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Translation of the Original Instructions

Operating Instructions
Digital Continuous Printer
CSAT ITS6 210

Serial No.: EG.LAA0-00135

Save for use at a later date!

Markem-Imaje CSAT GmbH
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Revision				
Date	Version	Chapter	Reason	Responsible
Nov. 30, 2016	1.0	All	New	Matthias Lohrer

These operating instructions were drawn up to the best of our knowledge. Nevertheless, if they should contain errors or ambiguities, please let us know. Furthermore, we are grateful for any helpful hints or suggestions. Please contact us:

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1   General Remarks

1.1   Introduction

These operating instructions are intended as an aid for the personnel responsible for installing, operating and repairing the printer. Familiarity with these operating instructions is the only way to prevent problems with the printer and guarantee trouble-free operation. Therefore, it must be ensured that anyone who has been assigned to use/operate this machine has read and understood the operating instructions before starting work.

If you have any questions or problems, please do not hesitate to contact our customer service.

1.2   Notes to the customer

The operating instructions are a compilation of the essential technical data and descriptions that are required for the installation, operation, maintenance, and repair of the machine. They also contain a list of replacement parts, any separate operating instructions needed for individual units, and drawings.

By using the directions in these operating instructions wisely and purposefully, the following conditions should be achieved:

- constant availability of the machine,

- optimum performance and therefore perfect print quality,

- timely detection and rectification of defects, thereby reducing maintenance and repair costs,

- the assurance of operational safety,

- extended service life of the machine.

The personnel responsible for the machine must always have access to and be familiar with the operating instructions. The personnel qualified for operation and maintenance must have complete and comprehensive knowledge of the contents. A copy of the operating instructions must be laid out directly at the machine.

In addition to the operating instructions, the generally recognized statutory and other mandatory accident prevention and environmental regulations must be observed. Such duties also refer to the handling of hazardous substances and the wearing of personal protection equipment.

The personnel assigned to work on or with this machine must have read and understood all aspects of the operating instructions before starting work. This applies in particular to personnel who only works with the machine occasionally, for instance to perform fitting, maintenance, or repair work.

If permitted by law, Markem-Imaje CSAT GmbH excludes all liability for consequential damage incurred by non-compliance with these operating instructions.

Furthermore, Markem-Imaje CSAT GmbH is not liable for intent and gross negligence.

All rights are reserved, including the right to reproduce these operating instructions in full or in part in any manner.

We reserve the right to modify the contents without prior announcement.

We reserve the right to make technical modifications without prior announcement.

In order to avoid accidents and to ensure optimum performance, no changes or conversions may be made to the machine without the explicit approval of Markem-Imaje CSAT GmbH.

The attached separate instructions for individual units should be observed and given priority.

Instructions on how to handle extraordinary events, as well as any special safety instructions, must be drawn up by the machine's owner and likewise be laid out for inspection.

1.3 Scope of delivery and responsibilities

The ITS6 printer was developed and built under the responsibility of Markem-Imaje CSAT GmbH. The initial commissioning will be performed by Markem-Imaje CSAT GmbH.

The owner is responsible for the proper function and the safe operation of the machine.

The operating instructions are a constituent part of the product and should be kept throughout the service life of the machine and then passed on to the next owner or user.

A copy of the operating instructions must be kept at the machine and be easily accessible to operating personnel.

The manufacturer is not responsible for any changes made by the owner at a later date.

1.4 Liability, warranty, guarantee

1.4.1 General

All information and directions for the operation and maintenance of the machine are based to the best of our knowledge on our experience and know-how to date.

The warranty rights are defined in our General Terms and Conditions of Business. Warranty rights may be asserted only in the event that defects or damage occur on the machine for which Markem-Imaje CSAT GmbH is responsible, despite the fact that all points of the operating instructions were observed.

We are liable for any errors or omissions, excluding any other claims, within the context of the warranty obligations set forth in the main contract. Fur-

ther claims for damages, irrespective of the legal basis on which they arise, are excluded.

Liability or warranty is excluded if:

- the information and directions in these operating instructions are disregarded,

- if error messages or problems arise on the machine and are ignored and accepted without rectifying them,

- if the machine, including any associated equipment, is operated improperly or if it isn't handled in the manner specified,

- if the machine is misused contrary to its original purpose,

- if safety equipment is not used or is deactivated,

- the printer is operated without being supervised,

- if functional changes of any kind are made without our written permission,

- if printing substrates are used, which endanger the security process of the print heads or the entire printer,

- if printing substrates, inks, cleaning fluids or cleansers are used which have not been approved and released by Markem-Imaje CSAT GmbH or which do not meet the customary specifications.

- if the relevant safety regulations are not observed (see related chapter in these operating instructions),

- if the machine, including any associated equipment, is maintained improperly (in terms of time intervals as well as execution) – this also includes the use of original replacement parts – and checks and inspections are not complied with,

- if changes, additions or conversions which could compromise safety are made to the machine without the authorization of Markem-Imaje CSAT GmbH. This also applies to the installation and adjustment of safety equipment and safety-related components.

In addition, the following conditions apply:

- Expendable parts are not covered by the manufacturer's warranty.

- Only manufacturer approved, original replacement parts should be used when replacing parts or purchasing spare parts.

- Whenever warranty claims are to be asserted, the factory must be informed of this fact in writing, as soon as the defect is discovered, along with the notation of the printer serial number and the exact description of the unit or assembly (include serial number of the part/assembly if available).

- If damage or defects are rectified on the part of the customer or others without prior approval by Markem-Imaje CSAT GmbH, then Markem-Imaje CSAT GmbH is not obligated to acknowledge the demands or claims.

> **Note**
>
> In the event of a complaint:
>
> - Always use the original packaging to return the non-confirming component.
> - Fill out the form **FRM-105-02 Return shipment dispatch note** completely and as precisely as possible. This form is enclosed with each component.
> - All defect claims are void if you do not use the original packaging and/or do not provide any information about the failure.

1.4.2 Warranty in connection with print heads

The ITS6 printer uses the established DOD printing method based on piezo print heads with thousands of small nozzles. These nozzles are miniscule (approx. 20um in diameter) and, therefore, very sensitive to contact and the uptake of extraneous matter.

Markem-Imaje CSAT GmbH has provided a series of measures meant to ensure a long lifetime of the print heads. Markem-Imaje CSAT GmbH guarantees that the guaranteed lifetime can be achieved if used properly.

> ## Notice
>
> Unfortunately, Markem-Imaje CSAT GmbH finds itself forced to pass on to all users of the ITS6 and treat as binding the print head manufacturer's extremely strict guarantee conditions in their current form.
>
> These are worded as follows:
>
> "…the manufacturer [of the print heads] guarantees trouble-free operation and shall be liable for all defects during the time frame of the lifetime guarantee – provided that they are not associated with the clogging of one or more nozzles.
>
> Clogged nozzles are a clear indication of the user's fault, which could be due either to mechanical contact of the print heads with the printing substrate or due to the uptake of fine particles from the material or dusty air around the print heads or due to improper cleaning of the print head.
>
> In such cases, the operator automatically accepts full liability!
>
> This applies not only to the printing process, but also to all treatment of the print heads during downtimes (e.g. during manual cleaning or when threading web through)…"

1.5   Identification

Designation	Continuous Digital Printer CSAT ITS6
Serial No.	EG.LAA0-00135
Manufacturer	Markem-Imaje CSAT GmbH Daimlerstr. 32 D-76344 Eggenstein-Leopoldshafen

The ITS6 printer is identified by its type plate beneath the main switch.

1.6   Understanding and handling these operating instructions

All commissioning, operation, maintenance and repairs of the machine must be carried out strictly on the basis of the procedural instructions specified in these operating instructions.

Before operating the machine, please read through these operating instructions carefully. The specially marked safety instructions must be observed!

Follow all instructions in order to avoid accidents, personal injury or damage to the machine.

The conveyance of these operating instructions to third parties is prohibited and will result in a claim for damages.

1.7   Other valid documentation

In addition to the manual for the ITS6 printer, the information contained in the documents accompanying various purchased parts must also be observed. The corresponding files are stored on the documentation CD included with delivery. Print-outs of the most important purchased parts can also be found in the appendix of the operating instructions.

The electrical equipment and controls were designed by Markem-Imaje CSAT GmbH. The associated descriptions can also be found in the appendix of the operating instructions and on the documentation CD.

1.8   Notations in the text and abbreviations

Notations

Function/Item	Representation
Instructions	… start with an arrow >
Lists	… start with a bullet ●
Keys, switches, touchscreen functions	… are placed in quotation marks " "
Text of messages and pop-up windows	… are placed in quotation marks " "
File and folder names, touchscreen menus and associated tabs	… are shown in *cursive* in running text
Paths of the menus and tabs of the touchscreen	… are shown in *cursive* in running text. The names of the higher level menu and the associated tabs are separated in the path by a greater than symbol ">"
Paths of file names and folders	… are shown in *cursive* in running text. […]

Abbreviations

Abbreviation	Meaning
HMI	Human Machine Interface
UV	Ultraviolet
IJ	Ink Jet
DSP	Digital Signal Processor
TOF	Top of Form

2   Safety

2.1   Intended use

The ITS6 printer was constructed in accordance with the state-of-the-art and the generally accepted safety regulations.

It was designed and built to convert image data by means of the "inkjet" process into actual images, which can then be transferred to a multitude of materials, for instance metal foil, paper and plastic. The ITS6 printer is designed exclusively for printing on roll-fed material, such as foil or labels.

The field of application of the ITS6 printer is industry, indoors.

The operational safety of the machine is ensured only if it is used properly. Improper use is considered any use other than the one given above. Any other use above and beyond that is considered improper.

The specifications in Chapter 3 "Technical Data" and the suppliers' documentation (see Chapter "Documentation from Outside Sources" in the appendix of this manual) are to be observed.

Proper use also includes reading, knowledge and compliance with the operating instructions and adherence to the maintenance and repair instructions.

Any other use of the machine or parts of this machine requires the written approval of Markem-Imaje CSAT GmbH.

2.2   Foreseeable misuse

Improper use is considered any use beyond the purpose for which the machine is intended.

It is not permitted to operate the machine …

- … without safety equipment,
- … with defective safety equipment,
- … when it is not in good order and condition,
- … with incorrect settings,
- … with printing substrates, inks, cleaning fluids, and cleaners which haven't been tested or released by Markem-Imaje CSAT GmbH.

The following are in particular considered improper use:

- … operation outside of the performance specifications,
- ... the use of printing substrates prone to crack, rip or curl,
- ... the use of printing substrates which tend to curl at the edges in the direction of side to be printed on, which means the edges may rub along the nozzle plates
- the use of a printing substrate that is too thick. This would result in a significantly smaller gap than the minimum distance of 0.9 mm, which is required between the nozzle plates of the print heads and the sur-

face of the printing substrate so that damage to the print heads is quite likely,

- … passing taped seams through the main curing unit or beneath print head units in their working positions,

- … the use of labels which come loose from the backing material on their own when deformed or subjected to heat,

- … the use of label material in which the backing is deeply incised or heavily embossed,

- … the processing of labels of self-adhesive printing substrates without a barrier coat on the side to be printed,

- … the use of materials which, under the influence of pressure and/or high temperatures, emit gases, liquids or even solid particles, that could settle as residue on the various components and render them useless,

- … the use of printing substrates which are affected, dissolved, or altered with respect to their mechanical and chemical properties as a result of using cleaning fluids and inks,

- … the processing of printing substrates which deviate strongly from the materials usually processed by the printer in terms of the substance, material thickness, composition, or method of manufacture,

- … the use of textile material with fibers protruding from the fabric,

- … the use of damaged printing substrates that are torn or have an uneven surface,

- … the use of damaged rolls of material, which exhibit defects on the end faces or on the surface, such as pressure marks, creases or tears,

- … the use of single sheets of paper or folded continuously fed material (e.g. EDP fan-fold paper),

- … the use of unqualified or insufficiently qualified personnel,

- … non-compliance with the permissible environmental conditions.

Notice
Unsuitable printing substrates can cause serious damage – irreparable damage in the case of print heads – as a result of tearing and the emission of vapors.
➔ The owner of the printer bears sole responsibility for the selection of the printing substrates used.
➔ The owner of the printer bears sole liability for damage attributable to the printing substrate!

Notice
If you aren't sure whether a printing substrate is suitable, please send a roll of the material along with the associated data sheet to Markem-Imaje CSAT GmbH and let it be checked for its suitability. The printer owner still bears sole responsibility nevertheless for the use of material tested this way!

2.3   Safety symbols

The following signal words are used in conjunction with safety symbols in this document to represent potential danger.

⚠ Danger	
Symbol Panel	Death, serious injury or substantial material damage **will occur** if the corresponding precautions are not taken.

⚠ Warning	
Symbol Panel	Death, serious injury or substantial material damage **can occur** if the corresponding precautions are not taken.

⚠ Caution	
Symbol Panel	Minor injuries can occur if the corresponding precautions are not taken.

Notice
Material damage can occur if the corresponding precautions are not taken.

2.3.1 Safety symbols and their meaning

The purpose of safety symbols is to quickly draw attention to objects and situations that are potentially dangerous.

Therefore, certain shapes and colors are used for the safety symbols.

The meaning of the safety symbol is indicated by the shape and color (ISO 3864-2).

Shape	Color	Meaning
	Safety red Contrasting white	Prohibition
	Safety yellow Contrasting black	Warning
	Safety blue Contrasting white	Mandatory action

2.3.2 Safety symbols in the operating instructions

The following safety symbols are used in the operating instructions:

Prohibition symbols

Safety symbol	Meaning	Safety symbol	Meaning
	Do not touch, housing under high voltage		Eating and drinking pro-hibited
	Fire, open flame and smoking prohibited		Do not step on surface
	Do not touch		

Warning symbols:

Safety symbol	Meaning	Safety symbol	Meaning
	General warning		Entanglement hazard
	Dangerous voltage		Tripping hazard
	Hazardous substances		Slippery surface
	Danger of whipping hoses		Danger machinery starts automatically
	Hot surface		Danger of hand injuries
	Suspended load warning		Danger of tipping
	Beware of industrial vehicles		Danger of entanglement at printing substrate conveyance area
	Corrosive substances		Warning electromagnetic field
	Cutting hazard		

Mandatory action symbols

Safety symbol	Meaning	Safety symbol	Meaning
	Disconnect before work		Unplug power supply before opening
	Wear safety gloves		Wear respiratory protection
	Wear eye protection		Wear safety shoes
	Read manual		
	Disposal of substances		

2.3.3 Safety symbols on the machine

The following safety symbols are attached to the machine:

Prohibition symbol	Position on the printer
	On the rear of the printer in the installation area+400, on the pivoting plate with the automatic circuit breaker
	On the gas springs of the hinged hood

Warning symbol	Position on the printer
	• Main switch • Corona station • Within the printer on different devices.
	On all housing panels, behind which could be live components exceeding 24 V.
	Print head unit. Below the cover and at the rear side.
	• Gear motor with friction drive • Transformer of corona
	• Corona station
	• Electrodes of printing substrate discharger

Mandatory action symbol	Position on the printer
	• Ink cartridge flap, inside • Collection pan • Residual ink bottle flap, inside

Notice
➔ Always keep the safety symbols clean. ➔ Comply with the warnings and mandatory actions. ➔ Do not expose yourself needlessly to danger.

2.3.4 Safety symbols on the cartridges for ink and cleaning fluid

The following safety symbols are used on the cartridges filled with ink and cleaning fluid:

Safety symbol	Meaning	Origin
	Hazardous to health!	CLP-Directive(EG) Nr. 1272/2008
	Caution	CLP-Directive(EG) Nr. 1272/2008

2.4　　　Safety instructions

The basic requirement for the safe handling and trouble-free operation of the ITS6 printer is awareness of the fundamental safety instructions and the work safety regulations.

These operating instructions contain all of the important information needed for operating the printer safely.

The internal work safety regulations must be observed.

⚠ **Warning**
Risk of fatal injury from contact with live parts.   ➜ Work on electrical equipment must be performed only by authorized personnel qualified in electronics.   ➜ Always keep switch cabinets closed. Only authorized personnel with key or tool are allowed access to the switch cabinets.   ➜ Do not work on live parts.   ➜ Replace loose connections and damaged cable immediately. Turn off and lock main switch before performing work.   ➜ Cables should not be jammed or crushed. Cables must be laid so that they cannot be damaged or pose a tripping hazard.

⚠ **Warning**
The machine may not be operated without locked and functioning safety equipment.   ➜ Risk of injury due to sudden movements of the handling systems in set-up mode and during repairs and maintenance.   ➜ Set-up work on the machine should be performed at a slow speed.   ➜ The machine components may be programmed by specially trained personnel only.

⚠ **Warning**
Warning of electromagnetic field. Persons staying in the direct vicinity of the electromagnetic field may be charged.   ➜ Persons with pacemakers should stay away from the corona station during printing operation..   ➜ A person who faints must be taken out of the danger area immediately. If the person continues to be unconscious, start resuscitation.   ➜ Also, call a doctor or paramedic.

⚠ **Warning**
The safety of the machine is ensured only when all safety equipment has been properly installed and is active.   ➔ Do not operate the machine without safety equipment.   ➔ Safety equipment must not be removed until the main switch has been disabled.   ➔ After repair work, replace all safety equipment and check for proper functioning.

⚠ **Warning**
➔ Do not perform repair work on machine components until each component has been turned off at the main switch and has been protected with a padlock against being switched back on.   ➔ Install a warning sign "Attention! Work on the machine in progress – Do not start the machine!"

⚠ **Warning**
Risk of injury due to improper handling of compressed air.   ➔ Never aim the discharge end of pneumatic hoses at people, otherwise serious injury can result.   ➔ Never aim the discharge end of pneumatic hoses at loose objects.   ➔ Work on pneumatic equipment must be performed by authorized and qualified personnel only.

⚠ **Warning**
Tripping hazard.   ➔ Make sure no loose cables or objects are left on the floor in the area of the machine.

⚠ **Warning**
Danger of slipping due to spilled lubricant or leaking liquids.   ➔ Clean up a contaminated floor immediately! Dispose of the cleaning cloths in the provided collection containers.

⚠ **Warning**
Warning of electromagnetic field. ➔ Persons with pacemakers should stay away from the corona station during printing operation. A person who faints must be taken out of the danger area immediately. If the person continues to be unconscious, start resuscitation. Also, call a doctor or paramedic. ➔ Persons staying in the direct vicinity of the electromagnetic field may be charged.

⚠ **Caution**
Risk of injury due to incorrect programming. ➔ Do not make any changes to the software of programmable systems.

⚠ **Caution**
Risk of burning and/or scalding. ➔ Use caution when handling hot production supplies. ➔ Do not touch the housing of the corona station.

⚠ **Caution**
Risk of injury upon contact with the electrodes of the printing substrate discharger. ➔ Do not reach into the area between the two electrodes / do not touch their needle-like contacts.

2.5   Safety concept

⚠ Warning
Death, serious injury or substantial material damage can occur if the corresponding precautions are not taken.   → Check the proper functioning of all safety measures on the machine.   → Do not bypass any safety measures.   → Wear the required personal safety protection equipment.   → Adhere to the specified order of work.   → Acquaint yourself with the handling of operating materials.

2.5.1   Safety zones

There are three different zones, depending on the degree of danger emanating from the machine. Only persons authorized by the owner are entitled to access the individual zones.

2.5.1.1   Traffic zone

The traffic zone is the area specified by the owner which is accessible to or can be reached by anyone without opening hard guards, triggering sensors on safety equipment, or using any other means to gain access.

2.5.1.2   Work zone

The work zone is the area specified by the owner in which persons work on or operate the printer in normal mode (inspection, maintenance and cleaning are not included here).

2.5.1.3   Maintenance zone

The maintenance zone is the area specified by the owner to which only the personnel authorized to perform maintenance work is allowed access. Access requires a tool. The machine is not switched off when accessed, but rather continues to run. Since a risk to personal health and safety is involved, this area is accessible only to authorized and trained personnel.

2.5.2 Safety measures

The purpose is to protect…

- … the personnel against injuries,
- … the machine against damage and downtime,
- … the environment against hazards.

The following safety measures were taken based on a risk analysis of the ITS6 printer:

- Fixed / movable hard guards,
- Use of monitored safety doors.
- Emergency Stop button at control panel,
- Obligation to wear personal protection equipment (PPE),
- Attachment of safety signs to the machine,
- Safety instructions on the machine,
- Safety instructions in the operating instructions.

All of the aforementioned measures will be explained in detail below.

2.5.3 Safety equipment

All dangerous areas are protected by moveable, mechanical hard guards.

Passive safety equipment is for the protection of the environment.

The hard guards include:

- The complete housing of the machine,
- Cover and safety doors with interlocking guard and monitoring.

The passive safety guards include:

- Collection container for cooling water underneath the cooling water inlet and outlet,
- Collection pan for ink and cleaning fluid under the printing unit. Small collection pans under the ink management and the residual ink bottle.

⚠️ **Warning**
The safety equipment prevents access to dangerous areas by unauthorized personnel.   → Never manipulate or deactivate safety guards or safety equipment.   → The conversion or deactivation of safety equipment can lead to serious injuries.

The instructions and safety signs attached to the printed must be observed:

- They must not be altered or removed.
- Damaged signs should be replaced immediately.
- Labels must be legible.

2.5.4 Organizational safety concept

In order to avoid accidents, the safety concept contains several measures:

- Personal safety,
- Machine safety,
- Data safety.

User administration and access control

In order to avoid damage to the ITS6 printer, only authorized persons and groups of persons have access to the operating functions and modes, which require the appropriate qualification.

All safety-related functions of the printer - e.g. changing the settings, starting the printing process or activating the feed-in – cannot be manipulated unless the qualified personnel:

- … is registered in the user administration,
- … possesses access rights and
- … has logged on with the user-specific password.

2.5.5   Personal protection equipment

The personal protection equipment (PPE) that has to be worn depends on the particular activity that is being performed.

Please refer to the following table:

Symbol	PPE	Activity
	Protective eyewear	During all maintenance work
	Safety gloves	Work on the printer, e.g. replacement of print heads
	Safety shoes	At all times

Protective gloves

The inks are very aggressive and may cause serious injuries even after brief skin contact. Therefore, always use protective gloves that comply with the following specifications:

Material	Minimum thickness of material	Max. period of use
Butyl rubber	0.36 mm	480 min.
Nitrile rubber	0.38 mm	480 min.
Neoprene	0.65 mm	240 min.

⚠ **Warning**
Risk of injuries when working on the printer.
➔ Wear the required personal protection equipment.
➔ Internal guidelines must be followed!

⚠ **Warning**
Danger of serious skin injuries!
➔ <u>Never use gloves from natural latex</u>, as they would be penetrated by the cleaning fluid after a very short time and dissolved!
➔ Do not use gloves several times, but dispose of them after use and collect them in a suitable container.

2.5.6 Safety doors with position monitor
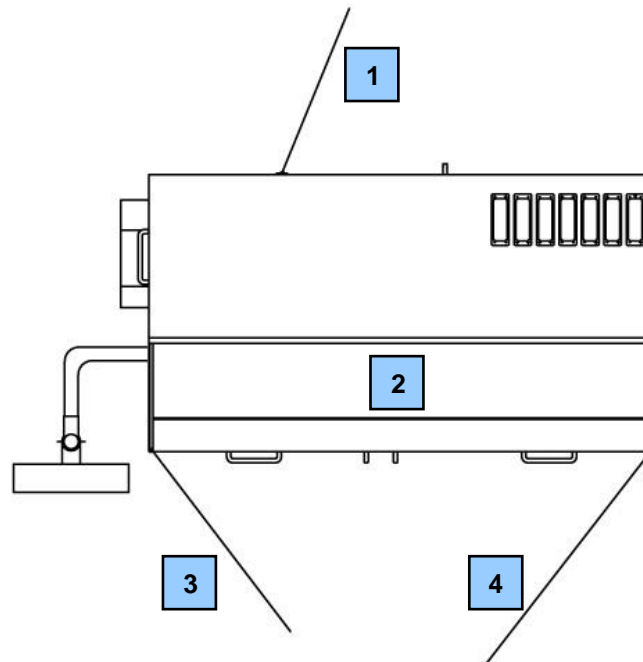
Fig. 1. Safety doors with position monitor (view from above)

Pos.	Components	Function
1	Safety door rear	Moveable hard guard (access to the rear of the print head unit and the collection pan)
2	Hinged hood	Moveable hard guard (access to internal components)
3	Safety door unwinding unit	Moveable hard guard (access to unwinding unit)
4	Safety door rewinding unit	Moveable hard guard (access to rewinding unit)

The safety doors installed on the machine are equipped with door monitoring sensors and interlocks.
The interlocks ensure that the safety doors cannot be opened until the machine has come to a complete stop or potentially dangerous movements have been excluded.

All doors in the machine are integrated in a common Emergency Stop system.

The door position monitor of the door interlock switches constantly monitors the status of every single door and ensures that, as long as the doors are

still open in the areas accessible to the operator, neither can the drives be started nor are any parts energized with high voltage.

All doors must be closed in order to start the printer.

Whenever the door interlock is not properly engaged, this will be indicated on the printer's display.
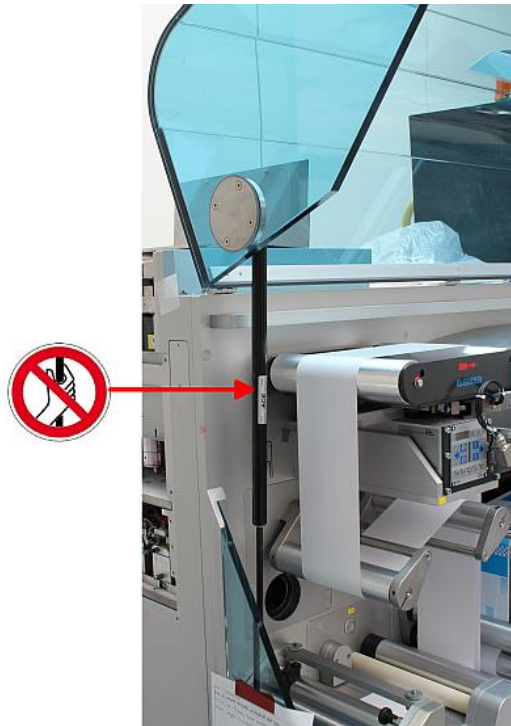
Fig. 2. Do not misuse the gas springs on the hinged hood as handles!

⚠ **Warning**	
	Crushing hazard. Risk due to falling hinged hood when the gas spring on the hinged hood is damaged. ➜ Do not misuse the gas springs on both sides of the hinged hood as handles. ➜ Do not apply lateral forces to the gas springs.
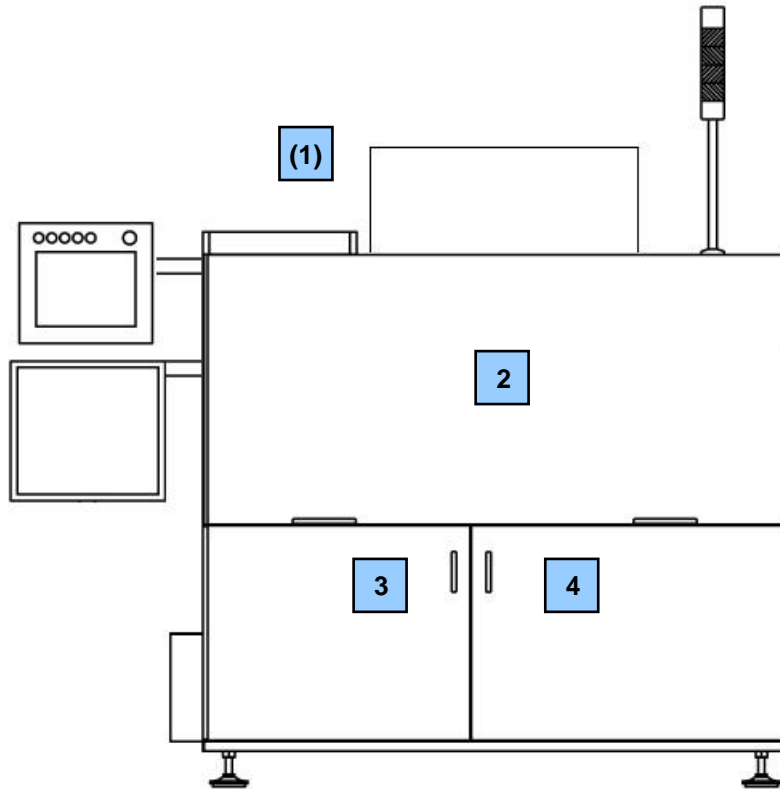
Fig. 3. Position of the door interlock switches

Pos.	Function	Displayed message
1	Monitoring of the safety door at the rear (access to the print head unit and the collection pan)	66 - "Rear door open"
2	Monitoring of the hinged hood (access to web guider)	63 - "Print head unit: hinged hood open"
3	Monitoring of the safety door (access to unwinding unit)	5 - "Bottom left door open"
4	Monitoring of the safety door (Access to U-loop storage, un-winding unit and web outfeed)	12 - "Bottom right door open"

2.5.7   Emergency Stop button safety device

In order to avert acute personal danger, an Emergency Stop button is installed on the control panel of the machine – in an easily accessible place. The button effectuates a controlled shutdown of all mechanical parts of the printer.

⚠ **Warning**
Danger due to inoperable emergency stop button.
➔ Anyone working on the machine must be aware of the location and function of the Emergency Stop button.
➔ Never manipulate the Emergency Stop button.
➔ The Emergency Stop button must always be accessible.
➔ Never cover over the Emergency Stop button with objects, hang something over it or use it as a coat hook.
➔ After completing repair work, make sure that the Emergency Stop button is working properly.

Notice
When the Emergency Stop button is used, sometimes it can cause the printer to switch off for an indefinite period.
➔ Before the machine can finally be restarted, the Emergency Stop must be reset.
➔ Before the machine is restarted, all moving parts must be checked and returned to their normal position if necessary.

The following illustration shows the position of the Emergency Stop button on the printer:
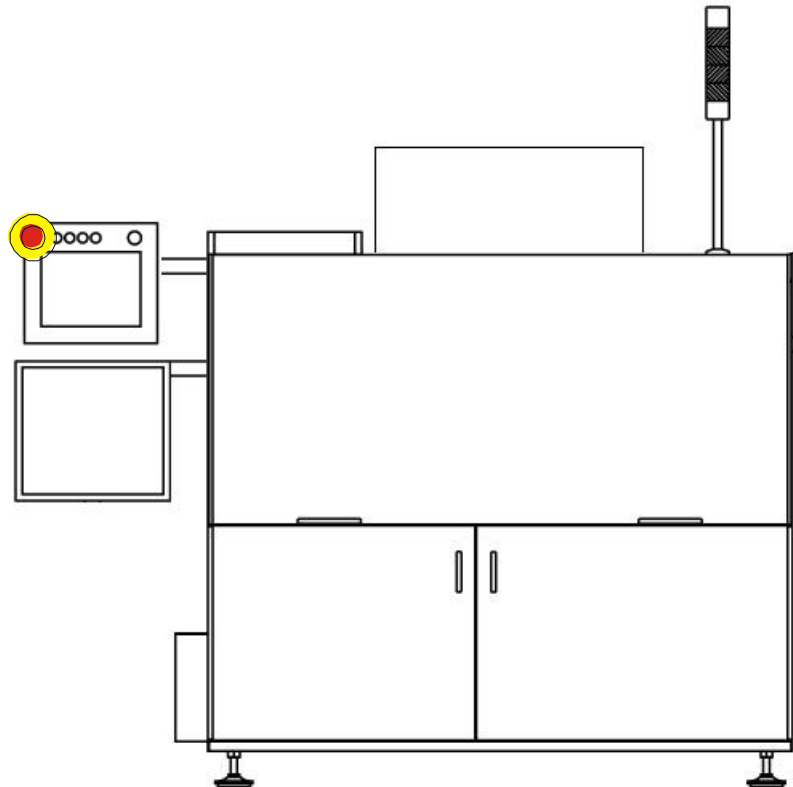
Fig. 4. Emergency Stop button on the printer

Depiction	Meaning	Position
⦿	Emergency Stop button	Control panel

Effects of an Emergency Stop

Pos.	Control element	Effects of an Emergency Stop
1	Emergency Stop button	When pressed, it switches off all drives, live components, and the pneumatic system, and effectuates a controlled shutdown of all mechanical parts of the printer. The touchscreen, displays and door interlocks remain switched on and active.

With the Emergency Stop button, you can stop the entire machine in critical situations, thereby reducing the chance of potential injuries. The button effectuates a controlled shutdown of all mechanical parts of the printer.

Anyone working on the machine must be aware of the location and function of the Emergency Stop button.

Never manipulate the Emergency Stop button.

The Emergency Stop button must always be accessible.

Never cover over the Emergency Stop button with objects, hang something over it or use it as a coat hook.

After completing repair work, make sure that the Emergency Stop button is working properly.

When the Emergency Stop button is used, sometimes it can cause the printer to switch off for an indefinite period.

Before the machine can finally be restarted, the Emergency Stop must be reset.

Before the machine is restarted, all moving parts must be checked and returned to their normal position if necessary.

Information

- By twisting the red button clockwise or counterclockwise, it will spring back out and the Emergency Stop button will be deactivated again.
- A green ring will appear when it springs back out.

2.5.8   Main switch

The main switch is used to switch the power supply to the machine on and off.
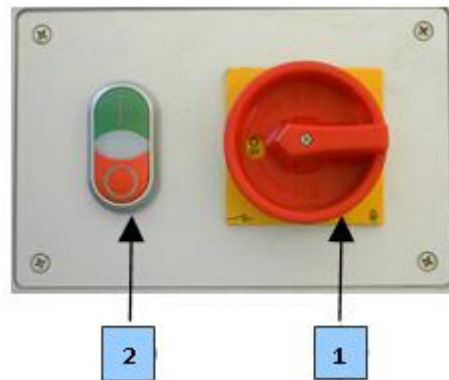
Fig. 5. Main switch on the printer

Meaning	Position	
Main switch	**1**	Main switch
	2	On/Off switch

Effects of the Main Switch and the On/Off Switch

Pos.	Control element	Effects of the main switch
1	Main switch	Cuts off power to the entire printer.
2	On/Off switch	Stops all moving parts, incl. pneumatic system: • Red button is pressed - all moving parts, incl. pneumatic system are stopped. The touchscreen and all lights remain switched on. • White button illuminates - if an Emergency Stop hasn't been triggered and the auto switching mode is active. • Green button is pressed - Protects against unintentional automatic restarting. This button has to be pressed each time the machine is switched on and after every power failure.

2.5.9   Sensors

The sensors constantly monitor the current status of all critical aspects of the printer. Whenever a parameter deviates from the set points, the printer tries to restore the nominal condition on its own. If that isn't possible, then an alarm and an error message are triggered. The error message is shown on the display; see Chapter 9.1.4 "Messages in the "Current Alarm" and "Stopreason" lines".

Depending on the gravity of the error, the printing process will either be stopped in a controlled manner or stopped directly.

2.6   Residual risks

Other risks occur when operating the ITS6 printer, which can be avoided through safety-conscious work habits.

⚠ **Warning**
Risk of fatal injury due to electrical shock. ➜ Observe the warning signs attached. ➜ Do not remove any covers in the switch cabinet. ➜ Work on electrical equipment must be performed only by authorized personnel qualified in electronics.

⚠ **Warning**
Danger of entanglement at printing substrate conveyance area. ➜ Do not reach into the individual guide rollers of the printing substrate.

⚠ **Caution**
Permanent damage to skin can be caused by contact with machine operating materials of all types! (long-term injuries) ➜ Wear solvent-resistant safety gloves and protective eyewear when handling media. (see section 2.5.5, "Personal protection equipment"). ➜ Avoid contact with operating materials and cleaning agents! ➜ Wash exposed skin thoroughly. See a doctor if skin irritation persists. ➜ Change contaminated or soaked clothing immediately. ➜ Observe the safety instructions of the materials used.

2.7   Duties of the owner

The owner commits himself to only allowing individuals to work on the machine who…

- … are familiar with the basic work safety and accident prevention regulations,

- … are qualified and have been trained to work on the ITS6,

- … have read and understood these operating instructions.

The owner of machines is obligated to draw up a standard operating procedure on the basis of the operating instructions and the operating conditions. In addition to instructions for normal operation, it should also include instructions for the following special situations:

- Transport

- Assembly, set-up

- Test run

- Troubleshooting

- Repair

- Decommissioning

Standard operating procedures can be compiled according to the following structure:

- Area of application

- Hazards and protective measures during normal and special operations

- General requirements of the personnel

- Instructions on what to do in case of emergency

Notice
The owner must remind the personnel about the observance of this requirement at least every six months.

2.8 Requirements of the personnel, due diligence

2.8.1 General

⚠ **Warning**
➔ All work on the ITS6 printer must be performed only by qualified and instructed personnel in compliance with the safety instructions of these operating instructions!

Only assigned personnel should work on the machine.

Never allow the machine to be operated by persons under the influence of substances which diminish their ability to react (alcohol, medicines, drugs,…) or who are not fit to operate the machine due to health reasons.

Personnel which is being schooled, trained, instructed, or is learning on the job, must be supervised at all times by a qualified and trained person when working on the machine.

Notice
• The operating instructions must always be available at the machine's location.
• The assigned personnel must know where to find them.

2.8.2 Due diligence of the personnel

The personnel must …

- … have read and understood the instruction manual and its safety chapter of the operating instructions for the individual components,

- … know the function and location of the control elements and the safety equipment (safety equipment includes, e.g. the Emergency Stop button, safety doors with position monitoring, etc.),

- … check the functioning of the safety equipment every day before work and check the machine at least once a day for visible external damage or defects. Any changes that occur (including the operating performance), which compromise the safety or function of the machine, must be reported immediately,

- ... check the condition of the used printing substrate several times a day and remove it immediately from the machine when the material begins to deform and thus may touch the print heads,

- … perform a standard or intensive cleaning of all print heads after switching on the printer and at least every two hours thereafter. Furthermore, all print heads must undergo a final standard and manual cleaning at the end of each shift.

- … inspect the essential components of the printer and clean them daily at the end of work/end of the shift,

- … have the causes of problems fixed immediately by authorized and qualified personnel,

- … make sure that the machine is not operated beyond the permitted threshold limits,

- … have been briefed on the way the machine functions and be familiar with the processes and particularities,

- … know how the individual tasks are performed,

- … be told about the residual risks emanating from the machine,

- … know which personal protection equipment must be worn for which task,

- … be in the appropriate physical condition to use the machine.

⚠️ **Warning**
⚠️   ➔ Any work habits that compromise safety should be avoided!

2.8.3   Training of the personnel

Various qualifications are required for the various tasks on the ITS6 printer.

The responsibilities of the personnel for the machine's individual phases of life (transport, commissioning, operation, maintenance, repair, dismantling, and disposal) must be clearly defined.
The following table shows the minimum qualifications required for working on the machine.

Job	Minimum qualification
Transport	Instructed qualified personnel
Assembly/commissioning	Skilled worker
Normal operation	Instructed individuals
Finding problem source	Skilled worker
Solving problems	Skilled worker
Maintenance/cleaning	Instructed individuals
Repair	Skilled worker
Testing	Competent individual

- An instructed individual is considered someone who has been instructed and, if appropriate, trained how to perform the assigned tasks, who has been told about the potential danger arising from improper actions, and who has been informed about the required safety equipment and safety measures.

- A skilled worker is considered someone who, based on his professional training, knowledge and experience, as well as knowledge of pertinent regulations, is able to assess the tasks assigned to him and recognize potential danger.

- A competent individual is considered someone who, based on his job training, job experience and his present job, has the necessary technical know-how to test and program the printer.

⚠ **Warning**
➔ The personnel working on and assigned to work on the printer must have the required qualification.

2.8.4   Minimum age

- Personnel must be at least 18 years old.

- Exception: Trainees under the age of 18 may operate the printer for training purposes only in the presence of a qualified supervisor.

2.9   Handling emergencies

Please observe the following points:

- The personnel must have been taught how to handle emergencies.

- All individuals working on the machine must have been informed about how to shut down the machine quickly.

- Press the Emergency Stop button in case of machine-related emergencies.

- The location of the First Aid stations must be known.

- The location and operation of fire extinguishers must be known. The personnel must have been instructed about fire alarms and firefighting measures.

- The personnel must be aware of the escape routes displayed in the production hall.

- The correct handling of emergencies must be checked and documented on a regular basis.

In case of emergency:

- Provide First Aid to the victims.

- Call a doctor or the occupational nurse.

- Inform superiors.

- Follow the instructions of the superiors or support staff.

3 Technical Data

3.1 Dimensions and weight

The values listed in the following table relate only to the intrinsic weight and external dimensions of the printer at the time of delivery. The actual space requirement after installation, the weight of the hoses used, and the printing material are not included in this list.

Measurement	Value	Remarks
$L_{tot, closed}$	1 902 mm	Total length with doors closed, measured across all of the parts on the front (including filters of the air circulation system and main switch), but without control panel.
	2 614 mm	Total length with doors closed, including monitor in swiveled-out position, control panel on the right side
$L_{tot, opened}$	3 600 mm	Total length with lower doors opened to the stoppers.
$W_{tot, closed}$	1 065 mm	Total width, doors closed, without control panel.
$W_{tot, opened}$	2 577 mm	Total width, doors opened
H_{hou}	1 640 mm	Height of housing, measured from the floor to the surface of the closed hinged hood, without structures, such as stack light, interfaces or ink management.
H_{Ink}	1 730 mm	Height of housing, measured from the floor to the surface of the ink management's closed hood.
$H_{hou, max}$	2 300 mm	Height of printer, measured from the floor to the surface of the opened hinged hood.
$H_{Sig, max}$	2 475 mm	Height of printer, measured from the floor to the top of the stack light.
Weight	1 300 kg – 1 500 kg	Total weight, depending on the components that are installed.

3.2   Load-bearing capacity of the foundation

Load-bearing capacity of the foundation				
Weight	1 300 kg	1 400 kg	1 500 kg	1 600 kg
Area load	733 kg/m²	790 kg/m²	846 kg/m²	902 kg/m²
Average concentrated load [1]	325 kg	350 kg	375 kg	400 kg
Floor composition	Raw or coated concrete, floor tiles			
Vibrations	none or negligible amount			

1)   The maximum concentrated load depends to a large extent on the distribution of the load onto the four adjustable feet of the printer. If necessary, the load can be balanced using a torque wrench.

3.3   Ambient conditions

Ambient conditions	
Ambient temperature	+17°C to +28°C
Relative humidity	20 - 60 %
Use	indoors only
Height above sea level	max. 2000 m
Light	Do not expose the printer to direct intense light. Protect it against sunlight especially.
Air purity	Use only in closed spaces without any suspended particles in the air, e.g. dust or fibers

3.4   Electrical connections

Power supply	
Voltage	AC, 3~ 400 V (min. 360 V; max. 440 V)
Frequency	50/60 Hz
P_{max}	15 kW
required pre-fuse	25 AT 3 Ph

3.5 Pneumatic system

Pneumatic connections	
Pressure	6 – 8 bar (6 – 8 * 10^5 Pa)
Max. flow rate	10 dm³/min.
Condition	dry, oil-free

3.6 Coolant connection

Coolant connection	
Operating pressure	4.5 bar (4.5 * 10^5 Pa)
Max. Inlet pressure at max. volumetric flow rate	Max. 5.0 bar (5.0 * 10^5 Pa)
Max. return pressure	Max. 0.5 bar (0.5 * 10^5 Pa)
Temperature	20°C ± 1°C
Coolant	1 part propylene glycol and 2 parts de-mineralized water as well as corrosion inhibitor
Diameter of hose intake	19 mm
Diameter of hose discharge	19 mm
Max. length of inlet and return all in all	20 m
Flow rate	min. 23 l/min.
Cooling power	min. 8 kW
Remaining rejected heat from the printing system to the ambience	max. 4.8 kW

<table>
<tr><td></td><td colspan="2">Notice</td></tr>
<tr><td>1)</td><td colspan="2">Mixtures of pure glycol and de-mineralized water have corrosive properties!
➔ Therefore only use anti-freeze with added corrosion inhibitor, e.g. PEKASOL</td></tr>
<tr><td></td><td colspan="2">Notice</td></tr>
<tr><td>2)</td><td colspan="2">The hoses for intake and discharge must stand the pressure and be resistant against propylene glycol.
➔ Use only hoses with NBR inner tube.
➔ Markem-Imaje CSAT recommends Landefeld NBR tank truck hoses.</td></tr>
</table>

3.7 Interfaces for signal and data transmission

Interfaces	
Print data	USB-A jack for the transfer of files by means of USB flash drive
	Ethernet connector RJ 45 10/100
Process interfaces	HARTING 5-pole, for signal exchange with ext. cooler

3.8 Performance range

Performance range	
Type designation	CSAT ITS6 - 210
Resolution	600 x 600 dpi (in direction of printing) x (perpendicular to direction of printing)
Printing speed at 600 dpi	min.: 2 m/min at 600 dpi max.: 48 m/min at 600 dpi recommended: 4 - 40 m/min, depending on layout, printing substrate and configuration
Printing length	No fixed limitation of printing length. The maximum possible printing length depends on the kind of layout and the preparation by prepress.
Printing width	max. 210 mm
Passage width	230 mm
Max. permitted width of the printing substrate	220 mm
max. diameter of printing substrate roll	550 mm
Max. weight of printing substrate roll placed on the unwinding shaft	max. 150 kg
Core diameter of the printing substrate	70 – 78 mm
Material of the cores	Heavy cardboard or plastic cores are to be preferred

Max. thickness of the printing substrate for …		
… printing table with non-exchangeable deflection rollers		200 µm
… printing table with exchangeable deflection rollers, using the following deflection rollers	0 - 0.2 mm	200 µm
	0.2 - 0.3 mm	300 µm
	0.3 - 0.4 mm	400 µm
	0.4 - 0.6 mm	600 µm

3.9 Substrate specifications

Depending on the technical equipment involved, every ITS6 printer is capable of printing a host of materials, be it labels or continuous webs of metal foil, paper, plastic or even textiles. All of them must fulfill the following criteria:

Requirement	Reason
• Good wettability	The ink should not roll off after it is applied, but rather should be held firm in place until the last curing process is completed. In some cases a more suitable printing substrate has to be used or else the printer in question has to be equipped with corona treatment.
• Mechanical resilience	The printing substrate is conveyed through the printer at high speed and under high tensile stress while changing directions several times. Perforated or pre-cut printing material has poor tear resistance and, therefore, is generally not permitted for use in the ITS6 printer.
• Surface and material properties	The printing substrate should have a homogenous structure, a smooth, blister-free surface and straight edges. The surfaces of the material to be printed – this includes the end faces of the roll of printing material – must be free of any loose particles, dust or sticky substances (e.g. gelatin), since these could damage the print heads directly or greatly impair the effectiveness of the printing substrate cleaning module. Thick fibers in textile materials should lie in the direction of travel whenever possible. Likewise, fibers should not protrude from the fabric, since they could get caught in the nozzles of the print heads and clog them permanently.
• No distortion ("center bowing")	The printing substrate is not to become deformed (center bowing or wavy edges) at all or only by 0.2 mm during the moisture equalization process since the edges of the printing substrate could otherwise rub along the sensitive nozzle plates of the print heads and may clog or damage these.
• Chemical resistance	Neither the printing substrate itself nor any coating it might have should be able to be dissolved or chemically altered by the ink or cleaning fluid used. The same applies to the backing material of labels.

•	Barrier coat	Labels or self-adhesive materials must have a barrier coat on the side to be printed which provides reliable protection against the adhesive or its solvent from being released.
•	Elasticity	The printing substrate must pass over rollers and change directions several times, but without being permanently deformed and causing blisters and creases to form. Labels should not come loose from their respective backing material during this process.
•	Taped seams	Each roll of printing substrate that is delivered should consist of one single length of uninterrupted material preferably. If this is not possible for technical reasons, the separate sections should be joined to one another using heat-resistant, highly visible tape so that these seams cannot get into the print head unit or the primary UV curing unit during the printing process.
•	Heat resistance	The temperatures beneath the print head units can reach levels of up to 50°C. In the main curing unit the printing substrate is subjected to even higher temperatures which can reach 100°C under particularly unfavorable conditions. Besides the printing speed, the greatest determining factor with regard to heat generation is the appearance of the print image in question, since the more dark colors it contains, the more light will be absorbed and converted into heat, which the printing substrate might only be able to release slowly into the environment. **IMPORTANT !** The printing material must be able to withstand these high temperatures for several minutes at a time without softening significantly, because it is kept under constant tension and could tear otherwise. If the material tears, it could come into contact with the print head and, in the worst case scenario, cause irreparable damage! Furthermore, the printing material should not emit any vapors or, especially, decompose when subjected to heat!

When selecting a printing substrate to use, make sure that it fulfills as many of the following criteria as possible.

3.9.1 Paper-like roll-fed material

Determining factor, parameter	Required property
Material thickness of continuous material for printing table without exchangeable deflection rollers	max. 200 µm
Material thickness of continuous material for printing table using suitable exchangeable deflection rollers	max. 600 µm
Material properties	• Homogenous structure in all directions or fiber orientation in direction of travel. • No creases or blisters. • Edges become bowed by no more than 0.2 mm. • Straight edges without fringes.
Properties of the supplied material roll	• Roll-fed material preferably without taped seams • Any taped seams must be highly visible, because they should never be allowed to pass under the print head unit or the main curing unit. • No moisture differences between the edges and the inner area of the material roll.

3.9.2   Plastic roll-fed material

Determining factor, parameter	Required property
Material thickness of continuous material for printing table without exchangeable deflection rollers	max. 200 µm
Material thickness of continuous material for printing table using suitable exchangeable deflection rollers	max. 600 µm
Material properties	• Homogenous structure in all directions or fiber orientation in direction of travel. • No creases or blisters. • Edges become bowed by no more than 0.2 mm. • Straight edges without fringes.
Properties of the supplied material roll	• Roll-fed material preferably without taped seams • Any taped seams must be highly visible, because they should never be allowed to pass under the print head unit or the main curing unit. • No moisture differences between the edges and the inner area of the material roll.

3.9.3   Aluminum foil roll-fed material

Determining factor, parameter	Required property
Material thickness of continuous material for printing table without exchangeable deflection rollers	max. 200 µm
Material thickness of continuous material for printing table using suitable exchangeable deflection rollers	max. 600 µm
Material properties	• Homogenous structure in all directions or fiber orientation in direction of travel. • No creases or blisters. • Edges become bowed by no more than 0.2 mm. • Straight edges without fringes.
Properties of the supplied material roll	• Roll-fed material preferably without taped seams • Any taped seams must be highly visible, because they should never be allowed to pass under the print head unit or the main curing unit. • No moisture differences between the edges and the inner area of the material roll.

3.9.4 Textile roll-fed material

Determining factor, parameter	Required property
Material thickness of continuous material for printing table without exchangeable deflection rollers	max. 200 µm
Material thickness of continuous material for printing table using suitable exchangeable deflection rollers	max. 600 µm
Material thickness of continuous material for printing table using suitable exchangeable deflection rollers	max. 600 µm
Material	• Natural fibers or synthetics
Fiber orientation	• Thick fibers should lie in the direction of travel of the printing substrate whenever possible • Fibers should not protrude from the fabric • Edges become bowed by no more than 0.2 mm • No creases or blisters • Straight edges without fringes
Properties of the supplied material roll	• Roll-fed material preferably without taped seams • Any taped seams must be highly visible, because they should never be allowed to pass under the print head unit or the main curing unit. • No moisture differences between the edges and the inner area of the material roll.

3.9.5   Label material made out of paper

Determining factor, parameter	Required property
Material thickness of continuous material for printing table without exchangeable deflection rollers	max. 200 µm
Material thickness of continuous material for printing table using suitable exchangeable deflection rollers	max. 600 µm
Shape of the label	• Label width ≥ 10 mm (crosswise to the direction of travel) • Label length ≥ 5 mm (in direction of travel) • Label spacing ≥ 2 mm (in direction of travel) • Leading and trailing edges not at an angle, but preferably perpendicular to the edge of the backing material.
Material properties of backing material and label	• Homogenous structure in all directions or fiber orientation in direction of travel. • No creases or blisters. • Edges become bowed by no more than 0.2 mm. • Straight edges without fringes.
Properties of the supplied material roll	• Roll-fed material preferably without taped seams • Any taped seams must be highly visible, because they should never be allowed to pass under the print head unit or the main curing unit. • No moisture differences between the edges and the inner area of the material roll.
Peel-off temperature of the labels	> 120°C

3.9.6   Label material made out of aluminum foil

Determining factor, parameter	Required property
Material thickness of continuous material for printing table without exchangeable deflection rollers	max. 200 µm
Material thickness of continuous material for printing table using suitable exchangeable deflection rollers	max. 600 µm
Shape of the label	- Label width ≥ 10 mm (crosswise to the direction of travel) - Label length ≥ 5 mm (in direction of travel) - Label spacing ≥ 2 mm (in direction of travel) - Leading and trailing edges not at an angle, but preferably perpendicular to the edge of the backing material.
Material properties of backing material and label	- Homogenous structure in all directions or fiber orientation in direction of travel. - No creases or blisters. - Edges become bowed by no more than 0.2 mm. - Straight edges without fringes.
Properties of the supplied material roll	- Roll-fed material preferably without taped seams - Any taped seams must be highly visible, because they should never be allowed to pass under the print head unit or the main curing unit. - No moisture differences between the edges and the inner area of the material roll.
Peel-off temperature of the labels	> 120°C

3.9.7   Label material made out of plastic

Determining factor, parameter	Required property
Material thickness of continuous material for printing table without exchangeable deflection rollers	max. 200 μm
Material thickness of continuous material for printing table using suitable exchangeable deflection rollers	max. 600 μm
Shape of the label	• Label width ≥ 10 mm (crosswise to the direction of travel) • Label length ≥ 5 mm (in direction of travel) • Label spacing ≥ 2 mm (in direction of travel) • Leading and trailing edges not at an angle, but preferably perpendicular to the edge of the backing material.
Material properties of backing material and label	• Homogenous structure in all directions or fiber orientation in direction of travel. • No creases or blisters. • Edges become bowed by no more than 0.2 mm. • Straight edges without fringes.
Properties of the supplied material roll	• Roll-fed material preferably without taped seams • Any taped seams must be highly visible, because they should never be allowed to pass under the print head unit or the main curing unit. • No moisture differences between the edges and the inner area of the material roll.
Peel-off temperature of the labels	> 120°C

3.9.8   Suitable printing substrates

According to the experience of Markem-Imaje CSAT GmbH, the following printing substrates are suitable for printing – assuming the correct procedure is used:

Manufacturer	Face material	Name of material	Coating ("Top-Coat")	Adhesive	Backing material
Raflatac	Paper	Raflacoat	no	RP51	Honey Glassine 65
Raflatac	Paper	Castgloss	no	RP51	Honey Glassine 65
Raflatac	Paper	Raflagloss	no	RP51	Honey Glassine 65
Raflatac	PP	PP clear TC	yes	PR35	HD 70 white
Mactac	PP	Maccrystal	yes	MP318UV	Clear PET 36
Mactac	PE/PP Mix	Coex top wh	yes	MP128UV	Cent 6
Mactac	PET	Macmilmar Clear TC 25	yes	MP312	Cent 6
Mactac	PE	Macthene 1029 TC	yes	MP128N	Cent 6
Mactac	PP	Macpropy TC	yes	MP128N	Cent 6
Mactac	PVC 90 µm	MacCal 8129	yes	MP128N	Cent 6
Mactac	PVC 90 µm	MacCal 8199	yes	MP128N	Cent 6
Mactac	PVC 80 µm	MacCal 9899	yes	MP128N	Cent 6
3M	PET	92913 PET silver matt	yes	310E	glassine white
3M	PET	92914 PET white gloss	yes	310E	glassine white
3M	PET	92915 PET white matt	yes	301E	glassine white
3M	PET	7828 PET silver matt	yes	310E	glassine white
Fasson	Paper	High gloss white	no	S2000N	BG40
Fasson	PE/PP-Mix	Primax 250	no	S692N	#44 pk
Fasson	PE	PE matt white	no	S692N	BG40
Herma	PE	PE white	no	62X	Glassine
Fasson	Matt paper	matt wine / Estate #8	no	WLA	Glassine

3.9.9 Unsuitable printing substrates

Never insert a printing substrate in the printer if at least one of the following points applies:

- With printing tables with deflection rollers: Total thickness of the material above the values mentioned in chapter 3.8.

- Printing substrates with edges are bowed up by more than 0.2 mm (edges that are bowed or wavy).

- Insufficient tensile strength: The material stretches, frays, or threatens to tear.

- Perforated material.

- Labels or self-adhesive materials without a barrier coat on the side to be printed.

- Insufficient temperature resistance: At temperatures above 50°C the material begins to stretch, to form blisters or waves, to tear, or to melt.

- Printing substrates with fibers protruding from the surface.

- Printing substrates and coatings which partially dissolve or become chemically altered through the use of inks and cleaning fluids.

- Materials which, under the influence of pressure and/or high temperatures, emit gases, liquids or even solid particles

- Labels which, when deformed or subjected to heat, come loose on their own from the backing material.

- Label material in which the backing is deeply incised or heavily embossed.

- Printing substrates which buckle or form waves perpendicular to the direction of travel and cannot be smoothed, even when pulled in the direction of travel.

- Printing substrates that tend to form creases.

- Printing substrates with uneven or fringed edges.

- Basically, all rolls of material which exhibit any defects on the end faces or on the surface, for example pressure marks, creases, or tears as a result of falling or impacts.

Fig. 6 shows a typical unsuitable printing material. Faults during manufacturing or storage do not allow this printing material to be smoothed on an electrostatic plate. When used for printing, such a printing material would most likely damage the print heads. Consequently, do not use it!
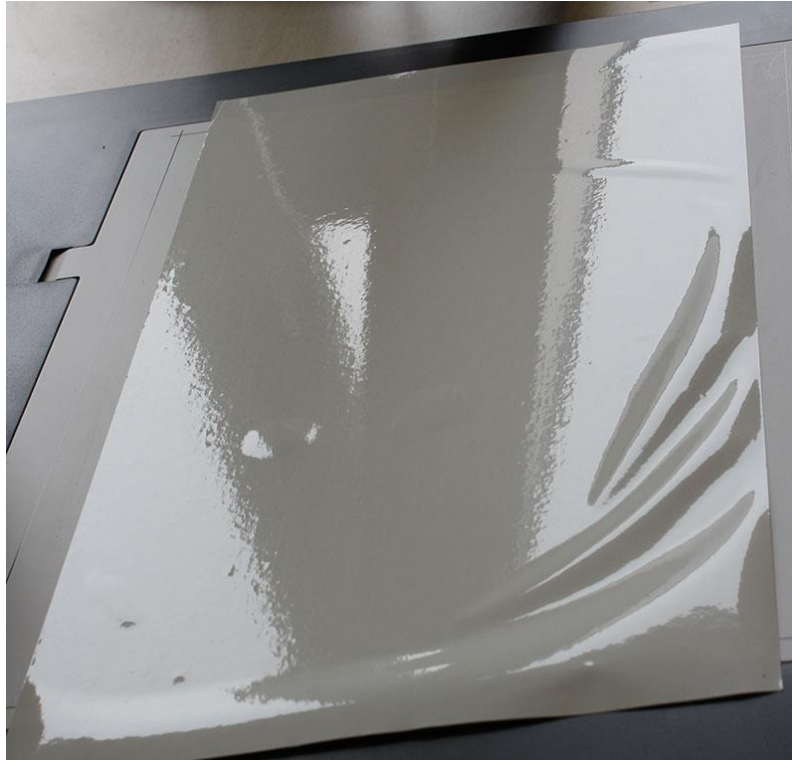
Fig. 6. Typical unsuitable printing material:

In particular when it is made from plastics, you must ensure that the printing material keeps its shape at a higher temperature:

- Perform a forward feed with clamped printing material (button on the control console). During the forward feed, main curing is active, and the printing material heats up.

- Cut a piece off the warm printing material. Check the printing material for flatness. This is done best on an electrostatic plate.

- A printing material that can not completely be flattened after a forward feed is unsuitable for printing.

Notice
Unsuitable printing substrates can cause serious damage – irreparable in the case of print heads – as a result of tearing and the emission of vapors. ➔ Check each and every roll of printing substrate before use. Each material may become unsuitable due to faulty storage or manufacturing flaws. ➔ The owner of the printer bears sole responsibility for the selection of the printing substrates used. ➔ The owner of the printer bears sole liability for damage attributable to the printing substrate!

Information

If you aren't sure whether a printing substrate is suitable, please send a roll of the material along with the associated data sheet to Markem-Imaje CSAT GmbH and have it checked for its suitability.

The printer owner still bears sole responsiblity neverthess for the use of material tested this way!

3.10   Adhesive tape

Just like the printing substrate itself, the adhesive tape used to join the ends of printing substrate in the cut-and-splice device(s) is of decisive importance for the safe operation of the printer.

Besides the material thickness and the adhesive power, the heat resistance of the adhesive tape and the printing substrate is of particular importance to ensure they do not fail and come apart in the area of the print head unit and the main curing unit.

Before using a new printing substrate, it should be tested whether it can be joined securely enough using the adhesive tape at hand. For instance, label backing material or textile fabric cannot be firmly joined, so that with these materials, it´s better to feed the seams slowly through the printer manually and not during the printing process.

Determining factor, parameter	Required property
Adhesive power	The adhesive tape should be suitable for the materials to be joined. If in doubt, test the holding power
Temperature resistance	> 120°C

The following materials have been approved by CSAT:

Manufacturer	Description	Order number
CSAT	Adhesive tape, red	**FX105851100**
Tesa	tesafilm 4156	4156-66-50

Notice

Never advance seams or taped areas through the printer during the printing process or while the print head unit is in its working position! Therefore:
- ➔ <u>Always</u> put the print head unit in its parking position first.
- ➔ Press the "Feed forward" key on the control panel, thereby pulling the seam behind the friction drive at the very least!
- ➔ Keep feeding until the web lies completely flat and without creases on the printing table.
- ➔ Now the print head unit can be put in its working position.

The printer owner bears sole liability for damage incurred due to using the incorrect procedure!

Notice
Unsuitable adhesive tape or improper attachment can cause severe – on the print heads even irreparable – damage. Therefore: ➔ Apply only one layer of adhesive tape on the front and on the rear of the printing substrate. ➔ Always apply the adhesive tape without wrinkles. ➔ Pull the adhesive tape over the entire width of the printing material. Never apply several short ends of adhesive tape next or above each other. ➔ Never allow open adhesive surfaces to protrude from the sides of the web. Solely the system user is responsible for any damage that results from improper application of the adhesive tapes and/or using unsuitable material.

3.11   Noise level

Measured in accordance with DIN 45635-1 - KI.3		
Emission	Sound power level generated by the printer:	$L_w = 67$ dB(A)
Immission	Sound pressure level impact on operator	$L_p = 59$ dB(A)

3.12   Device protection class

Device protection class	
IP code	IP 22

	Information
i	For detailed information on all of the individual components installed in the printer, please see the supplier's documentation (see appendix B of the operating instructions).

4　　　Machine Description

4.1　　　Functional diagram

Motor	Unwinder
	Printing substrate cleaning unit
	Dancer roller
	Web tension controller
	Cut-and-splice device with blade
	Corona treatment
	Air circulation system
	Web guider
	Substrate discharge
	Web retraction system
	Print mark sensor on the side not to be printed
	Label sensor
	Print mark sensor on the side to be printed
	Infeed height control
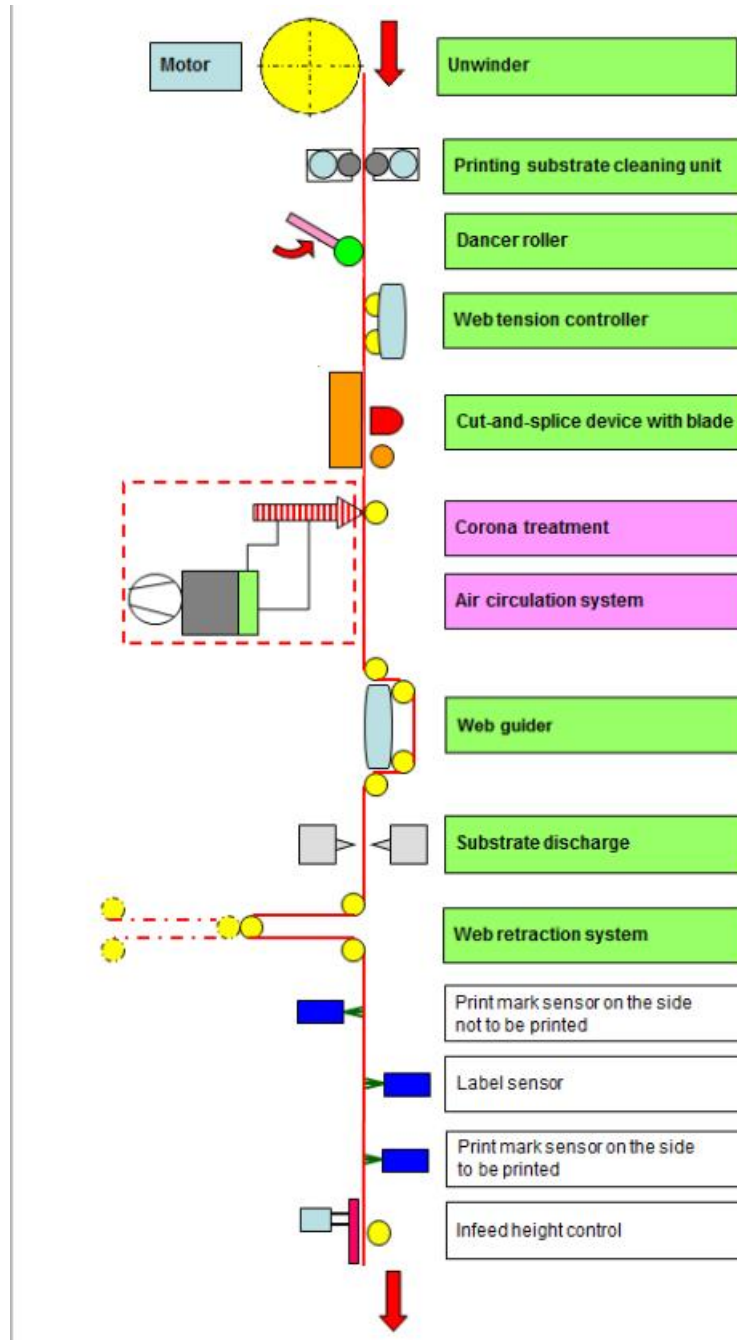
Fig. 7. Functional diagram of ITS6, part 1
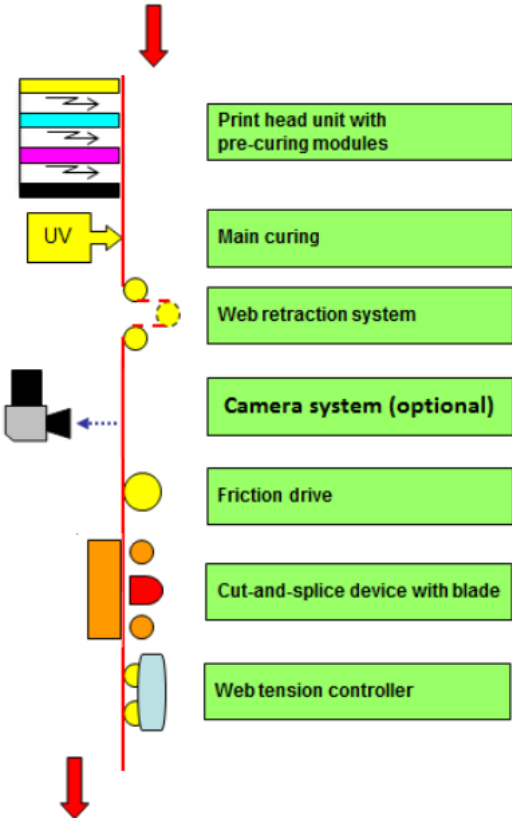
Fig. 8. Functional diagram of ITS6, part 2

4.2   Schematic representation

The printer consists of several components that are linked to one another.

The basic schematic structure of the ITS6 printer is described below.

4.2.1   ITS6 components

When the printing material comes from the unwinding roll, it passes by various assemblies in the printer as shown by the numbered position in the following illustration.
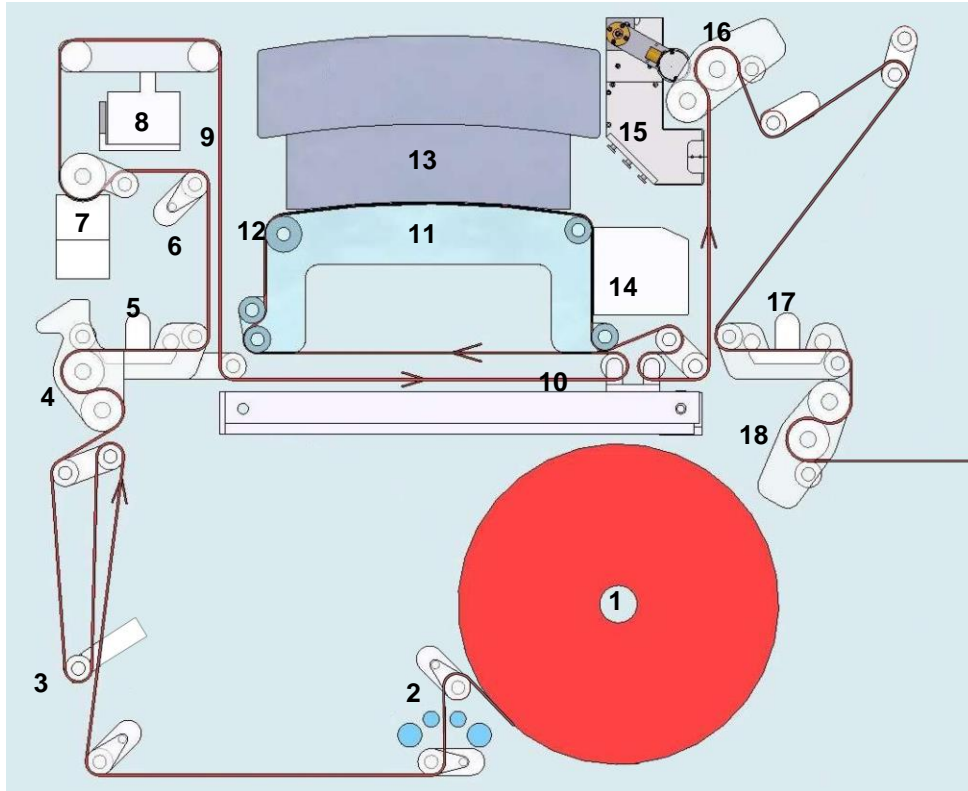
Fig. 9. Components ITS6 210 with Camera

Pos.	Component	Pos.	Component
1	Unwinder shaft	10	Web retraction system
2	Printing substrate cleaning unit	11	Printing table
3	Dancer roller	12	Infeed height control
4	Web tension control	13	Print head unit
5	Cut-and-splice device with blade and printing substrate clamp	14	UV main curing
6	Guide roller	15	Camera system
7	Corona station	16	Friction drive
8	Web guider	17	Cut-and-splice device with blade
9	Substrate discharge	18	Web tension control

4.2.2 ITS6 sensors

All of the printer's functions are monitored by sensors. The following illustration depicts the sensors that take readings related directly to the printing substrate. The numbering of the positions relates to the sequence with which the printing substrate passes through the machine.
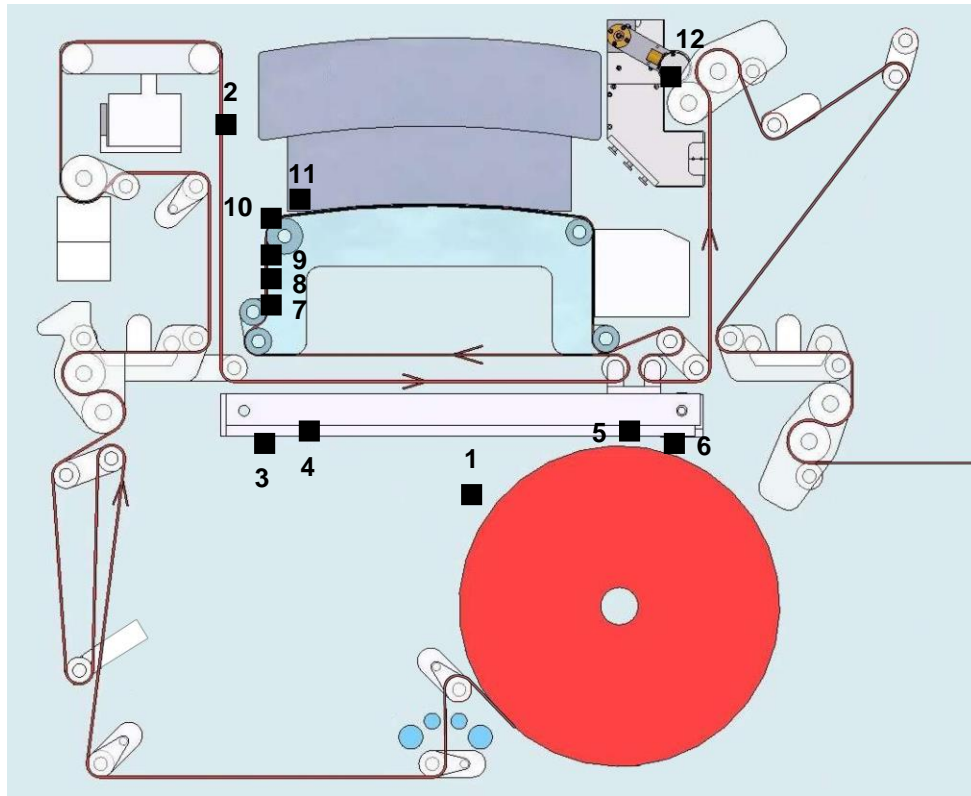
Fig. 10. Sensors CSAT ITS6 210 with camera

Pos.	Sensor
1	Material sensor for monitoring the diameter of the unwinding roll
2	Web guider
3	Web retraction system end stop left
4	Web retraction system working position left
5	Web retraction system working position right
6	Web retraction system end stop right
7	Print mark sensor
8	Label sensor
9	Print mark sensor
10	Shaft encoder
11	Material thickness sensor
12	Shaft encoder of the camera system

4.3   Workplace at the printer

The swivel-type bottom control console for the printer, that is installed at the right front side, is equipped with a touchscreen. The operator can use it to retrieve the data that is necessary for printing, activate or deactivate individual components, retrieving and editing actual values and setpoints. The upper monitor is used for controlling the camera system.

In addition, the upper part of the control panel contains an emergency stop button, four command buttons, and a USB interface that permits image files and format files to be read and written rapidly via a commercially available USB stick.

The operator is standing during his/her work.
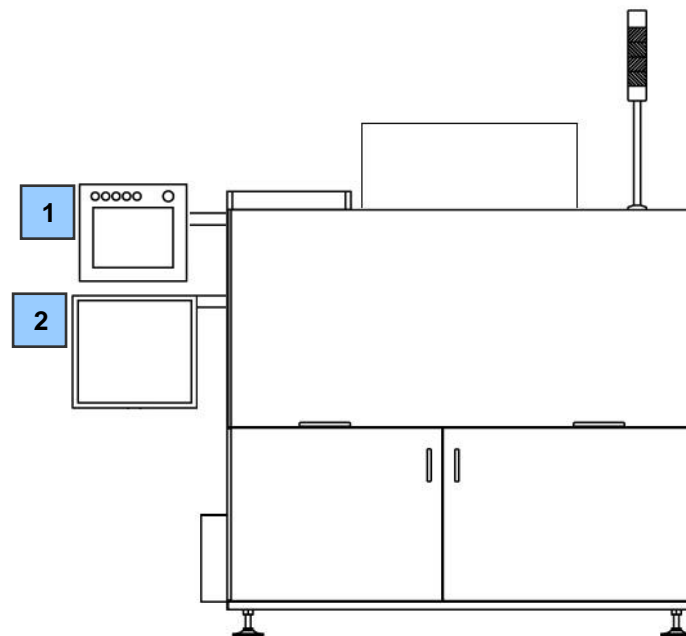
Fig. 11. Workplace at the printing system

Item	Designation
1	Control panel/monitor for the entire printing system
2	Control panel/monitor for the camera system

4.4   Functional description

The ITS6 printer is a fully digital continuously-fed printer which converts the imported image data into actual images by means of the UV inkjet process.

During printing, the roll installed in the unwinding unit is unwound continuously. The printing substrate is then led at a constant, pre-set speed over a guide roller of the web tension control, which is combined with the cut-and-splice device. This slows down the printing substrate slightly, so that it always remains taut in the area between the web tension control and the friction drive, and cannot form waves during the transfer of images, which would distort the printed images in the direction of travel. The printing substrate is then led over more guide rollers to the web guider and the web retraction system. In the print head unit, the printing substrate is passed by four consecutive print heads, each of which transfers a primary color to the desired image.

During the subsequent curing process with UV light, the ink is chemically cross-linked. The cross-linked ink bonds securely with the particular printing substrate, thereby forming a coating with exceedingly high thermal and chemical resistance. The different colored inks are cured directly after the printing process, before the printed material is conveyed by the friction drive and an additional web tension control to the rewinding unit installed in the printer (offline / roll-to-roll mode).

The ITS6 printer can only print continuously fed material, which is supplied to the printer in rolls.

The ITS6 printer is able to print on a variety of materials made of metal foil, paper and plastic. If necessary, a surface treatment can be performed to adjust the surface tension.

4.5   Path of the printing substrate

The following illustration depicts the schematic diagram of the path of the printing substrate when the outside of the printing substrate is to be printed.

The printing substrate passes successively through the stations shown in the functional diagram (see Chapter 4.2 "Schematic representation.").
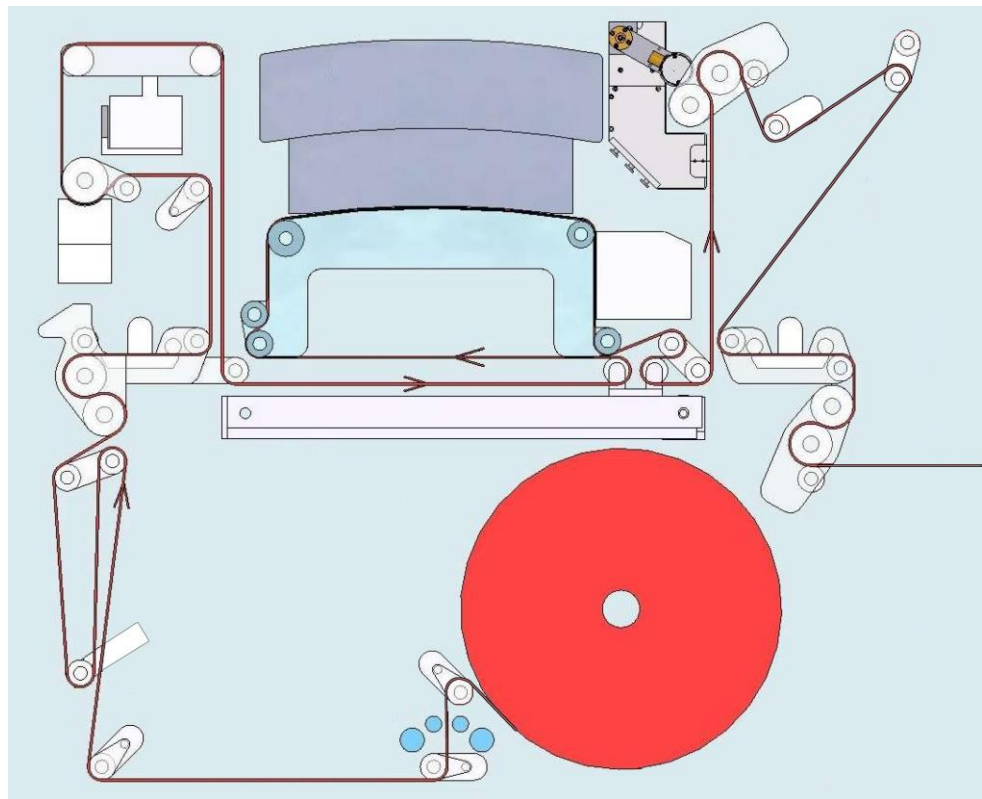
Fig. 12. Path of the printing substrate

4.6   Functional description of the components and parts

4.6.1   Unwinding unit

Purpose
Roll of printing substrate is secured on the clamping bar mandrel and held into place laterally with end plates.
Technical realization
A drive unit unwinds the printing substrate continuously from the unwinding unit at a speed adapted to the printing process.
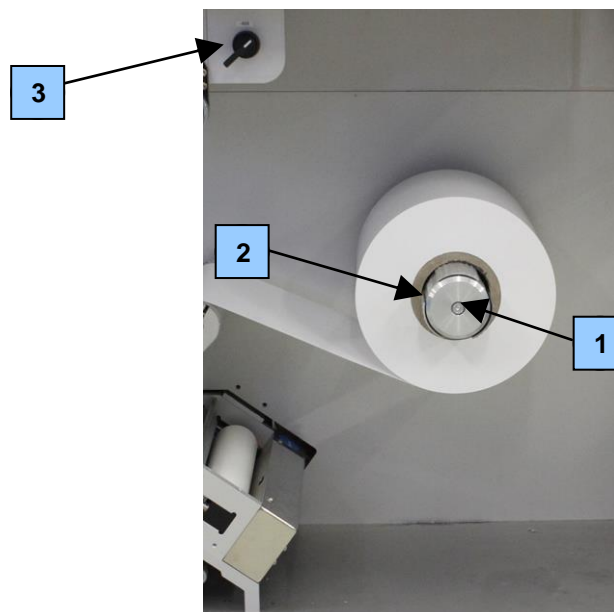
Fig. 13. Detailed view of the unwinding unit

Pos.	Element	Meaning
1	Unwinder shaft	Supports and centers roll of printing substrate
2	clamping bar	Secures the printing substrate roll to the shaft
3	Rotary switch	Tightens or releases the roll of printing sub-strate

Unwinder shaft

The unwinder shaft has a diameter of 69 mm. With the help of three radial adjustable clamping bars, it can accommodate rolls of material with an inner core diameter of 70 to 78 mm: The three clamping bars are tightened and released by using the rotary switch.

In order to ensure that the roll is seated correctly on the unwinder shaft, rolls with heavy cardboard or plastic cores should always be used.

The maximum outer diameter of the material roll is 550 mm.
The maximum width of the material roll is 220 mm.

Due to the incessant reduction of the outer diameter of the roll of printing substrate, the speed of the unwinder shaft is constantly being readjusted.

4.6.2　Material sensor on unwinding unit

Purpose
Measures the thickness of the roll of printing substrate in the unwinding unit. Responds when the roll is almost empty.
Technical realization
The sensor measures the distance between the sensor and the roll of printing substrate by means of a laser beam, which should be aimed as perpendicular as possible to the outer surface.
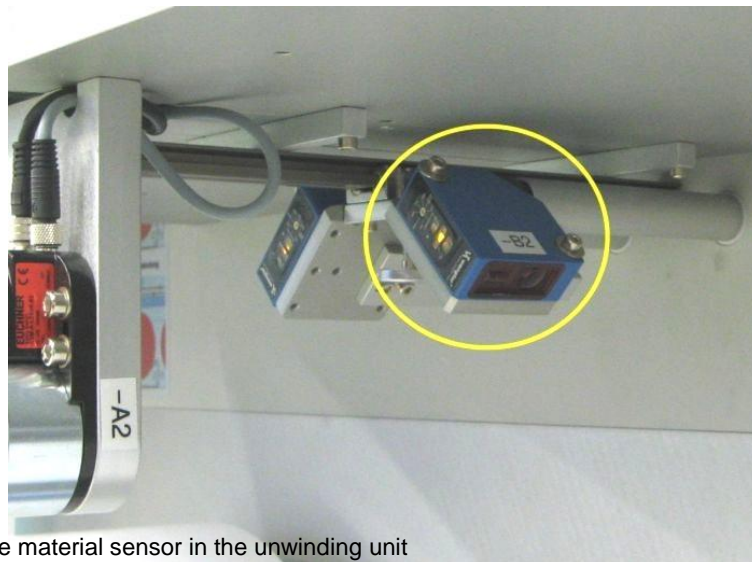
Fig. 14.　The material sensor in the unwinding unit

Material sensor unwinding unit

The outer diameter of the roll of printing substrate inserted is monitored constantly by a sensor. The distance to the outer surface is measured. The actual diameter can be read in millimeters off the touchscreen in the tab *Consumable > Reels*.

Once the roll of printing substrate reaches a preset diameter, which was defined in the tab *Consumable > Reels*, the printer will send a corresponding message to the display of the control panel "4= Unwinding unit: Foil nearly used up." The printing process will not be interrupted.

It is left to the discretion of the operator whether or not to stop the printer in order to change rolls.

If the measured roll diameter falls below the "Alarm" limit defined in the register "Consumable > Reels, the following message is triggered "2= rewinder: Film end, dancer shaft in upper stop" and the printing process is automatically stopped.

4.6.3   Printing substrate cleaning module

Purpose
Cleaning of the printing substrate from adhering loose particles. Neutralisation of electrostatic charge.
Technical realization
Loose dirt is removed from the substrate by means of cleaning rollers and transferred to rollers with adhesive foil.
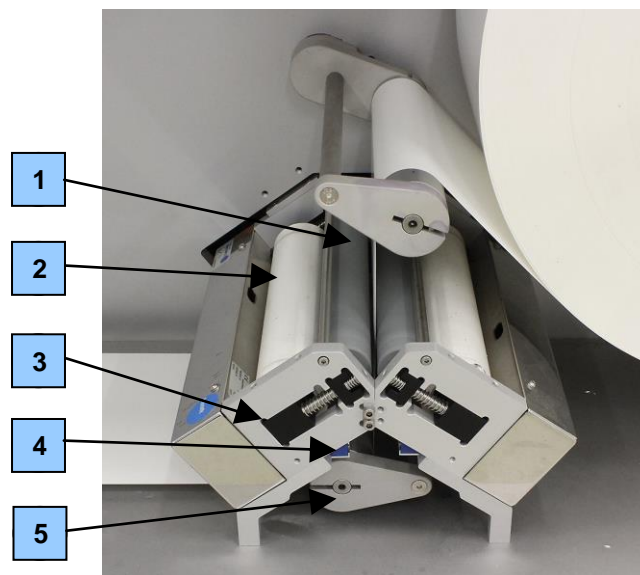
Fig. 15. Printing substrate cleaning module

Pos.	Element	Meaning
1	Cleaning roller	Removes loose dirt particles, e.g. fibres or film scraps of the printing substrate.
2	Roller with adhesive foil	Removes the gathered dirt particles from the cleaning roller and stores the dirt.
3	Pneumatic cylinder	Moves the cleaning roller and the glue rolls against the printing substrate during the printing procedure.
4	Antistatic strip	Neutralises electrostatic charges of the printing substrate.
5	Deflection roller	Guide for the printing substrate.

Printing substrate cleaning module

This module consists of two practically identical components constructed in mirror image.

During the printing procedure, two pneumatic cylinders (cf. illustration above, pos. 3) press the two white rollers with adhesive foil and the grey cleaning rollers against both sides of the printing substrate. The slightly sticky grey cleaning rollers absorb the dirt adhering to the printing substrate and transfer it to the white rolls, where the dirt particles are retained by paper coated with glue.

When the printer is standing still or even switched off, the white rolls are retracted from the printing substrate by means of springs; the grey cleaning rollers glide a few millimetres away from the printing substrate.

The outer paper layer of the white glue rolls should be removed every eight hours by tearing it off at the embossed edge or perforation. In case of a high degree of soiling, this procedure must be repeated in shorter intervals as soon as the sticky effect of the paper has diminished.

Notice
The grey cleaning rollers are very delicate!
➔ Touch the cleaning rollers only with clean white cotton gloves!
➔ Clean the surface of the grey cleaning rollers only with the especially provided Tekwipes.
➔ Never use solvents for cleaning!

4.6.4   Printing substrate storage assembly (unwinding unit)

Purpose
Controls the unwinding speed so that the printing substrate runs evenly through the machine. In addition, it tensions the printing substrate between the unwinding unit and web tension control unit.
Technical realization
A so-called dancer roller is attached to a pivoting lever arm which is connected to the swivel module. The angle of the dancer roller is registered by an angle transmitter and used to the control the speed of the unwinding unit drive. The printing substrate is pre-tensioned in accordance with the dancer force set in the touchscreen.
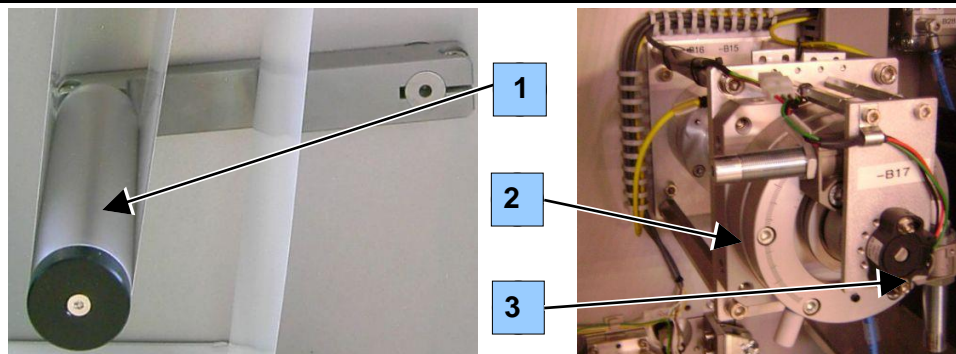
Fig. 16. Printing substrate storage assembly (unwinding unit)

Diagram (schematic)
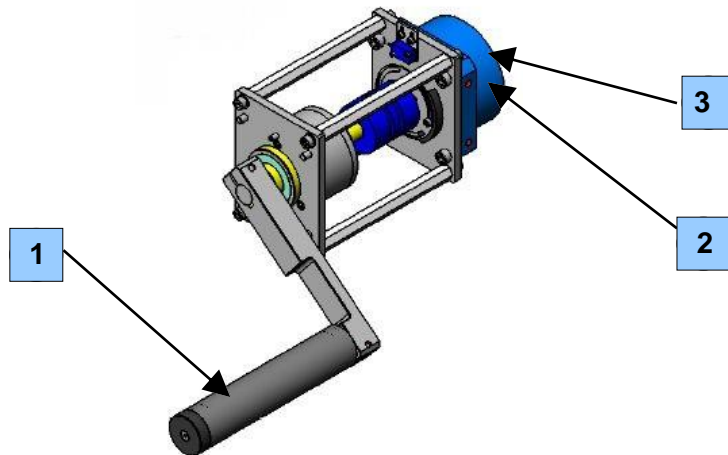
Fig. 17. Diagram of the printing substrate storage assembly – spatial representation

Pos.	Element	Meaning
1	dancer roller	Guidance of the printing substrate.
2	Swivelling module	Generation of the dancer force that keeps the substrate web firmly tightened.
3	Phase angle sensor (not visible)	Capturing of the actual position of the dancer shaft.

The printing substrate storage assembly (unwinding unit)

The unwinding shaft is driven by a motor in accordance with the settings entered in the touchscreen. The speed is controlled by means of the angle transmitter in the printing substrate storage assembly.

When too much printing substrate is unrolled, the dancer roller is moved down by the pre-set dancer force. The speed of the unwinding unit is decreased so that the roller can return to its nominal position.

When not enough printing substrate is unrolled, the dancer roller is pulled back up by the friction against the pre-set dancer force. The speed of the unwinding unit is increased so that the roller can return to its nominal position.

The dancer force for pre-tensioning the printing substrate is set in the touchscreen under the tab *Job > Web settings*. The value to be entered is "Dancer Force Unwinding Unit."

4.6.5   Web tension control

Purpose
Generates a pre-tension of the printing substrate entered in the touchscreen.
Technical realization
Static friction on a rubber roller.
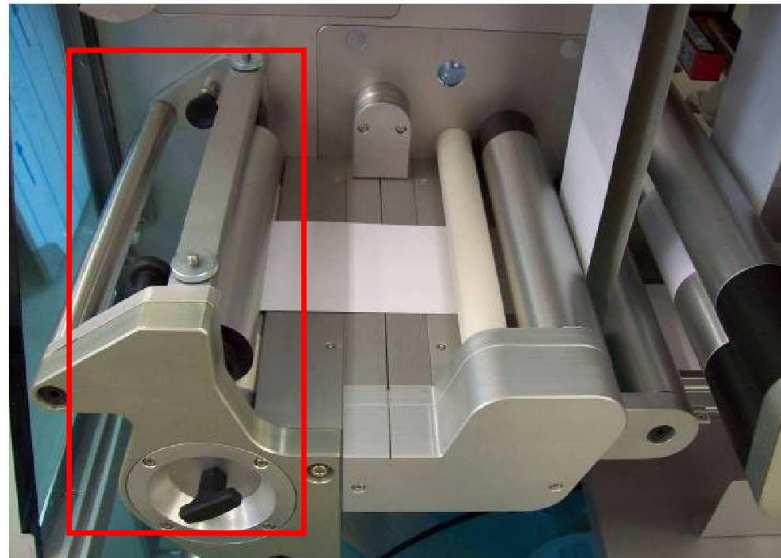
Fig. 18. Cut-and-splice device with web tension control
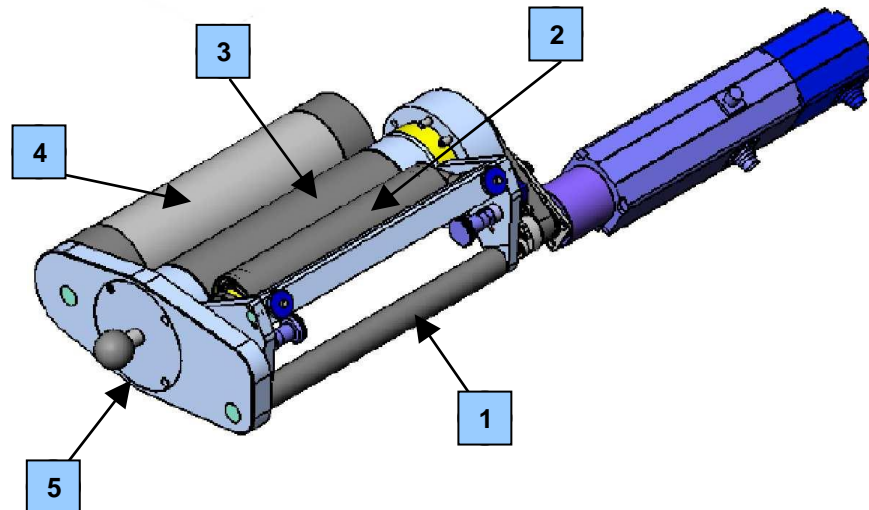
Fig. 19. Structure of the ITS6 web tension control

Pos.	Element	Meaning
1	Swivel axis	Releases the printing substrate by pivoting the pressure roller away.

Pos.	Element	Meaning
2	Pressure roller Ø 50 mm	Ensures static friction where the printing substrate contacts the rubber roller. The parallelism is adjusted by means of the knurled screws.
3	Drive shaft with rubber roller Ø 80 mm	Tightens the printing substrate
4	Infeed roller Ø 80 mm	Prepares the printing substrate for wrinkle-free infeed
5	Service access	Replacement of rubber sleeve

Web tension control

In order to ensure that the printed material is fed through the printer without wrinkling, the printer is equipped with a so-called web tension control.

The web tension control achieves a constant tension of the printing substrate in the area between the web tension control and the friction drive. The web tension control setting can be read off the touchscreen and changed if necessary (see tab *Job > Web settings*).

The rubber roller generates a torque against the flow of material, thereby tightening the printing substrate. In order to ensure a sufficient transmission of force, the pressure roller must be placed close to the rubber roller. This is achieved by adjusting the set screws and lock nuts at both ends of the pressure roller.

Pressure roller

Purpose
Regulates the friction force between the printing substrate and the rubber roller of the web tension control.
Technical realization
The distance between the pressure roller and rubber roller can be adjusted by means of the four knurled screws.
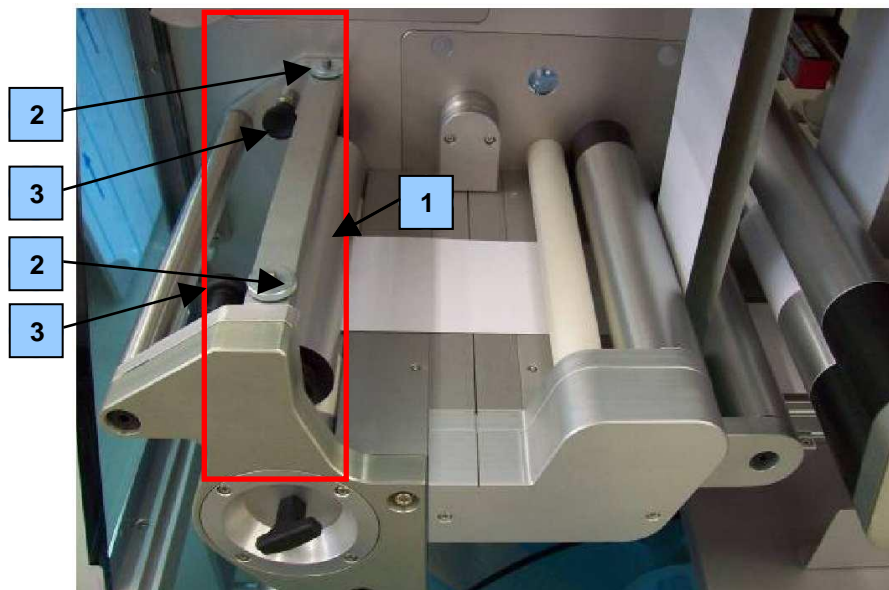
Fig. 20. ITS6 pressure roller

Pos.	Element	Meaning
1	Pressure roller	Presses the printing substrate against the friction roller.
2	Set screws with knurled lock nuts	For setting the distance/pressure between the pressure roller and friction roller.
3	Latch	Fixes the rack with the pressure roller either in the operating or in the service position.

Adjusting the pressure roller

The pressure roller #1 is meant to increase the friction force between the supplied material and the light-colored rubber roller of the web tension control.

The pressure roller usually doesn't have to be pressed down against the rubber roller in order to achieve sufficient force. Direct contact between these two rollers is necessary only in exceptional cases, for example when processing a printing substrate with an extraordinarily smooth and slippery

surface. In this case, both pressure roller set screws must be screwed down evenly over the printing substrate <u>but without denting the rubber-coated friction roller</u>:

> First loosen the knurled screws #2 at both ends of the pressure roller.

> By turning the lower and/or inner knurled screws counterclockwise, the two black bearing heads are pushed down. Make sure that the pressure roller is lowered evenly and is aligned parallel to the rubber-coated drive roller, <u>but without caving in its surface</u>.

> Afterwards the upper lock nuts should be tightened carefully so that the pressure roller is secured in the new position.

During the normal printing process, the pressure roller should be in a vertical position and secured into place by its two latches #3.

4.6.6   Cut-and-splice device with integrated blade

Purpose
The printing substrate is cut off precisely by the blade widthwise.
Technical realization
Rolling blade with linear guide.
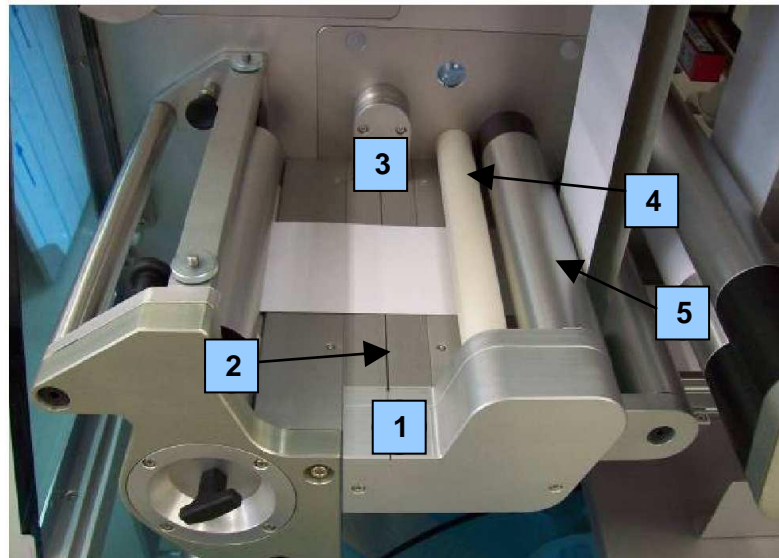
Fig. 21. ITS6 cut-and-splice device with integrated blade

Pos.	Element	Meaning
1	Cutting table plate	Support for the printing substrate during the cut-and-splice process.
2	Guide groove	Guides the blade along a straight path, perpendicular to the printing substrate.
3	Blade	Cuts through the printing substrate in the cut-and-splice device.
4	Clamping drum	Presses the web down onto the cutting table in order to secure it.
5	Guide roller	Exit area of the cut-and-splice device.

This component is used during roll replacement to cut off the printing substrate. Afterwards the end of the new web is joined to the material left in the printer by means of tape. Afterwards, the new web can be pulled into the printer.

The new web is taped to the printing substrate on the right side of the cutting table, thus eliminating the need to thread the new web through.

The printing substrate can be cut off precisely with the blade, which allows the printing substrate to flow smoothly through the components. The ergonomic design of the cutting table also helps to join the two ends of the webs neatly.

4.6.7 Printing substrate clamp

Purpose
Securing the printing substrate.
Technical realization
Pneumatic-driven rubber swivel axis.
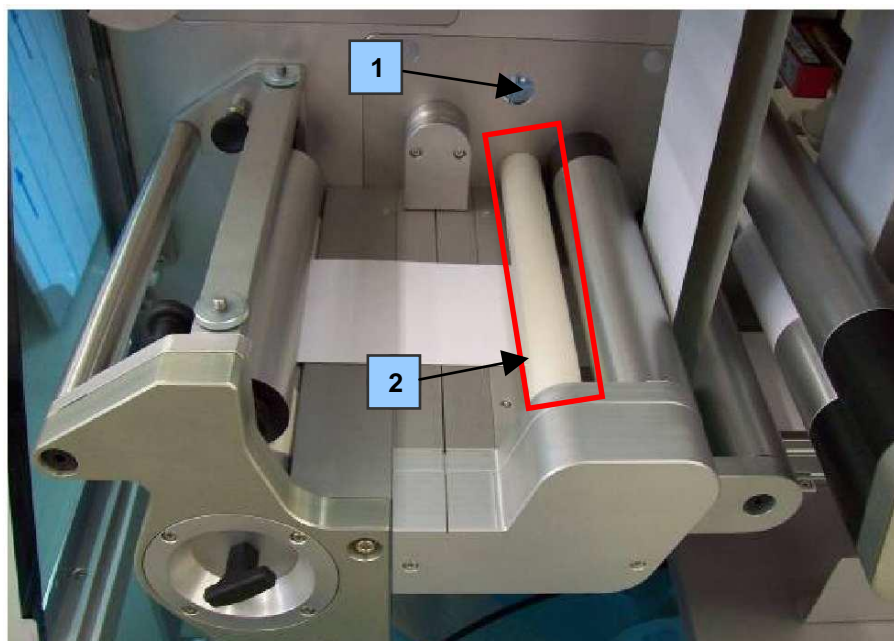
Fig. 22. ITS6 printing substrate clamp

Pos.	Element	Meaning
1	Button	Clamping and release of printing substrate.
2	Clamping drum	Secures the printing substrate to the cutting table plate.

When the safety doors are opened, the clamping drum is in the clamping position. The printing substrate cannot be moved. This ensures that this position is kept after the web is cut through.

The printing substrate clamp is released by means of a button located on the rear wall above the clamping drum. When the button is pushed, the rubber axis swings up and releases the web. If the button is pushed again, the printing substrate will be clamped down again.

This function is used whenever a roll of printing substrate is replaced in the unwinding unit and the new material has to be joined with the web still in the printer.

4.6.8 Corona treatment

Purpose
To improve the wettability of the particular substrate.
Technical realization
Printing substrate is exposed to ionized air generated by an electrical high-voltage discharge.
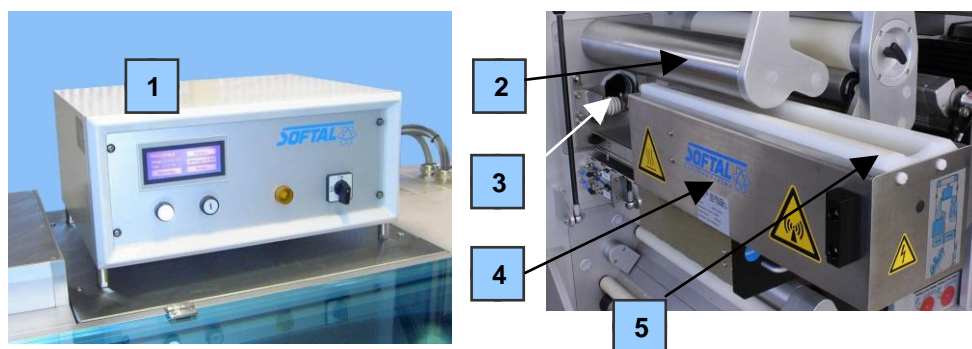
Fig. 23. Corona treatment

Pos.	Element	Meaning
1	Corona generator	Supplies the medium-frequency high-voltage required for generating the corona.
2	Counter drum	Serves as a counter-pole to the bar electrode as well as a guide for the substrate.
3	Extraction port	The air at the top of the printer is extracted through this port and conveyed to the printer's air circulation system.
4	Corona station	The corona station improves the wettability of the particular printing substrate.
5	Bar electrode	Generates a corona through high-voltage discharge which alters the surface of the substrate being passed through.

The corona treatment is needed especially when printing glossy, plastic materials in order to improve the adhesion of the applied ink.

Without the corona treatment, the applied drops of ink would behave similarly to water on a layer of grease by maintaining their round form and rolling off to some extent. Also, due to the relatively small areas of contact, they would coalesce rather poorly on the particular substrate even after curing, making the transferred images less durable. Furthermore, in some cases, fine stripes with less intense coloration could appear in the direction of travel when ink drops applied next to each other fail to coalesce and form a solid area before curing.

The corona treatment can usually be omitted if open-pored paper or synthetic fabric is being printed, since in such cases the capillary effect of the fibers allows the applied ink to spread and coalesce better on the substrate.

The corona treatment affects only the surface facing the bar electrode and not the opposite side or the interior of the substrate, so that mechanical properties, such as tensile strength, remain unchanged.

The corona treatment can be switched on and off as needed using the tab **Job / Job settings** on the touchscreen. Likewise, the setpoint for power can be entered here. These settings are stored in the associated format file.

⚠ **Caution**
The corona treatment produces ozone which can harm the respiratory tract and the components of the printer. The ozone that is released is usually neutralized and rendered harmless in the activated charcoal filter of the ventilation system.   ➔ Replace the activated charcoal filter of the ventilation system at regular intervals.

Information
If a penetrating ozone odor is noticed in the area of the printer, please proceed as follows: ➔ Have the ventilation system checked and replace the activated charcoal filter.   ➔ Deactivate the corona treatment and print only materials that don't require a surface treatment until the ventilation system is repaired.

4.6.9   Web guider

Purpose
This module constantly monitors the edge of the web as it is transported, and corrects deviations automatically.
Technical realization
The transport of the web is monitored by a sensor.
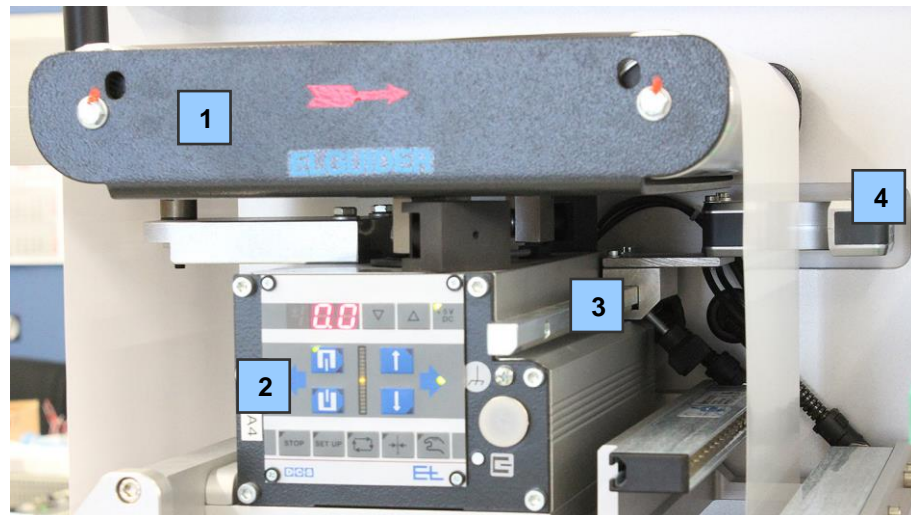
Fig. 24. ITS6 web guider

Pos.	Element	Meaning
1	Pivoting frame	Actuator for control
2	Control panel	Setting of operating parameters
3	Sensor	Sensor for the control
4	Clamping screw	Positioning of the sensor

The web guider

The web guider is a self-sufficient auxiliary system which functions independently of the printer and is not affected by its controls.

The flow of the printing substrate to be fed to the printing unit is monitored by a sensor. After the printing substrate has been inserted, it is moved by hand along a rail until it is just above the nominal position of the web edge, where it is then secured.

The web guider constantly monitors the edge of the web as it is transported. If it should drift off to the side, a motor-driven pivoting frame with two guide rollers is adjusted until the printing substrate returns to its proper position.

	Information
i	The device has already been pre-set, so it is very simple to use and its operation is limited to four buttons on its control panel.

	Information
i	For detailed information on operation, please refer to the associated manufacturer's documentation in the appendix of this manual

4.6.9.1 The control panel of the web guider
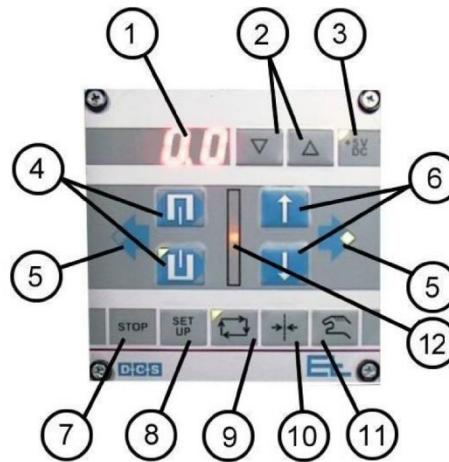
Fig. 25. The control panel of the web guider

The majority of the displays and buttons are not relevant for normal operation and therefore are mentioned only for the sake of completeness. For more information, please refer to the web guider manual.

The buttons and displays that are of importance to the operator are marked by a ⚠, whereby the quantity of these symbols indicates the importance of the particular element.

Pos.	Element	Meaning
1	Display	*Setup Mode*: Displays the various control parameters *Automatic mode*: Displays the manually induced shifting of the side of the web, measured in millimeters.
2	"Increase value," "Reduce value"	These buttons are needed in the setup mode only. During the printing process they have no effect and are irrelevant to the operator.
3	+5V DC	The operating voltage is enabled. This indicator light must always be illuminated.
4	Sensor displays	A green triangle on the left side indicates on which side of the web the sensor is located. Two red illuminated triangles on the right-hand side indicate in which direction the web has drifted in relation to the position of the sensor. If neither one of these triangles is illuminated, then the printing substrate is in the proper position. In the given device, only the bottom sensor display illuminates.
5	Direction of travel of web	Indicates which direction of travel of the web was programmed for the device. In this case, only the right/down arrow should be illuminated.
6	Manual shifting of the web position ⚠	Shifts the web in the direction of the arrow selected. The buttons are active only in automatic or manual mode. The display changes only in automatic mode, however. Furthermore, the selected shifting of the web can be deleted in automatic mode by pressing the two buttons simultaneously.
7	STOP	Whenever this indicator light blinks, then the automatic control is disabled. The device can only be operated in manual mode or in the central position.
8	SETUP	For setting the basic parameters. Not relevant for the operator.
9	Automatic mode ⚠ ⚠	Whenever the green LED is illuminated, then the automatic control is active. Whenever this LED blinks, then the control is disabled due to an external signal and is inactive.
10	Center mode ⚠ ⚠	The pivoting frame is put in its neutral center position and cannot be manipulated either by the sensor or by hand.
11	Manual mode	There is not automatic control. The pivoting frame stays fixed in the position it was moved to manually.

Pos.	Element	Meaning
12	Position indi-cator ⚠ ⚠	Indicates in which direction and how far the web has shifted with respect to the position of the sensor: If only the LEDs at the bottom are illuminated, then the web has moved closer to the observer, if the LEDs at the top are illuminated, the web has wandered away from the observer. Ideally, only one LED in the middle should be illuminated.

4.6.9.2 Maintenance and repair of web guider

The web guider is maintenance-free. To make sure it functions properly, however, the two rollers of the pivoting frame and the sensor of this component must be kept as clean as possible.

Notice
Apply securing devices properly to avoid any damage: ➜ Whenever the printer is moved somewhere else, the pivoting frame of the web guider must be secured in its center position by means of the two screws marked by red flags. ➜ These lock screws must be removed before the printer is switched on for the first time, since otherwise the drive of the web guider could become damaged due to overload.

4.6.9.3 Web guider safety features

The web guider does not have any safety features of its own since malfunctions do not pose an immediate risk either to the operator or to the printer. Whenever the proper functioning of the web guider can no longer be guaranteed, either because of a defect or because the ultrasonic sensor is in the wrong position, the printer will not receive any kind of message in this respect and will simply continue to run.

On the other hand, if the interconnection between the controls of the web guider and the printer should be interrupted for some reason, any ongoing printing process will be discontinued automatically.

4.6.9.4 Web guider sensor

Purpose
This sensor measures the offset of the web being transported and transmits this offset to the web guider to correct it.
Technical realization
Correction of the lateral position of the printing substrate at the exit by means of electromotive adjustment of the entire pivoting frame.
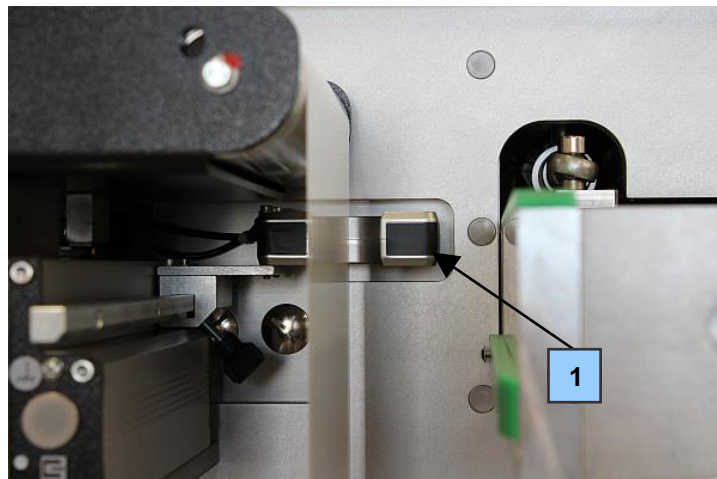
Fig. 26. ITS6 sensor of web guider

Pos.	Element	Meaning
1	Sensor	Sensor for the control

Sensor of the web guider

This fork-shaped ultrasonic sensor is attached to a rail on which it can be moved from side to side. During the set-up of the printer, it should be moved to and secured in its nominal position, precisely above the edge of the web.

4.6.10   Substrate discharge at the unwinding unit

Purpose
Elimination of any electrostatic charges.
Technical realization
High-voltage electrostatic fields and alternating polarity neutralize any electrostatic charges of the material to be printed.
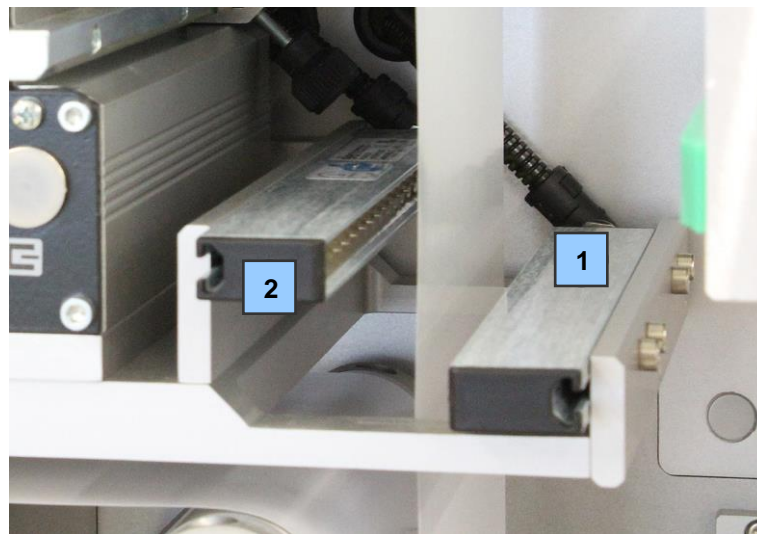
Fig. 27. Substrate discharge at the unwinding unit

Pos.	Element	Meaning
1	Electrode +100-E1	Eliminates electrostatic charges on the side of the substrate to be printed.
2	Electrode +100-E2	Eliminates electrostatic charges on the opposite side of the substrate.

Pure plastic foils or printing materials which also contain plastic – for example so-called "peel-push foils" or textiles made of synthetic fibers – take on an electrostatic charge during the unwinding and diverting processes. Since such charges dissipate only very slowly into the air, and the substrate, as well as most of the printer's guide rollers, is non-conductive, these charges remain "captured" in place until eventually the areas in question are exposed to an electrically conductive object, at which point the following could then occur:

- the substrate would be attracted by the oppositely charged objects and remain stuck there, which could cause it to tear,

- the charged substrate could attract oppositely charged particles of dust and dirt and hold them on its surface,

- the machine operator could suffer harmless yet unpleasant minor electrical shocks when approaching the machine,

- Impairment of the image quality: In the areas with a high charge or where flashovers have already occurred, the ink drops to be transferred could be deviated or applied differently than desired on the substrate.

but the worst that could happen would be:

- light arcs could jump over to the sensitive print heads and damage or clog the individual nozzles there.

In order to preclude the negative effects listed here, the electrodes of the substrate discharger are automatically activated / switched-on whenever the substrate is in motion inside the printer, that is, during the normal printing process, and also during the mechanical feed process.

⚠ **Caution**
Risk of injury upon contact with the electrodes of the printing substrate discharger. ➔ Do not reach into the area between the two electrodes / do not touch their needle-like contacts.

The electrodes of the printing substrate discharge units are activated automatically when the printing substrate is moving inside the printer.

The printing substrate discharge unit has its own power supply unit and is switched on/off via this unit. The power supply unit sits behind the rear middle door of the printer, see Fig. 28.
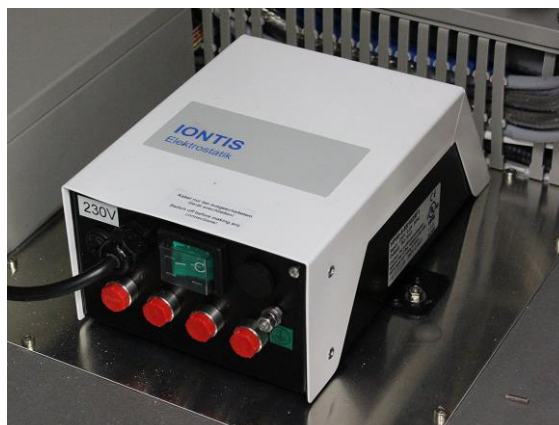
Fig. 28. The power supply unit of the printing substrate discharge unit

Pure plastic sheets or printing material that contains plastics – such as "peel-push film" or textiles made from synthetic fiber – accumulate static electricity during the unwinding and deflecting operations. These charges decay only slowly in the air. Since the printing substrate and most of the guide rollers in the printer are not electrically conductive, these electric charges remain "trapped" until the charged areas come in the vicinity of an electrically conductive object. Here, the following can happen:

- The printing substrate is attracted by objects with opposite charge, sticks to these objects, and can break.

- The charged printing substrate attracts dust and dirt particles with opposite charge, and adheres them.

- The machine operator suffers harmless but annoying slight electric shocks when he/she approaches the substrate.

- Deterioration of the image quality: In zones with a high charge or where discharges took place, the applied ink droplets can be deflected or run on the material in a way that is different from the desired structure.

- Winding up the printing substrate is worse if the attraction is such that the material on the roll is wound up so tightly that it can no longer be aligned.Conversely, repulsive effects can produce bubbles or air pockets between the individual layers.

However, the worst case would be:

- Electric arcs spark over to the delicate print heads, and obstruct or damage individual nozzles there.

To exclude the negative effects listed here, the electrodes of the printing substrate discharge unit are always activated / switched on automatically as long as the printing substrate inside the printer is in motion (this means during normal printing operation and during machine-controlled forward feed).

4.6.11 Web retraction system

Purpose
Completion of the printed image, curing of the printed areas and retraction of the last printed image. This way, the starting position is reached for "seamless" printing after a re-start.
Technical realization
The movement is achieved on a minimum length of printing substrate by means of a double roller pair on a linear carriage.
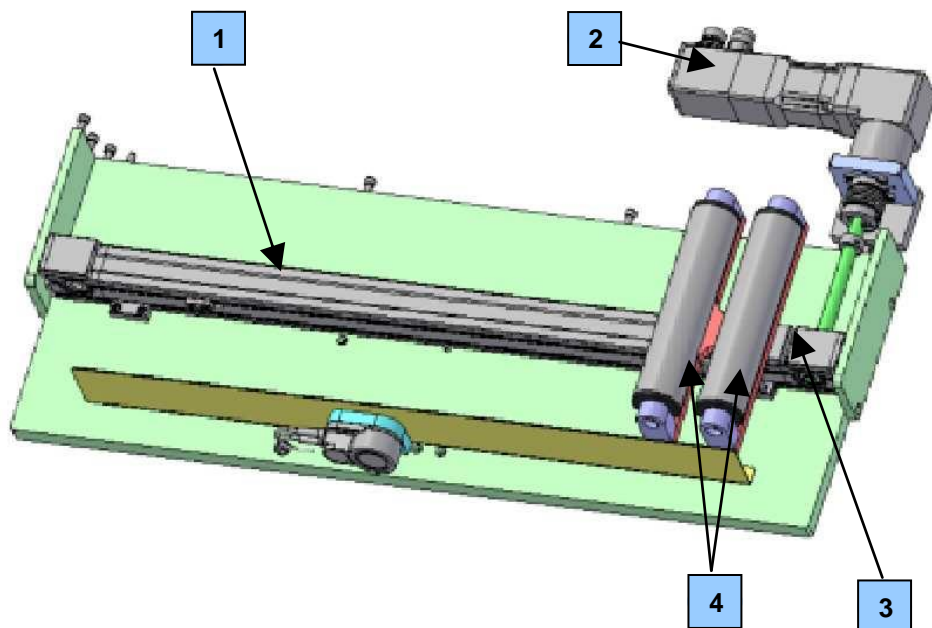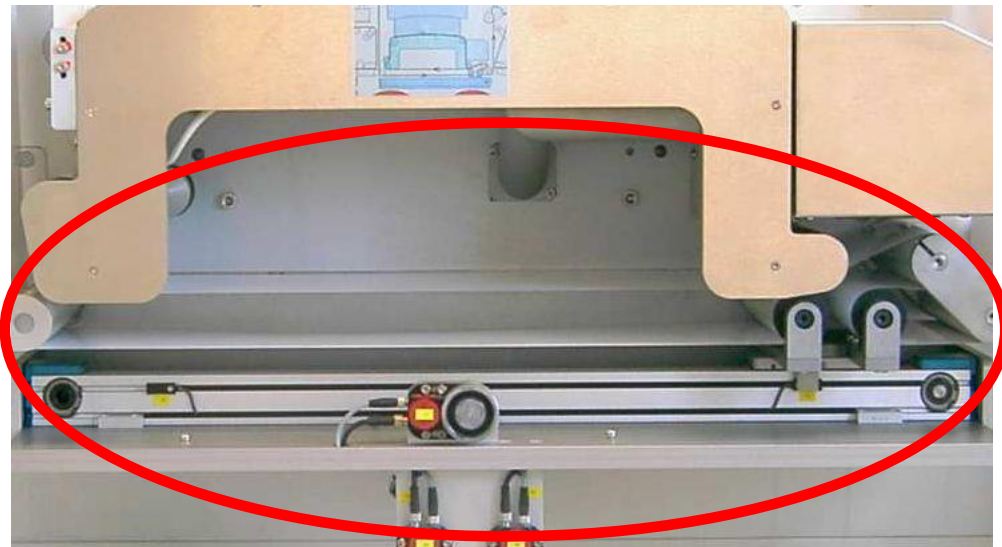
Fig. 29. ITS6 web retraction system

Pos.	Element	Meaning
1	Linear unit	Guide system for the carriage
2	Linear unit drive	Speed-controlled movement of the carriage
3	Carriage	Guide roller support
4	Guide rollers	Guidance of the printing substrate

Web retraction system

This module serves as temporary storage whenever the printing process has to be stopped. After a regular stop, all images that have been started are completed and cured. Afterwards, the carriage with the guide rollers moves to the right, taking the last image to be printed to the left of the print module, where it remains until the printing process is restarted.

Once the printing process restarts, the first image is printed precisely behind the last completed image, without a seam or dimensional difference being able to be detected.

The only way incomplete images can occur is if the printing process had to be interrupted abruptly due to a serious alarm.

4.6.12   Label sensor

Purpose
The sensor monitors the substrate web and recognises labels on the carrier material.
Technical realization
Ultrasonic sensor with linear guide and clamping function.
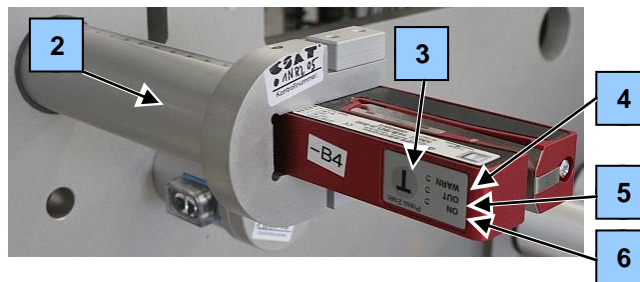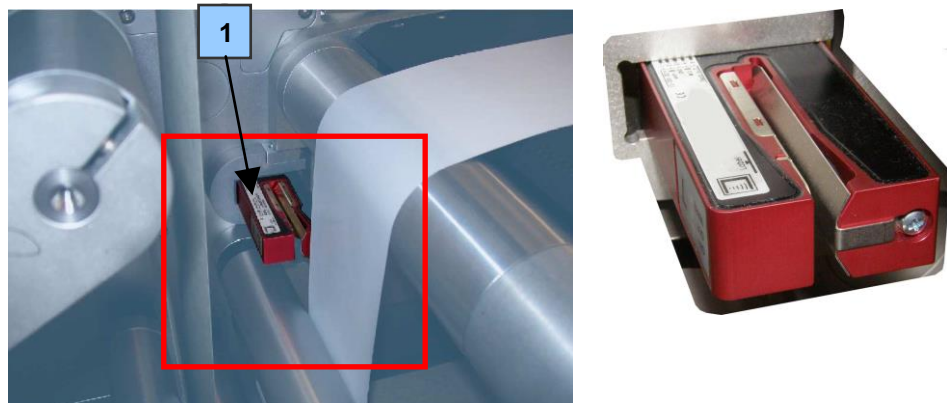
Fig. 30. Label sensor

Pos.	Element	Meaning
1	Label sensor	Sends a signal to the printer's controls which initiates the transfer of the corresponding image
2	Slide	The label sensor is applied at a slide that can be moved in transversal direction of the printing substrate's movement.
3	Teach button	Button for calibration
4	Warn: Red LED	Status display
5	OUT: Orange LED	Status display
6	ON: Green LED	Status display

4.6.12.1 Functional incorporation of the label sensor (in front of printing unit)

This sensor is needed for the placement of the printed image on cut label material. When the sensor detects the leading edge of a label, it sends a signal to the printer's controls which initiates the transfer of the next image as soon as the printing substrate has covered the pre-set distance, "leading edge of label to beginning of printed image." This way, each label is provided with the exact image whose printing was triggered by the label's sensor signal. This means that on all labels, the distance between the leading edge and the respective printed image is always identical, and areas in which a label is missing or isn't detected aren't printed at all.

4.6.12.2 Properties of the label sensor

The printing substrate must have a wide enough empty space between the individual labels in the direction of travel, so that the sensor can register a difference in thickness. A label/printing substrate is unsuitable if …

- … it touches adjacent labels,

- … residual material is left between the labels,

- … the printing substrate is not supposed to be stamped until after printing.

The label sensor can only be shifted on one axis, perpendicular to running direction of the substrate web, to the front or to the back. The label sensor must be positioned in a way that – seen in running direction – the starting edges of the labels are in the range of the sensor.

LED of the sensor:

LED	Meaning	LED glows …
Green	Operating display	… when the sensor is under operating voltage.
Yellow	Switching display	… when the sensor generates the switching signal.
Red	Warning display	… in case of sensor error.

Information

- Position the sensor so that it will detect the edge of labels that are aligned exactly perpendicular to the direction of travel.
- Angled edges, for example on round labels, cannot be precisely detected, which can lead to inaccuracies in the positioning of images.

4.6.12.3 Calibration of the label sensor

When calibrating, the sensitivity of the sensor is set in a way that it recognises reliably whether a label with its carrier material or only the so-called label gap is currently between the two legs of the sensor.

To set the label sensor, please proceed according to the following instructions. The sequence of the operating steps must be exactly observed.

> Switch on the print system and have it start up automatically.
  In case the print system was already switched on, stop the ongoing printing process and wait until the system has come to a complete standstill.

> Open the protective installation in front of the label sensor.

> Position the slide with the sensor in a way that – seen in running direction – the starting edges of the labels are guided between the two legs of the sensor when the substrate web is transported so that they can be captured by the sensor.

> Press the "Teach key T" on the label sensor for at least 2 sec. until the green and the yellow LED of the sensor start to blink.

> Release the "T" key.

> Close the open protective device.

> Hold down the "Feed forward" ⩔ of the printer until only the yellow LED on the sensor blinks while the green LED glows continuously.
  If the red LED comes on, repeat the calibration procedure.

> Check that after successful calibration, the label sensor shows the following operating behaviour:

Sensor captures …	LED "ON" (green)	LED "OUT" (yellow)	LED "WARN" (red)
… label and carrier material	LED on	LED off	LED off
… only carrier material	LED on	LED on	LED off
… no material	LED on	LED on	LED off

Information

Further information about the label sensor or other options for calibration is included on the documentation CD in the instructions saved in the directory *PDFAnnex\DataSheets\Leuze.*

4.6.13 Print mark sensor

Purpose
Sensor for the printing of pre-printed material. The sensor detects so-called print marks or "bars."
Technical realization
Reflection sensor with linear guide and clamping function.
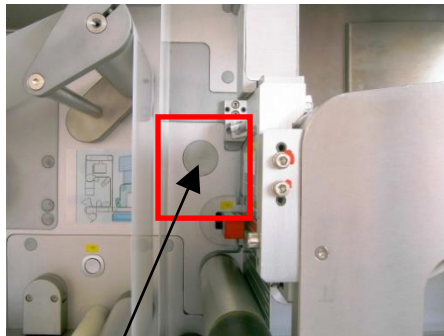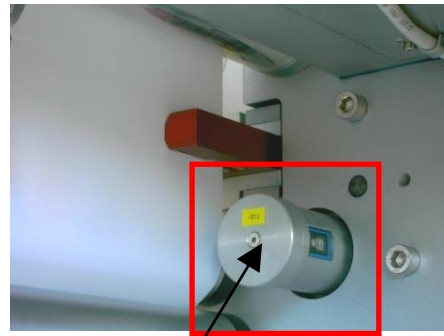
Fig. 31. Positions of the ITS6 print mark sensors

Pos.	Element	Meaning
1	Print mark sensor on the side to be printed	Detects print marks located on the side of the printing substrate to be printed by the ITS6. When it detects a print mark, it emits a separate signal which initiates the printing of the associated image.
2	Print mark sensor on the side not to be printed	Detects print marks located on the side of the printing substrate not to be printed by the ITS6. When it detects a print mark, it emits a separate signal which initiates the printing of the associated image.

4.6.13.1 Properties of print mark sensors

The so-called print mark sensors or bar sensors are used for synchronized printing of continuously fed material, whereby the distance between the individual images to be printed has been established in advance, and is defined by the rectangular print marks, the so-called "bars," which have been applied to the printing substrate in advance by the manufacturer. Pre-printed material is unsuitable if …

- … the print marks are smaller than 5 x 2 mm,

- … the print marks have been applied at an angle or have fringed contours,

- … the gray-scale contrast between the print marks and the particular background is too low,

- … the print marks have the same color as or a similar color to the light of the particular print mark sensor,

- … other image elements are found between the print marks, which the sensor could detect as a print mark.

A print mark sensor can only be moved perpendicular to the direction of travel of the printing substrate, and should be positioned so that the print marks pass directly through the sensor's light beam – as seen from the direction of travel.

When the sensor detects the leading edge of a print mark, it sends a signal to the printer's controls, which initiate the transfer of the next image as soon as the printing substrate has covered the pre-set distance "leading edge of print mark to beginning of printed image." This way, each image is placed directly next to the print mark that triggered the image transfer through the sensor signal. This also means that when printing with print marks, the distance between the leading edge of an image and the respective print mark is always identical, and areas in which a print mark is missing or isn't detected aren't printed at all.

Information

- Position the sensor so that as long as possible it detects print marks that are aligned exactly perpendicular to the direction of travel.
- Angled edges, for example on dots, cannot be precisely detected, which can lead to inaccuracies in the positioning of images.
- If a printer has two print mark sensors, only of them can be active at a time. Both cannot be used at the same time.

4.6.13.2 Calibrating a print mark sensor

During so-called calibration, the sensitivity of the sensor is adjusted ideally to the contrast between the color of the print marks and the surface of the particular printing material. It is completely irrelevant whether there are dark print marks against a light background or vice versa.

In order to adjust a print mark sensor, please follow the following instructions. The sequence of work steps must be strictly adhered to.

> Switch on the printer and allow it to run up to speed automatically. If the printer is already turned on, then simply stop any ongoing printing process and wait until the system has come to a complete stop.

> Position the carriage with the sensor so that, when the printing substrate is conveyed, the print marks ("bars") pass directly through the beam of light generated by the sensor and can be detected by it.

> First position the printing material so that the print marks to be detected are centered exactly in the spot of white light. Now press the sensor button for at least one second until the yellow indicator LED starts to blink at a high rate.

> Let go of the button: The yellow indicator LED will now blink more slowly.

> Continue to transport the printing material until the sensor shines only on the background/the unprinted material.

> Now tap very briefly(!) the small sensor button. Its yellow indicator LED should no longer be illuminated, but rather, remain dark.

> After completing calibration, each print mark sensor should respond as follows:

Material characteristic		Display of the yellow indicator LED	
Print mark	Background	Sensor detects print mark	Sensor shines onto substrate
dark	light	LED on	LED off
light	dark	LED on	LED off

4.6.14 Infeed height control

Purpose
Infeed control at the beginning of the printing process. This is intended to prevent printing substrate that is too thick or labels that are sticking up from being able to reach the sensitive print heads. Criterion is the height of the material entering the printing unit.
Technical realization
Height-adjustable lever which is read by a sensor.
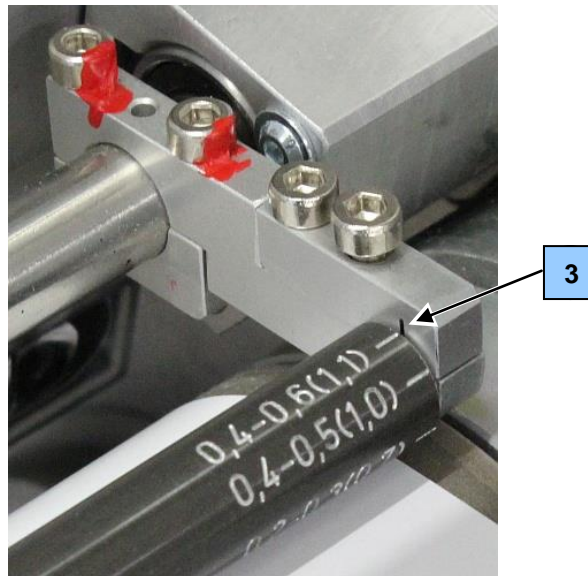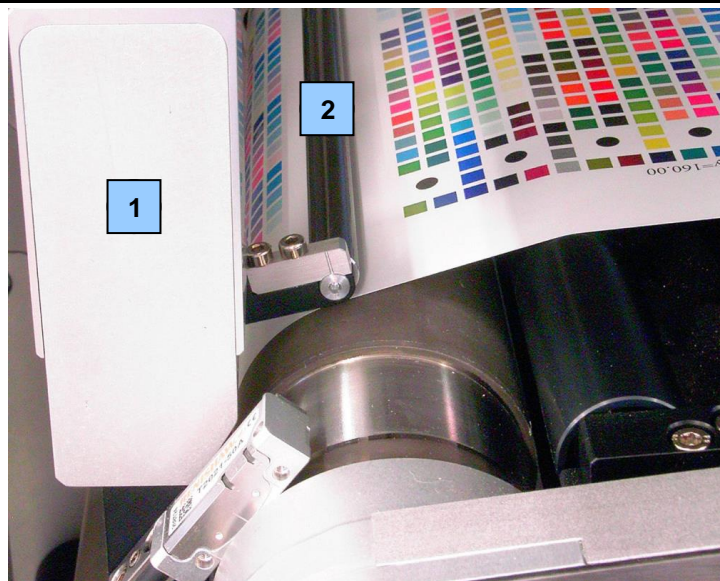
Fig. 32. Infeed height control

Pos.	Element	Bedeutung
1	Sensor	Whenever the permissible material thickness is exceeded, the sensor will trigger the abrupt stop of the machine.
2	Scanning bar	Floats normally above the printing material. Is touched and raised by too thick a printing material.
3	Marks	Marks for adjusting the scanning bar to the thickness of the employed printing material.

Function of the infeed height control

The infeed height control monitors the height of the material.

If a label comes loose from the substrate and sticks up, or two labels are stuck on top of each other, they should not be allowed to enter the printing unit.

Whenever the permissible material thickness is exceeded, the sensor will trigger the abrupt stop of the machine and its feed process, so that the labels in question cannot enter the printing unit.

Functional principle: The scanning bar of the height control floats above the entire printing width of the printing substrate. Whenever "thicker" material comes along, then the scanning bar will rise, which in turn lifts a lever from a corresponding sensor inside the printer. If the distance is too great, the sensor will trigger an alarm and cause the transport of material to be stopped abruptly.

The scanning bar sits on an eccentric and can be rotated. This permits the scanning bar to be adjusted to different printing material thicknesses. Mark #3 shows the currently selected value. Adjust the required value when you change the printing material.

The range specification defines the thickness of the printing material in millimeters. The specification in parentheses defines the maximum passage height in millimeters.

Example: "0.0 - 0.2 (0.5)" means: This setting is suitable for printing material of a thickness of 0.0 ... 0.2 mm. Any irregularities may pass infeed height control up to a height of 0.5 mm.

Notice
Solely the system user is responsible for any damage on the print heads that results from incorrect settings of the infeed height control unit!

Use the specifications in the following table when you select the deflection rollers for a printing material and when you adjust the scanning bar of the infeed height control unit.

Thickness of the printing substrate	Inscription on the exchangeable deflection rollers	Scanning bar adjustment value
0.0 to 0.2 mm	0,0 - 0,2 mm	0,0 - 0,2 (0,5)
0.2 to 0.3 mm	0,2 - 0,3 mm	0,2 - 0,3 (0,7)
0.3 to 0.4 mm	0,3 - 0,4 mm	0,3 - 0,4 (0,9)
0.4 to 0.6 mm	0,4 - 0,6 mm	0,4 - 0,6 (1,1)

Information

➜ Continuing the scanning bar rotation does not always lead automatically to the next higher or next lower value. Sometimes, values are skipped that are marked at a different location.

➜ The reason is that the space for inscriptions on the scanning bar is limited. The limited space can better be used for inscriptions when the values are distributed over the entire roller.

4.6.15   Printing table

4.6.15.1 Printing table with exchangeable deflection rollers

Purpose
Ensures a flat and accurate height and lateral position of the printing substrate during the printing process.
Technical realization
Smooth-running, bearing-mounted guide rollers.
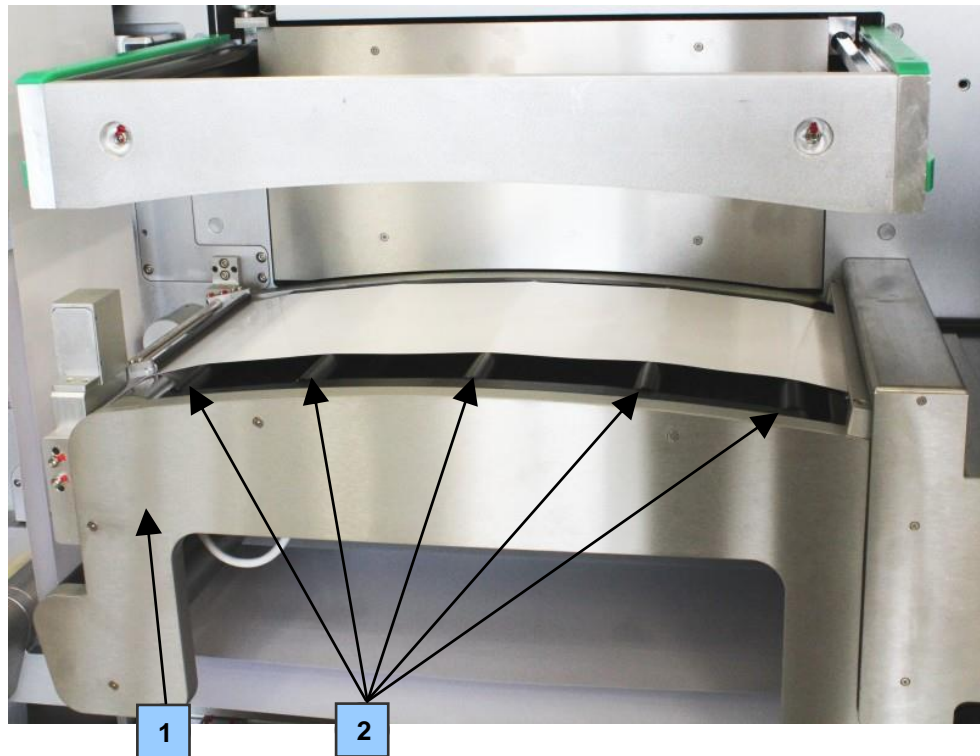
Fig. 33. ITS6 printing table

Pos.	Element	Meaning
1	Chassis	Bracing, ensures the accurate height and lateral position
2	Exchangeable deflection rollers	Support of the printing substrate

The printing table has five deflection rollers. This reduces the contact between the printing substrate and the surface below to such an extent that even electrically charged printing substrate cannot stick to the surface below - the rollers in this case - during stoppages. This practically excludes the chance of tearing when printing is started up again.

Information

- ➔ The loaded image/printing width must always be narrower than the respective printing substrate!
- ➔ Any ink that gets onto the deflection rollers must be thoroughly removed at once, since it could cure there over time. Likewise, the ink could crawl under the printing substrate and make it stick to the rollers after curing.

The five deflection rollers of the printing table can be replaced by deflection rollers with a different diameter after removing the mounting blocks. This is required to make sure the distance between the surface of the respective printing substrate and the nozzle plates of the print heads is always about 0.9 mm regardless of the different material thicknesses.

Always use the following table as a reference for selecting substrates and deflection rollers!

Thickness of the printing substrate	Inscription on the exchangeable deflection rollers	Scanning bar adjustment value
0.0 to 0.2 mm	0,0 - 0,2 mm	0,0 - 0,2 (0,5)
0.2 to 0.3 mm	0,2 - 0,3 mm	0,2 - 0,3 (0,7)
0.3 to 0.4 mm	0,3 - 0,4 mm	0,3 - 0,4 (0,9)
0.4 to 0.6 mm	0,4 - 0,6 mm	0,4 - 0,6 (1,1)

When the rollers used are too thin, the print pattern would have white streaks (white lines) in the direction of travel.
However, if the used rollers are too thick, the printing substrate may rub along the sensitive nozzle plates of the print heads and clog or damage these!

Notice

Avoid any damage to the printing heads!
- ➔ The system or machine operator is solely responsible for damage to the print heads, which are due to the incorrect pairing of substrate and rollers!
- ➔ Never use damaged or bent rollers!
- ➔ Solely the system user is responsible for any damage on the print heads that results from incorrect settings of the infeed height control unit!

> **Information**
>
> → If you are in doubt, always use the deflection rollers for the next thicker printing material.
> → This also applies if the particular substrate tends to have bowed or wavy edges.

4.6.15.2 Infeed roller of the printing table with angular encoder

Task
Wrinkle-free infeed of the printing substrate into the printing table, and exact determination of the fed printing substrate quantity
Technical implementation
Roughened roller surface in conjunction with angular encoder
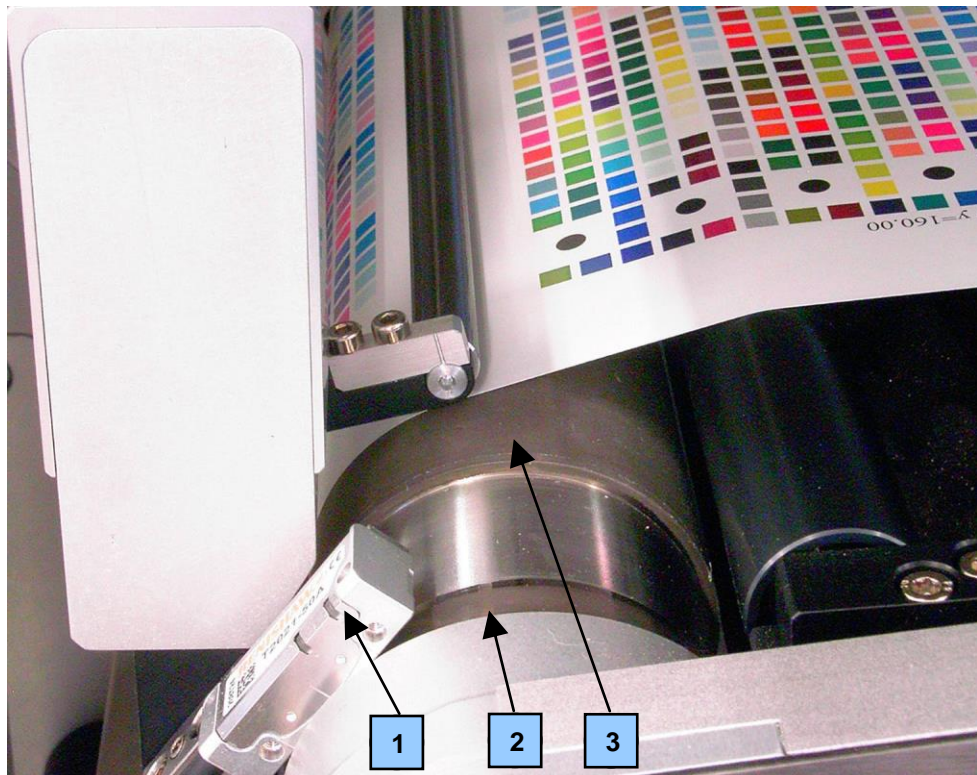
Fig. 34. Infeed roller from CSAT ITS6 printing table

Item	Element	Meaning
1	Angular encoder	Permanently monitors the rotation of the gauge ring / the infeed roller, and sends the corresponding signals to the control system.
2	Gauge ring	Rotates together with the infeed roller, thus triggering the signals of the angular encoder.
3	Infeed roller	Wrinkle-free infeed of the printing substrate into the printing table.

The infeed roller of the printing table features a high concentricity. This shall ensure that the printing substrate is fed underneath the print head unit such that it is always straight and without wrinkles.

In addition, the infeed roller permanently monitors the printing substrate volume that is fed to the printing table. A gauge ring is secured to the front end of the infeed roller. In a contactless process, the optical angular encoder scans the fine pattern of horizontal stripes on this gauge ring.

As soon as the infeed roller and its gauge ring start rotating, the angular encoder sends signal pulses to the print head controller. The print head controller uses these signals to synchronize / position the printed images.

Any slip between printing substrate and infeed roller during printing operation would have a negative effect on the image lengths. To avoid this, the error message "53= printing substrate run: Fault" would be generated in such a case.

Caution
➔ To avoid measuring errors, ensure that the surface of the infeed roller is always clean and adherent, and not damaged at all.
➔ The surface of the gauge ring is extremely sensitive, and must therefore never be touched, neither with fingers nor with an object, and always be clean.- Serious faults during image positioning would result.

4.6.16 Print head unit

Purpose
Inkjet print head unit for creating the printed image on the printing substrate.
Technical realization
Four print heads in a row, which apply the primary colors to the printing substrate one after another. The print head unit has an automatic cleaning system.
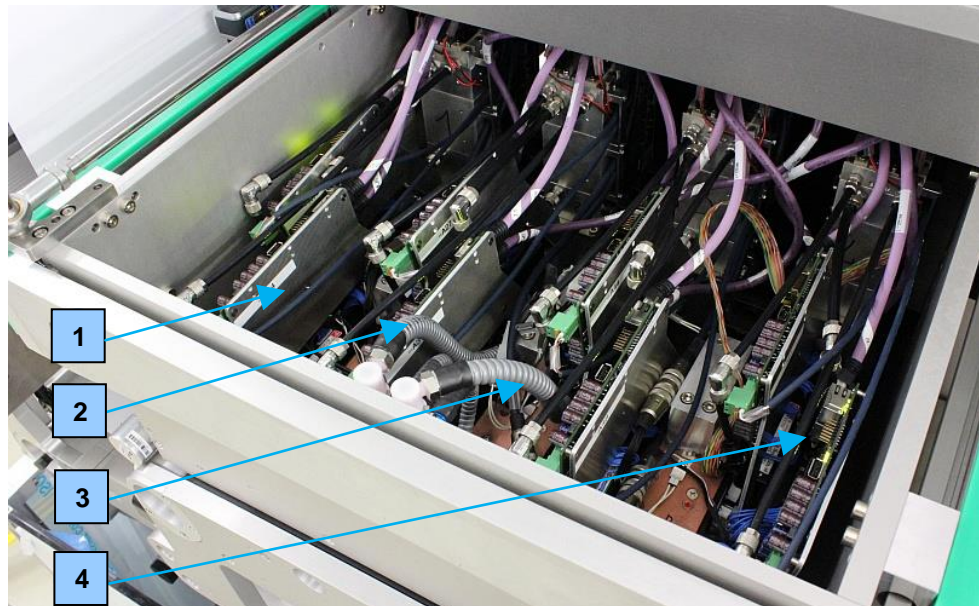
Fig. 35. ITS6 print head unit

Pos.	Element	Meaning
1	Print head Y	Transfers the primary color yellow.
2	Print head C	Transfers the primary color cyan.
3	Print head M	Transfers the primary color magenta.
4	Print head K	Transfers the primary color black.

4.6.16.1 Function of the print head unit

The printer operates with a print head unit that can be maneuvered when idle. The printing process takes place by means of four print heads aligned behind one another, each of which transfers one of the four primary colors (cyan, magenta, yellow, black). During printing, these colors are applied to the printing substrate one after another. The amount and position are determined by the print layout.

Notice
Never turn any of the screws with which the print heads are attached to the chassis of the print head unit!
Even the slightest rotation could change the position of the print heads to such a degree that they would apply the ink to the wrong place. This could result in light or dark stripes and discoloration in the printed image when the ink drops are applied over each other instead of next to each other.
Misaligned print heads can only be readjusted by a qualified service technician from Markem-Imaje CSAT GmbH.

Notice
If the printing substrate should tear between the area of the cut-and-splice device on the unwinding unit side and the friction drive, then all of the print heads and the LED strips of the pre-curing unit should be checked <u>immediately</u> and cleared of any foreign objects or spots of ink.

4.6.16.2 Positioning of the print head unit

When the printer is idle, the print head unit can be moved between the working and the so-called parking position by means of of a pneumatic drive. The print head unit can also be moved manually to the so-called service position in order to perform maintenance work or to clean the wipers, print heads, and lamp modules of the pre-curing unit.
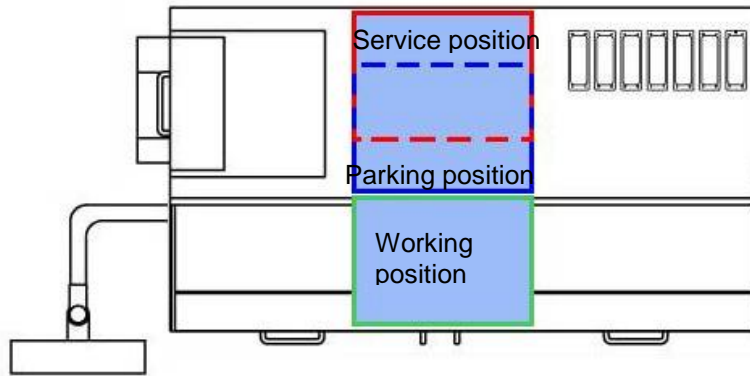
Fig. 36. Standard positions of the print head unit (view from above)

Position	Operational state
Service position	When cleaning the wipers, print heads, and lamp modules of the pre-curing unit as well as when performing maintenance work on the lines leading to the print head unit.
Parking position	Whenever the printing process haas been interrupted for a longer period of time (pause) or the printer has been turned off completely. Likewise, when pulling in new printing material or during the mechanical feed process.
Working position	During the printing process. Likewise, during repairs on the components installed in the print head unit above.

If the change between the working and parking position is interrupted or if it takes too long, then the error message "83= Print head unit not in required position" will be displayed. In this event, the print head unit should be pulled manually to the parking position before the printer is turned back on.

4.6.16.3 Care of the print heads

The underside of the print heads always have a thin film of ink, which is at the risk of hardening when exposed to the rays of the pre-curing unit or light from outside. The only way this can be prevented is to subject all of the print heads of the ITS6 to standard or intensive mechanical cleaning just after turning on the printer and then at intervals of no more than every two hours thereafter. Furthermore, each print head must also be cleaned by hand at the end of each shift and before switching off the printer. Extreme caution must be used when this is done since the nozzle plate of a print head is very sensitive to mechanical stress factors (pressing, rubbing, and scratching).

This aforementioned standard and intensive cleaning takes place fully automatically at the push of a button and lasts no more than 30 seconds for

standard and 1½ to 2 minutes for intensive cleaning. This supposed loss of time makes up for itself very quickly when one considers that …

- … plugged nozzles cause white stripes to appear lengthwise in the printed image,

- … it will take at least several hours and all kinds of materials to manage to clean them again,

- … a new print head costs several thousand Euros and can only be installed by one of the manufacturer's service technicians.

Therefore, please emphasize to all your employees that the print heads always have to be handled with care and that the aforementioned cleaning procedures and intervals must be strictly adhered to!

Notice
If the print heads are cleaned improperly or not often enough, this can result in the loss of all warranty rights!

4.6.16.4 Print head cleaning equipment

Purpose
Mechanical cleaning of the print heads
Technical realization
Wipers which wipe off the print head nozzle plates.
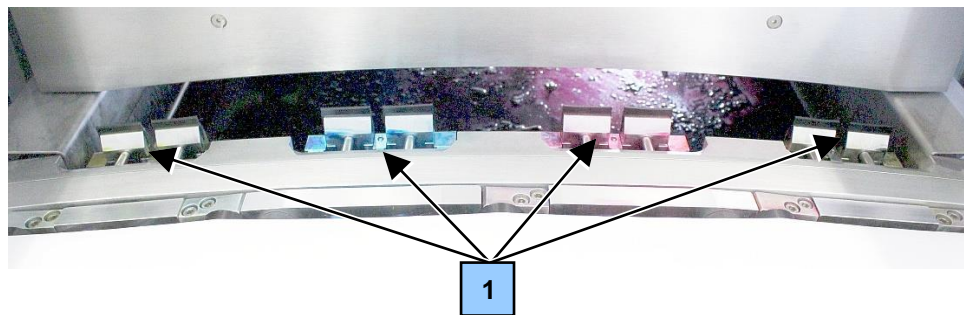
Fig. 37. Print head cleaning equipment

Pos.	Element	Bedeutung
1	Wiper unit	The wipers of the wiper unit clear ink and dirt from the print head nozzle plates.

4.6.16.5 Wiper cleaning action

The wipers come into use during standard and intensive cleaning process-es, and can be adjusted individually for each print head under the tab *Job\Cleaning*.

During the cleaning process, first the print head unit is pulled into its park-ing position at the rear of the printer. This is where all of the print heads se-lected previously are rinsed out with ink for a few seconds. While the print head unit is being moved back into its working position, each wiper will stay flipped up as long as it is beneath a print head that has just been rinsed. The ink that is wiped off the print heads flows down the wipers into the col-lection pan.

Each wiper unit consists of three main parts, each of which occurs in a pair:

  – rubber wiper,

  – pivoting wiper holder,

  – pneumatic cylinder for the drive.

Each of these components occurs in a pair, because the print heads are ar-ranged as an offset pair for each color of ink.
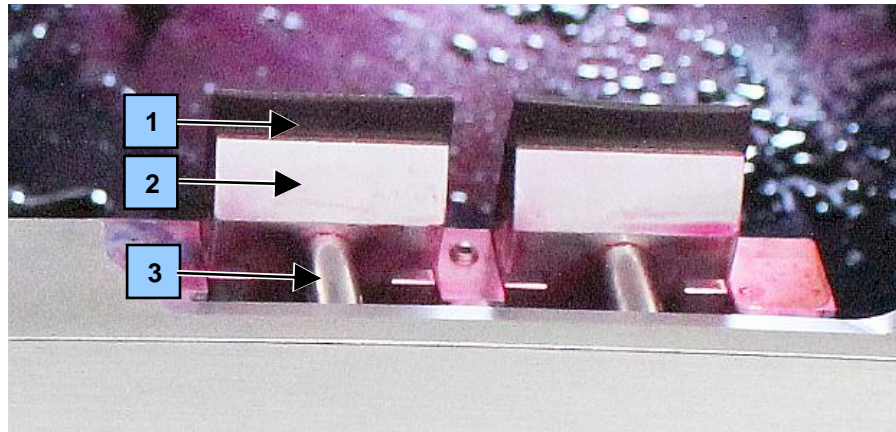
Fig. 38. Print head cleaning equipment

Pos.	Element
1	Wiper
2	Pivoting wiper holder
3	Pneumatic cylinder

Information

> After each shift, clean the wipers and their holders manually and make sure that they are in good condition and proper working order.

> Make sure that, when the wipers are flipped up, they do not reach beyond the print head nozzle plates above them, and that they are aligned exactly parallel to the print head nozzle plates and are in good condition.

Notice
The owner of the printer is solely responsible for any damage that can be attributed to damaged wipers or to not performing the cleaning process often enough!

4.6.16.6 Wiper shower

Task
Automatically cleaning adhering ink and other contamination off the wiper.
Technical implementation
Cleaning fluid is sprayed automatically on each wiper
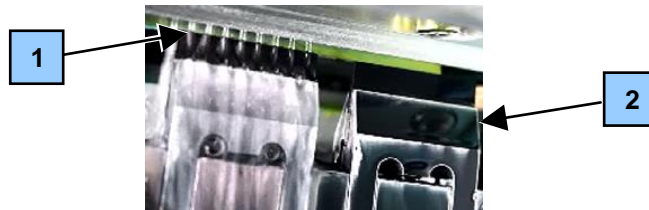
Fig. 39. Cleaning the left wiper unit with the wiper shower

Item	Element	Meaning
1	Spray nozzles of the wiper shower	Removing adhering ink and other contamination from the individual wipers.
2	Wiper unit (not yet cleaned)	The wipers of the wiper unit wipe ink and contamination off the print head nozzle plates.

The automatically operating wiper shower is activated after the printer has been switched on and before and after each print head cleaning.

At the beginning of the showering process, the print head unit is first moved to the working position in the front section of the printer. Next, all wipers are

---

automatically folded up and, one by one in succession, sprayed on with cleaning fluid from several nozzles. Each wiper unit has its own spray nozzles that sit on the underside of the print head unit.

Simultaneous showering of more than one wiper unit of a printer is not possible. This would require a large volumetric flow that can not be provided by the relatively small intermediate cleaning fluid reservoir. Efficient cleaning of more than one wiper unit could thus not be ensured.

The settings of the wiper shower can be changed in the *Job\Cleaning* tab.
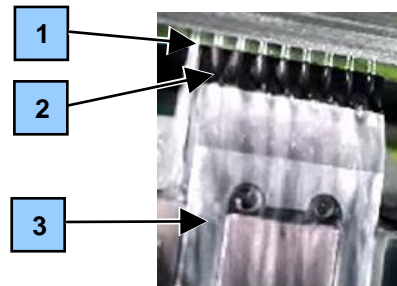
Fig. 40. Wiper shower

Item	Element
1	Spray nozzles of the wiper shower
2	Wiper
3	Swivel-type wiper holder

Information

> Despite the wiper shower function, manually cleaning the wipers and their supports after each shift, and checking their function and condition is essential.

> When you clean the print head nozzle plates manually, ensure that you do not wipe any contamination on the spray nozzles of the wiper shower. This could obstruct the nozzles.

Caution

Solely the system user is responsible for any damage on the print heads that results from damaged or contaminated wipers.

4.6.17   Pre-curing

Purpose
Pre-curing of the ink applied by the first three rows of print heads by means of chemical cross-linking on the surface.
Technical realization
The ink that was last applied is cured on the surface by UV light on the way between the adjoining print heads to the point that it cannot mix with the next ink to be applied. Conversion of short ink molecules into long-chain, chemically and mechanically resistant macro-molecules when subjected to UV light.
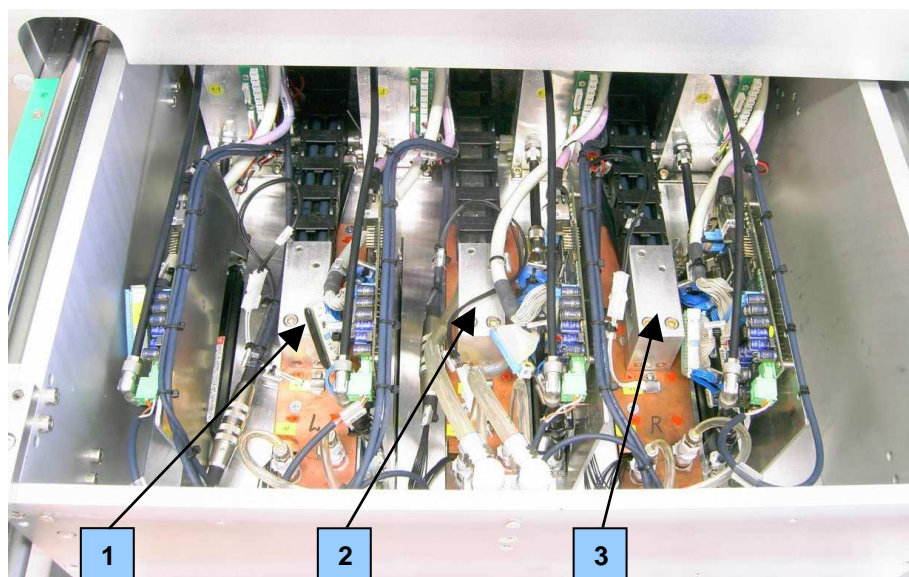
Fig. 41. Pre-curing inside the print head unit

Pos.	Element	Meaning
1	Pre-curing Y	Pre-cures the **y**ellow ink applied by the first print head.
2	Pre-curing C	Pre-cures the **c**yan ink applied by the second print head.
3	Pre-curing M	Pre-cures the **m**agenta ink applied by the third print head.

4.6.17.1 Layout and function of the pre-curing unit

The ink applied by each of the first three print head rows is pre-cured by UV light on its way to the next print head row to the point that an intact membrane is formed on the surface which will not allow the mixing of any ink applied later. The ink underneath this membrane has not cross-linked yet and therefore remains fluid. Pre-cured ink cannot withstand chemical and mechanical loads, and therefore can be washed off or smeared with little effort.

After the fourth print head row (black), no more pre-curing takes place since no more ink is applied, but rather, the printing substrate is conveyed to the main curing module, where all of the applied ink is completely hardened.
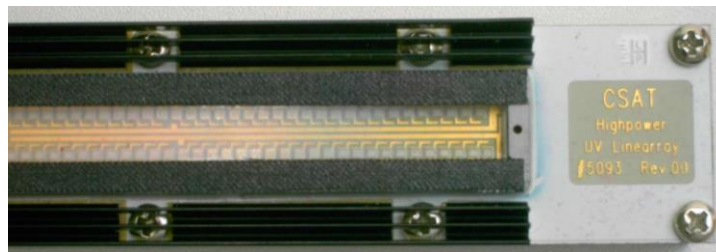
Fig. 42. Close-up of a dismantled LED-strip of the pre-curing unit

All three of the UV pre-curing modules have the same design. The lamps consist of UV LEDs which, compared to UV fluorescent tubes, do not have to be pre-heated, and therefore require less energy. Due to the low heat emission, even heat-sensitive materials won't be damaged. The lamp modules of the UV pre-curing modules are water-cooled.

In case of activated UV pre-curing the associated LEDs are switched on automatically before the uncured image reaches the first lamp module. While the printing process is going on, all of the UV pre-curing modules remain switched on continuously. They are not switched off until the printing process is stopped and the printing substrate is no longer moving forward.

4.6.17.2 Correct operation of the pre-curing unit

Operating the pre-curing unit involves the risk of light being emitted by its LEDs, which can be partially reflected and slowly harden the film of ink on the underside of the print heads. This would cause the nozzle plates to become clogged over time and the print heads, costing several thousand Euros each, would have to be replaced – damage that is not covered by any warranty and, therefore, always has to be covered by the owner of the system!

Notice
Prevent any damage to the print heads!
➔ Only use the pre-curing unit when absolutely necessary, namely:
The edges of the inks run into each other and mix in areas where inks of different color are directly adjacent to one another.
The printing substrate is very smooth so that the drops of ink could roll off or fail to merge into solid patches of color.
➔ Make sure that the pre-curing unit is operated at the lowest possible power level.
➔ Make sure that all print heads undergo a standard or intensive cleaning at least every two hours.

Notice
If thin, white lines appear lengthwise in the prints, then
➔ Stop the printing process <u>immediately</u> and have all print heads undergo a standard or intensive cleaning.
➔ Keep repeating these procedures until all of the print heads are clean again. See Chap.10.7.5.1, "Mechanical cleaning of the nozzles"
➔ Extremely dirty print heads might also need to be cleaned by hand. See Chap.10.7.5.2, "Manual cleaning of the print heads".

In order to prompt the operator to print without the pre-curing wherever possible, this unit is deactivated automatically by the controls whenever a new image file is loaded. If pre-curing is nevertheless required for the next print job, then the operator must re-activate it after loading the image file using the tab *Job > UV Curing*.
On the other hand, if the required format file is not loaded until after the image file, the settings saved in the format file would override in this case: If it provides for printing with a pre-curing unit, then the latter would in fact be switched on by the controls and not be deactivated automatically.

4.6.17.3 Care of the pre-curing unit

In general, the cleanliness of the LED strips of the pre-curing unit only has to be checked once a day when the print heads are cleaned by hand. If foreign objects or ink film and drops are visible on an LED strip, they should be removed using only a soft, lint-free cloth if possible (see Chap.10.7.5.2, "Manual cleaning of the print heads").

Notice

➜ Clean the LED strips and the surrounding areas using only dry, soft cloths (Order no.: `FF100252100`).

➜ Dried-on or cross-linked ink spots should be removed using only the special cleaning pads no. `ZE1010-75`.

➜ All other cleansers are prohibited.

Notice

➜ <u>Never</u> clean the LED strips and the adjacent areas with aggressive solvents (e.g. acetone) or <u>wipe off with dripping wet</u> low-viscosity liquids (e.g. water, glass cleaner, isopropyl alcohol)!

➜ <u>Solvents and low-viscosity cleansers are prohibited</u> since they can penetrate the lamp module and cause damage there.

➜ Never scratch or scrape the glass shields using hard objects!

Notice

Risk whenever the printing substrate should tear:

➜ If the printing substrate should tear between the area of the cut-and-splice device on the unwinding unit side and the friction drive, then all of the print heads and the LED strips of the pre-curing unit should be checked <u>immediately</u> and cleared of any foreign objects or spots of ink.

4.6.18 Main curing

Purpose
Fixation of the printed image by means of chemical cross-linking. This produces an abrasion-resistant print.
Technical realization
Conversion of short ink molecules into long-chain, chemically and mechanically resistant macro-molecules when subjected to UV light.
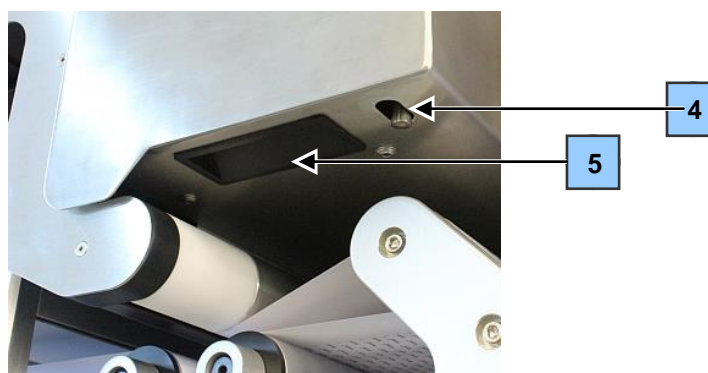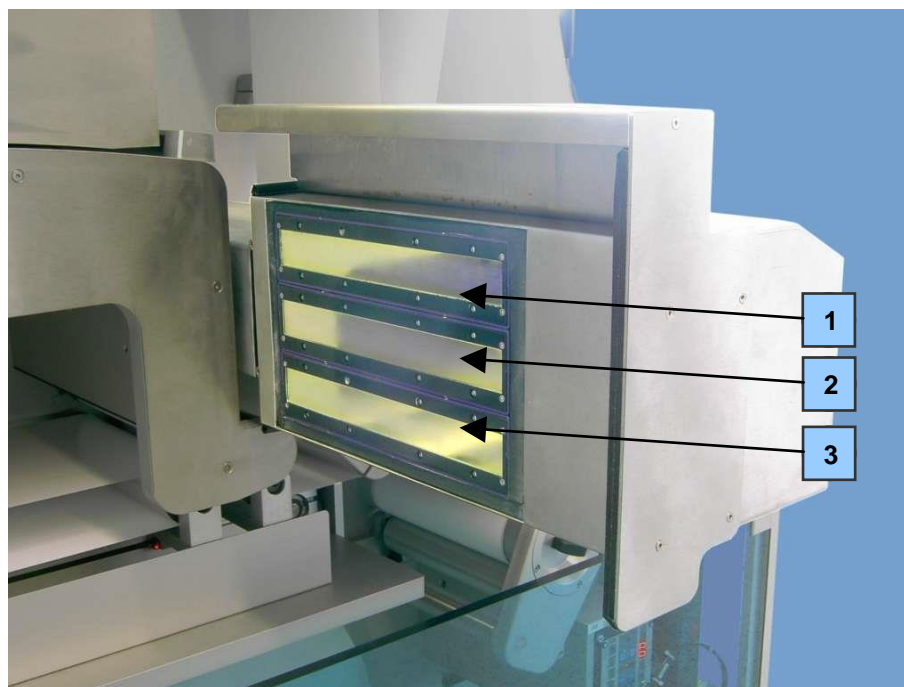
Fig. 43. main curing

Pos.	Element	Meaning
1	Lamp module 1	Complete curing of the ink
2	Lamp module 2	Complete curing of the ink

Pos.	Element	Meaning
3	Lamp module 3	Complete curing of the ink
4	Lock	Locking and unlocking
5	Handle	Pull handle

Main curing

The applied ink is permanently fixed to the surface of the printing substrate by means of chemical cross-linking when subjected to the UV light from the 3 lamp modules. A solid, dry coat of color is created, which also features high thermal and mechanical resistance. A printing substrate treated in this manner can continue to be processed immediately.

All three of the UV lamp modules have the same design. The lamps consist of UV LEDs which, compared to UV fluorescent tubes, do not have to be pre-heated, and therefore require less energy. Due to the low heat emission, even heat-sensitive materials won't be damaged. The UV main curing lamp modules are water-cooled.

The UV main curing modules are switched on automatically before the un-cured image reaches the first lamp module. While the printing process is going on, all of the UV pre-curing modules remain switched on continuously. They are not switched off until the printing process is stopped and the printing substrate is no longer moving forward.

Pulling out and reinserting the main curing unit

In order to clean the glass plates and the adjacent areas, the main curing unit must be removed.

> Push the latch #4 forwards.

> Take hold of the handle #5 and pull the main curing unit out.

> When reinserting, make sure that the latch #4 engages on its own.

Notice
→ Clean the glass shields and the adjacent areas preferably with dry, soft cloth pads.
→ A scraper for ceramic stovetops can be used to remove the first layers of heavy deposits as well as possible.
→ Afterwards, use the special cleaning pads (Order no. `ZE1010-75`) to remove the rest.
→ All other cleansers are prohibited!

4.6.19 Air circulation system

Purpose
The air circulation system circulates and filters the air in the area of operation.
Technical realization
Continuous suction of air by means of a fan and cleaning by means of an activated charcoal filter.
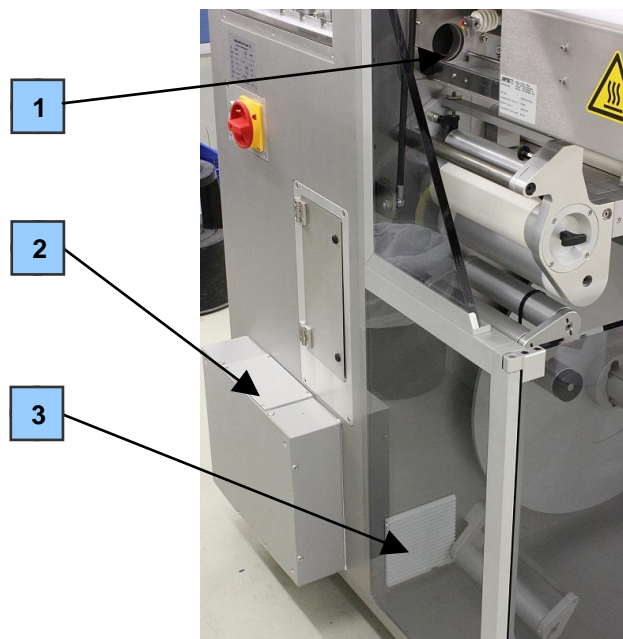
Fig. 44. ITS6 air circulation system

Pos.	Element	Meaning
1	Air intake duct	Suctions contaminated air from the interior of the printer.
2	Activated charcoal filter	Eliminates odors and intercepts particles.
3	Exhaust duct	Inflow of cleaned air into the interior of the printer.

Circulation system

The air circulation filter system is used to eliminate unwanted substances from the air circulating inside the printer and to prevent odors.

Since the printer is almost entirely enclosed, the exchange of air with the environment is very limited. In order to avoid an accumulation of ozone and other harmful substances, the air is continuously suctioned by a fan from the upper part of the operating area, cleaned in an activated charcoal filter, and then returned to the lower part of the operating area.

4.6.20   Air cooling

Purpose
Cooling of the printer interior by extracting hot air.
Technical realization
Permanent extraction of the air via a fan and cleaning via activated charcoal filters.
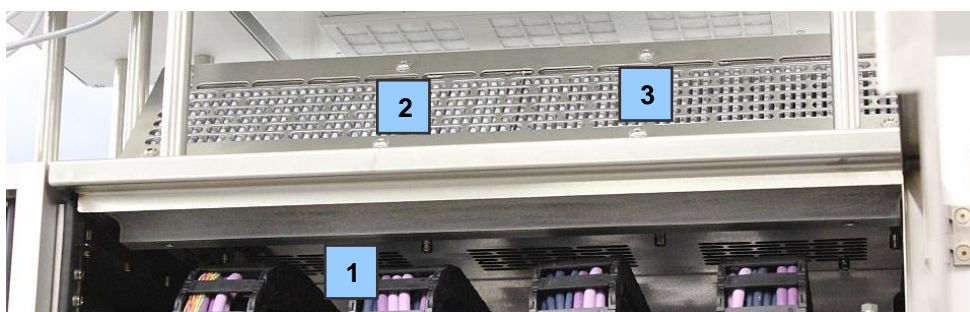
Fig. 45. Air cooling (rear view with open safety door rear)

Pos.	Element	Meaning
1	Intake grille	Extraction of hot air from the interior of the printer.
2	Activated charcoal filters (behind the ventilation grille)	Eliminates odors and separates particles.
3	Ventilation grille	Discharge of the cleaned air into the environment.

By the extraction of hot air, the interior of the printer is cooled. Activated charcoal filters clean the air from particles and eliminate odors.

4.6.21 CAPS server

Task
Preparing image files for printing, and inserting variable components
Technical implementation
Standard PC with installed CAPS software (CSAT Advanced Print Server).

Fig. 46. CAPS server (rear view)

The CAPS server performs color separation and enters variable data into the rendered images.

All cables of the CAPS server are installed and secured. The CAPS PC does not need to be switched on/off separately. It is connected to the power supply of the printer.

4.6.22 Camera system

Task
Recording the printed image and comparing the recorded image with a reference image. Sending the result of the evaluation to the Label Rejection Controller.
Technical implementation
Trigger signal from an incremental encoder.
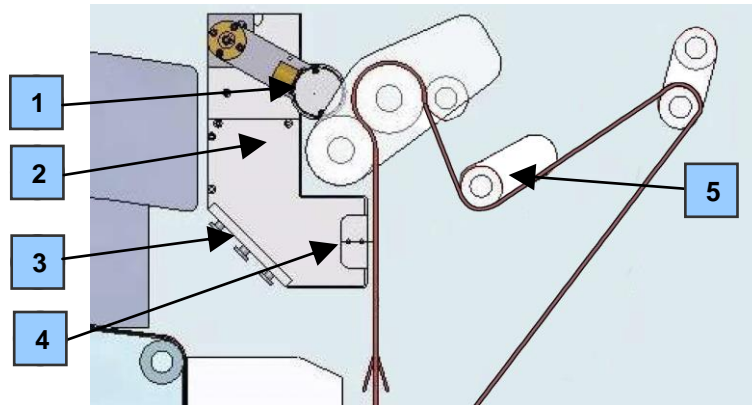
Fig. 47. Camera system

Item	Element	Meaning
1	Incremental en-coder	Transfers the trigger signal for the camera to take a photo of the printed image.
2	Camera	Records the printed image.
3	Mirror carrier	Carries the mirror that reflects the image of the printing substrate to the camera.
		Access to the camera, to the mirror, and to the plug-in connection of the lighting.
4	Lighting unit	Illuminates the printing substrate with white LEDs.
5	Guide roller	Guides the printing substrate.

The camera system consists of the camera module that is installed in the printing system, a control computer that is installed on the printing system, and a camera control panel that is installed on a swivel arm.

During the "Teach-in phase" at the beginning of a print job, the color line camera in the camera module completely records several passing printed images, and uses this information to generate a reference image that basically represents the average of the previously seen images. During the PDF comparison this reference image is compared with the original PDF file. The result shows whether or not the desired image was printed.

Once the PDF comparison has successfully been completed, the camera system compares each image printed during the subsequent printing operation with the reference image only. In addition to the overall printed image, the camera system checks other previously defined image sections for deviations. Deviations are:

- Text discrepancies (missing text, for example)

- Color discrepancies (such as smeared ink, missing color).

- Image discrepancies (such as different positioning, missing image, missing label, different bar code, creases).

The camera reads and decodes the data matrix code. It sends the decoded number and the result of the comparison to the Label Rejection Controller. The Label Rejection Controller is installed in the finishing system.

4.6.23   Function of the camera system components

Camera module

Each printed image is fully scanned by a camera. Two LEDs illuminate the image section in front of the camera lenses. Most of the camera module is encapsulated so that almost no light can get to the outside, dazzling the operators.

Incremental encoder

The incremental encoder provides the camera with the signal for the optimum shot time.

Control computer

The control computer has the following tasks:

- It evaluates the images taken by the camera.

- It reads the Data Matrix Code.

- It sends the information decoded from the Data Matrix Code to the Label Rejection Controller together with the result of the evaluation – that is, whether the printed label is regarded as good or as bad.

- It saves the last 50 shots in a cyclic buffer.

- It saves the shots with deviations.

- It saves the log data.

Control panel

The camera control panel permits the processes at the camera system to be watched, and camera system adjustments to be made.

4.6.24   Friction drive

Purpose
The friction drive conveys the material to be printed at a specified speed past the print heads and the curing systems.
Technical realization
Static friction on rotating rubber rollers.
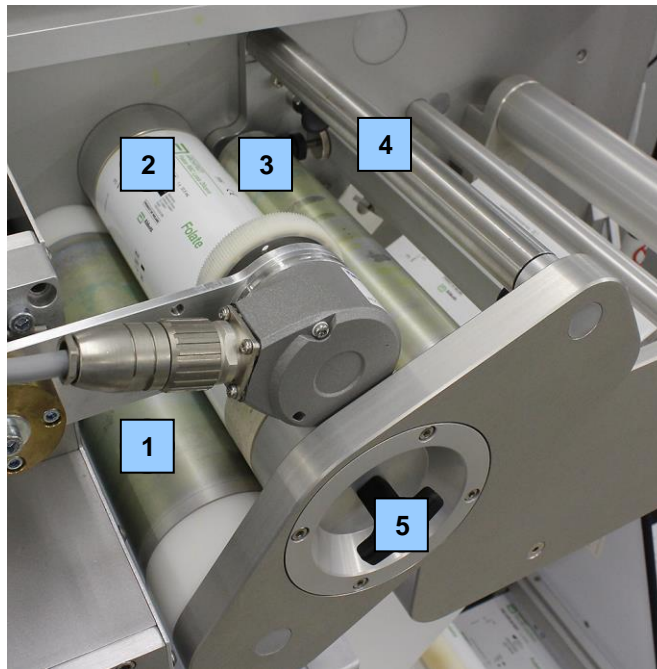
Fig. 48. ITS6 friction drive

Pos.	Element	Meaning
1	Infeed roller Ø 80 mm	Prepares the printing substrate for wrinkle-free infeed
2	Drive shaft with rubber roller Ø 80 mm	Transport of the printing substrate.
3	Pressure roller Ø 50 mm	Ensures static friction where the printing substrate contacts the rubber roller. The parallelism is adjusted by means of the knurled screws.
4	Swivel axis	Releases the printing substrate by pivoting the pressure roller away.
5	Service access	Replacement of rubber sleeve

Friction unit

The rubber roller of the friction drive rotates clockwise during printing and pulls the printing substrate through the printer from left to right. In order to ensure a sufficient transmission of force, the pressure roller must be placed

close to the rubber roller. This is achieved by adjusting the set screws and lock nuts at both ends of the pressure roller.

The friction unit conveys the printing substrate coming from the unwinding unit past the print head unit and UV curing systems at a constant, specified speed. The printed material is then conveyed to the rewinding unit.

The friction drive interacts with the web tension control to create a constant tension of the printing substrate between these two components. The settings of the friction drive can be read off the touchscreen under the tab *Job > Web settings*) and changed if necessary.

Pressure roller

Purpose
Controls the friction force between the printing substrate and the rubber roller of the friction drive
Technical realization
The distance between the pressure roller and the rubber roller can be adjusted by means of four knurled screws.
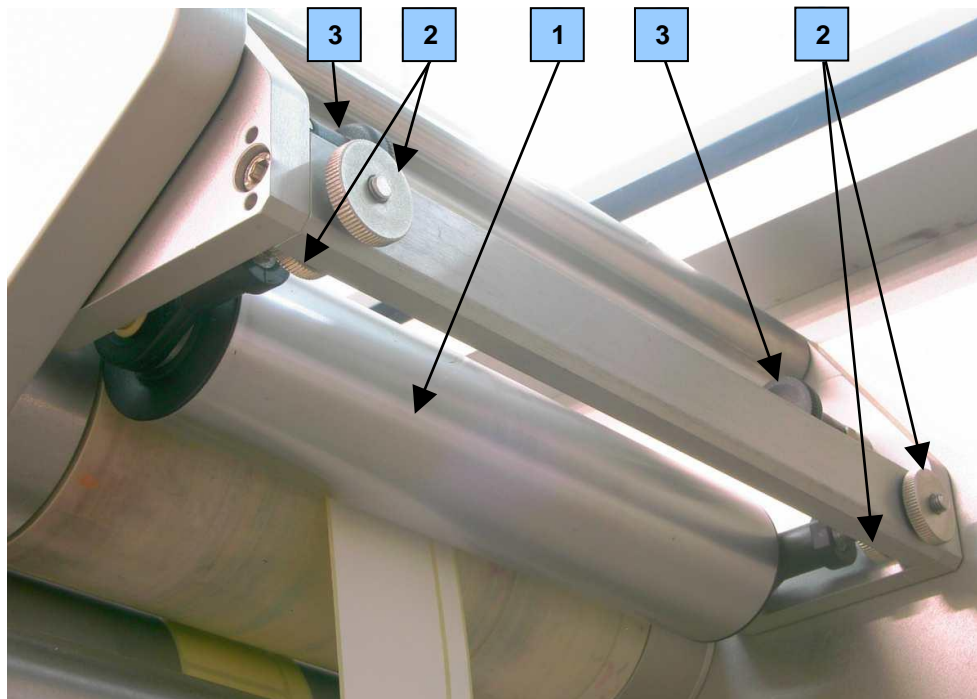
Fig. 49. Pressure roller

Pos.	Element	Meaning
1	Pressure roller	Presses the printing substrate against the drive roller of the friction drive.
2	Set screws with knurled lock nuts	For adjusting the distance/pressure between the pressure roller and the rubber-coated friction roller.
3	Locking mechanism	Secures the pressure roller either in the operating or the higher service position.

Adjusting the pressure roller

The purpose of the pressure roller #1 is to increase the friction force between the printing substrate being fed in and the light-colored rubber roller of the friction drive.

There's no need to push the pressure roller down hard onto the rubber roller in order to achieve sufficient transmission of force. These two rollers only have to meet tightly on rare occasions, for example when processing printing substrate with a particularly smooth or slippery surface. In this event, with the print material already inserted, the two set screws of the pressure roller have to be turned evenly and as far as necessary to the left, so that the friction drive won't slip during printing operation:

> First loosen all of the knurled lock nuts #2 at both ends of the pressure roller.

> By turning the left/inside knurled lock nuts clockwise, the two black bearing heads will be pushed to the left. Make sure that the pressure roller is aligned parallel to the rubber-coated drive roller.
Furthermore, never press the pressure roller into the rubber coating of the friction roller in order to avoid permanent distortion!

> Finally, screw down carefully the two lock nuts on the right until the pressure roller is secured in the newly adjusted position.

During normal printing operation, the suspension of the pressure roller should be pivoted towards the friction roller and be secured in this position using both of its locking mechanisms #3.

4.7 Indicators and control elements

The correct use and reliable shutdown of the printer is ensured by the switches and control elements shown below:

4.7.1 Main switch and ON/OFF switch

The round main switch and the red-green ON/OFF switch are located on one of the two narrow ends of the printer.
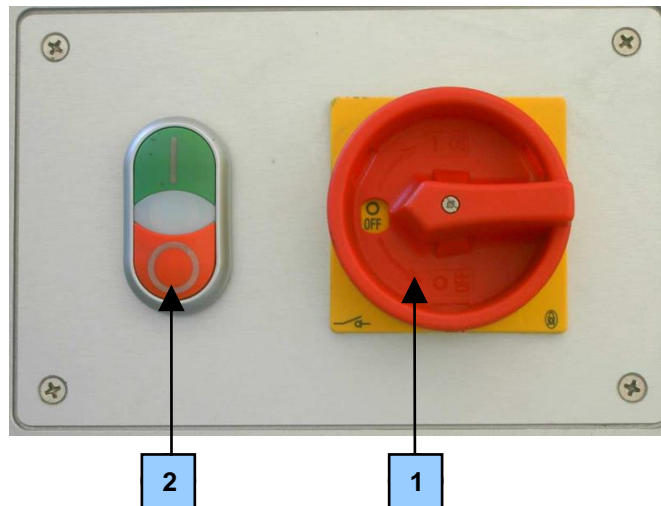
Fig. 50. Main switch and ON/OFF switch on the printer

Pos.	Elements	Meaning
1	Main switch	Disconnects the printer from the power supply. In the "**0**" position the entire printer is dead.
2	ON/OFF switch	In the "**0**" position, it disconnects the power supply to all drives and high voltage parts. The touchscreen, indicators and door interlocks remain switched on and active.

4.7.2   Control panel

The ITS6 printer is operated by means of a control panel.

The control panel is mounted on a hinged and pivoting cantilever arm, which can be attached to either the right end or left end of the printer according to customer requirements.
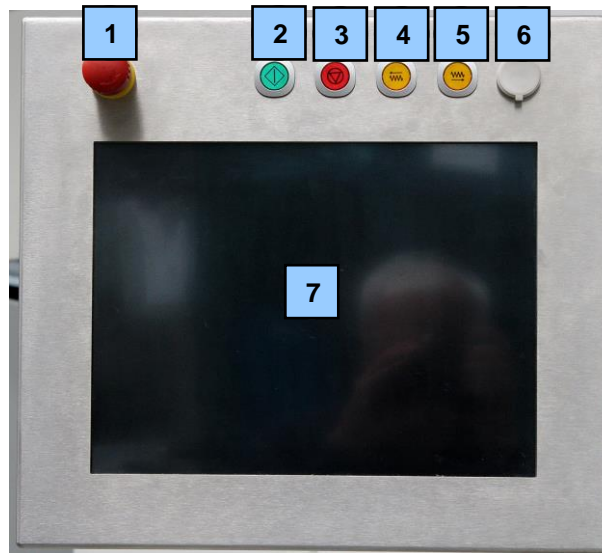
Fig. 51. ITS6 printer control panel

Pos.	Elements	Meaning
1	Emergency Stop button	Switches off all drives, high voltage parts and the pneumatic system when pushed. The touchscreen, indicators and door interlocks remain switched on and active. To reset from the Emergency Stop mode, the red button has to be turned until it pops back out and a green ring becomes visible.
2	Start printer	Pushbutton that is active only in roll-to-roll mode. After this button is pressed the printer will start working. - This button will blink until the material starts to be conveyed. - This button is constantly illuminated during the printing process. - This button remains dark when the printer is stopped. Whenever the printer has been stopped, it can be restarted with this button. The printing process will resume.
3	Stop print system	Pushbutton that is only active in roll-on-roll operation. Pressing the **"Stop"** button stops the printing operation in a controlled way The printer will continue running for a few seconds, finish printing the last images, and then initiate the web retraction. - This button is illuminated only in the time between being pushed and the end of the web retraction. - The rest of the time and in all other operating modes this button remains dark.

Pos.	Elements	Meaning
4	Retraction / Feed backward	Pushbutton The printing substrate is transported in the direction of the unwinding unit. When this button is pushed, the drives of the unwinding and rewinding units and the friction unit will start up. In addition, the curing systems will be switched on. This key is activated / illuminated yellow only as long as the print head unit is in its parking position.
5	Feed forward	Pushbutton The printing substrate is transported forward without being printed. When this button is pushed, the drives of the unwinding and rewinding units and the friction unit will start up. In addition, the curing systems will be switched on. This key is activated / illuminated yellow only as long as the print head unit is in its parking position.
6	USB port	Interface for data exchange. The USB port interface supplements the printer's network connection for the printer and is used primarily for the rapid import and export of image and format files by means of a USB flash drive. Log files can also be exported this way. Data is selected and shifted with the help of the "*Import / Export*" sub-menu.
7	Touchscreen	Menu-driven touchscreen for presentation of messages, presentation of nominal and current values and for command input.

Information

Each time after booting, the touchscreen as well as the control buttons above it are always locked.

Not until a user logs in with a valid user name and password can the menus be opened and settings made. In offline printers, the printing process cannot be started.

4.7.3   Access restriction

Print unit is password-protected. The operating panel and its various functions are only activated as long as the username of the most recently logged on person in the footer of the touchscreen.

If access is blocked or if nobody has logged on, all operating elements and registers of the touchscreen are blocked with the exception of the log-on key and the help page. This also applies for start, stop and feeds keys above the touchscreen.

To log on, enter username and password. After that, the functions corresponding to the user rights of the respective operator are released.

When the log-on key with the blue user icon of the released touchscreen is touched it becomes grey and the operating panel is immediately blocked.

In case that the touchscreen is not operated for a longer period, it is possible to install an automatic block. This is currently not available. If necessary, the automatic block can be implemented by the CSAT.

The Emergency Stop button of the printer is not included in the access restriction; it can therefore always be used.

4.7.4   The printer's display

The touchscreen of the control panel enables convenient operation of the ITS6. The operating status of the ITS6 and the control functions are arranged clearly on a graphic display.

The touchscreen of the printer allows the operator to enter data and settings, to retrieve nominal and actual conditions, and to monitor various components. Changed settings are stored in so-called format files – for short: "Format" – on the hard disk of the on-line computer. When changes are made, a new format file is stored under the same name but with a new revision. This way an old format file can always be retrieved again.

There is also the possibility of creating and storing detailed log files, in which details of all of the events, switching processes, and values measured during a print job are recorded.

The display has a touch-sensitive surface (touchscreen) with the so-called touch elements.

4.7.5 Using touch elements

Touch elements are areas of the touchscreen which, when touched, cause the system to respond in a certain way, and which can serve, for instance, as buttons or retrieve input screens or selection boxes. The use of these buttons is basically no different than using conventional buttons. By putting your finger on the touch element, you can intervene in the process events directly.

Notice
Prevent any damage to the touchscreen. ➔ The touchscreen should only be touched gently and with minimum pressure. Do not punch around on the screen frantically! – Risk of breaking! ➔ Never touch several touch elements simultaneously. Otherwise you could trigger actions unintentionally. ➔ The touchscreen is suitable only for being touched by fingers or a special pen! Therefore, never use pointed or sharp objects, including your fingernails, so that the plastic surface of the touchscreen is not damaged.

Information	
• Make sure to touch gently! • Touch only one point on the screen at once.	OK
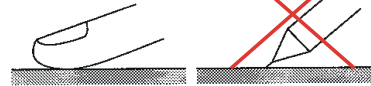
4.7.6 Properties of the touchscreen

With the help of the touchscreen, numerous actions can be carried out from the control panel of the printer:

- Numerical and in some cases graphic depictions of actual states and settings.

- Convenient program navigation and the entry of data and settings by means of the touchscreen.

- Presentation of the remaining service life of many components and consumable materials: Worn parts will not be used by accident.

- Setting of the printing modes and the corresponding printer configuration: Inline or roll-to-roll mode, ability to switch on the components or system parts required for the particular print job.

- Automatic access to manufacturer-provided parameter tables for various materials and printing speeds. This way the best printing quality is achieved faster and more easily.

- Ability to compile and store detailed log files, in which details of all of the events, switching processes, and values measured during a print job are recorded.

- At least 1 GB storage space for image files: Fast access, since you don't have to import the file needed for the print job each time.

- User administration with individual, password-protected access rights.

- Convenient, easy-to-learn menu navigation and extensive help functions.

- Secure access restriction by means of user name and password query. Chip cards or tokens are not needed and won't be accepted.

4.7.7 Enabling switch

Purpose
Intentional bypassing of the door monitoring system for repair work.
Technical realization
Overriding the door lock switch of the rear door panel

Fig. 52. Enabling switch

4.7.7.1 Purpose of the enabling switch

The purpose of the enabling switch is to intentionally override the door lock switch of the rear door panel to allow the service personnel to carefully observe the print head cleaning process – that is, the forcing through of ink and the wiping-off with the wipers – at close range.

The enabling switch has no impact whatsoever on the other door lock switches of the printer: Therefore, even if one of the front doors of the printer is open, the drives and high voltage will remain switched off, even if the operator pushes the enabling switch.

4.7.7.2 How the enabling switch works

The enabling switch works / overrides the rear door only as long as the spring-loaded button is held down halfway or deeper, but without reaching its switching point. In this controlled state, all of the drives and high voltage of the printer can be activated either one at a time or several at a time by means of the control panel. The printing process can also be carried out.

If the enabling switch is let go or if it is depressed past its switching point - both ordinary reactions during an emergency situation – then the printer's door monitoring system will be reinstated immediately and switch off all drives and high voltage. The printer will return to the standard pause mode.

The print head unit will also be stopped if it happens to be underway between the parking and printing position or vice versa.

4.7.7.3 Proper use of the enabling switch

⚠ **Warning**
The use of the enabling switch renders a basic safety function of the printer inoperative! → Therefore, use the enabling switch only in situations in which it is called for - e.g. repairs – and avoid any misuse!

In order to use the enabling switch, please proceed as follows:

> If not done yet, turn on the printer with the main switch and the ON/OFF switch and let it run up to speed, but without starting the printing process.

> As soon as the touchscreen has booted, an employee with the appropriate access rights must register / log-in to the touchscreen.

> Open the tab *ManufacturerService > Service* and hit the "On" key in the "Enabling mode" box.

> Open the rear door panel of the printer and remove the enabling switch from its compartment.

Function check:
It the enabling switch is held down at its switching point, then the message "66 = Rear door open" must disappear from the "Current Alarm" line of the control panel within a few seconds. Then, if the button is pushed all the way down or let go, the aforementioned message should reappear immediately.
The enabling switch should only be active as long as the system is in the enabling mode. During normal operation, pressing the button should have no effect whatsoever!

> Make sure that you do not endanger either yourself or others in the simulation mode! Not until this has been ensured may you press the enabling switch down to the switching point and activate the cleaning function.

> When you are finished, put the enabling switch back into its compartment in the rear door panel and lock it.

> Open the tab *ManufacturerService > Service 1* and hit the "Off" key in the "Enabling mode" box.

Information

If one of the front door panels happens to be opened while the enabling switch is being used, this can disturb the controls of the door monitoring system / the control device no. +400-A145. Remedy:

> Shut down the printer and its touchscreen.

> Turn off the printer completely.

> Wait 5 seconds, turn the printer back on and reboot the touchscreen.

4.7.8 Stack light

The stack light mounted on top of the printer is used for indicating the current operating status by means of visual and acoustic signals.

No matter what the operating status is at a given moment, each of the four different colored lights could burn continuously, blink, or remain dark. It's also possible for several lights at once to give off signals. If the signal light is equipped with a buzzer, acoustic signals are emitted as well.

The stack light is divided into the following segments, from top to bottom:
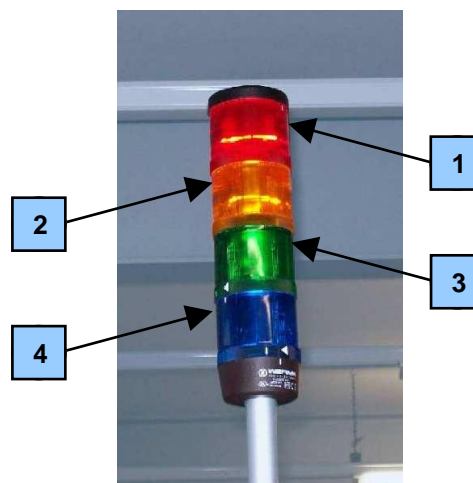
Fig. 53. Stack light

Pos.	Element	Signal type	Status	Meaning
1	Red	Visual	Steady light	Printer is switched on and is not running, without a pending error.
			Blinking light	The printer is not running; at least one error is pending.
2	Yellow	Visual	Steady light	Not defined yet.
			Blinking light	The safety doors of the printer are unlocked. The printer cannot be started in this state for safety reasons.
3	Green	Visual	Steady light	The printing process is in progress. Everything OK.

Pos.	Element	Signal type	Status	Meaning
			Blinking light	Heating/cleaning: The printer was started and is running up to speed.
4	Blue	Visual	Blinking light	The ink supply is exhausted and/or the material supply in the rewinder is almost used up. The printing process is not automatically stopped but continued for the time being.
			Steady light	The printing substrate has torn between the unwinder shaft of the printer and the web tension control of the unwinding device. By consequence the lever with the dancer roller has fallen into its lower stopper. The printing process will be stopped.

Notice

Faulty signals after incorrect assembly:

➔ The order of the light elements and the optional buzzer (from top to bottom: Buzzer – red – yellow – green – blue); must not be changed, since otherwise the light could signal something that does not correspond with the actual operating status.

Information

More detailed information regarding the stack light can be found in the documentation of the original supplier Werma. These documents have been saved in the following directory of the documentation CD:

PDFAnnex \ DataSheets \ Werma

4.8 Interfaces

4.8.1 Overview of interfaces

This chapter describes the supply of electricity, water, and compressed air as well as all of the interfaces required for the exchange of data and signals between the printer and the periphery.

Notice
Dirty interfaces pose a hazard. ➔ Avoid the penetration of dirt and moisture! ➔ Whenever the interfaces are not in use, cover the sockets with the matching plastic caps!

	Information
i	The printer is delivered without connection cables. The machine owner must supply them and have them made to comply with the conditions on site.
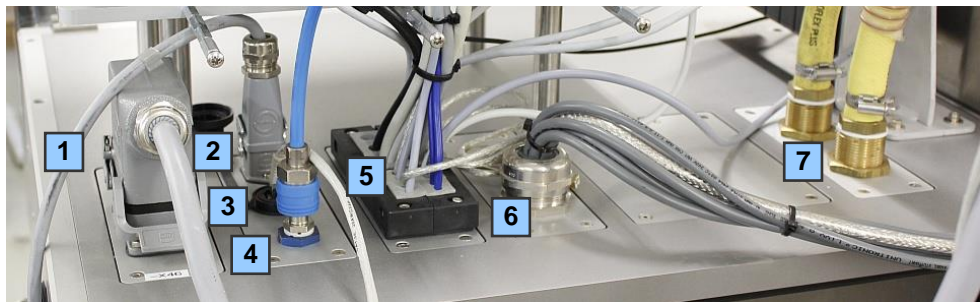
Fig. 54. Interfaces, rear view

Pos.	Bedeutung
1	Electrical power supply
2	Process interface cooler
3	Network connections
4	Compressed air connection
5	Connection to the CAPS-Server and to the camera PC
6	Connection of the generator of the corona treatment
7	Coolant connection

4.8.2 Power supply

The printer is operated with 400 V three-phase current. The power is supplied by means of a 5-pole plug.

4.8.3 Interface external cooling device

This permanently installed 4-pole process interface is for the exchange of signals between the printer and the external cooling device.

It cannot be connected in the wrong place since the plug is asymmetrical and also has coding pins.

4.8.4 Network interfaces

The ITS6 has two network interfaces. You can use one of them for connecting PCs.

By means of the integrated 8-pole Ethernet connectors type RJ 45 10/100, all of the data required for printing (format and image files) can be imported and exported in the printer via the network. The log files created by the printer can also be exported via this interface.

In addition, the network connection facilitates the remote diagnosis and servicing of the printer via a network.

The connection cables must be suitable for industrial use on the basis of its shield (Cat 5). Please make sure that the cables are always inserted securely in the sockets of the printer.

4.8.5 Compressed air connection

A permanently installed FESTO KS4-1/4-A type compressed air coupler serves as the connection for compressed air.

The supplied air must be dry and oil-free and have an operating pressure of 6-8 bar (= 6-8 * 10^5 Pa).

A flow rate of 10 dm³/min. is sufficient.

4.8.6 Connection cables to the CAPS server

These permanently installed cables are used for connection of the CAPS server positioned on the upper cover of the printer.

4.8.7 Connection cables to the camera system computer

Various lines: Camera power supply, synchronization signal from printing system to camera, trigger signal for camera, data exchange between camera system computer and camera.

4.8.8 Connection cable of the corona generator

These permanently installed cables are used for connection of the generator positioned on the upper cover of the printer. A faulty connection of those cables is not possible because all the plugs and couplings to be connected to the generator have different construction types.

4.8.9   Coolant connection

Intake and discharge are standard hose fittings. Required inner diameter of the connecting hoses: 19 mm.

4.9   The user interface of the touchscreen

Each time the printer is switched on, the touchscreen will boot. As soon as the printer is ready for operation, the home page will be shown first:
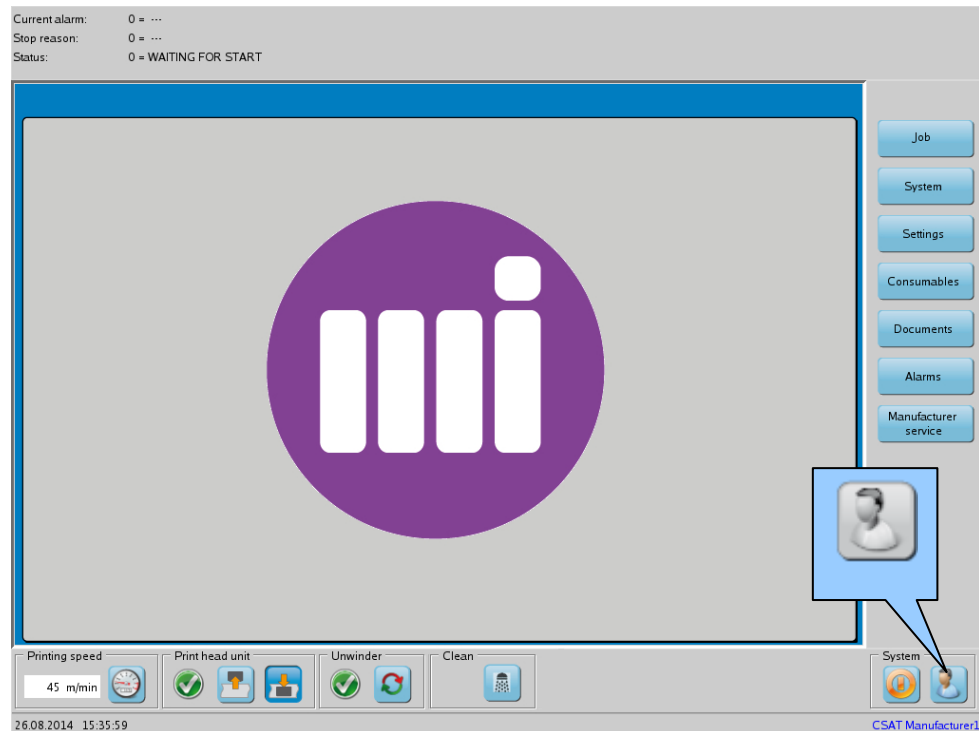
Fig. 55. Start screen with login button.

Whenever the machine is started up, touchscreen and control console buttons are locked. Each user of the printing system must enter his/her password to log in with the system:

> Touch the login button.

> Enter the user name in the next screen. Press "Enter" to confirm.

> Enter the password in the next screen. Press "Enter" to confirm.

After a successful login, your user name appears in the bottom right corner of all screens.The login button is colored and no longer black-and-white.

When you log in for the first time, you must enter the standard password that is associated with your user account. Next, the system prompts you to replace the standard password with your personal password. Use this new personal password to log in in the future.

Operator, service engineers, and administrators have separate user accounts with different access privileges to the individual functions. The right to enter and modify data (parameters) is linked to different privilege levels and thus to different passwords.

The privilege levels are set up such that a user with a given level always has all privileges or all lower levels.A level-3 user is allowed to do everything a level-1 or level-2 user is allowed to do.

> **Information**
>
> Observe the following points when you enter the password:
> - The background color of the input line changes from red to white as soon as the required minimum number of characters is entered.
> - A password must be at least six characters long. It must contain numbers and at least one capital and one small letter, that may be in any sequence.
> - The validity time of a password can be restricted if necessary.
> - An expired password must be replaced with a new one.

4.9.1 Logging off at the touchscreen

> **>** To log off, press the login button in the bottom right corner of the touchscreen. Most buttons and displays are now locked. This shows with a dimmed gray display.

The system logs off the user automatically when the touchscreen is not used for a specified time after login.

The user is logged off automatically when the touchscreen is switched off (together with the printing system).

Each user can manually lock the touchscreen at any time (for example to prevent any intervention from unauthorized persons during his/her absence).

The currently running printing operation is not influenced by logging in/off. The printer retains its current state.

4.9.2   Menu structure of the touchscreen

Main Menu
- **Job**
  - Job settings
  - Layout manager
  - Job manager
  - Pre-curing
  - Main curing
  - Web settings
  - Print head alignment
  - Cleaning

- **System**
  - Settings
  - Network
  - File manager
  - Machine info
  - User management

- **Consumables**
  - Fill levels
  - Reels
  - Print heads
  - UV modules
  - Wipers
  - Drive rollers
  - Air filters
  - Ink filters

- **Documents**
  - Audit trail
  - Printing costs

- **Alarms**
  - Alarms

- **Manufacturer service**
  - Service 1
  - PV monitor
  - PV monitor 2
  - Synchronization settings
  - Other settings
  - Cleaning settings
  - Process settings
  - Web treatment
  - Ink pre-heating
  - Print head alignment

4.9.3 Screen structure

The basic structure of the screen masks is described here using the example of the tab *Job > Job settings.*
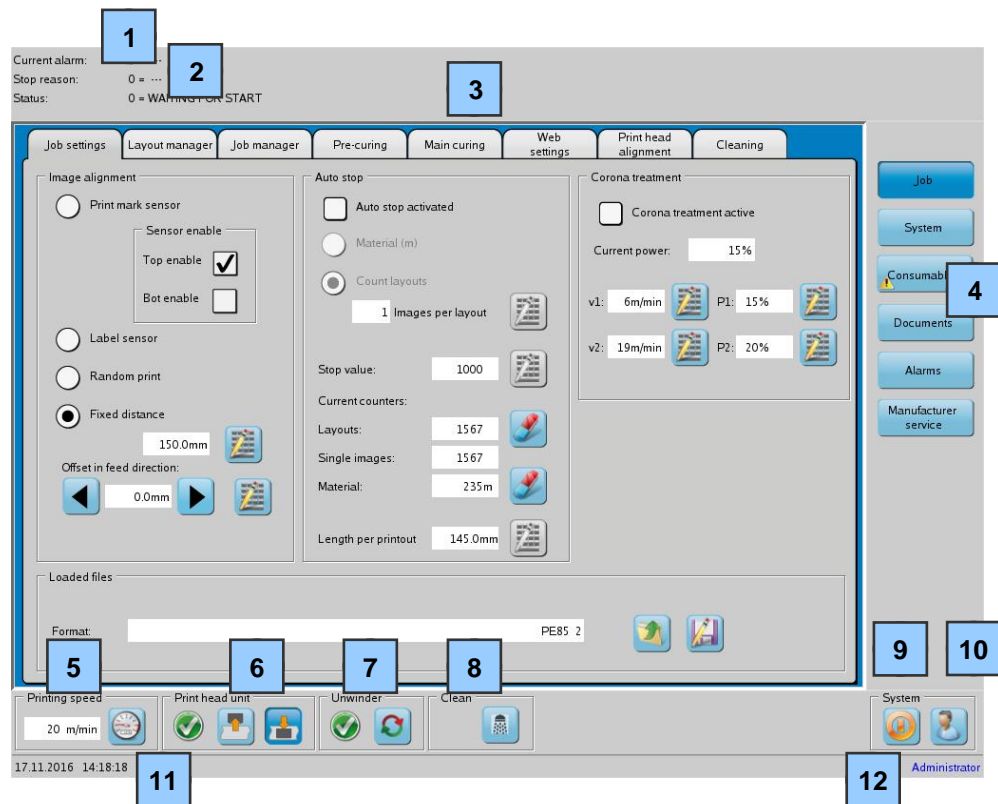
Fig. 56. Structure of the screen masks

With the exception of the homepage, all other screen masks exhibit an identical appearance around the margins and contain the same elements [1] - [12]. The appearance of the tab itself varies greatly, but thanks to standardized display and control elements, navigation is quick and easy to learn.

Pos.	Meaning
1	Malfunction and alarm messages.
2	Status messages.
3	Tabs for selecting the various masks.
4	Navigation keys: Access to sub-menus. The key associated with the menu currently being shown will be color-coded, that is, darker than the other keys.
5	Indicates the printing speed for offline mode. After hitting the key bearing the tachometer symbol, this setpoint can be changed.
6	Indicates the position of the print head unit. The print head unit can be moved to the parking or working position using the two corresponding keys.
7	Indicates the position of the dancer roller of the unwinding unit. If the red symbol displayed here is being shown, then the corresponding key should be pressed to move the dancer roller to its required position.
8	This key calls the tab *Job > Cleaning* where the most important parameters of the cleaning process can be read and manipulated, if required.

Pos.	Meaning
9	Hitting this key will shut down the curing systems automatically so that the printer can then be switched off.
10	Key for unlocking or locking the touchscreen. In order to obtain access to the touchscreen, each user must log-in with his personal user name and password.
11	Footer: Indicates the current date / time.
12	Footer: Status / name of the user logged-in.

4.9.4　Functions of the buttons

The menus of the touchscreen can be accessed using the so-called navigation buttons on the far right edge of the screen. The buttons that are associated with the menu that's currently being shown are either highlighted in color or are darker.

The following table describes the most important buttons and functional elements that appear in the various menus:
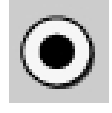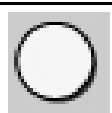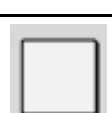
Key	Meaning	Description
	Printing speed	After hitting this key, the printing speed for the offline mode can be changed. An input box with a numerical keyboard will open with which the new setpoint can be entered / changed.
	Parking position	For moving the print head unit into the selected position. The print head unit cannot be stopped somewhere between these two end stops. The unit is driven by a pneumatic cylinder.
	Working position	
	Dancer roller in target position	Hitting this key will move the dancer roller of the unwinding or rewinding unit automatically into its target position.
	Shut down system	Hitting this key will shut down the curing systems automatically so that the printer can then be switched off.
	Clean	Hitting this key will call the tab *Job > Cleaning* where the most important parameters of the cleaning process can be read and manipulated, if required.
	Help page	Hitting this key will open the so-called help page which contains details about the menu / tab currently being displayed.
	Log-in key	Key for unlocking or locking the touchscreen. In order to obtain access to the touchscreen, each user must log-in with his personal user name and password.
	Lower value	For changing the parameter displayed between these two keys. In the tab *Job > Print Head Alignment*, these keys are used to move the particular color in the direction of the arrow.
	Raise value	
	Lower value	For changing the parameter displayed between these two keys. In the tab *Job > Print Head Alignment*, these keys are used to move the particular color in the direction of the arrow.
	Raise value	

Key	Meaning	Description
←	Back	For navigating within a list.
→	Forward	
↑	One step up	For moving the cursor / selection mark within a list
▲	One step up	For moving the cursor / selection mark within a list.
▼	One step down	
(select icon)	Single se-lection	This key is displayed only when importing and exporting files and is used to select / mark individual files. The names of the files selected for data transmission are highlighted in blue. If you hit the "Single selection" key again after a file has already been marked, the selection will be cancelled.
(multi-select icon)	Selection of multiple items	This key is displayed only when importing and exporting files and is used to select / mark in succession several of the files listed. The names of the files selected for data transmission are highlighted in blue. As long as the color of this symbol remains dark, all of the files marked by the cursor in one direction will be included in the selection list. If you change the direction of the cursor, the selection will be cancelled file by file.
(scroll bar icon)	Scroll bar	The scroll bar appears when long lists or tables are shown whose contents cannot fit on one side of the screen. To scroll up or down in the particular display, tap on the triangle at the top or bottom of the scroll bar or slide the dark-grey rectangular bar in the middle to the desired position.
(start icon)	START	Hitting this key will start or switch on the particular function.
(prompt icon)	Prompt	After hitting this key, the contents of the display next to it can be changed. Depending on the function, an input box with either a numerical or alphanumerical keyboard will open in which figures, text, or the date can be entered or changed.

Key	Meaning	Description
	Enter	With this key you confirm a selection or call a selected function or file.
	Reset key	Hitting the reset key will reset all of the settings or readings (or return them to "0").
RESET	Reset key	Hitting the reset key will reboot the associated function, e.g. a server.
	ON/OFF switch	Status indicator and ON/OFF switch of the particular function or module. A black check mark appears in the box if activated.
	Selection key	Status indicator and ON/OFF switch within a selection list, in which normally only one function can be activated at a time. A black dot appears in the box if activated.
	Load file	Loads the marked file or opens a menu in which you can select a file and then load it.
	Export	These keys are used in the tab *System > File Manager* for exporting and importing files, protocols or certain software.
	Import	
	Save as…	Hitting this key opens a dialog box with which the format file can be saved either under its current name or under a new name.
	Delete	Opens a menu in which a file of a certain type can be selected and deleted.
	Refresh	After tapping on this button the data in the display will be updated.
	New	Creates a new job container.
	Copy	Copies the jobs of the selected job container into the clipboard.
	Insert	Inserts the jobs which are currently in the clipboard into the selected job container.
	Print	Sends the selected job container to the printer.
	Ink consumption	Tapping on this button calls up the tab "Printing Costs" which presents the estimated consumption of the several inks.

Key	Meaning	Description
	Thumbnail	The image file of the highlighted print job will be presented as a thumbnail.
	Unlock	Unlocks a job container.
Auftrag abbrechen	Cancel print job	This button allows the currently selected print job to be cancelled, but not until confirmed by a prompt.
Weiter	Continue	Starts / enables user to start a print job.
Einricht- betrieb	Set-up mode	This button is similar to a "Pause" button: As long as this button is depressed, the current print job will be temporarily stopped, for instance, in order to make print tests after a problem has occurred.

4.9.5 Symbols in the screen masks

Symbol	Meaning	Description
	Not in target position	The element in question, e.g. print head unit or dancer roller, is not in its target position.
	In target position	The element in question, e.g. print head unit or dancer roller, is in its target position.
	Cyan color indicator	Whenever these colors are shown, then something with the ink or the associated print head can be adjusted, or a message appears in connection with this color. e.g. fill level
	Magenta color indicator	
	Yellow color indicator	
	Black color indicator	
	Active	If the black dot can be seen, this function has been activated. This indicator appears frequently when there is an optional choice, i.e. only one function or option can be selected.
	Inactive	If the black dot is <u>not</u> visible, this function has been deactivated
	Active	Checks box for activation. In this case, multiple selections can always be made. Cf. User management.
	Inactive	Removes check for deactivation Cf. User management.
	Active	The particular component is currently active / available.
	Inactive	The particular component is currently inactive / unavailable.
	Test mode	This symbol is displayed in the header of the touchscreen as long as the printer is in the so-called test mode.
	No cleaning possible	Notice in the tab *Job > Cleaning*, which is displayed only during the printing process or when the residual ink bottle is full or missing.

	Ok	Everything is OK, the components in question are in their operative target positions.
	Caution	Either the components in question are not in the normal state for operation or else there is a malfunction.
	Image cannot be displayed	General error message that a graphic cannot be displayed by the HMI. This refers to thumbnails of the image file but also to symbols or control elements of the HMI.

4.10   Menu Job

4.10.1   Tab Job > Job settings

The user controls the printing process on this page. In particular, this includes

- how the printing system positions the layout on the printing substrate,

- whether corona treatment of the printing substrate is necessary, and

- when the printing system should stop the printing process automatically.
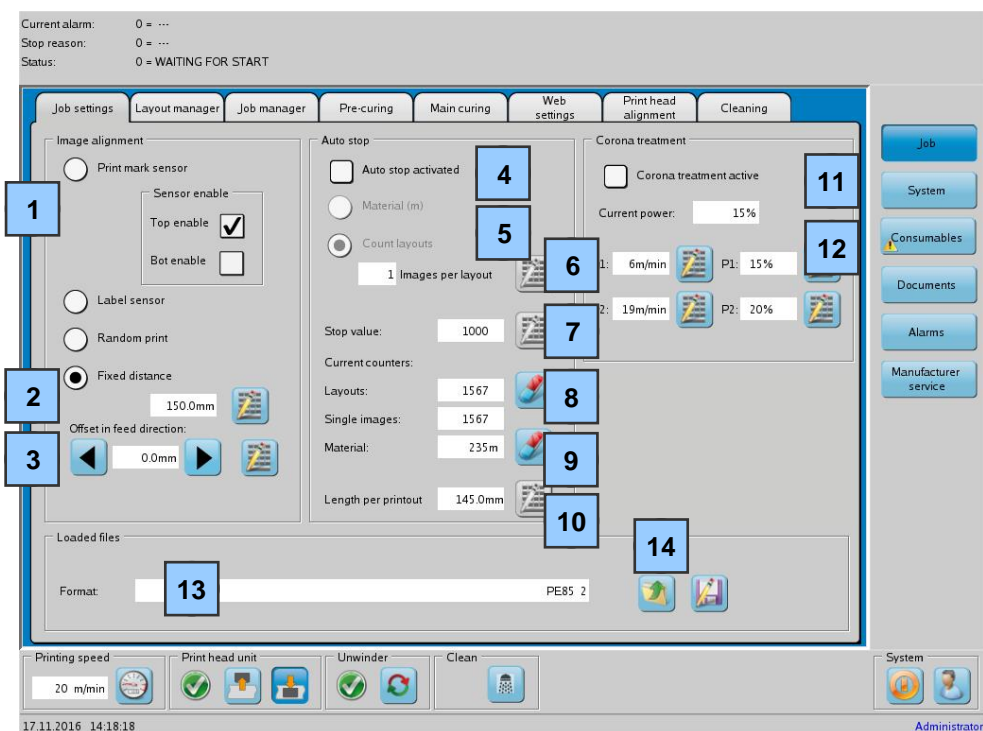
Fig. 57. Job > Job settings tab

Item	Object	Meaning
1	Image alignment	The selection list shows what principle should be applied to print the individual images one after the other. Only one of these options can ever be activated. Additional gaps can occur on the printout when the printing process is interrupted.
	Print mark sensor	Activates top oder bottom print mark sensor.
	Label sensor	Activates label sensor.
	Random Print	The layouts are printed one after another with an additional gap. This gap has a width of one pixel.

Item	Object	Meaning
2	Fixed distance	When you choose "Fixed distance" the layouts are printed in the length that is set here. If the layout is longer than the set value the layout is cut off. If the layout is shorter than the set value a blank strip is added. If you set a value that is a tiny bit lower than the real length of the layout you will get a seamless transition from one printed layout to the next.
3	Offset in feed direction	Indicator for the image offset in the feed direction.
4	Auto stop	Button to activate the automatic stop function. When the target quantity is reached, the printing process stops automatically.
5	Material (m)/Count layouts	Option to select whether the automatic stop function should be based on the length of the printed material or the number of layouts printed.
6	Images per layout	Number of individual images associated with each layout.
7	Stop value	Setpoint for the quantity to be printed; the printing process stops automatically when this is reached.
8	Layouts/Single images	Job counter for the layouts and individual images printed. Given in number of layouts or images. The counters can be reset to "0" with the blue "Reset" button.
9	Material	Job counter for printed material, measured in linear meters. The counter can be reset to "0" with the blue "Reset" button.
10	Length per printout	Total length of a printed layout, measured from the beginning edge of a layout to the beginning edge of the next layout. The value can be modified with the adjacent button. The system needs this information whenever a particular number layouts is to be printed. The printer can only slow down the printing process promptly if the correct value is given here. If an incorrect value is given here, more layouts may be printed than indicated under "Stop value".
11	Corona treatment active	Status indicator and ON/OFF switch to activate the corona treatment.
12	Current power of corona treatment	Adjust target power of the corona treatment depending on the printing speed.
13	Format	File name of the format file currently loaded.
14	Load	Load new layout.

The *Job > Job* tab is related functionally to the *Manufacturer service > Synchronization setting* tab: Changes made in one tab are always also made automatically in the other tab.

4.10.2   Tab Job > Layout manager

In the layout manager, the user specifies what is printed. It determines the print volume of jobs, determines ranges, and combines multiple jobs into job containers. It sends prepared job containers to the printer.
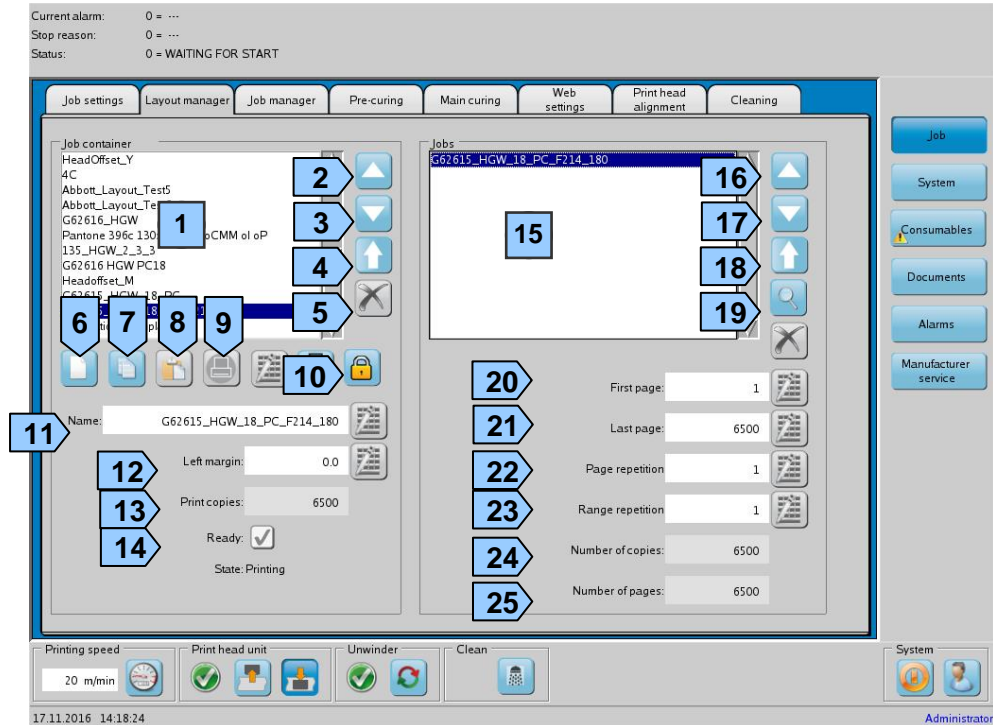
Fig. 58.   Manage layouts in the layout manager.

Item	Object	Meaning
1	Job containers	The available job containers. Print jobs that the user places in the hotfolder are listed here automatically.
2	Upwards	Move the selection bar upwards.
3	Downwards	Move the selection bar downwards.
4	Change order	Move the selected job container upwards in the order.
5	Delete	Delete the selected job container
6	New	Generate a new job container.
7	Copy	Copy the jobs of the selected job container to the clipboard.
8	Insert	Insert the jobs currently located on the clipboard into the job container currently selected.
9	Print	Send the selected job container to the printer.
10	Unlock	Unlock a job container.
11	Name	The name of the selected job container can be changed by pushing the "Input prompt" button.
12	Left margin	Left margin in cm.
13	Print copies	Total number of images to be printed.
14	Ready	Attribute of job containers that are already loaded into the DSP3 buffer.
15	Jobs	The jobs contained in the selected job container.
16	Up	Move the selection bar upwards.
17	Down	Move the selection bar downwards.

Item	Object	Meaning
18	Change order	Move the selected job upwards in the order.
19	Delete	Delete the selected job.
20	First page	The selected job should be printed starting from this page.
21	Last page	The selected job should be printed up to this page.
22	Page repetition	How often the individual page should be printed.
23	Range repetition	Number of repetitions of the range.
24	Number of copies	Calculated field: Number of pages to be printed.
25	Number of pages	Static field: Number of pages in the job.

Adding jobs to a job container

The user adds jobs to a job container by copying the jobs of another job container and inserting them into the desired job container.

> In the *Job container* list box, mark the job container that contains the desired job(s).

> Press the *Copy* button

> In the *Job container* list box, select the job container into which the jobs should be inserted.

> Press the *Insert* button

The copied jobs are inserted into the selected job container.

Deleting jobs from a job container

> Select the desired job container in the *Job container* list box.

Display showing the jobs contained in the *Jobs* list box .

> In the *Jobs* list box, select the job to be deleted.

> Press the *Delete* button.

> Confirm the safety inquiry.

The job is delivered.

Creating a new job container

> Press the *Create new job container* button.

> Enter a name for a new job container and confirm with "Enter".

The new job container s listed in the *Job container* list box and can be edited here.

Sending a job container to the printer

> Select the job container to be printed in the *Job container* list box.

> Press the *Print* button.

> Confirm the safety inquiry.

The job container is transferred to the printer.

The job container is then locked for editing. If the job container needs to edited again, it must first be unlocked.

Unlocking a job container

> Select the desired job container in the *Job container* list box.

When a job container is locked, the button with the padlock appears with a blue background.

> Press the button with the padlock.

> Confirm the safety inquiry.

The user can then edit the job container again.

If the job container should be printed, it must be sent to the printer again.

4.10.3   Tab Job > Job manager

This tab displays status information. The operator can abort jobs or proceed with a job when the system required an intervention.
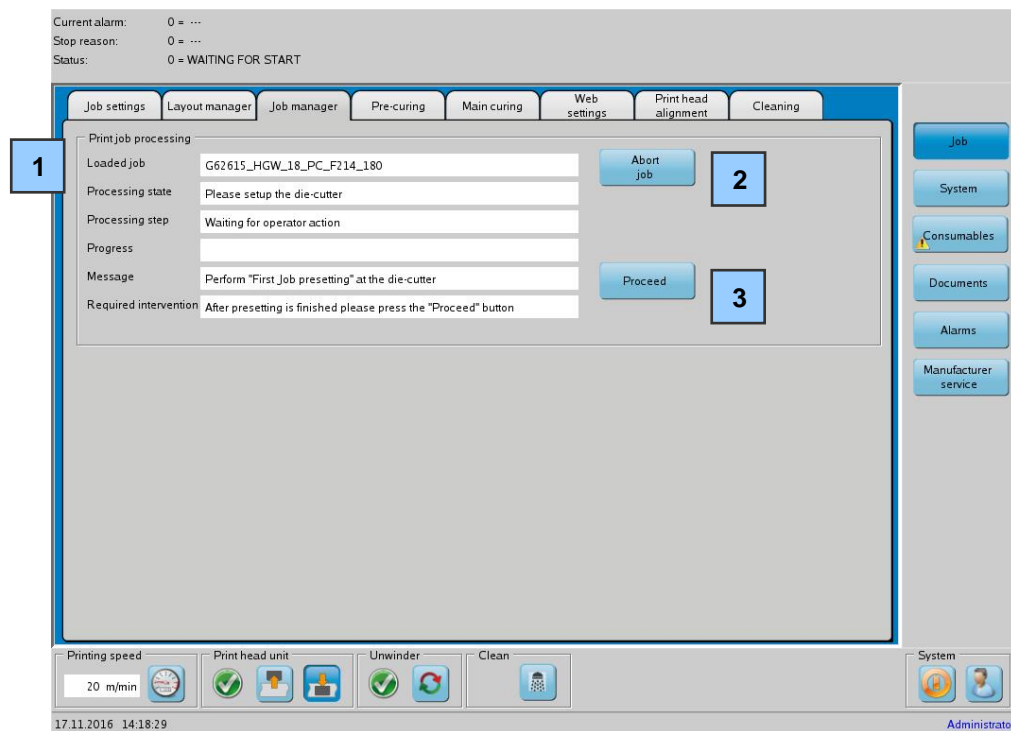
Fig. 59. Tab Job manager

Pos.	Item	Meaning
1	Print job processing	Display of status information.
2	Abort job	Button for aborting a job.
3	Proceed	Button for proceeding the operation when the operator has finished a required intervention.

4.10.4 Tab Job > Pre-curing

Pre-curing is done with the three UV lamp modules installed between the print heads.Since pre-curing puts extreme stress on the print heads, pre-curing should only be used as sparingly as possible:

- Only use pre-curing for the required color.

- Only select the required area.

- Select the lowest possible power.

- Print at the highest possible speed.
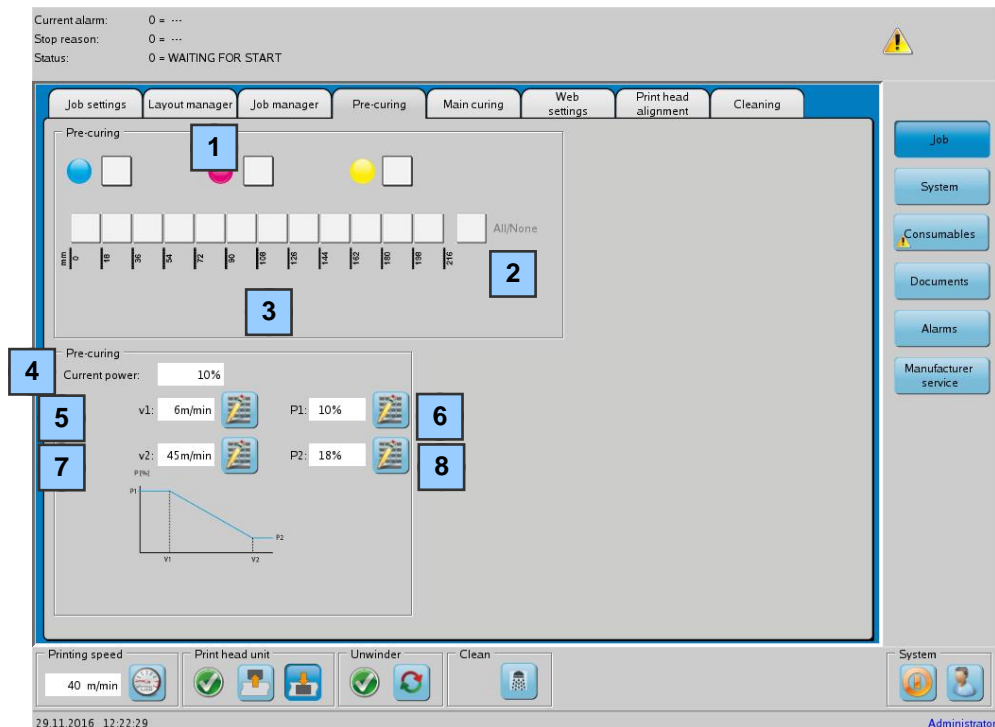
Fig. 60. Job > Pre-curing tab

Item	Object	Meaning
1	Color selection	Selection of which color pre-curing should be activated for. The pre-curing can be activated simultaneously for one or more colors.
2	All/None	Activate/deactivate pre-curing for the entire printing area.
3	Selection	Selection of the area for which pre-curing should be activated.12 sections, each 18 mm wide, can be selected. A contiguous region must be selected. Multiple areas that are separated from each other cannot be selected.
4	Current power	Indicates the current power of the pre-curing unit.
5	v1	Indicates the lower reference speed v1 in m/min.
6	P1	Indicates the required power P1 assigned to the lower reference speed v1.
7	v2	Indicates the upper reference speed v2 in m/min.
8	P2	Indicates the required power P2 assigned to the upper reference speed v2.

4.10.5 Tab Job > Main curing
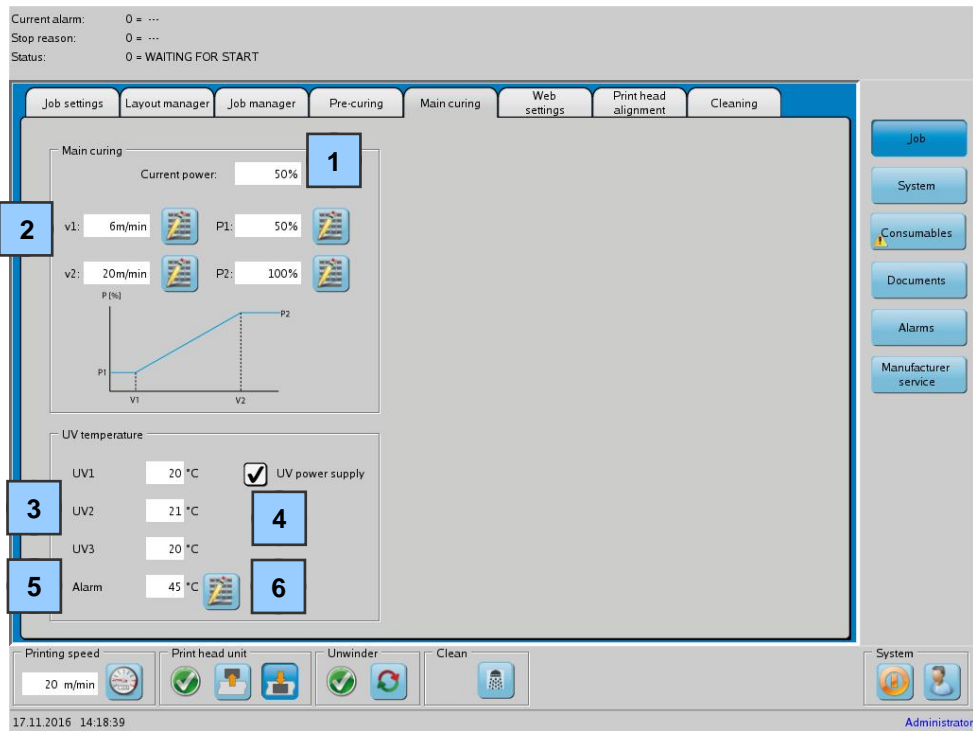
Fig. 61. Job > Main curing tab

	Object	Meaning
1	Current power	The currently measured main curing power in %.
2	v1	The lower reference speed v1 in m/min.
	P1	The required power P1 assigned to the lower reference speed v1.
	v2	The upper reference speed v2 in m/min.
	P2	The required power P2 assigned to the upper reference speed v2.
	Diagram	Visual representation of how the main curing power P should behave with respect to the printing speed: The higher the printing speed, the higher the power.
3	UV1-UV3	Actual temperature of the respective UV lamp module.
4	UV power supply unit	Status indicator and ON/OFF switch to of the power supply unit of the UV curing unit. The button serves especially to turn the main curing unit back on after the displayed temperatures "UV1" – "UV3" have fallen below the "Alarm" limit value again.
5	Alarm	Limit value, or temperature that is no longer permissible within the UV lamp modules. If this value is reached, the alarm 39 – 41 (Main curing…: Temperature error) assigned to the lamp module in question is issued.
6	Alarm, input	"Input prompt" button to modify the temperature limit.

4.10.6 Tab Job > Web settings

This tab is used for the basic settings of the unwinding unit and the components installed there.
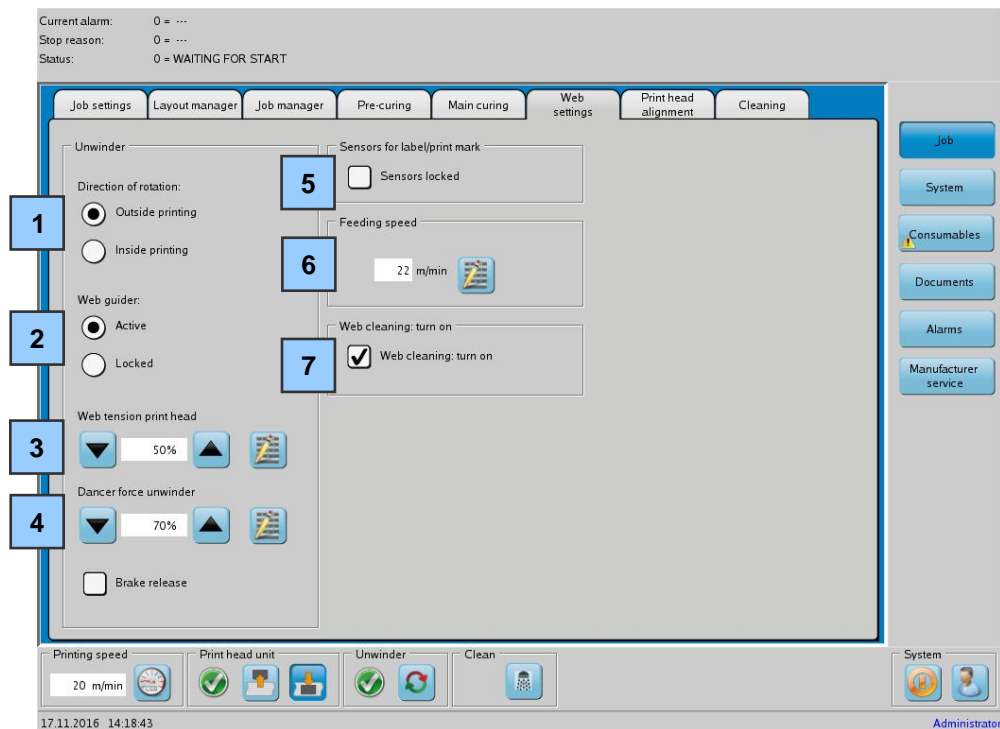
Fig. 62. Job > Web settings tab

Item	Object	Meaning
1	Direction of rotation	Selection buttons to specify which side of the material roll clamped in the unwinding unit should be printed on. This specifies the usual direction of rotation of the unwinder shaft during the printing process. There is a status indicator to the right of this. A yellow triangle with an exclamation point appears in the event of a fault; otherwise the field remains empty.
2	Web guider	Status indicator and ON/OFF switch to activate the web guider. If the "Locked" option is selected, the web guider switches to so-called middle mode, in which it has no influence of any kind on the position of the web. There is a status indicator to the right of this. A yellow triangle with an exclamation point appears in the event of a fault; otherwise the field remains empty.
3	Web tension print head	Setpoint for the tautness of the printing substrate within the print head unit as a percentage. The setpoint can be modified with the arrow buttons in 1% intervals. The value can be modified with the adjacent button.
4	Dancer force unwinder	Setpoint for the force applied to the printing substrate by the dancer roller as a percentage. The setpoint can be modified with the arrow buttons in 1% intervals. The value can be modified with the adjacent button.

Item	Object	Meaning
5	Sensors lo-cked	Status indicator and ON/OFF switch for locking or releas-ing all linear guides of the label and print mark sensors installed. A black check mark should always be displayed here dur-ing printing operation.
6	Feeding speed	Displays the target speed set for feeding. The value can be modified with the adjacent button.
7	Web cleaning: turn on	Status indicator and ON/OFF switch to activate the printing substrate cleaning module.

4.10.7 Tab Job > Print head alignment

This tab is needed in order to compensate for positional discrepancies between the individual printing colors, viewed transverse and parallel to the direction of travel.

Fig. 63. Job > Print head alignment tab

Item	Object	Meaning
Print head alignment across feed direction.		
1	Reduce distance	Moving the respective color in the direction of the arrow, or in the direction of the left edge of the printing substrate, viewed from the direction of travel. Each press of the arrow button reduces the respective correction value by 1 pixel.
2	Indicator	Current correction value for the respective color with respect to the left edge of the printing substrate, viewed in the direction of travel.
3	Increase distance	Moving the respective color in the direction of the arrow or away from the left edge of the printing substrate. Each press of the arrow button increases the respective correction value by 1 pixel.
4	Input prompt	Enter value manually.
5	Input button	Pressing this button saves the correction value determined previously through tests.
Print head alignment in feed direction		
6	Move to the left	Moves the respective color in the direction of the arrow or closer to the yellow print head. Each press of the arrow button reduces the respective correction value by 1 pixel.
7	Indicator	Current correction value for the respective color with respect to the yellow print head, viewed here as a fixed point.

Item	Object	Meaning
8	Move to the right	Moves the respective color in the direction of the arrow or further away from the yellow print head. Each press of the arrow button increases the respective correction value by 1 pixel.
9	Input prompt	Enter value manually.
10	Input button	Pressing this button saves the correction value determined previously through tests.
Web-specific correction		
11	Web-specific correction	Cur Current value of the printing substrate-specific correction, a correction factor to take different printing substrate thicknesses into account. This value only needs to be modified if the thickness of the printing substrate to be processed at the moment differs significantly from the value stored in the respective format file.
12	Input prompt	Enter value manually. Permissible values are -1000 to +1000.

4.10.7.1 Print head alignment in feed direction

The position of the yellow color cannot be changed. All other colors are aligned to yellow.

> Perform a short test print.

> Use a scale magnifier to measure how far the target position of the image elements printed with the color in question are running ahead or behind, and determine the offset ΔY, which can be converted to pixels with the following formula:

$$\Delta Y = \underline{\hspace{3cm}} \, mm \times \frac{1\,Pixel}{0{,}042\ mm} = \underline{\hspace{3cm}} \, Pixel$$

> Start a test print and change the correction value:

Image elements are running ahead of the target position:	Increase correction value (1) by ΔY or press the ◄ button.
Image elements lagging behind the target position:	Reduce correction value (1) by ΔY or press the ► button.

> Check the printing result again with the scale magnifier. Repeat the correcting actions if necessary.

> Press "Apply" if the printed image is OK.

4.10.7.2 Print head alignment across feed direction

> Perform a short test print.

> Use a scale magnifier to measure how far the image elements printed
with the color in question deviate to the left or right from their target
positions and determine the offset ΔX, which can be converted to pix-
els with the following formula:

$$\Delta X = \underline{\hspace{3cm}} \, mm \times \frac{1 \, Pixel}{0,042 \, mm} = \underline{\hspace{3cm}} \, Pixel$$

> Start a test print and change the correction value:

Image elements too close to the left edge of the printing substrate:	<u>Increase correction value</u> (1) by ΔX or press the ▼ button.
Image elements too far away from the left edge of the printing substrate:	<u>Reduce correction value</u> (1) by ΔX or press the ▲ button.

> Check the printing result again with the scale magnifier. Repeat the
correcting actions if necessary.

> Press "Apply" if the printed image is OK.

4.10.7.3 Web-specific correction

The printing substrate thickness has an effect on the color registration in
the printing direction. To achieve optimal color registration, you can use a
printing substrate-specific correction value.

You determine a printing substrate-specific correction value as follows:

> Under "Job / Print head alignment" on the touchscreen, set all values
in the "Print head alignment" fields to 0.

> Print a test file with thin lines that run transverse across the printing
substrate. All four colors should be printed directly over each other in
the lines.

> Analyze the printout under a scale magnifier on the operator's side.

If the printout is correct, only black lines appear, since all four colors were
printed directly over each other.

In contrast, Fig. 64 and Fig. 65 show a typical registration offset due to a
change in the printing substrate thickness. Here the colors are not over
each other; instead the lines of the four colors deviate from each other at
regular intervals. You can fix this distortion with the 'Web specific correc-
tion" field.

You can determine the input value for the "Web specific correction" field as
follows:

Determine in which order the four colors were printed. This determines whether you must increase or reduce the current value in the "Web specific correction" field.

If the colors appear from left to right in the order black – magenta – cyan – yellow as in Fig. 64, the value must be increased.

If the colors appear from left to right in the order yellow – cyan – magenta – black as in Fig. 65, the value must be increased.

To determine the amount by which the current value should be increased or reduced, you must measure the distance between one line and the next line in millimeters.

Multiply this line distance, measured in millimeters, by the constant factor 770. You must increase or reduce the amount by this value.

Example: The current value of the "Web specific correction" field is 1000. The lines appear in a test printout in the order yellow – cyan – magenta – black from left to right. Therefore, the value must be reduced.

You measure a distance from one line to the next line of exactly one millimeter.

You calculate: 1 millimeter x 770 = 770.

You must subtract this amount from the current value, i.e.:

1000 - 770 = 230

Enter the value 230 as the new value for the "Web specific correction" field.

Perform a new test print.

If there are still deviations, you can gradually approach an optimal value with further changes to the input value and further test prints.
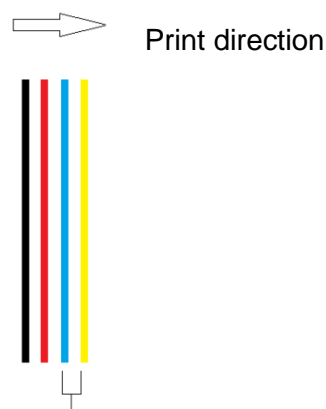
Fig. 64. The value in the "Web specific correction" field must be increased.

Print direction

Fig. 65. The value in the "Web specific correction" field must be reduced.

4.10.8 Tab Job > Cleaning

This tab can be used to monitor and if necessary manipulate the most important parameters of the cleaning process.
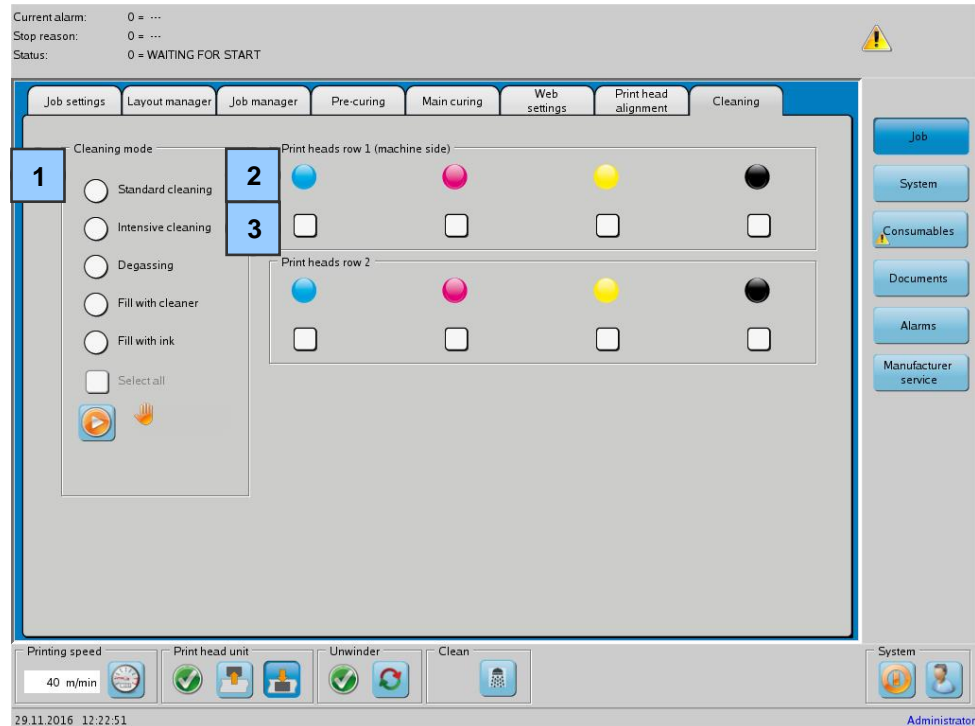
Fig. 66. Tab Cleaning

Pos.	Item	Meaning
1	Standard cleaning	Selection key. During standard cleaning, the print heads in question are rinsed with a small amount of ink.
	Intensive cleaning	Selection key. During intensive cleaning, the print heads in question are rinsed with a greater amount of ink than during standard cleaning.
	Degassing	Selection key. Degassing of the print heads. Normally only required after maintenance work at the print heads, in order to remove air bubbles out of the ink system.
	Fill with cleaner	Selection key. The print heads in question are filled with a greater amount of cleaning fluid. This process has to be repeated several times until the contents of the print head and the connecting lines have been completely replaced.
	Fill with ink	Selection key. The print heads in question are filled with a greater amount of ink. This process has to be repeated several times until the contents of the print head and the connecting lines have been completely replaced.
	START	Start button for the cleaning process. The selected cleaning or filling process will be started and then be carried out automatically. The operator can neither interrupt this process nor stop it briefly.
2	Position	Indicates the location: The print head row 1 is located on the machine side.
3	ON/OFF switch	Status indicator and ON/OFF switch for selecting the print heads to be cleaned or filled. Only the print heads that have been marked with a check will be cleaned or filled.

Information

During the printing process, and whenever the residual ink bottle is full or missing, an orange-red hand symbol will be shown next to the button. This is to advise the operator that the cleaning process cannot be started at this time.

4.11 Menu System

The menu System is where general system settings are made, for instance the network configuration or the system time. As a rule, these settings are not job-specific and, therefore, rarely have to be changed.

4.11.1 Tab System > Settings

This tab is used to change the touchscreen display language, the system time, and the passwords of the logged-in users.
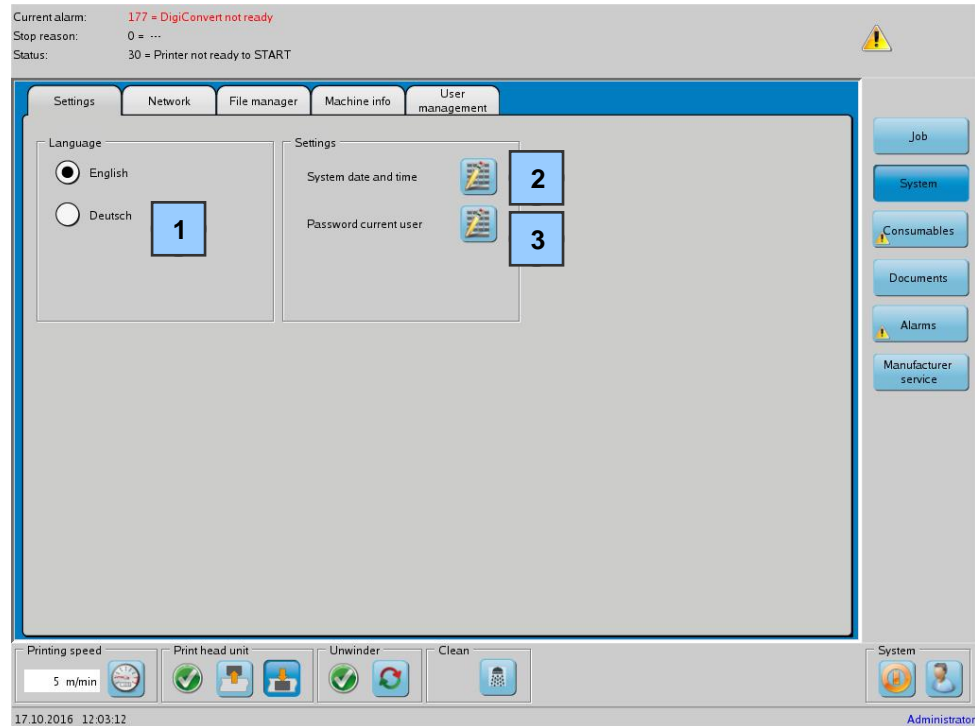
Fig. 67. Tab System > Settings

Pos.	Item	Meaning
1	Language	Selection of the desired display language. After hitting the desired key, the display language of the MHI will change within a few seconds. Only one language can be selected at a time.
2	System date and time	Setting of the current time for the touchscreen and printer. After hitting the "command prompt" key, an input box will appear in which the new system time setting can be entered.
3	Password current user	Changing your own password. After hitting the "command prompt" key, a logged-in user can replace his previous password with a new one. The passwords of other users cannot be changed here. Each password must be at least six characters long and contain numbers as well as at least one upper case and lower case letter each. The characters can be put in any desired order.

4.11.2 Tab System > Network

This dialog screen can be used by a properly authorized administrator to enter or change network settings in order to be able to exchange data through the local network.
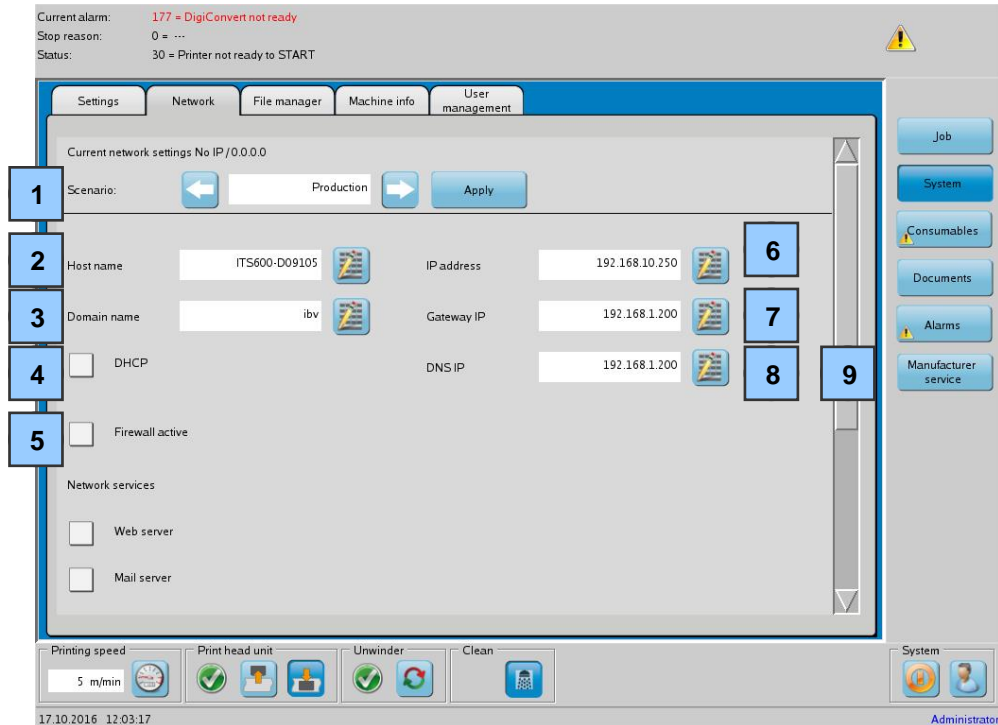
Fig. 68. Tab System > Network, top section

Pos.	Function	Meaning
1	Scenario	This is where certain scenarios can be simulated during set-up or error diagnosis without having to change the existing settings. Possible scenarios: • Production • Local service • Remote service (enables servicing from an external source, for example by a Markem-Imaje CSAT service computer). • Development
2	Host Name	Display of the host name of the process computer / the local network. This information can be changed after hitting the blue "command prompt" key.
3	Domain Name	Display of the domain. This information can be changed after hitting the blue "command prompt" key.
4	DHCP	Automatic address assignment depending on the local network system. If this function has been enabled, the box will be checked and the IP address, subnet mask, gateway IP, and the DNS IP will no longer be shown and, consequently, can no longer be changed.

Pos.	Function	Meaning
5	Enable Firewall	Status indicator and ON/OFF switch for enabling the firewall. When enabled, a black check mark is shown here.
6	IP address	Display of the IP address. This information can be changed after hitting the blue "command prompt" key.
7	Gateway IP	Display of the gateway IP. This information can be changed after hitting the blue "command prompt" key.
8	DNS IP	Display of the DNS IP. This information can be changed after hitting the blue "command prompt" key.
9	Scroll Bar	Allows access to the settings for network services.
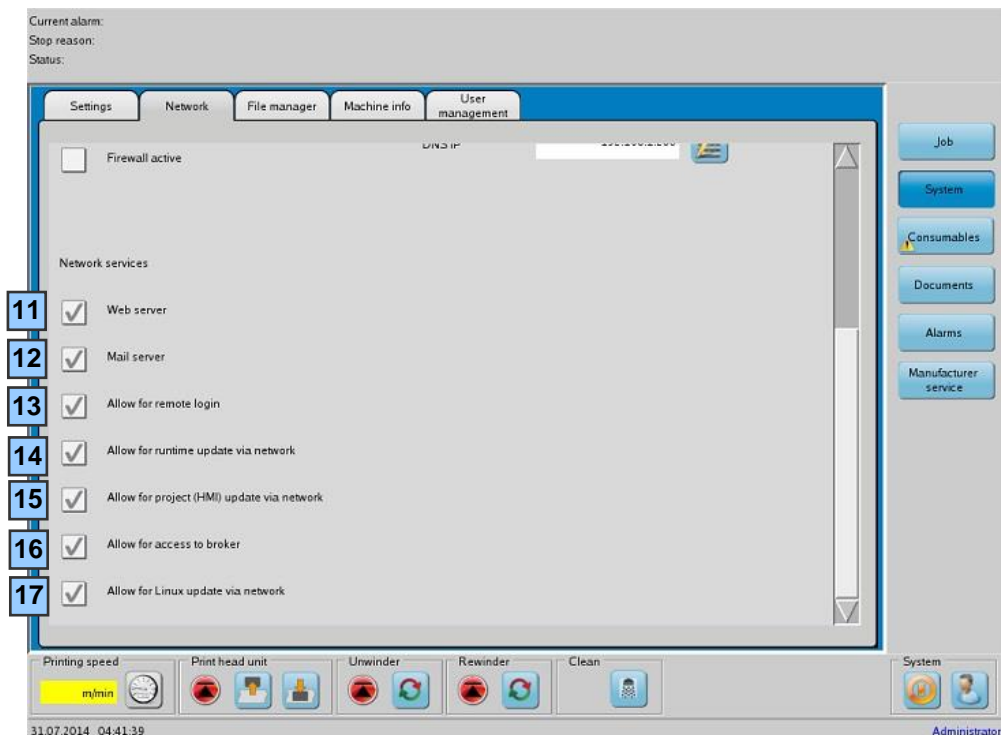
Fig. 69. Tab System > Network, bottom section

Pos.	Item	Meaning
11	Web server	Activates or disconnects the connection between the PC of the printer and the local web server. This option is available for all scenarios.
12	Mail server	Activates or disconnects the connection between the PC of the printer and the local mail server. This option is available for all scenarios.
13	Allow for remote login	This option allows or prevents access of external systems (for example the Markem-Imaje CSAT customer service) to the PC of the printer via Internet or Intranet. This option is displayed in the scenarios "Local Service," "Remote Service" and "Development" only.
14	Allow for runtime update via network	This option allows the so-called runtime software to be updated by external computers via the local network. This option is displayed in the scenarios "Local Service", "Remote Service" and "Development" only.

Pos.	Item	Meaning
15	Allow for project (HMI) up-date…	This option allows the so-called "project" software to be updated by external computers via the local network. This option is displayed in the scenarios "Local Service", "Remote Service" and "Development" only.
16	Allow for access to broker	This option allows or prevents access of external systems to the broker of the printer PCs via Intranet. This option is displayed in the scenarios "Local Service", "Remote Service" and "Development" only.
17	Allow for Linux up-date via network	This option allows the "Linux" software / operating system of the printer to be updated via Intranet. This option is displayed in the scenarios "Local Service", "Remote Service" and "Development" only.

Information

The basic settings of this tab should be made by an **Administrator** only.

4.11.3 Tab System > File manager

The tab *System > File manager* allows the export of files and protocols and the import of files and software packages via Intranet.
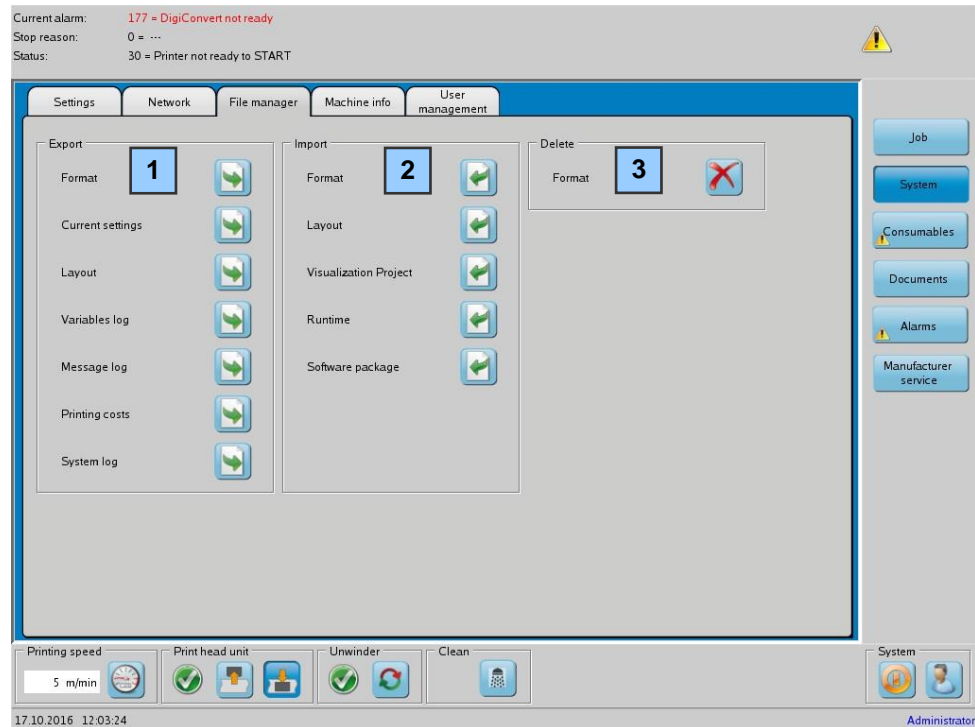
Fig. 70. Tab System > File manager

Pos.	Item	Meaning
Export of ...		
1	Format	Format files with the settings of the printer.
	Current settings	Only the current settings of the printer.
	Layout	The current layout file.
	Variables log	One or more variables log protocol files in which all of the changeable variables are kept.
	Message log	One or more message log protocol files in which the current statuses and actions of the printer are kept.
	Printing costs	Printing costs
	System log	System log
Import of ...		
2	Format	Format files with the settings of the printer.
	Layout	Layout file
	Visualization project	Software that creates the touchscreen display.
	Runtime	Software with the "runtime environment" required for the touchscreen display.
	Software package	Any software package.
Deletion of ...		
3	Format	After hitting this key, a list with the currently saved format files is shown from which one or more files can be selected for deleting.

4.11.4 Tab System > Machine info

This tab lists not only the machine model and serial number, but also the performance data and the most important software versions installed.
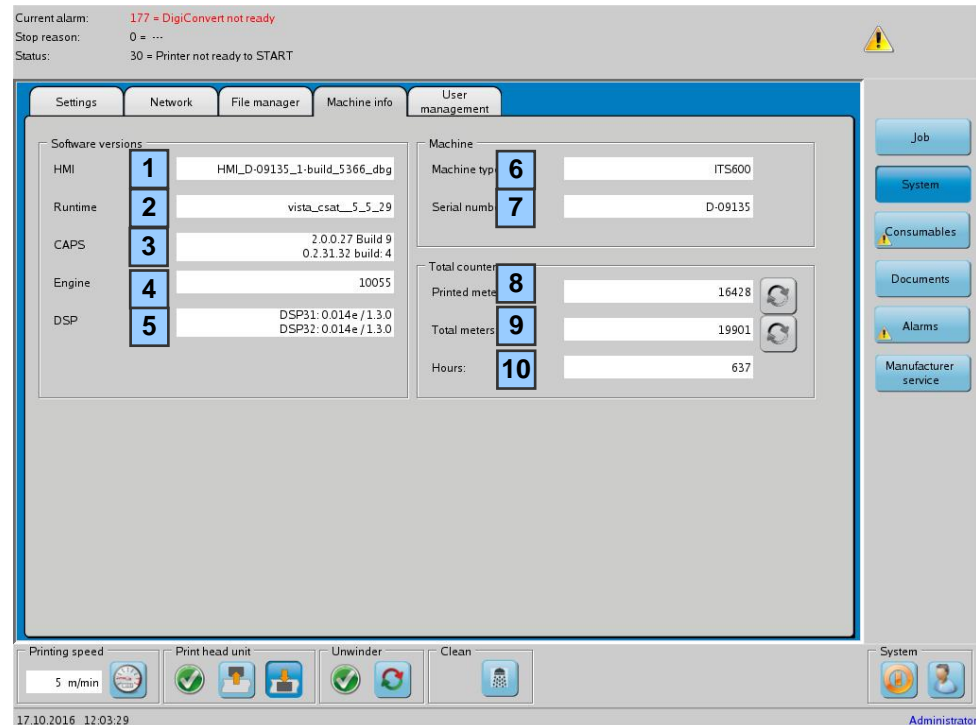
Fig. 71. Tab System > Machine info

Pos.	Item	Meaning
1	HMI	Version of the touchscreen software currently installed.
2	Runtime	Version of the runtime environment currently installed.
3	Engine	Version of the engine software currently installed.
4	CAPS Service	Version of the CAPS Service.
5	CAPS Renderer	Version of the CAPS Renderer.
6	Machine type	Machine model.
7	Serial number	Serial number of the printer.
8	Total counter, printed meters	Total quantity of the printed material, measured in meters. A user, logged in as *CSATAdmin*, has the possibility to reset this value to the value as set in *Manufacturer service / Other settings / Counter initial value*. Doing so can be necessary when the engine board has to be exchanged in order to transfer the values that already have been accumulated on the old engine board to the new engine board.

Pos.	Item	Meaning
9	Total counter, total meters	Total quantity of the feeded material, measured in meters. A user, logged in as *CSATAdmin*, has the possibility to reset this value to the value as set in *Manufacturer service / Other settings / Counter initial value*. Doing so can be necessary when the engine board has to be exchanged in order to transfer the values that already have been accumulated on the old engine board to the new engine board.
10	Total counter, hours	Total running time of the printer, measured in hours.

4.11.5   Tab System > User management

The purpose of the user management is to create and manage user accounts and to assign specific access rights to everyone who works with the printer.

In order to ensure the proper functioning of the printer and the safety of the operator, anyone who works with the printer is assigned to various user groups with specific access rights in accordance with their particular job profile and qualifications.

The individual access rights are assigned by the user administrator. The authorization and privileges of each employee are defined during the creation of the user account by clicking on the corresponding selection buttons. These rights can always be changed later.

The number of defined user groups and the establishment of precise access rights are to be determined by the system owner, and depend on how critical the jobs are judged.

4.11.5.1 User management – upper section of the tab

On the upper half of the screen, operators with user administrator rights have the ability to assign passwords, define their term of validity, as well as to manage, create or disable user accounts.
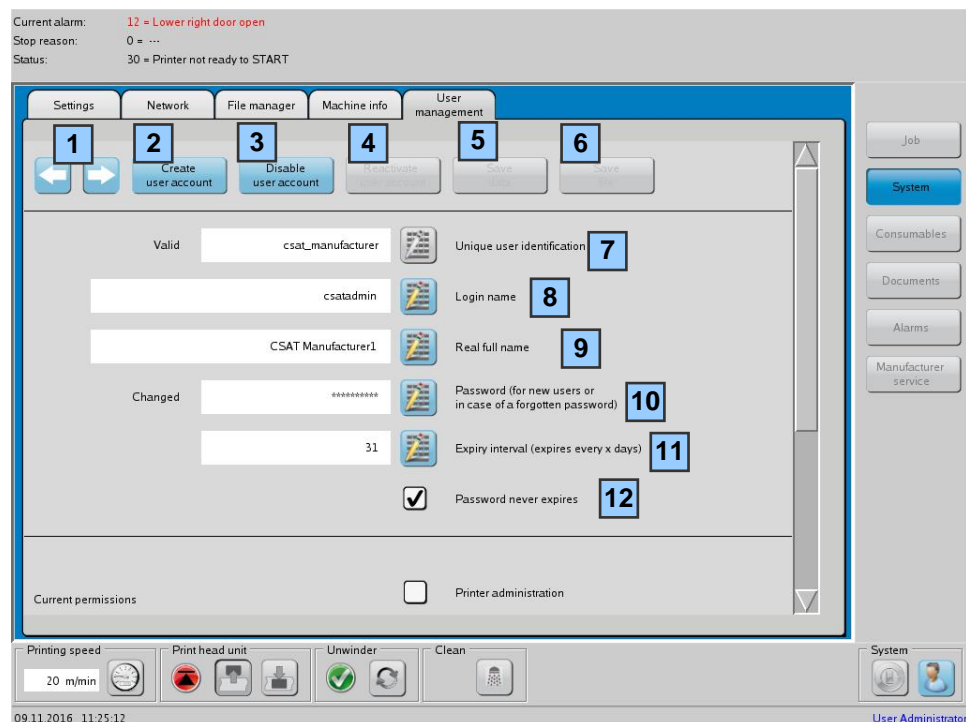
Fig. 72. Tab System > User management, upper section

Pos.	Item	Meaning
1	Arrow keys	These keys are used for navigating within the list of users. The list is not in alphabetical order, but rather, in chronological order according to when the various user accounts were set up.
2	Create user account	After hitting this key, an empty screen with empty input lines will appear in which all of the required data is to be entered.
3	Disable user account	Option for disabling the user account currently shown on the screen. Disabled data records are not deleted, but rather, they are still kept in the list of users. They can be reactivated or enabled by the user administrator at any time.
4	Reactivate user account	This key is used to reactivate / enable disabled user accounts.
5	Save data	Hitting this key informs the system that all of the entries have been made and checked.
6	Save file	Hitting this key initiates an update and saves the file again with the data records of all user accounts.
7	Unique user identification	A positive identification of the particular user, which is recorded in the so-called audit trail and in the event log.
8	Login name	This user name must be entered whenever you want to log-in. This information is recorded in the so-called audit trail and in the event log.
9	Real full name	First and last name of the particular employee. This information is recorded in the so-called audit trail and in the event log.
10	Password	The secret password of the particular user. A password must be at least six characters long and contain numbers as well as at least one upper case and lower case letter each. The characters can be put in any desired order.
11	Expiry interval	After expiration of the time period entered here, the last password to have been entered will become automatically invalid. The particular employee will be forced to enter a new password, otherwise he can no longer access the printer. The system will accept only positive, whole numbers between 1 and 10,000.
12	Password never expires	Special option for service technicians and administrators. Even when this option has been enabled, a valid number still has to be entered in the "Period of validity in days" field.

The text fields

The first four fields of the user account currently being displayed show the specific data of the particular employee. Usually these fields have a white background. When a new user account is created, however, the fields in which data still has to be entered are marked in red for better clarity.

Passwords

About halfway down this screen, a user administrator with the appropriate authorization can change passwords for access rights.

A password must consist of at least six characters in any order, which includes numbers and at least one upper case and lower case letter each. The system will only accept characters that are shown on the keys of the input screen.

The user administrator must make sure that no password is given twice.

The password entered when setting up a user account is not permanent! As soon as the particular employee tries to log-on to the printer for the first time, he will be forced to enter a new password to which the same access rights pertain as the password saved previously in the user account. Furthermore, a saved password is automatically disabled after the period of validity expires and has to be replaced with a new password.

4.11.5.2 User Administrator – lower section (scroll bar down)

In the lower section of the screen, all access rights and privileges which can be assigned to the individual employees are listed. Each of these access rights should be considered separate from the other privileges, that is, that none of the rights given here is already included in another right.

When setting up a user account, at least one access right must always be selected. But it is also possible to assign the particular person any combination of privileges or even all of the access rights.
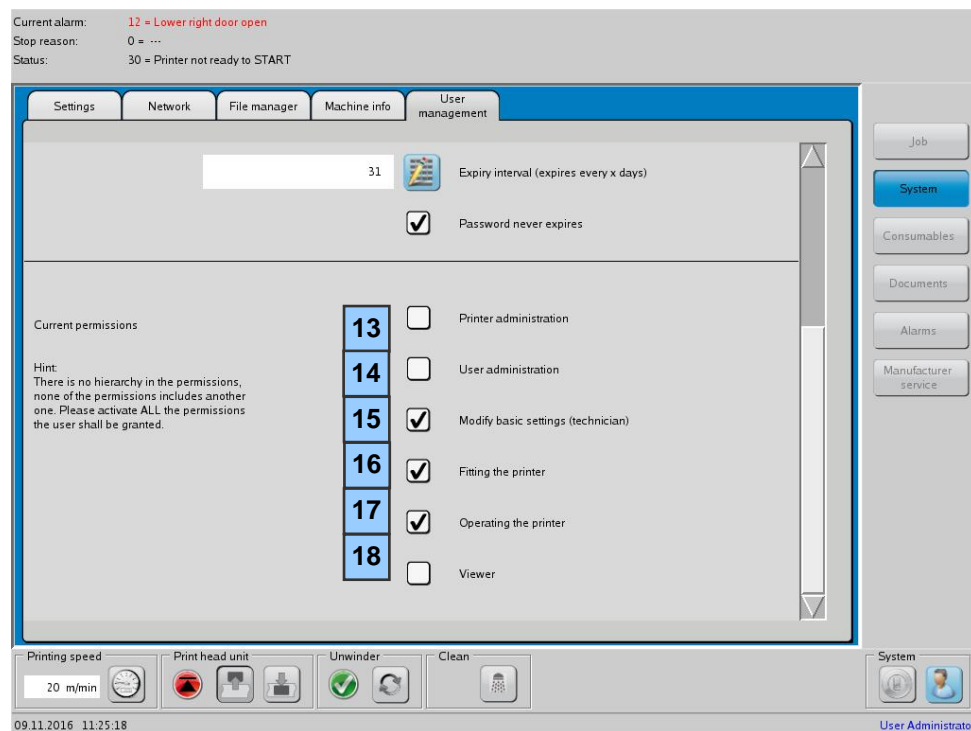
Fig. 73. User management tab, lower section

Pos.	Access right	Meaning
13	Printer administration	Printer administrators are authorized to read, save and delete image and format files, check log files, and perform backup and restore of software, etc.

Pos.	Access right	Meaning
14	User administration	The user administrator is authorized to set-up or disable user accounts or access rights, and to change the password of the particular employee.
15	Modify basic settings (technician)	Technicians are allowed to perform maintenance and repair work, especially on electronic components. They are also authorized to exchange software, change or replace format files, parameters lists, etc.
16	Fitting the printer	Those setting-up the printer are allowed to import and export image and format files, change network settings, and make basic settings on the curing unit.
17	Operating the printer	Operators are authorized to supervise the ongoing print job, add / replace substrate and ink cartridges, empty the residual ink bottle, clean, fine-tune contrast and line width.
18	Viewer	Viewers cannot make any changes but are allowed to view the HMI.

Information

The basic settings of this tab are to be made by a
User Administrator only.

4.12   Menu Consumables

The various tabs of this menu focus on the fill levels of the containers of liquid, the diameters of the rolls in the unwinding and rewinding units, and the useful life of several expendable parts.

If one of the materials listed under the tab *Consumables > …* has been used up or a component has reached the end of its guaranteed lifetime, the system will make the operator aware of this condition in the following way:

- The "Consumable" navigation key will be marked conspicuously with a yellow warning sign ⚠

- The color of the letters on the tab in question will change from black to red.

- The background of the particular elapsed time or lifetime indicator will be colored in red.

- When an operator logs on, a pop-up window will appear indicating that at least one consumable is close to or has reached the end of its useful life.

4.12.1   Tab Consumables > Fill levels

This tab shows whether there is enough fluid in the tanks for ink and cleaning fluid. Furthermore, it shows whether the bottle for residual ink and cleaning fluid has reached a critical fill level.

If the fill level of each is OK, a green check mark will be shown.

If the fill level of a container should be critical then the tank in question will be marked by a yellow triangle with a black exclamation mark. In this case a full cartridge should be inserted or respectively an empty residual ink bottle should be installed.
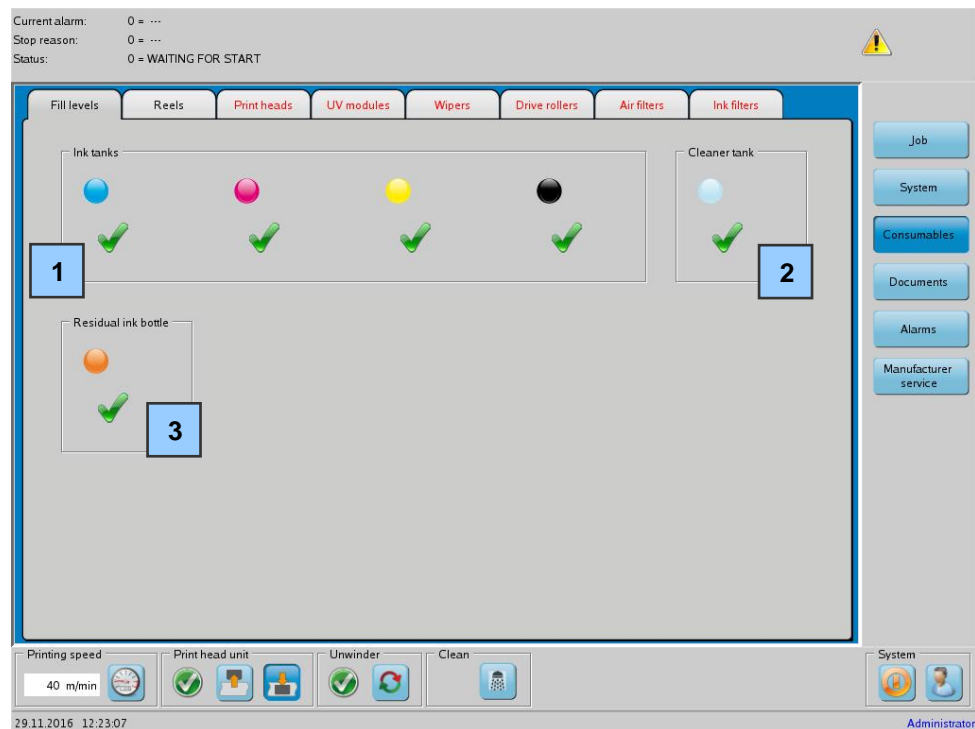
Fig. 74. Tab Consumables > Fill levels

Pos.	Item	Meaning
1	Ink tanks	Fill levels of the inks.
2	Cleaning fluid	Fill level of cleaning fluid.
3	Residual ink bottle	Fill level of residual ink bottle.

4.12.2 Tab Consumables > Reels

This tab is for monitoring the diameter of the substrate roll in the unwinding unit.
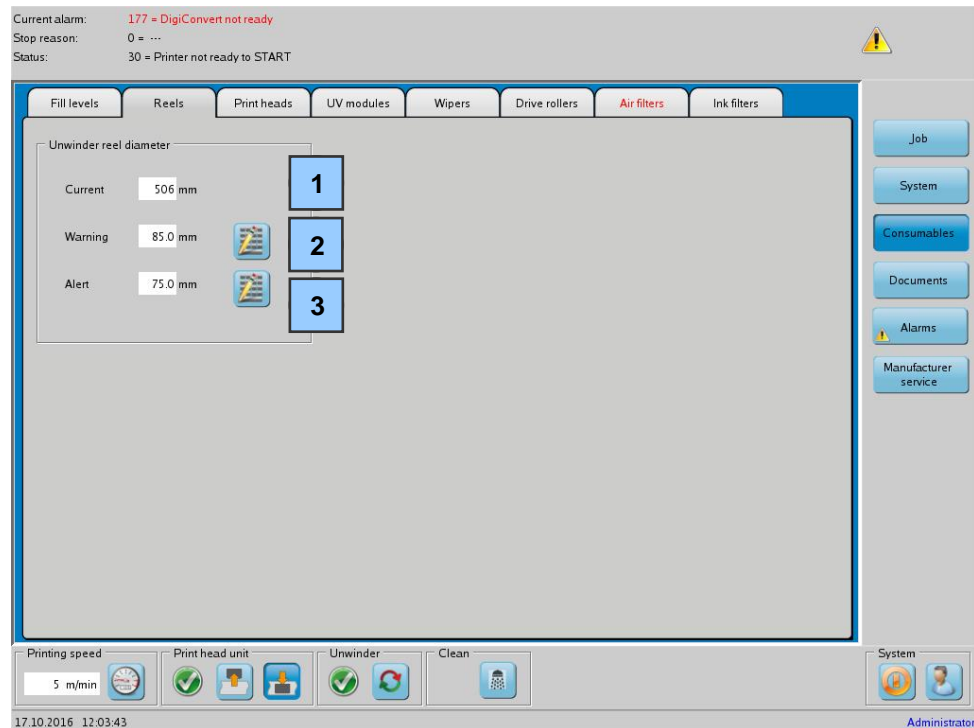
Fig. 75. Tab Consumables > Reels

Pos.	Item	Meaning
1	Current	Indicates the current diameter of the roll of printing substrate in the unwinding unit detected by the sensor.
2	Warning	Indicates the warning threshold / diameter below which the message no. 4 "Unwinding unit: web almost used up" will be shown on the "Alarms" page. The printing process will continue. The blue signal light will start to blink. This setpoint can be changed after hitting the blue "command prompt" key.
3	Alert	Indicates the alarm threshold / diameter below which the message 136 "Unwinding unit: end of web" will be shown. The printing process will be stopped automatically. This setpoint can be changed after hitting the blue "command prompt" key.

4.12.3 Tab Consumables > Print heads

This tab is for monitoring the running time / the useful life of the individual print heads.

The basis for calculations is the number of the so-called "shots," that is, how often a print head gives off one or multiple drops simultaneously during printing or during the cleaning processes. The total number of drops given off is irrelevant in this respect. In other words: A print head that always creates a thin, continuous line in the direction of travel will wear out just as fast as a print head that is used over its total lentgth to create larger, solid-colored areas.

The print head row 1 is located on the side next to the inside wall of the printer. The print head row 2 is located on the side of the web of substrate facing the operator.
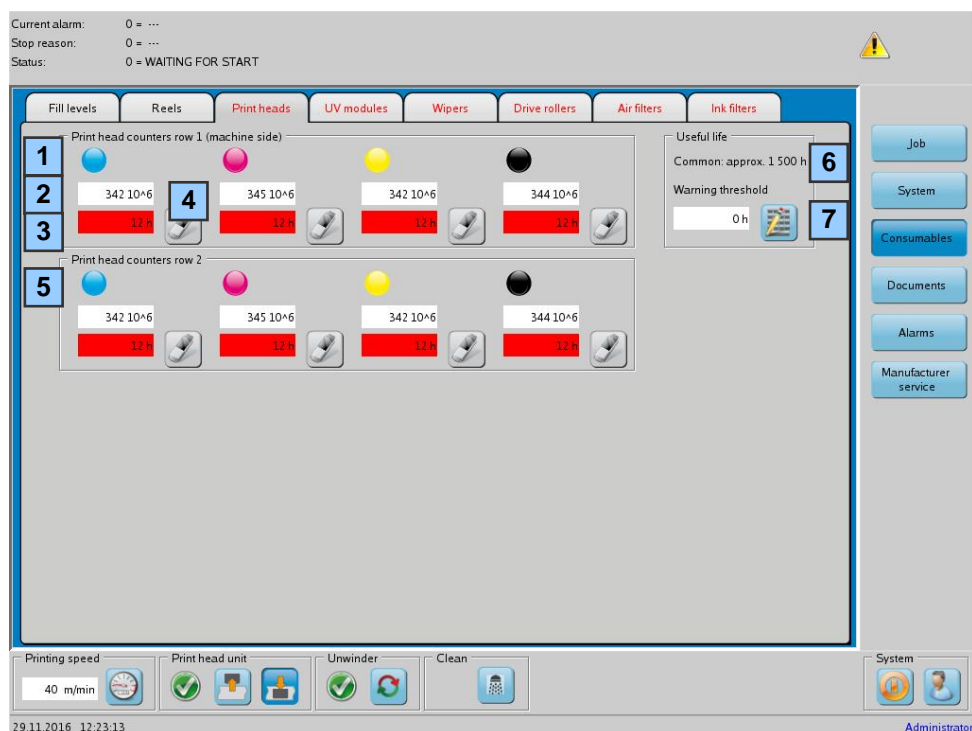
Fig. 76. Tab Consumables > Print heads

Pos.	Item	Meaning
1	Print head counter row 1	Indicates the location: The print head row 1 is located on the side next to the inside wall of the printer.
2	Shots	Indicates the current number of shots given off by the print head, measured in millions.
3	Running time	Indicates the current running time of the print head in question, measured in hours.
4	Reset	Hitting the reset key returns the number of shots and the running time of the particular print head to "0". (This option only available for MI CSAT.)
5	Print head counters row 2	Same information as above for the print head row 2, located on the side of the operator.
6	Useful life: Common	The expected useful life of a print head

Pos.	Item	Meaning
7	Warning threshold	Setpoint at which, when reached, the operator should be notified in several ways (cf. Section 4.12) that a print head has nearly reached the end of its recommended running time / useful life. The "command prompt" key opens an input box with which the setpoint can be entered manually.

4.12.4 Tab Consumables > UV modules

This tab is used for monitoring the running time / on-period of the individual lamp modules in the pre-curing and main curing units.
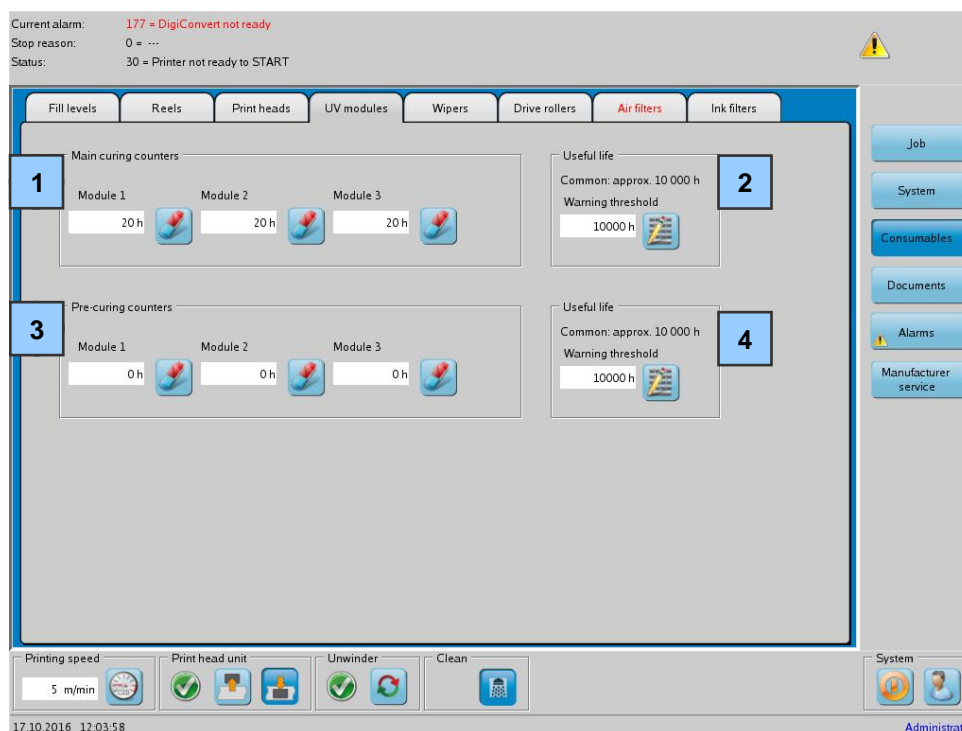
Fig. 77. Tab Consumables > UV modules

Pos.	Item	Meaning
1	Main curing counters	The main curing unit is located to the right of the printing table. There are three modules. For each module the current running time is indicated. Hitting the blue "Reset" key will reset the reading to "0 h".
	Module 1	Uppermost module.
	Module 2	Center module.
	Module 3	Bottommost module.
2	Usefule life main curing	Setpoint at which, when reached, the operator should be notified in several ways (cf. Section 4.12) that the main curing has nearly reached the end of its useful life. The "command prompt" key opens an input box with which the setpoint can be entered manually.
3	Pre-curing counters	The lamp modules of the pre-curing unit are located in the print head unit and are arranged between the individual print heads. There are three modules. For each module the current running time is indicated. Hitting the blue "Reset" key will reset the reading to "0 h".
	Module 1	Between color 1 and color 2.
	Module 2	Between color 2 and color 3.
	Module 3	Between color 3 and color 4.

Pos.	Item	Meaning
4	Usefule life pre-curing	Setpoint at which, when reached, the operator should be notified in several ways (cf. Section 4.12) that the pre-curing has nearly reached the end of its useful life. The "command prompt" key opens an input box with which the setpoint can be entered manually.

4.12.5 Tab Consumables > Wipers

This tab is used for monitoring the lifetime of the small rubber plates used for the automatic cleaning of the underside of the print heads.

The reading indicates the number of hours in which one or more of the wipers of a certain color was used.
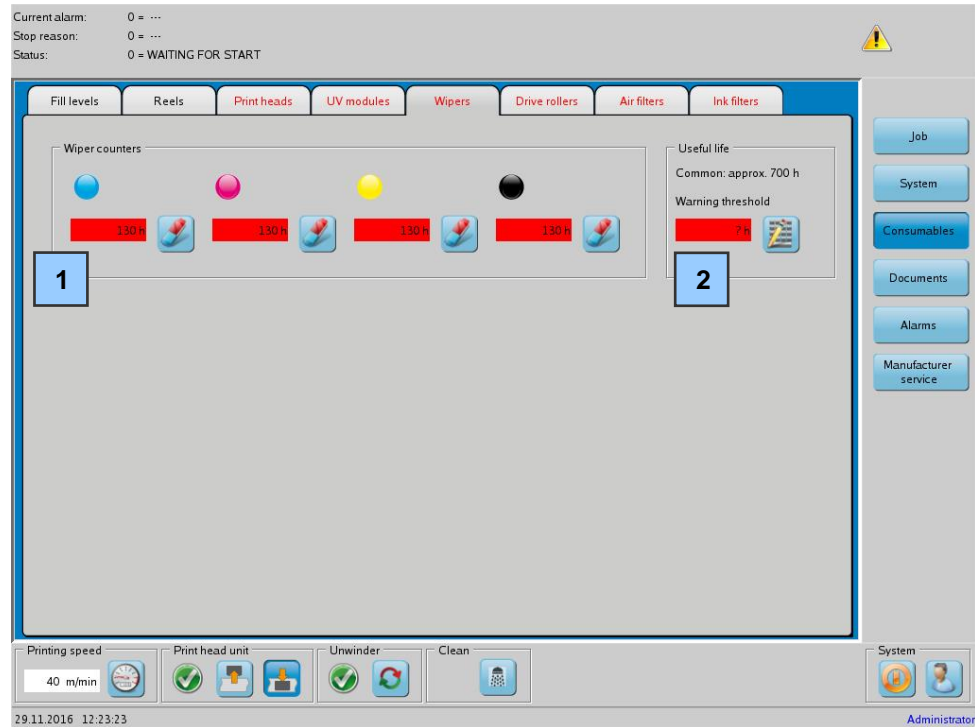
Fig. 78. Tab Consumables > Wipers

Pos.	Function	Meaning
1	Wiper counters	Indicates the current number of hours in which the wipers installed beneath each line of print heads. Hitting the blue "Reset" key will reset the reading to "0".
2	Warning threshold	Setpoint at which, when reached, the operator should be notified in several ways (cf. Section 4.12) that a pair of wipers has nearly reached the end of its recommended useful life. The "command prompt" key opens an input box with which the setpoint can be entered manually. Decimal places are rounded off.

4.12.6 Tab Consumables > Drive rollers

This tab is used to monitor the running time of the rubber rollers installed in the web tension controllers and the friction drive.
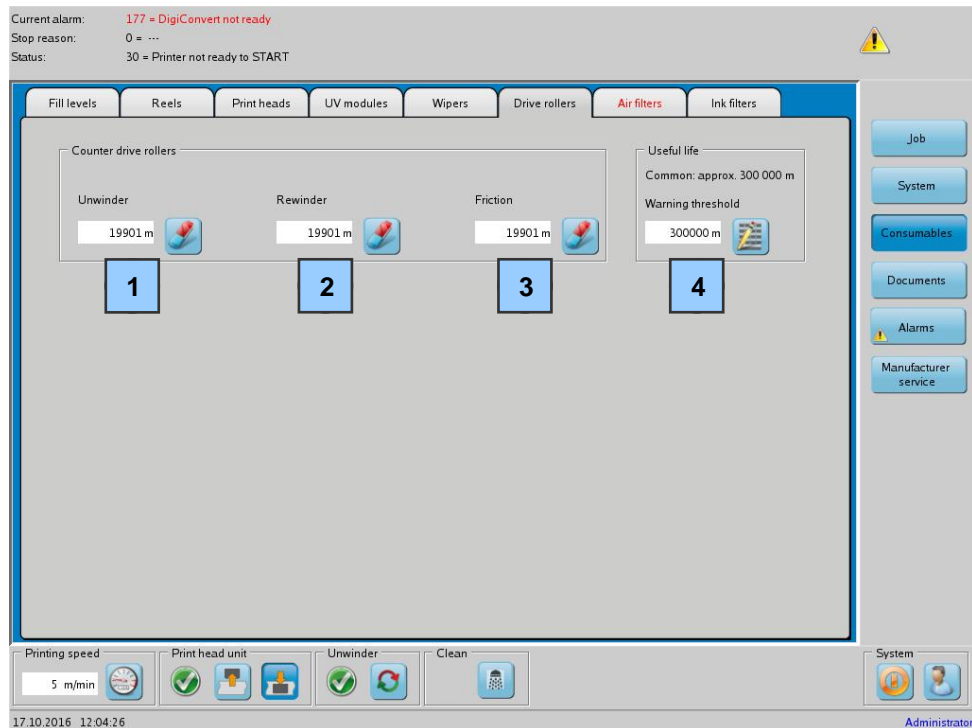
Fig. 79. Tab Consumables > Drive rollers

Pos.	Item	Meaning
1	Counter of unwinder	Current running time of the drive roller belonging to the web tension controller of the unwinder, measured in meters. Hitting the blue key will reset the reading to "0 h".
2	Counter of rewinder	Current running time of the drive roller belonging to the web tension controller that leads the web to the finishing machine, measured in meters. Hitting the blue key will reset the reading to "0 h".
3	Counter of friction drive	Current running time of the drive roller belonging to the friction drive, measured in meters. Hitting the blue key will reset the reading to "0 h".
4	Warning threshold	Setpoint at which, when reached, the operator should be notified in several ways (cf. Section 4.12) that one rubber roller of the mentioned drives has nearly reached the end of its recommended running time. The "command prompt" key opens an input box with which the setpoint can be entered manually.

4.12.7   Tab Consumables > Air filters

This tab is used to monitor the running time of the installed air filters.
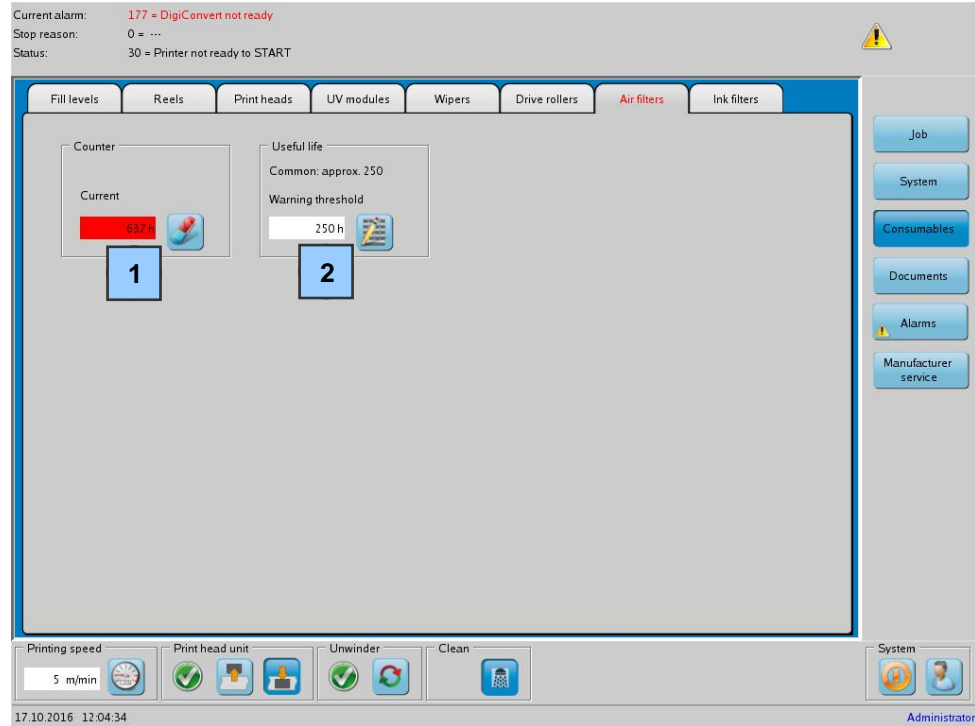
Fig. 80. Tab Consumables > Air filters

Pos.	Item	Meaning
1	Current	Indicates the current running time of all installed air filters, measured in hours. Hitting the blue key will reset the reading to "0 h".
2	Warning threshold	Setpoint at which, when reached, the operator should be notified in several ways (cf. Section 4.12) that the air filters have nearly reached the end of their recommended running time. The "command prompt" key opens an input box with which the setpoint can be entered manually.

4.12.8   Tab Consumables > Ink filters

This tab is used to monitor the running time of the installed ink filters.
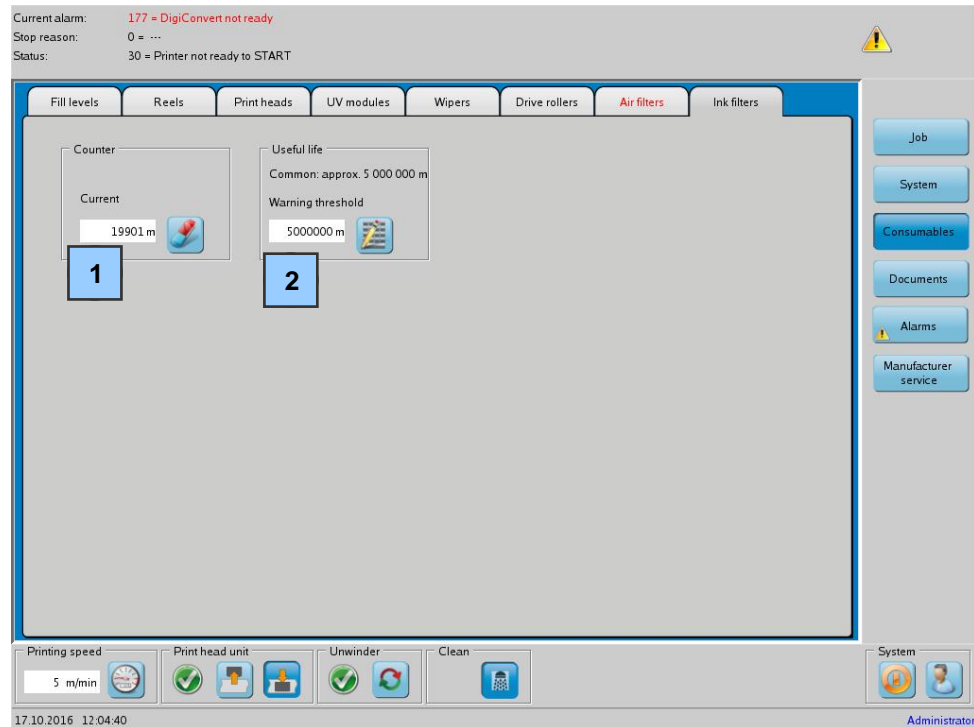
Fig. 81. Tab Consumables > Ink filters

Pos.	Objekt	Bedeutung
1	Current	Indicates the current running time of all installed ink filters, measured in meters. Hitting the blue "Reset" key will reset the reading to "0 h".
2	Warning threshold	Setpoint at which, when reached, the operator should be notified that the ink filters have nearly reached the end of their recommended running time. The "command prompt" key opens an input box with which the setpoint can be entered manually.

4.13 Menu Documents

This menu contains the tabs *Audit Trail* and *Printing Costs*, which are of relevance especially to the system administrator.

4.13.1 Tab Documents > Audit trail

The so-called audit trail is an automatically generated record which contains all of the relevant events in chronological order.

Each entry always includes the exact time and date, the name of the person logged-in at the time of the event, and the event itself, for instance an alarm, the changing of settings, etc. (cf. following illustration).

The audit trail starts at the time of the initial commissioning of a printer or when the touchscreen software is newly installed, and continues being written thereafter. In order to find the events of a certain time period faster, therefore, the audit trail is provided with a search-by-date function.
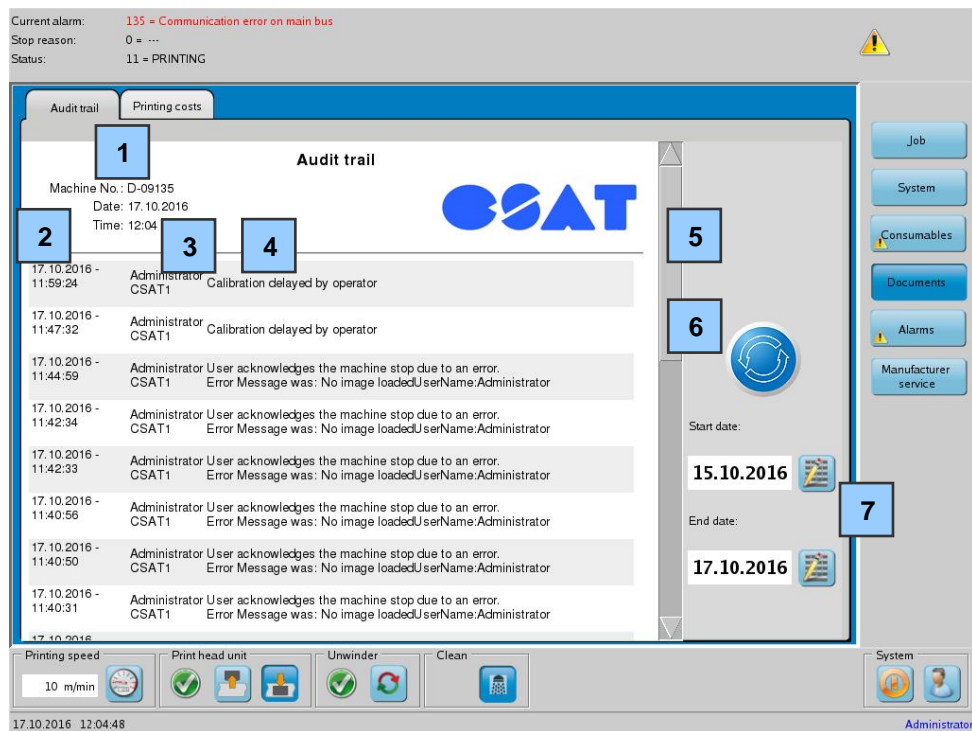
Fig. 82. Tab Documents > Audit trail

Pos.	Item	Meaning
1	Machine No.	Serial number of the particular printer.
	Date, Time	Time at which the information shown on the screen was last updated by pressing the round button [6].
2	Column 1	Time at which a recorded event occurred. The time is always shown according to the formula: YYYY/MM/DD HH:MM:SSUpdate
3	Column 2	Login / user name of an operator who was registered / logged in at the time the event occurred and was recorded. Servers can also be recorded here, for instance the login server.

Pos.	Item	Meaning
4	Column 3	Description of the particular event. For example, logins and logouts, the changing of settings or the acknowledgement of messages is recorded here.
5	Scroll bar	Allows recorded entries to be viewed which momentarily is not visible in this section of the screen.
6	Update	This button is used to update the contents of the screen. The automatic recording of all relevant events continues on uninterrupted regardless of whether the user makes use of this help function or not.
7	Start date	Starting date of the search-by-date function. By hitting the blue "command prompt" key, a calendar will open in which the desired starting date of the period to be shown can be entered. A more detailed entry of the starting time, which includes hours and minutes, is not possible.
	End date	Ending date of the search-by-date function. By hitting the blue "command prompt" key, a calendar will open in which the desired ending date of the period to be shown can be entered. A more detailed entry of the starting time, which includes hours and minutes, is not possible.

4.13.2   Tab Documents > Printing costs

This function is not implemented.

4.14   Menu Alarms

This menu lists all of the alarms or irregularities registered at present. The list of errors includes in particular the messages which are less critical and which are usually overwritten by alarms with higher priority and, therefore, seldom appear in the line "**Current Alarm**" in the header.

The printing process cannot be started until all irregularities have been eliminated and the *Alarms* list is empty.
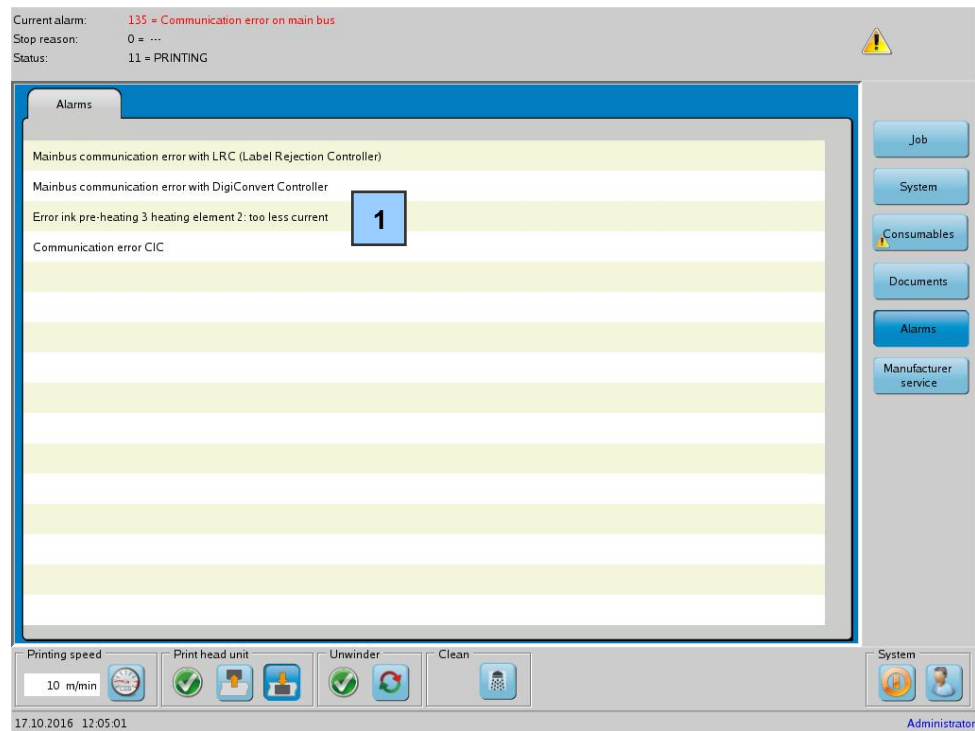
Fig. 83. Menu Alarms

Pos.	Item	Meaning
1	Message list	List of the error messages or irregularities registered at the moment. The number of the associated error code is not shown here.

4.15   Menu Manufacturer service

Tabs of this menu are used primarily to make general basic settings that do not need to be modified for each new print job. Therefore, these tabs are usually only accessible to the local administrator or the manufacturer's customer service.

4.15.1   Tab Manufacturer service > Service 1

This tab gives the user a general overview of the current state of the printing system.
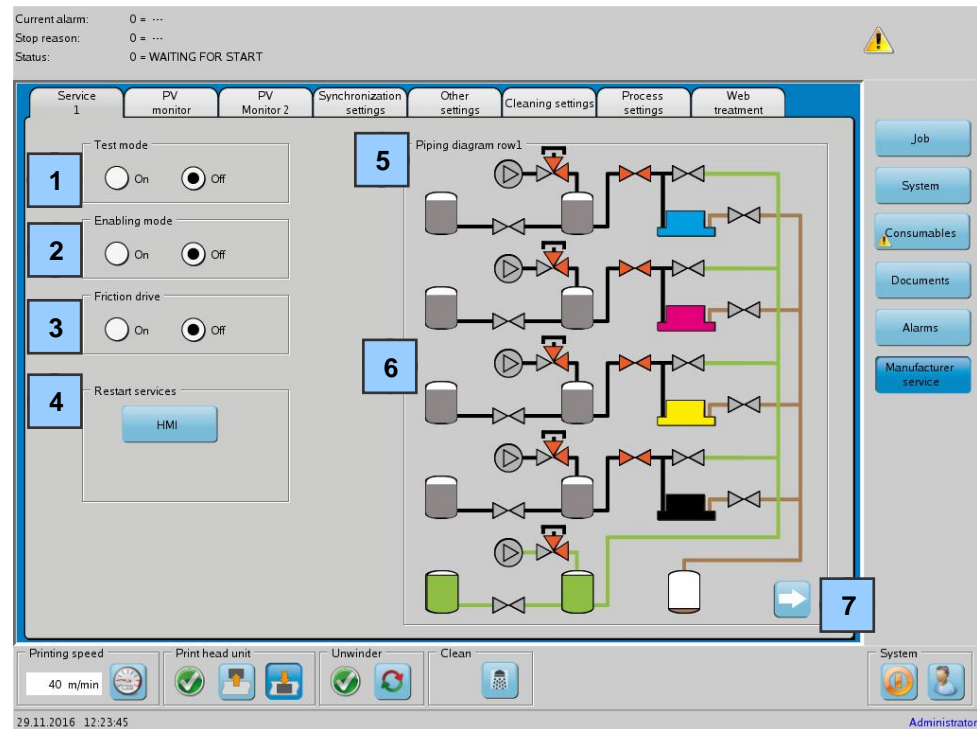
Fig. 84. Manufacturer service > Service 1 tab

Item	Object	Meaning
1	Test mode	Selection switch to switch between test mode and normal operating mode. The current state is marked with a black dot. Furthermore, the ![symbol] symbol is displayed in the header in test mode.
2	Enabling mode	Selection switch to switch between normal operating mode and the enabling mode necessary during setup or repair work using the enabling switch in order to be able to observe the cleaning of the print heads from the back of the printer.
3	Friction drive	Status indicator and ON/OFF switch to activate the friction drive in test mode. This on-switch function is locked or not active in normal operating mode.
4	Restart services	Reset button to restart the user interface of the touchscreen.
5	Piping diagram ...	Piping diagram 1 refers to print head row 1 on the machine side. Piping diagram 2 refers to print head row 2 on the operator's side.

Item	Object	Meaning
6	Diagram	Piping diagram representing the most important components and pipelines for cleaning fluid and inks.
		If a problem is detected in a component, a yellow triangle with a black exclamation point is displayed on the corresponding symbol.
		Each print head unit is provided with its own piping diagram.
7	Arrow but-ton	Selection button to switch between the piping diagrams.

4.15.2 Tab Manufacturer service > PV monitor

This tab is only intended for service technicians and the manufacturer's customer service and gives the person viewing it a general overview of all process variables (PVs) that occur in the respective printing system and thus of the current state of the printing system.

The overwhelming majority of the process variables can also be modified in this tab. However, a pre-condition for this is that the printer is already in so-called test mode.

To improve the overview, the PV process variables are combined into groups according to their functions or associations, for example for web transport, curing, or cleaning.
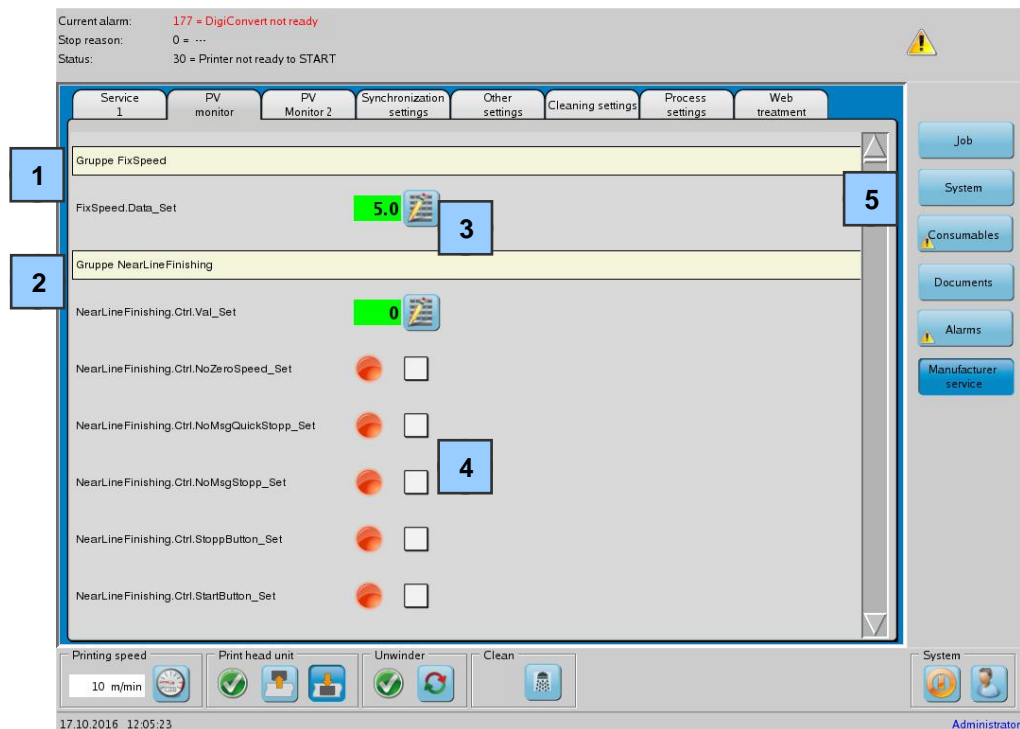
Fig. 85. PV monitor tab

Item	Object	Meaning
1	Group …	Designation of the group or function to which the process variables listed below should be assigned.
2	Variable	Short designation of the respective process variables.
3	Setpoint	Setpoint of the respective process variables. The value can be modified with the adjacent button.
4	Status indicator and ON/OFF switch	Status indicator and ON/OFF switch of the respective process variables. The respective process variable is active as soon as a black check mark appears in the white box after it is clicked and the round indicator changes from red to green.
5	Scroll bar	For scrolling up and down.

4.15.3 Tab Manufacturer service > Synchronization settings

This tab displays all settings associated with the respective image synchronization mode.

The indicators and switches located in the right-hand part of this tab are only enabled or made available depending on the selected image synchronization mode.

The *Manufacturer service > Synchronization settings* tab is related functionally to the *Job > Job settings* tab: Changes made in one tab are also made automatically in the other tab.
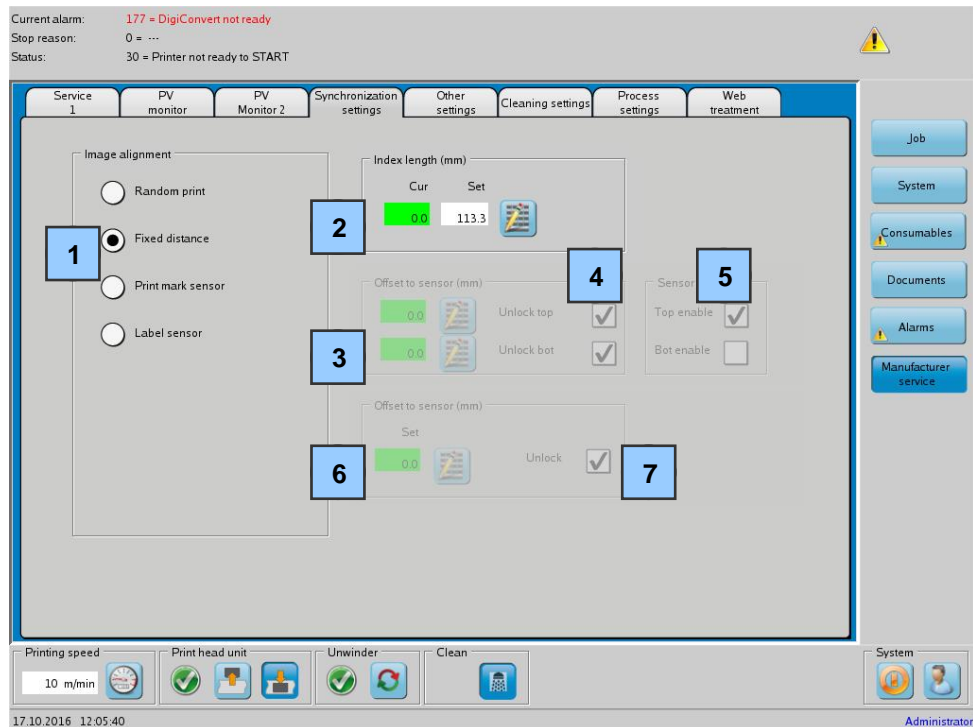
Fig. 86. Manufacturer service > Synchronization settings

Item	Object	Meaning
1	Image alignment	The selection list shows what principle should be applied to print the individual images one after the other. Only one of these options can ever be activated.
2	Index length	Setpoint for the distance between the beginnings of the images if "Fixed distance" mode is selected. The value can be modified with the adjacent button. The actual value also displayed refers to the distance between the two most recently printed images.
3	Offset to sensor	Setpoint for the distance between the print mark sensors and the first print head. The value can be modified with the adjacent button.
4	Unlock	Status indicator and ON/OFF switch to separately unlock or clamp the linear guides of the two print mark sensors. No black check mark should be displayed here during printing operation.

Item	Object	Meaning
5	Top enable / Bot enable	Status indicator and ON/OFF switch to activate one of the two print mark sensors. The "Top" sensor is located on the side of the printing substrate which is to be printed on, and the "Bot" sensor is located on the back of the printing substrate.
6	Label sensor	Setpoint for the distance between the label sensors and the first print head. The value can be modified with the adjacent button.
7	Unlock	Status indicator and ON/OFF switch to unlock or clamp the linear guide of the label sensor. No black check mark should be displayed here during printing operation.

4.15.4   Tab Manufacturer service > Other settings

This tab is primarily for displaying and entering parameters that are identical for most print jobs and only seldom need to be modified.
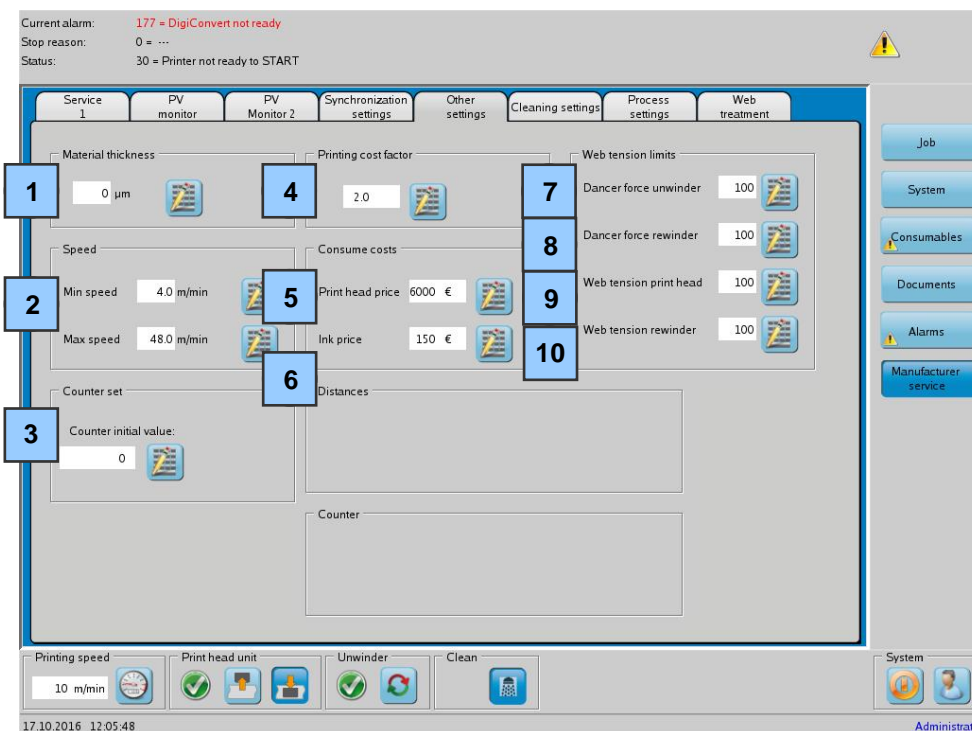
Fig. 87. Manufacturer service > Other settings tab

Item	Object	Meaning
1	Material thickness	Displays the material thickness of the printing system. The value can be modified with the adjacent button.
2	min./max. speed	Displays the lowest or highest printing speed, v1 or v2, respectively, in m/min. The value can be modified with the adjacent button.
3	Counter set	A user, logged in as CSATAdmin, has the possibility to reset the values that are displayed in *Machine info / Printed meters* and *Machine Info / Total meters* to the value set here. Doing so can be necessary when the engine board has to be exchanged in order to transfer the values that already have been accumulated on the old engine board to the new engine board.
4	Printing cost factor	Displays the cost factor used in the printing cost calculation. The value can be modified with the adjacent button.
5	Print head price	Procurement price of a new print head. This information is required for the printing price calculation.
6	Ink price	Procurement price of a full ink cartridge; the color is not important. This information is required for the printing price calculation.
7	Dancer force unwinder	For entering a limit value. The limit value represents the upper limit to which the "Dancer force unwinder" setting in the *Job > Web settings* tab is reduced internally; in %.

Item	Object	Meaning
8	Dancer force rewinder	For entering a limit value. The limit value represents the upper limit to which the "Dancer force rewinder" setting in the *Job* > *Web settings* tab is reduced internally; in %.
9	Web tension print head	For entering a limit value. The limit value represents the upper limit to which the "Web tension print head" setting in the *Job* > *Web settings* tab is reduced internally; in %.
10	Web tension rewinder	For entering a limit value. The limit value represents the upper limit to which the "Web tension rewinder" setting in the *Job* > *Web settings* tab is reduced internally; in %.

4.15.5 Tab Manufacturer service > Cleaning settings

In this tab the most important parameters of the cleaning process can be monitored and influenced if necessary.
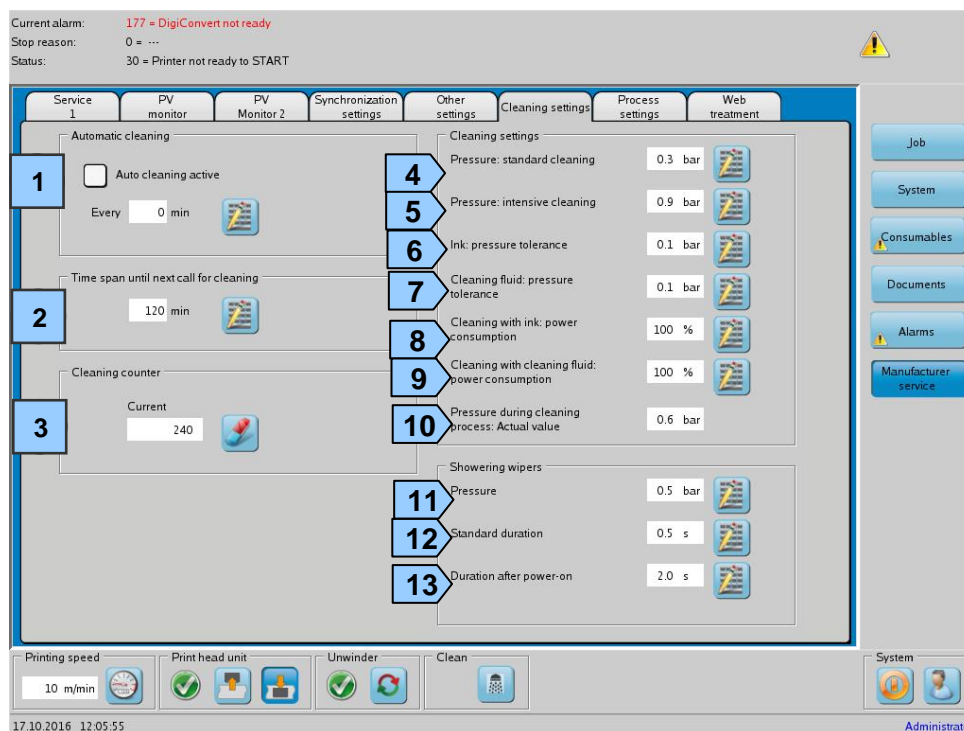
Fig. 88. Manufacturer service > Cleaning settings tab

Item	Object	Meaning
1	Automatic cleaning	ON/OFF switch for activating the automatic cleaning of all print heads when the useful life displayed here is reached, in minutes. The value can be modified with the adjacent button. When the useful life indicated here is reached, a printing process in progress is automatically interrupted. No black check mark should be displayed here during printing operation.
2	Time span until next call for cleaning	Interval in minutes after which the pop-up window with the prompt to clean the print heads is displayed again. The value can be modified with the adjacent button.
3	Cleaning counter	Number of automatic cleaning processes logged by the controller. The value displayed can be reset to "0 h" by clicking the blue "Reset" button.
Cleaning settings		
4	Pressure: Standard cleaning	Displays the setpoint for the pressure during standard cleaning with ink. Unit: bar The value can be modified with the adjacent button.
5	Pressure: intensive cleaning	Displays the setpoint for the pressure during intensive cleaning with ink. Unit: bar The value can be modified with the adjacent button.
6	Ink: pressure tolerance	Allowable pressure deviation during the process of rinsing with ink. Unit: bar The value can be modified with the adjacent button.

Item	Object	Meaning
7	Cleaning fluid: pressure tolerance	Allowable pressure deviation during the process of rinsing with cleaning fluid. Unit: bar The value can be modified with the adjacent button.
8	Ink: power consumption	Setpoint for the power consumption of the pump during the process of rinsing with ink, as a percentage. The value can be modified with the adjacent button.
9	Cleaning fluid: power consumption	Setpoint for the power consumption of the pump during the process of rinsing with cleaning fluid, as a percentage. The value can be modified with the adjacent button.
10	Pressure during cleaning process: Actual value	Displays the pressure measured in the pump during the rinsing process. Unit: bar
Showering wipers		
11	Pressure	Setpoint for the pressure during intensive cleaning with ink. Unit: bar The value can be modified with the adjacent button.
12	Standard duration	Standard duration of a wiper shower in seconds. The value can be modified with the adjacent button.
13	Duration after power-on	A different duration can be specified here for the first wiper shower after the printing system is switched on. The value can be modified with the adjacent button.

4.15.6 Tab Manufacturer service > Process settings

Basic settings of the process can be made with this tab.
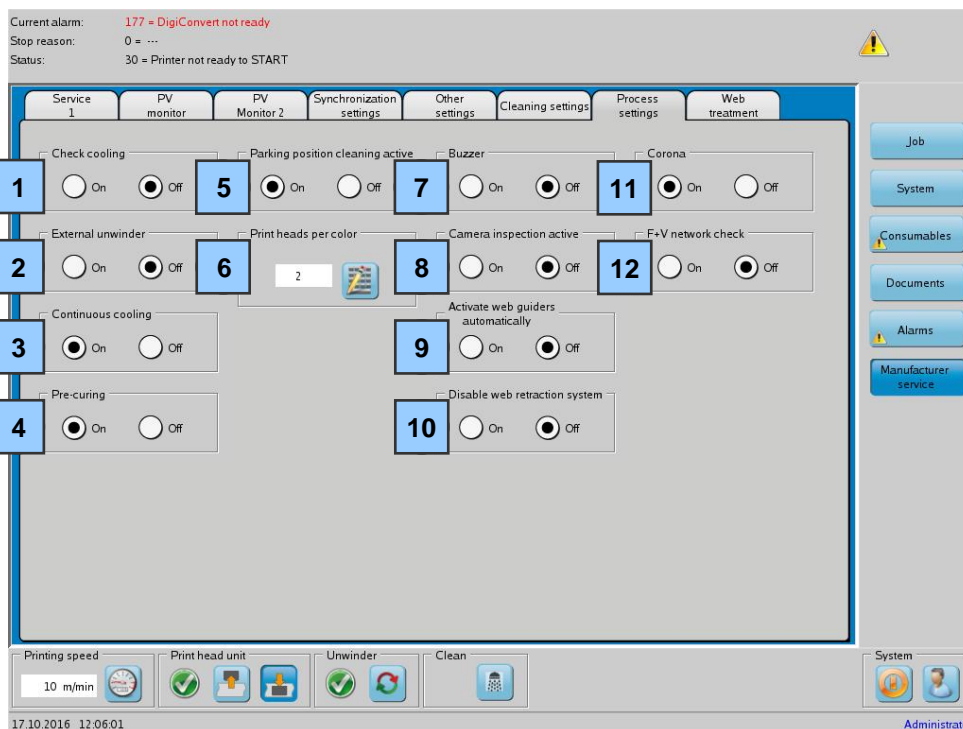
Fig. 89. Manufacturer service > Process settings tab

Item	Function	Meaning
1	Check cooling	Selection switch to activate automatic monitoring of the cooling.
2	External unwinder	Selection switch to activate an optional additional unwinding unit located outside the printer.
3	Continuous cooling	Selection switch to control whether the coolant should flow continuously or only while the curing modules are switched on. ITS6 printers should ideally always be cooled without interruption. In contrast, the "Off" option should only be selected if the respective printer is not connected to a closed coolant system.
4	Pre-curing	Selection switch to control whether or not the engine should monitor the pre-curing unit.
5	Parking position cleaning active	Selection switch to control whether it should be possible to start cleaning when the print head unit is in its parking position.
6	Print heads per color	Number of print heads or webs activated per printing color.
7	Buzzer	Selection switch to turn the buzzer on or off.
8	Camera inspection active	Activate camera inspection
9	Activate web guiders automatically	Selection switch for the web guiders. If this function is activated, both web guiders are put in automatic mode during printing operation regardless of which operating mode has been set in the operating fields of these devices.

Item	Function	Meaning
10	Disable web retraction system	Selection switch to activate or deactivate web retraction.
11	Corona	Activate corona
12	F+V network check	Switch on or off checking of network connection to finishing machine.

4.15.7 Tab Manufacturer service > Web treatment

You make the basic settings for the treatment of the printing substrate in this tab. Via this tab you can also get to the tabs for ink pre-heating and print head alignment.
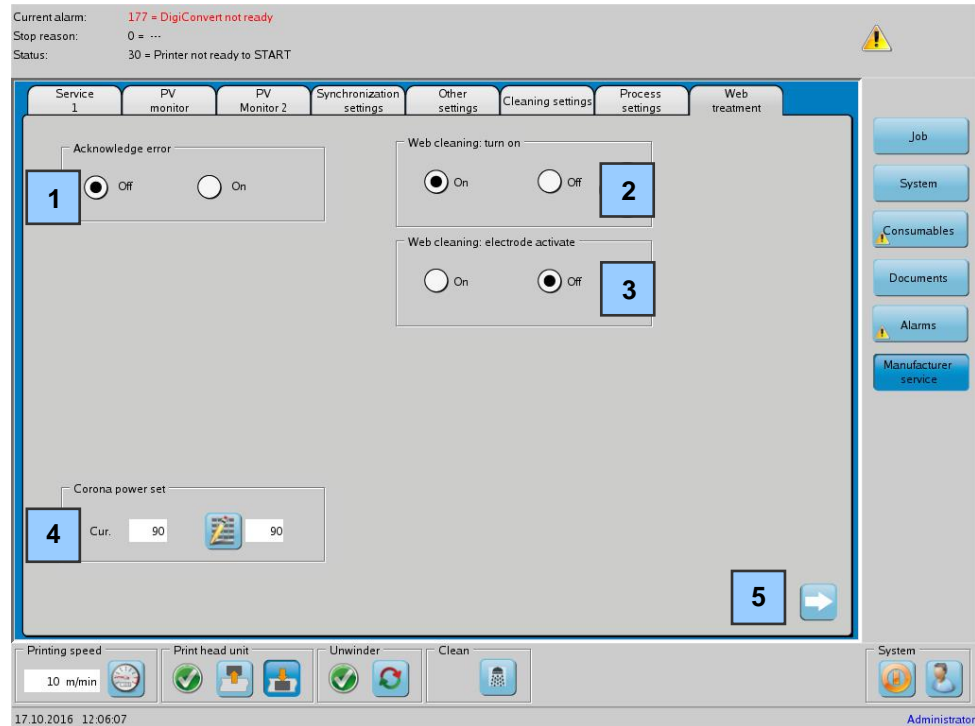
Fig. 90. Manufacturer service > Web treatment tab

Item	Function	Meaning
1	Acknowledge error	
2	Web cleaning: turn on	Selection switch to switch on the power supply of the printing substrate cleaning module.
3	Web cleaning: electrode active	Selection switch to activate the printing substrate cleaning module. If this option is switched on, the rollers of the printing substrate cleaning module are pressed against the material to be printed on immediately. Furthermore, the electrodes of the printing substrate discharge unit on the printing substrate cleaning module are switched on. This function is also active when the printer should be stopped.
4	Corona power set	Setting of corona power.
5	Next	Opens the following pages for ink pre-heating and print head alignment.

4.15.8   Tab Manufacturer service > Ink pre-heating

You can control the ink pre-heating in this tab.
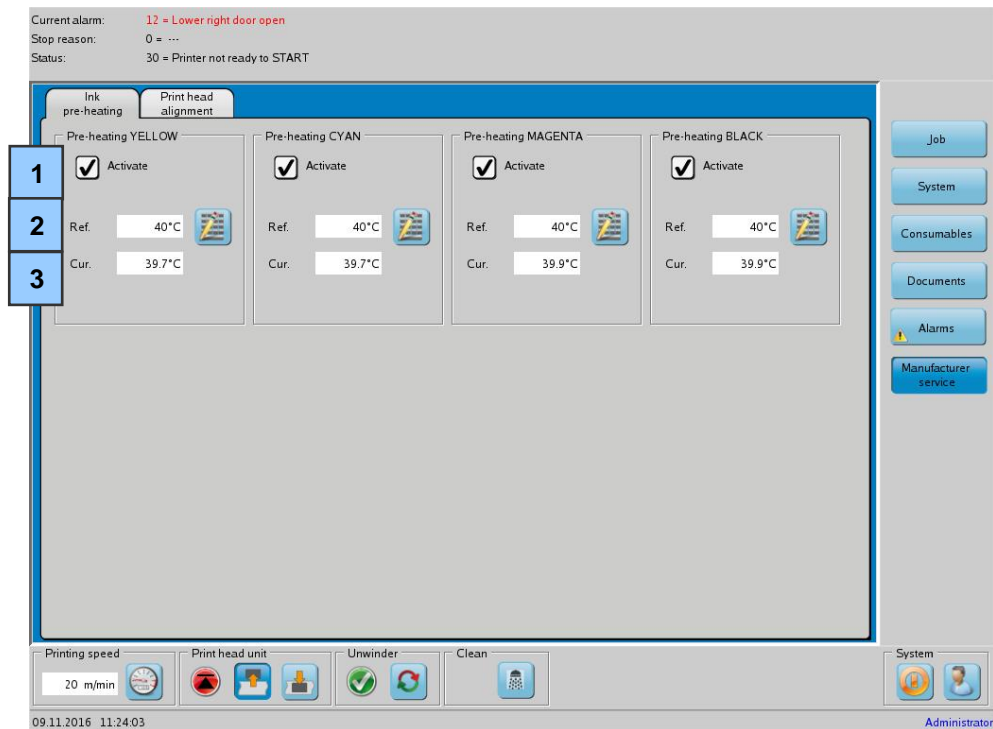
Fig. 91. Manufacturer service > Ink pre-heating tab

Item	Function	Meaning
1	Activate pre-heating	Option for activating the ink pre-heating for the respective color.
2	Ref.	Displays the temperature setpoint. The value can be modified with the adjacent button.
3	Cur.	Displays the current ink temperature.

4.15.9 Tab Manufacturer service > Print head alignment

The manufacturer specifies the basis values for the alignment of the print heads on this page. The structure of this page is identical to that of the Job / Print head alignment page.

Fig. 92. Manufacturer service > Print head alignment tab

Item	Object	Meaning
Print head alignment across feed direction		
1	Reduce distance	Moving the respective color in the direction of the arrow, or in the direction of the left edge of the printing substrate, viewed from the direction of travel. Each press of the arrow button reduces the respective correction value by 1 pixel.
2	Indicator	Current correction value for the respective color with respect to the left edge of the printing substrate, viewed in the direction of travel.
3	Increase distance	Moving the respective color in the direction of the arrow or away from the left edge of the printing substrate. Each press of the arrow button increases the respective correction value by 1 pixel.
4	Input prompt	Enter value manually.
5	Input button	Pressing this button saves the correction value determined previously through tests.
Print head alignment in feed direction		
6	Move to the left	Moves the respective color in the direction of the arrow or closer to the yellow print head. Each press of the arrow button reduces the respective correction value by 1 pixel.
7	Indicator	Current correction value for the respective color with respect to the yellow print head, viewed here as a fixed point.

Item	Object	Meaning
8	Move to the right	Moves the respective color in the direction of the arrow or further away from the yellow print head. Each press of the arrow button increases the respective correction value by 1 pixel.
9	Input prompt	Enter value manually.
10	Input button	Pressing this button saves the correction value determined previously through tests.

5 Transport

5.1 General

The means used for lifting and transportation must be appropriate in terms of their form, stability, and load-bearing capacity for the loads they are supposed to support (taking into account their weight, shape, volume and type). The maximum permissible load must be clearly indicated on these resources (including on the hooks).

5.2 Methods of transport

The printer should always be loaded with a forklift. Please refer to the machine data for the weight of the machine. (See Chapter 3 "Technical Data").

5.3 Safety instructions for the transport

⚠ Warning
Risk of fatal injury due to electrical shock. Even when moving the machine only short distances: → Disconnect the machine from external power sources!   → Before restarting the machine, set it up properly and connect it to the power supply.

⚠ Warning
Risk of crushing due to falling/overturning loads.   → Have the machine transported by trained personnel only.   → Assign a knowledgeable person to give directions during lifting.   → Make sure the transporting devices are attached properly to the machine.   → Each time before lifting, make sure no one is in the danger area.   → Avoid transporting across sloping surfaces.

⚠ Warning
Risk of fatal injuries due to improper transport.   → Use only the appropriate transport vehicle with sufficient load-bearing capacity! If a forklift is used for transport, it must have a load-bearing capacity of more than 1.5 tons and forks longer than 1.5 m. The forks should make contact with the base plate of the printer only.   → Fasten load securely.

	→ Wear the proper personal protection equipment (PPE). → Danger of tipping over! → Machine components must be held onto by the transport vehicle until they stand securely on the floor. This applies especially during and after transport with a lifting cart or a forklift.

⚠ **Warning**
Risk of fatal injuries due to improper transport. → When transporting the machine by crane, use adequately sized devices, ropes or belts. Do not attach the gear being used directly to the printer or place it on its housing since the housing could warp. When transported by crane, the printer must be placed on a sufficiently large transport pallet or else in its original transport crate so that the lifting gear makes no contact whatsoever with the housing. → Make sure the load has been secured and distributed evenly. Locate the center of gravity of the machine when transporting. → Never stand under a suspended load. → Carefully remove and save the parts attached for transport purposes.

Notice
Damage to the printer → Transport the printer in an upright position only. → Avoid all jarring during transport!

Notice
Damage to the printer due to moisture → The printer should never be subjected to moisture (vapors, dripping or sprayed water). If this cannot be avoided, then wrap the machine in plastic wrap and transport it in the original wooden crate.

Notice
No warranty claims / claims under guarantee can be made for damage incurred as a result of non-compliance with the transport regulations.

5.4 Internal transport

Internal transport means that the printer is transported within the same building across short and level distances as follows:

- … by means of forklift,

- … by means of lifting cart,

The printer remains closed during transport.

Any other transport should be treated as an external transport. This specification also holds true for transports over long distances and/or uneven surfaces inside a building.

> **Information**
>
> Components and printing media can remain in the printer during the internal transport.

5.4.1 Transport preparations

> Turn the pivoting frames of both web guiders into their central positions.

> Push the print head unit back and secure it in place with the transport lock (cf. Chapter 5.4.2).

> Switch off the printer and secure against unauthorized restarting: Attach a padlock to the main switch of the printer!

> Disconnect the connecting cables and supply lines from the printer:

- Power supply,

- Interface cables,

- Network cable,

- Pneumatic hose,

- Disconnect the water intake and discharge on the cooler. It is not necessary to empty the cooler.

> Unlock and raise the pressure rollers of the friction drive and the web tension control.

> Empty the three ink collection pans.

> Close all door panels and flaps.

> Do not place any objects on the printer!

> Place any parts that were removed in the appropriate containers and transport them separately from the printer.

5.4.2   Transport securing device

The print head unit must always be fastened down with the transport secur-
ing device included with delivery in order to prevent uncontrolled movement
of the print head unit and therefore jarring of the components installed in-
side.
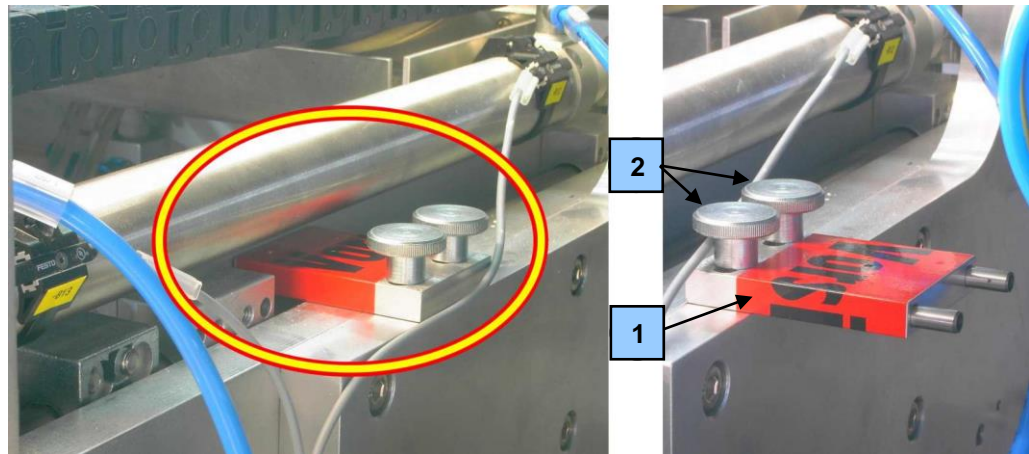
Print head unit secured   Position of the transport secur-
                                           ing device during printing

Fig. 93. Transport securing device of the print head unit

Pos.	Elements	Meaning
1	Transport securing device	Securing of the print head unit
2	Knurled screws	Fastening of the securing device plate

5.4.2.1 Mounting the transport securing device to the print head unit

> Remove the top cover panel of the print head unit.

> Move the print head unit into the parking position.

> Loosen the two knurled screws.

> Twist the transport securing device around and insert it into the two holes on the side of the print head unit.

> Tighten the knurled screws.

> Reinstall the cover panel.

5.4.2.2 Mounting the transport securing device of the web guiders

> Below the pivoting frame #1 of each web guider, attach at least one cylinder head screw #2 (M4X70). The tip of the screw #2 has to be screwed into console #3 by at least 15 mm.

> Make sure that the tip of the screw penetrates the support roller #4 by some millimeters.

> Please note the instructions on the red label of the pivoting frame #1.

Fig. 94. Transport securing of the web-edge control unit by means of cylinder head screws M4x70 with red flag

Fig. 95. Transport securing of the web-edge control unit

5.4.3   Preparation of the transport route

Proceed in the following order:

> Before starting the transport, locate a sufficiently wide, obstacle-free transport route with a smooth surface. Obstacles are considered:

- door sills,

- wires on the floor,

- wire conduits with uneven covers (light grids, safety tread floor plate), that lie higher or lower than the surrounding surface.

> In case of doubt, make a test run with a four-wheeled trolley.

> Clear the transport route of all obstacles,

> Also check whether the floor has sufficient load-bearing capacity.

5.5   Executing the transport

5.5.1   Transport by crane

Right way to transport
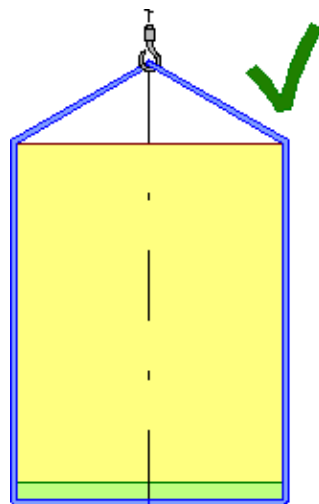
Transport in the original wooden crate
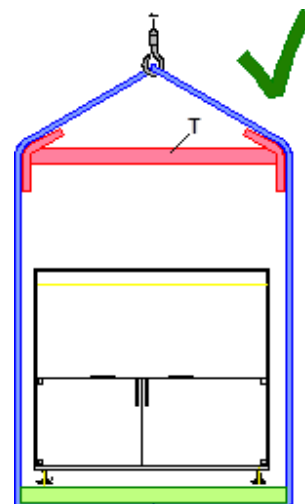
Transport on a pallet.
The lifting gear is held apart by the traverse "T".

Fig. 96. Approved transport by crane

Wrong way to transport
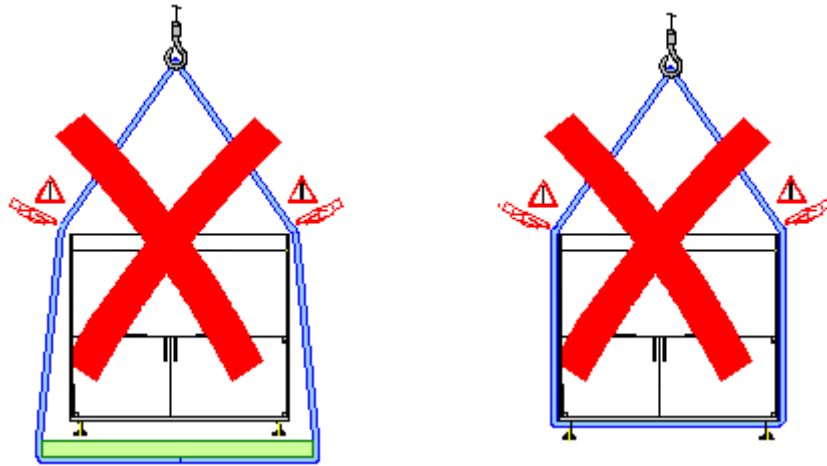
The lifting gear touches the upper edges of the printer.

The lifting gear is attached to the printer.

Fig. 97. Prohibited transport by crane

5.5.2 Transporting by forklift

Proceed in this order:

> Position the forklift under the printer's center of gravity,

> Make sure that the machine is sitting solidly on the forklift and cannot tip over,

> Secure the printer to the forklift,

> Lift the printer off the ground,

> Move the printer to the new location,

> Slowly lower printer to the ground,

> Remove transport restraints,

> Pull out forklift.

Notice
➔ Avoid all jarring of the printer.

5.6 External transport or storage for any length of time

External transports include all transports that are not internal transports. These are transports:

- … from one building to another building within a company,

- … from one company to another company,

- … on public streets by truck or trailer,

- … with long and/or uneven transport routes.

Notice
➔ Transports by forklifts or other vehicles without suspension should be kept to an absolute minimum.

The ITS6 printer should be packed in the special wooden crate in which it was delivered. Similarly, due to the unavoidable jarring during transport, more extensive measures for securing the printer have to be taken than during a transport within the company.

These instructions also apply to situations where the printer has to be taken out of commission and stored for any length of time.

5.6.1 Transport preparations

> In addition to the tasks listed in Chapters 5.4.1 and 5.4.2, the following tasks also have to be completed:

> Rinse all print heads thoroughly with cleaning fluid (tab *Job > Cleaning*). This process has to be repeated several times until the contents of each print head and the connecting lines have been completely replaced.

> Remove the substrate web roll from the unwinding unit!
This is necessary since otherwise, each time the printer is jarred, the strain on the unwinder shaft would be too great.

> Remove the substrate web roll from the rewinding unit!
This is necessary since otherwise, each time the printer is jarred, the strain on the rewinder shaft would be too high.

> Remove all of the unwound printing substrate from the machine. This prevents the material no longer under tension from rubbing against the sensitive surfaces of the printing unit.

> Drain the cooling circuit and seal the inlet and outlet with the appropriate plugs.

> The following components have to be removed/replaced:

- Remove the cartridge with the cleaning fluid (in case of longer storage),

- Remove the ink cartridges and replace them by cartridges with cleaning fluid (in case of transport and short-term storage) or re-move ink cartridges (in case of longer storage),

- Replace the residual ink bottle with an empty bottle,

- Empty the collection pan and the small collection pans,

- Dirty absorbent mats should be replaced with new ones.

> All of the articles removed should be stored in their custom packaging outside of the printer and shipped in a separate crate.

> If necessary, shove the printer to an area with enough space to finish packing it (cf. Chapter 5.6.4.).

5.6.2   Preparation of the transport route

Proceed in the following order:

> Before starting the transport, locate a sufficiently wide, obstacle-free transport route with a smooth surface. Obstacles are considered:

- door sills,

- wires on the floor,

- wire conduits with uneven covers (light grids, safety tread floor plate), that lie higher or lower than the surrounding surface.

- If in doubt: Run a test drive with a four-wheeled handcart.

> Clear the transport route of all obstacles,

> Also check whether the floor has sufficient load-bearing capacity.

5.6.3   Carrying out external transports

Proceed in the following order:

> For longer transports, it is imperative to pack the printer in its original transport crate (cf. Chapter 5.6.4.).

> For shorter transports on the company premises, the printer can be placed directly on a suitable transport vehicle.

> Secure the load against slipping and tipping over.

> Protect the load against moisture.

> For external transports, it is imperative that the unpacked printer be covered by a tarpaulin impermeable to light, since daylight could harden any existing drops of ink and make them impossible to remove.

⚠ **Caution**
➔ Avoid all jarring of the printer.   ➔ The printer must always be transported in an upright position only! It is prohibited to tilt it or especially place it on its side!

5.6.4   Packing the printer in the transport crate

> Wrap the stack light with two layers of bubble wrap. Unscrew its foot plate of the stack light and lay the latter on the upper cover of the printer. Then fix this unit there with some adhesive tape.

> Wrap the printer in plastic foil:
> Start at one of the bottom corners and wrap the material up and around the machine tightly at a slight angle until all walls are covered in plastic. Make sure that the individual layers of plastic foil overlap by at least 50 mm.
> Then spread a plastic tarpaulin with an area of at least 2 x 1.3 m over the top of the machine and tape down the hanging corners to the side walls of the machine.

> If the transport is supposed to take several weeks or is going to be carried out by ship, or if the printer is to be stored for an indefinite period in an unheated warehouse or high fluctuations in climate or temperature are expected, then the printer should be hermetically sealed in plastic wrap as well. Furthermore, in this case, several small sacks of desiccant (e.g. silica gel) should be placed inside and outside of the wrapped printer to protect the machine against moisture.
> Have these tasks performed by a company qualified for this purpose.

> Lift the printer onto the floor panel of its original transport crate. Place the machine with its floor panel either on squared timbers or screw down the feet of the printer as described in Chapter 6.1.1.3 "Setting up the printer".

> Tighten the lock nut of the adjustable feet. This protects the threads against damage during transport.

> Secure the machine against slipping sideways: Press long squared timbers against the floor panel of the printer and screw them down in this position onto the floor of the wooden crate. But make sure that none of the squared timbers projects beyond the upper edge of the floor panel of the printer, since otherwise they could crush the side door and cover panels.

> Then place tension belts over the printer and attach the belts to the eyebolts attached to the floor panel of the wooden crate. These belts should be led up over the machine vertically and not diagonally.
> Tighten the belts as much as possible so that the machine cannot lift up off the floor panel of the wooden crate during transport.

> The tension belts should be attached only at the rear of the aluminum walls. Tension belts over the front cover would damage it.

> Do not place any loose objects on, in or beside the printer!

> Now attach the four side walls and the lid of the wooden crate. Join all parts of the wooden crate with adequately sized woodscrews.

> Do not use any nails, since afterwards the transport crate could not be opened without damaging it and would render it unusable.

> Write the return address and receiving address clearly on at least two opposite side walls of the transport crate.

> Apply the following three pictograms to all four side walls of the transport crate:
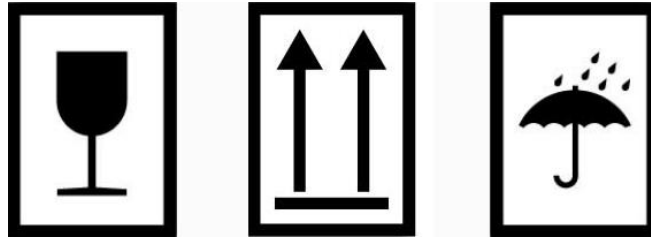
Fig. 98. Transport pictograms

> All parts and components that have been removed should be transported separately from the printer in their customized packaging.

5.6.5 Shipping the transport crate

Once the printer has been packed according to the requirements, then it's ready to go. However, the following points must be observed throughout the shipping process:

- The transport crate must be protected against heavy fluctuations in temperature as well as against moisture and wetness.

- The transport crate must always be transported in an upright position.

- The transport crate should be transported only by a suitable transport vehicle with adequate suspension and pneumatic tires. Transports by forklifts or other vehicles without suspension should be kept to an absolute minimum.

- The crate must always be lifted and set back down again slowly.

- If the freight is transported by a crane, it must not bump against objects, since this could damage sensitive components or loosen parts.

5.6.6 Unpacking the printer from the transport crate

> Check the transport crate immediately upon receipt for any damage (breakage and heavy wetness). Record any damage found and take photographs as evidence.

> First unscrew the lid of the transport crate before removing the four side walls. Please go about this process with care so that the crate can be used again at a later date.

> Remove the tension belts and the timbers with which the machine was secured to the floor of the transport crate.

> Lift the printer on the floor panel of its original crate onto the floor. Use only an appropriate forklift for this purpose. Transport by crane is prohibited!

⚠ **Caution**
Risk of damage from condensate.   ➔ Do not remove the film around the printing press before the printing press is at room temperature.

> Wait until the printing press is at room temperature. This is particularly important when the printing press is delivered at a low outdoor temperature. Depending on the temperature difference, acclimatization can take several hours, or even days.

> Remove the packaging film around the unit only after the printing press is at room temperature.

> Check the condition and equipment of the printer and compare it with the bill of delivery. Should there be any reason for a complaint, please contact the forwarding company involved immediately.

> Do not remove the transport securing device from the print head unit (two screws M6 x 25 mm) until the machine is standing in its final position (see Chap. 5.4.2.1, "Mounting the transport securing device to the print head unit").

> Remove the transport restraints of the web guider (see Chap. 5.4.2.2 "Mounting the transport securing device of the web guiders").

> Replace all of the printer's consumable materials that were removed before the transport:

> Remove any visible dirt with the appropriate cleaning agents.

6   Assembly

The assembly of the individual machine components is carried out under the direction of Markem-Imaje CSAT GmbH.

In this chapter, the assembly is described in general terms.

The documents enclosed in the appendix of these operating instructions give details about the assembly and connection of hoses and cables.

Assemble the ITS6 printer as described in these drawings and wiring diagrams.

6.1   Safety instructions for the assembly

⚠ Warning
Potential hazard due to improper installation ➔ Make sure that the installation has been carried out completely and correctly before commissioning is started. ➔ Do not begin commissioning until all safety equipment has been installed in full and is functioning properly. ➔ In case someone is forced to stand directly next to the machine or machine components during commissioning, set-up or conversion work (e.g. alignment), a second person must be present to press the Emergency Stop button if necessary.

⚠ Warning
Danger of tripping due to improperly laid connection cables. ➔ Make sure to lay all connection cables away from walkways and entries. ➔ Supply lines and control lines to the ITS6 printer must be protected in ducts or conduit in accordance with the general and special conditions and directives.

⚠ Caution
Potential hazard due to incorrect assembly. ➔ Before a general function test is performed on the machine, check the direction of rotation on the individual motors. ➔ The general function test should start first with a comprehensive test of all manual functions before changing to automatic mode.

Notice
Machine can be damaged by using it in an unsuitable environment.
The machine should only be used in ambient conditions which are suitable for the machine and the materials being processed.

6.1.1 Set-up at final destination

⚠ Warning	
	Potential hazard due to lack of stability.
	➔ The floor must be even and horizontal. The machine has to be leveled in order to ensure trouble-free operation.
	➔ Place the printer on a flat, solid, underlying surface which is able to withstand the expected load.

6.1.1.1 Load-bearing capacity of the underlying surface

The printer should be set up only on even, flat surfaces which have sufficient load-bearing capacity in terms of distributed load and concentrated load, see Chapter 3 "Technical Data".

6.1.1.2 Ambient conditions

The printer should not be operated unless all of the conditions defined in Chapter 3 "Technical Data" are met.

6.1.1.3 Setting up the printer

> Lift the print system from the transport crate or lift the print system from the transport pallet

> Position the print system at the set-up location. Impacts must be avoided!

> Level the printer until it is perfectly horizontal as described in the following section.

6.1.1.4 Aligning the printer horizontally

Required tools

- 200mm long precision spirit level with accuracy of 0.02mm/m in accordance with DIN 877.

- 2 wrenches SW30

Prerequisites

- The screws between the front, side, and cover panel must be sealed with a screw-lock coating.

- The hinged hood and the safety doors of the unwinding and rewinding units must be closed.

- The printer must be at room temperature.

Procedure

> Loosen the lock nuts #2 on all of the adjustable feet, see Fig. 99.

> At all adjustable feet, lock the lock nut #4 firmly against the adjusting nut #5.

> To adjust the height, hold the adjusting nut #5 with a fork wrench.

> First level the printer roughly: Raise the machine with the adjustable feet to a uniform height of around 80 to 100 mm. The distance between the floor and the underside of the printer's base plate should not exceed 125 mm.

> Set the spirit level down correctly: Place the precision spirit level only on the surfaces shown in Fig. 100. The lengthwise and crosswise measuring surfaces for the precision spirit level must be clean and free of burrs. The precision spirit level must not be placed on the face of the front panel.

> Make fine adjustments: Readjust the adjustable nuts and check with the precision spirit level, alternating between lengthwise and crosswise.

> After all of the adjustable feet have been set properly, screw the lock nuts #2 back up and tighten them. Now check the alignment.
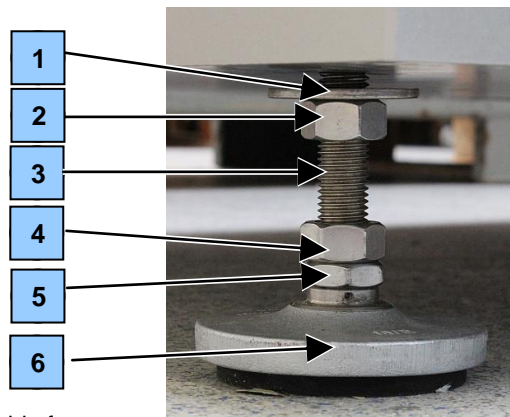
Fig. 99. Adjustable foot.

Pos.	Element	Meaning
1	Washer	Load distribution
2	Lock nut	To lock the levelling foot
3	Thread	Guide for height adjustment
4	Lock nut	To lock the adjusting nut
5	Adjusting nut	To adjust the height
6	Levelling foot	Positioning and vibration buffering
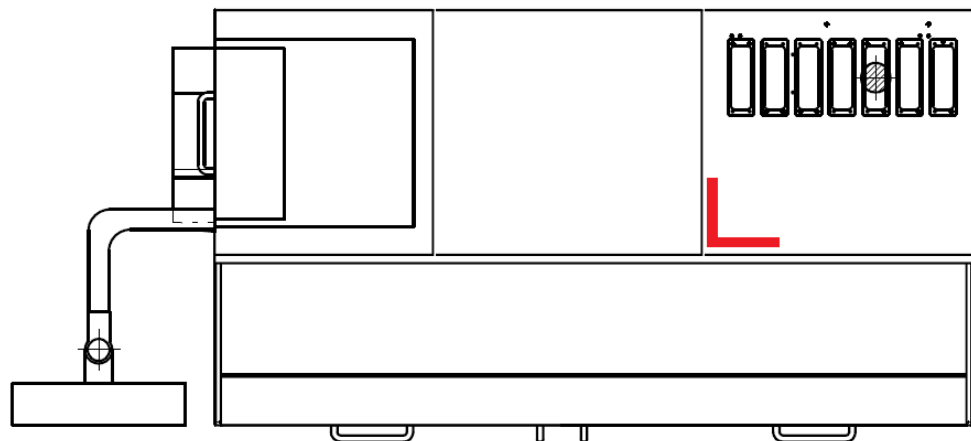
Fig. 100. Correct placement of the precision spirit level

6.2   Installation of the printer's supply systems

⚠ **Warning**
Installation of the supply lines. ➔ The printer must be connected properly to all supply lines by qualified technical personnel. ➔ The commissioning procedure should be carried out in accordance with the operating instructions only.

6.2.1   Electrical connection

The ITS6 printer must be connected properly to the power supply with the correct voltage and frequency.

> Plug the lead of the printer into a compatible and fuse-protected socket of the three-phase current supply network.
> (Observe specifications on the type plate of the printer!)

6.2.2   Pneumatic system

All of the pneumatic equipment on the ITS6 printer is pre-installed.

The ITS6 printer requires dry, oil-free air.
Flow rate and pressure are maximum 10 dm³/min and 6 – 8 bar respectively.

> Connect the line coming from the on-site compressed air supply to the coupling plug on the printer.

> Check for leaks and the secure fit of all hose connections.

Notice
Make sure to connect a pneumatic supply line with a 2'' diameter and permanent excess pressure of at least 5 bar. The supplied compressed air must be free of oil and dry.

6.2.3   Interfaces

> Now connect all signal cables to the associated interface plugs on the printer and secure the connector housings with the provided retainers.

6.2.4   Transport securing devices

> Remove the transport securing device on the printer head unit.
> Loosen both knurled screws and pull the transport securing device out of the two holes on the side of the print head unit. Turn the transport securing device around so that its rods are pointing to the right and

then tighten it back down on the chassis of the printer with the two
knurled screws.

> Remove the transport securing device on each web guider.
  Screw out the cylinder head screws. The cylinder head screws must
  be labelled for later transports and kept with the print system.

> Remove all cable ties, tape and plastic wrap used to immobilize parts
  of the printer for the duration of the transport.

> Unpack the indicator light and screw it back on top of the printer.

6.2.5 Consumables

> Now install all of the printer components removed before transport:

  • Cartridge with cleaning fluid, if missing

  • Ink cartridges
    Cleaning cartridges placed there instead of ink cartridges may have
    to be removed.

  • Printing substrate web rolls

7   Commissioning

The assembly and commissioning of the individual machine components takes place under the direction of Markem-Imaje CSAT GmbH.

In the set-up mode, the machine may be operated only by especially trained operating and maintenance personnel.

7.1   Safety information for the initial commissioning

⚠ **Warning**
Risk of fatal injury from contact with live parts. ➔ Work on electrical equipment must be performed only by authorized personnel qualified in electronics. ➔ Always keep switch cabinets closed. Only authorized personnel with key or tool are allowed access to the switch cabinets. ➔ Do not work on live parts. ➔ Replace loose connections, damaged, or burned cable immediately. Make sure main switch is always turned off and locked before performing work. ➔ Cables should not be jammed or crushed. Cables must be laid so that they cannot be damaged or pose a tripping hazard.

⚠ **Warning**
Danger of injuries due to non-functioning safety equipment. ➔ Do not remove safety equipment until the machine is shut down. ➔ The machine may not be operated unless all safety equipment is intact and functioning. Make sure all safety equipment is in place before turning on the machine. ➔ Make sure that the access barriers are always functioning and have not been bypassed. ➔ Replace immediately any damaged or missing notices and warning signs as well as safety labels.

⚠ **Caution**
Potential hazard due to improper commissioning. ➔ Have the machine be commissioned only by especially trained operating and maintenance personnel. ➔ The machine may be programmed only by specially trained personnel. ➔ Re-commission in compliance with the operating instructions only.

⚠ Caution

	Danger of injuries and damage to the system.
⚠	➔ The commissioning of the printer and connection of supply lines should be carried out by trained technical personnel only.
	➔ Carefully reinstall and secure parts that were removed for transporting purposes before re-commissioning.

⚠ Caution

	Danger of crushing hands and fingers when closing the safety doors and the hinged hood.
⚠	➔ Do not reach into the areas where the safety doors and the hinged hood close.

Notice

Potential damage to machine parts due to electrostatic charges.

➔ Establish a potential equalization between the machine and the environment.

➔ Do not operate the machine unless it is sufficiently grounded.

Notice

Machine parts can be damaged by using the wrong substrate and consumable supplies.

➔ Do not use any substrates that have not been approved by Markem-Imaje CSAT GmbH or whose properties deviate from the materials ordinarily used.

➔ Use only original ink and cleaning fluid from Markem-Imaje CSAT GmbH!

Notice

When adding on to the machine or installing components that haven't been used before, the safety of the machine must be newly assessed.

7.2   Initial commissioning procedure

7.2.1   Overview of commissioning measures

> Check all of the printer's interface connections.

> Switch on the compressed air supply.

> Switch on the water supply.

> Fill the printer with its consumables.

> Turn the main switch of the printer to "I."

> Wait until the control program of the touchscreen has booted.

> Insert an <u>intact</u> roll of substrate into the printer.

> Thread the substrate through the printer. <u>Make sure there are no taped seams between the unwinding shaft and the friction drive!</u>

> Check the safety equipment on the printer:

  - Emergency Stop button

  - Door interlocks

  - Stack light

> Check the operational readiness of the printer

7.2.2   Ambient conditions

The printer should not be operated unless all of the conditions defined in Chapter 3 "Technical Data" are met.

7.2.3   Reconnection and preparation of the printer

> Reconnect to the printer all of the lines that were disconnected before the transport (power supply, interface and network cables, and pneumatic hose and exhaust line).

> Remove any transport securing devices that were installed.

> Replace all of the printer's consumable materials that were removed before the transport:

> Remove any visible dirt with the appropriate cleaning agents. This applies in particular to spilled ink dripped onto the guide rollers or in the immediate vicinity of ball bearings or linear guides.

> Re-attach any add-on parts that were removed from the printer.

> Close all of the printer's doors and flaps.

> Switch on the printer and let it warm up.

> Rinse all print heads thoroughly with the respective ink (tab *Job* > *Cleaning*). This process has to be repeated several times until each print head and the connecting lines have been filled with undiluted ink.

> Let the print head unit move to its parking position.

> Use only intact material for threading through:

- Press the "**Center Mode**" button on the control panel of the web guiders.

- Press the "**Feed forward**" key on the control panel until the taped seam is no longer between the unwinding unit and the friction drive. Furthermore, the material must lie flat on the printing table without creases.

- Loosen the knurled screw on the side margin sensor.

- Move the sensor back and forth until only one diode is illuminated on the control panel of the web guider. Now you have manually adjusted it to the neutral position.

- Retighten the knurled screw.

- Press the "**Automatic Mode**" button on the control panel of the web guiders.

> Let the print head unit move into its working position.

> The printer is ready for operation again.

7.3 Check the defaults of the printer

Before the printer can be started up at its new location, important defaults have to be checked and set if necessary:

- Set the language used in the touchscreen menus in the tab *System > Settings* (cf. Section 4.11.1).

- Set the system time in the tab *System > Settings* (cf. Section 4.11.1).

- Set up the connections to the local computer network (cf. Section 4.11.2).

- Check and if necessary create user accounts.

These tasks only have to be performed once or seldom

7.4   Function test

> ⚠ **Caution**
>
> Potential danger due to incorrect rotation of motors.
> ➔ Before a general function test is performed on the machine, check the direction of rotation on the individual motors.

> **Information**
>
> The general function test should start first with a comprehensive test of all manual functions before changing to automatic mode.

Test No.	Prerequisite / Criterion	Expected reaction of the printer:	If something else occurs:
1	Turn the main switch and the ON/OFF switch of the printer to "I" position.	The printer's internal computer will boot. The touchscreen of the printer's control panel will display the home page. The printer will not start running unchecked on its own. Processes cannot be started until the operator has logged in with a password.	Is the required voltage being supplied? Did a fuse blow? Check cable connections.
2	Test of the door monitors: Open any one of the monitored shrouds or doors	Safety interlocks can only be released when the printer is shut down. When doors are open, a message is displayed in the top line of the touchscreen. A separate message is displayed for each door that it is open: 5 Bottom left door open 12 Bottom right door open 63 Printing unit: Shroud open 66 Rear door open Neither the printer nor the partner machine can be started as long as doors are open.	Check whether the doors are equipped with safety switches. Check the wiring of the safety switches. Is the required voltage being supplied?

Test No.	Prerequisite / Criterion	Expected reaction of the printer:	If something else occurs:
3	In the unwinding unit lower the pressure axis of the cut-and-splice device by pressing the corresponding button directly on the partition or on the touchscreen.	A corresponding error message will appear in the top line of the touchscreen "1= Unwinding unit, cut-and-splice device: web clamped!" An acoustical alarm will not sound.	Is the required voltage being supplied?
4	In the rewinding unit lower the pressure axis of the cut-and-splice device by pressing the corresponding button directly on the partition or on the touchscreen.	A corresponding error message will appear in the top line of the touchscreen "7= Rewinding unit, cut-and-splice device: web clamped" An acoustical alarm will not sound.	Is the required voltage being supplied?
5	Start the printing process and let it run for some time without interruption.	The printer will transfer the loaded image to the printing substrate and cure it thoroughly. The image can neither be scratched with a fingernail nor be dissolved with water. The printing substrate will not drift to the side or weave back and forth perpendicular to the direction of travel.	If the material is not fed in a straight line through the printer, then the web guider should be checked: Is it set to automatic mode? Is the sensor positioned correctly? Eliminate the cause of any error and repeat the test.
6	Function of the rewinding unit	The last image file to be loaded is printed and cured correctly. The printed material should be wound up evenly at a constant tension and without trapped air, leving the end face of the wound-up roll flat.	If the material is wound up imprecisely, then the web guider next to the rewinding shaft should be checked: Has the automatic mode been set? Is the sensor positioned correctly? Eliminate the cause of the particular problem and repeat the test.

8 Operation

8.1 Safety instructions for operation

⚠ **Warning**
The safety of the machine is ensured only when all safety equipment has been properly installed and is active. ➔ The machine may not be operated without locked and functioning safety equipment. ➔ Never operate the machine without safety equipment or with defective or bypassed safety equipment. ➔ Never remove safety equipment unless the main switch has been turned off and locked.

⚠ **Caution**
Potential danger due to operational errors caused by operation by unauthorized and untrained personnel. ➔ The machine should be operated by trained and authorized technical personnel only.

8.2 Check the printer EACH TIME before switching it on

⚠ **Caution**
➔ Check the machine each day before starting to work. ➔ Make sure that no other people or objects are in the danger area of the machine. ➔ Make a visual check for damage of the display and control elements. ➔ Make a visual check for damage and soiling of the machine components. ➔ Never operate the machine unless it is in perfect working order. Replace all damaged parts.

8.3   Starting requirements

- All basic and standard functions of the ITS6 printer have to be checked.

- All safety equipment has to be in proper working order and activated.

- The main switch(es) of the machine is/are turned on.
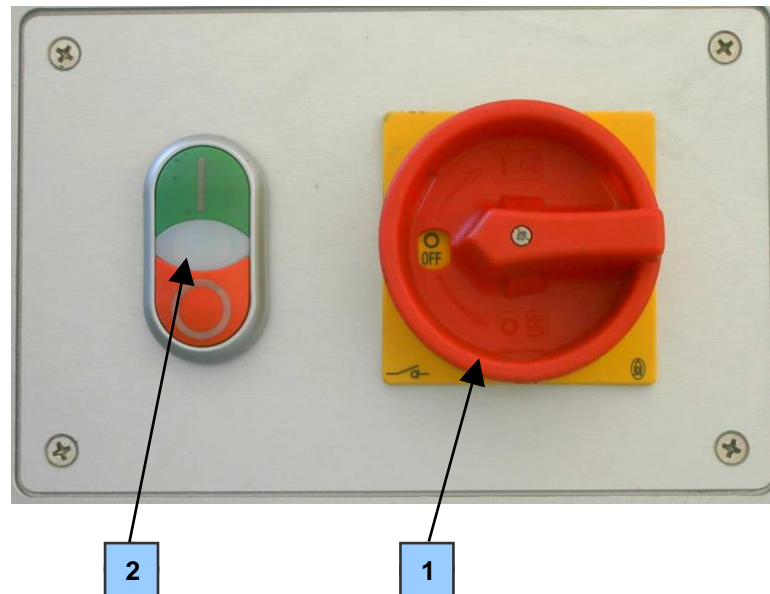
Fig. 101.   Main switches of the printer

Pos.	Elements	Meaning
1	Main switch	Disconnects the printer's electrical system from the power supply. In the "**0**" position, the entire machine is dead.
2	On/Off switch	In the "**0**" position, disconnects the voltage to all drives and high voltage parts. The touchscreen, displays and door interlocks all remain turned on and active. • Green button is pressed: Drives and high voltage parts are activated and can be used; • White button is illuminated: When no Emergency Stops have been triggered and the self-retention function is active; • Red button is pressed: Stops all moving parts including the pneumatic system and the ink management; high voltage is switched off.

8.3.1   Preparations

First perform all of the mandatory cleaning and maintenance work:

>   Check whether the ink cartridges are full or need to be replaced.

>   Empty residual ink bottles.

>   Clean up any spilled liquids – especially if they contain ink – immediately with a cloth.

>   Check the condition of the wiper plates:
     These should not be exhibit any damage or encrustations and should sit properly in their holders.

>   Give the print heads the standard cleaning.
     If this isn't sufficient, then carry out the intensive cleaning process.

>   Inspect the print heads:
     No damage, blotches, or any type of foreign object (i.e. residue from web, labels, etc.) should be visible underneath (nozzle plate).

>   Clean all ink residue off of all the guide rollers throughout the printer.

>   Clean the rollers of the friction drive thoroughly with isopropyl alcohol – nothing whatsoever should be left sticking to the rollers!

>   Clean the rollers of the web tension control thoroughly with isopropyl alcohol – nothing whatsoever should be left sticking to the rollers!

>   Clean the inside of the printer chassis with a lint-free cloth.
     Use cloths dampened with isopropyl alcohol if necessary.

>   Check screw connections for tightness.

>   Check rollers for freedom of movement and dirt.

>   Check separator maintenance unit.

>   Clean printing table.

8.3.2   Switching on the cooler

>   Open any shut-off valves in the water lines.

>   Turn on cooler.

8.3.3   Switch on corona treatment

>   Switch on the corona generator.

>   Activate the corona treatment in the tab *Job > Job Settings* and adjust the power if necessary.

8.4   Switch on printer

>   Turn on main switch to "**I ON**" position.

>   Press the "**I**" button on the ON/OFF switch.
- The white indicator light of the ON/OFF switch will illuminate.

>   Log in on the touchscreen as soon as the touchscreen has booted and the *Main Menu* is shown.

Now all components have been switched on.

If no error message is shown on the touchscreen, then the printer has reached its nominal condition.

>   Watch the displayed pop-up message "Attention" and give all print heads a standard cleaning (See Sect. 10.7.5.1, "Mechanical cleaning of the nozzles").

>   Check the remaining substrate supply. If necessary, insert a new roll of printing substrate in the unwinding unit and connect it with the cut-and-splice device to the printing substrate already in the printer. Or – if necessary – insert a new roll and thread the printing substrate by hand through the entire printer until it reaches the rewinding unit.

Notice
No matter what type of material you use, make sure the print head unit is retracted before manually feeding the taped seam slowly through the printer to avoid tearing during the printing process: ➔ First put the print head unit in the parking position.   ➔ Press the feed key and pull the taped seam beyond the friction drive at the very least!   ➔ Keep feeding until the web lies flat and without creases on the printing table.   ➔ Now the print head unit can be returned to its working position.   The printer owner bears sole liability for damage incurred due to using the incorrect procedure.

Notice
The webs of textile fabric and label backing material cannot be joined very securely with adhesive tape.   In order to minimize the risk of the material tearing, the seams of these substrates should never be allowed between the unwinding shaft and the associated partner machine / winding shaft.   The printer owner bears sole liability for damage incurred due to using the incorrect procedure.

> \> If the printing substrate was shifted perpendicular to the direction of travel or was replaced by material with a different width, the following sensors might have to be re-positioned:

- Sensor(s) of the web guider(s)

- Print mark sensor(s)

- Label sensor(s)

> \> If necessary, load a new image and open the corresponding settings. If it is a new layout which was never used before, then test the settings first and don't save them until you are satisfied with the printing results.

8.5 Switch off printer

The printer can be switched off when the printing process is finished and no more printing substrate is being processed.
The last image to be printed is parked in the web retraction system.

To switch off the printer, proceed as follows:

> Give all print heads a standard cleaning.
  If this isn't sufficient, then give them an intensive cleaning (See Sect. 10.7.5.1, "Mechanical cleaning of the nozzles").

> Shut down the system at the control panel.
  Watch the displayed pop-up "Attention!" and have all nozzle plates of the print heads and wipers cleaned by an employee trained especially for this purpose (See Sect. 10.7.5.2, "Manual cleaning of the print heads".)

> In case of any soiling: Clean the ink residue off of all of the guide rollers in the printer using isopropyl alcohol. Guide rollers made of metal can also be cleaned with acetone if necessary.

> In case of any soiling: Clean the rollers of the friction drive thoroughly using isopropyl alcohol. No residue whatsoever should be left sticking to the rollers!

> In case of any soiling: Clean the rollers of the web tension controllers thoroughly using isopropyl alcohol. No residue whatsoever should be left sticking to the rollers!

> In case of any soiling: Clean the rollers of the web guider thoroughly using isopropyl alcohol. No residue whatsoever should be left sticking to the rollers!

> In case of any soiling: Clean the inside of the printer chassis using a lint-free rag.

> Switch off printer: Press the red "**0**" on the ON/OFF switch.

> Turn the main switch of the printer to "**0 OFF**."
  The safety doors and the hinged hood can be opened.

> Switch off the cooler.

> Close any shut-off valves in the water lines.

> Switch off the corona generator.

Notice
Especially when the printer isn't being used for an extended period of time, the water supply has to be turned off.

8.6   Changing the roll of printing substrate

The roll of printing substrate has to be inserted in the unwinding unit so that it unrolls either counterclockwise or clockwise, depending on whether the outside or the inside of the printing substrate is supposed to be printed.

The direction of rotation of the roll depends on the winding direction of the printing substrate.

The printer may stay turned on during the replacement.

Notice
Use only substrates with edges not prone to bowing or becoming wavy when stretched in place. The max. amount of permissible bowing or waviness is 0.2 mm to avoid rubbing against the nozzle plates of the print heads.

➔ Do not open and remove the protective film of the substrate roll until ready to use the roll.

➔ Store any leftover material rolls in a warm, dry place or seal the roll airtight in plastic film until ready to use again.

➔ If necessary, dry the ends of the roll of printing substrate with a hot air gun.

Notice
For <u>each</u> substrate web roll, <u>measure</u> the material thickness first!
Be sure that at the printing table the proper deflection rollers rollers are installed, compare chapter "4.6.15.1 Printing table with exchangeable deflection rollers".
Only the operator of the plant is responsible for damages caused due to ignoring this requirement!

8.6.1   Inserting printing substrate

Information

Whenever you want to insert a thick roll of printing substrate, it is recommended that a layer of the white adhesive foil be torn off from the printing substrate cleaning modules beforehand, since due to lack of space this is hard to do when the printing substrate roll is already inserted.
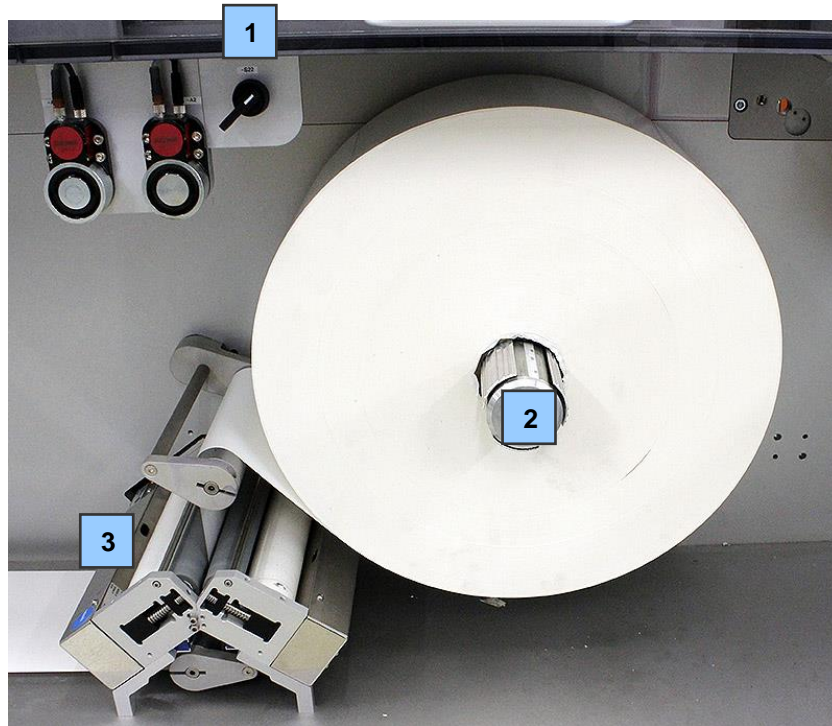
Fig. 102.   Print on the outside > Unwind clockwise.

> Interrupt the printing process and wait until the printer has come to a complete stop

> Open both lower door panels of the printer.

> Release the clamp bars of the unwinding shaft #2 by turning the rotary switch #1.

> Remove roll of printing material.

> If required, tear off a layer of adhesive foil from the printing substrate cleaning module #3.

> Place the new roll of printing material on the unwinding shaft.

> Engage the clamp bars of the unwinding shaft again by turning the rotary switch.

> Continued see next section.

8.6.2 Feeding in the printing substrate

There are two ways for the printing substrate to be fed in:

- Mechanical feed-in
- Manual feed-in

8.6.2.1 Mechanical feed-in

In order for the new printing substrate to be fed in mechanically, the printing substrate used until now has to be left in the printer. This is the only way for the new printing substrate to be pulled through the machine by the printing substrate already in the printer.

Requirements

- The printing substrate used until now is still in the machine.
- The printer was shut down and has come to a complete stop.

Procedure

> Open the safety doors.

> Pull in the substrate to the left cut-and-splice device as shown in the winding diagram (cf. Section 4.5, "Path of the printing substrate").

> Clamp down the substrate in the cut-and-splice device.

> Cut off the printing substrate cleanly with the integrated blade.

> Stick the printing substrate together with the printing substrate left in the machine.

> Close the safety doors and unclamp the printing substrate.

> Move the print head unit to the rear parking position.
> This is necessary to avoid having the adhesive tape contact the print heads.

> Press the "Feed forward" button on the control panel until the joint between the two printing substrates has reached the rewinder shaft.

> Once there, cut off the old printing substrate preferably at a right angle to the rewound roll, remove the rolled up material and install a new roll core.

> Stick the new printing substrate to the roll core.

Notice
The webs of textile fabric and label backing material cannot be joined very securely with adhesive tape!
In order to minimize the risk of the material tearing, the seams of these substrates should never be allowed between the unwinding shaft and the associated partner machine / winding shaft!
The printer owner bears sole liability for damage incurred due to using the incorrect procedure!

8.6.2.2 Manual feed-in of the printing substrate

When the printing substrate is fed in manually, the loose end of the printing substrate is threaded through the printer in accordance with the winding diagram.

> The following instructions should be applied if there is no printing substrate inside the print system.

> The following instructions must be applied if a printing substrate is to be processed with a different material thickness and therefore the five rollers of the printing table must be replaced

Requirements

- The printing substrate roll must be able to be wound by hand around the unwinder shaft (release the clamping bars).

- There is no printing substrate in upper part of the the machine.

- The printing process has been interrupted and after the material retraction, the machine has come to a complete stop.

- The print head unit is moved back.

- Clean the entire area between the unwinding shaft and the winding shaft. Remove all substrate residue.

- The inside of the machine has been cleaned with the appropriate cleaning supplies.

Procedure

> Open hinged hood and protective doors.

> If necessary, exchange coiler roll.

> At the printing substrate cleaning module: Tear off one layer of adhesive foil on both rollers with adhesive foil. Check the two cleaning rollers and clean if necessary using "Tewkipes". Compare chapter 4.6.3.

> Using the correct winding diagram located beneath the cut-and-splice device as a guide for the particular application, feed the printing substrate through the printing substrate cleaning module and through the

dancer roller system to the web tension control with the attached cut-and-splice device.

> Starting from the cut-and-splice device, use the winding diagram attached here as a guide to feed the printing substrate up over the guide rollers to the web guider and to the web retraction system.

> Using the winding diagram attached to the print head unit as a guide, feed the printing substrate through the web retraction system to the print head unit and then back to the web retraction system. From there, pull the printing substrate to the friction drive.

> Briefly unlock the friction drive in order to push the print material between the two rollers through to the right.

> From this point, the yellow "Infeed forward" button of the operating panel must be pushed for further material transport. All safety doors must be closed first for this purpose.

> Lead the substrate from the friction drive over the dancer roller to the cut-and-splice device as shown in the winding diagram.

8.7   Login and logout at the touchscreen

Each time the printer is switched on, the touchscreen will boot. As soon as the printer is ready for operation, the home page will be shown first:

i	**Information**
	After each start-up, the touchscreen as well as the control buttons above will always be disabled.
	Unless an operator has logged on with a valid user name and password, the menus cannot be opened and settings cannot be changed. In offline printers, the printing process will not be able to be started.
	The printing process can only be started in inline mode, because in this case, the required start and stop signals are received by the associated partner machine.

8.7.1   Touchscreen login

Each person who uses the printer must log in to the system with his password.
Operators, service technicians and administrators have separate logins with different access rights to the individual functions.

The input and alteration of data (parameters) is linked to different levels of access and therefore to different passwords.

When logging in the first time, the user must enter the standard password associated with his user account. Afterwards he will be asked to replace the standard password with a password of his own choosing. Thereafter, the user must log in with this new password.

The access levels are set up in such a way that the user with a certain access level is also given access to all levels below that: A user with Level 3 rights may do everything allowed by Levels 1 and 2.

Information

As long as a user has not logged in with a valid user name and password, both the touchscreen and the control elements below it will remain locked.
The printing process can only be started in inline mode in this state.

To log in to the touchscreen

> In order to log in to the system, press button 1 in the screen menu.
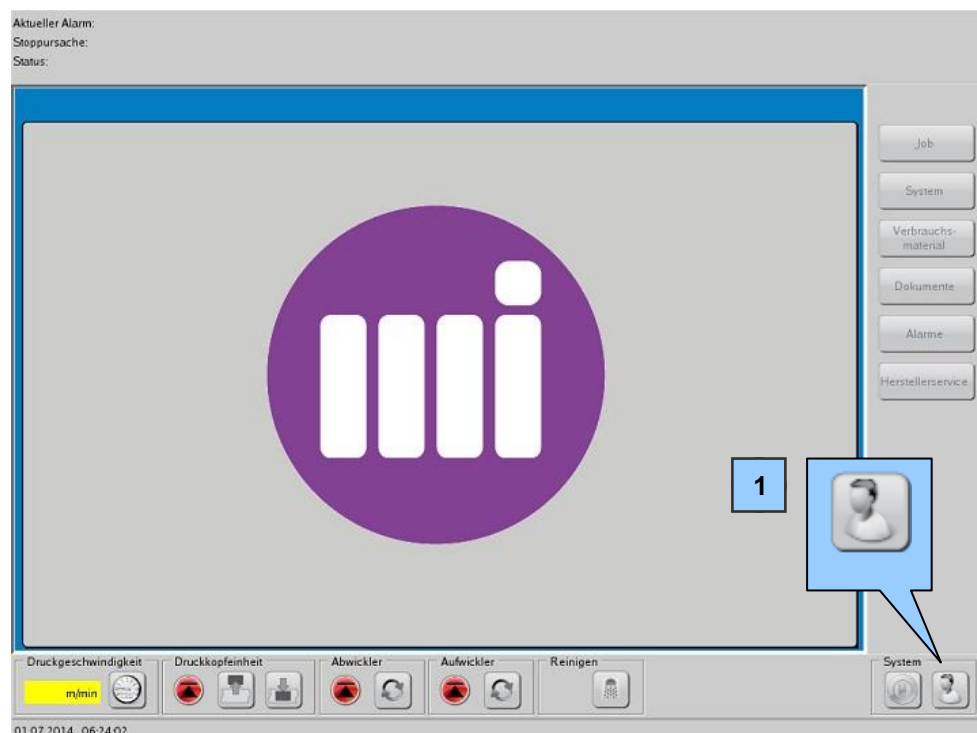
Fig. 103.   *Login* button

Afterwards the following input screen will open:
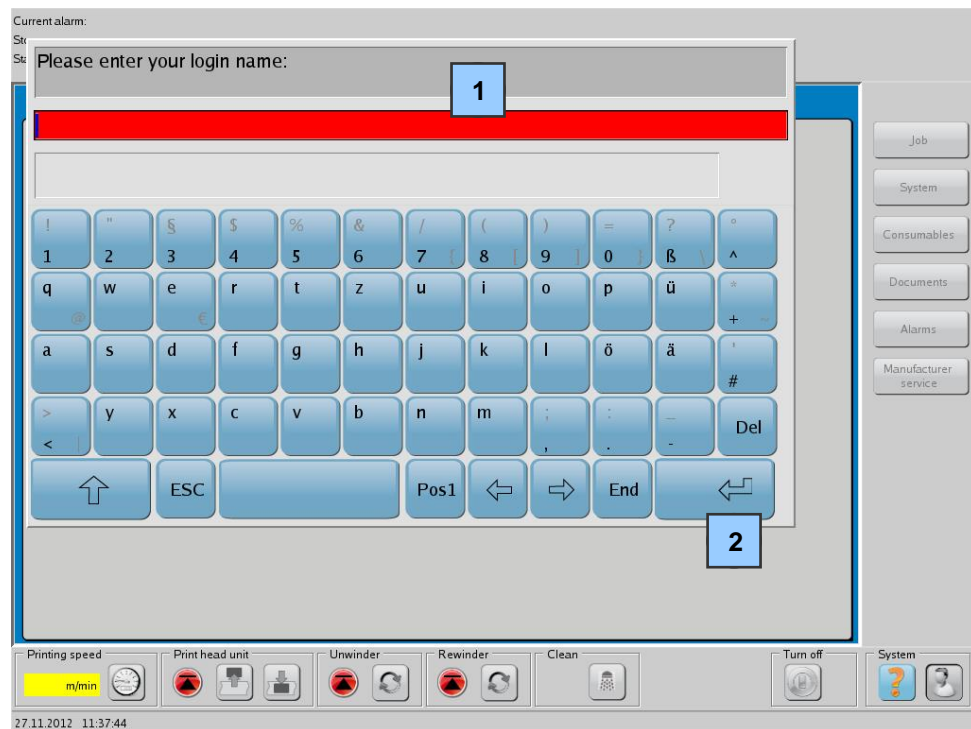
Fig. 104.   Innput screen

Pos.	Item	Meaning
1	Command line	The user is prompted to enter his user name.
2	ENTER key	Confirmation of the user name entered here.

> Enter your user name and confirm with "Enter."

Afterwards another input screen for entering the password will be shown:

> Enter your password and confirm with "Enter."

The background color of the input line will change from red to white as soon as the minimum number of six characters has been entered.

After successful log-in, the name of the user will be displayed in the lower right-hand corner of each window. Furthermore, the "Login" button will no longer be displayed in black and white, but rather, in color.

8.7.2 Touchscreen logout

If the touchscreen isn't touched for a specified time after someone has logged in, the system will log out automatically and the user will have to log in again. Until the next login, the touchscreen would be disabled to a large extent and would only offer limited use.

When the touchscreen is switched off (together with the printer), the user is logged out automatically.

However, all users can also manually disable the touchscreen at any time, for instance, in order to prevent misuse by unauthorized persons during their absence.

Manual logout

>   To log out of the system, all you have to do is tap briefly on the Login button in the lower right-hand corner of the display. This will disable most buttons and displays, which is indicated by gray shading.

Information

- The touchscreen can also be disabled by individuals who have no access rights whatsoever.

- Any ongoing process is not affected by the login and logout. The printer will maintain its current operating status.

8.8 Preparing and executing print jobs

8.8.1 Image files and format files

The terms "image files," "printing data" or simply "layouts" all refer to the data which contains nothing but information about the appearance and contents of the images to be printed, for example the distance to the left margin, text fonts, type size, number of colors and their assignment to the existing print heads, etc. Also general information about any existing variable data (e.g. screen or counter screens) is stored in the image files, but not their specific contents.

Image files contain no information whatsoever related to the sensors needed for printing or settings for the curing power level, speed, etc. All such information is stored in the so-called format files.

8.8.2 Preparing data for 4C digital printing

Basically the PDF print data is required as PDF/X standard print data.

Ideal is PDF/X-4.

All fonts should be embedded in PDF.

Images must have a resolution of at least 300 dpi.

All colors are mixed from the basic colors cyan, magenta, yellow and black (key). Work in CMYK color mode and with the grayscale for B/W images.

The size of the motif must correspond with the size of the document.

The outer dimensions of the image data to be printed must be created properly with reference to the punch dimensions of the label. Do not add any punch lines to the print files. Punch lines can be entered in separate control files.

Do not create any of the crop marks or scales that are required for offset printing, for example.

Create barcodes (binary) in black whenever possible. Provide the code specification for index-linked barcodes.

In order to avoid rotating the print file, during the design process pay attention to the proper orientation of the motif (in the direction of travel) and the maximum printing width of the respective CSAT ITS6-printer (100 mm, 210 mm or 420 mm depending on the printer).

Use unambiguous file names whenever possible (e.g. Company_Motifname_Motifdimensions.pdf). Avoid using any special characters in the file name, such as /, *, $, £, %, etc.

For a service fee, Markem-Imaje CSAT can match colors for 4-color printing on a supplied color-proof proof. When using mixed colors, only the color chart "PANTONE solid coated" (PANTONE color name ends in "C") can be used for color matching due to technical reasons. Please indicate here the exact shade of color and which motif detail is supposed to be matched. The

color will be matched as best as possible. Small nuances in color are una-voidable for technical reasons.

8.9 Working with format files

The settings required for printing are saved as format files. They contain, for example, the curing module power level and the sensors with which the printer is supposed to be operated.

Format files are contingent primarily upon the particular printing substrate and its properties, for it is easy to understand that, for instance, thin plastic foil could never be treated at the same curing power level as thicker metal foil.

By way of contrast, format data is basically contingent upon the image files. In other words, a single format file can be used for printing several different images. The greatest advantage of format data is that after it's imported, it changes the printer's settings automatically, and the operator only has to make fine adjustments if any at all.

8.9.1 Loading format files

To load a different image file, proceed as follows:

> Open the tab *Job > Job Settings.*

> Hit the "Load" key in the "Format" field.

> Select the desired format file as shown here:

Fig. 105.   List of the available format files

> Hit the "Select" key.
> Load the desired image file.

> **Information**
>
> Format files can only be changed by persons with the appropriate access rights.

8.10   Data exchange

The image files used by the printer are always created on external comput-ers, whereas the format files and log files generated in the printer have to be stored in external systems to be on the safe side.

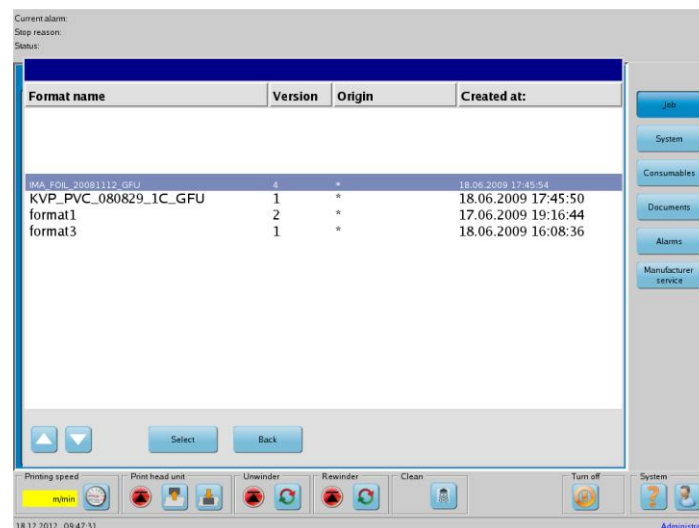Therefore, the printer regularly exchanges data with the outside world using the HMI page System / File manager.

8.10.1 Media for data exchange

The data required for the operation of the printer can usually be transferred in only two ways:

- With a USB flash drive.

- By means of the *Exchange* folder through a data line of the local net-work

CSAT sets standard values at the commissioning of the printer which can be changed if necessary, e.g. in order to improve the printed image. The values are based on the printing media and layout. Formats and other pro-cess files that have been changed are filed automatically in folders. There is neither a search function nor the possibility of switching between multiple folders.

Therefore, to exchange data, it is essential to maintain this defined directo-ry structure on the exchange media. Consequently, the required directory structure is created automatically on an empty USB flash drive when ex-porting:

```
USB Stick (H:)
  CSAT_ImportExport
    CSAT_Layouts
    formats
      active_mr
    keys
    log
    messages
    virusscanner
```
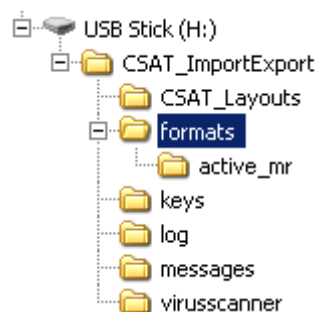
Fig. 106.   Required directory structure of the USB flash drive

For data exchange in the network (Intranet), an additional computer with control panel must be connected (e.g. a laptop or a network computer) and a connection between the internal PC of the printer and the Intranet must be established.

A corresponding exchange folder (e.g. *exchange_1*) with the required direc-tory structure must have been created on the network server.

No matter which medium is being used - USB flash drive or Intranet (folder *Exchange1*) – the export files always have to be placed first in the special recipient folders, whose name corresponds with the character/type of the particular file.

8.10.2 Procedure for data exchange

The tab *System > File Manager* allows data and protocols to be exported or imported.

Procedure

> Open the tab System > File Manager.

> In the left and center columns select the type of data (e.g. format file, a protocol or a software) that you would like to export or import and then hit the associated white-green key.

> In the dialogue window shown next, select whether the data exchange should be carried out via a USB flash drive or via the Intranet using the special folder Exchange1.
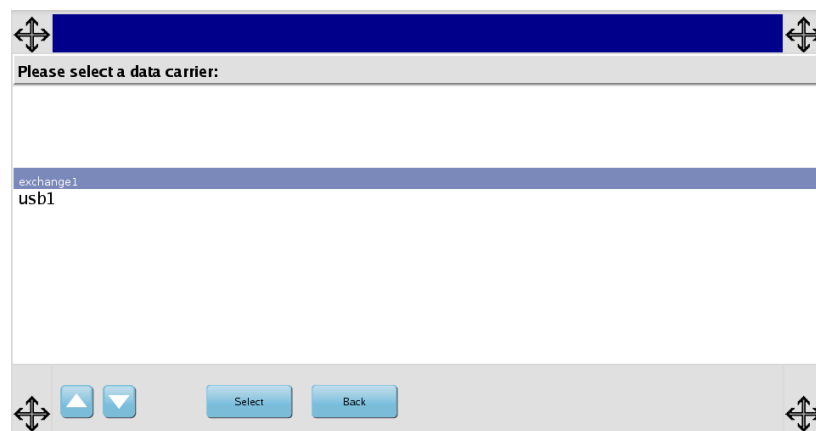
Fig. 107.   Dialogue window for selecting data medium

> If data transfer via USB flash drive is desired, a pop-up window will appear and the system will request that you insert the drive in the appropriate port and then confirm it.

> In the next window, select at least one of the files listed there. Confirm your selection by hitting the "Select" key.

> Afterwards, indicate whether you want to import or export additional files from the same or different directories.

9   Troubleshooting

Errors are displayed on the PC monitor on the main control panel.

⚠ **Warning**
➔ Troubleshooting of errors in the electrical system and errors which affect the mechanical and pneumatic systems should be carried out by qualified technicians only. The general standards for remedial action in accordance with the accident prevention regulations should be observed.   ➔ Only original CSAT replacement parts may be used!   ➔ The machine must be stopped and cooled down before performing repair work!

Information
• When errors occur on the machine, do not turn off the main switch or press the Emergency Stop button, but rather, read the error messages and remedy the error!   • If a problem occurs with the printer during operation, usually it will be stopped in the same way as an ordinary interruption of operation. If the problem is serious, the printer will be stopped immediately.   • Movements that have already been initiated will be interrupted in a controlled manner.   • If a problem occurs while the printer is stopped, it will not be able to be restarted.

9.1   Error messages

9.1.1   Introduction

All safety-related situations, important functions, and the main components of the ITS6 printer are monitored continuously by the controls. Whenever a deviation from the nominal condition of the printer occurs, for example because a sensor has responded or there was an interruption in a line, then depending on the potential danger, the printer will either be stopped ("Emergency Stop") or shut down like a normal interruption in operation: In this event, the last image will be printed and cured to completion before the printing substrate is then retracted a certain distance in the course of the "start-stop function."

Usually the last event to occur, which deviates from the normal printing process, will appear in the top line of "Current Alarm." If it concerns an error which requires an immediate (emergency) stop of the printer, then this message will also appear in the middle line "Reason for stop."

The messages shown in the header of the touchscreen are numbered consecutively in all language versions, so that if telephone contact is made with the manufacturer's customer service, only the number at the beginning of each line has to be given.

Besides the error text in the two lines of the footer in question, the ITS6 printer also has a list of errors; after clicking on the "**Alarms**" button, all of the pending problems and error messages are shown.

9.1.2   Basic procedure when errors are reported.

When errors and problems are reported, always proceed as follows:

> Read the messages "Current Alarm" and "Stopreason" displayed in the lines at the bottom of the screen, and look to see if an error message is shown on the touchscreen display. Pay particular attention to the two-digit number/error code shown on the far left, and look up the numbered instructions in the following section. Please follow the suggested solutions step-by-step until the cause of the error is found and eliminated.

> Always observe the safety regulations when eliminating the errors and their causes!

⚠ **Warning**
Hazards caused by errors.   ➔ For major problems, the service technician or the manufacturer's customer service should be contacted.   ➔ Never open or remove parts of housings or components whose exposure or removal is not described explicitly in the respective safety instructions!   ➔ Never perform tests or repairs unless you have been trained to do so!   ➔ If a defective printer cannot be repaired, it must be shut down until it is returned to complete working order: Lock the main switch into the "0" position with a padlock and close all covers!   ➔ Any attempts to get a defective printer going again by means of tricks or prohibited means will lead to the immediate forfeiture of all warranty rights!

Information
• In case of a malfunction, it has to be determined which machine components are involved.   • If a purchased part, for example a web guider or a sensor, should malfunction, then please also consult the chapter "Error Diagnosis" in the particular operating instructions and technical data sheets of the drives, frequency converters and other purchased parts (see Documentation-CD, Index *PDFAnnex\DataSheets*).

9.1.3 Messages under the tab *Alarms*

The *Alarms* screen displays all of the malfunctions and status messages currently being registered which result in the printing process either being stopped or not being able to be started at all. The printing process cannot be started until no more messages are being displayed on the Alarms screen and all problems have been eliminated.

Information

If any kind of a problem occurs that's indicated on the *Alarms* screen, then the "Alarms" navigation key in the touchscreen will be marked with

a prominent yellow triangle ⚠ in order to bring this condition to the operator's attention and to have him open the *Alarms* screen.

9.1.4 Messages in the "Current Alarm" and "Stopreason" lines

The uppermost line "Current Alarm" describes briefly in words and sometimes in conspicuous red letters all conditions that do not correspond to the normal operation of the printer. These could be error messages or else just the notice that a door has been opened on the stopped printer. Although this is not an error, it is a condition that will prevent the printer from being started again and therefore has to be shown.

Each message shown in the "Current Alarm" line is displayed only until the irregularity has been eliminated or until another error signal with higher priority is received and simply writes over the previous text.

If an error message is shown in the "Stopreason" line, then usually it involves a more critical situation, which entails a potential hazard for the operating personnel or the plant. Therefore, the printer is stopped abruptly. Thereafter, the plant would not be able to be restarted until the problem has been eliminated.

Any message shown in the "Stopreason" line will not be deleted until the cause of the error has been eliminated and the printer has been restarted.

But if you want to view all of the errors that occurred in the past and which are still pending, all you have to do is press "**Alarms**", and then a separate window with all the latest messages will open on the screen.

The following table gives an overview of all the messages which can be shown in the status displays "Current Alarm" and "Stopreason". Besides short explanations and instructions on how to handle the error, the last column specifies who can eliminate the individual errors.

List of error messages

The following troubleshooting table can be used to locate and eliminate errors that occur on the machine.

O	=	Operator
T	=	Technician of Abbott
S	=	External service technician with the appropriate training
C	=	Customer service of Markem-Imaje CSAT

Code	Display: CA = Current Alarm; S= Status		Message or Alarm?	Cause of the message / Remedial action:		To be elimin. by
1	CA	"1= Unwinding unit, cut-and-splice device: web clamped"	A	C:	Clamping drum is lowered onto printing substrate and is holding it tight. Sensor +500-B36 is responding.	O, T
				R:	Release clamp: Press button +500-S1 above the clamping drum until it is no longer illuminated.	
	S:	"30= Printer not ready to START"		C:	Defective sensor or interruption in line.	S, C
				R:	Check sensor, lines and contacts, have defective parts replaced (by CSAT customer service).	
2	CA	"2= Unwinding unit: dancer roller at lower end stop"	A	C:	The printing substrate has torn between the unwinder shaft of the printer and the friction drive. Sensor +500-B29 is responding.	O, T
				R:	Stick printing substrate together. Feed in printing substrate manually.	
	S:	"30= Printer not ready to START"		C:	Defective sensor or interruption in line.	S, C
				R:	Check sensor, lines and contacts, have defective parts replaced (by CSAT customer service).	
3	CA	"3= Unwinding unit: Dancer roller at upper end stop"	A	C:	Roll unwound all the way, printing substrate stuck to the core. Sensor +500-B28 is responding.	O, T
				R:	Insert a new roll in the unwinding unit.	
	S:	"30= Printer not ready to START"		C:	Defective sensor or interruption in line.	S, C
				R:	Check sensor, lines and contacts, have defective parts replaced (by CSAT customer service).	
4	CA	"4= Unwinding unit: web almost used up"	M	C:	Printing substrate roll has been unwound to the extent that sensor +100-B2 has reached its upper switching threshold.	O, T
	S:	"0= Printer waiting for line start"		R:	Continue printing or immediately insert a new roll in the unwinding unit.	
5	CA	"5= Bottom left door open!"	A	C:	Safety door is open. Sensor +100-A1 is responding.	O, T
				R:	Close safety door.	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
	S:	"30= Printer not ready to START"		C:	Sensor defective or transmission interrupted. Fuse +400-F503 has blown.	S, C
				R:	Check the fuse, sensor, wiring and contacts, have defective parts replaced (by the CSAT customer service).	
6	CA	"6= Unwinding unit not ready"	A	C:	The controls or the drive of the unwinding unit is out of order. Is fuse +400-F16 OK?	S, C
	S:	"30= Printer not ready to START"		R:	Check the status LEDs of the frequency converter +400-FU2. Check fuse +400-F16 and replace if necessary.	S, C
7	CA:	"7= Rewinding unit, cut-and-splice device: web clamped"	A	C:	At least one clamping drum is lowered onto printing substrate and is holding it tight. At least one of the two sensors +300-B37 and +300-B38 is responding.	O, F
				R:	Release clamp: Press buttons +300-S2 and +300-S3 above the clamping drum until they are no longer illuminated.	
	S:	"30= Printer not ready to START"		C:	Defective sensor or interruption in line.	S, C
				R:	Check sensors, lines and contacts, have defective parts replaced (by CSAT customer service).	
12	CA	"12= Lower right door open"	A	C:	Safety door is open. Sensor +100-A2 is responding.	O, T
				R:	Close safety door.	
	S:	"30= Printer not ready to START"		C:	Defective sensor or interruption in line.	S, C
				R:	Check sensor, lines and contacts, have defective parts replaced (by CSAT customer service).	
14	CA	"14= Unwinding unit, web guider: error"	A	C:	Power supply of web guider +100-A4 interrupted in the printer. Web guider +100-A4 out of order. Is fuse +400-F603 OK?	S, C
	S:	"30= Printer not ready to START"		R:	Check lines and contacts, read product description (cf. appendix). Check fuse +400-F603 and replace if necessary.	S, C
21	CA	"21= Ink management unit: Cartridge… out of position"	M	C:	The ink cartridge in question is missing or is out of position. The respective sensor (+501-S8; +502-S10; +503-S12; +504-S14) is responding.	O, T
				R:	Install ink cartridge correctly.	
	S:	"30= Printer not ready to START"		C:	Sensor system out of order.	S, C
				R:	Check sensors, lines and contacts, have defective parts replaced (by CSAT customer service).	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
22	CA	"22= Ink man-agement unit: Ink level ..., error!"	A	C:	The ink cartridge in question is empty. The lower sensor of the intermediate reservoir responded.	O, T
				R:	Insert full ink cartridge.	O, T
				C:	Sensor system out of order.	
				R:	Check sensors, lines and contacts, have defective parts replaced (by CSAT customer service).	
24	CA	"24= Ink man-agement unit: needle out of position"	M	C:	The slider with the ventilation needle of the ink cartridge in question has been pushed back. The top of the ink cartridge is not (no longer) tapped.	O, T
	S	"30= Printer not ready to START"		R:	Pull the slider with the ventilation needle of the ink cartridge in question forwards. Afterwards the action of a pneumatic cylinder should be readily heard.	O, T
27	CA	"27= Cleaning unit: cartridge out of position"	M	C:	Cartridge with the cleaning fluid is missing or not installed properly. The sensor +520-S16 is responding.	O, T
				R:	Insert cartridge correctly.	
	S	"30= Printer not ready to START"		C:	Sensor system out of order.	S, C
				R:	Check sensor, lines and contacts, have defective parts replaced (by CSAT customer service).	
28	CA	"28= Cleaning unit: Fill level, error"	A	C:	The cartridge with the cleaning fluid is empty. The lower sensor +520-B1 of the intermediate reservoir responded	O, T
	S	"30= Printer not ready to START"		R:	Insert full cartridge of cleaning fluid.	O, T
				C:	Sensor system out of order.	
				R:	Check sensor, lines and contacts, have defective parts replaced (by CSAT customer service).	
30	CA	"30= Cleaning unit: cartridge not ventilated / needle up"	M	C:	The valve with the ventilation needle of the cleaning cartridge in question has been pushed back. The cartridge is not (no long-er) tapped.	O, T
	S:	"30= Printer not ready to START"		R:	Pull the valve with the ventilation needle of the cleaning cartridge in question forwards. Afterwards the action of a pneumatic cylin-der should be readily heard.	O, T
33	CA	"33= Friction drive, error"	A	C:	The controls of the friction drive are out of order. Is fuse +400-F606 OK?	S, C
	S:	"30= Printer not ready to START"		R:	Check the code displayed by frequency converter +300-FU3 against the product description (cf. appendix). Check fuse +400-F606 and replace if necessary.	S, C

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
34	CA	"34= Unwinding unit: web tension control, error"	A	C:	Error in the drive of the web tension control of the unwinding unit. Are fuses +400-F601 and +400-F702 OK? Motor safety switch +300-QM10 or +300-QM12 was triggered.	S, C
	S:	"30= Printer not ready to START"		R:	Check fuses +400-F601 and +400-F702 and replace if necessary. Has the sensitivity of the motor safety switch been adjusted? Please check and turn the motor safety switch back to the "I" position. Furthermore, perform a RESET (open and close a safety door), since otherwise the message will continue to be displayed.	S, C
35	CA	"35= Web retraction system drive, error"	A	C:	The controls/drive of the web retraction system are/is out of order. Is fuse +400-F607 ok?	S, C
	S:	"30= Printer not ready to START"		R:	Check the code displayed by frequency converter +300-FU4 against the product description (cf. appendix). Check fuse +400-F607 and replace if necessary. Check fuse +400-F14 and replace if necessary. Has the sensitivity of the motor safety switch been set incorrectly?	S, C
36	CA	"36= Web retraction system, position error"	A	C:	The carriage of the web retraction system is in the wrong position. One of the sensors responded or the controls got "hung up."	O, T, S, C
				R:	Move the print head unit into its service position. If this does not solve the problem try the next step.	
				R:	Switch off the printer and, after a few seconds, switch it back on in order to re-boot the controls.	
	S:	"30= Printer not ready to START"		C:	Error messages, even though the carriage is in the correct position.	S, C
				R:	Check sensors +100-B7 bis +100-B10, lines and contacts, have defective parts replaced (by CSAT customer service).	
37	CA	"37= Rewinding unit: web tension control drive, error"	A	C:	Error in the drive of the web tension control of the rewinding unit. Is fuse +400-F602 OK?	S, C
	S:	"30= Printer not ready to START"		R:	Check fuse +400-F602 and replace if necessary. Furthermore, perform a RESET (open and close a safety door), since otherwise the message will continue to be displayed.	

Code	Display: CA = Current Alarm; S= Status		Message or Alarm?	Cause of the message / Remedial action:		To be elimin. by
38	CA	"38= Web tension, error"	A	C:	The running of the three shaft encoders of the web tension control +500-B57), friction (+300-FU3) and entry of the printing unit (+100-B56) is not synchronized. Little adhesion between the rubber roller and printing substrate.	S, C
	S:	"30= Printer not ready to START"		R:	Is the guide roller at the entry of the printing unit sluggish or stuck? Have the worn friction rollers of the web tension controller and/or the friction unit replaced.	
39	CA	"39= Pre-curing 1: Temperature error"	A	C:	The temperature of the first pre-curing unit has reached the "Alarm" warning point entered on the HMI.	S, C
	S:	"30= Printer not ready to START"		R:	Check the "Alarm" warning point. Recommended range of adjustment: 35°C - 39°C. Is the cooling unit working? Has it been set correctly and is enough coolant flowing? Does the coolant line have a leak? Has the nominal value for the curing unit power level been set?	
40	CA	"40= Pre-curing 2: Temperature error"	A	C:	The temperature of the second pre- curing unit has reached the "Alarm" warning point entered on the HMI.	S, C
	S:	"30= Printer not ready to START"		R:	Check the "Alarm" warning point. Recommended range of adjustment: 35°C - 39°C. Is the cooling unit working? Has it been set correctly and is enough coolant flowing? Does the coolant line have a leak? Has the nominal value for the curing unit power level been set?	
41	CA	"41= Pre-curing 3: Temperature error"	A	C:	The temperature of the 3rd pre-curing unit has reached the "Alarm" warning point entered on the HMI.	S, C
	S:	"30= Printer not ready to START"		R:	Check the "Alarm" warning point. Recommended range of adjustment: 35°C - 39°C. Is the cooling unit working? Has it been set correctly and is enough coolant flowing? Does the coolant line have a leak? Has the nominal value for the curing unit power level been set? Has the sensitivity of the motor circuit breaker been set incorrectly?	
42	CA	"42= Main curing 1: Error"	A	C:	The temperature of the top main curing module is too high. The LEDs of this module will be switched off automatically.	S, C
	S:	"30= Printer not ready for START"		R:	In the touchscreen tab *Job > UV Curing,* turn off the "UV power supply unit," wait 10 seconds and turn it back on. If the alarm nos. 42 - 44 should continue to appear frequently: Call a service technician or the CSAT customer service.	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
43	CA	"43= Main curing 2: Error"	A	C:	The temperature of the middle main curing module is too high. The LEDs of this module will be switched off automatically.	S, C
	S:	"30= Printer not ready for START"		R:	In the touchscreen tab *Job > UV Curing,* turn off the "UV power supply unit," wait 10 seconds and turn it back on. If the alarm nos. 42 - 44 should continue to appear frequently: Call a service technician or the CSAT customer service.	
44	CA	"44= Main curing 3: Error"	A	C:	The temperature of the bottom main curing module is too high. The LEDs of this module will be switched off automatically.	S, C
	S:	"30= Printer not ready for START"		R:	In the touchscreen tab *Job > UV Curing,* turn off the "UV power supply unit," wait 10 seconds and turn it back on. If the alarm nos. 42 - 44 should continue to appear frequently: Call a service technician or the CSAT customer service.	
45	CA	"45= Main curing power supply unit 1: Error"	A	C:	Disturbance/interruption in power supply to lamp 1	S, C
	S:	"30= Printer not ready to START"		R:	Please check: Was the motor circuit breaker +300-QM1 triggered? Did at least one of the power supply units +300-G10…-G12 fail? Are the lines damaged or contacts loose?	
46		"46= Main curing power supply unit 2: Error"	A	C:	Disturbance/interruption in power supply to lamp 2	S, C
	S:	"30= Printer not ready to START"		R:	Please check: Was the motor circuit breaker +300-QM3 triggered? Did at least one of the power supply units +300-G20…-G22 fail? Are the lines damaged or contacts loose?	
47	CA	"47= Main curing power supply unit 3: Error"	A	C:	Disturbance/interruption in power supply to lamp 3	S, C
	S:	"30= Printer not ready to START"		R:	Please check: Was the motor circuit breaker +300-QM5 triggered? Did at least one of the power supply units +300-G30…-G32 fail? Are the lines damaged or contacts loose?	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
48	CA	"48= Coolant supply: Error"	A	C:	No coolant or insufficient supply of coolant. Sensor +300-B52 is responding.	S, C
	S:	"30= Printer not ready to START"		R:	Make sure that the cooler is working and has enough coolant in its tank. All cut-off valves must be completely open. Check the inlet and outlet lines: The hoses must be continuous and should not be bent or be reduced in diameter.	
				C	The sensor +300-B52 is set incorrectly.	
				R	Change the sensitivity / adjust the setting of the sensor.	
				C	Sensor is out of order.	
				R	Check sensor, wiring and contacts, have defective parts replaced (by CSAT customer service).	
49	CA	"49= Coolant outlet: Error"	A	C:	Loss of water between inlet and outlet sensors. Sensor +300-B53 is responding.	S, C
	S:	"30= Printer not ready to START"		R:	Check whether there is a leak inside the printer between the inlet and outlet. Is water escaping anywhere or can any puddles in or under the printer be seen? If water is leaking, then the printer must be switched off IMMEDIATELY! Call the customer service!	
				C:	The sensor +300-B53 is set incorrectly.	
				R:	Change the sensitivity / adjust the setting of the sensor.	
				C:	Sensor is out of order.	
				R:	Check sensor, wiring and contacts, have defective parts replaced (by CSAT customer service).	
51	CA	"51= No image loader"	A	C:	Connection cable between DSP and IJ-Engine interrupted, DSP and/or flash drive defective.	S, C
	S:	"30= Printer not ready to START"		R:	Check the cable and the plug connections between the IJ-Engine and DSP. If an image couldn't be loaded, then the DSP and/or flash drive is defective. If the image data was lost when the printer was switched off and on again, then the flash drive must be checked for the error.	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
52	CA	"52= Main curing: temperature too high"	A	C:	The temperature of at least one of the lamp modules in the main curing unit has reached the "Alarm" warning point entered in the tab *Job > UV Curing*.	S, C
	S:	"30= Printer not ready for START"		R:	Check the "Alarm" warning point. Recommended range of adjustment: 35°C - 39°C. Is the cooling unit working? Has it been adjusted correctly and is enough coolant flowing? Does the coolant line have a leak? Has the setpoint for the curing power been set too high?	
54	CA	"54= Emergency stop in the printer"	A	C:	Emergency Stop button of the printer was actuated.	O, T, S, C
	S:	"30= Printer not ready to START"		R:	Pull out the Emergency Stop button of the printer. Switch the printer off and on again briefly with the "ON/OFF switch". Not until then will the message disappear and can the system be restarted.	
55	CA	"55= Emergency stop in the finishing system"	A	C:	Emergency Stop button of the finishing system was actuated.	
	S	"30= Printer not ready to START"		R:	Pull out the Emergency Stop button of the finishing system. Switch the printer off and on again briefly with the "ON/OFF switch". Not until then will the message disappear and can the system be restarted.	
56	CA	"56= No compressed air"	A	C:	No compressed air available	O, T, S, C
	S:	"30= Printer not ready to START"		R:	Restore the compressed air supply	
				C:	Is fuse +400-F503 OK?	S, C
				R:	Check fuse +400-F503 and replace if necessary.	
59	CA	"59= Friction drive: Pressure roll unlocked"	A	C:	The frame with the pressure roll is unlocked. The printing substrate is no longer being pressed by the pressure roller against the rubber roller and, therefore, can slip off of it.	O, T, S, C
	S:	"30= Printer not ready to START"		R:	Press down the frame with the pressure roller until the two black latches lock into place.	
				C:	Sensor system out of order.	S, C
				R:	Check sensor +300-B46, lines and contacts, have defective parts replaced (by CSAT customer service).	
63	CA	"63= Printing unit: hinged hood open"	A	C:	The hinged hood of the printer is open. The sensor +100-A3 responded.	O, T, S, C
	S:	"30= Printer not ready to START"		R:	Close the hinged hood.	O, T
					If this message is shown even though the hood is closed, then please check the sensor +100-A3 and the associated wires.	S, C

Code	Display: CA = Current Alarm; S= Status		Message or Alarm?	Cause of the message / Remedial action:		To be elimin. by
64	CA	"64= Main curing unit: out of position"	A	C:	The main curing unit is not in its working position, but rather it has been pulled forwards toward the operator to some extent.	O, T, S, C
	S:	"30= Printer not ready to START"		R:	Push the main curing unit all the way back against the rear wall of the chassis until the lower lock falls into place.	O, T, S, C
					If this message is shown even though the module is already in its operating position, then please check the sensor +300-B44 and the associated wires.	S, C
65	CA	"65= No communication between Engine and HMI"	A	C	Defect hardware causes errror in communication.	S, C
	S	"30= Printer not ready to START"		R	Call MI CSAT customer service.	
66	CA	"66= Rear door open"	A	C:	Safety door is open. Sensor is responding.	O, T
				R:	Close safety door.	
	S:	"30= Printer not ready to START"		C:	Defective sensor or interruption in line.	S, C
				R:	Check sensor +400-A147, lines and contacts, have defective parts replaced (by CSAT customer service).	
71	CA	"71= Waiting for image data from DSP"	M	C:	Usually this is only a short status message: The printer was started externally and is now waiting for the image data stored in the DSP.	(O, T, S, C)
	S:	"11 = Printing"		R:	None. This message is shown only briefly and disappears before the UV curing systems are switched on.	
				R:	If this message has been displayed for awhile and the printing process does not start, then please call the CSAT customer service.	S, C
75	CA	"75 = Door open"	A	C:	One protective door is opened.	O, T, S, C
	S:	"30= Printer not ready to START"		R:	Close the protective door.	
76	CA	"76= Emergency stop situation reversed"	A	C:	The printer was not switched back on after an Emergency Stop situation was reversed.	O, T
	S:	"0= Printer waiting for line start"		R:	Turn the printer back on at its "ON/OFF switch." Not until then will this message be cancelled and can the printer be started again.	
81	CA	"81: Preset job amount done."	A	C	Printing has finished.	O, T
	S	"30= Printer not ready to START"		R	Finish the print job.	
83	CA	"83= Printing unit not in proper position!"	A	C:	This message is shown whenever the printing unit is not in its operating or parked position, that is, is not at one end stop or the other, but rather, somewhere in between.	O, T

Code	Display: CA = Current Alarm; S= Status		Message or Alarm?	Cause of the message / Remedial action:		To be elimin. by
	S:	"30= Printer not ready to START"		R:	After a power failure or a cut-off of the compressed air supply: Turn the printer off completely. Pull the print head unit into the parked position, that is, to the rear end stop. Now turn the printer back on and restore the compressed air supply.	
				R:	Check the freedom of movement of the printing unit: Are there any foreign objects near the linear guides or between the housings or have hoses or wires gotten caught somewhere?	S, C
				R:	Check whether the pneumatic cylinder +300-Z6 on the side used for locking the print head unit is still extended and is keeping the print head unit from returning to its operating position.	
84	CA	"84= Error by cleaning"	A	C:	This alarm is emitted during the automatic cleaning of the print heads whenever a process hasn't been started or is taking too long.	O, T, S, C
	S:	"30= Printer not ready for START"		R:	Eliminate all of the errors indicated in the *Alarm* menu. If this isn't possible, please contact the CSAT customer service.	
85	CA	"85= Cleaning mode hasn't been entered yet!"	M	C:	The "Start" button was pushed in the register *Job > Cleaning* without selecting a cleaning procedure first.	O, T, S, C
	S:	"0= Printer waiting for line start"		R:	Wait a few seconds until this message disappears. Then select the desired cleaning procedure for the respective print head and press "Start" again.	
86	CA	"86= Residual ink bottle: out of position"	M	C:	The residual ink bottle is missing.	O, T
	S:	"30= Printer not ready to START"		R:	Insert an empty bottle in the holder and close the doors. The micro switch +500-S20 must click audibly.	
				C:	Defective sensor system.	S, C
				R:	Check the micro switch +500-S20 and the associated connecting wires and their plug contacts. Defective components must be replaced.	

Code	Display: CA = Current Alarm; S= Status		Message or Alarm?	Cause of the message / Remedial action:		To be elimin. by
87	CA	"87= Residual ink bottle is full"	M	C:	The residual ink bottle is full.	O, T
	S:	"0= Printer waiting for line start"		R:	Stop the printing process as quickly as possible, remove the full bottle and seal it carefully. Insert an empty bottle in the holder and close the door.	
				C:	Sensor system out of order.	S, C
				R:	Check sensor +500-B34, lines and contacts, have defective parts replaced (by CSAT customer service).	
89	CA	"89= Error during curing process!"	A	C:	This message appears only when the printing process is interrupted: Problem during the automatic curing of the last images to be printed.	O, T
	S:	"30= Printer not ready to START"		R:	In order to ensure that incompletely cured printing substrate is not passed on to further production, all of the printed material to the left of the friction unit should be marked clearly so that it can be easily found later and removed.	
90	CA	"90= Ink management unit: Cartridge … empty!"	M	C:	The ink cartridge in question is empty.	O, T
	S:	"0= Printer waiting for line start"		R:	Insert a new ink cartridge.	
				C:	During the cleaning process, so much ink can be used up that the upper fill level sensor of the respective intermediate reservoir will no longer respond.	O, T
				R:	Wait one or two minutes until more ink has flowed into the intermediate reservoir. If the message is still shown afterwards, then the ink cartridge is empty and has to be replaced by a new one.	
				C:	Sensor system out of order.	S, C
				R:	Check sensor the fill level sensor +501-B1 to +504-B1 of the respective intermediate reservoir, lines and contacts, have defective parts replaced (by CSAT customer service).	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
91	CA	"91= Cleaning unit: cartridge empty!"	M	C:	The cartridge with the cleaning fluid is empty.	O, T
				R:	Insert a new cartridge with cleaning fluid.	
	S:	"0= Printer waiting for line start"		C:	During the cleaning process, so much fluid can be used up that the upper fill level sensor of the intermediate reservoir will no longer respond.	O, T
				R:	Wait one or two minutes until more cleaning fluid has flowed into the intermediate reservoir. If the message is still shown afterwards, then the cartridge with the cleaning fluid is empty is empty and has to be replaced by a new one.	
				C:	Sensor system out of order.	S, C
				R:	Check sensor the fill level sensor +520-B1 of the intermediate reservoir, lines and contacts, have defective parts replaced (by CSAT customer service).	
92	CA	"92= Collection pan: out of position"	A	C:	The collection pan is not in its proper position. The sensor in question is responding.	O, T
	S:	"30= Printer not ready to START"		R:	At the rear of the printer push the collection pan all of the way into the machine.	
				C:	Sensor system out of order.	S, C
				R:	Check sensor +400-B14, lines and contacts, have defective parts replaced (by CSAT customer service).	
93	CA	"93= Residual ink intermediate reservoir full!"	A	C:	The residual ink bottle is so full that the residual ink can no longer run out of the intermediate reservoir. The sensor in question is responding.	O, T
	S:	"30= Printer not ready to START"		R:	Insert empty residual ink bottle into the holder and wait until the residual ink has run out of the intermediate reservoir.	
				C:	Sensor system out of order.	S, C
				R:	Check sensor +400-B13, lines and contacts, have defective parts replaced (by CSAT customer service).	
94	CA	"94= Unwinding unit: Pressure roller of web tension control unlocked"	A	C:	The frame with the pressure roll is unlocked. The printing substrate is no longer being pressed by the pressure roller against the rubber roller and, therefore, can slip off of it. The sensor in question is responding.	O, T
	S:	"30= Printer not ready to START"		R:	Press down the frame with the pressure roller until the two black latches lock into place.	
				C:	Sensor system out of order.	S, C
				R:	Check sensor +500-B45, lines and contacts, have defective parts replaced (by CSAT customer service).	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
95	CA	"95= Rewinding unit: Pressure roller of web tension control unlocked "	A	C	The frame with the pressure roll is unlocked. The printing substrate is no longer being pressed by the pressure roller against the rubber roller and, therefore, can slip off of it. The sensor in question is responding.	O, F
	S:	"30= Printer not ready to START"		R	Press down the frame with the pressure roller until the two black latches lock into place.	
				C	Sensor system out of order.	S, C
				R	Check sensor +300-B47, lines and contacts, have defective parts replaced (by CSAT customer service).	
97	CA	"97= The infeed height control has triggered "	A	C:	A foreign object, printing substrate that is too thick or overlapping labels are pressing against the bracket at the entry of the print unit thus triggering the alarm. The sensor in question is responding.	O, T
	S:	"30= Printer not ready to START"		R:	Remove thick label or foreign object. Replace thick printing substrate with thinner material.	
				C:	Sensor system out of order.	S, C
				R:	Check sensor +400-B35, lines and contacts, have defective parts replaced (by CSAT customer service).	
99	CA	"99= Pre-curing yellow: error"	A	C:	Defective module, loose or broken cable. The controls did not detect any current.	S, C
	S:	"30= Printer not ready to START"		R:	If the power supply, wiring, and plug contacts are OK, then the module in question has to be replaced.	
100	CA	"100= Pre-curing cyan: error"	A	C:	Defective module, loose or broken cable. The controls did not detect any current.	S, C
	S:	"30= Printer not ready to START"		R:	If the power supply, wiring, and plug contacts are OK, then the module in question has to be replaced.	
101	CA	"101= Pre-curing magenta: error"	A	C:	Defective module, loose or broken cable. The controls did not detect any current.	S, C
	S:	"30= Printer not ready to START"		R:	If the power supply, wiring, and plug contacts are OK, then the module in question has to be replaced.	
103	CA	"103= Water level in collection pan too high!"	A	C:	Water is leaking from the coolant collection container below the coolant inlet and outlet. The sensor +300-B54 is responding.	S, C
	S:	"30= Printer not ready to START"		R:	Shut off the coolant supply. Empty the two hoses from the inlet and outlet and fix the leak. Hold an empty can or bowl (minimum volume: 1 l) under the coolant collection container , remove its drain nut (Allen screw DIN 912-M10x20) and empty the coolant collection container . Reinsert the drain nut.	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
104	CA	"104= Degassing unit: vacuum too low!"	A	C:	Vacuum in the degassing system is too low. The reading displayed by the sensor +500-B26 is less than 0.79 points.	S, C
	S:	"30= Printer not ready to START"		R:	Check the vacuum pump +500-M8 and its connection wires and plug contact +500-A140/X2.	
				R:	Fix any leaks. Replace porous hoses and membranes.	
105	CA	"105= Degassing sensor not ready!"	A	C:	Vacuum in the degassing system is insufficient. The reading displayed by the sensor +500-B26 is between 0.8 and 0.85 points. Water is up to sensor +500-B25.	S, C
	S:	"30= Printer not ready to START"		R:	Empty the separator of the degassing system until the sensor +500-B25 no longer responds.	
				R:	Fix any leaks. Replace porous hoses and membranes.	
110	CA	"110= Missing data IJ image converter"		C:	The data packet transmitted from the IJ-image converters to the engine board contains incorrect or incomplete data.	S, C
	S:	"30= Printer not ready for START"		R:	On the touchscreen open the tab *Consumables > Print heads* and read off the number of shots fired by each print head: If a "0" is shown anywhere, then the associated IJ image converter board is defective and has to be replaced.	S, C
111	CA	"111= Communication error IJ image converter"		C:	The communication between the IJ converter boards and the IJ engine board is out of order.	S, C
	S:	"30= Printer not ready for START"		R:	Connect the connections between the various IJ converter boards and the connection between the IJ converter boards and the IJ engine board.	
				C:	The power supply to the IJ converter boards in question is out of order or interrupted.	
				R:	The power supply unit +300-G80 has failed or at least one of the fuses +400-F510 to +400-F514 has been triggered. Check all of the components, wiring and contacts mentioned, have defective parts replaced (by CSAT customer service).	
112	CA	"112= Print head in service position"	M	C:	This message is shown whenever the print head unit has been uncoupled from its guide frame and has been pulled back into the so-called cleaning position.	O, T
	S:	"30= Printer not ready for START"		R:	Push the print head unit in its guide frame forward until the black lock knob falls back into place.	
				C:	Sensor is out of order.	S, C
				R:	Check the sensor +400-B43, wiring and contacts, have defective parts replaced (by CSAT customer service).	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
113	CA	"113= Print head is not in working position"	M	C:	This message is shown as long as the print head is situated in the parking position or somewhere between the parking and printing position.	O, T
	S:	"30= Printer not ready for START"		R:	On the touchscreen hit the "Working Position" key 🔼 to move the print head unit into the working / printing position.	
				C:	Sensor is out of order.	S, C
				R:	Check sensor +400-B41, wiring and contacts, have defective parts replaced (by CSAT customer service).	
114	CA	"114= Cooling unit not ready"		C:	The external cooling unit is switched off or is not circulating enough coolant. The hose lines could be (at least partially) clogged or interrupted.	S, C
	S:	"30= Printer not ready for START"		R:	Switch on the cooling unit. Check the hose lines and connections, have defective parts replaced (by CSAT customer service).	
116	CA	"116= DSP module not active"		C:	The DSP module has gotten "hung up," so that a print head can no longer transfer or print any images.	O, T
	S:	"30= Printer not ready for START"		R:	Shut down the printer, switch it off and after waiting a few seconds switch it back on.	
				C:	If the print head in question is still unable to transfer an image, then the associated DSP module has to be replaced. This error message will not be generated by a loose or defective cable.	S, C
118	CA	"118= Error on corona treatment"	A	R:	The controls are no longer receiving "Ready" signals from the corona treatment module.	S, C
	S:	"30= Printer not ready for START"		C:	Call a service technician and have the entire corona treatment module as well as its connection to the printer's controls checked.	S, C

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
122	CA	122 = UPS error	A	C:	Power supply failure or fluctuation(s) in the power supply.	O, T, S, C
	S:	"30= print system not ready for start"		R:	End print job, shut down and switch off printer. Restart once failure-free power supply has been ensured.	
				C:	Malfunction/defect at the lead/plug of the power supply.	S, C
				R:	Check/correct connect/plug-in power supply plug.	
				R:	Check the power supply cable, replace if necessary.	
126	CA	126 = Printer is locked	A	C:	The printer is currently busy with a delicate task, such as data transmission. To prevent this process from being disturbed by other commands, job management has temporarily blocked buttons and touchscreen.	O, T, S, C
	S:	"30= printer not ready for START"		R:	Wait until buttons and touchscreen of the printer are released.	
132	CA	132=Time interval for cleaning the print heads is reached	A	C:	The time interval for cleaning the print heads has elapsed.	O, T
	S	30= Printer not ready for START		R:	Perform standard cleaning of all print heads	
135	CA	135=Communication error on main bus	A	C:	Error in the internal communication of electronic components.	S, C
	S	30= Printer not ready for START		R:	Contact the Markem-Imaje CSAT customer service!	
136	CA	136=Unwinding unit: end of web	A	C:	The printing substrate in the unwinding unit has run out.	O, T
	S	30= Printer not ready for START		R:	Insert new printing substrate.	
137	CA	137= ink management unit: Ink level in color xyz too high	A	C:	The top sensor in the intermediate reservoir of the ink concerned was triggered.	O, T
	S	30= printer not ready for START		R:	Start a standard cleaning procedure for the ink concerned via the Job/cleaning menu.	
				C:	The ink system is defective.	S, C
				R:	Notify the customer service of Markem-Imaje CSAT GmbH.	
138	CA	138= Cleaning unit: Fill level too high	A	C:	The top sensor in the intermediate reservoir of cleaning fluid was triggered.	O, T
	S	30= printer not ready for START		R:	Start a standard cleaning procedure via the Job/cleaning menu.	
				C:	The ink system is defective.	S, C
				R:	Notify the customer service of Markem-Imaje CSAT GmbH.	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
177	CA	177=DigiConvert not ready.	A	C	DigiConvert is not ready.	O, T
	S	30= printer not ready for START		R	Make DigiConvert ready.	
178	CA	178=DigiConvert dancer in lower stop position.	A	C	DigiConvert Buffer is full.	O, T
	S	30= printer not ready for START		R	Empty DigiConvert buffer.	
181	CA	LRC Error: Same counter twice in shift register	A	C	Invalid manipulation caused an invalid status of the LRC.	O, T
	S	30= printer not ready for START		R	Discard current production. Perform line clearance.	
182	CA	LRC Error: Counter not found in shift register	M	C	Possible reason: The camera could not read the data matrix code but the DMC reader could read it.	
	S			R	No intervention necessary. Invalid labels are rejected.	
183	CA	LRC Error: DMC reader did not react to a trigger	M	C	Data matrix reader did not react to a trigger.	O, T
	S			R	No intervention necessary. Invalid labels are rejected.	
				C	Data matrix reader is defective when the error keeps arising.	S, C
				R	Notify the customer service of Markem-Imaje CSAT GmbH.	
184	CA	LRC Error: Camera system is not ready	A	C	Vision system not active.	O, T
	S			R	Start camera inspection.	
185	CA	LRC Error: Camera is in teach-in mode	A	C	Camera is in teach-in mode.	O, T
	S			R	Finish teach-in mode.	
186	CA	LRC Error: Rejection control sensor did not detect a label	A	C	Rejection control sensor did not detect a label	O, T
	S			R	Check whether labels were correctly produced.	
187	CA	LRC Error: Bad label was not rejected.	A	C	Bad label was not rejected.	O, T
	S			R	Remove all labels between rejection control sensor and the roll of wound material. Continue printing.	

Code	Display: CA = Current Alarm; S= Status		**M**essage or **A**larm?	**C**ause of the message / **R**emedial action:		To be elimin. by
188	CA	LRC Error: Layout length below minimum	A	C	Layout length is below the minimum.	O, T
	S			R	Print a label with a sufficient length.	
189	CA	LRC Error: More than 1m no print mark detected	A	C	More than 1m no print marks have been detected.	O, T
	S			R	Cancel the current print job. Start a new print job.	
190	CA	LRC Error: Empty label detected	A	C	Empty label on roll.	O, T
	S			R	Remove empty label from roll. Continue printing.	
191	CA	LRC Error: Consecutive error	A	C	A sequence of more than five bad labels occured.	O, T
	S			R	Different reasons possible. If reason was detected and eliminated continue with printing.	
192	CA	LRC Error: Label rejection controller not ready	A	C	The Label Rejection Controller could not be started.	S, C
	S			R	Notify the customer service of Markem-Imaje CSAT GmbH.	

10   Maintenance and Repair

10.1   Content and purpose

These instructions are intended to provide the owner and the specially trained personnel with all of the information required for performing maintenance and repair work and for compiling internal maintenance and repair instructions.

The specifications given in the instructions are guidelines, which may have to be adapted or even corrected depending on the operating conditions after commissioning as well as the machine load factor.

The maintenance instructions enable the owner of the machine to practice preventive maintenance. The enclosed specialized operating instructions contain the maintenance instructions of the suppliers. Those instructions are to be given priority. The specially trained personnel responsible for operation and maintenance must have a complete and comprehensive understanding of the contents.

A copy of the maintenance and care instructions must be laid out directly next to the machine.

10.2   Area of validity

These maintenance and care instructions serve as a guideline for maintenance and repair. If different or additional aspects should arise during the operation of the machine, these should also be observed.

10.3   Safety through regular maintenance

The purpose of maintenance is not only to ensure trouble-free production, but also to ensure safe working conditions by means of regular inspections, maintenance and repair measures.

Consequently, a machine that exhibits potentially dangerous movements, including its safety equipment, is required to be checked by a qualified person:

- before the initial commissioning

- at appropriate time intervals

- after alterations or repairs

For its safe condition, and at the very least for visible external damage or defects.

10.4   Safety instructions for maintenance and repair

⚠ **Warning**
Danger of injury during maintenance and repair work.   ➔ The printer must be shut down before any maintenance and repair work is performed.   ➔ Before starting work the printer must be switched off and protected against being switched back on with a padlock.   ➔ Install a warning sign "Attention! Work on the machine in progress – Do not start the machine!"   ➔ Before restarting, make sure that all safety equipment has been installed.

⚠ **Warning**
Risk of fatal injury from contact with live parts.   ➔ Work on electrical equipment must be performed only by authorized personnel qualified in electronics.   ➔ Always keep switch cabinets closed. Only authorized personnel with key or tool are allowed access to the switch cabinets.   ➔ Do not work on live parts.   ➔ Replace loose connections or damaged cable immediately.   ➔ Cables should not be jammed or crushed. Cables must be laid so that they cannot be damaged or pose a tripping hazard.

⚠ **Warning**
Danger of crushing injuries.   ➔ Do not reach into the rollers during work.

⚠ **Warning**
Danger of entangling body parts or clothing in rotating machine parts   ➔ Before beginning any maintenance work on the printer, make sure that all rotating machine parts have come to a stop!   ➔ Never work while motors are running!

⚠ **Warning**
Danger of injury on mechanical parts that are under tension.
➜ When working on machine components, make sure they are not under tension.

⚠ **Warning**
Risk of injury upon contact with the electrodes of the printing substrate discharger.
➜ Do not reach into the area between the two electrodes / do not touch their needle-like contacts.

⚠ **Warning**
Permanent damage to skin can be caused by contact with machine operating materials of all types! (long-term injuries)
➜ Wear solvent-resistant safety gloves and protective eyewear when handling media. (see section 2.5.5, "Personal protection equipment").
➜ Avoid contact with operating materials and cleaning agents!
➜ Wash exposed skin thoroughly. See a doctor if skin irritation persists.
➜ Change contaminated or soaked clothing immediately.
➜ Observe the safety instructions of the materials used.

Information

Maintenance and repair work should be performed by specially trained personnel only who, based on their professional training, knowledge and experience, as well as knowledge of pertinent regulations, are able to assess the tasks assigned to them, recognize potential danger, and take the measures necessary to prevent potential accidents.

Information

- Inspection intervals are derived from the manufacturer's instructions and the policy and specifications of the owner. We recommend the compilation of test records.

- During maintenance and repair work, please also observe the "Maintenance and Repair" chapter in den operating instructions of the machine components in the appendix of this manual.

10.4.1   Instructions regarding hazards due to live parts

Whenever there are problems with the machine's electricity supply, it should be switched off immediately!

Switch off power – if required - to machine parts on which inspection, maintenance and repair work is to be performed. Test the dead parts for voltage, then ground and short-circuit them and isolate live adjacent parts!

The machine's electrical equipment should be inspected / tested regularly. Defects, such as loose connections or burnt wires should be fixed immediately.

Whenever work on live parts is necessary, have another person standing by who, in case of an emergency, can press the Emergency Stop button or switch off the main power supply. Cordon off the working area with a red and white chain and a warning sign. Use only insulated tools!

⚠ Warning
The supply line is under current even when the main switches are turned off.

10.4.2   Instructions regarding hazards due to hot operating materials

When handling chemical substances, observe the safety requirements applicable to the product!

⚠ Caution
Risk of burning and/or scalding.   ➔ Use caution when handling hot production supplies.   ➔ Observe the safety data sheets of the materials used.

10.5   Maintenance

The "Maintenance" chapter is aimed predominantly at all employees who work with the ITS6 printer during the actual production process, therefore, cleaning personnel, machine operators, and fitters.

10.5.1   Maintenance schedule

For the maintenance of the individual machine components, please observe the respective manufacturer's specifications. Maintenance instructions can be found in the supplied accompanying documentation.

The maintenance of the machine will be carried out in accordance with the maintenance schedules of the manufacturer, Markem-Imaje CSAT GmbH.

The machine should be cleaned once a week. Whenever there is a heavy accumulation of dust and dirt, the deposits that could interfere with the functioning of the printer and the printing results should be removed daily.

Drops of ink should be removed immediately, since they can no longer be removed after the ink has hardened.

Notice
Clean the printer carefully. ➔ Remove blotches of ink immediately! ➔ Never touch the nozzle plate on the underside of the print head with your bare fingers or other objects. ➔ Do not use a high-pressure cleaner to clean the machine. ➔ Use only approved cleansers.

Notice
The disposal of operating supplies and materials is governed by environmental laws. ➔ Bring used operating supplies and materials to the hazardous waste collection center. ➔ Clean up spilled operating and cleaning fluids and dispose of them properly. ➔ Take the necessary precautions to catch spilled operating and cleaning fluids (sealed floor, catch pans and containers, drip sheets).

Maintenance Schedule ITS6
Every 2 hours
All print heads must undergo a standard or intensive cleaning very two hours at the latest (see Chap. 10.7.5.1 Mechanical cleaning of the nozzles"
Daily
At the end of the shift, all of the print heads must first undergo a standard cleaning and then be cleaned by hand.
Move the print head unit to service position, check the wipers for print head cleaning for dried up ink residues and clean them manually.   - The wipers must be straight and sharp-edged. They must not show any cracks or foreign bodies.   - Each wiper must be aligned in parallel to the upper edge of the related clamping plate.   - Replace wipers if necessary.
At the end of the shift, check all of the LED strips of the pre-curing unit for any dirt and clean if necessary.
Check inlet suction. Remove any dirt
Check all guide rollers for spotlessness, clean if necessary.
Check the adhesive film of the printing substrate cleaning module on a regular basis. If heavily soiled or lacking adhesive power, tear off one layer of the adhesive foil.
Move the print head unit into the service position, check the wipers used for cleaning the print heads for areas of dried-on ink and clean by hand (see chap.10.7.5.2 „Manual cleaning of the print heads".). The edges of the wipers have to be straight and sharp and shouldn't have any cracks or especially any foreign objects on them. Furthermore, the cleaning edge of each wiper must be aligned parallel to the upper edge of the clamping plate. Replace wiper if necessary, see chap. .10.6.3 "Changing the wipers on the print heads".
Move back the print head unit into the service position and check the rollers of the printing table and the sheet below for spotlessness. Clean with cleaning fluid or acetone if necessary. Check to see whether the entire print image is narrower than the substrate to be processed and that it is positioned entirely on the web so that no ink is sprayed alongside the substrate onto the printing table without being fixed there. Furthermore, when the printing table is soiled with ink, the guide rollers behind the printing table should be checked for soiling also.
Check the glass shields of the UV lamps for soiling. Completely remove heavier grime deposits using a special cleaning pad (order no. `ZE1010-75`) if necessary.
Check the rubber rollers of the web tension controller and the friction drive for soiling. If necessary, clean with isopropyl alcohol.
Check the electrodes of the two substrate dischargers for soiling. Remove

Maintenance Schedule ITS6
any adhering lint or substrate residue with a brush. Use cloths dampened in acetone to clean any ink adhering to the metal contacts.
Weekly
Check the clamping function of the cut-and splice device.
Clean the cleaning rollers of the printing substrate cleaning module, see chap. 10.6.7 "Maintenance of the printing substrate cleaning module".
Check all guide rollers for freedom of movement and bearing clearance.
Monthly
Check the condensate trap of the compressed air maintenance unit.
Check the separator of the degassing system of the ink management and drain the condensation as needed, see chap. 10.6.4 "Maintaining the separator of the degassing system".
Visual check of all screw connections for leaking ink.
Every 3 months
Check connections in compressed air system for leaks.
Clean the cleaning rollers of the printing substrate cleaning module with the "Roller Doctor System", see chap. 10.6.7 "Maintenance of the printing substrate cleaning module".
Every 6 months
Check drive belts of the web tension control and the unwinding mandrel of the unwinding and winding shafts.
On the left front wall, remove the metal cover of the ink management. Check the intermediate reservoirs for leaking ink.
Once a year
Check all cooling water hoses.
Replace the coolant, provided it circulates in a closed system between the printer and an external cooling unit.
Replace the non-woven filter of the collection pan.
Replace the non-woven filters of the small collection pans.
Every 2 years
Preventive maintenance by Markem-Imaje CSAT. The measures to be taken are described in a separate protocol.
Check lighting of camera system.
Every 5 years
Replace all cooling water hoses between the printer and the cooling unit in question.

10.6   Maintenance of assemblies and parts

10.6.1   Web Tension Control maintenance

The mechanics of the web tension control are practically maintenance-free since all of the bearings are permanently lubricated. For trouble-free operation, however, please make sure that this assembly is kept as clean as possible and that the guide rollers do not suffer any damage.

Information

The rubber roller of the web tension control is a consumable part. The running time can be viewed on the touchscreen. A message will be displayed when its useful life has expired.

Function check

The guide rollers should move freely. During the preventive maintenance performed by Markem-Imaje CSAT, the drive belt and drive belt tension will be checked.

10.6.2   Changing cartridges filled with ink and cleaning fluid

The cartridges filled with ink and cleaning fluid are consumables and have to be replaced on a regular basis. When a low level of ink is reported by the touchscreen, the ink cartridge in question has to be replaced.

Information

The cartridges cannot be replaced unless the printer has been switched on completely.

Notice

Prevent soiling and environmental damage.
➔ Do not squeeze the removed cartridge, since otherwise ink could spray out of the penetrated membranes!
➔ Dispose of the cartridges in compliance with the local regulations.

> Lift up the cover flap to access the ink holders.

> Press down the black handle

> Push the slider all the way back.

> Remove the empty cartridge.

> Provide a new cartridge with the same color and type of ink.
> Remove the two caps from both ends oft he cartridge.

> Slowly insert a new cartridge #1 with the same ink into the retainer until the cartridge sits on the locking element and the bar code #2 at the rear of the cartridge is at the level of the bar code reader #3.
> Wait a moment until the bar code reader has read the bar code. When the signal sounds, the cartridge was recognized as correct, the locking element is released, and the cartridge slips automatically down to its end position. The lock remains if a signal does not sound. The bar code is incorrect or illegible.
> If a correctly recognized cartridge does not slip down automatically, apply a slight pressure to push it down to its end position.
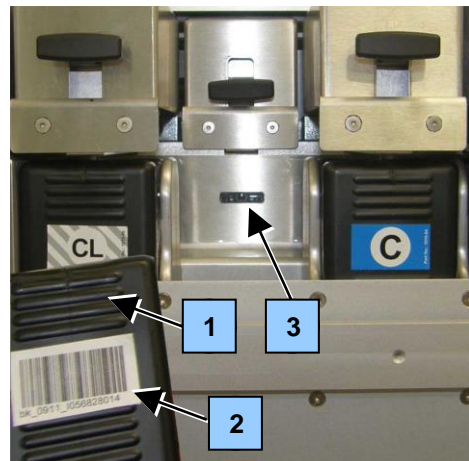
> Pull the slider back towards the front. When you let go, the sound of a pneumatic cylinder should be heard.

Proper order of the cartridges:

Pos.	Designation
1	Cleaning fluid
2	Yellow
3	Cyan
4	Magenta
5	Black
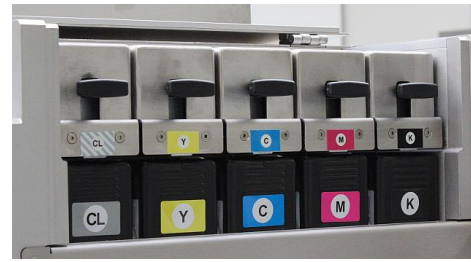
> Close the cover flap

10.6.3 Changing the wipers on the print heads

In order to change the wipers on the print heads, the entire print head unit has to be pushed back.

Required equipment:

Clean, solvent-resistant protective gloves (cf. chapter 2.5.5 Personal protection equipment).

> Interrupt the printing process.
> Wait until the printer has come to a complete stop.
>
>
> Press the 🔧 button on the touchscreen. The print head unit moves into the parking position.

On the rear of the printer:
> Open the middle door.
> Release the black knob, located on the right-hand side above the collection pan.
> Pull the print head unit all of the way back until the wipers are exposed.
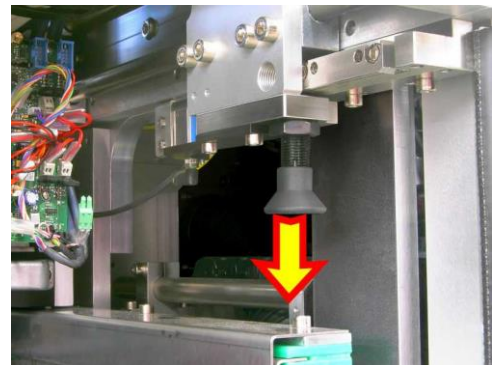
On the front of the printer:
> Open the hinged hood.
> Press down the bolt on the rubber wiper to be changed. The holder will open.
> Remove the rubber wiper.
> Push the bolt all the way down again and insert the new rubber wiper. Make sure that the rubber wiper is seated all the way into the holder and that the cleaning edge of the wiper is aligned parallel to the upper edge of the clamping plate.
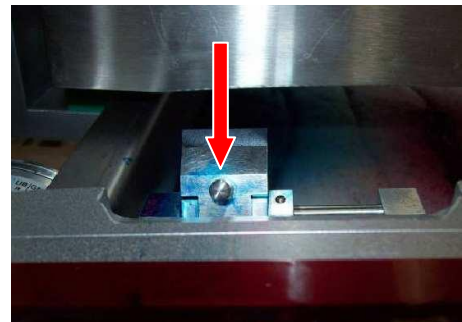
When all wipers are exchanged, on the rear of the printer:

> Push the print head forward until the black knob locks into place again.

> Move the print head unit into the working position:

> Close the back door of the printer.
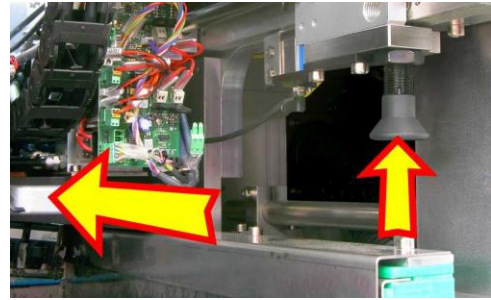
On the touchscreen:

> Reset the corresponding counter reading to "0" in the tab *Consumables > Wipers*.

> Press the 🖌 button on the touchscreen.

> Close the hinged hood.

The machine is ready for operation.

10.6.4   Maintaining the separator of the degassing system

10.6.4.1 Creating the conditions for the maintenance of the separator

Disconnect the printing system from the power line. The printer must be switched off at the main switch.

10.6.4.2 Performing visual inspection

Open the right rear door of the printer by means of the supplied switch cabinet key.
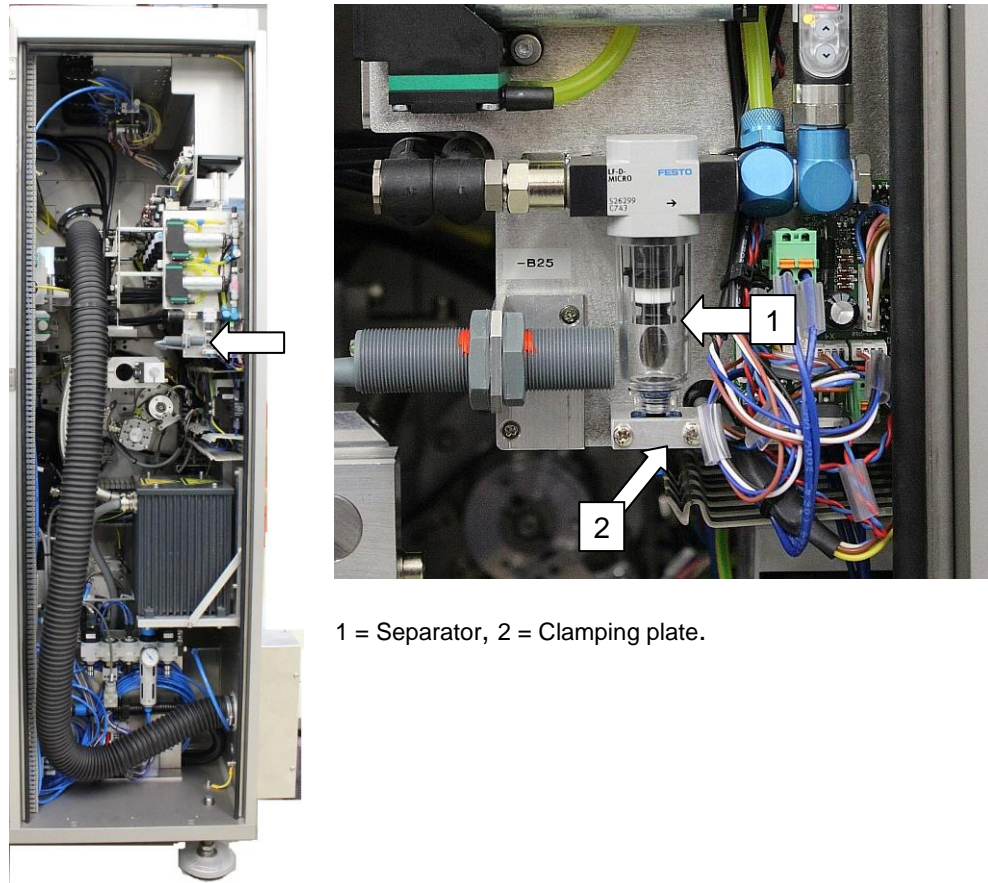
1 = Separator, 2 = Clamping plate.

Installation location of the separator.

Fig. 108.   The separator of the degassing system

Check: Does the separator contain any liquid?

If not: No action required. Close the door again.

If so: Drain the separator.

10.6.4.3 Draining the separator

Required accessories:

Clean, solvent-resistant protective gloves (refer to Chapter 2.5.5 "Personal protection equipment").

> Loosen the two screws on the clamping plate, see Fig. 108. Remove the clamping plate.

> Unscrew and remove the separator.

> Drain the separator, dispose of the content in the same way as residual ink.

> Thoroughly clean separator. It must be transparent and may not contain any dirt residue. If the separator cannot be cleaned, it must be replaced.

> Screw cleaned separator back in.

> Retighten clamping plate.

Information

If the separator is filled with ink, the error message 105 appears on the touchscreen. In this case, the separator must be drained.

Information

Should the separator be filled with liquid again shortly after draining it, there is a defect in the ink system. In this case, contact a service technician for assistance.

10.6.5 Changing the residual ink bottle

The residual ink bottle has to be emptied regularly.

Supplies needed:

- Clean, solvent-resistant protective gloves (see Chap. 2.5.5 Personal protection equipment)

- Replacement residual ink bottle (order no.: `ZE1010-09`)

⚠ **Caution**	
	Permanent damage to skin can be caused by contact with machine operating materials of all types! (long-term injuries)
	➔ Wear solvent-resistant safety gloves and protective eyewear when handling media. (see section 2.5.5, "Personal protection equipment").
	➔ Avoid contact with operating materials and cleaning agents!
	➔ Wash exposed skin thoroughly. See a doctor if skin irritation persists.
	➔ Change contaminated or soaked clothing immediately.
	➔ Observe the safety instructions of the materials used.

> Interrupt the printing process.
> Wait until the printer has come to a complete stop.
> Turn locks to the left with a screwdriver.
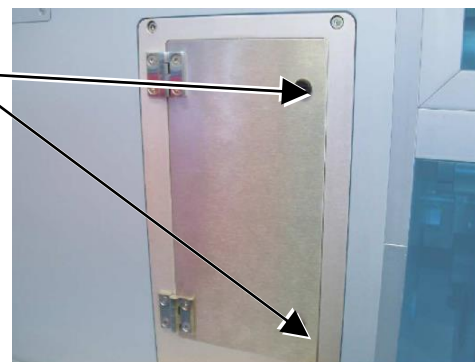
> Remove residual ink bottle from the holder.
> Seal the removed residual ink bottle immediately with its screw top. – Screw tight!

> Insert new residual ink bottle and close the door.
> The residual ink bottle is monitored by sensors.
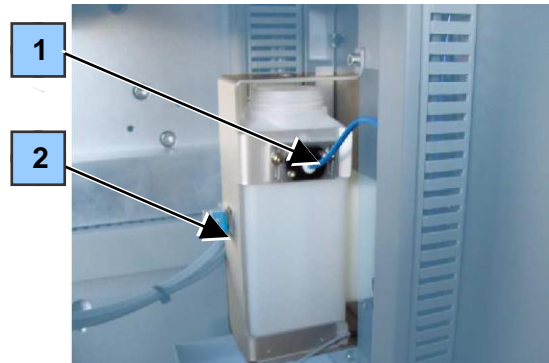
Pos.	Designation	Function
1	Fill level sensor	Monitors fill level / reports to touchscreen when full
2	Occupany control sensor	Occupany control / Reports to touchscreen whether collection container is present

> Close the door and turn locks to the right with a screwdriver.
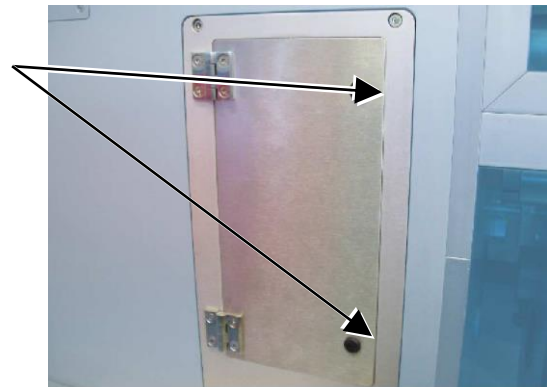
> The machine is ready for operation.

Information

The residual ink bottle should always be emptied before transporting the printer.

10.6.6   Changing the rubber rollers of the friction drive and the web tension control

The rubber-coated rollers of the friction drive and web tension control are consumables and have to be replaced on a regular basis. Once the touchscreen indicates that the defined useful life of 300,000 m has expired, then the roller in question has to be replaced.

ℹ Information

The rubber rollers can be replaced even if print material is still inserted in the printer.

> Stop the printing process.
> Wait until the printer has come to a complete stop.
> Open the front safety doors and the hinged hood.
> Remove all four screws #1 from the cover #2 and take off the bearing cover.
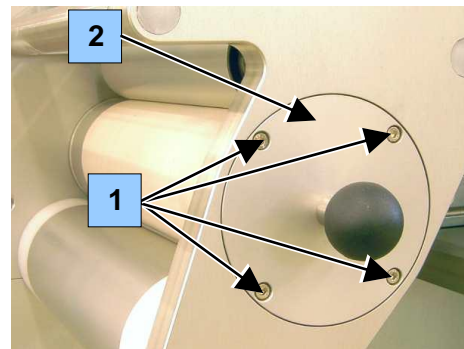
> Pull out the two black knobs of the locking mechanisms #3.
> Raise the frame #4 with the pressure roller as far as possible and let the locking mechanisms fall back into place.
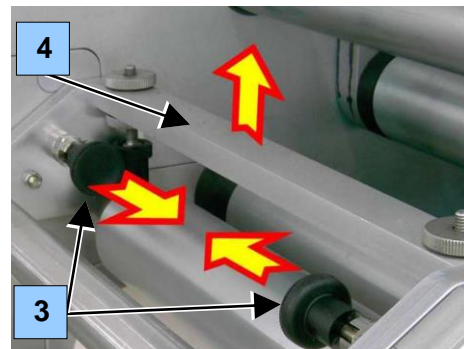
> Remove the three inner screws #5.
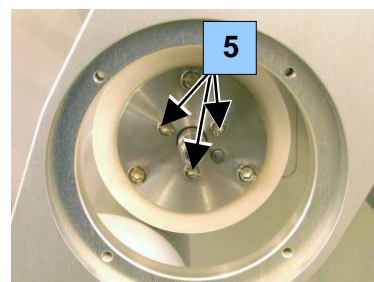
> Grab the rubber roller with both hands and pull it out.
This might require quite a bit of effort in some cases.

> Remove the 3 outer screws #6 from the old rubber roller.
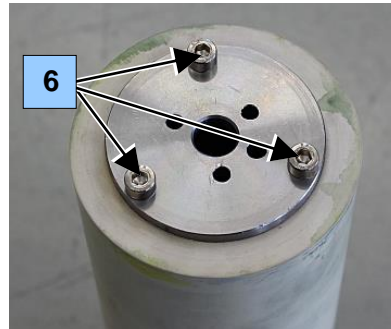
> Remove the centering sleeve #7 from the old rubber roller.

Never pry out the centering sleeve with a screwdriver!

If necessary, insert a piece of wood or plastic at the other end of the rubber roller and drive the centering sleeve out by gently hammering.

Use caution! Avoid damaging any of the curved parts of the centering sleeve.
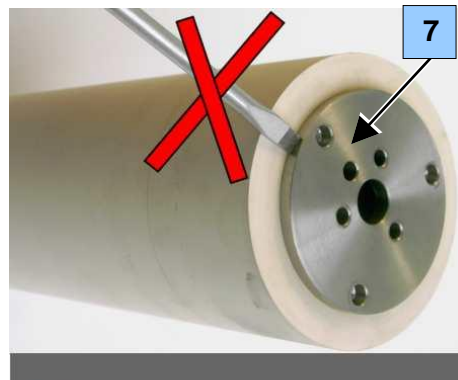
> Place a new rubber roller upright on a clean table.
> Twist the centering sleeve without jamming into the hole of the rubber roller.
> Insert the M5 x 12 screws without tightening them.
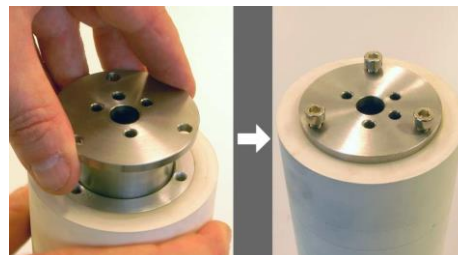
> Place the rubber roller on the
drive shaft #6 and align it so that
the hole #7 fits right over the
dowel pin #8.

> Shove the rubber roller all of the
way onto the drive shaft.
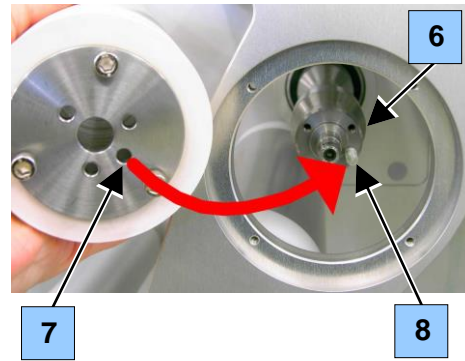
> Make sure that the rubber roller
contacts the rear end. If there is
still a gap, then make sure that
the hole #7 is seated over the
dowel pin #8.

> First tighten the three inner
M4 x 16 screws a few turns.

> Tighten the outer M5 x 12 all the
way.

> Now finish tightening the inner
screws.
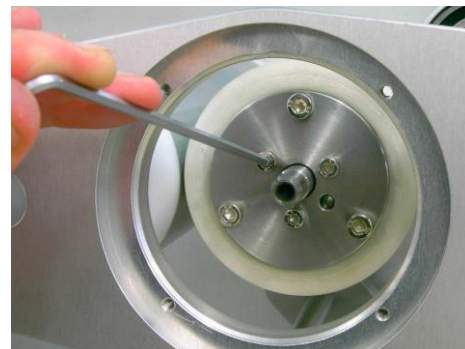
> Insert the bearing cover all the
way into the bearing plate without
jamming.

> Screw down the bearing cover
with the four M4 x 14 screws.

> Pull out the two black knobs of the locking mechanisms #11.
> Lower the frame #12 with the pressure roller and let the locking mechanisms fall back into place.
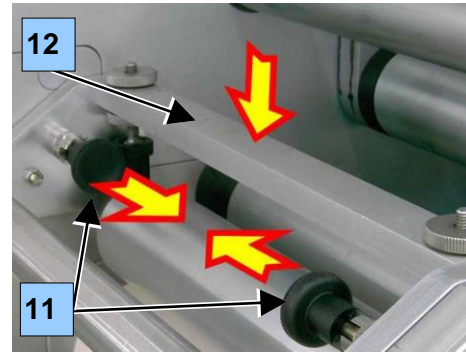
> Reclose the hinged hood and the safety doors.
> The printer is now ready for operation again.

10.6.7   Maintenance of the printing substrate cleaning module

The printing substrate cleaning module is a purchased part. The manufacturer's documentation for this part with detailed information can be found in the appendix.

10.6.7.1 Removal of used adhesive foil

The adhesive foil rolls pick up dust, fibers and other dirt during the printing process and binds them to its surface. Even when there isn't any dirt, the adhesive power of the adhesive foil diminishes over time due to constant use. For this reason the outer layer of the adhesive foil must be removed at regular intervals.

To remove the used adhesive foil of the printing substrate cleaning unit, proceed as follows:

> Stop the printing process. The printer can remain turned on during the following steps.

> Especially when printing on very wide printing substrate, it can be helpful to remove the end plates from the unwinding and winding shafts.

> Pull off one sheet of the adhesive foil from each adhesive roller. Afterwards the entire adhesive roller should be covered in clean, unused adhesive foil again.

> Reinstall the end plates on the unwinding and winding shafts.

Fig. 109.   Pulling off the adhesive foil

> **Information**
>
> We recommend that the outermost layer of the adhesive roller be removed every eight hours, depending on the conditions. When there is a high degree of dirt, this process must be repeated at correspondingly shorter intervals.

Notice
The grey cleaning rollers are very delicate!

➔ Touch the cleaning rollers only with clean white cotton gloves!

➔ Clean the surface of the grey cleaning rollers only with the especially provided Tewkipes. Never use solvents!

10.6.7.2 Maintenance operations recommended by the manufacturer

The manufacturer teknek recommends the following maintenance operations for the printing substrate cleaning module:

Time	Measure	Notice
Daily	Pull off one sheet of the adhesive foil from each adhesive roller	When there is a high degree of dirt, this process must be repeated at correspondingly shorter intervals.
Weekly	Cleaning the cleaning rollers with Tekwipes MI6700.	After cleaning. the printing press should remain out of operation for 15 minutes. This shall ensure that the alcohol in the Tekwipes evaporates completely from the cleaning rollers.
Every three months	Cleaning the cleaning rollers with the „Roller Doctor System"	After cleaning. the printing press should remain out of operation for 15 minutes. This shall ensure that the alcohol in the Tekwipes evaporates completely from the cleaning rollers.

10.6.7.3 Replacing the adhesive rollers of the printing substrate cleaning module

To replace the adhesive rollers of the printing substrate cleaning module, proceed as follows:

> Remove the used adhesive roller and dispose of it properly.

> Install the new adhesive roller. Make sure to align the roller correctly, as shown in the following schematic diagram:

Printing substrate

Rubber rollers

Adhesive rollers
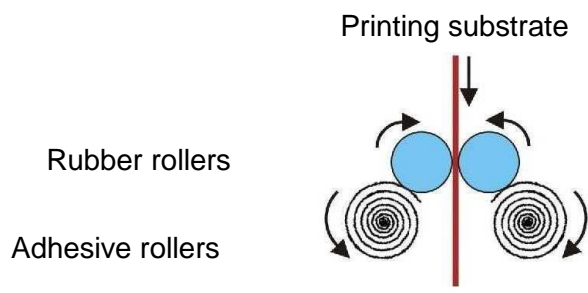
Fig. 110.   Roller alignment in the printing substrate-cleaning module

10.6.8   Changing the filters of the air circulation system

The air circulation system is for cleaning the air that circulates inside the printer. The suctioned air is conveyed through two consecutive filters which, depending on their nature, serve to separate out airborne particles or to neutralize ozone and odors.

10.6.8.1 Changing the activated charcoal filters

The air circulation system of the ITS6 has several activated charcoal filters (order no.: `ZEOI.000.00.Z`) which eliminates ozone and other odors from the suctioned air.

All activated charcoal filters generally have to be replaced after 250 hours of use. Replacement might have to be made even earlier if the printer is located in a space where there is a proliferation of dust.
However, if a printer is operated in a clean environment or especially in cleanrooms, the filters can be used significantly longer than the recommended 250 hours and can be replaced as needed.
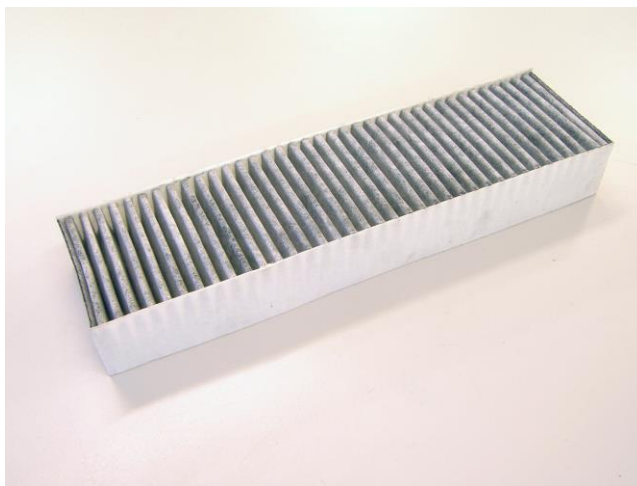
Fig. 111.   Activated charcoal filter

> **Information**
>
> Use only the original replacement part from Markem-Imaje CSAT. Otherwise dirt can accumulate or odors can occur.

Replace the activated charcoal filters as follows:

> Stop the printing process.
> Wait until the printer has come to a complete stop.
> Open the safety door on the left.

> Unscrew the cover #1 on the front of the printer.
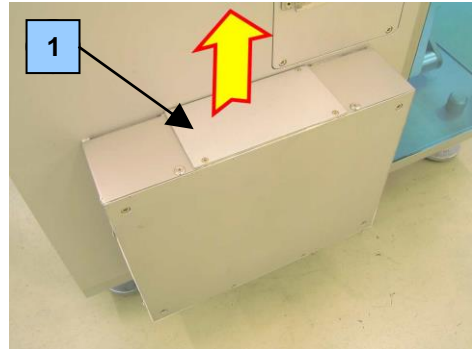
> Remove the three used filter elements. These can be thrown away in the house-hold garbage.

> Insert the new filter elements (order no.: `ZEOI.000.00.Z`) carefully all of the way into the housing.
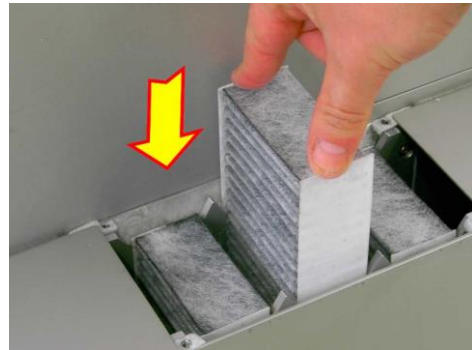
> Replace the cover on the housing and screw down tight.

> The ITS6 is now ready for operation again.

10.6.8.2 Changing the activated charcoal filters of the air cooling

The air cooling of the ITS6 has two activated charcoal filters (order no.: `ZEOI.000.00.Z`) which eliminates ozone and other odors from the suctioned air.

All activated charcoal filters generally have to be replaced after 250 hours of use. Replacement might have to be made even earlier if the printer is located in a space where there is a proliferation of dust.
However, if a printer is operated in a clean environment or especially in cleanrooms, the filters can be used significantly longer than the recommended 250 hours and can be replaced as needed.

Via the touchscreen menu "Consumables / Air filters" you can determine how long the air filters have been in operation; refer to Chapter 4.12.7 Tab Consumables > Air filters.

⚠ **Caution**
Risk of injury.   ➔ Switch off the printer prior to replacing the activated charcoal filter. During operation, there would be a risk of injury due to the openly accessible fans.

Information
Use only the original replacement part from Markem-Imaje CSAT. Otherwise dirt can accumulate or odors can occur.

Replacing the activated charcoal filter

> Unscrew the ventilation grille.

> Remove the two worn filter elements and dispose of via the domestic waste.

> Insert two new filter elements.

> Retighten ventilation grille.

> The printer is ready for operation again.

10.6.9   Replacing the guide rollers of the printing table and adjusting the in-feed height control unit

Always replace the five guide rollers of the printing table before you process a printing substrate of a very different material thickness.

After each replacement of the guide rollers, additionally adjust the scanning bar of the infeed height control unit.

Use the specifications in the following table when you select the guide rollers for a printing material and when you adjust the scanning bar of the infeed height control unit.

Thickness of printing substrate	Designation on the guide roller	Value for infeed height control
0,0 bis 0,2 mm	0,0 - 0,2 mm	0,0 - 0,2 (0,5)
0,2 bis 0,3 mm	0,2 - 0,3 mm	0,2 - 0,3 (0,7)
0,3 bis 0,4 mm	0,3 - 0,4 mm	0,3 - 0,4 (0,9)
0,4 bis 0,6 mm	0,4 - 0,6 mm	0,4 - 0,6 (1,1)

Using guide rollers that are too thin would show white lines on the printed image in the direction of paper travel.
Using guide roller that are too thick, however, could cause the printing substrate to rub on the sensitive nozzle plates of the print head, and obstruct or even damage them.

Caution

Avoid any damage to the print heads.

➔ If you are in doubt, always use the guide rollers for the next thicker printing material.Also use such rollers if the employed printing substrate tends to raise up at the edges ("cockling") or to undulate.

➔ Never use damaged or bent guide rollers.

➔ Solely the system user is responsible for any damage on the print heads that results from incorrect pairing of printing material and guide rollers.

➔ Solely the system user is responsible for any damage on the print heads that results from incorrect settings of the infeed height control unit.

Replacing the guide roller

Use the following procedure to replace the guide rollers:

> Stop the printing process.
> Wait until the printing system has stopped.

> Press the button 🔼 on the control panel to move the print head unit to its parking position.
> Open the hinged hood.
> Release the screws of the print head unit cover. Pull off the print head unit cover from the front, and deposit it at a clean place.

> Remove the printing substrate from the printer.

> Unscrew the small attachment blocks **(A)** of a guide roller. Note down the installation position of the individual blocks.
> Remove the guide roller **(B)** and put it down on a clean surface.
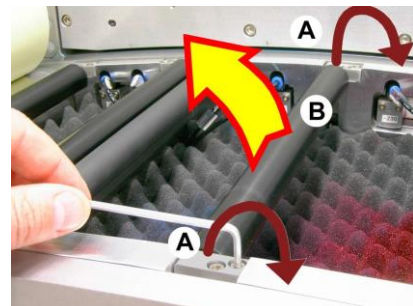
> Take a guide roller that is compatible with the new printing substrate (see table above).
> Clean the shaft stubs **(C)** of the guide roller and the two recesses **(D)** in the printing table.
> Carefully insert the guide roller into the two recesses. Ensure that the inscription on the roller is at the operator's side.
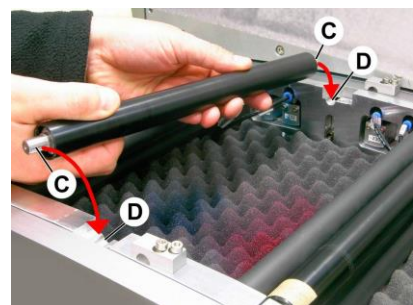
> Tighten the two attachment blocks.
> Ensure that the guide roller is straight and does not wobble.
> Following these instructions, also replace the other four guide rollers <u>one by one in succession</u>.

> Push the cover back onto the guide frame of the print head unit.
> Tighten the screws of the cover.
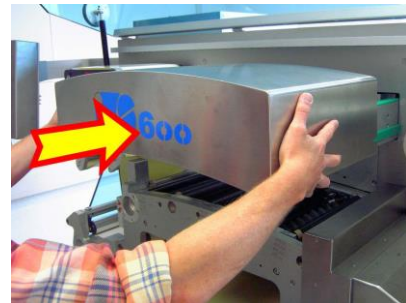
Adjust the scanning bar of the infeed height control unit:

> Release the screws #1 at both ends of the scanning bar.
> Rotate the scanning bar until mark #2 points to the correct value.
> Tighten the screws of the scanning bar.
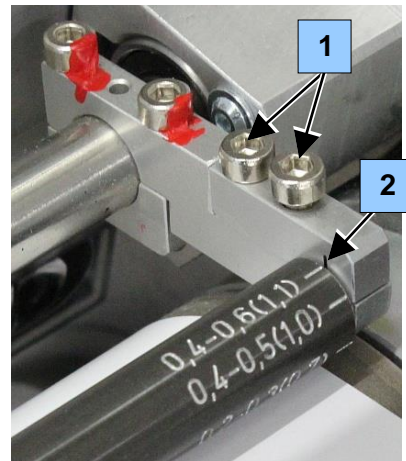
> Load the new printing substrate into the printer.
> If necessary, load the new image and format files.
> Close the hinged hood of the printer.
  The printer is ready to run.

Information

Continuing the rotation of the scanning bar of the infeed height control unit does not always lead automatically to the next higher or next lower value. Sometimes, values are skipped that are marked at a different location.

The reason is that the space for inscriptions on the scanning bar is limited. The limited space can better be used for inscriptions when the values are distributed over the entire roller.

10.6.10 Replacing the lighting unit on the camera system

	Information
i	When you replace the lighting unit on the camera system, pay particular attention to the deflecting mirror and the camera. Avoid any damage to deflecting mirror and camera lens, and any change of the camera adjustment.

Replacing the lighting unit

Use the following procedure to replace the lighting unit:

> Stop the printing process.
> Wait until the printing system has stopped.
> Shut down the printing system via the touchscreen.
> Press the red button of the ON/OFF switch.
> Disconnect the printing system from the power supply system. To do this, set the main switch to "0/OFF".
> Open the hinged hood.
> Loosen the two knurled screws #1 on the mirror carrier #2, and remove the knurled screws and the mirror carrier.

> Disconnect the plug-in connection #3 of the lighting.
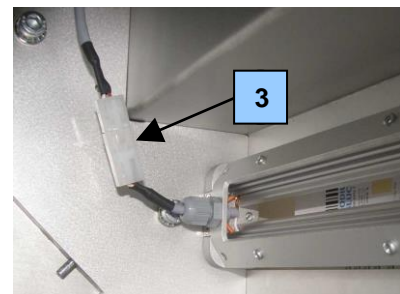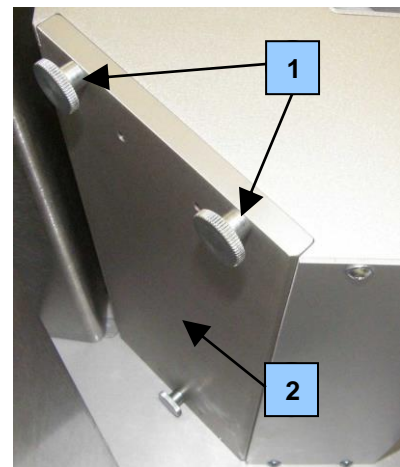
> Loosen and remove the Allen screw #4 on the lighting unit #5.
> Carefully pull out the lighting unit.
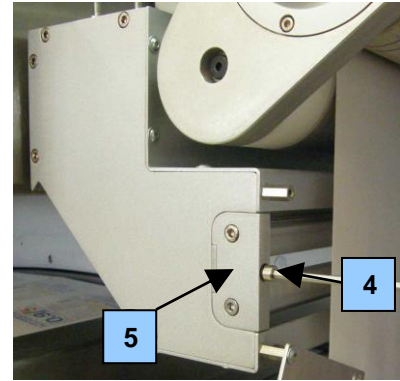
> Carefully insert the new lighting unit. Ensure that the lighting unit is inserted into the guide pins #6.
> Establish the plug-in connection #7 of the lighting.
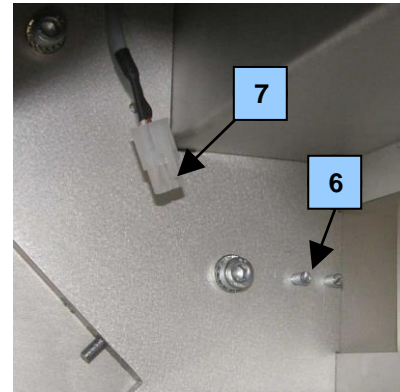
> Install and tighten the Allen screw #4 on the lighting unit.
> Position the mirror carrier #8 and install it with the associated knurled screws #9. To do this, insert and tighten the two knurled screws.
> Close the hinged hood.
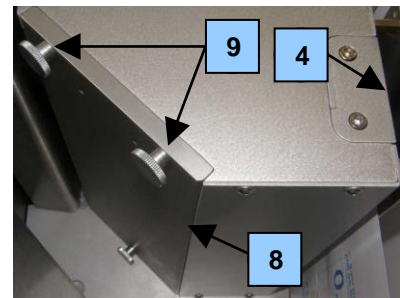
10.7   Cleaning the printing system

10.7.1   Necessity of regular cleaning

In order to achieve a sustained high printing quality, the printer's components have to be cleaned on a regular basis during which dirt and deposits are removed from the assemblies.

Dust, dirt particles and colour pigments may be deposited on the deflection rollers, leaving visible indentations in the print result like embossing stamps.

The cleaning work described below is to be carried out in accordance with the instructions in the table, and therefore should be performed at least once a day, preferably at the beginning of each shift, but no later than after 8 hours of operation. The list of tasks should be accomplished one by one. Only the recommended cleaning agents and aids should be used.

For reasons of safety, all of the cleaning work inside the printer that requires the removal of cover panels should be performed by a qualified service technician only.

10.7.2   Safety instructions for cleaning

⚠ Warning
Risk of injuries due to short circuits or flashovers.   ➔ Always keep wet and especially dripping wet cleansers away from ventilation slits, openings, gaps or joints.

⚠ Caution
The solvents and cleaning agents used can be hazardous to your health.   ➔ Operate the printer in well-ventilated spaces only.   ➔ Store solvents and cleaning agents in tightly sealed containers.   ➔ When handling solvents and cleaning agents, wear personal protection equipment (safety shoes, protective eyewear and protective gloves).   ➔ Store printing ink, solvents and cleaning agents in closed containers.   ➔ After contact with printing ink, solvents and cleaning agents, wash the affected areas and change contaminated clothing.   ➔ Do not eat or drink at the printer.   ➔ Observe the safety data sheets of the substances used.

Notice

Risk of damaging machine components by improper cleaning.

➜ Never spray or pour cleaning agents directly onto the machine, but rather, on-to the cleaning accessory only (cloth, cleaning swab). Penetrating moisture can destroy covered components.

➜ All bearings (guide rollers, hinges) should be dry-cleaned if possible. Whenev-er moist cleaning is required, make sure that moisture never penetrates the bearings!

➜ Never use moisture to clean hot parts of the machine! This will cause damage, for example to the cover lenses and to the LED UV module!

➜ Never clean the machine with high-pressure cleaners or with degreasing agents.

➜ The various components should be cleaned using only the substances and cleaning aids approved for this purpose (cf. tables in the sections to follow)!

➜ No warranty / guarantee claims will be accepted for damage incurred as a re-sult of non-compliance with the cleaning instructions or the use of unauthor-ized cleansers or cleaning aids.

10.7.3   Cleaning agents and aids for cleaning work

For the various cleaning tasks, use only the following cleaning substances and aids. Any other cleaning agents are prohibited! Especially when using solvents, make sure to check whether the surfaces are solvent-resistant!

10.7.3.1 Approved cleansers

Cleanser	Use	Suitable for	Unsuitable for
Cleaning fluid suitable for the type of UV ink used	Manual cleaning of the underside of the print head	Metal parts	Plastics, coated surfaces Glass shields of the curing system
Acetone	Dissolving and cleaning of dried-on ink blotches	Metal parts	Print heads Plastics, coated surfaces glass shields of the curing system all rubber-coated rollers (e.g. from the friction drive, web tension controller) rubber hoses Glass shields of the curing system
Isopropyl alcohol (pure, anhydrous)	Moist cleaning of small parts and large surfaces	All plastic and metal parts	Labels (could be dissolved when used intensively!) Grey rollers of the printing substrate cleaning module Glass shields of the curing system
Household glass cleaner	Moist cleaning of small parts and large surfaces	All plastic and metal parts	Grey rollers of the printing substrate cleaning module Glass shields of the curing system
Plexiglas cleaner	Moist cleaning of Plexiglas parts	Hinged hood and the safety doors	Grey rollers of the printing substrate cleaning module Glass shields of the curing system
Stainless steel spray	Spray on and wipe off immediately	Especially for the external stainless steel housing panels of the printer	Interior of the printer, since the substance could penetrate various components when sprayed.

10.7.3.2 Approved cleaning aids

Utensil	Use	Suitable for:	Unsuitable for:
Bristle brush, size 0 or 2	dry	(Housing), cleaning of corners and niches, sensors	large surfaces
Hand brush	dry	Rough pre-cleaning of large external surfaces. Removal of dry dust, small parts, etc.	Cleaning work around the print head unit
soft, lint-free cloths (fabric or paper)	dry, moist (isopropyl alcohol)	All large surfaces	Small parts in general, sensors
Cleaning cloths for print heads, order no.: FF100252100	Cleaning the underside of the print head / nozzle plate	For print heads only	Anything else
Cleaning swabs	dry, moist (isopropyl alcohol) dry	When moistened, for dissolving and removing dirt particles Removal of dry dust and lint	large surfaces, liquids, wet powder or granules, small parts (screws, nuts, etc.), web residue
Solvent-resistant protective gloves	Moist cleaning	Cleaning the underside of the print head, removal of ink blotches, touching objects that have ink or cleaning fluid on them	Dry cleaning of the external housing, handling heavy or sharp-edged objects
"Teknek" cotton gloves	dry	Touching the grey rollers of the printing substrate cleaning module	Everything else
Tekwipes MI6700" cloths	dry	Grey rollers of the printing substrate cleaning module	Everything else
compressed air	dry	Rough pre-cleaning of parts and circuit boards <u>at a distance to the printer</u>	Small parts
Scraper for (Ceran®) ceramic stovetops	dry	Removal of dried-on ink splotches from the glass plates of the UV main curing unit	Everything else
Special cleaning pads, order no. ZE1010-75	dry	Removal of dried-on ink splotches from the glass plates of the UV main curing unit	Everything else

Notice
Any other cleaning agents are prohibited!

10.7.4 Cleaning the printer

The various components of the printer should be cleaned in accordance with the specifications in the following table. Please comply with the restrictions regarding the use of cleaning substances and aids!

10.7.4.1 Outer surface, panels

Component:	Cleaning interval:	Should be cleaned by:	Approved cleaners and utensils:
Metal cover panels	As needed	Machine operator, cleaning personnel	Soft cloths, hand brush, special stainless steel cleaner, isopropyl alcohol
Plastic doors	As needed	Machine operator, cleaning personnel	Soft cloths, hand brush, Plexiglas cleaner, isopropyl alcohol
Control panel (casing)	As needed	Machine operator, cleaning personnel	Soft cloths, special stainless steel cleaner or isopropyl alcohol
Control panel (screen)	As needed	Machine operator, cleaning personnel	Soft cloths, special cleaner for screens, glass cleaner
Cable, pneumatic hose	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alcohol
Exhaust air hose (external)	As needed	Machine operator, cleaning personnel	Hand brush, soft cloths, isopropyl alcohol

10.7.4.2 Print head unit

Component:	Cleaning interval:	Should be cleaned by:	Approved cleaners and utensils:
Chassis, metal parts(!)	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alcohol, acetone, glass cleaner,
Nozzle plate from the underside of the print head	≤ 2 hours but also at the beginning and at the end of each shift	Machine operators, cleaning personnel	Wiper (automatic cleaning)
	at least 1x at the end of a shift	Specially trained (!) machine operators and service technicians	Cleaning cloths no. FF100252100, cleaning fluid suitable for the type of UV ink used
Pre-curing	at least 1x at the end of a shift	Specially trained (!) machine operators and service technicians	Cleaning cloths no. FF100252100, cleaning fluid suitable for the type of UV ink used

Compo-nent:	Cleaning in-terval:	Should be cleaned by:	Approved cleaners and utensils:
Rubber wipers	at the begin-ning and end of each shift	Specially trained (!) machine operators and service tech-nicians	Cleaning cloths no. `FF100252100`, cleaning fluid suitable for the type of UV ink used

10.7.4.3 Area around the print head unit

Compo-nent:	Cleaning in-terval:	Should be cleaned by:	Approved cleaners and utensils:
Metal panels	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alco-hol, acetone, glass cleaner
Interior walls	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alco-hol, acetone, glass cleaner
Web guider	1x per shift	Machine operator, cleaning personnel	Soft cloths, isopropyl alcohol
Guide rollers	1x per shift	Machine operator, cleaning personnel	Soft cloths, isopropyl alco-hol, acetone

10.7.4.4 Cleaning the inside of the printer chassis

Compo-nent:	Cleaning in-terval:	Should be cleaned by:	Approved cleaners and utensils:
Inside of chassis	As needed	Machine operator, cleaning personnel	Brush, vacuum; soft cloths, isopropyl alcohol

10.7.4.5 Unwinding unit and rewinding unit

Compo-nent:	Cleaning in-terval:	Should be cleaned by:	Approved cleaners and utensils:
Wall parts	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alco-hol, acetone
Plastic doors	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alco-hol, glass cleaner
Distance measuring system	As needed	Machine operator, cleaning personnel	Soft cloths, brush, isopropyl alcohol, glass cleaner
Unwinder shaft	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alco-hol
Cut-and-splice device	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alco-hol
Metal guide rollers	1x per shift	Machine operators, cleaning personnel	Soft cloths, isopropyl alco-hol, acetone
Metal rollers of the web tension con-troller	1x per shift	Machine operators, cleaning personnel	Soft cloths, isopropyl alco-hol, acetone

Component:	Cleaning interval:	Should be cleaned by:	Approved cleaners and utensils:
Rubber-coated rollers of the web tension controller	1x per shift	Machine operators, cleaning personnel	Soft cloths, isopropyl alcohol NEVER use acetone or other solvents
Electrodes of the substrate discharger	1x per shift	Machine operators, cleaning personnel	• Brush, vacuum for removing lint and substrate residue. • With cloths moistened with acetone to wipe ink off the metal contacts.

10.7.4.6 Rollers of the friction drive

Compo- nent:	Cleaning in- terval:	Should be cleaned by:	Approved cleaners and utensils:
Rollers of the friction drive	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alco- hol,

10.7.4.7 UV curing unit

Compo- nent:	Cleaning in- terval:	Should be cleaned by:	Approved cleaners and utensils:
All metal surfaces	As needed	Machine operator, cleaning personnel	Soft cloths, isopropyl alco- hol, acetone, glass cleaner
Glass lenses of the UV lamp module	1x per shift	Machine operator, cleaning personnel	Special cleaning pads no. `ZE1010-75` for removing small spots. Dry, soft cloths no. `FF100252100` for pre- cleaning. Scraper for (Ceran®) ceram- ic stovetops <u>only</u> to remove thick encrustations.

10.7.4.1 Printing substrate discharge

Component	Cleaning interval	Cleaning by	Approved cleansers and auxiliary equipment
Electrodes	1x per shift	Machine operator, cleaning staff	Remove adhering fluff and printing material residues with a brush. Clean adhering ink from the metallic contacts with acetone-damped cloths.

10.7.4.2 Cleaning the camera system

Component	Cleaning interval	Cleaning by	Approved cleansers and auxiliary equipment
Deflecting mirror	1x per week	Machine operator, cleaning staff	Dry, soft, fluffless cloths. If neces- sary, moisten the cloths with glass cleaner.
Camera lens	If necessary	Machine operator, cleaning staff	Dry, soft, fluffless cloths. If neces- sary, moisten the cloths with glass cleaner.

10.7.4.3 The printing substrate cleaning module

The printing substrate cleaning module is a purchased part manufactured by Teknek Ltd. The manufacturer's documentation for the part with detailed information can be found in the appendix.

Notice
When cleaning the rollers of the printing substrate cleaning module, use the specified cleaning agent only. Otherwise the components will be damaged and the warranty will be voided.

Part	Cleaning interval	To be cleaned by	Allowed cleansers and aids
Grey cleaning rollers	Once per shift , in case of dusty or fibrous printing material more often	Machine operator, cleaning personnel	Tekwipes MI6700 Clean, white cotton gloves
Grey cleaning rollers	Every three months	Machine operator, cleaning personnel	Roller Doctor System

10.7.4.4 Rear of printer (inside)

Part	Cleaning interval	To be cleaned by	Allowed cleansers and aids
Drives	As needed	Service technician	Soft cloths, isopropyl alcohol
Control devices	As needed	Service technician	Soft cloths, isopropyl alcohol
Proximity switch (blue)	As needed	Service technician	Brush, soft cloths, isopropyl alcohol
Circuit boards	As needed	Service technician	Brush, compressed air (at a distance to the printer!)
Fans	As needed	Service technician	Soft cloths, isopropyl alcohol

10.7.5 Cleaning the print heads

In order to achieve a high printing quality at all times during printing, all print heads of the ITS6 printer have to be cleaned on a regular basis.

When	Standard or intensive cleaning	Manual cleaning
After switching on	Yes	as needed only
When the printer is switched on, at intervals of at least every 2 hours	Yes	as needed only
After eight hours of operation	Yes	Yes
Before switching off	Yes	Yes

The correct cleaning of the print heads is decisive for the printing quality and the availability of the printer!

If a print head is not cleaned often enough or not at all, then the ink film and drops adhering underneath would harden with time and clog the nozzle plate. Since once nozzles are clogged, only rarely can they be cleaned again, either you'll have to accept longitudinal, white stripes in the prints from now on or else buy a new print head for thousands of Euros and install it.

But print heads can also be destroyed by incorrect cleaning methods, namely, whenever too much pressure is exerted against the nozzle plate when cleaning manually, but also, in particular, when the wrong type of cleaning cloths are used: either ones that are already dirty or ones that have a fuzzy surface and leave behind fibers on the nozzle plates with each wipe, clogging the nozzles.

Please emphasize to your employees how important it is to always handle the print heads with care and to strictly observe the cleaning procedures and intervals!

Notice

If the print heads are not cleaned often enough or are cleaned incorrectly, this will result in the loss of all warranty rights!

10.7.5.1 Mechanical cleaning of the nozzles

The print heads are cleaned with the aid of the cleaning program in the touchscreen. Ink is used to clean the print heads.

The cleaning process can be carried out on a single print head or on several print heads simultaneously.

A standard or intensive cleaning program can be selected.

Type of cleaning	Function
Standard cleaning	Light soiling During standard cleaning, the print heads in question are rinsed with a small amount of ink.
Intensive cleaning	Heavy soiling During standard cleaning, the print heads in question are rinsed with a greater amount of ink.

There are two methods of cleaning:

- With ink (standard and intensive)
- With cleaning fluid (for service technicians only)

Cleaning with ink

The purpose of standard cleaning with ink is to clean out any clogged nozzles in the print heads. During intensive cleaning, ink is forced through the print heads at high pressure several times.

After the ink has been forced through the nozzles, the print head unit will return automatically to its working position. During this forward movement, the wipers are flipped against the undersides of the print heads to wipe off any adhering drops.

Cleaning with cleaning fluid

When cleaning with cleaning fluid, first of all, all of the ink is forced out of the print heads. Afterwards, the print heads in question are filled with cleaning fluid and then rinsed.

Finally, they have to be refilled with ink.

After cleaning with cleaning fluid, a few test prints have to be made, because some cleaning fluid could still be present in the print heads and mar the quality of the printed images.

Not until the printed image is entirely OK and completely cured can production be restarted.

Notice
Cleaning with cleaning fluid should only be carried out when the printer is going to be taken out of operation for more than five days, since this procedure… … takes a long time, … requires a good deal of ink and cleaning fluid, … diluted ink cannot be cured completely.

How to proceed

> Open the tab *Job > Cleaning* on the touchscreen.

> Select the print heads to be cleaned. These will then be marked with a check mark.

> Select the cleaning procedure.

> Press the "Start" key.

Cleaning program sequence

Ink is forced into the print head and then is cleaned off with a wiper. This removes soil from the print head.

The fluid that escapes drips without splashing into a collection pan lined with a non-woven filter.

The fluid that collects in the collection pan passes through a drain into the residual ink bottle.

10.7.5.2 Manual cleaning of the print heads

The nozzle plate on the underside of each print head must be kept very clean at all times. If ever encrusted ink or anything else should collect here, such as shreds of substrate or adhesive tape, they should be removed immediately, bearing in mind the following instructions:

Required utensils:

- Clean, solvent-resistant protective gloves (cf. Chapter 2.5.5)
- Clean cleaning cloth for print heads Order no.: `FF100252100`
- Cleaning fluid suitable for the type of UV ink used

Notice
Prevent damage to the print heads and forfeiture of all warranty rights. ➔ Never touch a nozzle plate with your bare fingers! ➔ Never exert pressure on a nozzle plate! ➔ Never use any cleaning utensils other than the cleaning cloth no. `FF100252100` and the cleaning fluid suitable for the type of UV ink used! ➔ Do not re-use areas of a cleaning cloth that are already dirty!

In order to replace the wipers of the print heads, the entire print head unit must be moved back.

> Stop the printing process.
> Wait until the printer has come to a complete stop.

> Place the print head unit into the parking position: Press the button on the touchscreen.
> Open the middle door on the rear of the printer.

> Unlock the black knob. It's located on the right side above the collection pan.

> Pull the print head unit all the way back.

> Pull the collection pan out of the chassis and place it carefully on a level surface large enough to accommodate it.

> Remove a cleaning cloth order no. `FF100252100` from its package and immediately fold it in halves as shown here:
> > 2x crosswise

> 1x lengthwise

IMPORTANT !

- Never place the cloth being used aside either before or during cleaning!
- Always use only clean sections of the cloth for cleaning.

> Wrap the folded cloth around your index finger.

- Moisten the cloth with a little bit of cleaning fluid suitable for the type of UV ink used.

> NEVER wipe from one end to the other!

> First clean each wiper with a clean, lint-free cloth no. `FF100252100` and cleaning fluid suitable for the type of UV ink used.
After that the rubber wiper mustn't show any dirt or encrusted spots.
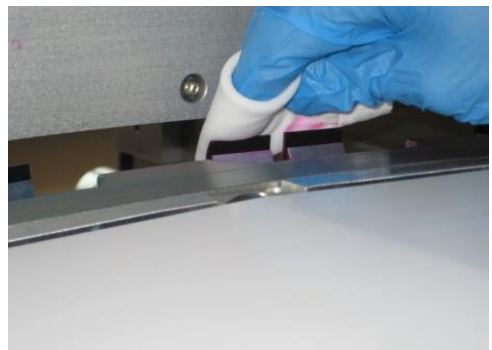
> Use backlighting to check the condition of all of the wipers:

- All wipers must point backwards,

- all wipers must be seated all the way down in their holders,

- wipers that are bent or torn or contain foreign bodies must be replaced immediately (See Chap.10.6.3 Changing the wipers on the print head.
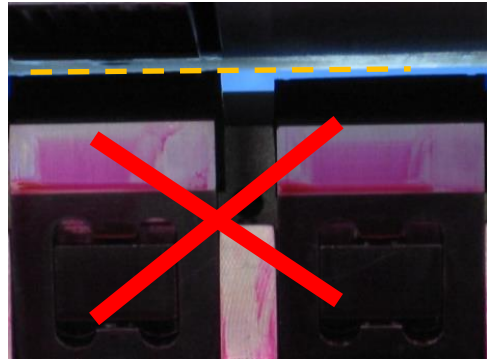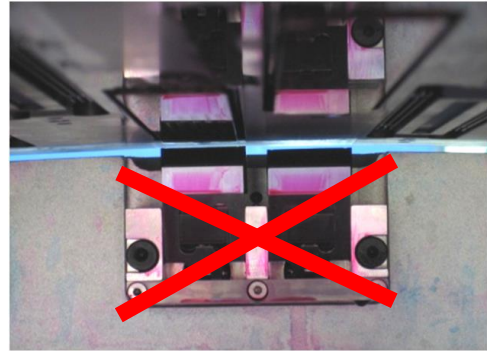
> First wipe from the back third of the print head towards your body and then wipe from the front third of the print head away from your body. Rotate your fingers slightly during the wiping process so that only clean parts of the cloth come into contact with the nozzle plate.
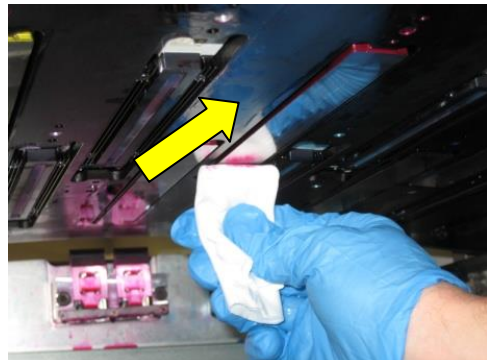
To better explain the sweeping motions that are mandatory during cleaning, the next six illustrations depict the cleaning of a print head that has been removed:

> Apply the cloth carefully to the front third of the print head.

> Push – without exerting pressure on the nozzle plate – the cloth carefully to the other end of the nozzle plate while <u>rotating</u> your finger <u>counterclockwise</u>:

> During the forward movement, continue to <u>rotate your finger counterclockwise without changing direction</u> …
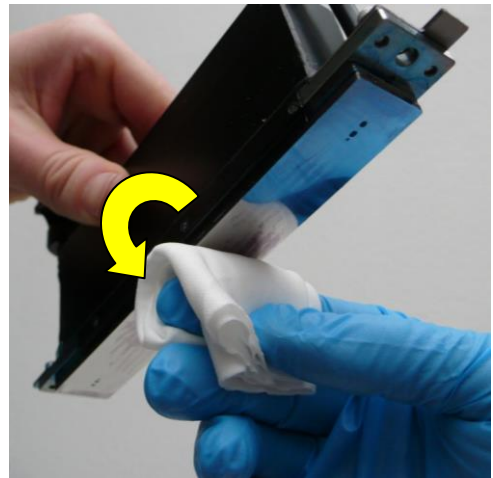
> Sweep the cloth beyond the back end of the nozzle plate so that no dirt remains behind on the print head.
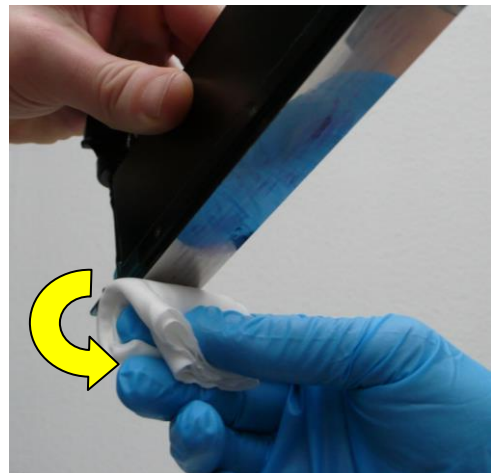
> Now fold the cloth so that a clean area is on top or else get a fresh, clean cloth.

> Carefully apply the cloth to the back third of the print
> Pull – without exerting pressure on the nozzle plate – the cloth carefully to the other end of the nozzle plate while <u>rotating</u> your finger <u>clockwise</u>:
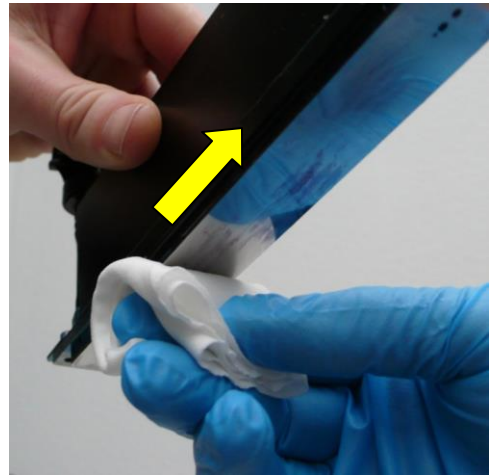
> While pulling, continue to <u>rotate your finger counterclockwise without changing direction(!)</u> …
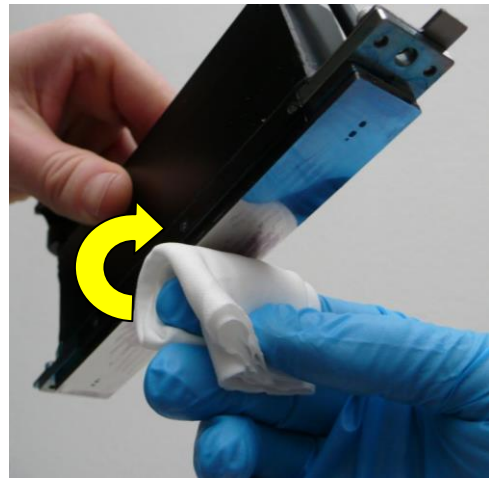
> Sweep the cloth beyond the back end of the nozzle plate so that no dirt remains behind on the print head.
> Make sure that no dirt gets into the nozzles of the wiper showers and clogs them.
> Repeat the previous 7 steps as often as necessary until the nozzle plate is shiny and spotless.

> Check all of the LED strips of the pre-fusing unit and clean if necessary using a dry, clean, lint-free cloth order no. FF100252100. If needed, the cloth can be moistened slightly(!) with cleaning fluid suitable for the type of UV ink used.
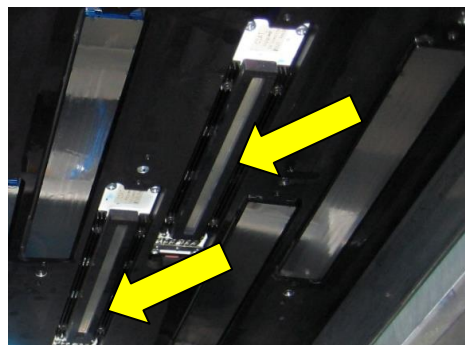
> Push the print head unit back in until the black knob locks in place.
> Return the print head unit to its working position: Press the ![button] button on the touchscreen
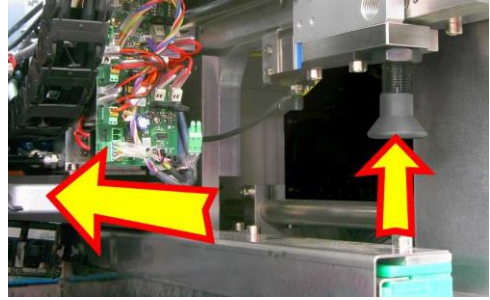
> Clean up any drops of fluid from the catch sheet under the print head unit. If needed, use cloths moistened with acetone.

> Carefully replace the collection pan in the chassis.
> Push the collection pan all the way in until you hear it click into place.

> Close the rear door of the printer.

> The machine is ready for operation again.

10.7.6 Inspection and cleaning of the main curing unit

Notice
Prevent any damage to the main curing unit due to incorrect cleaning. ➔ Any cleaning of the main cleaning unit may only be performed after the printer was switched off completely. ➔ The lamp modules should be no more than warm to the touch during cleaning. ➔ Only use the cleaning aids mentioned here.

Cleaning the main curing unit

> Unlock and remove lamp module.
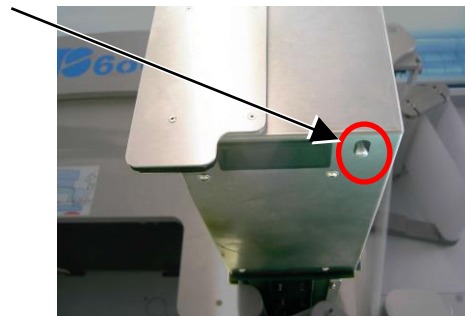
> Check the 3 glass covers for cleanliness.
> First remove loose dirt or wet ink with a dry, lint-free cloth (Order no. `FF100252100`)
> If heavy deposits are present, first remove them as much as possible using a ceramic stovetop scraper.
> Afterwards, remove the rest using a special cleaning pad no `ZE1010-75`.
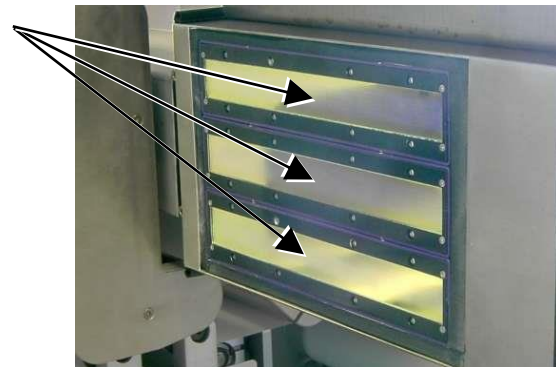
10.7.7 Checking and cleaning the pre-curing unit

The lamp modules of the precuring unit located beneath each print head always have to be kept clean. If they become too dirty, not enough light can be transmitted to the applied ink. As a result, the ink might not be properly crosslinked and the different colors could run into each other.

Required aids:

- Clean, solvent-resistant protective gloves (see Chap. 2.5.5)

- Spotless cleaning cloth for print heads CSAT order no.: `FF100252100`

- Cleaning fluid suitable for the type of UV ink used

Notice
The print heads located next to the lamp modules of the pre-curing unit are very sensitive! Therefore…
➔ never touch their nozzle plates with your bare fingers
➔ do not exert pressure on the nozzle plates
➔ do not work with hard objects in the area beneath the print heads
➔ therefore, remove bracelets and rings.
Non-compliance will result in the loss of all warranty rights!

The lamp modules of the pre-curing unit are not cleaned during the mechanical print head cleaning process, but rather, they can – and must – be cleaned by hand only. This is usually done at the same time as the manual cleaning of the print heads, but it can also be done more often as needed according to the following instructions.

In order to be able to check and clean the lamp modules of the pre-curing unit, the entire print head unit has to be pushed back into its service position.

> Stop the printing process.
> Wait until the printer has shut down completely.

> Open the middle door at the rear of the printer.

> Unlock the black knob. It's located on the right side above the collection pan.

> Pull the print head unit all the way back.

> Pull the collection pan out of the chassis and place it carefully on a level surface large enough to accommodate it.

> Remove a cleaning cloth order no. `FF100252100` from its package and immediately fold it in halves as shown here:
>   > 2x crosswise
>   > 1x lengthwise

IMPORTANT !

- Never place the cloth being used aside either before or during cleaning!
- Always use only clean sections of the cloth for cleaning.

> Wrap the folded cloth around your index finger.

> Moisten the cloth with a little bit of cleaning fluid suitable for the type of UV ink used.

IMPORTANT !

- Never place the cloth being used aside either before or during cleaning!
- Always use only clean sections of the cloth for cleaning.
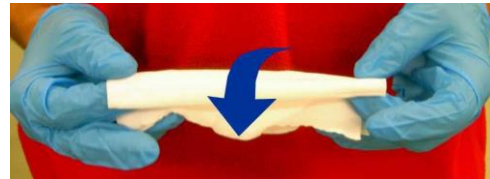
> **Check all of the LED light strips of the pre-curing unit** between the print heads and clean them using a dry, clean and lint-free cloth (CSAT order no. `FF100252100`). The cloth may be slightly (!) moistened with cleaning fluid suitable for the type of UV ink used as needed.
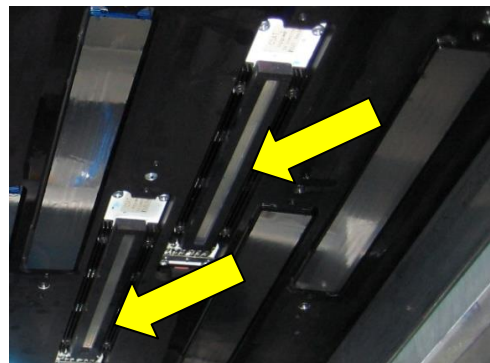
> Make sure that the narrow light strips of all lamp modules are spotless and streak-free (see detail photo).

> If a lamp module exhibits scratches or dull areas, a service technician must be called.

> Clean up any drops of fluid from the catch sheet under the print head unit. If needed, use cloths moistened with acetone.

> Carefully replace the collection pan in the chassis.
> Push the collection pan all the way in until you hear it click into place.

> Close the rear door of the printer.
> Return the print head unit to its working position: Press the 🔼 button on the touchscreen

> The machine is ready for operation again.

10.8   Repairs

The "Repairs" chapter is intended predominantly for service technicians or qualified persons who usually step into action whenever there is more extensive maintenance work or repairs to be done or during extraordinary events, such as transports or conversions.

Notice
Damage due to improper repair work.
➔ Do not perform any repairs on your own. Perform repair work only in coordination with Markem-Imaje CSAT GmbH.
➔ Use only original replacement parts.
➔ Observe the supplier's documentation.

Please contact us when the printer has problems or defects.

10.9   Backup & Restore – data protection

The necessity of regular back-ups

The ITS6 printer backs up data by means of an integrated PC with its own hard disk. This is where all of the data needed for printing, such as the operating system, image and format files, as well as the log files, which are needed for the uninterrupted documentation of the production process, are stored.

In order to avoid a loss of production due to the loss of data, it is necessary to make a back-up of all of the data stored on the hard disk on a regular basis.

The backup is made on the bootable USB flash drive included with delivery.

How often backups are made is left to the discretion of the owner.

10.9.1   Making a backup

When a backup is made, all of the data stored on the hard disk of the printer is copied in blocks, which are then kept as a backup copy apart from the printer.

By importing the last data to be saved, the system can be restored to the condition it was in at the time the last backup was made.

Required equipment:
- Bootable USB flash drive
- Standard computer keyboard with USB interface

Information

The operating system does not need a backup since the operating system is already stored on the USB included with delivery.

Procedure

Please comply with the sequence of steps.

> Stop any ongoing printing pro-
> cess.
> Shut down the printer and its
> UV curing system and switch
> off the printer completely:
>> Press the red "0" button of
>> the ON/OFF switch for this
>> purpose
>> Turn the round main switch
>> to the "0" position.
> Connect a standard computer
> keyboard to any of the two USB
> interfaces of the control panel.
> Connect the USB flash drive to
> the other USB interface.

ℹ **Information**

In order to avoid malfunctioning of the printer, the smaller "ON/OFF"
switch must be left switched off during the backup!

> Turn the round main switch to
> the "I" or "ON" position.
> The following menu will be
> shown on the display:
> Select "F2 - Make backup."
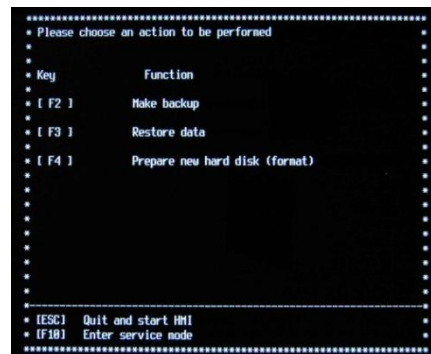
> The following selection menu will be shown:

> Tap once on the particular F-key "F__" next to the data you want to select to be copied onto the USB flash drive.

> To correct an entry, tap again on that particular F-key. The cross "X" will disappear from the "on/off" column and that data will not be included in the backup.

> Once all of the data blocks to be saved have been selected, tap on the function key "F10."
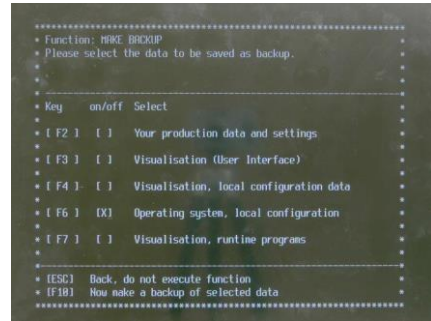
Function key:		Data included in backup:
F2	"Your production data and settings"	All production-related data (e.g. layouts, formats, log files)
F3	"Visualization (User Interface)"	All information about the user interface (pages, control elements, text, etc.).
F4	"Visualization, local configuration data"	The settings of the touchscreen, which apply specifically to the printer (e.g. specially adapted text or access rights)
F6	"Operating system, local configuration"	The complete operating system (Linux).
F7	"Visualization, runtime programs"	The basis software of the control system. This is required, for instance to make the control elements (see F3) visible
ESC	"Back, do not execute function"	Cancels the entry and returns to the previous selection menu. No backup will be made.
F10	"Now make a backup of the selected data"	All of the data blocks checked in the "on/off" column will be copied to the USB flash drive after this key is tapped.

Information

It is not possible to backup the operating system (key "F5"). The operating system is already stored on the USB included with delivery.

> The following screen will appear. Please select:

> Start the backup with the "F10" key.

OR:

> Cancel the backup with the "ESC" key.
This is needed, for instance, when data on the USB flash drive would be overwritten without having been saved.
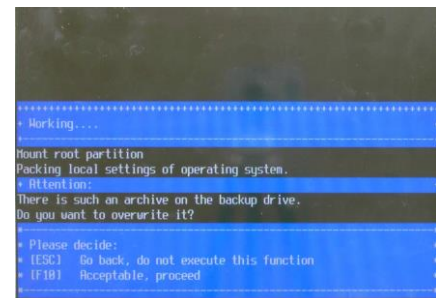
The data are packed. This process can take several minutes.

> When the data block has been transmitted successfully, the system will always show the following screen.

> Tap on the "ESC" key to continue with the backup.

> The following screen will be shown. Please select: "ESC"

> Wait until the turquoise line "Please hit return and … (blank screen)" is shown.

> Tap on: "ESC".

> As soon as only a black screen is shown <u>after</u> the green line of text "Preparing for reboot…" is displayed, pull out the USB flash drive <u>immediately</u>, since otherwise the system would reboot from the USB flash drive again.
Store the USB flash drive in a safe place apart from the printer.

The operating system will boot:

> Disconnect the standard computer keyboard.

> Disconnect the USB flash drive.

> The backup is finished. Now you can either switch off the printer completely (turn the round main switch back to the "0" or "OFF" position) or started back up by pressing the smaller "ON/OFF" switch.
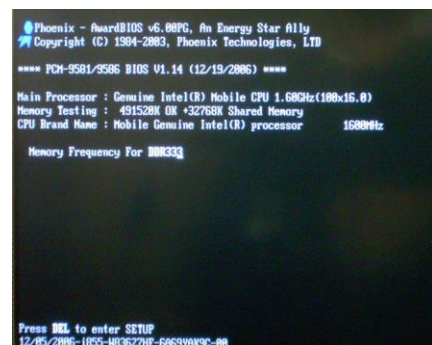
10.9.2 Performing a restore operation

With a restore operation, you can replace deleted or destroyed data sets from the printer with the data sets saved during the last backup. All or part of the data blocks saved on the USB flash drive will be copied to the hard disk of the printer.

> **Information**
>
> Data sets and logs that were created after the last backup will also be deleted in the course of a restore operation.

The basic requirement for a successful restore operation is the proper functioning of the hard disk installed in the printer! If it is damaged, then a new hard disk should be installed and the printer should be reconfigured before the restore process is carried out (cf. Section 10.9.2).

Required equipment:

- Bootable USB flash drive
- Standard computer keyboard with USB interface

Please comply with the sequence of steps.

> Stop any ongoing printing process.
> Shut down the printer and its UV curing system and switch off the printer completely:
>> Press the red "0" button of the ON/OFF switch for this purpose
>> Turn the round main switch to the "0" position.

> Connect a standard computer keyboard to any of the two USB interfaces of the control panel.
> Connect the USB flash drive to the other USB interface.

> **Information**
>
> In order to avoid malfunctioning of the printer, the smaller "ON/OFF" switch must be left switched off during the restore operation!

> Turn the round main switch to the "I" or "ON" position.
> The following menu will be shown on the display:
> Select "F3 – Restore data."

```
*************************************************
* Please choose an action to be performed       *
*                                                *
* Key             Function                       *
* [ F2 ]          Make backup                    *
*                                                *
* [ F3 ]          Restore data                   *
*                                                *
* [ F4 ]          Prepare new hard disk (format) *
*                                                *
*                                                *
*                                                *
*                                                *
*-----------------------------------------------*
* [ESC]   Quit and start HMI                    *
* [F10]   Enter service mode                    *
*************************************************
```
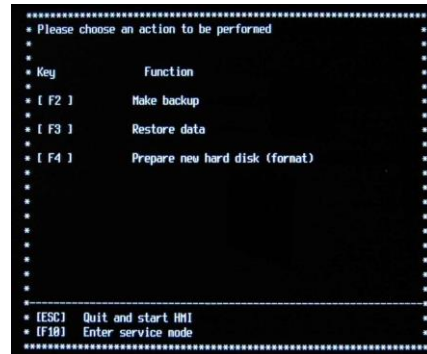
> Tap on the particular function key "F__" to select which of the data blocks on the hard disk of the printer you want to replace with the data on the USB flash drive
> To correct an entry, tap again on that particular function key. The cross "X" will disappear from the "on/off" column and that data will not be included in the backup.
> Once all of the data blocks to be replaced have been selected, tap on the function key "F10."

```
* Function: RESTORE SAVED DATA
* Please select the data to be restored from backup
* [-] means: No backup data of this type on backup drive!

* Key      on/off  Select
* [ F2 ]   [X]     Your production data and settings
* [ F3 ]   [X]     Visualisation (User Interface)
* [ F4 ]   [X]     Visualisation, local configuration data
* [ F5 ]   [X]     Operating system
* [ F6 ]   [X]     Operating system, local configuration
* [ F7 ]   [X]     Visualisation, runtime programs

* [ESC]   Back, do not execute function
* [F10]   Now restore selected data
```

Function key:		Function of the data blocks:
F2	"Your production data and settings"	All production-related data (e.g. layouts, formats, log files)
F3	"Visualization (User Interface)"	All information about the user interface (pages, control elements, text, etc.).
F4	"Visualization, local configuration data"	The settings of the touchscreen, which apply specifically to this printer (e.g. specially adapted text or access rights)
F5	"Operating system,	The complete operating system (Linux).
F6	"Operating system, local configuration"	The complete operating system (Linux).
F7	"Visualization, runtime programs"	The basis software of the control system. This is required, for instance to make the control elements (see F3) visible
ESC	"Back, do not execute function"	Cancels the entry and returns to the previous selection menu. No restore operation will be performed.
F10	"Now make a backup of the selected data"	All of the data blocks checked in the "on/off" column will be copied to the USB flash drive after this key is tapped.

> The following screen will appear. Please select:
  > Start the backup with the "F10" key.

     OR:

  > Cancel the restore process with the "ESC" key.
    This might be needed, for instance, when data on the hard disk would be overwritten without having been saved.
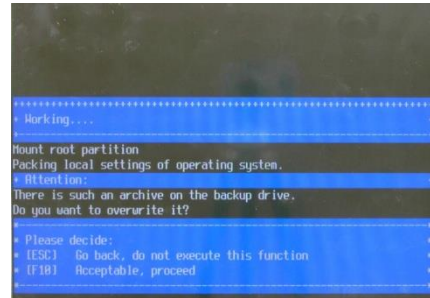
The data is transmitted. This process can take several minutes.

> When the data transmission has been concluded successfully, the system will show the following screen.
> Tap on the "ESC" key.
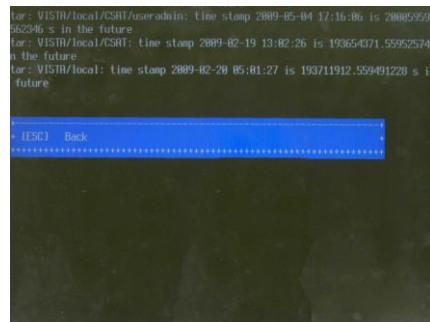
> The following screen will be shown. Please select: "ESC"

> Wait until the turquoise line "Please hit return and … (blank screen)" is shown.
> Tap on: "ESC".
> As soon as only a black screen is shown <u>after</u> the green line of text "Preparing for reboot…" is displayed, pull out the USB flash drive <u>immediately</u>, since otherwise the system would reboot from the USB flash drive again.
  Store the USB flash drive in a safe place apart from the printer.

The operating system will boot:

> Disconnect the standard computer keyboard.
> The backup is finished. Now you can either switch off the printer completely (turn the round main switch back to the "0" or "OFF" position) or started back up by pressing the smaller "ON/OFF" switch.
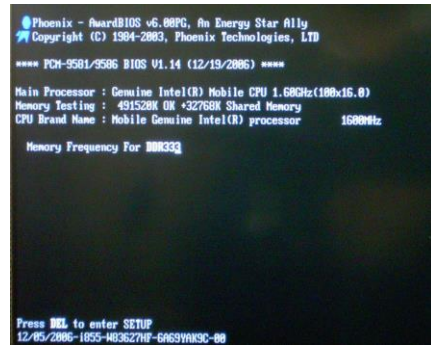
10.9.3   Replacing a hard disk

If the printer does not respond at all to commands or entries, or if it exhibits a conspicuous number of malfunctions for which there is no other reasonable explanation, if the printer does not start up at all after being switched on, this could be caused by a damaged hard disk in the printer. In this case, the old hard disk has to be replaced with a new one of the same construction, onto which the data from the last backup has to be transferred by performing a restore operation (cf. Section 10.9.2 of this manual).

The complete replacement of a damaged hard disk in the printer only takes a few minutes and must be performed only by qualified employees trained for this purpose!

Information

Data sets and logs on the hard disk to be removed that were created after the last backup have to be backed up themselves (cf. Section 10.9.1)!

Required equipment

- Bootable USB flash drive

- Standard computer keyboard with USB interface

- New serial ATA hard disk

Please comply with the sequence of steps.

> Stop any ongoing printing process.
> Shut down the printer and its UV curing system and switch off the printer completely:
  > Press the red "0" button of the ON/OFF switch for this purpose
  > Turn the round main switch to the "0" position.
> Connect a standard computer keyboard to any of the two USB interfaces of the control panel.
> Connect the USB flash drive to the other USB interface.
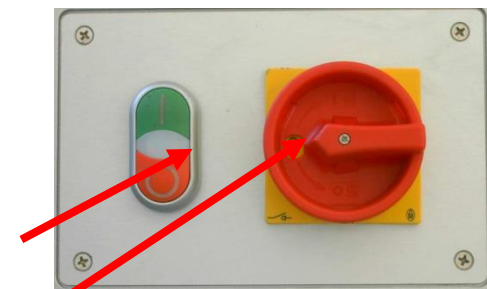
Information

Avoid malfunctioning of the printer,:
- ➔ The smaller "ON/OFF" switch must be left switched off during the restore operation!
- ➔ No other cables should be removed or especially be mixed up with one another!

> Remove the larger of the two cover plates on the rear of the control panel.
> Carefully(!) remove the small screw next to the upper left-hand corner of the hard disk.

> Lift up the gray metal casing gently and pull it to the left.
> Pull off the black connection plug at the same time.
> Remove the hard disk and place it on a clean table.

> Remove the four small attachment screws shown here and lift the old hard disk out of the gray casing.
> Insert the new hard disk in gray casing.
> Reattach the four attachment screws in all four corners.

> Place the metal casing with the new hard disk in the control panel.
> Attach the black plug to the hard disk.
> Screw down the hard disk with the screw in the upper left-hand corner.

> Turn the round main switch to "I" or "ON."
> The following menu will appear on the display:
> Select "F4 - Prepare new hard disk (format)."

```
**********************************************
* Please choose an action to be performed    *
*                                             *
* Key            Function                     *
* [ F2 ]         Make backup                  *
*                                             *
* [ F3 ]         Restore data                 *
*                                             *
* [ F4 ]         Prepare new hard disk (format)*
*                                             *
*                                             *
*---------------------------------------------*
* [ESC]   Quit and start HMI                  *
* [F10]   Enter service mode                  *
**********************************************
```

> The following screen will appear. Please select:
  > Start the formatting with the "F10" key.
     OR:
  > Cancel formatting with the "ESC" key.
> If you're sure that formatting should be carried out, then when prompted, answer with "Y" ("Yes, I'm sure").

```
* Function: PREPARE NEW HARD DISK

* CAUTION!
* This function is used to build a new system or for the recon-
  struction of a saved one on a new hard disk.

* If you proceed all data on this hard disk will be destroyed if
  there is any.


* [ESC]   Back, do not execute function

* [F10]   Initialize hard disk, destroy all data on it.
```

The data will be transferred. This process can take several minutes.

> When the data transfer has been successfully completed, the system will show the following screen.
> Tap on the "ESC" key.

```
Working...

DiskSize=160GB
Build swap partition
Build root partition
Set Boot flag
Wait for file devices
Formatting swap partition
Formatting root partion with Reiser FS
Mounting root to /mnt/mydisk

[ESC]   Back
```

> The following screen will appear. Please select: "F3" and perform a complete restore operation.

```
**********************************************
* Please choose an action to be performed    *
*                                             *
* Key            Function                     *
* [ F2 ]         Make backup                  *
*                                             *
* [ F3 ]         Restore data                 *
*                                             *
* [ F4 ]         Prepare new hard disk (format)*
*                                             *
*                                             *
*---------------------------------------------*
* [ESC]   Quit and start HMI                  *
* [F10]   Enter service mode                  *
**********************************************
```

> In the selection menu shown here, click on keys "F2" to "F7."
> Perform a complete restore operation (cf. Section 10.9.2).

```
**********************************************
* Function: MAKE BACKUP
* Please select the data to be saved as backup.


* Key       on/off  Select

* [ F2 ]   [ ]    Your production data and settings

* [ F3 ]   [ ]    Visualisation (User Interface)

* [ F4 ]   [ ]    Visualisation, local configuration data

* [ F6 ]   [X]    Operating system, local configuration

* [ F7 ]   [ ]    Visualisation, runtime programs

* [ESC]   Back, do not execute function
* [F10]   Now make a backup of selected data
```

10.10   Consumables concept

The consumables of the ITS6 printer:

- Ink

- Cleaning fluid

- Rubber covered rollers of the friction drive and web tension controls

- Print heads

- Pre-curing units

- Lamp module of main curing unit

- Wipers

- Ink filter

- Degassing unit

- Activated charcoal filter

- Filter fleece liner of collection pan

- Suction inlet

- Suction outlet

- Adhesive rollers of the printing substrate cleaning module

Information

- Whenever additional consumables are needed in addition to what was procured initially, then these must be obtained as new parts. It is not possible to purchase used and reconditioned components.

- The exchange prices given in the list of consumables refer only to the repair or reconditioning of components that have already been supplied.

10.10.1 Auxiliary supplies

"Auxiliary supplies" refers in general to all work supplies that are needed to maintain the availability of a means of production, and which do not become part of the particular end product – the printed material in this case. In addition to power, most notably water and lubricants and cleansers are considered classic auxiliary materials.

10.10.1.1 Water

The printer needs cooling water for cooling purposes.

Both the main curing and pre-curing units are liquid-cooled. The coolant is supplied from a separate cooling unit and circulates in a closed hose system.

For coolant, use a mixture of 2 parts of de-mineralised water and 1 part propylene glycol with corrosion inhibitor (e.g. Pekasol).

Further information concerning the coolant is included in the manual for the cooling appliance which is attached in the appendix of these instructions as well as in chapter 3.6 of this manual.

10.10.1.2 Lubricants

All bearings of the ITS6 printer are permanently lubricated. No central lubricating system has been installed. Likewise, manual lubrication is also not necessary.

10.10.1.3 Cleaning agents

The only approved products for keeping the ITS6 printer clean are pure, anhydrous isopropyl alcohol, mild (Plexi)glass cleaner, soft, lint-free cloths, bristle brushes, lint-free cleaning swabs, such as "Foamtips" swabs, and special stainless steel cleaning sprays. In addition, the "Tekwipes" for cleaning the grey rollers of the printing substrate cleaning module are also allowed.

Treatment

The printer should be dry cleaned as much as possible. For stubborn spots, the cleaning tools can be moistened, but not saturated until dripping with the aforementioned cleaning substances.

10.11 Schedule for the replacement of consumable components

Consumable	Order no.	Usual life cycle
CSAT ITS6 UV Ink Cyan **G2**, 1000 ml	`HT4001201`	When required
CSAT ITS6 UV Ink Magenta **G2**, 1000 ml	`HT4001202`	When required
CSAT ITS6 UV Ink Yellow **G2**, 1000 ml	`HT4001203`	When required
CSAT ITS6 UV Ink Black **G2**, 1000 ml	`HT4001204`	When required
Cleaning fluid for print heads, suitable for **G1/G2** UV ink	`HT4001100`	When required
Rubber roller, friction drive	`ZEFI.007.00.E`	300 000 m
Rubber roller, web tension control	`ZEFI.007.00.E`	300 000 m
Wiper	`FF100251100`	700 h
Activated charcoal filter 300 x 80 x 37 mm	`FF100386100`	250 h
Outlet filter fleece (rectangular), air circulation system	`FF100312100`	250 h
Filter fleece for collection pan	`FF100313100`	When required
Filter fleece for intermediate reservoir, 420 x 165 x 15 mm	`ZETB.078.00.M`	When required
Foam rubber for printing table	`ZEFD.029.00.M`	When required
Intake filter fleece (round), air circulation system	`ZECV.008.00.M`	250 h
Cleaning cloth for print heads (300 pcs.)	`FF100252100`	For single use
Filter fleece for ink management (with cutout) 420 x 165 x 15 mm	`FF100314100`	When required
Filter fleece for degassing unit, 400 x 65 x 15 mm	`FF100315100`	When required
Roller with adhesive foil (1 item) for printing substrate cleaning module	`FF100316100`	When required
Cleaning roller (1 pc) for printing substrate cleaning module	`ZE1010-42`	12 months, or even earlier, if required
Tekwipes (1 package) for printing substrate cleaning module	`FF100317100`	When required
Roller Doctor Kit for printing substrate cleaning module	`FX107428100`	When required

Consumable	Order no.	Usual life cycle
Residual ink bottle	FF100318100	When required
Filter fleece below residual ink bottle	FF100319100	When required
Filter fleece drain module, 65 x 35 x 15 mm	FF100320100	When required
Ink filter module (incl. 5 ink filters)	EG7TB021000	2 000 h
Cleaning set ITS6	ZE1010-43	When required
Adhesive tape, red, 66 m x 50 mm (1 pack. with 3 rolls)	FF100321100	When required
Abrasive pad for the UV curing	ZE1010-75	For single use
Round blade no. 727 (Martor)	FF100322100	When required

Status: Nov. 09, 2016

The actual service lives that can be achieved are highly dependent on the daily maintenance, properties of the printing material in question and repair and on the climatic conditions around the printer and, consequently, they can vary by around ±30 % as compared to the intervals given in this table. If the operating conditions are particularly favorable on the other hand (dust-free air, constant room temperature and relative humidity, clean printing substrate), then the service life of individual components can be almost doubled. This does not affect the warranty term given by the manufacturer, however.

By contrast, if the service life of a component proves to less than 70 % of the time period given in the table, the cause is more than likely due to the soiling of the machine as a result of insufficient cleaning and care and/or unfavorable environmental conditions.

If part of a consumable module has reached the end its guaranteed useful life shown in the following time schedule and, therefore, either has to be reconditioned by the manufacturer or be replaced with a new part, the *Consumable* key in the HMI will be marked conspicuously with a yellow warning sign ⚠ in order to indicate this condition to the operating personnel. Which of the consumables has actually been used-up can also be ascertained by simply glancing at the tab in the *Consumables* sub-menu, since the letters in the name of the tab in which the used-up material is listed will now appear red, while the counter reading of the used-up material will exhibit a red background. The part in question should be removed at once by a service technician or an operator specially trained for this purpose, and then be replaced by a reconditioned or brand-new replacement part. Afterwards, the service life meter in the *Consumables* sub-menu has to be reset to zero, of course.

If for whatever reason the reminder to make a replacement was ignored, then the printer can still be used after the displayed message is acknowl-

edged, however in this event the manufacturer will accept no liability or guarantee. The respective owner would bear all risks solely.

Components that need to be reconditioned should always be returned in their custom packaging to the manufacturer Markem-Imaje CSAT GmbH.

Information

Return the dismantled components exclusively in their customized packaging and <u>fill out the accompanying return receipt carefully and completely</u>, since fast processing cannot be guaranteed without a precise reason for the return. – Non-observance of these requirements can result in the loss of all warranty rights!

After the reconditioning of the component in question, Markem-Imaje CSAT GmbH grants a warranty for the next interval of use. If a part should exhibit a defect as a result of a production error before the scheduled time period expires, the costs of materials for the subsequent repair will be calculated proportionate to the actual service life achieved. The basis for assessment of the costs incurred are the replacement part and consumable part lists valid at the time of the repair. 70 % of the recommended replacement interval is used as a basis.

This guarantee covers only the material costs of the part in question but does not cover any consequential costs incurred by the premature defect, for instance for production losses or delivery delays. The costs for any service technicians required must be carried by the user proportionate to the actual service life.

If a component is used beyond the service life indicated in the replacement schedule, this is done at the sole risk of the machine owner. The warranty for full and proper functioning cannot be granted by Markem-Imaje CSAT GmbH until after reconditioning.

11 Storage

According to the experience of Markem-Imaje CSAT GmbH, all replacement parts and consumables for the ITS6 printer can be kept indefinitely when stored properly.

If individual articles have a limited lifetime due to special circumstances, this will be indicated on the package.

Information

➔ Store consumables in a cool and dry place.

➔ Use the customized packages for storage.

➔ Protect against all exposure to light – especially sunlight!

➔ The cartridges and the original package (carton) should be kept closed.

➔ Do not store near oxidizing agents, acids or alkali.

11.1 Printer

Whenever the ITS6 printer isn't going to be used for some period of time, then the cartridges for ink and cleaning fluid should be removed and the printer and all of its accessories and consumables should be stored in a cool, dry place with as little exposure to light as possible. The following ambient conditions must be met:

Component	Storage temperature
Printer	+15°C (+59°F) to +30°C (+86°F)

Electronic components should be left in their original packages to protect them against electrostatic charges, and should be handled as little as possible.

Ideally, the printer should be stored in the transport crate in which it was delivered. If the transport crate is no longer available, the machine can be covered with light-impermeable tarpaulins for the duration of its storage.

Notice

Make sure there is adequate air circulation in the storage space so that condensation cannot form.

11.1.1 Storage of ink and cleaning fluid

The storage life of ink and cleaning fluid is limited . When you store inks and cleaning fluids, observe the corresponding information on the cartridges. Do not use ink and cleaning fluid beyond the expiration date that is printed on the cartridges.

Notice
Avoid any damage to print head and ink system from spoiled ink and cleaning fluid.
➔ Do not use them beyond the expiration date. Using ink and cleaning fluid beyond the expiration date can damage the ink system of the printer and the print heads. Any resulting damage can not be subject to warranty claims.

Notice
➔ The cartridges for ink and cleaning fluid should be stored in a cool and dry place.
➔ Protect against all exposure to light – especially sunlight!
➔ Leave all supplied replacement parts and consumables in their original packages in order to avoid damage and environmental influences.
➔ The cartridges and the original package (carton) should be kept closed.
➔ Do not store near oxidizing agents, acids or alkali.

Ink should be consumed no later than two years after the fill date printed on the cartridge.

Component	Storage temperature
ink and cleaning fluid	+15°C (+59°F) to +25°C (+77°F)

Component	Relative humidty
ink and cleaning fluid	30% r.h. to 60% r.h.

11.1.2 Storage of cleaning agents

All cleaning agents should be stored away from the printer in their designated places on shelves or in cabinets. It is not permitted to make cloths and/or containers "handy" by placing them on or especially in the printer.

11.1.3   Storage of replacement parts and consumables

Electronic components should be left in their original packages to protect them against electrostatic charges, and should be handled as little as possible.

All consumables should be kept in their customized packages in a cool and dry place and be protected against exposure to direct sunlight.

Please take account of the expiry date on the packagings, especially in case of ink and cleaning fluid.

12 Disassembly and Disposal

Disassembly and disposal should be carried out only in coordination with Markem-Imaje CSAT GmbH.

> **Information**
>
> When disassembling and disposing of the machine or machine components, please observe the documentation of the supply companies (see appendix of this manual).

12.1 Safety instructions for disassembly of the machine

When the machine is taken out of commission, certain hazards can be expected.

⚠️ **Warning**
Risk of fatal injury from contact with live parts. ➔ Work on electrical equipment must be performed only by authorized personnel qualified in electronics. ➔ Do not work on live parts.

⚠️ **Warning**
Deadly injuries due to improper transport. ➔ Use only approved lifting gear with adequate lifting and load-bearing capacity. ➔ Make sure lifting gear is attached properly. ➔ Wear suitable personal protection equipment (PPE). ➔ Do not stand under suspended loads. ➔ Even when moving short distances, the machine must be disconnected from every external power source! The machine must be reconnected to the power supply properly before restarting!

⚠ **Caution**
➜ Direct contact with leaking operating fluids can cause damage to skin.
➜ Wear solvent-resistant gloves and protective eyewear when handling the media.
➜ Avoid contact with operating supplies and cleansers!
➜ Wash exposed skin parts thoroughly. If skin irritation persists, see a doctor.
➜ Change contaminated or saturated clothing immediately.
➜ Observe the safety data sheets of the substances used.

Caution
Avoid environmental damage from exhausted consumables and cleansers.
➜ Take precautions to collect spilled consumables and cleansers (sealed floor, collection pan, small collection pans, collecting tarpaulins).
➜ Pour binding agent on spilled substances, and dispose of the soaked binding agent as hazardous waste.
➜ Collect consumables in suitable containers, and dispose of them through a specialized waste disposal company in an environmentally compatible way.
➜ Observe the applicable environmental regulations for the disposal of consumables and cleansers.
➜ If required, dispose of exhausted consumables and cleansers as hazardous waste.
➜ Observe the data sheets from the manufacturers (see Appendix to this manual).

12.2   Disassembly of the machine

When the machine has to be disassembled at the end of its service life, this work should be assigned to qualified personnel.

> For the disassembly, the printer must be disconnected properly and thoroughly from the power supply. All connection cables to the drive units in the machine must be removed.

> All other connections between the machine and supply systems or other machine components must be removed.

> Use proper tools for disassembling machine parts.

> Danger of injury on sharp-edged machine parts / tools.

> Use suitable lifting gear.

12.3   Safety information for the disposal of the machine

When the machine has to be disposed of at the end of its service life, this work should be assigned to qualified personnel.

12.4   Disposal of the machine

The ITS6 printer was designed in compliance with the RoHS directive (on the restriction of the use of certain hazardous substances in electrical and electronic equipment) and does not contain any harmful substances.

Therefore, the printer and its accessories can be disposed of at any collection center for electronic and metal scrap.

The individual components of the machine are to be separated according to the following categories:

- Steel

- Aluminum

- Oil-contaminated parts (e.g. motors, lines, etc.)

- Cleaning agents

- Ink and cleaning fluid

- Electronic parts

- Plastic parts

- Miscellaneous waste (e.g. filters)

<table>
<tr><td>

Notice

</td></tr>
<tr><td>

The disposal is strictly governed by environmental laws and their regulations.

Observe the safety data sheets of the manufacturer (see appendix of this manual).

</td></tr>
</table>

Disposal of single components

Damaged parts and components from the ITS6 printer which are not considered consumables, e.g. circuit boards, gear wheels, or guide rollers can be disposed of in small quantities in the household garbage or at the local recycling center.

12.5   Safety instructions for the disposal of production waste

The disposal of operating liquids and any harmful cleaning agents is strictly governed by environmental laws and their regulations.

- Collect used materials in containers and have them disposed of properly by the waste disposal company.

- Spilled materials should be covered in a binding agent immediately and, after binding, be disposed of as hazardous waste.

- Take the necessary precautions to catch spilled substances (sealed floor, catch pans, drip sheets).

12.6   Disposal of production waste

The following waste is accumulated during operation:

- Ink, cleaning fluid

- Worn consumables

- Production auxiliary materials

- Cleaning agents

Information

- For detailed information on disposal, please observe the safety data sheets of the manufacturer (see appendix of this manual).

Disposal of replacement parts

Obsolete replacement parts or replacement parts damaged during storage can be disposed of in small quantities in the ordinary household garbage. Please observe the local, regional and national laws and regulations as well as the provisions of the local waste disposal company!

All other components should be returned to Markem-Imaje CSAT GmbH for reconditioning.

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