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			Author:	RO
			Date:	2018-05-24
Project:	Air Rinsing Machine			
Com.- No.:	17.825	Dokument-Signat:	FS - 17.825 / 1.0	

Functional Design Specification to:	
Machine	Air Rinsing Machine
Manufacturer	Rudolf Deckert GmbH & Co. KG
Year of construction	2018

Machine	Com.-No. / Machine-No.	Type
Air Rinsing Machine	17.825	DABM 738



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1 Release Table

Approval by Rudolf Deckert GmbH Co. KG:

-	Name / Function	Date	Signature
Checked:	Reimund Maas Sales Manager	_____	_____
	-	-	-
	-	-	-
Approved:	Ömer Razgatlioglu Project Engineer Sales	_____	_____

Approval by Rotem Industries Ltd., Arava, Israel:

-	Name / Function	Date	Signature
Checked:		_____	_____
	-	-	-
	-	-	-
	-	-	-
Approved:		_____	_____


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2 Change history

This is the history for the Functional Design Specification.

All changes up from version 2.0 are marked in "blue".

Version	Change	Date	Name
1.0	New creation	24. May 2018	Ramazan Öztürk Rudolf Deckert GmbH & Co. KG

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3 Introduction

The specification is the “detailed description of performances, which are necessary or required, so that the aims of project are reached”.

3.1 Release of Functional Design Specification

The FS is only valid, if it will approve and release by Sindan Pharma, Bucharest.

The FS will confirm by name, date and signature in the provided signature area of the printed document. The release could only issued by persons authorized by Sindan Pharma, Bucharest.

A release can only issued after previous check in the same signature area.

4 Preconditions

4.1 Validation team

The validation team for FS have to be professionally competent and have to consist of one representative of each of the following areas.


Rudolf Deckert GmbH & Co. KG

- ⇒ Construction personnel
- ⇒ Validation personnel

ROTEM INDUSTRIES Ltd., Arava, Israel:

- ⇒ Validation personnel
- ⇒ Quality assurance QA personnel

Rotem Industries, Arava, Israel is responsible for the manufacturing process / -control and therefore able to assign the requirement of validation to Rudolf Deckert GmbH & Co. KG or a third party.

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5 Process flow diagram

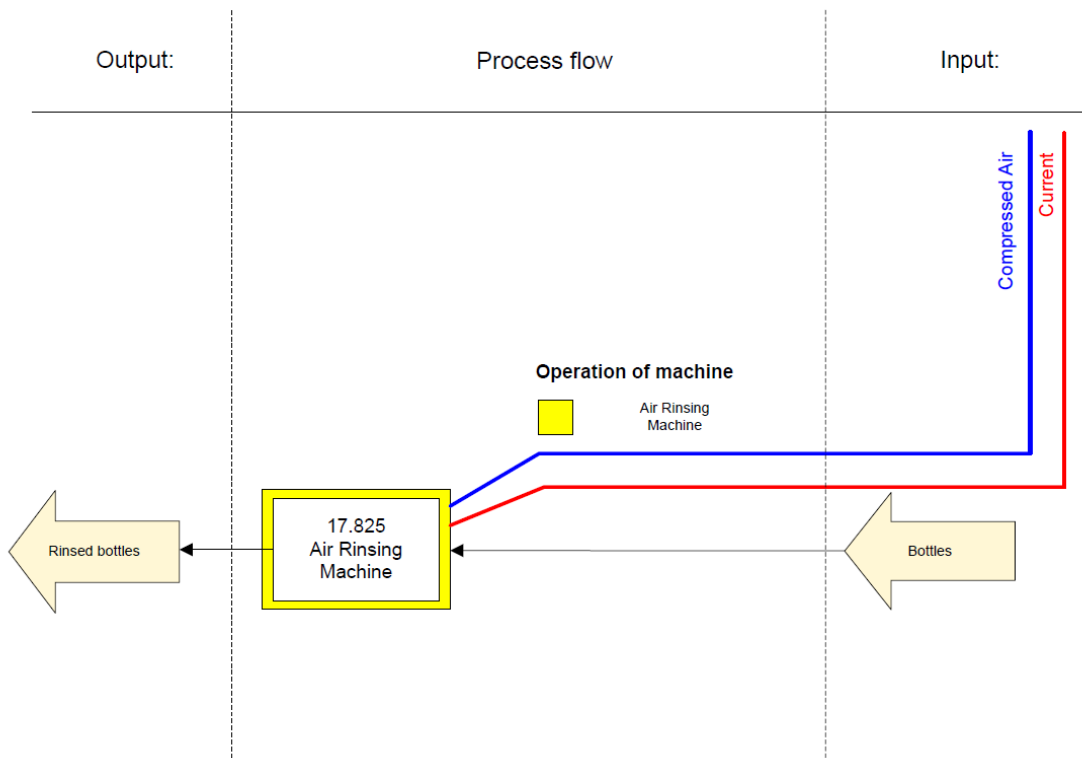




Image 1: Overview Process/Check flow (with In-/Output)

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6 Description of the line / machines

- ⇒ The designing of the machine induces to ensure a rapid format change and a possible cleaning.
- ⇒ All format parts of the Air Rising Machine are clearly marked. The assignments of the parts are in the format list described. A chapter "Size change Instruction" is in Operating Manual included.

The working hight of machines is ca. 900 +/- 25 mm.

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6.1 Air Rinsing Machine DABM 738 Com. Nr. 17.825

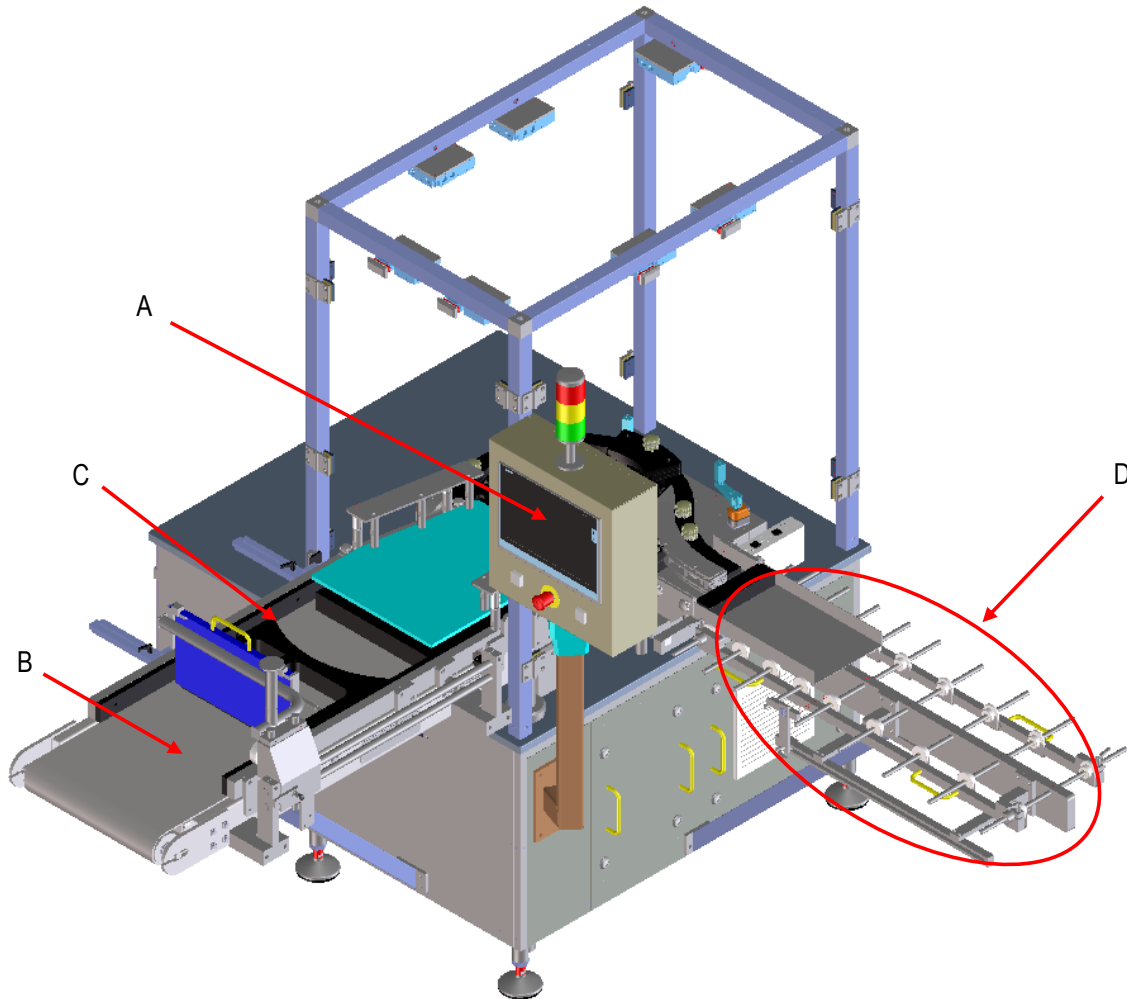



Image 2: Air rinsing machine

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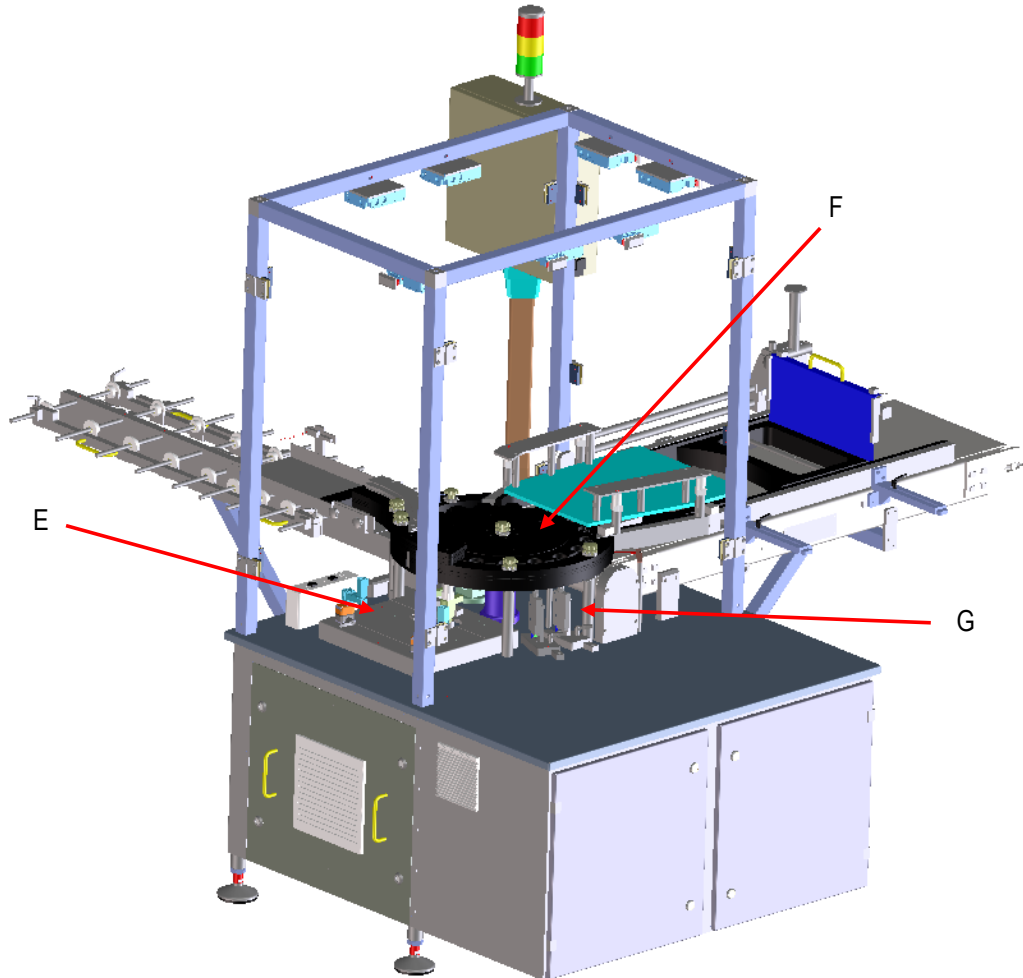



Image 3: Air rinsing machine

Pos.	Description
A	Operating Panel with signal lamp
B	Infeed wire strip
C	Infeed Magazine
D	Outfeed Magazine
E	Nozzles for blow-out
F	Star wheel
G	Ionization

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6.1.1 Function of the “Air Rinsing Machine”

The Air Rinsing Machine is constructed for air rinsing automatically

Stable containers with a diameter up to 60 mm and a height up to 100 mm. The machine has an adjustable capacity up to 3000 containers / h depending on containers.

Only containers like described in chapter “Range of formats” could be processed.

1. The operation of the Air Rinsing Machine is executed via the operator panel IPC 277 (HMI) in English and German.
2. Access to PLC is protected via password and user ID. Different users at various user levels could be created by the administrator. Each password can only be assigned once to one special user.
3. An emergency stop buttons is integrated. By triggering the emergency stop button, the machine interrupts. After eliminating cause of emergency stop, the emergency stop button must be unlocked. After unlocking, the emergency stop is again activ. Then the breakup of emergency stop must approved on the machine (Reset the machine).
4. If air pressure is missing or to low, an additional emergency stop for compressed air stops the machine.
5. If troubles are detect during the automatic mode, the machine switches automatically off and the illuminated button “RESET” is flashing. The corresponding fault shows as a trouble message on the display of the operator panel.
6. After clearing the fault the failure must be receipt with button “RESET” so that the flashing of the button expires. After that restart the machine.
7. Quantities and hours are counted and stored by PLC and are displayed on the operator panel. The actual working hour meter and actual production hour meter can be reset with “RESET”.
8. The containers are fed by a wire strap and a magazine to the intermitted driven star-wheel of the Air Rinsing Machine.
9. The “Infeed accumulation light barrier” checks if containers are present at the infeed of the machine. If that light barrier doesn’t detect containers the working process won’t start. The machine stops the automatic mode. The absence is displayed on the HMI. If containers are detected by the light barrier again the machine will start automatically.
10. The intermitted driven star-wheel separates the containers, transports them to the working stations and positions them there. Thereby the distance between the containers is sufficiently established so that they can be easily processed.
11. A light band checks the presence of a container in the pocket of the star wheel and clocks this in. Further processes of the machine are only released for each detected container.


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1st station: Air Rinsing station.

12. The intermitted driven star-wheel transports the containers to the air rinsing station and positions them there.
13. At first position the ionisation needle is located. The ionized air purified by a Pall Kleenpak filter is blown through the needle into the container. The ionized air removes static charges through which remain otherwise "stick" dirt particles in the container. The degree of purification is thus increased.
14. An air-rinsing nozzle moves into the container and seals the container neck. The container still stands in star-wheel.
15. The two Pall, Kleenpak filter Emflon PFR filters are designed for an absolute separation rate of 0.2 µm.
16. Simultaneously, contaminated air is drawn back through another part of the nozzle by means of a vacuum pump.
17. The contaminated air is filtered to collect any contaminates. The exhaust air filter has a replaceable filter cartridge.
18. On the Air Rinsing station the adjusted air pressure is checked by means of a pressure switch and the exhaust by means of a vacuum switch. If the pre-set values are not reached, the machine stops. On display in the operator panel, a message is displayed. The red signal lamp lights.
19. The intermitted driven star-wheel transports the containers from the air rinsing station to the outfeed station.

2nd station: Outfeed station / outfeed magazine.

20. The star wheel indexes the bottles to the outfeed station.
21. The outfeed station is equipped with a sensor for checking if the magazine is full. If this sensor detects the magazine that gets pulled away from the outfeed station the machine stops the automatic mode until it doesn't detect a magazine anymore. A new magazine has to be placed on the outfeed station. Then the machine restarts automatically / can be started again.

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All machines were especially designed for the listed containers. All functions aligned to these containers.

In the screen "Recipe" all are formats listed. It is to select a format data adjustment or to copy format data from an existing format to a new one.

The settings for container exchange for the different formats and a quick format change are listed in a format list.

The product counter indicates the endless and actual number of processed containers. The actual counter indicates the number of processed containers since the last reset of the counting.


The hour counter indicates the endless and the actual number of the working hour meters. The actual hour counter indicates the number of the working hour meters since the last reset of the hours.

The production data „START Charge“ and „Stop Charge“ with date and hour, good containers can be stored by starting a batch. After stopping the batch these data are on an interface available for printing.

The machine is equipped with doors made of safety glass and hedged with safety switches. The protective doors must be closed to start the machine in the automatic mode. Turning locks at upper and lower pos. of the doors secure the fastening of doors.

The underframe is covered with stainless steel sheet metal.

In case new formats have to be processed which were not required for construction of the machines additional format parts and functional elements have to be constructed for those formats for all machines.

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6.2 Conveyors

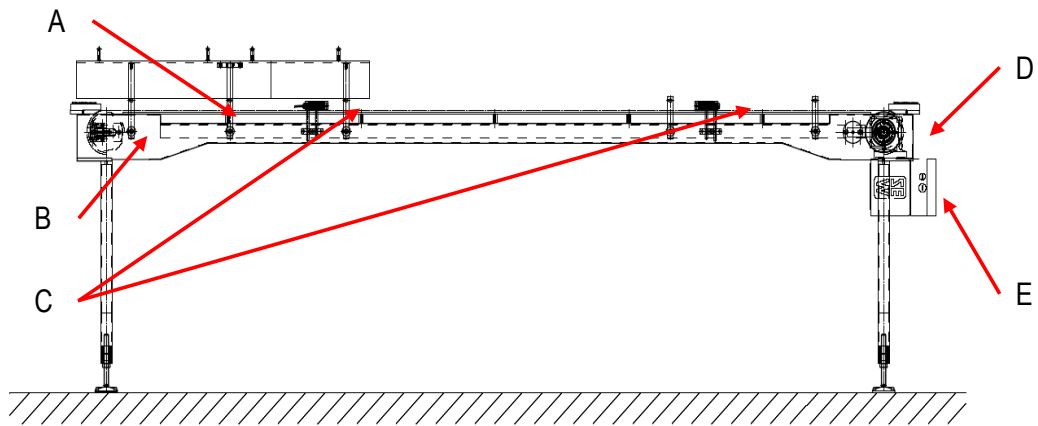



Image 4: e.g. Conveyor

Pos.	Description
A	Safety device
B	Deflect roll
C	Sensors
D	Drive gear
E	Drive motor


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6.2.1 Description of conveyors

The conveyors are especially for automatically transport of containers to the further processes constructed and with corresponding released components equipped.

Conveyors are over the corresponding panel of the machine started.

1. A conveyor is equipped with a motor with adjustable gear to fit the conveyor speed according the machine requirement. The transport speed must be to the working speed of the following process adjusted.
2. Conveyors are with adjustable side guides equipped. Adjust this side guides according the container diameter and conveyor centerline.
3. Infeed conveyor has a motor with integrated frequency inverter. In addition, to switch on and off the conveyor on the operator panel, adjust there the transport speed to the working speed of machine.

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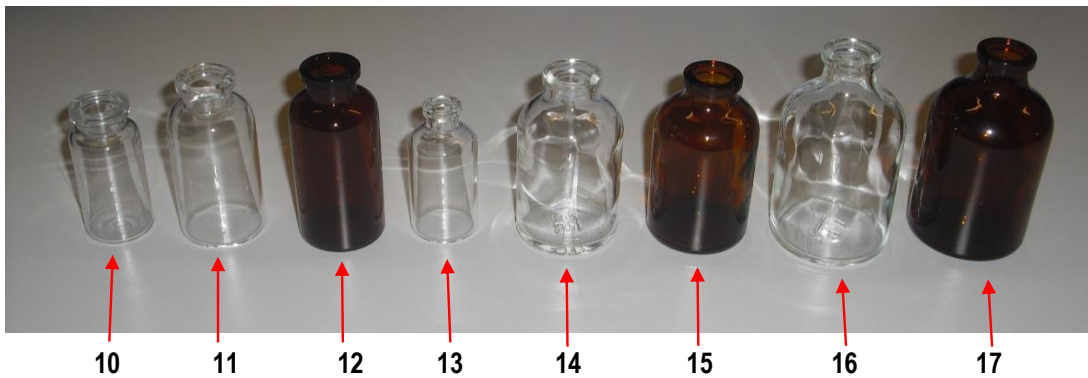
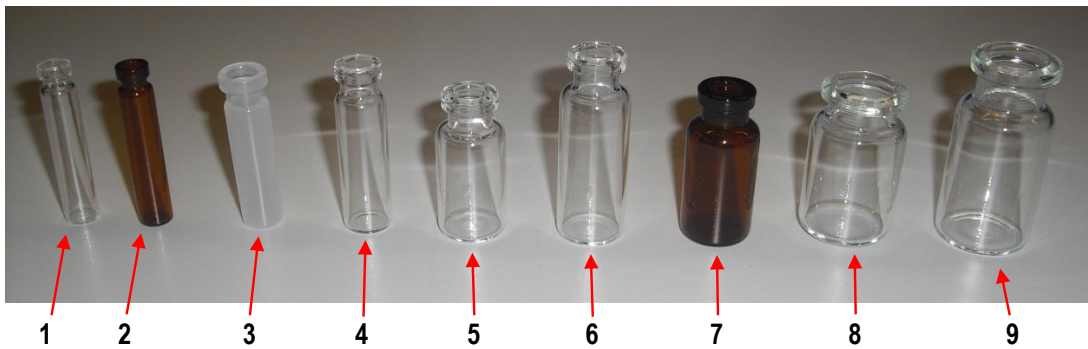
7 Format range

In the following are the formats defined, for which the machine designed, manufactured and released.


7.1 Container type

In the following the formats are defined for which the machine is designed, manufactured and released.

Containers:




No.	Format No.	Rotem item	Capacity	Dimension (mm)
1	F1	KIT40008	1,2 ml	Ø 8,2 mm x 40 mm
2	F1	KIT40008/1	1,2 ml	Ø 8,2 mm x 40 mm
3	F3	KIT40159	XXX	Ø 10,5 mm x 39,2 mm
4	F3a	KIT400011/1	2,5 ml	Ø 11,6 mm x 41 mm

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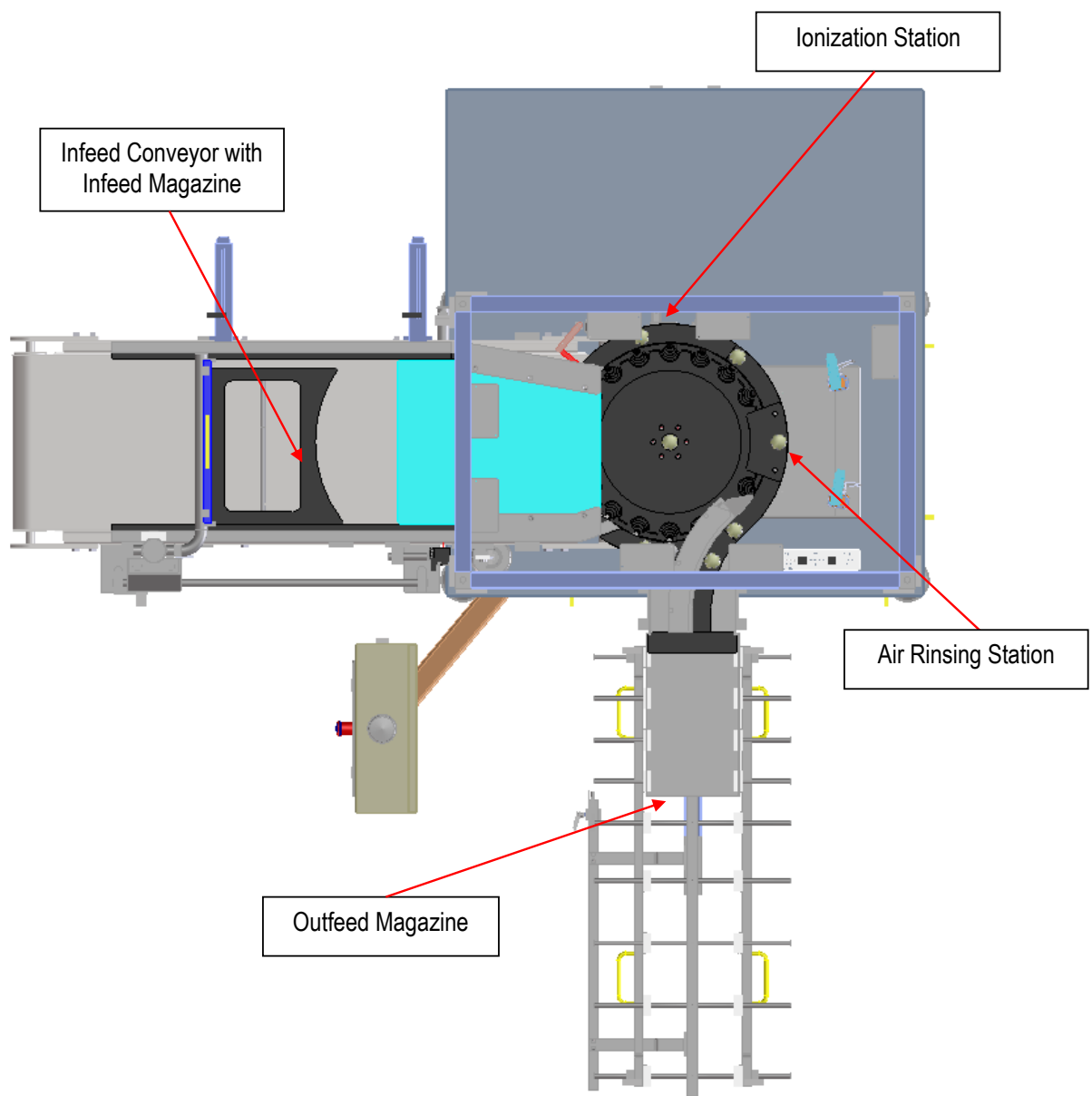
5	F4	KIT40031	XXX	Ø 16 mm x 35 mm
6	F4a	KIT40082	XXX	Ø 16 mm x 45 mm
7	F5	KIT40109	3 ml	Ø 17 mm x 37 mm
8	F7	PCA660038	5 ml	Ø 22 mm x 38,2 mm
9	F7a	KIT40005	10 ml	Ø 22,5 mm x 46 mm
10	F8	KIT40035	10 ml	Ø 23,75 mm x 50 mm
11	F9	KIT40080	XXX	Ø 30 mm x 55 mm
12	F9a	KIT40147	XXX	Ø 30 mm x 65 mm
13	F12	621136-10	10 ml	Ø 24 mm x 50 mm
14	F10	KIT40033	30 ml	Ø 36 mm x 63 mm
15	F10a	KIT40139	30 ml	Ø 36 mm x 63 mm
16	F11	KIT40034	50 ml	Ø 42,5 mm x 73 mm
17	F11a	KIT40140	50 ml	Ø 42,5 mm x 73 mm


These values result from the formats we have received. We have not received all information we need so we filled in "XXX" in the table left over. The information in the table is without engagement.

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7.2 Control of the Air Rinsing Machine

In the control of the Air Rinsing Machine – PLC Simatic S7-300 – are the described machines summarized as unit „air rinsing“. Operating is by operating panel IPC 277 executed.




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8 HDS / SDS

8.1 Hardware Design Specification

Hardware Design Specification Air Rinsing Machine DABM 738

No.	Manufacturer	Description
1.	Siemens	S7-300 CPU 314C – 2PN/DP 24 DI 24VDC / 16 DO 24VDC 4 AI / 2 AO
2.		Control panel IPC 277D
3.		USV Module
4.		Control Unit CU310-2DP
5.		Power Module PM340
6.	Lenze	Frequency inverter

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8.2 Software Design Specification

Software Specification Air Rinsing Machine DABM 738

Software Identification-

Identification of the Deckert-application-software:

1.	
----	--


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9 Emergency stop

The machine is equipped with an integrated emergency stop. By triggering the emergency stop button, the machine is in a safety torque off mode.

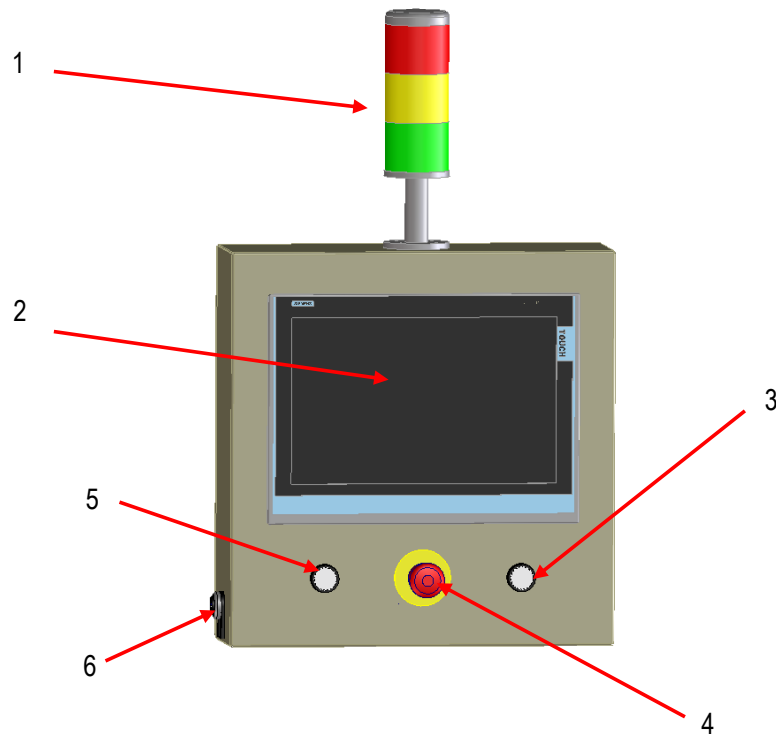
After eliminating cause of emergency stop, the emergency stop button must be unlocked.

After unlocking, the emergency stop is again activ. Then the breakup of emergency stop must approved on the machine (Reset the machines)




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10 Operator panels




10.1 Controls at the operator panels




10.1.1 Description of the controls at operator panel

No.	Part	Component	Function
1		Signal lamp	The light tree on the operator panel indicates the operational status / occurrence of a fault
2		Operator panel (DECKERT)	To operate the machine
3		Emergency button	To switch off the machine in case of emergency

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No.	Part	Component	Function
4		Push button	"Control voltage RESET" to – switch on and switch off the control voltage
5		Key switch	For the choice of the mode system "Setup" or "Automatic"
6		USB port	USB ports - for connecting peripherals e.g. external keyboard, USB-Sticks etc.

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10.2 Errors and Trouble Shooting

The machine is equipped with different control elements checking the functions of the machine. If the control elements do not detect any trouble the machine can start working in the Automatic Mode.

If trouble is detected during the Automatic Mode the machine switches off automatically and the illuminated button "RESET" is flashing. The corresponding fault shows as a trouble message on the display of the operator panel. In case a fault detects, the according signal light is flashes up. In addition, the signal light shows the status of the machine.

After clearing faults the failure has to be receipted with button "Control Voltage RESET" the flashing of the button it expires. After that restart the machine just like described in the corresponding chapter.

If the flashing of the illuminated button does not expire after receipt another fault must existence which has to be cleared before restarting the machine.


There are two kinds of messages:

Alarm messages:

Displayed when the machine is operational in the Automatic Mode or in the Setup Mode and a fault appear. The machine stops and must restart after successful trouble shooting.

Event messages:

Displayed when the machine is in stand-by mode – event messages inform about the operating status with automatic Restart of the machine. As well as about probable additional faults may have happened that are indicated as event message.

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10.3 Description of the Signal lamp

A signal lamp with the colours red, orange and green is on the operator panel of the machine mounted.



Image 5: Signal Lamp


When a fault has been remedied, this has to be confirmed by pushing the “Control Voltage RESET” on the Operator Panel of the machine.

10.3.1 Description signal colours of machine (manufactured by R.Deckert)

In addition, the light tree on the operator panel indicates the operational status / occurrence of a fault as follows:

In addition, the light tree on the Operator Panel indicates the operational status / occurrence of a fault as follows:

Illuminated lamp	Reason for fault illumination
red light	lighted, when fault has occurred – action required
orange light:	lighted or flashing as warning, before a fault occurs: for example material is going to run empty
green light	lighted, when machine is working in automatic mode

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11 Access protection on PLC control

The access to the PLC is via passwords controlled. Each password can only assign once to one special user.

Attention:

It is the responsibility of the user to care for the access management and the assigning of the passwords

There are 4 possible levels of access. Each password is allocate to one level. Each password is to a person with certain rights for access allocated.

The following list shows the basic schematic for the allocation of the levels.

User (Name) **	Password*	Group (Level)	Access Protection
n.a.	-	0 – Unauthorized	No Password Protection e.g. after enter a faulty password 3-times in succession.
1111	-	1 – Operator	Production Setup e.g. Recipe Selection, Speed
2222	-	2 – Setup	Parameter e.g. Teach in, Timer Counter
3333	-	3 – Technician	Date to be changed only on Instruction e.g. Cams
9999	-	9 – Administrators	Unlimited Access


*At the delivery of the machine, passwords are pre-installed in the machine is, the customer have to change them to it's owns. The allocation and the management of it is the responsibility of the customer.

**The listed User-Names are only for example, you could make your own name or another kind like this.

Access to levels 1 to 3 can granted to several passwords / users. Level 9 is to the administrator assigned.

The passwords, which are from the vendor pre-installed, are delivering to the customer administrator on a separate way.

**In case a password is filled in wrong 3 times in series, the corresponding user is debarred and will be classified to the group "Unauthorized". Only the User with Level 9 (Administrators) can bring back the authorisation.
In case, the password of the administrator is 3 times in series filled in wrong, contact Deckert to reset the administrator.**


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11.1 Automatic Log-Out

The control checks the actions during a log-in.

In case there is no action for a certain period, say change of screens or change of parameters, the user is automatically logged-out. Therefore, no person gets access to unauthorized screens.

To get access to protected screens / parameters, a new log-in is necessary.

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12 Machine parameter

In the following are the sizes defined, in which the control parameters enter in machine. The PLC control and the PC control thereby separately regarded.


12.1 PLC- Control

Size	Parameter example
Piece / min.	Number of cycles of the machine
%	Percentage of a maximum capacity; e.g. Engine performance/number of revolutions
Second	Time related functions

13 Centralised voltage injection


13.1 Current, compressed air


Maschine / -type	Com.- No.	Voltage V	Compressed air	Air pressure bar
Air rinsing Machine DABM 738	17.825	400 V, 3 Phasen, N+PE, -10%+10%, 50Hz, +/-2%	Air quality corresponding ISO 1217 or 7183; dew- point 3°C; residual oil rate of 0.01 mgr/m ³ or smaller;	6 bar

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13.2 Typ plate Fa. Deckert:

Main machine:

 R. DECKERT <small>Komplexe Aufgaben. Packende Lösungen.</small>			
Maschinen-Nr.: Machine-No.:	17.825	Baujahr: Year of Construction:	2018
Type Type	DABM 738		
Spannung-Volt: Voltage:	400V3~NPE	Hz:	50
Steuerspannung: Control Voltage:	24 V DC	KW:	0,7
Schaltplan-Nr.: E-Circuit Diagram No.:	17_825		
Germany · 74523 Schwäbisch Hall · 0049 791 9 51 51 0 · www.rdeckert.com			

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13.3 Installation

The machines must be on a flat, solid ground placed, subsequent to the machine.

The machines are in height adjustable by spindle feet and could be adapted to minimally uneven ground and thereby adjusted to a desired working height.

It is important to ensure that the machine is aligned with a spirit level and is even placed.

13.4 Electrical connection


The electrical installation of machines may only in accordance to the electrical rules and regulations, by skilled personell carried out.

Electrical connection data of machines must match the data on type plates of motors and machines.

All electrical parts are by a label marked.

13.5 Compressed air connection

To ensure a trouble free operation of machines, we recommend connecting the pneumatic system to a compressed air supply with internal diameter of 10 mm and a pressure of 6 bar absolute. The compressed air must be by customer dry and oil free provided.

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14 EC- machine directives

The machinery is in compliance with the following rules and guidelines planned, designed and built:

The following national norms, guidelines and specifications used:

EC-machine directives and her appendices:
2006/42/EG

EU-low voltage guideline:

2006/95/EG

EU-guidelines electromagnetic compatibility (EMC):


89/336/EWG

Applied national technical specifications, especially:

UVVén BGV A2
BGV D17

Applied harmonized norms, especially:

EN ISO 12 100 -1
EN ISO 12 100 -2
DIN EN 60 204 -1


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15 Used materials, surface finish

15.1 Material – tangential packaging parts

In the following, all tangential packaging parts are with used material listed.

Machine area		Material	Surface
Infeed conveyor	Side guiding	PE 1000	milled
	Transportation belt	Stainless steel 1.4301	---
Guiding through machine	Star wheel	PE 1000	milled
	Side guiding	PE 1000	milled
Air rinsing station	Air rinsing nozzles	Stainless steel 1.4404	turned, grounded
	Format part (adapter air rinsing nozzles)	POM	turned
Outfeed conveyor	Side guiding	Stainless steel 1.4301	milled, grounded
	Metal sheet	Stainless steel 1.4301	grounded

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15.2 Surface finish – general description


Material	Surface
High-grade steel surface	grounded grain 240 glass pearls blasted satined
Aluminium	External parts: anodized Parts on the inside: nature
Plastics	milled turned water blasted
Steel	zincd brouned painted (at frame)

15.3 Welding

The weldings are according to the welding plans of manufacturer of the parts executed.

In the welding plans are the relevant regulations for product contact and/or primarily packaging contact parts considered.

Welding plans are a component of the internal documentation of the manufacturer, which could review by legitimate requirement.

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16 Annex

no Annex