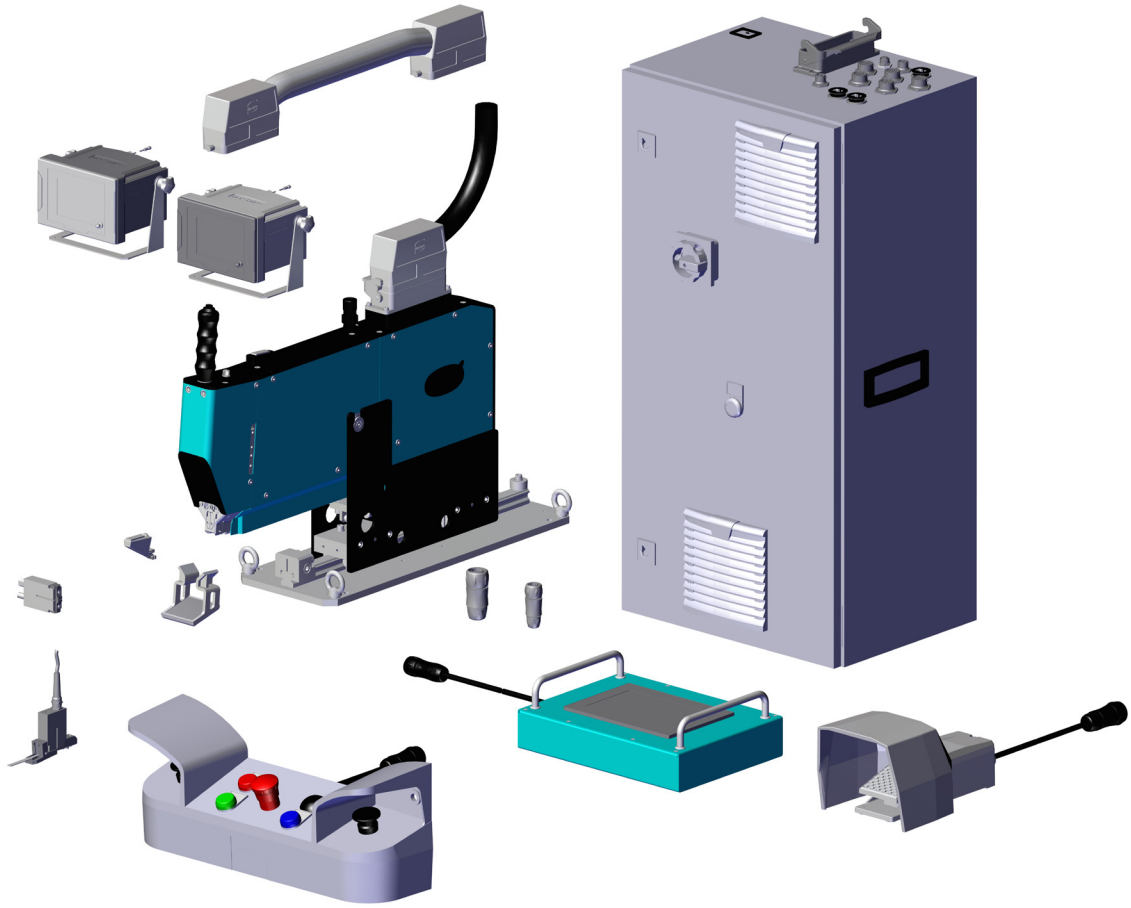
Reliable Connections



OETIKER FAST 3000

Instruction manual

Translation of the original
instruction manual
Item No.: 08906397
Issue: 2311_V03_c
Software: V5.1

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Switzerland

Content

1 Information about this manual

1.1 Symbols and means of representation used

Safety notices are used in this manual to warn of the risk of personal injury or property damage.

- ► Always read and observe these safety notices.
- ► Observe all instructions that are flagged with a warning symbol and warning text.

The following symbols are used in this Instruction Manual:

DANGER — **Hazardous situation.**
Disregarding this instruction will lead to death or serious injury.

WARNING — Indicates a hazard with medium risk, which can lead to death or serious injury!

CAUTION — Indicates a hazard with low risk, which can lead to medium or minor injuries!

INDICATION — Indicates a danger of damage to the device! Indicates information useful for operation!

Symbol	**Meaning**
► ...	One-step instruction
1. ... 2. ... 3. ...	Multi-step instruction ► Carry out the steps in the order shown.
✓ ...	Requirement • Necessary or labor-saving steps for the successful execution of an action.
Connecting	Display or operating elements of the menu or the PC software are highlighted.

1.2 Scope

These Operating Instructions apply to all Oetiker FAST 3000 (stationary tool for installing strap clamps) and describe the method of operation together with the correct procedures for commissioning, operation, maintenance, decommissioning, recommissioning, storage and transport.

They contain important instructions for safe working procedures.

For the version FAST 3000 with Light curtain, refer to the corresponding leaflet “Instruction Manual FAST 3000 Light Curtain”.

1.2.1 FAST 3000

- Control cabinet
- Two-hand control desk (optional)
- Installation tool
- Connecting cable
- Touch panel (optional)
- Foot pedal (optional)
- Closing force verification unit (optional)
- Crimping force monitoring devices
- Emergency stop dongle
- Jaws kit for CFM verification on the FAST 3000 (optional)

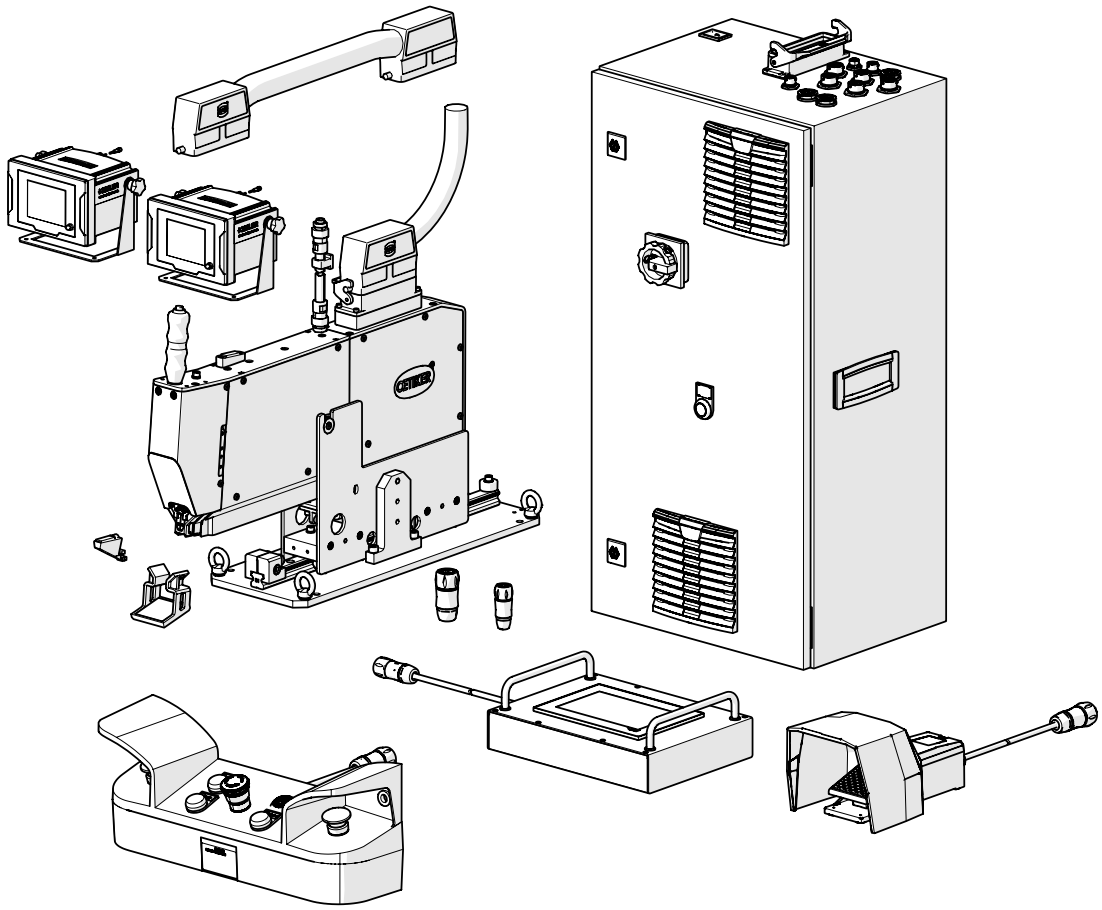


Fig. 1: *FAST 3000*

1.2.2 Rating plates

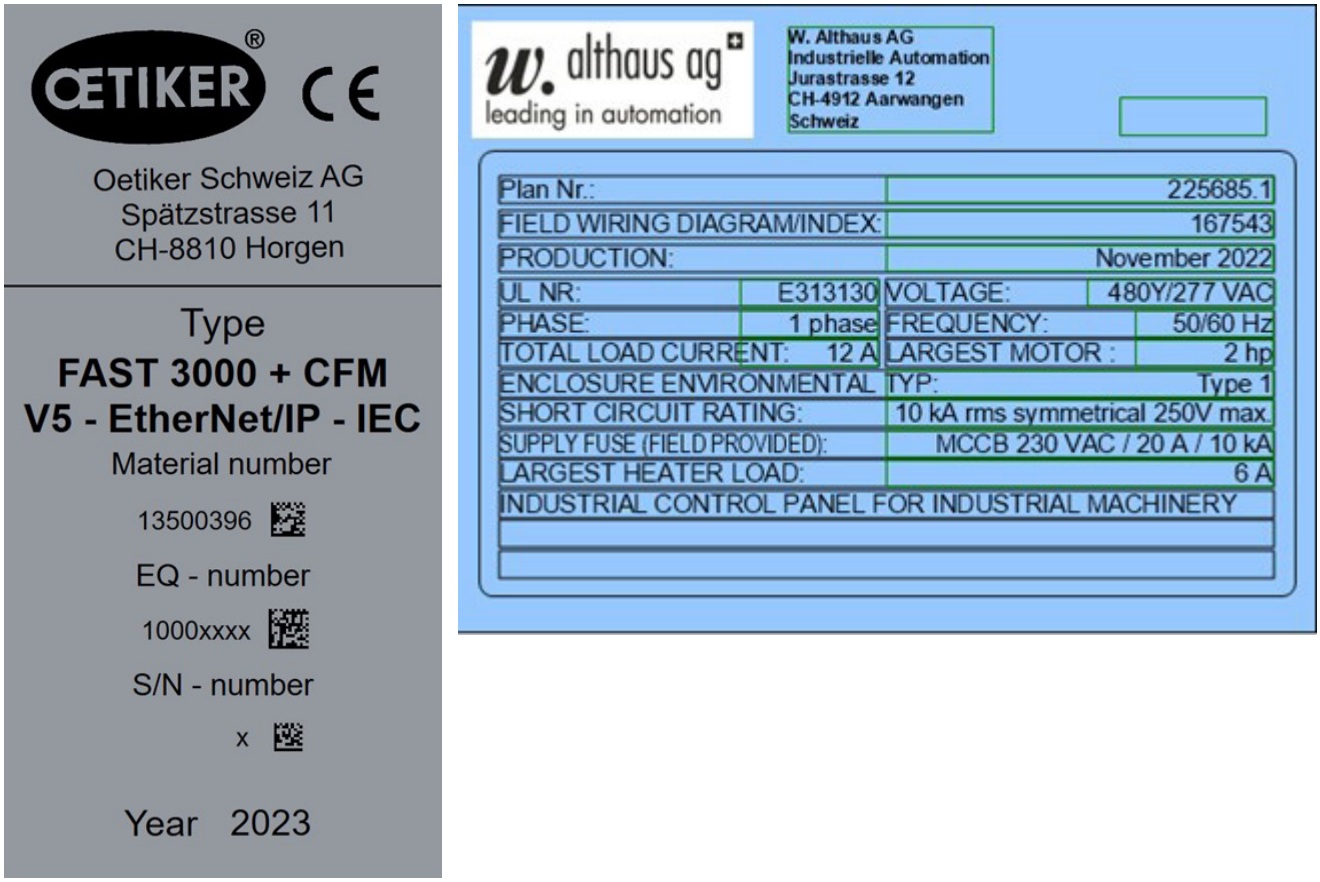


Fig. 2: *Rating plates*

1.3 Abbreviations

N	Newton	s	seconds
mm	millimeters	ms	milliseconds
kg	kilogram	CFM	Crimping Force Monitoring

1.4 Light curtain

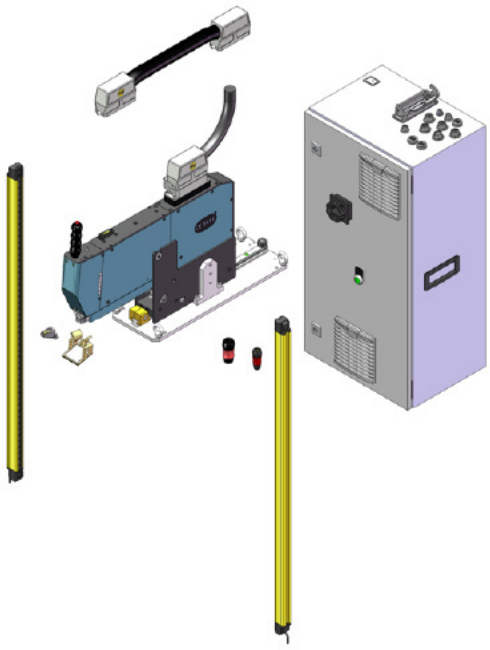


Fig. 3: *Light curtain*

1.4.1 Requirements for the safety light curtain

According to the following standards, a two-channel safety light curtain must be used:

- EN ISO 13849-1:2015: at least Cat. 3, PL d
- EN 62061+A1:2009: at least Cat. 3, SIL 2

Possible safety light curtain:	Keyence GL-R (GL-R08H)
Stopping time of the OETIKER FAST 3000 for calculating the safety distance from the safety light curtain	0.15 s

1.4.2 Mount safety light curtain

NOTICE

- The safety distance of the safety light curtain must be determined by the integrator.
- EN ISO 13855:2010 must be observed.

Stopping time of the OETIKER FAST 3000 for calculating the safety distance from the safety light curtain: 0.15 s

1.5 Stickers on the FAST 3000

CAUTION

▶ Comply with all safety stickers and always exercise great care when using the FAST 3000.

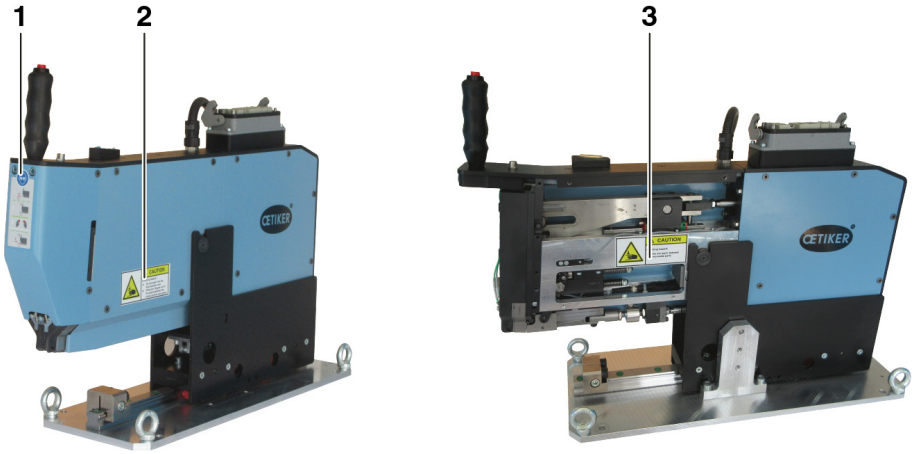


Fig. 4: *Stickers (1, 2, 3) on the FAST 3000*

1 Wear safety glasses!

2 Crush hazard!

3 Crush hazard!

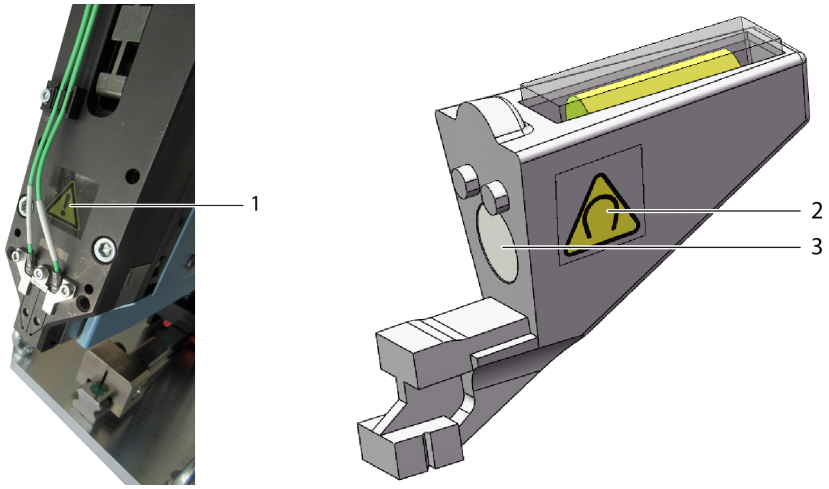


Fig. 5: *Stickers (1, 2) on the crimping cut-off head and alignment aid*

1 General warning signs: Never use a FAST 3000 without force sensors.

2 Warning sign: Magnetic field

3 Permanent magnet

1.6 Associated documents

- EC Declaration of Conformity, see Appendix (*Section 14*)
- Other associated documents, see Appendix (*Section 14*)

2 Basic safety instructions

2.1 Using the Operating Instructions

- Make sure that these Operating Instructions are always kept close at hand ready for use.
- Pass these Operating Instructions on to the next owner or user.
- Please read these Operating Instructions carefully before commissioning the FAST 3000 tool.
  - Familiarize yourself with all settings and their functions.
  - Anyone involved in setting up, commissioning, maintaining or repairing the unit must have read and understood the Operating Instructions and in particular the safety instructions.

2.2 Intended use

CAUTION

The FAST 3000 with its associated parts is intended solely for the controlled closure of OETIKER PG270 WingGuard® strap clamps. It may not be used to close clamps other than Oetiker WingGuard®270 strap clamps.

- The unit may be used only for the intended purpose and under technically safe and fault-free conditions.
- Correct usage also covers observance of these Operating Instructions and compliance with the technical data.
- Any use not in accordance with the prescribed usage shall be regarded as incorrect usage.
- The use of the FAST 3000 in areas subject a risk of explosions is not permitted.
- The FAST 3000 can be used as a stand-alone tool or be integrated into an assembly cell.
- If the FAST 3000 is integrated into an assembly cell it can be used without the optional two-hand control desk and without the optional touch panel. In such cases the integrator is responsible for the safe integration of the FAST 3000 into the assembly cell.
  - For further information on the integration of the FAST 3000 see Section 10.
- The installation of the light curtain is the responsibility of the operator.

Use other than for the intended purpose

The FAST 3000 is built to current technology and is safe in operation. Residual hazards remain if it used incorrectly or by untrained personnel. The manufacturer bears no responsibility for injuries to personnel and damage to property arising from improper use of the FAST 3000. In such cases the operating company bears sole responsibility.

Implemented safety concept for safe operation

The FAST 3000 is intended for operation by a single operator. It is prohibited for a third person to start the clamping cycle.

To exclude the risk that parts of limbs my be crushed between the WingGuard®clamp and the goods being strapped, the two-hand control requires the use of two hands to start the clamping cycle, which corresponds to a Performance Level PL d to EN ISO 13849-1.

The clamping cycle is started by depressing the two start buttons simultaneously.

After 300 milliseconds the WingGuard® clamp is sufficiently closed that no parts of limbs can be inserted, the start buttons can be released again once they have been depressed. This excludes the possibility of incorrect clamping that might be caused by premature release of the start buttons.

In the event of the clamping drive starting up unexpectedly during the insertion phase, an additional sensor ensures that the pulling unit is immediately disabled.

The safety concept considers the hazards that might arise from the FAST 3000. Other hazards in the surrounding working area must be considered by the operating company and countered as necessary by measures for personal safety.

If the FAST 3000 is not controlled via the Oetiker two-hand control, the operating company must ensure safe integration of the FAST 3000.

2.3 General safety instructions

CAUTION

Hazard due to an unsuitable workplace.

▶ Ensure sufficient space and sufficient lighting.

- Comply with all operating instructions and maintenance instructions.
- Maintenance and repair work should be carried out only by qualified specialists.
- The FAST 3000 tool may be used only by persons who are familiar with its use and have been informed of the risks.
- All relevant accident prevention regulations and other generally recognized health and safety rules must be complied with. The manufacturer shall not be held liable for damage resulting from unauthorized modifications to the FAST 3000.
- Use the FAST 3000 only in a clean and dry working environment.
- Use the FAST 3000 only in an area provided with sufficient lighting.
- Provide sufficient space for safe handling and operation.

Spare parts

In order to ensure the fast and accurate delivery of spare parts, a clear purchase order is essential. It must include the following information:

- Product name, software version
- Type designation
- Serial number
- Name of the spare part and quantity required
- Part number
- Shipping method
- Full address

Details can be found in the OETIKER tools catalog.

Improvements to the machine

In our endeavor to continuously improve the quality of our products, we reserve the right to make improvements without changing the Operating Instructions. Details of dimensions, weights, materials, performance ratings and names may therefore be subject to necessary changes. Regarding electrical diagrams, the diagram supplied with the machine takes precedence in all cases.

2.4 Covers

CAUTION

Use the FAST 3000 only when all covers are correctly fitted.

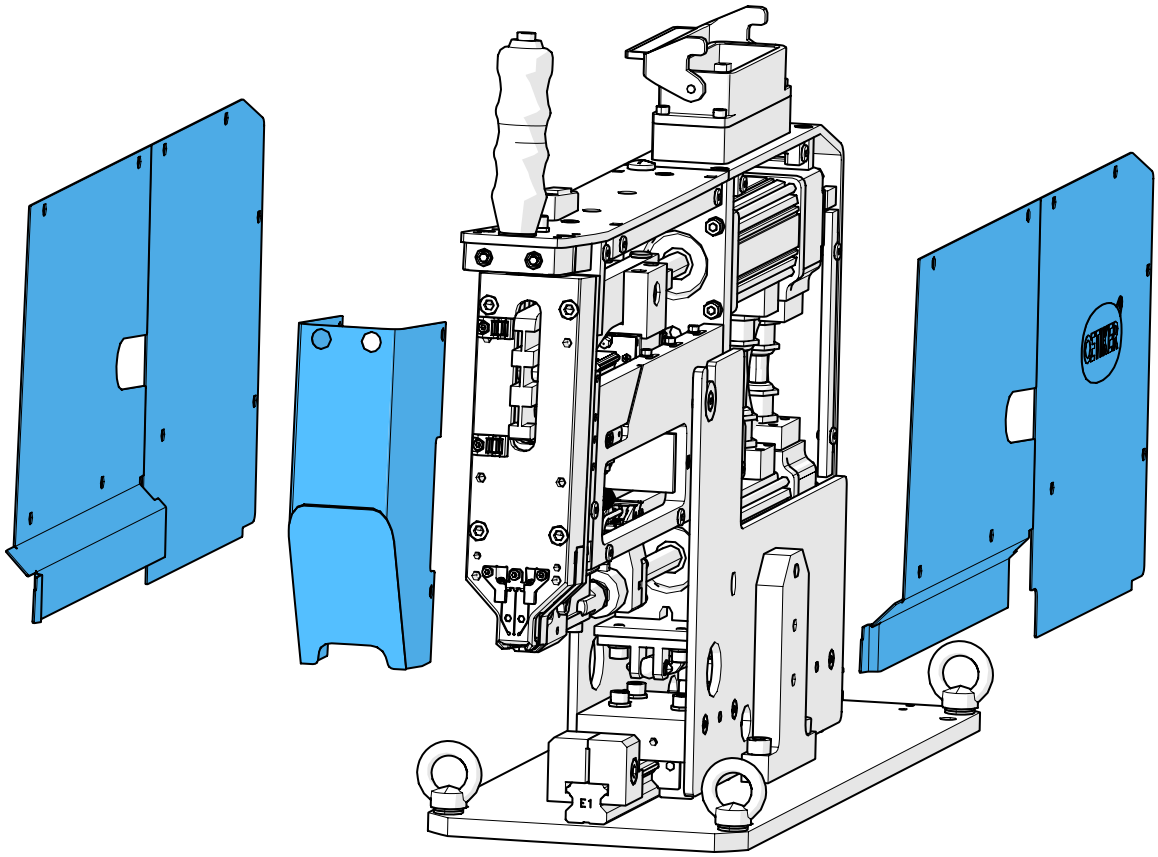


Fig. 6: *Protective covers on the FAST 3000*

- ► Make sure that identification marks and warning instructions on the machine are always present and legible.

2.5 Special safety instructions

Only specially trained personnel are authorized to carry out maintenance and repair work on electrical equipment.

- ► Before starting maintenance and repair work, switch off all units and disconnect the entire tool from the power supply.
- ► Check the crimping jaws and cut-off die as part of the preventive maintenance routine and replace them if necessary.

2.6 Safe methods of working

- Check the FAST 3000 for visible damage on each occasion before starting production, and make sure it is used only when in good condition. Make particularly sure to thoroughly check the crimping jaws and emergency stop!
- Any defects must be reported to a supervisor immediately.
  - Do not continue to use the FAST 3000 if defects have been identified.
- During operation of the machine and when performing maintenance, wear safety glasses.
- The FAST 3000 is intended for operation by only a single operator. The closing cycle may not be initiated by a second person.
- Keep sufficient free space around the product. Users must not be hampered by third persons.
- Arrange the working area of the FAST 3000 for good ergonomics.
- Pressing the emergency stop button on the two-hand control desk disconnects both positioning drives from the power supply and brings their movement to an immediate halt.
  - If the FAST 3000 is controlled via an external PLC, *see section 10*.
- The operator must install a suitable light curtain!

2.7 Using the FAST 3000 via an external control system

- The integrator is responsible for the safe integration of the FAST 3000.
- The integrator must perform a risk evaluation and implement the system in accordance with the risk evaluation.
- The integration my be performed only by qualified personnel.
- If no two-hand control desk is used, an external emergency stop must be wired in.
- For more information on this subject, *see section 10*.
- If you have questions about how to perform integration contact Oetiker.
- The installation of the light curtain is the responsibility of the operator.

2.8 Conversions, modifications

- The FAST 3000 may not be modified either in respect of its design or in respect of its safety features without express permission from OETIKER. OETIKER shall not be held liable for any damages resulting from any unauthorized modifications.
- Use only original spare parts and accessories.
- Do not dismantle any safety equipment or features.

2.9 Qualified personnel

WARNING

Hazards due to operation by unauthorized or unqualified personnel.

This device may be used only by authorized and qualified personnel. The machine may be used only in accordance with the Operating Instructions. Any other use is prohibited. The levels of authorization for use are as follows:

Personnel / Use/operation	Operator	Maintenance mechanic	Electrician
Installation/decommissioning	×	✓	✓
Transport/storage	×	✓	✓
Commissioning without the optional two-hand control desk / without the optional touch panel	×	×	✓

Personnel / Use/operation	Operator	Maintenance mechanic	Electrician
Commissioning with the optional two-hand control desk / with the optional touch panel	×	✓	×
Normal operation	✓	✓	✓
Removal/installation of the crimping cut-off head	×	✓	✓
Maintenance of the crimping cut-off head	×	✓	✓
“Manual mode” operation	×	✓	✓
Troubleshooting	×	✓	✓
Removal of the covers	×	✓	✓
Opening the control cabinet	×	×	✓
Replacing parts	×	✓	✓

Explanation: ✓ = permitted × = not permitted

“Operator”:

- is familiar with the specified safety instructions and regulations
- knows the relevant procedures described in this document
- is appropriately trained
- is authorized by the competent office
- The operating company must ensure that the employee has received the safety instructions and regulations in the relevant language.

“Maintenance mechanic”:

- has the knowledge described for the “Operator”
- is familiar with the mechanical techniques required for working on the machines and tools (fastening, cleaning, lubricating)
- knows the relevant procedures described in this document
- does not use the tool under improper conditions (when maintenance intervals have been exceeded or when partially disassembled)

“Electrician”:

- has the knowledge described for the “Maintenance mechanic”
- has sound knowledge of mechanical and electrical matters
- has been trained and authorized to work on equipment at potentially fatal voltages (110/230 V AC)
- is aware that bad workmanship can lead to serious injuries to personnel and damage to equipment
- is aware that bad workmanship can lead to the failure of electrical and mechanical components
- is aware that the tool must be in good condition when handed over to another user
- knows the relevant procedures described in this document

The **"Operator"** is authorized to perform the following activities:

- Use of the tool in normal operation
- Cleaning the working area

The **“Maintenance mechanic”** is authorized to perform the following activities:

- The activities performed by the “Operator”
- Working in the *Manual operation* operating mode. This allows the tool to be operated manually.
- Make changes to the closure data
- Removal/installation of the crimping cut-off head and cleaning the associated parts
- Maintenance of the crimping cut-off head by replacing the spare parts, cleaning and lubricating
- Investigation of the crimping cut-off head and the associated parts for wear and damage
- Installation, transport and storage
- Removal of the covers for access to the components

The **“Electrician”** is authorized to perform the following activities:

- The activities performed by the “Maintenance mechanic”
- Repair of the tool if it is in a defective condition
- Removal of the covers and opening the control cabinet for access to the components
- Replacement of the parts and maintenance of the electrical wiring

2.10 Maintenance work

The inspection and maintenance intervals specified in the Operating Instructions must be complied with.

Compliance with maintenance and repair instructions is mandatory.

2.11 Overload protection of the crimping cut-off head

CAUTION

Do not remove the overload protection of the crimping cut-off head.
Using the tool without overload protection and CFM force load cells can lead to mechanical damage.

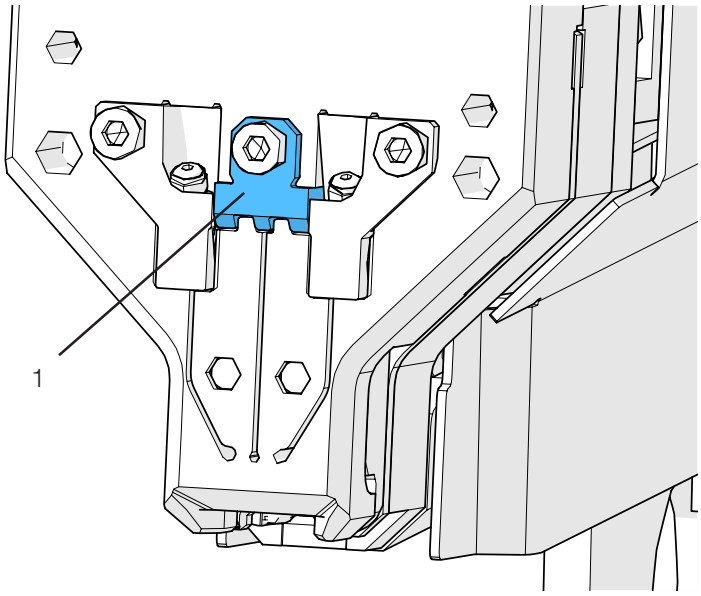


Fig. 7: *Overload protection (1) of the crimping cut-off head*

2.12 Noise level

In normal operation a maximum noise level of 75 dBA can be expected.

3 Scope of supply of the FAST 3000 tool

3.1 Overview of the main components of the FAST 3000

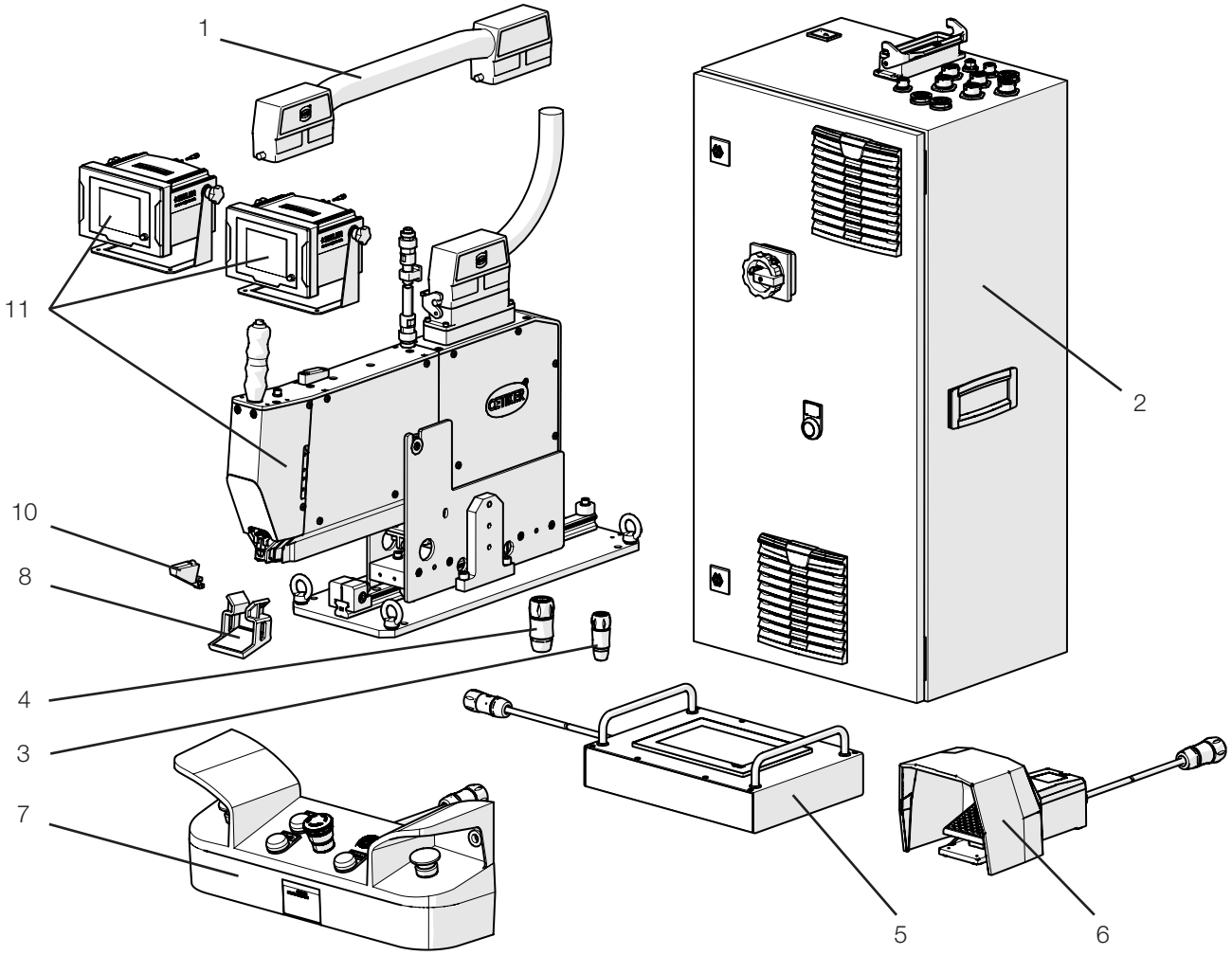
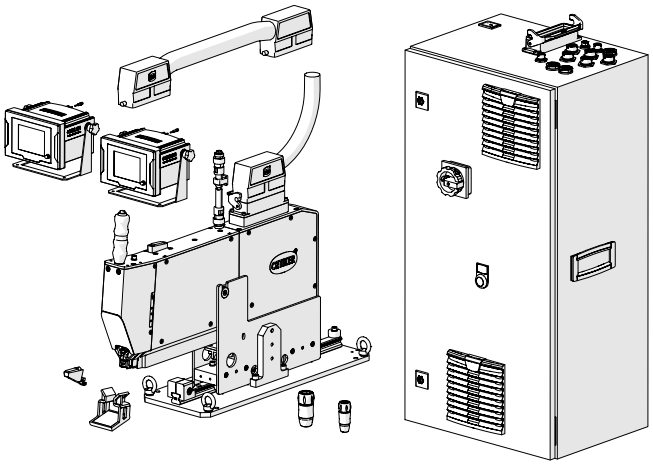
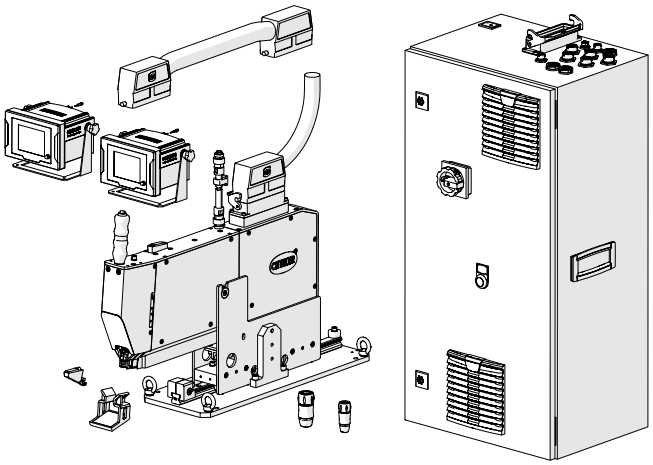


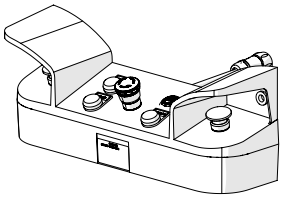
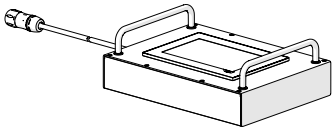
Fig. 8: *Design of the FAST 3000 tool*

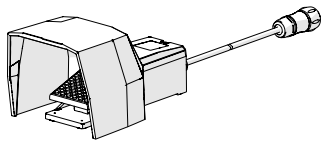
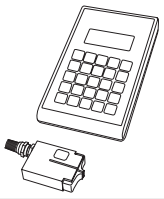
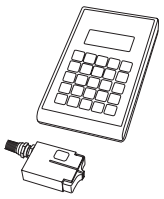
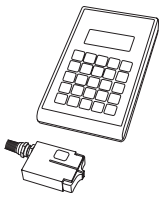
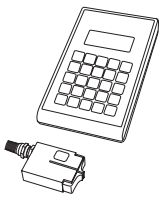
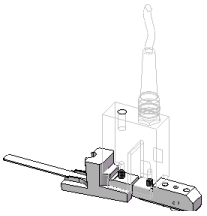
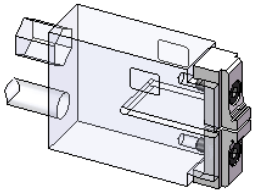
1. Connecting cable
2. Control cabinet
3. Two-hand dongle, thin
4. Two-hand dongle (emergency stop two-hand control desk, used if the two-hand control desk is not connected)
5. Touch panel / optional
6. Foot pedal / optional
7. Two-hand control desk / optional
8. Crimping jaws checking mirror
9. Closing force verification unit can CAL 01 calibrator (not shown) / optional
10. Alignment aid
11. Installation tool with crimping force monitoring devices
12. Jaws kit for CFM verification on the FAST 3000 (not shown) / optional

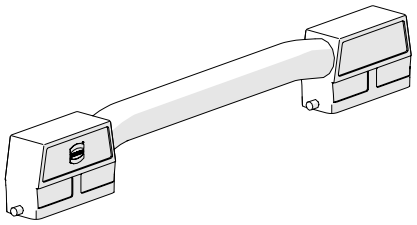
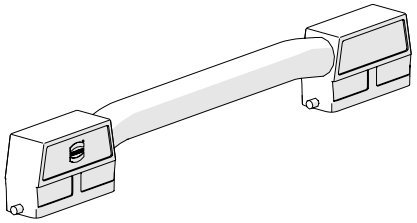
3.2 Available main configurations

Configuration	Scope of supply
Oetiker FAST 3000 AdvantEdge + CFM - EtherNet/ IP Light curtain 2 Part number 13500396 (IEC) / 13500398 (UL) Oetiker FAST 3000 with CFM and EtherNet/IP The tool is supplied with a tool carrier	
Oetiker FAST 3000 + CFM - PROFINET Light curtain 2 Part number 13500395 (IEC) / 13500397 (UL) Oetiker FAST 3000 with CFM and PROFINET The tool is supplied with a tool carrier	

3.3 Optional extras

Option	Scope of supply
Two-hand control desk Part number 13500298 Two-hand control desk for autonomous operation of the FAST 3000.	
Touch panel, complete Part number 13500278 Touch panel for controlling the FAST 3000 if no laptop or supervisory controller is used.	

Option	Scope of supply
Foot pedal Part number 13500105 Foot pedal to allow hands-free use of the FAST 3000 during tests or in the laboratory.	
Test equipment CAL 01 CAL 01 qualified UK / engl-de / SKS01-1500mm Part number 13600384 Test equipment for verification of the closure force and crimping force	
Test equipment CAL 01 CAL 01 qualified USA / engl-es / SKS01-1500mm Part number 13600385 Test equipment for verification of the closure force and crimping force	
Test equipment CAL 01 CAL 01 qualified CN / engl-de / SKS01-1500mm Part number 13600386 Test equipment for verification of the closure force and crimping force	
Test equipment CAL 01 CAL 01 qualified EURO / de-engl / SKS01-1500mm Part number 13600387 Test equipment for verification of the closure force and crimping force	
Verification unit PG135 lockable Part number 13500299 Adapter jaws for verification of the closing force. The CAL 01 must be ordered separately.	
Jaws kit for CFM verification on the FAST 3000 Part number 13500237 For CFM verification The CAL 01 must be ordered separately.	

Option	Scope of supply
Connecting cable cpl. 1m, 2x180° Part number 13500354	
Connecting cable cpl. 1.5 m, 2x180° Part number 13500359	

For spare parts and auxiliary tools, *see section 9.7*.

4 Brief description of the FAST 3000

The Oetiker FAST 3000 was developed to perform closure of the OETIKER WingGuard® strap clamps.

A production cycle consists of the following steps:

- The operator positions the OETIKER WingGuard® strap clamps on the application.
- The FAST 3000 is pulled in the direction of the application and the strap end of the OETIKER WingGuard® strap clamp is inserted into in the crimping cut-off head.
- Pressing the clamping button secures the strap end.
- After the start of the closing cycle the strap end is drawn in by the FAST 3000 until a certain closing force is achieved.

  Precise control of the force is ensured by the force load cell and the high-performance electro-mechanical drive.
- After the closing force is achieved, the strap is crimped by the FAST 3000 to create the wings that secure the clamp against opening. The clamping procedure is monitored by two force load cells. The signal from the force load cells is evaluated by two force monitoring devices. OK/not OK signals are sent by the monitoring devices to the PLC of the FAST 3000.
- After crimping procedure has been performed, the strap ends are cut off.
- They are transported to the ejection position, where they fall out of the tool.
- The FAST 3000 returns to the starting position.

NOTICE

More information on the different steps is provided in Section 6.6.

4.1 Design of the tool mechanism

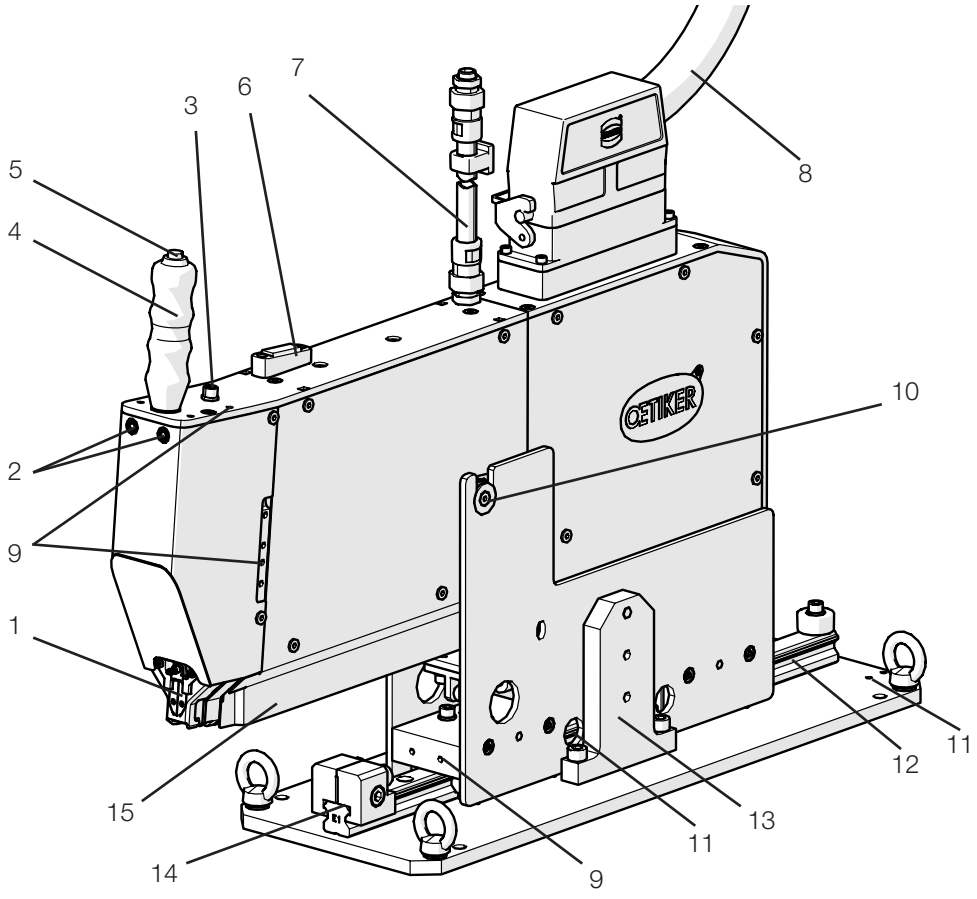


Fig. 9: *Tool mechanism*

Tool mechanism of the FAST 3000

1.	Crimping cut-off head	The crimping cut-off head crimps the WingGuard® clamp and cuts off the projecting strap end.
2.	Strap detection LED	Indicates whether a strap is present: • Continually dark: No strap present • Flashing slowly: Strap present but not clamped • Flashing quickly: Strap present and clamped but not inserted sufficiently far. The strap must be inserted further. • Continually lit: Strap present and clamped. Ready for the clamping cycle.
3.	M8 3-pin port for connecting the customer's clamping pushbutton	When a second handle is used, a second clamping pushbutton can also be connected.
4.	Handle	The tool can be positioned using the handle.
5.	Clamping pushbutton	To trigger the securing of the WingGuard® strap end.
6.	Spirit level	Using the spirit level it can be checked that the tool is correctly positioned vertically (see Section *6.5*).
7.	Sleeve for the sensor signal cable for crimping monitoring	Sleeve that contains the sensor signal cables for crimping monitoring. The cables are directly connected to the crimping force monitoring device.
8.	Connecting cable between the tool and control cabinet	Connecting cable between the tool mechanism and control cabinet
9.	Tapped hole for attachments	This is available for customer applications such as installation of sensors or of a second handle
10.	Pivot point for the tilting motion	This permits easy insertion of the WingGuard® clamp into the strap end slot.
11.	Tapped hole (concealed)	This can be used for instance to mount the customer's positioning cylinder.
12.	Linear guide	This permits easy insertion of the WingGuard® clamp into the strap end slot. Achievement of the correct setting position must always be guaranteed.
13.	Transport restraint	This must be installed for transporting the mechanism. For normal operation the transport restraint must be removed.
14.	Positioning stop	The purpose of the stop is to ensure the correct horizontal positioning of the tool mechanism in the setting position.
15.	Strap end discharge duct	The strap ends of the WingGuard® clamps are ejected here. Make sure that the strap ends are correctly discharged and do not remain on the linear guide.

4.2 Design of the FAST 3000 crimping cut-off head

CAUTION

Risk of damage to the crimping jaws and the cut-off die.

- Make sure that only the intended OETIKER PG270 WingGuard® strap clamps are used. Otherwise the crimping jaws and the cut-off die may be damaged.

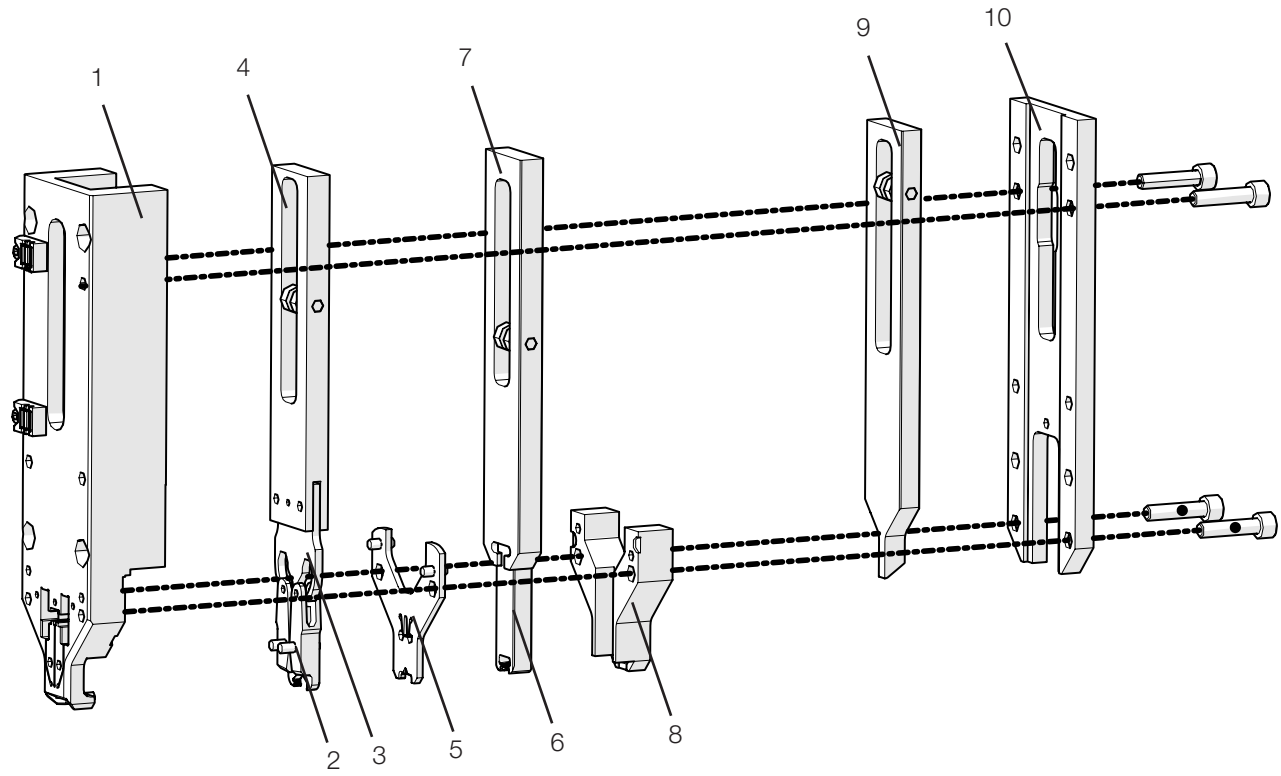


Fig. 10: *Crimping cut-off head*

1. Head housing
2. Crimping jaws
3. Crimping wedge
4. Crimping slide
5. Spacer plate
6. Cut-off die
7. Cut-off slide
8. Cut-off die guide
9. Clamping unit slide
10. Head housing cover

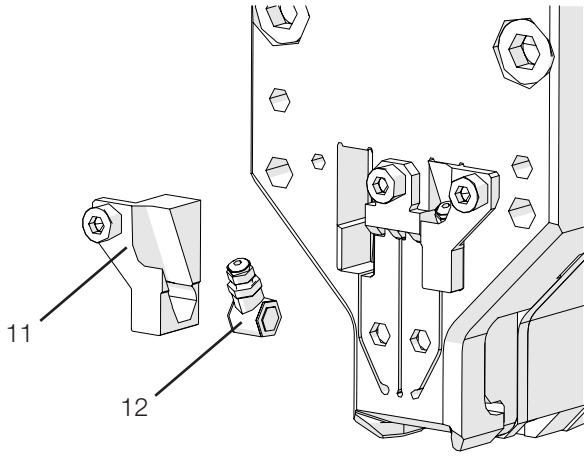


Fig. 11: *Particulars of the crimping cut-off head: CFM force load cell and its brackets*

11. Force sensor bracket
12. Crimping force sensor

4.3 Two-hand control desk (option)

DANGER

The two-hand control desk must be positioned at least 210 mm from the crimping tool mechanism and must be bolted into position.

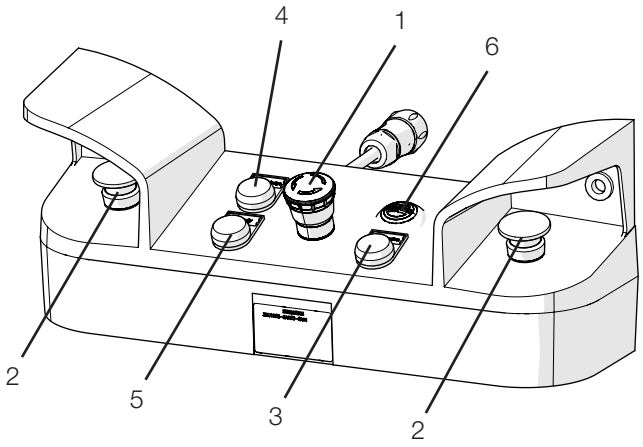


Fig. 12: *Two-hand control desk*

1. Emergency stop button
2. 2-hand start buttons (must be depressed simultaneously to start a closing cycle)
3. Initialization button (for initializing the FAST 3000).
   - Flashes when the tool requires initialization.
   - The button is lit continually while initialization is in progress.
4. Acknowledgement button (“Acknowledge”; to display and acknowledge closures that are not OK, and error messages)
5. Green indicator light (“Ready”; indicates that the FAST 3000 is ready for operation)
6. Buzzer (active in laboratory mode, indicates the closing cycle is about to start)

5 Description of the process monitoring of the FAST 3000

5.1 Control of the closing force, description the of process parameters

The purpose of the FAST 3000 is to close OETIKER WingGuard® strap clamps.

NOTICE

For the recommended values for the process parameters please refer to the technical data sheet of the OETIKER PG270 WingGuard® strap clamp.

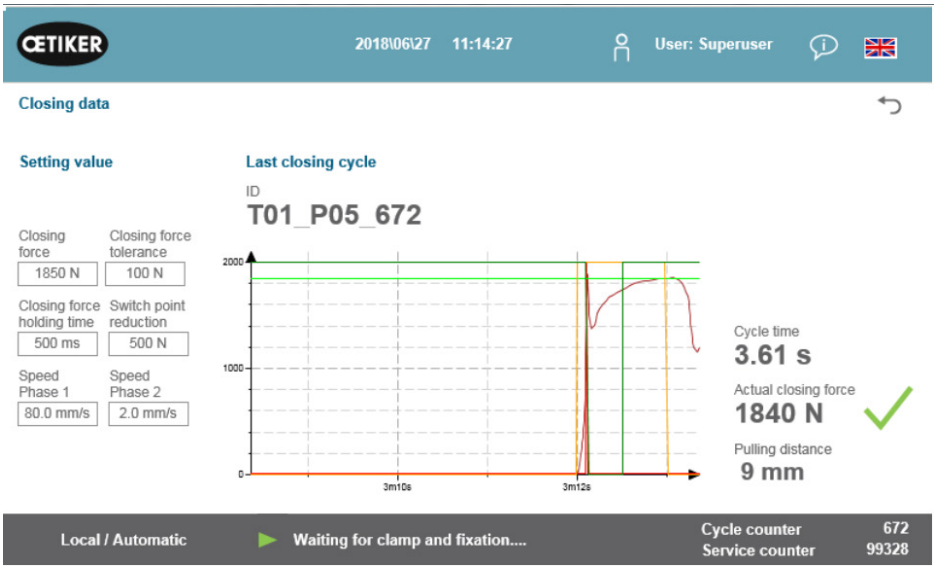


Fig. 13: *Closure data table*

5.1.1 Functional description of control of the closing force

The development of the closing force is divided into four phases. These four phases allow simple adjustment of the force control parameters, which are required for a constant and repeatable pulling operation.

Phase 1 Rapid pre-closing of the clamp.

- The clamp is closed at **speed phase 1** until the **closing force** minus the **switch point reduction** has been reached.

Phase 2 A slower closing speed until the required closing force has been reached.

- The speed with which the clamp is closed is specified by the **speed phase 2**. When the **closing force** has been reached, the force control switches to phase 3.

Phase 3 In phase 3, the FAST 3000 force control mode is active.

- As soon as the closing force has remained within the **closing force tolerance** for a period specified by the **closing force holding time**, the crimping starts.

Phase 4 Phase 4 is the crimping phase.

- At the end of the crimping process the clamp is released. The pulling unit moves back 0.8 mm and then the strap is cut off.

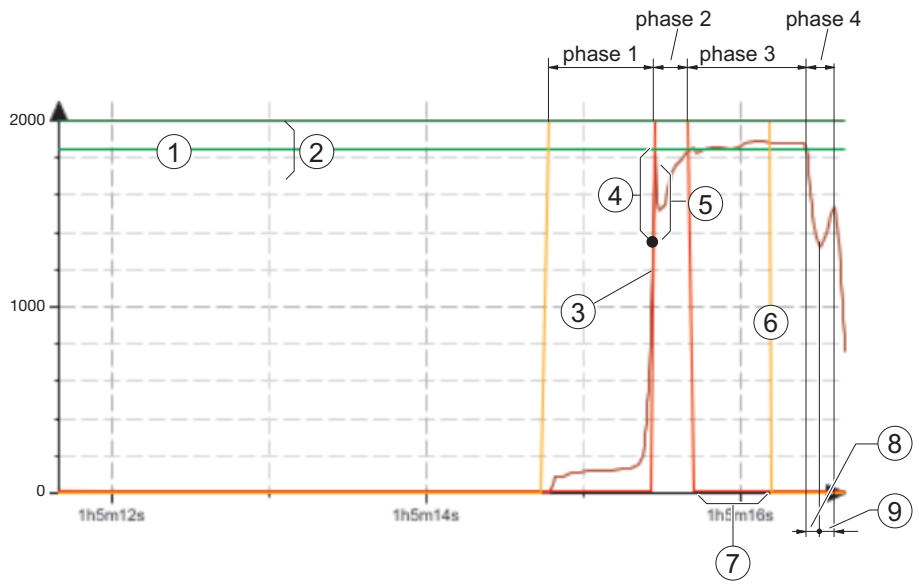


Fig. 14: *Force control phases (Example, shows a target of closing force of 1850 N)*

1. Closing Force
2. Closing force tolerance (±100 N around 1850 N)
3. Force threshold at which the engine is starts to decelerate
4. Switch point reduction
5. Force increase after reaching the closing force, due to the drive stroke during deceleration
6. Start crimp process
7. Closing force holding time
8. Strain relief on the clamp strap
9. Force increase while cutting the strap

5.1.2 Closing Force

OETIKER PG270 WingGuard® strap clamps must be closed with a recommended and uniform closing force (force priority). This results in a consistent, reproducible and permitted pulling stress on the strap material and avoids overloading the individual components, the parts being clamped and the clamps.

5.1.3 Closing force tolerance

Specifies the tolerance range within which the closing force must lie for clamp locking to be activated.
Adjustable Tolerance Range: ±50 N to ±150 N.

5.1.4 Switch point reduction

Sets the force to a value less than the set closing force. At that point the pulling speed changes from the fast speed phase 1 to a slower speed phase 2.

5.1.5 Speed phase 1

Speed during phase 1 (fast closure of the clamp).

5.1.6 Speed phase 2

Speed during phase 2 (slow closure of the clamp before activation of force control).

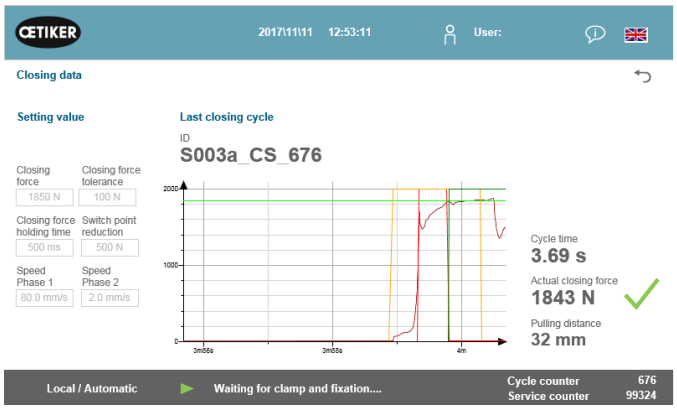
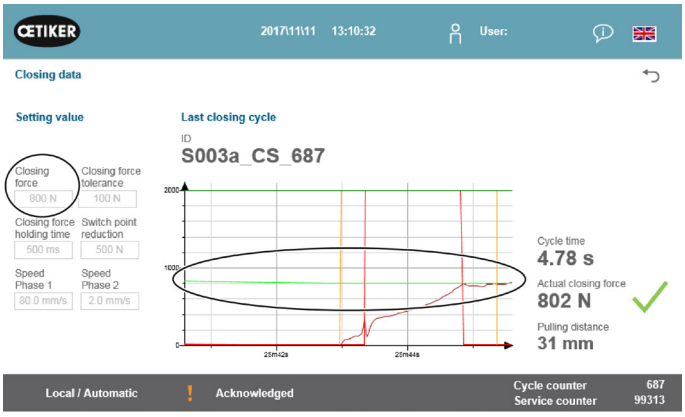
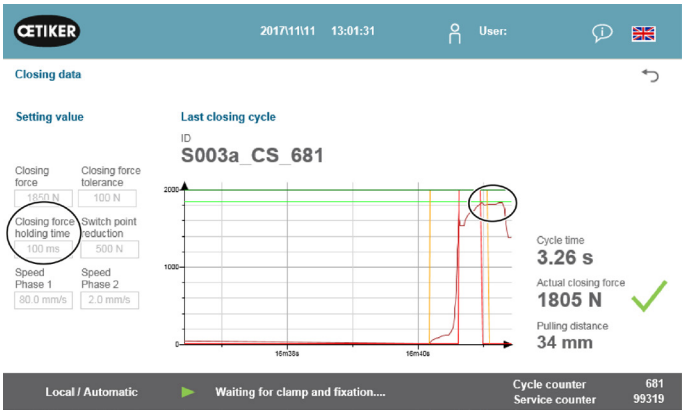
5.1.7 Closing force holding time

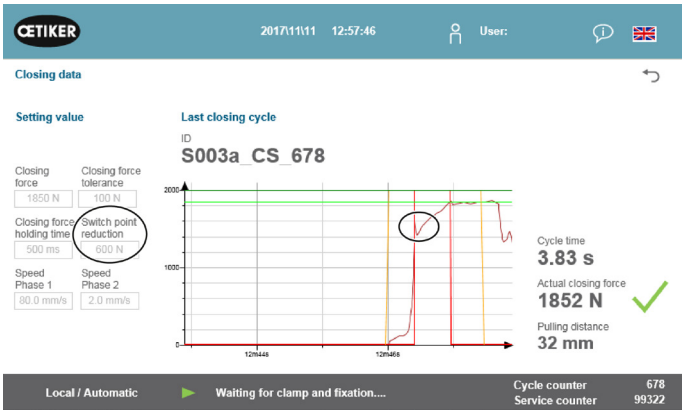
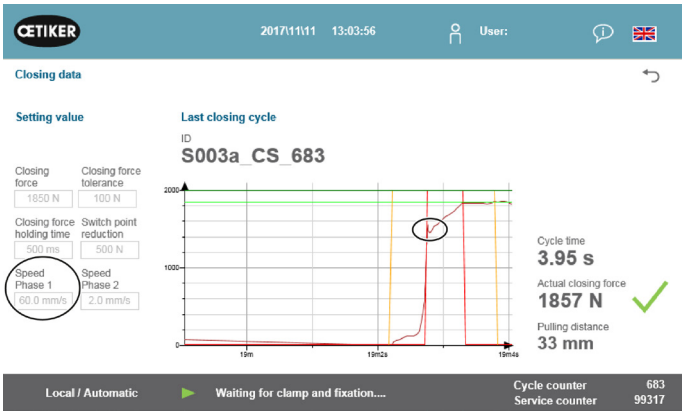
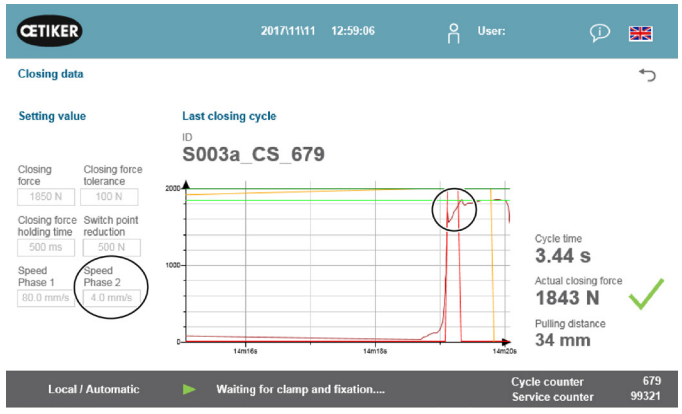
Some applications require a specific applied force and a specific period of time, so that the components are ideally connected. The FAST 3000 allows the user to configure this period of time.

In general, soft materials require a longer holding time than harder ones.

Sample curves with different closing force parameters

The preset closing force parameters function on all applications, including very hard ones. It is therefore recommended the settings are not changed unnecessarily.

Diagram/Setting	Comment
	Closing with standard settings on a hard mandrel
	Closing force set to 800 N
	• Reduced holding duration • This results in a shorter cycle time

Diagram/Setting	Comment
	• Switch point reduction set to a higher value • The FAST 3000 switches earlier to phase 2. • The drive begins to reduce speed at 1250 N (600 N before reaching the closing force)
	• Phase 1 speed is lower • This results in a slightly longer cycle time • Due to the lower speed setting, the FAST 3000 switches to phase 2 at 1550 N. (Less time required to reduce the drive speed)
	• Phase 2 speed is higher • This results in a slightly shorter cycle time • The risk of a force overshoot is higher.

5.1.8 Pulling force sensor check

During each closing cycle, the FAST 3000 performs a pulling force sensor check. In the unloaded state, a check is carried out as to whether the measured force is approx. 0N (+/- 25N).
In addition, the system tests in a lightly loaded state whether the measured force is within the expected range (+/- 20N).

5.2 Crimping monitoring

The crimping operation is monitored during measurement of the forces occurring during crimping.

NOTICE

Details on how to export data, see maXYmos-BL Manual section 4.3.7.

5.2.1 General information on the crimping force monitoring (CFM)

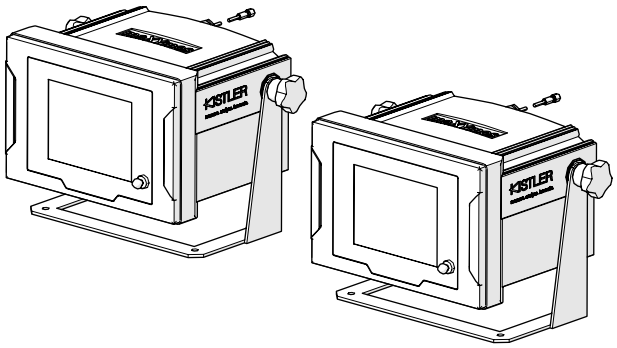


Fig. 15: *Crimping force monitoring devices*

- Two monitoring devices evaluate the force signals from the two load cells. A sensor and a monitoring device is used for each wing; one on the left, one on the right.
- The independent monitoring of the two wings ensures that as many irregularities as possible are recorded.
- The evaluation is based on a time-force curve.
- The units send OK/not OK signals to the FAST 3000 PLC. The FAST 3000 PLC uses these and other signals to determine whether the overall closing operation was OK or not OK.
- The monitoring devices must be positioned separately from the control cabinet. They can be mounted within the user's field of view.
- Using the "Kistler maXYmos" software, new measurement programs can be transmitted from a laptop to the monitoring devices via an Ethernet connection (see Section *6.8.7*).
- The results of the individual closing operations, including the force curve and current evaluation settings of the monitoring device, can be saved automatically to a central server. For more detailed information on this, please refer to the Operating Instructions of the monitoring device.

5.2.2 Mechanical design

The following figure shows the action of the forces applied to the crimping jaw. Viewed from the crimping jaw side.

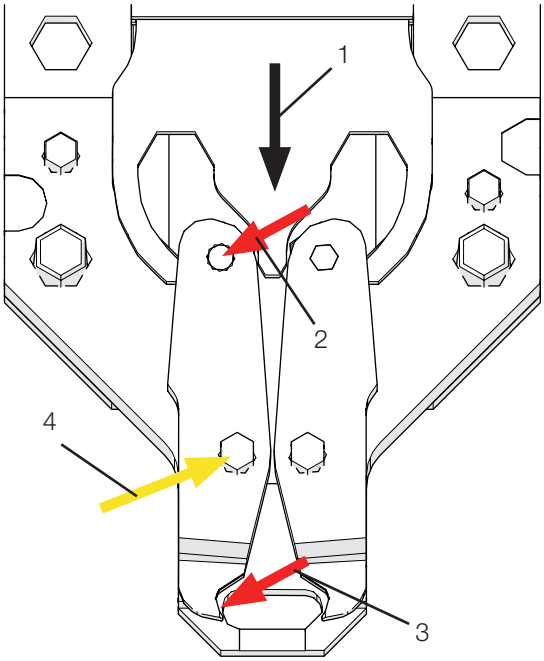


Fig. 16: *Application of force to on the crimping jaws*

1. Movement of the crimping wedge
2. Force acting on the jaw due to the closing action of the crimping wedge
3. Shearing and deformation force during the crimping of the WingGuard® strap clamp (wing formation)
4. Resulting force accepted by the crimping jaws pivot pin

The force is transmitted via the crimping jaw pivot pins to the force transmission levers of the crimping head.

NOTICE

Due to the principle of leverage the force is divided between the transmission lever and the spacer plate.

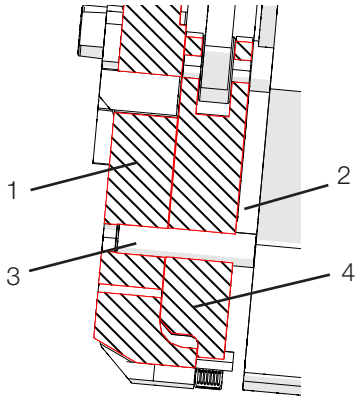


Fig. 17: *Force transmission level, lateral sectional view through the crimping head*

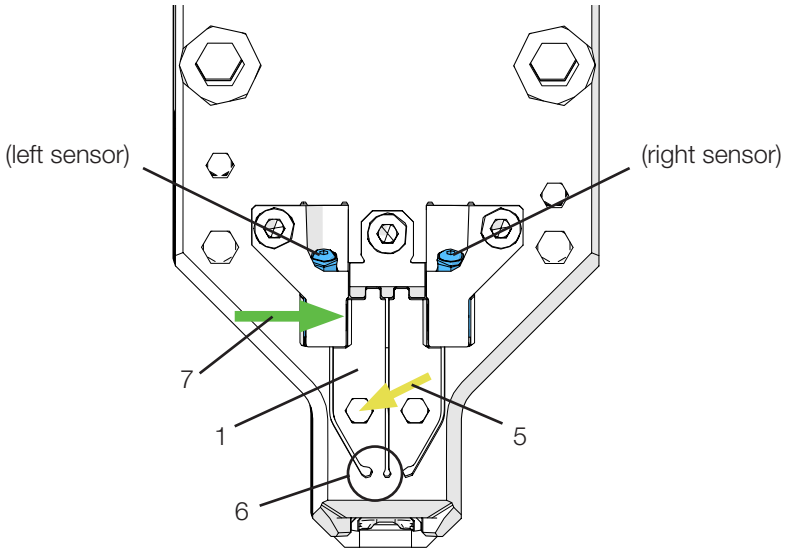


Fig. 18: *Front view of the crimping cut-off head with force transmission levers*

1. Force transmission lever
2. Spacer plate
3. Crimping jaw pivot pins
4. Crimping jaw
5. The force on the crimping jaw pivot pins is transmitted to the force transmission lever of the head housing
6. Fixed body hinge
7. Force measured by the crimping force sensor (leverage principle)

5.2.3 CFM: Typical OK force curve

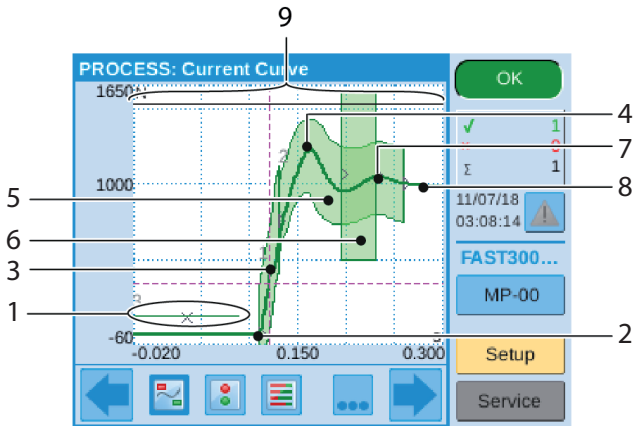


Fig. 19: *OK force curve*

1. EO 3: No-Pass curve: The force curve may not intersect this curve. If the force curve intersects the No-Pass curve:

- The crimping procedure will be evaluated as not OK.
- In addition, the closing operation will be terminated immediately and the strap of the WingGuard® clamp will be cut off without formation of the closing wings. This function protects the components of the FAST 3000, particularly the crimping jaws, against overloading.

2. The crimping jaw touches the strap of the WingGuard® strap clamp, the force increases.
3. EO 1: First envelope curve: If the actual force curve infringes the upper or lower envelope curve limit, the crimping operation will be evaluated as not OK.
4. First peak: The strap begins to shear/to form the wings.
5. EO 2: Second envelope curve: If the actual force curve infringes the upper or lower envelope curve limit, the crimping operation will be evaluated as not OK.
6. EO 4: Uni-Box: Transmits the force values on entry and exit to the FAST 3000 PLC. See next section.
7. Second peak: The crimping jaw reaches its end position.
8. Relaxation effects. As there is no process-relevant information, this is not a part of the envelope curves.
9. Switching signal: If the force curve intersects the switching signal, then the crimping operation is terminated immediately and strap of the WingGuard® clamp is cut off without forming the closing wings. This function protects the components of the FAST 3000, particularly the crimping jaws, against overloading.

NOTICE

Immediately an EO (Evaluation Object) fails to meet the test condition, it is displayed in red.

5.2.4 CFM: Wear detection

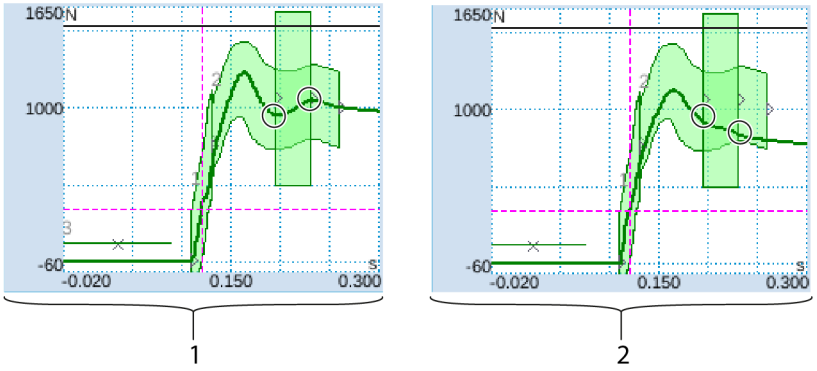


Fig. 20: *Wear detection*

1. New crimping cut-off head
2. Worn crimping cut-off head

If the second peak is missing this means either that parts of the crimping cut-off head (crimping jaws, crimping wedge, crimping pivot pin) are worn or that the crimping jaw has broken off (Example pictures on Page 39 to Page 42).
For this reason, the FAST 3000 PLC will perform an additional check: The monitoring devices measure the force levels at entry into the green rectangular box and exit from the box. These force values are transmitted to the FAST 3000 PLC, which calculates the difference between the entry force and exit force. If the difference is less than a specific value, an error message is generated (-50 N is the standard setting, adjustable range –100 to +100 N).

Formula:

For information on how to adjust the wear value tolerance parameter, see Section 7.4.7.

If Exit Force – Entry Force > Threshold value, then the closure is OK.

The condition of the Crimping cut-off head can be determined by:

- checking the condition of the crimping jaws visually. See picture below showing good jaws:

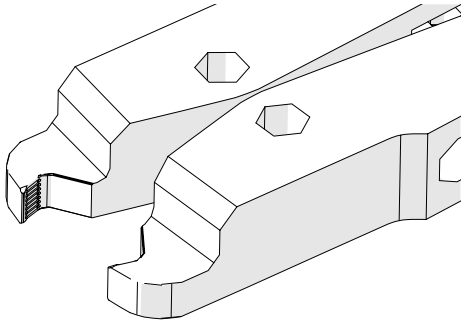
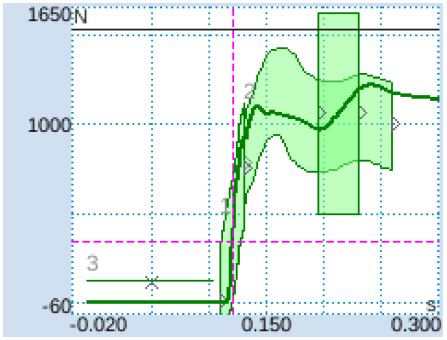
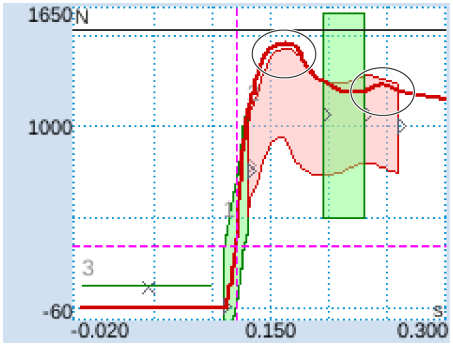
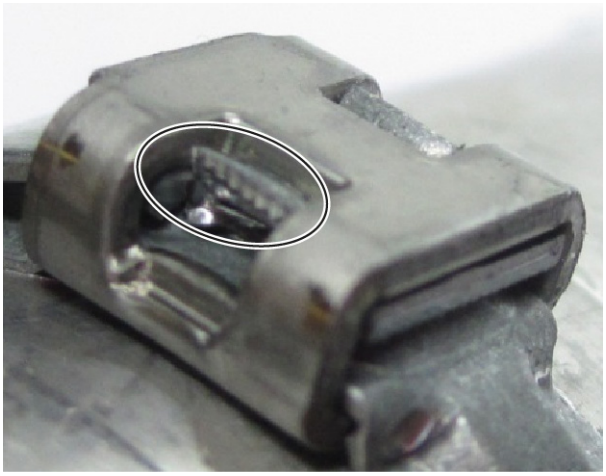


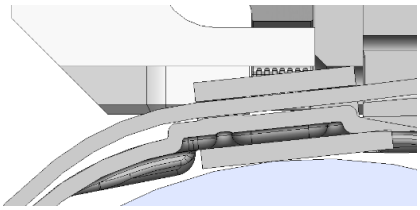
Fig. 21: *crimping jaws*

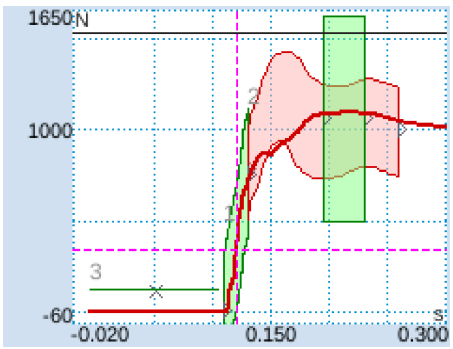
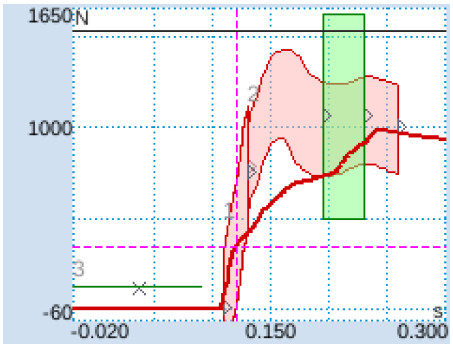
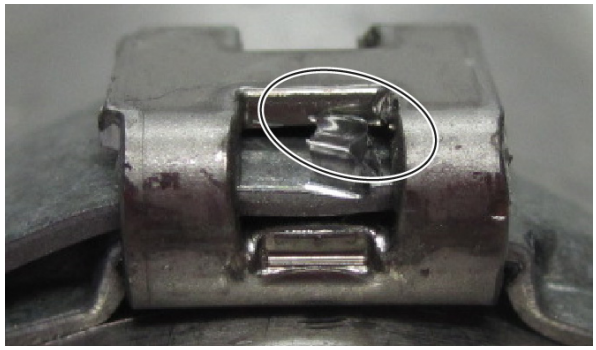
- measuring the closing gap of the Crimping cut-off head in mounted condition (Refer to maintenance manual for information about how to measure the closing gap).

In addition to the condition of the crimping cut-off head, the strap thickness of the WingGuard® clamp and side-acting forces on the WingGuard® clamp also affect the force differential.

5.2.5 CFM: Sample curves of crimping operations

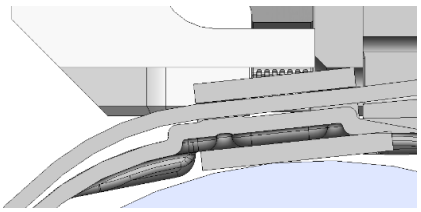
CFM curve	Image of the closed clamp
Left  **Right**  	Wings unusually thin and not closed to a sufficient height. 

Description
During wing closure the clamp housing was not parallel to the crimping cut-off head.  The following criteria have led to the not OK evaluation: • Second envelope curve (EO 2) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*) • Wear detection right (Troubleshooting *„PrErr_310: Crimping error CFM2 wear“*)

CFM curve	Image of the closed clamp
Left  **Right**  	 

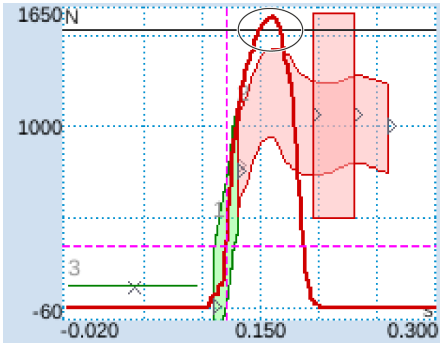
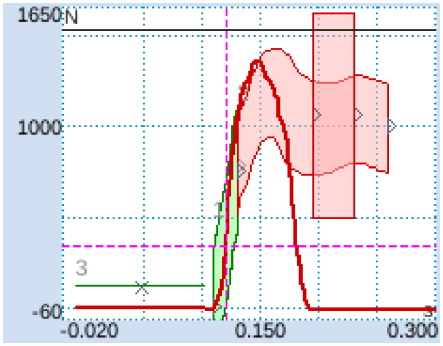
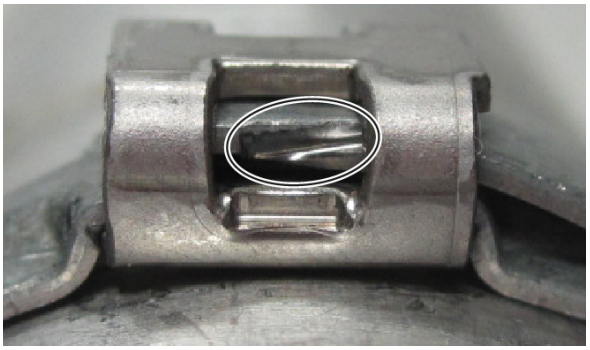
Description

During wing closure the clamp housing was not parallel to the crimping cut-off head.



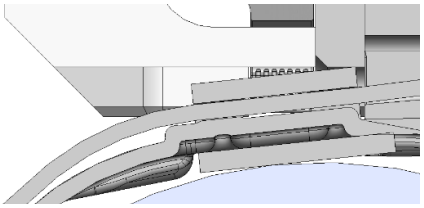
The following criteria have led to the not OK evaluation:

- First envelope curve (EO 1) right (Troubleshooting *„PrErr_307: Crimping error CFM2 envelope curve 1“*)
- Second envelope curve (EO 2) left (Troubleshooting *„PrErr_304: Crimping error CFM1 envelope curve 2“*)
- Second envelope curve (EO 2) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“)*

CFM curve	Image of the closed clamp
Left  **Right**  	

Description

During wing closure the clamp housing was not parallel to the crimping cut-off head.



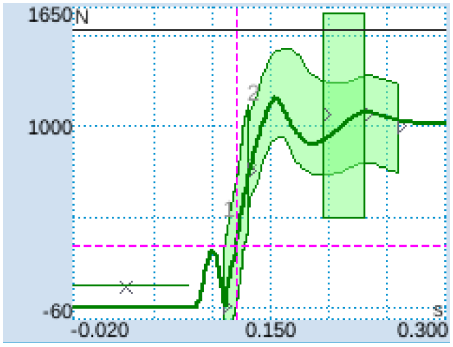
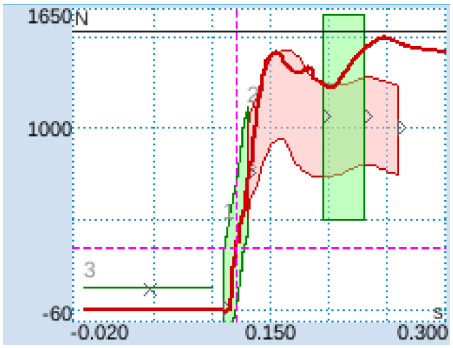
Crimping jaw struck the edge of the strap instead of reaching underneath the strap.

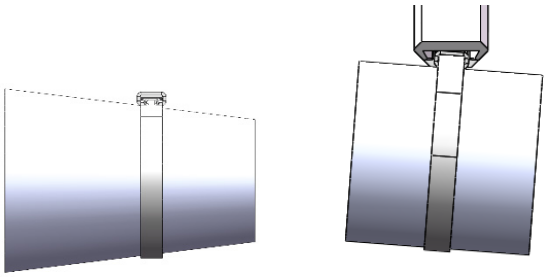
The closure process is aborted in order to protect the crimping jaws of the FAST 3000 against damage.

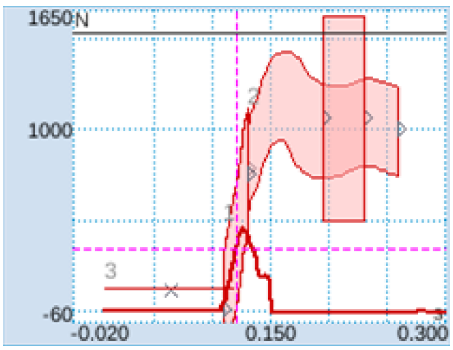
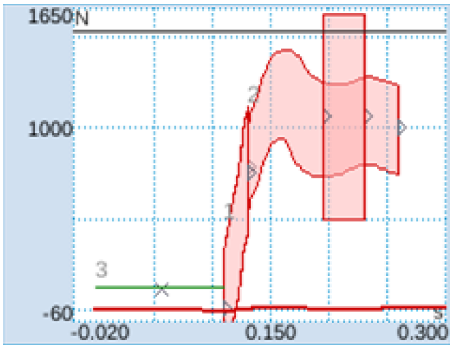
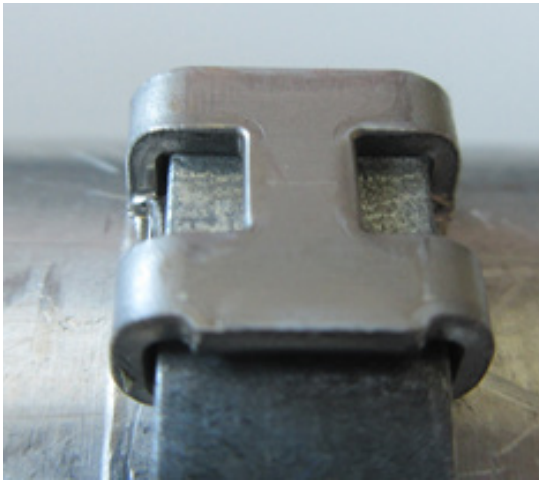
Cancellation triggered by maximum force of the left crimping jaw.

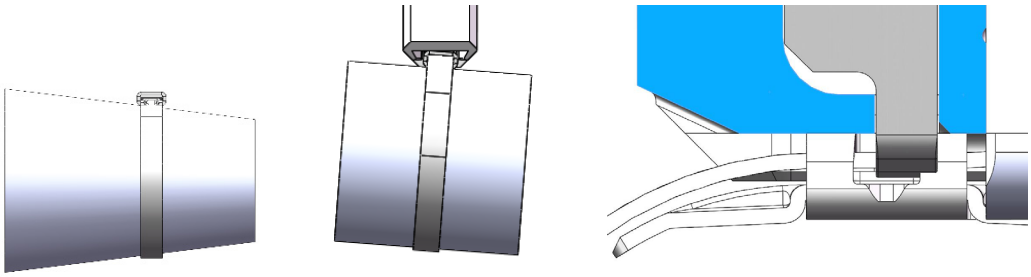
The following criteria have led to the not OK evaluation:

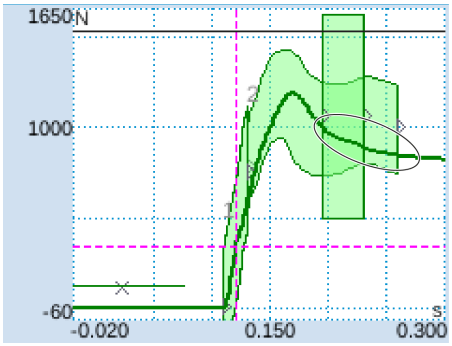
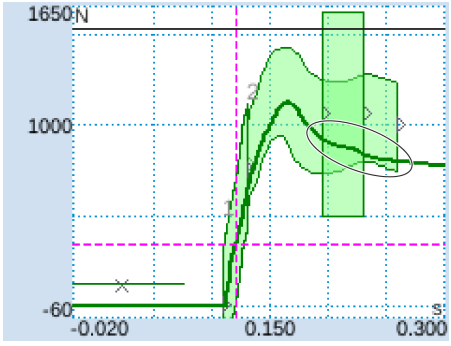
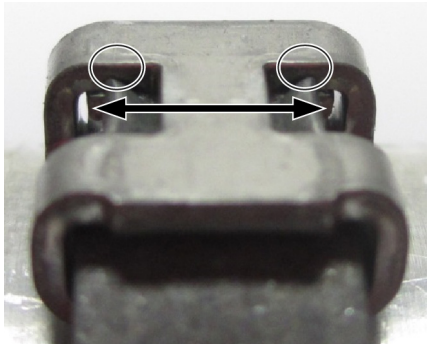
- Second envelope curve (EO 2) left (Troubleshooting *„PrErr_304: Crimping error CFM1 envelope curve 2“*)
- Second envelope curve (EO 2) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*)
- Uni-Box (EO 4) left (Troubleshooting *„PrErr_304: Crimping error CFM1 envelope curve 2“*)
- Uni-Box (EO 4) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*)

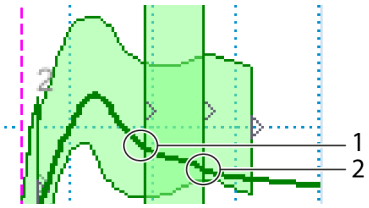
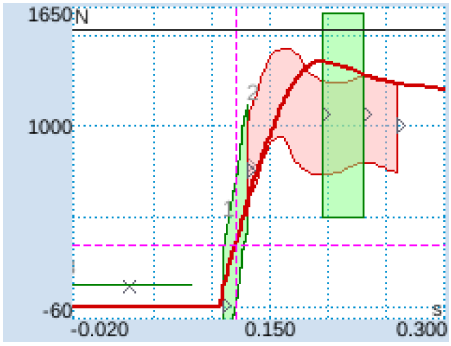
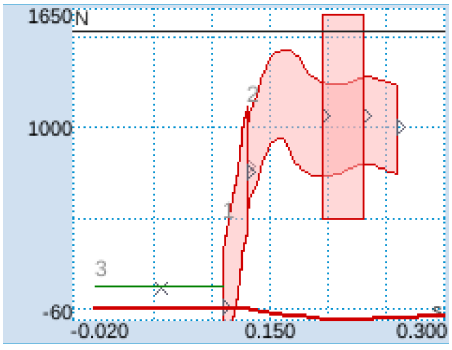
CFM curve	Image of the closed clamp
Left  **Right**  	Chip formation under the wing. 

Description
Slanting application; the right side is lower than the left side. Closure of the clamp on an oblique solid surface.  The following criteria have led to the not OK evaluation: Second envelope curve (EO 2) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*)

CFM curve	Image of the closed clamp
Left  **Right**  	No wing formation. 

Description
• Slanting application; the right side is lower than the left side. Closure of the clamp on an oblique solid surface. • Foreign Object leads to a gap between cut off punch and WingGuard® housing, therefore there is a collision between the FAST 3000 crimp jaw and the WingGuard® housing.  The crimping process is terminated due to the premature increase in force, in order to prevent damage to the crimping jaws. The following criteria have led to the not OK evaluation: • No-Pass (EO 3) left (Troubleshooting *„PrErr_305: Crimping error CFM1 NoPass“*) • First envelope curve (EO 1) left (Troubleshooting *„PrErr_303: Crimping error CFM1 envelope curve 1“*) • First envelope curve (EO 1) right (Troubleshooting *„PrErr_307: Crimping error CFM2 envelope curve 1“*) • Second envelope curve (EO 2) left (Troubleshooting *„PrErr_304: Crimping error CFM1 envelope curve 2“*) • Second envelope curve (EO 2) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*) • Uni-Box (EO 4) left (Troubleshooting *„PrErr_304: Crimping error CFM1 envelope curve 2“*) • Uni-Box (EO 4) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*)

CFM curve	Image of the closed clamp
Left  **Right**  	Closing width larger, wing less high. 

CFM curve	Image of the closed clamp
Description	
Closing with simulated wear (closing gap 3.4 mm. Refer to maintenance manual for information about how to measure the closing gap.)  The FAST 3000 PLC checks that the following condition is fulfilled: Exit Force – Entry Force < Threshold value. If yes, the FAST 3000 PLC outputs an error message and the closure operation is evaluated as not OK. More information about wear detection *see section 5.2.4*. The following criteria have led to the not OK evaluation: • Wear detection left (Troubleshooting *„PrErr_306: Crimping error CFM1 wear“)* • Wear detection right (Troubleshooting *„PrErr_310: Crimping error CFM2 wear“*)	
Left  **Right**  	Right wing not formed, left wing badly formed. 

CFM curve	Image of the closed clamp

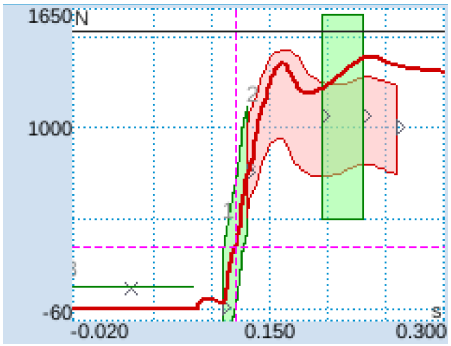
Description
Right crimping jaw completely broken off. Compared to good jaws:

(Illustrated example)

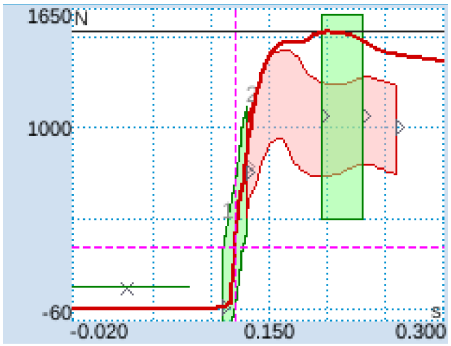
The following criteria have led to the NOK evaluation:

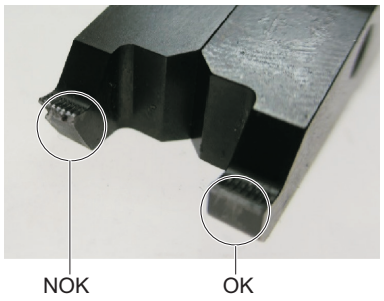
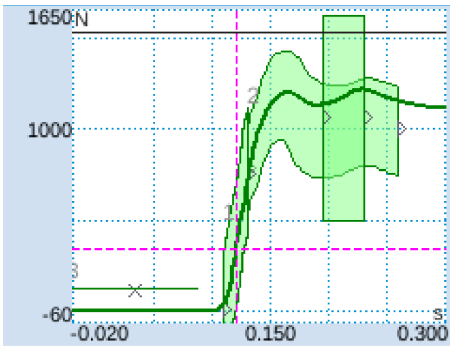
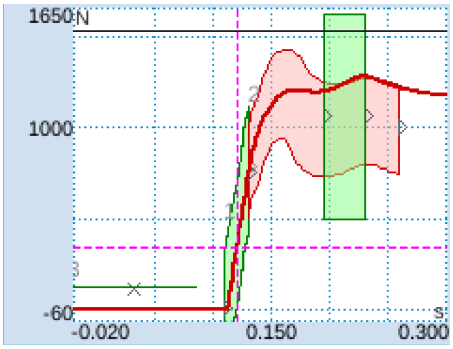
- First envelope curve (EO 1) right (Troubleshooting *„PrErr_307: Crimping error CFM2 envelope curve 1“)*
- Second envelope curve (EO 2) left (Troubleshooting *„PrErr_304: Crimping error CFM1 envelope curve 2“*)
- Second envelope curve (EO 2) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*)
- Uni-Box (EO 4) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“)*
- Wear detection left (Troubleshooting *„PrErr_306: Crimping error CFM1 wear“)*
- Wear detection right (Troubleshooting *„PrErr_310: Crimping error CFM2 wear“*)

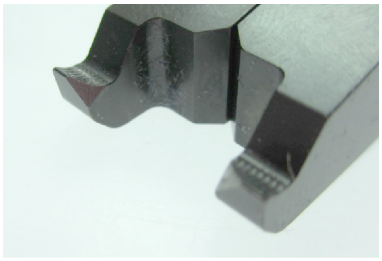
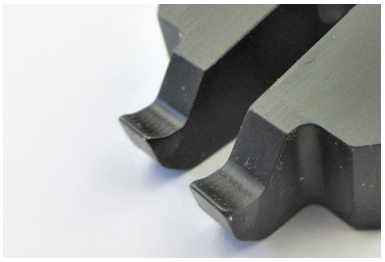
Left

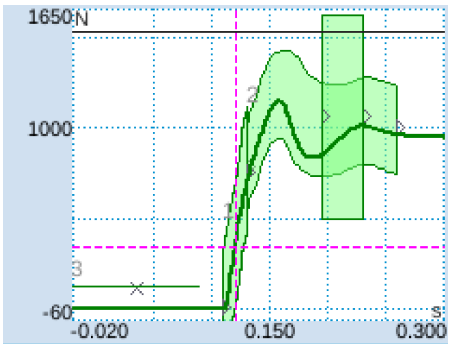
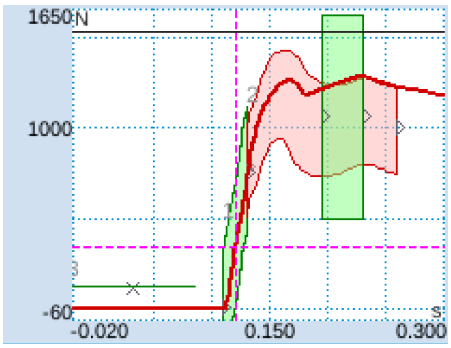
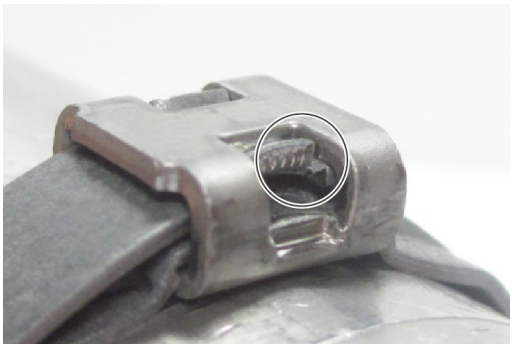


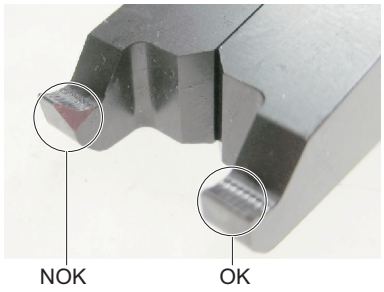
Right

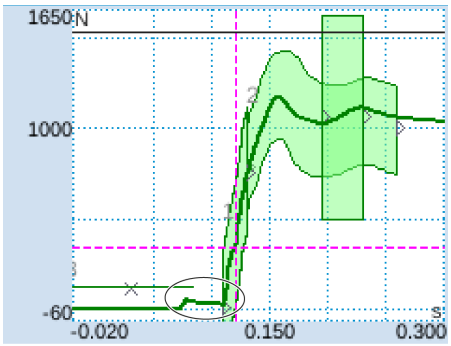
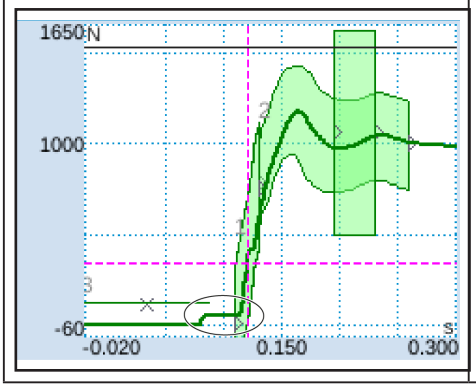


CFM curve	Image of the closed clamp
Description	
Right crimping jaw partially broken off:  The following criteria have led to the not OK evaluation: • Second envelope curve (EO 2) left (Troubleshooting *„PrErr_304: Crimping error CFM1 envelope curve 2“*) • Second envelope curve (EO 2) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*) • Wear detection right (Troubleshooting *„PrErr_310: Crimping error CFM2 wear“*)	
Left  **Right**  	

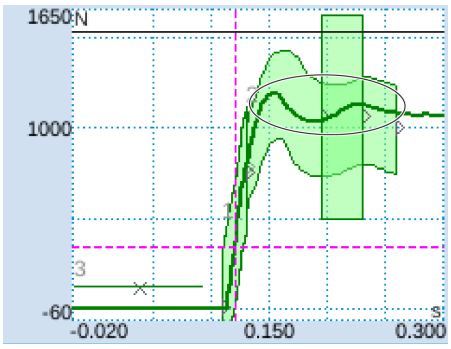
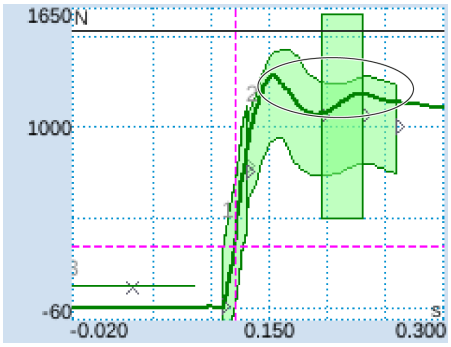
Description	
Both jaws partially broken off: 	Compared to good jaws: 

CFM curve	Image of the closed clamp
The following criteria have led to the not OK evaluation: • Second envelope curve (EO 2) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*)	
Left  **Right**  	

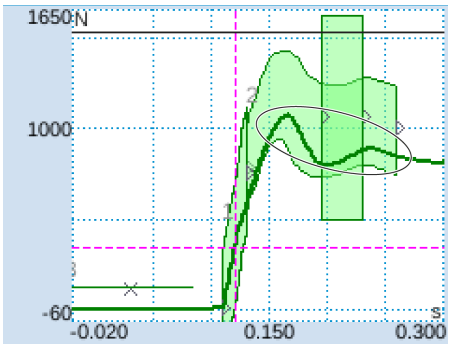
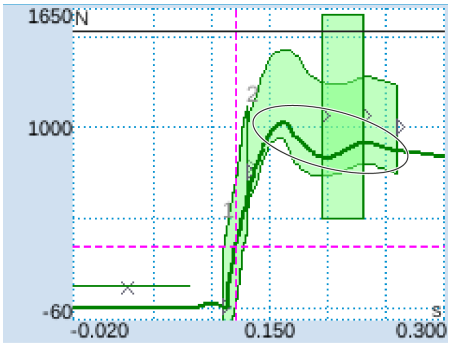
Description
Right jaw partially broken off:    The following criteria have led to the not OK evaluation: • Second envelope curve (EO 2) right (Troubleshooting *„PrErr_308: Crimping error CFM2 envelope curve 2“*)

CFM curve	Image of the closed clamp
Left  **Right**  	

Description
Fastening screws of the head housing cover are not sufficiently tight. Lock is still OK! For information about the correct tightening torque refer to Section *9.3.3*.

CFM curve	Image of the closed clamp
Left  **Right**  	

Description
Closing force set to 800 N instead of the 1850 N standard setting. CFM force lever higher than 1850 N due to generally low pulling level in the clamping strap. Conclusion: The closing force has an influence on the CFM curves. As a comparison, check the diagrams on the previous page.

CFM curve	Image of the closed clamp
Left  **Right** 	

Description
Closing force set to 2500 N instead of the 1850 N standard setting. Due to the generally higher pulling level in the clamping strap, the CFM force level is lower than with the standard 1850 N setting. Conclusion: The closing force has an influence on the CFM curves. As a comparison, check the pictures on the previous page.

5.3 Cut-off monitoring

The FAST 3000 PLC checks the force acting on the load measuring cells, whilst the strap end of the WingGuard® clamp is ejected. If the force measured is higher than expected, this may mean that the strap of the WingGuard® strap clamp has not been fully cut off and the cutting die is defective. An error message appears and the assembly operation is evaluated as not OK.

6 Working with the FAST 3000

WARNING

Hazardous situation due to improper installation.

- Read and understand the safety instructions, Section *2*.
- Make sure that the FAST 3000 has enough space around it to ensure the operator is not hampered or bumped into by other persons.
- Attach the FAST 3000 installation tool and its control cabinet to the attachment points provided.
- Ensure that the necessary plugs are inserted (the tool, two-hand control desk, …) before the FAST 3000 is connected to the power supply.
- A touch panel/ two-hand control desk and/or a connection to a PLC must be provided.

6.1 Commissioning

CAUTION

Hazard due to the machine being incorrectly installed.

The installation of the FAST 3000 may be performed only by qualified personnel who have read and understood the Operating Instructions.

CAUTION

Hazard due to incorrect inspection.

Ensure during and after each installation that

- all parts are in good condition,
- all parts have been installed so they cannot fall off,
- all safety-relevant parts are installed and working correctly.
- the crimping cut-off head is correctly installed. Use only crimping jaws that are in good condition and use only an intact cut-off die.

CAUTION

Hazard due to defective devices due to improper handling and positioning.

- All cables and installation tools must be in the de-energized state when the connections to the control cabinet are made or broken.
- Plug connector contacts may be touched only by persons who are grounded to prevent ESD.
- The control cabinet may be installed only in an upright position.

CAUTION

Risk of insufficient quality of closures due to incorrect routing of the connecting cable

When closing a WingGuard® clamp the WingGuard® strap clamp housing of the tool head must be pressed gently against the parts to be connected.

- Lay the connecting cable so that the crimping cut-off head tilts downwards.

The commissioning procedure of the FAST 3000 includes the following steps:

1. Install the components of the FAST 3000 so that they cannot fall off, so that the ergonomic factors are recognized and so that the clamps can be closed correctly.
2. Connect the installation tool to the control cabinet.

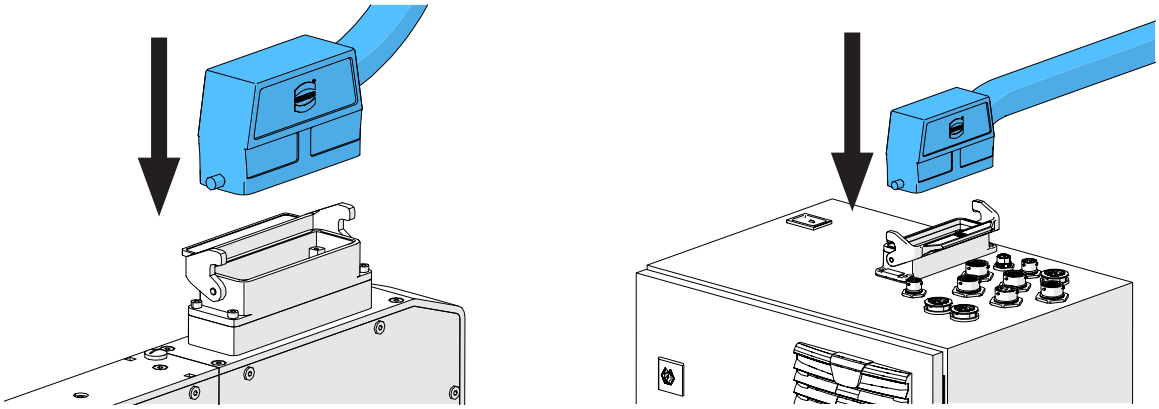


Fig. 22: *Connection connecting cable*

3. Connect the CFM unit to the control cabinet (see Section *6.3*).
4. Optional: Connect the touch panel, the two-hand control desk, the foot pedal and the external PLC to the control cabinet (see Section *6.2*).
5. Connect the control cabinet to the power supply.
6. Switch the FAST 3000 on (see Section *6.4*).
   The first closures on a loose mandrel can now be performed.
7. Position the installation tool (see Section *6.5*).
   The tool is now ready for operation.
8. Close a few test clamps to determine the functionality of the tool.

6.2 Connections to the control cabinet

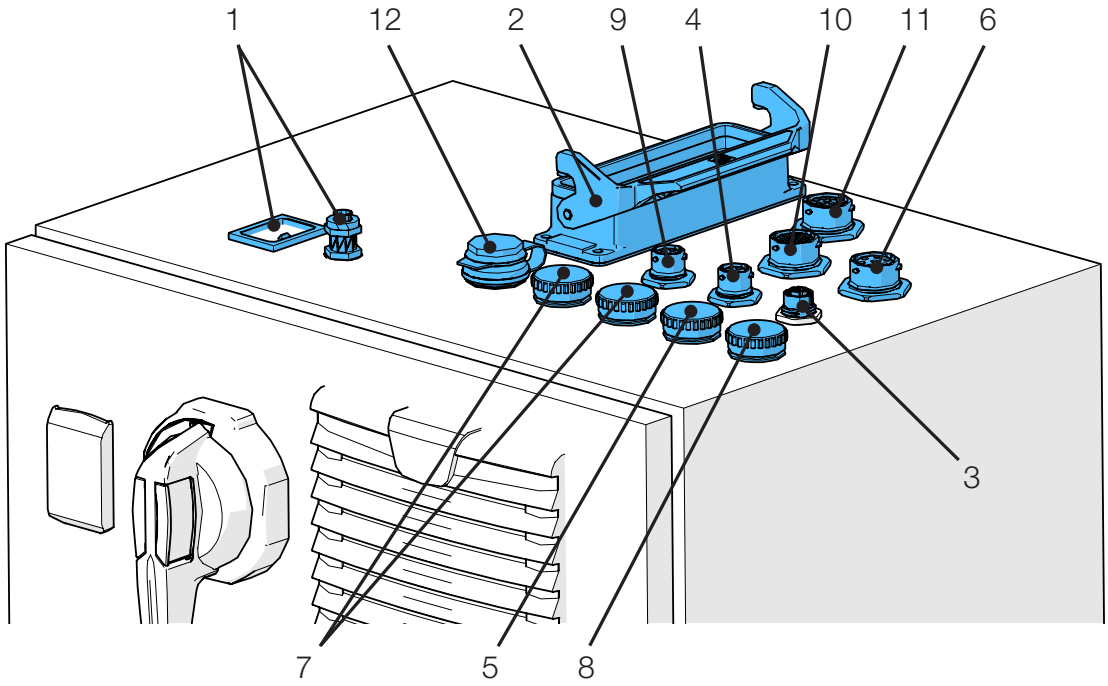


Fig. 23: *Connections to the control cabinet*

1. Power supply
2. Connecting cable between the tool mechanism and control cabinet
3. Touch Panel
4. Power supply CFM 24 V
5. EtherCat CFM
6. Foot pedal
7. ProfiNet / Ethernet IP
8. EtherNet (TCP)
9. External emergency stop (if this port is not connected to an external emergency stop the thin two-hand dongle must be plugged in.)
10. Two-hand control desk (if no two-hand control desk is connected the two-hand dongle must be plugged in, see Section *3.3.*)
11. M16 cable gland, external light curtain, external power management
12. USB

6.3 Cable connections to the crimping force monitoring devices

NOTICE

Use the cable strain relief strip supplied to provide strain relief to the connecting cables.

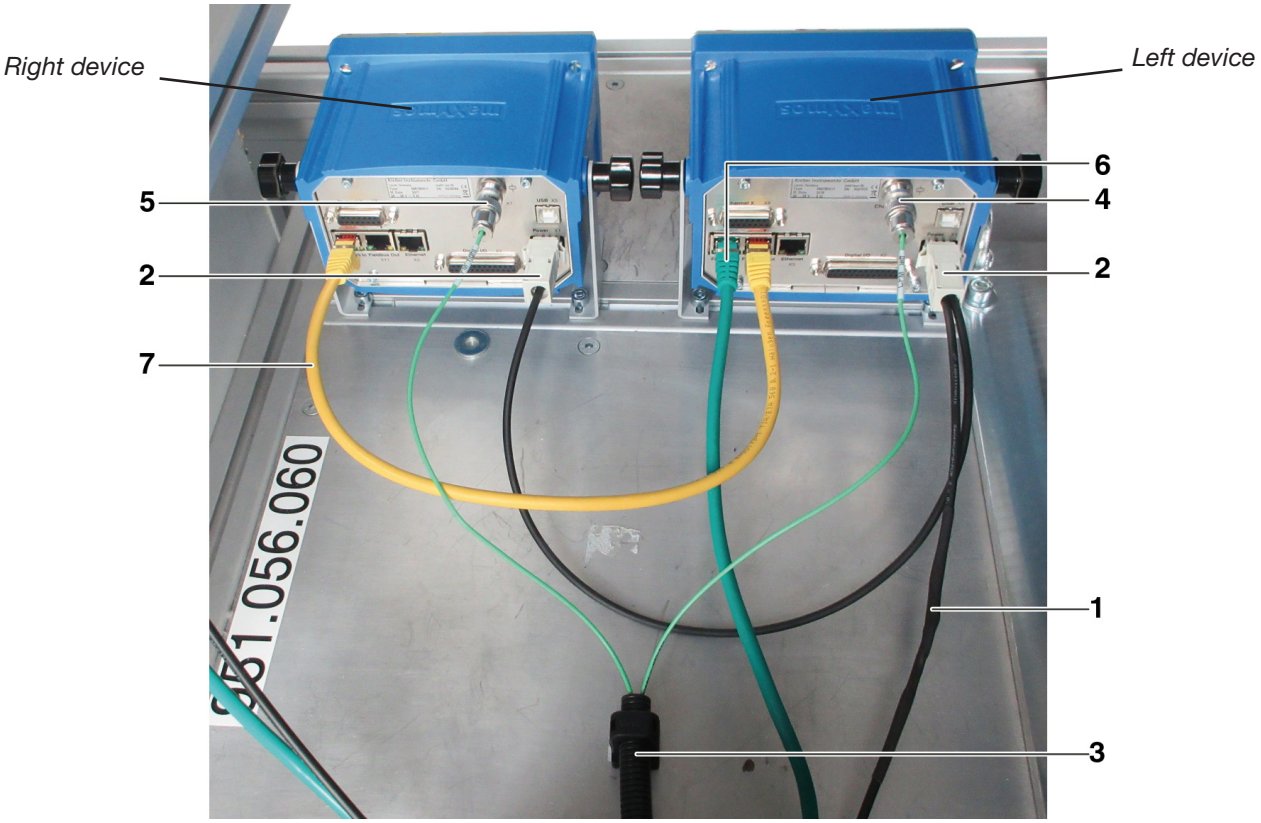


Fig. 24: *Control unit, connections*

1. Cables for connecting the crimping force monitoring devices to the FAST 3000 control cabinet
2. 24-V power supply for the crimping force monitoring devices
3. Cable conduit and bracket for the force signal cables (use an M5 bolt for strain relief of the cables and attach the bracket to a secure surface)
4. Port for the left hand CFM force load cell (when the port is not occupied, cover it with the closure cap supplied. Do not allow dirt to enter the plug connector socket.)
5. Port for the right hand CFM force load cell (when the port is not occupied, cover it with the closure cap supplied. Do not allow dirt to enter the plug connector socket.)
6. EtherCAT connection (use the "Fieldbus In" port of the left hand CFM device)
7. RJ-45 cable connecting the “Fieldbus Out” socket of the left hand crimping force monitoring device to the “Fieldbus In” socket of the right hand CFM unit

6.4 Switching on the FAST 3000

NOTICE

Further information on controlling the FAST 3000 without the two-hand control desk *see Section 10*.

NOTICE

The FAST 3000 may not be initialized when a clamp or other part is inserted in the crimping cut-off head. Disregard of this rule can lead to breakage of the crimping jaws.

1. Switch the FAST 3000 on using the On/Off switch (1) on the control cabinet.

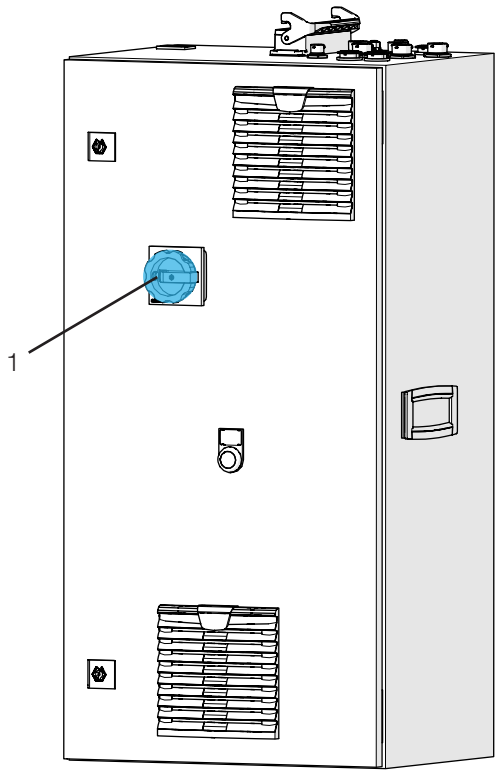


Fig. 25: *Main switch control cabinet*

2. Wait until the FAST 3000 PLC has booted up. After the blue illuminated button on the two-hand control desk has started to flash, press the green button (2) on the control cabinet door.
   This indicates that the power stages of the drives are supplied with power. CAUTION! As long as no enable flag from the supervisory system is present and the bypass is not active, the power cannot be switched on (see Sections *7.4.7* and *10.1.3*).

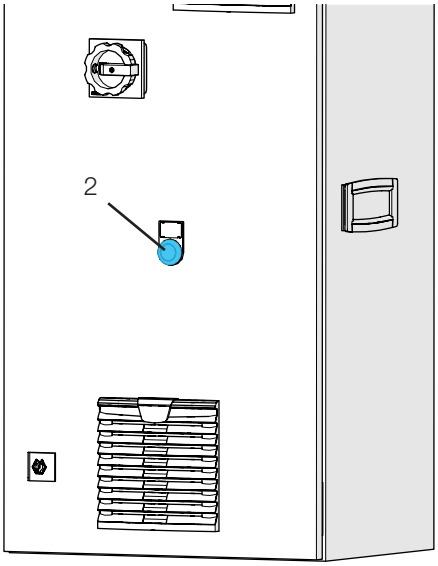


Fig. 26: *Switch for voltage power of the output stages*

3. Make sure that no clamp is present in the crimping cut-off head and the crimping jaws and the cut-off die can move freely.

4. To initialize the FAST 3000, press the blue flashing button (3) on the two-hand control desk.

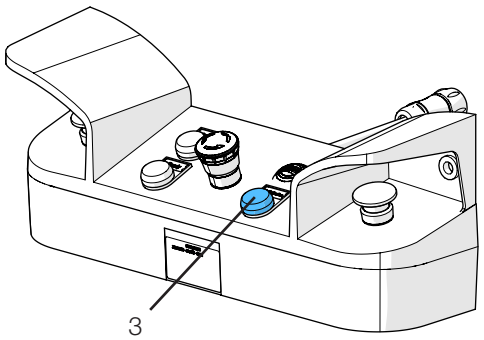


Fig. 27: *Initialization key 2 Manual operation*

The FAST 3000 is ready for operation when the green indicator lamp on the two-hand control desk is lit.

6.5 Correct positioning of the FAST 3000

6.5.1 General instructions, positioning the FAST 3000 and WingGuard® clamp housing

CAUTION

Hazard due to incorrect tool positioning.

The positioning of the FAST 3000 may be performed only by qualified personnel who have read and understood the Operating Instructions.

The following procedure is applicable only if after the installation the housing of the WingGuard® strap clamp must be in the horizontal position. In all other cases the FAST 3000 must be set up manually.

- Many different mounting conditions are possible. Therefore, you must check the correct alignment of the WingGuard® strap clamp. In addition you must install it after the first set-up to the trial clamps.
- The horizontal and tilting movement of the FAST 3000 must not be obstructed by contact with external objects.
- During the closure procedure, the crimping cut-off head of the FAST 3000 must not touch any parts other than the WingGuard® clamp that is being closed. Disregard of this rule can lead to mechanical damage and poor connection quality of the WingGuard® strap clamp (see *Fig. 29*).
- In order to obtain the full benefit of the WingGuard® strap clamp, the WingGuard® housing must be supported by the application (see *Fig. 24 and Fig. 26*).
- The WingGuard® strap clamp must not be mounted on a conical surface (see *Fig. 27*).
- Before positioning the FAST 3000, always remove the transport restraint. The transport restraint must not be installed whilst production is in operation.
- We emphatically recommend that a suitable jig is employed for the entire application. Free-hand closure can result in the clamps not being properly closed.
- The base plate of the FAST 3000 must be securely attached to the supporting structure. This applies even during the application validation phase.
- Incorrect alignment of the machine can lead to a reduced residual force in the WingGuard® strap clamp.
- The control cabinet may be installed only in an upright position.

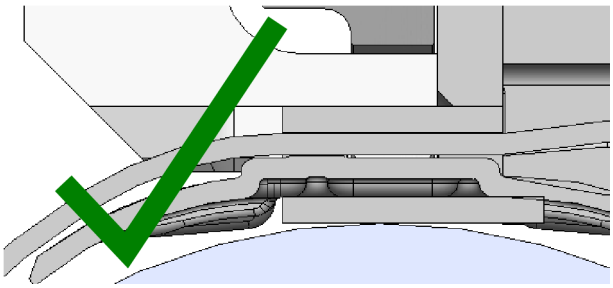


Fig. 28: *Example of correct installation of the WingGuard® housing and the crimping cut-off head (which are parallel with each other)*

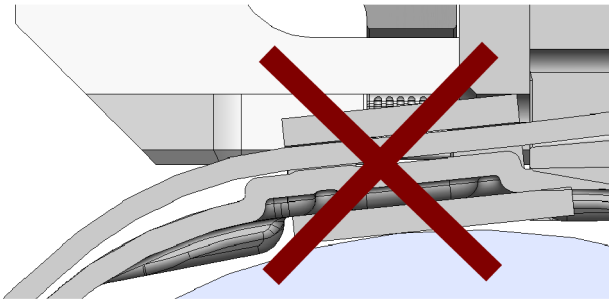


Fig. 29: *Example of an incorrect installation of the WingGuard® with the housing and the crimping cut-off head not parallel with each other*

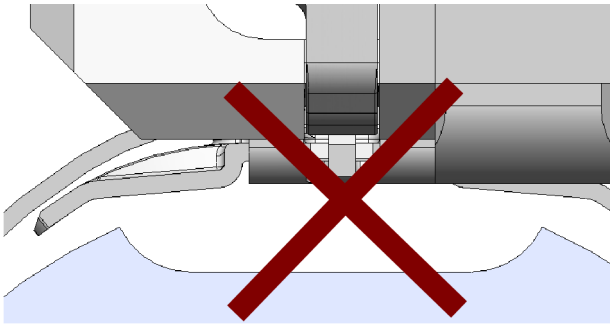


Fig. 30: *Impermissible positioning of the WingGuard® housing on an application*

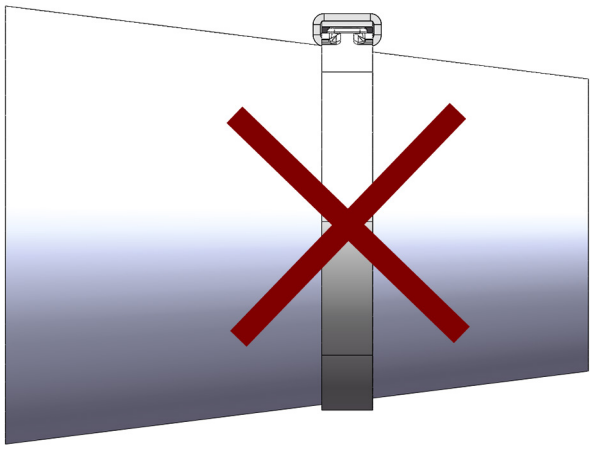


Fig. 31: *Impermissible application of the WingGuard®strap clamp on a conical surface*

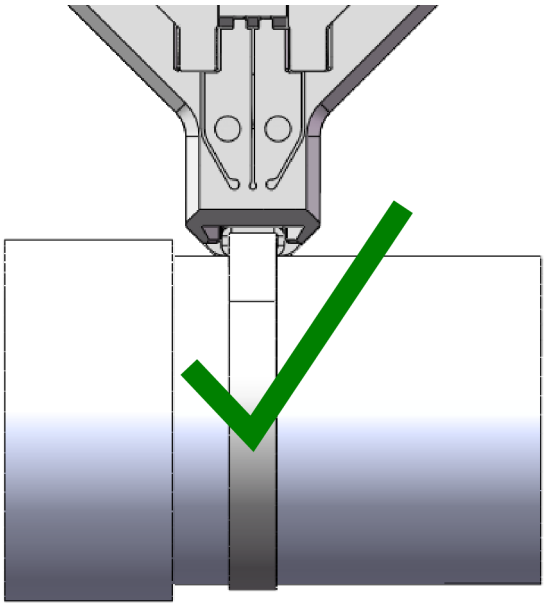


Fig. 32: *The crimping cut-off head must be at a sufficient distance from the application. No collision with the application.*

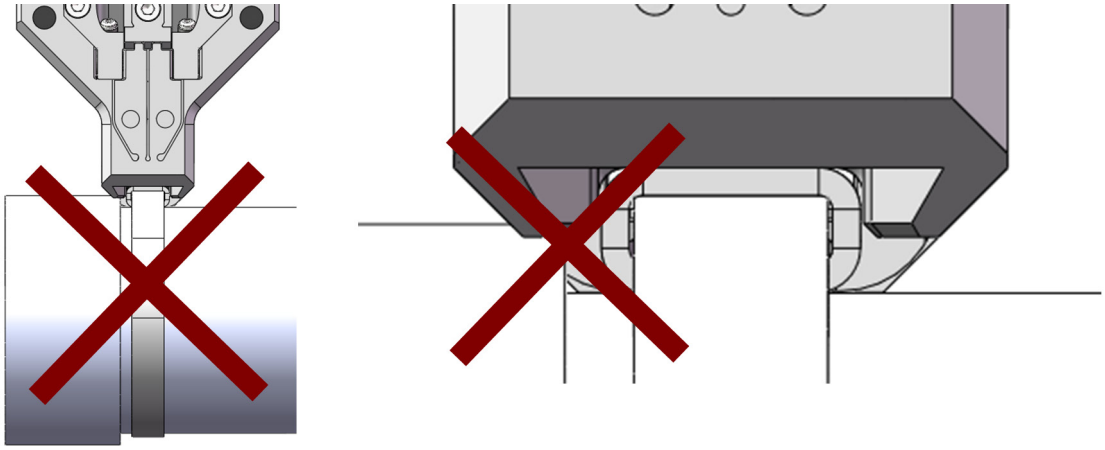


Fig. 33: *The crimping cut-off head is colliding with the application.*

Impermissible application. The same is true if two WingGuard® strap clamps are fitted too close to each other.

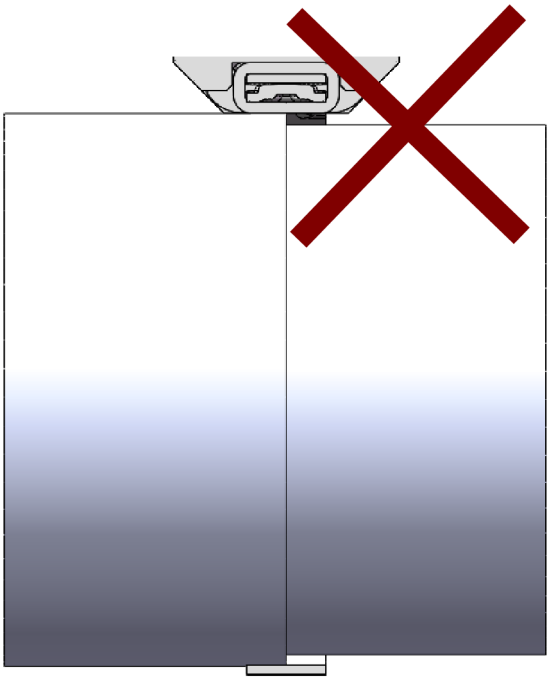


Fig. 34: *Do not mount the WingGuard® strap clamp on a stepped application.*

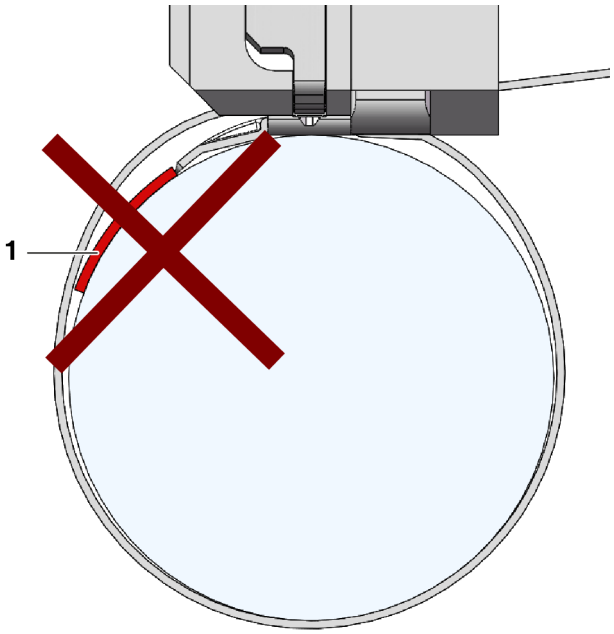


Fig. 35: *Avoid contact between the end face of the strap and the goods being strapped (example shown: goods being strapped (1)).*

6.5.2 Positioning the FAST 3000 installation tool using the alignment aid

WARNING

Hazard due to a magnetic field.
The alignment aid is held against the crimping cut-off head by a powerful magnet. Personnel fitted with a heart pacemaker must maintain a suitable distance from the alignment aid.

1. Make sure that the alignment of the base plate of the FAST 3000 is horizontal.
2. Fix the customer application in the nest provided by the customer. Remove the transport restraint (2).
3. Attach the alignment aid (1) to the crimping cut-off head and satisfy yourself that both pins are correctly positioned.

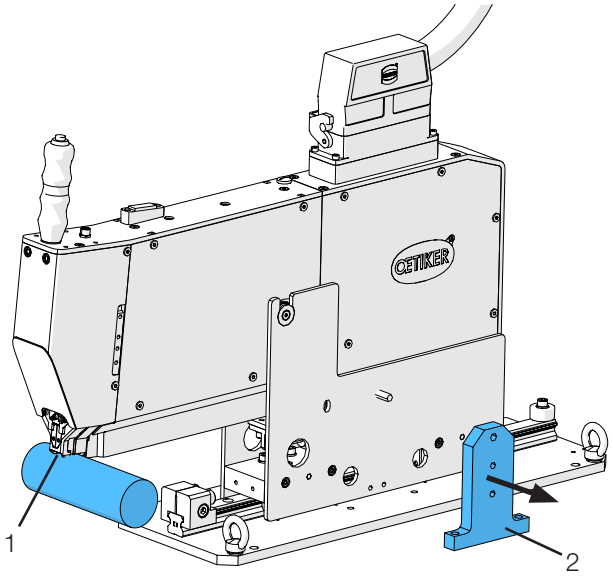


Fig. 36: *Alignment tool*

4. Displace the FAST 3000 horizontally so that the indicated dummy housing (3) of the alignment aid (1) is correctly positioned relative to the intended position of the WingGuard® housing.
In most applications this is the 12 o'clock position.

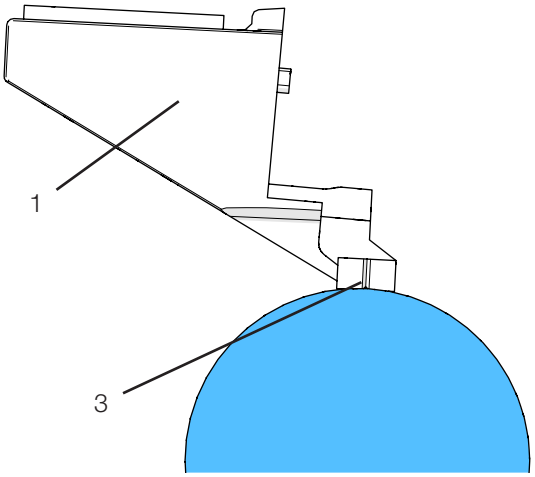


Fig. 37: *Setup help*

5. Make sure that the FAST 3000 has sufficient space (~ 50 mm) for attaching the positioning stop (3) to the guide rail.

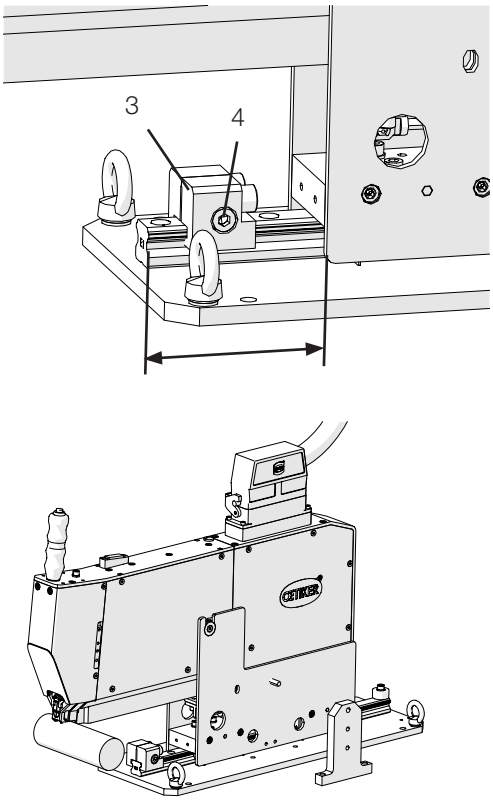


Fig. 38: *Positioning stop*

6. Adjust the height of the tool so that the bubble of the spirit level is exactly central between the two vertical lines (horizontal alignment).
   The correct horizontal position must be maintained at all times.
7. Mount the positioning stop on the tool so that the both the vibration-absorbing rubber pads rest lightly against the tool.
8. Tighten the attachment screw (4) on the positioning stop (3) to a torque of 5 Nm.

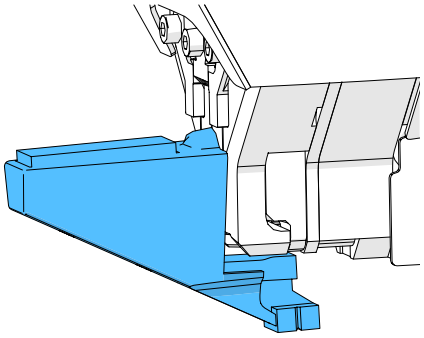


Fig. 39: *Setup aid Horizontal alignment*

9. Check the horizontal alignment yet again. The tool must rest lightly against an the positioning stop and against the alignment aid on the application.
10. Remove the alignment aid.
11. Check the alignment of the FAST 3000. To do this, install several WingGuard® clamps on your application. If the WingGuard® strap clamp is not in 12 o'clock position, manually correct the horizontal alignment of the FAST 3000. You can check the correct vertical positioning of the FAST 3000 by reference to the spirit level which is mounted at the top of the tool. To do this, position the crimping cut-off head on the clamp housing of the WingGuard® clamp. The spirit level must now be correctly aligned.

The FAST 3000 is now correctly positioned.

6.5.3 Dimensions for correctly positioning the FAST 3000

CAUTION

Hazard due to the machine being incorrectly installed.

The following drawing relates to installation situations where the surrounding surfaces of the WingGuard® strap clamp housing are symmetrical (cylindrical surfaces).

- If the surfaces on which WingGuard® strap clamp housing is installed are asymmetrical (elliptical or the like), the correct position of the WingGuard® strap clamp housing and the FAST 3000 must be determined by means of tests.
- The horizontal and tilting movement of the FAST 3000 must not be obstructed by contact with external objects.
- The crimping cut-off head of the FAST 3000 must not touch any parts other than the WingGuard® clamp that is being closed. Disregard of this rule can lead to mechanical damage and poor connection quality of the WingGuard® strap clamp.
- Make sure that the arrangement of the customer-provided waste channel is appropriate.
- Before positioning the FAST 3000, always remove the transport restraint.
- We emphatically recommend that a suitable jig is employed for the entire application. Free-hand closure can result in the clamps not being properly closed.

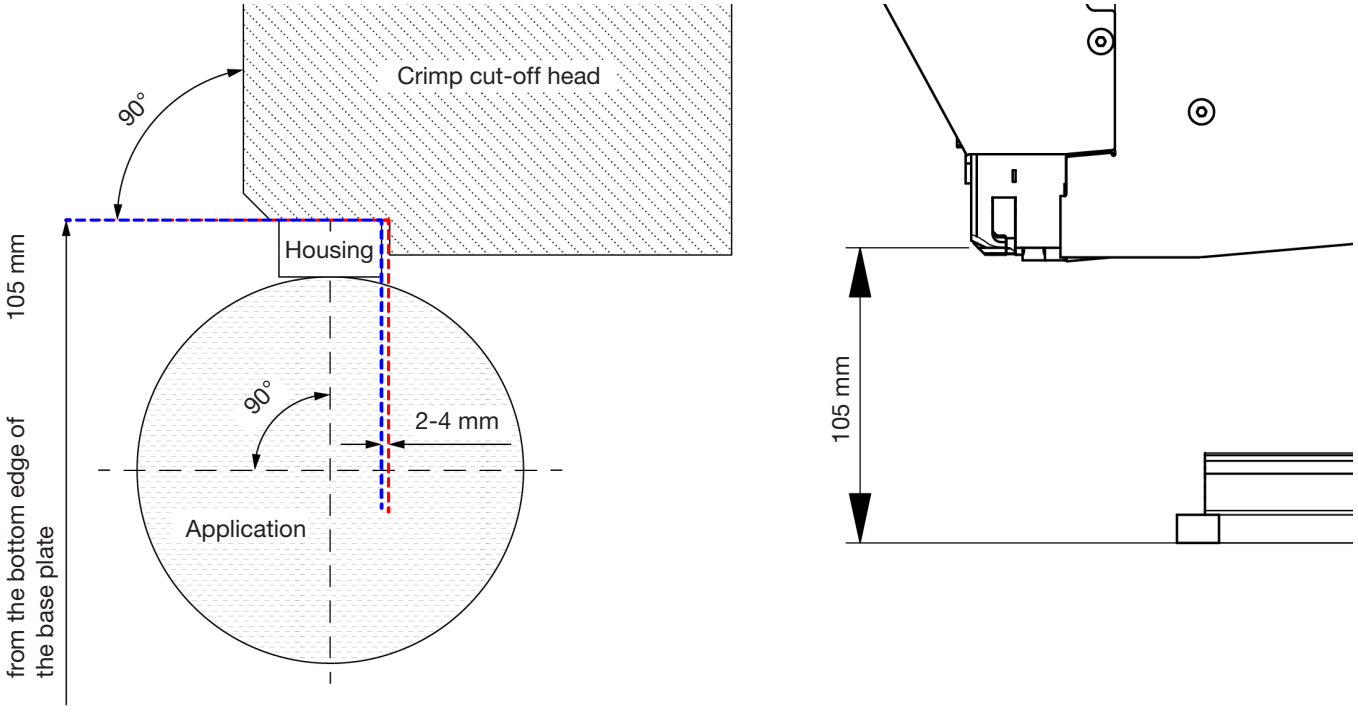


Fig. 40: *Alignment tool*

Comment: On request, Oetiker will provide a 3D-CAD model of the FAST 3000.

Arrangement of the waste channel

It must be ensured that no other parts touch the clamping unit and distort the measurement of the closing force. Among other things, this concerns the customer-provided waste channel. The illustrations below show the recommended arrangement of the waste channel.

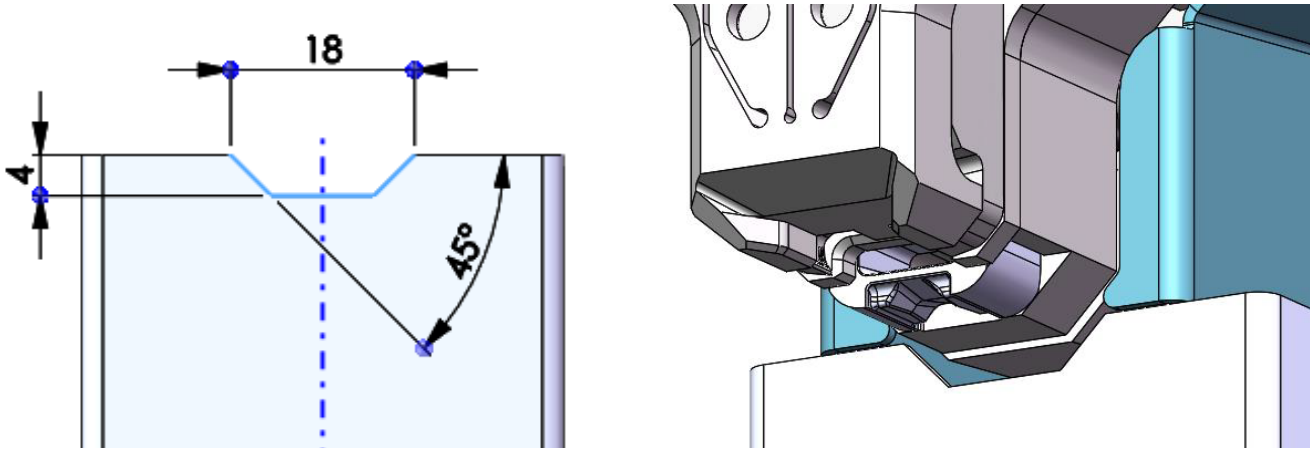


Fig. 41: *Waste channel*

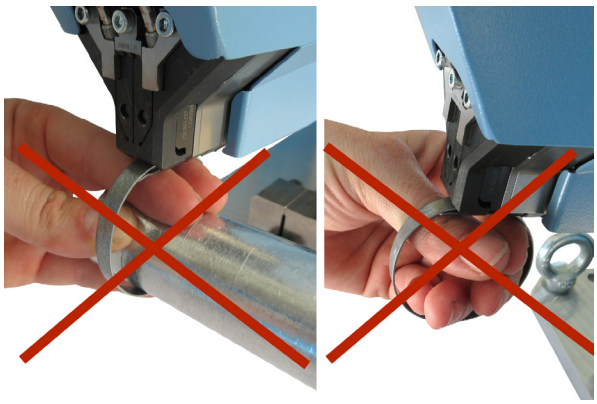
6.6 Normal operation (production)

WARNING

Crush hazard at the WingGuard® strap clamp.

Fingers can be crushed when the START button is pressed or when a start is initiated by an external controller.

▶ When starting the clamping cycle, keep your fingers away from the clamp.



WARNING

Crush hazard at moving parts.

The FAST 3000 may be used only when all covers are correctly fitted and bolted in place!

WARNING

Hazard due to positioning the hands under the installation tool.

- Never reach under the installation tool while it is in operation.

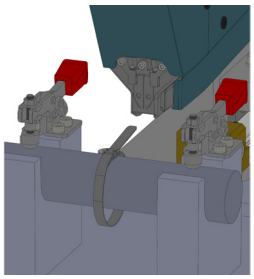
CAUTION

Danger due to parts being flung from the machine.

If parts become defective while the machine is in during operation, parts may become loose and be flung from the machine.

During operation and maintenance of the machine, always wear safety glasses.

1. Check that the process parameters are set to the correct values for your application (see Section *5.1*).
2. Place the clamp around the parts to be connected and secure the customer application in the bracket provided by the purpose by the customer.
3. Hold the machine by the handle and pull it in the direction of the clamp. When doing so, guide the tail of the OETIKER PG270 WingGuard® strap clamp into the bottom slot on the crimping cut-off head.



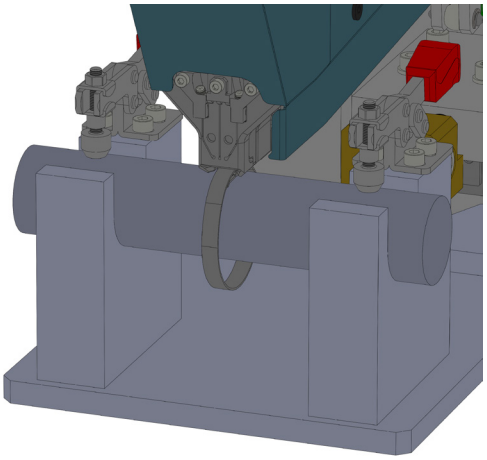
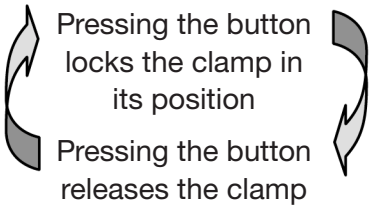


Fig. 42: *Mount Wingguard clamp*

4. Push the OETIKER PG270 WingGuard® strap clamp into the tool as far as possible.

A sensor detects the correct positioning and confirms this with two LED lamps on the front cover (slowly flashing green light). Now the clamp can be locked by pressing the button on the top of the handle. Pressing the button a second time releases the lock.



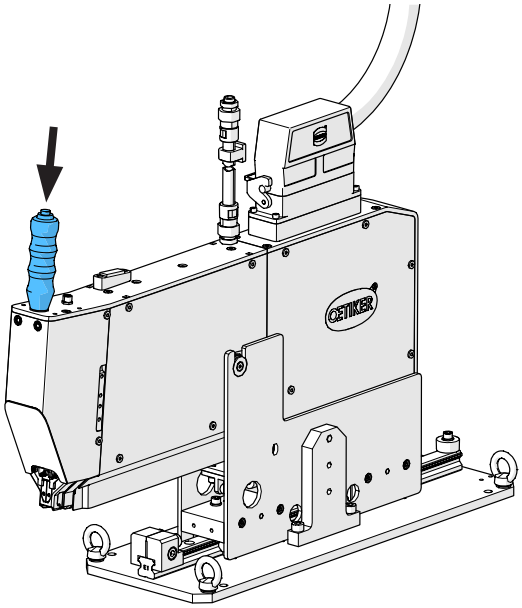


Fig. 43: *Locking clamp*

Once the strap is locked (as shown by the two LEDs on the front cover) lighting up continuously, the installation of the OETIKER PG270 WingGuard® strap clamp can start.

If the clamp tail was inserted insufficiently far, the LEDs will flash at rapid intervals. In this case the button must be pressed again to release the clamp, the tail must be pushed in further and locked again.

NOTICE

Risk of an increased error rate.

▶ Do not touch the FAST 3000 until the closure procedure is completed.

5. Start the installation by pressing both the left and right buttons (1) on the two-hand control desk simultaneously. This initiates closure of the clamp. This initiates closure of the clamp. At the end of the closure procedure the clamp is released and the tool can be pushed back into the output position.
6. Remove the installed assembly and start another cycle.

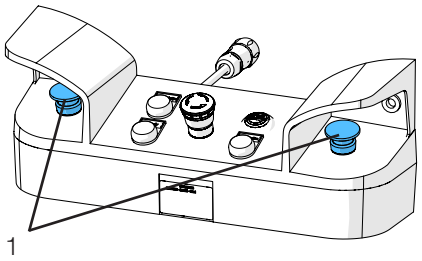


Fig. 44: *Trigger buttons 2 hand operation*

NOTICE

After a defective clamp closure, always check the crimping jaws for damage.

NOTICE

If the tail sensor detects no tail, the clamping push button is deactivated.

NOTICE

You must depress both start buttons quickly and simultaneously. Otherwise the warning “War_2 Check button contacts occurs” is output.

6.7 Laboratory mode (password-protected)

You can switch into the password-protected laboratory mode and choose between 1-hand control or foot pedal control. Laboratory mode can be used only for a limited number of connections and activated for only a limited period of time (see Section *7.4.3*).

WARNING

Hazard due to unqualified personnel.

Laboratory mode can be used only under laboratory or test conditions where there is no alternative.
The personnel must have been trained to use the FAST 3000 with an increased level of care.

WARNING

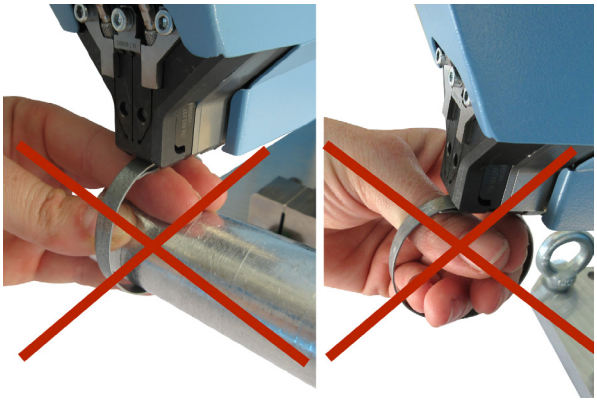
Crush hazard at moving parts.
The FAST 3000 may be used only when all covers are correctly fitted and bolted in place.

WARNING

Crush hazard at the WingGuard® strap clamp.

Fingers can be crushed when the START button is pressed or when a start is initiated by an external control.

▶ When starting the clamping cycle, keep your fingers away from the clamp.



WARNING

Hazard due to positioning the hands under the installation tool.

- Never reach under the installation tool while it is in operation.

CAUTION

Danger due to parts being flung from the machine.

If parts fracture while the machine is in during operation, parts may become loose and be flung from the machine.

- During operation and maintenance of the machine, always wear safety glasses.

NOTICE

Only one laboratory mode can ever be activated at a time. Depending on the setting you can then initiate a cycle by pressing a start button or pressing the foot pedal.

6.7.1 One-hand operation

1. Check that the process parameters are set to the correct values for your application.
2. Activate the one-hand operation:
   - Switch to “operating mode", activate “laboratory mode" and “one-hand operation”.
   - In order to access laboratory mode you must be logged in as Superuser.
3. Place the clamp around the parts to be connected.

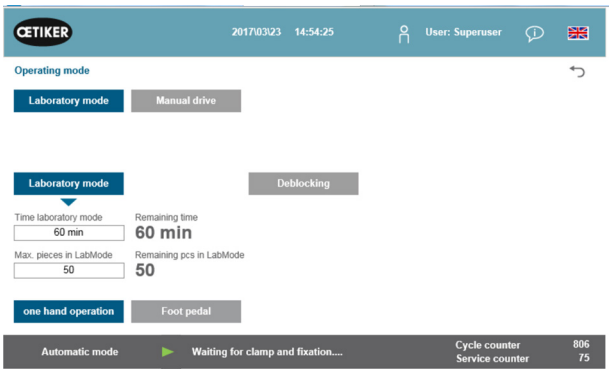
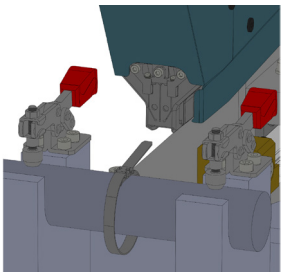
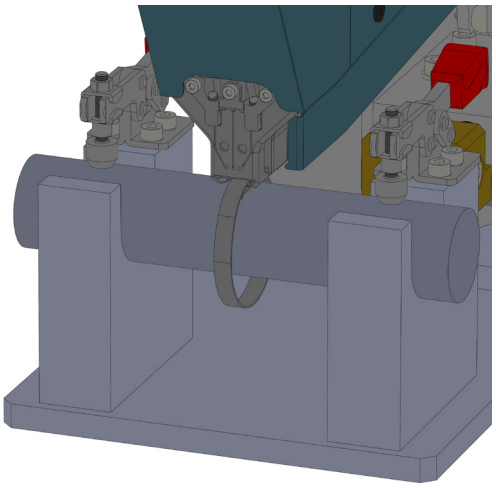


Fig. 45: *Laboratory operation one hand operation*

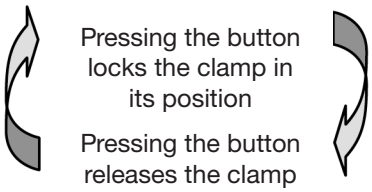
4. Hold the machine by the handle and pull it in the direction of the clamp. When doing so, guide the tail of the OETIKER PG270 WingGuard® strap clamp into the bottom slot on the crimping cut-off head.

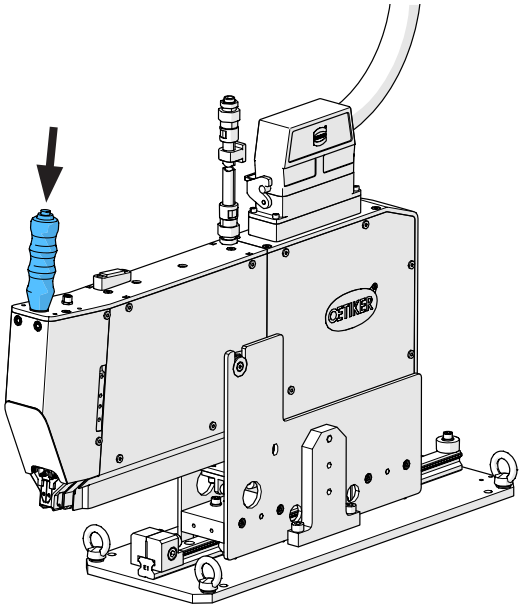




5. Push the OETIKER PG270 WingGuard® strap clamp into the tool as far as possible.

A sensor detects the correct positioning and confirms this with two LED lamps on the front cover (slowly flashing green light). Now the clamp can be locked by pressing the button on the top of the handle. Pressing the button a second time releases the lock.





If the sensor does not detect a tail, the locking button will not work.

Once the strap is locked (as shown by the two LEDs on the front cover lighting up continuously) the installation of the OETIKER PG270 WingGuard® strap clamp can start.

If the clamp tail was inserted insufficiently far, the LEDs will flash at rapid intervals. In this case the button must be pressed again to release the clamp, the tail must be pushed in further and locked again.

NOTICE

Risk of an increased error rate.

▶ Do not touch the FAST 3000 until the closure procedure is completed.

6. Start the installation. Press either the left-hand or right-hand button on the two-hand control desk for at least 2.5 seconds.

   After the buzzer has sounded 3 times the clamp will start to close. Once the closure process is complete, the clamp is released again.

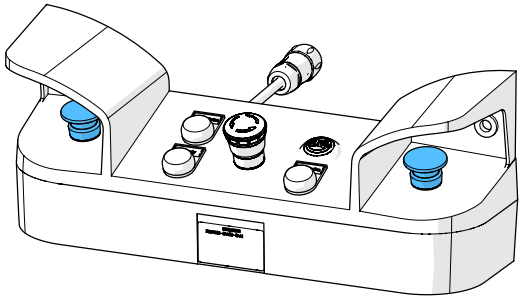


Fig. 46: *Trigger buttons 2 hand operation*

6.7.2 Foot pedal

1. Check that the process parameters are set to the correct values for your application.
2. Activating foot pedal mode
   - Switch to “operating mode”, activate “laboratory mode” and “foot pedal”.
   - In order to access laboratory mode you must be logged in as Superuser.
3. Place the clamp around the parts to be connected.

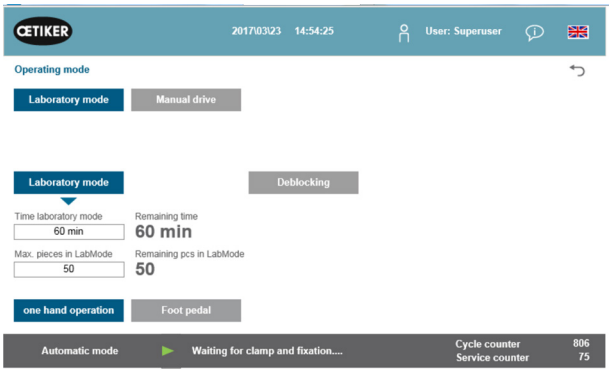
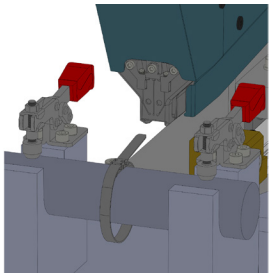
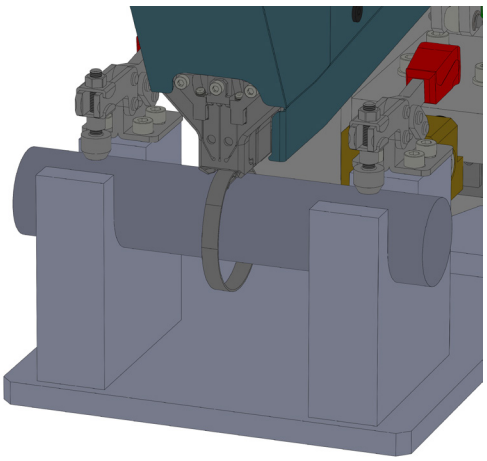


Fig. 47: *Laboratory operation one hand operation*

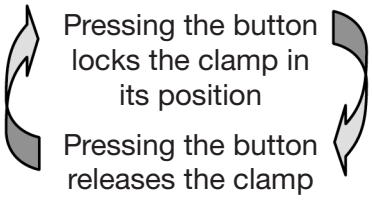
4. Hold the machine by the handle and pull it in the direction of the clamp. When doing so, guide the tail of the OETIKER PG270 WingGuard® strap clamp into the bottom slot on the crimping cut-off head.

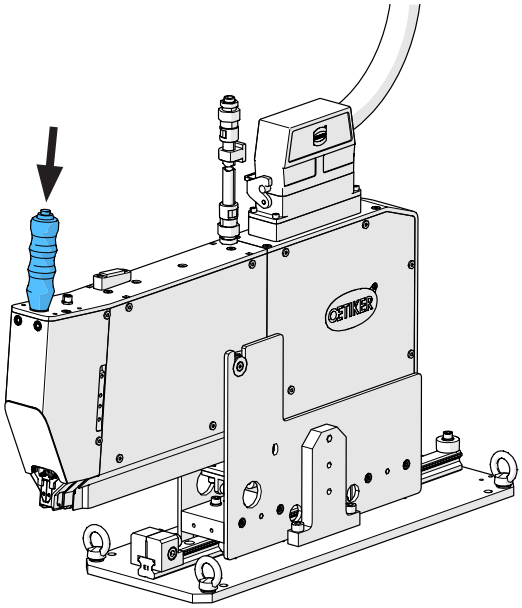




5. Push the OETIKER PG270 WingGuard® strap clamp into the tool as far as possible.

A sensor detects the correct positioning and confirms this with two LED lamps on the front cover (slowly flashing green light). Now the clamp can be locked by pressing the button on the top of the handle. Pressing the button a second time releases the lock.





If the sensor does not detect a tail, the locking button will not work.

Once the strap is locked (as shown by the two LEDs on the front cover lighting up continuously) the installation of the OETIKER PG270 WingGuard® strap clamp can start.

If the clamp tail was inserted insufficiently far, the LEDs will flash at rapid intervals. In this case the button must be pressed again to release the clamp, the tail must be pushed in further and locked again.

NOTICE

Risk of an increased error rate.

- Do not touch the FAST 3000 until the closure procedure is completed.

6. Start the installation. To do this, depress the foot pedal down to the middle position for at least 2.5 seconds. After the buzzer has sounded 3 times the clamp will start to close. Once the closure process is complete, the clamp is released again.

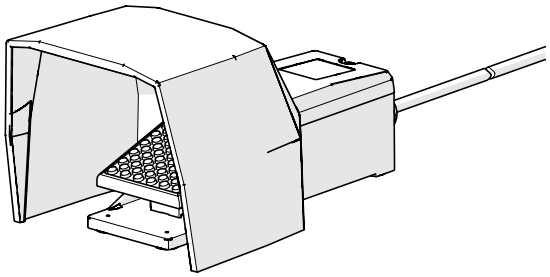


Fig. 48: *Foot pedal*

6.8 Special operating modes (password-protected)

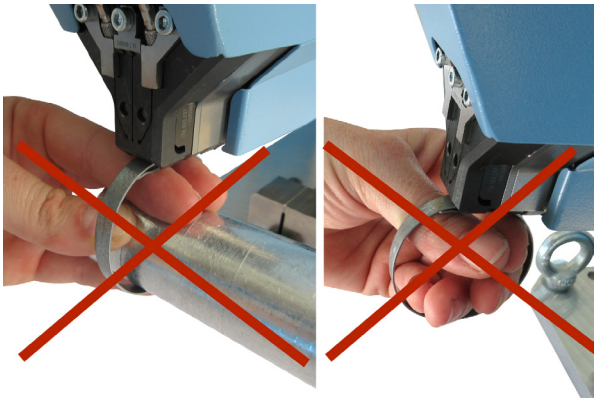
These operating modes are not intended for closing clamps, instead they are only for testing the positions and forces during maintenance and repair work, and for quality assurance.

WARNING

Crush hazard at the WingGuard® strap clamp.

When the functions described below are triggered, fingers may be crushed by the WingGuard® strap clamp.

- When starting functions, keep your fingers away from the clamp.



WARNING

Crush hazard at moving parts.

- Use the FAST 3000 only when all covers are correctly fitted. and bolted into place.

WARNING

Hazard due to positioning the hands under the installation tool.

- Never reach under the installation tool while it is in operation.

CAUTION

Danger due to parts being flung from the machine.

If parts fracture while the machine is in during operation, parts may become loose and be flung from the machine.

- During operation and maintenance of the machine, always wear safety glasses.

6.8.1 Deblocking

NOTICE

In certain situations, tool initialization cannot be performed since it might lead to mechanical damage.

▶ Use the unlocking function of the FAST 3000 only when tool initialization cannot be performed.

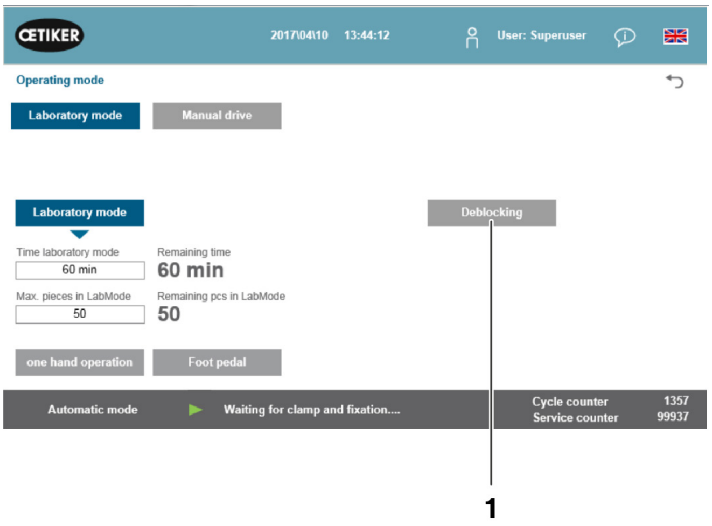


Fig. 49: *Deblocking*

1. Switch to the “operating mode” tab.
2. If the emergency stop button was activated, deactivate it.
3. Press the"Deblocking" button (1).
   The strap of the WingGuard® strap clamp will now be cut off by the FAST 3000, but not crimped. The residual piece of strap is discarded.
4. Press the blue “initializing” button on the two-hand control desk.

The tool is now ready for operation.

6.8.2 “Manual Drive” Operation

NOTICE

Possible damage to the FAST 3000

Inn this mode the overload protection function of the crimping cut-off head is not active.

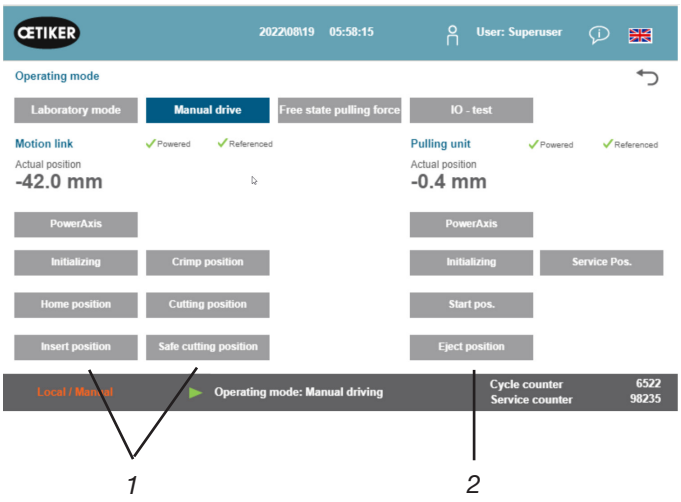


Fig. 50: *Drive manually*

1. Activating operating mode.
   - Switch to “operating mode” and activate “manual drive”.
   - In order to access manual drive mode you must be logged in as Superuser.
2. Control the drives by pressing one of the pre-defined positions (1, 2). For further Information see Section *7.4.3*.

6.8.3 Setting the force offset to zero

NOTICE

Under various conditions the force measured by the force load cell in the clamping unit can vary due to changes in temperature. To compensate for this you can set the measured to zero when there is no force measured by the unloaded force load cell. If the value is found to deviate from zero by more than 20 N, we recommend that the force offset is set to zero. We recommend that the force offset is checked every week.

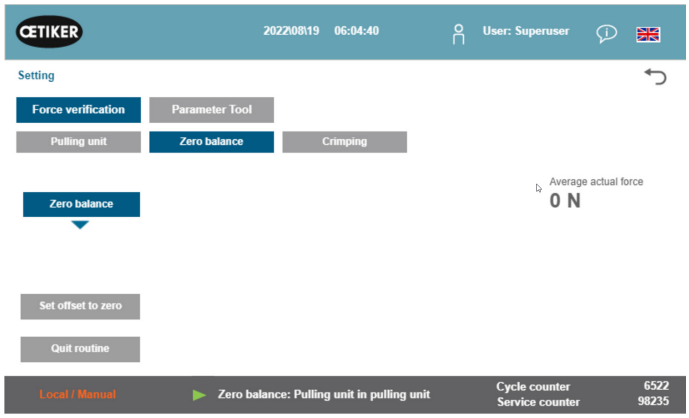


Fig. 51: *Zero adjustment*

1. Switch to the “Settings” tab.
   – In order to access the zero offset tab you must at least be logged in as Operator.
2. Select “Force verification” and “Zero balance“

► Start the procedure by pressing “Zero balance”.
   – The tool will move so that the force load cell is unloaded.

The “Actual force average value” indicates the force actually measured. If you wish compensate an existing offset, press “Set offset to zero”.

► Press “Quit routine”
   – The tool returns to the starting position.

For further information see Section *7.4.7.*

6.8.4 Verifying the pulling force

NOTICE

To verify the correct operation of the load cell, verify the measured force at least once a week with an Oetiker CAL 01. At a set force of 1850 N, the force measured by the OETIKER CAL 01 must be within a tolerance of ± 50 N.
The pull strap must be replaced after approx. 50 verifications.

Setting the CAL 01: SKS mode: hold-ME-EL / average (see operating manual OETIKER FAST 3000)

1. Activate the verification.
   - Switch to the “Settings” tab.
   - In order to access force verification mode you must be at least logged in as Operator.
2. Press the “Force verification” button.
3. Press the “pulling unit” button.
4. Press the “Force verification” button.

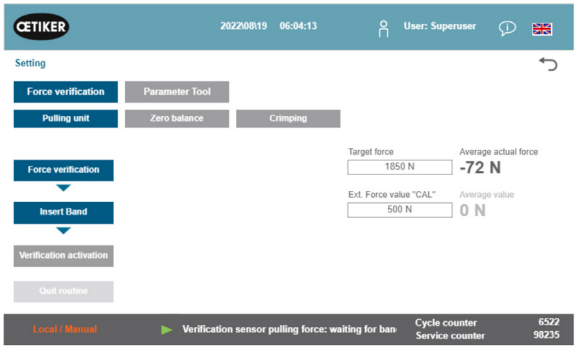


Fig. 52: *Verify traction*

Insert the closing force verification unit (1).

1. Pull the locking hook (2) backwards.
2. Insert the end of the pull strap completely into the crimping cut-off head.
3. Engage the locking hook (2) and then release it.

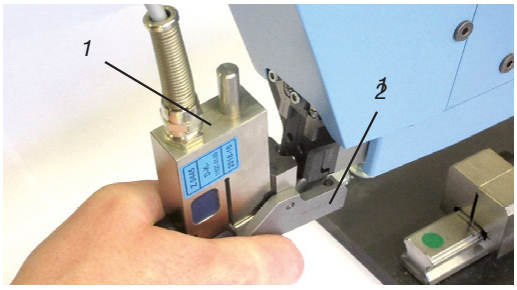


Fig. 53: *SKS Tensile force sensor*

The cams of the verification unit must be correctly positioned in the holes of the crimping cut-off head. The locking hook must be engaged.

Positioning of the locking hook - ok

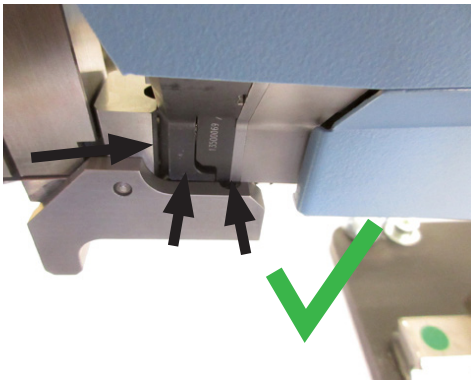


Fig. 54: *SKS Correct positioning traction sensor*

Positioning of the locking hook - incorrect

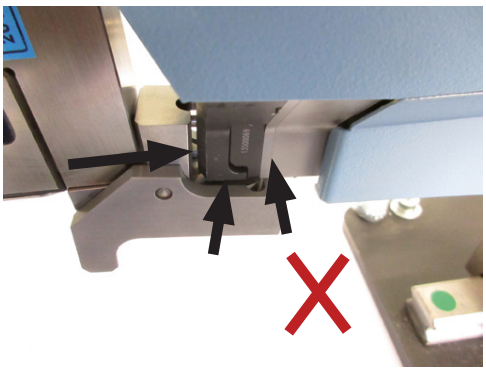
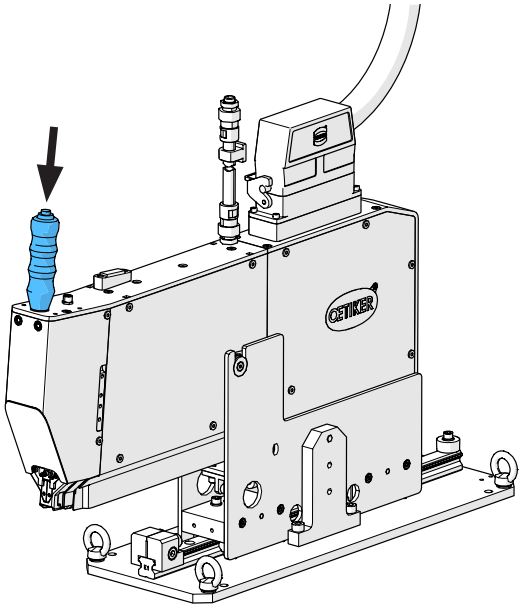


Fig. 55: *SKS Incorrect positioning tensile force sensor*

4. Press the button at the top of the handle.



5. Press on “Target force” to change the verification force to the desired value.
6. Press on “Verification activation”.
7. Input the force measured by the CAL 01 into the “Ext. force value “CAL“) field. The value that is input will be saved in the verification log.
8. Press “Quit routine”
   The values are written to the relevant log file.
9. Remove verification unit from the tool.
10. If the force measured by the CAL 01 is outside the tolerance, refer to Section *see section 9.5* for what to do next.

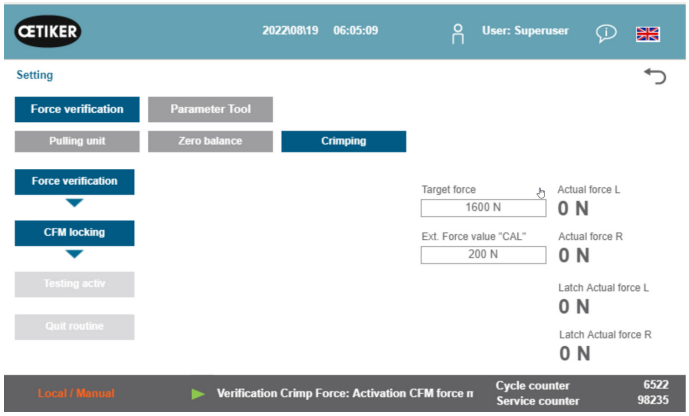
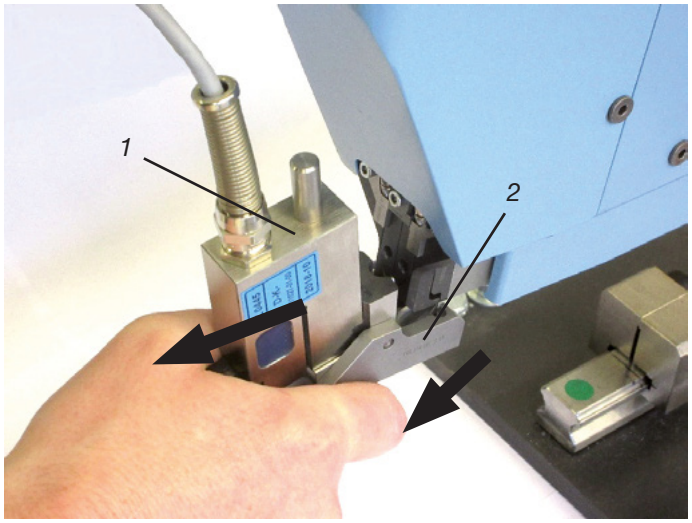


Fig. 56: *Verification traction*

Removing the closing force verification unit (1)

1. Pull the locking hook (2) backwards.
2. Pull the verification unit (1) out of the crimping cut-off head.



6.8.5 Verifying the crimping force monitoring

NOTICE

To check the correct operation of the CFM force load cell, we recommend that the measured force is verified at least once a week, using an Oetiker CAL 01.
If the force is set to 1600 N, the force measured by the CAL 01 must be within a tolerance of ± 50 N of that value.

Setting the CAL 01: SKS mode: hold-ME-EL / average (see Section *7.4.7)*

NOTICE

During the verification, do not hold the SKS firmly in the hand, since this can corrupt the measured result.

1. Activate the force verification.

▶ Switch to the “Settings” tab.

▶ In order to access CFM force verification mode you must at least be logged in as Operator.

2. Press the “Force verification” button.
3. Press the “Crimping” button.
4. Press the “Force verification” button.

Fig. 57: *Verification crimping force*

5. Set the “force target value" to the desired value, e.g. 1600 N +/- 50 N.
6. Position the SKS 01 with the correctly installed CFM verification jaws (use only the CFM-Verification-Jaw-Kit, 13500237) under the crimping cut-off head, as shown in the photo on the right.
7. Press the strap locking button on the handle, keeping the SKS01 in this position.
8. Keep the SKS 01 in this position until the CFM measured force achieves the force target value. After a few seconds, the SKS 01 will be released.
9. Input the force measured by the CAL 01 into the “Ext. force value “CAL“) field. The value that is input will be saved in the verification log.
10. Press “Quit routine” The values are written to the relevant log file.

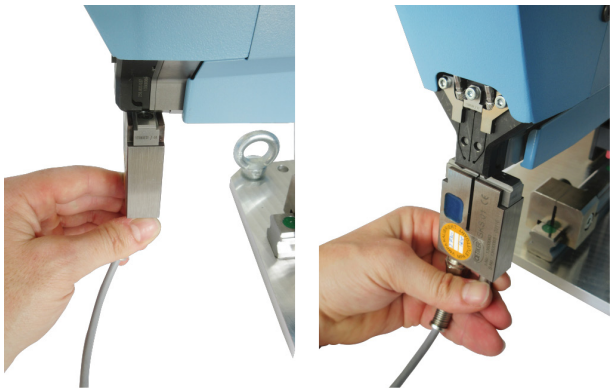


Fig. 58: *Positioning SKS crimping force*

6.8.6 Adjusting the crimping force monitoring

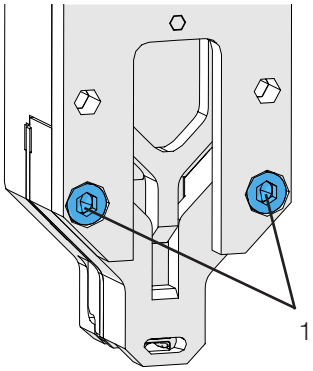
NOTICE

The definition of the envelope curves for the crimping force monitoring devices is based on the force curve of the Wing-Guard® strap clamps for various different clamps, clamp straps and batches of steel. It is therefore recommended to use the factory settings for as long as possible so as to avoid faults in material due to differing melt batches.

NOTICE

Before making any adjustments, make sure that there is no problem apart from the clamp batch. This is done by the following tests:

- Visual inspection of the crimping jaws. No chips or visible wear.
- Check the tightening torque of the two marked screws (1): Target 7–9 Nm.
- Remove the crimping force sensors; check to see that the area where they are mounted is free from particles. Reinstall the sensors.
- Measure the distance between the crimping jaws: Target 3 ±0.1 mm (*see section 9.2.5*).
- Check the CFM correlation factor: On both CFM devices perform Setup / Global / Channel-Y /Channel-Y / Right arrow. The sensitivity should be about -1.2 pC/N.



- Check the crimping force (see Section *5.2.1*).
- Set the crimp closing force in Newtons: 800 N
- Use the closing force verification unit to check the closing force (see Section *6.8.4*).
- Check the positioning of the FAST 3000 installation tool (12 o'clock position) (see Section *6.5*).

For EO 2, the second envelope curve, it is strongly recommended to use a smaller value for DY, such as 180.

It is likely that, due to variations of the WingGuard®strap clamp, after a while these adapted curves lead once again to an increased rate of NOK closures in production. In this case, check first if the standard settings work well:

A backup of the standard settings can be found on the monitoring devices under MP15, measurement program 15.

- Use the copy and paste function on the CFM devices.

NOTICE

If the closing force deviates from the factory setting of 1850 N you may have to teach new reference curves.

Teaching the crimping force monitoring

Each monitoring device must be set separately.

1. Select “Settings” and “Parameter Tool” on the FAST 3000 touch panel.
   Select “CFM Teaching mode”.
   In order to access CFM Teaching mode you must be logged in as Superuser.

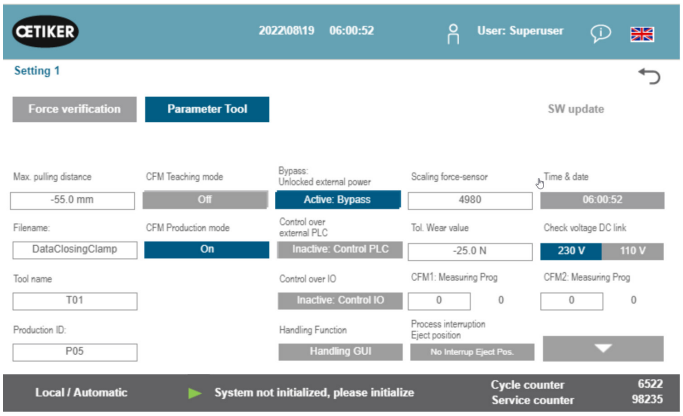


Fig. 59: *Setting parameters*

Separately on each of the two crimping force monitoring devices:

2. Select “Setup” on the welcome screen.
3. Log in as Superuser (password-protected).
4. Select “MP Setup”.

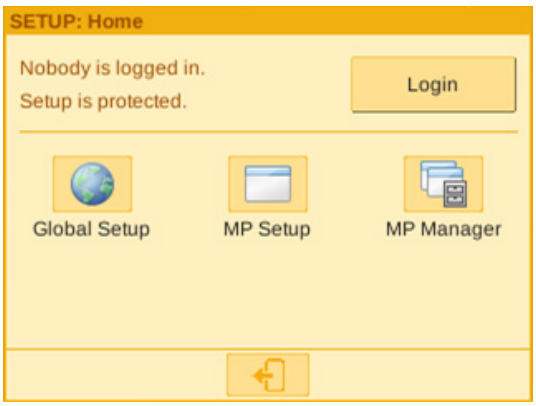


Fig. 60: *Login CFM*

5. Select MP-00.

Fig. 61: *Measuring program*

6. Select “Evaluation”.

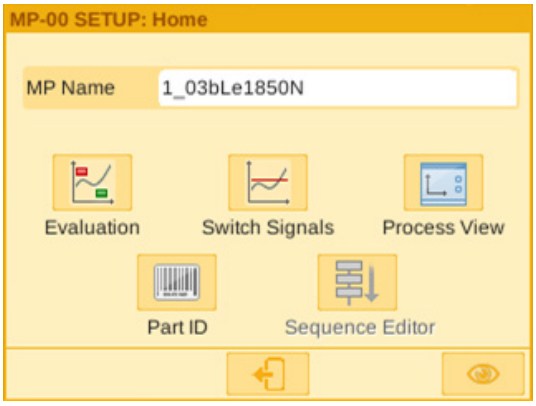
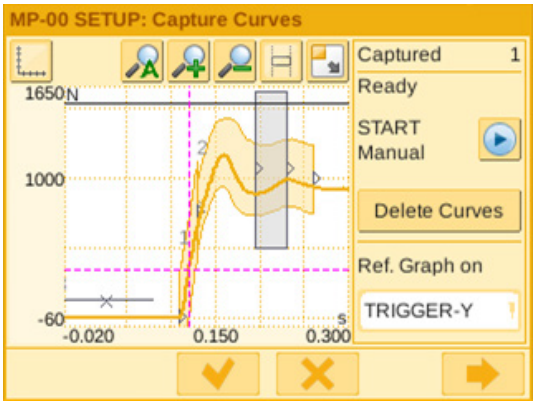


Fig. 62: *Evaluation criteria*

7. If the message “Retain the curve" appears on the screen, select “No”.
   Select “Delete curve”.
8. Close a WingGuard® strap clamp.



9. If the WingGuard® strap clamp closes correctly, press “Yes”, otherwise press “No”.
10. Repeat steps 11 and 12 four times, in order to record at least five OK reference curves.
11. Select the button “Forwards” .

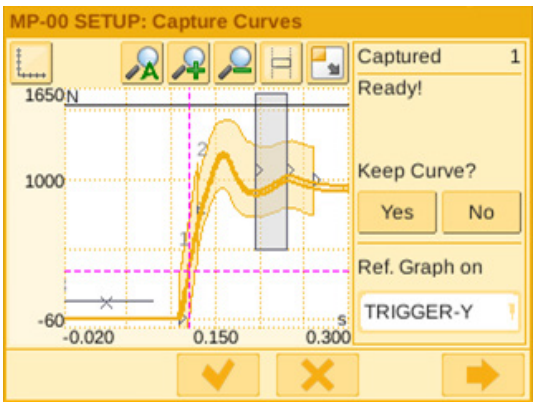
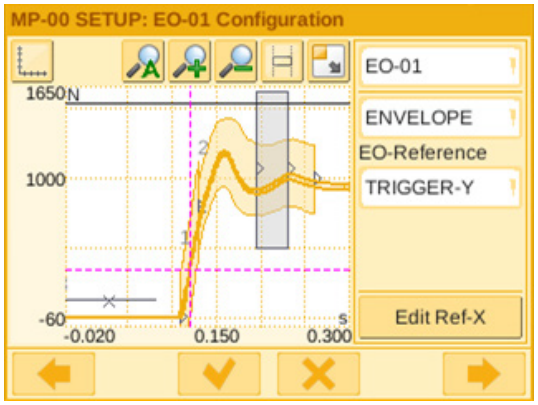


Fig. 63: *Envelopes*

12. Select the EO that you wish to change (01 or 02 for the envelope curves).
13. Select the button “Forwards”  .
14. If necessary, adjust the evaluation tolerance by editing DY.
15. Select “Recalculate”.



16. If necessary, repeat steps 14 to 17 for further Eos (use the “Back” button  to select a different EO).
17. Confirm the new settings by pressing the check  .
18. Press the button  twice to return to the welcome screen.
19. After the teaching process, deactivate the mode again. If this is not done, the relevant pop-pup window will appear periodically.
20. On the touch panel of the FAST 3000: Be sure to set “CFM Production mode” to “On”.
21. Log out of the FAST 3000 and also log out of the crimping force monitoring devices as Superuser.

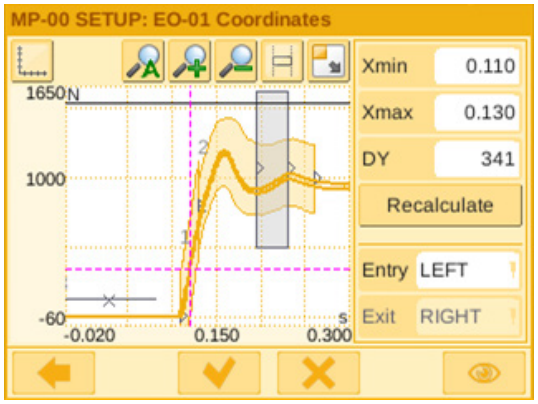


Fig. 64: *Envelopes*

Adjusting the crimping force monitoring tolerance

Each monitoring device must be set separately.

1. Select “Setup” on the welcome screen.
2. Log in as Superuser (password-protected).

Fig. 65: *Measuring program*

3. Select “MP Setup”.
4. Select MP-00.
5. Select “Evaluation”.

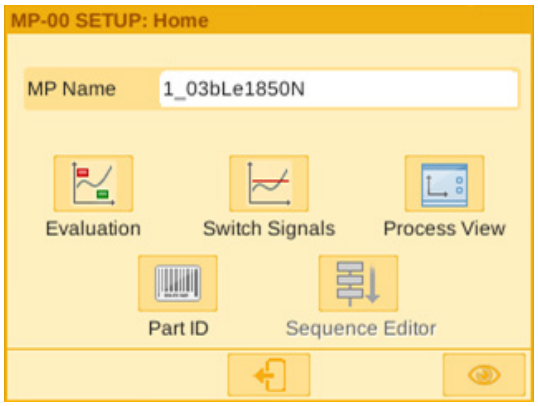


Fig. 66: *Criteria*

6. Select the button “Forwards”  .

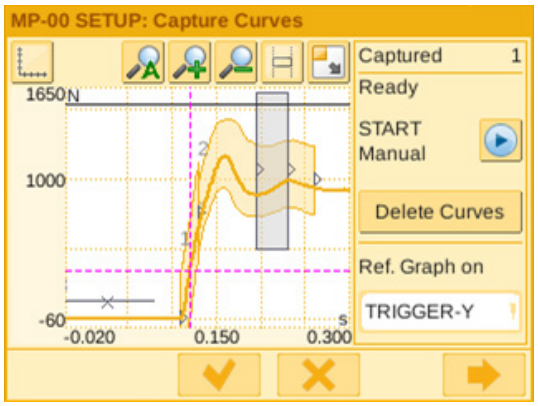
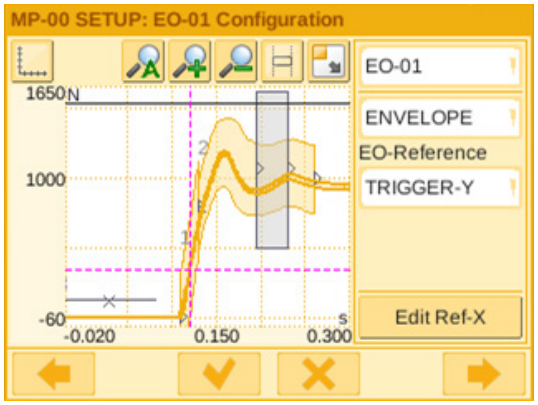


Fig. 67: *Envelope*

7. Select the EO that you wish to change (01 or 02 for the envelope curves).
8. Select the button “Forwards”  .



9. Adjust the evaluation tolerance by editing DY.
10. Select “Recalculate”.
11. If necessary, repeat steps 7 to 10 for further EOs (use the “Back” button  to select a different EO).
12. Confirm the new settings by pressing the check  . Press the button  twice to return to the welcome screen.

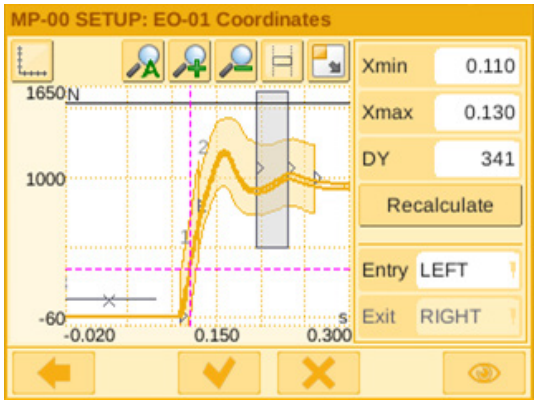


Fig. 68: *Envelope*

6.8.7 Changing the measurement program

The active measurement program is always measurement program 0!
The measurement program must be configured individually for each monitoring device.

NOTICE

The purpose of the measurement program 0 is to evaluate the closing force curves.
A backup is saved under measurement program 15.

1. Press the emergency stop-button.
2. Select “Setup” on the welcome screen.
3. Log in as Superuser (password-protected).

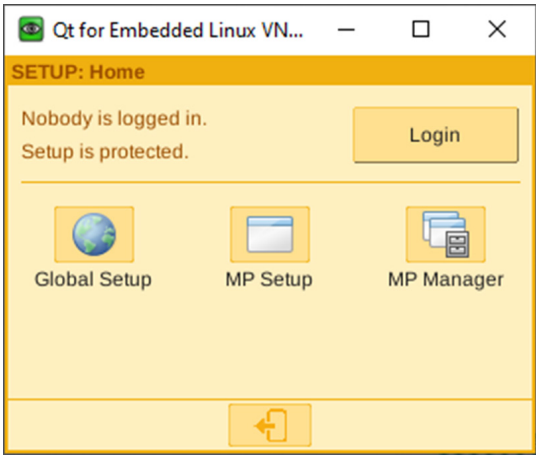


Fig. 69: Login

4. Select “MP Manager”.
5. Select to the measurement program to be copied:

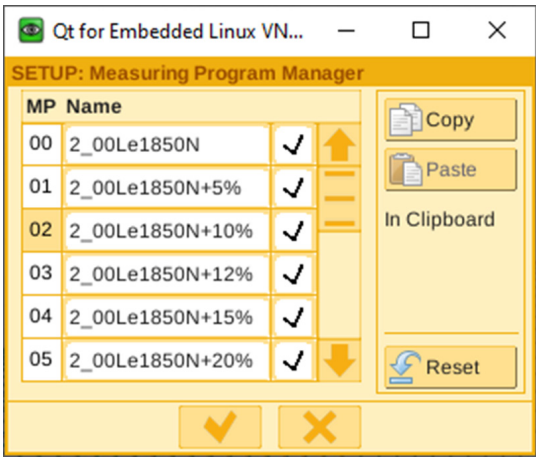


Fig. 70: Measuring programs

6. Press “Copy”.

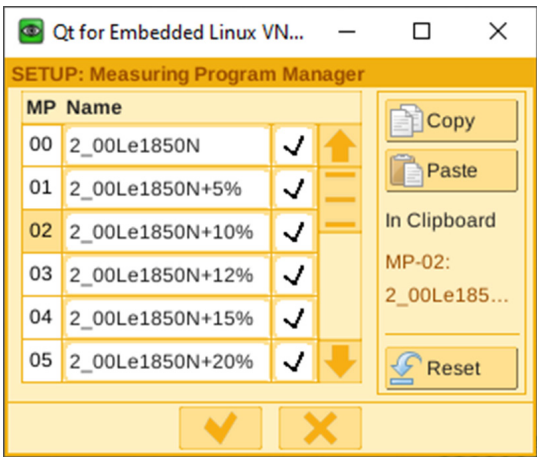


Fig. 71: Measuring programs

7. Select the Measurement program 00.

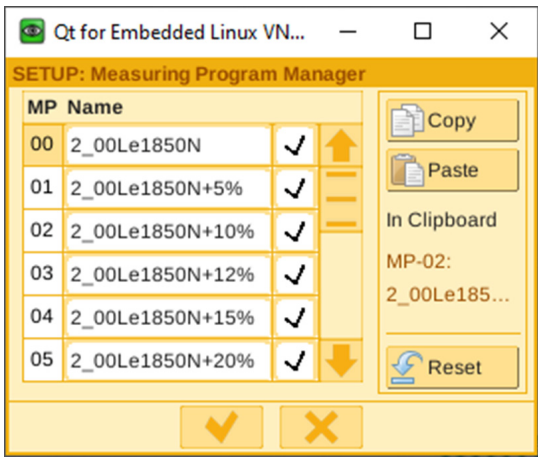


Fig. 72: Measuring programs

8. Select “Insert”.

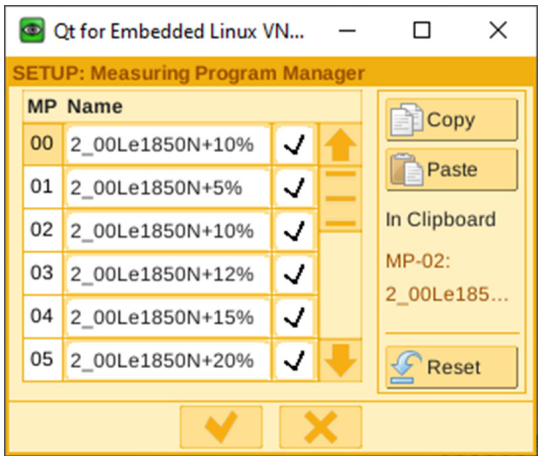


Fig. 73: Measuring programs

9. Confirm the new settings by pressing the check.

10. log out of the monitoring devices.
11. Unlatch the emergency stop button.
12. Initialize the FAST3000.

6.8.8 Loading new settings/measurement programs to the CFM units

NOTICE

If Oetiker recommends an optimized setting of the CFM devices, this setting can be transferred to the CFM devices according to the following procedure.

For communication with the CFM units both participants (PC and device) must be within the same network.

- ✓ A PC must be available for loading settings and programs.
- ✓ The maXYmos software is available. The software is part of the FAST 3000 scope of delivery.
- ✓ The CFM settings file must be available in zip format. The file is provided by Oetiker.
- ✓ An Ethernet cable must be available.

1. Connect the laptop to the CFM device, using a LAN cable. Use the Ethernet port of the CFM device.
2. Start the maXYmos software. The device currently connected is displayed in the list of units (4) on the left, identified with a green dot.
3. If necessary, use the “Languages” tab (1) to change the language settings.
4. Double click on the device and acknowledge to login message.
5. If the connection is not established automatically, proceed as follows:
   - Go to “New device” (2).
   - Enter the network address.
   - Confirm with "OK".
6. Select “Restore” (3), to load new settings to the device.
7. Select the file with the new CFM settings.
8. Select the settings to be loaded on the CFM device and deselect all others. The measuring programs 0 (5) and 15 (6) are activated by default.
9. Confirm the selection with "OK" (7).
   A message acknowledging the input will appear.
10. Confirm the message with OK in order to load the new settings on to the device.

Only on the CFM device for the right-hand side:

11. Select “Setup” (8).

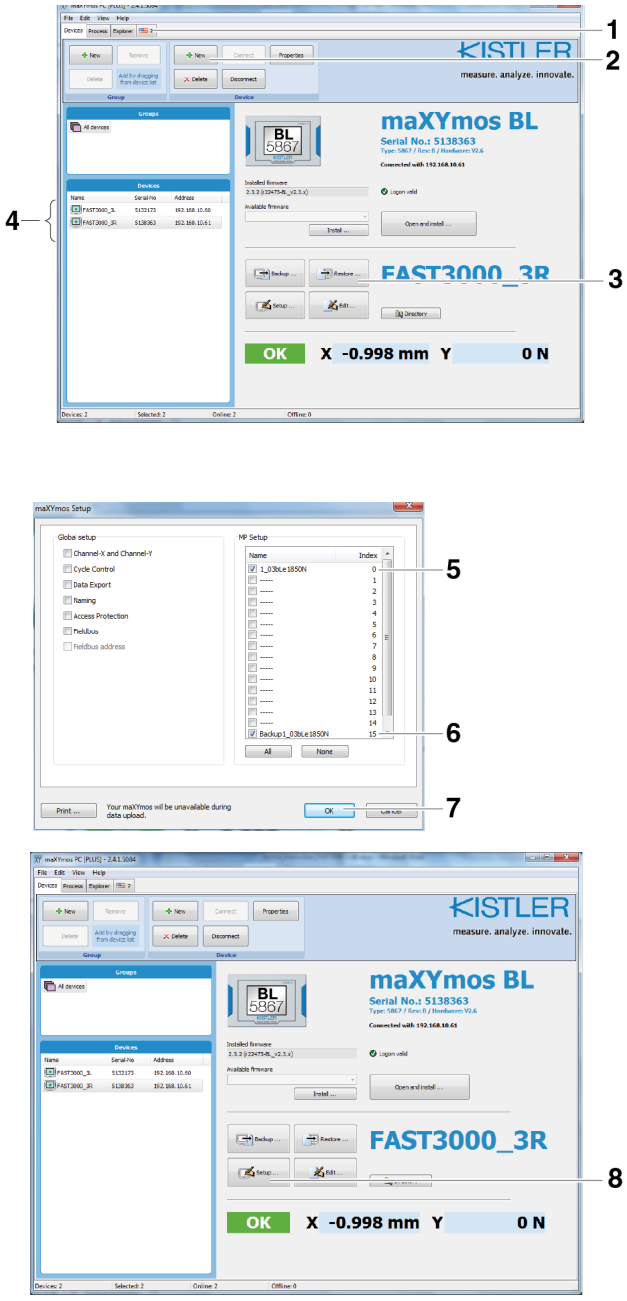
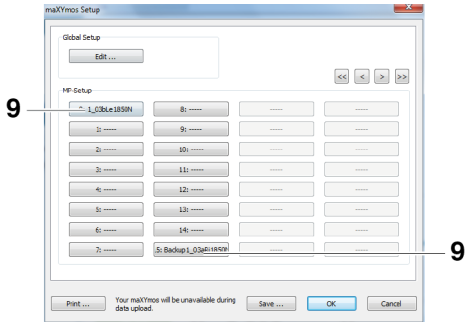


Fig. 74: *Software CFM*

12. Select the measurement programs for which the name are to be changed (9).



13. Switch to the “General” tab (10).
14. Rename the measurement program by replacing “Le” with “Ri” (11).
15. Confirm with OK (12).
    A message acknowledging the input will appear.
16. Confirm the message with OK in order to load the new settings on to the device.

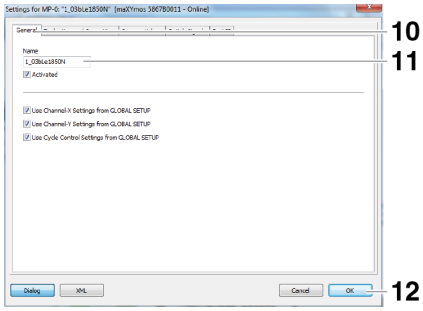


Fig. 75: *Software CFM*

NOTICE

The purpose of the measurement program 0 is to evaluate the closing force curves. A backup is saved under measurement program 15.

7 GUI (Graphical User Interface)

Control and monitoring of the FAST 3000 can be performed either by means of the optional touch panel, a laptop or computer.

WARNING

Danger of starting up unexpectedly

Only one operator control unit may be used for the FAST 3000. For reasons of safety, simultaneous control by the optional touch panel and a computer is not permitted.

7.1 Touch Panel

The available touch panel has software pre-installed. Using this software, all the main functions of the FAST 3000 closure procedures can be controlled and monitored. The output of images and data is the same as for a computer with a web browser.

7.2 Computer

You can connect the FAST 3000 to any standard computer or laptop with a RJ45 network port and a web browser.

1. Go to the settings for your LAN connection and open the TCP/IPv4 settings.
2. Set the IP of your device to the value 192.168.10.xx, default settings for IP addresses:
   - 192.168.10.51 Ethernet Port PAC120 X2 (laptop, Ethernet/IP and touch panel)
   - 192.168.10.40 Touch panel
   - 192.168.10.60 Ethernet Port CFM1
3. Set the subnet mask to the value 255.255.255.0.
4. Then you can input http://192.168.10.51:8080/webvisu.htm into your web browser and access the controller of the FAST 3000. For further Information *see section 10*.

7.3 GUI layout

The main view of the FAST 3000 visualization is as follows:

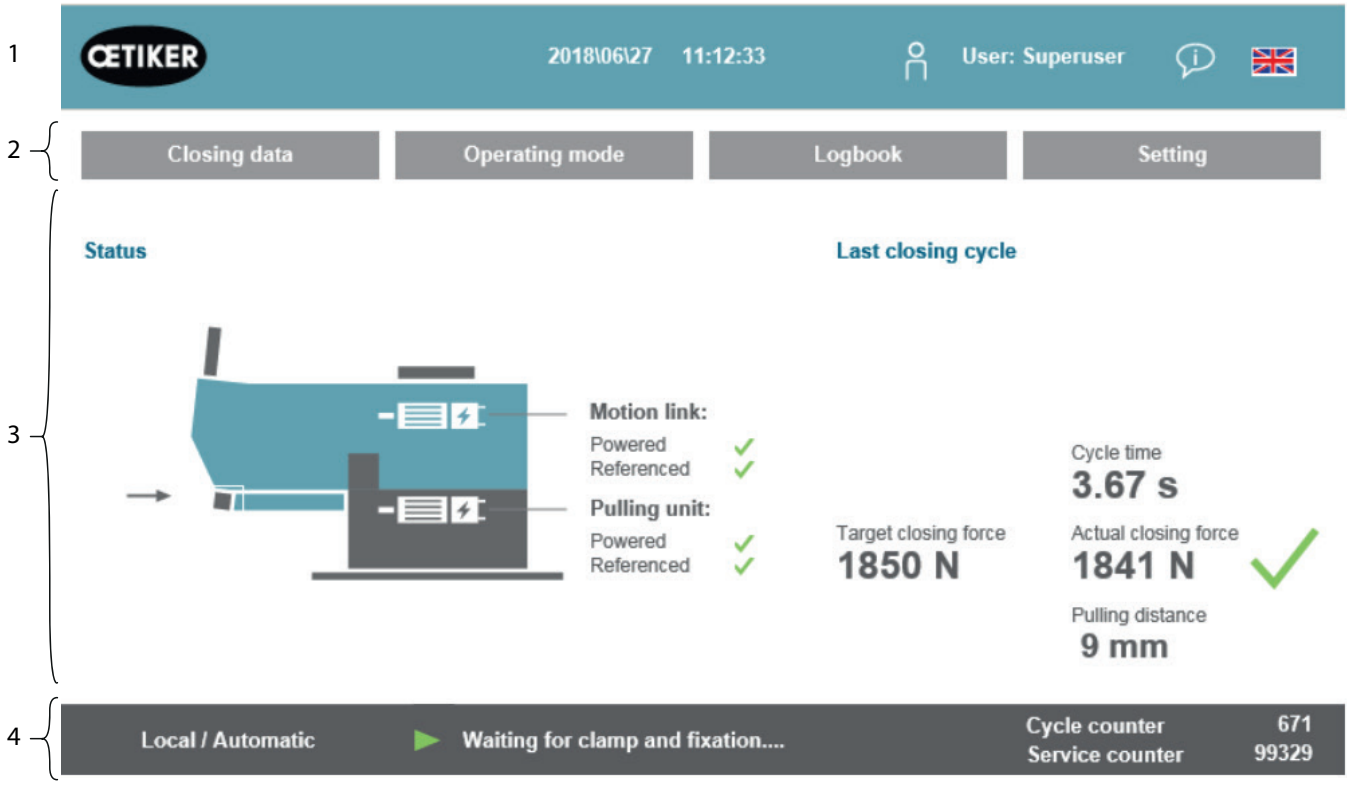


Fig. 76: *Structure GUI*

1. User management / Language selection / Date & Time
2. Tabs
3. Content of the tabs
4. Status bar

7.4 Menu structure

7.4.1 Welcome screen

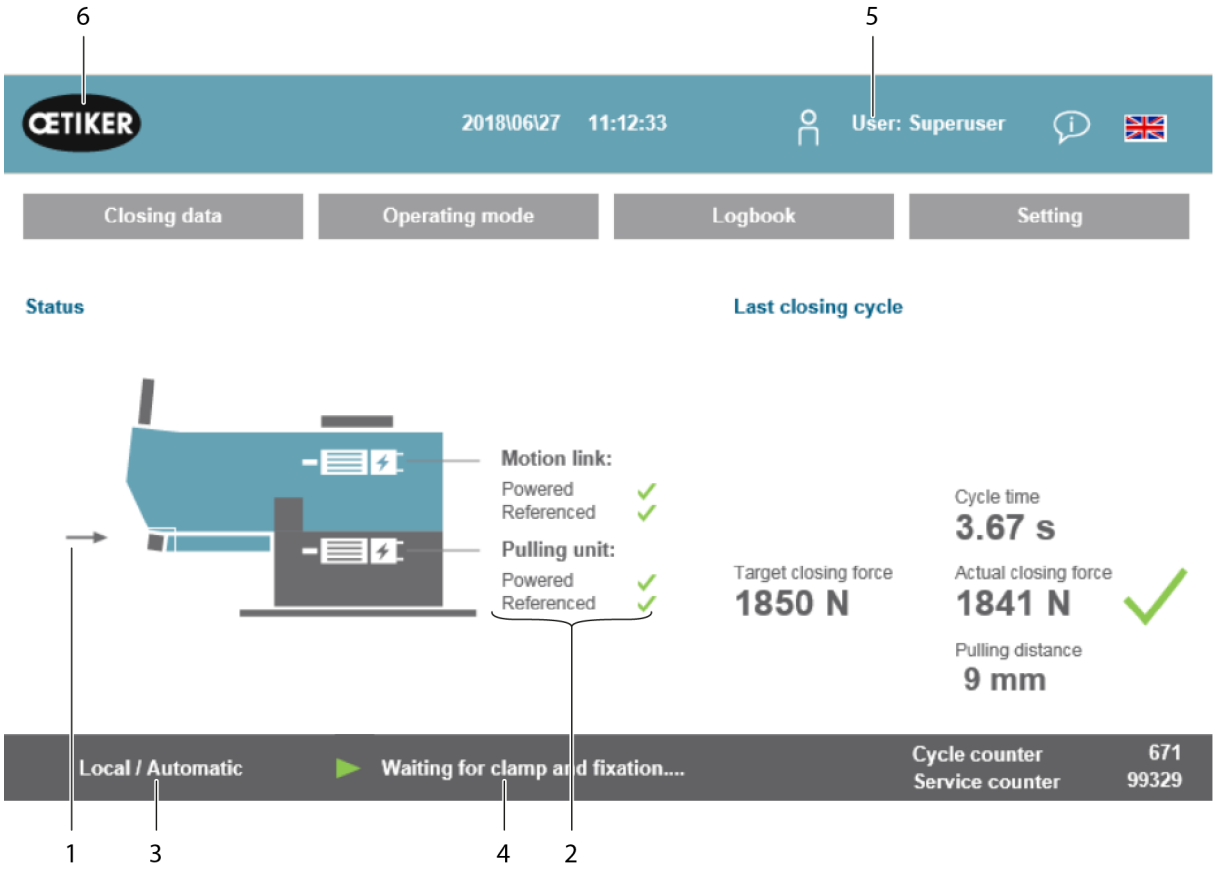


Fig. 77: *Startup image*

1	**- Arrow** **Symbol for the WingGuard® strap clamp**	– No WingGuard® strap clamp present in the FAST 3000 – WingGuard® strap clamp present in the FAST 3000
2	**Status**	Shows the status of the two electrical drives of the FAST 3000
3	**Operating mode**	Automatic mode or manual operation of drives; local or PLC
4	**Messages**	Error messages etc.
5	**User**	Select the user level
6	**Oetiker Symbol**	Press the symbol to log out from a higher user level
7	**Target closing force**	Set closing force in Newtons
8	**Cycle time**	Duration in seconds of the last clamp closure from start to readiness for the next start
9	**Actual closing force**	Force in Newtons applied during the last clamp closure
10	**Pulling distance**	Pulling travel in mm when closing the WingGuard® strap clamp

7.4.2 Closure data (a password is necessary to change the values)

All the settings for the installation of an OETIKER PG270 WingGuard® strap clamp are displayed under the “Closure data” tab. This tab can be accessed without using a password. Provided you are logged in you can change the values.

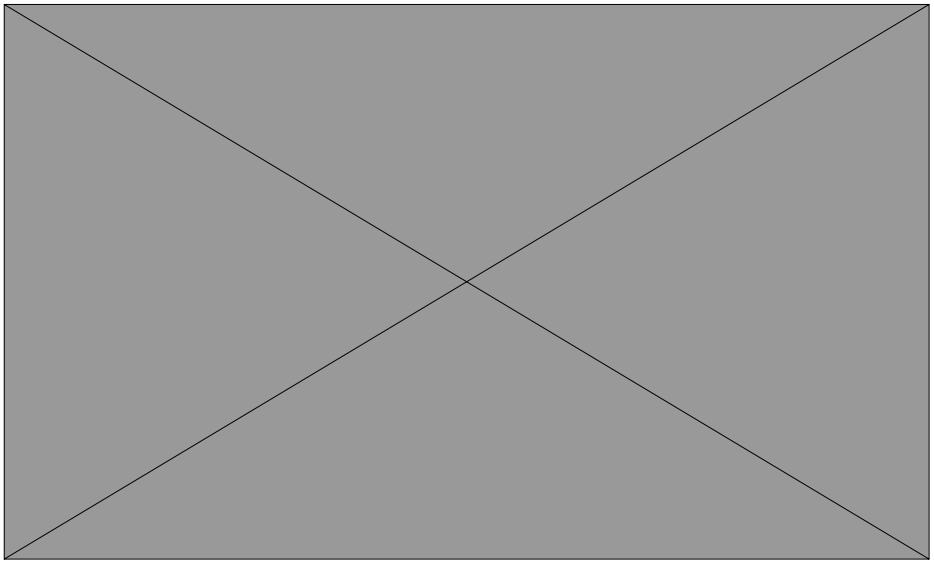


Fig. 78: *Closing process Tractive force curve*

Closing force	Set the closing force in Newtons
Closing force tolerance	Set the closing force tolerance in Newtons
Switch point reduction	The force in Newtons below the set closing force at which the speed is reduced
Speed Phase 1	Speed during the first closing phase in mm/s
Speed Phase 2	Speed during the second closing phase in mm/s
Closing force holding time	Holding time in milliseconds during which the closing force is held within the closing force tolerance
ID	Name of the data record that is displayed
Cycle time	Duration in seconds of the last clamp closure from start to readiness for the next start
Actual closing force	Force in Newtons applied during the last clamp closure
Pulling distance	Pulling travel in mm when closing the WingGuard® strap clamp
Diagram	Shows how the force is/was achieved during closure

7.4.3 Operating mode

The operating mode can be selected using the “Operating mode” tab. The options available are: Normal operation, Laboratory mode, Manual operation and Deblocking function.

Laboratory mode (password-protected)

WARNING

Hazard due to unqualified personnel.

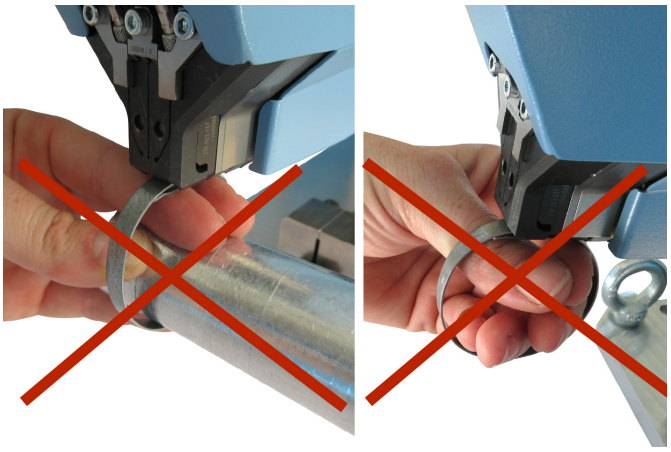
Laboratory mode can be used only under laboratory or test conditions where there is no alternative. The personnel must have been trained to use the FAST 3000 with an increased level of care.

WARNING

Crush hazard at the WingGuard® strap clamp.

When the functions described below are triggered, fingers may be crushed by the WingGuard® strap clamp.

- When starting functions, keep your fingers away from the clamp.



WARNING

Crush hazard at moving parts.
The FAST 3000 may be used only when all covers are correctly fitted and bolted in place.

CAUTION

Hazard due to positioning the hands under the installation tool.
Never reach under the installation tool while it is in operation.

CAUTION

Danger due to parts being flung from the machine.
If parts become defective while the machine is in during operation, parts may become loose and be flung from the machine.

- During operation and maintenance of the machine, always wear safety glasses.

Laboratory mode (password-protected)

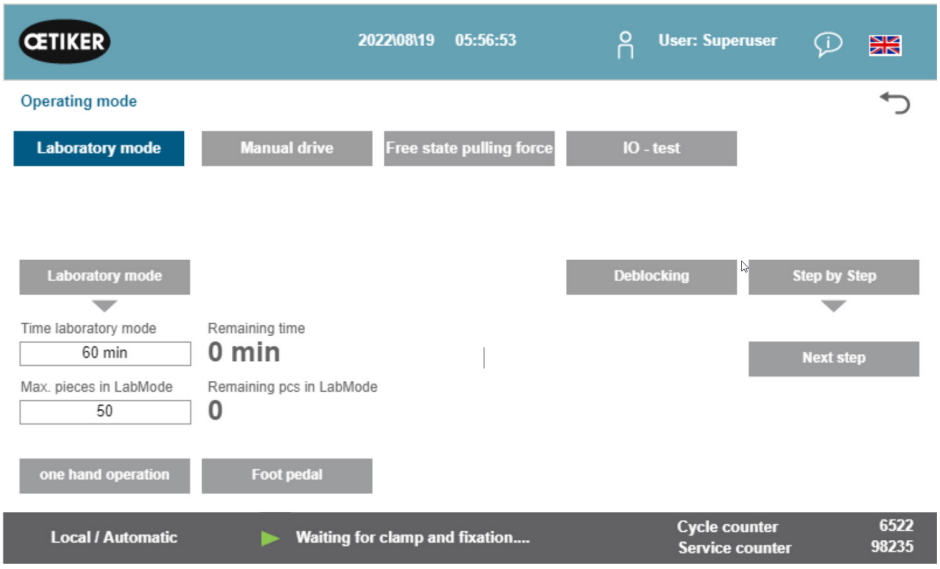


Fig. 79: *Lab mode*

Laboratory mode	Activating and deactivating laboratory mode
Time laboratory mode	Specify the duration in minutes, after which laboratory mode is deactivated automatically
Remaining time [min]	Time remaining until automatic deactivation of laboratory mode
Max. Max. pieces in LabMode	Set the counter to the maximum number of pieces to be closed, after which laboratory mode is deactivated automatically
Remaining pcs in LabMode	Displays the remaining number of closures in laboratory mode
One hand operation	Activate this in order to use one-hand operation in laboratory mode
Foot pedal	Activate this in order to use the foot pedal in laboratory mode

Step by Step mode

Step by step	Activating / deactivating / Step by Step mode
Next Step	Perform the next step (the start of the cycle is triggered by the start signal (2-Hand triggering, industrial communication)

Deblocking (emergency scenario)

Deblocking	Start deblocking (there is no guarantee this will work in every case) • The motion link moves to the safe cutting position • The pulling unit moves to the ejection position

Manual mode (password-protected)

WARNING

Crush hazard at moving parts.

For maintenance work it may be necessary to operate the tool in the operating mode “Manual operation” and without covers. Do this only if you have no alternative, and take the utmost care when doing so.

► On completion, immediately refit the covers.

CAUTION

Hazard due to incorrectly closed clamps.

The “Manual operation” function must not be used for closure of clamps. This operating mode may be used only for troubleshooting.

CAUTION

Damage to the device due to improper use of the manual mode.

► Before each use of the run commands “Crimp position” or “Cutting position” make sure that nothing is between the jaws!

Manual mode (password-protected)

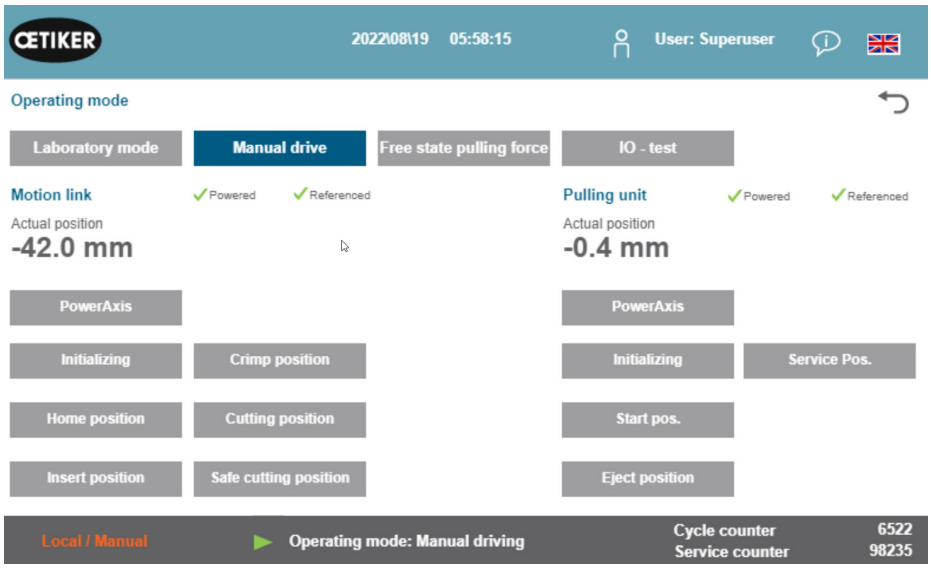


Fig. 80: *Manual driving*

Motion link (left-hand side)

Initializing	Initializing the motion link: Setting the zero point
Starting position	Motion link in the starting position (if there is a WingGuard® strap clamp in the clamping unit, this is secured.)
Insert position	Motion link in the position that allows the clamp to be inserted
Crimp position	Motion link in the crimping position
Cutting position	Motion link in the cutting position
Safe cutting position	Motion link moves directly into the cutting position, skips the crimping position
Actual position	Position of the motion link in millimeters

Pulling unit (right-hand side)

Initializing	Initializing the pulling unit: Setting the zero point
Start position	Pulling unit in the start position
Eject position	Pulling unit in the position that allows the remaining strap to be ejected
Actual position	Position of the pulling unit in millimeters
Service position	Pulling unit in the position that allows the strap sensor to be set

7.4.4 Free state pull force test

NOTICE

The operating mode “Free state pull force test” is available for testing the internal friction of the WingGuard® clamp. To achieve this, the WingGuard® clamp is closed without any strap present, and the maximum no-load closing force is determined.

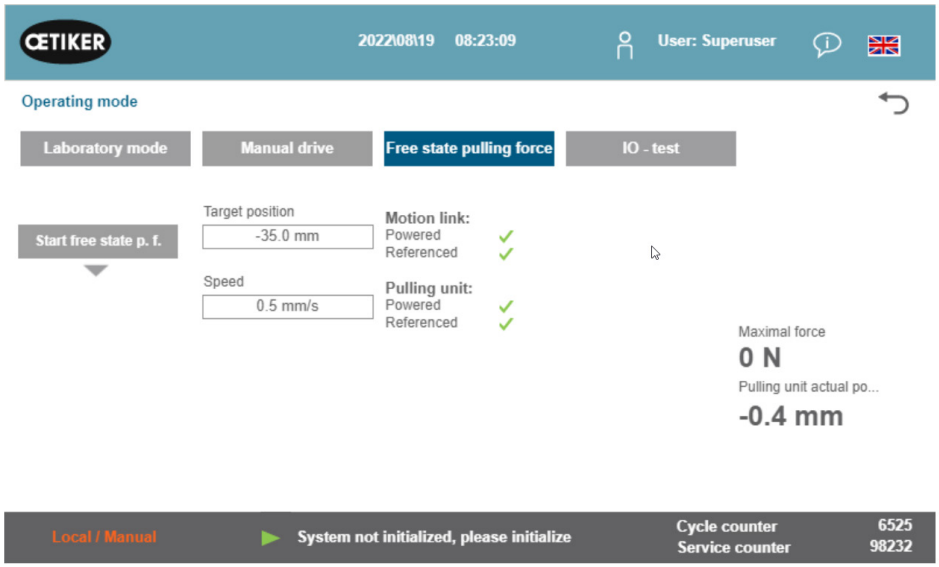


Fig. 81: *Friction test*

Start the friction test (start free state p.f.)	Start of the free state pull force test
Pulling position (target position)	End position of the pulling motor during the friction test
Speed	Speed of the pulling unit during the free state pull force test
Maximum force	Maximum force applied during the free state pull force test
Pulling unit actual position	Position of the pulling unit

Sequence of the free state pull force test

✓ The FAST 3000 must be referenced.

1. Activate the function by pressing the “Start Friction test “Start free state p. f. test” button.
2. Insert the clamp.
3. Fix the clamp by pressing the button on the handle of the tool.
4. Start the test by pressing the start buttons on the two-hand control desk.
   The pulling unit moves at the defined speed towards the end position. The maximum pulling force applied during this time is determined. At the end, the strap is cut off.

7.4.5 I/O test

The purpose of the “I/O Test” menu is to test the basic functions of the inputs to the FAST 3000. The depiction of the individual inputs are distributed across three pages. When the “I/O Test” menu is open, the individual buttons have no further functions.

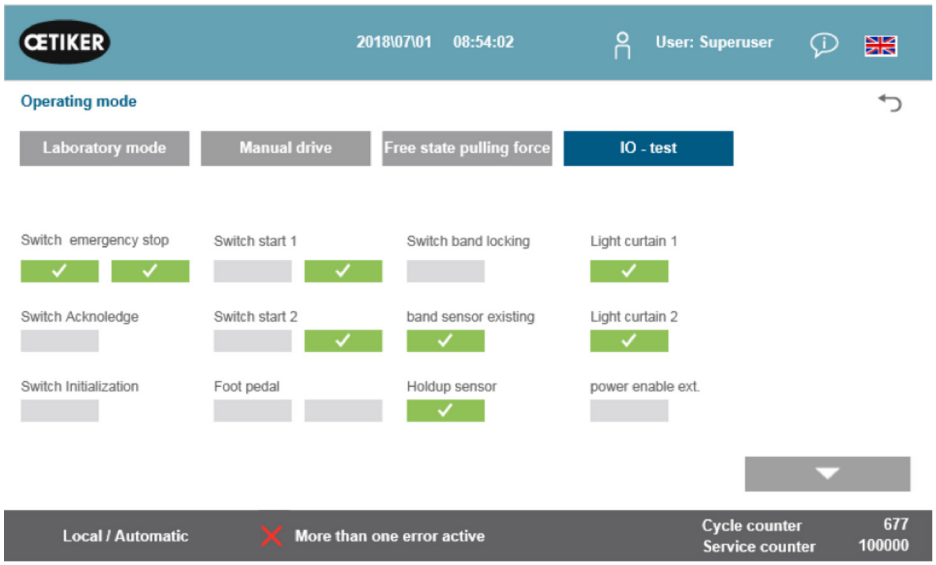


Fig. 82: *IO Test*

Emergency stop switch	Status of the 2-channel emergency stop circuit; two-hand control desk and external emergency stop switch
Acknowledge switch	Red acknowledgement button on the two-hand control desk
Initialization switch	Blue initialization switch on the two-hand control desk
Start switch 1	2-channel start button on the two-hand control desk
Start switch 2	2-channel start button on the two-hand control desk
Foot pedal	2-channel foot pedal
Strap locking switch	Strap locking
Strap present sensor	Clamp present sensor
Holdup sensor	Holdup sensor for monitoring the pulling motor
Light curtain 1	Light curtain
Light curtain 2	Light curtain
External power enable	Provide external power to the servo amplifiers

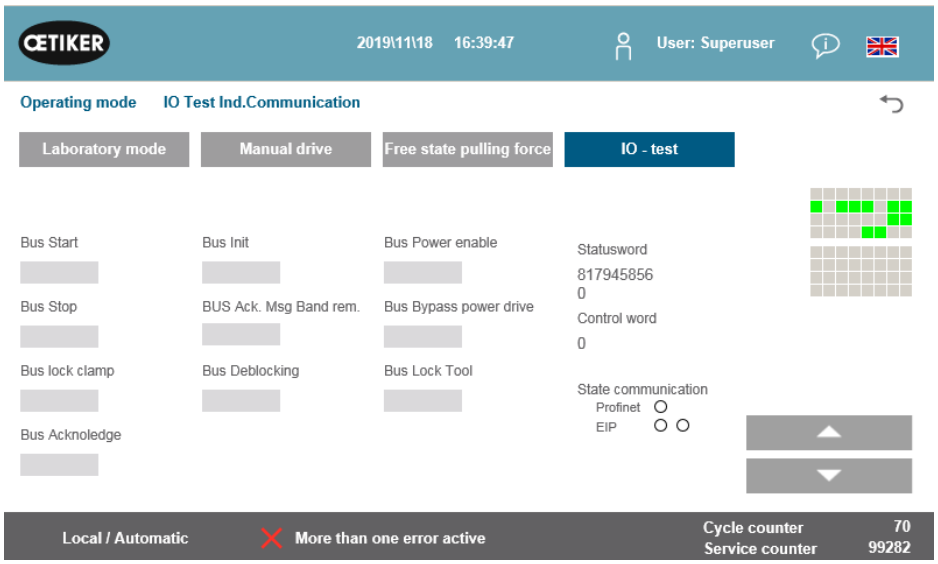
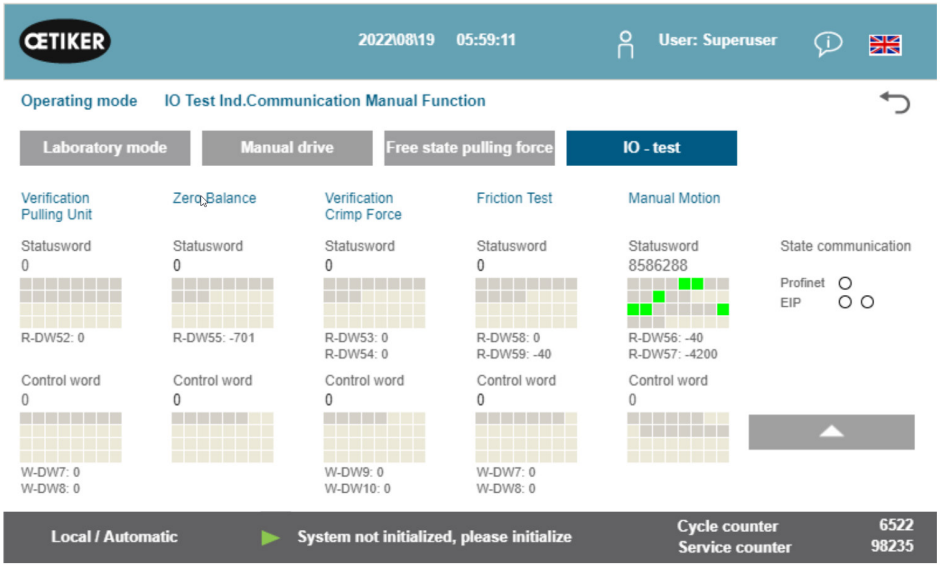


Fig. 83: *IO Test Digital Signals Industrial Communication*

Bus Start	Start command via Profinet or Ethernet/IP	
Bus Stop	Stop command via Profinet or Ethernet/IP	
Bus lock clamp	Locking the clamps via Profinet or Ethernet/IP	
Bus Acknowledge	Acknowledgment of error messages via Profinet or Ethernet/IP	
Bus Init	Initializing via Profinet or Ethernet/IP	
Bus Ack. Msg strap rem.	Acknowledgment of the message “Remove strap” via Profinet or Ethernet/IP	
Bus Power enable	Enable connection of the power supply to the motors from the supervisory system via Profinet or Ethernet/IP	
Bus Bypass power drive	Connection of the power supply to the motors from the supervisory system via Profinet or Ethernet/IP	
Bus Deblocking	Deblocking of the tool via Profinet or Ethernet/IP	
Status word	Status words (status word 1 and status word 2) generated by the tool (32-bit integer value)	
Control word	Control word sent by the external control unit to the FAST 3000	
State communication	Status of the Profinet communication	**Green:** The controls are connected to a supervisory control unit. **White:** The controls are not connected to any other control unit.
	Status of the Ethernet/IP communication	**Green (1):** The controls are connected to a supervisory control unit. **White (1):** The controls are not connected to any other control unit. **Red (2):** There is a communication error. **White (2):** Communications are operating correctly.

IO Test Communication Industrial Network



Signaling display

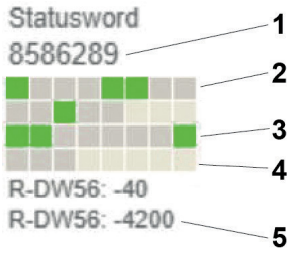


Fig. 84: *IO Test Industrial Communication*

1. Status word
2. Signal inactive
3. Signal active
4. Signal not used
5. Integer value

For every manual function the status word and the control word are displayed as integer values. The status of all bits is also displayed as green or grey.

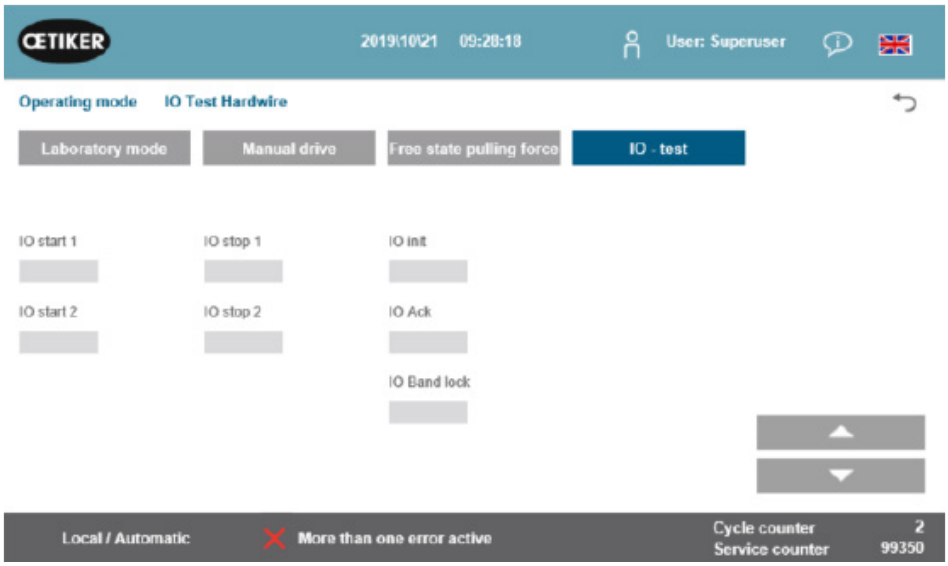


Fig. 85: *IO Test Digital In Output Signals*

I/O start 1	Hardwire I/O start channel 1
I/O start 2	Hardwire I/O start channel 2
I/O stop 1	Hardwire I/O stop channel 1
I/O stop 2	Hardwire I/O stop channel 2
I/O init	Hardwire I/O initializing
I/O Ack	Hardwire I/O acknowledgement
I/O strap lock	Hardwire I/O strap clamp

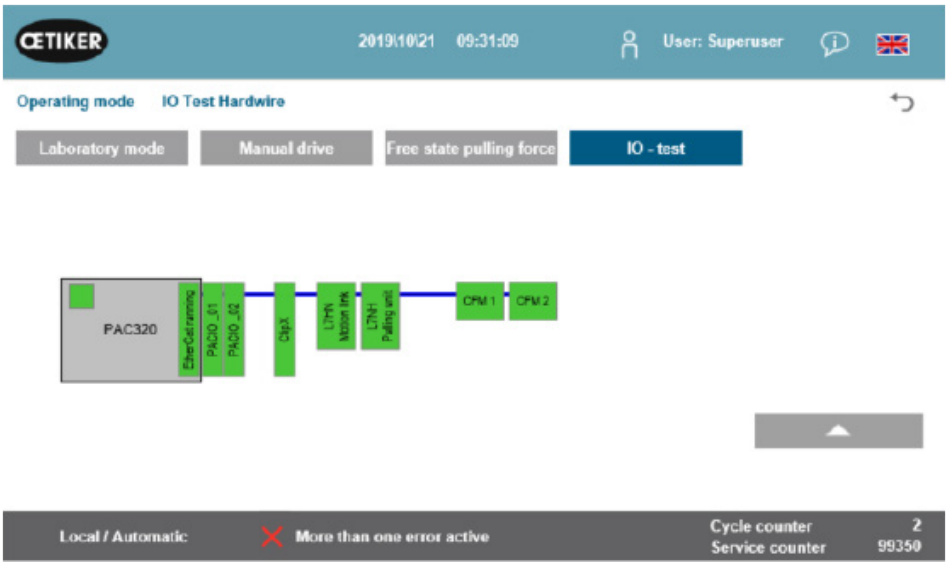


Fig. 86: *Status EtherCAT devices*

EtherCAT running	Green: Bus EtherCAT is running Red: Bus EtherCAT is not running
PACIO_01	Green: IO module1 OK Red: IO module1 fault
PACIO_02	Green: IO module2 OK Red: IO module2 fault
ClipX	Green: ClipX amplifier OK Red: ClipX amplifier fault
L7NH **Motion link**	Green: Servo drive motion link OK Red: Servo drive motion link fault
L7NH **Pulling unit**	Green: Pulling unit servo drive OK Red: Pulling unit servo drive fault
CFM1	Green: CFM1 (1. Kistler device) OK Red: CFM1 (1. Kistler device) fault
CFM2	Green: CFM2 (2. Kistler device) OK Red: CFM2 (2. Kistler device) fault

7.4.6 Logbook

Process log

The data on the most recent clamp closures are shown in the “Data log” tab. This menu can be accessed without using a password.

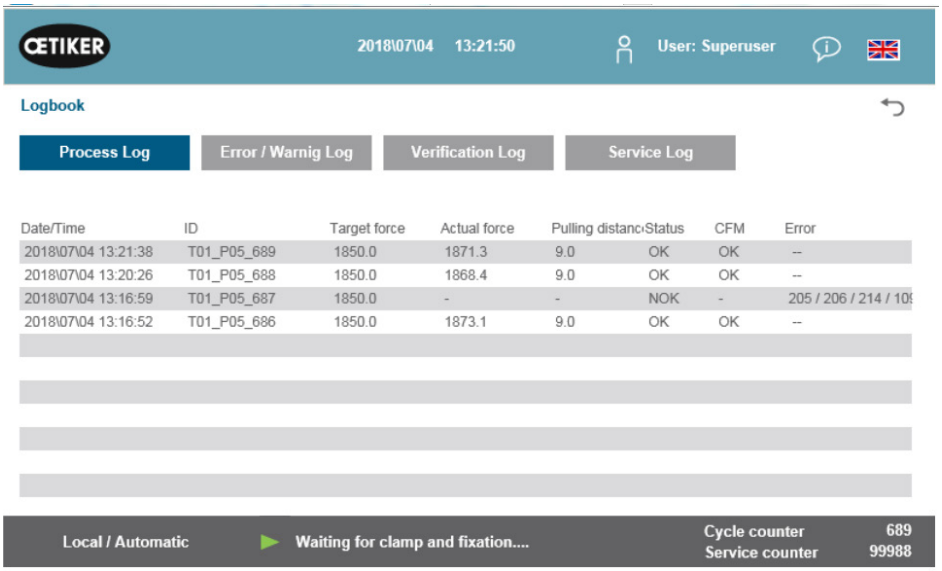


Fig. 87: *LOG process log*

Date/Time	Data and time of the installation
ID	Identification ID of the closure
Target force	Target force value in Newtons
Actual force	Pulling force actual value in Newtons
Pulling distance	Pulling travel in mm when closing the WingGuard® strap clamp
Status	Closing status as viewed by the tool, evaluated by control of the installation tool (OK or not OK) based on pre-defined values
CFM	OK or not OK from the crimping force monitoring. “-”, if the CFM is not in production mode
Error	Error numbers if the closure was not OK; errors are listed by code numbers such as 205 / 206 / 214 /...

Error / warning protocol

The most recent errors of the tool are displayed in the “Error log” tab. This menu can be accessed without using a password.

Fig. 88: *LOG ErrorMessages*

See Sections 7.4.9 and 13.3 for detailed information about the individual error messages.

Alarm management

The alarm management is a list of the errors and warnings. To open the alarm management, click on the information (1) shown in the status bar.

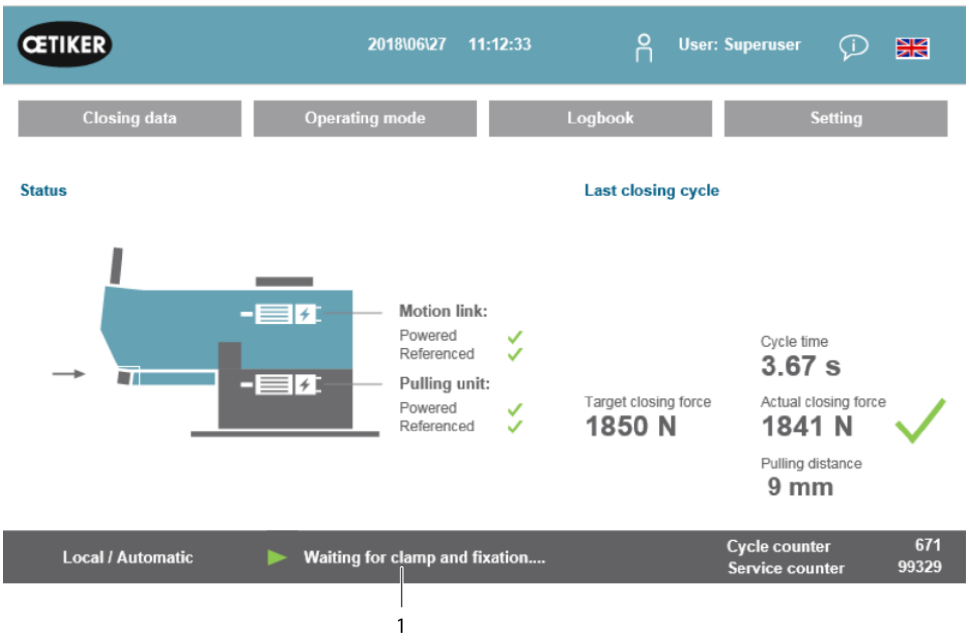


Fig. 89: *GUI Alarmhadling*

If no alarm is active, the screen appears as follows:

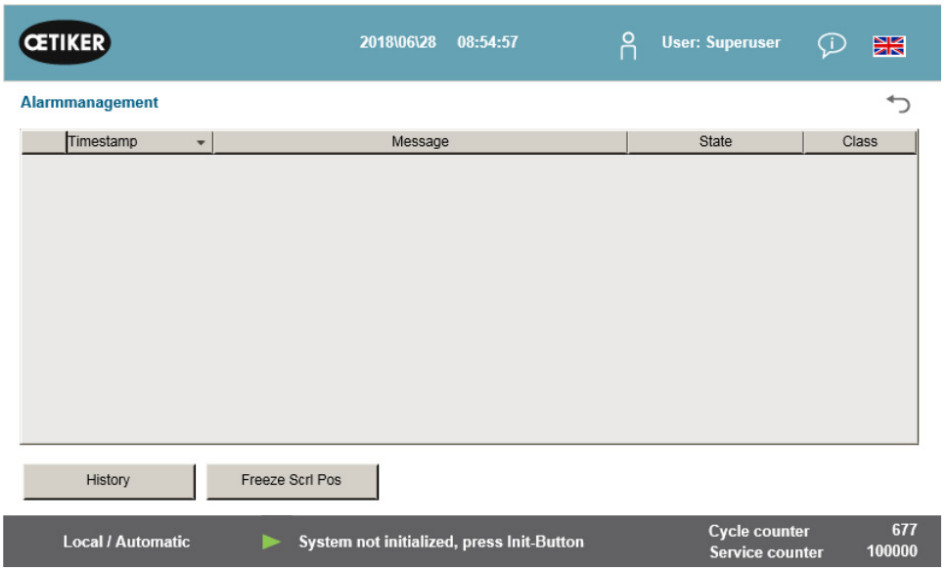


Fig. 90: *GUI alarm history*

If alarms are active, the screen can appear as follows:

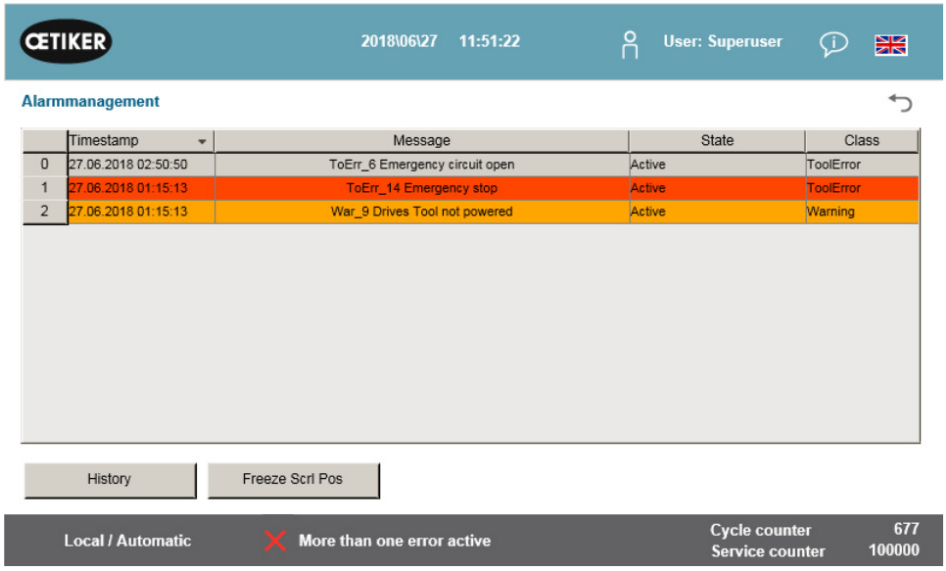


Fig. 91: *GUI Active alarm messages*

If only one alarm is active, the error is shown as a message in the status bar. If several alarms are active, the message “Several errors active” is shown.

Colored:

There are alarms that are active and have not been acknowledged.

Not colored:

There are alarms outstanding which have been acknowledged.

► To acknowledge the alarms, press the Acknowledge button or the Initialization button on the two-hand control desk (if PLC mode is active, the relevant bit must be set).

If you press on the “History” button, a list of past errors and warnings is displayed:

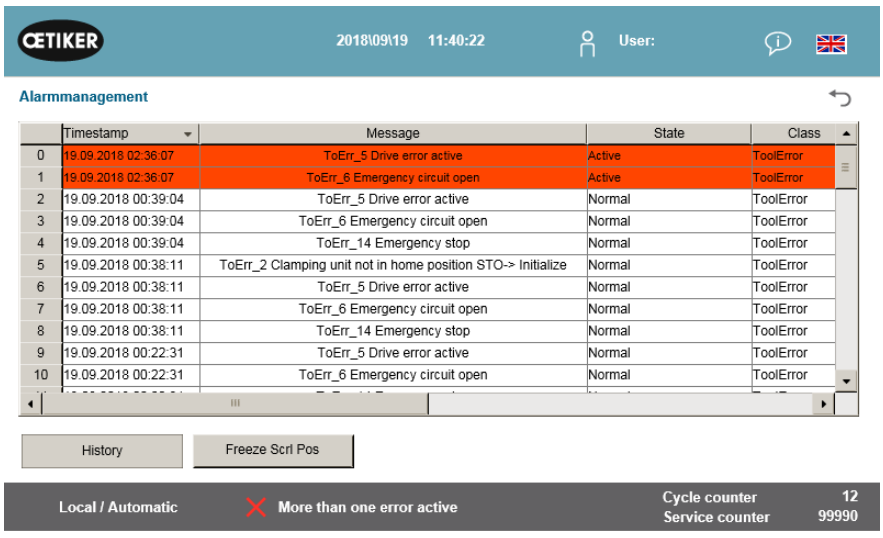


Fig. 92: *GUI alarms*

Verification log

The most recent verification forces are displayed under the “Verification log” tab. This menu can be accessed only by inputting a password.

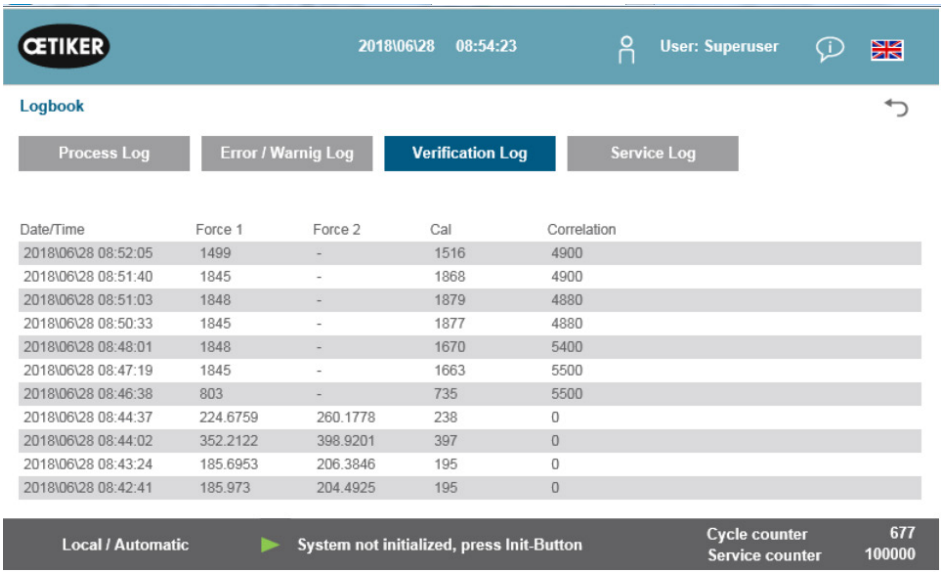


Fig. 93: *LOG Verification entries*

If a value is listed only for force 1, this is a pulling force verification. The scaling factor is listed for the correlation factor to convert the PLC force sensor input signal into the closing force (*see section 9.5.2*).

For the crimping force verification, both forces are listed. The value 0 is shown for the correlation factor, since no correlation exists for the crimping force.

Servicelogbook

In the “Service logbook” the most recently performed Service work / Maintenance work are displayed. This menu can be accessed only by inputting a password.

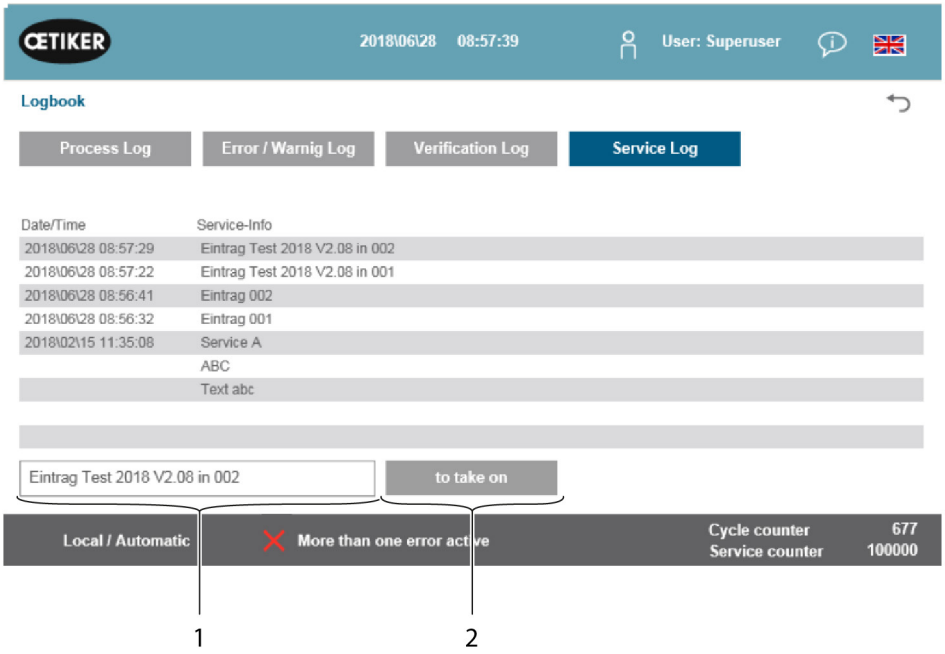


Fig. 94: *Log Service_log*

To create a new service log entry, write the text in the field (1) in the bottom left corner and press “enter” (2).

7.4.7 Settings

Tool Parameters

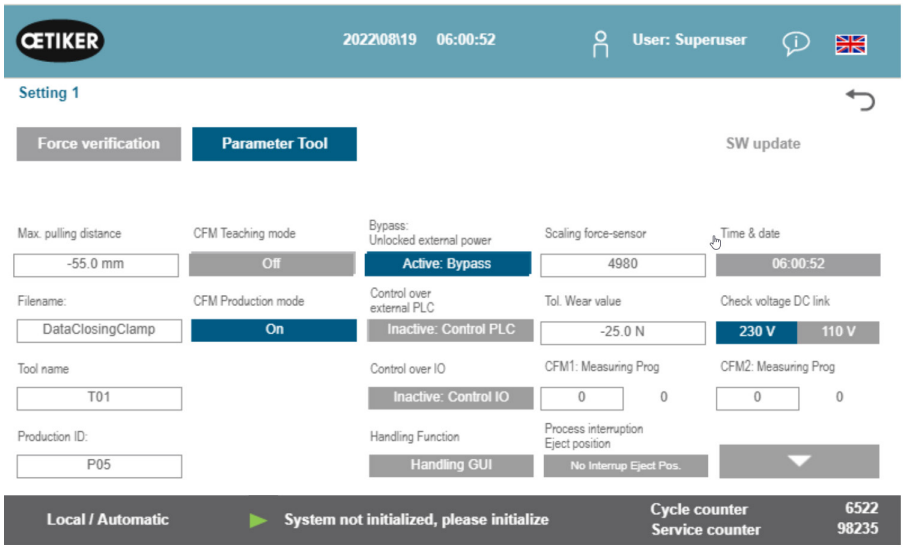


Fig. 95: Settings Tool Page 1

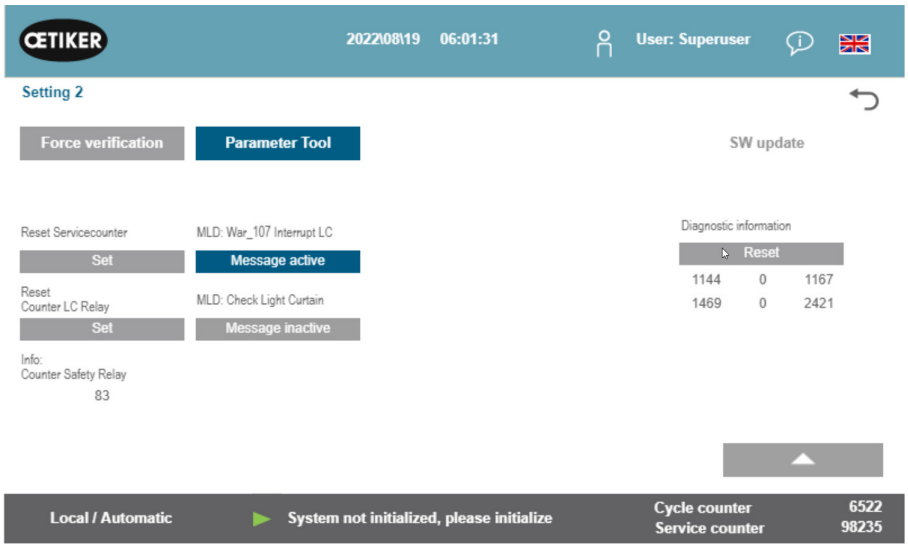


Fig. 96: Settings Tool Page 2

Max. Max. pulling travel	Maximum pulling travel of the clamping unit. The maximum pulling travel limits the maximum diameter reduction of the WingGuard ® clamp.
File name	Name of the data file stored on the USB stick
Tool name	Name of the tool (part of the data record ID)
Production ID (Production ID)	Name of the production batch (part of the data record ID)
CFM Teaching mode	Production mode (the FAST 3000 PLC does not evaluate the output of the CFM monitoring devices)
CFM Production mode	Production mode (the FAST 3000 PLC evaluates the output of the CFM monitoring devices)
Bypass	Bypass the external power unlock signal.
Control via external PLC	Select this button in order to control the FAST 3000 via an external PLC
Operating Function: “Operation by Ext. PLC”	Commands are activated either by the external PLC or local (GUI) for the manual operation (manual drive, pulling unit verification, zero balance, verification crimp force verification, friction test)
Scaling force-sensor	Scaling of the pulling force sensor (the factor should lie between 4750 and 5200)
Tol. Wear value	Limit for the error message of the wear value. See Section 5.2.4
Check voltage DC link: “230V / 110V”	Checks the voltage in the DC-link of the servo amplifier
Time & Date	Setting the date and time
Reset the service counter	Resets the Service counter to zero after a Service
Process Interruption Eject position: “Interrupt Eject Position”	Activation / Deactivation Function: Stop the closing cycle in the eject position and waiting for the enable signal for continue.
CFM1: Measuring Program / CFM2: Measuring program	*Active and Target Program for the CFM; If the industrial communication is active then will be the target from the industrial communication.*

Force verification / Zero offset

NOTICE

Under various conditions the force measured by the force load cell in the clamping unit can vary due to changes in temperature. To compensate for this you can set the measured to zero when there is no force measured by the unloaded force load cell. If the value is found to deviate from zero by more than 20 N, we recommend that the force offset is set to zero. We recommend that the force offset is checked every week (*see section 6.8.3).*

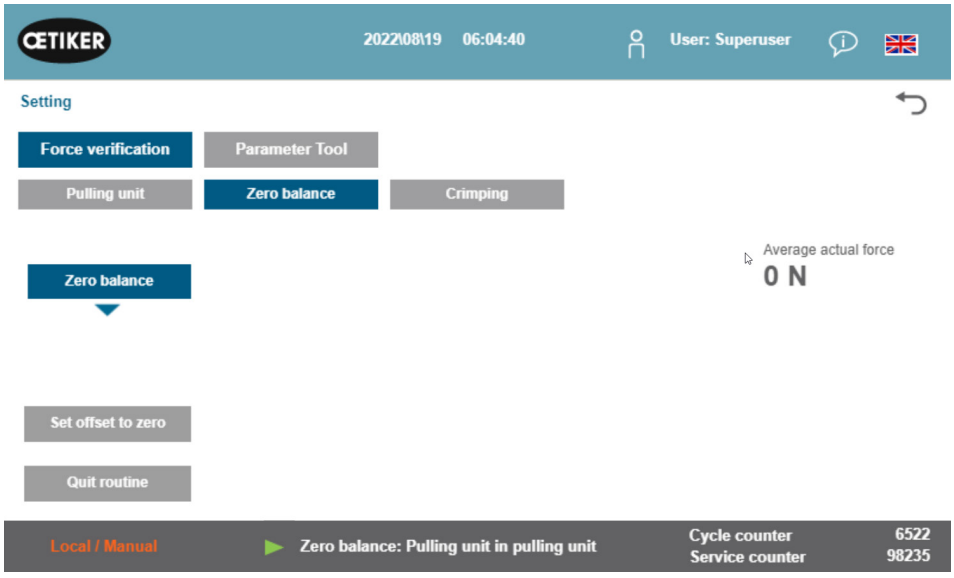


Fig. 97: *Zero adjustment*

In order to zero the offset of the force load cell you must be logged in.

Force verification	Changes to the verifier force tab
Pulling unit	Changes to the tab for the pulling unit verification
Zero balance	Activates the zero offset function
Set offset to zero	Press the button to change the current setting to zero
Quit routine	Quit the zero offset routine
Actual force	Displays the actual force measured by the force load cell, in Newtons

Force verification / verification of the pulling force when the force is configurable

NOTICE

For verification of correct operation of the force load cell which measures the pulling force, the measured force must be measured at least once a week. Further Information *see section 6.8.4.*

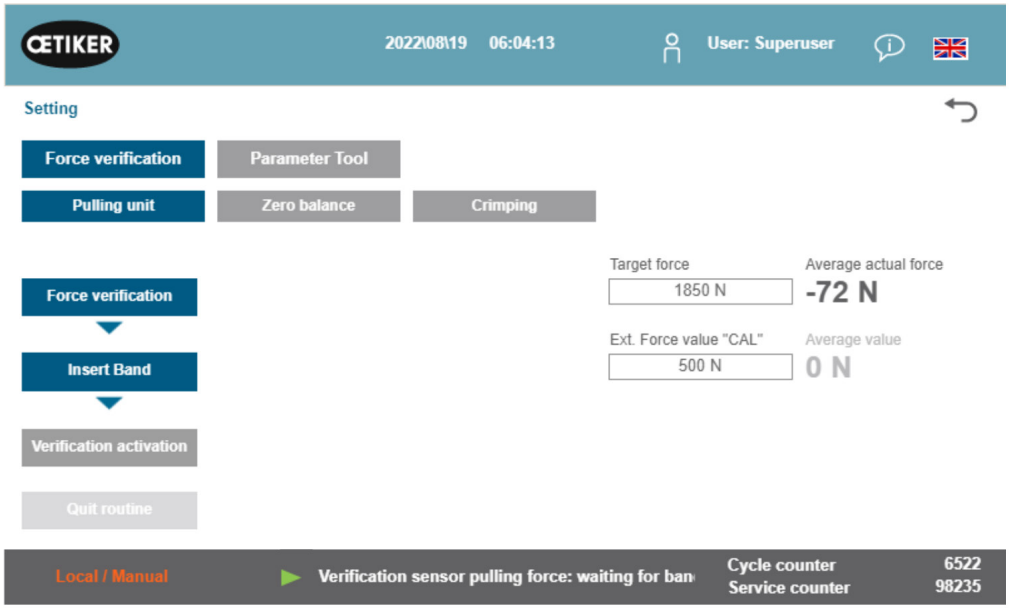


Fig. 98: *Zero adjustment*

To check the closing force you must be logged in at least as Operator.

Force verification	Changes to the verifier force tab
Pulling unit	Changes to the tab for the pulling unit verification
Force verification	This activates the force verification routine
Strap locking	Indicates that the pull strap is locked (the locking must be performed using the button on the handle of the FAST 3000)
Target force	Set the force in Newtons that the FAST 3000 will use to pull the clamps
Activating verification	Start the pulling process at the set force
Actual force	Displays the actual force measured by the force load cell, in Newtons

Ext. . Ext. force value “CAL”	The force value that is input is read by the CAL 01 and is logged in the verification record
Quit routine	Stop pulling and quit the force verification routine. In normal operation, the pulling force sensor stops automatically. When the force has been achieved, a defined time elapses after which the pulling unit / motion link revert to their starting position.

Crimping force monitoring verification

NOTICE

For verification of the correct operation of the crimping force sensors which measure the crimping forces we recommend that the measured force is verified once a month using an Oetiker CAL 01. (For further information *see section 6.8.5*.)

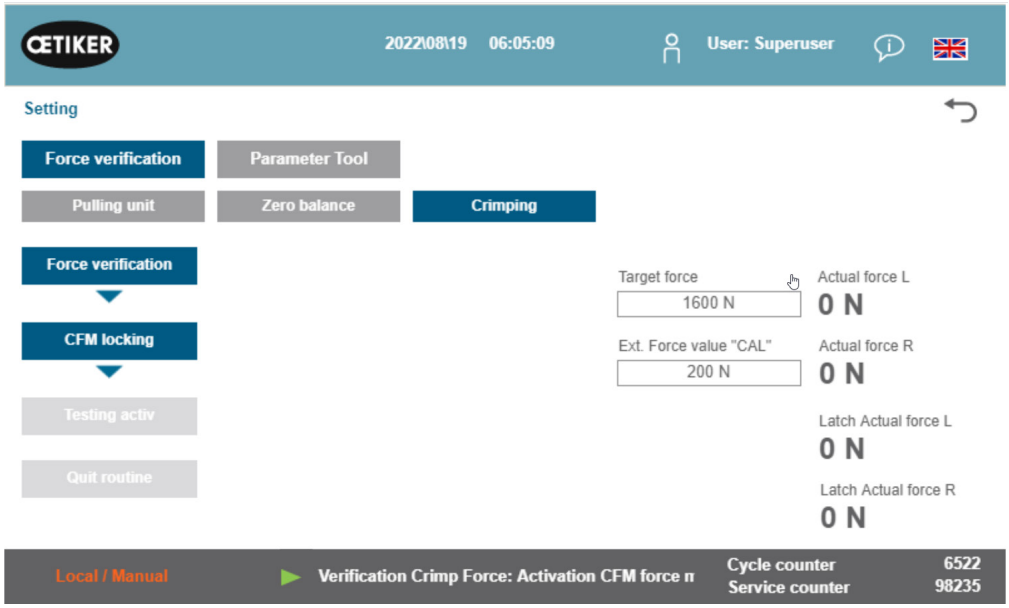


Fig. 99: *Verification crimping force*

To verify the crimping force monitoring you must at least be logged in as Operator.

Force verification	Changes to the verifier force tab
Crimping	Changes to the crimping force verification tab
Force verification	This activates the force verification routine
CFM locking	This activates the force verification
Target force	Set the verification force in Newtons; FAST 3000 stops the force increase as soon as the first force sensor detects this force
Force L/R	Currently measured force, in Newtons
Testing active	Indicates that the force verification is being performed
Latch Actual force L/R	Displays the force measured by the force load cells, in Newtons. The force value determined during the measurement phase of the verification is displayed
Ext. . force value “CAL”	The force value that is input is read by the CAL 01 and is logged in the verification record
Quit routine	Quits the force verification routine

Setting the date and time

The Time & Date can be set by three ways.

1. Connecting to the controller of the Fast3000
2. Using the GUI (see below)
3. Industrial communication using UTC Unix Time Stamp

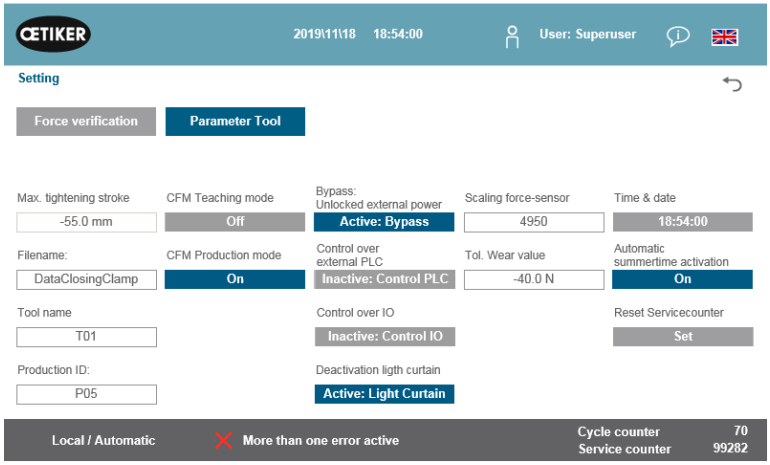


Fig. 100: *Settings Tool Page 1*

A popup window appears, in which the date and time can be set.

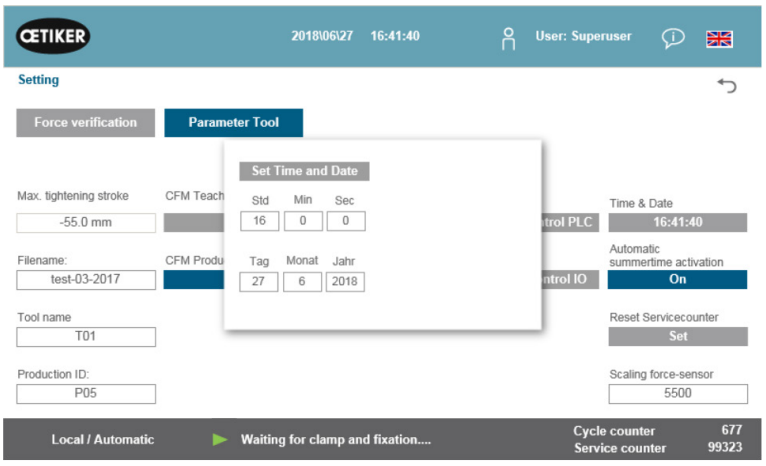


Fig. 101: *Set time*

Input the current date and time.

To load the setting, press the “Set time and date” button.

7.4.8 Information

The currently installed software version and the publication date are shown in the “Information” tab. It also contains a list of the Oetiker service addresses.

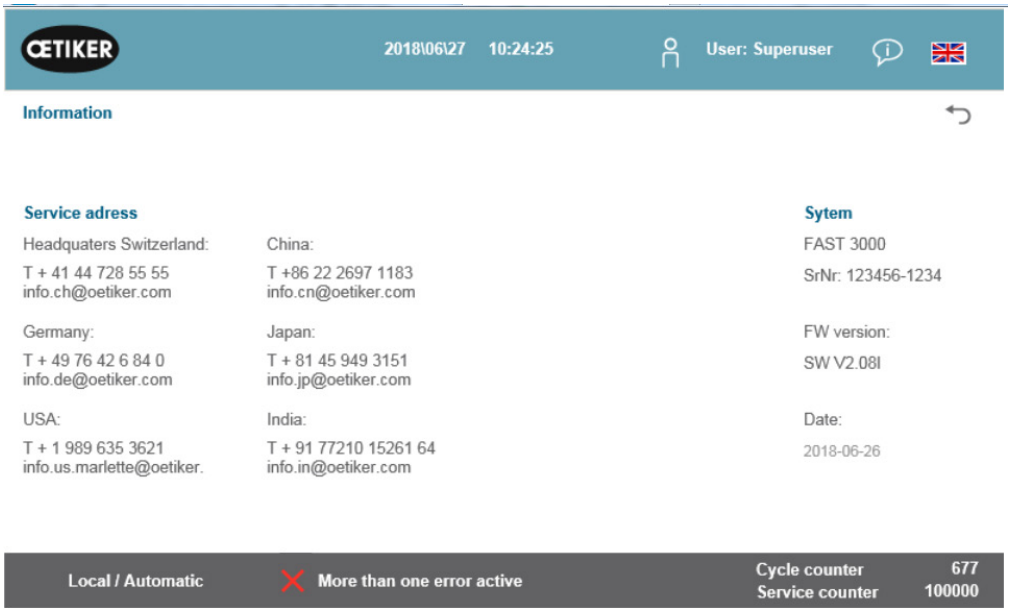


Fig. 102: *Information page*

7.4.9 Error list

For further information on error correction see Section *13*.

NOTICE

The errors are grouped as follows:
100-199: Warnings. These do not affect whether a closure is evaluated as OK.
200-299: Tool errors. These do not affect whether a closure is evaluated as OK.
300-399: Process errors. All process errors cause the closure to be evaluated as NOK.

Error number	Description	Class/Severity	See Section
101	War_101 Error acknowledged	Warning	13.3.1
102	War_102 Check start button contacts	Warning	
103	War_103 No power -> press start / and init	Warning	
104	War_104 CFM box warning / error	Warning	
105	War_105 Soon service necessary	Warning	
106	War_106 Service necessary	Warning	
107	War_107 Stop about light curtain	Warning	
108	War_108 Mode CFM teaching active	Warning	
109	War_109 Drives Tool not powered	Warning	
110	War_110 No Power -> activate external enable signal, then press Start	Warning	
111	War_111 Remove strap	Warning	
112	War_112 Abort pulling force verification	Warning	
113	War_113 Abort verification crimp force	Warning	
114	War_114 Stop about external stop command	Warning	
115	War_115 External Signal strap lock is on	Warning	
116	War_116 EtherCAT - bus not running	Warning	
117	War_117 Init command is pending	Warning	
118	War_118 Please check function light curtain	Warning	
119	War_119 Manual Mode: Run the command before the last run end (Pulling unit)	Warning	
120	War_120 Manual Mode: Run command before last run end (Motion link)	Warning	
121	War_121 Friction Test Target outside tolerance	Warning	
122	War_122 Verification Crimp Force Target outside tolerance	Warning	
123	War_123 Pulling force verification Target outside tolerance	Warning	
124	War_124 Warning Friction Test	Warning	
125	War_125 Warning Verification Crimp Force	Warning	
126	War_126 Warning pulling unit verification	Warning	
127	War_127 Warning Zero Balance	Warning	
128	War_128 Warning Change LC relay soon	Warning	
129	War_129 Warning Change LC relay	Warning	
130	War_130 Light curtain enable absent	Warning	
131	War_131 Stop after abort cmd	Warning	
132	War_132 CFM1 Wrong Number Measuring Prog.	Warning	
133	War_133 CFM2 Wrong Number Measuring Prog.	Warning	
134	War_134 Enclosure Cabinet temperature too high	Warning	

Error number	Description	Class/Severity	See Section
201	ToErr_201 Strap present -> remove & acknowledge	Tool error	13.3.2
202	ToErr_202 Clamping unit not in home position STO-> Initialize	Tool error	
203	ToErr_203 Check pulling unit and cut-off unit	Tool error	
204	ToErr_204 Position sensor defective	Tool error	
205	ToErr_205 Drive error active	Tool error	
206	ToErr_206 Emergency circuit open	Tool error	
207	ToErr_207 Light curtain during init sequence	Tool error	
208	ToErr_208 Verification CFM error phase 1	Tool error	
209	ToErr_209 Verification CFM error phase 2	Tool error	
210	ToErr_210: Verifying the crimping force: No force increase	Tool error	
211	ToErr_211 Check strap scrap	Tool error	
212	ToErr_212 CFM general warning/error	Tool error	
213	ToErr_213 Check pulling force sensor	Tool error	
214	ToErr_214 Emergency stop	Tool error	
215	ToErr_215 Pulling unit not in home position	Tool error	
216	ToErr_216 Tool drive lost power during the cycle	Tool error	
217	ToErr_217 Pulling force verification; Target force not reached	Tool error	
218	ToErr_218 Tool locked by external bus signal	Tool error	
219	ToErr_219 Manual mode: More than 1 run command at pulling unit	Tool error	
220	ToErr_220 Manual mode: More than 1 run command Motion Link	Tool error	
221	ToErr_221 Error Friction test	Tool error	
222	ToErr_222 Crimp force verification error	Tool error	
223	ToErr_223 Pulling unit verification error	Tool error	
224	ToErr_224 Error Zero Balance	Tool error	
225	ToErr_225 Motion Link undervoltage	Tool error	
226	ToErr_226 Pulling unit undervoltage	Tool error	
227	ToErr_227 EtherCAT not running	Tool error	
228	ToErr_228 Check pulling force sensor	Tool error	
229	ToErr_229 CFM wrong Measuring Program	Tool error	

Error number	Description	Class/Severity	See Section
301	PrErr_301 Max. pulling travel exceeded	Process error	13.3.3
302	PrErr_302 Max. pulling time exceeded	Process error	
303	PrErr_303 Crimping CFM1 envelope 1	Process error	
304	PrErr_304 Crimping CFM1 envelope 2	Process error	
305	PrErr_305 Crimping CFM1 NoPass	Process error	
306	PrErr_306 Crimping CFM1 wear	Process error	
307	PrErr_307 Crimping CFM2 envelope 1	Process error	
308	PrErr_308 Crimping CFM2 envelope 2	Process error	
309	PrErr_309 Crimping CFM2 NoPass	Process error	
310	PrErr_310 Crimping CFM2 wear	Process error	
311	PrErr_311 General error crimping	Process error	
312	PrErr_312 Cutting error	Process error	
313	PrErr_313 Force limit exceeded	Process error	
314	PrErr_314 Max. pulling force exceeded	Process error	
315	PrErr_315 Closing force out of tolerance	Process error	
316	PrErr_316 Max. force at stop from light curtain	Process error	
317	PrErr_317 Max. force during move to throw-off position	Process error	
318	PrErr_318 Process interrupt	Process error	
319	PrErr_319 Max. force at stop from Bus	Process error	
320	PrErr_320 CFM1: Abort line crossed	Process error	
321	PrErr_321 CFM2: Abort line crossed	Process error	
11016	Servo pulling unit: IPM error	Drive error	
11017	Servo pulling unit: IPM temperature	Drive error	
11020	Servo pulling unit: Overcurrent	Drive error	
11021	Servo pulling unit: Current offset	Drive error	
11022	Servo pulling unit: Current limit exceeded	Drive error	
11033	Servo pulling unit: continually overloaded	Drive error	
11034	Servo pulling unit: Drive temperature 1	Drive error	
11035	Servo pulling unit: Overload on regeneration	Drive error	
11036	Servo pulling unit: Motor cable not connected	Drive error	
11037	Servo pulling unit: Temperature 2	Drive error	
11038	Servo pulling unit: Encoder temperature	Drive error	
11048	Servo pulling unit: Encoder communication error	Drive error	
11049	Servo pulling unit: Encoder cable not connected	Drive error	
11050	Servo pulling unit: Encoder data error	Drive error	
11051	Servo pulling unit: Motor settings	Drive error	

Error number	Description	Class/Severity	See Section
11052	Servo pulling unit: Z phase not connected	Drive error	
11053	Servo pulling unit: Low battery level	Drive error	
11054	Servo pulling unit: Sine ENC	Drive error	
11055	Servo pulling unit: Sine frequency	Drive error	
11056	Servo pulling unit: Encoder setting error	Drive error	
11064	Servo pulling unit: Undervoltage	Drive error	
11065	Servo pulling unit: Overvoltage	Drive error	
11066	Servo pulling unit: Interruption in power supply	Drive error	
11067	Servo pulling unit: Interruption in control voltage	Drive error	
11080	Servo pulling unit: Speed overshoot	Drive error	
11081	Servo pulling unit: POS following	Drive error	
11083	Servo pulling unit: Large SPD deviations	Drive error	
11099	Servo pulling unit: Checksum error	Drive error	
11113	Servo pulling unit: Error in the factory settings	Drive error	
12016	Servo Motion Link: IPM error	Drive error	
12017	Servo Motion Link: IPM temperature	Drive error	
12020	Servo Motion Link: Overcurrent	Drive error	
12021	Servo Motion Link: Current offset	Drive error	
12022	Servo Motion Link: Current limit exceeded	Drive error	
12033	Servo Motion Link: Continuously overloaded	Drive error	
12034	Servo Motion Link: Drive temperature 1	Drive error	
12035	Servo Motion Link: Overload on regeneration	Drive error	
12036	Servo Motion Link: Motor cable not connected	Drive error	
12037	Servo Motion Link: Temperature 2	Drive error	
12038	Servo Motion Link: Encoder temperature	Drive error	
12048	Servo Motion Link: Encoder communication error	Drive error	
12049	Servo Motion Link: Encoder cable not connected	Drive error	
12050	Servo Motion Link: Encoder data error	Drive error	
12051	Servo Motion Link: Motor settings	Drive error	
12052	Servo Motion Link: Z phase not connected	Drive error	
12053	Servo Motion Link: Low battery level	Drive error	
12054	Servo Motion Link: Sine ENC	Drive error	
12055	Servo Motion Link: Sine frequency	Drive error	
12056	Servo Motion Link: Encoder setting error	Drive error	
12064	Servo Motion Link: Undervoltage	Drive error	
12065	Servo Motion Link: Overvoltage	Drive error	
12066	Servo Motion Link: Interruption in power supply	Drive error	
12067	Servo Motion Link: Interruption in control voltage	Drive error	
12080	Servo Motion Link: Speed overshoot	Drive error	
12081	Servo Motion Link: POS following	Drive error	
12083	Servo Motion Link: Large SPD deviations	Drive error	
12099	Servo Motion Link: Checksum error	Drive error	
12113	Servo Motion Link: Error in the factory settings	Drive error	

* Reserved warning/error but not in use

7.4.10 Access rights

Rights	User		
	“none” = status at switch-on	Operator	Superuser
Closing force parameter	×	×	✓
Parameter Tool	×	×	✓
Process log	✓	✓	✓
Error / warning protocol	✓	✓	✓
Verification log	×	×	✓
Service logbook	×	×	✓
Unlocking function	×	✓	✓
Laboratory mode	×	×	✓
Manual operation (manual operation)	×	×	✓
Friction test	×	×	✓
I/O test	×	×	✓
Force verification	×	✓	✓

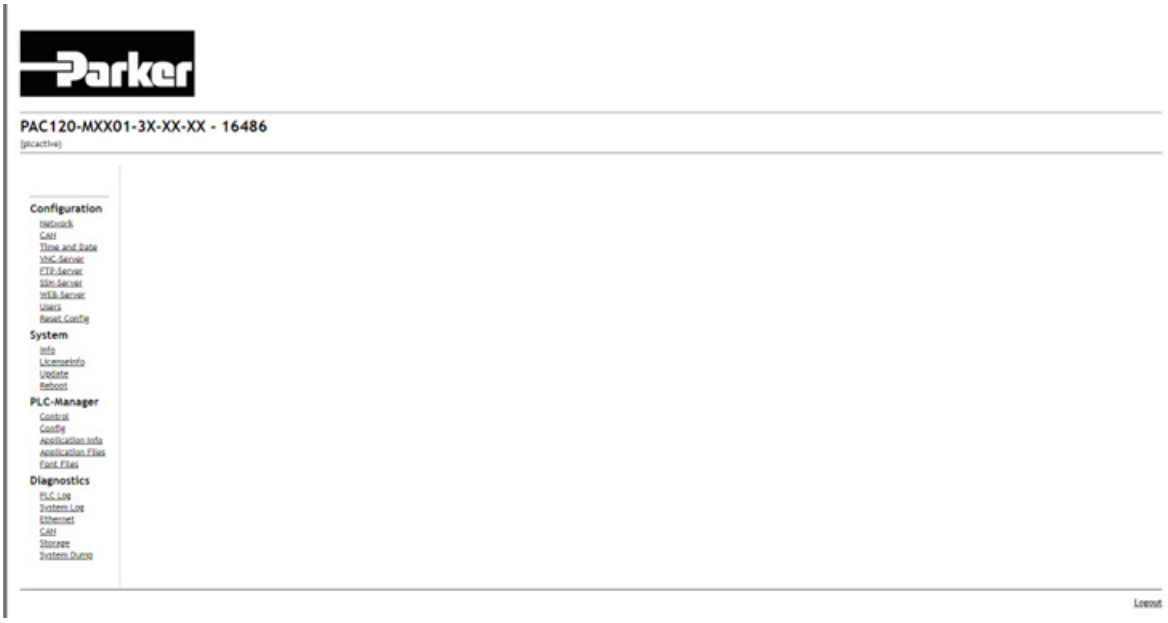
Explanation: ✓ = access × = no access

The user “Superuser” will be logged out automatically on expiry of a certain time.

8 Assigning the IP address

If the tool is to be integrated into a network, make sure that the IP address that is assigned will not generate any conflicts. The factory setting of the IP address is 192.168.10.51.
To change the IP address you must use a web browser to access the controller. If you must use a touch panel you must also make changes at the touch panel.

Login: admin
Password: admin



After logging in to the home page, input the desired IP address, subnet mask and standard gateway. You can find the setting at the menu item Configuration Network. ETH0 is the standard interface for web visualization.

Attention: The web visualization for the touch panel also uses the IP address.

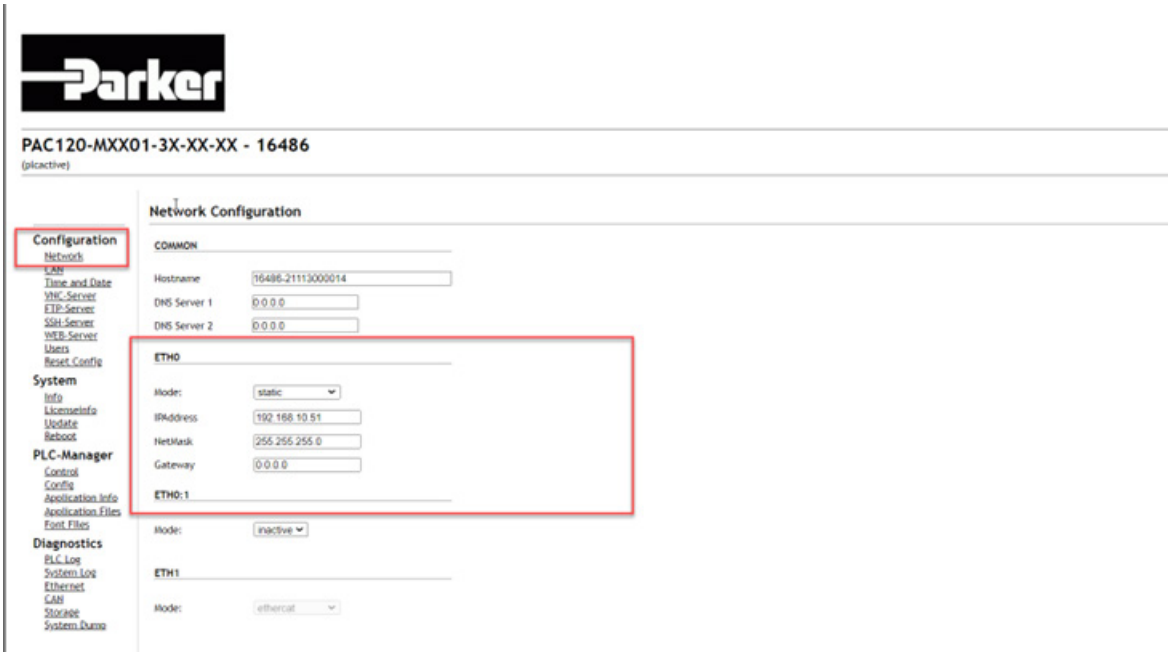


Fig. 103: *PLC Setting the IP address*

8.1 Industrial communication X21/X22

8.1.1 Setting the IP address for the EtherNet/IP

The adjustment of the IP for the industrial communication by means of EtherNet/IP is also performed using the web browser. You can find the setting at the menu item Configuration Network. Industrial Communication uses the ETH2 interface. After the interface has been adjusted the physical interface plug must be withdrawn and reinserted. After insertion, wait for a short time to allow communication to be re-established.

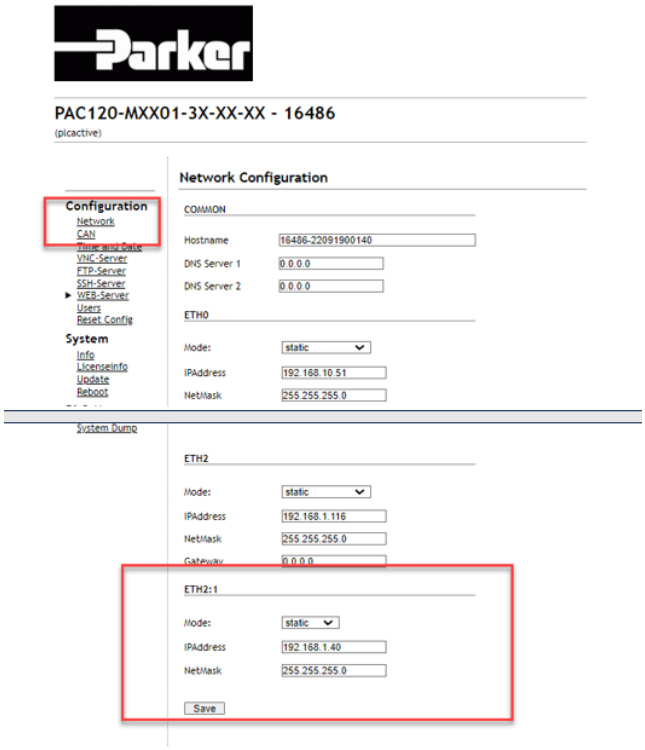


Fig. 104: *PLC Setting the IP address*

8.1.2 Setting the IP address for the Profinet

The interface for the Profinet is set up using the usual development tools such as Proneta, Tia-Portal etc. These tools allow the IP to be assigned to the FAST 3000.

8.2 Touch Panel

The de Default IP address of the touch panel is 192.168.10.40. Check that this IP address does not create any conflicts. Change the IP address if necessary. Keep the button on the touch panel depressed for five seconds in order to call up the relevant menu.
The Network menu allows you to modify the respective IP address of the touch panel.

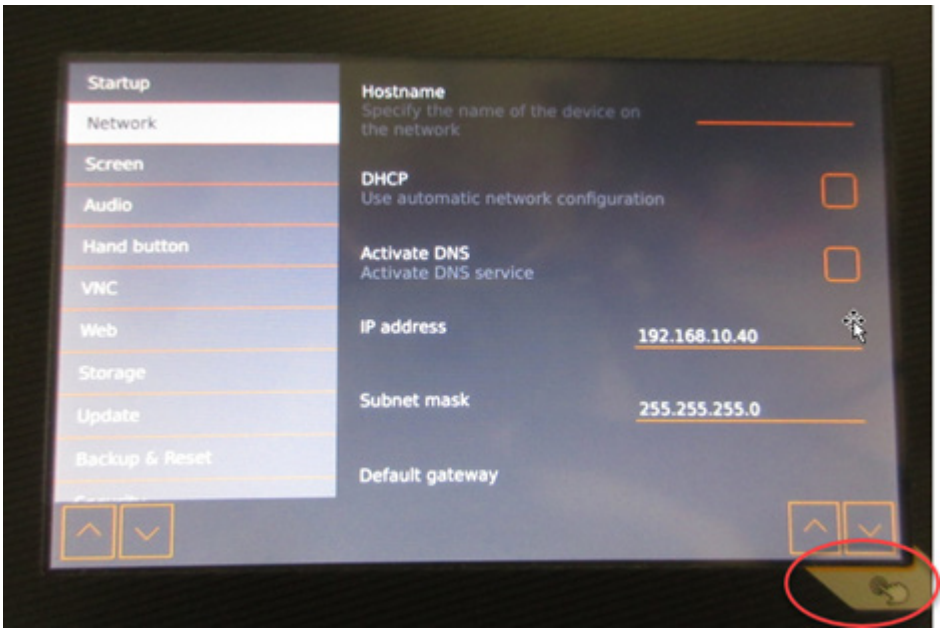


Fig. 105: *Touch Panel*

If the tool was used to change the IP at the ETH0, the setting on the touch panel must be modified correspondingly.
For this purpose the setting for the server must be modified using the Web menu item.
The following entry is set by default: 192.168.10.51:8080/webvisu.htm.
This must be modified to suit the relevant IP address.

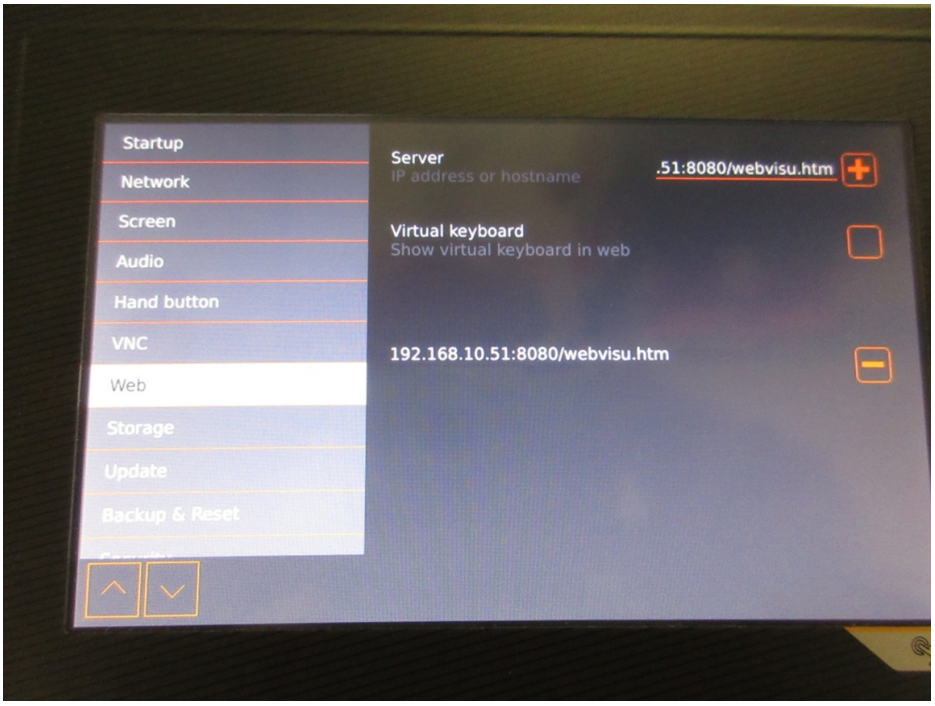


Fig. 106: *Touch Panel*

9 Maintenance and replacement of parts

9.1 General safety instructions for maintenance and repair work

WARNING

Danger of death from electric shock!

Touching live parts can result in death.

- ▶ Withdraw the mains plug from the electrical socket and secure the FAST 3000 to prevent it being plugged in again accidentally.
- ▶ Before working on electrical components within the control cabinet: Wait 15 minutes after switching off the power, to allow the intermediate circuit voltage in the servo amplifier to dissipate.
- ▶ Ensure that only qualified and authorized electricians work on the electrical equipment.
- ▶ Ensure that operators rectify only those faults that are clearly attributable to operating or maintenance errors.

WARNING

Never immerse the FAST 3000 in water or other liquids.

CAUTION

Risk of damage to the force load cell.

- ▶ The FAST 3000 is equipped with a force load cell. This is a precision measuring device. So as not to damage the force load cell, apply only the intended forces to it (do not apply hammer impacts and the like).

- Cleaning, lubrication and maintenance work should only be carried out by authorized technical personnel in accordance with the enclosed maintenance instructions and local safety regulations. Failure to observe these instructions and regulations may lead to personal injury and property damage.
- For maintenance and repair work use only the tools and original equipment recommended by OETIKER.
- Use only original-spare parts from OETIKER.
- Maintenance work may be performed on the FAST 3000 only when it is disconnected from the electrical supply.
- Following initial commissioning, the FAST 3000 tool should be cleaned daily or weekly, depending on the degree of soiling.
- Never immerse the FAST 3000 in water or other liquids.

9.2 Maintenance

9.2.1 Before maintenance work

WARNING

Danger of death from electric shock!
Touching live parts can result in death.

- Withdraw the mains plug from the electrical socket and secure the FAST 3000 to prevent it being plugged in again accidentally.
- Wait 15 minutes after switching off the power, to allow the intermediate circuit voltage in the servo amplifier to dissipate.
- Ensure that only qualified and authorized electricians work on the electrical equipment.
- Ensure that operators rectify only those faults that are clearly attributable to operating or maintenance errors.

CAUTION

Crush hazard at moving parts.

- Maintenance work may be performed on the FAST 3000 only when it is disconnected from the electrical supply.
- The covers may be removed only by authorized, trained and qualified personnel.

9.2.2 After maintenance work

CAUTION

Crush hazard at moving parts.

- After maintenance work, ensure that all safety devices have been replaced and securely bolted in place.

CAUTION

Danger due to parts being flung from the machine.
If parts fracture while the machine is in during operation, parts may become loose and be flung from the machine.

- During operation and maintenance of the machine, always wear safety glasses.

- Ensure that the electrical plug connectors which were withdrawn are plugged in again following the maintenance and inspection work.
- Check all screw connections.
- Reattach all safety devices immediately.
- Check all operating functions of the FAST 3000 and the initialize the tool.

9.2.3 Regular checking of the status

CAUTION

Any defects must be reported to a supervisor immediately.

- Do not continue to use the FAST 3000 if defects have been identified.

- Check the FAST 3000 for visible damage daily or at the start of each shift, and make sure it is used only when in good condition. This applies particularly to the crimping jaws and operation of the emergency stop.

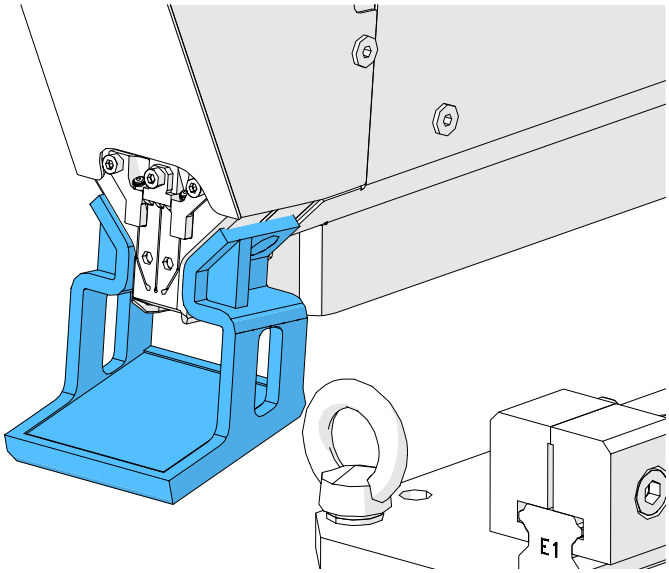


Fig. 107: *Use the mounted jaws checking mirror to check the crimping jaws*

- The closing force must be verified every week (see Section *6.8.4*).
- We recommend that the force offset is verified every week (see Section *6.8.3*).
- We recommend that the crimping force sensors are verified once every month (see Section *6.8.5*).
- We recommend that the tool positioning is checked weekly.

9.2.4 Regular maintenance work / maintenance schedule

Service	Service interval / Performed by	Parts to be replaced	Maintenance activities	Time required
A	100,000 cycles CUSTOMER or Oetiker	• Crimping jaws kit (part number 13500112)	• Replace the crimping jaws • Rotate the cut-off die through 180° • Clean and lubricate the tool head	10 minutes
B	200,000 cycles CUSTOMER or Oetiker	• Parts involved in the 100,000 cycles service activities • Cut-off die • Clamping lever • Crimping wedge • Crimping jaw pivot pins • (Select all the parts contained in part number 13500157)	• A-service • Replacing parts • Clean and lubricate the clamping unit	40 minutes
C	2,000,000 cycles Exclusively by Oetiker: Please contact your OETIKER representative.	• Parts involved in the 200,000 cycles service activities • Clamping lever kit • Clamping unit slide (depending on the extent of wear) (Select all the parts contained in part number 13500228)	• B-Service • Replacing parts • Grease the drives • Check the condition of the tool • Clean the dust filter of the control cabinet	2 hours

Recommended lubricant

Description	Type	Manufacturer
Grease	MICROLUBE GBU-Y 131	Klüber Lubrication AG (Switzerland) Thurgauerstrasse 39 8050 Zürich Tel.: +41 44 308 69 69 Fax: +41 44 308 69 44 www.klueber.com

Greasing points

► Apply a thin film of grease to all the areas marked yellow.

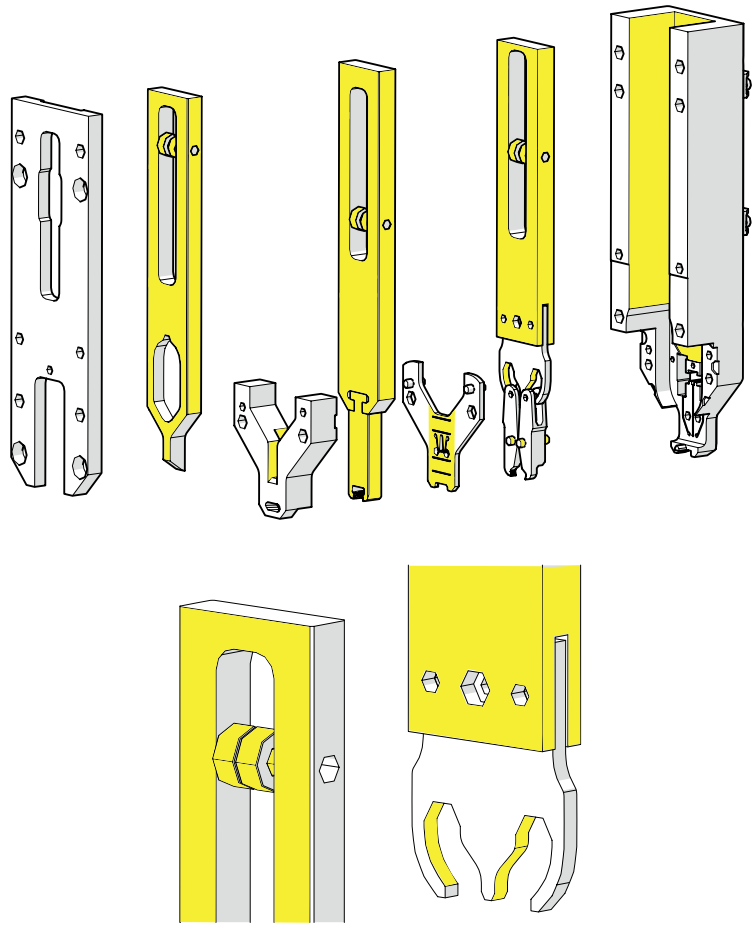


Fig. 108: *Fat head*

9.2.5 A-service - to be performed every 100,000 cycles

⚠	**CAUTION** Replace wear parts (crimping jaws) after 100,000 closures. When doing this, clean and grease the entire head.

This service must be performed every 100,000 cycles.

1. Dismantle the crimping cut-off head (*see section 9.1).*
2. Clean and grease the crimping cut-off head.
3. Perform a visual inspection of the crimping wedge and crimping jaw pivot pins: No excessive wear.
4. Replace the crimping jaws (*see section 9.3.3).*
5. Rotate the cut-off die through 180° (*see section 9.3.3).*
6. Reassemble the crimping cut-off head (*see section 9.3.3).*

7. The closure gap SS must be within 3 ±0.1 mm (measure it in the closed condition).

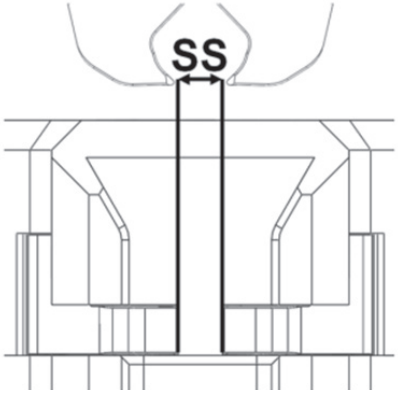


Fig. 109: *Adjusting the closing gap*

8. After installing and securing the head housing cover, all three slides must be free to move with very little resistance.
9. After assembling the FAST 3000, perform a closing force verification at 1850 N (see Section *6.8.4)*. The closing force must lie within ±100 N.
10. Perform ten WingGuard® clamp closures. These ten closures must all be evaluated as OK pieces.

9.2.6 B-service - to be performed every 200,000 cycles

	**CAUTION** Replace wear parts (crimping jaws) after 100,000 closures. Replace the wear parts (cut-off die, crimping wedge, crimping jaws pivot pin, clamping lever) after 200,000 closures. When doing this, clean and grease the entire crimping cut-off head and clamping unit.

An extended/major service must be performed every 200,000 cycles.

1. Dismantle the crimping cut-off head (*see section 9.3).*
2. Clean and lubricate the tool head (*see section 9.2.4).*
3. Replace the crimping wedge (*see section 9.3.4).*
4. Replace the crimping jaws pivot pin (*see section 9.3.5).*
5. Replace the crimping jaws (*see section 9.3.3*).
6. Replace the cut-off die (*see section 9.3.3*).
7. Reassemble the crimping cut-off head (*see section 9.3*).
8. Clean and grease the clamping unit.
9. Replace the clamping levers (*see section 9.3.4*).
10. The closure gap SS must be within 3 ±0.1 mm (measure it in the closed condition).

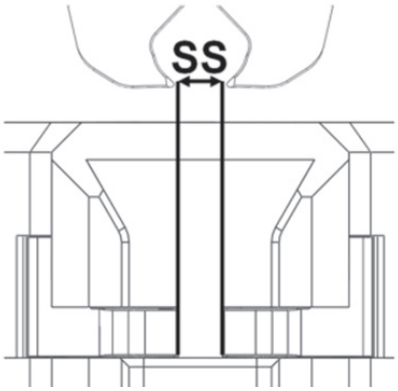


Fig. 110: *Adjusting the closing gap*

11. After installing and securing the head housing cover, all three slides must be free to move with very little resistance.
12. After assembling the FAST 3000, perform a closing force verification at 1850 N. The closing force must lie within ±100 N.
13. Perform ten WingGuard® clamp closures. These ten closures must all be evaluated as OK pieces.

9.3 Replacing parts

WARNING

Risk of injury when the crimping cut-off head is not mounted.

- Never operate the FAST 3000 without a correctly fitted crimping cut-off head.

CAUTION

When the CFM force load cells are not fitted there is a risk of mechanical damage.

- If the force load cells are not installed in their normal position, never operate the FAST 3000 with a crimping cut-off head that is equipped for CFM. Failure to comply with this instruction risks mechanical damage to the crimping cut-off head.

9.3.1 Removing the crimping cut-off head

1. To facilitate installation, move the clamping unit to the ejection position (see Section *6.8.2*).
2. Switch off the FAST 3000.

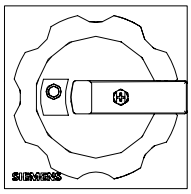


Fig. 111: *Main switch*

3. Unscrew the 4 screws at the side and remove the cover from the head.

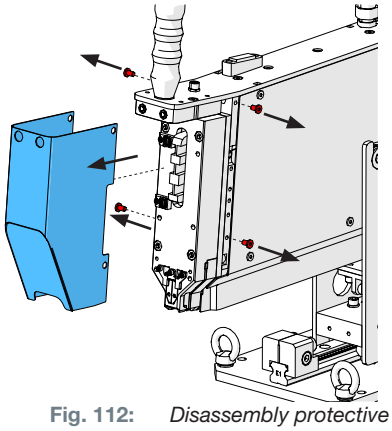


Fig. 112: *Disassembly protective cover head*

4. Release the force sensor cable from the cable clips.
5. Unscrew the screws from the force sensor brackets.
6. Using a no. 2 slot-head screwdriver, remove the crimping force sensors and their brackets, as shown in the photo on the right.

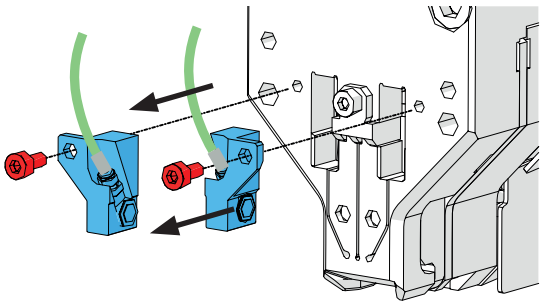


Fig. 113: *Disassembly sensors caulking monitoring*

7. Before removing the crimping cut-off head, lay the force sensor cables (1) over the FAST 3000. This reduces the risk of inadvertently crushing the force sensor cables.

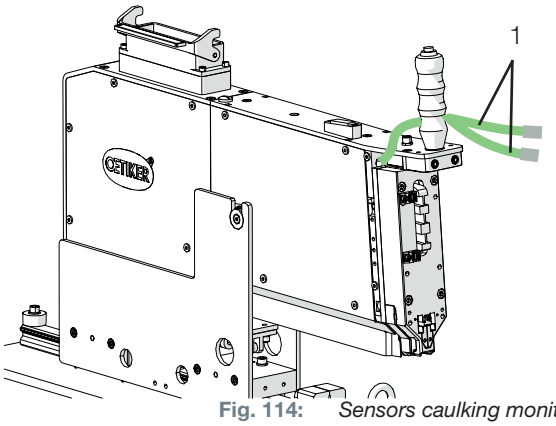


Fig. 114: *Sensors caulking monitoring*

8. Unscrew the 4 screws on the front face, and pull the crimping cut-off head off.

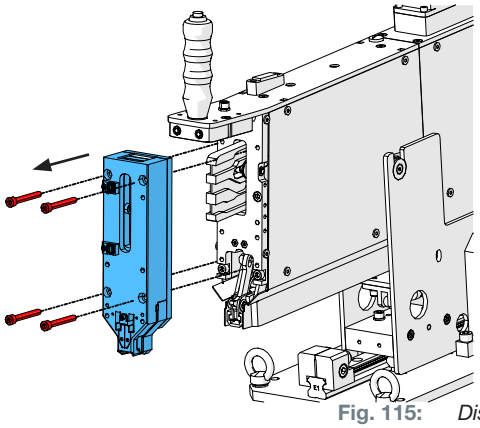


Fig. 115: *Disassembly head*

9. Place the crimping cut-off head face-down on the worktop.

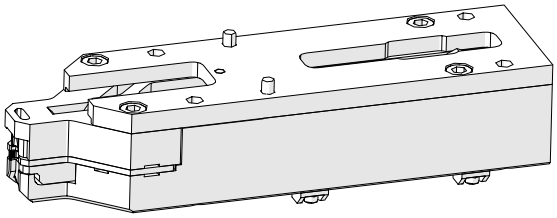


Fig. 116: *Removed crimping cut-off head*

9.3.2 Installing the crimping cut-off head

1. Make sure that the FAST 3000 is switched off.

2. To install the crimping cut-off head, perform steps 3 to 7 of Section *9.3.1* in the reverse order. Tightening torque of the M6 screws: 7–9 Nm (62–80 lbf in)

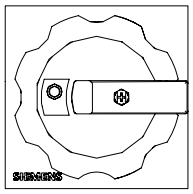


Fig. 117: *Main switch*

9.3.3 Replacing the crimping jaws and/or the cut-off die

CAUTION

Damage to the tool due to the use of unauthorized parts or improper handling.
Use only original OETIKER spare parts. Crimping jaws other than those designated may not be installed in the crimping cut-off head.
Use no impact tools when disassembling or reassembling the crimping cut-off head.
The assembly is part of a measurement system which can be damaged by improper handling.

For further information on the part numbers of spare parts, *see section 9.5*.

For information on naming the components of the crimping cut-off head, *see section 4.2*.

Dismantle the crimping cut-off head

1. Make sure that the workplace is free of chips and dust.

2. Place the crimping cut-off head face-down on the worktop.

3. Release the 4 screws and take off the head housing cover.

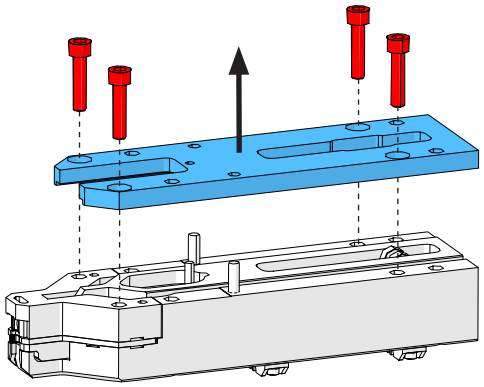


Fig. 118: *Head cover housing*

4. Dismantle the parts.

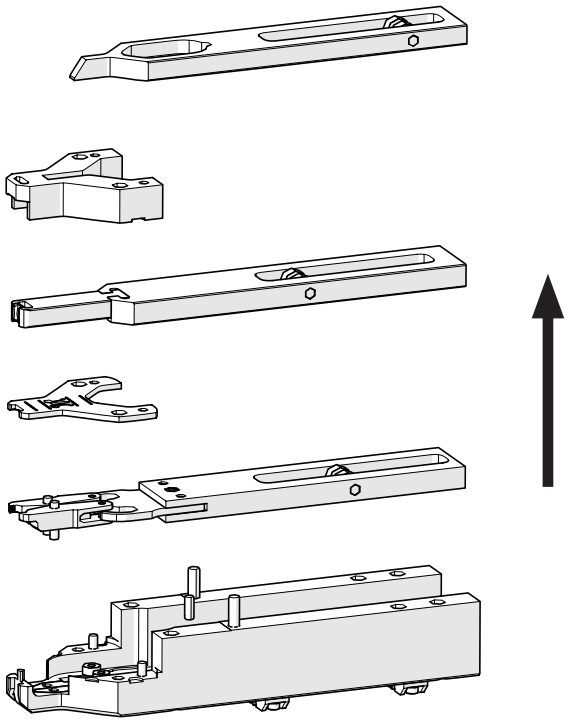


Fig. 119: *Disassemble head*

5. To remove the spacer plate, lift the spacer plate by inserting a no. 2 slot-head screwdriver into the recesses provided.
After lifting at one recess, always switch to the opposite recess.

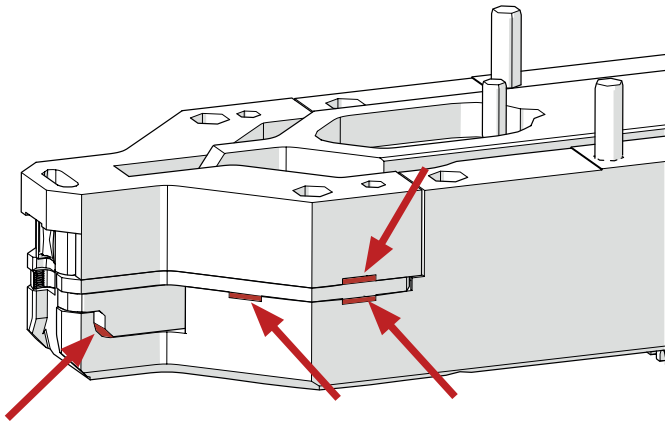


Fig. 120: *Disassembly head*

Reassembling the crimping cut-off head

To install the crimping cut-off head, perform the steps for disassembly in the reverse order.

Comply with the following instructions:

- When assembling the crimping cut-off head and installing it on the FAST 3000 mechanism, make sure that the crimping jaw rollers are located in the crimping wedge guides as shown in the left-hand photo. Failure to comply with this instructions can lead to mechanical damage to the crimping cut-off head.

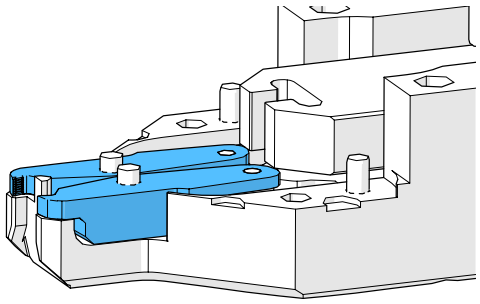


Fig. 121: *Assembly caulking jaws*

► Push down the spacer plate by hand alternately at the points indicated.

Tightening torque of the M6 screws: 7-9 Nm (62-80 lbf in)

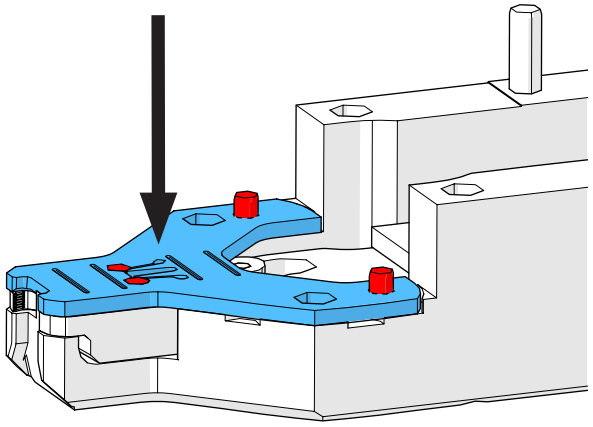


Fig. 122: *Mounting spacer plate*

Replacing the cut-off die

NOTICE

Do not use the respective side of the cut-off die any longer that the number of cycles specified in the Maintenance section.

NOTICE

When the FAST 3000 is delivered, the cut-off die is inserted so that the side marked “1” is the cutting side. Accordingly, a new cut-off die should be inserted so that the side marked “1” cuts.

1. Comply with the disassembly instructions when dismantling the crimping cut-off head.

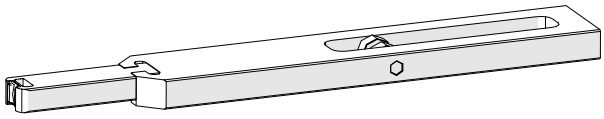
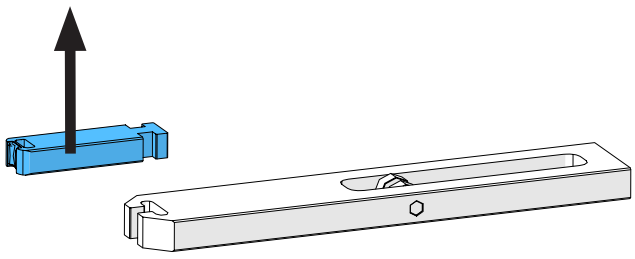


Fig. 123: *Dismantled cut-off die and slide*

2. Push the cut-off die out of the slide.



3. When for the first time the cut-off die is due for replacement it can simply be turned over and the other side used. If this has already been done, replace the cut-off die with a new one.

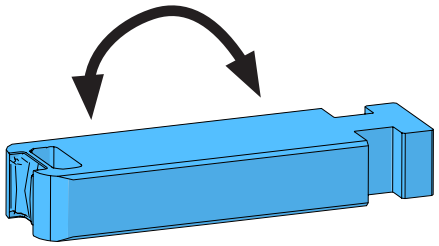


Fig. 124: *Separator*

Replacing the crimping jaws

NOTICE

Always replace the right-hand and left-hand crimping jaws together.

NOTICE

Do not use the crimping jaws any beyond the recommended number of cycles (*see section 9.2.4*).

1. Comply with the disassembly instructions when dismantling the crimping cut-off head (see „Dismantle the crimping cut-off head“).
2. Replace the crimping jaws.
3. Reassemble the crimping cut-off head.

9.3.4 Replacing the crimping wedge

For details of dismantling the crimping cut-off head see Sections *9.3.1 and 9.3.3.*

1. Release the attachment screw and remove it.
2. Remove the pins.
3. Pull the crimping wedge out of the crimping slide and replace the crimping wedge with a new one.
4. Insert the pins again into their recesses.
5. Tighten the attachment screw.
6. Assemble the crimping head again, as described in the Section “Assembling the crimping cut-off head”.

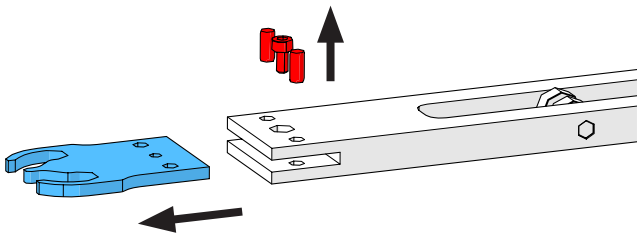


Fig. 125: *Caulking wedge*

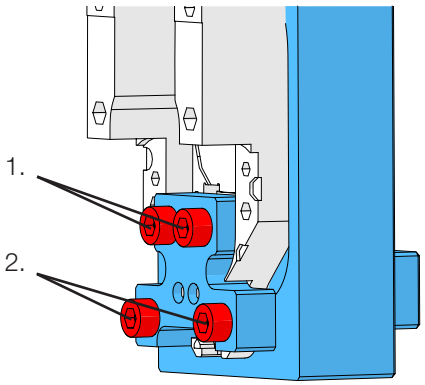
9.3.5 Replacing the crimping jaws pivot pin

NOTICE

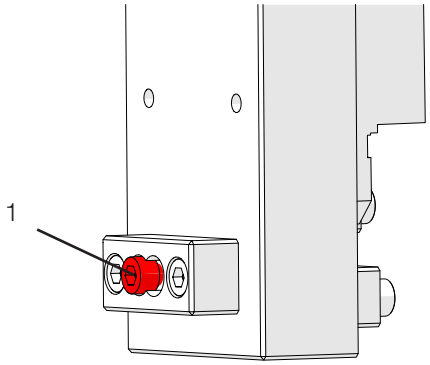
The crimping jaw pivot pins may only be replaced using the press-out and press-in tools provided for the purpose (see Section *9.7)*. Do not use any hammers or punches, since these increase the risk of mechanical damage.

The pivot pin press-in tool ensures that each crimping jaw pivot pin is pressed in to the correct depth. The pivot pin must not project beyond the spacer plate and must not be pressed in too deeply.

1. Mount the pivot pin press-out tool on the crimping cut-off head as shown in the picture on the right. Comply with the sequence of tightening operations.



2. Tighten the marked screw (1) and press the first pivot pin out. Then screw the screw in the other tapped hole and press the second pivot pin out. Remove the press-out tool.



3. Mount the pivot pin press-in tool on the crimping cut-off head as shown in the picture on the right. Comply with the sequence of tightening operations.

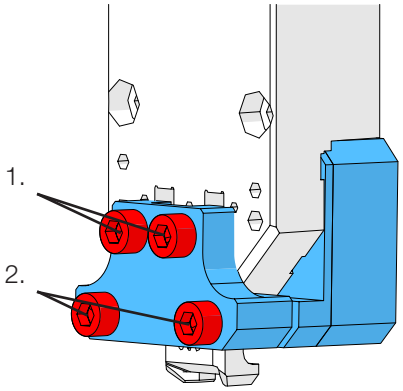
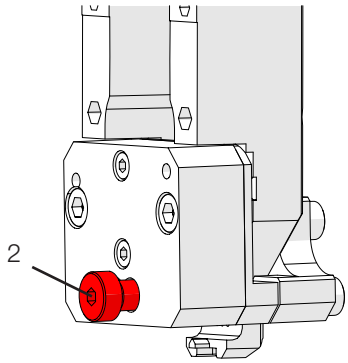


Fig. 126: *Off- Pressing device*

4. Insert the new crimping jaw pivot pin (3) and insert the marked screw (2). Now tighten the screw, to press the crimping jaw pivot pin in. Stop tightening as soon as resistance is clearly sensed. Do the same for the second new pivot pin.
5. Remove the press-in tool and assemble the crimping head again, as described in the Section “Assembling the crimping cut-off head”.



6. The pivot pin press-in tool ensures that each crimping jaw pivot pin is pressed in to the correct depth (3).

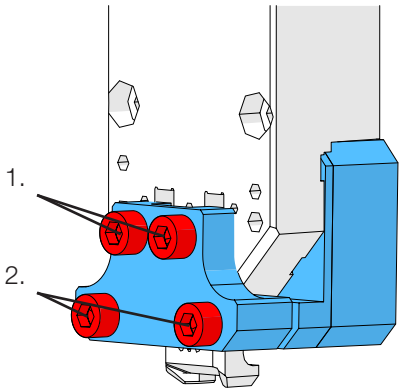


Fig. 127: *Off- Pressing device*

9.3.6 Replacing the clamping levers

CAUTION

Damage to the tool due to the use of unauthorized parts.
Use only original OETIKER spare parts.

For further information on the part numbers of spare parts see Section *9.7.*

CAUTION

Damage to the tool due to incorrect closure of clamps.
Install the clamping lever in the correct position with the nose facing forwards.

NOTICE

Do not use the clamping lever any longer that the number of cycles specified in the Maintenance section.

1. Move the lower drive into the ejection position.
2. Press the emergency stop button.
3. Remove the front covers.

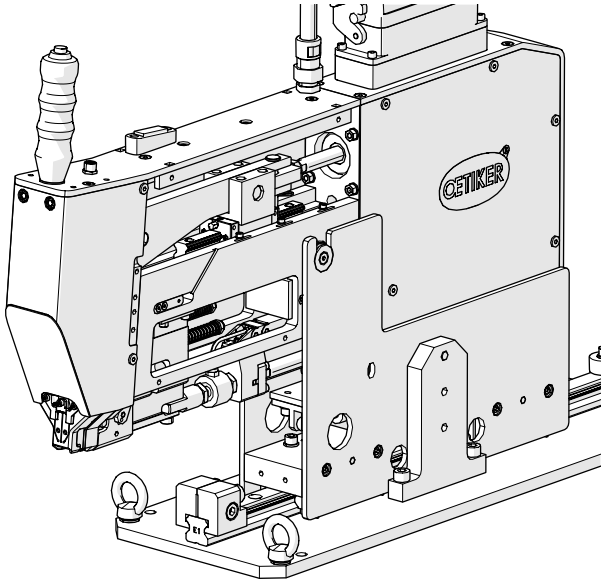


Fig. 128: *Tool with front covers removed*

4. Pull the clamping lever pivot pin out (no tool necessary).

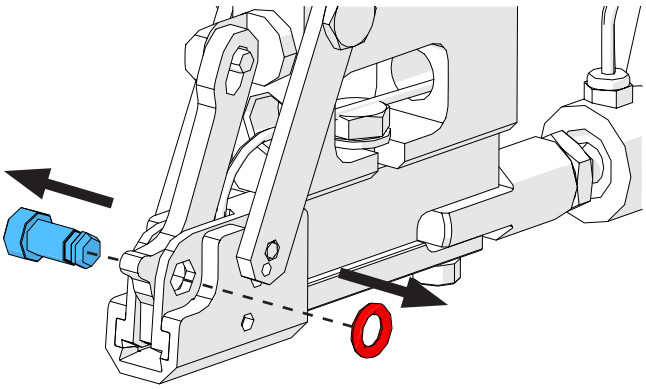
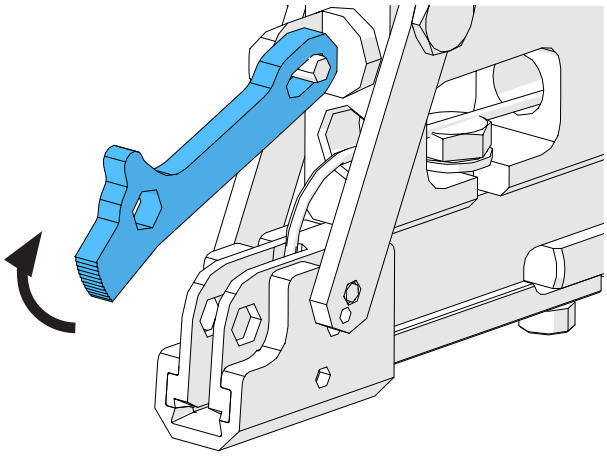


Fig. 129: *Removal clamping lever*

5. Move the clamping lever forwards.



6. Push the clamping lever to one side, take it off and replace it with a new one.

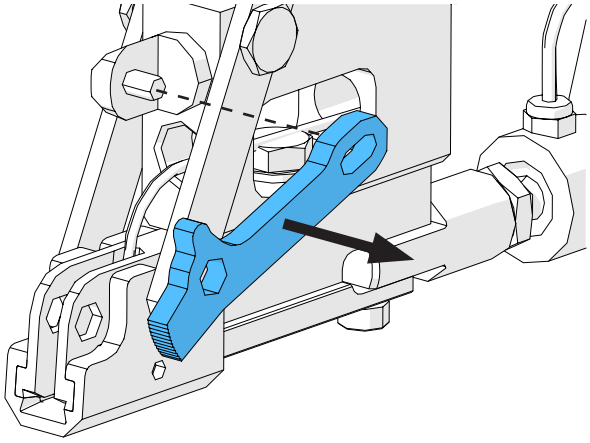


Fig. 130: *Clamping lever*

7. Reassemble everything. To do this, perform the above steps in the reverse order.

9.4 Checking and adjusting the position of the strap detection sensor

NOTICE

To check whether the strap sensor is set correctly, perform steps 1 to 6.

NOTICE

For information about the part numbers of the two strap strips, see Section 9.7.

1. Move the lower drive into the service position (Operating mode -> Manual operation -> Service position).
2. Press the Emergency Stop button.
3. Remove both the side covers.
4. Insert the strap section (1) bearing the “LED on” legend into the slot in the pulling unit. Press the pulling lever rod (2) of the crimping cut-off head to open the pulling unit. Once the strap section has been inserted, release the pulling lever rod.

   (Note: If the strap section is curved, insert it as shown by the yellow line. This ensures that once the pulling lever has been released the strap section will lie flat.

   When the sensor is set correctly the LED (4) will light up.
5. Remove the strap section bearing the "LED on" legend again and insert the strap section bearing the "LED off" legend. When the sensor is set correctly the LED will light up.
6. If at steps 4 or 5 the LED status is incorrect, continue with the next step. Otherwise the setting of the sensor is correct; continue with step 14.

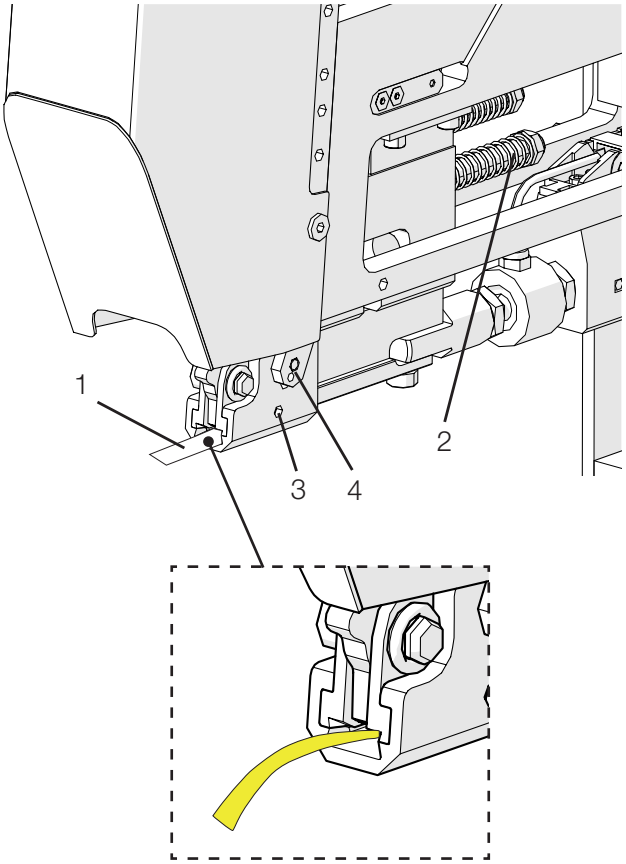


Fig. 131: Setting band detection sensor

7. Once again insert the strap section bearing the “LED on” legend into the slot in the pulling unit.
8. Using a 1.5 mm hexagon drive key, undo the set screw (3) about one turn.
9. Press the strap sensor down until it rests on the strap section. You can do this more easily if you hold the sensor by gripping its cable with a pair of tweezers.
10. Slowly raise the sensor off the strap section until the LED lights up.
11. If necessary, rotate the sensor so that the LED is visible.
12. Hold the LED securely in position and tighten the set screw. Tightening torque: 5 Ncm. Excessive tightening of the set screw may damage the sensor.
13. Perform steps 4 and 5 to check the sensor position once again.
14. Reinstall both the side covers.
15. Deactivate the Emergency Stop and initialize the FAST 3000.

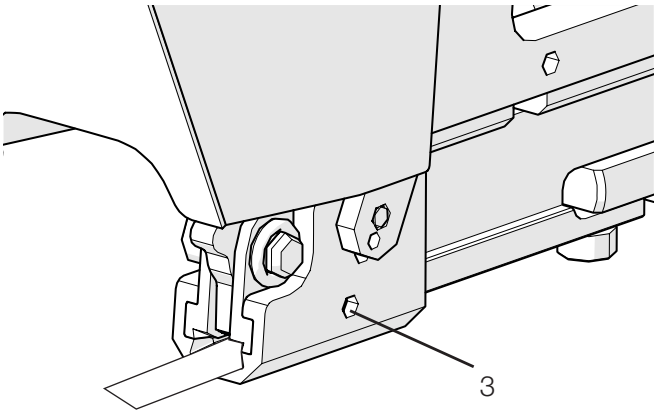


Fig. 132: Setting band detection sensor

9.5 Setting the closing force sensor

NOTICE

If the factor “Force sensor scaling” is set incorrectly this will cause the WingGuard® strap clamps to be closed with a closing force that is either too high or too low.

▶ Make adjustments carefully, use a calibrated CAL 01.

NOTICE

Adjusting the scaling of a tool with a mechanical problem masks the mechanical problem, which can lead to incorrectly installed WingGuard® clamps and incorrectly mounted products.

▶ Before adjusting the force sensor scaling, check the tool mechanics, in particular the smooth running of the linear guide of the clamping unit and the correct alignment of the clamping unit to the crimping head.

For setting you will need a CAL 01 and a PG135 verification unit. For information about part numbers see Section 3.3.

For information on how to verify the closing force sensor, see Section *6.8.4* (Verifying the closing force) .

9.5.1 Checking the ease of movement of the clamping unit

1. Move the motion link to the starting position and the pulling unit to the service position.
2. Press the Emergency Stop button.
3. Remove the screw red marked.
4. Move the pulling unit by hand. Move the pulling unit by hand, it must be possible to move it smoothly and easily over the entire available pulling travel.
5. Reassemble the screw removed in step 3.
6. Release the emergency stop and initialize the FAST 3000.

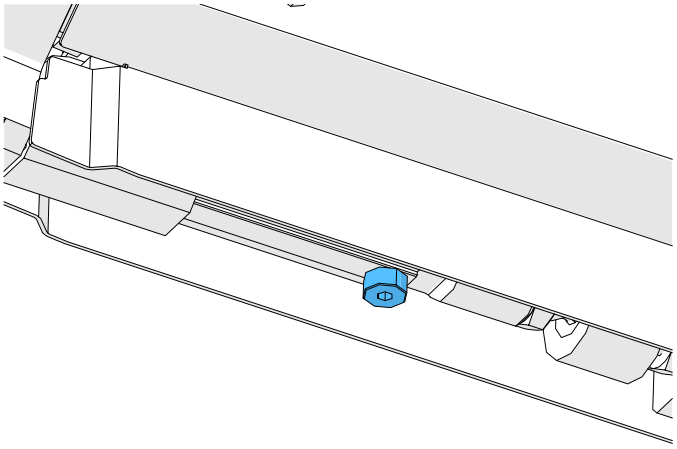


Fig. 133: *Checking the ease of movement of the clamping unit*

9.5.2 Adjusting the load cell

1. Log in as “Superuser”.
2. Set the CAL 01 to Hold-ME-EL Average mode.
3. Wait five minutes until the CAL 01 has warmed up.
4. Check whether there is any force deviation (zero point offset). If there is, zero the device (see Section *6.8.3* (Setting the force offset to zero)).
5. Perform five force verifications with a target force of 1850 N and make a note of the values.
6. Calculate the average of these five values (for instance 1950 N).
7. Select “Settings” on the FAST 3000 touch panel and select the “Tool parameters” sub-menu:

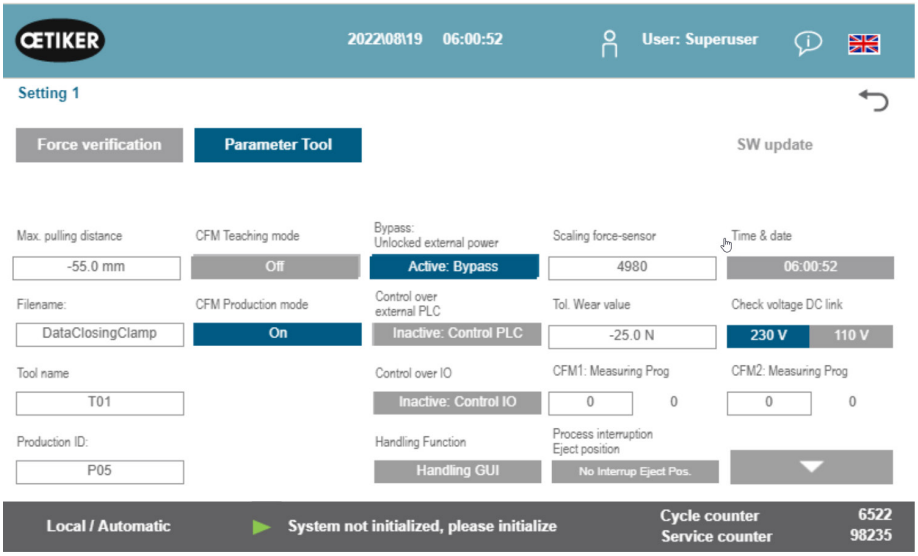


Fig. 134: *Setting parameters Tool Page 1*

8. Use the following formula to calculate the new value for the force sensor scaling:

$$NKS = D_{CAL01} / F_Z \bullet AKS$$

NKS:	New Force Sensor scaling
D_{CAL01}*:*	Average value of the CAL01 force measurement
F_Z*:*	Target force
AKS:	Old force sensor scaling

9. Input this value into the field “Force sensor scaling”).
10. Check whether there is any force deviation (zero point offset). If there is, zero the device.
11. Perform force verification to check the correct setting once again.

9.6 Replacing the control cabinet or tool mechanism

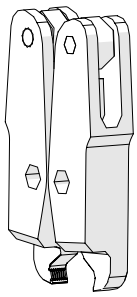
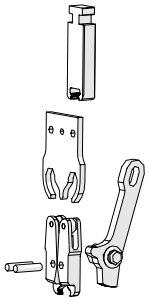
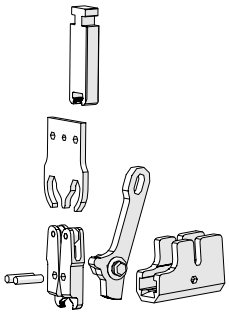
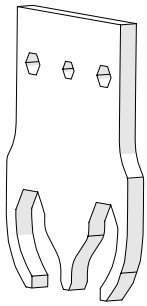
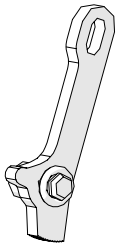
WARNING

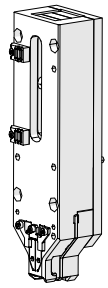
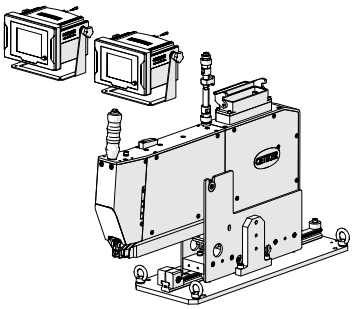
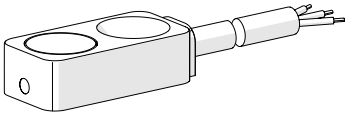
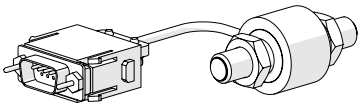
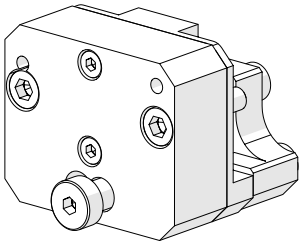
Failure to comply with the procedure described below will cause the WingGuard® strap clamps 270 to be closed with a closing force different from the set value. It is absolutely essential that the closing force is verified and the force sensor scaling factor is adjusted if necessary.

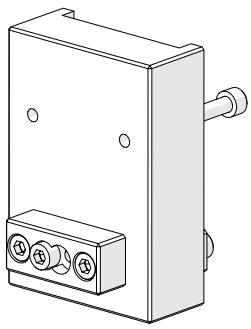
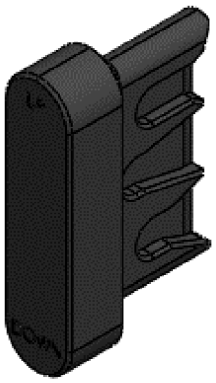
1. Remove the defective components (from the tool mechanism or control cabinet).
2. If you have to send the defective component back to Oetiker for repair, make sure you send back all the necessary components.

   The scope of the components sent back must be the same as the scope of spare components supplied.
   Caution: The scope of supply of the tool mechanism includes both the crimping force monitoring devices.
3. Install all the components within the scope of supply of the spare components.
4. Perform a closing force verification (see Section *6.8.4*).
5. If the measured closing force deviates by more than 25 N from the set value, perform readjustment of the closing force sensor (see Section 9.5).

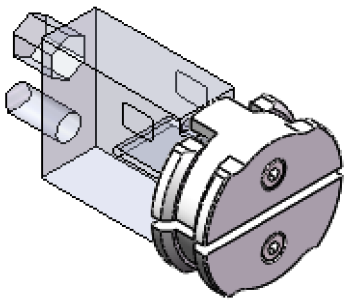
9.7 Tools and consumable materials required for maintenance

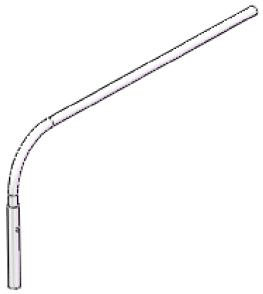
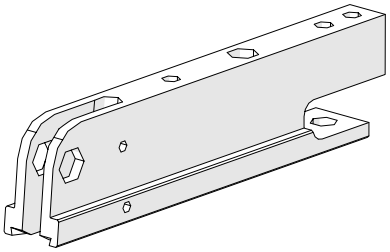
Tool error / Consumable materials		Part number	Application
Spare parts kit for the crimping jaws **(Service pack A)**		13500112	A-service
Service pack B		13500157	B-Service
Service pack C		13500228	C-service
Crimping wedge		13500324	Spare part
Spare parts kit for clamping lever		13500335	Spare part

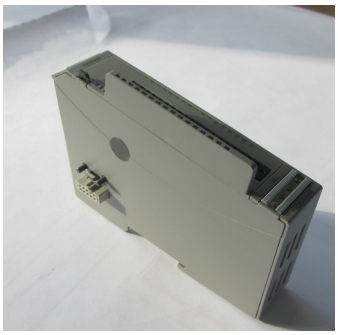
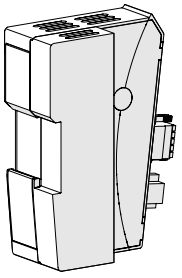
Tool error / Consumable materials		Part number	Application
Crimping cut-off head for CFM		13500215	Crimping cut-off head for quick maintenance
Crimping cut-off tool + CFM		13500352	Spare part
Profinet control cabinet - UL	–	13500374	Spare part
Ethernet IP control cabinet - IEC	–	13500373	Spare part
Ethernet IP control cabinet - UL	–	13500375	Spare part
Profinet control cabinet - IEC	–	13500380	Spare part
Sensor Clamping Unit		13500292	Spare part
Force Cell with Connector		13500293	Spare part
Press-in tool		13500342	Press in the crimping jaws

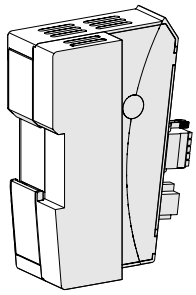
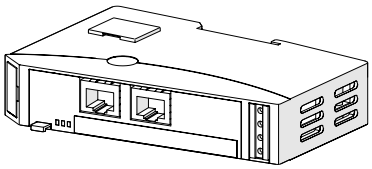
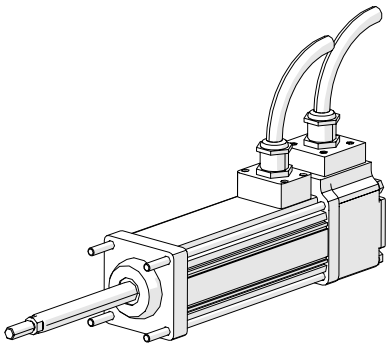
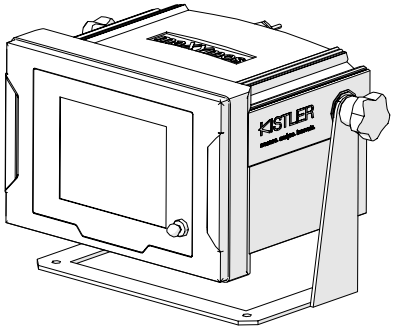
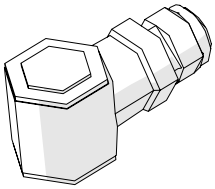
Tool error / Consumable materials		Part number	Application
Press-out tool		13500341	Press out the crimping jaws
Pull strap		13500347	Closing force verification
Installation aid for the crimping cut-off head		13500288	Facilitates the installation of the crimping head
CAL01 and SKS01		*	Closing force verification
Sensor setting strip “LED on”		13500336	Setting the strap detection sensor
Sensor setting strip “LED off”		13500337	Setting the strap detection sensor

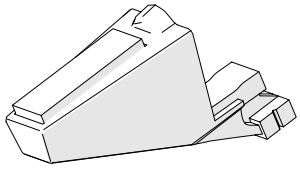
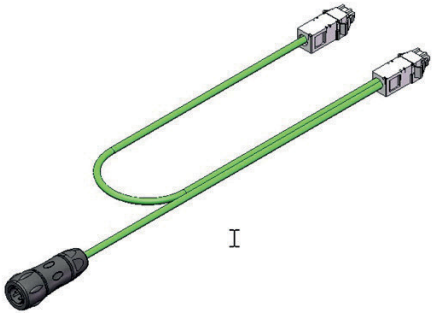
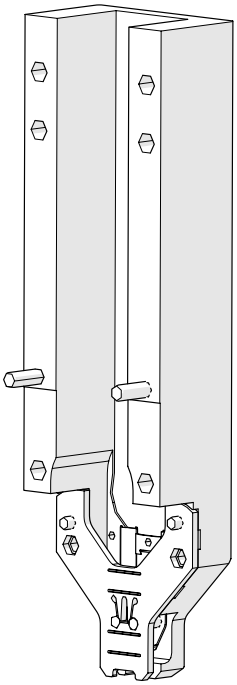
* Various different article numbers (*see section 3.3*)

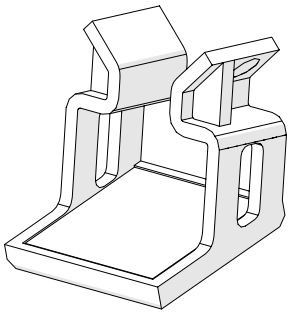
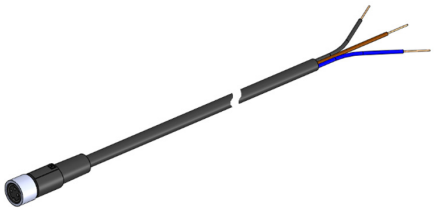
Force measurement jaws set		13500264	The force measurement jaws set is used to determine the remaining radial force on the set WingGuard® strap clamps. The set must be used in conjunction with a CAL01 and a SKS01.

Tool error / Consumable materials		Part number	Application
Proximity switch IFRM 03P3501/KS35L (Clamping unit strap sensor)		06001786	Spare part
Damper, complete		13500318	Spare part
Sensor clamping bushing		13500346	Spare part
Clamping unit rail		13500345	Spare part
Contact module NO		06001813	Spare part

Tool error / Consumable materials		Part number	Application
Contact module NC		06001814	Spare part
Servo amplifier L7NHA004U		06001892	Spare part
Measurement amplifier 1-BM40IE		06002147	Spare part
Digital input / output card		06001891	Spare part
PAC120 PROFINET PLC		06004388	Spare part

Tool error / Consumable materials		Part number	Application
PAC120 Ethernet/IP PLC		06004387	Spare part
PACIO Extender Module EtherCAT		06004389	Spare part
Drive GSM20 complete (with connection plugs)		13500271	Spare part
Force monitoring device		06001877	Spare part
Miniature force sensor 2.5kN (crimping force sensor)		06001864	Spare part

Tool error / Consumable materials		Part number	Application
Alignment aid		13500343	Positioning of the FAST 3000
Cable for the force monitoring device 2 m		06001878	Cable for connecting the crimping force sensor to the crimping force monitoring devices
Connecting Cable PLC – CFM		13500276	Spare part
Spare Part Head Housing, force monitoring		13500314	Spare part
Tool Mount Guide		13500041	Spare part

Tool error / Consumable materials		Part number	Application
Jaws checking mirror		13500351	Spare part
Sensor plug connector M8		*13500115*	Extension cable for the strap sensor
Handle, complete		*13500178*	
Safety sticker set for the FAST 3000		08904156	Spare part
Hexagon key wrench 1.5 mm			Strap sensor
Hexagon key wrench 2 mm			Safety proximity sensor, …
Hexagon key wrench 2.5 mm			Power supply chain
Hexagon key wrench 3 mm			Covers, …
Hexagon key wrench 4 mm			-
Hexagon key wrench 5 mm			Various different
Hexagon key wrench 6 mm			Transport restraint, …
Hexagon key wrench 8 mm			Jointed pin, female
Tweezers			Setting the strap sensor

Tool error / Consumable materials		Part number	Application
MICROLUBE GBU-Y 131 grease			Greasing the crimping cut-off head, Clamping unit and strap
Brush			Applying grease
Feeler gauge **0-150 mm**			Closure gap verification

10 Controlling the FAST 3000 via an external PLC

WARNING

Never operate the FAST 3000 via an external PLC, without providing the necessary safety precautions.

Failure to observe this instruction may lead to death or serious injury.

- The system integrator is responsible for the safe integration of the FAST 3000 into the assembly cell.
- The system integrator must perform a risk analysis and configure the tool in accordance with this analysis.
- If particular, if the two-hand control desk is not used, the two-hand dongle must be plugged in. An external emergency stop must be connected.
- The integration my be performed only by qualified personnel.
- If you have questions about how to perform integration contact Oetiker.

See also the circuit diagram:

- Connecting the emergency stop
- light curtain and power-on readiness

10.1 Control via a field bus (Ethernet/IP or Profinet)

The FAST 3000 can be controlled via an external control system based on the Ethernet/IP or Profinet field bus.

Connect the supervisory control system to the respective LAN port of the FAST 3000 control cabinet.

For further Information see Sections *6.2 and 7.4.5.*

10.1.1 Settings for the Ethernet/IP communication protocol

Name:	Parker
IP address:	192.168.10.51
Communication format:	Bytes
Inhibit module:	true
Use a Unicast connection via EtherNet/IP:	false

	Assembly example	Size
Input	101	256
Output	100	128
Configuration	102	2

10.1.2 Settings for the Profinet HW configuration

The GDSML file for configuration of the supervisory control system can be found on the USB stick supplied.
The following settings must be performed in the configuration of the supervisory control system:

- 256 Bytes
- 128 Bytes

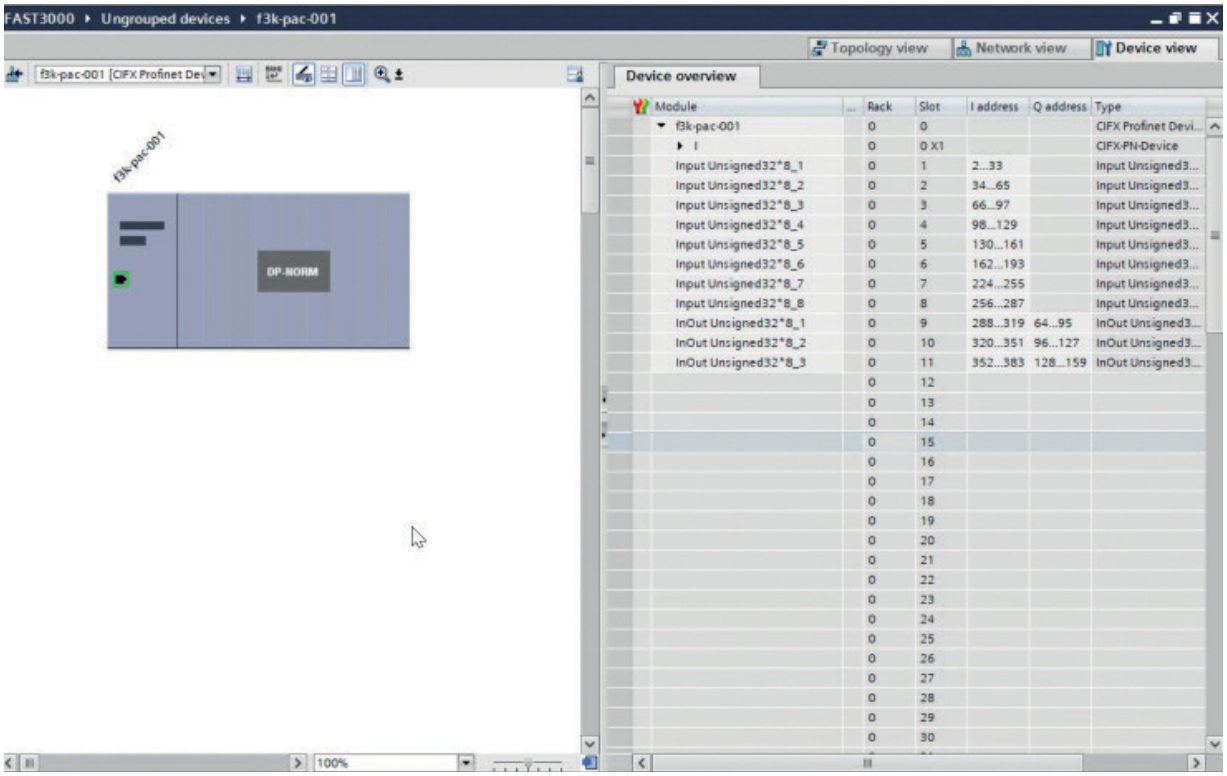


Fig. 135: *HW Configuration Profinet PLC Siemens*

10.1.3 Field bus mapping

	Adress Range	8-Bit value	Description		Data Type	Recommendation
R-DW0: Status word	0 ... 3	4	Status information			
R-DW0: Status word		Bit0	Part OK	Normal Mode	R Bool	
R-DW0: Status word		Bit1	Part not OK	Normal Mode	R Bool	
R-DW0: Status word		Bit2	Pulling force verification: Routine active	Force adjustment	R Bool	
R-DW0: Status word		Bit3	Pulling force verification: Ready for strap	Force adjustment	R Bool	
R-DW0: Status word		Bit4	Pulling force verification: Controller active	Force adjustment	R Bool	
R-DW0: Status word		Bit5	Zero balance: Routine active	Adjust to zero	R Bool	
R-DW0: Status word		Bit6	Zero balance: Ready to set it to zero	Adjust to zero	R Bool	
R-DW0: Status word		Bit7	Motion link: Powered	Tool	R Bool	
R-DW0: Status word		Bit8	Motion link: Referenced	Tool	R Bool	
R-DW0: Status word		Bit9	Pulling unit: Powered	Tool	R Bool	
R-DW0: Status word		Bit10	Pulling unit: Referenced	Tool	R Bool	
R-DW0: Status word		Bit11	Light curtain (Input to safety relay)	Tool	R Bool	
R-DW0: Status word		Bit12	PLC ready and EtherCAT running	Tool	R Bool	
R-DW0: Status word		Bit13	Feedback external Enable power	Tool	R Bool	
R-DW0: Status word		Bit14	Ready for external Enable power	Tool	R Bool	
R-DW0: Status word		Bit15	Ready for initialization	Normal Mode	R Bool	
R-DW0: Status word		Bit16	Ready for locking the clamp	Normal Mode	R Bool	
R-DW0: Status word		Bit17	Ready for start the cycle closing clamp	Normal Mode	R Bool	
R-DW0: Status word		Bit18	Busy (Cycle closing clamp active)	Normal Mode	R Bool	
R-DW0: Status word		Bit19	Error from the drives	Normal Mode	R Bool	
R-DW0: Status word		Bit20	Laboratory Mode active	Laboratory mode	R Bool	
R-DW0: Status word		Bit21	State Restart Light curtain	Safety Information	R Bool	
R-DW0: Status word		Bit22	Emergency Stop state (Input to safety relay)	Safety Information	R Bool	
R-DW0: Status word		Bit23		Safety Information	R Bool	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
R-DW0: Status word		Bit24	Request Deblocking	Deblocking	R Bool	
R-DW0: Status word		Bit25	Deblocking Routine active	Deblocking	R Bool	
R-DW0: Status word		Bit26	HMI-message «Remove strap» (cont.)	Init Poutine	R Bool	
R-DW0: Status word		Bit27	Routine Closing clamp active	Normal Mode	R Bool	
R-DW0: Status word		Bit28	Sensor: Clamp present	Tool	R Bool	
R-DW0: Status word		Bit29	Sensor: Holdup sensor	Tool	R Bool	
R-DW0: Status word		Bit30	Alive Bit	Tool	R Bool	
R-DW0: Status word		Bit31	Release clamp required	Normal Mode	R Bool	
R-DW1: Status word	4 ... 7	4	Status information			
R-Adr8	8 … 9	2	Manual Mode	.	UInt	
R-Adr10	10 … 11	2	Status message	Error Handling	UInt	
R-Adr12	12 … 13	2	Force holding Time (Closing clamp)	Tool	UInt	
R-Adr14	14 … 15	2	Time laboratory mode	Laboratory-mode	UInt	
R-Adr16	16 … 17	2	Remaining time labo-ratory mode	Laboratory-mode	UInt	
R-Adr18	18 … 18	1	Max. pieces in laboratory mode	Laboratory-mode	USInt	
R-Adr19	19 … 19	1	Remaining pieces in laboratory mode	Laboratory-mode	USInt	
R-Adr20	20 … 23	4	Closing force	Normally Mode	UDint	
R-Adr24	24 … 27	4	Cycle time	Normally Mode	UDInt	
R-Adr28	28 … 31	4	Total cycle counter	Service	UDInt	
R-Adr32	32 … 35	4	Service Cycle counter	Service	UDInt	
R-Adr36	36 … 39	4	Actual position motion link	Tool	DInt	
R-Adr40	40 … 43	4	Actual position pulling unit	Tool	DInt	
R-Adr44	44 … 47	4	Home position motion link	Parameter motion link	DInt	
R-Adr48	48 … 51	4	Insert position motion link	Parameter motion link	DInt	
R-Adr52	52 … 55	4	Crimping position motion link	Parameter motion link	DInt	
R-Adr56	56 … 59	4	Cutting position motion link	Parameter motion link	DInt	
R-Adr60	60 … 61	2	Setting minimal crimping current	Parameter motion link	UInt	
R-Adr62	62 … 63	2	Setting maximum crimping current	Parameter motion link	UInt	
R-Adr64	64 … 65	2	Setting minimal cutting current	Parameter motion link	UInt	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
R-Adr66	66 … 67	2	Setting maximum cutting current	Parameter motion link	UInt	
R-Adr68	68 … 71	4	Home position pulling unit	Parameter pulling unit	DInt	
R-Adr72	72 … 75	4	Eject position pulling unit	Parameter pulling unit	DInt	
R-Adr76	76 … 77	2	Max. tightening stroke	Parameter pulling unit	UInt	
R-Adr78	78 … 79	2	Switch Phase 1 => Phase 2	Parameter pulling unit	UInt	
R-Adr80	80 … 81	2	Tolerance Force	Parameter pulling unit	UInt	
R-Adr82	82 … 83	2	PullDistance	Parameter pulling unit	UInt	
R-Adr84	84 … 87	4	Pulling force Home position	Parameter pulling unit	DInt	
R-Adr88	88 … 91	4	Pulling force insert position	Parameter pulling unit	DInt	
R-Adr92	92 … 93	2	CFM1: Force entry EO4	CFM EO4	UInt	
R-Adr94	94 … 95	2	CFM1: Force exit EO4	CFM EO4	UInt	
R-Adr96	96 … 97	2	CFM2: Force entry EO4	CFM EO4	UInt	
R-Adr98	98 … 99	2	CFM2: Force exit EO4	CFM EO4	UInt	
R-Adr100	100 … 101	2	CFM1: Force max value	CFM	UInt	
R-Adr102	102 … 103	2	CFM2: Force max value	CFM	UInt	
R-Adr104	104 … 107	4	Warning	Error Handling	UDint	
R-Adr108	108 … 111	4	Res. Warning	Error Handling	UDint	
R-Adr112	112 … 115	4	Tool Error	Error Handling	UDint	
R-Adr116	116 … 119	4	Res. Tool Error	Error Handling	UDint	
R-Adr120	120 … 123	4	Process Error	Error Handling	UDint	
R-Adr124: Statusword VeriPullF	124 … 127	4	Statusinformation Verification Pulling unit	Verification Pulling force	UDint	
b_ReqPullVerfiAvailable		Bit 0	It's availible for a request the handling Verification pulling force (Must be true for a request , else the request will be deneid	Verification Pulling force	R_Bool	
b_ReqPullVerfiAck		Bit 1	Conformation Request handling verification pulling unit is accepted	Verification Pulling force	R_Bool	
b_ReqPullVerfiDone		Bit 2	Handling Request Verification Pulling force is done	Verification Pulling force	R_Bool	
b_ReqPullVerfiDenied		Bit 3	Handling Request Verification Pulling Force is denied	Verification Pulling force	R_Bool	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
b_StatePull-VerfiBusy		Bit 4	Function Verification Pulling Force is active	Verification Pulling force	R_Bool	
b_StatePull-VerfiInsert-Clamp		Bit 5	Function Verification Pulling Force is waiting for insert a clamp	Verification Pulling force	R_Bool	
b_StatePull-VerfiLocked-Clamp		Bit 6	Function Verification Pulling Force clamp is locked	Verification Pulling force	R_Bool	
b_StatePull-VerfPIDAct		Bit 7	Function Verification Pulling Force activation control force			
b_StatePull-Verfi-ForceReached		Bit 8	Function Verification Pulling Force, Target Force is reached	Verification Pulling force	R_Bool	
b_StatePull-VerfiDone		Bit 9	Function Verification Pulling Force Completed waiting for next verif-cation or Pull Force Quit.	Verification Pulling force	R_Bool	
b_StatePullVe-riInterruptLC		Bit 10	Function is interrupted by LightCurtain	Verification Pulling force	R_Bool	
b_StatePull-VerfiWarning		Bit 11	State Warning Verifi-cation Pulling Force	Verification Pulling force	R_Bool	
b_StatePull-VerfiError		Bit 12	State Error Verification Pulling Force	Verification Pulling force	R_Bool	
b_StateFunc-tionAbort		Bit 13	Information Function is aborted	Verification Pulling force	R_Bool	
b_StateClamp-Present		Bit 14	Sensor ClampPresent is active	Verification Pulling force	R_Bool	
b_StateTar-FOutLimit		Bit 15	Information Target Pulling force is out of Limits	Verification Pulling force	R_Bool	
R-Adr128: Statusword VeriCrimpF	128 … 129	2	Statusinformation Verifi-cation Crimping force	Verification Crimp Force	Uint	
b_Req Crimp VerfiAvailable		Bit 0	It's availible for a request the handling Verification Crimp (Must be true for a request , else the request will be deneid	Verification Crimp Force	Uint	
b_Req Crimp Verfi Ack		Bit 1	Conformation Request handling verification Crimp force is accepted	Verification Crimp Force	Uint	
b_Req Crimp Verfi Done		Bit 2	Handling Verification Crimp Force is done	Verification Crimp Force	Uint	
b_ReqCrimp VerfiDenied		Bit 3	Request handling Crimp Force is denied	Verification Crimp Force	Uint	
b_StateCrimp-ForceBusy		Bit 4	State Function Crimp Force is active	Verification Crimp Force	Uint	
b_StateCrimp-ForceFCon-trolAct		Bit 5	State Function Crimp Force Control is active	Verification Crimp Force	Uint	
b_StateCrimp-ForceDone		Bit 6	State Function Zero Balance Completed waiting for next Zero Balance or Zero Balance Quit.	Verification Crimp Force	Uint	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
b_StateCrimp-ForceWarning		Bit 7	State Warning Crimp Force Verification	Verification Crimp Force	Uint	
b_StateCrimp-ForceError		Bit 8	State Erroe Crimp Force Verivication	Verification Crimp Force	Uint	
b_StateCrimp-ForceAbort		Bit 9	State Function Crimp Force Verification Abort	Verification Crimp Force	Uint	
b_StateCrimp-ForceTarOut-Limit		Bit 10	Information Target Crimp force out of Limits	Verification Crimp Force	Uint	
R-Adr130: Statusword ZeroBaPullF	130 … 131	2	Statusinformation Zero Balance	Zero Balance	Uint	
b_ReqZBalA-vailable		Bit 0	It's availible for a request the handling Zero Balance (Must be true for a request , else the request will be deneid	Zero Balance	R_Bool	
b_ReqZBalAck		Bit 1	Conformation Request handling Zero balance is accepted	Zero Balance	R_Bool	
b_ReqZ-BalDone		Bit 2	Handling Zero Balance is done	Zero Balance	R_Bool	
b_ReqZBalD-enied		Bit 3	Request handling Zero Balance is denied	Zero Balance	R_Bool	
b_StateZB-alBusy		Bit 4	Function Zero Balance is active	Zero Balance	R_Bool	
b_StateReady-SetZero		Bit 5	Ready for set to Zero	Zero Balance	R_Bool	
b_StateZ-BalDone		Bit 6	Function Zero Balance Completed waiting for next Zero Balance or Zero Balance Quit.	Zero Balance	R_Bool	
b_StateZBalIn-terruptLC		Bit 7	Function is interrupted by Light Curtain	Zero Balance	R_Bool	
b_StateZBal-Warning		Bit 8	Warning Function Zero Balance	Zero Balance	R_Bool	
b_StateZ-BalError		Bit 9	Error Function Zero Balance	Zero Balance	R_Bool	
b_StateZBal-Abort		Bit 10	Function Zero Balance Abort	Zero Balance	R_Bool	
R-Adr132: Statusword DriveManual	132 … 135	4	Statusinformation Manual Mode Drive	Manual Drive Operation	UDInt	
b_ReqMan-ualControlA-vailable		Bit 0	It's availible for a request the handling Manual Mode (Must be true for a request , else the request will be deneid	Drive Manual Mode	R_Bool	
b_ReqManual-ControlAck		Bit 1	Conformation Request handling manual mode is accepted	Drive Manual Mode	R_Bool	
b_ReqManual-ControlDone		Bit 2	Handling Manual mode is done	Drive Manual Mode	R_Bool	
b_ReqManual-ControlDenied		Bit 3	Request handling Manual Mode is denied	Drive Manual Mode	R_Bool	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
b_StatePullingUnitAxisPowered		Bit 4	Pulling Unit is powerd	Drive Manual Mode	R_Bool	
b_StatePullingUnitReferenced		Bit 5	Pulling unit is referenced	Drive Manual Mode	R_Bool	
b_StatePul-		Bit 6	Pulling unit is moving	Drive Manual Mode	R_Bool	
b_StatePullingUnitWarning		Bit 7	Warning from Pulling unit	Drive Manual Mode	R_Bool	
b_StatePullingUnitError		Bit 8	Error from Pulling unit	Drive Manual Mode	R_Bool	
b_StatePullingUnitInitDone		Bit 9	Initialization Pulling unit is finised	Drive Manual Mode	R_Bool	
b_PullingUnitOnStartPos		Bit 10	Pulling Unit is in Start Position	Drive Manual Mode	R_Bool	
b_PullingUnitOnEjectPos		Bit 11	Pulling Unit is in Eject Position	Drive Manual Mode	R_Bool	
b_PullingUnitOnServicePos		Bit 12	Pulling Unit is in Service Position	Drive Manual Mode	R_Bool	
b_StateMotionLinkAxisPowered		Bit 16	Motion Link is powered	Drive Manual Mode	R_Bool	
b_StateMotionLinkReferenced		Bit 17	Motion Link is referenced	Drive Manual Mode	R_Bool	
b_StateMotionLinkRunning		Bit 18	Motion link is moving	Drive Manual Mode	R_Bool	
b_StateMotionLinkWarning		Bit 19	Warning from Motion link	Drive Manual Mode	R_Bool	
b_StateMotionLinkError		Bit 20	Error from Motion lilnk	Drive Manual Mode	R_Bool	
b_StateMotionLinkInitDone		Bit 21	Initialization Motion link is finised	Drive Manual Mode	R_Bool	
b_MotionLinkOnHomePos		Bit 22	Motion link is in Home Position	Drive Manual Mode	R_Bool	
b_MotionLinkOnInsertPos		Bit 23	Motion link is in Insert Position	Drive Manual Mode	R_Bool	
b_MotionLinkOnCrimpPos		Bit 24	Motion link is in Crimp Position	Drive Manual Mode	R_Bool	
b_MotionLinkOnCutPos		Bit 25	Motion link is in Cut Position	Drive Manual Mode	R_Bool	
b_MotionLinkOnSafeCutPos		Bit 26	Motion link is in Safe Cut Position	Drive Manual Mode	R_Bool	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
R-Adr136: Statusword FrictionTest	136 … 137	2	Statusinformation Friction Test	Friction test	Uint	
b_ReqFricVerfiAvailable		Bit 0	It's availible for a request the handling Friction test (Must be true for a request , else the request will be deneid	Friction test	R_Bool	
b_ReqFricVerfiAck		Bit 1	Conformation Request handling Friction test is accepted	Friction test	R_Bool	
b_ReqFricVerfiDone		Bit 2	Handling Friction test is done	Friction test	R_Bool	
b_ReqFricVerfiDenied		Bit 3	Request handling Friction test is denied	Friction test	R_Bool	
b_StateFricTestBusy		Bit 4	Active Function: "Free State Pulling Force"	Friction test	R_Bool	
b_StateFricTestDone		Bit 5	Function Friction Test Completed waiting for next Zero Balance or Zero Balance Quit.	Friction test	R_Bool	
b_StateFricTestClampPres		Bit 6	Clamp present	Friction test	R_Bool	
b_StateFricTestClamp-Locked		Bit 7	Clamp is locked			
b_StateFricTestInterruptLC		Bit 8	Function is interrupted by Light Curtain	Friction test	R_Bool	
b_StateFricTestWarning		Bit 9	Warning function friction test	Friction test	R_Bool	
b_StateFricTestError		Bit 10	Error function friction test	Friction test	R_Bool	
b_StateFricTestAbort		Bit 11	Abort function friction test	Friction test	R_Bool	
b_StateTarFOutLimit		Bit 12	Limit function friction test. Target out of range	Friction test	R_Bool	
R-Adr138: Statusword Deblocking	138 … 139	2	Reserve (Deblocking)	Deblocking	UInt	
R-Adr140: i_ForcePullVerifi	140 … 141	2	Result Pulling Force Verification	Verification Pulling force	UInt	
R-Adr142: i_ForceCrimp-VerifiSen1	142 … 143	2	Result Crimp force 1 Verification	Verification Crimp Force	UInt	
R-Adr144: i_ForceCrimp-VerifiSen2	144 … 145	2	Result Crimp Force 2 Verification	Verification Crimp Force	UInt	
R-Adr146: i_ZBalActPull-Froce	146 … 147	2	Actual Value Pulling Force Zero Balance	Zero Balance	Int	
R-Adr148: i_PullingUnitActPos	148 … 151	4	Position Pulling Unit	Drive Manual Mode	DInt	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
R-Adr152: i_MotionLink-ActPos	152 … 155	4	Position Motion Link	Drive Manual Mode	DInt	
R-Adr156: i_FricActPo-sPullUnit	156 … 159	4	Actual Position Pulling unit Friction Test	Friction test	DInt	
R-Adr160: i_MaxForce-FricTest	160 … 161	2	Max. Force Friction test	Friction test	Int	
R-Adr162: i_ForcCrim-pActSen1	162 … 163	2	Actual Force Crimp-Sensor CFM1	Verification Crimp Force	Int	
R-Adr164: i_ForcCrim-pActSen2	164 … 165	2	Actual Force Crimp-Sensor CFM2	Verification Crimp Force	Int	
R-Adr166: i_MaxCut-Current	166 … 167	2	Max. Cutting current	Parameter pulling unit	UInt	
R-Adr168:	168 … 169	2	Max. Crimping current	Parameter pulling unit	Uint	
R-ADR170: i_CFM1Act-MeasProg	170 … 171	2	Actual Measring program CFM1	General	Uint	
R-ADR172: i_CFM1Act-MeasProg	172 … 173	2	Actual Measring program CFM1	General	Uint	
W-Adrr0: Steuerwort	0 … 3	4	Commad		UDINT	
W-DW0: Steuerwort		Bit0	Start Zyklus	Normally mode	W Bool	
W-DW0: Steuerwort		Bit1	Stop Zyklus	Normally mode	W Bool	
W-DW0: Steuerwort		Bit2	Start locking the clamp	Normally mode	W Bool	
W-DW0: Steuerwort		Bit3	Acknoledge error	Normally mode	W Bool	
W-DW0: Steuerwort		Bit4	Initialization	Normally mode	W Bool	
W-DW0: Steuerwort		Bit5	ResetPartStatusBits	Normally mode	W Bool	
W-DW0: Steuerwort		Bit6				
W-DW0: Steuerwort		Bit7				
W-DW0: Steuerwort		Bit8				
W-DW0: Steuerwort		Bit9				
W-DW0: Steuerwort		Bit10	Power enable	Start mode	W Bool	
W-DW0: Steuerwort		Bit11	Bypass start power for drives	Start mode	W Bool	
W-DW0: Steuerwort		Bit12	Start deblocking	Deblocking	W Bool	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
W-DW0: Steuerwort		Bit13	Ack.message "Band remove"	Normally mode	W Bool	
W-DW0: Steuerwort		Bit14	Locking Tool	Normally mode	W Bool	
W-DW0: Steuerwort		Bit15	Closing Cycle: Enable for Working after parallel Process	Normally mode	W Bool	
W-Ard4: Steuerword VeriPullF	4 … 5	2	Command Function Verification Pulling Unit	Verification Pulling force	UInt	
b_ReqPullVerfi		Bit 0	Request Handling Verification Pulling force	Verification Pulling force	W_Bool	
b_StartPull-Verfi		Bit 1	Command Verification Pulling force Start	Verification Pulling force	W_Bool	
b_LckClamp-PullVerfi		Bit 2	Command Lock Clamp in function Verification	Verification Pulling force	W_Bool	
b_UnLCK-ClampPullVeri		Bit 3	Command Unlock Clamp in function Verification	Verification Pulling force	W_Bool	
b_ActPullVerfi		Bit 4	Command Start PID-Control Pulling Force	Verification Pulling force	W_Bool	
b_QuitPullVerfi		Bit 5	Command Quit Routine	Verification Pulling force	W_Bool	
b_ConInter-ruptLCPullVeri		Bit 6	Command Continue interrupt Light Curtain	Verification Pulling force	W_Bool	
b_AbortPull-Verfi		Bit 7	Command Abort Routine Pulling force	Verification Pulling force	W_Bool	
W-Adr6: Steuerword VeriCrimpF	6 … 7	2	Command Function Verification Crimp Force	Verification Crimp Force	UInt	
b_ReqCrimp-Verif		Bit 0	Request Handling Verification Crimp force	Verification Crimp Force	W_Bool	
b_StartCrimp-Verif		Bit 1	Command Verification Crimp Force Start Function	Verification Crimp Force	W_Bool	
b_LockCFM		Bit 2	Command Verification Crimp Force Lock CFM	Verification Crimp Force	W_Bool	
b_QuitCrimp-Verifi		Bit 3	Command Quit Verification Crimp Force	Verification Crimp Force	W_Bool	
b_Abort-CrimpVeri		Bit 4	Command Abort Verification Crimp Force	Verification Crimp Force	W_Bool	
W-Adr8: Steuerword ZeroBalPullF	8 … 9	2	Command Function Zero Balance	Zero Balance	UInt	
b_ReqZero-Balance		Bit 0	Request handling Zero Balance	Zero Balance	W_Bool	
b_StartZBal		Bit 1	Command Start function Zero Balace	Zero Balance	W_Bool	
b_SetOff-setZBal		Bit 2	Command Set the Pulling force Sensor to Zero	Zero Balance	W_Bool	
b_QuitZBal		Bit 3	Command Quit Function Zero Balance	Zero Balance	W_Bool	
b_ConInter-ruptLCZBal		Bit 4	Command Continue interrupt Light curtain	Zero Balance	W_Bool	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
b_AbortZBal		Bit 5	Command Abort Function Zero Balance	Zero Balance	W_Bool	
W_Adr10: Steuerword Friction Test	10 … 11	2	Command Function Friction Test	Friction test	UInt	
b_ReqFricTest		Bit 0	Request handling Friction Test	Friction test	W_Bool	
b_StartFricTest		Bit 1	Command Start function Friction test	Friction test	W_Bool	
b_LckCaImp-FricTest		Bit 2	Command Lock the clamp Friction test	Friction test	W_Bool	
b_UnLck-ClampFricTest		Bit 3	Command Release the clamp Friction Test	Friction test	W_Bool	
b_StartFricT-estPull		Bit 4	Command Friction test start pulling	Friction test	W_Bool	
b_ContInter-ruptLCFricTest		Bit 5	Command Continue Interrupt Light Curtain	Friction test	W_Bool	
b_Abort-FricTest		Bit 6	Command Abort Routine Friction Test	Friction test	W_Bool	
W-Adr12: Steuerword DriveManaul	12 … 15	4	Command Function Manaul Mode Drive	Manual Drive Oparation	UDInt	
b_ReqManual-Control		Bit 0	Request handling Drive Manaul Mode	Drive Manual Mode	W_Bool	
b_PullingUnit-PowerAxis		Bit 1	Power for Pulling Unit	Drive Manual Mode	W_Bool	
b_PullingUni-tInitAxis		Bit 2	Init Pulling Unit	Drive Manual Mode	W_Bool	
b_PullingUnit-StartPos		Bit 3	Command go to Start Position Pulling Unit	Drive Manual Mode	W_Bool	
b_Pulling Unit Eject Pos		Bit 4	Command go to Eject Position Pulling Unit	Drive Manual Mode	W_Bool	
b_PullingUnit ServicePos		Bit 5	Command go to Service Position Pulling Unit	Drive Manual Mode	W_Bool	
b_MotionLink-PowerAxis		Bit 9	Power for Motion Link	Drive Manual Mode	W_Bool	
b_MotionLinkI-nitAxis		Bit 10	Init for Motion Link	Drive Manual Mode	W_Bool	
b_MotionLink-HomePos		Bit 11	Command go to Home Position Motion Link	Drive Manual Mode	W_Bool	
b_MotionLink-InsertPos		Bit 12	Command go to Insert Position Motion Link	Drive Manual Mode	W_Bool	
b_MotionLink-CrimpPos		Bit 13	Command go to Crimp Position Motion Link	Drive Manual Mode	W_Bool	
b_MotionLink-CutPos		Bit 14	Command go to Cut Position Motion Link	Drive Manual Mode	W_Bool	
b_MotionLink-SafeCutPos		Bit 15	Command go to Safe Cut Position Motion LinkSafe	Drive Manual Mode	W_Bool	
W_Ard16: steuerword Deblocking	16 … 17	2	Reserve (Deblocking)	Deblocking	UInt	

	Adress Range	8-Bit value	Description		Data Type	Recommendation
W-Adr18: i_TargetFor-cePullVerifi	18 … 19	2	Target Force Pulling Force Verification	Verification Pulling force	UInt	
W-Adr20: i_CalValFor-cePulVerifi	20 … 21	2	Value CAL01 Verification Pulling Verification	Verification Pulling force	UInt	
W-Adr22: i_TargetForce-CrimpForce	22 … 23	2	Target Force Crimp Force Verification	Verification Crimp Force	UInt	
W-Adr24: i_CalValFroce-CrompVerifi	24 … 25	2	Value CAL01 Verification Crimp Verification	Verification Crimp Force	UInt	
W-Adr26: i_TargetPos-FricTest	26 … 27	2	Target Position Friction test	Friction test	Int	
W-Adr28: i_TargetSpeed-FricTest	28 … 29	2	Target speed Friction test	Friction test	UInt	
W-Adr30:	30 … 31	2	Time Offset		Int	
W-Adr32:	32 … 35	4	Unix Time stamp		UDInt	
W-Adr36: i_TargetCFM-1MeasProg	36 … 37	2	Target Measring program CFM1	General	Int	
W-Adr38: i_TargetCFM-2MeasProg	38 … 39	2	Target Measring program CFM1	General	Int	

R Real	3 decimal fraction
R Real	2 decimal fraction

x:	Values for process documentation
y	Values for building up experience

Bit0: Manual mode
Bit1: Automatic Mode
Bit2: Labor Mode 2 Hand-Control
Bit3: Labor Mode Foot-Pedal
Bit4: Reserve
Bit5: Command Lokal
Bit6: Command HW I/O
Bit7: Command Bus
Bit8: Reserve
Bit9: Handling Function GUI
Bit10: Bus operating function

10.1.4 Addition to industrial communication

R-DW43 Warning

Hereby the messages from Section 7.4.9 (error list) are transmitted. It is the messages (warnings) 100 to 199. In these cases, 100 is subtracted from the error number, and then the number is bitwise added to the sum.

Error	Weighting	Value	Description
x01	2^1	2	War_101 Error acknowledged
x02	2^2	4	War_102 Check start button contacts
x03	2^3	8	War_103 No power -> press start / and init
x04	2^4	16	War_104 CFM box warning / error
x05	2^5	32	War_105 Soon service necessary
x06	2^6	64	War_106 Service necessary
x07	2^7	128	War_107 Stop about light curtain
x08	2^8	256	War_108 Mode CFM teaching active
x09	2^9	512	War_109 Drives Tool not powered
x10	2^10	1024	War_110 No Power -> activate external enable signal, then press Start
x11	2^11	2048	War_111 Remove strap
x12	2^12	4096	War_112 Abort pulling force verification
x13	2^13	8192	War_113 Abort verification crimp force
x14	2^14	16384	War_114 Stop about external stop command
x15	2^15	32768	War_115 External Signal strap lock is on
x16	2^16	65536	War_116 EtherCAT - bus not running
x17	2^17	131072	War_117 Init command is pending
x18	2^18	262144	War_118 Please check function light curtain
x19	2^19	524288	War_119 Manual Mode: Run the command before the last run end (Pulling unit)
x20	2^20	1048576	War_120 Manual Mode: Run command before last run end (Motion link)
x21	2^21	2097152	War_121 Friction Test Target outside tolerance
x22	2^22	4194304	War_122 Verification Crimp Force Target outside tolerance
x23	2^23	8388608	War_123 Pulling force verification Target outside tolerance
x24 *	2^24	16777216	War_124 Warning Friction Test
x25 *	2^25	33554432	War_125 Warning Verification Crimp Force
x26 *	2^26	67108864	War_126 Warning pulling unit verification
x27 *	2^27	134217728	War_127 Warning Zero Balance
x28	2^28	268435456	War_128 Warning Change LC relay soon
x29	2^29	536870912	War_129 Warning Change LC relay
x30	2^30	1073741824	War_130 Light curtain enable absent
x31	2^31	2147483648	War_131 Stop after abort cmd
x31	2^31	2147483648	War_132 CFM1 Wrong Number Measuring Prog.
x00	2^0	1	War_133 CFM2 Wrong Number Measuring Prog.
x01	2^1	2	War_134 Temperature Enclosure Cabinet to high

* Reserved warning, but not in use

R_DW44 Tool Error

Hereby the messages from Section 7.4.9 (error list) are transmitted. It is the messages (tool errors) 200 to 299. In these cases, 200 is subtracted from the error number, and then the number is added bitwise to the sum.

Error	Weighting	Value	Description
x01	2^1	2	ToErr_201 Strap present -> remove & acknowledge
x02	2^2	4	ToErr_202 Clamping unit not in home position STO-> Initialize
x03	2^3	8	ToErr_203 Check pulling unit and cut-off unit
x04	2^4	16	ToErr_204 Position sensor defective
x05	2^5	32	ToErr_205 Drive error active
x06	2^6	64	ToErr_206 Emergency circuit open
x07	2^7	128	ToErr_207 Light curtain during init sequence
x08	2^8	256	ToErr_208 Verification CFM error phase 1
x09	2^9	512	ToErr_209 Verification CFM error phase 2
x10	2^10	1024	ToErr_210: Verifying the crimping force: No force increase
x11	2^11	2048	ToErr_211 Check strap scrap
x12	2^12	4096	ToErr_212 CFM general warning/error
x13	2^13	8192	ToErr_213 Check pulling force sensor
x14	2^14	16384	ToErr_214 Emergency stop
x15 *	2^15	32768	ToErr_215 Pulling unit not in home position
x16	2^16	65536	ToErr_216 Tool drive lost power during the cycle
x17	2^17	131072	ToErr_217 Pulling force verification; Target force not reached
x18	2^18	262144	ToErr_218 Tool locked by external bus signal
x19	2^19	524288	ToErr_219 Manual mode: More than 1 run command at pulling unit
x20	2^20	1048576	ToErr_220 Manual mode: More than 1 run command Motion Link
x21 *	2^21	2097152	ToErr_221 Error Friction test
x22 *	2^22	4194304	ToErr_222 Crimp force verification error
x23 *	2^23	8388608	ToErr_223 Pulling unit verification error
x24 *	2^24	16777216	ToErr_224 Error Zero Balance
x25	2^25	33554432	ToErr_225 Motion Link undervoltage
x26	2^26	67108864	ToErr_226 Pulling unit undervoltage
x27	2^27	*134217728*	*ToErr_227 EtherCAT not running*
x28	2^28	*268435456*	*ToErr_228 Check pulling force sensor*
x29	2^29	*536870912*	*ToErr_229 CFM wrong Measuring Program*

* Reserved error but not in use

R_DW45 Process error

Hereby the messages from Section 7.4.9 (error list) are transmitted. It is the messages (process errors) 300 to 399. In these cases, 300 is subtracted from the error number, and then the number is added bitwise to the sum.

Error	Weighting	Value	Description
x01	2^1	2	PrErr_301 Max. pulling travel exceeded
x02	2^2	4	PrErr_302 Max. pulling time exceeded
x03	2^3	8	PrErr_303 Crimping CFM1 envelope 1
x04	2^4	16	PrErr_304 Crimping CFM1 envelope 2
x05	2^5	32	PrErr_305 Crimping CFM1 NoPass
x06	2^6	64	PrErr_306 Crimping CFM1 wear
x07	2^7	128	PrErr_307 Crimping CFM2 envelope 1
x08	2^8	256	PrErr_308 Crimping CFM2 envelope 2
x09	2^9	512	PrErr_309 Crimping CFM2 NoPass
x10	2^10	1024	PrErr_310 Crimping CFM2 wear
x11	2^11	2048	PrErr_311 General error crimping
x12	2^12	4096	PrErr_312 Cutting error
x13	2^13	8192	PrErr_313 Force limit exceeded
x14	2^14	16384	PrErr_314 Max. pulling force exceeded
x15	2^15	32768	PrErr_315 Closing force out of tolerance
x16	2^16	65536	PrErr_316 Max. force at stop from light curtain
x17	2^17	131072	PrErr_317 Max. force during move to throw-off position
x18	2^18	262144	PrErr_318 Process interrupt
x19	2^19	524288	PrErr_319 Max. force at stop from Bus
x20	2^20	*1048576*	*PrErr_320 CFM1: Abort line crossed*
x21	2^21	*2097152*	*PrErr_321 CFM2: Abort line crossed*

10.1.5 Handling Function

The individual functions can be handled via the GUI or via industrial communication. From where the individual functions are handled must be set in the GUI.

Handlings via GUI

It is possible to change between individual functions in manual mode without initialization being necessary. That is the case for: Verify pull, zero balance & verify crimping force.

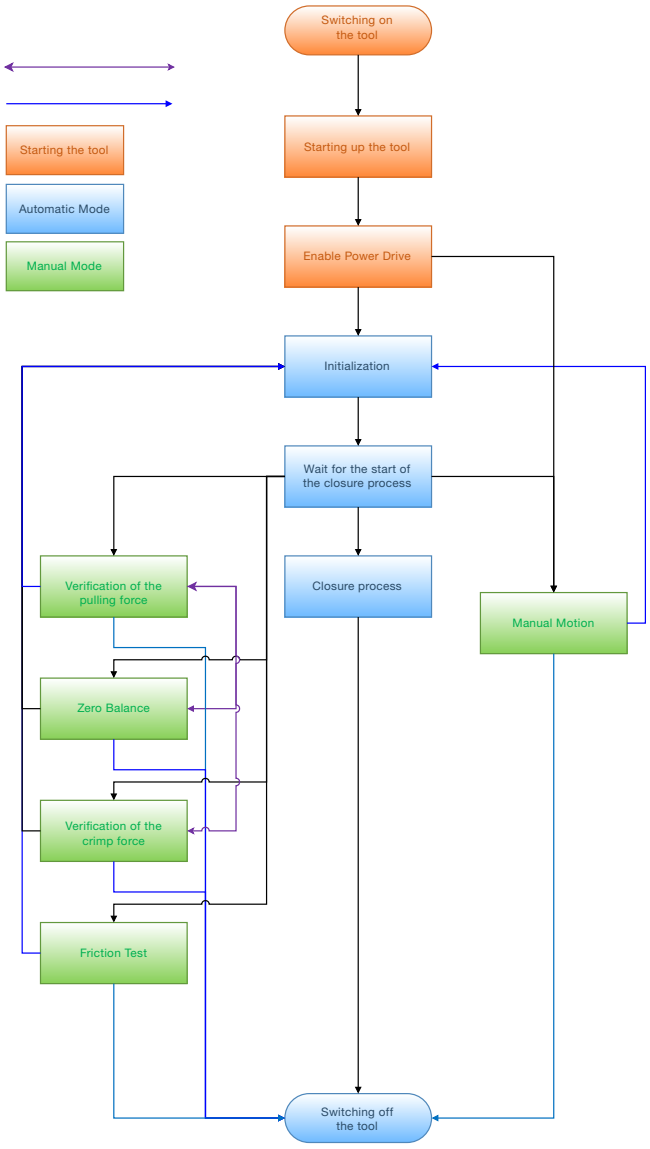


Fig. 136: *Operation via the GUI for manual functions*

Operation via industrial communication

When selecting the individual handlings in manual mode via ind. communication, the tool must always be reinitialized after exiting.

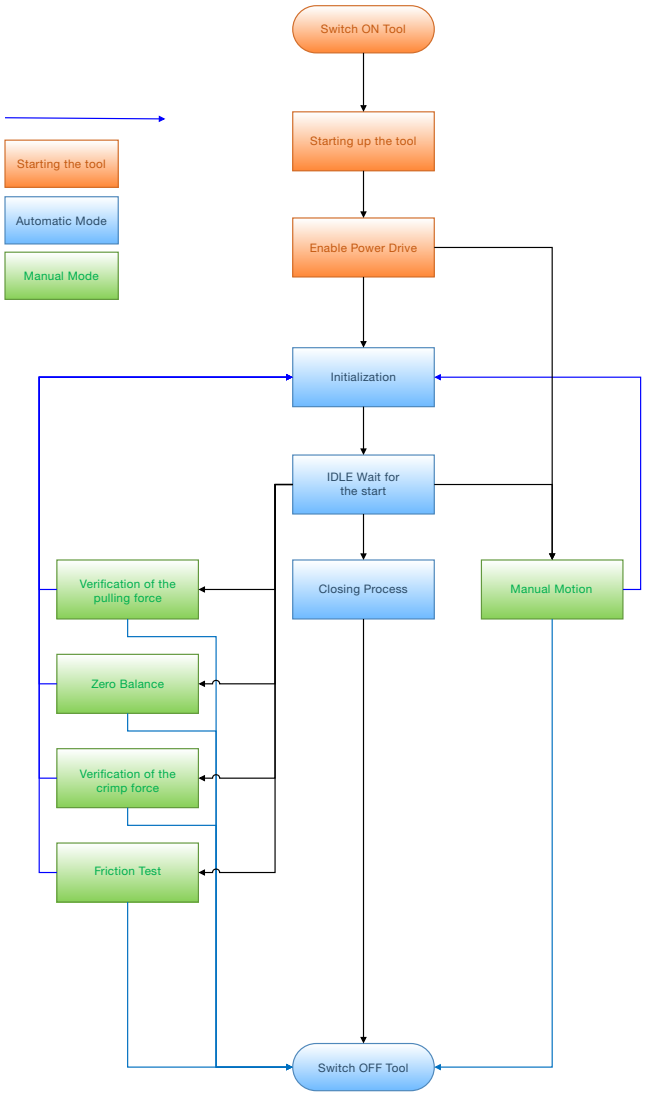


Fig. 137: *Operation via ind. Communication for the manual functions*

10.2 Overview of the state machine in the PLC

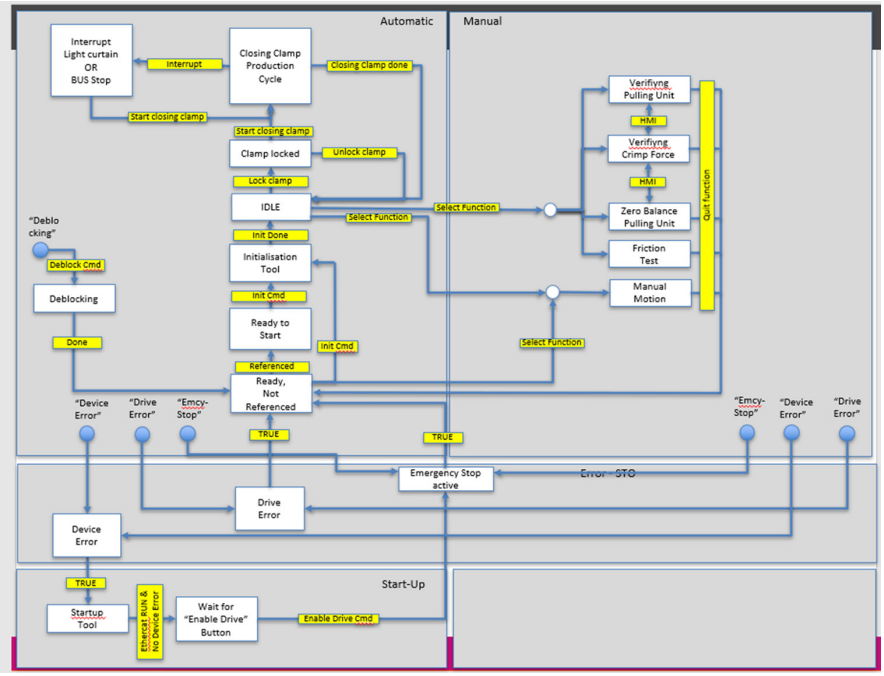


Fig. 138: *Flowchart Statemachine*

To control the various functions via industrial communication, the corresponding function must be selected in the settings.

10.3 Control via 24-V I/O signals

As an alternative to the bus the FAST 3000 can be controlled via 24-V signals.

Details of the connection for external control at the control cabinet of the FAST 3000 can be found in the circuit diagram on pages 350, 351, 352. For further information about activating control via I/O *see Sections 7.4.5 and 7.4.7* (Settings, Tool Parameters).

11 Decommissioning, transport, storage, recommissioning

11.1 Decommissioning

If the FAST 3000 is to remain out of service for an extended period, it must be decommissioned.

- Withdraw the electrical plug.
- Clean the FAST 3000 before putting it into storage.
- Replace all defective parts.
- Store the FAST 3000 in a clean dry place and protect it from dust.

11.2 Transport

The parts of the FAST 3000 are heavy. Always use appropriate means of transport. Always use two persons when lifting the tool.

Use the transport restraint to prevent linear and rotational movement of the tool mechanism during transport.

Remove the transport restraint before recommissioning.

CAUTION

Risk the machine may be dropped during transport!

- ▶ Do not remain underneath the machine.
- ▶ Wear safety equipment (particularly safety shoes).

CAUTION

Risk of dropping the control cabinet during transport!

- ▶ Do not remain underneath the machine.
- ▶ Wear safety equipment (particularly safety shoes).

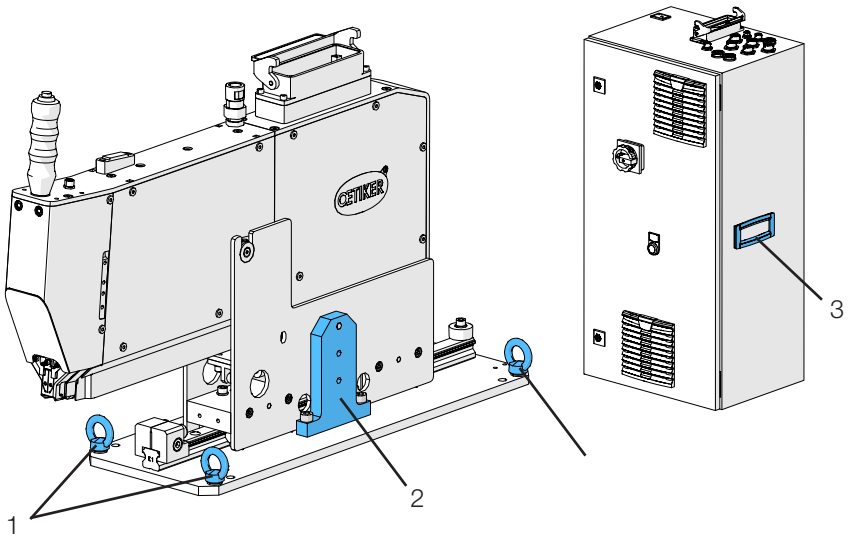


Fig. 139: *Transport Tool*

1. Transport eyes
2. Transport restraint
3. Handle

11.3 Storage

If the FAST 3000 is to remain out of service for an extended period, it must be decommissioned.

- Withdraw the electrical plug.
- Clean the FAST 3000 before putting it into storage.
- Replace all defective parts.
- Smear the mechanical parts with rust inhibitor.
- Store the FAST 3000 in a clean dry place and protect it from dust.

11.4 Recommissioning

If the FAST 3000 is to be taken back into use, it must be recommissioned.

- Check the FAST 3000 for defective parts or rust and perform any necessary repairs or maintenance.
- Perform setting up, see Section *6.1*.

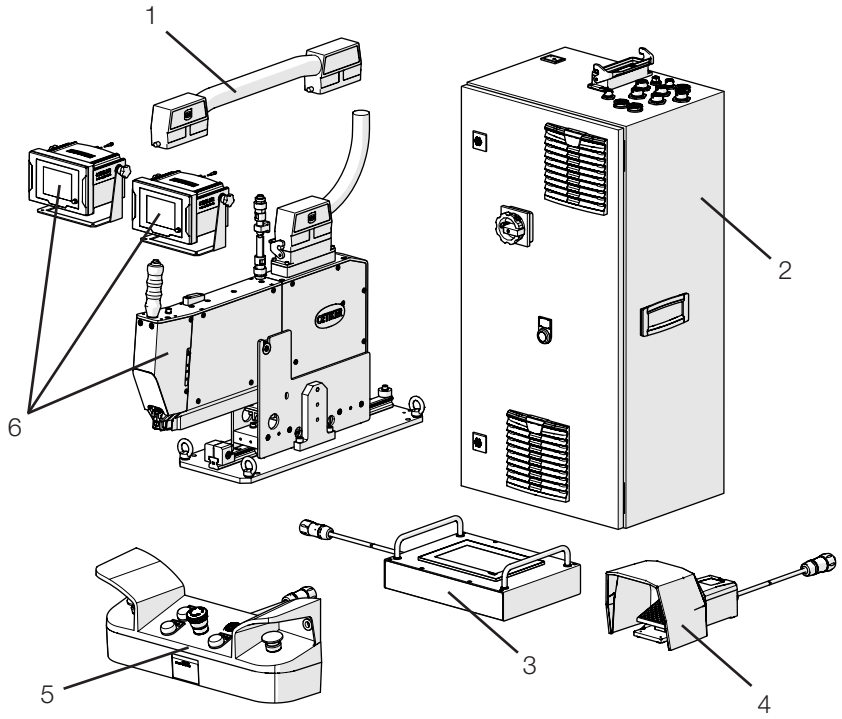
11.5 Disposal

The disposal of the tool, all replacement parts and in particular the operating materials used or other substances hazardous to the environment must be carried out by specialist companies in accordance with the applicable legal regulations.

12 Technical data

- For use only indoors
- Temperature range: 5 °C to 40 °C
- Max. relative atmospheric humidity: 80 % at temperatures up to 31 °C
- 110 V or 220/230 V 50-60 Hz AC, grounded
- Closing force tolerance: ±100 N
- Max. noise level: 75 dBA
- Machine capability: $C_{mk} > 1.33$ at 1850 ± 50 N
- Closing Force: 800 to 2500 N

Dimensions and weight



Item	Component	Approximate dimensions [mm]	Approximate weight [kg]
1	Connecting cable	–	2.5
2	Control cabinet	300 x 400 x 800	40
3	Touch Panel	340 x 220 x 120	2
4	Foot pedal	260 x 150 x 140	1.5
5	Two-hand control desk	465 x 190 x 120	2.5
6	Installation tool	610 x 71 x 470 (without base plate)	30
	Crimping force monitoring device	190 x 195 x 125	1

13 Troubleshooting and error messages

13.1 General instructions in the event of errors

- If the closing operation cannot be started or if functional faults occur during operation, then the technical personnel responsible for maintenance of the FAST 3000 should be contacted.
- Errors may only be corrected in a technically correct manner. If in doubt contact Oetiker (www.oetiker.com).

13.2 What should I do, if …?

Type of error	Reason for fault	Actions to rectify fault
Closure operation will not start	Tool not switched on	Switch tool on.
	Emergency Stop button activated	Deactivate the Emergency Stop button.
	Tool not initialized	Initialize tool.
	Clamp not inserted correctly (check the strap detection signal)	Insert the clamp correctly.
	Not all the required connectors have been inserted	Insert all the connectors required for the tool.
	Incorrect operating mode	Change the operating mode settings.
	Light curtain activated and light curtain damaged	Repair the light curtain.
	The FAST 3000 is in manual mode	Switch to Automatic mode and initialize the tool.
	Power to the drives not switched on	Press the green button on the control cabinet to switch on the power to the drive.
Initialization of FAST 3000 does not function	Insert a WingGuard® strap clamp strap into the clamping unit	Remove the strap. To release the clamping lever, it may be necessary to remove a front cover and the strap pulled out of the crimping cut-off head.
	Strap sensor soiled	Clean the strap sensor.
	Two-hand control panel not connected to the control cabinet	Connect the two-hand control panel to the control cabinet.
	Control cabinet defective	Send the unit back to OETIKER.
	Emergency Stop activated	Press and release the Emergency Stop button. Initialize the FAST 3000.
	Power to the drives not switched on	Press the green button on the control cabinet to switch on the power to the drive.
	One of the fuses in the control cabinet has responded	Check the control cabinet and the device. If test OK, switch on the fuse again.
	Incorrect operating mode	Change the operating mode settings.
	Light curtain activated and light curtain damaged	Repair the light curtain.
	No values stored for the parameters	Use Oetiker Service Center to reset the parameters of the PLC to the factory settings.
	Initialization cannot be performed due to the current operating state	Activate the emergency stop then deactivate it again.

Type of error	Reason for fault	Actions to rectify fault
Tool switched on, no display	Touch panel not connected to the control cabinet	Connect the touch panel to the control cabinet.
	Control cabinet defective	Send the unit back to OETIKER.
	Incorrect network address set on the display or on the controller	Set the network address correctly.
	Incorrect settings on the display	Have the display settings performed by the Oetiker Service Center.
	One of the fuses in the control cabinet has tripped	Check the control cabinet and the device. If test OK, switch on the fuse again.
Clamp is crimped on only one side	Crimping jaw broken	Replace the crimping jaws as a set.
	Crimping jaw pivot pin broken	Replace the pivot pin
Strap is not cut off	Cut-off die broken	Replacing the cut-off die
	Cut-off die guide not installed correctly	Perform installation of the cut-off die guide in accordance with the description (*see section 9.3.3).*
The crimping jaws cut into the clamp housing	Cut-off die guide not installed correctly	Perform installation of the cut-off die guide in accordance with the description (*see section 9.3.3).*
	Incorrect horizontal positioning of the FAST 3000	Check the correct positioning of the horizontal stop, in order to ensure the correct position of the clamp housing.
	When the WingGuard® clamp is closed, the tool head is not in the right position	Check whether a part is blocking the path of the tool head to its correct position as the clamp closes.
An inserted clamp cannot be removed from the FAST 3000 during the production	The WingGuard® clamp is blocked by the pushed-in clamping lever. Initialization cannot be performed due to an inserted clamp	Use the unblocking function (*see section 6.8.1*). If the unblocking function does not perform correctly, continue with the following steps: Switch the FAST 3000 off securely. Remove one of the front side covers and the cover of the crimping cut-off head. Slacken the fastening screws of the crimping cut-off head by a few turns and pull the head back slightly. The push rod of the clamping lever can now be loosened, so that the strap end of the WingGuard® clamp can be removed from the clamping unit and the head. Assemble the FAST 3000. Switch the device on and initialize it.
Crimping force level too high	Crimping jaws not run in	Undo some WingGuard® clamps. The crimping jaws will run in and the crimping force will take on the usual values.

Type of error	Reason for fault	Actions to rectify fault
Inserted clamp cannot be removed after the FAST 3000 was switched on	Drives cannot be initialized as the tool is detecting a clamp in the clamping unit.	Switch off the FAST 3000. Remove a front cover and push the clamping lever rod in the direction of the crimping cut-off head. Remove the clamp strap from the crimping cut-off head. The FAST 3000 is now ready for initialization. Mount the front cover again and switch on the FAST 3000. Initialize the FAST 3000.
No response by the FAST 3000 to the inputs (such as the strap locking button)	The FAST 3000 is in “Control via external PLC” or “Control via I/O” mode	Deactivate “Control via external PLC” or “Control via I/O”.
	The I/O module is not correctly plugged in to the PLC (connector or module)	Attach the connector correctly.
		Connect the module correctly.
	EtherCAT-Bus not ready for operation	Check whether all the devices are connected correctly, particularly the connections for the measurement amplifier of the pulling forces and the connections of the crimping force monitoring devices.
Tool error	Servo drive error	Refer to the manual for the drive "LH7N”.

13.3 Error messages and their resolution

13.3.1 Warnings

War_101: Error acknowledged

Errors and warnings have been acknowledged. No action necessary.

War_102: Check the switch contacts

	**NOTICE** For reasons of safety, the two start buttons on the manual control each have two channels. Every time a button is pressed, a plausibility check is performed. If the button is depressed too slowly this prompts an error War_102. ► Use the deblocking function (*see section 6.8.1*) to move the tool into a status where initialization can be performed.

► Use the deblocking function (*see section 6.8.1*).

If at the next cycle the FAST 3000 operates correctly:

► **Depress the start buttons quickly.**

If at the next cycle despite the buttons being depressed quickly the FAST 3000 once again exhibits the same error:

► Replace the contacts of the start button.
► Check the wiring of the buttons.

War_103: No power -> press start / Init

	**NOTICE** The power supply of the drive is not activated.

Remedy:

► Press the start button on the control cabinet door.
The start button will light up green.
► Initialize the device.

War_104: CFM box warning

	**NOTICE** This warning occurs when the Parker PLC is unable to communicate with the Kistler units when outside of a closing process.

Remedy:

► Perform an error analysis for both crimping force monitoring devices.

War_105: Service due soon

NOTICE

This warning occurs when the service counter reaches the number of cycles limit (Number of cycles for service (default 100,000 cycles) - Service cycles warning (default 100 cycles)). The message is repeated every ten closures.

Remedy:

► Perform the service and reset the service counter.

War_106: Service due

NOTICE

This warning occurs when the service counter reaches the number of cycles for service (default 100,000 cycles). The message appears periodically every two closures.

Remedy:

► Perform the service and reset the service counter.

War_107: Stop triggered by the light curtain

NOTICE

This warning occurs when the light curtain circuit has been broken.

► Prevent the light curtain tripping.

War_108: CFM teaching mode active

NOTICE

The message appears when the “CFM teaching mode” is active. As long as this mode remains active, the results of the CFM will be ignored. The message appears after five closures.

Remedy:

► Activate the “CFM Production Mode” setting in the “Settings" menu “Tool Parameters” sub-menu.

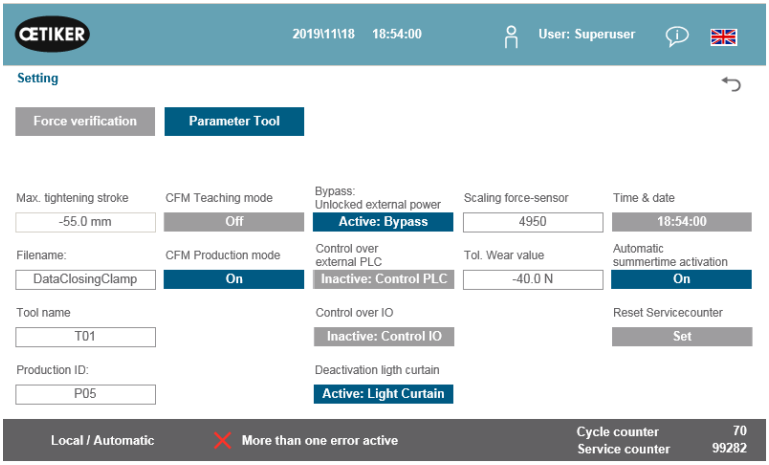


Fig. 140: *Set parameters Tool Page 1*

War_109: No power to tool

	**NOTICE** The power supply to the motion link or to the pulling drive is not activated.

Remedy:

- ► Re-establish the power supply to the tool. Switch on at the green button on the control cabinet door and initialize the tool.

War_110: No power supply – external enable, press Start

	**NOTICE** The power supply of the drive is not activated.

Remedy:

- ► Press the start button on the control cabinet door.
- ► The start button will light up green.
- ► No response to the start button: Check that the supervisory system enable flag is present (DI or BUS “Power enable”).

War_111: Remove strap

	**NOTICE** This warning appears during initialization. For safety reasons it may happen that during initialization the pulling unit moves to the ejection position and then the message appears that surplus pieces of the clamping strap must be removed.

Remedy:

- ► Check that there is no strap material present in the pulling unit and that the crimping cut-off head is free of foreign bodies (such as the WingGuard® clamp housing).

War_119: Manual mode: Run the command before the last run end (Pulling unit)

	**NOTICE** In manual mode -> Manual movement function -> Pulling unit: A new command was sent before execution of the old run command had been completed.

Remedy:

- ► Change the sequence for controlling the run command in the external PLC.

War_120: Manual mode: Run command before last run end (Motion link)

	**NOTICE** In manual mode -> Manual movement function -> Pulling unit: A new command was sent before execution of the old run command had been completed.

Remedy:

► Change the sequence for controlling the run command in the external PLC.

War_121: Friction Test: Target outside tolerance

	**NOTICE** The target values for the friction test function are outside the limits. The target values are limited to the limit values.

Remedy:

► Change the target values for the end position and the speed setting for the friction test.
Tolerances: See the mapping list.

War_122: Ververifying the crimping force: Target value outside tolerance

	**NOTICE** The target values for verification of the crimp force are outside the limits. The target values are limited to the limit values.

Remedy:

► Change the target values for the end position and the Cal01 value for verification of the crimp force.
Tolerances: See the mapping list.

War_123: Verifying the pulling unit: Target value outside tolerance

	**NOTICE** The target values for the pulling unit verification function are outside the limits. The target values are limited to the limit values.

Remedy:

► Change the target values for the end position and the Cal01 value for the pulling unit verification.
Tolerances: See the mapping list.

	**NOTICE** **The warnings 112-118 will be described in the next issue of the manual, see section *7.4.9***

13.3.2 Tool error

ToErr_201: (W) strap present -> remove & acknowledge

	**NOTICE** At each closure cycle a check is performed to determine whether the strap end has fallen from the clamping unit: The strap sensor checks whether the strap end is still present in the ejection position of the clamping unit. If it is, the warning War_111 is output. During initialization the tool checks whether a strap is present or not. The check is performed before the tool seeks to move the drives to the home position. If a clamp is present in the tool and the housing is not correctly positioned, this can lead to incorrect home positions of the drives.

Remedy:

If a strap end is present in the clamping unit:

- ► Remove one of the front covers.
- ► Press the ejector pulling rod in the direction of the crimping cut-off head and remove the strap end.

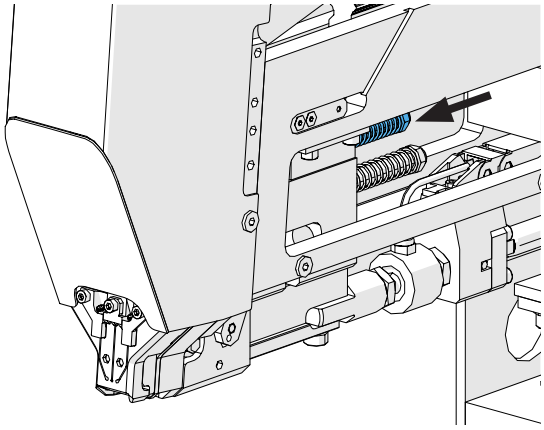


Fig. 141: *Clamping unit*

If the strap sensor is covered with particles of metal:

- ► Clean the area around the strap detection sensor. To clean the sensor it may be necessary to remove a front cover and push back the clamping unit slide.

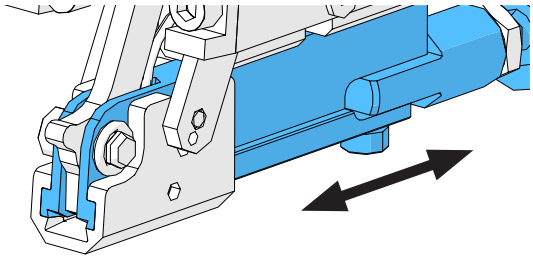


Fig. 142: *Clamping unit*

If the strap sensor fails the I/O test:

- ► Check the function of the sensor.
- ► Check the connection of the strap sensor plug.
- ► Check the connection of the extension cable in the tool socket.
- ► Check the I/O module in the FAST 3000 PLC.

ToErr_202 Clamping unit not in home position STO-> Initialize

	NOTICE
	Before starting the closure cycle the tool performs a safety check to determine whether the clamping unit is in its starting position. (If for instance the clamping unit is set in motion inadvertently when a finger is present between the clamp and the parts to be connected, this can lead to injuries.) If the position sensor detects that the clamping unit is not in its starting position, both the electrical drives are switched off. A plausibility check is performed during every closing cycle (to check whether the signal has changed its status).

Remedy:

If the tool performs initialization successfully:

The error was resolved.

If the clamping unit position sensor fails the I/O test:

- ► Check the function of the sensor.

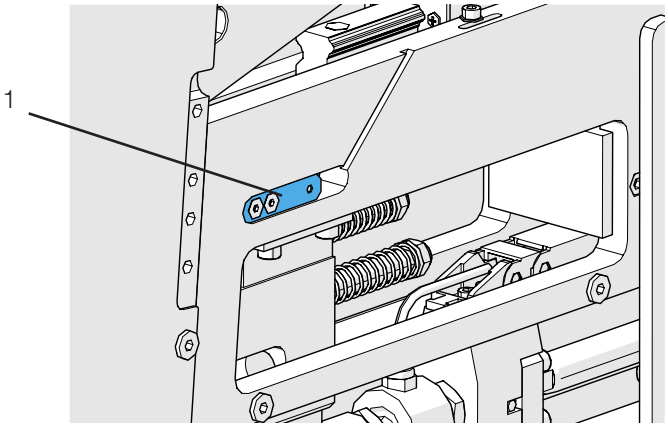


Fig. 143: *Standstill sensor*

- ► Check the connection of the sensor cable in the tool socket.
- ► Check the attachment condition of the force load cell as described in the Service Instructions.
- ► Check the I/O module in the FAST 3000 PLC.

If the clamping unit position sensor is dirty:

- ► Clean the sensor.

ToErr_204: Position sensor defective

The clamping unit position sensors failed the plausibility test.

NOTICE

This error occurs when the clamping unit position sensor fails the position sensor test.

Remedy:

See section „ToErr_202 Clamping unit not in home position STO-> Initialize“

If the clamping unit position sensor is dirty:

- ► Clean the sensor.
- ► Check the function of the sensor.
- ► Check the connection of the sensor cable in the tool socket.
- ► Check the attachment condition of the force load cell as described in the Service Instructions.
- ► Check the I/O module in the FAST 3000 PLC.

ToErr_205: Drive error active

If the green power enable button on the control cabinet door fails to light up:

NOTICE

This error occurs when a drive error is active.

- ► Press the green power enable button.

.If one of the miniature circuit breakers in the control cabinet has tripped:

- ► Switch the miniature circuit breaker back on.

If the EtherCAT interfaces are not correctly connected:

- ► Make sure that the Ethernet cables correct are correctly connected at the control cabinet and to the force monitoring devices.
- ► Check the Ethernet cables for damage.

If the servo drive is not correctly installed:

- ► Make sure that the Ethernet cables correct are correctly connected to the servo drive amplifier in the control cabinet.

If the servo drive is experiencing an error:

- ► Report your cabinet to your local Oetiker Power Tool Center.

ToErr_206 Emergency circuit open / ToErr_214 Emergency stop

NOTICE

This error occurs when the E-Stop circuit is open.

If the emergency stop-button is pressed:

Unlatch the emergency stop button.

If the emergency stop-button is not pressed:

- ► Check the cabling between the emergency stop-button and the two-hand control desk.
- ► Check that the two-hand dongle is plugged in correctly.
- ► Check that the external emergency stop is connected correctly or that the thin two-hand dongle is plugged in correctly.

ToErr_207 Light curtain during init sequence

NOTICE

The light curtain trips during initialization. The drives are stopped and the process is aborted.

Remedy:

- ► Prevent the light curtain tripping during the initialization procedure.

ToErr_208 Verification CFM error phase 1

NOTICE

The error occurs if an excessive force is present during the first phase (the lever moves at a pre-defined speed into position 1). The lever then moves back into the starting position and the verification is aborted.

Remedy:

- ► Check for foreign bodies in the area of the crimping jaws which deform the WingGuard® clamp strap.
- ► Check that the correct SKS is fitted with the correct jaws.

ToErr_209 Verification CFM error phase 2

NOTICE

The error occurs if the end force is not achieved during the second phase (the motion link moves at a pre-defined speed into position 2). The motion link then moves back into the starting position and the verification is aborted (see section *5.1*).

Remedy:

- ► Check that the crimping force monitoring devices are correctly set.
- ► Check that the crimping force monitoring devices are activated.
- ► Check that the target value the crimping force is not too great.

ToErr_210: Verifying the crimping force: No force increase

NOTICE

The error occurs if for a period of 5 seconds during the second phase the crimping force fails to increase.

Remedy:

- ► Check that the crimping force monitoring devices are switched on.
- ► Check that the crimping force monitoring devices are correctly set.
- ► Check that the crimping force monitoring devices are activated.

ToErr_211: Checking the strap waste

NOTICE

This error occurs when a strap is still detected after moving to the eject position.

Remedy:

- ► Move manually into the ejection position and check the respective sensor for damage.
- ► Check that the strap waste has been ejected.

ToErr_212: CFM general error

NOTICE

This warning occurs if during the closing process the Parker PLC is unable to communicate with the Kistler units.

Remedy:

- ► Check the crimping force monitoring devices in respect of their settings, damage and error messages.
- ► Check the crimping force monitoring devices in respect of their settings, damage and error messages.
- ► For further information see the crimping force monitoring devices manual.

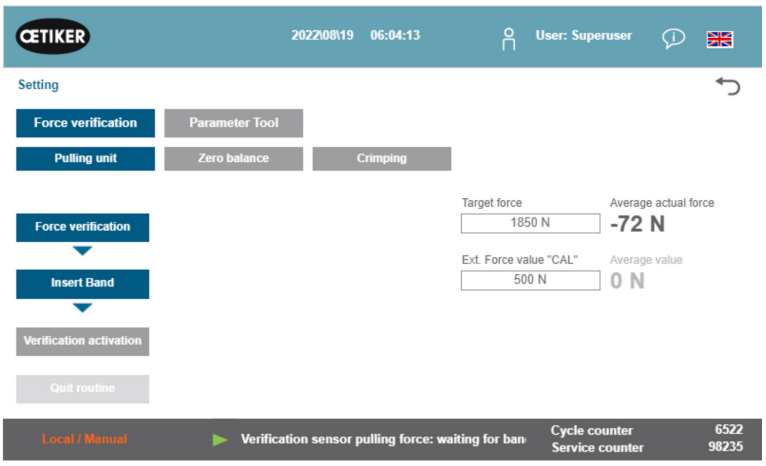
ToErr_213: Check the pulling force sensor

NOTICE

During the clamping cycle the pulling force sensor checks that the value satisfies certain criteria when the motion link is in the starting position and when it is in the insertion position.
The value (pre-pulling force) in the starting position depends on various factors. The value is set in the “Zero balance” function. In the starting position the value should be about 80 N and in the insertion position it should be 0 N. In the function of the setting, the value must be between -60N and -180N.
If the value is greater than -60 N, the value is set to -60 N. If the value is less than -180 N, the value is set to -180 N. The tolerance is ± 20N.

Remedy:

- Check that the crimping cut-off head is installed correctly.
- Make sure that no unauthorized parts come into contact with the clamping unit of the FAST 3000 during the closing cycle (*see section 6.5.3*).
- Check the tool mechanism, in particular that the linear guide of the clamping unit runs easily without jerking, and check the correct alignment of the clamping unit to the crimping head (*see section 9.5.1*).
- Perform a zero offset of the force sensor in the “Settings" menu and the "Force verification” sub-menu. Caution! During this procedure, it is essential that the “Set offset to zero” button is pressed (*see section 6.8.3*). This command will then determine the new value for the starting position.



- Check the scaling factor and correct it if necessary (*see section 9.5).*
- After the scaling factor has been corrected, perform a zero offset and a force verification.
- Check the measurement amplifier (connections, signaling display on the measurement amplifier).

ToErr_216: Tool drive lost power during the cycle

	**NOTICE** The power supply to the motion link or to the pulling drive has been interrupted.

Remedy:

- Re-establish the power supply to the tool. Switch on at the green button on the control cabinet door and initialize the tool. Make sure that the supervisory system enable flag for activating the servo drives is set, or that the bypass is activated is (“Settings” menu, “Tool parameters” sub-menu).

ToErr_217: Verification of the pulling force; target force not reached

	**NOTICE** During verification of the pulling force the pulling force was not reached.

Remedy:

- Repeat the verification with a new pull strap.
- Replace the clamping lever (*see section 9.3.6*).
- Set the force sensor scaling to 4950 by performing steps 1, 4, 7, 9 of section 9.5.2. At step 9 use 4950.
- Now repeat the verification.
  Important! If ToErr 217 does not recur, adjusting the load cell as specified in section 9.5.2 is mandatory!
- Check Measurement amplifier, the load cell and the cable of the load cell.
- Contact the PTC.

ToErr_218: Tool blocked by an external signal

	**NOTICE** The tool is blocked by the signal: W-DW0: Control Word Bit 14 locking tool

The cycle cannot be restarted whilst the signal is present.

Remedy:

- Cancel the signal.

ToErr_219: Manual mode: More than 1 run command at pulling unit

NOTICE

In manual mode with the Manual drive function: More than one command was sent to the pulling unit. No run command was performed.

Remedy:

- Change the sequence for controlling the run command in the external PLC.

ToErr_220: Manual mode: More than 1 run command Motion Link

NOTICE

In manual mode with the Manual drive function: More than one command is sent to the motion link device. No run command was performed.

Remedy:

- Change the sequence for controlling the run command in the external PLC.

NOTICE

ToErr_221-224 are reserved errors which are not currently in use:

- ToErr_221 Error Friction test
- ToErr_222 Crimp force verification error
- ToErr_223 Pulling unit verification error
- ToErr_224 Error Zero Balance

ToErr_225: Motion Link undervoltage

NOTICE

The servo amplifier of the motion link detected an undervoltage.

Remedy:

- Switch on the voltage with the green button in the control cabinet door or via industrial communication.
- Change the tool settings to the correct connected voltage.

ToErr_226: Pulling unit undervoltage

NOTICE

The servo amplifier of the pulling unit detected an undervoltage.

Remedy:

- Switch on the voltage with the green button in the control cabinet door or via industrial communication.
- Change the tool settings to the correct connected voltage.

13.3.3 Process errors

PrErr_301: Maximum pulling travel exceeded

	**NOTICE** The pulling travel can be limited. This can provide a check on whether the correct clamp diameter was used. (There are limitations to this function, since the WingGuard® strap end is detected even before it is fully inserted into the clamping unit.) Therefore the closure travel varies slightly (see sections *see section 5.1.1 - see section 5.1.7*).

Remedy:

The wrong clamp size was used:

- ► Use a clamp of the correct diameter.

Wrong parts to be connected were used:

- ► Use the correct parts.

Is the strap end broken?

- ► Check that the closing force is correctly set (*see section 7.4.7)*.
- ► Perform a closing force test (see the Operating Instructions).

The strap has slipped out of the clamping unit:

- ► Check the clamping lever, particularly its teeth, and replace it if necessary.
- ► Check the clamping unit slide. If it is worn, replace it.
- ► Check the clamping lever pivot pin. If it is worn, replace it.
- ► Check the clamping unit rail. If it is worn, replace it.

If the maximum pulling travel does not correspond to the required reduction in the clamp diameter:

- ► Adjust the setting of the max. pulling travel in the pulling unit parameters. For changing this setting you must be logged in as Superuser.

If the closure parameters are wrongly set:

Adjust the closure parameters (*see section 5.1.1–5.1.7*).

PrErr_302: Maximum pulling time exceeded

	**NOTICE** This error occurs if the time required for pulling exceeds the defined value for the time allowed.

Remedy:

If the closure parameters are wrongly set:

- ► Adjust the closure parameters (*see section 5.1.1–5.1.7*).

If the holding time setting is too long:

- ► Reduce the holding time (*see section 5.1.7*).

PrErr_303: Crimping error CFM1 envelope curve 1

NOTICE

This error occurs if CFM left force curve lies outside of EO1.

Remedy:

- Check the crimping jaws for damage and wear.
- Check the curve settings in the crimping force monitoring device 1.
- Check the FAST 3000 for correct positioning (*see section 6.5*).
- Check the correct routing of the connecting cable: During closure the crimping cut-off head must push down against the housing of the WingGuard® clamp.

PrErr_304: Crimping error CFM1 envelope curve 2

NOTICE

This error occurs when CFM Left force curve is outside of EO2.

Remedy:

- Check the crimping jaws for damage and wear.
- Check the curve settings in the crimping force monitoring device 1.
- Check the FAST 3000 for correct positioning (*see section 6.5*).
- Check the correct routing of the connecting cable: During closure the crimping cut-off head must push down against the housing of the WingGuard® clamp.

If the WingGuard® clamp batch exhibits an unusual crimping force curve:

- Re-teach the force curve 2 (*see section 6.8.6*).

PrErr_305: Crimping error CFM1 NoPass

NOTICE

This error occurs when during crimping the force at the crimping jaws increases too early.

Remedy:

- Check the setting of the crimping force monitoring device 1.
- Check the positioning of the FAST 3000.
- Check that the fastening screws of the crimping cut-off head are tightened to the correct tightening torque (*see section 9.3.3*).
- Check the correct routing of the connecting cable: During closure the crimping cut-off head must push down against the housing of the WingGuard® clamp.

PrErr_306: Crimping error CFM1 wear

NOTICE

This error occurs if CFM left force curve EO4 exit value is higher than the enter value.

Remedy:

- Check the crimping jaws for wear.
- Check the setting of the crimping force monitoring device 1.
- Check the positioning of the FAST 3000.
- Check the correct routing of the connecting cable: During closure the crimping cut-off head must push down against the housing of the WingGuard® clamp.
- If the WingGuard® clamp is subjected to guidance by parts other than the crimping cut-off head, make sure that this additional guidance is correctly centered relative to the crimping cut-off head. In addition, we recommend that the additional guidance is not too precise, instead it must allow approx. 0.7 mm clearance on each side of the clamp strap.
- If necessary, adjust the parameter “Tol. wear value”, see sections *5.2.4* and *7.4.7*.

PrErr_307: Crimping error CFM2 envelope curve 1

NOTICE

This error occurs when CFM right force curve is outside of EO1.

Remedy:

- Check the crimping jaws for damage and wear.
- Check the curve settings in the crimping force monitoring device 2.
- Check the positioning of the FAST 3000 (*see section 6.5*).
- Check the correct routing of the connecting cable: During closure the crimping cut-off head must push down against the housing of the WingGuard® clamp.

PrErr_308: Crimping error CFM2 envelope curve 2

NOTICE

This error occurs when CFM right force curve is outside of EO2.

Remedy:

- Check the crimping jaws for damage and wear.
- Check the curve settings in the crimping force monitoring device 2.

Check the positioning of the FAST 3000 (*see section 6.5*).

- Check the correct routing of the connecting cable: During closure the crimping cut-off head must push down against the housing of the WingGuard® clamp.

If the WingGuard® clamp batch exhibits an unusual crimping force curve:

- Re-teach the force curve 2 (*see section 6.8.6*).

PrErr_309: Crimping error CFM2 NoPass

	NOTICE
	This error occurs when during crimping the force at the crimping jaws increases too early.

Remedy:

- Check the setting of the crimping force monitoring device 2.
- Check the positioning of the FAST 3000.
- Check that the fastening screws of the crimping cut-off head are tightened to the correct tightening torque (*see section 9.3.3).*
- Check the correct routing of the connecting cable: During closure the crimping cut-off head must push down against the housing of the WingGuard® clamp.

PrErr_310: Crimping error CFM2 wear

	NOTICE
	This error occurs if CFM left force curve EO4 exit value is higher than the enter value.

Remedy:

- Check the crimping jaws for wear.
- Check the setting of the crimping force monitoring device 2.
- Check the positioning of the FAST 3000.
- Check the correct routing of the connecting cable: During closure the crimping cut-off head must push down against the housing of the WingGuard® clamp.
- If the WingGuard® clamp is subjected to guidance by parts other than the crimping cut-off head, make sure that this additional guidance is correctly centered relative to the crimping cut-off head. In addition, we recommend that the additional guidance is not too precise, instead it must allow approx. 0.7 mm clearance on each side of the clamp strap.
- If necessary, adjust the parameter “Tol. wear value”, see sections *5.2.4* and *7.4.7.*

PrErr_311: General error at crimping

	**NOTICE** This error is flagged when during the crimping operation the motion link current exceeds the defined limit value. The limit values are held as the variables min. crimping current and max. crimping current, which by default are set to 500 mA and 3000 mA respectively.

Remedy:

Subject the WingGuard® clamps that were closed during this cycle to visual inspection for defects especially in the wing formation area..

If a crimping jaw is broken:

- ► Replace both crimping jaws.

If the crimping wedge exhibits wear:

- ► replace the crimping wedge.

If the crimping jaw pivot pins exhibit wear:

- ► replace the crimping pivot pins.

If the FAST 3000 is not correctly positioned:

- ► Move the FAST 3000 into the correct position (*see section 6.1*).

If the crimping cut-off head is being pulled upwards by the connecting cable:

- ► Arrange for the connecting cable (*see section 6.1*) to be better secured.

If adjoining parts are obstructing the free movement of the FAST 3000:

- ► Ensure that the FAST 3000 can move freely and not accidentally come into contact with other parts.

If during the crimping operation the motion link current does not remain within the defined limit values:

- ► Have the current limit valuesfor the motion link (crimping) adjusted by the Oetiker service team.
- ► If the drive exhibits an excessive current consumption, repair or exchange it.
- ► Check that the crimping head and the motion link are intact and move freely.

PrErr_312: Error at cutting off

NOTICE

This error is flagged when during the cut-off operation the motion link current exceeds the defined limit value. The limit values are held as the variables min. cut-off current and max. cut-off current, which by default are set to 500 mA and 3000 mA respectively.

Remedy:

Subject the cut-off die to a visual inspection for defects.

If the cut-off die is broken:

- ► Replace the cut-off die.

If during the cut-off operation the motion link current does not remain within the defined limit values:

- ► Have the current limit valuesfor the motion link (cut-off) adjusted by the Oetiker service team.
- ► If the drive exhibits an excessive current consumption, repair or exchange it.
- ► Check that the crimping head and the motion link are intact and move freely.

PrErr_313: Force limit exceeded

NOTICE

This error is flagged when the tensile force during the first and second phases exceeds the tolerance for the target force. The tolerance is set by default to +/-100 N.

Remedy:

- ► Check that the closure parameters are set correctly.
- ► Increase the switching point reduction or reduce the speed of phase 1 and the speed of phase 2.

PrErr_314: Maximum permissible pulling force exceeded

NOTICE

This error is flagged when the tensile force recorded by the force check during the third phase is greater than the target force + tolerance. The tolerance is set by default to +/-100 N.

Remedy:

- ► Check the closing force curve under the closure data tab. Are vibrations evident? If they are, make sure the no external vibrations are coupled to the system.
- ► If the application permits it, reduce the closing force holding time to a smaller value. *See section 7.4.2*
- ► Refer to the PTC with a diagram of the closing force curve.

PrErr_315: Closing force outside tolerance

NOTICE

This error occurs if the closing force lies outside the tolerance range. The closing force is determined as the average of the last 40 measured values (40*2 ms). The tolerance is set by default to +/-100 N.

Remedy:

If the closure parameters are not correctly set:

- ► Check the curve profile (*see section 5.1).*
- ► Adjust the closure parameters (*see section 5.1.1–5.1.7*).
- ► Check that no external influences are preventing the correct control of the closing force.
- ► Check the tool mechanism, in particular that the linear guide of the clamping unit runs easily without jerking, and check the correct alignment of the clamping unit to the crimping head (*see section 9.5.1*).

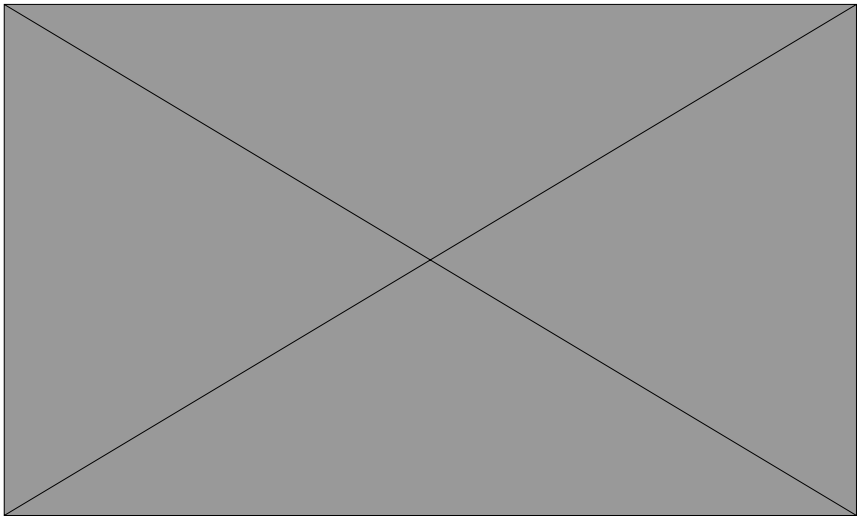


Fig. 144: *Closing parameters*

PrErr_316: Max. force at interruption of the light curtain

NOTICE

This error occurs if the defined force threshold is reached and the light curtain is interrupted.

Remedy:

- ► Prevent interruption of the light curtain during the cycle.
- ► Check that the light curtain system is correctly installed and operational.

PrErr_317 Max. force during move to throw-off position

	**NOTICE** After the strap has been cut off the pulling force is monitored during the journey to the ejection position. During this time the force should be effectively 0 N, otherwise the strap has not been correctly cut off.

Remedy:

- Check the cut-off die.
- Check the pulling force sensor.
- Check that no external influences are preventing the correct control of the closing force.
- Check the tool mechanism, in particular that the linear guide of the clamping unit runs easily without jerking, and check the correct alignment of the clamping unit to the crimping head (*see section 9.5.1).*
- Check the cut edge of the end of the strap at the WingGuard® clamp.
- If the cut edge is not square, the cut-off die may be defective.

PrErr_318: Process aborted

	**NOTICE** These message appears when the process has been aborted. As a rule it appears as a further message after the first message has been acknowledged.

Remedy:

- Acknowledge the message.

PrErr_319 Max. force at stop from Bus

	**NOTICE** This error occurs if during the clamping cycle a stop command is sent via the communication system.

Remedy:

- Check the operation of the supervisory system.

14 Appendix

- Circuit diagram
- Industrial communication
- EC Declaration of Conformity
- Oetiker production checklist
- FAST 3000 capability measurements
- Control cabinet test certificate
- HBM force sensor test certificate
- Kistler test certificates
- Operating Instructions for crimping force monitoring devices

15 Help and Support

If you need help or technical support, contact your local Oetiker Service Center.

For further information see www.oetiker.de.

EMEA	
E-mail	ptsc.hoe@oetiker.com
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