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Wire Terminal 24
Wire Terminal 36

from HMI V5.15.0 – 15.0 – A1

4051.024
4051.036

Operating Instructions

EN

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1 About this documentation

This manual describes the Wire Terminal (short WT) fully automated wire processing machine. Depending on the configuration, the WT can produce up to 36 different wires in cross-sections ranging from 0.5 mm² to 2.5 mm² (to 6.0 mm² for ordered machine option) fully automatically without manual intervention. Whereby, the wires are optionally cut to length, labelled, fitted with ferrules and provided in wire rails in the output magazine for further processing.

1.1 CE label

For the machine described in these operating instructions, a declaration of conformity has been prepared to confirm that the machine satisfies EU Machine Directive 2006/42/EU.

1.2 Symbols in these instructions

The warnings in this documentation are structured differently depending on the severity of danger.

Danger!
Possible risk of fatality!
Notices with the signal word "Danger" warn you about situations that lead immediately to fatal or serious injuries if you do not pay attention to the specified notices.

Warning!
Possible risk of fatality!
Notices with the signal word "Warning" warn you about situations that can lead to fatal or serious injuries if you do not pay attention to the specified notices.

Caution!
Risk of injury!
Notices with the signal word "Caution" warn you about situations that can lead to injury if you do not pay attention to the specified notices.

Note:
Identification of situations that can lead to material damage.

Attention!
Property damage!
Notices with the signal word "Attention" warn you about dangers that can result in damage to property.

- This symbol indicates an "action point" and shows that you should perform an operation or work step.

Situation-related warnings may contain the following warning symbols:

Symbol	Meaning
	Warning: Dangerous electrical voltage
	Warning: Injury to hands due to sharp blades
	Warning: Injury to hands (crushing)
	Work may be performed only by a qualified electrician.
	Perform work only with personal protective equipment.
	Notes on documentation
	Perform work only with personal protective equipment.
	Perform work only with personal protective equipment.
	Perform work only with personal protective equipment.
	Perform work only with personal protective equipment.

1.3 Associated documents

In addition to the provided operating instructions, the following individual operating instructions of the deployed components and diagrams belong to the complete documentation of the Wire Terminal:

– Wire printing unit operating instructions (depending on the scope of supply)
– Wire Cockpit operating instructions
– Label printer operating instructions
– End treatment units operating instructions (depending on the scope of supply)
– Electrotechnology documentation

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2 Safety

This section provides an overview of all important safety aspects for an optimum protection of personnel as well as for the safe and fault-free operation.

Danger!
Risk of death by the non-observance of these instructions!
The non-observance of the handling instructions and safety instructions listed in these instructions can cause major dangers.
Consequently:
- **Read the complete instructions before beginning any work.**
- **Follow all handling instructions and safety instructions in the instructions.**

2.1 Responsibilities of the operating company

The machine is deployed in the industrial area. Therefore, the machine operating company is subject to the legal obligations for work safety.

The safety, accident prevention and environment protection regulations appropriate for the operational area of the machine must also be adhered to in addition to the safety instructions given in these instructions. Whereby in particular:

– The operating company must inform itself about the applicable occupational safety regulations and determine additional dangers in a danger evaluation that result from the special work conditions at the machine installation location. The operating company must implement these as operating instructions for the machine operation and must provide unhindered access to them.
– During the complete service period of the machine, the operating company must check whether the operating instructions it prepared conform to the current status of the regulations and adapt these operating instructions if necessary.
– The operating company must unambiguously specify the responsibilities for the installation, operation, maintenance and cleaning or designate a person responsible for these tasks.
– The operating company must ensure that all workers who handle the machine have read and understood the operating instructions.
– Furthermore, the operating company must train the personnel in regular intervals and inform of any risks.
– The operating company must provide the personnel with the required safety equipment (see section 2.4 "Personal safety equipment")
– Because the operating company is also responsible for ensuring that the machine is always in a technically perfect state, the following apply:
– The operating company must ensure that the maintenance intervals described in these operating instructions are observed (see chapter 7 "Maintenance").
– The operating company must regularly check all safety equipment for correct functioning and completeness.
– The operating company must ensure that all required safety and protection equipment are installed on the machine.
– Before work is started, the operating company must check all safety and protection equipment for correct functioning and completeness.

2.2 Personnel requirements

2.2.1 Qualification

The following qualifications for the various task areas are named in the operating instructions:

Trained qualified personnel (qualified electricians, mechatronics engineers)

– Because of their professional training, knowledge and experience as well as knowledge of the relevant standards and regulations, trained qualified personnel (qualified electricians, mechatronics engineers) are able to execute their assigned work and to independently recognise and avoid any dangers. They are also instructed in special functions of the machine and so able to perform adjustment work beyond that described in these operating instructions.

Qualified personnel (qualified electricians, mechatronics engineers)

– Because of their professional training, knowledge and experience as well as knowledge of the relevant standards and regulations, qualified personnel (qualified electricians, mechatronics engineers) are able to execute their assigned work and to independently recognise and avoid any dangers.

Qualified personnel (operators)

– Qualified personnel (operators), because of an initial briefing and the hazard briefing by the manufacturer or an authorised representative, are authorised to operate the machine and perform visual inspections.

Only those persons from whom it can be expected that they can perform their work reliably are approved as personnel. Persons whose responsiveness is impaired, e.g. because of drugs, alcohol or medications, are not approved.

For the personnel selection, observe the occupational-specific regulations applicable at the installation location.

Warning!
Risk of injury in case of inadequate qualification!
Improper handling can cause severe injury and material damage. Consequently:
- **All tasks may be performed only by appropriately qualified personnel.**

Warning!
Danger for unauthorised persons!
Unauthorised persons who do not satisfy the requirements described in this document do not know the dangers in the work area. Consequently:
- **Keep unauthorised persons away from the work area.**
- **In case of doubt, approach persons and, if necessary, expel them from the work area.**
- **Interrupt work while unauthorised persons are present in the work area.**

2.2.2 Instruction

The operating personnel must be trained and authorised by the operating company or an authorised qualified person. The person to be instructed may work on the machine only under the supervision of an authorised and trained person.

To improve monitoring, the performed training must be documented.

An instruction must be repeated and documented at least once annually.

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2.3 Intended use

The machine is designed and constructed only for the intended use described in this document.
The machine may be operated only in accordance with the operating and environmental conditions named in these instructions, and the specifications stated on the title page of the electrical circuit diagram.
The intended use also includes the observance of all details in these instructions as well as the instructions of the wire labelling units of the Wire Cockpit and of the end treatment units.

Warning!
Each use of the machine that goes beyond or differs from the intended use is considered to be a misuse and can lead to dangerous situations or damage.

Note:
Any claims for damage that result from an unintended use are precluded.

Warning!
Danger caused by misuse!
Misuse of the machine can lead to dangerous situations or cause damage to the machine.
In particular, the following uses of the machine are prohibited:

- **Use of materials not approved by the manufacturer or not defined in these instructions. See section 3.1.2 "Released wires". In particular: Different materials for copper strands, plastic insulation and cross-sections.**
- **Commissioning the machine without it conforming to the fundamental safety requirements and the provisions of all relevant regulations.**

2.4 Personal safety equipment

To minimise risk to health, personal safety equipment must be worn when working.

- The safety equipment required for the associated work must always be worn during the work.
- Notices for the personal safety equipment placed in the work area must be followed.

Always wear for all work:

Work protective clothing
Tight-fitting work clothing with low tear resistance with narrow sleeves and without any protruding parts. Such clothing serves primarily to protect against being caught by moving machine parts.

- Do not wear any rings, chains and other jewellery.

Safety shoes
As protection against heavy falling parts and slipping on slippery surfaces.

Special safety equipment is required when performing certain work (such as cleaning work on printers or working on the Wire Printer additional module). Such special safety equipment is explained below:

Eye protection
To protect eyes against liquid spray.

Chemical-resistant protective gloves
To protect hands against aggressive substances. Before use, check protective gloves for leaks. Clean before taking them off and then store in a well-ventilated location.

2.5 Special dangers

Residual risks that have been determined based on a risk evaluation of the manufacturer are listed in the following section.

- To reduce health risks and to prevent dangerous situations, observe the listed safety instructions and the warnings in the subsequent sections of these instructions.

Electric current

Danger!
Life-threatening electric shock!
There is imminent risk of fatal injury on contact with live parts. Damage to the insulation or individual components is life-threatening. Consequently:

- **Work on the machine may be performed only by qualified electricians.**
- **Prior to performing maintenance, cleaning and repair work, disconnect the power supply and protect against being reactivated.**
- **Check the electrical equipment regularly.**
- **Replace damaged components, lines or cables immediately.**
- **Always keep the enclosure closed. Access is permitted only by qualified electricians.**
- **Never clean the electrical equipment with water.**

Danger!
An unauthorised reactivation is life-threatening!
During the installation there is a danger that the power supply is reactivated without authorisation. This is life-threatening for persons in the danger zone. Consequently:

- **Prior to performing work, disconnect all power supplies and protect against being reactivated.**

Highly flammable substances

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Warning!
Risk of fire by highly flammable substances!
Highly flammable substances (printer ink, solvents and cleaning agents) can catch fire and cause severe or even fatal injuries. Consequently:

- **Never place highly flammable substances on the enclosure or near motors or heat sources.**
- **Do not smoke within the danger zone and in the immediate vicinity. Refrain from naked flames or ignition sources.**
- **Keep fire extinguishers handy.**
- **In the event of fire, stop work immediately and disconnect power from the machine.**
- **Alert the fire brigade.**
- **Fight the fire with fire extinguishers. In the event of excessive fire or smoke, evacuate the danger zone until the all-clear signal is issued.**

Dirt and discarded objects

Caution!
Tripping hazard caused by dirt and discarded objects
Dirt and discarded objects form slipping and tripping hazards that can cause severe injuries. Consequently:

- **Always keep the work area clean.**
- **Remove objects that are no longer required.**
- **Mark tripping hazards with yellow-black marking tape.**

Freely accessible wires in the area of the wire guide

Caution!
Freely accessible, fast-moving wires in the area of the wire guide!
Contact with or other hindrance of the wires can cause malfunctions. If contact is made with a moving wire, its feed speed can cause friction heat at the contacting body part. Consequently:

- **During running production, avoid contact with wires in the area of the wire feed or at Wire Storage.**
- **Avoid the area of the wire guide as specified by the installation diagram of the machine during running production.**
- **Mark the area and adopt appropriate measures to prevent unauthorised persons from entering the area.**

Wires between Wire Storage and Wire Terminal

Caution!
Tripping hazard caused by wires between Wire Storage and Wire Terminal!
A particular tripping hazard occurs in the area between Wire Storage and Wire Terminal caused by clamped or loosely hanging wires. Consequently:

- **If possible, prevent people from being present between both machine parts.**
- **Do not use the wire guide area, as specified by the machine installation diagram, as passageway.**
- **Mark the area and adopt appropriate measures to prevent unauthorised persons from entering the area.**

Ink or solvent jet

Danger!
Danger caused by escaping ink or solvent!
In particular, danger of severe eye injuries when handling print heads or working with Wire Printer. Consequently:

- **The printers must be deactivated when setting up the print heads in the machine or on Wire Printer.**
- **Safety goggles and gloves must be worn for all work on printers. Follow the details in the printer operating instructions.**
- **Safety goggles and protective gloves must be worn for all work on Wire Printer.**

Enclosure

Caution!
Material damage caused by water, dirt, dust and other environmental effects!
When the enclosure doors are open, there is a danger that the machine is damaged, for example, by water, dirt, dust and other environmental effects. Consequently:

- **Always keep the enclosure doors closed.**
- **Access only by authorised qualified personnel.**
- **For example, ensure that no water, dirt and dust can enter the enclosure.**

Protect against being reactivated

Danger!
An unauthorised reactivation is life-threatening!
When working on the machine, there is a danger that the power supply is reactivated without authorisation. This is life-threatening for persons working on the machine. Consequently:

- **Observe the notices in these instructions for protection against being reactivated.**
- **Always observe the procedure for protection against being reactivated described below.**
- **The enclosure door must always remain closed.**

Protect against being reactivated

1. Place the master switch at the "OFF" position to switch off the power supply.
2. Secure the switch with a lock against an unauthorised reactivation and place an appropriate sign easily visible at the switch.
3. Have the switch lock key held by the person named on the sign.

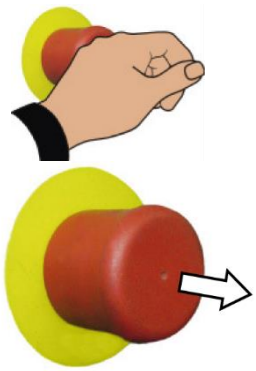
Danger!
Life-threatening and material damage caused by unauthorised reactivation!
If the master switch was protected with a padlock, persons could be present in the danger zone. When switching on, these persons could be subject to life-threatening injuries.
Consequently:
- **Never remove the lock without authorisation.**
- **Ensure that no mechanical defects exist.**
- **Before removing the lock, ensure that nobody is working on the machine.**

Observe the 5 safety rules when working on the electrical system!
- Switch off (all sides and all poles).
- Secure against reactivation.
- Check to ensure no voltage is connected.
- Earth and short-circuit.
- Cover or shield adjacent live parts.

2.6 Safety equipment

Warning!
Non-functioning safety equipment is life-threatening!
Safety is guaranteed only for intact safety equipment.
Consequently:
- **Before beginning work, ensure that the safety equipment is operational and correctly installed.**
- **Never disable the safety equipment.**
- **Ensure that all safety equipment, such as Emergency Stop push-buttons, is always accessible.**

All installed safety equipment is listed below.



2.6.1 Emergency Stop push-button

Pressing the Emergency Stop push-button triggers an emergency stop. The machine comes to a standstill immediately; all mechanical and pneumatic movements stop.

Once the Emergency Stop push-button has been pressed, it must be unlocked by being pulled so that reactivation is possible.

Once the Emergency Stop push-button has been unlocked, safety must be acknowledged by pressing the blue Reset push-button.

Caution!
- **Before reactivation, ensure that the cause of the emergency stop has been rectified, all safety equipment is mounted and operational.**
- **Unlock the Emergency Stop push-button only when danger no longer exists.**

2.6.2 Safety limit switch

Safety limit switch as access protection.
Safety limit switches are installed on all doors of the machine. They prevent start-up or operation in the opened state.
Opening a door causes an immediate standstill or emergency stop of the machine.

2.7 Requirements placed on the machine installation site

General conditions
The machine installation site must ensure that:
- The machine is installed in a well-ventilated, closed room with level of contamination 1.
- Sufficient space is available so that the doors can be opened fully for maintenance purposes (see section 2.7.1 "Installation diagram of the machine").
- All separations (in accordance with the installation drawing in section 2.7.1 "Installation diagram of the machine") are observed.
- The enclosure is not covered so that ventilation is not impaired.
- Adequate illumination is present.
- The normative specifications concerning movement spaces and escape routes are observed.

Note:
EN 61439 [7.1.3] Level of contamination 1
No or only dry, non-conducting contamination. The contamination has no effect.

2.7.1 Installation diagram of the machine

Machine with closed doors

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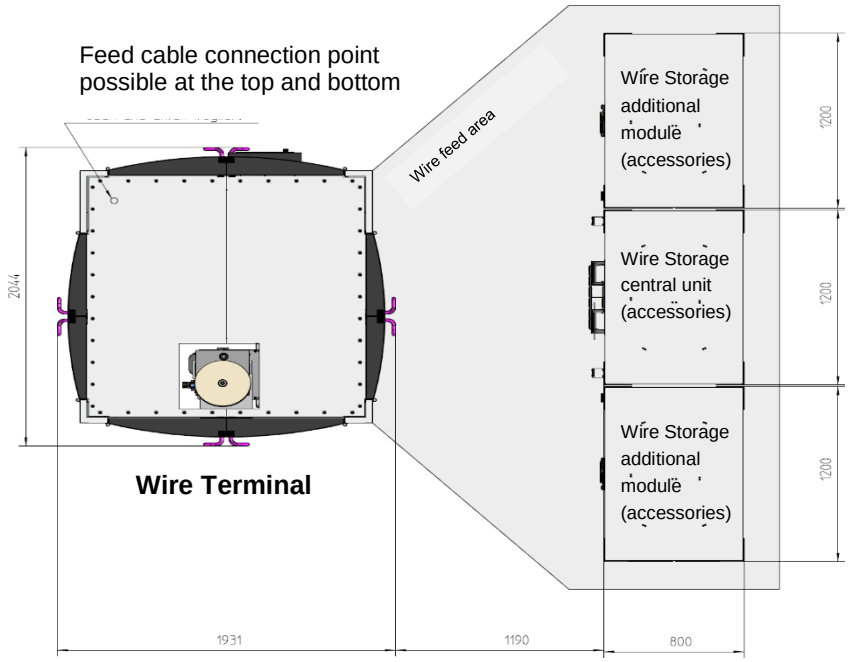
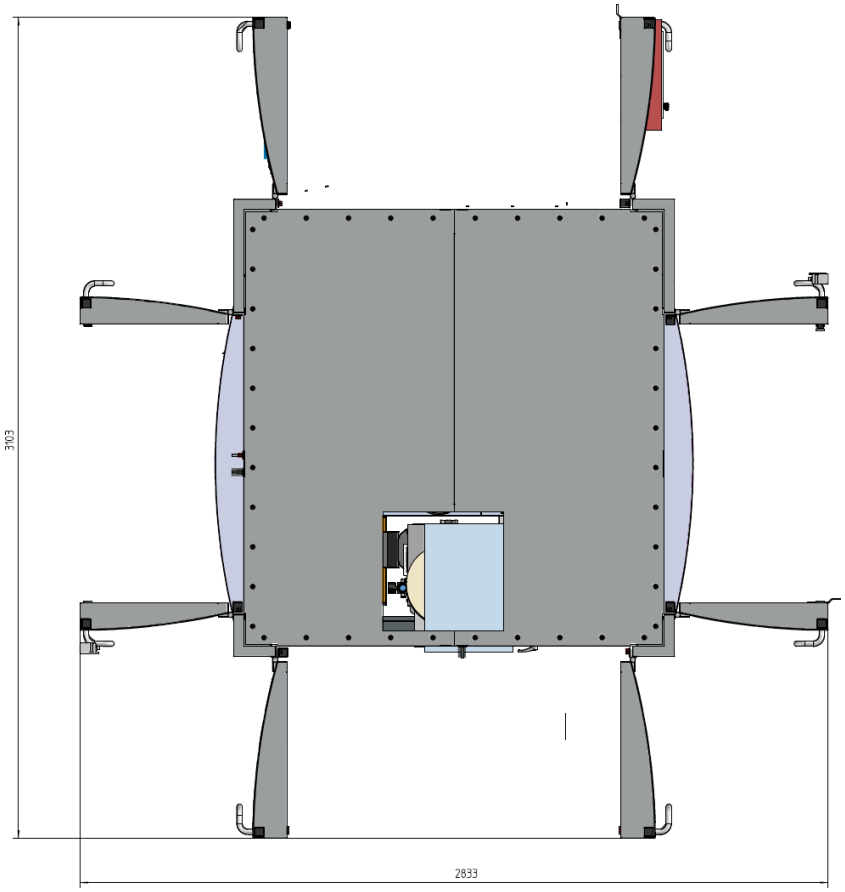


Machine with opened doors



2.7.2 Environmental conditions

Temperature range	5…35 °C
Relative humidity (at max. 40 °C)	20…50%
Altitude	Up to 1000 m above sea level

2.8 Rating plate

The rating plate is placed on the enclosure and contains the following details:

– Manufacturer
– Project number
– Pre-fuse
– Rated voltage / rated frequency
– Control voltage 1/2 (AC/DC)
– Project/program number
– Year of manufacture

2.9 Environmental protection

Caution!
Incorrect handling can endanger the environment!
The incorrect handling of environment-endangering substances, in particular, for improper disposal, can cause major damage to the environment.
Consequently:

- **The following notes must always be observed.**
- **Should environment-endangering substances be inadvertently released into the environment, adopt appropriate measures immediately. In case of doubt, inform the responsible communal authorities about the damage.**

The following environment-endangering substances are used:

– Printer ink / solvents as shown in the accompanying data sheets
– Lubricating grease: Castrol Tribol 4020/460-2
NLGI Class II

Warning!
Danger of environment-endangering substances!
Improper handling can cause severe injury and material damage. Consequently:

- **Observe the information in the accompanying documents of the machine.**

Electronic components
Electronic components are subject to hazardous waste treatment and must be sent to communal collection centres or disposed of by a specialist company.

2.10 Labelling

The following symbols and warning signs can be placed in the machine area or mark danger locations. They apply to the immediate vicinity where they are placed.

Warning!
Risk of injury caused by unreadable symbols!
During the course of time, stickers and signs can become soiled or be unrecognisable in some other manner. Consequently:

- **All safety, warning and operating notices must always remain well legible.**
- **Any damaged stickers or signs must be renewed immediately.**

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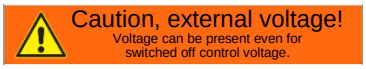

Electrical voltage
Only qualified electricians may work in such marked areas.
Unauthorised persons must not open the enclosure or perform work on it.

Voltage in front of the master switch
Only qualified electricians may work in such marked areas.

Warning!
Risk of injury by electric shock!
Voltage is present in such marked cable ducts and sockets even when the master switch is switched off. Consequently:
- **When working at such areas, disconnect the machine from the power grid.**

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3 Function description

3.1 Technical specification

3.1.1 Wire machining

Note:
The proper functioning of the machine can be ensured only when the wires are provided and fed using the specified Wire Storage fixture.

Details	Value	Unit
Length range	230…10,000 (max. error tolerance ≤ 8‰ to 4,000 mm)	mm
Length tolerance	Wire length with 500 mm ±10 Wire length with 5,000 mm ±20 Wire length with 10,000 mm ±40	mm
Cross-sections	0.5...2.5 *0.5…6.0 for ordered function module 4 and 6 mm² (4051.010)*	mm² *mm²*
Wire diameter	1.6...4.0 *1.6…5.0 for ordered function module 4 and 6 mm² (4051.010)*	mm *mm*
End treatment	Cutting, insulation stripping, crimping of ferrules (available end treatment depending on the deployed end treatment units)	
Feed rate	0.5 - 1.5 mm²: max. 2.5 (without printing) 2.5 mm²: max. 2.0 (without printing) > 2.5 mm²: max. 0.75 (without printing)	m/s
Wire types	See section 3.1.2 "Released wires"	

3.1.2 Released wires

Note:
Only those wires authorised by the manufacturer can be processed. For a complete list, contact your responsible sales partner.

Note:
The use of ringware or small-carton goods (100 m, 250 m or 500 m) is not recommended, because the small winding diameter can cause twist-related malfunctions.

Value	Container
H05V-K harmonised, flexible wiring individual cores of Lapp as drumware 0.5 mm²; 1 mm²	above 2,000 m/drum
H07V-K harmonised, flexible wiring individual cores of Lapp as drumware 1.5 mm²; 2.5 mm²	above 900 m/drum
H07V-K harmonised, flexible wiring individual cores of Lapp as drumware 4.0 mm²; 6.0 mm²	above 400 m/drum
Multi-standard SC 2.1, fine stranded copper wire, tinned, of Lapp as drumware 1 mm²; 1.5 mm²; 2.5 mm² Note: 2.5 mm², dependent on the stripper-crimper used	above 900 m/drum

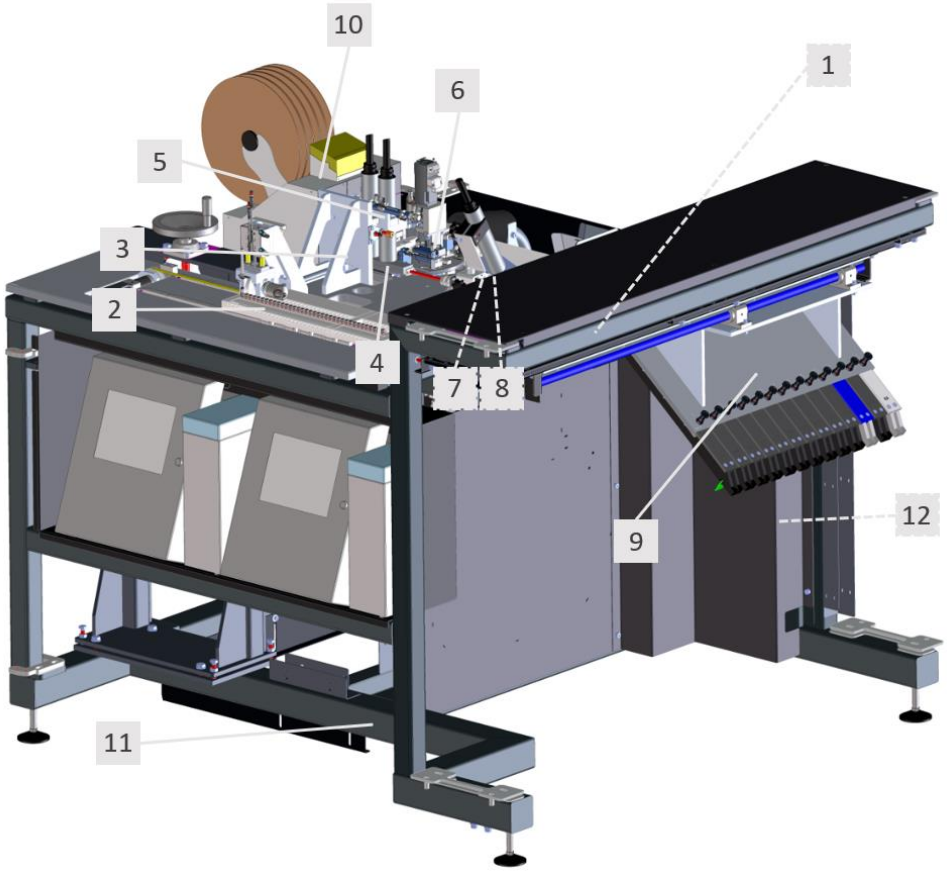
3.1.3 Wire Printer additional module (optional)

Note:
The Wire Printer additional module is orderable equipment and is not provided as standard.

Details	Value	Unit
Maximum print area	185 90	mm Characters
Font size	7x5…24x18	Pixels
Workpiece diameter/ thickness	Acceptance position 1: diameter 4-10 Acceptance position 2: diameter 8-20 Acceptance position 3: diameter 13-25 Acceptance position 4: diameter 18-30 Acceptance position 5 for flat material 8…15	mm
Maximum weight load	5.0 (For uniform weight distribution)	kg
Materials that can be printed	Depending on the ink type used and the associated material	

3.2 Mechanical system

Note:
Depending on the machine options ordered, some of the modules shown below may be absent.



Legend

1. Enclosure (A00100 module)
2. Feeder unit (A0200 module)
3. Wire cutter (A0300 module)
4. Wire centring (A0400 module)
5. Labelling unit (A0500 module)
6. Rotary unit (A0600 module)
7. Withdrawal unit (A0700 module)
8. Gripper (A0800 module)
9. Withdrawal magazine (A0900 module)
10. Lifter (manual or automatic) with end treatment unit (A1000 or A1800 module)
11. Frame (A1200 module)
12. Pneumatic system (A1600 module)

Operating unit (not shown; A1900 module)

Machine housing (not shown; A1500 module)

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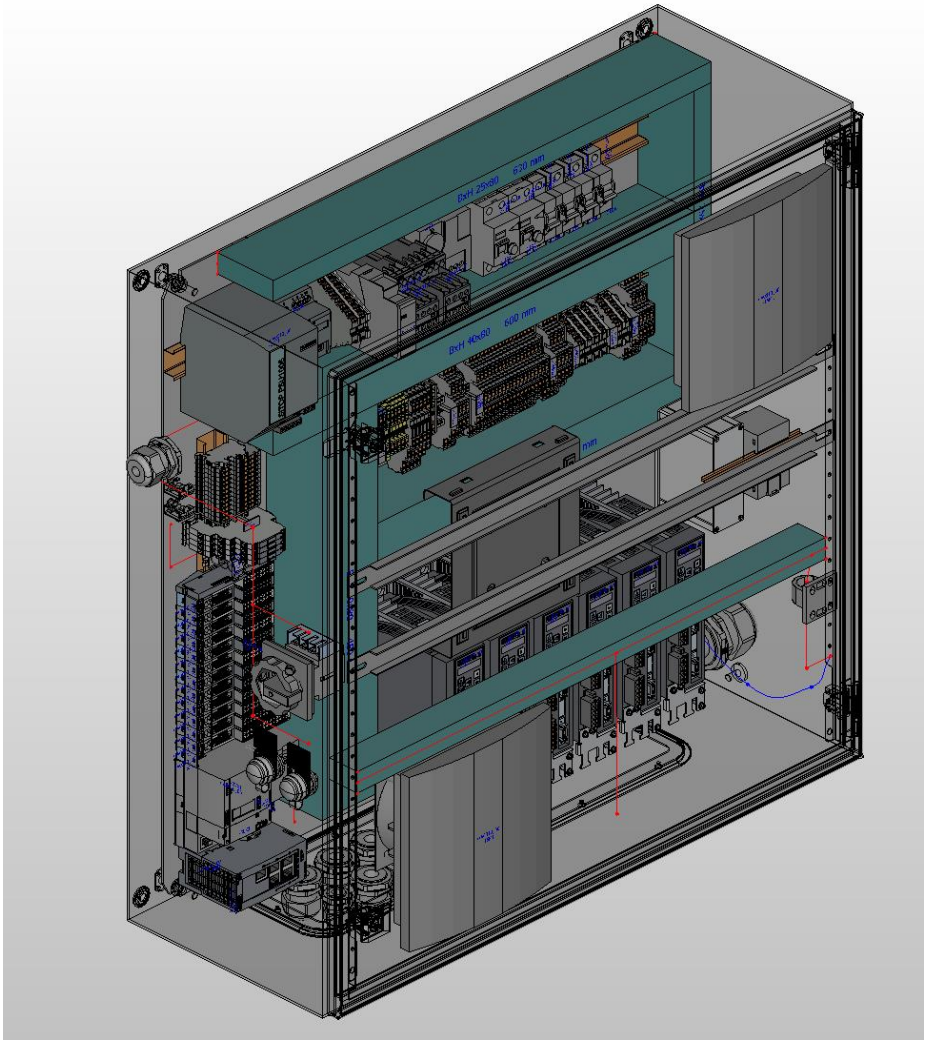
3.2.1 Enclosure A0010_00

The enclosure is integrated in the machine frame. The enclosure contains all components required for operating the machine.
The master switch and the network interfaces are located on the left-hand side of the enclosure.
The enclosure also contains the machine computer that represents the server component of the Wire Cockpit and handles the job management.



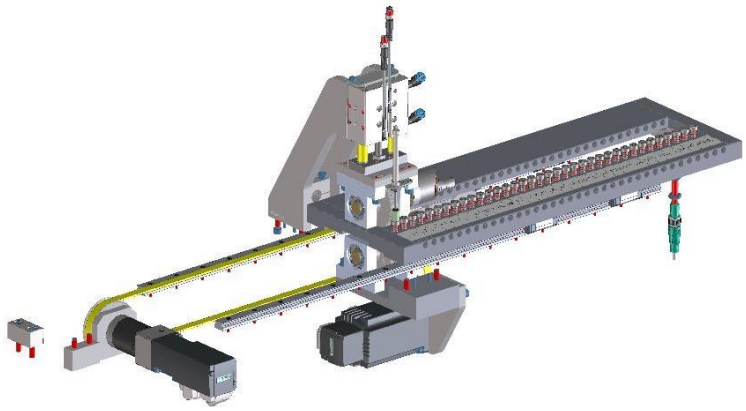
3.2.2 Feeder unit A0200_00

Wires are fed via a 24- or 36-wire horizontally adjustable feed magazine in which the setup wires are provided for processing (short: setup). The wires are held securely by a spring-assisted clamp. To setup the wires, this clamp must be released manually by pressing the release and inserting the wire flush into the feed magazine. Ensure that the wire end is cut straight and cleanly.

For ordered function module 4 and 6 mm² machine option, the feed magazine is configured so that wires can be setup with an appropriately large diameter.

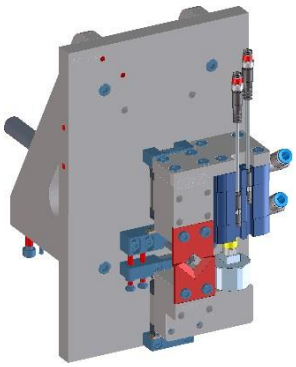
The wire to be setup at the associated position must be entered in the software (see section 3.3.10.2 "Feeder unit wire magazine configuration").

During feeding, the wire is clamped and moved by the feed rollers. The clamping pressure can be set in the wire parameters (see section 3.3.10.1 "Wire parameters") so that the wire is held reliably, but not damaged by the feed rollers.



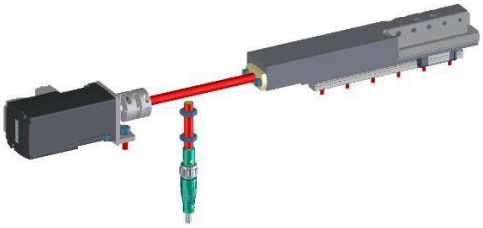
3.2.3 Wire cutter A0300_00

The wires are cut to the desired length with two blades that have a V-geometry. Whereby, the two blades are moved closely past each other with a pneumatic cylinder monitored for end position with limit switches.



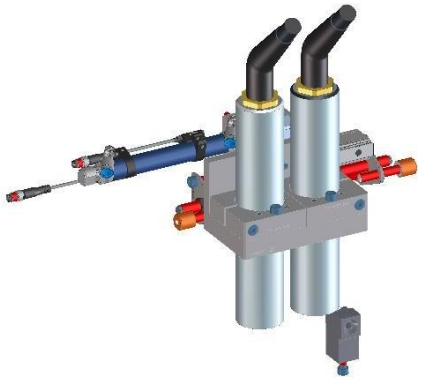
3.2.4 Wire centring A0400_00

The centring of the wire required for the labelling operation is performed via a spindle-driven linear guide that positions the wire guide depending on its outer diameter via a servomotor.



3.2.5 Labelling unit A0500_00

The wire is printed with two print heads fastened to a sliding carriage. This can be moved using a limit-switch monitored pneumatic cylinder. A collection tray that can be deployed in the wire centring simplifies the cleaning of the overspray that results during operation. To clean the print heads, they can be taken out of the guide pipe by pressing the snap-fastener without needing to reposition the print heads. The use of two print heads allows separate printing with two print colours without a new setup. The print information is obtained via the Wire Terminal software in the print unit. Furthermore, the rotary-transducer monitored wire feed of the feeder unit module provides the infeed speed of the wire for the print pattern.

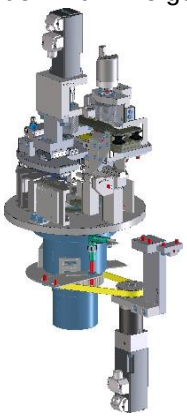


3.2.6 Rotary unit A0600_00

The wire is supplied for the two-sided end treatment on the crimping machine by a two-part wire guide rotating horizontally by 180° that contains another wire feed in its centre. The wire guide is moved together or outwards via a kinetic mechanism actuated by a pneumatic cylinder. A feed roller driven by a servomotor that presses a wire against a rotary-transducer monitored roller feeds the wire.

3.2.6.1 Rotary unit A0630_00 for function module 4 and 6 mm² (optional)

Although this rotary unit has the same functions as Rotary unit A0600_00, it is also able to handle wires with a cross-section up to 6 mm² (including ferrules). Unlike the traditional variant, this rotary unit has wire guide pipes with a larger internal diameter as well as additional guide rollers that permit rewinding of larger cross-sections. This machine option is deployed in conjunction with wire guide 4 and 6 mm².



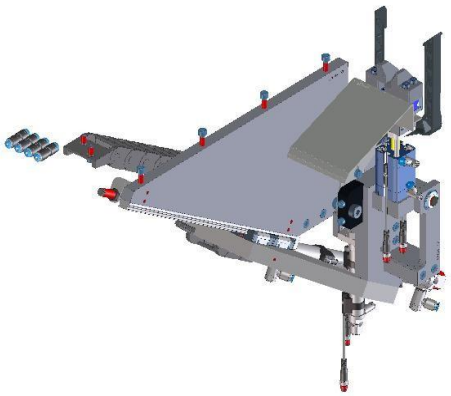
3.2.6.2 Wire guide for function module 4 and 6 mm² (optional)

The wire guide is required for rewinding the wire. For wires with cross-section of 4 or 6 mm², the wire guide has a 3D contour and can also be mounted in a moveable position on a pneumatic lifting unit. Depending on the wire length, the longer wires are fed through the funnel with the shorter wires being routed around the funnel.

3.2.7 Withdrawal unit A0700_00 and Gripper A0800_00

The fully assembled wire is transferred to the withdrawal magazine by the withdrawal gripper. The gripper accepts the wire from the rotary unit and the wire is moved by the withdrawal unit in the direction of the wire rail.

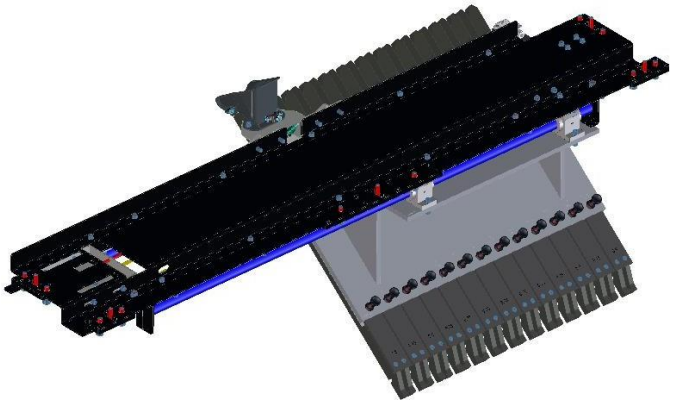
Wires not placed in a wire rail are brought to the discharge position and discharged by the gripper.



3.2.8 Withdrawal magazine A0900_00

The fully assembled wires are stored by the withdrawal unit in as many as 13 wire rails. The associated wire rail is positioned by the servomotor in front of the withdrawal unit gripper.

A laser light-barrier monitors the correct transfer of the wire to the wire rail. The serial number of the wire rail is also queried and reported to the "Wire Cockpit" for wire sets. This ensures that the wire will be found for subsequent further processing. Which wire rails are deployed at which position must be entered manually in the software or alternatively fetched automatically (see section 3.3.7 "Configuration of the rails").



3.2.9 Lifter

Depending on the machine options ordered, one or more end treatment units (short: automats) can be deployed in the machine. In the basic configuration, the machine offers one level for an automat.

Which automat is deployed at which position must be entered manually in the software (see section 3.3.10.5 "Automat configuration")

Warning!
Danger of injury or severe damage to the machine!
The placement level or lifter levels are equipped with acceptance plates appropriate for the end treatment units ordered that prevent the units from falling. The permissible overall weights depend on the end treatment units ordered. The placement of other units or other objects is inadmissible. Consequently:

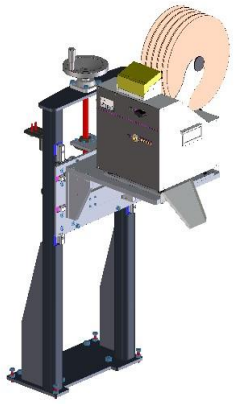
- **Place only accessories available for the machine with suitable acceptance plates in the machine.**

Caution!
Danger of damage when the lifter level is not inserted fully or is not locked!
Depending on the machine options ordered, lifter levels can be extracted to give easy access to the automats. When operating the system, the levels must be inserted and locked, otherwise damage can occur to the machine. Consequently:
- **Before starting the machine, ensure that all lifter levels are inserted and locked.**

Note:
End treatment units should be positioned so that the insertion opening is exactly at the height of the rotary unit wire guide and, where possible, the wire is entered centred and straight.
The separation between the end treatment unit and the rotary unit should be only a few millimetres, but not zero.
Check both sides of the rotary unit with a thin wire cross-section!

3.2.9.1 Lifter (manually operated) A1800_00

This lifter permits the manual height adjustment of the end treatment unit using a hand crank. The acceptance plate of the crimping machine also permits the optimum positioning of the crimping machine on the rotary unit.
For simple access to the automat, it is placed on a retractable level.

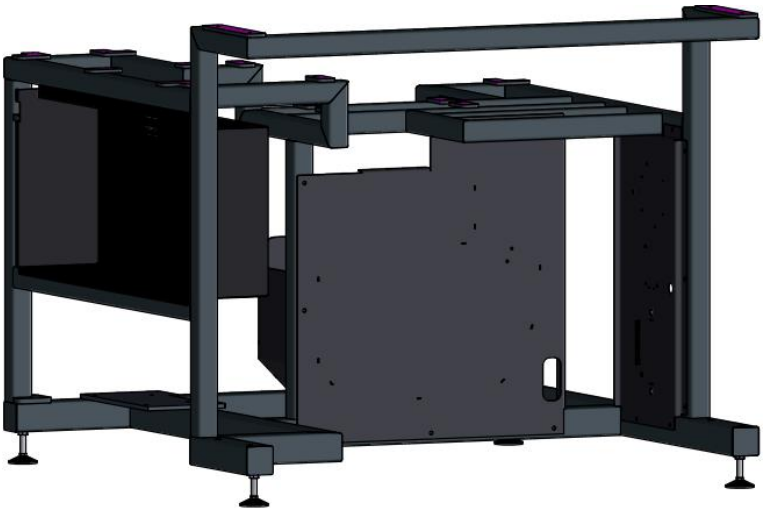


3.2.9.2 Lift option (automatic, optionally) A1000_00

The automatic lifter permits the sequential positioning of different automats during running operation. Each level also has an acceptance plate for an end treatment unit that ensures the optimum positioning of the associated automat on the rotary unit. To permit simple access to the individual automats, each level can be retracted. For maintenance purposes, the lifter can be traversed electrically by the machine operator (see section 3.3.5 "Home position", "Lifter position" area).

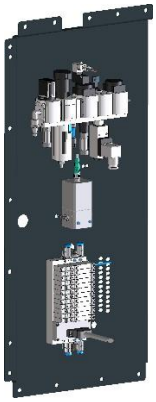
3.2.10 Frame A1200_00

The frame consists of a welded, steel shaped-tube construction, including mounting plates for various mounted parts, mounted on height-adjustable and levelling machine feet.



3.2.11 Pneumatic system A1600_00

The compressed air is supplied to the pneumatic system via a maintenance unit, including an integrated oil and water separator. A pressure reduction valve guarantees a constant operating pressure. All pneumatic actuators are actuated via a PLC-controlled multi-pin valve manifold.



3.2.12 Wire Printer Trolley (optional) A5010_00

The Wire Printer Trolley is a two-part, mobile frame on which the printers can be placed. The Wire Printer Trolley is provided for the easy removal of the individual printers, such as for maintenance purposes or retrofit. The printers are secured against shifting with positive-fit recesses in the base plate. When inserting in the machine, the trolley is centred automatically by entry rails.

Caution!
Risk of injury caused by the printer rolling away, falling over or falling down! Consequently:

- **Do not use the Wire Printer Trolley for transporting printers outside the work area.**
- **Place only supplied printers on the associated support plate.**
- **Do not allow the Printer Trolley to stand unattended outside the envisaged end position.**
- **Move the Printer Trolley carefully. In particular, when withdrawing from the machine, pay attention to the connection cables and do not overtension them.**

Note:
When switching on the machine, pay attention to the correct cable laying to prevent them from being trapped or to hinder insertion in the machine.

3.2.13 Wire Printer A5000_00 additional module

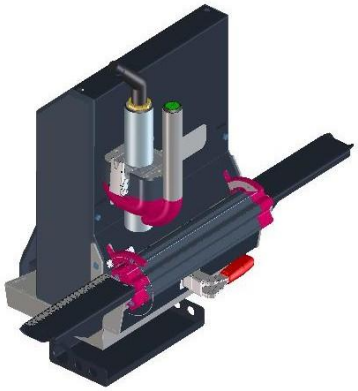
The Wire Printer additional module permits manual printing of workpieces, even those that cannot be processed automatically in the machine. The Wire Printer additional module is an additional option available for the Wire Terminal and can be fitted on the front of the machine, provided it has been prepared for this.

A print head of the Wire Terminal must be removed from the machine using the snap-fastener and installed in the Wire Printer additional module.

A five-position retainer (short: revolver) is available for various workpieces. Four positions cover various diameter areas of round workpieces; the fifth position can accept flat material (see section 3.1.3 "Wire Printer additional module (optional)" for more precise details).

The workpiece can be fixed with spring-loaded clamps in the retainer. The clamps are actuated with a lever below the revolver as follows: "open position" (lever fully left), "floating position" (lever in the centre), "clamp closed" (lever fully right).

Observe the danger notes and work processes in chapter "Working with the machine", section 6.4.3 "Wire Printer additional module (optional)".



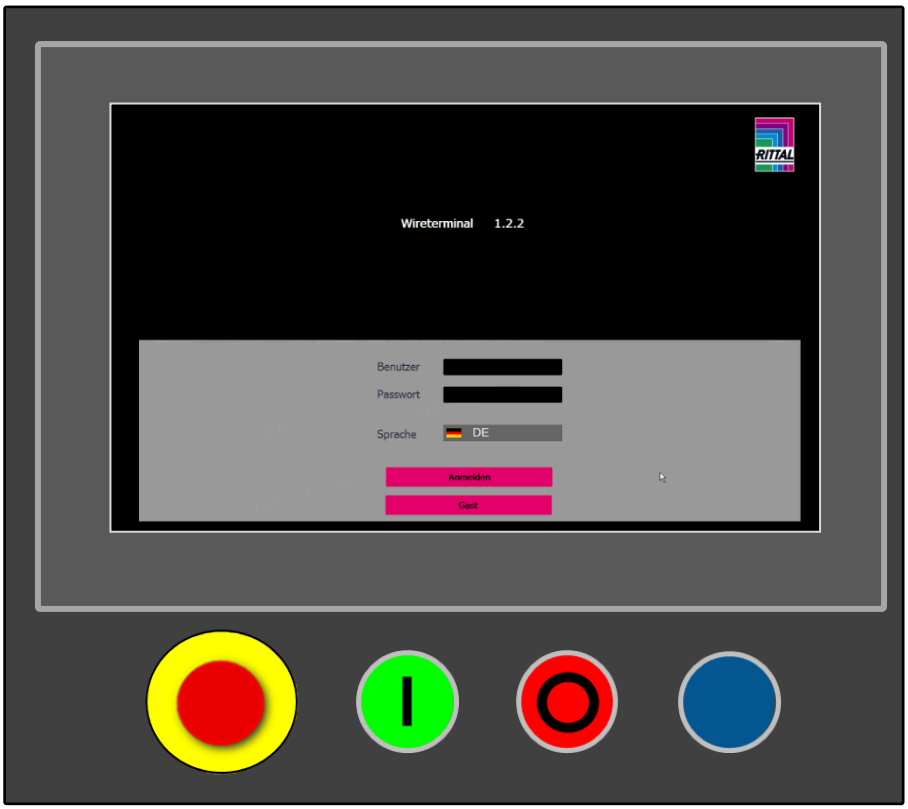
3.2.14 Cover A1500_00

The machine housing with included operating unit permits a flexible machine access via contact-less safety-switch monitored double leaf doors.

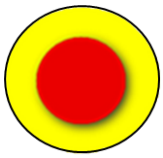
The shown figures serve only to illustrate the components, rather than the currently described machine.

3.2.15 Operating unit A1900_00

The display and the push-buttons for controlling the machine are mounted on the operating unit located on the left door at the machine front.
An RJ45 socket as maintenance interface for service technicians is located at the rear of the operating unit (door interior).



3.2.15.1 Push-button



Emergency Stop
The Emergency Stop push-button is provided as a red mushroom push-button at the lower edge of the operating unit.
It is triggered by being pressed and unlocked by being pulled. Actuating the Emergency Stop push-button interrupts all machine movements. The machine comes to a standstill after a short stopping time.

Start
Starts the automatic operation of the machine.
Lamp illuminates: Automatic operation active
Lamp flashes: Stop actuated. Automatic operation stops when the current cycle completes.

Stop
Initiates stop of the automatic operation.
The machine completes the current cycle.
Pressing the button for 2 seconds stops the automatic operation immediately.
Lamp illuminates: Malfunction
Lamp flashes: Automatic operation stop active / waiting for start

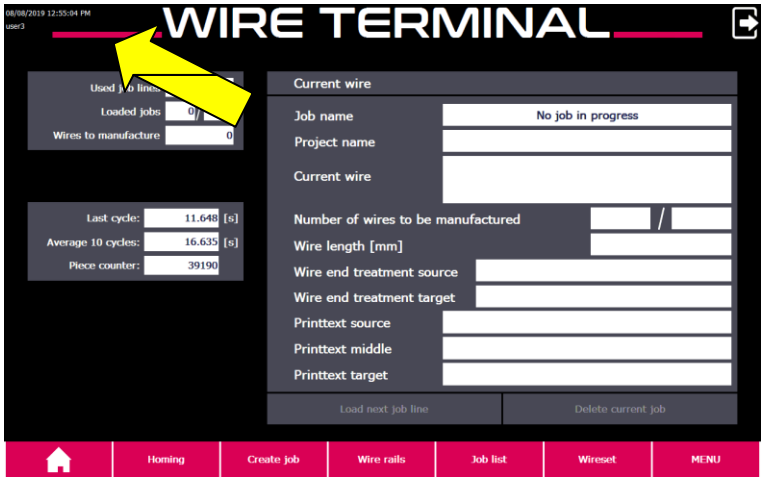
Emergency Stop acknowledgement
Emergency Stop acknowledgement and activation of safety circuit.
Lamp illuminates: Acknowledgement possible/required

EN

3.3 HMI

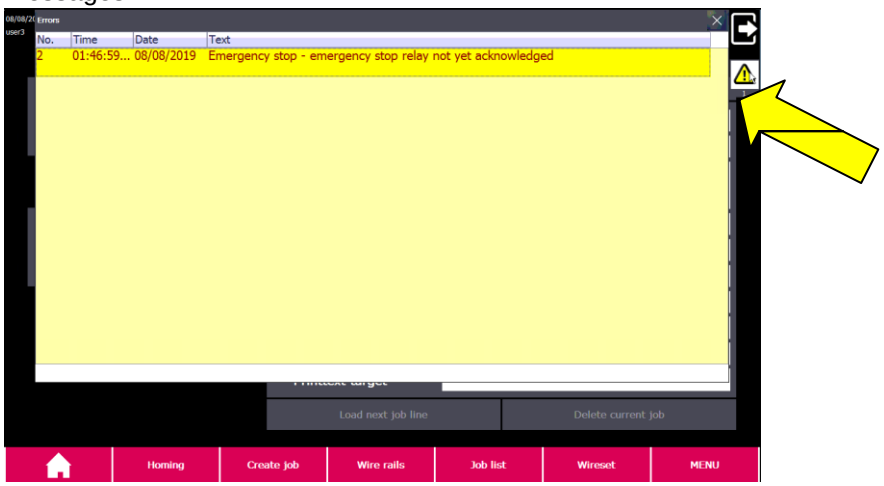
3.3.1 Messages/time

Time



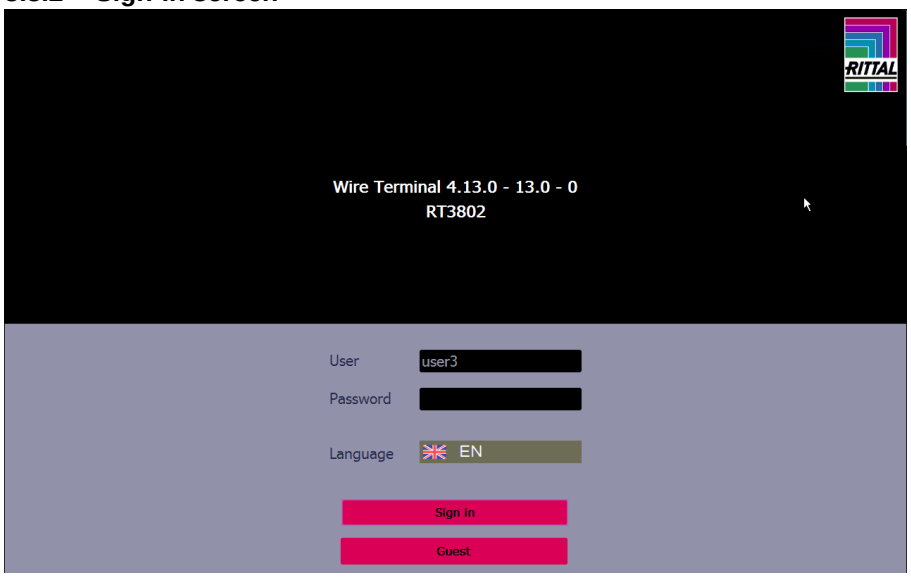
The time/date and the current user are displayed at the top left display edge on each display page.

Messages



This symbol indicates pending or unacknowledged warning or error messages and is displayed in the foreground on each display page.
If a new warning or error message becomes active, the message window opens automatically in the foreground. The window can be closed at any time with the "Close symbol" (X symbol) at the top right in the message window, even when the message has not yet been acknowledged.
Tapping the "Messages symbol" reopens the window.

3.3.2 Sign-in screen



The sign-in screen is displayed immediately after the system startup.
The upper half of the sign-in screen contains information about the installed software release of the system as well as the machine serial number.
The lower half of the sign-in screen is used for the sign-in with user name and password (see section 3.3.10.13 "User administration") or as guest.

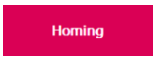
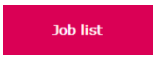
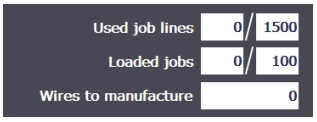
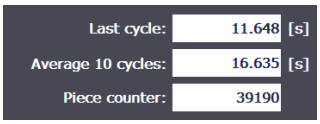
Language
Tapping the flag switches between the available languages.

Note:
For sign in as guest, all screen pages can be viewed, but no actions are performed. Only switching off the printers (see section 3.3.5 "**Fehler! Verweisquelle konnte nicht gefunden werden.**") can also be performed as guest.

3.3.3 Start screen

The following buttons used for navigation between the screen pages are displayed at the lower screen edge on all screen pages (exception: opened pop-up window).
The individual pages are described in more detail in the subsequent sections.

EN

Button	Description
	"Home" menu (section 3.3.3 "Start screen").
	"Home position" menu (section 3.3.5 "Home position")
	"Create manual job" menu (section 3.3.6 "Creating a manual job").
	"Rails configuration" menu (section 3.3.7 "Configuration of the rails").
	"Job list" menu (section 3.3.8 "Job list").
	"Wire set" menu (section 3.3.9 "Wire set").
	"Machine" menu (section 3.3.10 "Menu").
	Signs out the current user and switches to the sign-in screen (see section 3.3.2 "Sign-in screen").
	Used job lines shows the number of used job lines and the total number of available job lines. Each wire of a wire set uses one job line. The number of used job lines depends on the scope of a job. If all job lines are used, no further jobs can be created or loaded until job lines have been processed and so become free again, irrespective whether the maximum number of loaded jobs is reached. Loaded jobs shows the number of loaded jobs and the maximum number of jobs to be loaded. If the maximum number of loaded jobs is reached, no further jobs can be created or loaded until a job has been fully processed and so a position becomes free again. Wires to manufacture shows the sum of the wires not yet manufactured for all loaded jobs.
	Last cycle shows the cycle time (in seconds) of the wire manufactured most recently. Average 10 cycles shows the average cycle time (in seconds) of the 10 wires manufactured most recently. Piece counter shows the absolute unit count of all wires manufactured at the system. Further information about the absolute unit count can be found at the "INFO" menu item.
	Optional Opens "Wire Printer" screen page (Section 3.3.4 "Wire Printer additional module (optional)")

Current wire

For running production, this shows the data for the currently manufactured wire. The display corresponds to a job line.

Once a wire has been completed, the next wire of the current job is loaded and manufactured automatically or the next job is loaded from the job list and then manufactured.

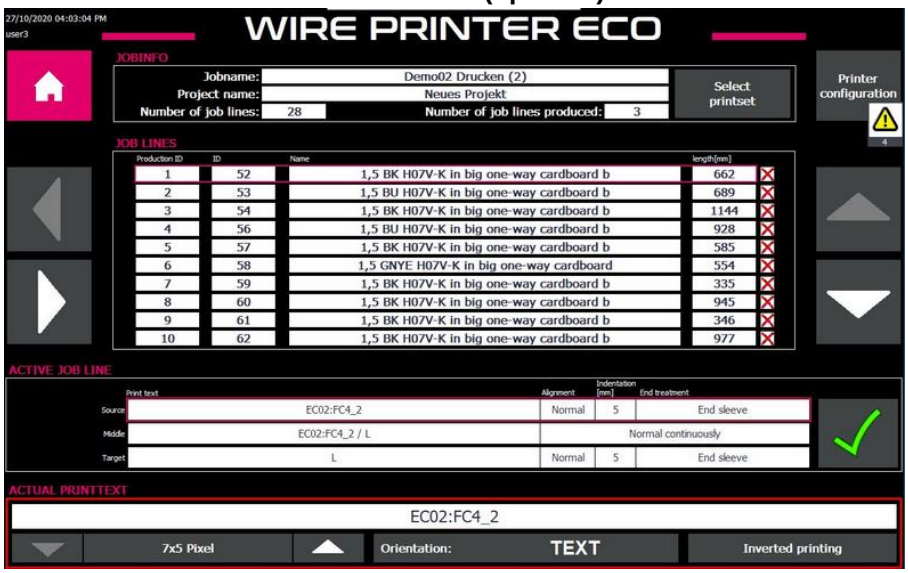
If no wire is loaded, pressing the "Start" push-button loads the next job from the job list and starts the production.
If the "Stop" push-button is pressed during running production, the current wire is completed, the next wire is loaded and production stopped.
Once the cycle has completed, the following buttons are released:

Button	Description
Load next job line	The currently loaded wire is not manufactured. The next wire of the current job is loaded automatically, provided no further wires in the current job are to be manufactured. Otherwise, the button label switches to "Load next job line". Pressing the button fetches the next job from the job list.
Delete current job	Deletes the currently loaded job.

If the job list contains further jobs, actuating the "Start" push-button or pressing "Load next job line" (displayed instead of "Skip current wire") loads the next job.

Note:
Deleting or skipping wires cannot be undone.
Manual jobs created directly on the machine can be deleted only as a whole. The function for skipping individual wires is **not** available for manual jobs.

3.3.4 Wire Printer additional module (optional)



EN

Description of the functions

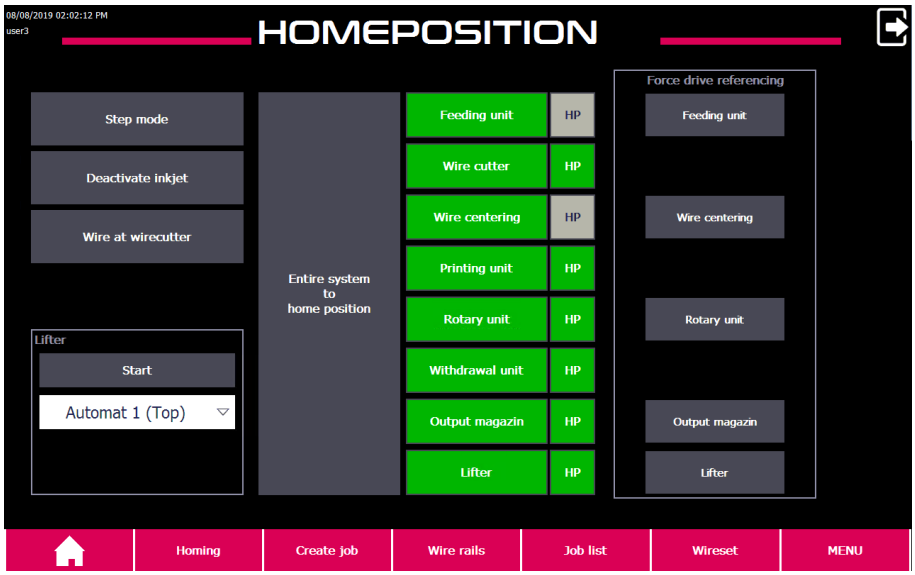
Button	Description
	Home menu (section 3.3.3 "Start screen").
Select print set	Opens the "Print set" screen page. Print sets loaded previously from the Wire Cockpit to the Wire Terminal can be loaded or deleted. Procedure similar to loading a wire set (see section 3.3.9 "Wire set")
Printer configuration	Opens the "Printer configuration" screen page. The position of the print heads is set with the arrow buttons. (See also section 3.3.10.7 "Printer configuration")
	A maximum of 10 wires are displayed in the "Job lines" area. These arrow buttons allow scrolling forwards and backwards within the print set.
	Pressing these buttons marks the next or previous job line.
	After processing a job line, it can be set to "manufactured" by the operator pressing this button. The print set is considered as being complete and vanishes from the job list only when all job lines of a print set are set to "manufactured". Just printing the individual text items does not have this result.
	This button resets a job line already marked as "manufactured" to "not manufactured".
	These two buttons set the print size.
Orientation	When this function is activated, the suggested text orientation is rotated by 180°.

Inverted print	The pixels to be printed are reversed when this function is activated. The background is printed, but the text remains free.

Note:
Depending on the surface to be printed, settings may need to be made to the print image and the proper print adhesion for the deployed ink checked.
The operator is responsible for setting the print image, for example, font size or inverted print. We recommend making a test print at an uncritical location of the workpiece or producing a sample.

3.3.5 Home position

Note:
Depending on the ordered machine options, some of the functions shown here may be absent.



Button	Description
	After switching on the system, the buttons of all components are shown grey. When the associated component is moved for the first time, a check is made whether this can be moved, whether the values of the limit switches are plausible and a homing performed. If this initialisation completed successfully, the button switches to green.
	Tapping a component moves it to the home position, provided all error messages have been acknowledged and the safety loop is active. When the component is at the home position, "HP" appears green. This function can be executed individually for each component.

Button	Description
Entire system to home position	Pressing the "Entire system" button causes all components to be traversed concurrently to the home position. If a movement has not yet been homed or the "Force new homing" function is activated, travel is first made to the reference touch-button and then to the home position.

Note:
This function is available only for servo-motorised drives with reference switch.

Further functions

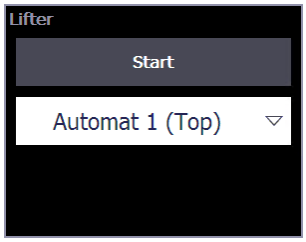
Button	Description
Step mode	If jogging is activated (pink button) and a job is loaded, each step of the machining sequence must be triggered individually by actuating the "Start" push-button (see section 3.2.15.1 "Push-button") Example: Start pressed: Wire is drawn in Start pressed: Rotary unit accepts the wire Start pressed: Wire is cut …

Note:
Jogging is used primarily for troubleshooting and permits an exact monitoring of the individual machining steps. If jogging of the system is active, an appropriate note is displayed at the top screen edge.

Button	Description
Deactivate inkjet	Deactivate inkjet / activate inkjet: Deactivates or activates the inkjet(s). If the button is flashing, the printer is currently switching from or to standby operation. The switching of the operating mode can take several minutes depending on the printer.

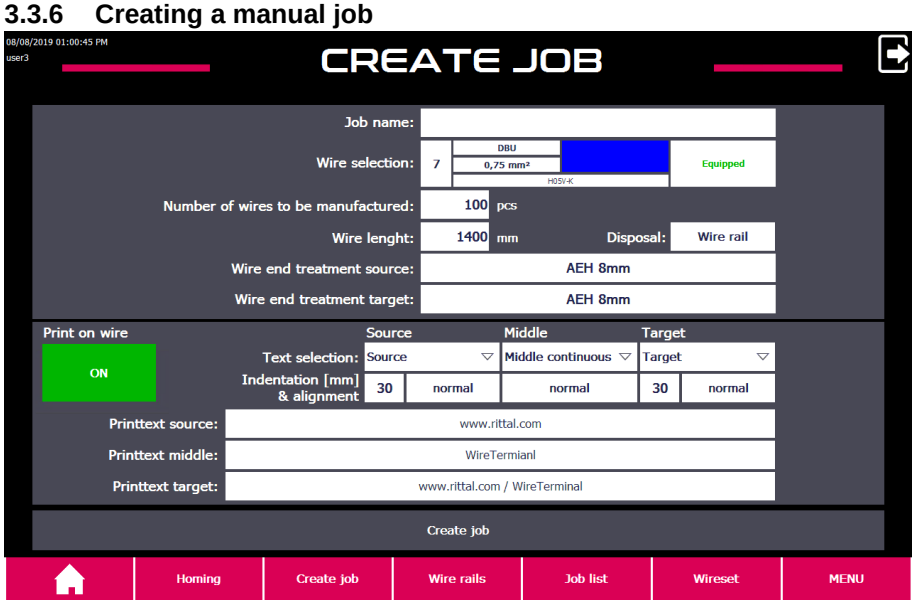
Note:
The printers can also be activated or deactivated by the user "Guest" (for example, before switching off power to the system).

EN

Button	Description
	To provide easy access to the end treatment units, the associated automat can be brought to the work position. The automat position to be brought to the work position is preselected via the drop-down menu. Pressing the "Start" push-button starts the movement and the axis traverses the selected level with reduced speed (compared with automatic operation) to the work position.

Note:
To move the axis, several conditions appropriate for the operating status must be satisfied. All protective doors must be closed and at least the rotary unit must be at the home position. If, however, the "Start" push-button cannot be actuated, the complete system must first be brought to the home position (see "Traverse complete system to the home position" button).

3.3.6 Creating a manual job



Job name
The job name can be entered or changed by tapping the text field. The job name is displayed later in the job list.

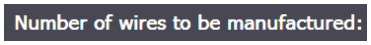
Wire preselection
Shows information about the selected wire:
– Index number of the wire, wire colour, cross-section, type
– Information whether the selected wire has been setup
To change the wire and to open the wire selection, touch the display area of the wire preselection.

EN

Wire selection

A menu that displays all created wires opens.
The filter at the top screen edge allows the selection to be restricted in accordance with different criteria.
Tapping a wire selects it.

Production options



Specify the number of wires to be manufactured.

Specify the length of the wires to be manufactured.

Select whether the completed wire should be stored in the rail or ejected.

Select the desired end treatment for each wire end.

Possible options depending on the configured end treatment available in the automat configuration:

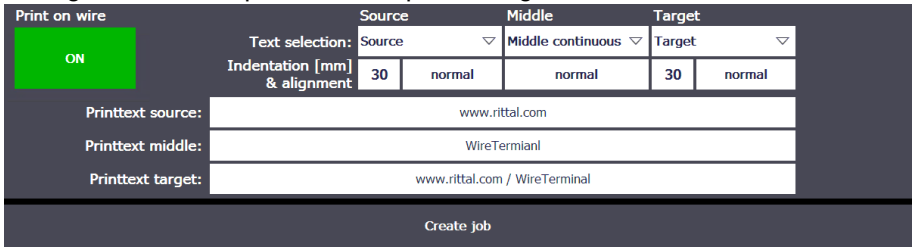
– No end treatment: Only cut to length or cut to length and printed.
– Full strip 8 mm and 10 mm: Insulation is removed at the wire end with the specified length.
– Ferrule 8 mm and 10 mm: Insulation is removed at the wire end and given a ferrule in the specified length.

The "Change selection" button switches the view between End treatment and Machining marks (for further information, see section 3.3.10.8 "Machining marks").

Note:
Only when a ferrule is required at one wire end is it desirable to perform an end treatment at the "Source" position in order to still store the wire in the rail system.

Note:
If wires are not given a ferrule, they are ejected automatically, irrespective of the selected target.

Printing a wire
Configuration of the print text and positioning on the wire.



Source
Print text at the wire start considering the indentation (at least 30 mm). The text can be printed straight or turned through 180°.
Possible options:
– No print: No print text at this position.
– Combined: The source and target print texts are separated and printed with a delimiter ("/").
– Source: The source print text is printed.
– Middle: The middle print text is printed.
– Target: The target print text is printed.

Middle
Print text in the wire middle or continuously (repeating) over the complete wire length.
– No print: No print text at this position.
– Combined: The source and target print texts are separated and printed with a delimiter ("/"). If "Combined" is selected at the middle position, the text is printed continuously, repeating over the complete wire length.
– Source: The source print text is printed.
– Middle continuously: The middle print text is printed repeating over the complete wire length.
– Middle once: The middle print text is printed once in the wire middle.
– Target: The target print text is printed.

Target
Print text at the wire end considering the indentation (at least 30 mm). The text can be printed straight or turned through 180°.
– No print: No print text at this position.
– Combined: The source and target print texts are separated and printed with a delimiter ("/").
– Source: The source print text is printed.
– Middle: The middle print text is printed.
– Target: The target print text is printed.

Note:
If the entered indentation or the alignment of the text does not match the standard shown on the screenshot, the input fields are pink-highlighted.

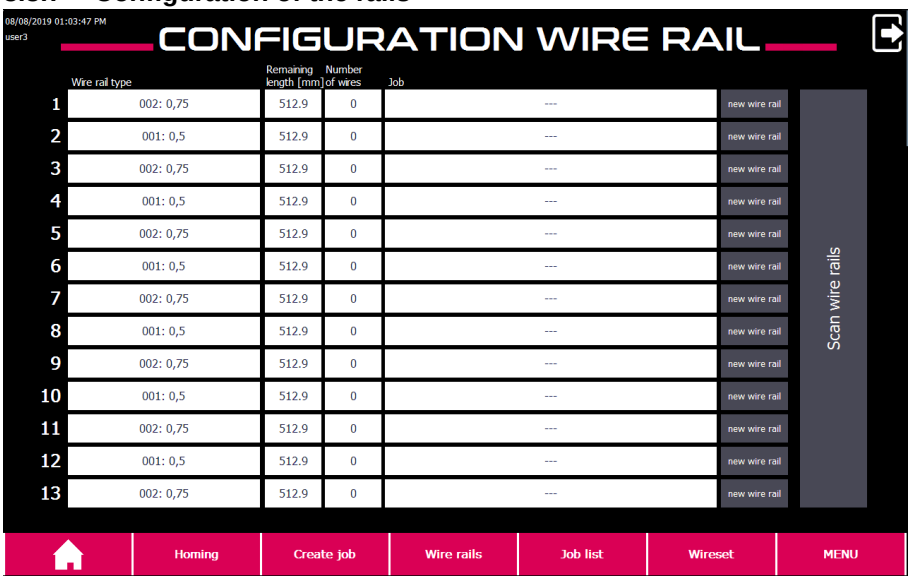
Note:
If the length of the text or the indentation is longer than the length of the wire, any text with lower priority is omitted automatically before the text with higher priority:
4. Source print text
3. Target print text
2. Middle print text once
1. Middle print text continuously

Note:
If machining marks are printed at the wire ends and also limited text indentations are specified, the print text can be displaced. Text overlap is not possible.

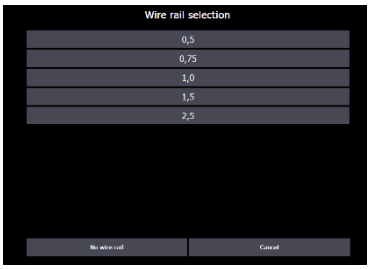
Tapping the text fields allows the texts to be entered from the displayed screen keyboard.

EN

3.3.7 Configuration of the rails



1-13
Corresponds to the rail positions in the output magazine.



Rail type
Shows which rail is located at the associated position of the output magazine.
Tapping a rail opens the rail selection. A different rail can be selected manually or the rail removed by pressing "No rail".
Alternatively, the automatic fetching can be reinitiated by pressing the "Import rails" button.

Remaining length
Shows how much space is still free for further wires in the rail. Details are specified in mm.

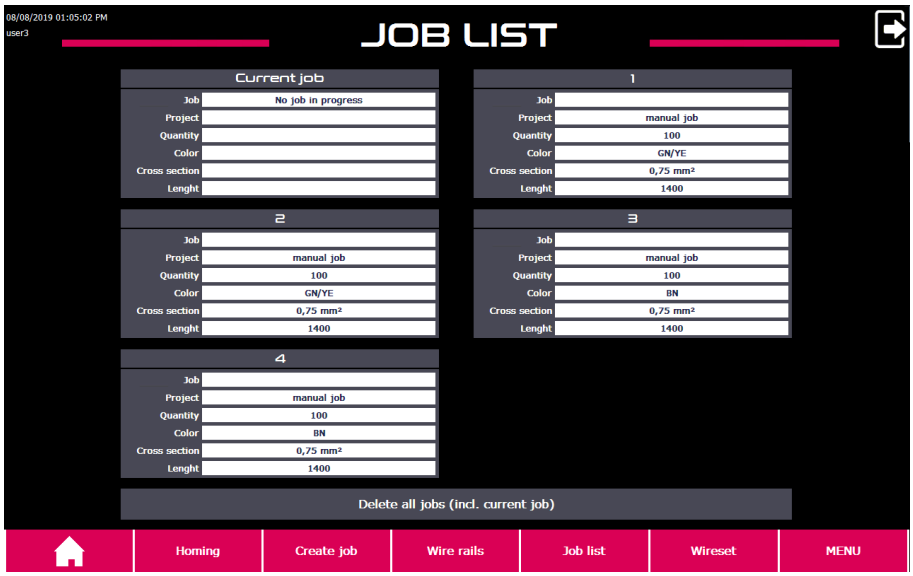
Number of wires
Shows how many wires exist already in the rail. Details are specified as units.

Job
When a wire set is loaded and the rail has been assigned, the name of the wire set is specified.
Rails that contain wires from manual jobs can be named manually by tapping the text field.
The information is stored in the RFID chip of the rail.
If a rail is taken from the machine and reinserted at another position or later, the job information on the RFID chip is deleted automatically.

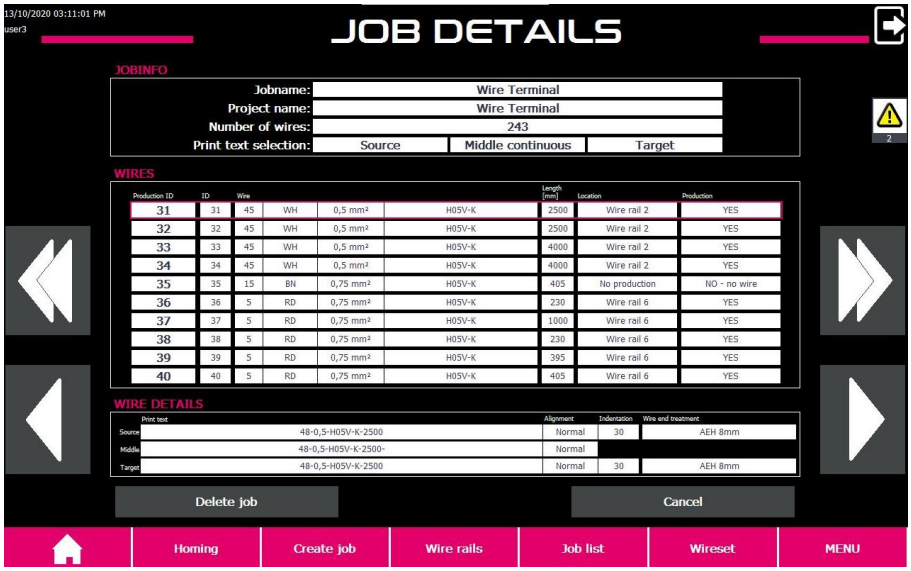
New rail
Pressing the "New rail" button deletes the data stored on the rail (number of wires, job name). The rail becomes free for a new job.
If the rail is assigned to a wire set that is still being machined, the rail cannot be reset. An appropriate message appears on the screen.

EN

3.3.8 Job list



This overview shows not only the job currently being processed, but also the jobs that have not yet been processed.
For manual jobs, not only the job name, project name and count, but also the colour, cross-section and wire length are shown.



This page shows all information that affects the job and its wires.
A wire can be marked in the "Wires" area. Information about the print text and end treatments of the selected wire is then displayed in the "Wire details" area.

Tapping a job deletes it.
Alternatively, the "Delete all jobs" function deletes jobs from the job list.
This function is available only when the machine is stopped.

Note:
Deleting jobs cannot be undone. Wire sets may need to be reloaded.

EN

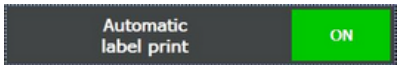
3.3.9 Wire set

Single jobs
Single jobs are jobs envisaged for one-off processing.

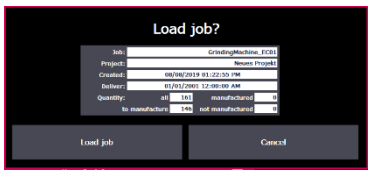
Series jobs
Series jobs are jobs to be reproduced more than once or often. Each call of a series job transfers an image to the list of single jobs, whereby the job name of the resulting single job is suffixed with a "@" followed by a consecutive number.

Filter
Pressing this button sorts the displayed wire sets according to the name or time of import in ascending or descending order.
The filter allows the displayed list to be filtered alphabetically or according to a term.

Selected job
If a wire set is selected by being touched, some associated key data is displayed at the right screen edge at "Selected job".

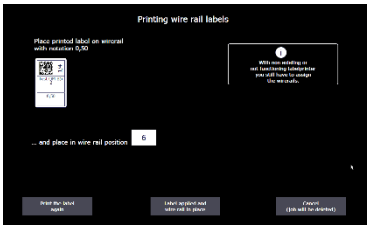


If "Automatic label print" is deactivated, the print-out of labels must be initiated by pressing the "Print label" button in the "Print Rail Labels" pop-up window.



Load job
Pressing "Load job" loads new jobs.
Pressing "Load job" continues those jobs whose production was begun earlier, but have not be manufactured completely, at that location where the machining was interrupted. The "Initialise and load job" function is also available for these jobs.

Initialise and load job
Pressing "Initialise and load job" resets a partially manufactured job. The production of wires begins from the start.
Delete job
Deletes the currently selected job from the machine. It is no longer displayed on the machine.
The job can be restored via the Wire Cockpit.



When a job is loaded, the pop-up window for the assignment of rails and the printing of rail labels opens. The rails are assigned automatically, provided appropriate rails have already been setup. The rail positions, however, can be overwritten manually. If no appropriate rail has been setup, an appropriate rail must be setup and the rail position made known.
The lower buttons allow the label to be reprinted or the job loading interrupted.
Once all rails have been assigned, the loaded job appears in the job list (see section 3.3.8 "Job list").

3.3.10 Menu

The various submenus described in more detail in this section can be reached via the "Menu" screen page.

Note:
Individual menu items can be missing or the input fields locked depending on the signed in user. See also section 3.3.10.13 "User administration".

Wire parameters
See section 3.3.10.1 "Wire parameters".

Feeder unit wire magazine configuration
See section 3.3.10.2 "Feeder unit wire magazine configuration".

Rail parameters

Note:
The rail parameters are preset by the manufacturer and can be viewed, but not changed.

Magazine rail configuration
See section 3.3.7 "Configuration of the rails".

EN

Automat parameters

Note:
The automat parameters are preset by the manufacturer and should be changed only on special request.

Automat configuration
See section 3.3.10.5 "Automat configuration".

Printer parameters
See section 3.3.10.6 "Printer parameters".

Printer configuration
See section 3.3.10.7 "Printer configuration".

Wire length optimisation
See section 3.3.10.8 "Machining marks"

System parameters
See section 3.3.10.10 "System parameters".

Manual operation
See section 3.3.10.11 "Manual operation".

System figures
See section 3.3.10.12 "System figures".

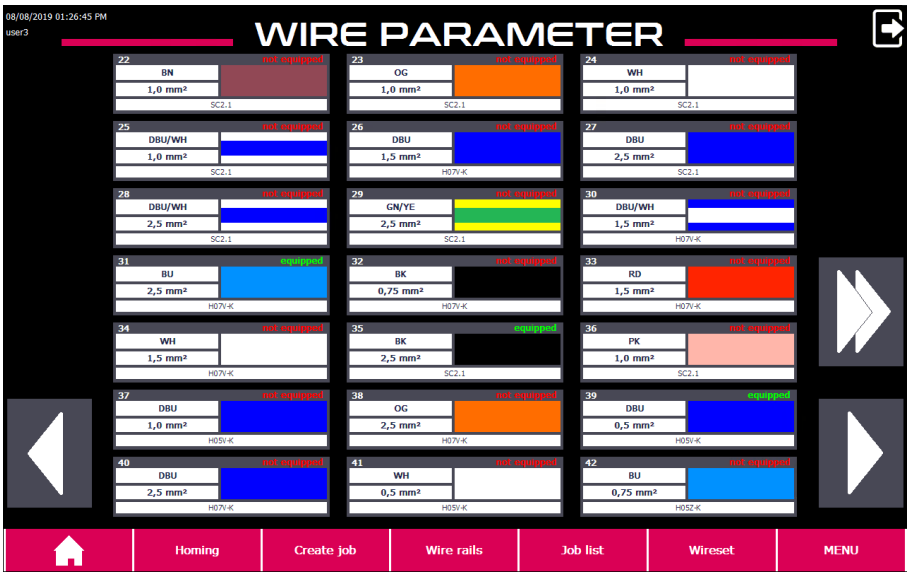
Info
Shows useful status information about the machine as well as detailed counter values and total unit counts.

PC
Remote connection to the machine computer.

User administration
See section 3.3.10.13 "User administration".

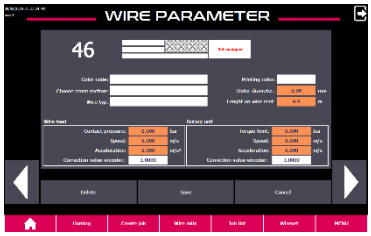
3.3.10.1 Wire parameters

Note:
To ensure an uninterrupted manufacturing process on the Wire Terminal and the proper placement of wires in wire rails, the wires must be parametrised in the system.



Wire parameters can be viewed, changed, deleted and copied as well as new wires created in this menu.

- To call or change a wire parameter set, tap the appropriate wire.
- To create a new parameter set, tap the next empty wire parameter set.
- For further information about wire parameters, see also section 6.4.1 "Creating and parametrising wires" in the "Working with the machine" area.



To reach the submenu in which the wire parameters can be entered or changed, select a wire parameter set.

Note:
When creating a new wire, the orange-highlighted fields must always be filled so that the wire can be manufactured or the wire length optimisation performed.

Note:
When a new wire is created, the parameters of an existing, similar wire can be copied with the "Copy wire" function and added at a different position. Only the affected parameters must then be adapted to the new wire.

Colour code
Selection of the wire colour (e.g. "DBU" for "Dark Blue").

Cross-section selection
Selection of the wire cross-section.

Wire type
Selection of the wire type (e.g. "H05V-K").

Wire feed contact pressure
Pressure (in bar) with which the cylinder presses the rollers of the wire infeed together.

EN

Pressure too low causes slip in the wire infeed. Pressure too high can cause deformation of the wire.

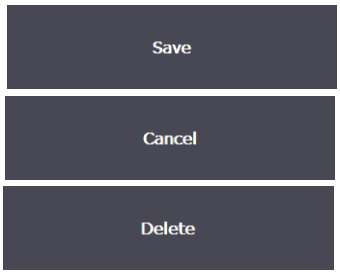
Feed rate
The speed (in m/s) with which the wire is moved.

Acceleration
The acceleration (in m/s²) with which the wire is accelerated until the feed rate is achieved.

Torque limitation
The required torque that must be applied to move the wire (the value serves as basis for calculating the maximum torque).
Torque too high causes slip and, in the event of a fault, damage to the wire insulation. Torque too low can cause increased occurrence of overvoltage shutdown.
The correct value can be determined automatically during the wire length optimisation (see section 3.3.10.9 "Wire length optimisation").

Rotary transducer correction factor
Factor for compensating the slip that occurs between the wire and the driven feed roller so that the correct wire length can still be ensured.
The correction factor is determined via the wire length optimisation (see section 3.3.10.9 "Wire length optimisation"). For a newly created wire, the correction factors are 1.000 by default.

Note:
The wire length should always be checked after setting up a new wire drum. In a few cases, it may be necessary to perform a new wire length optimisation. See section 3.3.10.9 "Wire length optimisation" for further information about wire length optimisation.



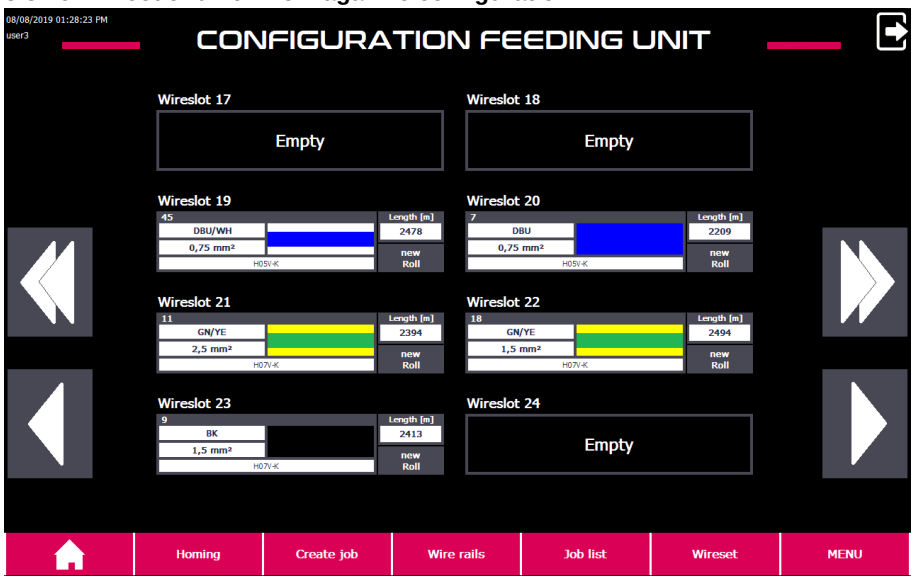
Pressing this button saves all entered data. Even incomplete data records can be saved.

Pressing this button exits the wire parameters menu without saving any changes that might have been made.

Pressing this button deletes all parameters of the current wire parameters set.

EN

3.3.10.2 Feeder unit wire magazine configuration



This menu sets up wires, specifies new rollers for setup wires and removes wires from the wire slot. Depending on the variant, 24 or 36 wires can be setup concurrently.

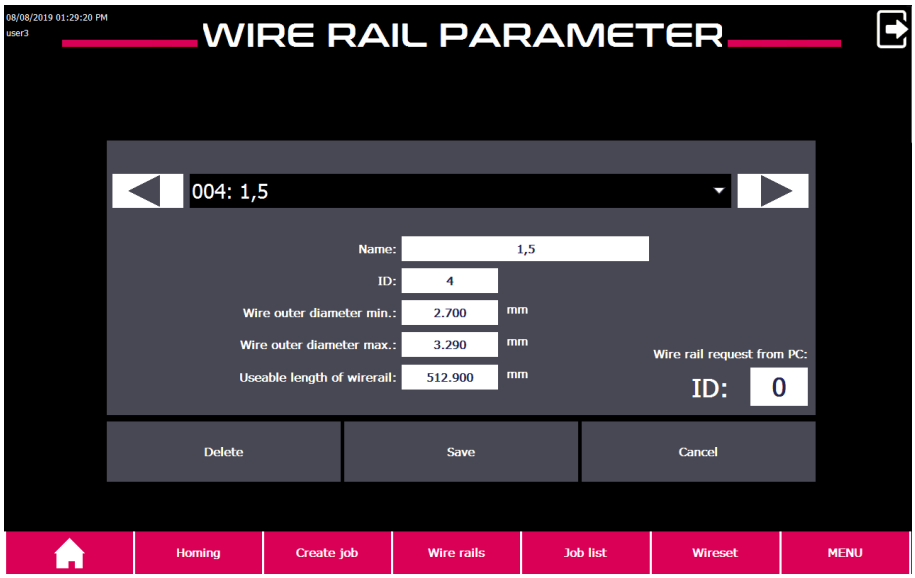
Setting up a wire
- Select the wire slot to be changed.
- An overview of the previously created wires is displayed.
- If no wire is selected, the current wire is removed from this wire slot.
- If a previously created wire is selected, set it up in the selected wire slot.

The remaining length (in metres) is displayed for each wire. When setting up the wire, the counter can be reset with "New roll" to any value stored in the wire parameters for the selected wire.
Alternatively, the remaining length can be entered manually, provided it is known.

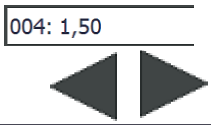
3.3.10.3 Rail parameters

Note:
The rail parameters are preset by the manufacturer and can be viewed, but not changed.

EN

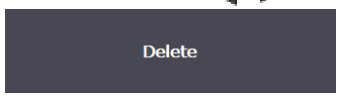


The parameters of the various rail types can be displayed in this menu.

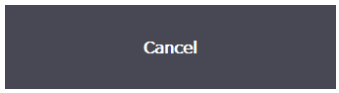


Displays the data record number and the name of the rail.

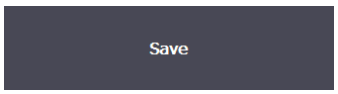
The arrow buttons can be used to navigate between the data records.



Cannot be selected



Pressing this button exits the menu.



Cannot be selected

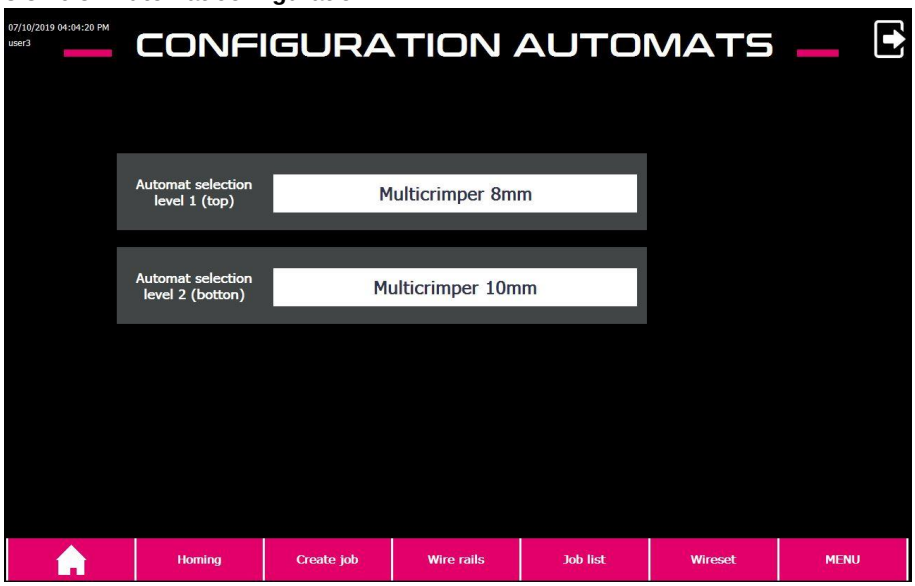
Cannot be selected

3.3.10.4 Automat parameters

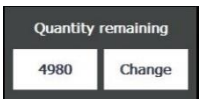
Note:
The automat parameters are preset by the manufacturer and should be changed only on special request.

EN

3.3.10.5 Automat configuration



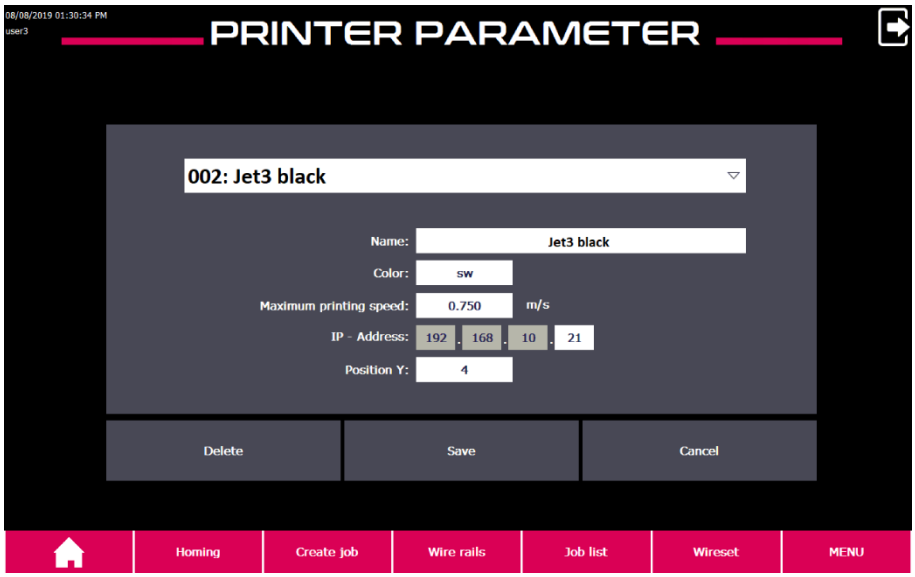
In this menu, the deployed end treatment units can be defined and the remaining ferrule counter can be edited or reset.



Press "Change" to reset the ferrules. This function is available only for 1-compartment crimping machines.

3.3.10.6 Printer parameters

Note:
The printer parameters are preset by the manufacturer and should be changed only on special request.



002: Jet3 black

The parameter sets for various printers are managed in the "Printer parameters" menu.
Switching between the parameter sets is possible via the drop-down menu.
The entries in the drop-down menu correspond to the data record number suffixed with the name.

Name
Uniquely identifies the printer in plain text.

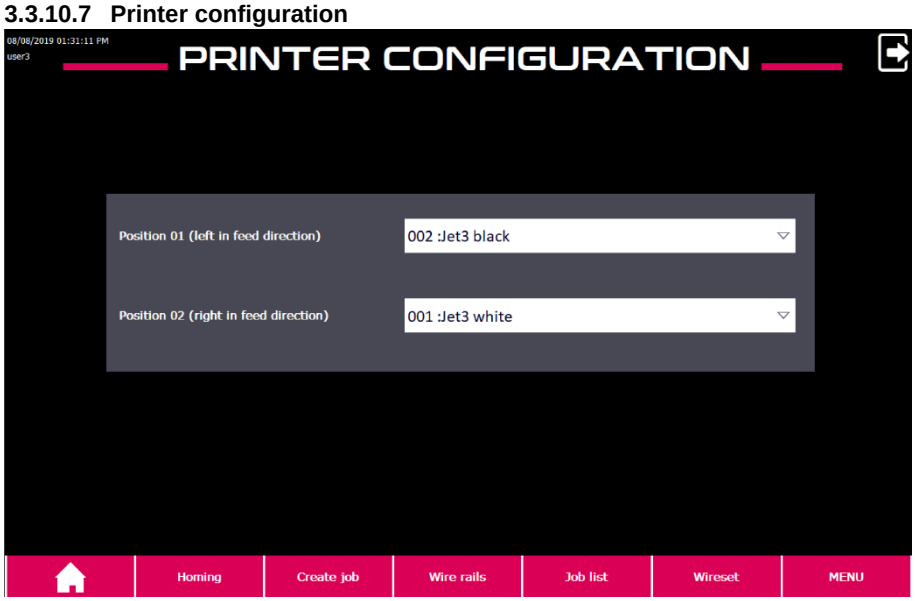
Colour
Designation of the print colour.

Maximum printing speed
The maximum printing speed depends on the deployed printer.

IP address
The IP address where the printer can be reached.

Position Y
The position of the first pixel of each print line (transverse to the feed direction) on the wire.

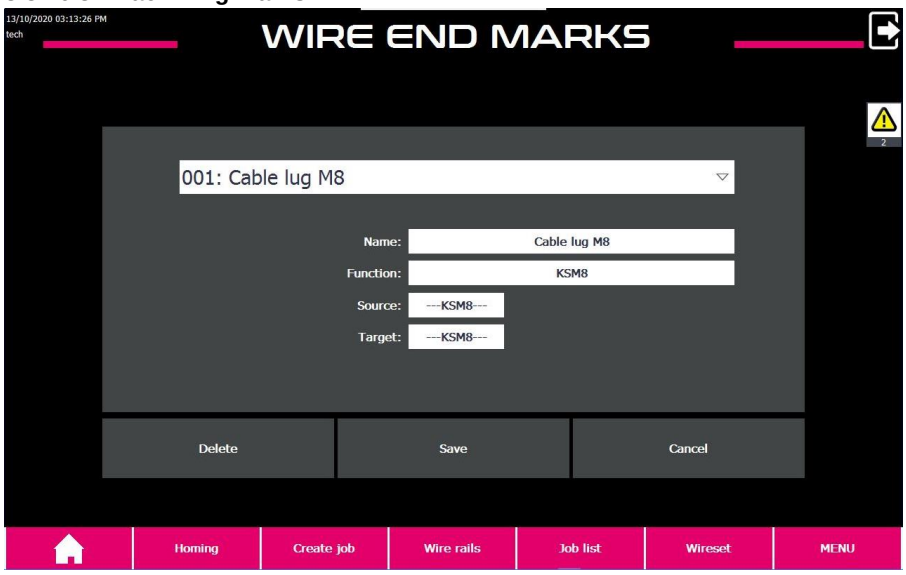
3.3.10.7 Printer configuration



The deployed printer(s) are defined in this menu.
Optional:
If the "Wire Printer additional module" is available, the actual position of the print heads must be set by pressing the arrow buttons.
Pressing the "WIRE PRINTER" button switches the screen page to "WIRE PRINTER" (see section 3.3.4).

EN

3.3.10.8 Machining marks

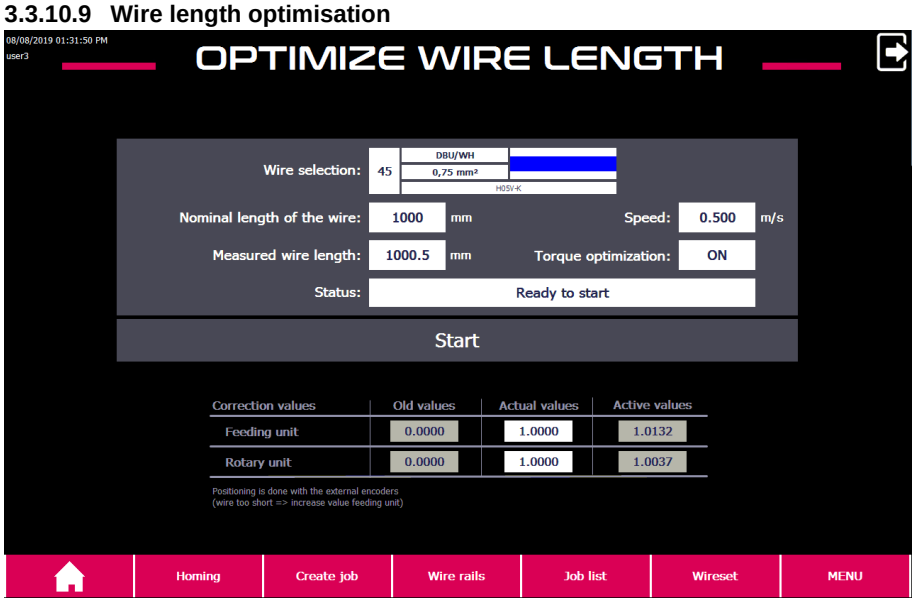


Machining marks are overprints at the wire start or wire end that can be selected instead of an end treatment.
The overprint is maximum 10 characters and provides information about the end treatment to be applied.

The function code for selecting this machining mark in "Create job" or in Wire Cockpit is available at "Function".
The function code must be unique. This means it must not appear in any end treatment or other machining mark.

"Wire start" and "Wire end" specify the texts to be printed on the wire.

3.3.10.9 Wire length optimisation



For each wire, slip occurs between the driven feed rollers of the wire feeder unit or rotary unit and the wire to be moved. Due to the resulting position error, the length by which a wire is moved for each rotation of the feed roller does not exactly match the roller circumference.

The degree of slip depends on many factors and differs for each wire. However, to ensure the correct wire length, factors to compensate for the position error are stored in the wire parameters (see section 3.3.10.1 "Wire parameters").
The wire length optimisation makes it easier to determine the correction factors.

Note:
For production reasons, different correction factors may be necessary for wires of the same type from different production batches.
- Consequently, after each wire drum change, check that the length of the wires is correct and, if necessary, perform a new wire length optimisation for the associated wire.

Preparation
Before the wire length optimisation can be started for a new wire, the wire must be created. The correction factors are initially 1.000.
- To avoid mistakes, ensure that no wires are in the ejection area of the wire output.
- Setup the wire to be optimised on the machine (see section 3.3.10.2 "Feeder unit wire magazine configuration") close all protective doors of the machine and acknowledge the safety loop.

The wire length optimisation can then be called in the menu.

Step 1
- Select the wire to be optimised via the wire preselection.

The torque optimisation can be enabled or disabled by being tapped.
If the torque optimisation is enabled, the minimum torque required to move the wire in the rotary unit can be determined during the length optimisation. The value is also stored in the wire parameters ("Torque limitation" value). The torque optimisation should also always be performed (Torque optimisation "ON").
Nominal length of the wire: By default, the wire is set using a 1000 mm long section. If the result of the wire length optimisation is too imprecise, if necessary, this value can be increased to maximum 5000 mm.
0.5 m/s is recommended as speed.
Once all preparations have been performed correctly, the "Ready to start" status appears.
- Pressing the Start push-button starts the wire length optimisation.

The "Ready to start" message extinguishes and "Wire is being cut to length" is displayed. The "Wire length optimisation active" message also appears at the top screen edge and the signal lamps illuminate yellow.

Step 2
A wire piece approx. 230 mm long is now drawn in and ejected. A wire piece that has approximately the "Nominal length of the wire" is then drawn in and ejected.
- Wait until the second wire has been cut to length and ejected.

"Wire is being cut to length" extinguishes and the request "Measure the cut wire and enter the measurement result" appears in Status. The "Actual wire length" input field is colour-highlighted.

Step 3
- Remove the longer wire from the machine and measure its length.
- Enter the result in the "Actual wire length" input field.

Once the value has been entered and confirmed with "Enter", the correction factor of the feeder unit is changed. The correction factor is displayed in the "Actual values" field of the table.

■ Close all protective doors and acknowledge the safety loop.

The automatic optimisation of the rotary unit starts. The "Rotary unit optimisation active" message is displayed in Status.

Step 4

Once the optimisation of the rotary unit has completed, its correction factor also changes.

The old and new parameters continue to be displayed until the wire length optimisation completes and the screen page has been exited.

If an error occurs during the length optimisation, the values in the "Actual values" field can be overwritten manually (for example, by entering the "Old values"). The values in the "Actual values" fields are transferred automatically to the wire parameters of the selected wire.

The "Wire length optimisation active" message disappears, the yellow signal lamp extinguishes and system operation can be resumed.

3.3.10.10 System parameters

All values for configuring the machine are stored in the system parameters. Such values include position values, speed parameters, limit values, etc.

Warning!
Incorrect system parameters can cause damage to the machine and result in malfunction or dangerous situations! Consequently:
■ **System parameters may be changed only by trained, qualified personnel.**

3.3.10.11 Manual operation

The screen pages for manual operation are used for manual traversing of individual axes or movements of the machine. Such functions are required primarily for setup and optimisation of the machine as well as for troubleshooting.

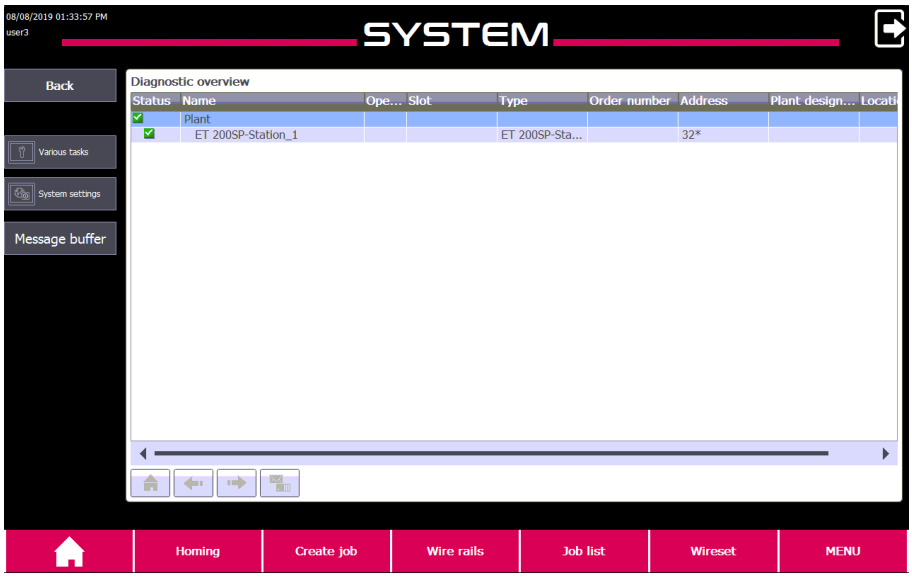
In addition, in the event of a fault, important information about axis positions and activated limit switches can be fetched.

Warning!
Misuse can lead to dangerous situations and damage to the machine! Consequently:
■ **System parameters may be changed only by trained, qualified personnel.**

3.3.10.12 System figures

Note:
In the event of faults, system figures can provide valuable information about the machine state.

EN



Diagnostic overview
Contains diagnostic information for the PLC control.

Various tasks
Contains functions for cleaning and calibrating the screen as well as the lamp test for the functional test of the illuminated control buttons.

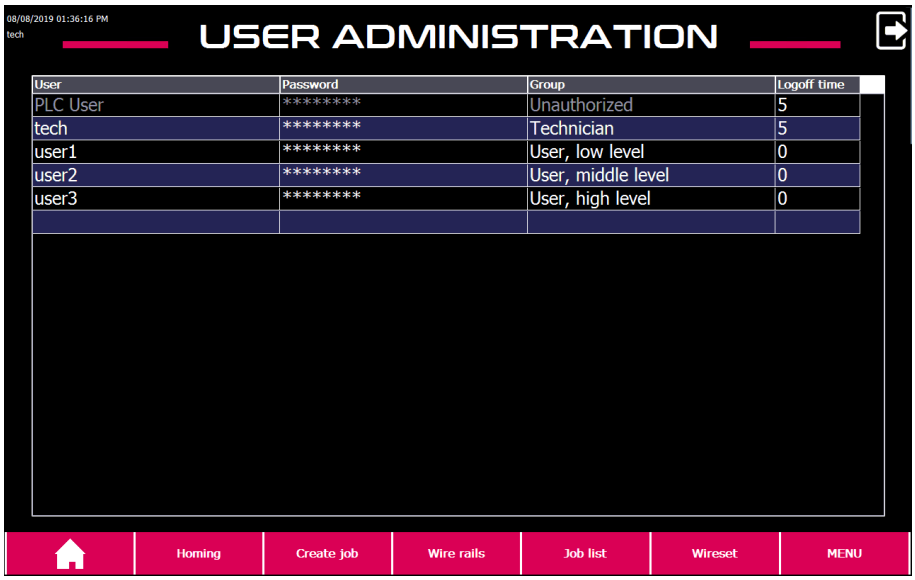
System settings
Access to the system settings of the Siemens SIMATIC Comfort Panel.

Message buffer
Shows a list of the 1000 most recently displayed warning and error messages.
Example:

No.	Time	Date	Status	Text
808	12:43:3...	08/08/2019	(K)G	Label printer - Communication error
20	12:43:3...	08/08/2019	(K)G	Protective door opened - Wire output
809	10:32:5...	08/08/2019	(K)G	Label printer - No ready signal
808	10:32:5...	08/08/2019	K	Label printer - Communication error
809	10:32:1...	08/08/2019	K	Label printer - No ready signal
20	10:32:0...	08/08/2019	K	Protective door opened - Wire output
20	10:07:2...	08/08/2019	(K)G	Protective door opened - Wire output
20	10:07:1...	08/08/2019	K	Protective door opened - Wire output
2	10:07:1...	08/08/2019	(K)G	Emergency stop - emergency stop relay not yet acknowledged
18	09:24:5...	08/08/2019	(K)G	Protective door opened - Rotary unit
2	09:24:5...	08/08/2019	K	Emergency stop - emergency stop relay not yet acknowledged
18	09:24:2...	08/08/2019	K	Protective door opened - Rotary unit
2	09:24:2...	08/08/2019	(K)G	Emergency stop - emergency stop relay not yet acknowledged
20	09:22:4...	08/08/2019	(K)G	Protective door opened - Wire output
2	09:22:4...	08/08/2019	K	Emergency stop - emergency stop relay not yet acknowledged
20	09:22:4...	08/08/2019	K	Protective door opened - Wire output
2	09:22:4...	08/08/2019	(K)G	Emergency stop - emergency stop relay not yet acknowledged
20	09:15:5...	08/08/2019	(K)G	Protective door opened - Wire output
2	09:15:5...	08/08/2019	K	Emergency stop - emergency stop relay not yet acknowledged
20	09:05:4...	08/08/2019	K	Protective door opened - Wire output
802	09:05:1...	08/08/2019	(K)G	All jobs are done!
802	09:05:1...	08/08/2019	K	All jobs are done!
803	08:59:4...	08/08/2019	(K)G	Required wire not installed!
803	08:59:1...	08/08/2019	K	Required wire not installed!
810	08:57:3...	08/08/2019	(K)G	Please wait! Printer startup...
810	08:56:4...	08/08/2019	K	Please wait! Printer startup...
2	08:56:4...	08/08/2019	(K)G	Emergency stop - emergency stop relay not yet acknowledged

3.3.10.13 User administration

The created users can be administered, added or removed in the user administration.



- To create a new user, touch an empty user field.
- Enter a user name and assign the desired authorisation group.
- If this user should be given a password, touch the Password field next to the user.
- Enter the password.

Note:
Only those user accounts assigned to the same or subordinate user group as the signed in user are displayed.

User name	Password
user1	123
user2	456
user3	789

Tab. 2: User accounts and passwords as delivered

User authorisations	User, lowest level	User, middle level	User, highest level	Technician
Create/delete jobs	X	X	X	X
Configure rails	X	X	X	X
Manual operation				X
Configure wires		X	X	X
Configure automats / printers			X	X
Edit rails			X	X
Edit wires			X	X
Edit automats / printers				X
System_parameters_noncritical				X

User authorisations	User, lowest level	User, middle level	User, highest level	Technician
System_parameters_critical				X
User administration				X
Personnel requirements (see section 2.2)	Qualified personnel (operators)		Qualified personnel (qualified electricians, mechatronics engineers)	Trained qualified personnel

4 Transport, packaging and storage

4.1 Safety instructions for transport

Personnel

The transport may be performed only by specially trained, qualified personnel.

Electrical system

Danger!
Life-threatening electric shock!
Contact with live parts is life-threatening. Switched-on electrical components can perform uncontrolled movements and cause severe injuries. Consequently:
- **Before transport, disconnect the machine from the power supply.**

Suspended loads

Warning!
When lifting loads, falling or uncontrolled swinging parts are life-threatening. Consequently:
- **Never stand under suspended loads.**
- **Observe the details for the provided lifting points.**
- **Use only approved lifting gear and slings with sufficient load capacity.**

Eccentric centre of gravity

Warning!
Risk of falling caused by eccentric centre of gravity!
Packing pieces can indicate an eccentric centre of gravity. Incorrect sling attachment can cause the packing piece to topple and so cause life-threatening injuries. Consequently:
- **Observe the markings on the packing pieces.**
- **Lift carefully and watch whether the load topples. If necessary, change the sling attachment.**
- **Drive the forklift truck with the forks under the specified lifting points. Ensure that the load does not topple. If necessary, secure the load.**

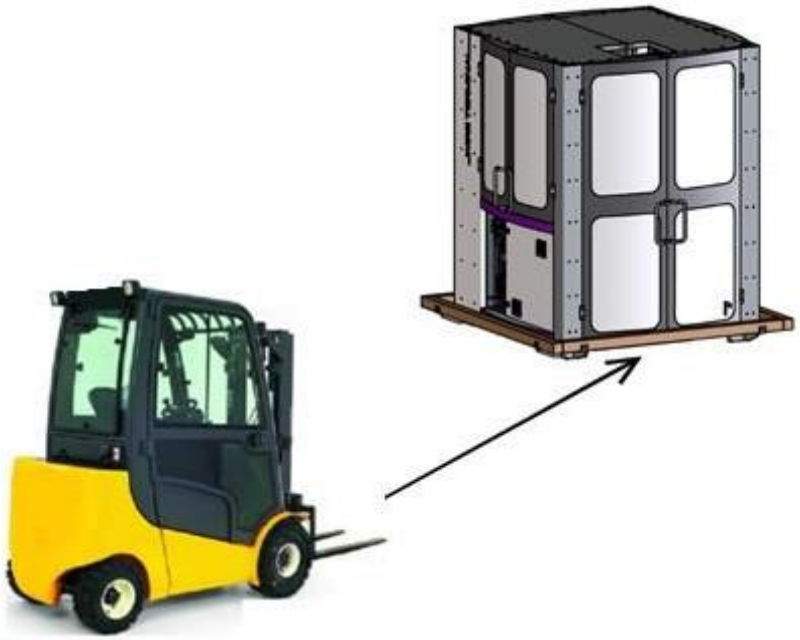
Toppling load

Warning!
Risk of injury due to toppling loads!
Toppling loads can cause severe injuries. Consequently:
- **Always secure components adequately from toppling.**
- **Use only suitable approved and tested lifting gear and slings with sufficient load capacity. Observe the weight of the machine components to be lifted.**
- **Move loads only under supervision.**

4.2 Transport

The machine may be transported only by a forklift truck or lifting truck with a fork length of at least 1400 mm.
The packaging is not suitable for crane handling.
The packed machine weighs 1200 kg.

EN



Note:
Because of its centre of gravity, the machine may be lifted only from one side (enclosure side).
The wooden bars provided on the packaging prevent incorrect lifting.
■ Observe the marking on the transport packaging!

4.3 Handling symbols on the transport packaging

	Lifting with a forklift truck from this side is possible
	Do not approach with a forklift truck at this side
	Transport with care
	Top
	Protect against moisture

4.4 Transport inspection

■ After delivery, check without delay the contents for completeness and transport damage.

If there is externally visible transport damage, proceed as follows:

■ Do not accept the delivery or only with reservation.
■ Note the damage extent on the transport documents or on the carrier's delivery note.
■ Initiate a complaint.

Note:
Issue a complaint for each fault as soon as it is recognised. Damage claims can be made only within the applicable complaint deadlines.

4.5 Packaging

For the packaging
The individual packing pieces must be packed appropriately for the expected transport conditions. Only environment-friendly materials are used for the packaging.
Before the individual components are installed, they should be protected by the packaging against transport damage, corrosion and other damage. Therefore, do not damage the packaging and remove it only just before installation.

Handling packaging material
Dispose of packaging material in accordance with the applicable legal provisions and local regulations.

Caution!
Risk of environmental damage caused by improper disposal!
Packaging materials are valuable raw materials and in many cases can be reused or appropriately reconditioned and recycled. Consequently:
- **Dispose of packaging materials environmentally-conform.**
- **Observe the locally applicable disposal regulations. If necessary, commission a specialist company with the disposal.**

4.6 Storage

Store the machine under the following conditions:
- Do not store outdoors.
- Store dry and dust-free.
- Do not subject to any aggressive substances.
- Prevent mechanical vibrations.
- Storage temperature: 5 °C to 40 °C.
- Relative humidity: min. 20% to max. 50%.
- To avoid condensation, prevent extreme temperature fluctuations.

During storage and standstill, frost effects must be avoided. If necessary, provide a heat insulation.

Note:
The printers and the crimping machines must be stored under different conditions.
- Observe the operating instructions of the manufacturers.

Note:
Printer inks and solvents must be stored under different conditions. Because printer inks are subject to ageing, they may be stored for only a few days.
- Observe the operating instructions of the manufacturers.

EN

5 Installation and initial commissioning

Note:
The installation and initial commissioning described in this chapter must always be commissioned via the Rittal Manufacturer's Service (or a commissioned representative) that should perform this work.
The independent execution of tasks, even partially, must be performed by authorised qualified personnel and after explicit approval by the manufacturer or the responsible sales partner.

5.1 Safety

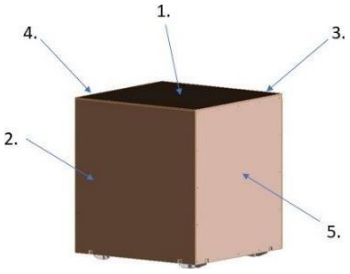
Electrical system

Danger!
Life-threatening electric shock!
Contact with live parts is life-threatening. Switched-on electrical components can perform uncontrolled movements and cause severe injuries. Consequently:
- **Perform the work only by a qualified electrician.**
- **Prior to performing work, disconnect the electrical supply and protect against being reactivated.**

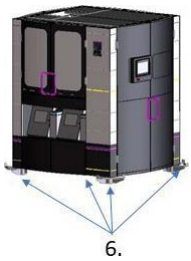
5.2 Installing the machine

Warning!
Heavy components and risk of toppling!
Loosening the encompassing packaging elements can cause the load to topple. Toppling loads can cause severe injuries, or even death, and damage the machine. Consequently:
- **Unpack the system with at least two persons (better, three or four).**
- **In particular, wear appropriate protective clothing.**
- **Provide adequate free space around the work area.**

Step 1 to 5:
- Remove the packaging material in the shown sequence.
- Ensure that the surface is not damaged.

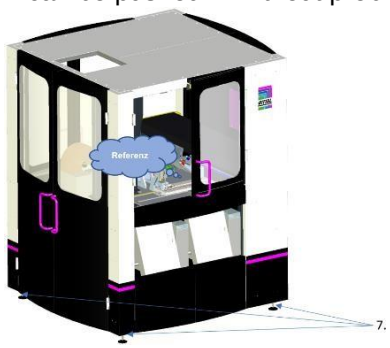


Step 6:
- Lift the Wire Terminal and remove the transport packaging at the four lower corners.
- Pay attention to the entry direction!



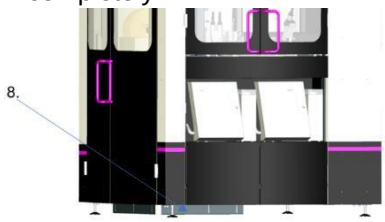
Step 7:

- Place the Wire Terminal at the envisaged position and align the machine horizontally with the four adjustment feet. Whereby, the reference level is the aluminium plate in the area of the wire feed.
- If the "Wire Printer Trolley" or "Lift option" machine option has been ordered, ensure that the spacing between the floor and the frame underside is approx. 90 mm to 100 mm so that the Wire Printer Trolley with printer can be pushed in without problem and the Lift option can be lowered.



Step 8: (only for machine option with automatic lifter):

- Mount the guard below the lifter with the slots so that it reaches the floor completely.



Step 9:

- Install the handles on all eight doors. The handles are packed in a separate carton supplied with the machine.

Warning!
Risk of injury caused by missing or incorrectly mounted guard!
During running operation, the lifter can be lowered until it is just above the floor so there is the risk that body parts or other objects can reach into the danger zone below the lifter.
The guard closes the danger zone and prevents entry.

5.2.1 Installation of additional equipment

Installation of the printers

Place the printers at the relevant printer position below the wire feed (Feeder unit A0200_00) in the Wire Terminal or on the Printer Trolley.

Insert the print heads through the opening behind the printer position in the machine area then further upwards to the print head holder (Labelling unit A0500_00).

EN

Caution!
Risk of damage when the print head lines are laid improperly!
The print head lines can be damaged by being kinked or by coming into contact with sharp edges or moving machine components:
Do not kink or forcibly bend the print head lines.
Lay the lines so they do not come into contact with the lifter or with other moving machine components.

Label printer
Position the label printer above the rail magazine.
The connection cables for the label printer lie in the cover. Connect the cables.

End treatment units

Note:
Also observe the notes and hazard warnings in section 3.2.9 "Lifter".

Set the automat(s) at the relevant positions in the machine and connect them to the pneumatic system.
Connect the end treatment units to the socket on the right. Ensure that any excessively long cables and hoses are placed under the automat and, if necessary, secure them from falling out!

Note:
Protruding lines can disturb uninterrupted operation of the system.

5.3 Installation of the Wire Printer additional module (optional)

Place the Wire Printer additional module carefully and at some distance from the machine on the mounting table while holding the unit. Attach the connection cables as well as the PE connection to the Wire Printer additional module. Then insert the Wire Printer additional module in the slots. Moving the module in the direction of the machine causes the module to snap into the locking bolts on the underside of the mounting table.
Dismantling is performed in the reverse sequence. The unit is freed by pulling down the locking bolt.

Danger!
Life-threatening electric shock!
Life-threatening is contact with live parts as well as improperly attached PE conductor connections. Consequently:
- **Install/dismantle the Wire Printer additional module only when the master switch is switched off.**
- **Ensure that the PE connection is attached to the provided terminal lug.**

5.4 Connecting the machine

Danger!
Life-threatening electric shock!
Contact with live parts is life-threatening. Damaged power supply cables can be live. Consequently:
- **Lay power supply cables in cable ducts so that mechanical damage is precluded.**
- **Also ensure that the power supply is shut down immediately in the event of a short-circuit or overload.**
- **Connect the machine to the site equipotential bonding.**

Caution!
Tripping hazard caused by improper laying of machine connections!
Improperly laid machine connections, such as cables, hoses or pipes, are tripping hazards that can cause severe injuries. Consequently:
- **Lay machine connections so they do not form any tripping hazards.**
- **Lay all cables in cable ducts.**
- **Mark any unavoidable tripping hazards with yellow-black marking tape.**

5.4.1 Electrical supply

The electricity is supplied via a separate infeed terminal box located at the rear of the enclosure (accessible via the protective door in the area of the end treatment units).

Note:
The electrical connection values must be taken from the technical specifications shown on the circuit diagrams or the rating plate.

Unless specified otherwise, the following apply:
– The machine may be connected only to a TN-S grid.
– The connection must be made as 3-phase with PEN conductor and protective-conductor contacting (3x 400 V/N/PE, AC 50 Hz, pre-fuse gG max. 16 A).
– The minimum cross-section of the connection cable is 2.5 mm² (copper).
– A potential equalisation connection with minimum cross-section of 10 mm² (copper) must also be established.

Note:
The permanent supply of electricity to the machine must be ensured. The printers and the machine computers must be supplied permanently with electricity to prevent ink from drying-out when printers are not being used and to permit data exchange via Wire Cockpit at any time.

5.4.2 Air supply

Air quality	ISO 8573-2010 [7:4:4]
Air pressure	Min. 5.5 bar / max. 6 bar
Air temperature	10…50 °C

Note:
Details for the connection of the pneumatic system must be taken from the circuit diagrams at the "Pneumatic system" area.

5.4.3 Network

The network interfaces can be found on the left side of the enclosure below the master switch.

Company network

Serves for the communication of the Wire Terminal with the PC workstations (Wire Cockpit) of the customer.

If a DHCP server is deployed in the customer network, one IP address must be reserved for the machine.

By default, the machine computer is not integrated in a domain.

Remote maintenance

The machine has a remote maintenance router.

For this interface, the same criteria as for the company network must also be satisfied in the customer network. The following must also be possible or given:

– The pinging of a public IP address
  (ICMP-request / echo reply)
  (ping 144.76.4.6, digicluster365.at, 8.8.8.8)
– The UDP and TCP port 1194 for outgoing connections must be open.

Note:
If no DHCP server is deployed in the customer network, the initial configuration of the two interfaces must be performed during the installation of the machine.
IP address, gateway, DNS server: Also note this information in the circuit diagrams at "Network configuration".

Note:
If remote maintenance access is not required, the remote maintenance connection can remain detached. Do not detach the cable during a remote maintenance! Otherwise there is the danger of data loss.

5.5 Dismantling

At the end of the service life, not only the machine, but also the electrical equipment must be dismantled and disposed off environmentally-conform.

Safety

Danger!
Life-threatening electric shock!
Contact with live parts is life-threatening. Switched-on electrical components can perform uncontrolled movements and cause severe injuries.
Consequently:
- **Perform the work only by a qualified electrician.**
- **Prior to performing work, disconnect the electrical supply and protect against being reactivated.**

Personnel
- Dismantling must be performed only by specially trained, qualified personnel.
- Work on electrical equipment must be performed only by qualified electricians.

Improper dismantling

Warning!
Risk of injury from improper dismantling!
Stored residual energy, sharp-edged components, tips and corners on and in the device or on the required tools can cause injuries. Consequently:
- **Ensure adequate free space before beginning work.**
- **Take care with open sharp-edged components.**
- **Ensure orderliness and cleanliness at the workplace! Loose components and tools lying around or on top of each other are potential accident sources.**
- **Dismantle components properly. Take care, some components are heavy, even when empty. If necessary, deploy the required lifting gear.**
- **Secure components so they cannot fall or topple.**
- **In case of doubt, consult the manufacturer.**

Dismantling
- Switch off the machine and prevent reactivation.
- Disconnect the complete power supply for the machine and wait until the stored residual energy has discharged.
- Remove operation supplies and auxiliary materials as well as any remaining processing materials and dispose of environmentally-conform.
- Then clean modules and components properly, and disassemble while observing the applicable local work protection regulations and environmental-protection regulations.

5.6 Disposal

Provided no return or disposal agreement has been made, send disassembled components for recycling:
- Scrap metals.
- Send plastic elements (insulation) for recycling.
- Dispose of other components (printer inks / solvents) according to their material properties. (Attention: Observe the manufacturer's declaration)

Caution!
Risk of environmental damage if incorrectly disposed of! Electronic components, lubrication materials and other auxiliary materials require hazardous waste treatment and must be disposed of only by approved specialist companies!

The local communal authorities or special disposal specialist companies provide information concerning the environmentally-conform disposal.

EN

6 Operation

6.1 Safety

Improper operation

Warning!
Risk of injury from improper operation!
Improper operation can cause severe injury or material damage. Consequently:

- **Perform all operating steps in accordance with the details of these operating instructions.**
- **Prior to performing work, ensure that all covers and safety equipment are installed and function correctly.**
- **Never disable safety equipment.**
- **Should faults, damage, unusually severe vibration or noise be present, switch off the machine and prevent re-activation.**
- **Ensure orderliness and cleanliness in the work area! Loose components and tools lying around or on top of each other are potential accident sources.**
- **Read the operating instructions prior to performing work.**
- **Prior to performing work, check the machine for any visible damage.**

6.2 Tasks before each use

Perform the following tasks before each use of the machine:

1. Ensure that all safety equipment functions correctly.
2. Ensure that all protective covers are installed correctly.
3. Ensure that the machine has no visible damage.
4. Ensure that the electricity supply is available.
5. Ensure that the pneumatic supply is available.
6. Ensure that the electrical connections are not damaged.

Personnel

Attention!
Only instructed persons may operate the machine!
The operating personnel must conform with the requirements handled in section 2.2 "Personnel requirements".

EN

6.3 Switching the machine on and off

6.3.1 Switching on

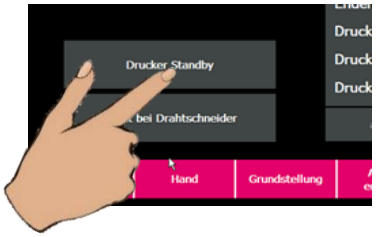
Turn the master switch on the enclosure of the Wire Terminal from the "OFF/O" position (horizontal) clockwise to the "ON/I" position (vertical).
The controller starts – this procedure takes less than one minute.
The printers are activated automatically after successfully starting the controller.

Switch on only the printer
The printers are permanently supplied with electricity and set by default so they are activated once daily automatically for one hour. This automatic operation is designated as "interval operation". Interval operation is required to prevent ink from drying-out when the machine is not being used. The printers can also be switched on manually independent of the machine.

Switch the printers on by touching any place of the still-dark touch-display for approx. 2 seconds.

6.3.2 Switching off

Press the "Deactivate printer" button in the "Home position" menu and wait until the button begins to flash.



Turn the master switch on the enclosure of the Wire Terminal from the "ON/I" position (vertical) counter-clockwise to the "OFF/O" position (horizontal).

6.4 Working with the machine

Note:
This chapter describes the work processes suggested by the machine manufacturer. This chapter also contains important information that must be observed for uninterrupted operation of the machine. This chapter, however, does not describe all machine functions in full detail.

6.4.1 Creating and parametrising wires

Introduction

Note:
To ensure an uninterrupted manufacturing process on the Wire Terminal and the proper placement of wires in wire rails, the wires must be parametrised correctly in the system.

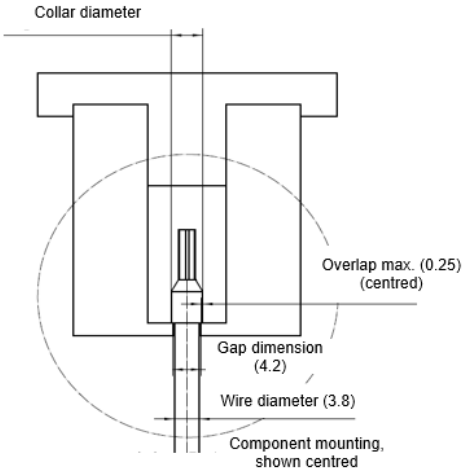


Fig. 2: 2.5 mm² rail

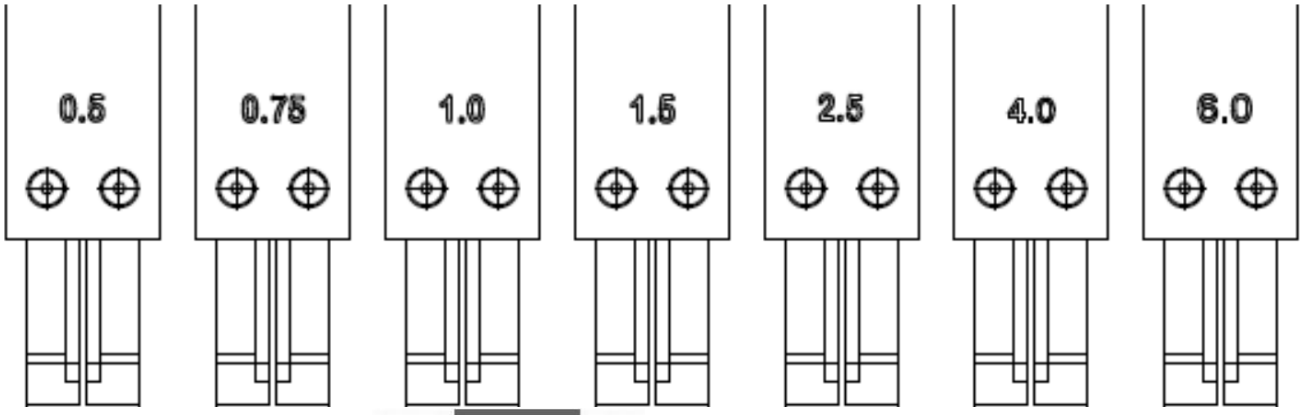
Outer diameters of wires for the same wire cross-sections can deviate greatly from each other, not just when different manufacturers or wire types are involved (e.g. multi-standard wires, halogen-free, etc.).
Differences in the outer diameter can also occur for type- and manufacturer-identical wires because of manufacturer tolerances and storage.

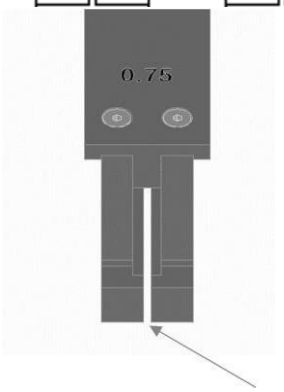
Note:
The software makes it possible to copy wire parameters. These must be checked and adapted to the actual values when necessary.

EN

Wire rails

The identification of the wire rails is only an orientation aid. The identification of an appropriate rail for a wire can, however, deviate from the actual wire cross-section depending on the wire diameter.





Nominal gap dimension in accordance with the following table:

Rail type	Nominal gap dimension
Rail 0.5	2.60 mm
Rail 0.75	2.80 mm
Rail 1.0	3.15 mm
Rail 1.5	3.50 mm
Rail 2.5	4.20 mm
Rail 4.0	4.80 mm
Rail 6.0	5.30 mm

Measuring the wire diameter

Note:
The wire should be remeasured for each setup (e.g. when refilling the wire) and the values corrected in the wire parameters when necessary.

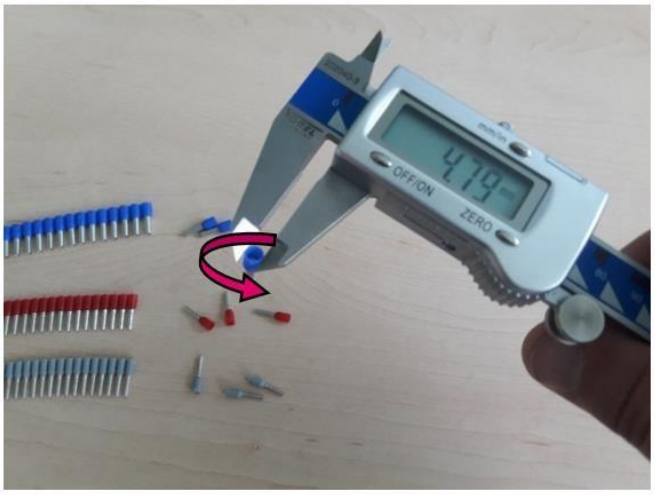
Check the wire diameter at at least three positions of the wire. Because wires do not have an absolutely cylindrical form, the wire must also be turned radially at the various measurement positions.
The largest measured value is taken as the wire diameter.

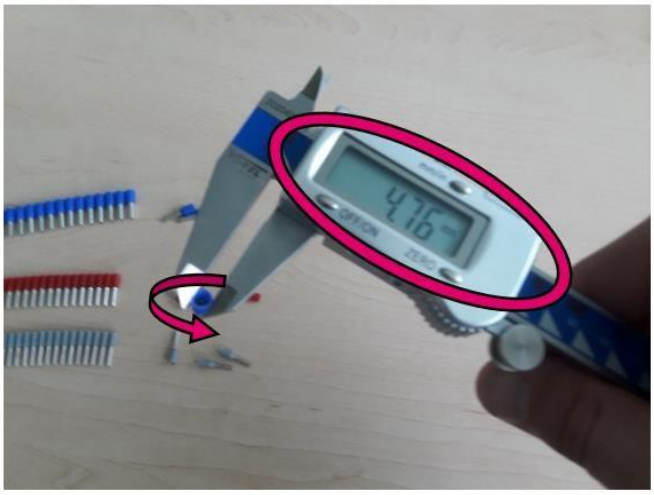
EN

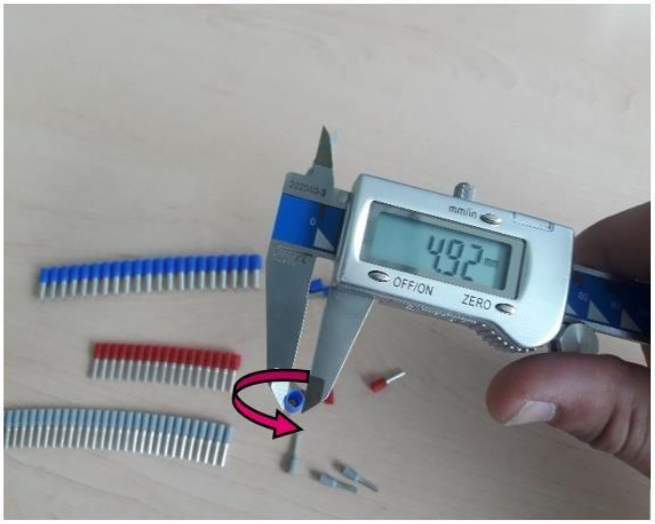
Measuring the ferrules

In addition to the wire diameter, the geometry of the ferrules, in particular, the diameter of the sleeve collar, is also very important for the correct storage in the rail system. To do this, check the measurements for at least three sleeves when ferrules are installed or retrofitted.

As with the wire measurements, the sleeves should also be turned radially when measuring the sleeve collar. In this case, the smallest diameter, however, is used for the correct rail storage.

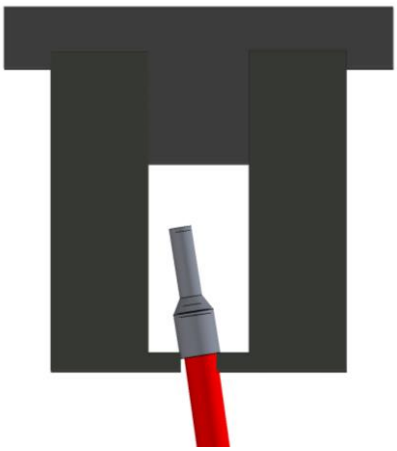






Rail selection in accordance with the measured values

Similarly, as an excessively large cross-section of a wire causes jamming in the rail gap, an excessively small sleeve diameters can cause side slipping of the ferrule in the rail gap. This can possibly also cause jamming of the wires in the rail.



(Symbolic diagram)

Depending on the previous measured values, the rail for wires must be chosen based on the following table:

Rail type	**0.5**	**0.75**	**1.0**	**1.5**	**2.5**	**4.0**	**6.0**
Rail nominal gap dimension [mm]	2.60	2.80	3.15	3.50	4.20	4.80	5.30
Max. wire diameter [mm]	2.19	2.39	2.69	3.29	4.20	4.60	5.10
For min. collar diameter [mm]	2.80	3.00	3.35	3.70	4.40	5.00	5.50
Min. wire diameter [mm]	1.80	2.20	2.40	2.70	3.30	4.00	4.50
For min. collar diameter [mm]	3.20	3.40	3.90	4.25	5.30	5.80	6.20

EN

6.4.2 Assembling wires

1. Setting up wires
(see section 3.3.10.2 "Feeder unit wire magazine configuration")
For manually created jobs, the wires must be set up before creating the job. When loading a wire set, the setup can also be performed while loading the job.

Note:
Wires with poor bending properties, usually those with large cross-section, should be placed in the middle Wire Storage and, where possible, fed straight to the machine to prevent friction-related malfunctions at the guide rollers.
Wires in the wire feed area should not cross each other. Any crossed wires should be untangled periodically.

2. Preparing rails
If necessary, empty the wire rail magazine, and deploy and fetch the wire rails required for the job in the machine (see section 3.3.7 "Configuration of the rails" for further information about the wire rail setup).

Note:
To ensure uninterrupted operation of the machine, we recommend loading wire rails sorted according to their diameter and assembling wires based on this sorting.

3. Creating or loading a job
Jobs can either be created manually (see section 3.3.6 "Creating a manual job") or loaded based on a wire set (see section 3.3.9 "Wire set").
Several jobs can be created or loaded manually in any sequence until a system limit is reached. The limit can be reached at the hardware (e.g. the maximum number of deployable wire rails) or at the controller (e.g. the maximum number of jobs or job lines that can be loaded) restrictions.
All loaded jobs are processed in the sequence in which they were loaded. Loaded jobs can be viewed or deleted via the job list (see section 3.3.8 "Job list").

4. Starting and monitoring the machining
Close all doors and acknowledge the safety loop. If no further error messages are pending, the fully automatic wire assembly can be started by pressing the Start push-button (see section 3.2.15.1 "Push-button").

Note:
To ensure uninterrupted operation, the magazine should be emptied regularly for jobs that contain many long wires, namely wires that reach the floor in the output magazine. An excessive wire volume in the output magazine can also cause accumulation of wires in the associated wire rail that can cause malfunction in the Wire Storage.

6.4.3 Wire Printer additional module (optional)

1. Print heads configuration

Before the print head is removed from the machine and placed in the Wire Printer additional module, the planned position change of the print heads must be made in the printer configuration (see section 3.3.10.7 "Printer configuration").
Changing the configuration terminates the print readiness. The printers must then be deactivated (see section 3.3.5 "Home position", "Activating/deactivating a printer" subsection).

Warning!
Risk of injury in the event of non-observance!
If the printer remains active or ready-to-print during setup, there is the risk of ink escaping from the print head which can cause injuries, in particular, to eyes. Consequently:
- **Before beginning the setup, ensure that the printer is deactivated.**
- **Reactivate the printer only when the print head is inserted in the retainer provided in the machine or on the Wire Printer additional module, and the retainer is locked with the provided lock.**

2. Remove the print head from the machine and place in the Wire Printer additional module

To do this, loosen the snap-fastener that fixes the print head in the retainer and drag the print head straight upwards from the retainer. Then guide the print head outwards through the opening immediately next to the operating unit and place in the Wire Printer additional module. The print head line can be fixed inside the machine with a hose clamp. This is located above the output magazine immediately below the operating unit.

Caution!
Risk of damage when the print head lines are laid improperly!
The print head lines can be damaged by being kinked or by coming into contact with sharp edges or moving machine components:
- **Do not kink or forcibly bend the print head lines.**
- **Lay the lines so they do not come into contact with the lifter or with other moving machine components.**
- **When using the Wire Printer additional module, insert the print head line in the hose clamp provided.**

When the print head is inserted properly in the Wire Printer additional module and has been locked, the printers can be reactivated (see section 3.3.5 "Home position", subsection "Activating/deactivating printers").

Warning!
Risk of injury in the event of non-observance!
If the printer is activated while the print head does not sit in the retainer provided, there is the risk of ink escaping from the print head which can cause injuries, in particular, to eyes. Consequently:

- **Before activating the printers, ensure that all print heads are inserted properly and the retainers are locked with the provided snap-fastener.**
- **Safety goggles and protective gloves must be worn for all work on the Wire Printer additional module.**

3. Select print set or enter print text

Print texts can be loaded from a print set. Or alternatively to select a print set, press the "Manual text input" button to return or unload the print set in order to enter in the "Current print text" area the text to be printed.

4. Select job line

In the "Job lines" area, the wire to be produced is selected by selection or with the arrow buttons.

5. Select print text

The data required for the production is displayed in the "Active job line" area.
The selected print text is sent to the printer and displayed in the "Current print text" area.
Sending a print text to the printer places the printer in the ready-to-print operating state. The coloured frame around the "Current print text" area indicates the printer status. Yellow: printer working, green: printer ready-to-print.

Note:
As standard, the machine is configured so that after a longer printing pause, print readiness is terminated by closing the nozzle to prevent excessive evaporation of solvent. Prior to the first printing, starting in the ready-to-print operating state takes quite some time before the printer is ready-to-print.

6. Printing

Select an appropriate revolver position based on the engraved acceptance diameter to ensure that, in particular, round workpieces are printed centred. Place the component to be printed in the Wire Printer additional module and, when required, fix with spring-loaded clamps. To do this, move the clamping lever from the "open position" (lever far left) or from the "floating position" (lever in the centre) to the far right.

Press the green button on the handle of the Wire Printer additional module and then push the print head first vertically onto the component until the sensing roller makes contact with the workpiece, and then drag horizontally to the right.

Note:
Printing begins at the reference line engraved in the acceptance revolver when the print head is moved from the start position straight downwards or at any position when the print head touches the workpiece.

Note:
Pressing the green button on the Wire Printer additional module places the printer first in active print mode. This operation requires approx. 100 ms.
Consequently, the green button must be pressed first, otherwise the print text may be displaced.

EN

7 Maintenance

7.1 Safety

Personnel

Attention!
Only qualified personnel may maintain the machine!
The maintenance personnel must conform with the requirements handled in section 2.2 "Personnel requirements".

Improperly executed maintenance work

Warning!
Risk of injury from improperly executed maintenance work!
Improper maintenance can cause severe injury or material damage. Consequently:
- **Ensure adequate free space before performing the work.**
- **Wear personal protective equipment.**
- **Ensure orderliness and cleanliness in the work area! Loose components and tools lying around or on top of each other are potential accident sources.**
- **If components have been removed, ensure correct installation, install all fastening elements again and observe the bolt tightening torques.**

Cleaning and maintenance tasks in the enclosure or on the machine electrical equipment

Danger!
Risk of fatal injury by always live parts! Even for switched-off master switch, parts of the system are live because the deployed printers require a permanent power supply.

Place the master switch in the "OFF" position. Also disconnect the power supply in front of the feed cable and secure against reactivation.
Do not use any aggressive detergents, water (only a slightly dampened cleaning cloth, then wipe dry), alcohols, solvents or thinners.

7.2 Maintenance schedule

The following sections describe the maintenance work required for optimum and fault-free operation.
If the regular inspections show increased wear, shorten the required maintenance intervals as appropriate for the signs of wear.

Interval	Maintenance work	Execute by
Daily	Visual inspection of the complete machine for damage	Operator
	Clean the print head / collection tray	
	Clean the crimper	
As necessary, but at least weekly	Clean the complete machine	Operator
Monthly	Check the protective equipment for correct functioning (pay attention to dual circuits): – RC circuit-breaker	Qualified electrician

Interval	Maintenance work	Execute by
	– Emergency Stop push-button – Security door switch	
Yearly	Check all screw joints for tightness. If necessary, tighten the screw joints.	Qualified electrician Operator
	Lubrication of the linear guide	
	Check the belt tension (2 x wire feeder unit, turntable, rail magazine)	
	Check the safety equipment (see section 7.3.2)	Qualified electrician
As necessary	Pneumatic system inspection/maintenance	Qualified personnel
Monthly	Check all sensors and actuators for tightness. If necessary, tighten.	Qualified electrician
Every two years	Clean or renew the filters of the enclosure cooling (optional) as necessary, but every two years at the latest.	Qualified electrician
	Check the complete electrical equipment for correct operation.	
	Replace all pressure rollers and feed rollers of the wire feed as well as the wire cutter blades.	Rittal Manufacturer's Service
Refer to the manufacturer's documentation	Printer maintenance (see external printer documentation)	Rittal Manufacturer's Service
	Crimper maintenance (see external crimper documentation)	Rittal Manufacturer's Service

7.3 Maintenance work

7.3.1 Cleaning

Cleaning the print heads

To clean the print heads, we recommend using the optionally available cleaning station.

Note:
Unlike most other cleaning actions on the machine, the print heads are cleaned when the machine is switched-on. This is necessary because the print nozzle must be opened intermittently while cleaning.
The removal of the print head internals from the hood is documented in the log file of the machine.

The print head is cleaned in the sequence described below, whereby the print manual should be consulted for a detailed description of the cleaning tasks performed on the print heads.

- Preparing the cleaning station
- Swivel out the cleaning station, insert the funnel in the provided support and screw an empty collection container onto the station from below.

- Provide tool and thinner, and, if necessary, insert in the tool holder on the cleaning station.
- Remove the print head internals from the hood and insert the print head in the cleaning station. Perform the cleaning.
- Check the hood interior for soiling and clean as necessary.
- Clean the hood exterior as well as the collection tray in the machine below the print heads.
- Reinsert the print head, and, if necessary, repeat the operation for the other printers.

Clean the machine housing

- The cleaning must generally be performed wet, or at least moist. In most cases, clear water suffices, although this should be lukewarm with a mild household detergent for heavy soiling.
- Use only a soft chamois or new microfibre cloth for all cleaning operations.
- Never use any form of normal window cleaning agents or similar cleaning agent. In addition, solvents, thinners and alcohols as well as all forms of abrasive cleaning agents, cloths and sponges may generally not be used.
- Immediately after the intensive and thorough cleaning, it is desirable to apply an antistatic plastic conditioner for transparent acrylic, PET and polycarbonate glass.

Note:
Improper cleaning or the use of inappropriate cleaning agents can scratch the glass of the machine housing or cause clouding.

Cleaning work in the machine
Prior to starting cleaning:

- Stop the machine
- Remove any residual material from the machine

Warning!
For cleaning work on the electrical equipment of the machine, the safety instructions described in the "Cleaning tasks in the enclosure or on the electrical equipment of the machine" section also apply.

All cleaning work should generally be performed dry, or with a moist cloth at most.

- Never use any form of normal abrasive cleaning agents, cloths or sponges as well as aggressive cleaning agents.
- Prior to cleaning visible surfaces, it is desirable to test the effects of the cleaning agent on the surface at a hidden location in the machine.
- Never use compressed air, because this can cause dirt particles to be pressed deep into seals, bearings or generally inaccessible locations and so cause damage to the machine.
- For further information on cleaning the machine, contact the manufacturer or the responsible sales partner.

7.3.2 Checking the safety equipment

The defined safety functions, as well as all associated components of these safety functions, must be checked and documented regularly, at least once annually, by the appropriate qualified personnel.

Emergency Stop push-button
The following items must be checked for each individual Emergency Stop push-button.

- Visual inspection. The Emergency Stop housing and the Emergency Stop push-button must not show any mechanical damage!
- The Emergency Stop push-button must remain locked when it is pressed and must unlock correctly when the push-button is pulled!
- All safety and mains contactors must act when the Emergency Stop push-button is pressed (pay attention to dual circuits). In addition, drives with STO-function must switch to STO (check the voltage to ensure that the contact has switched).
- Check the feedback contacts in the safety switching relay and the PLC, as well as the alarm contacts of the safety function, for correct functioning.
- If the Emergency Stop is unlocked again, the Emergency Stop acknowledgement must function correctly.

Protective door limit switch

The following items must be checked for each individual protective door limit switch:

- Visual inspection. The safety limit switch must not show any mechanical damage!
- The safety limit switch actuator must not show any mechanical damage!
- All safety and mains contactors must act when a protective door limit switch is open (pay attention to dual circuits). In addition, drives with STO-function must switch to STO (check the voltage to ensure that the contact has switched).
- Check the feedback contacts in the safety switching relay and the PLC, as well as the alarm contacts of the safety function, for correct functioning.
- If the protective door limit switch is actuated again, the acknowledgement must function correctly.

Acknowledge push-button

- Visual inspection. The housing and the Acknowledge push-button must not show any mechanical damage.
- The push-button function of the Acknowledge push-button must function correctly.
- A reset of the safety function for emergency stop or opening a protective door limit switch may be performed only after actuating the Acknowledge push-button.

Complete machine

A complete machine check must be performed by the appropriate Rittal qualified personnel, when:

- Mechanical or electrical service or repair work has been performed.
- Safety components or adjacent components have been removed and/or installed again.
- Electrical components have been removed and/or installed again.

Notes for checking

The check of safety components, in particular for dual circuits, must also include the following measures:

- The activation and deactivation of the individual contacts (for example, does an actuated Emergency Stop push-button open its load- and control-voltage side contacts and close them correctly once the Emergency Stop push-button has been unlocked again).
- Actuation and release of magnetic valves, contactors, etc. (they do not remain at one position).

The safety equipment to be checked includes not only the Emergency Stop push-buttons and safety limit switches, but also:

– Reset push-button

– Pressure sensor and switch-on valve at the maintenance unit

The service life of the controller is 20 years. After this period, all safety-relevant electrical components must be replaced.

7.4 Commissioning after maintenance work

After maintenance work, perform the following recommissioning steps:

1. Check all previously loosened screw joints for tightness.
2. Check whether all previously removed protective equipment and covers have been installed correctly.
3. Ensure that all used tools, materials and other equipment have been removed from the work area.
4. Clean the work area and remove any escaped materials, such as liquids, processing material or similar.
5. Ensure that all safety equipment of the machine is installed correctly and functions properly.
6. Place the master switch at the "ON" position to switch on the power supply.
7. Press the "Start" push-button to start a new work process.

Warning!
A premature reactivation is life-threatening!
Reactivation is life-threatening for all persons in the danger zone. Consequently:
- **Prior to reactivation, ensure that no persons are present in the danger zone.**

7.5 Rectification of malfunctions

Note:
After every malfunction that occurs during running operation, any wires or wire scraps must be removed manually from the machine before the machine is restarted.

To do this, open one of the doors to provide access to the machine.
The rotary unit can be moved manually in the pressure-free state. Remove any cut or partially machined wires completely from the machine.
If a malfunction occurs before the wire was cut, it must be pulled out and cut manually. To do this, open the doors in the wire feed area, manually actuate the wire clamp and pull out the wire. Pay particular attention to any damaged wire insulation and cut the wire. The wire can then be reinserted flush in the feed magazine.

Before restarting the machine, ensure that the malfunction cause has been rectified, no wire scraps remain in the machine, and all tools and other objects have been removed from the machine. The steps described in section 7.4 "Commissioning after maintenance work" apply similarly for restarting after fault rectification.

7.5.1 Alarm list

Note:
The alarm list contains many common error messages and frequent error causes or solution concepts. If you cannot solve the problem yourself, it is very useful to specify the alarm number when making a support request!

Machine alarm messages

Alarm no.	Error message	Possible cause and solution approach:
1	Emergency stop - emergency stop has been actuated	The Emergency Stop push-button is pressed and/or one or more safety doors are open.
2	Emergency stop - the emergency stop relay has not yet been acknowledged	The Emergency Stop push-button has been unlocked, all doors are closed. The safety loop must be acknowledged.
3	Emergency stop - safety loop or safety acknowledgement faulty	Error in the safety loop. Inspect by a qualified electrician! Rectify the error and replace any faulty components.
17	Safety door open - feeding unit	The safety door is open.
18	Safety door open - turntable	The safety door is open.
19	Safety door open - wire end treatment	The safety door is open.
20	Safety door open - removal	The safety door is open.
33	System pressure loss	Check the compressed air supply, maintenance unit and pressure control valve.
34	Fuse - safety features and PLC outputs	A fuse in the enclosure has tripped. Inspect by a qualified electrician! Rectify the error cause and activate the fuse.
41	PC - no communication	The PC in the enclosure is not active or the communication is interrupted. Restart the PC (attention: the PC is always supplied with electricity).
42	PC - wire data has not been updated	The PC in the enclosure reacts too slowly or not at all. Restart the PC (attention: the PC is always supplied with electricity) or reset the database.
43	PC - automat data has not been updated	The PC in the enclosure reacts too slowly or not at all. Restart the PC (attention: the PC is always supplied with electricity) or reset the database.
44	PC - wire set request timeout	The PC in the enclosure reacts too slowly or not at all. Restart the PC (attention: the PC is always supplied with electricity) or reset the database.
81	Feeding unit - wire feed hold down - working position timeout	The module is blocked mechanically.
82	Feeding unit - wire feed hold down - home position timeout	The module is blocked mechanically.
83	Feeding unit - wire feed retainer - both limit switches actuated	One or both limit switches are set incorrectly or defective.
84	Feeding unit - servocontroller fuse - wire magazine and wire feed	The fuse in the enclosure has tripped.
85	Feeding unit - wire feed tracking error - remove wire from machine! (place wire end in the start position)	The wire to be drawn in is blocked. This can be inside the WireTerminal or in the feed area.
86	Feeding unit - wire magazine servocontroller - power on error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
87	Feeding unit - wire magazine servocontroller - reset error	Contact your Rittal customer service.
88	Feeding unit - wire magazine servocontroller - reference error	Check the reference switch for correct operation and whether it is set correctly.
89	Feeding unit - wire magazine servocontroller - positioning error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
90	Feeding unit - wire magazine servocontroller - manual mode error	A servo error in jogging mode has occurred. Check the configuration and parameters.
91	Feeding unit - wire feed servocontroller - power on error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
92	Feeding unit - wire feed servocontroller - reset error	Contact your Rittal customer service.
93	Feeding unit - wire feed servocontroller - reference error	Check the reference switch for correct operation and whether it is set correctly.

94	Feeding unit - wire feed servocontroller - positioning error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
95	Feeding unit - wire feed servocontroller - manual mode error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
96	Feeding unit - proportional valve for the pressure control in the contact pressure range for the wire feed - analogue output scale error	Incorrect value in the wire parameters.
97	Feeding unit - wire feed servocontroller - discrepancy error (motor encoder - ext. encoder)	Excessive deviation between motor and external rotary transducer. Ensure that the wire is not blocked. Remove the wire and check for damaged spots.
98	Feeding unit - wire end reached! Remove residual wire from the machine and insert a new wire	The retainer of the wire feed has reached the lower limit position during insertion, because there is no wire between the rollers.
99	Feeding unit - no wire in the selected wire slot!	The retainer of the wire feed has reached the lower limit position, because there is no wire between the rollers.
100	Feeding unit - wire magazine servocontroller - technology error (<field ref="0" />)	For further variants, refer to the list of technology alarms.
101	Feeding unit - wire feed servocontroller - technology error (<field ref="0" />)	For further variants, refer to the list of technology alarms.
110	Feeding unit - wire cutter 4-6 mm² - timeout during the movement to the work position	The module is blocked mechanically.
111	Feeding unit - wire cutter 4-6 mm² - timeout during the movement to the home position	The module is blocked mechanically.
112	Feeding unit - no wire for wire cutter 4-6 mm²	The wire cutter has been requested, although no wire is located at the specified position.
113	Feeding unit - timeout during the wire retraction from wire cutter 4-6 mm²	The module is blocked mechanically.
114	Feeding unit - wire sensor actuated impermissibly for wire cutter 4-6 mm²	The sensor has been actuated, although no actuation is expected.
129	Wire cutter - timeout during the movement to the work position	The module is blocked mechanically.
130	Wire cutter - timeout during the movement to the home position	The module is blocked mechanically.
131	Wire cutter - both limit switches occupied	One or both limit switches are set incorrectly or defective.
132	Wire cutter - no limit switch occupied	One or both limit switches are set incorrectly or defective, or the module is blocked mechanically.
145	Wire centring - wire centring servocontroller - power on error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
146	Wire centring - wire centring servocontroller - reset error	Contact your Rittal customer service.
147	Wire centring - wire centring servocontroller - reference error	Check the reference switch for correct operation and whether it is set correctly.
148	Wire centring - wire centring servocontroller - positioning error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
149	Wire centring - wire centring servocontroller - manual mode error	A servo error in jogging mode has occurred. Check the configuration and parameters.
150	Wire centring - wire centring servocontroller - technology error (<field ref="0" />)	For further variants, refer to the list of technology alarms.
177	Printing unit - print head adjustment - movement to working position timeout	The module is blocked mechanically.
178	Printing unit - print head adjustment - movement to home position timeout	The module is blocked mechanically.
179	Labelling unit - writing head adjustment - both limit switches actuated	One or both limit switches are set incorrectly.
180	Printing unit - printer 1 - check and clear error at printer	Follow the instructions on the display or in the printer operating instructions.

181	Printing unit - printer 2 - check and clear error at printer	Follow the instructions on the display or in the printer operating instructions.
182	Printing unit - printer 1 - LAN connection timeout	The printer is switched off or not connected correctly. The IP address of the printer is not set correctly. -The printer configuration (see 3.3.10.7 "Printer configuration") does not match.
183	Printing unit - printer 2 - LAN connection timeout	The printer is switched off or not connected correctly. The IP address of the printer is not set correctly. -The printer configuration (see 3.3.10.7 "Printer configuration") does not match.
184	Labelling unit - writing head adjustment - no limit switch actuated	One or both limit switches are set incorrectly.
193	Rotary unit - horizontal rewinding hopper - timeout during the movement to the work position	The module is blocked mechanically.
194	Rotary unit - horizontal rewinding hopper - timeout during the movement to the home position	The module is blocked mechanically.
195	Rotary unit - horizontal rewinding hopper - both limit switches occupied	One or both limit switches are set incorrectly or defective.
196	Rotary unit - horizontal rewinding hopper - no limit switch occupied	One or both limit switches are set incorrectly or defective, or the module is blocked mechanically.
197	Rotary unit - vertical rewinding hopper - timeout during the movement to the work position	The module is blocked mechanically.
198	Rotary unit - vertical rewinding hopper - timeout during the movement to the home position	The module is blocked mechanically.
199	Rotary unit - vertical rewinding hopper - both limit switches occupied	One or both limit switches are set incorrectly or defective.
200	Rotary unit - vertical rewinding hopper - no limit switch occupied	One or both limit switches are set incorrectly or defective, or the module is blocked mechanically.
209	Rotary unit - side 1 wire guide pipe - working position timeout	The module is blocked mechanically.
210	Rotary unit - side 1 guide pipe - home position timeout	The module is blocked mechanically.
211	Rotary unit - wire guide machining side 1 - both limit switches actuated	One or both limit switches are set incorrectly.
212	Rotary unit - side 2 guide pipe - working position timeout	The module is blocked mechanically.
213	Rotary unit - side 2 guide pipe - home position timeout	The module is blocked mechanically.
214	Rotary unit - wire guide machining side 2 - both limit switches actuated	One or both limit switches are set incorrectly.
215	Rotary unit - linear movement - working position timeout	The module is blocked mechanically.
216	Rotary unit - linear movement - home position timeout	The module is blocked mechanically.
217	Rotary unit - longitudinal movement - both limit switches actuated	One or both limit switches are set incorrectly.
218	Rotary unit - wire feed clamping - working position timeout	The module is blocked mechanically.
219	Rotary unit - wire feed clamping - home position timeout	The module is blocked mechanically.
220	Rotary unit - wire feed clamp - both limit switches actuated	One or both limit switches are set incorrectly.
221	Rotary unit - fuse servocontroller - rotation and wire feed	The fuse in the enclosure has tripped.
222	Turning unit - Timeout wire retraction from end processing - Remove wire!	The wire could not be pulled out of the end machining machine.
223	Rotary unit - rotary unit servocontroller - power on error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
224	Rotary unit - rotary unit servocontroller - reset error	Contact your Rittal customer service.

225	Rotary unit - rotary unit servocontroller - reference error	Check the reference switch for correct operation and whether it is set correctly.
226	Rotary unit - rotary unit servocontroller - positioning error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
227	Rotary unit - rotary unit servocontroller - manual mode error	A servo error in jogging mode has occurred. Check the configuration and parameters.
228	Rotary unit - wire feed servocontroller - power on error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
229	Rotary unit - wire feed servocontroller - reset error	Contact your Rittal customer service.
230	Rotary unit - wire feed servocontroller - reference error	Check the reference switch for correct operation and whether it is set correctly.
231	Rotary unit - wire feed servocontroller - positioning error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
232	Rotary unit - wire feed servocontroller - manual mode error	A servo error in jogging mode has occurred. Check the configuration and parameters.
233	Rotary unit - wire feed tracking error - remove wire!	Check the rotary unit and the path to the crimping machine.
234	Rotary unit - wire end treatment timeout - remove wire!	Check the rotary unit and the path to the crimping machine.
235	Rotary unit - linear movement - no limit switch actuated	One or both limit switches are set incorrectly.
236	Rotary unit - rotary unit servocontroller - technology error (<field ref="0" />)	For further variants, refer to the list of technology alarms.
237	Rotary unit - wire feed servocontroller - technology error (<field ref="0" />)	For further variants, refer to the list of technology alarms.
241	Withdrawal unit - lifting gripper - working position timeout	The module is blocked mechanically.
242	Withdrawal unit - lifting gripper - home position timeout	The module is blocked mechanically.
243	Withdrawal unit - gripper stroke - both limit switches actuated	One or both limit switches are set incorrectly.
244	Withdrawal unit - longitudinal gripper - working position timeout	The module is blocked mechanically.
245	Withdrawal unit - longitudinal gripper - home position timeout	The module is blocked mechanically.
246	Withdrawal unit - gripper longitudinal feed - both limit switches actuated	One or both limit switches are set incorrectly.
247	Withdrawal unit - tilting movement gripper - movement in horizontal position timeout	The module is blocked mechanically.
248	Withdrawal unit - tilting movement gripper - movement in vertical position timeout	The module is blocked mechanically.
249	Withdrawal unit - gripper tilting movement - both limit switches actuated	One or both limit switches are set incorrectly.
250	Withdrawal unit - gripper - working position timeout	The module is blocked mechanically.
251	Withdrawal unit - gripper - home position timeout	The module is blocked mechanically.
252	Withdrawal unit - gripper - both limit switches actuated	One or both limit switches are set incorrectly.
253	Withdrawal unit - gripper stroke - no limit switch actuated	One or both limit switches are set incorrectly.
254	Withdrawal unit - gripper longitudinal feed - no limit switch actuated	One or both limit switches are set incorrectly.
255	Withdrawal unit - gripper tilting movement - no limit switch actuated	One or both limit switches are set incorrectly.
273	Magazine - servocontroller fuse - axis feed	The fuse in the enclosure has tripped.

274	Magazine - magazine servocontroller - power on error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
275	Magazine - magazine servocontroller - reset error	Contact your Rittal customer service.
276	Magazine - magazine servocontroller - referencing error	Check the reference switch for correct operation and whether it is set correctly.
277	Magazine - magazine servocontroller - positioning error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
278	Magazine - magazine servocontroller - manual mode	A servo error in jogging mode has occurred. Check the configuration and the parameters.
279	Magazine - magazine servocontroller - technology error (<field ref="0" />)	For further variants, refer to the list of technology alarms.
280	Magazine - invalid serial number on wire rail <field ref="0" />	A rail that has not been read in is located at this position. Update the rail database.
281	Magazine - unknown rail-ID at rail position <field ref="0" />	A rail that has not been read in is located at this position. Update the rail database.
282	Magazine - wire rail missing at position <field ref="0" />	No rail is available or it is not detected. Insert a rail, check the configuration of the rails, check the RFID transponder.
283	Magazine - incorrect wire rail at position <field ref="0" />	The configuration of the rails has been changed or does not match the actual configuration. See 3.3.7 "Configuration of the rails"
284	Magazine - RFID error <field ref="0" />	The serial number of the rail was not detected. Check the rail or update the database.
285	Magazine - deposit wire to wire rail timeout	The wire was not placed in the wire rail or not detected. Remove the wire from the machine and produce it again. Check the laser light-barrier setting.
286	Magazine - ejection control sensor actuated impermissibly	The laser light-barrier was actuated, although no actuation was expected. Check the light-barrier setting.
287	Magazine - no RFID transponder can be reached	Check the correct operation of the RFID transponder and inspect the wiring.
306	Lifter - servocontroller fuse – lifter	The fuse in the enclosure has tripped.
307	Lifter - lifter servocontroller - power on	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
308	Lifter - lifter servocontroller - reset error	Contact your Rittal customer service.
309	Lifter - lifter servocontroller - referencing error	Check the reference switch for correct operation and whether it is set correctly.
310	Lifter - lifter servocontroller - positioning error	Check all cables and connections for the servomotor and for the converter, and ensure that movement is not blocked mechanically.
311	Lifter - lifter servocontroller - manual mode error	A servo error in jogging mode has occurred. Check the configuration and parameters.
312	Lifter - level 1 pullout not inserted	Insert the pullout level and ensure that the limit switch operates correctly.
313	Lifter - level 2 pullout not inserted	Insert the pullout level and ensure that the limit switch operates correctly.
314	Lifter - level 3 pullout not inserted	Insert the pullout level and ensure that the limit switch operates correctly.
315	Error "<field ref="0" />" - see message on the automat display	Follow the instructions on the display or in the operating instructions of the affected wire end treatment unit.
316	Lifter - lifter servocontroller - technology error (<field ref="0" />)	For further variants, refer to the list of technology alarms.
317	Wire end treatment - timeout - remove wire!	The wire end treatment could not be completed within the specified time.

318	Lifter - level 1 - malfunction at the wire end treatment automat	The automat signals a malfunction. If no automat is present at the specified position, check the automat configuration.
319	Lifter - level 2 - malfunction at the wire end treatment automat	The automat signals a malfunction. If no automat is present at the specified position, check the automat configuration.
320	Lifter - level 3 - malfunction at the wire end treatment automat	The automat signals a malfunction. If no automat is present at the specified position, check the automat configuration.
800	Printer 1 - warning - see printer display	Observe the printer display warning and follow the instructions in the printer manual.
801	Printer 2 - warning - see printer display	Observe the printer display warning and follow the instructions in the printer manual.
802	All orders have been completed!	No further orders in the order list. Create an order and restart the machining.
803	No appropriate wire equipped for the current order!	Equip the required wire and restart the machining.
804	No appropriate rail configured for the wire store!	Equip the required rail or empty the available rail, and restart the machining.
805	No appropriate automat configured for the requested wire end treatment!	Equip the automat for the desired wire end treatment and restart the machining.
806	No appropriate printer configured!	Equip the printer for the desired printer ink and restart the machining.
807	Wire too short for the current order!	In accordance with the wire configuration details, the wire remaining in the wire drum is shorter than that required for the current order line. Equip new wire drum.
808	No label printer connection	Switch on the label printer or ensure the correct connection.
809	Label printer not ready	Check the label printer
810	Please wait! The printer is being started ...	The required printer is currently starting. Wait until the printer is ready.
811	PC - wire feedback has not been acknowledged	The PC in the enclosure reacts too slowly or not at all. Restart the PC (attention: the PC is always supplied with electricity) or reset the database.
812	PC - no connection to the WireCockpit server	The PC in the enclosure is not active or the communication is interrupted. Restart the PC (attention: the PC is always supplied with electricity).
813	Automat for wire end treatment not ready!	The wire end treatment automat does not issue any ready signal. Check the automat or correct the automat configuration.
814	Drum unit counter of the automat at 0!	In accordance with the automat configuration details, no further ferrules available. Equip new wire end ferrule roll.
815	PC - no update of the orders	The PC in the enclosure reacts too slowly or not at all. Restart the PC (attention: the PC is always supplied with electricity) or reset the database.
816	Jogging mode active - deactivation on the home position side	See section "Jogging mode" for further information
817	PC - no feedback during RFID check	The PC in the enclosure reacts too slowly or not at all. Restart the PC (attention: the PC is always supplied with electricity) or reset the database.
818	The wire rails are being read in	Wait until the wire rails have been read in completely.
819	Error in the network settings	Check the network settings or reconfigure.
820	PC - timeout while changing the network settings	The PC in the enclosure reacts too slowly or not at all. Restart the PC (attention: the PC is always supplied with electricity) or reset the database.
821	Wire length optimisation active	Follow the notes on the display or wait until the wire length optimisation has completed.
822	Print head in Wire Printer	Insert the required print head in the machine or check the printer configuration.

823	The printer does not stop	Check the printer display! Check the connection to the printer.
840	Please wait! The printer is being started ...	The required printer is currently starting. Wait until the printer is ready.
841	Wire Printer - warning - see printer display	Observe the printer display warning and follow the instructions in the printer manual.

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8 Appendix

In addition to the complete scope of these instructions, the following are supplied:

– A circuit diagram
– A pneumatic diagram
– A bill of materials
– The operating instructions for the supplied printers, label printers, end treatment units and the Wire Storage (depending on the ordered machine options)
– The manual for the PC software that belongs to the machine

Note:
If any of the documents listed above are missing from the scope of supply of these instructions, inform the manufacturer without delay. All documents must always be kept up-to-date by the operating company.

Vereinfachte EU-Konformitätserklärung / Simplified EU Declaration of Conformity

Wir
We

Rittal GmbH & Co. KG, Auf dem Stützelberg, 35745 Herborn

erklären hiermit, dass die Produkte
hereby declare that the products

Drahtkonfektioniervollautomat Wire Terminal WT
Wire Terminal WT fully automated wire processing machine

(Artikel gemäß dieser Anleitung /
Types referenced in this manual)

folgenden Richtlinien entsprechen:
conform to the following directives:

Maschinenrichtlinie 2006/42/EG, Anhang II A - Machinery directive 2006/42/EC, Annex II A
Funkgeräterichtlinie 2014/53/EU – Radio equipment directive 2014/53/EU

Bei einer nicht mit uns abgestimmten Änderung der Maschine verliert diese EU-Konformitätserklärung ihre Gültigkeit.
This EU declaration of conformity shall become null and void when the assembly is subjected to any modification that has not met with our approval.

Die vollständige und unterschriebene EU-Konformitätserklärung erhalten Sie auf der Produktseite der Rittal Homepage www.rittal.com.
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Notes

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