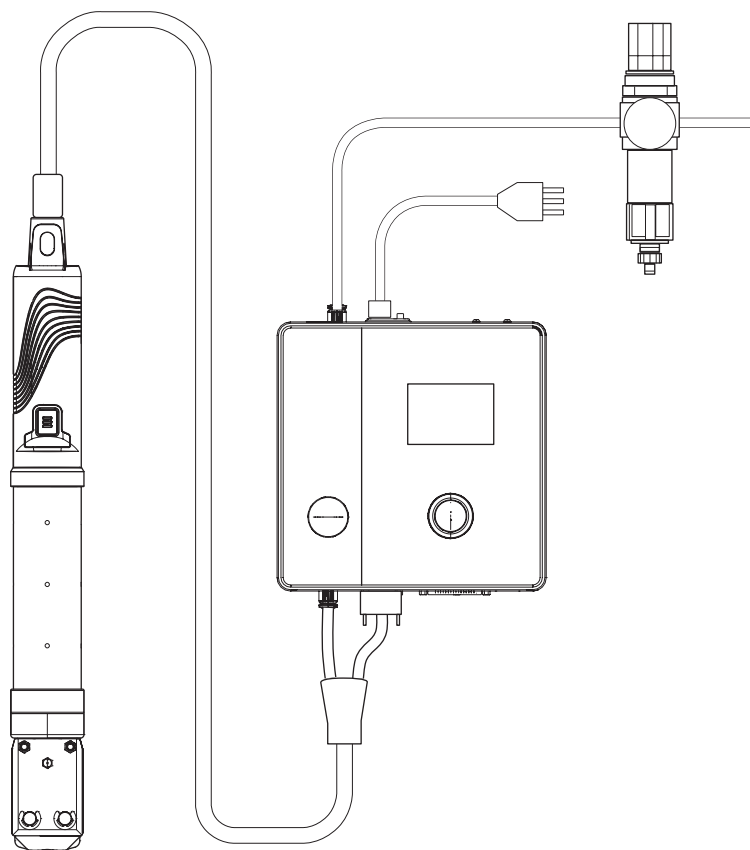




OETIKER EPC 01

Instruction manual

Translation of the original
instruction manual
Issue 06.21

Part no. 08905306
Oetiker Switzerland AG, Horgen,
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1 Information about this manual

1.1 Symbols and meanings of the representations used

Various warning signs are used in this instruction manual to alert the reader about potential damage to property and personal injury.

- ▶ Compliance with these warning signs is mandatory.
- ▶ Compliance with the instructions that are flagged with a warning symbol and text is mandatory.

The following symbols are used in this instruction manual:

DANGER

Dangerous situation.

Non-compliance with these instructions will result in fatal or serious injuries.

WARNING

Dangerous situation.

Non-compliance with these instructions may lead to fatal or serious injuries.

CAUTION

Dangerous situation.

Non-compliance with these instructions may lead to minor injuries.

NOTE

Information relating to the understanding or optimization of work processes.

Symbol	Meaning
▶ ...	Single-step call to action
1. ... 2. ... 3. ...	Multi-step call to action ▶ Note the sequence.
✓ ...	Requirement • Necessary or labor-saving steps for the successful execution of an action.
Connect	Display or operating elements of the menu or the PC software are highlighted.

1.2 Scope

This instruction manual applies to all OETIKER Electro-Pneumatic Controllers 01 (EPC 01) and describes the mode of operation as well as the correct commissioning, operation, decommissioning, recommissioning, storage and transport. This instruction manual contains important information for safe working procedures.

Maintenance information can be found in chapter 10.

1.3 Compatibility

Some components of the OETIKER products EPC 01, ELK 01 and ELK 02 are compatible with each other.

The following should be noted:

- The control unit of the ELK 02 can be used with the EPC 01
 - The HO-EL pincer cannot be used as a hand-held tool.
 - The HO-EL pincer can be used under external control (*see chapter 9*).
- The EPC 01 release unit cannot be used with ELK 01 and ELK 02.
- The pincer body of the ELK 02 can be retrofitted to the release unit of the EPC 01. Retrofitting is carried out after prior consultation with the regional OETIKER Service Center.

2 Basic safety instructions

2.1 How to use the instruction manual

- ▶ Make sure that this instruction manual is always available for use within easy reach.
- ▶ If the device is sold, ensure this instruction manual is passed on to the next owner of the device.
- ▶ Please read the instruction manual carefully before commissioning the EPC 01.
 - Familiarize yourself with all settings and their functions.
 - Anyone setting up, commissioning, maintaining or repairing the unit must have read and understood the instruction manual and in particular the safety instructions.

2.2 Intended use

- The EPC 01 with the associated OETIKER pincers is used exclusively for closing OETIKER clamps and low-profile clamps with high process reliability.
- The EPC 01 must be used only as specified in the intended use and under technically safe and fault-free conditions.
- Intended use also covers observance of this instruction manual and compliance with the technical data.
- The EPC 01 is designed for one-man operation. Action by other persons to start of the closure cycle is prohibited.
- The EPC 01 is designed for manual operation.
- The use of the EPC 01 in potentially explosive atmospheres or outdoors is not permitted.
- If the EPC 01 is used in an automated environment, the operating company is responsible for compliance with the applicable safety regulations.
- Any use not in accordance with the intended use shall be regarded as incorrect usage.

Usage other than intended use

The EPC 01 device is built to current state-of-the-art technology and is safe to operate. Residual hazards remain if the device is used incorrectly or by untrained personnel. The manufacturer cannot be held responsible for injuries to personnel and/or damage to property arising from the improper use of the EPC 01. In such cases the operating company shall be solely responsible.

2.3 General safety instructions

- ▶ Observe the operating instructions and maintenance instructions.
- ▶ Only qualified technicians shall be permitted to proceed with maintenance and repair tasks.
- ▶ Only persons who are familiar with it and have been informed about the dangers shall be permitted to use the EPC 01.
- ▶ Compliance with all relevant accident prevention regulations, and generally accepted health and safety rules is mandatory.

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 instruction manual. 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 General safety instructions

Only specially trained personnel are authorized to proceed with maintenance and repair work on pneumatic and electrical equipment.

- ▶ Before maintenance and repair work, switch off all devices and disconnect the EPC 01 from the mains and the compressed air supply.
- ▶ Check hose lines for wear in the course of preventive maintenance, and replace them if necessary.

2.4.1 Moving parts

During operation, there is a risk of serious injury from crushing, cutting and shearing of fingers by the moving jaws on the pincer head.

- ▶ Do not reach into the clamping area of the pincer head during operation.
- ▶ Before carrying out any work on the clamping area of the pincer head, switch off the voltage and compressed air supply of the EPC 01 and secure it against being switched on again.
- ▶ Do not point the pincer head at other persons.

2.4.2 Flying parts

If the workpiece, accessories or machine tool break, parts can be ejected at high speed. There is a risk of serious injury.

- ▶ Before use, check the EPC 01 for fractures. Change damaged parts.
- ▶ Wear protective equipment.

2.4.3 Noise level

When venting the pincer, a max. noise level of 92 dBA can be expected at the control unit.

- ▶ Where high noise levels are present, wear hearing protection.
- ▶ Do not mount the control unit at head height.

2.4.4 Compressed air

The EPC 01 is operated with compressed air. Even after switching off, individual system parts and devices may still be under pressure. Compressed air flows out when the pincer is vented.

Escaping compressed air can cause injuries.

- ▶ Close the compressed air supply after switching off and before all maintenance and repair work. Switch off the compressed air supply.
- ▶ Depressurize all air-operated plant components and equipment.
- ▶ Do not operate EPC 01 at pressures above the permissible maximum pressure.
- ▶ Ensure that the vent holes on the pincer body are clear.

2.5 Safe working methods

- ▶ Before each start of production, check the EPC 01 for visible damage and ensure that it is only operated in perfect condition.
- ▶ Report deficiencies to supervisor immediately.
 - Do not attempt to continue using the EPC 01 if defects have been identified.
- ▶ Wear safety glasses and safety shoes during operation and maintenance. Wear a hard hat when working overhead.
- ▶ The EPC 01 is designed for operation by a single operator: The closure cycle must never be initiated by a second person.
- ▶ Keep sufficient space around the product. Users must not be obstructed by third parties.
- ▶ Set up the workstation ergonomically for working with the EPC 01. In particular, this includes the following:
 - Ensure lighting intensity of at least 400 lux.
 - Enable safe and comfortable posture during operation.
 - Set up and lay plant components, hoses and lines in such a way that they cannot cause any tripping or falling hazards during operation.
- ▶ When working with the EPC 01, the hands, arms, shoulders and neck can be stressed. Pain and discomfort can be the result.
 - Interrupt work with the EPC 01 at regular intervals.
 - Stop work if symptoms of stress persist or recur. Have stress symptoms medically checked.

- ▶ Observe the following for safe and proper operation:
 - Before switching on, hold the pincer firmly in both hands.
 - Securely fasten the workpiece.

2.6 Safety devices

Safety devices protect against hazards when handling the EPC 01.

- ▶ Do not modify safety devices.
- ▶ Ensure that all safety devices are effective during operation.

2.6.1 Pressure relief valve

One or more pressure relief valves are installed in the service unit to protect against excessive pressure. The valves are arranged in such a way that they limit the pressure in all relevant system parts and equipment. Alternative devices, such as pressure regulators, may be used provided they meet the requirement of the application.

2.6.2 Safety shut-off valve

A safety shut-off valve is installed in the compressed air supply line in the area of the compressed air filter. In the event of excessive pressure, the safety shut-off valve closes and shuts off the compressed air supply line to the downstream plant components and equipment.

2.6.3 Safety lever

There is a safety lever on the release unit of the pincer. The safety lever is pressed and held down during the crimping process. The safety lever actuates the integrated 3/2 safety valve. The safety valve is designed to close independently under pressure and to vent safely.

Unintentional closures are prevented by actuating the safety lever.

2.7 Using the EPC 01 via an external control system

- The integrator is responsible for the safe integration of the EPC 01.
- The integrator must prepare a risk assessment and implement the system according to the risk assessment.
- Integration may be performed only by qualified personnel.
- For more information on this topic see *chapter 9*.
- If you have any questions about integration, contact Oetiker.

2.8 Modifications, changes

If the seal on the EPC 01 is damaged or removed without authorization, OETIKER will not accept any warranty claims.

- ▶ Do not modify the EPC 01 without the consent of OETIKER. Any modification excludes liability on the part of OETIKER for any resulting damage.
- ▶ Only use original spare parts and accessories. In particular, use only the pneumatic components and lines described in this instruction manual.
- ▶ Do not remove any safety devices.

2.9 Qualified personnel

WARNING

Danger due to actions of unauthorized or unqualified personnel.

The use of this device is reserved exclusively for authorized and qualified personnel. Use without the instruction manual is prohibited. The authorization levels for use are as follows:

Personnel Activities	User (public)	Line responsible	Customer Administrator
Operating the EPC 01	✓	✓	✓
Making settings	×	✓	✓
Training users in using the EPC 01	×	✓	✓
Providing the instruction manual	×	✓	✓
Ensuring closure data	×	✓	✓
Updating firmware	×	×	✓

Explanation: ✓ = permitted × = not permitted

“User”:

- is familiar with the specified safety instructions and regulations
- knows the relevant procedures described in this document
- has been trained appropriately
- has been trained by the responsible line manager or an employee of OETIKER

The operating company must ensure that the employee has received the safety instructions and regulations in his or her respective language.

“Line responsible”:

- possesses the knowledge described for the “user”
- trains the operator

“Customer Administrator”:

- possesses the knowledge described for the “line manager”
- is the Power User and has comprehensive rights

2.10 Maintenance tasks

The inspection and maintenance intervals specified in the instruction manual must be observed.

Maintenance and repair instructions must be observed accordingly.

- ▶ Regularly check that the pincer head and pressing mechanism are working properly. If cracks and fractures occur, replace the corresponding components.
- ▶ Complex maintenance work involving opening the EPC 01 must be carried out exclusively by OETIKER.

2.11 Signs on the EPC 01

2.11.1 Safety signs

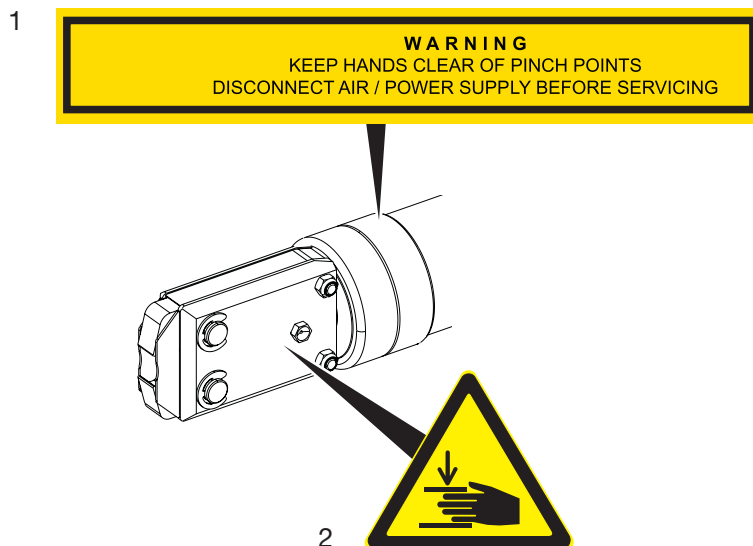


Fig. 1 Safety labels on the pincer head of the EPC 01

- 1 Warning:
Keep hands away from the crush points!
Disconnect compressed air / voltage supply before maintenance!
 - 2 Crush hazard in the crimping area of the pincer head!
- Observe the safety signs.
► Do not remove the safety signs: keep them in legible condition at all times.

2.11.2 Nameplates

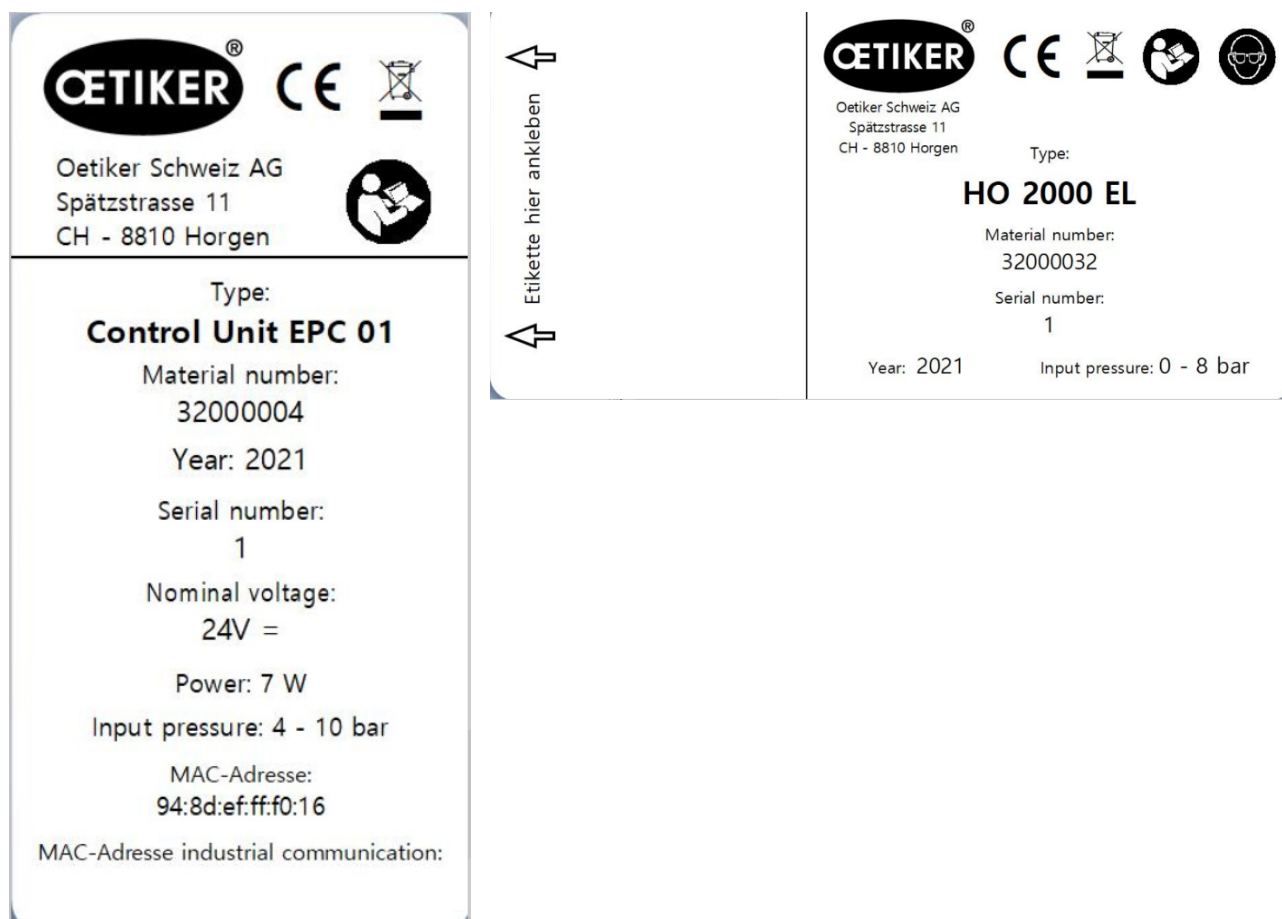


Fig. 2 Nameplates (left: control unit, right: pincer)

3 Structure and description

3.1 Overall EPC 01 system

Structure

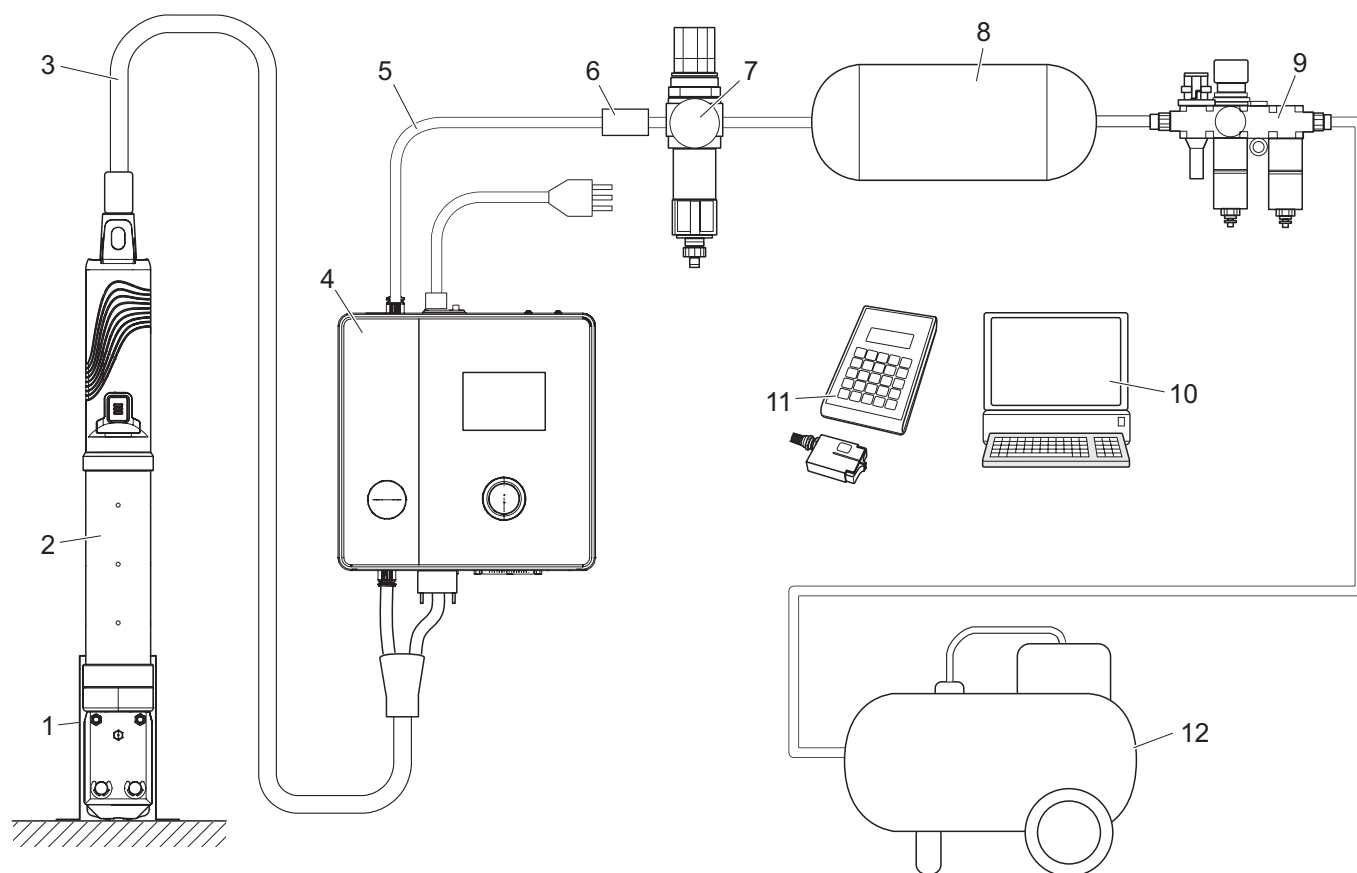


Fig. 3 Structure of the overall EPC 01 system

1	Pincer holder (recommended, plastic)	7	Compressed air filter
2	Pincer	8	Compressed air tank
3	Hybrid hose	9	Maintenance unit
4	Control unit	10	PC
5	Compressed air supply line	11	CAL01
6	Safety shut-off valve	12	Compressor / compressed air supply

Description

The OETIKER EPC 01 is an electro-pneumatic system for closure of clamps and low-profile clamps.

The components of the system are connected to each other via compressed air and hose lines (3, 5).

The compressor / compressed air supply (12) generates compressed air which flows to the maintenance unit (9).

The air pressure is reduced to the defined pressure range by the maintenance unit (9) to protect the entire system from overpressure. The compressed air is stored in the compressed air tank (8). The compressed air filter (7) cleans the compressed air. In the event of impermissible pressure, the safety shut-off valve (6) closes and shuts off the compressed air supply line (5) to the control unit (4).

The control unit (4) controls and monitors the crimping operations using defined control parameters and closure data. The data of the control unit are stored in the PC software of the PC (10). The hybrid hose (3) supplies the pincer (2) with compressed air and power.

The pincer (2) is the tool used by the operator to close the clamps and low-profile clamps. The pincer is held in the pincer holder (1).

The CAL01 (11) is used to calibrate the pincer during the pincer test.

3.2 Control unit

Structure

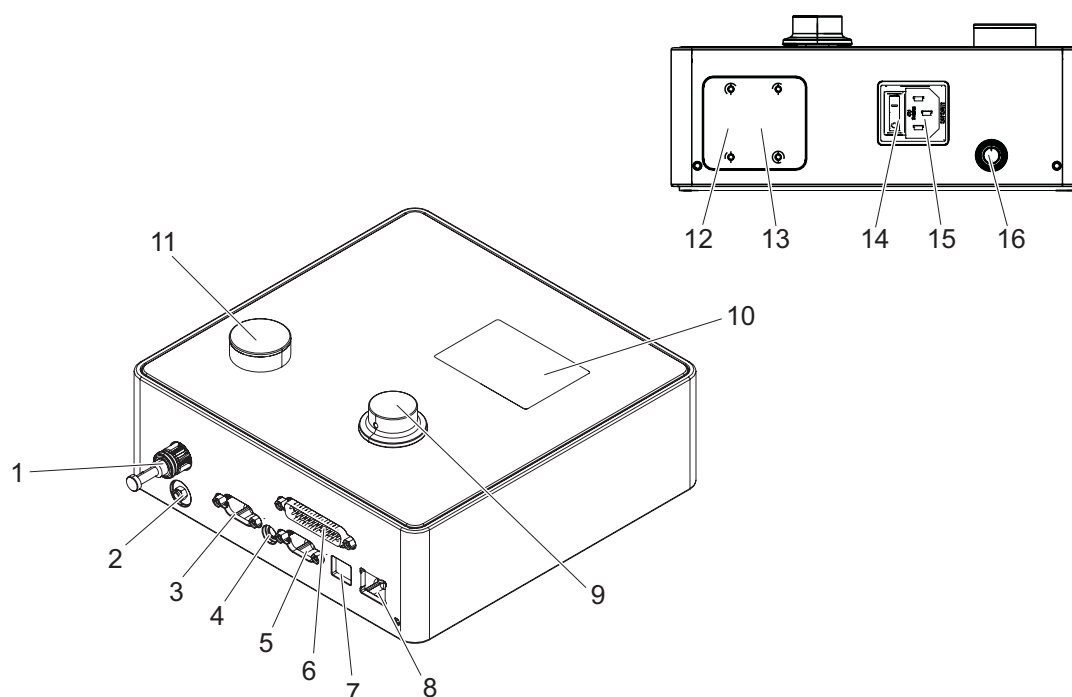


Fig. 4 Structure of the control unit

Item	Designation	Description / Use
1	pA	Hybrid hose connection (compressed air connection)
2	Vent	Compressed air outlet during venting
3	X1	9-pin D-SUB interface Connection hybrid hose (electrical connection)
4	X12	Jack plug Interface for reading out force and displacement as analog signals for optical display on relevant display devices (e.g. an oscilloscope)
5	X3	RS232 Interface for communication with the PC software
6	X20	25-pin D-SUB interface Connection for control via the logic module (PLC), inputs/outputs
7	USB	Interface for communication with the PC software
8	Ethernet	Interface for communication with the PC software
9	Rotary pushbutton	Operating the menu of the control unit
10	Display	Displaying the menus of the control unit Displaying error messages
11	Vent	Button for venting the control unit
12/13	SPS	Optional BUS interface for industrial communication with a higher-level system (PLC)
14	On/Off switch	Switching the control unit on and off
15	Plug for low-power equipment	3-pin plug (male) for low-power equipment
16	PE	Compressed air inlet (compressed air supply line)

Description

The control unit is the central device for controlling and monitoring the crimping operations. Control parameters and closure data are set and read on the control unit.

NOTE

Further information:

- Operation via external controls see *chapter 9*.
- Detailed information of the interfaces see *chapter 13.2*.

3.3 Pincer

Structure

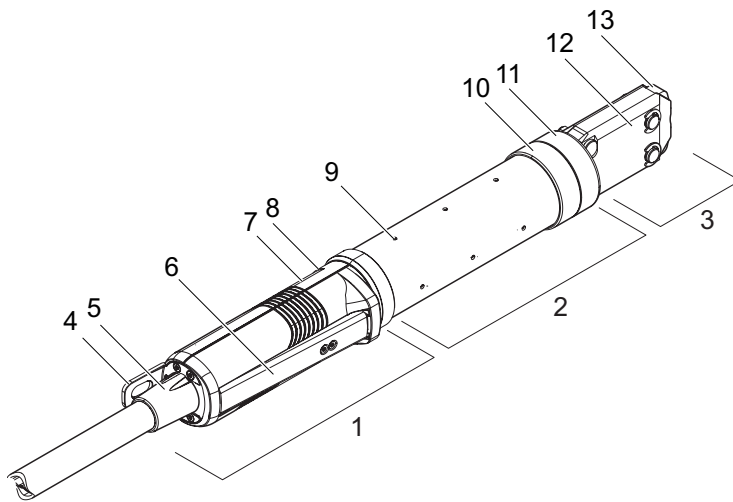


Fig. 5 Structure of the pincer

1	Trigger unit	8	LED (hidden)
2	Pincer body	9	Vent hole
3	Pincer head	10	Available fixing surface
4	Suspension tab	11	Union nut
5	Rotary adapter	12	Pincer plate
6	Safety lever	13	Pincer jaw
7	START key (hidden)		

Description

The pincer is the operator's tool and is used to close the clamps and low-profile clamps. The pincer consists of 3 elements.

The pincer is held and operated at the release unit (1). Pressing the START key (7) triggers a closure. The integrated 3/2 safety valve enables safe closure and venting when the safety lever (6) is actuated. The LED (8) signals status messages. The pincer is suspended from the suspension lug (4).

The pincer body (2) has several vent holes (9) for venting. The pincer head (3) is mounted to the pincer body.

The pincer head (3) uses the pincer jaws (13) to close the clamps and low-profile clamps. A specific pincer head is required depending on the clamp type and style. For applications that are difficult to access, for example, special pincer heads can be mounted (consultation with OETIKER required). After the pincer head has been changed, a pincer test is required.

The pincer head can be changed as required within the following 3 groups:

- HO 2000, HO 3000, and HO 4000
- HO 5000 and HO 7000
- HO 10000

3.4 CAL01

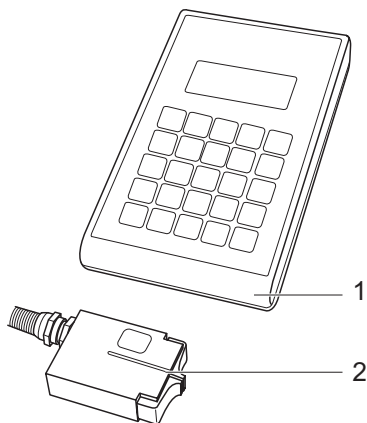


Fig. 6 Structure of the CAL01

- | | |
|---|--------------|
| 1 | CAL01 |
| 2 | Sensor SKS0x |

The CAL01 measuring device (1) is used to calibrate the pincer and is particularly required for the force test during the pincer test. The SKS0x sensor (2) is mounted on the pincer head. The measured force can either be transferred to the PC software or directly to the control unit.

The CAL01 is a stand-alone device available from OETIKER. The function of the device can be found in the corresponding operating instructions.

4 Process description

4.1 Process flow

The EPC 01 is used for professional and reliable closure of OETIKER clamps and low-profile clamps.

To do this, an ear or the closure hook of the low-profile clamp (1) is inserted between the pincer jaws (2).

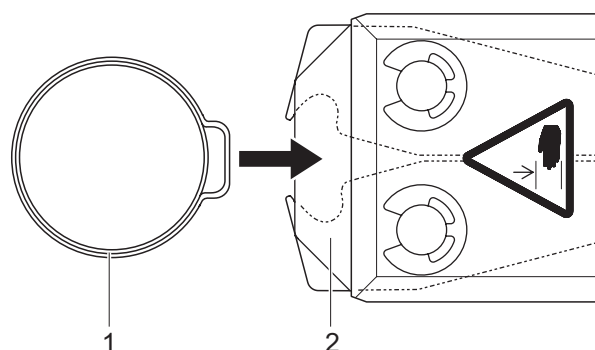


Fig. 7 Inserting a clamp / low-profile clamp

Subsequently, the closure process on the release unit is first released by pressing and continuously holding the safety lever (4) and then initiated via the START button (3).

The safety lever must be released after each completed closure (but at least every 20 closures).

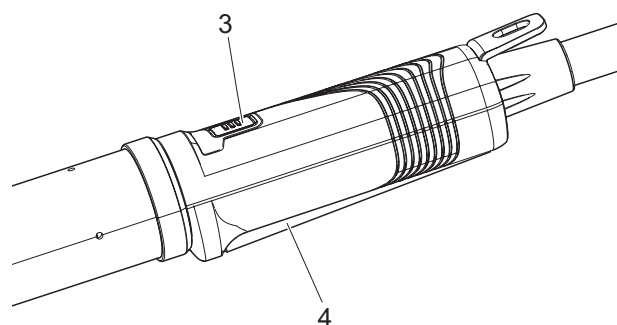


Fig. 8 Starting the closure process

The pincer jaws crimp the ear (5), using the preset force. When using clamps, the preset value is used so that the clamp is hooked in.

The control unit monitors, qualifies and quantifies the crimping process. Various interfaces allow the measured variables as well as OK/NOK conditions to be displayed.

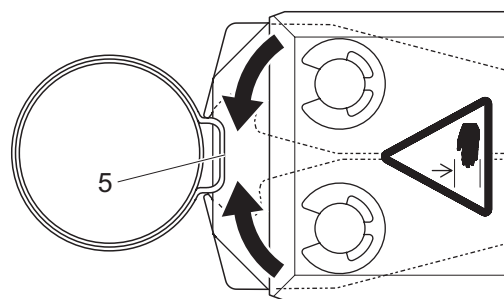


Fig. 9 Closing the clamp / low-profile clamp

4.2 Closing modes

4.2.1 Force priority

With this closure function, closure takes place at a defined closure force, which is controlled by the control unit.

The deformation of the clamp and the parts being clamped results in a closing gap. The closing gap can be used to verify the position of the assembled components; however, this gap is subject to change due to various tolerances (of the parts being clamped, the clamp itself, and the nozzle).

Force priority closure is used to close the ear clamps. The performance of the clamp depends on the closing force (and not on the closing gap). OETIKER recommends for each clamp whether the latter should be closed using force priority or gap priority.

The figure to the right shows a simplified force priority closing process.

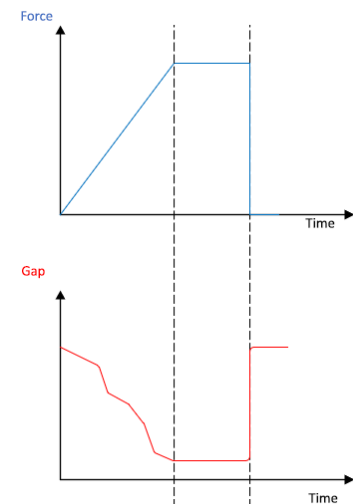


Fig. 10 Force priority closure

4.2.2 Gap priority

With this closure function, closure takes place at a defined closure gap, which is governed by the control unit.

The resistance of the parts being clamped and the resistance of the clamp itself result in a closing force. This closing force was needed in order to move to the given position. The closing force can be used to verify the assembled components; however, this force is subject to change due to various tolerances (of the parts being clamped, the clamp itself, and the nozzle).

The gap priority closure function is used to close low-profile clamps. Because the performance of a low-profile clamp is guaranteed only when the hook is engaged, the EPC 01 closes up to a certain gap value at which the engagement of the low-profile clamp is ensured. OETIKER recommends for each clamp whether the latter should be closed using force priority or gap priority.

The figure to the right shows a simplified gap-priority closing process.

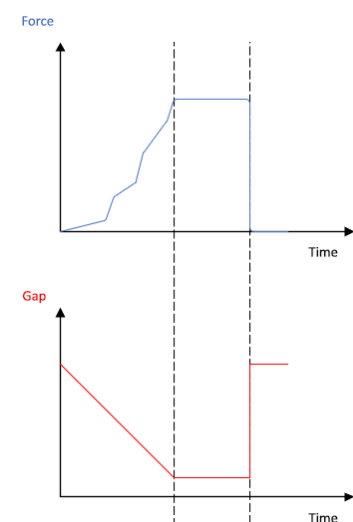


Fig. 11 Gap priority closure

4.2.3 Schnappi

With this closure function, closure takes place at a defined closure force (force priority closure), whereby the control unit detects when the hook has been passed over and stops the crimping process. This ensures that the material is not stressed excessively. This closure method is recommended for type PG168 and PG192 low-profile clamps. The closing process with verification is illustrated in the figure below.

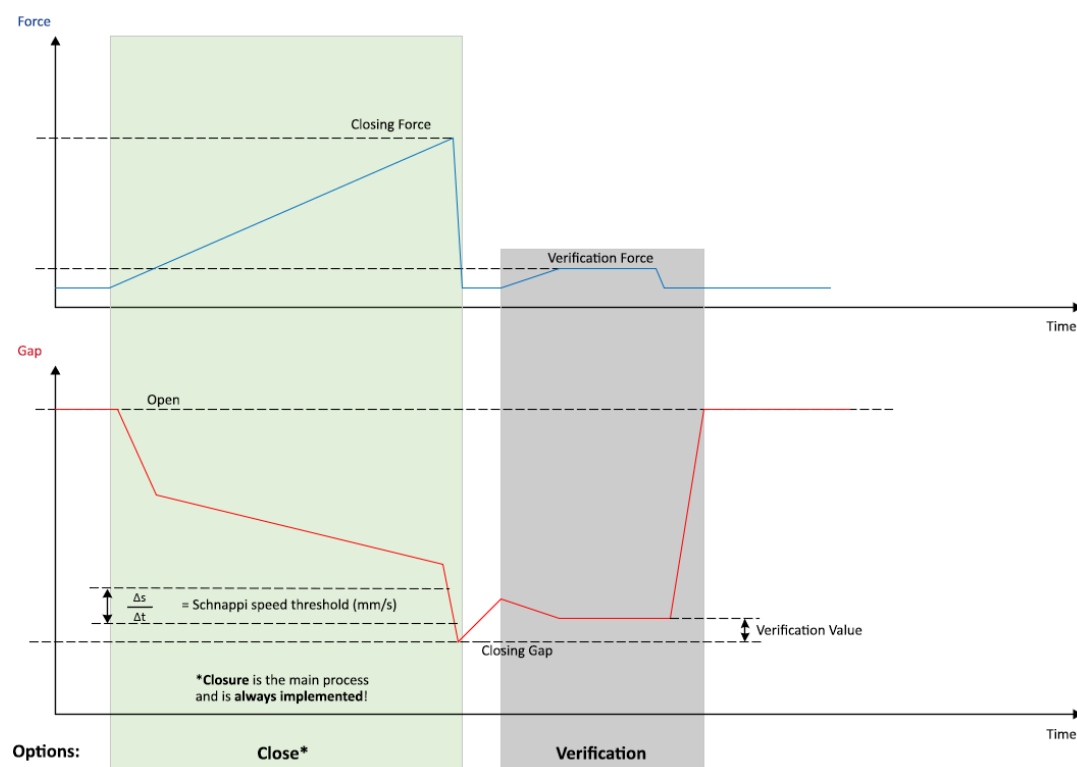


Fig. 12 Schnappi closing

4.3 Options

The closing process can be extended by incorporating the options shown below. The options can be set in the PC software (see *chapter 8.6.5*).

4.3.1 Open

Using this option the jaws can move from the open gap to a defined opening gap.

This option is suitable when the open gap is larger than the ear of the clamp. To activate the opening gap, the safety lever must be pressed and held continuously. As soon as the START key is pressed, the pincer moves to the set opening gap and remains there until the cycle is triggered by pressing the START key again. After the cycle is completed the pincer retracts completely and is brought back into the opening gap by releasing and pressing and holding the safety lever again and pressing the START key.

4.3.2 Holding or detecting

Only one option can be selected and used.

Hold

The clamp is held in place using a little force between the pincer jaws in order to pre-position and hold in place the parts being crimped. Thus, the clamp can be moved to the desired position and subsequently closed.

Holding must be performed by continuously pressing the safety lever and pressing the START key. In order to proceed with the closure function, a new start must be triggered.

The course of holding for all the options is shown in the figure below:

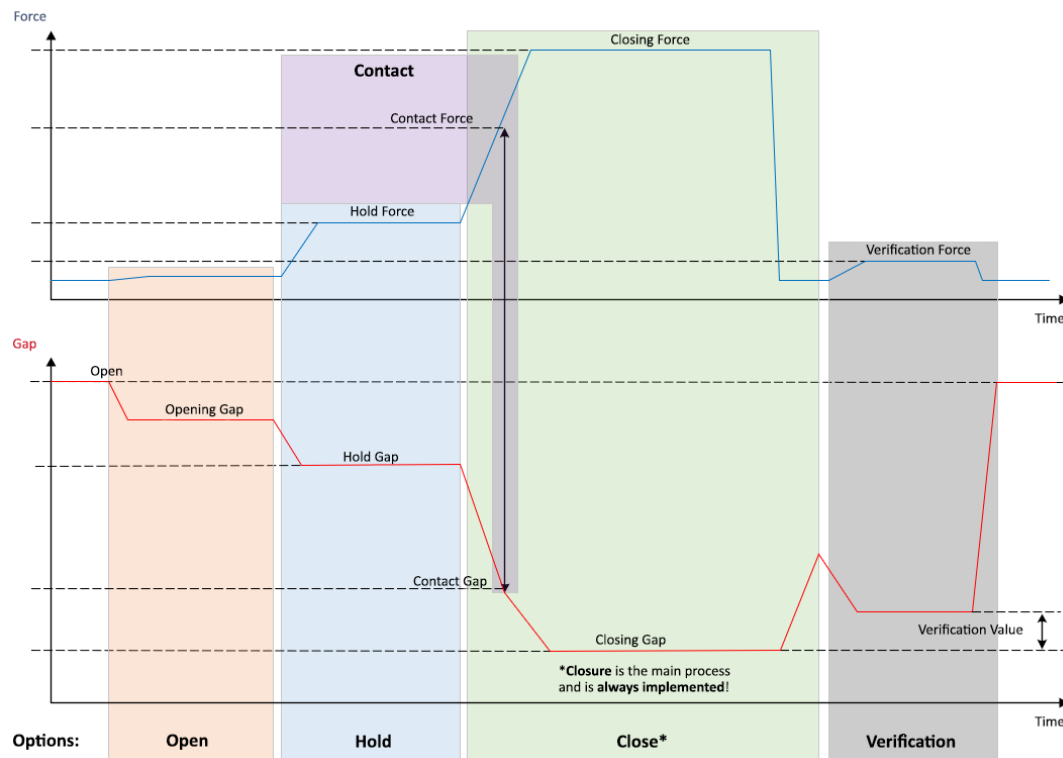


Fig. 13 Holding for all options

Detect

The detection function identifies a second closure of the same clamp or low-profile clamp and reports the procedure as NOK. The detection function requires that a specified force must be achieved for a specified gap. If the clamp had already been closed the force at the gap will not be reached and the closure process is canceled. This type of detection can also be implemented with the Hold option. If the pincers do not reach the holding force at the holding gap, this is an indication that the clamp is already deformed. This requires a correct setting. The course of detection for all options is shown in the figure below:

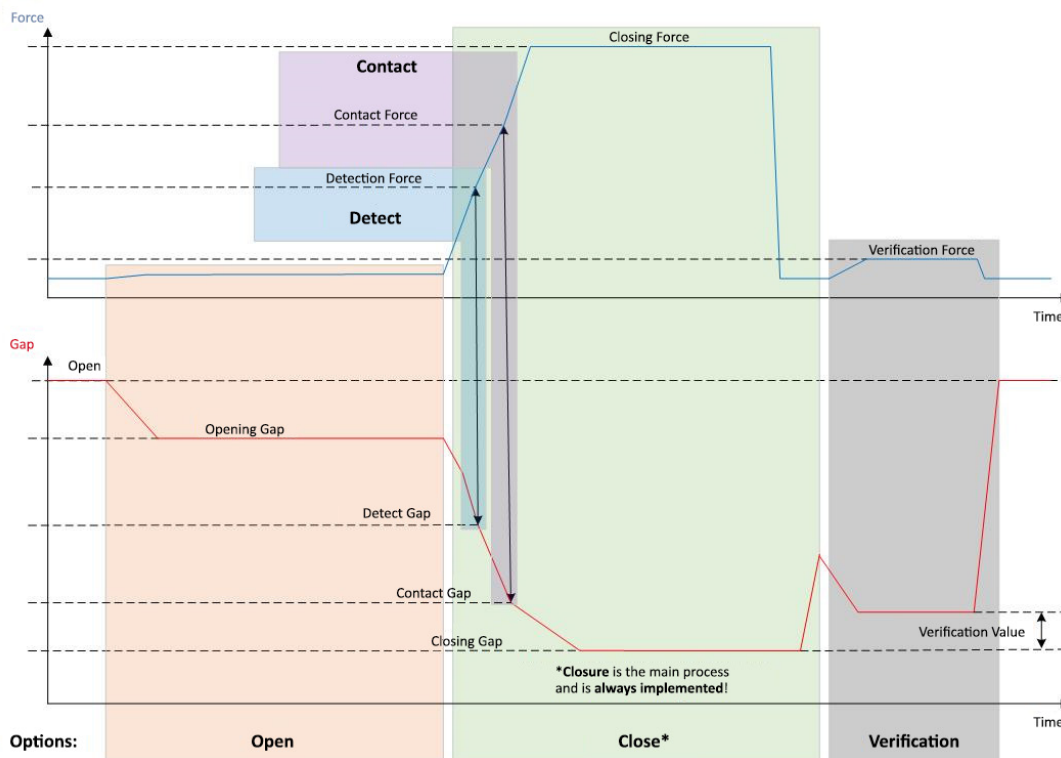


Fig. 14 Detection for all options

4.3.3 Contact

With this option, the contact position is determined. This refers to the contact of the clamp to the parts being crimped but not to the ear of the clamp. The contact detection function displays the contact gap when the specified force is reached. Together with the closing gap, a higher-level system can calculate the difference and thus an approximation to the compression of the material.

4.3.4 Verification

In this option, the closure is checked. After closing, the pincer jaws are pressed against the clamp with little force. This can verify whether the low-profile clamp has sprung open or has closed correctly. If a force cannot be built up on the clamp, the clamp has sprung open again and the assembled components are NOK. The safety lever must be held in the actuated position during the entire closure process, including verification.

4.4 Pincer test

The pincer is the operator's tool and is stressed when in use.. OETIKER therefore recommends that the pincer is regularly calibrated using a pincer test. The pincer test should be performed at the beginning of a shift or after a pincer head change. The pincer test is selected with the rotary-push button on the control unit.

Basically, 3 test steps are performed one after the other during the pincer test:

- Friction test
- Force test
- Gap test

The safety lever must be pressed and held continuously during the entire test procedure. Pressing the START key starts the pincer test cycle. Each test step is triggered by pressing the START key again.

4.4.1 Procedure

The following flow chart provides an overview of the pincer test sequence:

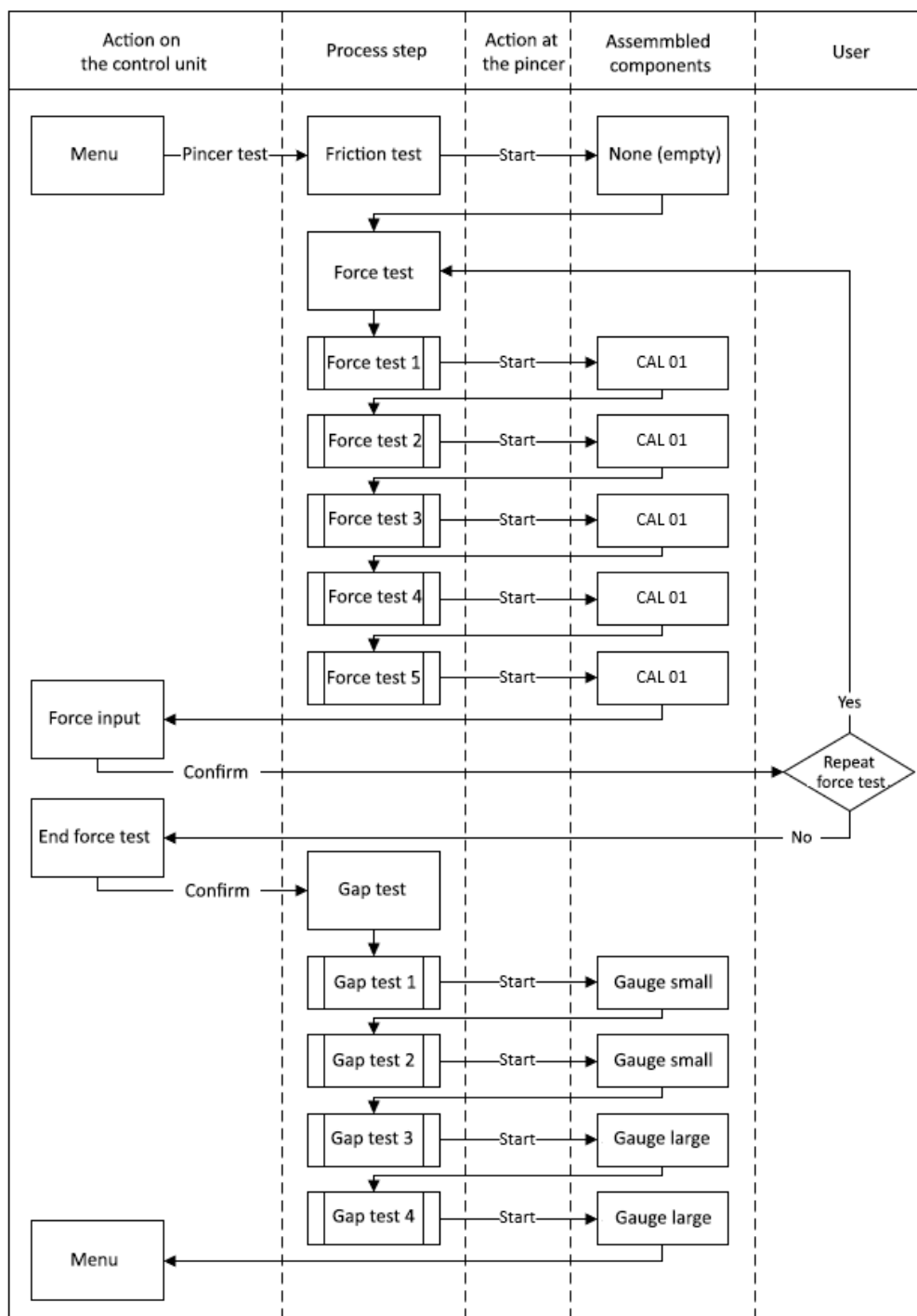


Fig. 15 Procedure for the pincer test

4.4.2 Friction test

In order to set the pincer jaws in motion, a minimum force is required to overcome friction. Since this force does not act on the clamp during crimping, it is determined during the friction test and compensated accordingly during crimping. During the friction test, the pincer closes empty (without parts being crimped between the pincer jaws) and thus determines its internal friction.

4.4.3 Force test

The force test is carried out in order to match the displayed force of the control unit to the actual force at the pincer head. A CAL01 is required for the force test. The CAL01 determines the force applied to the pincer jaws.

During this test, the closing force sensor SKS0x simulates the closing force and the CAL01 records the force for calibration purposes. The displayed force can be entered either in the PC software or directly on the control unit.

At least 10 crimping operations must be performed and their mean value transferred. If a subsequent check of the closure force reveals a deviation that is greater than the pincer tolerance (HO2000-4000: 150 N, HO5000-7000: 250 N, HO10000: 350 N), the procedure must be repeated.

An iterative determination of the closure force is often more precise. For this purpose, three measurements are taken, followed by a closure force correction. This procedure must then be repeated at least three times.

4.4.4 Gap test

The pincer body can be equipped with different heads. After a change, each

pincer head must be recalibrated. The displacement measuring system is compared with the pincer jaw travel.

During the gap test, a gap gauge is held between the pincer jaws. The head is calibrated based on two gap gauges.

Two closures are carried out for each gap gauge. Consequently, a total of four closures will be carried out.

5 Structure and connection

5.1 Prepare assembly and connection

5.1.1 Checking the ambient conditions

1. Ensure the required ambient conditions (see *chapter 12.2*).
2. Ensure that there is no potentially explosive atmosphere at the installation site.

5.1.2 Preparing the installation site

NOTE

- ▶ To avoid physical strain when operating the pincer vertically, provide a suitable suspension device at the installation site. The pincer is suspended from the suspension lug on the release unit.
- ▶ To avoid trip hazards, provide sufficient storage space for the hybrid hose at the setup location.
- ▶ Observe the length of the hybrid hose at the installation site and do not change it (standard: 3 m, optional: 6 m, 9 m, 12 m)
- ▶ OETIKER EL (T) pincer installed in a mounting fixture float. The floating bearing facilitates the closure process of the clamps and low-profile clamps. Appropriate devices are available as an option.

- ✓ Ambient conditions tested.
- ▶ Ensure that the installation site meets the following conditions:
 - Sufficient space for the installation/removal of all components as well as for the operator's work area
 - Necessary connections for pneumatic and electric supply available
 - Good visibility of the display of the control unit for the operator
 - The power supply and compressed air supply can be disconnected at any time

5.1.3 Preparing the components for installation

- ✓ Assembly area prepared.
1. Remove packaging materials completely. Do not remove transport or sealing covers until immediately before assembly.
 2. Check components for completeness, correctness and damage. Replace damaged components with original spare parts.
 3. Ensure that compressed air lines and connections are free of objects.
 4. Provide compressed air supply or compressor. In doing so, ensure the following:
 - The inlet pressure of the EPC 01 must be 4 to 10 bar: 6 bar is recommended.
 - A suitable deposit area with prior venting.
 5. Provide a compressed air tank, 2 to 5 ltr tank volume is recommended.
 6. Read and observe the notes on assembly in the supplier documentation.

5.2 Setting up and connecting the EPC 01

The following figure shows the structure and connection points of the components:

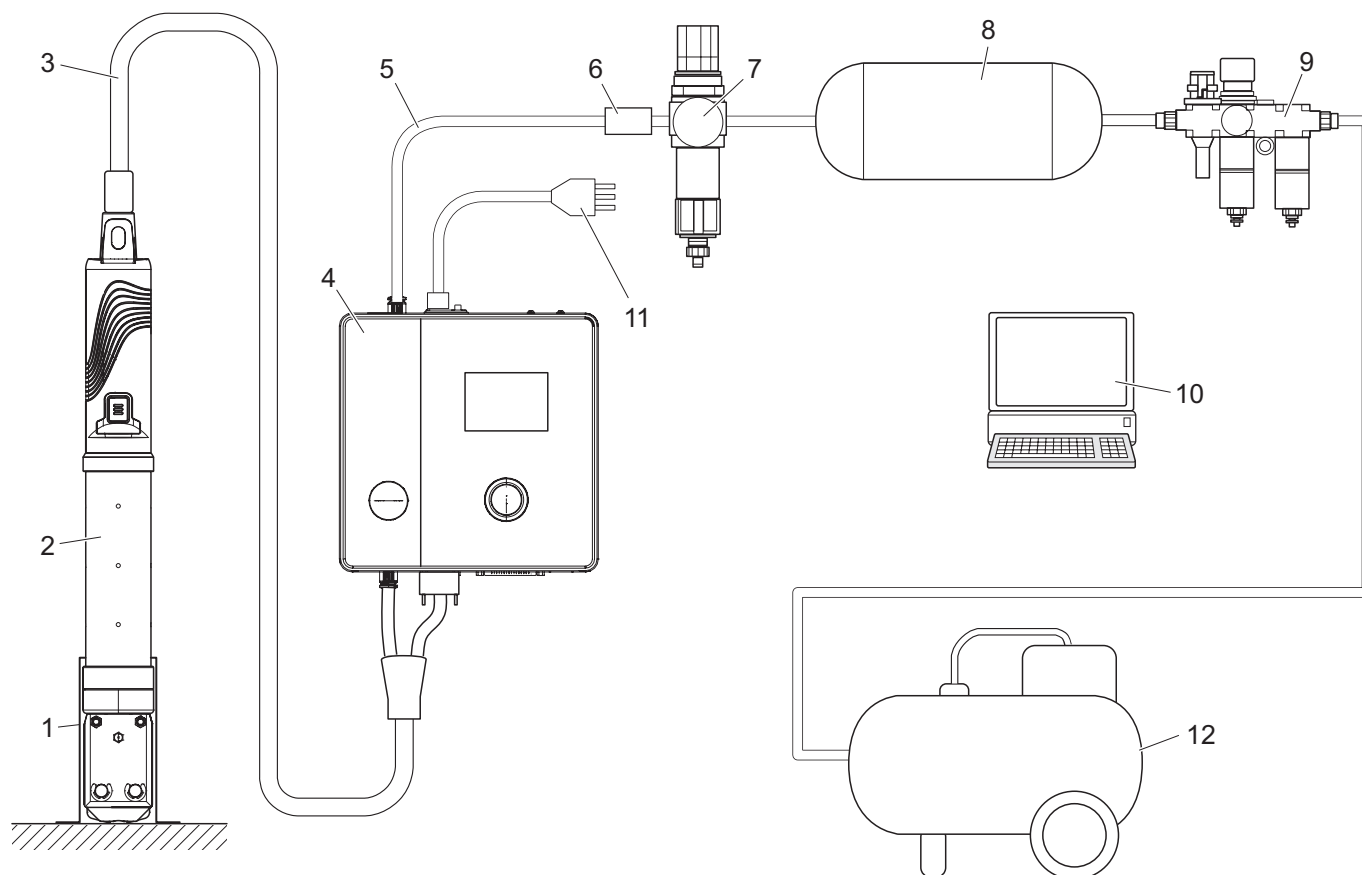


Fig. 16 Setting up and connecting the EPC 01

1	Pincer holder (recommended, plastic)	7	Compressed air filter
2	Pincer	8	Compressed air tank
3	Hybrid hose	9	Maintenance unit
4	Control unit	10	PC
5	Compressed air supply line	11	Power cable
6	Safety shut-off valve	12	Compressor / compressed air supply

- ✓ Setup and connection prepared.
- ✓ Tools / resources provided:
 - Drilling machine
 - EPC 01 bracket

Control unit

1. Proceed as follows for wall mounting:
 - Measure the oblong or round holes of the EPC 01 bracket.
 - Drill 4 holes in the wall accordingly.
2. Mount the EPC 01 bracket with 4 suitable screws.
3. Mount the control unit (4) on the bracket and secure it with 4 grub screws.

Pincer and hybrid hose **CAUTION****Damage to the pincer and the hybrid hose due to improper assembly!**

- ▶ Do not clamp the pincer at the cylinder tube of the pincer body (only the HO 7000 version can be clamped at the reinforced point at the center of the pincer body).
- ▶ Do not strike the pincer and do not allow it to be dropped.
- ▶ Do not lift and transport the pincer using the hybrid hose.
- ▶ Comply with the maximum permissible bending radius of 50 mm of the hybrid hose; do not bend it to a tighter radius.
- ▶ After assembly, clamp the pincer in the pincer holder.

4. Using the hybrid hose (3), connect the pincer (2) on the underside of the control unit (4):
 - Connect the electrical plug of the hybrid hose to the connector **X1**. Secure the plug-in connection finger-tight with both screws.
 - Connect the pneumatic plug of the hybrid hose to the compressed air outlet **pA**.
5. Mounting the pincer holder (1).
6. Secure the pincer (2) in the pincer holder (1) or optionally suspend it from the suspension strap.

PC and PLC (option)

7. Connect the PC (10) or a PLC to the interfaces of the control unit (4) as required.

Components of the compressed air supply **CAUTION****Escaping compressed air!**

In the event of improper work on the compressed air supply, escaping flows of compressed air can lead to injuries.

- ▶ Allow only qualified personnel to work on the compressed air supply.
- ▶ Ensure that the compressed air supply is disconnected.

1. Mounting the compressed air filter (7):
 - Fasten the mounting bracket of the compressed air filter close to the control unit.
 - Mount the compressed air filter suspended on the mounting bracket (the filter insert points downwards).
2. Mount the compressed air tank (8) in front of the compressed air filter (7) and connect it to the compressed air filter.
3. Mount the maintenance unit (9) in front of the compressed air tank (8) and connect it to the compressed air tank.
4. Connect the safety shut-off valve (6) to the compressed air filter (7).
5. Connect the compressed air supply line (5) to the safety shut-off valve (6).
6. Connect the compressed air supply line (5) to the compressed air inlet **pE** on the top of the control unit (4).
7. Check all connections for tight fit and tighten them if necessary.
8. Connect the maintenance unit (9) to the compressed air supply/compressor (12) using a suitable hose.

Electrical connection

NOTE

- ▶ For the variant with a **low-power equipment plug** ensure the following:
 - Connect the EPC 01 only to power supply systems fitted with a ground fault circuit interrupter / GFCI
 - Use only the power cord supplied with the device and do not exchange it
- ▶ For the variant with an **AIDA socket for 24 V supply** ensure the following:
 - Fuse 0.3 A is a slow-blow fuse connected in series
 - Switch-on time of the 24 V DC supply < 10 ms

9. For the variant with a **low-power equipment plug** proceed as follows:
 - Connect the mains cable (11) to the **low-power equipment plug** of the control unit.
 - Plug the power cord (11) into the socket.
10. For the variant with an **AIDA socket for 24 V supply** proceed as follows:
 - Connect the supply cable of the control unit to the **AIDA socket for 24 V power supply** of the control unit.
 - Ensure that the control unit is properly connected to the power supply.

6 Working with the EPC 01

6.1 Preparatory activities

Every day before the start of the shift, the work is prepared with the EPC 01.

WARNING

Risk of injury from escaping compressed air!

- ▶ Do not use HO 10000 type pincer above the maximum permissible inlet pressure of 5 bar.

1. Ensure that the EPC 01 is properly assembled and connected (*see chapter 5*).
2. Ensure that the PC software is installed on the connected PC (*see chapter 8*).
3. Check the vent holes on the pincer body:
 - Clean any vent holes that are clogged.
 - Make sure that any mounted devices / brackets do not cover the vent holes.
4. Switch on the compressed air supply / compressor and ensure that sufficient inlet pressure is applied to the EPC 01.
5. Ensure that the power supply is switched on at the workstation.

6.2 Switching the EPC 01 on and off

6.2.1 Switching the EPC 01 on

- ✓ Preparatory activities carried out.

1. On the control unit, switch the **On/Off switch** on.
2. For the 24 V DC variant, switch on the EPC 01 at the separate voltage supply (detailed information on this see *chapter 13.2*).

After the power is switched on, a system check is performed:

- After an error-free system test, the function selection appears in the display. The EPC 01 is now ready for operation.
- In the event of an error, an error message appears in the display. The error must be rectified (*see chapter 11*).

6.2.2 Switching the EPC 01 off

1. On the control unit, switch the **On/Off switch** off.
2. At the end of the shift:
 - Vent the control unit.
 - Switching off the compressed air supply / compressor.

6.3 Proceed with the closure functions

NOTE

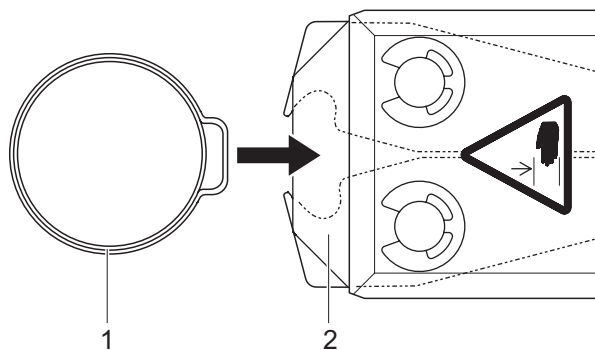
In order to ensure a consistent and reproducible quality of the working process, the pincer test must be performed before the start of the shift, but in any case at least once a day. A pincer test is also required if components of the pincer have been changed.

After the mandatory pincer test, OETIKER recommends the closure force should be checked using the CAL01.

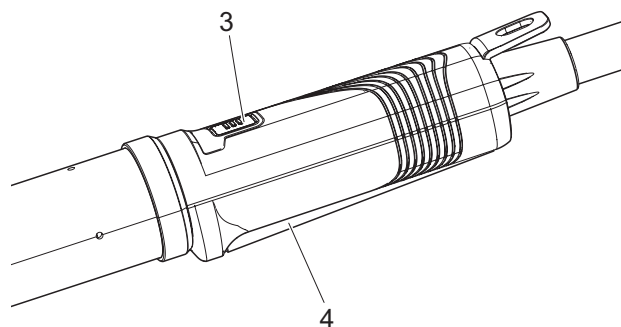
- ✓ EPC 01 switched on.
- 1. Ensure that the correct closure data for the application is on the control unit.
- 2. Select the intended APN for the application.
- 3. Proceed with the pincer test (see *chapter 4.4*).
- 4. Insert one ear of each OETIKER clamp (1) into the clamping area on the pincer head (2).

For low-profile clamps:

- 5. Position the pincer jaws on the closure hooks of the low-profile clamp.

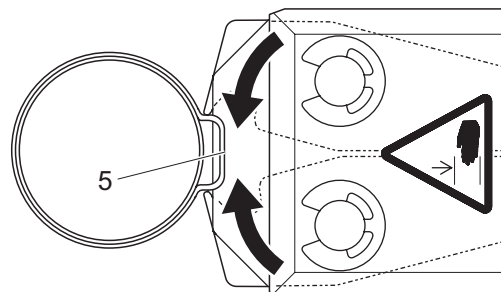


- 6. Trigger closure:
 - Press and hold the safety lever (4).
 - Press the START key (3).



The crimping process is triggered and the ear (5) in the clamp is closed.

- The pincer jaws crimp the ear, using the preset force.
- When using clamps, the preset value is used so that the clamp is hooked in.



After the preset parameter values have been reached, the pincer jaws on the pincer head are opened.

7. After crimping, release the safety lever if necessary, but in any case at least once every 20 closures.

6.4 EPC 01 feedback

The feedback of the system can be read out via the following channels (OK/NOK).

- When the button **START** on the release unit or the LED above the rotary pushbutton on the control unit
 - Continuous green signal: System is OK
 - Blinking red signal: Error (see chapter 11)
- Via the interfaces, depending on the configuration of the PC software (see chapter 12.2).

6.5 Changing the pincer

CAUTION

Risk of injury from escaping compressed air!

- ▶ When changing the pincer, switch off the control unit.

1. Switch the control unit off.
2. Vent the control unit.
3. Disassemble the pincer:
 - Disconnect the pneumatic plug of the hybrid hose from the compressed air outlet **pA**.
 - Disconnect the electrical plug of the hybrid hose from the connection **X1**.
 - Remove the pincer.
4. Mount the new pincer:
 - Connect the electrical plug of the hybrid hose to the connector **X1**. Secure the plug-in connection finger-tight with both screws.
 - Connect the pneumatic plug of the hybrid hose to the compressed air outlet **pA**.

5. Switch on the control unit.
6. Proceed with the pincer test (*see chapter 4.4*).

6.6 Taking the EPC out of operation

If the EPC 01 is not going to be used for an extended period of time it must be taken out of operation and then stored.

- ✓ EPC 01 switched off.
- 1. Disconnect the EPC 01 from the compressed air and voltage supply.
- 2. Depressurize the EPC 01.
- 3. Disconnect the cables and hose connections.
- 4. Remove the components.
- 5. Storing the EPC 01 (*see chapter 11.2*).

NOTE

When the EPC 01 is put back into operation having been taken out of operation, the activities must be carried out as for a new purchase (*see chapter 5*).

7 EPC 01 menu

7.1 User level

The access rights for the settings and functions in the menu depend on the user level. A role description of the personnel can be found in the personnel qualification (see *chapter 2.9*).

7.2 Symbols and controls



Fig. 17 Display and operating elements on the control unit

Item	Element	Designation	Description / Function
1	–	Display	Show menu.
2		Rotary pushbutton	Press to trigger an action.
			Turn the rotary pushbutton counterclockwise or clockwise to navigate in the menu.
–		Selection	Confirm the selection.
–		Cancel	Cancel action.

Item	Element	Designation	Description / Function
–		Back	Navigate back to the previous menu page.
–		Settings	Call up the menu settings.
–		Language	Set the language of the menu.
–		Information	View information.
–		Nominal force	Enter values of the nominal force from CAL01.
–		Pincer test	Proceed with the pincer test.
–	–	START key (pincer)	Release the pincer. Press the safety lever and keep it pressed.

7.3 Menu structure

7.3.1 Overview

The start menu appears when the EPC 01 is switched on. Starting from the start menu, the rotary pushbutton can be used to navigate to the next menu level:

Start menu	Menu	Sub-menu	Functions / Description
Function selection	APN	Current APN	APN selection
	Pincer test	Start	Friction test
	System	Languages	- German - English - Japanese - Chinese
		System info	- Firmware version - Build date
		Hardware info	- Input pressure - Supply voltage - Temperature - Log memory - Trigger unit - Industrial network module - Version - Date
		Network settings	- IP settings - DHCP

7.3.2 Structure

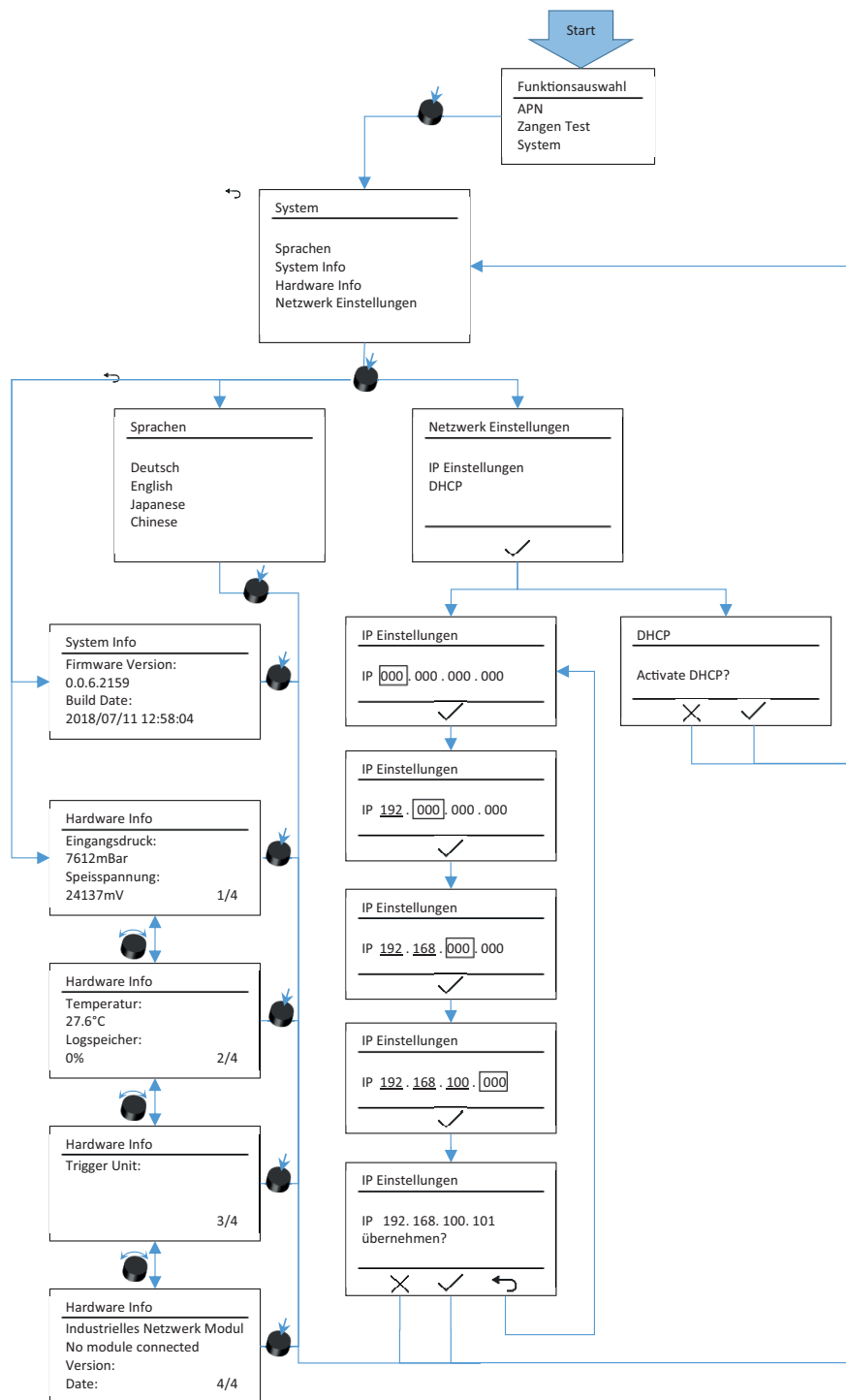


Fig. 18 Structure of the menu (here: **System**)

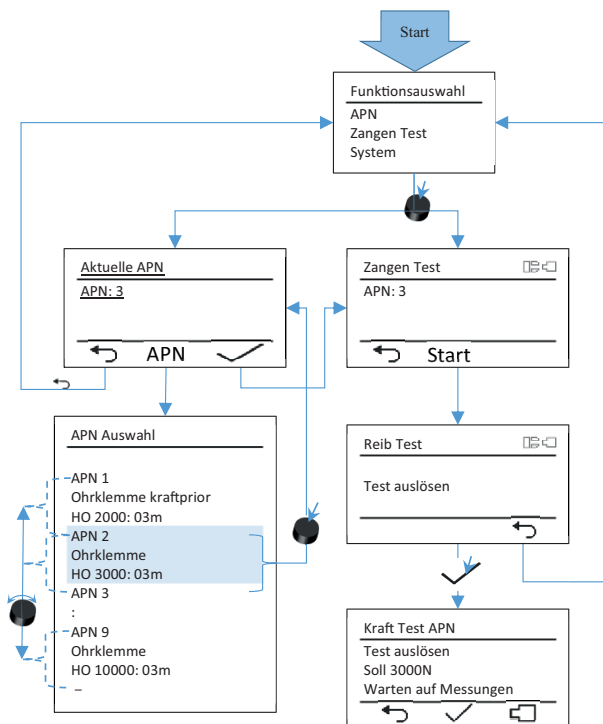


Fig. 19 Structure of the menu (here: **APN** and **Pincer Test**)

8 PC Software

8.1 Basic matters

The PC software has the following basic tasks and functions:

- Manage the databases. The data for the control unit are stored in the databases (DB). Multiple databases can be stored and edited on the PC. When sending/reading data sets, the entire databases are transferred.
- Read and edit datasets. During operation, log data are stored and data are updated (e.g. pincer test). The data can be read out and edited. Processed data can then be sent back to the control unit. If data sets are sent directly to the control unit (without first reading the records), the log memory and the data from the pincer test are overwritten.
- Configuring and setting the EPC 01.

8.2 Installation

8.2.1 System requirements

1. Check the minimum requirements of the PC in the following table:

Parameter	Value / Description
Processor	1 GHz or higher
Graphics	Minimum screen resolution 1024x768, however, 1920x1080 is recommended in
Working memory	512 MB
Hard disk space	2 GB free disk space
Operating system	Windows XP Professional or higher
Connections	USB, Ethernet

2. Check system requirements for the .NET Framework:
[https://msdn.microsoft.com/de-de/library/8z6watww\(v=vs.100\).aspx](https://msdn.microsoft.com/de-de/library/8z6watww(v=vs.100).aspx)

8.2.2 Installing the PC software and USB driver

The PC software and USB drivers are stored on the USB stick included in the scope of delivery.

- ✓ System requirements checked.
- ✓ User has all administrator rights of the PC.

PC Software

1. Switch on PC and boot up.
2. Insert the USB stick into the PC.
3. Open the folder system of the USB stick.

4. Execute the file **Oetiker.Easy.application.Setuo.msi** by double-clicking on it and following the instructions on the screen.
The installation process starts.
Once the software installation is complete, an Explorer window with available USB drivers will open automatically.

USB driver

5. If it is necessary to update the EPC 01 firmware, select and install the appropriate driver. For 64-bit systems, execute the driver **dpinst_amd64.exe** and install it.
6. If the driver is installed later, open the following path in the installation folder of the PC software and install the appropriate driver:
...\Oetiker\Oetiker EPC Configuration 0.1.0.0\dfu\STM-Bootloader-Driver

8.3 Structure and elements of the PC software

The following figure shows the structure of the home page with its basic software elements:

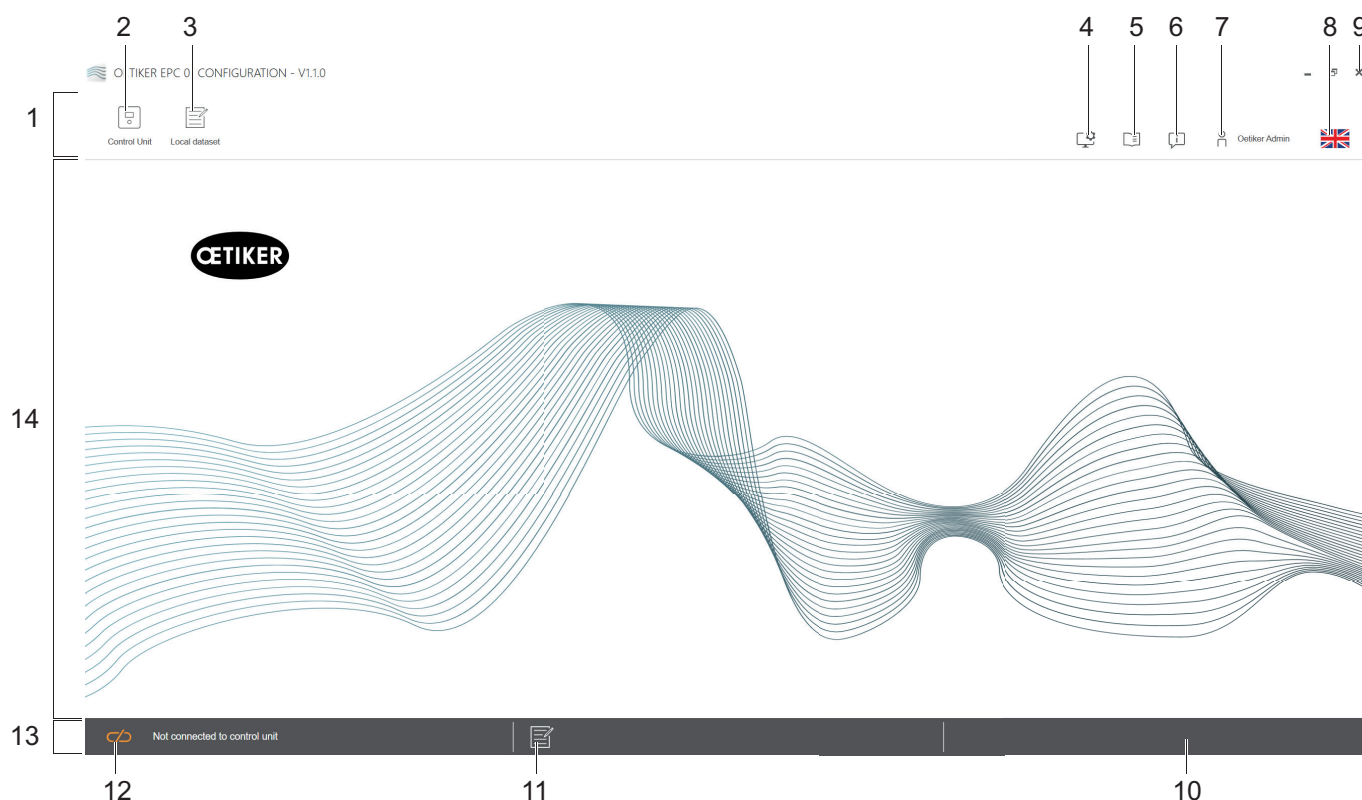
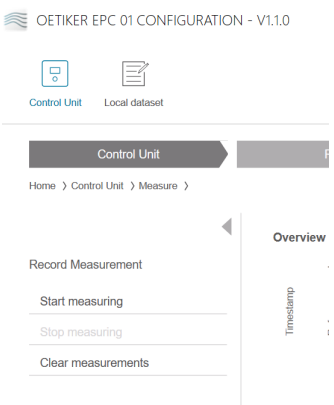
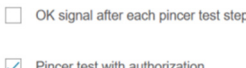
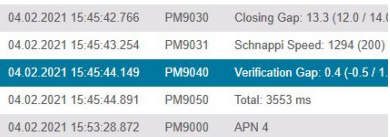


Fig. 20 Structure of the PC software (here: start page)

Item	Element	Designation	Description / Function
1	–	Menu bar	Allows, among other things, the Control unit , Local dataset and Settings menus to be called up.
2		Control unit	Calls up the Control unit menu.
3		Local dataset	Call up the Local dataset menu.
4		Settings	Calls up the Settings of the PC software, including the following: • Converting the force display from Newton to pounds. • Configure TCP/IP address. Here, a list of control units can be created so that the connection between the computer and control unit can be easily selected. The set IP address cannot be sent to the control unit. • Roles configuration.

Item	Element	Designation	Description / Function
5		Instruction manual	Calling up the instruction manual.
6		About	View information about software and OETIKER.
7		Log In	• User login and logout. • Edit permissions of the users. • Change password (default password Lin: "Easy!").
8		Language	Set the language of the PC software.
9	x	Exit	Exit PC software.
10	–	Feedback	Displays feedback from the PC software.
11		Help text	Call help text of the currently opened file.
12		Connection status	Displays the connection status to the control unit. • Symbol orange (open): PC software not connected • Symbol green (closed): PC software connected
13	–	Status bar	Displays, among other things, the connection status to the control unit and feedback messages from the PC software.
14	–	Menu page	The menu page changes depending on the selection in the menu bar. The specific software items and parameters for operation appear on each menu page.

On the different pages of the PC software there are specific software elements and parameters and they have the following meaning:

Element (example)	Naming	Description / Function
	Function bar	The function bar is displayed on the left side of the software interface and is not present on every menu page or sub-menu page (example here: Record measurement). Depending on the menu, the toolbar contains specific dialog elements for editing as well as navigating the page contents.
	Increase or decrease the value	- Press the + button to increase the value - Press the - button to decrease the value
	Input field	Enter characters or values (example here: EPC01).
	Check box	- Check the box to select the function. - Remove the check mark to deselect the function.
	Drop-down menu	Select value from a drop-down menu.
	Edit list entry	Select list entry for editing. - Blue coloration: List entry selected. The list entry can be edited e.g. with the dialog elements from the function list. - White/Gray coloration: List entry not selected or not selectable.

8.4 Basic operation

8.4.1 Start PC software

- ✓ Monitor and PC are switched on.
- ✓ Operating system is started.
- ▶ On the desktop, click the shortcut to the PC software.
The PC software is started and the start page appears.

8.4.2 Exit PC software

- ▶ In the title bar of the PC software, press the **x** button.

8.4.3 Checking the roles configuration

Navigation: Home > Settings

Function name	Public	Line responsible	Customer Admin	Oetiker Admin
AuthorizePincerTest		✓	✓	✓
ChangeRolePassword			✓	✓
CreateEditDeleteClampData		✓	✓	✓
CreateEditDeleteClampDataSequences		✓	✓	✓
CreateEditDeleteCulpConfiguration		✓	✓	✓
CreateEditDeleteLocalDataset		✓	✓	✓
CreateEditDeleteProcessData				✓
EditCuSettings		✓	✓	✓
EditGeneralApplicationSettings	✓	✓	✓	✓
EditOetikerCuSettings				✓
ExecuteFirmwareUpdate			✓	✓
ExecuteLanguageUpdate			✓	✓
ImportExportLocalDataset		✓	✓	✓
LockLocalDataset		✓	✓	✓
ManageRoleFunctionAssignment			✓	✓
ManageSchnappiSpeed				✓
OpenLocalDataset	✓	✓	✓	✓
ReceiveCulImage		✓	✓	✓
RequestPincerTest		✓	✓	✓
ResetAEStatistics				✓
ResetCuLogs		✓	✓	✓
ResetNOClosingsStatistics		✓	✓	✓
ResetREStatistics				✓
ResetTrialPeriod				✓
SelectSpecificImportExportData				✓
SendCulImage		✓	✓	✓
SendNominalForceToCu		✓	✓	✓
ShowClampData	✓	✓	✓	✓
ShowClampDataSequences		✓	✓	✓
ShowCuLogs		✓	✓	✓
ShowCuSettings		✓	✓	✓
ShowCuStatistics		✓	✓	✓
ShowLicensedFeatures	✓	✓	✓	✓
ShowOetikerCuSettings				✓
ShowProcessData				✓
ShowRoleConfiguration			✓	✓
StartMeasurement		✓	✓	✓
UpdateLicenseCode			✓	✓
UpdateProductionData				✓

Fig. 21 Roles configuration

In the PC software, the role configuration of the 4 user groups is checked. Active rights are marked with a check mark.

8.5 Menu Control unit

Navigation: **Home** > **Control unit**

8.5.1 Overview of the menu structure

Menu page	Sub-menu page
Control unit	Connect to Control Unit
Read	–
Send	–
Measure	Start measuring
	Stop measuring
	Clear measurements
Pincer test	Request pincer test
	Nominal force input
	Authorize pincer test
Commands	Reset the control unit
	Update firmware
	Update firmware language
	Control Unit license

8.5.2 Connecting to the control unit

Navigation: **Home > Control unit > Connect to control unit**

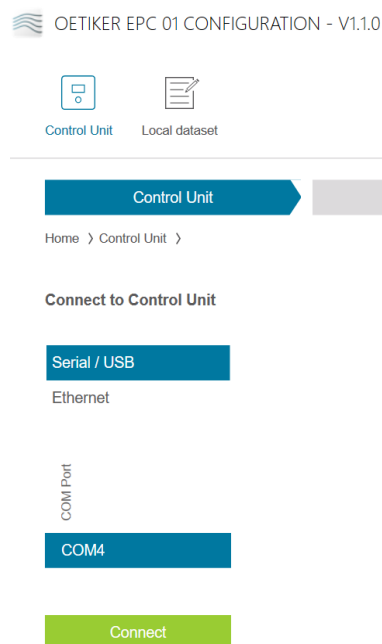


Fig. 22 Menu Connect to Control Unit

The control unit is connected to the PC using the **Connect to control unit** menu page. To establish the connection, first select the interface to the control unit: **Ethernet**, **USB** or **RS232**. The interface is then selected in the software **COM Port** range. The connection is established by pressing the **Connect** button.

8.5.3 Read data set

Navigation: **Home > Control unit > Read**

OETIKER EPC 01 CONFIGURATION - V1.1.0

Control Unit Local dataset

Control Unit Read

Home > Control Unit > Read >

☒ Overwrite existing local dataset ☐ Create new local dataset

Local dataset	Last dataset change	Nr of Clamp data	Version	Has license violations
default	2020-09-17 16:41:33Z	0	0.0.2	

☐ Include log data

Read

Fig. 23 The Read menu

On the **Read** menu page, data from the control unit are read into the PC software. Either the data are read in as a new dataset or an existing dataset is overwritten in the process. The reading in is done by pressing the **Read** button. The log file of the control unit can also be read in (see chapter 8.6.9) by selecting the **Include log data** function. This is necessary, for example, in the event that support is being provided.

8.5.4 Sending the data set

Navigation: **Home > Control Unit > Send**

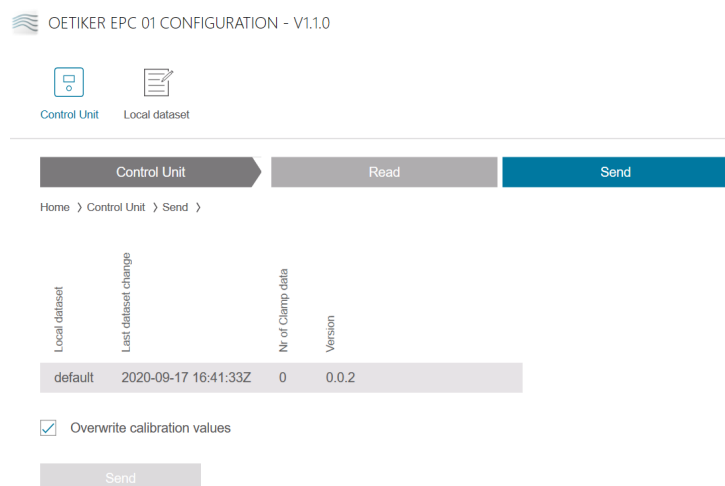


Fig. 24 The Send menu

On the **Send** menu page, a newly created or edited dataset is sent to the control unit.

The control unit determines specific values for each pincer test. When the **Overwrite calibration values** function is performed, the defined values of the pincer test are overwritten with default values. The pincer must be recalibrated after the data have been sent.

For minor editing operations (e.g. closure force or tolerances), sending the calibration values is optional.

8.5.5 Measuring

Navigation: **Home > Control unit > Measure**

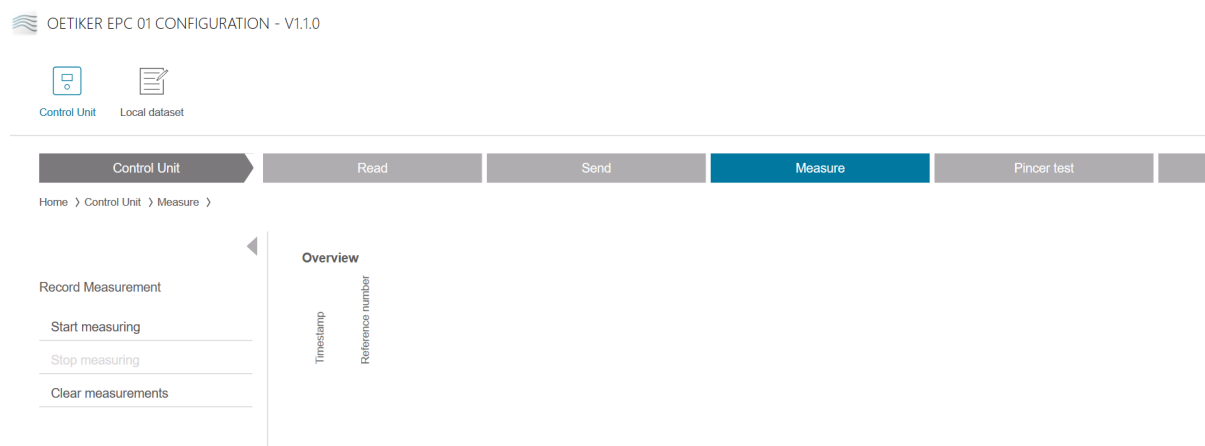


Fig. 25 Fairs menu

On the **Measure** menu page, all log entries relevant for closure are displayed as an overview. This is required for the validation phase.

On the sub-menu pages the log entries for **started**, **stopped** or **deleted** can be deleted.

The log entry selected as an example in the figure has the following meaning:

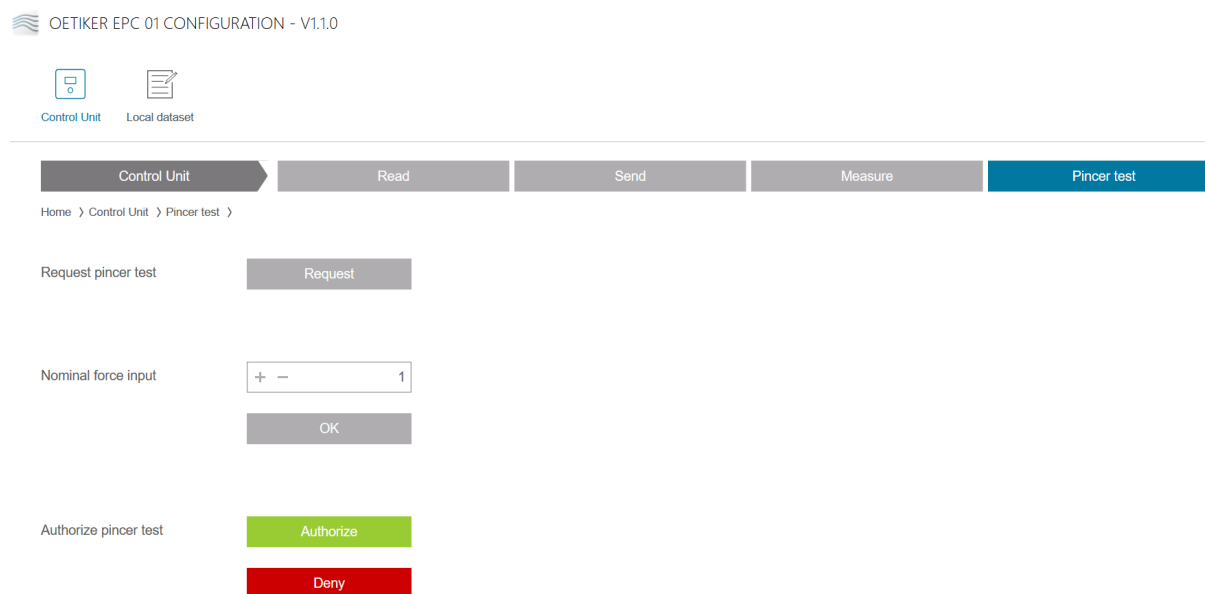
Verification Gap: 0.4 (-0.5 / 1.0 / 2.5) mm

Verification Force: 243 (150 / 250 / 350) N

Log message	Meaning	Log message	Meaning
Verification gap	Verification gap	Verification Force	Verification force
0.4	Actual value [mm]	243	Actual value [N]
-0.5	Lower tolerance [mm]	150	Lower tolerance [N]
1.0	Set point [mm]	250	Target value [N]
2.5	Upper tolerance [mm]	350	Upper tolerance [N]

8.5.6 Pincer test

Navigation: **Home > Control unit > Pincer Test**



OETIKER EPC 01 CONFIGURATION - V1.1.0

Control Unit Local dataset

Control Unit Read Send Measure Pincer test

Home > Control Unit > Pincer test >

Request pincer test Request

Nominal force input + - 1 OK

Authorize pincer test Authorize Deny

Fig. 26 Pincer test menu

On the **Pincer Test** menu page, the pincer test is requested by pressing the **Request** button. Work with the pincer must be interrupted in order to perform the pincer test.

If CAL01 is used for the pincer test, the nominal force determined there can be entered in the **Nominal force input** field. Pressing the **OK** button sends the value to the control unit. If this is a repetition of the nominal force measurement, the new value can be sent to the control unit.

The pincer test can be **authorized** or **denied**. Authorization is available only if the **Authorize the pincer test** option is selected in the local dataset (see section *“Edit pincer test settings” on page 8-71*).

NOTE

Detailed information on the procedure of the pincer test and the description of the action steps are given in chapter 4.4 described.

8.5.7 Execute commands

Navigation: **Home > Control unit > Commands**

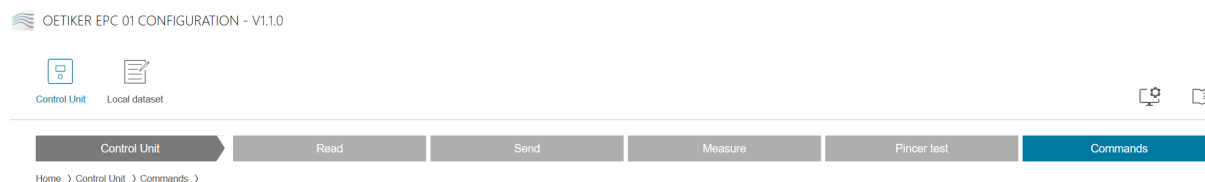


Fig. 27 Commands menu

On the **Commands** menu page, the following commands can be executed in the corresponding sub-menus:

- Deleting a log file
- Updating firmware
- Update firmware language
- Enter the license key

Deleting a log file

Navigation: **Home > Control unit > Commands > Reset statistics and log data**



Fig. 28 Reset control unit sub-menu

On the **Reset statistics and log data** sub-menu page the log file is deleted by pressing the **Reset** button.

Updating the firmware

Navigation: **Home > Control unit > Commands > Update firmware**

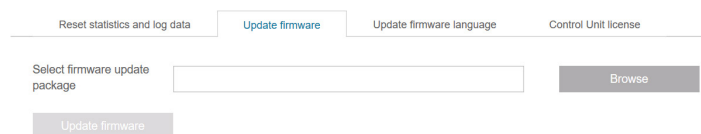


Fig. 29 Update Firmware sub-menu

On the **Update firmware** sub-menu page the firmware of the controller unit is updated.

To be able to update the firmware, the following requirements must be met:

- The control unit is connected to the PC via the USB port. The other ports cannot be used for this purpose.
- The correct driver is installed. If the default driver is used, the update cannot be performed and the following error message appears:



Fig. 30 Error message wrong driver

Pressing the **Select** button selects the firmware update file. After selecting the correct file, the update is started by pressing the **Execute firmware update** button.

Updating the firmware language

Navigation: **Home > Control unit > Commands > Update firmware Language**

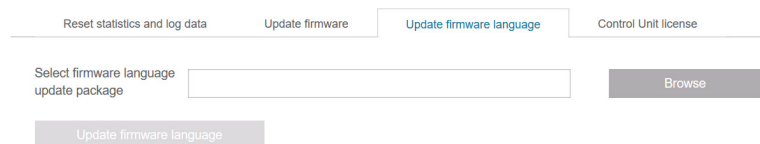


Fig. 31 Submenu Update firmware language

On the **Update firmware language** sub-menu page the firmware language is updated.

Press the **Browse** button to select the language firmware update file. Once the correct file has been selected, the update is started by pressing the **Update firmware language** button.

Entering the license key

Navigation: **Home > Control Unit > Commands > Control Unit licence**

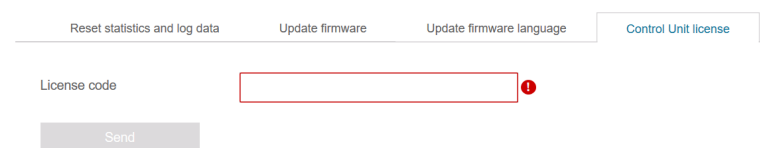


Fig. 32 Control Unit licence sub-menu

On the **Control unit licence** sub-menu page the license key is entered to unlock extended functions.

Pressing the **Send** button sends the license key to the control unit for processing.

8.6 Local dataset menu

Navigation: **Home** > **Local dataset**

The **Local dataset** menu allows both the closure data and the settings of the control unit to be managed. These can also be exported or imported as a complete package.

8.6.1 Overview of the menu structure

Menu page	Sub-menu page	Functions
Local dataset	Local dataset	• Open • New from existing • Delete • Rename • Lock • Unlock
	Import	• Import data set
	Export	• Exporting the data set
Clamp data	Dataset	• Save • Send to control unit
	Clamp data	• Open single view • New • New from existing • Delete
Sequence	Dataset	• Save • Send to control unit
	Clamp data Sequence	• Open single view • New • New from existing • Delete
Settings control unit	General	–
	Closing	–
	Closing feedback	–
	Pincer test	–
	Compatibility mode	–
Statistic	General	–
	Closures	Reset closings divisions
	Pincer test	–
Log data	Export measurements	–
Licensed features	–	–

8.6.2 Edit local dataset

Navigation: **Home > Local dataset > Local dataset**

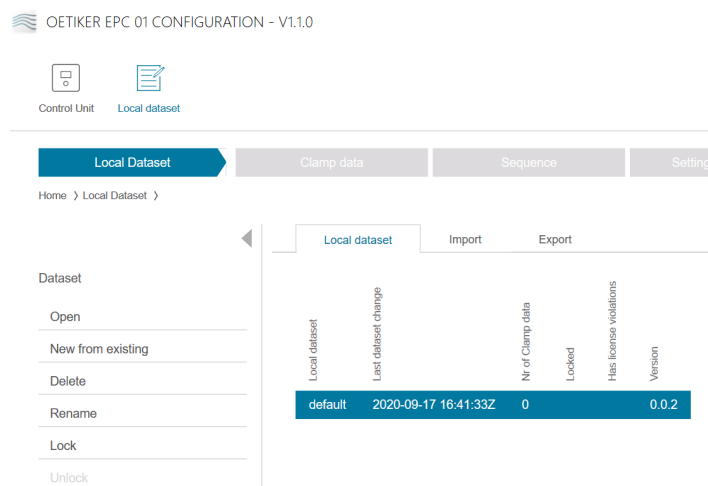


Fig. 33 Local dataset sub-menu

Local datasets are edited using the **Local dataset** sub-menu page. To do this, select the dataset from the list and then open it for editing with the **Open** button.

Datasets can be duplicated, deleted, renamed, locked or unlocked as needed. Locking prevents accidental deletion or renaming of the dataset.

8.6.3 Importing the local dataset

Navigation: **Home** > **Local dataset** > **Import**

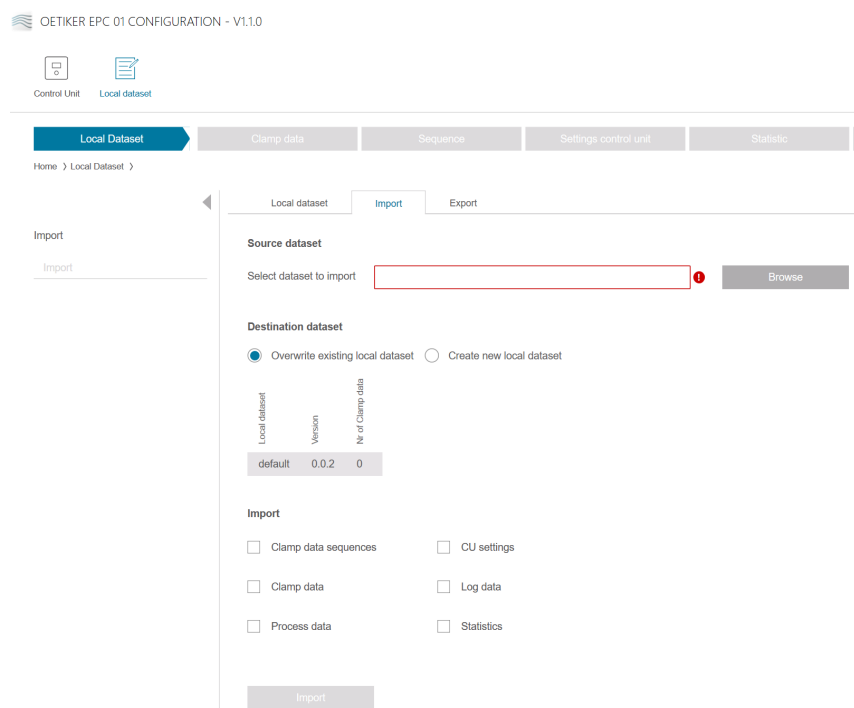


Fig. 34 Import sub-menu

Local datasets are imported, e.g. even from an external device, using the **Import** sub-menu page.

The dataset file is selected via the **Browse** button.

After the correct file has been selected, the type of saving is chosen:

- **Overwrite existing local dataset**
- **Create new local dataset**

The import of the dataset file is executed by pressing the **Import** button.

8.6.4 Exporting the local dataset

Navigation: **Home** > **Local dataset** > **Export**

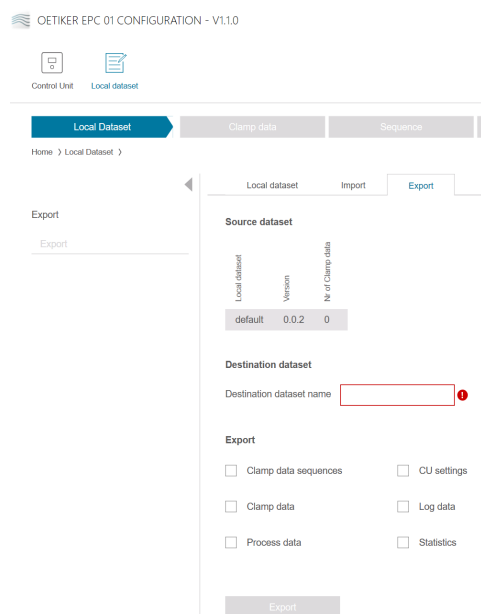


Fig. 35 Export sub-menu

In order to import the file e.g. to another PC, the local datasets are exported using the **Export** sub-menu page. The desired dataset is selected in the list and named in the **Destination dataset name** field. Subsequently, the scope of the dataset is selected and exported by pressing the **Export** button. This automatically opens the storage location in the folder system. From there the file can then be copied and moved to another location, e.g. using drag and drop.

8.6.5 Editing the clamping dataset

Navigation: **Home** > **Local dataset** > **Clamp data**

OETIKER EPC 01 CONFIGURATION - V1.1.0

Control Unit Local dataset

Customer Admin

Local Dataset Clamp data Sequence Settings control unit Statistic Log data Licensed features

Home > Local Dataset > Clamp data >

Dataset

Save

Send to control unit

Clamp data

Open single view

New

New from existing

Overview

APN	Description	Clamp type	Process type	Clamping mode	Open Gap	Open gap	Open Gap Tol	Open Gap Delay Time	Hold	Delayed	Hold Gap	Hold Gap Tol	Hold Force	Hold Force Tol	Delayed Gap	Delayed Force 2	Contact Definition	Strip Detection Speed Threshold	Contact Force	Clamping Gap	Clamping Gap Tol (°)	Clamping Gap Tol (°)	Clamping Force	Clamping Force Tol (°)
1	1008	PG167	HO 7000: 03m	FORCE_PRIOR	13.7	4.0	350.0		12.0	4.0	500	150	4.7	500	300	700	3.0	1.2	1.2	4900	250			
2	1010	PG167	HO 7000: 03m	FORCE_PRIOR	13.7	4.0	350.0		12.0	4.0	500	150	4.7	500	300	700	3.0	1.2	1.2	4900	250			

Fig. 36 Clamp data sub-menu

All clamping dataset are displayed as an overview on the **Clamp data** sub-menu page.

The clamping dataset to be edited is selected here and is then, depending on requirements, **opened**, **newly created**, **duplicated** or **deleted**.

Clamping data single view

Navigation: Home > Local dataset > Clamping data > Clamp data single view

OETIKER EPC 01 CONFIGURATION - V1.1.0

Control Unit

Local dataset

Local Dataset

Clamp data

Sequence

Settings control unit

Statistic

Log data

Home > Local Dataset > Clamp data > Clamp data single view >

Dataset

Save

Send to control unit

Clamp data

Back to overview

Single view

APN

+ - 1

Description

1008

Clamp Type

PG167

Pincer Type

HO 7000 : 03m

Closing mode

FORCE_PRIOR

☐ Open Gap

Open Gap

+ - 13.7 mm

Open Gap Delay Time

+ - 350 ms

Open Gap Tol.

+ - 4.0 mm

☒ Inactive

☐ Hold

☐ Detect

☐ Contact Detection

Contact Force

+ - 700 N

Fig. 37 Clamp data single view sub-menu

Once the **Clamp data single view** has been opened, the closure dataset is edited as required. In the individual view, additional options such as hold, verify or detect can be selected and parameterized.

NOTE

Detailed information of the options is described in chapter 4.3.

Output 06.21

08905306

8-64

8.6.6 Edit sequence

Navigation: **Home** > **Local dataset** > **Sequence**

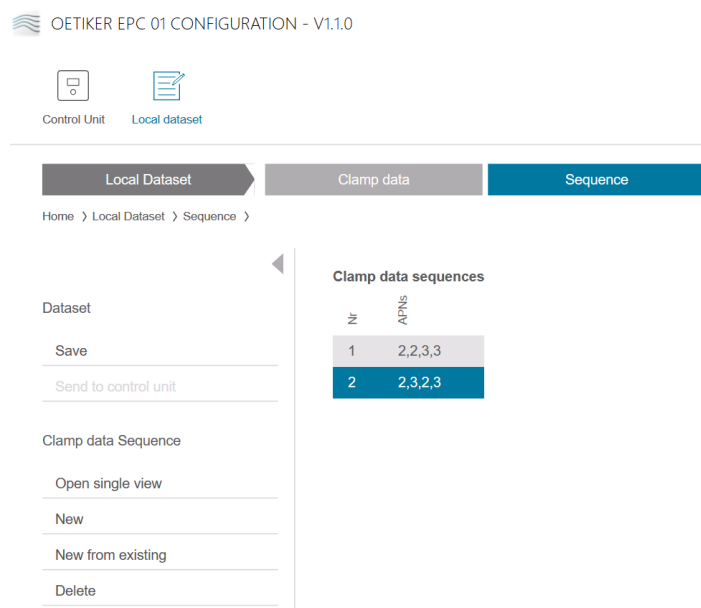


Fig. 38 Sequence sub-menu

On the **Sequence** sub-menu page, all sequences are displayed as an overview.

The sequence to be edited is selected here, and then, depending on the requirements, selected as follows **opened**, **newly created**, **duplicated** or **deleted**.

In a sequence, different APNs can follow one another. This prevents frequent APN changes at the control unit.

Clamping data sequence single view

Navigation: **Home > Local dataset > Sequence > Clamp data sequence single view**

OETIKER EPC 01 CONFIGURATION - V1.1.0

Control Unit Local dataset

Local Dataset Clamp data Sequence Settings control unit Statistic

Home > Local Dataset > Sequence > Clamp data sequence single view

Application settings

Save

Send to control unit

Clamp data Sequence

Back to overview

Single view

Sequence Nr 2

1. closure	2 (HO 7000 : 03m)	16. closure	
2. closure	3 (HO 7000 : 03m)	17. closure	
3. closure	2 (HO 7000 : 03m)	18. closure	
4. closure	3 (HO 7000 : 03m)	19. closure	
5. closure		20. closure	
6. closure		21. closure	
7. closure		22. closure	
8. closure		23. closure	
9. closure		24. closure	
10. closure		25. closure	
11. closure		26. closure	

Connected to control unit:
EPC01 (43086605245956124 / V 1.0.1)

default

Fig. 39 Sequence sub-menu

Once the **Clamp data sequence single view** sub-menu page has been opened, the sequence is edited as needed. To create or edit a sequence, the clamping data are selected according to the desired sequence in the drop-down menu. Only the clamping operations that are actually required are selected, but not all 30.

8.6.7 Edit the control unit settings

Navigation: **Home** > **Local dataset** > **Settings control unit**

Edit general settings

Navigation: **Home** > **Local dataset** > **Settings control unit** > **General**

OETIKER EPC 01 CONFIGURATION - V1.1.0

Control Unit Local dataset

Local Dataset Clamp data Sequence Settings control unit

Home > Local Dataset > Settings control unit >

General Closing Closing feedback Pincer test Compatibility mode

Dataset

Save

Send to control unit

Settings

Reset to default

Control Unit name EPC01

Time synchronization type PC

Time zone + - 1

IP address 10.0.23.199

Subnet mask 255.255.0.0

Gateway address 0.0.0.0

Firmware language English

☐ Force display in lbs

☐ Pincer remains closed in case of NO

☒ Control Unit button active

Active X3 interface PC

Display time 1 + - 2000 ms

Display time 2 + - 2000 ms

Fig. 40 General sub-menu

The following general settings are made on the **General** sub-menu page:

Element	Description of the setting
Control Unit name	Enter the name of the control unit.
Time synchronization type	Select time alignment of the control unit. - PC: Each time a connection is established, the control unit compares the time with the PC - Server: The control unit synchronizes the time with the integrated NTP server at regular intervals
Time zone	Set the time zone.
IP address	Enter the IP address.
Subnet mask	Enter the subnet mask.

Element	Description of the setting
Gateway address	Enter the gateway address.
Firmware language	Select the firmware language.
Force display in lbs	Select whether the force display is shown in the unit of pounds.
Pincer remains closed in case of NO	Select whether the pincer remains closed when set to NO.
Control Unit button active	Select whether the rotary-push button on the control unit is active.
Active X3 interface	Select the assignment of the X3 interface: • PC • CAL01
Display time	If several data are displayed after a closure (e.g. with Verify), then the display changes at the intervals set here

NOTE

The firmware time of the control unit can deviate up to 6 minutes per day. Therefore, regular time synchronization is recommended for data storage.

If an NTP server is used, it must be included in the same network as the control unit.

Editing clamping settings

Navigation: **Home > Local dataset > Settings control unit > Closing**

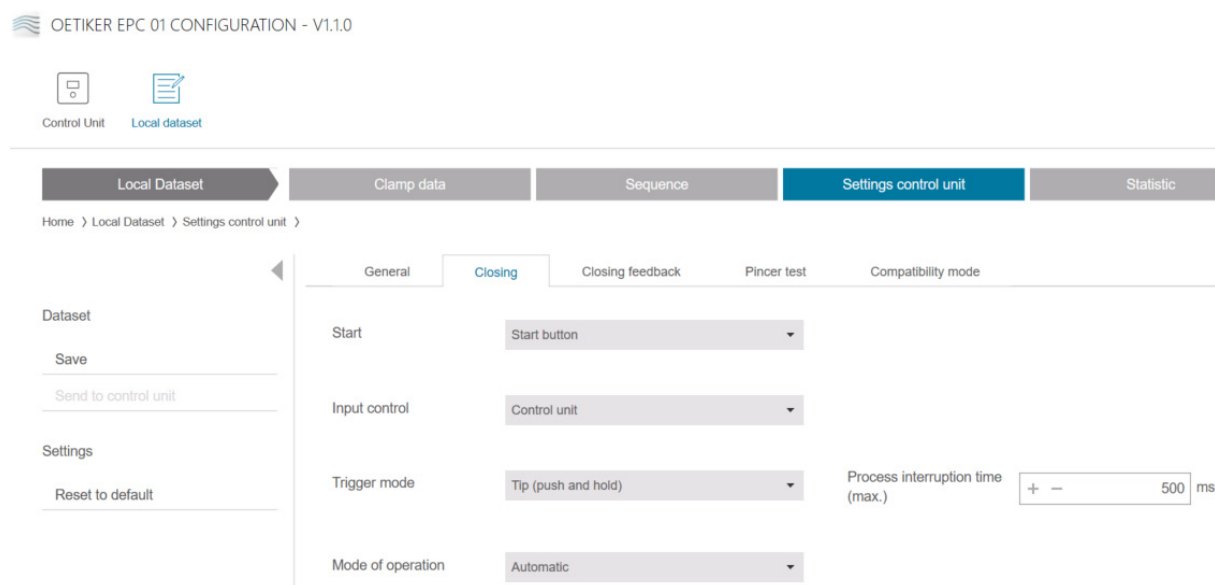


Fig. 41 Closure sub-menu

The following settings are made on the **Closing** sub-menu page:

Element	Description of the setting
Start	Select the triggering of the closure. START button on the triggering unit - Higher level control START button on the triggering unit and higher-level controller jointly
Input control	Select the source of the start signal. - Higher-level controller: If the start signal is sent from a higher-level controller, this must be selected here. With this option, the safety valve must be actively locked by an accessory specially available from OETIKER. - Control unit: The control unit sends the start signal.
Trigger mode	Select starting the closure process. - Tip (press start button until closure is completed, when released the pincer opens and the process is aborted). - Impulse (a short pulse on the start button triggers complete closure). - Double-click (double-clicking the start button triggers complete closure). In order to demonstrate this, a step by step operation is implemented. When the device is triggered, the system moves to the next step.

Element	Description of the setting
Mode of operation	Select operating mode. - Automatic - Step by step

Edit settings for closure feedback

Navigation: **Home** > **Local dataset** > **Settings control unit** > **Closure feedback**

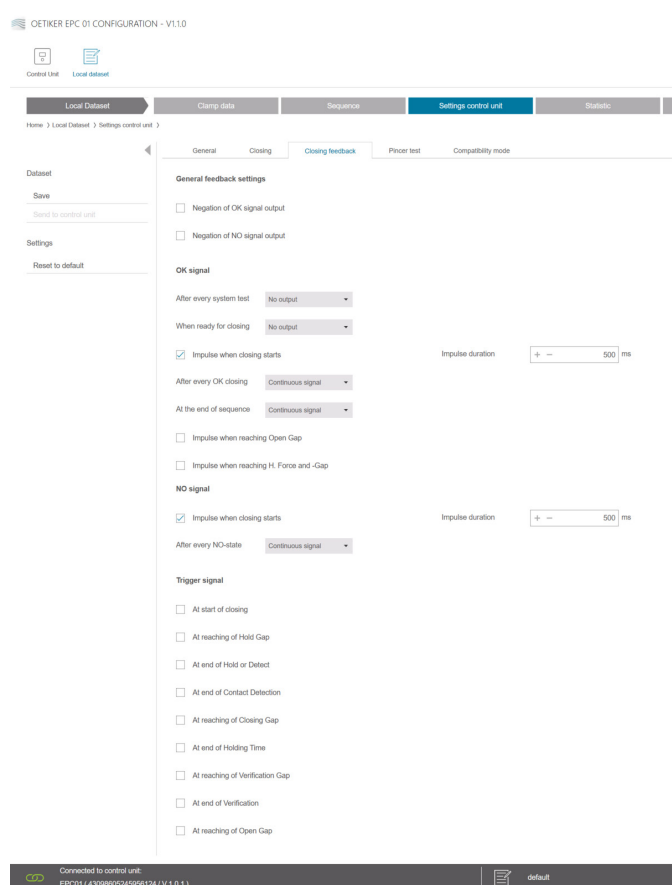


Fig. 42 Closure feedback

The settings for feedback from the control unit are made on the **Closure feedback** sub-menu page.

The inversion of the OK signal and the NOK signal is selected / deselected in the **General feedback settings** range.

The output parameters of the respective signal are set in the **OK signal** and **NOK signal** ranges.

The time or the operating event for the signal output is selected / deselected in the **Trigger signal** range.

Edit pincer test settings

Navigation: **Home** > **Local dataset** > **Settings control unit** > **Pincer test**

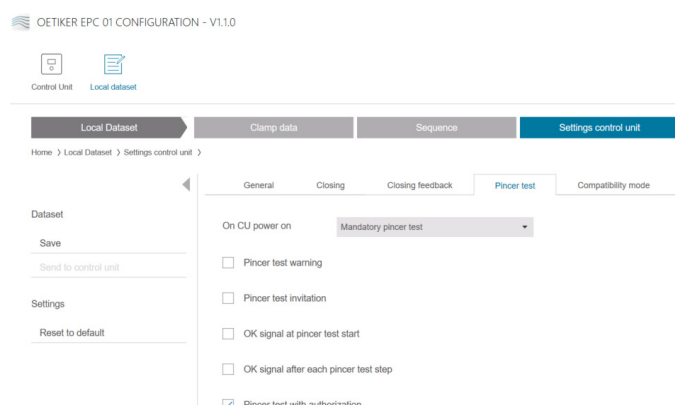


Fig. 43 Pincer test sub-menu

The settings of the pincer test are made in the local dataset on the **Pincer test** sub-menu page:

Element	Description of the setting
On CU power on	Select whether the pincer test is performed each time the control unit is started. - Mandatory pincer test - Function selection “PT” and “APN” - Directly to active APN
Pincer test warning	Select whether a warning appears after a defined number of closures.
Pincer test invitation	Select whether a pincer test is performed after a defined number of closures.
OK signal at pincer test start	Select whether OK signals are sent at the start of the pincer test.
OK signal after each Pincer teststep	Select whether OK signals are sent after each step during the pincer test.
Pincer test with authorization	Select whether to authorize a pincer test in the pincer test menu at the control unit (see chapter 8.5.6).

Edit compatibility mode settings

Navigation: **Home** > **Local dataset** > **Settings control unit** > **Compatibility mode**

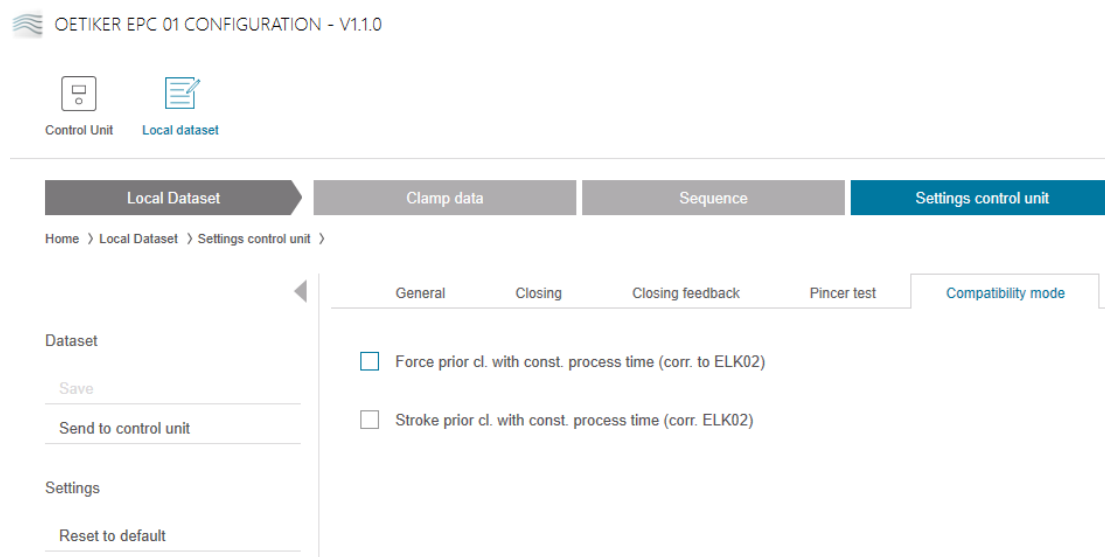


Fig. 44 Compatibility mode sub-menu

On the **Compatibility mode** sub-menu page the same process times of the OETIKER ELK 02 can be readjusted for force priority and gap priority closures.

This function is selected only in the event that an ELK 02 is replaced or after consultation with OETIKER. The quality of the closures is maintained and there are no disadvantages.

8.6.8 View statistics

Navigation: **Home > Local dataset > Statistic**

OETIKER EPC 01 CONFIGURATION - V1.1.0

Control Unit

Local dataset

Local Dataset

Clamp data

Sequence

Settings control unit

Statistic

Home > Local Dataset > Statistic >

Dataset

Save

Send to control unit

General

Closings

Pincer test

Item Nr. 10034676

Serial Nr. 00991df40000001c

Firmware version 1.0.1

Statistics timestamp 13.07.2021 06:31:44

Nr of closings	Pincer	Serial number
0	HO 2000 : 03m	00991df4000000022
2	HO 4000 : 03m	000000000098a0ae
29	HO 4000 : 03m	0000000000000104
5	HO 4000 : 03m	0000000000000104
0	HO 3000 : 03m	00991df4000000037
303	HO 3000 : 03m	0000000000000000
0	HO 5000 : 03m	00991df4000000031
54	HO 3000 : 03m	0000000000000000
4	HO 4000 : 03m	0000000000000002
0	HO 4000 : 03m	0000000000000002

Control unit

Description	Value	Unit
Total nr of closings	403	Closures
Total nr of NO closings	56	Closures
Last maintenance at		Closures
Since last maintenance		Closures
Last maintenance timestamp		
Maintenance note after	1000000	Closures
Repeat maintenance note after	1000	Closures

Pincer

Description	Value	Unit
Pincer type	HO2000 : 3m	
Serial nr	00991df400000022	
Total nr of closings	282	Closures
Since last maintenance	282	Closures
Last maintenance timestamp	01.01.1970 00:00:00	
Maintenance note after	250000	Closures
Repeat maintenance note after	1000	Closures

Fig. 45 Statistic sub-menu

On the **Statistic** sub-menu page all closures per pincer are displayed. In addition, the control unit counts all closures and all NOK closures.

8.6.9 View log file

Navigation: **Home > Local dataset > Log data**



Fig. 46 Log data sub-menu

On the **Log data** sub-menu page all actions of the control unit are stored as log files, provided that the log files have been read in (see chapter 8.5.3). Log files that are not needed can be deleted (see chapter 8.5.7).

8.6.10 View Licensed Functions

Navigation: **Home > Local Dataset > Licensed features**

OETIKER EPC 01 CONFIGURATION - V1.1.0

Control Unit Local dataset

Local Dataset Clamp data Sequence Settings control unit Statistic Log data **Licensed features**

Home > Local Dataset > Licensed features >

Dataset

Save

Send to control unit

Overview

License feature	Is enabled	Has license violation errors
Pincer statistics		
Safety lever override	✓	
Industrial network	✓	
X12 output	✓	
X20 output	✓	
X20 input	✓	
X3 calib interface	✓	
Schnappi closings	✓	
Ear Clamps	✓	
Low Profile Clamps	✓	
Closing with old pincer types	✓	
Max 5 APNs defined		
Max 20 APNs defined		
Max 99 APNs defined	✓	
Hold and detect APN feature	✓	
Define sequences	✓	
Trial period		

Fig. 47 Licensed features sub-menu

The rights conferred by the license that is used are displayed on the **Licensed features** sub-menu page. Active rights are marked with a check mark. License violations are displayed in the right-hand column. Extended functions or rights can be unlocked by entering a license key (see Section “Entering the license key” on page 8-58).

9 Controlling the EPC 01 via an external control unit

WARNING

Never operate the EPC 01 via an external control without taking the appropriate safety precautions.

Non-compliance with these instructions may lead to fatal or serious injuries.

- ▶ The system integrator is responsible for safe integration of the EPC 01.
- ▶ The system integrator must perform a hazard analysis and set up the tool according to this analysis.
- ▶ Integration may be performed only by qualified personnel.
- ▶ If you have any questions about integration, contact OETIKER.

9.1 Integration description

9.1.1 Settings in the PC software

Specific settings for the integration are made in the PC software. This is especially true for the settings of the following parameters:

- Closure (see section *“Edit Closure Settings”* on page 8-69).
- Closure feedback (see section *“Edit settings for closure feedback”* on page 8-70).
- Pincer test (see section *“Edit pincer test settings”* on page 8-71).

9.1.2 Bypassing the safety valve in the pincer

To enable external control of the EPC 01, the safety valve in the trip unit must be bypassed at all times. The safety lever is mechanically pressed steadily with the safety lever locking ring accessory part, and fixed in this position. The integrated safety function of the firmware, whereby the safety lever must be released once after at least every 20th closure, is thereby automatically suppressed.

The following illustration shows the safety lever locking ring accessory part, part no. 32000385:



Fig. 48 Safety lever locking ring

For further information, please contact your regional OETIKER Service Center.

9.1.3 Compatibility

During integration, the compatibility of individual components must be ensured (see chapter 1.3).

9.2 Example of integration with two-hand release

The following system overview describes the safe integration on the principle of two-hand release.

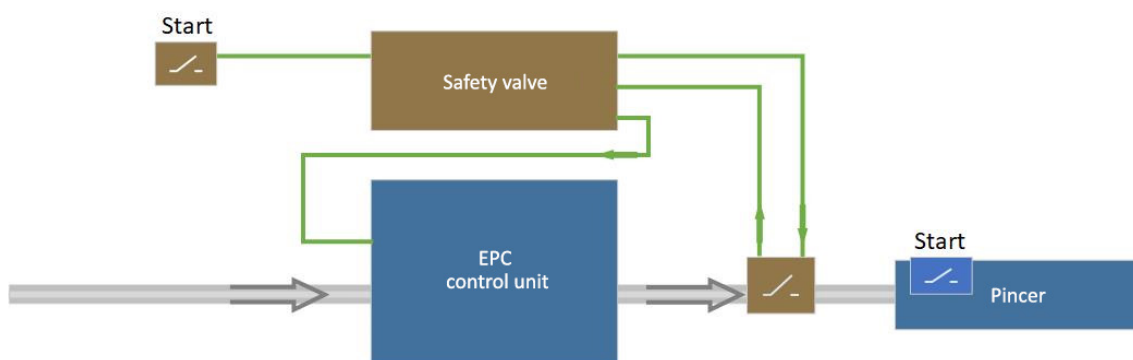


Fig. 49 System overview, example of integration with two-hand release

Settings in the PC software

In the PC software, the start via external control and START button must be set.

Mechanical integration

OETIKER recommends mounting a safety valve. The safety valve prevents unintentional closures due to system faults.

Electrical integration

The actuation of the safety valve should be communicated from the external control to the control unit via either the X20 interface or industrial communication.

10 Maintenance and repair

10.1 General safety instructions for maintenance and repair work

- 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.
- Use only the tools and original parts recommended by OETIKER for maintenance and repair work.
- Use only original spare parts from OETIKER.
- Maintenance work may be performed only once the EPC 01 has been disconnected from the power supply.
- Following initial commissioning, the EPC 01 unit should be cleaned daily or weekly, depending on the degree of soiling.
- Never immerse the EPC 01 in water or other liquids.

10.2 Preparation and completion of maintenance

Before and after maintenance, the following preparatory and final activities are performed.

10.2.1 Preparing for maintenance

WARNING

Danger of death from electric shock.

Touching live parts can result in death.

- ▶ Disconnect the mains plug from the socket and secure the EPC 01 against unintentional reconnection.
- ▶ Ensure that only qualified and authorized electricians work on the electrical equipment.
- ▶ Ensure that operators rectify only faults that are clearly attributable to operating or maintenance errors.

1. Disconnect the EPC 01 from the compressed air and power supplies and depressurize the relevant system parts and equipment.
2. Perform maintenance according to the maintenance schedule (see *chapter 10.3*).

10.2.2 Completing maintenance

- ✓ Maintenance and repair completed.
1. Make all separate electrical and pneumatic plug connections.
 2. Install safety devices, if they had been dismantled.
 3. Check screw connections and tighten them if necessary.
 4. Check the EPC 01 for proper operation.

10.3 Perform maintenance according to the maintenance schedule

► Maintain the EPC 01 as specified in the maintenance schedule:

When?	Where?	What?
Weekly	EPC 01	► Clean the EPC 01 (see chapter 10.3.1).
Monthly	Pincer head	► Lubricate the pincer head (see chapter 10.3.2).
Annually or after 250,000 closures	Pincer Pincer head	► Have the pincer or pincer head serviced (see chapter 10.3.4)
As needed	Pre-filter	► Check and change the pre-filter (see chapter 10.3.3)

10.3.1 Cleaning the EPC 01

✓ Maintenance prepared.

CAUTION

Material damage due to aggressive cleaning agents!

- Clean the EPC 01 exclusively with water.
- Do not use aggressive cleaning agents.

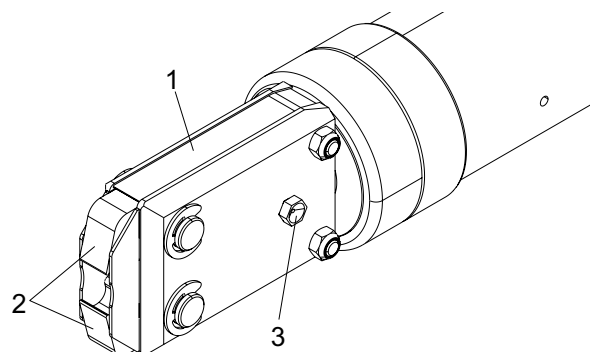
1. In the event of minor contamination, clean the EPC 01 with a dry cloth.
2. In the event of heavy soiling, clean the EPC 01 with a damp cloth.
3. Completion of maintenance (see chapter 10.2.2).

10.3.2 Lubricating the pincer head

The rollers and plunger are mechanically stressed parts on the pincer head, and must be lubricated regularly, but at least monthly.

✓ Maintenance prepared.

1. Make sure that the compressed air supply is disconnected and the control unit is de-energized.
2. Lubricate the pincer head (1) at the grease nipple (3) using a grease gun and the correct grease (see chapter 12.2).
3. Check the pincer jaws (2) for wear and chipped closure edges, replace them if necessary (see the tool catalog for the part no.).
4. Check the pincer and control unit for mechanical damage.
5. Replace any defective parts.
6. Completion of maintenance (see chapter 10.2.2).



10.3.3 Checking and changing the pre-filter

Inspect the pre-filter at regular intervals for soiling and replace if necessary.

Recommended filters, pre-filters and accessories:

Designation	Manufacturer, type	Part no.
Filter	OETIKER, standard filter with sieve function $\leq 5\mu$	05005930
Filter	FESTO, Type MS4-LF-1/4-C-R-V	529 397
Pre-filter (for heavily polluted air)	FESTO, Type MS6-LF-1/4-E-R-V	527 668
Bracket for FESTO filter	FESTO, MS4-WB or MS6-WB	–

✓ Maintenance prepared.

1. Check the pre-filter for contamination.
2. Change the pre-filter in the event of contamination. Install the new pre-filter vertically to ensure proper operation.
3. Completion of maintenance (see *chapter 10.2.2*).

10.3.4 Have the pincer and pincer head serviced (recommended)

OETIKER recommends that the pincer and the pincer head are sent to the OETIKER Service Center for servicing after the specified interval.

A counter is integrated in the release unit of the clamp, which after 250,000 closures issues a warning to the control unit that maintenance is due.

✓ Maintenance prepared.

1. Disassemble the pincer and pincer head, send them in and have them serviced.
2. After maintenance, install the pincer and pincer head.
3. Completion of maintenance (see *chapter 10.2.2*).

10.4 Repair

10.4.1 Changing the pincer head

WARNING

Risk of injury when pincer head is not mounted!

Starting a closure can cause the compression spring and plunger to fly apart if the pincer head is not mounted.

- ▶ Never operate the pneumatic pincer unless the pincer head is mounted.
- ▶ Change the pincer head only when the power supply and compressed air supply are disconnected.

NOTE

Each pincer body is compatible with different pincer heads. The type designations can be found in the tool catalog.

Scope of supply of a pincer head set

- Lip seal (1)
- Piston guide tape with wedge piston (2)
- Compression spring (3)
- Plunger (4)
- Spacer washer (5)
- Pincer head (6)

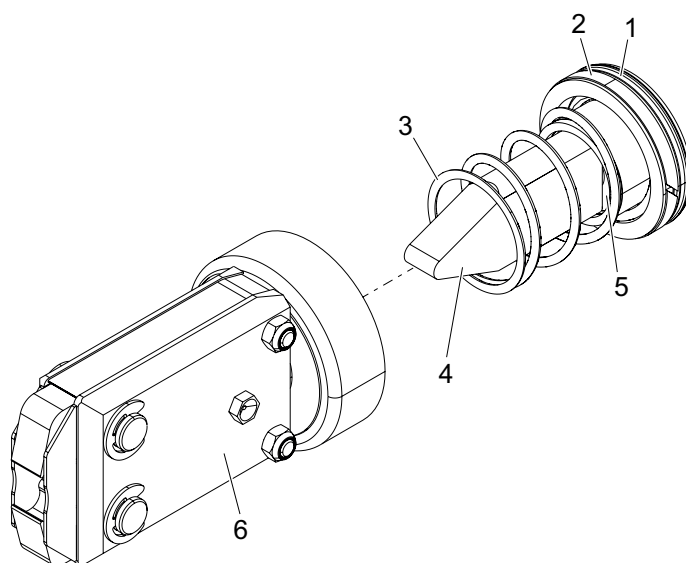
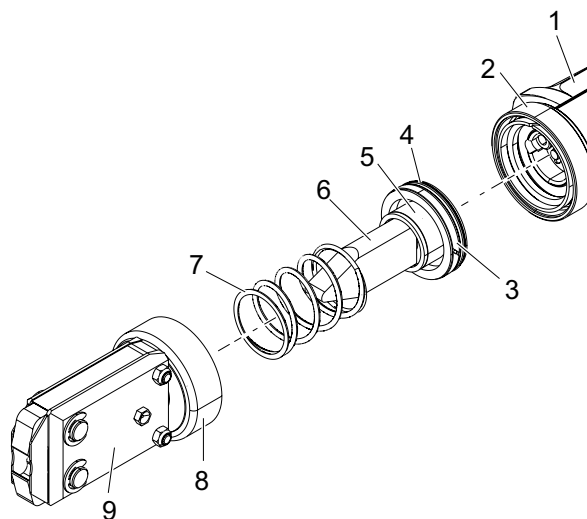


Fig. 50 Pincer head set

Changing the pincer head

1. Disconnect the compressed air supply and switch off the control unit.
2. Detach the pincer unit from the control unit.
3. Separate the pincer head (9) from the pincer body (1):
 - Undo the locknut (2).
 - Undo the union nut (8).
4. Remove the plunger (6), plunger piston (5), piston guide band (4), lip seal (3) with compression spring (7) from the pincer body (1).
5. Lubricate the plunger piston (5) together with the plunger (6), piston guide band (4) and lip seal (3) from the new pincer head set with the correct lubricant (see chapter 12.2).
6. Insert the lubricated unit into the pincer body (1).
7. Mount the compression spring (7) on the plunger (6).
8. Screw the pincer head (9) on to the pincer body (1).
9. Fully screw in the lock nut (2).
10. Align the pincer head (9) on the plunger (6) and tighten the union nut (8) hand-tight so that the pincer head can be rotated only with difficulty.
11. Tighten the lock nut (2) against the union nut (8) so that the pincer head can be rotated easily.



10.4.2 Aligning the pincer head

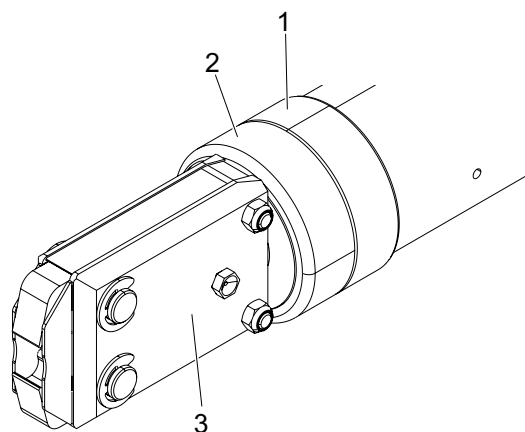
WARNING

Crush hazard when the pincer head is dismantled!

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

- ▶ Do not reach in the closure area of the pneumatic pincer.
- ▶ Align the pincer head only when the power supply and compressed air supply are disconnected.

1. Disconnect the compressed air supply and switch off the control unit.
2. Undo the locknut (1).
3. Undo the union nut (2) slightly so that the pincer head (3) can be aligned.
4. Align the pincer head (3) and hold it in the desired position.
5. Tighten the union nut (2).
6. Tighten the lock nut (1) against the union nut (2).
7. Proceed with the pincer test (see chapter 4.4).



10.4.3 Changing the pincer jaws

NOTE

Pincer jaws to be replaced are available as a pincer jaw replacement kit. In order to ensure the fast and accurate delivery of spare parts, a complete purchase order is essential.

It must include the following information:

Product name, part number, shipping method, full address.

Corresponding technical details can be found in the tools catalog.

Changing the pincer jaws – HO pincers

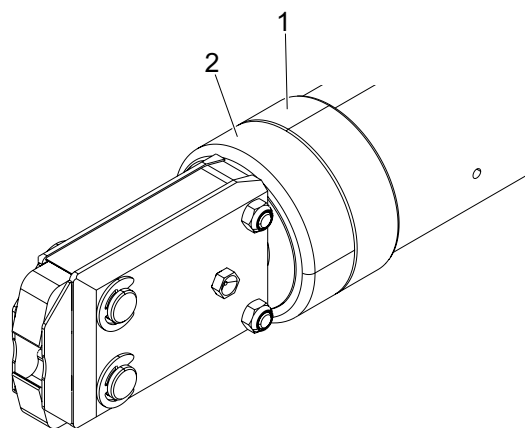
A number is engraved on the pincer jaws. Use this number to order a pincer jaws replacement kit (see also the tools catalog). Only the designated pincer jaws must be fitted into the pincer head!

CAUTION

Damage to the pincer from third-party parts!

- ▶ Only use original OETIKER pincer jaws. Only fit the designated pincer jaws type in the pincer head.

1. Disconnect the compressed air supply and switch off the control unit.
2. Detach the pincer unit from the control unit.
3. Undo the locknut (1).
4. Unscrew the union nut (2).



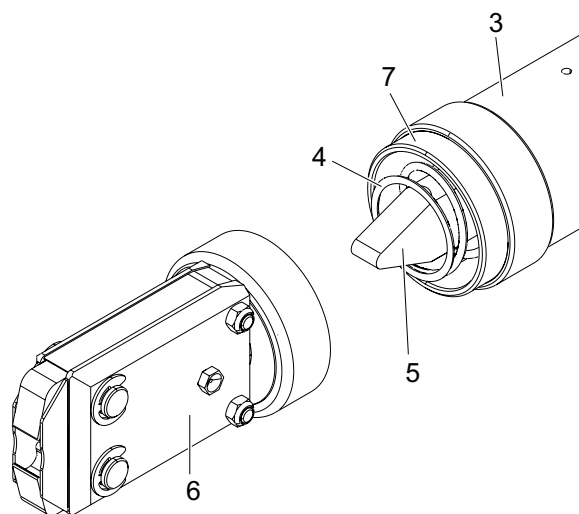
CAUTION

Risk of injury from flying parts!

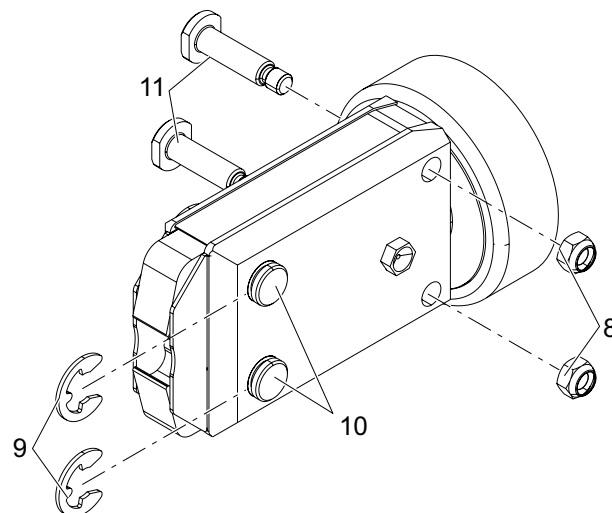
The built-in compression spring (4) is under compression.

► Hold the pincer head firmly during disassembly.

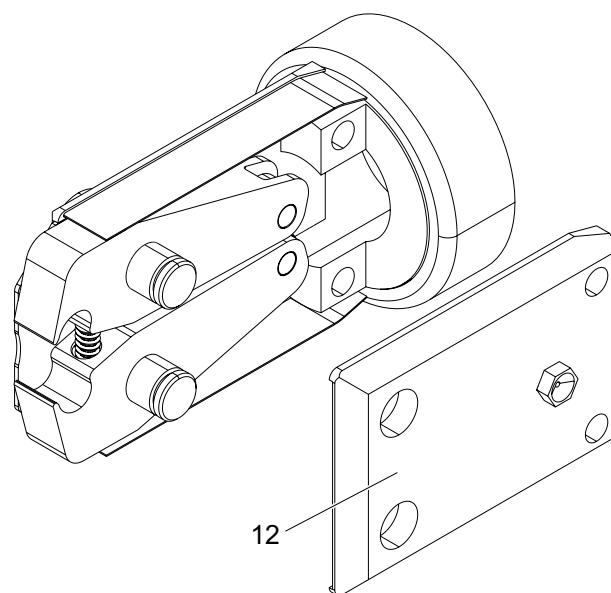
5. Separate the pincer head (6) from the pincer body (3).
The plunger (5) and plunger piston (7) remain within the pincer body.



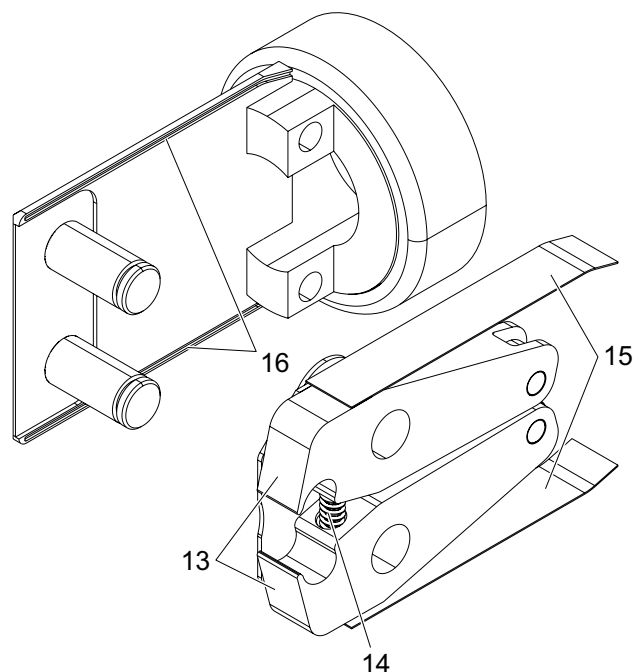
6. Remove two Circlips (9) on the pincer head from the side with grease nipple. Do not push back the pins (10).
7. Unscrew two hexagon nuts (8) from the machine screws (11).
8. Remove the machine screws (11).



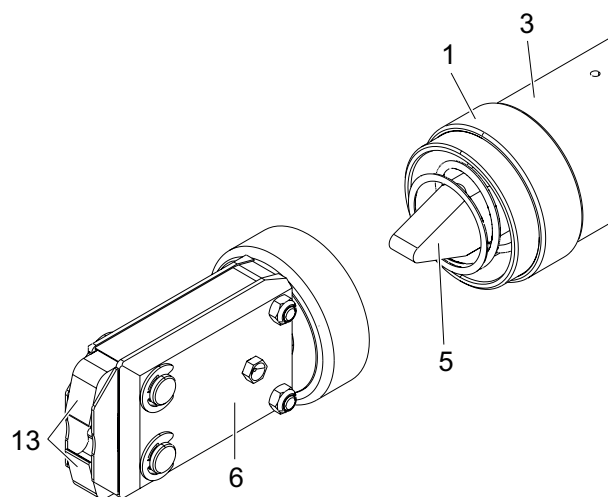
9. Remove the pincer plate (12).



10. Remove the unit consisting of the compression spring (14), cover plates (15) and pincer jaws (13).
11. Lubricate the new pincer jaws (13) and compression spring (14) from the pincer jaw replacement kit using the correct lubricant (*see chapter 12.2*).
12. Assemble the lubricated pincer jaws (13), compression spring (14) and cover plates (15) into one unit.
13. Insert the unit with the cover plates (15) on both sides into the grooves (16) of the pincer plates.
14. Check that the pincer jaws (13) move freely.



15. Screw the pincer head (6) on to the pincer body (3) and secure it with the lock nut (1).
The plunger (5) must lie between the two pincer jaws (13).



11 Troubleshooting and error messages

11.1 General instructions in the event of errors

- If the crimping cannot be started or if malfunctions occur during operation, the specialist maintenance personnel responsible for the EPC 01 must be called in.
- Correction of errors must be performed only in a professional manner. If in doubt, contact OETIKER (www.oetiker.com).

11.2 Displaying errors

Errors are displayed as follows:

- The error is shown as an error message with a clear marking in the display of the control unit (see *chapter 11.3*)
- Errors that cannot be shown in the display of the control unit are described separately (see *chapter 11.4*).

The error message in the display of the control unit is structured as follows:

SE1001

1 2 3

Fig. 51 Structure of the error message (example)

Position	Characters	Designation	Description
1	S:	System	The first letter describes the type of error.
	H	Handling	
	P	Process	
2	E	Error	The second letter describes the error category.
	W	Warning	The category M is applicable only to for error type Process .
	I	Info	
	M	Message	
3	–	Number	The four-digit number describes the unique identification.

11.3 Troubleshooting measures for error messages

11.3.1 Fixing errors of the “System” error type

Error message	Cause of the error	Troubleshooting measures
SE1001	Incorrect or no data from pressure / temperature sensor, valve sensor or travel measuring system	▶ Switch the control unit off. After approx. 20 s, switch the control unit on and check that the data are displayed correctly. ▶ If the error message appears again, change the pincer (if possible). ▶ If the error message can be acknowledged, send in the defective pincer. If the error message cannot be acknowledged, send in the defective control unit.
SE1002	Inlet pressure in the control unit fell below the threshold value during crimping	▶ Ensure the following: • The pressure accumulator is installed. • The supply pressure is sufficient. • The flow rate at the pre-filter is sufficient. ▶ Reduce the closure force if necessary.
SE1003	• Max. permissible friction force of the pincer was exceeded • Friction in the pincer head is too high • Pincer head is obstructed	▶ Check that the plunger of the pincer head lies between the rollers. If necessary, realign the plunger. ▶ If the error cannot be resolved return the defective pincer.
SE1004	Firmware is not compatible with the new pincer	▶ Update the firmware of the control unit (customer admin). ▶ Send in the pincer and have the firmware updated.
SW2001	Preset number of closures until maintenance of the control unit has been reached	▶ Send in the control unit and have it serviced.
SW2002	The log memory on the control unit is 90% full. (this message only appears in the log)	▶ Read log memory and then delete it. If the log memory is not deleted, the oldest entries are overwritten automatically.
SW2003	Inlet air temperature $\leq 10^{\circ}\text{C}$	▶ Set the inlet air temperature to the required value (see chapter 12.2) ▶ To avoid damage to the pincer and control unit, ensure that there is no water in the compressed air system.

Error message	Cause of the error	Troubleshooting measures
SW2004	Preset number of closures until maintenance of the pincer is triggered	► Send in the pincer and have it serviced.
SI3001	When updating the firmware, the FRAM of the control unit was deleted	► Update the firmware (customer admin).

11.3.2 Fixing errors of the “Handling” error type

Error message	Cause of the error	Troubleshooting measures
HE4001	Inlet pressure of the control unit ≤ 2.5 bar	► Increase the inlet pressure of the control unit.
HE4002	No pincer detected: • Pincer is not connected • Pincer is defective	Perform actions in the following sequence until the error is eliminated: ► Check the connection of the pincer to the control unit and connect it correctly if necessary. ► Send in defective pincer and have it repaired.
HE4003	No APN selected: • APN was not selected after the device was started or after sending a dataset • No matching APN available for the pincer type	► Select an appropriate APN. ► Create and send APN with corresponding pincer type.
HE4004	Incorrect or non-existent closure/ process data and settings: • Erroneous data received • Error during firmware update • Memory is damaged	Perform actions in the following sequence until the error is eliminated: ► Check the dataset and resend it if necessary. ► Update the firmware (customer admin). ► Send in the control unit and have it repaired.

Error message	Cause of the error	Troubleshooting measures
HE4005	The crimping/measuring process was aborted: • Start button was released in jog mode • Process aborted by external device • Process abort at the control unit or release unit by the operator • Errors in the control sequence of the closure or the pincer test • Selected holding force too low • Selected open gap too small • Selected verification force too low	Perform actions in the following sequence until the error is eliminated: ▶ Check trigger mode setting and correct if necessary. ▶ Check the open gap parameter. ▶ Check the hold parameter. ▶ Check the verification parameter. ▶ Check pincer jaws for blockage.
HE4006	Max. number of closures in force test without force adjustment is reached	▶ Perform force adjustment. Proceed with the adjustment of the force or complete the pincer test and crimp the clamps in closure mode.
HE4007	The set closure force cannot be reached at the applied inlet pressure	▶ Reduce the closure force. Alternatively, increase the inlet pressure.
HE4008	No pincer test performed: • The pincer has been newly connected • Control unit restarted • The calibration values were overwritten when sending the dataset	▶ Proceed with the pincer test.
HE4009	Wrong gap gauge inserted	Perform actions in the following sequence until the error is eliminated: ▶ Perform the calibration step again using the correct gap gauge. ▶ Abort the pincer test and start again.
HE4010	License for demo version expired	▶ Enter valid license (customer admin).
HE4011	Invalid or no license present on the control unit	▶ Enter valid license (customer admin).
HE4012	ELK pincer was used: Pincer type is not covered by the current existing license	▶ Enter valid license that includes ELK clamps (Customer admin). ▶ Replace the ELK pincer with an EPC 01 pincer
HE4013	Safety switch was not fully actuated when triggering the closure or the pincer test	▶ Fully actuate the safety switch and perform the closure or the pincer test again.

Error message	Cause of the error	Troubleshooting measures
HE4014	The safety switch was released during the closure process or during the pincer test	▶ Keep the safety switch fully depressed during the entire closure process (incl. retraction of the pincer).
HE4015	Safety switch was not released for more than 20 consecutive closures	▶ Check safety switch for blockage and remove the blockage if necessary. ▶ During 20 consecutive closures, release the safety switch at least 1 time. ▶ Send in the pincer and have it repaired.
HE4016	ELK 02 trip unit without safety switch is connected	▶ Replace the ELK 02 release unit with an EPC 01 release unit with a safety switch.
HW5001	Max. number of closures until the recommended pincer test has been reached	▶ Proceed with the pincer test. ▶ Alternatively, set the number of closures as required in the control unit settings / pincer test menu.
HW5002	The force correction exceeds the factor 2 to the default setting	▶ Ensure that the force has been transmitted correctly. If necessary, end the pincer test and start again.

11.3.3 Fixing error of the “Process” error type

Error message	Cause of the error	Troubleshooting measures
PE7001	Insufficient movement to reach the open gap: - Excessive friction in the system (pincer and pincer head) - Pincer jaws are prevented from moving towards the open gap - The selection of the open gap tolerances is too tightly	Perform actions in the following sequence until the error is eliminated: - Check whether the area of the pincer jaws is free. - Proceed with the pincer test. - Check the open gap tolerances and increase them if necessary. - Send in the pincer and have it serviced. - Send in the control unit and have it serviced.
PE7002	For the Force priority closure function, the closure force is outside the tolerance range: - The closing time is too short. - The pincer is not correctly positioned on the clamp (pincer jaws parallel to clamping strap) - Selected closure force too low	Perform actions in the following sequence until the error is eliminated: - Correct the pincer positioning so that the pincer jaws are aligned parallel to the clamp band - Extend closing time. - Check the closure force setting. - Send in the pincer and have it serviced. - Send in the control unit and have it serviced.
	For the Gap priority closure function, the closure force is outside the tolerance range: - In order to reach the closing gap more than the pre-set closing force is required. - The set minimum force (closure force - closure force-tolerance) could not be reached at the set closure gap	Perform actions in the following sequence until the error is eliminated: - Adjust the closure force tolerances more precisely to the application and increase the minus tolerance if necessary. - Proceed with the pincer test. - Check the closure gap and increase it if necessary. - Check the type of clamp. - Send in the pincer and have it serviced. - Send in the control unit and have it serviced.

Error message	Cause of the error	Troubleshooting measures
PE7003	For the Force priority closure function, the closure gap is outside the tolerance range: • The pincer jaws have slipped off the clamp. • Clamp is broken. • A wrong clamp was closed (not suitable for this APN) • The parts being clamped are outside the expected tolerance. • The closing gap window selected is too narrow (or not adapted to the application).	Perform actions in the following sequence until the error is eliminated: ► If the clamp is broken or the pincer jaws have slipped, repeat closure using a new clamp. ► Insert correct clamp and the parts being clamped. ► Proceed with the pincer test ► Adjust closure gap tolerances more precisely to the application.
	For the Gap priority closure function, the closure gap is outside the tolerance range: • The pincer jaws have slipped off the clamp. • Clamp is broken. • The closing time was too short.	Perform actions in the following sequence until the error is eliminated: ► If the clamp is broken or the pincer jaws have slipped, repeat closure using a new clamp. ► Extend closing time.

Error message	Cause of the error	Troubleshooting measures
PE7004	For the Force priority closure function, the closure force and closure gap are outside the tolerance range: • The pincer jaws have slipped off the clamp. • Clamp is broken. • The pincer is not correctly positioned on the clamp (pincer jaws parallel to clamping strap) • No clamp inserted • The part being clamped is not inserted	Perform actions in the following sequence until the error is eliminated: ▶ If the clamp is broken or the pincer jaws have slipped, repeat closure using a new clamp. ▶ Insert correct clamp and the parts being clamped. ▶ Position the pincer correctly: perpendicular to the part being crimped. ▶ Extend closing time.
	For the Gap priority closure function, the closure force and closure gap are outside the tolerance range: • The pincer jaws have slipped off the clamp. • Clamp is broken. • No clamp inserted • The part being clamped is not inserted • In order to reach the pre-set closing gap more than the pre-set closing force is required • The closure force setting is outside the pincer head specification	Perform actions in the following sequence until the error is eliminated: ▶ If the clamp is broken or the pincer jaws have slipped, repeat closure using a new clamp. ▶ Insert correct clamp and the parts being clamped. ▶ Extend closing time. ▶ Proceed with the pincer test. ▶ Check the type of clamp.
PE7005	The holding force is outside the tolerance range: • The selection of the holding tolerances is too tightly • Holding force selected is too low	Perform actions in the following sequence until the error is eliminated: ▶ Increase the holding force tolerance. ▶ Increase the holding force.
PE7006	The holding force is outside the tolerance range: • A wrong clamp was closed (not suitable for this APN) • The pincer jaws have slipped off the clamp. • While holding, the clamp was deformed	Perform actions in the following sequence until the error is eliminated: ▶ Insert correct clamp. ▶ Check the holding force and reduce it if necessary. ▶ Proceed with the pincer test. ▶ Check the holding gap tolerances and increase them if necessary.

Error message	Cause of the error	Troubleshooting measures
PE7007	The holding force and holding gap are outside the tolerance range: No clamp inserted	Perform actions in the following sequence until the error is eliminated: ▶ Insert correct clamp. ▶ Proceed with the pincer test. ▶ Check the holding force and holding gap tolerances and increase them if necessary.
PE7008	The verification force was outside the tolerance range: - Verification force tolerance chosen was set too tightly - Selected verification force too low - Excessive friction in the system (pincer and pincer head)	Perform actions in the following sequence until the error is eliminated: ▶ Proceed with the pincer test. ▶ Check the verification force tolerance and increase it if necessary. ▶ Increase the verification force, but do not exceed 500 N. ▶ Send in the pincer and have it serviced.
PE7009	The verification value was outside the tolerance range: - Clamp not hooked in or locked - The pincer slipped off the clamp during the verification function - The verification gap tolerance was set too tightly - Excessive friction in the system (pincer and pincer head)	Perform actions in the following sequence until the error is eliminated: ▶ Check the clamp engagement and repeat the closure with a new clamp. ▶ Proceed with the pincer test. ▶ Check the verification gap tolerance and increase it if necessary. ▶ Send in the pincer and for servicing.
PE7010	Verification force and verification value were outside the tolerance range: - Pincer jaws have not verified on the closing mechanism (pincer was removed before verification) - The verification force was set too low - Verification force tolerance chosen was set too tightly - The verification gap tolerance was set too tightly	Perform actions in the following sequence until the error is eliminated: ▶ Check the insertion of the clamp. ▶ Proceed with the pincer test. ▶ Check the verification force and increase it if necessary, but do not exceed 500 N. ▶ Check the verification force tolerance and increase it if necessary. ▶ Check the verification value tolerance and increase it if necessary. ▶ Send in the pincer and have it serviced.

Error message	Cause of the error	Troubleshooting measures
PE7011	Clamp snap-in not detected: - The clamp did not travel past the hook - The clamp snapped in outside the closing gap tolerance window - The snapping force was too weak to be detected	Perform actions in the following sequence until the error is eliminated: - Check the closure gap tolerance and increase it if necessary. - Check the Snap Detection Speed Threshold (OETIKER Admin). - Check the type of clamp.
PE7012	Pincer test canceled by user	Repeat the pincer test.
PE7013	Pincer does not move to the open starting position: - The friction in the pincer is too high - Exhaust air vents blocked. - Incorrect initial position due to error PE7015	Perform actions in the following sequence until the error is eliminated: - Proceed with the pincer test. - Clean the exhaust air vents. - Send in the pincer and have it serviced.
PE7014	When passing over the detection gap, the measured force is less than the pre-set detection force: - No clamp inserted - The clamp has already been closed (attempted double closing) - The part being clamped is not inserted - Detection gap set too large - Detection force set too high	Perform actions in the following sequence until the error is eliminated: - Insert correct clamp and the parts being clamped. - Check the detection gap and reduce it if necessary. - Check the detection force and reduce it if necessary.
PE7015	The maximum speed of the pincer has been exceeded: - The pincer jaws have slipped off the clamp. - Clamp is broken. - Displacement measuring system damaged	Perform actions in the following sequence until the error is eliminated: - If the clamp is broken or the pincer jaws have slipped, repeat closure using a new clamp. - Send in the pincer and have it serviced.

11.3.4 Description of the messages when measuring with the PC software

In the PC software, closures can be performed when the “Measure” function is activated. The messages described in the table apply exclusively to this function. This information is required to supply the “Measure” screen in the PC software with data. Measurement with the PC software is described in the chapter 8.5.5.

Message	Description
PM9000	Measuring is started
PM9010	The “Hold” function is used when measuring
PM9011	The “Detect” function is used when measuring
PM9020	The “Contact” function is used when measuring
PM9030	The “Close” function is used when measuring
PM9031	The “Schnappi” function is used when measuring
PM9040	The “Verification” function is used when measuring
PM9050	The “Sequence time” function is used when measuring

11.4 Troubleshooting measures without error messages

The following table describes selected errors that are not indicated by an error message in the display of the control unit.

Description of fault	Cause of the error	Troubleshooting measures
When updating the firmware, the following message is displayed in the PC software: “Connect to Control Unit”	Driver not installed or outdated	▶ Install the correct driver on the PC (see chapter 8.2.2).
No connection establishment to the control unit via Ethernet	- Control unit and PC are not connected in the same network - Wrong connection on the controller unit is used	▶ Check the IP configuration in the PC software and make sure that the IP address and subnet mask are correct. ▶ On the control unit, use the Ethernet port for the connection (bottom side of the device).
No values can be sent from CAL01 to EPC01 during the pincer test	- Incorrect setting of Active X3 interface in the PC software - Wrong cable is used	▶ In the PC software, navigate to the “Control unit settings” screen and set the “Active X3 interface” to “CAL01”. ▶ Use the correct cable.

Description of fault	Cause of the error	Troubleshooting measures
APN / sequence cannot be selected	- No APN / sequence created - APN / sequence does not match connected pincer type	Perform actions in the following sequence until the error is eliminated: ▶ Resend the dataset. ▶ Ensure the correct type of pincer and reconnect the pincer.
The changes in the dataset were not applied after sending	Error not acknowledged	Perform actions in the following sequence until the error is eliminated: ▶ Acknowledge error. ▶ Resend the dataset.
APN which was used for a sequence cannot be deleted. It cannot be deleted even if the sequence has since been removed from the dataset.	Dataset not saved before deleting the APN	▶ Save the dataset and then remove APN from the sequence.
The holding function aborts before the holding force or holding point is reached.	Holding force set too low so that the controller does not function properly in this range	▶ Increase the holding force.
Contact detection shows unusual values	Contact force set too low, so that the controller does not function properly in this range	▶ Increase the contact force.
Closing is canceled when detecting and/or contact detection are activated	Forces set incorrectly, so that a logical error causes the EPC 01 to abort the closure process	▶ Observe the following rule when setting the forces: Holding force/detection force < Contact force < Closing force

12 Transport, storage and disposal

12.1 Transport

- ✓ EPC 01 disconnected from the power supply and compressed air supply.
- ✓ Compressed air operated equipment and plant components depressurized.
- 1. Disconnect the pincer and all connected devices and system parts from the control unit.
- 2. Pack the components in suitable transport containers. Secure the components against damage and sudden changes in position.

12.2 Storage

- ✓ Decommissioning carried out.
- 1. Ensure the following conditions at the storage place:
 - dust free
 - clean
 - dry
- 2. Prepare the pincer and control unit for storage as follows:
 - Use dummy plugs to close the pneumatic connections.
 - Cleaning.
- 3. Pack the components dust-tight in suitable storage containers. Ensure that the components are secured against damage and sudden changes in position.

12.3 Disposal

- ✓ EPC 01 disconnected from the power supply and compressed air supply.
- ✓ Compressed air operated equipment and plant components depressurized.
- ✓ Decommissioning carried out.
- 1. Disconnect the pincer and all connected devices and system parts of the EPC 01.
- 2. Remove all operating fluids and substances hazardous to the environment from the components and collect them safely.
- 3. Have operating materials, components and packaging material disposed of by a specialist company in accordance with local and statutory regulations.
- 4. Optionally, send the EPC 01 to the locally responsible OETIKER branch and have it disposed of.

13 Appendix

13.1 Technical data

13.1.1 Environmental conditions

Parameter	Value
Humidity	Max. 80% up to 31°C Max. 50% at 40°C (decreasing linearly between these ranges)
Working temperature	15°C to 40°C
Storage temperature	0°C to 60°C
Altitude	max. 2,000 m above sea level
Pollution level	2 (acc. to EN 61010-1)
Overvoltage Category	II (to EN 61010-1)

13.1.2 Electrical data

Parameter			Value
Power supply	Standard (power cord)	Input voltage	110 to 230 V
		Frequency	50 to 60 Hz
	24 V supply (external control)	Input voltage	24 V DC ± 10%
		Back-up fuse	0.3 A
Power consumption			7 W

13.1.3 Mass and weights

Control unit

Parameter	Value
External dimensions	200 x 300 x 70 mm
Weight	2.4 kg
Color	gray, powder-coated

Pincer

Parameter		Value
Length (without pincer head)	HO 2000	320 mm
	HO 10000	485 mm
Diameter	HO 2000 to HO 4000	50 mm
	HO 5000 / HO 7000	54 mm
	HO 10000	74 mm
Weight		2 to 4.5 kg (depending on version)
Color		black

13.1.4 Accuracy within the working temperature range

	Force priority closure	Gap priority closure*
HO 2000 to HO 4000	± 150 N	± 0.2 mm
HO 5000	± 250 N	± 0.2 mm
HO 7000	± 250 N	± 0.2 mm
HO 10000	± 300 N	± 0.2 mm
CmK value	≥ 1.67	

* The accuracy of travel (gap of the pincer) is ensured in the operative range of the clamp. Because the pincer head movement is radial, larger deviations outside the operative range may occur.

13.1.5 Compressed air

General technical data

Parameter	Value
Air quality	≤ 5 µ, must not contain oil or water (ISO 8573-1)
Air volume	2 ltr / closure
Compressed air inlet pE	> 4 bar to max. 10 bar (6 bar recommended)
	≤ 5 bar for pincer type HO 10000

Compressed air connection specification

Connection	Specification
Compressed air inlet pE	Push-in connector for hose 8/6 mm
Compressed air output pA	

Compressed air tank specification

Parameter	Value
Volume	2 to 5 ltr depending on the size of the pincer

13.1.6 Lubricant

Typ	Typ	Manufacturer
Grease	RENOLIT LX EP 2 (RENOLIT DU-RAPLEX EP 2)	FUCHS PETROLUB AG Friesenheimer Str. 17 D-68169 Mannheim Phone +49 (621) 38 02-00 Fax +49 (621) 38 02-1 90

13.2 Electrical connections and interfaces

The following figure shows the electrical connections and interfaces of the control unit:

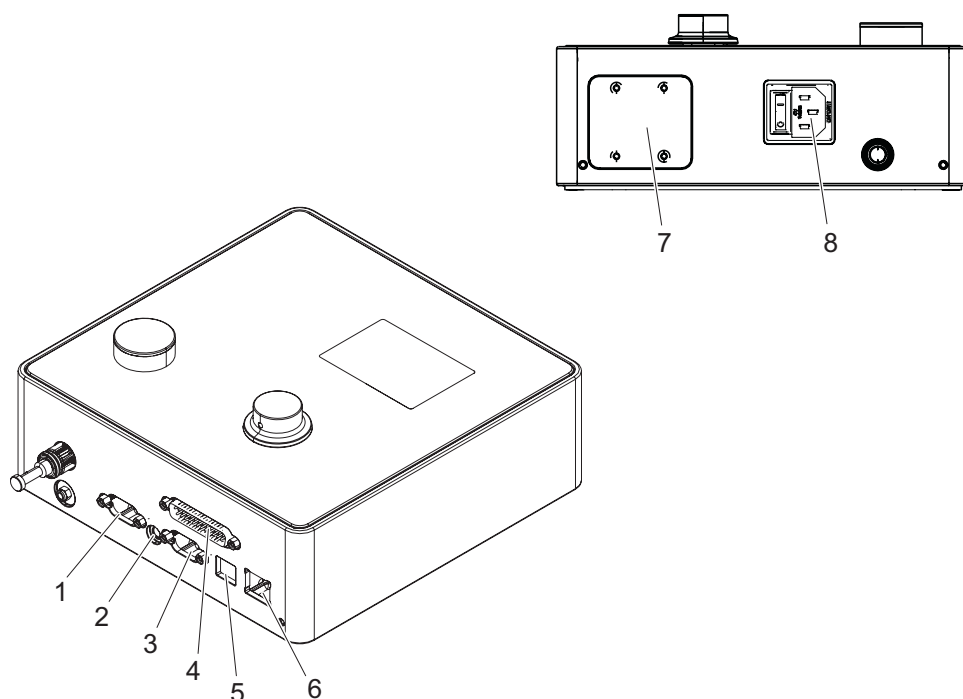


Fig. 52 Overview of electrical connections and interfaces

1	X1	5	USB
2	X12	6	Ethernet
3	X3	7	PLC (option)
4	X20	8	Plug for low-power equipment

13.2.1 Electrical connection

The electrical connection of the control unit is available in 2 variants.

Low-power equipment plug (standard)

Parameter	Value / Description
Designation	Plug for low-power equipment
Typ	Socket for low-power equipment plug 3-pin (C13)
Usage	Electrical connection to the mains on site (110 V to 230 V AC, 50 to 60 Hz)
Cable specification	Use only the power cable supplied (ensures connection of the protective ground)

AIDA socket for 24 V supply

Parameter	Value / Description
Designation	AIDA socket for 24 V supply
Typ	AIDA H distributor
Usage	Electrical connection via a connected controller (24 V DC $\pm$ 10%)

13.2.2 Interface X1 pincer

Parameter	Value / Description
Designation	X1
Typ	Interface consists of 2 connections: - D-Sub 9-pin for electrical connection, D-SUB connector with screw restraint - Plug-in connection for compressed air output pA
Usage	Connection of the hybrid hose

13.2.3 X12 interface jack

Parameter	Value / Description
Designation	X12
Typ	Jack socket for 3.5 mm jack plug
Usage	Read out the following data in test mode: - Travelled path in the pincer (not at the pincer head) - Pincer pressure curve
Cable specification	Suitable cable available from OETIKER

13.2.4 X20 interface digital connection

General technical data

Parameter	Value / Description
Designation	X20
Typ	25-pin D-SUB plug with screw restraint
Usage	Connection for external and higher-level control
Cable specification	- Shielded cable required - Cable length $\leq$ 3 m

Inputs and outputs

The opto-decoupled inputs and outputs are supplied by the customer.

Inputs		Outputs	
Parameter	Value / Description	Parameter	Value / Description
Pin 1	24 V $\pm$ 10%	Pin 1	24 V $\pm$ 10%
Pin 25	GND	Pin 25	GND
Signal 0	0 to 5 V	Signal 0	0 V
Signal 1	15 to 26.4 V	Signal 1	-0.5 V
Input current	10 mA (at 24 V)	Output current	20 mA (short-circuit proof)

Pin assignment

Pin	Assignment	Pin	Assignment
1	24 V $\pm 10\%$ (supply voltage)	14	Bit 32 input
2	Reset input	15	Bit 64 input
3	Enable input	16	Spare input
4	Quit / Function input	17	Busy output
5	Start input	18	System error at output
6	Spare input	19	Pincer test output
7	Function input	20	Ready output
8	Spare input	21	OK output
9	Input Bit 1	22	Output NOK
10	Input Bit 2	23	Trigger signal
11	Input Bit 4	24	Spare output
12	Input Bit 8	25	GND
13	Input Bit 16	Housing	PE (protective earth conductor)

Pin assignment	Function	Description	Times
Reset	Input	• Cancels a closure function that was started • Cancels the pincer test	Impulse > 300 ms
Enable	Input	Error pending • Acknowledging errors Ae Function display (Start Screen) • Request pincer test • Skip to the selected APN* • Skip to SEQ At APN display • Skip to main menu (Start Screen) At pincer test • Confirm the force test • Skip to main menu (Start Screen)	2 s 2 s 4 s 6 s 4 s 2 s 4 s
Start	Input	Triggering the Start function (only if enable=TRUE possible)	> 100 ms
Function back	Input	Skip back to the "Function" display	–
Bit 1 ... Bit 64	Input	Selecting the APN NOTE: The sum of the bits determines the APN Example: APN 40 = Bit 8 = TRUE + Bit 32 = TRUE	Continuous signal
Busy	Output	Active during the crimping process	–
System error	Output	Active in case of an error message	–
Ready	Output	Active: Close is enabled	–
Trigger signal	Output	After each closure step (Configurable via PC software)	–

* The APN is selected via the inputs "Input bit 1" .. "Input bit 64"

13.2.5 Interface X3, RS232

Parameter	Value / Description
Designation	X3
Typ	RS232 (9-pin D-Sub)
Usage	Connection and communication with PC software: • Read and write local datasets Connection and communication with CAL01: • Sending the measured mean value to the control unit • Authorize pincer test Two different protocols are used for communication. In the PC software, the corresponding device is selected for communication.

13.2.6 USB interface

Parameter	Value / Description
Designation	USB
Typ	USB socket
Usage	Interface for short-term communication with the PC (e.g. service): • Update the firmware of the control unit
Cable specification	• Cable length ≤ 3 m • Install a ferrite ring at the end of the cable (near the USB socket)

13.2.7 Ethernet interface

Parameter	Value / Description
Designation	Ethernet
Typ	LAN socket (RJ45)
Usage	Interface for permanent communication with the PC: • Send configuration data to the EPC 01
Cable specification	LAN cable, at least category 5

13.3 Industrial communication

13.3.1 General and preparatory activities

Check EPC 01 for industrial communication

In order to enable the EPC 01 to exchange data via the industrial communication interface, the applicable function must be enabled. This can be checked in the software in the **Licensed functions** sub-menu (menu description see *chapter 8.6.10*).

- ✓ EPC 01 switched on and connected to the PC.
- ✓ PC software started.
- 1. In the PC software, navigate to the following sub-menu page: **Local dataset > Local dataset > Licensed functions**.
- 2. In the **Industrial networks** overview, check the license function: If the license function is activated with a check mark, the EPC 01 can be used for industrial communication.

Defining the settings for industrial communication

The required parameters for industrial communication are set in the PC software in the **Closing** sub-menu (*for the menu description see section "Edit Closure Settings" on page 8-69*). For this it is necessary to define the START button on the release unit and the command processing of the control unit.

- ✓ EPC 01 tested for industrial communication
- 1. In the PC software, navigate to the following sub-menu page: **Home > Local dataset > Settings control unit > Closure**.
- 2. In the **Start** drop-down menu set the **External control** value.
- 3. In the **Input control** drop-down menu set the **Industrial Network** value.

Check the hardware version

The hardware version of the integrated industrial interface can be read as follows:

- Part no. of EPC 01
- In the menu of the control unit under the item **Information / Hardware Info** on page 4

Description of the display elements on the control unit



Fig. 53 Display elements on the control unit

On the front panel, 4 LEDs (1) are provided for industrial communication. The LEDs have the following meaning:

Designation	Description
L/A0	Link/Activity Port 1
L/A1	Link/Activity Port 2
SF	System error (Profinet)
BF	Bus error (Profinet)
ST	Status (EtherCAT)
NS	Network Status (Ethernet/IP)
FB	FBLED Configuration -/Diagnosis LED

13.3.2 Profinet

The corresponding GSDML file can be downloaded from the OETIKER homepage.

When configuring the hardware, 128 input bytes and 128 output bytes must be defined:

Device overview						
Module	Rack	Slot	I address	Q address	Type	
epc01-pn	0	0			EPC 01 PN	3
PN-IO	0	0 X1			epc01-pn	
64 Bytes Output_1	0	1		368...431	64 Bytes Output	
64 Bytes Output_2	0	2		432...495	64 Bytes Output	
	0	3				
	0	4				
64 Bytes Input_1	0	5	368...431		64 Bytes Input	
64 Bytes Input_2	0	6	432...495		64 Bytes Input	
	0	7				
	0	8				

The structure for the applicable mapping is the same for all industrial communication types and is described in chapter 13.3.5.

The IP address and the device name can be assigned via the usual programs (hardware configuration Siemens Step7, Pronenta, etc.).

13.3.3 EtherNet / IP

The corresponding EDS file can be downloaded from the OETIKER homepage.

When configuring the hardware, 128 input bytes and 32 output bytes must be defined:

Connection
Default Connection (without eds)

General

Transport Trigger: Cyclic
Config Instance: 1
Port: 0
Timeout Multiplier: 4
Config Size: 0
Slot: 0

Inputs - Data Length: 128 Bytes

Connection Point: 101
Cycle Time Multiplier: 10
Transport Type: Multicast
Priority: Scheduled

Outputs - Data Length: 32 Bytes

Connection Point: 100
Cycle Time Multiplier: 10
Transport Type: Point to Point
Priority: Scheduled

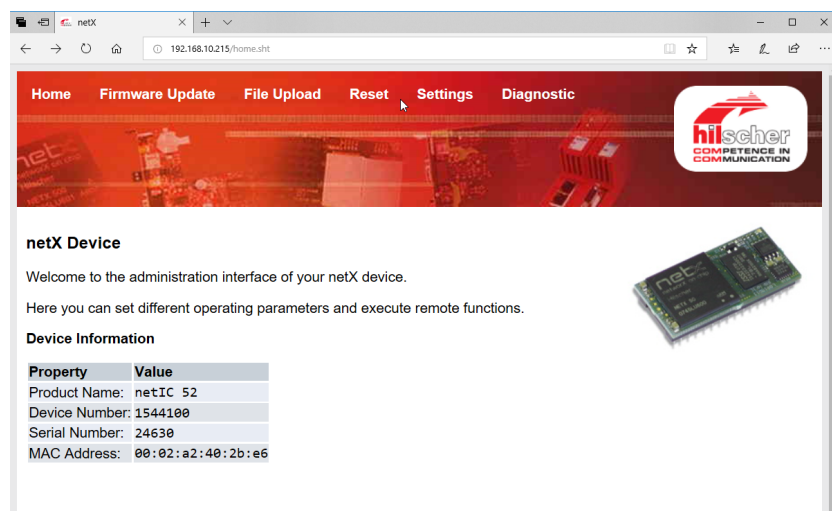
Parameter	Assembly instance	Size [bytes]
Input	101	128
Output	100	128

The structure for the applicable mapping is the same for all industrial communication types and is described in chapter 13.3.5.

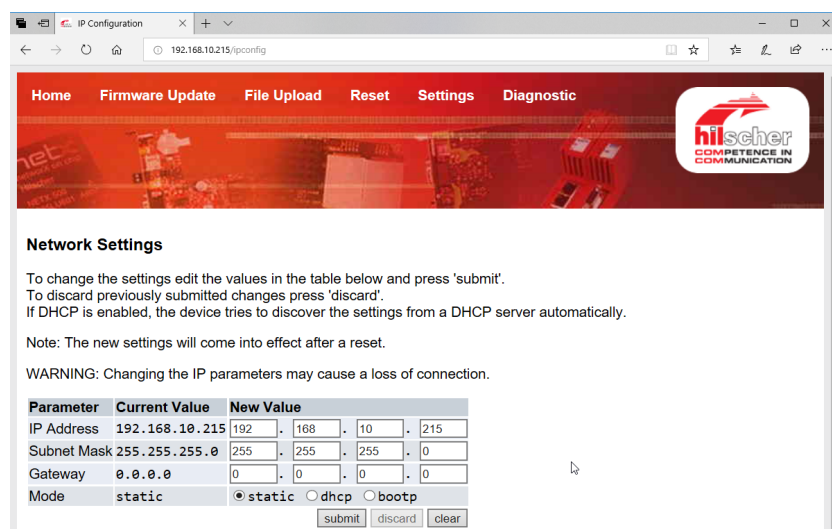
Use a web browser in order to assign the IP address. When delivered, the IP address 192.168.10.215 is assigned to the industrial communication interface.

Assign IP address

1. Open the web browser and enter the following IP address: **192.168.10.215**



2. Navigate to the **Settings** page.
3. Log in with the following credentials:
 - Login: **Customer**
 - Password: **EPC01**

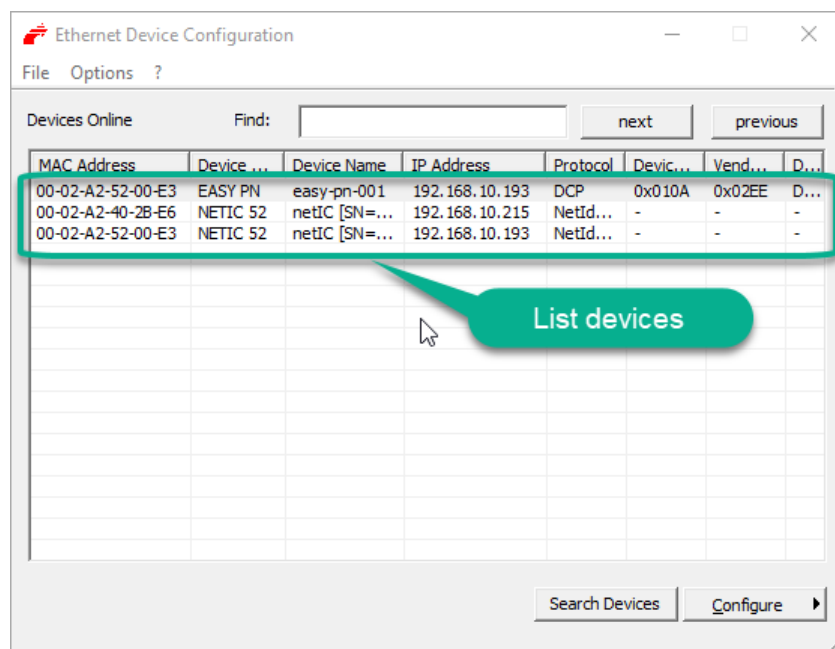


4. Enter the IP address in the corresponding menu.

5. Press the **Submit** button to confirm the assignment.

If the IP address is no longer known, the IP address can be determined with the help of the “Ethernet Device Configuration” tool:

6. Open the “Ethernet Device Configuration” tool.



7. Press the **Search Device** button to list all devices of the communication module, company Hilscher.

8. In **List devices**, determine the corresponding IP address.

13.3.4 EtherCAT

EtherCAT® is a registered trademark and patented technology licensed by Beckhoff Automation GmbH, Germany. For the hardware definition a corresponding XML file is available on the USB stick provided. The structure for the applicable mapping is the same for all industrial communication types and is described in chapter 13.3.5.

13.3.5 Mapping list

Input

Offset	Length [Byte]	Bit Offset	Data	Description
0	1	0	F Menu	Navigate to the functions Selection menu.
		1	APN Menu	Navigate to current APN menu. A closure process can only be started from here.
		2	Sequence Menu	Navigate to the Sequence Menu. From this menu a closure can be started and if this is OK, then the next APN is loaded automatically.
		3	Pincer test menu	Navigate to the pincer test menu. A pincer test can only be started from here.
		4	Start	Starts a closure process or the corresponding ZT step in the ZT/SbS. The value must be reset in order to start again. The Enable function must be active.
		5	Reset	Cancels a closure function that was started.
		6	Acknowledge error	Acknowledge error.
		7	Confirm the force test	Confirm the force test and then move to the gap test.
1	1	0	Enable	Safety control byte to ensure that a closure was not started accidentally.
		1	Apply APN	To be activated when the APN number is to be input and applied.
		2	Apply sequence No.	To be activated when the sequence number is to be input and applied.
		3	Apply nominal force	To be activated when the nominal force is to be input and applied.
		4	Spare	
		5	Spare	
		6	Spare	
		7	Spare	
2	2		Applicable APN	Selects the current APN. APN number must be > 0. Only active in the "Ready" status and in the APN menu.
4	2		Applicable sequence	Selects the current sequence. Sequence number must be > 0. Only active in the "Ready" status and in the Sequence menu.

Offset	Length [Byte]	Bit Offset	Data	Description
6	4		Measured nominal force	Applies the measured nominal force. The nominal force must be > 0. Only active during the pincer test and when the “Nominal force input allowed” flag is active. Can only be set 1x / force test closure.
10	108		Spare	

Caution: the nominal force is transmitted as integer value and not as a real value.

Output

Offset	Length [Byte]	Bit Offset	Data	Description
5	1	0	Version	The same version as the protocol.
4	1	0	Ready	Active when ready for closure/pincer test or for receiving commands.
		1	System error	Active when serious errors have occurred and the EPC 01 cannot continue. Error must be confirmed first.
		2	Pincer test	Active during the pincer test. See pincer test status for sub-status information.
		3	Closing	Active during the crimping process. See SbS status for sub-status information.
		4	Spare	
		5	Input of nominal force permitted	Active when the EPC 01 is ready to accept the measured nominal force.
		6	Spare	
		7	Spare	
6	2		APN nr	Currently selected APN no.
8	2		SEQ No.	Currently selected SEQ no.
10	2		Error number	Error number, Current error shown on the display.
12	1		SbS status	Step by step status according to coding (see section “Codes Definitions” on page 116, table PLC status codes).
13	1		Pincer test status	Pincer test status according to coding (see section “Codes Definitions” on page 116, table ZT status codes).
14	4		TU type	Type of the Trigger Unit. Includes coded cable length and force.
18	4		TU part no.	Part number of the Trigger Unit.
22	4		Head part no.	Part number of the pincer head.
26	1		Closing mode	Force priority = 1, Gap priority = 2.

Offset	Length [Byte]	Bit Offset	Data	Description
27	1	0	OK	Active if last closure function was OK.
		1	NO	Active if last closure function was NO.
		2	Hold	Active when the measurement values of the hold function are available. The hold and detect functions can never be active together.
		3	Detect	Active when the measurement values of the detect function are available. The hold and detect functions can never be active together.
		4	Contact	Active when the measurement values of the contact function are available.
		5	Closure	Active when the measurement values of the closure function are available.
		6	Verification function	Active when the measurement values of the verification function are available.
		7	Spare	
28	4		Holding/detecting closure gap setpoint	Target gap during the holding or detecting function at the time of the last closure.
32	4		Holding/detecting min. closure gap	Minimum gap during the holding or detecting function at the time of the last closure.
36	4		Holding/detecting max. closure gap	Max. target gap during the holding or detecting function at the time of the last closure.
40	4		Holding/detecting actual closure gap	Measured gap during the holding or detecting function at the time of the last closure.
44	2		Holding/detecting target closure force	Target force during the holding or detecting function at the time of the last closure.
46	2		Holding/detecting min. closure force	Min. target force during the holding or detecting function at the time of the last closure.
48	2		Holding/detecting max. closure force	Max. target force during the holding or detecting function during the last closure.
50	2		Holding/detecting actual closure force	Measured force during the holding or detecting function at the time of the last closure
52	2		Holding/detecting result	Result of the holding/detecting work step. OK = 0, NO = error number.
54	4		Contact actual closing gap	Measured gap during the contact function at the time of the last closure.

Offset	Length [Byte]	Bit Offset	Data	Description
58	2		Target contact closure force	Target force during the contact function at the time of the last closure.
60	2		Actual closing gap	Measured force during the contact function at the time of the last closure.
62	4		Closing closure gap setpoint	Target gap during the closing function at the time of the last closure.
66	4		Closure min. closing gap	Min. target gap during the closing function at the time of the last closure.
70	4		Closing max. closing gap	Max. target gap during the closing function at the time of the last closure.
74	4		Closure actual closing gap	Measured gap during the closing function at the time of the last closure.
78	2		Closure closing cgap setpoint	Target force during the closing function at the time of the last closure.
80	2		Closure min. closing force	Min. target force during the closing function at the time of the last closure.
82	2		Closing max. closing gap	Max. target force during the closing function at the time of the last closure.
84	2		Closure actual closing force	Measured force during the closing function at the time of the last closure.
86	2		Closure result	Result of the closing work step. OK = 0, NO = error number.
88	4		Verification of the target closure gap	Target gap during the verification function at the time of the last closure.
92	4		Verification of the min. target closure gap	Min. target gap during the verification function at the time of the last closure.
96	4		Verification of the max. target closure gap	Max. target gap during the verification function at the time of the last closure.
100	4		Verification of the actual closure gap	Measured gap during the verification function at the time of the last closure.
104	2		Verification of the target closure force	Target gap during the verification function at the time of the last closure.
106	2		Verification of the min. closing force	Min. target force during the verification function at the time of the last closure.
108	2		Verification of the max. closing force	Max. target force during the verification function at the time of the last closure.

Offset	Length [Byte]	Bit Offset	Data	Description
110	2		Verification of the actual closure gap	Measured force during the verification function at the time of the last closure.
112	2		Verification result	Result of the verification work step. OK = 0, NO = error number.
114	8		Spare	

Up to 2 bytes the values are transmitted as integer values, starting at 4 bytes the values are transmitted as float values.

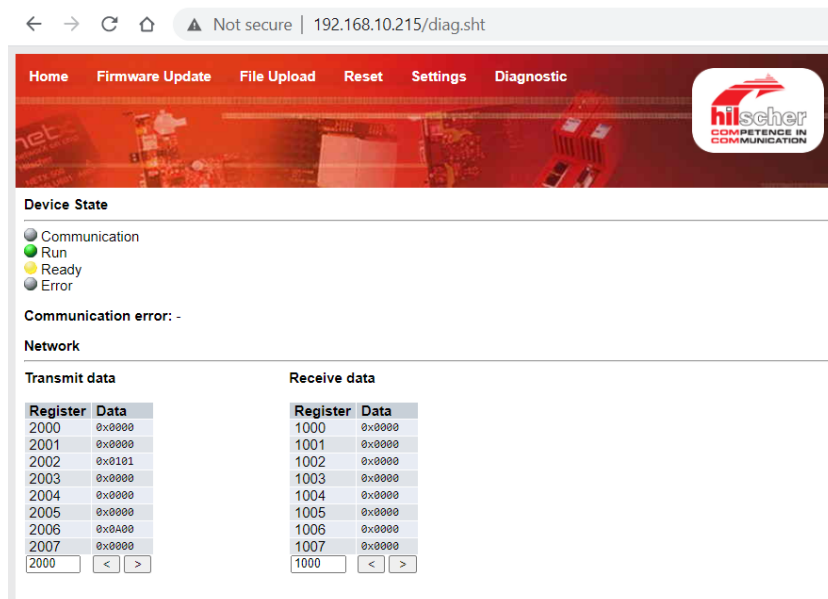
Codes Definitions

ZT status codes	Description
0	APN menu
10	In the F menu. ZT can be started
11	In the F menu. ZT must be started
40	Friction test ready for starting
41	Friction test running
60	Force test ready for triggering
61	Force test running
62	Force test ready for re-triggering
80	Gap test <Gap and <Force ready for starting
81	Gap test <Gap and <Force running
82	Gap test <Gap and >Force ready for starting
83	Gap test <Gap and >Force running
84	Gap test >Gap and <Force ready to start
85	Gap test >Gap and <Force running
86	Gap test >Gap and >Force ready for starting
87	Gap test >Gap and >Force running
100	End of ZT

PLC status codes	Description
0	Pincer jaw fully open
10	Open gap reached
20	Hold function completed
30	Closure function completed
40	Verification function completed

13.3.6 Check the data

For the Profinet and Ethernet / IP interface, the data can be checked using a web browser. The values of the registers are displayed in hexadecimal notation.



13.3.7 Software for SPS

At OETIKER, the software mentioned in the table has been tested on a PLC of the relevant model. The software was written in the "Structured Text" language.

SPS	Type of communication	Connection established	Software	Programming language
Siemens S7-1212C	Profinet	Profinet connection S7-1212C	TIA Portal V15	Structured Text
Beckhoff CP6706	Profinet	Bus coupler EK1100 / module EL6631	TwinCAT 3	Structured Text
Beckhoff CP6706	EtherNet/IP	Bus coupler EK1100 / Modul EL6652	TwinCAT 3	Structured Text
Beckhoff CP6706	EtherCAT	Bus coupler EK1100	TwinCAT 3	Structured Text

13.4 Warranty conditions

13.4.1 Warranty period

Warranty period for pincer

- 24 months on manufacturing defects, except wear parts

Warranty period for wear parts

- 6 months

Wear parts

Trigger unit	Hybrid cable with compressed air hose and cable
	Measuring system
	Band and button
	Safety valve and safety lever
Pincer body	Seals, plunger, rollers, pincer jaws

13.4.2 Requirements

- The component has been commissioned in accordance with the instruction manual.
- The component has not been opened.
- The release unit has not been detached from the pincer body.

13.4.3 Warranty claims

A warranty claim may be made if, taking into account the preconditions, there are defects or the warranted characteristics are not present.

Sending the unit back

OETIKER recommends that the components are sent back in their original packaging.

If this cannot be done, the components must be packed in an equivalent manner. The condition is that the pneumatic plugs are plugged on the control unit and compressed air hose of the release unit. If the component is damaged due to defective packaging, the customer shall bear the costs, irrespective of any justified warranty claims.

Complaint report

The complaint report must be filled out and supplied!

If no complaint report is enclosed, all components must be measured completely. These costs will be borne by the customer, irrespective of any justified warranty claims.

13.4.4 Consequential damages

We accept no liability for consequential damages occurring directly or indirectly in connection with the installation of our components.

13.4.5 Costs

In the event of a valid warranty claim, OETIKER will bear the costs. This is conditional on the correct method of return and also submission of a full report to OETIKER.

If there is no valid warranty claim, the expenses will be invoiced at cost.

13.5 Pixel fonts

The pixel fonts used are published under the SIL Open Font License or GPLv2 FE License:

https://gitlab.com/aat_hoh/pixelfont

The following licenses are applicable:

License	Web address for retrieving the license terms
SIL Open Font	http://scripts.sil.org/OFL
GPLv2 FE	http://www.gnu.org/licenses/old-licenses/gpl-2.0