

# OPERATING INSTRUCTIONS



The oscillating and rotating sieve mill

## OscilloWitt-3

Customer:

**NOVARTIS  
SINGAPORE  
PHARMACEUTICAL  
SG-Singapore**

Ref. :

**PRO-14-0055**

Serial Nr:

**140055-254**

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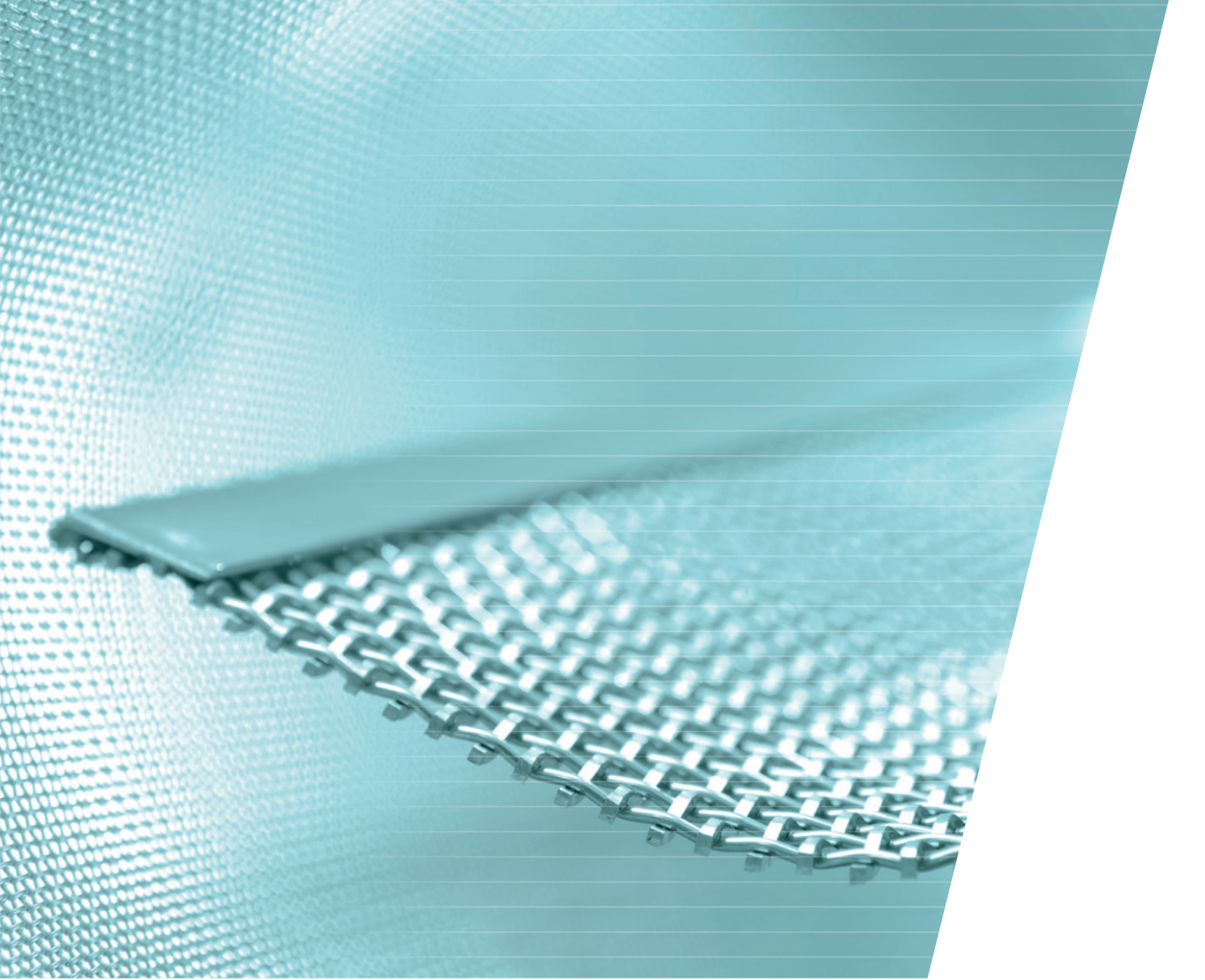
Quality Certificate ISO 9001 / ISO 14001  
Test protocol Profitest 60204  
FAT Protocol

**15 Qualification and Validation IQ/OQ**

Related documentation

# OVERVIEW





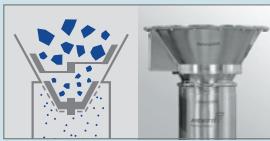
## **OscilloWitt 3-6**

*The oscillating and rotating sieve mill for gentle size reduction of heat-sensitive and difficult products in the pharmaceutical, fine chemical and food industries*

# OscilloWitt 3-6

## Milling process

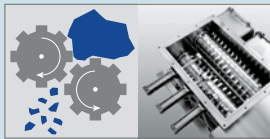
### DelumpWitt



Particle size

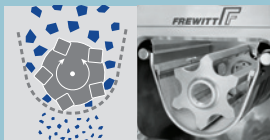
60 cm  
500 µm

### Crusher CC-310 • CCD-450



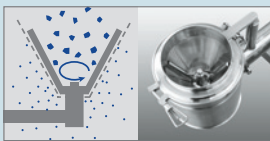
30 cm  
2 cm

### Oscillating sieve mill OscilloWitt 3-6



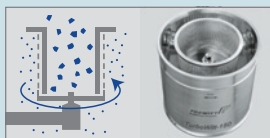
5 cm  
250 µm

### Conical sieve mill ConiWitt 150-200-250 • TC-Lab



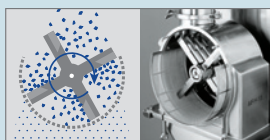
2 cm  
150 µm

### Rotary sieve mill TurboWitt C20-C25



1 cm to 1 mm  
150 µm

### Hammer mill MFH-6 • MFH-15 • HammerWitt-Lab



1 cm  
30 µm

## Excellent for narrow grain size spectrums and the grinding of heat sensitive products

The oscillating and rotating sieve mills of the OscilloWitt series are especially suited for the size reduction of heat-sensitive products and products that are difficult to process.

The OscilloWitt has been fundamentally redesigned and this results in a substantial increase in utility. The product is gently reduced in size through the infinitely adjustable oscillating or rotating rotor movement, the ever-constant speed and the force exerted. During the milling process, the granules are gently moved through the sieve openings, which reduces the heating of the product to a minimum.

### The advantages are obvious

- The milling process can be optimised in either rotating or oscillating mode.
- The rotor speed is infinitely adjustable.
- The intelligent design reduces the number of moving parts as well as their weight to a minimum.
- The discharge plate can be replaced without removing the inlet funnel.
- Homogeneous interior of the mill, easy cleaning, no cracks.
- Inlet funnel with a Tri-Clamp connection.
- The outlet funnel is seamlessly integrated into the milling chamber preventing accumulation of the product.

### Wide range of applications

It functions as a stand-alone system and can be easily integrated into production facilities.

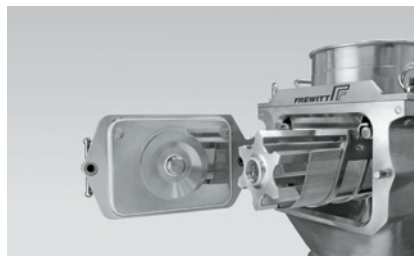
The OscilloWitt is primarily used for sophisticated milling of products that are difficult to process in the pharmaceutical, fine chemical and food industries.

The large swing front doors allow user-friendly installation and removal of the sieve, rotor and rigid screen support.

The innovative door guide and continuous door seal permits the OscilloWitt to be used at the highest containment level (tightness).



## The OscilloWitt sets new Standards



The OscilloWitt consists of a rotor, sieve, sieve tensioner or rigid screen support. The oscillating or rotating cyclical movement causes the passage of the product through the sieve. The functionality of the OscilloWitt and the applied use of the milling forces are particularly suited to the gentle milling of products that are heat-sensitive and difficult to process, and the production of narrow grain size spectrums tolerances without fine materials.

- 1 Oscillating or rotating rotor
- 2 Various sieve inserts for dry or wet milling (round wire/square wire/rasp and perforated plate)
- 3 The sieve can be tensioned directly by using a sieve tensioner (classic mode of operation)
- 4 Rigid screen support for adjusting the distance between rotor/sieve
- 5 Security check at the inlet funnel (cables laid internally)
- 6 Milling area with optimised surface and front access for easy handling and easy cleaning.

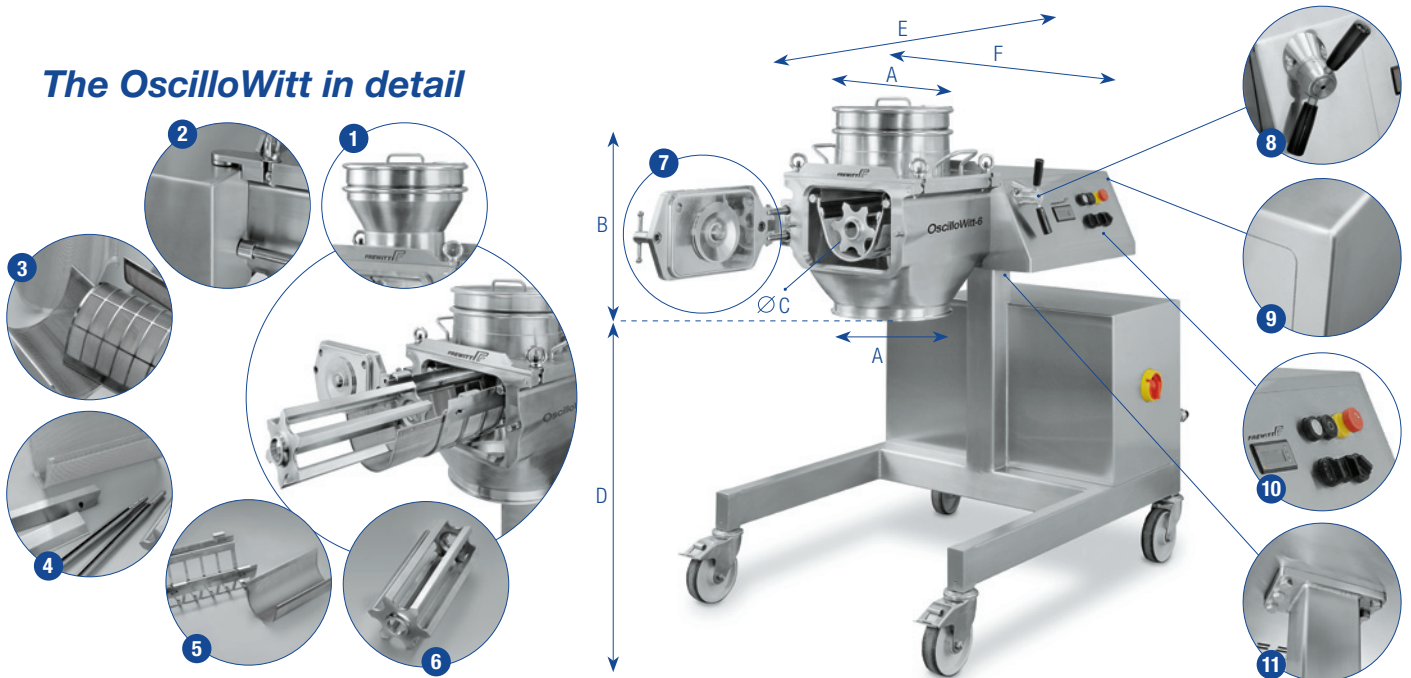
### Milling forces



Comminution in the OscilloWitt is achieved primarily by shearing and comminution of the particles between the sieve and the oscillating or rotating rotor at a relatively low level of force.



## The OscilloWitt in detail



### OscilloWitt at a glance

- 1 Inlet funnel with a protective grill
- 2 Security check at the inlet funnel and doors (default) no external cable
- 3 Large selection of different sieve types (round wire/square wire/rasp and perforated plate)
- 4 Sieve tensioner for direct tensioning of the sieve (classic mode of operation)
- 5 The use of the rigid sieve support and the correct adjustment of the distance between the rotor and sieve prevents contact between metal parts
- 6 Rotor with six arms
- 7 O-ring seal on doors for highest level of containment
- 8 Relevant process parameters can be seamlessly documented
- 9 No screws on the cover
- 10 LCD speed display in m/s
- 11 Easy attachment
  - Sieve with round wire for the size reduction of products that are easy to break down
  - Sieve with square wire for hard products
  - Fine sieves for wet grinding
  - Multi-function mill thanks to quick setting of the milling process to oscillating or rotating

Installation	B	C	D	E	F	A - INFEED	A - DISCHARGE	
OscilloWitt-3	477.5	∅Rotor=160	1000.5	1304.39	888	∅213.9	∅213.9	
OscilloWitt-6	472.5	∅Rotor=160	1015.5	1304.39	888	∅315.9	∅315.9	
Installation	Flow rate*		Voltage		Speed		Power	Net weight
OscilloWitt-3	600 kg/h		400V – 50Hz		0 – 1.35 m/s		1.8 kW	340 kg
OscilloWitt-6	1000 kg/h		400V – 50Hz		0 – 1.35 m/s		1.8 kW	370 kg

\* The throughput is dependent upon the product and grain size.

## Advantages

### Ergonomic and easy to use

- Modular, compact design
- The rotor, sieve and rigid screen support can be installed and removed in only a few simple steps due to the large, swinging front doors
- With a few simple steps it is tightly closed in a few seconds, thanks to optimal closures
- All relevant process parameters can be read and documented (distance between rotor/sieve, product temperature, rotor speed, etc.)
- Installation through the wall (clean room)
- On a mobile base, if required

### Cleaning according to the strictest health standards

- SIP sterilisation is possible
- The milling head is made of AISI 316L stainless steel. The ground, homogeneous surfaces support the smooth and residue-free flow of the product
- The OscilloWitt meets the requirements both for "Washing in Place", (WIP) and those for CIP cleaning
- Fast, safe cleaning, thanks to internal routing of cables
- Pressure shock resistant design possible
- Improved sealing through continuous seals and an integrated outlet funnel

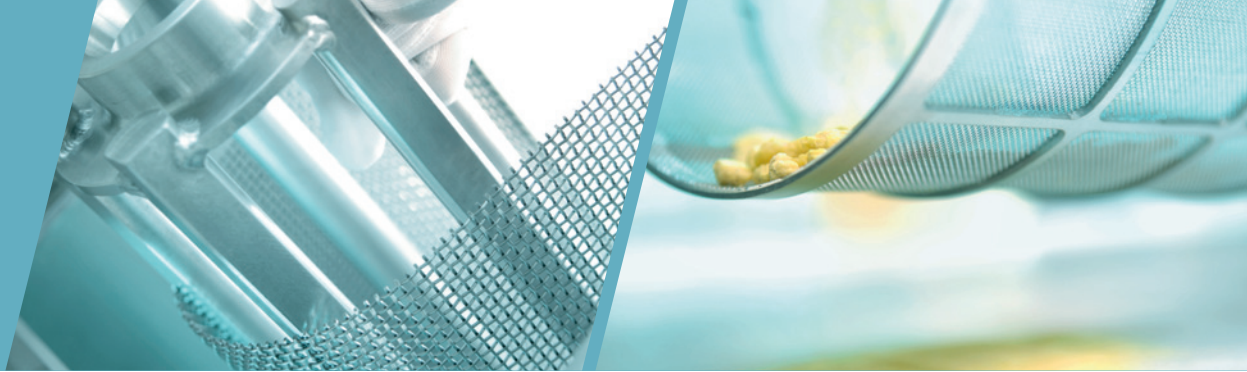
### Less maintenance and greater workplace safety

- Simple, intuitive, low maintenance construction
- International Customer Service
- Quick delivery service of spare parts
- Security check at the front door and hand protection at the outlet
- ATEX to zone 0/20 inside, zone 1/21 outside is possible
- Rotor/sieve speed control (from 0 to 1.35 m/s)



Only use original wear and spare parts from Frewitt. The use of non-original Frewitt parts can lead to dangerous situations that may result in an explosion or injury and therefore invalidates the ATEX certificate.





## High flexibility and optimal results in size reduction

- With a few simple steps, the specific exchange of sieves can be carried out through the large, swinging front doors, so the milling process can be adjusted for dry or wet milling.
- Thanks to a large selection of sieves, as well as setting the rotor to oscillating or rotating, the grinding process can be adjusted to suit every conceivable product.
- The adjustable speed/oscillation prevent heating of the product.
- Consistent processing of the product can be ensured thanks to the LCD speed setting m/s.
- Using the new technology in rotor movement; the ever-constant speed and the large active sieve surface, the product is gently processed, thus the percentage of fine materials remain very small.
- The OscilloWitt can be used as a stand-alone system and, thanks to the new design, it integrates more easily into a production facility.
- Head and the motor are built separately, which allows installation through the wall (clean room).

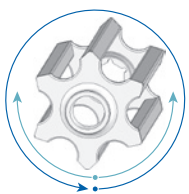


Construction	Parts in contact with the product	Parts not in contact with the product
Metals	1.4435 / 1.4404 (AISI-316L)	1.4301 / 1.4305 (AISI-304)
Seals	FDA compliant plastics (EPDM / PTFE)	Various plastics
Surface finish	Ra ≤ 0.8 µm polished / Head Ra ≤ 0.4 µm polished	Head Ra ≤ 1.4 µm polished
Weld seams	Ground und polished	Treated and brushed
Rotor	Rotor with 6 arms	
Sieve types	Dry milling: round or square wire/wet milling: fine sieve, round wire	
Distance rotor / sieve	Adjustable via locking mechanism	
Rotor speed	Infinitely adjustable	

## Options for custom-made solutions

Inlet funnel		Outlet funnel	
<b>Silicone collar</b>	<b>Compensator</b>	<b>ProFi-Bant (Holding Device pneumatic)</b>	<b>ProFi-Lun (Holding Device manual)</b>
OscilloWitt-3    ∅250/315	DN 100    DN 250	OscilloWitt-3    DN 200/300	OscilloWitt-3    DN 200/300
OscilloWitt-6    ∅315	DN 150    DN 300	OscilloWitt-6    DN 200/300	OscilloWitt-6    DN 200/300
	DN 200		

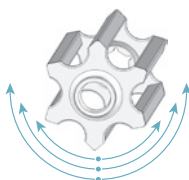
### Control options



#### Option: Pack 1

- Variable rotation / oscillation speed
- Switching from rotation to oscillation

Oscillation with a superimposed light rotation ensures that the rotor is used uniformly on all sides. Thus a longer operating life is possible.



#### Option: Pack 2

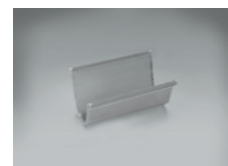
- Changing the oscillation amplitude via a potentiometer
- Greater angle in the milling area

Oscillation with a superimposed light rotation ensures that the rotor is used uniformly on all sides. Thus a longer operating life is possible.

### Type of tools



Sieve insert with a rigid screen support



Sieve insert with direct sieve tensioner

- On a mobile base
- SIP sterilisation is possible
- Pressure shock resistant design
- Speed control (from 0 to 1.35 m/s)
- ATEX to zone 0/20 inside, zone 1/21 outside is possible



## A particle sizing system in universal application

The redevelopment of the OscilloWitt makes "Frewitting", even more successful. Both dry and wet products, as well as those that are heat-sensitive and difficult to process, can be reduced in size and dosed through the oscillation or rotation of the rotor.

The OscilloWitt can be used for the production of small quantities, as well as for large-scale production in batch or in-line operations, as standard or customized execution in the pharmaceutical, fine chemicals and food industry.

The OscilloWitt is reliable in processing and fast in processing, protecting the user, as well as the product and also ensures a reduction in production costs. The OscilloWitt - a sieve mill of a very special kind, able to grow with your needs.



Stand-alone OscilloWitt in ATEX construction



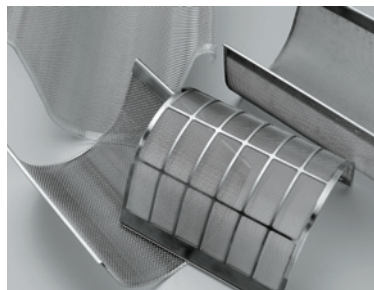
Can be integrated into installation with the DelumpWitt crusher module



Quick and easy handling of the OscilloWitt is ensured thanks to the large front door



OscilloWitt with LCD speed display

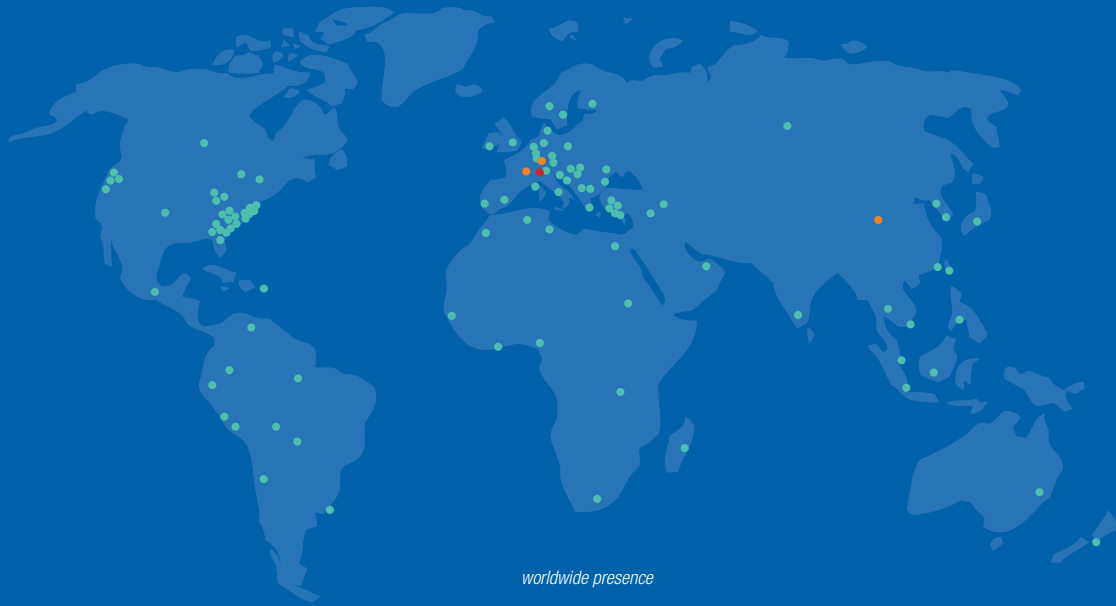


Various sieve inserts for dry or wet milling (round wire/square wire/rasp and perforated plate)



OscilloWitt integrated into the process flow

Thanks to the modular design of the OscilloWitt, it can be integrated quickly and easily anywhere. Call us to discuss your application.



worldwide presence

References

AstraZeneca AB  
 Bayer AG  
 BASF AG  
 Sandoz GmbH  
 Ciba Spezialitätenchemie AG  
 Cilag AG  
 Clariant International Ltd

Colman's of Norwich  
 DE-VAU-GE Gesundkostwerk GmbH  
 Dollis France and Italy  
 F. Hoffmann-La Roche AG  
 Ferring International Center SA  
 Firmenich SA  
 Sanofi-Aventis Deutschland GmbH

McCormick  
 Natura Cosmetica  
 Nestlé SA  
 Novartis Consumer Health SA  
 Novartis Crop Protection AG  
 BASF Monthey SA  
 Reckitt & Colman (Unilever)

Schering AG  
 Siegfried CMS AG  
 UCB Farchim SA  
 Uelzerna Milchwerke eG  
 Ultra Precision SA  
 ect.



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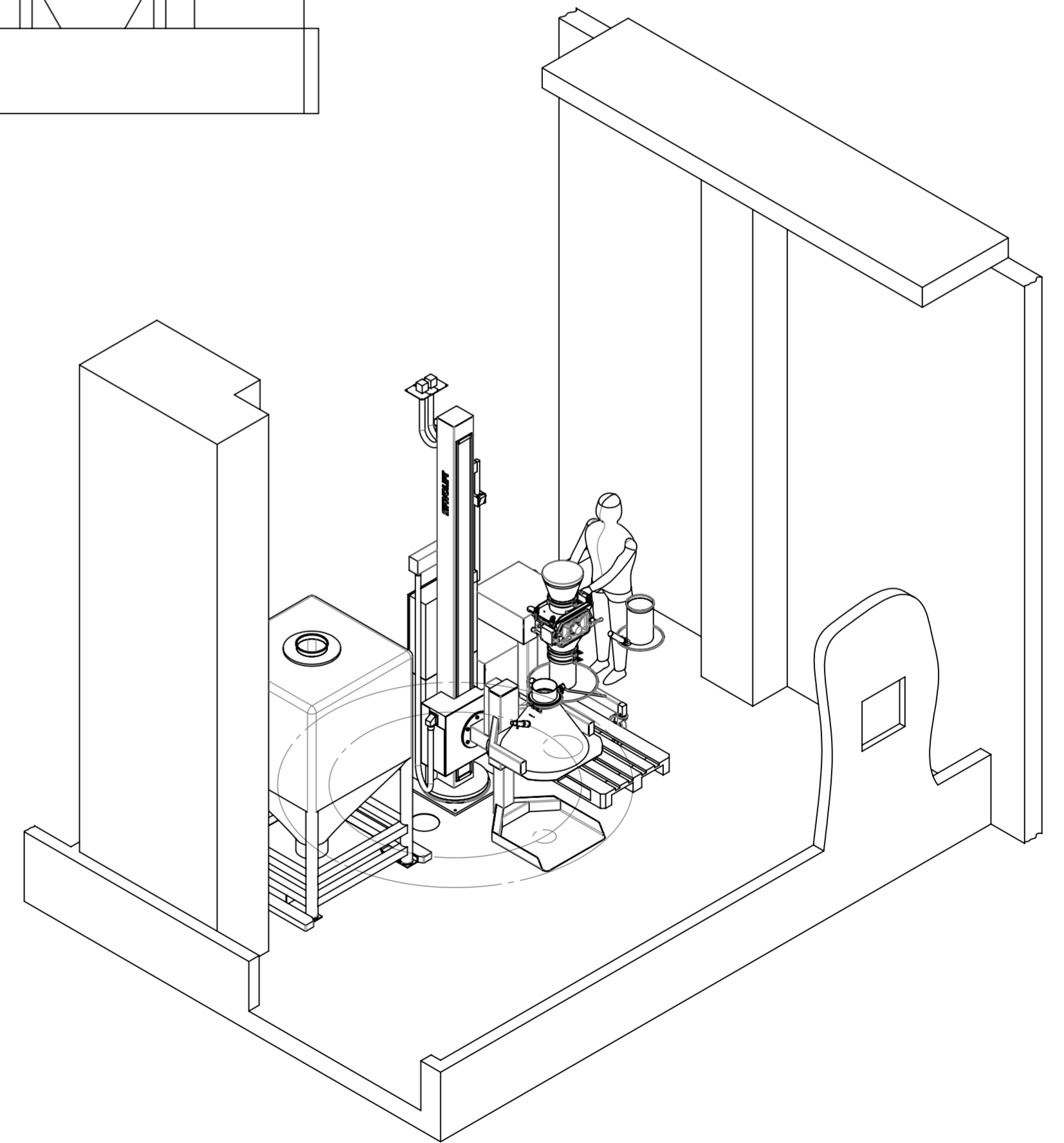
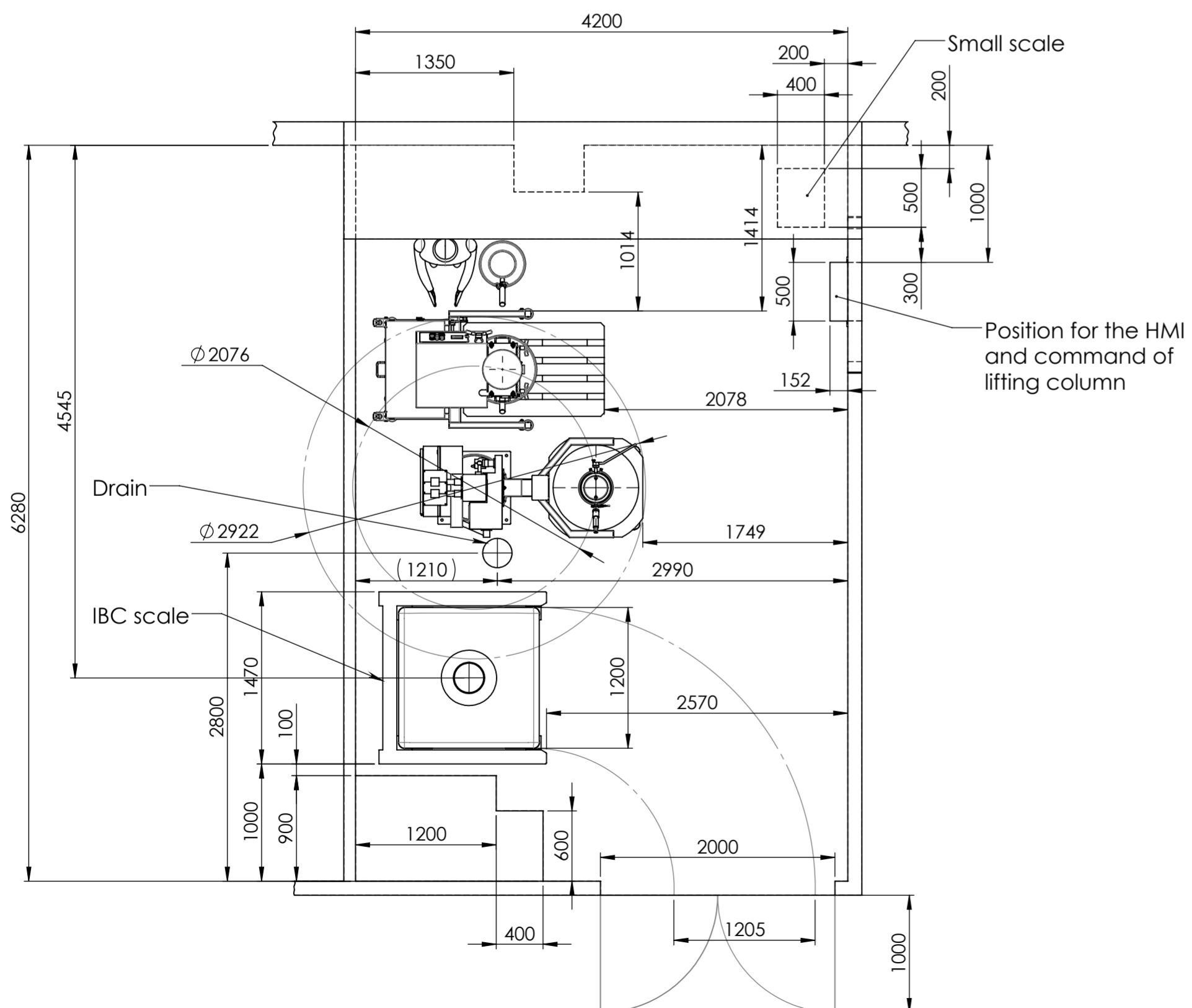
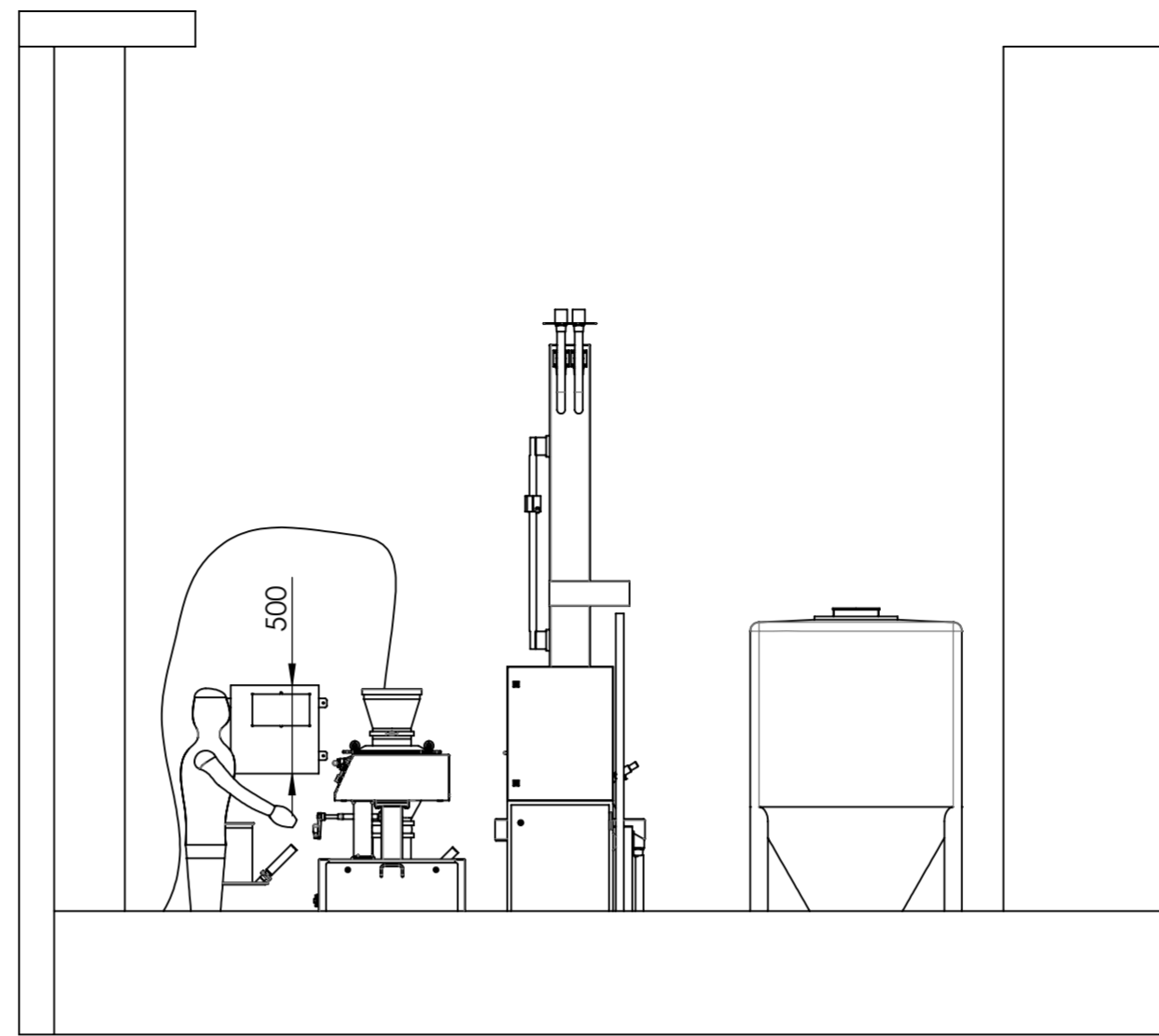
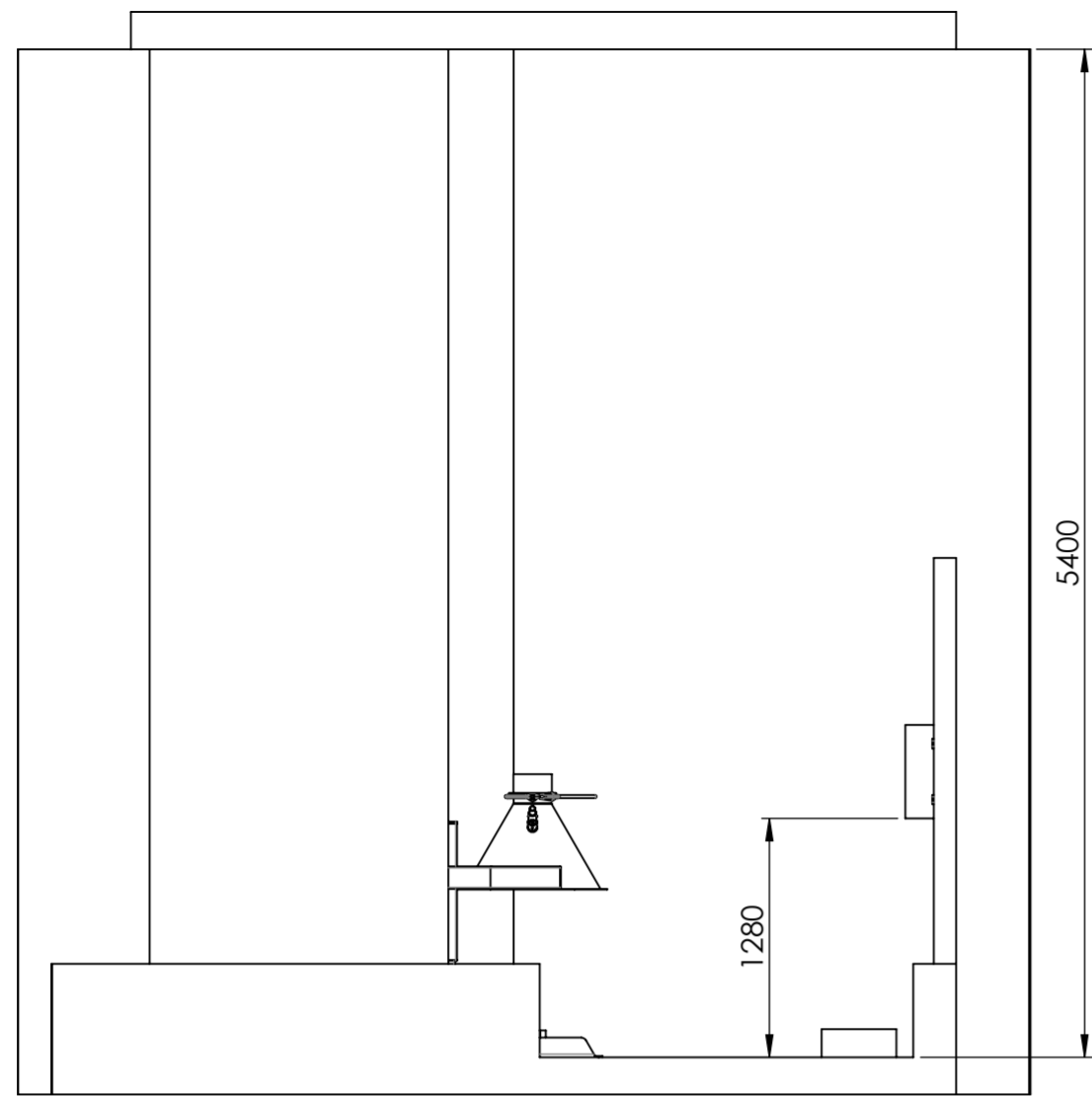
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OscilloWitt PRO-14-0055, Layout		scale %	Designed	18/06/2014	edgu
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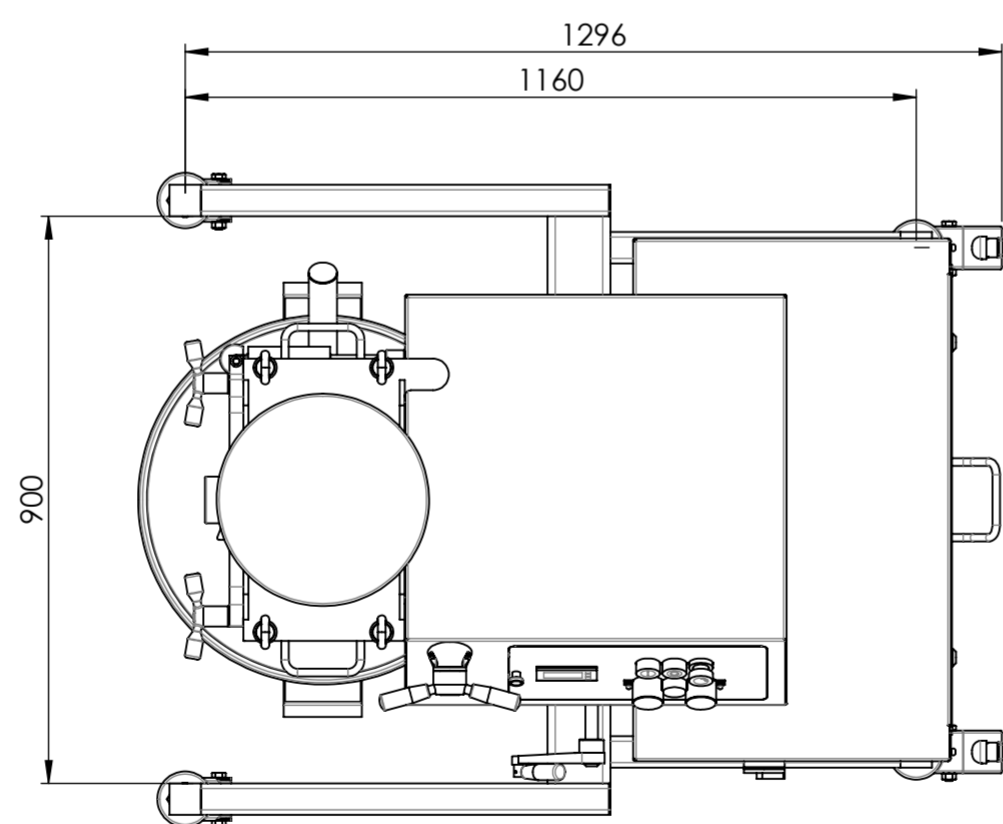
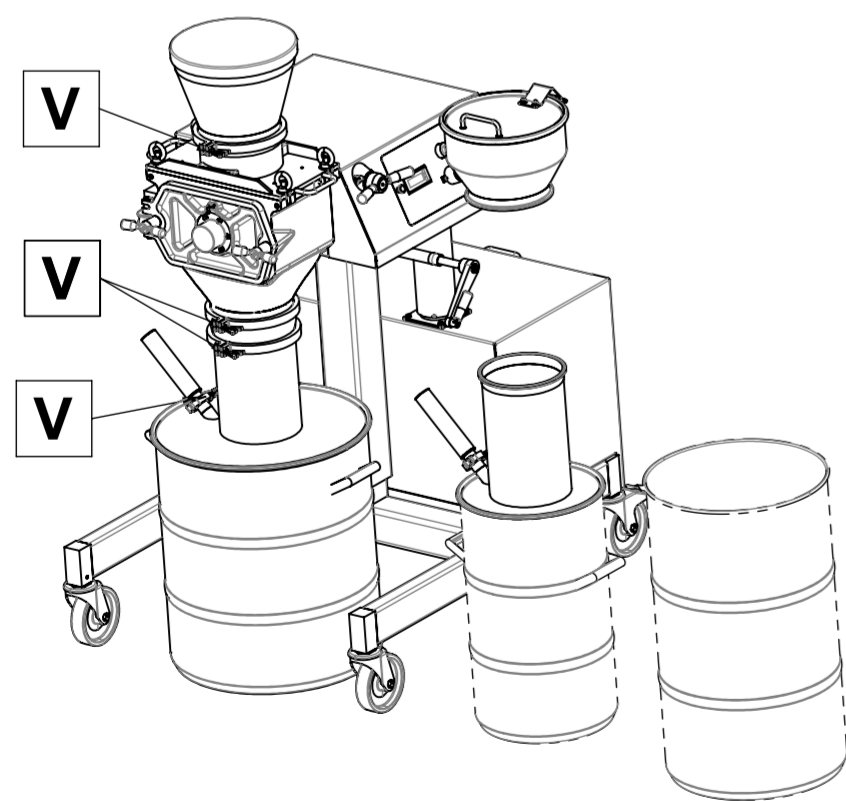
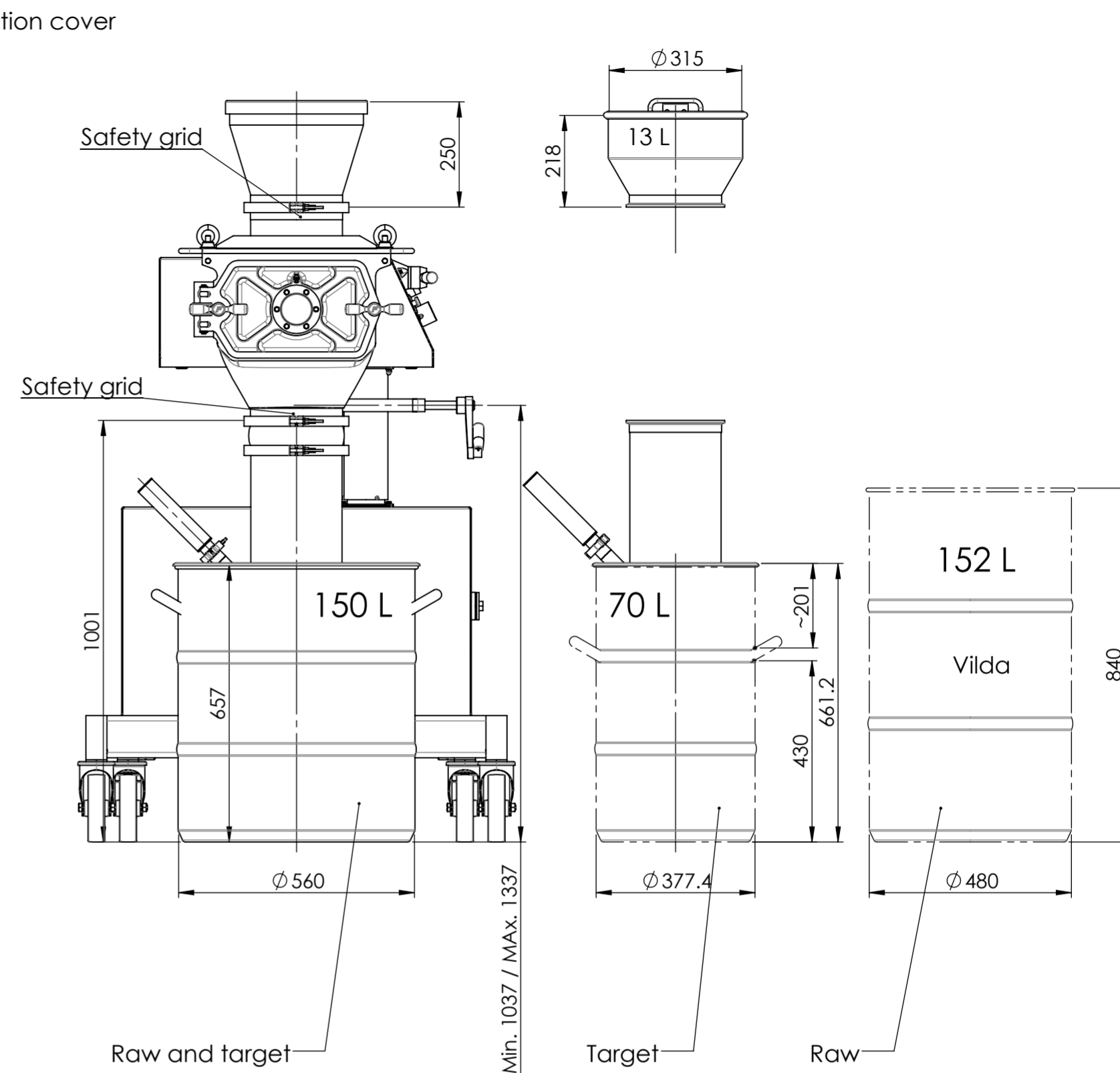
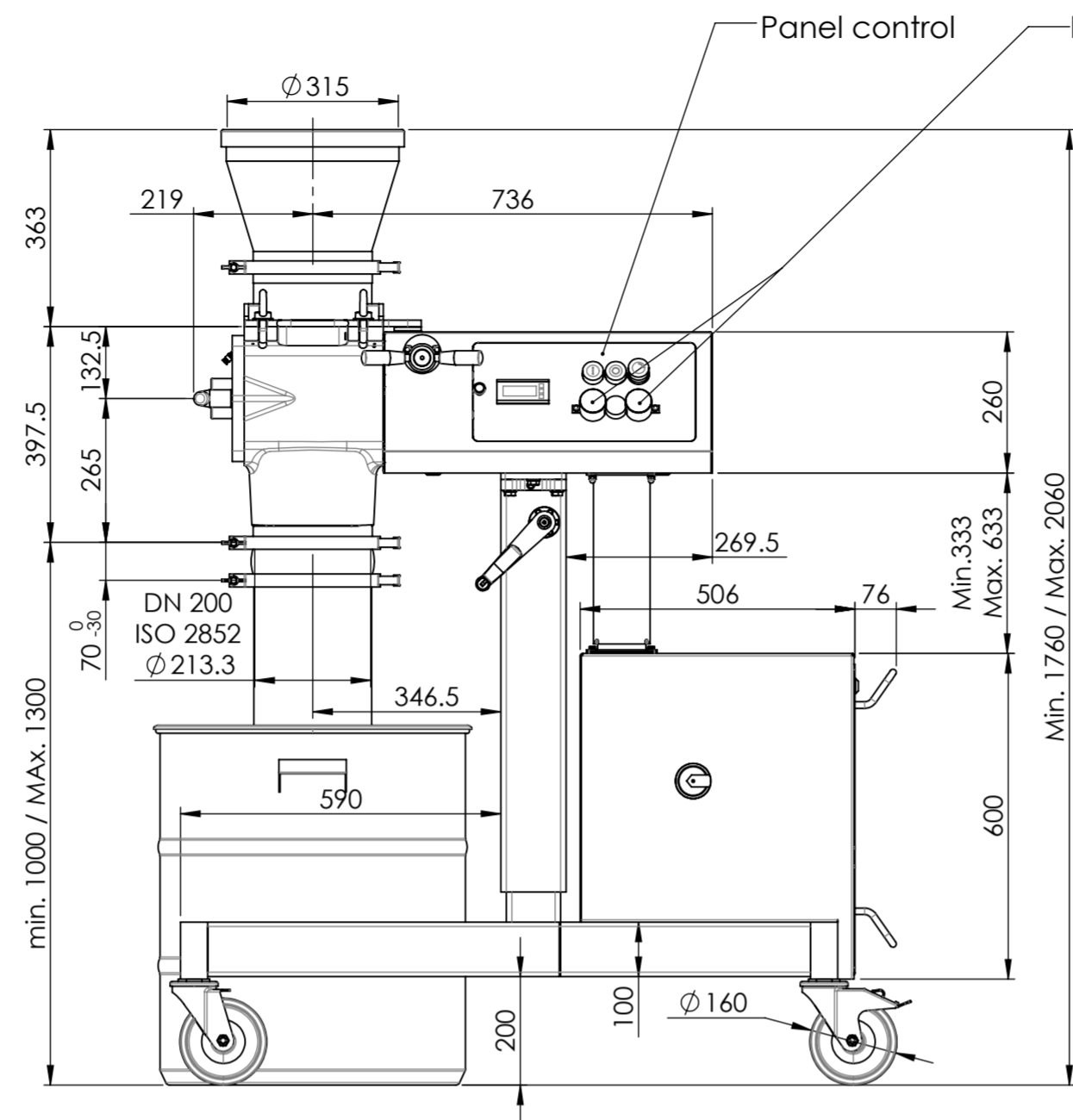
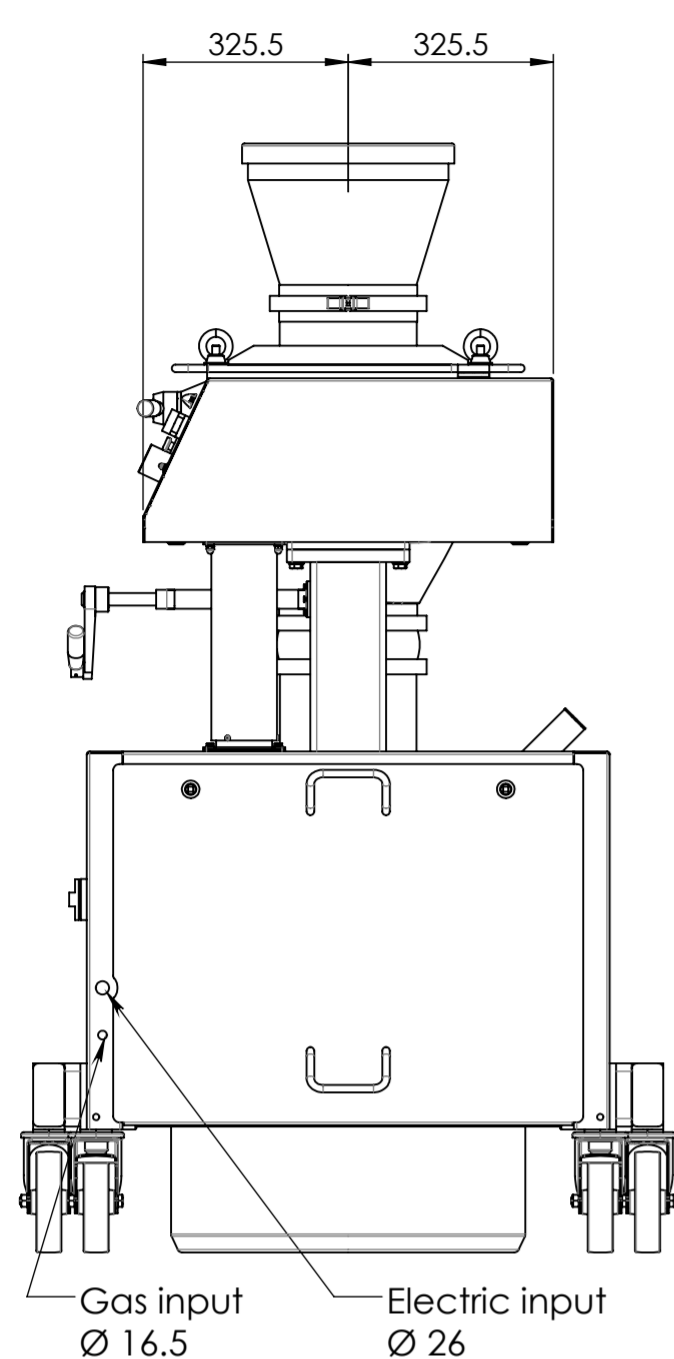
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.

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**FREWITT**

**475077-LAY**





Sous réserve de modifications  
Subject to modifications  
Änderungen vorbehalten

## SG.TBP.202.M.5236

Symbol	Description
V	Ecrou à ailette / Flügelmutter / Wing nut
S *	Ecrou de sécurité / Sicherheitsmutter / Safety nut
6	Ecrou hexagonal / Sechskantmutter / Hex nut

\* Voir chapitre 3 - Directives générales de sécurité  
\* Sehen Kapitel 3 - Allgemeine Sicherheitsrichtlinien  
\* See chapter 3 - Security guidelines

Network (V)	400
Rated torque (Nm)	10
Frequency (Hz)	50
Speed (m/s)	0.02 - 1.00
Serial Nr	140055-254
ATEX category (int.)	1 GD
ATEX category (ext.)	3 D

PRO-14-0055 / OscilloWitt-3

scale %  
Designed 19/03/2014 tgr  
Controlled 16/09/2014 edgu  
Revised 16/09/2014 edgu  
Page 1/1  
Ver. B



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474201-LAY





# Name plate







2

Customer :

Serial Nr :

**Novartis Pharma  
SG-Singapore**

**140055-254**

Swiss Made				CH-1763 Granges-Paccot SWITZERLAND	
Type	OscilloWitt-3	Year :	2014	Serial Nr:	140055-254
Network :	400 V	Frequency :	50 Hz	Amp. :	16 A
int.		1258		II	1 G c IIB T4 X 1 D c IIIC T125°C X
ext.				II	3 D c Ex tD IIIC T125°C X
Please read the user manual before start-up !					



# **SAFETY**



## Safety

In order to use the installation in a completely safe manner, it is indispensable to follow the instructions stated in these operating instructions. All safety parts protecting either the operators and/or the machine (such as safety switches, safety grids, etc...) must not in any case be dismantled, modified or bypassed. Follow specifically the guidelines indicated by the following symbols:

## Symbols

The following symbols are employed to provide practical guidelines regarding safety and operation of the installation. They advise the user against possible accidents to both person and equipment and provide practical guidelines for the use of the installation.



**Danger:** This symbol warns you regarding mortal danger or serious injuries. These types of accidents may be produced when the directions within these operating instructions are not strictly or only partially followed.



**Warning:** This symbol warns you about a potential risk regarding injuries, installation damage or other serious damages. An accident can occur if the directions in the operating instructions are not or only partially followed. Disregard of these may cause the manufacturer's warranty to be void.



**Risk of generation of electrostatic charges:** This symbol warns you about a risk of fire or explosion that may be generated due to electrostatic discharges. This risk can be substantially decrease by following the directions provided in these operating instructions step by step.



**Recommendation:** This symbol provides you with complementary indications about installation allowing an optimum use of your installation.



**Maintenance:** Maintenance or development jobs that are represented by this symbol should only be carried out by qualified maintenance personnel that have the specific skills to do so, and have read these operating instructions. They should only use specific tools designated for this purpose.



**Danger cutting hazard:** This symbol alerts you that there is a risk of serious injury in case of contact with the moving rotor. Please always wait until the rotor stops completely before reaching inside the housing.

## Operators and maintenance staff

Operators and maintenance staff should provide themselves with appropriate personal protection and have prior knowledge of the directions contained within these operating instructions for every use and maintenance intervention.

The start-up of the installation should only be carried out by personnel specifically trained for such purpose. Work on electric components should be carried out only by qualified and trained staff.

Initial adjustments are carried out in the factory. In normal operation mode, installation only requires the supervision of the operator.

Regarding cleaning and maintenance tasks, these should be only carried out by personnel authorized and trained for such activity. The directions provided in these operating instructions should be carefully followed.

In order to avoid any risk of getting trapped or caught up in the machine, users of the installations shouldn't wear baggy clothes. Long hair should be tied back or retained in a proper way (net, rubber band, etc.)

The safety nuts may only be unscrewed during cleaning or maintenance work. Only properly trained cleaning and maintenance staff may have access to the special tools required for the safety nuts

### Electrostatic charging hazards

Incorrect earthing may lead to electrostatic charging, which could cause an explosion. Earth connections must be checked regularly.

### Electrical hazards

In the event of contact with live or current-carrying parts, there is a risk of electrical discharge which could cause serious injury or death. Never touch damaged cables. Before carrying out any maintenance work on the electrical equipment, the installation must be turned off and disconnected from the power supply. Replace defective cables or fuses immediately.

### Compressed air hazards

The release of compressed air gives rise to a mechanical risk of injury, particularly for the eyes but also for the ears. When handling the pneumatic system, wear glasses and ear protection. When servicing the compressed air system, the main inlet for the compressed air must be closed and the system cleared using a discharge valve. The pneumatic oil is toxic. Do not ingest. Avoid contact with the eyes and mucous membranes. Beware of ejection and oil residues.

### Product hazards

These operating instructions are only concerned about the installation's operation and use. The specific risks resulting from the products to be transformed are not included in these operating instructions and should be discussed separately. The person responsible for the installation should state clearly in his/her own operating instructions the risks and safety instructions inherent to the products to be transformed. Operators should follow these indications carefully.

### Residual risks

Residual risks are those unforeseeable risks that, despite proper safety precautions, cannot be excluded when using the installation. These residual risks are not easy to detect and may be a possible health hazard, related to injuries or danger (see European standards EN ISO 12100-1, paragraph 4). If such a risk arises, the installation should be switched off immediately and the person responsible for the installation should be advised. He/she should apply all appropriate measures in order to definitely avoid these risks. In all such cases the manufacturer should always be informed.

### Other risks

The installation under operation can have a high noise level. When operating the installation, wear ears protection.

### Integration

If the installation of Frewitt has to be integrated in a final installation, the user should ensure that the proper safety systems are operational in order to avoid the introduction of members at the fragmentation zone near the installation's inlet-outlet.

### Warranty Limit

The warranty of Frewitt is valid in so far as the installation is operated within the technical limits, conditions and applications stated in the customer specifications and confirmed by Frewitt. The warranty of Frewitt is not valid if the customer or the user does not comply with operating instructions and/or if modifications are done without the written consent of Frewitt.

### Limitation of responsibility of the product manufacturer

Frewitt provides an installation that complies with CE standards regarding safety or the applicable standards in the destination's country. Any damage to people, material and merchandises belonging to the user or a third party due to the use or maintenance of the installation is the exclusive responsibility of the customer, respectively the user.

## Emergencies

In the event of an accident involving injury, immediately apply recognised first aid procedures and inform the medical personnel.

## Information about explosives zones

Since a dangerous, potentially explosive atmosphere may not exist all the time within an area with an explosion hazard, these areas are divided into zones, according to the probability of the dangerous atmosphere being present. Here an extract of classification.

Gases, vapors, mists

Ex zones	Covers areas in which a dangerous, potentially explosive atmosphere is ...	We are in general...	Operation without effective ignition source.
<b>Zone 0</b>	Present continuously or for lengthy periods. [> 1000 hours/year]	Only inside containers or the space inside apparatus.	<ul style="list-style-type: none"> <li>- Fault-free operation</li> <li>- Rare operational faults</li> <li>- Frequent operational faults</li> </ul>
<b>Zone 1</b>	Present occasionally. [10 - 1000 hours/year]	The immediate surroundings of zone 0, of loading openings, filling/emptying devices, etc.	<ul style="list-style-type: none"> <li>- Fault-free operation</li> <li>- Frequent operational faults</li> </ul>
<b>Zone 2</b>	Present infrequently and then only for a short time. [<10 hours/year]	The areas surrounding zone 0 and 1 or around flange connections.	<ul style="list-style-type: none"> <li>- Fault-free operation</li> </ul>

Dust

Ex zones	Covers areas in which a dangerous, potentially explosive atmosphere is ...	We are in general...	Operation without effective ignition source.
<b>Zone 20</b>	In the form of a combustible cloud of dust in the air. Present continuously or for lengthy periods. [> 1000 hours/year]	Only inside apparatus, containers (mills, dryers, mixers), piping	<ul style="list-style-type: none"> <li>- Fault-free operation</li> <li>- Rare operational faults</li> <li>- Frequent operational faults</li> </ul>
<b>Zone 21</b>	In the form of swirls of deposits dust. Present occasionally. [10 - 1000 hours/year]	In surrounding area e.g. by dust removal or at filling stations or areas of dust deposits.	<ul style="list-style-type: none"> <li>- Fault-free operation for whirled-up dust</li> <li>- Rare operational faults for dust deposits</li> </ul>
<b>Zone 22</b>	Present infrequently and then only for a short time [ <10 hours/year]	In areas in which dust may emerge from seals and from deposits.	<ul style="list-style-type: none"> <li>- Fault-free operation</li> </ul>

The installer or operator of an installation must judge whether there is an explosion hazard within an area, and make the zoning accordingly.

**For ATEX installations, refer to chapter "ATEX (EN 94/9/CE)"**





Type de machine / Maschinentyp / Type of machine: **OscilloWitt-3**

Appareil de mesure / Messgerät / Measuring unit : **Testo 815**

N° de série / Serien Nr. / Serial Nr. : **30811293/105**

Norme / Norm / Standard : **dBA (DIN 45635)**

#### Conditions de mesure

La mesure est faite:

- à 1 m
- à hauteur de la chambre de broyage
- avec l'outillage monté
- avec les accessoires montés
- à vide (sans produit)

#### Messbedingungen

Die Messung wird gemacht:

- bei einer Distanz von 1 m
- auf Mahlkammerhöhe
- mit montiertem Werkzeug
- mit montiertem Ein- und Auslaufzubehör
- Mahlkammer leer (ohne Produkt)

#### Measuring conditions

Measurement is made:

- at a distance of 1 m
- at height of milling chamber
- with installed tools
- with installed inlet and outlet accessories
- Milling chamber empty (without product)

Niveau sonore  
Geräuschpegel  
Noise level

**70 dBA**

**65 dBA**

Vitesse maxi  
Geschwindigkeit maxi  
Speed maxi

Vitesse mini  
Geschwindigkeit mini  
Speed mini



# START-UP



## Transport and handling

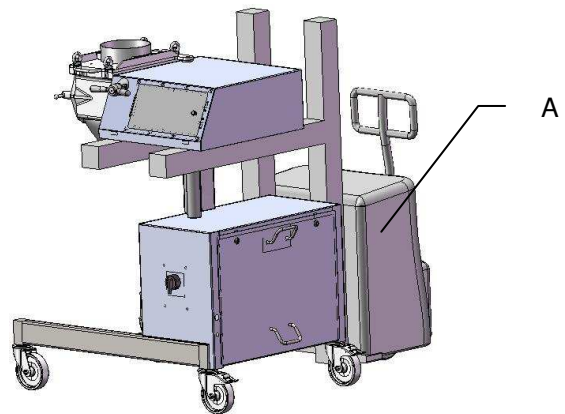
To ensure the safety of operators and the status of the installation during transport and handling operation the staff should :



- Have enough technical know-how as regards packing and handling.
- Have a detailed knowledge of safety prescriptions.
- Use transport and lifting gear for supporting installation's mass.

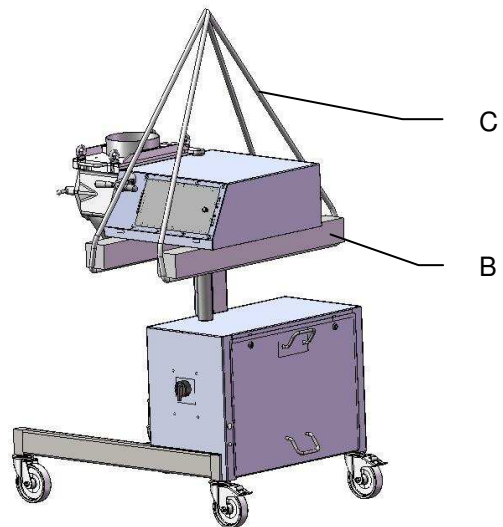
### Possibility 1

- Use a pallet truck (A)

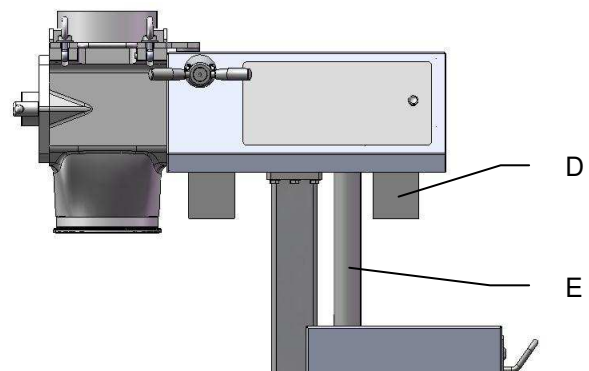


### Possibility 2

- Insert 2 beams (B)
- Pass the straps (C) under the beams



In both cases, the support (D) must be located as near as possible to the tube (E)





Avant la première mise en service, vérifiez les points suivants:

Prüfen Sie folgende Punkte vor der ersten Inbetriebnahme:

Before first start-up, check the following points:

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>- Contrôler visuellement l'état de l'installation.</li> </ul>   | <ul style="list-style-type: none"> <li>- Den Zustand der Anlage optisch kontrollieren.</li> </ul>   | <ul style="list-style-type: none"> <li>- Visually control of the installation status.</li> </ul>  |
| <ul style="list-style-type: none"> <li>- Contrôler la fixation de l'installation. (peut varier selon l'exécution de l'installation).</li> </ul>      | <ul style="list-style-type: none"> <li>- Die Befestigung der Anlage kontrollieren. (Kann je nach Ausführung ändern).</li> </ul>                         | <ul style="list-style-type: none"> <li>- Control installation fastening. (May vary according installation's execution).</li> </ul>                  |
| <ul style="list-style-type: none"> <li>- Contrôler le branchement électrique et pneumatique.</li> </ul>  | <ul style="list-style-type: none"> <li>- Kontrolle des elektrischen und pneumatischen Anschlusses.</li> </ul>   | <ul style="list-style-type: none"> <li>- Control electric and pneumatic connections.</li> </ul>   |
| <ul style="list-style-type: none"> <li>- Contrôler la mise à terre si nécessaire.</li> </ul>   | <ul style="list-style-type: none"> <li>- Die Erdung kontrollieren, sofern notwendig.</li> </ul>   | <ul style="list-style-type: none"> <li>- Control the grounding if necessary.</li> </ul>   |
| <ul style="list-style-type: none"> <li>- Si l'outillage est monté, contrôler que celui-ci est monté correctement selon chapitre 5.</li> </ul>        | <ul style="list-style-type: none"> <li>- Sofern die Werkzeuge montiert sind, kontrollieren, ob diese korrekt montiert sind, gemäß Kapitel 5.</li> </ul> | <ul style="list-style-type: none"> <li>- If tools are assembled, control that these are properly assembled according to Chapter 5.</li> </ul>       |
| <ul style="list-style-type: none"> <li>- Si les accessoires sont montés, contrôler que ceux-ci sont montés correctement selon chapitre 5.</li> </ul> | <ul style="list-style-type: none"> <li>- Wenn die Aufsätze montiert sind, kontrollieren, ob diese korrekt montiert sind, gemäß Kapitel 5.</li> </ul>    | <ul style="list-style-type: none"> <li>- If accessories are assembled, control that these are properly assembled according to Chapter 5.</li> </ul> |





Lors du branchement de l'installation au réseau électrique, contrôlez la tension qui doit correspondre à celle indiquée sur la plaquette signalétique.

Si le convertisseur de fréquences n'est pas fourni par Frewitt, se référer à la plaquette signalétique du moteur pour le paramétrer

Le sens de rotation de l'entraînement doit correspondre à la flèche se trouvant sur le bâti.

Votre installation est prévue pour

Beim Anschluss der Anlage an das Stromnetz ist die Spannung zu überprüfen. Sie muss mit den Angaben des Typenschildes der Maschine übereinstimmen.

Wenn der Frequenzumrichter nicht von Frewitt geliefert wird, verweisen wir für seine Parametrisierung auf das Typenschild des Motors

Die Drehrichtung muss mit dem Pfeil auf dem Gehäuse übereinstimmen.

Ihre Installation ist mit...

Check voltage before the installation is connected to the electric network. the voltage must be identical to the indication shown on the type plate.

If the frequency converter was not supplied by Frewitt, consult the plate on the motor to set it

The direction of rotation of the rotor motion has to correspond to the arrow shown on the housing.

Your installation is to supply with

**400V 50Hz / 3LNPE**

... zu speisen

Si les installations équipées d'un variateur de fréquence sont branchées sur un réseau électrique équipé d'un disjoncteur différentiel à courant de défaut, celui-ci doit être adapté (Type B).

L'installation ne peut en aucun cas être branchée directement au réseau électrique. L'utilisation d'un appareil de limitation de courant au démarrage est nécessaire comme par exemple un démarreur progressif.

Le courant de démarrage doit être limité à max. 160 % du courant nominal.

Wenn die Anlagen, die mit einem Frequenzumformer ausgestattet wurden, auf einem Stromversorgungsnetz angeschlossen werden, das mit einem Fehlerstromschutzschalter ausgestattet wurde, muß dieser angepaßt werden (Typ B).

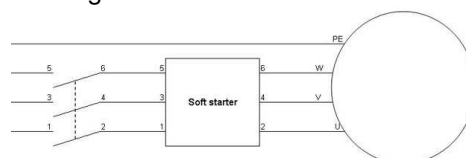
Die Anlage darf in keinem Fall direkt an das Stromnetz angeschlossen werden. Eine Anlaufstrombegrenzung, zum Beispiel ein Stufenanlasser, ist erforderlich.

Der Anlaufstrom ist auf max. 160 % des Nominalstromes zu begrenzen.

If the installations equipped with a frequency converter are connected to an electrical network including a residual current circuit-breaker, this one must be adapted (Type B).

Under no circumstances may the installation be plugged directly into the mains power supply. An inrush current limitation device is required, such as a progressive starter.

The starting current must be limited to max. 160 % of the nominal current.



Raccorder l'air ou l'azote. Afin d'assurer un bon fonctionnement des joints Garlock, la pression minimum requise pour l'inertage est de

Luft oder N<sub>2</sub> anschliessen. Um ein gutes funktionieren der Garlock Dichtungen zu gewährleisten, ist der erforderliche Mindestdruck für die Lager-begasung

Connect the air or N<sub>2</sub>. This is a must in order not to damage the Garlock bearing lip seals. Use a minimum of

**3 barg minimum**



# **OPERATING INSTRUCTIONS**



<b>Functional Design Specification</b>
--

Project PRO-14-0055  
 Novartis Singapore  
 NSPM MELT EXTRUSION LINE

OscilloWitt 3  
 SG.TBP.202.M.5236

ATEX Inside Zone 0/20  
 Outside Zone 22

Name	Signature Reason	Function/ Department	Signature	Date
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## Contains

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## Versions control

Date	Revision	Reason of change
05.09.2014	0	Initial Version

# 1 Introduction

## 1.1 Specifications

This document describes:

- the different parts of the OscilloWitt3 from Frewitt SA
- The functions of the Mill

## 1.2 Basic documents

This document is based on:

- Quotation Frewitt OFC-2679-2
- The P&ID drawing 474466
- Layout 475077
- 

## 1.3 Power requirements and Conditions

- Ex Zone : inside the OscilloWitt Zone 0+20, outside Zone 22,
- Electrical power feed: 400VAC, PE
- Control voltage 24VDC
- Pneumatic feeding: minimum 5 bar

## 2 Overview

### 2.1 Equipment

The OscilloWitt 3 consists of the following elements :

- Mill with inlet and outlet pieces
- Push button panel for Start/Stop Alarm and speed adjustment
- Electrical cabinet integrated on a mobile frame

#### Screen

- Aperture size 0.5 mm
- Round wire

#### Rotor

- Oscillation of rotor is adjustable step less. Setting of oscillation must be distinct and reproducible.
- Oscillation of sieving rotor: 56 – 164 Osc./min, limited to 1m/s.
- Tolerance: +/- 5%

For prevention of (cross) contaminations the mill will get a double-acting bearing flushing (compressed air), to efficiently prevent the penetration of dust, lubricants etc. through the shaft seal (rotor / driving unit).

Product contact parts material of construction shall be FDA compliant and suitable for Pharmaceutical applications. All product and cleaning fluids contact parts manufactured with AISI 316/316 L or equivalent with surface finish  $R_a \leq 0.8 \mu\text{m}$ . Non product metal contact surfaces in the production zone shall be AISI 304/304L with  $R_a \leq 1.2 \mu\text{m}$ .

Lubricants: Lubricated bearings for which an entry into the product may not be excluded absolutely e.g. oils/grease shall conform to FDA compliant food grade quality (for instance USDA class H1).

Maximal noise level during production in 1m distance shall not exceed 75 dB(A)

### 2.2 Functions

The following components are built in the OscilloWitt 3 to control the functions:

Main Switch  
Push button "Start"  
Push Button "Stop"  
Mushroom push button "Emergency stop"  
Potentiometer "Speed adjustment"  
Two Position switch " Oscillation/Rotation"  
White lamp "Start"  
Green lamp "Cooling and gas"  
Display "Speed"



## 2.2.1 Lamp functions

The operator gets the following information from the lamps:

White lamp "Start"                      Off : machine is stopped  
On: the machine is switched on  
Blinking: there is an error

Green lamp "cooling and gas"      Off: no cooling, machine off  
On: cooling on  
Blinking: there is an error

## 2.2.2 Conditions to start

Before starting it is needed to check the following points :

Main Switch activated  
All needed pieces installed  
E-stop not pressed  
Motor circuit breaker not tripped  
Safety switch inlet installed  
Safety switch door installed  
Pneumatic feeding installed

## 2.2.3 Function start

The machine is started with the following steps.

1. Start conditions fulfilled
2. If the white lamp is blinking reset the alarms by pressing to the "Stop" button
3. Press the start button
4. The valves for the cooling are switched on. The green and white lamp switch on
5. With a delay of 10 Seconds the mill starts to oscillate

## 2.2.4 Function stop

The started mill is stopped as follows:

1. The mill is started as shown in 2.2.3
2. Press the stop button
3. The motor is stopped, the valve are closed
4. The white and green lamp is switched off
5. The mill can be immediately switched on again by pressing the start button.

## 2.2.5 Function E-stop

1. The mill is started as shown in 2.2.3
2. Press the E-stop button
3. The motor is stopped, the valve are closed
4. The white lamp is blinking
5. The machine cannot be started
6. Reset the push button and press the stop button
7. The white lamp is off and the machine can be started again.

## 2.2.6 Alarms

The following events stop the machine with an Alarm

- a) White lamp blinking
  - 1. Safety switch inlet
  - 2. Safety switch door
  - 3. Motor circuit breaker
- b) Green lamp blinking
  - 1. Pressure switch air
  - 2. Pressure switch gas

## 2.2.7 Speed adjustment

The speed is adjusted with a potentiometer in the range of 0.02 – 1.00m/

## 2.2.8 Speed Display

The speed display range on the control panel is 0.02 – 1.00m/s

For using the OscilloWitt 3 with 80 Osc/min, the mill has to be adjusted to 0.37 m/s.

## 2.2.9 Speed Comparison OscilloWitt

	OW-3	OW-3
Rotor speed m/s	Oscillation / min	rpm
	Oscillation angle : 92°	
0.25	56	30
0.34	73	40
0.37	80	44
0.46	94	54
0.59	116	70
0.73	135	87
0.87	152	103
1.00	164	119

## 2.2.10 Oscillation / Rotation

With a two position switch operator can select between the oscillation movement and the rotation movement. Only when the machine is stopped a change of selection is possible.

Voir documents suivants.

Siehe folgende Dokumente.

See following documents

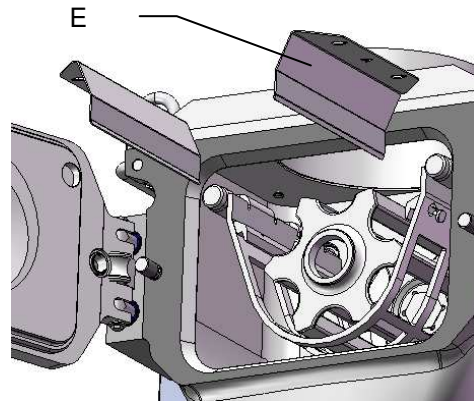


## Detaching the inlet accessory

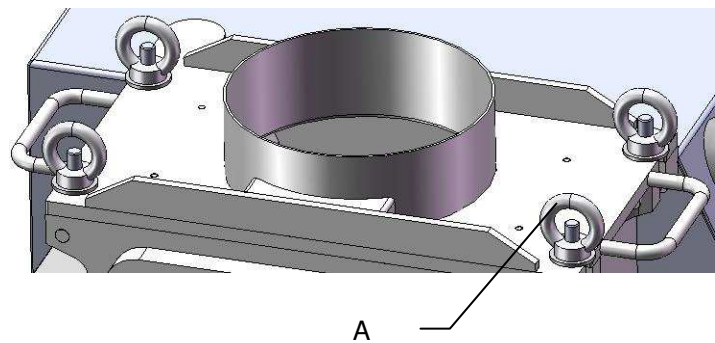


Before performing any work on this unit, it must be turned off and all electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product

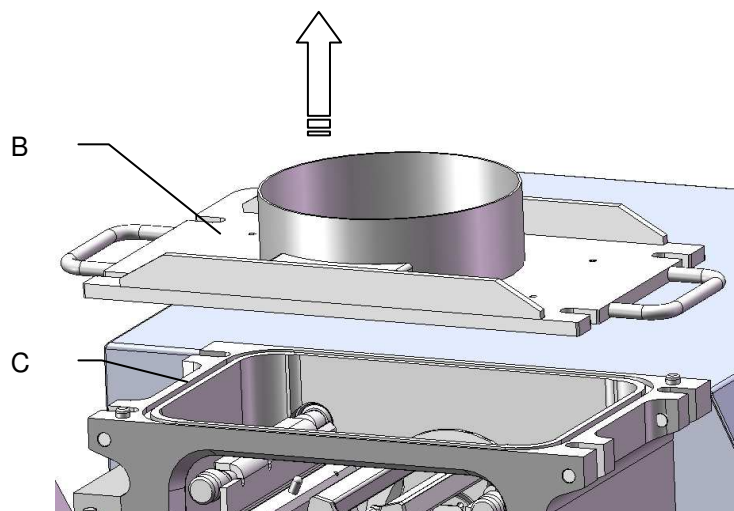
- Remove the deflectors (E), see chapter detaching the tools



- Unscrew the 4 nuts (A)



- Lift up and remove the inlet accessory (B)

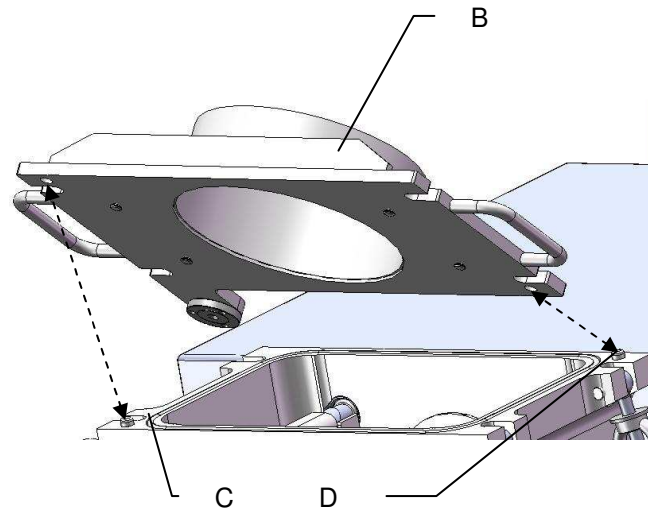


Do not lose the gasket (C)

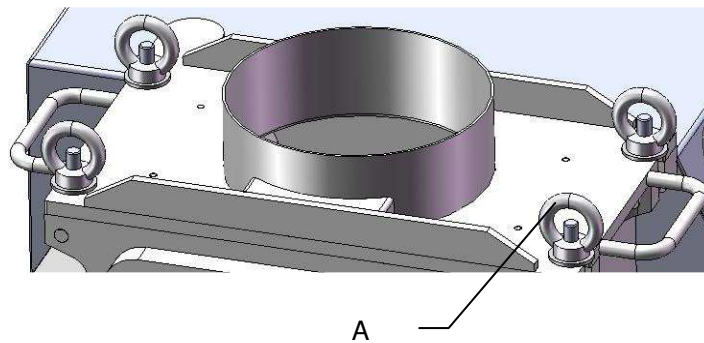
**Attaching the inlet accessory**

Before performing any work on this unit, it must be turned off and all electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product.

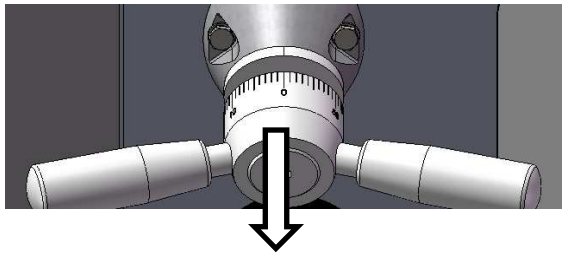
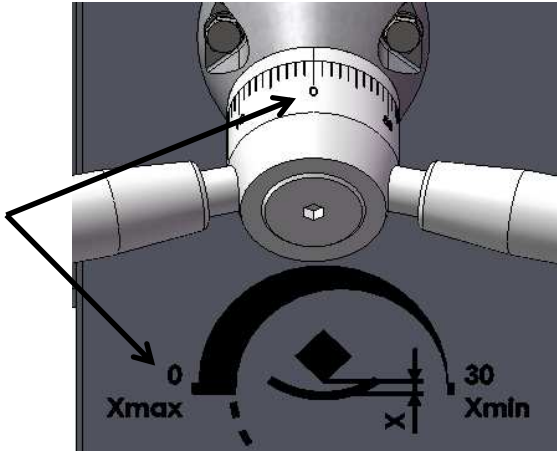
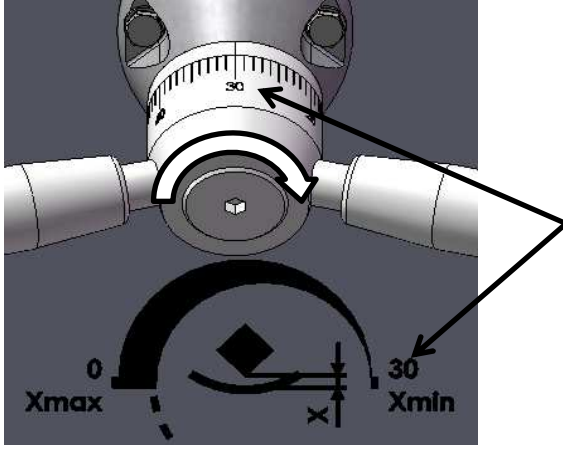
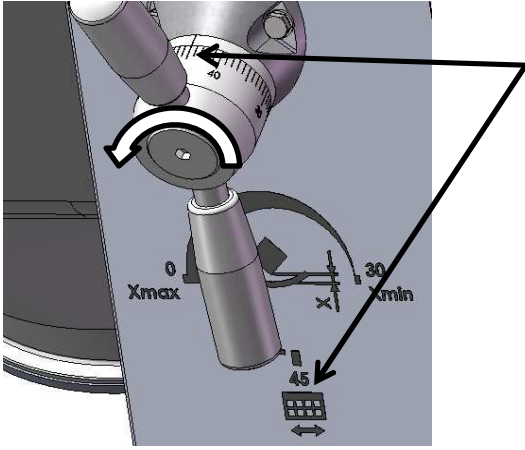
- Inspect the condition of the gasket (C) and replace it if necessary
- Center the inlet accessory (B) on the 2 pins (D)



- Screw on the 4 nuts (A)



**Adjusting the sieve-rotor distance**

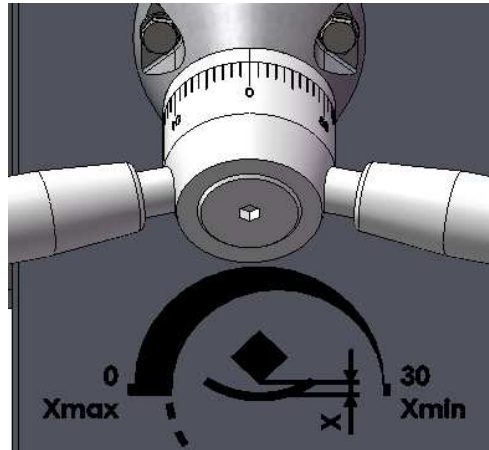
<ul style="list-style-type: none"> <li>- To change position, pull the wheel</li> </ul>	
<ul style="list-style-type: none"> <li>- Position 0 = maximum distance</li> </ul>	
<ul style="list-style-type: none"> <li>- Position 30 = minimum distance</li> </ul>	
<ul style="list-style-type: none"> <li>- Position 45 = recommended position for tool changing</li> </ul>	

**Adjusting the distance****Step 1**

- Tool must be installed on the installation

**Step 2**

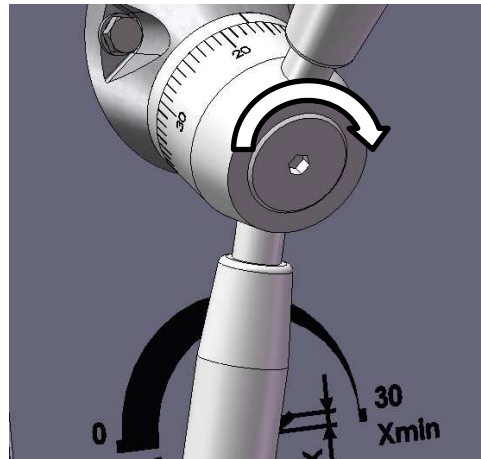
- Set the maximum distance (position 0)

**Step 3**

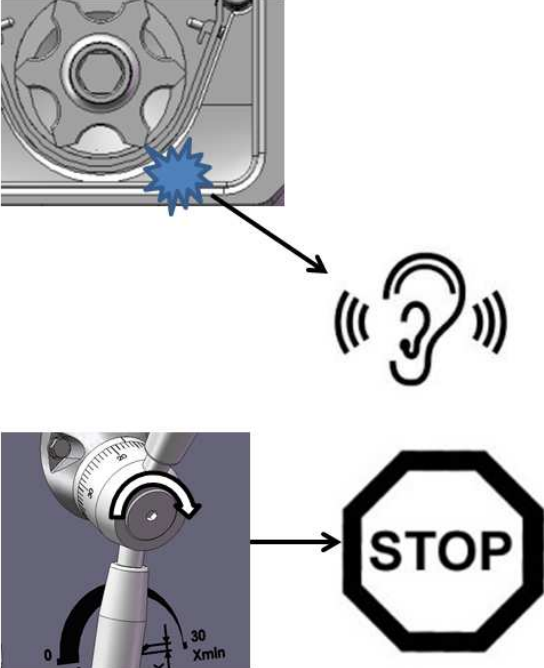
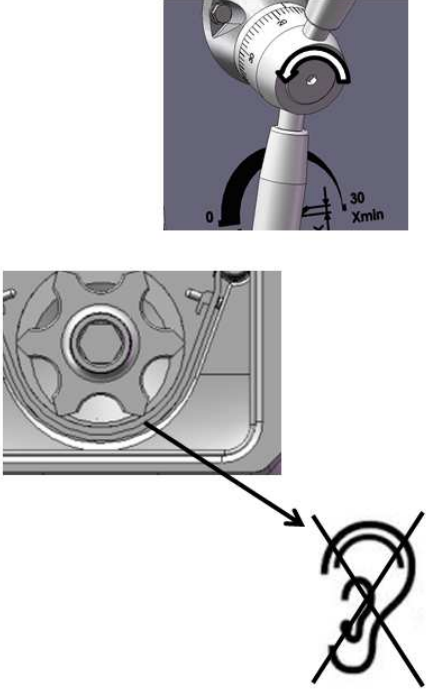

- Start the installation

**Step 4**

- Reduce the distance slowly et listen





<p><b>Step 5</b></p> <ul style="list-style-type: none"> <li>- When you hear the friction of the rotor on the screen, stop reduce the distance</li> </ul>	
<p><b>Step 6</b></p> <ul style="list-style-type: none"> <li>- Slightly increase the distance until you no longer hear the friction</li> <li>- Repeat step 5 and 6 if necessary</li> </ul> <p><b>Remark</b></p> <p>This step should not be performed with sieve for direct tensioning</p>	
<div style="display: flex; align-items: center;">  <div style="border: 1px solid black; padding: 10px; flex-grow: 1;"> <p><b>This procedure must be performed at each tool change (rotor or mesh), although the reference toll is the same</b></p> </div> </div>	

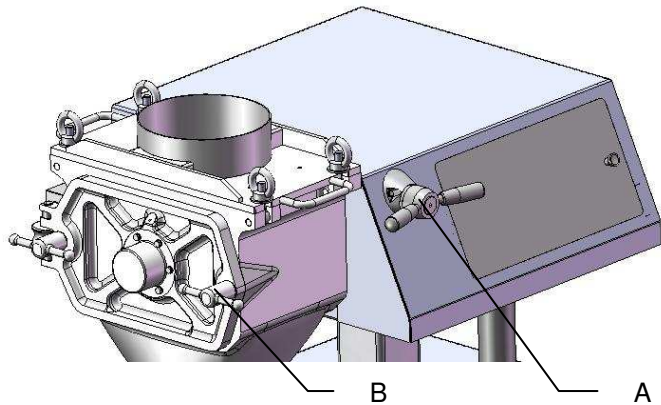


## Detaching the tools



Before performing any work on this unit, it must be turned off and all electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product

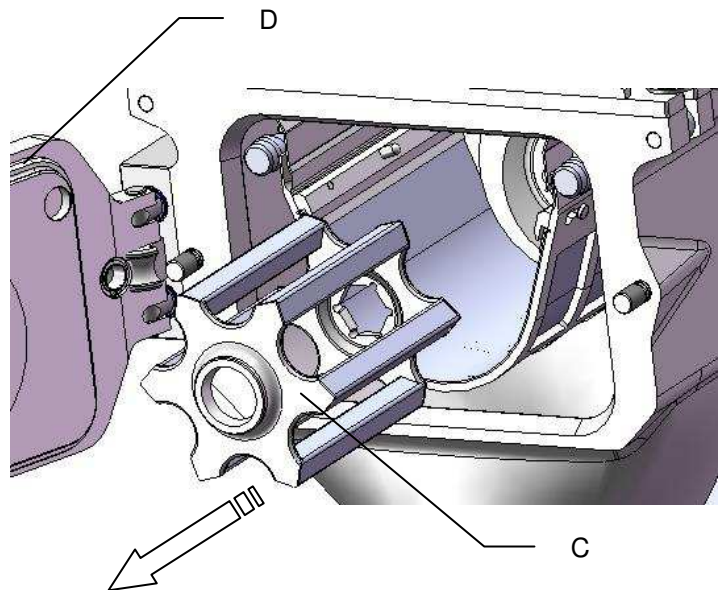
- Adjust the height of the screen to the lower position
- Pull the knob (A) toward you and turn it (**see Instructions for Use / Distance adjustment screen-rotor**)
- Unscrew the 2 knobs (B) of the door



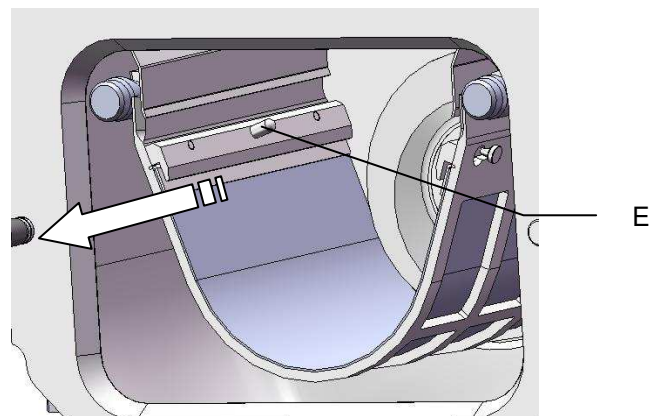
- Pull the door
- Allow the door to pivot
- Carefully pull on the rotor (C) in order to remove it



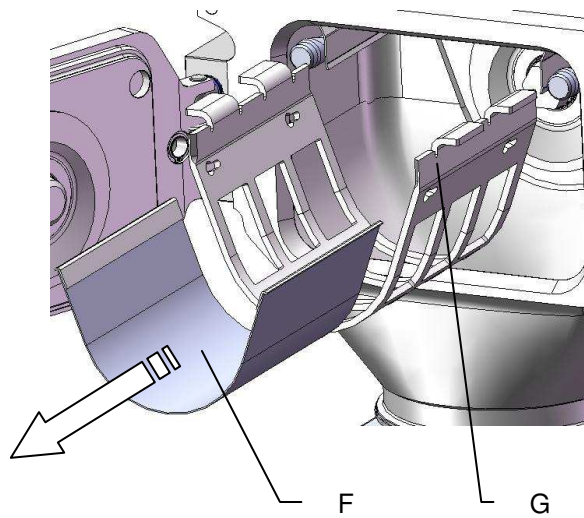
Do not lose the door gasket (D)



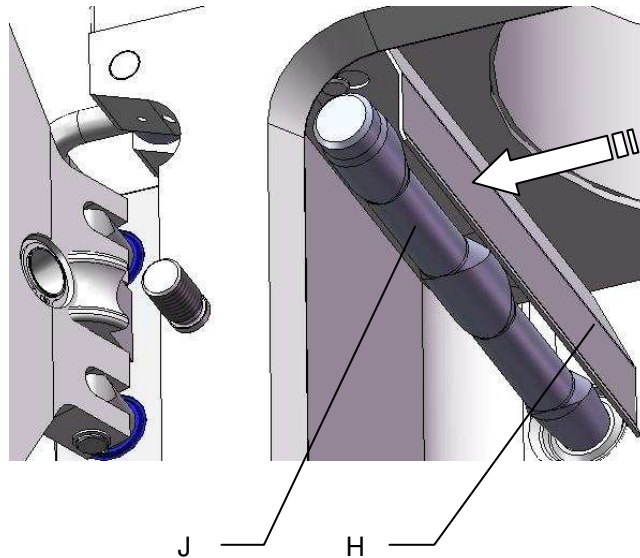
- Pull the stop bar (E) forwards
- Remove the stop bar



- Carefully pull on the screen (F) in order to remove it
- Pull on the cradle (G) to remove it



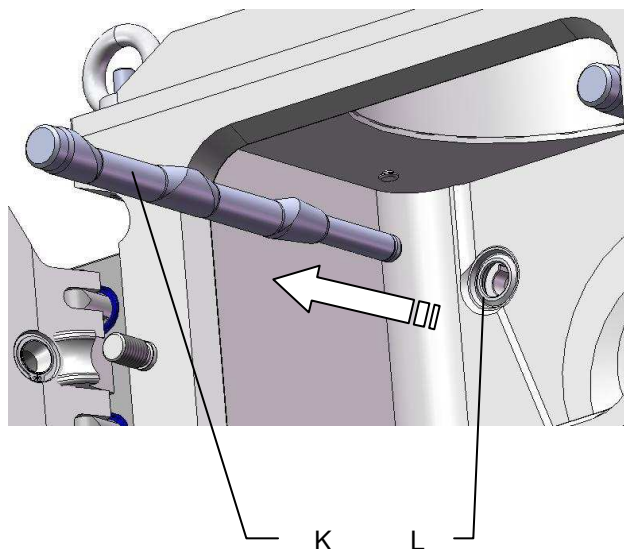
- Push the deflector (H) toward the tightener (J)
- Remove the deflector



- Give a sharp tug to the tightener (K) and carefully remove it
- Clean the tightener (K) and the gasket (L)



Do not damage the gasket (L)

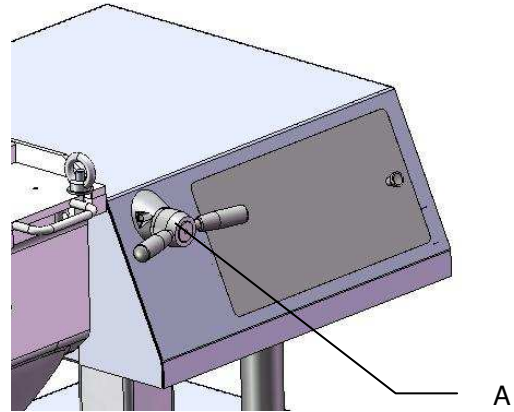


## Attaching the tool



Before performing any work on this unit, it must be turned off and all electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product.

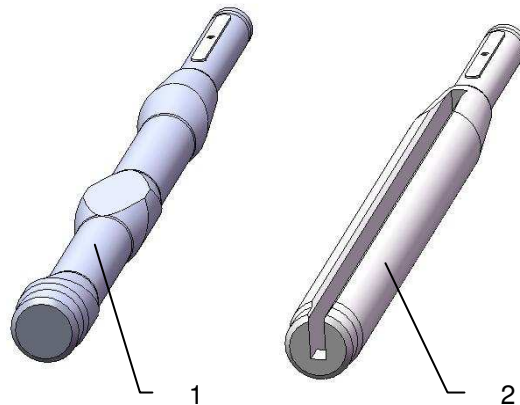
- Adjust the height of the screen to the lower position
- Pull the knob (A) and turn it (see **Instructions for Use / Distance adjustment screen-rotor**)



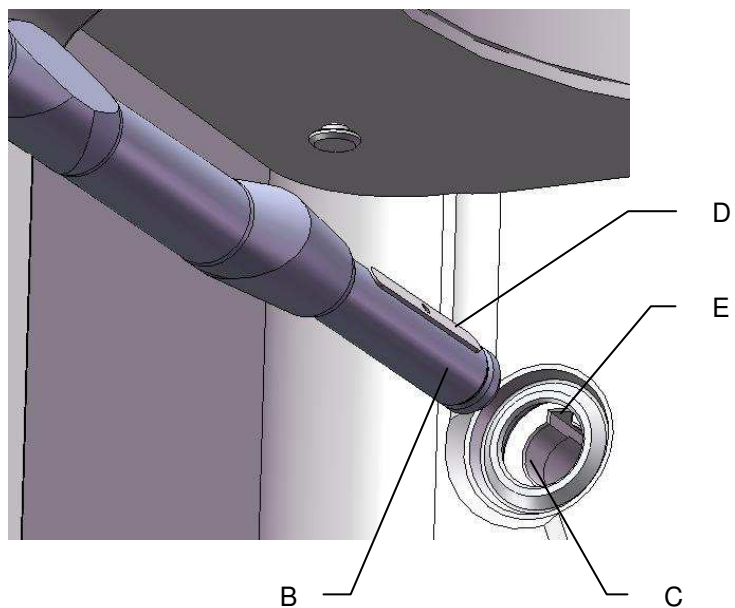
- Select the appropriate tightener (B) for the respective tool. See chapter 9 – Screen types

Type 1 = for rigid cradle

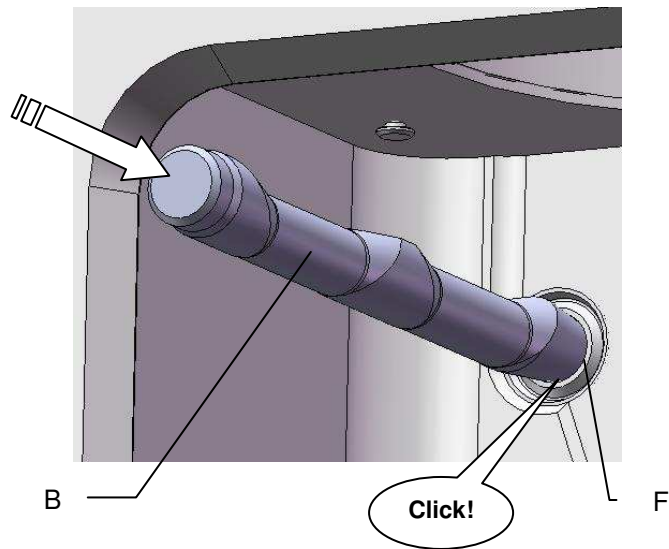
Type 2 = for direct tightening



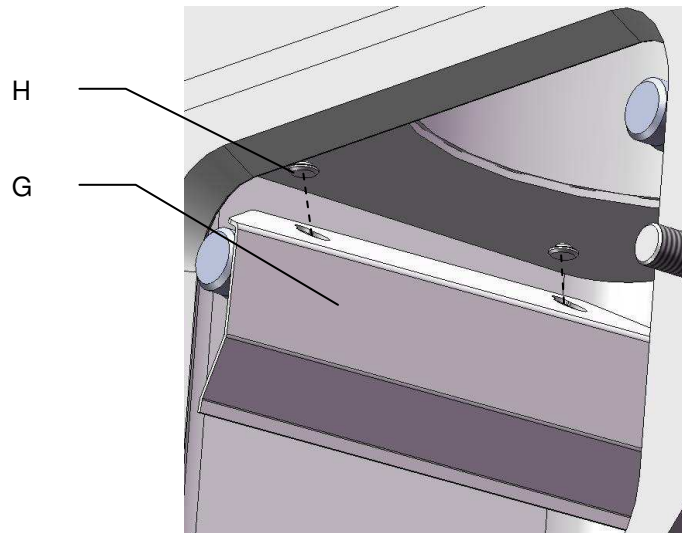
- Lightly grease the diameter (B) of the tightener as described in chapter 7 – Lubrication chart
- Insert the tightener in the bearing (C)
- Align the key (D) with the groove (E)



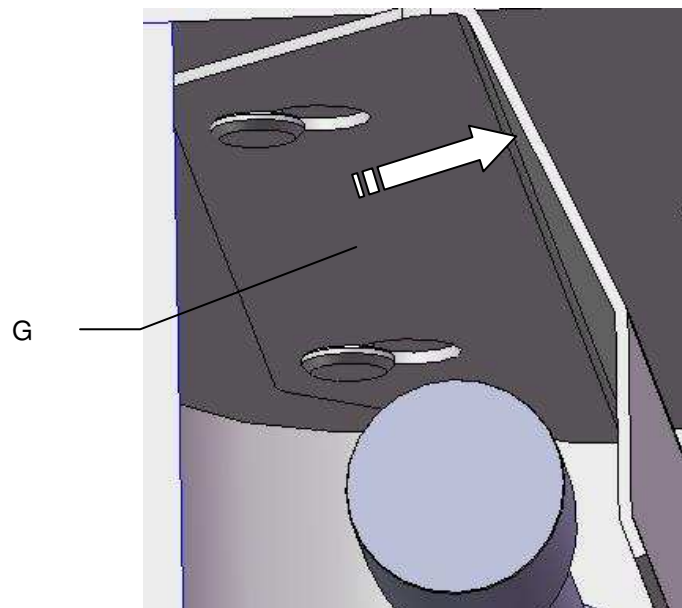
- Push the tightener (B) in as far as it will go
- Rotate the tightener (B) in both directions in order to position the gasket (F) correctly



- Position the deflector (G) on the pins (H)

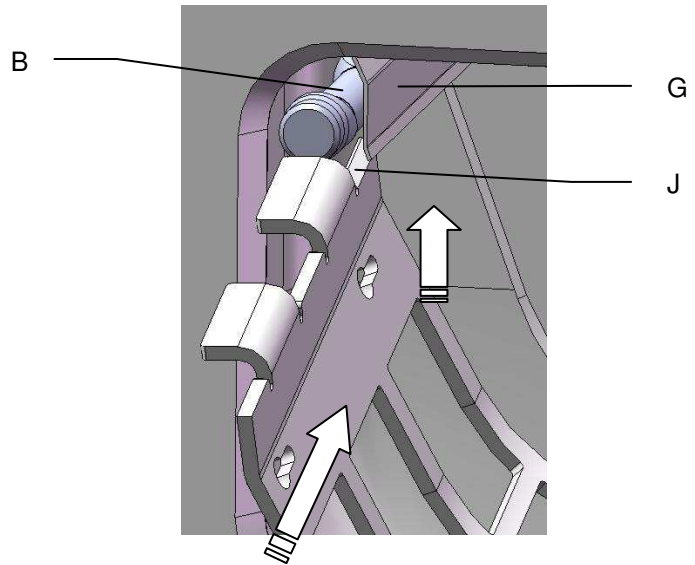


- Push the deflector (G) as far as it will go

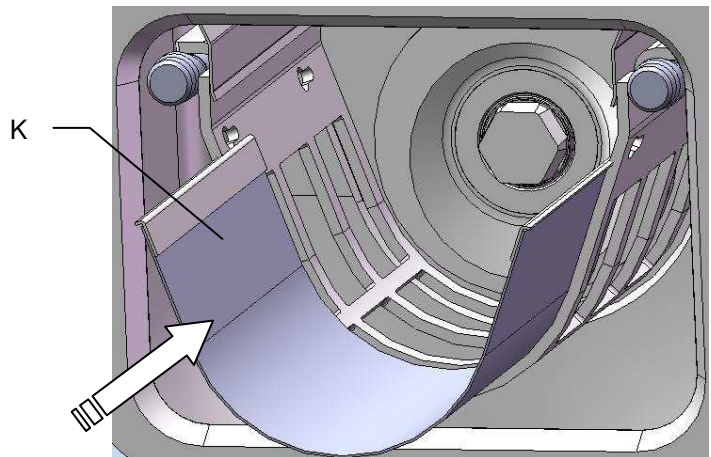


**Rigid cradle option**

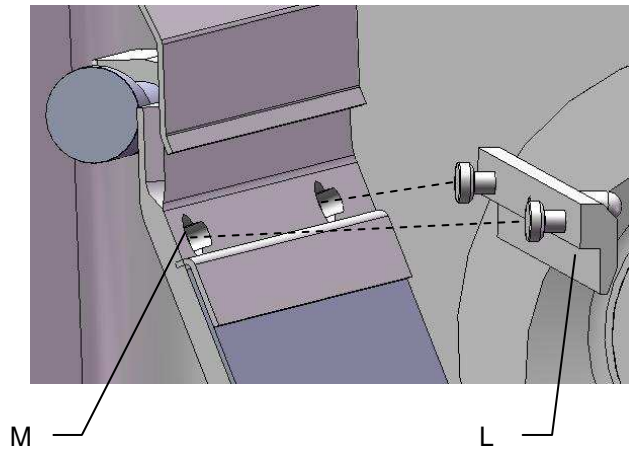
- Insert the chamfered side (J) of the rigid cradle between the deflector (G) and the tightener (B)
- Push the cradle upwards and then push it into the housing as far as it will go



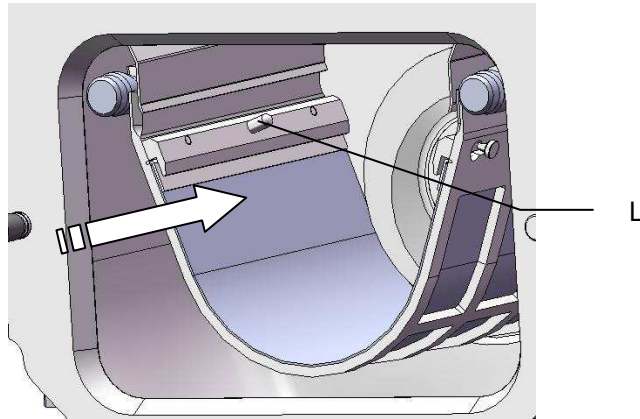
- Insert the screen (K) and push it in as far as it will go



- Insert the stop bar (L) in the openings (M) of the rigid cradle

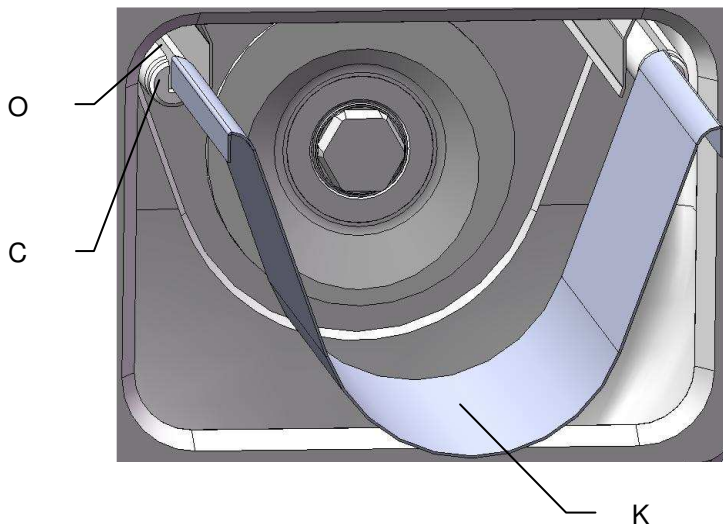


- Push the stop bar (L) as far as it will go

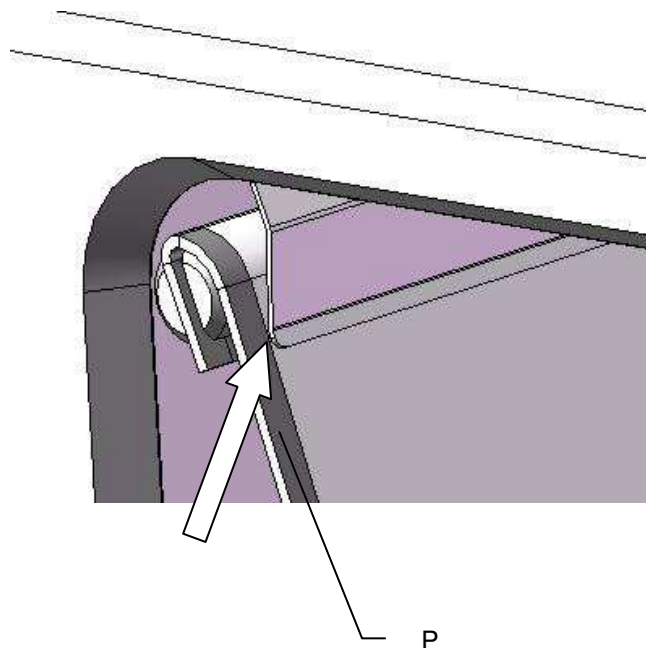


### Direct tightening option

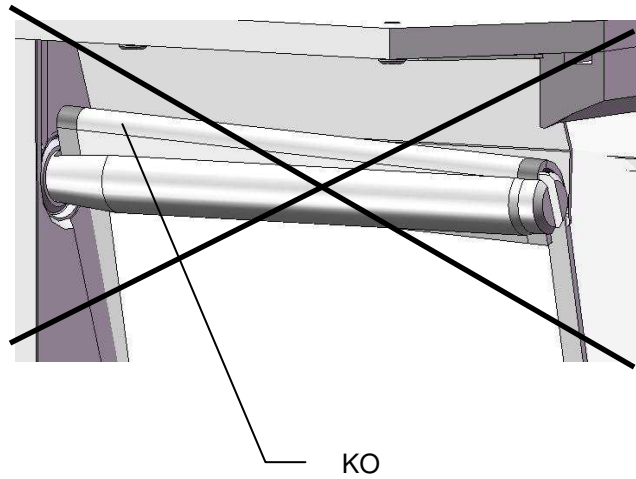
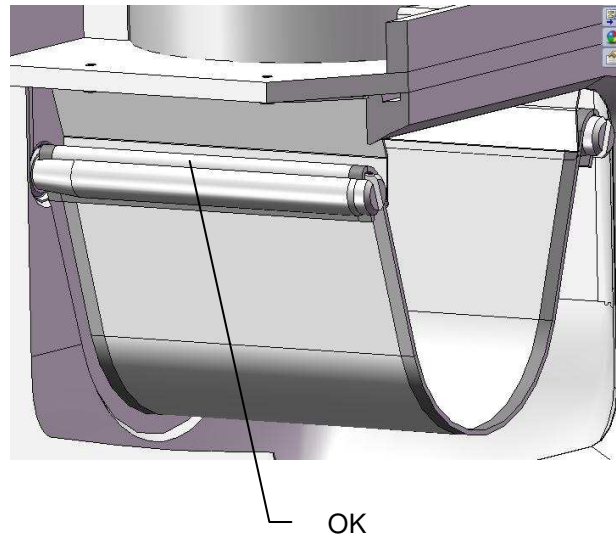
- Insert the screen (K) in the openings (O) of the tighteners (C)
- Push the screen in as far as it will go



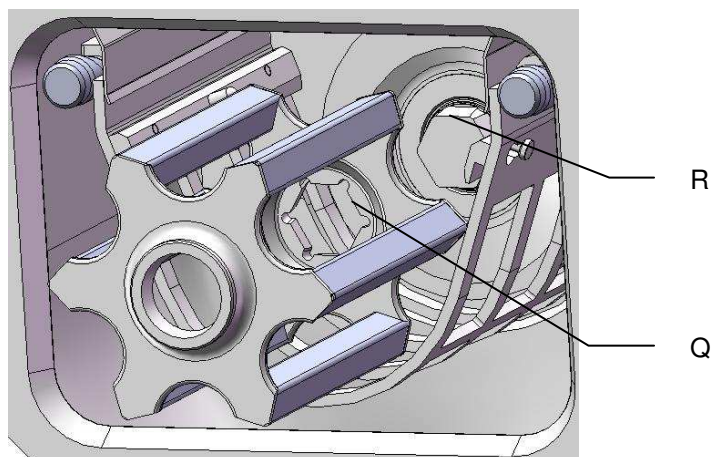
- Do not damage the gum (P)
- Push the screen (K) in as far as it will go



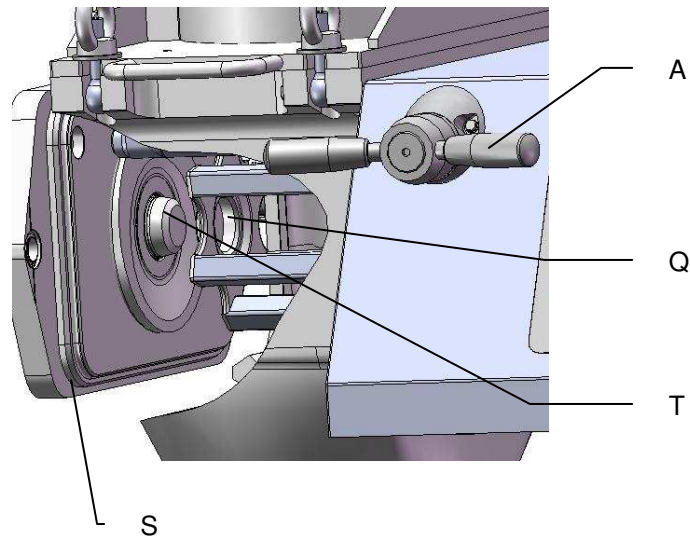




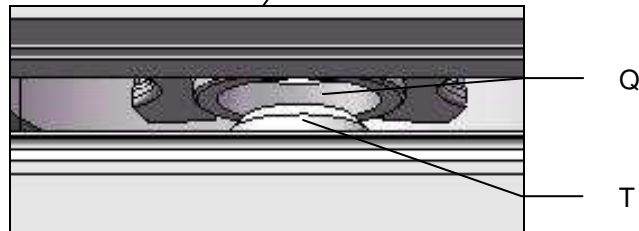
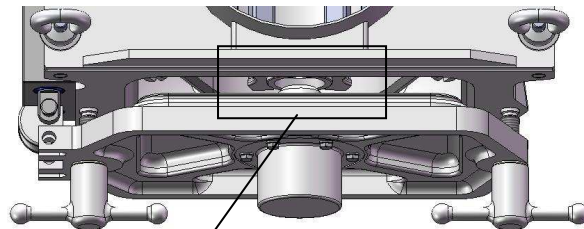
- Insert the 6 faces (Q) of the rotor in the 6 faces (R) of the bearing



- Make sure that the gasket (S) is in place and in good condition. Replace it if needed.
- Adjust (A) the height of the screen until the rotor (Q) is more or less aligned with the bearing (T)



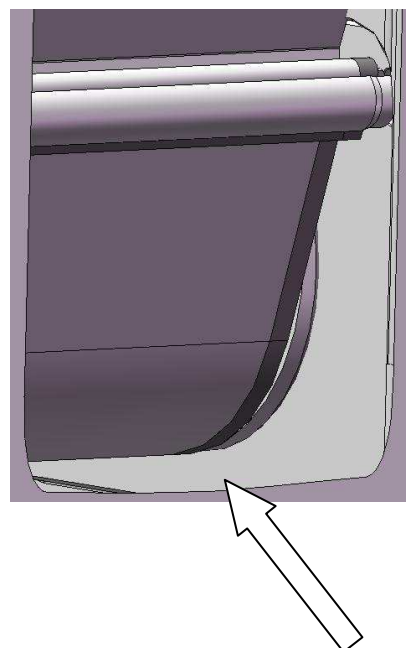
- Close the door until the shaft of the bearing (T) is engaged in the rotor (Q)
- Adjust (A) the height of the screen if necessary



- Push slowly the door

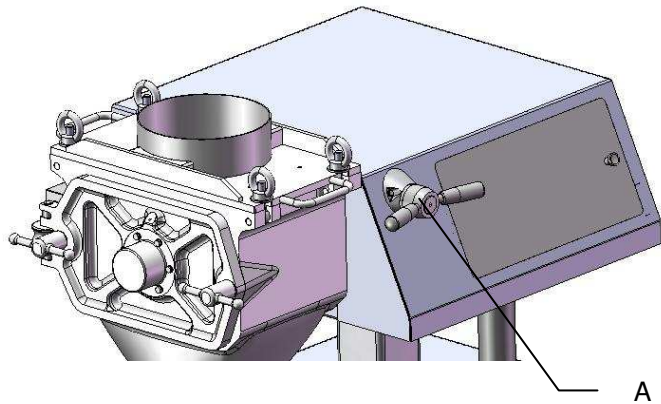


- The flange (U) of the bearing should not press against the screen (K)
- Adjust (A) the height of the screen if necessary
- Close the door



### Adjusting the cradle/the screen in the direct tightening version

- Make sure that the tool is attached
- Adjust the height of the screen to 0 (lower position)
- Pull the knob (A) towards you and turn it
- Start the unit as described in chapter 5-Controls
- Reduce the rotor/screen (A) distance until you hear a slight friction noise between the rotor and the screen
- Distance between rotor/sieve (A) must be increased. In order to do so, 2 units on the manual scale must be dialed back.





## Removing the protective housing

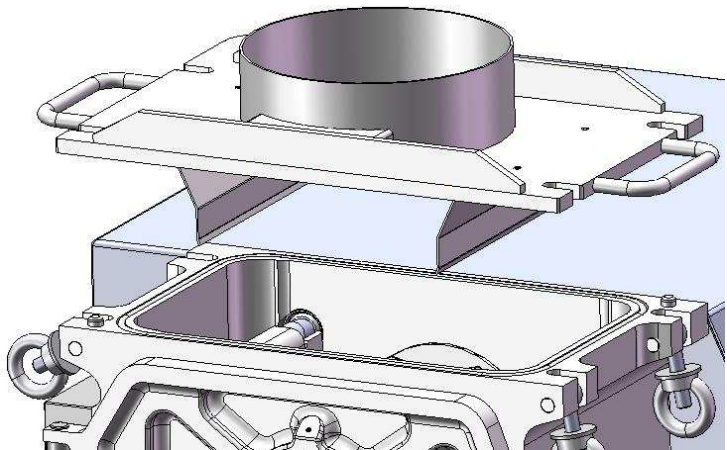


Before performing any work on this unit, it must be turned off and all electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product

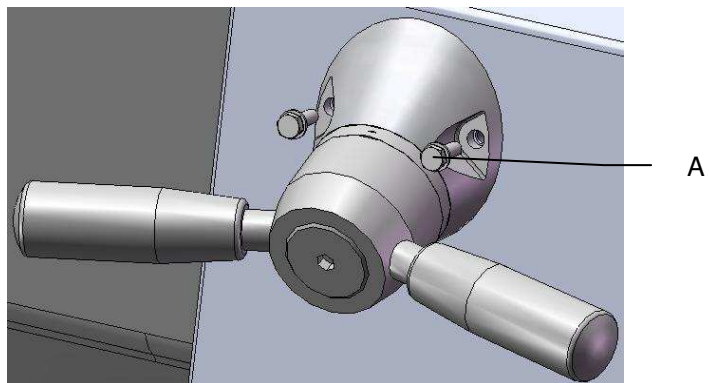


This operation may only be performed by qualified service technicians possessing the specific skills needed to perform the task and who have read these instructions for use.  
They will only use the proper tools for the job.

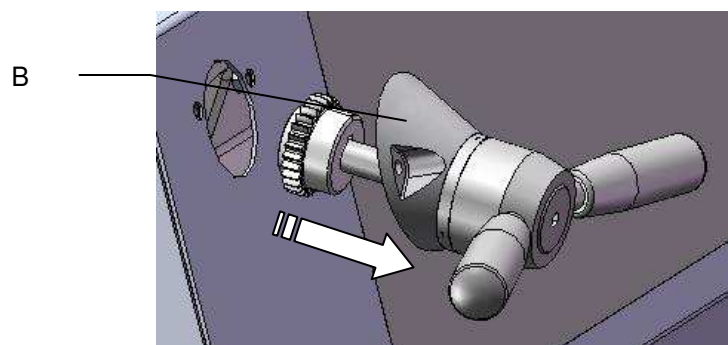
- Detach the inlet accessory according to the instructions in chapter 5 – Detaching the inlet accessory



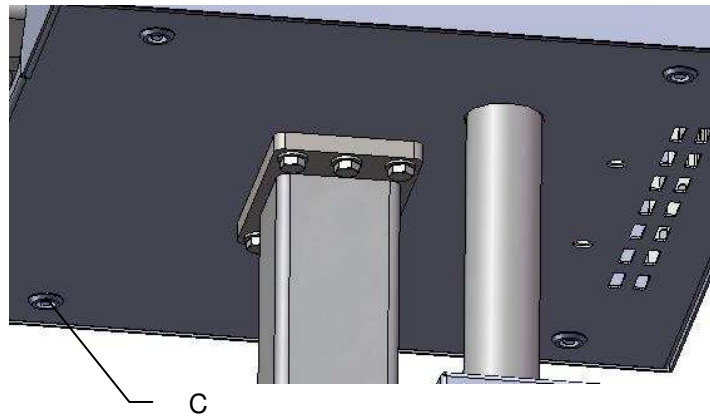
- Remove the 2 screws (A)



- Carefully pull out the adjustment mechanism (B)

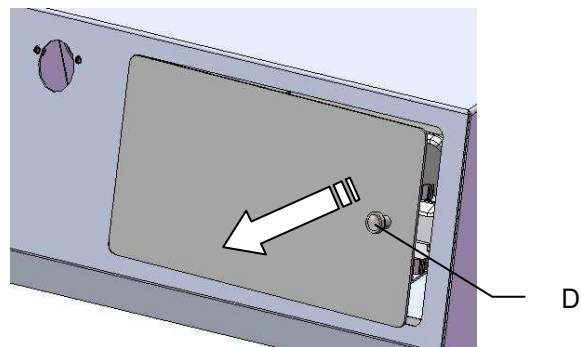


- Unscrew the 4 fasteners (C) of the protective housing



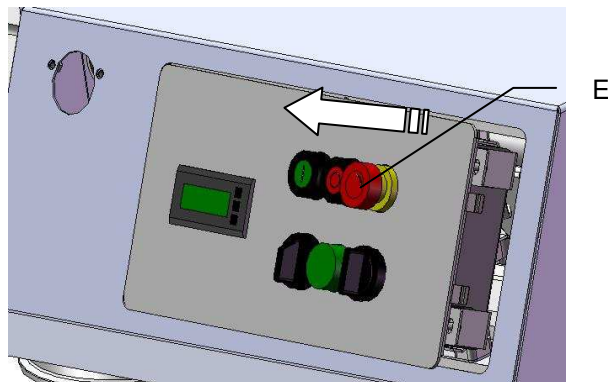
#### Non-ATEX version

- Pull on the knob (D) in order to remove the control box



#### ATEX version

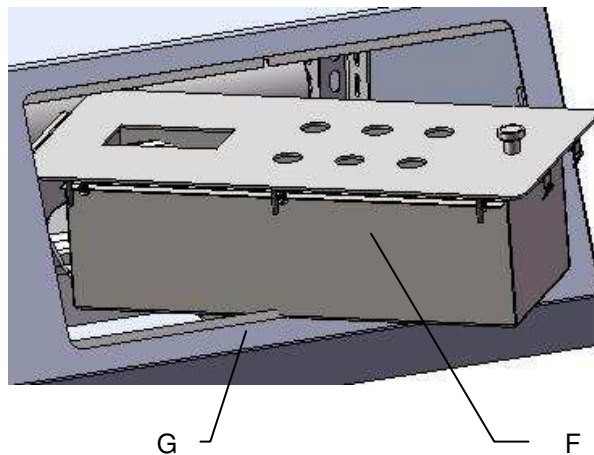
- Pull on the emergency off button (E) in order to remove the control box



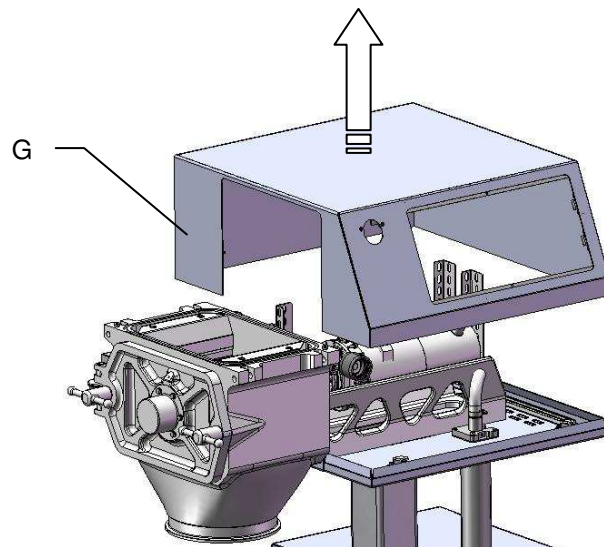
- Insert the control box (F) in the protective housing (G)



Take the necessary precautions to avoid damaging the electric cable



- Carefully remove the protective housing (G)



### Attaching the protective housing



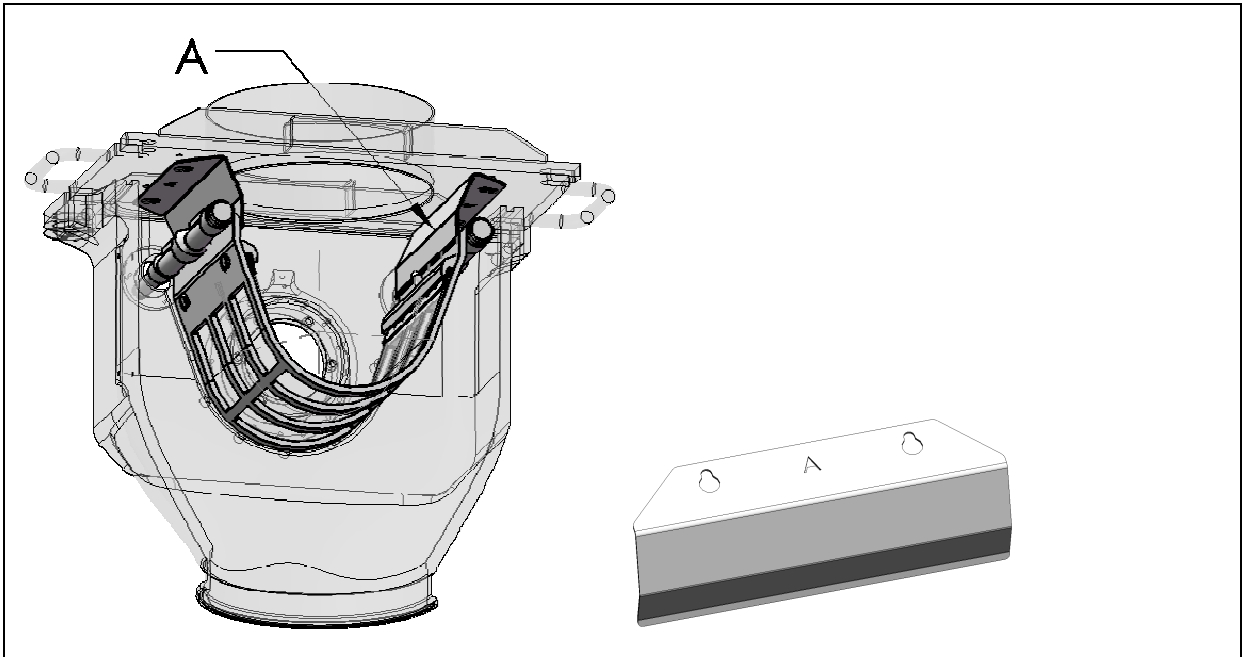
Before performing any work on this unit, it must be turned off and all electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product.

- Follow the steps for removing the protective housing in reverse order

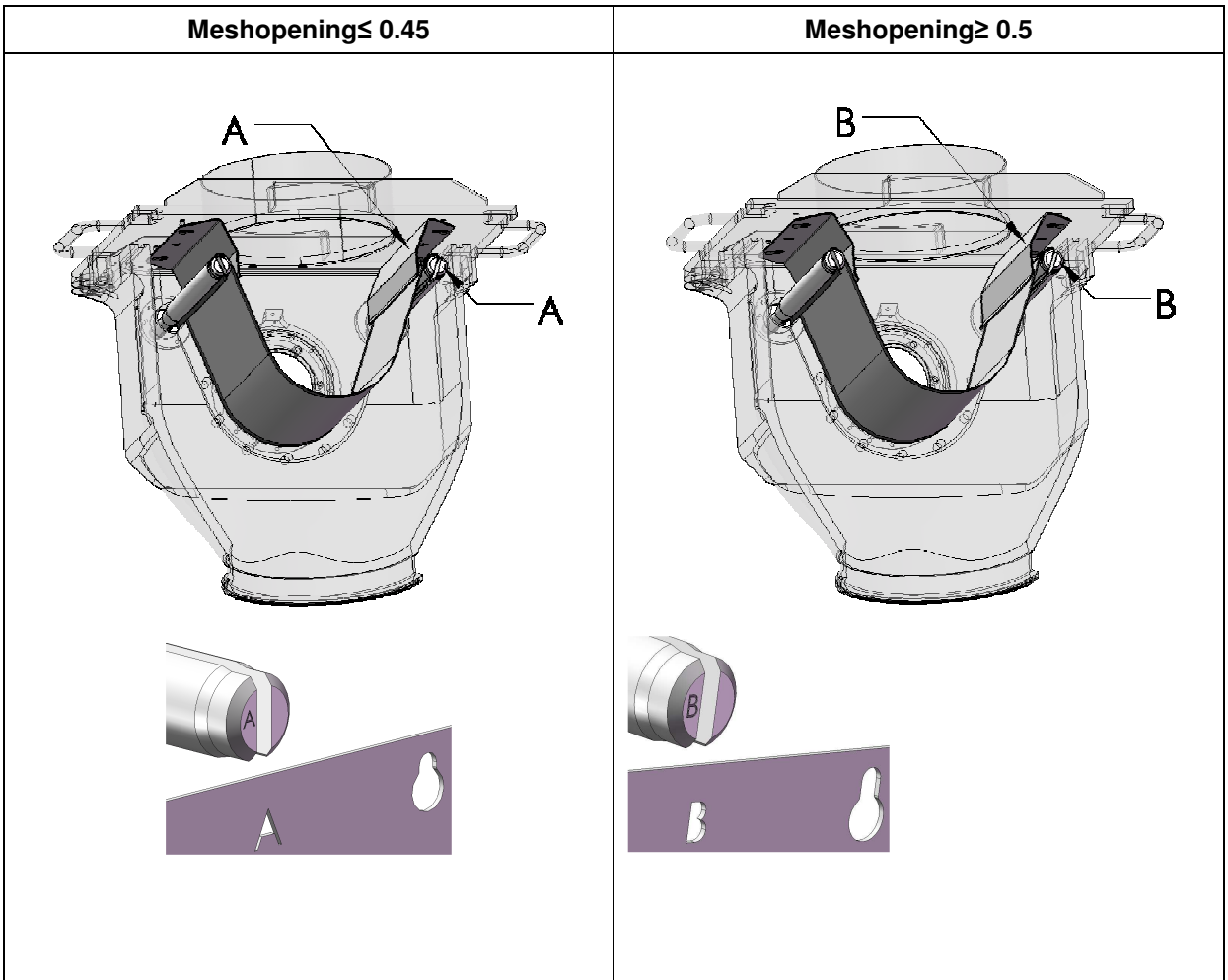




Sieve on rigidscreen support



Sieve for direct mounting





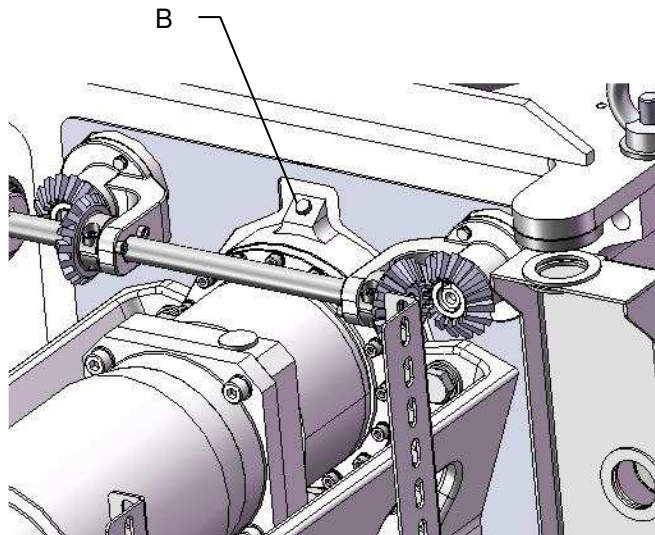
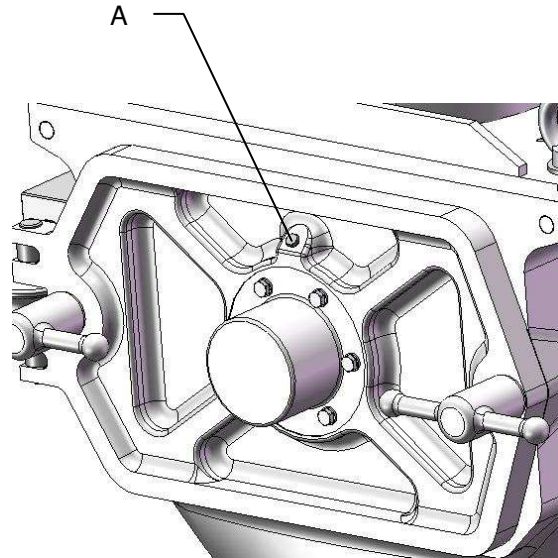
## Non-inerted machine



- The lines of non-inerted units are closed
- The screws (A) and (B) are covered with a special sealing epoxy



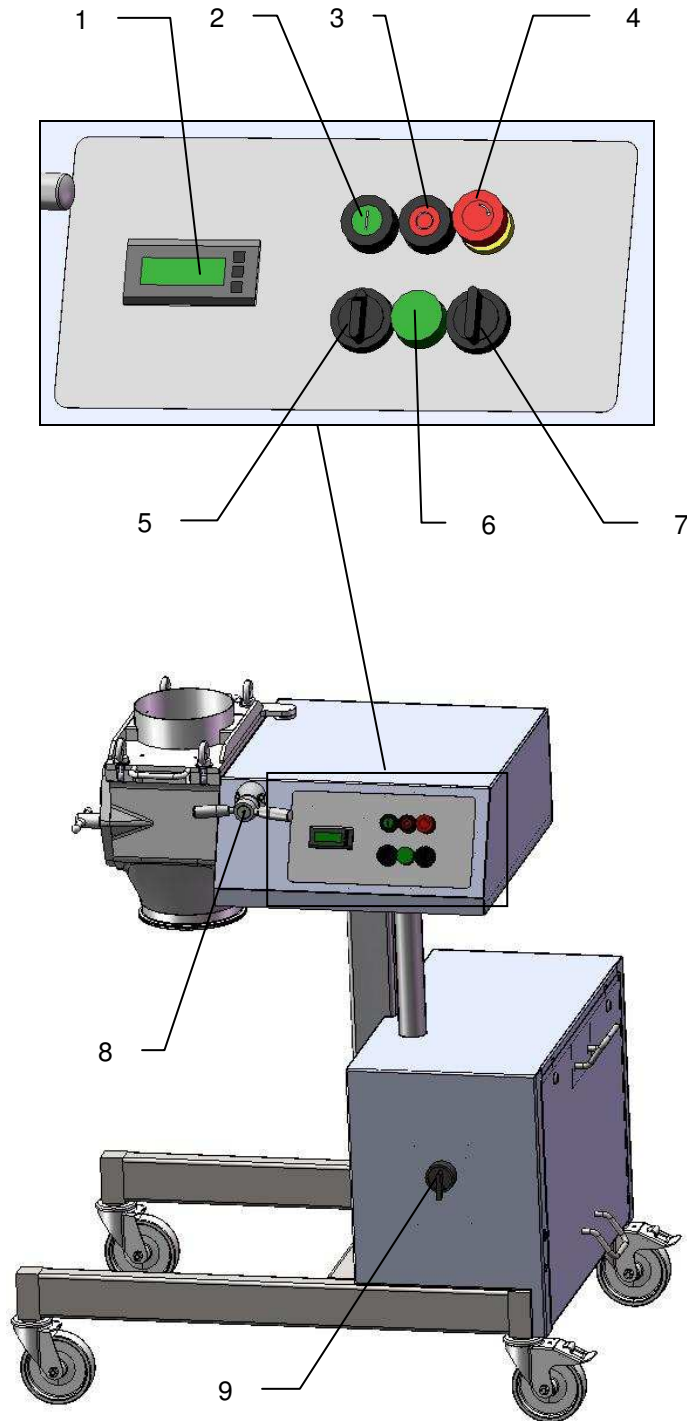
- Never loosen these screws





**Controls**

- 1. Speed indicator (optional)
- 2. On
- 3. Off
- 4. Emergency stop
- 5. Speed adjustment
- 6. Control of the pressure of gas
- 7. Setting of the oscillation width of the rotor (optional)
- or
- 7. Switch oscillating / rotating (optional)
- 8. Adjustement of the distance between rotor/rigid screen support
- 9. Main switch





## Ventilated bearing (optional extra)

### Operation

The ventilated bearing protects the double-lip seal from wear and tear and cools the bearing.

### Version without distribution



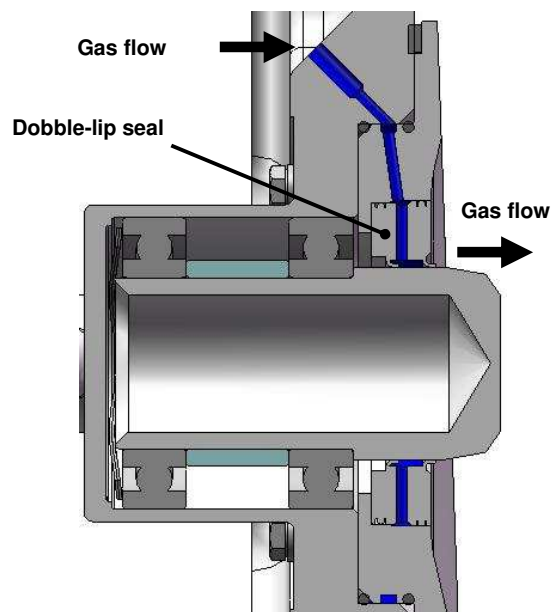
The installation must be connected to a gas supply with a pressure of 2.2 barg.  
Gas consumption: ~ 30 NI/min.

### Operation

- In case of an emergency stop, the inerting must be cease separately

### Controls

- No additional controls are required for this version.



### Version with distribution



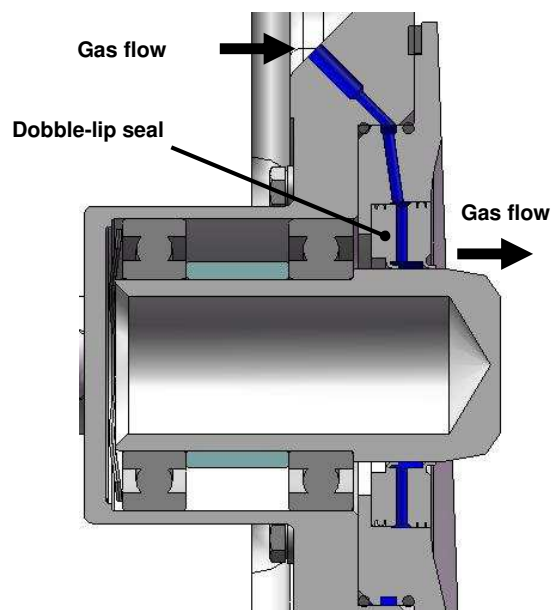
The installation must be connected to a gas supply with a pressure of 3 barg min.  
Gas consumption: ~ 30 NI/min.

### Components

- 1 x solenoid valve
- 1 x filter
- 1 x pressure regulator with manometer (regulated to 2.2 barg)
- 1 x pressure switch

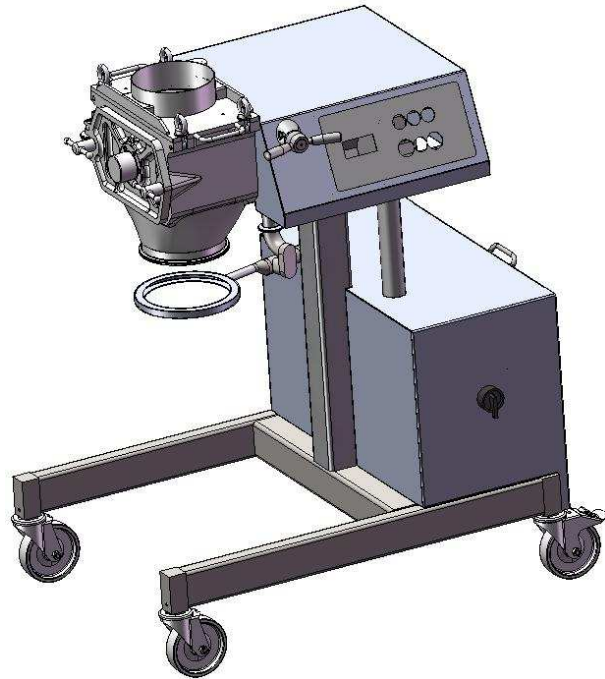
### Operation

- The installation and the air pressure supply start simultaneously.
- The installation and the air pressure supply stop simultaneously.
- The installation will stop if the pressure falls too low.
- In case of an emergency stop, the inerting is cease automatically

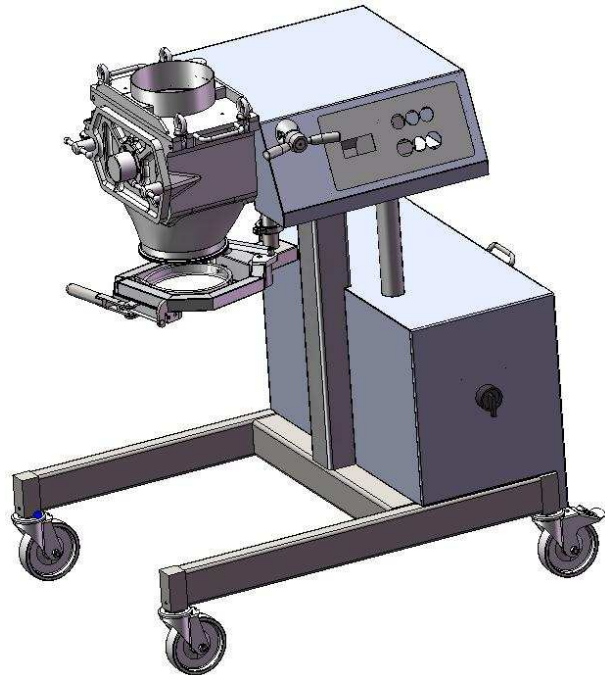


**ProFi-Bant (optional extra)**

The installations can as an optional extra be fitted with a ProFi-Bant DN200 / DN300 pneumatic bag-attaching system.

**ProFi-Lun (optional extra)**

The installations can as an optional extra be fitted with a ProFi-Lun DN200 / DN300 manual bag-attaching system.

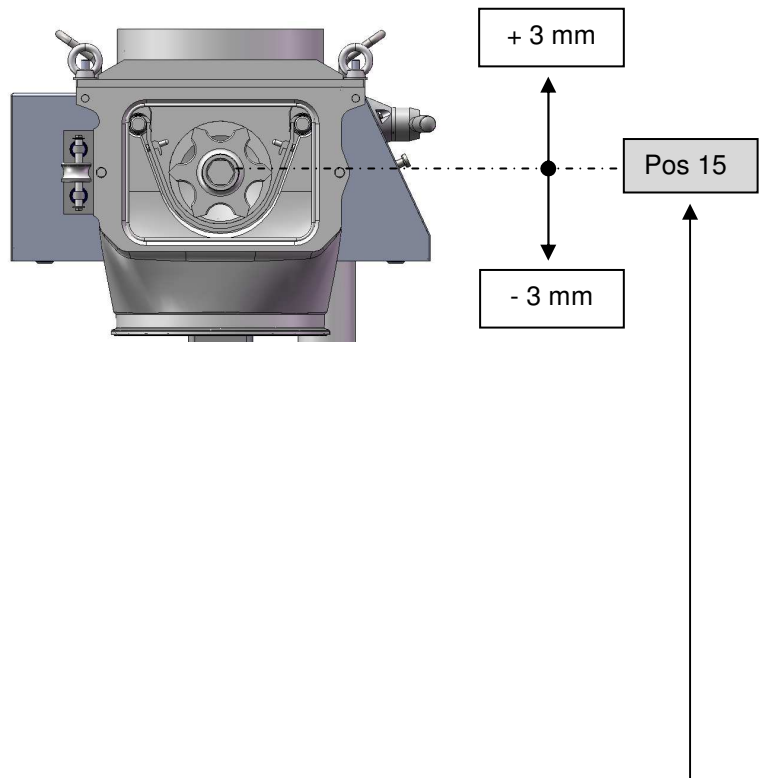




**Distance de réglage / Einstellungsabstand / Distance ajustment**

**Déplacement berceau OW**

position	$\Delta$ (mm)
0	0.02
1	0.05
2	0.08
3	0.11
4	0.14
5	0.17
6	0.2
7	0.22
8	0.25
9	0.26
10	0.28
11	0.29
12	0.31
13	0.31
14	0.31
15	0.31
16	0.31
17	0.31
18	0.31
19	0.29
20	0.28
21	0.26
22	0.25
23	0.22
24	0.2
25	0.17
26	0.14
27	0.11
28	0.08
29	0.05
30	0.02





Comparaison des vitesses / Vergleich der Geschwindigkeiten / Comparison speeds

Angle d'oscillation du rotor Schwenkwinkel des rotors Oscillating angles of the rotor	92°
---	-----

Rotor m/s	MF-3/6 (osc/min)		MF-8 (osc/min)		MF-Lab (osc/min)		OW-3/6 (osc/min) 50 / 60 Hz
	50 Hz	60Hz	50 Hz	60Hz	50 Hz	60Hz	
0.25	48	58	28	33	---	---	56
0.34	64	77	38	45	---	---	73
0.46	86	103	51	61	90	108	94
0.59	111	133	66	79	115	138	116
0.73	138	166	82	98	142	170	135
0.87	164	197	98	117	170	204	152
1.02	192	230	114	136	199	239	167
1.18	223	268	132	158	230	276	180
1.25	236	283	140	168	244	293	184
1.36	257	308	152	182	265	318	---



**L'installation ne démarre pas**

Déclencher l'interrupteur principal.

Contrôler que l'installation est branchée à une source d'énergie électrique.

Contrôler que l'arrêt d'urgence est déclenché.

Contrôler que toutes les sécurités sont bien positionnées par rapport au détecteur.

Enclencher l'interrupteur principal.

Démarrer l'installation.

**L'installation ne démarre toujours pas**

Contrôler que l'arrivée de gaz est branchée.

Contrôler la pression et le débit de la distribution de gaz.

**L'installation ne démarre toujours pas**

Contactez le service après-vente de Frewitt.

**Die Anlage läuft nicht an**

Hauptschalter ausschalten.

Kontrollieren, ob die Anlage an einer Stromquelle angeschlossen ist.

Kontrollieren, ob der Not-Aus-Schalter nicht betätigt ist.

Kontrollieren, ob alle Sicherheiten gegenüber den Sensoren richtig positioniert sind.

Hauptschalter einschalten.

Installation einschalten.

**Die Anlage läuft immer noch nicht an**

Die Gas-Anschluss kontrollieren

Den Druck und die Durchflussmenge der Gas-Versorgung kontrollieren.

**Die Anlage läuft immer noch nicht an**

Kontaktieren Sie den Frewitt Kundendienst.

**The installation does not start**

Switch off the main switch.

Check that the installation is connected to a electric power supply.

Check that the emergency stop is started.

Check that all safety measures are in place regarding the detector.

Switch on the main switch.

Start the installation.

**The installation still does not start**

Check connection of the gas input.

Check the gas supply's pressure and flow.

**The installation still does not start**

Contact Frewitt after-sales service.

**FREWITT SA**  
phone ++41 / 26 460 74 52 (direct)  
fax ++41 / 26 460 74 01  
e-mail: customerservice@frewitt.com



# **CLEANING**







**“Cleaning Recommendation”**

Granules

**CIP-Cleaning & Disinfection**

**PHARMACOS**

Application / Method:

Milling

Typical residues:

Granules







Specific application area:

Solid production

Company:                      Location:                      Department

**Frewitt SA**                                      **1763 Granges Paccot**

Cleaning interval: After each production batch

Cleaning Procedure & Chemicals	%	°C	min.	Notes
 <b>Pre-cleaning</b> water	-	-	-	Pre-cleaning either with water or steam depending on the solubility or melting point of residue Demineralized water improves the removal of TiO <sub>2</sub> -residues
 <b>Alkaline Cleaning</b> <b>P3-cosa® CIP 95</b>	<b>2.0</b>	<b>80</b>	<b>20</b>	
 <b>Intermediate Rinse</b> water	-	-	-	Rinse until pH- neutral
 <b>Acid Cleaning</b> <b>P3-cosa® CIP 72</b>	<b>1.5</b>	<b>60</b>	<b>20</b>	We recommend P3-cosa CIP 77 in case of Iron oxide residues (10% P3-cosa CIP 77 // 85°C // 20 min)
 <b>Intermediate Rinse</b> water	-	-	-	
 <b>Final Rinse</b> water	-	-	-	Until quality assurance accepted level

Remark:

**USA:**

Use P3-cosa CIP 95NA instead of P3-cosa CIP 95

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For any more assistance, do not hesitate to contact your responsible Ecolab service.  
Ecolab Technical Pharmacos Support: +49 211 9893729



**Important additional remarks!**

Due to the diversity of materials and applications the information given below represents only a non binding guideline and is not intended to supersede the manufacturers specifications, limitations and recommendations. It is compulsory to follow the manufacturers limitations, especially concerning pH and temperature stability of the materials. The cleaning process should be individually optimised.



**"Cleaning Recommendation"**

Manual cleaning

**CIP-Cleaning & Disinfection**

**PHARMACOS**

Application / Method:

Small equipment

Typical residues:

All kind of residues

Specific application area:

Manual cleaning

Company:



Frewitt SA

Location:

1763 Granges Paccot

Department

Cleaning interval: After each production batch

Cleaning Procedure & Chemicals	%	°C	min.	Notes
 <b>Pre Rinse</b> water	-	-	-	
<b>Neutral cleaning</b> <b>P3-cosa® FOAM 40</b>	1.0	≥ 45		
 <b>Final Rinse</b> water	-	cold	-	Until quality assurance accepted level

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For any more assistance, do not hesitate to contact your responsible Ecolab service.



**Important additional remarks!**

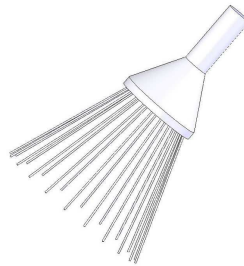
Due to the diversity of materials and applications the information given below represents only a non binding guideline and is not intended to supersede the manufacturers specifications, limitations and recommendations. It is compulsory to follow the manufacturers limitations, especially concerning pH and temperature stability of the materials. The cleaning process should be individually optimised.

## Explanation of the symbols



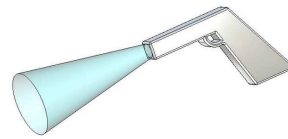
High pressure water jet  
> 4 bar

Minimum cleaning dis-  
tance 50 cm



Low pressure water jet  
≤ 4 bar

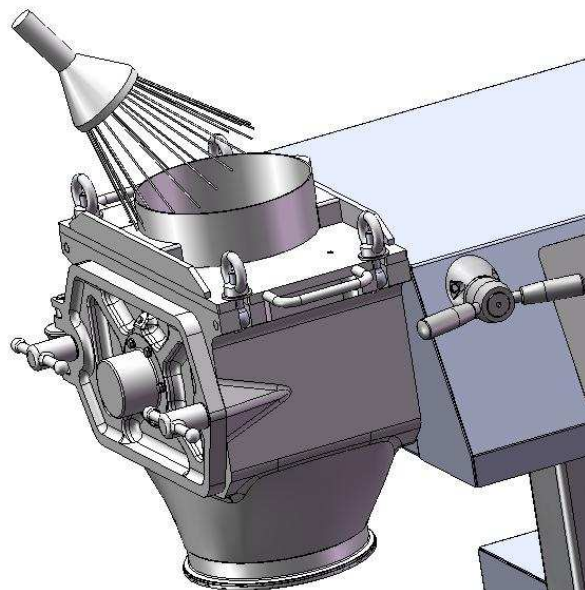
Minimum cleaning dis-  
tance 50 cm



Compressed air

## Cleaning the unit

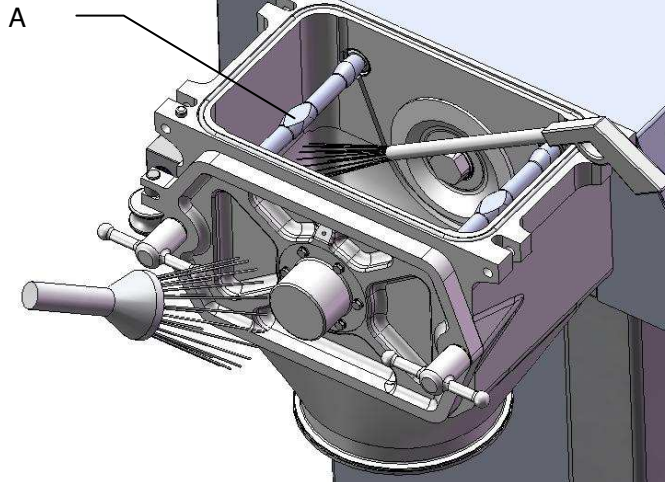
- Allow water to run through the housing
- Start the unit and let it run for a few minutes (optional)
- Turn off the unit (optional)
- Collect the water at the discharge of the housing





Before performing any work on it, the unit must be turned off and disconnected from the electric and pneumatic power supplies.  
 The operator is responsible for avoiding risks of contamination by the product.

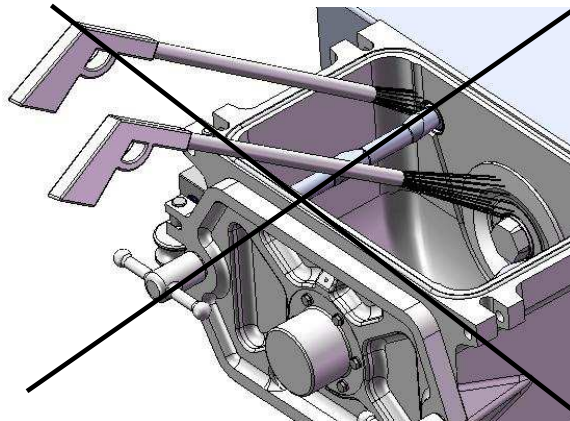
- Remove the tool (axis A excluded) and the accessories according to Chapter 5 – Removing the tool, accessories
- Clean the housing
- With a high pressure water jet  
or
- With a low pressure water jet  
or
- With a wet or dry cloth



- Do not use sharp or pointed tools. They might damage certain parts of the unit.



- Do not clean the bearing seals with a high pressure water jet

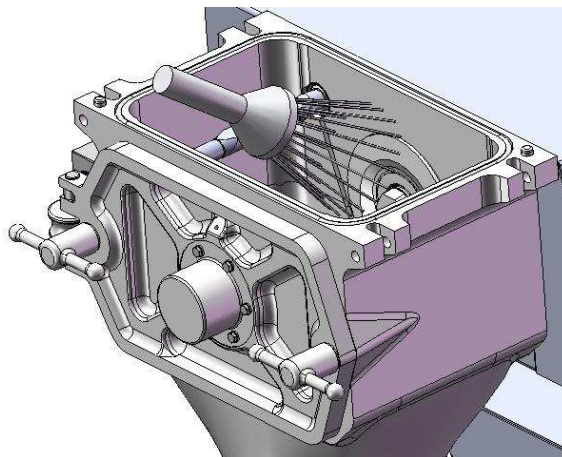


These seals can be cleaned:

- With a low pressure water jet  
or
- With a wet or dry cloth

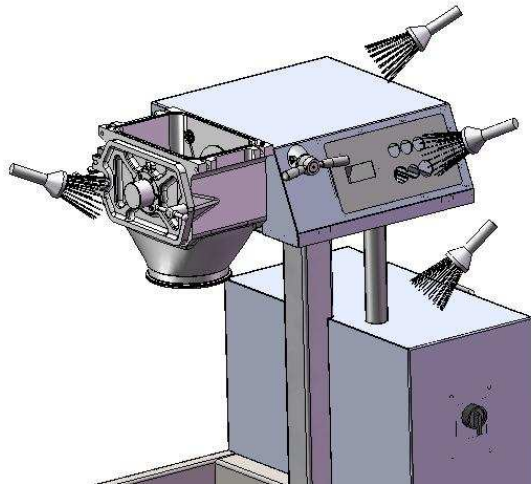


- Don't use other solvents than alcohol to clean the parts in plastic materials.



Clean the outside :

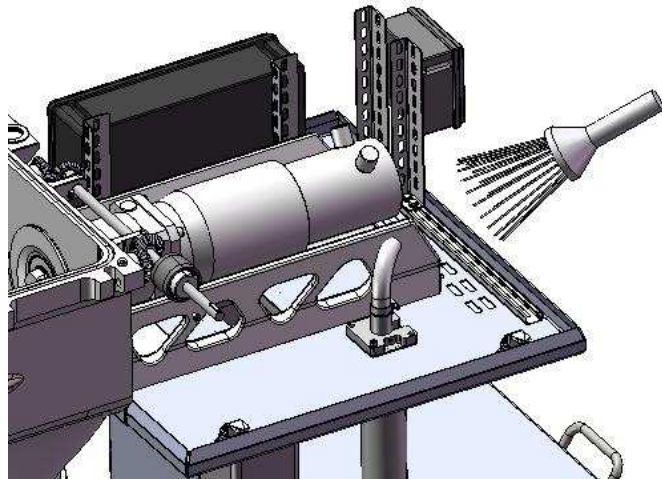
- With a low pressure water jet  
or
- With a wet or dry cloth



- Remove the protection, according to chapter 5 – « Removing the protection »

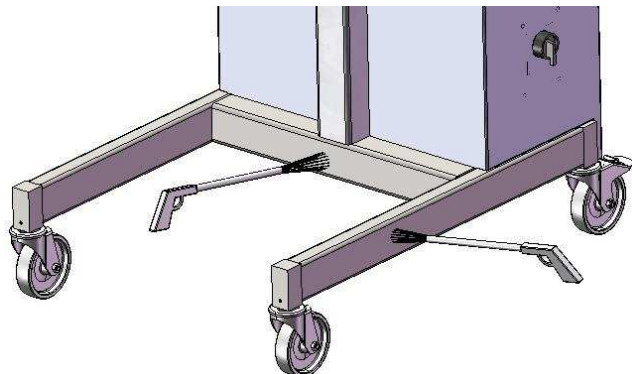
Clean the inside :

- With a low pressure water jet  
or
- With a wet or dry cloth



The base can be cleaned:

- With a high pressure water jet  
or
- With a low pressure water jet  
or
- With a wet or dry cloth



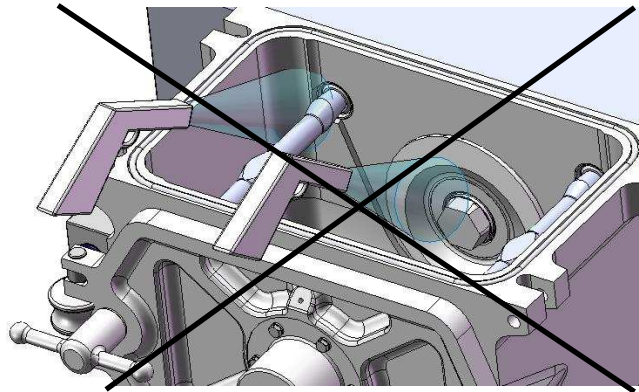
## Drying the unit

The unit can be dried:

- By letting it air dry  
or
- With a cloth  
or
- In an environment heated to 60°C maximum.



- Do not dry the seals with compressed air. Doing so may damage them.
- Dry the seals with a cloth



## Cleaning the tool and the accessories

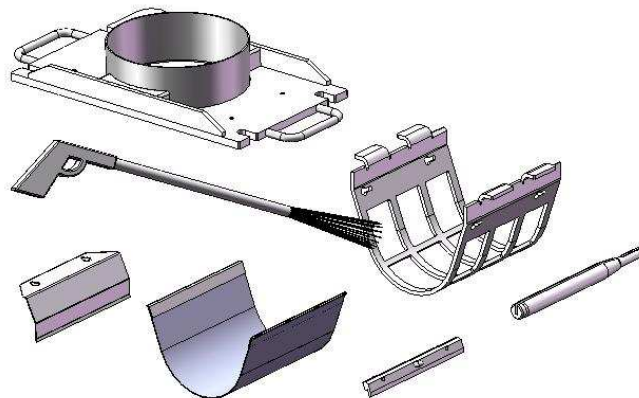
- Remove the tool and the accessories according to Chapter 5 – Removing the tool and the accessories

The tool/infeed-discharge accessory can be cleaned:

- With a wet cloth  
or
- With a low pressure water jet  
or
- With a high pressure water jet

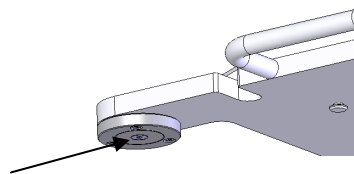


- Do not use pointed or sharp tools. They may damage the tool/infeed-discharge accessory.



## Sterilization

- The tool and the accessories can be sterilized at a temperature of 125°C.



Exception : security element (max 80 °C)

## Chemical resistance list

(italiano: vedi pagina 17)

The information on the following pages is based on tests under various different conditions. Many of the values have been determined at room temperature with a reaction time of 7 days (150 hours). In individual cases observations may differ between laboratory and practical tests. Because of differences in conditions of use and the composition of fluids the data given are only guidelines and should not be taken as binding. For these reasons we cannot give any guarantees as to the correctness of our recommendations in individual cases. If your operating conditions are unusual please feel free to discuss them with us.

Definition of information given in the table:

**On request:**

Information on resistance for ACM, IIR, SBR, AU/EU and NR is available

	NBR	FPM	MVQ	EPDM	CR	MFQ	FFKM	FEP <sup>①</sup>	FPA <sup>②</sup>	PTFE <sup>②</sup>	Nichel alloy X-750 mat. nr. 2.4669 <sup>③</sup>
<b>A</b>											
Acetaldehyde	C	D	B	B	C	D	A <sup>①</sup>	A	A		
Acetamide	A	C	B	A	A	A	A <sup>①</sup>	A			
Acetate of copper	B	D	D	A	B	D	A	A	B		
Acetic acid											
	concentrated (glacial acetic acid)	B	D	B	B	D	D	A	A	B	
	hot	D	D	C	C	D	D	A	A	B	
Acetic anhydride	D	D	B	B	B	D	A	A	B		
Acetoacetic ester	D	D	B	B	D	D	A	A			
Acetone	D	D	D	A	D	D	A	A	A		
Acetophenone	D	D	D	A	D	D	A	A			
Acetyl chloride	D	A	C	D	D	A	A	A	A		
Acetylacetone	D	D	D	A	D	D	A	A			
Acetylene, Ethene	A	A	B	A	B	A	A	A	A		
Acrylic acid ethyl ester	D	D	B	B	D	D	A <sup>②</sup>	A			
Acrylonitrile	D	C	D	D	D	D	A <sup>①</sup>	A			
Aero Shell 7A	A	A	B	D	B	A	A	A			
Aero Shell 17	A	A	B	D	B	A	A	A			
Aero Shell 750	B	A	D	D	D	B	A	A			
Aero Shell Fluid 4	A	A	D	D	D	A	A	A			
Aerosafe 2300	D	D	C	A	D	C	-	A			
Aerosafe 2300 W	D	D	C	A	D	C	-	A			
Air	A	A	A	A	A	A	A	A	A		
Air oil-free											
	100°C	A	A	A	A	A	A	A	A		
	150°C	B	A	A	B	B	A	A	A		
	200°C	D	A	A	D	D	B	A	A		
Alkazene <sup>®</sup>	D	B	D	D	D	B	A	A			
Aluminium acetate	B	D	D	A	B	D	A	A			
Aluminium bromide	A	A	A	A	A	A	A	A			
Aluminium chloride	A	A	B	A	A	A	A	A	B		
Aluminium fluoride	A	A	B	A	A	A	A	A			
Aluminium nitrate	A	A	B	A	A	B	A	A	A		
Aluminium phosphate	A	A	A	A	A	A	A	A			
Aluminium sulphate	A	A	A	A	A	A	A	A	C		
Alums	A	A	B	A	A	D	A	A	A		
Ammonia gas											
	(cold)	A	D	A	A	A	D	A <sup>①</sup>	A	B	
	gas (hot)	D	D	B	B	B	D	A <sup>①</sup>	A	B	
	liquid (anhydrous)	B	D	B	A	A	D	A <sup>①</sup>	A	B	

① depending of compound, we suggest to discuss with us!

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③ for metal O-Rings and C-Rings

A stable

B can be used (static applications)

C limited stability (use not recommended)

D not stable

	NBR	FPM	MVQ	EPDM	CR	MFQ	FFKM	FEP <sup>①</sup> FPA <sup>②</sup> PTFE <sup>③</sup>	Nichel alloy X-750 mat. nr. 2.4669 <sup>③</sup>
Ammonium carbonate	C	B	D	A	A	D	A	A	A
Ammonium chloride	A	A	B	A	A	A	A	A	B
3 molar solution	A	B	A	A	A	A	A	A	A
Ammonium hydroxide concentrated	D	C	A	A	A	A	A <sup>①</sup>	A	A
Ammonium nitrate	A	B	B	A	A	A	A	A	B
Ammonium nitrite	A	-	B	A	A	-	A	A	
Ammonium persulphate	D	-	-	A	A	-	A	A	B
Ammonium persulphate solution	D	-	-	A	A	-	A	A	
Ammonium phosphate	D	-	-	A	A	-	A	A	
Ammonium phosphate									
primary	A	B	B	A	B	B	A	A	B
secondary	A	B	B	A	B	B	A	A	B
tertiary	A	B	B	A	B	B	A	A	B
Ammonium sulphate	A	C	A	A	A	C	A	A	
Ammonium sulphide	A	D	B	A	A	B	A	A	B
Amyl acetate	A	D	B	A	A	B	A	A	
Amyl alcohol	D	D	D	A	D	D	A	A	A
Amyl borate	B	B	D	A	B	A	A	A	A
Amyl chloride	A	A	-	D	A	-	A	A	
Amyl chloronaphthalene	D	A	D	D	D	B	A	A	B
Amyl naphthalene	D	A	D	D	D	B	A	A	
Aniline (aniline oil)	D	A	D	D	D	A	A	A	
Aniline dyes	D	C	D	B	D	C	A	A	B
Aniline hydrochloride	D	B	C	B	B	B	A	A	
Animal fat	A	A	B	B	B	A	A	A	
Aqua regia	D	B	D	C	D	C	A <sup>①</sup>	A	C
Argon	B	B	C	B	D	B	A	A	
Aromatic fuels (Fuel C) 50 %	A	A	A	A	A	A	A	A	
Arsenic acid (arsenic trichloride)	A	D	D	D	B	A	A	A	
Asphalt	A	A	A	A	A	A	A	A	C
ASTM-oil									
No. 1	B	A	D	D	B	B	A	A	A
No. 2	A	A	A	D	A	A	A	A	A
No. 3	A	A	D	D	B	A	A	A	A
No. 4	A	A	C	D	D	A	A	A	A
ASTM-reference									
fuel A	B	A	D	D	D	B	A	A	A
fuel B	A	A	D	D	B	A	A	A	A
fuel C	A	A	D	D	D	A	A	A	A
ATF-oil	B	A	D	D	D	B	A	A	A

**B**

Barium chloride	A	A	A	A	A	A	A	A	B
Barium hydroxide	A	A	A	A	A	A	A	A	B
Barium sulphide	A	A	A	A	A	A	A	A	
Beer	A	A	A	A	A	A	A	A	A
Benzaldehyde	D	D	D	A	D	D	A	A	B
Benzene	D	A	D	D	D	A	A	A	A
Benzene-sulphonic acid 10 %	D	A	D	D	B	B	A	A	
Benzoic									
acid	D	A	D	B	D	B	A	A	A
benzyl ester	D	A	-	D	D	A	A	A	
methyl ester	D	A	D	D	D	A	A	A	
Benzophenone	-	A	-	B	-	A	A	A	
Benzoyl chloride	D	A	-	A	D	A	A	A	
Benzyl									
alcohol	D	A	B	B	B	B	A	A	A

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D not stable



		NBR	FPM	MVQ	EPDM	CR	MG	FFKM	FEP <sup>①</sup> FPA <sup>②</sup> PTFE <sup>③</sup>	Nichel alloy X-750 mat. nr. 2.4669 <sup>③</sup>
Benzyl chloride		D	A	D	D	D	A	A	A	A
Black liquor		B	A	B	B	B	B	-	-	A
Blast furnace gas		D	A	A	D	D	B	A	A	
Bleaching lye		D	A	B	A	D	B	B	A	
Borax		B	A	B	A	D	B	B	A	A
Bordeaux mixture		B	A	B	A	B	B	A	A	
Boric acid		A	A	A	A	A	A	A	A	B
Boron liquid (HEF)		B	A	D	D	D	B	-	A	
Bromine		D	A	D	D	D	B	A	A	C
	water	D	A	D	D	D	B	A	A	
Bromobenzol		D	A	D	D	D	B	B	B	
Bromochloromethane		D	A	D	B	D	B	A	A	
Bromochlorotrifluoroethane		D	A	D	D	D	B	A	B	
Bromopentafluoride		D	D	D	D	D	D	B	B	
Bromotrifluoride		D	D	D	D	D	D	B	B	
Butadiene (monomer)		D	A	D	D	D	A	A	A	A
Butan-2-one (methyl ethyl ketone, MEK)		D	D	D	A	D	D	A	A	
Butane		A	A	D	D	A	A	A	A	A
Butanol (butyl alcohol)		A	A	B	B	A	A	A	A	A
Butene		B	A	D	D	C	B	A	A	
Butter		A	A	B	A	B	A	A	A	A
Butyl	acetate	D	D	D	B	D	D	A	A	B
	acetylricinoleate	B	A	-	A	B	B	A	A	
	acrylate	D	D	D	D	D	D	A <sup>①</sup>	A	
	alcohol	A	A	B	B	A	A	A	A	A
	butyrate	D	A	-	A	D	A	A	A	
	carbitol	D	C	D	A	C	D	A	A	
	catechol	D	A	-	B	B	A	A	A	
	cellosolve	D	D	D	B	D	D	A	A	
	glycol	C	D	B	B	C	D	A	A	
	glycoladipate	D	B	B	B	D	B	A	A	
	mercaptan	D	A	D	D	D	-	A	A	
	oleate	D	A	-	D	D	B	A	A	
	stearate	B	A	B	D	D	B	A	-	
Butylooo n-Butyl ether		C	D	D	C	D	C	A	A	
Butylamine, n-Butylamine		C	D	B	D	D	D	A <sup>①</sup>	A	
Butyraldehyde		D	D	D	B	D	D	A <sup>①</sup>	A	
Butyric acid		D	B	D	B	D	D	A	A	C

**C**

Calcium	acetate	B	D	D	A	B	D	A	A	
	bisulphite	A	A	A	D	A	A	A	A	
	chloride	A	A	A	A	A	A	A	A	A
	cyanide	A	-	A	A	A	-	A	A	
	hydroxide	A	A	B	A	A	A	A	A	B
	hypochloride	B	A	B	A	B	B	A	A	C
	lysulphide	A	A	A	A	A	A	A	A	
	nitrate (nitrate of lime)	A	A	B	A	A	A	A	A	A
	silicate	A	A	-	A	A	-	A	A	
	sulphite	A	A	A	A	A	A	A	A	
	thiosulphate	B	A	A	A	A	A	A	A	
Caliche solution (Chile saltpetre)		A	A	B	A	A	A	A	A	

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Caproic aldehyde (Hexanal)	-	D	B	B	-	D	A <sup>①</sup>	A	
Carbamates	D	A	-	B	B	A	A	-	
Carbitol/Diethylene glycol monoethyl ether	B	B	B	B	B	B	A	A	
Carbolic acid (phenol)	D	A	D	D	D	B	A	A	
Carbon dioxide									
dry	A	B	B	B	B	B	A	-	A
moist	A	B	B	B	B	B	A	-	
Carbon									
disulphide	D	A	D	D	D	A	A	A	A
monoxide	A	A	A	A	B	B	A	-	A
tetrachloride	B	A	D	D	D	B	B	B	A
Carbonic acid	B	A	A	A	A	A	A	A	A
Castor oil	A	A	A	B	A	A	A	A	A
Cellosolve (Ethylene glycol ethyl ether)	D	D	D	B	D	D	A	A	
Cellosolve acetate	D	D	D	B	D	D	A	A	
Cetane (Hexadecane)	A	A	D	D	B	C	A	A	
Chloracetone	D	D	D	A	D	D	A	A	
Chlorax	B	A	-	B	B	A	A	A	
Chlordane	B	A	D	D	C	B	A	A	
Chlordecane	D	A	D	D	D	A	A	A	
Chloracetic acid	D	D	D	B	D	D	A	A	B
Chlorextol	B	A	D	D	B	B	A	A	
Chlorinated carbonic acid ethyl ester	D	A	D	D	D	B	A	A	
Chlorine dioxide									
	D	A	D	C	D	B	A	A	A
8 % Cl as CaClO in solution	D	A	D	D	D	B	A	A	
Chlorine									
dry	D	B	D	D	D	A	A	A	A
moist	C	A	-	B	D	B	B	A	
naphthaline	D	A	D	D	D	B	A	A	
trifluoride	D	D	D	D	D	D	B	-	
1-chlorine-1-nitroethane	D	D	D	D	D	D	A	A	
Chloroacetic acid	D	A	D	D	D	B	A	A	
Chlorobenzene (monochlorobenzene)	D	A	D	D	D	B	A	A	B
Chloroform (Trichloromethane)	D	A	D	D	D	B	A	A	A
Chloroprene	D	A	D	D	D	B	A	A	
Chlorosulphonic acid	D	D	D	D	D	D	A	A	B
Chlortoluene	D	A	D	D	D	B	A	A	
Chrome bath electrolyte	D	A	B	B	D	B	A	A	
Chromic alum	A	A	A	A	A	-	A	A	A
Citric acid	A	A	A	A	A	A	A	A	A
Cobalt chloride									
	A	A	B	A	A	A	A	-	
2n	A	A	A	A	A	A	A	-	
Coconut oil	A	A	A	C	C	A	A	A	A
Cod liver oil	A	A	B	A	B	A	A	A	A
Coffee	A	A	A	A	A	A	A	A	A
Colamine (ethanolamine)	D	D	B	B	D	D	A <sup>①</sup>	A	
Coliche-solution	B	-	-	B	A	-	-	A	
Compressed air supply (oil-free)	A	A	A	A	A	A	A	A	A
Coolanal (Monsanto), Silicone oil	A	A	D	D	A	B	A	A	
Copper chloride	A	A	A	A	B	A	A	A	A
Copper cyanide	A	A	A	A	A	A	A	-	
Cotton seed oil	A	A	A	C	C	A	A	A	A
Creosote, carbolineum	A	A	D	D	B	A	A	A	A
Cresilic acid	D	A	D	D	D	B	-	A	
Crude oil	B	A	D	D	D	B	A	A	A

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	NBR	FPM	MVQ	EPDM	CR	MFQ	FFKM	FEP <sup>①</sup> FPA <sup>②</sup> PTFE <sup>③</sup>	Nichel alloy X-750 mat. nr. 2.4669 <sup>③</sup>
Cumene (isopropylbenzene)	D	A	D	D	D	B	A	-	
Cyclohexane	A	A	D	D	C	A	A	A	A
Cyclohexanol	A	A	D	D	B	A	A	A	
Cyclohexanon	D	D	D	B	D	D	A	A	

**D**

Decane	A	A	B	D	C	A	A	A	
Delco brake fluid	C	D	C	A	B	D	A	A	
Denatured alcohol	A	A	A	A	A	A	A	A	
Detergent dissolved in water	A	A	A	A	B	A	A	A	A
Developer (photo)	A	A	A	B	A	A	A	A	
Diacetone alcohol	D	D	D	A	D	D	A	A	
Diazinone (insecticide)	C	B	D	D	C	B	-	A	
Dibenzyl									
ether	D	D	D	B	D	D	A	A	
sebacate	D	B	C	B	D	C	A	A	
Dibromethyl benzol	D	A	D	D	D	B	A	A	
Dibromodifluoromethane	D	-	D	B	D	D	B	-	
Dibutyl									
amine	D	D	C	D	C	D	A <sup>①</sup>	A	
ether	D	C	D	C	D	C	A	A	
phthalate	D	C	C	B	D	C	A	A	
sebacate	D	B	B	B	D	B	A	A	
Dichlorobutane (Tetramethylene chloride)	B	A	D	D	D	B	A	A	
Dichloroisopropylether	D	C	D	C	D	C	A	A	
Dichloromethane (Methylene chloride)	D	B	D	D	D	B	A	A	
Dicyclohexylamine	C	D	D	D	D	D	A <sup>①</sup>	A	
Diesel fuel	A	A	D	D	C	A	A	A	A
Diethyl									
ether	D	D	D	D	C	C	A	A	
sebacate	D	B	B	B	D	B	A	A	
Diethylamine	B	D	B	B	B	D	A <sup>①</sup>	A	
Diethylene glycol	A	A	B	A	A	A	A	A	
Diisobutylene	B	A	D	D	D	C	A	A	
Diisooctyl sebacate	C	B	C	C	D	C	A	A	
Diisopropyl ketone	D	D	D	A	D	D	A	A	
Dilute nitric acid									
3-molar	D	A	D	B	D	C	A	A	C
concentrated	D	A	D	D	D	C	A	A	C
red, fumingoooo	D	B	D	D	D	D	B	A	C
Dimethyl formamide (DMF)	C	D	B	B	C	D	A	A	
2,2-Dimethylbutane	A	A	D	D	B	A	A	A	
2,3-Dimethylbutane	A	A	D	D	B	A	A	A	
Dimethylether (Methylether)	A	A	A	A	C	A	A	A	
Dimethylhydrazine	B	D	D	A	B	D	A	A	
2,4-Dimethylpentane	A	A	D	D	B	C	A	A	
Dimethylphthalate	D	B	-	B	D	B	A	A	
Dinitrogen monoxide (laughing gas)	A	A	A	B	A	A	A	A	
Dinitrotoluene	D	D	D	D	D	D	A	-	
Diocyl phthalate (DOP)	D	B	C	B	D	B	A	A	
Diocyl sebacate (DOS)	D	B	C	B	D	C	A	A	
Dioxan	D	D	D	B	D	D	A	A	
Dioxolan	D	D	D	B	D	D	A	A	
Dipentene (paint solvent)	B	A	D	D	D	C	A	A	
Diphenyl (biphenyl)	D	A	D	D	D	B	A	A	
Diphenyl ether	D	A	C	D	D	B	A	A	A

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Dowtherm A thermal oil		D	A	D	D	D	B	A	A	
Dowtherm E thermal oil		D	A	D	D	D	B	A	A	
Drilling oil		A	A	D	D	B	A	A	A	
Dye solvent		D	B	D	D	D	B	A	A	

**E**

Electroplating solution	chrome	D	A	B	B	D	B	A	A	
	other metals	-	A	D	A	-	-	A	A	
Epichlorhydrin		D	D	D	B	D	D	A	A	A
Epoxy resins		-	D	-	A	A	-	A	A	
Ethan		A	A	D	D	B	B	A	A	A
Ethane		A	A	B	B	B	A	A	A	A
Ethane thiol		D	B	C	D	C	-	A	A	
Ethanol (ethyl alcohol)		A	C	A	A	A	A	A	A	A
Ethanolamine (Colamin)		B	D	B	B	B	D	A <sup>①</sup>	A	
Ether (various)		D	C	D	C	D	C	A	A	A
Ethyl	acetate	D	D	B	B	D	D	A	A	B
	acrylic acid	D	-	D	B	B	D	A <sup>①</sup>	A	
	alcohol (ethanol)	A	C	A	A	A	A	A	A	A
	benzoate	D	A	D	D	D	A	A	A	
	bromide	B	A	D	D	D	A	A	A	
	chloride	A	A	D	A	A	A	A	A	A
	cyclopentane	A	A	D	D	C	A	A	A	
	dichloride	D	B	D	D	D	B	A	A	
	ether	C	D	D	C	D	C	A	A	A
	oxalate	D	A	D	A	D	B	A	A	
	pentachlorobenzene	D	A	D	D	D	B	A	A	
silicate	A	A	B	A	A	A	A	A		
Ethylbenzene		D	A	D	A	D	A	A	A	A
Ethylcellulose		B	D	B	B	B	D	A	A	B
Ethylene	chlorhydrin	D	A	C	B	B	B	A	A	A
	dibromide	D	A	D	C	D	C	A	A	
	dichloride	D	A	D	C	D	C	A	A	A
	glycol (glycol)	A	A	A	A	A	A	A	A	B
	oxide	D	D	D	C	D	D	A <sup>①</sup>	A	A
	oxide (12 %) and Freon (80 %)	C	D	D	B	D	D	A <sup>①</sup>	A	
	trichloride («Tri»)»	D	A	D	D	D	B	A	A	
2-ethyl-1-hexanol (Isooctanol)	A	A	B	A	A	A	A	A		
Ethylenediamine		A	D	A	A	A	D	A <sup>①</sup>	A	

**F**

Fatty acids		B	A	B	C	B	A	A	A	A
Fluorolub		A	B	A	A	A	B	-	-	
Formaldehyde		C	D	B	B	C	D	A <sup>①</sup>	A	A
Formic acid methylester		D	D	-	B	B	-	A	A	B
Freon	11	B	B	D	D	C	B	B	A	
	12	A	A	D	B	A	D	B	A	
	12 and ASTM oil no. 2 (50 : 50 mix)	B	A	D	D	C	B	B	A	
	12 and Suniso 4G (50 : 50 mix)	B	A	D	D	C	B	B	A	
	13	A	A	D	A	A	D	B	-	
	13 B1	A	A	D	A	A	B	B	-	
14	A	A	D	A	A	B	B	-		

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Freon	21	D	D	D	D	B	B	A	-	
	22	D	D	D	A	A	B	B	A	
	22 and ASTM oil no. 2 (50:50 mix)	D	B	D	D	B	B	B	A	
	31	D	D	D	A	A	B	B	-	
	32	A	D	D	A	A	B	B	-	
	112	B	A	D	D	B	B	B	-	
	113	A	B	D	D	A	D	B	A	
	114	A	A	D	A	A	B	B	-	
	114 B2	B	B	D	D	A	B	B	-	
	115	A	A	D	A	A	B	B	-	
	502	B	B	A	A	A	-	B	-	
	BF	B	A	D	D	B	-	B	-	
	C 318	A	B	D	A	A	B	B	-	
	K-142b	A	D	-	A	A	-	B	-	
	K-152a	A	D	-	A	A	-	B	-	
	MF	B	B	D	D	D	-	B	-	
PCA	A	B	D	D	A	-	B	-		
TF	A	B	D	D	A	D	A	A		
Fuel oil		A	A	D	D	B	A	A	A	A
Fumaric acid		A	B	D	D	B	D	A	A	
Fural (2-furaldehyde)		D	D	D	B	D	D	A <sup>①</sup>	A	B
Furan		D	D	D	D	D	D	A	A	
Furfur alcohol		D	D	D	B	D	D	A	A	
Furyl carbinol		D	-	D	B	D	D	-	A	

**G**

Gallic acid		B	A	A	B	B	A	A	A	
Gallotannic acid	tannin	A	A	B	A	B	A	A	A	
	10%	A	A	B	A	A	A	A	A	
Gear oil type A		A	A	B	D	B	A	A	A	
Gelatines		A	A	A	A	A	A	A	A	A
Generator gas		A	A	B	D	B	B	A	A	
Girling brake fluid		C	D	-	A	B	D	A	A	
Glacial acetic acid (100 % acetic acid)		B	D	B	B	D	D	A	A	
Glauber salt (Sodium sulphate)		D	A	A	B	B	A	A	A	
Glucose		A	A	A	A	A	A	A	A	A
Glycerine		A	A	A	A	A	A	A	A	A
	triacetate	B	D	B	A	B	D	A	A	
Glycol (ethylene glycol)		A	A	A	A	A	A	A	A	
Green Liquor		B	A	-	A	B	B	A	A	
Groundnut oil		A	A	A	C	C	A	A	A	A

**H**

Halon 1301		A	A	D	A	A	B	B	A	
Halothane (narcotic)		D	A	D	D	D	B	A	A	
Halowax oil		D	A	D	D	D	A	A	A	
Heavy water		A	A	A	A	B	A	A	A	
Helium		A	A	A	A	A	A	A	A	
n-heptane		A	A	D	D	B	A	A	A	
n-hexaldehyde		D	D	B	A	A	D	A <sup>①</sup>	A	
n-hexane		A	A	D	D	B	A	A	A	
1-n-hexene		B	A	D	D	B	A	A	-	

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Hexylalcohol		A	A	B	C	B	B	A	A	
Houghto-Safe	271 (water/glycol, HFC)	A	B	B	A	B	B	A	A	
	620 (water/glycol, HFC)	A	B	B	A	B	B	A	A	
	1010 (phosphate ester, HFD-R)	D	A	C	A	D	B	A	A	
	1055 (phosphate ester, HFD-R)	D	A	C	A	D	B	A	A	
	1120 (phosphate ester, HFD-R)	D	A	C	A	D	B	A	A	
	5040 (water/oil emulsion)	A	A	C	D	B	B	A	A	
Hydraulic fluid (mineral oil based)		A	A	B	D	B	A	A	A	A
Hydrazine		B	B	B	A	B	B	A	A	C
Hydrobromic acid		D	A	D	A	D	C	A	A	C
Hydrobromic acid 40%		D	A	D	A	D	C	A	A	C
Hydrochloric acid	3-molar	C	A	D	A	C	B	A	A	C
	concentrated	D	A	D	C	D	C	A	A	C
Hydrocyanic acid		B	A	C	A	B	B	A	A	B
	< 65% cold	C	A	D	A	A	D	A <sup>①</sup>	A	B
	> 65% cold	D	A	D	C	D	D	B	A	B
	< 65% hot	D	C	D	D	C	D	B	A	B
	> 65% hot	D	C	D	D	D	D	B	A	B
Hydrofluosilicic acid		B	A	D	A	B	D	B	B	
Hydrogen fluoride (hydrofluoric acid, anhydrous)		D	D	D	A	D	D	B	A	C
Hydrogen gas	cold	A	A	C	A	A	C	A	A	
	hot	A	A	C	A	A	C	A	A	
Hydrogen peroxide	90 %	D	A	B	C	D	B	A	A	B
	dilute	B	A	A	A	A	A	A	A	B
Hydrogen sulphide	dry, cold	A	D	C	A	A	C	A	A	B
	dry, hot	D	D	C	A	B	C	A	A	B
	moist, cold	D	D	C	A	A	C	A	A	B
	moist, hot	D	D	C	A	B	C	A	A	B
Hydroquinone		C	B	D	D	D	B	A	A	A
Hydyn		B	D	D	A	B	D	A	A	
<b>I</b>										
Iodine		B	A	-	B	D	A	A	A	
	pentafluoride	D	D	D	D	D	D	B	-	
Iron chloride		A	A	B	A	B	A	A	A	C
	nitrate	A	A	B	A	A	A	A	A	C
Isobutyl alcohol (isobutanol)		B	A	A	A	A	B	A	A	
Isobutyl-n-butyrate		D	A	-	A	D	A	A	A	
Isododecane		A	A	D	D	B	A	A	A	
Iso-octane		A	A	D	D	B	A	A	A	
Isophoron (ketone)		D	D	D	A	D	D	A	A	
Isopropanol (Isopropyl alcohol)		B	A	A	A	B	B	A	A	
Isopropyl	benzene	D	A	D	D	D	B	A	A	
	chloride	D	A	D	D	D	B	A	A	
Isopropylacetat		D	D	D	B	D	D	A	A	
Isopropylacetate		B	D	D	D	C	C	A	A	
Isopropylalkohol (Isopropanol)		B	A	A	A	B	B	A	A	
<b>J</b>										
JP 3 (MIL-J-5624)		A	A	D	D	D	A	A	A	
JP 4 (MIL-J-5624)		A	A	D	D	D	B	A	A	
JP 5 (MIL-J-5624)		A	A	D	D	D	B	A	A	

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JP 6 (MIL-J-5624)		A	A	D	D	D	B	A	A	
JP X (MIL-F-25604)		A	D	D	D	B	D	-	A	
<b>K</b>										
Kaliumcyanidoooo		A	A	A	A	A	A	A	A	B
Kerosine		A	A	D	D	B	A	A	A	A
<b>L</b>										
Lactams		D	D	-	B	B	D	A	-	
Lactic acid	cold	A	A	B	A	A	A	A	A	B
	hot	D	A	B	D	D	B	A	A	B
Lard, animal fat		A	A	B	B	B	A	A	A	A
Lavender oil		B	A	D	D	D	B	A	A	A
Lead	acetate (sugar of lead)	B	D	D	A	B	D	B	A	A
	nitrate	A	A	B	A	A	A	B	A	A
	sulphate	B	A	B	A	A	A	A	A	
Light crude oil (crude benzene)		A	A	D	D	B	A	A	A	A
Light lubricants		A	A	D	D	D	A	A	A	A
Lime milk		A	A	B	A	B	A	A	A	A
Linoleic acid		B	B	B	D	B	-	A	A	
Linseed oil		A	A	A	C	C	A	A	A	A
Liquid gas (Propane, Butane, Propylene)		A	A	C	D	B	C	A	A	
Liquimoly		A	A	D	D	B	A	A	A	
Lubricating oils	di-ester based	B	A	D	D	C	B	A	A	A
	petroleum based	A	A	D	D	B	A	A	A	A
	SAE 10, 20, 30, 40, 50	A	A	C	D	B	A	A	A	A
<b>M</b>										
Magnesium chloride		A	A	A	A	A	A	A	A	A
	hydroxide	B	A	A	A	B	A	A	A	A
	sulphate	A	A	A	A	A	A	A	A	A
Maize oil		A	A	A	C	C	A	A	A	A
Malathion (insecticide)		B	A	D	D	-	B	A	A	
Maleic acid		D	A	D	D	D	-	A	A	B
	anhydrous	D	D	-	B	D	-	A	A	
Malic acid		A	A	D	D	B	D	A	A	A
Mercury		A	A	A	A	A	A	A	A	A
Mercury	chloride	A	A	A	A	A	A	A	A	C
	vapour	A	A	A	A	A	-	A	A	
Mesityl oxide (ketone)		D	D	D	B	D	D	A	A	
Methacrylic acid		D	C	D	B	B	D	A	A	
Methane		A	A	D	D	B	B	A	A	A
Methyl	2-Methyl pentane	A	A	D	D	B	C	A	A	
	3-Methyl pentane	A	A	D	D	B	C	A	A	
	acetate	D	D	D	B	B	D	A	A	
	aceto acetate	D	D	B	B	D	D	A	A	
	alcohol (methanol)	A	D	A	A	A	A	A	A	A
	bromide	B	A	D	D	D	A	A	A	
	butyl ketone	D	D	D	A	D	D	A	A	
	carbonate	D	A	D	D	D	B	A	A	
	cellulose	B	D	B	B	B	D	A	A	
	chloride	D	A	D	C	D	B	A	A	A

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Methyl	chloroform	D	A	D	D	D	B	A	A	
	ether (dimethyl ether)	A	A	A	A	C	A	A	A	
	ethyl ketone (butanon, MEK)	D	D	D	A	D	D	A	A	B
	ethyl ketone peroxide	D	D	B	D	D	D	A <sup>①</sup>	A	
	glycol	C	D	D	B	C	D	A	A	
	isobutyl ketone (MIBK)	D	D	D	C	D	D	A	A	
	methacrylate	D	D	D	D	D	D	A <sup>①</sup>	-	
	oleate	D	A	-	B	D	B	A	A	
Methylaniline		D	B	-	D	D	-	A	A	
Methylcyclopentane		D	A	D	D	D	B	A	A	
Methylene chloride (dichloromethane)		D	B	D	D	D	B	A	A	
Methylisopropylketone		D	D	D	B	D	D	A	A	
Metilacrilato		D	D	D	B	B	D	A	-	
Milk		A	A	A	A	A	A	A	A	A
Mineral oils		A	A	B	D	B	A	A	A	A
Mixed amines		D	D	B	B	B	D	A <sup>①</sup>	A	
Molten sulphur		D	A	C	C	C	C	A	-	A
Monochlorobenzene (chlorobenzene)		D	A	D	D	D	B	A	A	B
Mopar brake fluid		C	D	C	A	B	D	A	A	

**N**

Naphtha		B	A	D	D	D	B	A	A	
Naphthaline		D	A	D	D	D	A	A	A	A
Naphthenic acid		B	A	D	D	D	A	A	A	A
Natural gas		A	A	A	D	A	C	A	A	A
n-Butyl benzoate		D	A	-	A	D	A	A	A	
Neat's foot oil		A	A	B	B	D	A	A	A	
Neon		A	A	A	A	A	A	A	A	
Neville and Winther's acid		D	A	D	B	D	B	A	A	
Nickel acetate		B	D	D	A	B	D	A	A	
	chloride	A	A	A	A	B	A	A	A	B
	sulphate	A	A	A	A	A	A	A	A	A
Nitrobenzene		D	B	D	D	D	D	A	A	B
Nitroethane		D	A	D	B	B	D	A	A	
Nitrogen		A	A	A	A	A	A	A	A	A
Nitromethane		D	A	D	B	C	D	A	A	
Nitropropane		D	A	D	B	D	D	A	A	
Nitrotoluene (40 % + dinitrotoluene 60 % mix)		D	C	D	D	D	C	A	A	
Non-mineral oil based brake fluid		C	D	C	A	B	D	A	A	A
n-propyl acetone		D	D	D	A	D	D	A	A	

**O**

Octachlorotoluene		D	A	D	D	D	B	A	A	
Octadecane		A	A	D	D	B	A	A	A	
Octyl alcohol		B	A	B	A	B	B	A	A	
Oleic acid		C	B	D	D	D	B	A	A	A
Oleum (fuming sulphuric acid)		D	A	D	D	D	D	A	A	A
Olive oil		A	A	A	B	B	A	A	A	
Ortho-chloroethyl benzene		D	A	D	D	D	B	A	A	
Orthochlorophenol		D	A	D	D	D	B	A	A	
Ortho-dichlorobenzene		D	A	D	D	D	B	A	A	
Ortho-n-octane		B	A	D	D	D	B	A	A	

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Oxalic acid	B	A	B	A	B	A	A	A	B
Oxygen, liquid	D	D	D	D	D	D	A <sup>①</sup>	A	A
Ozone	D	A	A	A	C	A	A <sup>①</sup>	A	A

**P**

Paint thinners	D	D	D	D	D	D	A	A	A
Paints	B	A	D	D	D	B	A	A	A
Palmitic acid	A	A	D	B	B	A	A	A	A
n-pentane	A	A	D	D	A	C	A	A	
Perchloric acid 2-molar	D	A	D	B	B	A	A	A	
Petrol	A	A	D	D	B	A	A	A	A
Phenol	D	A	D	D	D	B	A	A	A
Phenyl ethyl ether	D	D	D	D	D	D	A	-	
Phenylhydrazine	D	A	D	D	D	D	A	A	
Phoron	D	D	D	A	D	D	A	A	
Phosphate of calcium	A	A	A	A	B	A	A	A	
Phosphoric acid, 3-molar aqueous solution	D	A	B	A	C	B	A	A	A
Phosphoric acid, 3-molar concentrated molten	D	A	C	B	D	B	A	A	A
Phosphoric acid, 3-molar Phosphorous chloride	D	A	D	A	D	A	A	A	
Picric acid	aqueous solution	A	A	B	A	A	B	A	A
	molten	B	A	D	B	B	B	A	A
Pine oil	A	A	D	D	D	A	A	A	
Pinene	B	A	D	D	C	A	A	A	
Piperidine	D	D	D	D	D	D	A <sup>①</sup>	-	
Polyvinyl acetate emulsion	-	-	-	A	B	-	A	A	
Potassium	acetate	B	D	D	A	B	D	A	A
	chloride	A	A	A	A	A	A	A	A
	copper ferricyanide	A	A	A	A	A	A	A	A
	dichromate	A	A	A	A	A	A	A	B
	hydroxide solutions (dilute)	B	B	B	A	B	B	A	A
	hydroxide caustic potash 50 %	B	D	C	A	B	C	A	A
	nitrate	A	A	A	A	A	A	A	B
	sulphate	A	A	A	A	A	A	A	A
sulphite	A	A	A	A	A	A	A	A	
Prestune antifreeze	A	A	A	A	A	A	A	A	
Propane	A	A	D	D	B	B	A	A	A
Propionitrile	A	A	D	D	B	C	A	A	
Propyl	acetate	D	D	D	B	D	D	A	A
	alcohol (Propanol)	A	A	A	A	A	A	A	A
	nitrate	D	D	D	B	D	D	A	A
Propylene	D	A	D	D	D	B	A	A	A
Propylene oxide	D	D	D	B	D	D	A <sup>①</sup>	A	
Pyradine	D	D	D	B	D	D	A	A	A
Pyranol, transformer oil (postchlorinated biphenylene)	A	A	D	D	B	A	A	A	
Pyrolube	D	A	B	B	D	B	-	A	
Pyrrole	D	D	B	D	D	D	A	A	

**R**

Radioactive radiation	C	D	C	C	C	D	-	D	
Rape oil	A	A	D	A	B	A	A	A	A

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<b>S</b>										
Salicylic acid		B	A	A	A	A	A	A	A	B
Salts of	ammonium	A	B	B	A	B	B	A	A	B
	barium	A	A	A	A	A	A	A	A	
	calcium	A	A	B	A	A	A	A	A	
	copper	A	A	A	A	A	A	A	A	
	magnesium	A	A	A	A	A	A	A	A	A
	nickel	A	A	A	A	B	A	A	A	
	potassium	A	A	A	A	A	A	A	A	A
	sodium	A	A	A	A	B	A	A	A	A
	zinc	A	A	A	A	A	A	A	A	B
Seawater	containing chlorine and salt	D	A	D	D	D	A	A	A	
	salt water	A	A	A	A	A	A	A	A	A
Silicate ester		B	A	D	D	A	A	A	A	A
Silicone greases		A	A	D	A	A	A	A	A	A
Silicone oils		A	A	D	A	A	A	A	A	A
Silver nitrate		B	A	A	A	A	A	A	A	B
Soda (sodium carbonate)		A	A	A	A	A	A	A	A	A
Soapy water		A	A	A	A	B	A	A	A	A
Sodium	acetate	B	D	D	A	B	D	A	A	B
	bicarbonate (baking soda)	A	A	A	A	A	A	A	A	B
	bisulphate <sup>oooo</sup>	A	A	A	A	A	A	A	A	B
	borate (Borax)	A	A	A	A	A	A	A	A	
	carbonate (soda) <sup>oooo</sup>	A	A	A	A	A	A	A	A	B
	chloride (common salt)	A	A	A	A	A	A	A	A	B
	cyanide	A	A	A	A	A	A	A	A	
	hydroxide (caustic soda) 3 molar	B	B	A	A	B	B	A	A	A
	hypochlorite	C	A	C	C	B	B	A	A	A
	metaphosphate (Calgon)	A	A	-	A	B	A	A	A	A
	metasilicate	A	A	-	A	A	-	A	A	A
	nitrate (saltpetre)	B	A	D	A	B	A	A	A	A
	perborate	B	A	B	A	B	A	A	A	
	peroxide	B	A	D	A	B	A	A	A	B
	phosphate primary	A	A	D	A	B	A	A	A	A
	phosphate secondary	A	A	D	A	B	A	A	A	A
	phosphate tertiary	A	A	A	A	B	A	A	A	A
	sulphate (Glauber's salt)	A	A	A	A	A	A	A	A	A
	sulphide	A	A	A	A	A	A	A	A	A
sulphite	A	A	A	A	A	A	A	A		
thiosulphate (fixer)	B	A	A	A	A	A	A	A		
Soya oil		A	A	A	C	C	A	A	A	A
<b>St</b>										
Stannic chloride		A	A	B	A	D	A	A	A	
	50%	A	A	B	A	D	A	A	A	
Stannous chloride		A	A	B	A	A	A	A		
Steam	below 150°C	D	C	C	A	D	D	A	A	A
	above 150°C	D	D	D	B	D	D	A	A	A
Stearic acid		B	A	B	B	B	A	A	A	A
Styrene (monomer)		D	B	D	D	D	C	A <sup>①</sup>	A	
Sugar cane solution		A	A	A	A	A	A	A	A	A
Sugar solutions		A	A	A	A	B	A	A	A	A
Sugar-beet juice		A	A	A	A	B	A	A	A	A

① depending of compound, we suggest to discuss with us!

② for virgin PTFE O-Rings and O-Rings covered with FEP and PFA

③ for metal O-Rings and C-Rings

A stable

B can be used (static applications)

C limited stability (use not recommended)

D not stable

		NBR	FPM	MVQ	EPDM	CR	MFQ	FFKM	FEP <sup>①</sup> FPA <sup>②</sup> PTFE <sup>③</sup>	Nichel alloy X-750 mat. nr. 2.4669 <sup>③</sup>
Sulphur		D	A	B	A	A	A	A	A	
Sulphur chloride	D	A	C	D	D	A	A	A	A	
Sulphur dioxide	aqueous	D	D	B	A	B	B	A	A	A
	dry	D	D	B	A	D	B	A	A	A
	liquid under pressure	D	D	B	A	D	B	A	A	
Sulphur hexafluoride		B	C	B	A	A	B	B	-	
Sulphur trioxide, dry		D	A	B	B	D	B	A	A	A
Sulphuric acid	3-molar	D	A	D	B	C	C	A	A	B
	concentrated	D	A	D	D	D	D	A	A	C
	fuming (20/25 % oleum)	D	A	D	D	D	D	A	A	C
Sulphurous acid		B	A	D	B	B	B	A	A	B
Supergrade petrol		A	A	D	D	B	B	A	A	A
<b>T</b>										
Tar (bituminous)		B	A	B	D	C	A	A	A	A
Tartaric acid		A	A	A	B	B	A	A	A	B
Tetrabromethane		D	A	D	D	D	B	A	A	
Tetrabutyl titanate		B	A	-	A	B	A	A	A	
Tetrachloroethylene (perchloroethylene dry cleaning fluid)		B	A	D	D	D	B	B	B	
Tetraethyl lead		B	A	D	D	B	D	A	A	
	chips	B	A	D	D	D	B	A	A	
Tetrahydrofuran		D	D	D	B	D	D	A	A	
Tetraline		D	A	D	D	D	A	A	A	
Titanium (IV) chloride		B	A	D	D	D	B	A	A	
Toluene		D	A	D	D	D	B	A	A	A
Toluylene diisocyanate		D	D	D	B	D	D	A	A	
Transformer oil		A	A	B	D	B	A	A	A	
Transmission fluid type A		A	A	B	D	B	A	A	A	
Triaryl phosphate		D	A	C	A	D	B	A	A	
Tributoxyethyl phosphate		D	A	-	A	D	B	A	A	
Tributyl	mercaptan	D	A	D	D	D	C	A	A	
	phosphate	D	D	D	A	D	D	A	A	
Trichloroacetic acid		B	C	C	B	D	D	A	A	A
Trichloroethane		D	A	D	D	D	B	A	A	A
Trichloroethylene (Trilene)		D	A	D	D	D	B	A	A	B
Trichloromethane (Chloroform)		D	A	D	D	D	B	A	A	
Triethanolamine		C	D	D	B	B	D	A <sup>①</sup>	A	
Trifluoroethane		D	A	D	D	D	B	B	A	
Trinitrotoluene		D	B	-	D	B	B	A	-	
Trioctyl phosphate		D	B	C	A	D	B	A	A	
Trionthocresylphosphate («TOCP»)		D	B	C	A	D	B	A	-	
Tripolyphosphate		D	B	C	A	C	A	A	A	
Tung oil (China wood oil)		A	A	D	D	B	B	A	A	
Turbine oil		A	A	D	D	D	A	A	A	
Turpentine		A	A	D	D	D	B	A	A	A
<b>V</b>										
Vaseline		A	A	D	D	B	A	A	A	
Vegetable oils		A	A	A	C	C	A	A	A	A
Vinegar (5% acetic acid)		B	A	A	A	B	C	A	A	A
Vinyl acetylene		A	A	B	A	B	-	A	A	

① depending of compound, we suggest to discuss with us!

② for virgin PTFE O-Rings and O-Rings covered with FEP and PFA

③ for metal O-Rings and C-Rings

A stable

B can be used (static applications)

C limited stability (use not recommended)

D not stable

	NBR	FPM	MVQ	EPDM	CR	MFQ	FFKM	FEP <sup>②</sup>	FPA <sup>②</sup>	PTFE <sup>③</sup>	Nichel alloy X-750 mat. nr. 2.4669 <sup>③</sup>
<b>W</b>											
Waste water	A	A	A	A	B	A	A	A	A		
Water (for industrial use) up to	70 °C	A	B	A	A	B	A	A	A	A	
	100 °C	B	B	B	A	C	C	A	A	A	
White oil	A	A	D	D	B	A	A	A			
White pine oil	B	A	D	D	D	A	A	A			
Wine and whisky	A	A	A	A	A	A	A	A	A		A
Wolman's salt (wood impregnation)?	A	A	A	A	B	A	A	A			
Wood oil	A	A	D	D	B	B	A	A			
Wood vinegar	D	D	-	B	D	D	A	A			
<b>X</b>											
Xenon	A	A	A	A	A	A	A	A			
Xylene	D	A	D	D	D	A	A	A	A		A
Xylidine (mixture of aromatic amines)	C	D	D	D	D	D	A <sup>①</sup>	A			
<b>Z</b>											
Zeolites	A	A	A	A	A	A	A	A			
Zinc acetate		B	D	D	A	B	D	A	A		
	chloride	A	A	A	A	A	A	A	A		A
	sulphate	A	A	A	A	A	A	A	A		B

① depending of compound, we suggest to discuss with us!

② for virgin PTFE O-Rings and O-Rings covered with FEP and PFA

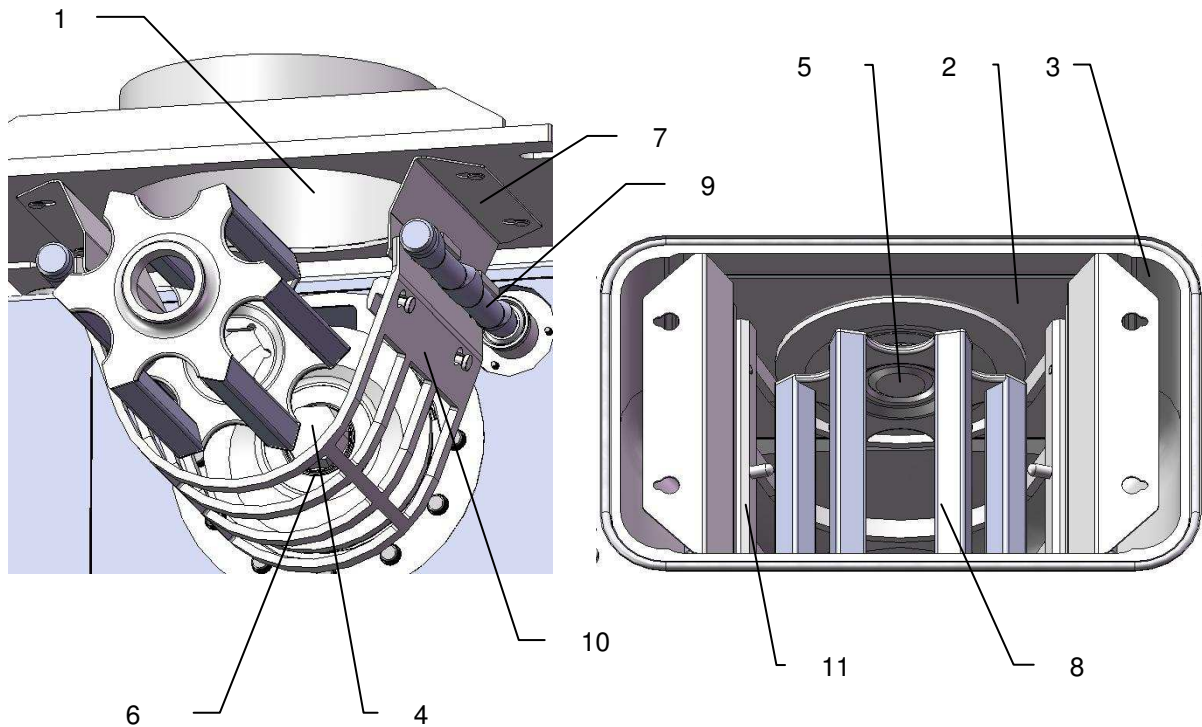
③ for metal O-Rings and C-Rings

A stable

B can be used (static applications)

C limited stability (use not recommended)

D not stable



Pos.	Description / Bezeichnung / Description	Quantité Menge Quantity	Surface/cm <sup>2</sup> Fläche Area
1	Accessoire / Einlaufsätze / Inlet funnel	1	916
2	Bâti / Gehäuse / Housing	1	3392
3	Porte / Fronttüre / Door	1	385
4	Palier fixe / Fest Lager / Fixed bearing	1	264
5	Palier mobile / Mobil Lager / Bearing	1	273
6	Joint du palier/ Lagerdichtung / Seal of bearing	2	71
7	Défecteur / Leitblech / Sheet deflector	2	940
8	Rotor / Rotor / Rotor	1	1358
9	Tendeur / Spanner / Lifting device	2	318
10	Berceau rigide / Stützwanne / Rigid screen support	1	1328
11	Barre d'arrêt / Klemmleiste / Holding rods	2	329

**Total cm<sup>2</sup> 9574**



# **MAINTENANCE AND SUPPORT**









**Pièces mécaniques / Mechanische Teile / Mecanical parts**

Désignation Beschreibung Description	Fréquence de contrôle Kontrollhäufigkeit Frequency of control	Recommandation de changement Austauschempfehlung Recommendation of change
Palier Lager Bearing		~ 5'000 h
Clamp Klemme Clamp	A chaque démontage Bei jeder Demontage To each disassembly	Selon l'état Je nach Abnutzung Depending on the condition

**Joint / Dichtung / Seal**

Désignation Beschreibung Description	Fréquence de contrôle Kontrollhäufigkeit Frequency of control	Recommandation de changement Austauschempfehlung Recommendation of change
Joint à lèvres Lippendichtung Lip gasket		~ 1'500 h
Joint plat Flachdichtung Flat gasket	A chaque nettoyage Nach jeder Reinigung To each cleaning	A chaque démontage Bei jeder Demontage To each disassembly
Joint O-Ring O-Ringdichtung O-ring gasket		Selon l'état Je nach Abnutzung Depending on the condition

**Outillage / Werkzeuge / Tools**

Désignation Beschreibung Description	Fréquence de contrôle Kontrollhäufigkeit Frequency of control	Recommandation de changement Austauschempfehlung Recommendation of change
Rotor		Selon chapitre 7- Usure rotor
Tamis / râpe / treillis  Siebtrommel / Raspeltrommel / Siebe  Screen / Grating / Sieve	A chaque nettoyage Nach jeder Reinigung To each cleaning	Selon l'état Je nach Abnutzung Depending on the condition

**Composants électriques / Elektrische Komponente / Electrical components**

Désignation Beschreibung Description	Fréquence de contrôle Kontrollhäufigkeit Frequency of control	Recommandation de changement Austauschempfehlung Recommendation of change
Sécurité (accessoire entrée/sortie) Sicherheit (Einlauf/Auslaufsätze) Security (inlet/outlet funnel)	1 x par année 1 x pro Jahr 1 x per year	
Sécurité (porte) (5) Sicherheit (Tür) (5) Security (Door) (5)		

## Graissage / Schmierung / Lubrication

Selon chapitre 7 – Tableau de graissage  
Gemäss Kapitel 7 – Schmiertabelle  
According chapter 7 – Lubricating chart



### Conditions spéciales " X"

L'utilisateur final est tenu de respecter le plan de maintenance délivré par le fabricant

Voir documents suivants.

Siehe folgende Dokumente.

See following documents



## Replacing the lip gasket of the bearings

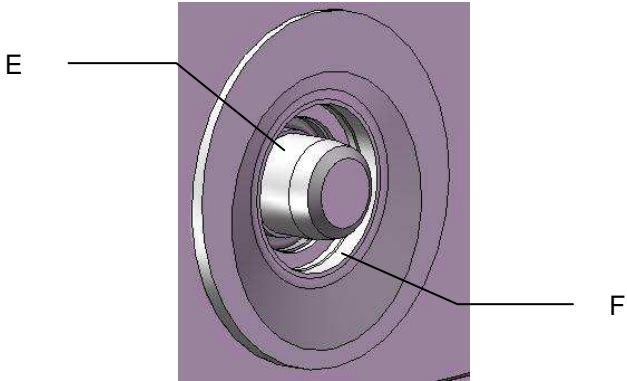
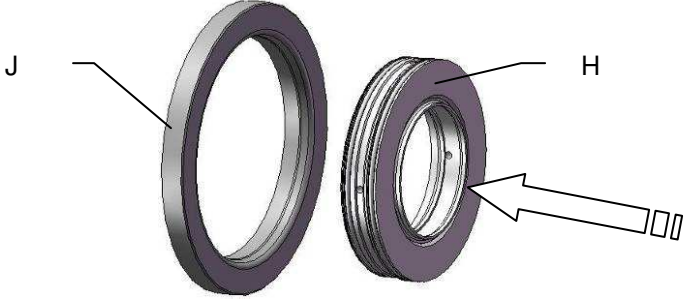
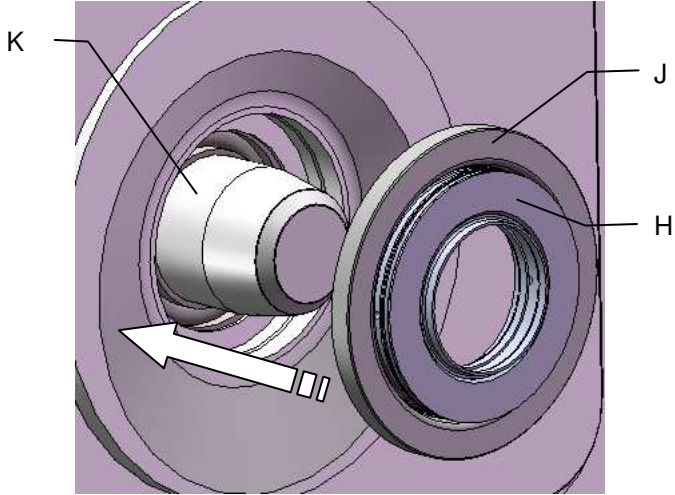
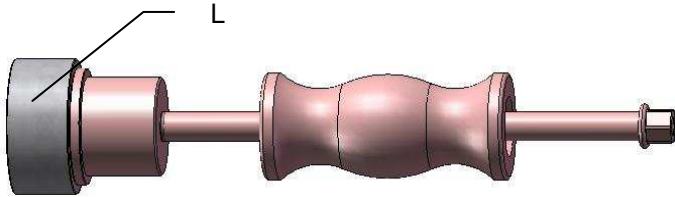


Before performing any work on this unit, it must be turned off and all electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product



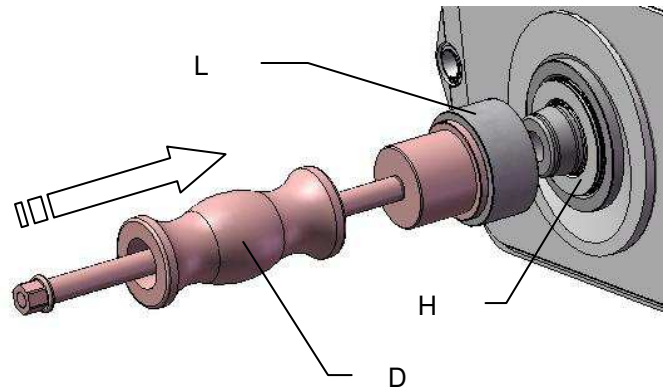
This operation may only be performed by qualified service technicians possessing the specific skills needed to perform the task and who have read these instructions for use.  
They will only use the proper tools for the job.

<ul style="list-style-type: none"> <li>- Open the door according to the instructions in chapter 5- Detaching the tools</li> </ul>	
<ul style="list-style-type: none"> <li>- Position the knife* (A) as shown and cut the gasket (B) by turning the knife</li> </ul> <p>* see chapter 7 – Special tools</p>	
<ul style="list-style-type: none"> <li>- Screw the tip* (C) into the gasket</li> <li>- Tap it with the muff (D) in order to remove the gasket</li> </ul> <p>* see chapter 7 – Special tools</p>	

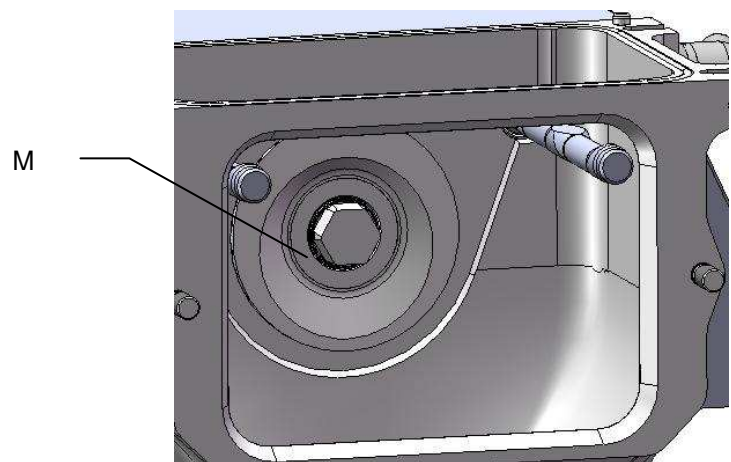
<ul style="list-style-type: none"><li>- Clean the surfaces (E) and (F)</li><li>- Lightly grease the surface (F), see chapter 7 – Lubrication chart</li></ul>	
<ul style="list-style-type: none"><li>- Insert the new gasket (H) in the ring* (J)</li></ul> <p>* see chapter 7 – Special tools</p>	
<ul style="list-style-type: none"><li>- Position the new gasket (H) and the ring (J) on the shaft (K)</li></ul>	
<ul style="list-style-type: none"><li>- Screw on the synthetic element (L)</li></ul>	



- Press the synthetic element (L) against the gasket (H)
- Drive the new gasket in place by tapping it with the muff (D)



- Replace the lip gasket of the housing bearing (M) in the same manner





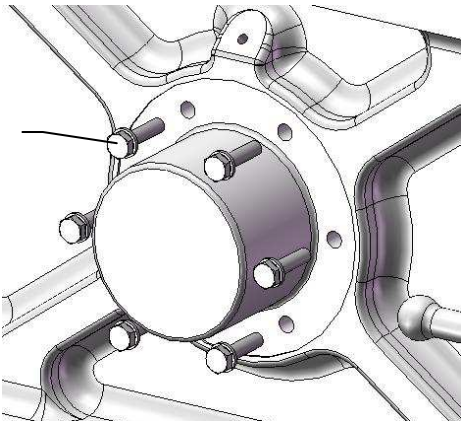

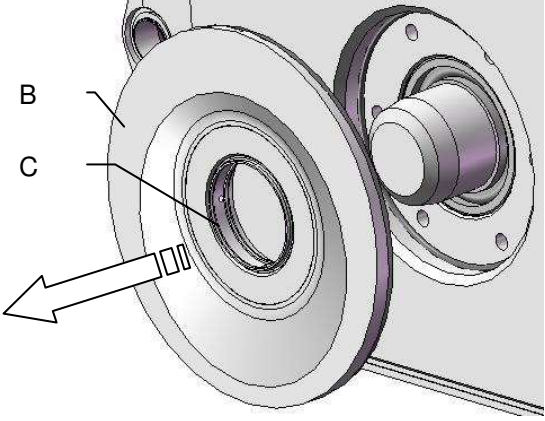
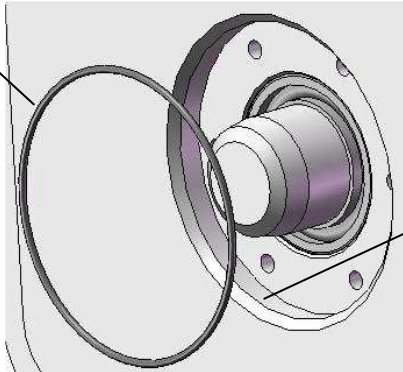
## Replacing the door bearing seals



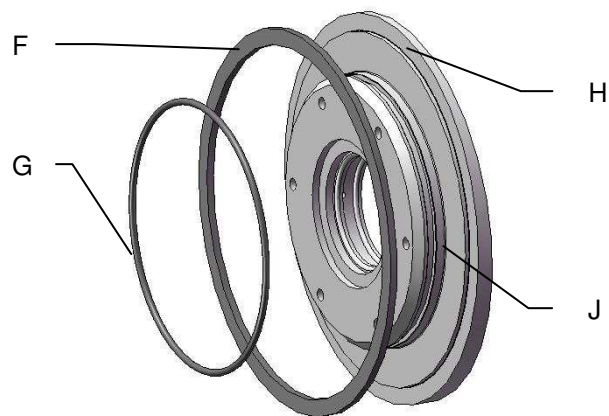
Before performing any work on this unit, it must be turned off and all electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product



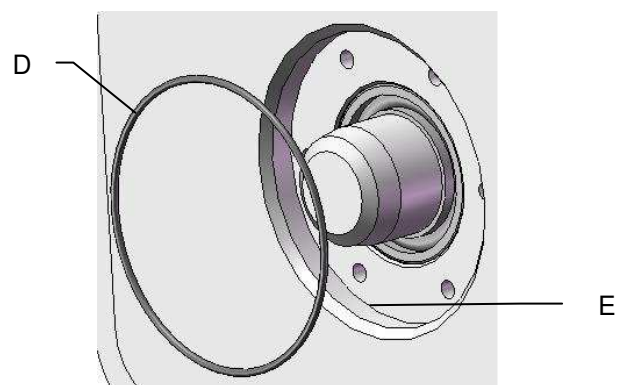
This operation may only be performed by qualified service technicians possessing the specific skills needed to perform the task and who have read these instructions for use.  
They will only use the proper tools for the job.

<ul style="list-style-type: none"> <li>- Open the door according to the instructions in chapter 5- Detaching the tools</li> </ul>	
<ul style="list-style-type: none"> <li>- Loosen and remove the screws (A)</li> </ul>	
<ul style="list-style-type: none"> <li>- Pull and carefully remove the flange collar (B)</li> </ul>  <p>Do not damage the lip gasket (C)</p>	
<ul style="list-style-type: none"> <li>- Remove the gasket (D)</li> <li>- Clean the groove (E)</li> </ul>	

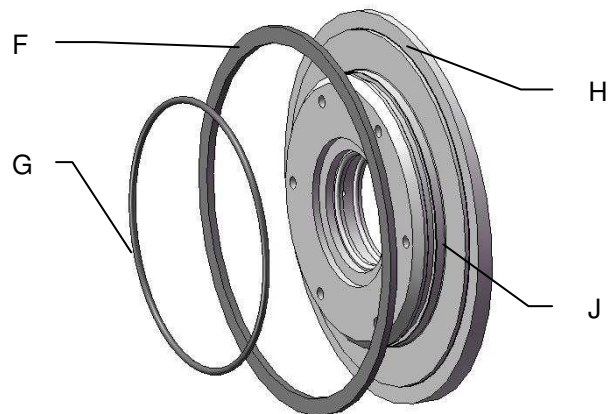
- Remove the flat gasket (F) and the O-ring (G)
- Clean the gasket grooves (H) and (J)



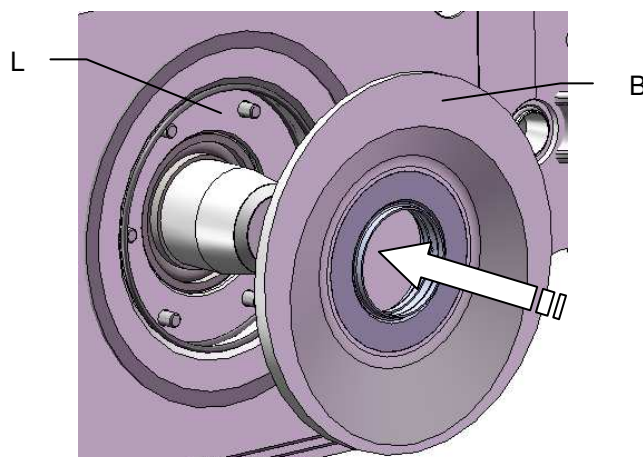
- Lightly grease the gasket (D) according to the instructions in chapter 7 - Lubrication chart
- Place the gasket (D) in the bottom of the groove (E)



- Place the gasket (F) in its groove (H)
- Lightly grease the gasket (G) according to the instructions in chapter 7 - Lubrication chart
- Insert the gasket (G) in its groove (J)

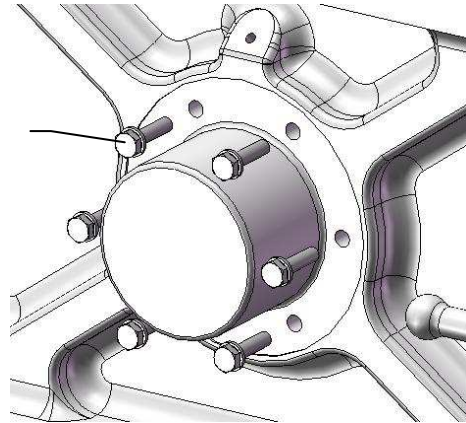


- Carefully insert the flange collar (B) in the door (L)

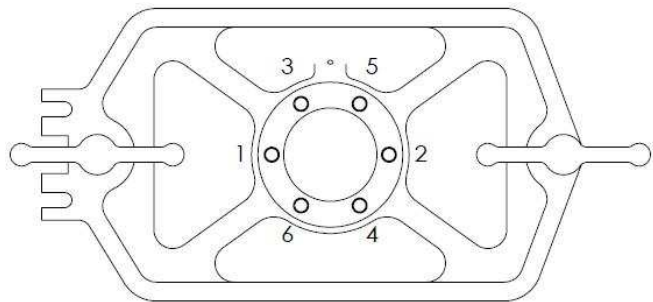


- Insert the screws (A)

A



- Tighten the screws (A) in the sequence shown
- Tighten to the torques indicated in chapter 7 – Tightening torques





## Replacing the gaskets of the housing bearing

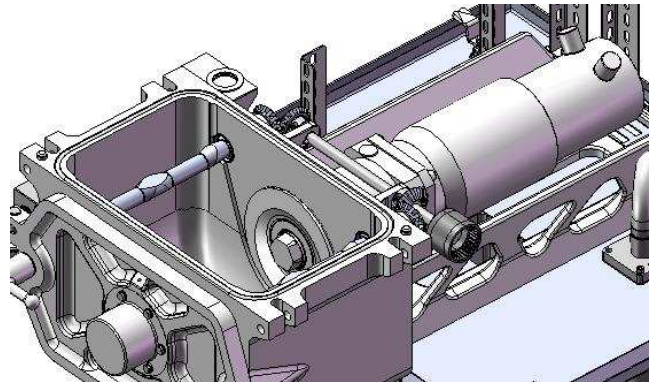


Before performing any work on this unit, it must be turned off and all electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product

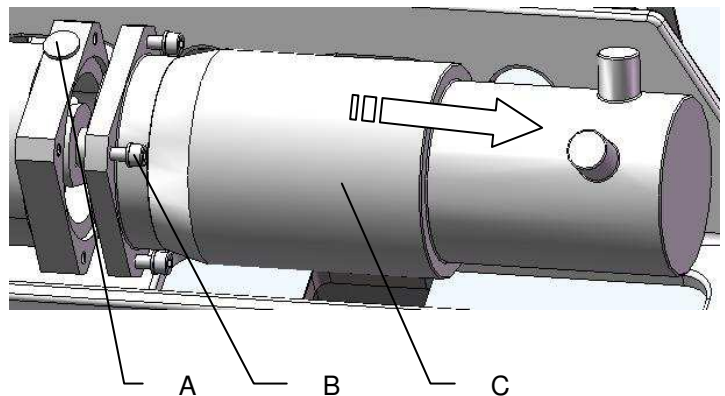


This operation may only be performed by qualified service technicians possessing the specific skills needed to perform the task and who have read these instructions for use.  
They will only use the proper tools for the job.

- Take off the inlet accessory, the tools, and the protective housing. See chapter 5- Detaching the inlet accessory, the tools, and the protective housing



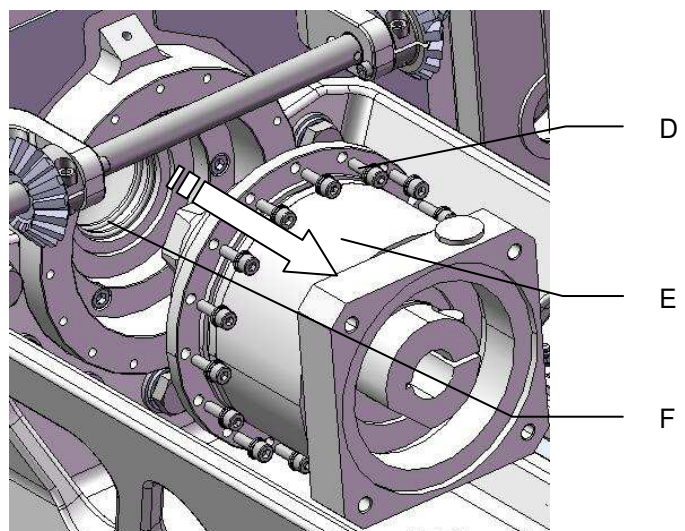
- Remove the plug (A)
- Loosen the inside screw (A)
- Loosen the screws (B)
- Carefully remove the motor (C)



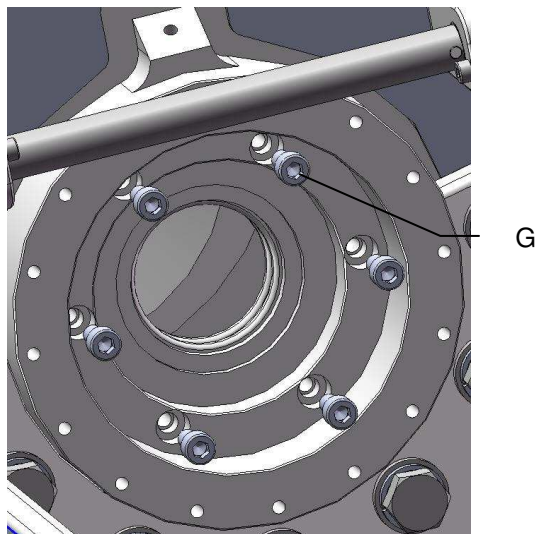
- Loosen the screws (D)
- Carefully remove the reducer (E)



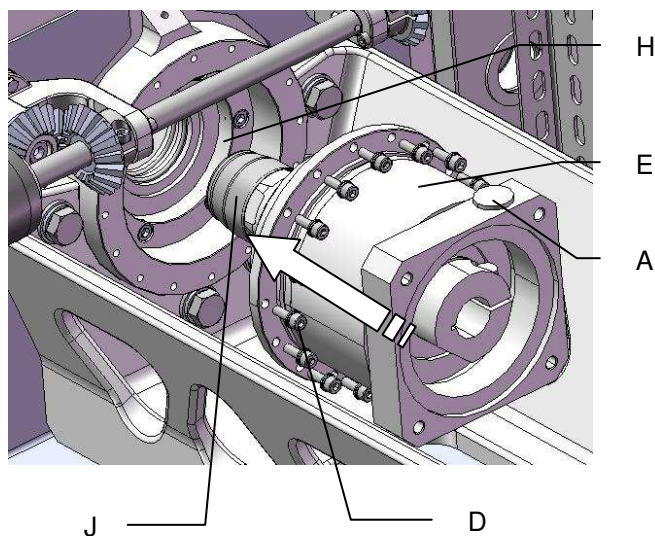
Do not damage the lip gasket (F)



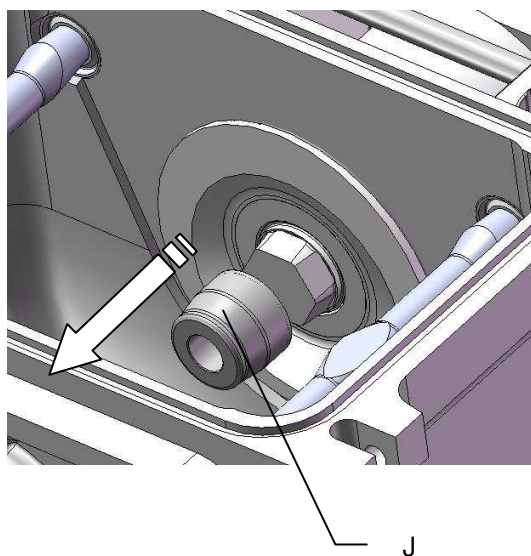
- Loosen the screws (G)
- Then follow the same steps as for the door gaskets, see chapter 7 – Replacing the flat (door) gasket



- Lightly grease the seating (H), see chapter 7 - Lubrication chart
- Insert the assembly cone (J)
- Carefully insert the reducer (E)
- Align the plug (A) so that it is facing up
- Tighten the screws (D), see chapter 7- Tightening torques

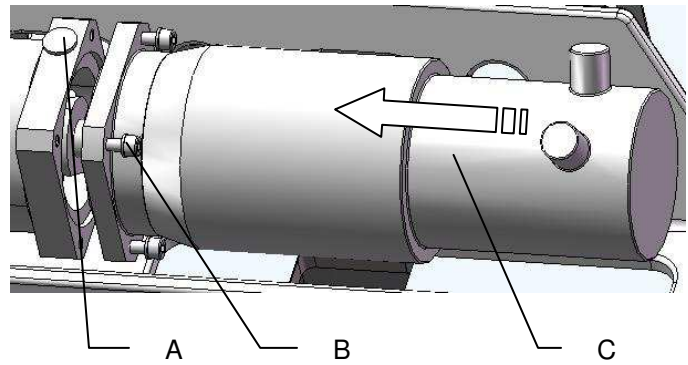


- Do not forget to remove the assembly cone (J)





- Carefully insert the motor (C) in the reducer
- Tighten the screws (B), see chapter 7- Tightening torques
- Tighten the inside screw (A) to the torque indicated in chapter 7 – Tightening torques
- Replace the plug (A)





## Replacing the tightener bearing seals

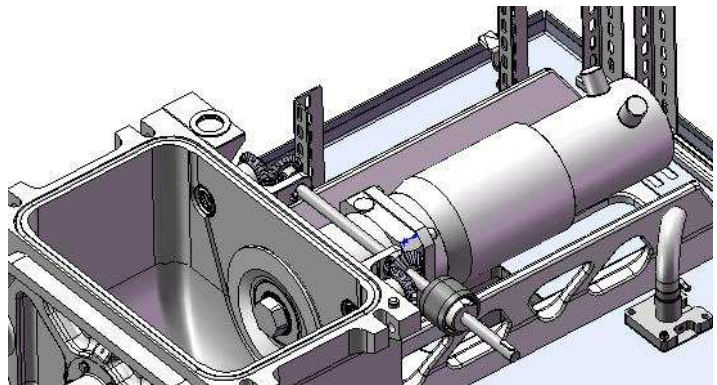


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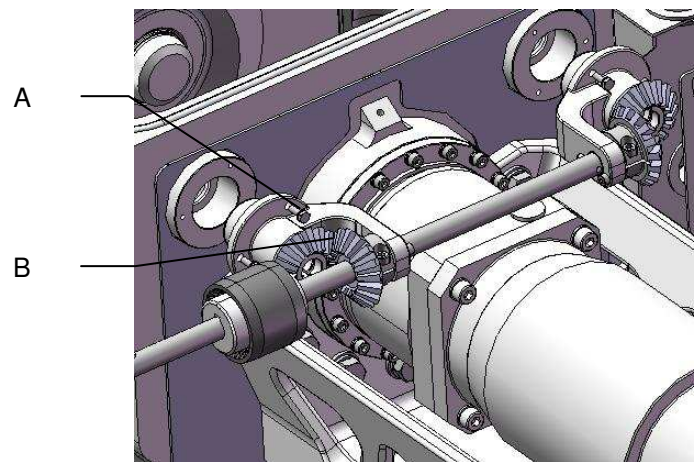


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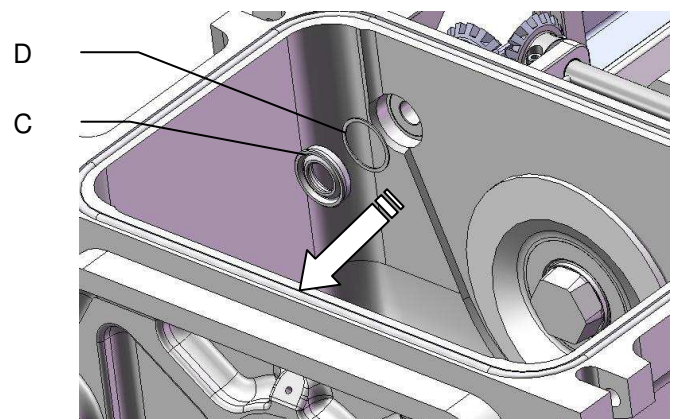
- Take off the inlet accessory, the tools, and the protective housing according to the instructions in chapter 5 – Detaching the inlet accessory, the tools, and the protective housing



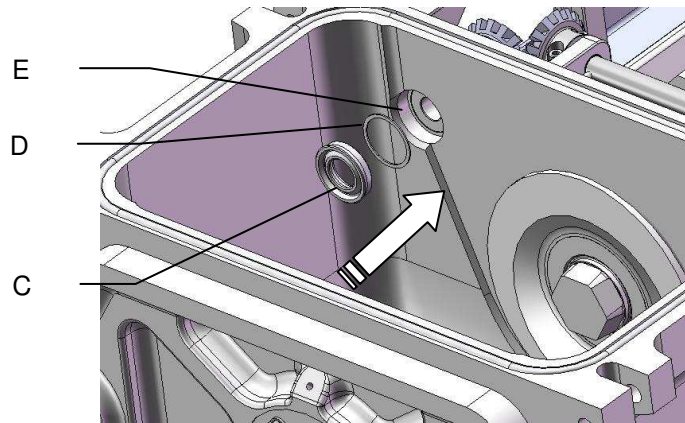
- Loosen the screws (A)
- Remove the tightener adjustment mechanism (B)



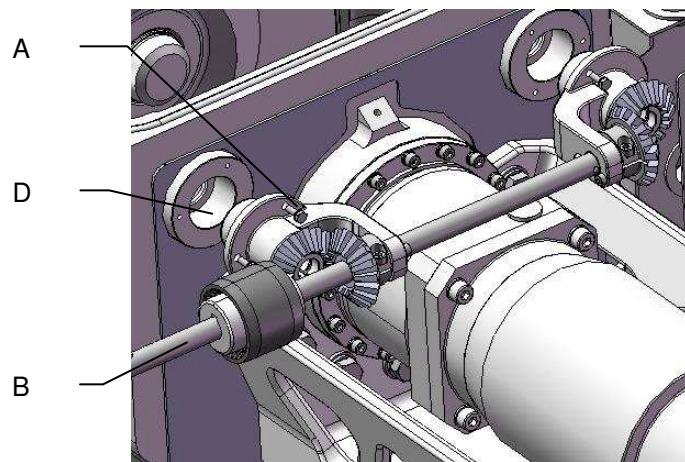
- Using a suitable socket, drive the lip gasket (C) and the ring (D) out of the housing



- Clean the groove (E) and lightly grease the outside of the new gasket (C), see chapter 7 – Lubrication chart
- Drive the ring (D) and the gasket (C) into their groove



- Clean and lightly grease the groove (E) of the bearing, see chapter 7 – Lubrication chart
- Carefully insert the tightener adjustment mechanism (B)
- Tighten the screws (A), see chapter 7 – Tightening torques



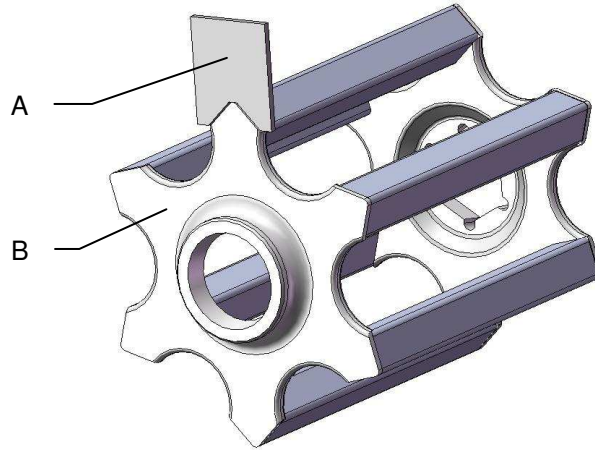
- Attach the inlet accessory, the tools, and the protective housing according to the instructions in chapter 5 – Attaching the inlet accessory, the tools, and the protective housing

## Replacing the rotor

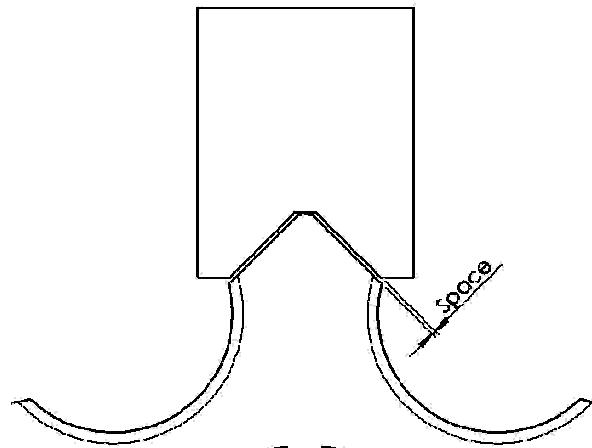


Before performing any work on this unit, it must be turned off and the electric and pneumatic lines disconnected.  
The operator is responsible for preventing risks of contamination by the product

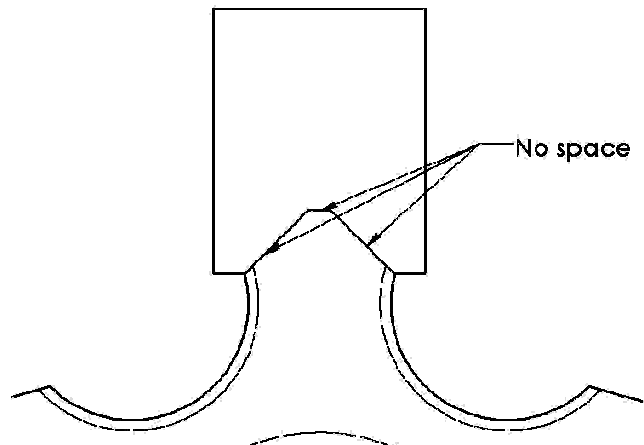
- Place the gauge (A) on the rotor (B)



- OK



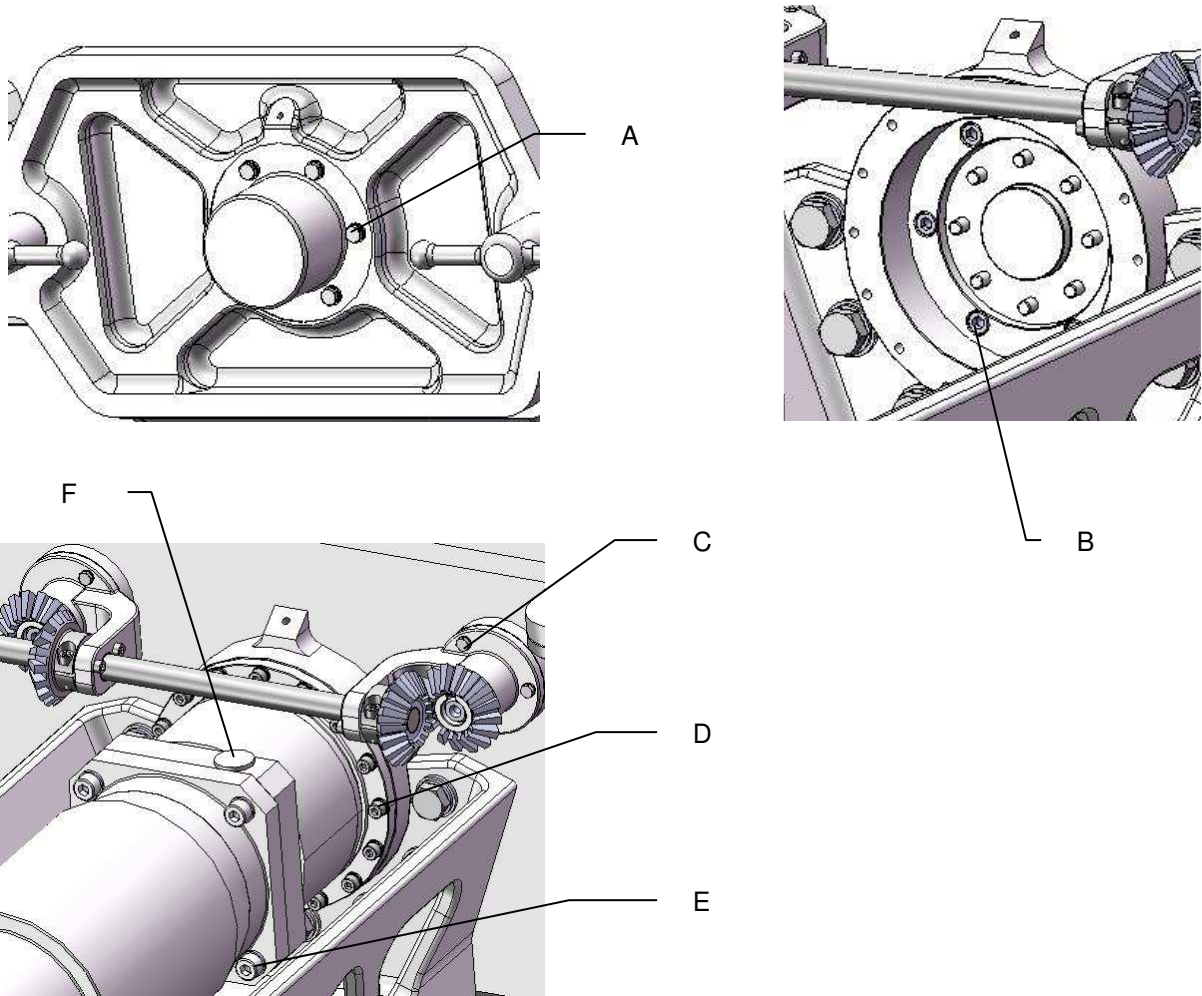
- KO



The rotor must be replaced



**Couples de serrage / Anziehdrehmomente / Tightening torques**



	<b>OscilloWitt-3 / 6</b>	<b>Remarques / Bemerkungen / Remarks</b>
A	8.8 Nm	Graisser / Einfetten / Grease
B	8.8 Nm	Graisser / Einfetten / Grease
C	2.6 Nm	Coller / Kleben / Paste
D	5.1 Nm	Graisser / Einfetten / Grease
E	21.4 Nm	Graisser / Einfetten / Grease
F	40 Nm	Graisser / Einfetten / Grease



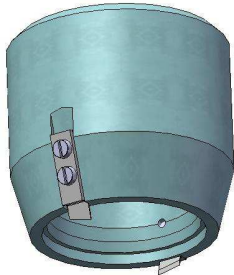
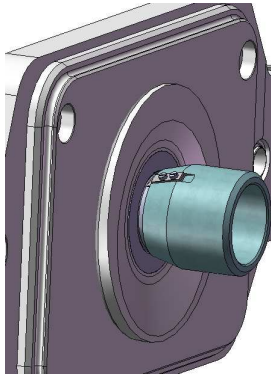
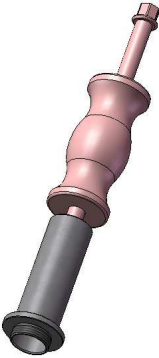
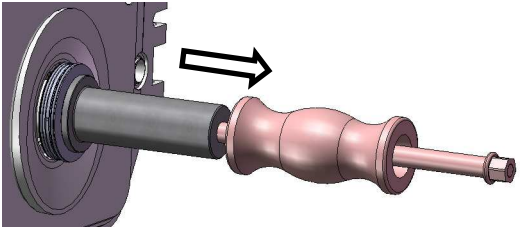


**Outils spéciaux / Spezialwerkzeuge / Specialtools**

Les outils spéciaux ne font pas partie de la fourniture standard de l'installation. Vous pouvez les commander en indiquant le type de machine et le numéro de série à l'adresse indiquée à la fin de ce document.

Die Spezialwerkzeuge gehören nicht zur Standardausrüstung der Anlage. Sie können die bestellen, indem Sie den Maschinentyp und die Seriennummer bei der unten aufgeführten Adresse dieses Dokuments angeben.

The special tools are not included as part of the installation standard supplies. You can order these pieces indicating the type of machine and the serial number at the address indicated at the end of this document.

<p>Couteau Messer Knife</p>		
<p>461102</p>		
<p>Extracteur Abziehwerkzeug Extraction tool</p>		
<p>473187</p>		

Voir chapitre « Formulaire de commande »

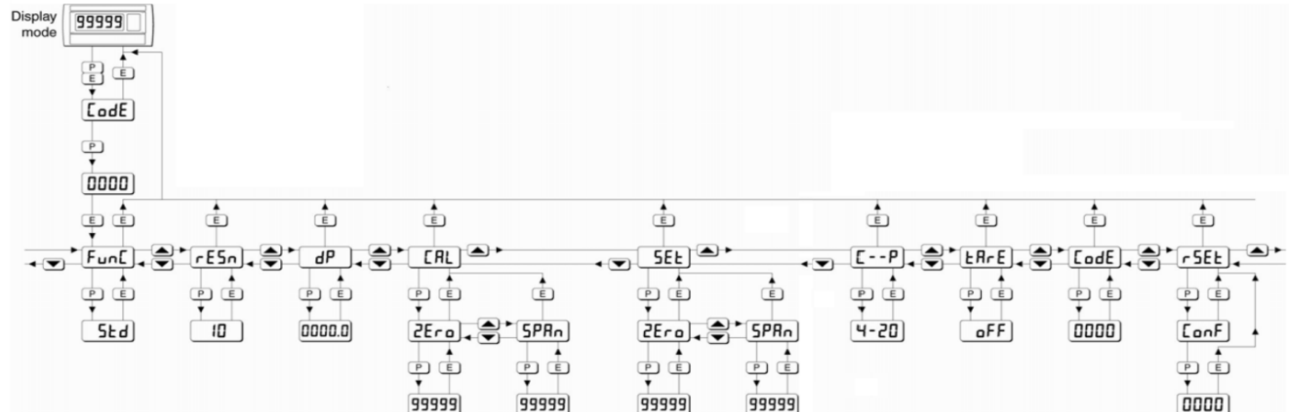
Kapitel « Bestellformular » sehen

Seechapter « Order »



<b>Object:</b>	BEKA BA307E 4-20 mA Art. Nr.: 473177
<b>Project Nr.:</b>	PRO-14-0055, OW-3, Novartis Singapore
<b>Date; Visa:</b>	15.09-2014 (NBR)

### Routing diagram



### Parameters

Code	Description	Setting
FunC	Function	Std
rESn	Resolution	1
dP	Decimal point	00.00
CAL / Zero (Pot.Pos. 0)	Minimum value	0002
CAL / SPAn (Pot. Pos.10)	Maximum value	01.00
C--P	P button function	4-20



# SPARE PARTS



N° Série:

Serien-Nr.

Serial Nr.

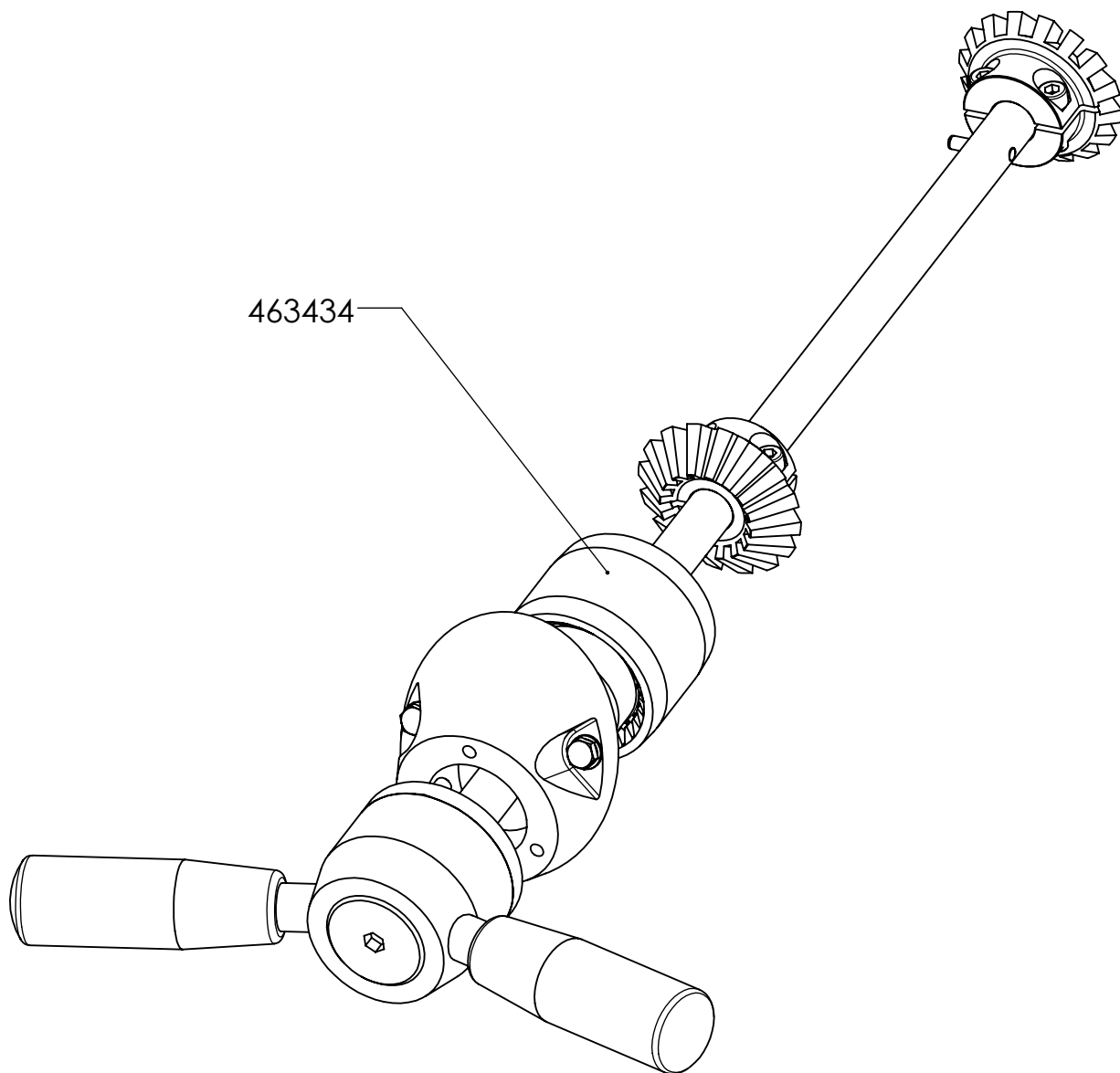
140055-254

REF: **475077 (474201-PRE)**

Article N° Artikel Nr. Article ID.	Description Beschreibung Description	Quantité Menge Quantity	Unité Einheit Unit	No Dessin Zeichnungs-Nr Drawing ID *
... 463434	Coupling Bowex M-24C d1 Ø14 / d2 Ø14	1	Pce	<b>455813</b>
... 459777	Double-lip seal PS -for Ø45, OW-3/6	1	Pce	<b>455814</b>
... 455246	Scraper LUBROSEAL LWP7C 20/28/5, NBR 88 Shore	4	Pce	<b>461981</b>
... 452638	Flat Seal Novafon 500	1	Pce	<b>464645</b>
... 440582	O-Ring 107.63x2.62 FKM 75.5/VA75F HITEC, 11 4035 2666 OR 3425	2	Pce	464645
... 459777	Double-lip seal PS -for Ø45, OW-3/6	1	Pce	464645
... 451418	O-RING 354.97X5.33 EPDM 70 FDA RAL 1013	1	Pce	<b>466519</b>
... 451236	O-RING 278.77X5.33 EPDM 70 FDA RAL 1013	1	Pce	466519
... 452638	Flat Seal Novafon 500	1	Pce	<b>473084</b>
... 440582	O-Ring 107.63x2.62 FKM 75.5/VA75F HITEC, 11 4035 2666 OR 3425	2	Pce	473084
... 459777	Double-lip seal PS -for Ø45, OW-3/6	1	Pce	473084
... 463931	Sieve-TD , 0.50 x rd 0.25, rubber edges	1	Pce	<b>474201</b>
... 443474	Rotor tube 90 6 arms, 1x6p, 160x206, OscilloWitt-3	1	Pce	474201
... 423856	Clamp seal DN200, EPDM, ID213.3, A233.5	1	Pce	474201
... 443387	Rubber covering EPDM Antistatic FDA 0315	1	Pce	474201
... 428631	Compensator Double TRI-CLAMP ISO200, H=70mm, EPDM antistatic black	1	Pce	474201
... 463739	Filter stainless steel L=225.5 D=45 Porostar 5µm	2	Pce	474201
... 464435	Seal D560x7, silicone, 010242.	1	Pce	474201
... 410119	Clamp Seal DN25 silicone	2	Pce	474201
... 412913	Seal D375x7, silicone	1	Pce	474201

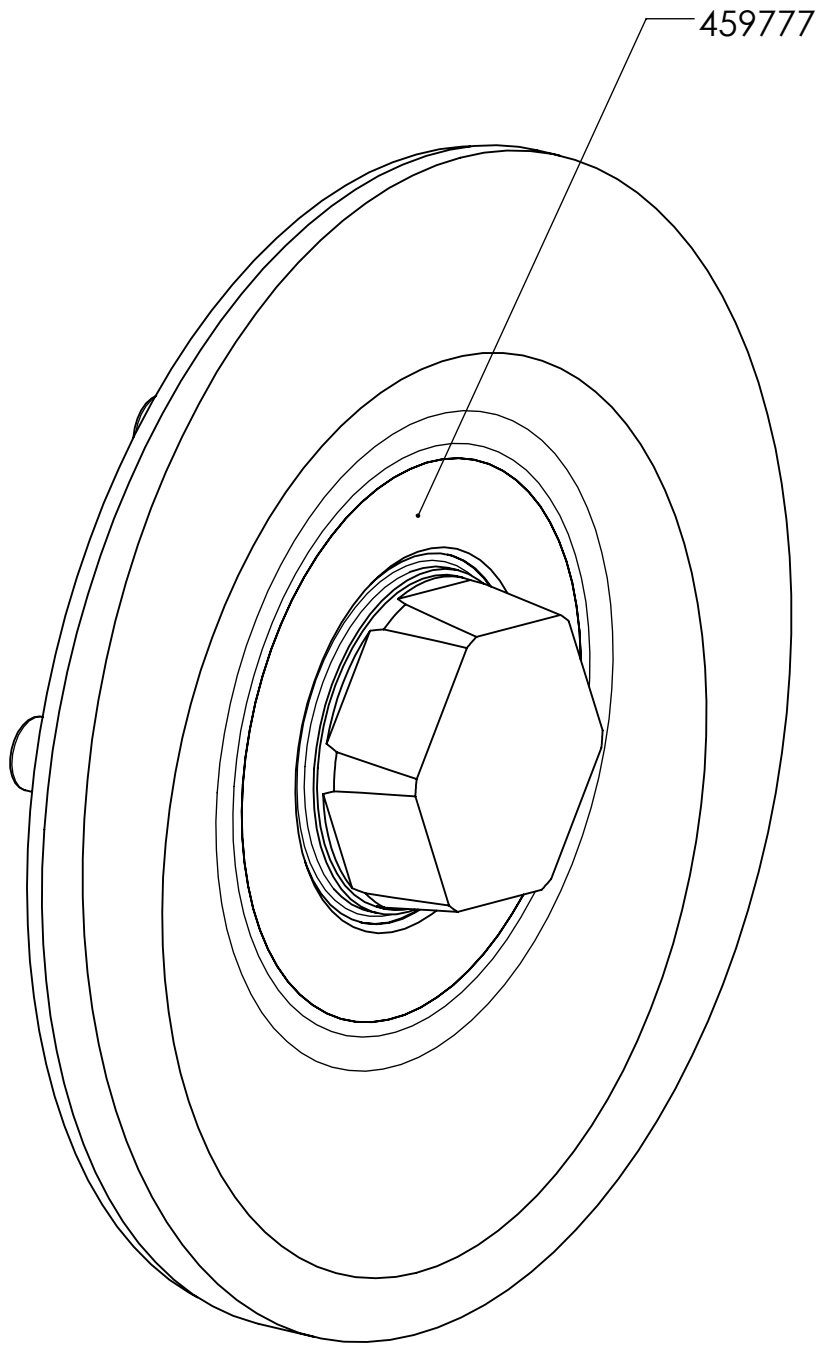






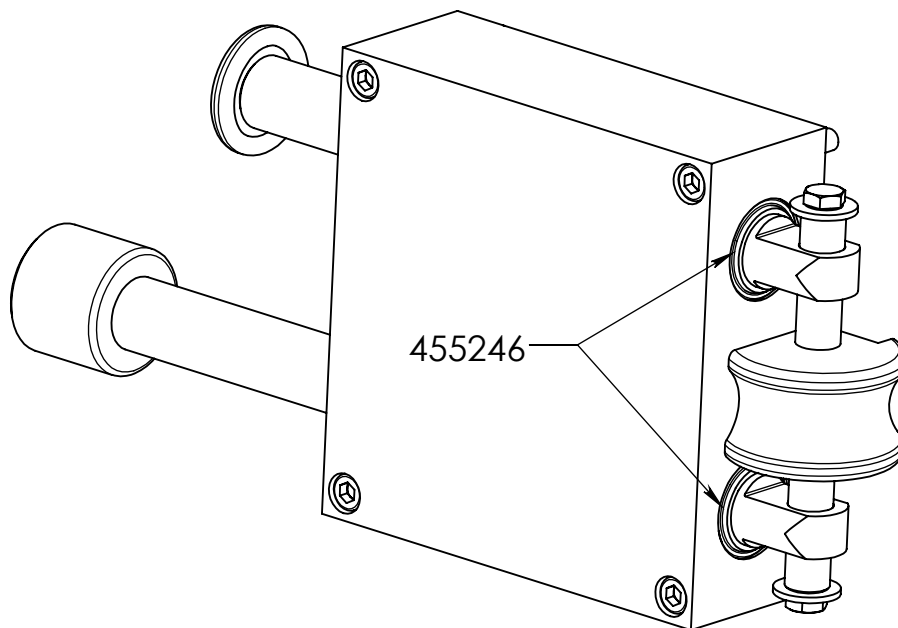
Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	MATERIAL : Matériau <non spécifié>								
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale %	Similar	Designed	27/09/2010	jbe			
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00		Weight [kg]	Controlled	31/01/2011	jbe			
Ensemble axe transmission										A4	2.87	Revised	31/01/2011	jbe	
								Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.							
										1/1		A			





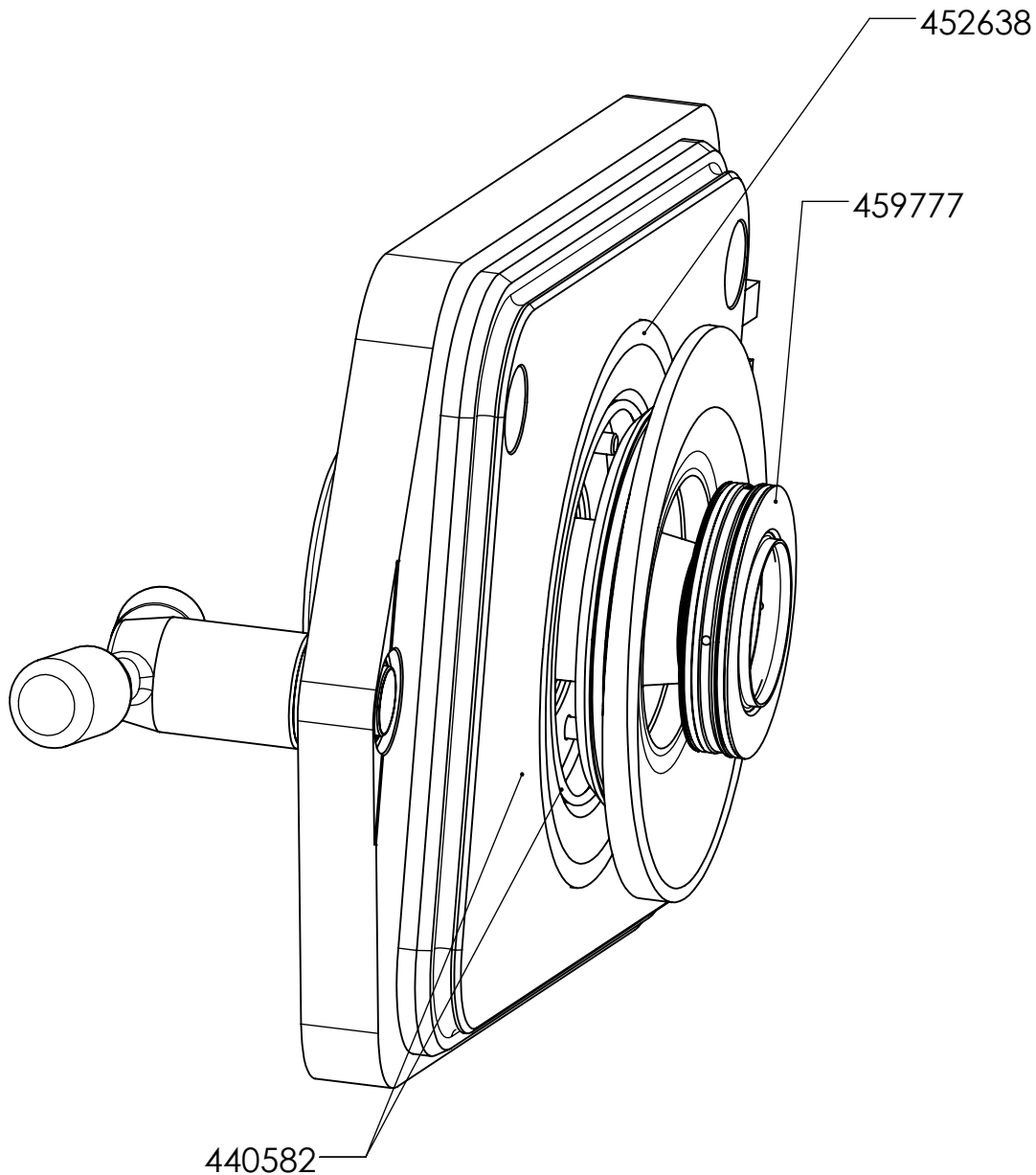
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	up to	6	30	120	400	1000	2000						
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Weight [kg]	A4	0.000000	Atex		
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00						
Palier entraînement									A4	0.000000	Atex	Page	Ver.
												1/1	A
<small>Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.</small>				<small>Frewitt SA; Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com</small>				<h1>455814-PRE</h1>					





Dimensions without tolerance [mm]	above		6	30	120	400	1000	MATERIAL : Matériau <non spécifié>				
	up to	6	30	120	400	1000	2000		Scale	Similar	Designed	27/09/2010
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	%		Controlled	08/09/2011	jbe
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00		Weight [kg]	Revised	08/09/2011	jbe
Ensemble charnière de porte									A4	7.02	Atex	
								Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.				Frewitt SA; Milling and Handling of Powders P.O.B. 615; CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com
										1/1	A	

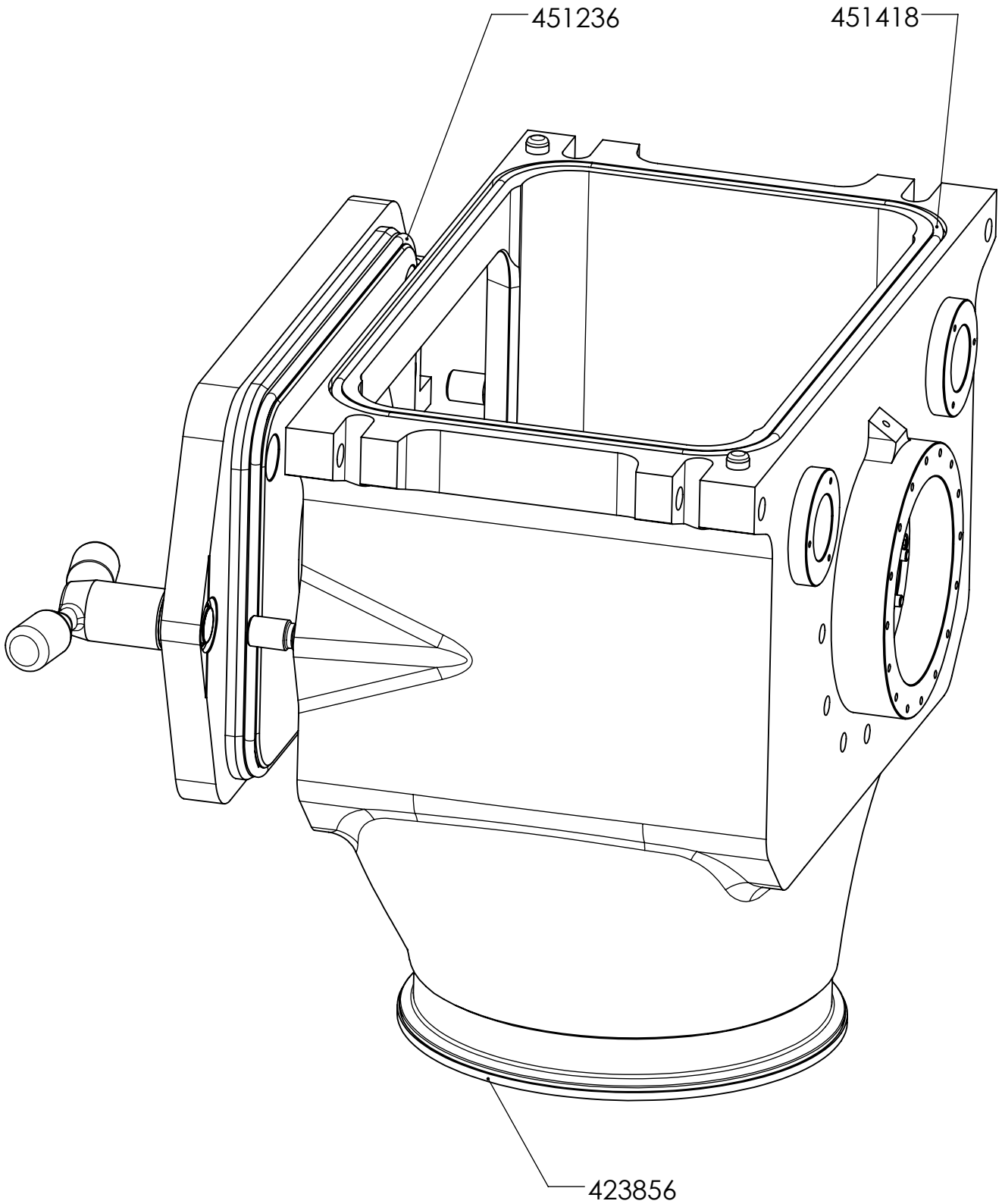





Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	MATERIAL : Matériau <non spécifié>					
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale	Similar	Designed	18/04/2011	jbe
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00	%		Controlled	27/09/2013	jbe
Ensemble porte et palier									Weight [kg]	Revised	27/09/2013	jbe
										A4		15.80
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.				Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com				<b>464645-PRE</b>		Page	Ver.	
										1/1	A	

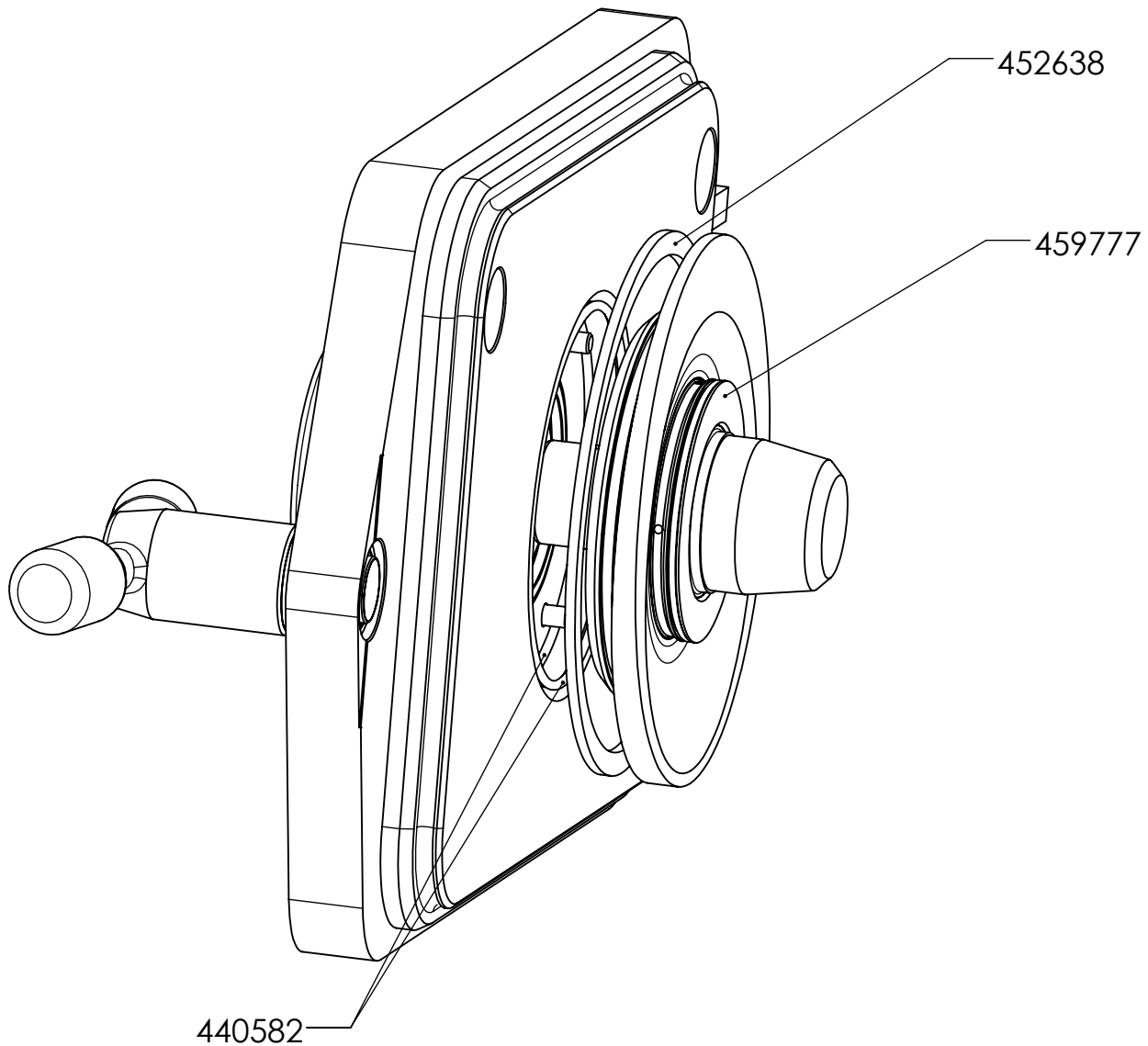






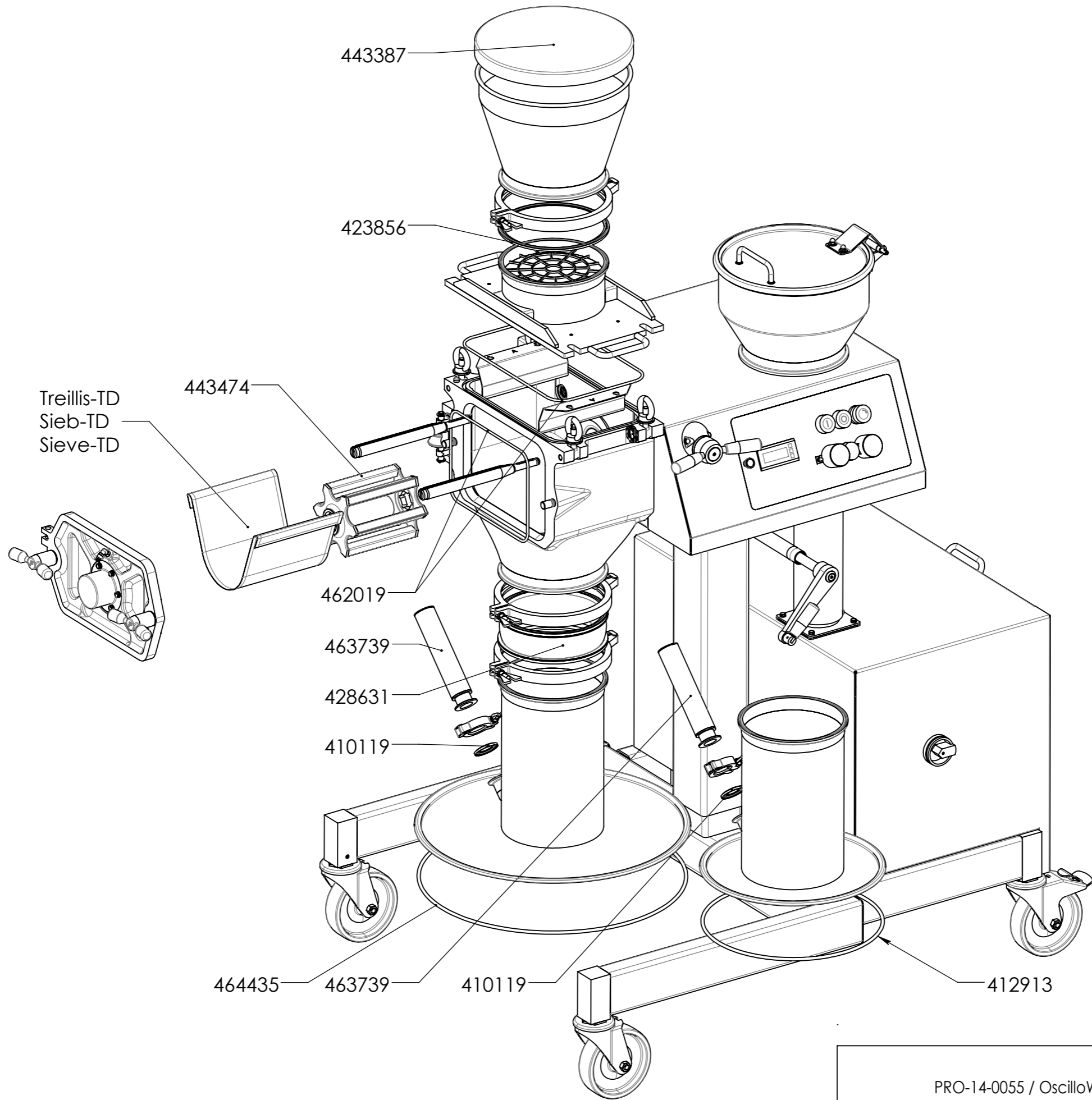
Dimensions without tolerance [mm]	above		6	30	120	400	1000	MATERIAL :	Scale	Similar	Designed	07/09/2010	jbe
	up to	6	30	120	400	1000	2000						
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20		%		Controlled	07/02/2014	jbe
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00		⊕	Weight [kg]	Revised	07/02/2014	jbe
Etanchéité EPDM								A4	64.670150	Atex			
								Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.		 Frewitt SA; Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com		462019-PRE	
												1/1	A





Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	MATERIAL : Matériau <non spécifié>								
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale %	Similar	Designed	27/11/2013	jbe			
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00		Weight [kg]	Controlled	27/11/2013	jbe			
Ensemble porte et palier										A4	16.27	Revised	27/11/2013	jbe	
								Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.							
<b>473084-PRE</b>		1/1	A												





PRO-14-0055 / OscilloWitt-3 <small>Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.</small>	scale %	Designed	01/04/2014	tgr
		Controlled	16/09/2014	edgu
	A3	Revised	16/09/2014	edgu
<small>Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com</small>	<b>474201-PRE</b>		Page	Ver.
			1/1	A



Notre service d'après vente se tient volontiers à votre disposition pour les commandes et demandes d'offre. Vous pouvez nous contacter comme suit:

Für Bestellungen oder Preisanfragen für Ersatzteile steht Ihnen unser Kundendienst gerne zur Verfügung. Sie erreichen uns wie folgt :

Our After Sales Service is at your disposal for inquiries, purchase orders for spare parts as well as for any further information you request on your machine. Our contacts are as follows

Tel: +41 26 460 74 00  
Fax +41 26 460 74 07  
E-mail: [customerservice@frewitt.com](mailto:customerservice@frewitt.com)

Formulaire de commande / d'offre au verso.

Bestellformular / Angebotsformular auf der Rückseite

Order / Inquiry form on the back





# TOOLS



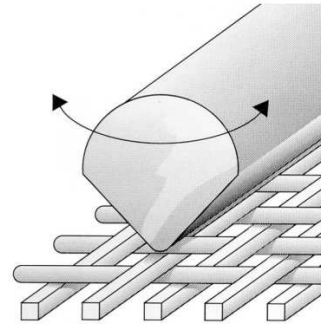
Besides the correct adjustment of the machine, the choice of the right sieve is of great importance for a quality sizing. This information gives you some details about the application of our various sieve types.

### Dry sizing

Very strong sieves are required for crushing and dry sizing. FREWITT has introduced sieves with square wire to the market, which provides remarkable advantages in comparison to conventional round wire sieves.

#### Square wire sieves

These sieves, developed by FREWITT, are made of square wire lengthways, parallel to the rotor arms and of round wires perpendicularly.



#### What are the advantages?

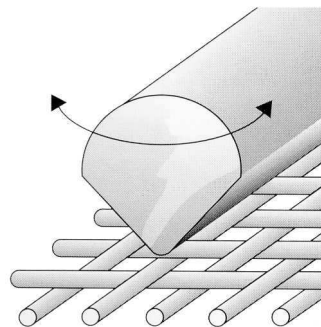
- Up to 15% more output
- Cutting effect due to the square wire

#### How to explain such improvements?

The sharp edge of the square wire provides a breaking effect as opposed to the crushing of the product against the curved surface of round wires. The material breaks on the edge of the square wire. Thus producing less fines with a higher yield (see sketch).

#### Round wire sieves

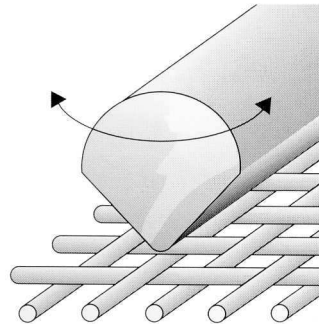
These sieves are adequate for sieving and loosening of lumped products.



## Wet sizing

### *Round wire sieves*

During wet sizing, the material has to be cut to obtain granules. Therefore the sieves are made of fine wires in proportion to the mesh size. This process can be compared with cutting butter. The thinner the wire, the less power is required.



## Adjustment of the installation

See chapter 5 – adjustment of the rigid screen support and 5 – adjustment of the directly mounted sieves

Les treillis doivent être entreposés correctement.

Die Siebgewebe müssen ordnungsgemäß gelagert werden.

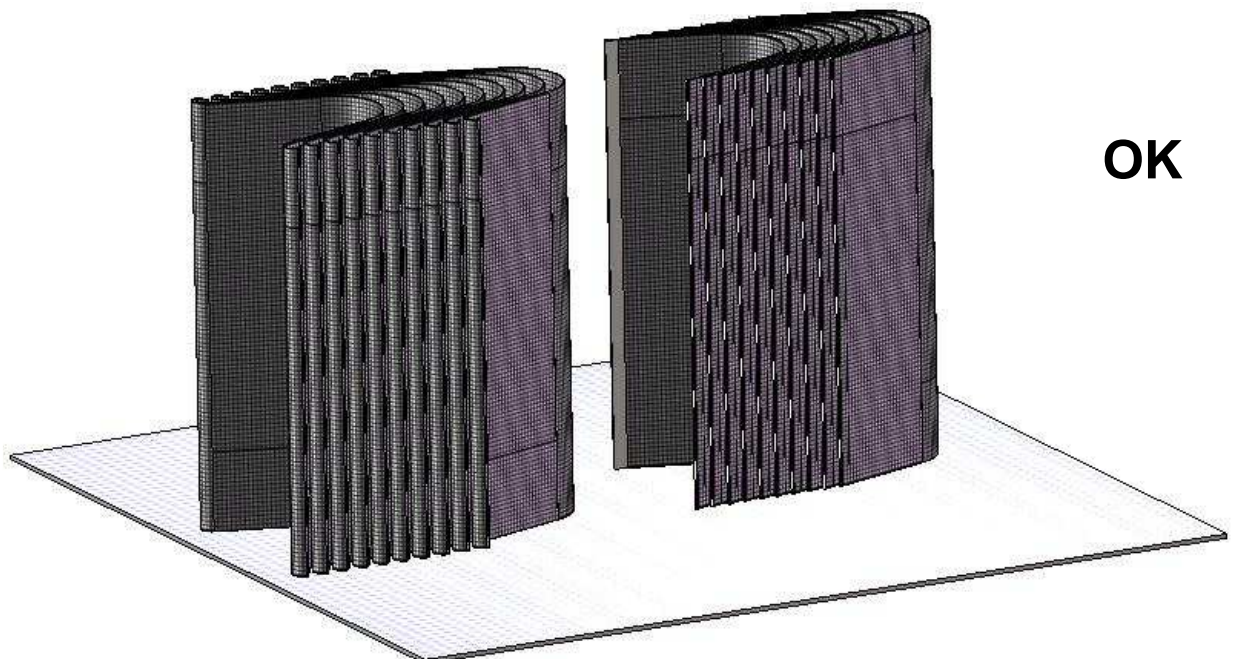
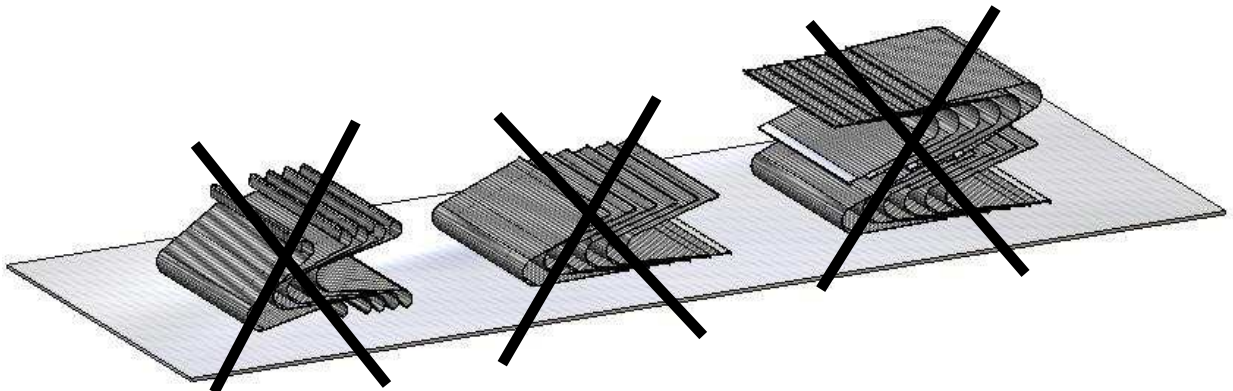
The sieves must be stored correctly.



Un entreposage incorrect peut endommager les treillis

Eine falsche Lagerung kann die Siebgewebe beschädigen

Incorrect storage can damage material to the sieves

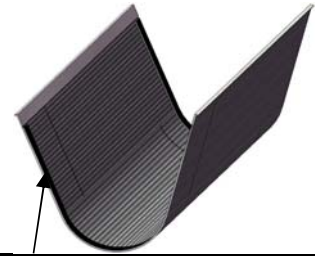




# OscilloWitt-3



**Treillis pour berceau rigide**  
**Siebe für starre Stütze**  
**Sieves for rigid screen support**



Surface utile

Wirksame Fläche 625 cm<sup>2</sup>

Useful surface

**316**  
**(1.4401)**

bords renforcés  
 verstärkte Rändern  
 reinforced edges

Article Artikel Article		Ouverture maille Maschenweite Mesh opening mm	Fil Draht Wire mm	Passage Nutzfläche Passage %	Prix Preis Price £
463880	O	1.00	Ø 0.63	38	344
463881	X	1.25	Ø 0.80	37	344
463882	X	1.50	Ø 1.00	36	344
463883	X	2.00	Ø 1.00	44	344
463884	X	2.50	Ø 1.00	51	344
463885	O	1.00	■ 0.63	38	366
463886	X	1.25	■ 0.80	37	366
463887	X	1.50	■ 1.00	36	366
463888	X	2.00	■ 1.00	44	366
463889	X	2.50	■ 1.00	51	366

Ø = fil rond / Runddraht / round wire

■ = fil carré / Vierkantdraht / square wire

O Stock / Lager / Stock

X Livrable en 10 semaines / Verfügbar in 10 Wochen / Available in 10 weeks



**Use original Frewitt spare and wear parts only.**  
**Using non Frewitt parts may lead to dangerous situations (explosion or injury)**  
**and will void the ATEX certification**

Date d'impression / Druck Datum / Printed Date : 28.05.2014

Prix indicatifs, sous réserve de modification / Richtpreise, Änderungen vorbehalten / Approximate price, subject to change

# OscilloWitt-3



**Treillis pour berceau rigide**  
**Siebe für starre Stütze**  
**Sieves for rigid screen support**



Surface utile

Wirksame Fläche 625 cm<sup>2</sup>

Useful surface

**316**  
**(1.4401)**

Article Artikel Article		Ouverture maille Maschenweite Mesh opening mm	Fil Draht Wire mm	Passage Nutzfläche Passage %	Prix Preis Price £
463905	X	3.15	Ø 1.50	46	310
463906	X	4.00	Ø 1.00	64	310
463907	X	5.00	Ø 1.25	64	310
463908	X	6.00	Ø 1.50	64	310
463909	X	3.15	■ 1.50	46	337
463911	X	6.00	■ 1.50	64	337
463912	X	8.00	■ 1.50	71	337

Ø = fil rond / Runddraht / round wire

■ = fil carré / Vierkantdraht / square wire

O Stock / Lager / Stock

X Livrable en 10 semaines / Verfügbar in 10 Wochen / Available in 10 weeks



**Use original Frewitt spare and wear parts only.**  
**Using non Frewitt parts may lead to dangerous situations (explosion or injury)**  
**and will void the ATEX certification**



# OscilloWitt-3



**Treillis sur support léger**  
**Siebe auf leichte Stütze**  
**Sieves on light screen support**



Surface utile

Wirksame Fläche 625 cm<sup>2</sup>

Useful surface

**316**  
**(1.4401)**

Article Artikel Article		Ouverture maille Maschenweite Mesh opening mm	Fil Draht Wire mm	Passage Nutzfläche Passage %	Prix Preis Price £
463844	O	0.25	Ø 0.16	37	495
463845	X	0.315	Ø 0.20	37	495
463846	X	0.40	Ø 0.25	38	495
463847	O	0.50	Ø 0.25	44	495
463848	X	0.63	Ø 0.40	37	495
463849	X	0.71	Ø 0.45	37	495
463850	O	0.80	Ø 0.50	38	495
463851	O	1.00	Ø 0.32	57	495
463852	X	1.25	Ø 0.40	57	495
463853	X	1.50	Ø 0.50	56	495
463854	X	2.00	Ø 0.63	58	495
463855	X	0.63	■ 0.40	37	519
463856	X	0.71	■ 0.45	37	519
463857	O	0.80	■ 0.50	38	519

Ø = fil rond / Runddraht / round wire

■ = fil carré / Vierkantdraht / square wire

O Stock / Lager / Stock

X Livrable en 10 semaines / Verfügbar in 10 Wochen / Available in 10 weeks



**Use original Frewitt spare and wear parts only.**  
**Using non Frewitt parts may lead to dangerous situations (explosion or injury)**  
**and will void the ATEX certification**

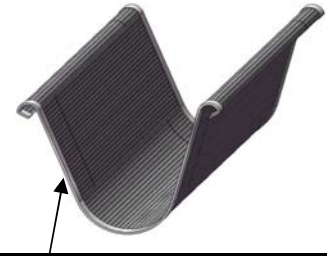
Date d'impression / Druck Datum / Printed Date : 28.05.2014

Prix indicatifs, sous réserve de modification / Richtpreise, Änderungen vorbehalten / Approximate price, subject to change

# OscilloWitt-3



Treillis pour tension directe (sans berceau rigide)  
 Siebe für Direkt-Einspannen (ohne starre Stütze)  
 Sieves for direct tensioning (without rigid screen support)

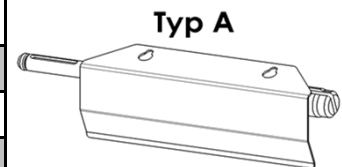


Surface utile  
 Wirksame Fläche 625 cm<sup>2</sup>  
 Useful surface

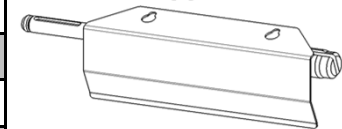
**316**  
**(1.4401)**

bords gommés  
 Gummirand  
 rubber edges

Article Artikel Article		Ouverture maille Maschenweite Mesh opening mm	Fil Draht Wire mm	Passage Nutzfläche Passage %	Prix Preis Price £
463928	X	0.25	Ø 0.16	37	#N/A
463929	X	0.315	Ø 0.20	37	#N/A
463930	X	0.40	Ø 0.25	38	#N/A
463931	O	0.50	Ø 0.25	44	#N/A
463932	X	0.63	Ø 0.40	37	#N/A
463933	X	0.71	Ø 0.45	37	#N/A
463934	O	0.80	Ø 0.50	38	#N/A
463935	O	1.00	Ø 0.63	38	#N/A
463936	O	1.25	Ø 0.80	37	#N/A
463937	X	1.50	Ø 1.00	36	#N/A
463938	O	1.50	Ø 0.50	56	#N/A
463939	X	2.00	Ø 0.63	58	#N/A
463940	X	2.50	Ø 1.00	51	#N/A
463941	X	3.15	Ø 0.80	64	#N/A
463942	X	3.50	Ø 1.50	49	#N/A



**Typ A**



**Typ B**

Ø = fil rond / Runddraht / round wire

O Stock / Lager / Stock

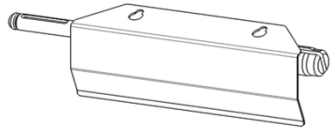
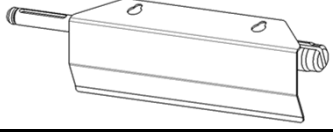
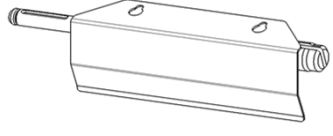
X Livrable en 10 semaines / Verfügbar in 10 Wochen / Available in 10 weeks



**Use original Frewitt spare and wear parts only.**  
**Using non Frewitt parts may lead to dangerous situations (explosion or injury)**  
**and will void the ATEX certification**

Date d'impression / Druck Datum / Printed Date : 28.05.2014

Prix indicatifs, sous réserve de modification / Richtpreise, Änderungen vorbehalten / Approximate price, subject to change

Article Artikel Article		Ouverture maille Maschenweite Mesh opening mm	Fil Draht Wire mm	Passage Nutzfläche Passage %	Prix Preis Price £	
463943	X	4.00	Ø 1.00	64	#N/A	 <p>Typ B</p>
463944	X	5.00	Ø 1.25	64	#N/A	
463945	X	0.63	■ 0.40	37	#N/A	 <p>Typ A</p>
463946	X	0.71	■ 0.45	37	#N/A	
463947	X	0.80	■ 0.50	38	#N/A	 <p>Typ B</p>
463948	O	1.00	■ 0.63	38	#N/A	
463949	X	1.25	■ 0.80	37	#N/A	
463950	X	1.50	■ 1.00	36	#N/A	
463951	X	2.00	■ 1.00	44	#N/A	
463952	X	3.15	■ 1.50	46	#N/A	

Ø = fil rond / Runddraht / round wire  
 ■ = fil carré / Vierkantdraht / square wire

O Stock / Lager / Stock  
 X Livrable en 10 semaines / Verfügbar in 10 Wochen / Available in 10 weeks



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 Using non Frewitt parts may lead to dangerous situations (explosion or injury)  
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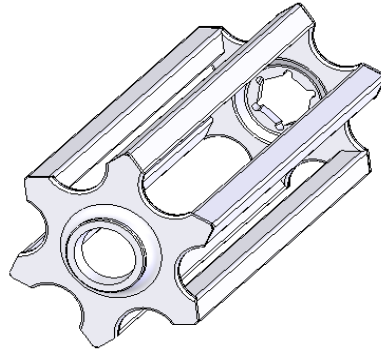
Date d'impression / Druck Datum / Printed Date : 28.05.2014

Prix indicatifs, sous réserve de modification / Richtpreise, Aenderungen vorbehalten / Approximate price, subject to change

# OscilloWitt-3


**Rotor**
**316 L**

Article Artikel Article		Prix Preis Price £
443474	<b>O</b>	1332


**O Stock / Lager / Stock**
**X Livrable en 10 semaines / Verfügbar in 10 Wochen / Available in 10 weeks**

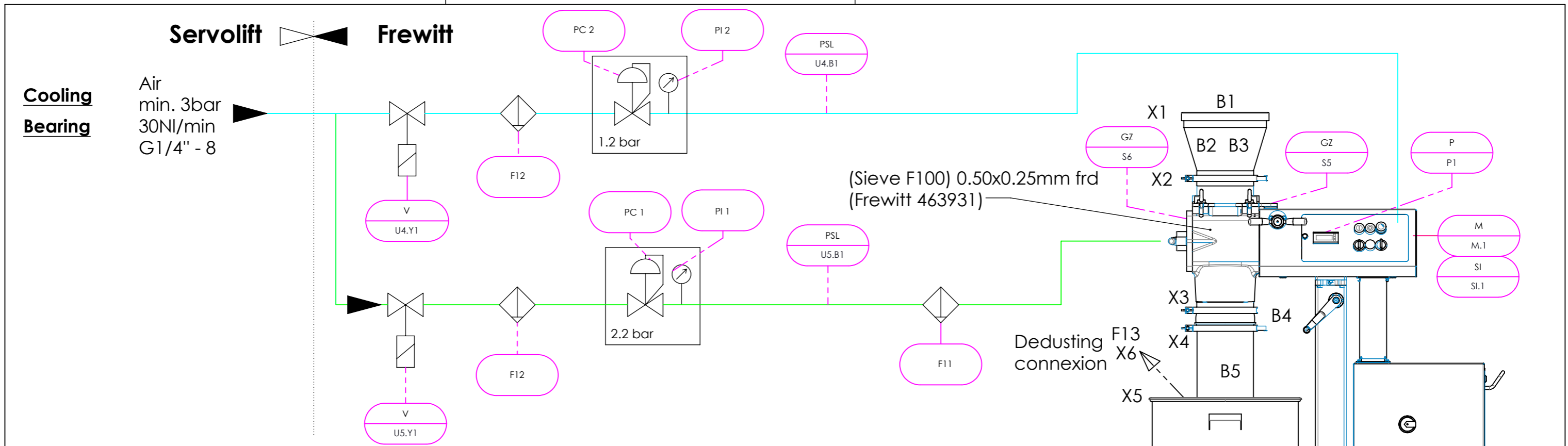

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and will void the ATEX certification**

Date d'impression / Druck Datum / Printed Date : 28.05.2014

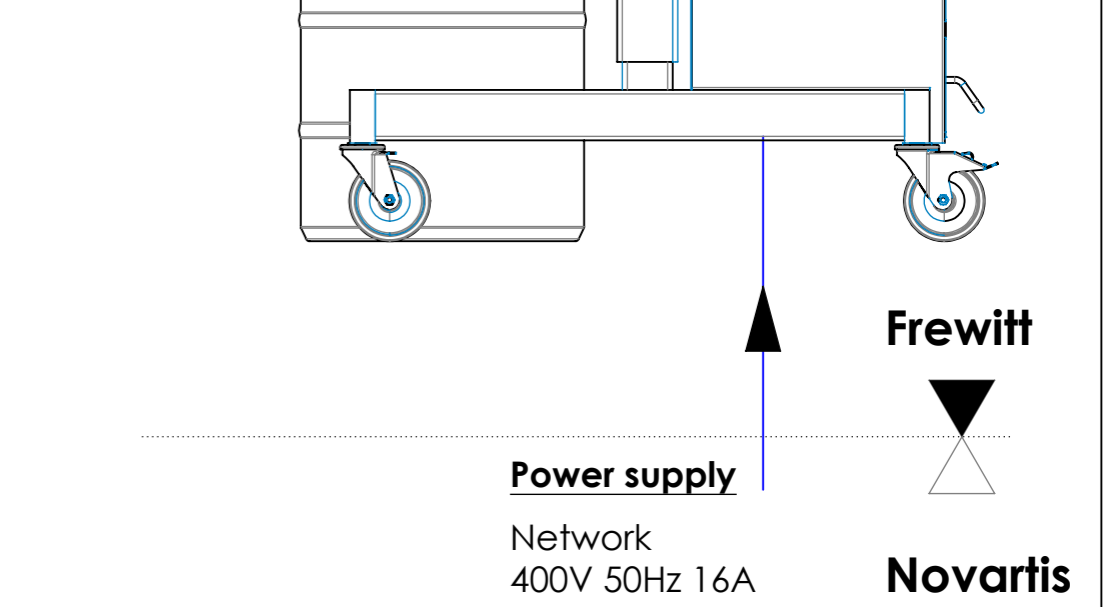
Prix indicatifs, sous réserve de modification / Richtpreise, Aenderungen vorbehalten / Approximate price, subject to change

# **ELECTRIC / DRIVE / PNEUMATICS**





PID Article	N° Article	Description	Manufacturer	Quantity
S5	404568	Magnet safety switch 671 271 MU0 5	ELOBAU	1
S6	404568	Magnet safety switch 671 271 MU0 5	ELOBAU	1
M1/SI.1	441627	Gear Motor EX630ETSR1210 + SRS50	PARVEX	1
U4.B1	(453536)	Pressure switch 405 002 112 11	UNIVER	1
PI 2	(453536)	Manometer P1415B073001	TESCIS	1
PC 2	(453536)	Regulator R.01 G1/4 0.2-6bar	UNIVER	1
U4.Y1	(453536)	Solenoid valve PV E374A016MS	ASCO JOUCOMATIC	1
U5.B1	(453536)	Pressure switch 405 002 112 11	UNIVER	1
PI 1	(453536)	Manometer P1415B073001	TESCIS	1
PC 1	(453536)	Regulator R.01 G1/4 0.2-6bar	UNIVER	1
U5.Y1	(453536)	Solenoid valve PV E374A016MS	ASCO JOUCOMATIC	1
F12	(453536)	Filter F0.01 HA4 G1/4	UNIVER	1
F11	457102	Sterifilter for air - P-SRF N 0006 G1/4 - Element P-SRF N 03/10	DONALDSON	1
F13	463739	Filter stainless L=225.5 D=45 Porostar 5um	f	1
X1	-	Specific connection rubber DN315	-	1
X2	-	Tri-Clamp connection DN200 ISO2852	-	1
X3	-	Tri-Clamp connection DN200 ISO2852	-	1
X4	-	Tri-Clamp connection DN200 ISO2852	-	1
X5	-	Cover specific customer DN560	-	1
X6	-	Tri-Clamp connection DN25 ISO2852	-	1
B1	443387	Rubber covering EDPM Antistatic FDA Ø315	STERIVALVES	1
B2	474202	Inlet funnel for rubber	FREWITT	1
B3	471380	Inlet funnel with cover	FREWITT	1
B4	428631	Compensator DN200 ISO2852 EPDM antisatatic black	STERIVALVES	1
B5	474209	Outlet funnel with cover	FREWITT	1
P1	429506	Display EXI PR Electronics, 5531B	Comat	1



For general arrangement details refer to GA DWG 474201-LAY

# SG.TBP.202.M.5236

Network (V)	400
Rated torque (Nm)	10
Frequency (Hz)	50
Speed (m/s)	0.02 - 1.00
Serial Nr	140055-254
ATEX category (int.)	1 GD
ATEX category (ext.)	3 D

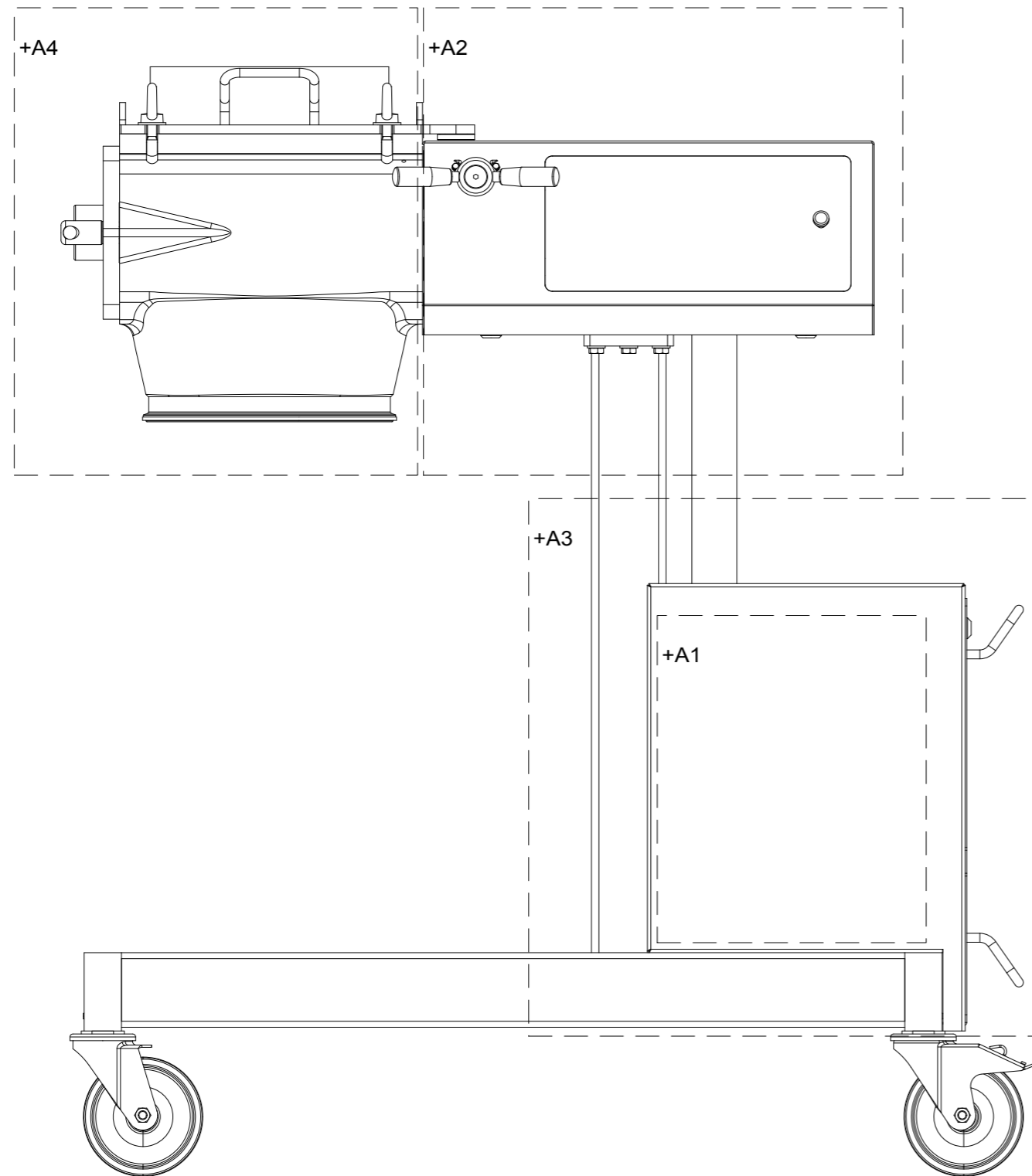
Schéma PID / PRO-14-0055 / OscilloWitt-3		scale %	Designed	08/04/2014	obi
			Controlled	19/09/2014	edgu
		A3	Revised	19/09/2014	edgu
<small>Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.</small>		<small>Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com</small>		Page	Ver.
		474466-SCH		1/1	D





# Project : PRO-14-0055

# SG.TBP.202.M.5236



Type : MA - OW-3  
 Carrying out: 400V,50Hz,3L+N+PE Atex II 3D  
 Rated output power: 3.5kW  
 Rated current: 6.5A



### Wire colors :

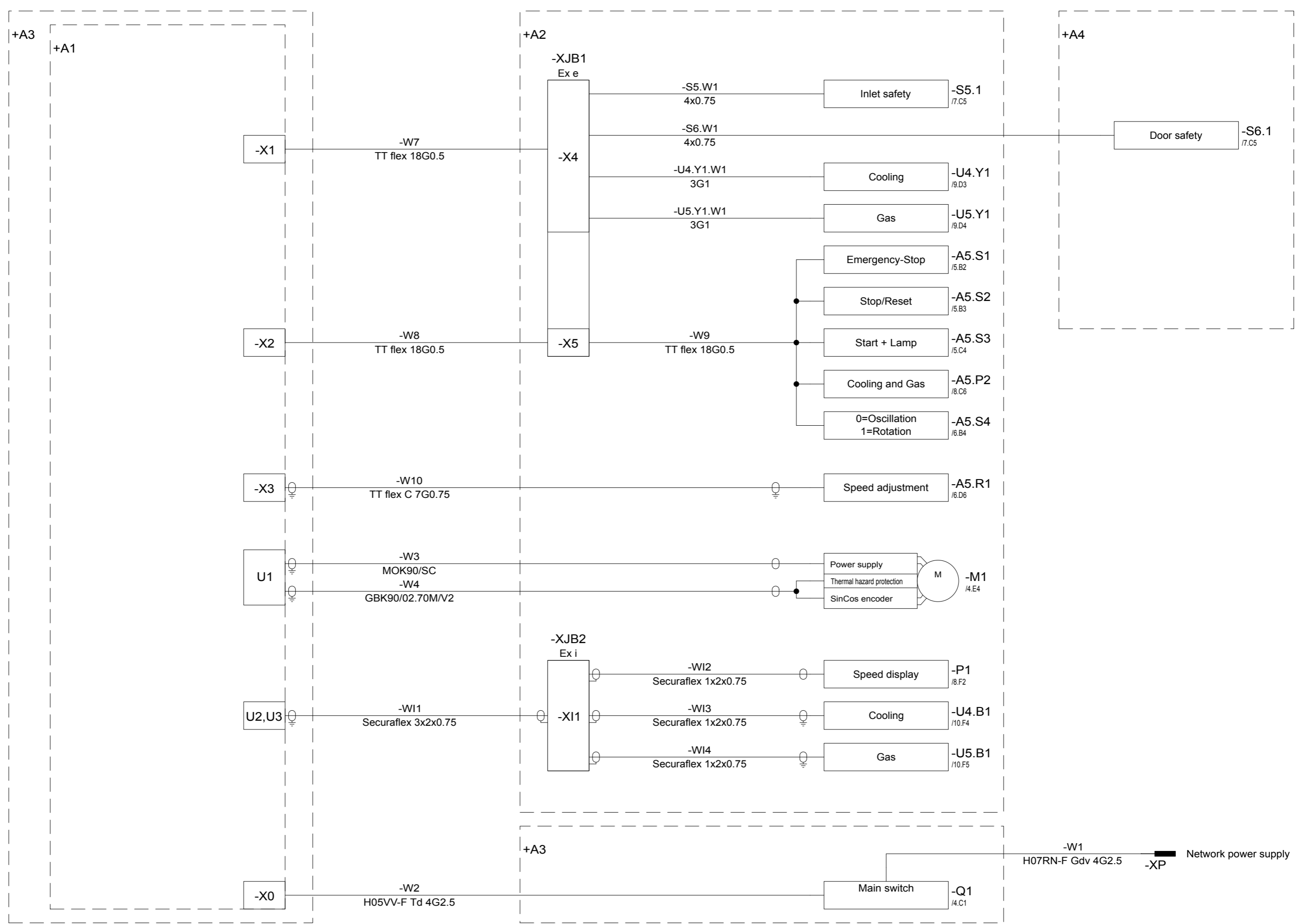
Power	400VAC - L1	Brown	2.5mm <sup>2</sup>
Power	400VAC - L2	Black	2.5mm <sup>2</sup>
Power	400VAC - L3	Gray	2.5mm <sup>2</sup>
Power	N	Light blue	2.5mm <sup>2</sup>
Power	PE	Green/Yellow	2.5mm <sup>2</sup>
Control voltage	24VDC	Violet	0.5 to 0.75mm <sup>2</sup>
Control voltage	0VDC	Violet-White	0.5 to 0.75mm <sup>2</sup>
Control voltage	Ex-i	Blue	0.75mm <sup>2</sup>
External voltage	...	Orange	0.75mm <sup>2</sup>

White	WH	Blue	BU
Brown	BN	Red	RD
Green	GN	Black	BK
Yellow	YE	Violet	VT
Gray	GY	Orange	OG
Pink	PK		

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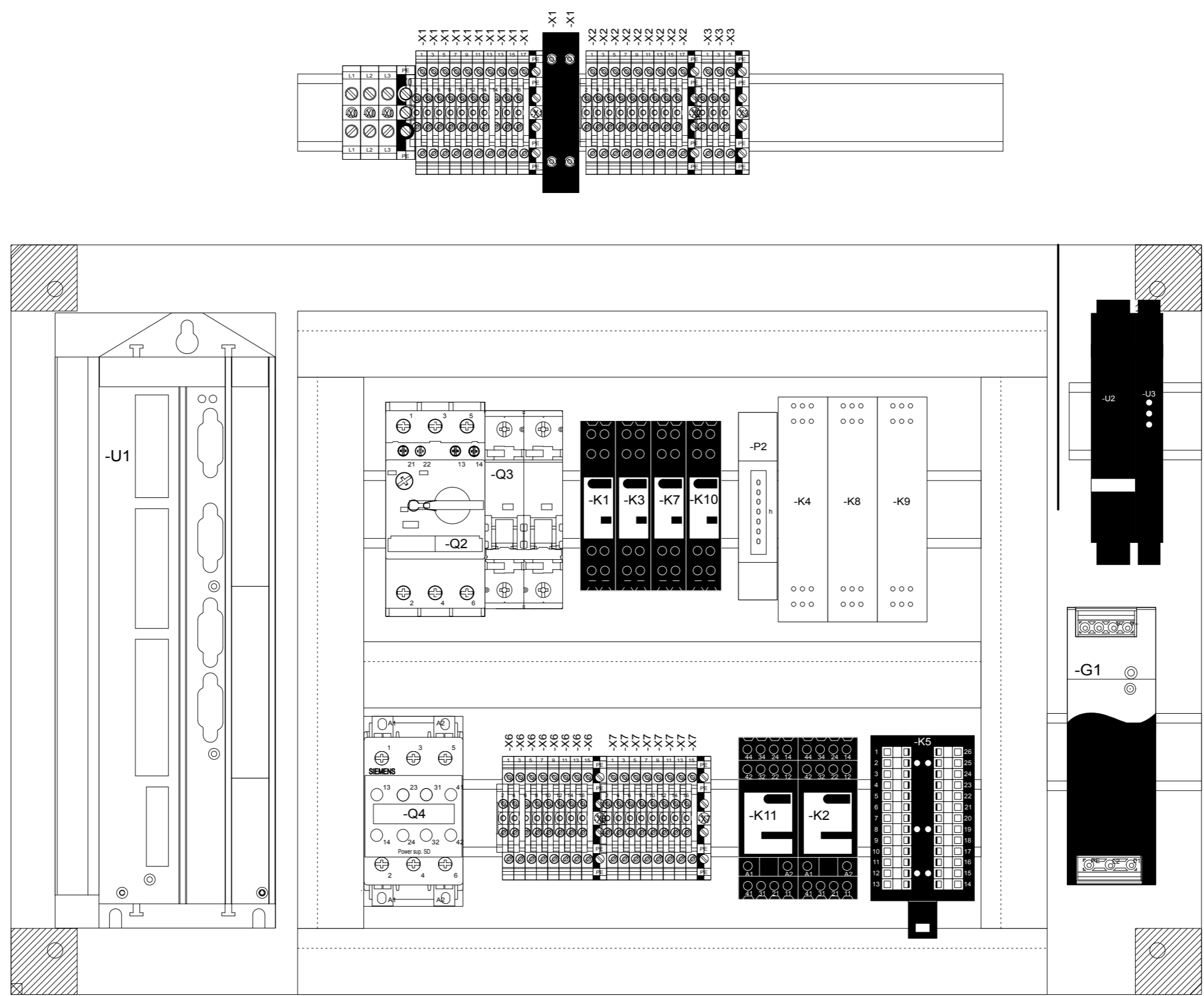
A	Initial version	08.05.2014	phha	Date	08.05.2014	Novartis Singapore, SG-Singapore	Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Tribourog, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com	00 - Cover sheet	474738	Page
B	Project closure	16.09.2014	vri	User	phha					
				Proved	phha					
Status	Change	Date	Name	Standard	6001020-140109	Origin	Repl. f.	Repl. by		1 / 23

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B	Project closure	16.09.2014	vri	User	phha						
				Proved	phha						
Status	Change	Date	Name	Standard	6001020-140109	Origin	Repl. f.	Repl. by			

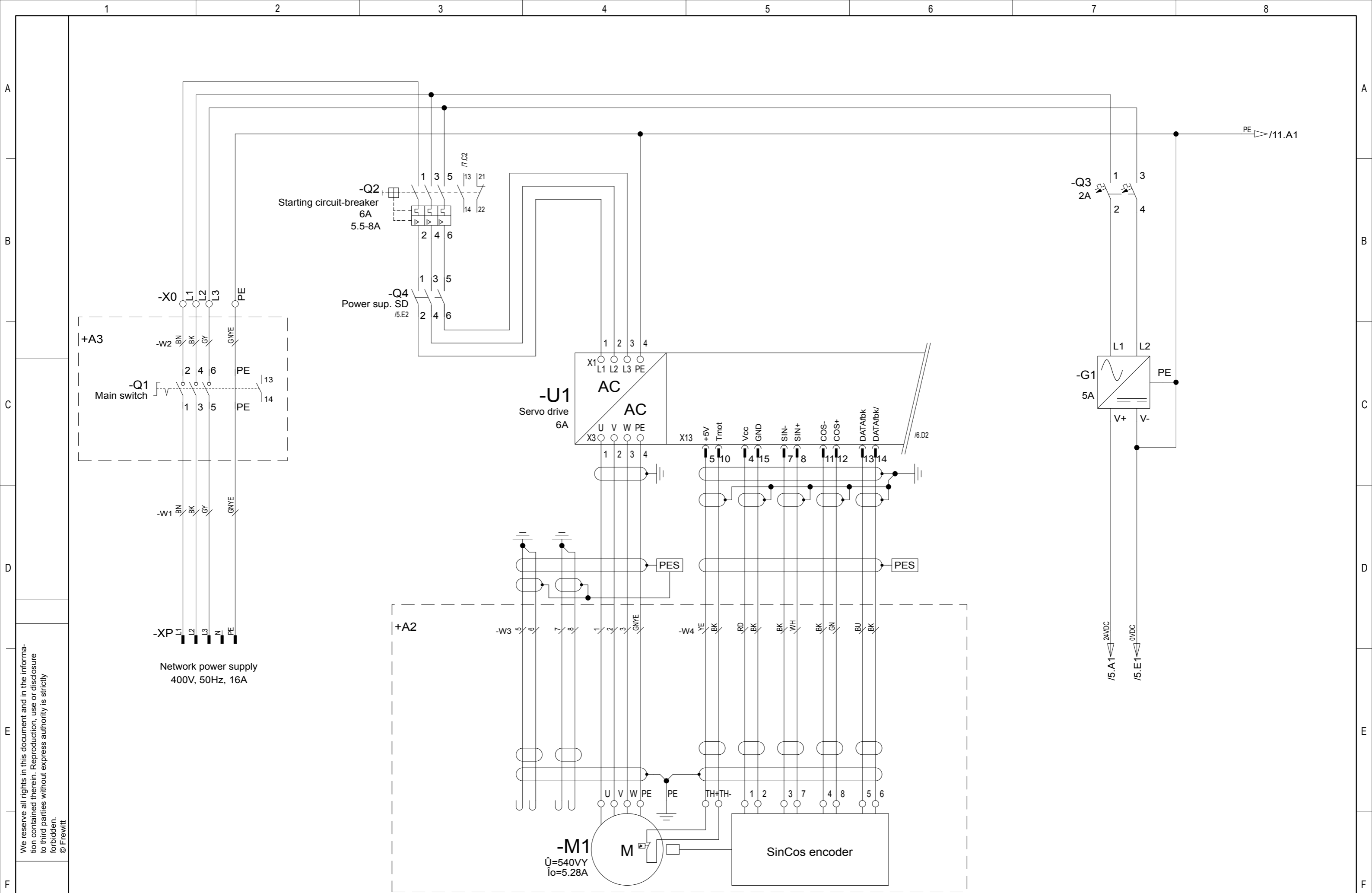
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				Proved	phha
Status	Change	Date	Name	Standard	6001020-140109

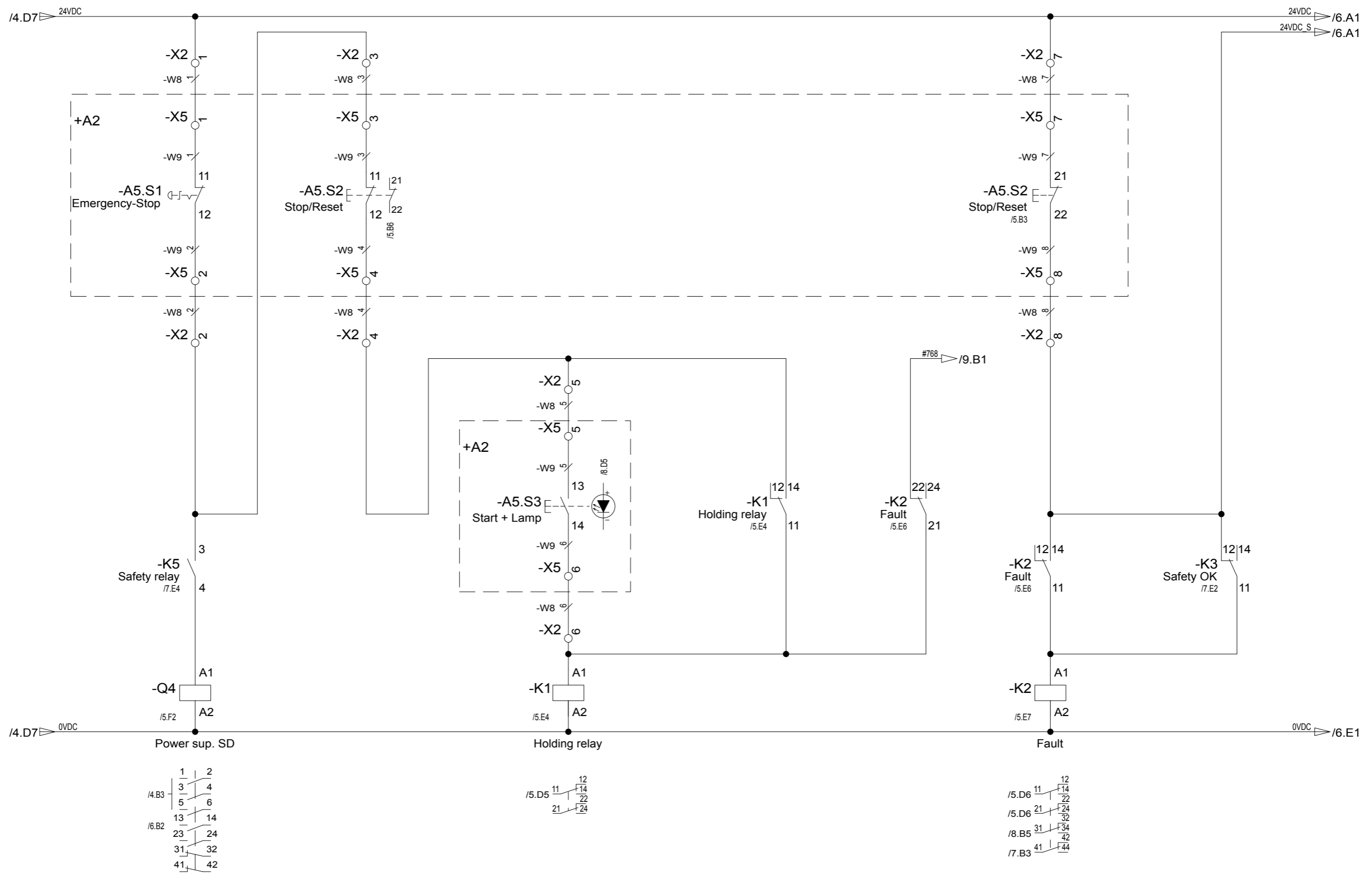
Novartis Singapore, SG-Singapore PRO-14-0055 400V,50Hz,3L+N+PE Atex II 3D		 Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Erlibourg, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com	
Origin	Repl. f.	Repl. by	

02 - Electric layout		Type : MA - OW-3	+A1
		474738	Page 3 / 23



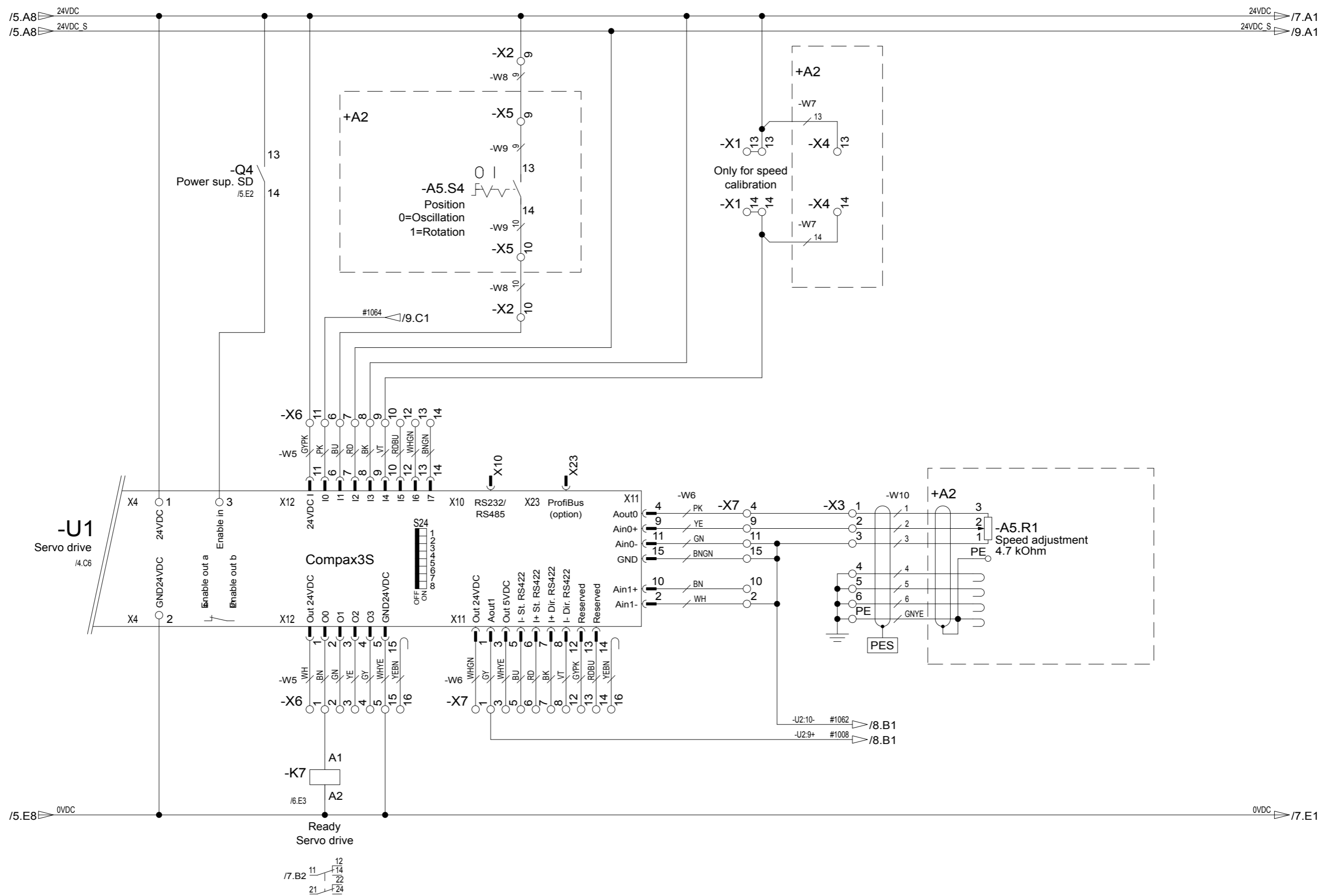
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B	Project closure	16.09.2014	vri	User	phha							4 / 23
Status	Change	Date	Name	Standard	6001020-140109							Origin



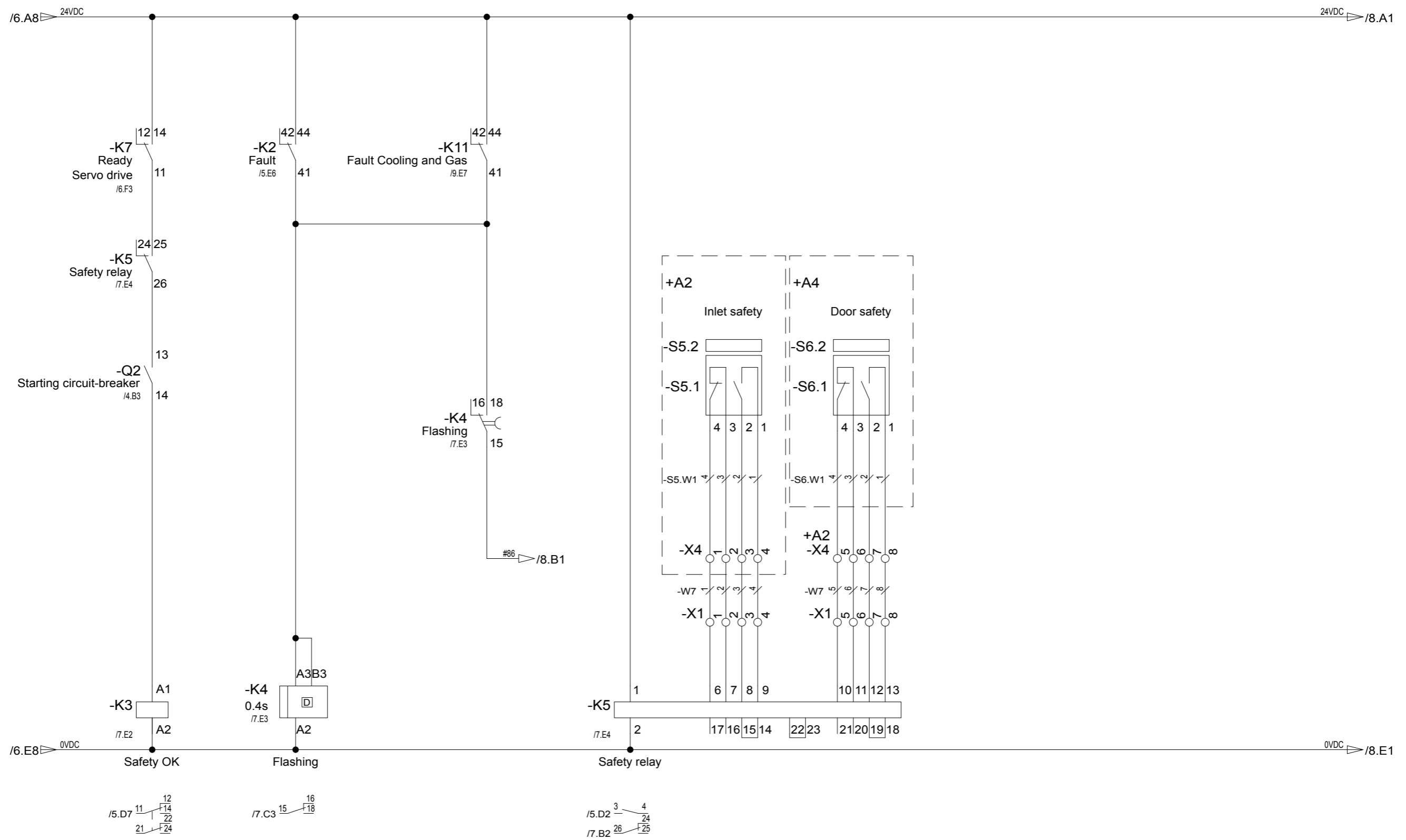
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B	Project closure	16.09.2014	vri	User	phha							5 / 23
Status	Change	Date	Name	Standard	6001020-140109							Origin



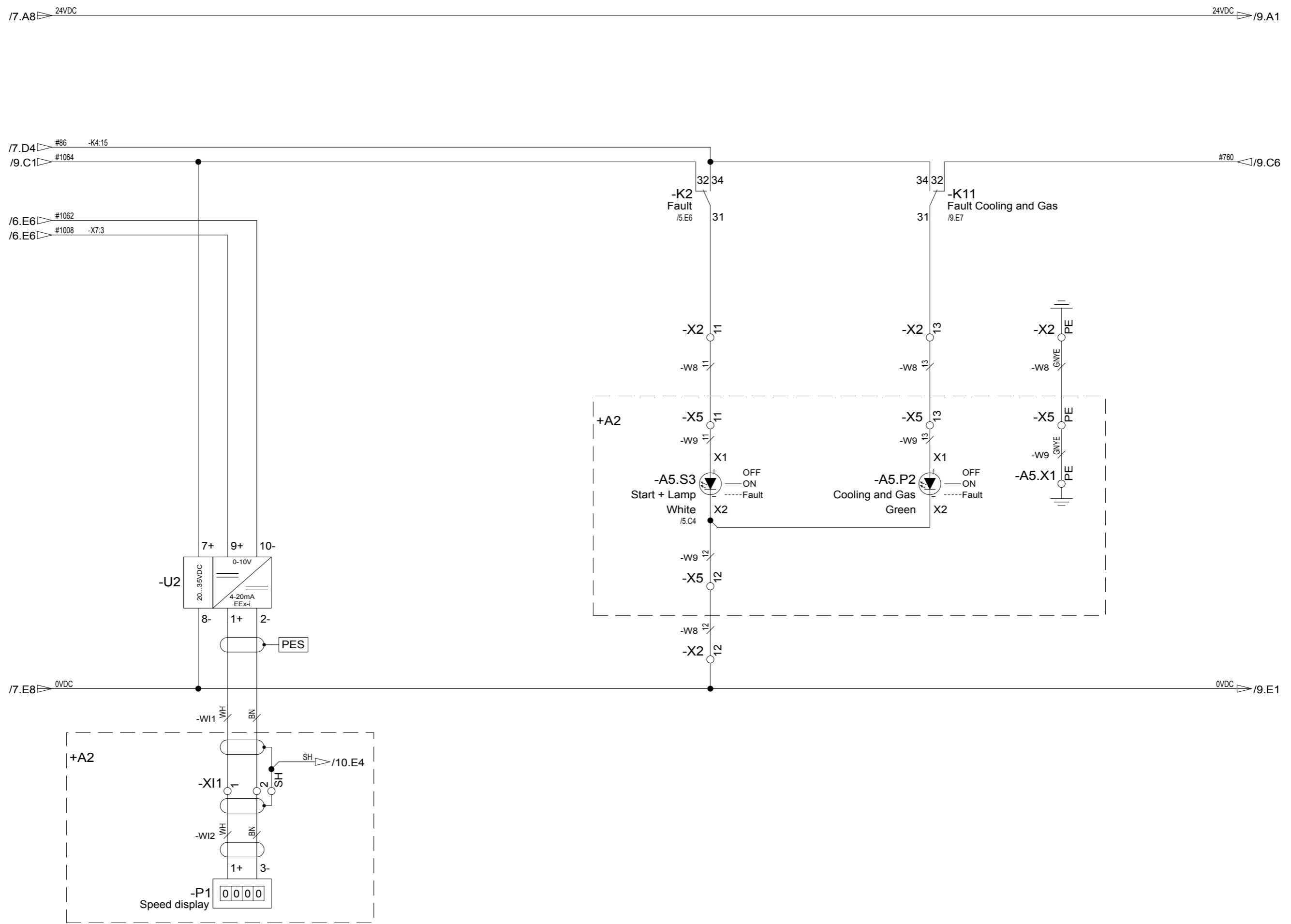
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B	Project closure	16.09.2014	vri	User	phha						6 / 23
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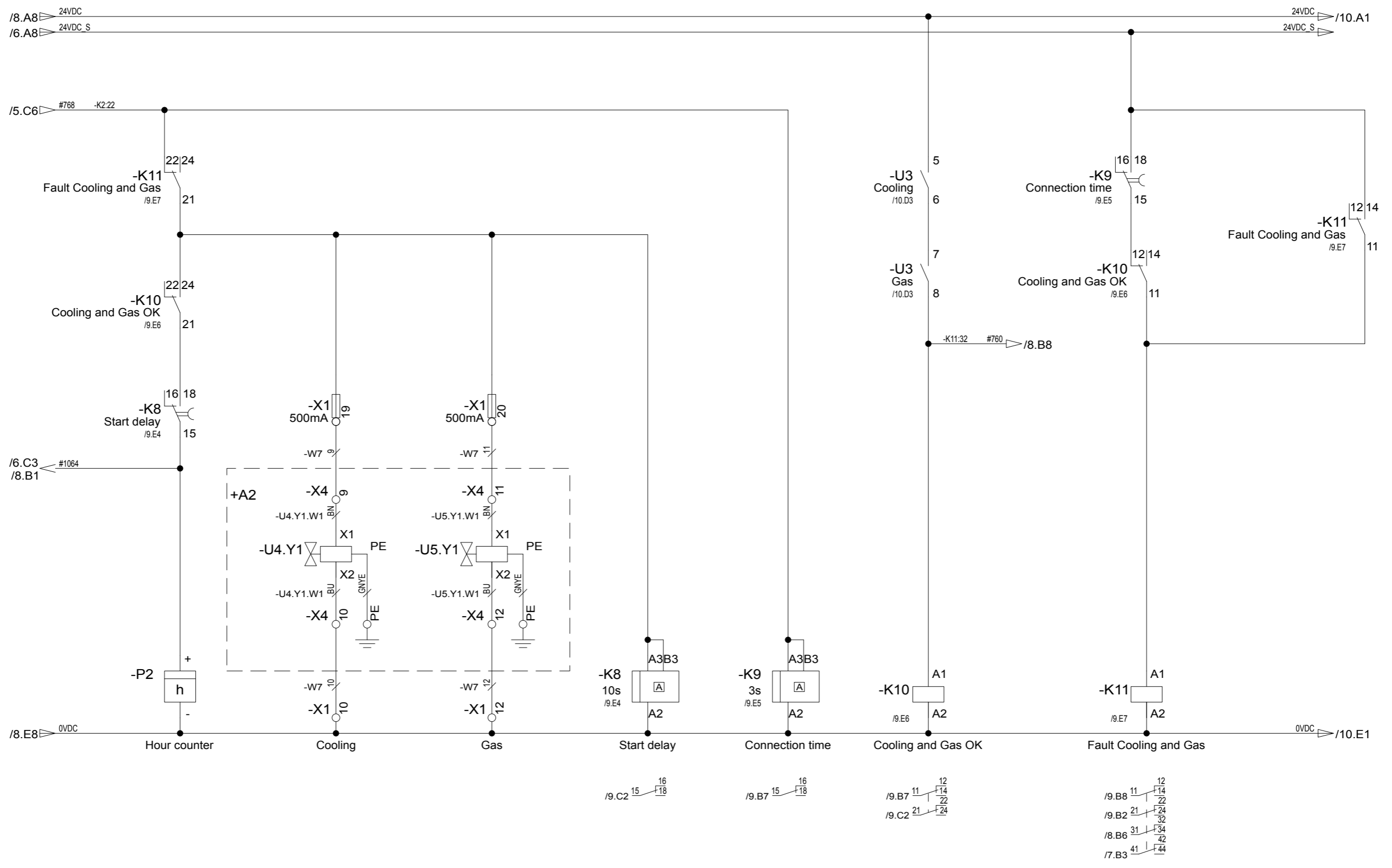
A	Initial version	08.05.2014	phha	Date	08.05.2014	Novartis Singapore, SG-Singapore PRO-14-0055 400V,50Hz,3L+N+PE Atex II 3D	Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Erlibourg, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com	03 - Schematic Safeties	Type : MA - OW-3	474738	+A1	Page
B	Project closure	16.09.2014	vri	User	phha							7 / 23
Status	Change	Date	Name	Standard	6001020-140109							Origin



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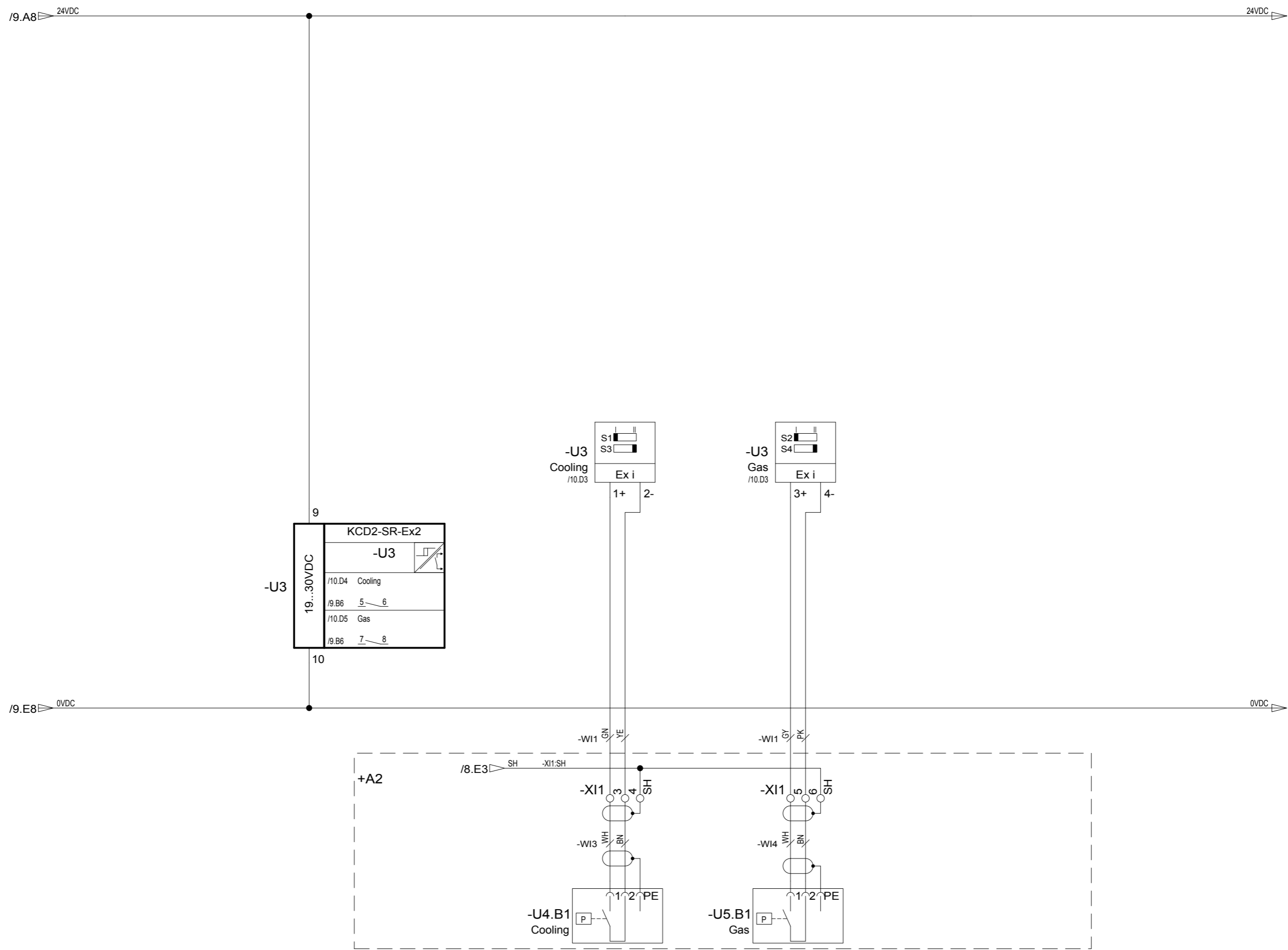
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B	Project closure	16.09.2014	vri	User	phha				474738	Page	
Status	Change	Date	Name	Standard	6001020-140109						





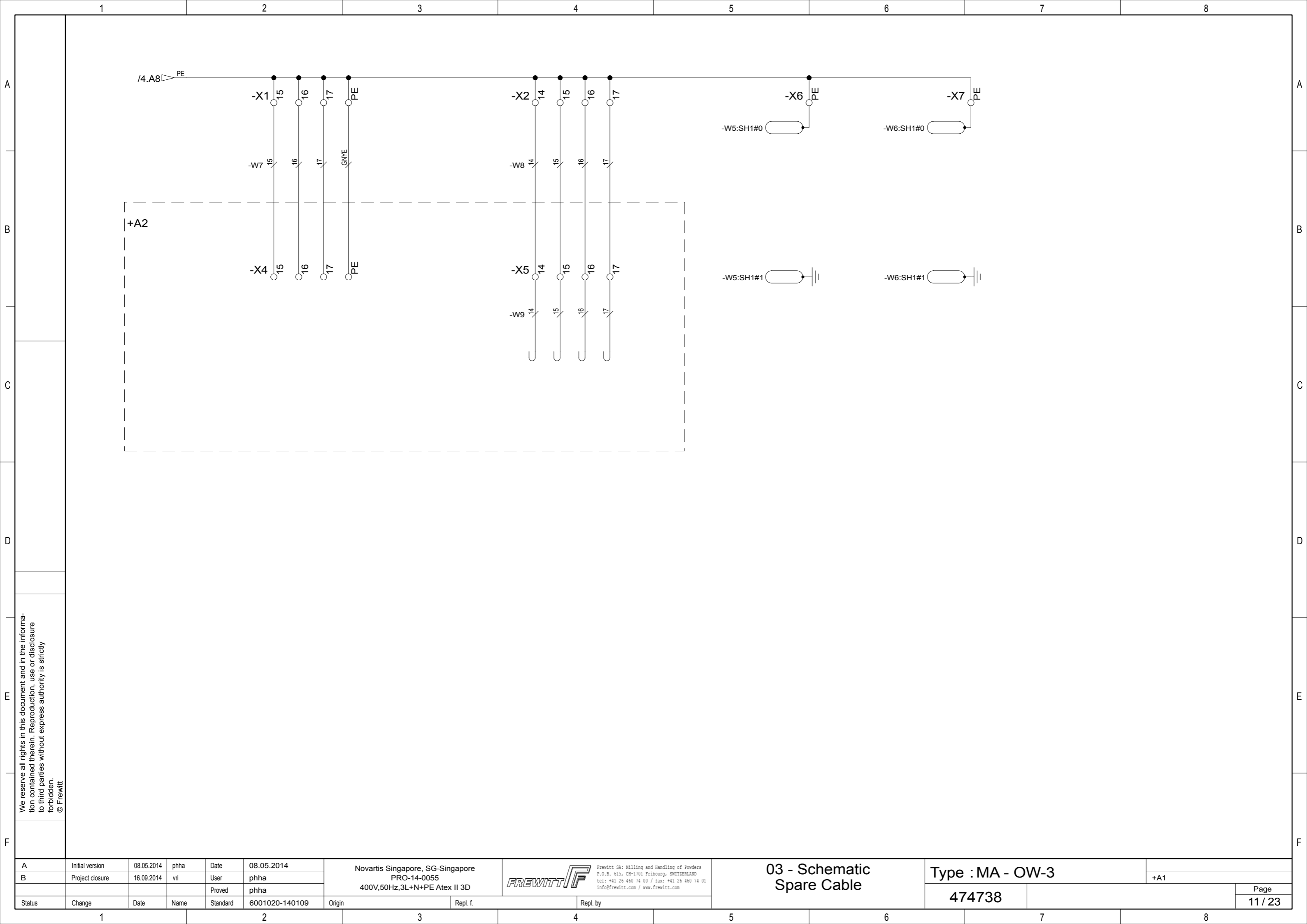
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B	Project closure	16.09.2014	vri	User	phha							9 / 23
Status	Change	Date	Name	Standard	6001020-140109							Origin



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B	Project closure	16.09.2014	vri	User	phha						
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Status	Change	Date	Name	Standard	6001020-140109

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Origin	Repl. f.		Repl. by	

<b>03 - Schematic Spare Cable</b>		<b>Type : MA - OW-3</b>	
		474738	+A1
			Page <b>11 / 23</b>



1 2 3 4 5 6 7 8

A

B

C

D

E

F

# Terminal strip -X1

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-X1



Cable type	Cable designations	Terminal number	Potential	Target External	Target Internal	Placement in Schematics
TT flex 18G0.5	-W7	1	:1	+A2 -X4	+A1 -K5	/7.D5
		2	:2	+A2 -X4	+A1 -K5	/7.D5
		3	:3	+A2 -X4	+A1 -K5	/7.D5
		4	:4	+A2 -X4	+A1 -K5	/7.D5
		5	:5	+A2 -X4	+A1 -K5	/7.D5
		6	:6	+A2 -X4	+A1 -K5	/7.D5
		7	:7	+A2 -X4	+A1 -K5	/7.D5
		8	:8	+A2 -X4	+A1 -K5	/7.D6
		9				
		10	:10	+A2 -X4		/9.E3
		11				
		12	:12	+A2 -X4		/9.E4
		13				/6.B5
		14				/6.B5
		13	:13	+A2 -X4		/6.B5
		14	:14	+A2 -X4	+A1 -X6	/6.B5
		15	:15	+A2 -X4		/11.A2
		16	:16	+A2 -X4		/11.A2
		17	:17	+A2 -X4		/11.A2
		18				
		PE	:PE	+A2 -X4		/11.A3
		9	:9	+A2 -X4		/9.C3
		11	:11	+A2 -X4		/9.C4

Terminal UKK 3 [ 1 - 18 ]  
Terminal UK5-HESI 3004100\_2 [ 19 - 20 ]  
Terminal UKK 5-PE [ PE ]

Terminal type

A	Initial version	08.05.2014	phha	Date	08.05.2014
B	Project closure	16.09.2014	vri	User	phha
				Proved	phha
Status	Change	Date	Name	Standard	6001020-140109

Novartis Singapore, SG-Singapore  
PRO-14-0055  
400V,50Hz,3L+N+PE ATEX II 3D



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tel: +41 26 460 74 00 / fax: +41 26 460 74 01  
info@frewitt.com / www.frewitt.com

04 - Terminals Block  
Terminals Block  
-X1

Type : MA - OW-3  
474738

1 2 3 4 5 6 7 8

A	1	2	3	4	5	6	7	8
B								
C								
D								
E								
F								

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## Terminal strip -X2

Cable type	Cable designations	Placement in Schematics	Target Internal	Target External	Terminal number	Potential	Jumpers
TT flex 18G0.5	-W8	/5.A2		:1	1	24VDC	●
		/5.C2		:2	2		●
		/5.A3		:3	3		●
		/5.C3		:4	4		●
		/5.C4		:5	5		●
		/5.D4		:6	6		
		/5.A7		:7	7	24VDC	●
		/5.C7		:8	8	24VDC_S	
		/6.A4		:9	9	24VDC	●
		/6.C4	+A1 -X6	:10	10		
		/8.C5	+A1 -K2	:11	11		
		/8.E5		:12	12	0VDC	
		/8.C6	+A1 -K11	:13	13		
		/11.A4		:14	14	PE	●
		/11.A4		:15	15	PE	●
		/11.A4		:16	16	PE	●
		/11.A4		:17	17	PE	●
			+A1 -PE1	:PE	PE	PE	

Terminal UKK 3 [ 1 - 18 ]

Terminal UKK 5-PE [ PE ]

Terminal

Terminal type

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B	Project closure	16.09.2014	vri	User	phha							
				Proved	phha							
Status	Change	Date	Name	Standard	6001020-140109	Origin	Repl. f.	Repl. by	-X2	474738	Page 14 / 23	



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## Terminal strip -X4

Cable type	Cable designations	Terminal number	Potential	Target External	Jumpers	Target Internal	Placement in Schematics
3G1	+A2 -U5.Y1.W1	1		+A1 -X1		:4	/7.D5
3G1	+A2 -U4.Y1.W1	2		+A1 -X1		:3	/7.D5
4x0.75	+A4 -S6.W1	3		+A1 -X1		:2	/7.D5
4x0.75	+A2 -S5.W1	4		+A1 -X1		:1	/7.D5
		5		+A1 -X1		:4	/7.D5
		6		+A1 -X1		:3	/7.D5
		7		+A1 -X1		:2	/7.D5
		8		+A1 -X1		:1	/7.D6
		9		+A1 -X1		:X1	/9.D3
		10	0VDC	+A1 -X1		:X2	/9.D3
		PE	PE			:PE	/9.D3
			PE			:	/9.D3
		11		+A1 -X1		:X1	/9.D4
		12	0VDC	+A1 -X1		:X2	/9.D4
		PE				:PE	/9.D4
						:	/9.D4
		13	24VDC	+A1 -X1			/6.B6
		14		+A1 -X1			/6.B6
		15		+A1 -X1			/11.B2
		16		+A1 -X1			/11.B2
		17		+A1 -X1			/11.B2
		GNYE		+A1 -X1			/11.B3

Terminal type

Terminal	UK 3 N [ 1 - 17 ]	
Terminal	USLKG 3 [ PE - PE ]	
Terminal		



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# Terminal strip -X5

Cable type	Cable designations	Terminal number	Potential	Target External	Target Internal	Jumpers	Placement in Schematics
TT flex 18G0.5	-W9	1	24VDC	+A1-X2	:A1		/5.B2
		2		+A1-X2	:2		/5.B2
		3		+A1-X2	:3		/5.B3
		4		+A1-X2	:4		/5.B3
		5		+A1-X2	:5		/5.C4
		6		+A1-X2	:6		/5.D4
		7	24VDC	+A1-X2	:7		/5.B7
		8	24VDC_S	+A1-X2	:8		/5.B7
		9	24VDC	+A1-X2	:9		/6.B4
		10		+A1-X2	:10		/6.B4
		11		+A1-X2	:11		/8.C5
		12	0VDC	+A1-X2	:12		/8.D5
		13		+A1-X2	:13		/8.C6
		14	PE	+A1-X2	:14		/11.B4
		15	PE	+A1-X2	:15		/11.B4
		16	PE	+A1-X2	:16		/11.B4
		17	PE	+A1-X2	:17		/11.B4
		GNVE	PE	+A1-X2	:PE		/8.C7

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Status	Change	Date	Name	Standard	6001020-140109

Novartis Singapore, SG-Singapore  
PRO-14-0055  
400V,50Hz,3L+N+PE ATEX II 3D



Frewitt SA: Milling and Handling of Powders  
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04 - Terminals Block  
-X5


Type : MA - OW-3  
474738

+A2

Page  
17 / 23

Terminal UK 3 N [ 1 - 17 ]  
Terminal USLKG 3 [ PE ]  
Terminal

Terminal type

1	2		3		4		5		6		7		8			
A	Terminal strip -X6													A		
B														B		
C														C		
D														D		
E														E		
F														F		
A	Initial version	08.05.2014	phha	Date	08.05.2014		Novartis Singapore, SG-Singapore			 Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Tribourge, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com		04 - Terminals Block		Type : MA - OW-3		+A1
B	Project closure	16.09.2014	vri	User	phha		PRO-14-0055			400V,50Hz,3L+N+PE ATEX II 3D		-X6		474738		Page
C	Change	Date	Name	Standard	6001020-140109		Origin		Repl. f.		Repl. by				18 / 23	
D	Cable type	Cable designations	Placement in Schematics	Target Internal	Target External	Jumpers	Terminal number	Potential	Cable type	Cable designations	Terminal type	Terminal	Terminal	Terminal		
E	C3X12/01.00M	+A1 -W5	/6.E3	+A1 -K7	:1	● — ●	1	24VDC_S		WH	UKK 3 [ 1 - 16 ]	UKK 3 [ 1 - 16 ]	UKK 3 [ 1 - 16 ]			
F			/6.E3		:2		2	24VDC		BN	UKK 5-PE [ PE ]	UKK 5-PE [ PE ]	UKK 5-PE [ PE ]			
			/6.E3		:3		3			GN						
			/6.E3		:4		4			YE						
			/6.E3		:5		5			GY						
			/6.C3		:6		6			PK						
			/6.C3		:7		7			BU						
			/6.C3		:8		8			RD						
			/6.C3		:9		9			BK						
			/6.C3		:10		10			VT						
			/6.C3		:11		11			GYPK						
			/6.C3		:12		12			RDBU						
			/6.C3		:13		13			WHGN						
			/6.C3		:14		14			BNGN						
			/6.E3		:15		15	0VDC		WHYE						
			/6.E3		:		16	PE		YEEN						
			/11.A5				PE			SH1						

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# Terminal strip -X7

Cable type	Cable designations	Placement in Schematics	Target Internal	Target External	Terminal number	Potential	Jumpers
C3X11/01.00M	+A1 -W6	/6.E4		:1	1		●-----●-----●
	WHGN	/6.D5		:2	2		
	WH	/6.E4	+A1 -U2	:3	3		
	GY	/6.D5	+A1 -X3	:4	4		
	PK	/6.E4		:5	5		
	WHYE	/6.E4		:6	6		
	BU	/6.E4		:7	7		
	RD	/6.E4		:8	8		
	BK	/6.E4		:9	9		
	YE	/6.D5	+A1 -X3	:10	10		
	BN	/6.D5		:11	11		
	GN	/6.E4		:12	12		
	VT	/6.E4		:13	13		
	GYPK	/6.E4		:14	14		
	RDBU	/6.E4		:15	15		
	BNGN	/6.D5		:	16	PE	
	YEBN	/6.E4			PE		
	SH1	/11.A7					

Terminal UKK 3 [ 1 - 16 ]  
Terminal UKK 5-PE [ PE ]  
Terminal

Terminal type



# Bill of material

Article Number	Description	Manufacturer	Reference	Device	Quantity
462260	Electrical cabinet	FREWITT	462260	-A1	1
462960	Control box	STAHL	8146/5051	-A5	1
462084	Power supply	MEANWELL	WDR-120-24	-G1	1
456536	Relay	SIEMENS	LZS:RT4A4L24	-K1	1
456535	Relay	SIEMENS	LZS:PT5A5L24	-K2	1
456536	Relay	SIEMENS	LZS:RT4A4L24	-K3	1
405381	Timing relay	SIEMENS	3RP1505-1AP30	-K4	1
465865	Safety relay	ELOBAU	462 121 E1 U1	-K5	1
456536	Relay	SIEMENS	LZS:RT4A4L24	-K7	1
405381	Timing relay	SIEMENS	3RP1505-1AP30	-K8	1
405381	Timing relay	SIEMENS	3RP1505-1AP30	-K9	1
456536	Relay	SIEMENS	LZS:RT4A4L24	-K10	1
456535	Relay	SIEMENS	LZS:PT5A5L24	-K11	1
441627	Motor	PARVEX	EX630ETSR1210 - SRS50	-M1	1
473177	Digital display	BEKA	BA307E	-P1	1
463735	Hour counter	ABB	E233-12/48	-P2	1
439658	Safety switch	STAHL	8146/5-V37-301-50-1050	-Q1	1
440971	Safety switch support	FREWITT	440971	-Q1	1
474741	Motor Circuit breaker	SIEMENS	3RV10211HA15	-Q2	1
474742	Protection switch	SIEMENS	5SY6 202-7	-Q3	1
456534	Contactor	SIEMENS	3RT10241BB44	-Q4	1
404567	Magnet	ELOBAU	304 200 00 V2	-S5	1
404568	Magnet safety switch	ELOBAU	671 271 MU0 5	-S5	1
404567	Magnet	ELOBAU	304 200 00 V2	-S6	1
404568	Magnet safety switch	ELOBAU	671 271 MU0 5	-S6	1
461326	Servo drive	PARKER	C3S038V4F11I20T30M00	-U1	1
434480	Ex-i U/I converter	PEPPERL+FUCHS	KFD2-CD-Ex1.32.8	-U2	1
442787	Ex-i Switch Amplifier	PEPPERL+FUCHS	KCD2-SR-Ex2	-U3	1
453536	Pneumat. preparation unit	Frewitt	453536	-U4	1

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				Proved	phha						
Status	Change	Date	Name	Standard	6001020-140109	Origin	Repl. f.	Repl. by			

# Bill of material

Article Number	Description	Manufacturer	Reference	Device	Quantity
=>	Pressure switch	UNIVER	405 002 112 11	-U4.B1	1
=>	Solenoid valve	ASCO JOUCOMATIC	PV E374A016MS	-U4.Y1	1
453536	Pneumat. preparation unit	Frewitt	453536	-U5	1
=>	Pressure switch	UNIVER	405 002 112 11	-U5.B1	1
=>	Solenoid valve	ASCO JOUCOMATIC	PV E374A016MS	-U5.Y1	1
434715	Cable	HEINIGER	115 120 420 / H07RN-F Gdv 4G2.5	-W1	1
403952	Cable	HEINIGER	114 020 420 / H05VV-F Td 4G2.5	-W2	1
464456	Cable	PARKEM	MOK90/SC	-W3	1
464457	Cable	PARKEM	GBK90/02.70M/V2	-W4	1
462043	Cable	PARKEM	C3X12/01.00M	-W5	1
462042	Cable	PARKEM	C3X11/01.00M	-W6	1
435708	Cable	HEINIGER	888 830 183 / TT flex 18G0.5	-W7	1
435708	Cable	HEINIGER	888 830 183 / TT flex 18G0.5	-W8	1
435708	Cable	HEINIGER	888 830 183 / TT flex 18G0.5	-W9	1
411933	Cable	HEINIGER	888 851 073 / TT flex C 7G0.75	-W10	1
451302	Cable	HEINIGER	777 923 032 / Securaflex 3x2x0.75	-W11	1
451300	Cable	HEINIGER	777 925 002 / Securaflex 1x2x0.75	-W12	1
451300	Cable	HEINIGER	777 925 002 / Securaflex 1x2x0.75	-W13	1
451300	Cable	HEINIGER	777 925 002 / Securaflex 1x2x0.75	-W14	1
456540	Terminal	PHOENIX CONTACT	3004524	-X0	3
456542	Terminal	PHOENIX CONTACT	0442079	-X0	1
414554	Fuse Terminal	PHOENIX CONTACT	UK5-HESI	-X1	2
456543	Terminal	PHOENIX CONTACT	2770011	-X1	10
456544	Terminal	PHOENIX CONTACT	2774211	-X1	1
464300	Fuse	SCHURTER	0034.3114	-X1	4
456543	Terminal	PHOENIX CONTACT	2770011	-X2	9
456544	Terminal	PHOENIX CONTACT	2774211	-X2	1
456543	Terminal	PHOENIX CONTACT	2770011	-X3	3
456544	Terminal	PHOENIX CONTACT	2774211	-X3	1

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Status	Change	Date	Name	Standard	6001020-140109	Origin	Repl. f.	Repl. by			

# Bill of material

Article Number	Description	Manufacturer	Reference	Device	Quantity
456539	Terminal	PHOENIX CONTACT	3001501	-X4	17
456541	Terminal	PHOENIX CONTACT	0441083	-X4	3
456539	Terminal	PHOENIX CONTACT	3001501	-X5	17
456541	Terminal	PHOENIX CONTACT	0441083	-X5	1
456543	Terminal	PHOENIX CONTACT	2770011	-X6	8
456544	Terminal	PHOENIX CONTACT	2774211	-X6	1
456543	Terminal	PHOENIX CONTACT	2770011	-X7	8
456544	Terminal	PHOENIX CONTACT	2774211	-X7	1
456548	Terminal	PHOENIX CONTACT	3001514	-XI1	9
409713	Terminal box	STAHL	8146/1071-10	-XJB1	1
466364	Terminal box support	FREWITT	466364	-XJB1	2
408786	Terminal box	STAHL	8118/222-199	-XJB2	1
466364	Terminal box support	FREWITT	466364	-XJB2	2
411082	Male connector	STAHL	8570/12-506	-XP	1

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Voir documents suivants.

Siehe folgende Dokumente.

See following documents



BRUSHLESS MOTORS  
**EX630EAS2**  
 ELECTRONIC DRIVE  
**Base Compax 3 S038V4**  
 (400V)



Max. ambient temperature : 60°C

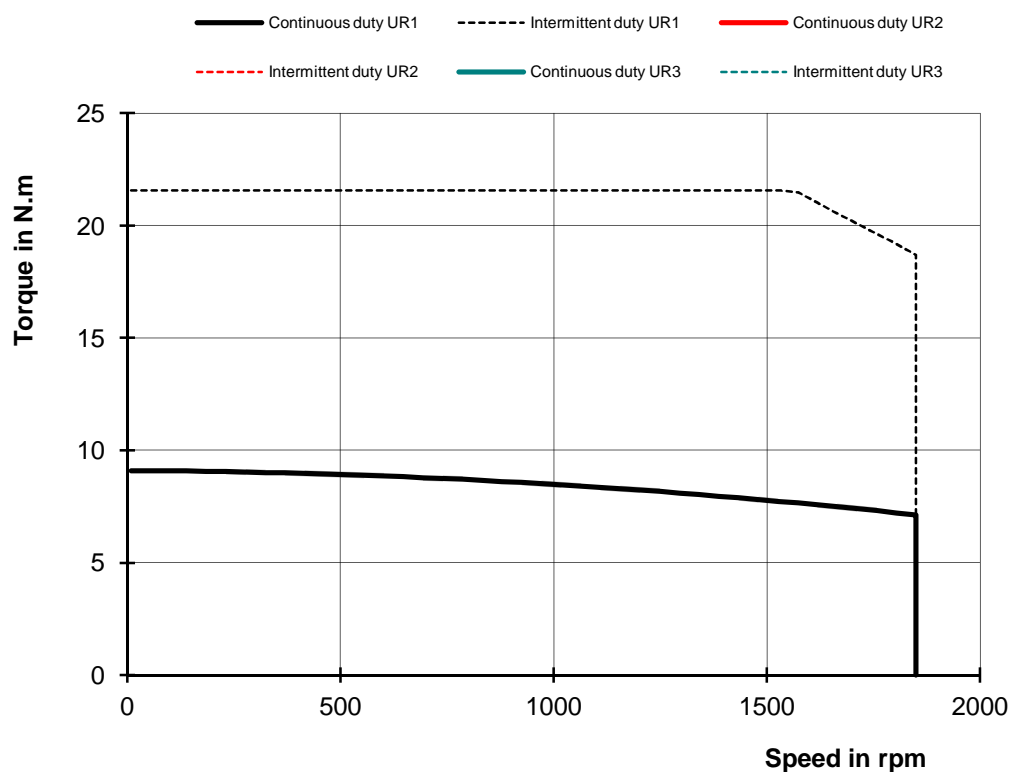
No UL certification

Torque at low speed	$M_o$	Nm	9.1	
Permanent current at low speed	$I_o$	$A_{rms}$	3.28	
Peak torque	$M_p$	Nm	21.6	--
Current for the peak torque	$I_p$	$A_{rms}$	7.51	--
Back emf constant at 1000 rpm (25°C)*	$K_e$	$V_{rms}$	171	
Torque sensitivity	$K_t$	$Nm/A_{rms}$	2.77	
Winding resistance (25°C)*	$R_b$	$\Omega$	3.59	
Winding inductance*	$L$	mH	37.9	
Rotor inertia	$J$	$kgm^2 \times 10^{-5}$	147	
Thermal time constant	$T_{th}$	min	33	
Motor mass	$M$	kg	12.5	
Voltage of the mains	UR1 UR2 UR3	$V_{rms}$	400	- -
Rated speed	Nn1 Nn2 Nn3	rpm	1850	- -
Rated torque	Mn1 Mn2 Mn3	Nm	7.13	- -
Rated current	In1 In2 In3	$A_{rms}$	2.65	- -
Rated power	Pn1 Pn2 Pn3	W	1380	- -

All data are given in typical values under standard conditions

\* Phase to phase

Voltages and currents are given in rms values



Characteristics are given for an optimal drive of the motor

FICHE-009

Création: 21 juin 2007

Edition: 25/juin/2012

EX630EAS2

a





# Servomotors

## EX Series

### Technical Manual

#### PVD 3665 - EX





## DECLARATION CE OF CONFORMITY

We,

### Parker Hannifin Manufacturing France SAS

Etablissement de Dijon  
8 Avenue du Lac CS 30749  
21007 DIJON CEDEX

Certify that the product, **SERVOMOTORS TYPE EX** with the following marking:

**II 2 G Ex d IIB T4 IP64**

or

**II 2 GD Ex d IIB T4 IP65 Ex tD A21 IP65 T135°C**

Satisfy the arrangements of the directives :

**Directive 2006/95/EC: "Low Voltage Directive"**

**Directive 2006/42/EC: "Machinery directive"**

**Directive 2011/65/EU: "Restriction of hazardous substances"**

**Directive 94/9/EC: "Equipment and protective systems intended for use in potentially explosive atmospheres"**

and meet standards or normative document according to :

**EN 60034-1 : 2010**

**EN 60034-5 : 2001/A1 2007**

**EN 60079-0 : 2006**

**EN 60079-1 : 2004**

**EN 61241-0 : 2006**

**EN 61241-1 : 2004 + corrigendum 2006**

The product is not impacted by the modifications made on the latest standards harmonized, therefore it stays conform to the essential requirements regarding the healthy and the safety to the directive N° 94/9/EC.

EX3 EC Certification : INERIS 03ATEX0060X

EX6 EC Certification : INERIS 04ATEX0032X

EX4 EC Certification : INERIS 04ATEX0097X

EX8 EC Certification : INERIS 05ATEX0061X

Quality system notification ; **INERIS** body EC 0080.

Further information :

SERVOMOTORS shall be mounted on a mechanical support providing good heat conduction and not exceeding 40° C in the vicinity of the motor flange.

The product must be installed in accordance with the instructions and recommendations contained in the operating instructions supplied with the product.

EX3 C.E. Marking in : June 04<sup>th</sup> 2003

EX6 C.E. Marking in : March 09 th 2004

EX4 C.E. Marking in : January 24<sup>th</sup> 2005

EX8 C.E. Marking in : May 30 th 2005

DIJON, July 1st 2014

**QUALITY MANAGER**

S. POIZOT



## Compliance with «UL» standards

### Certificate of Compliance

Certificate Number E302760-20090312  
 Report Reference E302760-20090203  
 Issue Date 2009 March 12

Page 1 of 1



**Issued to:** SSD PARVEX SAS

8 Avenue du lac  
 21000 DIJON  
 France

*This is to certify that  
 representative samples of*

USL/CNL - Brushless servo motors

Models EX310, EX420, EX430, EX620, EX630, EX 820, EX 840, EX 860 followed by U,  
 followed by A through Z, followed by A through Z, followed by R, followed by 1,  
 followed by 2 or 5, followed by code 00 through 99,  
 for use in Hazardous (Classified) Locations, Class I, Groups C & D.

*Have been investigated by Underwriters Laboratories Inc.® (UL) or any authorized  
 licensee of UL in accordance with the Standard(s) indicated on this Certificate.*

**Standard(s) for Safety:**

Standard No. UL 674, 4th Ed., Rev. 2008-08-12, Electric Motors and Generators  
 for Use in Division 1 Hazardous (Classified) Locations.


Standard No. CAN/CSA C22.2 No. 145-M1986 (reaffirmed 1992), Motors and Generators for Use in Hazardous  
 Locations

**Additional Information:**

Voltage Ratings 230/400/480

**Only those products bearing the UL Listing Mark for the US and Canada should be considered as being covered by  
 UL's Listing and Follow-Up Service meeting the appropriate requirements for US and Canada.**

The UL Listing Mark for the US and Canada generally includes: the UL in a circle symbol with "C" and "US" identifiers:

 the word "LISTED"; a control number (may be alphanumeric) assigned by UL; and the product category name  
 (product identifier) as indicated in the appropriate UL Directory.

**Look for the UL Listing Mark on the product**

Issued by: **Tai Min KIM**  
 Tai Min KIM, Project Engineer

UL International France SA

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Reviewed by: **Russell L. FILIP**  
 Russell L. FILIP, Senior Engineer Staff

UL International France SA



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## 1. INTRODUCTION




### 1.1. Purpose and intended audience

This manual contains information that must be observed to select, install, operate and maintain PARKER EX servomotors.

Installation, operation and maintenance of the equipment should be carried out by qualified personnel. A qualified person is someone who is technically competent and familiar with all safety information and established safety practices; with the installation process, operation and maintenance of this equipment; and with all the hazards involved.

Reading and understanding the information described in this document is mandatory before carrying out any operation on the motors. If any malfunction or technical problem occurs, that has not been dealt with in this manual, please contact PARKER for technical assistance. In case of missing information or doubts regarding the installation procedures, safety instructions or any other issue tackled in this manual, please contact PARKER as well.

PARKER's responsibility is limited to its servomotors and does not encompass the whole user's system. Data provided in this manual are for product description only and may not be guaranteed, unless expressly mentioned in a contract.

	<p><b><u>DANGER:</u></b> PARKER declines responsibility for any industrial accident or material damage that may arise, if the procedures and safety instructions described in this manual are not scrupulously followed.</p>
	<p><b><u>Motors for ATEX locations :</u></b> EX servomotors manufactured for the CE market are designed to operate in ATEX classified areas.</p>
	<p><b><u>Motors for hazardous classified locations :</u></b> EX servomotors manufactured for the North American market are designed to operate in hazardous classified areas.</p>

### 1.2. Safety

#### 1.2.1. Principle

To operate safely, this equipment must be transported, stored, handled, installed and serviced correctly. Following the safety instructions described in each section of this document is mandatory. Servomotors usage must also comply with all applicable standards, national directives and factory instructions in force.



**DANGER:** Non-compliance with safety instructions, legal and technical regulations in force may lead to physical injuries or death, as well as damages to the property and the environment.

### **1.2.2. General Safety Rules**



#### **Generality**

**DANGER:** The installation, commission and operation must be performed by qualified personnel, in conjunction with this documentation.

The qualified personnel must know the safety (C18510 authorization, standard VDE 0105 or IEC 0364) and local regulations.

They must be authorized to install, commission and operate in accordance with established practices and standards.



#### **Electrical hazard**

Servo drives may contain non-insulated live AC or DC components. Respect the drives commissioning manual. Users are advised to guard against access to live parts before installing the equipment.

Some parts of the motor or installation elements can be subjected to dangerous voltages, when the motor is driven by the inverter, when the motor rotor is manually rotated, when the motor is driven by its load, when the motor is at standstill or stopped.

For measurements use only a meter to IEC 61010 (CAT III or higher). Always begin using the highest range. CAT I and CAT II meters must not be used on this product.

Allow at least 5 minutes for the drive's capacitors to discharge to safe voltage levels (<50V). Use the specified meter capable of measuring up to 1000V dc & ac rms to confirm that less than 50V is present between all power terminals and between power terminals and earth.

Check the drive recommendations.






The motor must be permanently connected to an appropriate safety earth.

To prevent any accidental contact with live components, it is necessary to check that cables are not damaged, stripped or not in contact with a rotating part of the machine. The work place must be clean, dry.

General recommendations :

- Check the wiring circuit
- Lock the electrical cabinets
- Use standardized equipment



	<p><b>Mechanical hazard</b> Servomotors can accelerate in milliseconds. Running the motor can lead to other sections of the machine moving dangerously. Moving parts must be screened off to prevent operators coming into contact with them. The working procedure must allow the operator to keep well clear of the danger area.</p>
	<p><b>Burning Hazard</b> Always bear in mind that some parts of the surface of the motor can reach a temperature of 135°C.</p>
	<p><b>Generality</b> The installation and operation must be made with the <i>Commissioning and use manual</i> given with the motor.</p> <p>Commissioning and use manual of the EX motor series :</p> <ul style="list-style-type: none"> <li>- EX3 Atex : PVD 3559</li> <li>- EX4 Atex : PVD 3566</li> <li>- EX6 Atex : PVD 3562</li> <li>- EX8 Atex : PVD 3571</li> <li>- EX3 UL to EX8 UL : PVD 3628</li> </ul>
	<p><b>Atex servomotors</b> This motor can be used in hazardous areas. May particular attention to the notes marked with  .</p>



### 1.2.3. Using Category of the EX motors

Version	ATEX locations	UL Hazardous locations
Gaseous atmosphere	<ul style="list-style-type: none"> <li>- <b>II</b> Outside industries</li> <li>- <b>2</b> Intermittent presence of gas</li> <li>- <b>d</b> Explosionproof</li> <li>- <b>II B</b> Ethylene or propane</li> <li>- <b>T4</b> 135°C for the Max. temperature on the motor surface</li> <li>- <b>IP64 or IP65</b> Protection index</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Class 1</b> Flammable gases, vapours and liquids</li> <li>- <b>Division 1</b> Explosionproof</li> <li>- <b>Groups C &amp; D</b> Ethylene or propane</li> <li>- <b>T4A</b> 120°C for the Max. temperature on the motor surface</li> <li>- <b>IP65</b> Protection index</li> </ul>
Combustible dust atmosphere	<ul style="list-style-type: none"> <li>- <b>tD</b> Protection by enclosure</li> <li>- <b>A21</b> Protection with seal</li> <li>- <b>T135°C</b> 135°C for the Max. temperature on the motor surface</li> <li>- <b>IP65</b> Protection index</li> </ul>	<b>Not available</b>



### 1.2.4. Special conditions for the ATEX servomotors

The EC certifications are marked with a **X**. It seems the using of the motor must be in accordance with special conditions explained below:

In case of fail of a screw used to assemble the parts of the flameproof enclosure, the new part must have a quality class superior or equal to 8.8.

In case of an using in dusty explosive atmospheres, the user must perform regular cleaning operations on the motor to avoid dust deposits.



## 2. PRODUCT DESCRIPTION

### 2.1. Quick URL

All informations and datas are available on :

<http://www.parker.com/eme/ex>

### 2.2. Overview

The EX servomotors from Parker are specifically designed to operate in explosive atmospheres for industrial applications.

The EX motors are brushless synchronous servomotors, with permanent magnets, based on NX active parts.

A large set of torque / speed characteristics, options and customization possibilities are available, making EX servomotors the ideal solution for most servosystems applications in explosive atmospheres.

#### Advantages

- High precision
- High motion quality
- High dynamic performances
- Compact dimensions and robustness
- Large set of options and customization possibilities
- CE and UL marking certification available.

### 2.3. Applications

Painting applications  
Packaging machinery  
Robot applications  
Special machines  
Cleaning applications  
Printing applications



## 2.4. General Technical Data for ATEX motors

	EX3, EX4, EX6	EX8
<b>Motor type</b>	Permanent-magnet synchronous motor	
<b>Magnets material</b>	Neodymium Iron Boron	
<b>Number of poles</b>	10	
<b>Type of construction</b>	IMB5 – IMV1 – IMV3 (EN60034-7)	
<b>Degree of protection</b>	<ul style="list-style-type: none"> <li>• Gaseous atmosphere : IP64, IP65</li> <li>• Combustible dust atmosphere : IP65</li> </ul>	
<b>Cooling</b>	Natural cooling	
<b>Rated voltage</b>	230VAC, 400 VAC	
<b>Insulation of the stator winding</b>	Class F according to IEC 60034-1	Class F according to IEC 60034-1 with potting
<b>Altitude</b>	Up to 1000m (IEC 60034-1) No allowed for higher altitude	
<b>Ambiant temperature</b>	-20°C to +40°C	
<b>Storage temperature</b>	-20°C to +60°C	
<b>Connection</b>	Electronic plate with cable glands	
<b>Marking</b>	CE	
<b>Paint</b>	Without	
<b>Sensor</b>	<ul style="list-style-type: none"> <li>• Resolver in standard</li> <li>• Sick encoder - Hiperface: SKS36 and SKM36 SRS50 and SRM50 (Not available for EX3)</li> <li>• Heidenhain encoder – Endat: ECN1113 and EQN1125 (Not available for EX3 and EX4)</li> <li>• Sensorless</li> </ul>	
<b>Brake</b>	Parking brake in option	
<b>Thermal protection</b>	Temperature sensors + thermofuse	
<b>Remark</b>	Numerous customization are possible on request (special shaft, special flange,...)	



## 2.5. General Technical Data for UL motors

	EX3, EX4, EX6	EX8
<b>Motor type</b>	Permanent-magnet synchronous motor	
<b>Magnets material</b>	Neodymium Iron Boron	
<b>Number of poles</b>	10	
<b>Type of construction</b>	IMB3 (EN60034-7)	
<b>Degree of protection</b>	IP65	
<b>Cooling</b>	Natural cooling	
<b>Rated voltage</b>	230VAC, 400 VAC, 480 VAC	
<b>Insulation of the stator winding</b>	Class F according to IEC 60034-1	Class F according to IEC 60034-1 with potting
<b>Altitude</b>	Up to 1000m (IEC 60034-1)	
<b>Ambiant temperature</b>	-20°C to +40°C	
<b>Storage temperature</b>	-20°C to +60°C	
<b>Connection</b>	Electronic plate with threaded holes	
<b>Marking</b>	UL	
<b>Paint</b>	Without	
<b>Sensor</b>	<ul style="list-style-type: none"> <li>• Resolver in standard</li> <li>• Sick encoder - Hiperface: SKS36 and SKM36 SRS50 and SRM50 (Not available for EX3)</li> <li>• Heidenhain encoder – Endat: ECN1113 and EQN1125</li> <li>• Sensorless</li> </ul>	
<b>Brake</b>	Parking brake in option	
<b>Thermal protection</b>	Temperature sensors + thermofuse	
<b>Remark</b>	Numerous customization are possible on request (special shaft, special flange,...)	





## 2.6. Product Code

The EX servomotors are defined by its electrical and mechanical characteristics, by its accompanying accessories and by any customer specificity. This information is coded and entered in the "Type" column on the manufacturer's plate for the basic codification; the specificities are entered in a separate column.

Code	E	X	3	1	0	E	A	K	R	1	2	0	0
<b>Product Series</b>	-----												
<b>Motor size</b> 1, 2, 3, 4, 6 or 8 in relation with the motor diameter	-----		-----										
<b>Motor length</b> up to 60 depend on size	-----			-----									
<b>Motor version</b> E: ATEX motor U: UL motor	-----				-----								
<b>Feedback Sensor</b> A: resolver 2 poles transformation ratio = 0.5 R: Hiperface encoder singleturn SKS36 (128pulses) S: Hiperface encoder mutiturn SKM36 (128pulses) T: Hiperface encoder singleturn SRS50 (1024pulses) U: Hiperface encoder mutiturn SRM50 (1024pulses) V: Endat encoder singleturn ECN1113 W: Endat encoder multiturn ECN1125 Y: sensorless series for 650S drive Z : Special encoder	-----			-----									
<b>Torque / Speed Characteristics</b> See motor data	-----					-----							
<b>Painting</b> R: no painting	-----						-----						
<b>Electric connection</b> 1: Cable gland	-----							-----					
<b>Break and thermal sensor option</b> 2: Without brake 5: With brake	-----								-----				
<b>Mechanical Interface</b> 00: IP64 plain shaft 01: IP64 key on shaft Other: custom code	-----										-----		
											10: IP65 with plain shaft 11: IP65 with key on shaft		



## 3. TECHNICAL DATA

### 3.1. Motor selection

#### 3.1.1. Altitude derating

From 0 to 1000 m : no derating

> 1000 m : the EX motors are not designed to operate in hazardous area for this altitude.

#### 3.1.2. Pressure

The EX motors are designed to operate in area with a pressure between 80 kPa (0.8 bar) and 110 kPa (1.1 bar).

#### 3.1.3. Temperature derating

The maximal ambient temperature for these motor is 40°C. In case of a maximal ambient temperature above 40°C is needed, a special certification is mandatory, please contact Parker.

#### 3.1.4. Thermal equivalent torque (rms torque)

The selection of the right motor can be made through the calculation of the rms torque  $M_{rms}$  (i.e. root mean squared torque) (sometimes called equivalent torque).

This calculation does not take into account the thermal time constant. It can be used only if the overload time is much shorter than the copper thermal time constant.

The rms torque  $M_{rms}$  reflects the heating of the motor during its duty cycle.

Let us consider:

- the period of the cycle  $T$  [s],

- the successively samples of movements  $i$  characterized each ones by the maximal torque  $M_i$  [Nm] reached during the duration  $\Delta t_i$  [s].

So, the rms torque  $M_{rms}$  can be calculated through the following basic formula:

$$M_{rms} = \sqrt{\frac{1}{T} * \sum_{i=1}^n M_i^2 \Delta t_i}$$

Example:

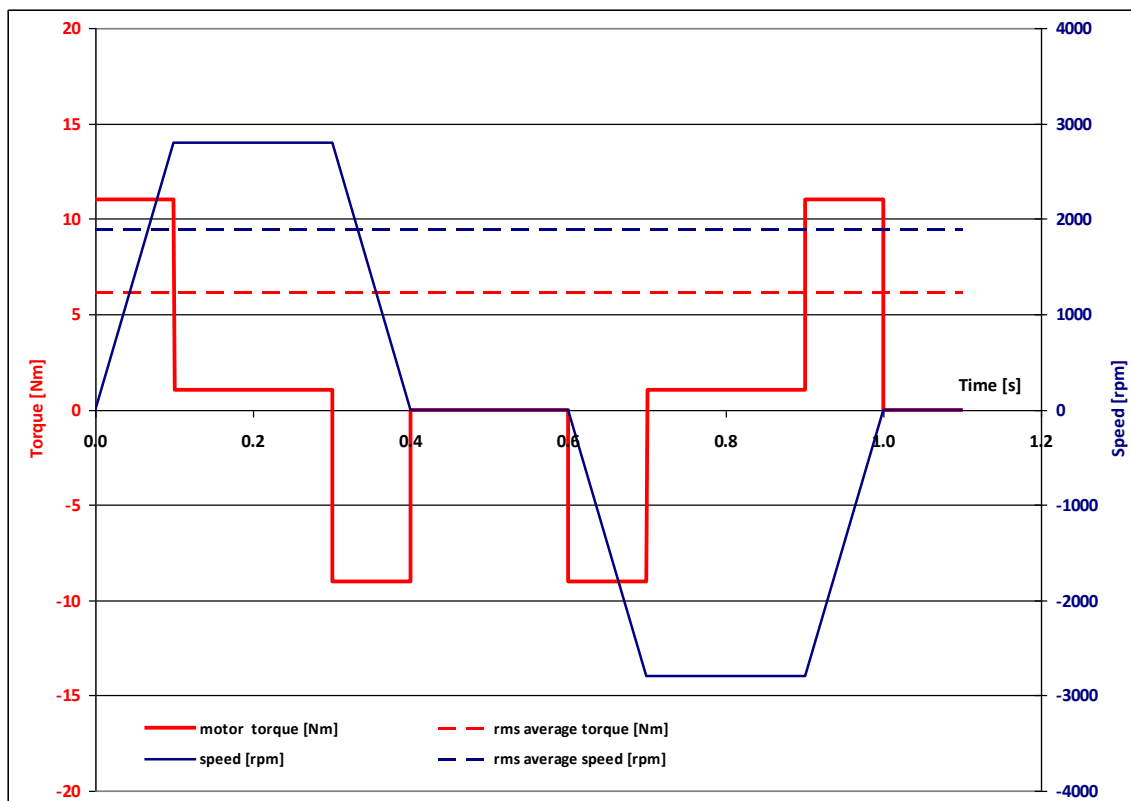
For a cycle of 2s at 0 Nm and 2s at 10Nm and a period of 4 s, the rms torque is

$$M_{rms} = \sqrt{\frac{1}{4} * 10^2 * 2} = 7,07 Nm$$

Illustration :

Acceleration-deceleration torque: 10 Nm during 0.1 s. Resistant torque: 1 Nm during the movement.

Max-min speed:  $\pm$  2800 rpm during 0.2 s. Max torque provided by the motor 11 Nm. rms torque: 6 Nm.



The maximal torque  $M_i$  delivered by the motor at each segment  $i$  of movement is obtained by the algebraic sum of the acceleration-deceleration torque and the resistant torque. Therefore,  $M_{max}$  corresponds to the maximal value of  $M_i$ .

### Selection of the motor :

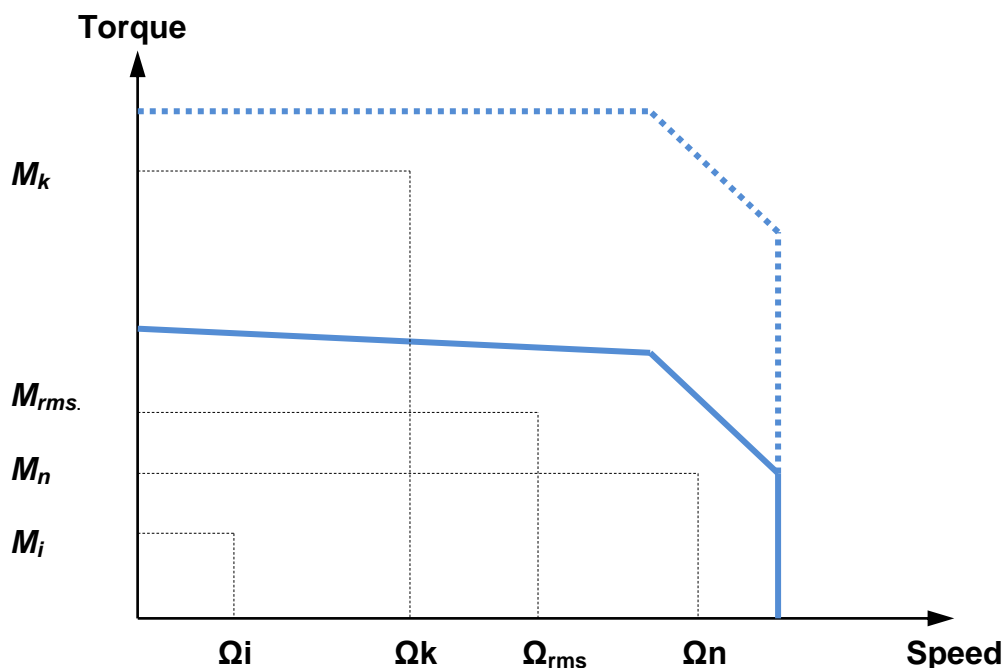
The motor adapted to the duty cycle has to provide the rms torque  $M_{rms}$  at the rms speed(\*) without extra heating. This means that the permanent torque  $M_n$  available at the average speed presents a sufficient margin regarding the rms torque  $M_{rms}$ .

$$\Omega_{rms} = \sqrt{\frac{1}{T} * \sum_{i=1}^n \Omega_i^2 \Delta t_i}$$

(\*) rms speed is calculated thanks to the same formula as that used for the rms torque. The mean speed cannot be used (in general mean speed is equal to zero). Only use the rms speed.



Furthermore, each  $M_i$  and speed associated  $\Omega_i$  of the duty cycle has to be located in the operational area of the torque vs speed curve.



Drive selection

Drive selection depends on its rated power and its mode selection which leads to the maximal current duration.

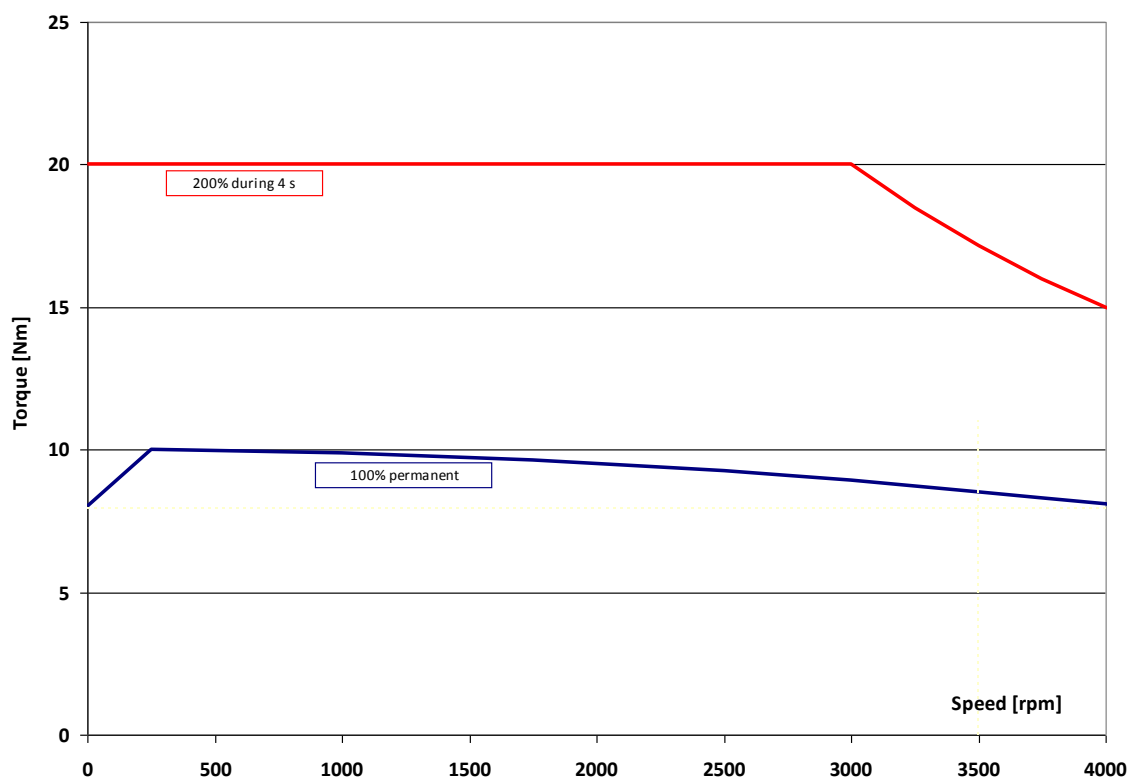


Please refer to the drive technical documentation for any further information and to select the best motor and drive association.

### **AC890 PARKER drive example:**

The rated current provided by the AC890 drive depends on its rated power and its mode selection. "Vector mode" is used for induction motors while "Servo mode" is used for brushless AC motors. With EX motors the power is usually < 37 kW, the rated current corresponds to 100 %.

Power of Drive AC890 [kW]	< 37 kW	
Mode	Vector mode	Servo mode
Overload capability [%]	150 % during 60 s	200 % during 4 s

**Illustration:**



### Example n°1 :

The application needs:

- a rms torque of **7 Nm** at the rms speed of 2000 rpm,
- an acceleration torque of **10 Nm**,
- a maximal speed of 2800 rpm.

### Selection of the motor:

The selected motor is the type **EX620EAO**.

The nominal speed is equals to 4300 rpm.

The maximal speed is equals to 4300 rpm.

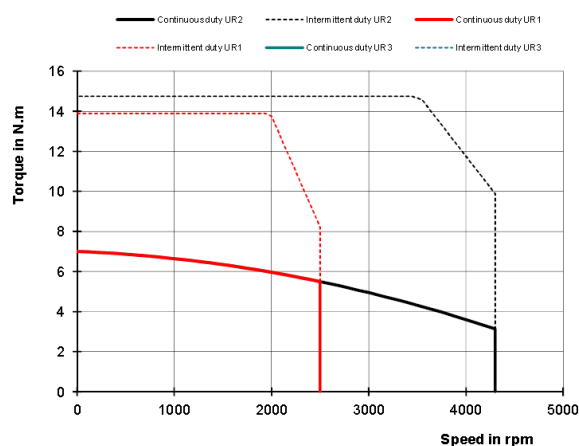
The torque sensitivity is equals to 1.27 Nm/Arms.

BRUSHLESS MOTORS		EX620EAO		ELECTRONIC DRIVE		DIGIVEX 7.5/15 et DIGIVEX 8/16		Parker	
		(230V)		(400V)				No UL certification	
Torque at low speed	$M_0$	Nm	7						
Permanent current at low speed	$I_0$	A <sub>rms</sub>	5.51						
Peak torque	$M_p$	Nm	14.7		--				
Current for the peak torque	$I_p$	A <sub>rms</sub>	11.3		--				
Back emf constant at 1000 rpm (25°C)*	$K_e$	V <sub>rms</sub>	81.7						
Torque sensitivity	$K_t$	Nm/A <sub>rms</sub>	1.27						
Winding resistance (25°C)*	$R_b$	Ω	1.63						
Winding inductance*	L	mH	14						
Rotor inertia	J	kgm <sup>2</sup> ×10 <sup>-5</sup>	98						
Thermal time constant	T <sub>th</sub>	min	27						
Motor mass	M	kg	11.3						
Voltage of the mains	UR1 UR2 UR3	V <sub>rms</sub>	230	400	-				
Rated speed	Nn1 Nn2 Nn3	rpm	2500	4300	-				
Rated torque	Mn1 Mn2 Mn3	Nm	5.49	3.13	-				
Rated current	In1 In2 In3	A <sub>rms</sub>	4.47	2.75	-				
Rated power	Pn1 Pn2 Pn3	W	1440	1410	-				

All data are given in typical values under standard conditions

\* Phase to phase

Voltages and currents are given in rms values



The permanent current  $I_0$  of the motor is **5.51 Arms** for  $M_0=7$  Nm at low speed.

The nominal current  $I_n$  of the motor is **2.46 Arms** for  $M_n = 3.13$  Nm at the nominal speed.

### Selection of the drive:

The drive has to provide at least a permanent current equals to  $I_0$  (5.51 Arms).

In order to obtain an acceleration torque of **10 Nm**, the current will be about 8 Arms. This means that the drive has to provide at least 8 Arms as transient current.

→ Therefore, we can select the drive **AC890SD-53 2100 B** which delivers under 400 VAC:

**6 Arms** as permanent current and

$6 \times 200\% = 12$  Arms as maximal transient current during 4 s.

The drive is set with "**Servo Mode**".

→ We also can select the drive **DIGIVEX 8/16 Â** which delivers under 400 VAC:

**5.6 Arms** as permanent current and

$5.6 \times 200\% = 11.3$  Arms as maximal transient current during 2 s.



### Example n°2 :

This times; the application needs :

- a permanent torque of 5 Nm at low speed,
- a rms torque of 5 Nm at the rms speed of 1890 rpm,
- an acceleration torque of **7.6 Nm**,
- a maximal speed of 2800 rpm.

### Selection of the motor:

The selected motor is the type **EX620EAO**.

The nominal speed is equals to 4300 rpm.

The maximal speed is equals to 4300 rpm.

The torque sensitivity is equals to 1.27 Nm/Arms.

### Selection of the drive:

The drive has to provide a permanent current equals to 4 Arms to obtain 5 Nm.

In order to obtain an acceleration torque of **7.6 Nm**, the current will be of about 6 Arms

This means that the drive has to provide at less 6 Arms as transient current.

Compared to the previous example n°1, it is now possible to decrease the size of drive.

→ Therefore, we can select the drive **AC890SD-53 1600 B** which delivers under 400 VAC:

**4 Arms** as permanent current and

**4\*200%=8 Arms** as maximal transient current during 4 s.



The drive is set with "**Servo Mode**".



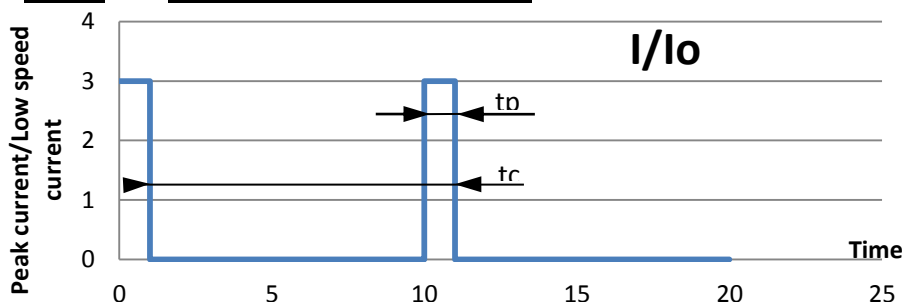
### 3.1.5. Current limitation at stall conditions (i.e. speed < 3 rpm)

Recommended reduced current at speed < 3 rpm:

$$I_{reduced} = \frac{1}{\sqrt{2}} * I_0 \cong 0.7 * I_0$$

	<p><b>Warning:</b> The current must be limited to the prescribed values. If the nominal torque has to be maintained at stop or low speed (&lt; 3 rpm), imperatively limit the current to 70% of <math>I_0</math> (permanent current at low speed), in order to avoid an excessive overheating of the motor.</p>
	<p>Please refer to the drive technical documentation for any further information and to choose functions to program the drive.</p>

### 3.1.6. Peak current limitations



It is possible to use the EX motor with a current higher than the permanent current. But, to avoid any overheating, the following rules must be respected.

- 1) The peak currents and peak torques given in the data sheet must never be exceeded
- 2) The thermal equivalent torque must be respected (§3.1.3)
- 3) If 1) and 2) are respected (it can limit the peak current value or duration), the peak current duration ( $t_p$ ) must be limited, in addition, accordingly to the following table ( $I_0$  is the permanent current at low speed):

$I_{peak}/I_n$	$I_p/I_0 = 2$	$I_p/I_0 = 3$
EX310	$t_p < 0.8 \text{ s}$	$t_p < 0.3 \text{ s}$
EX420		
EX430		
EX620	$t_p < 1.5 \text{ s}$	$t_p < 0.6 \text{ s}$
EX630		
EX820		
EX840		
EX860		

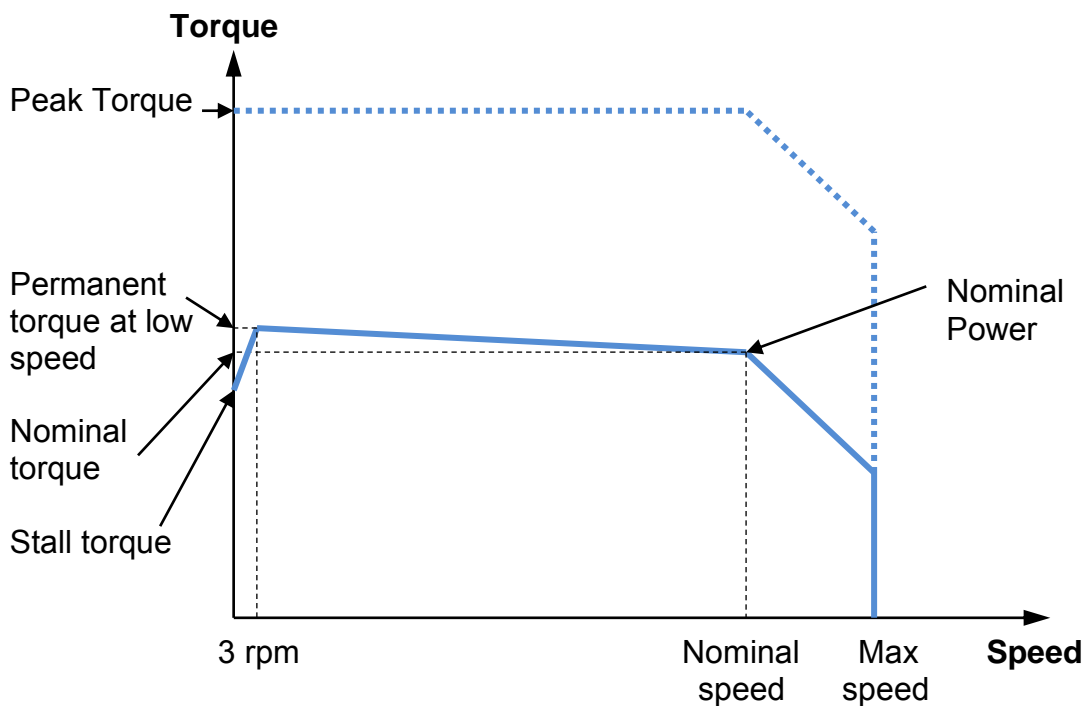
The peak current duration is calculated for a temperature rise of 3°C  
Consult us for more demanding applications.





### 3.2. EX Characteristics: Torque, speed, current, power...

The torque vs speed graph below explains different intrinsic values of the next tables.





Motor	Electronic Drive	Torque at low speed	Current at low speed	Peak Torque	Peak current	Back emf constant at 1000rpm	Torque sensitivity	Winding resistance	Winding inductance	Rotor inertia	Voltage of the mains	Rated speed and max speed	Rated torque	Rated current	Rated power
Name	Type	Mo (Nm)	Io (Arms)	Mp (Nm)	Ip (Arms)	Ke (V)	Kt (Nm/A)	Rb (Ω)	L (mH)	J (10 <sup>-5</sup> .kg.m <sup>2</sup> )	UR (V)	Nn (rpm)	Mn (Nm)	In (Arms)	Pn (W)
EX310EAK	DRIVE 2.2/5.7 - 230	1,75	2,16	4,37	5,66	50,9	0,81	6,6	20,3	7,9	230	4000	1,54	1,96	640
EX310EAM	DRIVE 1.9/4.8 - 400	1,75	1,81	4,38	4,76	60,7	0,97	9,9	28,9	7,9	400	6000	1,33	1,45	830
EX310EAP	DRIVE 1.3/2.9 - 230	1,75	1,24	3,89	2,83	88,9	1,42	20,7	62,0	7,9	230	2300	1,66	1,19	400
EX310EYP	DRIVE 1.3/2.9 - 230	1,75	1,24	3,89	2,83	88,9	1,42	20,7	62,0	7,9	230	1700	1,69	1,21	300
EX310EAG	DRIVE 5/11 - 230	1,75	4,05	4,37	10,6	27,2	0,43	2,0	5,8	7,9	230	7600	1,11	2,80	890
EX310UUAU	DRIVE 2.5/6.4 - 230	1,6	2,46	4	6,33	41	0,65	4,3	13,2	7,9	230	4200	1,41	2,24	620
EX310UAP	DRIVE 1.2/3 - 230	1,6	1,13	4	2,92	88,9	1,41	20,7	62,0	7,9	230	1700	1,56	1,12	280
EX420EAJ	DRIVE 5/11 - 230	3,5	4,26	8,31	10,6	51,4	0,82	2,3	11,0	29	230	4000	2,67	3,33	1120
EX420EAP	DRIVE 2.5/5.7 - 230	3,5	2,46	7,76	5,66	89	1,42	7,2	33,0	29	230	2300	3,18	2,26	770
EX420EAP1	DRIVE 2.4/5.7 - 400	3,25	2,3	7,73	5,66	89	1,42	7,2	33,0	29	400	4000	2,30	1,67	960
EX420EAP2	DRIVE 2.2/5.4 - 230	3	2,13	7,3	5,32	89	1,41	7,2	33,0	29	230	2300	2,60	1,86	630
EX420EAV	DRIVE 1.3/2.9 - 400	3,5	1,24	7,73	2,83	177	2,83	28,4	131,0	29	400	2000	3,25	1,16	680
EX430EAJ	DRIVE 5/11 - 230	4,8	4,57	10,8	10,6	65,6	1,05	2,2	10,9	42,6	230	3200	3,79	3,68	1270
EX430EAF	DRIVE 6/15 - 230	4,8	5,79	11,6	14,5	51,8	0,83	1,4	6,8	42,6	230	4000	3,28	4,07	1370
EX430EAP	DRIVE 2.5/5.7 - 230	4,8	2,46	10,7	5,63	122	1,95	7,3	37,8	42,6	230	1500	4,53	2,34	710
EX430EAL	DRIVE 3.4/8.3 - 400	4,8	3,3	11,6	8,28	90,9	1,45	4,2	21,0	42,6	400	4000	3,28	2,32	1370
EX420UAI	DRIVE 5/11 - 230	3,2	4,15	7,97	10,7	48,3	0,77	1,9	9,7	29	230	4000	2,45	3,25	1030
EX430UAG	DRIVE 5/13 - 230	4,4	4,88	11	12,6	56,4	0,90	1,6	8,1	42,6	230	3200	3,48	3,94	1170
EX430UAG	DRIVE 5/13 - 230	4,4	4,88	11	12,6	56,4	0,90	1,6	8,1	42,6	230	3200	3,48	3,94	1170



Motor	Electronic Drive	Torque at low speed	Current at low speed	Peak Torque	Peak current	Back emf constant at 1000rpm	Torque sensitivity	Winding resistance	Winding inductance	Rotor inertia	Voltage of the mains	Rated speed and max speed	Rated torque	Rated current	Rated power
Name	Type	Mo (Nm)	Io (Arms)	Mp (Nm)	Ip (Arms)	Ke (V)	Kt (Nm/A)	Rb ( $\Omega$ )	L (mH)	J (10 <sup>-5</sup> .kg.m <sup>2</sup> )	UR (V)	Nn (rpm)	Mn (Nm)	In (Arms)	Pn (W)
EX620EAO	DRIVE 6/12 - 230	7	5,51	14,7	11,3	81,7	1,27	1,6	14,0	98	230	2500	5,49	4,47	1440
EX630EAI	DRIVE 10/22 - 230	10,4	9,28	24,1	21,2	68,2	1,12	0,6	6,1	147	230	3000	7,24	6,75	2270
EX630EAY	DRIVE 6/12 - 230	10,4	5,11	23,5	11,3	124	2,03	1,9	20,0	147	230	1600	9,27	4,63	1550
EX630EAN	DRIVE 7/18 - 230	10,4	6,92	26	17,2	91,6	1,50	1,1	10,9	147	230	2200	8,52	5,81	1960
EX630EYN	DRIVE 7/16 - 230	10,4	6,92	23	15	91,6	1,50	1,1	10,9	147	230	2000	8,79	5,97	1840
EX620UAM	DRIVE 7/15 - 230	6,4	6,02	16	14,7	68,8	1,06	1,1	9,9	98	230	2750	4,76	4,67	1370
EX630UAK	DRIVE 8/20 - 230	9,5	7,91	23,8	19,4	73,6	1,20	0,7	7,1	147	230	2700	7,12	6,16	2010
EX820EAL	DRIVE 15/41 - 230	14	14,9	35	40,4	58,1	0,94	0,4	3,4	320	230	3600	7,53	8,30	2840
EX820EAR	DRIVE 10/23 - 230	14	9,28	32,1	22,6	93	1,51	1,0	8,6	320	230	2200	11,16	7,49	2570
EX820EAW	DRIVE 6/12 - 400	14	5,4	28,3	11,3	160	2,59	3,0	25,3	320	400	2200	11,16	4,36	2570
EX820UAQ	DRIVE 10/23 - 230	12,9	9,1	29,9	22,7	87,2	1,42	0,9	7,5	320	230	2300	10,10	7,21	2430
EX840EAJ	DRIVE 17/43 - 230	24,5	16	61,3	42,3	94,2	1,53	0,4	4,3	620	230	2200	14,18	9,54	3270
EX840EAQ	DRIVE 9/22 - 400	24,5	8,55	58,6	21,4	177	2,87	1,4	15,1	620	400	2100	15,01	5,37	3300
EX840EAK	DRIVE 15/38 - 400	24,5	14,3	61,3	37,6	106	1,72	0,5	5,4	620	400	3300	2,85	2,07	990
EX840UAL	DRIVE 13/33 - 230	22,6	12	56,5	32,1	118	1,89	0,6	6,7	620	230	1650	16,80	9,00	2900
EX860EAD	DRIVE 28/71 - 230	35	27,9	84,9	70,7	78,7	1,26	0,2	2,0	920	230	2500	9,00	7,82	2360
EX860EAJ	DRIVE 16/40 - 230	35	15,7	83,8	39,2	140	2,23	0,5	6,4	920	230	1500	24,80	11,28	3900
EX860UAJ	DRIVE 14/37 - 230	31,4	13,9	78,5	36,8	140	2,26	0,5	6,4	920	230	1500	22,30	10,01	3500
EX840EAM	DRIVE 12/23 - 400	24,5	11,2	48,8	22,6	135	2,20	0,8	8,9	620	400	2500	11,50	5,46	3010



### 3.2.1. Efficiency curves



Caution: The efficiency curves are typical values. They may vary from one motor to another



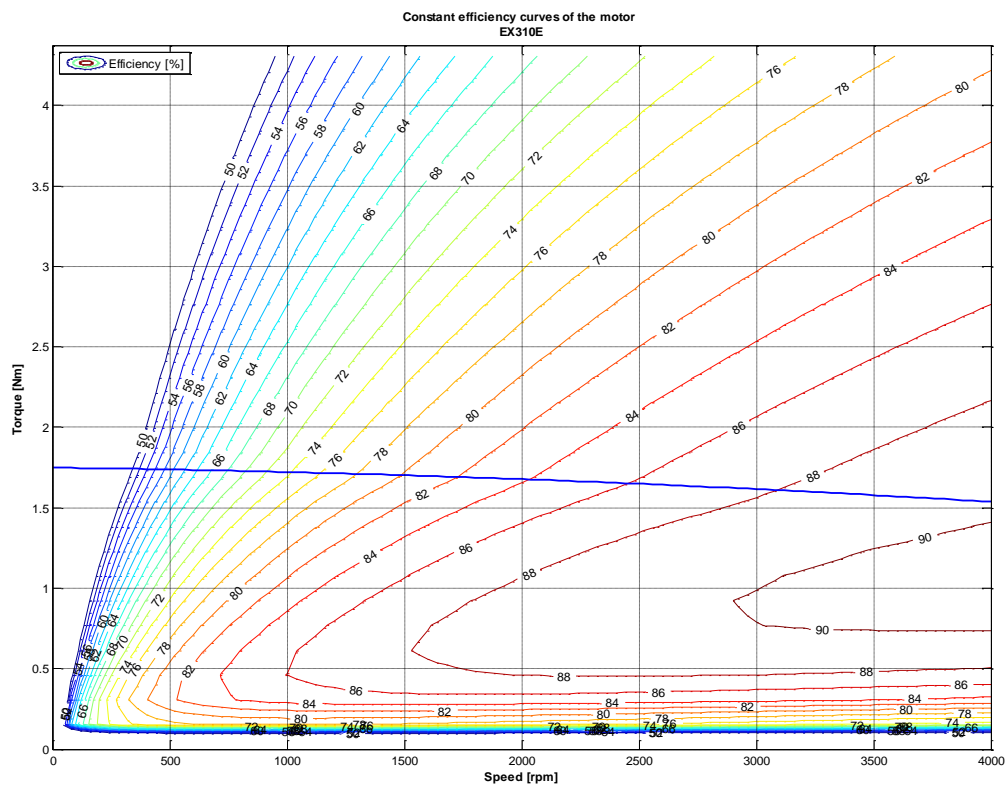
Caution: The efficiency curves are given for an optimal motor control (no voltage saturation and optimal phase between current and EMF)



Caution: The efficiency curves do not include the losses due to the switching frequency.

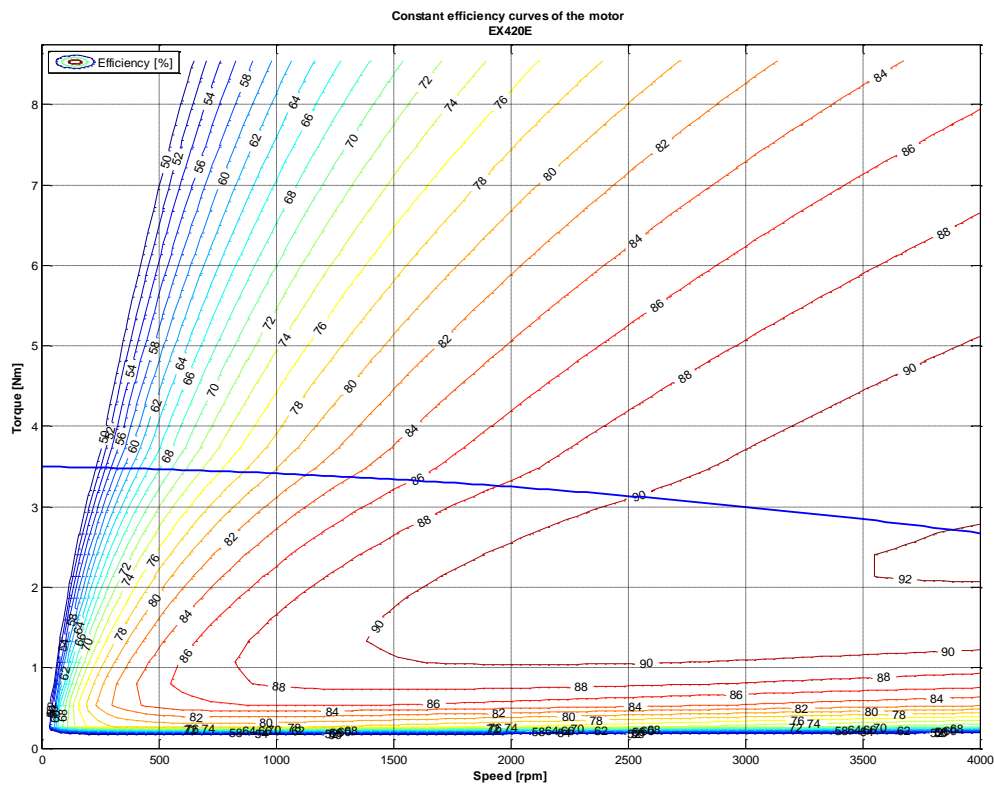


### 3.2.1.1. Series EX310E (EX310EAP)

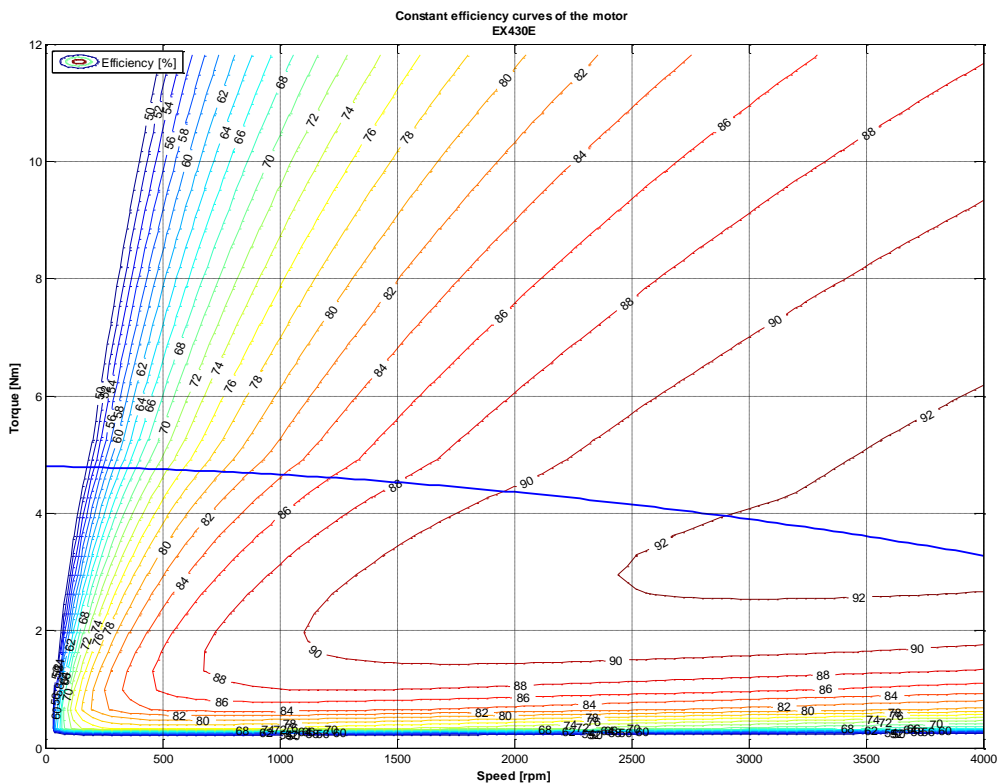




### 3.2.1.2. Series EX420E (EX420EAP)

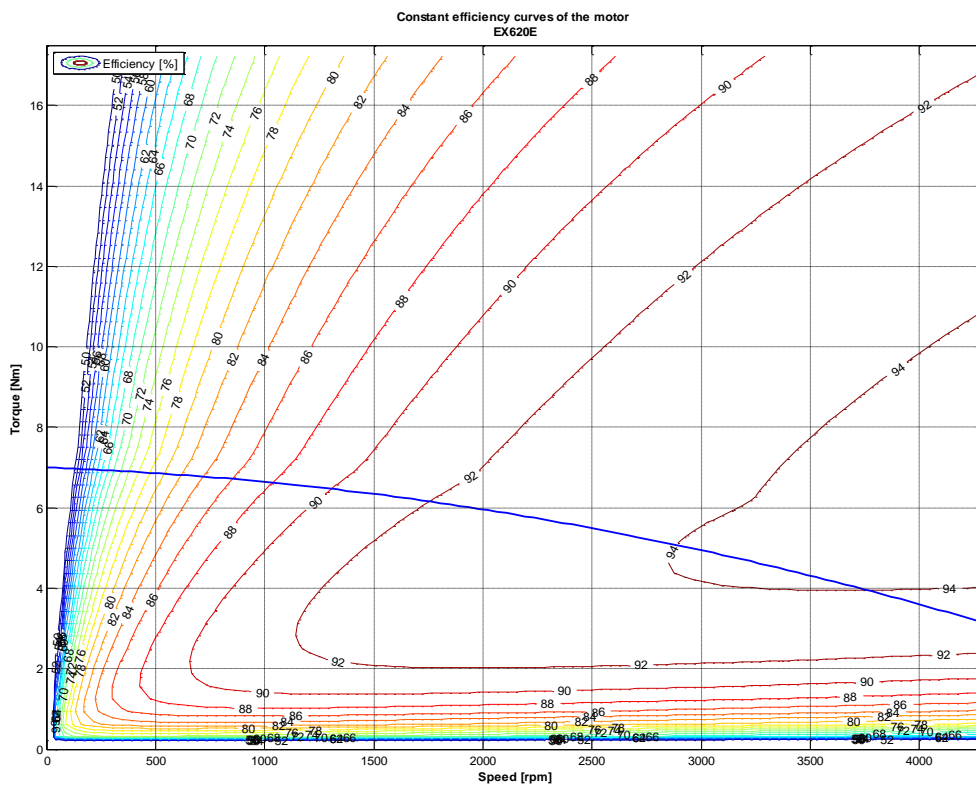


### 3.2.1.3. Series EX430E (EX430EAL)

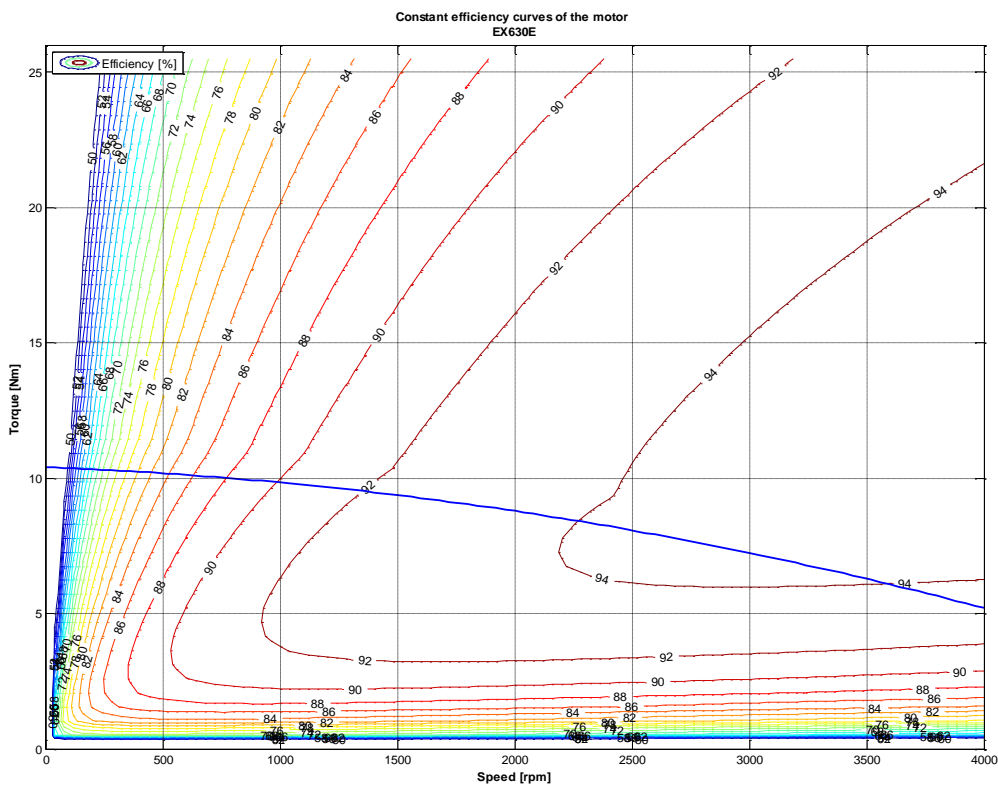




### 3.2.1.4. Series EX620E (EX620EAO)

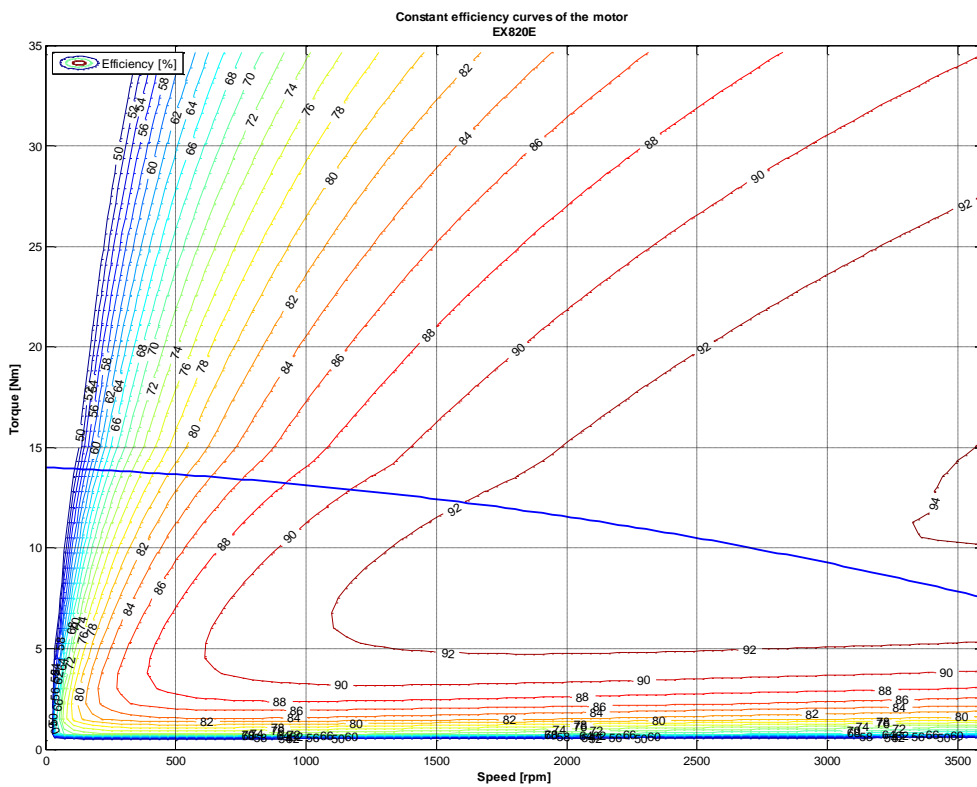


### 3.2.1.5. Series EX630E (EX630EAN)

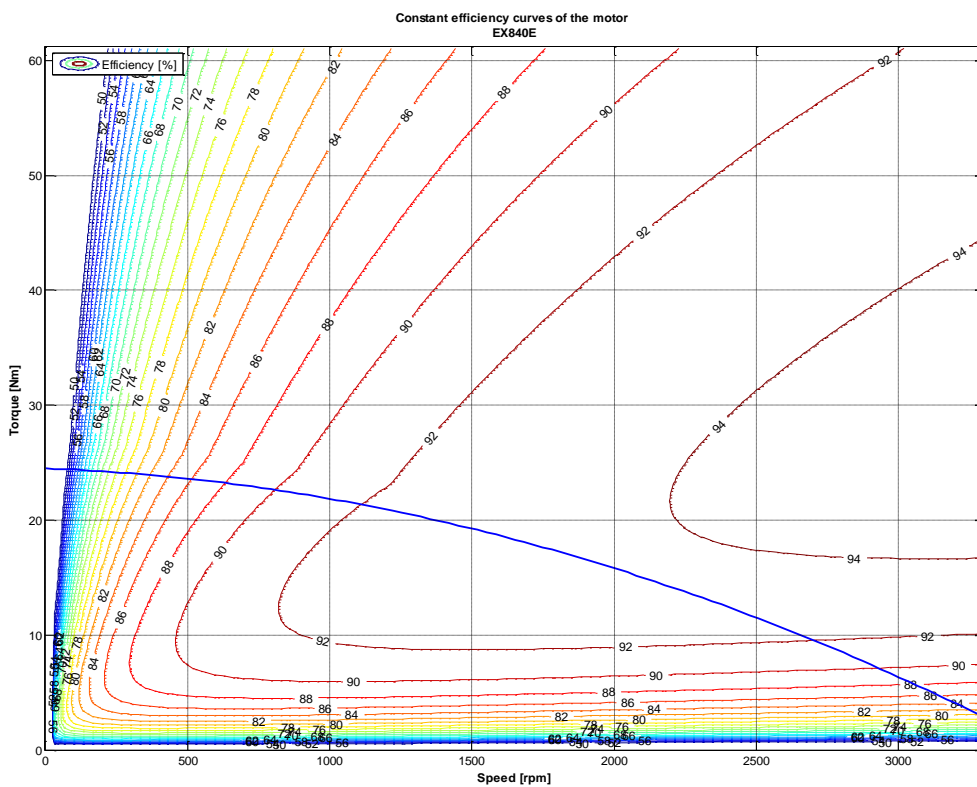




### 3.2.1.6. Series EX820E (EX820EAR)



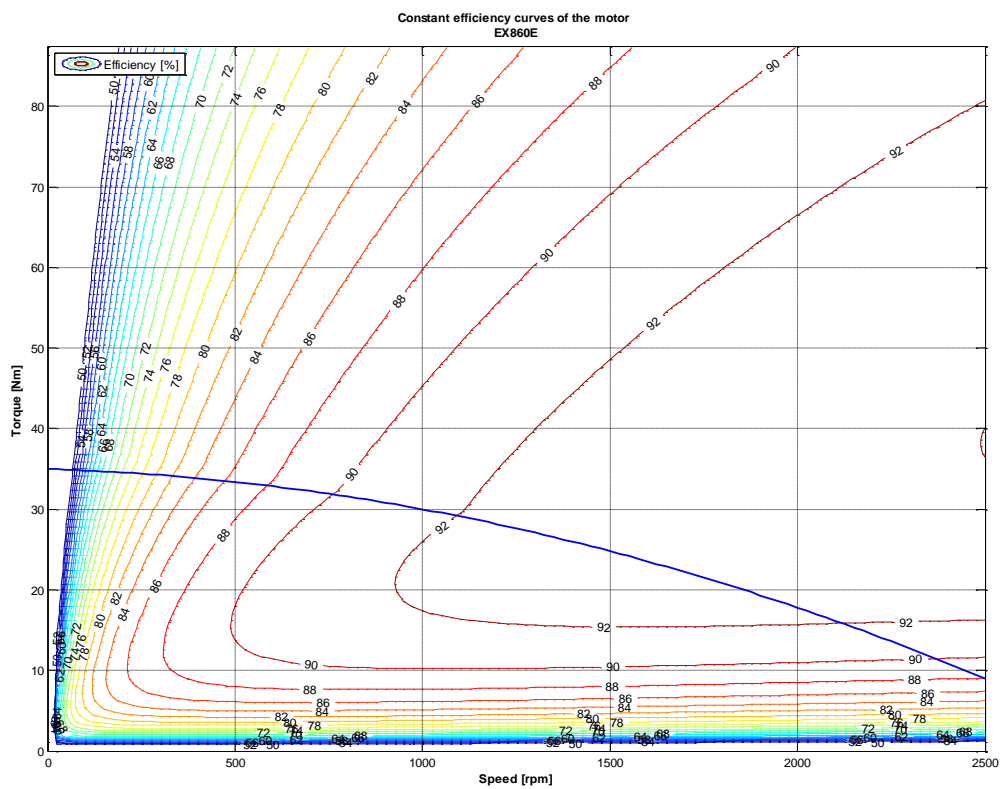
### 3.2.1.7. Series EX840E (EX840EAK)





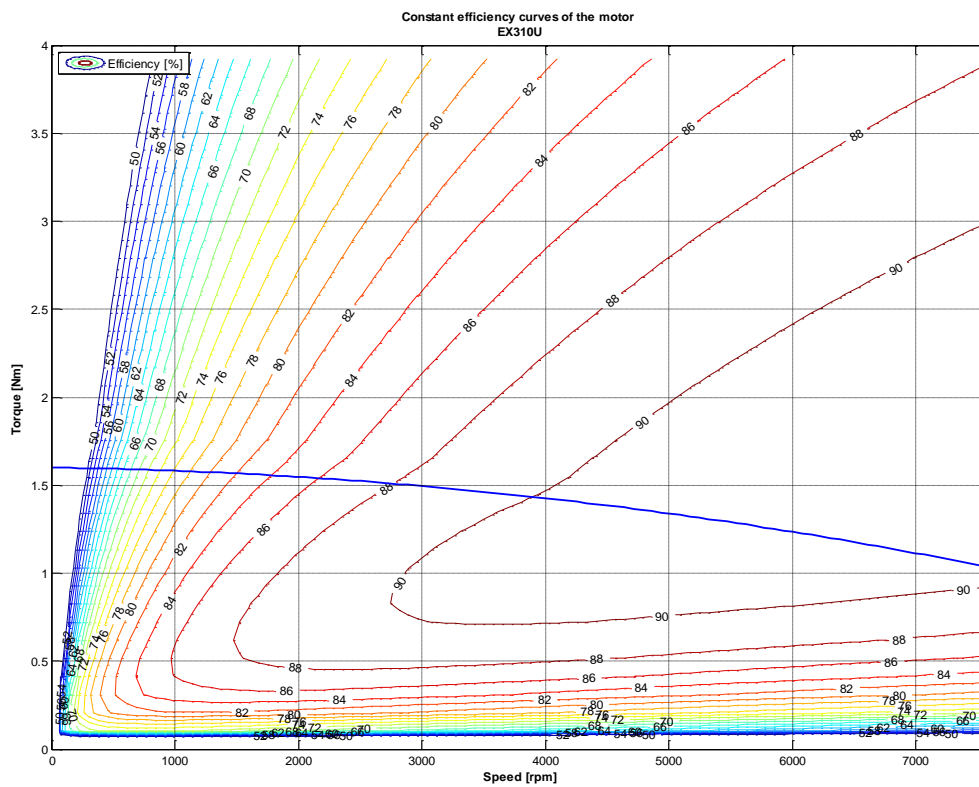


### 3.2.1.8. Series EX860E (EX860EAJ)



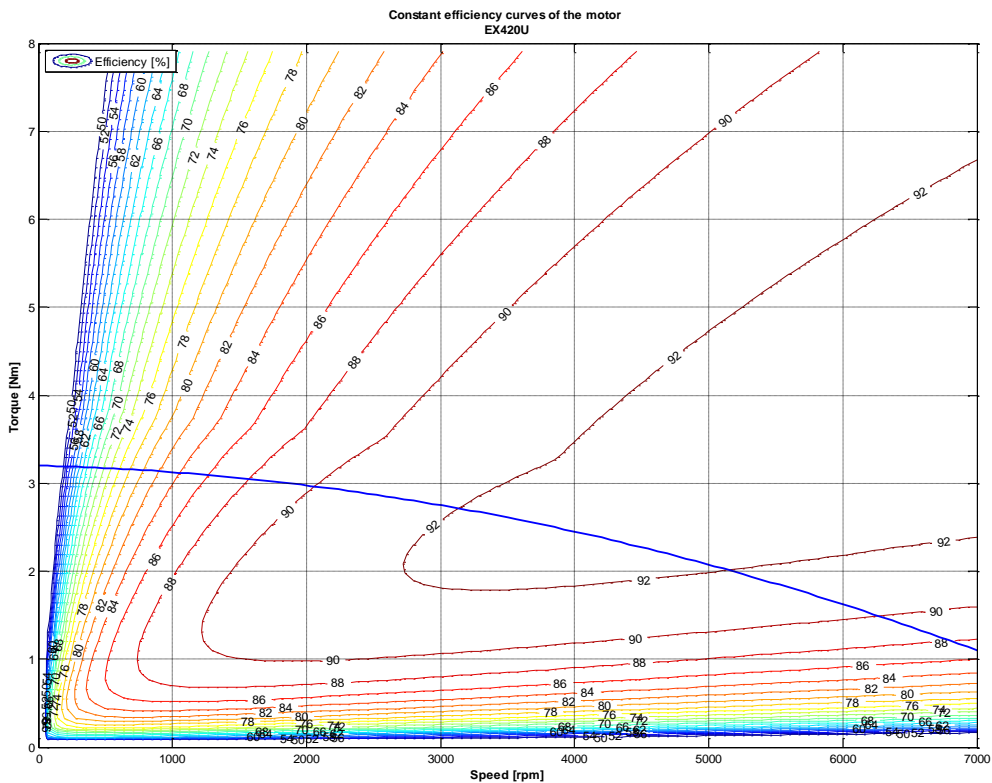


### 3.2.1.9. Series EX310U (EX310UAU)

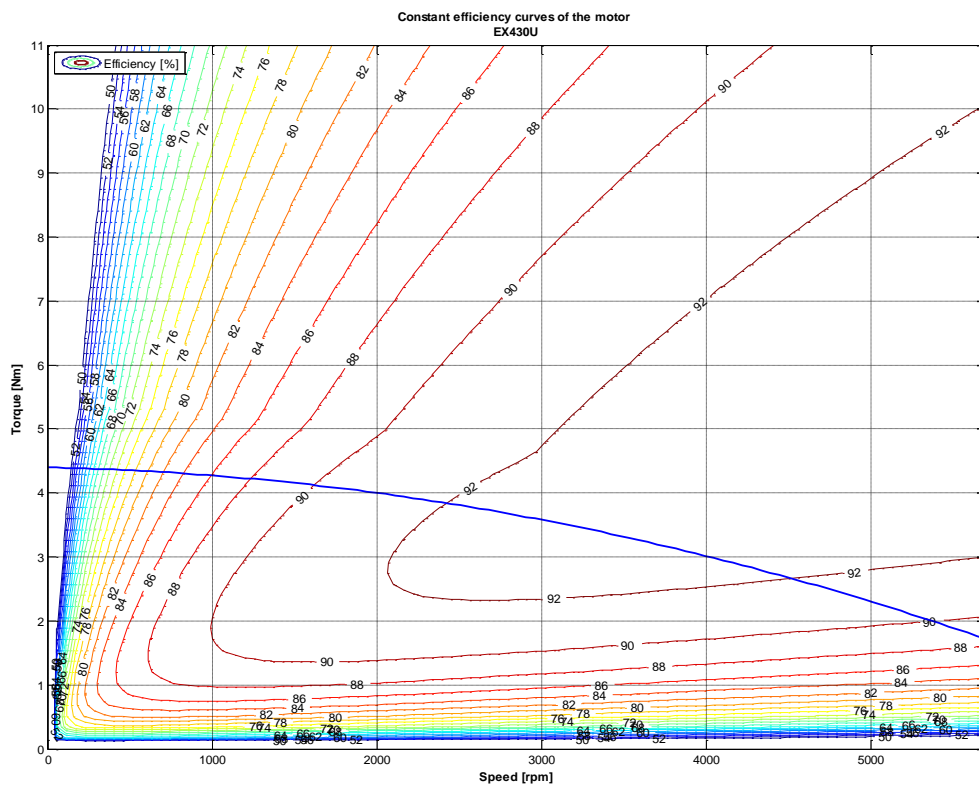




### 3.2.1.10. Series EX420U (EX420UAI)

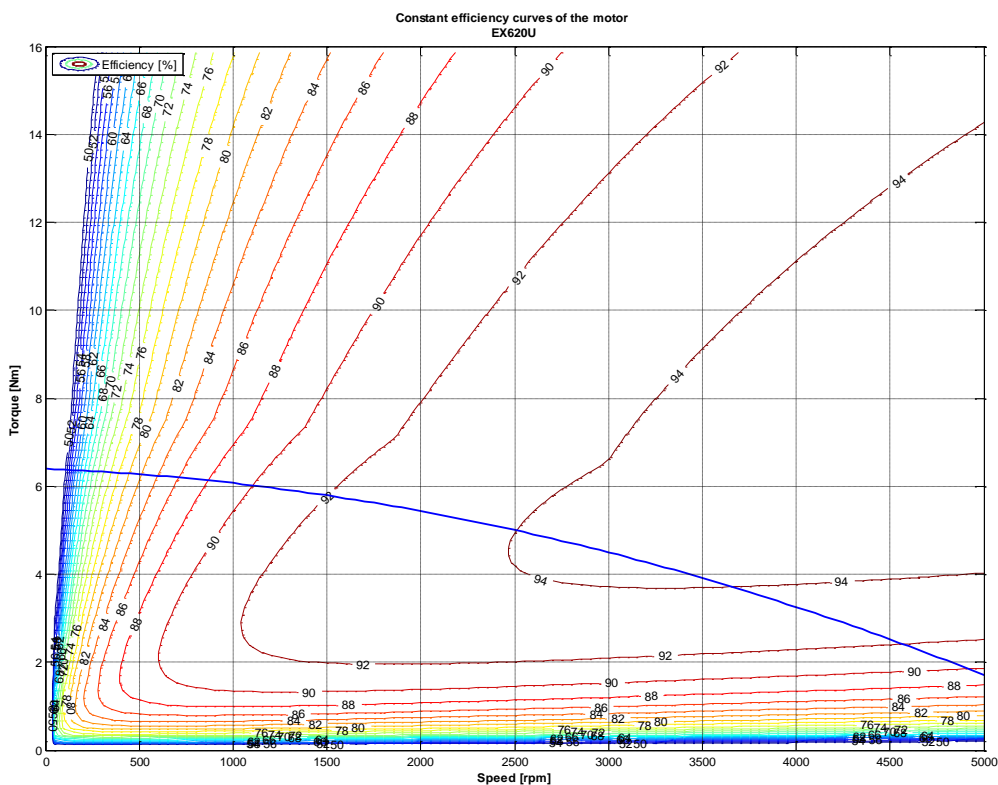


### 3.2.1.11. Series EX430U (EX430UAG)

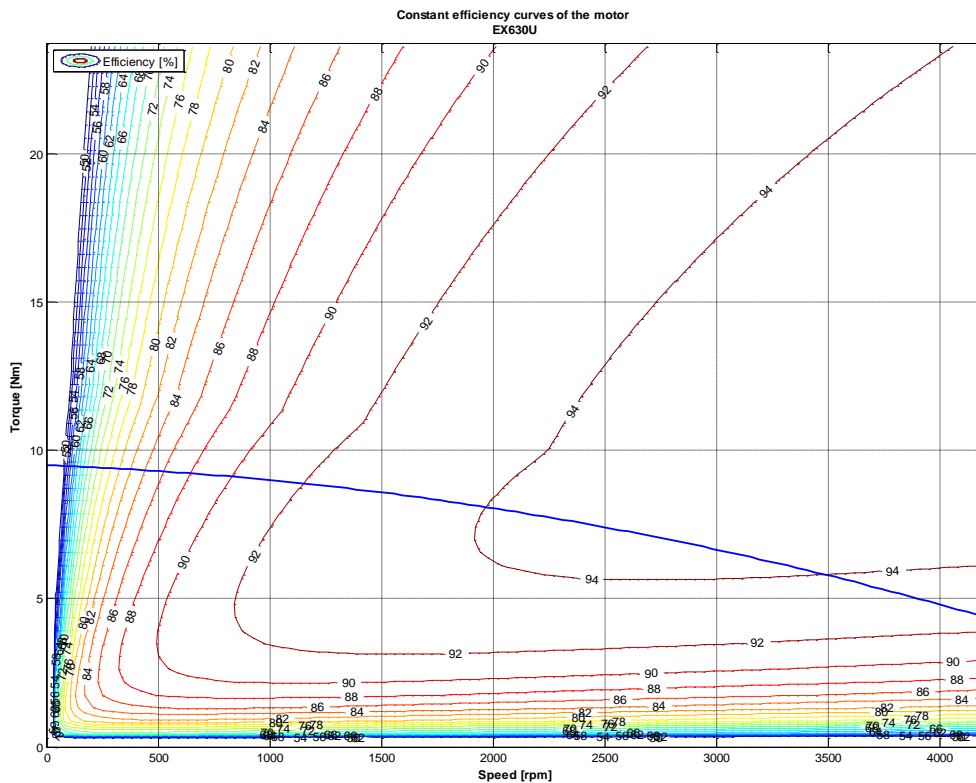




### 3.2.1.12. Series EX620U (EX620UAM)

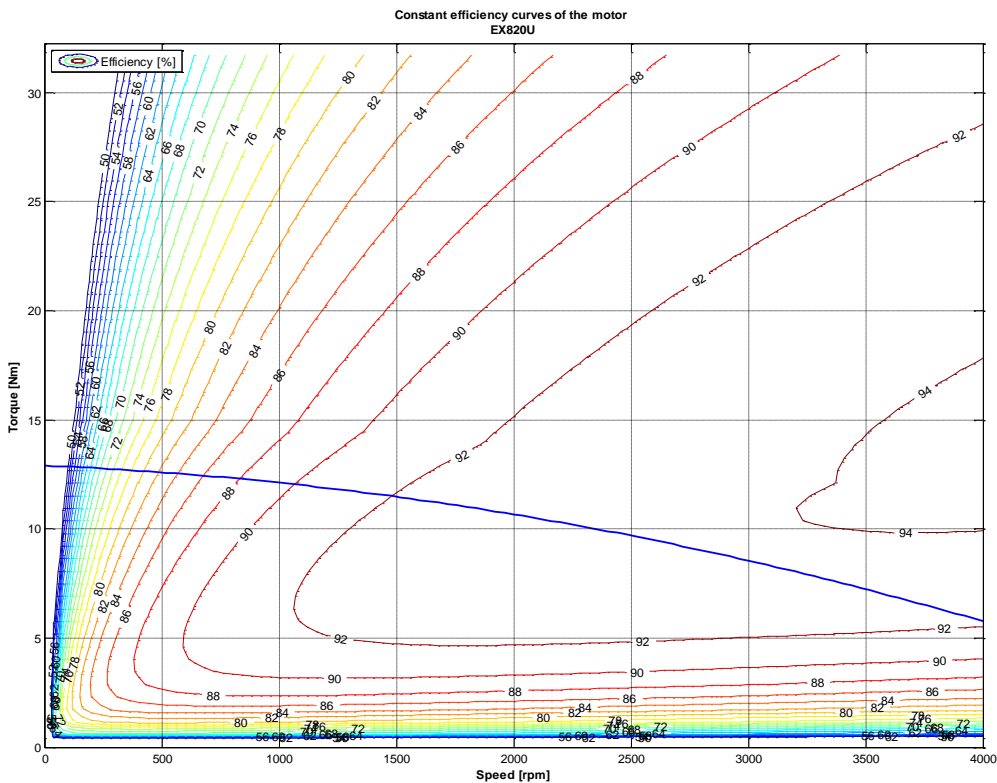


### 3.2.1.13. Series EX630U (EX630UAK)

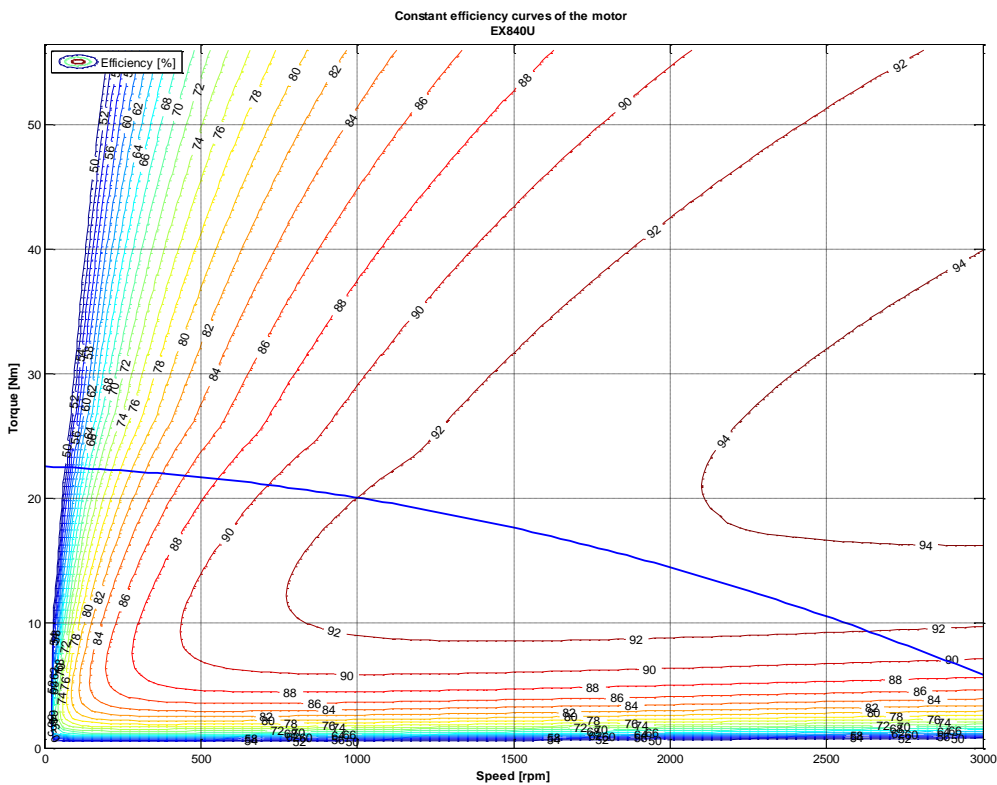




### 3.2.1.14. Series EX820U (EX820UAQ)

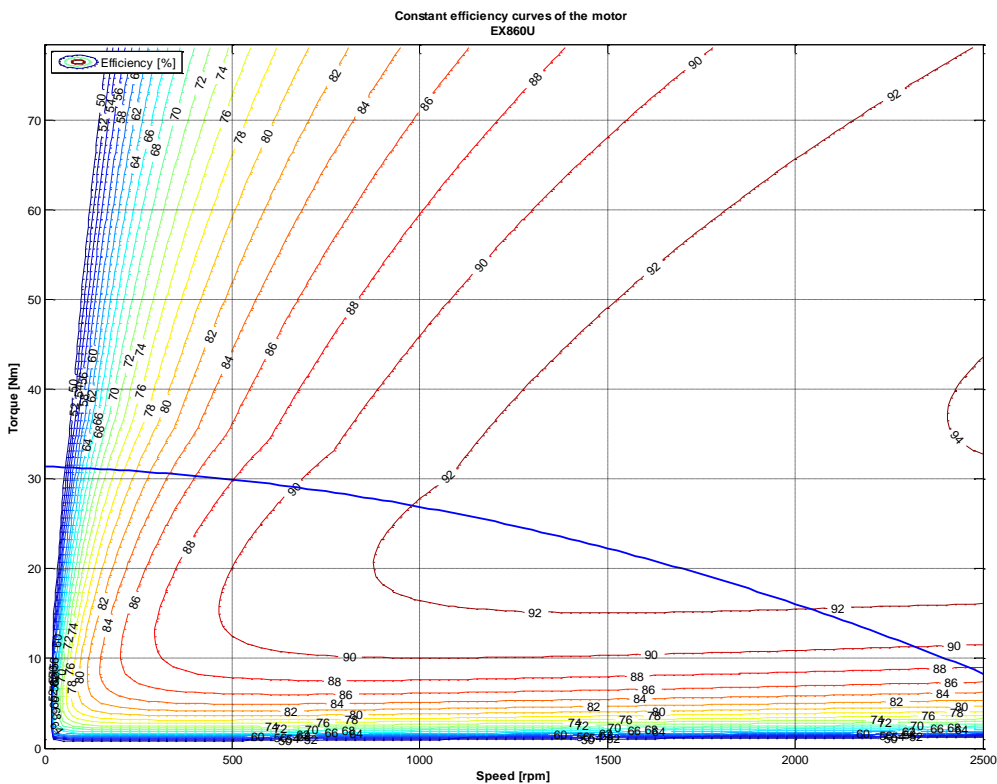


### 3.2.1.15. Series EX840U (EX840UAL)






### 3.2.1.16. Series EX860U (EX860UAJ)





### 3.2.2. Electromagnetic losses

	<p><u>Caution:</u> Following data result from our best estimations but are indicative. They can vary from one motor to another and with temperature. No responsibility will be accepted for direct or indirect losses or damages due to the use of these data.</p>
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(Following data are indicative)

Type	Tf [Nm]	Kd [Nm/1000rpm]
EX310EAP	0.024	0.012
EX420EAP	0.045	0.013
EX430EAP	0.059	0.020
EX620EAR	0.080	0.034
EX630EAR	0.120	0.040
EX820EAR	0.104	0.083
EX840EAK	0.208	0.166
EX860EAJ	0.485	0.160

Torque losses = Tf + Kd x speed/1000    *Speed in rpm*



### 3.2.3. Time constants of the motor

#### 3.2.3.1. Electric time constant:

$$\tau_{elec} = \frac{L_{ph\_ph}}{R_{ph\_ph}}$$

With following values given in the motor data sheet  
 $L_{ph\_ph}$  inductance of the motor phase to phase [H],  
 $R_{ph\_ph}$  resistance of the motor phase to phase at 25°C [Ohm].

#### Example:

Motor series EX620EAO

$L_{ph\_ph} = 14 \text{ mH}$  or  $14 \cdot 10^{-3} \text{ H}$

$R_{ph\_ph}$  at 25°C = 1.63 Ohm

→  $\sigma_{elec} = 14 \cdot 10^{-3} / 1.63 = 8.6 \text{ ms}$

An overall summary of motor time constants is given a little further.

#### 3.2.3.2. Mechanical time constant:

$$\tau_{mech} = \frac{R_{ph\_ph} * J}{Kt * Ke_{ph\_n}} = \frac{0.5 * R_{ph\_ph} * J}{(3 * \frac{Ke_{ph\_ph}}{\sqrt{3}}) * \frac{Ke_{ph\_ph}}{\sqrt{3}}}$$

$$\tau_{mech} = \frac{0.5 * R_{ph\_ph} * J}{(Ke_{ph\_ph})^2}$$

With following values obtained from the motor data sheet:

$R_{ph\_ph}$  resistance of the motor phase to phase at 25°C [Ohm],

$J$  inertia of the rotor [kgm<sup>2</sup>],

$Ke_{ph\_ph}$  back emf coefficient phase to phase [V<sub>rms</sub>/rad/s].

The coefficient  $Ke_{ph\_ph}$  in the formula above is given in [V<sub>rms</sub>/rad/s]

To calculate this coefficient from the datasheet, use the following relation:

$$Ke_{ph\_ph} [V_{rms}/rad/s] = \frac{Ke_{ph\_ph} [V_{rms}/1000rpm]}{\frac{2 * \pi * 1000}{60}}$$

#### Example:

Motor series EX620EAO

$R_{ph\_ph}$  at 25°C = 1.63 Ohm

$J = 98 \cdot 10^{-5} \text{ kgm}^2$

$Ke_{ph\_ph} [V_{rms}/1000rpm] = 81.7 [V_{rms}/1000rpm]$

→  $Ke_{ph\_ph} [V_{rms}/rad/s] = 81.7 / (2 * \pi * 1000 / 60) = 0.7802 [V_{rms}/rad/s]$

→  $\sigma_{mech} = 0.5 * 1.63 * 98 \cdot 10^{-5} / (0.7802^2) = 1.3 \text{ ms}$





### Remarks:

For a DC motor, the mechanical time constant  $\sigma_{\text{mech}}$  represents the duration needed to reach 63% of the final speed when applying a voltage step without any resistant torque. However this value makes sense only if the electric time constant  $\sigma_{\text{elec}}$  is much smaller than the mechanical time constant  $\sigma_{\text{mech}}$  (for the motor EX620EAO taken as illustration, it is not the case because we obtain  $\sigma_{\text{mech}} < \sigma_{\text{elec}}$ ).

An overall summary of motor time constants is given a little further.

#### 3.2.3.3. Thermal time constant of the copper:

$$\tau_{\text{therm}} = R_{\text{th}} * C_{\text{th}}_{\text{copper}}$$

$$C_{\text{th}}_{\text{copper}} [J/^{\circ}K] = \text{Mass}_{\text{copper}} [Kg] * 389 [J/kg^{\circ}K]$$

With:

**$R_{\text{th}}$**  thermal resistance between copper and ambient temperature [ $^{\circ}K/W$ ]  
 **$C_{\text{th}}_{\text{copper}}$**  thermal capacity of the copper [ $J/^{\circ}K$ ]  
 **$\text{Mass}_{\text{copper}}$**  mass of the copper (winding) [kg]

Hereunder is given an overall summary of motor time constants:

Type	Electric time constant [ms]	Mechanical time constant [ms]	Thermal time constant of copper [s]
EX310EAP	3.0	1.0	11.6
EX420EAP	4.6	1.2	31.1
EX430EAP	5.2	1.3	32.6
EX620EAR	8.6	1.2	59.5
EX630EAR	10.2	1.3	53.9
EX820EAR	8.5	1.9	67.3
EX840EAK	11.0	1.5	29.9
EX860EAJ	12.9	1.7	28.1

#### 3.2.4. Speed ripple

The typical speed ripple for a EX motor with a resolver at 4000rpm is 3% peak to peak.

This value is given as indicative data because depending on the settings of the drive (gains of both speed and current regulation loops, presence of filtering or not, load inertia, resistant torque and type of sensor in use), without external load (neither external inertia nor resistant torque).



### 3.2.5. Rated data according to rated voltage variation

The nominal characteristics and especially the rated speed, maximal speed, rated power, rated torque, depend on the nominal voltage supplying the motor considered as the rated voltage. The rated data mentioned in the data sheet are given for each association of motor and drive. Therefore, if the supply voltage changes, the rated values will also change. As long as the variation of the rated voltage remains limited, for instance  $\pm 10\%$  of the nominal value, it is possible to correctly evaluate the new rated values as illustrated below.

#### Example:

Extract of EX620EAO datasheet

BRUSHLESS MOTORS			
<b>EX620EAO</b>			
ELECTRONIC DRIVE			
<b>DIGIVEX 7.5/15 et DIGIVEX 8/16</b>			
(230V) (400V)			

No UL certification

Torque at low speed	$M_o$	Nm	7	
Permanent current at low speed	$I_o$	$A_{rms}$	5.51	
Peak torque	$M_p$	Nm	14.7	--
Current for the peak torque	$I_p$	$A_{rms}$	11.3	--
Back emf constant at 1000 rpm (25°C)*	$K_e$	$V_{rms}$	81.7	
Torque sensitivity	$K_t$	$Nm/A_{rms}$	1.27	
Winding resistance (25°C)*	$R_b$	$\Omega$	1.63	
Winding inductance*	$L$	mH	14	
Rotor inertia	$J$	$kgm^2 \times 10^{-5}$	98	
Thermal time constant	$T_{th}$	min	27	
Motor mass	$M$	kg	11.3	
Voltage of the mains	UR1 UR2 UR3	$V_{rms}$	230	400
Rated speed	Nn1 Nn2 Nn3	rpm	2500	4300
Rated torque	Mn1 Mn2 Mn3	Nm	5.49	3.13
Rated current	In1 In2 In3	$A_{rms}$	4.47	2.75
Rated power	Pn1 Pn2 Pn3	W	1440	1410

All data are given in typical values under standard conditions

\* Phase to phase

Voltages and currents are given in rms values

□ If we suppose that the rated voltage  $U_n=400 V_{rms}$  decreases of **10%** ; this means that the new rated voltage becomes  $U_{n2}=360 V_{rms}$ .

#### Rated speed:

The former rated speed  $N_n=4300$  rpm obtained with a rated voltage  $U_n=400 V_{rms}$  and an efficiency of  $\eta=92\%$  leads to the new rated speed  $N_{n2}$  given as follows:

$$N_{n2} = N_n * \frac{\frac{U_{n2}}{U_n} - 1 + \eta}{\eta} \qquad N_{n2} = 4300 * \frac{\frac{360}{400} - 1 + 0.92}{0.92} = 3832rpm$$



### Maximum speed:

The former maximum speed  $N_{\max} = 4300$  rpm obtained with  $U_n = 400$  V<sub>rms</sub> and  $N_n = 4300$  rpm leads to the new maximum speed  $N_{\max 2}$  given as follows:

$$N_{\max 2} = N_{\max} * \frac{N_{n2}}{N_n} \qquad N_{\max 2} = 4300 * \frac{3832}{4300} = 3832 \text{rpm}$$

### N.B.

□ If the rated voltage increases ( $U_{n2} > U_n$ ), the new rated speed  $N_{n2}$  and the new maximum speed  $N_{\max 2}$  will be greater than the former ones  $N_n$  and  $N_{\max}$ . Moreover you will have to check that the drive still shows able to deal with the new maximum electric frequency.



Warning: If the main supply decreases, you must reduce the maximum speed accordingly in order not damage the motor.  
In case of doubt, consult us.

### Rated power:

The former rated power  $P_n = 1410$  W obtained with  $U_n = 400$  V<sub>rms</sub> leads to the new rated power  $P_{n2}$  given as follows:

$$P_{n2} = P_n * \frac{U_{n2}}{U_n} \qquad P_{n2} = 1410 * \frac{360}{400} = 1269 \text{W}$$

### Rated torque:

The former rated torque  $M_n = 3.13$  Nm obtained with  $U_n = 400$  V<sub>rms</sub> leads to the new rated torque  $M_{n2}$  given as follows:

$$M_{n2} = \frac{P_{n2}}{2 * \pi * N_{n2}} \qquad M_{n2} = \frac{1269}{2 * \pi * 3832} = 3.16 \text{Nm}$$



### 3.2.6. Voltage withstand characteristics of EX series

The motors fed by converters are subject to higher stresses than in case of sinusoidal power supply. The combination of fast switching inverters with cables will cause overvoltage due to the transmission line effects. The peak voltage is determined by the voltage supply, the length of the cables and the voltage rise time. As an example, with a rise time of 200 ns and a 30 m (100 ft) cable, the voltage at the motor terminals is twice the inverter voltage.

The insulation system of the servomotors EX is designed to withstand high repetitive pulse voltages and largely exceeds the recommendations of the IEC/TS 60034-25 ed 2.0 2007-03-12 for motors without filters up to 500V AC (See figure 1).

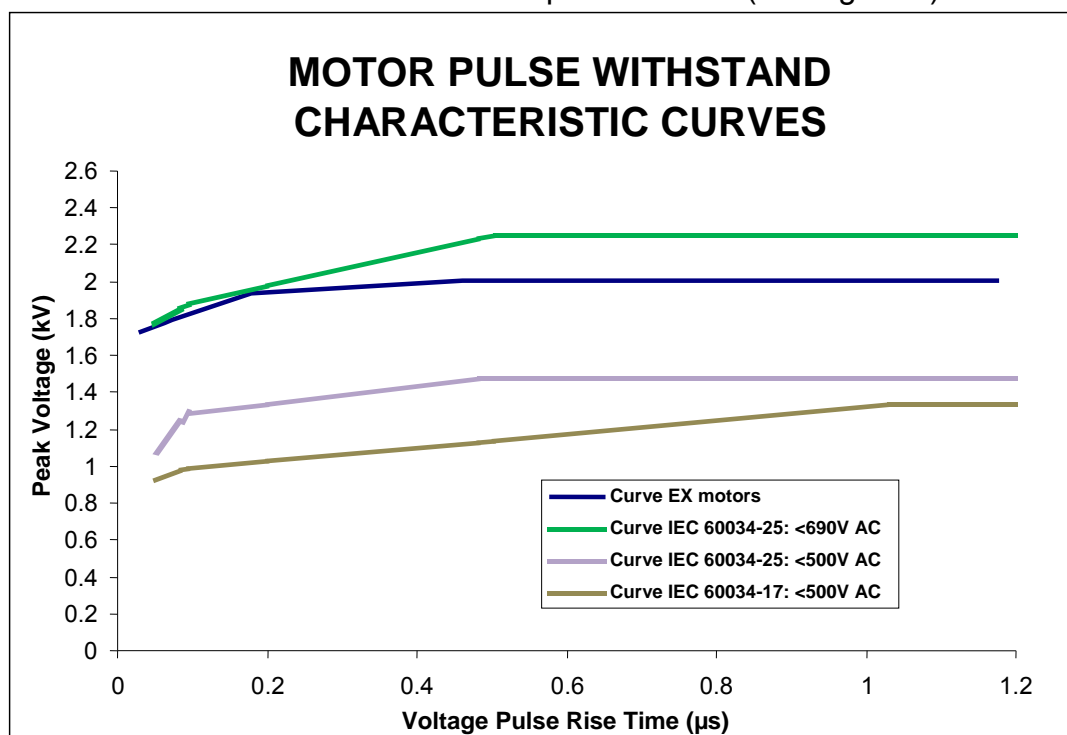


Figure 1: Minimum Voltage withstands characteristics for motors insulations according to IEC standards. At the top are the typical capabilities for the EX motors.

Note: The pulse rise times are defined in accordance with the IEC/TS 60034-17 ed4.0 2006-05-09.

The EX motors can be used with a supply voltage up to 500 V under the following conditions:

- The pulse rise times must be longer than 50 ns.
- The repetitive pulse voltages must not exceed the values given in figure 1, "Curve EX motors" in dark blue.



### **3.2.7. Voltage and current during the operating**

The EX motors carry ATEX and UL certification and due to this certificate, they are subjected to strict rules regarding their use. One of such rules is the use of a servoamplifier that meets specific characteristics.

#### **EX310 ATEX :**

<b>Voltage of the associated speed drive</b>	<b>24V direct current</b>	<b>48V direct current</b>	<b>230V single / three phase</b>	<b>400V three phase</b>
Power supply direct current voltage (V)	24 ±10%	48 ±10%	310 ±10%	550 ±10%
Motor electrical frequency (Hz)	0 à 500	0 à 500	0 - 500	0 - 500
Steady peak current in a phase (Â/Arms)	Max. 17/12	Max. 17/12	Max. 7.5/5.3	Max. 4/2.8
Maximum peak current in a phase (Â/Arms)	Max. 34/24	Max. 34/24	Max. 15/10.6	Max. 8/5.6
Maximum steady motor power (W)	Max. 250	Max. 500	Max. 1900	Max. 1800

#### **EX4 ATEX :**

<b>Voltage of the associated speed drive</b>	<b>24V direct current</b>	<b>48V direct current</b>	<b>230V single / three phase</b>	<b>400V three phase</b>
Power supply direct current voltage (V)	24 ±10%	48 ±10%	310 ±10%	550 ±10%
Motor electrical frequency (Hz)	0 à 500	0 à 500	0 to 500	0 to 500
Steady peak current in a phase (Â/Arms)	Max. 17/12	Max. 17/12	Max. 14/9.9	Max. 8/5.6
Maximum peak current in a phase (Â/Arms)	Max. 34/24	Max. 34/24	Max. 28/19.8	Max. 16/11.3
Maximum steady motor power (W)	Max. 200	Max. 400	Max. 3400	Max. 3400

#### **EX6 ATEX :**

<b>Voltage of the associated speed drive</b>	<b>230V single / three phase</b>	<b>400V three phase</b>
Power supply direct current voltage (V)	310 ±10%	550 ±10%
Motor electrical frequency (Hz)	0 to 500	0 to 500
Steady peak current in a phase (Â/Arms)	Max. 25/17.7	Max. 16/11.3
Maximum peak current in a phase (Â/Arms)	Max. 50/35.3	Max. 32/22.6
Maximum steady motor power (W)	Max. 6000	Max. 6000

**EX8 ATEX :**

Voltage of the associated speed drive	230V single / three phase	400V three phase
Power supply direct current voltage (V)	310 ±10%	550 ±10%
Motor electrical frequency (Hz)	0 to 500	0 to 500
Steady peak current in a phase (Â/Arms)	Max 100/70.7	Max 50/35.3
Maximum peak current in a phase (Â/Arms)	Max 200/141.4	Max 100/70.7
Maximum steady motor power (W)	Max 10 000	Max 10 000

**EX310 UL :**

Voltage of the associated speed drive	230V single / three phases	400-480V three phases
Nominal Power supply direct current voltage(v)	310 ±10%	550-660 ±10%
Motor electrical frequency (Hz)	0 to 650	0 to 650
Steady peak current in a phase (Â/Arms)	Max. 7.5/5.3	Max. 4/2.8
Maximum peak current in a phase (Â/Arms)	Max. 15/10.6	Max. 8/5.6
Maximum steady motor power (W)	Max. 1900	Max. 1800

**EX4 UL :**

Voltage of the associated speed drive	230V single / three phases	400-480V three phases
Nominal Power supply direct current voltage (V)	310 ±10%	550-660 ±10%
Motor electrical frequency (Hz)	0 to 650	0 to 650
Steady peak current in a phase (Â/Arms)	Max. 14/9.9	Max. 8/5.6
Maximum peak current in a phase (Â/Arms)	Max. 28/19.8	Max. 16/11.3
Maximum steady motor power (W)	Max. 3400	Max. 3400

**EX6 UL :**

Voltage of the associated speed drive	230V single / three phases	400- 480V three phases
Nominal Power supply direct current voltage (V)	310 ±10%	550-660 ±10%
Motor electrical frequency (Hz)	0 to 650	0 to 650
Steady peak current in a phase (Â)	Max. 25	Max. 16
Maximum peak current in a phase (Â)	Max. 50	Max. 32
Maximum steady motor power (W)	Max. 6000	Max. 6000


**EX8 UL :**

Voltage of the associated speed drive	230V single / three phases	400-480V three phases
Nominal Power supply direct current voltage (V)	310 ±10%	550-660 ±10%
Motor electrical frequency (Hz)	0 to 500	0 to 500
Steady peak current in a phase (Â)	Max 100	Max 50
Maximum peak current in a phase (Â)	Max 200	Max 100
Maximum steady motor power (W)	Max 10 000	Max 10 000

The EX motors must be connected in accordance with the diagrams in the commissioning and use manual supplied with the motor.



### 3.3. Dimension drawings

#### 3.3.1. EX310E

IP Motor	IP64	IP65	
Protection	11 2 G Ex d II B T4 IP64	11 2 G0 Ex d II B T4 IP65 Ex tD A21 IP65 T35°C	<ul style="list-style-type: none"> <li>EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.</li> <li>EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".</li> <li>EN 60241-0 : Electrical apparatus for use in the presence of combustible dust.</li> <li>EN 60241-1 : Electrical apparatus for use in the presence of combustible dust.</li> <li>EN 60241-1 : Electrical apparatus for use in the presence of combustible dust.</li> <li>Part 1 : Protection by enclosures "10"</li> </ul>
Standards	<p style="text-align: center;"><b>EX</b></p> <p style="text-align: center;">Certification : INERIS 03ATEX060X</p>		
<p><b>EX310E R1</b></p> <p>Connections: Torque range (depends on length), Winding (depends on speed), Brake, Feedback, Shaft</p> <p>A : Resolver - ratio 0.5 E : Encoder CR410 G : Resolver - ratio 0.3 R : Hyperface singleturn SKS36 S : Hyperface multiturn SKM36 X : Low cost encoder Y : Sensorless</p>			

<b>WELIGHT</b>	<b>BRAKE</b>	<b>SHAFT END</b>	<b>WITH KEY</b>
Supply voltage : 24V Static torque	Supply voltage : 24V Static torque	M4 x 10	M4 x 12
EX310 20°C 2 Nm 100°C 1.8 Nm	EX310 20°C 2 Nm 100°C 1.8 Nm	12.5-8.12	12.5-8.12
Without brake 2.8 kg With brake 3.2 kg	Without brake 2.8 kg With brake 3.2 kg	Ø60	Ø60
Without brake 225 With brake 255	Without brake 225 With brake 255	Ø116	Ø116
Resolver ratio 0.3 (G)	Resolver ratio 0.3 (G)	Ø50	Ø50
Hyperface SKS36 (S)	Hyperface SKS36 (S)	Ø116	Ø116
Hyperface SKM36 (R)	Hyperface SKM36 (R)	Ø116	Ø116
Encoder CR410 (E)	Encoder CR410 (E)	Ø116	Ø116
Resolver ratio 0.5 (A)	Resolver ratio 0.5 (A)	Ø116	Ø116
Feedback option (feedback letter)	Feedback option (feedback letter)	Ø116	Ø116
without brake L (mm)	without brake L (mm)	Ø116	Ø116
with brake L (mm)	with brake L (mm)	Ø116	Ø116

CONNECTIONS VARIANT ON SHEET 2/2

Sheet : 1/2

EX300

OUTLINE DRAWING

Format A3

344487

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General tolerances DIN ISO 2768 mK

Drawn 11/09/09 00

Visa 22/05/13 SD

AM24109 22/04/13 SD

AM 23600 27/04/11 YG

AM23304 - 10/12/09 SD

Modifications



### 3.3.2. EX420E EX430E

**WITH KEY**

**SHAFT END**

Ground screw M5x12  
 Power cable gland ExdII B ExTD : Ø8.5-Ø16 + clamping module  
 Sensor cable gland ExdII B ExTD : Ø6-Ø12 + clamping module

Dimensions: 0±0.6, 0.035, Ø0.08 A, 0.08 A, 19, 70, Ø80.6, 10.5, 3, 4.0±0.6, 35 Max, L Max, 4.5°, 7.5°, 4 x Ø7 on Ø100, Ø118, M6 x16

**EX4 E R1**

Torque range (depends on length) (depends on speed)  
 Feedback  
 A : Resolver - ratio 0.5  
 G : Resolver - ratio 0.3  
 R : Hipertace singleturn SKS36  
 S : Hipertace multiturn SKM36  
 T : Hipertace singleturn SRS50  
 U : Hipertace multiturn SRM50  
 X : Low cost encoder  
 Y : Sensorless

Brake  
 2 : without brake  
 5 : with brake

IP  
 0 : IP64  
 1 : IP65

Shaft  
 0 : Plain shaft  
 1 : With key

**CONNECTIONS VARIANTS ON SHEET 2/2**

Feedback options (feedback letter)	Resolver ratio 0.5 (A)	Resolver ratio 0.3 (G)	Low cost encoder (X)	Sensorless (Y)	Hipertace SKS36 (R)	Hipertace SKM36 (S)	Hipertace SRM50 (U)
W/ out brake L (mm)	265	265	265	265	285	305	305
W/ with brake L (mm)	290	290	290	290	310	330	330
W/ out brake L (mm)	290	290	290	290	310	330	330
W/ with brake L (mm)	315	315	315	315	335	355	355

**W/ ELIGHT**

Motor	w/ out brake	w/ with brake
EX420	7 kg	8 kg
EX430	8 kg	9 kg

**BRAKE**

Supply voltage : 24V	Static torque
EX420	6 N.m
EX430	5 N.m
20°C	6 N.m
100°C	5 N.m

Supply voltage : 24V  
 Static torque ±10%

**IP Motor**

IP64 : II 2 G Ex d II B T4 IP64  
 IP65 : II 2 GD Ex d II B T4 IP65 Ex ID A21 IP65 T135°C

Protection  
 • EN 60079-0 : Electrical apparatus for explosive gas atmospheres Part 0 : General requirements.  
 • EN 60079-1 : Electrical apparatus for explosive gas atmospheres Part 1 : Flameproof enclosures "d".  
 Standards  
 • EN 60079-1 : Electrical apparatus for explosive gas atmospheres Part 1 : Flameproof enclosures "d".  
 • EN 6124-0 : Electrical apparatus for use in the presence of explosive atmospheres Part 0 : General requirements.  
 • EN 6124-1 : Electrical apparatus for use in the presence of explosive atmospheres Part 1 : Protection by enclosures "1D".

Certification : INERIS 04ATEX0097X

Format A3  
 Sheet : 1/2

EX400  
 OUTLINE DRAWING  
 344619  
 B

Scale 1:2

Drawn 29/07/09 SD  
 Checked 22/05/13 SD  
 Validated B AM 24/08 22/04/13 SD  
 A AM 23304 10/12/09 SD

General tolerances  
 DIN ISO 2768 mK

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### 3.3.3. EX620E EX630E

Ground screw M5

Ø107

24

Ø130

Ø110

Ø95

0±0.6

0.0L

0.1A

3.5

14

50±0.6

30°

30°

45°

45°

4 x Ø8.4 on Ø130

Ø150

MB x 18

L Max

Power cable gland ExdII B Ex tD : Ø8.5 - Ø7.6 + clamping module

Sensor cable gland ExdII B Ex tD : Ø8.5 - Ø7.6 + clamping module

<b>W/TH KEY</b> 	<b>SHAFT END</b> 	<b>W/THOUT BRAKE</b> 
---------------------	----------------------	--------------------------

WEIGHT	
Motor w/ thout brake	10 Kg
Motor w/ thout brake w/ th brake	11 Kg
EX620	12.5 Kg
EX630	13.5 Kg

BRAKE	
Supply voltage : 24V	±10%
Static torque	±10%
20 °C	12 N.m
100 °C	10 N.m
EX620	12 N.m
EX630	10 N.m

DIMENSIONS								
Feedback options (feedback letter)	Resolver - ratio 0.5 (A) ratio 0.3 (G) encoder (X)	Low cost encoder (Y)	Sensorless (Y)	Hiperface SKS36 (R)	Hiperface SKS36 (S)	Hiperface SR550 (T)	Hiperface SR450 (U)	Endat ECN 1113 (V) Endat ECN 1125 (W)
W/ thout brake L (mm)	275	300	300	305	330	330	325	325
W/ th brake L (mm)	300	300	325	330	330	350	350	350
W/ thout brake L (mm)	300	300	325	330	330	350	350	350
W/ th brake L (mm)	325	325	325	355	355	375	375	375

**EX6**

Torque range (depends on length)

Winding (depends on speed)

IP

0 : IP64

1 : IP65

Feedback

A : Resolver - ratio 0.5

G : Resolver - ratio 0.3

R : Hiperface singleturn SKS36

S : Hiperface multiturn SKM36

T : Hiperface singleturn SRM50

U : Hiperface multiturn SRM50

V : Endat singleturn ECN 1113

W : Endat multiturn ECN 1125

X : Low cost encoder

Y : Sensorless

**EX6**

IP Motor

Protection

II 2 G Ex d II B T4 IP64

II 2 GD Ex d II B T4 IP65

Ex tD AZ1 IP65 T135 °C

Standards

EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.

EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".

EN 6124-0 : Electrical apparatus for use in the presence of combustible dust.

EN 6124-1 : Electrical apparatus for use in the presence of combustible dust.

Part 1 : Protection by enclosures "1D".

CONNECTIONS VARIANTS ON SHEET 2/2

Parker	EX600	OUTLINE DRAWING	344550
8 Avenue du lac, B0249 27007-DUN CEDEX-FRANCE www.ssdorives.com	Format A3	Scale 1:2	Sheet : 1/2



3.3.4. EX820E EX840E EX860E

**W/ ITH KEY**

**SHAFT END**

Power cable gland Exd11B Ex1D : Ø8.5-Ø16 + clamping module  
Sensor cable gland Exd11B Ex1D : Ø8.5-Ø16 + clamping module  
Ground screw M6

Lifting eye bolt Ø20

**W/ ITH KEY**

**W/ ITH LIGHT**

**BRAKE**

Supply voltage : 24V  
Static torque

EX820	EX840	EX860
20°C	36 Nm	36 Nm
100°C	32 Nm	32 Nm

Motor w/ i/ thout brake w/ i/ th brake

EX820	EX840	EX860
22 kg	28 kg	38 kg
25 kg	31 kg	41 kg

**IP Motor**

Protection

IP64

IP65

Standards

Certification :  
INERIS 05ATEX0061X

**EX800E R1**

Torque range (depends on length)

Feedback

A : Resolver - ratio 0.5  
B : Hiperface singletium SKS36  
C : Hiperface multium SRM36  
L : Hiperface singletium SRM50  
U : Hiperface multium SRM50  
V : Endat singletium ECN 1113  
X : Low cost encoder  
Y : Sensorless

Brake

2 : w/ i/ thout brake  
5 : w/ i/ th brake

IP

0 : IP64  
1 : IP65

Shaft

0 : Plain shaft  
1 : w/ i/ th key

**DIMENSIONS**

Feedback option (Feedback letter)	Resolver ratio 0.5 (A) encoder (X)	Low cost encoder (Y)	Sensorless (Y)	Hiperface SKS (R)	Hiperface SRM50 (S)	Hiperface SRM50 (T)	Hiperface SRM50 (U)	Endat ECN 1113 (V)	Endat ECN 1125 (W)
EX820	without brake	290		310	325	360	385	420	445
EX840	with brake	325		345	370	405	430	465	480
EX860	without brake	350		405	430	465	480		
	with brake	385		430	465	480			

CONNECTIONS VARIANT ON SHEET 2/2

Sheet : 1/2

Format A3

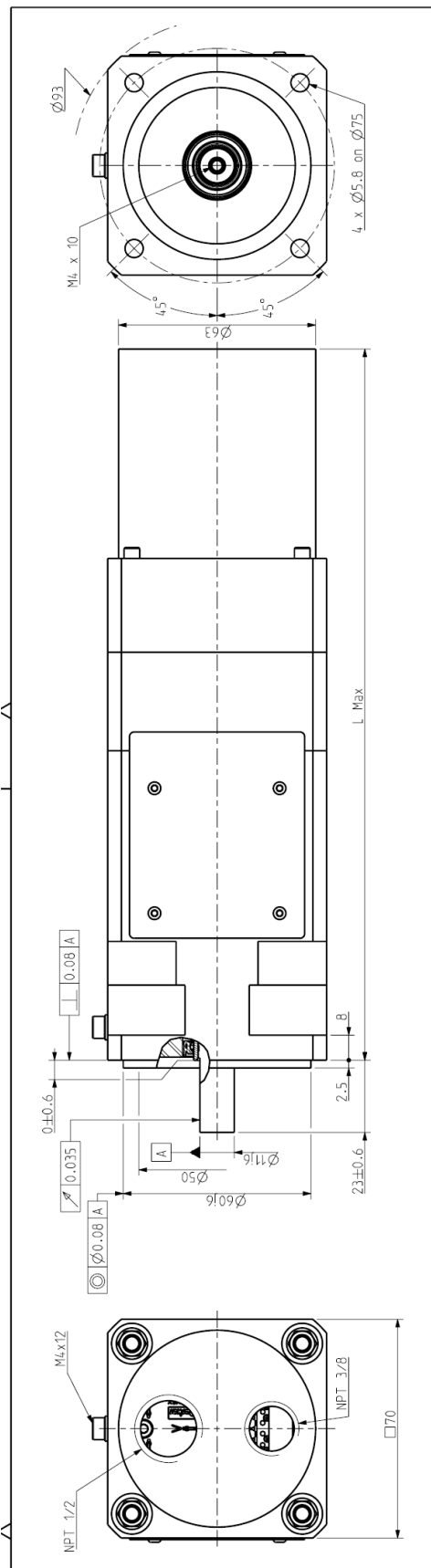
OUTLINE DRAWING

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B



**3.3.5. EX310U**



**UL LISTED**

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UL674 : Electric Motors and Generators  
for use in Division 1 Hazardous  
(classified) Locations.

**WEIGHT**

Without brake	2.8 kg
With brake	3.2 kg

**BRAKE**

Supply voltage : 24V  
Static torque

EX310	±10%
20 °C	2 N.m
100 °C	1.8 N.m

**SHAFT END**

**WITH KEY**

3.5  
16  
23 ± 0.6

**EX310U R1**

Torque range (depends on length)	Winding (depends on speed)	IP
Feedback	0 : IP64 1 : IP65	Shaft 0 : Plain shaft 1 : With key
A : Resolver - ratio 0.5	Brake	
R : Hiperface singleturn SKS36	2 : Without brake	
S : Hiperface multiturn SKM36	5 : With brake	
V : Endat singleturn ECN 1113		
W : Endat multiturn ECN 1125		
X : Low cost encoder		
Y : Sensorless		

**CONNECTIONS VARIANTS ON SHEET 2/2**

**DIMENSIONS**

Feedback option (feedback letter)	Resolver ratio 0.5 (A)	Low cost resolver (X)	Sensorless (Y)	Hiperface SKS36 (R)	Hiperface SKM36 (S)	Endat ECN 1113 (V)	Endat ECN 1125 (W)
without brake L (mm)	230		230			240	
with brake L (mm)			260			270	

Sheet : 1/2

<b>SSD Parvex</b> 8 Avenue de la Tech - BÉNAÏE 20077 - FRANCE www.SSDDrives.com	Format	A3	344939
	EX300U		
OUTLINE DRAWING		A	

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### 3.3.6. EX420U EX430U

Class 1, Division 1, Group C & D  
UL6974 - Electric Motors and Generators  
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(Classified) Locations.

**BRAKE**  
Supply voltage : 24V  
Startic forque ±10%

	EX420	EX430
20 °C	6 Nm	6 Nm
100 °C	5 Nm	5 Nm

**WEIGHT**

Motor	w ithout brake	w ith brake
EX420	7 kg	8 kg
EX430	8 kg	9 kg

**EX420U R1**

Torque range (depends on length) | Feedback (depends on speed)

0 : IP64  
1 : IP65

0 : Plain shaft  
1 : With key

2 : w ithout brake  
5 : w ith brake

A : Resolver - ratio 0.5  
R : Hiperface singleturn SKS36  
S : Hiperface multiturn SKM36  
T : Hiperface singleturn SRS50  
U : Hiperface multiturn SRM50  
V : Endat singleturn ECN 113  
W : Endat multiturn EGN 1125  
X : Low cost encoder  
Y : Senseless

**DIMENSIONS**

Feedback option (feedback tier)	Resolver ratio 0,5 (A)	Low cost encoder (X)	Senseless (Y)	Hiperface SKS36 (R)	Hiperface SRS50 (T)	Hiperface SRM50 (U)	Endat ECN 113 (V)	Endat EGN 1125 (W)
Without brake	275	300	300	290	310	310	310	310
With brake	300	300	300	315	335	335	335	335
Without brake	300	300	300	315	335	335	335	335
With brake	325	325	325	340	360	360	360	360

**CONNECTIONS VARIANTS ON SHEET 2/2**

Sheet : 1 / 2

Format : F E S G I  
A3 x x x x x

EX400U

OUTLINE DRAWING

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A

**General tolerances**  
DIN ISO 2768 mK

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Scale : 1:2

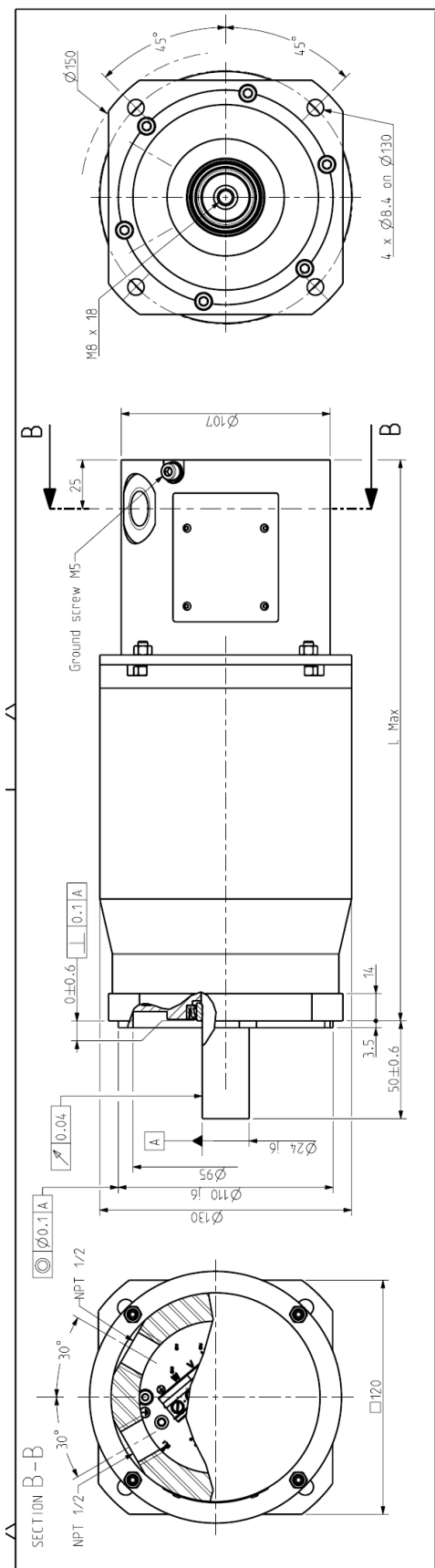
Modifications : A JAN23321 - 18/01/10 00

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www.parker.com

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**3.3.7. EX620U EX630U**



**WITH KEY**

SHAFT END  
M8 x 18  
5  
4.0  
50±0.6  
27.822

**WEIGHT**

Motor w/ without brake	Hiperface SKM36 (S)	Hiperface SR550 (T)	Hiperface SRM50 (U)	Endat ECN 1113 (V)	Endat EGN 1125 (W)
EX620	10 kg	11 kg	12 N.m	12 N.m	12 N.m
EX630	12.5 kg	13.5 kg	10 N.m	10 N.m	10 N.m

**BRAKE**

Supply voltage : 24V  
Static torque ±10%

EX620	EX630
20°C	12 N.m
100°C	10 N.m

**UL**  
**USA**

Class 1, Division 1, Group C & D  
UL674 : Electric Motors and Generators  
for use in Division 1 Hazardous  
(classified) Locations.

**EX6 0U R1**

Feedback option (feedback letter)	Resolver ratio 0.5 (A)	Low cost encoder (X)	Sensotess (Y)	Hiperface SKS36 (R)	Hiperface SRM36 (S)	Hiperface SR550 (T)	Hiperface SRM50 (U)	Endat ECN 1113 (V)	Endat EGN 1125 (W)	Torque range (depends on length)		Winding (depends on speed)		IP
										L (mm)	L (mm)	Feedback ratio 0.5	Brake	
without brake		290		305	305	325	310			A : Resolver ratio 0.5	2 : Without brake	0 : Plain shaft	0 : Without brake	0 : Plain shaft
with brake		320		335	335	355	335			B : Hiperface singleturn SKS36	5 : With brake	1 : With key	1 : With key	1 : With key
without brake		320		335	335	355	335			S : Hiperface multiturn SKM36				
with brake		345		360	360	380	360			T : Hiperface singleturn SRM50				
										U : Hiperface multiturn SRM50				
										V : ENDAT singleturn ECN 1113				
										W : ENDAT multiturn EGN 1125				
										X : Low cost encoder				
										Y : Sensotess				

CONNECTIONS VARIANTS ON SHEET 2/2

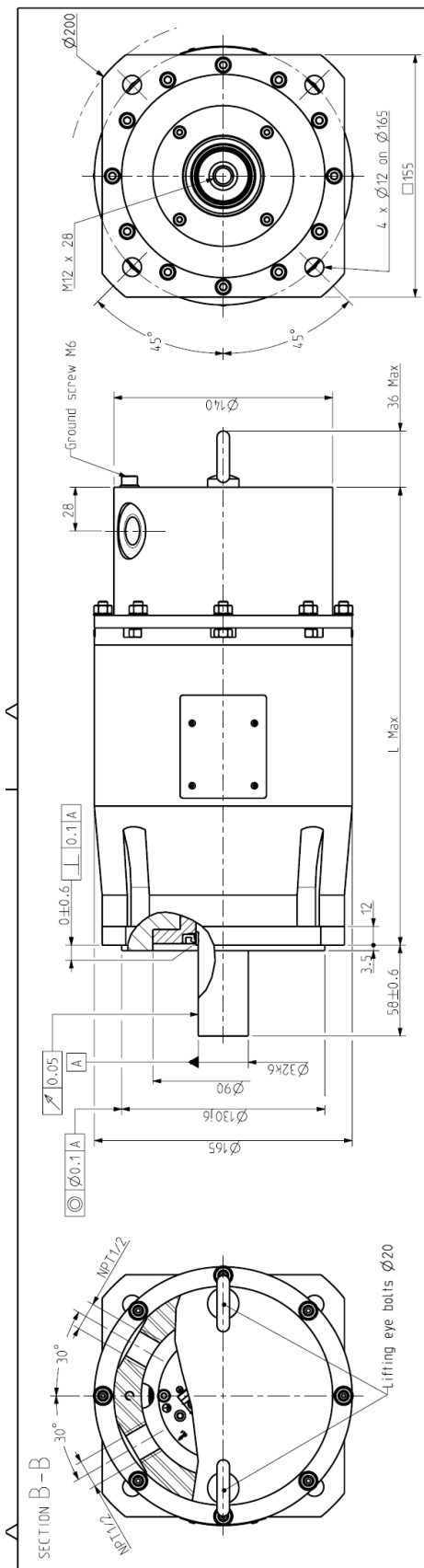
Sheet : 1/2

Parker	SSD Parvex	8 Avenue du Parc - BEAULIEU 20077 BEAULIEU CEDEX www.SSDDrives.com	Format	A3	344853
			EX600U	OUTLINE DRAWING	
Scale	1:2	Drawn	08/09/09	00	V/isa
General tolerances	DIN ISO 2768 mk	Modifications			

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**3.3.8. EX820U EX840U EX860U**



**UL LISTED**

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UL674 - Electric Motors and Generators  
for use in Division 1 Hazardous  
(classified) Locations.

**WEIGHT**

Motor without brake	With brake
EX820	EX840
22 kg	25 kg
28 kg	31 kg
38 kg	41 kg

**BRAKE**

Supply voltage : 24V  
Static torque

	EX820	EX840	EX860
20°C	36 N.m	36 N.m	36 N.m
-100°C	32 N.m	32 N.m	32 N.m

**EX800U R1**

Connections: Torque range (depends on length), Winding (depends on speed), Feedback, Brake, Shaft.

Feedback option (feedback letter)	Resolver ratio 0.5 (A)	Low cost encoder (X)	Sensorless (Y)	Hiperface SKS36 (R)	Hiperface SR350 (S)	Hiperface SR350 (T)	Hiperface SRP50 (U)	ECN 1113 (V)	ECN 1123 (W)	Endat
EX820	without brake	295	330	310	345	330	365	370	335	335
EX840	with brake	355	390	370	405	390	425	430	395	370
EX860	without brake	415	450	430	465	450	485	455	430	490

Feedback: A: Resolver - ratio 0.5, R: HIPERFACE singleturn SKS36, S: HIPERFACE multiturn SRP36, T: HIPERFACE singleturn SR350, U: HIPERFACE multiturn SRP50, V: ENDAT singleturn ECN 1113, W: ENDAT multiturn ECN 1123  
Brake: 2: Without brake, 5: With brake  
Shaft: 0: Plain shaft, 1: With key  
X: Low cost encoder, Y: Sensorless

**CONNECTIONS VARIANTS ON SHEET 2/2**

Sheet : 1/2

Format: F E S G I  
A3 x

EX800U

OUTLINE DRAWING

344854

Scale: 2.5

Drawn: 08/09/09  
OD  
Visa

General tolerances: DIN ISO 2768 mK

Modifications:

SSD Parvex  
8 Avenue du Lac BP269  
21007-DJON cedex-FRANCE  
www.SSDparvex.com

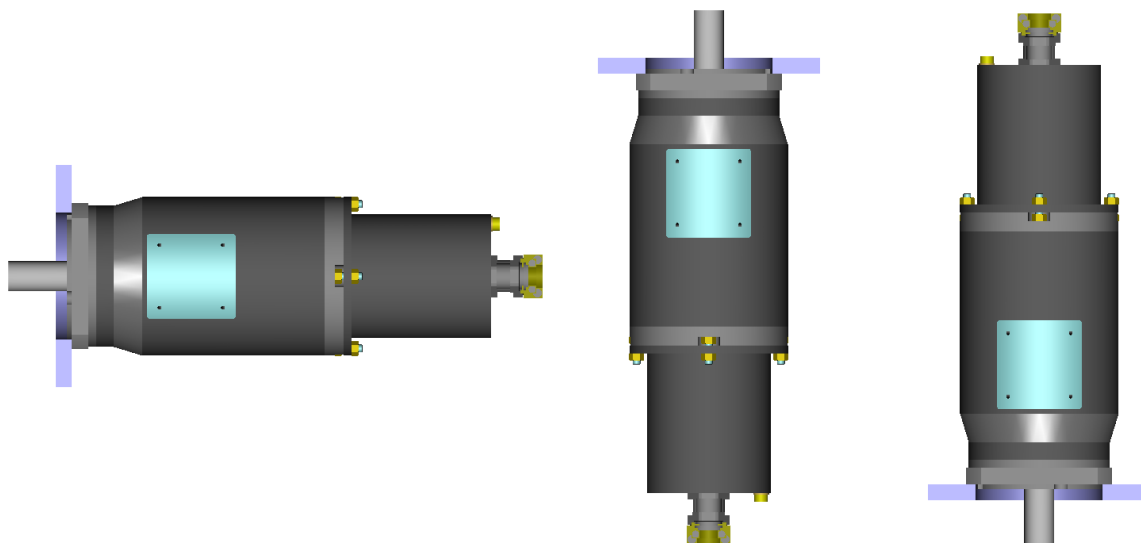


## 3.4. Motor Mounting

---

### 3.4.1. Motor mounting

By flange in any direction




### 3.4.2. Installation of explosionproof machines

When installing electrical systems in hazardous locations, carefully observe the corresponding country regulations.





### 3.4.3. Frame recommendation

	<p><u>Warning</u> : The user has the entire responsibility to design and prepare the support, the coupling device, shaft line alignment, and shaft line balancing.</p>
---	--


Foundation must be even, sufficiently rigid and shall be dimensioned in order to avoid vibrations due to resonances.

The servomotors need a rigid support, machined and of good quality.

The maximum flatness of the support has to be lower than 0.05mm.

The motor vibration magnitudes in rms value are in accordance with IEC 60034-14 – grade A:

- maximum rms vibration velocity for EX is 1.3mm/s for rigid mounting

	<p><u>Warning</u> : A grade A motor (according to IEC 60034-14) well-balanced, may exhibit large vibrations when installed in-situ arising from various causes, such as unsuitable foundations, reaction of the driven motor, current ripple from the power supply, etc.</p> <p>Vibration may also be caused by driving elements with a natural oscillation frequency very close to the excitation due to the small residual unbalance of the rotating masses of the motor.</p> <p>In such cases, checks should be carried out not only on the machine, but also on each element of the installation. (See ISO 10816-3).</p>
--	--



### 3.5. Shaft Loads

#### 3.5.1. Vibration resistance to shaft end

Frequency domain :10 to 55 Hz according to EN 60068 -2-6

Vibration resistance to the shaft end :

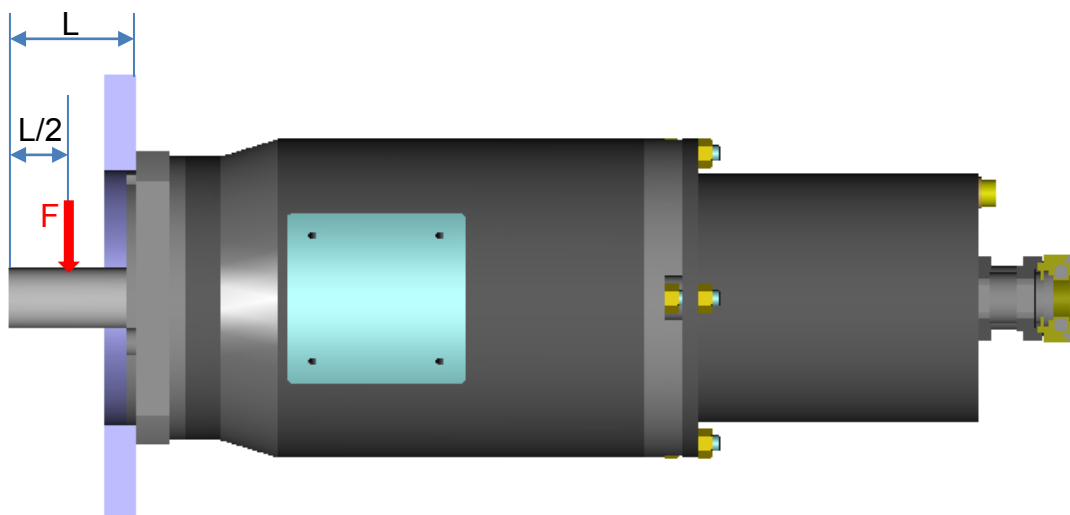
- radial 3 g
- axial 1 g

#### 3.5.2. Maximum load acceptable on the shaft



**Warning :**

The values written in the table are given for a load placed on the middle of the shaft like the picture below.



**Warning :**

Due to the small ATEX airgap requirements between the shaft and the front flange, the radial loads on the shaft are lower than standard NX motors.

The ATEX airgap requirements depend on the volume of the motor and can lead to lower radial loads for bigger motors.



**Warning :**

Regarding to these shaft loads, you must'nt use a pulley belt system without a load take-up system.

Type	Maximum shaft load F [N]
EX310	100
EX430	500
EX630	500
EX860	250



### 3.6. Cooling

In compliance with the IEC 60034-1 standards:

#### 3.6.1. Natural cooled motor

The ambient air temperature shall not be less than **-20°C** and more than **40°C**.

### 3.7. Thermal Protection

The drive guarantees a 1st level of safety but it is not sufficient. Safety is guaranteed by the independent relay system described in the connection diagram (in the PVD3559\_EX3, PVD3566\_EX4, PVD3562\_EX6, PVD3571\_EX8 and PVD3628\_EXUL) which constitutes an independent protection circuit meeting safety classification SIL2 in accordance with the standard IEC 61508.

The drive can be equipped with a Safe Torque Off function in accordance with EN ISO13849-1 : 2006 and EN 61800-5-2:2006 and validated by a notified organization. In this case the safety system can be connected to this function with a validation of a notified organization.

In the motor, there are 2 kinds of thermal sensors used for the safety. Both devices are wired in-series with the coil of the drive power contactor.

- Two thermostiches fitted in the servomotor coil mean that the circuit is mechanically opened on a basis at  $125^{\circ}\text{C}\pm 5^{\circ}\text{C}$ . This protection is reversible, after a decreasing of the temperature under the basis, the circuit is mechanically closed.
- A thermofuse fitted with a contact on the servomotor frame means that the circuit is mechanically opened on a permanent basis at  $130^{\circ}\text{C}-5^{\circ}\text{C}$ . In case of an over temperature and thermostiches default, the thermo fuse cuts off permanently the power supply to the contactor coil.

**Caution** : (see diagrams in the commisioning and use manuals PVD3559\_EX3, PVD3566\_EX4, PVD3562\_EX6, PVD3571\_EX8 and PVD3628\_EXUL) :

- Make sure the parameters of the contactor and the connecting are strictly followed.
- The motor is out of order if the thermofuse is activated!
- The power contactor KM1 should be replaced in accordance with its operation lifespan and number of manoeuvres. A yearly test, intended to check on the ability of the contactor to detect condition changes, should also be carried out.
- The thermal sensors, due to their thermal inertia, are unable to follow very fast winding temperature variations. They acheive their thermal steady state after a few minutes.




Warning: To protect correctly the motor against very fast overload, please refer to 3.1.6. Peak current limitations





## 3.8. Power Electrical Connections

### 3.8.1. Wires sizes


	<p>In every country, you must respect all the local electrical installation regulations and standards.</p>
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Not limiting example in France: NFC 15-100 or IEC 60364 as well in Europe.

	<p>Cable selection depends on the cable construction, so refer to the cable technical documentation to choose wire sizes</p>
---	--

	<p>Some drives have cable limitations or recommendations; please refer to the drive technical documentation for any further information.</p>
---	--

### Cable selection

	<p>At standstill, the current must be limited at 80% of the low speed current <math>I_o</math> and cable has to support peak current for a long period. So, if the motor works at standstill, the current to select wire size is <math>\sqrt{2} \times 0.8 I_o \cong 1,13 \times I_o</math>.</p>
---	--



### **3.8.2. Conversion Awg/kcmil/mm<sup>2</sup>:**

<b>Awg</b>	<b>kcmil</b>	<b>mm<sup>2</sup></b>
	500	253
	400	203
	350	177
	300	152
	250	127
0000 (4/0)	212	107
000 (3/0)	168	85
00 (2/0)	133	67.4
0 (1/0)	106	53.5
1	83.7	42.4
2	66.4	33.6
3	52.6	26.7
4	41.7	21.2
5	33.1	16.8
6	26.3	13.3
7	20.8	10.5
8	16.5	8.37
9	13.1	6.63
10	10.4	5.26
11	8.23	4.17
12	6.53	3.31
14	4.10	2.08
16	2.58	1.31
18	1.62	0.82
20	1.03	0.52
22	0.63	0.32
24	0.39	0.20
26	0.26	0.13

### **3.8.3. Motor cable length**

For motors windings which present low inductance values or low resistance values, the own cable inductance, respectively own resistance, in case of large cable length can greatly reduce the maximum speed of the motor. Please contact PARKER for further information.



**Caution:** It might be necessary to fit a filter at the servo-drive output if the length of the cable exceeds 25 m. Consult us.



### 3.8.4. Mains supply connection diagrams

#### 3.8.4.1. EX310E

<p style="text-align: center;"><b>Resolver and CR410 connection</b> Feedback letter : A/E/G</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake- (option) BR+ : Brake+ (option) S1 : Resolver 1 S2 : Resolver 2 S3 : Resolver 3 S4 : Resolver 4 R1 : Resolver 5 R2 : Resolver 6 B : Shield option (screw M3) Ground</p> <p style="text-align: right;">SCALE : 3/2</p>	<p style="text-align: center;"><b>Hiperface connection</b> Feedback letter : Q/R/S</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake- (option) BR+ : Brake+ (option) 1 : Encoder Us 2 : Encoder gnd 3 : Encoder refSIN 4 : Encoder refCOS 5 : Encoder DATA + 6 : Encoder DATA - 7 : Encoder +SIN 8 : Encoder -COS B : Shield option (screw M3) Ground</p> <p style="text-align: right;">SCALE : 3/2</p>	<p style="text-align: center;"><b>Low cost encoder connection</b> Feedback letter : X</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake- (option) BR+ : Brake+ (option) 1 : A 2 : B 3 : B 4 : B 5 : Z 6 : Z 7 : 0 8 : Vcc B : Shield option (screw M3) Ground</p> <p style="text-align: right;">SCALE : 3/2</p>																																				
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Encoder settings</p> <p>Resolver setting Feedback letter : R/E/G</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.</p> </div> <div style="text-align: center;"> <p>Encoder settings</p> <p>Hiperface SEL setting Feedback letter : Q</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.</p> </div> <div style="text-align: center;"> <p>Encoder settings</p> <p>Low cost encoder setting Feedback letter : X</p> <p>Engine driven clockwise shaft end side. Switching signal V is in phase with FEM UV.</p> </div> </div>																																						
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Scale 4:5	344487																																					

### 3.8.4.2. EX420E, EX430E

<p style="text-align: center;"><b>Resolver connection</b> Feedback letter : A/G</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake - (option) BR+ : Brake + (option) S1 : Resolver 1 S2 : Resolver 2 S3 : Resolver 3 S4 : Resolver 4 R1 : Resolver 5 R2 : Resolver 6 B : Shield option (screw M3) ⊕ : Ground</p> <p style="text-align: right;">SCALE : 3/2</p>	<p style="text-align: center;"><b>Hiperface connection</b> Feedback letter : R/S/T/U</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake - (option) BR+ : Brake + (option) 1 : Encoder Us 2 : Encoder gnd 3 : Encoder refSIN 4 : Encoder refCOS 5 : Encoder Data + 6 : Encoder Data - 7 : Encoder +SIN 8 : Encoder +COS B : Shield option (screw M3) ⊕ : Ground</p> <p style="text-align: right;">SCALE : 3/2</p>	<p style="text-align: center;"><b>Low cost encoder connection</b> Feedback letter : X</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake - (option) BR+ : Brake + (option) 1 : A 2 : A' 3 : B 4 : B' 5 : Z 6 : Z' 7 : 0 8 : Vcc B : Shield option (screw M3) ⊕ : Ground</p> <p style="text-align: right;">SCALE : 3/2</p>										
<p><b>ENCODER SETTINGS</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 33%; vertical-align: top;"> <p><b>Resolver setting</b> Feedback letter : A/G</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.</p> </td> <td style="width: 33%; vertical-align: top;"> <p><b>Hiperface SRS/SRM setting</b> Feedback letter : R/S</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.</p> </td> <td style="width: 33%; vertical-align: top;"> <p><b>Low cost encoder setting</b> Feedback letter : X</p> <p>Engine driven clockwise shaft end side. Switching signal V is in phase with FEM UV.</p> </td> </tr> </table>			<p><b>Resolver setting</b> Feedback letter : A/G</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.</p>	<p><b>Hiperface SRS/SRM setting</b> Feedback letter : R/S</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.</p>	<p><b>Low cost encoder setting</b> Feedback letter : X</p> <p>Engine driven clockwise shaft end side. Switching signal V is in phase with FEM UV.</p>							
<p><b>Resolver setting</b> Feedback letter : A/G</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.</p>	<p><b>Hiperface SRS/SRM setting</b> Feedback letter : R/S</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.</p>	<p><b>Low cost encoder setting</b> Feedback letter : X</p> <p>Engine driven clockwise shaft end side. Switching signal V is in phase with FEM UV.</p>										
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<p style="font-size: small;">This document is the property of PARKEX. Reproduction as well as any other use is strictly prohibited without written authorisation.</p>												

### 3.8.4.3. EX620E, EX630E

<p style="text-align: center;"><b>Resolver connection</b> Feedback letter : A/G</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake - (option) BR+ : Brake + (option) S1 : Resolver 1 S2 : Resolver 2 S3 : Resolver 3 S4 : Resolver 4 R1 : Resolver 5 R2 : Resolver 6 B : Shield option (screw M4) ⊕ : Ground</p> <p style="text-align: right;">Scale : 2/3</p>	<p style="text-align: center;"><b>Hiperface connection</b> Feedback letter : R/S/T/U</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake - (option) BR+ : Brake + (option) 1 : Encoder US 2 : Encoder gnd 3 : Encoder refSIN 4 : Encoder refCOS 5 : Encoder Data + 6 : Encoder Data - 7 : Encoder + S1N 8 : Encoder + COS B : Shield option (screw M4) ⊕ : Ground</p> <p style="text-align: right;">Scale : 2/3</p>	<p style="text-align: center;"><b>Endat connection</b> Feedback letter : V/W</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake - (option) BR+ : Brake + (option) 1 : Encoder Up 5V ±5% 2 : Encoder OV 3 : Encoder A + 4 : Encoder A - 5 : Encoder B + 6 : Encoder B - 7 : Encoder DATA 8 : Encoder DATA 9 : Encoder CLOCK 10 : Encoder CLOCK B : Shield option (screw M4) ⊕ : Ground</p> <p style="text-align: right;">Scale : 2/3</p>									
<p style="text-align: center;"><b>Low_cost_encoder connection</b> Feedback letter : X</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake - (option) BR+ : Brake + (option) 1 : A 9 : U 2 : A 10 : U 3 : B 11 : V 4 : B 12 : V 5 : Z 13 : W 6 : Z 14 : W 7 : 0 8 : VCC B : Shield option (screw M4) ⊕ : Ground</p> <p style="text-align: right;">Scale : 2/3</p>	<p style="text-align: center;"><b>Sensorless connection</b> Feedback letter : Y</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake - (option) BR+ : Brake + (option) B : Shield option (screw M4) ⊕ : Ground</p> <p style="text-align: right;">Scale : 2/3</p>	<p style="text-align: center;"><b>EX600 Logo</b></p> <p style="text-align: center;">Certification : INERIS 04ATEX0032X</p>									
<p><b>ENCODER SETTINGS</b></p> <p>Resolver setting Feedback letter : A/G Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.</p> <p>Hiperface SKS/SKM setting Feedback letter : R/S Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.</p> <p>Endat setting Feedback letter : V/W Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 410.</p> <p>Low_cost_encoder setting Feedback letter : X Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 410.</p>											
<p style="text-align: right;">Sheet : 2/2</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%; text-align: center;">Format A3</td> <td style="width:33%; text-align: center;">F E S G I X</td> <td style="width:33%; text-align: center;">344550</td> </tr> <tr> <td colspan="2" style="text-align: center;">EX600</td> <td style="text-align: center;">B</td> </tr> <tr> <td colspan="3" style="text-align: center;">OUTLINE DRAWING</td> </tr> </table> <p style="text-align: center;">               8 Avenue de la Recherche              21007-DJON cedex-FRANCE  <a href="http://www.SSDparks.com">www.SSDparks.com</a> </p> <p style="font-size: small;">             This document is the property of PARKEX. Transmission as well as reproduction without written authorisation.         </p>			Format A3	F E S G I X	344550	EX600		B	OUTLINE DRAWING		
Format A3	F E S G I X	344550									
EX600		B									
OUTLINE DRAWING											

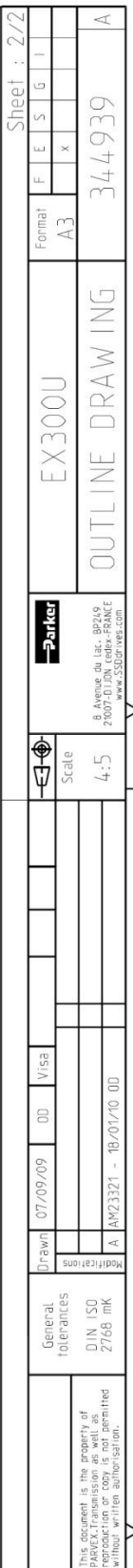
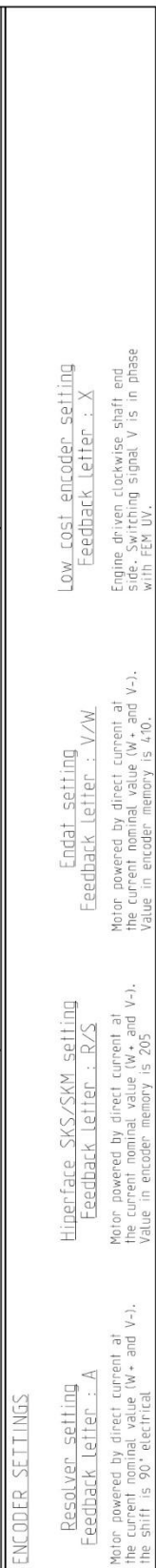
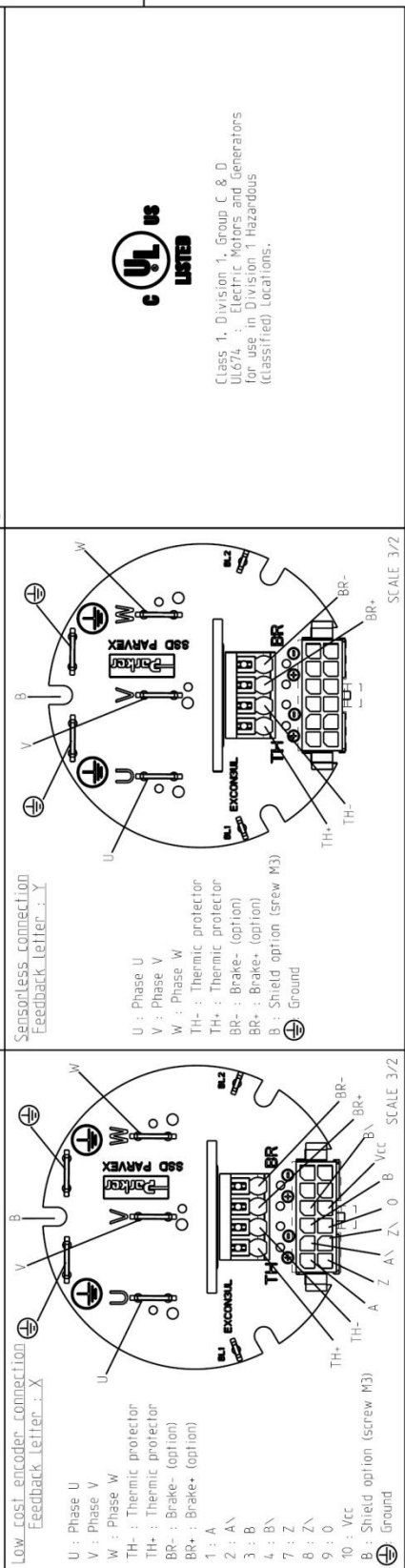
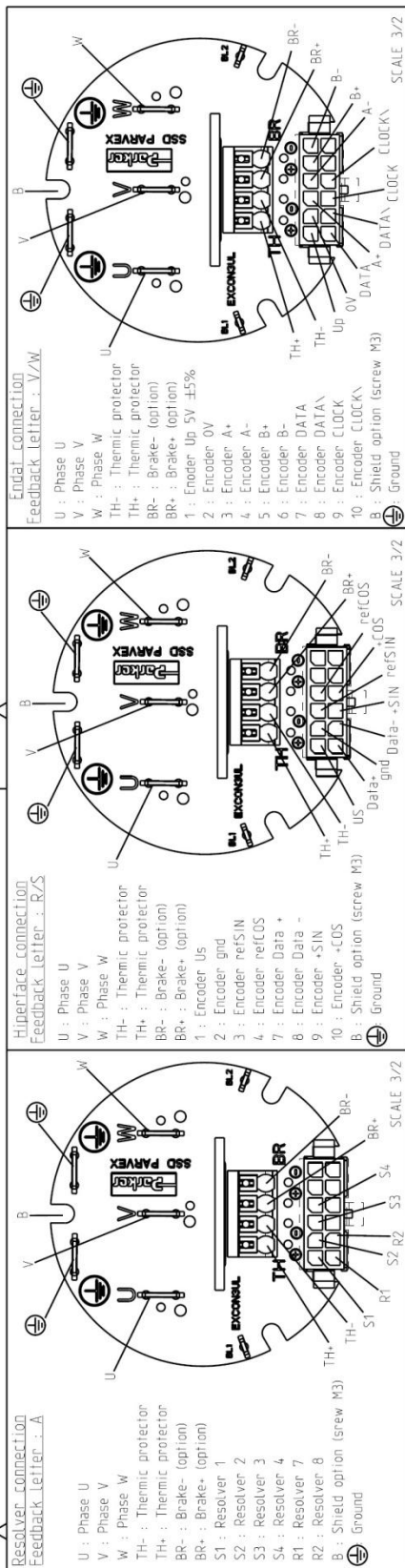


### 3.8.4.4. EX820E, EX840E, EX860E

<p><b>Resolver connection</b> Feedback letter : A</p> <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) S1 : Resolver 1 S2 : Resolver 2 S3 : Resolver 3 S4 : Resolver 4 R1 : Resolver 5 R2 : Resolver 6 B : Shield option (screw M4) Ground</p> <p style="text-align: right;">Scale : 2/3</p>	<p><b>Hiperface connection</b> Feedback letter : R/S/T/U</p> <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) Encoder -US Encoder -Gnd Encoder refSIN Encoder refCOS Encoder DATA + Encoder DATA - Encoder -SIN Encoder -COS B : Shield option (screw M4) Ground</p> <p style="text-align: right;">Scale : 2/3</p>	<p><b>Endat connection</b> Feedback letter : V/W</p> <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) Encoder 0V Encoder A+ Encoder A- Encoder B+ Encoder B- Encoder Data Encoder Data Encoder Clock Encoder Clock B : Shield option (screw M4) Ground</p> <p style="text-align: right;">Scale : 2/3</p>
<p>Certification : INERIS 05ATEX0061X</p>		
<p><b>Low cost encoder connection</b> Feedback letter : X</p> <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) 1 : A 9 : U 2 : A 10 : U 3 : B 11 : V 4 : B 12 : V 5 : Z 13 : W 6 : Z 14 : W 7 : 0 8 : Vcc B : Shield option (screw M4) Ground</p> <p style="text-align: right;">Scale : 2/3</p>	<p><b>Low cost encoder connection</b> Feedback letter : Y</p> <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) Encoder -US Encoder -Gnd Encoder refSIN Encoder refCOS Encoder DATA + Encoder DATA - Encoder -SIN Encoder -COS B : Shield option (screw M4) Ground</p> <p style="text-align: right;">Scale : 2/3</p>	<p><b>Encoder SETTINGS</b></p> <p>Resolver setting Feedback letter : A Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.</p> <p>Hiperface SRS/SRM setting Feedback letter : R/S Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.</p> <p>Endat setting Feedback letter : V/W Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 410.</p> <p>Low cost encoder setting Feedback letter : X Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 1638.</p>
<p>8, Avenue du lac, BP249 21007 JOYEUX cedex FRANCE www.5SDP-vest.com</p>		
<p>EX800</p>		
<p>OUTLINE DRAWING</p>		
<p>344664</p>		
<p>B</p>		
<p>Sheet : 2/2</p>		



3.8.4.5. EX310U



Class 1, Division 1, Group C & D  
UL074 : Electric Motors and Generators  
(or use in Division 1 Hazardous  
(classified) Locations).

ENCODER SETTINGS

**Resolver setting**  
Feedback Letter : A  
Motor powered by direct current at the current nominal value (W+ and V-), the shift is 90° electrical

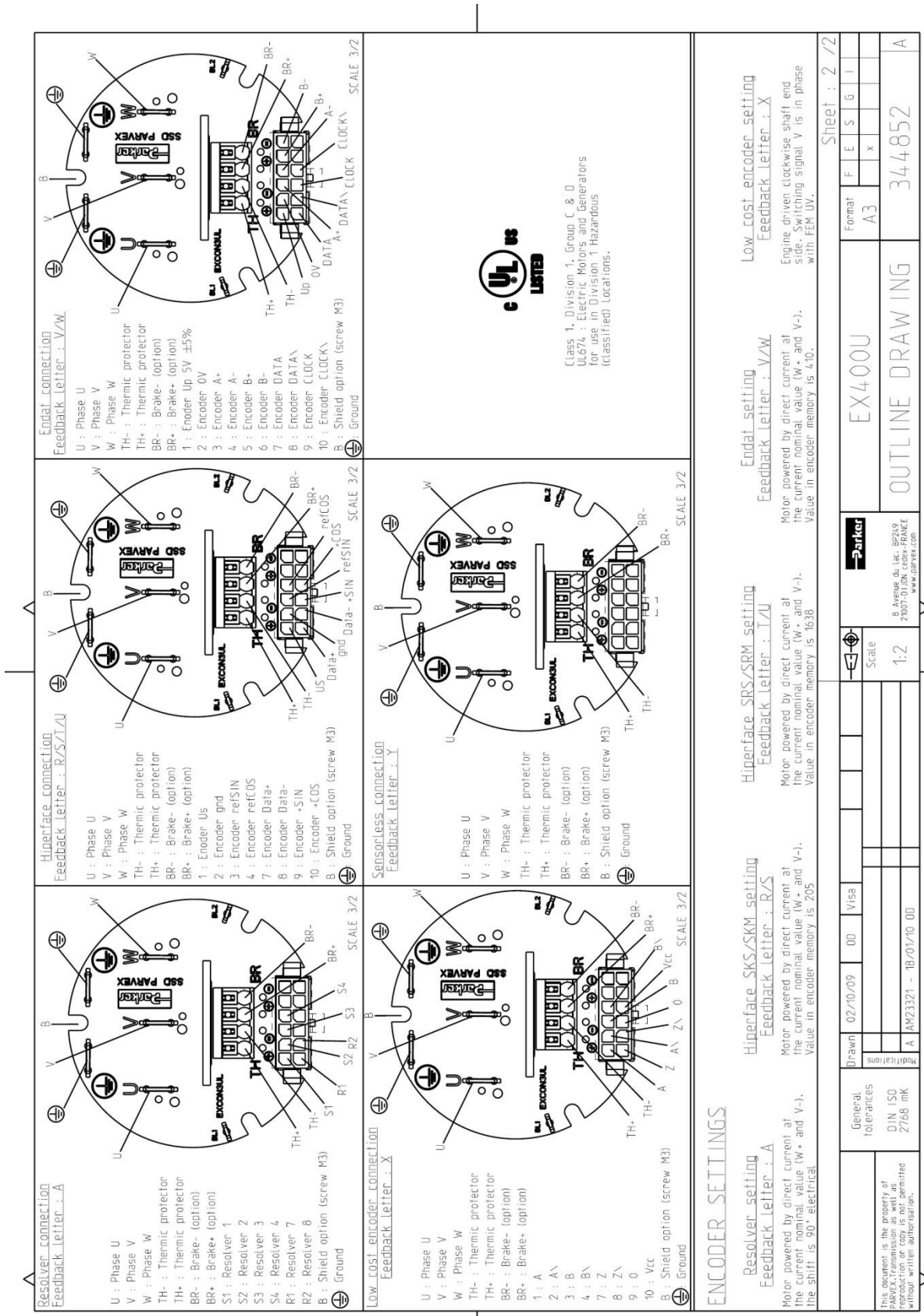
**Hiperface SKS/SKM setting**  
Feedback Letter : Z/S  
Motor powered by direct current at the current nominal value (W+ and V-), Value in encoder memory is 205

**Endat setting**  
Feedback Letter : V/W  
Motor powered by direct current at the current nominal value (W+ and V-), Value in encoder memory is 470.

**Low lost encoder setting**  
Feedback Letter : X  
Engine driven clockwise shaft and side Switching signal V is in phase with FEV.UV.

General tolerances	DIN ISO 2768 mK
Sheet : 2/2	Format A3
Scale 4:5	EX3000
Drawn 07/09/09	00
Visa	
Modifications	
A : M23321 - 18/07/10-00	344939
<p>OUTLINE DRAWING</p>	
<p>8 Avenue du lac, BP29 21007-DJON, cedex-FRANCE www.SSDrives.com</p>	

3.8.4.6. EX420U, EX430U



Class 1, Division 1, Group C & D  
UL674 : Electric Motors and Generators  
for use in Division 1 Hazardous  
(classified) Locations.

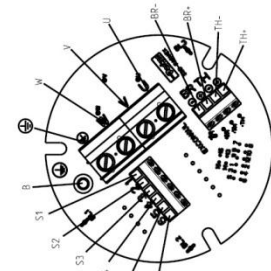
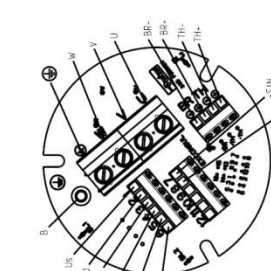
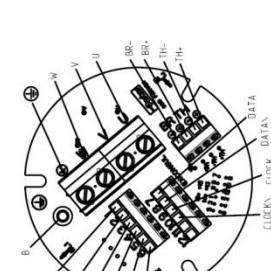

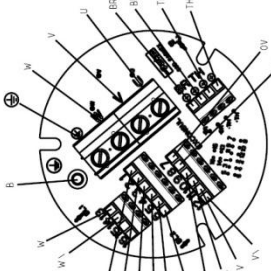
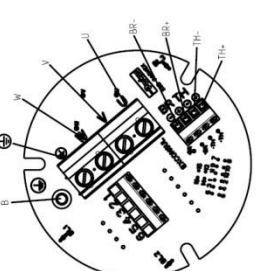
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Modifications									
General tolerances									
DIN ISO 2768 mk									
This document is the property of PARKEX Transmission as well as reproduction or copy is not permitted without written authorization.									
				Scale		1:2		Parker	
				Format		A3		EX400U	
				Feedback letter		V/W		Low cost encoder setting	
				Feedback letter		I/ZU		Hiperface SRS/SRM setting	
				Feedback letter		X		Low cost encoder setting	
				Sheet		2 / 2			
				Outline Drawing		344852		A	
<p>8 Avenue du Lac, BP259 27007-DIJON cedex-FRANCE www.parker.com</p>									

### 3.8.4.7. EX620U, EX630U

<p style="text-align: center;"><b>Resolver connection</b> Feedback letter : A</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake- (option) BR+ : Brake+ (option) S1 : Resolver 1 S2 : Resolver 2 S3 : Resolver 3 R1 : Resolver 4 R2 : Resolver 5 R2 : Resolver 6 B : Shield option (screw M4) ⊕ Ground</p> <p style="text-align: right;">SCALE 2/3</p>	<p style="text-align: center;"><b>Hiperface connection</b> Feedback letter : R/S/T/U</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake- (option) BR+ : Brake+ (option) 1 : Encoder US 2 : Encoder gnd 3 : Encoder refSIN 4 : Encoder refCOS 5 : Encoder Data + 6 : Encoder Data - 7 : Encoder +SIN 8 : Encoder +COS B : Shield option (screw M4) ⊕ Ground</p> <p style="text-align: right;">SCALE 2/3</p>	<p style="text-align: center;"><b>Endat connection</b> Feedback letter : V/W</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake- (option) BR+ : Brake+ (option) 1 : Encoder Up 5V ±5% 2 : Encoder OV 3 : Encoder A+ 4 : Encoder A- 5 : Encoder B+ 6 : Encoder B- 7 : Encoder Data 8 : Encoder Data 9 : Encoder Clock 10 : Encoder Clocks B : Shield option (screw M4) ⊕ Ground</p> <p style="text-align: right;">SCALE 2/3</p>
<p style="text-align: center;">Class 1, Division 1, Group C &amp; D UL674 : Electric Motors and Generators for use in Division 1 Hazardous (Classified) Locations.</p>		
<p style="text-align: center;"><b>Low cost encoder connection</b> Feedback letter : X</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake- (option) BR+ : Brake+ (option) 1 : A 2 : B 3 : B+ 4 : B- 5 : Z 6 : Z+ 7 : 0 8 : Vcc B : Shield option (screw M4) ⊕ Ground</p> <p style="text-align: right;">SCALE 2/3</p>	<p style="text-align: center;"><b>Sensorless connection</b> Feedback letter : Y</p> <p>U : Phase U V : Phase V W : Phase W TH- : Thermic protector TH+ : Thermic protector BR- : Brake- (option) BR+ : Brake+ (option) B : Shield option (screw M4) ⊕ Ground</p> <p style="text-align: right;">SCALE 2/3</p>	<p style="text-align: center;"><b>Encoder SETTINGS</b></p> <p>Resolver setting Feedback letter : A Motor powered by direct current at the current nominal value (W+ and V-), the shift is 90° electrical</p> <p>Hiperface SKS/SKM setting Feedback letter : R/S Motor powered by direct current at the current nominal value (W+ and V-), Value in encoder memory is 205</p> <p>Hiperface SRS/SRM setting Feedback letter : T/U Motor powered by direct current at the current nominal value (W+ and V-), Value in encoder memory is 1638</p> <p>Endat setting Feedback letter : V/W Motor powered by direct current at the current nominal value (W+ and V-), Value in encoder memory is 410.</p> <p>Low cost encoder setting Feedback letter : X Engine driven clockwise shaft end side, Switching signal V is in phase with FEM UV.</p>
<p style="text-align: right;">Sheet : 2/2</p>		
<p style="text-align: center;">EX600U</p>		
<p style="text-align: center;">OUTLINE DRAWING</p>		
<p style="text-align: center;">344853</p>		
<p style="text-align: center;">Format A3</p>		
<p style="text-align: center;">Scale 1:2</p>		
<p style="text-align: center;">JDrawn 08/09/09 00 Visa</p>		
<p style="text-align: center;">Modifications</p>		
<p style="text-align: center;">General tolerances DIN ISO 2768 mK</p>		
<p style="text-align: center;">This document is the property of PARKER. Transmission as well as reproduction or copy is not permitted without written authorisation.</p>		



3.8.4.8. EX820U, EX840U, EX860U

<p style="text-align: center;"><b>Resolver connection</b> Feedback letter : A</p>  <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) S1 : Resolver 1 S2 : Resolver 2 S3 : Resolver 3 S4 : Resolver 4 R1 : Resolver 5 R2 : Resolver 6 B : Shield option (screw M4) Ground</p> <p style="text-align: right;">SCALE 2/3</p>	<p style="text-align: center;"><b>Hiperface connection</b> Feedback letter : R/S/T/U</p>  <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) 1 : Encoder Us 2 : Encoder gnd 3 : Encoder refSIN 4 : Encoder refCOS 5 : Encoder Data + 6 : Encoder Data - 7 : Encoder +SIN 8 : Encoder -COS B : Shield option (screw M4) Ground</p> <p style="text-align: right;">SCALE 2/3</p>	<p style="text-align: center;"><b>Endat connection</b> Feedback letter : V/W</p>  <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) 1 : Encoder Up 5V ±5% 2 : Encoder 0V 3 : Encoder A+ 4 : Encoder A- 5 : Encoder B+ 6 : Encoder B- 7 : Encoder Data 8 : Encoder Data 9 : Encoder Clock 10 : Encoder Clock B : Shield option (screw M4) Ground</p> <p style="text-align: right;">SCALE 2/3</p>
 <p>Class 1, Division 1, Group C &amp; D UL674 : Electric Motors and Generators for use in Division 1 Hazardous (classified) Locations.</p>		
<p style="text-align: center;"><b>Low cost encoder connection</b> Feedback letter : X</p>  <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) 1 : A 9 : U 2 : A' 10 : U' 3 : B 11 : V 4 : B' 12 : V' 5 : Z 13 : W 6 : Z' 14 : W' 7 : 0 8 : Vcc B : Shield option (screw M4) Ground</p> <p style="text-align: right;">SCALE 2/3</p>	<p style="text-align: center;"><b>Sensorless connection</b> Feedback letter : Y</p>  <p>U : Phase U V : Phase V W : Phase W TH+ : Thermic protector TH- : Thermic protector BR+ : Brake- (option) BR- : Brake- (option) B : Shield option (screw M4) Ground</p> <p style="text-align: right;">SCALE 2/3</p>	<p style="text-align: center;"><b>Hiperface_SRS/SRM setting</b> Feedback letter : T/U</p> <p style="text-align: center;"><b>Endat setting</b> Feedback letter : V/W</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 1638</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 410.</p> <p style="text-align: right;">SCALE 2/2</p>
<p><b>ENCODER SETTINGS</b></p> <p style="text-align: center;"><b>Resolver setting</b> Feedback letter : A</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical</p>		
<p style="text-align: center;"><b>Hiperface_SKS/SKM setting</b> Feedback letter : R/S</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205</p>		
<p style="text-align: center;"><b>Encoder settings</b> Feedback letter : X</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 410.</p>		
<p>General tolerances DIN ISO 2768 mK</p>	<p>Drawn 08/09/09 00 Visa</p>	<p>Format A3</p> <p style="text-align: center;">EX800U</p> <p style="text-align: center;">OUTLINE DRAWING</p> <p style="text-align: right;">344854</p>
<p>Scale 1/5</p> <p>Sheet : 2/2</p>		
<p>8, Avenue du Lac, 92249 27007-0101, cedex-FRANCE www.SSDUPVBS.com</p>		



### 3.8.5. Conversion resolver connection

Parker connection	Standard connection
S1	Cos -
S2	Sin -
S3	Cos +
S4	Sin -
R1	Ref +
R2	Ref -

## 3.9. Feedback system

### 3.9.1. Resolver 2 poles transformation ratio = 0.5 – code A

	EX3	NX4, NX6 & NX8
Parker part number	220005P1001	220005P1002
Electrical specification	Values @ 8 kHz	
Polarity	2 poles	
Input voltage	7 Vrms	
Input current	86mA maximum	
Zero voltage	20mV maximum	
Encoder accuracy	± 10' maxi	
Ratio	0,5 ± 5 %	
Output impedance (primary in short circuit whatever the position of the rotor)	Typical 120 + 200j Ω	
Dielectric rigidity (50 – 60 Hz)	500 V – 1 min	
Insulation resistance	≥ 100MΩ	
Rotor inertia	~30 g.cm <sup>2</sup>	
Operating temperature range	-55 to +155 °C	



### **3.9.2. Hiperface encoder singleturn SKS36 (128pulses) – code R**

	<b>EX3, EX4, EX6 &amp; EX8</b>
Model	SKS36 (Sick)
Type	Absolute single turn encoder
Parker part number	220174P0003
Line count	128 sine/cosine periods per revolution
Electrical interface	Hiperface
Position values per revolution	4096
Error limits for the digital absolute value	$\pm 320''$ (via RS485)
Integral non-linearity	$\pm 80''$ (Error limits for evaluating sine/cosine period)
Differential non-linearity	$\pm 40''$ (Non-linearity within a sine/cosine period)
Perating speed	12 000 rpm
Power Supply	7VDC to 12VDC
Current consumption (without load)	60mA
Output frequency	0kHz – 65kHz
Operating temperature range	-20°C to +110 °C

### **3.9.3. Hiperface encoder multiturn SKM36 (128pulses) – code S**

	<b>EX3, EX4, EX6 &amp; EX8</b>
Model	SKM36 (Sick)
Type	Absolute multi turn encoder
Parker part number	220174P0004
Line count	128 sine/cosine periods per revolution
Electrical interface	Hiperface
Position values per revolution	4 096
Revolutions	4 096
Error limits for the digital absolute value	$\pm 320''$ (via RS485)
Integral non-linearity	$\pm 80''$ (Error limits for evaluating sine/cosine period)
Differential non-linearity	$\pm 40''$ (Non-linearity within a sine/cosine period)
Perating speed	9000 rpm
Power Supply	7VDC to 12VDC
Current consumption (without load)	60mA
Output frequency	0kHz – 65kHz
Operating temperature range	-20°C to +110 °C



### **3.9.4. Hiperface encoder singleturn SRS50 (1024pulses) – code T**

	<b>EX4, EX6 &amp; EX8</b>
Model	SRS50 (Sick)
Type	Absolute single turn encoder
Parker part number	220174P0007
Line count	1024 sine/cosine periods per revolution
Electrical interface	Hiperface
Position values per revolution	32 768
Integral non-linearity	$\pm 45''$ (Error limits for evaluating sine/cosine period)
Differential non-linearity	$\pm 7''$ (Non-linearity within a sine/cosine period)
Perating speed	6 000 rpm
Power Supply Current consumption (without load)	7VDC to 12VDC 80mA
Output frequency	0kHz – 200kHz
Operating temperature range	-30°C to +115 °C

### **3.9.5. Hiperface encoder multiturn SRM50 (1024pulses) – code U**

	<b>EX4</b>	<b>EX6 &amp; EX8</b>
Model	SRM50 (Sick)	
Type	Absolute multi turn encoder	
Parker part number	220174P0009	220174P0005
Line count	1024 sine/cosine periods per revolution	
Electrical interface	Hiperface	
Position values per revolution	32 768	
Revolutions	4 096	
Integral non-linearity	$\pm 45''$ (Error limits for evaluating sine/cosine period)	
Differential non-linearity	$\pm 7''$ (Non-linearity within a sine/cosine period)	
Perating speed	6 000 rpm	
Power Supply Current consumption (without load)	7VDC to 12VDC 80mA	
Output frequency	0kHz – 200kHz	
Operating temperature range	-30°C to +115 °C	





### 3.9.6. Endat encoder singleturn ECN1113 – code V

	EX3 & EX4 ATEX	EX3UL, EX4UL, EX6 & EX8
Model	N/A	ECN 1113 (Heidenhain)
Type		Absolute single turn encoder
Parker part number		220165P0002
Line count		512 sine/cosine periods per revolution
Electrical interface		Endat2.2
Position values per revolution		8 192 (13 bits)
System accuracy		± 60"
Perating speed		12 000 rpm
Power Supply		3.6VDC to 14VDC 85mA @ 5VDC
Current consumption (without load)		
Cutoff frequency – 3 dB		≥ 190kHz typical
Operating temperature range		-40°C to +115 °C

### 3.9.7. Endat encoder multiturn ECN1125 – code W

	EX3 & EX4 ATEX	EX3UL, EX4UL, EX6 & EX8
Model	N/A	ECN 1125 (Heidenhain)
Type		Absolute multi turn encoder
Parker part number		220165P0001
Line count		512 sine/cosine periods per revolution
Electrical interface		Endat2.2
Position values per revolution		8 192 (13 bits)
Revolutions		4 096
System accuracy		± 60"
Perating speed		12 000 rpm
Power Supply		3.6VDC to 14VDC 105mA @ 5VDC
Current consumption (without load)		
Cutoff frequency – 3 dB		≥ 190kHz typical
Operating temperature range		-40°C to +115 °C

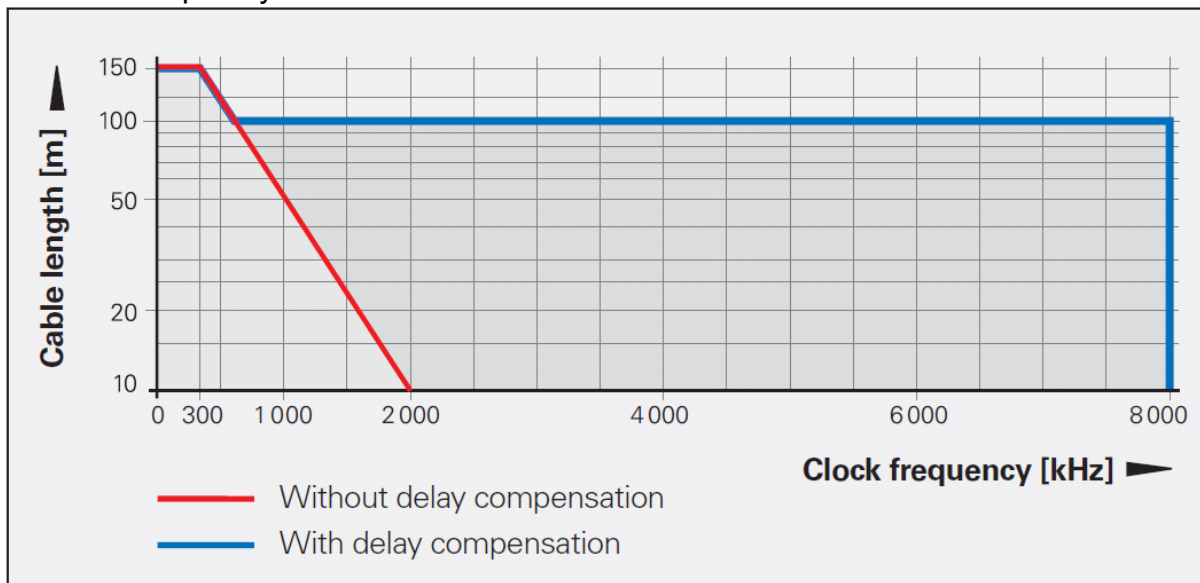


With unregulated power supply (AC890 PARKER drive for instance), the max cable length is **65m** with 0.25mm<sup>2</sup> power supply wire due to the voltage drop into the cable itself.



## Maximum Endat cable length

Please refer to the following curve to calculate the max cable length depending on the clock frequency



## AC890 PARKER Wiring – EnDat encoder

### From Heidenhain

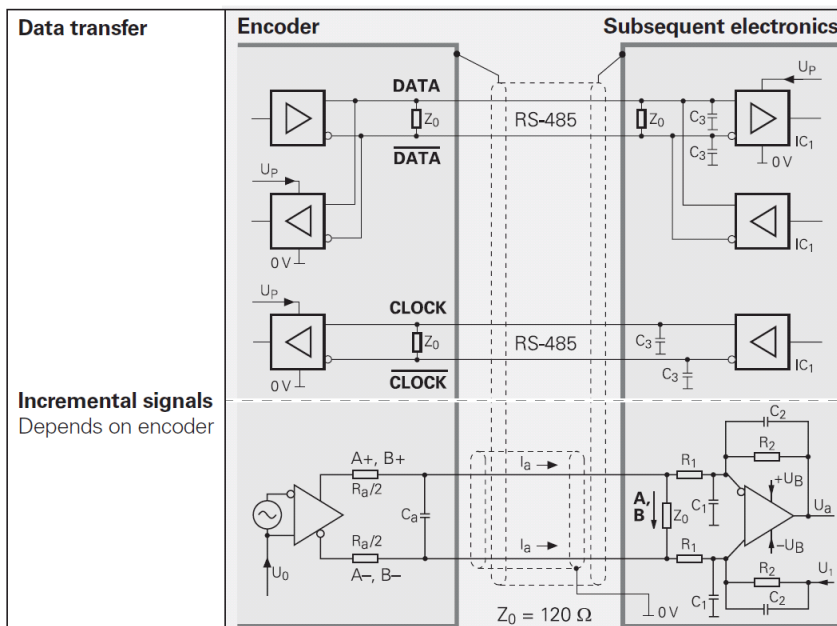
Data (measured values or parameters) can be transferred bidirectionally between position encoders and subsequent electronics with transceiver components in accordance with RS-485 (differential signals), in synchronism with the clock signal produced by the subsequent electronics.

#### Dimensioning

IC<sub>1</sub> = RS 485 differential line receiver and driver

C<sub>3</sub> = 330 pF

Z<sub>0</sub> = 120 Ω






### 3.9.8. Cables

You can connect EX motor to PARKER drive : AC890, COMPAX3 or SLVD, you can use complete cable with part number on the tabs below.

The "xxx" in the part number must be replaced by the length in meter.

Ex : for 20m cable, "xxx" = 020.

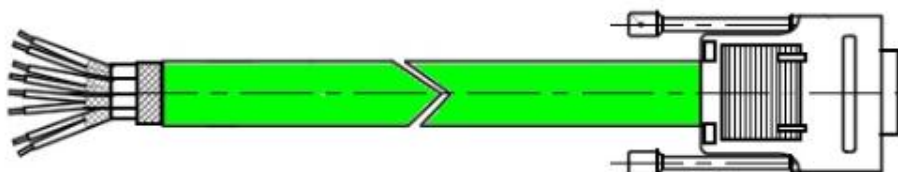
#### Special requirements for ATEX servomotors

	<p>For ATEX installations, you must use special type of cable : self extinguish according to EN 50265-2-1.</p> <p>Warning, the temperature of the cables used for the :</p> <ul style="list-style-type: none"> <li>• EX3 can reach a temperature of 80°C,</li> <li>• EX4 can reach a temperature of 85°C,</li> <li>• EX6 can reach a temperature of 89°C,</li> <li>• EX8 can reach a temperature of 95°C.</li> </ul>
---	--

#### 3.9.8.1. Resolver cable connection for AC890

##### Cable reference :

CS4UA1D1R0xxx



Feedback cable **6537P0059**

Male 15 pins SUB-D connector reference **AC 80552**

SUB-D cover reference **220029P0043**

Pins reference **220029P0021**

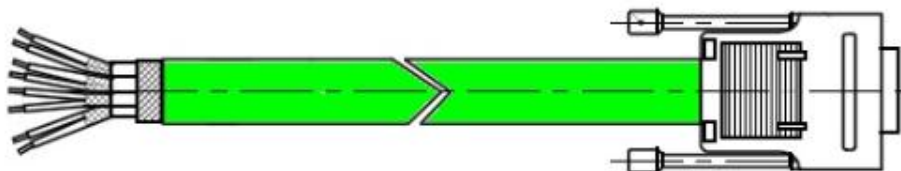
##### Cable arrangement :

EX terminals	Identification	Wire colour	SUB-D terminals
1	S1 / Cos -	Black (Black/White pair)	3
2	S2 / Sin -	Black (Black/Blue pair)	1
3	S3 / Cos +	White	11
4	S4 / Sin -	Blue	9
5	R1 / Ref +	Red	8
6	R2 / Ref -	Black (Black/Red pair)	15



### 3.9.8.2. Endat cable connection for AC890

**Cable reference :**  
CS4UV1D1R0xxx



Feedback cable **6537P0059**

Male 15 pins SUB-D connector reference **AC 80552**

SUB-D cover reference **220029P0043**

Pins reference **220029P0021**

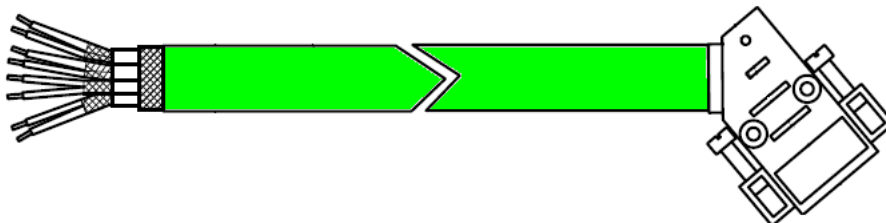
**Cable arrangement :**

EX terminals	Identification	Wire colour	SUB-D terminals
1	up	Red	10
2	0V	Black (Black/Red pair)	2
3	A+	Green	3
4	A-	Black (Black/Green pair)	11
5	B+	Blue	1
6	B-	Black (Black/Blue pair)	9
7	Data	White	4
8	Data\	Black (Black/White pair)	12
9	Clock	Yellow	5
10	Clock\	Black (Black/Yellow pair)	13



### 3.9.8.3. Resolver cable connection for COMPAX3

**Cable reference :**  
CC3UA1D1R0xxx



Feedback cable **6537P0059**

Male 15 pins SUB-D connector reference **220029P0040**

SUB-D cover reference **220029P0039**

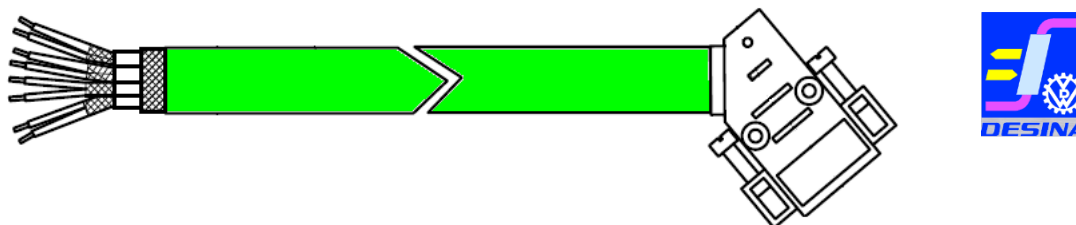
**Cable arrangement :**

EX terminals	Identification	Wire colour	SUB-D terminals
1	S1 / Cos -	Black (Black/White pair)	12
2	S2 / Sin -	Black (Black/Blue pair)	8
3	S3 / Cos +	White	11
4	S4 / Sin -	Blue	7
5	R1 / Ref +	Red	4
6	R2 / Ref -	Black (Black/Red pair)	15



### 3.9.8.4. Hiperface encoder cable connection for COMPAX3

**Cable reference :**  
CC3UR1D1R0xxx



Feedback cable **6537P0059**

Male 15 pins SUB-D connector reference **220029P0040**

SUB-D cover reference **220029P0039**

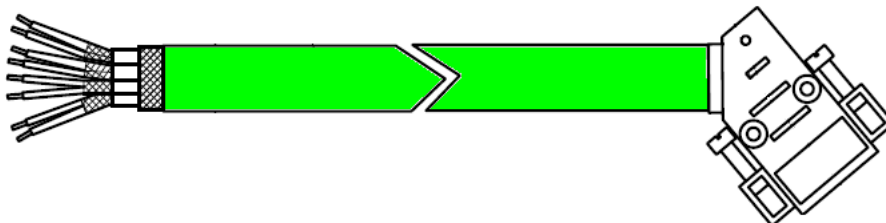
**Cable arrangement :**

EX terminals	Identification	Wire colour	SUB-D terminals
1	Us	Red	4
2	Gnd	Black (Black/Red pair)	15
3	refSin	Black (Black/White pair)	7
4	refCos	Black (Black/Blue pair)	1
5	Data +	Yellow	13
6	Data -	Black (Black/Yellow pair)	14
7	Sin +	White	8
8	Cos +	Blue	12



### 3.9.8.5. Resolver cable connection for SLVD

**Cable reference :**  
CS5UA1D1R0xxx



Feedback cable **6537P0059**

Male 15 pins SUB-D connector reference **220029P0040**

SUB-D cover reference **220029P0039**

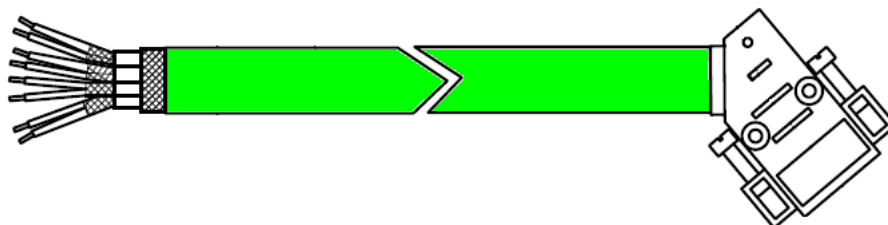
**Cable arrangement :**

EX terminals	Identification	Wire colour	SUB-D terminals
1	S1 / Cos -	White	12
2	S2 / Sin -	Black (Black/Blue pair)	8
3	S3 / Cos +	Black (Black/White pair)	11
4	S4 / Sin -	Blue	7
5	R1 / Ref +	Red	4
6	R2 / Ref -	Black (Black/Red pair)	15



### 3.9.8.6. Resolver cable connection for 637/638

**Cable reference :**  
CS1UA1D1R0xxx



Feedback cable **6537P0059**

Male 9 pins SUB-D connector reference **220029P0020**

SUB-D cover reference **220029P0039**

Pins reference **220029P0021**

**Cable arrangement :**

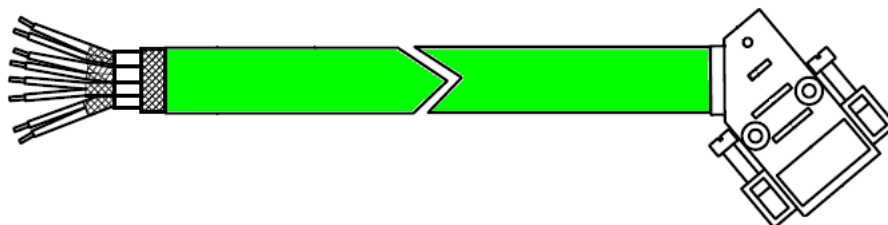
EX terminals	Identification	Wire colour	SUB-D terminals
1	S1 / Cos -	Black (Black/White pair)	7
2	S2 / Sin -	Black (Black/Blue pair)	4
3	S3 / Cos +	White	3
4	S4 / Sin -	Blue	8
5	R1 / Ref +	Red	5
6	R2 / Ref -	Black (Black/Red pair)	9





### 3.9.8.7. Hiperface encoder cable connection for 637/638

**Cable reference :**  
CS2UR1D1R0xxx



Feedback cable **6537P0059**

Male 9 pins SUB-D connector reference **220029P0020**

SUB-D cover reference **220029P0039**

Pins reference **220029P0021**

**Cable arrangement :**

EX terminals	Identification	Wire colour	SUB-D terminals
1	Us	Green	2
2	Gnd	Black (Black/ Green pair)	1
3	refSin	Blue	4
4	refCos	Black (Black/White pair)	7
5	Data +	Red	9
6	Data -	Black (Black/Red pair)	5
7	Sin +	Black (Black/Blue pair)	8
8	Cos +	White	3

### 3.9.8.8. Feedback cable reference

For other drive, you can assembly cable and plug by soldering with part number on the tab below:

Feedback Sensor	Cable reference
Resolver	6537P0059
Hiperface Encoder	
EnDat Encoder	

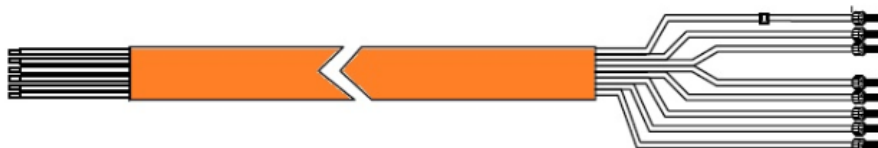


### 3.9.8.9. Power cable for AC890


#### Cable reference :

CS4UQ1D1R0xxx for current  $\leq 12$ Amps  
Power cable **6537P0057**

CS4UQ2D1R0xxx for current  $\leq 30$ Amps  
Power cable **6537P0058**



#### Cable arrangement :

EX terminals	Identification	Wire colour	Markings with labels on wires
U	U phase	Black 1	U
V	V phase	Black 2	V
W	W phase	Black 3	W
	Ground	Green/Yellow	
Br+	Brake +	Black 5	B +
Br-	Brake -	Black 6	B -
TH+	Thermal sensor +	Black 7	T+
TH-	Thermal sensor -	Black 8	T -

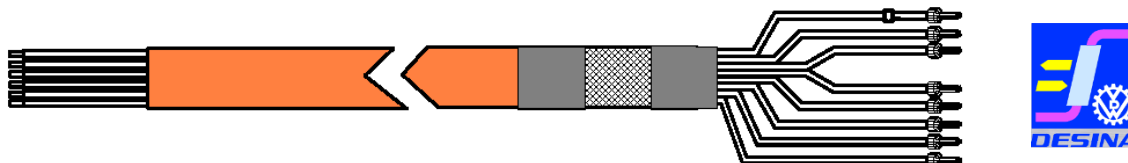


### 3.9.8.10. Power cable for COMPAX3


#### Cable reference :

CC3UQ1D1R0xxx for current  $\leq 12$ Amps  
Power cable **6537P0057**

CC3UQ2D1R0xxx for current  $\leq 30$ Amps  
Power cable **6537P0058**



#### Cable arrangement :

EX terminals	Identification	Wire colour	Markings with labels on wires
U	U phase	Black 1	U
V	V phase	Black 2	V
W	W phase	Black 3	W
	Ground	Green/Yellow	
Br+	Brake +	Black 5	B +
Br-	Brake -	Black 6	B -
TH+	Thermal sensor +	Black 7	T+
TH-	Thermal sensor -	Black 8	T -

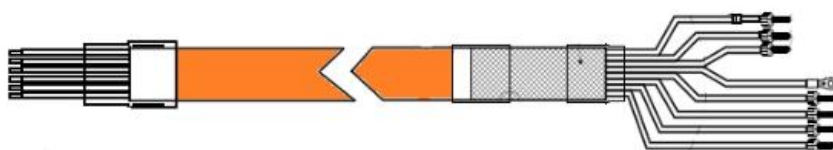


### 3.9.8.11. Power cable for SLVD


#### Cable reference :

CS5UQ1D1R0xxx for current  $\leq$  12Amps  
Power cable **6537P0057**

CS5UQ2D1R0xxx for current  $\leq$  30Amps  
Power cable **6537P0058**



#### Cable arrangement :

EX terminals	Identification	Wire colour	Markings with labels on wires
U	U phase	Black 1	U
V	V phase	Black 2	V
W	W phase	Black 3	W
	Ground	Green/Yellow	
Br+	Brake +	Black 5	B +
Br-	Brake -	Black 6	B -
TH+	Thermal sensor +	Black 7	T+
TH-	Thermal sensor -	Black 8	T -

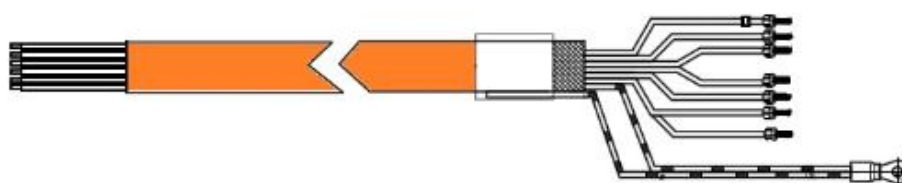


### 3.9.8.12. Power cable for 637/638

#### Cable reference :

CS2UQ1D1R0xxx for current  $\leq$  12Amps  
Power cable **6537P0057**

CS2UQ2D1R0xxx for current  $\leq$  30Amps  
Power cable **6537P0058**



#### Cable arrangement :

EX terminals	Identification	Wire colour	Markings with labels on wires
U	U phase	Black 1	U
V	V phase	Black 2	V
W	W phase	Black 3	W
$\oplus$	Ground	Green/Yellow	
Br+	Brake +	Black 5	B +
Br-	Brake -	Black 6	B -
TH+	Thermal sensor +	Black 7	T+
TH-	Thermal sensor -	Black 8	T -


### 3.9.8.13. Power cable reference

For other drive, you can assembly cable and plug by soldering with part number on the tab below:


Feedback Sensor	Cable reference
Current $\leq$ 12Amps	6537P0057
Current $\leq$ 30Amps	6537P0058



### 3.9.9. Cable connection

	<p>The EX motors must be carefully connected according to the connection diagrams placed in the commissioning and use manuals PVD3559_EX3, PVD3566_EX4, PVD3562_EX6, PVD3571_EX8 and PVD3628_EXUL.</p> <p>To avoid other problems due to the connections (cable glands, connections, cover etancheity...) the EX motors must be carefully connected according the chapter “Final connection” placed in the commissioning and use manuals.</p>
---	---

### 3.10. Brake option

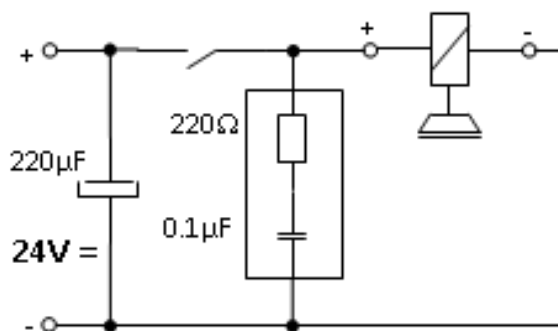
	<p><b>Caution:</b> The holding brake is used to completely immobilize the servomotor under load. It is not designed to be used for repeated dynamic braking ; dynamic braking must only be used in the case of an emergency stop and with a limited occurrence depending on the load inertia and speed.</p>
---	---

The standard brake power supply is 24 Vcc DC  $\pm$  10%.

Follow the polarity and the permissible voltage, and use shielded cables.

A 220  $\mu$ F capacitor avoids untimely braking if the 24 V voltage is disturbed by the external relay. Check the voltage value once this capacitor has been fitted. The RC network (220  $\Omega$ , 0.1  $\mu$ F) is needed to eliminate interference produced by the brake coil.

Position the contactor in the DC circuit to reduce brake response times. Follow the connection instructions taking the brake polarisation into account.



Motor	Static torque @20°C (N.m)	Static torque @100°C (N.m)	Power (W)	Engaging time (ms)	Disengaging time (ms)	Extra Inertia (Kg.m <sup>2</sup> .10 <sup>-5</sup> )	Angular backlash (°)
EX3	2	1.8	11	13	25	0.68	0
EX4	5.5	4	12	17	35	1.8	0
EX6	12	8	18	28	40	5.4	0
EX8	36	32	26	45	100	55.6	0

Table with typical values



## 4. COMMISSIONING, USE AND MAINTENANCE

### 4.1. Instructions for commissioning, use and maintenance

#### 4.1.1. Equipment delivery

All servomotors are strictly controlled during manufacturing, before shipping. While receiving it, it is necessary to verify motor condition and if it has not been damaged in transit. Remove it carefully from its packaging. Verify that the data written on the label are the same as the ones on the acknowledgement of order, and that all documents or needed accessories for user are present in the packaging.



Warning: In case of damaged material during the transport, the recipient must **immediately** make reservations to the carrier through a registered mail within 24 h..

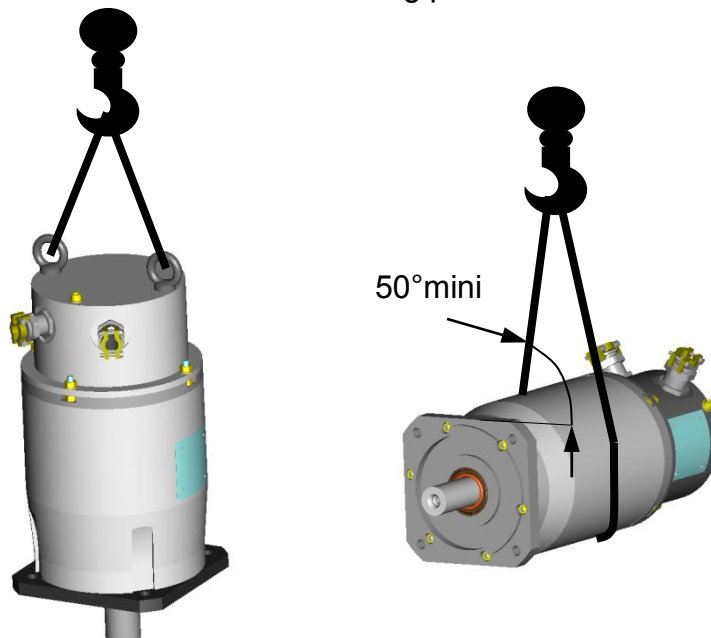
#### 4.1.2. Handling

Servomotors are equipped with two lifting rings intended for handling.



Caution: Use only servomotors lifting rings, if present, or slings to handle the motor. Do not handle the motor with the help of electrical cables, connectors and water inputs/outputs, or use any other inappropriate method.

The drawings below show the correct handling procedure.



DANGER: Choose the correct slings for the motor weight. The two slings must be the same length and a minimum angle of 50° has to be respected between the motor axis and the slings.



### 4.1.3. Storage

Before being mounted, the motor has to be stored in a dry place, without rapid or important temperature variations in order to avoid condensation.

During storage, the ambient temperature must be kept between -20 and +60°C.


If the torque motor has to be stored for a long time, verify that the shaft end, feet and the flange are coated with corrosion proof product.

After a long storage duration (more than 3 month), run the motor at low speed in both directions, in order to blend the bearing grease spreading.


The motor is delivered with caps for the water inlet and outlet to protect the cooling circuit. Keep them on place until the motor commissioning.

## **4.2. Installation**

### 4.2.1. Mounting

	<p><b>Generality</b> The installation and operation must be made with the <i>Commissioning and use manual</i> given with the motor.</p> <p>Commissioning and use manual of the EX motor series :</p> <ul style="list-style-type: none"> <li>- EX3 Atex : PVD 3559</li> <li>- EX4 Atex : PVD 3566</li> <li>- EX6 Atex : PVD 3562</li> <li>- EX8 Atex : PVD 3571</li> <li>- EX3 UL to EX8 UL : PVD 3628</li> </ul>
---	--

Foundation must be even, sufficiently rigid and shall be dimensioned in order to avoid vibrations due to resonance. Before bolting the motor, the foundation surface must be cleaned and checked in order to detect any excessive height difference between the motor locations. The surface variation shall not exceed 0,1 mm.

	<p><b>Caution:</b> The user bears the entire responsibility for the preparation of the foundation.</p>
---	--





The table below gives the average tightening torques required regarding the fixing screw diameter. These values are valid for both motor's feet and flange bolting.

Screw diameter	Tightening torque
M2 x 0.35	0.35 N.m
M2.5 x 0.4	0.6 N.m
M3 x 0.5	1.1 N.m
M3.5 x 0.6	1.7 N.m
M4 x 0.7	2.5 N.m
M5 x 0.8	5 N.m
M6 x 1	8.5 N.m
M7 x 1	14 N.m
M8 x 1.25	20 N.m

Screw diameter	Tightening torque
M9 x 1.25	31 N.m
M10 x 1.5	40 N.m
M11 x 1.5	56 N.m
M12 x 1.75	70 N.m
M14 x 2	111 N.m
M16 x 2	167 N.m
M18 x 2.5	228 N.m
M20 x 2.5	329 N.m
M22 x 2.5	437 N.m
M24 x 3	564 N.m

	<p><b>Warning:</b> After 15 days, check all tightening torques on all screw and nuts.</p>
--	---

#### **4.2.2. Preparation**

Once the motor is installed, it must be possible to access the wiring, and read the manufacturer's plate. Air must be able to circulate around the motor for cooling purposes.

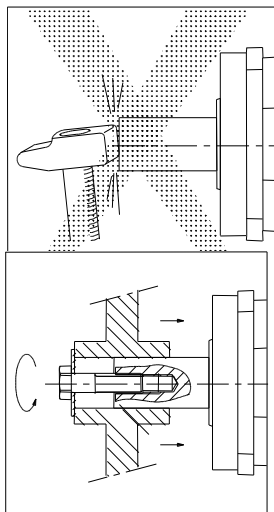
Clean the shaft using a cloth soaked in white spirit or alcohol. Pay attention that the cleaning solution does not get on to the bearings.

The motor must be in a horizontal position during cleaning or running.

	<p><b>Caution:</b> Do not step on the motor or the cable glands.</p>
	<p><b>Caution:</b> Always bear in mind that some parts of the surface of the motor can reach a temperature of 135°C</p>



### 4.2.3. Mechanical installation



The operational life of torque motor bearings largely depends on the care and attention given to this operation.

- Carefully check the alignment of the motor shaft with that of the machine to be driven thus avoiding vibration, irregular rotation or putting too much strain on the shaft.
- Prohibit any impact on the shaft and avoid press fittings which could mark the bearing tracks. If press fitting cannot be avoided, it is advisable to immobilize the shaft in motion; this solution is nevertheless dangerous as it puts the encoder at risk.
- In the event that the front bearing block is sealed by a lip seal which rubs on the rotating section, we recommend that you lubricate the seal with grease thus prolonging its operational life.



We cannot be held responsible for wear on the drive shaft resulting from excessive strain.



### 4.3. Electrical connections

---



Danger: Check that the power to the electrical cabinet is off prior to making any connections.



Caution: The wiring must comply with the drive commissioning manual and with recommended cables.



Danger: The motor must be earthed by connecting to an unpainted section of the motor.



Caution: After 15 days, check all tightening torques on cable connection.



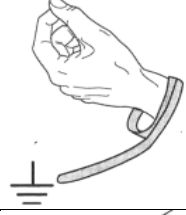



#### **4.3.1. Cable connection**

Please, read §3.8 "Electrical connection" to have information about cable connection

A lot of information are already available in the drive documentations.


#### **4.3.2. Encoder cable handling**


	<p><u>Danger:</u> before any intervention the drive must be stopped in accordance with the procedure.</p>
	<p><u>Caution:</u> It is forbidden to disconnect the Encoder cable under voltage (high risk of damage and sensor destruction).</p>
	<p><u>Warning:</u> Always wear an antistatic wrist strap during encoder handling.</p>
	<p><u>Warning:</u> Do not touch encoder contacts (risk of damage due to electrostatic discharges ESD).</p>




## 4.4. Maintenance Operations


### 4.4.1. Summary maintenance operations

	<p><b>Generality</b>  <b>DANGER:</b> The installation, commission and maintenance operations must be performed by qualified personnel, in conjunction with this documentation.</p> <p>The qualified personnel must know the safety (C18510 authorization, standard VDE 0105 or IEC 0364) and local regulations.</p> <p>They must be authorized to install, commission and operate in accordance with established practices and standards.</p> <p>Please contact PARKER for technical assistance.</p>
---	--

	<p><b>Danger:</b> before any intervention the motor must be disconnected from te power supply.</p> <p>Due to the permanent magnets, a voltage is generated at the terminals when the motor shaft is turned</p>
---	--

### Special requirements for ATEX servomotors

	<p>If a screw assembly of the enclosure need to be replaced, the new screw will must be quality 8.8 or higher. For the EX8 in UL version the screw must be quality 14.9 or higher.</p>
---	--

	<p>If the motor is used in dust explosive atmospheres, do not forget to do a regular cleaning in order to avoid the deposits of dusts.</p>
---	--

Operation	Periodicity
Clean the motor	Every year
Motor inspection (vibration changes, temperature changes, tightening torques on all scews)	Every year
Bearing replacement	Every 20 000h



#### 4.4.2. Informations about the flameproof enclosure components

The Ex motors of Parker Hannifin France has a traceability on the flameproof enclosure components. It is forbidden to replace one of these components without consulting Parker Hannifin.

If a cover exchange between two identical motors is required, the customer must make a new traceability on these components. To make the traceability, the customer must refer to the number written on the cover.

### 4.5. Troubleshooting

Some symptoms and their possible causes are listed below. This list is not comprehensive. Whenever an operating incident occurs, consult the relevant servo drive installation instructions (the troubleshooting display indications will help you in your investigation) or contact us at: <http://www.parker.com/eme/repairservice>.

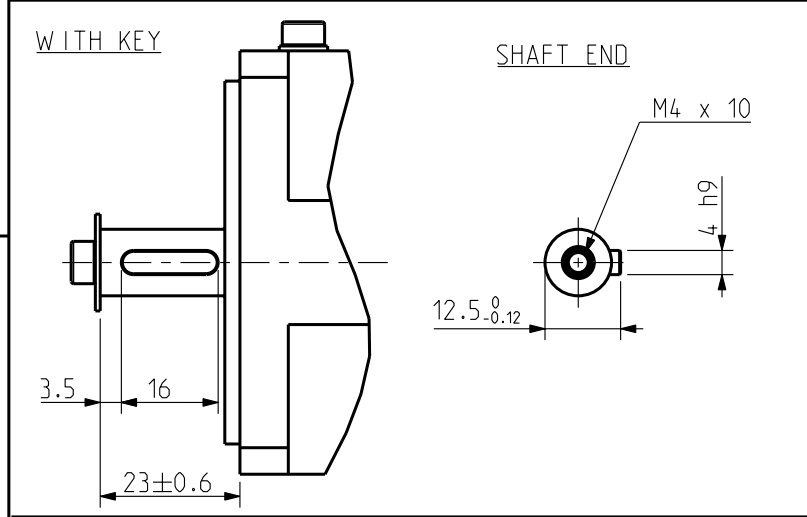
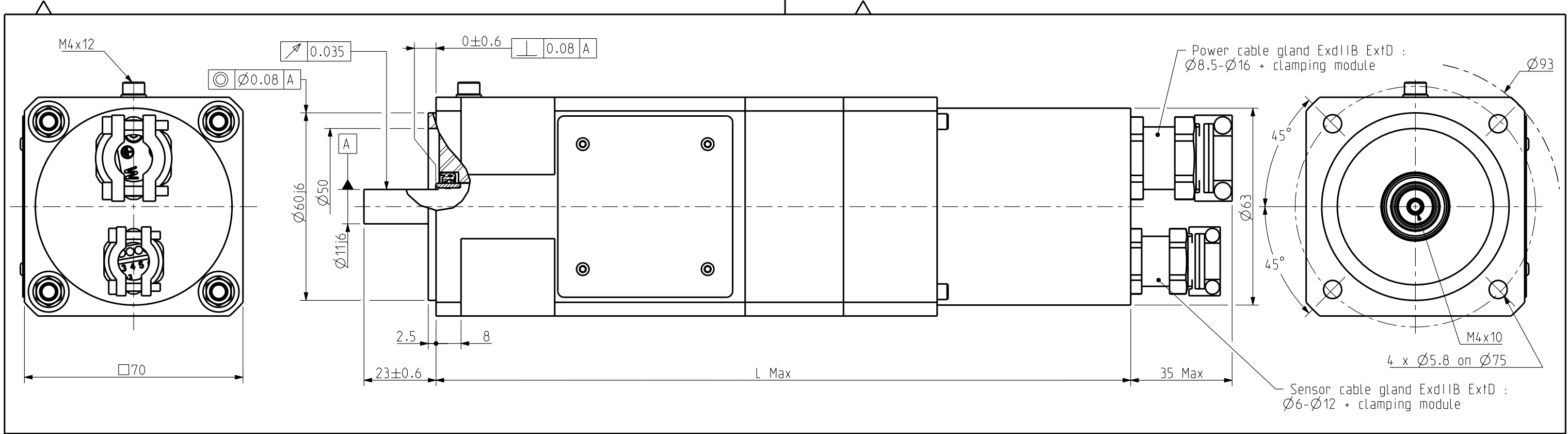
You note that the motor does not turn by hand when the motor is not connected to the drive.	<ul style="list-style-type: none"> <li>• Check there is no mechanical blockage or if the motor terminals are not short-circuited.</li> <li>• Check the power supply to the brake</li> </ul>
You have difficulty starting the motor or making it run	<ul style="list-style-type: none"> <li>• Check on the fuses, the voltage at the terminals (there could be an overload or the bearings could be jammed), also checks on the load current.</li> <li>• Check the power supply to the brake (+ 24 V <math>\pm</math> 10 %) and its polarity.</li> <li>• Check on any thermal protection.</li> <li>• Check on the servomotor insulation (if in doubt, carry out hot and cold measurements).</li> </ul> <p>The minimum insulation resistance value measured under a max. 50V DC is 50 M<math>\Omega</math>:</p> <ul style="list-style-type: none"> <li>• Between the phase and the casing</li> <li>• Between the thermal protection and the casing</li> <li>• Between the brake coil and the casing</li> <li>• Between the resolver coils and the casing.</li> </ul>
You find that the motor speed is drifting	<ul style="list-style-type: none"> <li>• Reset the offset of the servoamplifier after having given a zero instruction to the speed input.</li> </ul>
You notice that the motor is racing	<ul style="list-style-type: none"> <li>• Check the speed set-point of the servo drive.</li> <li>• Check you are well and truly in speed regulation (and not in torque regulation).</li> <li>• Check the encoder setting</li> <li>• Check on the servomotor phase order: U, V, W</li> </ul>
You notice vibrations	<ul style="list-style-type: none"> <li>• Check the encoder and tachometer connections, the earth connections (carefully) and the earthing of the earth wire, the setting of the servo drive speed loop, tachometer screening and filtering.</li> <li>• Check the stability of the secondary voltages.</li> <li>• Check the rigidity of the frame and motor support.</li> </ul>



<p>You think the motor is becoming unusually hot</p>	<ul style="list-style-type: none"> <li>• It may be overloaded or the rotation speed is too low : check the current and the operating cycle of the torque motor</li> <li>• Friction in the machine may be too high :             <ul style="list-style-type: none"> <li>- Test the motor current with and without a load.</li> <li>- Check the motor does not have thermal insulation.</li> <li>- Check that there is no friction from the brake when the brake power is on.</li> </ul> </li> </ul>
<p>You find that the motor is too noisy</p>	<p>Several possible explanations :</p> <ul style="list-style-type: none"> <li>• Unsatisfactory mechanical balancing</li> <li>• There is friction from the brake: mechanical jamming.</li> <li>• Defective coupling</li> <li>• Loosening of several pieces</li> <li>• Poor adjustment of the servo drive or the position loop : check rotation with the loop open.</li> </ul>







**WEIGHT**

Without brake	With brake
2.8 kg	3.2 kg

**BRAKE**

Supply voltage : 24V ±10%  
Static torque

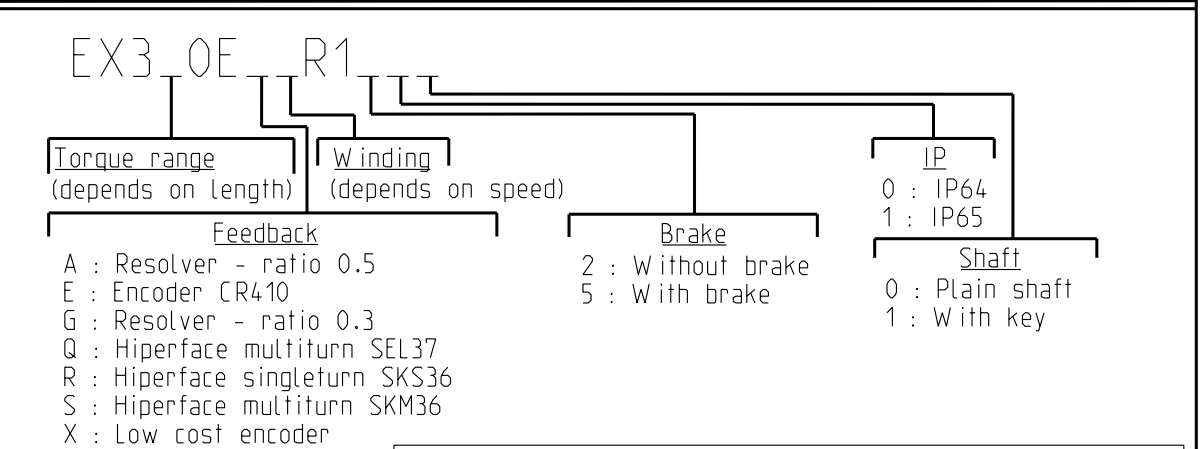
	EX310
20°C	2 Nm
100°C	1.8 Nm



IP Motor	IP64	IP65
Protection	II 2 G Ex d II B T4 IP64	II 2 GD Ex d II B T4 IP65 Ex tD A21 IP65 T135°C
Standards	<ul style="list-style-type: none"> <li>* EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.</li> <li>* EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".</li> </ul>	<ul style="list-style-type: none"> <li>* EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.</li> <li>* EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".</li> <li>* EN 61241-0 : Electrical apparatus for use in the presence of combustible dust. Part 0 : General requirements.</li> <li>* EN 61241-1 : Electrical apparatus for use in the presence of combustible dust. Part 1 : Protection by enclosures "tD".</li> </ul>

**DIMENSIONS**

Feedback option (feedback letter)	Resolver ratio 0.5 (A)	Encoder CR410 (E)	Resolver ratio 0.3 (G)	Hiperface SEL37 (Q)	Hiperface SKS36 (R)	Hiperface SKM36 (S)	Low cost encoder (X)	Sensorless (Y)
EX310 without brake	L (mm)				225			
EX310 with brake	L (mm)				255			



Sheet : 1/2

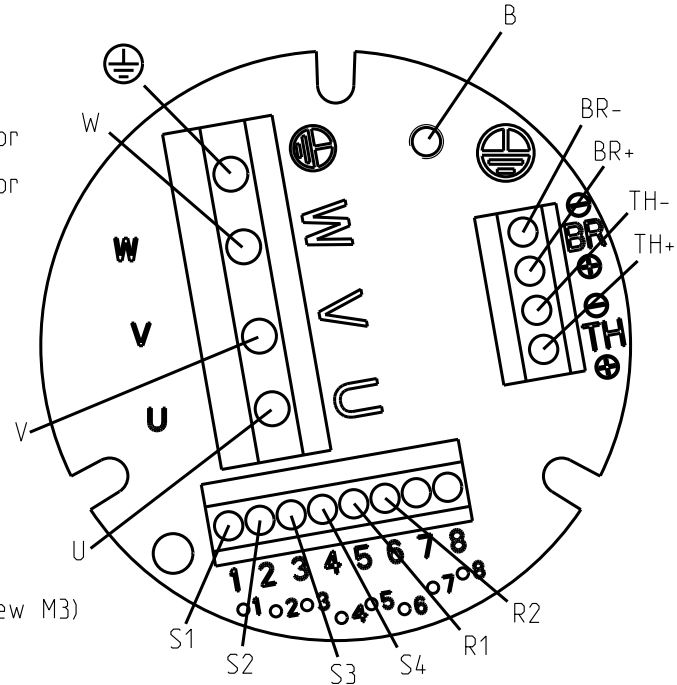
General tolerances DIN ISO 2768 mK	Drawn	11/09/09	OD	Visa						Scale 4:5	 <b>SSD Parvex</b> 8 Avenue du lac. BP249 21007-DIJON cedex-FRANCE www.SSDdrives.com	EX300 OUTLINE DRAWING	Format	F	E	S	G	I		
	Modifications	A	AM23304 - 10/12/09 SD											A3		x				

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344487 A

Resolver and CR410 connection  
Feedback letter : A/E/G

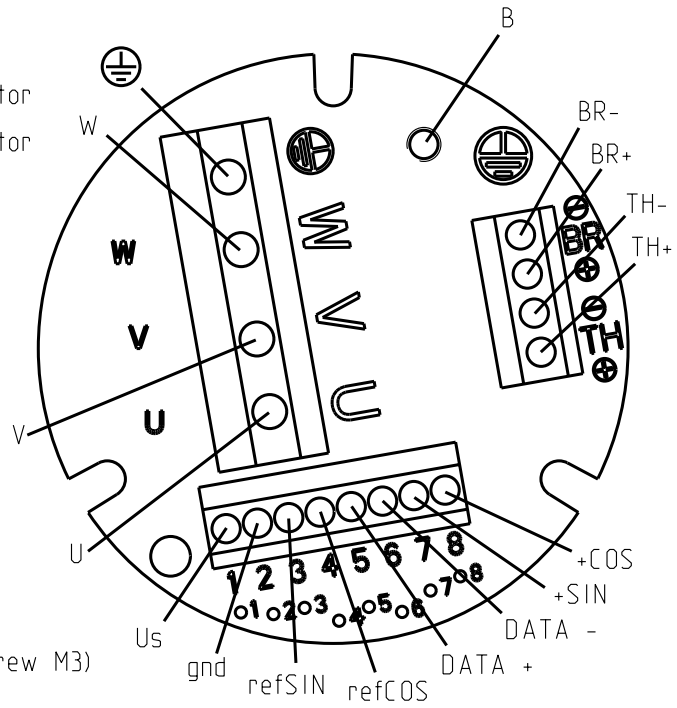
- U : Phase U
- V : Phase V
- W : Phase W
- TH- : Thermic protector
- TH+ : Thermic protector
- BR- : Brake- (option)
- BR+ : Brake+ (option)
- S1 : Resolver 1
- S2 : Resolver 2
- S3 : Resolver 3
- S4 : Resolver 4
- R1 : Resolver 5
- R2 : Resolver 6
- B : Shield option (screw M3)
- ⊕: Ground



SCALE : 3/2

Hiperface connection  
Feedback letter : Q/R/S

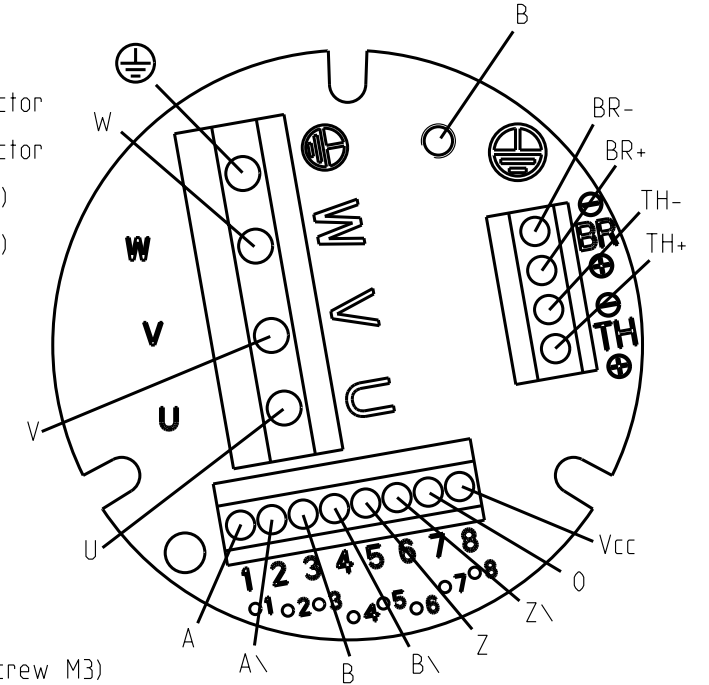
- U : Phase U
- V : Phase V
- W : Phase W
- TH- : Thermic protector
- TH+ : Thermic protector
- BR- : Brake- (option)
- BR+ : Brake+ (option)
- 1 : Encoder Us
- 2 : Encoder gnd
- 3 : Encoder refSIN
- 4 : Encoder refCOS
- 5 : Encoder DATA +
- 6 : Encoder DATA -
- 7 : Encoder +SIN
- 8 : Encoder +COS
- B : Shield option (screw M3)
- ⊕: Ground



SCALE : 3/2

Low cost encoder connection  
Feedback letter : X

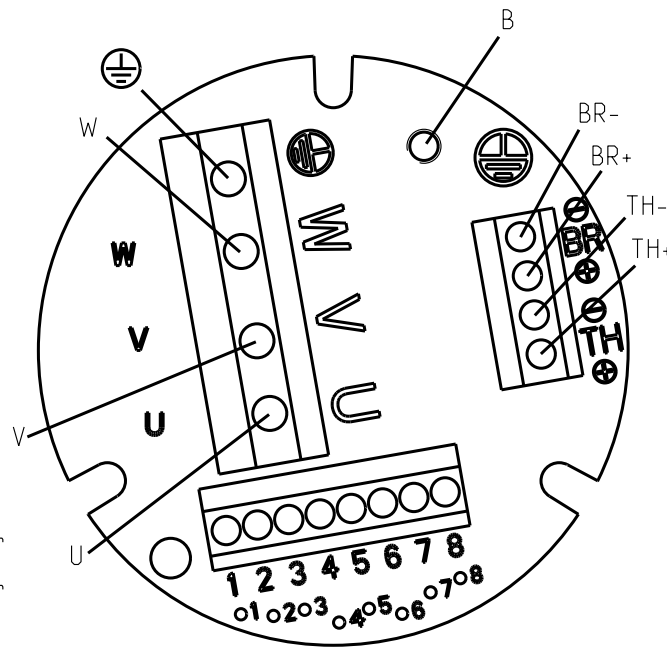
- U : Phase U
- V : Phase V
- W : Phase W
- TH- : Thermic protector
- TH+ : Thermic protector
- BR- : Brake- (option)
- BR+ : Brake+ (option)
- 1 : A
- 2 : A\
- 3 : B
- 4 : B\
- 5 : Z
- 6 : Z\
- 7 : 0
- 8 : Vcc
- B : Shield option (screw M3)
- ⊕: Ground



SCALE : 3/2

Sensorless connection  
Feedback letter : Y

- U : Phase U
- V : Phase V
- W : Phase W
- TH- : Thermic protector
- TH+ : Thermic protector
- BR- : Brake- (option)
- BR+ : Brake+ (option)
- B : Shield option (screw M3)
- ⊕: Ground



SCALE : 3/2

ENCODER SETTINGS

Resolver setting  
Feedback letter : A/E/G

Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.

Hiperface SEL setting  
Feedback letter : Q

Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 26.

Hiperface SKS/SKM setting  
Feedback letter : R/S

Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.

Low cost encoder setting  
Feedback letter : X

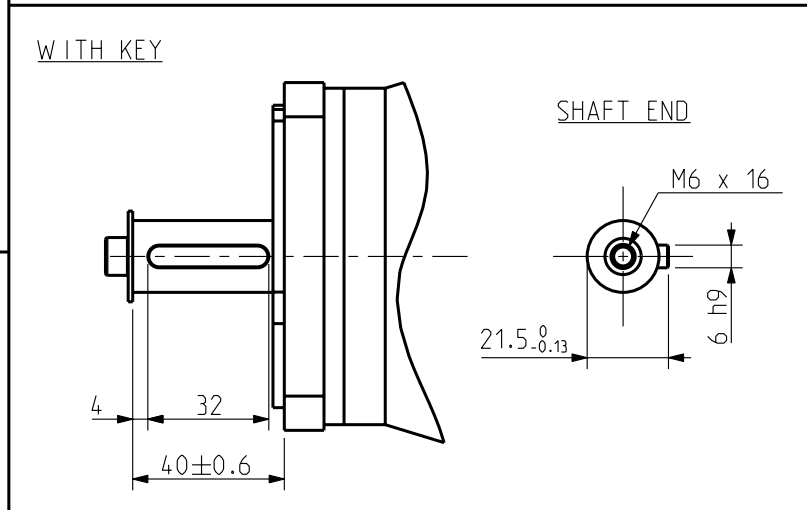
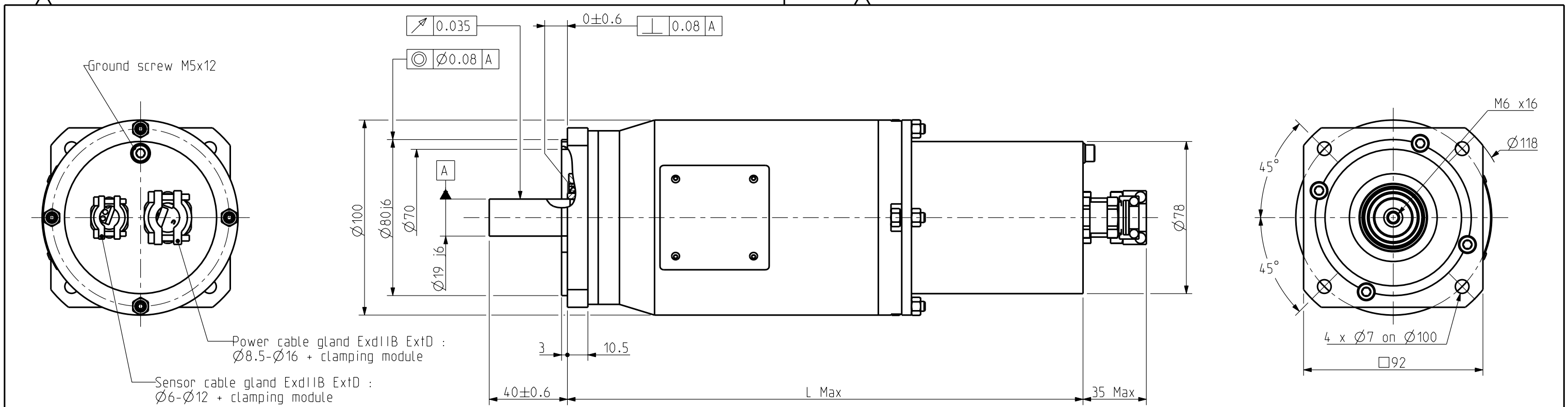
Engine driven clockwise shaft end side. Switching signal V is in phase with FEM UV.



Certification : INERIS 03ATEX0060X

Sheet : 2/2

This document is the property of PARVEX. Transmission as well as reproduction or copy is not permitted without written authorisation.	General tolerances DIN ISO 2768 mK	Drawn 11/09/09 OD Visa	Scale 4:5	SSD Parvex 8 Avenue du Lac. BP249 21007-DIJON cedex-FRANCE www.SSDdrives.com	EX300 OUTLINE DRAWING	Format A3	F E S G I x	344487	A
	Modifications A AM23304 - 10/12/09 SD								



WEIGHT

Motor	Without brake	With brake
EX420	7 Kg	8 Kg
EX430	8 Kg	9 Kg

BRAKE

Supply voltage : 24V  $\pm 10\%$

Static torque

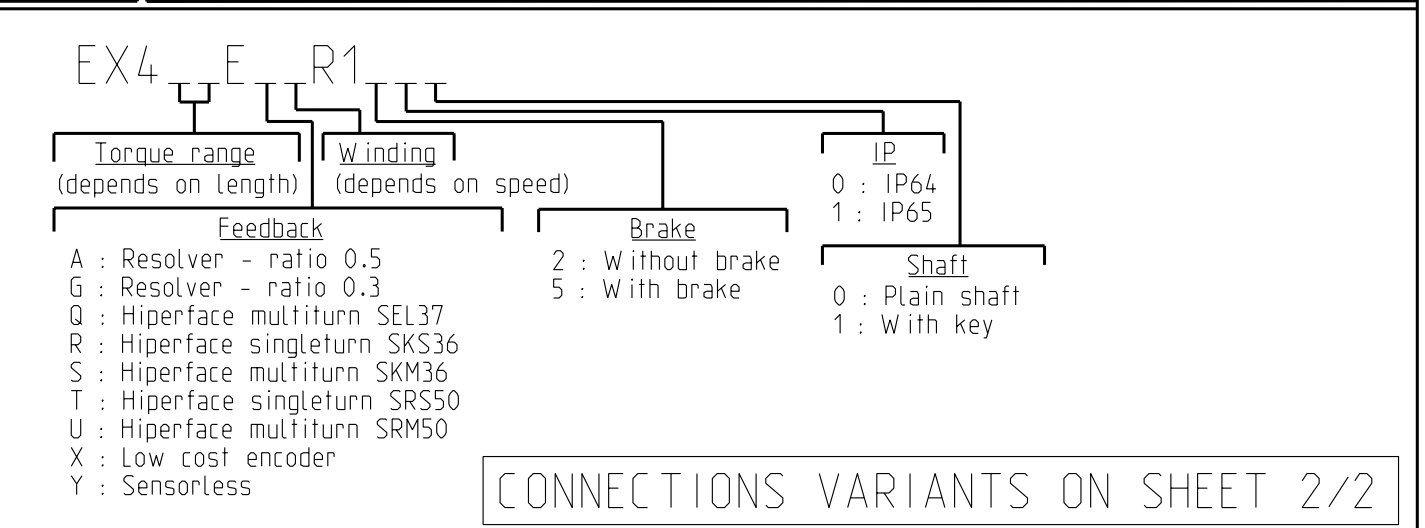
	EX420	EX430
20°C	6 N.m	6 N.m
100°C	5 N.m	5 N.m



IP Motor	IP64	IP65
Protection	II 2 G Ex d II B T4 IP64	II 2 GD Ex d II B T4 IP65 Ex tD A21 IP65 T135°C
Standards	<ul style="list-style-type: none"> <li>* EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.</li> <li>* EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".</li> </ul>	<ul style="list-style-type: none"> <li>* EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.</li> <li>* EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".</li> <li>* EN 61241-0 : Electrical apparatus for use in the presence of combustible dust. Part 0 : General requirements.</li> <li>* EN 61241-1 : Electrical apparatus for use in the presence of combustible dust. Part 1 : Protection by enclosures "tD".</li> </ul>

DIMENSIONS

	Feedback options (feedback letter)	Resolver ratio 0.5 (A)	Resolver ratio 0.3 (G)	Low cost encoder (X)	Sensorless (Y)	Hiperface SEL37 (Q)	Hiperface SKS36 (R)	Hiperface SKM36 (S)	Hiperface SRS50 (T)	Hiperface SRM50 (U)
EX420	Without brake	L (mm)		265			285			305
	With brake	L (mm)		290			310			330
EX430	Without brake	L (mm)		290			310			330
	With brake	L (mm)		315			335			355



Sheet : 1/2

General tolerances DIN ISO 2768 mK	Drawn	29/07/09	SD	Visa															
	Modifications	A	AM 23304	10/12/09	SD														

Scale: 1:2

**Parker**  
SSD Parvex  
8 Avenue du lac. BP249  
21007-DIJON cedex-FRANCE  
www.SSDdrives.com

EX400

Format A3

OUTLINE DRAWING

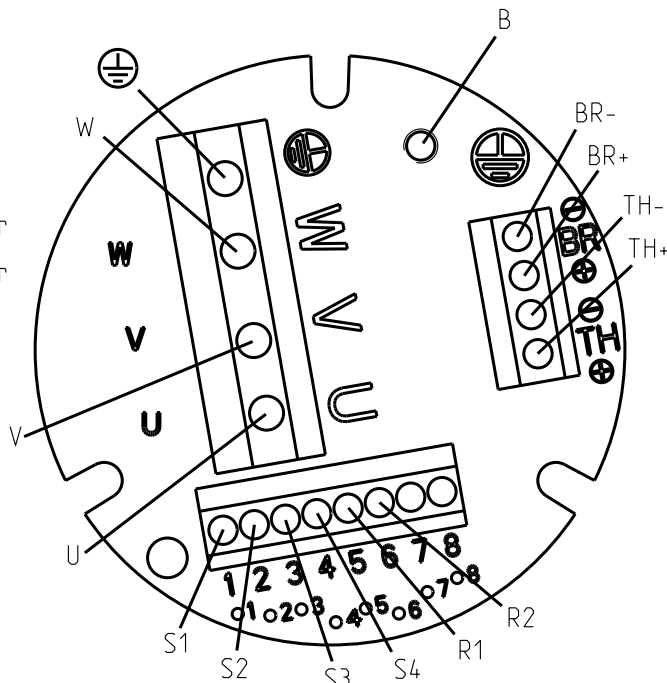
344619

A

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Resolver connection  
Feedback letter : A/G

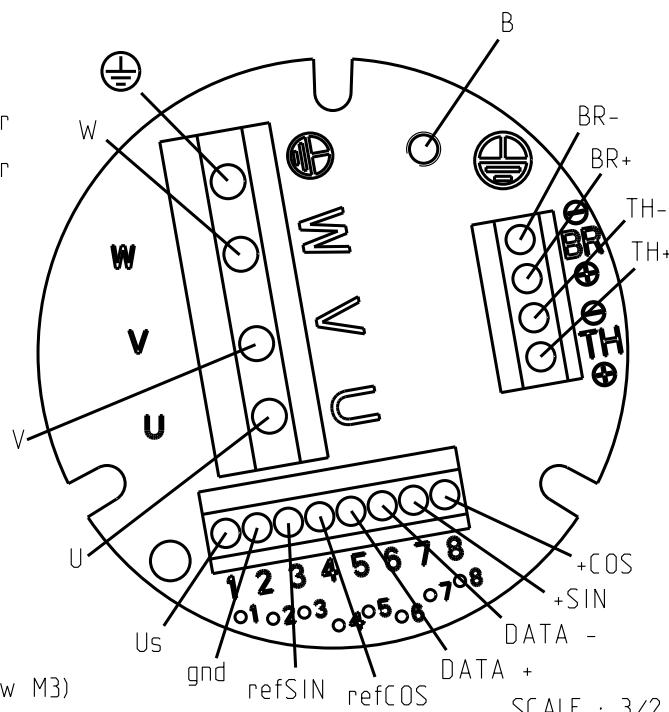
- U : Phase U
- V : Phase V
- W : Phase W
- TH- : Thermic protector
- TH+ : Thermic protector
- BR- : Brake - (option)
- BR+ : Brake + (option)
- S1 : Resolver 1
- S2 : Resolver 2
- S3 : Resolver 3
- S4 : Resolver 4
- R1 : Resolver 5
- R2 : Resolver 6
- B : Shield option (screw M3)
- ⊕: Ground



SCALE : 3/2

Hiperface connection  
Feedback letter : Q/R/S/T/U

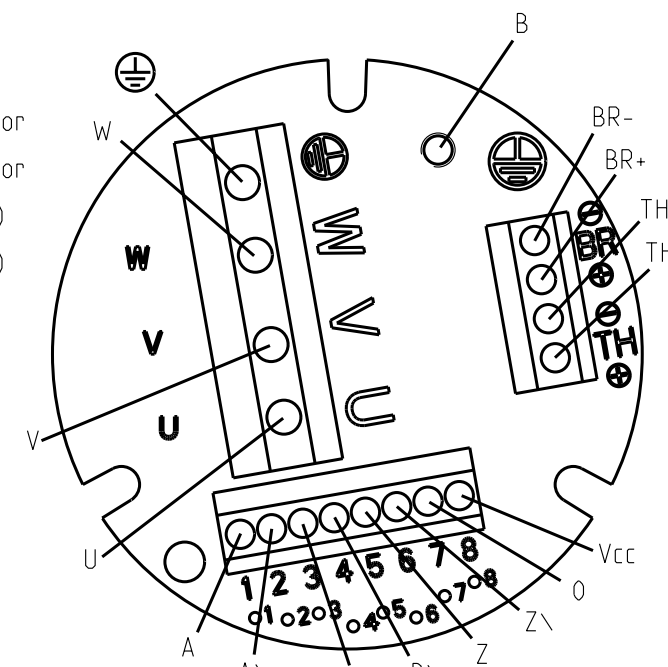
- U : Phase U
- V : Phase V
- W : Phase W
- TH- : Thermic protector
- TH+ : Thermic protector
- BR- : Brake - (option)
- BR+ : Brake + (option)
- 1 : Encoder Us
- 2 : Encoder gnd
- 3 : Encoder refSIN
- 4 : Encoder refCOS
- 5 : Encoder Data +
- 6 : Encoder Data -
- 7 : Encoder +SIN
- 8 : Encoder +COS
- B : Shield option (screw M3)
- ⊕: Ground



SCALE: 3/2

Low cost encoder connection  
Feedback letter : X

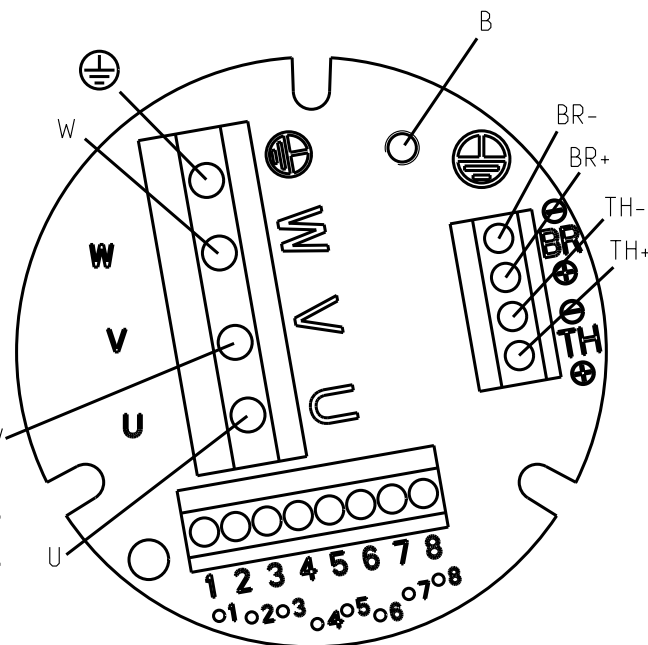
- U : Phase U
- V : Phase V
- W : Phase W
- TH- : Thermic protector
- TH+ : Thermic protector
- BR- : Brake - (option)
- BR+ : Brake + (option)
- 1 : A
- 2 : A\
- 3 : B
- 4 : B\
- 5 : Z
- 6 : Z\
- 7 : 0
- 8 : Vcc
- B : Shield option (screw M3)
- ⊕: Ground



SCALE : 3/2

Sensorless connection  
Feedback letter : Y

- U : Phase U
- V : Phase V
- W : Phase W
- TH- : Thermic protector
- TH+ : Thermic protector
- BR- : Brake - (option)
- BR+ : Brake + (option)
- B : Shield option (screw M3)
- ⊕: Ground



Scale : 3/2

ENCODER SETTINGS

Resolver setting  
Feedback letter : A/G

Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.

Hiperface SEL setting  
Feedback letter : Q

Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 26.

Hiperface SKS/SKM setting  
Feedback letter : R/S

Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.

Hiperface SRS/SRM setting  
Feedback letter : T/U

Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 1638.

Low cost encoder setting  
Feedback letter : X

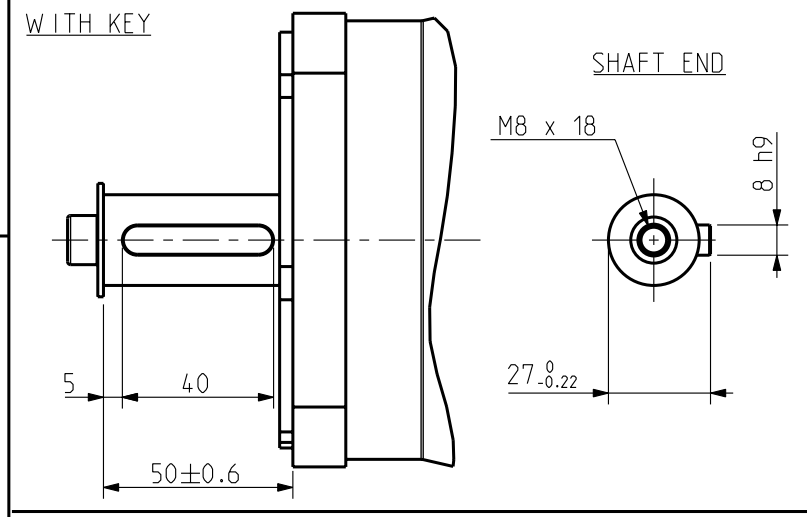
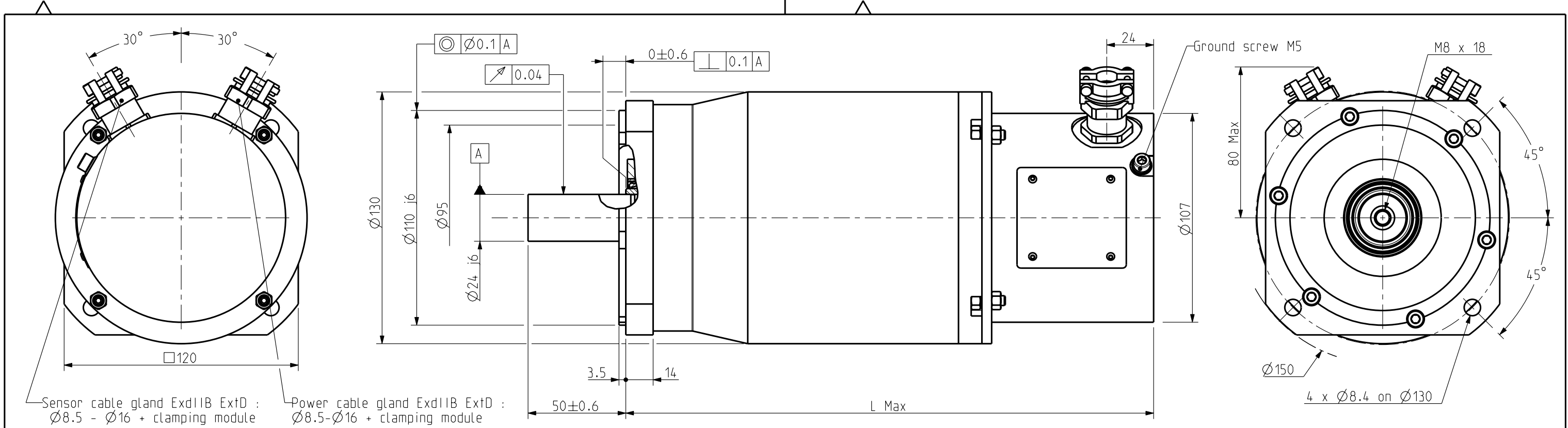
Engine driven clockwise shaft end side. Switching signal V is in phase with FEM UV.



Certification : INERIS 04ATEX0097X

Sheet : 2/2

This document is the property of PARVEX. Transmission as well as reproduction or copy is not permitted without written authorisation.	General tolerances  DIN ISO 2768 mK	Drawn 29/07/09 SD Visa	Scale 1:2	 <b>SSD Parvex</b> 8 Avenue du Lac. BP249 21007-DIJON cedex-FRANCE www.SSDdrives.com	EX400  OUTLINE DRAWING	Format A3	F x	E x	S x	G x	I x	344619	A
	Modifications A AM 23304 10/12/09 SD												
	Sheet : 2/2												



**WEIGHT**

Motor	Without brake	With brake
EX620	10 Kg	11 Kg
EX630	12.5 Kg	13.5 Kg

**BRAKE**

Supply voltage : 24V ±10%  
Static torque

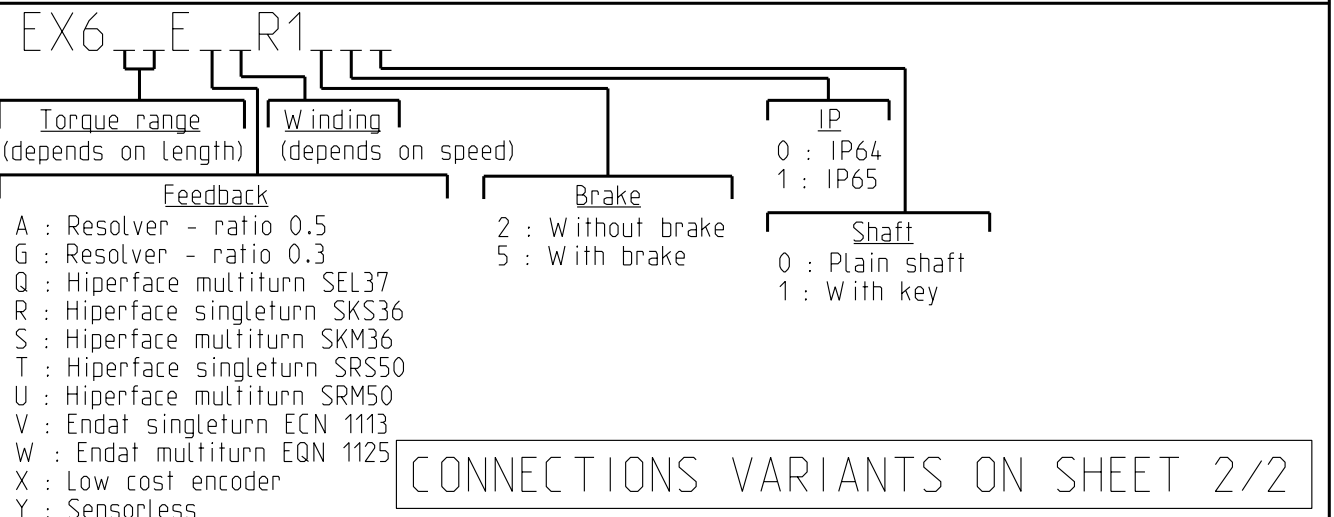
	EX620	EX630
20 °C	12 N.m	12 N.m
100 °C	10 N.m	10 N.m



IP Motor	IP64	IP65
Protection	II 2 G Ex d II B T4 IP64	II 2 GD Ex d II B T4 IP65 Ex tD A21 IP65 T135°C
Standards	<ul style="list-style-type: none"> <li>EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.</li> <li>EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".</li> </ul>	<ul style="list-style-type: none"> <li>EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.</li> <li>EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".</li> <li>EN 61241-0 : Electrical apparatus for use in the presence of combustible dust. Part 0 : General requirements.</li> <li>EN 61241-1 : Electrical apparatus for use in the presence of combustible dust. Part 1 : Protection by enclosures "tD".</li> </ul>

**DIMENSIONS**

	Feedback options (feedback letter)	Resolver ratio 0.5 (A)	Resolver ratio 0.3 (G)	Low cost encoder (X)	Sensorless (Y)	Hiperface SEL37 (Q)	Hiperface SKS36 (R)	Hiperface SKM36 (S)	Hiperface SRS50 (T)	Hiperface SRM50 (U)	Endat ECN 1113 (V)	Endat EQN 1125 (W)
EX620	Without brake	L (mm)			275		305		325			325
	With brake	L (mm)			300		330		350			350
EX630	Without brake	L (mm)			300		330		350			350
	With brake	L (mm)			325		355		375			375



Sheet : 1/2

General tolerances DIN ISO 2768 mK	Drawn	07/10/09	SD	Visa															
	Modifications																		
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Scale 1:2

**Parker**  
SSD Parvex  
8 Avenue du lac. BP249  
21007-DIJON cedex-FRANCE  
www.SSDdrives.com

EX600  
OUTLINE DRAWING

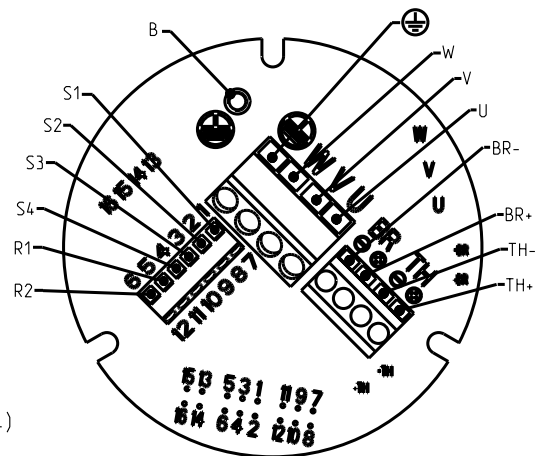
Format	F	E	S	G	I
A3		x			

344550

A

Resolver connection  
Feedback letter : A/G

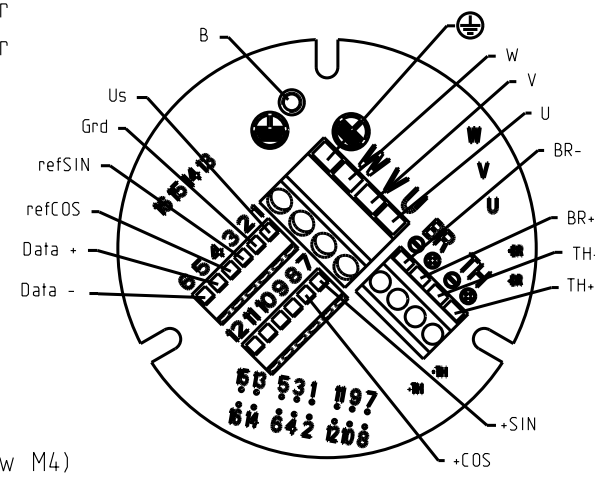
U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake - (option)  
BR+ : Brake + (option)  
S1 : Resolver 1  
S2 : Resolver 2  
S3 : Resolver 3  
S4 : Resolver 4  
R1 : Resolver 5  
R2 : Resolver 6  
B : Shield option (screw M4)  
⊕: Ground



Scale : 2/3

Hiperface connection  
Feedback letter : Q/R/S/T/U

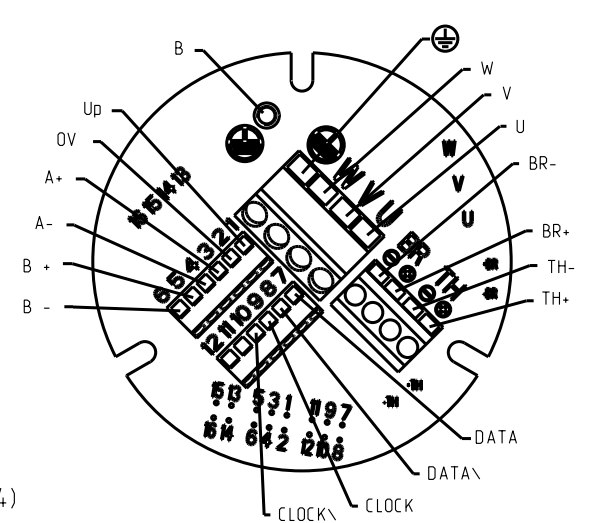
U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake - (option)  
BR+ : Brake + (option)  
1 : Encoder Us  
2 : Encoder gnd  
3 : Encoder refSIN  
4 : Encoder refCOS  
5 : Encoder Data +  
6 : Encoder Data -  
7 : Encoder + SIN  
8 : Encoder + COS  
B : Shield option (screw M4)  
⊕: Ground



Scale : 2/3

Endat connection  
Feedback letter : V/W

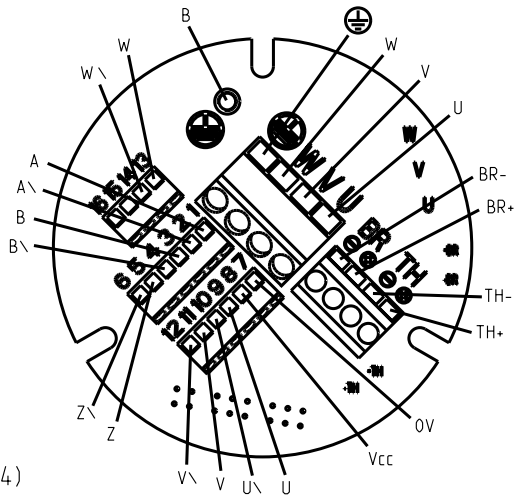
U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake - (option)  
BR+ : Brake + (option)  
1 : Encoder Up 5V ±5%  
2 : Encoder 0V  
3 : Encoder A +  
4 : Encoder A -  
5 : Encoder B +  
6 : Encoder B -  
7 : Encoder DATA  
8 : Encoder DATA\  
9 : Encoder CLOCK  
10 : Encoder CLOCK\  
B : Shield option (screw M4)  
⊕: Ground



Scale : 2/3

Low cost encoder connection  
Feedback letter : X

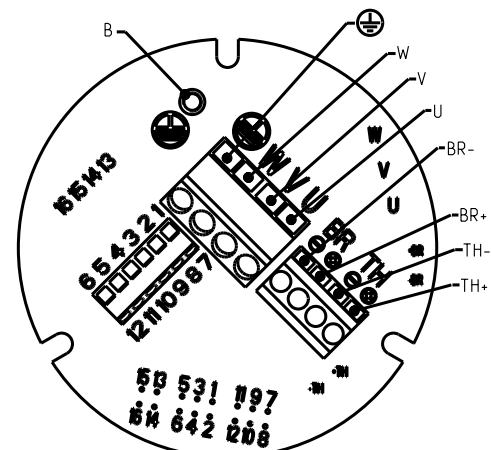
U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake - (option)  
BR+ : Brake + (option)  
1 : A  
2 : A\  
3 : B  
4 : B\  
5 : Z  
6 : Z\  
7 : 0  
8 : Vcc  
B : Shield option (screw M4)  
⊕: Ground



Scale : 2/3

Sensorless connection  
Feedback letter : Y

U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake - (option)  
BR+ : Brake + (option)  
B : Shield option (screw M4)  
⊕: Ground



Scale : 2/3



Certification : INERIS 04ATEX0032X

ENCODER SETTINGS

Resolver setting  
Feedback letter : A/G

Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.

Hiperface SEL setting  
Feedback letter : Q

Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 26.

Hiperface SKS/SKM setting  
Feedback letter : R/S

Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.

Hiperface SRS/SRM setting  
Feedback letter : T/U

Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 1638.

Endat setting  
Feedback letter : V/W

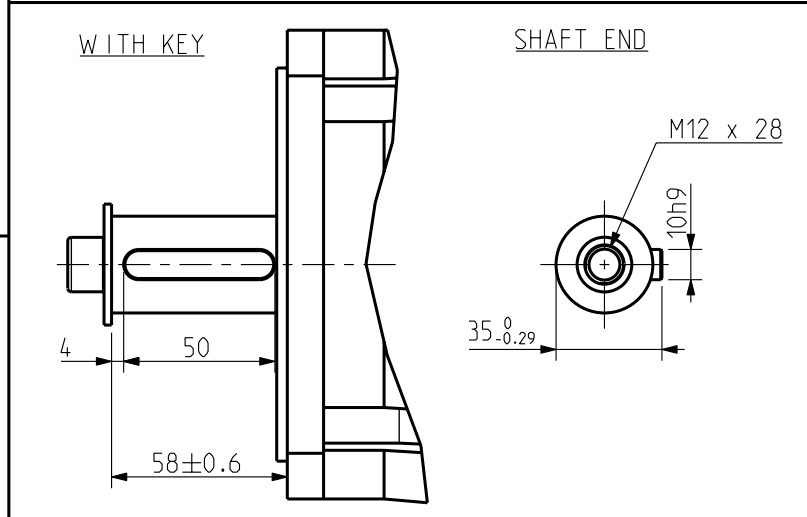
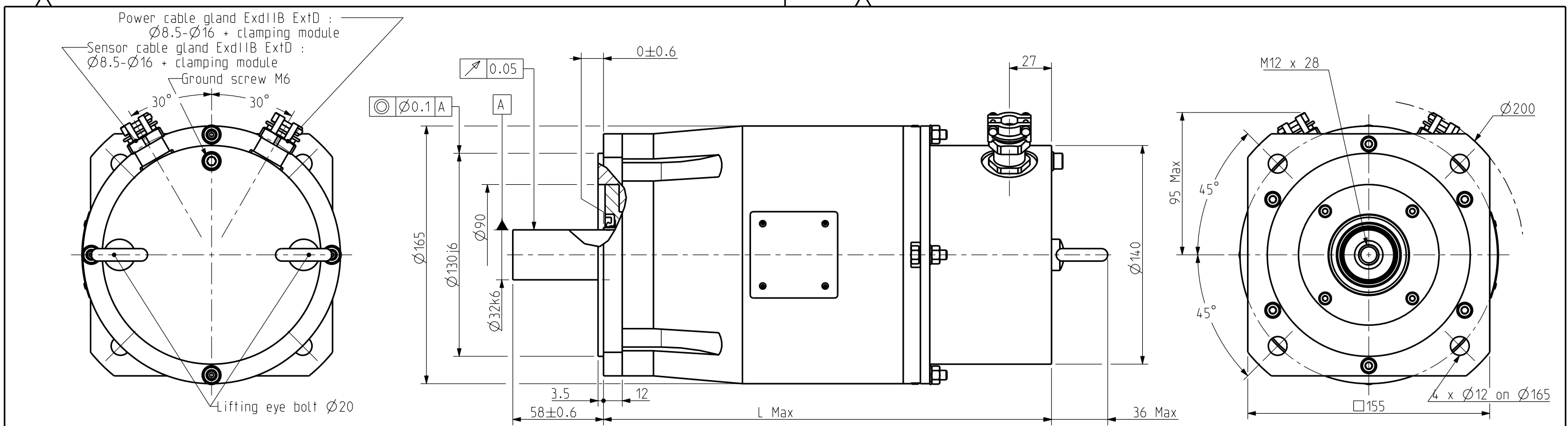
Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 410.

Low cost encoder setting  
Feedback letter : X

Engine driven clockwise shaft end side. Switching signal V is in phase with FEM UV.

Sheet : 2/2

This document is the property of PARVEX. Transmission as well as reproduction or copy is not permitted without written authorisation.	General tolerances	Drawn	07/10/09	SD	Visa					Scale 1:2	<b>SSD Parvex</b> 8 Avenue du Lac. BP249 21007-DIJON cedex-FRANCE www.SSDdrives.com	EX600	Format	F	E	S	G	I	344550	A
	DIN ISO 2768 mK	Modifications												A3		x				
			A	AM 23304	10/12/09	SD						OUTLINE DRAWING								



**WEIGHT**

Motor	Without brake	With brake
EX820	22 kg	25 kg
EX840	28 kg	31 kg
EX860	38 kg	41 kg

**BRAKE**

Supply voltage : 24V  $\pm 10\%$   
 Static torque

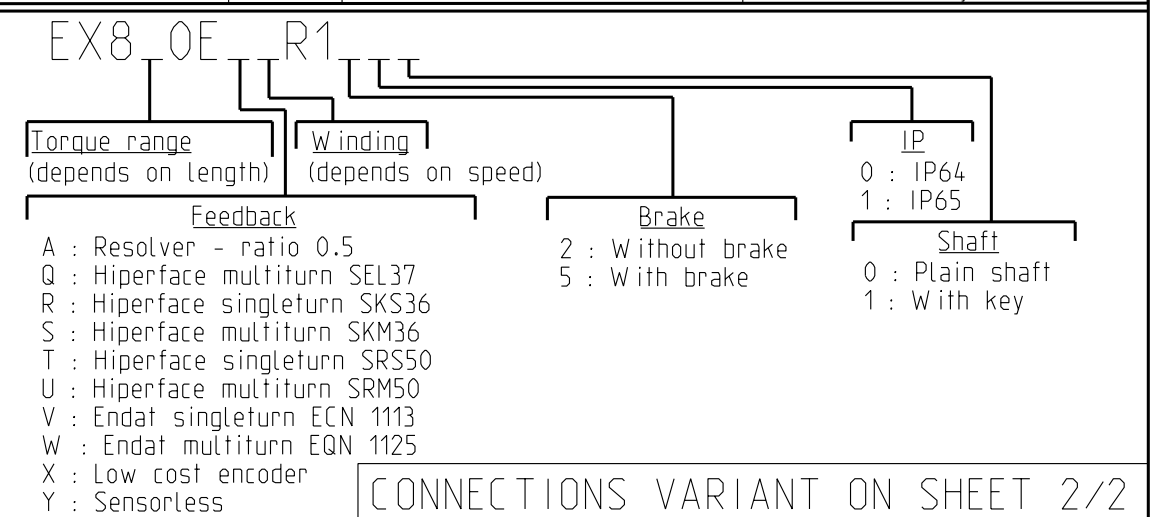
	EX820	EX840	EX860
20°C	36 Nm	36 Nm	36 Nm
100°C	32 Nm	32 Nm	32 Nm



IP Motor	IP64	IP65
Protection	II 2 G Ex d II B T4 IP64	II 2 GD Ex d II B T4 IP65 Ex tD A21 IP65 T135°C
Standards	<ul style="list-style-type: none"> <li>EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.</li> <li>EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".</li> </ul>	<ul style="list-style-type: none"> <li>EN 60079-0 : Electrical apparatus for explosive gas atmospheres. Part 0 : General requirements.</li> <li>EN 60079-1 : Electrical apparatus for explosive gas atmospheres. Part 1 : Flameproof enclosures "d".</li> <li>EN 61241-0 : Electrical apparatus for use in the presence of combustible dust. Part 0 : General requirements.</li> <li>EN 61241-1 : Electrical apparatus for use in the presence of combustible dust. Part 1 : Protection by enclosures "tD".</li> </ul>

**DIMENSIONS**

	Feedback option (feedback letter)	Resolver ratio 0.5 (A)	Low cost encoder (X)	Sensorless (Y)	Hiperface SEL37 (Q)	Hiperface SKS36 (R)	Hiperface SKM36 (S)	Hiperface SRS50 (T)	Hiperface SRM50 (U)	Endat ECN 1113 (V)	Endat EQN 1125 (W)
EX820	without brake	L (mm)	290			310		325		325	
	with brake	L (mm)	325			345		360		360	
EX840	without brake	L (mm)	350			370		385		385	
	with brake	L (mm)	385			405		420		420	
EX860	without brake	L (mm)	410			430		445		445	
	with brake	L (mm)	445			465		480		480	



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	DIN ISO 2768 mK	Modifications																	
		A	AM23304 - 10/12/09 SD																

Scale: 2:5

Parker  
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 www.SSDdrives.com

EX800

Format A3

OUTLINE DRAWING

344664

Sheet : 1/2

**Resolver connection**  
Feedback letter : A

U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake- (option)  
BR+ : Brake+ (option)  
S1 : Resolver 1  
S2 : Resolver 2  
S3 : Resolver 3  
S4 : Resolver 4  
R1 : Resolver 5  
R2 : Resolver 6  
B : Shield option (screw M4)

Scale : 2/3

**Hiperface connection**  
Feedback letter : Q/R/S/T/U

U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake- (option)  
BR+ : Brake+ (option)  
1 : Encoder Us  
2 : Encoder gnd  
3 : Encoder refSIN  
4 : Encoder refCOS  
5 : Encoder DATA +  
6 : Encoder DATA -  
7 : Encoder +SIN  
8 : Encoder +COS  
B : Shield option (screw M4)

Scale : 2/3

**Endat connection**  
Feedback letter : V/W

U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake- (option)  
BR+ : Brake+ (option)  
1 : Encoder up 5V ±5%  
2 : Encoder 0V  
3 : Encoder A+  
4 : Encoder A-  
5 : Encoder B+  
6 : Encoder B-  
7 : Encoder Data  
8 : Encoder Data\  
9 : Encoder Clock  
10 : Encoder Clock\  
B : Shield option (screw M4)

Scale : 2/3

**Low cost encoder connection**  
Feedback letter : X

U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake- (option)  
BR+ : Brake+ (option)  
1 : A  
2 : A\  
3 : B  
4 : B\  
5 : Z  
6 : Z\  
7 : 0  
8 : Vcc  
9 : U  
10 : U\  
11 : V  
12 : V\  
13 : W  
14 : W\  
B : Shield option (screw M4)

Scale : 2/3

**Sensorless connection**  
Feedback letter : Y

U : Phase U  
V : Phase V  
W : Phase W  
TH- : Thermic protector  
TH+ : Thermic protector  
BR- : Brake- (option)  
BR+ : Brake+ (option)  
B : Shield option (screw M4)

Scale : 2/3

Certification : INERIS 05ATEX0061X

ENCODER SETTINGS					
<p><b>Resolver setting</b> Feedback letter : A</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). The shift is 90° electrical.</p>	<p><b>Hiperface SEL setting</b> Feedback letter : Q</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 26.</p>	<p><b>Hiperface SKS/SKM setting</b> Feedback letter : R/S</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 205.</p>	<p><b>Hiperface SRS/SRM setting</b> Feedback letter : T/U</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 1638.</p>	<p><b>Endat setting</b> Feedback letter : V/W</p> <p>Motor powered by direct current at the current nominal value (W+ and V-). Value in encoder memory is 410.</p>	<p><b>Low cost encoder setting</b> Feedback letter : X</p> <p>Engine driven clockwise shaft end side. Switching signal V is in phase with FEM UV.</p>

Sheet : 2/2

This document is the property of PARVEX. Transmission as well as reproduction or copy is not permitted without written authorisation.	General tolerances DIN ISO 2768 mK	Drawn 14/09/09 OD Visa	Scale 2:5	<p><b>SSD Parvex</b> 8 Avenue du Lac. BP249 21007-DIJON cedex-FRANCE www.SSDdrives.com</p>	EX800 OUTLINE DRAWING	Format A3	<table border="1"> <tr> <td>F</td> <td>E</td> <td>S</td> <td>G</td> <td>I</td> </tr> <tr> <td></td> <td>x</td> <td></td> <td></td> <td></td> </tr> </table>	F	E	S	G	I		x				344664	A
	F	E	S	G	I														
	x																		

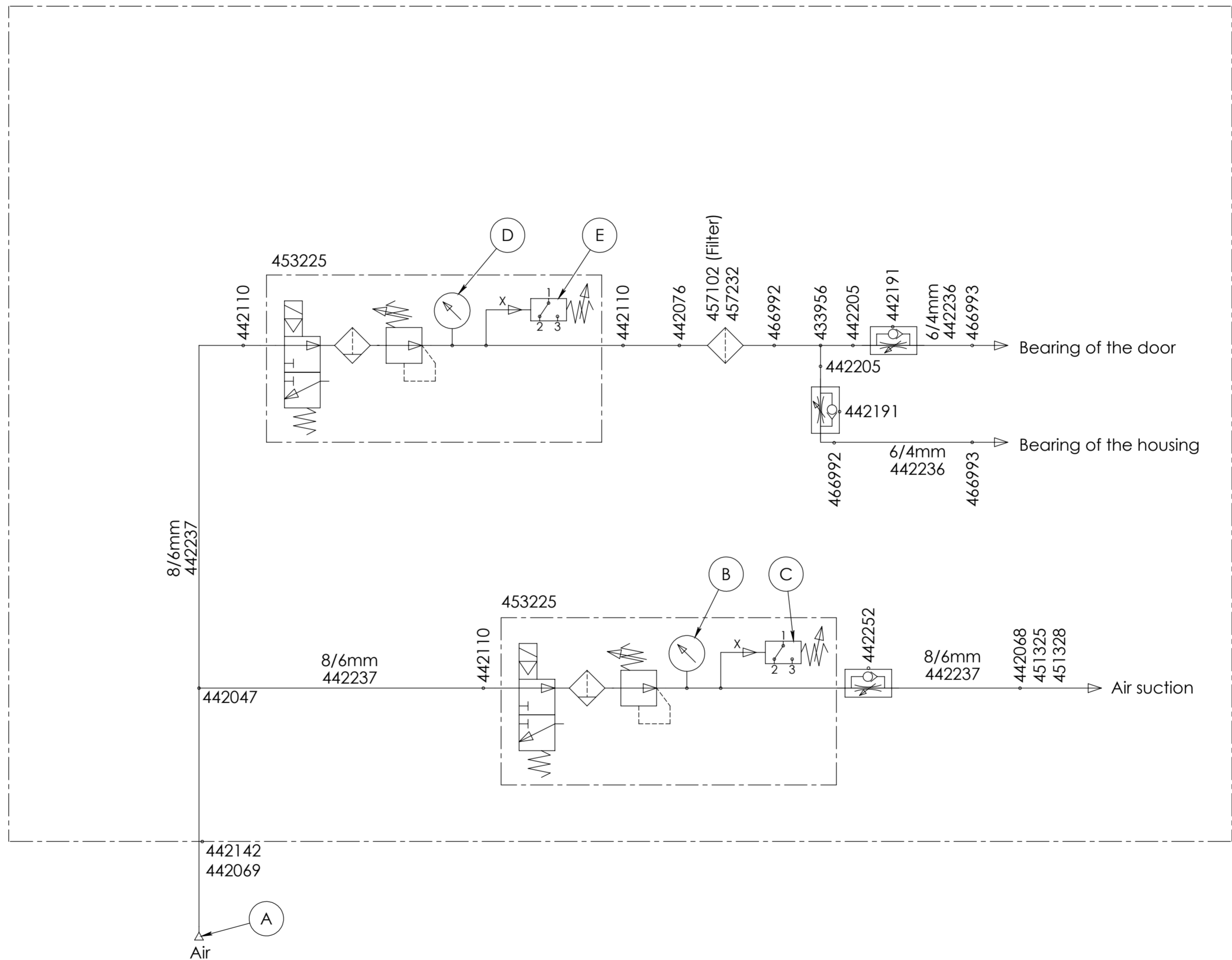


Voir documents suivants.

Siehe folgende Dokumente.

See following documents





Typ	Reference	Pressure (barg)
OscilloWitt	A	min 3 / max 6
	B	1.2
	C	1
	D	2.2
	E	min 2

scale %		Designed	31/03/2014	tgr
A2		Controlled	19/09/2014	edgu
		Revised	19/09/2014	edgu
474365-SCH		Page	1/1	Ver.
				A

Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.

FREWITT SA: Milling and Handling of Powders  
P.O.B. 615, CH-1701, Fribourg, SWITZERLAND  
tel: +41 26 460 74 00 / fax: +41 26 460 74 01  
info@frewitt.com / www.frewitt.com





**Pneumatics 474365\_A**

Article N° Artikel Nr. Article ID.	Description Beschreibung Description	Quantité Menge Quantity	Unité Einheit Unit	No Dessin Zeichnungs-Nr Drawing ID
. 442254	Cap B-1/4	2	Pce	474365
. 442142	Push-in bulkhead fitting QSSF-1/4-8-B	1	Pce	474365
. 453225	Preparation Unit non Ex, certifié UL + CSA	2	Pce	474365
. 451325	SleeveQM-1/8-1/8, 2254	1	Pce	474365
. 451328	Double nipple met. NPFB-D-2G18-M, 547800	1	Pce	474365
. 442076	Bent connector QSL-B-1/4-6-20, 130930	1	Pce	474365
. 442110	Push-in L-fitting QSL-B-1/8-8-20, 130928	3	Pce	474365
. 457102	Filter inox FDA 0.2 µm G1/4 316/316L Off.3169-10-01)	1	Pce	474365
. 457232	Clip 68-73, 1/2p-M10, V4A, Debrunner, 560.107.200	1	Pce	474365
. 466992	L-fitting CRQSL-1/4-6, 132599	2	Pce	474365
. 466993	Push-in-fitting CRQS-M5-6-I, 132329	2	Pce	474365
. 442236	Plastic tubing PUN-H 6/4, natur	3	m	474365
. 442237	Plastic pipe PUN-H-8X1.25-NT, 197378	1.5	m	474365
. 433956	T-connection 1/4 stainless steel	1	Pce	474365
. 442047	Push-in Y-connector QSY-B-8-20, 130957	1	Pce	474365
. 442068	Connection QS-B-1/8-8-20, 130916	1	Pce	474365
. 442069	Connection QS-B-1/4-8-20, 130919	1	Pce	474365
. 442191	Flow control valve	2	Pce	474365
. 442205	Push-in L-fitting CRQSL-1/4-8, 162874	2	Pce	474365
. 442252	One-way flow control valve GRLA-1/4-QS-8-RS-B, 162968	1	Pce	474365



# CERTIFICATES





We declare that the security and design of the equipment described below are conform to the requirements of following European directives:

**Machinery Directive :** 2006/42/CE  
**ATEX :** 94/9/CE

**Additional safety indications:**  
 Additional information for EEx-Machines Special conditions « X »

**Manufacturer :** Frewitt fabrique de machines S.A., route du Coteau 7, CH-1763 Granges-Paccot

**Organisme notifié :** LCIE, Avenue du Général Leclerc 33, F-92260 Fontenay-aux-Roses  
 Notified Body's identification Nr : 0081  
 EC type examination Nr : SNCH 03 ATEX 3486 X (mecanic)

**Notified Body :** Electrosuisse, Luppmenstrasse 1, CH-8320 Fehraltdorf  
 Notified Body's identification Nr : 1258  
 Quality assurance of production Nr : SEV 09 ATEX 4137  
 EC type examination Nr : SEV 06 ATEX 0133 (electric)

<b>Description :</b>	Oscillating mill	<b>Type :</b>	OscilloWitt-3
<b>Year of manufacture :</b>	2014	<b>Serial Nr :</b>	140055-254
<b>ATEX certification :</b>	int.		1258
	ext.		
		II	1 G c IIB T4 X 1 D c IIIC T125°C X
		II	3 D c Ex tD IIIC T125°C X



The following technical standards have been applied in order to implement the basic health and safety requirements mentioned in the EC directives in an appropriate manne :

<b>General principles of construction</b>	EN ISO 12100
<b>Safety distance</b>	EN ISO 13857
<b>Design and ordering system</b>	EN ISO 13849-1
<b>Prevention / protection of the explosion</b>	EN 1127-1
<b>Non-electrical equipment:</b>	
general requirements	EN 13463-1
protection construction "c"	EN 13463-5

Any alteration or inappropriate uses of this equipment makes this declaration invalid.

**Chief executive officer (CEO)**  
 Antoine Virdis

**Technical department**  
 Olivier Bianchi / Yves Grossrieder

Granges-Paccot

10.04.2014



<b>Relevé de contrôle EN 10204-2.2 pour les matériaux des pièces utilisées.</b>	<b>Werkzeugnis EN 10204-2.2 für die Werkstoffe der produktberührenden Teile.</b>	<b>Test report EN 10204-2.2 for material of product contact parts</b>
---	--	---

Nous certifions que les parties en contact avec le produit des pièces utilisés sont, soit en:

Hiermit bestätigen wir, dass die produktberührten Teile der obengenannten Zerkleinerungsmaschine aus folgenden Werkstoffen hergestellt sind:

We certify herewith that the used parts of above-mentioned device are made of:

**Acier inoxydable:**

**Rostfreier Stahl:**

**Stainless steels:**

<b>AISI</b>
316 / 316L

**Joints (conforme FDA) :**

**Dichtungen (FDA-konform) :**

**Seals (FDA conform) :**

Ecorubber (EPDM)
EPDM
Gylon, blanc (PTFE)
Novaflon
Silicone

Ecorubber (EPDM)
EPDM
Gylon, weiss (PTFE)
Novaflon
Silikon

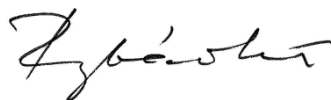
Ecorubber (EPDM)
EPDM
Gylon, white (PTFE)
Novaflon
Silicone

En outre, nous certifions qu'aucun élément d'amiante n'a été utilisé dans nos machines.

Desweiteren bestätigen wir, dass in unserer Anlage keine asbesthaltigen Teile enthalten sind.

Furthermore, we certify that no asbestos material has been used for manufacturing the machine.

**Frewitt Fabrique de Machines SA**



**R. Rybarikova**  
 Documentaliste  
 Dokumentalist  
 Documentalist



Voir documents suivants.

Siehe folgende Dokumente.

See following documents





August 26, 2005

Dr. Luciana Husfeld  
KLUBER LUBRICATION MUNCHEN KG.  
GEISENHAUSENER STR. 7  
81379 MÜNCHEN  
GERMANY

RE: Kluberpaste® UH1 84-201  
Category Code: H1  
NSF Registration No. 136305

Dear Dr. Luciana Husfeld:

NSF has processed the application for Registration of **Kluberpaste® UH1 84-201** to the NSF Registration Guidelines for Proprietary Substances and Nonfood Compounds (2004), which are available at <http://www.nsf.org>. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements including FDA 21 CFR for appropriate use, ingredient and labeling.

**This product is acceptable as a lubricant with incidental food contact (H1) for use in and around food processing areas. Such compounds may be used on food processing equipment as a protective anti-rust film, as a release agent on gaskets or seals of tank closures, and as a lubricant for machine parts and equipment in locations in which there is a potential exposure of the lubricated part to food. The amount used should be the minimum required to accomplish the desired technical effect on the equipment. If used as an anti-rust film, the compound must be removed from the equipment surface by washing or wiping, as required to leave the surface effectively free of any substance which could be transferred to food being processed.**

NSF Registration of this product is current when the NSF Registration Number, Category Code, and Registration Mark appear on the NSF-approved product label, and the registered product name is included in the current NSF White Book Listing of Nonfood Compounds at the NSF website (<http://www.nsf.org>). The NSF Registration Mark can be downloaded from the NSF website, at [http://www.nsf.org/business/about\\_NSF/nsf\\_marks\\_download.asp](http://www.nsf.org/business/about_NSF/nsf_marks_download.asp).

NSF Listing of all registered Nonfood compounds by NSF International is not an endorsement of those compounds, or of any performance or efficacy claims made by the manufacturer.

Registration status may be verified at any time via the NSF web site, at <http://www.nsf.org>. Changes in formulation or label, without the prior written consent of NSF, will void registration, and will supersede the on-line listing.

Sincerely,

A handwritten signature in black ink, appearing to read 'Carmen Grindatti'.

Carmen Grindatti  
NSF Nonfood Compounds Registration Program

Company No: N04391





## Material Safety Data Sheet

### According to 91/155 EEC

Printing date 27.04.2006

Reviewed on 25.04.2006







#### 1 Identification of the substance/preparation and of the company/undertaking

- **Product details**
- **Trade name:** Klüberpaste UH1 84-201
- **Article number:** 005113
- **Application of the substance / the preparation** Lubricant
- **Manufacturer/Supplier:**  
 KLÜBER LUBRICATION MÜNCHEN KG  
 Geisenhausenerstrasse 7  
 D-81379 München  
 Tel.: 0049 (0) 897876-0  
 Fax: 0049 (0) 897876-333
- **Further information obtainable from:** Material Compliance Management
- **Information in case of emergency:** 0011 49 89 7876 700 (24 hrs)

#### 2 Composition/information on ingredients

- **Chemical characterization**
- **Description:**  
 Synthetic hydrocarbon oil  
 solid lubricant  
 PTFE

- **Dangerous components:**

	amine neutralized phosphoric acid ester of alkylated alcohols  Xi,  N; R 36/38-51/53	0.25-1%
CAS: 95-38-5 EINECS: 204-414-9	2-(2-heptadec-8-enyl-2-imidazolin-1-yl)ethanol  C,  N; R 22-34-50/53	0.25-1%
	Amine carboxylic acid compound  Xi,  N; R 38-41-50	0.25-1%

- **Additional information:** For the wording of the listed risk phrases refer to section 16.

#### 3 Hazards identification

- **Hazard description:** Not applicable.
- **Information concerning particular hazards for human and environment:**  
 The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.  
 R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- **Classification system:**  
 The classification is according to the latest editions of the EU-lists, and extended by company and literature data.

#### 4 First-aid measures

- **After inhalation:** Supply fresh air; consult doctor in case of complaints.
- **After skin contact:** Wash off with soap and plenty of water.

(Contd. on page 2)

# Material Safety Data Sheet

## According to 91/155 EEC

Printing date 27.04.2006

Reviewed on 25.04.2006

Trade name: Klüberpaste UH1 84-201

(Contd. of page 1)

- **After eye contact:**  
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
- **After swallowing:** If symptoms persist consult doctor.

### 5 Fire-fighting measures

- **Suitable extinguishing agents:**  
Water haze  
Foam  
Fire-extinguishing powder  
Carbon dioxide
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards caused by the substance, its products of combustion or resulting gases:**  
In case of fire, the following can be released:  
Carbon monoxide (CO)  
Hydrocarbons  
traces of fluorinated products
- **Protective equipment:**  
Do not inhale explosion gases or combustion gases.  
Standard procedure for chemical fires.
- **Additional information**  
Cool endangered receptacles with water spray.  
Dispose of fire debris and contaminated fire fighting water in accordance with official regulations.

### 6 Accidental release measures

- **Person-related safety precautions:** Not required.
- **Measures for environmental protection:** Do not allow to enter sewers/ surface or ground water.
- **Measures for cleaning/collecting:**  
Pick up mechanically.  
Dispose of the material collected according to regulations.

### 7 Handling and storage

- **Handling:**
- **Information for safe handling:** No special measures required.
- **Information about fire - and explosion protection:** No special measures required.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**  
Store in cool, dry conditions in well sealed receptacles.
- **Information about storage in one common storage facility:**  
Store away from foodstuffs.  
Store away from oxidizing agents.
- **Further information about storage conditions:** None.

### 8 Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.
- **Ingredients with limit values that require monitoring at the workplace:**  
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
- **Additional information:** The lists valid during the making were used as basis.

(Contd. on page 3)

# Material Safety Data Sheet

## According to 91/155 EEC

Printing date 27.04.2006

Reviewed on 25.04.2006

Trade name: Klüberpaste UH1 84-201

(Contd. of page 2)

- **Personal protective equipment:**
- **General protective and hygienic measures:**  
Immediately remove all soiled and contaminated clothing  
Avoid close or long term contact with the skin.  
Be sure to clean skin thoroughly after work and before breaks.  
Keep away from tobacco products.
- **Respiratory protection:** Not required.
- **Protection of hands:** Preventive skin protection by use of skin-protecting agents is recommended.
- **Eye protection:** Not required.

### 9 Physical and chemical properties

#### · General Information

**Form:** Pasty  
**Colour:** White  
**Odour:** Product specific

#### · Change in condition

**Drip point:** > 240°C (DIN ISO 2176)

· **Flash point:** not applicable

· **Danger of explosion:** Product does not present an explosion hazard.

· **Density at 20°C:** 1.13 g/cm<sup>3</sup>

· **Solubility in / Miscibility with water:** Insoluble.

### 10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:**  
No decomposition if used and stored according to specifications.
- **Materials to be avoided:** oxidizing agents
- **Dangerous reactions** No dangerous reactions known.
- **Dangerous decomposition products:** > 280°C danger of forming toxic pyrolysis products.

### 11 Toxicological information

- **Additional toxicological information:**  
Prolonged skin contact may cause skin irritation and/or dermatitis.

### 12 Ecological information

- **Ecotoxicological effects:**
- **Behaviour in sewage processing plants:** The product can be mechanically separated.
- **General notes:**  
Harmful to aquatic organisms  
Do not allow product to reach ground water, water course or sewage system.

### 13 Disposal considerations

- **Product:**
- **Recommendation** Can be incinerated in accordance with local and national regulations.

(Contd. on page 4)

# Material Safety Data Sheet

## According to 91/155 EEC

Printing date 27.04.2006

Reviewed on 25.04.2006

Trade name: Klüberpaste UH1 84-201

(Contd. of page 3)

- **Waste disposal key:**  
For this product no waste disposal key according the European Waste Catalogue (EWC) can be determined, as only the purpose of application defined by the user enables an allocation. The waste code number has to be determined in accordance with the local waste disposer.
- **Uncleaned packaging:**
- **Recommendation:**  
Empty contaminated packagings thoroughly. They may be recycled after thorough and proper cleaning.

### 14 Transport information

- **Land transport ADR/RID (cross-border)**
- **ADR/RID class:** -
- **Maritime transport IMDG:**
- **IMDG Class:** -
- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** -
- **Transport/Additional information:**  
Not classified as dangerous according to the above specifications.

### 15 Regulatory information

- **Labelling according to EU guidelines:**  
The product has been classified and marked in accordance with EU Directives / Ordinance on Hazardous Materials.
- **Risk phrases:**  
52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- **Safety phrases:**  
61 Avoid release to the environment. Refer to special instructions/safety data sheets.

### 16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Relevant R-phrases**
  - 22 Harmful if swallowed.
  - 34 Causes burns.
  - 36/38 Irritating to eyes and skin.
  - 38 Irritating to skin.
  - 41 Risk of serious damage to eyes.
  - 50 Very toxic to aquatic organisms.
  - 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
  - 51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- **Department issuing MSDS:** Material Compliance Management
- **Contact:** +49(0)897876-1564
- **\* Data compared to the previous version altered.**



## NSF International / Nonfood Compounds Registration Program

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Nonfood Compounds  
Program Listed

February 18, 2013

Dr. Luciana Husfeld  
Klüber Lubrication München SE & Co. KG  
Geisenhausenerstrasse 7  
D-81379 Munich  
Germany

RE: PARALIQ® GTE 703  
Category Code: H1  
NSF Registration No. 056372

Dear Dr. Luciana Husfeld:

NSF has processed the application for Registration of **PARALIQ® GTE 703** to the NSF International Registration Guidelines for Proprietary Substances and Nonfood Compounds (2009), which are available at [www.nsfwhitebook.org](http://www.nsfwhitebook.org). The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements including FDA 21 CFR for appropriate use, ingredient and labeling review.

**This product is acceptable as a lubricant with incidental food contact (H1) for use in and around food processing areas. Such compounds may be used on food processing equipment as a protective anti-rust film, as a release agent on gaskets or seals of tank closures, and as a lubricant for machine parts and equipment in locations in which there is a potential exposure of the lubricated part to food. The amount used should be the minimum required to accomplish the desired technical effect on the equipment. If used as an anti-rust film, the compound must be removed from the equipment surface by washing or wiping, as required to leave the surface effectively free of any substance which could be transferred to food being processed.**

NSF Registration of this product is current when the NSF Registration Number, Category Code, and Registration Mark appear on the NSF-approved product label, and the Registered product name is included in the current NSF White Book Listing of Nonfood Compounds at the NSF website ([www.nsfwhitebook.org](http://www.nsfwhitebook.org)). The NSF Registration Mark can be downloaded by clicking the "Download Registration Mark" link on the NSF website ([www.nsfwhitebook.org](http://www.nsfwhitebook.org)).

NSF Listing of all Registered Nonfood compounds by NSF International is not an endorsement of those compounds, or of any performance or efficacy claims made by the manufacturer.

Registration status may be verified at any time via the NSF website, at [www.nsfwhitebook.org](http://www.nsfwhitebook.org). Changes in formulation or label, without the prior written consent of NSF, will void Registration, and will supersede the on-line listing.

Sincerely,

A handwritten signature in black ink, appearing to read "Amanda Phelka".

Amanda Phelka  
NSF Nonfood Compounds Registration Program

Company No: N04391



## Description

PARALIQ GTE 703 is a special lubricating grease based on silicone oil and PTFE.

The product complies with the German food regulations and meets the requirements set forth in the "Guidelines of sec. 21 CFR 178.3570 of FDA regulations". It is a USDA H1-registered product.

PARALIQ GTE 703 is also registered according to NSF 51 and NSF 61.

PARALIQ GTE 703 is resistant to hot and cold water, disinfectants, cleaning agents and steam.

When applied properly, it does not impair the formation of froth or the taste of beer.

The German testing laboratory for beverage dispensing taps in Gräfelfing, Germany, confirmed that PARALIQ GTE 703 meets all requirements for a sealing grease in dispensing units.

## Application

PARALIQ GTE 703 is a special grease suitable for beer taps, barrel filling installations and valves.

It can be used for the lubrication of seals in the beverage industry whenever a H1 food-grade lubricating grease compatible with EPDM is required.

## Application notes

PARALIQ GTE 703 can be applied by spatula, grease gun or directly from the tube.

The lubrication technique for highly viscous lubricants should be chosen with great care: in the system used the intake of air should be avoided since otherwise the high pressures lead to oxidation and consequently decomposition of the product.

For this reason we recommend pumping the product with the lowest pressure possible. It may make sense to contact the manufacturer of the application equipment used.

As a general rule, users should make sure to use only new high-pressure pumping lines in their lubrication equipment.

As a precaution against grease leaking from lines we recommend wearing suitable protection gear (e.g. protective goggles).

## Compatibility with materials

According to our current knowledge PARALIQ GTE 703 is compatible with EPDM, NBR and FPM.

Owing to the many different elastomer and plastic compositions their compatibility has to be checked at the elastomer manufacturer prior to series applications.

## PARALIQ GTE 703

- Registered as NSF 51 and NSF 61
- USDA H1
- Neutral towards EPDM
- Free of mineral oil
- Neutral towards beer froth
- Resistant to many disinfectants and cleaning agents
- Resistant to hot and cold water
- Steam resistant

## Minimum shelf life

The minimum shelf life is approx. 36 months when stored in the closed original container in a dry place.

## Pack sizes

25 x 60	g	tubes
750	g	cans
600	g	cartridges
25	kg	buckets

# PARALIQ® GTE 703

Synthetic lubricating grease for valves & fittings with EPDM seals

## Product data

Colour	white
Texture	homogeneous
Density, at 20 °C, g/cm <sup>3</sup> , approx.	1.31
Worked penetration at 25 °C, DIN ISO 2137, 0.1 mm	220-250
Apparent dynamic viscosity, viscosity grade**	S
Service temperature range*, °C	-50 to 150

\* Service temperatures are guide values which depend on the lubricant's composition, the intended use and the application method. Lubricants change their consistency, apparent dynamic viscosity or viscosity depending on the mechano-dynamical loads, time, pressure and temperature. These changes in product characteristics may affect the function of a component.

\*\* Klüber viscosity grades: EL = extra light lubricating grease; L = light lubricating grease; M = medium lubricating grease S = heavy lubricating grease; ES = extra heavy lubricating grease

The data in this product information is based on our general experience and knowledge at the time of printing and is intended to give information of possible applications to a reader with technical experience. It constitutes neither an assurance of product properties nor does it release the user from the obligation of performing preliminary tests with the selected product. We recommend contacting our Technical Consulting Staff to discuss your specific application. If required and possible we will be pleased to provide a sample for testing. Klüber products are continually improved. Therefore, Klüber Lubrication reserves the right to change all the technical data in this product information at any time without notice.



Klüber Lubrication München KG, a member of the Freudenberg group

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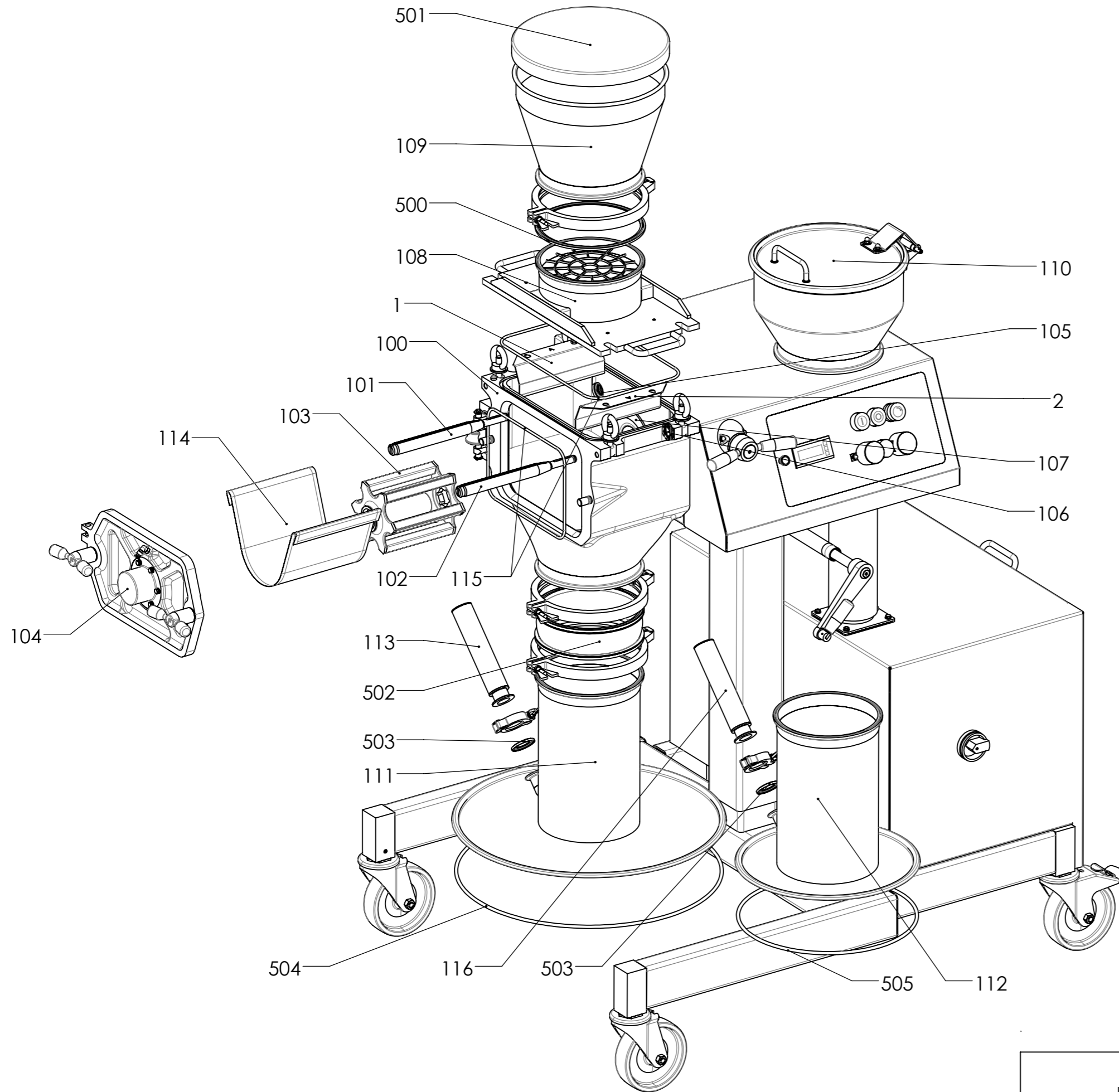


Voir documents suivants.

Siehe folgende Dokumente.

See following documents





Pos.	Item number	Control drawing	Materials certificates EN-10204-3.1B FDA	Surface quality certificates
1	440334	474201-CMA	X	X
2	440334		X	X
100	460090	460090-CMA	X	X
101	462358	462358-CMA	X	X
102	462358		X	X
103	443474	443474-CMA	X	X
104	464645	464645-CMA	X	X
105	473992	473992-CMA	X	0
106	473992		X	0
107	455814	455814-CMA	X	X
108	466518	466518-CMA	X	X
109	474202	474202-CMA	X	X
110	471380	471380-CMA	X	X
111	474209	474209-CMA	X	X
112	475517	475517-CMA	X	X
113	463739	463739-CMA	X	0
114	463931	463931-CMA	X	0
115	462019	462019-CMA	X	0
116	463739	463739-CMA	X	0
500	423856	---	X	0
501	443387	---	X	0
502	428631	---	X	0
503	410119	---	X	0
504	464435	---	X	0
505	412913	---	X	0

X = delivered  
0 = undelivered

PRO-14-0055 / OscilloWitt-3		scale %	Designed	01/04/2014	tgr
			Controlled	16/09/2014	edgu
		A3	Revised	16/09/2014	edgu
<small>Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.</small> <small>Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com</small>		474201-CMA		Page	Ver.
				1/1	A



**N° Série:**

**Serien-Nr.**  
140055-254

**Serial Nr.**

REF: **474201-CMA**

Appareil de mesure / Messapparat / Measurin unit :

Niton XL2 800

N° série / Serien-Nr. / Serial Nr. :

73651

N° certificat / Zertifikat-Nr. / Certificate Nr. :

35JN-10182010-IARM-P

**Pos. 1**      440334      Dessin / Zeichnung / Drawing : 474201-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.00	0.02	0.00	0.00	0.00	2.06	0.03	0.00	0.01	0.01	0.00	0.04	0.09	0.30	10.57	0.07	69.49	0.81	16.39	0.11	0.01

**Pos. 2**      440334      Dessin / Zeichnung / Drawing : 474201-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.01	0.01	0.00	0.00	0.00	2.11	0.02	0.00	0.01	0.03	0.00	0.12	0.03	0.29	10.37	0.16	69.36	0.69	16.71	0.10	0.00

**Pos. 100**      460090      Dessin / Zeichnung / Drawing : 460090-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.00	0.00	0.01	0.00	0.01	2.35	0.00	0.00	0.00	0.03	0.00	0.04	0.05	0.25	10.08	0.05	67.76	0.67	18.59	0.09	0.03
2	316/316L	0.00	0.01	0.02	0.01	0.00	0.00	1.99	0.00	0.00	0.00	0.03	0.00	0.09	0.19	0.36	10.41	0.02	69.42	0.57	17.76	0.10	0.03

**Pos. 101**      462358      Dessin / Zeichnung / Drawing : 462358-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.00	0.01	0.00	0.00	0.00	2.20	0.04	0.00	0.01	0.02	0.00	0.04	0.08	0.40	10.18	0.08	68.54	1.57	16.74	0.06	0.02

**Pos. 102**      462358      Dessin / Zeichnung / Drawing : 462358-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.02	0.03	0.00	0.00	0.00	2.08	0.06	0.00	0.01	0.01	0.01	0.00	0.11	0.53	10.03	0.00	68.95	0.70	17.44	0.04	0.00

**Pos. 103**      443474      Dessin / Zeichnung / Drawing : 443474-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.00	0.02	0.00	0.00	0.00	2.26	0.00	0.00	0.01	0.00	0.00	0.00	0.07	0.35	10.92	0.22	68.44	1.55	16.07	0.09	0.00
2	316Ti	0.00	0.00	0.01	0.01	0.01	0.00	2.05	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.27	11.09	0.37	67.67	1.31	16.83	0.08	0.25
3	316/316L	0.00	0.00	0.00	0.00	0.00	0.01	2.33	0.00	0.00	0.02	0.02	0.00	0.01	0.12	0.37	10.82	0.33	68.21	1.36	16.30	0.09	0.00

**Pos. 104**      464645      Dessin / Zeichnung / Drawing : 464645-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.01	0.01	0.00	0.00	0.01	2.35	0.03	0.01	0.00	0.03	0.00	0.00	0.07	0.27	9.54	0.20	68.45	0.25	18.73	0.06	0.00
2	316/316L	0.00	0.01	0.01	0.00	0.00	0.00	2.05	0.00	0.00	0.02	0.01	0.00	0.10	0.05	0.47	10.23	0.21	68.54	1.30	16.93	0.07	0.00
3	316/316L	0.00	0.01	0.02	0.00	0.00	0.00	2.08	0.03	0.00	0.01	0.01	0.00	0.08	0.06	0.33	9.85	0.40	68.53	1.52	17.00	0.10	0.00

**Pos. 100**      459777      Dessin / Zeichnung / Drawing : 459777-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316Ti	0.00	0.01	0.01	0.01	0.00	0.01	2.08	0.04	0.02	0.00	0.02	0.00	0.00	0.10	0.26	10.96	0.01	67.61	1.61	16.91	0.08	0.27

Pos. 500      Dessin / Zeichnung / Drawing : 459777-CMA

Mesure/Pos. N° Mass/Pos. Nr. Measure/Pos Nr.	Matière Material Material	Article Artikel Article	Certificat FDA N° FDA Zertifikat Nr. FDA certificate No :
500	<b>Gylon</b>	459777	137866

**Pos.500**      Dessin / Zeichnung / Drawing : 464645-CMA

Mesure/Pos. N° Mass/Pos. Nr. Measure/Pos Nr.	Matière Material Material	Article Artikel Article	Certificat FDA N° FDA Zertifikat Nr. FDA certificate No :
500	<b>Novafon</b>	452638	42422

**Pos. 105**      473992    Dessin / Zeichnung / Drawing : 473992-CMA  
 Pos.500

Mesure/Pos. N° Mass/Pos. Nr. Measure/Pos Nr.	Matière Material Material	Article Artikel Article	Certificat FDA N° FDA Zertifikat Nr. FDA certificate No :
500	Ecorubber	475705	49621

**Pos. 106**      473992    Dessin / Zeichnung / Drawing : 473992-CMA  
 Pos.500

Mesure/Pos. N° Mass/Pos. Nr. Measure/Pos Nr.	Matière Material Material	Article Artikel Article	Certificat FDA N° FDA Zertifikat Nr. FDA certificate No :
500	Ecorubber	475705	49621

**Pos. 107**      455814    Dessin / Zeichnung / Drawing : 455814-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.01	0.02	0.00	0.00	0.00	2.05	0.03	0.00	0.00	0.02	0.00	0.08	0.04	0.42	9.78	0.06	68.14	1.68	17.57	0.10	0.01
2	316/316L	0.00	0.00	0.02	0.01	0.00	0.00	2.10	0.01	0.00	0.00	0.01	0.00	0.07	0.03	0.42	10.30	0.08	68.49	1.65	16.72	0.09	0.00

**Pos. 100**      459777    Dessin / Zeichnung / Drawing : 459777-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316Ti	0.00	0.00	0.01	0.01	0.00	0.01	2.03	0.01	0.00	0.01	0.03	0.00	0.00	0.05	0.36	10.70	0.07	67.61	1.84	16.90	0.09	0.27

Pos. 500      Dessin / Zeichnung / Drawing : 459777-CMA

Mesure/Pos. N° Mass/Pos. Nr. Measure/Pos Nr.	Matière Material Material	Article Artikel Article	Certificat FDA N° FDA Zertifikat Nr. FDA certificate No :
500	Gylon	459777	137866

**Pos.500**      Dessin / Zeichnung / Drawing : 455814-CMA

Mesure/Pos. N° Mass/Pos. Nr. Measure/Pos Nr.	Matière Material Material	Article Artikel Article	Certificat FDA N° FDA Zertifikat Nr. FDA certificate No :
500	Novafion	452638	42422

**Pos. 108**      466518    Dessin / Zeichnung / Drawing : 466518-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.01	0.02	0.00	0.00	0.00	2.26	0.00	0.01	0.01	0.01	0.00	0.11	0.06	0.41	10.65	0.26	68.63	1.41	17.10	0.07	0.00
2	316/316L	0.00	0.01	0.01	0.00	0.00	0.00	2.09	0.00	0.00	0.01	0.02	0.00	0.03	0.05	0.42	10.47	0.46	67.93	1.28	17.16	0.05	0.00
3	316/316L	0.00	0.00	0.02	0.00	0.01	0.01	2.78	0.06	0.00	0.00	0.03	0.00	0.21	0.23	0.35	9.90	0.47	67.24	1.05	17.46	0.11	0.06
4	316Ti	0.00	0.03	0.02	0.05	0.01	0.00	2.15	0.30	0.10	0.03	0.04	0.00	0.13	0.18	0.26	9.77	0.30	68.17	1.30	16.88	0.13	0.17
5	316/316L	0.00	0.01	0.00	0.00	0.00	0.00	2.14	0.00	0.01	0.01	0.02	0.00	0.08	0.07	0.39	10.27	0.20	69.10	0.99	16.61	0.10	0.00

**Pos. 109**      474202    Dessin / Zeichnung / Drawing : 474202-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.02	0.01	0.00	0.00	0.00	2.18	0.02	0.01	0.00	0.01	0.00	0.04	0.06	0.30	10.54	0.16	69.08	0.95	16.55	0.07	0.02
2	316/316L	0.00	0.00	0.02	0.00	0.00	0.00	2.58	0.02	0.01	0.00	0.00	0.00	0.02	0.08	0.31	10.74	0.09	67.95	1.13	16.98	0.06	0.01
3	316/316L	0.00	0.00	0.00	0.00	0.00	0.00	2.65	0.01	0.00	0.01	0.01	0.00	0.07	0.10	0.31	12.18	0.31	64.56	1.52	18.17	0.11	0.00

**Pos. 110**      471380    Dessin / Zeichnung / Drawing : 471380-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.01	0.02	0.00	0.00	0.00	2.04	0.04	0.01	0.01	0.01	0.00	0.11	0.04	0.46	10.12	0.26	67.79	1.78	17.21	0.07	0.00
2	316/316L	0.00	0.00	0.02	0.00	0.00	0.01	2.11	0.02	0.00	0.01	0.00	0.01	0.00	0.06	0.31	10.40	0.40	67.50	1.78	17.31	0.06	0.02
3	316/316L	0.00	0.00	0.01	0.00	0.00	0.00	2.14	0.02	0.01	0.00	0.01	0.00	0.05	0.07	0.40	10.50	0.17	69.07	0.88	16.60	0.08	0.00

**Pos.500**      Dessin / Zeichnung / Drawing : 471380-CMA

Mesure/Pos. N° Mass/Pos. Nr. Measure/Pos Nr.	Matière Material Material	Article Artikel Article	Certificat FDA N° FDA Zertifikat Nr. FDA certificate No :
500	Silicone	407112	136549

**Pos. 111**      474209      Dessin / Zeichnung / Drawing : 474209-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.01	0.02	0.00	0.00	0.00	2.10	0.00	0.00	0.00	0.02	0.00	0.00	0.14	0.47	9.87	0.33	68.06	0.59	18.27	0.10	0.03
2	316/316L	0.00	0.02	0.02	0.01	0.00	0.00	2.66	0.03	0.00	0.00	0.02	0.00	0.08	0.05	0.41	10.89	0.32	67.29	1.22	16.89	0.09	0.00
3	316/316L	0.00	0.00	0.02	0.00	0.00	0.00	2.01	0.03	0.00	0.01	0.03	0.00	0.05	0.04	0.37	10.11	0.41	68.82	1.08	16.90	0.10	0.01
4	316/316L	0.00	0.01	0.01	0.00	0.00	0.00	2.66	0.02	0.00	0.01	0.03	0.00	0.00	0.10	0.29	13.25	0.18	64.75	1.57	17.04	0.07	0.00
5	316/316L	0.00	0.00	0.00	0.00	0.00	0.00	2.07	0.01	0.00	0.01	0.01	0.00	0.00	0.20	0.11	10.21	0.33	69.34	1.51	16.82	0.08	0.00

**Pos. 112**      475517      Dessin / Zeichnung / Drawing : 475517-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.00	0.00	0.00	0.00	0.00	2.18	0.00	0.00	0.00	0.03	0.00	0.02	0.07	0.28	10.16	0.20	70.68	0.60	16.87	0.09	0.00
2	316/316L	0.00	0.00	0.02	0.01	0.00	0.01	2.62	0.02	0.01	0.00	0.04	0.00	0.08	0.07	0.25	10.77	0.15	68.05	1.24	16.58	0.08	0.01
3	316/316L	0.00	0.00	0.01	0.00	0.00	0.01	2.05	0.02	0.01	0.01	0.04	0.00	0.16	0.07	0.32	9.99	0.02	69.13	1.19	16.89	0.06	0.02
4	316/316L	0.00	0.00	0.01	0.01	0.00	0.01	2.74	0.00	0.00	0.01	0.02	0.00	0.03	0.04	0.32	13.94	0.19	64.89	1.70	16.04	0.06	0.00
5	316/316L	0.00	0.00	0.00	0.00	0.00	0.00	2.03	0.00	0.00	0.01	0.01	0.00	0.06	0.06	0.00	10.44	0.16	69.13	0.98	17.04	0.05	0.00

**Pos. 113**      463739      Dessin / Zeichnung / Drawing : 463739-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.01	0.00	0.00	0.00	0.00	2.56	0.03	0.01	0.02	0.01	0.00	0.00	0.13	0.50	13.38	0.00	65.29	0.98	16.98	0.06	0.02
2	316/316L	0.00	0.00	0.01	0.00	0.01	0.00	2.05	0.03	0.00	0.00	0.02	0.00	0.08	0.08	0.40	9.89	0.44	68.70	1.41	16.78	0.09	0.00
3	316/316L	0.00	0.01	0.02	0.00	0.00	0.00	2.49	0.02	0.00	0.00	0.01	0.00	0.00	0.07	0.35	12.04	0.53	68.58	1.03	16.71	0.10	0.04

**Pos. 114**      463931      Dessin / Zeichnung / Drawing : 463931-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.00	0.02	0.00	0.00	0.00	2.24	0.02	0.00	0.02	0.01	0.00	0.17	0.11	0.44	11.23	0.23	68.57	0.97	16.85	0.14	0.00

**Pos. 115**      Dessin / Zeichnung / Drawing : 462019-CMA

Mesure/Pos. N° Mass/Pos. Nr. Measure/Pos Nr.	Matière Material Material	Article Artikel Article	Certificat FDA N° FDA Zertifikat Nr. FDA certificate No :
500	EPDM	451236	165274
501	EPDM	451418	165274
502	EPDM	423856	56867

**Pos. 116**      463739      Dessin / Zeichnung / Drawing : 463739-CMA

Mesure N° Mass Nr. Measure Nr.	Matière Material Material	%																					
		Al	Sb	Sn	Cd	Pd	Ag	Mo	Nb	Zr	Bi	Pb	Se	W	Zn	Cu	Ni	Co	Fe	Mn	Cr	V	Ti
1	316/316L	0.00	0.00	0.01	0.01	0.00	0.01	2.60	0.04	0.01	0.01	0.01	0.00	0.10	0.06	0.35	14.05	0.36	64.00	1.83	16.51	0.06	0.00
2	316/316L	0.00	0.01	0.01	0.01	0.00	0.00	2.06	0.03	0.00	0.01	0.02	0.00	0.05	0.04	0.41	9.93	0.49	68.54	1.50	16.83	0.08	0.00
3	316/316L	0.00	0.02	0.02	0.00	0.00	0.01	2.42	0.01	0.00	0.00	0.02	0.00	0.05	0.12	0.39	11.23	0.11	67.60	0.71	17.15	0.11	0.03

**Pos. 500-505**      Dessin / Zeichnung / Drawing : 474201-CMA

Mesure/Pos. N° Mass/Pos. Nr. Measure/Pos Nr.	Matière Material Material	Article Artikel Article	Certificat FDA N° FDA Zertifikat Nr. FDA certificate No :
500	EPDM	423856	56867
501	EPDM	443387	48620
502	EPDM	428631	17683
503	Silicone	410119	56867
504	Silicone	464435	136549
505	Silicone	412913	36592

**Protocole établi par (visa)**  
**Protokoll erstellt von (visa)**  
**Report established by (visa)**

H.REY

**le**  
**am**      16.09.2014  
**on**





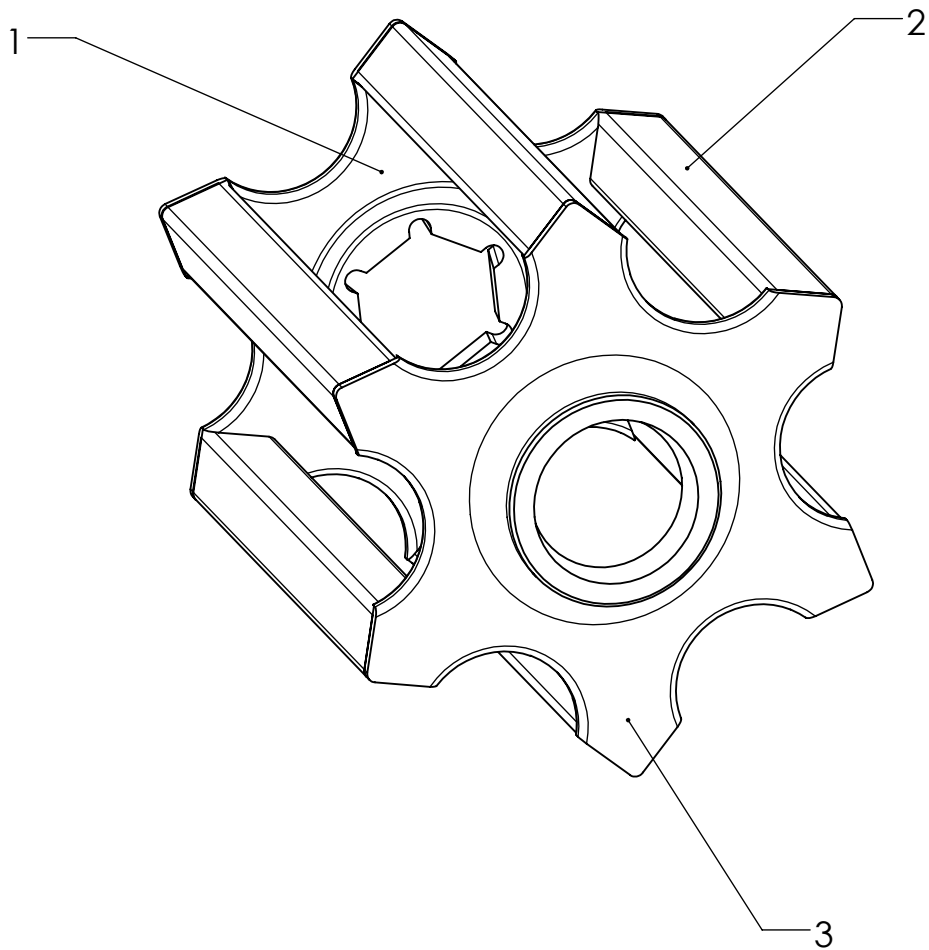
**Voir documents suivants****Siehe folgende Dokumente****See following documents**

*(Dessins sont placés dans  
l'ordre croissant)*

*(in aufsteigender Reihenfolge)*

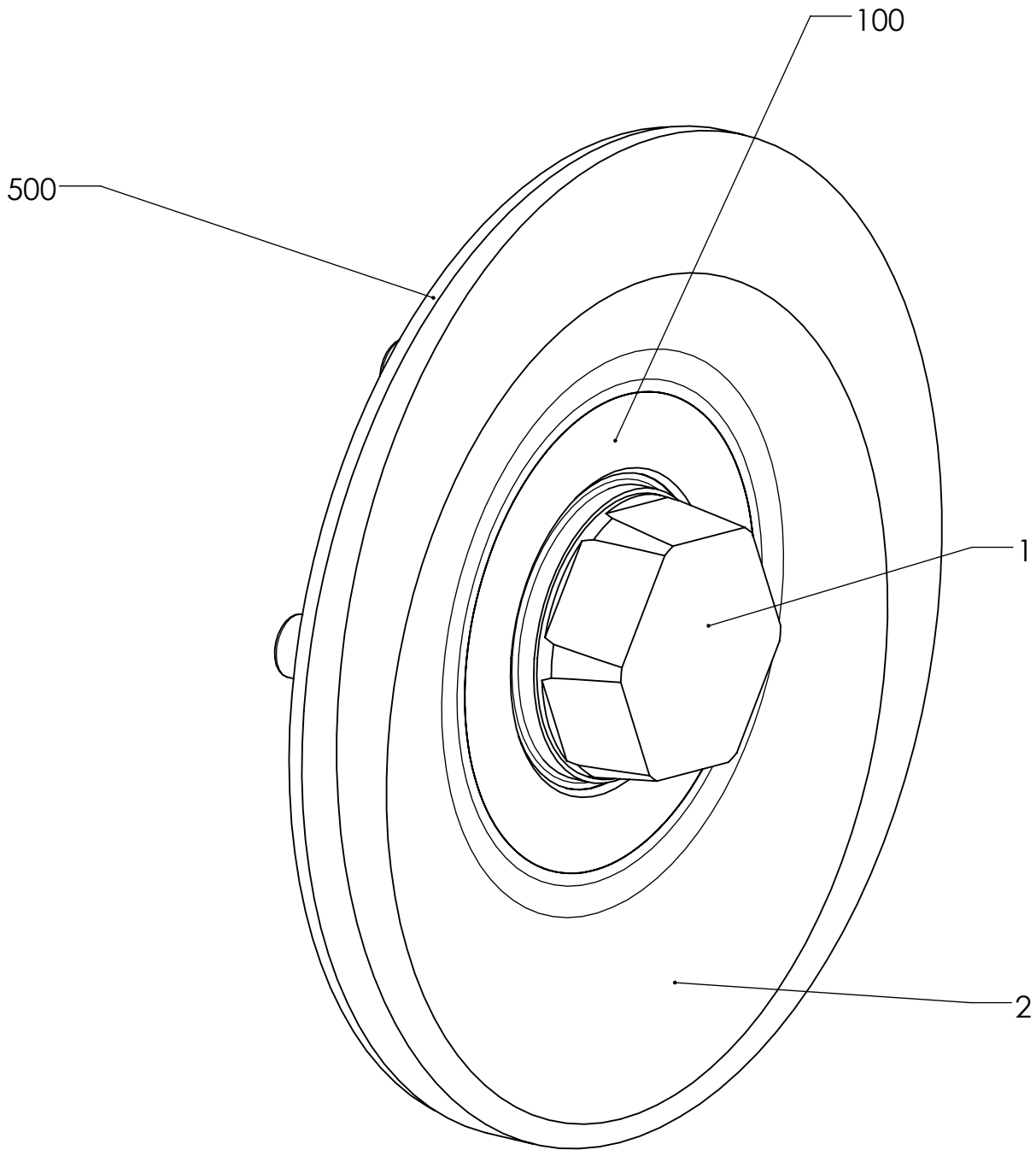
*(in ascending order)*






Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	MATERIAL : Matériau <non spécifié>								
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale %	Similar	Designed	20/05/2011	jbe			
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00		Weight [kg]	Controlled	20/05/2011	jbe			
Rotor tube 90										A4	2.206	Revised	20/05/2011	jbe	
								Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.							
1/1		A													

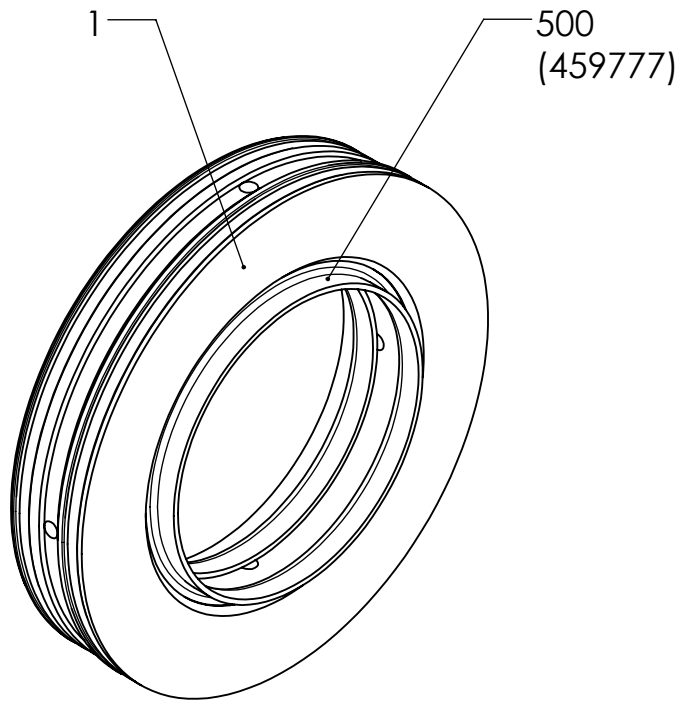




Position	N° article Artikel Nr Item number
1	---
2	---
100	459777-CMA
500	452638

Dimensions without tolerance [mm]	above	6	30	120	400	1000	MATERIAL :						
	up to	6	30	120	400	1000		2000	Scale	Similar	Designed	07/09/2010	jbe
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	%		Controlled	06/06/2011	wwi	
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00	⊕	Weight [kg]	Revised	06/06/2011	wwi	
Palier entraînement								A4	0.000000	Atex			
								Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.		 Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com		455814-CMA	
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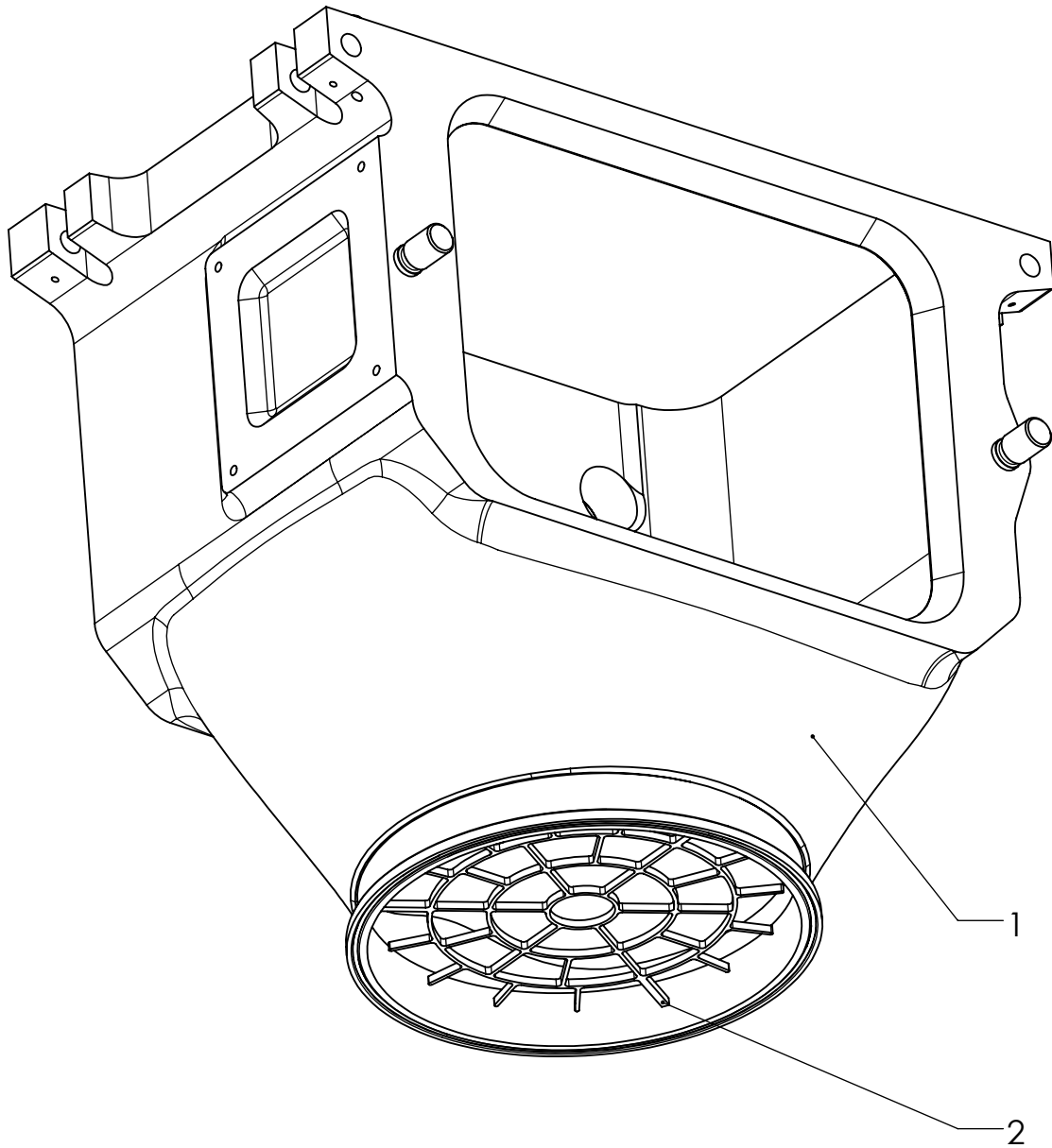




Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	MATERIAL : Matériau <non spécifié>						
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale %	Similar	Designed	19/05/2011	wwi	
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00		Weight [kg]	Revised	19/05/2011	wwi	
Joint à 2 lèvres PS									A4	0.036	Atex		
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.				Frewitt SA; Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com				<h1>459777-CMA</h1>		Page	Ver.	1/1	A

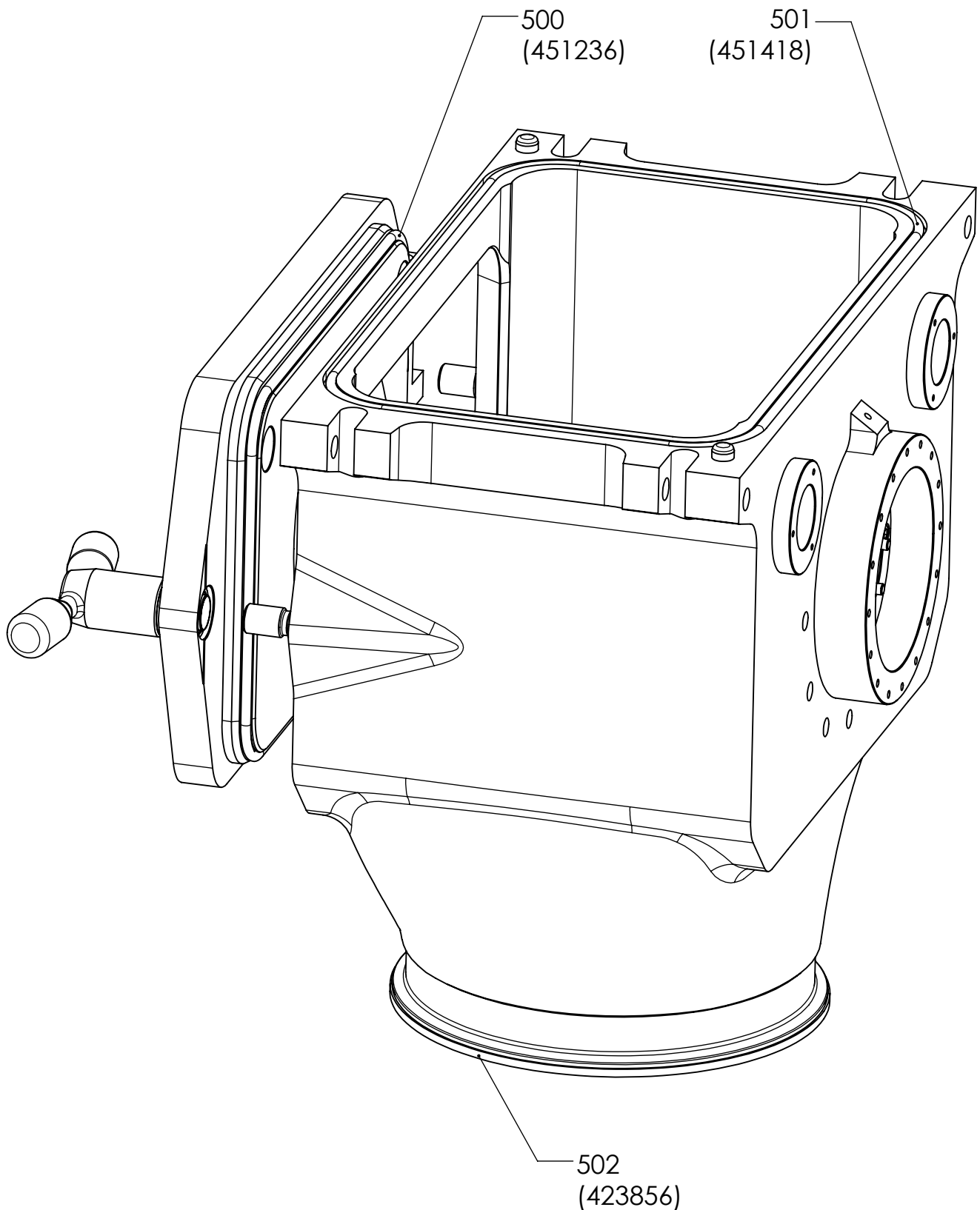






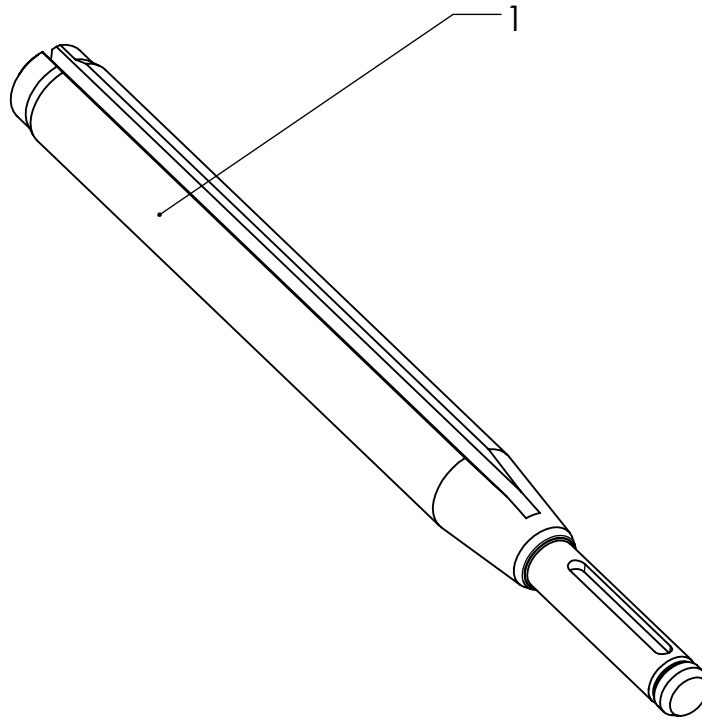
Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	MATERIAL :						
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale	Similar	Designed	06/09/2010	jbe	
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00	%		Controlled	07/02/2014	jbe	
Bâti complet avec finitions									Weight [kg]	Revised	07/02/2014	jbe	
									A4	46.783650	Atex		
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.				Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com				<b>460090-CMA</b>		Page	Ver.		
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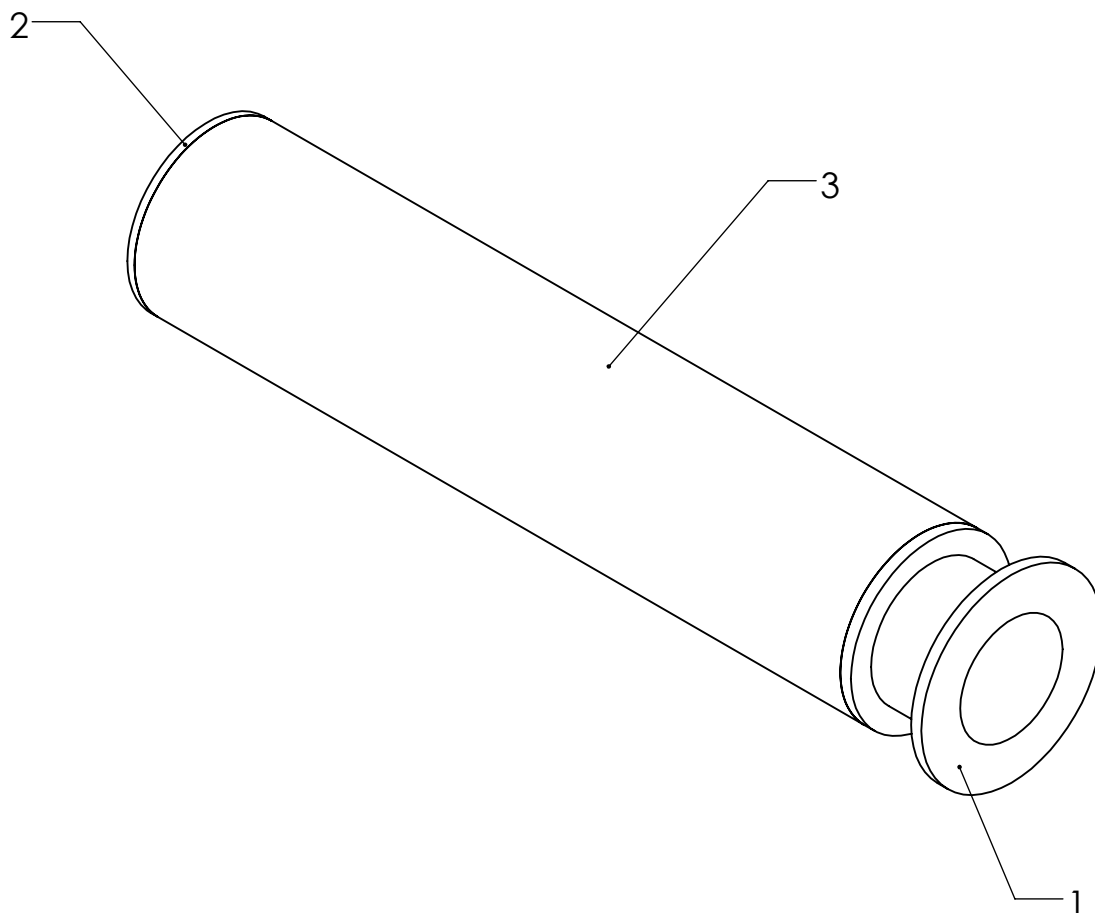
Dimensions without tolerance [mm]	above		6	30	120	400	1000	MATERIAL :	Scale	Similar	Designed	07/09/2010	jbe		
	up to	6	30	120	400	1000	2000								
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20				Controlled	07/02/2014	jbe		
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00				Revised	07/02/2014	jbe		
Etanchéité EPDM								☒	Weight [kg]	Atex					
								A4	64.670150						
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.								Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com				462019-CMA		Page	Ver.
														1/1	A






Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	2000	MATERIAL :					
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20					Scale %	Similar
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00		Weight [kg]	Controlled	08/05/2013	jbe	
Tendeur de treillis										A4	0.842389	Revised	08/05/2013
								Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.					
										Page	Ver.		
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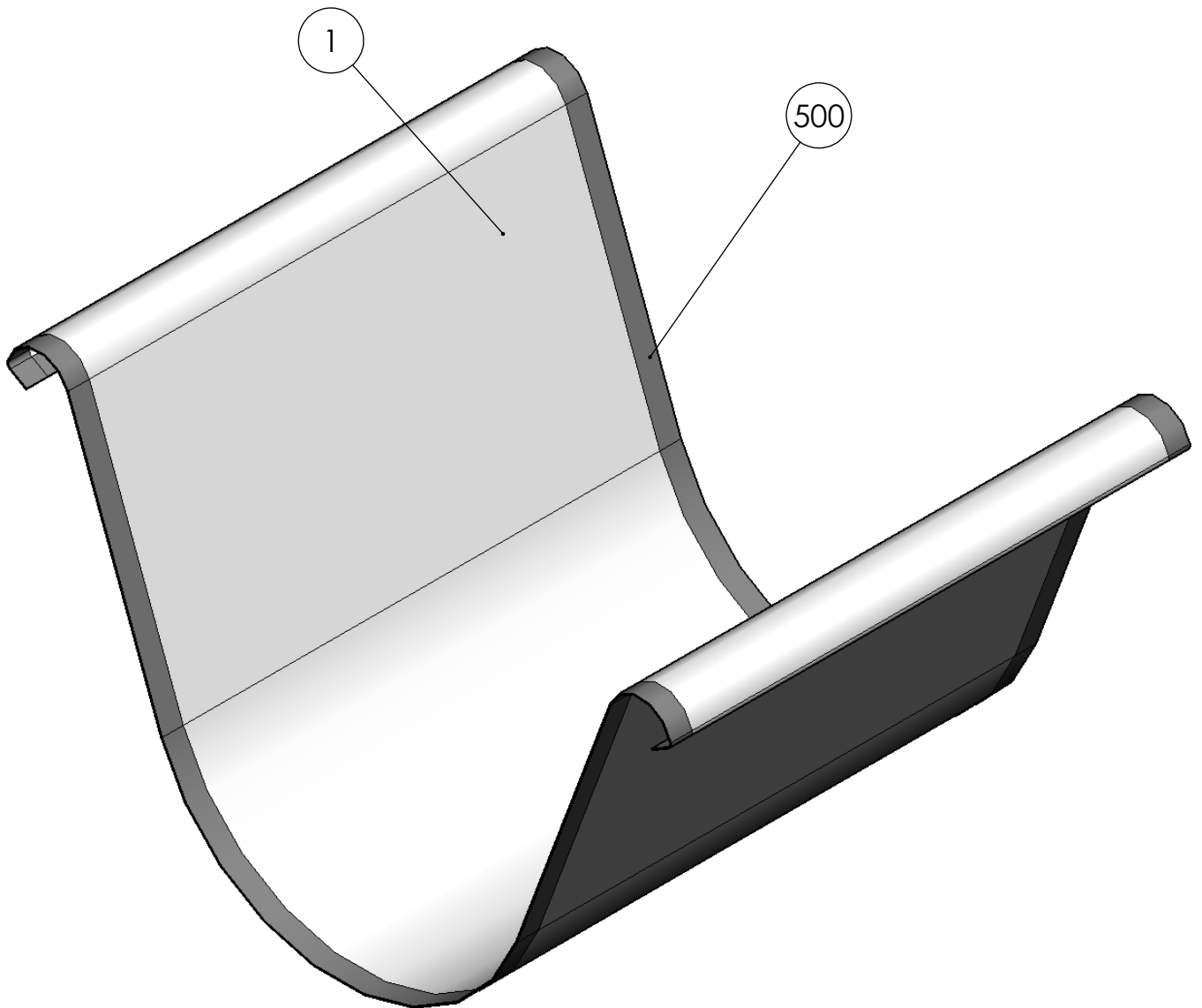




Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	MATERIAL : 316/316L					
		6	30	120	400	1000	2000	Scale %	Similar	Designed	20/05/2011	thle
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20			Controlled	18/11/2013	tgr
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00	⊕	Weight [kg]	Revised	18/11/2013	tgr
Filtre inox							A4	N/A	Atex			
							Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.		 Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com		463739-CMA	
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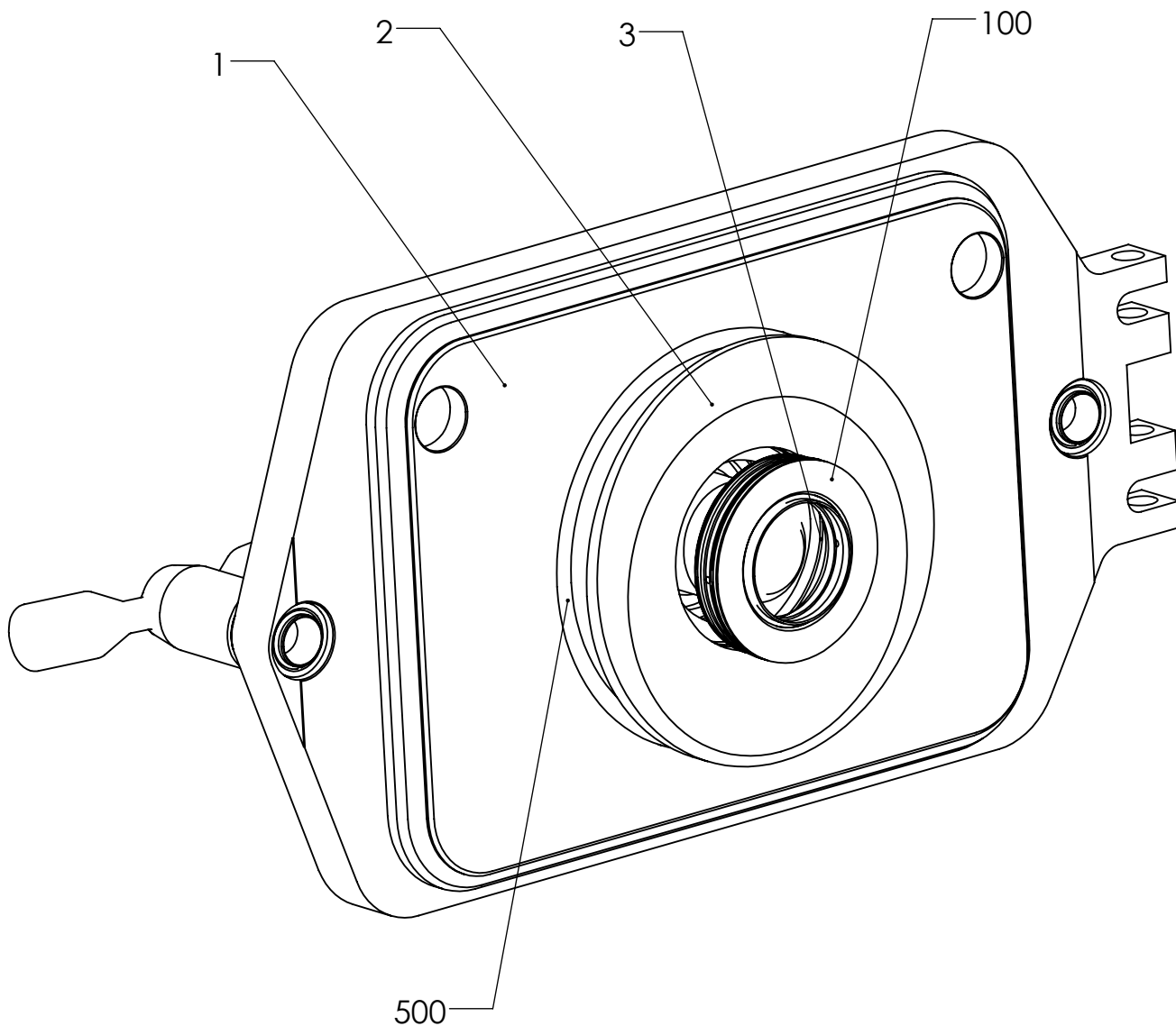






Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	2000	MATERIAL :					
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20					Scale %	Similar
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00		Weight [kg]	Controlled	23/02/2011	wwi	
Treillis-TD										A4	0.452	Revised	23/02/2011
								Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.					
Page		Ver.											
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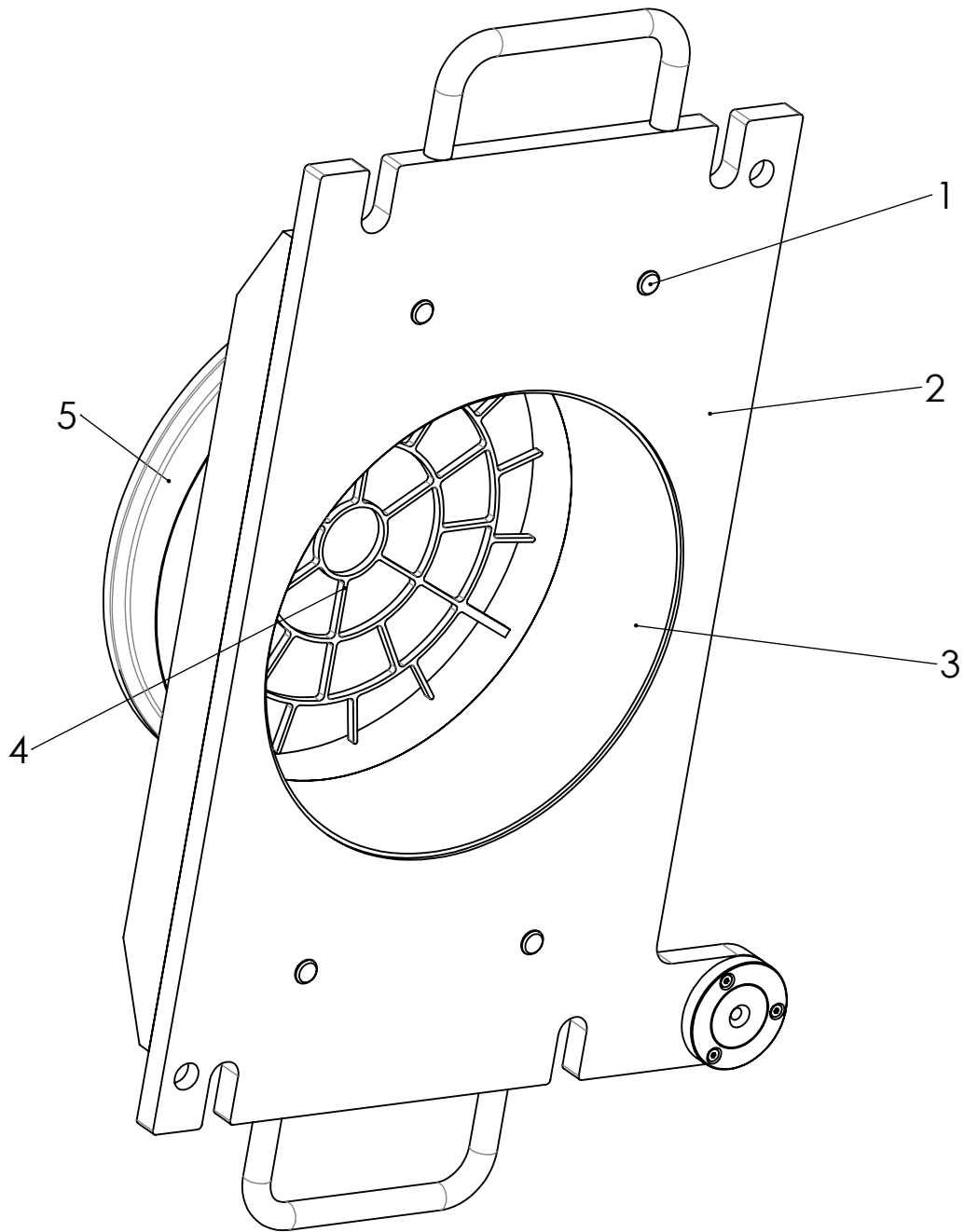




Position	N° article Artikel Nr Item number
1	---
2	---
3	---
100	459777-CMA
500	452638

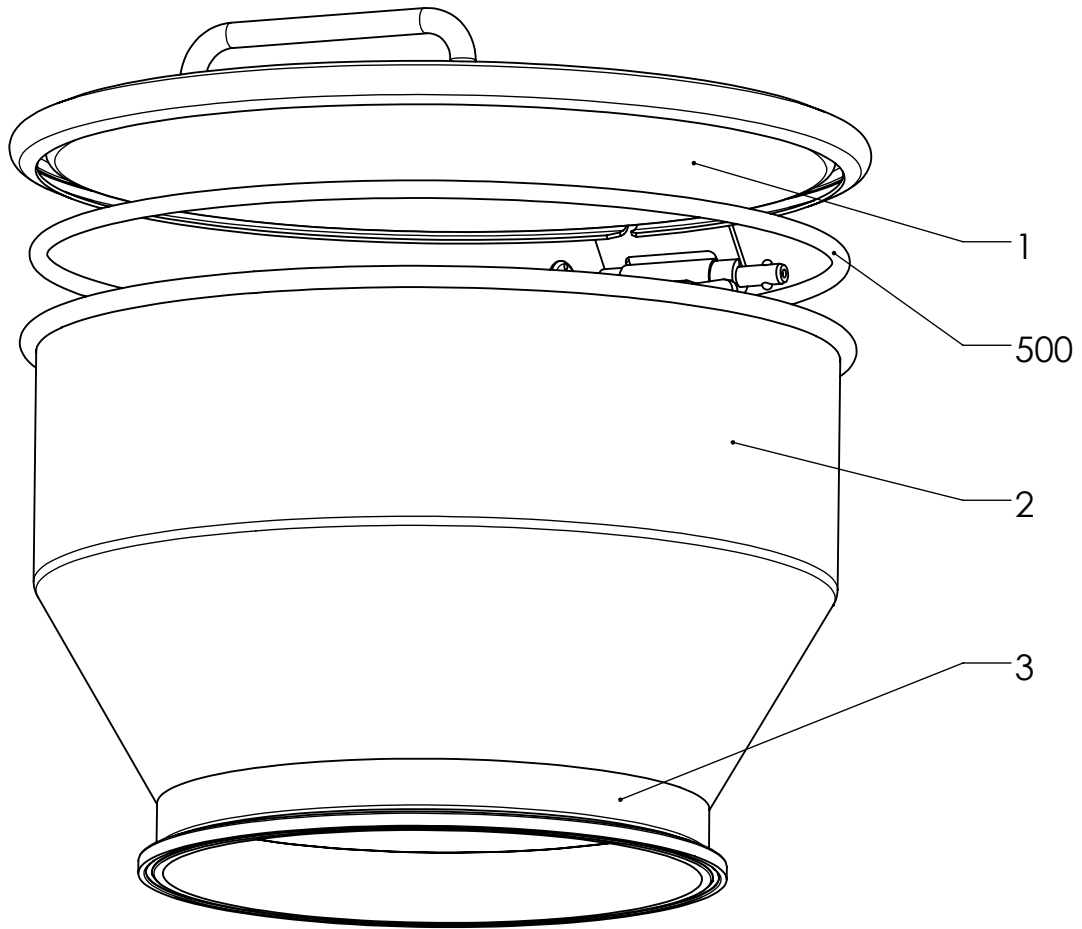
Dimensions without tolerance [mm]	above	6	30	120	400	1000	MATERIAL : Matériau <non spécifié>					
	up to	6	30	120	400	1000						
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20					
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00					
Ensemble porte et palier							Scale	Similar	Designed	18/04/2011	jbe	
							%		Controlled	27/09/2013	jbe	
								Weight [kg]	Revised	27/09/2013	jbe	
								A4	15.80	Atex		
<small>Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.</small>									<small>Frewitt SA; Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com</small>		<h1 style="margin: 0;">464645-CMA</h1>	
							Page	Ver.	1/1	A		





Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	2000	MATERIAL :					
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale	Similar	Designed	26/10/2011	cde	
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00	%		Controlled	06/02/2014	jms	
Contre bride entrée									Weight [kg]	Revised	06/02/2014	jms	
										Atex			
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.								A4	11.12	Page		Ver.	
								Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com		466518-CMA		1/1	A





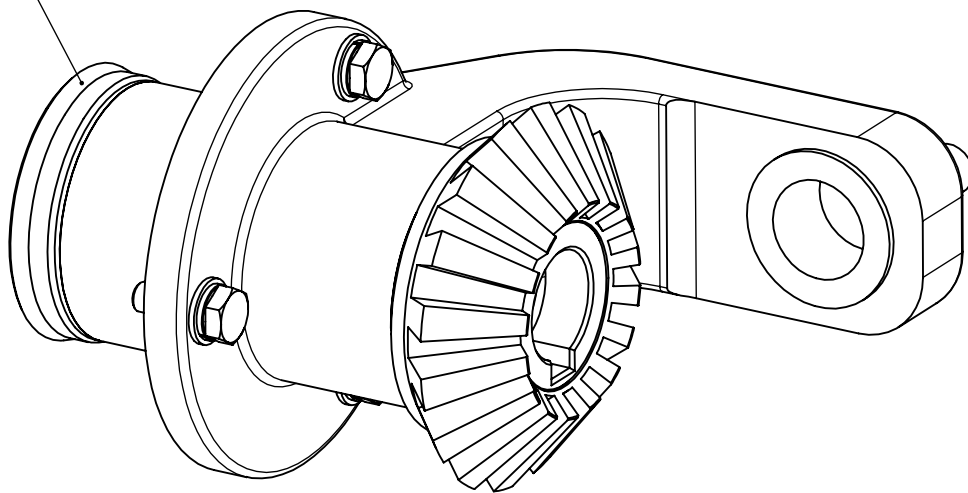
Position	Item number
1	---
2	---
3	---
500	407112


Dimensions without tolerance [mm]	above		6	30	120	400	1000	MATERIAL : Matériau <non spécifié>			
	up to	6	30	120	400	1000	2000				
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale			
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00	Similar			
Entonnoir								Designed	23/09/2013	jbe	
								%		Controlled	05/11/2013
								Weight [kg]	Revised	05/11/2013	jbe
									A4	5.87	Atex
<small>Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.</small>										Page	Ver.
								Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com			



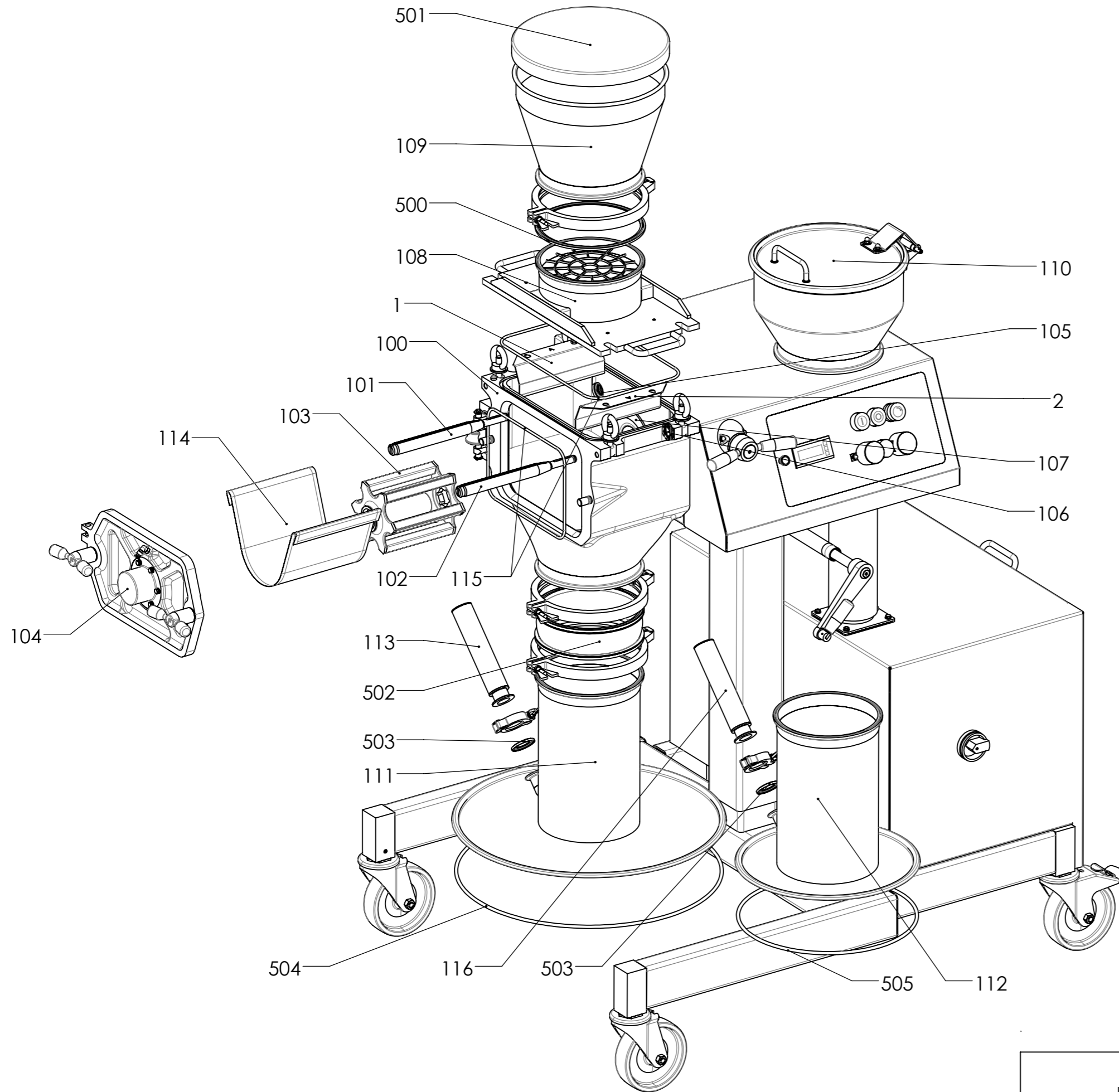


500  
(475705)



Dimensions without tolerance [mm]	above up to	6	30	120	400	1000	2000	MATERIAL : Matériau <non spécifié>					
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale	Similar	Designed	04/03/2014	jbe	
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00	%		Controlled	18/09/2014	jbe	
Palier pour axe tendeur								⊕	Weight [kg]	Revised	18/09/2014	jbe	
								A4	0.77	Atex			
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.				Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com				<b>473992-CMA</b>		Page	Ver.		
										1/1	B		



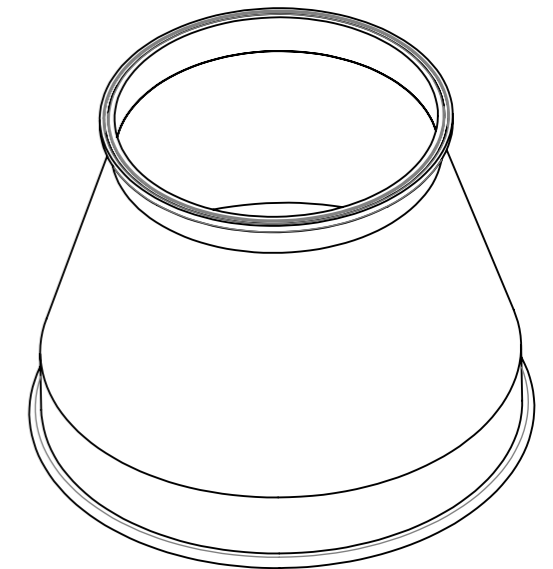
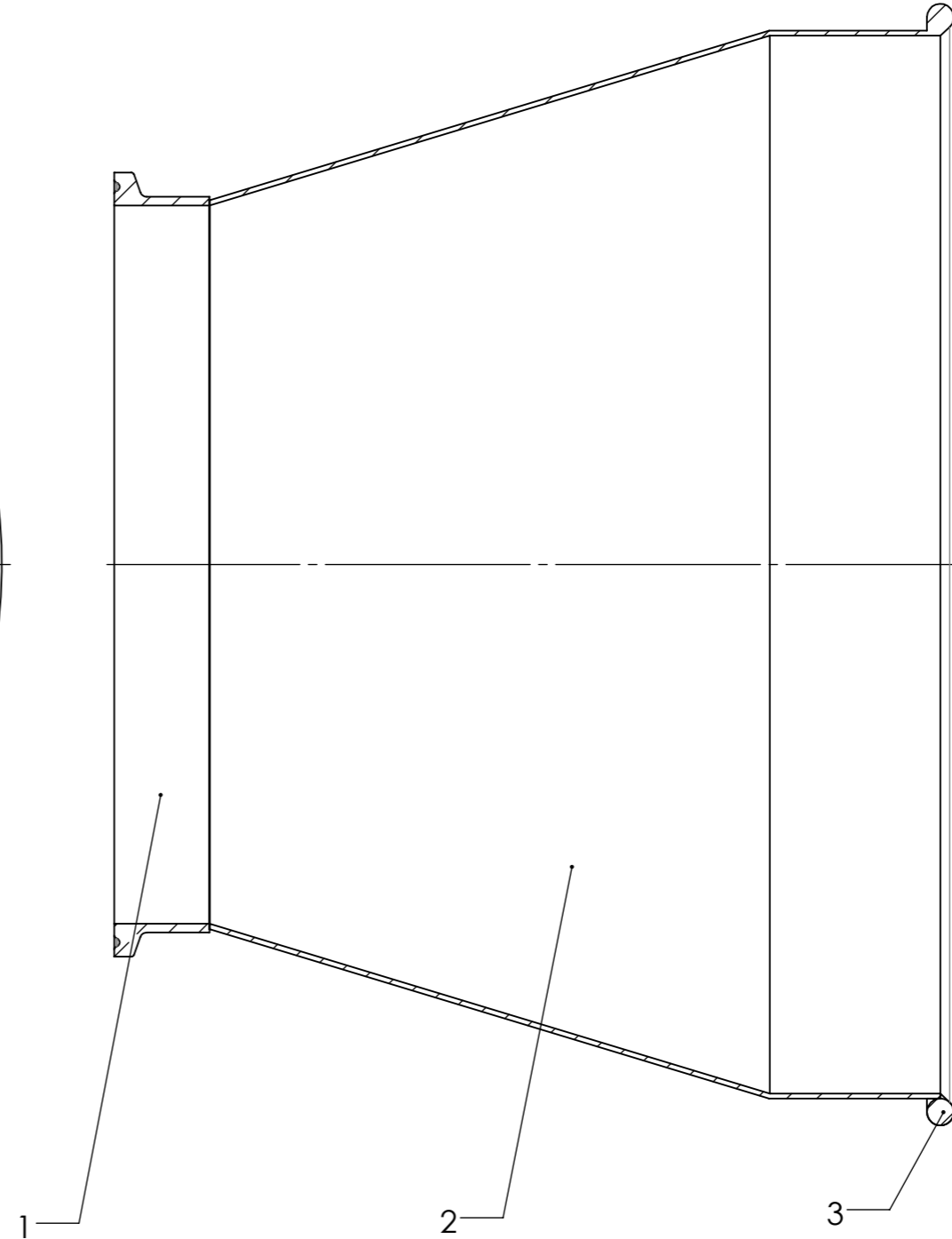
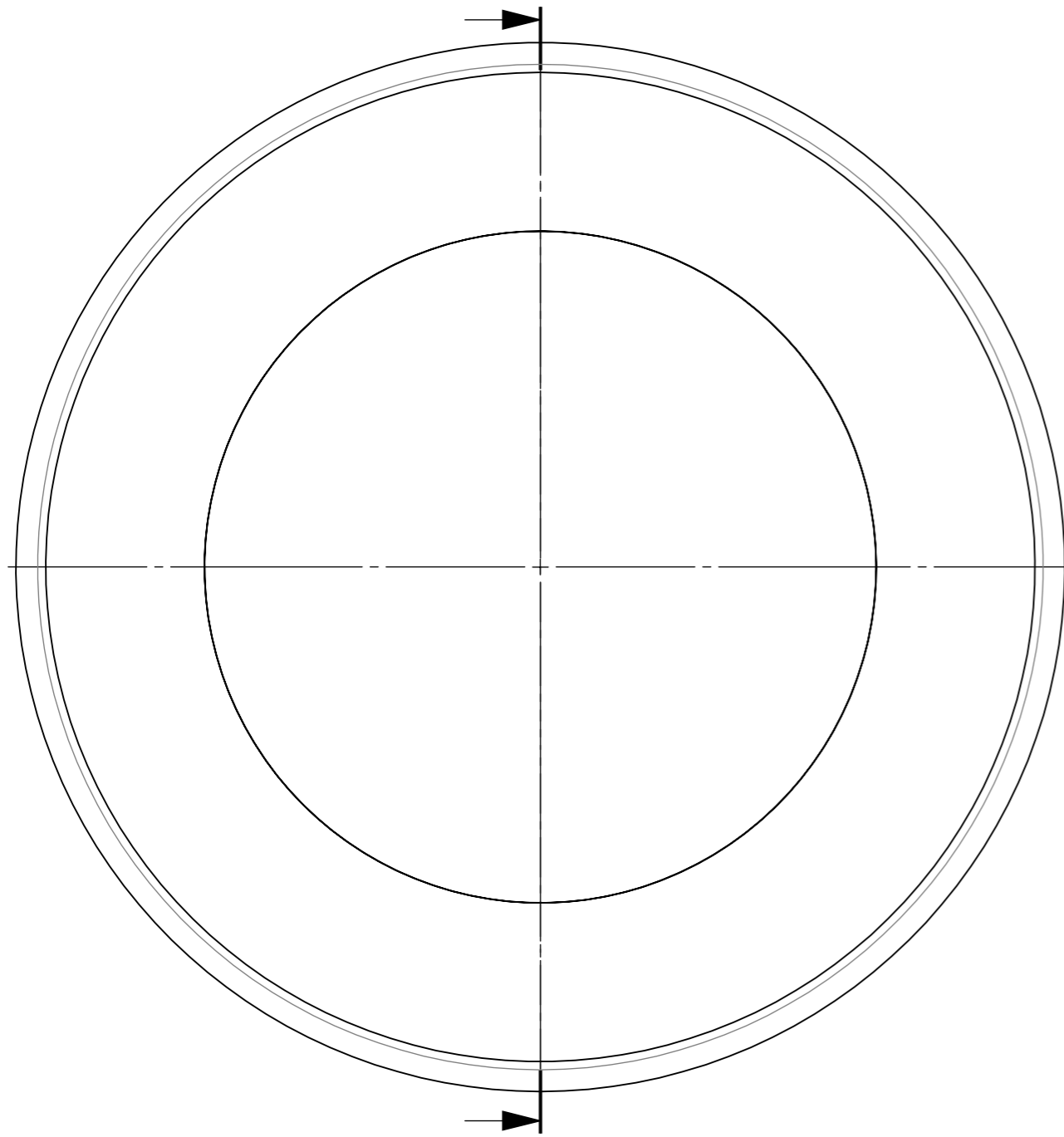


Pos.	Item number	Control drawing	Materials certificates EN-10204-3.1B FDA	Surface quality certificates
1	440334	474201-CMA	X	X
2	440334		X	X
100	460090	460090-CMA	X	X
101	462358	462358-CMA	X	X
102	462358		X	X
103	443474	443474-CMA	X	X
104	464645	464645-CMA	X	X
105	473992	473992-CMA	X	0
106	473992		X	0
107	455814	455814-CMA	X	X
108	466518	466518-CMA	X	X
109	474202	474202-CMA	X	X
110	471380	471380-CMA	X	X
111	474209	474209-CMA	X	X
112	475517	475517-CMA	X	X
113	463739	463739-CMA	X	0
114	463931	463931-CMA	X	0
115	462019	462019-CMA	X	0
116	463739	463739-CMA	X	0
500	423856	---	X	0
501	443387	---	X	0
502	428631	---	X	0
503	410119	---	X	0
504	464435	---	X	0
505	412913	---	X	0

X = delivered  
0 = undelivered

PRO-14-0055 / OscilloWitt-3		scale %	Designed	01/04/2014	tgr
			Controlled	16/09/2014	edgu
		A3	Revised	16/09/2014	edgu
<small>Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.</small> <small>Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com</small>		474201-CMA		Page	Ver.
				1/1	A





Dimensions without tolerance [mm]	above		6	30	120	400	1000
	up to	6	30	120	400	1000	2000
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00

MATERIAL : 316/316L

Entonnoir		Scale	Similar	Designed	31/03/2014	tgr
		%		Controlled	31/03/2014	tgr
		Weight [kg]		Revised	31/03/2014	tgr
		A3	3.47	Atex		

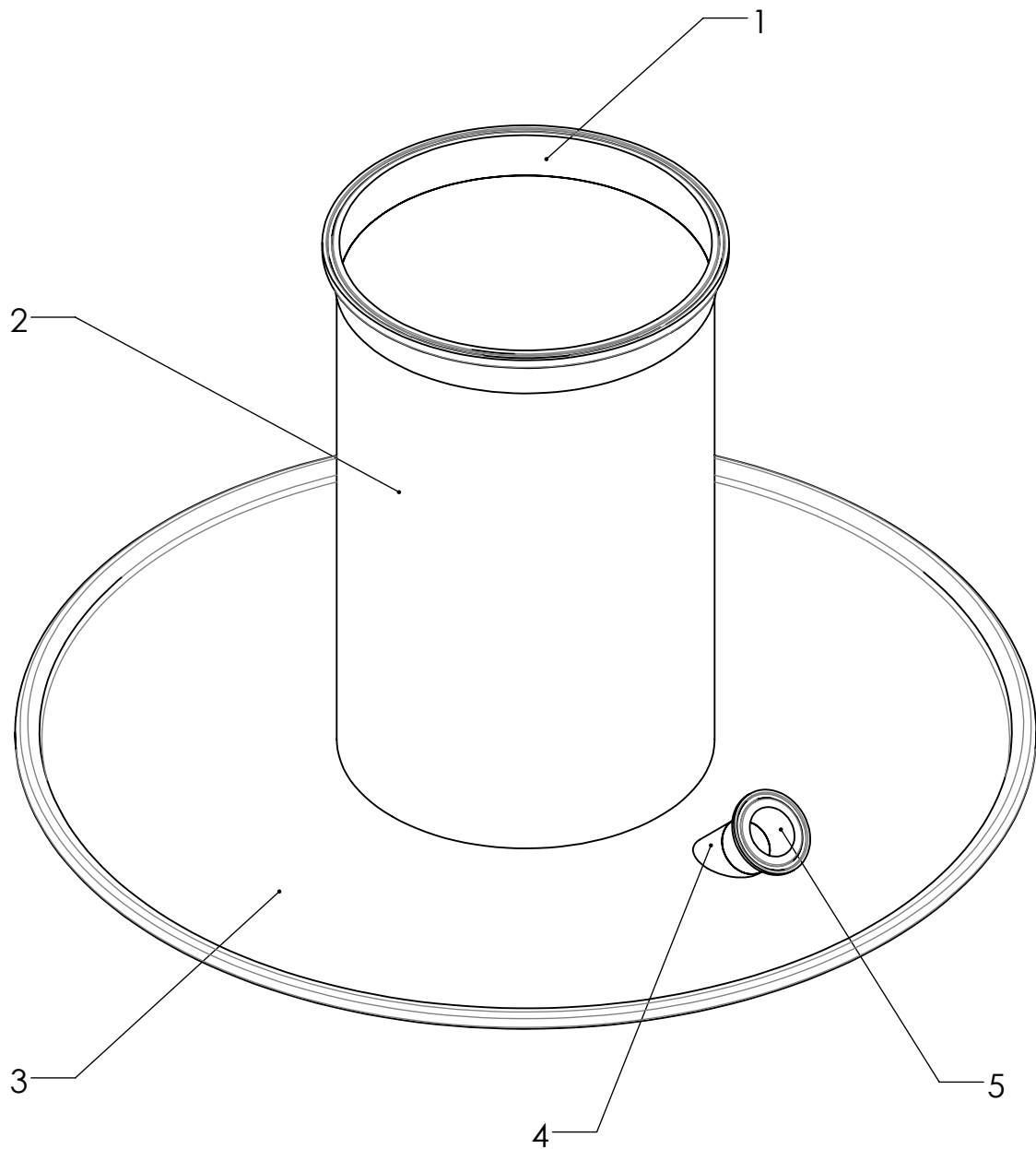
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.




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474202-CMA		Page	Ver.
		1/1	A

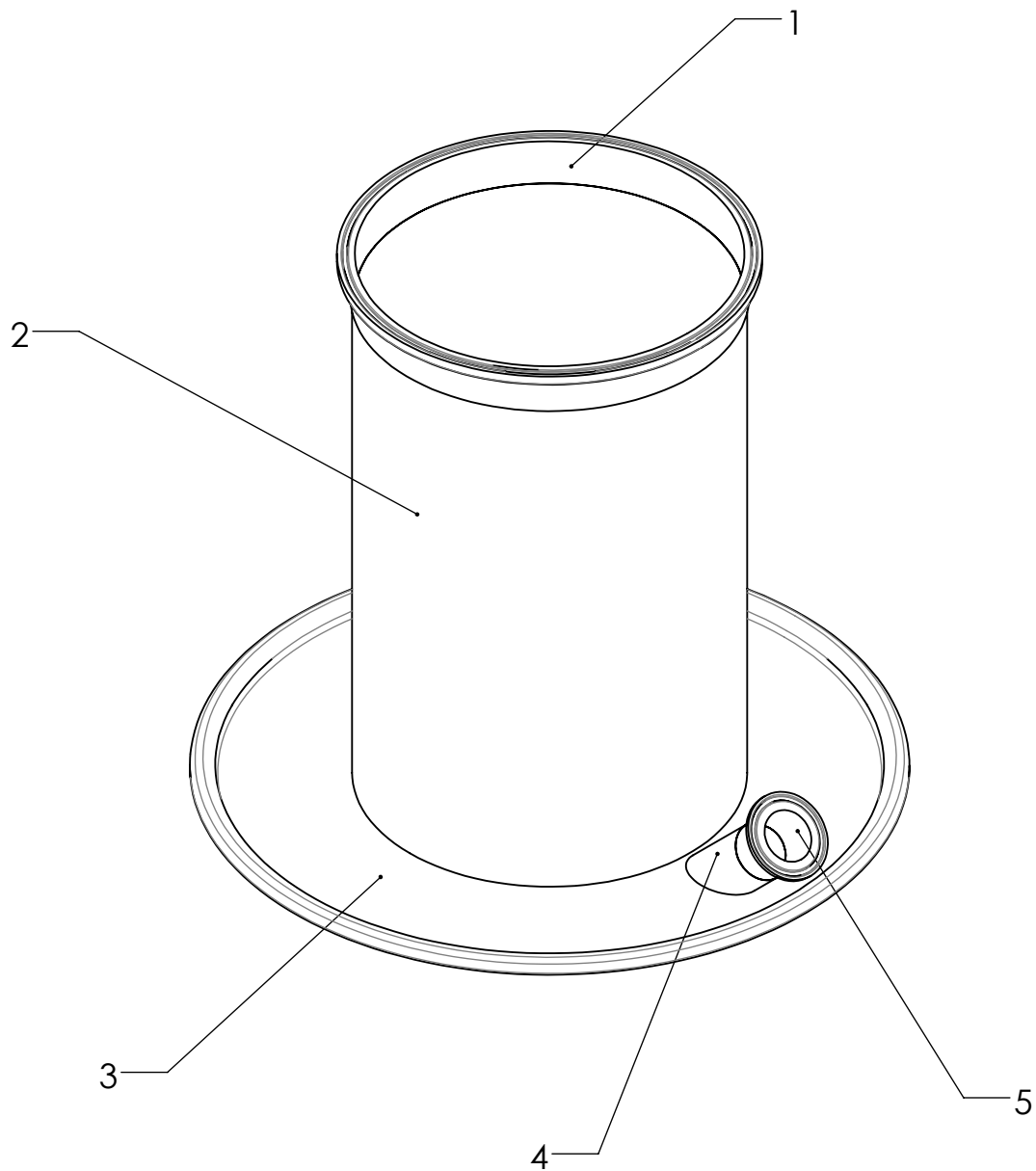




Dimensions without tolerance [mm]	above		6	30	120	400	1000	MATERIAL : 316/316L				
	up to	6	30	120	400	1000	2000		Scale	Similar	Designed	01/04/2014
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	%	Weight [kg]	Controlled	08/09/2014	tgr
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00			Revised	08/09/2014	tgr
Couvercle de fût D560								⊕	N/A	Atex		
								A4				
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.				Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND Tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com				474209-CMA		Page	Ver.	
										1/1	A	







Dimensions without tolerance [mm]	above		6	30	120	400	1000
	up to	6	30	120	400	1000	2000
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00

MATERIAL : "SW-Material@@475517@474209-2.SL

Couvercle de fût D375	Scale	Similar	Designed	07/08/2014	edgu
	%		Controlled	07/08/2014	edgu
		Weight [kg]	Revised	07/08/2014	edgu
	A4	N/A	Atex		

Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.



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475517-CMA

Page	Ver.
1/1	A



**Voir documents suivants****Siehe folgende Dokumente****See following documents**

(Certificats sont placés dans  
l'ordre croissant)

(in aufsteigender Reihenfolge)

(in ascending order)





**SteriValves S.r.l.**

Via E. Mattei, 393

55100 LUCCA

ITALY

VAT IT01722430467

 (+39) 0583 440 560 (+39) 0583 440 559 info@sterivalves.eu [www.sterivalves.eu](http://www.sterivalves.eu)

---

Modular System Valves and Accessories for the Pharmaceutical, Chemical and Food Industries

**CONFORMITY DECLARATION**  
**KONFORMITÄTSERKLÄRUNG**  
**DÉCLARATION DE CONFORMITÉ**  
**Dichiarazione di conformità**

With the present we state that the EPDM compound we utilized for the vulcanization of the compensator SilEnd is recommended and approved for food applications. This polymer is suitable to be utilized with food, in accordance to Food and Drug Administration (FDA) Regulation 21 CFR 177.2600. Furthermore we state that the carbon black utilized in this compound assures a certain grade of **conductivity**.

Hiermit erklären wir, dass die für die Vulkanisation der Kompensator SilEnd verwendete EPDM-Mischung für Anwendung in der Lebensmittelindustrie geeignet ist. Dieses Polymer ist geeignet für die Lebensmittelindustrie nach der Food and Drug Administration (FDA) Regulation 21 CFR 177.2600. Außerdem erklären wir, dass das in der Mischung verwendete Carbon Black eine gewisse Leitfähigkeit gewährleistet.

Par la présente nous déclarons que le mélange EPDM utilisé pour la vulcanisation des compensateur SilEnd est recommandé et approuvé pour applications dans l'industrie alimentaire. Ce polymère est aptes pour l'industrie alimentaire selon la Food and Drug Administration (FDA) Regulation 21 CFR 177.2600. Nous déclarons encore, que le carbon black utilisé dans ce mélange garantit une certaine conductivité.

Con la presente dichiariamo che la miscela EPDM utilizzata per i compensatori SilEnd è approvata per utilizzi in campo alimentare. Questo polimero è consigliato ed indicato ad uso alimentare, secondo FDA § 177.2600. Inoltre dichiariamo che il carbon black è un grado conduttivo, tale da assicurare un certo livello di conduttività della miscela.

**SteriValves S.r.l.**  
Quality Manager  
Dr. Gianfranco Nelli

A handwritten signature in black ink that reads "Gianfranco Nelli".

## TESTS DECLARATION

### DICHIARAZIONE PROVE

With the present we declare that the surface resistivity test on our polymer EPDM was executed. Two electrodes, positioned at the diagonal extremities of a square plate (thickness 2mm) with sides 20cm long, that were applied with an electric potential difference of 10 Volts, were measured with a value of superficial electrical resistance minus of 1000 Ohm.

Con la presente dichiariamo che il test di resistività per il nostro polimero EPDM è stato eseguito. A due elettrodi con una differenza di potenziale di 10 Volt, posti alle estremità della diagonale di una placca (spessore 2mm) quadrata di lato 20 cm, è stato misurato un valore di resistenza elettrica superficiale inferiore a 1000 Ohm.

**SteriValves S.r.l.**

Quality Manager

Dr. Gianfranco Nelli



Müller  
D-79618 Rheinfelden  
Industrieweg 5

Telefon 0 76 23 / 969-0  
Telefax 0 76 23 / 9 69 69 Verkauf  
Telefax 0 76 23 / 9 69 70 Einkauf

info@mueller-gmbh.com  
www.mueller-gmbh.com

System-Technik in Edelstahl  
Behälter / Gehäuse  
Verpackungen

Qualitätsmanagement  
ISO 9001 / EN 29001



## RUNDSCHNURRINGE

Your order no. <i>80301</i>	Part no. <i>0102423</i>
Our order no. <i>V11043346</i>	Drawing no. ....
Pos. no. of order <i>2</i>	Pos. no of drawing .....

QUALITÄTSSPEZIFIKATION  
SILIKON – ELASTOMER; transparent, talkumiert

**Item No: 412913**  
**Doc No: 36592-0**

Type: ST-AA-40-001  
ST-AA-40-farbig

Härte:	42 +/- 5° Shore A.	DIN 53 505
Dichte:	1,15 +/- 0,02 g/cm <sup>3</sup>	DIN 53 479 A
Farbe:	Transluzent	
Zugfestigkeit:	10,2 N/mm <sup>2</sup>	DIN 53 504-S1
Reißdehnung:	750 %	DIN 53 504-S1
Weiterreißfestigkeit:	40,0 N/mm	ASTM D 624 B

### Eigenschaften:

- temperaturbeständig von -40°C bis +200°C, im +Bereich trockene Hitze
- peroxidfrei (platinkatalysiert)
- physiologisch unbedenklich
- entspricht FDA § 177.2600  
USP Class VI  
europ. Pharmacopoeia
- sterilisierbar: in Dampf 134° C  
Heißluft 200° C  
EO  
Gamma-Strahlen

Hinweis: Auch vor der Erstverwendung sind Produkte in dieser Qualität zu reinigen und mit Dampf zu sterilisieren.

Item No. : *412913*  
Order No. : *80301*  
Checked : *9.6.04*

Statistische Werte  
Stand: 03/2002

*MH*





# CERTIFICATE OF CONFORMANCE

in accordance to the US Food and Drug Administration (FDA)

The following Frenzelit gasketing materials based on modified and multi-directionally expanded PTFE are in fully compliance with the FDA 177.1550 Perfluorocarbon regulation:

**novaflon 100**

**novaflon 200**

**novaflon 300**

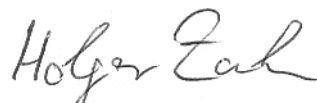
**novaflon 500**

Bad Berneck, March 2006

**Frenzelit-Werke GmbH & Co. KG**



Hans-Günther Koch  
Head of Gasket Division



Holger Zahn  
Quality Assurance



**CONFORMITY DECLARATION**  
**KONFORMITÄTSERKLÄRUNG**  
**DÉCLARATION DE CONFORMITÉ**  
**Dichiarazione di conformità**

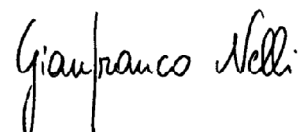
With the present we state that the EPDM compound we utilized for the vulcanization of the SilCap is recommended and approved for food applications. This polymer is suitable to be utilized with food, in accordance to Food and Drug Administration (FDA) Regulation 21 CFR 177.2600. Furthermore we state that the carbon black utilized in this compound assure a certain grade of conductivity.

Hiermit erklären wir, dass die für die Vulkanisation der SilCap verwendete EPDM-Mischung für Anwendung in der Lebensmittelindustrie geeignet ist. Dieses Polymer ist geeignet für die Lebensmittelindustrie nach der Food und Drug Administration (FDA) Regulation 21 CFR 177.2600. Außerdem erklären wir, dass das in der Mischung verwendete Carbon Black eine gewisse Leitfähigkeit gewährleistet.

Par la présente nous déclarons que le mélange EPDM utilisé pour la vulcanisation des SilCap est recommandé et approuvé pour applications dans l'industrie alimentaire. Ce polymère est aptes pour l'industrie alimentaire selon la Food and Drug Administration (FDA) Regulation 21 CFR 177.2600. Nous déclarons encore, que le carbon black utilisé dans ce mélange garantit une certain conductivité.

Con la presente dichiariamo che la mescola EPDM utilizzata per i SilCap è approvata per utilizzi in campo alimentare. Questo polimero è consigliato ed indicato ad uso alimentare, secondo FDA § 177.2600. Inoltre dichiariamo che il carbon black è un grado conduttivo, tale da assicurare un certo livello di conduttività della mescola.

**SteriValves S.r.l.**  
Quality Manager  
Dr. Gianfranco Nelli



## TESTS DECLARATION

### DICHIARAZIONE PROVE

With the present we declare that the surface resistivity test on our polymer EPDM was executed. Two electrodes, positioned at the diagonal extremities of a square plate (thickness 2mm) with sides 20cm long, that were applied with an electric potential difference of 10 Volts, were measured with a value of superficial electrical resistance minus of 1000 Ohm.

Con la presente dichiariamo che il test di resistività per il nostro polimero EPDM è stato eseguito. A due elettrodi con una differenza di potenziale di 10 Volt, posti alle estremità della diagonale di una placca (spessore 2mm) quadrata di lato 20 cm, è stato misurato un valore di resistenza elettrica superficiale inferiore a 1000 Ohm.

**SteriValves S.r.l.**

Quality Manager

Dr. Gianfranco Nelli



# CERTIFICATE

We herewith confirm the ECONOMOS material

**ECORUBBER 3 – 85A – w - FG**

Polymer: EPDM  
Colour: white  
Hardness: 85 ± 5 Shore A  
Density: 1,27 g/cm<sup>3</sup>

which is intended as a sealing material for the use in food processing machinery is in accordance with

the positive list of § 177.2600, CFR 21, "Rubber Articles Intended for Repeated Use" of the Food and Drug Administration, USA

and the BGVV – recommendation, paragraph XXI, category 3, of the BGA ("German authority of health issues").

**Judenburg, 19. Jänner 2009**

  
SKF Economos GmbH

Gabelhoferstraße 25, 8750 Judenburg  
Tel. 03572 82555-0, Fax 03572 82439

We believe this information is the best currently available on the subject to our internal amendment routine. Economos is unable to guarantee and/or take any responsibility, obligation or liability whatsoever in connection with this information.



# STAHLCON GMBH

VERTRIEB VON EINBAUELEMENTEN FÜR TECHNISCHE ANLAGEN

STAHLCON GMBH . KRINGSTRASSE 13 : D-71144 STEINENBRONN

Frewitt SA  
Mme Christelle Thion  
Route du Coteau 7  
CH-1763 Granges-Paccot  
Schweiz

## FDA-Zertifikat

Nummer 68574  
Datum 03.01.2013  
Kunden-Nr. 40603  
Lieferanten-Nr. 362400  
Ihre Bestellung  
Lieferdatum 03.01.2013  
Erfasst AL

Pos	Artikel	Beschreibung	Menge
-----	---------	--------------	-------

### Zertifizierung von Dichtungen nach FDA

Die oben aufgeführten Dichtungen stammen aus der EU und werden vom Hersteller wie folgt zertifiziert:

#### CERTIFICATION OF COMPLIANCE

We hereby certify that the elastomer compounds: Viton, EPDM, Silicone and Nitrile, used in the manufacture of our hygienic sealing gaskets are in compliance with the Food and Drug Association (FDA) Code of Federal Regulations for rubber and rubber-like materials. This under Title 21, paragraph 177.2600 and also meets the criteria of the Class I materials classification of the 3-A Sanitary Standards, U.S.D.A. and standard 51 of the N.S.F.

We hereby confirm that no Phthalate Esters are contained in any plasticisation agent used during the manufacturing process.

We hereby certify that the PTFE resins from which our solid and envelopped gaskets are produced have been tested in our suppliers laboratory and found to be in compliance with FDA code of Federal Regulations for PTFE and Fluorocarbons resins. This under Title 21 Paragraph 177.1550 for use in contact with foodstuffs. The material also meets the criteria of the Class I materials classification of the 3-A Sanitary standard 51 of the N.S.F.

*Max Mönkemöller*

Anschrift:  
STAHLCON GMBH  
Kringstraße 13  
D-71144 Steinenbronn

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info@stahlcon.de  
INTERNET  
www.stahlcon.de

GESCHÄFTSFÜHRER  
Max Mönkemöller

REGISTERGERICHT  
Böblingen HRB 5993  
USt.Id Nr.: DE 147 865 860  
St.Nr. 9906801903

SITZ DER GESELLSCHAFT  
Steinenbronn





Müller GmbH  
Industrieweg 5  
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Systemtechnik in Edelstahl  
Behälter / Gehäuse  
Handlinggeräte

Qualitätsmanagement  
ISO 9001:2008

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E-Mail: info@mueller-gmbh.com  
Internet: www.mueller-gmbh.com



### **FDA- Bestätigung für Silikone**

### **FDA- Confirmation for silicones**

### **FDA- Confirmation pour des matières en silicone**

Wir bestätigen hiermit, dass die Rohstoffe unserer Silikon-Qualitäten den Richtlinien der BfR XV und der Food and Drug Administration FDA 21 CFR §177.2600, USP Class VI entsprechen.

Die Verarbeitung erfolgt nach den Richtlinien der Rohstoffhersteller.  
Sie können als physiologisch unbedenklich gem. FDA eingestuft werden.

We confirm, that the silicone qualities are manufactured from materials which correspond with the BfR XV and the directives from the Food and Drug Administration FDA 21 CFR §177.2600, USP Class VI.

The processing is effected according to the directives of the raw material suppliers.  
These articles can physiologically be recognized as safe according FDA.

Nous certifions que les matières premières de nos qualités en silicone correspondent aux directives de BfR XV et de Food and Drug Administration FDA 21 CFR §177.2600, USP Class VI.

Le traitement est effectué selon les directives des fabricants de matières premières.  
On peut les classer physiologiquement comme neutre selon FDA.

Stand/state/état:

11/ 2010



# Garlock

SEALING TECHNOLOGIES®

an EnPro Industries company

## Konformitätserklärung

### FDA

Geltungsbereich GYLON® Werkstoffe

GYLON Standard (Style 3500, 3501E) und GYLON Weiß (Style 3510) erfüllen die FDA-Vorschriften 21 CFR 177.1550 . Diesen Ansprüchen genügen alle Bestandteile und Inhaltstoffe. Die Füllstoffe sind außerdem akzeptiert unter 21 CFR 177.2600 und die Farbpigmente (falls vorhanden) unter 21 CFR 182.5991, 21 CFR 182.8991 und 21 CFR 177.2600.

Die Markierungsfarbe erfüllt die Vorschrift 21 CFR 175.300.

GYLON Standard (Style 3500) hat außerdem die Freigabe des USDA für Anwendungen mit Direktkontakt bei Fleisch und Geflügel.

GYLON Blau (Style 3504 oder Style 3506 pigmentlos) und GYLON Food (Style 3550) erfüllen die FDA-Vorschriften 21 CFR 177.1550. Diesen Ansprüchen genügen die Hauptbestandteile bis auf die Füllstoffe. Die Füllstoffe sind in dem Food Chemicals Codex (FCC, 3<sup>rd</sup> Edition) aufgeführt und als grundsätzlich sicher anerkannt (GRAS – 21 CFR 170.30) für Anwendungen in Filtern und Lebensmittelprozessen.

Der zweite Füllstoff in GYLON Food erfüllt die FDA-Vorschrift 21 CFR 177.2600.

Die Markierungsfarbe erfüllt die Vorschrift 21 CFR 175.300.

GYLON Style 3545 erfüllt die FDA-Vorschriften 21 CFR 177.1550, 21 CFR 182.10, 21 CFR 182.1217 und 21 CFR 175.300 für seine Bestandteile. Die Menge der sich herauslösenden Materialien kann die Anforderungen nach 21 CFR 177.1550 überschreiten. Die sich herauslösenden Materialien erfüllen jedoch die FDA-Vorschriften 21 CFR 170.30 und sind als grundsätzlich sicher anerkannt (GRAS).

Die Markierungsfarbe erfüllt die Vorschrift 21 CFR 175.300.

GYLON 3522 / 3527 erfüllt die FDA-Vorschriften 21 CFR 177.1550. Diesen Ansprüchen genügen alle Bestandteile und Inhaltstoffe.

FDA	- Food and Drug Administration
USDA	- United States Department of Agriculture
CFR	- Code of Federal Regulations
FCC	- Food Chemicals Codex
GRAS	- Generally Recognized As Safe

Garlock GmbH  
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Geschäftsführer:  
Harald H. Poppke  
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Konto 318 047 800  
BLZ 620 400 60  
BIC/Swift COBADEFF 620

HR B 7884 AG Neuss  
VAT.No. DE 119354138  
St.-Nr. 125/5706/0863  
IBAN DE 93620400600318047800

## Konformitätserklärung

# Gefahren tierischen Ursprungs

Geltungsbereich: GYLON® Werkstoffe

Hiermit bestätigen wir, dass umgeformte oder geschnittene oder zum Zwecke der Abdichtung verwendete Werkstücke aus den Materialien unserer Produktlinie

### GYLON®

den Leitlinien für die Minimierung des Risikos der Übertragung von Erregern im Bereich der TSE (Transmissiblen Spongiformen Enzephalopatien) tierischen Ursprungs durch Human- und Tierarzneimittel (EMEA/410/01 Rev.2 – Oktober 2003), angenommen vom Ausschuss für Arzneyspezialitäten (Committee for Proprietary Medical Products – CPMP) und vom Ausschuss für Tierarzneimittel (Committee for Veterinary Medical Products – CVMP) entsprechen.

Die Tierseuche BSE (Bovine spongiforme Enzephalopathie) gehört zur Gruppe der TSE.

Diese Leitlinie wurde im Amtsblatt C 24 der Europäischen Union am 28.01.2004 veröffentlicht.

Die genannten Materialien sind vollsynthetische Werkstoffe und frei von Produkten tierischen Ursprungs.

Die Produkte sind nach Verwendung bestimmungsgemäß zu entsorgen.

#### Garlock GmbH

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DICHTUNGEN

FEDERN

**KUBO** 

## KONFORMITÄTSBESCHEINIGUNG

Hiermit bestätigen wir, dass der von der Kubo Tech AG verwendete Werkstoff:

**Aethylen-Propylen-Kautschuk, EPDM, 70 Shore A, weiss**  
**Materialnummer 05-70-0105**

den Vorgaben der amerikanischen **Food and Drug Administration** (FDA), wie im Code of Federal Regulations (Food and Drugs) Titel 21, § 177.2600 dokumentiert, entspricht.

Kubo Tech AG



André Bitzer  
BSc ZFH in Maschinentechnik  
Leiter Technik

Effretikon, 17. Oktober 2013



Donaldson Filtration Deutschland GmbH  
Bussingsstraße 1  
D-42781 Haan  
Germany



www.donaldson.com

## Sterile Air & Gas Filter (P)-SRF N Certificate of Conformance

We confirm that the Donaldson Filtration Deutschland high efficiency filter element

Type:	(P)-SRF N
Filter media:	Borosilicate
Absolute retention rate:	99,99998% at 0.2µm, 99,999998% at 0.02µm
Support material:	Stainless steel

is produced, packaged and shipped in a facility, whose Quality Management System is approved by an accredited registering body to the appropriate ISO9000 Quality Systems Standard and, at a minimum, conforms with exact quality and performance standards as specified in product data sheets. No changes in critical filter specifications will be made without notification in advance. All products have been inspected and released by Quality Assurance as having met the following requirements:

- All materials used in this filter construction are cited for food contact use in Code of Federal Regulations (CFR) Title 21, Part 177.2260, 177.2600 & 211.65 issued by the Food and Drug Administration (FDA).
- All materials used in this filter construction have been tested and approved for indirect food contact use according to the European Guideline EC/1935/2004.
- The filter elements are completely assembled, tested and packaged in an accredited DIN EN ISO 9001 facility.
- Each filter element (P)-SRF is controlled and 100% integrity tested according to EN ISO 1822.
- The integrity of each element (P)-SRF is tested by a Paraffin aerosol challenge test according to EN ISO 1822 and ASTM D 2986-91. The Paraffin oil used in this test is approved for Food Contact by the FDA according to CFR Title 21, Part 175.250.
- All filter elements are manufactured from high quality, non-toxic as well as biologically inert raw materials.
- This filter element was manufactured with a Borosilicate filter matrix which meets the criteria for a "non-fibre" releasing filter as defined in 21 CFR 210.3 (b)(6).
- All "plastic" – related component materials have been tested and meet the criteria for the USP Class VI Biological Test for Plastics.
- The filter element can be steam sterilized in both directions.
- The typical flow rate of a 10" filter element of this type is equal to or larger than 400 Nm<sup>3</sup>/h at a differential pressure of 50 mbar at 8 bar abs (20°C).
- All delivered filter elements (P)-SRF, (P)-SRF N and (P)-BE are not sterilized by plant.
- Do **NOT** use organic solvents to clean or disinfect the element prior to use!

A handwritten signature in black ink, appearing to read 'P. Schwarz'.

Product Line Manager Process Filtration  
Dr. P. Schwarz  
Haan, March 2012

A handwritten signature in black ink, appearing to read 'M. Pohlmann'.

Quality Representative  
M. Pohlmann

Donaldson Filtration Deutschland GmbH  
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D-42781 Haan  
Germany



www.donaldson.com

## Steriler Luft- und Gasfilter (P)-SRF N Konformitätszertifikat

Hiermit wird bestätigt, dass nachstehendes Filterelement der Donaldson Filtration Deutschland GmbH

Typ:	(P)-SRF N
Filtermedium:	Borosilikat
Absolute Abscheiderate:	99,99998% bei 0,2µm, 99,999998% bei 0,02µm
Stützgewebe:	Edelstahl

in einem Unternehmen produziert, verpackt und versendet wird, dessen Qualitätsmanagementsystem von einer akkreditierten Stelle nach dem Qualitätsstandardsystem ISO9000 genehmigt ist. Das Produkt entspricht in exakter Weise den Qualitäts- & Leistungsdaten, die in der Produktspezifikation hinterlegt sind. Änderungen in kritischen, produktspezifischen Eigenschaften werden nicht ohne vorherige Ankündigung durchgeführt. Alle Produkte werden von der Qualitätssicherung kontrolliert und freigegeben und entsprechen nachstehenden Kriterien:

- Alle verwendeten Materialien, sind für den Kontakt mit Lebensmitteln gemäß dem Code of Federal Regulations (CFR) Title 21, Part 177.2260, 177.2600, 177.1550 & 211.65, der von der Food and Drug Administration (FDA) herausgegeben wird, geeignet.
- Alle verwendeten Materialien, wurden nach der europäischen Richtlinie EC/1935/2004 für den indirekten Lebensmittelkontakt getestet und zugelassen.
- Die Filterelemente werden gemäß DIN EN ISO 9001 komplett hergestellt, getestet und verpackt.
- Jedes (P)-SRF N Filterelement wird kontrolliert und gemäß EN ISO 1822 100% auf Integrität getestet.
- Der Integritätstest jedes (P)-SRF N Elements ist nach der EN ISO 1822 und ASTM D 2986-91 mit einem Paraffinaerosoltest durchgeführt. Das Paraffinöl, das in diesem Test verwendet wird, ist gemäß der FDA nach CFR Title, Part 175.250 für den Lebensmittelkontakt geeignet.
- Alle Filterelemente werden aus hochwertigen, nicht toxischen und biologisch inerten Rohmaterialien gefertigt.
- Die extrahierbaren Bestandteile des Filters betragen 35mg oder weniger bei einem 10" Element nach 24h bei 20°C in 70/30% IPA/Wasser Gemisch.
- Dieses Filterelement wurde aus einer Borosilikat - Filtermatrix hergestellt, die die Kriterien eines nicht faserabgebenden Filters, wie sie in 21 CFR 210.3 (b)(6) definiert sind, erfüllt.
- Alle Materialkomponenten, die aus Kunststoff bestehen, wurden getestet und erfüllen die Kriterien der USP Class VI Biological Test für Plastics.
- Das Filterelement kann in beide Richtungen sterilisiert werden.
- Die typische Durchflussrate für ein 10" Element beträgt 400Nm<sup>3</sup>/h oder mehr bei einem Differenzdruck von 50mbar bei 8 bar abs. (20°C).
- Alle gelieferten Filterelemente (P)-SRF, (P)-SRF N und (P)-BE werden nicht im Werk sterilisiert.
- Verwenden Sie keine organischen Lösungsmittel, um das Element vor dem Gebrauch zu reinigen oder zu desinfizieren.

**Produkt Manager, Prozess Filtration**

Dr. P. Schwarz  
Haan, März 2012

**Quality Manager**

M. Pohlmann



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Germany



www.donaldson.com

### Quality certificate

We confirm that the Donaldson Filtration Deutschland high efficiency filter element

Type:	(P)-SRF N
Filter media:	Borosilicate
Absolute retention rate:	99,999998% at 0,2µm, 99,9999998% at 0,02µm
Support material:	Stainless steel

is produced, packaged and shipped under the strictest control, and, at a minimum, conforms with exact quality and performance standards as specified in product data sheets. No changes in critical filter specifications will be made without notification in advance. All products have been inspected and released by Quality Assurance as having met the following requirements:

- The filter elements are completely assembled, tested and packaged in an accredited DIN EN ISO 9001 facility.
- All filter elements are 100% integrity tested according to EN 1822 and ASTM D 2986-91 (Aerosol Challenge Test). The retention rate complies with the product specification of 99,99998% at 0,2µm.
- All components comply to the FDA regulations for food contact use according to CFR (Code of Federal Regulations) Title 21.
- All filter elements are fabricated without the use of binders, adhesives, additives or surface-active agents.
- All filter elements are manufactured from high quality, non-toxic as well as biologically inert raw materials.
- This filter element was manufactured with a Borosilicate filter matrix which meets the criteria for a "non-fibre" releasing filter as defined in 21 CFR 210.3 (b)(6).
- The level of extractables of an 10" cartridge after 24 hours in a 70/30% IPA/Water mixture at 20°C was equal to or less than 35mg.
- The typical flow rate of a 10" filter element of this type is equal to or larger than 400 Nm<sup>3</sup>/h at a differential pressure of 50 mbar at 8 bar abs (20°C).
- All delivered filter elements (P)-SRF, (P)-SRF N and (P)-BE are not sterilized by plant.
- Do **NOT** use organic solvents to clean or disinfect the element prior to use!

Handwritten signature of Dr. P. Schwarz in black ink.

Product Line Manager

Dr. P. Schwarz

Handwritten signature of M. Pohlmann in black ink.

Quality Representative

M. Pohlmann

Haan, September 2009

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## P-SRF N

### Product description:

The P-SRF N is a pleated depth filter for sterile filtration of compressed air, process air, technical gases and vent applications. The retention rate is 99,99998% related to 0,2 µm. The P-SRF N combines great strength, long service life, high safety and high flow rates and can dramatically reduce costs by cartridge usage. All components meet the FDA requirements for the contact with food in accordance with the CFR requirements (Code of Federal Regulations), title 21. The filter is manufactured according to DIN EN ISO 9001.

Materials and CFR Title 21		
Filter Media	Borosilicate glass fibers	177 2260
Coating	PDMS	177 2260
Support	Stainless steel 1.4301	211.56
Cage / Core	Stainless steel 1.4301	211.56
End Caps	Stainless steel 1.4301	211.56
O-Rings	Silicone, EPDM, Buna N	177 2600
Sealing Compound	Silicone	177 2600

### Application:

The P-SRF N sterile filters are designed for the following applications:

- Food & Beverage Industry
- Pharmaceutical Industry
- Biotech Industry
- Health Care
- Aseptic Packaging
- Chemical Industry
- Breweries
- Dairies

**Absolute Retention rate:**  
99,99998% related to 0,2 µm

**Effective Filtration Area (nominal):**

0,84 m<sup>2</sup> per 10" (254 mm) element  
For other sizes see correction factor CF

### Bacterial / Viral Retention:

P-SRF N filter elements have been scientifically validated from an independent institute by:

- Brevundimonas (Pseudomonas) diminuta aerosol challenge, LRV >7 /cm<sup>2</sup>
- MS-2 Coliphages Aerosol Challenge, LRV >9 /cm<sup>2</sup>

### Operating Conditions:

Maximum Differential Pressure:  
5 bar (75psid) (-20°C up to 150°C),  
independent of the system pressure or the flow direction

Typical Continuous Air Service Life: 12 months  
Typical Vent Service Life: 6 months

### Temperature Range:

-20 °C (-4 °F) to 200°C (400°F)  
>150°C (300°F) only for dry compressed air

### Dimensions:

Element size	A [mm]	B [mm]	Ø C * [inch]	Ø D [mm]	CF
03/10	76	11	¾"	52	0,12
04/10	104	11	¾"	52	0,17
04/20	104	14	1"	52	0,17
05/20	128	14	1"	52	<b>0,21</b>
05/25	128	14	1"	62	<b>0,29</b>
07/25	180	14	1"	62	<b>0,42</b>
07/30	180	16	2"	86	<b>0,70</b>
10/30	254	16	2"	86	<b>1,00</b>
15/30	381	16	2"	86	<b>1,28</b>
20/30	510	16	2"	86	<b>2,00</b>
30/30	764	16	2"	86	<b>2,56</b>

\* Plug-type connection with double-o-ring  
CF: Correction Factor filter area

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## Manual for Installation and Sterilization

Applicable to: (P)-SRF, (P)-SRF N, (P)-BE

This document is just a recommendation and will help you to operate and sterilize your Donaldson filter element in an optimum way retaining integrity and extending service life. All methods mentioned below have been tested in day to day practise. Please be aware that all sterilization methods potentially have to be adapted to your system and conditions. Our recommendation will not absolve you from the responsibility to validate your filtration system. Please refer to the manufacturer or to your sales representative for a detailed sterilization guide or if you have any further questions about this manual or other aspects regarding your filtration system.

### **Installation (1. – 6.) & De-installation (7.) of P-SRF N filter elements:**

Donaldson filters are available in a number of different adapter and O-ring configurations designed to fit modern filter housings. The filter should fit snugly in the housing. Improper installation can impair filtration efficiency.

1. Verify that the correct filter part number for the application has been chosen.
2. If autoclave sterilization is used, sterilize the filter in a suitable sterilization bag before installation.
3. Keep the filter in its plastic bag to avoid contaminating the filter element as long as possible. Cut open the bag at the O-ring end. While holding the bagged filter element, if necessary lubricate the O-rings by dipping the O-rings into clean water or other suitable liquid compatible with the process fluid.
4. Line up the open end of the filter element with the housing seat and install using a slight twisting motion while holding the bagged filter near the O-ring end. Verify that the O-rings are fully seated and not twisted. If the cartridge has locking tabs, rotate the tabs into place with a clockwise motion until engaged. **Attention: only rotate cartridges while firmly grasping the O-ring end of the cartridge to prevent excessive torque damage to the filter (Picture 1 – 2).**
5. Repeat with additional filters. Remove protective bags from the filter elements. If present, install filter retainer system (plate or spring). Reassemble housing.
6. If inline sterilization is used, sterilize the filter before the first use.
7. To uninstall the element (e.g. for autoclave sterilization), grasp the filter firmly at the O-ring end and rotate it anticlockwise to release locking tabs. Pull the element carefully out of the seat in vertical direction using a slight twisting motion. **Avoid to cant the cartridge to prevent damage to the filter (Picture 3 – 4).**

### **Sterilization:**

The sterilization time for inline-sterilization of filter cartridges differs depending on the used sterilization temperature. The complete sterilization cycle time consists of a heating and a cooling phase plus the sterilization phase.

θ in °C	Sterilization phase	Heating & cooling phase	Entire sterilization cycle
121 - 125	30 min.	15 min. & 15 min.	60 min.
131 – 135	15 min.	15 min. & 15 min.	45 min.
141	10 min.	15 min. & 15 min.	40 min.

These sterilization times are valid for both steam in place and autoclave sterilization.

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### **Inline-Sterilization (Steam in Place):**

For Steaming in Place (SIP), the steam should be free of rust and other particulates. The housing should be cleaned before the cartridge is installed. To assure sterilization, steam pressure in the assembly must not be allowed to fall below 15 psi (1 bar) or 250°F (121°C). Condensate should be drained from the system during sterilization.

- Always vent trapped air from the housing.
- Upstream and downstream gauges must be provided to verify that the differential pressure across the filter does not exceed 5 psi (0,3 bar) during any of the sterilization steps.
- Drain condensate from the housing and pipes during sterilization.
- Fill the housing with the process liquid with air that has the same pressure as the used steam.
- Allow the system to cool and keep the system under pressure until ready for use.

Always use the lowest possible sterilizing temperature to avoid surplus stress on the element.

### **Autoclave sterilization:**

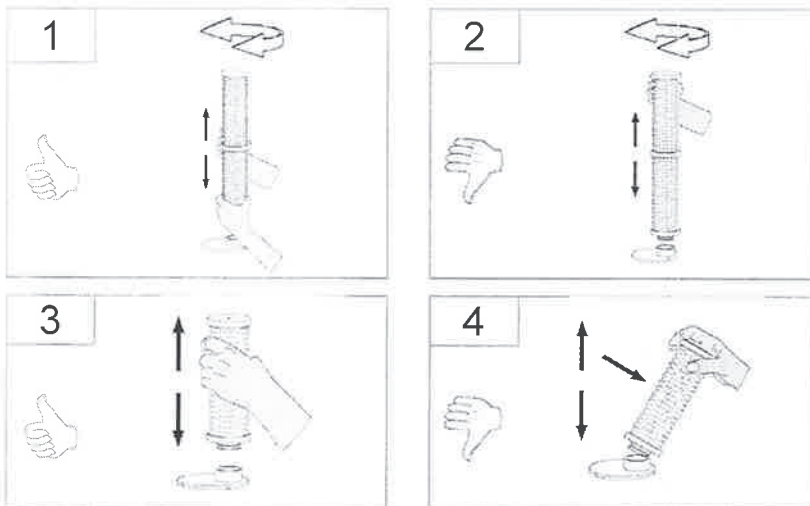
It is possible to sterilize the cartridge only or cartridge and housing together in an autoclave.

- To sterilize the filter element only, use a special sterilizing bag and insert it into the autoclave. The O-ring end should face down to allow condensate to flow out. Sterilize and dry the filter, then install it again using aseptic techniques.
- To sterilize both, filter element and housing, install the cartridge into the housing. Rinse the filter thoroughly with clean water and cover the inlet and outlet of the housing with autoclave wrap or aluminium foil. Vent and valve drains should be open. Sterilize the assembly, then allow the housing to cool and dry before aseptic installation.

After sterilization, integrity test the filter if desired.

### **Element drying:**

To avoid damage of the filter after sterilization, start the fluid flow slowly. Allow the element to dry for several minutes, meanwhile keeping the flow so low as to maintain a differential pressure below 7 psi (0,5 bar).



## **FICHE TECHNIQUE**

**Article Numéro: 453536**

**Univer AG  
Sumpfstasse 26  
6312 Steinhausen**

Pos.	Article Numéro	Quantité	Désignation
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### **Unité de préparation d'air 'ATEX'**

**U20090300b**

**v/no 453536**

**composé par:**

- 1 UNIVER-Filtre  
F.01 HA4 G1/4
- 1 UNIVER-Régulateur  
R.01 G1/4 0,2 – 6 bar
- 1 Tecsis-Manomètre  
P1415B073001  
0 – 4 bar, ø40, G1/8 arrière
- 1 UNIVER-Distributeur étroit  
Z.01 G1/4
- 1 Layher-Pressostat  
405 002 112 11  
0,3 – 2 bar, G1/8
- 1 Joint en Polyamid  
RA 080 1/8
- 1 UNIVER-Equerre de fixation  
ZW.00
- 2 UNIVER-Joints d'assemblage  
KP.00
- 1 Sistem P-Mamelon conique  
S10440 G1/4 – G1/4



Projet / Projekt / Project: PRO-14-0055 .....

Type / Typ / Type : OscilloWitt-3 .....

N° de série / Serien Nr. / Serial Nr.: 140055-254 .....

Client / Kunde / Customer : Novartis Pharmaceutical Manufacturing ; SG-Singapore .....

**Cleaning certificate for welding**

We confirm that all the welding manufactured by Frewitt or a sub-manufacturer of Frewitt is cleaned by acid or an equivalent process.

**This cleaning is conform to the requirement of NSPM.**

**Edouard Gummy**

Project Manager

Granges-Paccot, le 19.09.2014





N° Série:

Serien-Nr.

Serial Nr.

140055-254

REF: 474201-CMA

Appareil de mesure / Messapparat / Measuring unit : Mitutoyo Sufitest SJ-301

N° série / Serien-Nr. / Serial Nr. : 400197

N° Etalon / Massstab-Nr. / Standard Nr. : 522

Position de mesure: Intérieur Extérieur

Massnahmenposition: I = innen E = Aussen

Measure position: Inside Outside

Ref	Position mesure Massnahmenposition Measure position	Mesure N° Mass Nr. Measure Nr.	Norme Norm Stand	Profil Profil Profile	Filtre Filter Filter	Eva.-L Ausw.-L Eva.-L	λC	N	Vitesse Gesch. Speed	Drive Vorschub Drive	Ra
<b>Pos.1</b>											
440334	E	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.19um
440334	E	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.18um
<b>Pos.2</b>											
440334	E	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.21um
440334	E	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.22um
<b>Pos.100</b>											
460090	I	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.11um
460090	I	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.05um
<b>Pos.101</b>											
462358	E	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.21um
462358	E	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.23um
<b>Pos.102</b>											
462358	E	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.10um
462358	E	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.15um
<b>Pos.103</b>											
443474	E	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.16um
443474	E	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.22um
<b>Pos.104</b>											
464645	I	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.17um
464645	I	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.20um
<b>Pos.107</b>											
455814	I	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.24um
455814	I	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.30um
<b>Pos.108</b>											
466518	I	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.18um
466518	I	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.06um
<b>Pos.109</b>											
474202	I	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.10um
474202	I	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.10um
<b>Pos.110</b>											
471380	I	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.16um
471380	I	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.09um
<b>Pos.111</b>											
474209	I	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.12um
474209	I	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.06um
<b>Pos.112</b>											
475517	I	1	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.11um
475517	I	2	JIS2001	R	GAUSS	4.0mm	0.8mm	5.00	0.5mm/s	STAND	0.15um

Protocole établi par (visa)  
Protokoll erstellt von (Visa)  
Report established by (Visa)

B.GAILLARD

*Gaillard* le  
am  
on

16-09-2014



Client:

Kunde:

Customer:

Novartis Pharma SG-Singapore

N° Série:

Serien-Nr.  
140055-254

Serial Nr.

Description	Beschreibung	Description
Diamètre / carré des trous des Tôles perforées / Tamis conique / Treillis	Durchmesser / Viereck der Löcher der perforierten Bleche / Konischelochbleche / Siebe	Diameter / square of the holes of the Perforated sheets / Conical sieve / Sieve
Critère	Kriterium	Criterion
±10% du diamètre / carré des trous	±10% des Durchmessers / Viereck der Löcher	±10% of the diameter / square of holes

Outillage N° Werkzeug-Nr Tool Nr	Perforation Oeffnungen Perforation Ø / ■ [mm]	Critère Kriterium Criterion	Remarques Bemerkung Remarks
463931	0.5	0.45 - 0.55	OK

Etabli par (visa) Erstellt von (Visa) Established by (Visa)	H. Rey		le am on	16.09.2014
---	--------	--	----------------	------------



**Client:****Kunde:****Customer:****Novartis Pharma  SG-Singapore****N° Série:****Serien-Nr.  
140055-254****Serial Nr.**

Appareil de mesure / Messapparat / Measuring unit :	Testo 815
N° série / Serien-Nr. / Serial Nr. :	30811293/105
Norme / Norm / Standard :	dBA (DIN45635)

**Conditions de mesure**

La mesure est faite:

- à 1m
- à hauteur de la chambre de broyage
- à vitesse max.
- avec l'outillage monté
- avec les accessoires montés
- à vide (sans produit)

**Messbedingungen**

Die Messung wird gemacht:

- bei einer Distanz von 1 m
- auf Mahlkammerhöhe
- mit maximaler  
Geschwindigkeit
- mit montiertem Werkzeug
- mit montiertem Ein- und  
Auslaufzubehör

**Measuring conditions**

Measurement is made:

- at a distance of 1 m
- at height of milling chamber
- with maximum speed
- with installed tools
- with installed inlet and outlet  
accessories

**Lp [dBA] : 60.80****Protocole établi par (visa)  
Protokoll erstellt von (Visa)  
Report established by (Visa)**

H. Rey

**le  
am  
on** 16.09.14









**Voir documents suivants****Siehe folgende Dokumente****See following documents**

*(Certificats sont placés dans  
l'ordre croissant)*

*(in aufsteigender Reihenfolge)*

*(in ascending order)*





# Certificate of calibration No. 258-16620-1

*Translation*

*Subject*

**Revolution counter**  
Jaquet, DHO 907  
S/N 0606.214692, METAS 411967

*Order*

Calibration at different speed of rotation

*Applicant*

Frewitt Fabrique de Machines SA  
Route du Coteau 7  
1763 Granges-Paccot

*Traceability*

The reported measurement values are traceable to national standards and thus to internationally supported realizations of the SI-units.

*Date of calibration*

31.07.2012

*Marking*

Calibration label METAS 07/12

3003 Bern-Wabern, 3. April 2013

For the Measurements

Nikola Misic

Sector Traffic, Acoustics and Vibration

Walter Fasel, Head of Sector

## Certificate of calibration No. 258-16620-1

### Extent of the Calibration

The revolution counter was tested on your desired or in a specific measuring range by different revolutions per minutes (rpm).

### Measurement Procedure

The revolution counter has been tested according to the design with a mechanical speed encoder or with electronic or optical signals.

### Measurement Conditions

Temperature ambient:  $(22 \pm 2)$  °C.

### Measurement Results

A table and a detailed diagram can be found in the appendix.  
The diameter of the perambulator is:  $48.45 \pm 0.1$  mm.

### Uncertainty of Measurement

The reported uncertainty of measurement is stated as the combined standard uncertainty multiplied by a coverage factor  $k = 2$ . The measured value ( $y$ ) and the associated expanded uncertainty ( $U$ ) represent the interval  $(y \pm U)$  which contains the value of the measured quantity with a probability of approximately 95 %. The uncertainty was estimated following the guidelines of the ISO (GUM:1995).

The measurement uncertainty contains contributions originating from the measurement standard, from the calibration method, from the environmental conditions and from the object being calibrated. The long-term characteristic of the object being calibrated is not included.

Model: **Jaquet**  
Type: **DHO 907**

Metas Nr.: **411967**  
Serial Nr.: **06.06.214692**

Appendix

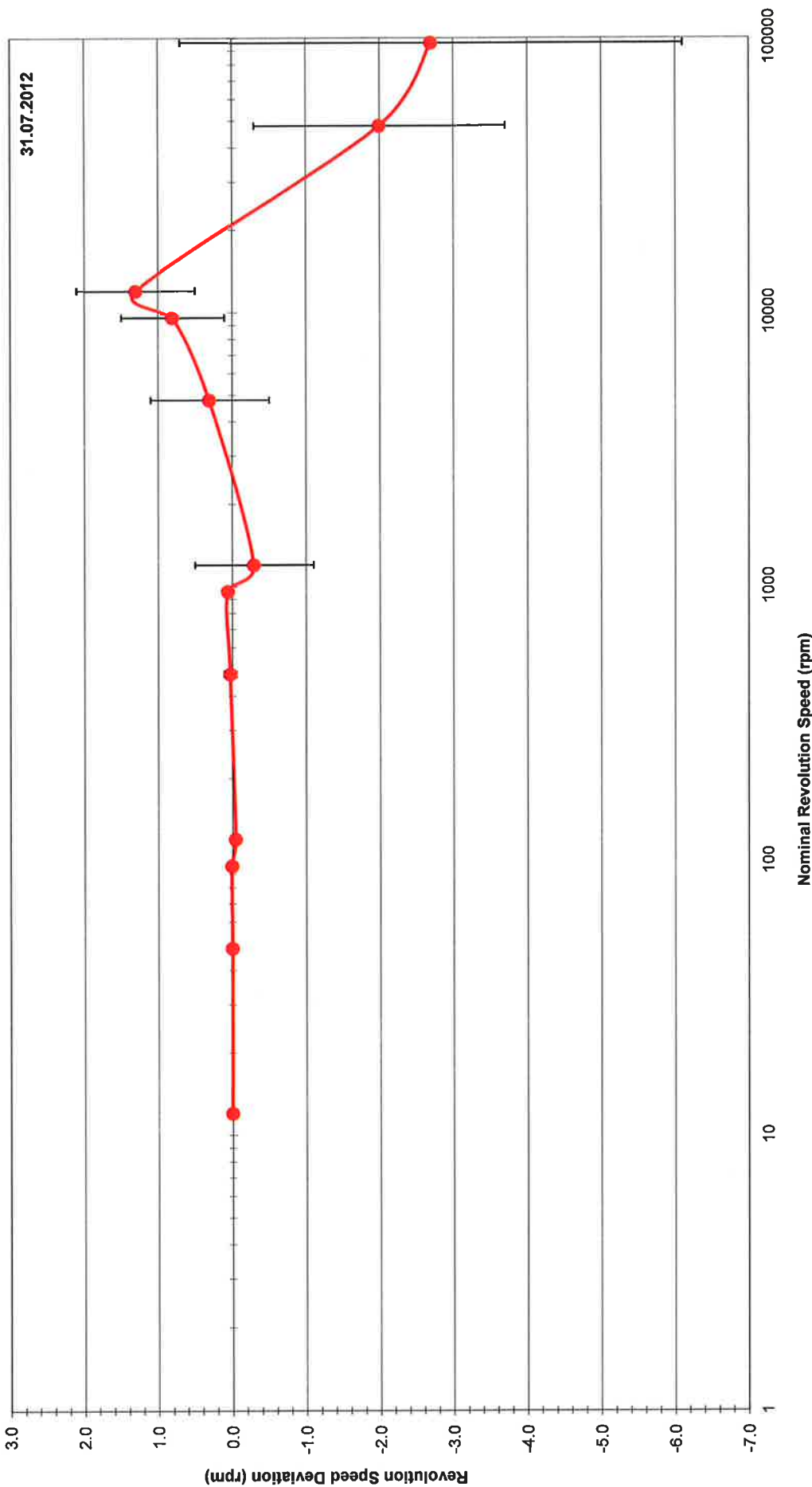
31.07.2012

## Measurement Results

Rotation speed Range	Deviation rpm	Uncertainty of measure ± rpm
12	-0.005	0.007
48	-0.005	0.007
96	0	0.008
120	-0.05	0.07
480	0.02	0.08
960	0.05	0.07
1200	-0.3	0.8
4800	0.3	0.8
9600	0.8	0.7
12000	1.3	0.8
48000	-2	1.7
96000	-2.7	3.4

The specified values represent the mean value from 6 measurements.

Model: **Jaquet**      Type: **DHO 907**      Metas Nr.: **411967**      Serial Nr.: **06.06.214692**





Kalibrier-Zertifikat

Calibration certificate

802357

Gegenstand Object	testo 815 Schallpegel- Messgerät	---
Hersteller manufacturer	Testo AG	---
Typ Type	0563 8155	---
Serien Nr. serial no.	30811293/105	---
Inventar Nr. inventory no.	---	---
Prüfmittel Nr. test equipment no.	---	---
Equipment Nr. equipment no.	11330550	---
Standort location	---	---
Auftraggeber customer	Frewitt Fabrique de Machines CH-1763 Granges-Paccot	
Kunden Nr. customer ID no	39	
Auftrags Nr. order no.	5874746 / 0520 0111	
Datum der Kalibrierung date of calibration	08.02.2012	

Hiermit bestätigen wir, dass das durchführende Kalibrierlabor ein Managementsystem nach ISO 9001:2008, sowie ISO/IEC 17025:2005 eingeführt hat. Die Urkunden finden Sie auf [www.testo-industrial-services.de](http://www.testo-industrial-services.de). Die für die Kalibrierung verwendeten Messeinrichtungen werden regelmäßig kalibriert und sind rückführbar auf die nationalen Normale der Physikalisch Technischen Bundesanstalt (PTB) Deutschlands oder auf andere nationale Normale. Wo keine nationalen Normale existieren, entspricht das Messverfahren den derzeit gültigen technischen Regeln und Normen. Die für diesen Vorgang angefertigte Dokumentation kann eingesehen werden. Alle erforderlichen Messdaten sind auf der(n) nachfolgenden Seite(n) dieses Kalibrier-Zertifikats aufgelistet.

Hereby we confirm that the performing calibration laboratory is working with a management system according to ISO 9001:2008 and ISO/IEC 17025:2005. Accreditation certificates can be found under [www.testo-industrial-services.de](http://www.testo-industrial-services.de). The measuring installations used for calibration are regularly calibrated and traceable to the national standards of the German Federal Physical Technical Institute (PTB) or other national standards. Should no national standards exist, the measuring procedure corresponds with the technical regulations and norms valid at the time of the measurement. The documents established for this procedure are available for viewing. All the necessary measured data can be found on the following page(s) of this calibration certificate.

Datum der empfohlenen Rekalibrierung  
Date of the recommended re-calibration

**Konformitätsaussage** conformity

- Messwert(e) innerhalb der zulässigen Abweichung<sup>1</sup>. Measured value(s) within the allowable deviation<sup>1</sup>.
- Messwert(e) außerhalb der zulässigen Abweichung<sup>1</sup>. Measured value(s) outside of the allowable deviation<sup>1</sup>.

<sup>1</sup>) Die Messunsicherheit wurde nach GUM mit dem Erweiterungsfaktor k=2 berechnet und enthält die Unsicherheit des Verfahrens sowie die Unsicherheit des Prüflings. Die Konformitätsaussage erfolgte nach DIN EN ISO 14253-1 gemäß der Kalibrieranweisung QSA 7.5-02.

<sup>1</sup>) The measurement uncertainty was calculated according to the regulations of GUM with the coverage factor k=2 and contains the uncertainty of the measuring procedure and the uncertainty of the measuring system. The statement of conformity was made according to DIN EN ISO 14253-1 according to calibration instruction QSA 7.5-02.

Dieser Kalibrierschein darf nur vollständig weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.  
This calibration certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without signature and seal are not valid.

Stempel seal



Fachverantwortlicher supervisor

*Tim Tröndle*  
Tim Tröndle

Bearbeiter technician

*S. Rast*  
Sabine Rast



# Kalibrier-Zertifikat Calibration certificate

# 802357

## Messeinrichtungen measuring equipment

Referenz reference	Rückführung traceability	Rekal. next cal.	Zertifikat-Nr. certificate-no	Eq.-Nr. eq. no.
Schallpegelkalibrator 4226 Sound level calibrator 4226	DKD-K-27801 2010-11	2012-11	580076	10113317

\*Referenzzertifikate sind auf [www.primasonline.de](http://www.primasonline.de) abrufbar Reference certificates are available at [www.primasonline.com](http://www.primasonline.com)

## Umgebungsbedingungen ambient conditions

Temperatur temperature	(20...26) °C	Druck pressure	(940...990) hPa
Feuchte humidity	(20...60) % rF % RH	Luftdichte air density	- - - kg/m <sup>3</sup>

## Messverfahren measuring procedure

Kalibrierung erfolgt mit Schalldruckkalibrator bei 94 dB(A) nach DIN EN 61672-1.  
Calibration took place with a sound level calibrator by 94 db(A) according to DIN EN 61672-1.

## Messergebnisse measuring results

Messwert Referenz measured value reference	angezeigter Messwert Kalibriergegenstand indicated measured value probe	Abweichung deviation	zulässige Abweichung <sup>2)</sup> allowed deviation <sup>2)</sup>	Gesamt- Messunsicherheit total uncertainty of measuring	Bewertung confirmation	Messein- richtung EQ-Nr. measuring EQ-no.
94,0 dB(A)/63Hz	92,9 dB(A)/63Hz	-1,1 dB(A)/63Hz	± 2,1 dB(A)/63Hz	0,52 dB(A)/63Hz	o.k.	10113317
94,0 dB(A)/125Hz	92,8 dB(A)/125Hz	-1,2 dB(A)/125Hz	± 1,6 dB(A)/125Hz	0,52 dB(A)/125Hz	o.k.	10113317
94,0 dB(A)/250Hz	92,4 dB(A)/250Hz	-1,6 dB(A)/250Hz	± 1,6 dB(A)/250Hz	0,52 dB(A)/250Hz	o.k.	10113317
94,0 dB(A)/500Hz	92,4 dB(A)/500Hz	-1,6 dB(A)/500Hz	± 1,6 dB(A)/500Hz	0,52 dB(A)/500Hz	o.k.	10113317
94,0 dB(A)/1kHz	92,6 dB(A)/1kHz	-1,4 dB(A)/1kHz	± 1,6 dB(A)/1kHz	0,52 dB(A)/1kHz	o.k.	10113317
94,0 dB(A)/2kHz	93,4 dB(A)/2kHz	-0,6 dB(A)/2kHz	± 2,1 dB(A)/2kHz	0,52 dB(A)/2kHz	o.k.	10113317
94,0 dB(A)/4kHz	94,8 dB(A)/4kHz	0,8 dB(A)/4kHz	± 3,1 dB(A)/4kHz	0,52 dB(A)/4kHz	o.k.	10113317
94,0 dB(A)/8kHz	98,3 dB(A)/8kHz	4,3 dB(A)/8kHz	± 5,1 dB(A)/8kHz	0,52 dB(A)/8kHz	o.k.	10113317

<sup>2)</sup> gemäß Hersteller in accordance with the manufacturer

## Besondere Bemerkungen special remarks

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# Certificate of Calibration



N° de Certificat : S - 140917-7R

Nous attestons que l'instrument ci-dessous atteint ou dépasse les spécifications électriques publiées par le fabricant, sur tous les points mesurés. Toutes les mesures sont traçables par des standards nationaux ou internationaux, ou ont été dérivées par une technique approuvée.

We certify that the below instrument meets or exceeds the manufacturers published electrical specifications at the points tested. All measurement are traceable to national or international standards or have been derived by approved ratio technique.

Page 1 de / of 1

## CALIBRATION INFORMATION

**Type / Model:** FLUKE 87

**N° de série / Serial Number:** 60321248

**N° d'inventaire / Asset Number:** 111

**Client / Customer :** FREWITT SA

**N° de Commande / Work Order :** 14-199

**Date de l'étalonnage:** 17 septembre 2014

## STANDARDS USED FOR CALIBRATION


Serial number	Description	Cal. Date	Due Date
8170006	Fluke 5520A Multi product calibrator	10.06.2014	10.06.2015

Renato Ricci

Signed: 

# Report of Calibration

## Servilec SA

UNIT UNDER TEST :	FLUKE 87	
SERIAL NUMBER :	60321248	
ASSET NUMBER :	111	
CERTIFICATE N° :	S-140917-7R	
CUSTOMER :	FREWITT SA	
TEMPERATURE :	23.7 °C	
HUMIDITY :	56 %	
TEST RESULT :	<b>PASS</b>	
PERFORMED ON :	17.09.2014	
CALIBRATED BY :	Renato Ricci	

REMARKS:

Page 1 de 4

### Standards Used

Serial number	Description	Cal Date	Due Date
8170006	Fluke 5520A Multi product calibrator	10.06.2014	10.06.2015

### Test Data

Test	Parameter	----- Unit Under Test -----			ERROR in	
		Reading	Tolerance	UUT Error	(% of TOL)	User
DISPLAY TEST						
	Result of Operator Evaluation					Pass
Root Difference Square guardbanding method used						
AC VOLTAGE TESTS						
400mV Range						
2	350.0 mV @ 60 Hz	349.2mV	2.90mV	-0.229%	28%	Pass
3	350.0 mV @ 1 kHz	349.0mV	3.90mV	-0.286%	26%	Pass
4	350.0 mV @ 5 kHz	346.7mV	7.40mV	-0.943%	45%	Pass
5	350.0 mV @ 20 kHz	349.2mV	9.00mV	-0.229%	9%	Pass
4V Range						
6	3.500 V @ 60 Hz	3.494V	27.00mV	-0.171%	22%	Pass
7	3.500 V @ 1 kHz	3.491V	39.00mV	-0.257%	23%	Pass
8	3.500 V @ 5 kHz	3.464V	74.00mV	-1.03%	49%	Pass

Test	Parameter	----- Unit Under Test -----			ERROR in (% of TOL)	User
		Reading	Tolerance	UUT Error		
9	3.500 V @ 20 kHz	3.466V	90.00mV	-0.971%	38%	Pass
40V Range						
10	35.00 V @ 60 Hz	34.94V	270.00mV	-0.171%	22%	Pass
11	35.00 V @ 1 kHz	35.00V	390.00mV	0.00ppm	0%	Pass
12	35.00 V @ 5 kHz	34.96V	740.00mV	-0.114%	5%	Pass
13	35.00 V @ 20 kHz	34.92V	900.00mV	-0.229%	9%	Pass
400V Range						
14	350.0 V @ 60 Hz	349.4V	2.70V	-0.171%	22%	Pass
15	350.0 V @ 1 kHz	350.1V	3.90V	286ppm	3%	Pass
16	350.0 V @ 5 kHz	349.8V	7.40V	-571ppm	3%	Pass
17	100.0 V @ 20 kHz	99.7V	4.00V	-0.300%	8%	Pass
18	200.0 V @ 20 kHz	200.2V	6.00V	0.100%	3%	Pass
19	300.0 V @ 20 kHz	300.2V	8.00V	667ppm	3%	Pass
20	350.0 V @ 10 kHz	349.0V	9.00V	-0.286%	11%	Pass
1000V Range						
21	900 V @ 60 Hz	903V	8.00V	0.333%	38%	Pass
22	900 V @ 1 kHz	905V	13.00V	0.556%	39%	Pass
23	900 V @ 5 kHz	904V	22.00V	0.444%	18%	Pass
FREQUENCY TESTS *						
19.999kHz Range						
24	19.000 kHz @ 150 mV	18.999kHz	2.00Hz	-52.6ppm	50%	Pass
199.99kHz Range						
25	190.00 kHz @ 150 mV	189.99kHz	20.00Hz	-52.6ppm	50%	Pass
DC VOLTAGE TESTS						
4V Range						
26	3.500 V	3.502V	5.00mV	571ppm	40%	Pass
40V Range						
27	35.00 V	35.02V	50.00mV	571ppm	40%	Pass
28	-35.00 V	-35.02V	50.00mV	571ppm	40%	Pass
400V Range						
29	350.0 V	350.2V	500.00mV	571ppm	40%	Pass
1000V Range						
30	1000 V	1001V	2.00V	0.100%	50%	Pass
DC MILLIVOLT TEST						

Test	Parameter	----- Unit Under Test -----			ERROR in (% of TOL)	User
		Reading	Tolerance	UUT Error		
400mV Range						
31	350.0 mV	350.2mV	500.00uV	571ppm	40%	Pass
RESISTANCE TESTS						
400 Ohm Range						
32	190.0 Ohm	190.10hm	500.00mOhm	526ppm	20%	Pass
40 kOhm Range						
33	19.00 kOhm	19.01kOhm	50.00Ohm	526ppm	20%	Pass
4 MOhm Range						
34	1.900 MOhm	1.902MOhm	5.00kOhm	0.105%	40%	Pass
40 MOhm Range						
35	19.00 MOhm	19.03MOhm	220.00kOhm	0.158%	14%	Pass
CONDUCTANCE TEST						
40nS Range						
36	10.00 nS	9.96nS	200.00pS	-0.400%	20%	Pass
CAPACITANCE TESTS *						
5.00uF Range						
37	1.00 µF	0.98µF	30.00mF	-2.00%	67%	Pass
0.500uF Range						
38	0.470 µF	0.468µF	7.00mF	-0.426%	29%	Pass
0.0500uF Range						
39	0.0470 µF	0.0471µF	700.00uF	0.213%	14%	Pass
DIODE TEST						
40	3.000 V	2.991V	61.00mV	-0.300%	15%	Pass
AC DC MILLIAMP TESTS						
40mA Range						
41	35.00 mA	35.02mA	90.00uA	571ppm	22%	Pass
400mA Range						
42	350.0 mA	350.1mA	900.00uA	286ppm	11%	Pass
40mA Range						
43	35.00 mA @ 60 Hz	34.97mA	370.00uA	-857ppm	8%	Pass

Test	Parameter	----- Unit Under Test -----			ERROR in (% of TOL)	User
		Reading	Tolerance	UUT Error		
44	35.00 mA @ 1 kHz	35.02mA	370.00uA	571ppm	5%	Pass
4 00mA Range						
45	350.0 mA @ 60 Hz	349.9mA	3.70mA	-286ppm	3%	Pass
46	350.0 mA @ 1 kHz	350.4mA	3.70mA	0.114%	11%	Pass
AC DC MICROAMP TESTS						
400uA Range						
47	350.0 µA	350.3µA	1.00uA	857ppm	30%	Pass
4000uA Range						
48	3500 µA	3500µA	9.00uA	0.00ppm	0%	Pass
400uA Range						
49	350.0 µA @ 60 Hz	349.6µA	3.70uA	-0.114%	11%	Pass
50	350.0 µA @ 1 kHz	350.1µA	3.70uA	286ppm	3%	Pass
4000uA Range						
51	3500 µA @ 60 Hz	3498µA	37.00uA	-571ppm	5%	Pass
52	3500 µA @ 1 kHz	3502µA	37.00uA	571ppm	5%	Pass
AC DC AMP TESTS						
4000mA Range						
53	3500 mA	3501mA	9.00mA	286ppm	11%	Pass 4.00
10A Range						
10A Range						
54	10.00 A	10.00A	40.00mA	0.00ppm	0%	Pass
4000mA Range						
55	3500 mA @ 60 Hz	3496mA	37.00mA	-0.114%	11%	Pass
56	3500 mA @ 1 kHz	3502mA	37.00mA	571ppm	5%	Pass
10A Range						
57	10.00 A @ 60 Hz	10.05A	120.00mA	0.500%	42%	Pass
58	10.00 A @ 1 kHz	10.06A	120.00mA	0.600%	50%	Pass

**End of Test Data**





**ELS-Elektronik GmbH**  
**Kalibrier- und Kundenservice**

Wiesenstrasse 7  
CH-5412 Gebenstorf  
Phone ++41 (0)44 856 14 92  
Fax ++41 (0)44 856 16 67  
elscal@elscal.ch www.elscal.ch

Von der Schweizerischen Akkreditierungsstelle akkreditierte Kalibrierstelle  
Calibration Laboratory accredited by the Swiss Accreditation Service

The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates



S Schweizerischer Kalibrierdienst  
C Service suisse d'étalonnage  
S Swiss Calibration Service

Akkreditierungs Nr. **SCS 042**  
ISO / IEC 17025

Auftragsnummer: **6724**  
Order number:

Zertifikat Nr.: **11854**  
Certificate nr.:

**SCS Kalibrier-Zertifikat**  
**SCS Certificate of Calibration**

Page 1 of 4 pages

Gegenstand: Sicherheitstester  
Object:

Hersteller: GMC  
Manufacturer:

Typ: Profitest 204  
Model:

Ident. Nummer: M55228968  
Ident. number:

Auftraggeber: GMC-Instruments Schweiz AG 8052 Zürich  
Customer:

Bemerkungen: Kalibration gemäss Messprotokoll. Sämtliche Messwerte liegen innerhalb der  
Remarks: spezifizierten Toleranzen.

Datum der Kalibrierung: 14.04.14  
Date of calibration:

ELS-Elektronik GmbH  
CH-5412 Gebenstorf

Leiter der Kalibrierstelle:  
Head of Calibration Laboratory:

Datum / Date:

*15. April 2014*

Karl Haus

Dieses Kalibrierzertifikat darf ohne die schriftliche Zustimmung des Laboratoriums nicht auszugsweise vervielfältigt werden.  
Dieses Kalibrierzertifikat dokumentiert die Rückführbarkeit auf nationale Normale zur Darstellung der physikalischen Einheiten (SI).

This calibration certificate shall not be reproduced except in full, without written approval of the laboratory.  
This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).

Auftragsnummer: **6724**  
Order number:Zertifikat Nr.: **11854**  
Certificate nr.:

---

**Kalibrierresultate / Calibration Results:**

Die angegebene erweiterte Messunsicherheit ist die Standardunsicherheit der Messung multipliziert mit einem Erweiterungsfaktor  $k = 2$ , was für eine Normalverteilung einem Vertrauensniveau von etwa 95 % entspricht.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k = 2$ , which for a normal distribution corresponds to a coverage probability of approximately 95 %.

**Test Conditions:** Lab temperature  $23^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , relative humidity  $45 \pm 10 \%$

---

Object: Sicherheitstester  
Manufacturer: GMC  
Model: Profitest 204  
Ident. number: M55228968

**Measurement Instruments used:**

Manufacturer / Model	Ident. number	last calibration
Electrical Safety Calibrator Fluke 5320 A	S/N 510900307	23.05.2013
Calibrator Fluke 5500 A	6425024	08.08.2013





Auftragsnummer: **6724**  
Order number:

Zertifikat Nr.: **11854**  
Certificate nr.:

Nominal value	Indicated UUT	Dim.	Frequenz	Range	Deviation	Measurement uncertainty	Test
Angelegter Wert	Anzeige Prüfling			Bereich	Abweichung	Mess-unsicherheit	
<b>Protective conductor resistance</b>							
<b>Schutzleiterprüfung</b>							
<i>IAC measured at</i>							
IAC gemessen an 0.0979 Ohm 10.6 Aac						6.21E-03	OK
286.7	287	mOhm	50 Hz		0.11%	3.98E-03	OK
<b>Insulation resistance</b>							
<b>Isolationsprüfung</b>							
Isolationsprüfung				100 Vdc			
UIISO gemessen an 10 MOhm: 126 Vdc						1.59E-02	OK
<i>UIISO measured at</i>							
1.00	1.00	MOhm	DC	100 V	0.00%	1.15E-02	OK
10.00	10.00				0.00%	1.17E-03	OK
50.00	50.3				0.60%	2.74E-03	OK
<b>Insulation resistance</b>							
<b>Isolationsprüfung</b>							
Isolationsprüfung				250 Vdc			
UIISO gemessen an 10 MOhm: 291 Vdc						6.91E-03	OK
<i>UIISO measured at</i>							
1.00	1.00	MOhm	DC	250 V	0.00%	1.15E-02	OK
10.00	10.00				0.00%	1.17E-03	OK
50.00	50.0				0.00%	2.75E-03	OK
<b>Insulation resistance</b>							
<b>Isolationsprüfung</b>							
Isolationsprüfung				500 Vdc			
UIISO gemessen an 10 MOhm: 570 Vdc						3.71E-03	OK
<i>UIISO measured at</i>							
1.00	1.00	MOhm	DC	500 V	0.00%	1.15E-02	OK
10.00	10.00				0.00%	1.17E-03	OK
50.00	49.8				-0.40%	2.76E-03	OK
<b>Insulation resistance</b>							
<b>Isolationsprüfung</b>							
Isolationsprüfung				1000 Vdc			
UIISO gemessen an 10 MOhm: 1188 Vdc						1.90E-03	OK
<i>UIISO measured at</i>							
10.00	10.0	MOhm	DC	1000 V	-0.10%	1.16E-02	OK
50.00	50.4				0.80%	2.74E-03	OK


 Auftragsnummer: **6724**  
 Order number:

 Zertifikat Nr.: **11854**  
 Certificate nr.:

Nominal value Angelegter Wert	Indicated UUT Anzeige Prüfling	Dim.	Frequenz	Range Bereich	Deviation Abweichung	Measurement uncertainty Mess- unsicherheit	Test
<b>Leakage current</b>							
<b>Ableitstromprüfung</b>							
1.00	1.00	mA	50 Hz		0.00%	1.26E-02	OK
1.50	1.51				0.67%	8.41E-03	OK
2.00	2.01				0.50%	6.35E-03	OK
2.50	2.51				0.40%	5.11E-03	OK
5.00	5.01				0.20%	2.62E-03	OK
<b>Voltage</b>							
<b>Spannungsmessung</b>							
115.0	115	V	DC		0.00%	1.00E-02	OK
230.0	229				-0.43%	5.04E-03	OK
400.0	398				-0.50%	2.90E-03	OK
950.0	946				-0.42%	1.22E-03	OK
115.0	115	V	50 Hz		0.00%	1.01E-02	OK
230.0	230				0.00%	5.06E-03	OK
400.0	400				0.00%	2.96E-03	OK
950.0	950				0.00%	1.35E-03	OK
<b>Frequency</b>							
<b>Frequenzmessung</b>							
50.0	50.0	Hz			0.00%	2.31E-03	OK
60.0	60.0				0.00%	1.92E-03	OK
400.0	400				0.00%	2.89E-03	OK

# Analytical Reference Materials International

## *Provisional Certificate of Analysis*

### *Certified Reference Material*



Grade: **1¼Cr ½Mo / UNS K11572**

Part Number (Q.A. NO.): **IARM 35JN**

Certificate Date: **10/18/2010**

Certificate No.: **35JN-10182010-IARM-P**

Revision Date: **03/10/2011**

#### Interpretation of Data

1. Certified values listed below reflect analysis results submitted by qualified analytical laboratories using a combination of methods and instrumentation that emulate actual methods and instrumental techniques currently utilized in the analytical community and are reported as % wt. unless otherwise noted.
2. Any data reported and enclosed by a **parentheses ( )** is a **"best estimate"** and is **NOT CERTIFIED**. This data could not be quantified sufficiently for certification. It was however, reported by enough laboratories to be considered as potentially present in the matrix of the material being examined.
3. The "Inter-laboratory Analysis Program" (ILAP) utilized in the establishment of the data are an ongoing program with permanent membership. Certain elements may be selected by a consensus of the members for more extensive testing. Therefore the data in **brackets [ ]** indicates further testing is in process.
4. The **"±Estimated Uncertainty"** is enclosed by a **parentheses ( )** below the individual element's concentration and is based on a Confidence Interval at 95%. Included in this estimated uncertainty, are the combined effects of method imprecision, material inhomogeneity, and any bias between methods.

**Important: A "User Registration Card" accompanies all shipments. This card should be completed immediately upon receipt of materials with the appropriate user information. This is the only way in which ARMI can guarantee customer updates or possible data modifications!**

<u><b>Aluminum</b></u> [0.029] [(0.001)]	<u><b>Antimony</b></u> [0.0018] [(0.0005)]	<u><b>Arsenic</b></u> [0.004] [(0.001)]	<u><b>Boron</b></u> [0.0003] [(0.0001)]	<u><b>Carbon</b></u> [0.129] [(0.003)]	<u><b>Calcium</b></u> [0.0006] [(0.0002)]	<u><b>Cobalt</b></u> [0.006] [(0.001)]	<u><b>Chromium</b></u> [1.18] [(0.02)]
<u><b>Copper</b></u> [0.087] [(0.002)]	<u><b>Manganese</b></u> [0.55] [(0.01)]	<u><b>Molybdenum</b></u> [0.45] [(0.01)]	<u><b>Nitrogen</b></u> [0.009] [(0.0005)]	<u><b>Niobium</b></u> [0.002] [(0.001)]	<u><b>Nickel</b></u> [0.086] [(0.002)]	<u><b>Oxygen</b></u> [(0.001)]	<u><b>Phosphorus</b></u> [0.006] [(0.001)]
<u><b>Lead</b></u> [(0.001)]	<u><b>Sulfur</b></u> [0.025] [(0.002)]	<u><b>Silicon</b></u> [0.60] [(0.01)]	<u><b>Tin</b></u> [0.005] [(0.001)]	<u><b>Titanium</b></u> [0.0020] [(0.0001)]	<u><b>Vanadium</b></u> [0.004] [(0.0004)]	<u><b>Tungsten</b></u> [(0.003)]	<u><b>Zirconium</b></u>

The laboratories participating in the "Inter-Laboratory Analysis Program" (ILAP) and certification of this material are as follows:

Anderson Laboratories, Inc. - Greendale, WI  
Ellwood National Steel - Irvine, PA  
Jorgensen Forge Corp. - Seattle, WA  
Laboratory Testing, Inc. - Hatfield, PA  
NSL Analytical Services - Cleveland, OH  
Special Metals IncoTest - Hereford, UK

Colorado Metallurgical Services - Denver, CO  
Essar Steel Algoma, Inc. - Sault Ste. Marie, ON  
Kalco Metals, Inc - Wheatland, PA  
Latrobe Specialty Steel Co. - Latrobe, PA  
Outokumpu Stainless OY - Tornio Finland  
Stork-MMA Laboratories - Newtown, PA

**Traceability:** All members of the "Inter-Laboratory Analysis Program" (ILAP) listed above validate test methods and instrument performance utilizing SRMs produced by the National Institute of Standards and Technology, (NIST) as well as other CRMs and RMs produced by recognized Certifying Bodies from around the world. The specific SRMs, CRMs, and RMs applicable to the material covered by this certificate are: NIST 1263, IARM 30C, 40B, 143B, EURO 077-1, NR 2D, MBH 15255, IARM 35B, LECO 501-503, 501-644, NIST 16F, 362, 364, 367, 368, C1152, C1153, C1154, 1161, 1162, 1163, 1164, 1165, 1166, 1167, 1168, 1169, 1261, 1261A, 1262, 1263A, 1264, 1265, 1754, 1761, 1762, 1763, 1764, 1765, 1766, 1767, BAS 401/1, 402/1, 403/1, 404/1, 405/1, 406/1, 407/2, 408/1, 409/1, 410/2, JSS ST01, ST02, ST03, ST04, ST05, ST06, JSS 168-4, 169-4, 170-4, 171-4, 172-4, 173-4, 174-4, 175-4, 190-1, 191-1, 192-1, 193-1, 194-1, 195-1, CZECH 184A, BS 12, 12B, 13, 13B, 14B, 156, 4142SE, CA-1, CA-2, CA-3, CA-4, CA1A, CA2A, CA3A, XAAS, XCCV, XCCS, MBH 12X353, LECO 501-506, 501-510, 502-416, NIST 293, 361, 363, LECO 501-644, NIST 898, 1263A, 1264A, 1761, BS 14B, ALPHA AR660, AR869, AR960, LECO 502-193, 762-747, IARM 35A, ALPHA AR872, NIST 1763, 1765, IARM 35B, LECO 501-510, 502-257, IST 1263A, 1766, 1767, BCS SS 401, SS 401/2, SS 404/2, SS 406/1, SS 407/2, SS 408/2, SS 409/2, SS 454/1, SS 459/1, SS 460/1, EURONORM 096/1, 097-1, LECO 501-502, 501-503, 502-256, NIST 361, 362, 363, 364, IARM 31C, 35C, 35F, 35G, LECO 501-504, 501-644, CKD 169, 170, BS CA-3, 14A, 50B, 64B, 68B, BCS 351, 408, 410, 451, 453, 454/1, 462/1, 483, IH R5657, LECO 501-551, 502-102, NIST 1217, 1225, 1763, IARM 35E, 35F, BS 4942, ALPHA AR660, AR872, IARM 35D

A specific line of traceability is established to NIST and other Certifying Bodies for those elements that are noted as "Certified Values" on the Certificates of Analyses referenced above.

**See Reverse Side for Statistical Data and Additional Information Regarding this Material.**

**700 Corporate Cr., Suite A • Golden, Colorado 80401 • Telephone (303) 216-2621 • FAX (303) 216-2649**

The following data and accompanying statements represent all pertinent information reported in the ILAP as it applies to the chemical characterization of this material as of 03/10/2011.

35JN	Al	As	B	C	Co	Cr	Cu	Mn	Mo	N	Nb	Ni	O	P	Pb
1	0.030	0.0033	0.00016	0.12	0.007	1.191	0.091	0.55	0.46	0.0078	0.001	0.086	0.00050	0.0045	0.001
2	0.030	0.0061	0.0003	0.130	0.007	1.144	0.086	0.539	0.452	0.0090	0.0019	0.085	0.00109	0.0088	0.0017
3	0.0280	0.0051	0.0002	0.132	0.0063	1.172	0.088	0.557	0.439	0.008	0.0026	0.088	0.00048	0.0052	0.0017
4	0.0280	0.0035	0.0004	0.1327	0.0054	1.2522	0.0877	0.557	0.450	0.00944	0.0016	0.0855	0.0014	0.0072	0.0001
5	0.0305	0.0025	0.0005	0.1224	0.0052	1.181	0.08045	0.5494	0.4373	0.00939	0.0022	0.0797	0.0010	0.0064	0.0001
6	0.028	0.0023	0.0004	0.125	0.005	1.23	0.080	0.5665	0.4725	0.00852	0.0023	0.089		0.005	
7	0.0259	0.0031	0.0002	0.128	0.0065	1.155	0.084	0.555	0.488	0.008		0.085		0.0056	
8	0.029		0.0002	0.1279	0.0077	1.159	0.0872	0.538	0.442	0.0087		0.088		0.0055	
9	0.0293			0.128	0.006	1.2122	0.0899	0.5543	0.442	0.0090		0.0926		0.0070	
10	0.0283			0.1262	0.0065	1.145	0.0908	0.53	0.4474	0.0071		0.080		0.006	
11	0.0273			0.129		1.165	0.088	0.554	0.4738	0.0096		0.089		0.0053	
12	0.0279			0.136		1.1652	0.090	0.5577	0.469	0.0097		0.0857		0.0076	
13	0.0306			0.1353		1.1786	0.0832	0.5505	0.443	0.0092				0.0078	
14				0.1285			0.0868		0.4496						
15									0.4476						
Mean	0.0287	0.0037	0.0003	0.1286	0.0063	1.1808	0.0866	0.5506	0.4542	0.0087	0.0019	0.0881	0.0009	0.0061	0.0009
STDV.	0.0014	0.0014	0.0001	0.0045	0.0009	0.0329	0.0038	0.0098	0.0151	0.0008	0.0006	0.0037	0.0004	0.0011	0.0008
Certified	0.029	0.004	0.0003	0.129	0.006	1.18	0.087	0.55	0.45	0.009	0.002	0.086	(0.001)	0.006	(0.001)
95% C.I.	0.001	0.001	0.0001	0.003	0.001	0.02	0.002	0.01	0.01	0.0005	0.001	0.002		0.001	
Methods	I,O	X,I,I,O	I,O	C,O	X,I,O	X,I,O	X,I,O	X,I,O	X,I,O	F,O	X,O	X,I,O	F	X,I,O	H,O

Legend: W = Classical, C = Combustion, F = Fusion, A = AA or GFAA, I = ICP or DCP, D = DC Arc, O = AES, X = XRF, G = GDAES or GDMS, H = Hollow Cathode AES

35JN	S	Si	Sn	Ti	V	W	Bi	Ca	H	Mg	Sb	Se	Ta	Zn	Zr
1	0.024	0.581	0.0047	0.0019	0.003	0.0046	<0.0001	0.00043	<0.0001	0.0001	0.0019	<0.00005	<0.001	0.0018	<0.001
2	0.0248	0.598	0.007	0.0022	0.0034	0.0018	0.0004	0.0008		<0.0001	0.0015	0.0005	0.0036	0.0006	0.0033
3	0.0224	0.612	0.0054	0.002	0.0037	0.0005	0.00002	0.0002		0.0001	0.0018	0.00005	<0.0001	0.0015	<0.0001
4	0.0224	0.5984	0.0054	0.0022	0.0025	0.0029	0.0001	0.001		0.0001	0.0010		0.003	0.0011	0.0146
5	0.0290	0.6085	0.0041	0.0020	0.0044	0.0025		0.0005		0.0005	0.0024		<0.0001	0.0014	0.0015
6	0.0277	0.61	0.0046	0.0023	0.0046			0.0007			0.0022				0.0011
7	0.0228	0.591	0.0072	0.0018	0.0037			0.0005							<0.0001
8	0.0235	0.590	0.0074	0.0019	0.0032										
9	0.0269	0.5938	0.003		0.004										
10	0.0292	0.5993	0.0053		0.0033										
11	0.0253	0.615	0.0041		0.0038										
12	0.0257	0.608	0.0081												
13		0.6035													
14		0.6126													
Mean	0.0253	0.6012	0.0054	0.0020	0.0036	0.0025	0.0002	0.0006	#DIV/0!	0.0002	0.0018	0.0003	0.0033	0.0013	0.0051
STDV.	0.0024	0.0101	0.0014	0.0002	0.0006	0.0015	0.0002	0.0003	#DIV/0!	0.0002	0.0005	0.0003	0.0004	0.0005	0.0084
Certified	0.025	0.60	0.005	0.0020	0.004	(0.003)		0.0006			0.0018			(0.001)	
95% C.I.	0.002	0.01	0.001	0.0001	0.0004			0.0002			0.0005				
Methods	C,O	X,I,O	X,I,O	X,O	X,I,O	X,I,O		I,O			X,H,O			X,H,I,O	

Legend: W = Classical, C = Combustion, F = Fusion, A = AA or GFAA, I = ICP or DCP, D = DC Arc, O = AES, X = XRF, G = GDAES or GDMS, H = Hollow Cathode AES

The International Standards Organization (ISO) definitions, expressed in ISO Guide 30-1992 list the following:

**Certifying Body:** Any technically competent body (organization or firm, public or private) that issues a reference material certificate, which provides the information, detailed in ISO Guide 31. The only generally accepted certifying body in the United States for primary standards - Standard Reference Materials (SRM) is the U. S. Department of Commerce, National Institute of Standards & Technology, (NIST), Gaithersburg, MD. All other certifying bodies in the United States produce Reference Materials (RM) or Certified Reference Materials (CRM).

**Reference Material (RM):** Material or substance one or more of whose property values are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials.

**Certified Reference Material (CRM):** Reference material, accompanied by a certificate, one or more of whose property values are certified by a procedure, which establishes its traceability to an accurate realization of the unit in which the property values are expressed, and for which each certified value is accompanied by an uncertainty at a stated level of confidence.

**Inter-Laboratory Analysis Program (ILAP):** Although ASTM Standard E691-87 applies to inter-laboratory studies to "Determine the Precision of a Single Test Method", it is also a well thought out and logical plan for conducting an inter-laboratory program involving multiple techniques. Therefore, the planning, conducting, analyzing, protocol, and treatment of data resulting from this inter-laboratory program were performed utilizing the guidelines established in ASTM E691-87.

**Methods of Analysis:** In view of the fact, that the "Inter-Laboratory Analysis Program" entails a wide variety of materials, no single analytical method would provide optimum data results. Therefore, the methods utilized were a combination of ASTM Standard Methods for classical wet chemistry, ICP, AA, Optical Emission, and X-Ray spectrometric methods. The determinations for Carbon, Sulfur, Nitrogen, and Oxygen are the result of combustion and OE instrument procedures.

**Expiration of Certification:** The certification of this IARM is valid indefinitely, within the uncertainty specified, provided the IARM is handled and stored in accordance with the instructions stated on this certificate. The certification is nullified if the IARM is damaged, contaminated, otherwise modified, or used in a manner for which it was not intended.

**Instructions for Use:** The test surface is the side opposite to the labeled surface, which includes the IARM number. The entire thickness of the unit is certified. However, the user is cautioned not to measure disks less than 2 mm thick when using X-ray fluorescence spectrometry. Each packaged disk has been prepared by finishing the test surface using a lathe. The user must determine the correct surface preparation procedure for each analytical technique. The user is cautioned to use care when either resurfacing the disk or performing additional polishing as these processes may contaminate the surface. When not in use, the material should be stored in a cool, dry location. This material was tested using both the solid disks and chips prepared from the disks. The certified values are considered representative of the overall average composition of the material. **Chips are not intended for Nitrogen, or Oxygen analysis.**

**Selection of Materials:** A "batch" or "series" is defined as a single bar of one continuous length and heat. The majority of materials are in wrought condition; other methods of manufacture are utilized as a less desirable resort. ILAP samples are taken by removing a section, a minimum of, every one-twelfth of total length from the entire bar. A portion of the section is converted to chips and thin (pin) disk for analysis by classical wet chemistry, ICP, AA, and combustion procedures, and the balance remains as a thick disk for OES and X-Ray analysis. This systematic sampling procedure results in the homogeneity being reflected as a product of the overall statistics and certified data. This method of homogeneity testing is in accordance with ISO Guide 34, regarding the systematic selection and testing of a representative number of units for the assessment of homogeneity.

  
William D. Britt, President, & General Manager  
Analytical Reference Materials International Corporation

Certificate No.: 35JN-10182010-IARM-P  
Certificate Date: 10/18/2010  
Revision Date/No.: 03/10/2011

Apparail 409

Mitutoyo

Mitutoyo Corporation

20-1, Sakado 1-chome, Takatsu-ku,  
Kawasaki, Kanagawa, 213-8533, Japan  
Phone (044) 813-8230

ONE YEAR WARRANTY

Product Name Mitutoyo Sufitest SJ-301 Code No.

Serial No. 400197 Date Purchased

Mitutoyo Corporation conducts quality assurance under ISO 9000 certified quality system. This product conforms to the MITUTOYO inspection standard, and the standard (s) used for the calibration is /are traceable to the national(international) standard (s).

In the event that this product should fail within one (1) year from the original date of purchase through normal use conforming to the User's Manual provided with the product and Warning Label(s) on the product, we will repair or replace at our option, free of charge, upon its prepaid return to Mitutoyo with this WARRANTY card.

\*Purchaser is requested to fill the blank above and retain the warranty card at hand. Return card only when requesting Warranty Service.

*Y. Yamamoto*  
Quality Assurance Office  
Y. Yamamoto Manager

This warranty shall not apply if the product and consumables have been subject to fair wear and tear, abuse through misuse or improper use/handling/storage/maintenance/service/repair or through adaptation/modification by the original purchase or any third party without prior written consent of Mitutoyo or as a result of damage by an actual disaster or circumstances beyond the control of Mitutoyo. To obtain service under this warranty the product must be returned to the store/dealer you purchased from along with the warranty card. Any postage, insurance, or shipping charges incurred in returning the product for service are the responsibility of the purchaser.

\*This warranty is not transferable and is only valid within the country of the original purchase

\*You may have additional rights under the laws of country of original purchase that do not allow the exclusion of implied warranties of the exclusion or limitation of certain damages if these laws apply, Mitutoyo's limitations and exclusions may not apply to you.

■ Quality Assurance under the ISO 9000 Registered Quality System

The latest status of the ISO9000 registration is posted on our website  
<http://www.mitutoyo.co.jp>

Reference sample  
Roughness standard Mitutoyo  
N°:522



Mitutoyo Sufitest SJ-301

DATE 13-05-2014  
HEURE 09:13:00

NORME JIS2001  
PROFIL R  
FILTRE GAUSS  
EVA-L 4.0mm  
N 5

λc 0.8mm  
λs 2.5 μm  
C. INCL IN. TOUS  
VITESSE - M 0.5mm/s  
PLAGE AUTO

PRE/POST ESC  
DRIVE ON  
STAND

R-PROFIL

EVA-L 4.0mm  
λc 0.8mmX5

Ra 2.94 μm

Mitutoyo

WA140 ⑫

保証書

商品名 コード番号

製造番号 お買い上げ日

《お願い》 お買い上げの際、上記各欄の必要な項目についてご記入ください。

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保証期間（お買い上げ日より）

本 体 1 年

株式会社 ミットヨ  
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電話(044)813-8201 (代)

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- ◆ お買い上げ後の移送、輸送、落下などによる故障または損傷
- ◆ 不適当な保守、保管、保存による故障または損傷
- ◆ 異常電圧、指定外の使用電源（電圧、周波数）による故障または損傷
- ◆ 消耗品の消耗による故障または損傷
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- ◆ その他当社の責任とみなされない故障または損傷

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\*本保証書は再発行いたしませんので大切に保管してください。

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ISO9000の最新登録状況は当社ホームページにて公開しております。  
<http://www.mitutoyo.co.jp>



# **ATEX**





## Special " X " Conditions

**In order to ensure maximum safety, the end user must be familiar with the following points and put them into practice:**

1. For category 1 and 2 one of the three following protection measures (a, b or c) have to be chosen:
  - a. During the milling process, the end user must undertake effective measures to ensure that there is a product flow through the equipment.
  - b. In closed systems, the end user must ensure that the emptying time is monitored.
  - c. During the milling process, the end user must undertake effective measures to ensure that the milling chamber does not become obstructed or overfilled with milling product.
2. The end user must make sure that there is no mechanical contact between the stationary and moving milling tools each time that the unit is assembled/dismantled.
3. The end user must inspect the milling tools for intactness each time that the unit is assembled/dismantled.
4. Only original manufacturer's parts are approved for use in maintenance operations affecting ATEX safety.
5. The end user must ensure that the unit is free of all foreign objects, other than the milling product.
6. The end user must follow the manufacturer's maintenance schedule.
7. The machine must be stopped when switching between the oscillatory and rotary modes.
8. The end user is responsible for excluding all risks and hazards associated with the milling product.
9. The end user must guarantee that the unit is used only as intended in order to avoid explosion hazards.
10. Only products with an EMI >1 mJ may be processed with this unit.
11. The temperature of the product introduced in the milling chamber must be in the range of between -20°C and +60°C
12. The ambient temperature must be in the range of between -20°C and +30°C while the unit is running.
13. For the execution without motor protection the ambient temperature must be in the range between -20°C and +40°C
14. The standard model of the unit is rated for solvents capable of generating group IIA and IIB gases and vapors (see descriptive plate).
15. The mechanical parts contacting the milling product are approved for ATEX zones 0 and/or 20, depending on the model (see descriptive plate).
16. The model which withstands explosion pressure has to be marked in accordance (see descriptive plate).
17. Any modification or adjustment of the unit having an effect on ATEX safety is prohibited.
18. The end user must ensure that the unit is protected from overheating.

- 
19. The function mode oscillating the sense of rotation has to be controlled by the operator after installation at end user's place.
  20. The end user must undertake all necessary measures to protect the unit from excessive wear.
  21. Improper use may void the manufacturer's warranty
  22. The unit may only be used in accordance with the conditions specified and described in the owner's manual.



**LCIE**

**1 ATTESTATION D'EXAMEN CE DE TYPE**

**2 Appareil ou système de protection** destiné à être utilisé en atmosphères explosibles (**Directive 94/9/CE**)

**3 Numéro de l'attestation d'examen CE de type**  
**LCIE 11 ATEX 3067 X**

**4 Appareil ou système de protection :**  
Machine de réduction de poudre  
Type : OscilloWitt- et RotorWitt-

**5 Demandeur :** FREWITT S.A.  
**Adresse :** Route du Coteau 7  
1763 Granges-Paccot  
SUISSE

**6 Fabricant :** FREWITT S.A.  
**Adresse :** Route du Coteau 7  
1763 Granges-Paccot  
SUISSE

**7 Cet appareil ou système de protection et ses variantes éventuelles acceptées sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités en référence.**

**8 Le LCIE, organisme notifié sous la référence 0081 conformément à l'article 9 de la directive 94/9/CE du Parlement européen et du Conseil du 23 mars 1994, certifie que cet appareil ou système de protection est conforme aux exigences essentielles de sécurité et de santé pour la conception et la construction d'appareils et de systèmes de protection destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la directive. Les résultats des vérifications et essais figurent dans le rapport confidentiel N° 105347-609076.**

**9 Le respect des exigences essentielles de sécurité et de santé est assuré par la conformité à :**  
- EN 13463-1 (2009), EN 13463-5 (2003)  
- EN 1127-1 (2007)

**10 Le signe X lorsqu'il est placé à la suite du numéro de l'attestation, indique que cet appareil ou système de protection est soumis aux conditions spéciales pour une utilisation sûre, mentionnées dans l'annexe de la présente attestation.**

**11 Cette attestation d'examen CE de type concerne uniquement la conception et la construction de l'appareil ou du système de protection spécifié, conformément à l'annexe III de la directive 94/9/CE.**

Des exigences supplémentaires de la directive sont applicables pour la fabrication et la fourniture de l'appareil ou du système de protection. Ces dernières ne sont pas couvertes par la présente attestation.

**12 Le marquage de l'appareil ou du système de protection doit comporter les informations détaillées au point 15.**

**Fontenay Aux Roses**

**13 JUL. 2011**

**1 EC TYPE EXAMINATION CERTIFICATE**

**2 Equipment or protective system** intended for use in potentially explosive atmospheres (**Directive 94/9/EC**)

**3 EC type examination certificate number**  
**LCIE 11 ATEX 3067 X**

**4 Equipment or protective system :**  
Powder mill  
Type : OscilloWitt- and RotorWitt-

**5 Applicant :** FREWITT S.A.  
**Address :** Route du Coteau 7  
1763 Granges-Paccot  
SWITZERLAND

**6 Manufacturer :** FREWITT S.A.  
**Address :** Route du Coteau 7  
1763 Granges-Paccot  
SWITZERLAND

**7 This equipment or protective system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.**

**8 LCIE, notified body number 0081 in accordance with article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994 certifies that this equipment or protective system has been found to comply with the essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in confidential report N° 105347-609076.**

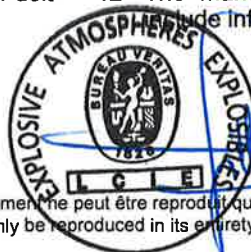
**9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with :**  
- EN 13463-1 (2009), EN 13463-5 (2003)  
- EN 1127-1 (2007)

**10 If the sign X is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.**

**11 This EC type examination certificate relates only to the design and construction of this specified equipment or protective system in accordance with annex III to the directive 94/9/EC.**

Further requirements of the directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

**12 The marking of the equipment or protective system shall include information as detailed at 15.**



**Marc GILLAUX**

Le responsable de certification ATEX  
ATEX certification manager

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LCIE



13 ANNEXE

13 SCHEDULE

14 ATTESTATION D'EXAMEN CE DE TYPE

14 EC TYPE EXAMINATION CERTIFICATE

LCIE 11 ATEX 3067 X

LCIE 11 ATEX 3067 X

15 DESCRIPTION DE L'APPAREIL OU DU SYSTEME DE PROTECTION

15 DESCRIPTION OF EQUIPMENT OR PROTECTIVE SYSTEM

Machine de réduction de poudre  
Type : OscilloWitt- et RotorWitt-

Powder mill  
Type : OscilloWitt- and RotorWitt-

Les machines OscilloWitt- et RotorWitt- sont des machines destinées à la réduction dimensionnelle des poudres. Elles sont constituées d'une partie mécanique incluant un réducteur et un accouplement pour l'entraînement des parties mobiles et d'une chambre de broyage incluant un rotor et un treillis pour la réduction des poudres. Le fonctionnement des machines est assuré par un moteur électrique et un système de commande (certifiés) hors du cadre de cette certification. L'intérieur de la chambre de broyage est de catégorie 1 et le reste de la machine de catégorie 2.

The OscilloWitt-\* / RotorWitt-\* equipment are intended to the dimensional powder diminution. The equipment are made of a mechanical part including gear box and coupling ensuring the mobile part drive, and the mill chamber including rotor and grid for the powder reduction. The operation is ensured by an electric motor and command system (certified) outside of the scope of this certification. The inside of the chamber is a category 1 part of equipment and other parts of the machine are category 2.

Le marquage doit être :


FREWITT S.A.

Adresse :

Type : OscilloWitt- ou RotorWitt-

N° de fabrication :

Année de fabrication :

 II 1 / 2 G D c IIB T4 T125°C

LCIE 11 ATEX 3067 X (facultatif)

The marking shall be :


FREWITT S.A.

Address :

Type : OscilloWitt- or RotorWitt-

Serial number :

Year of construction :

 II 1 / 2 G D c IIB T4 T125°C

LCIE 11 ATEX 3067 X (facultative)

L'appareil doit également comporter le marquage normalement prévu par les normes de construction qui le concerne.

The equipment shall also bear the usual marking required by the manufacturing standards applying to such equipment.

16 DOCUMENTS DESCRIPTIFS

Dossier de certification N° GED 135256-1 rev. 1 du 24 Mai 2011.

Ce document comprend 15 rubriques.

16 DESCRIPTIVE DOCUMENTS

Certification file N° GED 135256-1 rev. 1 dated May 24<sup>th</sup>, 2011.

This file includes 15 items.

17 CONDITIONS SPECIALES POUR UNE UTILISATION SÛRE

Les conditions d'entretien et de maintenance doivent être respectées.

Température maximum du produit : +60°C.

17 SPECIAL CONDITIONS FOR SAFE USE

The maintenance conditions provided by the manufacturer shall be respected.

Maximum product temperature: +60°C.

18 EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE

Couvertes par les normes listées au point 9.

18 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS

Covered by standards listed at 9.

19 VERIFICATIONS ET ESSAIS INDIVIDUELS

Néant.

19 ROUTINE VERIFICATIONS AND TESTS

None.

20 CONDITIONS DE CERTIFICATION

Les détenteurs d'attestations d'examen CE de type doivent également satisfaire les exigences de contrôle de production telles que définies à l'article 8 de la directive 94/9/CE.

20 CONDITIONS OF CERTIFICATION

Holders of EC type examination certificates are also required to comply with the production control requirements defined in article 8 of directive 94/9/EC.



## Notification of recognition of the quality assurance production

### Annex IV

- (1)
- (2) Equipment or protective systems intended for use in potentially explosive atmospheres - **Directive 94/9/EC**
- (3) Conformity certificate number: **SEV 09 ATEX 4137**
- (4) Equipment: **Machines in the type of protection Liquid Immersion "k", Control of Ignition Source "b", Constructional Safety "c", Increased Safety "e", Flameproof Enclosures "d" and Resistent Equipment**
- A list of the EC-Type Examination Certificates covered by this notification is held by the notified body.
- (5) Applicant: **Frewitt Fabrique de machines SA  
Route du Coteau 7, CH-1763 Granges-Paccot**
- (6) Manufacturer: **Frewitt Fabrique de machines SA  
Route du Coteau 7, CH-1763 Granges-Paccot**
- (7) Electrosuisse SEV, notified body number 1258 for Annex IV in accordance with article 9 of the council Directive 94/9/EC, notifies to the manufacturer that he has a production quality system which complies with Annex IV of the Directive.
- (8) This notification is based on audit report no. 09-IK-0183.03 dated 2012-11-15.
- (9) The results of a regular repeat evaluation of the quality assurance system form part of this notice.
- (10) This notification is valid until 2015-11-27 and can be withdrawn if the manufacturer no longer satisfies the requirements of Annex IV.
- (11) According to article 10 (1) of the Directive 94/9/EC the notified body assessing the examination phase must be indicated by showing the notified body number 1258 of Electrosuisse SEV beside the CE mark.

 **Electrosuisse  
Notified Body ATEX**

Martin Plüss  
Product Certification



Fehraltorf, 2012-11-27

SEV 09 ATEX 4137 / page 1 of 1





(1) **EG-Baumusterprüfbescheinigung**

(2) Geräte und Schutzsysteme zur bestimmungsgemässen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**

(3) Prüfbescheinigungsnummer: **SEV 06 ATEX 0133**

(4) Gerät: Steuerung Typ MA bzw. ES

(5) Hersteller: Frewitt Fabrique de machines SA

(6) Anschrift: Route du Coteau 7, CH-1763 Granges-Paccot

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Prüfbescheinigung festgelegt.

(8) Electrosuisse SEV, benannte Stelle Nr. 1258 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG), bescheinigt die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemässen Verwendung in explosionsgefährdeten Bereichen gemäss Anhang II der Richtlinien.

Die Ergebnisse der Prüfung sind im vertraulichen Prüfbericht 06-IK-0149.01 inkl. Erweiterung 1 und 2 festgehalten.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit:

**EN 1127-1:11**

**EN 60079-0:12**

**EN 60079-31:09**

(10) Falls das Zeichen «X» hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Bau des festgelegten Gerätes gemäss Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen des Gerätes.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

**siehe Anlage Seite 2: (19) Kennzeichnung**

 **Electrosuisse**  
**Benannte Stelle ATEX**

Martin Plüss  
Zertifizierung Produkte



Fehraltorf, 30.09.2013

SEV 06 ATEX 0133 / Seite 1 von 2

(13) **Anlage**(14) **EG-Baumusterprüfbescheinigung**(15) Beschreibung des Gerätes

Die Steuerung FREWITT Typ MA bzw. ES wird in den durch die Seriennummer bestimmten Ausführungsvarianten für gas- und/oder staubexplosionsgefährdete Bereiche in den Zündschutzarten „Druckfeste Kapselung“ und/oder „Schutz durch Gehäuse“ entsprechend den Anforderungen der Kategorien 2 oder 3 zur ausschliesslichen Verwendung in den Geräten zum Mahlen und Behandeln von Pulvern gefertigt.

Die geprüften Geräte sind Baugruppen, bestehend aus Komponenten, die ein Konformitätsbewertungsverfahren gemäss Artikel 8 der Richtlinie 94/9/EG durchlaufen haben sowie aus Teilen ohne Anforderungen an den Explosionsschutz.

Für jede Ausführungsvariante der Baugruppe wird ein thermischer Nachweis erstellt.

Installations- und Gebrauchsart: stationär  
 IP Schutzgrad: IP54 bzw. IP65  
 Umgebungstemperaturbereich (°C): -20 °C bis 40 °C

(16) Prüfbericht 06-IK-0149.01 inkl. Erweiterung 1 und 2(17) Besondere Bedingungen  
keine(18) Grundlegende Sicherheits- und Gesundheitsanforderungen  
Durch die angewandten Normen erfüllt.

## (19) Kennzeichnung

⊕	II 2G	Ex d* IIB T6 Gb	und / oder bzw.
	II 2D	Ex tb IIIC T85°C Db	
⊕	II 3G	Ex d* IIB T6 Gb	und / oder
	II 3D	Ex tb IIIC T85°C Db	

(\* = Ergänzung je nach eingebauten Geräten mit gesonderten Konformitätsbewertungsverfahren)

 **Electrosuisse**  
Benannte Stelle ATEX

Martin Plüss  
Zertifizierung Produkte




Fehraltorf, 30.09.2013

SEV 06 ATEX 0133 / Seite 2 von 2



# **OUTER ELEMENTS**

(SEE ADDITIONAL BINDER)

# **LIFTING TOWER**

(SERVOLIFT)

# **BALANCE**

(METTLER-TOLEDO)



## **13.1- Drum lifter Servolift**

Designation [Document N°]
01-10_Manual [ <a href="#">178157</a> ]
12_Drawings Schemes Parts Lists [ <a href="#">178158</a> ]
13_Data Sheets of Accessories and MSDS [ <a href="#">178159</a> ]
14_Manual of Discharge Valve [ <a href="#">178160</a> ]
15_Certificates [ <a href="#">178161</a> ]



## Index of Attachments

### 12. Drawings, Parts Lists and Data sheets

Drum Lifter general arrangement drawing .....	13264-00-001a
Assembly of front case and bearing.....	04-39-001/2
Liftcylinder Ø 40 spare and wear parts .....	00-41-101V
Clamp cylinder Ø 50/20.....	00-43-301V
Hydraulic scheme .....	13264-61-001 0
with parts and hose list.....	13264
Pneumatic scheme .....	13264-62-001 0
with parts list .....	13264
Spare parts list.....	13264
Electric scheme .....	13264
with list of electric components.....	13264

### 13. Data sheets of Accessories and MSDS

Product Information and Safety Data Bulletin of Hydraulic oil .....	Foodmax AW 46
Product Information automatic greaser .....	PERMA
Product Information and Safety Data Bulletin of Grease .....	Soraja FM 372
Chemical anchors .....	HILTI

### 14. Discharge valve

Manual of Discharge valve.....	Sterivalve
--------------------------------	------------

### 15. Certificates

Declaration of conformity acc. 2006/42 EC (Machine Directive)
Declaration of conformity acc. 94/9/EC (ATEX)
Declaration of Compliance with the order acc. DIN EN 10204-2.1

## 1. Description of Product

### Table of Contents

<b>1.</b>	<b>Description of Product</b>	<b>1</b>
1.1.	Intended Use of the Machine .....	2
1.2.	Design .....	3
1.3.	Functional characteristic .....	4
1.3.1.	Operating elements (lifter only) .....	5
1.4.	Supporting arm .....	6
1.5.	Functional description .....	7
1.5.1.	Semi-automatic Sequence (Discharging into container) .....	7
1.5.2.	Semi automatic sequence (Discharging into OscilloWitt) .....	8

## 1.1. Intended Use of the Machine

The **drum lifter 13264** is exclusively designed to:

- a) carry a product bag, to slew it above a container infeed and to lower it. The operator opens the bag to release the product into the container erected on a scale.
- b) to carry an 150 or 152 litre – drum, to clamp, lift, invert and slew it to release the drum content through a manually opened butterfly valve into an OscilloWitt and final into an 100 or 70 litre-drum.

The drum lifter is controlled from a remote installed panel via push buttons and membrane key pad.

It is only allowed to stress the lifter with a total weight of 250 kg (drum with product or bag with product)

The machine is equipped and designed to be operated in an explosion rated area acc. ATEX zone II3D.

The machine is not intended and designed for other use as above listed; this applies as non-allowed use.



### INFORMATION

This machine is operated from a combined and remote installed panel together with the terminal of the scale.

### Especially we point out, that it is forbidden to:

- Lift and transport personnel.
- Climb up the unit.
- Stay under the load.
- Be present within the direct work- and slew area during operation of the machine
- Lift up loads with other parts than the provided load suspension device
- Put the unit into operation, if any fault is notified
- Modify the unit without the expressly written confirmation of the manufacturer
- by- pass or remove any of the installed interlocks
- Handle other equipment, than shown below
- Use the machine with damaged or worn out mounting points
- Use damaged drums, specially at the load suspension points.



### DANGER

#### Operation of the machine.

Vital wounds, death and or damage to machinery.

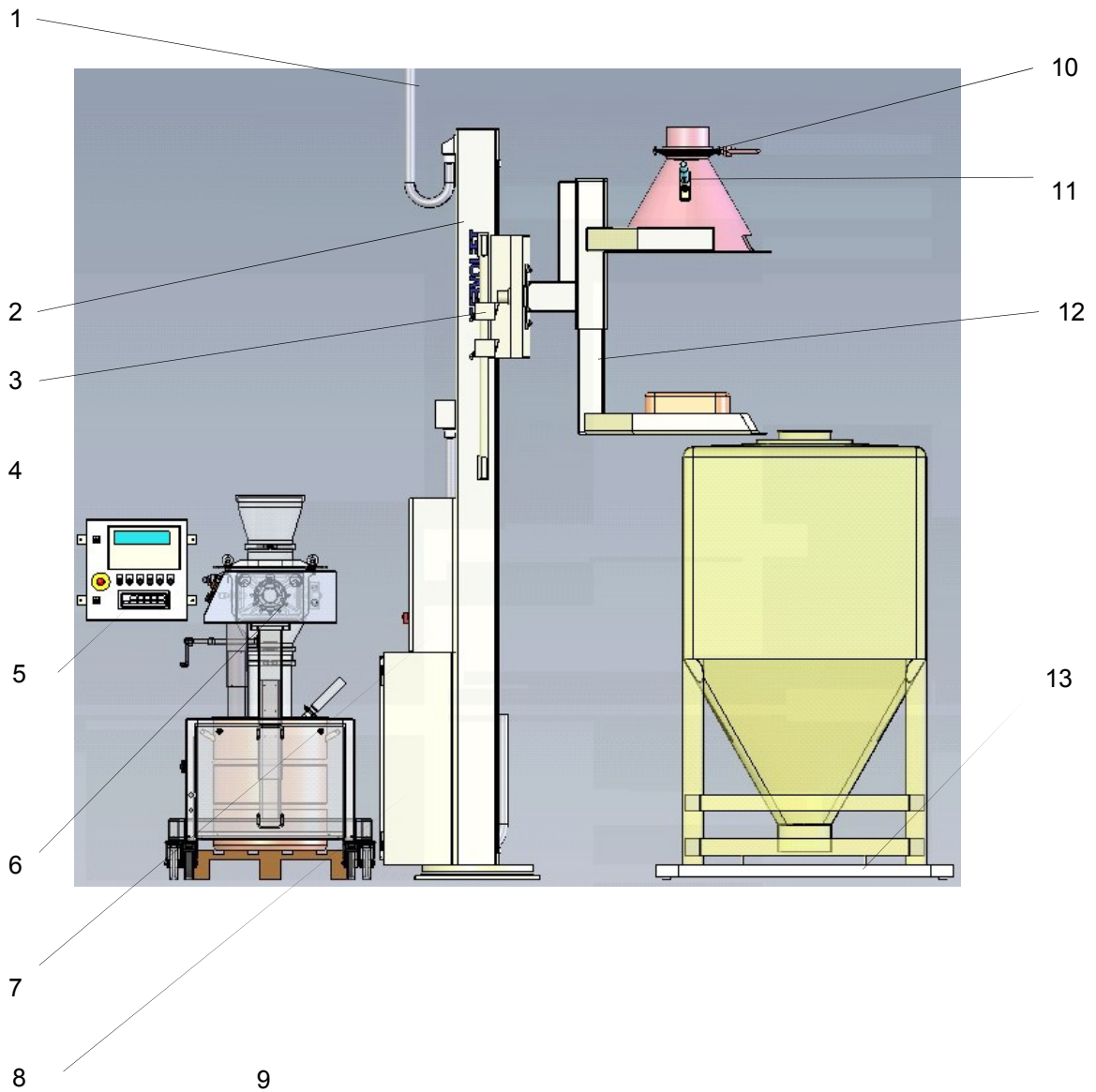
- The machine must only be operated / used according to its intended use
- It is imperative that all safety precautions be observed, in this operation instruction and at the machine



### INFORMATION

This manual does not contain all safety information. Depending on local regulations and legal provisions at site, further safety measures might be necessary. Indication to health hazard caused by the product itself or by a customer specific working procedure is not subject of this manual.

## 1.2. Design



1. energy supply / control cable to operator panel
2. column with guide and hydraulic lift system
3. height stops (different discharge heights)
4. scale terminal
5. lifter operating elements
6. OscilloWitt
7. electric control cabinet
8. hydraulic control cabinet
9. base with slew ring, stops and slew motor
10. manually operated butterfly valve
11. pneumatic knocker
12. telescopic clamp platform
13. scale

For further details and dimensions refer to attached drawing No.: 13264-00-001



## 1.3. Functional characteristic

The Drum Lifter is stationary and bolted to the floor and ceiling by compound anchors.

It is driven by an electro-hydraulic power pack which is placed in the lower part of rear of the column mounted cabinet. The various functions are operated by a pneumatically actuated hydraulic main control block which is controlled via a remote installed panel with membrane key pad. This panel includes also a scale terminal.

Lifting is powered by a simple acting hydraulic cylinder with pilot operated check valve as a safety device and a chain system.

Minimum and maximum height positions are detected by sensors.

On the side of the column a rod is installed for infinitely adjustable height stops that allow an accurate height positioning when lowering to the various discharge heights or bin sizes respectively. To activate a requested height stop in discharge slew position it has to be selected first by the selection switch. In slew start position all height stops are automatically retracted to allow a lowering down to floor level.

Discharge height position is detected with arm set on corresponding height stop.

Slewing is powered by hydraulic motor with disc brake, which drives an external geared pivot bearing by means of a pinion. The slew-end positions (93° clockwise and 80° counter clockwise) are limited by mechanical block stops and are also detected by sensors. The pick up middle position is only monitored by a sensor.

To the carriage that is lifted up and down inside the column is fixed the hydraulically powered tilt drive. The tilting is crosswise to the column. A hydraulic motor with disc brake drives an external geared pivot bearing by means of a pinion. The tilt-end positions (0° and 180°) are limited by mechanical block stops. End positions also detected.

The support arm with drum clamp system is flanged to the tilt gear.

The drum which is placed onto a platform will be lifted and pressed by means of a double acting hydraulic cylinder into a stainless steel funnel. The clamped position is held by a pilot operated check valve. The clamp pressure is adjusted to clamp the drum firmly and safe without squeezing the drum.

Clamping is also monitored by sensors. The funnel can be dismantled for cleaning purposes.

At the discharge funnel outlet a butterfly valve is installed with a divided body which is connected by clamp ring.

The butterfly valve is operated manually.

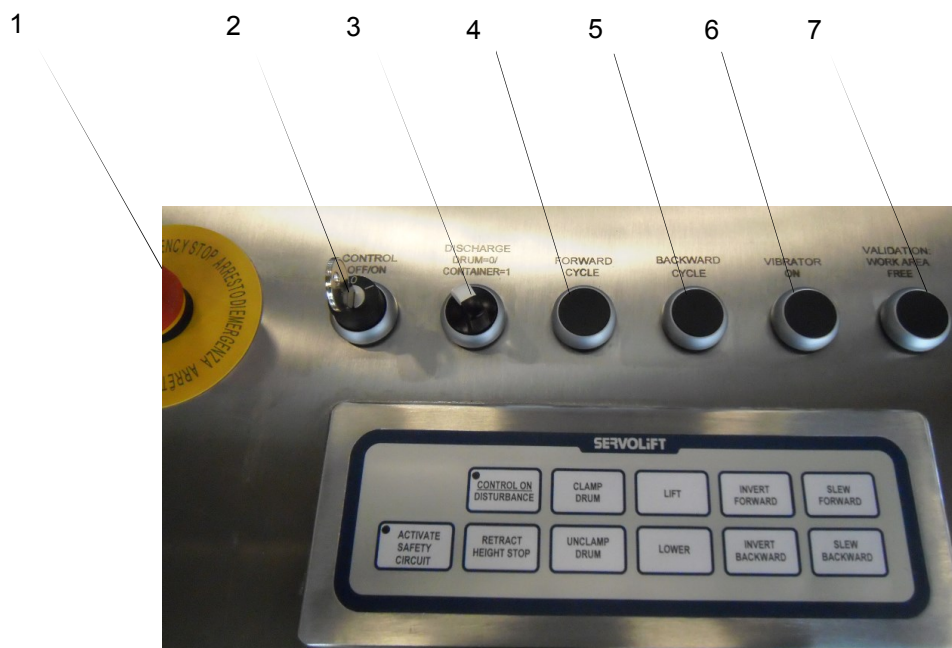
The drum is brought and positioned to the platform in centre under the discharge funnel by a trolley to be finally clamped into the open side of the funnel.

An optional actuated pneumatic knocker supports the discharge process.

The clamp platform is also used to lift a product bag to be discharged manually into a positioned container. In this case the platform is fully retracted. The platform- funnel assembly cannot be tilted and is only used as a small lift platform to bring the bag above the manhole of the positioned container.

## 1.3.1. Operating elements (lifter only)

The operator panel includes membrane key pads for the drum lifter 12838 and the machine lifter 12839.



operating elements for semi automatic mode

operating elements in service mode

	11	13	15	17	19
10	12	14	16	18	20

- 1 E-STOP
- 2 CONTROL OFF / ON key switch
- 3 selection switch DRUM cycle / CONTAINER cycle
- 4 FORWARD CYCLE
- 5 BACKWARD CYCLE
- 6 VIBRATOR ON
- 7 VALIDATION WORK AREA FREE

- 10 ACTIVATE SAFETY CIRCUIT
- 11 CONTROL ON / DISTURBANCE (LED)
- 12 RETRACT HEIGHT STOP
- 13 CLAMP DRUM
- 14 UNCLAMP DRUM
- 15 LIFT
- 16 LOWER
- 17 INVERT FORWARD
- 18 INVERT BACKWARD
- 19 SLEW FORWARD
- 20 SLEW BACKWARD

Remote installed panel. Explanation of functioning refer to chapter "OPERATION".

## 1.4. Supporting arm



- 1 manually operated butterfly valve
- 2 pneumatic knocker
- 3 hydraulic operated telescopic clamp mast
- 4 drum / bag platform
- 5 pin to receive knocker
- 6 funnel window for drum handle
- 7 knurled mounting nuts

## 1.5. Functional description

All hydraulic functions are push and hold mode (dead man's control)

### Start position:

- Mains and compressed air supply are connected to lifters
- Main switch is activated
- Supporting arm is at min height
- Clamp platform fully extended
- Clamp platform is not loaded
- Empty container is placed on the IBC-scale at slew position 2 (93° clockwise)
- OscilloWitt and empty drum are placed at slew position 1 (80° counter clockwise)
- 

### Sequence of operation:

#### 1.5.1. Semi-automatic Sequence (Discharging into container)

The operator puts a product bag onto the platform and selects at the operator panel "Discharge product bag into container", presses "Validation work area free", presses and holds SEQUENCE FORWARD:

1. The clamp platform retracts fully
2. Supporting arm lifts to maximum height
3. Column slews to position 2
4. Supporting arm lowers onto corresponding height stop
5. Clamp platform fully extends
6. The unit stops

The operator enters the mezzanine platform

Opens the bag

Discharges the product into container

Leaves the platform, goes back to the panel", presses "Validation work area free", presses and holds SEQUENCE BACKWARDS:

7. Clamp platform retracts fully
8. Supporting arm lifts to maximum height
9. Column slews to position 0
10. Supporting arm lowers minimum height
11. Clamp platform fully extends
12. The unit stops

## 1.5.2. Semi automatic sequence (Discharging into OscilloWitt)

The operator centres a drum on the clamp platform and selects at operator panel "Discharge into drum" presses "Validation work area free", presses and holds SEQUENCE FORWARD

1. Drum is clamped
2. Supporting arm lifts to maximum height
3. Supporting arm inverts fully to valve down position
4. Column slews to position 1
5. Supporting arm lowers onto corresponding height stop
6. The unit stops

The operator starts the OscilloWitt and opens discharge valve

After the drum contents is discharged and calibrated, the operator closes the discharge valve and stops the OscilloWitt.

Back to the operator panel he presses "Validation work area free", presses and holds SEQUENCE BACKWARDS

7. Supporting arm lifts to maximum height
8. Column slews to position 0
9. Supporting arm inverts 180° backward (valve up)
10. Supporting arm lowers down to minimum height
11. Clamp platform extends
12. The unit stops

Operator removes discharged drum

## Load

Load	Drum Müller 152 L / Ø 480 mm / H = 840 mm Drum Müller 150 L / Ø 560 mm / H = 660 mm
	Bag max. 680 mm x 540 mm. (max. height = 200 mm)
Load capacity	250 kg (Drum with product) 250 kg (Bag with product)

## Dimension and Technical Specification

Ceiling height	5400mm
Column height	3709 mm
Min. height (center of inversion) (=Pick up height drum) (=Pick up height bag)	680 mm
Max. height (center of inversion) (=Tilting height) (=Slewing height)	3000 mm
Discharge height into container (center of inversion)	2880 mm (+90 mm / - 30 mm)
Discharge height into drum (center of inversion)	2696 mm (+30 mm / -350 mm)
Total width	Approx. 910 mm
Total length	Approx. 1901 mm
Design	sleuable column with floor fixing
Hydraulic cabinet	W x H x D 600 mm x 1050 mm x 335 mm
Control cabinet	W x H x D 600 mm x 760 mm x 210 mm
Oil Tank	Size NG7, filling volume approx. 5 L
Hydraulic Oil	With FDA approval
Hydraulic Pump	3,2 cm <sup>3</sup> /U (4,64 L/min.)
Total weight	approx. 1050 kg incl. load
Reach (middle of column – middle of drum)	1038 mm

# SERVOLIFT

Mounting	Finished floor installation by compound anchors M12x95 - floor has to be even and horizontal. - thickness of concrete has to be minimum 190 mm - minimum concrete quality: B25, C20/25.
Compressed Air Supply (for column and OscilloWitt)	6 bar – 200 NI/min. – (ND6) supply from ceiling  (Servolift delivers 5 m hose, cut to adequate length on site)
Pneumatic Service Unit	water separator and pressure limiter
Compressed Air Supply (for OscilloWitt)	Servolift is fixing a pneumatic quick coupling to the hydraulic cabinet G ¼“, Serie 26, Legris 9101 26 13 (Servolift part No.112247)
Electric supply	230/400 V, 50 Hz, 3Ph+N+PE 3,5 kW supply from control cabinet  (Client provides and installs mains supply cable to ceiling above the column)  (Client provides and installs cable ducts)
Cable between control panel and column	Servolift delivers 30 meters cables respectively from the control panel to ceiling above the column  (Client provides and installs cable ducts)
Explosion rating	ATEX-protection category II3D (Zone 22)
Wiring	Electric installation acc. EN 60204, with single core labelling and <b>British colour</b>
Sound level	< 78 dB(A)
Ingress protection of electrical components	IP 54
<b>Stainless steel design</b>	
Exterior parts	1.4301 (AISI 304), 1.4306 (AISI 304L) 1.4541 (AISI 321)
Product contact parts	1.4404 (AISI 316L) with Inspection Certificate according DIN EN 10204-3.1
Mechanical treated parts (bearing flanges, handles, distance blocks)	1.4104 (AISI 430F) 1.4057 (AISI 431) aluminium anodized
Interior parts	St37-2 (S235JR) St52-3 (S355J2G3) QSTE 380 (S355MC)

# SERVOLIFT

Non product contact surfaces	Pharmaceutical design: surfaces, mounting parts, mechanical stainless steel parts Ra ≤ 1,5 µm welding seams ground flat, other welds seams ground
Product contact surfaces	Weld seams polished flat to sheet Ra ≤ 0,8 µm Surfaces rolled blank 2B, Ra ≤ 0,8 µm
Cover band	- polyester with urethane coating - sealed edges - FDA-conform

## Assembly Groups

Lift Unit	- column with internal guide system - hydraulic cylinder with double lift chain
Mechanical height stop	- one infinitely adjustable height stops pneumatically retractable for discharge height
Supporting arm with tilting drive	- inversion drive bolted to guided carriage. - supporting arm bolted to inversion bearing. - components installed into housing . - 1 pc. hydraulic motor completely housed.
Hydraulic cabinet	Stainless steel cabinet including: - hydraulic power pack - pneumatic and hydraulic control valves

## Control

Control	- installed into electric cabinet - PLC Siemens S7-300 - main switch on electric cabinet
---------	--



# SERVOLIFT

## Operating elements on control panel

- 1 off E-STOP
- 1 off key switch "OFF/ON"
- 1 off selector "Discharging into container / Discharging into drum"
- 1 off push button "Forward cycle"
- 1 off push button "Backward cycle"
- 1 off push button "Vibrator On"
- 1 off push button "Validation work area free"

1x membrane key pad with following keys:

- 1 off green/red LED "ON / FAULT"
- 1 off key "ACTIVATE SAFETY CIRCUIT" with blue LED
- 1 off key „LIFT“
- 1 off key „LOWER“
- 1 off key „CLAMP“
- 1 off key „UNCLAMP“
- 1 off key „SLEWING FORWARD“
- 1 off key „ SLEWING BACKWARD“
- 1 off key „TILTING FORWARD“
- 1 off key "TILTING BACKWARD"
- 1 off key "RETRACT HEIGHT STOP"

## Operating elements in Control panel

- 1 off key switch MAINTENANCE MODE"

(for service mode or failure recovery this switch can be used by instructed personal  
Within the service mode the unit can be operated without any interlocks)

## Sensors

- 1 off min height (electric sensor)
- 1 off max height (electric sensor)
- 1 off slew position 0 (= pick up drum)
- 1 off slew position 1 (= above mill)
- 1 off slew position 2 (= above container)
- 1 off supporting arm tilted backward (electric sensor)
- 1 off supporting arm tilted forward (electric sensor)
- 1 off discharging height bag into container (electric sensor)
- 1 off drum clamped left (electric sensor)
- 1 off drum clamped right (electric sensor)
- 1 off clamp platform fully retracted (electric sensor)

## Contacts

- 1 off compressed air ON (pressure switch)
- 1 off oil temperature switch (el. contact)

## Interfaces

- None

## Interlocks

- LIFT /LOWER only possible at 0° pick up position, supporting arm with valve up position and clamp platform fully retracted

- LIFT /LOWER only possible at 0° pick up position, supporting arm with valve up position and drum correctly clamped

- LIFT /LOWER only possible at slew position 1, supporting arm with valve down position and drum correctly clamped

# SERVOLIFT

- LIFT /LOWER only possible at slew position 2,° supporting arm in valve up position clamp platform fully retracted
- Clamping always possible
- Clamp platform only to open in minimum height, supporting arm in valve up position and column slewed to 0° pick up position.
- Clamp platform can be extended if bag discharge height into container is reached and unit slewed to slew end position 2 and supporting arm at valve up position.
- Slewing into direction 2 only at maximum height, clamp platform fully retracted and supporting arm in valve up position.
- Slewing into direction 1 only at maximum height, supporting arm with valve down position and drum correctly clamped.
- Height stops retractions automatically at slew position 0
- Tilting only at maximum height, at slew position 0 and drum correctly clamped.
- After pressing the push button “Validation work area free”, the operator have to press within a time of 10 seconds on the push button “Forward cycle” or “Backward cycle”. If 10 seconds have passed, the operator must press again the validation button.

## 2. General Safety Advise

### Table of Contents

<b>2.</b>	<b>General Safety Advise</b>	<b>1</b>
2.1.	User's Duty of Care .....	2
2.2.	Explanation of the Used Safety Signs .....	3
2.3.	Basic Safety Measures .....	5
2.4.	Basic Safety Measures during Maintenance and Servicing.....	6
2.5.	Demands on Operators.....	6

## 2.1. User's Duty of Care



### INFORMATION

This manual does NOT refer to health hazards caused by the used product itself or by customer's specific working procedure! A warning on this matter and appropriate safety precautions belongs to users undivided responsibility!

This machine has been designed under consideration and careful selection of the harmonized standards which have to be kept, as well as further technical specifications. Therefore it agrees with the state of art and guarantees a maximum of safety.

This safety can only be achieved during normal operation, if all recommended measures are met. It belongs to the user's duty of care, to plan these steps and to control the execution.

### The user especially has to control, that

- the machine is only employed for its intended use as described at chapter "Description of product"
- the machine is only operated in perfect and working state and especially the safety installations are checked periodically for their functioning.
- the necessary personnel protective equipment for the operating-, maintaining-, and repair staff is at hand and used by the corresponding people.
- the owner's manual is always complete and in a readable condition and available at the machine's site.
- only sufficiently qualified and authorized personnel operate, maintain and repair the machine.
- this personnel is periodically instructed regarding all appropriate questions of operational safety and environmental protection and that they know the owner's manual and especially the included safety advice.
- all installed safety and warning labels will not be removed and are always readable.
- the machine is not operated with not installed covers and lids.

## 2.2. Explanation of the Used Safety Signs

Following safety signs are used in the present owner's manual. These signs should call above all the readers attention to the text opposite the safety sign.



**DANGER**

Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING**

Warning indicates a hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION**

Caution, used with a safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



**INFORMATION**

This sign indicates information which is used for a better understanding among other things of the machines function.



**SEPARATE INSTRUCTION**

This sign points to (attached or separately delivered) additional manuals or guides for operating and servicing of OEM (original equipment manufacturer) parts which have to be read and followed attentively! Safety instructions referring to this must be respected absolutely!

## 2.2.1. Explanation of the machine etched safety signs



**OVERHEAD LOAD  
WARNING**

Warning of raised loads.

Those machines are labeled, which are exclusively destined for stay under the raised load only by the operator, e.g. to open the discharge valve or to install a discharge nozzle. At this time the load must be mechanically set on the height stop. The max. lift capacity is indicated below the pictogram.



**STAY UNDER THE  
LOAD PROHIBITED**

This sign strictly prohibits any stay under the raised load. Those machines are labeled which are not equipped by a height stop device and a stay under the load is not exclusively intended. The max. lift capacity is indicated below the pictogram..



**MAN RIDING  
PROHIBITED**

This sign strictly prohibits any man riding on the load suspension device.

Those machines are labeled which offers evidently the possibility of riding the supporting arm, e.g. platforms, forks etc..

## 2.3. Basic Safety Measures

- the legal rules for prevention of accidents must be followed.
- lifting personnel and climbing up the machinery is forbidden.
- it is only allowed to handle the described drums.
- if other bins should be handled, the written approval of the manufacturer is necessary.
- prior each start of the unit, a safe pick up of the load is to be checked.
- do not exceed the maximum allowed working load.
- do not stand within the direct working area of the lifter.
- do not do any work on the electric installation with alive electric.
- any work on the electric installation is only allowed to licensed electricians.
- the owner's manual must be always accessible to the operating staff. One copy must be stored at the machine. (e.g. cabinet door)
- when putting machine out of service, it has to be locked against unauthorized use by the lockable main switch.
- prior to each start of production the machine has to be checked for visible faults. Make sure, that it is only used in perfect shape. Discovered faults have to be reported to the superior.
- prior to each start of production, material and objects which are not necessary for production have to be removed from the working area, e.g. forklift truck.



**CAUTION**

**Prevent from electrostatic self-charge, while discharging non-conducting products! (Fluids, powders, granulates) If conductivity is greater than  $10^{-8}$  S/m, self-charge can be excluded.**

Electrostatic discharge.

- For an suitable deduction / grounding, wear applicable shoes and clothes

## 2.4. Basic Safety Measures during Maintenance and Servicing

The provided inspection and maintenance interval must be kept!

Respect maintenance and repair manuals of individual components attached to this manual

- prior to the execution of maintenance and servicing, the access to the working area of the machinery has to be closed against non-authorized staff. Attach or install information signs, which indicates the maintenance or repair work!
- prior to the execution of maintenance and servicing the electric main switch has to be locked by a padlock. The control has to be switched off by the key. Both keys must be in hands of the person, who carries out the maintenance and servicing.
- for the exchange of heavy machine parts, only suitable and perfect load suspension devices and sling units must be used!
- lubricants, cooling and cleaning agents, dangerous to environment, have to be disposed according to legal regulations.
- hydraulic- and pneumatic system must be depressurized for maintenance.



**DANGER**

### **Supply lines under voltage despite switched of main switch.**

Vital wounds, death by electric shock.

- By installation of supply lines, disconnect electrical connections on side.



**WARNING**

### **Release pressurized hydraulic and pneumatic lines.**

Vital wounds, death by pressure plunge.

- Switch off supply of energy and check pressure at the corresponding manometer



**CAUTION**

### **Oil and grease handling.**

Skin irritation, sickness / vomit if swallowed.

- Wear suitable protective clothing
- Wear safety goggles
- Observe the safety instructions of manufacturer
- Avoid skin contact – by skin contact, deep clean
- rinse eyes after any eye contact



## 2.5. Demands on Operators



**DANGER**

**By operating errors.**

Vital wounds, death and or damage to machinery.

- Following regulations must be kept

- Operation of the unit is only allowed to trained persons above an age of 18 years. The operator must be "expressly" instructed by the user.
- Only authorized personnel are allowed to be present at the working area of the machine.
- The operator must have read and understood the manual and knows the shown safety information.
- Works on the electric and electronic components are only allowed to licensed expert persons. Maintenance and repair work on hydraulic and pneumatic components must only be done by special trained persons.

## **3. Transport**

### **Table of Contents**

<b>3.</b>	<b>Transport</b>	<b>1</b>
3.1.	General .....	2
3.2.	Transport to installation site .....	3
3.3.	Admissible Devices for Transport.....	4
3.4.	Suspension of the machine.....	5
3.5.	Remove the eye bolt screws .....	6

## 3.1. General



**DANGER**

### **Transport.**

Vital wounds, death and or damage to machinery.

- Following regulations must be kept

- Transport work is only allowed to qualified personnel, taking the safety regulations into account.
- It is only allowed to lift up the machine at the designed supporting spots or possibilities respectively.
- To transport the machine, use only appropriate load suspension devices and hanging equipment. At selection, consider the crate or packing list indicated load.
- Read also chapter "Safety Advice"!
- Loose or bulky parts have to be removed before transport or must be fastened against independent movement.
- Loose hangings out cable and hoses have to be tied up safe. On this occasion pay attention that these are not bent.
- The hydraulic power pack (tank) must be emptied and the electric motor must be supported within the cabinet if the machine is NOT transported vertically! (Note: In case of an installed, so called "mini- power- pack"- (black colored oil tank!)- replace of tank vent screw by a (closed) screw plug will be sufficiently)
- Leave machine parts as long as possible on transport pallets.

## 3.2. Transport to installation site

The machine / machine parts are delivered on pallets or crates. Let the machine if possible on the way to the the assembly location as long as possible on the range or in the crate and carry the load with a forklift or pallet truck.



**DANGER**

### **Suspended machine can swing.**

Vital wounds, death and or damage to machinery.

- Hang up the machine as shown with appropriate load suspension device
- Manoeuvre slowly and gently
- The location of the central suspension point must be coincide with the centre of gravity and must not be moved



**INFORMATION**

If no suitable holes or attachment points for slings are available, the machine parts are hung with suitable cable loops. Make sure that no parts are crushed or torn.

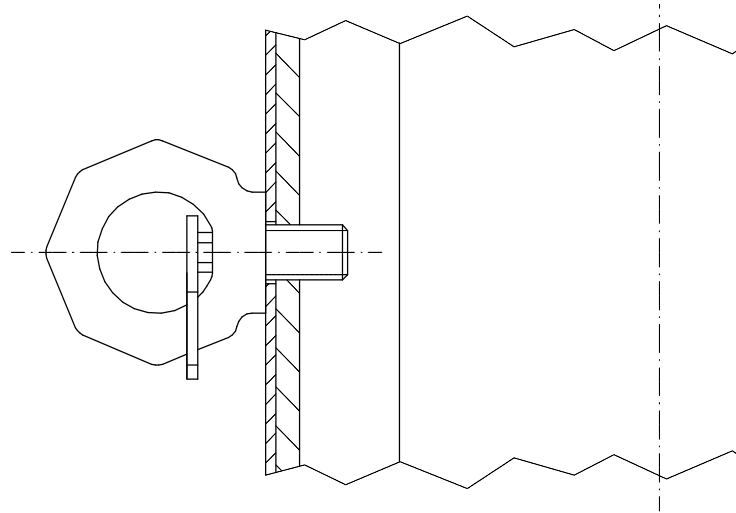
## 3.3. Admissible Devices for Transport



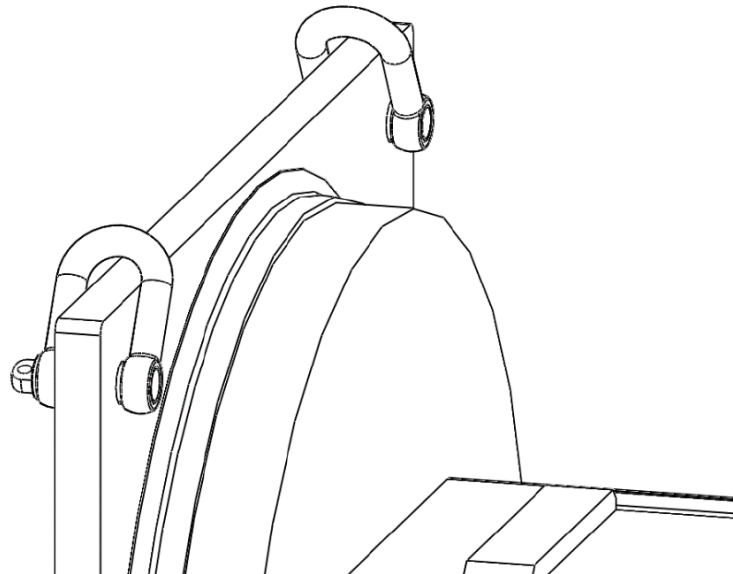
### INFORMATION

Max. allowed load at 45° pulling direction:  
M16 = 500 kg  
M20 = 830 kg  
Orientate eyebolts into pulling direction.

- eye bolt at right or left side face of column



- shackle at floor plate (in the mounting holes)

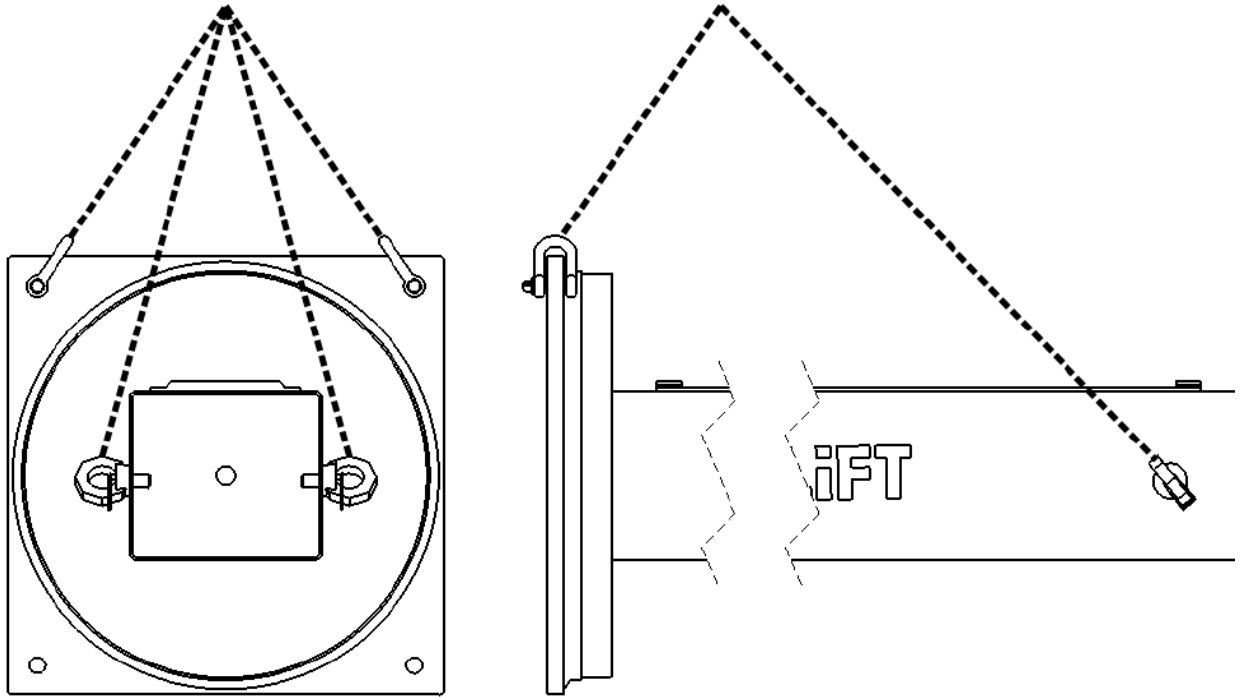


### INFORMATION

The eye bolts must be screwed completely into the column, in this case the ring can be rotated about 360°!  
Before loading, turn the eye bolt in the direction of force.

## 3.4. Suspension of the machine

To hang up the machine, mount the lifting devices as shown in the picture below.



### INFORMATION

Do not hook up the unit at any part of the supporting arm system!

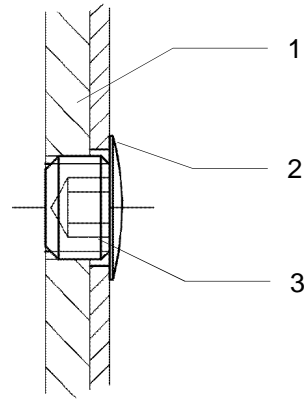
## 3.5. Remove the eye bolt screws



### INFORMATION

Eye bolts at the right and left side of the unit must be removed before operation of the unit! Close threaded holes as shown below.

- 1 Hex socket set screw, flat with outer surface
- 2 Plastic cap pressed into socket set screw
- 3 Outer surface of column



## **4. Installation**

### **Table of Contents**

<b>4.</b>	<b>Installation</b>	<b>1</b>
4.1.	General .....	2
4.2.	Conditions of Surroundings for Installation .....	3
4.3.	Assembly and Erection .....	3



## 4.1. General



**DANGER**

### **Installation of the machine.**

Vital wounds, death and or damage to machinery.

- Following regulations must be kept

- Installation work- assembly and connection of the machine is only allowed to qualified staff by keeping the safety advice.
- Prior to installation, the device has to be checked for transport damage. The manufacturer has to be informed immediately about possible damages.
- Use only the delivered fixing material as dowels and bolts.
- Pay attention especially to the tightening torque of the fixing screws of the load suspension device.



**INFORMATION**

Attention: The chemical anchors are subject of approval certificates by building authorities, that means that during installation of the anchors records are to be kept , confirming the actual concrete strength and the installation in accordance with regulations by the construction supervisor or one of his representatives. The corresponding records have to be kept available 5 years at minimum by the contractor.

- Let the hook up and the bracing at the machine as long at the machine till it is perfectly anchored.
- Do not stress the machine, before the anchors have reached their full load carrying ability.
- Refer also to chapter "Safety advice"



**DANGER**

### **Respect exactly curing time of chemical anchors.**

Vital wounds, death and or damage to machinery.

- Avoid any stress or displacement during curing time
- Remove the load suspension device after curing time

## 4.2. Conditions of Surroundings for Installation

- For installation within an explosion proof area the user has to be informed in time, to arrange any necessary steps. (e.g. interruption of production, to confer a welding permit, as well as the allowance to run non x-p rated machines and tools).

This is valid analogous for the installation of machines within clean rooms used in the pharmaceutical industry.

- The load carrying ability the quality of the floor must be guaranteed (even, resistant concrete floor with minimum thickness of 190mm to allow an anchoring depth of 110 mm)
- The area shown at the top view must be free of obstacles.
- The place for installation is prepared in that way, that the machine can be installed on smooth ground (possible pitch) and erected exactly vertical.
- Electricity is available near the machine's supply (column tip).
- Cranes or lifting equipment (e.g. fork lift truck) or fixing spots for a pulley bock above the area of installation.
- The unit is intended to be installed in a room. It is not suited for being operated under open air.

## 4.3. Assembly and Erection

If the machine has been delivered on a pallet or in a crate, the single parts and accessories have to be removed to have free access to the column.

The column has to be hooked up at the above described point(s) (refer also to chapter "transport" item 2) and erected at the intended place.

In case of slewable units the machine is delivered in one of the end positions.

Make sure, possibly by removal of the slew bearing cover by means of checking the end stops, at which direction the column is able to slew.

Usually the unit is adjusted ex works at 0° position. Refer also to the general arrangement drawing.

- First, mark exact location for erection onto the floor- corresponding to surrounding equipment
- Erect the column exactly vertical (e.g. by help of sheet metal stripes under the floor plate). Take care, that it is not hollow between the base plate and the floor.
- Check vertical position of the column.
- Drill and install the included floor anchors according to manufacturer's specification directly through the holes of the floor plate.
- Do not stress floor anchors before expiration of curing time. (refer to corresponding data sheets)
- Line and install electric lines the middle of the tilt bearing and connect it to the corresponding terminal box.
- Line and install the hydraulic hoses in the middle of the tilt bearing to the corresponding fittings of the clamp cylinder.
- Install supporting arm according to drwg.04-39-001/2
- Seal the rim of the floor plate by silicone rubber.

# SERVOLIFT

- Check and prepare of installation position of the energy supply at the ceiling. Be aware that lines will not be twisted or lengthened during later slew movement of the column.
- Line control cable to the intended place of installation of the operator panel. Consider an overview with placement out of active range of the two machines.
- Install operator panel foreseen for wall installation.
- Close all covers

## **5. Commissioning**

### **Table of Contents**

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5.2. Installation of supply lines .....	2
5.3. Basic adjustments .....	3
5.3.1. Activation of automatic grease canister .....	4

## 5.1. General



**DANGER**

**It's only allowed to instructed and authorized expert to hook up of the supply lines.**

Vital wounds and or death by electrocution.

- By installation of supply lines, disconnect electrical connections on side.

## 5.2. Installation of supply lines

- Install main supply cable to the site mains corresponding to electric scheme. Use the strain relief.
- Connect pneumatic maintenance unit to compressed air supply.
- Connect machine to buildings equipotential bonding conductor!
- Connect control cable to the operator panel



**INFORMATION**

Refer to enclosed pneumatic and electric schemes.

## 5.3. Basic adjustments

Commissioning of the unit is only allowed to qualified personnel under consideration of the safety advice.

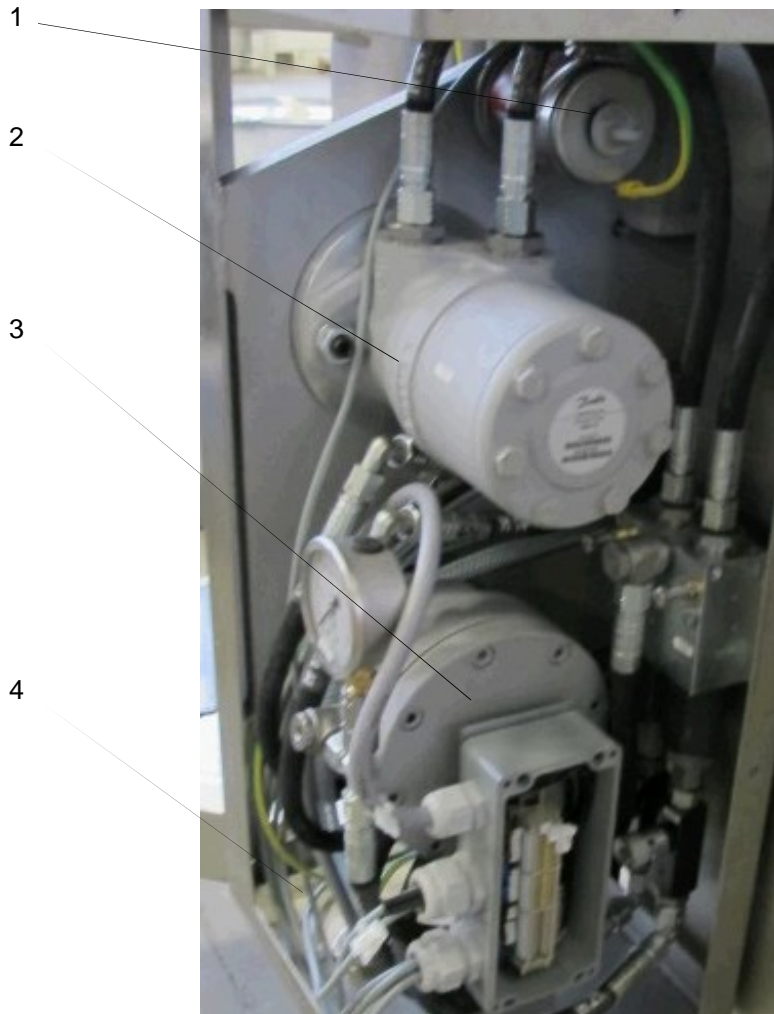
- Remove all crating material and transport fasteners from unit, especially the supporting piece from the electric motor of the power pack.
- Check whether the electric- and control cables have been connected and safe installed.
- Open the door of the lower rear cabinet behind the column.
- Check the manometer of the pneumatic maintenance unit, whether pressure is adjusted to 6 bars, but not higher than 8 bar.
- Open the filling cap of the hydraulic oil tank and fill in the provided oil (approx. 6 lt.) e.g. by help of a funnel. (See chapter "Change of oil")
- If the tank has been filled up by the manufacturer, the blanking plug is to be replaced with the delivered ventilated tank filler cap!  
The oil level has to be checked with load suspension device at minimum level.
- Turn main switch ON and start motor (e.g. by function CLAMP) of hydraulic pump short-lived to verify its sense of rotation.



### INFORMATION

The motor and thus the pump must not be run without oil. A so called "dry run" destroys the pump. Prior the first operation of the machine, the sense of rotation of the pump motor has to be checked (refer to red arrow).

## 5.3.1. Activation of automatic grease canister



- 1 grease canister with activator screw and grounding
- 2 hydraulic tilt motor
- 3 spring loaded brake
- 4 throttle non return valves H 3.2, H 3.3

rear view with cover



Open round cover rear the tilt gear box (refer to symbol hand oiler), loosen the middle screw only and slide lid away

Turn in the activator screw, till the rear eye breaks off. Refer to operating manual PERMA.

### **Now, the machine is ready for first test run!**

**During test run, height – slew and height positions may be readjusted if necessary. Control especially height stop position to dock inverted drum/funnel assembly to feeding port.**

**Follow step by step the following SEQUENCE OF OPERATION.**

(See chapter ADJUSTMENT). Pay Attention to speeds, pressures and eventual collisions heights


## 6. Operation

### Table of Contents

<b>6.</b>	<b>Operation</b>	<b>1</b>
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6.2.	Operating elements .....	3
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6.3.1.	Semi-automatic Sequence (Discharging into container) .....	4
6.3.2.	Semi automatic sequence (Discharging into drum).....	5
6.3.3.	Service Mode .....	6



## 6.1. Working place of the operator

 <b>DANGER</b>	<p><b>Operating of the machine.</b> Vital wounds and or death to by power-driven movement.</p> <ul style="list-style-type: none"><li>• Don't stay at reach of efficacy</li><li>• To watch out the load and movement of the machine</li><li>• By faults / troubles switch the machine off and locked against not allowed use until the defect has been rectified</li></ul>
--	---

During working with the lifter, only the operator himself is allowed to be present within the working area of the machine.


The usual working place of the operator is defined as follows. He moves a drum or product bag into the onto the platform of the clamp system. This is usually done from the funnel side with view to the column. The drum will be positioned and centered onto the clamp platform under the funnel.


Operation of the lifter is done from the remote installed wall panel.

Only for discharge, insertion and removal of the drum or bag, the operator is allowed to be present within the working area of the machine. It is not foreseen, that personnel is present within the area with any machine movement.

The discharge valve is manually opened with 180° tilted supporting arm. The operator is only allowed to near the raised load with arm set on one of the height stops.

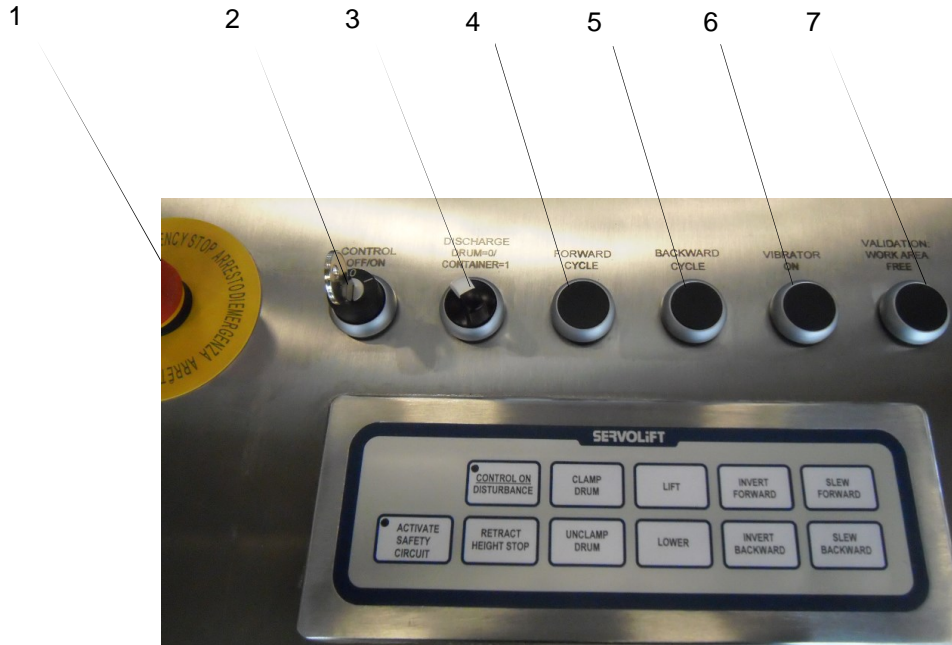
Do not stay within the working area while machine is in operation

 <b>WARNING</b>	<p><b>Inappropriate installation of the load.</b> Vital wounds, death and or damage to machinery by slipping off / drop down of the load.</p> <ul style="list-style-type: none"><li>• Max. load don't exceed</li><li>• Pick up the load with the provided load suspension device</li><li>• Don't stay under the load</li></ul>
---	--

 <b>CAUTION</b>	<p><b>Pay attention by the lowering movement of the supporting arm.</b> Contusive by lowering to the floor.</p> <ul style="list-style-type: none"><li>• Wear appropriate personal protective equipment</li></ul>
---	--

## 6.2. Operating elements

Operation of the lifter is done by the operating elements on top of the rear mounted cabinet.



operating elements for semi automatic mode

operating elements in service mode

	11	13	15	17	19
10	12	14	16	18	20

- 1 E-STOP
- 2 CONTROL OFF / ON key switch
- 3 selection switch DRUM cycle / CONTAINER cycle
- 4 FORWARD CYCLE
- 5 BACKWARD CYCLE
- 6 VIBRATOR ON
- 7 VALIDATION WORK AREA FREE

- 10 ACTIVATE SAFETY CIRCUIT
- 11 CONTROL ON / DISTURBANCE (LED)
- 12 RETRACT HEIGHT STOP
- 13 CLAMP DRUM
- 14 UNCLAMP DRUM
- 15 LIFT
- 16 LOWER
- 17 INVERT FORWARD
- 18 INVERT BACKWARD
- 19 SLEW FORWARD
- 20 SLEW BACKWARD



### INFORMATION

SERVICE MODE actuation is only available with actuated key switch internal electric cabinet.

## 6.3. Sequence of operation

### Start position:

- Main switch is "ON", compressed air is "ON".
- Supporting arm is at min height
- Clamp platform fully extended
- Clamp platform is not loaded
- Empty container is placed on the IBC-scale at slew position 2 (93° clockwise)
- OscilloWitt and empty drum are placed at slew position 1 (80° counter clockwise)

### 6.3.1. Semi-automatic Sequence (Discharging into container)

The operator puts a product bag onto the platform.

1. Switch key switch CONTROL ON
2. press ACTIVATE SAFETY CIRCUIT
3. select DISCHARGE CONTAINER (1)
4. press VALIDATION WORK AREA FREE
5. press and hold FORWARD CYCLE
  - The clamp platform retracts fully
  - Supporting arm lifts to maximum height
  - Column slews to position 2
  - Supporting arm lowers onto upper height stop
  - Clamp platform fully extends
  - The unit stops

The operator enters the mezzanine platform

Opens the bag

Discharges the product into container

Leaves the platform, goes back to the panel

1. press VALIDATION WORK AREA FREE
2. press and hold BACKWARD CYCLE
  - Clamp platform retracts fully
  - Supporting arm lifts to maximum height
  - Column slews to position 0
  - Supporting arm lowers minimum height
  - Clamp platform fully extends
  - The unit stops

Next sequence

## 6.3.2. Semi automatic sequence (Discharging into drum)

The operator puts a drum onto the platform.

1. Switch key switch CONTROL ON
2. press ACTIVATE SAFETY CIRCUIT
3. select DISCHARGE into drum (0)
4. press VALIDATION WORK AREA FREE
5. press and hold FORWARD CYCLE
  - Drum is clamped
  - Supporting arm lifts to maximum height
  - Supporting arm inverts fully to valve down position
  - Column slews to position 1
  - Supporting arm lowers onto lower height stop
  - The unit stops

The operator starts the OscilloWitt and opens discharge valve  
If necessary press VIBRATOR ON to support product flow.

After the drum contents is discharged and calibrated, the operator closes the discharge valve and stops the OscilloWitt.

1. press VALIDATION WORK AREA FREE
2. press and hold BACKWARD CYCLE
  - Supporting arm lifts to maximum height
  - Column slews to position 0
  - Supporting arm inverts 180° backward (valve up)
  - Supporting arm lowers down to minimum height
  - Clamp platform extends
  - The unit stops

Operator removes discharged drum

Next sequence

Operator removes discharged drum

Next sequence

## 6.3.3. Service Mode

Switch off main switch and open cabinet  
Switch SERVICE MODE switch to "I"  
Close cabinet and switch main switch ON  
Switch CONTROL ON  
Press ACTIVATE SAFETY CIRCUIT

Use membrane key switch panel to activate functions according to their labelling.



### INFORMATION

Before SERVICE MODE is switched off, bring unit first back to start position.

- 0° slew position
- supporting arm in upright position
- platform extended

Switch key switch CONTROL OFF  
Switch off main switch and open cabinet  
Switch SERVICE MODE switch to "0"  
Close cabinet



### DANGER

#### **Prevention from not allowed use.**

Vital wounds and or death by electrocution.

- Main switch must be deactivation and locked by an padlock.

# 7. Troubleshooting

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## 7.1. General



### INFORMATION

If any defect or malfunction is noted before, during or after the operation of the machine, usually experts have to be consulted. The operator has to inform his supervisor. He is not allowed to remedy the fault, e.g. defects at the electric installation, on his own.

**In case of faults, the machine has to be switched off and locked against further use, till the defect has been repaired by the competent expert.**

### 7.1.1. List of possible faults

Kind of fault	Reason	Steps to repair
no function /movement available	<ul style="list-style-type: none"> <li>main switch OFF</li> <li>excess current release is active</li> </ul>	<ul style="list-style-type: none"> <li>turn main switch ON</li> <li>turn main switch OFF /ON again, in case of excess current release, experts have to be consulted</li> <li>verify compressed air supply</li> </ul>
supporting arm is not lifted up to maximum height	not enough oil in tank	top up oil level and evacuate cylinder
supporting arm is not lifted with load	<ul style="list-style-type: none"> <li>maximum load is exceeded</li> <li>pressure limiting valve not correctly adjusted.</li> </ul>	<ul style="list-style-type: none"> <li>check load</li> <li>adjust pressure limiting valve to requested value</li> </ul>
supporting arm is lifted elastically	cylinder contains air	evacuate cylinder and find out, why air had been come into cylinder
height positioning not correct	height stop position not correct	loosen height stop latch and clamp to required height.
lamp CONTROL ON is blinking (fast)	<ul style="list-style-type: none"> <li>pneum. pressure &lt; 4bar</li> <li>hydr. oil temp. <math>\geq 70^\circ</math></li> <li>fuses defect</li> <li>E- STOP activated</li> <li>E- STOP module defect</li> </ul>	<ul style="list-style-type: none"> <li>adjust pneum. pressure greater 4bar</li> <li>switch machine off and let oil cool down</li> <li>check overvoltage and replace fuse</li> <li>release E- STOP</li> <li>check E-STOP module</li> </ul>



### INFORMATION

Further obvious faults might be caused by the interlocks with non fulfilled options. Refer to chapter "Description of Product item "Technical Data" –Interlocks.

## 7.1.2. List of supposed faults

column can not be slewed	<ul style="list-style-type: none"> <li>max. height not reached</li> </ul>	<ul style="list-style-type: none"> <li>lift fully to max. height.</li> </ul>
arm can not be tilted	<ul style="list-style-type: none"> <li>max. height not reached</li> <li>column not positioned at slew start (pick up position)</li> <li>drum not fully clamped</li> </ul>	<ul style="list-style-type: none"> <li>lift fully to max. height</li> <li>slew column against mechanical stop</li> </ul>
arm can not be lifted or lowered	<ul style="list-style-type: none"> <li>slew end positions not reached</li> <li>drum not clamped or mast not fully retracted</li> <li>clamp mast not fully vertical</li> </ul>	<ul style="list-style-type: none"> <li>slew to any slew end position</li> <li>clamp drum into funnel, or retract fully clamp mast</li> <li>tilt clamp mast against mechanical stop</li> </ul>
clamp mechanism can not be opened	<ul style="list-style-type: none"> <li>arm is not fully lowered to minimum height</li> </ul>	<ul style="list-style-type: none"> <li>lower supporting arm completely down to minimum height</li> </ul>
heights stops are all retracted in slew start position, one is released in discharge position	<ul style="list-style-type: none"> <li>one container size is selected at selection switch</li> </ul>	<ul style="list-style-type: none"> <li>according to selected bin, upper height stop is retracted or released. (DRUM retracted, CONTAINER released)</li> </ul>
lamp CONTROL ON is blinking (slow)	<ul style="list-style-type: none"> <li>cabinet internal switch is actuated to SERVICE MODE</li> </ul>	<ul style="list-style-type: none"> <li>switch service switch OFF</li> </ul>
semi automatic cycle cannot be started after VALIDATION WORK AREA FREE is pressed	<ul style="list-style-type: none"> <li>forward or backward cycle is not started within 10 seconds</li> </ul>	<ul style="list-style-type: none"> <li>press VALIDATION WORK AREA FREE button and within 10 seconds requested forward or backward cycle</li> </ul>



## 8. Maintenance and Adjustment

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## 8.1. General



### INFORMATION

The information regarding an annual service by a competent expert person is given.



### DANGER

#### **Danger by operation without interlocks in service mode**

Vital wounds, death and or damage to machinery.

- Only instructed staff is allowed to operate machine in maintenance mode
- Operation in maintenance mode must be carried out under utmost care
- Pay attention to unexpected movement compared to normal operation.

- The area for maintenance has to be protected spaciouly.
- Mark the machine by a sign that it is out of operation for maintenance.
- Switch off all terminals and lock them against non intended switch on (by a padlock).
- Switch the control off at the key switch. Hand both keys (padlock and key of key switch) to the person in charge with the maintenance work.
- Release the pneumatic maintenance unit from pressure.
- Use exclusively the spare parts listed at our lists, or parts which are confirmed by us in writing.
- Refer also to the chapter "Safety advises"



### INFORMATION

SERVICE actuation of the height stops is only available in SERVICE MODE, actuated by key switch internal electric cabinet.

## 8.2. Maintenance and care

### Daily or if required respectively:

- release water from pneumatic maintenance unit.

### Monthly:

- check oil level with supporting arm at min.-height and tightness of hydraulic components (Check small bore at columns footplate for oil leakage at the lift cylinder).
- check state and shape of load suspension device
- check installation of the flexible duct from the column to frontcase
- check coverband for bends and wave lines.
- check state and readability of the operating elements, clean if necessary
- check condition of discharge valve and its components
- clean the machine

### every ½ year:

- visual check of floor fixing
- check height stop devices for fixing and correct functioning
- check complete unit for visual damage as deformation and cracks.
- grease U-tracks inside column with common machine grease. On this occasion check tightness of lift cylinder. Bear in mind that all cylinder rods are coated with a thin film of oil which might summarize during the course of time
- oil lift chain slightly (delivered hydraulic oil may be used)
- check tightness of tilt drive unit
- check oil level at hydraulic power pack. If oil level needs to be to be filled up, check the device and its supply pipes and hoses for any leaks.

### every year: (check by a competent person)

- remove all covers
- all carrying parts have to be checked visually for corrosion, cracks and loose fixings
- tighten the floor anchors with recommended torque by torque wrench
- tighten fixing screws of frontcase with recommended torque by torque wrench (see dwg. 04-39-001/2d)
- check completeness of all lids and covers

*continued*

- remove and exchange automatic lubricator (PERMA) at the tilt drive according to the enclosed specification.
- clean tilt bearing toothing from used grease
- clean slew bearing toothing and apply fresh grease



## INFORMATION

Slew bearing itself has not to be greased.  
("lifetime lubricated")

### Every six years:

- The hydraulic hoses have to be exchanged every six years.
- Empty and open oil tank
- Clean tank inside
- Replace suction filter
- Exchange hydraulic oil



## INFORMATION

Checking intervals for functioning and rate of wear of the machine is to be done corresponding to load factor, frequency of use and environment conditions on site. In case of "heavy duty" working conditions, intervals must be shortened adequately.

## 8.2.1. Lubricants

Application:	Type:	Used product	Quantity:
Hydraulic system	CLPHC 46, ISO-VG 46	Molyduval Biolube 46	approx. 6 L
Lift chain	chain oil, acid-free, non resinifying (food grade if needed)	Molyduval Biolube 46	thinly and evenly
Guides, rails, articulations, hinges	Multipurpose grease, acid-free and non resinifying (food grade if needed)	Molyduval Soraja FM 372	thinly and evenly

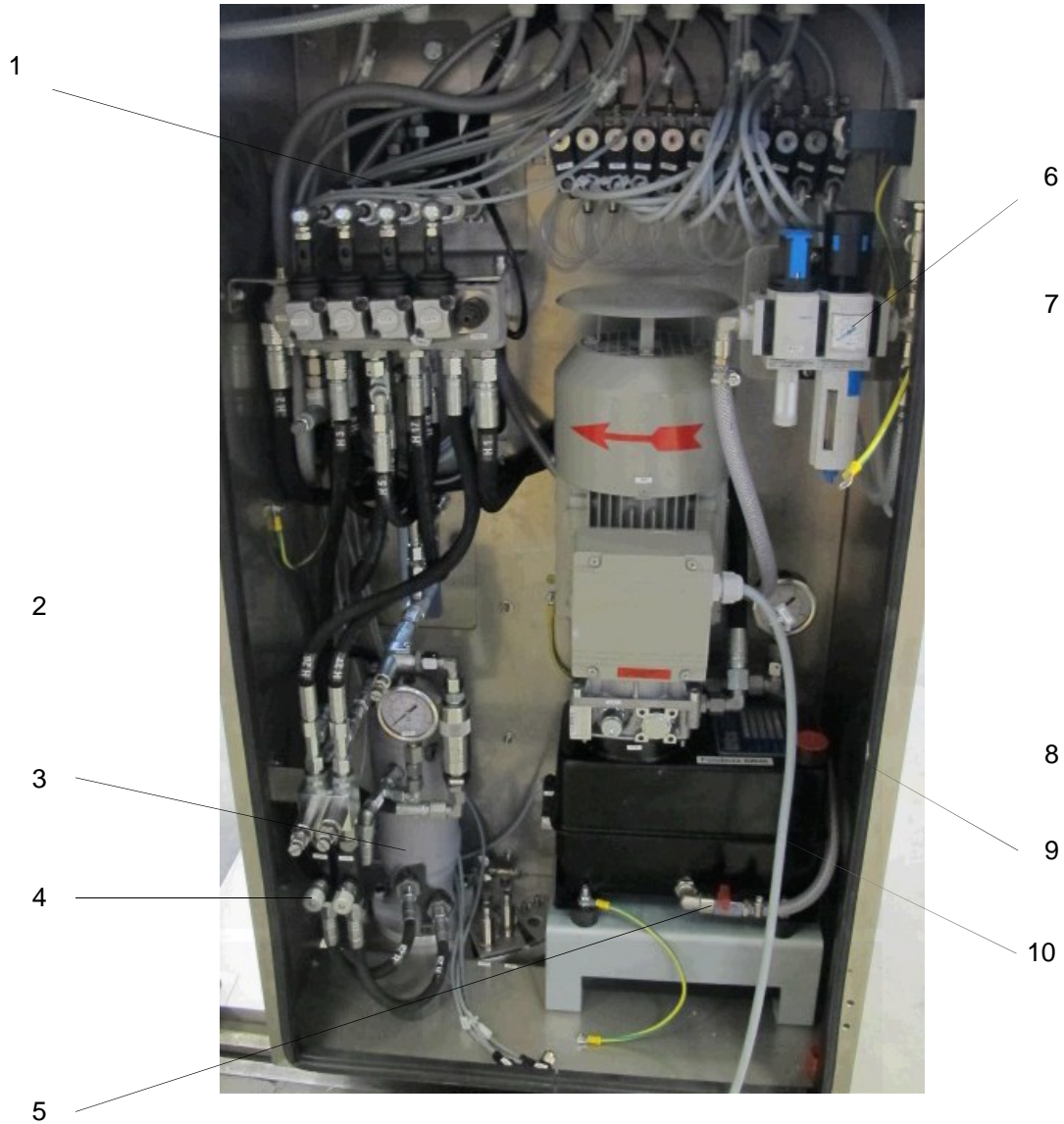


### INFORMATION

The factory provided oil is MOLYDUVAL Biolube 46 with viscosity class 46 acc. DIN 51519. This oil is conforming DAB and USDA H1 and is suitable for use in food industries with incidental food contact. All ingredients correspond to USDA respectively to FDA-direction. It can be ordered from SERVOLIFT under Art.No. 126424

## 8.3. Hydraulic equipment

### 8.3.1. Hydraulic power pack



- 1 hydraulic valve control block
- 2 flow control valve H1.3 (lower speed)
- 3 slew motor H4.0 with disc brake
- 4 throttle non return valves H4.2, H4.3 (slew speed)
- 5 tank drain cock
- 6 pneumatic maintenance unit P0.1
- 7 electric (AC) motor
- 8 manometer H 0.2
- 9 vented filler cap
- 10 tank with internal pump H5.0

## 8.3.2. Change of oil



**ATTENTION**

### **Leaking / spill oil.**

Environment polluting.

- At first cover the working area with appropriate measures
- Immediately remove of leaking oil
- Disposed waste oil according to the valid regulations

The change of oil has to be carried out as follows:

- Lower load suspension device down to minimum height.
- Switch the machine off at the electric main switch.
- Open the access of the hydraulic cabinet.
- Place a recipient (approx. 8 lt.) in front of the oil tank.
- Open tank filler cap.
- Place drain hose into recipient and open drain cock or use a suction pump for pumping off the content of hydraulic tank.
- After oil has completely run off from tank and drain hose, close drain cock and clean drain hose. Restore drain hose as shown above.
- Pour in new oil (approx. 6 lt., type as above) until oil level is appr. 20 mm below upper rim of filling nozzle.
- Close filling nozzle.
- Switch machine ON, lift supporting arm to max.-height position and lower back to minimum height and check oil level again.
- Correct oil level if necessary.
- Remove spilled or wasted oil.
- Close access of cabinet.

## 8.4. Adjustment Works



### INFORMATION

Pressures and speeds have been adjusted by the manufacturer corresponding to customers operating conditions as far as known during manufacturing. Any changes of necessary adjustments have to be done carefully and step by step, respecting max. pressure and speeds.



### SEPARATE INSTRUCTION

The manufacturer-set pressures and speeds are listed in the MACHINE BOOK related to the engine.

### 8.4.1. Adjusting of hydraulic pressure.

1. Lift supporting arm to max.-height till it stops by itself. Check pressure at manometer (H 0.2) with activated hand lever (H 1.10).
2. Release lock nut at pressure limiting valve (H 6.1) by a wrench.
3. Adjust new rate with allen key (using allen key 3mm) with running motor and actuated valve (clockwise "+", counter clockwise "-")
4. Tighten counter nut by holding the screw.



pressure limiting valve (H 6.1)  
with stud screw and counter nut

hydraulic control  
valve (H 5.0)



## 8.4.2. Lowering speed

This speed can be adjusted at flow control valve H 1.3 (refer to hydraulic scheme resp. picture "hydr. power pack"). The adjustment has to be done with maximum load. Prior to adjustment the little set screw at the side of the silver colored bushing has to be loosened (Allen key size 2,5 mm). The adjustment is done by turning the bushing while machine is lowering under load.

## 8.4.3. Tilt and slew speed

Tilt speed (fwd/ bwd) may be adjusted separately at throttle-non return valves H 3.2 / H 3.3 (refer to hydraulic scheme resp. see picture automatic greaser). The adjustment has to be done with maximum load. Prior to adjustment the little set screw at the adjusting knob has to be loosened (Allen key size 2 mm). The adjustment is done by turning the adjusting knob while machine is inverting under load.

Same procedure should be carried out to adjust slew speed. Corresponding throttle non return valves (H 4.2 / 4.3 are installed in the cabinet left of the slew motor.

## 8.4.4. Pneumatic maintenance unit

Necessary pressure for the machine is to be adjusted at the maintenance unit as follows:

- lift up the upper blue cap till it is released noticeably
- now the pressure can be adjusted to the requested value by turning the cap (clockwise "+" or counter clockwise "-")
- lock the adjustment by pressing down the cap till it is caught

To release the water from the sight glass, the nozzle at the bottom has to be turned counter- clockwise (seen from below) with pressurized unit.

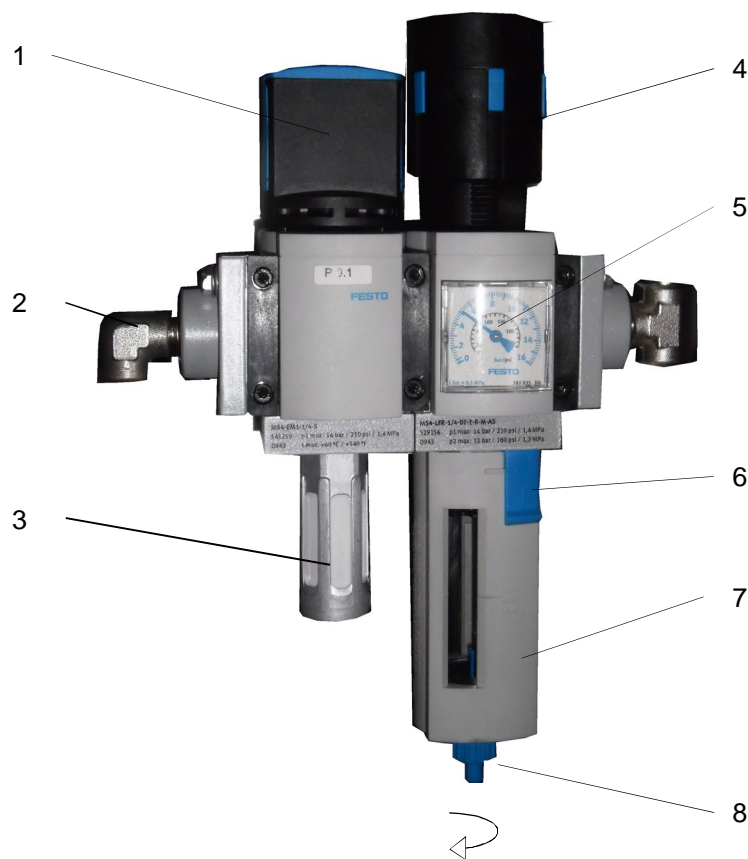
Replace the filter element as follows:

Close shut- off valve: system will be depressurized.

Turn filter bowl counter- clockwise, take out used filter element and put in the new one.

Remount filter bowl.

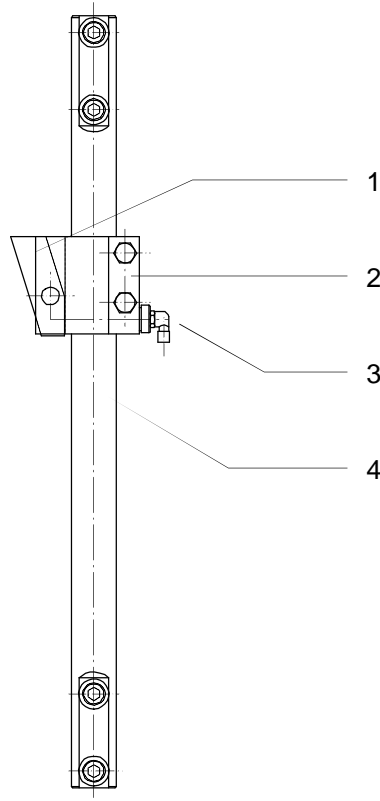
Readjust pressure if necessary.



- 1) shut off valve („open-position“)
- 2) inlet
- 3) silencer
- 4) pressure adjustment by pulling up an turning the cap (right "+", left "-")
- 5) manometer
- 6) button to release filter bowl
- 7) filter bowl (filter and water separator inside)
- 8) water release

## 8.4.5. Adjustment of Height Stop

Discharge height can be adjusted by displacement of the height stop device on its rod, mounted on the lateral column side.



- 1) height stop rod
- 2) electric activation of height stop device
- 3) height stop block
- 4) fixing screws

Loosen both lateral hex cap screws aside the block by a wrench size 17mm. After the adjustment, orientate the device parallel to the column and tighten the screws again (tightening torque 42 Nm).



**CAUTION**

### **Loaded component.**

Vital wounds / crashing hazard.

- By the adjustment the supporting arm must not be degraded at the height stop device

## 8.4.6. Adjustment of slew end stops

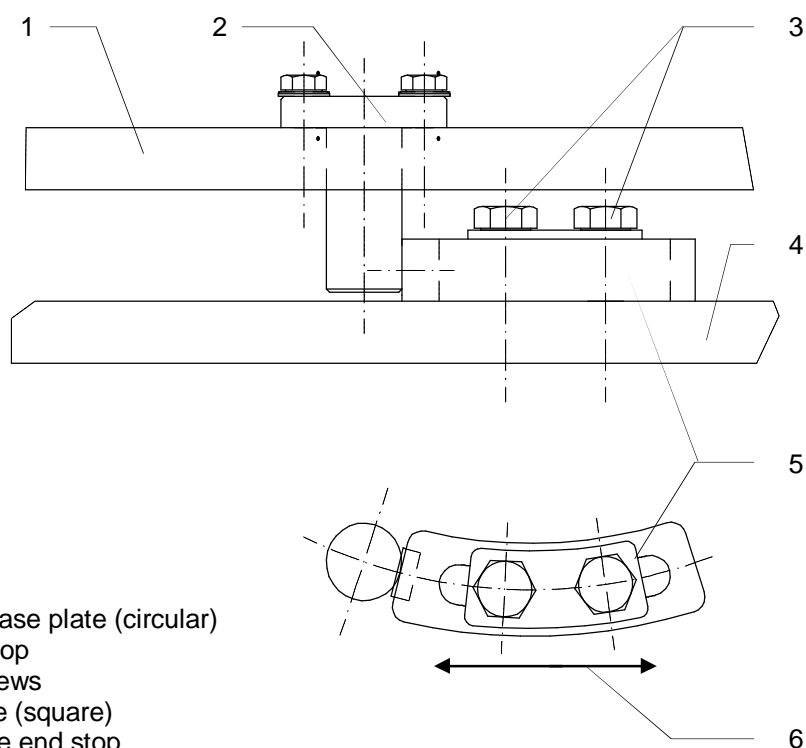
If the slew end position does not correspond to the start or discharge position, the fixed stops can be adjusted in a little range as follows:

After removal of the stainless steel cover band around the base plate, following section is shown



### INFORMATION

Move the column into the required position and slide the end stop (no. 5) to the rotary end stop (no.2). Tighten screws after adjustment.



- 1) column base plate (circular)
- 2) turning stop
- 3) fixing screws
- 4) floor plate (square)
- 5) adjustable end stop
- 6) adjustment direction

Loosen fixing screws (open-end-wrench size 19 mm) of corresponding end stop and move end stop into desired direction. Retighten fixing screws carefully (tightening torque = 41 Nm). Check columns end-position and readjust if necessary. Adjusting range is  $\pm 4^\circ$  approximately.



### INFORMATION

Check the steady toggle of the position sensing after readjustment, if necessary reposition the switching flag at the rotary mounting bar.

After adjustment, turn column some times to both end positions and verify their correctness. Readjust if necessary. Remount and fix the two- part stainless steel cover.

Adjustment of 0° and 180° tilt position

The tilt positions (0° & 180°) may be adjusted slightly with the end stops inside of the inversion drive housing. (

For this, the two-part front cover of the inversion drive housing must be removed completely.

Unscrew counter nut (hex. key size 24 mm) of corresponding tilt stop block.

**NOTE: 180°- stop is above, 0°- stop is below the tilt bearing!**

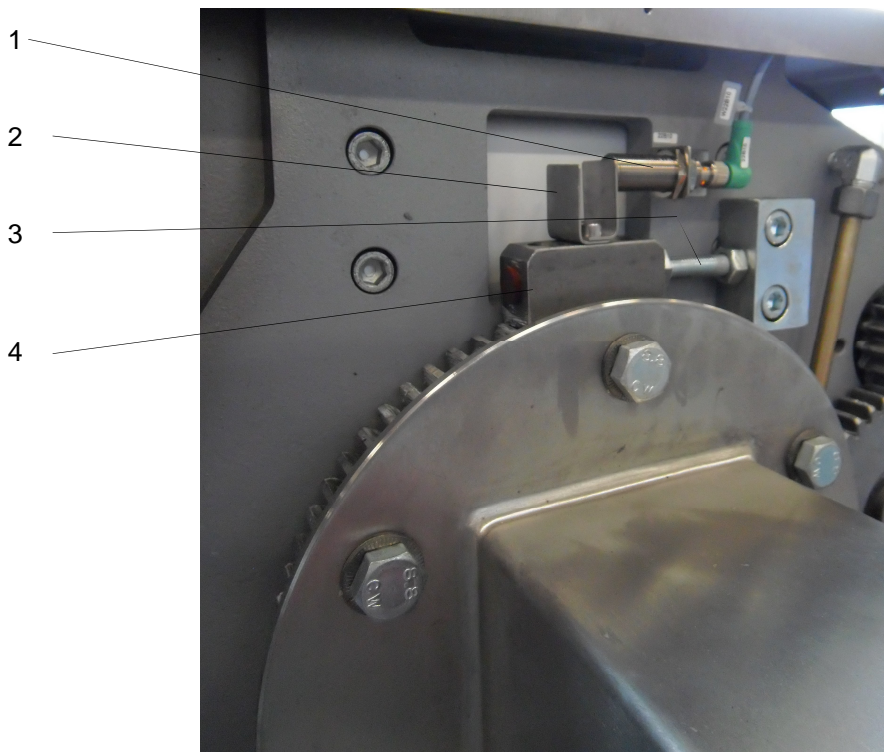
Adjust stop- screw (using open-end-wrench 24 mm) to corresponding direction. Tighten counter nut and verify correct positioning.



## INFORMATIONS

**Adjustment of end stop is not possible while support is at corresponding end position!**

View of 0° tilt- position.

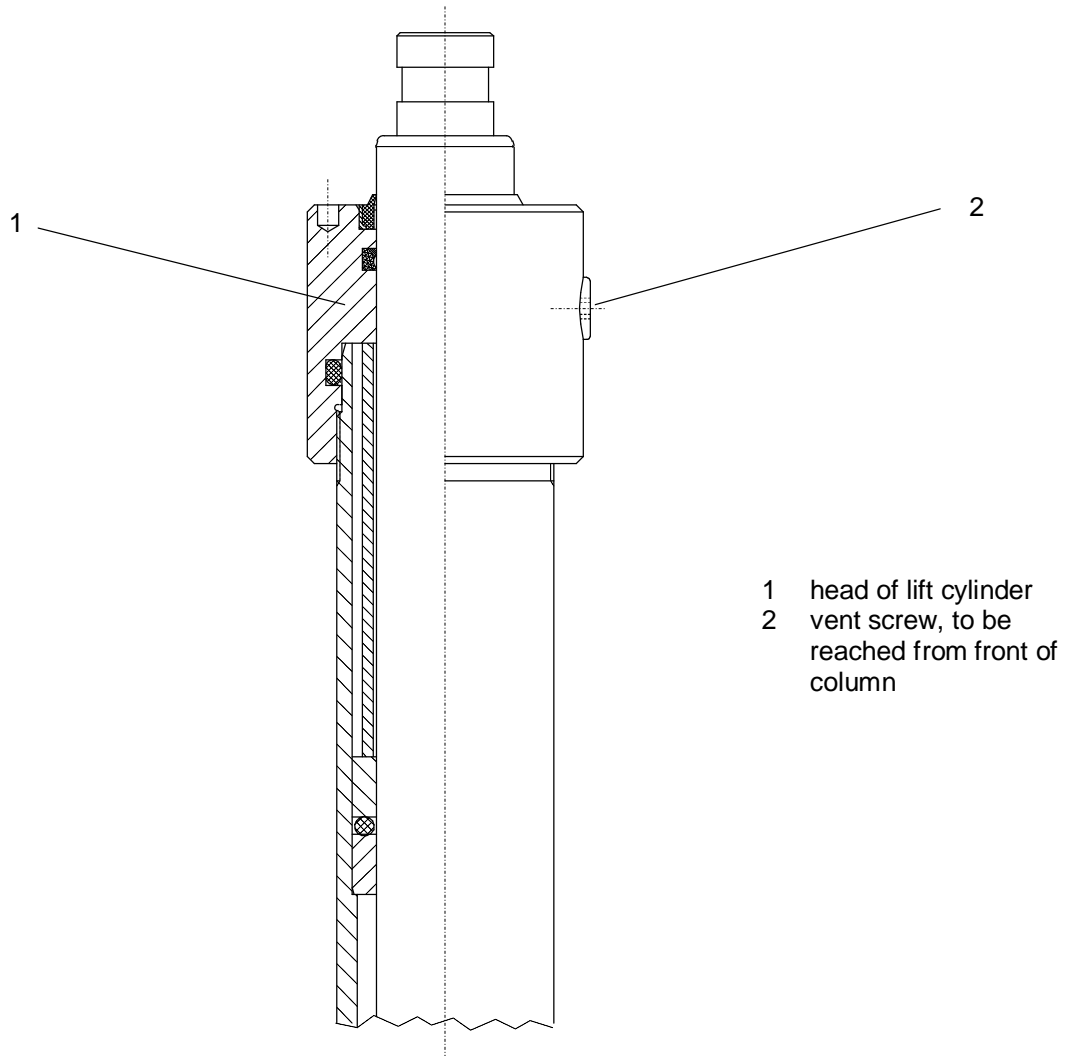


- 1 sensor 0°
- 2 sensor flag
- 3 0° stop screw
- 4 revolving stop block

After adjustment, tighten counter nut carefully.  
0° and 180° positions can be adjusted separately.

## 8.4.7. Evacuation of lift cylinder

If the lift movement appears jerkily, air has come into the lift cylinder, which now has to be evacuated.



- Lift supporting arm to maximum height till it stops itself. (Lift cylinder is extended to maximum)
- Loosen the vent screw of the cylinder head (**only ½- 1 turn**) by Allen key (5mm)
- Actuate “LIFT” lever at the same time with the push button “MOTOR ON”
- Check the outcoming oil till it is free of bubbles.
- Repeat this process twice to be sure that no air remains in the cylinder.
- Close the vent screw firmly and clean the cylinder from the oil
- Check oil level with supporting arm at **minimum** level.

## **9. Cleaning**

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9.2. Product contact parts .....	3

The machine has to be cleaned periodically according to operational use or to production based requirements. Normally no danger of pollution from the machine itself is expected, also as a rule no or minor pollution are taken up from the environment, e.g. by a cooling fan.

During the foreseen maintenance intervals, the machine has to be cleaned so far to prevent operational malfunctions caused by accumulation of dirt, dust and production residuals. This has to be circumscribed to external cleaning, removal of oil leakage and coming out lubricates, condensate and particles of out blowing compressed air, as well as exchange of installed filter.

Production based cleaning (e.g. during change of product) has to be performed according to customer's instructions (method, scope and period of repetition) and if necessary recorded.

## 9.1. Principle

Switch machine off at main switch.

Do not use:

- abrasive cleanser
- aggressive detergents (acid or alkaline)
- polish or abrasive polishing paste
- abrasive clothes or scrub sponges

### 9.1.1. External Cleaning

Stainless steel surfaces:

- remove dust by soft cotton cloth, do not use compressed air
- use neutral cleaning agents with soft sponge or similar.
- rinse with soft water, dry with cotton cloth/ fleece.
- if necessary remove greasy dirt with alcohol (e.g. isopropyl)

Painted surfaces:

- as above, please note additionally data sheets of used cleaning detergent!
- pay attention, if alcoholic or solvent solutions are used.



#### INFORMATION

Do not clean machine by hose or flush water, do not use solvents or hot water or steam and high pressure cleaners! Prevent water and cleaning detergents from internal the hoist, cabinet, over terminal boxes and motors or further electric, pneumatic or hydraulic components!

Avoid direct contact of seals and rubber parts during sprinkling (w/o pressure) with cleaning detergents. Used plastics and seal materials usually are resistant against alcoholic-, low acid- and alkaline solutions. These are not resistant against chlorinated hydrocarbon, concentrated acids and alkaline solutions, polycyclical aromatic hydrocarbons, oils and fuels. (exception according to execution or requirement)



## 9.1.2. Internal cleaning:

- remove dust by soft cotton cloth and / or clean housing by vacuum cleaner (do not use compressed air to blow out housings).
- remove greasy dirt with alcohol (e.g. isopropyl).
- take up spilled oil by absorptive clothes.
- do not use water or watery solutions.

## 9.2. Product contact parts

- These parts are usually manufactured by high quality material, thus deviating from above mentioned principles regarding cleaning and disinfection, other cleaning agents and procedures can be used, which correspond to company's internal and product specific validation requirements.

Supplier has to be informed at order about possibly used detergents and methods or procedures to determine appropriate materials. Based on our experience no objections are raised against detergents and disinfection solutions used within the pharmaceutical industry.

- In case of doubt contact our service department, describing detergent and machine part intended to be cleaned



### ATTENTION

Environment polluting cleaning and disinfection agents must be disposed according to national regulations. Consider corresponding safety data sheets.

# 10. Disposal

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## 10.1. General

The machine consists of various components and parts, which have to be disposed or recycled according to local or legal provisions.



### INFORMATION

Clean machine carefully from all product residuals.

After complete emptying of the hydraulic system and removal of the machine from place of installation, disassemble it and sort parts into the following groups:

- steel scrap
- aluminium
- plastic
- electronic parts and cables
- hydraulic oil and grease

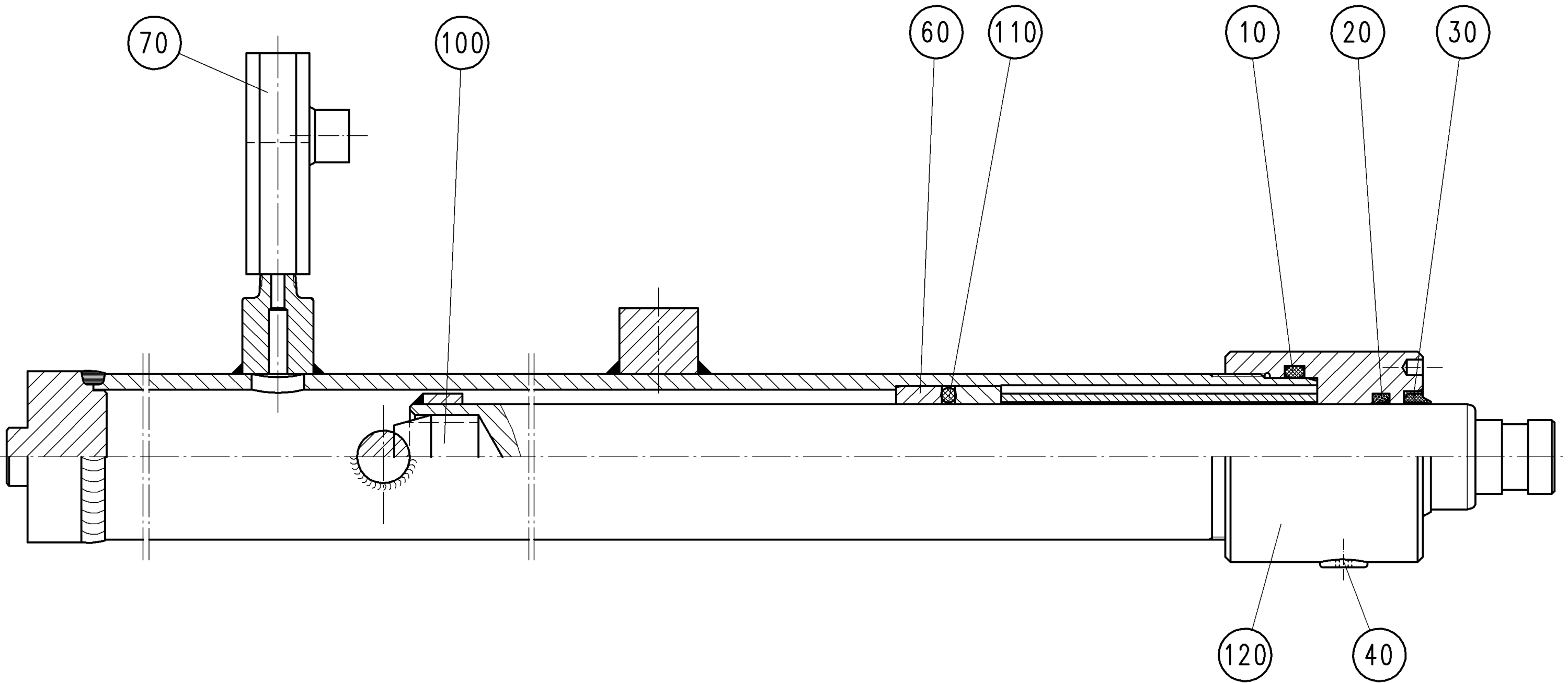


### ATTENTION

Please note, that especially hydraulic cylinders and the pipe and hose system will still contain oil even with emptied hydraulic tank.

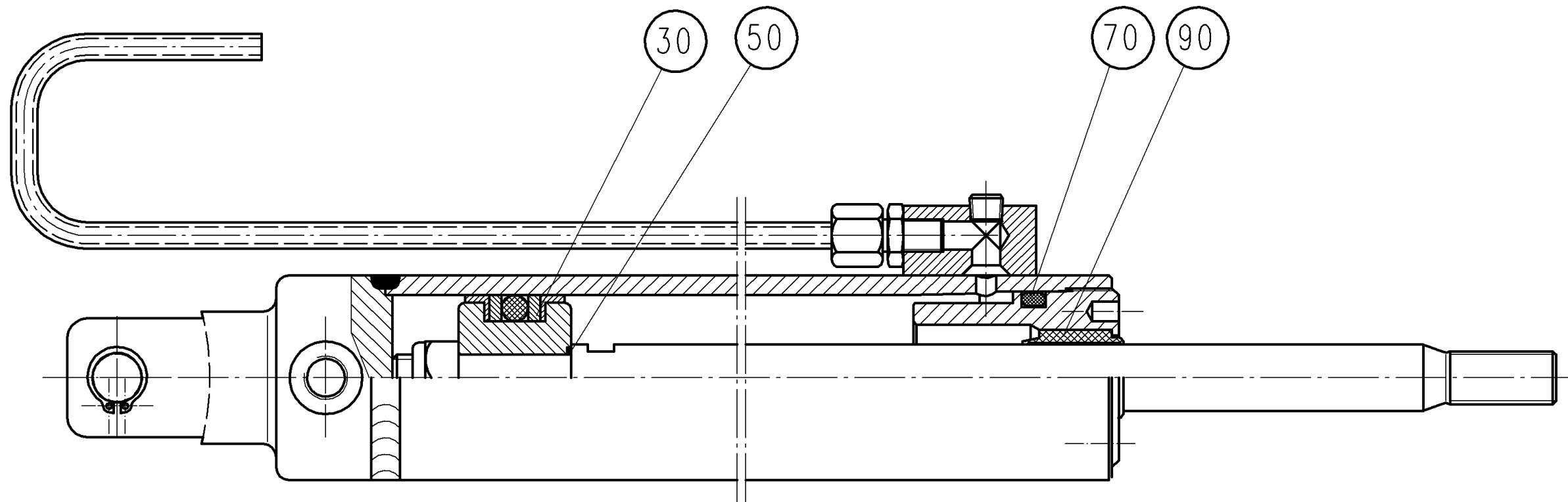
Environment polluting lubricants and cleaning agents have to be disposed properly according to effective regulations.





POS.	PCS.	DESCRIPTION	DRAWING NO.	ART.-NO.	SPECIFICATION
10	1	O-RING		100819	59.2x5.7
20	1	ROD SEAL		101739	S39-40-48-6.3
30	1	ROD WIPER		100803	40-50-7-10 AS
40	1	SCREW PLUG		100507	R1/8"
60	2	GUIDE BUSHING	00-41-106	112397	∅54x∅40-17,5 lg.- Rg7
70	1	CHECK VALVE		101190	RH1
	1	LINE RUPTURE VALVE		110258	LB 1 C-10
100	1	RUBBER BUMPER		112325	80-32 - EFFBE-Urelast 90 Shore
110	1	O-RING		100812	41,2x5,7
120	1	CYLINDER HEAD ∅40	00-41-102	101725	Rd 80-75 lg.-DIN 1691-GGG 25
	1	SEAL SET		112432	POS.: 10, 20, 30, 100, 110

Projekt-Nr.		Maße ohne Toleranzangaben mittel ISO 2768		Oberflächenreihe R 2 DIN ISO 1302		Maßstab 1:1,5 Werkstoff, Halbzeug		Art.-Nr. -	
		Datum		Name		Benennung			
		Erst. 02.05.02		schmitt		Liftcylinder plungertyp ∅40 Spare and wear parts			
		Änder. 02.05.02							
		Bearb. 07.12.04		Pielawa					
		Gepr. 04.04.05		luckerm		Zeichnungsnummer U:0205\ZE1\SCKDV1EQ.ZE1			
				SERVO LIFT GmbH Handhabungstechnik Albert-Einstein-Str.9 D-77656 Offenburg-Zunsweier Tel.0781/6100-0		Index 00-41-101V		Blatt 2/3	
Zusl. Änderung		Datum		Name		Ersatz für: DO-41-101		Ersatz durch:	



Pos.	Pcs.	Description	Art.-No.	Specification
30	1	piston seal	100793	50-34-18,4
50	1	o-ring	102294	14x1,6
70	1	o-ring	100812	41,2x5,7
90	1	rod seal	100841	QFNH - 20x29 - VG02
	1	seal set	106722	Pos.: 30, 50, 70, 90

Projekt-Nr.		Maße ohne Toleranzangaben mittel ISO 2768	Oberflächenreihe R 2 DIN ISO 1302	Maßstab 1:1,5 Werkstoff, Halbzeug	Art.-Nr. -
		Datum	Name	Benennung	
		Erst.	06.05.02	Clamp cylinder Ø20/50	
		Änder.	06.05.02	Spare and wear parts	
		Bearb.	09.12.04		
		Gep.	21.01.08		
		SERVO LIFT GmbH Handhabungstechnik Albert-Einstein-Str.9 D-77656 Offenburg-Zunsweier Tel.0781/6100-0		Zeichnungsnummer U:0205\ZE1\SCT620SN.ZE1	Index 0
Zust. Änderung		Datum	Name	Ersatz für: DO-43-301	Ersatz durch:



# SERVOLIFT

Albert-Einstein-Str. 9  
D-77656 Offenburg  
Tel.: +49 (0) 781 6100-0

# 13264

Customer : Frewitt Fabrique  
Plant designation : DRUM LIFTER

Power supply : 230/400V (50Hz)  
Input lead : 5x2,5mm<sup>2</sup>  
Power : 2,5 KW  
Fuse : 16 A  
Control Voltage : 24 VDC  
Manufacturing date : 2014  
Ex - rating : ZONE 22

Designed / checked : 26.08.2014  
Creator : LORENZ  
Last Modification : 18.09.2014  
Last modification by : lorenz  
Version : 1  
CAD - Ver. : 2.3.5

2



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=DOK/2.a	DIMENSIONING FOR DIN VDE 0100-430/1991:		16.04.2012	voegele
=DOK/3	OVERVIEW		27.08.2014	lorenz
=DOK/3.a	OVERVIEW		09.09.2014	lorenz
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=DOK/9.a	CONTROL PANEL		27.08.2014	lorenz
=DOK/10	CONTROL PANEL		11.09.2014	lorenz
=EP/1	POWER SUPPLY		18.09.2014	lorenz
=EP/2	SUPPLY 24V		18.09.2014	lorenz
=EP/2.a	SUPPLY 24V		10.09.2014	lorenz
=EP/2.b	SUPPLY 24V		18.09.2014	lorenz
=EP/5	MOTOR HYDRAULIC PUMP		18.09.2014	lorenz
=EP/10	E-STOP MODULE		18.09.2014	lorenz
=EP/15	PLC OVERVIEW		12.09.2014	lorenz
=EP/19.a	PLC-REFERENCE		25.09.2012	lorenz
=EP/19.b	PLC-REFERENCE		25.09.2012	lorenz
=EP/19.c	PLC-REFERENCE		25.09.2012	lorenz
=EP/19.d	PLC-REFERENCE		18.03.2014	lorenz
=EP/20	CIRCUIT DIAGRAM INPUTS, DIGITAL		18.09.2014	lorenz
=EP/21	CIRCUIT DIAGRAM INPUTS, DIGITAL		18.09.2014	lorenz
=EP/22	CIRCUIT DIAGRAM INPUTS, DIGITAL		27.08.2014	lorenz
=EP/23	CIRCUIT DIAGRAM INPUTS, DIGITAL		27.08.2014	lorenz
=EP/24	CIRCUIT DIAGRAM INPUTS, DIGITAL		18.09.2014	lorenz
=EP/25	CIRCUIT DIAGRAM INPUTS, DIGITAL		18.09.2014	lorenz
=EP/26	CIRCUIT DIAGRAM INPUTS, DIGITAL		09.09.2014	lorenz

2.a

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Designed / checked

 date 26.08.2014  
 Ed. by LORENZ

Modification

 date 18.09.2014  
 Ed. by lorenz  
 ver.: 1

project: DRUM LIFTER

project no.: 13264

description

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 =EP/26

Frewitt Fabrique

Schweiz

=

+

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of 2.a







# DESIGN REFERENCE

## WIRING WIDTH

MAIN CIRCUIT : 400V AC - MIN. 1,5MM<sup>2</sup>  
 CONTROL CIRCUIT : 24V DC - MIN. 0,5MM<sup>2</sup>  
 CONTROL CIRCUIT : 230V AC - MIN. 1,5MM<sup>2</sup>

## SPECIFIC REFERENCE

CABLE ENTRY : BELOW  
 CUSTOMER SPECIFICATIONS :   
 CONDUCTOR MARKING :   
 LANGUAGE : ENGLISH

THE INSTALLATION OF THE MACHINE IS ACCORDING TO VDE 0100, VDE 0113.

## WIRING COLOURS

MAIN CIRCUIT L1 : BROWN  
 L2 : BLACK  
 L3 : GREY  
 NEUTRAL CONDUCTOR : LIGHT BLUE  
 PROTECTIVE WIRE : GREEN-YELLOW  
 CONTROL CIRCUIT 24V DC : VIOLETT  
 GROUND 24V DC : VIOLET/WHITE  
 EXTERNAL VOLTAGE : ORANGE  
 ANALOGUE SIGNAL : WHITE  
 PT 100 : WHITE  
 INTRINSICALLY SAFE (EX I) : BLUE

## CUSTOMER SPECIFICATIONS

## WIRING COLOURS

1

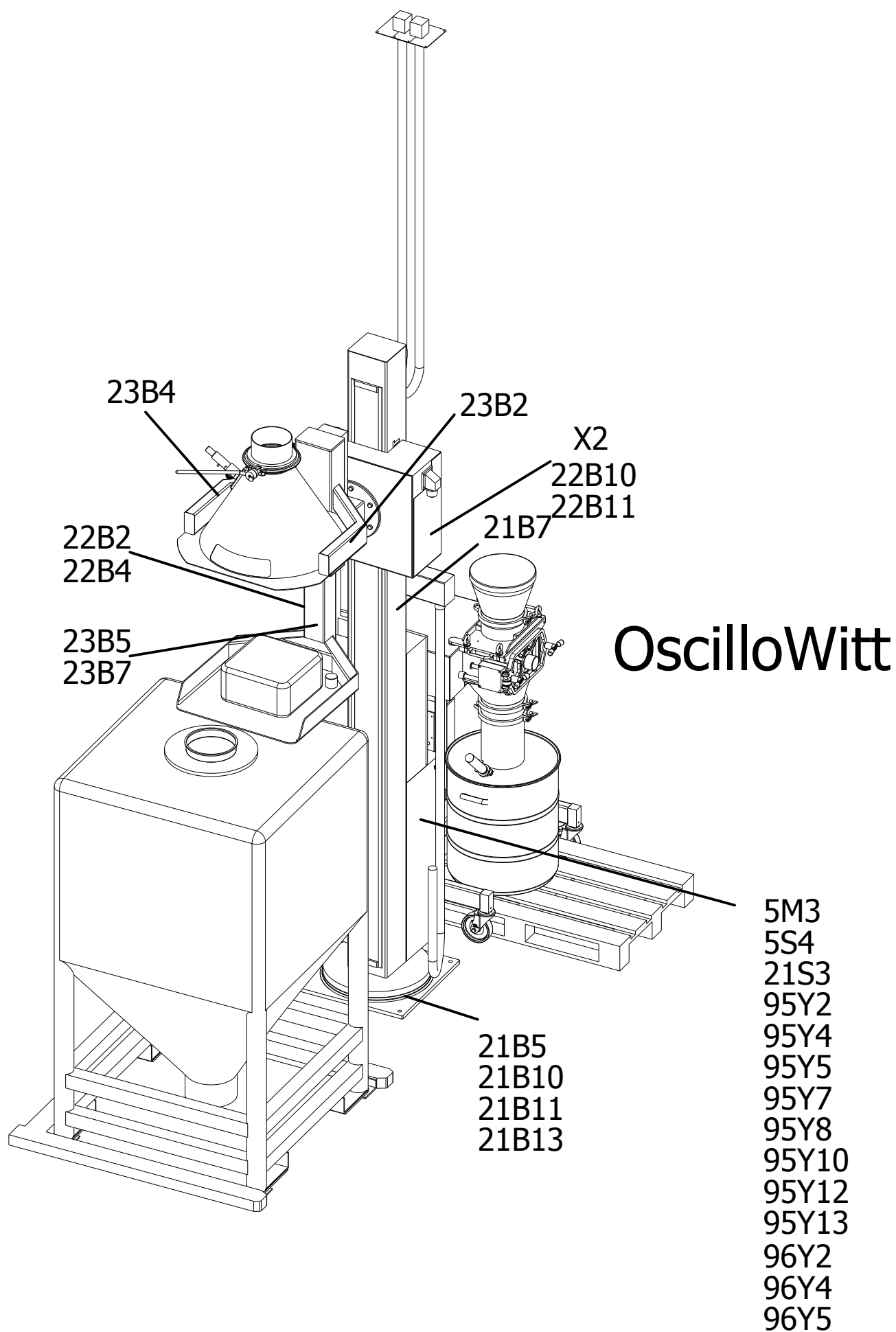
2.a

## DIMENSIONING FOR DIN VDE 0100-430/1991:

CURRENT CARRYING CAPACITY OF CABLES AND WIRES WITH COPPER UND PVC-INSULATION  
AT FIXED LAYING IN AND AT BUILDINGS; CONTINUOUS OPERATION;  
WORKING TEMPERATURE: 70°C; AMBIENT TEMPERATURE: 25°C

1		2	3	4	5	6	7	8	9	10	11	12	13	
LAYING SYSTEM		A1		A2		B1		B2		C		E		
NUMBER OF CONDUCTED WIRES		2	3	2	3	2	3	2	3	2	3	2	3	
NOMINAL WIDTH IN MM <sup>2</sup>		CURRENT CARRYING CAPACITY "I Z" IN A; NOMINAL CURRENT "I N" IN A												
COPPER	1,5	I Z	16,5	14,5	16,5	14,0	18,5	16,5	17,5	16,0	21	18,5	23	19,5
		I N	16	13	16	13	16	16	16	16	20	16	20	16
	2,5	I Z	21	19	19,5	18,5	25	22	24	21	29	25	32	27
		I N	20	16	16	16	25	20	20	20	25	25	32	25
	4	I Z	28	25	27	24	34	30	32	29	38	35	42	36
		I N	35	35	35	20	32	25	32	25	35	35	40	35
	6	I Z	36	33	34	31	43	38	40	36	49	43	54	46
		I N	25	32	32	25	40	35	40	35	40	40	50	40
	10	I Z	49	45	46	41	60	53	55	50	67	63	74	64
		I N	40	40	40	40	50	50	50	50	63	63	63	63
	16	I Z	65	59	60	55	81	72	73	66	90	81	100	85
		I N	63	50	50	50	80	63	63	63	80	80	100	80
	25	I Z	85	77	80	72	107	94	95	85	119	102	126	107
		I N	80	63	80	6	100	80	80	80	100	100	125	100
	35	I Z	105	94	98	88	133	117	118	105	146	126	157	134
		I N	100	80	80	80	100	100	100	100	125	125	125	125
	50	I Z	126	114	117	105	160	142	141	125	178	153	191	162
		I N	125	100	100	100	160	125	125	125	160	125	160	160

Power supply for column  
Air supply for column and OscilloWitt



2.a

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Ed. by LORENZ

Modification  
date 18.09.2014  
Ed. by lorenz  
ver: 1

project: DRUM LIFTER

project no.: 13264

description  
OVERVIEW

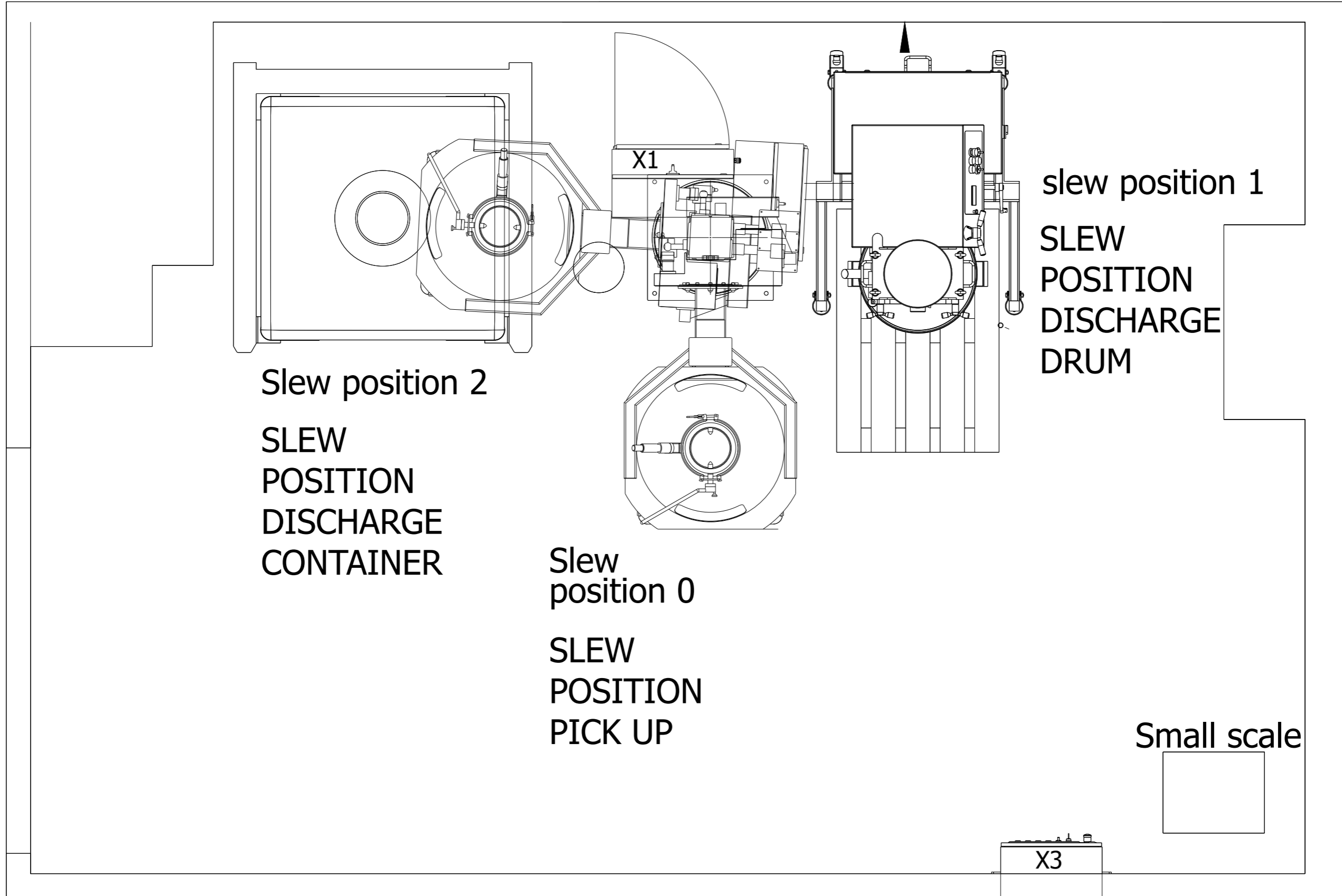
Frewitt Fabrique  
Schweiz

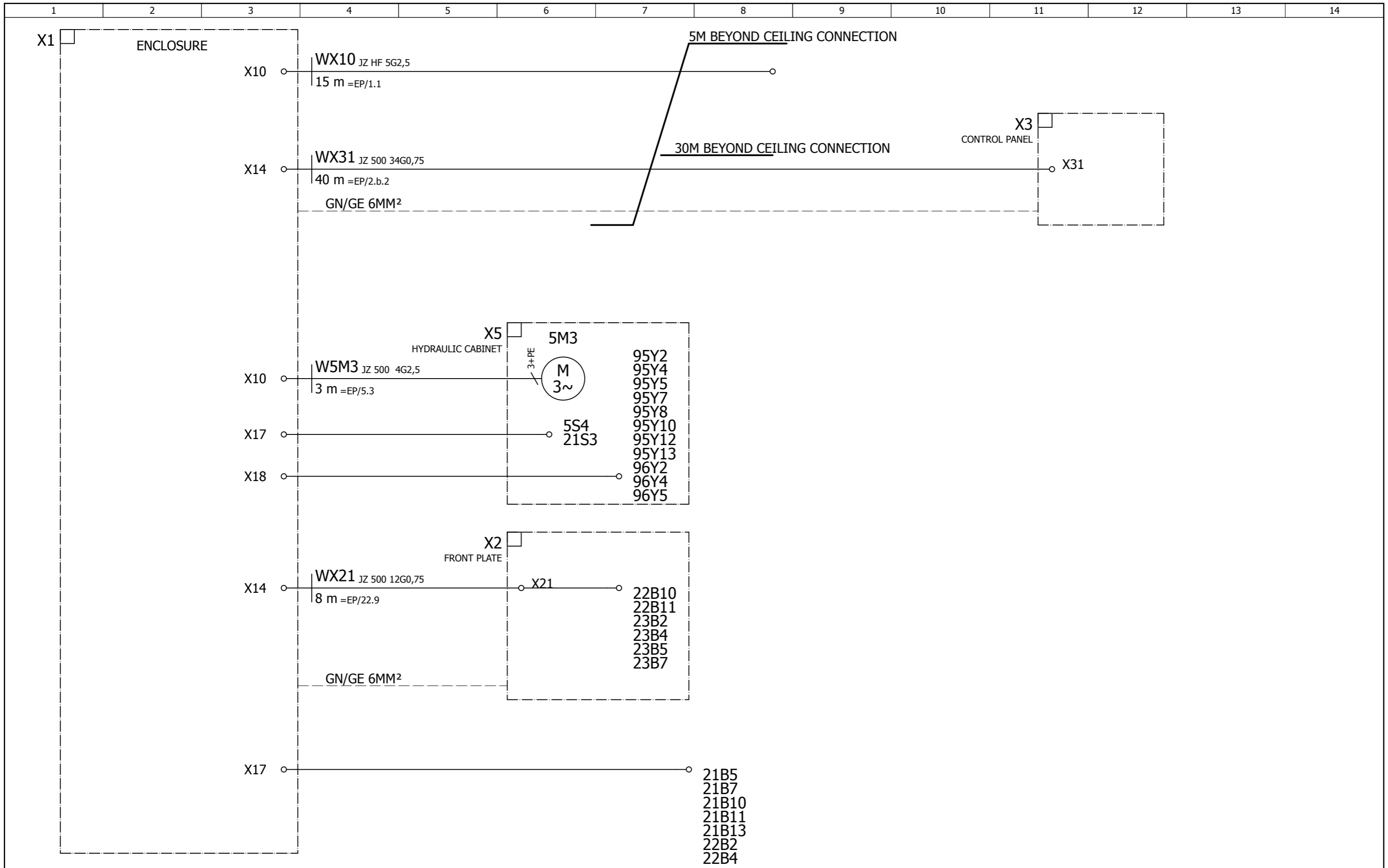
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3.a





3.a

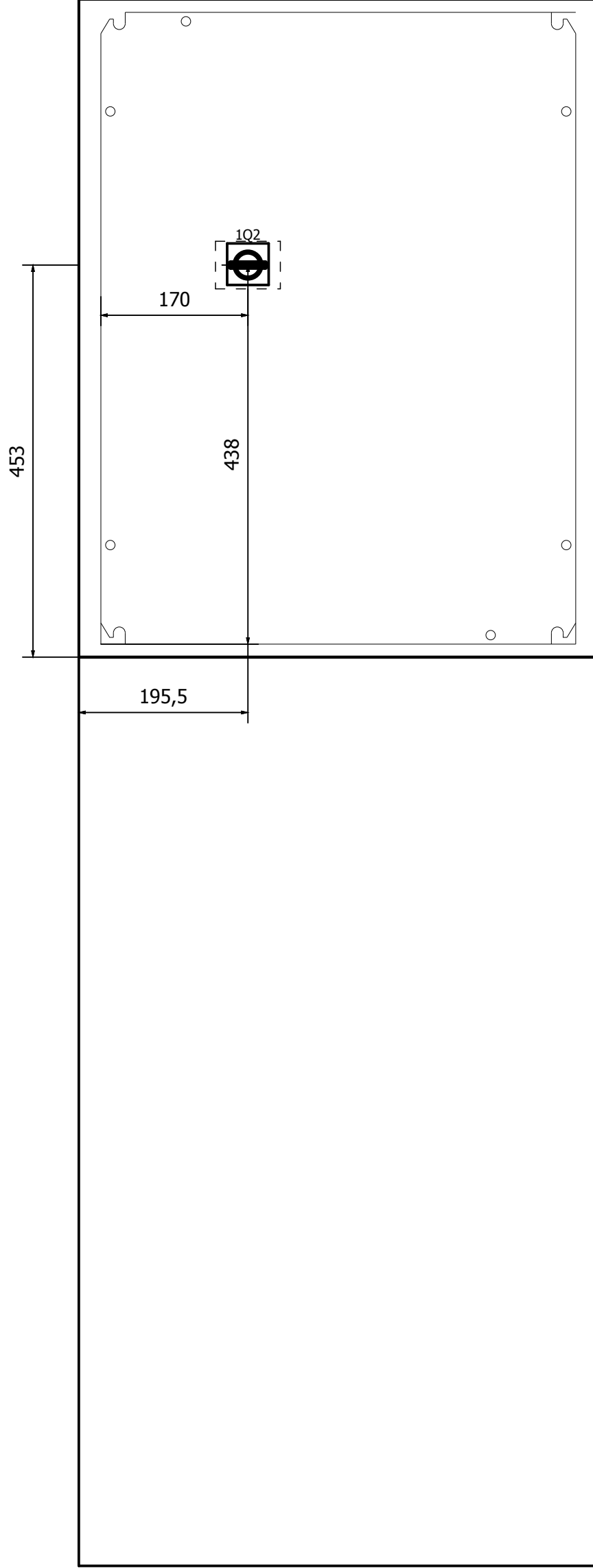
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<b>SERVOLIFT</b> Albert-Einstein-Str.9 77656 Offenburg Phone +49 (0) 781-6100-0 Email: sl@servolift.de	Designed / checked	Modification	project: DRUM LIFTER	description CABLE ARRANGEMENT	Frewitt Fabrique	= DOK	DOCUMENTATION
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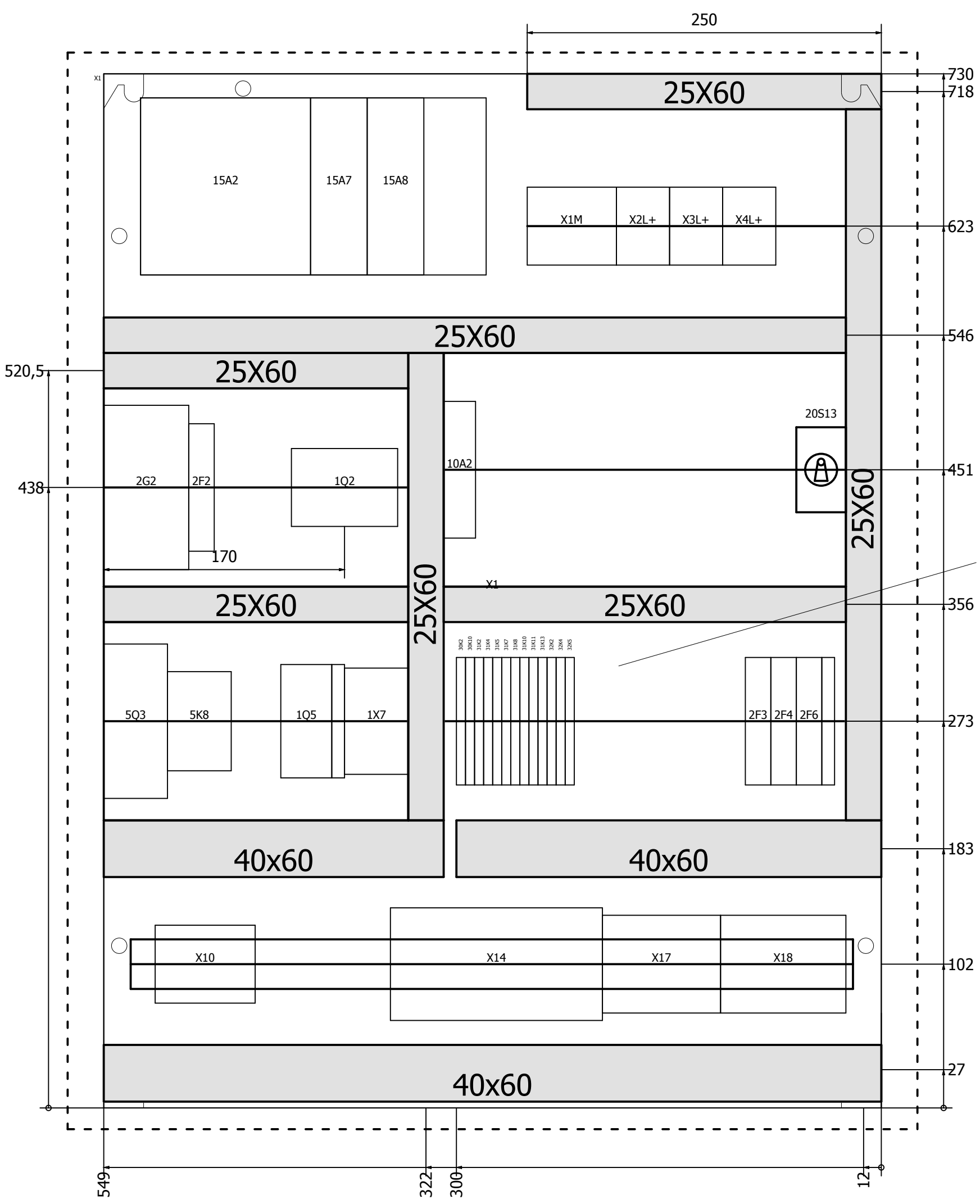
## Cable overview

Cable designation	Source		Cable type	Total Conductors	Cross- section mm <sup>2</sup>	Remark
	by	to				
W5M3	X10	5M3	JZ 500	4G	2,5	MOTOR HYDRAULIC PUMP ON
W5S4	X17	5S4	OZ 500	2x	1	TEMPERATURE HYDRAULIC OIL >70°C =LOW
W21B5	X17	21B5	M8, V1	3	0,34	MIN. HEIGHT
W21B7	X17	21B7	M12, V1	4	0,34	MAX. HEIGHT
W21B10	X17	21B10	M12, V1	4	0,34	SLEW POSITION 0
W21B11	X17	21B11	M12, V1	4	0,34	SLEW POSITION 1
W21B13	X17	21B13	M12, V1	4	0,34	SLEW POSITION 2
W21S3	X17	21S3	OZ 500	2x	1	COMPRESSED AIR ON
W22B2	X17	22B2	M12, V1	4	0,34	DISCHARGE HEIGHT DRUM
W22B4	X17	22B4	M12, V1	4	0,34	DISCHARGE HEIGHT CONTAINER
W22B10	X21	22B10	M12, V1	4	0,34	INVERT POSITION 0°
W22B11	X21	22B11	M12, V1	4	0,34	INVERT POSITION 180°
W23B2	X21	23B2	M12, V1	4	0,34	DRUM CLAMPED LEFT
W23B4	X21	23B4	M12, V1	4	0,34	DRUM CLAMPED RIGHT
W23B5	X21	23B5	M12, V1	4	0,34	MIN CLAMP POSITION
W23B7	X21	23B7	M12, V1	4	0,34	CLAMP ARM OPENED =LOW
W95Y2	X18	95Y2	JZ 500	3G	1,5	VALVE: LIFT
W95Y4	X18	95Y4	JZ 500	3G	1,5	VALVE: LOWER
W95Y5	X18	95Y5	JZ 500	3G	1,5	VALVE: CLAMP
W95Y7	X18	95Y7	JZ 500	3G	1,5	VALVE: UNCLAMP
W95Y8	X18	95Y8	JZ 500	3G	1,5	VALVE: INVERT FORWARD
W95Y10	X18	95Y10	JZ 500	3G	1,5	VALVE: INVERT BACKWARD
W95Y12	X18	95Y12	JZ 500	3G	1,5	VALVE: SLEW FORWARD
W95Y13	X18	95Y13	JZ 500	3G	1,5	VALVE: SLEW BACKWARD
W96Y2	X18	96Y2	JZ 500	3G	1,5	VALVE: RETRACT HEIGHT STOP DRUM
W96Y4	X18	96Y4	JZ 500	3G	1,5	VALVE: RETRACT HEIGHT-STOP
W96Y5	X18	96Y5	JZ 500	3G	1,5	VIBRATOR ON
WX10	X10	L1;L2;L3;N;PE	JZ 500	5G	2,5	POWER SUPPLY
WX21	X14	X21	JZ 500	12G	0,75	FRONT PLATE
WX31	X14	X31L+;X31M;X31	JZ 500	34G	0,75	CONTROL PANEL



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		project no.: 13264						Schweiz	page of	7 10	

x1



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= DOK +	DOCUMENTATION	page	8
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Frewitt Fabrique  
Schweiz

description  
MOUNTING PANEL

project: DRUM LIFTER  
project no.: 13264

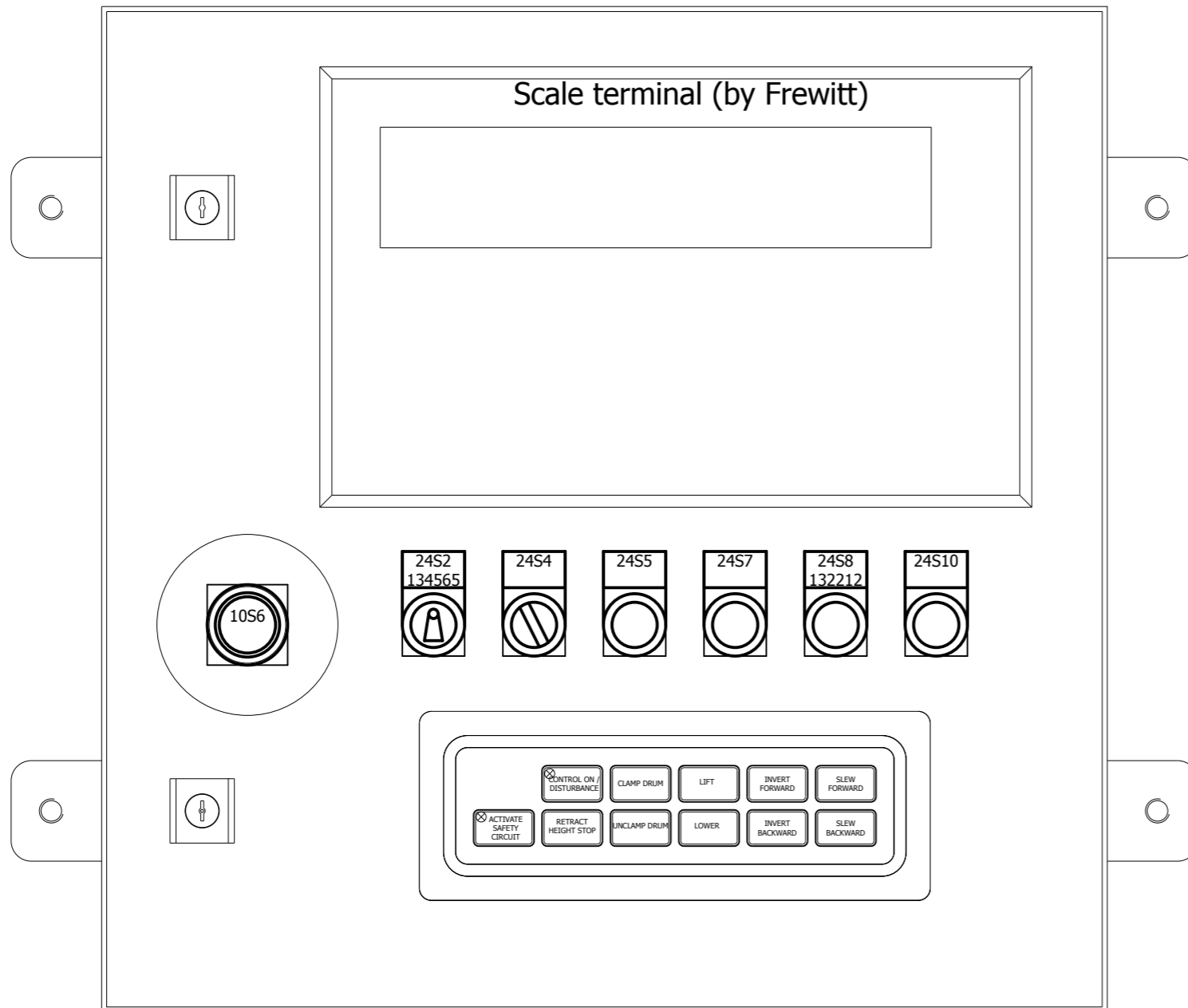
Modification  
date 18.09.2014  
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ver: 1

Designed / checked  
date 26.08.2014  
Ed. by LORENZ

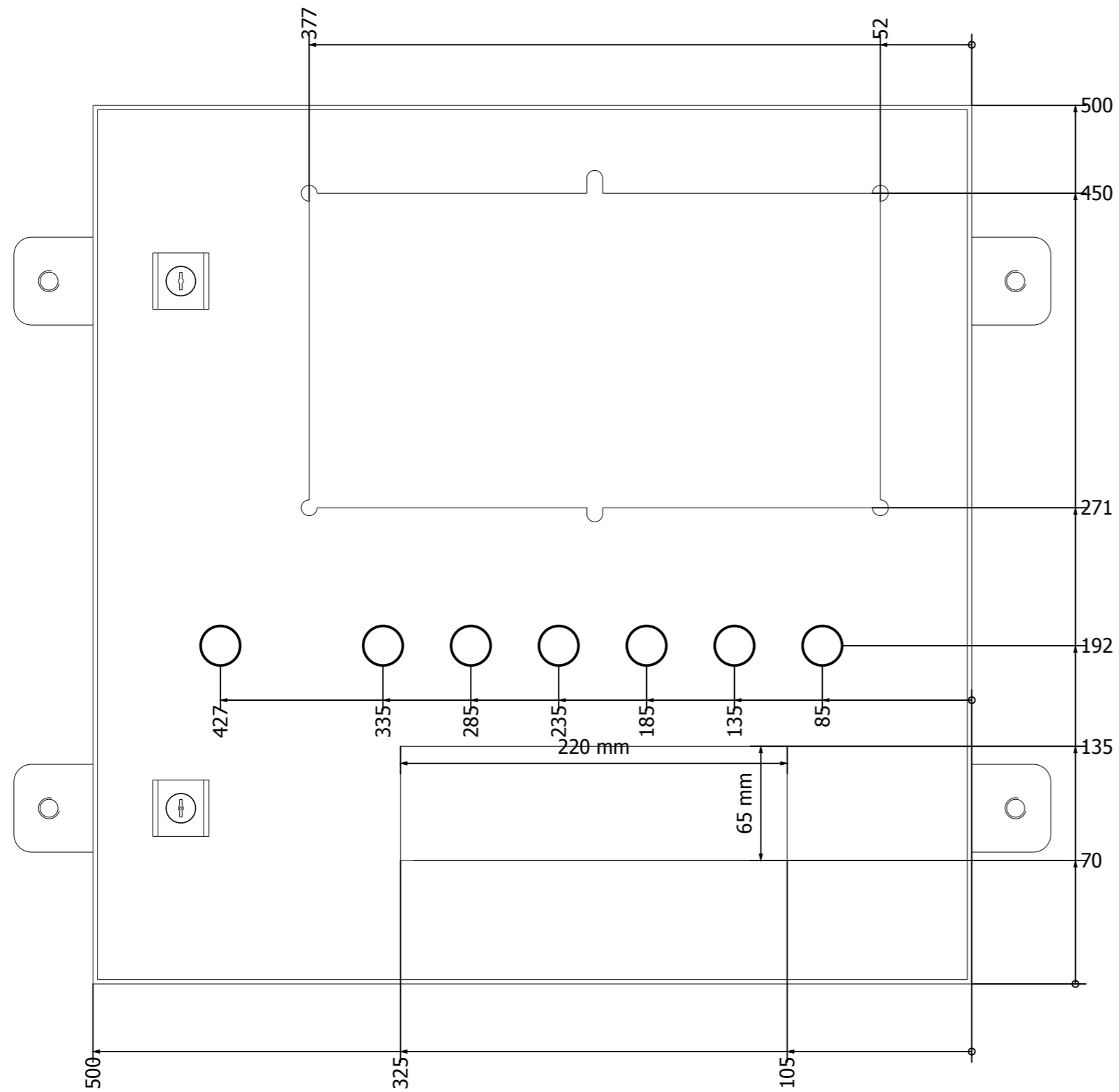
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Email: s@servolift.de

- 30K2
- 30K10
- 31K2
- 31K4
- 31K5
- 31K7
- 31K8
- 31K10
- 31K11
- 31K13
- 32K2
- 32K4
- 32K5

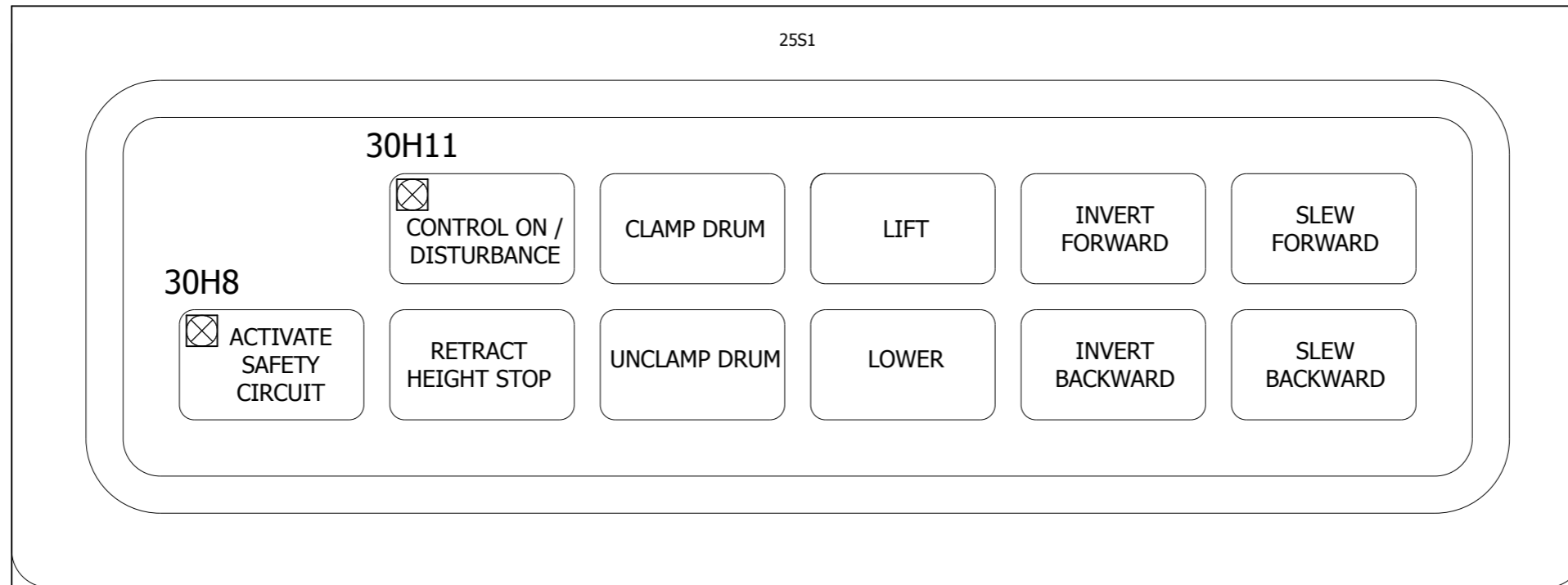
7



BMK	FUNCTION
30H8	ACTIVATE SAFETY CIRCUIT
30H11	CONTROL ON / DISTURBANCE
24S2	CONTROL OFF/ ON
10S6	E-STOP OPERATOR PANEL
24S4	DISCHARGE INTO DRUM /CONTAINER
24S5	FORWARD CYCLE
24S7	BACKWARD CYCLE
24S8	VIBRATOR ON
24S10	VALIDATION: WORK AREA FREE
25S1	MEMBRANE KEYPAD



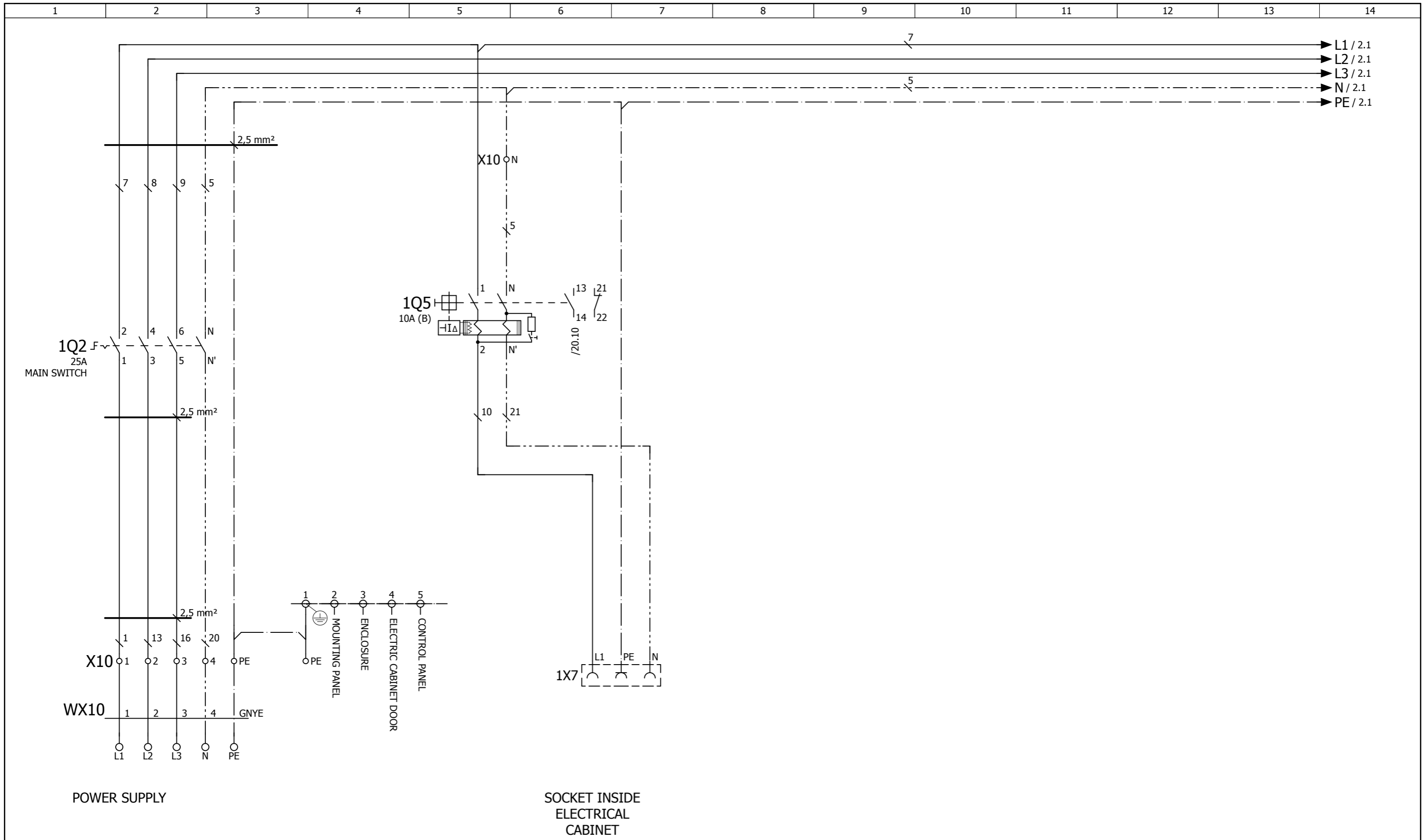
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9.a

=EP/1

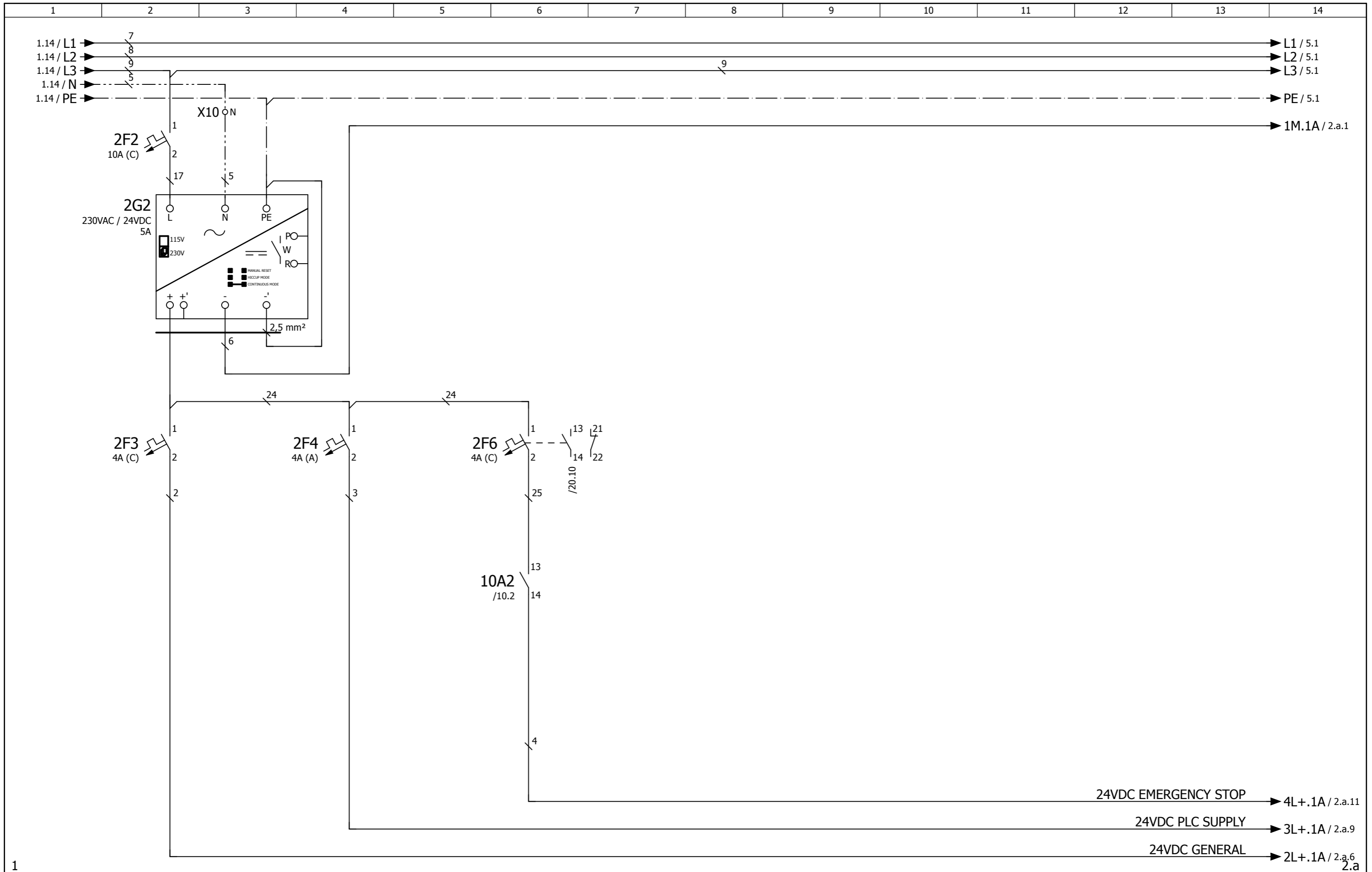
<p><b>SERVOLIFT</b>                  Albert-Einstein-Str.9                  77656 Offenburg                  Phone +49 (0) 781-6100-0                  Email: sl@servolift.de</p>	Designed / checked	Modification	project: DRUM LIFTER	description CONTROL PANEL	Frewitt Fabrique	= DOK	DOCUMENTATION	
	date 26.08.2014	date 18.09.2014	project no.: 13264				+	
	Ed. by LORENZ	Ed. by lorenz	ver.: 1					page 10
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2

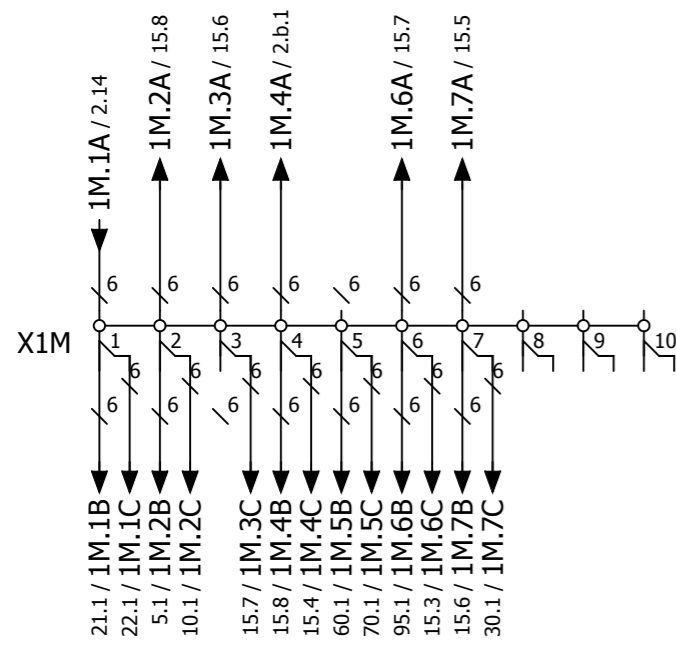
<b>SERVOLIFT</b> Albert-Einstein-Str.9 77656 Offenburg Phone +49 (0) 781-6100-0 Email: sl@servolift.de	Designed / checked date 26.08.2014 Ed. by LORENZ	Modification date 18.09.2014 Ed. by lorenz ver.: 1	project: DRUM LIFTER  project no.: 13264	description POWER SUPPLY	Frewitt Fabrique  Schweiz	= EP +	CIRCUIT DIAGRAM
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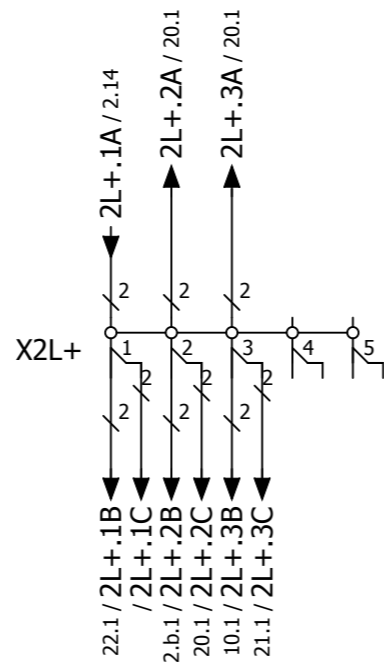
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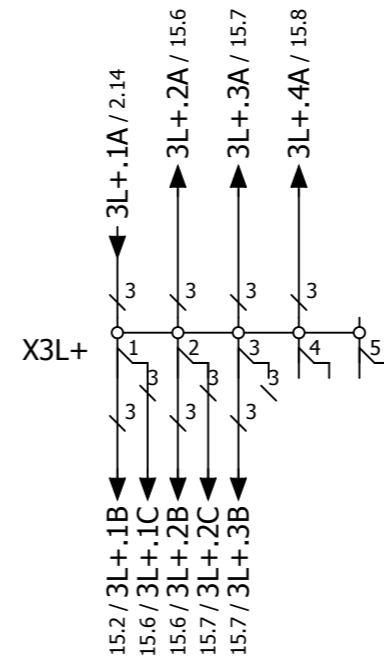
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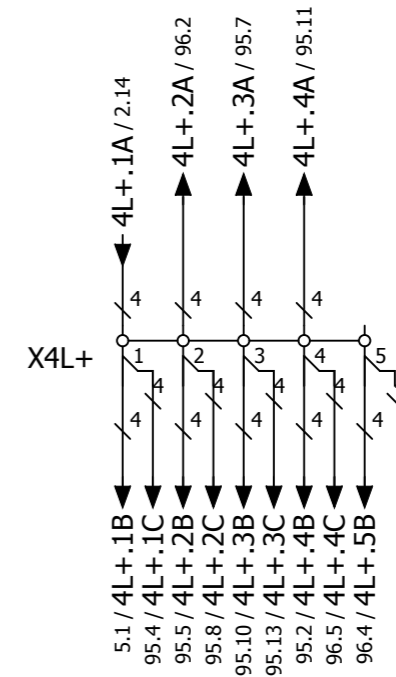
GROUND 24V DC



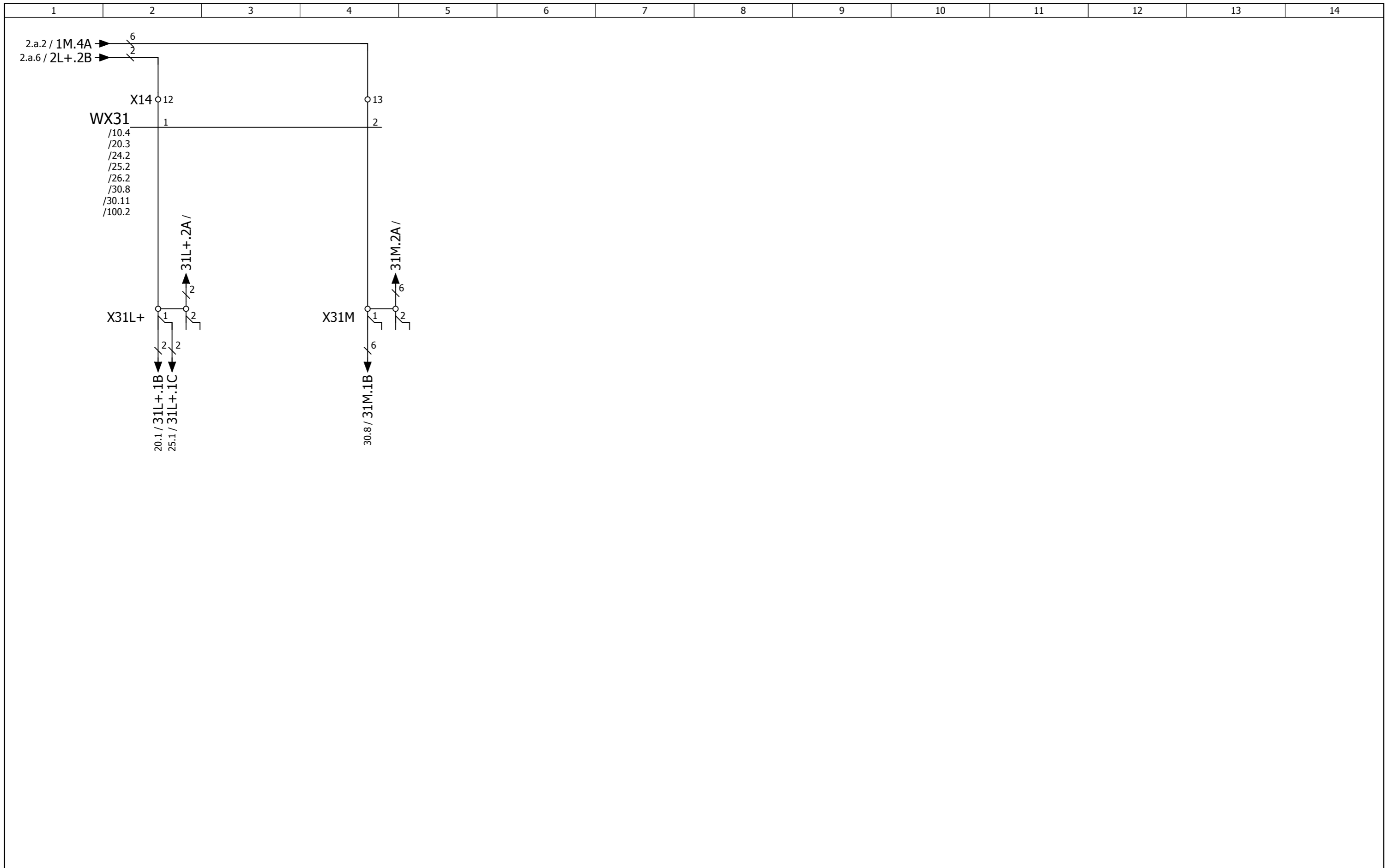
24VDC GENERAL



24VDC PLC SUPPLY



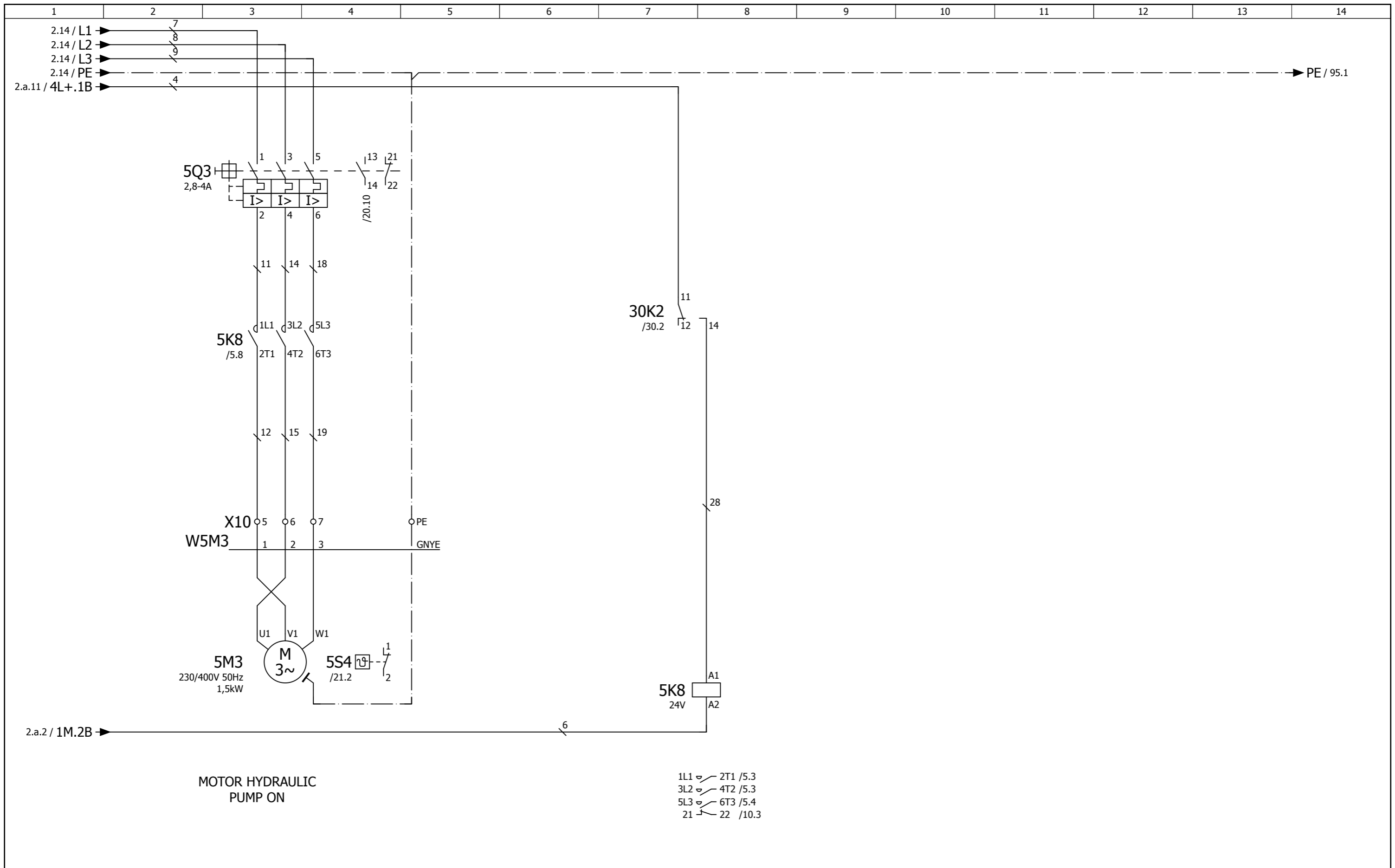
24VDC EMERGENCY STOP



2.a

5

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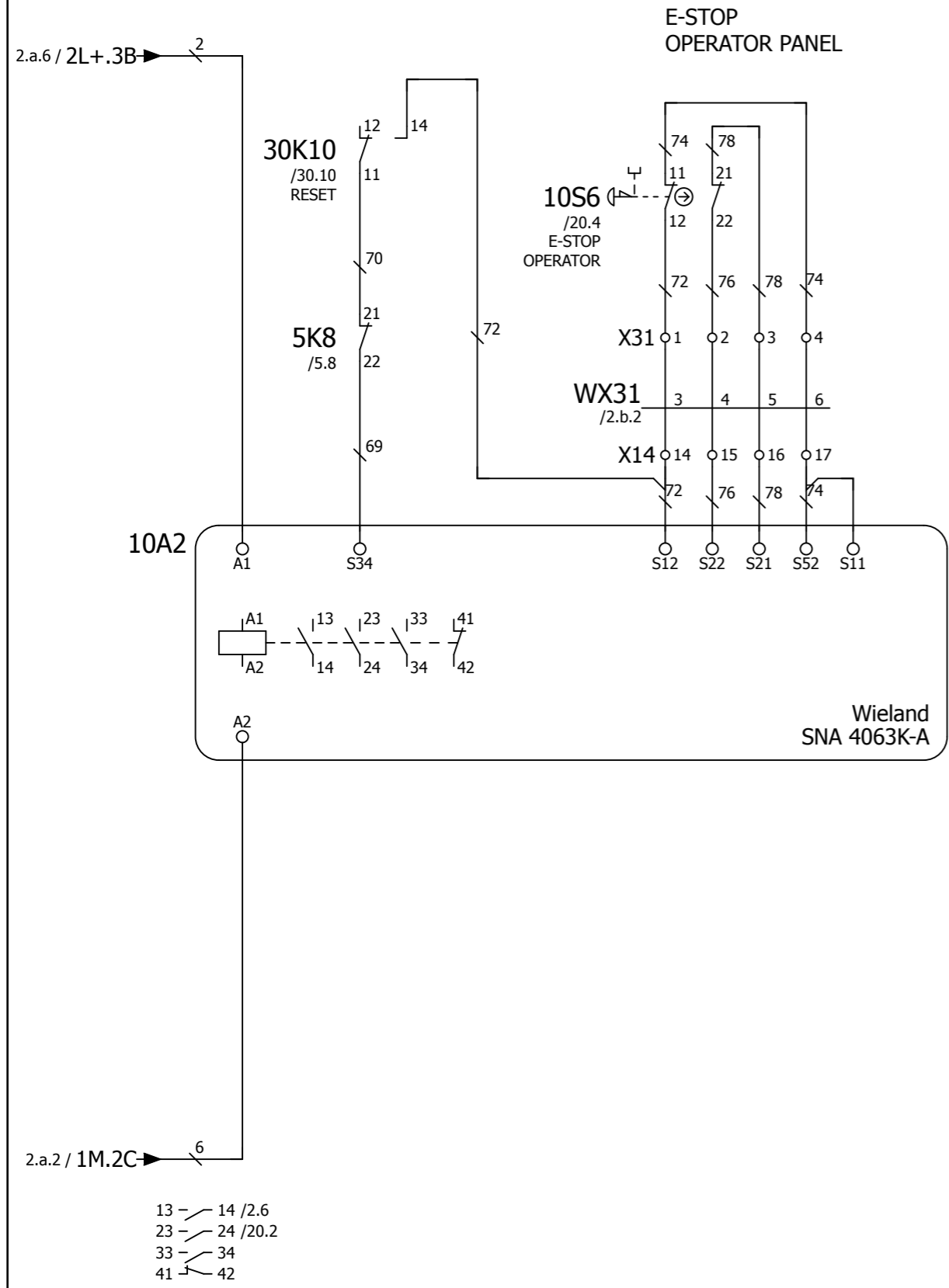


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10

 Albert-Einstein-Str.9 77656 Offenburg Phone +49 (0) 781-6100-0 Email: sl@servolift.de	Designed / checked	Modification	project: DRUM LIFTER	description MOTOR HYDRAULIC PUMP	Frewitt Fabrique	= EP	CIRCUIT DIAGRAM
	date 26.08.2014	date 18.09.2014	project no.: 13264		Schweiz	+	
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1 2 3 4 5 6 7 8 9 10 11 12 13 14



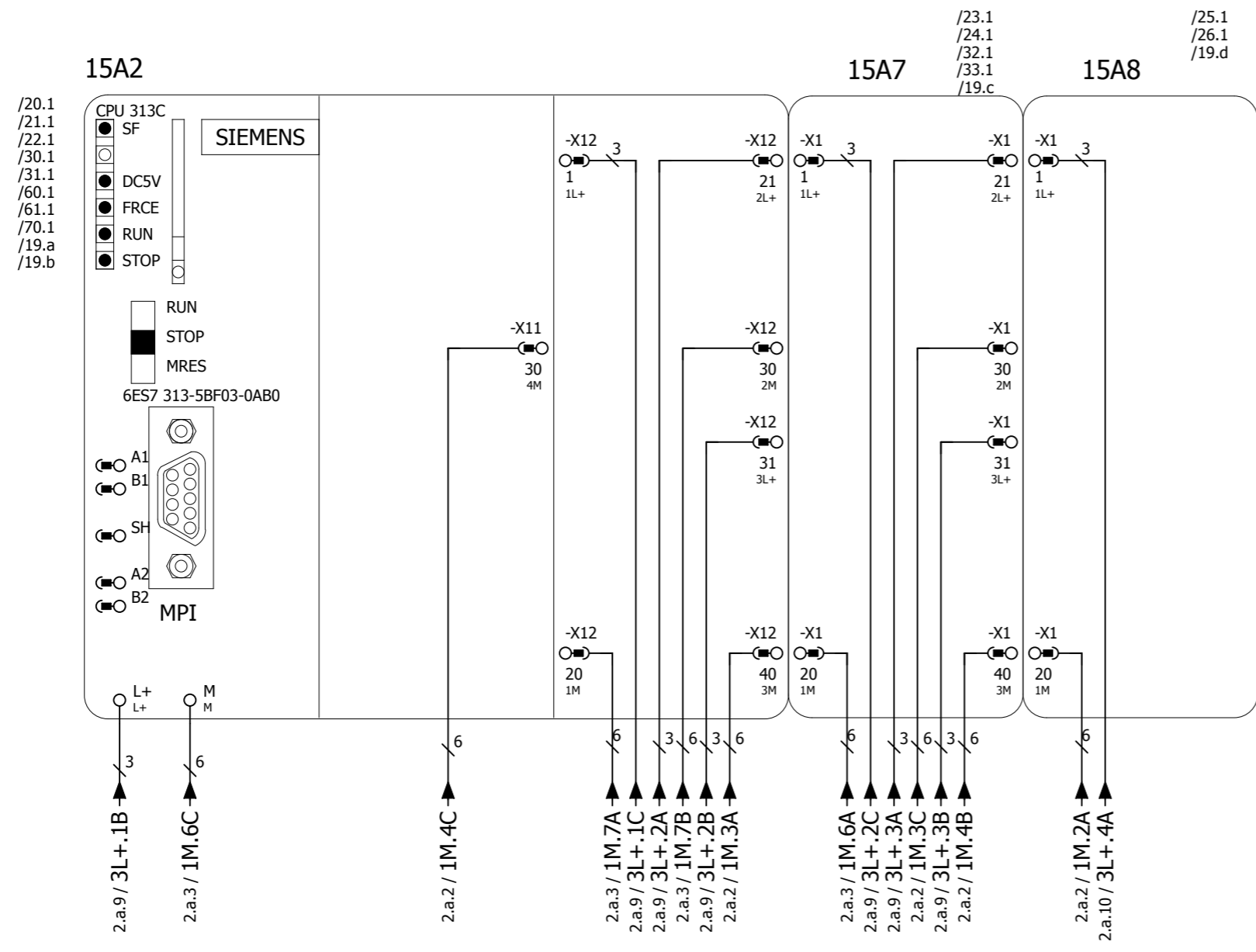
2.a.2 / 1M.2C → 6

13 - 14 /2.6  
 23 - 24 /20.2  
 33 - 34  
 41 - 42

5 15

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	date 26.08.2014	date 18.09.2014	project no.: 13264		Schweiz	+	
	Ed. by LORENZ	Ed. by lorenz					page 10
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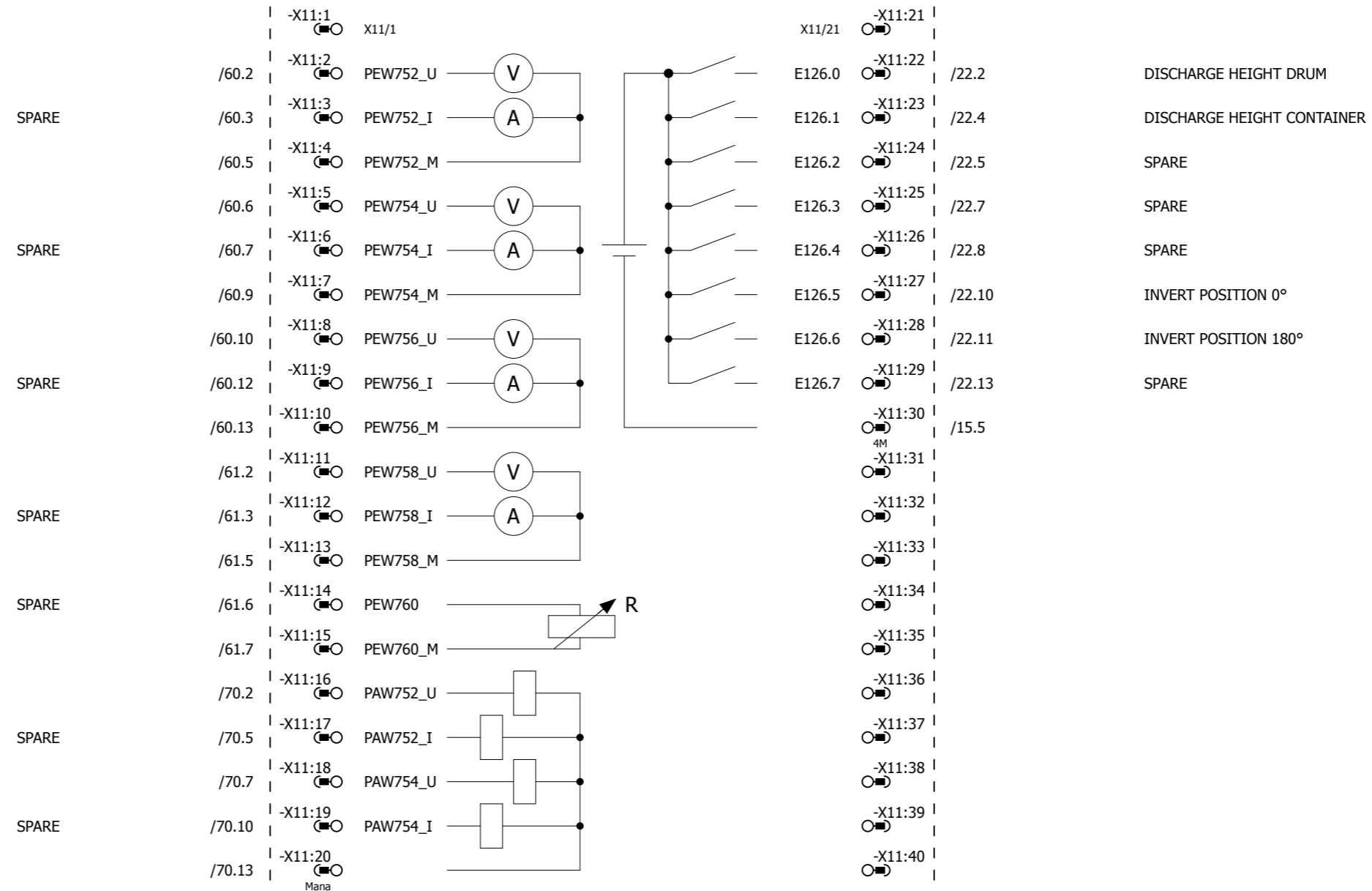
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15A2  
/15.2

S7-300  
CPU 313 C  
DI 8x DC 24V AI 5/AO 2x 12 Bit

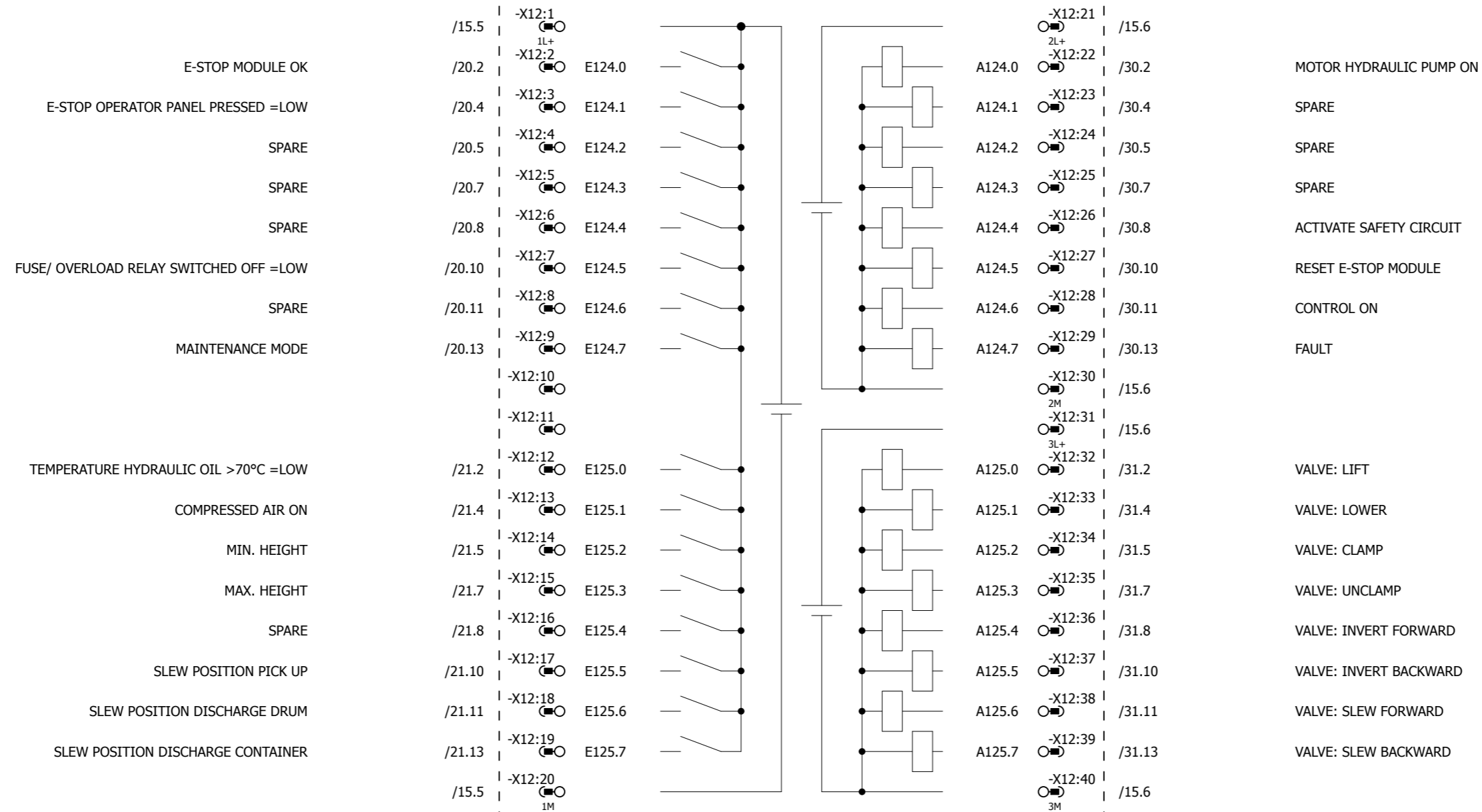
SIEMENS



6ES7313-5BF03-0AB0

**15A2**  
/15.2  
S7-300  
CPU 313 C  
DI 16/DO 16x DC 24V

SIEMENS



6ES7313-5BF03-0AB0

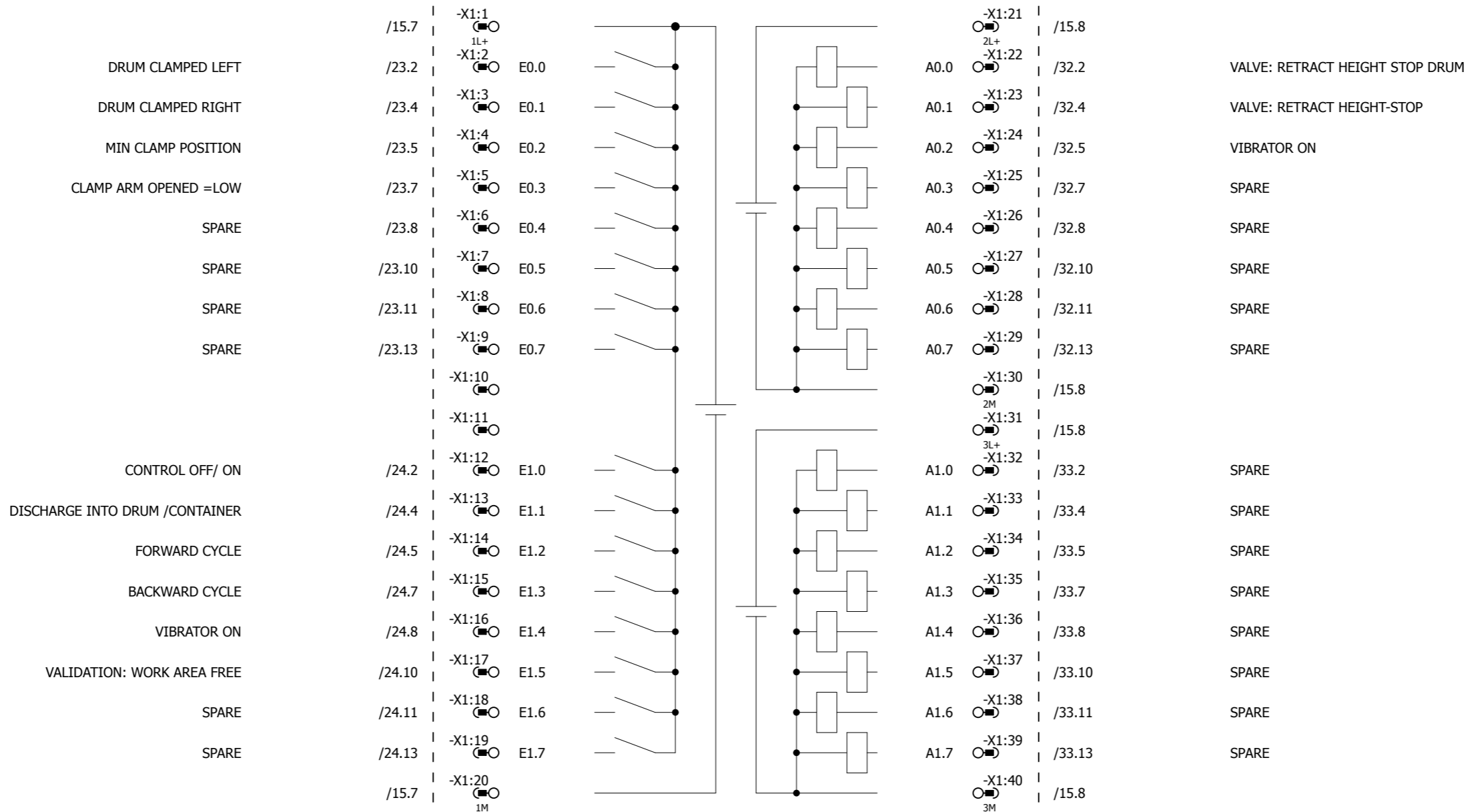
19.a

19.c

15A7  
/15.7

S7-300  
SM 323  
DI 16/DO 16x DC 24V

SIEMENS



19.b

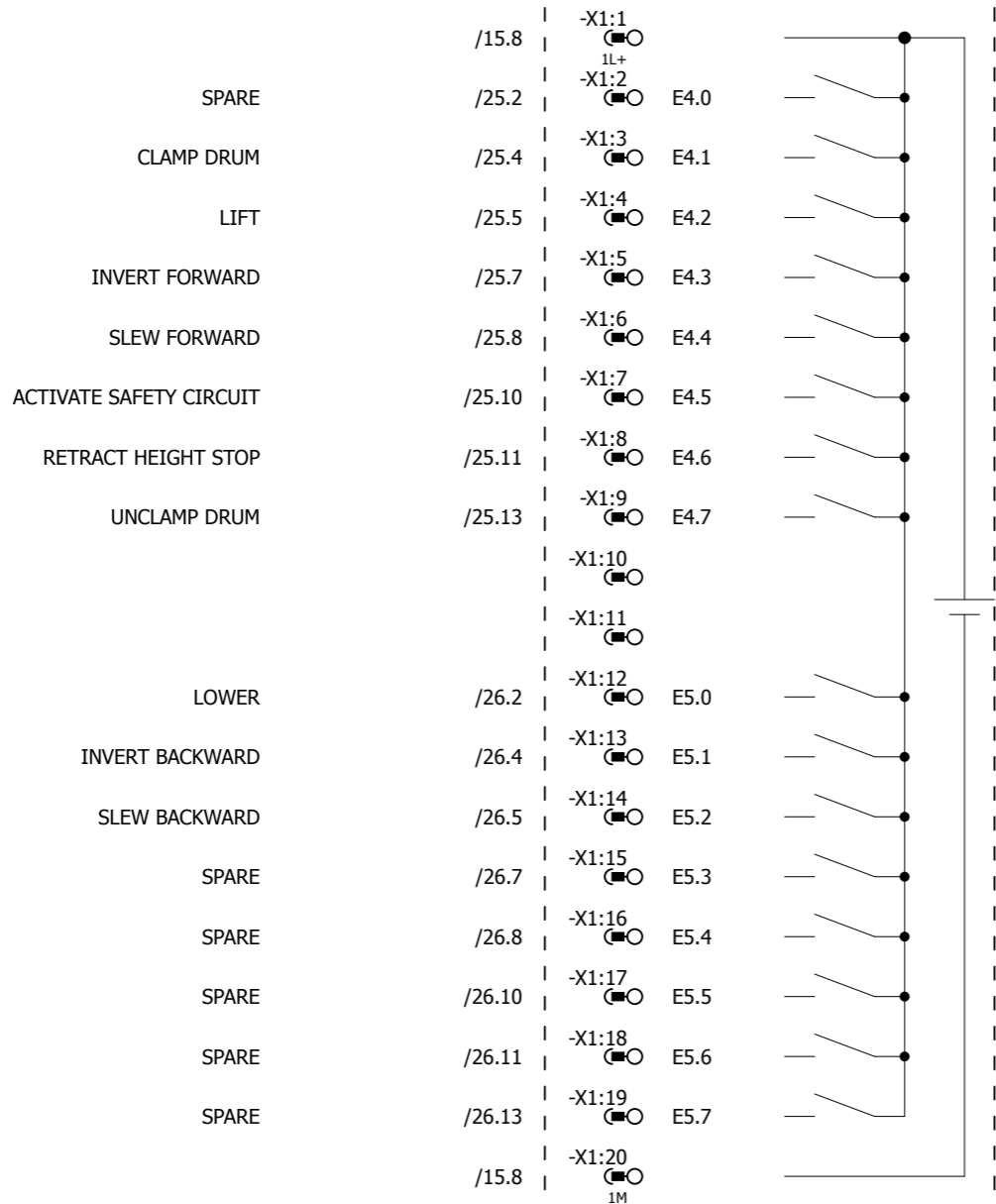
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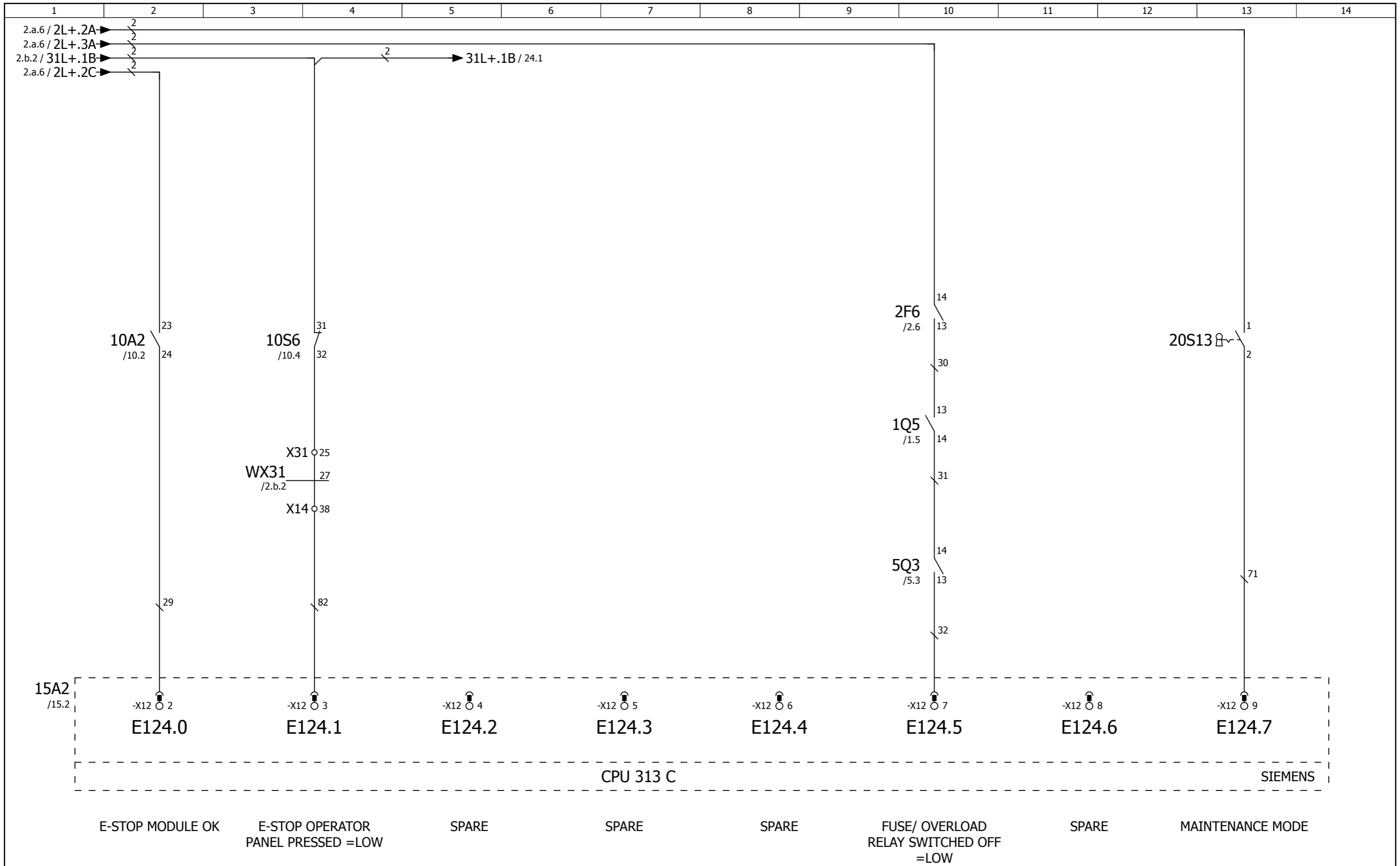


15A8  
/15.8

S7-300  
SM 321  
DI 16 DC 24V

SIEMENS

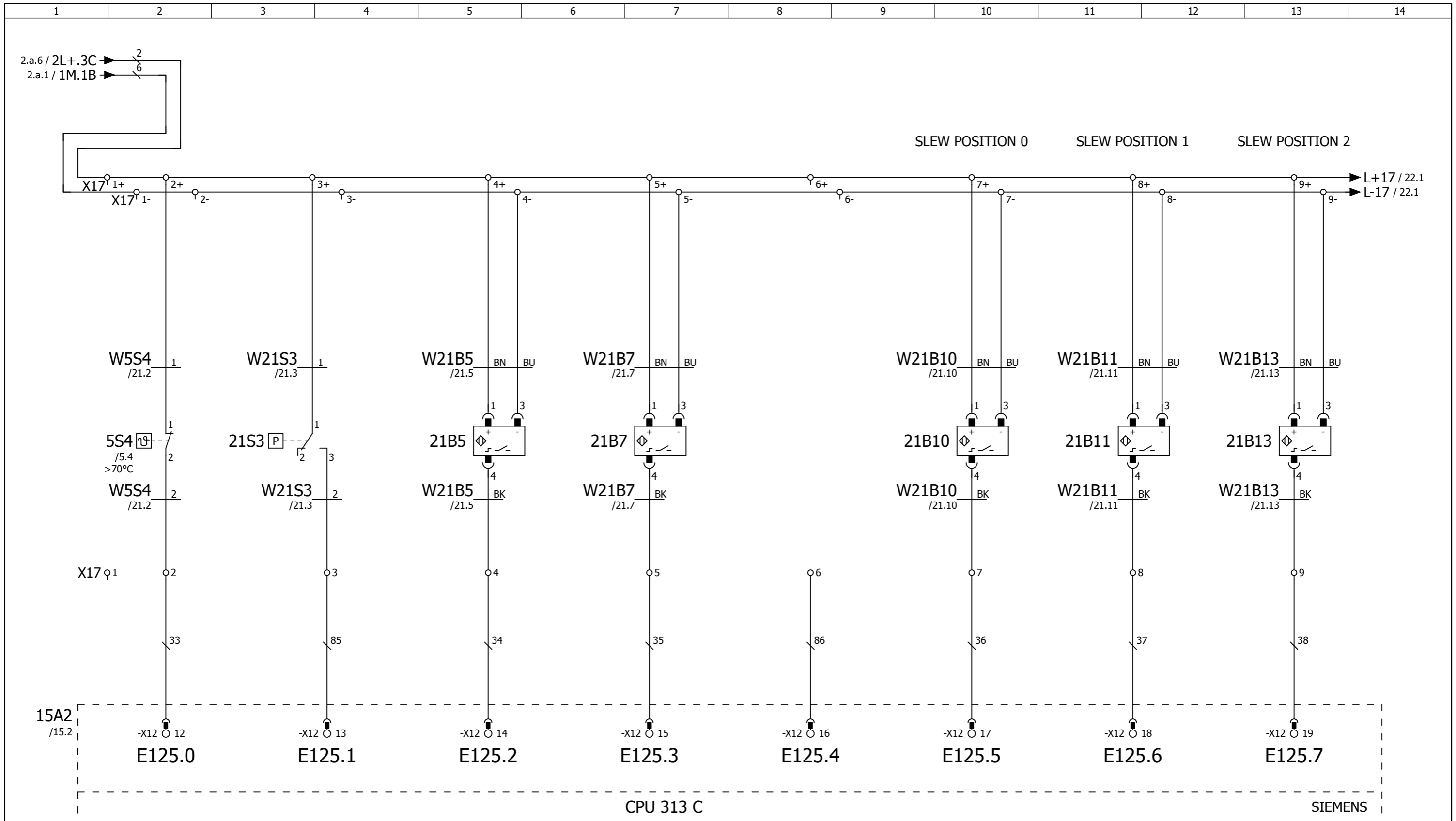




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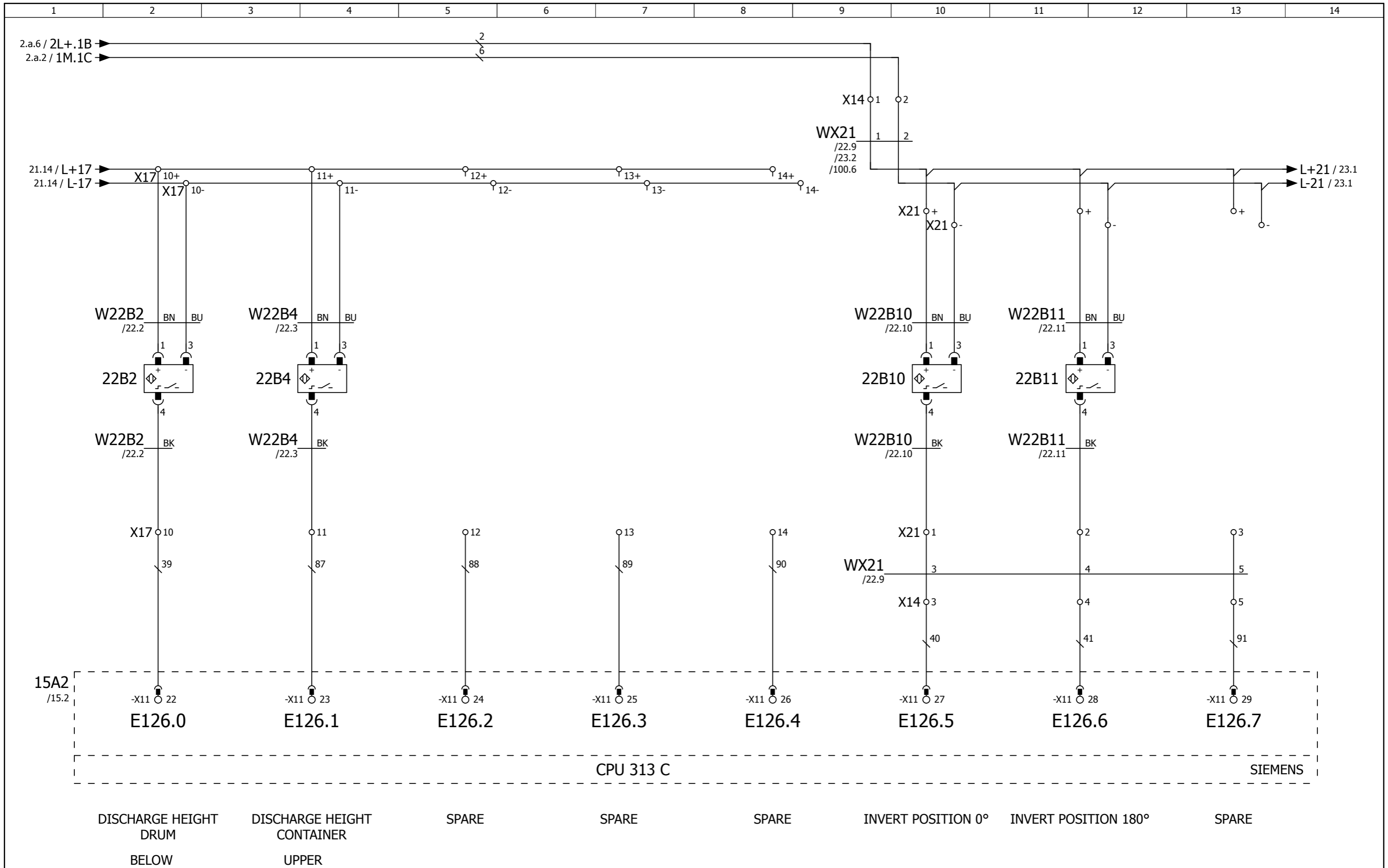
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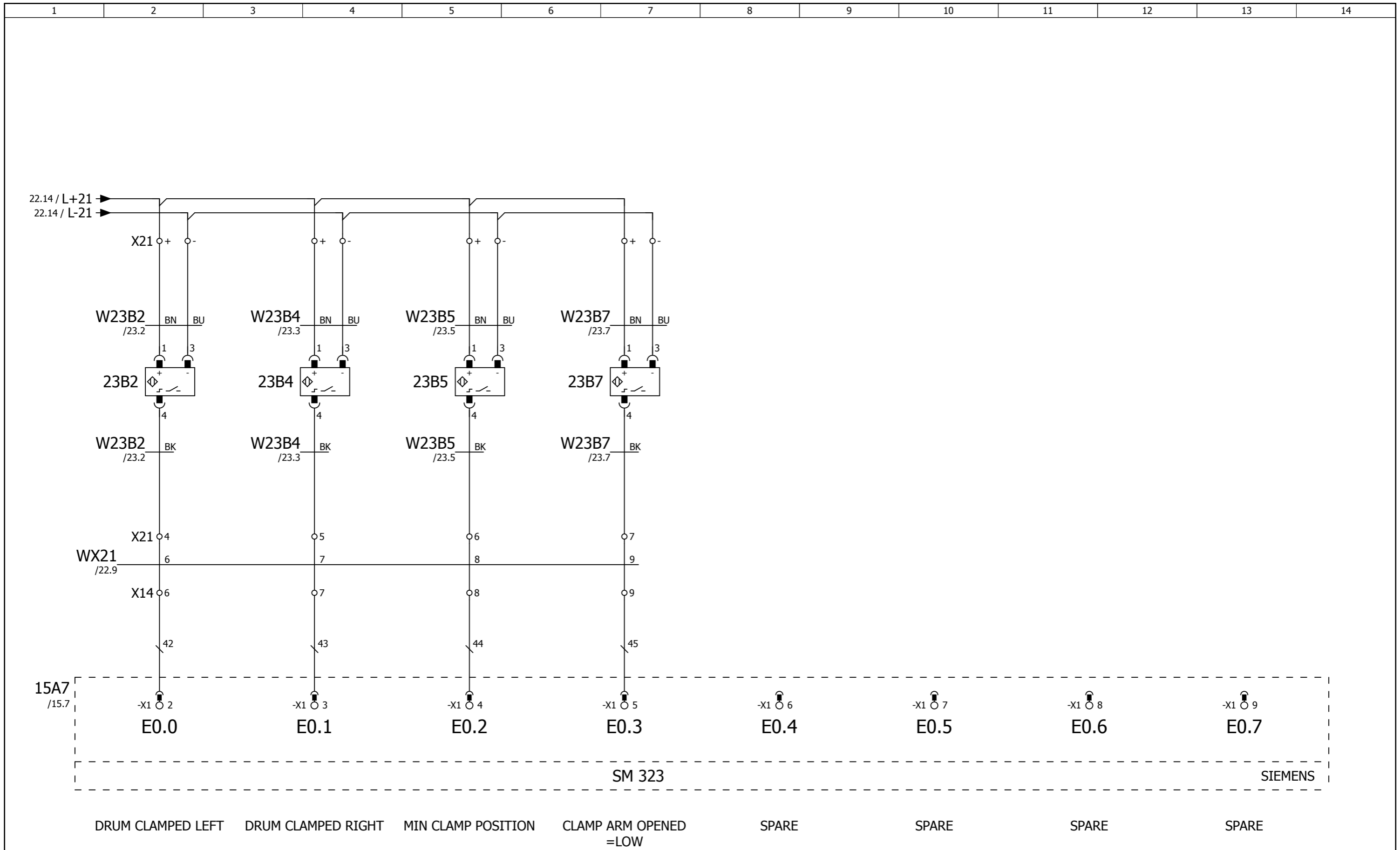
<b>SERVOLIFT</b> Albert-Einstein-Str.9 77656 Offenburg Phone +49 (0) 781-6100-0 Email: sl@servolift.de	Designed / checked	Modification	project: DRUM LIFTER	description CIRCUIT DIAGRAM INPUTS, DIGITAL	Frewitt Fabrique  Schweiz	= EP	CIRCUIT DIAGRAM
	date 26.08.2014	date 18.09.2014	project no.: 13264			+	
	Ed. by LORENZ	Ed. by lorenz				page 20	
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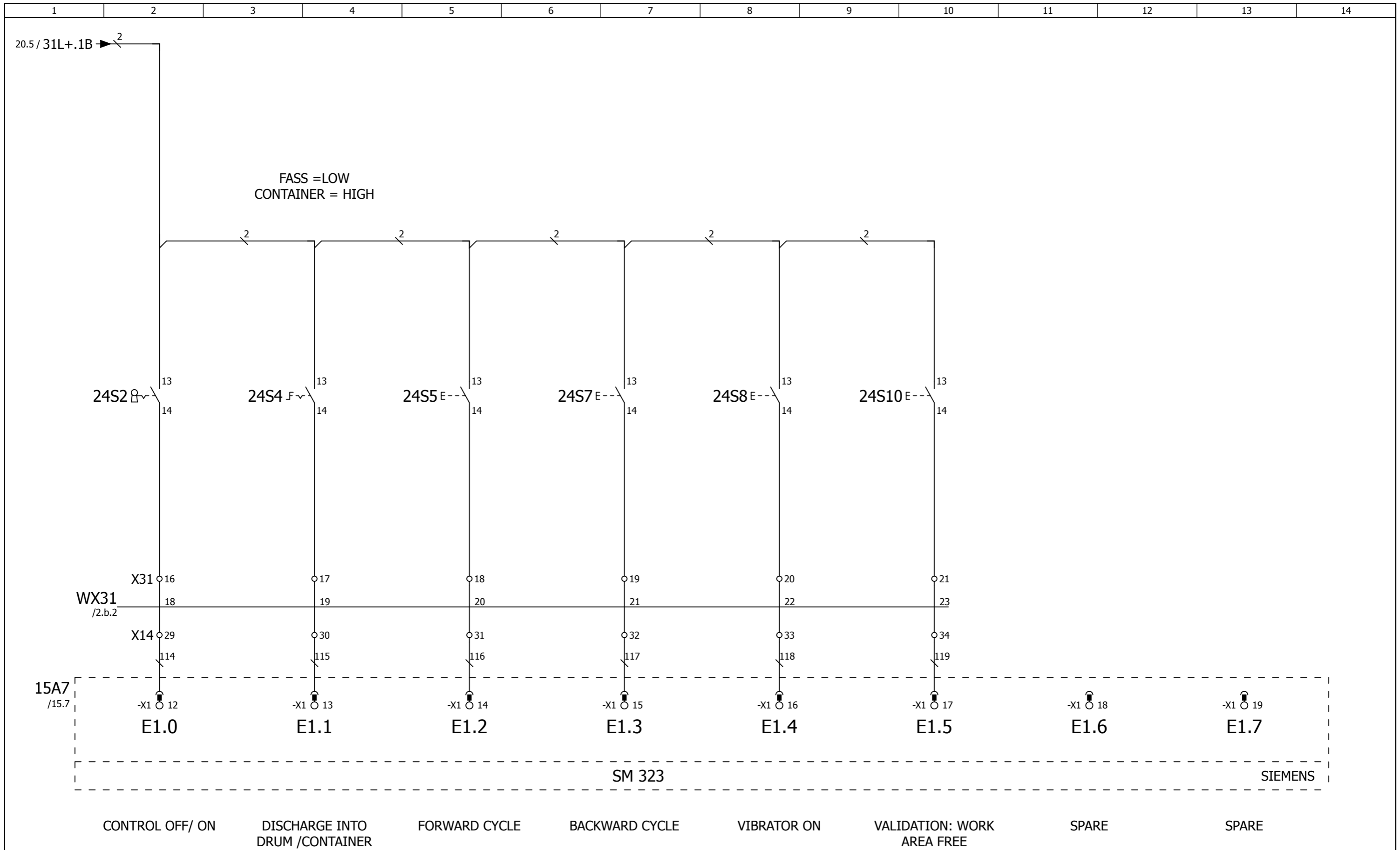


TEMPERATURE HYDRAULIC OIL >70°C =LOW      COMPRESSED AIR ON P0.2      MIN. HEIGHT      MAX. HEIGHT      SPARE      SLEW POSITION PICK UP      SLEW POSITION DISCHARGE DRUM      SLEW POSITION DISCHARGE CONTAINER

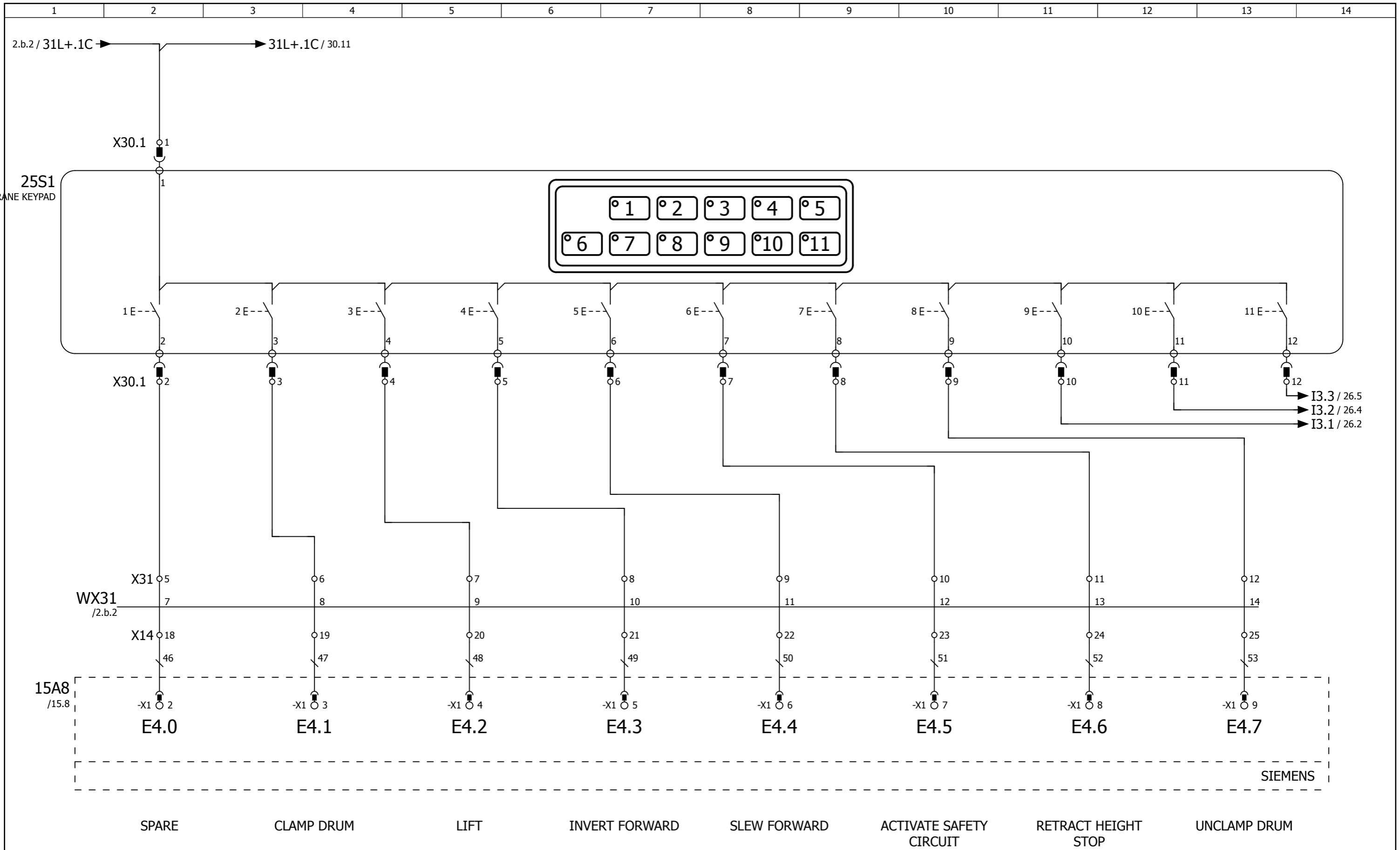
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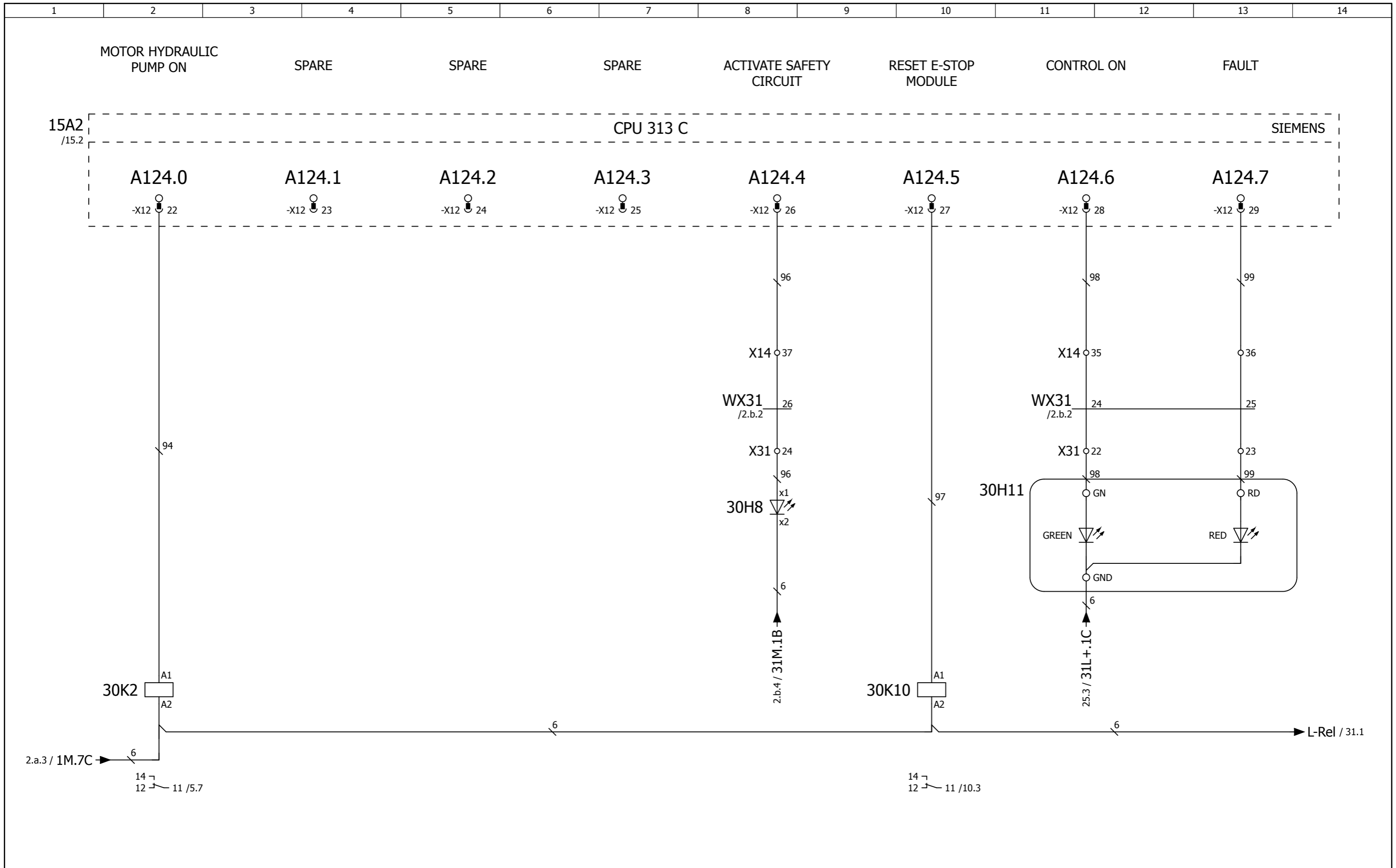
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	Ed. by LORENZ	Ed. by lorenz					
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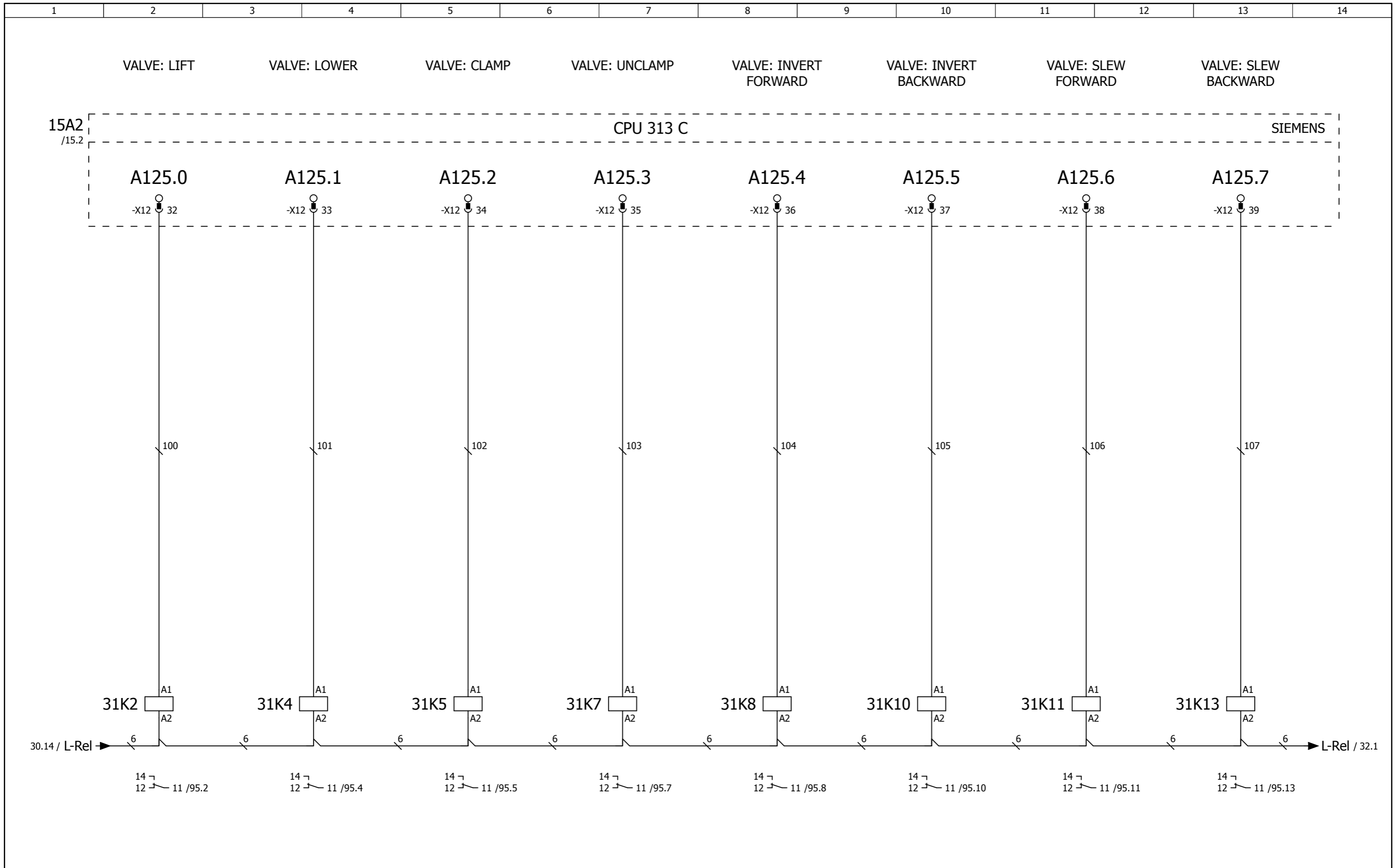
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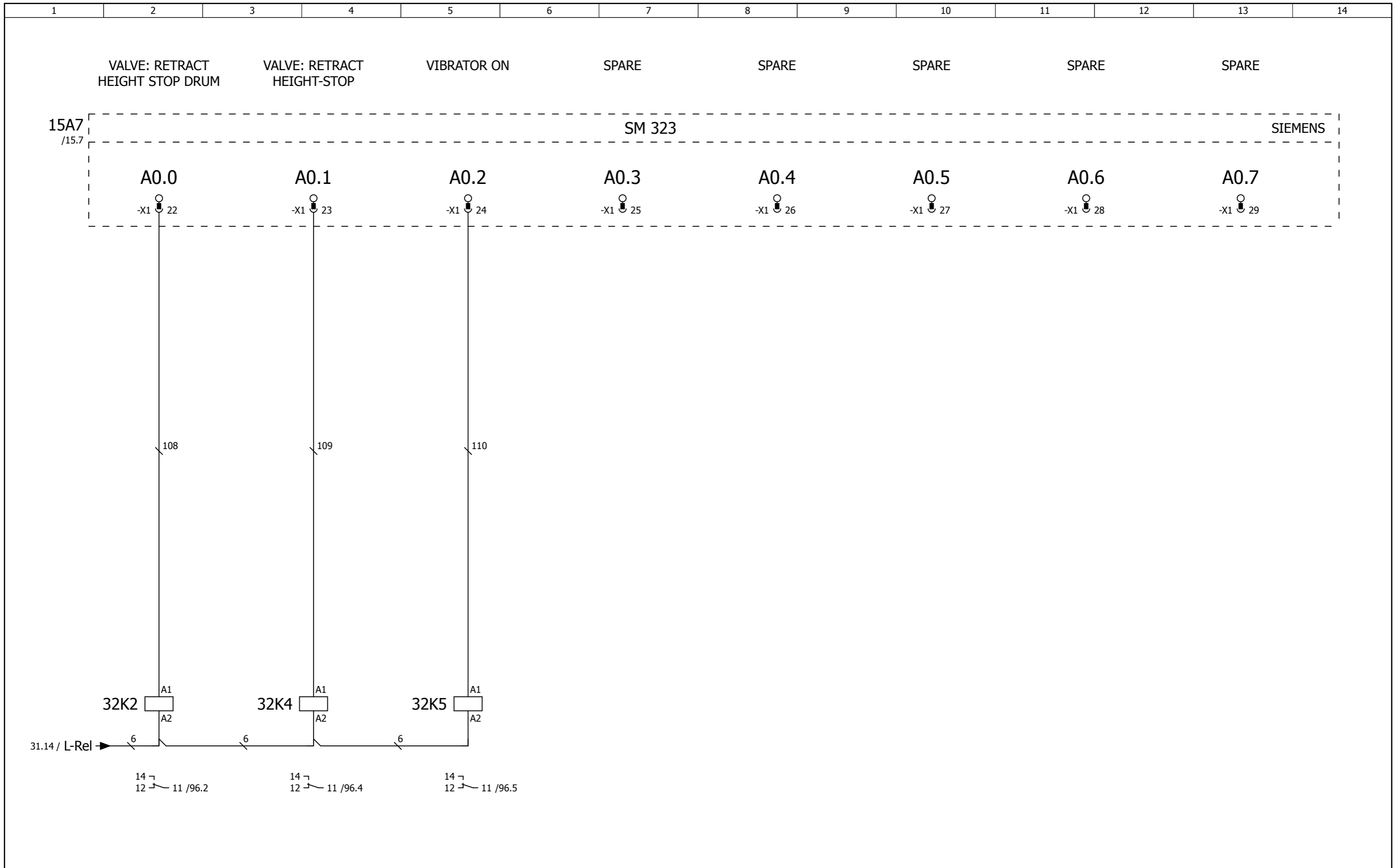


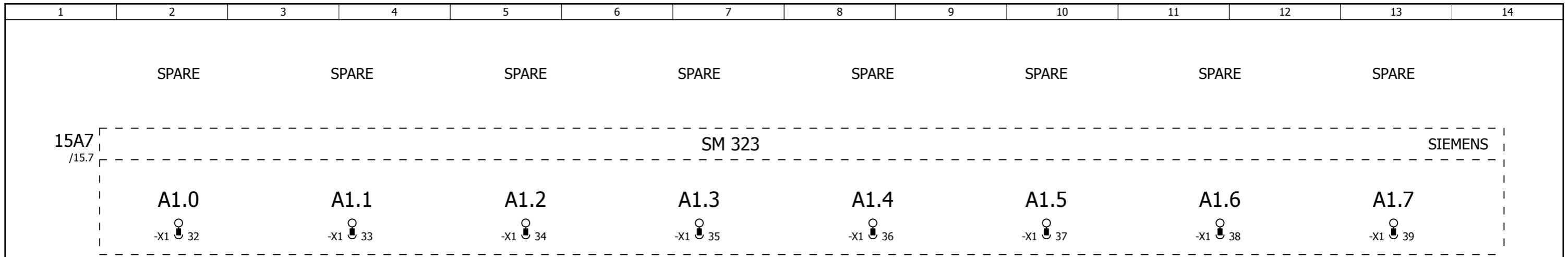




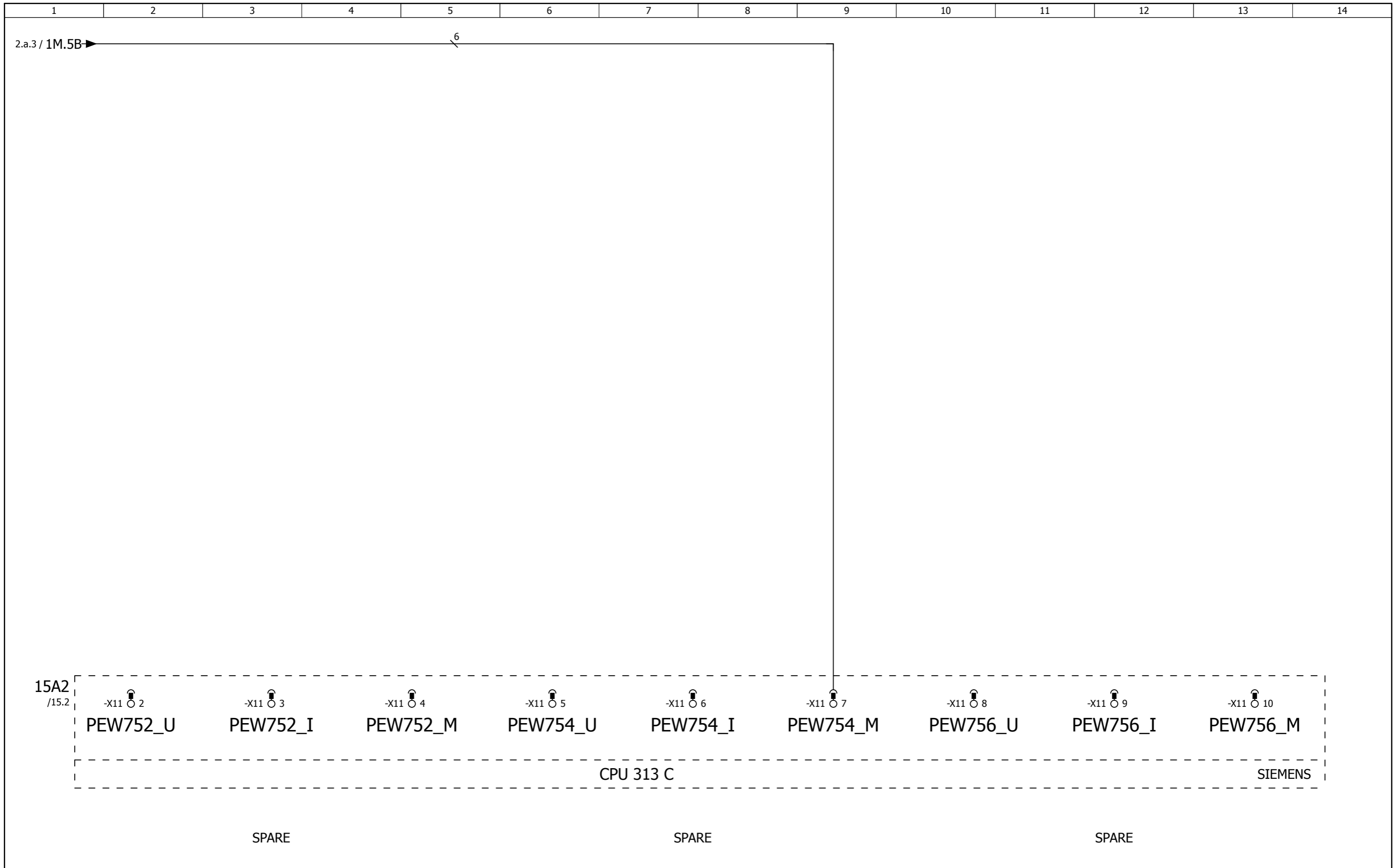
<p>Albert-Einstein-Str.9 77656 Offenburg Phone +49 (0) 781-6100-0 Email: sl@servolift.de</p>	Designed / checked	Modification	project: DRUM LIFTER	description CIRCUIT DIAGRAM OUTPUTS, DIGITAL	Frewitt Fabrique  Schweiz	= EP	CIRCUIT DIAGRAM
	date 26.08.2014	date 18.09.2014	project no.: 13264			+	page 30
	Ed. by LORENZ	Ed. by lorenz	ver.: 1			of 100	



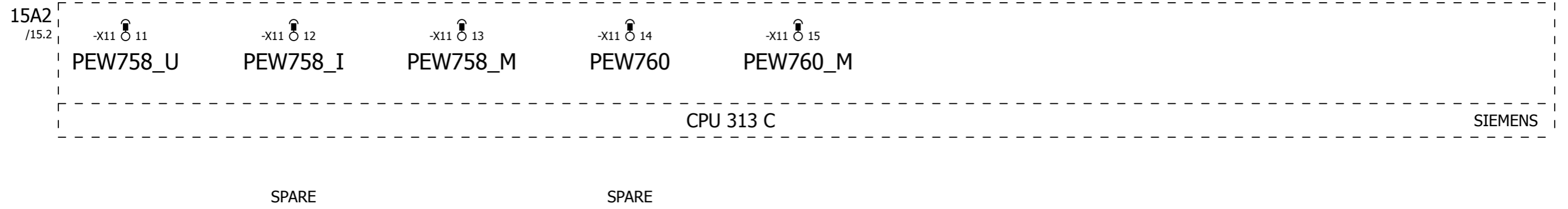




<b>SERVOLIFT</b> Albert-Einstein-Str.9 77656 Offenburg Phone +49 (0) 781-6100-0 Email: sl@servolift.de	Designed / checked	Modification	project: DRUM LIFTER	description CIRCUIT DIAGRAM OUTPUTS, DIGITAL	Frewitt Fabrique	= EP	CIRCUIT DIAGRAM	
	date 26.08.2014	date 18.09.2014	Ed. by LORENZ	Ed. by lorenz			+	
	ver.: 1		project no.: 13264		Schweiz			page 33 of 100



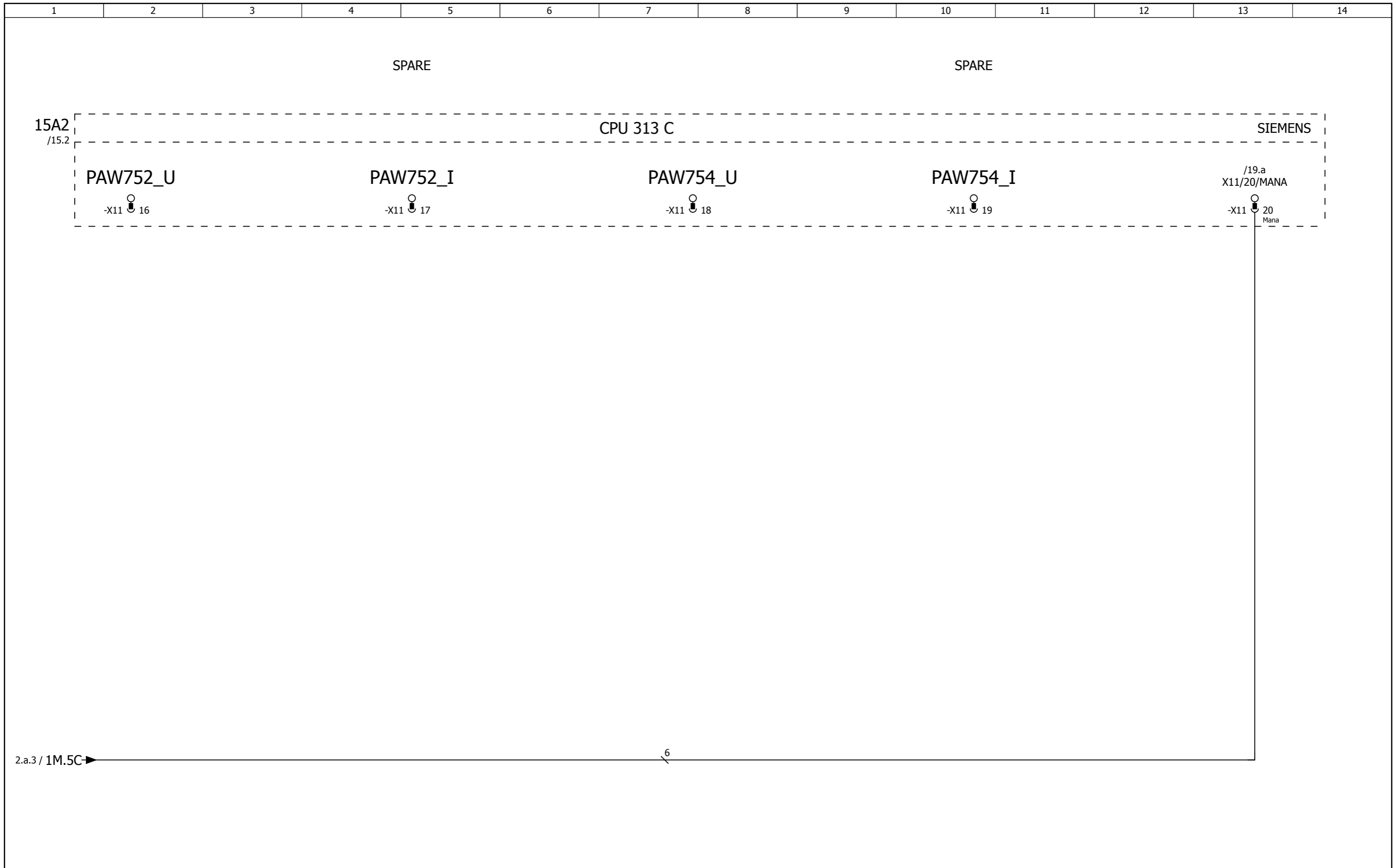
1 2 3 4 5 6 7 8 9 10 11 12 13 14

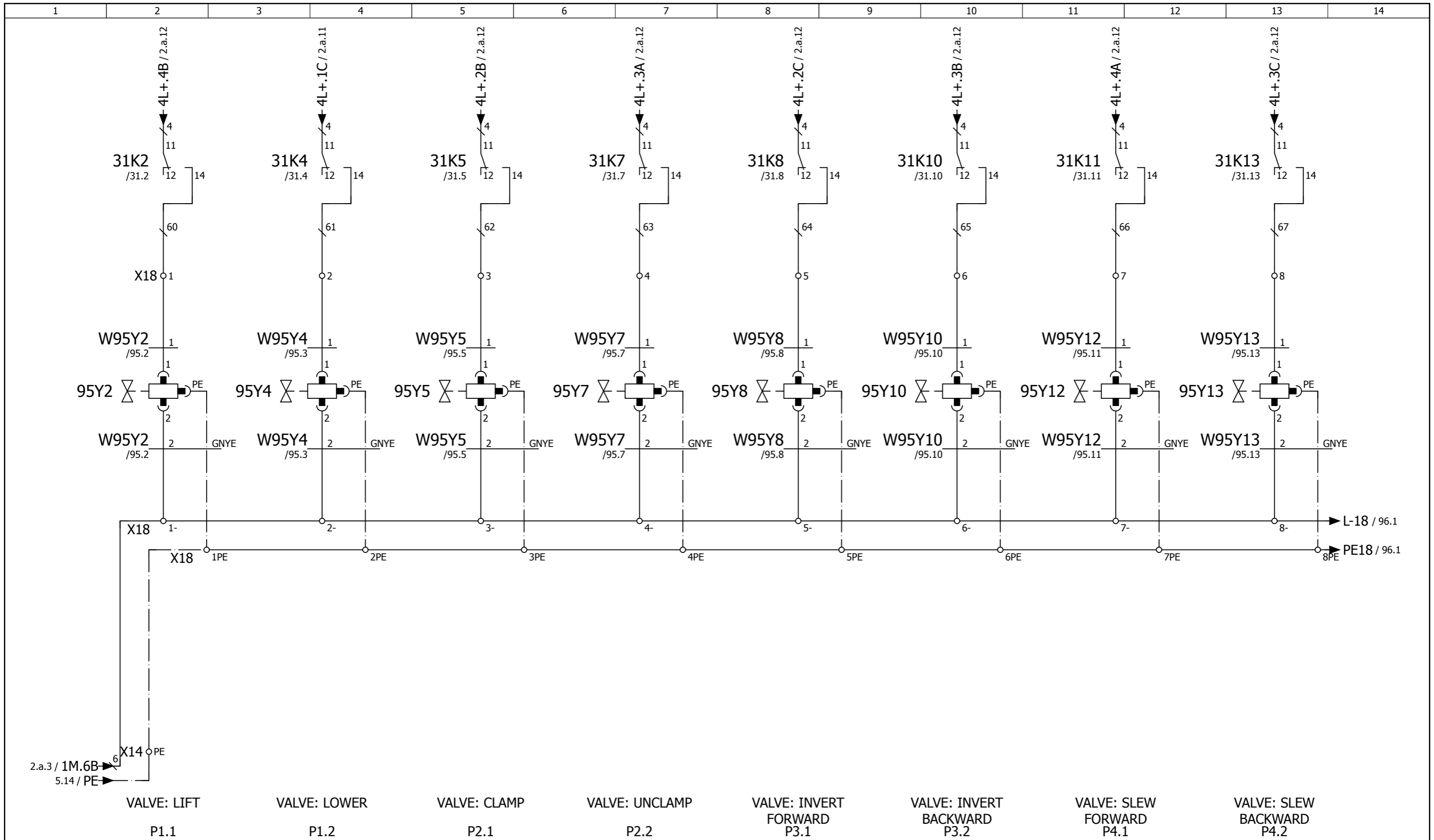


60

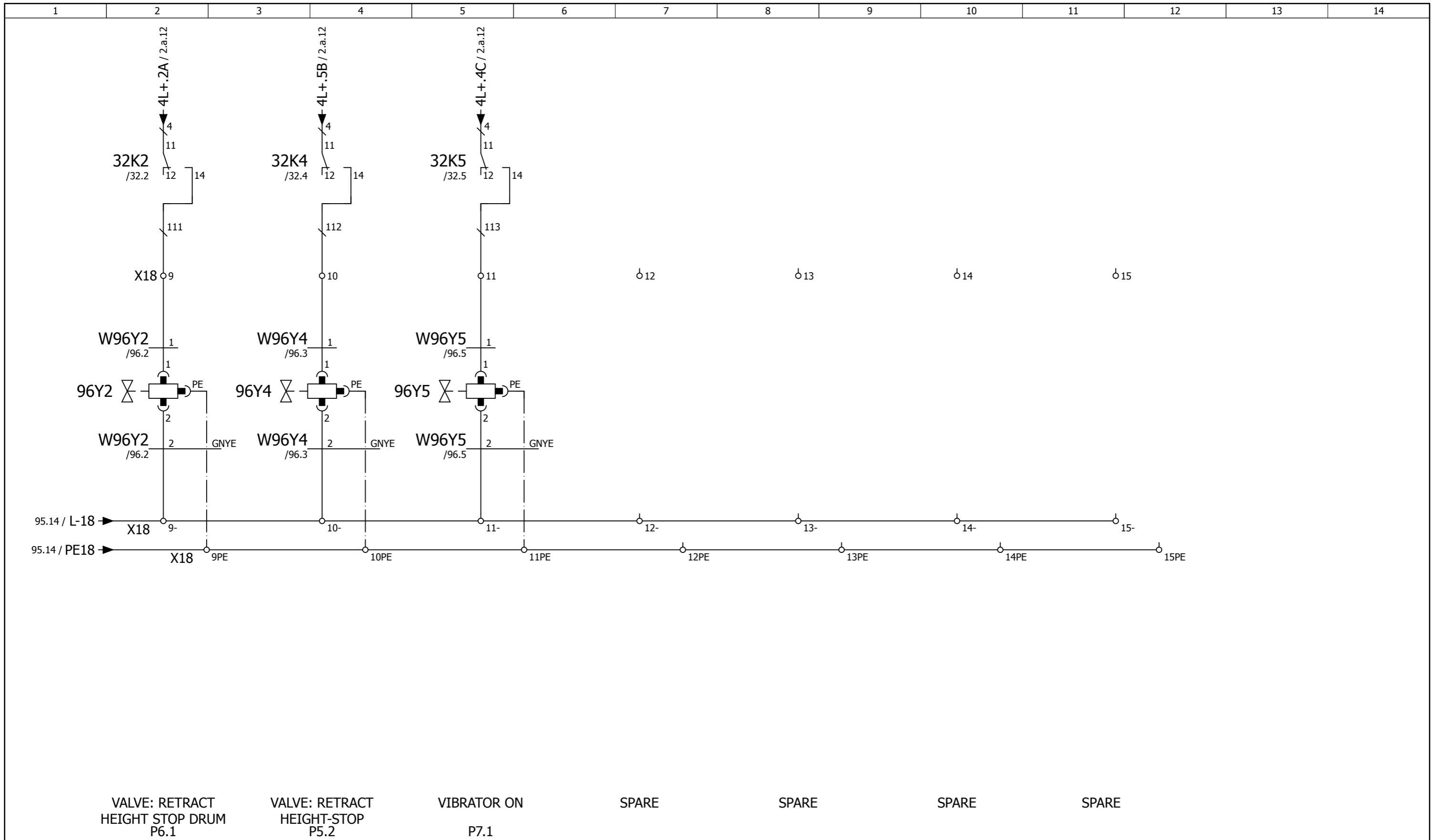
70

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	date 26.08.2014	date 18.09.2014	project no.: 13264	CIRCUIT DIAGRAM INPUTS	Schweiz	+	
	Ed. by LORENZ	Ed. by lorenz		ANALOG		page 61	
	ver.: 1					of 100	









VALVE: RETRACT  
HEIGHT STOP DRUM  
P6.1

VALVE: RETRACT  
HEIGHT-STOP  
P5.2

VIBRATOR ON  
P7.1

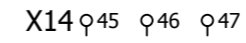
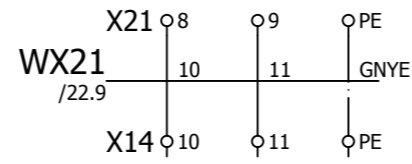
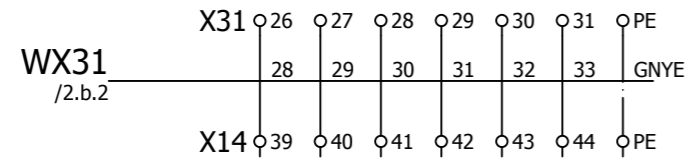
SPARE

SPARE

SPARE

SPARE

1 2 3 4 5 6 7 8 9 10 11 12 13 14



Terminal diagram

Cable name		Cable type		Wire number		Target design.		Connection		Terminal number		Jumpers		Target design.		Connection		Cable name		Cable type	
				6		X17		1-		1		●		2G2		-					
				6		X14		2		2		●		15A8		-X1:20					
				6		5K8		A2		2		●		15A2		-X1:20					
				6		10A2		A2		2		●		15A2		-X12:40					
				6		15A7		-X1:30		3		●		15A2		-X12:40					
				6		15A7		-X1:40		4		●		X14		13					
				6		15A2		-X11:30		4		●									
				6		15A2		-X11:7		5		●									
				6		15A2		-X11:20		5		●									
				6		X18		1-		6		●		15A7		-X1:20					
				6		15A2		M		6		●		15A2		-X12:20					
				6		15A2		-X12:30		7		●									
				6		30K2		A2		7		●									
										8		●									
										9		●									
										10		●									

Strip designation  
X1M  
GROUND 24V DC

=EP/100

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Terminal diagram

Cable name		Cable type	
Wire number	Target design.	Connection	Terminal number
2	X14	1	1
2	X14	12	2
2	10A2	23	3
2	10A2	A1	4
2	X17	1+	5
Target design.	Connection	Cable name	
2F3	2		
20513	1		
2F6	14		
Page/ path	=EP/2.a.6		
	=EP/2.a.6		
	=EP/2.a.6		
	=EP/2.a.7		
	=EP/2.a.7		
	=EP/2.a.7		

Terminal diagram

Cable name		Cable type						
Wire number		Target design.						
Connection		Terminal number						
Jumpers		Target design.						
Connection		Cable name						
Cable type		Cable type						
		Strip designation <b>X3L+</b> 24VDC PLC SUPPLY						
3	15A2			L+	1		2F4	2
3	15A2			-X12:1				
3	15A2			-X12:31			15A2	-X12:21
3	15A7			-X1:1	2		15A7	-X1:21
3	15A7	-X1:31	3					
3			4	●	15A8	-X1:1		
			5	●				
						Page/ path		
						=EP/2.a.9		
						=EP/2.a.9		
						=EP/2.a.9		
						=EP/2.a.9		
						=EP/2.a.10		
						=EP/2.a.10		
						=EP/2.a.10		



Terminal diagram

Cable name		Cable type		Wire number	Target design.	Connection	Terminal number	Jumpers	Target design.	Connection	Cable name	Cable type
W5M3		JZ 500		1	L1		1	•	IQ2	1		
WX10		JZ 500		2	L2		2	•	IQ2	3		
				3	L3		3	•	IQ2	5		
				4	N		4	•	IQ2	N'		
				5	IQ2	N	5	•	IQ5	N		
				5	N		4	•	IQ2	N'		
				5	N		5	•	2G2	N		
GNYE					PE	PE						
					X10	PE						
					PE	PE						
					X10	PE						
				1	X10	PE						
				2	SM3	V1				5K8		
				3	SM3	U1				4T2		
GNYE					SM3	W1				6T3		
				19	SM3							
					SM3							
					X14	PE						
					PE	PE						

Strip designation  
X10  
400VAC CABINET

2,5 mm<sup>2</sup>

Page/  
path









Terminal diagram

										Cable name	Cable type
										Wire number	
										Target design.	Strip designation <b>X17</b> 24VDC CABINET
										Connection	
										Terminal number	
										Jumpers	
										Target design.	
										Connection	
										Cable name	Cable type
										Page/ path	

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Terminal diagram

Cable name		Cable type		Wire number		Target design.		Connection		Terminal number		Jumpers		Target design.		Connection		Cable name		Cable type	
W96Y5		JZ 500		3G1,5 mm <sup>2</sup>																	
W96Y4		JZ 500		3G1,5 mm <sup>2</sup>																	
W96Y2		JZ 500		3G1,5 mm <sup>2</sup>																	
W95Y13		JZ 500		3G1,5 mm <sup>2</sup>																	
W95Y12		JZ 500		3G1,5 mm <sup>2</sup>																	
W95Y10		JZ 500		3G1,5 mm <sup>2</sup>																	
W95Y8		JZ 500		3G1,5 mm <sup>2</sup>																	
W95Y7		JZ 500		3G1,5 mm <sup>2</sup>																	
W95Y5		JZ 500		3G1,5 mm <sup>2</sup>																	
W95Y4		JZ 500		3G1,5 mm <sup>2</sup>																	
W95Y2		JZ 500		3G1,5 mm <sup>2</sup>																	
GNYE		GNYE		GNYE		95Y2		PE		1PE		.		X18		2PE					
						6		2		1-		.		X1M		6					
						60		1		1		.		31K2		14					
						95Y4		PE		2PE		.		X18		3PE					
						95Y4		2		2-		.									
						61		1		2		.		31K4		14					
						95Y5		PE		3PE		.		X18		4PE					
						95Y5		2		3-		.									
						62		1		3		.		31K5		14					
						95Y7		PE		4PE		.		X18		5PE					
						95Y7		2		4-		.									
						63		1		4		.		31K7		14					
						95Y8		PE		5PE		.		X18		6PE					
						95Y8		2		5-		.									
						64		1		5		.		31K8		14					
						95Y10		PE		6PE		.		X18		7PE					
						95Y10		2		6-		.									
						65		1		6		.		31K10		14					
						95Y12		PE		7PE		.		X18		8PE					
						95Y12		2		7-		.									
						66		1		7		.		31K11		14					
						95Y13		PE		8PE		.		X18		9PE					
						95Y13		2		8-		.									
						67		1		8		.		31K13		14					
						96Y2		PE		9PE		.		X18		10PE					
						96Y2		2		9-		.									
						111		1		9		.		32K2		14					
						96Y4		PE		10PE		.		X18		11PE					
						96Y4		2		10-		.									
						112		1		10		.		32K4		14					
						96Y5		PE		11PE		.		X18		12PE					
						96Y5		2		11-		.									
						113		1		11		.		32K5		14					
						96Y5		1		11		.									
						12				12-		.									
						13				13-		.									
						13				13-		.									

107.a

108.a

 <p>Albert-Einstein-Str.9 77656 Offenburg Phone +49 (0) 781-6100-0 Email: sl@servolift.de</p>	Designed / checked date 26.08.2014 Ed. by LORENZ	Modification date 18.09.2014 Ed. by lorenz ver.: 1	project: DRUM LIFTER  project no.: 13264	description X18	Frewitt Fabrique  Schweiz	= KP +	TERMINAL DIAGRAM
							page 108 of 112
							Page/ path

Terminal diagram

Terminal diagram															Cable name	Cable type		
																	Wire number	
																	Target design.	Strip designation <b>X18</b> 24VDC CABINET
																	Connection	
																	Terminal number	
																	Jumpers	
																	Target design.	
																	Connection	
																	Cable name	Cable type
																		2,5 mm <sup>2</sup>
																	Page/ path	
																	=EP/96.10	
																	=EP/96.10	
																	=EP/96.10	
																	=EP/96.12	
																	=EP/96.11	
																	=EP/96.11	



Designed / checked  
date 26.08.2014  
Ed. by LORENZ

Modification  
date 18.09.2014  
Ed. by lorenz  
ver.: 1

project: DRUM LIFTER  
project no.: 13264

description  
X18  
Frewitt Fabrique  
Schweiz

= KP	TERMINAL DIAGRAM
+	
	page 108.a
	of 112

Terminal diagram


Cable name		Cable type		Wire number		Target design.		Connection		Terminal number		Jumpers		Target design.		Connection		Cable name		Cable type		Page/ path			
W23B7	M12, V1	4x0,34 mm <sup>2</sup>				22B10	1	+						X14	1			WX21	JZ 500	12G0,75 mm <sup>2</sup>			=EP/22.10		
W23B5	M12, V1	4x0,34 mm <sup>2</sup>				22B11	1	+																=EP/22.11	
W23B4	M12, V1	4x0,34 mm <sup>2</sup>				23B2	1	+																	=EP/22.13
W23B2	M12, V1	4x0,34 mm <sup>2</sup>				23B4	1	+																	=EP/23.2
W22B11	M12, V1	4x0,34 mm <sup>2</sup>				23B5	1	+																	=EP/23.4
W22B10	M12, V1	4x0,34 mm <sup>2</sup>				23B7	1	+																	=EP/23.5
						22B10	3	-																	=EP/22.10
						23B2	3	-																	=EP/23.2
						23B4	3	-																	=EP/23.4
						23B5	3	-																	=EP/23.5
						23B7	3	-																	=EP/23.7
						22B10	4	1																	=EP/22.10
						22B11	4	2																	=EP/22.11
						23B2	4	3																	=EP/22.13
						23B4	4	4																	=EP/23.2
						23B5	4	5																	=EP/23.4
						23B7	4	6																	=EP/23.5
								7																	=EP/23.7
								8																	=EP/100.6
								9																	=EP/100.7
								10																	=EP/100.7
								11																	=EP/100.7

108.a

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Terminal diagram

Cable name		Cable type		Strip designation		Cable name		Cable type		Page/ path
Wire number	Target design.	Connection	Terminal number	Jumpers	Target design.	Connection	WX31	JZ 500	34G0,75 mm <sup>2</sup>	
72	10S6	12	1	.	X14	14	3			=EP/10.4
76	10S6	22	2	.	X14	15	4			=EP/10.5
78	10S6	21	3	.	X14	16	5			=EP/10.5
74	10S6	11	4	.	X14	17	6			=EP/10.5
			5	.	X14	18	7			=EP/25.2
			6	.	X14	19	8			=EP/25.4
			7	.	X14	20	9			=EP/25.5
			8	.	X14	21	10			=EP/25.7
			9	.	X14	22	11			=EP/25.8
			10	.	X14	23	12			=EP/25.10
			11	.	X14	24	13			=EP/25.11
			12	.	X14	25	14			=EP/25.13
			13	.	X14	26	15			=EP/26.2
			14	.	X14	27	16			=EP/26.4
			15	.	X14	28	17			=EP/26.5
			16	.	X14	29	18			=EP/24.2
	24S2	14	17	.	X14	30	19			=EP/24.4
	24S4	14	18	.	X14	31	20			=EP/24.5
	24S5	14	19	.	X14	32	21			=EP/24.7
	24S7	14	20	.	X14	33	22			=EP/24.8
	24S8	14	21	.	X14	34	23			=EP/24.10
	24S10	14	22	.	X14	35	24			=EP/30.11
	30H11	RD	23	.	X14	36	25			=EP/30.13
96	30H8	X1	24	.	X14	37	26			=EP/30.8
	10S6	32	25	.	X14	38	27			=EP/20.4
			26	.	X14	39	28			=EP/100.3
			27	.	X14	40	29			=EP/100.3
			28	.	X14	41	30			=EP/100.3
			29	.	X14	42	31			=EP/100.4
			30	.	X14	43	32			=EP/100.4
			31	.	X14	44	33			=EP/100.4
			PE	.	X14	PE	GNVE			=EP/100.5

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							page 110 of 112

Terminal diagram

										Cable name		Cable type	
										Wire number			
										2		1056	
										31		Connection	
										1		Terminal number	
										2		Jumpers	
										X14		Target design.	
										12		Connection	
										Cable name		Cable type	
										1		WX31	
												JZ 500	
												34G0,75 mm²	
										=EP/2.b.2		Page/ path	
										=EP/2.b.2			
										=EP/2.b.2			

Strip designation  
X31L+



Terminal diagram

										Cable name		Cable type	
										Wire number			
										6		30H8	
										X2		Connection	
										1		Terminal number	
										2		Jumpers	
										X14		Target design.	
										13		Connection	
										Cable name		Cable type	
										2		WX31	
												JZ 500	
												34G0,75 mm²	
										=EP/2.D.4		Page/ path	
										=EP/2.D.4			

Strip designation  
X31M

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# SERVOLIFT

## SPARE PARTS LIST

13264

Project no.

1033540

Parts-# Servolift	Qty	Description	Manufacturer	location
101350	1 pcs	square socket key 7 mm black PA, black	Dirak GmbH & Co. KG	control cabinet
106325	3,5 m	cover band 140 mm width, with sealed rim	Forbo Siegling GmbH	column
104923	2 pcs	cover element M 10 for socket cap screw in countersinking, GPN 340, grey	Pöppelmann GmbH & Co.	column
128137	1 pcs	flange for flexa duct type 321, polyamide M40x1,5 - RAL 9006	Servolift	power supply
125822	2 pcs	flexa fitting type LKI-M M40x1,5 for hose AD 36 (Pg29)	Flexa	power supply
102861	6 m	flexible duct Airflex-KUW, grey	Flexa	power supply
104924	4 pcs	cover element M12 for socket cap screw in countersinking, GPN 340, grey	Pöppelmann	height stop device
133751	2 pcs	slide bearing -1 6x8x10	Igus GmbH	height stop
101124	4 pcs	bushing, cyl. ISO 3547-1615 DU (16x18x15), steel back	Glacier Garlock	height stop
102369	2 pcs	spring DIN 2098 - VD-146 1x12,5x24 - 1,28N/mm - 1.4310	Gutekunst & Co. Federnfabriken	height stop
127106	2 pcs	grooved ring 8x12x3 type 2HO, NBR	Techno Parts GmbH	height stop
125310	1 pcs	cross roller bearing 9E-1Z12-0215-0694-1, m=4, z=7	PSL Wälzlager GmbH	bottom group
111067	1 pcs	cover compl. external diameter 120 mm	Servolift	bottom group
112323	1,7 m	silicone seal with sealing lip, No. 1874	Schmidt & Bartl GmbH	bottom group
108768	1 pcs	pinion for motor type OMR, shaft Ø25 m=4, Z=16, d=25, D=70mm, l=50mm	Seitz Albert GmbH	bottom group
125444	2 pcs	elastomer pad Ø16x7, Urelast 90	EFFBE GmbH	bottom group
110160	3,0 m	sealing profile for control cabinet	Dirak GmbH & Co. KG	control cabinet
133792	10 l	hydraulic oil, tecoil Foodmax AW46 (food grade quality)	George Handels GmbH	power pack
111290	1 pcs	power pack without motor, without valve type MC4, NG7/ 3,2cm <sup>3</sup>	Hydr-App. SpA	control cabinet
101785	4 pcs	rubber bumper 30x20 - M8, 55 Shore A bolt / thread, NR	ITK Kienzler GmbH & Co.KG	power pack
125204	1 pcs	coupling for hydraulic power pack type MC2/MC4 for shaft Ø 24	Lotz Hydraulik GmbH	power pack
111636	1 pcs	temperatur switch, IP65 TS-70/X/12	Hydac/Flutec	power pack
101072	4 pcs	hinged joint M8 130 ST-BLK/KU SXN03	springfix GmbH	control cabinet
128758	1 pcs	Hydr. control valve assembly 4 functions  quantity of control valve block funktions 4 functions Function 1 valve block LIFT / LOWER	Servolift	control cabinet
103882	2 pcs	cover DP 625 d=15.9 2663 black	Heymann Manufacturing GmbH	support arm
9081204	2 pcs	Anschlag	Servolift	support arm
9081352	1 pcs	Anschlag 80x 50 x 45 dick	Lienhard Kunststoffe	support arm
106722	1 pcs	seals for clamp cylinder Ø50/20	Servolift	clamp cylinder
100793	1 pcs	piston seal 50-34-18,4	HME GmbH	Dichtsatz Spannzylinder
102294	1 pcs	O-ring 14,00x1,60 NBR DIN 3771	HME GmbH	Dichtsatz Spannzylinder
100841	1 pcs	rod seal QFNH 20x29	Kaco	Dichtsatz Spannzylinder
100812	1 pcs	O-ring 41,20x5,70 DIN 3771	HME GmbH	Dichtsatz Spannzylinder
106722	1 pcs	seals for clamp cylinder Ø50/20	Servolift	clamp cylinder
101287	2 pcs	articulated joint bearing DIN 648 GE 15 DO	Ina Wälzlager Schaeffler oHG	clamp system
100793	1 pcs	piston seal 50-34-18,4	HME GmbH	Dichtsatz Spannzylinder

# SERVOLIFT

## SPARE PARTS LIST

13264

Project no.

1033540

Parts-# Servolift	Qty	Description	Manufacturer	location
102294	1 pcs	O-ring 14,00x1,60 NBR DIN 3771	HME GmbH	Dichtsatz Spannzylinder
100841	1 pcs	rod seal QFNH 20x29	Kaco	Dichtsatz Spannzylinder
100812	1 pcs	O-ring 41,20x5,70 DIN 3771	HME GmbH	Dichtsatz Spannzylinder
122691	4 pcs	knurled nut DIN 6303 M 10 Stainless steel	Ganter Otto & Co.KG	support arm
124974	4 pcs	spring cotter DIN 11024 - 3,2 A2	Jäger GmbH Schrauben	support arm
133375	4 pcs	retaining cable 150 mm, GN 111.2-150-14-B	Ganter Otto & Co.KG	support arm
134728	4 pcs	idler pulley standard 0 HMTR 24x61,8x24 2RS	Knapp Wälzlagertechnik GmbH	support arm
101347	2 pcs	hinge black 224-9001	Dirak GmbH & Co. KG	control cabinet
101349	2 pcs	lock, assembled 7mm/26mm with H26/L45	Dirak GmbH & Co. KG	control cabinet
112432	1 pcs	seal set for lift cylinder Ø40, plunger type	Servolift	lift cylinder
100629	2 pcs	slide bearing, cyl. ISO 3547-3220 DU (32x36x20) steel back	Glacier Garlock	idler pulley
108012	4 pcs	bushing GFM-3236-16	Igus GmbH	idler pulley
128354	2 pcs	lift chain, type flyer 5/8"-3x4 with end plates	Donghua Industries Europe GmbH	column
103212	2 pcs	plastic cap for hexagon head screw M12 19 A/F ,grey	Inden GmbH	column
100625	2 pcs	slide bearing, cyl. ISO 3547-2515 DU (25x28x15) steel back	Glacier Garlock	lift sled
134728	4 pcs	idler pulley standard 0 HMTR 24x61,8x24 2RS	Knapp Wälzlagertechnik GmbH	lift sled
111067	1 pcs	cover compl. external diameter 120 mm	Servolift	frontcase
125647	1 pcs	lubricator compl. 12 months filled with food grade grease, Soraja FM 372	Servolift	frontcase
112333	1 pcs	V-seal type VL 300 (D=285-305 mm)	Trelleborg	support arm
103214	6 pcs	cover element M 16 for hexagon head screw GPN 1000, SW24, grey	ITK Kienzler GmbH & Co.KG	support arm
132655	2 pcs	guide bar for recover band 140 POM white	Servolift	frontcase
111032	2 pcs	bushing rotary fitting DVGE 8-PSR 1/4"	Lotz Hydraulik GmbH	frontcase
104176	1 pcs	cover ø 120 mm	Hommel GmbH	support arm
125822	2 pcs	flexa fitting type LKI-M M40x1,5 for hose AD 36 (Pg29)	Flexa	frontcase
102861	2 m	flexible duct Airflex-KUW, grey	Flexa	frontcase
128137	1 pcs	flange for flexa duct type 321, polyamide M40x1,5 - RAL 9006	Servolift	frontcase
103212	4 pcs	plastic cap for hexagon head screw M12 19 A/F ,grey	Inden GmbH	bottom group

## HYDRAULIC PARTS LIST

**13264**
**Project no.**
**1033540**

Project:		Name	Date	Revision	Dwg. no.
Drum Lifter		Becherer	07.07.2014	0	13264-61-001
Pos. Nr.	Qty	Description	Manufacturer	Parts-# Servolift	location
10	H 0.2	1 pcs pressure gauge NG63/DIN - 160 bar bottom fitting	Welte Cardan-Service GmbH	103252	power pack
20	H 1.0	1 pcs lift cylinder	Servolift	127586	column
30	H 1.1	1 pcs check valve with hydr. release RH 1, G1/4", 15 l/min	HAWE Hydraulik SE	101190	lift cylinder
40	H 1.2	1 pcs flow control valve VCD-RU 3/8"	Oil Control GmbH	110982	control cabinet
50	H 1.3	1 pcs hydr. pressure limiting valve G3/8" MVCS46 E, Bypass, R=500bar	HAWE Hydraulik SE	101192	control cabinet
60	H 1.6	1 pcs sieve and filter element HFE 1/4 F in housing	HAWE Hydraulik SE	122971	lift cylinder
70	H 1.7	1 pcs sieve and filter element HFE 1/4 F in housing	HAWE Hydraulik SE	122971	lift cylinder
80	H 1.8	1 pcs filtration element for screwing in in HFC 1/4 F 3 elements, 100µm	HAWE Hydraulik SE	122907	lift cylinder
100	H 2.0	1 pcs Spannzyylinder nach Auftrag	Servolift	128313	support arm
110	H 2.1	1 pcs shuttle valve WV 08-PL	Hansa-Flex Hydraulik GmbH	102125	control cabinet
120	H 2.2	1 pcs check valve with hydr. release RH 1, G1/4", 15 l/min	HAWE Hydraulik SE	101190	support arm
130	H 2.3	1 pcs check valve with hydr. release RH 1, G1/4", 15 l/min	HAWE Hydraulik SE	101190	support arm
140	H 2.4	1 pcs hydr. pressure limiting valve G 1/4" MV41 E-70, R=20bar	HAWE Hydraulik SE	101186	control cabinet
150	H 2.5	1 pcs bushing rotary fitting DVGE 8-PSR 1/4"	Lotz Hydraulik GmbH	111032	frontcase
160	H 2.6	1 pcs bushing rotary fitting DVGE 8-PSR 1/4"	Lotz Hydraulik GmbH	111032	frontcase
164	H 2.7	1 pcs sieve and filter element HFE 1/4 F in housing	HAWE Hydraulik SE	122971	clamp cylinder
167	H 2.8	1 pcs sieve and filter element HFE 1/4 F in housing	HAWE Hydraulik SE	122971	clamp cylinder
180	H 3.0	1 pcs hydraulic motor OMR 315 shaft d=25mm		101216	inversion drive unit
185	H 3.1	1 pcs hydraulic disc brake ELB288 OMP/OMR, shaft Ø25mm		128713	inversion drive unit
190	H 3.2	1 pcs throttle non-return valve G1/4" F-Serie, steel	Parker Hannifin GmbH & Co. KG	130006	inversion drive unit
200	H 3.3	1 pcs throttle non-return valve G1/4" F-Serie, steel	Parker Hannifin GmbH & Co. KG	130006	inversion drive unit
210	H 3.4	1 pcs load holding valve LHK 33 F-21 W-140/140	Heilmeyer u. Weinlein	101193	inversion drive unit
220	H 3.5	1 pcs pressure gauge NG63/DIN - 160 bar bottom fitting	Welte Cardan-Service GmbH	103252	inversion drive unit
240	H 4.0	1 pcs hydraulic motor type OMR 315 F with brake		128373	bottom group
250	H 4.2	1 pcs throttle non-return valve G1/4" F-Serie, steel	Parker Hannifin GmbH & Co. KG	130006	control cabinet
260	H 4.3	1 pcs throttle non-return valve G1/4" F-Serie, steel	Parker Hannifin GmbH & Co. KG	130006	control cabinet
270	H 4.4	1 pcs pressure gauge NG63/DIN - 160 bar bottom fitting	Welte Cardan-Service GmbH	103252	control cabinet
280	H 4.5	1 pcs Hydr. double pressure limiting valve G3/8" DMV 42 F	HAWE Hydraulik SE	111808	control cabinet

## HYDRAULIC PARTS LIST

**13264****Project no.****1033540**

<b>Project:</b>		<b>Name</b>	<b>Date</b>	<b>Revision</b>	<b>Dwg. no.</b>
Drum Lifter		Becherer	07.07.2014	0	13264-61-001

Pos. Nr.	Qty	Description	Manufacturer	Parts-# Servolift	location
290	<b>H 4.6</b>	1 pcs <b>shuttle valve WV 08-PL</b>	<i>Hansa-Flex Hydraulik GmbH</i>	<b>102125</b>	control cabinet
310	<b>H 5.0</b>	1 pcs <b>power pack by order</b>	<i>Servolift</i>	<b>128285</b>	control cabinet
320	<b>H 6.0</b>	1 pcs <b>control-block</b>	<i>Servolift</i>	<b>128309</b>	control cabinet

## PNEUMATIC PARTS LIST 13264

Project no. 1033540

Project:		Name	Date	Revision	Dwg. no.
Drum Lifter		Becherer	07.07.2014	0	13264-62-001
Pos. Nr.	Qty	Description	Manufacturer	Parts-# Servolift	location
10	P 0.1	1 pcs <b>Air maintenance unit combination</b> MSB4-AGB:C4:J1-WP-EX2 EXII2GD	Festo KG	8014571	control cabinet
20	P 0.2	1 pcs <b>pneum. pressure switch PEV-1/4A-SW27-B-OD</b> No. 175252	Festo KG	8007788	control cabinet
30	P 1.0	1 pcs <b>pneu. cylinder dia.20, stroke 50, ISO 6432</b>	Festo KG	103078	control cabinet
40	P 1.1	1 pcs <b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	Festo KG	128171	control cabinet
50		1 pcs <b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	Festo KG	128092	control cabinet
60		1 pcs <b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	Festo KG	129839	control cabinet
70	P 1.2	1 pcs <b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	Festo KG	128171	control cabinet
80		1 pcs <b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	Festo KG	128092	control cabinet
90		1 pcs <b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	Festo KG	129839	control cabinet
100	P 2.0	1 pcs <b>pneu. cylinder dia.20, stroke 50, ISO 6432</b>	Festo KG	103078	control cabinet
110	P 2.1	1 pcs <b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	Festo KG	128171	control cabinet
120		1 pcs <b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	Festo KG	128092	control cabinet
130		1 pcs <b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	Festo KG	129839	control cabinet
140	P 2.2	1 pcs <b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	Festo KG	128171	control cabinet
150		1 pcs <b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	Festo KG	128092	control cabinet
160		1 pcs <b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	Festo KG	129839	control cabinet
170	P 3.0	1 pcs <b>pneu. cylinder dia.20, stroke 50, ISO 6432</b>	Festo KG	103078	control cabinet
180	P 3.1	1 pcs <b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	Festo KG	128171	control cabinet
190		1 pcs <b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	Festo KG	128092	control cabinet
200		1 pcs <b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	Festo KG	129839	control cabinet
210	P 3.2	1 pcs <b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	Festo KG	128171	control cabinet
220		1 pcs <b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	Festo KG	128092	control cabinet
230		1 pcs <b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	Festo KG	129839	control cabinet
240	P 4.0	1 pcs <b>pneu. cylinder dia.20, stroke 50, ISO 6432</b>	Festo KG	103078	control cabinet
250	P 4.1	1 pcs <b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	Festo KG	128171	control cabinet
260		1 pcs <b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	Festo KG	128092	control cabinet
270		1 pcs <b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	Festo KG	129839	control cabinet
280	P 4.2	1 pcs <b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	Festo KG	128171	control cabinet

## PNEUMATIC PARTS LIST 13264

Project no. 1033540

Project:	Name	Date	Revision	Dwg. no.	
Drum Lifter	Becherer	07.07.2014	0	13264-62-001	
Pos. Nr.	Qty	Description	Manufacturer	Parts-# Servolift	location
290	1 pcs	<b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	<i>Festo KG</i>	<b>128092</b>	control cabinet
300	1 pcs	<b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	<i>Festo KG</i>	<b>129839</b>	control cabinet
310 <b>P 5.0</b>	1 pcs	<b>pneum. actuated piston for</b> height stop latch	<i>Servolift</i>	<b>132000</b>	height stop
320 <b>P 5.1</b>	1 pcs	<b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	<i>Festo KG</i>	<b>128171</b>	control cabinet
330	1 pcs	<b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	<i>Festo KG</i>	<b>128092</b>	control cabinet
340	1 pcs	<b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	<i>Festo KG</i>	<b>129839</b>	control cabinet
350 <b>P 6.0</b>	1 pcs	<b>pneum. actuated piston for</b> height stop latch	<i>Servolift</i>	<b>132000</b>	height stop
360 <b>P 6.1</b>	1 pcs	<b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	<i>Festo KG</i>	<b>128171</b>	control cabinet
370	1 pcs	<b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	<i>Festo KG</i>	<b>128092</b>	control cabinet
380	1 pcs	<b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	<i>Festo KG</i>	<b>129839</b>	control cabinet
390 <b>P 7.0</b>	1 pcs	<b>Druckluft Kolbenvibrator EX</b> NTS 250 HF E L, kann ohne geölter Druckluft betrieben werden	<i>Netter GmbH</i>	<b>8014381</b>	support arm
400 <b>P 7.1</b>	1 pcs	<b>3/2 valve G1/8" MFH-3-1/8-EX</b> solenoid/ spring actuated	<i>Festo KG</i>	<b>128171</b>	control cabinet
410	1 pcs	<b>solenoid coil Ex-protect zone 2+22</b> MSFG-24-EX	<i>Festo KG</i>	<b>128092</b>	control cabinet
420	1 pcs	<b>plug for valves (20x28mm) for MSFG-24-EX</b> type MSSD-F-M16	<i>Festo KG</i>	<b>129839</b>	control cabinet
430 <b>P 8.0</b>	1 pcs	<b>pneum. quick coupling, G1/8" internal thread</b> with anti-retour valve , Serie 21	<i>Legris</i>	<b>8010999</b>	
440 <b>P 8.1</b>	1 pcs	<b>pneum. plug-in nipple, G1/4" external thread</b> with anti-retour valve, Serie 21	<i>Legris</i>	<b>8010744</b>	

## HOSE LIST

13264

Project no.

1033540

Project:		Name	Date	Revision	Dwg. no.
Drum Lifter		Becherer	19.09.2014	0	13264-61-001
Pos. Nr.	Qty	Description	Manufacturer	Parts-# Servolift	location
10	1	1 pcs <b>hydraulic hose SC1 DN 12x 750mm EN 857</b> 2x DKO-L M18x1,5 <b>length: 750 mm</b>	Welte Cardan-Service GmbH	<b>132563</b>	control cabinet
20	2	1 pcs <b>hydraulic hose SC1 DN 12x 950mm EN 857</b> 2x DKO-L M18x1,5 <b>length: 950 mm</b>	Welte Cardan-Service GmbH	<b>132564</b>	control cabinet
30	3	1 pcs <b>hydraulic hose SC1 DN 10x 700mm EN 857</b> 2x DKO-L M16x1,5 <b>length: 700 mm</b>	Hansa-Flex Hydraulik GmbH	<b>132568</b>	control cabinet
40	4	1 pcs <b>hydraulic hose SC1 DN 8x 350mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 350 mm</b>	Welte Cardan-Service GmbH	<b>132541</b>	control cabinet
50	5	1 pcs <b>hydraulic hose SC1 DN 8x 350mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 350 mm</b>	Welte Cardan-Service GmbH	<b>132541</b>	control cabinet
60	6	1 pcs <b>hydraulic hose SC1 DN 8x 300mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 300 mm</b>	Welte Cardan-Service GmbH	<b>132540</b>	control cabinet
70	7	1 pcs <b>hydraulic hose SC1 DN 8x 350mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 350 mm</b>	Welte Cardan-Service GmbH	<b>132541</b>	control cabinet
80	8	1 pcs <b>hydraulic hose SC1 DN 8x 250mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 250 mm</b>	Welte Cardan-Service GmbH	<b>132539</b>	control cabinet
90	9	1 pcs <b>hydraulic hose DN 8, DKO-L M 14x1,5 both sides</b> Typ Tractor/1K prEN857/1SC <b>length: 3550 mm</b>	Welte Cardan-Service GmbH	<b>8012933</b>	idler pulley
100	10	1 pcs <b>hydraulic hose DN 8, DKO-L M 14x1,5 both sides</b> Typ Tractor/1K prEN857/1SC <b>length: 3550 mm</b>	Welte Cardan-Service GmbH	<b>8012933</b>	idler pulley
110	11	1 pcs <b>hydraulic hose SC1 DN 8x 500mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 500 mm</b>	Welte Cardan-Service GmbH	<b>132546</b>	frontcase
120	12	1 pcs <b>hydraulic hose SC1 DN 8x 500mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 500 mm</b>	Welte Cardan-Service GmbH	<b>132546</b>	frontcase
130	13	1 pcs <b>hydraulic hose SC1 DN 8x 250mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 250 mm</b>	Welte Cardan-Service GmbH	<b>132539</b>	frontcase
140	14	1 pcs <b>hydraulic hose SC1 DN 8x 300mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 300 mm</b>	Welte Cardan-Service GmbH	<b>132540</b>	frontcase
150	15	1 pcs <b>hydraulic hose SC1 DN 8x 1000mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 1000 mm</b>	Welte Cardan-Service GmbH	<b>132555</b>	support arm
160	16	1 pcs <b>hydraulic hose SC1 DN 8x 1000mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 1000 mm</b>	Welte Cardan-Service GmbH	<b>132555</b>	support arm
170	17	1 pcs <b>hydraulic hose SC1 DN 8x 350mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 350 mm</b>	Welte Cardan-Service GmbH	<b>132541</b>	control cabinet
180	18	1 pcs <b>hydraulic hose SC1 DN 8x 300mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 300 mm</b>	Welte Cardan-Service GmbH	<b>132540</b>	control cabinet
190	19	1 pcs <b>hydraulic hose DN 8, DKO-L M 14x1,5 both sides</b> Typ Tractor/1K prEN857/1SC <b>length: 3550 mm</b>	Welte Cardan-Service GmbH	<b>8012933</b>	idler pulley
200	20	1 pcs <b>hydraulic hose DN 8, DKO-L M 14x1,5 both sides</b> Typ Tractor/1K prEN857/1SC <b>length: 3550 mm</b>	Welte Cardan-Service GmbH	<b>8012933</b>	idler pulley



## HOSE LIST

13264

Project no.

1033540

Project:		Name	Date	Revision	Dwg. no.
Drum Lifter		Becherer	19.09.2014	0	13264-61-001
Pos. Nr.	Qty	Description	Manufacturer	Parts-# Servolift	location
210	21	1 pcs <b>hydraulic hose SC1 DN 8x 500mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 500 mm</b>	Welte Cardan-Service GmbH	132546	frontcase
220	22	1 pcs <b>hydraulic hose SC1 DN 8x 500mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 500 mm</b>	Welte Cardan-Service GmbH	132546	frontcase
230	23	1 pcs <b>hydraulic hose SC1 DN 8x 450mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 450 mm</b>	Welte Cardan-Service GmbH	132542	frontcase
240	24	1 pcs <b>hydraulic hose SC1 DN 8x 450mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 450 mm</b>	Welte Cardan-Service GmbH	132542	frontcase
250	25	1 pcs <b>hydraulic hose SC1 DN 8x 450mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 450 mm</b>	Welte Cardan-Service GmbH	132542	frontcase
260	26	1 pcs <b>hydraulic hose SC1 DN 8x 450mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 450 mm</b>	Welte Cardan-Service GmbH	132542	control cabinet
270	27	1 pcs <b>hydraulic hose SC1 DN 8x 450mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 450 mm</b>	Welte Cardan-Service GmbH	132542	control cabinet
280	28	1 pcs <b>hydraulic hose SC1 DN 8x 250mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 250 mm</b>	Welte Cardan-Service GmbH	132539	control cabinet
290	29	1 pcs <b>hydraulic hose SC1 DN 8x 300mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 300 mm</b>	Welte Cardan-Service GmbH	132540	control cabinet
300	30	1 pcs <b>hydraulic hose SC1 DN 8x 350mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 350 mm</b>	Welte Cardan-Service GmbH	132541	control cabinet
310	31	1 pcs <b>hydraulic hose SC1 DN 8x 350mm EN 857</b> 2x DKO-L M14x1,5 <b>length: 350 mm</b>	Welte Cardan-Service GmbH	132541	control cabinet

**ELECTRIC PARTS LIST****13264****Project no.****1033540**

Fass-Hubsäule / Potence pour fut

Frewitt Fabrique / Switzerland

Version 1, dated 28.08.2014

Name:Lorenz/MP

Pos.	Qty	Unit	Component/ Marking	Description	Manufacturer	Parts-#	
10	1	pcs.	10A2	safety relay, 24V AC/DC, 50-60Hz, 3 NC/1 NO SNA 4063K-A	Wieland Electric GmbH	614725	
20	1	pcs.	15A2	S7-300 CPU 313C 128k, 120mm, 24E/16A, 4AE/2AA	Siemens AG	613950	
30	1	pcs.	15A2	S7-300 Micro-Memory-Card 64k	Helmholz Systeme GmbH	613951	
40	2	pcs.	15A2	S7 frontplug EasyConnect, 40 poles	Helmholz Systeme GmbH	614112	
60	1	pcs.	15A2	DIN rail for S7-300 244mm		131549	
70	1	pcs.	15A7	S7-300 digital input and output module, 16x in/16x out	Helmholz Systeme GmbH	613083	
80	1	pcs.	15A7	S7 frontplug EasyConnect, 40 poles	Helmholz Systeme GmbH	614112	
90	1	pcs.	15A8	S7-300 digital input module, 16 inputs	Helmholz Systeme GmbH	613079	
100	1	pcs.	15A8	S7 frontplug	Helmholz Systeme GmbH	612248	
110	1	pcs.	21B5	proximity switch, flat housing, 3G/3D NO, 2m cable	Pepperl+Fuchs GmbH	6902442	II 3D Ex tD A22 IP67 T80°C X II 3G Ex nA IIC T6 X
120	1	pcs.	21B5	non pre-wired cable socket for prox.switch, M8 3 poles, without LED, Slimline	Murrelektronik GmbH	615024	
140	1	pcs.	21B7	proximity switch M18 NO, DC, 8b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614276	II 3D IP67 T91°C X II 3G Ex nA IIC T6 X
150	1	pcs.	21B7	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
160	1	pcs.	21B10	proximity switch M18 NO, DC, 8b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614276	II 3D IP67 T91°C X II 3G Ex nA IIC T6 X
170	1	pcs.	21B10	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
180	1	pcs.	21B11	proximity switch M18 NO, DC, 8b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614276	II 3D IP67 T91°C X II 3G Ex nA IIC T6 X
190	1	pcs.	21B11	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
200	1	pcs.	21B13	proximity switch M18 NO, DC, 8b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614276	II 3D IP67 T91°C X II 3G Ex nA IIC T6 X

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Pos.	Qty	Unit	Component/ Marking	Description	Manufacturer	Parts-#	
210	1	pcs.	21B13	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
220	1	pcs.	22B2	proximity switch M12 NO, DC, 4b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614982	II 3D Ex tD A22 IP67 T80°C X II 3G Ex nA IIC T6 X
230	1	pcs.	22B2	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
240	1	pcs.	22B4	proximity switch M12 NO, DC, 4b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614982	II 3D Ex tD A22 IP67 T80°C X II 3G Ex nA IIC T6 X
250	1	pcs.	22B4	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
260	1	pcs.	22B10	proximity switch M18 NO, DC, 8b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614276	II 3D IP67 T91°C X II 3G Ex nA IIC T6 X
270	1	pcs.	22B10	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
280	1	pcs.	22B11	proximity switch M18 NO, DC, 8b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614276	II 3D IP67 T91°C X II 3G Ex nA IIC T6 X
290	1	pcs.	22B11	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
300	1	pcs.	23B2	proximity switch M12 NO, DC, 4b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614982	II 3D Ex tD A22 IP67 T80°C X II 3G Ex nA IIC T6 X
320	1	pcs.	23B4	proximity switch M12 NO, DC, 4b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614982	II 3D Ex tD A22 IP67 T80°C X II 3G Ex nA IIC T6 X
340	1	pcs.	23B5	proximity switch M18 NO, DC, 8b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614276	II 3D IP67 T91°C X II 3G Ex nA IIC T6 X
350	1	pcs.	23B5	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
360	1	pcs.	23B7	proximity switch M18 NO, DC, 8b, plugable, 3G/3D	Pepperl+Fuchs GmbH	614276	II 3D IP67 T91°C X II 3G Ex nA IIC T6 X
370	1	pcs.	23B7	interlock protection for M12 connector V1-CLIP, category 3G/3D	Pepperl+Fuchs GmbH	614404	
380	1	pcs.	2F2	miniature circuit breaker, 10A, 1 poles C-5-10xIN	Siemens AG	614011	
390	1	pcs.	2F3	miniature circuit breaker, 4A, 1 pole C-5-10xIN	Siemens AG	614034	
400	1	pcs.	2F4	miniature circuit breaker, 4A, A-2-3xIN	Siemens AG	613997	

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410	1	pcs.	2F6	miniature circuit breaker, 4A, 1 pole C-5-10xIN	Siemens AG	614034	
420	1	pcs.	2F6	auxiliary contact 1NO+1NC	Siemens AG	614029	
430	1	pcs.	2G2	primary switch mode power supply REP 1-2405 230VAC/24VDC; 5A	Riedel Michael	615196	
440	1	pcs.	30H8	LED-indicator, blue 24V AC/DC, 15mA, IP40	Murrelektronik GmbH	615176	
450	1	pcs.	30H11	LED-indicator, green/red 24V DC, 10mA per LED, IP65	Murrelektronik GmbH	608168	
460	1	pcs.	5K8	motor contactor 4KW 3NO, 1NC, 24V DC, with diode	Siemens AG	615120	
470	1	pcs.	30K2	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
480	1	pcs.	30K10	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
490	1	pcs.	31K2	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
500	1	pcs.	31K4	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
510	1	pcs.	31K5	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
520	1	pcs.	31K7	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
530	1	pcs.	31K8	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
540	1	pcs.	31K10	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
550	1	pcs.	31K11	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
560	1	pcs.	31K13	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
570	1	pcs.	32K2	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
580	1	pcs.	32K4	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	
590	1	pcs.	32K5	coupling relay, TERMSERIES TRZ 24VDC 1CO 24V DC, 6A, 1CO, dimension 6,2mm	Weidmüller GmbH & Co. KG	615265	

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Pos.	Qty	Unit	Component/ Marking	Description	Manufacturer	Parts-#	
600	1	pcs.	5M3			-	
610	1	pcs.	1Q2	main switch 25A/7,5kW, 4 poles, rear mounting	Kraus & Naimer	613148	
620	1	pcs.	1Q5	residual-current circuit breaker, B10 1-pol.+N, 30mA, 10A	Siemens AG	614987	
630	1	pcs.	1Q5	auxiliary contact 1NO+1NC	Siemens AG	614029	
635	1	pcs.	1Q5	handle connector for residual-current circuit breaker f.mounting add.components	Siemens AG	614989	
640	1	pcs.	5Q3	motor protective circuit breaker, S00 2,8-4A, without aux. switch	Siemens AG	615105	
650	1	pcs.	5Q3	aux. contacts for motor-protective circuit-breaker 1NO/1NC	Siemens AG	615113	
660	1	pcs.	5S4	temperatur switch, IP65 TS-70/X/12	Hydac/Flutec	111636	IP65
670	1	pcs.	10S6	emergency stop button M22-PV	Eaton	613438	
680	1	pcs.	10S6	fixing adapter, M22-A for contact elements M22-K	Eaton	613381	
690	3	pcs.	10S6	contact element, NC, M22-K01	Eaton	613380	
700	1	pcs.	10S6	emergency stop plate M22-XAK11 round 90 mm - Ø 22,5	Eaton	615125	
710	1	pcs.	20S13	key operated switch, 1 NO, key removable in 0	Kraus & Naimer	613585	
720	1	pcs.	21S3	pneum. pressure switch PEV-1/4A-SW27-B-OD No. 175252	Festo KG	8007788	
730	1	pcs.	24S2	key operated actuator, 2NO, key removable in 0 M22-WRS-A1	Eaton	613455	
740	1	pcs.	24S2	fixing adapter, M22-A for contact elements M22-K	Eaton	613381	
750	1	pcs.	24S2	contact element, NO, M22-K10 for RMQ-Titan, front fixing	Eaton	613379	
760	1	pcs.	24S4	selector switch actuator, 2 pos. , M22-WKV	Eaton	6900506	
770	1	pcs.	24S4	fixing adapter, M22-A for contact elements M22-K	Eaton	613381	

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Pos.	Qty	Unit	Component/ Marking	Description	Manufacturer	Parts-#	
780	1	pcs.	24S4	contact element, NO, M22-K10 for RMQ-Titan, front fixing	Eaton	613379	
790	1	pcs.	24S5	push button M22D-S black	Eaton	613446	
800	1	pcs.	24S5	fixing adapter, M22-A for contact elements M22-K	Eaton	613381	
810	1	pcs.	24S5	contact element, NO, M22-K10 for RMQ-Titan, front fixing	Eaton	613379	
820	1	pcs.	24S7	push button M22D-S black	Eaton	613446	
830	1	pcs.	24S7	fixing adapter, M22-A for contact elements M22-K	Eaton	613381	
840	1	pcs.	24S7	contact element, NO, M22-K10 for RMQ-Titan, front fixing	Eaton	613379	
850	1	pcs.	24S8	push button M22D-S black	Eaton	613446	
860	1	pcs.	24S8	fixing adapter, M22-A for contact elements M22-K	Eaton	613381	
870	1	pcs.	24S8	contact element, NO, M22-K10 for RMQ-Titan, front fixing	Eaton	613379	
880	1	pcs.	24S10	push button M22D-S black	Eaton	613446	
890	1	pcs.	24S10	fixing adapter, M22-A for contact elements M22-K	Eaton	613381	
900	1	pcs.	24S10	contact element, NO, M22-K10 for RMQ-Titan, front fixing	Eaton	613379	
910	1	pcs.	25S1	membrane keypad, 11 keys, type 4 with plug	Schurter GmbH	608031	
920	1	pcs.	25S1	terminal unit for membrane keyboard	Servolift GmbH	613164	
930	1	pcs.	1X7	plug socket for control panels 16A	Schneider Groupe	603492	
940	1	pcs.	95Y2	VENTIL: HEBEN		-	
950	1	pcs.	95Y2	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
960	1	pcs.	95Y4	VENTIL: SENKEN		-	

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Pos.	Qty	Unit	Component/ Marking	Description	Manufacturer	Parts-#	
970	1	pcs.	95Y4	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
980	1	pcs.	95Y5	VENTIL: SPANNEN		-	
990	1	pcs.	95Y5	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
1000	1	pcs.	95Y7	VENTIL: LOESEN		-	
1010	1	pcs.	95Y7	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
1020	1	pcs.	95Y8	VENTIL: KIPPEN VOR		-	
1030	1	pcs.	95Y8	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
1040	1	pcs.	95Y10	VENTIL: KIPPEN ZURUECK		-	
1050	1	pcs.	95Y10	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
1060	1	pcs.	95Y12	VENTIL: SCHWENKEN VOR		-	
1070	1	pcs.	95Y12	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
1080	1	pcs.	95Y13	VENTIL: SCHWENKEN ZURUECK		-	
1090	1	pcs.	95Y13	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
1100	1	pcs.	96Y2	VENTIL: ABSETZKLINKE FASS EINZIEHEN		-	
1110	1	pcs.	96Y2	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
1120	1	pcs.	96Y4	VENTIL: ABSETZKLINKE EINZIEHEN		-	
1130	1	pcs.	96Y4	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65
1140	1	pcs.	96Y5	VIBRATOR EIN		-	
1150	1	pcs.	96Y5	solenoid coil Ex-protect zone 2+22 MSFG-24-EX	Festo KG	128092	II 3GD EEx nA II 130°C X IP65

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Pos.	Qty	Unit	Component/ Marking	Description	Manufacturer	Parts-#	
1160	3	M	W5M3	flexible control cable 4x 2,5qmm, JZ-500	Helukabel GmbH	602707	
1170	3	M	W5S4	flexible control cable, number coded 2x 1qmm, OZ-500	Helukabel GmbH	602691	
1180	1	pcs.	W21B5	cable socket, straight, M8 10m, 4-pole, PVC cable	Pepperl+Fuchs GmbH	614916	
1190	1	pcs.	W21B7	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs Vertrieb	611749	
1200	1	pcs.	W21B10	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1210	1	pcs.	W21B11	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1220	1	pcs.	W21B13	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1230	3	M	W21S3	flexible control cable, number coded 2x 1qmm, OZ-500	Helukabel GmbH	602691	
1240	1	pcs.	W22B2	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1250	1	pcs.	W22B4	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1260	1	pcs.	W22B10	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1270	1	pcs.	W22B11	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1280	1	pcs.	W23B2	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1290	1	pcs.	W23B4	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1300	1	pcs.	W23B5	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1310	1	pcs.	W23B7	elbow connector plug for proximity switch, M12 with cable 5m, 4 cores	Pepperl+Fuchs GmbH	611749	
1320	2	M	W95Y2	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1330	1	pcs.	W95Y2	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1340	2	M	W95Y4	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	



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1350	1	pcs.	W95Y4	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1360	2	M	W95Y5	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1370	1	pcs.	W95Y5	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1380	2	M	W95Y7	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1390	1	pcs.	W95Y7	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1400	2	M	W95Y8	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1410	1	pcs.	W95Y8	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1420	2	M	W95Y10	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1430	1	pcs.	W95Y10	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1440	2	M	W95Y12	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1450	1	pcs.	W95Y12	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1460	2	M	W95Y13	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1470	1	pcs.	W95Y13	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1480	2	M	W96Y2	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1490	1	pcs.	W96Y2	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1500	2	M	W96Y4	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1510	1	pcs.	W96Y4	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	
1520	2	M	W96Y5	flexible control cable 3x 1,5qmm, JZ-500	Helukabel GmbH	602702	
1530	1	pcs.	W96Y5	plug for valves (20x28mm) for MSFG-24-EX type MSSD-F-M16	Festo KG	129839	

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1540	15	M	WX10	flexible control cable 5x 2,5qmm, JZ-500	Helukabel GmbH	602708	
1550	8	M	WX21	flexible control cable 12x 0,75qmm, JZ-500	Helukabel GmbH	602696	
1560	40	M	WX31	flexible control cable 34x 0,75qmm, JZ-500	Helukabel GmbH	602701	
1570	1	pcs.	X1	compact enclosure AE 1012.600 600x760x210, stainless steel	Rittal	602134	
1580	1	pcs.	X1M	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
1590	2	pcs.	X1M	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
1600	10	pcs.	X1M	spring-cage terminal, 3 connections, 0,13-2,5qmm ZDU 2,5-2/3AN	Weidmüller	614433	
1610	5	pcs.	X2L+	spring-cage terminal, 3 connections, 0,13-2,5qmm ZDU 2,5-2/3AN	Weidmüller	614433	
1620	1	pcs.	X2L+	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
1630	2	pcs.	X2L+	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
1640	1	pcs.	X3L+	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
1650	2	pcs.	X3L+	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
1660	5	pcs.	X3L+	spring-cage terminal, 3 connections, 0,13-2,5qmm ZDU 2,5-2/3AN	Weidmüller	614433	
1670	1	pcs.	X4L+	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
1680	2	pcs.	X4L+	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
1690	5	pcs.	X4L+	spring-cage terminal, 3 connections, 0,13-2,5qmm ZDU 2,5-2/3AN	Weidmüller	614433	
1700	1	pcs.	X10	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
1710	2	pcs.	X10	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
1720	1	pcs.	X10	end plate for ZDU 2,5 ZAP/TW7	Weidmüller	614441	

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1730	9	pcs.	X10	spring-cage terminal, 2 connections, 0,13-2,5qmm ZDU 2,5-2	Weidmüller	614431	
1740	3	pcs.	X10	ground spring-cage terminal, 2 connections, 0,13-2,5qmm; ZPE 2,5-2	Weidmüller	614444	
1750	24	pcs.	X14	double desk spring-cage terminal, 2 connections 0,08-2,5qmm; ZDK 2,5/1,5	Weidmüller	614498	
1760	2	pcs.	X14	double desk earth spring-cage terminal, 2 connect. 0,08-2,5qmm; ZDK 2,5/1,5PE	Weidmüller	614702	
1770	1	pcs.	X14	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
1780	2	pcs.	X14	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
1790	1	pcs.	X17	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
1800	2	pcs.	X17	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
1810	14	pcs.	X17	basic element for initiator terminal ZIA 1,5/3L-1S	Weidmüller	614447	
1820	14	pcs.	X17	distributor block for initiator terminal, blue ZVL 1,5 BL	Weidmüller	614450	
1830	14	pcs.	X17	distributor block for initiator terminal, brown ZVL 1,5 BR	Weidmüller	614449	
1840	1	pcs.	X17	cover plate for initiator terminal ZAP/TW ZIA1,5/3L	Weidmüller	614448	
1850	1	pcs.	X18	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
1860	2	pcs.	X18	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
1870	15	pcs.	X18	basic element for initiator terminal ZIA 1,5/3L-1S	Weidmüller	614447	
1880	16	pcs.	X18	distributor block for initiator terminal, blue ZVL 1,5 BL	Weidmüller	614450	
1890	16	pcs.	X18	distributor block for initiator terminal,green/yel ZVL 1,5/PE GN/GE BED	Weidmüller	614451	
1900	1	pcs.	X18	basic element PE for initiator terminal ZIA 1,5/3L-PE	Weidmüller	614452	
1910	1	pcs.	X18	cover plate for initiator terminal ZAP/TW ZIA1,5/3L	Weidmüller	614448	

**ELECTRIC PARTS LIST****13264****Project no.****1033540**

Fass-Hubsäule / Potence pour fut

Frewitt Fabrique / Switzerland

Version 1, dated 28.08.2014

Name:Lorenz/MP

Pos.	Qty	Unit	Component/ Marking	Description	Manufacturer	Parts-#	
1920	1	pcs.	X2	terminal box 75x160x55	Rose Elektrotechnik GmbH&Co KG	602187	
1930	2	pcs.	X21	end bracket ZEW 15	Weidmüller	614563	
1940	1	pcs.	X21	connector markers ZGB 15, 15x7mm, Polyamid, white	Weidmüller	615191	
1950	23	pcs.	X21	terminals TS 15; 0,13-1,5qmm WDU 1,5/R3.5	Weidmüller	615044	
1960	1	pcs.	X21	earth terminals TS 15; 0,13-1,5qmm WDU 1,5/R3.5	Weidmüller	615046	
1970	1	pcs.	X3	compact enclosure AE 1007.600 500x500x210, stainless steel	Rittal GmbH & Co. KG	608320	
1980	4	pcs.	X3	M8, Befestigungsdicke 10mm	Fischer	8011103	
1990	4	pcs.	X3			125711	
2000	4	pcs.	X3	washer 6,4x20           DIN 522, galv.		101144	
2010	4	pcs.	X3	wood screw 6x40       DIN 571 galv.		107624	
2020	1	pcs.	X31	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
2030	2	pcs.	X31	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
2040	16	pcs.	X31	double desk spring-cage terminal, 2 connections 0,08-2,5qmm; ZDK 2,5/1,5	Weidmüller	614498	
2050	1	pcs.	X31	double desk earth spring-cage terminal, 2 connect. 0,08-2,5qmm; ZDK 2,5/1,5PE	Weidmüller	614702	
2055	2	pcs.	X31	earth spring-cage terminal, 2 connections, 0,13-6qmm; ZPE 4	Weidmüller	614472	
2060	1	pcs.	X31L+	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	
2070	2	pcs.	X31L+	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
2080	2	pcs.	X31L+	spring-cage terminal, 3 connections, 0,13-2,5qmm ZDU 2,5-2/3AN	Weidmüller	614433	
2090	1	pcs.	X31M	WAD 5 cover, neutral WAD 5 NEUTRAL; 33,5x5mm	Weidmüller	614481	

**ELECTRIC PARTS LIST****13264****Project no.****1033540**

Fass-Hubsäule / Potence pour fut

Frewitt Fabrique / Switzerland

Version 1, dated 28.08.2014

Name:Lorenz/MP

Pos.	Qty	Unit	Component/ Marking	Description	Manufacturer	Parts-#	
2100	2	pcs.	X31M	modular terminal, accessories, rail support ZEW35, width:6mm	Weidmüller	614443	
2110	2	pcs.	X31M	spring-cage terminal, 3 connections, 0,13-2,5qmm ZDU 2,5-2/3AN	Weidmüller	614433	
2120	1	pcs.	X5	HYDRAULIKSCHRANK		-	

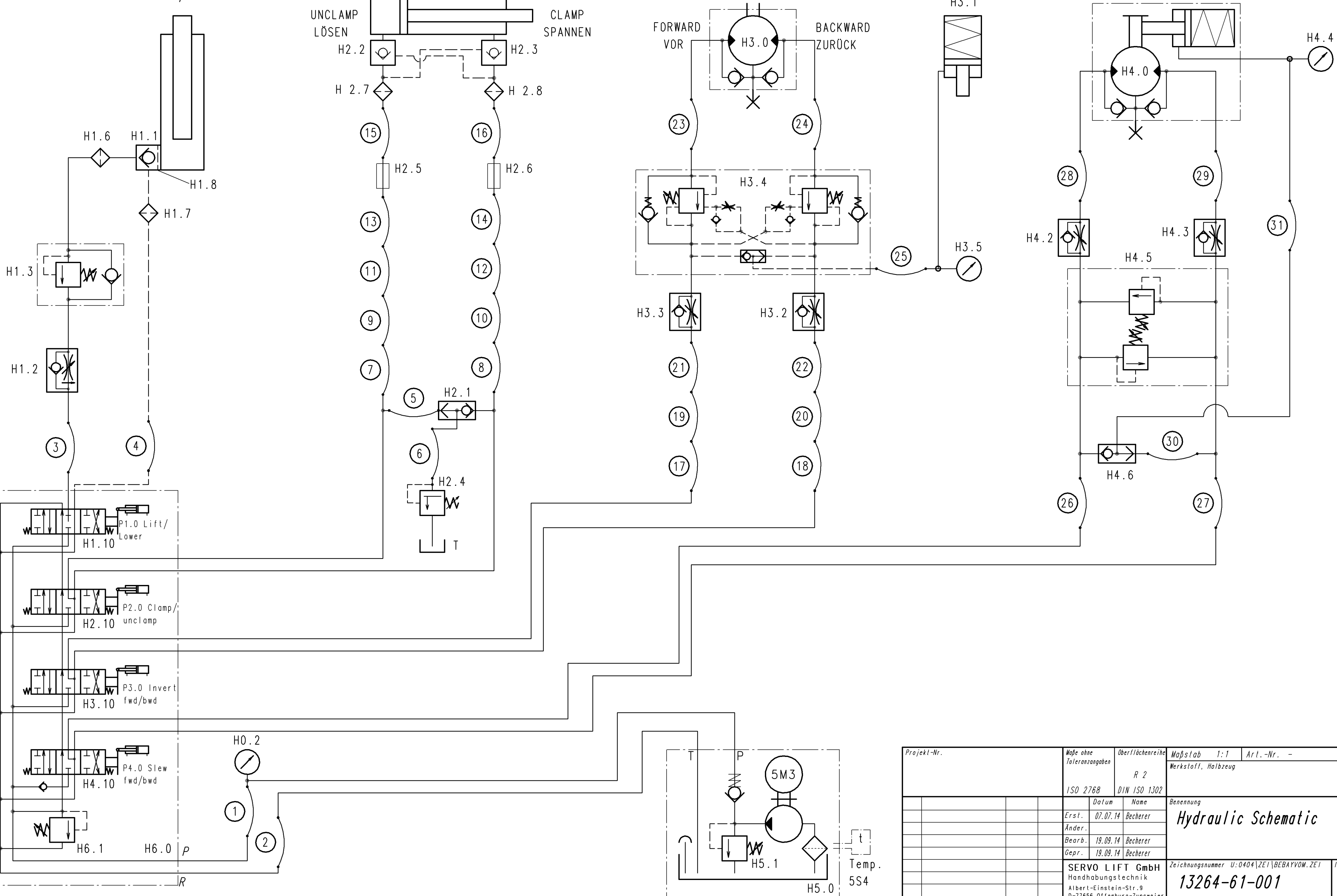


H 1.0 LIFT/LOWER  
HEBEN/SENKEN

H 2.0 CLAMP/UNCLAMP  
SPANNEN/LÖSEN

H 3.0 INVERT FORWARD/BACKWARD  
KIPPEN VOR/ZURÜCK

H 4.0 SLEW FORWARD/BACKWARD  
SCHWENKEN VOR/ZURÜCK



Projekt-Nr.	Maße ohne Toleranzangaben	Oberflächenreihe R 2	Maßstab 1:1	Art.-Nr. -
	ISO 2768	DIN ISO 1302	Werkstoff, Halbzeug	
	Datum	Name	Benennung	
	Erst. 07.07.14	Becherer	Hydraulic Schematic	
	Änder.			
	Bearb. 19.09.14	Becherer		
	Gepr. 19.09.14	Becherer		
	SERVO LIFT GmbH Handhabungstechnik Albert-Einstein-Str.9 D-77656 Offenburg-Zunsweier Tel.0781/6100-0		Zeichnungsnummer U:0404\ZE1\BEBAYVOM.ZEI	Index Blatt 0/1/1
Zust. Änderung	Datum	Name	Ersatz für:	Ersatz durch:

P 1.0  
(hydraulic valve 1.10)  
lift / lower

P 2.0  
(hydraulic valve 2.10)  
clamp / unclamp

P 3.0  
(hydraulic valve 3.10)  
invert forward / backward

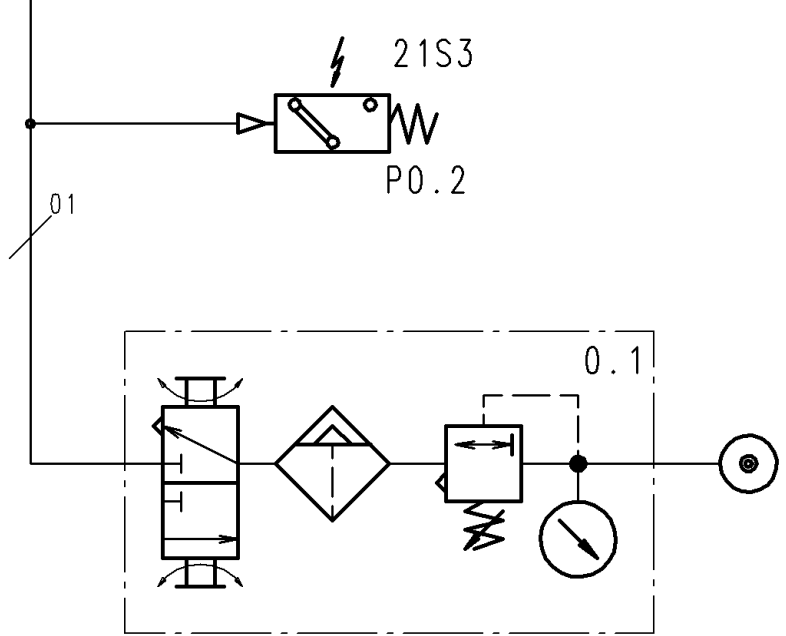
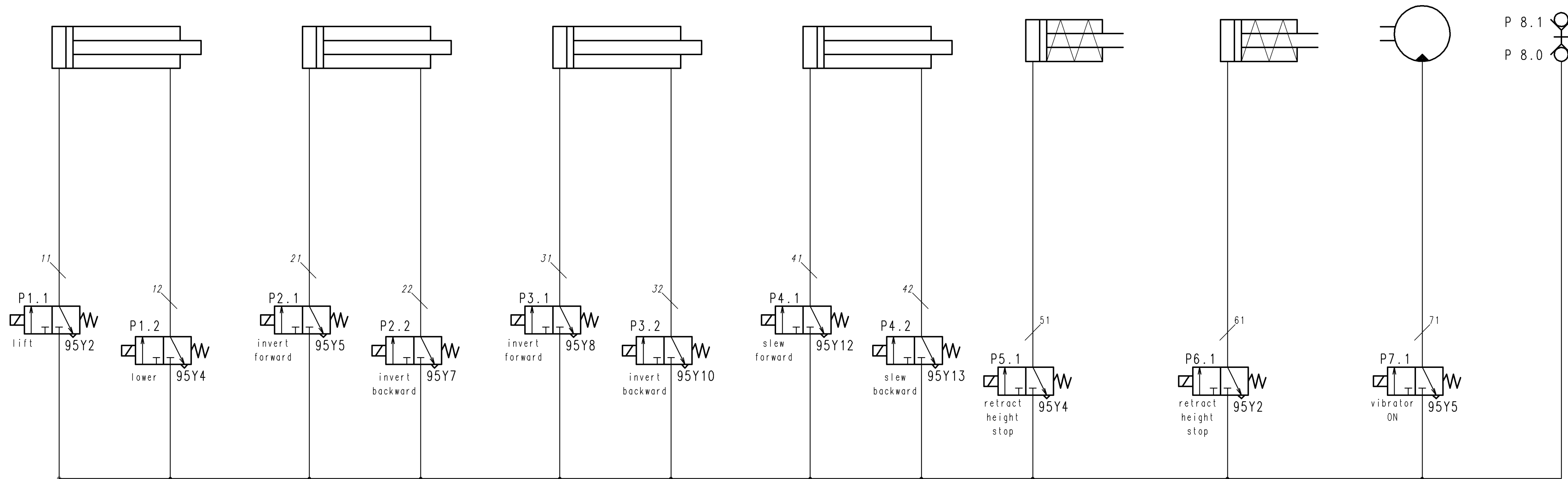
P 4.0  
(hydraulic valve 4.10)  
slew forward / backward

P 5.0  
upper  
height-stop  
discharge position  
container

P 6.0  
lower  
height-stop  
discharge position  
into drum

P 7.0  
vibrator

P 8.0  
pneumatic  
quick  
coupling for  
OscilloWitt



Projekt-Nr.	Maße ohne Toleranzangaben ISO 2768	Oberflächenreihe R 2 DIN ISO 1302	Maßstab 1:1 Werkstoff, Halbzeug	Art.-Nr. -	
	Datum	Name	Benennung		
	Erst. 07.07.14	Becherer	<b>Pneumatic Scheme</b>		
	Änder.				
	Bearb. 19.09.14	Becherer			
	Gepr. 19.09.14	Becherer			
	SERVO LIFT GmbH Handhabungstechnik Albert-Einstein-Str.9 D-77656 Offenburg-Zunsweier Tel.0781/6100-0		Zeichnungsnummer U:94\940867\BE78C60Z.ZEI	Index	Blatt
			13264-62-001	0	1/1
Zust. Änderung	Datum	Name	Ersatz für:	Ersatz durch:	



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Hammelburger Str. 21  
97717 EUERDORF

GERMANY

Tel: +49 (0) 9704 609-0

Fax: +49 (0) 9704 609-50

E-Mail: [info@perma-tec.com](mailto:info@perma-tec.com)

Homepage: [www.perma-tec.com](http://www.perma-tec.com)



## perma CLASSIC



	<b>Betriebsanleitung</b>	<b>DE</b>	18 - 19
	<b>Ръководство за експлоатация</b>	<b>BG</b>	18 - 19
	<b>操作指南</b>	<b>CN</b>	20 - 21
	<b>Návod k obsluze</b>	<b>CS</b>	20 - 21
	<b>Brugsanvisning</b>	<b>DA</b>	22 - 23
	<b>Εγχειρίδιο λειτουργίας</b>	<b>EL</b>	22 - 23
	<b>Operating Instructions</b>	<b>EN</b>	24 - 25
	<b>Manual de instrucciones</b>	<b>ES</b>	24 - 25
	<b>Käyttöohje</b>	<b>FI</b>	26 - 27
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	<b>取扱説明書</b>	<b>JP</b>	30 - 31
	<b>Gebruiksaanwijzing</b>	<b>NL</b>	32 - 33
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	<b>Návod na obsluhu</b>	<b>SK</b>	38 - 39
	<b>Navodila za uporabo</b>	<b>SL</b>	38 - 39
	<b>Driftsanvisningar</b>	<b>SV</b>	40 - 41



- 1 - - 2 -



- 3 - - 6 -



- 7 - - 8 -



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- 12 -



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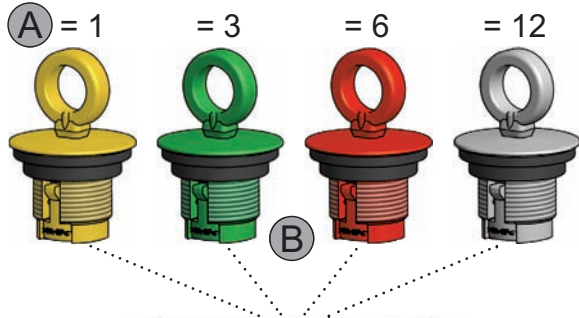


- 14 -



- 15 -





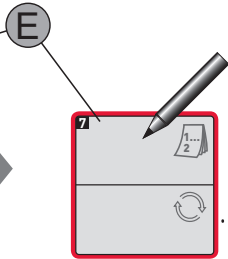
		120 cm <sup>3</sup>
	145 g	
		≈ 260 g
↔ max. 4 bar / 58 psi		
	0 °C / + 32 °F to + 40 °C / + 104 °F	
	CL - JJWW (yyww) - #####	
<b>C</b>	+ 20 °C / + 68 °F	max. 1 J (y)
360°		



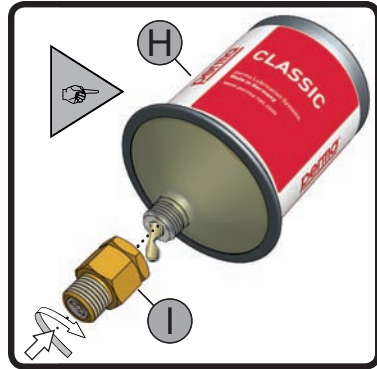




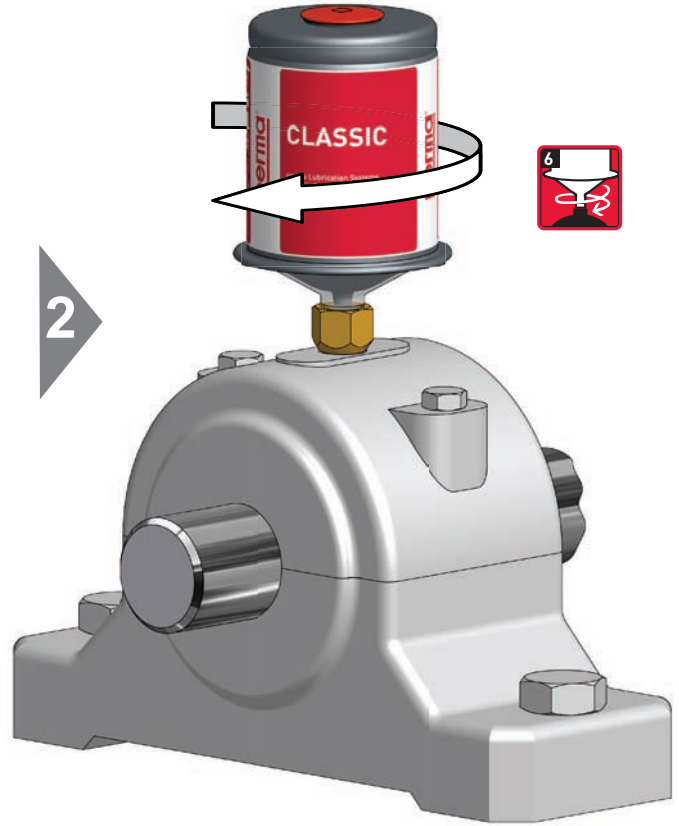
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VI



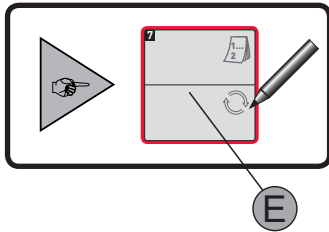
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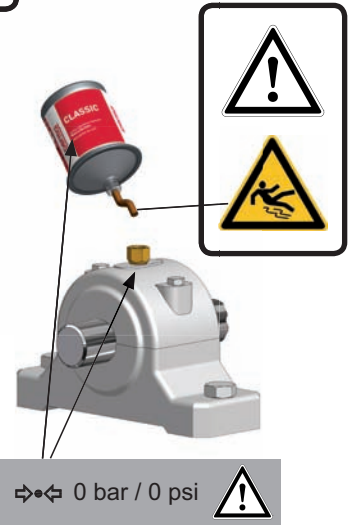
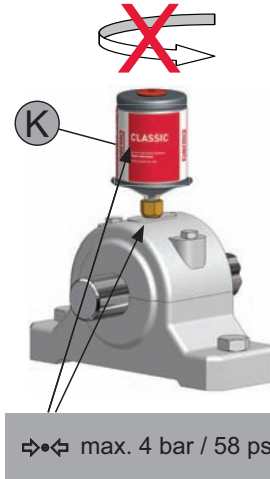
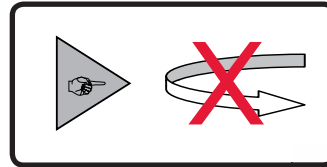
# IV

				
0 °C/32 °F	4	8	15	> 18
+10 °C/50 °F	2	5	8	18
+20 °C/68 °F	1	3	6	12
+30 °C/86 °F	0,8	2	3	6
+40 °C/104 °F	0,6	1	2	3
<b>J</b> ≈ 24 h (⇔ 0 bar / 0 psi)				

A



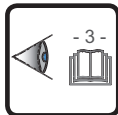
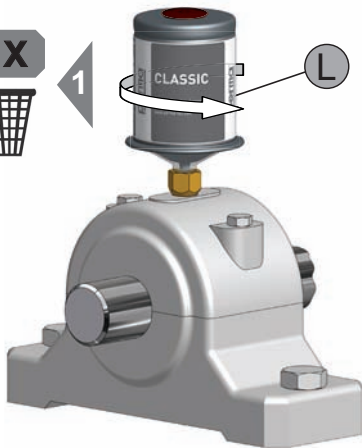
# V



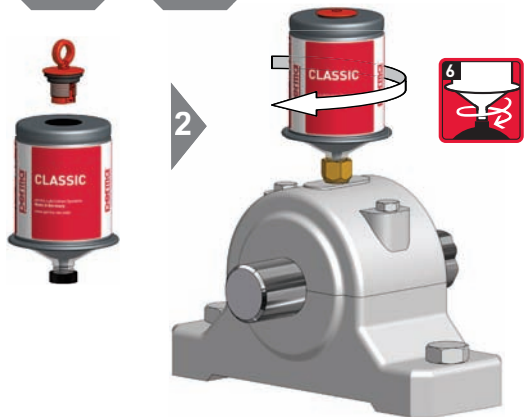
VI



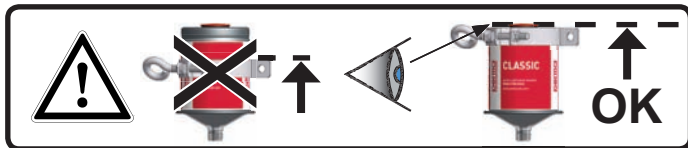
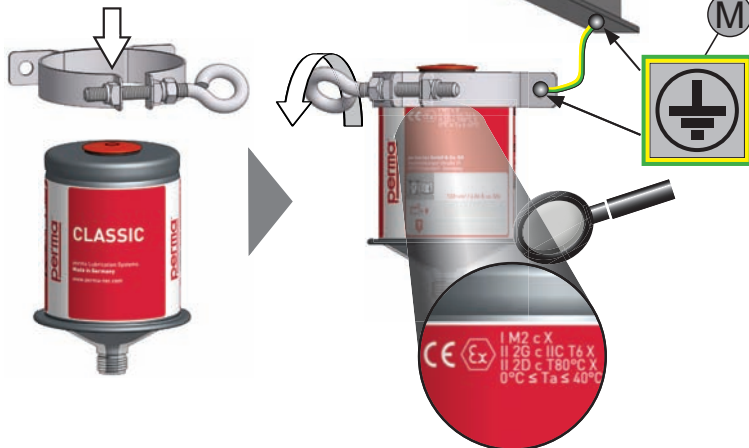
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2



VII




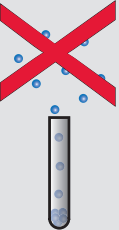

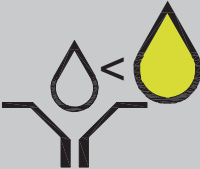



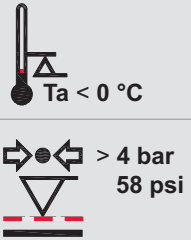
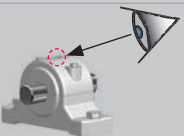
CE    Ex    I M2 c X    ZELM 04 HB 040801  
 II 2G c IIC T6 X    CL-E1  
 II 2D c T80°C X

0 °C ≤ Ta ≤ +40 °C

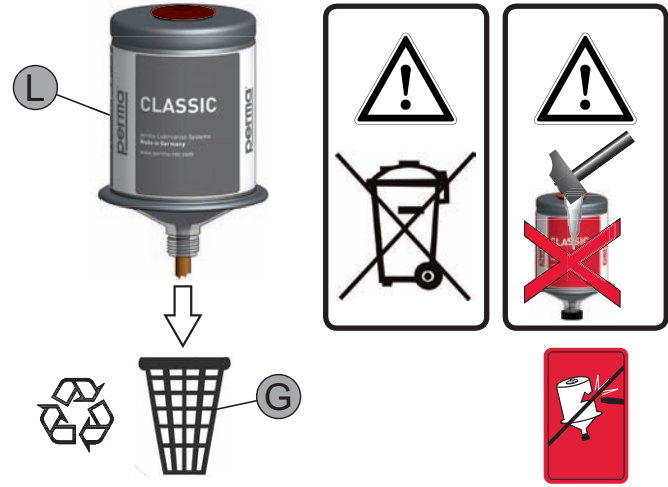




**VIII**  = 

O	P	Q
		
	<p>Ta &gt; +40 °C</p> 	<p>OK Ta &lt; +40 °C</p>  <p>Ta &gt; +40 °C</p>
	<p>Ta &lt; 0 °C</p>  <p>&gt; 4 bar 58 psi</p>	<p><b>IV</b></p> 

**IX**





## EC declaration of conformity

- according to ATEX - Directive 94/9/EC



The manufacturer

**perma-tec GmbH & Co. KG**  
**Hammelburger Straße 21**  
**97717 Euerdorf**  
**Germany**

hereby declares that the product as described in the given statement conforms to the regulations appertaining to the directives referred to above, including any amendments thereto which are in force at the time of the declaration.

Product description: Automatic lubrication system  
 Product name: CLASSIC  
 Type: 120  
 Product identification number: CL-E1

The following harmonised standards were applied:

ATEX:	EN 1127-1:2007	EN 1127-2:2002 + A1:2008
	EN 13463-1:2009	EN 13463-5: 2003

Ex-Marking:



I M2 c X  
 II 2G c IIC T6 X  
 II 2D c T80°C X  
 0 °C ≤ Ta ≤ +40 °C

EC-Confirmation of Retention Number: ZELM 04 HB 040801

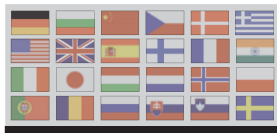
Euerdorf, 1 December 2010

perma-tec GmbH & Co. KG

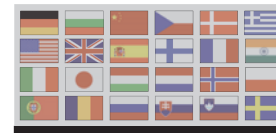
Walter Graf, Managing Director

Egon Eisenbacher, Technical management





Blank writing lines for the user to write the language names corresponding to the flags in the grid above.



- 18 - - 19 -

Deutsch	
Български	

- 20 - - 21 -

中文	
Česky	

- 22 - - 23 -

Dansk	
Ελληνικά	

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Español	

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Français	

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हिंदी	
Magyar	

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Italiano	
日本語	

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Norsk	

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Русский	

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Slovensky	
Slovenščina	

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Svenska	
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**EN**

This operating manual is intended for the safe operation of the automatic lubrication system used for the lubrication of roller- and sliding bearings, chains, guidelines, open gears, etc.

The lubrication system was designed for a one-time use only. Do not open or take the unit apart!

Avoid contact of oil/grease with eyes, skin and clothing; also avoid swallowing of oil/grease.

Prevent oil/grease from getting into soil or sewer system.

Observe safety data sheets of oil/grease.

You may download lubricant data sheets from our web site ([www.perma-tec.com](http://www.perma-tec.com)) or ask your local supplier.

We accept no liability for any damages and malfunctions which are caused by inappropriate usage and inappropriate operations on or with the lubricator.

- I Properties**
- II Activation**
- III Installation**
- IV Discharge periods**
- V During operation**

- A** Discharge period in months
- B** Activator screw
- C** Storage conditions
- D** Gas generator (metal pellet)
- E** Installation-/Exchange date
- F** Plug
- G** Oil containing waste
- H** Oil filled
- I** Oil retaining valve

- VI CLASSIC exchange**
- VII Ex-protection**
- VIII Trouble shooting**
- IX Waste disposal**
- X Declaration of conformity**

- J** Time until first discharge
- K** In operation
- L** CLASSIC empty
- M** Grounding with bracket
- N** The right lubricant amount
- O** Error
- P** Cause
- Q** Corrective action

**ES**

Las instrucciones sirven para trabajar con seguridad en y con el sistema de lubricación automática, que lubrica rodamientos, cojinetes de deslizamiento, cadenas, guías, engranajes abiertos, etc.

Este sistema de lubricación es de un solo uso y no debe ser abierto ni desmontado.

Evitar el contacto de aceite/grasa con los ojos, la piel y la vestimenta, así como la ingestión de aceite/grasa.

No permitir que el aceite/la grasa llegue a la tierra ni al alcantarillado.

Observar las hojas de datos de seguridad de los aceites y grasas.

Las hojas de datos de los lubricantes se pueden obtener en nuestra página principal ([www.perma-tec.com](http://www.perma-tec.com)) o a través del distribuidor local.

No se asumirá la garantía por aquellos daños y anomalías de funcionamiento que se originen por haber utilizado inapropiadamente o por haber trabajado inadecuadamente en o con el sistema de lubricación.

- I Propiedades**
- II Activación**
- III Instalación**
- IV Tiempo de lubricación**
- V Durante la lubricación**

- A** Tiempo de dosificación en meses
- B** Tornillo activador
- C** Condiciones de almacenamiento
- D** Generador de gas (pastilla metálica)
- E** Fecha de instalación/cambio
- F** Tapón cierre
- G** Residuos con grasa
- H** Relleno con aceite
- I** Válvula dosificadora de aceite

- VI Cambio CLASSIC**
- VII Protección Ex**
- VIII Eliminación de fallos**
- IX Eliminación de residuos**
- X Declaración de conformidad**

- J** Tiempo de puesta en marcha
- K** En funcionamiento
- L** CLASSIC vacío
- M** Derivación en tierra con abrazadera
- N** Cantidad correcta a dosificar
- O** Error
- P** Causa
- Q** Remedio



# MOLYDUVAL

## Soraja FM 372



### Special Grease for Food Industry

Virtually odourless and tasteless lubrication grease. It is made with a white mineral oil and an aluminium complex soap thickener. Extreme care is taken throughout the manufacture to protect its purity. If any incidental contact with food occurs, the grease will not affect the colour, odour, or taste of the product.

Contains an FDA approved oxidation inhibitor which gives high stability against chemical changes. It also contains rust inhibitor protecting bearings and metal surfaces subjected to wet conditions, humidity, water washing, steam. It also protects during periods of machine idleness. It resists water washout and provides a sealing of the bearing against entrance of water, or fruit and vegetable juices. Because it is compatible with beverages and food juices, it maintains his consistency. And because it is shear-stable, it also maintain its consistency when it is severely worked in the bearing.

### Properties

- \* free from mineral oil
- \* very good corrosion protection
- \* suitable for centralized lubrication systems
- \* excellent tackiness
- \* good resistant against cold and hot water, even sea water
- \* excellent wear protection
- \* food grade - all components conform to USDA H1 or the FDA regulations for Lubricants in incidental food contact
- \* very good water resistance
- \* withstands many alcohols and acids
- \* good resistant against washing off
- \* good resistant against cold and hot water, even sea water

### Applications

- \* for anti-friction and sleeve bearings at high temperatures, in ovens, ventilators, engines
- \* for bearings in refrigeration equipment
- \* for chains in food industry, for packing and filling machines
- \* for bearings at funnels and weirs
- \* for slide bars in butcheries or slaughterhouses
- \* as corrosion preservative
- \* for gear boxes in food industry
- \* for anti-friction and sleeve bearings in fish production
- \* for hooks, sleeve elements, rolls, joints, clutches
- \* for slow running bearings, especially heavy loaded bearings

### Technical Datas

Color		white
Consistency Class NLGI		2
Name		KPF2K-20
Base Fluid		White Oil
Name		ISO-L-XBCEB2
Density 15°C	kg/m <sup>3</sup>	1000
Water Resistance Static	Grade	0
Water Resistance Static	Grade	1-90
Temperature Range	°C	-20 -> +120
Temperature Range kurzzeitig bis	°C	140
Corrosion Protection Kupfer	Grade	1b

For further information, please see our website [www.molyduval.com](http://www.molyduval.com) or consult your local representative.

The technical data in this information sheet represents our present knowledge and is based on our general experience. It is intended to give information of possible applications to a reader with technical experience. It constitutes neither an assurance of product properties nor does it release the user from the obligation of performing preliminary tests with the selected product to ensure that the product is safe, effective and fully satisfactory for the intended end use. It does also not form part of any sales contract as guaranteed properties of the delivered material.

# MOLYDUVAL

## Soraja FM 372

### Technical Datas

Oxidation Resistance	kPa	< 35
Dropping Point	°C	265
Lubricating Ability 02-SKF-R2F 120°C		pass
Wear Protection VKA Schweißkraft	N	6000
Wear Protection VKA Verschleißtiefe 40kg/107C/1200U/1h	mm	0,7

*The indicated service temperatures are guide values depending on the lubricants composition and on the application. They may vary in case of special influences or ongoing use.*

For further information, please see our website [www.molyduval.com](http://www.molyduval.com) or consult your local representative.

The technical data in this information sheet represents our present knowledge and is based on our general experience. It is intended to give information of possible applications to a reader with technical experience. It constitutes neither an assurance of product properties nor does it release the user from the obligation of performing preliminary tests with the selected product to ensure that the product is safe, effective and fully satisfactory for the intended end use. It does also not form part of any sales contract as guaranteed properties of the delivered material.

**EC-Safety Data Sheet conforming to 1907/2006/EG, Article 31**

MOLYDUVAL Soraja FM 372

Date 13.12.2012 Page 1

**1. Commercial Product Name and Company/Manufacturer**

1.1 Trade Name:	Soraja FM 372
1.2 Product Application	for gear boxes in food industry for anti-friction and sleeve bearings at high temperatures, in ovens, ventilators, engines for bearings in refrigeration equipment for chains in food industry, for packing and filling machines for bearings at funnels and we
1.3 Producer / Distributor:	MOLYDUVAL GmbH * Halskestr.6 * D-40880 Ratingen * H.Wunsch
1.4 Emergency Phone	+49 (2102) 9757-00

**2. Hazards Identification**

2.1 Classification	No health hazards known. Product may be used fro lubrication of food processing equipment.
2.2 Information pertaining to particular dangers for man	Is improbable, that the product leads to eye irritations, to a provoking the skin, to an endangerment of the respiratory organs, to a provoking of the lungs or that swallowing leads to effects injurious to health.
2.3 Information pertaining to particular dangers for environment:	Although no environmental damages and bioaccumulations were expected, withdrawing should be avoided into the environment. Into drains to arrive do not leave

**3. Composition - Information on Ingredients**

3.1 Composition - Information on Ingredients	Mixture from paraffinic white oil and thickener. All components conform to the FDA regulations FDA 21 CFR 178.3570 and/or the german DAB.
--	---

**4. First Aid Measures**

4.1 General Instructions	Remove victim from danger zone, without exposing yourself to any personal risk. Remove wetted clothing and shoes and clean items before using them again.
4.2 After Inhalation	Not applicable.
4.3 After Skin Contact	Wash with soap and much water.
4.4 After Eye Contact	Flush eyes with copious amounts of water for 15 minutes holding lid away from eye.
4.5 After Ingestion	Consult a physician
4.6 Symptoms and effects	no
4.7 Instructions for attending physician	Prolonged or repeated exposure may cause skin discomfort.

**5. Fire-Fighting Measures**

5.1 Extinguishing media - Usable	Water Spray, Powder, Alcohol Foam, Sand, CO2
5.2 Extinguishing media - Not usable	Waterjet
5.3 Special personal protection	No
5.4 Further information	Water may cause splattering.

**6. Accidental Release Measures**

6.1 Special Personal Protection	Use oil-proofed clothing
6.2 Special Environmental Protection	Do not expose to environment or in effluent water.
6.3 Absorbing Materials	Sabbia
6.4 Cleaning Methods	Take up mechanically.

**7. Handling and Storage**

7.1 Handling	Open and handle with the general caution when handling lubricants.
7.2 Storage	Keep container closed. Store in a cool, well ventilated place away from incompatible materials. Do not handle or store near an open flame, heat or other sources of ignition. Protect material from direct sunlight. Do not pressurize, cut, heat, or weld containers. Storage Class VCI: 11 Flammable Solids

**8. Exposure Controls / Personal Protection**

8.2 Eye Protection:	None required
8.3 Skin Protection:	None required
8.4 Respiratory Protection:	None required
8.5 Technical Protection	None required

**9. Physical and Chemical Properties**

9.1 Appearance Form	pasty
9.2 Color	light
9.3 Appearance	like grease
9.4 Odour	without
9.6 Boiling Point / Boiling Range	n.b.
9.7 Melting Point / Melting Range	n.b.
9.8 Flash Point	n.b.

**EC-Safety Data Sheet conforming to 1907/2006/EG, Article 31**

MOLYDUVAL Soraja FM 372

Date 13.12.2012 Page 2

9.9 Autogenous Ignition Temperature	n.b.
9.10 Upper Explosion Limit	-
9.11 Lower Explosion Limit	-
9.13 Specific Gravity, 20°C	0,96 g/cm <sup>3</sup>
9.14 Water Solubility	N
9.15 Viscosity, 40°C	n.b.
9.17 VOC-Content	n.b.

**10. Stability und Reactivity**

10.1 Stability	This product is stable in normal-use temperatures and will not react violently with water
10.2 Conditions to be avoided	No
10.3 Substances to be avoided	No

**11. Toxicological Information**

11.1 Toxicological Tests	No health hazards known. Product may be used fro lubrication of food processing equipment.
11.2 At Eye Contact	No hazard.
11.3 At Skin Contact	No hazard.
11.4 At Inhalation	no data available
11.5 At Ingestion	May cause sickness and vomiting.

**12. Ecological Information**

12.1 Ecological Information	Ecotoxicological data have not been determined specifically for this product. The information provided is based on the knowledge of the components. Product is not readily biodegradable. The main constituents are expected to be inherently biodegradable, but some components that may persist in the environment.
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**13. Disposal Considerations**

13.1 Disposal Considerations	May not be disposed together with domestic rubbish. Disposal in compliance with federal, state, and local laws. EAK Waste Product Code : 130899 Ölabfälle, nicht anders spezifiziert
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**14. Transport Information**

14.1 UN-No	No
14.2 Land Transport ADR/GGVS RID/GGVE	No
14.3 Sea Transport ADNR/IMDG/GGVSee	No
14.4 Air Transport IATA/ICAO	No
14.5 Other	No transport regulations.

**15. Regulatory Information**

15.1 Limits for Disposal at Places of Employment	No MAK Values defined
15.2 Characterisation symbols	No Precautionary Labels.

**16. Further Information**

16.1 Further Information	Although the information on this safetysheet is based on the by us known and reliable considered information, we can neither accept any responsibility for the use of it. Please contact us if more infos are needed.
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**EC-Safety Data Sheet conforming to 1907/2006/EG, Article 31**

MOLYDUVAL Soraja FM 372

Date 13.12.2012 Page 1

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4.6 Symptoms and effects	no
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**8. Exposure Controls / Personal Protection**

8.2 Eye Protection:	None required
8.3 Skin Protection:	None required
8.4 Respiratory Protection:	None required
8.5 Technical Protection	None required

**9. Physical and Chemical Properties**

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9.2 Color	light
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9.4 Odour	without
9.6 Boiling Point / Boiling Range	n.b.
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9.8 Flash Point	n.b.

**EC-Safety Data Sheet conforming to 1907/2006/EG, Article 31**

MOLYDUVAL Soraja FM 372

Date 13.12.2012 Page 2

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10.1 Stability	This product is stable in normal-use temperatures and will not react violently with water
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10.3 Substances to be avoided	No

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14.5 Other	No transport regulations.

**15. Regulatory Information**

15.1 Limits for Disposal at Places of Employment	No MAK Values defined
15.2 Characterisation symbols	No Precautionary Labels.

**16. Further Information**

16.1 Further Information	Although the information on this safetysheet is based on the by us known and reliable considered information, we can neither accept any responsibility for the use of it. Please contact us if more infos are needed.
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March 11, 2004

Thomas Hanemann  
MOLYDUVAL VAN LAAR GMBH  
HALSKESTR. 6  
RATINGEN, NRW 40880  
GERMANY

RE: Soraja FM 372  
Category Code: H1  
NSF Registration No. 132323

Dear Thomas Hanemann:

NSF has processed the application for Registration of **Soraja FM 372** to the *NSF Registration Guidelines for Proprietary Substances and Nonfood Compounds* (2004), which are available at [www.nsf.org/usda](http://www.nsf.org/usda). The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements including FDA 21 CFR for appropriate use, ingredient and labeling.

**This product is acceptable as a lubricant with incidental food contact (H1) for use in and around food processing areas. Such compounds may be used on food processing equipment as a protective anti-rust film, as a release agent on gaskets or seals of tank closures, and as a lubricant for machine parts and equipment in locations in which there is a potential exposure of the lubricated part to food. The amount used should be the minimum required to accomplish the desired technical effect on the equipment. If used as an anti-rust film, the compound must be removed from the equipment surface by washing or wiping, as required to leave the surface effectively free of any substance which could be transferred to food being processed.**

NSF Registration of this product is current when the NSF Registration Number, Category Code, and Registration Mark appear on the NSF-approved product label, and the registered product name is included in the current NSF White Book Listing of Nonfood Compounds at the NSF website (<http://www.nsf.org/usda>). The NSF Registration Mark can be downloaded from the NSF website, at [http://www.nsf.org/mark/download\\_marks.html](http://www.nsf.org/mark/download_marks.html).

NSF Listing of all registered Nonfood compounds by NSF International is not an endorsement of those compounds, or of any performance or efficacy claims made by the manufacturer.

Registration status may be verified at any time via the NSF web site, at <http://www.nsf.org/usda>. Changes in formulation or label, without the prior written consent of NSF, will void registration, and will supersede the on-line listing.

Sincerely,

A handwritten signature in black ink, appearing to read 'Carmen Grindatti', written in a cursive style.

Carmen Grindatti  
NSF Nonfood Compounds Registration Program

Company No: N11182



## Foodmax AW

### Range of multipurpose lubricating oils for the food industry

#### Description

Foodmax AW is formulated using specially selected highly refined base stocks in combination with the latest additive technology. The product is non toxic and suitable for use in applications where incidental contact with food or raw materials during the production is possible or likely. Thanks to its great performance characteristics and carefully chosen additives, Foodmax AW oils can be used in most applications in the manufacturing process in the food production and processing industry.

The Foodmax AW is available in a wide range and is both NSF and InS approved.

#### Applications

##### General lubrication

The Foodmax AW lubricants can be used for all kinds of general lubrication. For example for bearings, slides, chains and small mechanisms, which need a medium pressure oil that provides a clean and non contaminating lubrication. The application is easily done either automatic or by dropping, spraying or manually.

##### Air tool lubrication

Foodmax AW 22 (ISO VG 22) is perfectly suitable for airline and air tool lubrication. It will protect the pipes from corrosion as well as all the elements and valves of the pneumatic network. The use of Foodmax AW 22 will provide a trouble free operation. The de-emulsifying characteristics of Foodmax AW 22 provide easy draining of the moisture that is present in compressed air. Foodmax AW 22 is recommended for air lubrication whenever there is a chance that the air will be in contact with food; for example in case of spraying of food additives.

##### Hydraulic oil

Thanks to its excellent anti wear properties the AW range is used as hydraulic fluid for both power and motion transfer in machinery operated close to food production processes:

- High viscosity index, high temperature behaviour is excellent. Foodmax AW shows rather flat viscosity-temperature curves, which results in a smooth operation in both high and low temperature lubrication
- Low pour point which allows operation at temperatures below  $< 0$  °C and increased performance in start-up operations
- High shear stability
- Outstanding anti foam properties
- Excellent demulsifying capacity

##### Conveyor lubrication

In the beverage industry very often a mixture of soap and water is used to lubricate stainless steel conveyors in combination with glass bottles. The soap mixture will give a messy workplace and will stain labels. Foodmax AW 22 has proven to do an excellent job here. Usually a very small amount is sprayed on the conveyor (almost dry lubrication). Foodmax AW 22 has been approved by DROPSA, beverage equipment supplier for use on the conveyors.

All performance data on this Technical Data Sheet are indicative only and can vary during production

# Technical Data Sheet



## Dielectric oil

Foodmax AW fluids possess excellent isolating and dielectric properties. Foodmax AW 68 is amongst others being used as dielectric oil in underwater pumps that are used in drinking water.

## Anticorrosive agent

Foodmax AW can be used as light anticorrosive protector of metal surfaces which might be in contact with food products. Examples are wires for canned meat sealing, conveyor or slides in manufacturing equipment and handling food packaging. Foodmax AW can also be used to clean and polish stainless steel.

## Typical performance data

	AW 22	AW 32	AW 46	AW 68	AW 100
Density @ 20 °C, g/ml	0,842	0,864	0,850	0,865	0,870
Viscosity @ 40 °C, cSt	22	32	46	68	100
Viscosity Index	105	105	105	105	100
Pour point, °C	-24	-24	-21	-21	- 21
Flash point, °C	165	170	180	200	215
Acidity index, mg KOH/gr	0,8	0,8	0,8	0,8	0,8
Aniline point, °C	105	105	105	105	105
Copper corrosion, 3h/100 °C	1 a	1 a	1 a	1 a	1 a
Steel corrosion, distilled water	Pass	Pass	Pass	Pass	Pass
De-emulsifying index	40/37/3 (30')	40/37/3 (30')	40/37/3 (30')	40/37/3 (30')	40/37/3 (30')

**George Handels-GmbH, Waldstr. 10, D-76879 Bornheim**  
**Tel.: 0049-6348/98240, info@tecoil.de – www.tecoil.de**

All performance data on this Technical Data Sheet are indicative only and can vary during production

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		Supersedes : 14 / 12 / 2011
<b>Foodmax AW</b>		<b>FOODMAX AW</b>

## SECTION 1 Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

**Identification of the product** : Oily liquid.  
**Trade name** : Foodmax AW  
**Format** : Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

**Use** : Food grade hydraulic and lubricating fluid.

### 1.3. Details of the supplier of the safety data sheet

**Company identification** : George Handels-GmbH  
 Waldstr. 10  
 D-76879 Bornheim  
 Tel: +49 (0)6348 98240  
 Fax: +49 (0)6348 982440  
 info@tecoil.de  
 +49 (0)6348 98240

### 1.4. Emergency telephone number

**Emergency phone nr** : +31 (0)316 740850

## SECTION 2 Hazards identification

### 2.1. Hazard classification

Classification EC 67/548 or EC 1999/45

Hazard Class and Category Code Regulation EC 1272/2008 (CLP)

: Not classified as dangerous product (Directive 1999/45/EC).  
Not regulated.

### 2.2. Label elements

Labelling EC 67/548 or EC 1999/45

• **Symbol(s)** : None.

Labelling Regulation EC 1272/2008 (CLP)

• **Hazard pictograms code** : ---

• **Precautionary statements**

### 2.3. Other hazards

None under normal conditions.

## SECTION 3 Composition/information on ingredients

**Substance / Preparation** : Preparation.

**Components** : This product is not hazardous but contains hazardous components.

Substance name	Contents	CAS No	EC No	Annex No	REACH	Classification
Amine phosphates	: 0.1 0.5 %	----	----	----	----	Xi, R36/38 N, R51-53
N-phenyl benzolamine derivatives	: 0.1 0.5 %	----	----	----	----	N, R51-53

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<b>Foodmax AW</b>		<b>FOODMAX AW</b>

#### SECTION 4 First aid measures

##### 4.1. Description of first aid measures

###### First aid measures

- Inhalation : Assure fresh air breathing.
- Skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.
- Eye contact : Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persist.
- Ingestion : Rinse mouth. Do not induce vomiting. Seek medical advice.

##### 4.2. Most important symptoms and effects, both acute and delayed

None known.

##### 4.3. Indication of any immediate medical attention and special treatment needed

After adequate first aid, no further treatment is required unless symptoms reappear.

#### SECTION 5 Fire-fighting measures

##### 5.1. Extinguishing media

Alcohol foam.

###### Extinguishing media

- Suitable extinguishing media : Carbon dioxide.  
Dry powder.  
Foam.
- Unsuitable extinguishing media : Do not use extinguishing media containing water.

##### 5.2. Special hazards arising from the substance or mixture

Specific hazards : When exposed to heat, may decompose liberating hazardous gases.

##### 5.3. Advice for fire-fighters

- Protection against fire : Do not enter fire area without proper protective equipment, including respiratory protection.
- Prevention : No naked lights. No smoking.
- Special procedures : Exercise caution when fighting any chemical fire.  
Avoid (reject) fire-fighting water to enter environment.
- Surrounding fires : Use water spray or fog for cooling exposed containers.

#### SECTION 6 Accidental release measures

##### 6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions : Spill should be handled by trained cleaning personnel properly equipped with respiratory and eye protection.  
Spill area may be slippery.

##### 6.2. Environmental precautions

Environmental precautions : Harmful to aquatic organisms. Prevent entry to sewers and public waters. Notify authorities if product enters sewers or public waters.

##### 6.3. Methods and material for containment and cleaning up

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## SECTION 6 Accidental release measures (continued)

**Clean up methods** : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Dilute residues and flush. Recover the cleaning water for later disposal. On water, recover/skim from surface and pour out in disposal container.

### 6.4. Reference to other sections

See Headings 7 and 8.

## SECTION 7 Handling and storage

### 7.1. Precautions for safe handling

**General** : Ventilate confined spaces before entering.  
**Handling** : Handle in accordance with good industrial hygiene and safety procedures. Ensure prompt removal from eyes, skin and clothing. Wash hands and other exposed areas with mild soap and water before eat, drink or smoke and when leaving work.  
**Precautions in handling and storage** : Avoid all unnecessary exposure.

### 7.2. Conditions for safe storage, including any incompatibilities

**Storage** : Store in tightly closed, properly ventilated containers away from heat, sparks, open flame. Keep container closed when not in use.

### 7.3. Specific end use(s)

## SECTION 8 Exposure controls/personal protection

### 8.1. Control parameters

**Personal protection**

- **Respiratory protection** : No special respiratory protection equipment is recommended under normal conditions of use with adequate ventilation.
- **Skin protection** : No special clothing/skin protection equipment is recommended under normal conditions of use.
- **Eye protection** : Eye protection should only be necessary where liquid could be splashed or sprayed.
- **Hand protection** : In case of repeated or prolonged contact wear gloves.
- **Ingestion** : When using, do not eat, drink or smoke.

**Industrial hygiene** : Provide good ventilation in process area to prevent formation of vapour.

### 8.2. Occupational Exposure Limits

Not established.

## SECTION 9 Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

#### • Appearance

**Appearance** : Not established.  
**Physical state at 20 °C** : Liquid.  
**Colour** : Colourless.



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<b>SECTION 9 Physical and chemical properties (continued)</b>
---

**• Odour**

Odour : Odourless.

**• Initial boiling point - boiling range**

Boiling point [°C] : &gt;250

**• Flash point**

Flash point [°C] : &gt;165

**• Relative density**

Density @ 20°C g/ml : 0.842-0.890

**• Solubility**

Solubility in water : Insoluble.

**• Viscosity**

Viscosity (Cst @ 40 °C) : Depending on grade

<b>SECTION 10 Stability and reactivity</b>
--

**10.1. Reactivity**

Stability and reactivity : Not established.

**10.2. Chemical stability**

Not established.

**10.3. Possibility of hazardous reactions**Hazardous reactions :  
None under normal conditions.Hazardous properties :  
This product contains hazardous components for the environment.**10.4. Conditions to avoid**

Conditions to avoid : Strong oxidizers.

**10.5. Incompatible materials**

Materials to avoid : Not established.

**10.6. Hazardous decomposition products**Hazardous decomposition products : Thermal decomposition (>200 C) and combustion may produce Carbon oxides, phosphorus and nitrogen derivatives, as well as other toxic vapour and gases  
Not established.

<b>SECTION 11 Toxicological information</b>
---

**11.1. Information on toxicological effects**

Toxicity information

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		Supersedes : 14 / 12 / 2011
<b>Foodmax AW</b>		<b>FOODMAX AW</b>

### SECTION 11 Toxicological information (continued)

Rat oral LD50 [mg/kg] : Not established.

### SECTION 12 Ecological information

#### **12.1. Toxicity**

No known toxicological effects from this product.

LC50-96 Hour - fish [mg/l] : Not established.

#### **12.2. Persistence - degradability**

Persistence - degradability : Not established.

#### **12.3. Bioaccumulative potential**

Bioaccumulative potential : Not established.

#### **12.4. Mobility in soil**

Not established.

#### **12.5. Results of PBT and vPvB assessment**

Not established.

#### **12.6. Other adverse effects**

Not established.

Ecological effects information : No specific risk for the environment.  
No data available.

### SECTION 13 Disposal considerations

#### **13.1. Waste treatment methods**

General : Dispose of this material and its container at hazardous or special waste collection point. Avoid release to the environment. Dispose of this material and its container at hazardous or special waste collection point. Dispose in a safe manner in accordance with local/national regulations.

### SECTION 14 Transport information

#### **14.1. UN Number**

General information : Not classified.

#### **14.2. Proper shipping name**

Shipping name : (product name)

#### **14.3. Transport Hazard Classification**

Not established.

#### **14.4. Packing group**

#### **14.5. Environmental hazards**

In case of spillage and/or leakage : Clean up even minor leaks or spills if possible without unnecessary risk.  
Not established.

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#### SECTION 14 Transport information (continued)

##### **14.6. Special precautions for user**

- Personal precautions** : The driver shall not attempt to deal with any fire of the load.
- Emergency action in case of accident** : Stop the engine. No naked lights. No smoking. Mark roads and warns other road users. Keep public away from danger area. NOTIFY POLICE AND FIRE BRIGADE IMMEDIATELY.
- Additional information** : None  
None.

#### SECTION 15 Regulatory information

##### **15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

Ensure all national/local regulations are observed.

##### **EUROPEAN COMMUNITIES**

*Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006.*

*Directive 2006/121/EC of the European Parliament and of the Council of 18 December 2006.*

##### **EC Labelling**

##### **15.2. Chemical Safety Assessment**

Not established.

#### SECTION 16 Other information

- Text of R-Phrases in § 3** :  
R51/53 : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- Further information** : None  
None.

End of document



March 27, 2006

RE: Foodmax AW 46  
Category Code: H1  
NSF Registration No. 138238

Dear Mr. Perry Peters:

NSF has processed the application for Registration of **Foodmax AW 46** to the NSF Registration Guidelines for Proprietary Substances and Nonfood Compounds (2004), which are available at <http://www.nsf.org>. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements including FDA 21 CFR for appropriate use, ingredient and labeling.

**This product is acceptable as a lubricant with incidental food contact (H1) for use in and around food processing areas. Such compounds may be used on food processing equipment as a protective anti-rust film, as a release agent on gaskets or seals of tank closures, and as a lubricant for machine parts and equipment in locations in which there is a potential exposure of the lubricated part to food. The amount used should be the minimum required to accomplish the desired technical effect on the equipment. If used as an anti-rust film, the compound must be removed from the equipment surface by washing or wiping, as required to leave the surface effectively free of any substance which could be transferred to food being processed.**

NSF Registration of this product is current when the NSF Registration Number, Category Code, and Registration Mark appear on the NSF-approved product label, and the registered product name is included in the current NSF White Book Listing of Nonfood Compounds at the NSF website (<http://www.nsf.org>). The NSF Registration Mark can be downloaded from the NSF website, at [http://www.nsf.org/business/about\\_NSF/nsf\\_marks\\_download.asp](http://www.nsf.org/business/about_NSF/nsf_marks_download.asp).

NSF Listing of all registered Nonfood compounds by NSF International is not an endorsement of those compounds, or of any performance or efficacy claims made by the manufacturer.

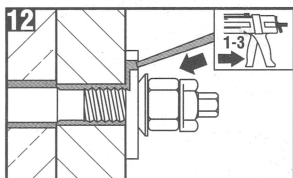
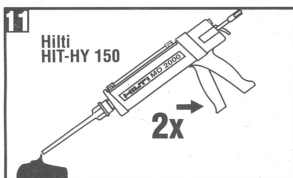
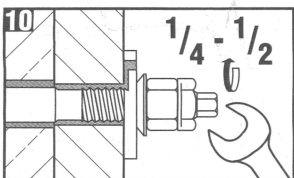
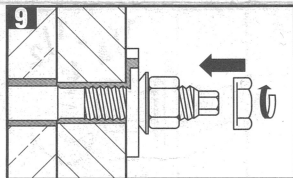
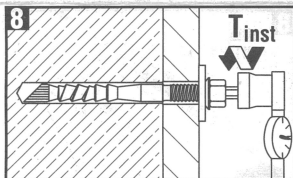
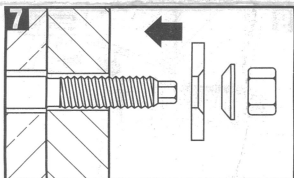
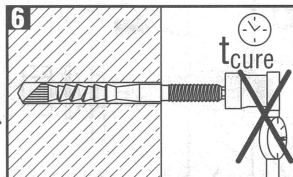
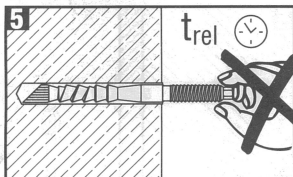
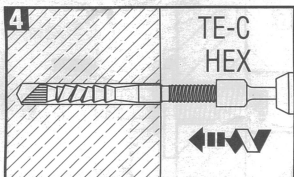
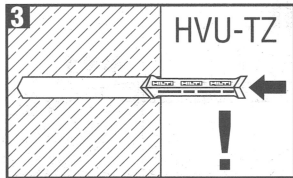
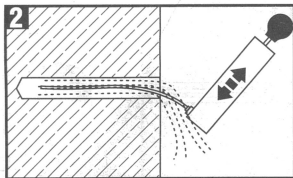
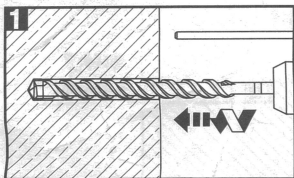
Registration status may be verified at any time via the NSF web site, at <http://www.nsf.org>. Changes in formulation or label, without the prior written consent of NSF, will void registration, and will supersede the on-line listing.

Sincerely,



A handwritten signature in black ink, appearing to read 'Carmen Grindatti'.

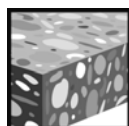
Carmen Grindatti  
NSF Nonfood Compounds Registration Program

Company No: 3L800



## HVZ Adhesive anchor

Mortar system	Benefits
 <p>Hilti HVU-TZ foil capsule</p>  <p>HAS-TZ HAS-RTZ HAS-HCRTZ rod</p>	<ul style="list-style-type: none"> <li>- suitable for cracked and non-cracked concrete C 20/25 to C 50/60</li> <li>- high loading capacity</li> <li>- suitable for dry and water saturated concrete</li> </ul>



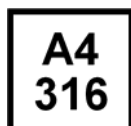
Concrete



Tensile zone



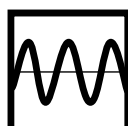
Fire resistance



Corrosion resistance



High corrosion resistance



Fatigue



Shock



European Technical Approval



CE conformity



Hilti anchor design software

### Approvals / certificates

Description	Authority / Laboratory	No. / date of issue
European technical approval <sup>a)</sup>	DIBt, Berlin	ETA-03/0032 / 2008-09-29
Approval for shockproof fastenings in civil defence installations	Bundesamt für Zivilschutz, Bern	BZS D 09-602 / 2009-10-28
Approval for dynamic loads	DIBt, Berlin	Z-21.3-1692 / 2007-11-04
Fire test report ZTV-Tunnel	IBMB, Braunschweig	UB 3357/0550-2 / 2001-06-26
Fire test report	IBMB, Brunswick	UB 3357/0550-1 / 2001-04-17
Assessment report (fire)	warringtonfire	WF 166402 / 2007-10-26

a) All data given in this section according ETA-03/0032, issue 2008-09-29.

### Basic loading data (for a single anchor)

All data in this section applies to

For details see Simplified design method

- Correct setting (See setting instruction)
- No edge distance and spacing influence
- Steel failure
- Base material thickness, as specified in the table
- Embedment depth, as specified in the table
- One anchor material, as specified in the tables
- Concrete C 20/25,  $f_{ck,cube} = 25 \text{ N/mm}^2$
- Temperate range I  
(min. base material temperature  $-40^\circ\text{C}$ , max. long term/short term base material temperature:  $+50^\circ\text{C}/80^\circ\text{C}$ )
- Installation temperature range  $0^\circ\text{C}$  to  $+40^\circ\text{C}$

### Embedment depth and base material thickness for the basic loading data.

Mean ultimate resistance, characteristic resistance, design resistance, recommended loads.

Anchor size	M10x75	M12x95	M16x105	M16x125	M20x170
Embedment depth [mm]	75	95	105	125	170
Base material thickness [mm]	150	190	210	250	340

### Mean ultimate resistance <sup>a)</sup>: concrete C 20/25 – $f_{ck,cube} = 25 \text{ N/mm}^2$ , anchor HVZ

Data according ETA-03/0032, issue 2008-09-29							
Anchor size			M10x75	M12x95	M16x105	M16x125	M20x170
Non cracked concrete							
Tensile $N_{Ru,m}$	HVZ	[kN]	36,8	53,3	72,4	94,1	149,2
Shear $V_{Ru,m}$	HVZ	[kN]	18,9	28,4	53,6	53,6	92,4
Cracked concrete							
Tensile $N_{Ru,m}$	HVZ	[kN]	31,2	44,4	51,6	67,1	106,4
Shear $V_{Ru,m}$	HVZ	[kN]	18,9	28,4	53,6	53,6	92,4

### Characteristic resistance: concrete C 20/25 – $f_{ck,cube} = 25 \text{ N/mm}^2$ , anchor HVZ

Data according ETA-03/0032, issue 2008-09-29							
Anchor size			M10x75	M12x95	M16x105	M16x125	M20x170
Non cracked concrete							
Tensile $N_{Rk}$	HVZ	[kN]	32,8	40,0	54,3	70,6	111,9
Shear $V_{Rk}$	HVZ	[kN]	18,0	27,0	51,0	51,0	88,0
Cracked concrete							
Tensile $N_{Rk}$	HVZ	[kN]	23,4	33,3	38,7	50,3	79,8
Shear $V_{Rk}$	HVZ	[kN]	18,0	27,0	51,0	51,0	88,0

### Design resistance: concrete C 20/25 – $f_{ck,cube} = 25 \text{ N/mm}^2$ , anchor HVZ

Data according ETA-03/0032, issue 2008-09-29							
Anchor size			M10x75	M12x95	M16x105	M16x125	M20x170
Non cracked concrete							
Tensile $N_{Rd}$	HVZ	[kN]	21,9	26,7	36,2	47,1	74,6
Shear $V_{Rd}$	HVZ	[kN]	14,4	21,6	40,8	40,8	70,4
Cracked concrete							
Tensile $N_{Rd}$	HVZ	[kN]	15,6	22,2	25,8	33,5	53,2
Shear $V_{Rd}$	HVZ	[kN]	14,4	21,6	40,8	40,8	70,4

### Recommended loads <sup>a)</sup>: concrete C 20/25 – $f_{ck,cube} = 25 \text{ N/mm}^2$ , anchor HVZ

Data according ETA-03/0032, issue 2008-09-29							
Anchor size			M10x75	M12x95	M16x105	M16x125	M20x170
Non cracked concrete							
Tensile $N_{rec}$	HVZ	[kN]	15,6	19,0	25,9	33,6	53,3
Shear $V_{rec}$	HVZ	[kN]	10,3	15,4	29,1	29,1	50,3
Cracked concrete							
Tensile $N_{rec}$	HVZ	[kN]	11,1	15,9	18,4	24,0	38,0
Shear $V_{rec}$	HVZ	[kN]	10,3	15,4	29,1	29,1	50,3

a) With overall partial safety factor for action  $\gamma = 1,4$ . The partial safety factors for action depend on the type of loading and shall be taken from national regulations. According ETAG 001, annex C, the partial safety factor is  $\gamma_G = 1,35$  for permanent actions and  $\gamma_Q = 1,5$  for variable actions.

## Service temperature range

Hilti HVZ adhesive anchor with anchor rod HAS-TZ may be applied in the temperature ranges given below. An elevated base material temperature may lead to a reduction of the design bond resistance.

Temperature range	Base material temperature	Maximum long term base material temperature	Maximum short term base material temperature
Temperature range I	-40 °C to +80 °C	+50 °C	+80 °C

### Max short term base material temperature

Short-term elevated base material temperatures are those that occur over brief intervals, e.g. as a result of diurnal cycling.

### Max long term base material temperature

Long-term elevated base material temperatures are roughly constant over significant periods of time.

## Materials

### Mechanical properties of HAS-TZ

			Data according ETA-03/0032, issue 2008-09-29				
Anchor size			M10x75	M12x95	M16x105	M16x125	M20x170
Nominal tensile strength $f_{uk}$	HAS-(R) (HCR)TZ	[N/mm <sup>2</sup> ]	800				
Yield strength $f_{yk}$	HAS-(R) (HCR)TZ	[N/mm <sup>2</sup> ]	640				
Stressed cross-section $A_s$	tension	[mm <sup>2</sup> ]	44,2	63,6	113	113	227
	shear	[mm <sup>2</sup> ]	50,3	73,9	141	141	245
Moment of resistance W	HAS-(R) (HCR)TZ	[mm <sup>3</sup> ]	50,3	89,6	236	236	541

### Material quality

Part	Material
HAS-TZ	carbon steel strength class 8.8 EN 20898-1
HAS-R-TZ	stainless steel 1.4401 and 1.4571 EN 10088
HAS-HCR-TZ	high corrosion resistance steel 1.4529 and 1.4547 EN 10088

## Anchor dimensions

Anchor size		M10x75	M12x95	M16x105	M16x125	M20x170
Anchor embedment depth	[mm]	75	95	105	125	170



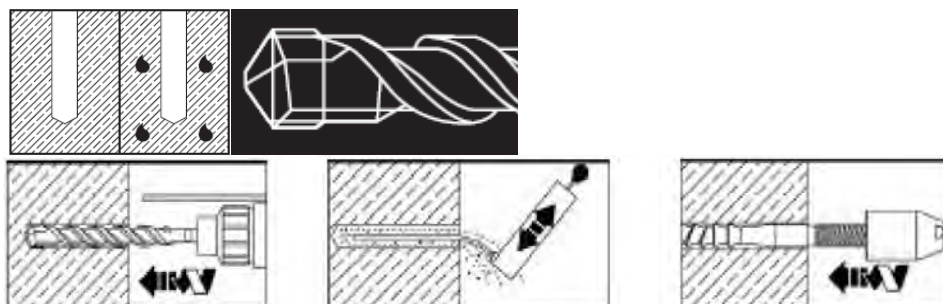
## Setting

### installation equipment

Anchor size	M10x75	M12x95	M16x105	M16x125	M20x170
Rotary hammer	TE 2 – TE 16				TE 40 – TE 70
Tools	Setting tools				

### Setting instruction

#### Dry and water-saturated concrete, hammer drilling



For detailed information on installation see instruction for use given with the package of the product.

For technical data for anchors in diamond drilled holes please contact the Hilti Technical advisory service.

### Curing time for general conditions

Data according ETA-04/0084, issue 2007-01-03	
Temperature of the base material	Curing time before anchor can be fully loaded $t_{cure}$
$\geq 20\text{ °C}$	20 min
10 °C to 20 °C	30 min
0 °C to 10 °C	60 min

These data are valid for dry concrete only. In wet concrete the curing time must be doubled.

## Setting details

			Data according ETA-03/0032, issue 2008-09-29				
Anchor size			M10x75	M12x95	M16x105	M16x125	M20x170
Nominal diameter of drill bit	$d_0$	[mm]	12	14	18	18	25
Diameter of element	$d$	[mm]	10	12	16	16	20
Effective anchorage depth	$h_{ef}$	[mm]	75	95	105	125	170
Drill hole depth	$h_0$	[mm]	90	110	125	145	195
Minimum base material thickness	$h_{min}^{a)}$	[mm]	150	190	210	250	340
Diameter of clearance hole in the fixture	$d_f$	[mm]	12	14	18	18	22
Cracked concrete							
Minimum spacing	$s_{min}$	[mm]	50	60	70	70	80
Minimum edge distance	$c_{min}$	[mm]	50	60	70	70	80
Non cracked concrete							
Minimum spacing	$s_{min}$	[mm]	50	60	70	70	80
Minimum edge distance	$c_{min}$	[mm]	50	70	85	85	80
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	$2 c_{cr,sp}$				
Critical edge distance for splitting failure	$c_{cr,sp}$	[mm]	$1,5 h_{ef}$				
Critical spacing for concrete cone failure	$s_{cr,N}$		$2 c_{cr,N}$				
Critical edge distance for concrete cone failure	$c_{cr,N}^{b)}$		$1,5 h_{ef}$				
Torque moment <sup>c)</sup>	$T_{max}$	[Nm]	40	50	90	90	150

For spacing (edge distance) smaller than critical spacing (critical edge distance) the design loads have to be reduced.

- a)  $h$ : base material thickness ( $h \geq h_{min}$ )
- b) The critical edge distance for concrete cone failure depends on the embedment depth  $h_{ef}$  and the design bond resistance. The simplified formula given in this table is on the save side.
- c) This is the maximum recommended torque moment to avoid splitting failure during installation for anchors with minimum spacing and/or edge distance.

## Simplified design method

Simplified version of the design method according ETAG 001, Annex C. Design resistance according data given in ETA-03/0032, issue 2007-01-03.

- Influence of concrete strength
- Influence of edge distance
- Influence of spacing
- Valid for a group of two anchors. (The method may also be applied for anchor groups with more than two anchors or more than one edge distance. The influencing factors must then be considered for each edge distance and spacing. The calculated design loads are then on the save side: They will be lower than the exact values according ETAG 001, Annex C. To avoid this, it is recommended to use the anchor design software PROFIS anchor)

The design method is based on the following simplification:

- No different loads are acting on individual anchors (no eccentricity)

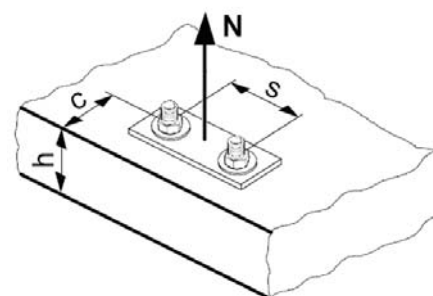
The values are valid for one anchor.

For more complex fastening applications please use the anchor design software PROFIS Anchor.

## Tension loading

### The design tensile resistance is the lower value of

- Steel resistance:  $N_{Rd,s}$
- Combined pull-out and concrete cone resistance:  $N_{Rd,p} = N_{Rd,p}^0 \cdot f_{B,p} \cdot f_{h,p}$
- Concrete cone resistance:  $N_{Rd,c} = N_{Rd,c}^0 \cdot f_B \cdot f_{1,N} \cdot f_{2,N} \cdot f_{3,N} \cdot f_{h,N} \cdot f_{re,N}$
- Concrete splitting resistance (only non-cracked concrete):  $N_{Rd,sp} = N_{Rd,c}^0 \cdot f_B \cdot f_{1,sp} \cdot f_{2,sp} \cdot f_{3,sp} \cdot f_{h,sp} \cdot f_{re,N}$



## Basic design tensile resistance

### Design steel resistance $N_{Rd,s}$

		Data according ETA-03/0032, issue 2008-09-29				
Anchor size		M10x75	M12x95	M16x105	M16x125	M20x170
$N_{Rd,s}$	HAS-TZ HAS-R-TZ HAS-HCR-TZ [kN]	23,3	34,0	60,0	60,0	121,3

### Design combined pull-out and concrete cone resistance $N_{Rd,p} = N_{Rd,p}^0 \cdot f_{B,p} \cdot f_{h,p}$

		Data according ETA-03/0032, issue 2008-09-29				
Anchor size		M10x75	M12x95	M16x105	M16x125	M20x170
Embedment depth $h_{ef}$ [mm]		75	95	105	125	170
Non cracked concrete						
$N_{Rd,p}^0$	Temperature range I [kN]	21,9	26,7	36,2	47,1	74,6
Cracked concrete						
$N_{Rd,p}^0$	Temperature range I [kN]	15,6	22,2	25,8	33,5	53,2





## 1 Identification of substance:

- **Product details:**
- **Trade name:** **Hilti HVU-TZ M10 - M20**
- **Container size** 11 g - 117 g
- **Application of the substance / the preparation** Adhesive anchor capsule for anchor fastening in concrete
- **Manufacturer/Supplier:**  
Hilti Deutschland GmbH  
Hiltistrasse 2  
86916 Kaufering  
Tel.: 08191-90-0  
Fax: 08191 90 1122
- **Informing department:** see section 16
- **Emergency information:**  
Hilti Deutschland GmbH  
Tel: 0049 8191 90-0  
Fax: 0049 8191 90 1122  
Schweizerisches Toxikologisches Informationszentrum - 24 h Service  
Tel.: 0041 / 1 251 51 51 (international)

## 2 Composition/information on ingredients

- **Chemical characterization**
- **Description:**  
2-component foil capsule contains:  
Urethane methacrylate resin, inorganic filler  
Dibenzoyl peroxide, phlegmatized  
Mixture of the substances listed below with harmless additions.

- **Dangerous components:**

27813-02-1	methacrylic acid, monoester with propane-1,2-diol	 Xi; R 36-43	2,5 - 10%
94-36-0	dibenzoyl peroxide	 Xi,  E,  O; R 3-7-36-43	<2,5%

- **Additional information** For the wording of the listed risk phrases refer to section 16.

## 3 Hazards identification

- **Hazard designation:**



Xi Irritant

- **Information pertaining to particular dangers for man and environment**

- The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
- R 36 Irritating to eyes.
- R 43 May cause sensitisation by skin contact.

- **Classification system**

- The classification is in line with current EC lists. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

## 4 First aid measures

- **General information** Instantly remove any clothing soiled by the product.
- **After inhalation**  
Move to fresh air in case of accidental inhalation of fumes from overheating or combustion. Move to fresh air in case of accidental inhalation of vapours. Consult a doctor after significant exposure.
- **After skin contact** Instantly wash with water and soap and rinse thoroughly. If skin irritation persists, call a physician.
- **After eye contact** Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
- **After swallowing**  
Rinse out mouth and then drink plenty of water.  
Seek medical treatment.
- **Information for doctor**
- **The following symptoms may occur:** Allergic reactions

## 5 Fire fighting measures

- **Suitable extinguishing agents** Water spray, carbon dioxide (CO<sub>2</sub>), carbon dioxide blanket, foam, or dry powder.
- **Special hazards caused by the material, its products of combustion or resulting gases:**  
Can be released in case of fire  
Carbon monoxide (CO)  
Carbon dioxide (CO<sub>2</sub>)  
Nitrogen oxides (NO<sub>x</sub>)

(Contd. on page 2)



Printing date 05.03.2009

Revision: 05.03.2009

Trade name: **Hilti HVU-TZ M10 - M20**

(Contd. of page 1)

- Under certain fire conditions, traces of other toxic gases cannot be excluded.
- **Protective equipment:** In the event of fire, wear self contained breathing apparatus

## 6 Accidental release measures

- **Person-related safety precautions:**
  - Wear protective clothing.
  - Keep away from ignition sources
  - Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition.
- **Measures for environmental protection:** keep dangerous ingredients away from soil, drains or water.
- **Measures for cleaning/collecting:**
  - Collect mechanically.
  - Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
  - Dispose of the material collected according to regulations.

## 7 Handling and storage

- **Handling**
  - **Information for safe handling:**
    - Observe the capsule expiration date: See date printed on the sales packaging (box).
    - The usual precautionary measures for handling chemicals must be observed.
    - Keep away from heat and direct sunlight.
  - **Information about protection against explosions and fires:** Keep ignition sources away - Do not smoke.
  - **Storage**
  - **Requirements to be met by storerooms and containers:** Store in a cool (+5°C to +25°C), dry and dark place only in the original packaging.
  - **Information about storage in one common storage facility:** Store away from foodstuffs.
  - **Further information about storage conditions:** Protect from heat and direct sunlight.
  - **Storage class**
    - As per VCI (1991) storage classification concept.
- 10

## 8 Exposure controls and personal protection

- **Additional information about design of technical systems:** Breathing apparatus with filter
- **Components with limit values that require monitoring at the workplace:**
  - The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
- **Additional information:** The lists that were valid during the compilation were used as basis.
- **Personal protective equipment**
- **General protective and hygienic measures**
  - Do not eat or drink while working.
  - Use skin protection cream for preventive skin protection.
  - Be sure to clean skin thoroughly after work and before breaks.
  - Keep away from foodstuffs, beverages and food.
  - Wash hands during breaks and at the end of the work.
  - Avoid contact with the eyes and skin.
- **Breathing equipment:** Not required.
- **Protection of hands:**
  - Protective gloves
  - Avoid direct contact with the chemical/ the product/ the preparation by organizational measures.
  - Use gloves of stable material (e.g. Nitrile) - if necessary tricoted to improve the wearability.
- **Material of gloves** Nitrile rubber, NBR
- **Penetration time of glove material**
  - The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
- **For the permanent contact gloves made of the following materials are suitable:** Nitrile rubber, NBR
- **Not suitable are gloves made of the following materials:**
  - Leather gloves
  - Strong gloves
- **Eye protection:** Tightly sealed safety glasses.
- **Body protection:** Protective work clothing.

## 9 Physical and chemical properties:

### · General Information

<b>Form:</b>	foil capsule
<b>Colour:</b>	resin: yellowish liquid hardener: white powder
<b>Odour:</b>	Ester-like

(Contd. on page 3)

DE

Trade name: **Hilti HVU-TZ M10 - M20**

(Contd. of page 2)

· <b>Change in condition</b> <b>Melting point/Melting range:</b> Not determined <b>Boiling point/Boiling range:</b> Not determined	
· <b>Flash point:</b>	109°C (DIN 53213)
· <b>Ignition temperature:</b>	
· <b>Decomposition temperature:</b>	Peroxid: +55 °C (SADT)
· <b>Self-inflammability:</b>	Product is not selfigniting.
· <b>Danger of explosion:</b>	Product is not explosive.
· <b>Vapour pressure at 20°C:</b>	<0,1 (HPMA) hPa
· <b>Density</b>	resin: 1,1 g/cm <sup>3</sup> hardener: 1,23 g/cm <sup>3</sup>
· <b>Solubility in / Miscibility with Water:</b>	Not miscible or difficult to mix
· <b>pH-value:</b>	not applicable
· <b>Viscosity: dynamic at 23°C:</b>	> 300 mPa.s (DIN 53788)
· <b>Solvent content:</b> <b>Organic solvents:</b> <b>Water:</b>	0 % 0 %

**10 Stability and reactivity**

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Dangerous reactions** No dangerous reactions known
- **Dangerous products of decomposition:** none, if stored and handled correctly.

**11 Toxicological information**

- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** Irritant effect.
- **Sensitization:** Sensitization possible by skin contact.
- **Additional toxicological information:**  
The product shows the following dangers according to the calculation method of the General EC Classification Guidelines for Preparations as issued in the latest version:  
Irritant

**12 Ecological information:**

- **Additional ecological information:**
- **According to recipe contains the following heavy metals and compounds according to EC guideline NO. 76/464 EC: ---**
- **General notes:**  
The product does not contain organically bounded halogens (AOX-free).  
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water.

**13 Disposal considerations**

- **Product:**
- **Recommendation**  
For disposal, local regulations issued by the authorities must be observed.  
Uncured product take for example to a suitable incineration plant.  
After curing, the product can be disposed of with household waste.

· **European waste catalogue**

20 01 28	paint, inks, adhesives and resins other than those mentioned in 20 01 27
08 04 10	waste adhesives and sealants other than those mentioned in 08 04 09

- **Uncleaned packagings:**
- **Recommendation:**  
Non contaminated packagings can be used for recycling.

(Contd. on page 4)

-DE-

# Safety Data Sheet

According to 91/155 EEC

Printing date 05.03.2009

Revision: 05.03.2009

Trade name: **Hilti HVU-TZ M10 - M20**

Disposal must be made according to official regulations.

(Contd. of page 3)

## 14 Transport information

- **Land transport ADR/RID (cross-border)**
- **ADR/RID-GGVS/E Class:** -
- **Remarks:** Not classified as dangerous goods in terms of the ADR
- **Maritime transport IMDG:**
- **IMDG Class:** -
- **Marine pollutant:** No
- **Remarks:** Not classified as dangerous goods as per above regulation.
- **Air transport ICAO-TI and IATA-DGR:**
- **ICAO/IATA Class:** -
- **Remarks:** Not classified as dangerous goods as per above regulation.

· **Transport/Additional information:** Not dangerous according to the above specifications.

## 15 Regulatory information

- **Designation according to EC guidelines:** The product has been labelled in accordance with EC Directives / relevant national laws.
- **Code letter and hazard designation of product:**



Xi Irritant

- **Hazard-determining components of labelling:**  
methacrylic acid, monoester with propane-1,2-diol  
dibenzoyl peroxide
- **Risk phrases:**  
36 Irritating to eyes.  
43 May cause sensitisation by skin contact.
- **Safety phrases:**  
3 Keep in a cool place.  
24/25 Avoid contact with skin and eyes.  
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
28 After contact with skin, wash immediately with plenty of soap and water.  
36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
- **National regulations**  
Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work. Article 12 Training of workers
- **Information about limitation of use:** Employment restrictions concerning young persons must be observed.

## 16 Other information:

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Relevant R-phrases**  
3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.  
36 Irritating to eyes.  
43 May cause sensitisation by skin contact.  
7 May cause fire.
- **Department issuing data specification sheet:**  
Hilti Entwicklungsgesellschaft mbH  
Hiltistrasse 6  
D-86916 Kaufering  
Tel.: +49 8191 906310  
Fax: +49 8191 906826  
e-mail: monika.moench@hilti.com
- **Contact:** Monika Mönch
- **\* Data compared to the previous version altered.**

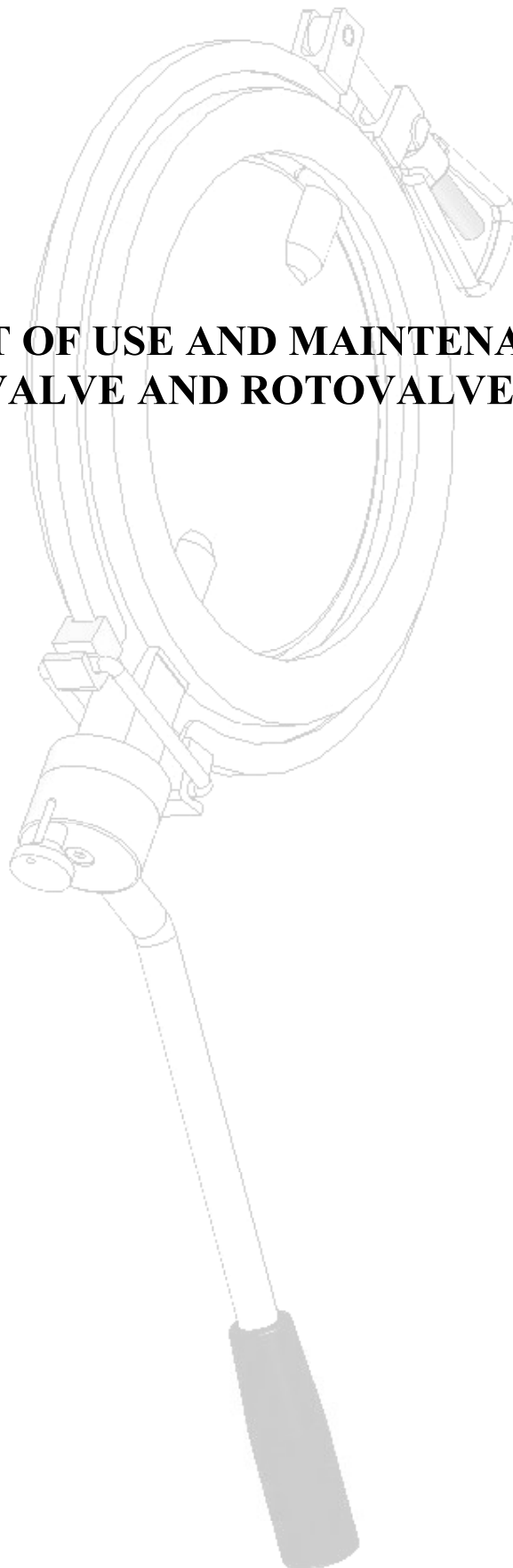
DE







**BOOKLET OF USE AND MAINTENANCE FOR  
STERIVALVE AND ROTOVALVE LIGHT**



## INDEX

### 1. ASSUMPTION

- 1.1 How to read this booklet
- 1.2 Purposes and contains
- 1.3 Addressees
- 1.4 Preservation

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- 2.2 Warranty

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  - 3.2.1 Table
  - 3.2.2 Gasket material
  - 3.2.3 Order code
- 3.3 Gasket and bushings wear test
- 3.4 Operating pressure
- 3.5 Min. and max. temperature of usage

### 4 INSTALLATION AND MAINTENANCE

- 4.1 Installation
  - 4.1.1 Assembly note
  - 4.1.2 Installation on the plant
- 4.2 Cleaning of the valve
- 4.3 Valve storage

## 1 ASSUMPTION

This booklet of use and maintenance is meant to provide all the information indispensable for a proper usage of the Sterivalve butterfly valve and Rotovalve light and their maintenance.

This booklet has to be considered an integral part of the valve itself.

In case the valve is yielded or change location, this booklet has to follow the valve.

This booklet must be preserved in a safe place and easy to be found by the maintenance engineer.

It is forbidden to eliminate or modify any part of the booklet.

### 3.1. How to read the booklet

This booklet is an integral part of the technical documentation and provide indications for the proper use of the valve.

The user must read with attention the information here reported.

The company is not responsible for disadvantages, breakings or damages to things or persons due to the misapplication of the indications contained in this booklet.

### 1.2 Purposes and contains

This booklet is meant to give to the user all the necessary information to be able to manage the valve autonomously and safety.

It contains information regarding the technical features, the operation, the maintenance, the spare parts and the safety.

In case of doubts regarding the right interpretation of the instructions, to get explanation call the constructor.

Any operation on the valve not included in this booklet must be considered improper and incorrect.

Sterivalves is entitled to modify the booklet without revising the previous ones already issued.

### 1.3 Addressees

This booklet is directed to the installer and to the operator enabled to the maintenance of the valve.

We specify that with the term operator we refers to the person in charge to work, settle, clean and make maintenance on the valve.

### 1.4 Preservation

This booklet and all the releases referring to it must be preserved in an accessible place and known by all the operators.

## 2 GENERAL INFORMATION

Start the valve exclusively once this booklet results clearly comprehended.

Before install the valve make sure it do not have visible damages.

All the Sterivalves valve are scrupulously checked before the delivery, but it is not possible to forecast damages due to the transportation or an improper unpacking. For no reason work on moving parts to release any block. Make sure the valve is still before working on it.

Substitute damaged parts with others parts recommended by Sterivalves and do not choose temporary solutions.

The valve must used only for its purpose.

### 2.1 Declaration of suitability for use with chemical/pharmaceutical materials

The Valve has been built with all the features for the chemical/pharmaceutical usage.

In particular:

- It built with materials suitable to contact with chemical/ pharmaceutical substances (stainless steel EN 1.4404 and elastomers FDA)
- All the surfaces in contact with chemical/pharmaceutical substances can be easily cleaned.
- Internal angles are projected to avoid accumulation of substances.

### 2.2 Warranty

During the warranty period Sterivalves Srl warrants his products against defects in materials and workmanship under proper use in compliance with the instructions given in Sterivalves booklet.

Warranty does not cover any substitutions and /or modification of the parts that are not made or authorized (by written authorization) by Sterivalves Srl.

Warranty does not cover improper handling.

Warranty will not be applicable in case of improper maintenance. This warranty is valid for a period of 12 months from the date of installation of the valve, in any case not after 18 months from the date of invoicing. Wearing parts are excluded. Customer is only entitled to get substitution of defective parts, excluding freight of transport and packaging. In case the valve cannot be used no compensation is due for an eventual interruption of production.

Warranty is valid exclusively if terms of payment are observed.

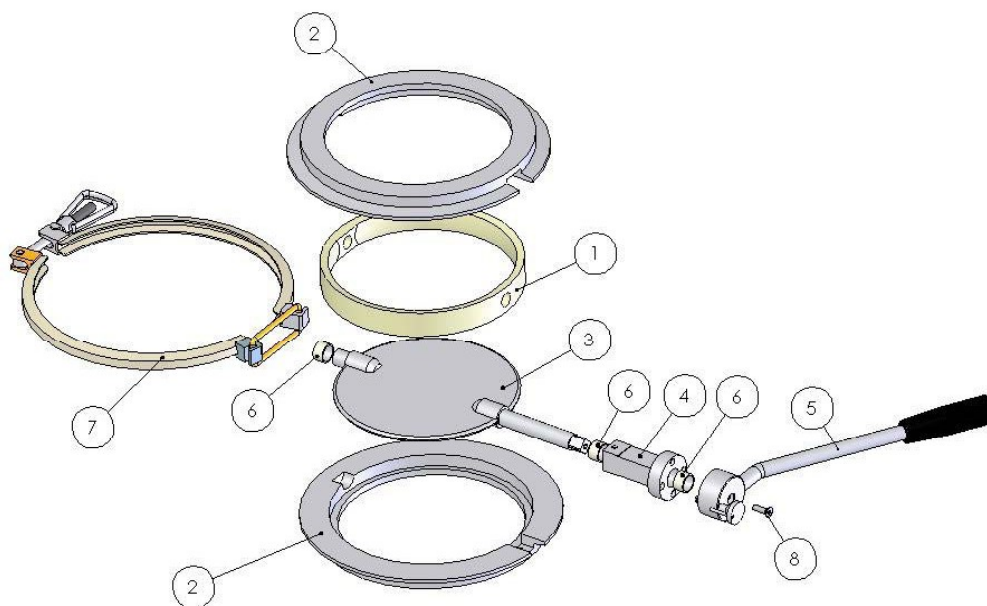
### 3. VALVE DESCRIPTION

Valves are devices for the interception of powders, granulates and pellets (in any case solid products) for gravitational unload.

They are constituted by a gasket in elastomer FDA (1), included between two half-bodies in stainless steel EN 1.4404 (2). On this gasket works a butterfly in EN 1.4404 (3) put into effect manually by a pneumatic actuator.

Sterivalves provides third party pneumatic actuators, disconnected during the supplying of the valve, and it is not responsible for them.

#### 3.1 Exploded view



Drawing1. Sterivalve type SR with handle

Pos.1 Gasket

Pos.2 Half-bodies

Pos.3 Butterfly

Pos.4 Handle support

Pos.5 Handle

Pos.6 Bushings

Pos.7 Clamp

Pos.8 Screw

### 3.2 Spare Parts list

The following table shows components that (considering a normal usage) are subjected to wear and need to be substituted depending on the number of operation schedules.

#### 3.2.1. Table

Valve Diameter DN	Gasket Pos. (1)	Bushing Pos. (6)
080	GSK080	BSH000-T
100	GSK100	BSH000-T
150	GSK150	BSH001-T
200	GSK200	BSH001-T
250	GSK250	BSH002-T
300	GSK300	BSH002-T
350	GSK350	BSH008-T
400	GSK400	BSH008-T

#### 3.2.2. Gasket material.

Possible materials for spare gaskets are:

- Silicone → S
- EPDM → E
- Conductive EPDM → E - C
- Viton → V
- White Viton → VB
- PTFE → T

#### 3.2.3 Order code.

Depending on the valve diameter DN and the material type required for the gasket the following table indicates the code for the orders:

Material	Order code
Silicone	GSK DN - S

EPDM	GSK DN - E
Conductive EPDM	GSK DN - E - C
Viton	GSK DN - V
White Viton	GSK DN - VB
PTFE	GSK DN - T

### 3.3. Gasket and bushings wear test

Sterivalves makes test on his valves to evaluate the life of all the components that need a periodic substitution been subjected to wear.

The following table indicate the life, in starting cycles, of these parts.

In case the parts are not substitute as indicated as in the following table the valve may cause a misuse of the valve and it implies the decadence of the warranty.

Material	Cycles
Silicone	20.000
EPDM	15.000
EPDM Conduttivo	15.000
Viton	15.000
Viton Bianco	15.000
PTFE	15.000

For the PTFE bushings 20.00 cycles are expected.

### 3.4 Operating pressure

Sterivalves makes tests on his valves to evaluate water seal as per DIN 3230 standard.

This values are inserted in the booklet of trial contained in the documentation that follows each valve produced and here below inserted for convenience.

Valve Diameter ND	Pressure (bar)
80	3
100	3
150	2
200	1,5
250	1
300	0,5
350	0,5

400	0,5
-----	-----

### 3.5 Min. and max. temperature of usage

Depending on the gasket material Sterivalves defines which are the Min. and. Max temperatures for the usage of the valve.

Temperatures must be observed in the following conditions:

- With dry air or inert gas.
- At atmospheric pressure

Material	Temp. MIN	Temp. MAX
Silicone	- 60 °C	230 °C
EPDM	-35 °C	150°C
Conductive EPDM	-35 °C	150 °C
Viton	- 35 °C	250 °C
White Viton	-35 °C	250 °C
PTFE	- 15 °C	250 °C

Any other condition that is not indicated in the table is under the complete responsibility of the user and void the warranty.



## 4 INSTALLATION AND MAINTENANCE

### 4.1 Installation

#### 4.1.1 Note on the assembly

For the assembly sequence see the documentation joint to the valve.

#### 4.1.2 Installation on the plant

If the valve installation on the plant need a welding it is necessary to follows Sterivalves indications in order to preserve the half –bodies from deformation that they undergo during the raising of temperature due to the welding:

- Do the welding only after the half-bodies have been jointed by the lever support, or actuator, and the clamp, or the screws, have been tightened. Do not do the welding if the valve, the butterfly and the bushing are assembly.

### 4.2 Cleaning of the valve

The user has the duty to verify the compatibility of the material that is utilized to clean with all the parties that compose the valve.

Materials that compose the valve are always indicated in the order confirmation and the drawing jointed to the documentation.

In case the valve is cleaned by substances that result not suitable to be in contact with the elastomer of the gasket, Sterivalves deny any responsibility and the warranty is void.

### 4.3 Valve storage

During the period of the storage of the valve, or if it is temporary removed, it is necessary follow some indications:

- Stock the valve safe from the light and the dust
- The butterfly must be slightly open, and if it is a Rotovalve, be sure the lobes of the rotor are not in contact with the supporting surface.
- Sterivalves suggest to clean the valve after a long permanence in the warehouse.



# SERVOLIFT



10100873 - TE201413264 1  
13264\_2.1 Werksbescheinigung

Declaration of Compliance with the order (acc. DIN EN 10204- 2.1)		
Name of Project: Drum Lifter	Date :	15.Sep. 2014
Client: Frewitt Fabrique de machines SA, CH- 1763 Granges-Paccot	Version :	1
		Servolift GmbH Project No. 13264

We herewith confirm that the above mentioned project and related delivered products and components correspond to the scope of our offer and to the requirements of your order:

#### Metal:

Product contact materials are made of AISI 316 ( L ) or equivalent.

Non product contact materials are made of AISI 304 or higher quality.

#### Seals:

Seals are made of Silicone with FDA approval.

#### Hydraulic oil and grease:

The shop provided lubricants are suitable for use in food industries with incidental food contact. These have received FDA and USDA H1 approval.

Servolift GmbH  
Albert-Einstein-Str. 9  
D- 77656 Offenburg

Phone : +49 (0) 781/61 00-0  
Fax : +49 (0) 781/61 00-99  
E-Mail : sl@servolift.de  
web : www.servolift.de

Offenburg, 15.Sep. 2014  
Place / Date

Horst Jekal  
Name (printed)  
Quality Assurance

*H. Jekal*  
Signature  
**SERVOLIFT**  
Qualitätssicherung

Datei:	13264_Declaration_of_compliance_2.1.docx	Version:	1	QM-Formular Werksbescheinigung 2.1
Erstellt:	M. Junker	Geprüft:	G.Macke	Freigegeben: M.Junker
Datum:	17.05.2005	Datum:	20.05.2005	Datum: 30.05.2005

# SERVOLIFT

## Declaration of Conformity for Machinery (Directive 2006/42/EC)

This is to declare that the following listed machinery, on the basis of its design, structure and execution presented by us to trade, conforms to all relevant Essential Health and Safety Requirements of the a.m. EC directive. Additionally the machine corresponds to below listed directives and standards.

**With by us non allowed modification of the machinery, this declaration becomes invalid.**

This declaration is only valid for directed use of the machinery by instructed personal.

**Name / Type of machinery:**                      **Drum Lifter / HF**  
**Machine No.:**                                        **13264**  
**Year of construction:**                         **2014**

Additional the below mentioned EC-directives EN and ISO standards have been considered –where applicable- completely or partly.

- Low Voltage Directive 2006/95/EEC
- EMC correct installation 2004/108/EEC
- DIN EN ISO 12100; 2011; DIN EN 60204-1; 2006, DIN EN ISO 13849-1

Attorney for technical documentation:   SERVOLIFT GmbH

Servolift GmbH  
 Albert-Einstein-Str. 9  
 D- 77656 Offenburg

Telefon : +49 (0) 781/61 00-0  
 Fax     : +49 (0) 781/61 00-400  
 E-Mail  : sl@servolift.de  
 web     : www.servolift.de

Offenburg, 15. Sep. 2014  
 \_\_\_\_\_  
 Place / Date

Jürgen Rieber, Managing Director  
 \_\_\_\_\_  
 Name

  
 \_\_\_\_\_  
 Signature

Datei: 13264\_EG-kon-IIA\_engl.docx  
 Erstellt: Macke  
 Datum: 07.12.2005

Version: 6  
 Geprüft: G. Macke  
 Datum: 21.07.2014




QM- Dokumente/Aufzeichnungen  
 Freigegeben: Rieber  
 Datum: 21.07.2014

1 / 1

# SERVOLIFT

## Declaration of Conformity acc. Directive 94/9/EC

This is to declare that the following listed machinery

**Name / Type of machinery:** Drum Lifter / HF  
**Machine No.:** 13264  
**Year of construction:** 2014  
**category:** II2G/D  
**Marking according to ATEX:**  II3D  
 II3D IP65 T135°C  
**Marking of non-electrical equipment:**  c b T4 (max. 130 °C)

complies to:

- Explosion protection guideline 94/9/EC

The documentation has been given to TÜV Product-Service, München (registration No. 0123) for archiving under registration No. EX9 03 02 47371 001

Place of archiving: TÜV Product-Service, Gottlieb Daimler Straße 7,  
D-70794 Filderstadt

Following standards have been considered completely or partly where applicable

- EN 60204-1:2006, - EN 1127-1:2011, - EN 60079-14:2008, - EN 13463-1:2009, - EN 13463-5:2011

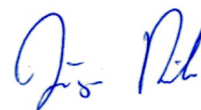
Attorney for technical documentation: SERVOLIFT GmbH

Servolift GmbH  
 Albert-Einstein-Str. 9  
 D- 77656 Offenburg

Telefon : +49 (0) 781/61 00-0  
 Fax : +49 (0) 781/61 00-400  
 E-Mail : sl@servolift.de  
 web : www.servolift.de

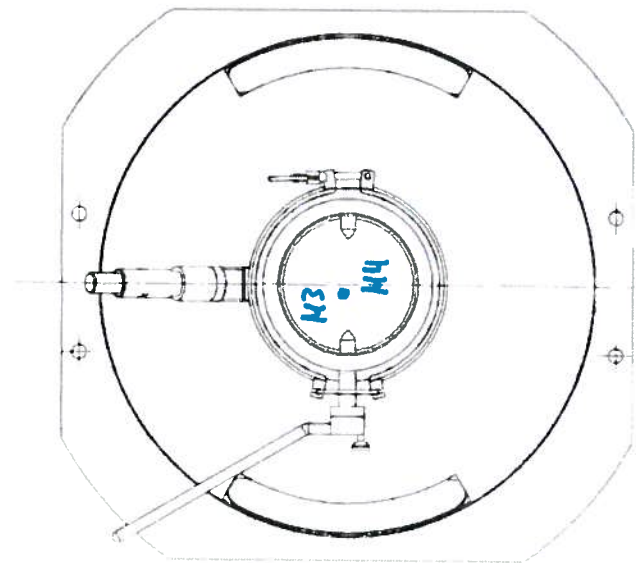
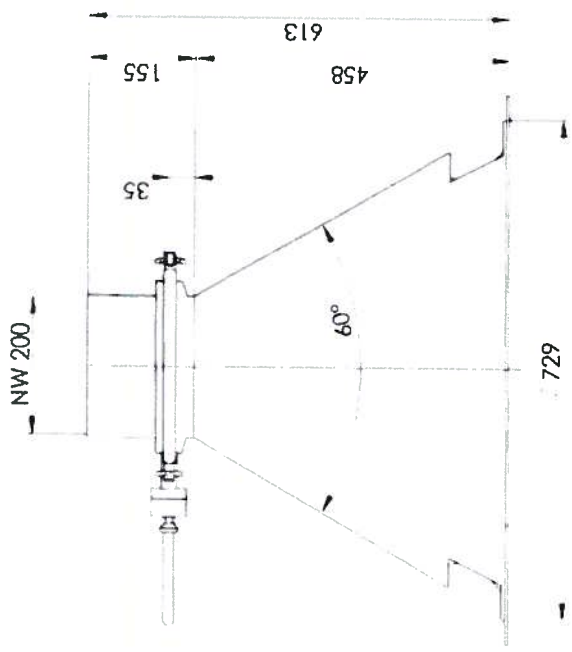
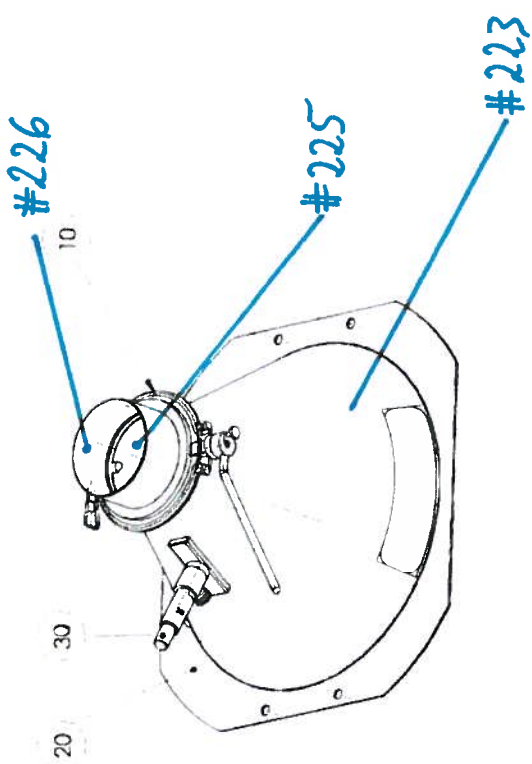
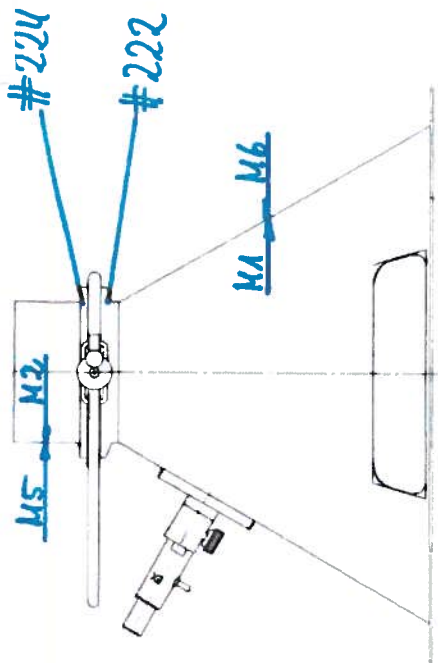
Offenburg, 15. Sep. 2014  
 Place / Date

Jürgen Rieber, Managing Director  
 Name



Signature

Konstruktionstreigabe



SERVOLIFT SERVOLIFT GmbH 77656 Oflenburg, Germany www.servolift.de		34	#13264
Trichter Schw	Ø729/60°/NW 200	9081228	0

i. SERVOLIFT Qualitätssicherung  
08.09.2014

Attachment No.: 2 P. 1. 4  
Attached To: Servolift : Wendi 18 sep 14  
FAT project number 13264  
order number CDF-14-269

# SERVOLIFT

## Analytical Material Test

Customer:	<u>Frewitt, Switzerland</u>	Inspector:	<u>Jürgen Föll</u>
No. of project:	<u>13264</u>	Date:	<u>08.09.2014</u>
Description:	<u>Funnel, 9081228</u>	Parameter:	<u>AISI 316 / 316L</u>

NITON XRF Material Analyzer Xlt 898SY; Serial No. 17578 THERMO NITON ANALYZERS LLC

### Description

<u>Testpoint</u>	<u>Article- No.; Drawing- No.; Part Name;</u>	<u>AISI</u>	<u>German Standard No.</u>
# 223	Funnel	316 / 316L	1.4401 / 04
# 222	Upper valve flange	316 / 316L	1.4401 / 04
#225	Flap	316 / 316L	1.4401 / 04
#224	Lower valve flange	316 / 316L	1.4401 / 04
#226	Outlet	316 / 316L	1.4401 / 04

Offenburg, 13. Sep. 2014

Place / Date

Horst Jekal

Name (print)

i.v. Jekal

Signature

**SERVOLIFT**  
Qualitätssicherung

Datei: XRF\_Test\_E.doc  
Erstellt: Maier K.  
Datum: 03.07.2008

Version: 1  
Geprüft: Jekal H.  
Datum: 30.07.2008

QM- Messung des Produkts  
Freigegeben: Rieber J.  
Datum: 30.07.2008

# SERVOLIFT

## Roughness Measuring - Ra according to DIN EN 4287 / 4288

Customer:	Frewitt, Switzerland	Inspector:	Jürgen Föll
No. of project:	13264	Date:	08.09.2014
Type of unit :	Funnel, 9081228	Rated value e.g. customer: Ra $\leq$ 0,8/1,5 $\mu\text{m}$	
Measuring device: Mitutoyo PM- No.: A4001	Type: Surftest -SJ 301 Serial Number: 900332	Mitutoyo Precision Reference Specimen 178-601 PM-Nr.: B4004	

Readings			passed	failed
measurement no. 1	Test Point: <u>surface inside</u> Funnel	RA = 0,76 $\mu\text{m}$	X	
measurement no. 2	Test Point: Outlet	RA = 0,13 $\mu\text{m}$	X	
measurement no. 3	Test Point: Flap plate	RA = 0,05 $\mu\text{m}$	X	
measurement no. 4	Test Point: Flap plate	RA = 0,02 $\mu\text{m}$	X	
measurement no. 5	Test Point: <u>surface outside</u> Outlet	RA = 0,58 $\mu\text{m}$	X	
measurement no. 6	Test Point: Funnel	RA = 0,90 $\mu\text{m}$	X	

Offenburg, 19. Sep. 2014

Place / Date

Horst Jekal

Name (print)

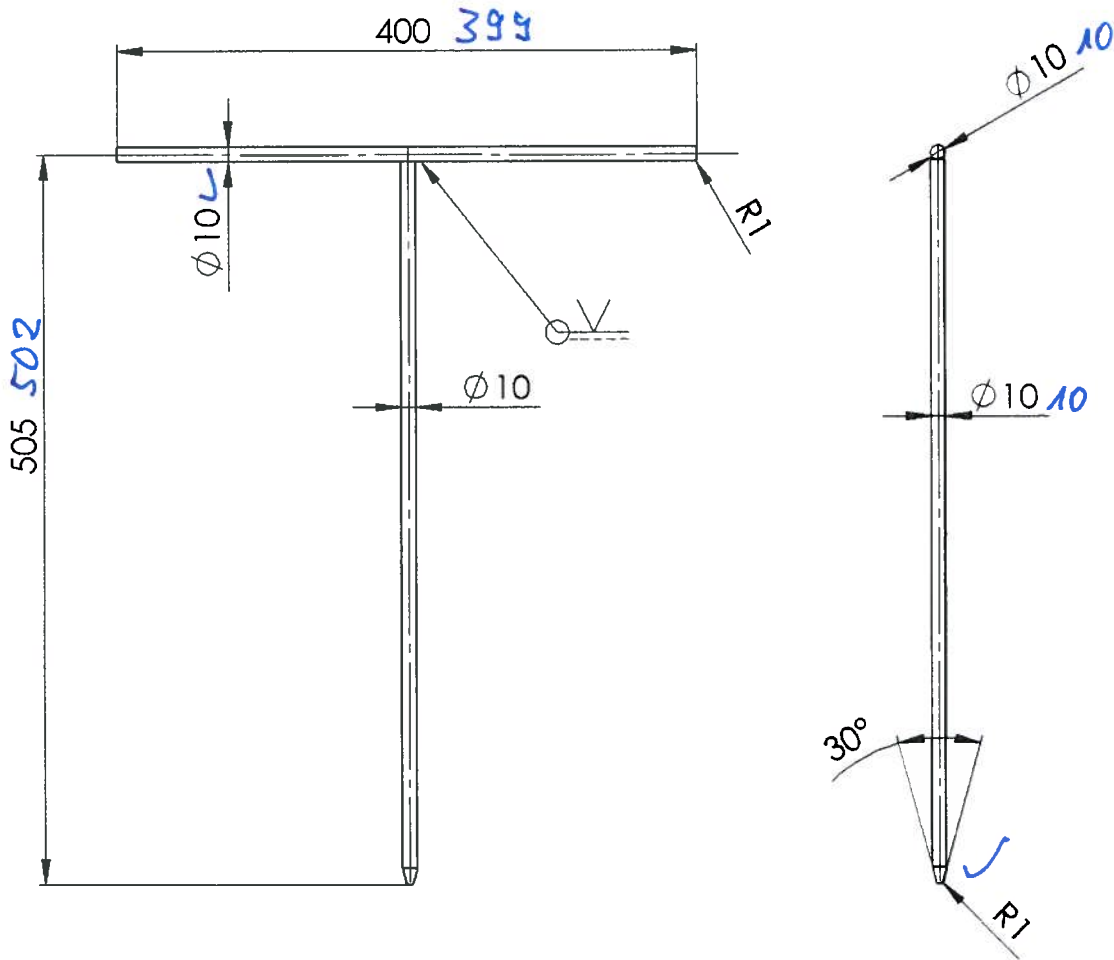
i.b. Jekal

Signature

**SERVOLIFT**  
Qualitätssicherung

Datei:	13264_Rauheitsmessung_E.doc	Version:	2	QM-Formular Roughness Measuring	
Erstellt:	Ambruster M.	Geändert	H. Jekal	Geprüft:	Rieber
Datum:	04.04.2014	Datum:	14.04.2014	Datum:	14.04.2014
					Seite 1 von 1





Oberflächen Schliff Ra 0,8 µm

22.09.2014 i.v.

Konstruktionsfreigabe

<b>SERVOLIFT</b> SERVOLIFT GmbH 77656 Offenburg, Germany www.servolift.de		Allgemeintoleranzen für Schweißkonstruktionen nach ISO13920			Masstab 1:5	BG/Zg.-Nr. 34
		B, F			Werkstoff	#13264
Maße ohne Toleranzangaben nach ISO2768		Oberflächenreihe		Benennung		
m, K		R 2 DIN ISO 1302		<b>Rückhaltelanze Schw.</b>		
Zust.		Änderung		Ident.-Nr.		Index
Datum		Name		9081326		0
Erst.		09.07.2014 becherer				Blatt 1 von 1
Bearb.		10.07.2014 becherer				A4H
Freig.				Ursursprungsprojekt 13264		Ersetzt durch:

# SERVOLIFT

## Analytical Material Test

<b>Customer:</b>	<b>Frewitt, Schweiz</b>	<b>Inspector:</b>	<b>Föll</b>
<b>No. of project:</b>	<b>13264</b>	<b>Date:</b>	<b>22.09.2014</b>
<b>Description:</b>	<b>Restraining bar</b>	<b>Parameter:</b>	<b>AISI 316 / 316L</b>

NITON XRF Material Analyzer Xlt 898SY; Serial No. 17578      THERMO NITON ANALYZERS LLC

### Description

Testpoint	Article- No.; Drawing- No.; Part Name;	AISI	German Standard No.
# 630	9081326 Pos.10	316 316L	1.4401/04
# 631	Pos.20	316 316L	1.4401/04

OG 22.09.2014

Place / Date

Föll

Name (print)

i.v.   
Qualitätssicherung  
Signature

# SERVOLIFT

## Roughness Measuring - Ra according to DIN EN 4287 / 4288

Customer:	Frewitt, Schweiz	Inspector:	Föll
No. of project:	13264	Date:	22.09.2014
Type of unit :	Restraining bar nZ. 9081326	Rated value e.g. customer: Ra ≤ 0,8µm	
Measuring device: Mitutoyo PM- No.: A4001	Type: Surftest -SJ 301 Serial Number: 900332	Mitutoyo Precision Reference Specimen 178-601 PM-Nr.: B4004	

Readings			passed	failed
measurement no. 1	Test Point: <u>surface inside</u> Pos.10	RA = <u>0.80</u> µm	X	
measurement no. 2	Test Point: Pos.20	RA = <u>0.68</u> µm	X	

OG 22.09.2014

Place / Date

Föll

Name (print)

SERVOLIFT  
IG-Untersuchung

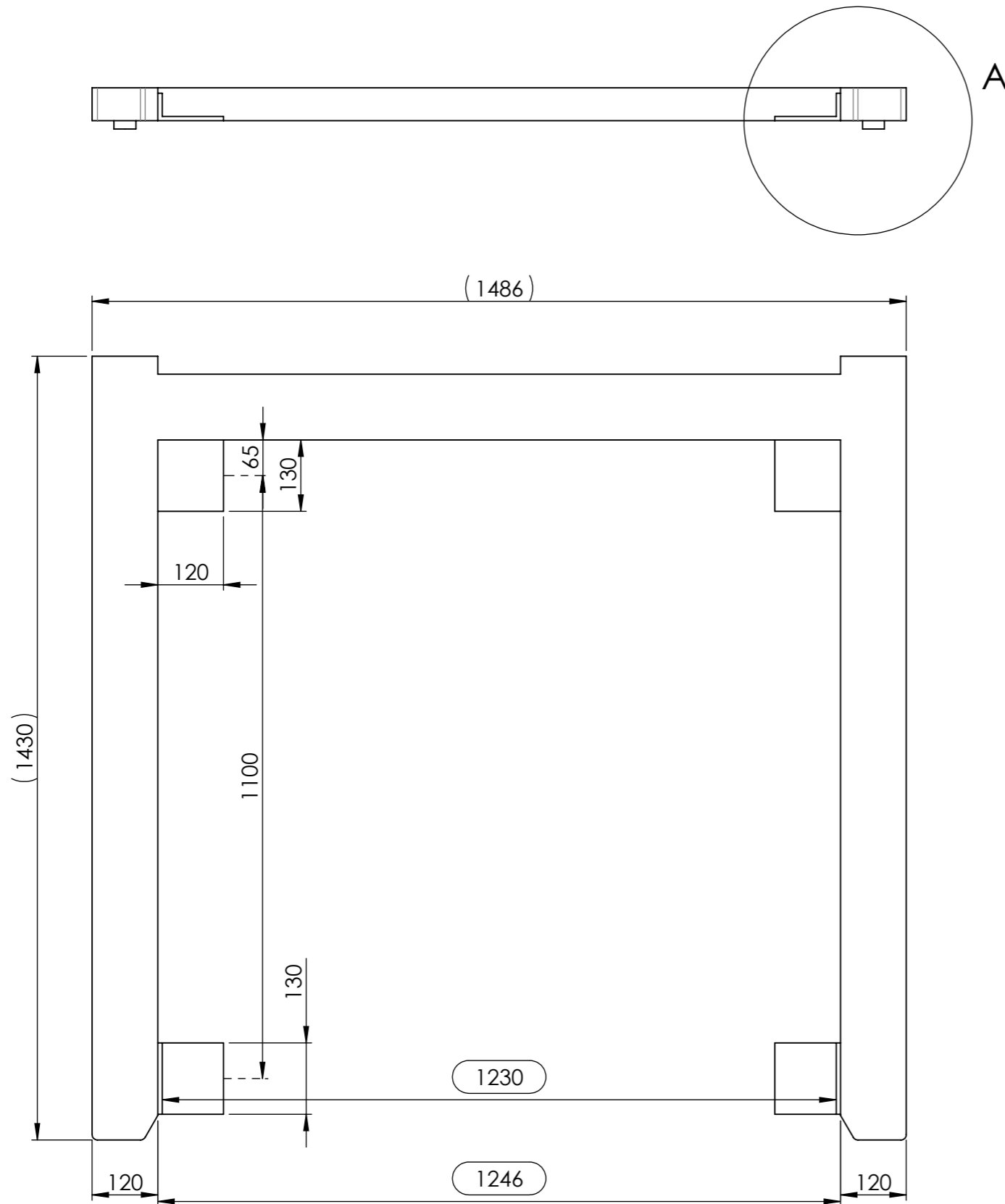
Signature



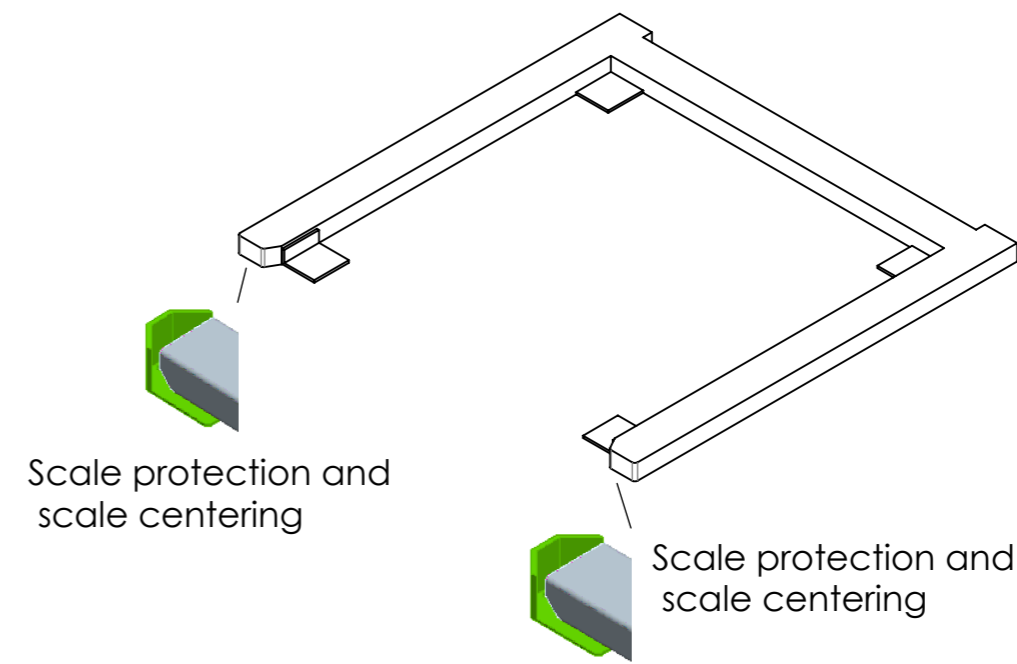
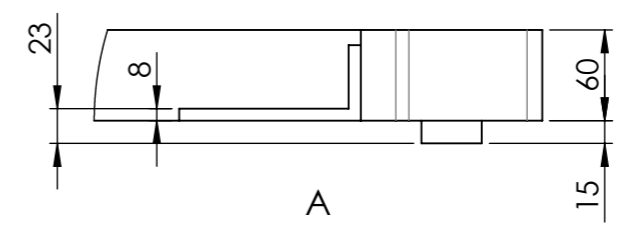
## **13.2- Balance Mettler-Toledo**

<b>[Document N°]</b>	<b>Designation</b>
<b>475309</b>	_DRAWING Art. 475309 - Balance
<b>178171</b>	_Mettler-Toledo IND690 /PTA459 - Manufacturer Certificates
<b>41544</b>	_ATEX Certificates - IND 690
<b>178172</b>	_Mettler-Toledo IND690 Weighing Terminal-Data Brief
<b>123356</b>	_Mettler-Toledo IND690 Grounding Kit
<b>178173</b>	_Mettler-Toledo IND690-install-safety instructions
<b>38288</b>	_Mettler-Toledo IND690-Base weighing terminals- Op.instructions
<b>38292</b>	_Mettler-Toledo_MultiRange IND690 - Quick Guide
<b>173022</b>	_Mettler-Toledo IND690 Weighing Module -config-functionality





A



PTA459-F1500 S/N .....

Dimensions without tolerance [mm]	above	6	30	120	400	1000	MATERIAL : 304/304L					
	up to	6	30	120	400	1000						
Machining: ISO 2768-m		±0.10	±0.20	±0.30	±0.50	±0.80	±1.20	Scale	Similar	Designed	18/08/2014	ygr
Welding Assembly: ISO 2768-c		±0.30	±0.50	±0.80	±1.20	±2.00	±3.00	%		Controlled	18/08/2014	ygr
Kit balance								⊕	Weight [kg]	Revised	18/08/2014	ygr
								A3	241.21	Atex		
Any and all information received by you from us shall be held and kept confidential and shall not be disclosed by you to any third party except with prior written consent of FREWITT SA.				Frewitt SA: Milling and Handling of Powders P.O.B. 615, CH-1701 Fribourg, SWITZERLAND tel: +41 26 460 74 00 / fax: +41 26 460 74 01 info@frewitt.com / www.frewitt.com				475309		Page	Ver.	
										1/1	A	





**METTLER TOLEDO**

# Werkszertifikat / Manufacturer Certificate

Produktionsdatum / Production Date: 02.09.2014

Produkttyp / Product Typ: Weighing Terminal IND690

Seriennummer / Serial Number: B435976383

Hergestellt von / Produced by: Mettler-Toledo(Albstadt) GmbH

Qualität und die damit verbundene Zufriedenheit unserer Kunden sind von entscheidender Bedeutung für unseren nachhaltigen Geschäftserfolg. Das von Ihnen erworbene Produkt wurde von dem oben angeführten Mitarbeiter entsprechend den relevanten Richtlinien und Gesetzen hergestellt und geprüft. Auf Basis der Testergebnisse bescheinigen wir hiermit die Übereinstimmung des Produktes mit Ihrem Auftrag und der technischen Spezifikation.

Mettler-Toledo (Albstadt) GmbH ist zertifiziert nach DIN EN ISO 9001 und DIN EN ISO 14001. Sollten Sie einen Grund zur Beanstandung haben, wenden Sie sich bitte mit Angabe der Seriennummer an Ihre zuständige Service-Organisation.

Quality and the resulting customer satisfaction are key factors for the prevailing success of our company. The product you have purchased was manufactured and tested by the employee mentioned above according to the relevant laws and guidelines. Based on the test results we certify that the product complies with the technical specifications of your order.

Mettler-Toledo (Albstadt) GmbH is both DIN EN ISO 9001 and DIN EN ISO 14001 certified. In case of complaints please contact your local service organisation and state to the serial number.



Christoph Dermond  
General Manager


**METTLER TOLEDO**
**Declaration of Conformity  
Konformitätserklärung  
Déclaration de conformité  
Declaración de Conformidad  
Dichiarazione di conformità**

22020918C

We Mettler-Toledo (Albstadt) GmbH, Unter dem Malesfelsen 34, D-72458 Albstadt,

**Declare under our sole responsibility that the product,**



erklären, in alleiniger Verantwortung, dass dieses Produkt,  
déclarons sous notre seule responsabilité que le produit,  
declaramos, bajo nuestra sola responsabilidad, que el producto,  
dichiariamo sotto nostra unica responsabilità, che il prodotto,

IND690xx ... Linle

S/N: > 3000000,

**to which this declaration relates, is in conformity with the following standard(s) or other normative document(s).**

auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.  
auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).  
al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).  
a cui si riferisce questa dichiarazione è conforme alla/e seguente/i norma/e o documento/i normativo/i.

	Applicable Standards:	
ATEX (94/9/ EEC)	EN 60079- 0 (2012) EN 60079-11 (2012) EN 60079-15 (2010) EN 60079- 31 (2009)	
Low Voltage Directive (2006/95/ EEC)	EN 60950 EN 50178	
EMC Directive (2004/108/EEC)	EN 61000-6-2 EN 61000-6-3	
Non automatic weighing instrument directive (2009/23/EEC) <sup>1)</sup>	EN 45501 <sup>1)</sup>	
		[Year] <sup>1)</sup> [Code] 

1) applies only to certified non-automatic weighing Instruments in connection with approved load cells  
gilt nur für geeichte Waagen in Verbindung mit zugelassenen Wägezellen  
valable uniquement pour les balances vérifiées en liaison avec des cellules de charge homologuées  
solo aplicable a balanzas verificadas en combinación con células de carga aprobadas  
la dichiarazione vale solo per le bilance omologate in collegamento con celle di carico approvate

Albstadt, November 2013



Christoph Dermond, General Manager

**Important notice for verified weighing Instruments in EC countries**

Wichtiger Vermerk für geeichte Waagen in EU-Ländern

Note importante concernant les instruments de pesage vérifiés dans les pays de la CE

Información importante para instrumentos de pesada verificados en países de la UE

Avvertenza importante per gli strumenti di pesatura testati nei paesi della Comunità Europea



Weighing instruments verified at the place of manufacture bear the preceding mark on the packing label and a green "M" sticker on the descriptive plate. They may be set to work immediately.

Werkgeeeichte Waagen tragen vorsehendes Kennzeichen auf dem Packetikett und einen grünen „M“-Aufkleber auf dem Eichschild. Sie können sofort in Betrieb genommen werden.

Les Instruments de pesage vérifiés sur le site de production portent la marque précédente sur l'emballage et un autocollant vert "M" sur la plaque signalétique. Ils sont immédiatement opérationnels.

Los Instrumentos de pesada verificados en el lugar de fabricación llevan la marca de la Izquierda en la etiqueta de embalaje y un adhesivo verde "M" en la placa descriptiva. Se pueden poner en funcionamiento inmediatamente.

Gli strumenti di pesatura testati nella sede di produzione recano un'etichetta con questo marchio sulla confezione e un adesivo verde con una "M" sulla targhetta descrittiva. Possono essere messi subito in funzione.



Weighing instruments which are verified in two steps have no green "M" on the descriptive plate, bear the aforementioned identification on the packing label. The second step of the verification must be carried out by the Mettler-Toledo service approved or by the W&M authorities. Please contact your Mettler-Toledo organization.

Waagen, die in zwei Schritten geeicht werden, und kein grünes „M“ auf dem Eichschild haben, tragen vorsehendes Kennzeichen auf dem Packetikett. Der zweite Schritt der Eichung ist durch den behördlich anerkannten Mettler-Toledo Service oder durch den Eichbeamten durchzuführen. Bitte nehmen Sie mit dem Mettler-Toledo Kundendienst Kontakt auf.

Les Instruments de pesage vérifiés en deux étapes n'ont pas d'autocollant vert "M" sur la plaque signalétique et leurs emballages ne portent pas la marque distinctive précédente. La seconde étape de la vérification doit être exécutée par le service agréé Mettler-Toledo ou par les autorités compétentes pour les poids et mesures. Veuillez contacter votre interlocuteur Mettler-Toledo.

Los Instrumentos de pesada que se verifican en dos etapas no tienen una "M" verde en la placa descriptiva y llevan la marca de la Izquierda en la etiqueta del embalaje. La segunda etapa de la verificación ha de realizarla el servicio autorizado Mettler Toledo o las autoridades responsables de pesos y mediciones. Póngase en contacto con la empresa Mettler-Toledo.

Gli strumenti di pesatura che vengono sottoposti a due serie di test sono privi della "M" verde sulla targhetta descrittiva e recano questo marchio di identificazione sull'etichetta della confezione. La seconda serie di test deve essere effettuata da un centro autorizzato Mettler Toledo o dalle autorità per i pesi e le misure. Si prega di contattare la filiale Mettler Toledo.

The first step of the verification has been carried out in the manufacturing company. It comprises all tests according EN45501-8.2.2. In regard to scales with analogue connection to the weighing-platform, a weighing test according to EN 45501-3.5.3.3 must be carried out additionally. This test is not necessary if the terminal bears the serial-number of the weighing-platform.

If national regulations in individual countries limit the period of validity of the certification, the operator of such a scale is himself responsible for its timely re-certification.

Der erste Schritt der Eichung wurde im Herstellerwerk durchgeführt. Er umfasst alle Prüfungen gemäß EN 45501-8.2.2. Bei Waagen mit analogem Wägebrückenanschluss muss zusätzlich die Richtigkeit gemäß EN 45501-3.5.3.3 geprüft werden. Diese Prüfung ist nicht notwendig, wenn das Terminal die Serien-Nr. der Wägebrücke trägt.

Sofern gemäß den nationalen Vorschriften in den einzelnen Staaten die Gültigkeitsdauer der Eichung beschränkt ist, ist der Betreiber einer solchen Waage für die rechtzeitige Nach Eichung selbst verantwortlich.

La première étape de la vérification a été exécutée dans l'usine de fabrication. Celle-ci inclut l'ensemble des tests conformément à EN45501-8.2.2.

Si les réglementations nationales des différents pays limitent la période de validité de la vérification, l'exploitant d'une telle balance est lui-même responsable de la faire révérifier en temps utile.

La primera etapa de la verificación se ha efectuado en la planta de fabricación. Incluye todas las pruebas según EN45501-8.2.2.

Si las normativas nacionales de los países limitan el período de validez de la certificación, el operador de dicha báscula es responsable de gestionar dicha certificación.

La prima serie di test è stata eseguita presso lo stabilimento e comprende tutti i test previsti da EN45501-8.2.2.

Qualora la legislazione locale dei singoli paesi limiti il periodo di validità della certificazione, l'operatore della bilancia dovrà provvedere tempestivamente al rinnovo della stessa.

**METTLER TOLEDO**

# Werkszertifikat / Manufacturer Certificate

Produktionsdatum / Production Date:	22.09.2014
Produkttyp / Product Typ:	Pallet Scale PTA459
Seriennummer / Serial Number:	B437026341
Hergestellt von / Produced by:	Mettler-Toledo(Albstadt) GmbH

Qualität und die damit verbundene Zufriedenheit unserer Kunden sind von entscheidender Bedeutung für unseren nachhaltigen Geschäftserfolg. Das von Ihnen erworbene Produkt wurde von dem oben angeführten Mitarbeiter entsprechend den relevanten Richtlinien und Gesetzen hergestellt und geprüft. Auf Basis der Testergebnisse bescheinigen wir hiermit die Übereinstimmung des Produktes mit Ihrem Auftrag und der technischen Spezifikation.

Mettler-Toledo (Albstadt) GmbH ist zertifiziert nach DIN EN ISO 9001 und DIN EN ISO 14001. Sollten Sie einen Grund zur Beanstandung haben, wenden Sie sich bitte mit Angabe der Seriennummer an Ihre zuständige Service-Organisation.

Quality and the resulting customer satisfaction are key factors for the prevailing success of our company. The product you have purchased was manufactured and tested by the employee mentioned above according to the relevant laws and guidelines. Based on the test results we certify that the product complies with the technical specifications of your order.

Mettler-Toledo (Albstadt) GmbH is both DIN EN ISO 9001 and DIN EN ISO 14001 certified. In case of complaints please contact your local service organisation and state to the serial number.



Christoph Dermond  
General Manager

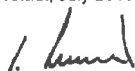
We Mettler-Toledo (Albstadt) GmbH, Unter dem Malesfelsen 34, D-72458 Albstadt,  
 Declare under our sole responsibility that the product,  
 erklären, in alleiniger Verantwortung, dass dieses Produkt,  
 déclarons sous notre seule responsabilité que le produit,  
 declaramos, bajo nuestra sola responsabilidad, que el producto,  
 dichiariamo sotto nostra unica responsabilità, che il prodotto,

**PTA... Linie S/N: > 3000000,**  
**to which this declaration relates, is in conformity with the following standard(s) or other normative document(s).**

auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.  
 auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s)  
 al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s)  
 a cui si riferisce questa dichiarazione è conforme alla/e seguente/i norma/e o documento/i normativo/i

Guideline	Certificate	Applicable Standards:	*Technical status in accordance with:
ATEX (94/9/ EC) Version Analog	BVS 08 ATEX E063 <sup>1)</sup> System Solution Type Analog Ex2 KEMA 03 ATEX 1070 <sup>2)</sup> Load Cell Model 0745A Load frame lift Load frame standard	EN 60079-0 (2006) * EN 60079-15 (2005) * EN 61241-0 (2006) * EN 61241-1 (2004) * EN 13463-1	EN 60079-0 (2009) EN 60079-15 (2010) EN 60079-31 (2009)
ATEX (94/9/ EC) Version IDNet	BVS 06 ATEX E098 <sup>1)</sup> System Solution Type Point KEMA 03 ATEX 1070 <sup>2)</sup> Load Cell Model 0745A Load frame lift Load frame standard	EN 60079-15 (2003) * IEC61241-0 (2004) * EN 61241-1 (2004) *  EN 13463-1	EN 60079-0 (2009) EN 60079-15 (2010) EN 60079-31 (2009)
EMC Directive: (2004/108/EC)		EN 61000-6-2 EN 61000-6-3	
RoHS 2011/65/EC		EN 50581 (2012)	
Non automatic weighing instrument directive (2009/23/EC)		EN 45501	
		<b>CE</b>	[Year] [Code] <b>M</b>

Albstadt, July 2013



Christoph Demond, General Manager

Certificate / Acknowledgement issued by:

- 1), 3) DEKRA EXAM GmbH, Dinnendahlstrasse 9  
D-44809 Bochum, NB: 0158
- 2) DEKRA Certification B.V. Utrechtseweg 310,  
Postbus 5185 NL-6802 ED Arnhem, NB: 0344

**Important notice for verified weighing instruments in EC countries**

Wichtiger Vermerk für geeichte Waagen in EU-Ländern

Note importante concernant les instruments de pesage vérifiés dans les pays de la CE

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**If national regulations in individual countries limit the period of validity of the certification, the operator of such a scale is himself responsible for its timely re-certification.**

Der erste Schritt der Eichung wurde im Herstellerwerk durchgeführt. Er umfasst alle Prüfungen gemäß EN 45501-8.2.2. Bei Waagen mit analogem Wägebrückenanschluss muss zusätzlich die Richtigkeit gemäß EN 45501-3.5.3.3 geprüft werden. Diese Prüfung ist nicht notwendig, wenn das Terminal die Serien-Nr. der Wägebrücke trägt. Sofern gemäß den nationalen Vorschriften in den einzelnen Staaten die Gültigkeitsdauer der Eichung beschränkt ist, ist der Betreiber einer solchen Waage für die rechtzeitige Nach Eichung selbst verantwortlich.

La première étape de la vérification a été exécutée dans l'usine de fabrication. Celle-ci inclut l'ensemble des tests conformément à EN45501-8.2.2.

Si les réglementations nationales des différents pays limitent la période de validité de la vérification, l'exploitant d'une telle balance est lui-même responsable de la faire révérier en temps utile.

La primera etapa de la verificación se ha efectuado en la planta de fabricación. Incluye todas las pruebas según EN45501-8.2.2.

Si las normativas nacionales de los países limitan el periodo de validez de la certificación, el operador de dicha báscula es responsable de gestionar dicha certificación.

La prima serie di test è stata eseguita presso lo stabilimento e comprende tutti i test previsti da EN45501-8.2.2.

Qualora la legislazione locale dei singoli paesi limiti il periodo di validità della certificazione, l'operatore della bilancia dovrà provvedere tempestivamente al rinnovo della stessa





**IND690xx Weighing Terminal**

<b>TÜV 06 ATEX 552902 X</b>		
EC-Type Examination Certificate	06 July 2006	Original, 3 pages
EG-Baumusterprüfbescheinigung	06 Juli 2006	Original, 3 Seiten
Attestation de vérification de type CE	06 Juillet 2006	Original, 3 pages
Certificado de inspecciones de tipo de construcción CE	06 Julio 2006	Original, 3 páginas
Certificato di approvazione CE	06 Luglio 2006	Originale, 3 pagine

<b>Amendment 1 to TÜV 06 ATEX 552902 X</b>		<b>Contens / Changes</b>	
Supplement 1	17 May 2010	Display, special condition for save use, marking	Original, 1 page
Ergänzung 1	17 Mai 2010	Anzeige, besondere Bedingungen für sicheren Betrieb, Kennzeichnung	Original, 1 Seite
Supplément 1	17 Mai 2010	Affichage, conditions speziales pour sûr l'usage, marquage	Original, 1 page
Suplemento 1	17 Mayo 2010	Pantella, condición especial para el uso seguro, marcación	Original, 1 página
Supplemento 1	17 Maggio 2010	Indicatioe, condizione speciale per il uso sicuro, marcatura	Originale, 1 pagina

<b>Amendment 2 to TÜV 06 ATEX 552902 X</b>		<b>Contens / Changes</b>	
Supplement 2	05 November 2013	New standards, special condition for use, marking	Original, 2 pages
Ergänzung 2	05 November 2013	Neue Normen, besondere Bedingungen, Kennzeichnung	Original, 2 Seiten
Supplément 2	05 Novembre 2013	Nouvelles conditions standards, état spécial pour l'usage, marquant	Original, 2 pages
Suplemento 2	05 Noviembre 2013	Nuevas condiciones estándar, condición especial para el uso, etiquetando	Original, 2 páginas
Supplemento 2	05 Novembre 2013	Nuove condizioni standard, stato speciale per uso, identificante	Originale, 2 pagine

**TÜV NORD****(1) Konformitätsaussage**

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen, **Richtlinie 94/9/EG**

(3) **Konformitätsaussage Nummer: TÜV 06 ATEX 552902 X**

(4) für das Gerät: Terminal Typ IND690xx-Desk  
und Typ IND690xx-Panel

(5) des Herstellers: Mettler-Toledo (Albstadt) GmbH

(6) Anschrift: Unter dem Malesfelsen 34  
D-72458 Albstadt

Auftragsnummer: 8000552902

Ausstellungsdatum: 06.07.2006

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Konformitätsaussage festgelegt.

(8) Die TÜV NORD CERT GmbH bescheinigt die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen. Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht Nr. 06 YEX 552902 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit:

EN 60079-15:2003

EN 50 281-1-1:1998+A1

EN 1127:1997

(10) Falls das Zeichen "X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese Konformitätsaussage bezieht sich nur auf Konzeption und Prüfung des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes. Diese Anforderungen werden nicht durch diese Bescheinigung abgedeckt.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

**Ex II 3 G EEx nA L [L] IIC T4 bzw. II 3 D T70°C IP69K**

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, akkreditiert durch die Zentralstelle der Länder für Sicherheitstechnik (ZLS), Ident. Nr. 0044, Rechtsnachfolger der TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

Der Leiter der Zertifizierungsstelle

Schwedt

Geschäftsstelle Hannover, Am TÜV 1, 30519 Hannover, Fon +49 (0)511 986 1455, Fax +49 (0)511 986 1590



**(13) ANLAGE****(14) Konformitätsaussage Nr. TÜV 06 ATEX 552902 X****(15) Beschreibung des Gerätes**

Die Terminals Typ IND690xx-Desk und Typ IND690xx-Panel dienen zur Anzeige und Auswertung von Gewichtswerten der angeschlossenen Wägebrücken. Zusammen mit angeschlossenen externen Geräten kann das Wägeterminal Typ IND690xx-Desk und Typ IND690xx-Panel für verschiedene Steueraufgaben genutzt werden.

Anschließbar über verschraubbare Stecker bzw. durch Kabelverschraubungen und interne Verbindungen sind folgende Geräte:

- eine alphanumerische Tastatur (gespeist über einen energiebegrenzten Stromkreis)
- bis zu drei Wägebrücken (digital IDNet oder analog)
- über optional eingebaute Datenschnittstellen (z. B. Serielle Interfaces, Netzwerk-Interfaces, Digitale I/O-Interfaces); Geräte gemäß der Installationsanleitung des Herstellers

Das Terminal Typ IND690xx-Desk ist als Tischgerät oder mit einer zugehörigen Wandkonsole als Wandgerät ausgeführt. Mit Hilfe der Zubehörteile Adapter, Stativ und Sockel kann das IND690xx Desk auch auf den Boden gestellt oder auf dem Boden bzw. an einem Bock festgeschraubt werden. Die Installationsanleitung des Herstellers ist zu beachten.

Das Terminal Typ IND690xx-Panel ist als Einbaugerät ausgeführt.

Die Terminals Typ IND690xx-Desk und Typ IND690xx-Panel dürfen in explosionsgefährdeten Bereichen, in denen Betriebsmittel der Kategorie 3 erforderlich sind, errichtet werden.

Der zulässige Umgebungstemperaturbereich ist  $-10^{\circ}\text{C} \dots +40^{\circ}\text{C}$ .

Elektrische Daten

Versorgungsstromkreis .....  $U_n = 100 \dots 240 \text{ V AC}, +10\%/-15\%, 50/60\text{Hz}, \text{ca. } 70 \text{ VA}$   
(Anschlussleitung)

Ausgang IDNet-Schnittstelle ...	Versorgungsspannung Wägezelle	max. 20 V DC
	Spannung Schnittstellenstromkreis CL	max. 27 V DC
	Stromstärke Schnittstellenstromkreis CL	max. 30 mA

5V-Versorgungsstromkreis..... energiebegrenzter Stromkreis EEx nL IIC  
 $U_o = 5 \text{ V DC}$   
 zulässige Stromentnahme im Bemessungsbetrieb:  
 $I_{n, \text{max}} = 100 \dots 300 \text{ mA}$   
 Die Installationsanleitung des Herstellers ist zu beachten  
 höchstzulässige äußere Kapazität:  $C_o = 200 \text{ } \mu\text{F}$   
 höchstzulässige äußere Induktivität:  $L_o = 60 \text{ } \mu\text{H}$

z. B. zur Versorgung der externen Tastatur Typ MF2 gemäß der Konformitätsaussage TÜV 00 ATEX 1629

Die höchstzulässige äußere Kapazität ist die Summe aller an dem energiebegrenzten 5V-Versorgungsstromkreis angeschlossenen Stromkreise.

Die höchstzulässige äußere Induktivität darf in jedem 5V-Stromkreis, der als energiebegrenzt betrachtet wird, angeschlossen werden.

Die elektrischen Daten für alle übrigen Anschlüsse (nicht energiebegrenzte Stromkreise) sind den Angaben des Herstellers in der Betriebsanleitung zu entnehmen.



Anlage Konformitätsaussage Nr. TÜV 06 ATEX 552902 X

(16) Die Prüfungsunterlagen sind im Prüfbericht Nr. 06 YEX 552902 aufgelistet.

(17) Besondere Bedingungen

1. Das Terminal Typ IND690xx-Panel so zu installieren, dass eine Schutzart von mindestens IP 54 gemäß EN 60529 erreicht wird.
2. Die Angaben bezüglich des energiebegrenzten Stromkreises sind dieser Bescheinigung zu entnehmen.
3. Das Verbinden und Trennen der Anschlüsse für die nicht energiebegrenzten Stromkreise unter Spannung ist nur bei der Installation oder für Reparaturzwecke zulässig.
4. Die angeschlossenen Geräte dürfen in explosionsgefährdeten Bereichen der Zone 2 und Zone 22 betrieben werden, wenn sie für die am Einsatzort vorliegenden Bedingungen geeignet sind.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

## Translation

(1) **Statement of Conformity****TÜV NORD**

- (2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 94/9/EC**



- (3) **Statement of Conformity Number: TÜV 06 ATEX 552902 X**

- (4) for the equipment: Terminal type IND690xx-Desk and type IND690xx-Panel
- (5) of the manufacturer: Mettler-Toledo (Albstadt) GmbH

- (6) Address: Unter dem Malesfelsen 34  
D-72458 Albstadt

Order number: 8000552902

Date of issue: 2006-07-06

- (7) This equipment or protective system and any acceptable variation thereto are specified in the schedule to this statement of conformity and the documents therein referred to.
- (8) The TÜV NORD CERT GmbH certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in the confidential report No. 06 YEX 552902.
- (9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
- EN 60079-15:2003                      EN 50 281-1-1:1998+A1                      EN 1127:1997
- (10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.
- (11) This statement of conformity relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.
- (12) The marking of the equipment or protective system must include the following:

 **II 3 G EEx nA L [L] IIC T4 resp. II 3 D T70°C IP69K**

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The head of the certification body

A handwritten signature in black ink, appearing to read 'Schwedt'.

Schwedt

Hanover office, Am TÜV 1, 30519 Hanover, Fon +49 (0)511 986 1455, Fax +49 (0)511 986 1590

(13) **SCHEDULE**(14) **Statement of Conformity No. TÜV 06 ATEX 552902 X**

## (15) Description of equipment

The terminals type IND690xx-Desk and type IND690xx-Panel are used for displaying and analysis of weighing values of connected weighing bridges. In combination with connected external devices the terminals type IND690xx-Desk and type IND690xx-Panel can be used for different control tasks.

Connectable by means of plugs fixed by screw connection resp. per cable threads and internal connections are the following devices:

- an alphanumeric keyboard (energised by an energy limited circuit)
- up to three weighing bridges (digital IDNet or analogue)
- by optional build-in data interfaces (e. g. serial interfaces, network interfaces, digital I/O interfaces); devices according to the installation guidelines of the manufacturer:

The terminal type IND690xx-Desk is executed as a tabletop unit or, with a belonging wall mounting bracket, as a wall unit. By means of the belonging accessories adapter, stand and socket, the IND690xx Desk can be placed on the floor or screwed to the floor resp. to a bench. The installation guidelines of the manufacturer have to be observed.

The terminal type IND690xx-Panel is executed as a built-in unit.

The terminals type IND690xx-Desk and type IND690xx-Panel may be installed in explosion hazardous areas where apparatus of category 3 are required.

The permissible ambient temperature range is  $-10^{\circ}\text{C} \dots +40^{\circ}\text{C}$

Electrical data

Supply circuit .....  $U_n = 100 \dots 240 \text{ V a. c.}, +10\%/-15\%, 50/60\text{Hz}, \text{ approx. } 70 \text{ VA}$   
(connecting cable)

Output IDNet interface .....	Supply voltage weighing cell	max.	20 V d. c.
	Voltage interface circuit CL	max.	27 V d. c.
	Current interface circuit CL	max.	30 mA

5V-supply circuit..... energy limited circuit EEx n L IIC

$U_o = 5 \text{ V d. c.}$

permissible current drain at rated operation:

$I_{n, \text{max}} = 100 \dots 300 \text{ mA}$

The installation guidelines of the manufacturer have to be observed.

max. permissible external capacitance:  $C_o = 200 \mu\text{F}$

max. permissible external inductance:  $L_o = 60 \mu\text{H}$

e. g. for supply of the external keyboard type MF2 according to the Statement of Conformity TÜV 00 ATEX 1629

The max. permissible external capacitance is the sum of all circuits which are connected to the energy limited 5V-supply circuit.

The max. permissible external inductance may be connected to each energy limited 5V-supply circuit.

The electrical data of all other connections (non energy limited circuits) have to be taken from the manufacturer's data in the installation guidelines.



Schedule Statement of Conformity No. TÜV 06 ATEX 552902 X

(16) The test documents are listed in the test report No. 06 YEX 552902.

(17) Special conditions for safe use

1. The terminal type IND690xx-Panel has to be installed in that way that a degree of protection of min. IP 54 according to EN 60529 is reached.
2. The specifications regarding the energy limited circuit have to be taken from this certificate.
3. The connection and disconnection of the connections of the non energy limited circuits under voltage, as well, is only permitted during installation and for repair purposes.
4. The connected devices may be operated in explosion hazardous areas of zone 2 resp. zone 22 if they are capable for the conditions at the place of installation.

(18) Essential Health and Safety Requirements

no additional ones



## 1. ERGÄNZUNG

zur Bescheinigungsnummer: **TÜV 06 ATEX 552902 X**  
 Gerät: Terminal Typ IND690xx-Desk und IND690xx-Panel  
 Hersteller: Mettler-Toledo (Albstadt) GmbH  
 Anschrift: Unter dem Malesfelsen 34  
 72458 Albstadt  
 Auftragsnummer: 8000555737  
 Ausstellungsdatum: 17.05.2010

Die Terminals Typ IND690xx-Desk und Typ IND690xx-Panel dürfen künftig auch entsprechend den im Prüfbericht aufgeführten Unterlagen gefertigt werden.

Die Änderungen betreffen den Einbau des Display-Modul Typ GUT170X40J-9301 des Herstellers Noritake sowie die „Besonderen Bedingungen“ und die Kennzeichnung.

Diese lautet:

II 3 G Ex nA nL [nL] IIC T4 bzw.  
 II 3 D Ex tD A22 T70°C IP69K

Die elektrischen Daten sowie alle weiteren Angaben gelten unverändert für diese Ergänzung.

Das Gerät entsprechend dieser Ergänzung erfüllt die Anforderungen der folgenden Normen:

EN 60079-0:2006                      EN 60 079-15:2005                      EN 61241-0:2006  
 EN 61241-1:2004                      EN 1127-1:2007

(16) Die Prüfungsunterlagen sind im Prüfbericht Nr. 10 204 555737 aufgelistet.

(17) Besondere Bedingungen

1. Das Terminal Typ IND690xx-Panel in einem geeigneten Gehäuse entsprechend EN 60079-15 bzw. EN61241-1 so zu installieren, dass eine Schutzart von mindestens IP 54 bzw. IP 6X für Anwendungen mit leitfähigem Staub gemäß EN 60529 erreicht wird.
2. Die Angaben bezüglich des energiebegrenzten Stromkreises sind dieser Bescheinigung zu entnehmen.
3. Das Verbinden und Trennen der Anschlüsse für die nicht energiebegrenzten Stromkreise unter Spannung ist nur bei der Installation oder für Reparaturzwecke zulässig.
4. Die angeschlossenen Geräte dürfen in explosionsgefährdeten Bereichen der Zone 2 und Zone 22 betrieben werden, wenn sie für die am Einsatzort vorliegenden Bedingungen geeignet sind.
5. Es ist zu beachten, dass die Oberflächentemperatur von 70 °C ohne Staubauflage gemessen wurde.
6. Bezüglich der Gefahren durch elektrostatische Entladungen ist die Betriebsanleitung des Herstellers zu beachten.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

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Der Leiter der Zertifizierungsstelle

Schwedt



## Translation

**1. SUPPLEMENT**

<b>to Certificate No.</b>	<b>TÜV 06 ATEX 552902 X</b>
Equipment:	Terminals type IND690xx-Desk and type IND690xx-Panel
Manufacturer:	Mettler-Toledo (Albstadt) GmbH
Address:	Unter dem Malesfelsen 34 72458 Albstadt, Germany
Order number:	8000555737
Date of issue:	2010-05-17

In the future, the terminal type IND690xx-Desk and type IND690xx-Panel may also be manufactured according to the documents listed in the test report.

The changes refer to the installation of the display module type GUT170X40J-9301 of the manufacturer Noritake as well as the "Special conditions for safe use and the marking.

This reads:

II 3 G Ex nA nL [nL] IIC T4 resp.  
II 3 D Ex tD A22 T70°C IP69K

The electrical data and all other data apply unchanged for this supplement.

The equipment incl. of this supplement meets the requirements of these standards:

EN 60079-0:2006	EN 60 079-15:2005	EN 61241-0:2006
EN 61241-1:2004	EN 1127-1:2007	

(16) The test documents are listed in the test report No. 10 204 555737.

(17) Special conditions for safe use

1. The terminal type IND690xx-Panel has to be installed in a suitable housing corresponding to EN 60079-15 resp. EN 61241-1 in that way that a degree of protection of min. IP 54 resp. IP 6X for use with conductive dust according to EN 60529 is reached.
2. The specifications regarding the energy limited circuit have to be taken from this certificate.
3. The connection and disconnection of the connections of the non energy limited circuits under voltage, as well, is only permitted during installation and for repair purposes.
4. The connected devices may be operated in explosion hazardous areas of zone 2 resp. zone 22 if they are capable for the conditions at the place of installation.
5. It has to be observed, that the surface temperature of 70 °C was measured without dust layer.
6. Regarding the hazards by electrostatic discharges, the manual of the manufacturer has to be observed.

(18) Essential Health and Safety Requirements

no additional ones

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The head of the certification body

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## 2. ERGÄNZUNG

zur Bescheinigungsnummer: TÜV 06 ATEX 552902 X  
 Gerät: Terminal Typ IND690xx-Desk und IND690xx-Panel  
 Hersteller: Mettler-Toledo (Albstadt) GmbH  
 Anschrift: Unter dem Malesfelsen 34  
 72458 Albstadt  
 Auftragsnummer: 8000425797  
 Ausstellungsdatum: 05.11.2013

Für die Geräte Terminal Typ IND690xx-Desk und IND690xx-Panel gelten künftig die folgenden Angaben:

### Elektrische Daten

5V-Versorgungstromkreis..... in Zündschutzart Eigensicherheit Ex ic IIC  
 $U_o = 5,1 \text{ V}$   
 $P_o = 7 \text{ W}$  (statischer Wert)  
 höchstzulässige äußere Kapazität:  $C_o = 200 \text{ } \mu\text{F}$   
 höchstzulässige äußere Induktivität:  $L_o = 60 \text{ } \mu\text{H}$

Die höchstzulässige äußere Kapazität ist die Summe aller an dem eigensicheren 5V-Versorgungstromkreis angeschlossenen Stromkreise.

Die höchstzulässige äußere Induktivität darf in jedem eigensicheren 5V-Versorgungstromkreis angeschlossen werden.

Für die zulässige Stromentnahme im Bemessungsbetrieb ist die Installationsanleitung des Herstellers ist zu beachten

Die elektrischen Daten für alle übrigen Anschlüsse (nicht eigensichere Stromkreise) sind den Angaben des Herstellers in der Betriebsanleitung zu entnehmen.

Die Kennzeichnung lautet künftig:

II 3 G Ex nA ic [ic ] IIC T4 Gc

II 3 D Ex tc T70 °C IIIB Dc

Alle weiteren Angaben gelten unverändert.

Das Gerät incl. dieser Ergänzung erfüllt die Anforderungen der folgenden Normen:

EN 60079-0:2012  
 EN 60079-31:2009

EN 60079-11:2012

EN 60079-15:2010

(16) Die Prüfungsunterlagen sind im Prüfbericht Nr. 13 214 129090 aufgelistet.





## 2. Ergänzung zur Bescheinigungsnummer TÜV 06 ATEX 552902 X

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### (17) Besondere Bedingungen

1. Entsprechend EN 60079-15, Abschnitt 6.3.1 gilt für den Einsatz in explosionsgefährdeten Bereichen durch Gas der Zone 2 für das Gerät „IND690xx-Panel“ Folgendes:
  - a) Das Gerät ist an einem gemäß der IEC 60079-0 geprüften Gehäuse so zu installieren, dass die Anforderungen der Schutzart IP54 erfüllt sind.
  - oder
  - b) Das Gerät ist an einem gemäß der IEC 60079-0 geprüften Gehäuse zu errichten, dass die Anforderungen der Schutzart IP4X erfüllt ist. Das Gehäuse darf dann ausschließlich in Bereichen installiert werden, die ihrerseits einen geeigneten Schutz gegen das Eindringen von Fremdkörpern oder Flüssigkeiten bieten.
2. Das Gerät „IND690xx-Panel“ ist für den Einsatz in explosionsgefährdeten Bereichen durch Staub der Zone 22 an einem gemäß der IEC 60079-0 geprüften Gehäuse so zu installieren, dass die Anforderungen der Schutzart IP5X erfüllt sind (EN 60079-31, Tabelle 1).
3. Die Geräte „Terminal Typ IND690xx-Desk und IND690xx-Panel“ dürfen für den Einsatz in explosionsgefährdeten Bereichen durch Gas der Zone 2 in einem Bereich mit einem Verschmutzungsgrad von nicht größer als 2 eingesetzt werden (EN 60079-15, Abschnitt 13). Der Versorgungsstromkreis muss entsprechend der Überspannungskategorie II nach IEC 60664-1 begrenzt sein (EN 60079-11, Abschnitt F.3.2).
4. Die Angaben bezüglich des eigensicheren Stromkreises sind dieser Bescheinigung zu entnehmen.
5. Das Verbinden und Trennen der Anschlüsse für die nicht eigensicheren Stromkreise unter Spannung ist nur zulässig, wenn keine explosionsfähige Atmosphäre vorhanden sein kann.
6. Die angeschlossenen Geräte dürfen in explosionsgefährdeten Bereichen der Zone 2 und Zone 22 betrieben werden, wenn sie für die am Einsatzort vorliegenden Bedingungen geeignet sind.
7. Die Geräte „Terminal Typ IND690xx-Desk und IND690xx-Panel“ dürfen nur in Räumen oder an Stellen betrieben werden, in denen erwartungsgemäß keine starken elektrischen Feldstärken (Vermeidung elektrostatischer Aufladung) auftreten können.
8. Geräte mit beschädigten Dichtungen dürfen in explosionsgefährdeten Bereichen nicht betrieben werden.

### (18) Grundlegende Sicherheits- und Gesundheitsanforderungen

keine zusätzlichen

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Der Leiter der benannten Stelle

Schwedt

Geschäftsstelle Hannover, Am TÜV 1, 30519 Hannover, Tel.: +49 (0) 511 986-1455, Fax: +49 (0) 511 986-1590



## Translation

### 2. SUPPLEMENT

<b>to Certificate No.</b>	<b>TÜV 06 ATEX 552902 X</b>
Equipment:	Terminal type IND690xx-Desk and IND690xx-Panel
Manufacturer:	Mettler-Toledo (Albstadt) GmbH
Address:	Unter dem Malesfelsen 34 72458 Albstadt
Order number:	8000425797
Date of issue:	2013-11-05

In the future, for the apparatus terminal type IND690xx-Desk and IND690xx-Panel, the following details are valid:

#### Electrical data

5V-supply circuit..... in type of protection intrinsic safety Ex ic IIC  
 $U_o = 5.1 \text{ V}$   
 $P_o = 7 \text{ W (static value)}$   
 max. permissible external capacitance:  $C_o = 200 \text{ } \mu\text{F}$   
 max. permissible external inductance:  $L_o = 60 \text{ } \mu\text{H}$

The max. permissible external capacitance is the sum of all circuits which are connected to the intrinsically safe 5V-supply circuit.

The max. permissible external inductance may be connected to each intrinsically safe 5V supply circuit.

The electrical data of all other connections (non intrinsically safe circuits) have to be taken from the manufacturer's data in the installation guidelines.

In the future, the marking reads:

II 3 G Ex nA ic [ic ] IIC T4 Gc

II 3 D Ex tc T70 °C IIIB Dc

All other details apply unchanged.

The equipment incl. of this supplement meets the requirements of these standards:

EN 60079-0:2012  
 EN 60079-31:2009

EN 60079-11:2012

EN 60079-15:2010

(16) The test documents are listed in the test report No. 13 214 129090.



2. Supplement to Certificate No. TÜV 06 ATEX 552902 X

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(17) Special conditions for safe use

1. According to EN 60079-15, section 6.3.1, for the operation in explosion hazardous areas caused by gas of zone 2 for the apparatus „IND690xx-Panel“, the following is valid:
  - a) The apparatus has to be mounted at a housing tested according to IEC 60079-0, so that the requirements of degree of protection IP54 are adhered to.
  - or
  - b) The apparatus has to be mounted at a housing tested according to IEC 60079-0, so that the requirements of degree of protection IP4X are adhered to. Then, the apparatus may exclusively be mounted in locations providing adequate protection against the entry of solid foreign objects or liquids.
2. For the operation in explosion hazardous areas caused by dust of zone 22, the apparatus „IND690xx-Panel“ has to be mounted at a housing tested according to IEC 60079-0, so that the requirements of degree of protection IP5X are adhered to (EN 60079-31, table 1).
3. For the operation in explosion hazardous areas caused by gas of zone 2, the apparatus „Terminal type IND690xx-Desk and IND690xx-Panel“ are allowed to be operated in an area of not more than pollution degree 2 (EN 60079-15, section 13). The supply circuit has to be limited to overvoltage category II as defined in IEC 60664-1 (EN 60079-11, section F.3.2).
4. The specifications regarding the intrinsically safe circuit have to be taken from the certificate.
5. The connection and disconnection of the connections of the non intrinsically safe circuits under voltage is only permitted, if no explosion hazardous atmosphere can be available.
6. The connected devices are allowed to be operated in explosion hazardous areas of zone 2 or zone 22, if they are suitable for the conditions available at the place of operation.
7. The apparatus „Terminal IND690xx-Desk and IND690xx-Panel“ are only allowed to be operated in rooms or locations, where from experience no intense electric field strength can occur (avoidance of electrostatic charge).
8. Apparatus with damaged sealings are not allowed to be operated in explosion hazardous areas.

(18) Essential Health and Safety Requirements

no additional ones

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The head of the notified body

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**22012998B**

Subject to technical changes

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# Anhang zur Installationsanleitung

## Dokumentation 22012802

### Anhang zur Dokumentation 22012802 Kapitel 5 "Technische Daten"

Aufgrund unseres Nachtrags zur IND690xx Zulassung (Konformitätsaussage Nummer: TÜV 06 ATEX 552902 X) wurde die, in der Installationsanleitung, angegebene Gerätekategorie aktualisiert.

#### Bisherige Gerätekategorie:

II 3 G Ex nA nL [nL] IIC T4  
II 3 D Ex tD A22 T70°C IP69k

#### Gültige Gerätekategorie ab 15.11.2013

II 3G Ex nA ic [ic] IIC T4 Gc  
-10°C ≤ Ta ≤ +40°C

II 3D Ex tc T70°C IIIB Dc  
IP6x

Diese Aktualisierungen wurden aufgrund Normänderungen notwendig und vollzogen. Nach folgenden europäischen Normen wurde das IND690xx geprüft:

EN60950  
EN 60079-0:2012  
EN 60079-11:2012  
EN 60079-15:2010  
EN 60079-31:2009

Des Weiteren müssen folgende Werte beim Anschließen von externen Geräten an IDNet, SICS, RS232 sowie PS/2 Schnittstellen beachtet werden:

### Elektrische Daten

5V-Versorgungstromkreis..... in Zündschutzart Eigensicherheit Ex ic IIC

$$U_o = 5,1 \text{ V}$$

$$P_o = 7 \text{ W (statischer Wert)}$$

$$\text{höchstzulässige äußere Kapazität: } C_o = 200 \text{ } \mu\text{F}$$

$$\text{höchstzulässige äußere Induktivität: } L_o = 60 \text{ } \mu\text{H}$$

Die höchstzulässige äußere Kapazität ist die Summe aller an dem eigensicheren 5V-Versorgungstromkreis angeschlossenen Stromkreise.

Die höchstzulässige äußere Induktivität darf in jedem eigensicheren 5V-Versorgungstromkreis angeschlossen werden.

Für die zulässige Stromentnahme im Bemessungsbetrieb ist die Installationsanleitung des Herstellers ist zu beachten

Die elektrischen Daten für alle übrigen Anschlüsse (nicht eigensichere Stromkreise) sind den Angaben des Herstellers in der Betriebsanleitung zu entnehmen.

IND690xx		Externes Gerät bei Anschluss an IDNet, SICS, RS232 sowie PS/2 Schnittstelle
$U_o$	$\leq$	$U_i$ or $U_{max}$
$P_o$	$\leq$	$P_i$ or $P_{max}$
$C_o$	$\geq$	$C_i$ + C Kabel
$L_o$	$\geq$	$L_i$ + L Kabel

Bemerkungen:

- Die PS/2 Schnittstelle ist eigensicher (5V).
- Die Werkseinstellung der RS232 sowie SICS Schnittstelle ist eigensicher (5V).
- Den 5V Pin der IDNet Schnittstelle darf nicht verwendet werden. Für die Mettler Toledo Wägebrücken werden nur die 12V sowie die 30V verwendet.
- Bei Verwendung der eigensicheren 5V Spannung muss die Norm EN60079-14 beachtet werden.

# Appendix for Installation manual

## Documentation 22012803

### Appendix for Documentation 22012802 Chapter 5 "Technical Data"

Due to the 2. Supplement of the IND690xx certificate (Certificate No.: TÜV 06 ATEX 552902 X) there is a update needed in respect of the type of protection.

#### Previous type of protection:

II 3 G Ex nA nL [nL] IIC T4  
II 3 D Ex tD A22 T70°C IP69k

#### Valid type of protection as from 15.11.2013:

II 3G Ex nA ic [ic] IIC T4 Gc  
-10°C ≤ Ta ≤ +40°C

II 3D Ex tc T70°C IIIB Dc  
IP6x

This updates were necessary and completed due to changes in the latest European standards. The IND690xx was tested according the below mentioned European Standards:

EN60950  
EN 60079-0:2012  
EN 60079-11:2012  
EN 60079-15:2010  
EN 60079-31:2009

Furthermore following values has to be considered as soon as you are going to use an external device on IDNet, SICS, RS232 and PS/2 interface(s).

### Electrical data

5V-supply circuit..... in type of protection intrinsic safety Ex ic IIC

$$U_o = 5.1 \text{ V}$$

$$P_o = 7 \text{ W (static value)}$$

$$\text{max. permissible external capacitance: } C_o = 200 \text{ } \mu\text{F}$$

$$\text{max. permissible external inductance: } L_o = 60 \text{ } \mu\text{H}$$

The max. permissible external capacitance is the sum of all circuits which are connected to the intrinsically safe 5V-supply circuit.

The max. permissible external inductance may be connected to each intrinsically safe 5V supply circuit.

The electrical data of all other connections (non intrinsically safe circuits) have to be taken from the manufacturer's data in the installation guidelines.

IND690xx		External device connected to an IDNet, SICS, RS232 and PS/2 interface
$U_o$	$\leq$	$U_i$ or $U_{max}$
$P_o$	$\leq$	$P_i$ or $P_{max}$
$C_o$	$\geq$	$C_i + C_{\text{cable}}$
$L_o$	$\geq$	$L_i + L_{\text{cable}}$

### Notes:

- The PS/2 interface is intrinsically safe (5V).
- Factory setting of the RS232 and SICS interface is intrinsically safe (5V).
- The 5V Pin of the IDNet Interface must not be used. All Mettler Toledo weighing platforms are using either 12 V or 30V.
- In case of using the intrinsically safe 5V voltage please consider the latest European standard EN 60079-14.



### IND690 Weighing Terminal

Professional Weighing Technology for hygienic sensitive areas



High degree of IP – protection enables high pressure cleaning.

Easy cleaning is provided by an optimized design, confirmed by NSF and EHEDG.

The IND690 can be used worldwide because of it's international Approvals.

Up to 4 analogue or digital scales simultaneous.

AC-power-operation.

10 High performance software application packages.

#### Requirements

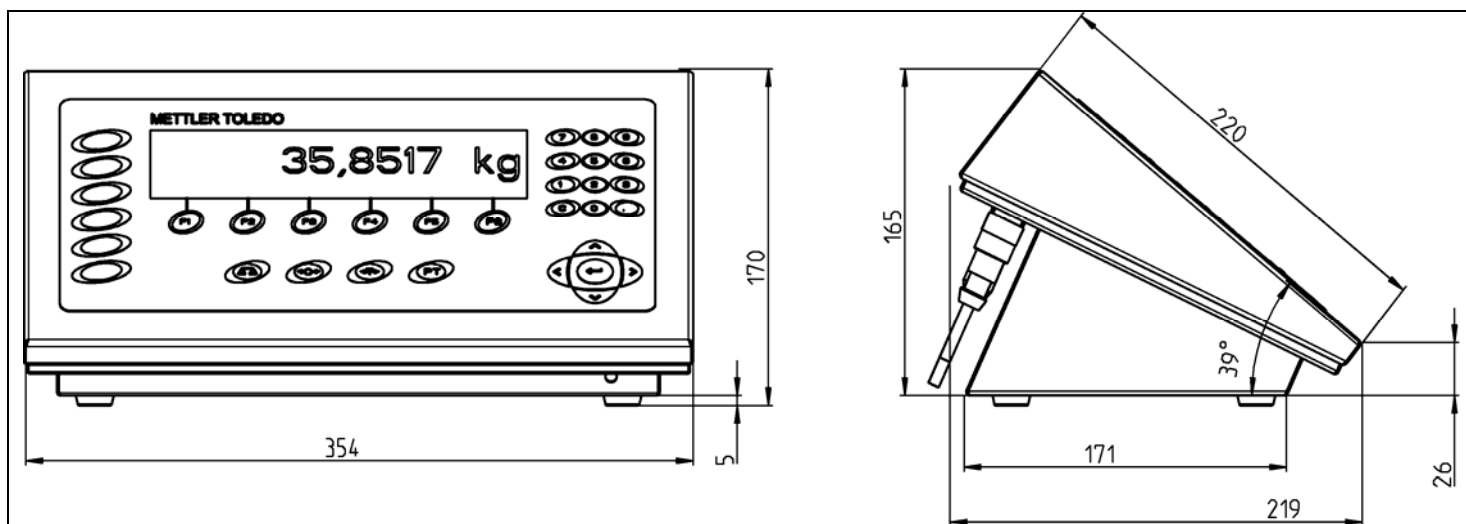
The IND690 is especially designed for harsh environments. If you have one of the following requirements, the IND690 will be the perfect solution!

- Easy cleaning
- High pressure cleaning
- Water- and dust-tight
- Tested to be used in hygienic sensitive areas
- Tested to be used in GMP areas
- World-wide approvals
- Weights- and measures approved
- Easy operation

#### Functionality

The very large assortment of Mettler-Toledo weighing technology can be connected to the IND690.

Different data interfaces are available. The standard RS232, but also Ethernet, WLAN or Profibus-DP ease the connection of the IND690 to your IT-environment.



### Enclosure / Environment

Housing	Bench model (angled desktop), suitable for wall mounting. Compact housing for front panel mounting.
Material	Chrome-nickel steel DIN X5 CrNi1810
Schutzart	IP69K (DIN 40050): resistant to high-pressure/steam jet cleaning
Ambient Temperature	-10 ... +40 °C for accuracy class III, 0 ... 40 °C for accuracy class II

### Display

Active, high-luminance VFD dot matrix display, graphics capability, green	
Screen size, Resolution	195 x 46mm, 170 x 40 pixel
BIG WEIGHT <sup>®</sup> - Display <sup>1</sup>	Patented, large display, showing weight or other data, characters are up to 35mm high
Display cover	Scratch-proof, toughened safety glass. For UK and USA: polycarbonate

### Keyboard

Type	Three-point membrane keypad with sensed key action, acoustic acknowledgement
Surface	Closed, smooth surface of heavy duty polyester, with raised, embossed buttons
Key functions	<ul style="list-style-type: none"> <li>• 6 keys A to F for identification data</li> <li>• 6 function keys F1 to F6</li> <li>• 4 weighing-function keys</li> <li>• Numeric entry keypad</li> <li>• Navigation keypad with Enter-key</li> </ul>

### Power supply

Voltage	100-240 V, +10/-15%, 50/60 Hz Or 24V optional
Power input	60VA approx.

### Interfaces

Standard	1 x RS232
Optional (maximum 8 more interfaces)	CL20mA, RS232, RS422/485, Ethernet, WLAN, USB (Slave), Bluetooth, Profibus-DP, Digital 4I/O intern or up to 64I/O extern via Relaysbox-8, Analog-Out, PS2/MFII for external keyboard

The interfaces are accessible via IP-protected receptacles

### Approvals, Assessment

Metrology	NTEP, OIML
Hygiene	NSF, EHEDG, GMP
EI. Safety	CSA - C US, CE
IP protection	IP69K, DIN 40050 (Desk/Wall and front of the Panel-version)

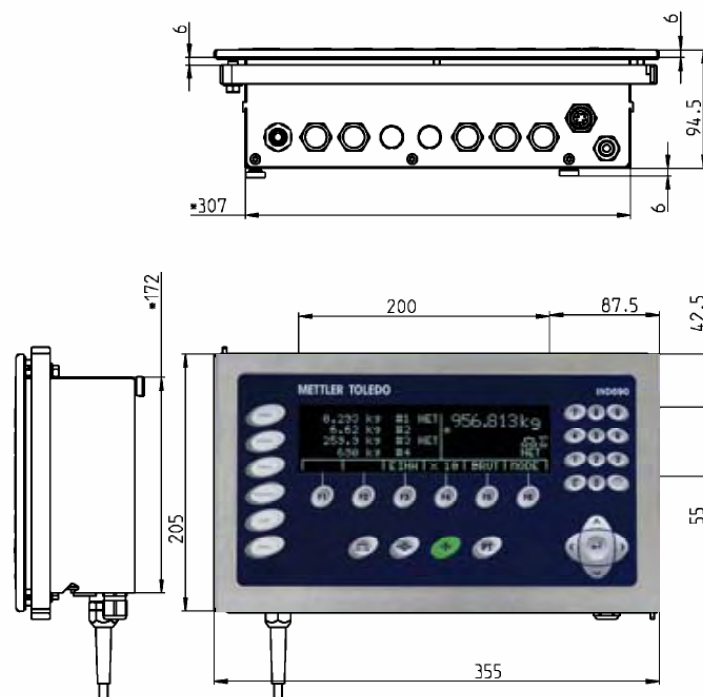
<sup>1</sup> BIG WEIGHT<sup>®</sup> is a registered trademark of Mettler-Toledo (Albstadt) GmbH.  
German Patent 197 32 659. European Patent 0 895 071.

### Weighing technology

Connectable platforms	4 (+ from it calculated sum-scale)
Types of connectable weighing platforms	IDNet-Scales, SICS-Scales (also via Bluetooth), Analog-Scales (also from other suppliers)
Technical Data of the A/D converter for Analog-Scales:	
Impedance	min. 87,5 Ohm
Excitation voltage	8.75 V
Sensitivity	0 to 3 mV/V
Max. Resolution	10.000d (NTEP) 7.000e (OIML) 450.000d non-approved
Min. verification interval	0.58µV / e

### Application Software Packages

High performance application software packages for special weighing tasks:	
Base-690	Basic functions, totalizing
Count-690	Counting, totalizing
Form-690	Formulating, totalizing
Com-690	Computer dialog mode
Sum-690	Totalizing on 3 levels
Fill-690	Dispensing
Batch-690	Multi-component dispensing
Control-690	Verifying, classifying
FormXP-690	Convenient formulating with PC connection
Sys-690	Free programmable



# IND690 Grounding Kit

## Installation Instructions

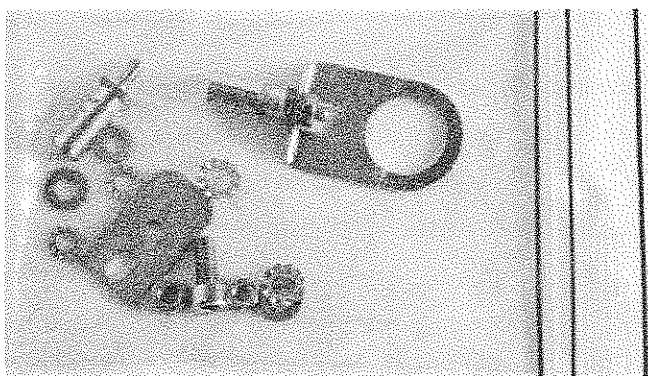
March 8, 2010

Document number: 64066444

### Introduction

This document describes the installation of the IND690 grounding kit, part number 22005326.

### Kit Contents



The kit contains the following items:

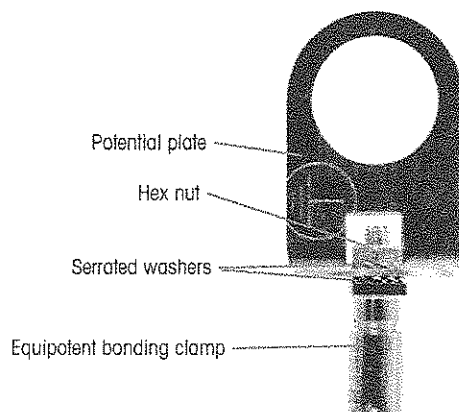
Refer to Section	# included	Description
A	1	Potential plate terminal
	1	Hex nut DIN934-M4-A2
	1	Equipotential bonding clamp DFG-1-AX
	2	Serrated lock washer DIN6798-A4, 3-CuSn9
B	1	Potential plate, weighing platform
	1	Equipotent bonding clamp DFG-1AX
	1	Fillister head screw DIN912-M5x12-A2-70
	1	Hex nut DIN934-M5-A2-70
	1	Hex nut DIN934-M4-A2
	2	Washer DIN125-5,3-140HV-A4
	1	Washer DIN125-4,3-140HV-A4
	2	Serrated lock washer DIN6798-A4,3-CuSn8
2	Serrated lock washer DIN6798-A5,3-CuSn8	

**METTLER TOLEDO**

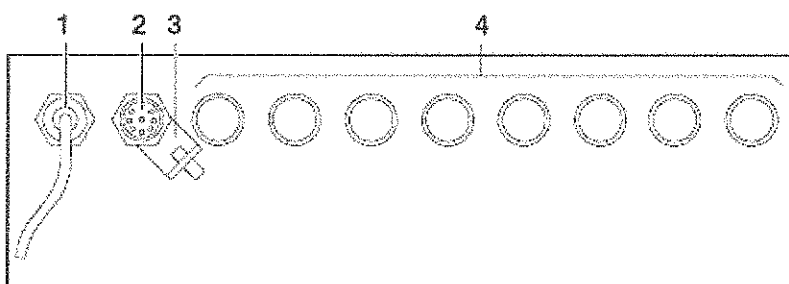
## A: Assemble and Mount Potential Plate Terminal

Mount the potential plate terminal to the IND690:

1. The first four items are assembled as shown:



2. Attach this part to the RS-232 interface as follows:
  - a. Remove the large hex washer from the port (2).
  - b. Position the potential plate (3) as shown in the illustration below.
  - c. Screw the hex washer back into place.



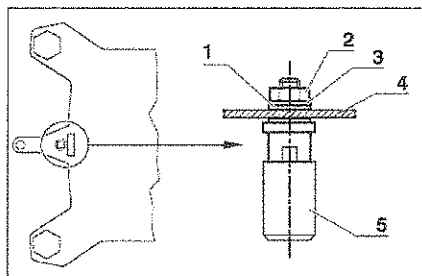
- 1 Mains connection
- 2 COM1 – standard RS232 interface
- 3 Equipotent bonding terminal (only IND690xx)
- 4 Optional interface connections COM2 ... COM9

## B: Install the Grounding Point on the Scale Base

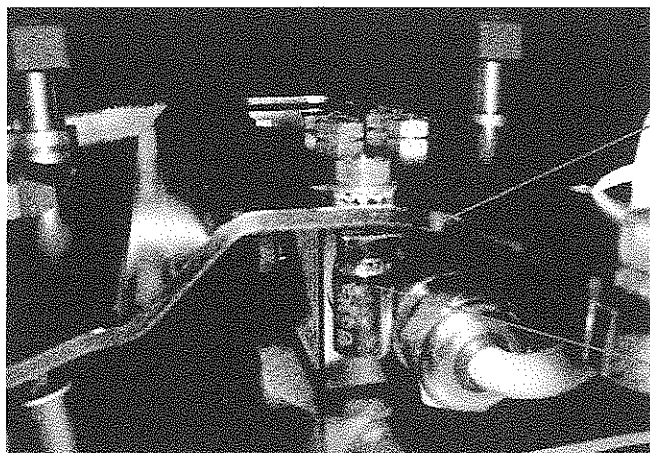
### Standard Scenario, Scales with One Hole

In this case, the potential plate is not needed.

1. Smaller lock washer (DIN6798-A4,3-CuSn8)
2. Smaller hex nut (DIN934-M4-A2)
3. Smaller washer (DIN125-4,3-140HV-A44.  
Bonding point on the scale base
4. Scale base bonding point
5. Equipotent bonding clamp DFG-1-AX



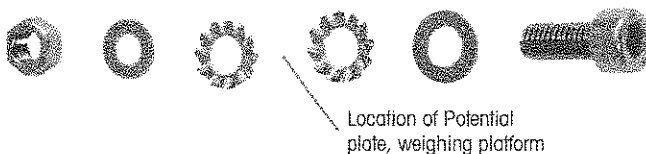
Assemble the components indicated above, at left, as shown in the illustration. The photograph below shows an **example** of an installation on a PBA430 scale base. Note that in this case the Potential plate, weighing platform is **not** needed.



### Alternative Scenario, Scales with 2 Holes

In this case, all the components listed on page 1 are used.

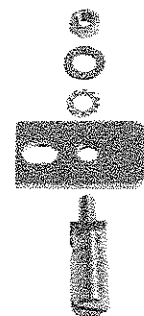
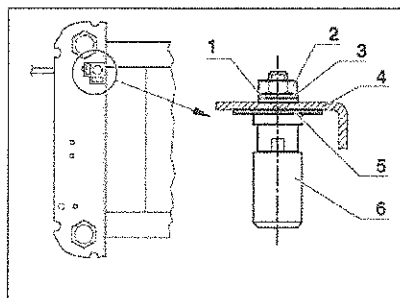
1. First, note the sequence of assembly of the Fillister head screw and its associated nut and washers:



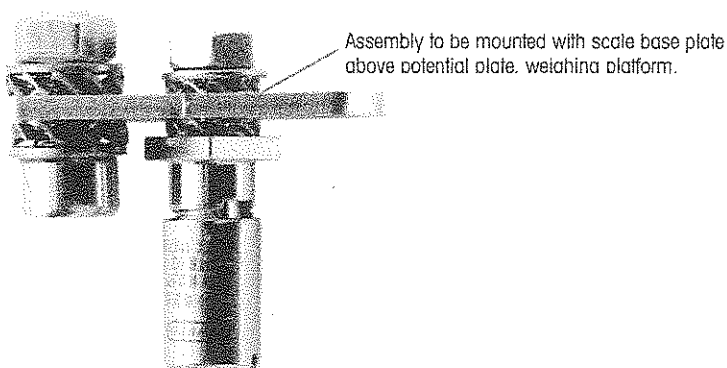
2. Place the flat and serrated washers on the screw.
3. Position the Potential plate over the holes in the weighing platform, and insert the screw through the plate and the platform.
4. Install the nut and the remaining flat and serrated washers to fasten the plate in place.

5. Install the bonding clamp and associated hardware through the remaining hole. The illustration below shows these components, and the relationship between the Potential plate and the weighing platform:

1. Smaller lock washer (DIN6798-A4,3-CuSn8)
2. Smaller hex nut (DIN934-M4-A2)
3. Smaller washer (DIN125-4,3-140HV-A44.  
Bonding point on the scale base
4. Scale base bonding point
5. Potential plate, weighing platform
6. Equipotent bonding clamp DFG-1-AX



6. The completed assembly will resemble the one shown in the illustration below:



## Earthing

To earth the scale, connect the blue lead of the power cable to the GND of the individual voltages and, internally, to the housing.

- Earthing of GND or the negative pole of the supply voltage is recommended.

## Mains Operation

METTLER TOLEDO recommends that the green-yellow lead of the power cable be connected to the earth or to the equipotential bonding of the mains or the system.

## Storage Battery Operation

If the negative pole of the storage battery is **not earthed**, the green-yellow lead of the power cable need not be connected.

If the negative pole of the storage battery is **earthed**, METTLER TOLEDO recommends that the green-yellow lead of the power cable be connected to the equipotential bonding.

# Safety instructions

## Consignes de sécurité

### IND690

#### Language: English

IND690 additional safety instructions

Below mentioned safety instruction regarding the usage of lithium battery is an extension to the service manual chapter 2 safety instructions (manual part number: 22012813).

- Caution. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

#### Langue: Français

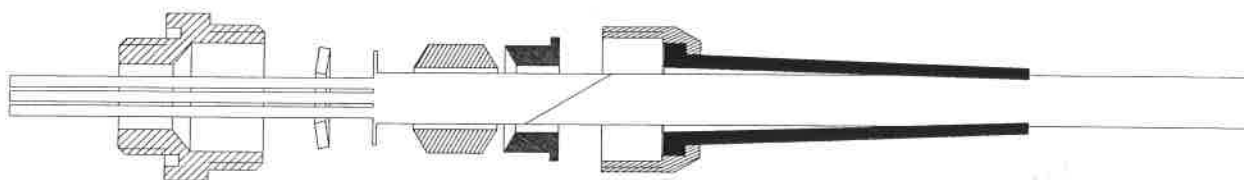
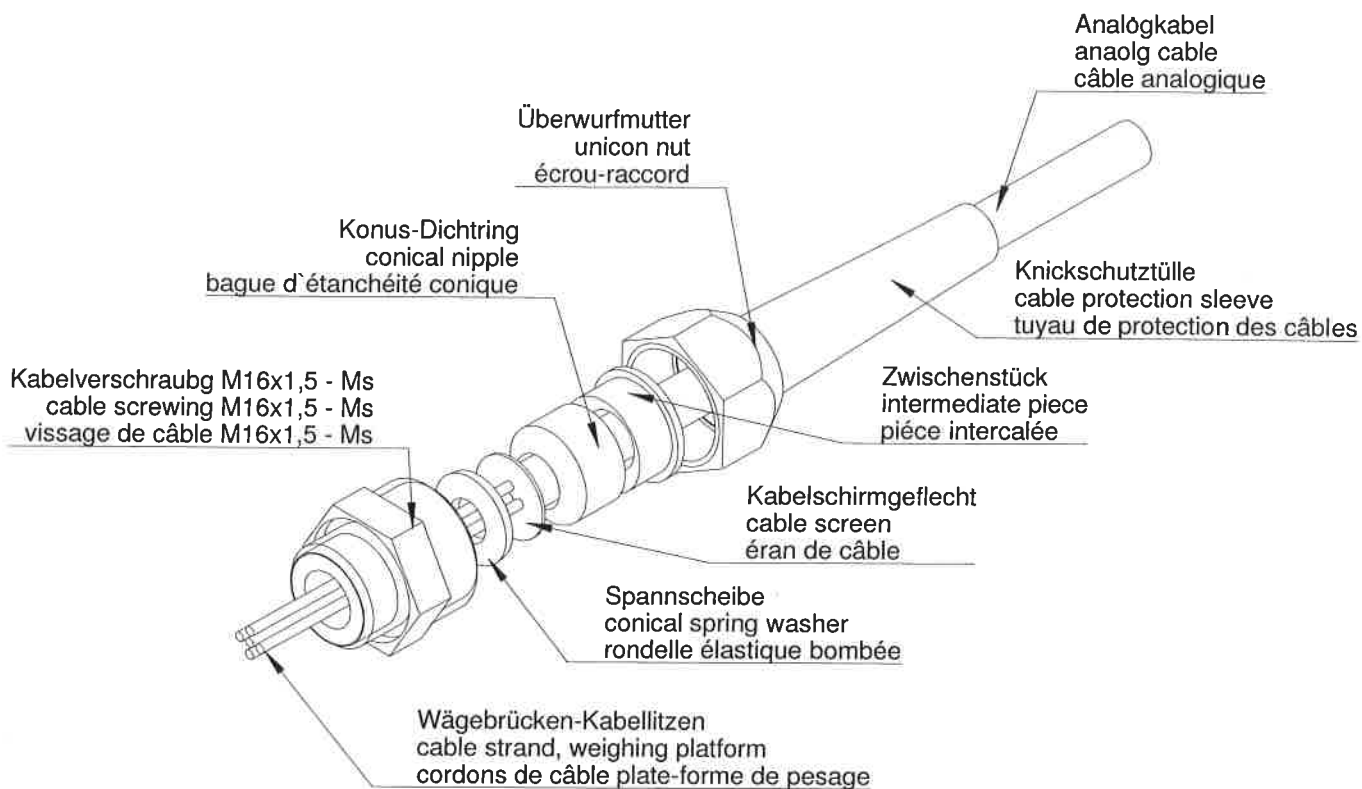
IND690 consignes de sécurité supplémentaires

L'instruction sécurité mentionnées ci-dessous qui concerne l'utilisation de la batterie au lithium est une extension pour le chapitre du manuel 2 consignes de sécurité de service (manuel de référence: 22012814).

- Attention. Danger d'explosion si la batterie est remplacée de façon incorrecte. Remplacez-la uniquement avec une batterie de même type ou équivalente recommandée par le fabricant. Jetez les batteries usagées conformément aux instructions du fabricant.

**Montageanleitung**  
**Installation instructions**  
**Notice de montage**

**METTLER TOLEDO**



**22015152**

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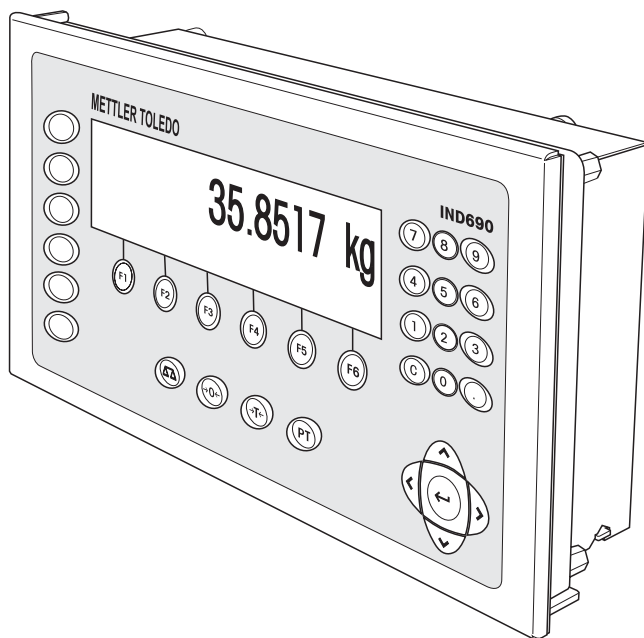
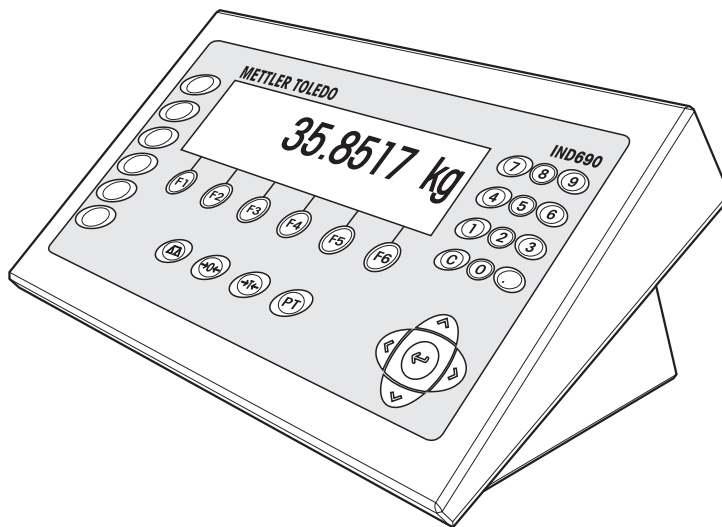
Internet: <http://www.mt.com>



# Operating instructions

## METTLER TOLEDO MultiRange IND690-Base weighing terminals

**METTLER TOLEDO**



[www.mt.com/support](http://www.mt.com/support)

## ServiceXXL

### Tailored Services

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use according to these instructions and regular calibration and maintenance by our factory-trained service team ensure dependable and accurate operation, protecting your investment. Contact us about a ServiceXXL agreement tailored to your needs and budget.

We invite you to register your product at [www.mt.com/productregistration](http://www.mt.com/productregistration) so we can contact you about enhancements, updates and important notifications concerning your METTLER TOLEDO product.

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# 1 Safety instructions

## 1.1 Safety instructions for IND690xx



The explosion-protected IND690xx weighing terminal fulfills Device category 3 and is approved for operation in Zone 2 (gases) and Zone 22 (dusts) hazardous areas.

There is an increased risk of injury and damage when the IND690xx weighing terminal is used in a potentially explosive atmosphere.

Special care must be taken when working in such hazardous areas. The code of practice is oriented to the "Safe Distribution" concept drawn up by METTLER TOLEDO.

- Competence**
- ▲ The IND690xx weighing terminal, accompanying weighing platforms and accessories may only be installed, maintained and repaired by authorised METTLER TOLEDO service personnel.
  - ▲ The mains connection may only be connected or disconnected by the owner's electrician.
- Ex approval**
- ▲ For the exact specification please refer to the statement of conformity.
  - ▲ In order to avoid electrostatic charging the IND690xx may only be installed in rooms or areas at which strong electric field strengths cannot occur from experience.
  - ▲ No modifications may be made to the terminal and no repair work may be performed on the modules. Any weighing platform or system modules that are used must comply with the specifications contained in the installation instructions. Non-compliant equipment jeopardizes the safety of the system, cancels the Ex approval and renders any warranty or product liability claims null and void.
  - ▲ The cable glands must be tightened so that a strain relief of  $\geq 20$  N per mm cable diameter is ensured.
  - ▲ When connecting external devices, always observe the maximum permissible connected loads, see installation information. It must be ensured that no voltages are fed into the IND690xx than it itself provides. The interface parameters have to fulfill the standard.
  - ▲ Peripheral devices without an Ex approval may only be operating in non-hazardous areas. It must be ensured that no voltages are fed into the IND690xx than it itself provides. In addition the maximum permissible connected loads have to be observed, see Page installation information. The interface parameters have to fulfill the standard.
  - ▲ The safety of a weighing system including the IND690xx weighing terminal is only guaranteed when the weighing system is operated, installed and maintained in accordance with the respective instructions.

- ▲ Also comply with the following:
  - the instructions for the system modules
  - the regulations and standards in the respective country
  - the statutory requirement for electrical equipment installed in hazardous areas in the respective country, e.g. EN 60079-14 and EN 6124-14
  - all instructions related to safety issued by the owner
- ▲ Before initial start-up and following service work, check the explosion-protected weighing system for the proper condition of all safety-related parts.

**Operation**

- ▲ Prevent the build-up of static electricity. Therefore:
  - only operate the IND690xx in rooms or areas at which strong electric field strengths cannot occur from experience,
  - always wear suitable working clothes when operating or performing service work on the system,
  - do not rub or wipe off the keyboard surface with a dry cloth or glove.
- ▲ Do not use protective hoods.
- ▲ Prevent damage to the weighing terminal. Hairline cracks in the keyboard membrane are also considered damage.
- ▲ If the IND690xx weighing terminal, accompanying weighing platforms or accessories are damaged:
  - Switch off weighing terminal.
  - Separate the weighing terminal from the mains in accordance with the applicable regulations.
  - Secure the weighing terminal against accidental start-up.

**Leakages**

- ▲ The IND690xx panel unit does not comply with any freedom-from-leaks rating. Therefore the installer is responsible for compliance with the freedom from leaks rating, e.g. at control cabinet installation. The respective national standards furthermore have to be observed. At least a freedom-from-leaks rating IP54 is required in hazardous areas, in case of conductive dust IP6X.

## 1.2 Safety instructions for IND690-24V



- ▲ Never operate the IND690-24V weighing terminal in hazardous areas; there are special scales in our product line for this purpose.
- ▲ The IND690-24V weighing terminal may only be connected to a power supply (storage battery or mains) having a 24 VDC SELV power circuit in accordance with EN 60950.
- ▲ Short-circuit danger!  
Ensure that the power supply is connected properly:  
brown lead    +24 V  
blue lead      0 V or negative pole
- ▲ The safety of the unit is endangered if it is not operated in accordance with these operating instructions.
- ▲ Only authorized personnel may open the IND690-24V weighing terminal.

### Competence

- ▲ The IND690-24V weighing terminal, accompanying weighing platforms and accessories may only be installed, maintained and repaired by authorised METTLER TOLEDO service personnel.

### Leakages

- ▲ The IND690-24V panel unit does not comply with any freedom-from-leaks rating. Therefore the installer is responsible for compliance with the freedom from leaks rating, e.g. at control cabinet installation. The respective national standards furthermore have to be observed.

## 1.3 Safety instructions for IND690



- ▲ Do not operate the IND690 weighing terminal in hazardous areas. We have special suitable scales in our range of products for hazardous areas.
- ▲ Ensure that the power socket outlet for the IND690 weighing terminal is earthed and easily accessible, so that it can be de-energised rapidly in emergencies.
- ▲ Ensure that the supply voltage at the installation site lies within in the range of 100 V to 240 V.
- ▲ The safety of the device cannot be ensured if it is not operated in accordance with these operating instructions.
- ▲ Only authorised personnel may open the IND690 weighing terminal.

### Competence

- ▲ The IND690 weighing terminal, accompanying weighing platforms and accessories may only be installed, maintained and repaired by authorised METTLER TOLEDO service personnel.

### Leakages

- ▲ The IND690 panel unit does not comply with any freedom-from-leaks rating. Therefore the installer is responsible for compliance with the freedom from leaks rating, e.g. at control cabinet installation. The respective national standards furthermore have to be observed.

## 2 Introduction and commissioning

### 2.1 Documentation

The weighing terminal comes supplied with a CD containing all the documentation on the IND690 weighing system.

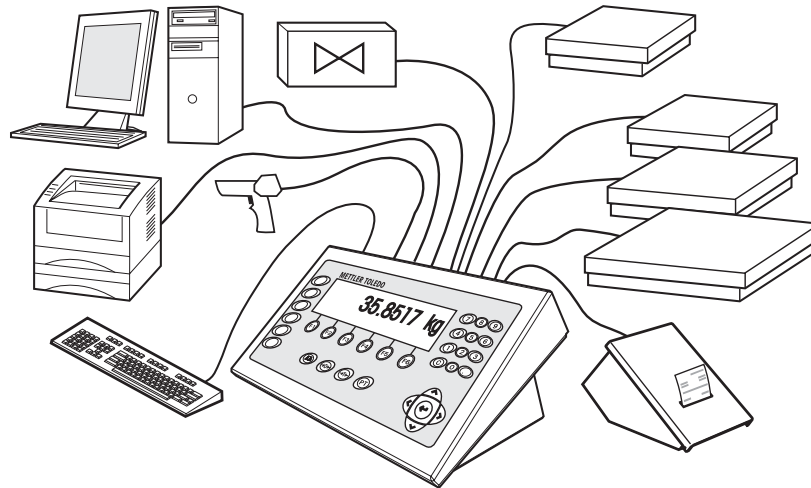
These installation instructions describe operation of the IND690 with the basic software Base-690 and all possible interfaces.

If your weighing terminal is equipped with application software (Batch-690, Com-690, Control-690, Count-690, Fill-690, Form-690, FormXP-690, Sum-690) you'll find the application specific information in the corresponding operating instructions.

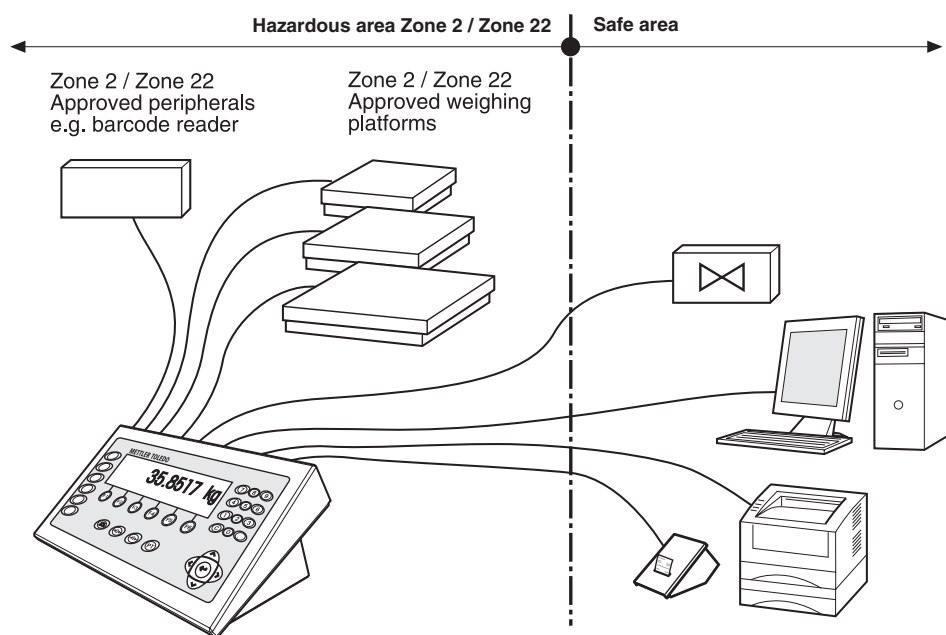
### 2.2 Applications

With the weighing terminals the following applications are possible:

**IND690  
IND690-24V**



**IND690xx**

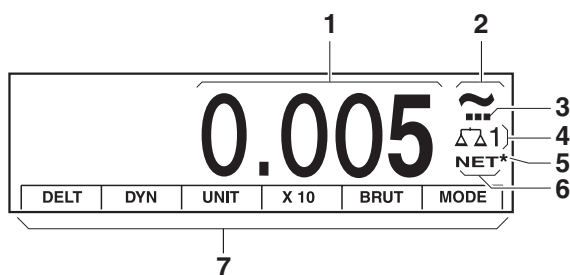




- Multi-scale operation with up to 4 weighing platforms with IND690 resp. up to 3 weighing platforms with IND690xx and IND690-24V, including weighing platforms with an analog signal output.
- Up to 9 data interfaces
  - for printing,
  - for data exchange with a computer,
  - for connecting a barcode reader,
  - for control, e.g. of valves or flaps,
  - for connecting reference scales,
  - for connecting an external keypad.

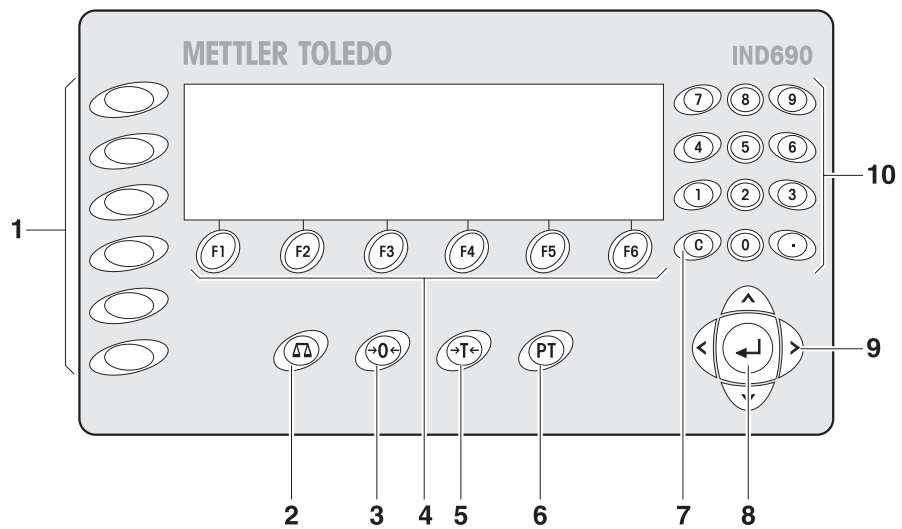
## 2.3 IND690 weighing terminals

### 2.3.1 Display



- 1 Weight display BIG WEIGHT® with sign and decimal point
- 2 Stability monitor: lights up until the weighing platform has levelled out, then the weight unit appears here
- 3 Range display for multi-range weighing platforms
- 4 Number of the weighing platform: shows the weighing platform just selected
- 5 Symbol \* for identifying weight values in the second unit or in a higher resolution
- 6 NET symbol for marking net weight values
- 7 Assignment of the function keys

### 2.3.2 Keypad



- 1 CODE A ... CODE F keys – enter identification data
- 2 SCALE key – select scale
- 3 ZERO-SET key – set scale to zero, test scale
- 4 Function keys F1 ... F6 – the current assignment is shown in the display above the key
- 5 TARA key – tare scale
- 6 TARE SPECIFICATION key – enter known tare values numerically
- 7 CLEAR key – clear entries and values
- 8 ENTER key – accept and transfer data
- 9 Cursor keys
- 10 Numeric keypad with decimal point

## 2.4 Cleaning



### DANGER OF SHOCK

→ Do not open the weighing terminal to clean.

### CAUTION

→ Make sure that unused connection sockets are covered with protective caps to protect the socket contacts from moisture and dirt.

### Cleaning

→ Wipe off the weighing terminal with a commercially available glass or plastic cleaner.

## 3 Basic functions

### 3.1 Switching on and off

#### Switch on from the standby mode

→ Press any key.

The display shows a weight value based on the last tare value and zero point.

#### Note

We recommend leaving the device switched on when it is operated in humid areas or is subjected to high temperature fluctuations. This ensures that condensate does not form on the device inside.

#### Switch off

→ Press function key OFF.

The display goes out and the IND690 weighing terminal is in the standby mode. The zero point and tare value remain saved.

#### Note

If the function key OFF does not appear in the current assignment, press the cursor key < or > several times if necessary until OFF is displayed.

#### Switch on with restart

1. Relieve weighing platform.
2. Press function key OFF and hold down until METTLER TOLEDO IND690 (factory setting) or text you have specified appears in display. Then weight value appears.

The weighing platform is restarted.

#### Note

The text which appears during switch-on with a restart is saved in the text memory 20, see page 37.

### 3.2 Charge indicator in storage battery operation (IND690-24V only)

If the supply voltage drops below 22.5 V, a continuous whistle sound is emitted for approx. 10 to 30 minutes.


If the supply voltage drops below 21 V, the IND690-24V weighing terminal switches off automatically.

→ If the whistle sound is emitted, complete the current weighing process and charge or replace the storage battery.

### 3.3 Setting to zero

Setting to zero corrects the influence of minor dirt on the load plate.


In the case of excessive dirt which cannot be compensated by setting to zero, the display shows OUT OF RANGE.

- Manual zero set**
1. Relieve weighing platform.
  2. Press .
- The display shows 0.000 kg.

**Automatic zero set** On certified weighing platforms the zero point of the weighing platform is automatically corrected when the weighing platform is relieved.  
The automatic zero set can be switched off in the master mode on noncertified weighing platforms.

### 3.4 Taring

#### 3.4.1 Manual taring

1. Place empty container on scale.
  2. Press .
- The tare weight is saved and the weight display set to zero.  
The display shows the NET symbol.

#### Notes

- When the weighing platform is relieved, the saved tare weight is displayed with a negative sign.
- The weighing platform only saves **one** tare value.

#### 3.4.2 Automatic taring

#### Condition

AUTOTARA ON must be set in the master mode, see page 48.

- Place empty container on scale.  
The container weight is automatically saved and the weight display set to zero.  
The display shows the NET symbol.

#### Note

The saved tare weight is automatically deleted with the load is removed from the weighing platform.

### 3.4.3 Specify tare weight

#### Enter numerically

1. Press **PT**.
2. Enter tare weight (container weight) and confirm with **←**.  
When weighing platform is relieved, the entered tare weight is displayed with a negative sign.

#### Note

The weight unit for entering the tare weight can be selected with the cursor keys **<** or **>**.

#### Correct entry

→ Clear the entry character by character with **C** and repeat correctly.

#### Copy tare constant

The IND690 has 999 tare memories for frequently used tare weights programmed in the master mode.

1. Enter memory number: 1... 999.

2. Press **PT**.

The memory number, the saved tare weight and the designation appear briefly in the display. The next to appear is the weight display with the net weight referred to the called-up tare weight and the symbol NET.

### 3.4.4 Recall currently saved tare weight

The saved tare weight can be recalled at any time.

→ Enter INFO, **PT** sequence.

The saved tare weight is displayed.

### 3.4.5 Clear tare weight

→ Relieve weighing platform and tare.

– or –

→ Specify tare weight 0.

– or –

→ Enter **PT**, **C** sequence.

#### Note

If AUTO CLEAR TARE ON is selected in the master mode, the saved tare weight is automatically deleted with the load is removed from the weighing platform.

## 3.5 Weighing

### Weighing without taring

- Lay weighing sample on weighing platform.  
Gross weight (total weight) is displayed.


### Weighing with taring

1. Place the empty container on the weighing platform and tare.  
The display shows the net weight and the NET symbol.

### Weighing with tare specification

1. Place filled container on weighing platform.  
The display shows the gross weight (total weight).
2. Specify tare weight or recall tare memory.  
The display shows the net weight (container content) and the NET symbol.

#### Note

If the MinWeight function is activated in the master mode, weight values that fall below the defined minimum weight are identified with the blinking symbol .


## 3.6 Working with several weighing platforms

Up to 4 weighing platforms can be connected to the IND690, and up to 3 weighing platforms can be connected to the IND690xx and IND690-24V.

Depending on the setting in master mode, only the currently active scale appears in the display (serial Multi-scale mode) or all scales are operated at the same time (parallel multi-scale mode). A constantly updated sum scale is also available in parallel multi-scale mode.

### 3.6.1 Switch over weighing platform

The weighing platform currently selected is shown on the terminal.

- Press .

The next weighing platform is selected.

– or –

- Enter number of weighing platform and press .

The desired weighing platform is selected.

### 3.6.2 Displaying several scales simultaneously

#### Condition

PARALLEL SCALE is selected in the master mode.

→ Press the cursor key < or > as often as necessary until all scales are shown in the display.

#### Notes

- When all scales are displayed, only the function keys UNIT and GROSS are still active. These function keys then act on all connected scales.
- The sum scale can only be operated non-verifyably. It is therefore identified by the symbol  $\Sigma$ .
- The calculation mode and resolution of the sum scale can be configured in master mode, see Section 5.5.5.

## 4 Additional functions

The assignment of the 6 function keys of the IND690 weighing terminal differs depending on the weighing task. The current assignment is shown above the function keys. The cursor keys < or > can then be used to switch to other function key assignments.

Independent of the application software, the IND690-Base has the following additional functions:

<b>DELT</b>	<b>DYN</b>	<b>UNIT</b>	<b>X 10</b>	<b>GROSS</b>	<b>MODE</b>
Weighing with the DeltaTrac, see 4.1	Dynamic weighing, see 4.2	Change weight unit, see 4.3	Increase resolution, see 4.4. This key is not assigned when the control mode is continually switched on.	Display gross weight, see 4.5	Activate master mode, see Chapter 5

<b>MUL-T</b>	<b>ADD-T</b>	<b>ITARE</b>	<b>SETP</b>	<b>OFF</b>	<b>INFO</b>
Multiplicative tare function, see 4.7	Additive tare function, see 4.8	Sandwich tare, see 4.9	Set dynamic set points, see 4.6. This key is not assigned if no set points are defined.	Switching off terminal	Calling up information

Without additional application software, the IND690-Base still provides the following function keys for totalizing:

<b>PLUS</b>	<b>MAN</b>	<b>CANC</b>	<b>SUM</b>	<b>TARG</b>	<b>ITEM</b>
Totalizing is described in Section 4.10					



## 4.1 Weighing with the DeltaTrac

The DeltaTrac is an analog display which makes it easier to read the weighing results.

In the master mode you can select how the DeltaTrac is displayed for the various weighing tasks FILLING, CLASSIFYING or CHECKWEIGHING.

### Notes

- With the DeltaTrac signals you can also control lamps, flaps or valves, see page 65.
- With the AnalogOut-690 interface the net value can be output as an analog current or voltage signal, see page 68.

### Application FILLING

For weighing-in to a target weight with tolerance monitoring.

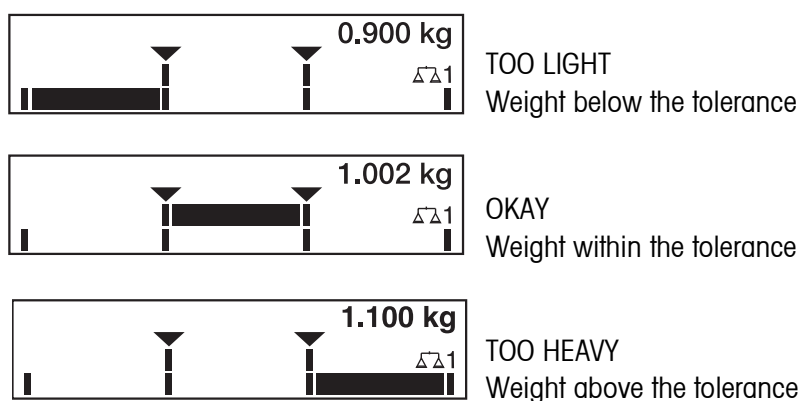
**Example: Target weight = 1.000 kg, tolerance = +/-1 %**



### Application CLASSIFYING

To evaluate test samples as OKAY, TOO LIGHT or TOO HEAVY, based on a target weight and specified +/- tolerances.

**Example: Target weight = 1.000 kg, tolerance = +/-1 %**



### Application CHECKWEIGHING

For determining the difference between the target and actual weight.

**Example: Target weight = 1.000 kg, tolerance = +/-1 %**

0.900 kg
▼▼▼ DELTA    -0.100 kg    ▲▲1

Weight below the tolerance  
Difference: -0.100 kg

1.002 kg
▼▼▼ DELTA    +0.002 kg    ▲▲1

Weight within the tolerance  
Difference: +0.002 kg

1.100 kg
▼▼▼ DELTA    +0.100 kg    ▲▲1

Weight above the tolerance  
Difference: +0.100 kg

#### 4.1.1 Preset DeltaTrac target values

##### Enter numerically

1. Press DELT key.
2. Enter target weight and confirm with  $\leftarrow$ .
3. Enter the lower tolerance TOL (-) as a % of the target weight and confirm with  $\leftarrow$ .
4. Enter the upper tolerance TOL (+) as a % of the target weight and confirm with  $\leftarrow$ .

##### Notes

- The weight unit for entering the DeltaTrac target values can be selected with the cursor keys < or >.
- The terminal suggests symmetrical tolerances TOL. (+) and TOL. (-). However, different tolerances are also permissible.

##### Correct entry

→ With  $\textcircled{C}$  the entry is corrected character by character.

##### Copy constants

The IND690 weighing terminal has 999 DeltaTrac memories for frequently used target values and tolerances, which are programmed in the master mode.

1. Enter number of DeltaTrac memory: 1 ... 999.
2. Press DELT key.

##### Reference sample

1. Press DELT key.
2. Lay sample on weighing platform and confirm with  $\textcircled{\Delta}$ .
3. Only for FILLING and CLASSIFYING: Enter tolerance and confirm with  $\leftarrow$ .
4. Remove sample from weighing platform.

<b>Limits</b>	Minimum target value	10 Digit, can be adjusted in master mode, see page 38
	Maximum target value	configured maximum load
	Minimum tolerance	1 Digit
	Maximum tolerance	100 %

**Note**

If the limits are not observed, a message appears in the display, e.g. MIN-DEL = ..., for too small a target value.

**Clear DeltaTrac target value** → Press DELT **C** key sequence.  
DELTA CLEARED appears briefly in the display, then the weight is shown.

## 4.2 Dynamic weighing

With the dynamic weighing function you can weigh restless weighing samples, e.g. live animals. To do this, specify the number of weighing cycles for which the mean weight value is to be taken.

1. Set container on the weighing platform.
2. Tare weighing platform.
3. Place weighing sample in container.
4. Press DYN key and enter number of weighing cycles.  
Possible values: 1 ... 255.
5. Start dynamic weighing with ←.
6. After cycle time has expired, center line of display shows:  
RESULT x.xxxx kg.  
This display is retained until the next weighing is started or until it is cleared.

**Delete result** → Press **C**.

**Notes**

- Dynamic weighing results are automatically printed when AUTO PRINT is set in the master mode, see page 41.
- During dynamic weighing it is not possible to display the weight value BIG WEIGHT DISPLAY, which fills the entire display.
- Dynamic weighing can also be started with the interface command AW016..., see page 116.

## 4.3 Change weight unit

If an additional, second weight unit is configured in the master mode, it is possible to switch back and forth between the two weight units.

→ Press UNIT key.  
The weight value is shown in the second unit.

**Note**

Possible second weight units are: mg, g, kg, lb, oz, ozt, dwf.

## 4.4 Working in a higher resolution

Depending on the setting of the master mode block CONTROL MODE (see page 41), the weight value can be displayed in a higher resolution continuously or when called. Weight values in a higher resolution are marked with a \*.

### Displaying weight values in higher resolution

→ Press X 10 key.

The weight value is displayed in at least a 10x higher resolution.

The higher resolution is displayed until the X 10 key is pressed again.

### Note

With certified weighing platforms, the weight value only appears in a higher resolution as long as the X 10 key is pressed.

## 4.5 Display gross weight

The gross weight can only be displayed when a tare weight has been saved.

→ Press GROSS key and hold down.

The gross weight is displayed.

## 4.6 Specifying dynamic set points

### Conditions

- 4 I/O-690 interface or 8-690 relay box connected.
- SETPOINT MODE ON is selected and a dynamic switching point is allocated to at least one output in the mastermode.

**Use** If the specified set point values are exceeded or dropped below, digital outputs are set, e.g. for controlling lamps, flaps, valves etc.


Dynamic set points can be set for each weighing procedure individually.

The set points are retained until they are overwritten with a new value or deleted.

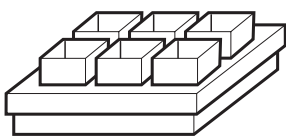
### Specifying set points

1. Press the SETP key; the entry prompt for the first dynamic set point appears.
2. Enter the desired weight value and confirm with ↵.
3. If additional dynamic set points are configured, the entry prompt appears for the next dynamic set point.
4. Enter the desired weight value and confirm with ↵.
5. Repeat the procedure until all set points have been entered.

### Deleting set points

→ Press the SETP key and delete the value with the .

## 4.7 Multiplicative tare function



The multiplicative tare function is particularly suitable when pallets with identical containers are filled. If the number of containers and tare of the individual container are known, the weighing terminal calculates the total tare.

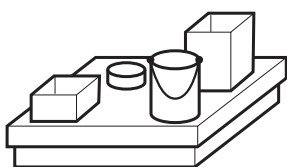
1. Press MUL-T key.
2. Enter known tare weight of individual container and confirm with  $\leftarrow$ .
3. Enter number of containers and confirm with  $\leftarrow$ .

When the weighing platform is relieved, the total tare value is shown in the display with a negative sign.

### Note

The weight unit for entering the tare weight can be selected with the cursor keys < and >.

## 4.8 Additive tare function



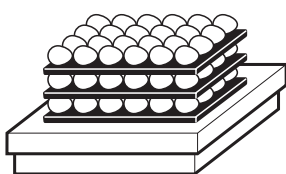
With the additive tare function you can subtract the tare of additional containers with a known tare weight for related weighings, e.g. if containers with different weights are filled on one pallet.

1. Place container on scale and press ADD-T key.
2. Enter known tare weight and confirm with  $\leftarrow$ .  
The total net weight appears in the weight display.

### Note

The weight unit for entering the tare weight can be selected with the cursor keys < or >.

## 4.9 Sandwich tare



With the sandwich tare function you can detect additional tare weights for related weighings without losing the total gross and total net.

### Example

In production or shipping boxes are laid between individual layers in the transport container. The weight of these boxes can be subtracted with this function.

1. Press ITARE key.
2. Place sandwich tare, e.g. box, on scale and confirm with  $\leftarrow$ .  
The net weight is retained.

## 4.10 Totalizing

Totalizing is only possible at the IND690-Base without additional software.  
The following function keys are available for totalizing:

PLUS	MAN	CANC	SUM	TARG	ITEM
Totalize the items	Totalize manual weight values	Remove the last item from the total	Display and print out the total	Enter the target value for the total	Enter a start and end value for the item counter

### 4.10.1 Course

- Place an item on the scale.  
If the weight exceeds the minimum deflection specified in mastermode, the "+" sign flashes behind the concurrent total.

<b>NO.: 0001</b> <b>SUM: 1,000 kg+</b>	<b>1,000 kg</b>
---	-----------------

- Press PLUS key.  
The item is added to the total and transferred to the printer/PC.
- Totalize further items.  
The item counter (NO.) and the transaction number are both increased by 1.

### 4.10.2 Printing the total and finalising

- Press the SUM key.  
The total is displayed and printed out.
- In order to continue with totalizing, press the ← key.  
– or –  
→ To clear the sum, press the **C** key.  
The item counter is reset to the start value.

### 4.10.3 Manual entry

In order to add known weights to the total proceed as follows:

- Unload the scale and press the MAN key.
- Enter the weight and use the ← key to add to the total.

**4.10.4 Totalizing to a target value**

If a target value is entered, the TARGET REACHED message is displayed when this weight value is reached.

1. Press the TARG key.
2. Enter the target weight and confirm with  $\leftarrow$ .
3. Totalize the items.
4. When the TARGET REACHED message is displayed, finalize the total.

**4.10.5 Totalizing with an item counter**

The start and end value of the item counter can be specified between 1 and 9999.

1. Press the ITEM key.
2. Enter the start value and confirm with  $\leftarrow$ .
3. Enter the end value and confirm with  $\leftarrow$ .
4. Totalize the items.
5. When the TARGET REACHED message is displayed, finalize the total.

**4.10.6 Cancelling an item**

The last added item can be removed from the total.

→ Press the CANC key.

The last item is removed from the total, the item counter is reduced by 1.

**4.11 Display ID code and test weighing platform**

Each time the weighing platform configuration is changed the ID code counter is increased by 1. On certified weighing platforms the displayed ID code must match the ID code on the ID code sticker, otherwise the calibration is no longer valid.

**Display ID code**

→ Press  $\rightarrow 0 \leftarrow$  and hold until IDENTCODE = ... appears in the display.

**Test weighing platform**

→ Press  $\rightarrow 0 \leftarrow$  again.

The connected weighing platform is checked. The display shows CHECK SCALE and then SCALE IS OK after completing the test.

**Note**

If weighing platform is defective, display shows SCALE ERROR.

## 4.12 Identifications

The weighing terminal is equipped with 6 identification data memories for storing identification data Code A ... Code F.

The memories have a name, e.g. Article No., and a content which identifies the current weighing, e.g. 1234567.

The memories are named in the master mode, and the names can be noted on the keyboard. When the CODE keys are pressed, the name appears in the display.

Identification data Code A ... Code F can be entered or recalled for each weighing and are printed immediately.

### 4.12.1 Enter identification

An identification may contain a maximum of 30 characters.

#### Enter numerical identification

1. Press one of the keys CODE A ... CODE F.
2. Enter identification data Code A ... Code F via the numeric keypad and confirm with ↵.

#### Enter alphanumeric identification

1. Press one of the keys CODE A ... CODE F.  
The functions keys are given the following assignment:

ABCDE	FGHIJ	KLMNO	PQRST	UVWXY	Z/(-)
Selection of letters A to E	Selection of letters F to J	Selection of letters K to O	Selection of letters P to T	Selection of letters U to Y	Selection of letter Z or a special character

2. Select desired group of letters, e.g. press KLMNO key.
3. Select desired letter.  
The display changes again to the above selection.
4. Repeat entry in steps 2 and 3 for additional characters.

#### Notes

- Letters and numbers can be combined as desired.
- It is possible to switch between upper case and lower case with the cursor keys ^ and v. The following special characters are then also available with the lower case letters: \*, \$, %, &.

#### Recall fixed text memory

The IND690 weighing terminal is equipped with 999 memories for fixed texts which can be programmed in the master mode and used as identifications.

1. Enter memory number: 1 ... 999.
2. Press a key CODE A ... CODE F.  
The saved fixed text is now assigned to the selected identification Code A ... Code F.



**Other entry possibilities** Identifications can also be entered with a barcode or RFID reader, see section 4.15, or with an external keypad, see section 4.16.

#### 4.12.2 Clear identifications

→ Press desired key CODE A ... CODE F and clear memory content with .

### 4.13 Recall information

On the weighing terminal memory contents and system information can be recalled.

1. Press INFO key.

Then the following function key assignment appears:

DELT	TARE	TEXT	ALIBI	DATE	VERS
Display DeltaTrac values	Display tare weight	Display fixed texts and name of keys CODE A ... CODE F	Recall content of alibi memory, see section 4.18. This selection only appears when Alibi-Memory-690 is installed.	Display date and time	Display version numbers of installed software modules

W&M	ERROR	COM	AB	DNGLE	
Display checksum of the software relevant to calibration. The correct checksum is documented in the calibration approval.	Fault / Event memory display	Calling up the settings of the interfaces	Display designation and contents of application blocks including sub-blocks To access directly first enter the number of the desired application block.	Display of production date, number and type of the hardware dongle	

2. Select desired information.

The information is displayed for the set DISPLAY DURATION, then the weighing terminal changes to the weighing mode again.

**Notes**

- When several values are displayed, the IND690-Base automatically changes to the next value after the set DISPLAY DURATION.
- With **C** it is possible to switch to the next value or back to the weighing mode.
- When the GA46 printer is connected, the version numbers of the installed software modules are automatically printed.
- After COM has been pressed, the settings of all 9 interfaces are displayed consecutively, for example  
COM1: RS232  
MODE: DEFAULT  
SETTING: 9600, N, 8, 1  
STATUS: ACTIVE

**4.13.1 Recall memory**

1. Press INFO key.
2. Enter number of memory and press DELT, TARA or TEXT key depending on desired memory.

**Recall name of CODE A ... CODE F keys**

1. Press INFO key.
2. Press one of the keys CODE A ... CODE F.  
The display shows the current Code.

**4.13.2 Calling up information on the installed interface modules**

Information on the installed interface modules can be called up with the following key combinations:

INFO 50	Type and software version of the installed WLAN module
INFO 51	Status of the WLAN module
INFO 60	Type and software version of the installed Bluetooth module
INFO 61	Status of the Bluetooth module

**4.13.3 Recall application-specific information**

See operating instructions of the relevant application software.

## 4.14 Print or transfer data

If a printer or computer is connected, weighing results can be printed out or transferred to the computer.

In the master mode you can set the following for this purpose:

- Data to be printed or transferred,
- Manual or automatic data transfer,
- Key which triggers printing or data transfer.

### Factory setting

- Manual triggering with ↵.
- The content of the display is transferred or printed.

## 4.15 Enter values with barcode or RFID reader

If you have connected a barcode or RFID reader to the weighing terminal, you can make all required entries, such as identifications or target specifications, easily with the barcode or RFID reader.

### 4.15.1 Read in any desired entries with the barcode or RFID reader

#### Example Read in identification Code A

1. Press CODE A key; the weighing terminal expects the entry of Code A.
2. Enter identification Code A with the barcode or RFID reader.  
The identification read in appears in the display.
3. Confirm barcode entry with ↵.

### 4.15.2 Read in a frequently used entry directly with the barcode or RFID reader

If your working procedure repeatedly requires the same entry, you can configure the barcode or RFID reader in the master mode (see page 63) so that no additional keys need to be pressed on the weighing terminal.

#### Example Barcodes are automatically read in as Code A









If the working procedure requires the entry of Code A:

- Enter identification Code A with barcode reader.  
The information read in appears in the display and is automatically processed by the weighing terminal as Code A.

## 4.16 Working with external keypad

If the weighing terminal is equipped with the interface PS2-690, an external keyboard can be connected so that alphanumerical values can be entered conveniently.

In addition to the alpha and numerical keys, the following additional scale functions can also be operated with the external AK-MFII keypad.

Function for IND690-Base	External keypad	Function for IND690-Base	External keypad
Function key F1	F1	CODE A key	Shift F1
Function key F2	F2	CODE B key	Shift F2
Function key F3	F3	CODE C key	Shift F3
Function key F4	F4	CODE D key	Shift F4
Function key F5	F5	CODE E key	Shift F5
Function key F6	F6	CODE F key	Shift F6
 key	F9	 key	Shift F9
 key	F10	 key	Shift F10
 key	F11	 key	Shift F11
 key	F12	 key	Shift F12

### Note

The language of your external keyboard can be set in the master mode block LAYOUT EXT. KEYBOARD, see page 68.

## 4.17 Working with a second display

An ID1 Plus, ID3s, ID7 or another IND690 weighing terminal can be connected to the IND690 weighing terminal as a second display.

### Conditions

- Interface CL 20mA-690 installed in passive operating mode (factory setting).
- AUTO-DIR setting selected in master mode (see page 56).
- Weighing terminal is connected as second display with cable 00 504 511.

### Operation possibilities on second display

The following functions are also possible on the second display:

- Set to zero
- Taring

### IND690 as second display

With IND690 as a second display, the weight value fills the entire display (BIG WEIGHT DISPLAY ON).

## 4.18 Recall data from Alibi memory

With the AlibiMemory-690 memory module you can fulfill your recording obligations in certified operation without having to archive paper.

AlibiMemory-690 automatically assigns every weighing operation a consecutive data record number that also appears on the printout, saves the net and tare value, the date and the time and also the scale number, tare source, MinWeigh and, if necessary, additional ID codes.

Immediately after the following actions, entries are made in the alibi memory:

- Interface commands "S" and "SX"
- Interface command "SR" as soon as a stable weight value has been determined
- Pressing ←
- Automatic transfer key printout when a certain weight value is reached (AutoPrint)

The AlibiMemory-690 operates according to the principle of a ring memory: When the capacity limit of 675500 data records is reached, the oldest data record is deleted and overwritten with data from the latest weighing.

By entering suitable search criteria you can quickly access the data of a very specific weighing.

### 4.18.1 Initiate

→ Press INFO, ALIBI key sequence.

The function keys change to the following assignment:

<b>FIND</b>	<b>&gt;&gt;...</b>		<b>PRINT</b>	<b>-&gt; Num</b>	<b>END</b>
Enter search criteria	Search for next matching data record starting with oldest		Print displayed data record	Search for data record with known data record number	Exit Info Alibi and return to normal mode

### 4.18.2 Fast search with entry of data record number

1. Press ->Num key.
2. Enter number of data record to be searched for and confirm with ←. AlibiMemory-690 now searches for the desired data record.

#### Notes

- The search may take up to 10 seconds.
- If no data record with the entered number is found, the message NO MATCHING DATA RECORD appears.

### 4.18.3 Search with other search criteria

→ Press FIND key.

The function keys are given the following assignment:

<b>DATE</b>	<b>TIME</b>	<b>NET</b>	<b>TARE</b>	<b>START</b>	<b>END</b>
Enter date as search criterion	Enter time as search criterion	Enter net value as search criterion	Enter tare value as search criterion	Start search with entered search criteria	Terminate search

All offered search criteria can be combined with each other. The entered search criteria are shown in the display in clear text. This enables you to search for a find a specific weighing.

#### Enter date

→ Press DATE key and enter complete date in DD.MM.YY form.

#### Enter time

→ Press TIME key and enter desired time in one of following formats.

Format HH            all weighings between HH.00.00 and HH.59.59 are found  
 Format HH.MM        all weighings between HH.MM.00 and HH.MM.59 are found  
 Format HH.MM.SS    only the weighing at the time HH.MM.SS is found

**Enter net/fare value**

1. Press NET or TARE key.
2. Enter weight value and confirm with  $\leftarrow$ .  
The function key assignment changes back again for selection of the search criteria.

**Note**

The weight unit for entering the weight values can be selected with the cursor keys < or >.

**Start search**

- Press START key.  
AlibiMemory-690 searches for the oldest data record which meets the entered search criteria.

**Notes**

- The search may take up to 10 seconds.
- If no data record with the entered values is found, the message NO MATCHING DATE RECORD appears.
- If no search criterion has been entered, the oldest data record is displayed.

**4.18.4 Displaying data records**

Found data records are shown in the display on 2 pages. You can change between the two pages with the cursor keys < or >.

**Example 1st page**

D/Z:	02.04.98	09:25:51	1/2
NUM:	000987		
NET:	25.000 KG		ΔΔ 1
TARE:	100,346 KG	PT	

**Example 2nd page**

ARTICLE NO.	2/2
A: 123456789	
ORDER NO.	
B: 55555	

**Scroll forward/back** The key >>... enables you to scroll within the found data records.

**Notes**

- When, during scrolling with the key >>... all entries of the AlibiMemory-690 have been searched through, the message END OF FILE appears.
- If a weight value has fallen below the set minimum weight, the weight value is also shown in the alibi memory with the symbol  $\leftarrow$ .

#### 4.18.5 Printing records

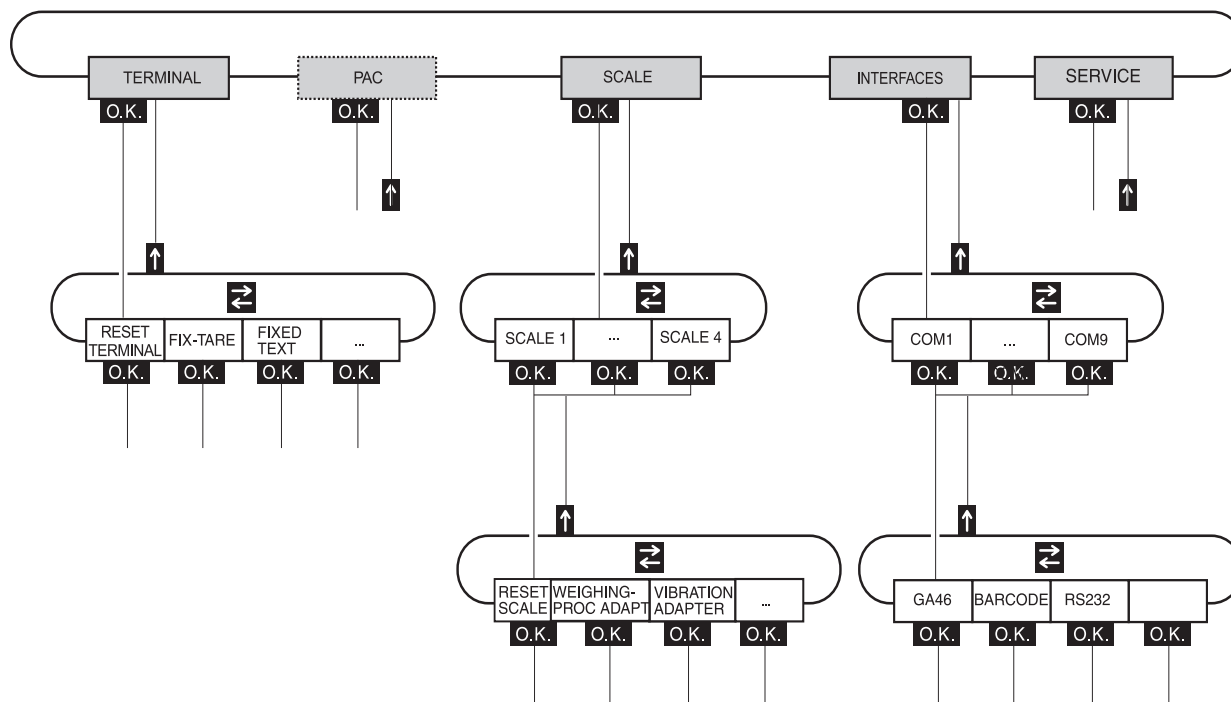
1. Press the PRINT key.
2. Press the PRINT key in the next window.
3. Enter the number of the first record to be printed.
4. Enter the number of records to be printed.
5. Enter the output port (COM1 ... COM9).  
The selected records are printed at the specified interface.



## 5 Settings in the master mode

### 5.1 Overview of the master mode

In the master mode you adapt the IND690-Base weighing terminal to meet your needs. Depending on the configuration, the master mode is divided into 4 or 5 master mode blocks, which are in turn divided into further blocks.



**TERMINAL** For system settings, such as entering the date and time or loading permanent texts, see section 5.3.

**PAC** To set application-specific parameters, see operating instructions of the respective application software.  
APPLICATION is displayed instead at the IND690-Base, see Section 5.4.

**SCALE** To select one of the connected weighing platforms. For each selected weighing platform the parameters are then set which concern the weight value, e.g. stability detector, unit, etc., see section 5.5.1.

**INTERFACES** To select an interface. The communication parameters are then set for each interface, see section 5.6.

**SERVICE** For configuring the weighing platform(s).  
On IDNet weighing platforms only for METTLER TOLEDO service technicians.  
On weighing platforms with an analog signal output, see service manual A/D converter Point ME-22004256.

## 5.2 Operating the master mode

### 5.2.1 Enter the master mode

1. Press MODE key.  
If the current function keys assignment does not contain MODE, press the cursor keys < or > as often as necessary until the MODE key appears.
2. Enter personal code if configured.  
The display shows the first master mode block TERMINAL.

### 5.2.2 Assignment of function keys in the master mode

#### Assignment on the top level

On the top level of the master mode the function keys are assigned as follows:

←	→		↑	END	OK
Change to previous block within a level	Change to next block within a level		Exit level and return to higher-level block	Exit the master mode and return to normal mode	Recall lower-level block or confirm selection

→ Select the function by pressing the function key.

**Example** → Press the END key to exit the master mode and return to the normal mode.

#### When the function keys are otherwise allocated

→ Press the cursor keys < or > repeatedly until the function key assignment shown above appears.

#### Assignment in input masks

In input masks for several parameters, the function keys are assigned as follows:

↓↑	<	>	F▶	EDIT	↑
Select parameters	Setting parameters		Select function of function key F5: EDIT, STD, ADD, INS, etc.	Possible assignments: ADD INS EDIT DEL PRINT STD EDIT GOTO	Accept settings and return to higher-level block

### 5.2.3 Master mode operation with the navigation keys

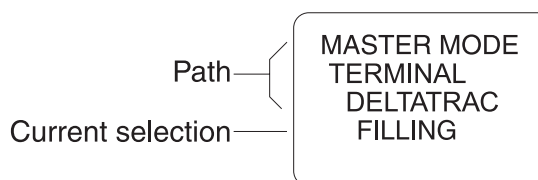
Instead of the function keys, it is also possible to use the navigation keys to operate the master mode.

Function key	Navigation key
F1 (←)	<
F2 (→)	>
F4 (↑)	^
F6 (OK)	↵

### 5.2.4 Orientation in the master mode

For improved orientation the display shows the last steps in the path of the current master mode block.

**Example** The upper 3 lines of the display show the following path for selecting the DeltaTrac application FILLING:



### 5.2.5 Entries in the master mode

The following basic rules apply to entries made in the master mode:

- Confirm (alpha)numeric entries with ↵.
- Alphanumeric entries with the IND690: see page 24.
- To accept the displayed value: Press ↵.

### 5.2.6 Emergency entrance into the master mode

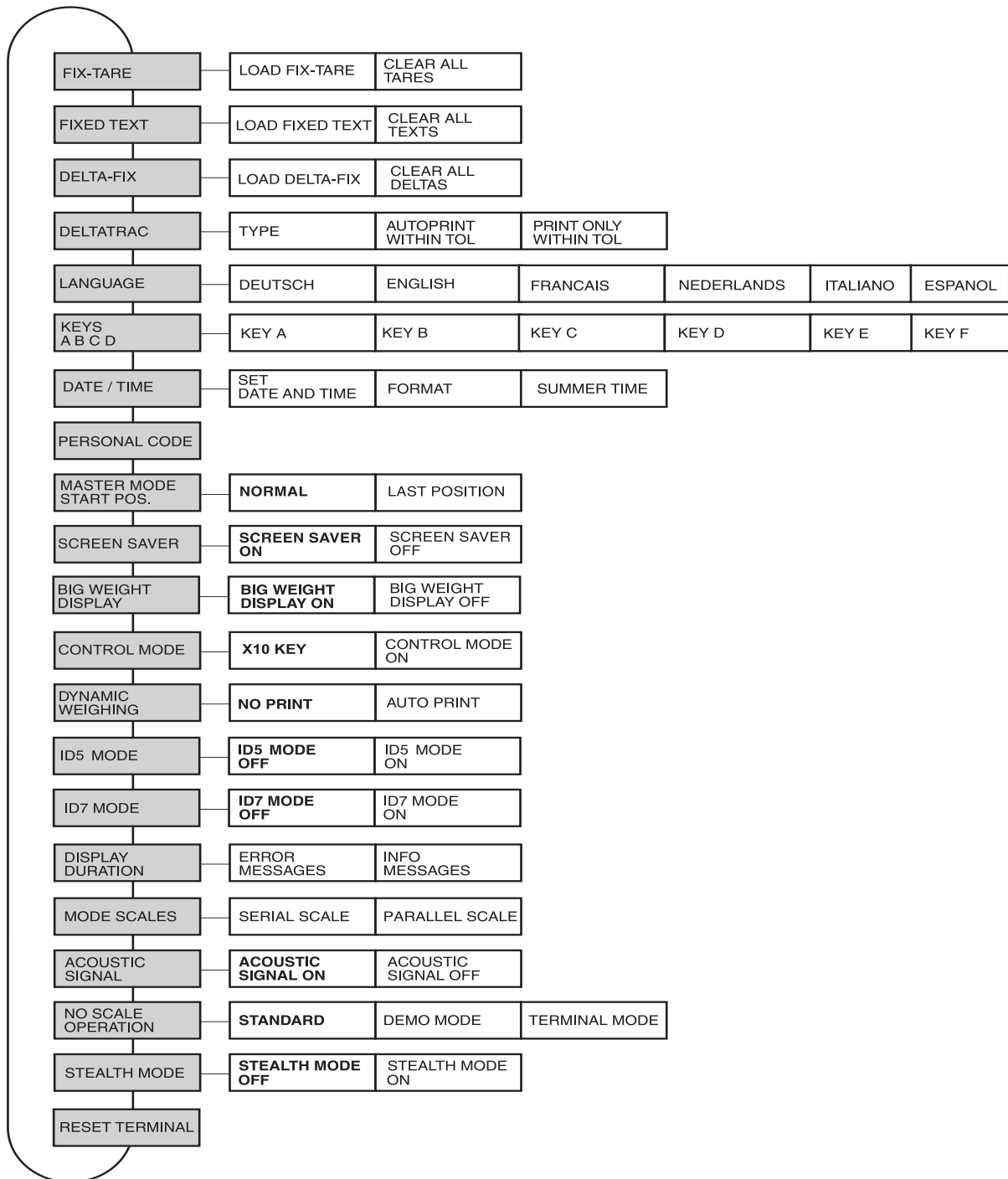
If a personal code has been assigned for entering the master mode and you have forgotten your code, you can still enter the master mode:

→ Enter the character sequence C, L, E, A, R as your personal code.

## 5.3 TERMINAL master mode block

### 5.3.1 Overview of the TERMINAL master mode block

In the TERMINAL master mode block you enter the following system settings:



#### Legend

- Blocks highlighted in **grey** are described in detail in the following.
- Factory settings are printed in **bold print**.

### 5.3.2 Settings in the master mode block TERMINAL

<b>FIXED TARE</b>	<b>Store tare values in the tare memory as a safeguard against power failure</b>
LOAD FIXED TARE	<ol style="list-style-type: none"> <li>1. Select memory number with GOTO: 1 ... 999.</li> <li>2. With ↓↑, change to WEIGHT, press EDIT and enter the tare weight in the unit displayed.</li> <li>3. With ↓↑, change to TEXT, press EDIT and enter the designation of the tare memory, max. 30 characters.</li> <li>4. To load additional tare weight constants, press ↓↑ and repeat steps 1 to 3.</li> </ol>
DELETE ALL TARES	Delete all tare memories.
Notes	<ul style="list-style-type: none"> <li>• With the cursor keys &lt; or &gt; you can scroll through the existing tare memories.</li> <li>• When entering the tare weight, it is possible to change the weight unit with the cursor keys &lt; or &gt;.</li> </ul>

<b>FIXED TEXT</b>	<b>Store texts in the text memory as a safeguard against power failure</b>
	These texts can for example be assigned as identifications or can be additionally output when printing.
LOAD FIXED TEXTS	<ol style="list-style-type: none"> <li>1. Select memory number with GOTO: 1 ... 999.</li> <li>2. With ↓↑, change to TEXT, press EDIT and enter the designation of the text memory, max. 30 characters.</li> <li>3. To load additional fixed texts, press ↓↑ and repeat steps 1 and 2.</li> </ol>
DELETE ALL TEXTS	Delete all text memories.
Notes	<ul style="list-style-type: none"> <li>• With the cursor keys &lt; or &gt; you can scroll through the existing text memories.</li> <li>• Fixed text No. 20 is displayed when switching on with a restart, see Page 11.</li> </ul>

<b>FIXED DELTA</b>	<b>Store target weight/tolerance combinations in DeltaTrac memories as a safeguard against power failure</b>
LOAD FIXED DELTA	<ol style="list-style-type: none"> <li>1. Select memory number with GOTO: 1 ... 999.</li> <li>2. With ↓↑, change to TARGET, press EDIT and enter the target weight in the unit displayed.</li> <li>3. With ↓↑, change to TOL.(–), press EDIT and enter the lower tolerance in the unit displayed.</li> <li>4. With ↓↑, change to TOL.(+), press EDIT and enter the upper tolerance in the unit displayed.</li> <li>5. To load additional DeltaTrac constants, press ↓↑ and repeat steps 1 to 4.</li> </ol>
DELETE ALL DELTA	Delete all DeltaTrac memories.
Notes	<ul style="list-style-type: none"> <li>• With the cursor keys &lt; or &gt; you can scroll through the existing DeltaTrac memories.</li> <li>• When entering the target weight and tolerances, it is possible to change the weight unit with the cursor keys &lt; or &gt;.</li> <li>• The terminal suggests symmetrical tolerances TOL. (+) and TOL. (–). However, different tolerances are also permissible.</li> </ul>

<b>DELTATRAC</b>	<b>Set DeltaTrac application</b>
TYPE	Select DeltaTrac application
FILLING	Weigh in target weight within a tolerance range (factory setting)
CLASSIFYING	Evaluate the test samples as good, too light or too heavy based on the target weight and tolerance
CHECKWEIGHING	Determine difference between target and actual weight
AUTO PRINT WITHIN TOL	Automatic printout when actual weight lies within the specified tolerance
PRINT ONLY WITHIN TOL	Printout only when actual value lies within the specified tolerance
MIN. DELTA	Specify minimum target weight, adjustable from 10 ... 100 d, factory setting: 40 d

<b>LANGUAGE</b>	<b>Select dialog language</b>
	Possible settings: German, English, French, Dutch, Italian, Spanish

KEYS A B C D E F	Name identification keys CODE A ... CODE F
KEY A (B, C, D, E, F)	Identification data CODE A (CODE B, CODE C, CODE D, CODE E, CODE F)
TEXT	Naming the ID key
LENGTH	Max. 30 characters possible, factory setting: 20 characters
REQUEST FOR INPUT	Set request for input for the selected key Possible settings:
	OFF CODE A (CODE B, CODE C, CODE D, CODE E, CODE F) does not have to be entered
	RENEW A new identification must be entered for every weighing
	REUSE An identification can be used for several weighings

DATE / TIME	Enter date and time
SET DATE AND TIME	
DATE	Enter date in the displayed format
TIME	Enter time in the displayed format
FORMAT	
DATE	Select date format Possible settings: DD.MM.YY (factory setting), MM.DD.YY, YY.MM.DD, DD.MM.YYYY, MM.DD.YYYY, YYYY.MM.DD
SEP	Select separating character in date format Possible settings: "." (factory setting), ":", "/", "-"
TIME	Select time format Possible settings: HH:MM:SS 24 h (factory setting), HH:MM:SS 12 h, HH:MM 24 h, HH:MM 12 h
SEP	Select separating character in time format Possible settings: ":" (factory setting), "."

<b>DATE / TIME</b>	<b>Enter date and time</b>
SUMMER TIME	
SUMMER TIME OFF	No automatic changeover to summer time
SUMMER TIME ON	Configure automatic changeover to summer time Other settings, factory settings in brackets: START      WEEKDAY      (Sunday) WEEK              (4) MONTH          (MARCH) TIME              (2:00) END        WEEKDAY      (Sunday) WEEK              (4) MONTH          (October) TIME              (03:00:00)

<b>PERSONAL CODE</b>	<b>Load or delete code for entering the master mode</b>
CODE	Enter code with a maximum of 8 alphanumeric characters.
Comment	<ul style="list-style-type: none"> <li>• If no code is entered, access to the master mode is unrestricted.</li> <li>• The personal code can be entered as ASCII characters (default), hexadecimal code (activation using the IDENT E key) or decimal code (activation with the IDENT F key).</li> </ul>

<b>MASTER MODE START POS.</b>	<b>Select start position for entering the master mode</b>
NORMAL	Selection of the master mode blocks always begins with the TERMINAL block (factory setting).
LAST POSITION	When entering the master mode, the last block edited is displayed immediately.

<b>SCREEN SAVER</b>	<b>Switch screen saver on or off</b>
WAITING TIME	Enter time until screen saver is activated. Possible values: 1 ... 60 minutes
Comment	To hold all display elements at the same luminosity, we recommend not switching off the screen saver.

<b>BIG WEIGHT DISPLAY</b>	<b>Switch full-display indication of the weight on or off</b>
	Factory setting: BIG WEIGHT DISPLAY ON



<b>CONTROL MODE</b>	<b>Adjust control mode</b>
X10 KEY	Activation of control mode with X10 key (factory setting).
CONTROL MODE ON	This setting is only possible with non-certified scales. The weighing terminal always operates with the higher resolution.

<b>DYNAMIC WEIGHING</b>	<b>Set printing during dynamic weighing</b>
NO PRINT	Results during dynamic weighing are not automatically printed out (factory setting).
AUTO PRINT	Each result during dynamic weighing is automatically printed. Dynamic weights are marked with "Result:" on the printout.

<b>ID5 MODE ID7 MODE</b>	<b>Deactivating or activating downward compatibility with ID5 or ID7</b>
	If ID5 MODE ON or if ID7 MODE ON is selected, the IND690 is operated with downward compatibility to the ID5 or ID7. This also applies to the other application pacs. For details please contact the METTLER TOLEDO customer service. Factory setting: ID5 MODE OFF, ID7 MODE OFF

<b>DISPLAY DURATION</b>	<b>Set display duration for messages</b>
ERROR MESSAGES	Set display duration for error messages; factory setting: 2 seconds
INFO MESSAGES	Set display duration for informational messages; factory setting: 3 seconds
STATUS MESSAGES	Set the display duration for status messages, factory setting: 3 seconds

<b>MODE SCALES</b>	<b>Select between serial and parallel operating mode for the connected scales</b>
SCALES SERIAL	Serial operation of the connected scales: Only the weight value of the current scale is displayed.
SCALES PARALLEL  SUM SCALE	Parallel operation of the connected scales: All weight values of the connected scales are displayed simultaneously.  A sum scale can be defined in parallel scale operation. 1. SUM SCALE: Select ACTIVATED. 2. With $\uparrow$ , change to SCALE 1 and select YES with < or > if this scale is to be the sum scale. 3. Repeat the procedure for SCALE 2 - SCALE 4. Factory setting: SUM SCALE DEACTIVATED

<b>ACOUSTIC SIGNAL</b>	<b>Signal tone On/Off</b>
	Factory setting: SIGNAL ON

<b>OPERATION WITHOUT SCALE</b>	<b>Set the behaviour when the weighing terminal is operated without a scale</b>
	IND690 searches for connected weighing platforms while booting. If no scale is found, the following behaviour patterns are possible.
STANDARD	If no scale is found, the booting process stops and the message NO SCALES DETECTED is displayed (factory setting). To continue the booting process press the SCALE key. During operation a virtual scale is shown whose weight value can be changed and which otherwise behaves like a "real" scale.
DEMO	If no scale is found, the message NO SCALES DETECTED is displayed briefly. During operation a virtual scale is shown whose weight value can be changed and which otherwise behaves like a "real" scale.
TERMINAL	If no scale is found, the message NO SCALES DETECTED is displayed briefly. A scale is not displayed during operation, the message TERMINAL is shown. All the scale-specific functions, keys and application blocks are deactivated.

<b>STEALTH MODE</b>	<b>Switch the scale on/off without weight display</b>
	Under certain circumstances, such as high quality goods or top secret recipes, working without a weight display may be desirable. The DeltaTrac is then the only filling aid.
DELTATRAC	Select the display behaviour of the DeltaTrac optical weighing aid
STANDARD	"Normal" DeltaTrac, high resolution in the range of the target weight
LINEAR	The optical weighing aid behaves linearly to the weighed-in weight
STANDARD-I	The display behaviour of the DeltaTrac is inversely to that of the "normal" DeltaTrac
Comment	STEALTH MODE can only be activated at non-certifiable scales.

RESET TERMINAL	Reset all terminal functions to the factory setting
	DELTATRAC                      Filling Autoprint within tol: no Print only within tol: no Min.Delta = 40 d DATE/TIME                      Format = DD.MM.YY / HH:MM:SS 24h Summertime: off MASTER MODE START POS.      Normal SCREENSAVER                      ON BIG WEIGHT DISPLAY              On DYNAMIC WEIGHING              No printout CONTROL MODE                    X 10 key ID5 MODE                          Off ID7 MODE                          Off DISPLAY DURATION                2 / 3 seconds MODE SCALES                      Serial ACOUSTIC SIGNAL                on OPERATION WITHOUT SCALE      Standard STEALTH MODE                    Off
Comment	The memories are not affected by this.

## 5.4 APPLICATION master mode block

This block is only displayed at the IND690-Base.

TOTALIZING	Adapting the totalizing function
	If TOTALIZING ON is selected, the following setting options are displayed.
FUNCTION KEYS	Displaying/hiding the function keys permitted for totalizing
TARG	Display/hide the TARG key
MAN	Display/hide the MAN key
CANC	Display/hide the CANC (cancel) key
ITEM	Display/hide the ITEM (item counter) key
MINIMUM DEFLECTION	Entry of the minimum deflection that has to be exceeded so that the next item can be totalized. Possible settings: 1 ... 999 d Factory setting: 10 d
TRANSACTION NUMBER	The transaction number is increased by 1 at every totalization. When the transaction number has reached 999 999, it begins again at 000 001. Nonetheless the transaction number in this block can be set to a specific value.
SCQ FUNCTION	Recording of the mean value standard deviation, minimum and maximum Factory setting: SCQ FUNCTION OFF
RESET APPLICATION	Reset the TOTALIZING function to the factory setting

## 5.5 SCALE master mode block

The weighing platform is selected in the first block: SCALE 1 ... SCALE 4 and SCALE  $\Sigma$  for IND690 or SCALE 1 ... SCALE 3 and SCALE  $\Sigma$  for IND690xx and IND690-24V.

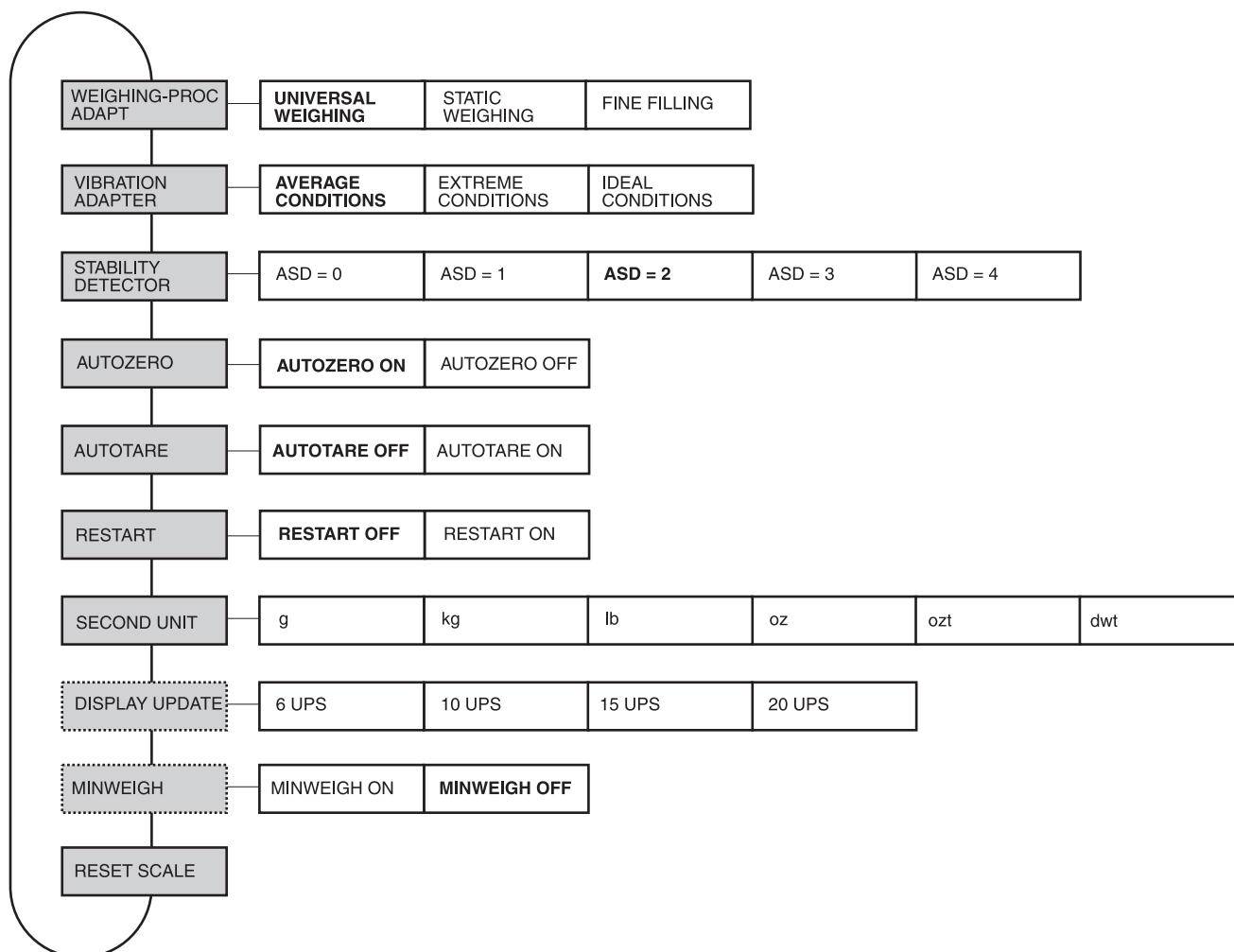
The SCALE master mode block depends on the connected weighing platform.

METTLER TOLEDO industrial scales	see Section 5.5.1
METTLER TOLEDO SICS scales	see Section 5.5.2
LabTec X-/XP-/XS scales	see Section 5.5.3
WM/WMH scales	see Section 5.5.4
Sum scale	see Section 5.5.5

### 5.5.1 SCALE master mode block for METTLER TOLEDO industrial scales

#### Overview

In the SCALE master mode block the following settings for the weight can be carried out:



- Legend**
- Blocks highlighted in **grey** are described in detail in the following.
  - Factory settings are printed in **bold print**.
  - Blocks which only appear under certain conditions have a **dotted outline**.

### Settings

<b>WEIGHING-PROC ADAPT</b>	<b>Adapt weighing platform to weighing sample</b>
UNIVERSAL WEIGHING	For solid bodies, coarse filling or checkweighing (factory setting).
STATIC WEIGHING	For solid bodies and weighing under extreme conditions, e.g. strong vibrations or weighing animals.
FINE FILLING	For liquid or powdered weighing samples.

<b>VIBRATION ADAPTER</b>	<b>Adapt weighing platform to the vibration influences of the environment</b>
AVERAGE CONDITIONS	Factory setting.
EXTREME CONDITIONS	The weighing platform operates more slowly, however is less sensitive, e.g. suitable with building vibrations and vibrations at the weighing location.
IDEAL CONDITIONS	The weighing platform operates very quickly, however is very sensitive, e.g. suitable with very calm and stable weighing location.

<b>STABILITY DETECTOR</b>	<b>Adapt automatic stability detector</b>
	<p>Possible settings:</p> <p>ASD = 0      Stability detector switched off            (only possible with non-certified weighing platforms)</p> <p>ASD = 1      fast display                      good reproducibility</p> <p>ASD = 2      ▲    ▼ (factory setting)</p> <p>ASD = 3      ▲    ▼</p> <p>ASD = 4      slow display                              very good reproducibility</p>


<b>AUTOZERO</b>	<b>Switch automatic zero-point correction on or off</b>
	<p>The automatic zero-point correction corrects the weight of minor dirt with the weighing platform unloaded.</p> <p>Factory setting: AUTOZERO ON</p>
Comment	On certified weighing platforms the zero-point correction is always switched on.

<b>AUTOTARE</b>	<b>Configuring automatic taring</b>
AUTO SET TARE	Activate/deactivate automatic taring
OFF	No automatic taring, factory setting
ON	Taring when the weight threshold is exceeded
AUTO CLEAR TARE	Activate/deactivate automatic clearing of the tare
OFF	No automatic clearing of the tare weight, factory setting
ON	Delete the tare automatically when the weight drops below the weight threshold
THRESHOLD	Entry of the weight threshold at which taring or tare clearing is carried out. Possible settings: 1 d ... 99 d, factory setting: 10 d

<b>RESTART</b>	<b>Switch restart function on or off</b>
	When RESTART ON is set, the zero point and tare value remain stored after the power supply is interrupted. When the weighing platform is switched on again, the terminal shows the current weight. Factory setting: RESTART OFF

<b>SECOND UNIT</b>	<b>Select second weight unit</b>																					
	Possible units: g, kg, lb, oz, ozt, dwt																					
	<table border="1"> <thead> <tr> <th>Unit</th> <th>Abbreviation</th> <th>Conversion to g</th> </tr> </thead> <tbody> <tr> <td>Kilogram</td> <td>kg</td> <td>= 1000 g</td> </tr> <tr> <td>Pound</td> <td>lb</td> <td>≈ 453.59237 g</td> </tr> <tr> <td>Ounce</td> <td>oz</td> <td>≈ 28.349523125 g</td> </tr> <tr> <td>Troy Ounce</td> <td>ozt</td> <td>≈ 31.1034768 g</td> </tr> <tr> <td>Pennyweight</td> <td>dwt</td> <td>≈ 1.555173843 g</td> </tr> <tr> <td>Gram</td> <td>g</td> <td>= 1 g</td> </tr> </tbody> </table>	Unit	Abbreviation	Conversion to g	Kilogram	kg	= 1000 g	Pound	lb	≈ 453.59237 g	Ounce	oz	≈ 28.349523125 g	Troy Ounce	ozt	≈ 31.1034768 g	Pennyweight	dwt	≈ 1.555173843 g	Gram	g	= 1 g
Unit	Abbreviation	Conversion to g																				
Kilogram	kg	= 1000 g																				
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Troy Ounce	ozt	≈ 31.1034768 g																				
Pennyweight	dwt	≈ 1.555173843 g																				
Gram	g	= 1 g																				
Comment	On certified weighing platforms only the units permitted by certification appear.																					

<b>DISPLAY UPDATE</b>	<b>Set display speed of the weight display</b>
	Select number of updates per second (UPS). Possible values: 6, 10, 15, 20 UPS
Comments	<ul style="list-style-type: none"> <li>This block only appears when the DISPLAY UPDATE function is supported by the connected weighing platform.</li> <li>The possible settings are dependent on the connected weighing platform.</li> </ul>

<b>MINWEIGH</b>	<b>Configure minimum weighing-in quantity</b>
MINWEIGH ON	In this setting, the blinking symbol  appears in the display when the weight on the scale falls below the stored minimum weight.
TYPE	<p>Determining the minimum weight:</p> <p>CALCULATED The minimum,5 weight is calculated:</p> <p><math>U_0</math> Measurement uncertainty when the load approaches 0.</p> <p>TOL Required tolerance</p> <p>SF Safety factor</p> <p>MINWEIGH Calculated value based on the parameters entered above</p> <p>DIRECT Enter MINWEIGH value directly</p>
MINWEIGH OFF	No monitoring of the minimum weighing-in quantity (factory setting)
Comment	MINWEIGH is only available if monitoring of the minimum weighing-in quantity is activated in service mode.

<b>RESET SCALE</b>	<b>Reset weighing platform to factory setting</b>
	<p>WEIGHING-PROC ADAPT universal weighing</p> <p>VIBRATION ADAPTER average conditions</p> <p>STABILITY DETECTOR ASD = 2</p> <p>AUTOZERO on</p> <p>AUTOTARE off</p> <p>RESTART off</p> <p>MINWEIGH off</p>

### 5.5.2 SCALE master mode block at SICS scales

Only the following settings for the weight value can be carried out at METTLER TOLEDO SICS scales:

<b>SCALE</b>	<b>Settings for the weighing value at SICS scales</b>
AUTOTARE	For details see Section 5.5.1
SECOND UNIT	
MINWEIGH	



### 5.5.3 SCALE master mode block at LabTec X-/XP-/XS scales

The following settings for the weight value can be carried out at METTLER TOLEDO LabTec X-/XP-/XS scales:

SCALE	Settings for the weighing value at LabTec X-/XP-/XS scales
WEIGHING MODE	For details see below
CONDITIONS	
MEASURED VALUE ENABLE	
TEST WEIGHT	
TEST CALIBRATION	
AUTOZERO	For details see Section 5.5.1
AUTOTARE	
RESTART	
SECOND UNIT	
DISPLAY UPDATE	
MINWEIGH	Display update is set fixed to 10 UPS

WEIGHING MODE	Adapt the weighing platform to the weighing sample
UNIVERSAL	For all the common weighing processes
FILLING	For liquid or powdered weighing sample
SENSOR MODE	Supplies a weighing signal that is filtered to different degrees depending on the setting of the ambient conditions. The filter behaves linearly (not adaptatively) with regard to time and is suitable for continuous measured value processing
CHECK WEIGHING	The scale only reacts to larger weight changes, the weighing result is very stable

CONDITIONS	Adapt the weighing platform to the conditions
STANDARD	Normal conditions, factory setting
RESTLESS	The scale operates slower, but is less sensitive. Suitable, for example, for building oscillations and vibrations at the weighing location
VERY RESTLESS	The scale operates very slowly, but is even less sensitive. Suitable, for example, for strong building oscillations and extreme vibrations at the weighing location
CALM	The scale operates very fast, but is very sensitive. Suitable, for example, for a very calm and stable weighing location

MEASURED VALUE ENABLE	Adapt the reproducibility	
VERY FAST	Rapid display	good reproducibility
FAST	▲	▼
RELIABLE + FAST	▲	▼ (factory setting)
RELIABLE	▲	▼
VERY RELIABLE	Slow display	excellent reproducibility

TEST WEIGHT	Test weight used to check the calibration
SET EXT CALIBRATION WEIGHT	Enter the weight value of the external calibration weight

TEST CALIBRATION	Settings used to check the calibration
CALIBRATION WEIGHT	
INTERNAL	Checking with the internal calibration weight
EXTERNAL	Checking with external calibration weights as entered under TEST WEIGHT External calibration weights are not possible at certified scales
Comment	For the course and starting refer to the LabTec X-/XP-/XS scales documentation

#### 5.5.4 SCALE master mode block at WM/WMH scales

The following settings can be carried out at METTLER TOLEDO WM/WMH scales:

SCALE	Settings at WM/WMH scales
DIRECT TALK	For details, see the next page
REMOTE TALK	
TEST WEIGHT	For details see Section 5.5.3
TEST CALIBRATION	
AUTOZERO	For details see Section 5.5.1
AUTOTARE	
RESTART	
SECOND UNIT	
DISPLAY UPDATE	Display Update can be configured using "Direct talk"
MINWEIGH	

<b>DIRECT TALK</b>	<b>Direct communication between IND690 and WM/WMH scale</b>
	<p>When DIRECT TALK is activated, commands can be entered and sent to the WM/WMH scale by using the SEND function key.</p> <p>In weighing mode the following information is displayed:            SEND           sent command            RCVD           answer received from the WM/WMH scale</p> <p>The possible commands are described in the WM/WMH operating instructions.</p>

<b>REMOTE TALK</b>	<b>Configuration at the PC, display at the IND690</b>
	<p>When REMOTE TALK is activated, commands to the WM/WMH scale have to be processed on a PC.</p> <p>In weighing mode the following information is displayed:            SENT           sent command            RECD           answer received from the WM/WMH scale</p> <p>Start command: RTS_x, whereby x is the scale number            End command: RTE</p> <p>The possible commands are described in the WM/WMH operating instructions.</p>

### 5.5.5 SCALE master mode block $\Sigma$

<b>SCALE <math>\Sigma</math></b>	<b>Setting a sum scale</b>
SCALE RESOLUTION	Select the scale resolution of the sum scale
METROLOGICAL	The sum scale resolution corresponds to the coarsest scale involved or the coarsest weighing range respectively
MATHEMATICAL	The weight values are totalized mathematically correctly
CALCULATION	Calculation basis for the total
NORMAL	The displayed weight values are added
HIGHRES	The high-resolution weight values are added

## 5.6 INTERFACE master mode block

### Select the interface connection

- Select the interface connection in the first block:  
COM1 ... COM9.

### Select interface type

- Specify the interface type for the selected interface connection COM1 ... COM9.

COM1 ... COM9	
NOT ASSIGNED	If the selected interface connection is not assigned.
GA46	For connecting the printer GA46/GA46-W. The data is exchanged via an RS232 interface. The other setting possibilities are described in the operating and installation instructions GA46.
BARCODE RFID	For connecting a barcode or RFID reader. The data is exchanged via an RS232 interface. For additional settings, see Section 5.6.2.
RS232	This requires an RS232 interface to be connected at the selected interface connection. For additional settings, see Section 5.6.1.
IDNET SCALE	Only for COM2 ... COM5 (IND690) or for COM2 ... COM4 (IND690xx, IND690-24V) This requires an interface IDNet-690 to be installed at the selected interface connection. For additional settings in the master mode block SCALE, see Section 5.5.
ANALOG SCALE	Only for COM2 ... COM5 (IND690) or for COM2 ... COM4 (IND690xx, IND690-24V) This requires an interface AnalogScale-690 to be installed at the selected interface connection. For additional settings in the master mode block SCALE, see Section 5.5.
SICS SCALE	Only for COM2 ... COM5 (IND690) or for COM2 ... COM4 (IND690xx, IND690-24V) This requires an interface SICS-Scale-690 to be installed at the selected interface connection. When SICS SCALE is selected, the following default settings are set: SICS mode, 9600 baud, 8 data bits, 1 stop bit, no parity. For additional settings, see Section 5.6.1.
ALIBI MEMORY	Only for COM2 ... COM9. This requires an AlibiMemory-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.3.
CL20MA	Only for COM2 ... COM9. This requires an interface CL20mA-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.1.

<b>COM1 ... COM9</b>	
RS422 RS485	Only for COM2 ... COM9. This requires an interface RS485/422-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.1.
4 I/O	Only for COM5/COM6. This requires an interface 4 I/O-690 with a relay box 4-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.4.
RELAY BOX 8	Only for COM2 ... COM9. This requires an interface RS485/422-690 with a relay box 8-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.4.
ARM100	Only for COM2 ... COM9. This requires an interface RS485/422-690 with ARM100 to be installed at the selected interface connection. For additional settings, see Section 5.6.4.
ANALOG OUTPUT	Only for COM5/COM6. This requires an interface AnalogOut-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.6.
ETHERNET	Only for COM2 ... COM9. This requires an interface Ethernet-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.7.
PROFIBUS-DP	Only for COM2 ... COM9. This requires an interface ProfibusDP-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.8.
WLAN	Only for COM2 ... COM9. This requires an interface WLAN-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.9.
BLUETOOTH	Only for COM2 ... COM9. This requires an interface Bluetooth-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.10.
BT-BLD DISPLAY	Only for COM2 ... COM9. For direct connection of the "BLD Display" as a second display. This requires an interface Bluetooth-690 to be installed at the selected interface connection. For additional settings, see Section 5.6.10.

<b>COM1 ... COM9</b>	
BT-P42	<p>Only for COM2 ... COM9. For direct connection of the "BT-P42" printer. This requires an interface Bluetooth-690 to be installed at the selected interface connection.</p> <p>For additional settings, see Section 5.6.10.</p>
BT-BARCODE	<p>Only for COM2 ... COM9. For connection of a Bluetooth barcode reader. This requires an interface Bluetooth-690 to be installed at the selected interface connection.</p> <p>For additional settings, see Section 5.6.10.</p>
BT-SICS SCALE	<p>Only for COM2 ... COM5 (IND690) or for COM2 ... COM4 (IND690xx, IND690-24V) This requires an interface Bluetooth-690 to be installed at the selected interface connection.</p> <p>When SICS SCALE is selected, the following default settings are set: SICS mode, 9600 baud, 8 data bits, 1 stop bit, no parity.</p> <p>For additional settings, see Section 5.6.10.</p>
USB	<p>Only for COM2 ... COM9.</p> <p>This requires an interface USB-690 to be installed at the selected interface connection.</p> <p>For additional settings, see Section 5.6.1.</p>
KEYBOARD PS2	<p>For connecting an external keyboard.</p> <p>Only for COM9.</p> <p>This requires an interface PS2-690 to be installed at COM9.</p> <p>For additional settings, see Section 5.6.5.</p>

### 5.6.1 Settings in the master mode blocks RS232, RS422, RS485, CL20mA, USB

RS232, RS422, RS485, CL20mA, USB	
OPERATING MODE	This selection only appears with the RS485 master mode block.
1:1 CONNECTION	Weighing terminal and peripheral are directly connected.
BUS SLAVE	For operating the weighing terminal in a bus system. The following parameters are set automatically for the dialog: No handshake, no continuous transmission, no transfer string, fixed string framing $C_{R\text{LF}}$ . The PC is the master, the terminals act as slaves and only transmit when requested to do so by the master. The master must also wait until after sending out a command until the slave's answer is received. Each terminal must be assigned a unique address. Additional setting: ENTER TERMINAL ADDRESS. Possible addresses: 1 ... 31
COMMUNICATION	Set communication parameters (factory settings are shown in bold print). All parameters are shown on a display page and can be set there; for function key assignment, see page 59.
BITS PER CHARACTER	Possible settings: 7 bits, <b>8 bits</b>
STOPBITS	Possible settings: <b>1 stop bit</b> , 2 stop bits
PARITY	Possible settings: Parity even, parity odd, parity space, parity mark, <b>no parity</b>
BAUDRATE	Possible settings: 150, 300, 600, 1200, 2400, 4800, <b>9600</b> , 19200, 38400, 57600 baud
MODE	Set operating mode. This selection does not appear when interface RS485/422-690 is operated in the BUS SLAVE operating mode.
STANDARD SETTING	Set operating mode to factory setting: MMR dialog mode, no handshake, no auto transmission (no continuous transmission), transfer string: Standard, string framing: $C_{R\text{LF}}$
DIALOG MODE	For dialog between weighing terminal and computer. For other settings see next section.
PRINT MODE	To print weighing data, e.g. on a form printer. For other settings see page 58.

## Set dialog mode

DIALOG MODE	Set dialog between weighing terminal and computer
<p>MMR</p> <p>HANDSHAKE</p> <p>AUTOMATIC CONTINUOUS TRANSMISSION</p> <p>TRANSFER STRING</p> <p>STRING FRAMING</p>	<p>For information on dialog mode with the MMR command set, see page 78. All parameters are shown on a display page and can be set there.</p> <p>Possible settings:</p> <ul style="list-style-type: none"> <li>• NO HANDSHAKE</li> <li>• CL HANDSHAKE – for additional information on the CL handshake, see page 128.</li> <li>• XON-XOFF PROTOCOL.</li> </ul> <p>This block does not appear with the RS485/422-690 interface.</p> <p>Possible settings:</p> <ul style="list-style-type: none"> <li>• NO AUTO TRANSMISSION.</li> <li>• AUTO SIR – after each measuring cycle a stabilized or dynamic weight is transmitted.</li> <li>• AUTO DIR – weight values are transmitted as with AUTO SIR and additionally, the special characters in the display are transmitted for a second display. Fixed communications parameters: 9600 baud, 7 data bits, 2 stop bits, parity even</li> <li>• AUTO SR – after each weight change which is greater than the set value, a motionless weight value and then a dynamic weight value are sent</li> </ul> <p>This block does not appear with the RS485/422-690 interface.</p> <p>Possible settings:</p> <ul style="list-style-type: none"> <li>• STANDARD – gross, net, tare</li> <li>• OPTION 082/083 – gross, net, tare in GNT form, see operating instructions, Option 082.</li> <li>• USER-DEFINED – enter numbers of the application blocks which are to be transmitted or printed out.</li> </ul> <p>Possible settings (factory settings are printed in <b>bold print</b>):</p> <ul style="list-style-type: none"> <li>• CR <b>Yes</b>/No</li> <li>• LF <b>Yes</b>/No</li> <li>• &lt;STX&gt;---&lt;ETX&gt; Yes/<b>No</b></li> <li>• BLOCK CHECK CHAR Yes/<b>No</b></li> </ul>
<p>SICS</p> <p>STANDARD</p> <p>HANDSHAKE</p> <p>AUTOREPEAT</p>	<p>Dialog mode with Standard Interface Command Set (SICS), see page 91.</p> <p>Standard setting: no handshake, no auto transmission.</p> <p>Possible settings as MMR, see above.</p> <p>Possible settings as MMR, see above.</p> <p>AUTO-DIR not possible with SICS.</p>



<b>DIALOG MODE</b>	<b>Set dialog between weighing terminal and computer</b>
<p>TOLEDO CONTINUOUS</p> <p>TRANSFER RATE</p> <p>CHECKSUM ON</p> <p>CHECKSUM OFF</p> <p>WEIGHT FORMAT</p>	<p>For the continuous transmission of net and tare values to METTLER TOLEDO devices, e.g. to a second display. For a description, see page 89. This block does not appear with the RS485/422-690 interface.</p> <p>Set the data transfer rate Possible settings: 25%, 33%, 50%, 100% Factory setting: 100%</p> <p>Checksum byte active, factory setting</p> <p>Checksum byte inactive, the transfer format is shortened by 1 character.</p> <p>Possible settings:</p> <ul style="list-style-type: none"> <li>• Leading zeroes (factory setting)</li> <li>• Leading blanks</li> </ul>
<p>TOLEDO SHORT CONTINUOUS</p> <p>TRANSFER RATE</p> <p>CHECKSUM ON</p> <p>CHECKSUM OFF</p> <p>WEIGHT FORMAT</p>	<p>For the continuous transmission of net values to METTLER TOLEDO devices, e.g. to a second display. For a description, see page 89. This block does not appear with the RS485/422-690 interface.</p> <p>Set the data transfer rate Possible settings: 25%, 33%, 50%, 100% Factory setting: 100%</p> <p>Checksum byte active, factory setting</p> <p>Checksum byte inactive, the transfer format is shortened by 1 character.</p> <p>Possible settings:</p> <ul style="list-style-type: none"> <li>• Leading zeroes (factory setting)</li> <li>• Leading blanks</li> </ul>
<p>PE SEND CONTINUOUS</p>	<p>For connecting a PE balance as a reference balance, only with IND690-Count and Interface CL20mA-690.</p>
<p>SECOND DISPLAY</p>	<p>Used to connect an IND4xx terminal as a second display</p>

### Set print mode

PRINT MODE	Configure printout on an external printer
HANDSHAKE	Possible settings: <ul style="list-style-type: none"> <li>• NO HANDSHAKE</li> <li>• XON-XOFF PROTOCOL</li> </ul>
LINE LENGTH	Enter number of characters per line. Possible settings: 1 ... 240 characters Factory setting: 40 characters
LINE FRAMING	Enter ASCII character for line framing. Possible settings: ASCII 0 ... 255 Factory setting: ASCII 013 010 (C <sub>R</sub> L <sub>F</sub> )
REPORT TYPE	Assignment of one of two possible printout formats to the configured printer. Possible settings: <ul style="list-style-type: none"> <li>• REPORT TYPE A e.g. for barcode printer</li> <li>• REPORT TYPE B e.g. for A4 printer</li> </ul>
CONFIGURATION PRINTOUTS  TRANSFER KEY CODE A KEY ... CODE F KEY DYNAMIC KEY PAC KEYS	Configuration of the printouts assigned to the individual keys. For each offered key, the current configuration can be printed out with the key sequence CHANGE CONFIGURATION, F▶ (possibly several times) and PRINT.  Configuration options: <ul style="list-style-type: none"> <li>• CHANGE CONFIGURATION See next section</li> <li>• DEFAULT SETTING Key-specific, if existent</li> <li>• DELETE ALL All blocks of the data string are deleted</li> <li>• PAPER FEED Adjustment range: 0 ... 9 lines</li> <li>• REPORT ON/OFF Switch key printout on/off</li> <li>• # OF COPIES Setting range: 1 ... 9 copies Factory setting: 1 copy</li> </ul> Only for the <b>transfer key</b> : <ul style="list-style-type: none"> <li>• PRINT INTERLOCK Prevents the same article from being weighed several times</li> <li>• ZERO LIMIT The weighing platform has to be unloaded at least under the zero limit before a new article can be weighed Setting range: 1 ... 99 d Factory setting: 10 d</li> <li>• MIN. DEFLECTION The weighing platform has to be deflected by at least the minimum deflection before the new article is weighed Setting range: 1 ... 99 d Factory setting: 30 d</li> </ul>

<b>PRINT MODE</b>	<b>Configure printout on an external printer</b>
AUTOMATIC PRINTOUT	Switch automatic printout for transfer key on/off. When AUTO PRINTOUT ON is selected, a printout for the transfer key is automatically created for each weight change > x digits. Possible settings: 1 ... 255 digits (factory setting: 30 digits)
DECIMAL FORMAT DOT (.) COMMA (,)	Decimal display Decimal point (factory setting) Decimal comma
PRINT LIST COMPLETE LIST LIST AB LIST SCALE LIST INTERFACES LIST KEY CONFIGURATIONS	Print settings Print a complete list of all the parameters Print only application blocks Print only the scale parameters Print only the interface parameters Print only the key configurations

### Change configuration

**Function keys** The function keys are assigned in CHANGE CONFIGURATION as follows:

	<	>	F▶	ADD	↑
	Display previous entry	Display next entry	Select function of function key F5: ADD, INS etc.	ADD INS EDIT DEL PRINT	Return to next highest level; changes are not saved

The printout can be edited with function key F5:

ADD	Adds a new entry at the end of the printout.
INS	Inserts a new entry in front of the displayed entry.
EDIT	Changes into the EDIT mode for the displayed entry to edit the entry.
DEL	Deletes the displayed entry.
PRINT	Creates a key printout.

## EDIT mode

**Function keys** The following function keys are available in the EDIT mode:

<->	<	>	F▶	SAVE	↑
Select parameters	Set parameters, scroll back	Set parameters, scroll forward	Select function of function key F5: SAVE, EDIT	Confirm changes and return to higher level	Cancel EDIT mode and return to higher level; changes are not saved

**Display page** The setting of the parameters of an entry appears in a clear layout on a display page (example):

TRANSFER KEY	[EDIT]	(2/7)
TYPE: AB		STYLE: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
CRLF: YES	FILL: NO	PAD: 01
DATA:		011-013

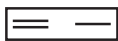
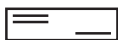

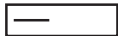
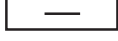
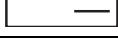
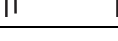
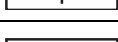
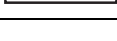
**First display line** Information for orientation in an entry

- Key name
- Mode: EDIT, INS or ADD
- Number of the display entry and total number of entries for the current printout.

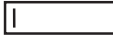
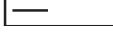

**TYPE parameter** Selection possibilities:

- AB Output content of an application block with or without designation
- TEXT Print out any desired text
- CHRn Insert n of any desired ASCII characters in the line, e.g. for tables; selection of character via DATA parameter
- LINE Blank line or separator line with any desired alphanumeric characters
- DB Accesses a database field. When a field is printed out, all entries of the field are listed.  
The option DB is only available when the software application supports access to a database.  
The offered database fields are application-specific.


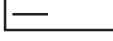
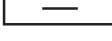
**STYLE parameter** STYLE determines in which format the designation and content of the application block are printed; adjustment possibilities:

TYPE	STYLE
AB DB	 Designation and content in grouped style
	 Designation and content in two lines, grouped style
	 Designation and content separated with extra blank spaces
	 Content alone, left-justified
	 Content alone, centred
	 Content alone, right-justified
TEXT	 Left-justified
	 Centred
	 Right-justified

**CRLF parameter** Force line feed; the CRLF parameter is only available for:

-  Text, left-justified
-  Content alone, left-justified
-  Designation and content separated with extra blank spaces
- Type CHRn


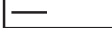
**FILL parameter** Show content with leading blank spaces up to maximum available length; the FILL parameter is only available for:

-  Designation and content separated with extra blank spaces
-  Content alone, left-justified
-  Content alone, centred

**PAD parameter** Show designation and content separated with x blank spaces

Possible settings: 0 ... 63 extra blank spaces.

The PAD parameter is only available for:

-  Designation and content separated with extra blank spaces
-  Content alone, left-justified

**DATA/FIELD parameter** Depending on the TYPE selected, DATA or FIELD is available.

TYPE	DATA/ FIELD	ENTRY
LINE	DATA	1 alphanumeric character Entry also possible as ASCII code, see below
AB	DATA	Number of application blocks to be output: xxx The application block can be further specified with the following keys: AB_EXT: _ For selecting read-only memories: xxx_yyy SUB-BLK: . For selecting a sub-block: xxx.z or xxx_yyy.z RANGE: - For entering a range: xxx-xxx or xxx_yyy-yyy
CHRn	DATA	1 alphanumeric character Entry also possible as ASCII code, see below
TEXT	DATA	Alphanumeric characters
DB	FIELD	Select database field

#### Entry of DATA parameter

To enter data or select database fields, the EDIT mode must be active.

1. Press **F▶** key, repeat if necessary until the assignment of the F5 key changes to EDIT.
2. Press the EDIT key; an input mask appears.
3. Enter data in the format and with the keys offered.
4. Complete entry with **↵**.

#### Enter ASCII code for LINE and CHRn parameters

1. Open the entry mask with the EDIT key.
2. Press IDENT F and enter the ASCII code numerically.
3. Complete the numeric entry with IDENT F.
4. Complete entry with **↵**.

### 5.6.2 Set barcode or RFID reader

BARCODE, RFID	Set barcode or RFID reader
TYPE  DL900/DL910/ DLL6000/LS3603/ GRYPHON BT100/ HERON-G D130/ FIRESCAN D131 ...  OTHER	Select barcode or RFID reader. When one of the barcode or RFID readers is selected, the communication and mode parameters for the selected barcode or RFID reader are automatically set.  For other barcode or RFID readers: Settings in the sub-blocks COMMUNICATION and MODE as for the blocks RS232/RS422/RS485/CL20mA/USB, see page 5.6.1. The PRINT MODE setting is not possible when using barcode or RFID readers!
DESTINATION BLOCK 000/00	Enter the number of the application block and of the subsequent block with which the barcode or RFID entry is to be described. When a target block is selected, barcode or RFID information can be read directly into this block without having to press a key beforehand, see page 27.
AUTOMATIC ENTRY	If AUTOMATIC ENTRY ON is selected, the received barcode or RFID code is shown in the display and is then accepted as the entry automatically. The display duration can be set in the TERMINAL master mode block, see page 41.
DISPLAY DATA  UNTIL TIMEOUT  UNTIL KEYPRESS	Only for RFID  The read-in data are displayed for the duration of the set display duration.  The read-in data are displayed until a key is pressed.

### 5.6.3 Setting AlibiMemory

ALIBI MEMORY	Configure contents of the entries of the alibi memory
ENTRY LENGTH  15 CHARACTERS  35 CHARACTERS  45 CHARACTERS  55 CHARACTERS  55 CHARACTERS  55 CHARACTERS  55 CHARACTERS  55 CHARACTERS	Use ↓↑ to select from various entries, the contents are shown in the display.  Gross, tare, date/time, scale number, MinWeigh, tare source; 15 characters Factory setting  Same as 1, additionally ID code A (20 characters)  Same as 1, additionally ID code A (30 characters)  Same as 1, additionally ID code A (20 characters) + ID code B (20 characters)  Same as 1, additionally ID code A (20 characters) + ID code C (20 characters)  Same as 1, additionally ID code A (20 characters) + ID code D (20 characters)  Same as 1, additionally ID code A (20 characters) + ID code E (20 characters)  Same as 1, additionally ID code A (20 characters) + ID code F (20 characters)
Note	If an alibi memory had already been initialised and the format is changed, all previous entries (in the old format) are deleted. For safety, a corresponding notice appears before initialisation.



### 5.6.4 Configure inputs/outputs

4 I/O / RELAY BOX 8 / ARM100	
INPUT	Operate inputs internally or externally.
INTERNALLY	<p>Factory setting. Additional settings:</p> <p>CONFIGURE INPUTS Select the desired setting for every input.            Factory setting for IND690-Base:            Input 1 not in use            Input 2 zero setting            Input 3 taring            Input 4 entry (ENTER key)            Input 5 ... 8 not in use            Possible settings: see page 127</p> <p>Additional settings, only for 4 I/O:</p> <p>ON/OFF HIGH ACTIVE Factory setting, the weighing terminal is switched off when ON/OFF = 1. After the digital input has been activated, the display goes out, and the content of the text read-only memory 021, factory setting appears in the upper left corner: POWER OFF.</p> <p>ON/OFF LOW ACTIVE The weighing terminal is switched off when ON/OFF = 0.</p> <p>ON TIME Delayed switch-on: After the On signal has been activated, the weighing terminal still remains switched off for the configured period.            Possible settings: 0 to 9 seconds</p> <p>Off TIME Delayed switch-off: After the Off signal has been activated, the weighing terminal still remains switched on for the configured period.            Possible settings: 0 ... 9 seconds</p> <p><b>Note:</b> The input ON/OFF has priority over the keyboard, i.e. the weighing terminal can only be switched on again in the POWER OFF state via the ON/OFF input! In addition, entry into the master mode is permitted via the F6 key to be able to correct incorrect settings.</p>
EXTERNALLY	<p>Inputs are independent of the weighing functions.            Read status of the inputs with the AR707 command, see page 121.</p>



**SETPOINT MODE ON –  
defining set points**

After SETPOINT MODE ON is selected, the following input mask appears for the setpoints 1 ... 4 (Example):

SP1:	F↑	A012	W1	1.2345 KG
SP2:	F↓	A013	W2	0.5678 KG
SP3:	D↑	A012	ALL	
SP4:	D↓	A011	ALL	

4 parameters can be set for each set point:

**a) Type of set point**

F↑ fixed set point, ascending

F↓ fixed set point, descending

D↑ dynamic set point, ascending

D↓ dynamic set point, descending

**Fixed set point** Set point value is specified in the master mode and cannot be changed in the weighing mode.

**Dynamic set point** Set point value is specified in the weighing mode, see page 20.

**Ascending** Digital output is set when the value of the application block concerned is greater than or equal to the set point value.

**Descending** Digital output is set when the value of the application block concerned is less than or equal to the set point value.

**b) Application block**

Weight value to which the set point refers. All application blocks with a valid weight unit (kg, g, lb, oz, ozt, dwt, pc) are possible.

Factory setting: Application block 012, net weight

**c) Scale**

W1 ... W4 or ALL for all scales

**d) Set point value**

With dynamic set points the weight value is entered in the normal mode, see page 20.

**Configuring switching points 5 – 8**


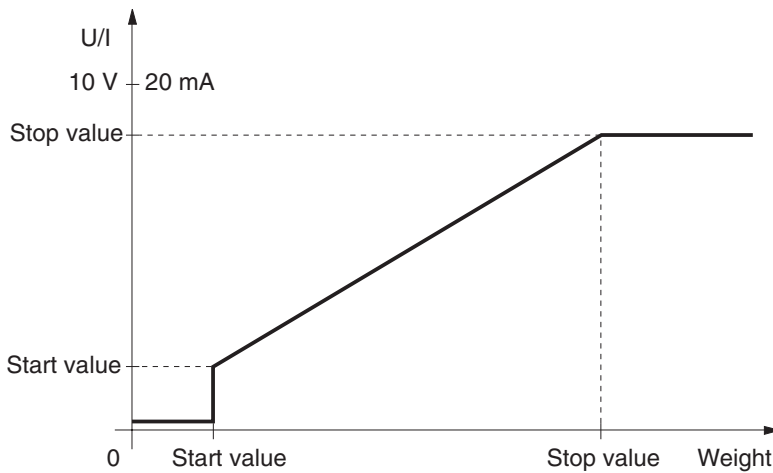
→ With F4 >>, change to the input mask for switching points 5 – 8.

### 5.6.5 Configuring external keyboard

<b>KEYBOARD PS2</b>	<b>Select keyboard layout of connected external keyboard</b>
	Possible setting: English-USA, English-UK, German, French, Dutch, Italian, Spanish, Finnish, Russian

### 5.6.6 Configuring AnalogOut-690

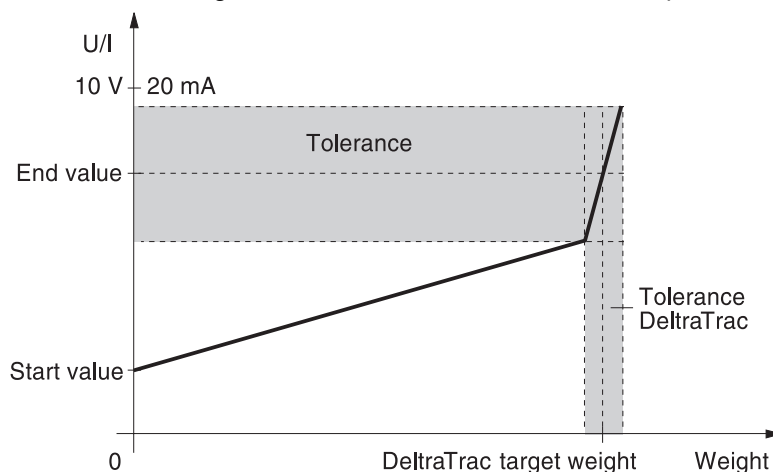
The functionality of AnalogOut-690 is dependent on the version of your weighing terminal.

ANALOG OUTPUT	
SCALE	Select weighing platform from which the weight values are to be output at the interface AnalogOut-690. This block only appears when several weighing platforms are connected. Factory setting: All weighing platforms
ALL SCALES	Weight values can be output by all connected weighing platforms at the AnalogOut-690 interface. The assignment of a weighing platform to the AnalogOut-690 interface can be changed with  or the command AW010...
SCALE 1 ... SCALE 4	Only weight signals of the selected weighing platform can be output via the AnalogOut-690 interface
START-STOP MODE	<p>When the selected weight value or the selected number of pieces is within the specified en start and stop values, a current/voltage signal in the specified range will be output at the AnalogOut-690 interface.</p>  <p>The graph shows a coordinate system with 'U/I' on the vertical axis and 'Weight' on the horizontal axis. The vertical axis has a tick mark for '10 V' and '20 mA'. The horizontal axis has a '0' at the origin and two points labeled 'Start value' and 'Stop value'. The signal curve starts at zero, jumps to a constant level at the 'Start value', then rises linearly until it reaches the 'Stop value', where it levels off to a constant maximum value.</p> <p>For additional settings, see page 70.</p>

**ANALOG OUTPUT****DELTATRAC MODE**

In this operating mode the net weight value on the AnalogOut-690 interface is output in the factory setting, provided DeltaTrac is active.

If no DeltaTrac target value is entered, 0 V / 0 mA are output.

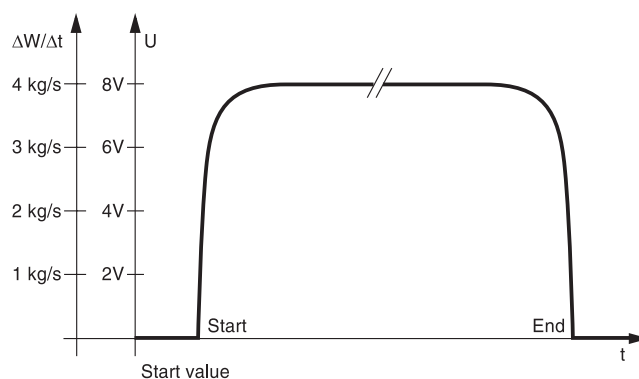


For additional settings, see page 70.

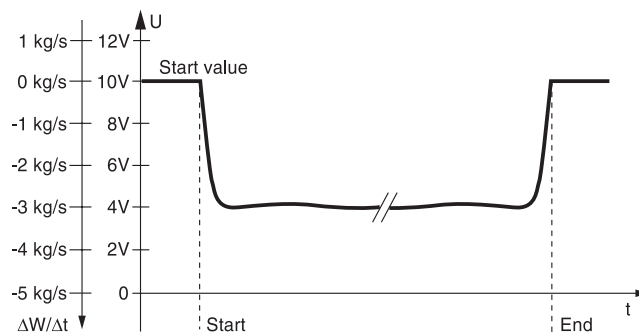
 **$\Delta W$ - $\Delta T$  MODE**

In this operating mode flows are measured via the weight change per time in the supply or catch container.

**Example 1:** Weighing in with a flow rate of 4 kg/sec.



**Example 2:** Subtractive weighing with a flow rate of 3 kg/sec. starting value of the analog voltage signal: 10 V.



In both cases a change in the flow rate of 1 kg/sec. results in a change in the analog voltage signal of 2 V.

For additional settings, see page 71.

<b>ANALOG OUTPUT</b>	
DIRECTION	Configure the behaviour of the analog output.
ALL	The analog signal is sent irrespective of the preceding sign.
POSITIVE	The analog signal is only output at positive weight values. In the case of an underload or negative weight values the signal remains at "0" or the start value.
NEGATIVE	The analog signal is only output at negative weight values. In the case of positive weight values the signal remains at "0" or the start value. This setting is ideal for subtractive weighing from a container.

#### Parameter for Start-Stop mode

AB	Application block number for the weight value to be output at the AnalogOut-690 interface. Factory setting: Application block 012, net weight
VALUE	Starting value of the analog output signal Factory setting: 0 V Possible settings: 0 V – 10 V or 0 mA – 20 mA Stop value of the analog output signal Factory setting: 10 V Possible settings: 0 V – 10 V or 0 mA – 20 mA
WEIGHT	Weight value at which the analog output is to start. Factory setting: 0 g or 0 kg Weight value from which the maximum value of the analog signal is to be output. Factory setting: Maximum load of weighing platform

#### Parameter for DeltaTrac mode

AB	Application block number for the weight value to be output at the AnalogOut-690 interface. Factory setting: Application block 012, net weight
V/mA AT ZERO	Starting value of the analog output signal Factory setting: 0 V Possible settings: 0 V – 10 V or 0 mA – 20 mA
V/mA AT TARGET	Stop value of the analog output signal Factory setting: 10 V Possible settings: 0 V – 10 V or 0 mA – 20 mA
TOLERANCE	+/- deviation from stop value of analog signal when the target weight tolerance is reached Factory setting: Tolerance = 0 V

**Parameters for the  $\Delta W$ - $\Delta T$  MODE**

AB	Application block number for the weight value to be output at the AnalogOut-690 interface. Factory setting: Application block 012, net weight
$\Delta W$ - $\Delta T$	Value for the change in the analog output signal in the case of a weight change of one unit per second.
START VALUE	Starting value of the analog output signal Factory setting: 0 V Possible settings: 0 V – 10 V or 0 mA – 20 mA

**5.6.7 Configuring Ethernet-690**

The weighing terminal can only be operated on a network with a valid IP address, subnet mask and gateway address (if the weighing terminal is to route connections to another partial network). Ask your system administrator for these addresses.

ETHERNET	Configuring Ethernet-690
COMMUNICATION	For adaptation of the communication parameters between weighing terminal and the Ethernet module, see page 55.
MODE	For adaptation of the communication mode, see page 55.
IP ADDRESS	IP address entry
SUBNET MASK	Net mask entry
GATEWAY	Gateway address entry

**Note**

Additional information on the configuration of the Ethernet-690 network card and information on troubleshooting can be downloaded from the website of the manufacturer: [www.WuT.de](http://www.WuT.de).

**Checking Ethernet-690****Condition**

You require a PC with Windows on which the protocol TCP/IP is installed. The PC must be operated in the same network segment as the weighing terminal with Ethernet-690.

### Conducting test

#### With DOS entry window

1. Open DOS entry window.
2. Enter **TELNET xxx.xxx.xxx.xxx 8000** (xxx.xxx.xxx.xxx = IP address) and confirm with ↵.

The PC reports the following in a Telnet window

```
*****
* Com-Server Highspeed *
*****
```

The message means that the Ethernet-690 network card is operable. The PC and the weighing terminal can communicate with each other via interface commands, see chapter 6.

3. Close Telnet window.

#### With browser

1. Start browser, e.g. Internet Explorer.
2. Enter **xxx.xxx.xxx.xxx** (xxx.xxx.xxx.xxx = IP address) and confirm with ↵.

The PC reports a login window.

3. Enter password (factory setting: no password).  
The configuration menu of the Ethernet-690 network card appears.

### 5.6.8 Configuring ProfibusDP-690

PROFIBUS-DP	Configuring ProfibusDP-690
NODE ADDRESS	Select desired node address in range 001 to 126. Factory setting: 3
OPERATING MODE	Set type and word length of user data parameter VALUE.
16-BIT-INTEGER / 2 WORDS	Consistent over valid module pair in GSD file 2 words 16-BIT-INTEGER 2(+2)W AI 16-BIT-INTEGER 2(+2)W AO
16-BIT-INTEGER / 4 WORDS	2 words 16-BIT-INTEGER 2(+2)W AI (use 2x) 16-BIT-INTEGER 2(+2)W AO (use 2x)
32-BIT-FLOATING- POINT	4 words 32-BIT-FLOATING-POINT 4W AI 32-BIT-FLOATING-POINT 4W AO
S/P MODE	Set type and use of setpoint.
UNIVERSAL	Each setpoint can be set and read independently of others.
CHECKWEIGHING	As soon as setpoints 1 and 2 are set, DeltaTrac CHECKWEIGHING will be activated with SP1 = setpoint and SP2 = tolerance (in %, in 16-bit integer mode with 2 decimal places). In read table current state BELOW (SP1), GOOD (SP2) or ABOVE (SP3) can be read off.



PROFIBUS-DP	Configuring ProfibusDP-690												
FILLING	<p>As soon as setpoints 1 and 2 are set, DeltaTrac CHECKWEIGHING will be activated with SP1 = setpoint and SP2 = tolerance (in %, in 16-bit integer mode with 2 decimal places). In addition, SP3 and SP4 can also be loaded as any desired setpoints.</p> <p>In read table current state GOOD (SP1), ABOVE (SP2), SP3 REACHED (SP3) or SP4 REACHED (SP4) can be read off.</p>												
I/P MODE	<p>Set request for identification data in Input mode.</p> <p>After setting the user data command INPUT MODE in the write table, the selected request for input is automatically carried out and the entries are saved in the application blocks 094 to 099.</p> <p>The user data response INPUT MODE RUNNING remains set while the input mode is active.</p>												
A	Code A is requested.												
A+B	Code B and Code A are always requested.												
A+B+C	Code C, Code B and Code A are always requested.												
A+B+C+D	Code D, Code C, Code B and Code A are always requested.												
A+B+C+D+E	Code E, Code D, Code C, Code B and Code A are always requested.												
A+B+C+D+E+F	Code F, Code E, Code D, Code C, Code B and Code A are always requested.												
BYTE ORDER	Order of the bytes within a data word												
NORMAL	Usual byte order (factory setting)												
SWAPPED	The upper and lower byte of each data word are swapped												
SIGN	Location of the sign in the 16-bit integer values Is only displayed if MODE = 16-BIT-INTEGERS/WORDS has been selected												
SEPARATE BIT 16	<p>The sign is transferred separately in Bit 16 (factory setting)</p> <p><b>Examples</b></p> <table> <tbody> <tr> <td>+2</td> <td>0002</td> <td>0000 0000 0000 0010</td> </tr> <tr> <td>+1</td> <td>0001</td> <td>0000 0000 0000 0001</td> </tr> <tr> <td>-1</td> <td>8001</td> <td>1000 0000 0000 0010</td> </tr> <tr> <td>-2</td> <td>8002</td> <td>1000 0000 0000 0010</td> </tr> </tbody> </table>	+2	0002	0000 0000 0000 0010	+1	0001	0000 0000 0000 0001	-1	8001	1000 0000 0000 0010	-2	8002	1000 0000 0000 0010
+2	0002	0000 0000 0000 0010											
+1	0001	0000 0000 0000 0001											
-1	8001	1000 0000 0000 0010											
-2	8002	1000 0000 0000 0010											
INTEGRATED IN INTEGER	<p>The sign is transferred integrated in the integer</p> <p><b>Examples</b></p> <table> <tbody> <tr> <td>+2</td> <td>0002</td> <td>0000 0000 0000 0010</td> </tr> <tr> <td>+1</td> <td>0001</td> <td>0000 0000 0000 0001</td> </tr> <tr> <td>-1</td> <td>FFFF</td> <td>1111 1111 1111 1111</td> </tr> <tr> <td>-2</td> <td>FFFE</td> <td>1111 1111 1111 1110</td> </tr> </tbody> </table>	+2	0002	0000 0000 0000 0010	+1	0001	0000 0000 0000 0001	-1	FFFF	1111 1111 1111 1111	-2	FFFE	1111 1111 1111 1110
+2	0002	0000 0000 0000 0010											
+1	0001	0000 0000 0000 0001											
-1	FFFF	1111 1111 1111 1111											
-2	FFFE	1111 1111 1111 1110											

PROFIBUS-DP	Configuring ProfibusDP-690																														
<p>EXP. AB AREA</p>	<p>Input of up to three expanded application blocks for constants which can be accessed when writing applications blocks.</p> <p><b>Example</b></p> <p><b>Input enables access to</b></p> <p>021 application blocks 021_001 to 021_999</p> <p>046 application blocks 046_001 to 046_999</p> <p>071 application blocks 071_001 to 071_999</p>																														
<p>CONFIGURE INPUTS</p>	<p>Select the desired setting for every input.</p> <p>Factory setting for the IND690-Base:</p> <p>Input 1 not in use</p> <p>Input 2 zero setting</p> <p>Input 3 taring</p> <p>Input 4 entry (↵ key)</p> <p>Input 5 ... 8 not in use</p> <p>Further settings: see page 129</p>																														
<p>CONFIGURE OUTPUTS</p>	<p>Select the desired setting for every output.</p> <p>Factory setting for the IND690-Base:</p> <p>Output 1 Delta low</p> <p>Output 2 Delta ok</p> <p>Output 3 Delta high</p> <p>Output 4 Stable</p> <p>Output 5 ... 8 Setpoint 1 ... 4</p> <p>Further settings: see page 129</p>																														
<p>TEST MODE</p>	<p>Activation of the information display. In line 3 and 4 write and read tables are displayed as follows:</p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;"></td> <td style="width: 15%; text-align: center;"><b>3</b></td> <td style="width: 15%; text-align: center;"><b>4</b></td> <td style="width: 15%;"></td> <td style="width: 15%; text-align: center;"><b>5</b></td> <td style="width: 15%; text-align: center;"><b>6</b></td> </tr> <tr> <td></td> <td style="border-right: 1px solid black; border-bottom: 1px solid black; padding: 2px;">TEST MODE</td> <td style="border-right: 1px solid black; border-bottom: 1px solid black; padding: 2px;">Id</td> <td style="border-right: 1px solid black; border-bottom: 1px solid black; padding: 2px;">Val</td> <td style="border-bottom: 1px solid black; padding: 2px;">5432109876543210</td> <td style="border-bottom: 1px solid black; padding: 2px;">0.999 kg</td> </tr> <tr> <td style="text-align: right; padding-right: 5px;"><b>2</b> —</td> <td style="border-right: 1px solid black; padding: 2px;">00</td> <td style="border-right: 1px solid black; padding: 2px;">0000</td> <td style="border-right: 1px solid black; padding: 2px;">00000000</td> <td style="padding: 2px;">10000000</td> <td style="padding: 2px;">00 00</td> </tr> <tr> <td style="text-align: right; padding-right: 5px;"><b>1</b> —</td> <td style="border-right: 1px solid black; padding: 2px;">00</td> <td style="border-right: 1px solid black; padding: 2px;">03E7</td> <td style="border-right: 1px solid black; padding: 2px;">01000000</td> <td style="padding: 2px;">00000000</td> <td style="padding: 2px;">08 00</td> </tr> <tr> <td></td> <td colspan="5" style="text-align: center; padding: 5px;">CANCEL</td> </tr> </table> </div> <p><b>1</b> Read table</p> <p><b>2</b> Write table</p> <p><b>3</b> Operating mode (internal)</p> <p><b>4</b> Value (hexadecimal)</p> <p><b>5</b> Command/response bits</p> <p><b>6</b> Inputs/outputs (hexadecimal)</p>		<b>3</b>	<b>4</b>		<b>5</b>	<b>6</b>		TEST MODE	Id	Val	5432109876543210	0.999 kg	<b>2</b> —	00	0000	00000000	10000000	00 00	<b>1</b> —	00	03E7	01000000	00000000	08 00		CANCEL				
	<b>3</b>	<b>4</b>		<b>5</b>	<b>6</b>																										
	TEST MODE	Id	Val	5432109876543210	0.999 kg																										
<b>2</b> —	00	0000	00000000	10000000	00 00																										
<b>1</b> —	00	03E7	01000000	00000000	08 00																										
	CANCEL																														

### 5.6.9 Configuring WLAN-690

The weighing terminal can only be operated in a wireless network with a valid IP address, subnet mask etc. Ask your system administrator for these parameters.

WLAN	Configuring WLAN-690
INFO	Displays the type and software version of the WLAN module. Same function as the key sequence "INFO 50" in the operating mode.
STATUS	Displays the current status of the WLAN module: Radio channel used, data rate of connection, transmission and reception quality, MAC address of the currently connected access point. Same function as the key sequence "INFO 51" in the operating mode.
COMMUNICATION	For adaptation of the communication parameters between weighing terminal and the WLAN module, see page 55.
MODE	For adaptation of the communication mode, see page 55.
IP ADDRESS	IP address entry
PORT NUMBER	Port number entry
GATEWAY	Gateway address entry
SUBNET MASK	Net mask entry
SSID	Entry of wireless-network name (ServiceSetIdentifier).
WEP-KEY	WEP key entry, with 5 characters (64 bit key) or 13 characters (128 bit key).
WPA-PSK	WPA-PSK key entry, with 16 characters (128 bit key). Note: It may take up to 50 seconds to proceed the key.
AUTHORIZATION	Activating/deactivating the authorization in accordance with the setting at the AccessPoint. If the authorization is activated at the AccessPoint, the authorization also has to be activated at the IND690.
PORT TYPE	Set WLAN architecture: Ad hoc or infrastructure
AUTO CONNECT	Input of the IP address and port number of a partner to which establishing of a connection is tried cyclically – if a connection does not exist.
Comment	SSID, WEP-key and WPA_PSK-key can be entered in different ways: ASCII characters                      direct entry Hexadecimal code                      start entry with IDENT E Decimal code                              start entry with IDENT F

### 5.6.10 Configuring Bluetooth-690/BT-BLD Display/BT-P42/BT-SICS

<b>BLUETOOTH/BT-BLD/ BT-P42/BT-SICS</b>	<b>Configure Bluetooth-690/BT-BLD Display/BT-P42/BT-SICS</b>
INFO	Displays the type, software version and manufacturer of the Bluetooth module. Same function as the key sequence "INFO 60" in the operating mode.
STATUS	Displays the current status of the Bluetooth module: own Bluetooth address, own Bluetooth name, user service/COM port and name of the Bluetooth module to which there is currently a connection. Same function as the key sequence "INFO 61" in the operating mode.
MODE	Adaptation of the communication mode, see Page 55.
PASSKEY	Switching the passkey interrogation on/off and entering the passkey, if switched on. Enter the passkey "Mettler-Toledo" at the BT-BLD display and the BT-P42. All the communication parameters are then set automatically for the connected device
CONNECT	All reachable Bluetooth modules are displayed. The connection to one of these modules can then be made or an existing connection can be broken.
Comment	Passkey can be entered in different ways: ASCII characters            direct entry Hexadecimal code        start entry with IDENT E Decimal code                start entry with IDENT F

## 6 Interface description

### 6.1 General

To exchange data with a computer, the weighing terminal is equipped with an RS232 interface. Up to 8 additional interfaces are available as an option.

The interfaces operate independently of each other, can be used simultaneously and can be adjusted individually, see section 5.6.

To operate the serial interfaces in the **dialog mode**, one of the following METTLER TOLEDO command sets must be selected in the master mode:

- MMR command set, see section 6.2.
- METTLER TOLEDO Continuous mode, see section 6.3.
- METTLER TOLEDO SICS command set, see section 6.4.

#### Note

In order to avoid data loss, do not operate the interfaces in unsolicited mode. In particular if the handshake is deactivated, ensure that the host waits for a response after every command before a new command is sent.

## 6.2 MMR command set

### 6.2.1 Syntax and formats of communication

Commands and responses for transmitting weights have the following formats:

#### Command format when transmitting weight formats

Identification	_	Weight value	_	Unit	Framing
Character sequence for specification of command (1 ... 4 characters)		1 ... 8 digits, number of digits variable		1 ... 3 characters, number of characters variable	Definable in master mode, factory setting: C <sub>R</sub> L <sub>F</sub>

#### Response format when transmitting weight formats

Identification	_	Weight value	_	Unit	Framing
Character sequence for specification of response (2 ... 3 characters)		10 digits, right-justified, filled out with blank spaces		3 characters, left-justified, filled out with blank spaces	definable in master mode, factory setting: C <sub>R</sub> L <sub>F</sub>

#### Example

Command Tare specification

T \_ 1 3 . 2 9 5 \_ k g

Response Tare specification

T B H \_ \_ \_ \_ \_ 1 3 . 2 9 5 \_ k g \_

#### Data formats

- The following symbols are used in the following command description:

Weight value      10 characters with sign and decimal point, right-justified (with preceding blank spaces)

Unit                3 characters, left-justified (with following blank spaces)

Text\_n              maximum of n characters, left-justified

- The string framing is mandatory, however it is **not** contained in the following command description!
- Enter commands as ASCII characters. The following ASCII characters are available: 20 hex/32 deci ... 7F hex/127 deci, see page 126.

#### BUS SLAVE operating mode (RS485)

In the BUS SLAVE operating mode each command and each response begins with a code for the terminal address.

Terminal address 1 ... 9      Code "1" ... "9"      (31H ... 39H)

Terminal address 10 ... 31    Code "a" ... "v"      (61H ... 76H)

#### Example

Command to terminal 3: 3 S

Response from terminal 3: 3 S \_ \_ \_ \_ \_ 1 2 . 7 6 5 \_ k g \_

### 6.2.2 Command overview

Command	Meaning	Page
RO / R1	Switch keypad on/off	80
KD / KE	Switch individual key on/off	80
Z	Set weight display to zero after weighing platform stabilization	80
U_...	Change over terminal to a different weight unit	80
T	Tare	81
T_...	Specify tare weight	81
DY_...	Specify DeltaTrac target value	82
S	Transmit in case of weighing platform stabilization	82
SI	Transmit independent of weighing platform stabilization	82
SIR	Transmit repeatedly independent of weighing platform stabilization	83
SR	Transmit stabilized weight values repeatedly depending on a weight change	83
SR_...	Transmit repeatedly depending on weighing platform stabilization with specification of an excursion value	83
SX	Transmit data record after weighing platform stabilization	84
SXI	Transmit data record independent of weighing platform stabilization	84
SXIR	Transmit data record repeatedly independent of weighing platform stabilization	84
ARNo.	Read information of application block	85
AWNo_...	Write to application block	85
D_...	Write to display	85
P_...	Print alphanumeric characters or barcodes on the GA46	86
DS	Trigger acoustic signal	86
ID	Interrogate terminal identification	86
W_...	Actuating digital outputs	87

### 6.2.3 Command description


#### Switch keypad on or off

Command	<input type="text" value="R,0"/> Switch on keypad <input type="text" value="R,1"/> Switch off keypad
Response	<input type="text" value="R,B"/> Keypad switched on or off
Comments	<ul style="list-style-type: none"> <li>• Factory setting: Keypad switched on.</li> <li>• When the keypad is switched off, the terminal cannot be operated manually.</li> </ul>

#### Switch individual key on or off

Command	<input type="text" value="K,E,_,x,x"/> Switch on key with key number xx <input type="text" value="K,D,_,x,x"/> Switch off key with key number xx
Response	<input type="text" value="K,B"/> Key switched on or off
Comments	<ul style="list-style-type: none"> <li>• Factory setting: Keys switched on.</li> <li>• See table in the Appendix for key numbers.</li> </ul>

#### Set zero




Command	<input type="text" value="Z"/> Set gross weight display to zero after weighing platform stabilization, effect as when  is pressed.
Response	<input type="text" value="Z,B"/> Weighing platform set to zero <input type="text" value="Z,-"/> Command cannot be executed: Zero-set range dropped below <input type="text" value="Z,+"/> Command cannot be executed: Zero-set range exceeded
Comments	<ul style="list-style-type: none"> <li>• Setting to zero is not possible when the weighing platform stabilizes in the zero-set range.</li> <li>• With some weighing platform types setting to zero deletes a saved tare weight. This is indicated with the message TA, see section 6.2.4.</li> </ul>

#### Changing over to different weight unit

Command	<input type="text" value="U,_,Unit"/> Change over weight display to different weight unit <input type="text" value="U"/> Change over weight display to first weight unit
Response	<input type="text" value="U,B"/> Weight display changed over to different weight unit
Comment	Possible units: g, kg, lb, ozt, oz, dwt



## Tare

Command	<p><b>T</b> Tare weighing platform: After the weighing platform stabilizes, the current weight value is saved as the tare weight and the weight display is set to zero with the weight placed on the platform.</p> <p>Effect as when  is pressed.</p> <p><b>T</b> <b>_</b> Tare weight (weight value) <b>_</b> <b>Unit</b> Specify tare weight: The content of the tare memory is overwritten with the specified tare weight and the net weight is displayed.</p> <p>Effect as when , 0 ... 9,  sequence is pressed.</p> <p><b>T</b> <b>_</b> <b>-</b> Delete tare weight.</p>
Response	<p><b>T</b> <b>B</b> <b>_</b> <b>_</b> Tare weight (weight value) <b>_</b> <b>Unit</b> Weighing platform is tared</p> <p><b>T</b> <b>B</b> <b>H</b> <b>_</b> Tare weight (weight value) <b>_</b> <b>Unit</b> Weighing platform is tared with specified weight</p> <p><b>T</b> <b>_</b> <b>-</b> Command cannot be executed: Tare range dropped below</p> <p><b>T</b> <b>_</b> <b>+</b> Command cannot be executed: Tare range exceeded</p>
Comments	<ul style="list-style-type: none"> <li>• Taring is only possible when the weighing platform stabilizes within the tare range.</li> <li>• The tare weight is always transmitted in the first weight unit.</li> <li>• Each taring command overwrites the content of the tare memory with the new tare weight.</li> <li>• Taring with an unloaded weighing platform deletes the tare memory. On some weighing platform types a zero set is carried out in the unloaded state. This is displayed with the message ZA, see section 6.2.4.</li> <li>• On not certified weighing systems the tare weight is automatically rounded to the current increment.</li> <li>• On certified weighing systems: Tare range for MultiRange only in first increment range.</li> </ul>
Example	<p>Command: <b>T</b></p> <p>Response: <b>T</b> <b>B</b> <b>_</b> <b>_</b> <b>_</b> <b>_</b> <b>_</b> <b>_</b> <b>_</b> <b>_</b> <b>1</b> <b>2</b> <b>.</b> <b>6</b> <b>5</b> <b>0</b> <b>_</b> <b>k</b> <b>g</b> <b>_</b> <b>_</b></p>

**Specify DeltaTrac target value**

Command	<code>D   Y   _   Target weight (weight value)   _   Unit   _   Lower tolerance   _   Unit   _  </code> <code>Upper tolerance   _   Unit</code> Specify DeltaTrac target value <code>D   Y</code> Delete DeltaTrac target value
Response	<code>D   B</code> DeltaTrac target value loaded/deleted
Comments	<ul style="list-style-type: none"> <li>Observe limit values, see page 18</li> <li>Also possible: <code>A   W   0   2   0   . . .</code>, see page 116</li> </ul>
Example	Command: <code>D   Y   _   4   .   5   _   k   g   _   5   _   %   _   4   _   %</code> Response: <code>D   B</code>

**Transmit content of display**

Command	<code>S</code> Transmit a stabilized weight when weighing platform is stabilized. <code>S   I</code> Transmit a stabilized or dynamic weight independent of weighing platform stabilization.
Response	<code>S   _   _   Weight value   _   Unit</code> Stabilized weight value transmitted <code>S   D   _   Weight value   _   Unit</code> Dynamic weight value transmitted <code>S   I</code> Invalid weight <code>S   I   -</code> Weighing platform in underload range <code>S   I   +</code> Weighing platform in overload range

**Transmit content of display repeatedly**

Command	<p><code>S,I,R</code> Transmit stabilized or dynamic weight values after each measuring cycle independent of weighing platform stabilization.</p> <p><code>S,R</code> Transmit the next stabilized weight value after a weight change (e.g. different item) and one dynamic and the next stabilized weight value after each deflection &gt; 30 d.</p> <p><code>S,R _ Deflection weight (weight value) _ Unit</code> Transmit the next stabilized weight value and, depending on the specified deflection, a dynamic weight value after a weight change greater than the specified deflection value.</p>
Response	<p><code>S _ _ Weight value _ Unit</code> Transmit stabilized weight value repeatedly</p> <p><code>S,D _ Weight value _ Unit</code> Transmit dynamic weight value repeatedly</p>
Comment	Stop command with <code>S</code> , <code>S,I</code> command or by interrupting the interface
Example	<p>Command: <code>S,R _ 1,4,0 _ k,g</code></p> <p>Responses: <code>S _ _ _ _ _ 2,0,0 . 0,0 _ k,g</code> 1st item  <code>S,D _ _ _ _ _ 3,4,5 . 8,5 _ k,g</code>  <code>S _ _ _ _ _ 4,1,0 . 5,0 _ k,g</code> 2nd item</p>

### Transmit data record

Command	<p><code>S,X</code> Transmit a data record with stabilized weight values after weighing platform stabilization. Effect as if <code>↵</code> is pressed.</p> <p><code>S,X,I</code> Transmit a data record with stabilized or dynamic weight values independent of weighing platform stabilization.</p> <p><code>S,X,I,R</code> Transmit data records with stabilized or dynamic weight values repeatedly independent of weighing platform stabilization.</p>
Response	<p><code>S,X,_,_ Application block _ _ Application block ... ]</code>     <code>A No. _ Data record</code> Data record with stabilized weight values transmitted</p> <p><code>S,X,D _ Application block _ _ Application block ... ]</code>     <code>A No. _ Data record</code> Data record with dynamic weight values transmitted</p> <p><code>S,X,I</code> Invalid value  <code>S,X,I -</code> Weighing platform in underload range  <code>S,X,I +</code> Weighing platform in overload range</p>
Comments	<ul style="list-style-type: none"> <li>• Number of application block: three-digit with leading zeros.</li> <li>• The content of the corresponding application block is contained in data record, see chapter 7. Standard data record consists of 3 blocks:  <code>S,X,_,_ A,0,1,1 _ Gross weight (weight value) _ Unit _ _</code>  <code>A,0,1,2 _ Net weight (weight value) _ Unit _ _</code>  <code>A,0,1,3 _ Tare weight (weight value) _ Unit</code></li> </ul> <p>The continuous transmission of data records started with the <code>S,X,I,R</code> command can be stopped with the <code>S,X</code> or <code>S,X,I</code> command.</p>
Example	<p>Command: <code>S,X,I</code></p> <p>Response: Standard data record</p> <p><code>S,X,D _ A,0,1,1 _ _ _ _ _ _ _ 2,3 . 6,5,0 _ k,g _ _</code>  <code>_ _ A,0,1,2 _ _ _ _ _ _ _ 2,1 . 6,5,0 _ k,g _ _</code>  <code>_ _ A,0,1,3 _ _ _ _ _ _ _ 2 . 0,0,0 _ k,g _ _</code></p>

**Read application block**

Command	<input type="text" value="A"/> <input type="text" value="R"/> <input type="text" value="No."/> <input type="text" value=""/>	Read content of application block
Response	<input type="text" value="A"/> <input type="text" value="B"/> <input type="text" value=""/> <input type="text" value="Information"/>	Content of application block transmitted
Comments	<ul style="list-style-type: none"> <li>• Transmitted information is dependent on application block, see chapter 7.</li> <li>• Number of application block must be entered as 3 digits with preceding zeros.</li> </ul>	

**Write to application block**

Command	<input type="text" value="A"/> <input type="text" value="W"/> <input type="text" value="No."/> <input type="text" value=""/> <input type="text" value="Information"/>	Write to application block
	<input type="text" value="A"/> <input type="text" value="W"/> <input type="text" value="No."/> <input type="text" value=""/>	Reset application block
	<input type="text" value="A"/> <input type="text" value="W"/> <input type="text" value="No."/> <input type="text" value=""/> <input type="text" value=""/>	Delete application block
Response	<input type="text" value="A"/> <input type="text" value="B"/>	Written to application block
Comments	<ul style="list-style-type: none"> <li>• Information to be entered is dependent on target block, see chapter 7.</li> <li>• Deleting and resetting have same effect.</li> </ul>	

**Write to display**

Command	<input type="text" value="D"/> <input type="text" value=""/> <input type="text" value="Text_20"/>	Write to display
	<input type="text" value="D"/> <input type="text" value=""/>	Switch display to dark
	<input type="text" value="D"/>	Set display to normal status
Response	<input type="text" value="D"/> <input type="text" value="B"/>	Written to display
Comments	<ul style="list-style-type: none"> <li>• Character stock: ASCII characters 20 hex/32 deci ... 7F hex/127 deci, see page 126.</li> <li>• Watch upper and lower case.</li> </ul>	

**Alphanumeric printout on GA46 printer**

Command	<p><code>P _ Text_48</code> Print text as per setting</p> <p><code>P _ \$ ! 1 Text_48</code> Print text in small type</p> <p><code>P _ \$ ! 2 Text_48</code> Print text in normal type</p> <p><code>P _ \$ ! 3 Text_48</code> Print text in large type</p> <p><code>P _ \$ ! A Text_48</code> Print text in small type and bold print</p> <p><code>P _ \$ ! B Text_48</code> Print text in normal type and bold print</p> <p><code>P _ \$ ! C Text_48</code> Print text in large type and bold print</p> <p><code>P _</code> Print blank line</p>
Response	<code>P   B</code> Alphanumeric characters printed
Comments	<ul style="list-style-type: none"> <li>• Character stock: ASCII characters 20 hex/32 deci ... 7F hex/127 deci, see page 126.</li> <li>• Text is printed in last selected type size.</li> <li>• Watch upper and lower case.</li> </ul>

**Barcode printout on GA46 printer**

Command	<p><code>P _ \$ # 1 Text_20, barcode-specific</code> Print Code 39</p> <p><code>P _ \$ # 2 Text_8, barcode-specific</code> Print EAN 8</p> <p><code>P _ \$ # 3 Text_13, barcode-specific</code> Print EAN 13</p> <p><code>P _ \$ # 4 Text_20, barcode-specific</code> Print EAN 128</p> <p><code>P _ \$ # 5 Text_20, barcode-specific</code> Print Code 2 of 5</p> <p><code>P _ \$ # 6 Text_20, barcode-specific</code> Print Code 2 of 5 interleaved</p> <p><code>P _ \$ # 7 Text_20, barcode-specific</code> Print Code 128</p> <p><code>P _ \$ # 8 Text_20, barcode-specific</code> Print EAN 128</p> <p><code>P _</code> Print blank line</p>
Response	<code>P   B</code> Barcode printed
Comments	<ul style="list-style-type: none"> <li>• Character stock: ASCII characters 20 hex/32 deci ... 7F hex/127 deci, see page 126.</li> <li>• With Code 39, 3 barcodes can be printed next to each other. Separating characters: \$\$ or H<sub>T</sub> (ASCII character 09 hex/9 deci). Arrangement of barcodes: Barcode 2, Barcode 1, Barcode 3.</li> </ul>

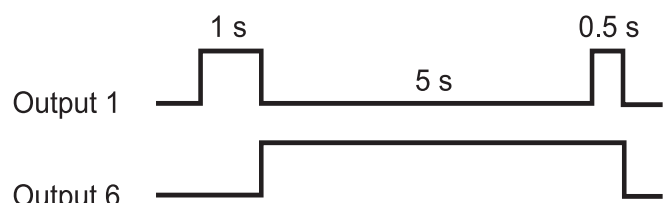
**Acoustic signal**

Command	<code>D   S</code> Generate short acoustic signal (beep tone) in terminal
Response	<code>D   B</code> Acoustic signal generated in terminal

**Identification**

Command	<code>I   D</code> Interrogate identification of terminal
Response	<code>I   D   7 _  </code> Program number of Pac

### Actuating digital outputs

<p>Command</p>	<p><code>W _ Status</code> Switch individual digital outputs on or off</p> <p><code>W _ Status 1 _ Time 1 _ Status 2 _ Time 2 _ ... Status 4 _ Time 4 _ Status 5</code> Trigger time sequence of status changes of digital outputs</p> <p><code>W , W _</code> Reset all outputs to logical 0</p> <p>Status: Each output is assigned a value. The total of the values of those outputs which are to be closed is indicated as the "Status".</p> <table border="0"> <tr><td>Digital output 1</td><td>1</td></tr> <tr><td>Digital output 2</td><td>2</td></tr> <tr><td>Digital output 3</td><td>4</td></tr> <tr><td>Digital output 4</td><td>8</td></tr> <tr><td>Digital output 5</td><td>16</td></tr> <tr><td>Digital output 6</td><td>32</td></tr> <tr><td>Digital output 7</td><td>64</td></tr> <tr><td>Digital output 8</td><td>128</td></tr> <tr><td>All outputs open</td><td>0</td></tr> <tr><td>All outputs closed</td><td>255</td></tr> </table> <p>Time: 1 ... 99999 ms</p>	Digital output 1	1	Digital output 2	2	Digital output 3	4	Digital output 4	8	Digital output 5	16	Digital output 6	32	Digital output 7	64	Digital output 8	128	All outputs open	0	All outputs closed	255
Digital output 1	1																				
Digital output 2	2																				
Digital output 3	4																				
Digital output 4	8																				
Digital output 5	16																				
Digital output 6	32																				
Digital output 7	64																				
Digital output 8	128																				
All outputs open	0																				
All outputs closed	255																				
<p>Response</p>	<p><code>W , B</code> Digital outputs set</p>																				
<p>Comments</p>	<ul style="list-style-type: none"> <li>• Max. 5 statuses "Status" and 4 intervals "Time" are possible. After sequence has been run, digital outputs freeze in last status "Status".</li> <li>• A break in the port has no effect on the outputs.</li> <li>• If terminal receives a new W command before time sequence has been run, ongoing sequence will be aborted immediately.</li> <li>• If limits for "Status" and "Time" are not adhered to, error message EL appears on 4 I/O-690 interface or 8-690 relay box.</li> </ul>																				
<p>Examples</p>	<p>Command: <code>W _ 5</code> Digital outputs 1 and 3 are closed, all others opened</p> <p>Command: <code>W _ 1 _ 1,0,0,0 _ 3,2 _ 5,0,0,0 _ 3,3 _ 5,0,0 _ 0</code> triggers following sequence:</p>  <p>The diagram shows two digital signals over time. The top signal, labeled 'Output 1', starts at a low level, transitions to high for a duration of 1 s, returns to low, remains low for 5 s, and then transitions to high for a duration of 0.5 s before returning to low. The bottom signal, labeled 'Output 6', starts at a low level, transitions to high at the same time as Output 1, remains high for 5 s, and then returns to low.</p>																				

#### 6.2.4 Terminal messages – only with RS232, RS422, CL20mA and USB

In the dialog mode the weighing terminal transmits an acknowledgement to the computer each time a key is pressed.

When this pressing of a key is replaced with an interface command, the acknowledgement only differs in the second character in the response format which is part of the command:

Function	Key	Acknowledgement
Set zero		Z, A
Tare		T, A ... (see command T)
Specify tare weight		T, A, H ... (see command T_ ...)
Change over unit		U, A, _ Unit
Transmit data record in case of weighing platform stabilization		S, T, _ _ ... (see command SX)
Switch over weighing platform		S, A, _ _ n n = weighing platform 1 ... 3
Dynamic weighing		A, A, 0, 1, 6 _ Weight value _ Unit
Identification A ... F	A ... F	K, x _ Identification x = A, B, C, D, E, F 20 characters, right-justified
Function keys	F1 ... F6	K, F _ x x = I, J, K, L, M, N

#### 6.2.5 Fault messages

Fault messages always consist of 2 characters and a string frame.

The string frame can be defined in the master mode (section 5.6.2).

E, T

##### Transmission error

The terminal transmits a transmission error for errors in the received bit sequence, e.g. parity errors, missing stop bit.

E, S

##### Syntax error

The terminal transmits a syntax error when the received characters cannot be processed, e.g. command does not exist.

E, L

##### Logic error

The terminal transmits a logic error when a command cannot be executed, e.g. when an attempt is made to write to a write-protected application block.



## 6.3 METTLER TOLEDO continuous mode

These operating modes are suitable for continuous data transmission in real time from the weighing terminal to METTLER TOLEDO devices, e.g. to a second display. The data are even transmitted when the weighing platform is moving or the gross weight = 0.

Commands can also be sent to the weighing terminal, permitting remote control of certain keys on the terminal.

There are 2 different continuous modes:

- Continuous mode – net and tare values are continuously transmitted.
- Short continuous mode – only net values are continuously transmitted.

### 6.3.1 Data output from IND690

#### Output format

Weight values are always transmitted in the following format:

STX	SB1	SB2	SB3	DF1	DF2	CR	CHK
-----	-----	-----	-----	-----	-----	----	-----

STX	ASCII characters 02 hex/2 deci, character for "start of text" is required by some printers
SB...	For status bytes, see below
DF1	Data field with 6 digits for the weight value transmitted without a decimal point and unit When counting is active in the IND690-Count: 6 digits for the quantity, no leading zeroes
DF2	Data field with 6 digits for the tare weight; is not transmitted in the short continuous mode When counting is active in the IND690-Count: 6 zeroes, not transferred in Short Continuous mode
CR	Carriage return (ASCII character 0D hex/13 deci)
CHK	Checksum (2-part complement of binary sum of 7 lower bits of all previously transmitted characters, including STX and CR)

#### Status byte SB1

Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	1	Rounding / Increment		Decimal position		

Bit 4	Bit 3	Rounding/ Increment
0	1	1
1	0	2
1	1	5

Bit 2	Bit 1	Bit 0	Decimal position
0	0	0	XXXX00
0	0	1	XXXXX0
0	1	0	XXXXXX
0	1	1	XXXXX.X
1	0	0	XXXX.XX
1	0	1	XXX.XXX
1	1	0	XX.XXXX
1	1	1	X.XXXXX

**Status byte SB2**

Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	1	0 lb	0 Stabiliza- tion	0 Normal status	0 Positive sign	0 Gross value
		1 kg	1 Movement	1 Underload/ overload	1 Negative sign	1 Net value

**Status byte SB3**

Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	1	0	0 Basic state 1 Print request	Weight value		

Bit 2	Bit 1	Bit 0	Weight value
0	0	0	kg / lb (SB2 Bit 4)
0	0	1	g
0	1	0	†
0	1	1	oz
1	0	0	oz†
1	0	1	dwt
1	1	0	ton
1	1	1	free unit

**6.3.2 Commands to IND690**

Individual command characters can be transmitted to the IND690 in the text format. One function each on the terminal is assigned to these command characters. After a command character is received, the following functions are executed:

Com- mand	Function	Note
C	Delete tare	for every application software
P	Print or send transfer string	
T	Taring	
Z	Setting to zero	
Tx.xxx	Specify tare value	
Sxxxx	Specify reference quantity	only for IND690-Count
Sx.xxx	Specify reference weight	
Ax.xxx	Specify reference piece weight	

## 6.4 METTLER TOLEDO SICS command set

### 6.4.1 Communication syntax and formats

#### Command format when transmitting weight values

Identification	_	Weight value	_	Unit	Framing
String of characters for specification of command (1 ... 4 characters)		1 ... 10 characters		1 ... 3 characters, number of characters variable	C <sub>R</sub> L <sub>F</sub>

#### Response format when transmitting weight values

Identification	_	Status	_	Weight value	_	Unit	Framing
String of characters for specification of response (1 ... 2 char.)		1 char.		10 char., right-justified, filled in with blank char.		3 char., left-justified, filled in with blank char.	C <sub>R</sub> L <sub>F</sub>

#### Example

Tare specification command

T, A \_ 1, 3, ., 2, 9, 5 \_ k, g

Tare specification response

T, A \_ A \_ \_ \_ \_ \_ 1, 3, ., 2, 9, 5 \_ k, g \_

#### Data formats

- The following symbols are used in the command description:

<u>Weight value</u>	10 numbers with sign and decimal point, right-justified (with preceding blank spaces)
<u>Unit</u>	3 characters, left-justified (with following blank spaces)
<u>"Text_n"</u>	maximum of n characters, left-justified

- The string framing is mandatory, however it is **not** listed in the following command description!
- Enter commands as upper-case letters.
- Text to be entered must always be placed in quotation marks.

### 6.4.2 Command overview

Command	Meaning	Page
<b>Level 0</b>		
I0	Transmit list of all available SICS commands	93
I1	Transmit SICS level and SICS versions	93
I2	Transmit scale data (terminal, platform)	93
I3	Transmit scale software version (program number)	94
I4	Transmit serial number	94
S, SI, SIR	Transmit display contents	94
Z	Set to zero	95
ZI	Set to zero immediately	95
@	Reset	95
<b>Level 1</b>		
D	Write display	95
DW	Weight display	95
K	Keyboard monitoring	96
SR	Transmit stable weight values repeatedly depending on a weight change	97
T	Taring	97
TI	Tare immediately	98
TA	Specify tare weight	98
TAC	Delete tare weight	99
<b>Level 2</b>		
SX, SXI, SXIR	Transmit data record	99
R0, R1	Switch keyboard on or off	100
U	Change over to different weight unit	100
DS	Acoustic signal	100
<b>Level 3</b>		
AR	Read application block	100
AW	Write application block	101
DY	Specify DeltaTrack target value	101
P	Print text or barcode	102
W	Actuating digital outputs	103

### 6.4.3 Command description

#### Transmit SICS commands

Command	<code>I,0</code> Transmit SICS commands
Response	<pre> I,0 B 0 "I0" I,0 B 0 "I1" ... I,0 B 1 "D" ... I,0 B 2 "SX" ... I,0 B 3 "AR" ... </pre>

#### Transmit SICS levels and SICS versions

Command	<code>I,1</code> Transmit SICS levels and SICS versions
Response	<pre> I,1 A "x1" "x2" "x3" "x4" "x5" </pre> <p> x1 = 0123 Scale with SICS levels 0, 1, 2 and 3  x2 Version or implemented SICS0 commands  x3 Version or implemented SICS1 commands  x4 Version or implemented SICS2 commands  x5 Version or implemented SICS3 commands </p> <pre> I,1 I Command understood, cannot be executed at this time </pre>
Comments	<ul style="list-style-type: none"> <li>On the SICS level only fully implemented levels are executed.</li> <li>With the SICS version all levels are specified.</li> </ul>

#### Transmit scale data

Command	<code>I,2</code> Transmit data from weighing terminal and weighing platform(s)
Response	<code>I,2 A "text"</code>
Example	<code>I,2 A "IND690-Count IZ05 15.000 kg IZ10 32.000 kg"</code>

**Transmit scale software version**

Command	<code>I,3</code> Transmit software version from weighing terminal and weighing platform(s)
Response	<code>I,3 _ A _ "text "</code>
Example	<code>I,3 _ A _ "IP63-0-0100I IZ05-0-030I IZ10-0-0221"</code>

**Transmit serial number**

Command	<code>I,4</code> Transmit serial number of weighing terminal
Response	<code>I,4 _ A _ "text "</code>
Example	<code>I,4 _ A _ "1234567"</code>
Comment	The response to I4 appears automatically following switch-on and after the Reset command (@).

**Transmit display contents**

Command	<p><code>S</code> Transmit a stable weight value when the weighing platform is at a standstill.</p> <p><code>S,I</code> Transmit a stable or a dynamic weight value, regardless of whether the weighing platform is at a standstill.</p> <p><code>S,I,R</code> Transmit a stable or a dynamic weight value after each measuring cycle, regardless of whether the weighing platform is at a standstill.</p>
Response	<p><code>S _ S _ Weight value _ Unit</code> Stable weight value transmitted</p> <p><code>S _ D _ Weight value _ Unit</code> Dynamic weight value transmitted</p> <p><code>S _ I</code> Invalid value</p> <p><code>S _ -</code> Weighing platform in underload range</p> <p><code>S _ +</code> Weighing platform in overload range</p>
Comment	Stop <code>S,I,R</code> command with <code>S</code> , <code>S,I</code> , <code>S,R</code> , @ command or disconnect port.

**Set to zero**

Command	<code>Z</code> <code>Z I</code>	Set gross weight display to zero after weighing platform comes to a standstill, effect as when $\rightarrow 0 \leftarrow$ is pressed Set the gross weight display immediately to zero independently of a standstill
Response	<code>Z _ A</code> <code>Z _ I</code> <code>Z _ -</code> <code>Z _ +</code>	Weighing platform set to zero Command cannot be executed: e.g. standstill not achieved or another command is currently being executed Command cannot be executed: Zero-set range dropped below Command cannot be executed: Zero-set range exceeded

**Reset**

Command	<code>@</code>	Reset weighing terminal to the state maintained after Power On
Response	<code>I, 4 _ A _ "text"</code>	Serial number
Comments	<ul style="list-style-type: none"> <li>All running applications and functions are cancelled.</li> <li>The tare memory is reset to zero.</li> </ul>	

**Write display**

Command	<code>D _ "Text_20"</code> <code>D _ ""</code>	Write display Darken display
Response	<code>D _ A</code> <code>D _ A</code> <code>D _ I</code> <code>D _ L</code>	Display written; the complete text appears left-justified in the display, marked with a symbol, e.g. with * Display written; the end of the text appears left-justified in the display with the beginning cut off, marked with a symbol, e.g. with * Command cannot be executed Command understood, parameters defective
Comment	A symbol in the display, e.g. *, indicates that an invalid weight value is displayed.	

**Weight display**

Command	<code>D, W</code>	Switch over main display into the weight mode
Response	<code>D, W _ A</code> <code>D, W _ I</code>	The main display shows the current weight value Command understood, but cannot be executed

### Keyboard monitoring

Command	<p><math>\boxed{K}_{-} \boxed{-} \boxed{1}</math> When a key is pressed, execute the function, but do not transmit anything (factory setting)</p> <p><math>\boxed{K}_{-} \boxed{-} \boxed{1}</math> When a key is pressed, do not execute the function and do not transmit anything</p> <p><math>\boxed{K}_{-} \boxed{-} \boxed{3}</math> When a key is pressed, do not execute the function, but transmit the key code <math>\boxed{K}_{-} \boxed{-} \boxed{C}_{-} \boxed{-} \boxed{x}</math> or, when the key is pressed longer, transmit <math>\boxed{K}_{-} \boxed{-} \boxed{R}_{-} \boxed{-} \boxed{x}</math> and <math>\boxed{K}_{-} \boxed{-} \boxed{C}_{-} \boxed{-} \boxed{x}</math></p> <p><math>\boxed{K}_{-} \boxed{-} \boxed{4}</math> When a key is pressed, execute the function and transmit the function code <math>\boxed{K}_{-} \boxed{-} \boxed{A}_{-} \boxed{-} \boxed{x}</math></p> <p>If the function cannot be executed immediately, the function code for the start of the function <math>\boxed{K}_{-} \boxed{-} \boxed{B}_{-} \boxed{-} \boxed{x}</math> or <math>\boxed{K}_{-} \boxed{-} \boxed{A}_{-} \boxed{-} \boxed{x}</math> for the end of the function is transmitted.</p>
Response	<p><math>\boxed{K}_{-} \boxed{-} \boxed{A}</math> Command understood or function successfully executed</p> <p><math>\boxed{K}_{-} \boxed{-} \boxed{I}</math> Command understood, but currently cannot be executed, e.g. no keyboard present</p> <p><math>\boxed{K}_{-} \boxed{-} \boxed{L}</math> Command understood, parameters defective</p> <p><b>Key codes</b></p> <p><math>\boxed{K}_{-} \boxed{-} \boxed{R}_{-} \boxed{-} \boxed{x}</math> Key x was pressed briefly and released again immediately</p> <p><math>\boxed{K}_{-} \boxed{-} \boxed{C}_{-} \boxed{-} \boxed{x}</math> Key x was pressed for approx. 2 sec.</p> <p>See table in the Appendix for key codes</p>
Comments	<ul style="list-style-type: none"> <li>• The factory setting is active after switch-on, after the Reset command and after exiting the master mode.</li> <li>• Only one K command is ever active at one time.</li> </ul>





**Tare immediately**

Command	<code>T, I</code> Tare weighing platform immediately.
Response	<code>T, I, S, Tare weight (weight value), Unit</code> Weighing platform tared, stable tare value <code>T, I, D, Tare weight (weight value), Unit</code> Weighing platform tared, dynamic tare value <code>T, I, I</code> Taring not carried out <code>T, I, L</code> Command cannot be executed <code>T, I, -</code> Command cannot be executed: Tare range dropped below <code>T, I, +</code> Command cannot be executed: Tare range exceeded
Comments	<ul style="list-style-type: none"> <li>• Each taring command overwrites the contents of the tare memory with the new tare weight.</li> <li>• Following a dynamic tare value, a stable weight value can be specified. However, this value is not exact.</li> </ul>

**Specify tare weight**

Command	<code>T, A, Tare weight (weight value), Unit</code> Specify tare weight: The contents of the tare memory are overwritten with the specified tare weight and the net weight is displayed. Effect as when the key sequence <code>PT</code> , 0 ... 9, <code>←</code> is pressed.
Response	<code>T, A, A, Tare weight (weight value), Unit</code> Weighing platform tared with the specified value <code>T, A, I</code> Command not carried out <code>T, A, L</code> Command understood, parameters defective <code>T, -</code> Command cannot be executed: Tare range dropped below <code>T, +</code> Command cannot be executed: Tare range exceeded
Comments	<ul style="list-style-type: none"> <li>• The contents of the tare memory are overwritten with the specified tare value.</li> <li>• On non-certified weighing systems the tare weight is automatically rounded off to the current increment.</li> <li>• On certified weighing systems: Tare range with MultiRange only in first increment range.</li> </ul>
Example	Command: <code>T, A, 1, 2, ., 6, 5, 0, k, g</code> Response: <code>T, A, A, _ _ _ _ 1, 2, ., 6, 5, 0, k, g, _</code>

**Delete tare weight**

Command	<code>T A C</code>	Delete tare weight.
Response	<code>T A C _ A</code> <code>T A C _ I</code>	Weighing platform tared with the specified weight Command not carried out

**Transmit data record**

Command	<code>S X</code> <code>S X I</code> <code>S X I R</code>	After the weighing platform comes to a standstill, transmit a data record with stable weight values. Effect as when $\leftarrow$ is pressed. Transmit a data record with stable or dynamic weight values, regardless of whether the weighing platform is at a standstill. Repeatedly transmit a data record with stable or dynamic weight values, regardless of whether the weighing platform is at a standstill.
Response	<code>S X _ S _ Application block _ _ Application block [ ... ]</code>     <code>A No. _ Data record</code> Data record with stable weight values transmitted  <code>S X _ D _ Application block _ _ Application block [ ... ]</code>     <code>A No. _ Data record</code> Data record with dynamic weight values transmitted  <code>S X _ I</code> Command cannot be executed <code>S X _ -</code> Weighing platform in underload range <code>S X _ +</code> Weighing platform in overload range	
Comments	<ul style="list-style-type: none"> <li>Number of application blocks: three-place with preceding zeros.</li> <li>The contents of the corresponding application block is contained in the data record, see chapter 7. The standard data record consists of 3 blocks:            <code>S X _ S _ A 0 1 1 _ Gross weight (weight value) _ Unit _ _</code>  <code>A 0 1 2 _ Net weight (weight value) _ Unit _ _</code>  <code>A 0 1 3 _ Tare weight (weight value) _ Unit</code> </li> </ul> The continuous transmission of data records started with the <code>S X I R</code> command can be stopped with the commands <code>S X</code> or <code>S X I</code> .	
Example	Command: <code>S X I</code> Response: Default data record <code>S X _ D _ A 0 1 1 _ _ _ _ _ 2 3 . 6 5 0 _ k g _ _</code> <code>_ _ A 0 1 2 _ _ _ _ _ 2 1 . 6 5 0 _ k g _ _</code> <code>_ _ A 0 1 3 _ _ _ _ _ 2 . 0 0 0 _ k g _ _</code>	

**Switch keyboard on or off**

Command	<code>R, 0</code> Switch on keyboard <code>R, 1</code> Switch off keyboard
Response	<code>R, 0 _ _ A</code> Keyboard switched on <code>R, 1 _ _ A</code> Keyboard switched off
Comments	<ul style="list-style-type: none"> <li>• Factory setting: Keyboard switched on.</li> <li>• When the keyboard is switched off, the terminal cannot be manually operated.</li> </ul>

**Changing over to different weight unit**

Command	<code>U _ Unit</code> Change over weight display to different weight unit <code>U</code> Change over weight display to the first weight unit
Response	<code>U _ _ A</code> Weight display switched over to another weight unit <code>U _ _ I</code> Impermissible weight unit
Comment	Possible units: g, kg, lb, ozt, oz, dwt

**Acoustic signal**

Command	<code>D, S</code> Generate short acoustic signal (beep) in the terminal
Response	<code>D, S _ _ A</code> Acoustic signal generated in the terminal

**Read application block**

Command	<code>A, R _ _ No.</code> Read contents of the application block
Response	<code>A, R _ _ A _ Information</code> Contents of the application block transmitted
Comments	<ul style="list-style-type: none"> <li>• The transmitted information is dependent on the application block, see chapter 7.</li> <li>• The number of the application block must be entered as a three-place number with preceding zeros.</li> </ul>

**Write application block**

Command	<input type="text" value="A,W,_,No.,_,Information"/> Write application block <input type="text" value="A,W,_,No."/> Reset application block <input type="text" value="A,W,_,No.,_"/> Delete application block
Response	<input type="text" value="A,W,_,A"/> Application block written <input type="text" value="A,W,_,I"/> Application block not present <input type="text" value="A,W,_,L"/> Application block cannot be written
Comments	<ul style="list-style-type: none"> <li>The information to be entered is dependent on the target block, see chapter 7.</li> <li>Deleting and resetting have the same effect.</li> </ul>

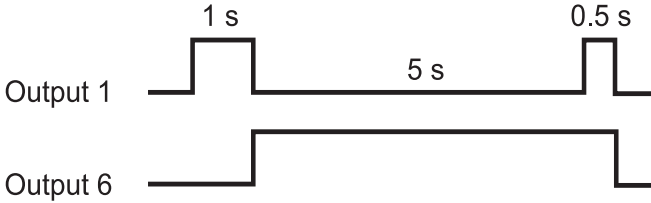
**Specify DeltaTrac target value**

Command	<input type="text" value="D,Y,_,Target weight (weight value),_,Unit,_,Lower tolerance,_,Unit,_,Upper tolerance,_,Unit"/> Specify DeltaTrac target value <input type="text" value="D,Y"/> Delete DeltaTrac target value
Response	<input type="text" value="D,Y,_,A"/> DeltaTrac target value loaded/deleted
Comments	<ul style="list-style-type: none"> <li>Observe limit values, see page 18</li> <li>Also possible: <input type="text" value="A,W,_,0,2,0,..."/> , see page 116</li> </ul>
Example	Command: <input type="text" value="D,Y,_,4,.,5,_,k,g,_,5,_,%"/> Response: <input type="text" value="D,Y,_,A"/>

**Print text or barcode with GA46 printer**

Command	<table border="0"> <tr> <td><code>P _ Text_48</code></td> <td>Print text as per setting</td> </tr> <tr> <td><code>P _ \$ ! 1 Text_48</code></td> <td>Print text in small print</td> </tr> <tr> <td><code>P _ \$ ! 2 Text_48</code></td> <td>Print text in normal print</td> </tr> <tr> <td><code>P _ \$ ! 3 Text_48</code></td> <td>Print text in large print</td> </tr> <tr> <td><code>P _ \$ ! A Text_48</code></td> <td>Print text in small type and bold print</td> </tr> <tr> <td><code>P _ \$ ! B Text_48</code></td> <td>Print text in normal type and bold print</td> </tr> <tr> <td><code>P _ \$ ! C Text_48</code></td> <td>Print text in large type and bold print</td> </tr> <tr> <td><code>P _ \$ # 1 Text_20, barcode-specific</code></td> <td>Print code 39</td> </tr> <tr> <td><code>P _ \$ # 2 Text_8, barcode-specific</code></td> <td>Print EAN 8</td> </tr> <tr> <td><code>P _ \$ # 3 Text_13, barcode-specific</code></td> <td>Print EAN 13</td> </tr> <tr> <td><code>P _ \$ # 4 Text_20, barcode-specific</code></td> <td>Print code 128</td> </tr> <tr> <td><code>P _ \$ # 5 Text_20, barcode-specific</code></td> <td>Print code 2 of 5</td> </tr> <tr> <td><code>P _ \$ # 6 Text_20, barcode-specific</code></td> <td>Print code 2 of 5 interleaved</td> </tr> <tr> <td><code>P _ \$ # 7 Text_20, barcode-specific</code></td> <td>Print code 128</td> </tr> <tr> <td><code>P _ \$ # 8 Text_20, barcode-specific</code></td> <td>Print EAN 128</td> </tr> <tr> <td><code>P _</code></td> <td>Print blank line</td> </tr> </table>	<code>P _ Text_48</code>	Print text as per setting	<code>P _ \$ ! 1 Text_48</code>	Print text in small print	<code>P _ \$ ! 2 Text_48</code>	Print text in normal print	<code>P _ \$ ! 3 Text_48</code>	Print text in large print	<code>P _ \$ ! A Text_48</code>	Print text in small type and bold print	<code>P _ \$ ! B Text_48</code>	Print text in normal type and bold print	<code>P _ \$ ! C Text_48</code>	Print text in large type and bold print	<code>P _ \$ # 1 Text_20, barcode-specific</code>	Print code 39	<code>P _ \$ # 2 Text_8, barcode-specific</code>	Print EAN 8	<code>P _ \$ # 3 Text_13, barcode-specific</code>	Print EAN 13	<code>P _ \$ # 4 Text_20, barcode-specific</code>	Print code 128	<code>P _ \$ # 5 Text_20, barcode-specific</code>	Print code 2 of 5	<code>P _ \$ # 6 Text_20, barcode-specific</code>	Print code 2 of 5 interleaved	<code>P _ \$ # 7 Text_20, barcode-specific</code>	Print code 128	<code>P _ \$ # 8 Text_20, barcode-specific</code>	Print EAN 128	<code>P _</code>	Print blank line
<code>P _ Text_48</code>	Print text as per setting																																
<code>P _ \$ ! 1 Text_48</code>	Print text in small print																																
<code>P _ \$ ! 2 Text_48</code>	Print text in normal print																																
<code>P _ \$ ! 3 Text_48</code>	Print text in large print																																
<code>P _ \$ ! A Text_48</code>	Print text in small type and bold print																																
<code>P _ \$ ! B Text_48</code>	Print text in normal type and bold print																																
<code>P _ \$ ! C Text_48</code>	Print text in large type and bold print																																
<code>P _ \$ # 1 Text_20, barcode-specific</code>	Print code 39																																
<code>P _ \$ # 2 Text_8, barcode-specific</code>	Print EAN 8																																
<code>P _ \$ # 3 Text_13, barcode-specific</code>	Print EAN 13																																
<code>P _ \$ # 4 Text_20, barcode-specific</code>	Print code 128																																
<code>P _ \$ # 5 Text_20, barcode-specific</code>	Print code 2 of 5																																
<code>P _ \$ # 6 Text_20, barcode-specific</code>	Print code 2 of 5 interleaved																																
<code>P _ \$ # 7 Text_20, barcode-specific</code>	Print code 128																																
<code>P _ \$ # 8 Text_20, barcode-specific</code>	Print EAN 128																																
<code>P _</code>	Print blank line																																
Response	<table border="0"> <tr> <td><code>P _ A</code></td> <td>Alphanumeric characters printed</td> </tr> <tr> <td><code>P _ L</code></td> <td>no GA46 present</td> </tr> </table>	<code>P _ A</code>	Alphanumeric characters printed	<code>P _ L</code>	no GA46 present																												
<code>P _ A</code>	Alphanumeric characters printed																																
<code>P _ L</code>	no GA46 present																																
Comments	<ul style="list-style-type: none"> <li>• Character stock: ASCII character 20 hex/32 dec ... 7F hex/127 dec, see page 126.</li> <li>• Printing is carried out in the font size last selected.</li> <li>• Watch upper and lower case.</li> </ul>																																

### Actuating digital outputs

<p>Command</p>	<p><code>W _ Status</code> Switch individual digital outputs on or off</p> <p><code>W _ Status 1 _ Time 1 _ Status 2 _ Time 2 _ ... Status 4 _ Time 4 _ Status 5</code> Trigger time sequence of status changes of digital outputs</p> <p><code>W , W _</code> Reset all outputs to logical 0</p> <p>Status: Each output is assigned a value. The total of the values of those outputs which are to be closed is indicated as the "Status".</p> <table> <tr><td>Digital output 1</td><td>1</td></tr> <tr><td>Digital output 2</td><td>2</td></tr> <tr><td>Digital output 3</td><td>4</td></tr> <tr><td>Digital output 4</td><td>8</td></tr> <tr><td>Digital output 5</td><td>16</td></tr> <tr><td>Digital output 6</td><td>32</td></tr> <tr><td>Digital output 7</td><td>64</td></tr> <tr><td>Digital output 8</td><td>128</td></tr> <tr><td>All outputs open</td><td>0</td></tr> <tr><td>All outputs closed</td><td>255</td></tr> </table> <p>Time: 1 ... 99999 ms</p>	Digital output 1	1	Digital output 2	2	Digital output 3	4	Digital output 4	8	Digital output 5	16	Digital output 6	32	Digital output 7	64	Digital output 8	128	All outputs open	0	All outputs closed	255
Digital output 1	1																				
Digital output 2	2																				
Digital output 3	4																				
Digital output 4	8																				
Digital output 5	16																				
Digital output 6	32																				
Digital output 7	64																				
Digital output 8	128																				
All outputs open	0																				
All outputs closed	255																				
<p>Response</p>	<p><code>W _ A</code> Digital outputs set</p>																				
<p>Comments</p>	<ul style="list-style-type: none"> <li>• Max. 5 statuses "Status" and 4 intervals "Time" are possible. After sequence has been run, digital outputs freeze in last status "Status".</li> <li>• A break in the port has no effect on the outputs.</li> <li>• If terminal receives a new W command before time sequence has been run, ongoing sequence will be aborted immediately.</li> <li>• If the limits for "Status" and "Time" are not adhered to when operating the interface types 4 I/O or relay box 8, the fault message EL appears.</li> </ul>																				
<p>Examples</p>	<p>Command: <code>W _ 5</code> Digital outputs 1 and 3 are closed, all others opened</p> <p>Command: <code>W _ 1 _ 1,0,0,0 _ 3,2 _ 5,0,0,0 _ 3,3 _ 5,0,0 _ 0</code> triggers following sequence:</p>  <p>The diagram shows two digital outputs over time. Output 1 starts low, goes high for 1 second, then low for 5 seconds, then high for 0.5 seconds. Output 6 starts low, goes high for 5 seconds, then low.</p>																				

#### 6.4.4 Error messages

Error messages always consist of 2 characters and a string limit.  
The string limit can be defined in the master mode (section 5.6.1).

**E, T**

##### Transmission error

The terminal transmits a transmission error for errors in the received bit sequence, e.g. parity error, missing stop bit.

**E, S**

##### Syntax error

The terminal transmits a syntax error when it cannot process the received characters, e.g. command not present.

**E, L**

##### Logic error

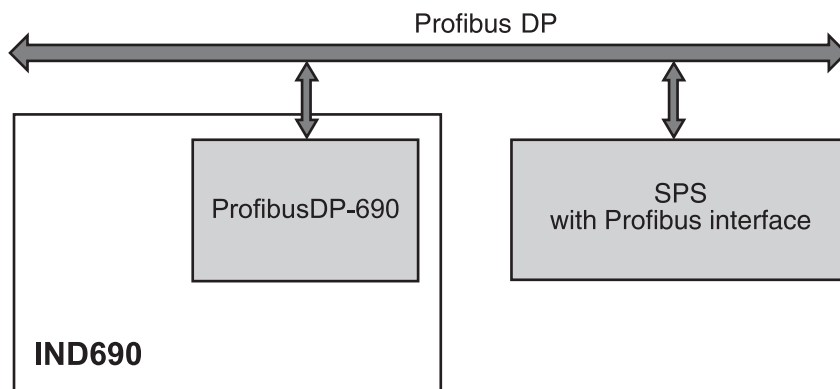
The terminal transmits a logic error, when a command cannot be executed, e.g. when an attempt is made to write a non-writable application block.

## 6.5 Profibus DP communication with a PLC

### 6.5.1 Overview

The ProfibusDP-690 is designed for operation as a slave on the Profibus DP. This provides the following possibilities with a master PLC also connected to the Profibus DP:

- Access to the weight values of the weighing platform connected to the weighing terminal
- Operation of the weighing platforms connected to the weighing terminal (zero-set, taring, setting specified tare values, etc.)
- Triggering key presses, transmitting data strings or display of texts





### 6.5.2 Data formats

All user data are transmitted in a compressed, up to 4-word long format.

**Write table** Format for transmitting user data from the PLC to the ProfibusDP-690.

**Read table** Format for the transmission of user data from ProfibusDP-690 to the PLC.

#### Structure of the write and read table

The write and read table are similarly structured and contain the following sections:

- Value (16-bit integer or 32-bit floating point) for the transmission of weight values, application block numbers, etc.
- Commands or the corresponding responses with a total of 16 bits
- Control of 16 digital I/Os

### 6.5.3 Handshake

As certain commands can not always be executed immediately by the scale, e.g. taring with a restless weighing platform, 3 handshake bits of the PLC allow clear monitoring of the success of its commands:

1. The PLC starts a command by setting the corresponding command bit and also toggles COMMAND VALID in the write table. All other command bits are 0.
2. The weighing terminal responds with the current data of the read table. If it was possible to completely process the command, the COMMAND EXECUTED bit is toggled. Otherwise COMMAND EXECUTED remains unchanged.
3. The PLC recognises whether it can transmit the next command or must repeat the last one from COMMAND EXECUTED and transmits the write table to the weighing terminal.
4. The weighing terminal recognises from the status change of the COMMAND VALID bit that it should carry out the next command. In addition, the weighing terminal also detects whether the last command has been executed or is still running. If the PLC attempts to start new commands before the previous one has been confirmed by the weighing terminal with a status change of COMMAND VALID, the weighing terminal ignores this new command.

### 6.5.4 Commands and responses

All commands available to the PLC and the corresponding responses are shown in the following two tables.

Data direction PLC -> IND690 Write table

Data direction IND690 -> PLC Read table

#### Write table

16-Bit Integer 2 Words	Word 0			Word 1		
16-Bit Integer 4 Words	Word 0			Word 1	Word 2	Word 3
32-Bit Floating Point		Word 0	Word 1	Word 2	Word 3	
Bit	Value 16-Bit	Value 32-Bit Floating Point		Command	16 Digital I/O	AB data
0				Command valid Toggle-bit for all commands	Setting of IND690 outputs  or  Displaying or evaluating inputs of external I/O module	Data for writing an application block  Tolerance specifica- tions are handled in % if the sign is set to 1.
1		Mantissa		Bits 1/2/3: Selection of read-table value, read/write AB 0/0/0 = Display                      1/0/0 = Net 0/0/1 = Key No.                      1/0/1 = Read AB 0/1/0 = Gross                        1/1/0 = Tare 0/1/1 = Write AB                      1/1/1 = Not in use		
2						
3						
4						
5						
6						
7		Mantissa		Taring		
8				Delete tare		
9				Set to zero		
10				ENTER key		
11				Input mode		
12				Switch keyboard on/off		
13		Exponent		Bits 13/14/15: Selection of weighing platform 0/0/0 = None                            1/1/0 = Scale 3 1/0/0 = Scale 1                        0/0/1 = Scale 4 0/1/0 = Scale 2                        1/0/1 = Sum scale		
14						
15	Sign				Sign	Sign

## Read table

16-Bit Integer 2 words	Word 0			Word 1		
16-Bit Integer 4 words	Word 0			Word 1	Word 2	Word 3
32-Bit Floating Point		Word 0	Word 1	Word 2	Word 3	
Bit	Value 16-Bit	Value 32-Bit Floating Point		Command	16 Digital I/O	Not in Use
0				Command executed Toggle-bit for all commands	Showing or reading of IND690 inputs  or Displaying or setting outputs of external I/O module	
1		Mantissa		Error command		
2				Movement		
3				Net		
4				Error scale (overload/underload...)		
5		Mantissa		Key(s) was/were pressed		
6				Input mode active		
7				Setpoint 1 reached		
8				Setpoint 2 reached		
9		Exponent		Setpoint 3 reached		
10				Setpoint 4 reached		
11				1 = keyboard blocked, 0 = keyboard unblocked		
12				Second unit 0 = first unit,                      1 = second unit		
13				Bits 13/14/15: Current weighing platform		
14				0/0/0 = None                      1/1/0 = Scale 3 1/0/0 = Scale 1                      0/0/1 = Scale 4 0/1/0 = Scale 2                      1/0/1 = Sum scale		
15	Sign	Sign				

### Notes on commands

If the command requires parameters, they will be transmitted either as an integer value or as a floating point value depending on the operating mode set.

Exception: The commands READ/WRITE APPLICATION BLOCK and PRESS KEY always expect integer values as parameters.

### Read commands

- The read commands Display value, Net, Gross, Tare, Key and Application block overwrite the cyclically transmitted display values with the required data. The data are transmitted as 16-bit integers or 32-bit floating points. As soon as the COMMAND EXECUTED bit is toggled, these values must be evaluated immediately by the PLC, as in the next cycle the value in the read table is overwritten again with the current weight value.
- The response to the READ KEY NUMBER command (write table bits 1/2/3 = 0/0/1) is transmitted in the Word 0 (16-bit integer) or in Word 1 (32-bit floating point). The low byte contains the keyboard code, the high byte the function key code. The weighing terminal can store a maximum of 10 keys for being called via the READ KEY NUMBER command. If they are not called, the oldest key actuations are overwritten.  
After reading out the last stored key, the KEY WAS PRESSED bit is reset. The key memory is cleared after the device is switched on and after the master mode is exited.

### Key numbers

Number	Function key
00	Standard keys of IND690-Base
02	Extended tare keys of ID690-Base
51	Standard keys of Pac
52	Extended keys of Pac
...	Only when the Pac is equipped with more than one function key page, i.e. more than 6 function keys

### Reading and writing application blocks

- When writing an application block, the desired data are simultaneously transferred with Word 3. For this reason, writing application blocks is only possible in 16-bit integer/4-word mode.
- Only application blocks with the formats "numeric" or "weight value" can be read or written. When writing, certain tolerance (sub-)blocks (e.g. with DeltaTrac) can be intentionally written with the format "percent" by setting the sign to "1".
- If a non-existent block or an alphanumeric block is selected, the IND690 responds with ERROR COMMAND.  
The requested data are supplied in the 16-bit integer mode in the same format as the weight value, and in the 32-bit floating point mode floating point values are always transmitted.

The **application block number** in the write table must be entered as a value (Word 0 in 16-bit integer mode, Word 1 in 32-bit floating point mode) in the following format for the READ APPLICATION BLOCK and WRITE APPLICATION BLOCK commands:

### "Basic" application block

	Sub-block no.				Exp.		Application block number													
	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
<b>Example</b>	S	S	S	S	E	E	A	A	A	A	A	A	A	A	A	A	A			
<b>AB 10</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0			
<b>AB 20, sub-block 2</b>	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0			

### Expanded application block

#### Condition

One or more expanded application blocks are selected in master mode.

#### Example

Application block 21 is selected as the 1st expanded application block, application block 46 is selected as the 2nd expanded application block.

	Sub-block no.				Exp.		Index of the expanded AB													
	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0			
<b>Example</b>	S	S	S	S	E	E	A	A	A	A	A	A	A	A	A	A	A			
<b>AB 21_007</b>	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1			
<b>AB 46_005, SB 1</b>	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	1	0			

### Input of tolerances in %

If the sign (bit 15) in Word 3 is set to 1, tolerance specifications can be written accurately down to one decimal place in %.

This rule applies in the same way for Word 0 (16-bit integer) and Word 1 (32-bit floating point) when reading.

Example	Decimal	Binary															
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
<b>100.0 %</b>	-1000	1	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0
<b>1 %</b>	-10	1	0	0	1	1	0	0	0	0	0	0	0	1	0	1	0
<b>0.1 %</b>	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

**Write commands**

- The write command PRESS KEY requires the low byte keyboard code and the high byte function key code as parameters.
- The function key code is based on the active function keys and must be correctly specified for each PRESS KEY command. A function key change can also automatically be forced by changing the function key code, e.g. from REF 10 (3301 hex) to X10 (0004 hex).
- The setpoints loaded via the WRITE SETPOINT X commands (e.g. Setpoint 1: write table bits 4/5/6 = 0/0/1) are deleted after switch-on and each time the master mode is run. The Tolerance parameter in the setpoint modes Checking and Filling must be specified in the 16-bit integer mode with 2 decimal places, e.g. 1025 for 10.25 %.

**6.5.5 Digital I/Os**

The operating mode of an I/O interface (4 I/O-690 or a relay box 8-690) installed on the IND690 is dependent on where the I/Os are located (directly on the IND690 or externally on the Profibus) and on the parameters CONTROL INPUTS, CONTROL OUTPUTS.

	<b>Outputs</b>	<b>Inputs</b>
No I/Os on IND690	The weighing terminal controls external outputs via the read table.	The weighing terminal reads external inputs from the write table and executes predefined actions.
I/Os on IND690 (4 I/O-690 or 8-690 relay box), inputs and outputs configured to CONTROL INTERNAL	The weighing terminal controls internal outputs and displays these in the read table.	The weighing terminal reads internal inputs and executes predefined actions; the PLC has no access.
I/Os on IND690 (4 I/O-690 or 8-690 relay box), inputs and outputs configured to CONTROL EXTERNAL	The PLC controls the outputs of the weighing terminal via the write table.	The weighing terminal reads internal inputs and displays these in the read table.

### 6.5.6 Messages in display

The following messages may appear briefly in the display:

Message	Meaning
PROFIBUS NOT ACTIVE!	<ul style="list-style-type: none"> <li>Initialisation processes are still running on Profibus DP.</li> <li>The weighing terminal is not yet connected to the Profibus DP.</li> </ul>
PROFIBUS ACTIVE	<ul style="list-style-type: none"> <li>Readiness restored, e.g. after switch-on, exiting master mode or following a bus interruption.</li> </ul>
PROFIBUS – ERROR BCC RX PROFIBUS – ERROR BCC TX	<ul style="list-style-type: none"> <li>Weighing terminal or field bus module have detected a BCC error.</li> </ul>
PROFIBUS – ERROR DATA RX PROFIBUS – ERROR DATA TX	<ul style="list-style-type: none"> <li>Communication error weighing terminal &lt;--&gt; Field bus module: e.g. not ETX, Uart error, etc.</li> </ul>
PROFIBUS – TIMEOUT IND690	<ul style="list-style-type: none"> <li>Communication error weighing terminal &lt;--&gt; Field bus module: The weighing terminal does not respond within the defined time.</li> </ul>
PROFIBUS – ERROR CONF.	<ul style="list-style-type: none"> <li>The field bus module has not received the configuration data properly.</li> </ul>

### 6.5.7 GSD file

The GSD file required for communication with the ProfibusDP-690 is available from METTLER TOLEDO Service or can be downloaded from the Profibus GSD Library at <http://www.profibus.com>.

### 6.5.8 Profibus DP-690 demo kit

For a demonstration and test of all commands with a normal PC, ask METTLER TOLEDO Customer Service for the ProfibusDP-690 demo kit.

## 7 Application blocks

Application blocks are internal information memories in which weighing data, calculated quantities, configuration data or character sequences entered with the keypad are stored. The content of the application blocks can be read out or written to with a computer.

When the GA46 printer is connected, the assignment of the application blocks can be printed out, see operating instructions for the GA46 printer.

### 7.1 Syntax and formats

The syntax and formats are dependent on the command set selected in the dialog mode, see page 56.

#### 7.1.1 Read application block

##### Read

A	R	No.
---	---	-----

A	R	_	No.
---	---	---	-----

MMR command set

SICS command set

The weighing terminal receives the command from the computer to read out the content of the "No." application block. Possible formats for "No." are:

xxx	Entire application block
xxx.zz	Sub-block of an application block
xxx_yyy	Read-only memory
xxx_yyy.zz	Sub-block of a read-only memory

This read command is **not** contained in the following description of the application blocks.

##### Response

A	B	_	Information
---	---	---	-------------

A	R	_	A	_	Information
---	---	---	---	---	-------------

MMR command set

SICS command set

As a response the weighing terminal transmits the content of the "No." application block to the computer.

This response is contained in the following description of the application blocks in the MMR version.

##### Example

Command MMR  
Command SICS

A	R	0	2	1	_	0	0	1
---	---	---	---	---	---	---	---	---

A	R	_	0	2	1	_	0	0	1
---	---	---	---	---	---	---	---	---	---

Read out tare memory 1.

Response MMR  
Response SICS

A	B	_	_	_	_	_	_	1	0	.	5	_	k	g	_
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

A	R	_	A	_	_	_	_	_	1	0	.	5	_	k	g	_
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---





### 7.1.3 Data formats

- In the following description of the application blocks the following data formats are used:

<u>Weight value</u>	10 digits with sign and decimal point, right-justified (with preceding blank space)
<u>Unit</u>	3 characters, left-justified (with following blank spaces)
<u>Number_n</u>	Number, n digits, right-justified (with preceding blank spaces)
<u>Text_n</u>	maximum of n characters If the SICS command set is used, "Text" must always be placed in inverted commas.

- Conclude commands and responses with the string frame  $C_R L_F$   
(ASCII characters  $C_R = 0D$  hex/13 deci,  $L_F = 0A$  hex/10 deci).  
The string frame is **not** contained in the following description.

### 7.1.4 Read and write application blocks with the SICS command set

In the following description, the application blocks are shown in the syntax for the MMR command set. When used with the SICS command set, please observe the following SICS conventions, also see sections 7.1.1 to 7.1.3 :

- A blank space must be entered between AR or AW and the application block number: E.g. `A | R | _ | No.`
- The command identification is repeated in the response and a blank space and the character A added:  
`A | R | _ | A | _ | Information` application block transmitted and  
`A | W | _ | A` application block written.
- Texts entered or transmitted are always in inverted commas.

#### Example Read application block for CODE A

Command: `A | R | _ | 0 | 9 | 4`

Response: `A | R | _ | A | _ | "Article"`

#### Write application block for CODE A

Command: `A | W | _ | 0 | 9 | 4 | _ | "Article"`

Response: `A | W | _ | A | ]`

## 7.2 List of the application blocks

No.	Content	Format
001	Terminal type	Response: <input type="text" value="A,B _ Mettler-Toledo_IND690"/>
002	Program number	Response: <input type="text" value="A,B _ IP60-0-0xxxx _"/>
004	Serial number	Response: <input type="text" value="A,B _ Identification (Text_20) _ _"/> <input type="text" value="SN Terminal (Number_7) _ _"/> <input type="text" value="SN Scale 1 (Number_14) _ _"/> <input type="text" value="SN Scale 2 (Number_14) _ _"/> <input type="text" value="SN Scale 3 (Number_14) _ _"/> <input type="text" value="SN Scale 4 (Number_14) _ _"/> <input type="text" value="SN Mainboard (Number_24)"/> Write: <input type="text" value="A,W 0,0,4 _ Identification (Text_20)"/>
005	Keyboard	Response: <input type="text" value="A,B _ Keyboard"/> Write: <input type="text" value="A,W 0,0,5 _ \$ \$ Text"/> Note: Only possible as long as input active on IND690. The text is then written into the input field
006	Electronic finger	Response: <input type="text" value="A,B _ Keys _ _ key number"/> Write: <input type="text" value="A,W 0,0,6 _ \$ \$ 2,4"/> Note: See table in the Appendix for key numbers
007 007.01 007.02	Current gross weight (2nd weight unit)	Response: <input type="text" value="A,B _ Weight value _ Unit"/> <input type="text" value="A,B _ Weight value"/> <input type="text" value="A,B _ Unit"/>
008 008.01 008.02	Current net weight (2nd weight unit)	Response: <input type="text" value="A,B _ Weight value _ Unit"/> <input type="text" value="A,B _ Weight value"/> <input type="text" value="A,B _ Unit"/>
009 009.01 009.02	Current tare weight (2nd weight unit)	Response: <input type="text" value="A,B _ Weight value _ Unit"/> <input type="text" value="A,B _ Weight value"/> <input type="text" value="A,B _ Unit"/> Write: <input type="text" value="A,W 0,0,9 _ Weight value _ Unit"/>
010	Current weighing platform	Response: <input type="text" value="A,B _ Number_2"/> Write: <input type="text" value="A,W 0,1,0 _ Number_2"/> Switch over weighing platform
011 011.01 011.02	Current gross weight (1st weight unit)	Response: <input type="text" value="A,B _ Weight value _ Unit"/> <input type="text" value="A,B _ Weight value"/> <input type="text" value="A,B _ Unit"/>
012 012-01 012-02	Current net weight (1st weight unit)	Response: <input type="text" value="A,B _ Weight value _ Unit"/> <input type="text" value="A,B _ Weight value"/> <input type="text" value="A,B _ Unit"/>

No.	Content	Format
013 013.01 013.02	Current tare weight (1st weight unit)	Response: <input type="text" value="A, B _ Weight value _ Unit"/> <input type="text" value="A, B _ Weight value"/> <input type="text" value="A, B _ Unit"/> Write: <input type="text" value="A, W 0, 1, 3 _ Weight value _ Unit"/>
014	Content of display	Response: <input type="text" value="A, B _ Display"/> Display = Text_20 or weight value
015	Date	Response: <input type="text" value="A, B _ Date"/> Write: <input type="text" value="A, W 0, 1, 5 _ Date"/> Comment: The date is sent in the format selected in the master mode.
016	Dynamic weighing	Response: <input type="text" value="A, B _ Weight value _ Unit"/> Write: <input type="text" value="A, W 0, 1, 6 _ No. of cycles"/> Start weighing cycle Comment: No. of cycles = 1 ... 255
018	Difference target/ actual weight	Response: <input type="text" value="A, B _ Weight value _ Unit"/>
019	Date and time	Response: <input type="text" value="A, B _ Date _ Time"/> Write: <input type="text" value="A, W 0, 1, 9 _ Date \$ \$ Time"/> Comment: Date and time are sent in the format selected in the master mode.
020	Current DeltaTrac	Response: <input type="text" value="A, B _ Target weight (weight value) _ Unit _ _"/> <input type="text" value="lower tolerance (weight value) _ Unit _ _"/> <input type="text" value="upper tolerance (weight value) _ Unit"/> Write: <input type="text" value="A, W 0, x, x _ Target weight (weight value) _ Unit \$ \$"/> <input type="text" value="lower tolerance (weight value) _ Unit \$ \$"/> <input type="text" value="upper tolerance (weight value) _ Unit"/> Comment: xx = 20
021_001 ... 021_999	Tare memory 1 ... 999	Response: <input type="text" value="A, B _ Weight value _ Unit _ _ Name (Text_30)"/> Write: <input type="text" value="A, W 0, x, x, _ x, x, x _ Weight value _ Unit \$ \$"/> <input type="text" value="Name (Text_30)"/> Comment: xx_xxx = 21_001 ... 21_999
021 ... 045	Tare memory 1 ... 25	Response: equal to 021_001 Write: equal to 020_001 Comment: xx_xxx = 21 ... 45 The contents of the tare memories 1 ... 25 are identical to the contents of the tare memories 021_001 ... 021_025.
046_001 ... 046_999	DeltaTrac memory 1 ... 999	Response: equal to 020 Write: equal to 020 Comment: xx = 46_001 ... 46_999

No.	Content	Format																																																																							
046 ... 070	DeltaTrac memory 1 ... 25	Response: equal to 020 Write: equal to 020 Comment: xx = 46 ... 70 The contents of the DeltaTrac memories 1 ... 25 are identical to the contents of the DeltaTrac memories 046_001 ... 046_025.																																																																							
071_001 ... 071_999	Text memory 1 ... 999	Response: <table border="1"><tr><td>A</td><td>B</td><td>_</td><td>Text_30</td></tr></table> Write: <table border="1"><tr><td>A</td><td>W</td><td>0</td><td>x</td><td>x</td><td>_</td><td>x</td><td>x</td><td>x</td><td>_</td><td>Text_30</td></tr></table> Comment: xx = 71_001 ... 71_999	A	B	_	Text_30	A	W	0	x	x	_	x	x	x	_	Text_30																																																								
A	B	_	Text_30																																																																						
A	W	0	x	x	_	x	x	x	_	Text_30																																																															
071 ... 090	Text memory 1 ... 20	Response: equal to 071_001 Write: equal to 071_001 Comment: xx_xxx = 71 ... 90 The contents of the text memories 1 ... 20 are identical to the contents of the text memories 071_001 ... 071_020.																																																																							
091	Barcode EAN 28, EAN 128	Response: <table border="1"><tr><td>A</td><td>B</td><td>_</td><td>EAN 28</td><td>_</td><td>_</td><td>EAN 128 01</td><td>_</td><td>_</td><td>EAN 128 310</td><td>_</td><td>_</td><td>_</td></tr><tr><td colspan="13" style="text-align: center;">  EAN 128 330  </td></tr></table> <u>EAN 28:</u> <table border="1"><tr><td>2</td><td>8</td><td>Article</td><td>Check digit</td><td>Weight</td></tr></table> Article: 4-digit article No. from memory Code A Check digit: 1-digit, calculated by IND690-Base for the weight Weight: 5-digit positive weight value with 3 decimal places between 00.000 kg - 99.999 kg  <u>EAN 128 01:</u> <table border="1"><tr><td>0</td><td>1</td><td>Article</td></tr></table> or <table border="1"><tr><td>0</td><td>1</td><td>Article</td><td>Check digit</td></tr></table> or <table border="1"><tr><td>0</td><td>1</td><td>0</td><td>Article</td><td>Check digit</td></tr></table> or <table border="1"><tr><td>0</td><td>1</td><td>0</td><td>Article</td></tr></table> Article: Article No. from memory Code A, max. 14 digits Check digit: 1-digit, calculated by IND690-Base Length: total of max. 16 digits  <u>EAN 128 310:</u> <table border="1"><tr><td>0</td><td>1</td><td>9</td><td>Article</td><td>Check digit</td><td>3</td><td>1</td><td>0</td><td>x</td><td>Weight</td></tr></table> or <table border="1"><tr><td>0</td><td>1</td><td>9</td><td>Article</td><td>3</td><td>1</td><td>0</td><td>x</td><td>Weight</td></tr></table> Article: Article No. from memory Code A max. 12 or 13 digits Check digit: 1-digit calculated by IND690-Base x: 0 ... 6, decimal places of weight value Weight: 6-digit net weight value  <u>EAN 128 330:</u> <table border="1"><tr><td>3</td><td>3</td><td>0</td><td>x</td><td>Weight</td></tr></table> x: 0 ... 6, decimal places of weight value Weight: 6-digit gross weight value	A	B	_	EAN 28	_	_	EAN 128 01	_	_	EAN 128 310	_	_	_	EAN 128 330													2	8	Article	Check digit	Weight	0	1	Article	0	1	Article	Check digit	0	1	0	Article	Check digit	0	1	0	Article	0	1	9	Article	Check digit	3	1	0	x	Weight	0	1	9	Article	3	1	0	x	Weight	3	3	0	x	Weight
A	B	_	EAN 28	_	_	EAN 128 01	_	_	EAN 128 310	_	_	_																																																													
EAN 128 330																																																																									
2	8	Article	Check digit	Weight																																																																					
0	1	Article																																																																							
0	1	Article	Check digit																																																																						
0	1	0	Article	Check digit																																																																					
0	1	0	Article																																																																						
0	1	9	Article	Check digit	3	1	0	x	Weight																																																																
0	1	9	Article	3	1	0	x	Weight																																																																	
3	3	0	x	Weight																																																																					

No.	Content	Format
092	Barcode EAN 29	Response: <input type="text" value="A,B _ 2,9 Article Check digit Weight"/> Comment: Article: 4-digit article no. from memory Code A Check digit: 1-digit no., calculated from IND690-Base for the weight Weight: 5-digit positive weight value with 3 places to right of point between 00.000 kg ... 99.999 kg
093	Barcode EAN 29 A	Response: <input type="text" value="A,B _ 2,9 Article Weight"/> Comment: Article: 5-digit article no. from memory Code A Weight: 5-digit positive weight value with 3 places to right of point between 00.000 kg ... 99.999 kg
094 ... 099	Identification data Code A ... Code F	Response: <input type="text" value="A,B _ Name (text_20) _ _ Identification (text_30)"/> Write: <input type="text" value="A,W 0,x,x _ Name (text_20) \$ \$ Identification (text_30)"/> Comment: xx = 94 ... 99
101 ... 109	Status COM1 ... COM9	Response: <input type="text" value="A,B _ HW (Text_21 _ _ Mode (Text_21 _ _ ) _ _ ) _ _ Status (Text_21 _ _ ) _ _ Settings (Text_31)"/> Write*: <input type="text" value="A,W 1,0,x _ Transmit buffer COMx"/> Note: x = 1 ... 9 The information entered is sent directly via the selected interface. The max. data length of a transmit buffer is 246 characters.
110	Scales ID	Response: <input type="text" value="A,B _ Scale No. Scale 1 (Number_2) _ _ Scale No. Scale 2 (Number_2) _ _ Scale No. Scale 3 (Number_2) _ _ Scale No. Scale 4 (Number_2) _ _ Scale No. Sum scale (Number_2)"/> Note: This block only contains data if the setting PARALLEL SCALES is selected under the SCALES MODE. When a sum scale is configured, the scale number 05 is output in the last sub-block. If no sum scale is configured, the last sub-block is empty.
111_001 ... 111_005	Gross weight, scales 1 ... 4, sum scale	Response: <input type="text" value="A,B _ Weight value _ Unit"/> Note: This block only contains data if the setting PARALLEL SCALES is selected under the SCALES MODE.
112_001 ... 112_005	Net weight, scales 1 ... 4, sum scale	Response: <input type="text" value="A,B _ Weight value _ Unit"/> Note: This block only contains data if the setting PARALLEL SCALES is selected under the SCALES MODE.
113_001 ... 113_005	Tare weight, scales 1 ... 4, sum scale	Response: <input type="text" value="A,B _ Weight value _ Unit"/> Write: <input type="text" value="A,W 1,1,3 _ 0,0,x Weight value _ Unit"/> Note: x = 1 ... 5 This block only contains data if the setting PARALLEL SCALES is selected under the SCALES MODE.
115	Status terminal	Response: <input type="text" value="A,B _ Status"/>

No.	Content	Format
116	Fault/event memory	Response: <input type="text" value="A, B _ Type (Number_2) _ _ Quantity (Number-2)"/>
117_001 ... 117_005	Gross weight, (2nd weight unit) scales 1 ... 4, sum scale	Response: <input type="text" value="A, B _ Weight value _ Unit"/> Note: This block only contains data if the setting PARALLEL SCALES is selected under the SCALES MODE.
118_001 ... 118_005	Net weight, (2nd weight unit) scales 1 ... 4, sum scale	Response: <input type="text" value="A, B _ Weight value _ Unit"/> Note: This block only contains data if the setting PARALLEL SCALES is selected under the SCALES MODE.
119_001 ... 119_005	Tare weight, (2nd weight unit) scales 1 ... 4, sum scale	Response: <input type="text" value="A, B _ Weight value _ Unit"/> Write: <input type="text" value="A, W 1, 1, 3 _ 0, 0, x Weight value _ Unit"/> Note: x = 1 ... 5 This block only contains data if the setting PARALLEL SCALES is selected under the SCALES MODE.
120	Disabling / Enabling keys	Response: <input type="text" value="A, B _ x, x, x, ... (37 places)"/> Write: <input type="text" value="A, W 1, 2, 0 _ x, x, x, ... (37 places)"/> Note: x = 1: Key enabled x = 0: Key disabled The position of the numerals corresponds to the table in section 10.2, beginning with 0. The setting is retained when the weighing terminal is switched off. Example: <input type="text" value="A, W 1, 2, 0 _"/> <input type="text" value="0000000000000000010000000000000111100"/> : All keys disabled except for F6 and the cursor keys.
181 ... 184	Parameters for scale 1 ... 4	Response: <input type="text" value="A, B _ Scale parameters"/> Note: For service information purposes the internal scale parameters can be read out/printed; the structure and content are scale-dependent.
185	Parameters for sum scale	Response: <input type="text" value="A, B _ Sum scale parameters"/>
199	Number of last Alibi entry	Response: <input type="text" value="A, B _ Number_6 _ _ Date _ _ Time _ _"/> <input type="text" value="Gross (Weight value) _ _"/> <input type="text" value="Net (Weight value) _ _"/> <input type="text" value="Tare (Weight value)"/> Note: Date and time as in application block 019.
201	Application	Response: <input type="text" value="A, B _ IND690 _ _ TOTALIZING"/>
202	Version application	Response: <input type="text" value="A, B _ IP60_1_0105"/>
205 205.01 205.02	Start and end value for the item counter	Response: <input type="text" value="A, B _ Start value (Number 4) _ End value (Number 4)"/> <input type="text" value="A, B _ Start value (Number 4)"/> <input type="text" value="A, B _ End value (Number 4)"/>

No.	Content	Format
206	Item counter	Response: <input type="text" value="A, B _ Item (Number 4)"/>
207	Transaction number	Response: <input type="text" value="A, B _ Transaction number (Number 6)"/>
208	Last process	Response: <input type="text" value="A, B _ Process (Number 1)"/> Remark: Last process carried out 1 = Totalizing 2 = Manual input 4 = Cancelled
211 211.01 211.02	Sum gross	Response: <input type="text" value="A, B _ Weight value _ Unit"/> <input type="text" value="A, B _ Weight value"/> <input type="text" value="A, B _ Unit"/>
212 212.01 212.02	Sum net	Response: <input type="text" value="A, B _ Weight value _ Unit"/> <input type="text" value="A, B _ Weight value"/> <input type="text" value="A, B _ Unit"/>
213 213.1 213.2	Sum tare	Response: <input type="text" value="A, B _ Weight value _ Unit"/> <input type="text" value="A, B _ Weight value"/> <input type="text" value="A, B _ Unit"/>
214 214.01 214.02	Last gross	Response: <input type="text" value="A, B _ Weight value _ Unit"/> <input type="text" value="A, B _ Weight value"/> <input type="text" value="A, B _ Unit"/>
215 215.01 215.02	Last net	Response: <input type="text" value="A, B _ Weight value _ Unit"/> <input type="text" value="A, B _ Weight value"/> <input type="text" value="A, B _ Unit"/>
216 216.01 216.02	Last tare	Response: <input type="text" value="A, B _ Weight value _ Unit"/> <input type="text" value="A, B _ Weight value"/> <input type="text" value="A, B _ Unit"/>
217	Mean value	Response: <input type="text" value="A, B _ Weight value _ Unit"/>
218	Standard deviation	Response: <input type="text" value="A, B _ Weight value _ Unit"/>
219	Minimum $x_{\min}$	Response: <input type="text" value="A, B _ Weight value _ Unit"/>
220	Maximum $x_{\max}$	Response: <input type="text" value="A, B _ Weight value _ Unit"/>
701	Description of application	Response: <input type="text" value="A, B _ ID690-Interfaces"/>
702	Program designation	Response: <input type="text" value="A, B _ IK07-0-0300"/>
706, 708, 710, 712, 714, 716, 718, 720	Dig. outputs 1 ... 8	Response: <input type="text" value="A, B _ 8-digit binary value"/> Write: <input type="text" value="A, W 7, x, x _ 8-digit binary value"/> Note: xx = 06, 08, 10, 12, 14, 16, 18, 20 8-digit binary value: Bit8, Bit7 ... Bit1 Bit8 = Output 8 ... Bit1 = Output 1



No.	Content	Format																																																
707, 709, 711, 713, 715, 717, 719, 721	Dig. inputs 1 ... 8	<p>Response: <input type="text" value="A, B _ _"/> 8-digit binary value</p> <p>Note: 8-digit binary value: Bit8, Bit7 ... Bit1 Bit8 = Input 8 ... Bit1 = Input 1</p>																																																
722, 723	COM5 analog output, COM6 analog output	<p>Response: Start-Stop mode</p> <table border="1"> <tr><td><input type="text" value="A, B _ _"/> Application block for COM5 (Number_3)</td><td><input type="text" value="_ _"/></td></tr> <tr><td>Start value (weight value)</td><td><input type="text" value="_ _"/> Unit <input type="text" value="_ _"/></td></tr> <tr><td>Stop value (weight value)</td><td><input type="text" value="_ _"/> Unit <input type="text" value="_ _"/></td></tr> <tr><td>Start value voltage/current</td><td><input type="text" value="_ _"/> Unit <input type="text" value="_ _"/></td></tr> <tr><td>Stop value voltage/current</td><td><input type="text" value="_ _"/> Unit *</td></tr> </table> <p>DeltaTrac mode</p> <table border="1"> <tr><td><input type="text" value="A, B _ _"/> Application block for COM5 (Number_3)</td><td><input type="text" value="_ _"/></td></tr> <tr><td>Start value voltage/current</td><td><input type="text" value="_ _"/> Unit <input type="text" value="_ _"/></td></tr> <tr><td>Stop value voltage/current</td><td><input type="text" value="_ _"/> Unit <input type="text" value="_ _"/></td></tr> <tr><td>Tolerance voltage/current</td><td><input type="text" value="_ _"/> Unit *</td></tr> </table> <p><math>\Delta W</math>-<math>\Delta T</math> mode</p> <table border="1"> <tr><td><input type="text" value="A, B _ _"/> Application block for COM5 (Number_3)</td><td><input type="text" value="_ _"/></td></tr> <tr><td>Start value voltage/current</td><td><input type="text" value="_ _"/> Unit <input type="text" value="_ _"/></td></tr> <tr><td>Delta voltage/current</td><td><input type="text" value="_ _"/> Weight unit/sec *</td></tr> </table> <p>Write: Start-Stop mode</p> <table border="1"> <tr><td><input type="text" value="A, W 7, x, x _ _"/> Application block for COM5 (Number_3)</td><td><input type="text" value="\$ \$"/></td></tr> <tr><td>Start value (weight value)</td><td><input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/></td></tr> <tr><td>Stop value (weight value)</td><td><input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/></td></tr> <tr><td>Start value voltage/current</td><td><input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/></td></tr> <tr><td>Stop value voltage/current</td><td><input type="text" value="_ _"/> Unit *</td></tr> </table> <p>DeltaTrac mode</p> <table border="1"> <tr><td><input type="text" value="A, W 7, x, x _ _"/> Application block for COM5 (Number_3)</td><td><input type="text" value="\$ \$"/></td></tr> <tr><td>Start value voltage/current</td><td><input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/></td></tr> <tr><td>Stop value voltage/current</td><td><input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/></td></tr> <tr><td>Tolerance voltage/current</td><td><input type="text" value="_ _"/> Unit *</td></tr> </table> <p><math>\Delta W</math>-<math>\Delta T</math> mode</p> <table border="1"> <tr><td><input type="text" value="A, W 7, x, x _ _"/> Application block for COM5 (Number_3)</td><td><input type="text" value="\$ \$"/></td></tr> <tr><td>Start value voltage/current</td><td><input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/></td></tr> <tr><td>Delta voltage/current</td><td><input type="text" value="_ _"/> Weight unit/s *</td></tr> </table> <p>Note: xx = 22: COM5 xx = 23: COM6</p>	<input type="text" value="A, B _ _"/> Application block for COM5 (Number_3)	<input type="text" value="_ _"/>	Start value (weight value)	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>	Stop value (weight value)	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>	Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>	Stop value voltage/current	<input type="text" value="_ _"/> Unit *	<input type="text" value="A, B _ _"/> Application block for COM5 (Number_3)	<input type="text" value="_ _"/>	Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>	Stop value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>	Tolerance voltage/current	<input type="text" value="_ _"/> Unit *	<input type="text" value="A, B _ _"/> Application block for COM5 (Number_3)	<input type="text" value="_ _"/>	Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>	Delta voltage/current	<input type="text" value="_ _"/> Weight unit/sec *	<input type="text" value="A, W 7, x, x _ _"/> Application block for COM5 (Number_3)	<input type="text" value="\$ \$"/>	Start value (weight value)	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>	Stop value (weight value)	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>	Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>	Stop value voltage/current	<input type="text" value="_ _"/> Unit *	<input type="text" value="A, W 7, x, x _ _"/> Application block for COM5 (Number_3)	<input type="text" value="\$ \$"/>	Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>	Stop value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>	Tolerance voltage/current	<input type="text" value="_ _"/> Unit *	<input type="text" value="A, W 7, x, x _ _"/> Application block for COM5 (Number_3)	<input type="text" value="\$ \$"/>	Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>	Delta voltage/current	<input type="text" value="_ _"/> Weight unit/s *
<input type="text" value="A, B _ _"/> Application block for COM5 (Number_3)	<input type="text" value="_ _"/>																																																	
Start value (weight value)	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>																																																	
Stop value (weight value)	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>																																																	
Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>																																																	
Stop value voltage/current	<input type="text" value="_ _"/> Unit *																																																	
<input type="text" value="A, B _ _"/> Application block for COM5 (Number_3)	<input type="text" value="_ _"/>																																																	
Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>																																																	
Stop value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>																																																	
Tolerance voltage/current	<input type="text" value="_ _"/> Unit *																																																	
<input type="text" value="A, B _ _"/> Application block for COM5 (Number_3)	<input type="text" value="_ _"/>																																																	
Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="_ _"/>																																																	
Delta voltage/current	<input type="text" value="_ _"/> Weight unit/sec *																																																	
<input type="text" value="A, W 7, x, x _ _"/> Application block for COM5 (Number_3)	<input type="text" value="\$ \$"/>																																																	
Start value (weight value)	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>																																																	
Stop value (weight value)	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>																																																	
Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>																																																	
Stop value voltage/current	<input type="text" value="_ _"/> Unit *																																																	
<input type="text" value="A, W 7, x, x _ _"/> Application block for COM5 (Number_3)	<input type="text" value="\$ \$"/>																																																	
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Stop value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>																																																	
Tolerance voltage/current	<input type="text" value="_ _"/> Unit *																																																	
<input type="text" value="A, W 7, x, x _ _"/> Application block for COM5 (Number_3)	<input type="text" value="\$ \$"/>																																																	
Start value voltage/current	<input type="text" value="_ _"/> Unit <input type="text" value="\$ \$"/>																																																	
Delta voltage/current	<input type="text" value="_ _"/> Weight unit/s *																																																	
724 ... 731	Set point 1	<p>Response: <input type="text" value="A, B _ _"/> Set point (Text_2) <input type="text" value="_ _"/></p> <table border="1"> <tr><td><input type="text" value="A, x, x, x, _ _"/> <input type="text" value="y, y, y, ., z, z"/></td></tr> <tr><td>Scale (Text_3)</td><td><input type="text" value="_ _"/></td></tr> <tr><td>Set point value (weight value)</td><td><input type="text" value="_ _"/></td></tr> </table> <p>Write: <input type="text" value="A, W 7, 2, x _ _"/> Set point type (Text_2) <input type="text" value="\$, \$"/></p> <table border="1"> <tr><td><input type="text" value="A, x, x, x, _ _"/> <input type="text" value="y, y, y, ., z, z"/></td><td><input type="text" value="\$, \$"/></td></tr> <tr><td>Scale (Text_3)</td><td><input type="text" value="\$, \$"/></td></tr> <tr><td>Set point value (weight value)</td><td><input type="text" value="_ _"/></td></tr> </table> <p>Note: xx = 24 ... 31 Set point type: F<math>\uparrow</math>, F<math>\downarrow</math>, D<math>\uparrow</math>, D<math>\downarrow</math> Scale: W1, W2, W3, ALL</p>	<input type="text" value="A, x, x, x, _ _"/> <input type="text" value="y, y, y, ., z, z"/>	Scale (Text_3)	<input type="text" value="_ _"/>	Set point value (weight value)	<input type="text" value="_ _"/>	<input type="text" value="A, x, x, x, _ _"/> <input type="text" value="y, y, y, ., z, z"/>	<input type="text" value="\$, \$"/>	Scale (Text_3)	<input type="text" value="\$, \$"/>	Set point value (weight value)	<input type="text" value="_ _"/>																																					
<input type="text" value="A, x, x, x, _ _"/> <input type="text" value="y, y, y, ., z, z"/>																																																		
Scale (Text_3)	<input type="text" value="_ _"/>																																																	
Set point value (weight value)	<input type="text" value="_ _"/>																																																	
<input type="text" value="A, x, x, x, _ _"/> <input type="text" value="y, y, y, ., z, z"/>	<input type="text" value="\$, \$"/>																																																	
Scale (Text_3)	<input type="text" value="\$, \$"/>																																																	
Set point value (weight value)	<input type="text" value="_ _"/>																																																	


## 8 What to do if ...?

Error / Display	Possible causes	Remedy
Display is dark	<ul style="list-style-type: none"> <li>• No mains voltage</li> <li>• Terminal switched off</li> <li>• Power cord not connected</li> <li>• Brief malfunction</li> <li>• Switch-off time too short in storage battery operation at the IND690-24V</li> <li>• Storage battery level too low at the IND690-24V</li> <li>• Operating-mode selector switch for storage battery operation/mains operation set incorrectly at the IND690-24V</li> </ul>	<ul style="list-style-type: none"> <li>→ Check mains</li> <li>→ Switch on terminal</li> <li>→ Plug in power plug</li> <li>→ Switch terminal off and on again</li> <li>→ Switch off power for 10 seconds</li> <li>→ Charge storage battery</li> <li>→ Set operating-mode selector switch to desired operating mode</li> </ul>
Underload	<ul style="list-style-type: none"> <li>• Load plate not in place</li> <li>• Preload not applied</li> <li>• Weighing range dropped below</li> </ul>	<ul style="list-style-type: none"> <li>→ Apply load plate</li> <li>→ Apply preload</li> <li>→ Set zero</li> </ul>
Overload	<ul style="list-style-type: none"> <li>• Weighing range exceeded</li> <li>• Weighing platform locked</li> </ul>	<ul style="list-style-type: none"> <li>→ Relieve weighing platform</li> <li>→ Release lock</li> </ul>
Weight display unstable	<ul style="list-style-type: none"> <li>• Agitated set-up location</li> <li>• Draft</li> <li>• Contact between load plate and/or weighing sample and surroundings</li> <li>• Power malfunction</li> </ul>	<ul style="list-style-type: none"> <li>→ Adjust vibration adapter</li> <li>→ Avoid drafts</li> <li>→ Eliminate contact</li> <li>→ Check mains</li> </ul>
Wrong weight display	<ul style="list-style-type: none"> <li>• Wrong setting to zero of weighing platform</li> <li>• Wrong tare weight</li> <li>• Contact between load plate and/or weighing sample and surroundings</li> <li>• Weighing platform tilted</li> <li>• Wrong weighing platform selected</li> </ul>	<ul style="list-style-type: none"> <li>→ Relieve weighing platform, set to zero and repeat weighing</li> <li>→ Delete tare or enter right tare value</li> <li>→ Eliminate contact</li> <li>→ Level weighing platform</li> <li>→ Select right weighing platform</li> </ul>
A whistle sound is emitted in the IND690-24V	<ul style="list-style-type: none"> <li>• Storage battery level too low</li> </ul>	<ul style="list-style-type: none"> <li>→ Charge storage battery or switch over to 24 VDC mains operation</li> </ul>
WRONG CODE	<ul style="list-style-type: none"> <li>• Wrong personal code</li> </ul>	<ul style="list-style-type: none"> <li>→ Enter right personal code</li> </ul>

Error / Display	Possible causes	Remedy
SCALE NO. ERROR	<ul style="list-style-type: none"> <li>• Error in weighing cell</li> </ul>	<ul style="list-style-type: none"> <li>→ Repeat test</li> <li>→ If the message appears again: contact METTLER TOLEDO Customer Service</li> </ul>
OUT OF RANGE	<ul style="list-style-type: none"> <li>• Zero set range exceeded</li> <li>• Gross weight negative</li> <li>• Taring range exceeded</li> <li>• Entered value outside permissible range</li> </ul>	<ul style="list-style-type: none"> <li>→ Relieve weighing platform</li> <li>→ Relieve weighing platform and set to zero</li> <li>→ Relieve weighing platform and set to zero</li> <li>→ Enter permissible value</li> </ul>
NOT ALLOWED	<ul style="list-style-type: none"> <li>• Weighing platform does not exist</li> <li>• Print with negative weight value</li> </ul>	<ul style="list-style-type: none"> <li>→ Connect weighing platform</li> <li>→ Relieve weighing platform, set to zero and repeat weighing</li> </ul>
NOT EXISTENT	<ul style="list-style-type: none"> <li>• Recalled memory not assigned</li> </ul>	<ul style="list-style-type: none"> <li>→ Recall other memory</li> </ul>
NO DATA TRANSFER	<ul style="list-style-type: none"> <li>• Weighing platform does not transmit data to the terminal</li> </ul>	<ul style="list-style-type: none"> <li>→ Switch terminal off and on again</li> <li>→ If the message appears again: contact METTLER TOLEDO Customer Service</li> </ul>
INTERF. COM X – BREAK	<ul style="list-style-type: none"> <li>• Break in receiving cable of specified interface</li> </ul>	<ul style="list-style-type: none"> <li>→ Check cable and connectors</li> <li>→ Check external devices (on/off)</li> </ul>
TRANSMIT BUFFER FULL	<ul style="list-style-type: none"> <li>• No transmission</li> <li>• Too many key messages and baud rate too low</li> </ul>	<ul style="list-style-type: none"> <li>→ Check handshake</li> <li>→ Increase baud rate</li> </ul>
KEY BUFFER FULL	<ul style="list-style-type: none"> <li>• Data string currently being edited contains too many blocks</li> </ul>	<ul style="list-style-type: none"> <li>→ Remove blocks from data string</li> </ul>
ERROR BARCODE	<ul style="list-style-type: none"> <li>• The specified application block contains no data</li> <li>• Wrong sub-block selected, e.g. sub-block 0</li> </ul>	<ul style="list-style-type: none"> <li>→ Select application block which contains data</li> <li>→ Select permissible sub-block</li> </ul>
NO BLOCK	<ul style="list-style-type: none"> <li>• Entered application block does not exist</li> </ul>	<ul style="list-style-type: none"> <li>→ Enter different application block</li> </ul>
BUFFER IS FULL	<ul style="list-style-type: none"> <li>• Data string of transfer key contains more than 10 application blocks</li> </ul>	<ul style="list-style-type: none"> <li>→ Change configuration of transfer key</li> </ul>
DISPLAY MODE	<ul style="list-style-type: none"> <li>• Weighing cell defective</li> </ul>	<ul style="list-style-type: none"> <li>→ Contact METTLER TOLEDO Customer Service</li> </ul>

Error / Display	Possible causes	Remedy
NO ANALOG OUTPUT	<ul style="list-style-type: none"><li>• Resolution or maximum load of the selected weighing bridge was changed</li></ul>	→ Reconfigure Interface AnalogOut-690 in master mode
SCALE NUMBER DOUBLED	<ul style="list-style-type: none"><li>• 2 weighing platforms with same scale number connected</li></ul>	→ Contact METTLER TOLEDO Customer Service

## 9 Technical data and accessories

Weighing functions	
Tare compensation	At the press of a button or automatically, up to maximum load (subtractive)
Tare target value	<ul style="list-style-type: none"> <li>• For single-range scales over entire weighing range (subtractive)</li> <li>• For multi-range scales depending on national calibration regulations</li> <li>• 999 stored tare memories, protected against power failure</li> </ul>
Tare indicator	NET lights up with saved tare weight
DeltaTrac	<ul style="list-style-type: none"> <li>• Analog display of dynamic measured values</li> <li>• With optical marks for target value and tolerances</li> <li>• Asymmetric tolerances possible</li> <li>• 3 selectable applications</li> <li>• 999 DeltaTrac memories, protected against power failure</li> </ul>
Setting to zero	Automatic or manual
Gross changeover	Display of weight value can be changed over to gross weight at press of a button
Unit changeover	Unit can be changed over to weight units kg, g, lb, oz, ozt, dwt in dependence on national calibration regulations at press of a button
Stabilization detector	4-step, with motion indicator
Weighing process adapter	3-step adjustment to weighing sample
Vibration adapter	3-step adjustment to ambient conditions
MinWeigh	<ul style="list-style-type: none"> <li>• Weight values below the minimum weighing-in quantity are identified with </li> <li>• Minimum weighing-in quantity fixed or calculated</li> </ul>
Identification data	<ul style="list-style-type: none"> <li>• 6 memories for 30 alphanumeric characters, can be recalled with keys A to F</li> <li>• Each memory can be assigned a fixed name which can be written in the marking field next to the corresponding key</li> <li>• 999 memories for frequently used identification data</li> </ul>
Info function	Displays of current weighing data, identification data and memories at the press of a button
Date and time	<ul style="list-style-type: none"> <li>• For printout or output via the data interface</li> <li>• Quartz-controlled, 12 or 24-hour display, automatic calendar function, Europe, USA or free format, safe against power failure</li> <li>• Automatic summer time switchover</li> </ul>







# 10 Appendix

## 10.1 ASCII table

hex	deci	ASCII US	hex	deci	ASCII US	hex	deci	ASCII US	hex	deci	ASCII US	hex	deci	ASCII US
00	0	NUL	34	52	4	68	104	h	9C	156	€	D0	208	⌚
01	1	SOH	35	53	5	69	105	i	9D	157	¥	D1	209	⌘
02	2	STX	36	54	6	6A	106	j	9E	158	ℳ	D2	210	⌚
03	3	ETX	37	55	7	6B	107	k	9F	159	f	D3	211	⌚
04	4	EOT	38	56	8	6C	108	l	A0	160	á	D4	212	⌚
05	5	ENQ	39	57	9	6D	109	m	A1	161	í	D5	213	⌚
06	6	ACK	3A	58	:	6E	110	n	A2	162	ó	D6	214	⌚
07	7	BEL	3B	59	;	6F	111	o	A3	163	ú	D7	215	⌚
08	8	BS	3C	60	<	70	112	p	A4	164	ñ	D8	216	⌚
09	9	HT	3D	61	=	71	113	q	A5	165	Ñ	D9	217	⌚
0A	10	LF	3E	62	>	72	114	r	A6	166	ª	DA	218	⌚
0B	11	VT	3F	63	?	73	115	s	A7	167	º	DB	219	■
0C	12	FF	40	64	@	74	116	t	A8	168	¿	DC	220	■
0D	13	CR	41	65	A	75	117	u	A9	169	¡	DD	221	■
0E	14	SO	42	66	B	76	118	v	AA	170	¬	DE	222	■
0F	15	SI	43	67	C	77	119	w	AB	171	□	DF	223	■
10	16	DLE	44	68	D	78	120	x	AC	172	□	E0	224	α
11	17	DC1	45	69	E	79	121	y	AD	173	¡	E1	225	β
12	18	DC2	46	70	F	7A	122	z	AE	174	«	E2	226	Γ
13	19	DC3	47	71	G	7B	123	{	AF	175	»	E3	227	Π
14	20	DC4	48	72	H	7C	124		B0	176	⋮	E4	228	Σ
15	21	NAK	49	73	I	7D	125	}	B1	177	⋮	E5	229	σ
16	22	SYN	4A	74	J	7E	126	~	B2	178	⋮	E6	230	μ
17	23	ETB	4B	75	K	7F	127	⏏	B3	179		E7	231	τ
18	24	CAN	4C	76	L	80	128	reserved	B4	180	¡	E8	232	φ
19	25	EM	4D	77	M	81	129	ü	B5	181	¡	E9	233	θ
1A	26	SUB	4E	78	N	82	130	é	B6	182	¡	EA	234	Ω
1B	27	ESC	4F	79	O	83	131	ê	B7	183	¡	EB	235	ø
1C	28	FS	50	80	P	84	132	ä	B8	184	¡	EC	236	∞
1D	29	GS	51	81	Q	85	133	à	B9	185	¡	ED	237	∅
1E	30	RS	52	82	R	86	134	å	BA	186	¡	EE	238	ε
1F	31	US	53	83	S	87	135	ç	BB	187	¡	EF	239	∩
20	32	SP	54	84	T	88	136	ê	BC	188	¡	F0	240	≡
21	33	!	55	85	U	89	137	ë	BD	189	¡	F1	241	±
22	34	"	56	86	V	8A	138	è	BE	190	¡	F2	242	≥
23	35	#	57	87	W	8B	139	ï	BF	191	¡	F3	243	≤
24	36	\$	58	88	X	8C	140	î	C0	192	¡	F4	244	
25	37	%	59	89	Y	8D	141	ï	C1	193	¡	F5	245	
26	38	&	5A	90	Z	8E	142	Ä	C2	194	¡	F6	246	÷
27	39	'	5B	91	[	8F	143	Å	C3	195	¡	F7	247	≈
28	40	(	5C	92	\	90	144	É	C4	196	¡	F8	248	°
29	41	)	5D	93	]	91	145	æ	C5	197	¡	F9	249	•
2A	42	*	5E	94	^	92	146	Æ	C6	198	¡	FA	250	·
2B	43	+	5F	95	_	93	147	ô	C7	199	¡	FB	251	√
2C	44	,	60	96	`	94	148	ö	C8	200	¡	FC	252	ˆ
2D	45	-	61	97	a	95	149	ò	C9	201	¡	FD	253	ˆ
2E	46	.	62	98	b	96	150	ù	CA	202	¡	FE	254	.
2F	47	/	63	99	c	97	151	û	CB	203	¡	FF	255	.
30	48	0	64	100	d	98	152	ÿ	CC	204	¡			
31	49	1	65	101	e	99	153	Û	CD	205	¡			
32	50	2	66	102	f	9A	154	Ü	CE	206	¡			
33	51	3	67	103	g	9B	155	ç	CF	207	¡			

## 10.2 Key codes

All keys of the IND690 are assigned to numbers so that the keys may be addressed via interfaces.

Key	Number	Key	Number
Key 0	0	Key 	19
Key 1	1	Key 	20
...	...	Key 	21
Key 9	9	Key 	22
Decimal point key	10	Key 	23
Function key F1	11	Key 	24
Function key F2	12	CODE A key	25
Function key F3	13	CODE B key	26
Function key F4	14	CODE C key	27
Function key F5	15	CODE D key	28
Function key F6	16	CODE E key	29
		CODE F key	30
		Cursor key <	31
		Cursor key >	32
		Cursor key ^	33
		Cursor key v	34

### 10.3 Notes on CL handshake

With the CL handshake 3 types of interface control are possible:

Handshake in receiving direction, in transmitting direction and in both directions.

After switch-on and after each interruption, the IND690 attempts to establish the handshake in both directions.

#### **CL handshake in receiving direction**

This type of CL handshake is suitable for data transmission from the IND690 to the computer.

1. The weighing terminal transmits SYN after switch-on.
2. The computer transmits the character ACK after switch-on or after receiving SYN.
3. The weighing terminal then sends the response to a command or to a key actuation after each ACK.

#### **CL handshake in transmission direction**

This type of CL handshake is suitable for data transmission from the computer to the IND690.






1. The weighing terminal transmits SYN after switch-on.
2. The computer transmits the character SYN after switch-on or after receiving SYN.
3. The weighing terminal acknowledges the receipt of SYN again with SYN and signals its readiness to receive with ACK.
4. Then the computer can transmit a command after each ACK.

#### **CL handshake in both directions**

1. The weighing terminal transmits SYN after switch-on.
2. The computer transmits the character SYN after switch-on or after receiving SYN.
3. The weighing terminal acknowledges the receipt of SYN again with SYN and signals its readiness to receive with ACK.
4. The computer signals its readiness to receive with ACK.
5. During operation the weighing terminal receives data and transmits ACK when it is ready to receive data again.  
The computer receives data and transmits ACK when it is ready to receive data again.



## 10.4 Selection possibilities for the assignment of the digital inputs and outputs

Digital inputs	Assignment	Function
	ON/OFF	switch terminal on or off
	ZERO SET	like 
	TARE SET	like 
	ENTER	like 
	CLEAR	like 
	SCALE	like 
	SCALE 1 ... SCALE 5	switch over to Scale 1 ... 5
	KBD LOCK	lock/unlock keyboard
	F1 .... F6	like key F1 ... F6
	NOT USED	no function stored
Digital outputs	Assignment	Function
	DELTA BELOW	DeltaTrac below tolerance
	DELTA GOOD	DeltaTrac within tolerance
	DELTA ABOVE	DeltaTrac above tolerance
	STABLE	scale stationary, no movement
	SETPOINT 1 ... SETPOINT 8	Setpoint 1 ... 8 reached or exceeded
	SCALE 1 ... SCALE 5	current scale is Scale 1 ... 5
	GA46 P O	Out of paper GA46
	CMD	toggles after a command triggered via an input has been executed
	RESULT	result of the command execution 0 = correct, 1 = incorrect
	NET	net weight is displayed
	NOT USED	no function stored

## 10.5 Disposal



In conformance with the European Directive 2002/96 EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of with domestic waste. This also applies to countries outside the EU, per their specific requirements.

→ Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

If you have any questions, please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

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## Quick Guide

**METTLER TOLEDO MultiRange**

**METTLER TOLEDO**

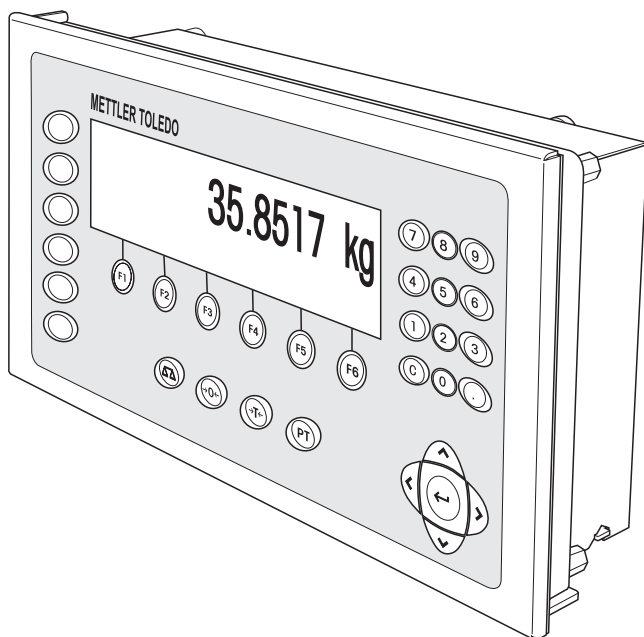
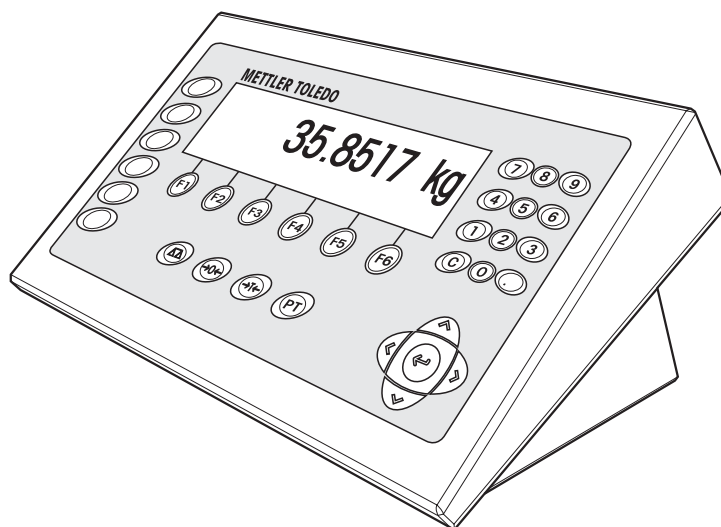
**IND690 / IND690xx / IND690-24V weighing terminals**

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**Terminaux de pesage IND690 / IND690xx / IND690-24V**

**Terminales de pesada IND690 / IND690xx / IND690-24V**

**Terminali di pesata IND690 / IND690xx / IND690-24V**



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# ServiceXXL

Tailored Services

Congratulations on choosing the quality and precision of METTLER TOLEDO. Proper use according to these instructions and regular calibration and maintenance by our factory-trained service team ensure dependable and accurate operation, protecting your investment. Contact us about a ServiceXXL agreement tailored to your needs and budget.

We invite you to register your product at [www.mt.com/productregistration](http://www.mt.com/productregistration) so we can contact you about enhancements, updates and important notifications concerning your product.

# 1 Safety instructions

## 1.1 Safety instructions for IND690xx



The explosion-protected IND690xx weighing terminal fulfills Device category 3 and is approved for operation in Zone 2 (gases) and Zone 22 (dusts) hazardous areas.

There is an increased risk of injury and damage when the IND690xx weighing terminal is used in a potentially explosive atmosphere.

Special care must be taken when working in such hazardous areas. The code of practice is oriented to the "Safe Distribution" concept drawn up by METTLER TOLEDO.

- Competence**
- ▲ The IND690xx weighing terminal, accompanying weighing platforms and accessories may only be installed, maintained and repaired by authorized METTLER TOLEDO service personnel.
  - ▲ The mains connection may only be connected or disconnected by the owner's electrician.
- Ex approval**
- ▲ For the exact specification please refer to the statement of conformity.
  - ▲ In order to avoid electrostatic charging the IND690xx may only be installed in rooms or areas at which strong electric field strengths cannot occur from experience.
  - ▲ No modifications may be made to the terminal and no repair work may be performed on the modules. Any weighing platform or system modules that are used must comply with the specifications contained in the installation instructions. Non-compliant equipment jeopardizes the safety of the system, cancels the Ex approval and renders any warranty or product liability claims null and void.
  - ▲ The cable glands must be tightened so that a strain relief of  $\geq 20$  N per mm cable diameter is ensured.
  - ▲ When connecting external devices, always observe the maximum permissible connected loads, see installation information. It must be ensured that no voltages are fed into the IND690xx than it itself provides. The interface parameters have to fulfill the standard.
  - ▲ Peripheral devices without an Ex approval may only be operating in non-hazardous areas. It must be ensured that no voltages are fed into the IND690xx than it itself provides. In addition the maximum permissible connected loads have to be observed, see installation information. The interface parameters have to fulfill the standard.
  - ▲ The safety of a weighing system including the IND690xxx weighing terminal is only guaranteed when the weighing system is operated, installed and maintained in accordance with the respective instructions.

- ▲ Also comply with the following:
  - the instructions for the system modules
  - the regulations and standards in the respective country
  - the statutory requirement for electrical equipment installed in hazardous areas in the respective country, e.g. EN 60079-14 and EN 61241-14
  - all instructions related to safety issued by the owner
- ▲ Before initial start-up and following service work, check the explosion-protected weighing system for the proper condition of all safety-related parts.

**Operation**

- ▲ Prevent the build-up of static electricity. Therefore:
  - only operate the IND690xx in rooms or areas at which strong electric field strengths cannot occur from experience,
  - always wear suitable working clothes when operating or performing service work on the system,
  - do not rub or wipe off the keyboard surface with a dry cloth or glove.
- ▲ Do not use protective hoods.
- ▲ Prevent damage to the weighing terminal. Hairline cracks in the keyboard membrane are also considered damage.
- ▲ If the IND690xx weighing terminal, accompanying weighing platforms or accessories are damaged:
  - Switch off weighing terminal.
  - Separate the weighing terminal from the mains in accordance with the applicable regulations.
  - Secure the weighing terminal against accidental start-up.

**Leakages**

- ▲ The IND690xx panel unit does not comply with any freedom-from-leaks rating. Therefore the installer is responsible for compliance with the freedom from leaks rating, e.g. at control cabinet installation. At least a freedom-from-leaks rating IP54 is required in hazardous areas, in case of conductive dust IP6X. The respective national standards furthermore have to be observed.



## 1.2 Safety instructions for IND690-24V



- ▲ Never operate the IND690-24V weighing terminal in hazardous areas; there are special scales in our product line for this purpose.
- ▲ The IND690-24V weighing terminal may only be connected to a power supply (storage battery or mains) having a 24 VDC SELV power circuit in accordance with EN 60950.
- ▲ Short-circuit danger!  
Ensure that the power supply is connected properly:  
brown lead    +24 V  
blue lead      0 V or negative pole
- ▲ The safety of the unit is endangered if it is not operated in accordance with these operating instructions.
- ▲ Only authorized personnel may open the IND690-24V weighing terminal.

- Competence** ▲ The IND690-24V weighing terminal, accompanying weighing platforms and accessories may only be installed, maintained and repaired by authorized METTLER TOLEDO service personnel.

- Leakages** ▲ The IND690-24V panel unit does not comply with any freedom-from-leaks rating. Therefore the installer is responsible for compliance with the freedom from leaks rating, e.g. at control cabinet installation. The respective national standards furthermore have to be observed.

## 1.3 Safety instructions for IND690



- ▲ Do not operate the IND690 weighing terminal in hazardous areas. We have special suitable scales in our range of products for hazardous areas.
- ▲ Ensure that the power socket outlet for the IND690 weighing terminal is earthed and easily accessible, so that it can be de-energized rapidly in emergencies.
- ▲ Ensure that the supply voltage at the installation site lies within in the range of 100 V to 240 V.
- ▲ The safety of the device cannot be ensured if it is not operated in accordance with these operating instructions.
- ▲ Only authorized personnel may open the IND690 weighing terminal.

- Competence** ▲ The IND690 weighing terminal, accompanying weighing platforms and accessories may only be installed, maintained and repaired by authorized METTLER TOLEDO service personnel.

- Leakages** ▲ The IND690 panel unit does not comply with any freedom-from-leaks rating. Therefore the installer is responsible for compliance with the freedom from leaks rating, e.g. at control cabinet installation. The respective national standards furthermore have to be observed.

## 2 Documentation

The weighing terminal comes supplied with the instructions and a CD containing all the documentation on the weighing system IND690.

**Quick Guide** These instructions describe the first steps with the weighing terminal following installation.

### **Operation instructions** **IND690-Base**

Further instructions on working with the weighing terminal with the basic software and the interface settings can be found in the operating instructions IND690-Base.

### **IND690-Batch, IND690-Com, IND690-Control, IND690-Count, IND690-Fill, IND690-Form, IND690-FormXP, IND690-Sum**

These operating instructions contain all information about how to operate and adjust the respective software application.

### **Example: Weighing terminal IND690-Count**

The operating instructions for **IND690-Base** contain the following information:

- Basic functions (e.g. weighing, taring, ...)
- Additional functions (e.g. printing, DeltaTrac, dynamic weighing ...)
- Terminal settings (e.g. date/time, language ...)
- Scale settings (e.g. second unit, weighing process adapter, ...)
- Interface settings

The operating instructions for **IND690-Count** contain the following information:

- Counting mode
- Settings for counting

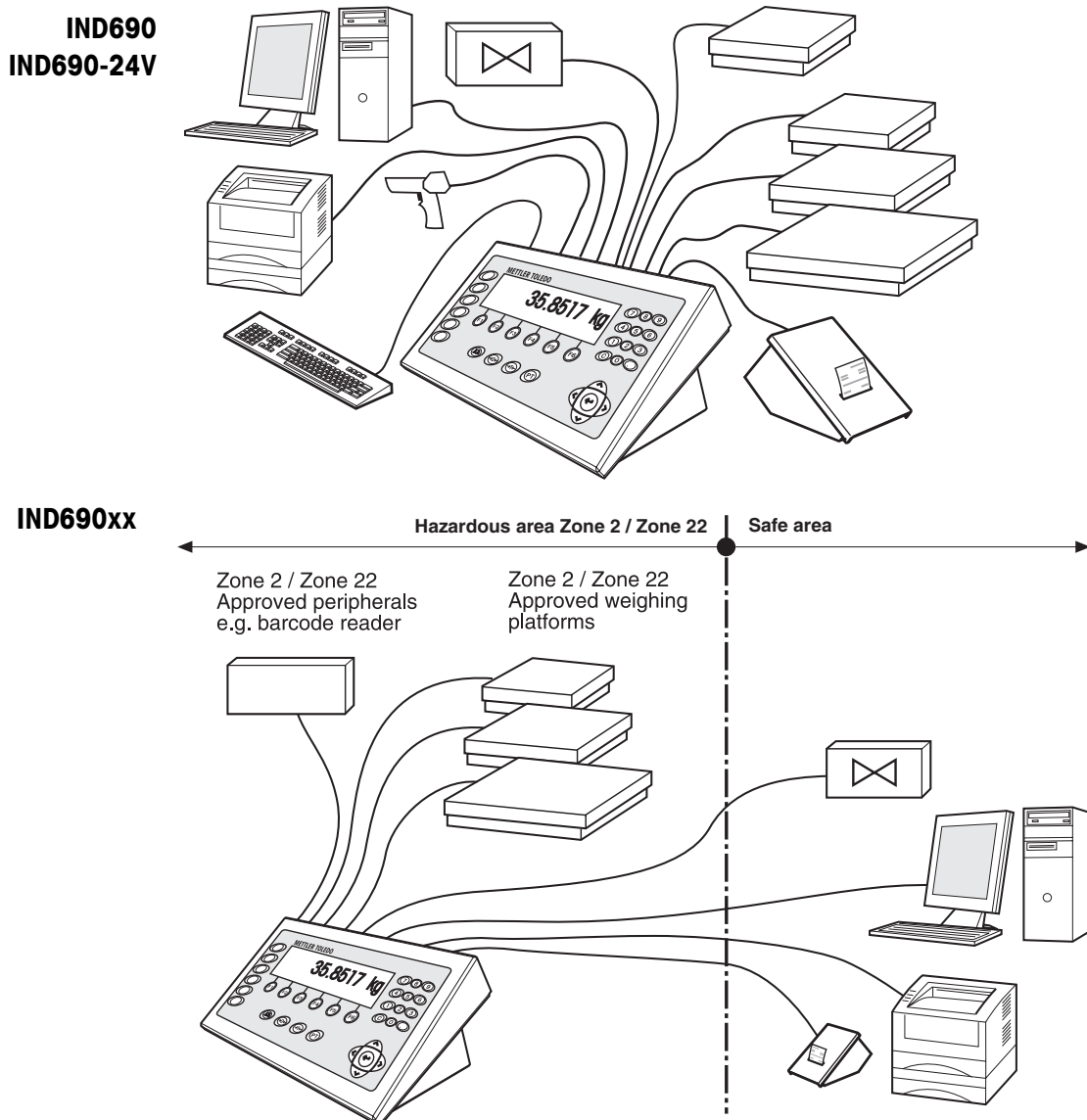
### **Installation information**

Information about installation and/or retrofitting your terminal and the technical data of the hardware components can be found in the installation information IND690 / IND690xx / IND690-24V.

## 3 The weighing terminals

### 3.1 Applications

With the weighing terminals the following applications are possible:



- Multi-scale operation with up to 4 weighing platforms with IND690 and up to 3 weighing platforms with IND690xx and IND690-24V, including weighing platforms with an analog signal output.
- Up to 9 data interfaces
  - for printing,
  - for data exchange with a computer,
  - for connecting a barcode reader,
  - for control, e.g. of valves or flaps,
  - for connecting reference scales.
  - for connecting an external keypad

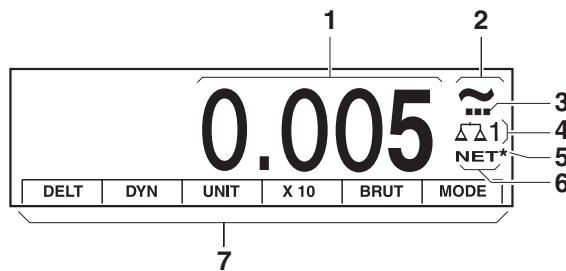
## 3.2 Installation

The weighing terminal is normally set up and installed by the METTLER TOLEDO Customer Service.

In the case of the IND690xx, the mains connection has to be made by one of the operator's skilled electricians.

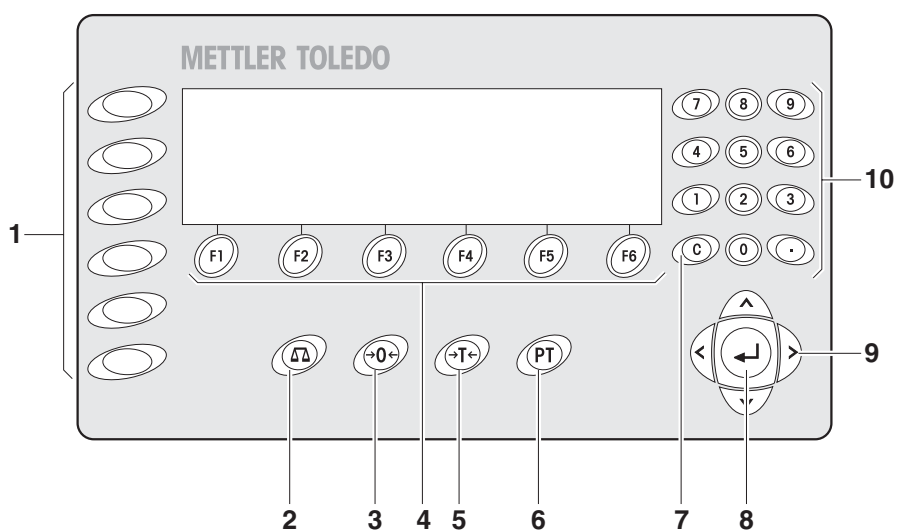
## 3.3 Overview

### 3.3.1 Display



- 1** Weight display BIG WEIGHT® with sign and decimal point
- 2** Stability monitor: lights up until the weighing platform has levelled out, then the weight unit appears here
- 3** Range display for multi-range weighing platforms
- 4** Number of the weighing platform: shows the weighing platform just selected
- 5** NET symbol for marking net weight values
- 6** Assignment of the function keys  
The function keys are multiple assigned. With the cursor keys < or > you can switch between the different assignments.

### 3.3.2 Keyboard



- 1 CODE A ... CODE F keys – enter identification data
- 2 SCALE key – select scale
- 3 ZERO SET key – set scale to zero, test scale
- 4 Function keys F1 ... F6 – the current assignment is shown in the display above the key
- 5 TARE key – tare scale
- 6 TARE SPECIFICATION key – enter known tare values numerically
- 7 CLEAR key – clear entries and values
- 8 ENTER key – accept and transfer data
- 9 Cursor keys
- 10 Numeric keypad with decimal point

## 4 Operation

### 4.1 Switching on and off

#### Switching on from the standby mode

- Press any key.  
The display shows a weight value based on the last tare value and zero point.

#### Switch off

- Press function key OFF.  
The display goes out and the weighing terminal is in the standby mode. The zero point and tare value remain saved.

#### Note

If the function key OFF does not appear in the current assignment, press the cursor keys < or > several times if necessary until OFF is displayed.

#### Switching on with restart

1. Relieve weighing platform.
2. Press function key OFF and hold down until METTLER TOLEDO IND690 (factory setting) or text you have specified appears in display.  
Then weight value appears.

The weighing platform is restarted.

### 4.2 Charge indicator in storage battery operation (IND690-24V only)

If the supply voltage drops below 22.5 V, a continuous whistle sound is emitted for approx. 10 to 30 minutes.

If the supply voltage drops below 21 V, the IND690-24V weighing terminal switches off automatically.


- If the whistle sound is emitted, complete the current weighing process and charge or replace the storage battery.

### 4.3 Setting to zero

Setting to zero corrects the influence of minor dirt on the load plate.

In the case of excessive dirt which cannot be compensated by setting to zero, the display shows OUT OF RANGE.

#### Manual zero set

1. Relieve weighing platform.
2. Press .  
The display shows 0.000 kg.

#### Automatic zero set

On certified weighing platforms the zero point of the weighing platform is automatically corrected when the weighing platform is relieved.

The automatic zero set can be switched off in the master mode on noncertified weighing platforms.

## 4.4 Taring

### 4.4.1 Manual taring

1. Place empty container on scale.
2. Press  $\rightarrow T \leftarrow$ .  
The tare weight is saved and the weight display set to zero.  
The display shows the NET symbol.

#### Notes

- When the weighing platform is relieved, the saved tare weight is displayed with a negative sign.
- The weighing platform only saves **one** tare value.

### 4.4.2 Specifying tare weight

1. Press  $\text{PT}$ .
2. Enter tare weight (container weight) and confirm with  $\leftarrow$ .  
When weighing platform is relieved, the entered tare weight is displayed with a negative sign.

#### Note

The weight unit for entering the tare weight can be selected with the cursor keys < or >.

### 4.4.3 Clearing tare weight

- Relieve weighing platform and tare.
- or –
- Specify tare weight 0.
- or –
- Enter  $\text{PT}$ ,  $\text{C}$  sequence.

## 4.5 Weighing

**Weighing without taring** → Lay weighing sample on weighing platform.  
Gross weight (total weight) is displayed.

**Weighing with taring**

1. Place the empty container on the weighing platform and tare.
2. Pour in weighing sample.  
The display shows the net weight and the NET symbol.

**Weighing with tare specification**

1. Place filled container on weighing platform.  
The display shows the gross weight (total weight).
2. Specify tare weight or recall tare memory.  
The display shows the net weight (container content) and the NET symbol.


## 4.6 Working with several weighing platforms

Up to 4 weighing platforms can be connected to the IND690, and up to 3 weighing platforms can be connected to the IND690xx and IND690-24V.

Depending on the setting in master mode, only the currently active scale appears in the display (serial Multi-scale mode) or all scales are operated at the same time (parallel multi-scale mode). A constantly updated sum scale is also available in parallel multi-scale mode.


### 4.6.1 Switching over weighing platform

The weighing platform currently selected is shown on the terminal.

→ Press .

The next weighing platform is selected.

– or –

→ Enter number of weighing platform and press .

The desired weighing platform is selected.

### 4.6.2 Displaying several scales simultaneously

#### Condition

PARALLEL SCALE is selected in the master mode.

→ Press the cursor keys < or > as often as necessary until all scales are shown in the display.



## 5 Cleaning



### **DANGER OF SHOCK**

→ Do not open the weighing terminals to clean.

### **CAUTION**

→ Make sure that unused connection sockets are covered with protective caps to protect the socket contacts from moisture and dirt.

→ Do not use high-pressure cleaners.

### **Cleaning**

→ Wipe off the weighing terminals with a commercially available glass or plastic cleaner.



# IND690 Terminal WM / WMH Weighing Module



Operation of WM weighing modules  
and WMH weighing platforms  
with an IND690 industrial terminal

**METTLER TOLEDO**

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# 1 Introduction

With the WM / WMH product line, METTLER TOLEDO offers weighing technology for the automation industry that is optimal with regard to speed, ruggedness, precision, and direct integration. The WM / WMH high-performance sensors (weighing modules) can be optimally connected to the IND690 industrial terminal with extended functionality as from Software Version 2.0, as well as to a computer (PC) or process control system (PLC). The DIRECT TALK and REMOTE TALK functionalities allow direct communication with a connected weighing module. The direct communication allows freely chosen commands to be sent directly to the weighing module, which makes configuration of the weighing module simple. With DIRECT TALK, the weighing module can be completely configured by the IND690, without connection of a PC.

## 2 Configuration

### 2.1 System structure

Operation of a weighing module on an IND690 requires a ConModule and a power supply from the system side (or power supply unit (PSU) for Ex Zone 1 weighing modules), because the IND690 cannot directly supply the weighing module with the necessary operating voltage. For the connection, an RS232 (point-point) or RS422 (for large distances) is available. Corresponding cables are available. The IND690 supports up to four scales with the METTLER TOLEDO Standard Interface Command Set (MT-SICS). The corresponding interface cards are built into the IND690.

The terminal can also be connected directly to a PC via the terminal interface COM1 (RS232) (interface configuration, see 3.3, page 6).

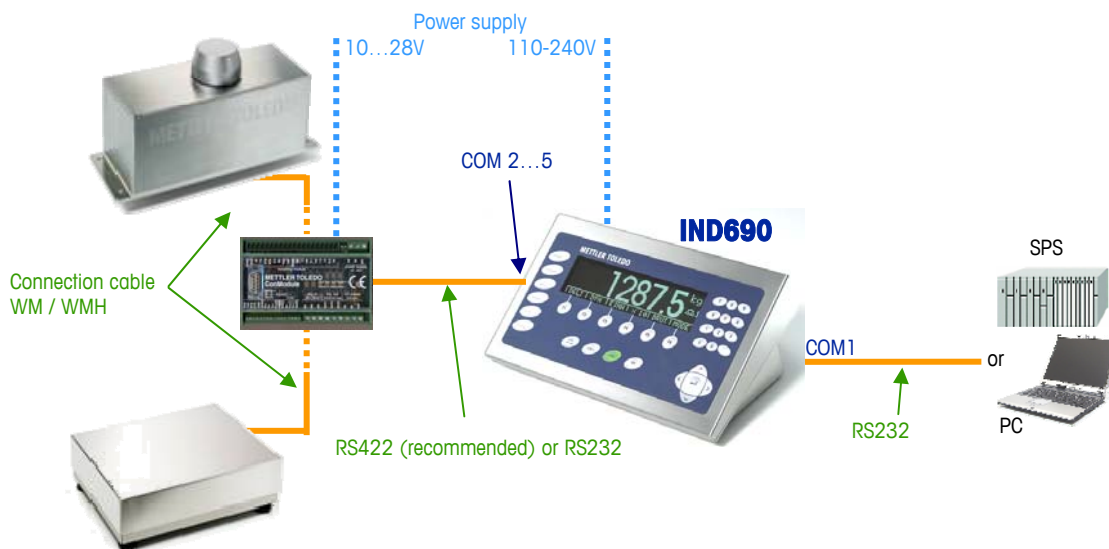


Figure 1: System structure IND690 weighing module

## 2.2 Connection diagram

As described in sections 2.2.1 and 2.2.2, an IND690 is connected to the weighing module via a ConModule (see [4]). Depending on the distance between the terminal and the ConModule or weighing module, an RS232 or RS422 connection can be used. Provided that the specification is met, and the correct baud rate is used, the RS422 allows a length of up to 1200 meters.

The voltage supply to the weighing module is from a separate supply on the ConModule.

The article numbers for typical configurations are listed in section 4.1 on page 9.

**Recommendation:** So that the RS232 remains available as service interface, METTLER TOLEDO recommends using the RS422 as connection between the IND690 and the ConModule.

### 2.2.1 Connection diagram for an RS232 connection

Terminal ConModule	1	2	3	4	5	6
Signal ConModule	RXD:	TxD	RTS	CTS	GND	Shield
Cable	See 4.1, page 9					
Color	White	Green	Yellow	Brown	Gray	Braid
Pin on plug IND690	2	3	8	4	6	1
Signal IND690	TxD	RxD	CTS	RTS	GND	Shield
Interface IND690	RS232-690 configuration: SICS-SCALE					

### 2.2.2 Connection diagram for an RS422 connection

Terminal ConModule	7	8	9	10	11
Signal ConModule	Rx+	Rx-	Tx+	Tx-	Shield
Cable	See 4.1, page 9				
Color	Green	Yellow	Gray	Pink	Braid
Pin on plug IND690	3	4	6	5	Plug
Signal IND690	TxD+	TxD-	RxD+	RxD-	Shield
Interface IND690	RS232-690 configuration: SICS-SCALE Interface module: switch 1 and 6: ON and 2-5: OFF (see [2])				

## 3 Functionality

For the WM and WMH weighing modules in conjunction with the IND690, many functions are available. In each case, the full update rate is maintained.

The functionalities described below are not all the functionalities that are available. The complete description of the functionality, and an overview of the available applications such as, for example, IND690 Count, is contained in the IND690 Operating Instructions [3] .

### 3.1 Direct Talk

#### 3.1.1 Description

With the DIRECT TALK configuration, individual commands can be sent to a weighing module as an ASCII character string. The terminal adds the end-of-line (<cr><lf>) automatically. The commands are input either directly via the terminal, or via a PC keyboard that is connected to the terminal (interface card).

The responses are displayed on the terminal; multiline responses are possible. The function keys F1 / F2 can be used to page through a multiline response (up to 40 lines).

#### 3.1.2 Terminal setting

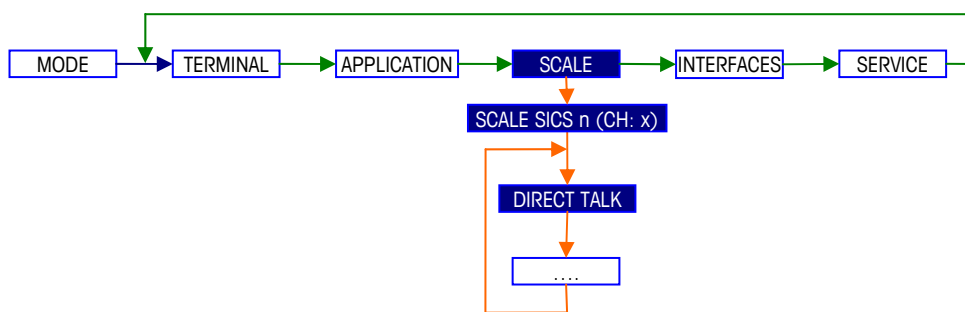


Figure 2: IND690 – DIRECT TALK menu

#### 3.1.3 Display information items

COMx    x = port number of the weighing module  
 SEND    Command that was sent to the weighing module  
 RECD    Response received from the weighing module



Figure 3: DIRECT TALK display

#### 3.1.4 Key designations

F1 / F2	< >	Up / down for multiline responses	
F3	NEW	Input new command to be sent	The command is input via the display or an external PC keyboard
F4	EDIT	Edit last command	
F5	ENDE	Quit DIRECT TALK; the terminal is re-started	
F6	SEND	Send the command to the weighing module	
< >		Page through long responses right / left	
^ v		Switch display keyboard between upper case, lower case, and special characters	

## 3.2 Remote Talk

### 3.2.1 Description

REMOTE TALK mode enables a direct connection to be set up between a computer (for example the WM\_Terminal or Microsoft ® HyperTerminal) and a weighing module via the IND690. Only one connection is possible. To change between several weighing modules, the connection must always be stopped. The IND690 is then re-started.

The communication is displayed on the terminal with the end-of-line (<cr><lf>) suppressed. The communication commands (see [1]) comprise the command set of the respective weighing module. The communication supports the full update rate (depending on the specific weighing module that is connected).

### 3.2.2 Display information items

COMx    x = port number of the weighing module  
 SEND    The command that was sent to the weighing module  
 RECD    Response received from the weighing module

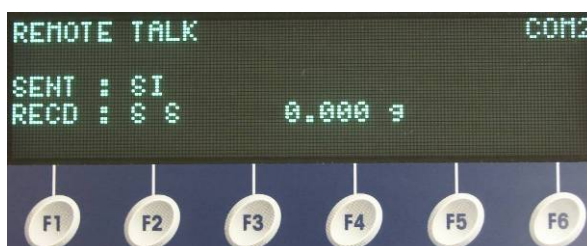


Figure 4: REMOTE TALK display

### 3.2.3 Command set

<b>Command</b>	RTS_ScaleID	Start REMOTE TALK ScaleID matches the ID of the scale (according to the display) [1...4]
<b>Responses</b>	RTS_A	Command executed successfully
	RTS_L	Command understood, but cannot be executed
	RTS_I	Invalid command, incorrect scale type connected

As soon as REMOTE TALK mode is activated, any interface command described in [1] can be sent to the weighing module.

<b>Command</b>	RTE	Stop REMOTE TALK The terminal is then re-started
<b>Responses</b>	RTE_A	REMOTE TALK was successfully stopped
	RTE_L	REMOTE TALK cannot be stopped
	RTE_I	REMOTE TALK is not switched on

## 3.3 MT-SICS commands of the IND690

The COM1 interface of the terminal serves to exchange data with a computer or SPS. In DIALOG MODE, the MT-SICS command set can be activated (MASTERMODE - INTERFACES - COMx - RS232 - MODE - DIALOG MODE - SICS). This makes it possible to communicate with the terminal by using MT\_SICS commands. When doing so, it is important to note that the MT-SICS commands are not transmitted unchanged 1:1 by the terminal (as in REMOTE TALK), but interpreted. The command is sent to the scale that is currently active in the display.

The complete list of the compatible MT-SICS commands is contained in the Operating Instructions: IND690 Base (see [3], Chapter 6.4).



## 3.4 Restart

### 3.4.1 Description

The Restart functionality of the IND690 allows the original status to be recreated after a loss of voltage on the weighing module. With the RESTART ON configuration, the tare and zero values are permanently stored in the terminal. After a voltage interruption, the IND690 writes the respective values back into the weighing module.

### 3.4.2 Terminal setting

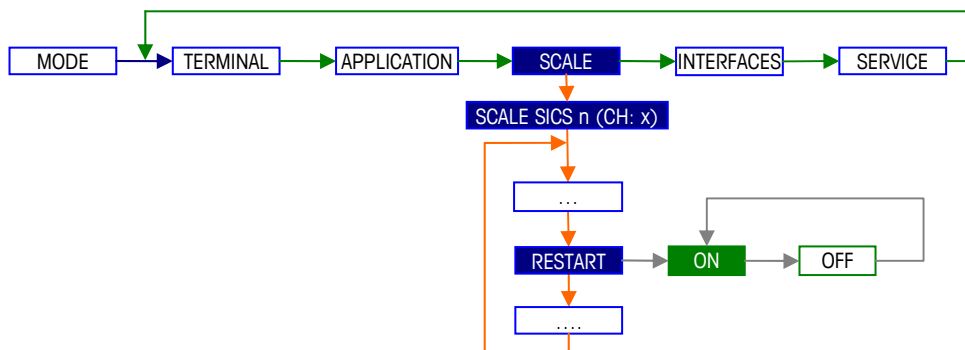


Figure 5: IND690 restart menu

## 3.5 Control mode x10

### 3.5.1 Description

Control mode x10 allows an additional display position – a so-called auxiliary numerical increment – on the WMH / WMH Ex weighing modules. This corresponds to the command MOD 1 or MOD 0 which is described in the MT-SICS Manual (see [1]).

With Control Mode switched on, the weight value is marked on the terminal with an asterisk (\*).

**Important:** When Control Mode is switched off, all user modes are also switched off! With Increased Display Resolution or Open Zero, this mode must be re-set (see [1]).

### 3.5.2 Terminal setting

Setting is done with function key F4 in Master Mode.



Figure 6: Control mode display

## 3.6 Totaling scale (scales in parallel)

### 3.6.1 Description

In the PARALLEL SCALE - Totaling Scale operating mode (see [3], Chapter 3.6.2), totaling of the weight values of up to four weighing modules is possible. When this operating mode is activated, the respective weighing modules that are used in the totaling are selected.

The SCALES key can be used to switch between the measurement values of the individual weighing modules and the total. Instead of the number of the weighing cell, the display shows a total sign ( $\Sigma$ ).

### 3.6.2 Terminal setting

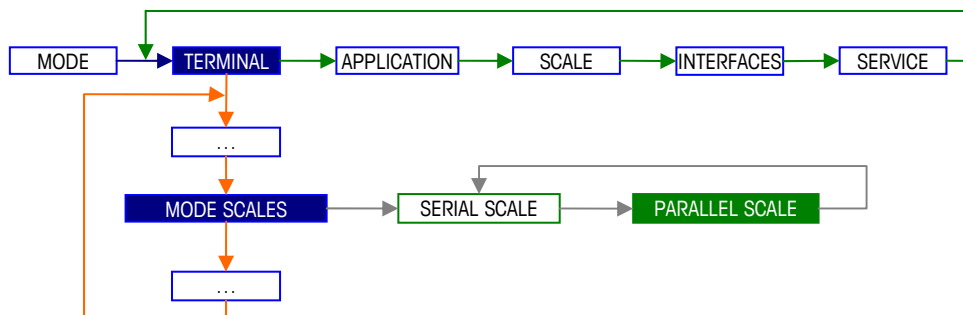


Figure 7: IND690 – SCALES IN PARALLEL - totaling scale

## 3.7 Menu item Scale

Under the menu item SCALE, several functions are available that depend on the scale that is connected. For the weighing modules, the functions that are listed below are possible. Further information is contained in the Operating Instructions (see [3]).

### 3.7.1 Terminal setting

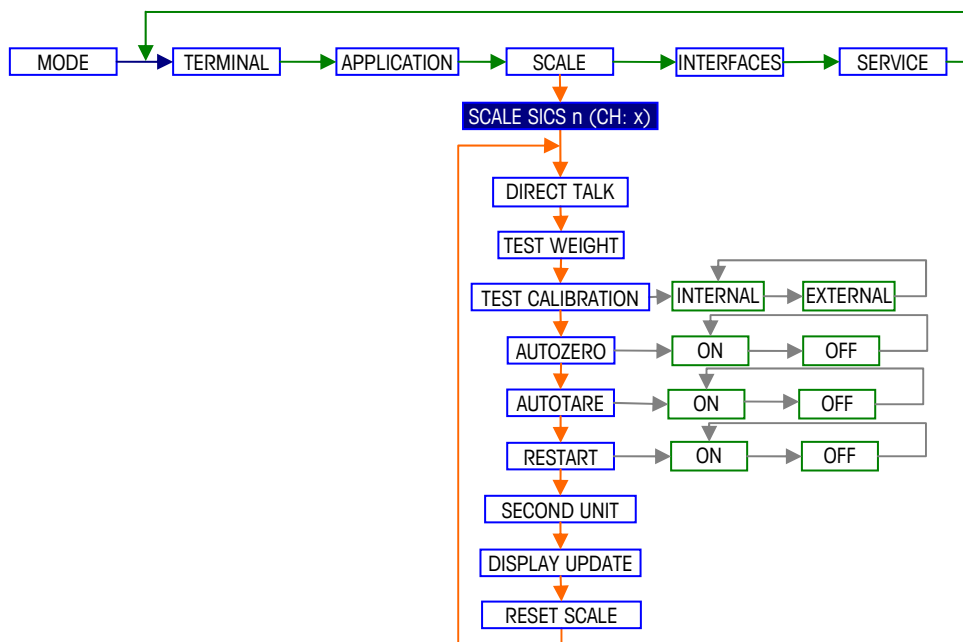


Figure 8: Overview IND690 - menu item SCALE

## 4 Annex

### 4.1 Typical configurations

#### 4.1.1 Connection of the WM / WMH weighing module via a ConModule

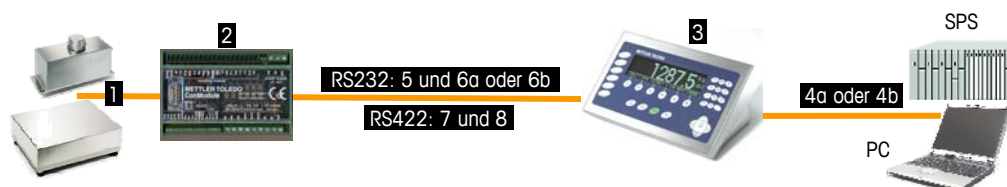


Figure 9: Typical configuration via a ConModule

No.	Article number	Designation
1	See [5]	WM or WMH weighing modules
		WM / WMH cable, 19-pin plug, straight or angled
2	42102811	ConModule (DIN rail) or ConBox (42102800)
3	22011901	IND690 terminal
4a	00504374	RS232 cable, 9-pin (female), 3 m for connection to a PC
4b	00503756	Plug (8-pin) and own cable for connection to an SPS/PLC
<b>Connection via RS232</b>		
5	22011953	RS232 interface card for installation in the IND690 terminal
6a	22006795	RS232 cable, 9-pin (male) for SICS balances via the service connector
6b	00503756	Plug (8-pin) and own cable for connection to the ConModule
<b>Connection via RS422 (recommended)</b>		
7	22011956	RS422 interface card for installation in the IND690 terminal
8	00204933	Cable (3 m) for RS422 with open end

#### 4.1.2 Connection of a WM Ex / WMH Ex weighing module via a PSU

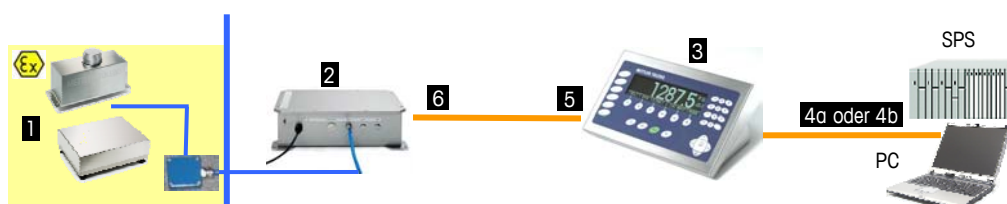


Figure 10: Typical configuration via a PSU

No.	Article number	Designation
1	See [5]	WM Ex or WMH Ex weighing modules
		Terminal box and Ex cable (blue)
2	22008525	Power supply unit (PSU) with RS232 interface
3	22011901	IND690 terminal
4a	00504374	RS232 cable, 9-pin, 3 m for connection to a PC
4b	00503756	Plug (8-pin) and own cable for connection to an SPS/PLC
5	22011953	RS232 interface card for installation in the IND690 terminal
6	22003832	PSU – IND690 connection cable (4 m)

### 4.1.3 Direct connection of a WX weighing module

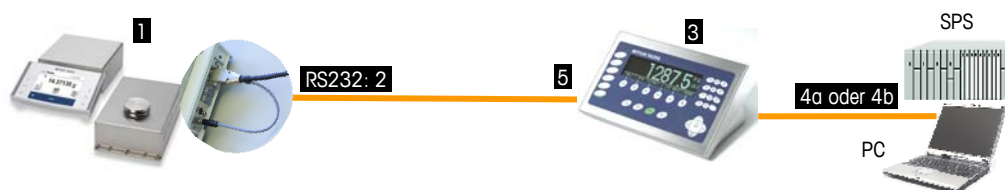


Figure 11: Typical configuration for WXT / WXS

No.	Article number	Designation
1	See [5]	WXT / WXS weighing module
2	22015128	RS232 cable, 9-pin (male) for SICS balances including power supply
3	22011901	IND690 terminal
4a	00504374	RS232 cable, 9-pin (female), 3 m for connection to a PC
4b	00503756	Plug (8-pin) and own cable for connection to an SPS/PLC
5	22011953	RS232 interface card for installation in the IND690 terminal <b>Important:</b> The voltage must be changed from 5V (factory) to 12V (BR2 bridge unpick and BR3 close).



## 4.2 Referenced documents

- [1] Reference Manual, Standard Interface Command Set for WM and WMH Weighing Modules MT-SICS (42101959)
- [2] Installation Information, Weighing Terminals IND690 / IND690xx / IND690-24V (22012803)
- [3] Operating Instructions, IND690 Base (22012808)
- [4] ConModule, Installation and Operating Instructions (42102823)
- [5] Weighing Components Catalog (44099884)

## 5 Figures

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[www.mt.com](http://www.mt.com)

For more information

**Mettler-Toledo AG**

Laboratory & Weighing Technologies  
CH-8606 Greifensee, Switzerland  
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Fax +41 44 944 30 60

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Printed in Switzerland 42908990A

# TESTS PROTOCOL





**Qualité**

Selon le système de management de la qualité ISO 9001:2008 et 14001:2004 établi dans l'entreprise Frewitt, nous attestons que l'installation à été construite, testée et contrôlée selon les règles de l'art pour assurer la qualité de l'installation et la conformité à la commande.

**Qualität**

Gemäss des Qualitätsmanagement-System ISO 9001:2008 und 14001:2004, welches für die Firma Frewitt erstellt wurde, bestätigen wir, dass die Anlage regelrecht konstruiert, getestet und kontrolliert wurde, um die Qualität der Anlage und die Übereinstimmung mit dem Auftrag zu gewährleisten.

**Qualité**

According to the system of management of quality ISO 9001:2008 and 14001:2004 established in the company Frewitt, we confirm that the installation has been built, tested and controlled according to the rules of practice to ensure the quality of the installation and its conformity to the order.

**N° d'enregistrements****Registrier Nr:****Record Numbers**

ISO 9001 : 02-103-118  
ISO 14001 : 02-103-523

**Résponsable Qualité**

Fabienne Reynaud





Frewitt atteste que la vérification des connections directes de la mise à terre a été réalisée selon les normes :

Frewitt bescheinigt, dass die Überprüfung der Erdung nach durchgeführt wurde:

Frewitt certify that the verification of direct connections to the grounding was performed according to:

**EN 60204-1 / DIN VDE 0133 / IEC 204-1**

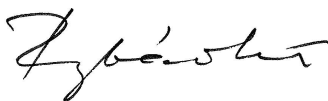
Cette vérification a été réalisée avec l'appareil :

Diese Prüfung erfolgte mit dem Gerät:

This test was conducted with the device:

**PROFITEST 204**

**Frewitt Fabrique de Machines SA**



**R. Rybarikova**

*Documentaliste  
Dokumentalist  
Documentalist*



P2 Commercial  
2-1 Vente  
Formulaire

FO-2-1-3\_FAT protocol



Page 1/8

177261-1-en commented.docx

TE 10/9 11 SEP 14

**Customer** NOVARTIS SINGAPORE PHARMACEUTICAL  
MANUFACTURING PTE LTD  
10, Tuas bay Lane  
Singapore - 637461

**Supplier/Manufacturer** FREWITT Fabrique de Machines SA  
Rte du Coteau 7  
1763 Granges-Paccot, Switzerland

**Type of machine** Sieve mill FREWITT type OscilloWitt-3, with  
lifting tower and IBC scale

**Serial-number** 140055-254

**Customer order number** 3001057132 dtd- 29.03.2014 - SC 1001749279

**Novartis Equipment Tag** SG.TBP.202.M.5236

**Frewitt reference-Number** CDC-14-0677 / PRO-14-0055


**1.1 Pre-Approval:**

This FAT test Protocol of the equipment was created, reviewed and accepted by:

Name	Signature Reason	Function/ Department	Signature	Date
Brigitte Thalmann	Author	Frewitt Sales Assistant		02.09.2014
Edouard Gummy	Author	Frewitt Technical Project Manager		10.09.2014
Ho Sook Hwa	Reviewer	NSPM Qualification Coordinator		11 SEP 14
Christina Chen	Approver	NSPM Process Engineer		11 SEP 14
Shivabalan Kanesan	Approver	NSPM Automation Engineer		11 Sep 14
Panicker Shreekumar	Approver	NSPM Technical Project Manager		11 Sep 14
Yap Yee Boon	Approver	NSPM Project QA		11 Sep 14

### 1.2 List of participants at FAT:

Participant customer Name	Signature	Date
LEE WEND LI	Wendli	+8 *EE Wendli 19 sep 14 19 sep 14

Participant supplier/manufacturer Name	Signature	Date
GUMY EDouARD		19 Sep 14

### 1.3 Acceptance by customer - Final approval

The installation has:


- no defects  
 minor defects which do not preclude a delivery / acceptance (see pos. 2 "Deviation report")  
 substantial defects/modifications, which do not permit a delivery / acceptance (see pos. 2 "Deviation report")

Delivery authorization given by the customer:

YES  NO

Foreseen delivery date: Week 40

The Signers confirm the FAT, for the rightness of the included data with their signature. All ascertained critical deviations are adequate documented.

Name	Signature Reason	Function/ Department	Signature	Date
Edouard Gummy	Reviewer	Frewitt Technical Project Manager		13 Sep 14
Christina Chen	Approver	NSPM Process Engineer		
Shivabalan Kanesan	Approver	NSPM Automation Engineer		
Panicker Shreekumar	Approver	NSPM Technical Project Manager		
Yap Yee Boon	Approver	NSPM Project QA		

#### 1.4 Mechanical check of the material to be supplied (as per purchase order)

Item	Quantity	Description	Checked and accepted	
			YES	NO
1	1	<b>Sieve mill FREWITT type OscilloWitt-3 with oscillating and rotating rotor motion</b>		
		<b>Execution</b>		
		ATEX execution	Milling chamber: ATEX II 1 G/D (zone 0/20) Rest of machine: ATEX II 3 D (zone 22) with pneumatic air ventilation system Venturi	
		Protection	IP-65	<input checked="" type="checkbox"/>
		Product contact parts	stainless steel AISI-316/316L, Ra ≤ 0,4 µm, polished and pickled welding seams, Sieve in AISI-316 Seals made of PTFE and EPDM	
		Other parts	AISI-304, Ra ≤ 1.4 µm, brushed and pickled welding seams * NSPM	
		Bearing	the mobile bearing fixed on the front door is mounted in a housing cast in one piece preventing any risk of leakage and product contamination	
		Front door	with endless seal, hinged execution	<input checked="" type="checkbox"/>
		Construction	according to the GMP-standard required by the WHO	<input checked="" type="checkbox"/>
		<b>Basic equipment</b>		
		Inlet	inlet plate N° 466518, Inlet plate with Tri-Clamp connection, with welded-in safety grid, height 109.3 mm, fixed on machine housing by means of 4 fast fixing devices (swivelling screws with ring nut)	<input checked="" type="checkbox"/>
		Outlet	outlet of milling head with Tri-Clamp flange DN 200 (ISO 2852)	<input checked="" type="checkbox"/>
		Safety device inlet	magnetic safety switch ELOBAU at inlet to stop the machine if the inlet device is not mounted	<input checked="" type="checkbox"/>
		Safety at outlet	safety grid welded in the outlet of the machine housing, incl. fixing clamp and seal	<input checked="" type="checkbox"/>
		Safety device front door	magnetic safety switch ELOBAU at the front to stop the machine if the front door is not closed	<input checked="" type="checkbox"/>

\* NSPM requirement Ra ≤ 0.8 µm.  
the surface quality was  
checked and within NSPM  
requirement. No impact.

Item	Quantity	Description	Checked and accepted		
			YES	NO	
		Protection	over the motor and drive unit	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Support	Frame with 4 mobile castors of which 2 with brake, in antistatic execution (grey – not marking), with manual height adjustment system made by means of a mechanical spindle, hub 300 mm (+/- 150 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<b>Tools</b>			
		Sieve (1 pce)	N° 463931, MS 0.50 x 0.25 mm, round wire, with rubber edges	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Sieve tensioning bars	N° 462358 permitting to tension the sieve against the rotor by means of a graduated handle	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Rotor with 6 arms	N° 443474, Ø 160 mm, welding cleaned with acid, with 92° oscillating angle. At each oscillating the angle moves by an additional 2° to extend operation life	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<b>Connection</b>			
		Electrical connection	3x400V, 3P+T+N, 50 Hz	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Air	cooling down of the motor by Venturi system (pressure 1,5 bar – fast coupling Ø 8 mm)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Bearing heads	foreseen for air or gaz ventilation, incl. control system	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<b>Drive unit</b>			
		Motorization	Servo-motor with reduction drive, speed adjustable by means of a potentiometer from 0.02–1.25 m/sec., speed limited to 1 m/sec.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<b>Control</b>			
		Control elements	with switches "ON", "OFF", "EMERGENCY STOP", digital display indicating the rotor speed, green lamp for gas control, main switch lockable with padlock. The switches are on right hand (see from the front)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Rotor motion	Selector switch for switching from oscillating to rotating rotor motion	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Electrical parts	mounted in a separate box (IP-55)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		Cabling	machine supplied with 5 m main cable, with plug	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Item	Quantity	Description	Checked and accepted	
			YES	NO
2	1	<b>Conical inlet funnel N° 474202</b> inlet with edged connection $\varnothing$ 315 mm and EPDM rubber cover N° 443387, height 250 mm, fixed on the inlet plate by means of a Tri-Clamp connection	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	1	<b>Conical inlet funnel with cover N° 471380</b> inlet $\varnothing$ 315 mm, Height 218 mm, fixed on the inlet plate by means of a tri-clamp connection	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	1	<b>Compensator DN 200 (ISO 2852) N° 428631</b> , to be fixed at the outlet of the milling head, EPDM black, antistatic execution, suitable for ATEX-zone, FDA conform, supporting rings made of stainless steel, incl. fixing clamp	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	1	<b>Cask-cover N° 474209</b> For 150 l cask, $\varnothing$ 560 mm, fitted with a sleeve with Tri-Clamp connection and ventilation sleeve fitted with a stainless steel filter N° 463739, 5 $\mu$ m	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6	1	<b>Cask-cover N° 475517</b> For 70 l cask, $\varnothing$ 375 mm, fitted with a sleeve with Tri-Clamp connection and ventilation sleeve fitted with a stainless steel filter N° 463739, 5 $\mu$ m	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7	1	<b>Set of recommended spare parts</b> for 2 years operation of the mill, comprising: 2 x N° 440582 O-Ring 107.63x2.62 2 x N° 452638 Flat Seal Novafion 500 4 x N° 459777 double lip seal 2 x N° 423856 Clamp seal EPDM ISO200 2 x N° 451236 O-RING 278.77x5.33 EPDM 2 x N° 451418 O-RING 354.97x5.33 EPDM 2 x N° 459859 Shaft seal 20x35.5x8	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8	1	<b>Set of special tools</b> for the replacement of the seals in the bearing heads, comprising: 1 x N° 461102 knife for lip seal 1 x N° 473187 seal extraction tool	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9	-	<b>Other tools:</b> 1 Gauge N° 464622 for controlling the abrasion of the rotor 1 Square key 8 mm N° 412452	<input checked="" type="checkbox"/>	<input type="checkbox"/>

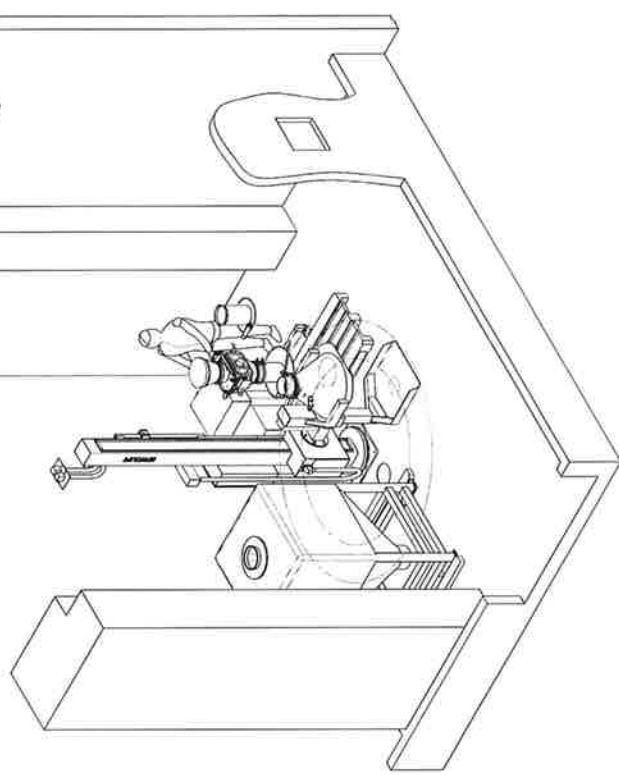
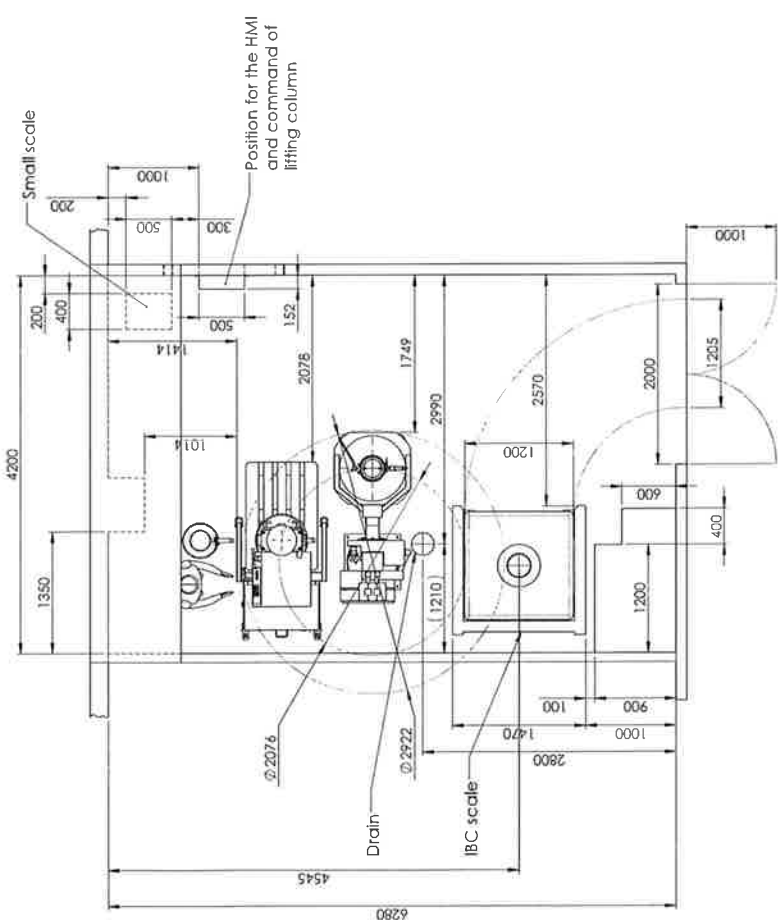
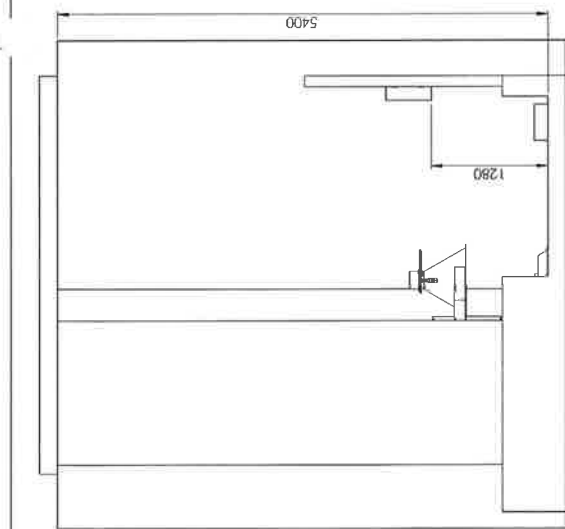
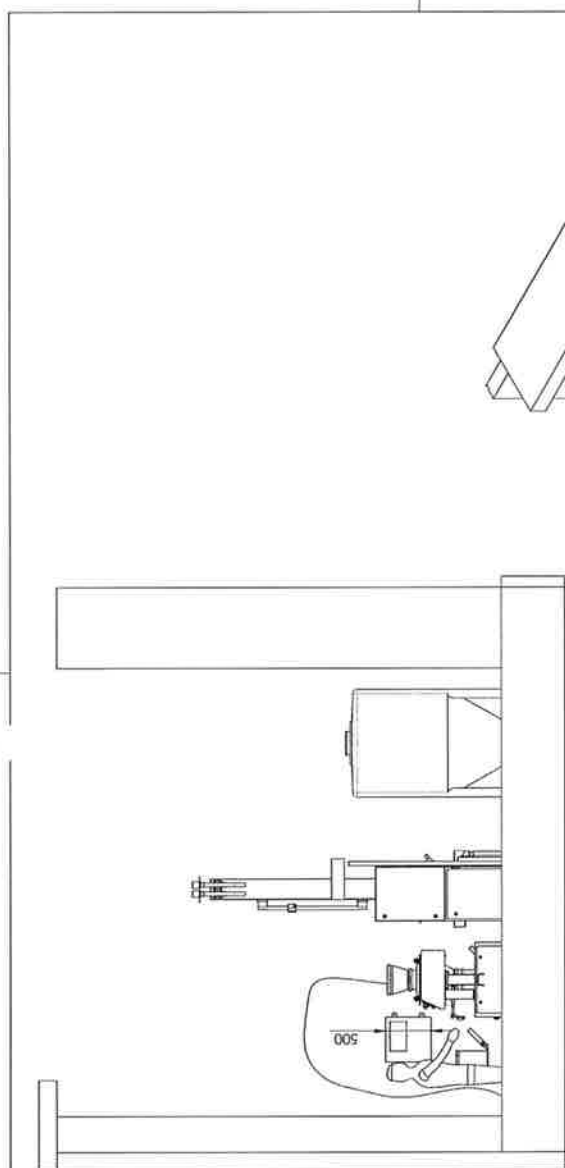
Item	Quantity	Description	Checked and accepted	
			YES	NO
10	1	<p><b>Lifting Tower / Drum lifter</b></p> <ul style="list-style-type: none"> <li>• pharmaceutical design</li> <li>• freestanding version / floor mounted</li> <li>• max load: 250 kg</li> <li>• squeeze funnel: <ul style="list-style-type: none"> <li>- pick-up by platform</li> <li>- clamping electro-hydraulically in a stainless-steel funnel</li> </ul> </li> <li>• lifting, lowering electro-hydraulically</li> <li>• tilting electro-hydraulically</li> <li>• 2 x height stop device for exact repetition and safe positioning height pneumatically retractable: <ul style="list-style-type: none"> <li>- feeding of the OscilloWitt</li> <li>- lifting API bag for manual charge to IBC by operator</li> </ul> </li> <li>• butterfly valve ND 200 <ul style="list-style-type: none"> <li>- disc AISI 316L</li> <li>- outlet connection length 100 mm</li> <li>- manual opening</li> </ul> </li> <li>• fixation of vibrator or knocking device</li> <li>• column height max. 3500 mm</li> <li>• ATEX-protection category II3D (Zone 22)</li> <li>• energy 230/400 V, 50 Hz, 3ph + N + PE</li> <li>• vibrator</li> <li>• electric installation acc. EN 60204, with single core labelling</li> <li>• operating by hand lever</li> </ul> <p><i>Additional features:</i></p> <p><b>Motorized Slewing</b></p> <ul style="list-style-type: none"> <li>• freestanding version / floor mounted</li> <li>• slewing electro-hydraulically</li> </ul> <p><b>Semi-automatic control</b></p> <ul style="list-style-type: none"> <li>- button forward cycle / button backward cycle</li> <li>• Selector to select one of following cycles: <ul style="list-style-type: none"> <li>- feeding the OscilloWitt</li> <li>- lifting API bag for manual charge to IBC by operator</li> </ul> </li> <li>• To secure the operating cycle</li> <li>• Maintenance mode secured by key <ul style="list-style-type: none"> <li>- 1 button for each function</li> </ul> </li> <li>• PLC Siemens and push button (no HMI)</li> </ul> <p><b>Remote control panel for operating the lifting tower/drum lifter</b></p> <ul style="list-style-type: none"> <li>• Stainless steel control cabinet</li> <li>• Push buttons for the functions</li> <li>• max 20m cable from the top of the column</li> <li>• provision to install the IBC scale display</li> </ul> <p>Without the cable trace between the column and the operation panel</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Item	Quantity	Description	Checked and accepted	
			YES	NO
11	1	<p><b>IBC Scale</b></p> <p><b>A) Process scale</b> Scale located in ATEX 22 zone for the product weight monitoring <u>Technical data:</u></p> <ul style="list-style-type: none"> <li>• Supplier : Mettler Toledo</li> <li>• U shape for easy access to load the IBC</li> <li>• Maximum load : 1'500 kg</li> <li>• Material of construction: Stainless steel AISI 304/304L</li> </ul> <p><b>B) Process scale display panel</b> The scale display rated ATEX 22 zone is mounted on the remote control panel for operating the lifting tower/drum lifter <u>Technical data:</u></p> <ul style="list-style-type: none"> <li>• Supplier : Mettler Toledo Type IND 690</li> <li>• Material of construction: Stainless steel AISI 304/304L</li> <li>• Interfacing by Ethernet for connection to customer's MES.</li> </ul> <p><b>C) Integration of the weighing systems to the Frewitt installation</b> full integration of the weighing system to the Frewitt installation, namely:</p> <ul style="list-style-type: none"> <li>➤ Weighing system components for the Frewitt installation</li> <li>➤ Mechanical integration to the Frewitt installation</li> <li>➤ Site calibration at NSPM of scales by Mettler</li> </ul>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

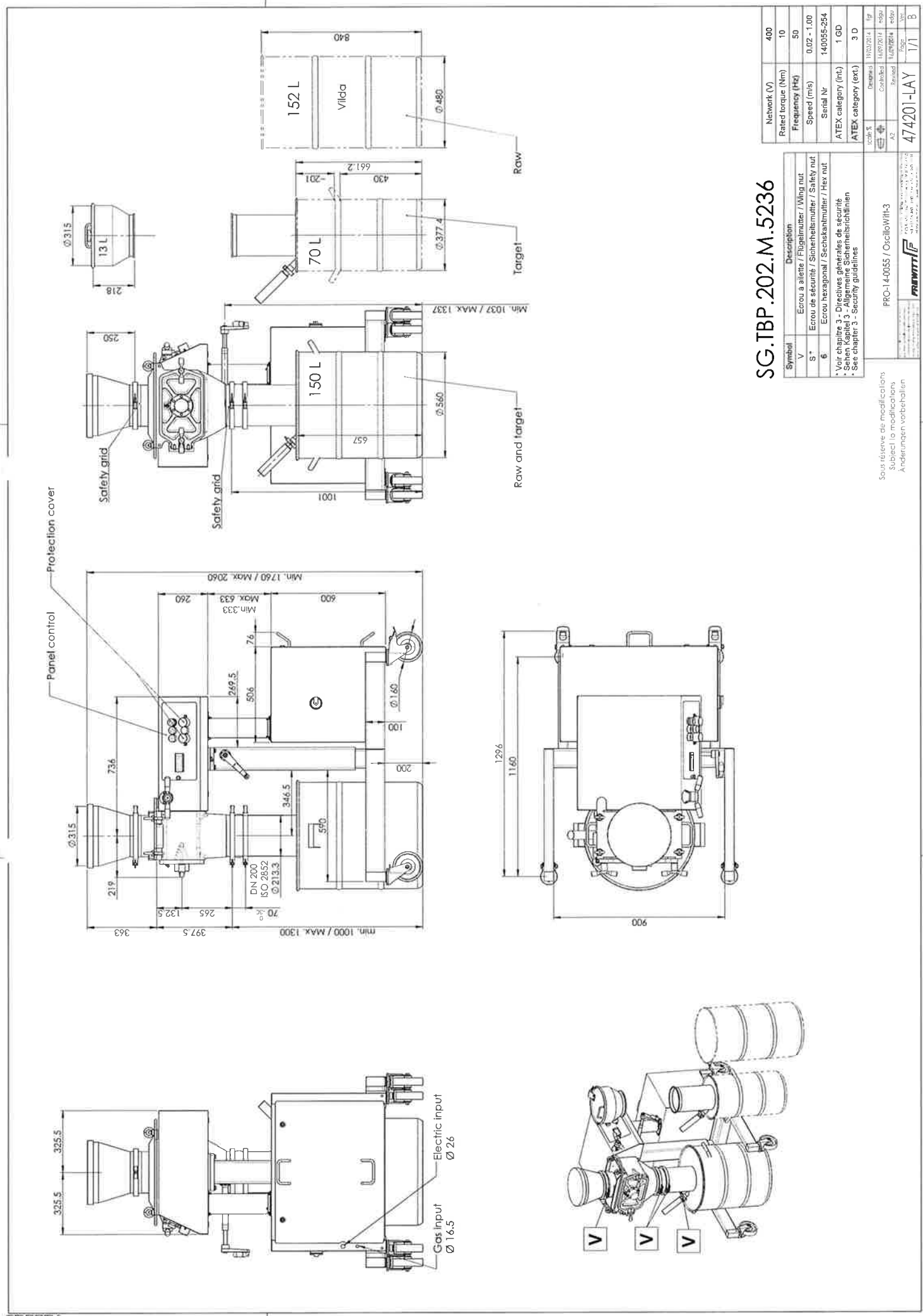
## 1.5 Documentation

Item	Quantity	Description	Checked and accepted	
			YES	NO
1	1	<b>Operating instructions in English</b> (2 x in paperform / 1 x on CD-Rom), adapted to the execution of the purchased machine	<input type="checkbox"/>	<input type="checkbox"/>
2	1	<b>Certificate of the surface quality</b> of the parts in contact with the product (without tools)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	1	<b>IQ/OQ Record (support)</b> , incl.: <ul style="list-style-type: none"> <li>• OQ records prepared for the existing measurement points</li> <li>• IQ/OQ record on CD-ROM</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
4	1	<b>Materials certificate EN 10204-3.1</b> of parts in contact with the product	<input checked="" type="checkbox"/>	<input type="checkbox"/>





scale %	AS	Designed	18/03/2014	app	171
		Checked	18/08/2014	app	
		revised	18/03/2014	app	
OscilloWitt PRO-14-0355 Layout					475077-LAY
<small>                 PREWITT                  PREWITT S.p.A. - Via S. Felice 10 - 37060 Sommacampagna (Verona) - Italy                  Tel. +39 0445 874111 - Fax +39 0445 874122 - Email: info@prewitt.it                  www.prewitt.it             </small>					C



# SG.TBP.202.M.5236

Symbol	Description
V	Ecrou à ailette / Flügelmutter / Wing nut
S*	Ecrou de sécurité / Sicherheitsmutter / Safety nut
6	Ecrou hexagonal / Sechskantmutter / Hex nut

\* Voir chapitre 3 - Directives générales de sécurité  
 \* See chapter 3 - Safety guidelines  
 \* See chapter 3 - Sicherheitsanleitungen

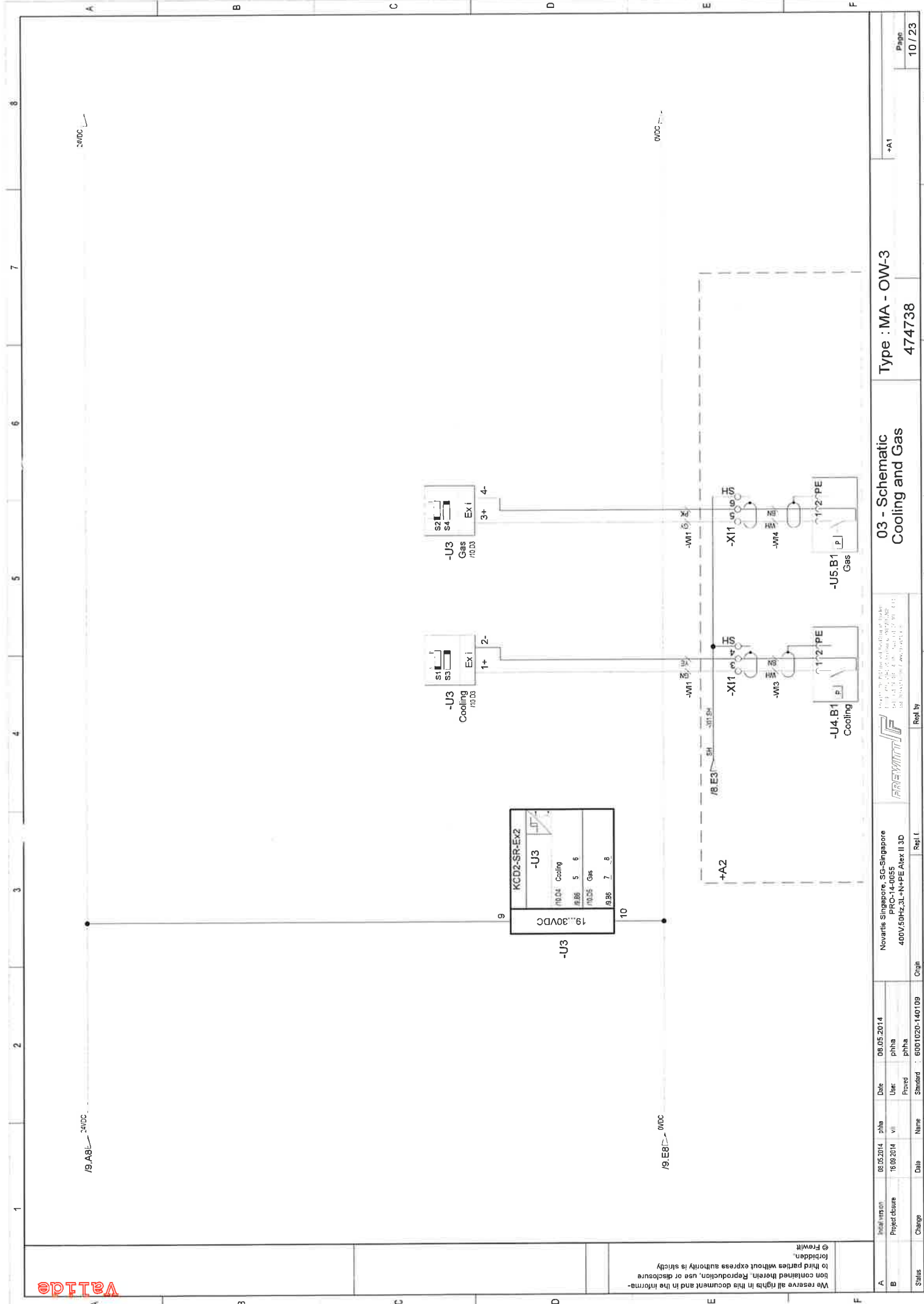
Network (V)	400
Rated torque (Nm)	10
Frequency (Hz)	50
Speed (m/s)	0.02 - 1.00
Serial Nr	140055-254
ATEX category (int.)	1 GD
ATEX category (ext.)	3 D

ICB %	Designs	1/03/2014	Tgr
	Controlled	14/07/2014	eddy
A2	Revised	14/07/2014	eddy
	Page	1/1	B

Sous réserve de modifications  
 Subject to modifications  
 Änderungen vorbehalten



PRO-1-4-0055 / OscilloW/H-3



Type : MA - OW-3  
474738

03 - Schematic  
Cooling and Gas

Novartis Singapore, SG-Singapore  
PRD-14-0055  
400V/50HZ/3L+N+PE Alex II 3D

08.05.2014  
User: phha  
Proved: phha  
Standard: 6001020-140109

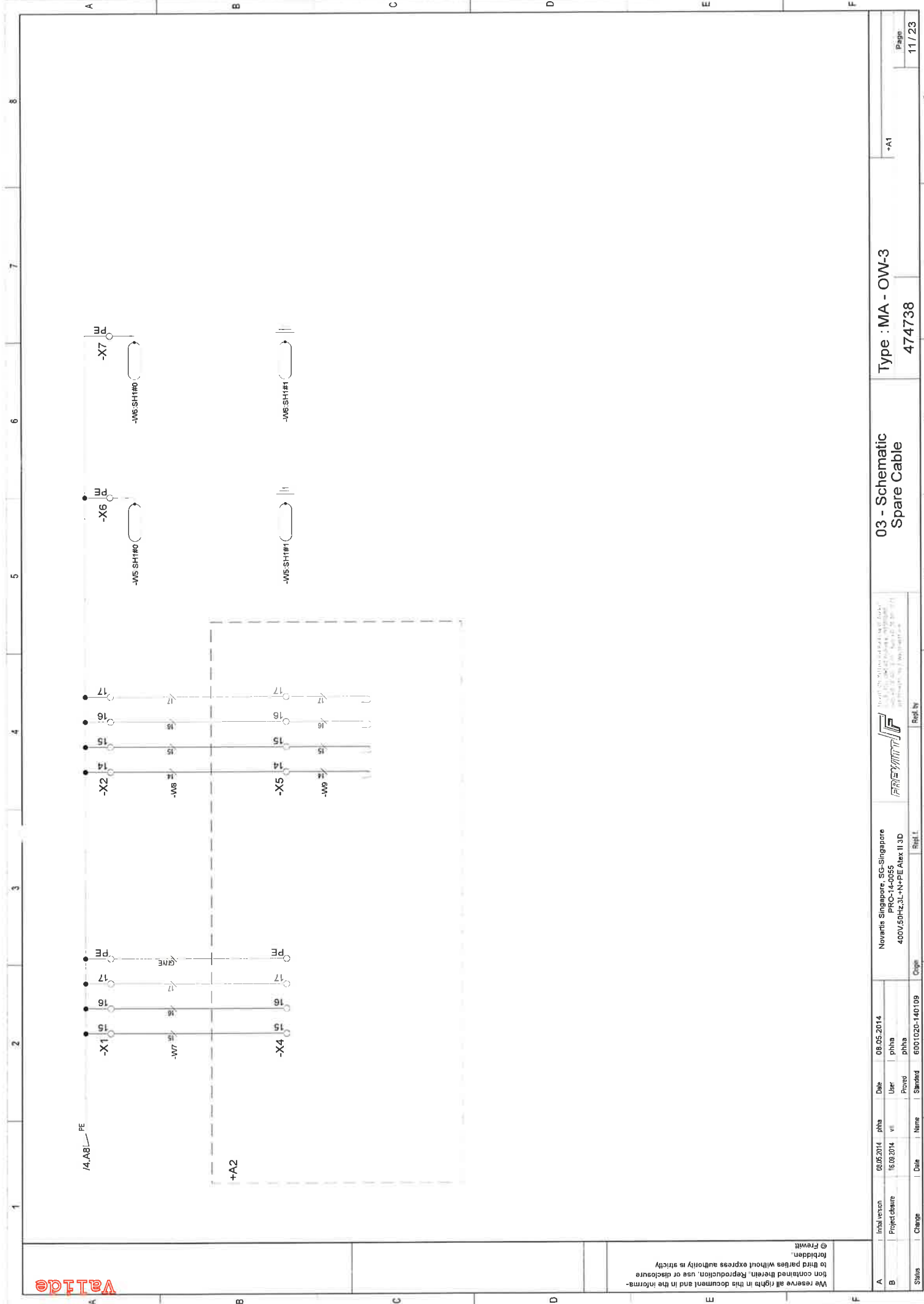
Change  
Date: 16.09.2014  
Name: vi

Status  
Change  
Date: 16.09.2014  
Name: vi

Page  
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Valid

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WALDIE

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A	Initial version	08.05.2014	pha	Date	08.05.2014	Novartis Singapore, SG-Singapore	
	Project departure	16.09.2014	vi	User	pha	PRO-14-0055	
B	Change		Name	pha	pha	400V50Hz,3L-NPE Alex II 3D	
			Date				
			Standard	6001020-140109	Origin		
							Novartis Singapore, SG-Singapore
							PRO-14-0055
							400V50Hz,3L-NPE Alex II 3D
							Right L
							Right by
							474738
							Type : MA - OW-3
							474738
							-A1
							Page
							11 / 23



1	2	3	4	5	6	7	8
<b>Terminal strip</b>							
<b>-X0</b>							
Jumpers							
Terminal number	L1	L2	L3	PE			
Potential	L1	L2	L3	PE			
Target	L1	L2	L3	PE			
External	L1	L2	L3	PE			
Internal	L1	L2	L3	PE			
Target	L1	L2	L3	PE			
Placement in Schematics	A/B1	A/B1	A/B2	A/B2			
Cable designations	A/B1	A/B1	A/B2	A/B2			
Cable type							
Cable designations							
Terminal type	UK6N(L1-L3)	Terminal					
Terminal	USLKG6N(PE)	Terminal					

Novartis Singapore, SG-Singapore PRC-14-0055 400V/50HZ/3L-N-PE Alex II 3D				Type : MA - OW-3 474738		Page 12 / 23	
Date	08.05.2014	Date	08.05.2014	04 - Terminals Block			
User	phha	User	phha	-X0			
Provid	phha	Provid	phha				
Standard	6001020-140108	Standard	6001020-140108				
Open		Open					

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1	2	3	4	5	6	7	8
<b>Terminal strip</b>							
<b>-X3</b>							
Cable type	Cable designations	Placement in Schematics					
		/6 D6	/6 D6	/6 D6	/6 D6	/6 D6	/6 D6
Target	Internal	+A1-X7	:4				
		+A1-X7	:9				
Jumpers	Terminal number	1					
		2					
Potential	Terminal number	3					
		4					
External	Terminal number	5					
		6					
Cable type	Cable designations	Terminal type					
		UKK311-61	UKK5-PE[PE]				
Target	Terminal number	1					
		2					
External	Terminal number	3					
		4					
Cable type	Cable designations	Terminal type					
		UKK311-61	UKK5-PE[PE]				
Target	Terminal number	5					
		6					
External	Terminal number	7					
		8					

Novartis Singapore, SG-Singapore		Type : MA - OW-3	
PRC-14-0055		474738	
400V50HZ3L-N+PE Alex II 3D		-X3	
Repl. f.		Repl. by	
600102B-140109		600102B-140109	
Date	08.05.2014	Date	08.05.2014
User	phha	User	phha
Provid	phha	Provid	phha
Name	Standard	Name	Standard
Date	16.02.2014	Date	16.02.2014
Project descue		Project descue	
Change		Change	
Status		Status	

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A		B		C		D		E		F	
Terminal strip		-X4		Jumpers		Terminal number		Potential		Target	
3G1	+A2-U5.Y1.W1	3G1	+A2-U4.Y1.W1			1	+A1-X1	:1	PE	+A1-X1	13
3G1	+A2-U5.Y1.W1	3G1	+A2-U4.Y1.W1			2	+A1-X1	:2	PE	+A1-X1	12
4G0.75	+A4-S8.W1	4G0.75	+A2-S5.W1			3	+A1-X1	:3	PE	+A1-X1	11
4G0.75	+A2-S5.W1	4G0.75	+A2-S5.1			4	+A1-X1	:4	PE	+A1-X1	10
						5	+A1-X1	:5	PE	+A1-X1	9
						6	+A1-X1	:6	PE	+A1-X1	8
						7	+A1-X1	:7	PE	+A1-X1	7
						8	+A1-X1	:8	PE	+A1-X1	6
						9	+A1-X1	:9	PE	+A1-X1	5
						10	+A1-X1	:10	PE	+A1-X1	4
						11	+A1-X1	:11	PE	+A1-X1	3
						12	+A1-X1	:12	PE	+A1-X1	2
						13	24VDC	:13	PE	+A1-X1	1
						14		:14	PE	+A1-X1	17
						15		:15	PE	+A1-X1	16
						16		:16	PE	+A1-X1	15
						17		:17	PE	+A1-X1	14
						18		:18	PE	+A1-X1	13
						19		:19	PE	+A1-X1	12
						20		:20	PE	+A1-X1	11
						21		:21	PE	+A1-X1	10
						22		:22	PE	+A1-X1	9
						23		:23	PE	+A1-X1	8
						24		:24	PE	+A1-X1	7
						25		:25	PE	+A1-X1	6
						26		:26	PE	+A1-X1	5
						27		:27	PE	+A1-X1	4
						28		:28	PE	+A1-X1	3
						29		:29	PE	+A1-X1	2
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						32		:32	PE	+A1-X1	1
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						35		:35	PE	+A1-X1	1
						36		:36	PE	+A1-X1	1
						37		:37	PE	+A1-X1	1
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						39		:39	PE	+A1-X1	1
						40		:40	PE	+A1-X1	1
						41		:41	PE	+A1-X1	1
						42		:42	PE	+A1-X1	1
						43		:43	PE	+A1-X1	1
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						45		:45	PE	+A1-X1	1
						46		:46	PE	+A1-X1	1
						47		:47	PE	+A1-X1	1
						48		:48	PE	+A1-X1	1
						49		:49	PE	+A1-X1	1
						50		:50	PE	+A1-X1	1
						51		:51	PE	+A1-X1	1
						52		:52	PE	+A1-X1	1
						53		:53	PE	+A1-X1	1
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						113		:113	PE	+A1-X1	1
						114		:114	PE	+A1-X1	1
						115		:115	PE	+A1-X1	1
						116		:116	PE	+A1-X1	1
						117		:117	PE	+A1-X1	1
						118		:118	PE	+A1-X1	1
						119		:119	PE	+A1-X1	1
						120		:120	PE	+A1-X1	1
						121		:121	PE	+A1-X1	1
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						140		:140	PE	+A1-X1	1
						141		:141	PE	+A1-X1	1
						142		:142	PE	+A1-X1	1
						143		:143	PE	+A1-X1	1
						144		:144	PE	+A1-X1	1
						145		:145	PE	+A1-X1	1
</											

Terminal	Terminal type	Terminal	Terminal
UK 3 N [1-17]		USLKG3 [PE]	
+A1 -X2	:1	24VDC	+A2 -AS.S1
+A1 -X2	:2		+A2 -AS.S1
+A1 -X2	:3		+A2 -AS.S2
+A1 -X2	:4		+A2 -AS.S2
+A1 -X2	:5		+A2 -AS.S3
+A1 -X2	:6		+A2 -AS.S3
+A1 -X2	:7	24VDC	+A2 -AS.S2
+A1 -X2	:8	24VDC	+A2 -AS.S2
+A1 -X2	:9	24VDC	+A2 -AS.S4
+A1 -X2	:10		+A2 -AS.S4
+A1 -X2	:11		+A2 -AS.S3
+A1 -X2	:12	0VDC	+A2 -AS.S3
+A1 -X2	:13		+A2 -AS.P2
+A1 -X2	:14	PE	+A2 -Res2
+A1 -X2	:15	PE	+A2 -Res2
+A1 -X2	:16	PE	+A2 -Res2
+A1 -X2	:17	PE	+A2 -Res2
+A1 -X2	:18	PE	+A2 -Res2
+A1 -X2	:19	PE	+A2 -Res2
+A1 -X2	:20	PE	+A2 -Res2
+A1 -X2	:21	PE	+A2 -Res2
+A1 -X2	:22	PE	+A2 -Res2
+A1 -X2	:23	PE	+A2 -Res2
+A1 -X2	:24	PE	+A2 -Res2
+A1 -X2	:25	PE	+A2 -Res2
+A1 -X2	:26	PE	+A2 -Res2
+A1 -X2	:27	PE	+A2 -Res2
+A1 -X2	:28	PE	+A2 -Res2
+A1 -X2	:29	PE	+A2 -Res2
+A1 -X2	:30	PE	+A2 -Res2
+A1 -X2	:31	PE	+A2 -Res2
+A1 -X2	:32	PE	+A2 -Res2
+A1 -X2	:33	PE	+A2 -Res2
+A1 -X2	:34	PE	+A2 -Res2
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+A1 -X2	:97	PE	+A2 -Res2
+A1 -X2	:98	PE	+A2 -Res2
+A1 -X2	:99	PE	+A2 -Res2
+A1 -X2	:100	PE	+A2 -Res2

Terminal strip  
-X5

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Initial version	08.05.2014	phh	Date	08.05.2014	phh	Novartis Singapore, SG-Singapore
Project closure	18.05.2014	phh	User	PRC-14-0055	PRC-14-0055	
Change		phh	Preved	400V.50Hz.3L+N+PE Alex II 3D	400V.50Hz.3L+N+PE Alex II 3D	
Status		phh	Standard	600.1020-1.40109	600.1020-1.40109	
						
Type : MA - OW-3 474738 -X5						
04 - Terminals Block						
Page 17 / 23						











# Bill of material

Article Number	Description	Manufacturer	Reference	Device	Quantity
=>	Pressure switch	UNIVER	405 002 112 11	-U4.B1	1
=>	Solenoid valve	ASCO JOUCOMATIC	PV E374A016MS	-U4.Y1	1
453536	Pneumat. preparation unit	Frewitt	453536	-U5	1
=>	Pressure switch	UNIVER	405 002 112 11	-U5.B1	1
=>	Solenoid valve	ASCO JOUCOMATIC	PV E374A016MS	-U5.Y1	1
434715	Cable	HEINIGER	115 120 420 / H07RN-F Gdv 4G2.5	-W1	1
403952	Cable	HEINIGER	114 020 420 / H05VV-F Td 4G2.5	-W2	1
464456	Cable	PARKEM	MOK90SC	-W3	1
464457	Cable	PARKEM	GBK90/02.70MV2	-W4	1
462043	Cable	PARKEM	C3X12/01.00M	-W5	1
462042	Cable	PARKEM	C3X11/01.00M	-W6	1
435708	Cable	HEINIGER	888 830 183 / TT flex 18G0.5	-W7	1
435708	Cable	HEINIGER	888 830 183 / TT flex 18G0.5	-W8	1
435708	Cable	HEINIGER	888 830 183 / TT flex 18G0.5	-W9	1
411933	Cable	HEINIGER	888 851 073 / TT flex C 7G0.75	-W10	1
451302	Cable	HEINIGER	777 923 032 / Securaflex 3x2x0.75	-W11	1
451300	Cable	HEINIGER	777 925 002 / Securaflex 1x2x0.75	-W12	1
451300	Cable	HEINIGER	777 925 002 / Securaflex 1x2x0.75	-W13	1
451300	Cable	HEINIGER	777 925 002 / Securaflex 1x2x0.75	-W14	1
456540	Terminal	PHOENIX CONTACT	3004524	-X0	3
456542	Terminal	PHOENIX CONTACT	0442079	-X0	1
414554	Fuse Terminal	PHOENIX CONTACT	UK5-HESI	-X1	2
456543	Terminal	PHOENIX CONTACT	2770011	-X1	10
456544	Terminal	PHOENIX CONTACT	2774211	-X1	1
464300	Fuse	SCHURTER	0034.3114	-X1	4
456543	Terminal	PHOENIX CONTACT	2770011	-X2	9
456544	Terminal	PHOENIX CONTACT	2774211	-X2	1
456543	Terminal	PHOENIX CONTACT	2770011	-X3	3
456544	Terminal	PHOENIX CONTACT	2774211	-X3	1

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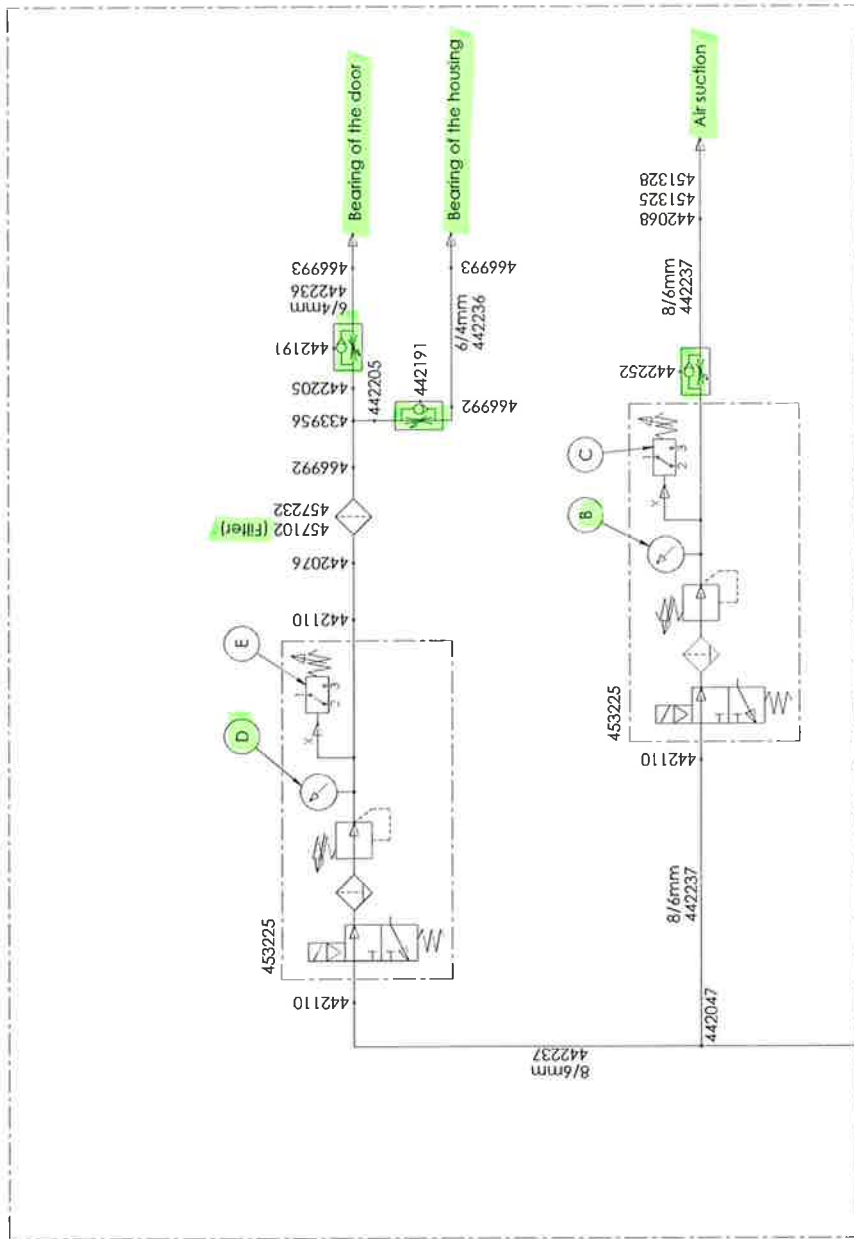
Novartis Singapore, SG-Singapore PRO-14-0055 400V 50Hz 3L+N+PE Alex II 3D		05 - Bill of material Type : MA - OW-3 474738	
Date: 08.05.2014 User: phia Status: Standard 6001020-140109	Date: 05.05.2014 User: phia Status: Standard 6001020-140109	Date: 18.09.2014 User: phia Status: Standard 6001020-140109	Date: 05.05.2014 User: phia Status: Standard 6001020-140109
Change:		Repl. by:	
Status:		Page: 22 / 23	

# Bill of material

Article Number	Description	Manufacturer	Reference	Device	Quantity
456539	Terminal	PHOENIX CONTACT	3001501	-X4	17
456541	Terminal	PHOENIX CONTACT	0441083	-X4	3
456539	Terminal	PHOENIX CONTACT	3001501	-X5	17
456541	Terminal	PHOENIX CONTACT	0441083	-X5	1
456543	Terminal	PHOENIX CONTACT	2770011	-X6	8
456544	Terminal	PHOENIX CONTACT	2774211	-X6	1
456543	Terminal	PHOENIX CONTACT	2770011	-X7	8
456544	Terminal	PHOENIX CONTACT	2774211	-X7	1
456548	Terminal	PHOENIX CONTACT	3001514	-X11	9
409713	Terminal box	STAHL	8146/1071-10	-XJB1	1
466364	Terminal box support	FREWITT	466364	-XJB1	2
408786	Terminal box	STAHL	8118/222-199	-XJB2	1
466364	Terminal box support	FREWITT	466364	-XJB2	2
411082	Male connector	STAHL	8570/12-506	-XP	1

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Initial version		08.05.2014	phha	Date	08.05.2014
Project closure		16.02.2014	in	User	phha
Change		Date	Name	Standard	6001020-140109
Status		Origin	Origin	Origin	Origin
Novartis Singapore, SG-Singapore		PHO-24-0055		400V50HZ3L-N+PE Alex II 3D	
Type : MA - OW-3		474738		05 - Bill of material	
Page		23 / 23		Type : MA - OW-3	



Attachment No.: 5 Page: 1 of 1  
 Sig. Rev: 2021.11.5236 Initial/Date: Wendy  
 Attached To: FAT 5g test protocol 19 sep 14

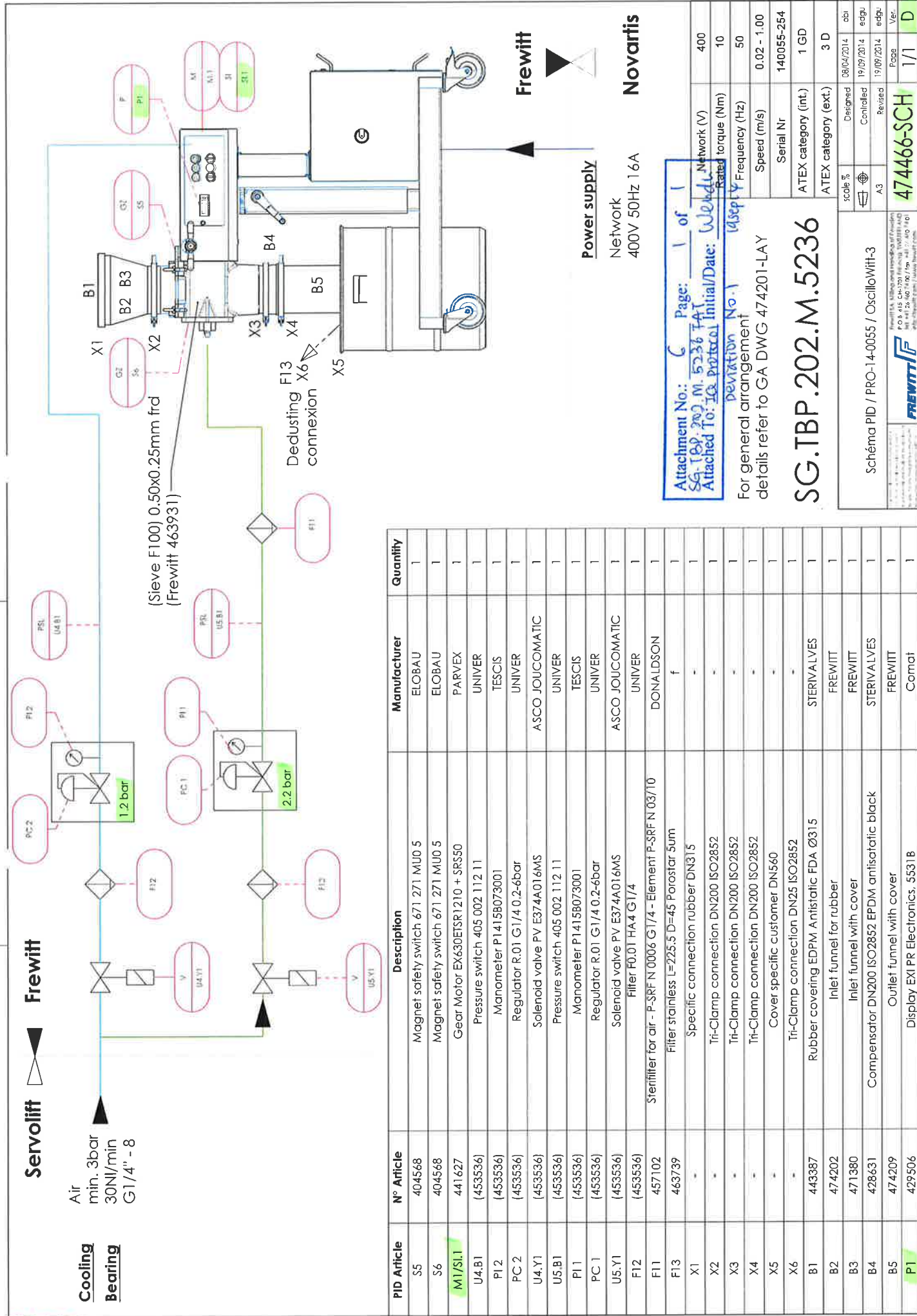
Typ	Reference	Pressure (barg)
OscilloWitt	A	min 3 / max 6
	B	1
	C	1
	D	min 2
	E	min 2

Date	Author	Checked	Approved	Page	Total
31/03/2014				1/1	1
19/09/2014					
19/09/2014					

474365-SCH 1/1 A

Schéma pneumatique ATEX sp

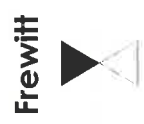
**OSCILOWITT**



Attachment No.: 6 Page: 1 of 1  
 SG-TBP.202.M.5236-FAT  
 Attached To: IG protocol Initial/Date: Wed, 14 Sep 2011 14:57:44  
 Deviation No.: 1  
 For general arrangement details refer to GA DWG 474201-LAY

# SG.TBP.202.M.5236

**Power supply**  
 Network  
 400V 50Hz 16A



**Novartis**

PID Article	N° Article	Description	Manufacturer	Quantity
S5	404568	Magnet safety switch 671 Z71 MU0 5	ELOBAU	1
S6	404568	Magnet safety switch 671 Z71 MU0 5	ELOBAU	1
M1/SI.1	441627	Gear Motor EX630EISR1210 + SRSS0	PARVEX	1
U4.B1	(453536)	Pressure switch 405 002 112 11	UNIVER	1
P1.2	(453536)	Manometer P1415B073001	TESCIS	1
PC.2	(453536)	Regulator R.01 G1/4 0.2-6bar	UNIVER	1
U4.Y1	(453536)	Solenoid valve PV E374A016MS	ASCO JOUCOMATIC	1
U5.B1	(453536)	Pressure switch 405 002 112 11	UNIVER	1
P1.1	(453536)	Manometer P1415B073001	TESCIS	1
PC.1	(453536)	Regulator R.01 G1/4 0.2-6bar	UNIVER	1
U5.Y1	(453536)	Solenoid valve PV E374A016MS	ASCO JOUCOMATIC	1
F12	(453536)	Filter F0.01 HA4 G1/4	UNIVER	1
F11	457102	Sterilifier for air - P-SRF N 0006 G1/4 - Element P-SRFN 03/10	DONALDSON	1
F13	463739	Filter stainless L=225.5 D=45 Porostar 5um	f	1
X1	-	Specific connection rubber DN315	-	1
X2	-	Tri-Clamp connection DN200 ISO2852	-	1
X3	-	Tri-Clamp connection DN200 ISO2852	-	1
X4	-	Tri-Clamp connection DN200 ISO2852	-	1
X5	-	Cover specific customer DN560	-	1
X6	-	Tri-Clamp connection DN25 ISO2852	-	1
B1	443387	Rubber covering EDPM Antistatic FDA Ø315	STERIVALVES	1
B2	474202	Inlet funnel for rubber	FREWITT	1
B3	471380	Inlet funnel with cover	FREWITT	1
B4	428651	Compensator DN200 ISO2852 EPDM antistatic black	STERIVALVES	1
B5	474209	Outlet funnel with cover	FREWITT	1
P1	429506	Display EXI PR Electronics. 5531B	Comat	1

Schéma PID / PRO-14-0055 / OscilloWith-3	scale %	Designed	08/04/2014	abi
	A3	Controlled	19/09/2014	edgu
		Revised	19/09/2014	edgu
		Page		Ver.
		<b>474466-SCH</b>		<b>1/1</b>

Frewitt S.A. Milling and packaging of Novartis  
 P.O. Box 415 CH-1701 Fribourg, 15001851-1402  
 www.frewitt.com | www.frewitt.com | www.frewitt.com

# SERVOLIFT



10101009 - TE201413264 1  
FAT Protokoll SL

## Factory Acceptance Test

### 1. Identification

Project Number:	13264	Date of Inspection:	18. Sept. 2014
Description:	Drum Lifter		
Customer	Frewitt Fabrique, Granges-Paccot, Switzerland		
Order Number:	CDF-14-0569, 10.03.2014	Order Confirmation	1033540

Inspector of Customer:	LEE WEND LI name	Inspector Servolift:	Horst Jehal name
Inspector of Customer:	name		

	YES	NO
Machine has stand factory approval:	✓	
Machine is release for shipment	✓	

Deviations/ Repair Work acc. List of Faults (page.13...-13...-):
Remark: Deviations to be completed before machine shipment.

Wende 18 sep 14

Signature Customer

H. Jehal

Signature Servolift

Offenburg, 18. Sept. 2014

Place/ Date

Signature Customer

# SERVOLIFT

## Version Control – Revision Page

In the following overview the changes concerning this document are chronologically specified with the note of the modification date and the reason for modification.

Version	Date	Editor	Reason for Change
1	15. Sep 2014	BR / GM	first issue – original – initial version



# SERVOLIFT

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# SERVOLIFT

## 2. Scope of delivery

			YES	NO
2.1.1.	1 pcs	Drum Lifter, squeeze funnel system, freestanding, floor mounted	✓	
2.1.2.	2 pcs	height stops	✓	
2.1.3.	1 pcs	manually operated butterfly discharge valve ND 200	✓	
2.1.4.	1 pc	pneumatic vibrator	✓	
2.1.5.	1 pc	operation on a separate control panel 30m cable included	✓	
2.1.6.	1 pc	Slewing motorized (hydraulic slewing of the lifter column	✓	
2.1.7.	1 pc	semi automatic control via membrane key panel, service mode by key switch, PLC included	✓	
2.1.8.	1 pc	stainless steel liner restraining bar for manual insertion	✓	
2.1.9.	1 pc	Acceptance test by TÜV (identify TÜV label)	✓	



### INFORMATION

Other non-listed items as service work, packaging and transport are not relevant for qualification, and thus not included in this table.

Remark: N.A.

*Wandl 18 Sep 14*

Signature Customer

*i.v. Jekel*

Signature Servolift

Offenburg, *18. Sept. 2014*

Place/Date

Signature Customer

# SERVOLIFT

## 3. Installation

		YES	NO
3.1.1.	Check of Dimensions acc. General Arrangement 13264-00-001	✓	

Remark: slight differences in the measurements are not critical to the operation. Refer to Attachment 1.

Wendt 18 sep 14

Signature Customer

i.v. Jehal

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Offenburg, 18. Sept. 2014

Place/Date

Signature Customer

# SERVOLIFT

## 4. Interlocks

### 4.1. in semi-automatic:

		YES	NO
4.1.1.	- LIFT /LOWER only possible: - at 0° pick up position, supporting arm with valve up position and clamp platform fully retracted	✓	
4.1.2.	- LIFT /LOWER only possible: - at 0° pick up position, supporting arm with valve up position and drum correctly clamped	✓	
4.1.3.	- LIFT /LOWER only possible: - at slew position 1, supporting arm with valve down position and drum correctly clamped	✓	
4.1.4.	- LIFT /LOWER only possible: - at slew position 2,° supporting arm in valve up position clamp platform fully retracted	✓	
4.1.5.	- Clamping always possible	✓	
4.1.6.	- Clamp platform only to open in minimum height, supporting arm in valve up position and column slewed to 0° pick up position	✓	
4.1.7.	- Clamp platform can be extended if bag discharge height into container is reached and unit slewed to slew end position 2 and supporting arm at valve up position	✓	
4.1.8.	- Slewing into direction 2 only at maximum height, clamp platform fully retracted and supporting arm in valve up position	✓	
4.1.9.	- Slewing into direction 1 only at maximum height, supporting arm with valve down position and drum correctly clamped	✓	
4.1.10.	- Tilting only at maximum height, at slew position 0 and drum correctly clamped	✓	
4.1.11.	- After pressing the push button "Validation work area free", the operator have to press within a time of 10 seconds on the push button "Forward cycle" or "Backward cycle". If 10 seconds have passed, the operator must press again the validation button	✓	

Remark: N.A.

*Wendt 18 sep 14*  
Signature Customer

*i.v. Jemel*  
Signature Servolift

Signature Customer

Offenburg, *18. Sept. 2014*  
Place/ Date

# SERVOLIFT

## 5. Operation

### 5.1. Control ON , Semi automatic sequence (Discharging into container)

		YES	NO
5.1.1.	Confirm, drum lifter is in defined start position: - supporting arm is at min. height - clamp platform is completely extended - clamp platform is not loaded - empty container is placed on the IBC scale at slew position - OscilloWitt and empty drum are placed at slew position	✓	
5.1.2.	Confirm, the control switch is on by turning key ON/OFF to ON - position	✓	
5.1.3.	Confirm, with pressed key ACTIVATE SAFETY CIRCUIT the safety module is switched on	✓	
5.1.4.	Confirm, the selector switch is turned in "DISCHARGING INTO CONTAINER" - position	✓	
5.1.5.	Confirm, a product bag is put on the platform	✓	
5.1.6.	Confirm, push button "VALIDATION WORK AREA FREE" is pressed and within a time of 10 seconds the push button FORWARD CYCLE is pressed and hold	✓	
5.1.7.	Confirm, semi-automatic sequence forward (discharging into container) starts, means: drum lifter clamps platform completely, supporting arm is lifted to maximum height, column is slewed to position 2, supporting arm is lowered onto corresponding height stop, platform is completely unclamped	✓	
5.1.8.	Confirm, after the unit has stopped, the product is discharged into the container by opening the bag manually	✓	
5.1.9.	Confirm, push button "validation work area free" is pressed and within a time of 10 seconds the push button BACKWARD CYCLE is pressed and hold	✓	
5.1.10.	Confirm, semi-automatic sequence backward starts, means: drum lifter clamps platform completely, supporting arm is lifted to maximum, column is slewed to slew position 0, supporting arm is lowered to minimum height, platform is unclamped, the unit has stopped	✓	

# SERVOLIFT

## 5.2. Semi automatic sequence (Discharging into drum)

		YES	NO
5.2.1.	Confirm, drum lifter is in defined start position: <ul style="list-style-type: none"> <li>- supporting arm is at min. height</li> <li>- clamp platform is completely extended</li> <li>- clamp platform is not loaded</li> <li>- empty container is placed on the IBC scale at slew position</li> <li>- OscilloWitt and empty drum are placed at slew position</li> </ul>	✓	
5.2.2.	Confirm, the selector switch is turned in "DISCHARGING INTO DRUM" - position	✓	
5.2.3.	Confirm, an 150 or 152 litre drum is put on the platform	✓	
5.2.4.	Confirm, push button "VALIDATION WORK AREA FREE" is pressed and within a time of 10 seconds the push button FORWARD CYCLE is pressed and hold	✓	
5.2.5.	Confirm, semi-automatic sequence forward (discharging into drum) starts, means: drum is clamped, supporting arm is lifted to maximum height, drum is inverted 180° to valve down position, column is slewed to slew position 1, supporting arm is lowered onto corresponding height stop	✓	
5.2.6.	Confirm, after the unit has stopped, the operator has started the OscilloWitt, and opened the discharge valve	✓	
5.2.7.	Confirm, after discharging into drum, the discharge valve is closed and the OscilloWitt is stopped by the operator	✓	
5.2.8.	Confirm, push button "validation work area free" is pressed and within a time of 10 seconds the push button BACKWARD CYCLE is pressed and hold	✓	
5.2.9.	Confirm, semi-automatic sequence backward starts, means: supporting arm is lifted to maximum, column is slewed to slew position 0, drum is inverted 180° to valve up position, supporting arm is lowered to minimum height, platform is unclamped, the unit has stopped	✓	
5.2.10.	Confirm, discharged drum is removed	✓	

# SERVOLIFT

## 5.3. Check MAINTENANCE MODE functions

		YES	NO
5.3.1.	Confirm, drum lifter is in defined start position: <ul style="list-style-type: none"> <li>- supporting arm is at min. height</li> <li>- clamp platform is completely extended</li> <li>- clamp platform is not loaded</li> <li>- empty container is placed on the IBC scale at slew position</li> <li>- OscilloWitt and empty drum are placed at slew position</li> </ul>	✓	
5.3.2.	Confirm, key switch MAINTENANCE MODE is turned to on - position	✓	
5.3.3.	Confirm, following functions are possible: lifting/lowering, clamping, unclamping, slewing, tilting, vibrator and retracting height stop	✓	
5.3.4.	Confirm, if working in maintenance mode is finished, return the machine back to its defined start position, turn key switch MAINTENANCE MODE to off – position, machine then can be operated in "normal" mode:	✓	

Remark: N.A.

Wendt 18 sep 14

Signature Customer

Signature Customer

i.v. Jekel

Signature Servolift


Offenburg,

18. Sept. 2014

Place/ Date

# SERVOLIFT

## 6. Labeling

		YES	NO
6.1.1.	Confirm name plate	✓	
6.1.2.	Confirm name plate labelled to 250 kg lift capacity	✓	
6.1.3.	Confirm machine labelling 250 kg lift capacity	✓	
6.1.4.	Confirm column etched by symbol 	✓	
6.1.5.	Confirm electrical test according EN 60204 with label	✓	
6.1.6.	Confirm machine labelled with CE - label	✓	
6.1.7.	Confirm machine labelled with TÜV label	✓	
6.1.8.	Confirm machine labelled according ATEX	✓	
6.1.9.	Confirm labelling of lubrication point of tilt- drive	✓	

Remark: N.A.

*Wendt* 18 sep 14

Signature Customer

*J. v. Jehel*

Signature Servolift

Offenburg,

*18. Sept. 2014*

Place/ Date

Signature Customer



# SERVOLIFT

## 7. Documentation

The complete set of documentation is available only after FAT. Documentation will be recorded on CD-Rom after FAT only.

		YES	NO
7.1.1.	Documentation, English language (1x paper & 1x empty CD-Rom)		✓
7.1.2.	Owner's manual		✓
7.1.3.	General assembly drawing 13264-00-001	✓	
7.1.4.	Lift cylinder, spare and wear parts	✓	
7.1.5.	Assembly of supporting arm to lift slide	✓	
7.1.6.	Hydraulic scheme	✓	
7.1.7.	Hydraulic parts list	✓	
7.1.8.	Hydraulic hose list		✓
7.1.9.	Pneumatic scheme	✓	
7.1.10.	Pneumatic parts list	✓	
7.1.11.	Spare parts list	✓	
7.1.12.	Electric scheme	✓	
7.1.13.	Electric parts list	✓	

Remark: 7.1.1, 7.1.2, 7.1.8. will be ready before delivery.

Wendt 18 sep 14

Signature Customer

i.v. Jekel

Signature Servolift

Offenburg,

18. Sept. 2014

Place/ Date

Signature Customer

# SERVOLIFT

		YES	NO
7.1.14.	Data sheet and MSDS of hydraulic oil	✓	
7.1.15.	Data sheet and MSDS of food grade grease	✓	
7.1.16.	Data sheet and MSDS of automatic greaser	✓	
7.1.17.	Declaration of Compliance with the order EN 10204-2.1 <i>3.1 18.09.14 i.v. Jekel</i>	✓	
7.1.18.	Machine Book	✓	
7.1.19.	Declaration of Conformity acc. Directive 2006/42/EC (Machine Directive)	✓	
7.1.20.	Declaration of Conformity acc. Directive 94/9/EC (ATEX Directive)	✓	

Remark: ~~NA~~ *\*EE Wende* 18 sep 14 7.1.17 refer to attachment 2.

*Wende 18 sep 14*

Signature Customer

Signature Customer

*i.v. Jekel*

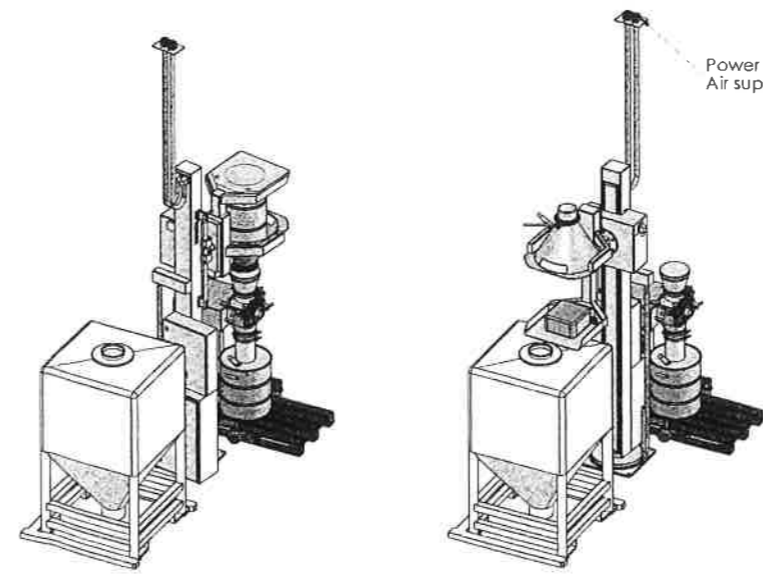
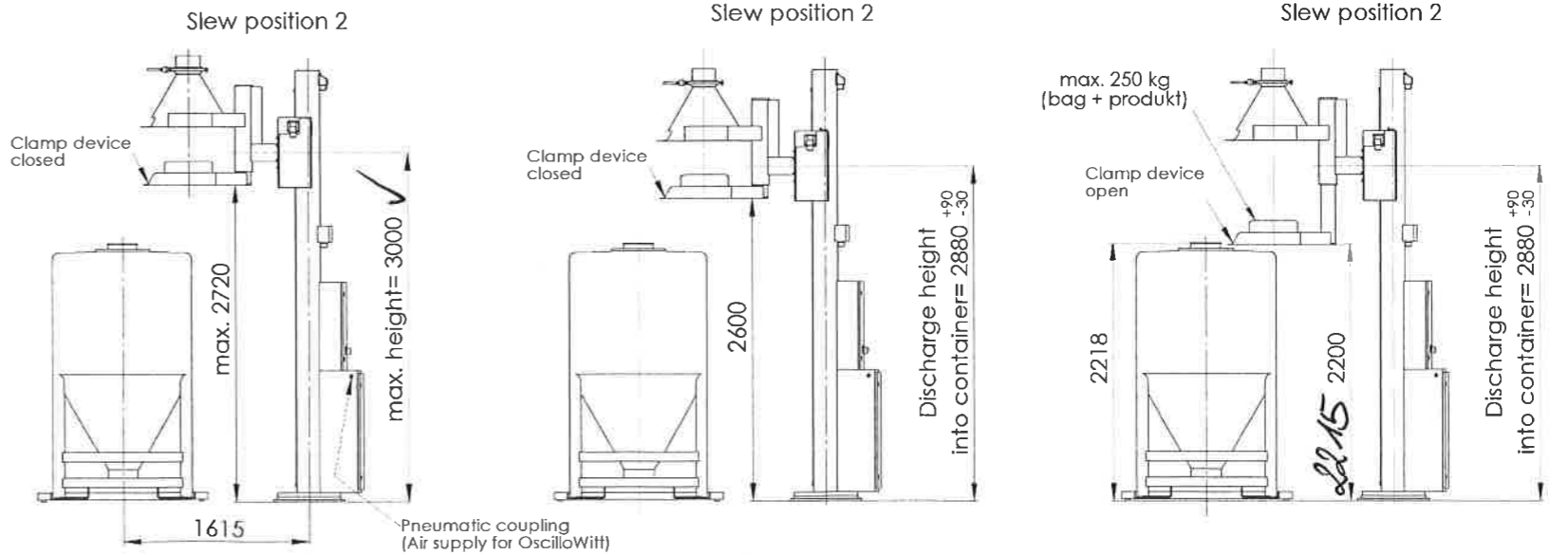
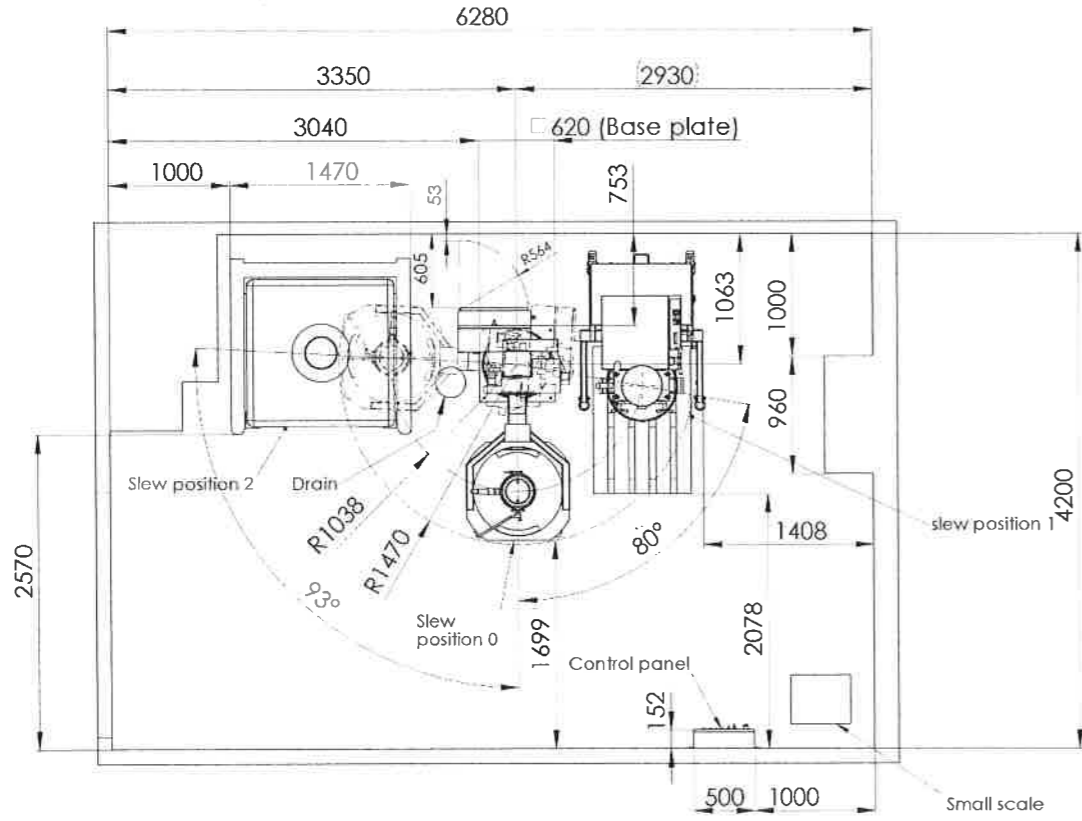
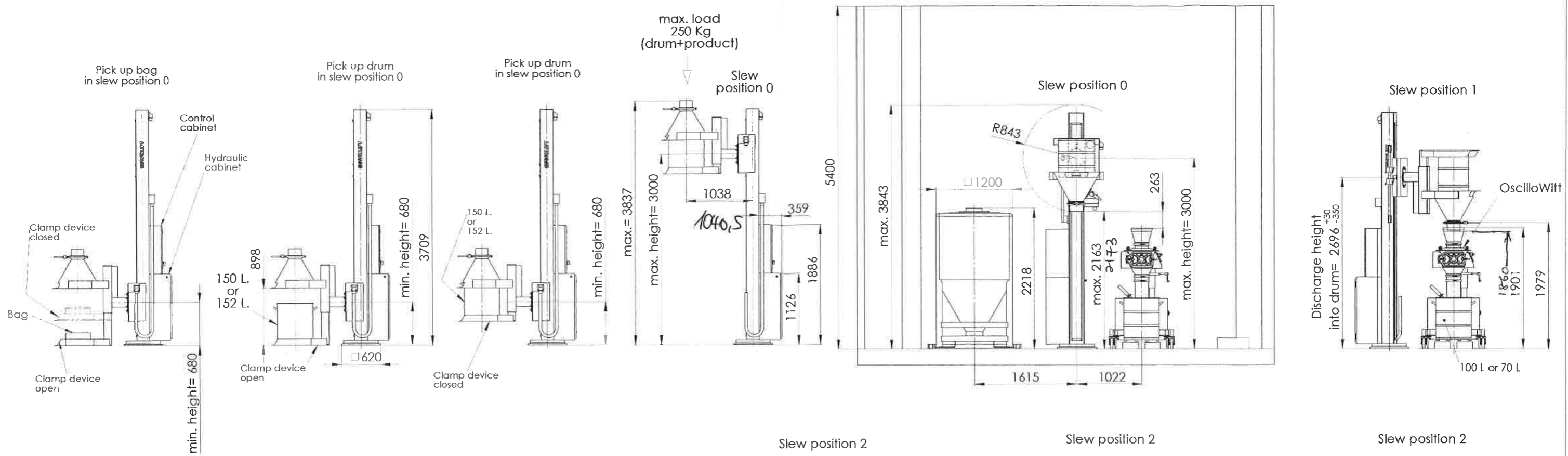
Signature Servolift

Offenburg,

*18. Sept. 2014*

Place/Date





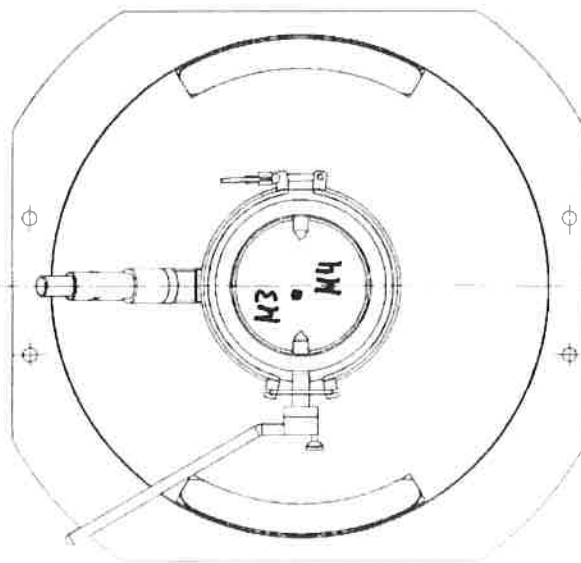
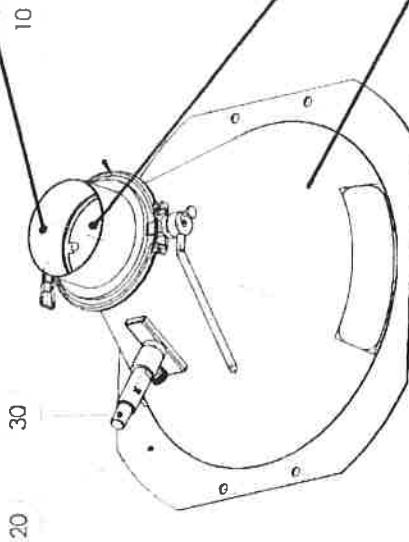
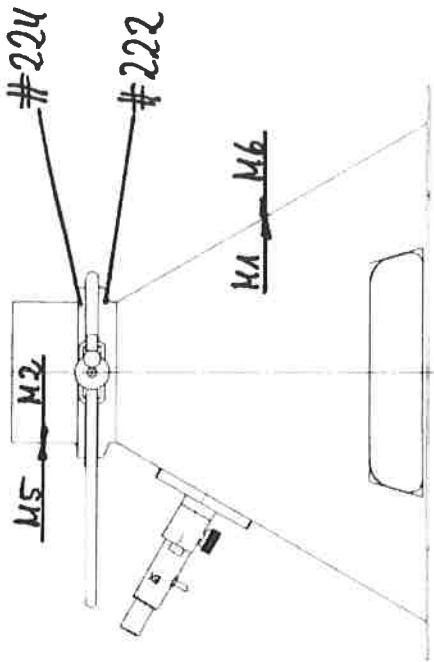
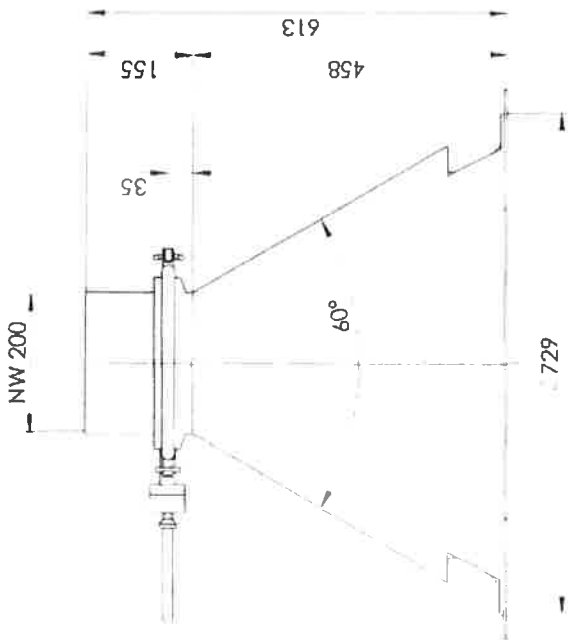
Offenburg, 18. Sept. 2014  
i.v. Jettel

Attachment No.: 1 Page: 1 of 1  
Attached To: Servo lift Initial/Date: Wendi 18 sep 14  
FAT project number 13264  
order number CDF-14-0569

<b>SERVOLIFT</b>		SERVOLIFT GmbH 77656 Offenburg, Germany www.servolift.de		Material: 100 1000-10 00	
Drum Lifter		Fass-Hubsäule		13264-00-001	
Order No.		Date		Rev.	
13264-00-001		18.09.2014		a	



Konstruktionsfreigabe



<b>SERVOLIFT</b> SERVOLIFT GmbH 77656 Orling, Germany www.servolift.de		Zeichnungs-Nr. <b>#13264</b> Trichter Schw. Ø729/60°/NW 200 9081228
Blatt 1 von 1 34	Datum 08.09.2014	Rev. 0

**SERVOLIFT**  
Qualitätssicherung

08.09.2014

Attachment No.: 2 P. 1 of 4  
 Attached To: Servolift : Alendi

18 sep 14

FAT project number 13264  
 order number CDF-14-289

# SERVOLIFT

## Analytische Materialprüfung

Kunde:	Frewitt, Schweiz	Prüfer:	Föll
Projektnummer:	13264	Datum:	08.09.2014
Benennung:	Trichter schw.	Vorgabe:	AISI 316 / 316L

NITON XRF Material Analyzer Xlt 898SY; Serial No. 17578

THERMO NITON ANALYZERS LLC

### Beschreibung

Prüfpunkt	Artikel- Nr.; Zeichnung- Nr.; Bezeichnung;	AISI	deutsche Standard Nr.
# 223	9081228 Trichter	316 316L	1.4401/04
# 222	Oberer Klappenflansch	316 316L	1.4401/04
# 225	Klappenteller	316 316L	1.4401/04
# 224	Unterer Klappenflansch	316 316L	1.4401/04
# 226	Auslauf	316 316L	1.4401/04

OG 08.09.2014

Place / Date

Föll

Name (print)


 Signature

Attachment No.: 2 Page: 2 of 4  
 Attached To: servolift Initial/Date: Wendy  
 FAT project number 13264  
 order number CDF-14-0569

18-sep14

Datei: XRF\_Test\_D.doc  
 Erstellt: Maier K.  
 Datum: 03.07.2008

Version: 1  
 Geprüft: Jekal H.  
 Datum: 30.07.2008

QM- Messung des Produkts  
 Freigegeben: Rieber J.  
 Datum: 30.07.2008

1

# SERVOLIFT

## Rauhheitsmessung- Ra nach DIN EN 4287 / 4288

Kunde: Frewitt, Schweiz Prüfer: Föll  
 Projektnummer: 13264 Datum: 08.09.2014  
 Gerätetyp: Trichter schw. Vorgabe: Ra ≤ 0,8/1,5 µm

Meßgerät: Mitutoyo Typ: Surftest -SJ 301 Mitutoyo Precision Reference Specimen 178-601 PM-Nr.: B4004  
 PM- Nr.: A4001 Seriennummer: 900332

Messwerte			i.o.	n.i.o
Messung.1	Messpunkt: <u>Oberfläche innen</u> Trichter	RA= <u>0.76</u> µm	X	
Messung.2	Messpunkt: Auslauf	RA= <u>0.13</u> µm	X	
Messung.3	Messpunkt: Klappenteller	RA= <u>0.09</u> µm	X	
Messung.4	Messpunkt: Klappenteller	RA= <u>0.02</u> µm	X	
Messung.5	Messpunkt: <u>Oberfläche außen</u> Auslauf	RA= <u>0.58</u> µm	X	
Messung.6	Messpunkt: Trichter	RA= <u>0.90</u> µm	X	

OG 08.09.2014  
Ort / Datum

Föll  
Name (Druckschrift)

**SERVOLIFT**  
Qualitätssicherung  
i.v.  
Unterschrift

Attachment No.: 2 Page: 3 of 4  
 Attached To: Servolift Initial/Date: Wendi 18 sep 14  
FAT project number 13264  
order number CDF-14-0569

Datel: Rauheitsmessung\_D.doc  
 Erstellt: Ambruster M.  
 Datum: 04.04.2014

Version: 2  
 Geändert H. Jekal  
 Datum: 14.04.2014

QM-Formular Rauheitsmessung  
 Geprüft: Rieber  
 Datum: 14.04.2014 Seite 1 von 1

**SERVOLIFT**10100873 TE201413264 1  
13264 2 1 Werksbescheinigung

Declaration of Compliance with the order (acc. DIN EN 10204- 2.1)		
Name of Project: Drum Lifter	Date :	15.Sep. 2014
Client: Frewitt Fabrique de machines SA, CH- 1763 Granges-Paccot	Version :	1
		Servolift GmbH Project No. 13264

We herewith confirm that the above mentioned project and related delivered products and components correspond to the scope of our offer and to the requirements of your order:

**Metal:**

Product contact materials are made of AISI 316 ( L ) or equivalent.

Non product contact materials are made of AISI 304 or higher quality.

**Seals:**

Seals are made of Silicone with FDA approval.

**Hydraulic oil and grease:**

The shop provided lubricants are suitable for use in food industries with incidental food contact. These have received FDA and USDA H1 approval.

Servolift GmbH  
Albert-Einstein-Str. 9  
D- 77656 Offenburg

Phone : +49 (0) 781/61 00-0  
Fax : +49 (0) 781/61 00-99  
E-Mail : sl@servolift.de  
web : www.servolift.de

Attachment No.: <u>2</u> Page: <u>4</u> of <u>4</u>
Attached To: <u>Servolift</u> Initial/Date: <u>Wendli</u> 15 Sep

FAT project number 13264  
order number CDF-14-0569

Offenburg, 15.Sep. 2014  
Place / Date

Horst Jekal  
Name (printed)  
Quality Assurance

*H. Jekal*  
Signature  
**SERVOLIFT**  
Qualitätssicherung

Datel:	13264_Declaration_of_compliance_2.1.docx	Version:	1	QM-Formular Werksbescheinigung 2.1
Erstellt:	M. Junker	Geprüft:	G.Macke	Freigegeben: M.Junker
Datum:	17.05.2005	Datum:	20.05.2005	Datum: 30.05.2005 1 / 1



# **QUALIFICATION AND VALIDATION**

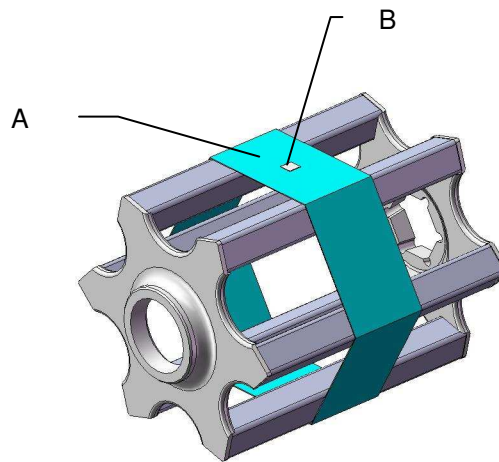


**Measurement of the rotor speed**

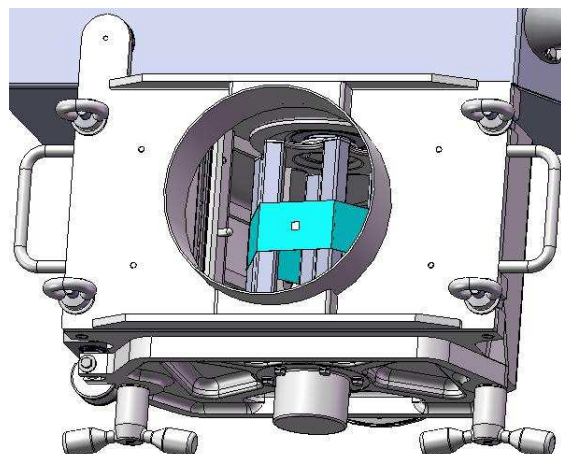


Measurement of the rotor speed is a maintenance operation. During this operation, the installation has no safety protection and there is a risk of injury. This risk is under the responsibility of the maintenance personnel. This operation must be carried out by qualified maintenance personnel who have the specific knowledge required and who have read the user guide. They must use only tools designed for the purpose. The user must prevent any risk of contamination by the product

- Wind a dark coloured paper band (A) around the rotor
- Stick the marker (B) delivered with the tachometer



- Position the rotor so that the mark is opposite the entry to the frame

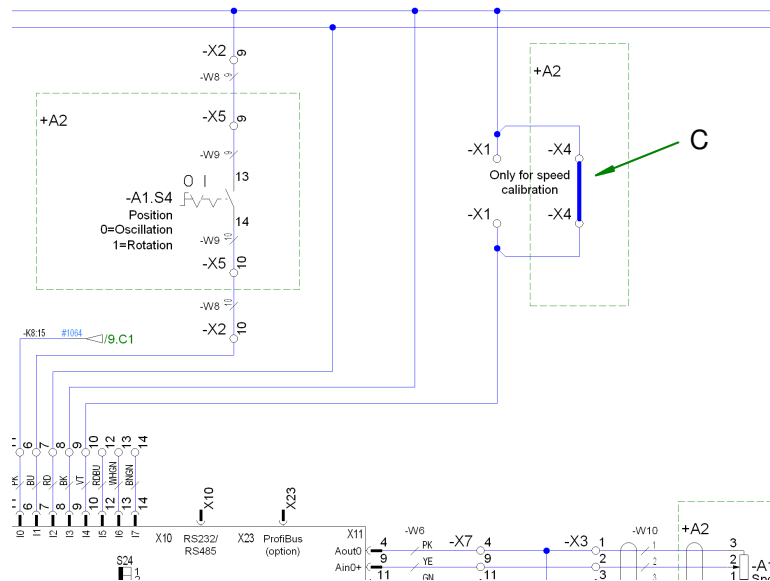


In standard mode, the rotor shifts by 2° per oscillation, allowing the same wear over the whole rotor. For these tests, this shift must be deactivated.

The oscillation angle adjustment is also deactivated.

- Place a shunt (C) on the terminals of the terminal box (X4) or in the cabinet (X1) to deactivate the rotor shift

See the electrical circuit diagram of the machine  
Example:



**DANGER OF EXPLOSION**

For installations in an area where there is risk of explosion, take the installation to a safe area.



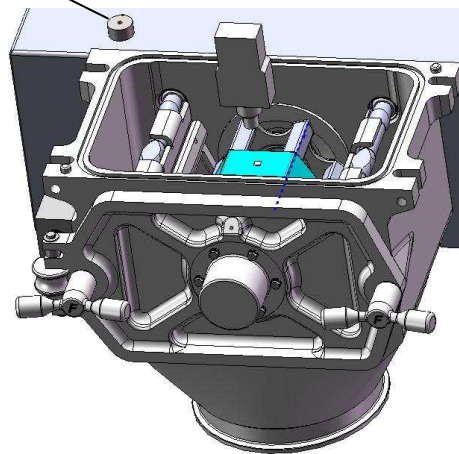
Remove the shunt after taking the measurements.



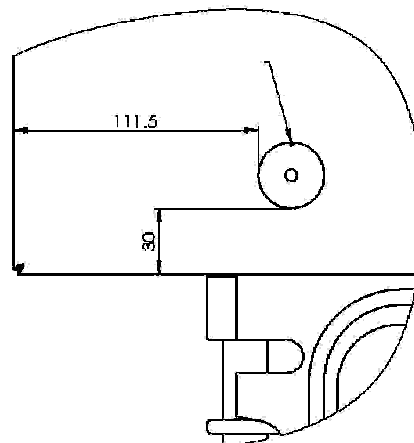
**Entry accessory with grid (option)**

- Remove the entry accessory (G)
- Position the magnet (D)

D



For safety reasons, the extra magnet required for this test must not be accessible to unauthorised persons.



**Rotary mode**

- Measure the speed with the tachometer (E)

Measured value = 1/min

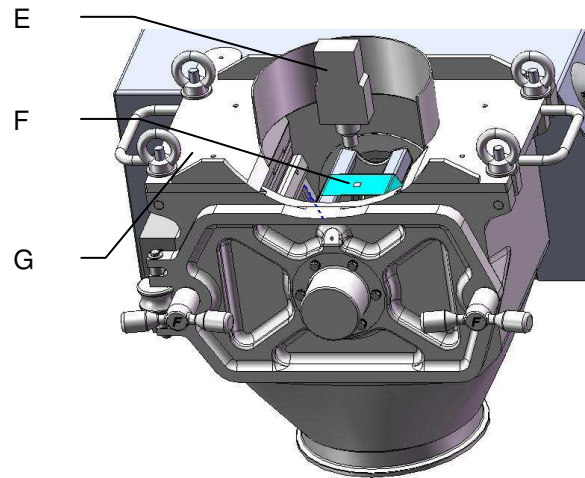
**Oscillating mode**

- Adjust the tachometer (E) to the marker (F) and switch on the machine.

Measured value = osc/min

- To obtain the correspondence with the circumferential speed, refer to the document "Speed comparison OscilloWitt" in section 5

Tachometer used by Frewitt:  
DHO 907 combi, Jaquet AG





## FAT IQ Test Protocol

SG.TBP.202.M.5236

OscilloWitt-3 (OW-3)

177396-1-en vers.01 (04.09.2014)

**Excellence in Milling and Handling of Powders**

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<b>Project Name :</b>	Novartis, Singapore, OscilloWitt-3
<b>Client :</b>	NOVARTIS SINGAPORE PHARMACEUTICAL
<b>Location :</b>	SG-Singapore
<b>Customer Order # :</b>	N° 3001057132/SC 1001749279 dtd.:29.03.2014
<b>Supplier :</b>	Frewitt Fabrique de Machines S.A.
<b>Object :</b>	OscilloWitt-3
<b>Serial # :</b>	140055-254

<b>Document Name :</b>	Qualification IQ OW-3 140055-254
<b>Document Reference :</b>	FAT-OW-3_IQ_140055-254.docx
<b>Document Version # :</b>	01

**Pre-Approval:**

This FAT-IQ test Protocol of the equipment was created, reviewed and accepted by:

Name	Signature Reason	Function/ Department	Signature	Date
Karsten Kutnar	Author	Frewitt Project Manager		09.05.2014
Edouard Gummy	Reviewer	Frewitt Project Manager		10.09.2014
Ho Sook Hwa	Reviewer	NSPM Qualification Coordinator		11 SEP 14
Christina Chen	Approver	NSPM Process Engineer		11 SEP 14
Shivabalan Kanesan	Approver	NSPM Automation Engineer		11 Sep 14
Panicker Shreekumar	Approver	NSPM Project Manager		11 Sep 14
Yap Yee Boon	Approver	NSPM Project QA		11 Sep 14





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FAT\_QUALIFICATION IQ  
 OSCILLOWITT-3 PRO-14-0055  
 4 / 19

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Table of Name and Abbreviated Signatures of All Personnel executing the FAT Qualification IQ

NAME	DEPARTMENT	SIGNATURE	INITIAL
LEE WEND LI	NSPM Process Expert	Wendli	Wendli
GUY EDWARD	FREWITT Project Manager		EG

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## 2. General tests

Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
2.1	Visible transport-related damage	No visible signs of impacts	No visible signs of damage.	Y	N.A.	Wendh 19 sep 14
2.2	User access to machine  There must be enough space around the machine to allow access to the control panel, accessories and tooling systems for normal operation of the machine. For units installed as permanent fixtures, there must also be enough room around the machine to allow maintenance work to be carried out.	Enough space for normal operation.  Enough room to allow maintenance.	Enough space for normal operation and maintenance	Y	N.A.	Wendh 19 sep 14
2.3	<b>Machine dimensions</b> Item # : 474201-LAY-Ver B Other : As per layout diagram and verify all components and instruments. (Attach verified highlighted doc)	Dimension matching as per 474201-LAY-Ver B	Verified GA drawing Attachment #: <u>1</u>	Y	N.A.	Wendh 19 sep 14
2.4	<b>Metallic material in contact with product</b> Item # : 474201-CMA Material #: <b>Stainless steel AISI-316 / AISI-316/316L</b> (Verify against the parts/components list)	Stainless steel AISI-316 / AISI-316/316L Materials certificate as per EN 10204-2.2 included in manual  Surface finish meets requirement $Ra \leq 0.4 \mu m$	Stainless steel AISI-316 / AISI-316/316L Material Certificate as per EN 10204-2.2; (Yes / No )  Manual Reference: <u>PRO-14-0055</u> <u>Chapter 11</u>  Surface finish meets $Ra \leq 0.4 \mu m$ (Yes / No )  Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u>	Y	N.A.	Wendh 19 sep 14

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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Ful-filled (Y/N)	Deviation No.	Executed by : (Initial, Date)
2.5	<b>Non-metallic material in contact with product</b> Item # : 474201-CMA (Verify against the parts/components list)	Materials shall be FDA compliant and suitable for pharmaceutical applications. Material certificates in accordance with EN10204, 2.2.	Material Certificate as per EN 10204-2.2;  (Yes / No )  Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u>	Y	N.A.	Wendh 19 sep 14
2.6	<b>Verify the Instruments, location Tags etc.,</b> Item # : 474466 – SCH Ver C P&ID Other : As per P&ID diagram and PID Part list (instrument list)  Verify all components/ instruments and tags as per P&ID and PID Part list (instrument list) Attach verified highlighted doc.	All components/ instruments and tags correctly installed/ indicated as per approved P&ID and PID Part list (instrument list).	All components/ instruments and tags correctly installed except missing speed display in P&ID and incorrect pressure indication  Verified P&ID Attachment # <u>2</u>	N	i	Wendh 19 sep 14
2.7	<b>Machine Tags</b> Item # : 474201-LAY-Ver B	Verify the main Equipment Tags and Markings as per Novartis Tags	Main equipment tag as per Novartis tag, SG-TBP.702.M.5236.	Y	N.A.	Wendh 19 sep 14
2.8	<b>Lubrication</b> Item # : 474201-LAY-Ver B	Verify any lubrication used and FDA food grade is used	Lubricants Certificate attached in Manual, Reference: <u>PRO-14-0055</u> <u>chapter 11</u> • Klüberpaste UHI 84-201 • Paralia GTE 703	Y	N.A.	Wendh 19 sep 14
2.9	<b>Bearing Flushing (air purge) &amp; Compressed air filter (F11, F12 &amp; F13)</b>	Filter verification with certificate	Filter Certificates attached in Manual, Reference: <u>PRO-14-0055</u> <u>chapter 11</u> <u>For F11 (air purge) and F13 only</u>	N	6	Wendh 19 sep 14

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## 3. Tools

Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
3.1	<p><b>Rotor</b> Item # : <b>443474</b> Other : Mounting on an installation</p> <p>Verify material of Rotor</p> <p>Check arrangement of rotor and arms as per drawing/layout. <b>443474-CMA</b></p> <p>Attach verified drawing.</p>	<p>Rotor is stainless steel AISI-316/316L</p> <p>Rotor with 6 arms, <math>\varnothing</math> 160 mm, welding cleaned with acid, with 92° oscillating angle. At each oscillating the angle moves by an additional 2° to extend operation life</p> <p>Ra 0.4</p>	<p>Rotor is stainless steel AISI-316/316L (Yes / No )</p> <p>Rotor and arm arrangement is correct as per drawing – 6 arms, <math>\varnothing</math> 160 mm, welding cleaned with acid. (Yes / No )</p> <p>Attachment #: <u>3</u></p> <p>Material and surface finish certificate is available (Yes / No )</p> <p>Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u></p>	Y	N.A.	Wendt 19 sep 14
3.2	<p><b>Sieve tensioning bars</b> Item#: <b>462358</b></p> <p>Verify material of sieve tensioning bars. Adjustment of distance between rotor and sieve is possible.</p> <p>Material certificate is available</p>	<p>Sieve tensioning bars are stainless steel AISI-316/316L</p> <p>permitting to tension the sieve against the rotor by means of a graduated handle</p> <p>Ra 0.4</p>	<p>Sieve tensioning bars are stainless steel AISI-316/316L (Yes / No )</p> <p>Distance adjustment between rotor and sieve is possible (Yes / No )</p> <p>Material and surface finish certificate is available (Yes / No )</p> <p>Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u></p>	Y	N.A.	Wendt 19 sep 14

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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
3.3	Sieve-TD MS <b>(mesh size)</b> 0.50x0.25mm  Item #: <b>463931</b>  Verify material of sieve.  Material certificate is available  Verify sieve identification	Sieve is stainless steel AISI-316/316L. Material certificate is available  Sieve is round wire with rubber edges on direct tension system and mounted directly in the machine (without rigid screen support)  Sieve identification possible	Sieve is stainless steel AISI-316/316L. Material certificate is available ( <u>Yes</u> / No )  Sieve is round wire with rubber edges on direct tension system and mounted directly in the machine (without rigid screen support) ( <u>Yes</u> / No )  Sieve identification possible ( <u>Yes</u> / No )  Material certificate is available ( <u>Yes</u> / No )  Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u>	Y	N.A.	Wendh- 19 sep 14

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## 4. Inlet and outlet accessories

Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
4.1	<b>Inlet Counter flange</b> Item # : <b>466518</b>  Other : fixed on machine housing by means of 4 fast fixing devices (swivelling screws with ring nut)	Funnel is stainless steel AISI-316/316L.  Material certificate is available  Inlet plate with Tri-Clamp connection, with welded-in safety grid, height 109.3 mm,  Ra 0.4	Funnel is stainless steel AISI-316/316L. (Yes / No )  Inlet plate with Tri-Clamp connection, with welded-in safety grid, height 109.3 mm (Yes / No )  Material and surface finish certificate is available (Yes / No )  Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u>	Y	N.A.	Wendli 19 sep 14
4.2	<b>Inlet funnel</b> Item # : <b>474202</b>  Other : fixed on the inlet plate by means of a Tri-Clamp connection	Funnel is stainless steel AISI-316/316L.  Material certificate is available  Conical Inlet funnel ISO200 with edged connection Ø 315 mm and EPDM rubber cover N° 443387, height 250 mm  Ra 0.4	Funnel is stainless steel AISI-316/316L. (Yes / No )  Conical Inlet funnel ISO200 with edged connection Ø 315 mm and EPDM rubber cover N° 443387, height 250 mm (Yes / No )  Material and surface finish certificate is available (Yes / No )  Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u>	Y	N.A.	Wendli 19 sep 14

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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
4.3	<b>Inlet funnel</b> Item # : <b>471380</b>  Other : fixed on the inlet plate by means of a tri-clamp connection	Funnel is stainless steel AISI-316/316L.  Material certificate is available  Conical Inlet funnel with cover, inlet Ø 315 mm, height 218 mm  Ra 0.4	Funnel is stainless steel AISI-316/316L. (Yes / No )  Conical Inlet funnel with cover, inlet Ø 315 mm, height 218 mm  Material and surface finish certificate is available ( Yes / No )  Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u>	Y	N.A.	Wendl 14 sept 14 *Et Wendl 14 sept 14  19 sep 14
4.4	<b>Outlet Compensator</b> Item # : <b>428631</b>  Other : supporting rings made of stainless steel, incl. fixing clamp	Compensator DN 200 (ISO 2852), to be fixed at the outlet of the milling head, EPDM black, antistatic execution, suitable for ATEX-zone, FDA conform	Compensator DN 200 (ISO 2852), to be fixed at the outlet of the milling head, EPDM black, antistatic execution, suitable for ATEX-zone, FDA conform ( Yes / No )  <u>PRO-14-0055</u> <u>chapter 11</u>	Y	N.A.	Wendl 19 sep 14





Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
4.5	<b>Target drum lid (X5)</b> <b>Item #: 474209 and 475517</b>  2 customised lids with breathing filters to fit the 70L and 150L target drums	Lids are stainless steel AISI-316/316L.  Lids fit the 70L and 150L target drums  Material certificate is available  5 um filter  Ra 0.4	Lids are stainless steel AISI-316/316L. (Yes / No )  Lids fit the 70L and 150L target drums ( Yes / No )  Material and surface finish certificate is available (Yes / No )  Filter Certificates attached in Manual, Reference: <u>PRO-14-0055</u> <u>chapter 11</u>	N	2	Wendli 19 sep 14

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**5. Motorisation**

Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
5.1	<b>Motor</b> Item # : <b>441627</b>  Verify motor rotation/ direction (to specify clock-wise or anti-clockwise)	Motor EX630ETSR1210, SRS50, Nmax 1850rpm, Mo 10.4Nm, IP65  Servo-motor with reduction drive, speed adjustable by means of a potentiometer from 0.02 – 1.00 m/sec	Motor EX630ETSR1210, SRS50, Nmax 1850rpm, Mo 10.4Nm, IP65 ( <u>Yes</u> / No )  Motor Data sheet; Manual Reference: <u>Not available</u>  Motor Direction: <u>clock wise and anticlockwise</u>	N	F	Wendt 19sep14
5.2	<b>Planetary Gear Unit</b> Item # : <b>441628</b>  Verify motor rotation/ direction (to specify clock-wise or anti-clockwise)	Planetary Gear Unit; i =10 PH521F0100 ME, for Servo-motor SMH115	Planetary Gear Unit; i =10 PH521F0100 ME, for Servo-motor SMH115 ( Yes / <u>No</u> )  Motor Data sheet; Manual Reference: <u>Not available</u>  Motor Direction: <u>clock wise and anti clockwise</u>	N	F	Wendt 19sep14

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## 6. Energies connections

Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
6.1	<b>Electrical connections</b> Item # : 474738 Other : As per circuit diagram.	All connections are found as per circuit diagram. (Attach after verification highlighted copy)	Electrical Wiring Diagram reference: <u>PRO-14-0055</u> <u>chapter 10</u>  Attachment#: <u>4</u>	Y	NA	Wendli 19 sep 14
6.2	<b>Pneumatic connections</b> Item # : 474365	All connections are found as per circuit diagram. (Attach after verification highlighted copy)	Pneumatic connections Diagram reference: <u>PRO-14-0055</u> <u>chapter 10</u>  Attachment#: <u>5</u>	Y	N.A.	Wendli 19 sep 14

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## 7. Miscellaneous

Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
7.1	Check Lifting Tower / Drum lifter Item: 474162	Construction stainless steel 1.4301  lifting tower: rotating, up and down movements  Max. applicable load: 250kg  For ATEX II3D (ATEX zone 22)  Electrical connection: 230/400 V, 50 Hz, 3Ph + N + E	Manual Reference: <u>N-A.</u>	N	3	Wendli 19 sep 14
7.2	Weigh Scale Item #: 475309  Check weighing range	Document the scale make and model  IP68 V2A (AISI 304)  Weighing range: 0- 1500 kg	Make: <u>N-A</u>  Model: <u>N-A</u>  Measuring Range: <u>N-A</u>	N	4	Wendli 19 sep 14

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**8. Documentation**

Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
8.1	<b>Manual contents</b>	Check that the following documents are present: <ul style="list-style-type: none"> <li>- Index</li> <li>- Overview</li> <li>- Safety</li> <li>- Initial Start-up</li> <li>- Operating instructions</li> <li>- Cleaning</li> <li>- Maintenance and support</li> <li>- Spare Parts</li> <li>- Tools</li> <li>- Electrical / Drive / Pneumatics / PID</li> <li>- Certificates (Material, Compliance, Calibration etc)</li> <li>- ATEX certificates</li> <li>- Qualification IQ / OQ</li> <li>- Factory calibration certificates.</li> <li>- Lubrication</li> </ul>	<i>All the documents are present except qualification IQ/OQ and other elements.</i>	<i>N</i>	<i>5</i>	<i>Wendt 19 sep 14</i>
8.2	<b>EMI verification &amp; CE Certification</b>	Check for CE Certificate	Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u>	<i>Y</i>	<i>N.A.</i>	<i>Wendt 19 sep 14</i>
8.3	<b>Factory calibration certificate</b>	Check calibration certificate for all instruments  (Note: Non-critical instruments will be checked during SAT)	Critical instrument: Manual Reference: <u>PRO-14-0055</u> <u>chapter 11</u>	<i>Y</i>	<i>N.A.</i>	<i>Wendt 19 sep 14</i>





**10. IQ – Conclusion**

IQ completed. Refer to chapter 11 for deviations to be completed before SAT.

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IBAN CHF: CH27 0483 5036 3818 01000  
IBAN USD: CH92 0483 5036 3818 0215 8  
Credit Suisse CH-3001 Bern / Swift CRESCH ZZ80A



**11. Deviation Sheet**

page 1 of 7 Wendi  
19 sep 14

<b>Deviation No.:</b>	1	<b>Deviation To Test No:</b>	2.6
<b>Description of Deviation</b>			
<p>① missing speed sensor and display in PID and PID part list.</p> <p>② incorrect pressure indication for PC1 and PC2 in PID.</p>			
<b>Evaluation and Proposed Corrective Action</b>			
<p>Update PID 474 466 sch Ver C to Ver D to include speed sensor, speed display and correct pressure indication for PC1 and PC2.</p>			
<b>Resolution</b>			
<p>Refer to Attachment G. PID 474 466 Ver D.</p> <p>No further action required.</p>			

Deviation Prepared By				
Name	Signature Reason	Department / Function	Date	Signature
LEE WEND LI	Author	NSPM Process Expert	19 sep 14	Wendi

Deviation Accepted By				
Name	Signature Reason	Department / Function	Date	Signature
Gumy Edouard	Approver	Frewitt Project Manager	19 sep 14	





11. Deviation Sheet

page 2 of 7  
Wendli  
14sep14

Deviation No.:	2	Deviation To Test No.:	4.5
<b>Description of Deviation</b>			
target drums 70L and 150L are not available for testing of fitting the drum lid item # 474209 and 475517.			
<b>Evaluation and Proposed Corrective Action</b>			
This test has no impact to the functionality of the equipment. The dimension of the target lids are measured and found to be as per GA drawing 474201-LAY-VER B.			
<b>Resolution</b>			
This test will be conducted during SAT.			

Deviation Prepared By				
Name	Signature Reason	Department / Function	Date	Signature
LEE WEND LI	Author	NSPM Process Expert	19 sep 14	Wendli

Deviation Accepted By				
Name	Signature Reason	Department / Function	Date	Signature
GURRY EDWARD	Approver	Frewitt Project Manager	18 sep 14	[Signature]



**11. Deviation Sheet**

page 3 of 7  
Wendli  
19 sep 14

<b>Deviation No.:</b>	3 and 4	<b>Deviation To Test No:</b>	7-1 and 7-2
<b>Description of Deviation</b>			
Lifting tower and weigh scale not available during FAT.			
<b>Evaluation and Proposed Corrective Action</b>			
No impact. The lifting tower was checked separately. The FAT document of lifting tower will be provided before delivery. The weigh scale will be checked and tested during SAT.			
<b>Resolution</b>			
Check the FAT document of lifting tower before delivery and insert in the manual. Check and test weigh scale during SAT.			

Deviation Prepared By				
Name	Signature Reason	Department / Function	Date	Signature
LEE WEND LI	Author	NSPM Process Expert	19 sep 14	Wendli

Deviation Accepted By				
Name	Signature Reason	Department / Function	Date	Signature
GUY EDWARD	Approver	FREWITT Project Manager	19 SEP 14	[Signature]



11. Deviation Sheet

page 4 of 7  
Wendin  
19 sep 14

Deviation No.:	5	Deviation To Test No:	8.1
<b>Description of Deviation</b>			
Incomplete documentation for manual. PRO-14-0055.			
<b>Evaluation and Proposed Corrective Action</b>			
No impact as the main documents are available. To provide the complete manual documents before SAT.			
<b>Resolution</b>			
Check the complete manual documents before SAT.			

Deviation Prepared By				
Name	Signature Reason	Department / Function	Date	Signature
LEE WEND LI	Author	NSPM Process Expert	19 sep 14	Wendin

Deviation Accepted By				
Name	Signature Reason	Department / Function	Date	Signature
GUY EDUARDO	Approver	FREWITT Project Manager	18 sep 14	[Signature]



11. Deviation Sheet

page 5 of 7  
Wendler  
(19 sep 14)

Deviation No.:	6	Deviation To Test No.:	2.9
<b>Description of Deviation</b>			
missing Filter certification for F12.			
<b>Evaluation and Proposed Corrective Action</b>			
No impact as F12 filter is not use for product contact air. The product contact air ( F11 filter ) has certificate.  Data sheet for F12 filter is in manual PRO-14-0055 chapter 11.			
<b>Resolution</b>			
No action required.			

Deviation Prepared By				
Name	Signature Reason	Department / Function	Date	Signature
LEE WEND LI	Author	NSPM Process Expert	19 sep 14	Wendler

Deviation Accepted By				
Name	Signature Reason	Department / Function	Date	Signature
GUY EDWARD	Approver	FREWITT Project Manager	19 sep 14	[Signature]



**11. Deviation Sheet**

page 6 of 7

Wendli

19 sep 14

<b>Deviation No.:</b>	7	<b>Deviation To Test No:</b>	5.1 and 5.2	
<b>Description of Deviation</b>				
<p>① Planetary Gear unit model cannot be verified.</p> <p>② motor data sheet for motor and planetary gear unit item # 441627 and 441628 not available.</p>				
<b>Evaluation and Proposed Corrective Action</b>				
<p>No impact as motor functionality is checked and motor direction is verified.</p> <p>Data sheets and planetary gear unit model to be provided in the manual before SAT.</p>				
<b>Resolution</b>				
<p>Check the data sheets and planetary gear unit model to be in the manual before SAT.</p>				

Deviation Prepared By				
Name	Signature Reason	Department / Function	Date	Signature
LEE WEND LI	Author	NSPM Process Expert	19 sep 14	Wendli

Deviation Accepted By				
Name	Signature Reason	Department / Function	Date	Signature
GUY EDUARDO	Approver	Frewitt Project Manager	19 Sep 14	[Signature]



11. Deviation Sheet

page 7 of 7  
Wendli

Deviation No.:	8	Deviation To Test No:	N.A.
<b>Description of Deviation</b>			
Missing part number and material certificate and surface quality certificate for the T-bar which prevents the drum roller from falling into the mill.			
<b>Evaluation and Proposed Corrective Action</b>			
to provide the part number and certificates before SAT.			
<b>Resolution</b>			
to provide the part number and certificates <sup>*EE Wendli 19 sep 14</sup> before SAT. in the manual before SAT.			


19 sep 14

Deviation Prepared By				
Name	Signature Reason	Department / Function	Date	Signature
LEE WEND LI	Author	NSP M Process Expert	19 sep 14	Wendli

Deviation Accepted By				
Name	Signature Reason	Department / Function	Date	Signature
GUMY EDUARDO	Approver	Frewitt Project Manager	19 Sep 14	[Signature]

## 12. Post-Approval

This FAT-IQ test Protocol of the equipment has been executed and accepted by:

Name	Signature Reason	Function/ Department	Signature	Date
Edouard Gummy	Reviewer	Frewitt Technical Project Manager		19 Sep 14
Ho Sook Hwa	Reviewer	NSPM Qualification Coordinator		
Christina Chen	Approver	NSPM Process Engineer		
Shivabalan Kanesan	Approver	NSPM Automation Engineer		
Panicker Shreekumar	Approver	NSPM Project Manager		
Yap Yee Boon	Approver	NSPM Project QA		

177396-1-en vers.01 (04.09.2014)

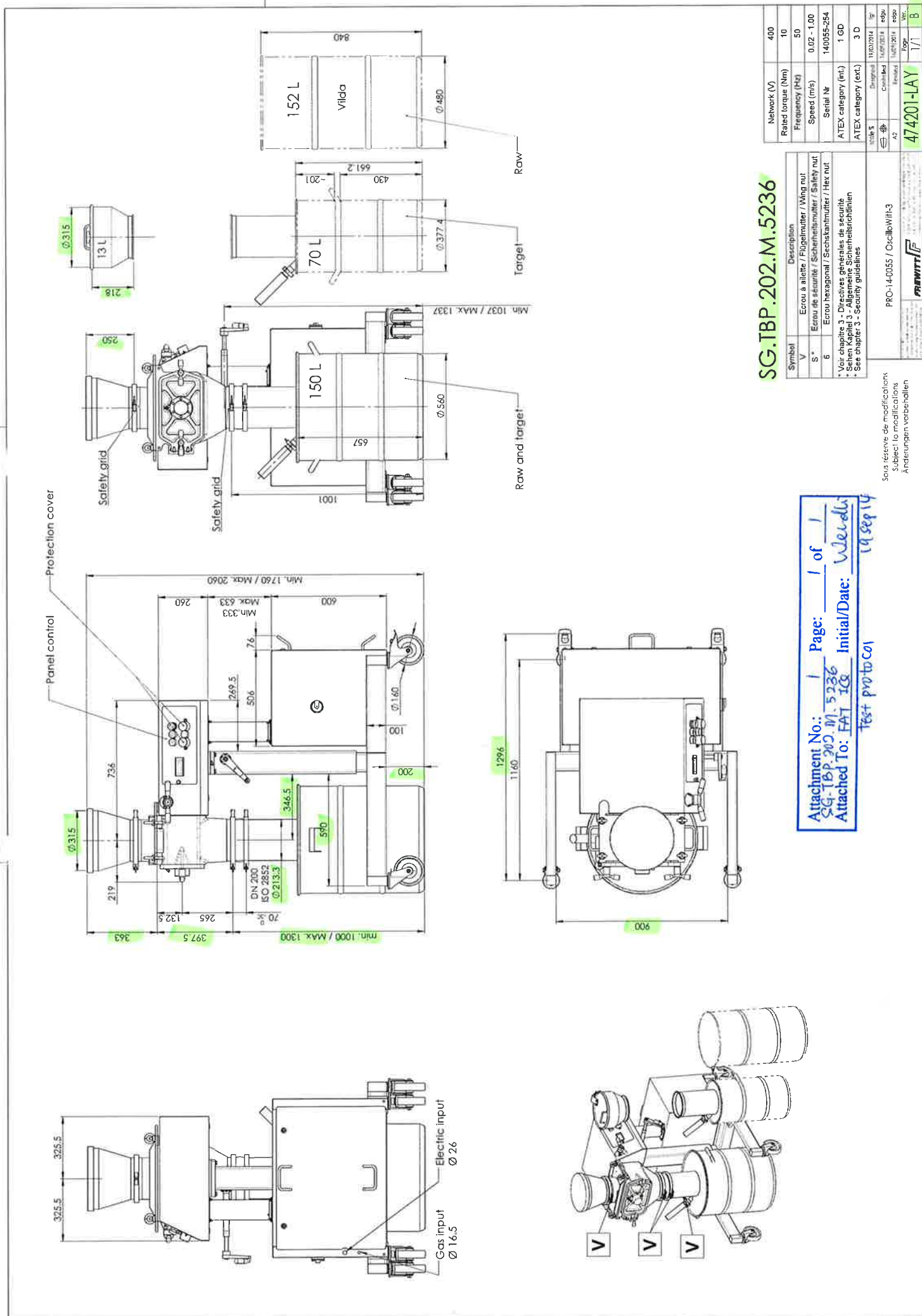
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 IBAN USD: CH92 0483 5036 3818 0215 8  
 Credit Suisse CH-3001 Bern / Swit. CRESCH ZZ80A



**SG.TBP.202.M.5236**

Symbol	Description
V	Erou à ailette / Flügelmutter / Wing nut
S*	Erou de sécurité / Sicherheitsmutter / Safety nut
6	Erou hexagonal / Sechskantmutter / Hex nut

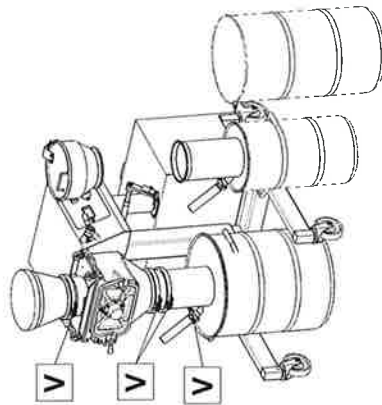
\* Voir chapitre 3 - Directives générales de sécurité  
 \* Sehen Kapitel 3 - Allgemeine Sicherheitsrichtlinien  
 \* See chapter 3 - Security guidelines

Network (V)	400
Rated torque (Nm)	10
Frequency (Hz)	50
Speed (m/s)	0.02 - 1.00
Serial Nr	140055-254
ATEX category (int.)	1 GD
ATEX category (ext.)	3 D
Scale	1:1
Designed	19/03/2014
Checked	19/03/2014
Approved	19/03/2014
Drawn	19/03/2014
Zone	1/1
Ver.	B

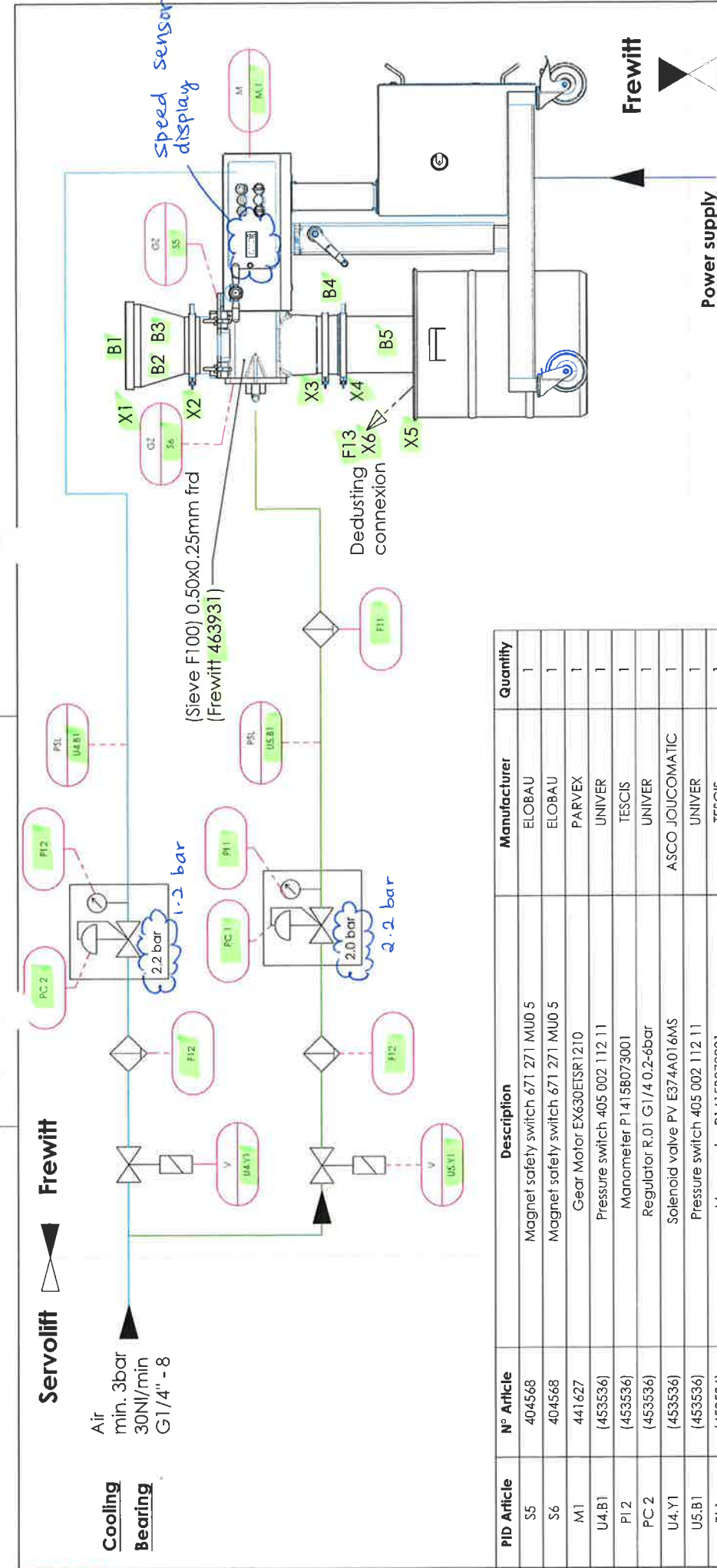
Sous réserve de modifications  
 Subject to modifications  
 Änderungen vorbehalten

PRO-14-0055 / OscilloWIIH-3  
**FRUITI**

Attachment No.: 1 Page: 1 of 1  
 SG.TBP.202.M.5236  
 Attached To: FAT ICG Initial/Date: Werdli 19 sep 14  
 Test proto Col







**Novartis**  
Network  
400V 50Hz 16A

Attachment No.: SG.TBP.202.M.5236 Page: 2 of 1  
 Attached To: FAT I.Q. Initial/Date: Waldemar  
test protocol

For general arrangement details refer to GA DWG 474201-LAY

**SG.TBP.202.M.5236**

Schéma PID / PRO-14-0055 / OscilloWitt-3

Frewitt SA, Milling and Handling of Powders  
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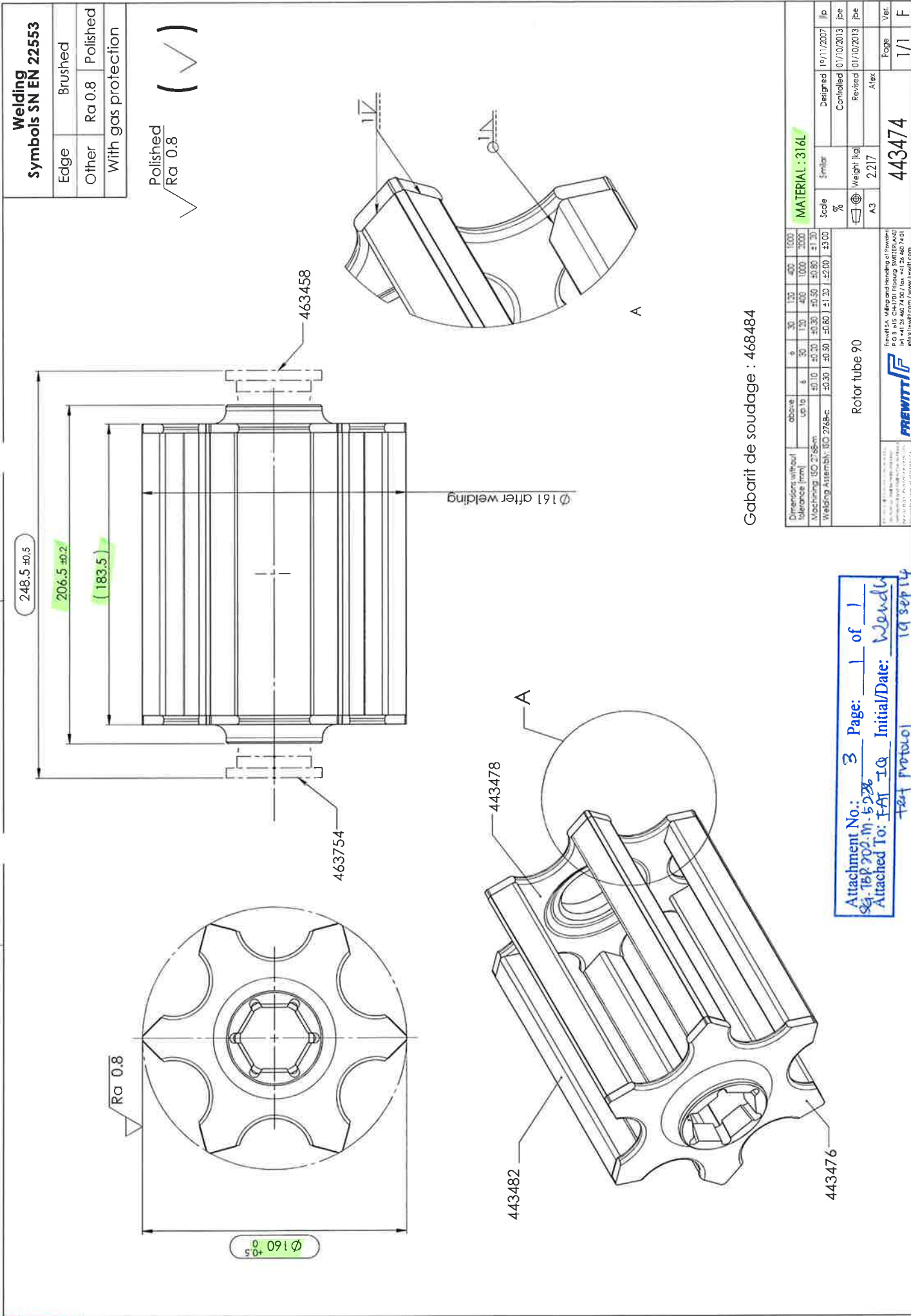
**474466-SCH**

Page 1/1  
Ver. C

PID Article	N° Article	Description	Manufacturer	Quantity
S5	404568	Magnet safety switch 671 271 MU0 5	ELOBAU	1
S6	404568	Magnet safety switch 671 271 MU0 5	ELOBAU	1
M1	441627	Gear Motor EX630EISR1210	PARVEX	1
U4.B1	(453536)	Pressure switch 405 002 112 11	UNIVER	1
PI2	(453536)	Manometer P1415B073001	TESCIS	1
PC 2	(453536)	Regulator R.01 G1/4 0.2-6bar	UNIVER	1
U4.Y1	(453536)	Solenoid valve PV E374A016MS	ASCO JOUCOMATIC	1
U5.B1	(453536)	Pressure switch 405 002 112 11	UNIVER	1
PI1	(453536)	Manometer P1415B073001	TESCIS	1
PC 1	(453536)	Regulator R.01 G1/4 0.2-6bar	UNIVER	1
U5.Y1	(453536)	Solenoid valve PV E374A016MS	ASCO JOUCOMATIC	1
FI2	(453536)	Filter F0.01 HA4 G1/4	UNIVER	1
FI1	457102	Sterifilter for air - P-SRF N 0006 G1/4 - Element P-SRF N 03710	DONALDSON	1
FI3	463739	Filter stainless L=225.5 D=45 Porostar 5um	f	1
X1	-	Specific connection rubber DN315	-	1
X2	-	Tri-Clamp connection DN200 ISO2852	-	1
X3	-	Tri-Clamp connection DN200 ISO2852	-	1
X4	-	Tri-Clamp connection DN200 ISO2852	-	1
X5	-	Cover specific customer DN560	-	1
X6	-	Tri-Clamp connection DN25 ISO2852	-	1
B1	443387	Rubber covering EDPM Antistatic FDA Ø315	STERIVALVES	1
B2	474202	Inlet funnel for rubber	FREWITT	1
B3	471380	Inlet funnel with cover	FREWITT	1
B4	428631	Compensator DN200 ISO2852 EPDM antistatic black	STERIVALVES	1
B5	474209	Outlet funnel with cover	FREWITT	1

Network (V)	400
Rated torque (Nm)	10
Frequency (Hz)	50
Speed (m/s)	0.02 - 1.00
Serial Nr	140055-254
ATEX category (int.)	1 GD
ATEX category (ext.)	3 D

scale %	obi	Designed	08/04/2014
A3	egu	Cancelled	09/09/2014
	egu	Revised	09/09/2014
	Page		
	Ver.		



Gabarit de soudage : 468484

Welding Symbols SN EN 22553		Edge	Brushed
Other		Ra 0.8	Polished
With gas protection			

Polished	✓	Ra 0.8	( ✓ )
✓			

MATERIAL : 316L	Scale	Similar	Designed	19/11/2007	1a
	%		Controlled	01/10/2013	1b
	⊕	Weight (kg)	Revised	01/10/2013	1c
	A3	2.217	Alex		Ver.
					Page
					1/1
					F

Dimensions without tolerance (mm)	above	30	130	400	1000
Up to	6	30	130	400	1000
Machining (ISO 2768-m)	±0.10	±0.20	±0.30	±0.50	±0.80
Welding Assembly (ISO 2768-c)	±0.30	±0.50	±0.80	±1.20	±2.00
					±3.00

Rotor tube 90	
Frewitt SA, Miling and Honing of Rotor P.O. B. 413, CH-1751 Fribourg, SWITZERLAND Tel: +41 26 467 47 00 Fax: +41 26 467 47 01 www.frewitt.com	

Attachment No.: 3 Page: 1 of 1  
 Attached To: FAT IQ Initial/Date: Wendy  
 test protocol 19 sept

# Project : PRO-14-0055

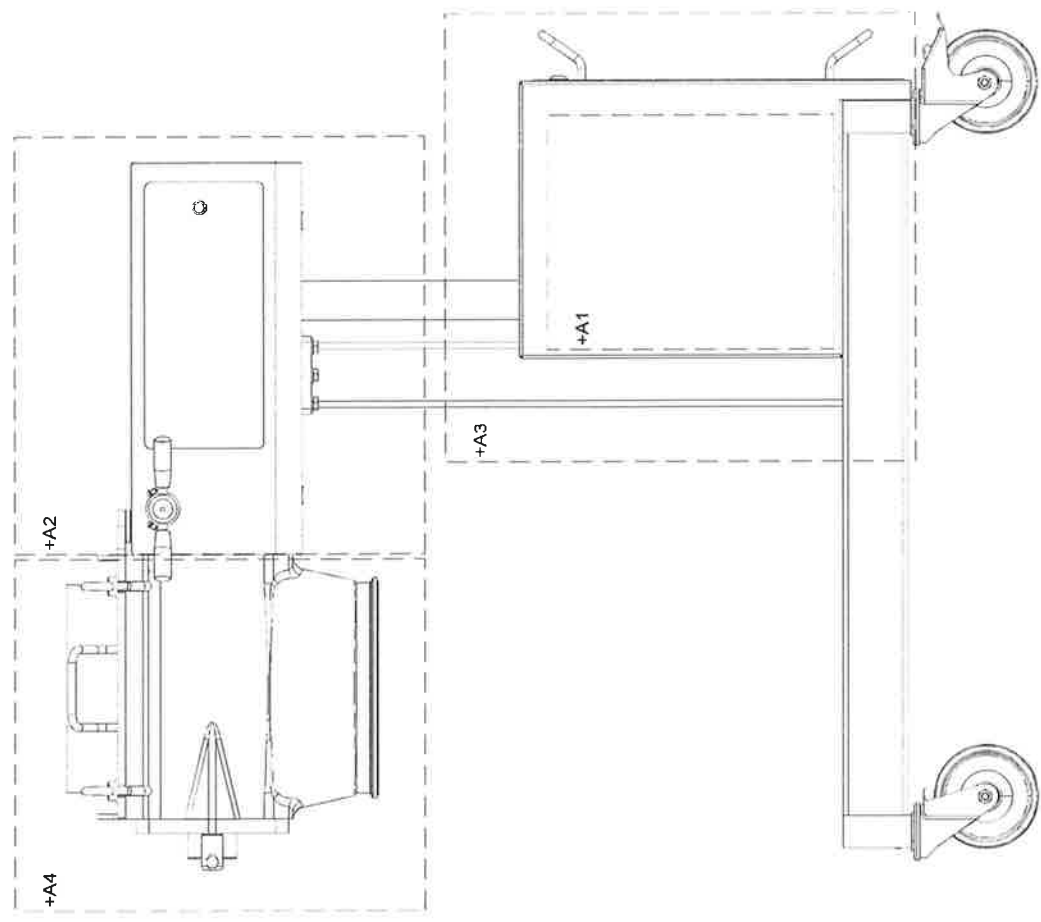
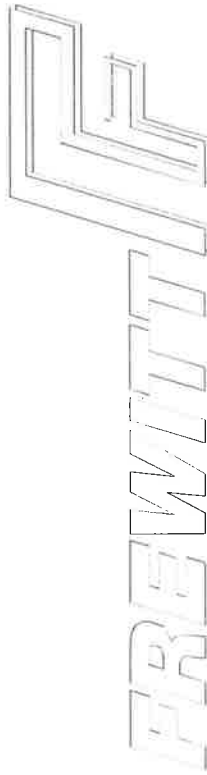
# SG.TBP.202.M.5236

Type : MA - OW-3

Carrying out : 400V,50Hz,3L+N+PE Atex II 3D

Rated output power: 3.5kW

Rated current: 6.5A



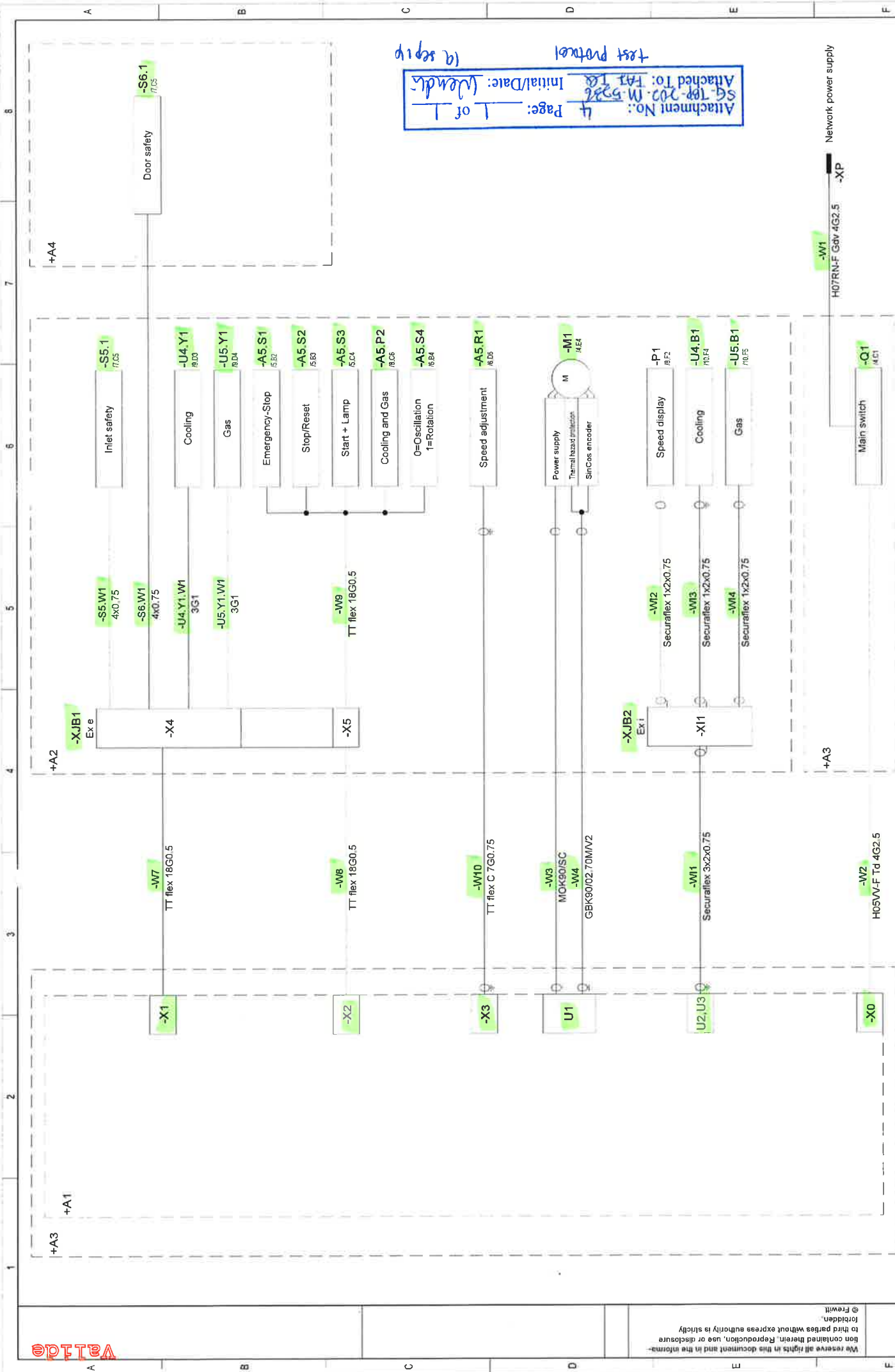
Wire colors :

Power	400VAC - L1	Brown	2.5mm <sup>2</sup>
Power	400VAC - L2	Black	2.5mm <sup>2</sup>
Power	400VAC - L3	Gray	2.5mm <sup>2</sup>
Power	N	Light blue	2.5mm <sup>2</sup>
Power	PE	Green/Yellow	2.5mm <sup>2</sup>
Control voltage	24VDC	Violet	0.5 to 0.75mm <sup>2</sup>
Control voltage	0VDC	Violet-White	0.5 to 0.75mm <sup>2</sup>
Control voltage	Ex-i	Blue	0.75mm <sup>2</sup>
External voltage	...	Orange	0.75mm <sup>2</sup>
White	WH	Blue	BU
Brown	BN	Red	RD
Green	GN	Black	BK
Yellow	YE	Violet	VT
Gray	GY	Orange	OG
Pink	PK		

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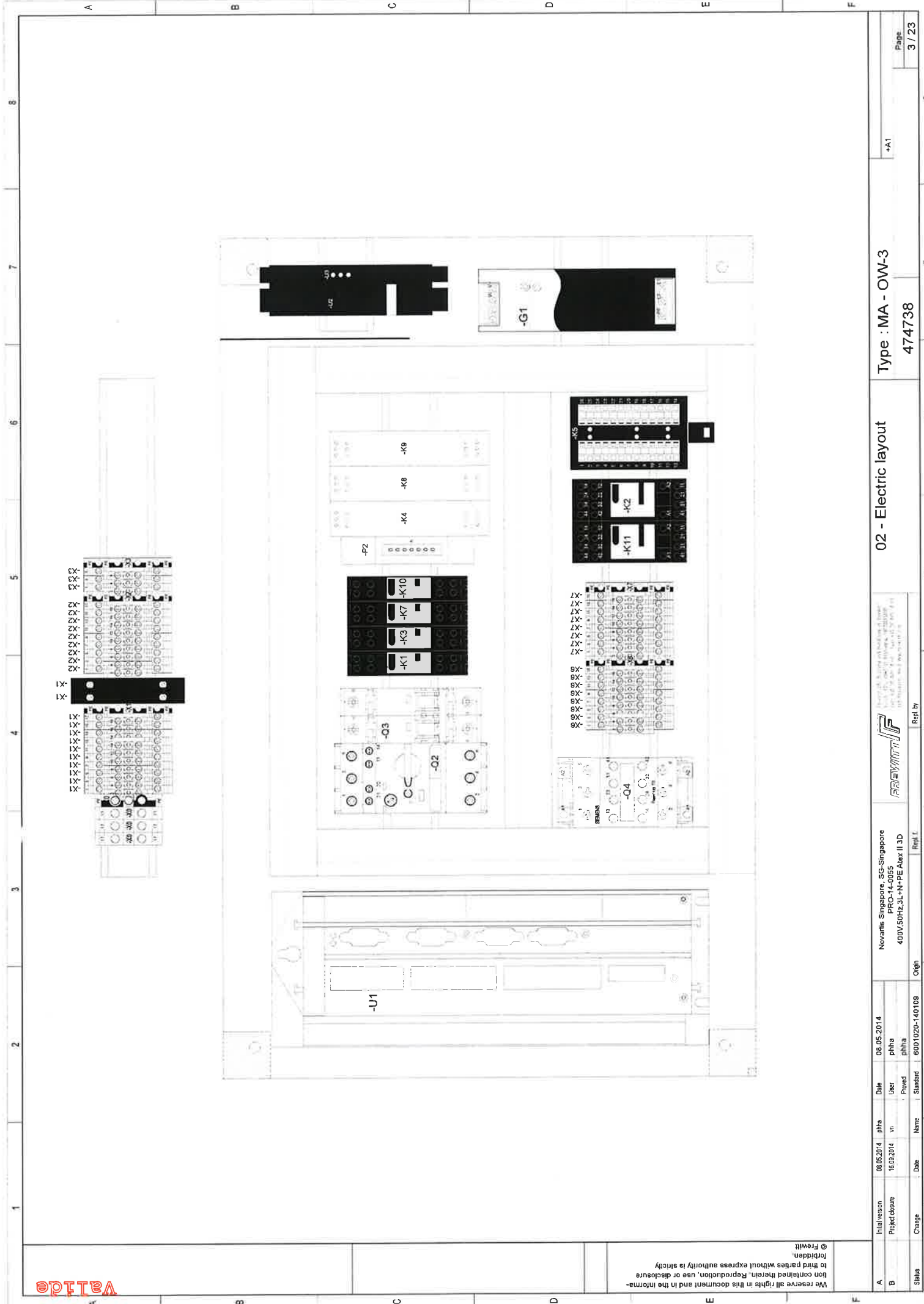
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	B	Project closure	16/02/2014	pha	User	pha					
Change	Date	Name	Standard	6001020-140109	Origin	Repl. f.	Repl. by				

Attachment No.: 4  
 Page: 1 of 1  
 Initial/Date: Mendis  
 Attached To: FAT 1a  
 SG TOP 202-M-5226  
 test protocol  
 1a setup



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Initial revision	08.05.2014	phia	Date	08.05.2014	phia
Project closure	18.09.2014	wp	User	wp	phia
Change	Date	Name	Standard	6001020-140109	Origin
Novartis Singapore, SCS-Singapore	Novartis Singapore, SCS-Singapore	Novartis Singapore, SCS-Singapore	Novartis Singapore, SCS-Singapore	Novartis Singapore, SCS-Singapore	Novartis Singapore, SCS-Singapore
400V 50Hz 3L-WPE Alex II 3D	400V 50Hz 3L-WPE Alex II 3D	400V 50Hz 3L-WPE Alex II 3D	400V 50Hz 3L-WPE Alex II 3D	400V 50Hz 3L-WPE Alex II 3D	400V 50Hz 3L-WPE Alex II 3D
Rev. 1	Rev. 1	Rev. 1	Rev. 1	Rev. 1	Rev. 1
01 - Overview	01 - Overview	01 - Overview	01 - Overview	01 - Overview	01 - Overview
Instruments location	Instruments location	Instruments location	Instruments location	Instruments location	Instruments location
Type : MA - OW-3	Type : MA - OW-3	Type : MA - OW-3	Type : MA - OW-3	Type : MA - OW-3	Type : MA - OW-3
474738	474738	474738	474738	474738	474738
Page	2 / 23	Page	2 / 23	Page	2 / 23



Type : MA - OW-3  
474738

02 - Electric layout



Novartis Singapore, SG-Singapore  
PRC-F-0055  
40DV50HZ3L-NP-E Alex II 3D

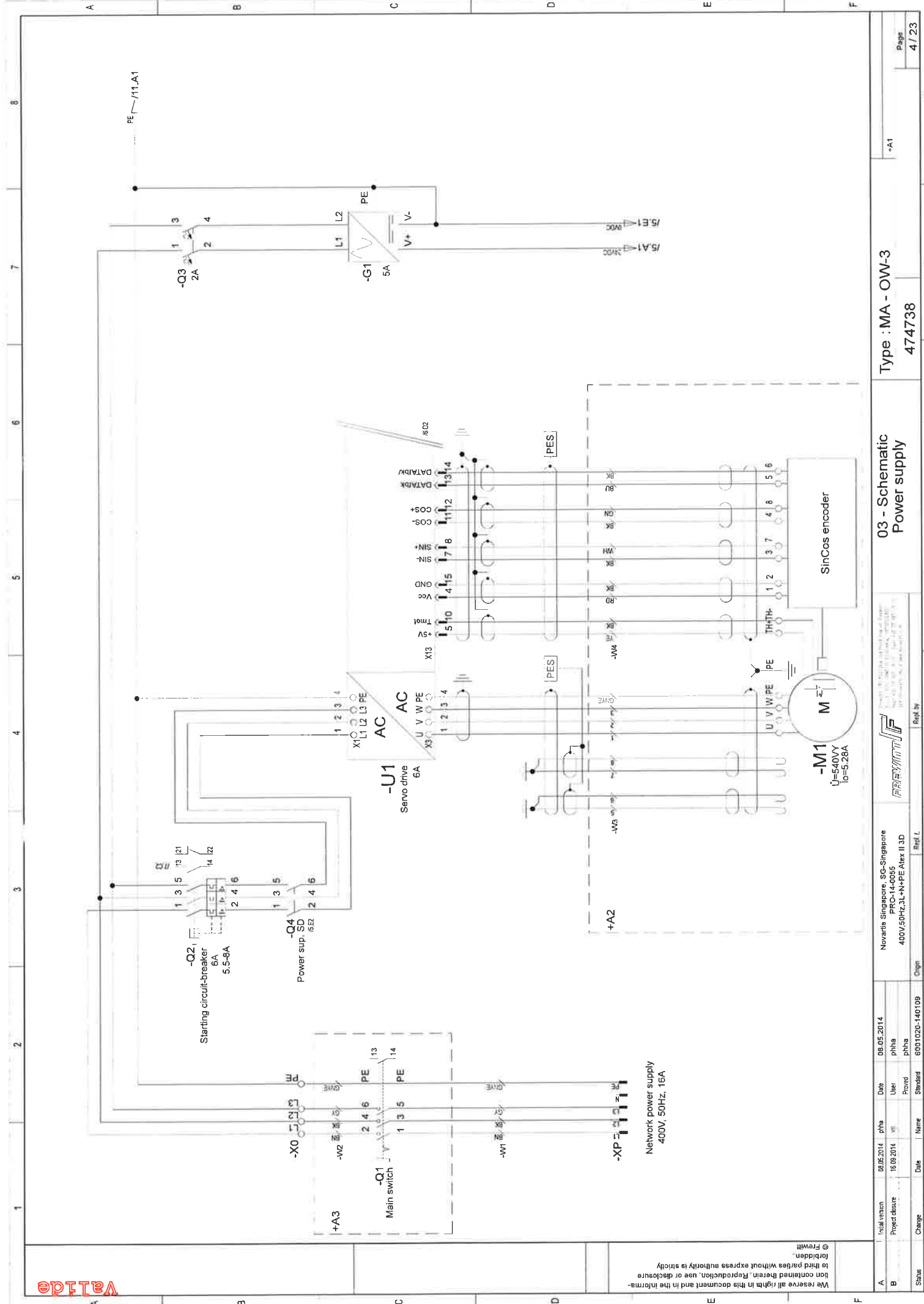
Date: 08.05.2014  
User: phha  
Paved: phha  
Name: Standard  
Origin: 600102B-140109

Initial version	08.05.2014	phha
Project closure	16.02.2014	vn
Change	Date	Name
		Standard
		600102B-140109

Repl. L. Repl. by

valido

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03 - Schematic Power supply  
Type : MA - OW-3  
474738

Change	Date	Name	Sign	Rev. I.
1	08.05.2014	phta		
2	16.09.2014	phta		
3	16.09.2014	phha		
4	08.05.2014	phha		

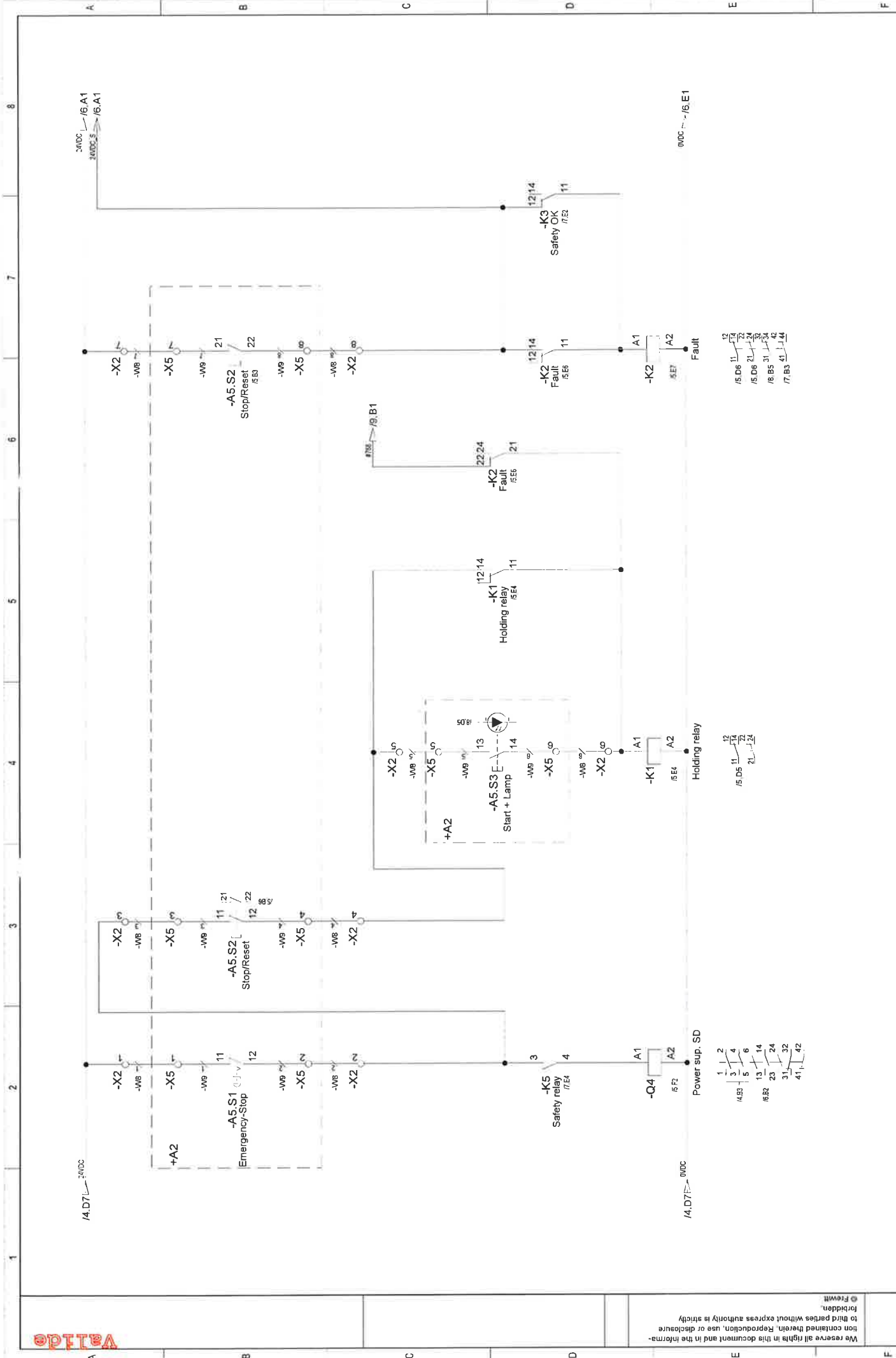
Novartis Singapore, SG-Singapore
PRO-14-0055
400V, 50Hz, 3L+N+PE Alex II 3D

Initial version	Date	08.05.2014
Project closure	User	phha
Change	Provided	phha
Standard	Standard	6001020-140109

Status: 4 / 23  
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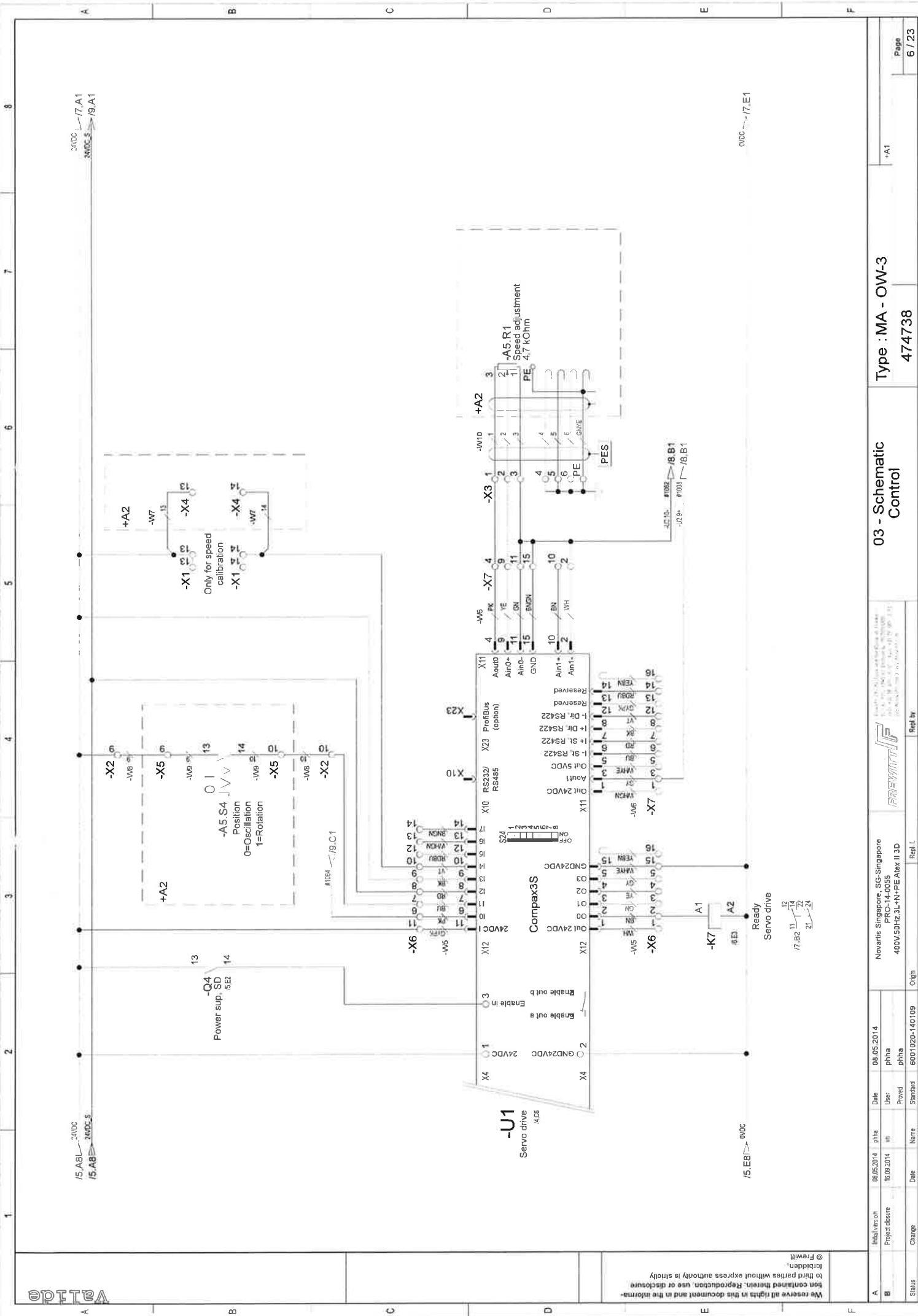
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A	Initial version	08.05.2014	phb	Date	08.05.2014	Novartis Singapore, SG-Singapore	Type : MA - OW-3	474738	Page	5 / 23
B	Project closure	16.09.2014	phb	User	PRO-14-0055	400V/50HZ/3L+N+PE Alex II 3D	03 - Schematic Control	474738	Page	5 / 23
Status	Change	Date	Name	Standard	6001020-140109	Cogn	Repl. by	4	3	8



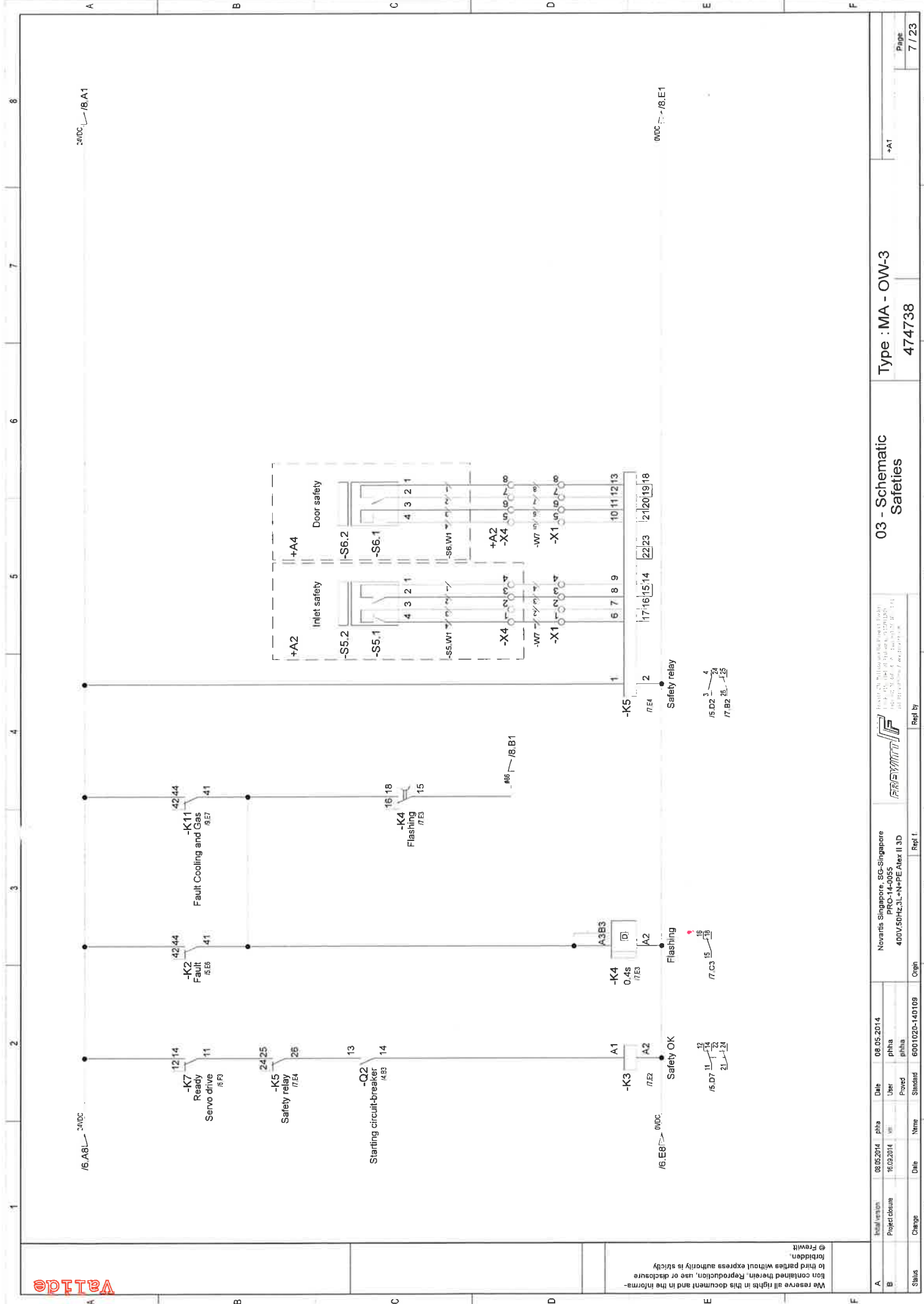
03 - Schematic Control

Type : MA - OW-3  
474738

Novatis Singapore SCS Singapore  
PFC-14-0955  
400V/50Hz/3L+N+PE ANx II 3D

Status	Change	Date	Name	Standard	Origin	Repl. I.
A	Initial req. 0/1	08.05.2014	phia			
B	Project closure	16.09.2014	wh	phia		
			Phed	phia		
			Standard	6001020-140 D9		

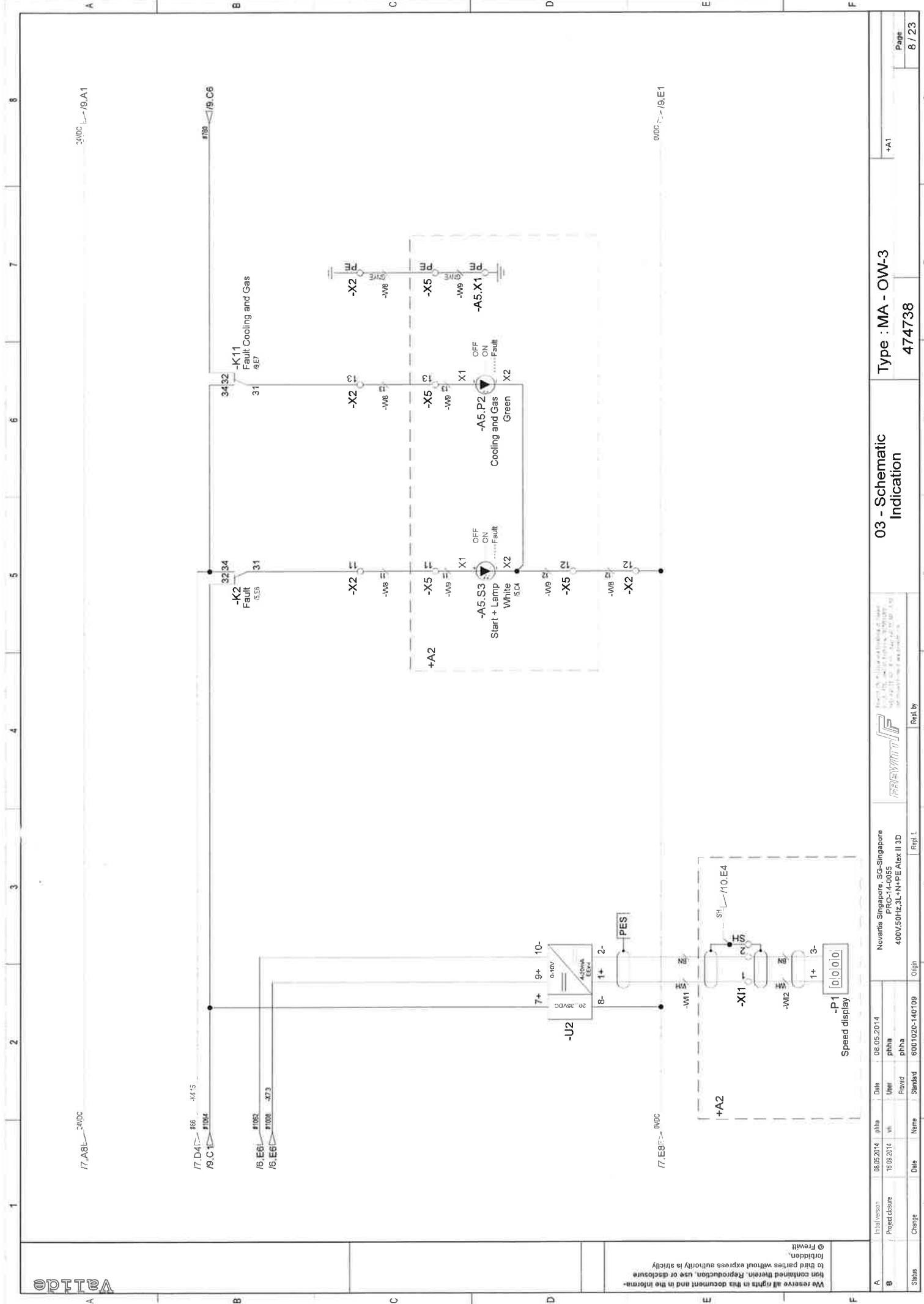




WALTEC

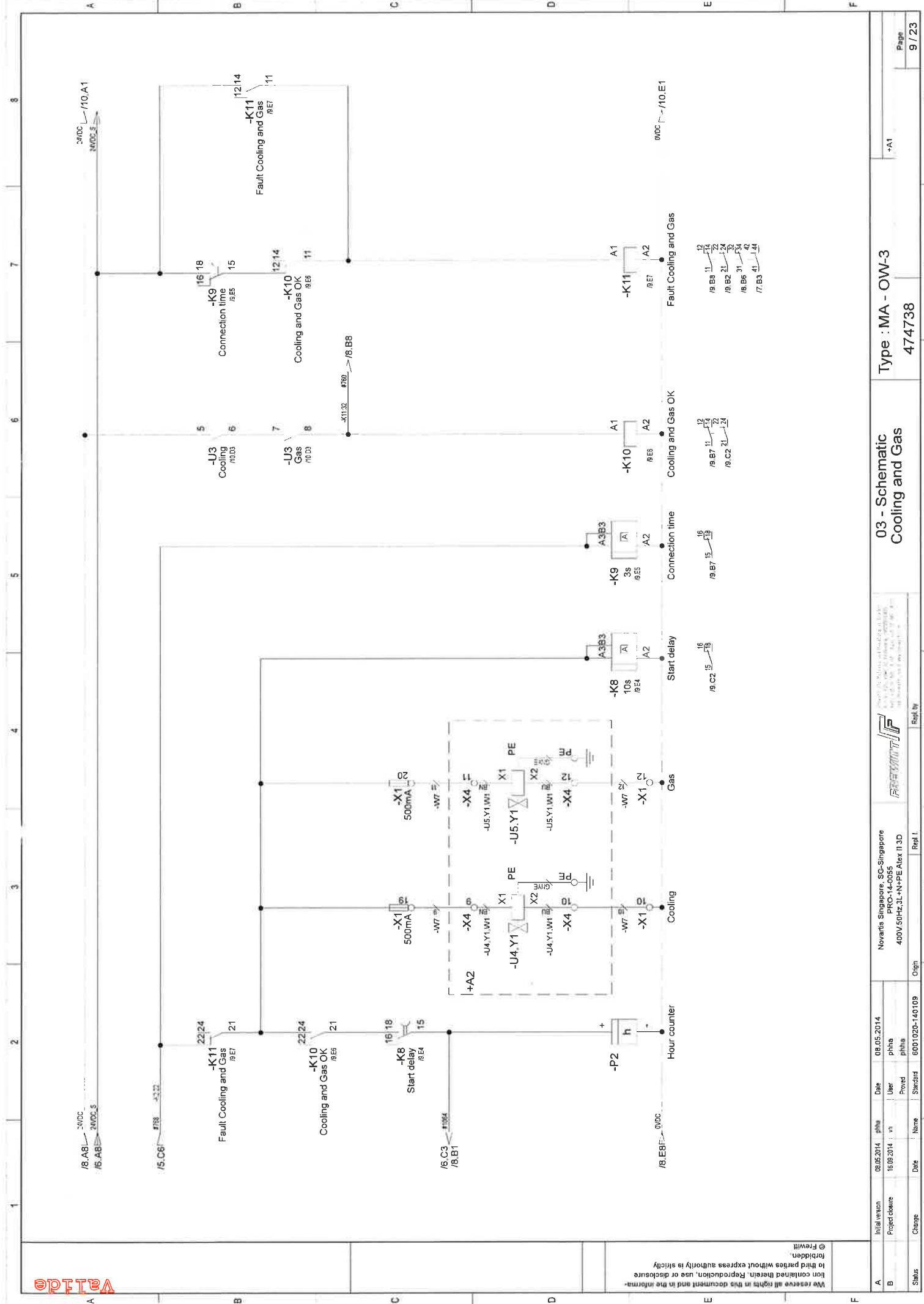
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Initial version	08.05.2014	phla	Date	08.05.2014	phla	Novartis Singapore, SG-Singapore	03 - Schematic Safeties	Type : MA - OW-3	+A1
Project closure	16.02.2014	phla	User	phla	phla	400V 50Hz 3L-N-PE Atex II 3D	474738	474738	7 / 23
Change			Name	Standard	6001020-140109	Origin			



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Initial version	08.05.2014	phha	Date	08.05.2014	Novartis Singapore, SG-Singapore
Project closure	18.02.2014	phha	Uff	PRO-1409ES	
Change	Date	Name	Standard	6001020-140109	Origin
					Repl. I.
					Repl. by
				474738	Type : MA - OW-3
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A	Initial version	08/05/2014	phh	Date	08/05/2014	Novartis Singapore, SG-Singapore	03 - Schematic	Type : MA - OW-3	9 / 23
B	Project closure	16/02/2014	vn	User	phh	400V-50Hz-3L-4WPE Atox II 3D	Cooling and Gas	474738	9 / 23
Change	Date	Name	Standard	Origin	Repl. I.	Repl. by			
			6001020-140109						



## FAT OQ Test Protocol

SG.TBP.202.M.5236

OscilloWitt-3 (OW-3)

177397-1-en vers.01 (08.09.2014)

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F +41 (0)26 460 74 01







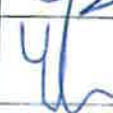
■ No. TVA 140 590 / CHE -103.808.536  
Customs account 6642-4  
IBAN EUR: CH90 0483 5036 9818 0200 0  
IBAN CHF: CH27 0483 5036 3818 01000  
IBAN USD: CH92 0483 5036 3818 0215 8  
Credit Suisse CH-3001 Bern / Swit CRESCHE ZZ80A

Project Name :	Novartis, Singapore, OscilloWitt-3
Client :	NOVARTIS SINGAPORE PHARMACEUTICAL
Location :	SG-Singapore
Customer Order # :	N° 3001057132/SC 1001749279 dtd.:29.03.2014
Supplier :	Frewitt Fabrique de Machines S.A.
Object :	OscilloWitt-3
Serial # :	140055-254

Document Name :	Qualification OQ OW-3 140055-254
Document Reference :	177397-1-en.docx
Document Version # :	01

## Pre-Approval:


This FAT-OQ test Protocol of the equipment was created, reviewed and accepted by:

Name	Signature Reason	Function/ Department	Signature	Date
Karsten Kutnar	Author	Frewitt Project Manager		10.05.2014
Edouard Gummy	Reviewer	Frewitt Project Manager		10.05.2014
Ho Sook Hwa	Reviewer	NSPM Qualification Coordinator		11 SEP 14
Christina Chen	Approver	NSPM Process Engineer		11 SEP 14
Shivabalan Kanesan	Approver	NSPM Automation Engineer		11 Sep 14
Panicker Shreekumar	Approver	NSPM Project Manager		11 Sep 14
Yap Yee Boon	Approver	NSPM Project QA		11 Sep 14

## 1. Contents List

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Table of Name and Abbreviated Signatures of All Personnel executing the FAT Qualification OQ

NAME	DEPARTMENT	SIGNATURE	INITIAL
LEE WEND LI	NSPM Process Expert	Wendli	Wendli
GUMY EDOUARD	FREWITT Project Manager		EG

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## 2. Introduction

### 1.1 Purpose

The purpose of this document is to verify the control function of the machine and the properties of the machine as per documented evidence.

### 1.2 Operation qualification (OQ)

With this operation qualification the functions according to the functional specification are controlled and documented.

### 1.3 General

The protocol "Operation qualification (OQ)" defines the procedure for implementation of the qualification.

### 1.4 Basis

The following references are the basis of these documents

- General standards of GMP
- General standards of safety



### 3. Function tests

#### 2.1 Test of each element

Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
1.	<b>Functional test for [GAS Start]</b> 1. Ensure the installation is connected to the appropriate electrical and pneumatic supply sources and that all safety fittings are installed. 2. Switch the installation on at the [main switch]. 3. Press the [GAS Start] button to start the installation. 4. The [GAS Start] light should light up 5. The gas supply should start	The machine can be switched on.  The [GAS Start] light lights up and the gas supply starts	The machine can be switched on. (( Yes / No ))  The [GAS Start] light lights up and the gas supply starts (( Yes / No ))	Y	N.A.	Wendli 19 sep 14
2.	<b>Functional test for [GAS Stop]</b> 1. Start the installation as described under "GAS Start function". 2. Press the [GAS Stop] button 3. The gas supply should shut down 4. The [GAS Start] light should go out	The gas supply shuts down and the [GAS Start] light goes out	The gas supply shuts down and the [GAS Start] light goes out (( Yes / No ))	Y	N.A.	Wendli 19 sep 14

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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
3.	Functional test for [Motor Start]  1. Ensure the installation is connected to the appropriate electrical and pneumatic supply sources and that all safety fittings are installed.  2. Switch the installation on at the [main switch].  3. Press the [Motor Start] button to start the installation.	The machine can be switched on.           The [Motor Start] light lights up and the rotor oscillates	The machine can be switched on. (Yes / No )           The [Motor Start] light lights up and the rotor oscillates (Yes / No )	Y	N.A.	Wendli 19 sep 14
4.	Functional test for [Motor Stop]  1. Start the installation as described under "Motor Start function".  2. Press the [Motor Stop] button	The rotor stops turning and [Motor Start] light goes out	The rotor stops turning and [Motor Start] light goes out (Yes / No )	Y	N.A.	Wendli 19 sep 14



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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
5.	<p>Functional test for [Emergency stop]</p> <p>1. Start the installation as described under "<b>Motor Start</b> function"</p> <p>2. Press the [Emergency stop] button</p>	<p>Installation shuts down after the [Emergency stop] button is pressed.</p> <p>If the gas supply is started, the [Gas Start] light goes out and gas supply shuts down.</p> <p>The [Motor Start] light goes out.</p> <p>The rotor stop oscillating</p> <p>It is not possible to restart the installation until the [Emergency stop] button has been released.</p> <p>It must not restart automatically on release of the [Emergency stop] button</p>	<p>Installation shuts down after the [Emergency stop] button is pressed.</p> <p>( Yes / No )</p> <p>If the gas supply is started, the [Gas Start] light goes out and gas supply shuts down.</p> <p>( Yes / No )</p> <p>The [Motor Start] light goes out.</p> <p>( Yes / No )</p> <p>*EE wendur 19 sep 14</p> <p>The rotor stop oscillating</p> <p>( Yes / No )</p> <p>Installation cannot be restarted until the [Emergency stop] button has been released.</p> <p>( Yes / No )</p> <p>Installation did not restart automatically on release of the [Emergency stop] button</p> <p>( Yes / No )</p>	N	1	wendur 19 sep 14

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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
6.	Functional test for inlet safety 1. Start the installation as described under " <b>Motor Start</b> function". 2. Remove the inlet funnel	Installation shuts down when the inlet funnel is removed.  If the gas supply is started, the <b>[Gas Start]</b> light goes out and gas supply shuts down.  The <b>[Motor Start]</b> light flashes on and off.  The rotor stop oscillating  Installation must not restart automatically	Installation shuts down after the inlet funnel is removed. ((Yes / No )  If the gas supply is started, the <b>[Gas Start]</b> light goes out and gas supply shuts down. ((Yes / No )  The <b>[Motor Start]</b> light flashes on and off. ((Yes / No )  The rotor stop oscillating ((Yes / No )  Installation did not restart automatically ((Yes / No )	Y	N.A.	Wandl 19 Sep 14

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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
7.	Functional test for door safety 1. Open the door 2. Dismount the rotor according to chapter 5 - Tools disassembly 3. Close the door 4. Start the installation as described under "Motor Start function" 5. Open the door	Installation shuts down when the door is opened.  If the gas supply is started, the [Gas Start] light goes out and gas supply shuts down.  The [Motor Start] light flashes on and off.  The rotor stop oscillating  Installation must not restart automatically	Installation shuts down after the door is opened. ( <input checked="" type="radio"/> Yes / No )  If the gas supply is started, the [Gas Start] light goes out and gas supply shuts down. ( <input checked="" type="radio"/> Yes / No )  The [Motor Start] light flashes on and off. ( <input checked="" type="radio"/> Yes / No )  The rotor stop oscillating ( <input checked="" type="radio"/> Yes / No )  The rotor stop oscillating ( <input checked="" type="radio"/> Yes / No )  Installation must not restart automatically ( <input checked="" type="radio"/> Yes / No )	Y	N.A.	Wendli 19 sep 14

Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
8.	Functional test of the magnetothermal circuit-breaker <b>EXPLOSION HAZARD</b> If the installation is in an area subject to the risk of explosions, move it to a safe location. 1. Open the switch cabinet 2. If the installation has an explosion-proof box, open the box 3. Start the installation as described under " <b>Motor Start</b> function". 4. Press the red button of the magnetothermal circuit-breaker to simulate the operation of the circuit-breaker (see circuit diagram for identification details).	Installation shuts down when the red button to the circuit breaker is pressed. If the gas supply is started, the [Gas Start] light goes out and gas supply shuts down. The [Motor Start] light flashes on and off. The rotor stop oscillating Installation must not restart automatically	Installation shuts down when the red button to the circuit breaker is pressed. ( Yes / No ) If the gas supply is started, the [Gas Start] light goes out and gas supply shuts down. ( Yes / No ) The [Motor Start] light flashes on and off. ( Yes No ) The rotor stop oscillating ( Yes No ) Installation must not restart automatically ( Yes / No )	N	1	Wendli 19 sep 14

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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
9.	Testing of the pressure switch 1. Start the installation as described under "Gas Start function" 1. Start the installation as described under "Motor Start function." 2. Adjust the pressure control to reduce the pressure to below the threshold value for the pressure switch shown on the pneumatic diagram 3. After the test, reset the initial pressure as per the pneumatic 4. Record initial threshold pressure and test pressure used.	Installation shuts down when the pressure is reduced to below the threshold value for the pressure switch  The [Gas Start] light goes out and gas supply shuts down.  The [Motor Start] light flashes on and off.  The rotor stop oscillating  Installation must not restart automatically when the pressure is reset to initial pressure	Installation shuts down when the pressure is reduced to below the threshold value for the pressure switch. (Yes) / No )  The [Gas Start] light goes out and gas supply shuts down. (Yes) / No ) *see wendli reply The [Motor Start] light flashes on and off. ( Yes / No )  The rotor stop oscillating ( Yes / No )  Installation did not restart automatically when the pressure is reset to initial pressure (Yes) / No ) Initial threshold Pressure PC1 = 2.2 bar PC2 = 1.2 bar  Test Pressure Used PC1 = 2.0 bar PC2 = 1.0 bar	N	1	Wendli 19 sep 14

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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
10.	<p><u>Speed calibration</u></p> <ol style="list-style-type: none"> <li>Shut the installation down as described under "Stop Function".</li> <li>Switch the installation off at the [main switch].</li> <li>Install the speed measurement equipment according to 141406-2en.doc</li> <li>Switch the installation on at the [main switch]</li> <li>Start the installation as described under "Start function".</li> <li>Set the speed on maximum, pos. 10 on the speed adjustment dial.</li> <li>Measure the speed with a calibrated tachometer and compare against the speed display.</li> <li>Set the speed on minimum on the speed adjustment dial.</li> <li>Measure the speed with a calibrated tachometer and compare against the speed display.</li> <li>Set the speed on any other two positions.</li> <li>Measure the speed with a calibrated tachometer and compare against the speed display.</li> </ol>	<p><u>Expected Range:</u> 56-164 osc/min</p> <p>On maximum setting, compare the speed measure against the speed display, within <math>\pm 5\%</math> tolerance.</p> <p>On minimum setting, compare the speed measure against the speed display, within <math>\pm 5\%</math> tolerance</p> <p>On speed setting "A", compare the speed measure against the speed display, within <math>\pm 5\%</math> tolerance</p> <p>On speed setting "B", compare the speed measure against the speed display, within <math>\pm 5\%</math> tolerance</p> <p>Attach tachometer calibration certificate to the protocol</p>	<p><u>Max Speed</u></p> <p>Measured Speed <u>163.2 osc/min</u></p> <p>Displayed Speed <u>1.00 m/s</u></p> <p>Tolerance <u>within <math>\pm 5\%</math></u></p> <p><u>Min Speed</u></p> <p>Measured Speed <u>57 osc/min</u></p> <p>Displayed Speed <u>0.26 m/s</u></p> <p>Tolerance <u>within <math>\pm 5\%</math></u></p> <p><u>"A" Speed</u></p> <p>Measured Speed <u>83.5 osc/min</u></p> <p>Displayed Speed <u>0.40 m/s</u></p> <p>Tolerance <u>within <math>\pm 5\%</math></u></p> <p><u>"B" Speed</u></p> <p>Measured Speed <u>146.5 osc/min</u></p> <p>Displayed Speed <u>0.80 m/s</u></p> <p>Tolerance <u>within <math>\pm 5\%</math></u></p> <p>Tachometer calibration certificate attached: <u>Attachment #1</u></p>	Y	N.A.	Wendli 19 sep 14





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Test No.	Test Description	Expected Result / Acceptance Criteria	Actual Results	Fulfilled (Y/N)	Deviation No.	Executed by : (Initial, Date)
11.	<u>Functional Operation of Bearing Flushing (Air purge) Test</u>	Verify functional operation test for the bearing flushing	Functional operation test for the bearing flushing was checked and found operational ( Yes ) / No )	Y	N.A.	Wendh 19 sep 14
12.	<u>Weigh Scale Function Test</u>  Confirm scales is functional within the anticipated range of loading (0-1500kg, Accuracy $\pm$ 0.5%)	Scale is functional within the specified range	Scale is functional within the specified range ( Yes / No )	N	2	Wendh 19 sep 14

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Confederazione Svizzera  
Confederaziun svizra

Federal Institute of Metrology METAS

Tachometer Tag number: 305  
Frewitt  
GUMY EDWARD 13 sep 14**Certificate of calibration No. 258-16620-1***Translation***Subject****Revolution counter**  
Jaquet, DHO 907  
S/N 0606.214692, METAS 411967**Order**

Calibration at different speed of rotation

**Applicant**Frewitt Fabrique de Machines SA  
Route du Coteau 7  
1763 Granges-Paccot**Traceability**

The reported measurement values are traceable to national standards and thus to internationally supported realizations of the SI-units.

**Date of calibration**

31.07.2012

**Marking**

Calibration label METAS 07/12

3003 Bern-Wabern, 3. April 2013

For the Measurements

Sector Traffic, Acoustics and Vibration

Nikola Misis

Walter Fasel, Head of Sector

Attachment No.: 1	Page: 1 of 5
SG-Rep. 202. m. 5236	
Attached To: FAT OCR	Initial/Date: Wendt
test protocol	19 reply
test. no. 10	

This document may not be published or forwarded other than in full.

METAS

Lindenweg 50, 3003 Bern-Wabern, Switzerland, phone +41 58 387 01 11, www.metas.ch

1/2

**Certificate of calibration No. 258-16620-1****Extent of the Calibration**

The revolution counter was tested on your desired or in a specific measuring range by different revolutions per minutes (rpm).

**Measurement Procedure**

The revolution counter has been tested according to the design with a mechanical speed encoder or with electronic or optical signals.

**Measurement Conditions**

Temperature ambient:  $(22 \pm 2) ^\circ\text{C}$ .

**Measurement Results**

A table and a detailed diagram can be found in the appendix.  
The diameter of the perambulator is:  $48.45 \pm 0.1$  mm.

**Uncertainty of Measurement**

The reported uncertainty of measurement is stated as the combined standard uncertainty multiplied by a coverage factor  $k = 2$ . The measured value ( $y$ ) and the associated expanded uncertainty ( $U$ ) represent the interval  $(y \pm U)$  which contains the value of the measured quantity with a probability of approximately 95 %. The uncertainty was estimated following the guidelines of the ISO (GUM:1995).

The measurement uncertainty contains contributions originating from the measurement standard, from the calibration method, from the environmental conditions and from the object being calibrated. The long-term characteristic of the object being calibrated is not included.

Attachment No.:	1	Page:	2 of 5
SG-TeP-202 M-5236		Attached To:	FAT 00
		Initial/Date:	Wendli
			test no. 10
			19 sep 14

Model: Jaquet  
Type: DHO 907Metas Nr.: 411967  
Serial Nr.: 06.06.214692

## Appendix

31.07.2012

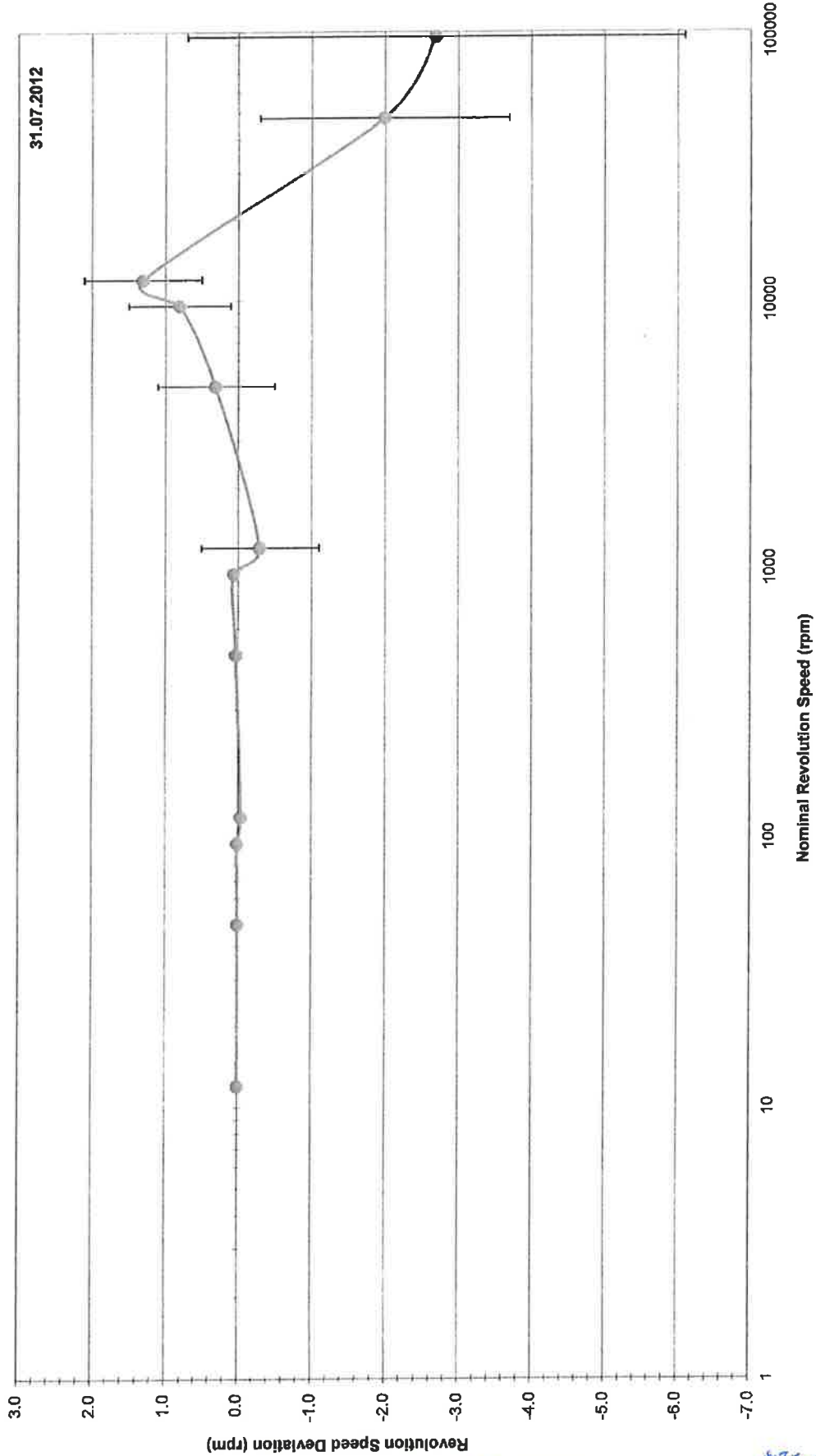
## Measurement Results

Rotation speed Range	Deviation rpm	Uncertainty of measure ± rpm
12	-0.005	0.007
48	-0.005	0.007
96	0	0.008
120	-0.05	0.07
480	0.02	0.08
960	0.05	0.07
1200	-0.3	0.8
4800	0.3	0.8
9600	0.8	0.7
12000	1.3	0.8
48000	-2	1.7
96000	-2.7	3.4

The specified values represent the mean value from 6 measurements.


Attachment No.: 1 Page: 3 of 5  
 Attached To: FAT O&A Initial/Date: Wendl  
 Test no. 10 19 sep 14

Model: Jaquet Type: DHO 907 Metas Nr.: 411967 Serial Nr.: 06.06.214692



Attachment No.: 1 Page: 84 of 5  
 SG: TBP: 202.M.5236  
 Attached To: FAT OQ Initial/Date: Wende  
 test no. 10

*19 sep 14  
Wende*

	Formulaire : <b>Equipements de test et de mesure</b>		
<b>MANUEL DE MANAGEMENT</b>	Document: N-305-1	P4 /Contrôle	du: 22.04.09
			Page : 1 de 2

N° appareil N° : 305	Catégorie : Force
N° article Frewitt : 426113	Service utilisateur : Contrôle
Désignation : Tachymètre	Constructeur : Jaquet
Type : DHO 907 Combi	Vendeur : Jaquet AG - 4009 Bâle
N° de série : 214692	Année d'achat : 2006
Plage(s) : 10 - 10000 T/min	Prix d'achat : 370 CHF
Tolérance (s) : + - 1 %	

<b>Etalonnage interne</b>  Périodicité : mois  Procédure de contrôle :	<b>Etalonnage externe</b>  Périodicité : 36 mois <u>Effectué chez :</u> Institut fédéral de la métrologie - 3084 Wabern.  <u>Procédure de contrôle :</u> Etalonnage entre 10 et 96000 T/min standard. Au laboratoire trafic, à l'att. de Mr. Fasel Walter et demander le certificat dans les 3 langues (français-allemand et anglais)
--	--

Type de contrôle: Ctrl externe	(si ext.) Certificat reçu : OUI	Equipement conforme : OUI	
Mesure de référence	Mesure effective	Mesure après correction	Conforme ?
mm	mm	mm	?
mm	mm	mm	?
mm	mm	mm	?
Date du ctrl	Contrôleur N°	Visa	
29/06/09	41	Hre	
<u>Remarque :</u>			

Type de contrôle: Ctrl externe	Outil de Ctrl N° :	(si ext.) Certificat reçu : OUI	Equipement conforme : OUI	
Mesure de référence	Mesure effective	Mesure après correction	Conforme ?	
mm	mm	mm	?	
mm	mm	mm	?	
mm	mm	mm	?	
Date du ctrl	Contrôleur N°	Visa		
juillet 12	41	Hre		
<u>Remarque :</u>				

Type de contrôle: ?	Outil de Ctrl N° :	(si ext.) Certificat reçu : ?	Equipement conforme : ?	
Mesure de référence	Mesure effective	Mesure après correction	Conforme ?	
mm	mm	mm	?	
mm	mm	mm	?	
mm	mm	mm	?	
Date du ctrl	Contrôleur N°	Visa		
<u>Remarque :</u>				

Attachment No.: 1 Page: 5 of 5  
SG-IMP-202.M 5386  
Attached To: FAT00 Initial/Date: Wendy  
Test no. 10 19 sep 14





### 5. OQ – Conclusion

OQ completed. Refer to chapter 6 for deviations to be completed before SAT.

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## 6. Deviation Sheet

Page 1 of 2


Wendli 19 sept 14

Deviation No:	1	Deviation To Test No:	5, 8 and 9
<b>Description of Deviation</b>			
<p>① the motor light does not go out when emergency stop.</p> <p>② the motor light does not flash on and off when the circuit breaker is pressed.</p> <p>③ the gas light does not go out and the motor light does not flash when pressure fall below the threshold value.</p>			
<b>Evaluation and Proposed Corrective Action</b>			
<p>No impact.</p> <p>① the motor light flashes on and off when emergency stop is correct to show fault in motor. *EE Wendli 19 sept 14</p> <p>② the motor light <del>flashes</del> goes out when the circuit breaker is pressed is correct.</p> <p>③ the gas light flashes on and off and the motor light goes out when pressure fall <del>below</del> <sup>see Wendli 19 sept 14</sup> the threshold value is correct to show fault in gas pressure.</p>			
<b>Resolution</b>			
Corrected the indication of light on, off and flash for the motor and gas on control panel.			

## Deviation Prepared By

Name	Signature Reason	Department / Function	Date	Signature
LEE WEND LI	Author	NSPM Process Expert	19 sept 14	Wendli

## Deviation Accepted By

Name	Signature Reason	Department / Function	Date	Signature
GUY EDUARD	Approver	Frewitt Project Manager	19 Sep 14	

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## 6. Deviation Sheet

page 2 of 2

Wendū casep14

Deviation No:	2	Deviation To Test No:	12
<b>Description of Deviation</b>			
Scale is not available for test in FAT.			
<b>Evaluation and Proposed Corrective Action</b>			
To be tested in SAT.			
<b>Resolution</b>			
Test in SAT			

Deviation Prepared By				
Name	Signature Reason	Department / Function	Date	Signature
LEE WEND LI	Author	NSPM Process Expert	19 sep 14	Wendū

Deviation Accepted By				
Name	Signature Reason	Department / Function	Date	Signature
GUY EDWARD	Approver	Frewitt Project Manager	19 sep 14	[Signature]

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**Excellence in Milling and Handling of Powders**

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 Customs account 6642-4  
 IBAN EUP: CH90 0483 5036 3818 0200 0  
 IBAN CHF: CH27 0483 5036 3818 01000  
 IBAN USD: CH92 0483 5036 3818 0215 8  
 Credit Suisse CH-3001 Bern / Swift CRESCH2280A

## 7. Post-Approval

This FAT-OQ test Protocol of the equipment has been executed and accepted by:

Name	Signature Reason	Function/ Department	Signature	Date
Edouard Gummy	Reviewer	Frewitt Technical Project Manager		19 Sep 14
Ho Sook Hwa	Reviewer	NSPM Qualification Coordinator		
Christina Chen	Approver	NSPM Process Engineer		
Shivabalan Kanesan	Approver	NSPM Automation Engineer		
Panicker Shreekumar	Approver	NSPM Project Manager		
Yap Yee Boon	Approver	NSPM Project QA		

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