

**Electronically controlled  
pneumatic pincer  
OETIKER ELK 02 V2.X**

**Instruction manual**

Original instruction manual  
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OETIKER Horgen, Switzerland

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# 1 Information about this manual

## 1.1 Symbols and means of representation used

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

- ▶ Always read and observe these safety notices.
- ▶ Observe all notices that are flagged with a safety alert symbol and signal word.

The following symbols are used in this instruction manual:

Symbol	Meaning
 <b>DANGER</b>	Hazardous situation. Failure to observe this notice will lead to death or serious injury.
 <b>WARNING</b>	Hazardous situation. Failure to observe this notice may lead to death or serious injury.
 <b>CAUTION</b>	Hazardous situation. Failure to observe this notice may lead to minor injury.
<b>NOTICE</b>	Information on the avoidance of property damage.
<b>INFO</b>	Information relating to the understanding or optimization of working practices.
▶	One-step instruction
1. ... 2. ... 3. ...	Multi-step instruction ▶ Carry out the steps in the order shown.
✓	Requirement Necessary or labor-saving steps for the successful execution of an action

## 1.2 Scope

This instruction manual applies to all HO-EL pincers with the ELK 02 V2.x control unit.

## 1.3 New features

### 1.3.1 The ELK 02 V1.X

#### Hardware

- Hardware compatible with ELK 01

The hardware and CAL 01 connectors are identical to the ELK 01. Therefore the ELK 01 hardware can be used with the ELK 02.

- Power supply range 85 - 265 V, 47 - 63 Hz
- USB interface, type B, galvanically isolated
- X20 interface, extended inputs and outputs
- Bus options, e.g. PROFINET / PROFIBUS
- X3 RS232 interface, galvanically isolated
- Graphic display unit, 65x35 mm, with 4 control buttons, display-driven for ease of use

#### Software

#### INFO

ELK 01 software and data sets cannot be migrated to the ELK 02.

- All pincer types are stored in the ELK 02
- Storage capacity for 99 active program numbers (APNs)
- Nominal force input directly on the ELK 02 (without PC)
- Closure with detection to prevent double closures
- Force and gap priority with verification for the qualification
- Measurement screen can be called directly from the individual closure data view
- Compressed air input pressure monitoring, static and dynamic
- Function key "i": displays the compressed air input pressure and the pincer type
- Software updates for ELK 02 online via PC
- PC backup function, data and settings
- PC restore function, data and settings
- Pincer test in 3 different modes
- Pincer test documentation
- New password structure
- Maintenance instructions

### 1.3.2 The ELK 02 V2.X

- 4 user keys on the graphical display can be disabled (switched off).

The ELK 02 then behaves like an ELK 01.

- Dual closure: improved gap priority closure
- Improved gap priority closure
- OK pulse output at the interface X2 in the pincer test
- Alphanumeric text field in the measurement screen
- Individual closure data simplified;

Because of the implementation of DUAL closure and for better overview and easier operation, the individual closure data viewing screen has been revised:

In the closure functions there remain only

- Force priority
- Gap priority
- Dual closure

Verification is switched on and off via a  $\beta$  (e.g.  $\beta$  Open,  $\beta$  Hold etc.).

The closure function and verification are determined by the pincer type.

Even after pincer type, closure function and verification have been selected, the individual closure data view screen still permits changes.

The data contents are compatible with earlier firmware issues.

## 1.4 Abbreviations

APN	Active program number (max. 99)	OS-SK	Closing time between opening gap – closing force
D	Closure function code for dual closure	OS-SS	Closing time between opening gap – closing gap
d	Closure function code for dual closure with verification	OS-T	Opening gap tolerance
DS	Detection gap	pE	Compressed air supply pressure
DK	Detection force	pA	Compressed air output to pincer
F	Closure function code for force priority	S	Closure function code for gap priority
f	Closure function code for force priority with verification	s	Closure function code for gap priority with verification
HK	Holding force	SK	Closing force
HK-T	Holding force tolerance	SK-HZ	Closing force holding time
HS	Holding gap	SK-T	Closing force tolerance
HS-T	Holding gap tolerance	SS	Closing gap
HS-SK	Closing time between holding gap – closing force	SS-HZ	Closing gap holding time
HS-SS	Closing time between holding gap – closing gap	SS-T	Closing gap tolerance
KK	Contact force	UK	Changeover force from force priority to gap priority
KS	Contact gap	VK	Verification force
NO	Not ok (refers to “Not ok” closure)	VK-HZ	Verification force holding time
OF	Open	VK-T	Verification force tolerance
OF-SK	Closing time between opening – closing force	VW	Verification value
OF-SS	Closing time between opening - closing gap	VW-T	Verification value tolerance
OF-Z	Removal time	ZT	Pincer test 
OS	Opening gap		

## 1.5 Labels on the ELK 02

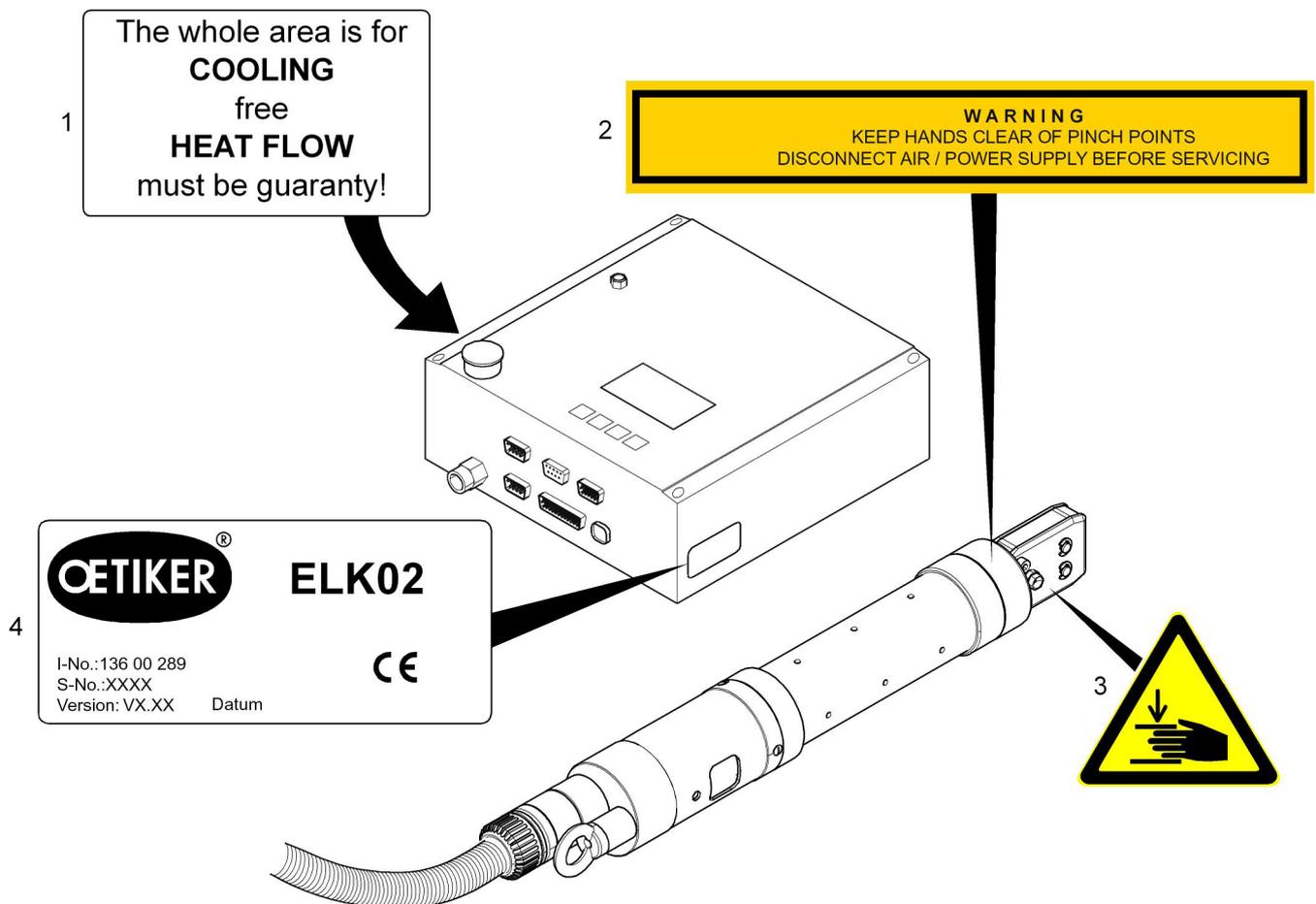


Fig. 1 Labels on the ELK 02

- 1 Warning labels (on the back of the control unit)
- 2 Warning label
- 3 Risk of crushing
- 4 Rating plate

## 2 Basic safety instructions

### 2.1 Using the instruction manual

- Make sure that this instruction manual is always kept close at hand ready for use.
- Pass on this instruction manual to the next owner.
- Please read through the instruction manual carefully before operating the ELK 02 unit. Familiarize yourself with all settings and their functions. Anyone involved in setting up, commissioning, maintaining or repairing the unit must have read and understood the instruction manual and in particular the safety instructions.

### 2.2 Use for the intended purpose

The unit may only be used for the intended purpose and under technically safe and fault-free conditions.

The ELK 02 and associated OETIKER pincers are intended solely for the controlled closure of OETIKER clamps and Low Profile Clamps.

Use for the intended purpose also covers observance of this instruction manual and compliance with the technical data.

Any use not in accordance with the intended purpose is regarded as incorrect.

Use other than for the intended purpose

The ELK 02 has been developed in accordance with the best available technology and is safe for use. Residual dangers remain if it is used incorrectly or by untrained personnel. The operator of the ELK 02, not the manufacturer, shall be held responsible for any personal injury or property damage arising from incorrect usage.

### 2.3 General safety instructions

- Observe all operating and maintenance instructions.
- Maintenance and repair work should always be carried out by qualified specialists.
- The ELK 02 unit may only be used by people who are familiar with its use and have been informed of the risks.
- All relevant accident prevention regulations and other generally recognized health and safety rules must be complied with. The manufacturer shall not be held liable for damage resulting from unauthorized modifications to the ELK 02.

### Spare parts

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

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

Details can be found in the OETIKER tools catalog.

### Improvements to the machine

In our endeavor to continuously improve the quality of our products, we reserve the right to make improvements without changing the 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 Special safety instructions

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

- ▶ Depressurize the machine's pneumatic equipment before starting maintenance or repair work.
- ▶ Check hoses for wear as part of the preventive maintenance routine and replace them if necessary.

## 2.5 Safe working practices

- ▶ Before each start of production, check the ELK 02 for visible damage and only use it if it is in perfect working order.
- ▶ Any defects must be reported to a supervisor immediately.  
Do not continue to use the ELK 02 if defects have been identified.

## 2.6 Modifications, changes

- No design or safety modifications may be made to the ELK 02 without our express authorization. We shall not be held liable for damage resulting from any modifications. In particular, repairs of any kind are prohibited.
- The securing screws on the control unit and the ELK 02 pincer are sealed with lacquer. If the lacquer is damaged, OETIKER cannot accept any claims under warranty.
- Use only original spare parts and accessories.
- Do not dismantle any safety equipment.

## **2.7 Qualified personnel**

Only authorized and qualified personnel are permitted to use this machine, subject to compliance with the technical data and the following safety rules and regulations. Qualified personnel are people who are familiar with setting up, assembling, commissioning and operating the product and who have the qualifications appropriate to their job role.

## **2.8 Maintenance work**

The inspection and maintenance intervals specified in the instruction manual must be complied with. Maintenance and repair instructions must be followed accordingly.

### 3 Design of the ELK 02 system

The ELK 02 electronically controlled pneumatic pincer system comprises the following main components:

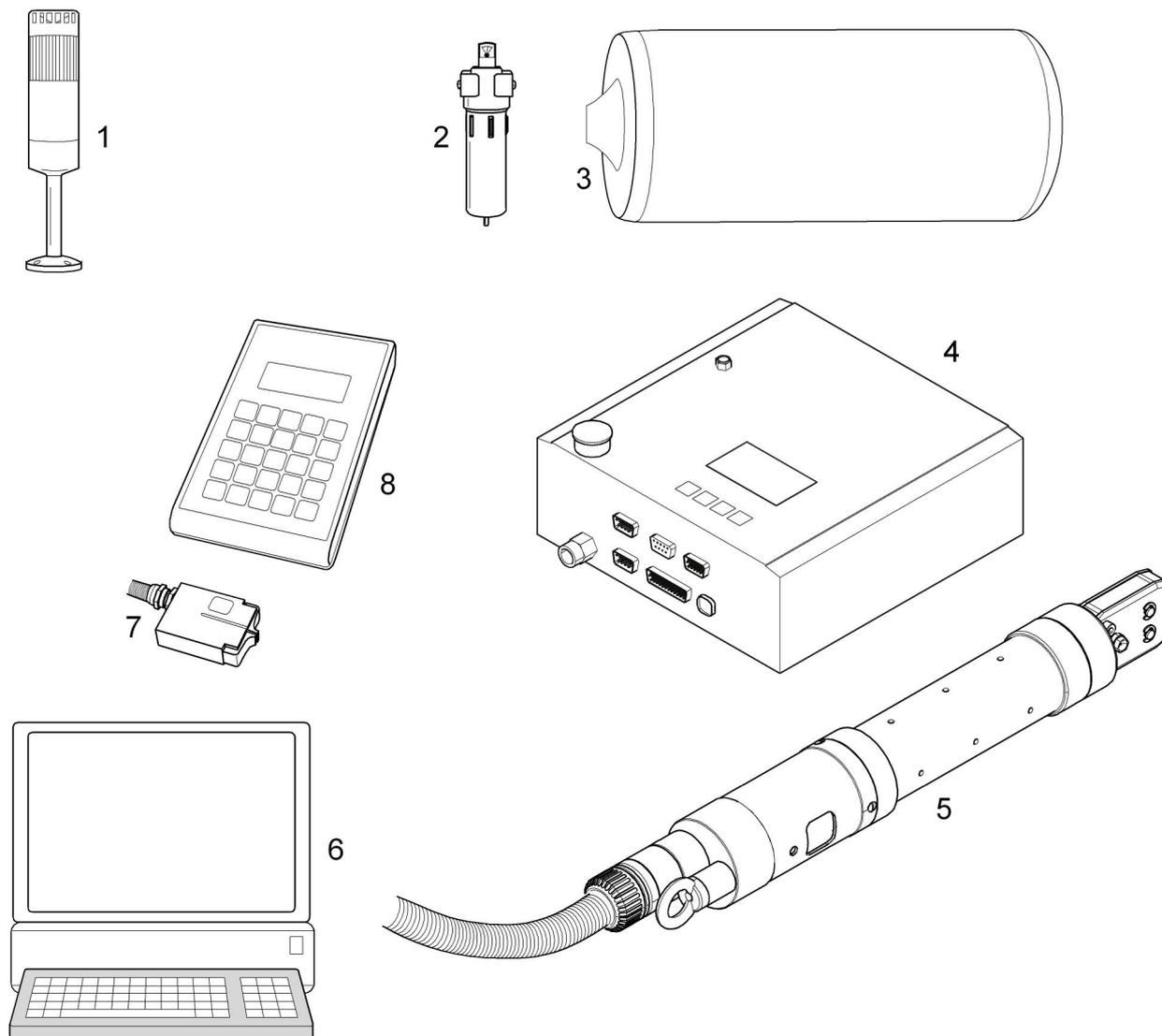


Fig.2 Design of the ELK 02 system

- |   |                            |   |                                |
|---|----------------------------|---|--------------------------------|
| 1 | Status lamp *)             | 7 | Closing force sensor SKS 01 *) |
| 2 | Pre-filter                 | 8 | Calibrator CAL 01 *)           |
| 3 | Accumulator                |   | *) optional extra              |
| 4 | Control unit               |   |                                |
| 5 | Pneumatic pincer EL        |   |                                |
| 6 | PC with installed software |   |                                |

### 3.1 Optional extras

A number of additional items are available for the automation process, including

- Test equipment CAL 01, comprising the calibrator CAL 01 and closing force sensor SKS 01, for measuring the pincer jaw force (closing force) and for calibrating the ELK 02
- Status lamp X2L01 for the visual detection of OK and NO closures and for the audible detection of NO closures

### 3.2 Design of the HO EL pincers

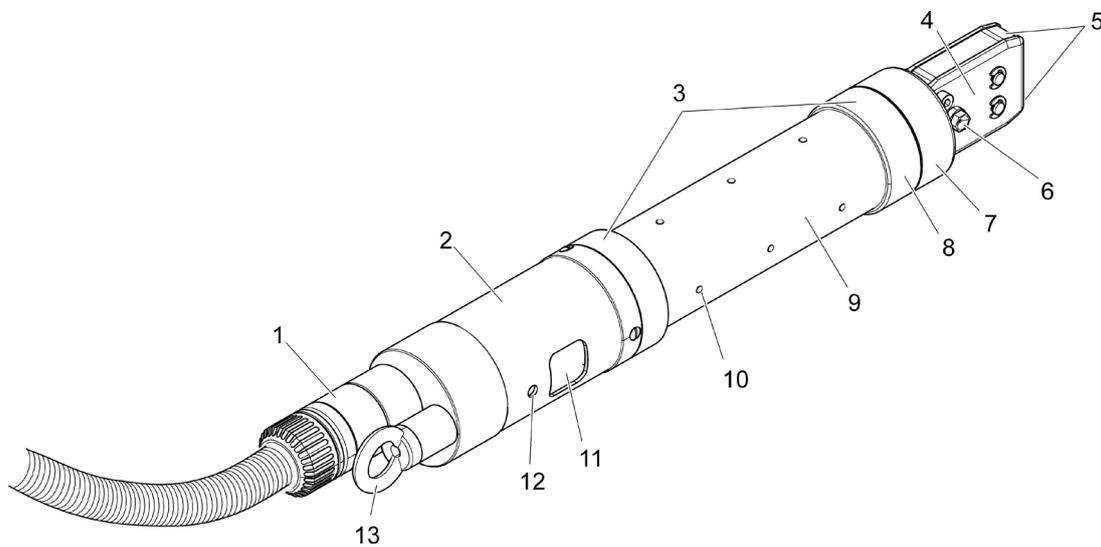


Fig.3 HO EL pincers

1	Rotary adapter	7	Union nut
2	EL trigger unit (“optional” extended trigger not shown)	8	Lock nut
3	Possible mounting surfaces	9	Pincer body
4	Pincer plate	10	Vent holes
5	Pincer jaw	11	START button
6	Grease nipple	12	LED light
		13	Suspension loop

**NOTICE**

Risk of pincer jaw damage

- ▶ When using the HO 10000 pincer model, make sure that the compressed air supply pressure pE does not exceed 5 bar.

**NOTICE**

The vent holes (Fig. 3/10) must not be blocked.

### 3.3 Connections on the ELK 02 control unit

**INFO**

For details of the inputs and outputs on the control unit please refer to section 13.1, from p. 13-116.

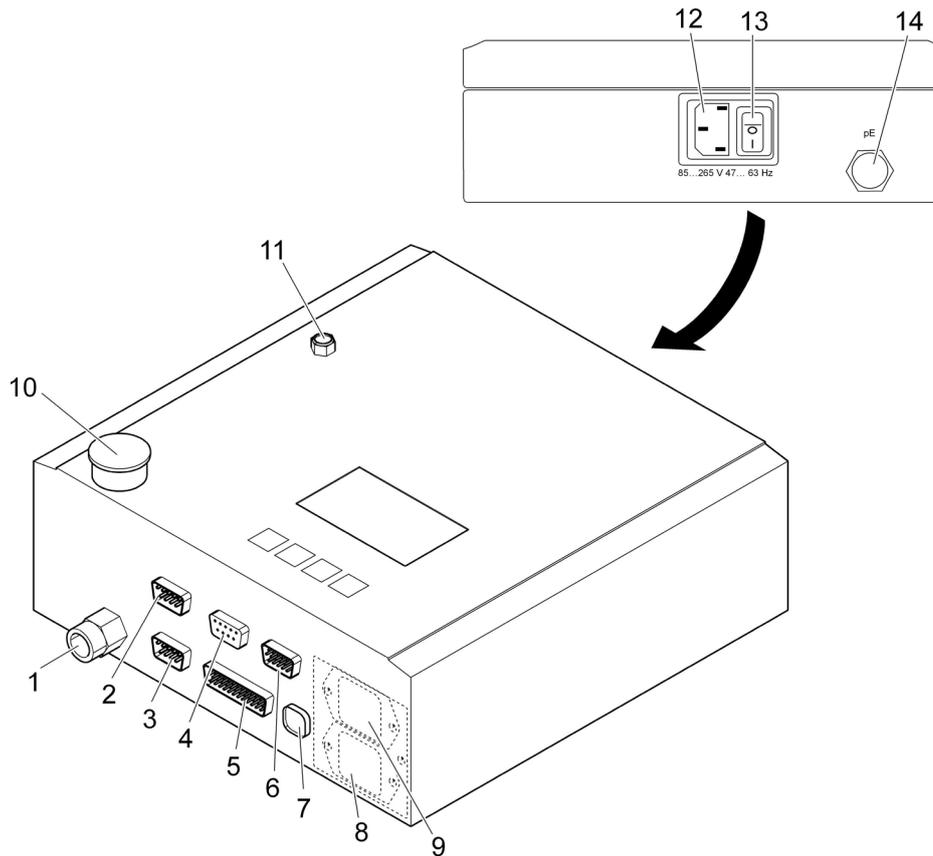


Fig. 4 Control unit, connections

Item in Fig. 4	Name of interface	Type/use
1	pA	Compressed air output to pincer
2	X1	9-pin SUB-MIN-D (male) Pincer connection
3	X2	15-pin SUB-MIN-D (HD) (male) Inputs/outputs
4	X3	9-pin SUB-MIN-D (female) <ul style="list-style-type: none"> <li>Computer connection RS232</li> <li>Connection CAL 01 RS232</li> </ul>
5	X20	25-pin SUB-MIN-D (male) Inputs/outputs
6	X5/6/7	Option

Item in Fig. 4	Name of interface	Type/use
7	USB	USB interface
8		Optional bus interface
9		Optional bus interface
10		Vent
11		Vent
12		3-pin IEC connector (male)
13		On/Off switch
14	pE	Compressed air supply pressure (see safety notice below)

Table 1 *Connections to the control unit***NOTICE****Risk of pincer jaw damage**

- ▶ When using the HO 10000 pincer model, make sure that the compressed air supply pressure pE does not exceed 5 bar

## 4 Process description

The ELK 02 is used for closing OETIKER clamps and Low Profile Clamps under the following conditions:

- quantified
- qualified
- verified

### Quantification

Corresponds to the definition of gap and closure values.

### Qualification

Corresponds to the definition of tolerances for gap and closure values and monitoring time profiles during closure.

### Verification

Closure of the pincer jaws at the verification force VK, a reduced force for determining the verification value VW.

### Detection

Detection identifies a second closure on the same clamp or Low Profile Clamp and reports it as NO.

All physical values necessary for the function can be input via the PC using the ELK 02 software. The PC can then be used if required for recording the closure data and for inputting the nominal force.

### Contact detection

The contact detection function determines the contact position of the corresponding clamp with the material being clamped at the start of compression.

## 4.1 Closing force

OETIKER clamps and Low Profile Clamps must be closed with a recommended and uniform closing force (force priority). This results in a consistent, reproducible and permitted tensile load on the strip material, without overloading the individual components, the parts being clamped and the clamps.

The recommended closing forces for each OETIKER product group are listed in the technical data sheets.

The closing force can be altered by changing the parameters in the ELK 02 control unit.

It is critical to use the clamping force established for both the clamp and the specific application.

The closing force test device (i.e. test equipment CAL 01) is used for determining and setting the closing force.

## 4.2 Procedure

1. Insert the ear of an OETIKER clamp (Fig. 5/1) into the clamping area on the pincer head (Fig. 5/2).

For OETIKER Low Profile Clamps:

2. Position the pincer jaws on the tensioning hooks of the Low Profile Clamp.

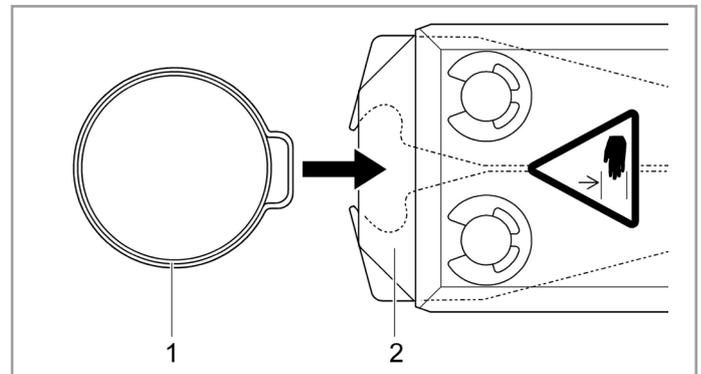


Fig. 5 *Insert clamp*

2. Press the START button (Fig. 6/3).

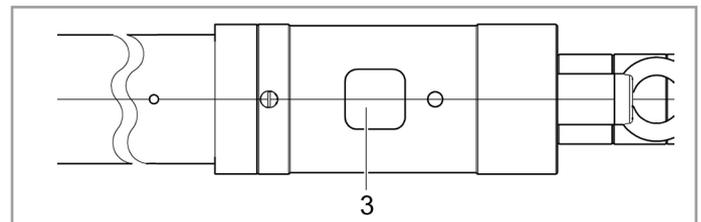


Fig. 6 *Start closure*

Closure is initiated and the ear (Fig. 7/4) of the clamp is closed.

In the case of Low Profile Clamps, initiating closure reduces the clamp diameter to the required size for engagement. Depending on the product, the clamp is either engaged automatically or by applying contact pressure on reaching the engagement position.

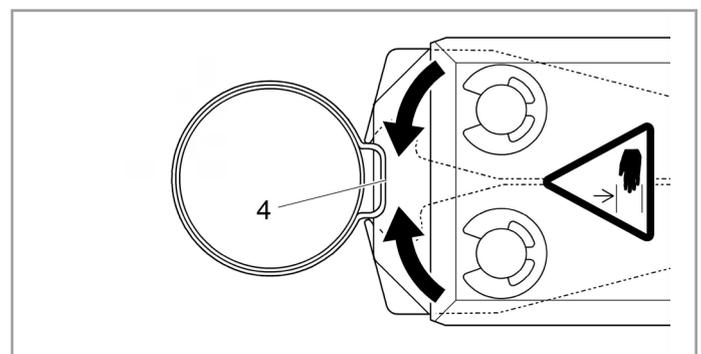


Fig. 7 *The ear is closed*

On reaching the predefined parameter values the jaws on the pincer head are opened.

### INFO

The closure sequence is dependent on the closure data and on the predefined system data. It is initiated by pressing the START button, for example.

A further closure operation can be performed.

If special heads are used – e.g. for closing OETIKER Low Profile Clamps – the details will differ from those shown in the diagrams in Fig. 5 to Fig. 7.

### 4.3 Sequence of operations

The sequence of operations when working with the ELK 02 system is divided into two sections:

- Test level
- The closure level

#### 4.3.1 Test level

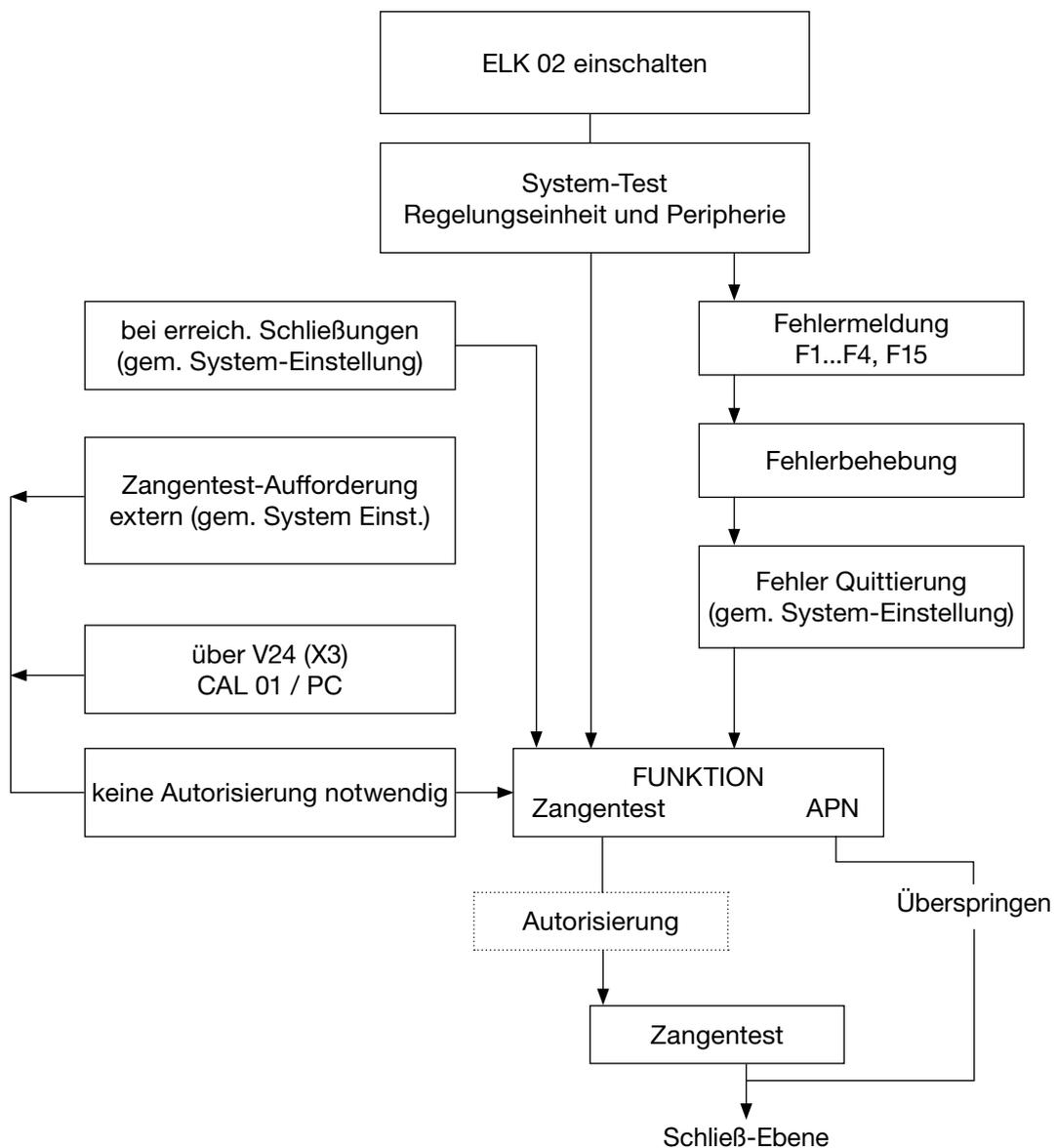


Fig. 8 The test level

**NOTICE**

In order to ensure uniform and reproducible process quality it is mandatory to perform an assembly tool pincer test at least once per shift, minimum daily. Furthermore, a pincer test is mandatory in the event any pincer components are replaced.

To maintain consistent pincer force, sufficient compressed air pressure and volume must be provided.

After pincer test, Oetiker recommends verifying the closing force as a secondary validation.

It is essential to ensure clamp closures are not conducted in pincer test mode.

### 4.3.2 The closure level

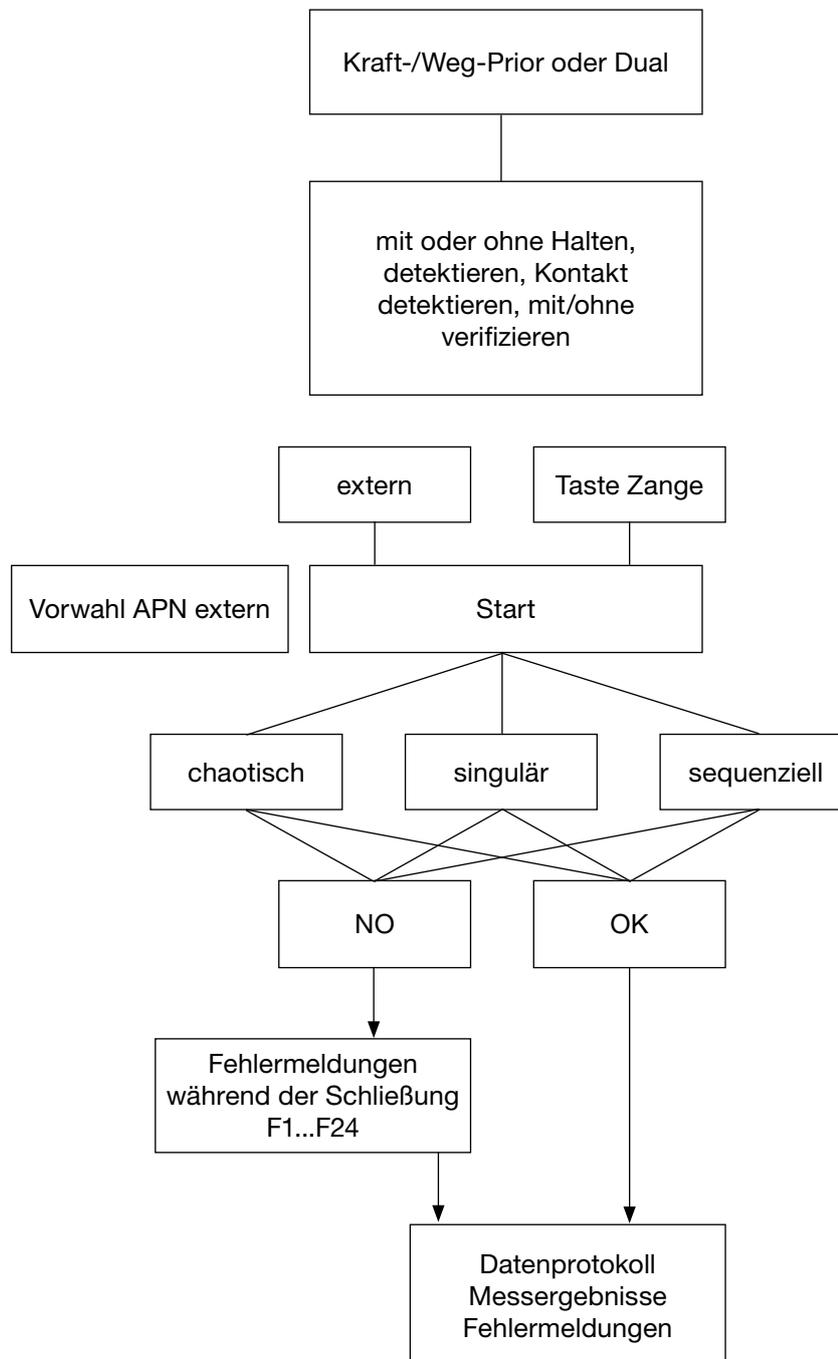


Fig.9 The closure level

## 5 Assembling and connecting the ELK 02

### 5.1 Connecting the control unit

#### INFO

When assembling and connecting the ELK 02 system, please observe the following points:

- To ensure an adequate circulation of air, there must be a gap of 10 mm between the control unit (Fig. 10/8) and the wall (Fig. 10/7).
- Do not alter the length of the corrugated hose (Fig. 10/3) (length 3 m, optionally 6 m or 12 m).
- ▶ When the pincer (Fig. 10/2) is not in use, store it in a (plastic) holder (Fig. 10/1), for example.
- ▶ Make sure that the bending radius of the corrugated hose (Fig. 10/3) is not less than 50 mm when in use.
- ▶ Warning: Compressed air must be clean and dry, free of oil and moisture.

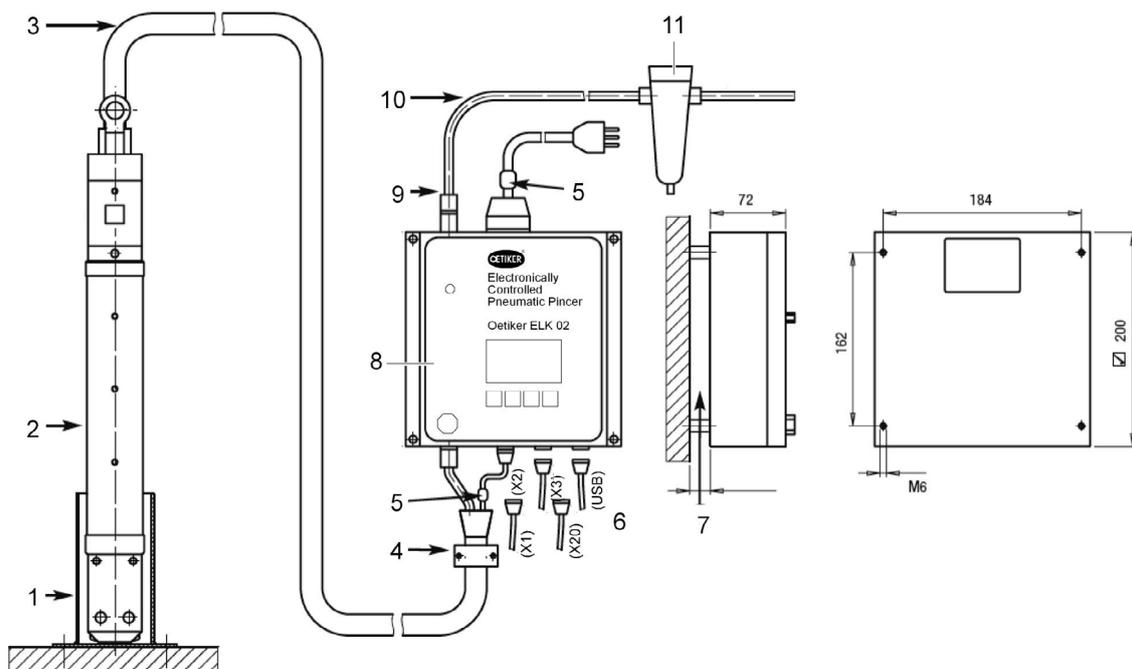


Fig. 10 Connecting the ELK 02

1	Holder for pincer (plastic recommended, supplied by others)	7	Distance from the wall to the control unit (10 mm)
2	Pincer	8	Control unit
3	Corrugated hose	9	Compressed air connection
4	Strain relief	10	Compressed air line
5	Ferrite ring for interference suppression	11	Compressed air filter
6	Connections to the control unit		

1. Mount the control unit (Fig. 10/8) so that the display is clearly visible to the user.
2. Connect the corrugated hose (Fig. 10/3) to the pincer (Fig. 10/2) with a strain relief device (Fig. 10/4) (clip, item no. 13600035 or mounting plate, item no. 13600028).
3. Connect the corrugated hose (Fig. 10/3) to the control unit (Fig. 10/8).
4. Connect the PC etc. to the control unit (Fig. 10/6).

## 5.2 Compressed air and pneumatic pincer

### 5.2.1 General information and requirements

#### NOTICE

##### Damage to the pincer

- ▶ Never clamp the pneumatic pincer at the cylindrical part of the pincer body (Fig. 3/9, p. 3-15) other than in the case of model HO 7000 at the reinforced point in the middle of the pincer body.
- ▶ Never drop or strike the pneumatic pincer.
- ▶ Never lift the pneumatic pincer by the corrugated hose.

#### INFO

To optimize the closure of OETIKER clamps and Low Profile Clamps, we recommend using a floating mount for OETIKER EL (T) pincers that are mounted in a jig. Appropriate devices are available as an option.

- The compressed air supply pressure must be between 4 and 10 bar; 6 bar is recommended.
- For the HO 10000 this must not exceed 5 bar
- A cutout mechanism with prior venting must be provided for the compressed air supply.

### 5.2.2 Connecting the compressed air

1. Compressed air pre-filter (Fig. 10/11) (item no. 05005930), suspended as shown in a suitable location by means of the mounting bracket supplied.
2. Connect the compressed air pre-filter to the compressed air supply inside the building (1/4" thread).
3. Connect the compressed air supply line (Fig. 10/10) to the compressed air connection (Fig. 10/9) on the control unit (Fig. 10/8) and to the compressed air filter (Fig. 10/11) (external diameter 8 mm, internal diameter 6 mm, suitable for pressure up to 10 bar).

### 5.3 Aligning the pincer head

The pincer head (Fig. 11/3) can be rotated into a convenient position for the user.

#### **WARNING**

##### **Risk of crushing from the pneumatic pincer**

Fingers can be crushed when the START button (Fig. 6/3) is pressed or when a start is initiated by an external control.

- ▶ Do not hold the pneumatic pincer in the clamping area.

1. Switch off the ELK 02 control unit.
2. Shut off the compressed air supply.
3. Loosen the lock nut (Fig. 11/1).
4. Loosen the union nut (Fig. 11/2) slightly.
5. Rotate the pincer head (Fig. 11/3) into the desired position.
6. Tighten the union nut (Fig. 11/2) and secure with the lock nut (Fig. 11/1).
7. Execute a pincer test.

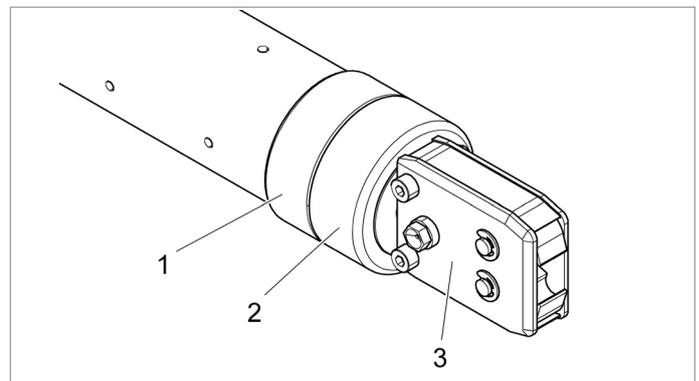


Fig. 11 *Aligning the pincer head*

## 6 Working with the ELK 02

- ✓ Requirements:
- The ELK 02 must be connected (see section 5, p. 5-23).
- The PC program must be installed (see section 7.2, p. 7-28).
- A compressed air supply must be available (see section 5.2.2, p. 5-24).

### 6.1 General instructions for handling

#### NOTICE

If the vent holes on the ELK 02 are closed the ELK 02 will not work properly and an error message is output.

- ▶ During operation, the vent holes (Fig. 12/2) on the pincer body (Fig. 12/1) must not be blocked.
- ▶ Make sure that any fixture that is fitted does not block the vent holes.

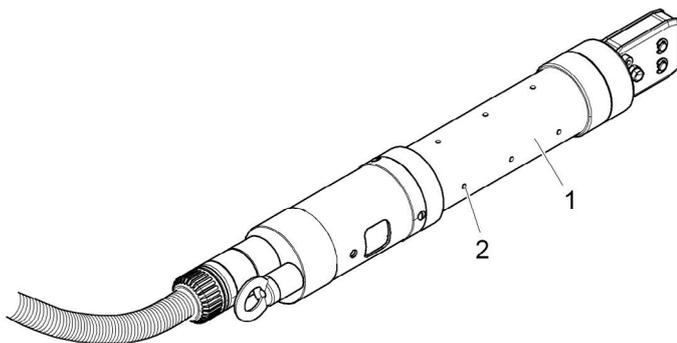


Fig. 12 Vent holes

### 6.2 Switching on the ELK 02

1. Switch on the ELK 02 using the On/Off switch (Fig. 13/2) on the control unit (Fig. 13/1).  
After switching on, a system check is performed. If all the checks are OK, FUNCTION appears in the display.
2. Perform a pincer test (see section 8.3, p. 8-40).
3. Select the closure function you require (see section 9.4, p. 9-84).

If a fault occurs on switching on (see section 14.3, p. 13-130).

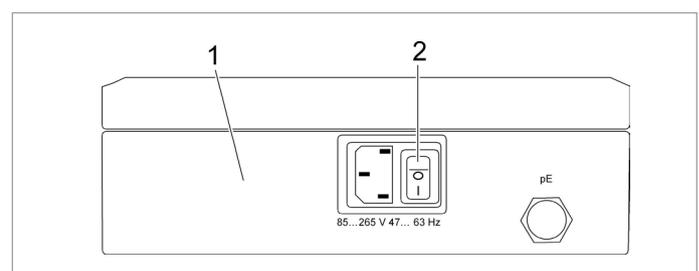


Fig. 13 Switching on the ELK 02

## 7 Menu navigation in the PC program

### 7.1 System requirements and installation

- Computer: Pentium 4 processor or equivalent – CPU 500 MHz or higher
- Graphics: Screen resolution min. 1024 x 764 pixels  
recommended 1280 x 1024 pixels or higher
- Memory: 512 MB RAM, 100 MB free disk space
- Operating system: Windows XP®, Windows Vista® or Windows 7®

#### Installation notes

The program must be installed and started up for the first time by somebody with adequate user rights. If an error message appears during installation or on initial startup, please contact your system administrator.

ELK 02 can be installed in parallel with an existing ELK 01/ELS 01 program.

The program CDs (or USB stick) are full program versions and contain the following:

- PC software
- Process data (pincer-related data)
- System settings
- Clamping data (default force and gap data)
- USB driver; Installation see section 7.2.3, p. 7-29
- Languages file

#### Rights necessary for installation

The following rights in particular are necessary for installation and initial startup:

- Creation of a new folder and subfolders in which the software is to be installed.

Subsequent running of the program requires the following rights:

- Full access to the program folder and subfolders in which the software was installed (by default):  
“C:\oetiker\elk02”.

## 7.2 Installing the PC program

### INFO

The following descriptions assume a basic knowledge of the Windows operating system.

### 7.2.1 Installing the program automatically

1. Close all open applications.
2. Place the CD in the CD-ROM drive.

After a few seconds the installation instructions will be displayed on the screen.

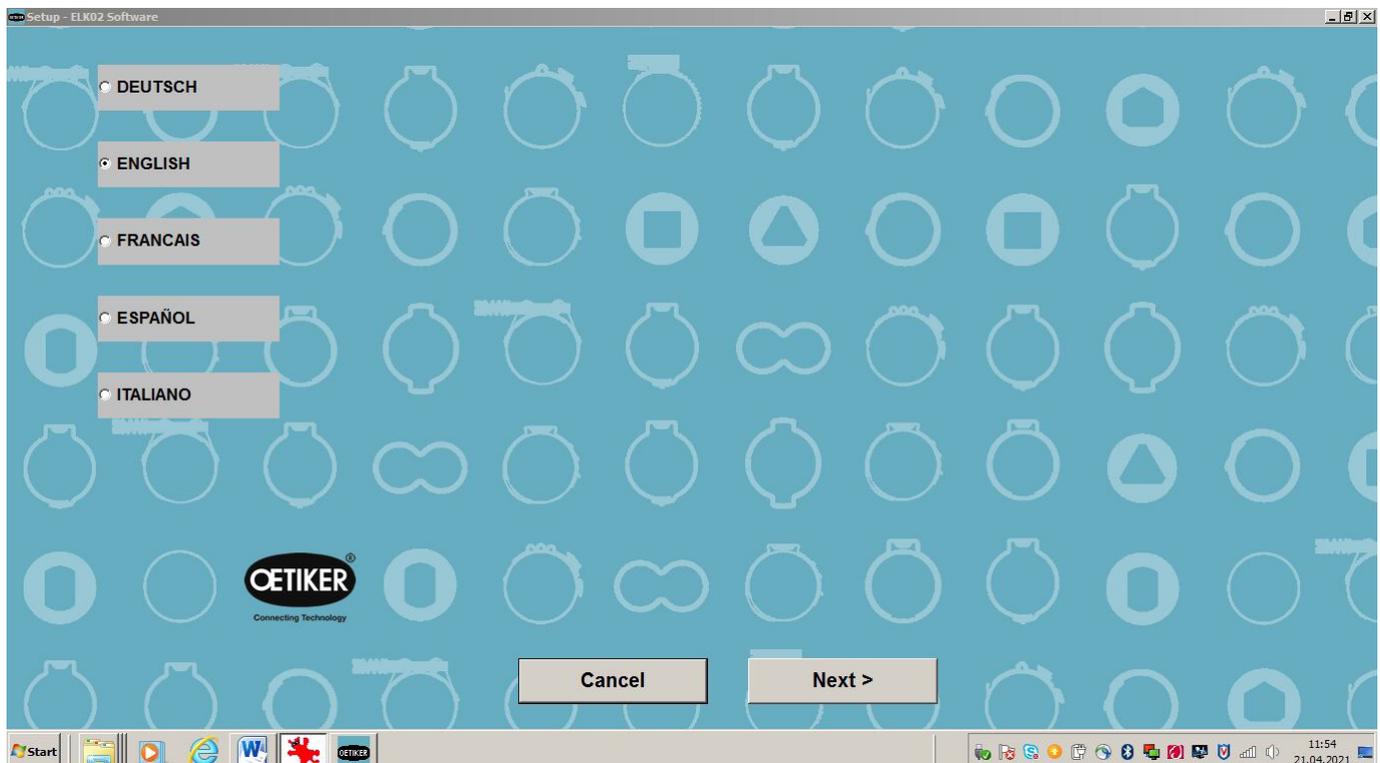


Fig. 14 Start menu

3. Follow the instructions on the screen.

## 7.2.2 Installing the program manually

If the CD-ROM drive does not support automatic installation, the program can be installed manually.

1. In the Windows taskbar click START.
2. In the Start menu select the menu command "Run...".
3. Input the following in the input box:[drive]:\Intsetup.  
drive = name of CD-ROM drive, e.g. D:\Intsetup
4. Click OK.
5. Follow the instructions on the screen.

## 7.2.3 Installing the USB driver

<b>INFO</b>
The USB driver does not install automatically.

1. Start installation by double clicking on the .exe file in the "USB-Driver" on the installation CD.
2. Select 32-bit or 64-bit according to the computer configuration.

### Windows 7

If an old USB driver is already installed on a Windows-7 computer this can continue to be used.

### Windows 8

To use the new USB drivers under Windows 8, any driver previously installed must first be uninstalled.

### 7.3 PC program structure

- Create the **Closure data** for parameterizing the closure steps
- Create the **Closure data tables** for organizing assembly processes
- Application-related changes to **system settings** for parameterizing inputs and outputs, operating modes and system constants
- Display of a **measurement screen** for viewing closing forces and gap values after a closure
- **Statistics screen** for reading the closure data and confirmation of completed pincer tests.
- **Languages file**

When the PC program is started a safety instruction message is displayed. Please notice:

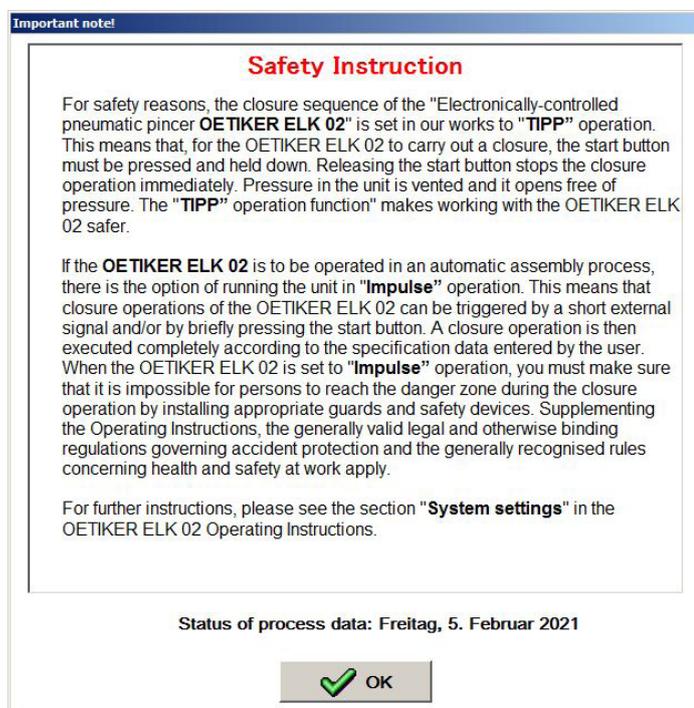


Fig. 15 PC program start safety instruction

## 8 Structure of the PC program



Fig. 16 PC program menu bar

Menu	Submenus
File	<ul style="list-style-type: none"> <li>• New closure data table</li> <li>• Open closure data tables</li> <li>• Pincer type overview</li> <li>• Backup/Restore</li> <li>• Quit</li> </ul>
Pincer test	<ul style="list-style-type: none"> <li>• Request pincer test</li> <li>• Authorize pincer test</li> <li>• Nominal force entry</li> </ul>
Measure	–
Options	<ul style="list-style-type: none"> <li>• Interface</li> <li>• Force display PC</li> <li>• Statistics</li> <li>• Process data</li> <li>• Password</li> <li>• Screen scaling</li> <li>• System settings</li> </ul>
Languages	–
Help	–

Table 2 Main menus in the PC program

## 8.1 Preparing to read and send data

Before data can be read or sent using the PC program, the following actions must be carried out:

1. Connect the PC and the ELK 02 (X3 or USB interface) using a data cable (Fig. 10/6, p. 5-23).
2. Power up the ELK 02.
3. In the “Options” – “Interface” menu select “Comport”.

### INFO

If no data cable is connected or the ELK 02 is not powered up, the message “Device not responding” will be displayed.

## 8.2 File menu



Fig. 17 File menu

Submenu	Description
New closure data table	Creates a new closure data table
Open the closure data tables	Opens the existing closure data table overview
Pincer type overview	Opens a table showing all the pincer types available in the ELK 02 software
Backup/Restore	
• Backup	Reads all data from the ELK 02 and saves it in a selected file
• Restore	Copies a selected file back to the ELK 02

Table3 Submenus in the File menu

### 8.2.1 Closure data table new

Creates a new closure data table.

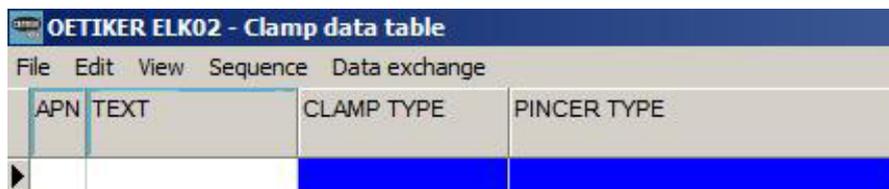


Fig. 18 New closure data table

#### File menu

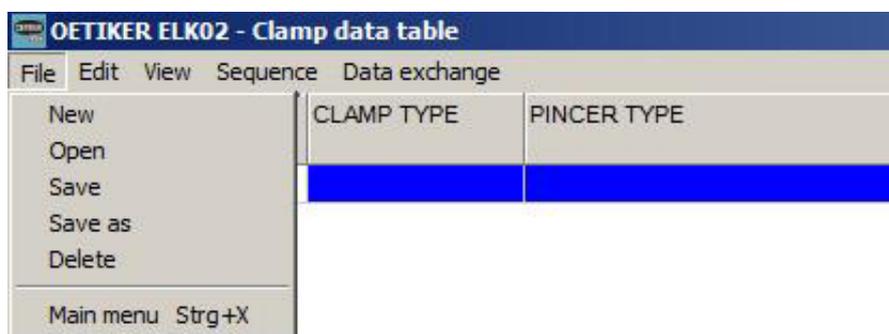


Fig. 19 File menu – New closure data table – File

Submenu	Description
New	INFO At least one individual closure data view must have been created. Creates a new, empty closure data table, which is displayed in the closure data table overview. You must input a new file name in order to save it
Open	Opens an existing closure data table
Save	Saves changes to the current closure data table under its existing name. If it is a new table, you will be prompted to input a name
Save as	Saves the current closure data table under a name and path of your choice and copies it as a current table to the overview
Delete	Deletes the current closure data table
Main menu	Takes you back to the main menu

Table 4 Submenus in the File menu – New closure data table – File

**Edit menu**

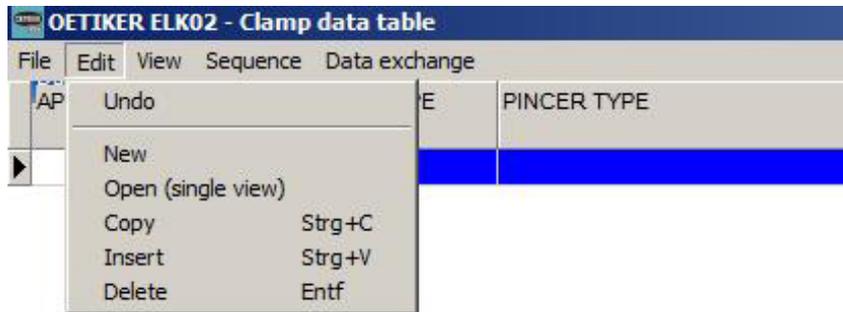


Fig. 20 File menu – New closure data table – Edit

Submenu	Description
Undo	Cancels the last action carried out since the data was last saved
New	Creates a new individual closure data view and opens the individual closure data view, APN 1
Open (individual view)	Opens a individual closure data view to create closure data Condition: At least one individual closure data view view must have been created.
Copy	Copies the currently highlighted closure data table to the clipboard
Insert	Inserts a individual closure data view from the clipboard You can insert the same individual closure data view from the clipboard more than once
Delete	Deletes the currently highlighted individual closure data view The “Delete” command can be undone

Table 5 Submenus in the File menu – New closure data table – Edit

**View menu**

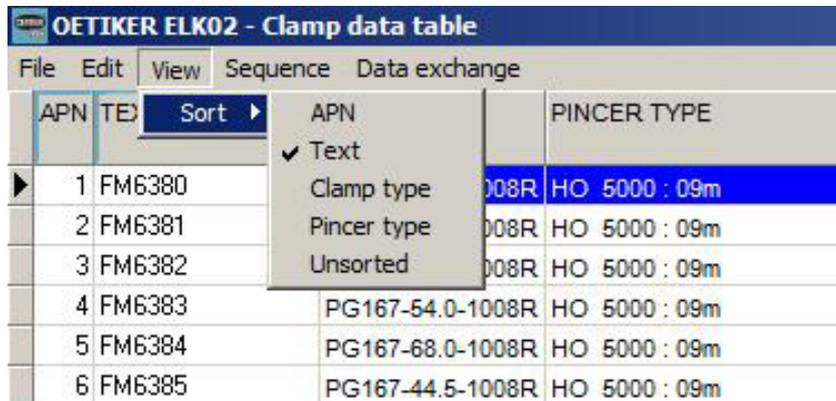


Fig.21 File menu – New closure data table – View

Submenu	Description	
Sort	APN	Sorts the APNs in ascending numerical order
	Text	Sorts the text column in ascending alphanumeric order
	Clamp type	Sorts the clamp types in ascending alphanumeric order
	Pincer type	Sorts the pincer types in ascending alphanumeric order
	Unsorted	Restores the chronological order of the created clamp individual view

Table6 Submenus in the File menu – New closure data table - View

**Sequence menu**

<b>INFO</b>
There must be at least two individual closure data view in the stored closure data table.

Define sequence

- A closure data table can have up to 99 individual closure data view.
- These max. 99 individual closure data view can be defined as a closure sequence in the Sequence table. Multiple repeats of the same APN are possible.
- The sequence of up to 30 closures can be freely defined.
- “Sequential closure” mode (see section 9.4.8, p. 9-100).

**Delete sequence**

To delete all or parts of a sequence, input the APN “0” in the number of the closure from where you want the sequence to be deleted. You must send the sequence in order to update the ELK 02.

- Example:
  - “APN0” in the 1st closure will delete the entire sequence (send to the ELK 02 to update it).
  - “APN0” in the 4th closure will delete the sequence from 4 to 30, but 1 to 3 will be retained (send to the ELK 02 to update it).

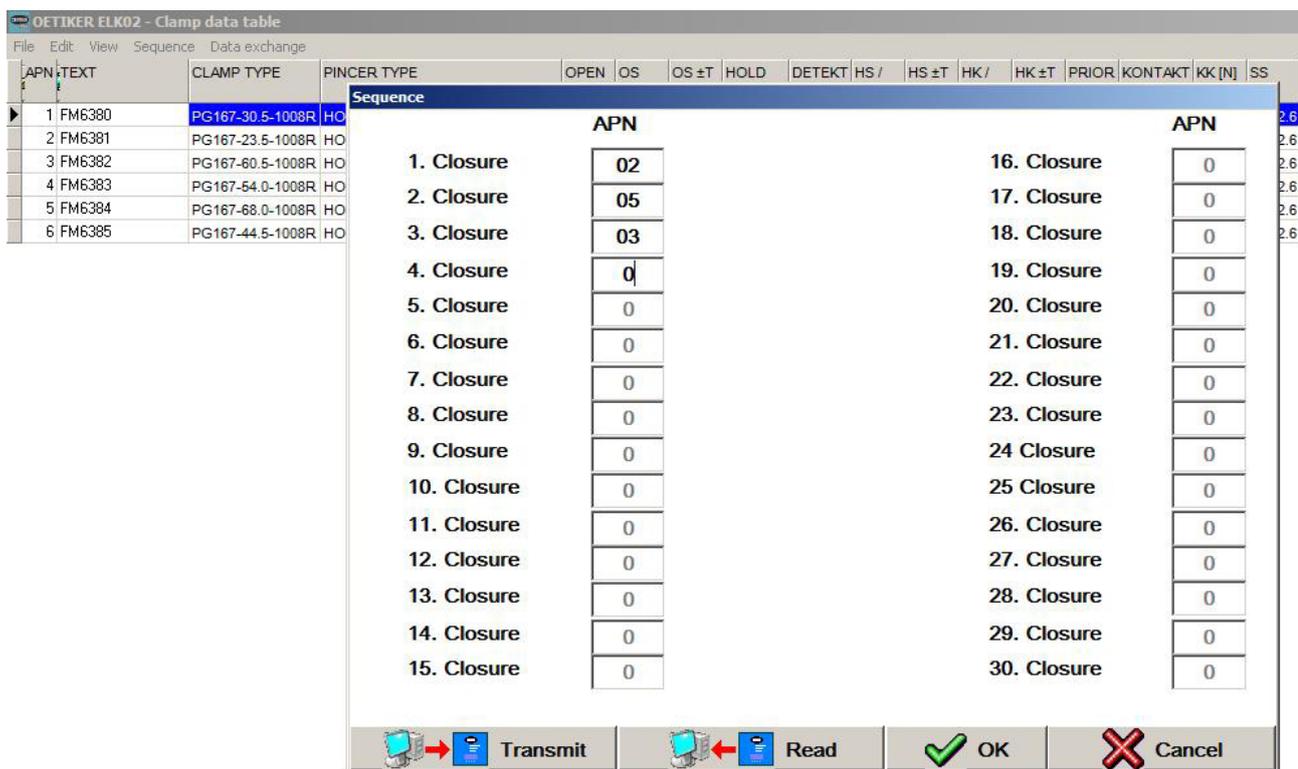


Fig.22 File menu – New closure data table – Sequence

Submenu	Description
Send	Sends a sequence to the ELK 02. When the transfer has been completed, the window closes
Read	Reads a sequence from the ELK 02. When the transfer has been completed, the window closes
OK	Assigns the defined sequence table to this grouped closure data overview, but does not send the sequence table to the ELK 02. The window closes
Discard	Discards the sequence input without accepting the changes. The old assignment is retained

Table7 Submenus in the File menu – New closure data table – Edit

Data exchange menu

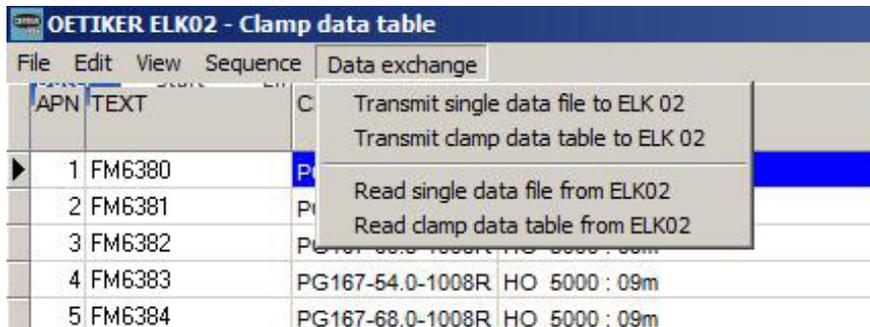


Fig.23 File menu – New closure data table – Data exchange

**INFO**

A data set corresponds to the individual closure data view of an APN.

Submenu	Description
Send individual data set to ELK 02	Opens a window in which a data set from the current table can be sent to the ELK 02 by inputting the APN. The currently highlighted data set is offered as a suggestion ▶ Press OK. The data set is sent to the ELK 02 and overwrites this data set in the ELK 02; all others are retained
Send closure data table to ELK 02	Sends all data sets displayed (regardless of which is highlighted) to the ELK 02 (max. 99 data sets). The message “Add existing table to the ELK?” appears in the confirmation window YES Adds the data sets to the data in the ELK 02 and overwrites existing data sets with the same APN number NO Deletes the existing data sets in the ELK 02 and copies the current table
Read individual data set from ELK 02	You are prompted to specify which data set is to be read back. When you input the APN, this data set is read back from the ELK 02. If there is a data set in the table with the same APN it will be overwritten. APNs that can be read back are flagged in the closure data table
Read closure data table from ELK 02	The message “Add existing data to the table?” appears in a confirmation window YES Adds the data to the data sets in the table and overwrites existing data sets with the same APN NO Deletes the existing data sets in the table and copies assigned data sets from the ELK 02 to the table

Table 8 Submenus in the File menu – New closure data table – Data exchange

### 8.2.2 Pincer type overview

All the pincer types in the ELK 02 software are listed in tabular form in the “Pincer type overview” menu.

A password-protected “Send” command copies these in full to the ELK 02. A progress bar shows the progress of the transfer.

If pincer types are added or improved, a further password-protected “Send” command copies the pincer type data stored in the ELK 02 PC software to the ELK 02.

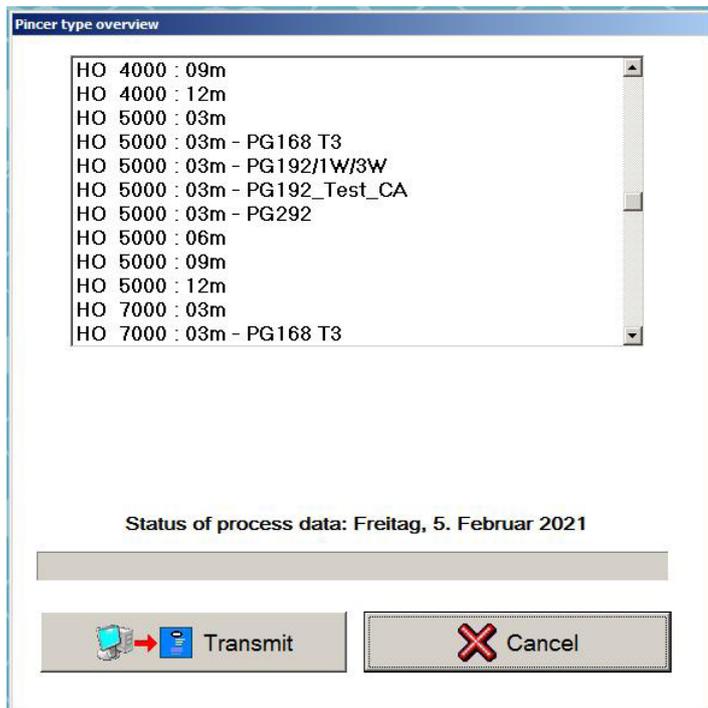


Fig.24 Pincer type overview menu

Button	Description
Send	Sends all the pincer types shown in the overview to the ELK 02
Cancel	Takes you back to the File menu
Bar	Displays the progress bar
Date	Shows the date on which the pincer type file was created or modified

Table9 Submenu in the File menu – Pincer type overview

#### Sending pincer types to the ELK 02

1. Carry out the preparatory steps (see section 8.1, p. 8-32).
2. Click the “Send” button.

The entire pincer type overview is sent to the ELK 02.

**INFO**

- The connected pincer has to be recalibrated after each “Send” operation.
  - If no data cable is connected or the ELK 02 is not powered up, the message “Device not responding” will be displayed.
- ▶ Click OK to confirm and repeat the process.

**8.2.3 Backup/Restore**

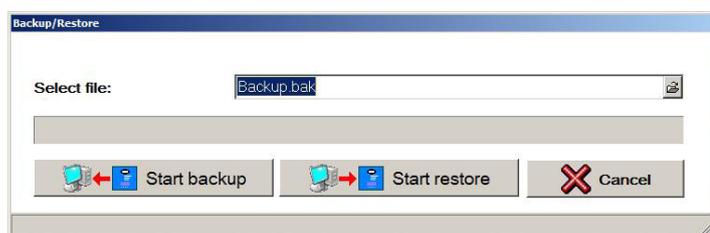


Fig.25 File menu – Backup/Restore

Input box/Button	Description
Select file:	Choose a backup or restore file
Start backup	The selected file is saved (backup)
Start restore	Enable to activate (see section 8.5.2 “Inputting the password to edit user rights”)
Cancel	Takes you back to the File menu

Table 10 Submenus in the File menu – Backup/Restore

**Backing up/restoring data**

1. Carry out the preparatory steps (see section 8.1, p. 8-32).
2. In the “Select file” input box select the desired backup or restore file.
3. Click the “Start backup” button.

All data from the ELK 02 is read and saved in a selected file (backup) or data from a selected file is copied back to the ELK 02 (restore).

**INFO**

The settings and data are copied to a new ELK 02.

### 8.2.4 ELK 02 firmware update

Updates the firmware.

#### INFO

This function is password-protected and is only available to OETIKER personnel. It only appears when the password is input.

### 8.2.5 Quit

The PC program closes.

## 8.3 Pincer test

The pincer test is used to calibrate the pincer for the following:

- the frictional forces in the “friction test”,
- the closing forces in the “force test”
- the closing gaps in the “gap test”

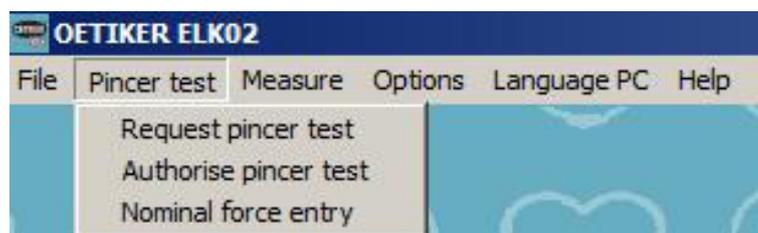


Fig. 26 Pincer test menu

Submenu	Description
Request pincer test	Opens the “FUNCTION” screen in the ELK 02, in which the pincer test can be requested.
Authorize pincer test	<ul style="list-style-type: none"> <li>• Allows a pincer test to be performed</li> <li>• Authorization is necessary if the pincer test is requested after one of the following events: <ul style="list-style-type: none"> <li>– after a pincer change,</li> <li>– on reaching a predefined number of closures.</li> <li>– via the “External bit pre-selection” interface X2 (see “System settings for pincer test”, p. 8-65)</li> <li>– via the “Pincer test” interface X20</li> </ul> </li> <li>• No separate authorization is necessary if the pincer test is requested from the PC</li> </ul>
Nominal force entry	Sends the calculated pincer force to the ELK 02

Table 11 Submenus in the Pincer test menu

### Authorization for the Suppress pincer test

Authorization for the pincer test can be suppressed (see “System settings for pincer test”, p. 8-65).

### Nominal force entry

#### NOTICE

In order to ensure uniform and reproducible process quality it is mandatory to perform an assembly tool pincer test at least once per shift, minimum daily. Furthermore, a pincer test is mandatory in the event any pincer components are replaced.

To maintain consistent pincer force, sufficient compressed air pressure and volume must be provided.

After pincer test, Oetiker recommends verifying the closing force as a secondary validation.

It is essential to ensure clamp closures are not conducted in pincer test mode.

The force correction can be input in various ways:

- via input in the ELK 02 display under “Force test” – “Correct nominal force”
- using the CAL 01 (see CAL 01 instruction manual)
- via the PC; the calculated forces at the pincer jaws are input as the nominal force in the nominal force input box (Fig. 27) and sent to the ELK 02.

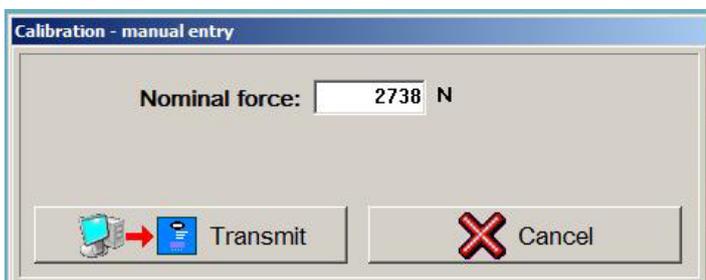
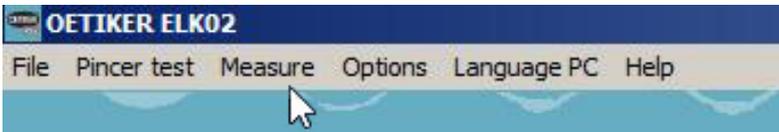


Fig. 27 Pincer test menu: Nominal force input

1. Carry out the preparatory steps (see section 8.1, p. 8-32).
2. In the “Pincer test” menu select “Nominal force entry” and input the calculated nominal force in the input box.
3. Click the “Send” button.

## 8.4 Measure



During a closure the close data is copied to the “Measurement” screen with and without hold/detect or contact detection, depending on the closure function.

After the closure the status is set to OK or to NO with the error message.

<b>Text:</b>	<input type="text" value="FM6380"/>				
<b>Clamp type:</b>	<input type="text" value="PG167-30.5-1008R"/>				
<b>Pincer type:</b>	<input type="text" value="HO 5000 : 06m"/>				
<b>Closure function:</b>	<input type="text" value="F"/> Force-priority				
	<b>Target</b>	<b>Actual</b>	<b>Tolerance:</b>		
<b>Holding gap:</b>	HS <input type="text"/> mm	<input type="text"/> mm	± <input type="text"/> mm		
<b>Holding force:</b>	HK <input type="text"/> N	<input type="text"/> N	± <input type="text"/> N		
<b>Contact gap</b>	KS	<input type="text"/> mm			
<b>Contact force</b>	KK <input type="text"/> N	<input type="text"/> N			
<b>Closing gap:</b>	SS <input type="text" value="3.0"/> mm	<input type="text" value="4.00"/> mm	+	<input type="text" value="4.2"/> mm	- <input type="text" value="1.2"/> mm
<b>Closing force:</b>	SK <input type="text" value="3000"/> N	<input type="text" value="3026"/> N	+	<input type="text" value="200"/> N	- <input type="text" value="200"/> N
<b>Verification value:</b>	VW <input type="text"/> mm	<input type="text"/> mm	+	<input type="text"/> mm	- <input type="text"/> mm
<b>Verification force:</b>	VK <input type="text"/> N	<input type="text"/> N	+	<input type="text"/> N	- <input type="text"/> N
<b>Status:</b>	<input type="text" value="OK"/>		<b>Error:</b> <input type="text" value="0"/>		
	<input type="checkbox"/> Save data in file				
<b>Select file:</b>	<input type="text" value="Daten.txt"/> 				
<b>Annotation:</b>	<input type="text"/>				
	<input type="button" value="OK"/>				

Fig.28 Measure menu

Output error	Description
Closure function	F Force priority with verification f S Gap priority with verification s D Dual closure with verification d
Status	<ul style="list-style-type: none"> <li>OK; the closure was successful</li> <li>NO; an error occurred (see below)</li> </ul>
Error	The error message is displayed (see Table 13)
Save data in file	Saves the measurement data in a file

Output error	Description
Select file	Chooses the file in which the data is to be saved
Comments	Input field for max. 30 alphanumeric characters

Table 12 The most important fields in the Measurement screen

**Working with the Measure function**

1. Carry out the preparatory steps (see section 8.1, p. 8-32).
2. Perform the closure.
3. Save the data to a selected file if required.
4. Click the “OK” button.  
The screen closes.

**INFO**

The “Measurement” screen must remain open throughout the save operation. If the screen is not visible, the data will not be saved.

Error	Output X2	Output X20
F04 OS - ERROR	NO → H	NO → H
F05 SK - ERROR	NO → H	NO → H
F06 SS - ERROR	NO → H	NO → H
F07 SK + SS - ERROR	NO → H	NO → H
F09 HK - ERROR	NO → H	NO → H
F10 HS - ERROR	NO → H	NO → H
F11 HK + HS - ERROR	NO → H	NO → H
F12 VK - ERROR	NO → H	NO → H
F13 VW - ERROR	NO → H	NO → H
F14 VK + VW - ERROR	NO → H	NO → H
F16 CANCEL PROCESS	NO → H	System error → H
F17 NOT ENGAGED	NO → H	NO → H
F22 DETECTION ERROR	NO → H	NO → H
F23 LOSS OF PRESSURE	NO → H	System error → H

Table 13 Error messages in the Error field in the Measurement screen

**INFO**

Explanation of NO → H: The NO output of the X2 or X20 interface is enabled (H – High) if a NO error is present. A 24 V signal is then present.

## 8.5 Options

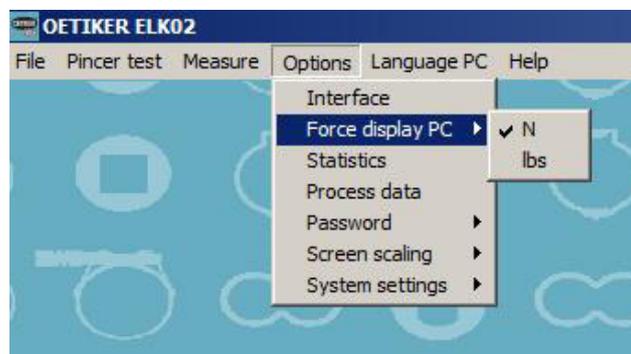


Fig.29 Options menu

Submenu	Description
Interface	Selects the COM interface in accordance with the computer configuration and has to be confirmed with OK. After establishing a USB link between the PC and the ELK 02, the ELK 02 PC program may need to be restarted or the ELK 02 switched off and on again.
Force display PC	Switches over the N / lbs unit in the PC (1 N = 0.2247 lbs) No decimal places are displayed if the value is shown in N
Statistics	The values for the closure process that are saved in the ELK 02 can be read for purposes of statistical analysis. The following screens can be used here: <ul style="list-style-type: none"> <li>• ELK data (see p. 8-45)</li> <li>• NO closures (see p. 8-47)</li> <li>• Pincer test (see p. 8-48)</li> </ul>
Process data	Process data is password-protected pincer type data, which is only accessible to OETIKER personnel
Password	To change the password, access service mode or input user rights (see section 8.5.2, p. 8-49)
Screen scaling	Adjusts the screen resolution automatically or manually (see section 8.5.3, p. 8-51)
System settings	The system settings are used for configuring the following: <ul style="list-style-type: none"> <li>• Start function</li> <li>• Inputs and outputs</li> <li>• Processes</li> <li>• Dimensions</li> <li>• Events</li> </ul> (see section 8.5.4, p. 8-51)

Table 14 Submenus in the Options menu

### 8.5.1 Statistics menu

#### ELK data

ELK data
NO closures
Pincer test

Part No.: 
 Serial No.: 
 Firmware version:

Status of statistics:

**Pincer type changes:**

Closures	Pincer type:
28180	HO 5000 : 03m
28174	HO 5000 : 03m
28170	HO 3000 : 03m - PG168-13
28170	HO 7000 : 03m
28170	HO 3000 : 03m
28170	HO 3000 : 03m
28168	HO 3000 : 03m

**Maintenance requirements**

Last maintenance at	<input type="text" value="26175"/>	Closures
Carried out since	<input type="text" value="2007"/>	Closures
Maintenance notification after	<input type="text" value="1000000"/>	Closures
Repeat after	<input type="text" value="1000"/>	Closures

**Total number of closures:**

**Total number of NO closures:**

Print
 Read
 Cancel

Fig. 30 Options menu – Statistics – ELK data

Input box/checkbox	Description
Item No.	Shows the item number
Serial No.	Shows the serial number
Firmware version	Shows the current firmware version
Status of statistics	Shows the date on which the statistics were created
Pincer type changes	Shows which pincer type was switched to and after how many closures
Total number of closures	Shows the number of closures since the date of manufacture of the ELK This value cannot be reset
Total number of NO closures	Shows the number of NO closures since the date of manufacture This value cannot be reset
Maintenance requirements	Shows the number of closures at the last maintenance
Last maintenance at	
Carried out since	
Maintenance notice after	Shows the factory-specified number of closures after which factory maintenance is required  The maintenance notice can be acknowledged so that the user can carry on working.

Input box/checkbox	Description
Repeat after	Shows the number of closures after which the user is reminded that maintenance is required. <b>INFO</b> There is no limit to the number of times the reminder can be acknowledged, but the reliability of a closure may be compromised.
Print	Starts printout of the ELK data
Read	Reads all data from the ELK 02 (ELK data, NO closures and pincer test)
Cancel	Takes you back to the Options menu

Table 15 *Input boxes and checkboxes in the ELK data menu*

Reading ELK data:

1. Carry out the preparatory steps (see section 8.1, p. 8-32).
2. Click the “Read” button.

**NO closures**

Displays the NO closures divided between APN numbers 1 to 99.

ELK data	NO closures	Pincer test
<b>Division of NO closures:</b>		
APN 1:	APN 2:	APN 3:
308	73	29
APN 4:	APN 5:	APN 6:
34	28	0
APN 7:	APN 8:	APN 9:
0	4	0
APN 10:	APN 11:	APN 12:
11	0	0
APN 13:	APN 14:	APN 15:
0	0	0
APN 16:	APN 17:	APN 18:
0	0	0
APN 19:	APN 20:	APN 21:
0	0	0
APN 22:	APN 23:	APN 24:
0	0	0
APN 25:	APN 26:	APN 27:
0	0	0
APN 28:	APN 29:	APN 30:
0	0	0
APN 31:	APN 32:	APN 33:
0	0	0
APN 34:	APN 35:	APN 36:
0	0	0
APN 37:	APN 38:	APN 39:
0	0	0
APN 40:	APN 41:	APN 42:
0	0	0
APN 43:	APN 44:	APN 45:
0	0	0
APN 46:	APN 47:	APN 48:
0	0	0
APN 49:	APN 50:	APN 51:
0	0	0
APN 52:	APN 53:	APN 54:
0	0	0
APN 55:	APN 56:	APN 57:
0	0	0
APN 58:	APN 59:	APN 60:
0	0	0
APN 61:	APN 62:	APN 63:
0	0	0
APN 64:	APN 65:	APN 66:
1	1	0
APN 67:	APN 68:	APN 69:
0	0	0
APN 70:	APN 71:	APN 72:
0	0	0
APN 73:	APN 74:	APN 75:
0	0	0
APN 76:	APN 77:	APN 78:
0	0	0
APN 79:	APN 80:	APN 81:
0	0	0
APN 82:	APN 83:	APN 84:
0	0	0
APN 85:	APN 86:	APN 87:
0	0	0
APN 88:	APN 89:	APN 90:
0	0	0
APN 91:	APN 92:	APN 93:
0	0	0
APN 94:	APN 95:	APN 96:
0	0	0
APN 97:	APN 98:	APN 99:
0	0	0
Division deleted on: 16.02.17 14:05 at 5805 Closures		
		
		

Fig. 31 Options menu – Statistics – NO closures

Input box/checkbox	Description
Delete division	Deletes the NO closures
Division deleted on	Date of deletion
At...closures	Number of NO closures for which the division was deleted
Print	Starts printout of the NO closures
Read	Reads all data from the ELK 02 (ELK data, NO closures and pincer test)
Cancel	Takes you back to the Options menu

Table 16 Input boxes and checkboxes in the NO closures menu

Read NO closures:

1. Carry out the preparatory steps (see section 8.1, p. 8-32).
2. Click the “Read” button.

**Pincer tests**

Shows the number of closures for which a pincer test was performed, indicating the pincer type and type of force calibration, the force setting and the nominal force input.

ELK data NO closures Pincer test

Closures	Pincer type:	Pincer test with constant nominal force	Force Value	Nominal force entry
28180	HO 5000 : 03m	<input type="checkbox"/>	3198	3501
28174	HO 5000 : 03m	<input type="checkbox"/>	3500	3198
28170	HO 3000 : 03m - PG168-1	<input type="checkbox"/>	4023	4023
28170	HO 7000 : 03m	<input type="checkbox"/>	4023	4023
28170	HO 3000 : 03m	<input type="checkbox"/>	2141	1539
28170	HO 3000 : 03m	<input type="checkbox"/>	2207	2141
28168	HO 3000 : 03m	<input type="checkbox"/>	4178	2207
28166	HO 7000 : 03m	<input type="checkbox"/>	4900	4178
28160	HO 7000 : 03m	<input type="checkbox"/>	4900	4202
28155	HO 7000 : 03m	<input type="checkbox"/>	1769	4139

Print Read Cancel

Fig. 32 Options menu – Statistics – Pincer tests

Input box/checkbox	Description
Closures	Number of closures for which a pincer test was performed
Pincer type	Shows the pincer type for each closure
Force calibration	There are two methods of force calibration: <ul style="list-style-type: none"> <li>Force calibration with constant target value setting</li> <li>Force calibration with constant nominal force</li> </ul>
Force setting	Shows the closing force set for the pincer type in the pincer test (force test)
Nominal force input	The calculated value of the closing force that was input
Print	Starts printout of the pincer test
Read	Reads all data from the ELK 02 (ELK data, NO closures and pincer test)
Cancel	Takes you back to the Options menu

Table 17 Input boxes and checkboxes in the Pincer test menu

Read the pincer test:

1. Carry out the preparatory steps (see section 8.1, p. 8-32).
2. Click the “Read” button.

### 8.5.2 Password menu

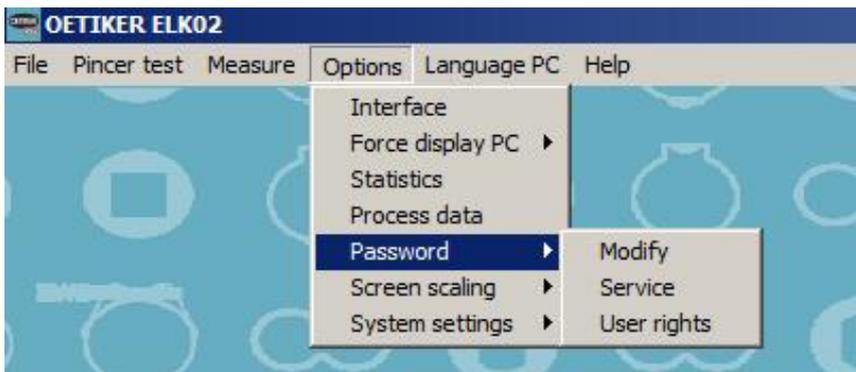
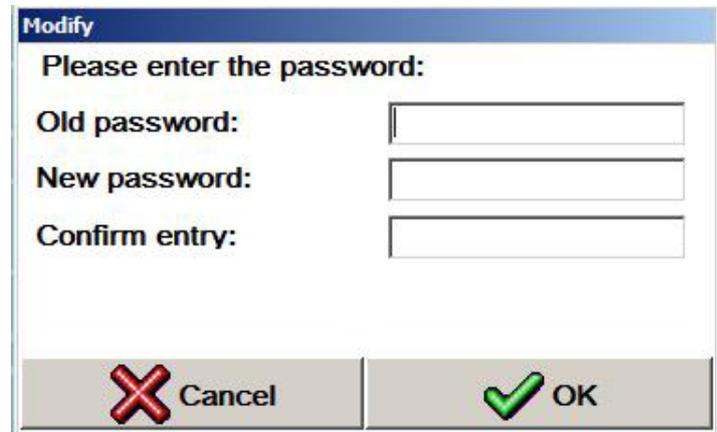


Fig.33 Options menu – Password

The default password for accessing the system settings is “ELK02”.

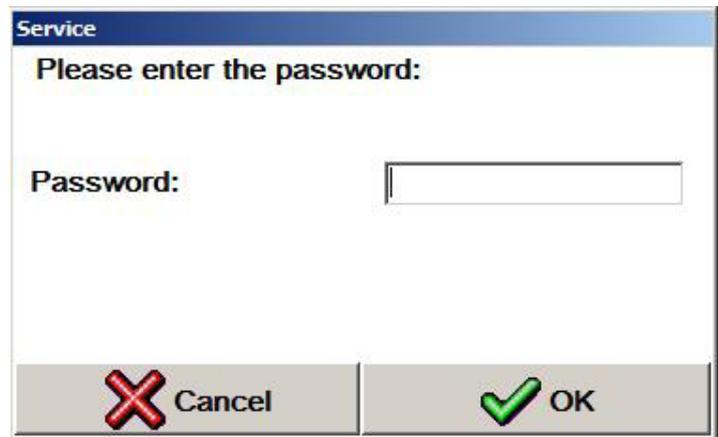
The system settings password can be changed at any time:

1. Input the old password “ELK02”.
2. Input a new password.
3. Input the new password again as verification.
4. Click “OK” to confirm.



Inputting the password for service mode:

1. Input the password.
2. Click "OK" to confirm.



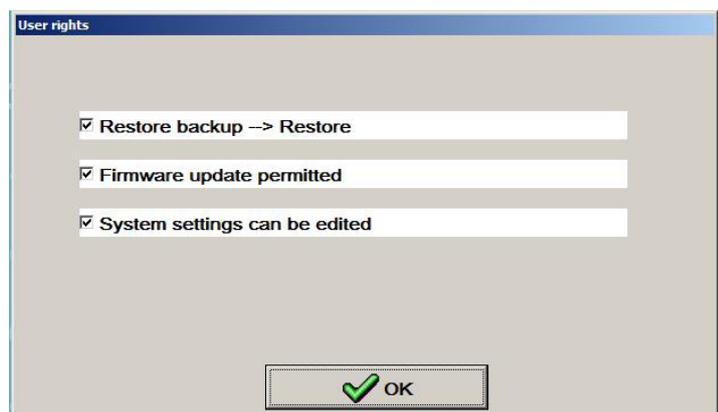
Inputting the password for service mode:

1. Input the password.
2. Click "OK" to confirm.



Inputting the password for service mode:

1. Input the password.
2. Click "OK" to confirm.



### INFO

These user rights remain enabled even after quitting the ELK 02 program.  
To disable them, reset (deactivate) the checkboxes.

### 8.5.3 Screen scaling menu

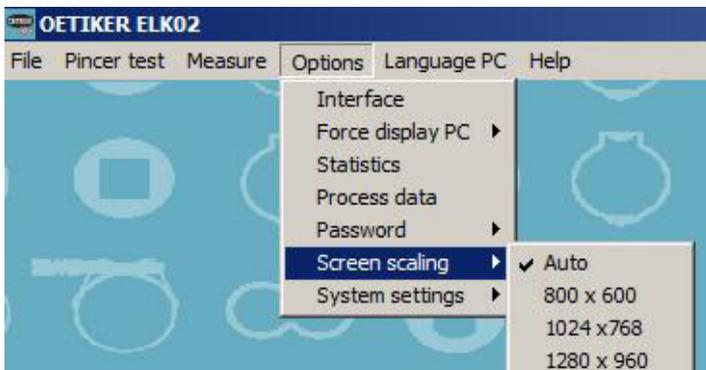


Fig.34 Options menu: Screen scaling

If problems occur with automatic screen scaling, you can set fixed resolutions for the program.

### 8.5.4 System settings menu

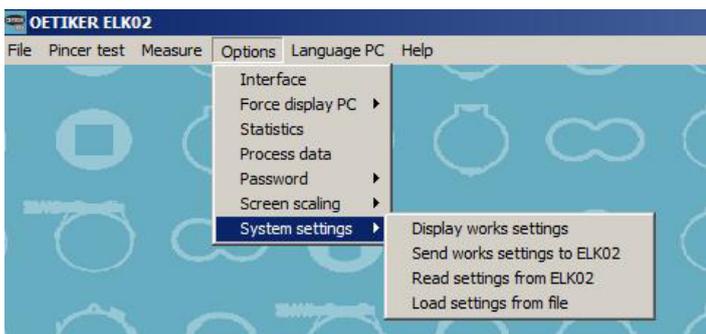


Fig.35 Options menu: System settings

Submenu	Description
Display factory settings	Displays the default factory settings
Send factory settings to ELK 02	Sends the factory settings data to the ELK 02
Read settings from ELK 02	Reads data from the ELK 02
Load settings from file	Loads the user-defined file

Table 18 Submenus in the System settings menu

#### General information on function-specific screens in the system settings

- Functions are switched on and off by means of checkboxes or radio buttons ( /  or  / .
- A \* by the checkbox (\*) indicates a factory setting.

### START system settings

Defines the START at the trigger unit or at the pincer's extended trigger along with the inputs at the Start/Acknowledge interface X2 and the Enable and Start interface X20.

#### INFO

“Start” means that a closure in accordance with the “closure function” has been initiated.

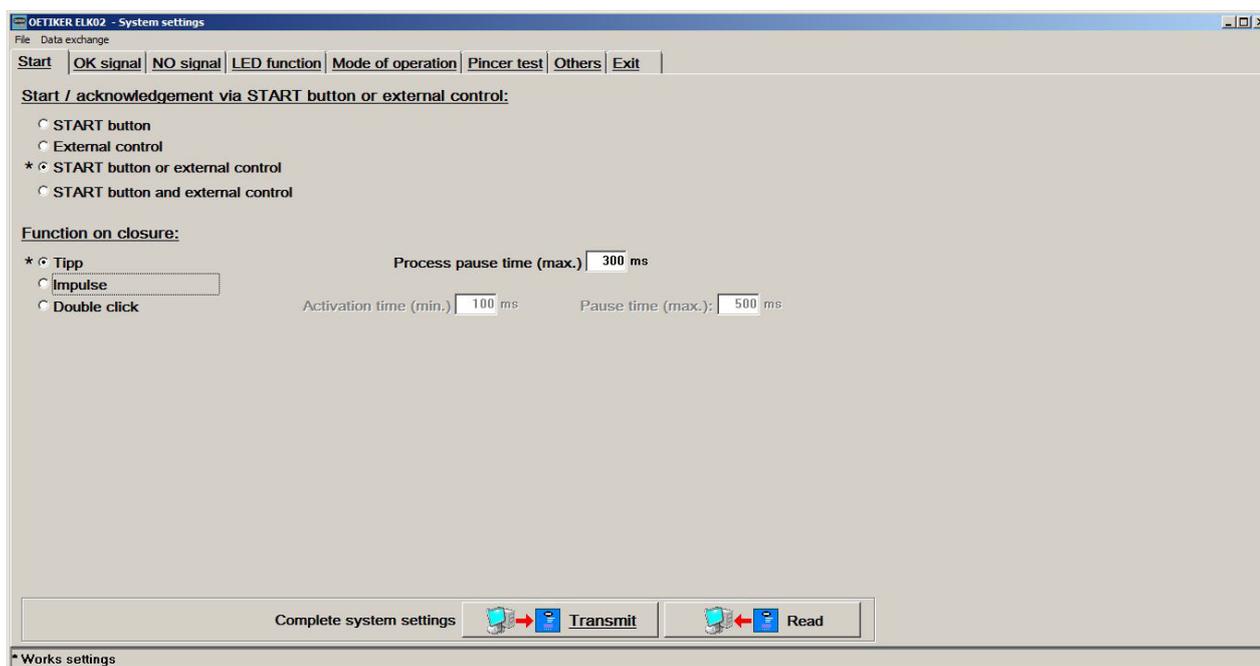


Fig. 36 START system settings

Input box/checkbox	Description
Start / acknowledgement via START button or external control	START button in the trigger unit EL or in the extended trigger ELT. External control via the X2 or X20 interfaces
<ul style="list-style-type: none"> <li>• START button</li> <li>• External control</li> </ul>	Start only via START button Start only via: <ul style="list-style-type: none"> <li>• X2 Start/Acknowledge</li> <li>• X20 Enable and Start</li> </ul>
<ul style="list-style-type: none"> <li>• START button or external control</li> </ul>	Start via START button or <ul style="list-style-type: none"> <li>• X2 Start/Acknowledge</li> <li>• X20 Enable and Start</li> </ul>

Input box/checkbox	Description
<ul style="list-style-type: none"> <li>START button and external control</li> </ul>	<p>Start only via START button and</p> <ul style="list-style-type: none"> <li>X2 Start/Acknowledge or</li> <li>X20 Enable and Start</li> </ul> <p><b>NOTICE:</b> This function is a safety function. The START button can initiate a closure only when the X2 interface: Start/Acknowledge or X20:Enable and Start is active</p>
<p>Function on closure:</p> <ul style="list-style-type: none"> <li>Tip</li> </ul> <p>Process pause time (max.)</p> <ul style="list-style-type: none"> <li>Impulse</li> </ul> <ul style="list-style-type: none"> <li>Double click</li> </ul> <p>Activation time (min.)</p> <p>Pause time (max.)</p>	<p>Safe start; in this function initiation must remain activated by means of the START button or a current feed via the Start/Acknowledge interface X2 or the Enable and Start interface X20 throughout the closure. If initiation is interrupted, the pincer jaws open immediately and F16 CANCEL PROCESS appears in the display.</p> <p>If a second initiation is required during a closure, e.g. “Hold”, the pause must not exceed the process pause time. If this time is exceeded, the pincer jaws open immediately and F16 CANCEL PROCESS appears in the display.</p> <p>A pulse of &gt;20 ms at the START button or via the interface</p> <ul style="list-style-type: none"> <li>X2 Start/Acknowledge or</li> <li>X20 Enable and Start, pulse of &gt;20 ms</li> </ul> <p>(see “Start / acknowledgement via START button or external control” in the table above)</p> <p><b>NOTICE:</b> When the OETIKER ELK 02 is set to “Impulse” operation, you must make sure that it is impossible for persons to reach the danger zone during the closure operation by installing appropriate guards and safety devices. Supplementing the Operating Instructions, the generally valid legal and otherwise binding regulations governing accident protection and the generally recognized rules concerning health and safety at work apply (see safety instruction Fig.37).</p> <p>A double click increases the safety of the start function.</p> <p>Two initiations via the START button or via the interface are required</p> <ul style="list-style-type: none"> <li>X2 Start/Acknowledge or</li> <li>X20 Enable and Start</li> </ul> <p>(see “Start / acknowledgement via START button or external control” in the table above)</p> <p>The initiation must take place within a defined time frame:</p> <p>Range 50 to 2000 ms</p> <p>Range 50 to 2000 ms</p>

Table 19 START system settings

\*see Safety Instructions (p. 8-54).

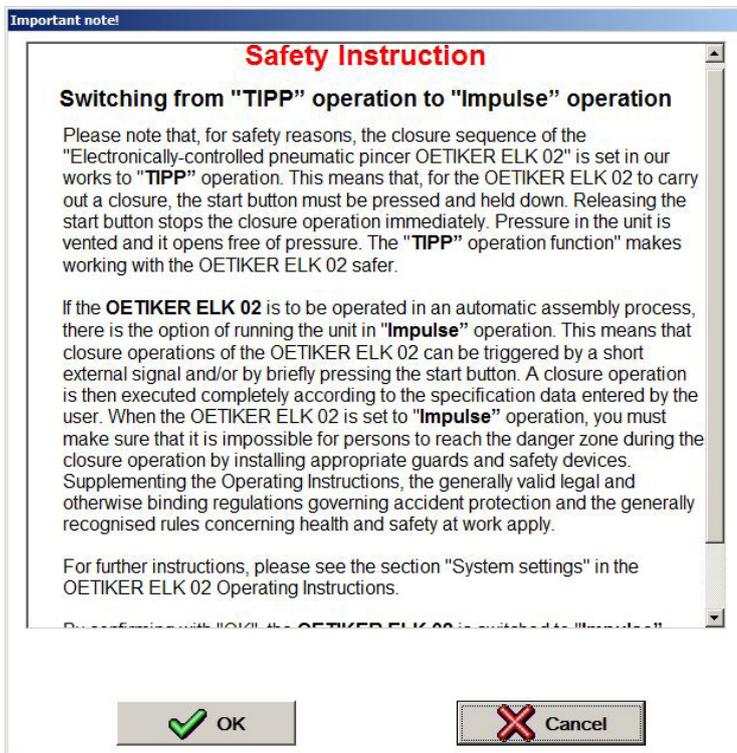


Fig. 37 Safety instruction START system settings

**Sequence:**

The start time is the time between the initiation of the START function and the movement of the pincer jaws.

The start time is determined by the configuration of PC program – Options – System settings  
OK signal / NO signal / LED function.

- OK signal: one pulse on initiation of start function
- NO signal: one pulse on initiation of start function
- LED function: one pulse on initiation of start function

The delay time between the initiation of the start function and the closing movement of the pincer jaws determines the longest pulse time for the OK or NO signal or the LED function.

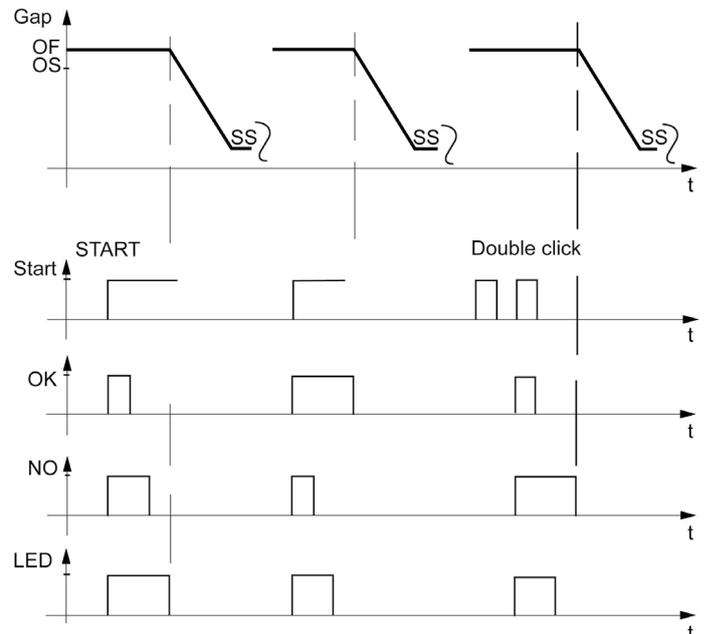


Fig. 38 START diagram

**System settings for the OK signal**

This menu defines the response of the OK output signal at the interfaces.

- X2 OK
- X20 OK

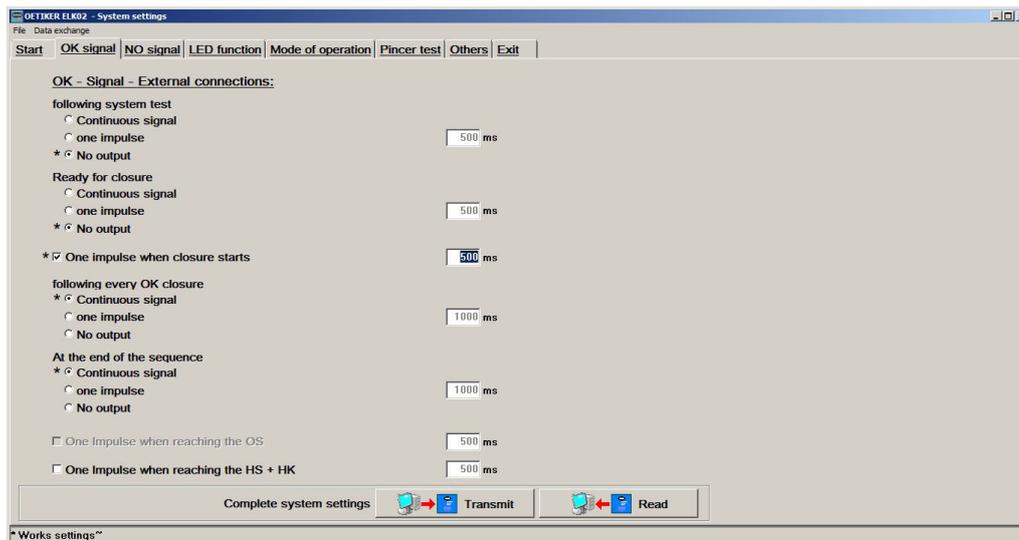
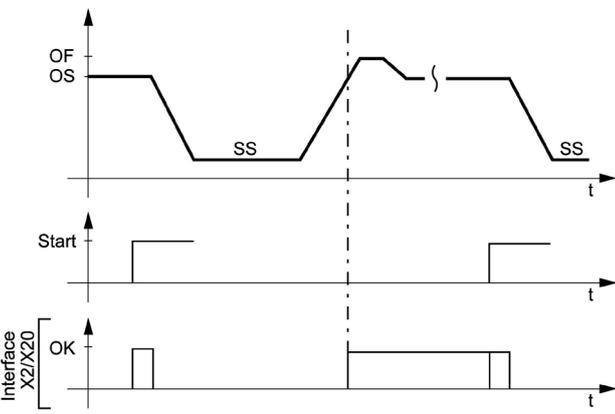
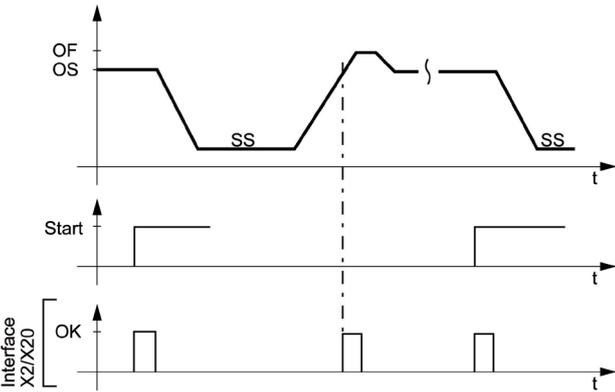
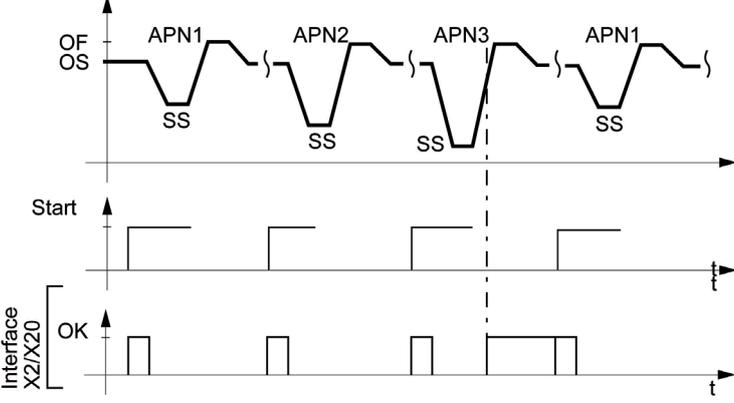
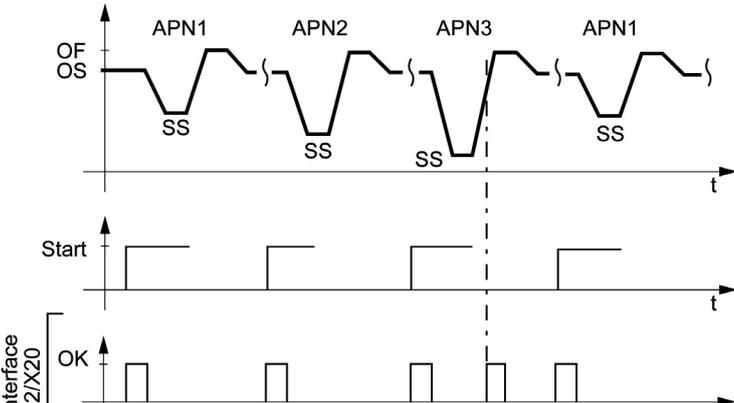


Fig. 39 System settings for the OK signal

Input box/checkbox	Description
After end of system test: <ul style="list-style-type: none"> <li>• continuous signal</li> <li>• one pulse</li> <li>• no output</li> </ul>	When the ELK 02 is powered up the control unit checks its function (system test) The output can be supplied as <ul style="list-style-type: none"> <li>• continuous signal</li> <li>• one pulse (10-1000 ms)</li> <li>• no output</li> </ul>
Read for closure <ul style="list-style-type: none"> <li>• continuous signal</li> <li>• one pulse</li> <li>• no output</li> </ul>	<ul style="list-style-type: none"> <li>• When “Current APN” appears on the ELK 02 display or</li> <li>• After a closure and display of the following messages on the ELK 02 display, the ELK 02 is ready for closure:               <ul style="list-style-type: none"> <li>– SS + SK OK or</li> <li>– SS + SK OK toggling to VW + VK.</li> </ul> </li> </ul> The output can be supplied as <ul style="list-style-type: none"> <li>• continuous signal</li> <li>• one pulse (10-1000 ms)</li> <li>• no output</li> </ul>
	NOTICE: If the X20 interface is activated (there is an option to switch between the X2 and X20 interface in the “Other” system settings), a separate output is available for each of the following statuses: <ul style="list-style-type: none"> <li>• BUSY (during the system test)</li> <li>• read for closure</li> </ul>
One impulse when closure starts	One pulse is supplied when closure starts. Factory setting 500 ms (range 10 to 1000 ms)

Input box/checkbox	Description
After each OK closure <ul style="list-style-type: none"> <li>continuous signal</li> </ul>	<p>The continuous signal remains until the next start</p> <p>If on opening the pincer jaws (from SS/SK/VW to fully open) the pincer head reaches the OS defined at the start time within its tolerance OS-T, a continuous signal is output until the next start (factory setting).</p> 
<ul style="list-style-type: none"> <li>one pulse</li> </ul>	<p>If on opening the pincer jaws (from SS/SK/VK to fully open) the pincer head reaches the OS defined at the start time within its tolerance OS-T, one pulse is output (range 10 ... 1000 ms).</p> 
<ul style="list-style-type: none"> <li>no output</li> </ul>	

Input box/checkbox	Description
<p>At the end of the sequence</p> <ul style="list-style-type: none"> <li>continuous signal</li> </ul>	<p>Continuous signal until the next start.</p> <p>If the pincer jaw opens (from SS to fully open) in a sequence in the last pressing operation and the OS assigned to the last pressing operation is reached within its tolerance OS-T, a continuous signal is output until the next start (factory setting).</p> 
<ul style="list-style-type: none"> <li>Pulse</li> </ul>	<p>If the pincer jaw opens (from SS to fully open) in a sequence in the last pressing operation and the OS assigned to the last pressing operation is reached within its tolerance OS-T, one pulse is output.</p> <p>Default 1000 ms (range 10-1000 ms).</p> 
<ul style="list-style-type: none"> <li>no output</li> </ul>	

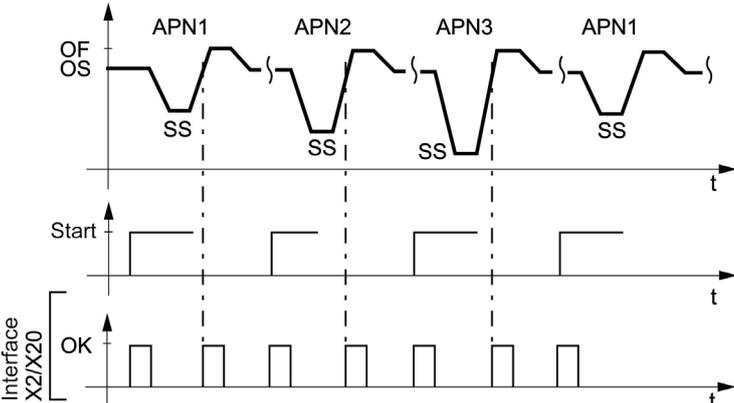
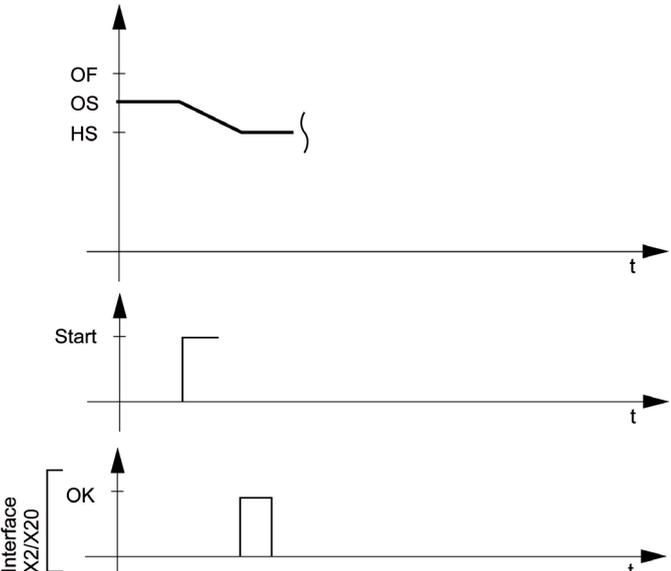
Input box/checkbox	Description
<p>One pulse on reaching the OS</p>	<p>Conditions: "Continuous signal" must not be set for "After each OK closure" or "At the end of the sequence".            If the OS is reached within its OS-T, one pulse is output.            Default 500 ms (range 10-1000 ms).</p> 
<p>One pulse on reaching the HS + HK</p>	<p>Condition: The Hold function has been pre-selected. If the HS is reached within the HS-T and the HK within the HK-T, one pulse is output.            Default 500 ms (range 10-1000 ms).</p> 

Table20 System settings for the OK signal

**INFO**  
 The signals are added together if multiple functions are active.

### System settings for the NO signal

This menu defines the response of the NO output signal at the X2 NO and X20 NO interfaces.

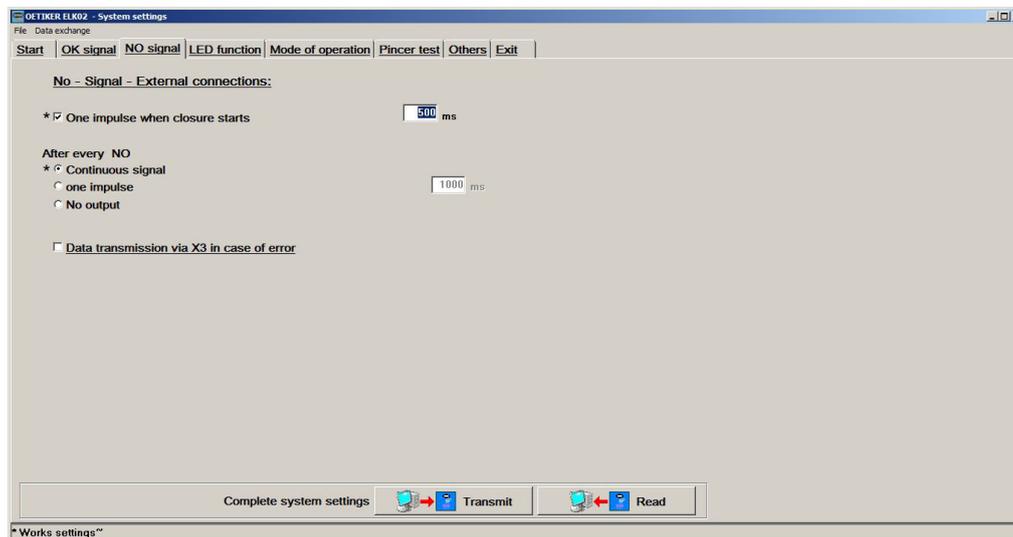
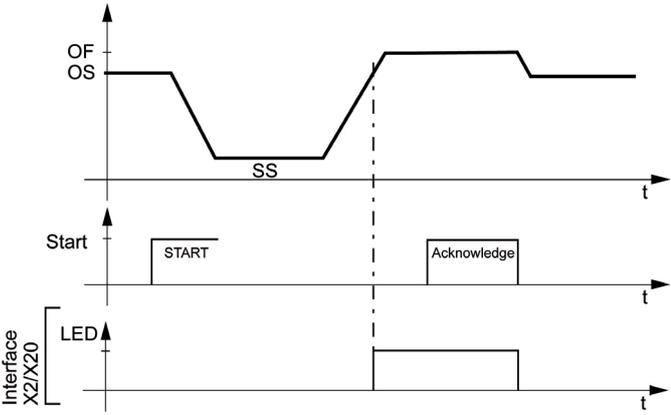


Fig. 40 System settings for the NO signal

Input box/checkbox	Description
One impulse when closure starts	One pulse is supplied when closure starts. Factory setting 500 ms (range 10 to 1000 ms)
After each NO <ul style="list-style-type: none"> <li>• continuous signal</li> </ul>	Continuous signal until the next start. If the OS defined at the start time is reached within its tolerance OS-T on opening the pincer jaws (from SS/SK/VW to fully open), a continuous signal is output until the next start (factory setting).    <b>NOTICE:</b> The opening gap (OS) is approached again only after the acknowledgement time has elapsed.

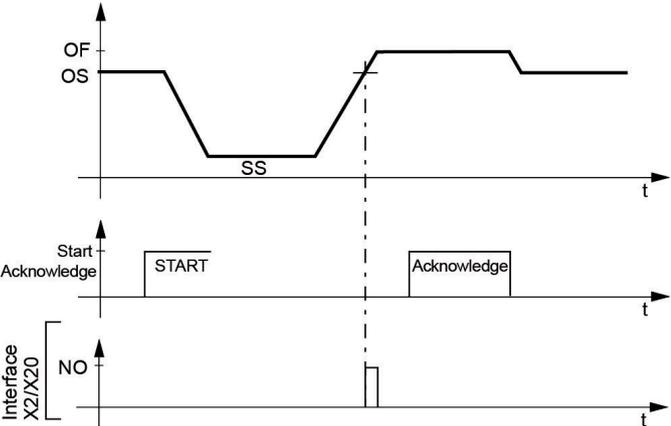
Input box/checkbox	Description
<ul style="list-style-type: none"> <li>• one pulse</li> </ul>	<p>If the OS defined at the start time is reached within its tolerance OS-T on opening the pincer jaws (from SS/SK/VW to fully open), one pulse is output. Default 1000 ms (range 10-1000 ms).</p>  <p><b>NOTICE:</b> The opening gap (OS) is approached again only after the acknowledgement time has elapsed.</p>
<ul style="list-style-type: none"> <li>• No output</li> </ul>	
<p>Data output at X3: on error</p>	<p>Data output at X3 on error (see p. 13-124)</p>

Table21 System settings for the NO signal

**INFO**

The signals are added together if multiple functions are active.

### System settings for the LED signal

This menu defines the response of the LED function (Fig. 3/12, p. 3-15) in the pincer.

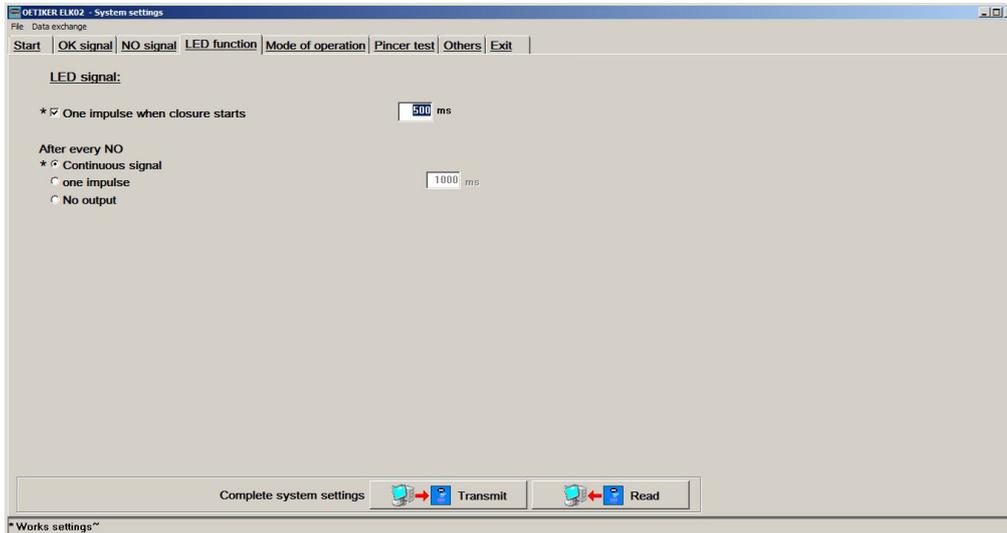
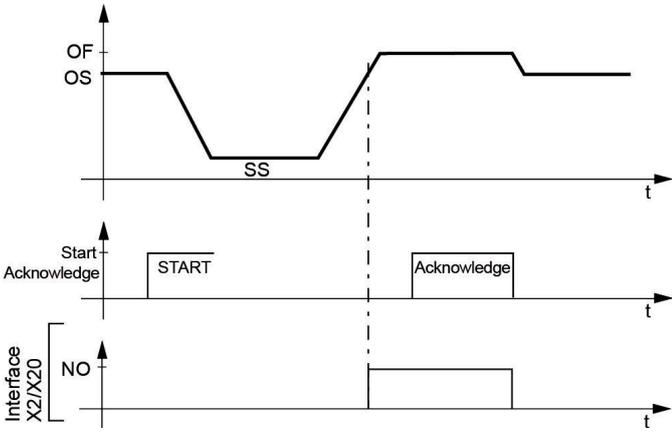


Fig. 41 System settings for the LED function

Input box/checkbox	Description
One impulse when closure starts	The LED lights up with one pulse when closure starts. Factory setting 500 ms (range 10 to 2500 ms).
After each NO	Continuous signal until the next start.
<ul style="list-style-type: none"> <li>continuous signal</li> </ul>	<p>If the OS defined at the start time is reached within its tolerance OS-T on opening the pincer jaws (from SS/SK/VW to fully open), the LED lights up until the next start (factory setting).</p>
	

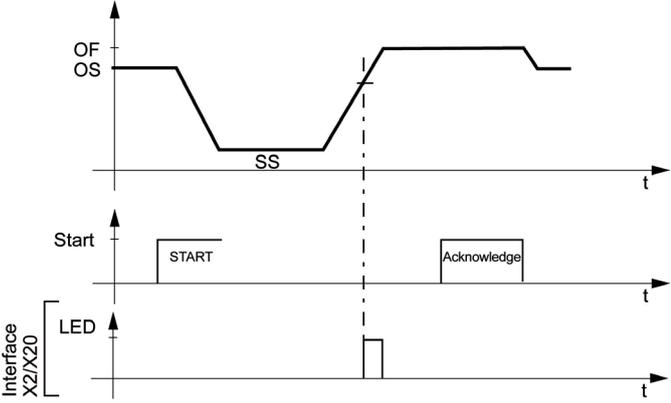
Input box/checkbox	Description
<ul style="list-style-type: none"> <li>• one pulse</li> </ul>	<p>If the OS defined at the start time is reached within its tolerance OS-T on opening the pincer jaws (from SS/SK/VW to fully open), the LED lights up for the length of one pulse.</p> <p>Default 1000 ms (range 10-1000 ms).</p>  <p>The diagram shows three time axes. The top axis is labeled 'OF OS' and shows a signal that starts at a high level, drops to a lower level labeled 'SS', and then rises back to the high level. A vertical dashed line marks the start of the rising edge. The middle axis is labeled 'Start' and shows a 'START' pulse followed by an 'Acknowledge' pulse. The bottom axis is labeled 'LED' and shows a single pulse that occurs during the rising edge of the 'OF OS' signal.</p> <p><b>NOTICE:</b> The opening gap (OS) is approached again only after the acknowledgement time has elapsed.</p>
<ul style="list-style-type: none"> <li>• No output</li> </ul>	

Table22 System settings for the LED signal

**INFO**

The signals are added together if multiple functions are active.

### System settings for the LED signal

This menu defines the response of the LED function (Fig. 3/12, p. 3-15) in the pincer.

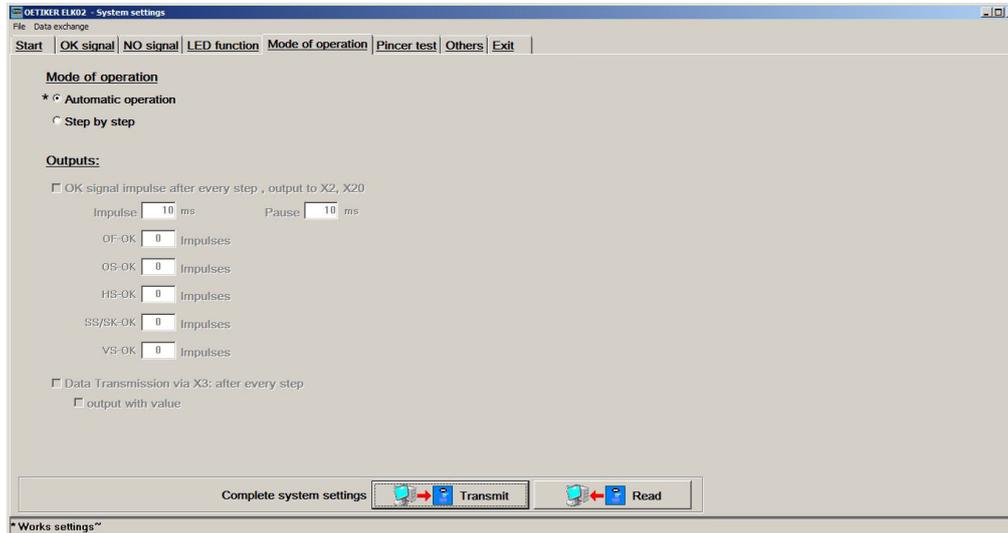


Fig. 42 System settings for operating modes

Input box/checkbox	Description
<b>Operating mode</b> <ul style="list-style-type: none"> <li>Automatic operation</li> <li>Step-by-step</li> </ul>	Closure mode in which the pincer performs a complete closing sequence when a start is initiated, e.g. OS-SS-OF-OS. Closure mode in which closure has to be initiated separately for each step.
<b>Outputs</b> <ul style="list-style-type: none"> <li>OK signal pulse on completed step, output at X2, X20</li> <li>Data output at X3: On completed step</li> </ul> With value output	NOTICE: Only in step-by-step mode When a closure step is completed within tolerance, this is recorded as OK (e.g. OS-OK) and pulses can be output. Pulse/pause (range 10 ... 1000 ms) Pulses: 1 to 9, 0 corresponds to no output As above, but with value output F [N], S [mm]

Table 23 System settings for operating modes

System settings for pincer test

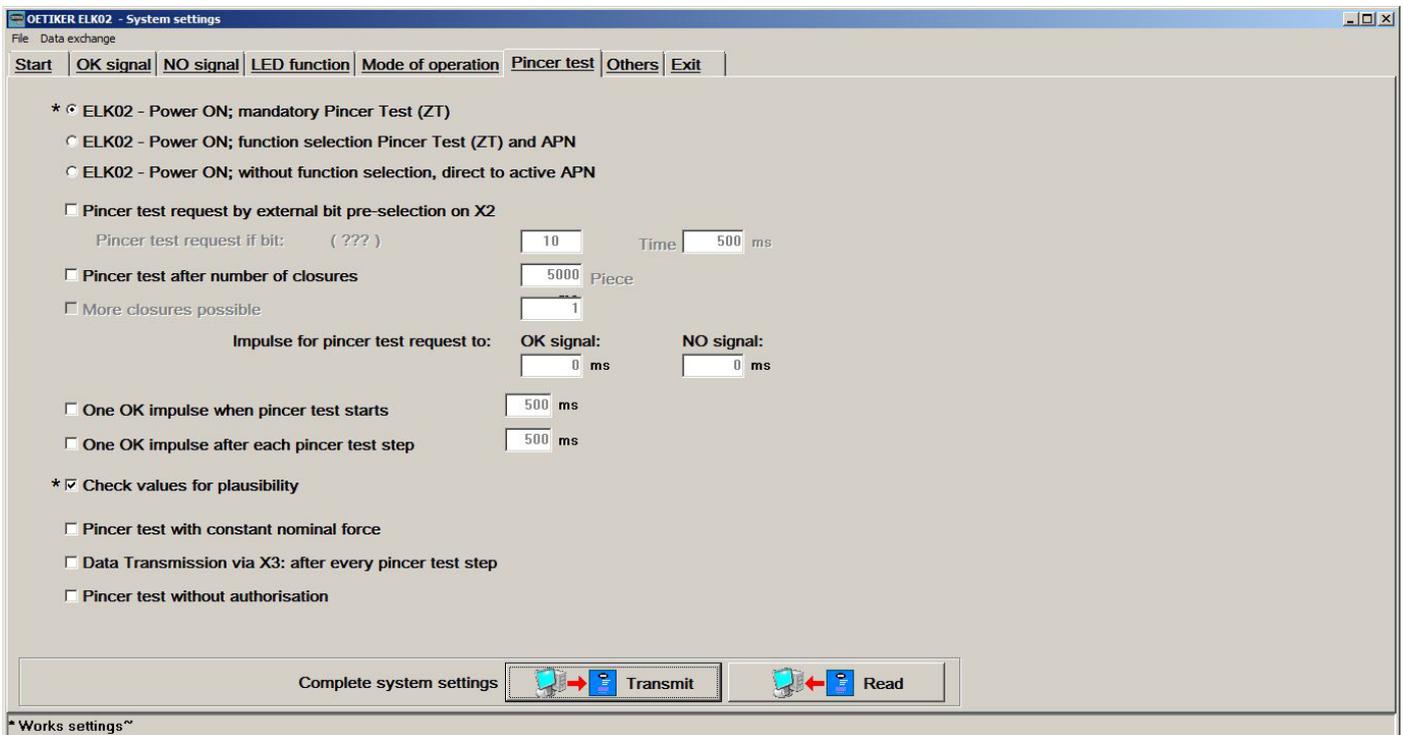


Fig. 43 System settings for pincer test

Input box/checkbox	Description
ELK02 - Power ON; with mandatory pincer test “ZT”	Pincer test-mode, which asks for a mandatory pincer test when switching on the ELK02 (default setting) (“ZT” = pincer test, see Table 27, page 9-74)
ELK02 - Power ON; with function selection pincer test “ZT” and “APN”*	Pincer test-mode, which allows to choose from two options when switching on the ELK02: <ul style="list-style-type: none"> <li>• pincer test</li> <li>• APN (“ZT” = pincer test, see Table 27, page 9-74)</li> </ul>
ELK02 - Power ON; without function selection, direct to active “APN” *	Pincer test-mode, which directly opens the active APN when switching on the ELK02
Pincer test prompt by external bit pre-selection at X2	The pincer test is activated via the X2 interface. Default: bit 10 (range bit 10-15) Activation time: 500 ms (range 20 to 2000 ms).
Pincer test after number of closures (counting from last pincer test)	Range: 1 to 50,000; factory setting: 5000 If error message F18 QUANTITY is displayed, <ul style="list-style-type: none"> <li>• The pre-set number has been reached</li> <li>• A pincer test is required</li> </ul>

Input box/checkbox	Description
More closures possible	Range: 1 to 5000 After this number of closures has been reached, further closures can be performed. NOTICE: A pincer test is mandatory on reaching this number.
Pulse on pincer test prompt at: • OK signal • NO signal	A pulse of an adjustable length can be output at the X2 or X20 interface, at the OK or NO output 1 to 5000 ms 1 to 5000 ms
One OK impulse when pincer tests starts	One OK pulse is output when the pincer test is requested. Range 10 ... 1000 ms
One OK pulse after each pincer test step	After the friction test, force test, large gap test, small gap test
Check values for plausibility	The following checks are performed during the pincer test: <ul style="list-style-type: none"> <li>• Stiffness of pincer</li> <li>• Measuring device check in force test</li> <li>• Correct gauge sequence</li> </ul> If a fault occurs, the error message F16 CANCEL PROCESS appears on the ELK 02 display
Pincer test with constant nominal force	The force test is performed at a uniform, constant nominal force, the internal force setting by the ELK is corrected (see "Pincer tests", p. 8-48).
Data transmission via X3: after every pincer test step	See "Data output at X3 after each pincer test step", p. 13-120
Pincer test without authorization	Disables the authorization prompt at the start of the pincer test
Pincer test can always be acknowledged (skipped)	Special function – Service password required for access

Table24 System settings for pincer test

\*see Safety Instructions (p. 8-67).

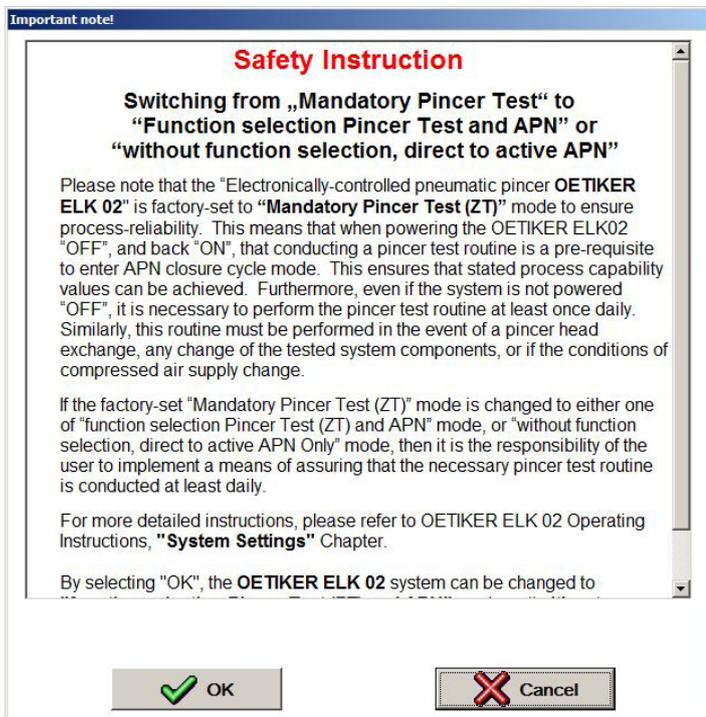


Fig. 44 Safety instruction system settings for pincer test

Other system settings

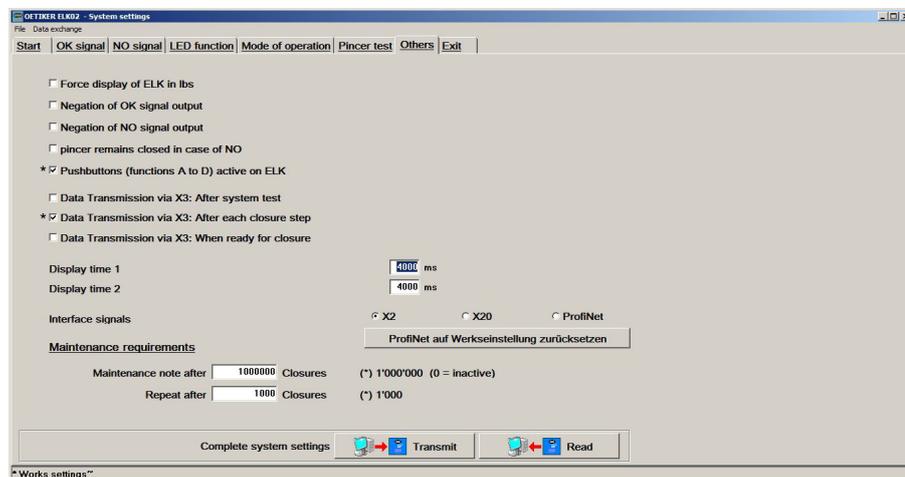


Fig. 45 Other system settings

Input box/checkbox	Description
Force display of ELK in lbs	Switches over the force display from N to lbs (1 N = 0.2247 lbs) <b>NOTICE:</b> No decimal places are shown in the ELK 02 display
Negation of OK signal output	Negates the OK output logic <ul style="list-style-type: none"> <li>• L (Low) becomes H (High)</li> <li>• H (High) becomes L (Low)</li> </ul>
Negation of NO signal output	Negates the NO output logic <ul style="list-style-type: none"> <li>• L (Low) becomes H (High)</li> <li>• H (High) becomes L (Low)</li> </ul>
pincer remains closed in case of NO	At the end of the closure the system checks whether the closure data is within tolerance. For NO closures the pincer remains closed. Outputs: <ul style="list-style-type: none"> <li>• X2 NO becomes H (High)</li> <li>• X20 Busy becomes H (High)</li> <li>• X20 NO becomes H (High)</li> </ul> Acknowledge 4 s. <ul style="list-style-type: none"> <li>▶ START button</li> </ul> -or- <ul style="list-style-type: none"> <li>▶ X2 Start/Acknowledge</li> </ul> -or- <ul style="list-style-type: none"> <li>▶ X20 Function and Start</li> </ul> The pincer jaws open again.

Input box/checkbox	Description
Pushbuttons (functions A to D) active on ELK	for enabling / disabling the function keys on the ELK
Data Transmission via X3: After system test	Data output at X3 after system test (see “Data output at X3 after system test”, p. 13-120)
Data Transmission via X3: After each closure step	Data output at X3 after each closure step (see “Data output at X3 after each closure step”, p. 13-123)
Data Transmission via X3: When ready for closure	Data output at X3 when ready for closure (see See “Data output at X3 when ready for closure”, p. 13-122)
Display time 1 Display time 2	<p>If more than one display is needed, e.g.</p> <ul style="list-style-type: none"> <li>• with verification or</li> <li>• with sequential pressing</li> </ul> <p>the display is switched over.            The display times can be adjusted.</p> <p><b>Closures with verification</b></p> <p>Display time 1:            Display time for the verification data VW, VK or next APN            (range 500 to 5000 ms).</p> <p>Display time 2:            Display time of the closure data SS, SK            (range 500 to 5000 ms).</p> <p><b>For closures without verification</b></p> <p>Display time 1:            Display time for the closure and verification data.</p> <p><b>NOTICE:</b> For sequential closure the display switches from 1 or 2 to 3.            Display 3 shows the text of the next APN.</p>
Signal interface <ul style="list-style-type: none"> <li>• X2</li> <li>• X20</li> <li>• ProfiNet</li> </ul>	Switches to one of the following interfaces: <ul style="list-style-type: none"> <li>• X2 interface active</li> <li>• X20 interface active</li> <li>• ProfiNet</li> </ul>

(continued overleaf)

Input box/checkbox	Description
Maintenance requirements	<p>After 1'000'000 closures (default setting) the message "F24 MAINTENANCE" appears on the ELK 02 display with the information: "send to Oetiker for maintenance". This message is acknowledgeable to do further closures.</p> <p><b>Information</b></p> <p>Under personal responsibility this number of closures can be changed or the feature disabled by setting it 0 (zero).</p> <p><b>Repetition</b></p> <p>After every 1'000 closures the message "F24 MAINTENANCE" reappears on the ELK 02 display and is acknowledgeable (see safety instruction Fig. 46).</p>

Table 25 Other system settings

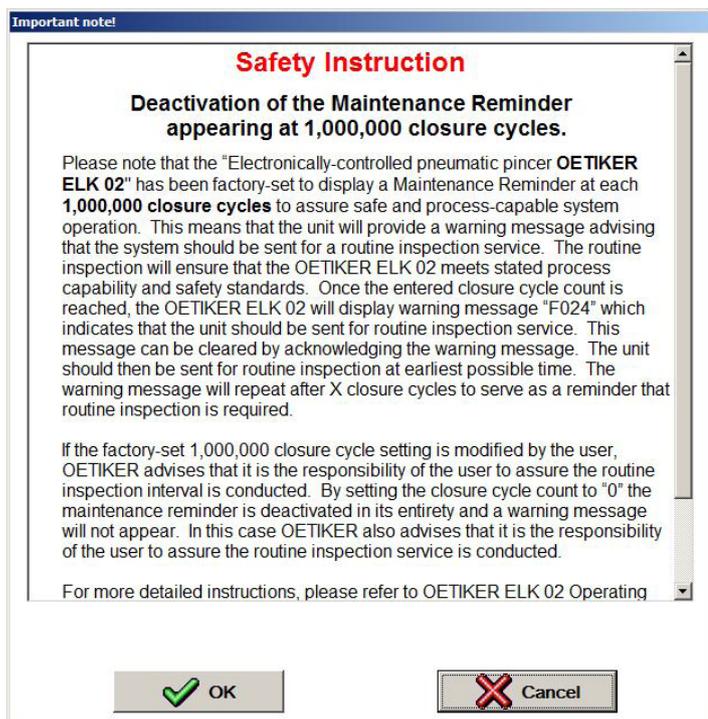


Fig. 46 Safety instruction system settings, other

### Quitting system settings

#### INFO

Special function – Service password required for access.

If changes have been made to the system settings, you are given the option of saving the settings. If no changes have been made to the system settings, the program returns directly to the main window.

If changes to the system settings are to be saved, a “Save” dialog window opens (see Fig. 47).

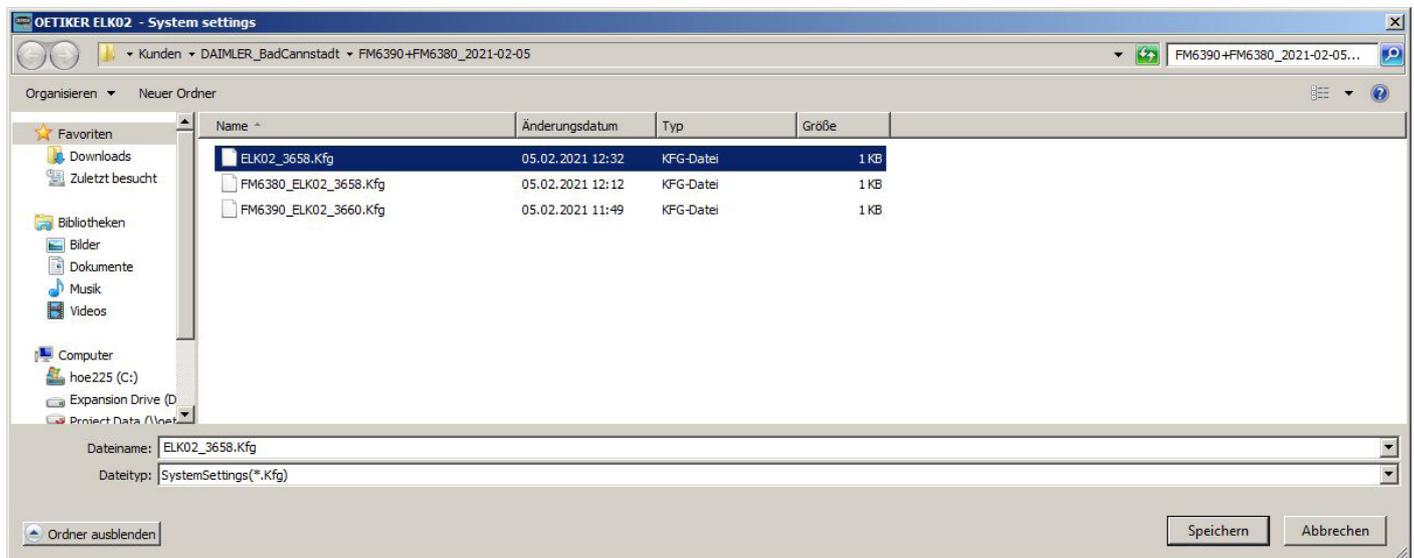


Fig. 47 Save system settings dialog window

### 8.5.5 Languages



Fig. 48 *Languages*

1. Select the language required.
2. Click OK to confirm.

The PC software switches to the selected language

### 8.5.6 Help

- Contact addresses for OETIKER branches (see also the back cover of this manual).
- Notes on the program

Input box/checkbox	Description
Status of process data Date	Shows the date on which the pincer type file (process data file) was created or modified

## 9 Menu navigation in the ELK 02

### 9.1 Description of the display

The meanings of the ELK 02 display and the buttons below it are as follows:

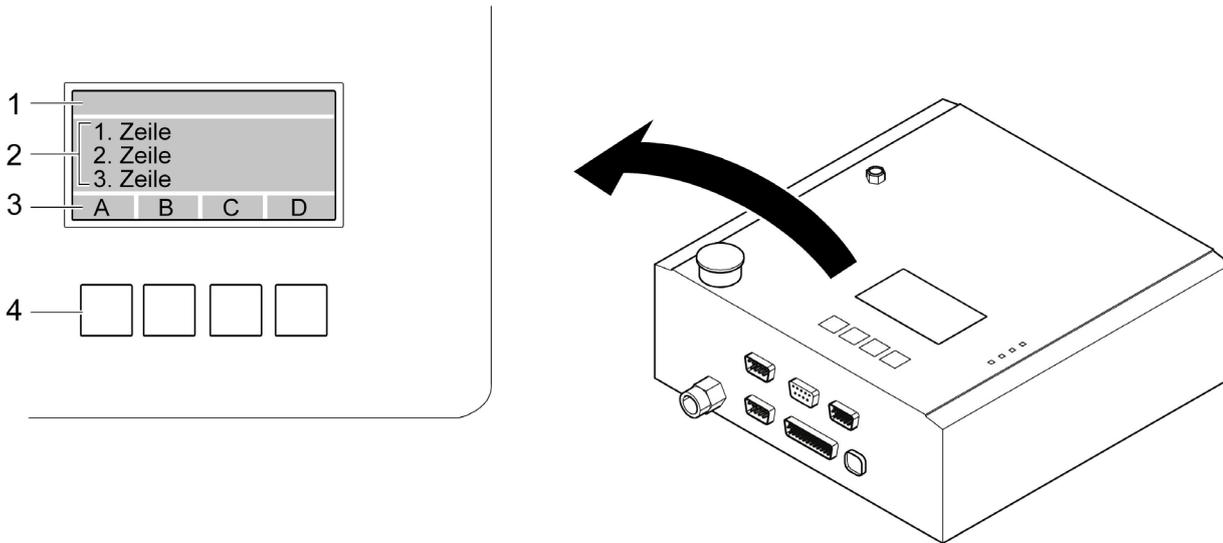


Fig. 49 Display

Item in Fig. 49	Description
1	Header; contains the heading, information, error messages, etc.
2	1st ... 3rd line: text; depending on the content only one line may be displayed, but in a larger font
3*	Button functions A to D; various functions are depicted in symbol form here and initiated by the buttons below (4)
4*	Pushbuttons corresponding to button functions A to D in the display

Table 26 Display

\*) The key functions and the print buttons can optionally be disabled in the system settings. Operation of the ELK 02 is then the same as the ELK 01 (ELK 01 mode)

### 9.1.1 Symbols and abbreviations in the display

Symbol	Description
?	Help with problems
i	Information, e.g. <ul style="list-style-type: none"> <li>Supply pressure in bar</li> <li>Connected pincer type</li> </ul>
	Parameter input, e.g. <ul style="list-style-type: none"> <li>Brightness</li> <li>Contrast</li> <li>Languages</li> </ul>
	Function acknowledgement
<b>APN</b>	Active program number; direct selection of the APN
	Takes you to the "Correct nominal force" submenu
	Pincer test request: "ZT"; takes you directly to the pincer test, bypassing the Function menu
▽	Scrolls down through display texts
△	Scrolls up through display texts
◀	Takes you one step back
✓	OK; confirms an input
	Cancel; aborts an input

Table27 Symbols and abbreviations in the display

### 9.2 Menu structure

Menu navigation in the ELK 02 consists primarily of the test level and closure level (see also section 4.3, page 4-20).



### 9.3.2 Button functions A to D disabled (ELK 01-Mode)

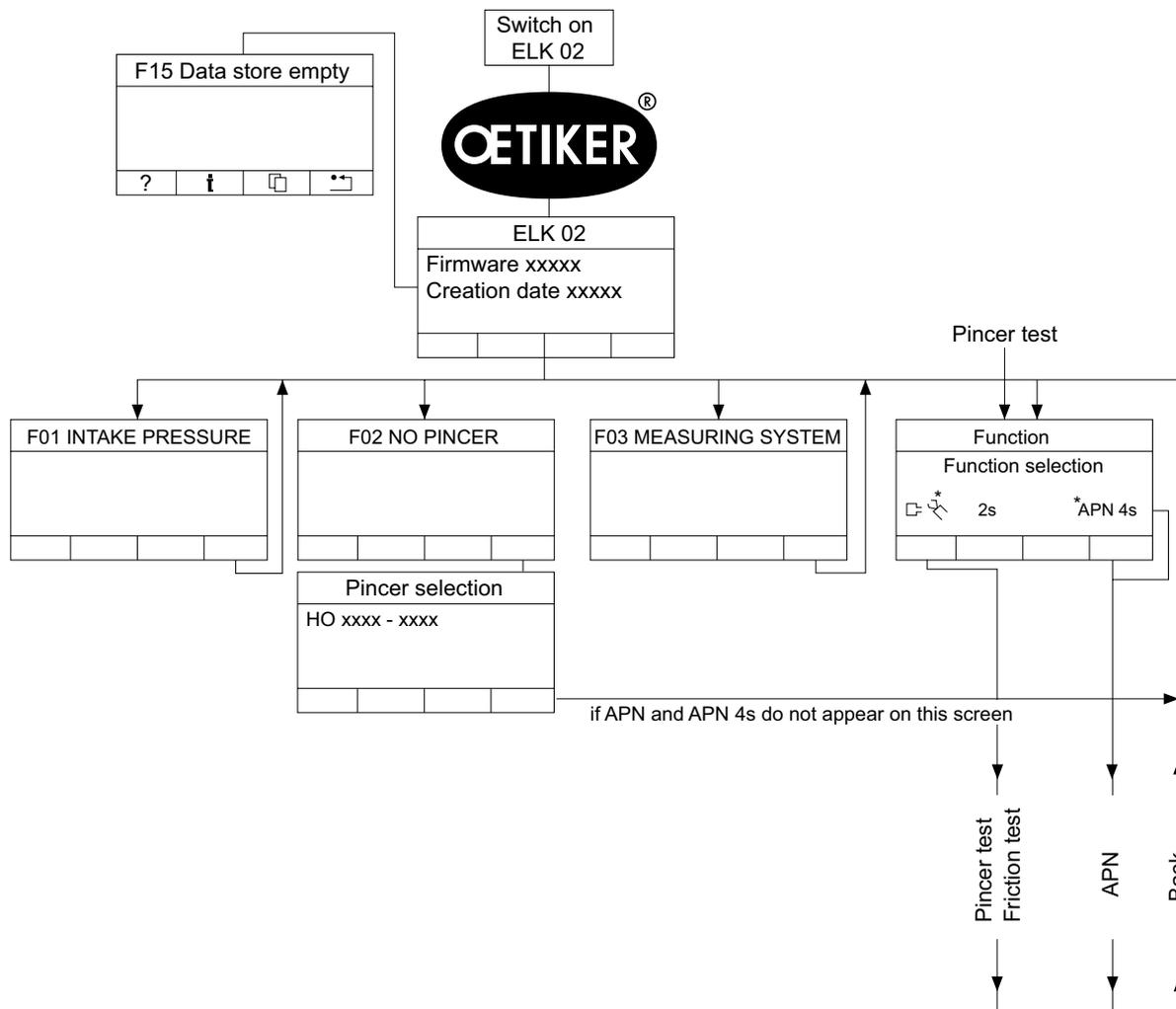


Fig. 51 Sequence of operations at the test level (ELK 01 mode)

\* Function selection is depending on the selected system settings.

### 9.3.3 Key functions enabled and disabled (ELK 01 mode)

#### START keys, interfaces X20, X2

Displays									
	Function		Current APN		Friction / force / gap test		Fxx Error	No pincer	Pincer selection
	Pincer test	APN	Closure	Back to the function	Back to the function	Start friction / force / gap test			
<b>START button</b>	2 s	4 s	> 100 ms		4 s	Start >100 ms apply force 2 s	2 s	2 s	a) Scroll mode > 100ms b) Function 2 s
<b>X20 inputs</b> Function	2 s	4 s			4 s	Apply force 2 s	2 s	2 s	a) Scroll mode > 100 ms b) Function 2 s
Start and enable			> 100 ms			> 100 ms			
Pincer test				> 100 ms					
<b>X2 input</b> Start	2 s	4 s	> 100 ms		4 s	Start >100 ms apply force 2 s	2 s	2 s	a) Scroll mode > 100 ms b) Function 2 s

Table28 START key, interfaces X20, X2 in ELK 01 mode

When the ELK 02 is switched on, the OETIKER logo appears, followed by the firmware version and creation date.

**INFO**

Prior to use, the ELK 02 should be switched on for approximately 1 hour for warm-up.

The ELK 02 then performs the following checks:

- System tests
  - compressed air supply pE
  - connected pincer type
  - gap measuring system in the pincer

If all ELK checks are OK, one of the following power on modes will be active depending on the selected system settings:

a) Default setting: Power On; with mandatory pincer test

b) Optional setting: Power On; operator may select start up mode:

- pincer test 

or

- closure level (APNs)

Prerequisite: The pincer has not been changed.

c) Optional setting: Power ON; without pincer test. Direct start in closure level (APNs)

**NOTICE**

In order to ensure uniform and reproducible process quality it is mandatory to perform an assembly tool pincer test at least once per shift, minimum daily. Furthermore, a pincer test is mandatory in the event any pincer components are replaced.

To maintain consistent pincer force, sufficient compressed air pressure and volume must be provided.

After pincer test, Oetiker recommends verifying the closing force as a secondary validation.

It is essential to ensure clamp closures are not conducted in pincer test mode.

### 9.3.4 Pincer test

There are 3 modes available to enter the pincer test:

- \*  **ELK02 - Power ON; mandatory Pincer Test (ZT)**
- ELK02 - Power ON; function selection Pincer Test (ZT) and APN**
- ELK02 - Power ON; without function selection, direct to active APN**

Fig. 52 Pincer test, modes

See “System settings for pincer test”, p. 8-65.

- The pincer test is used to calibrate the pincer for the following:
- frictional forces in the “friction test”
- the closing forces in the “force test”
- the closing gaps in the “gap test”

A pincer test must be performed each time the ELK 02 is switched on.

The pincer test can be initiated from the following programs:

- from the “Pincer test” PC program
- from the calibrator CAL 01 (see the instruction manual for the CAL 01)

The pincer test can be requested via the following interfaces:

- via the “External bit pre-selection” interface X2 (e.g. bit 10)
- via the “Pincer test” interface X20

Furthermore the pincer test can be requested:

- manually from the APN-mode menu using the step back button on the ELK control unit
- by the internal closure counter, if “Pincer test after number of closures” is activated in the “Pincer test” system settings

A pincer test is mandatory after:

- exchange of a pincer

#### **Attention**

Exchange of pincer is only recognized if the ELK is switched on during the change.

- aborting an in-progress pincer test
- error messages F04/F20
- switching on the ELK 02 control unit, if the default setting in the “Pincer test” system settings is selected

The following checks are made during the pincer test:

- intake pressure F01
- loss of pressure F23
- incorrect, missing or out-of-sequence measuring devices F16

**Friction test**

The friction test checks the sliding and friction properties of the pincer and the calibration of the open and closed pincer jaws.

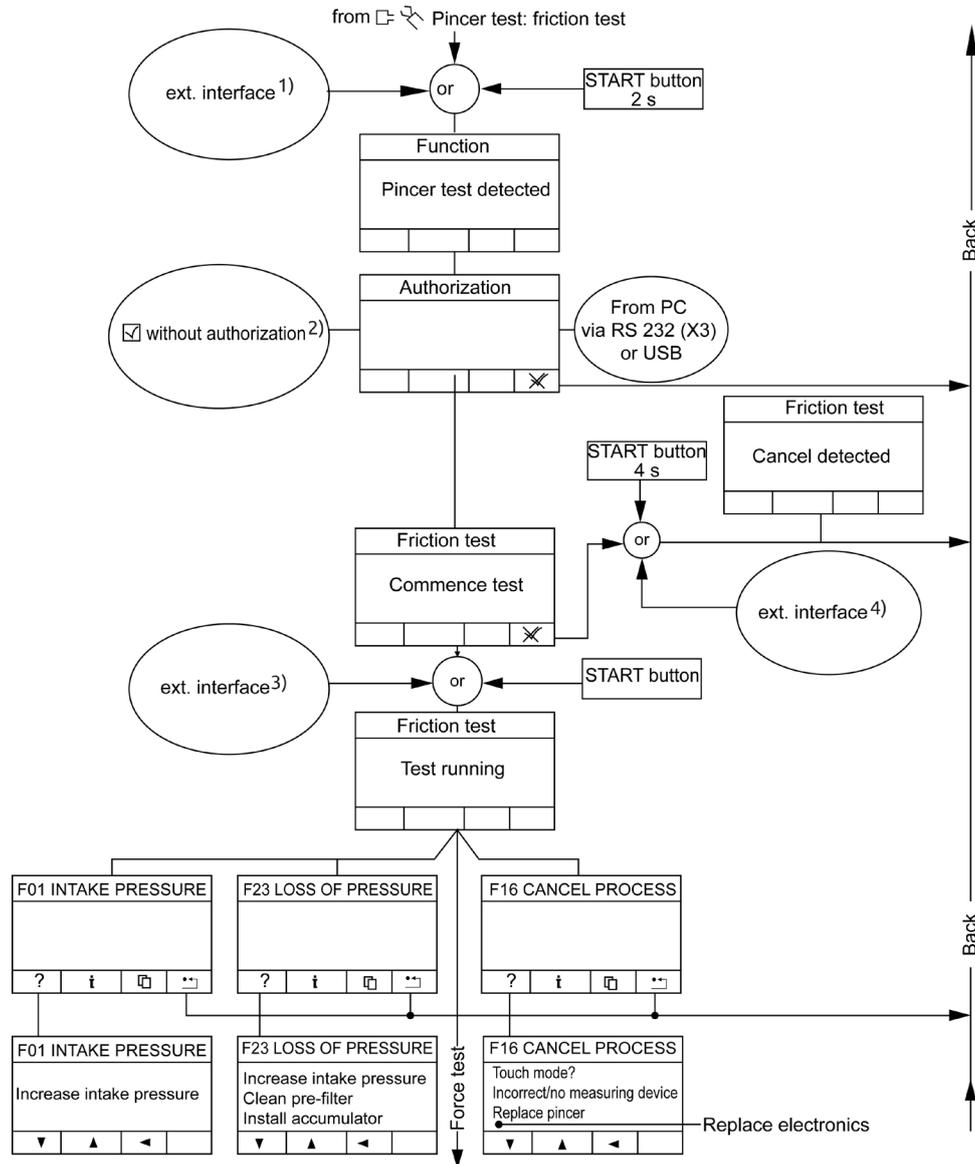


Fig. 53 Sequence of operations in the friction test

External interface X2/X20 can be selected via the “System settings” – “Other” menu

- |    |   |  |    |   |                               |
|----|---|--|----|---|-------------------------------|
| 1) | - | X2: Start / Acknowledge 2 s            | 3) | - | X2: Start/Acknowledge (pulse) |
|    | - | X20: Function 2 s                      |    | - | X20: Enable and Start (pulse) |
| 2) |   | can be disabled in the system settings | 4) | - | X2: Start / Acknowledge 4 s   |
|    |   |  |    | - | X20: Enable and Start 4 s     |

**Force test**

The force test checks the calibration of the closing force at the pincer jaws between the pre-set value in the ELK 02 and the measuring devices.

If 20 closures in force test are exceeded the message “F25 MAX. 20 CLOSURES” appears on the ELK 02 display.

When the message is acknowledged, a mandatory pincer test is required again.

**INFO**

This monitoring prevents the operation of the ELK 02 in pincer test mode.

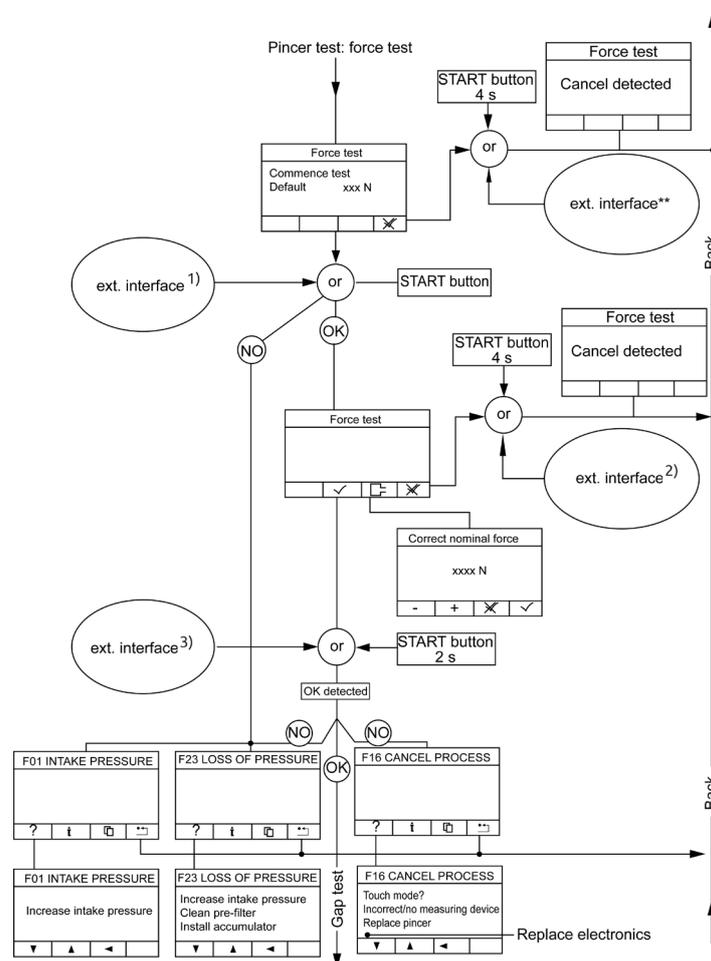


Fig.54 Sequence of operations in the force test

External interface X2/X20 can be selected via the “System settings” – “Other” menu

- |    |   |                               |    |   |                             |
|----|---|-------------------------------|----|---|-----------------------------|
| 1) | - | X2: Start/Acknowledge (pulse) | 3) | - | X2: Start / Acknowledge 2 s |
|    | - | X20: Enable and Start (pulse) |    | - | X20: Function 2 s           |
| 2) | - | X2: Start / Acknowledge 4 s   |    |   |                             |
|    | - | X20: Function 4 s             |    |   |                             |

**Gap test**

The gap test checks the calibration of the pincer geometry. Four gap tests have to be performed using the test gauge corresponding to the predefined display sequence.

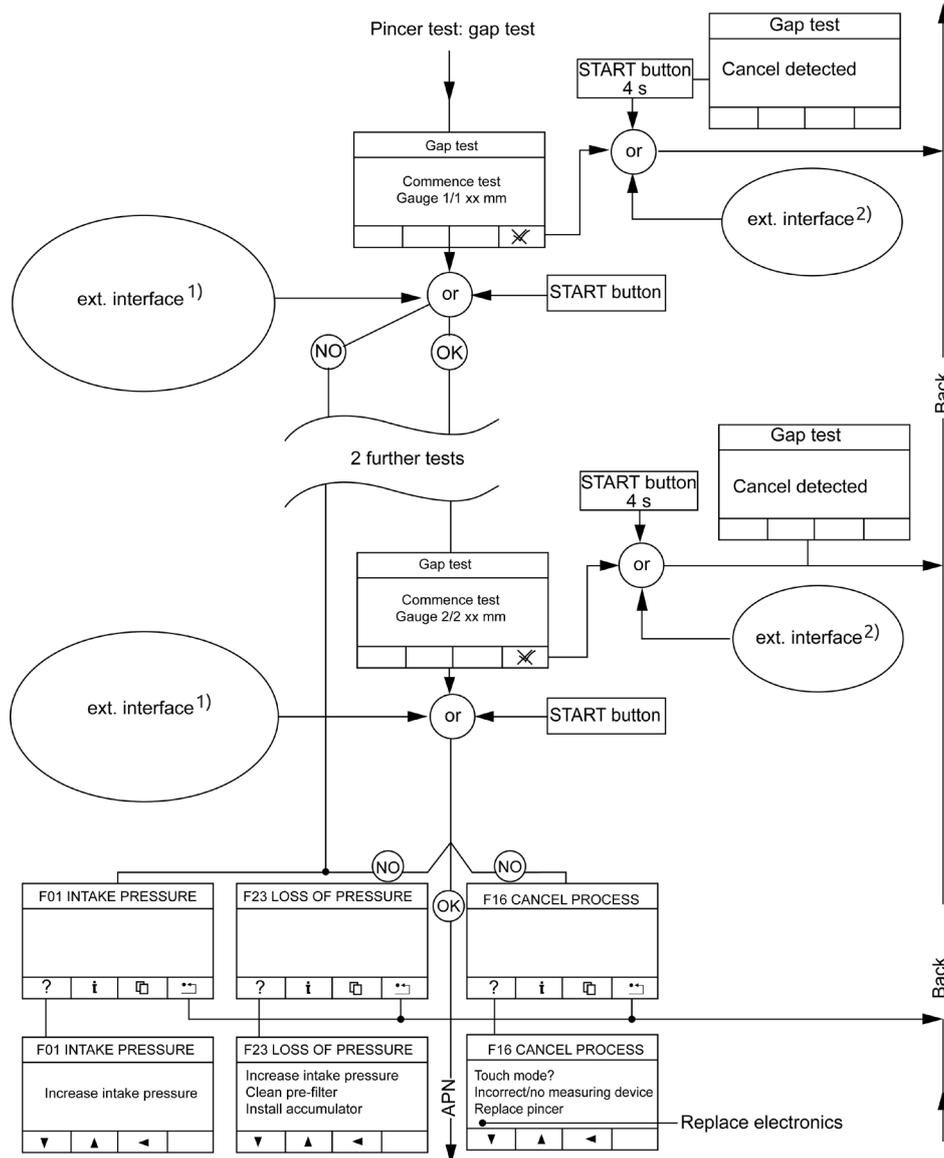


Fig. 55 Sequence of operations in the gap test

External interface X2/X20 can be selected via the “System settings” – “Other” menu

- |    |   |                               |    |   |                             |
|----|---|-------------------------------|----|---|-----------------------------|
| 1) | - | X2: Start/Acknowledge (pulse) | 2) | - | X2: Start / Acknowledge 4 s |
|    | - | X20: Enable and Start (pulse) |    | - | X20: Function 4 s           |

### 9.4 The closure level

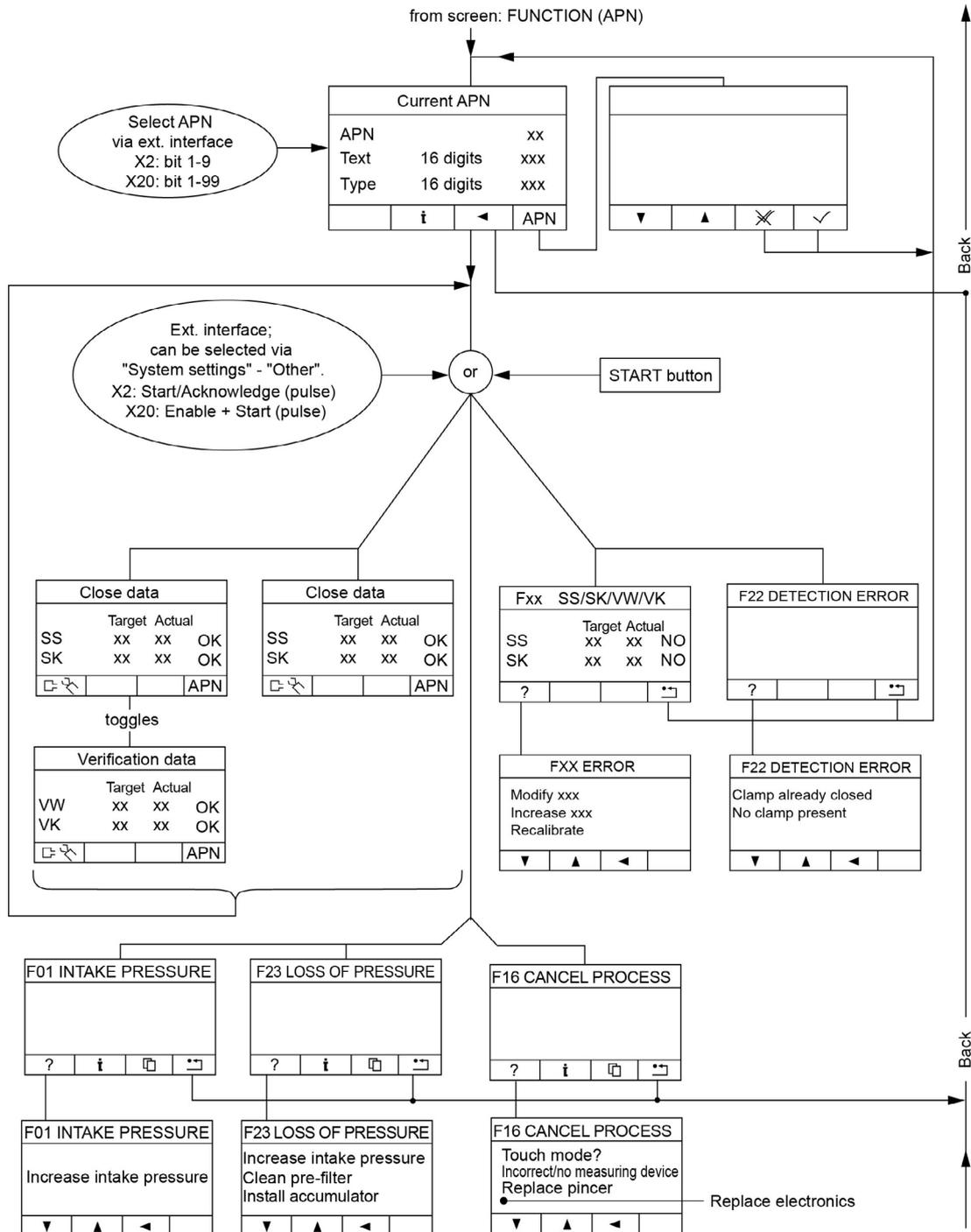


Fig. 56 Sequence of operations at the closure level

### 9.4.1 The closure

The following parameters can be selected in the individual closure data view:

- **Pincer type;** when selecting the pincer type, the default settings are defined as
  - close function
  - with/without verification
  - closure options for Low Profile Clamps such as PG192/168T or PG292 via the pincer type code such as HO 5000-PG 192.
- **Closure function;**
  - Force priority
  - Gap priority
  - Dual closure

**Other attributes:**

- with hold
- with detect
- with contact detection
- verification

The **following types, methods and functions** can be defined in the “System Settings” PC program and are sent to the ELK 02 by data exchange:

- singular closure
- chaotic closure
- sequential closure
- Step by step

<b>INFO</b>
-------------

Once the transfer has been performed successfully, the ELK 02 operates autonomously without a PC connection.
--

The closure sequence with the closing forces and closing gaps and their chronological closing order is defined in the Individual closure data view screen (see “Closure data-individual view”, p. 9-86).

Each individual closure data view has an active program number (APN).

The APN used for the closure can be selected via the ELK 02 display (select APN) or via the X2 or X20 interface.

The closure can be initiated by means of the START button (see Fig. 3/12, p. 3-15) on the pincer or externally via the X2/X20 interface.

## NOTICE

During the closure the supply pressure is monitored with the necessary closure pressure. The closure process is aborted if the pressure drops below this level.

### Closure data-individual view

The menu appears when a closure data table is opened.

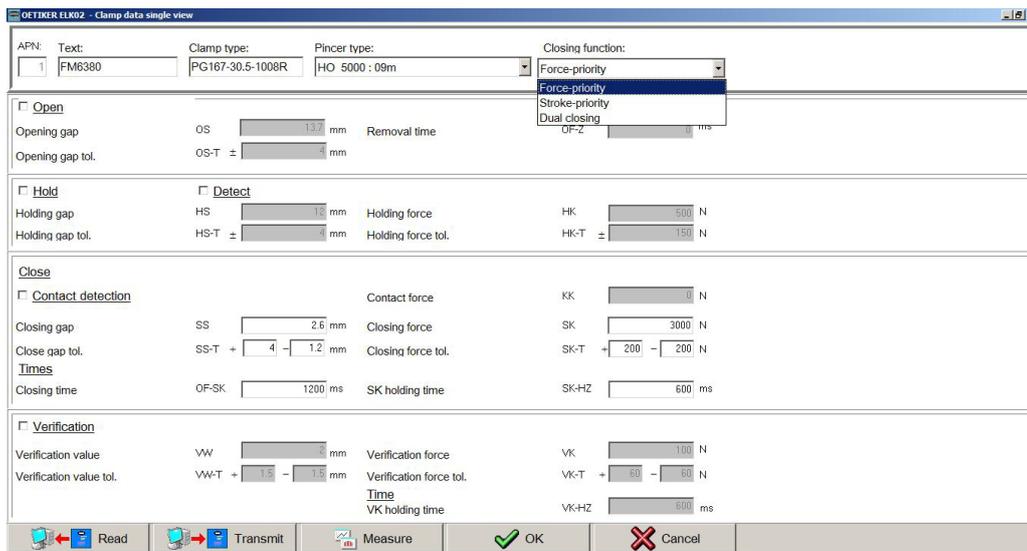


Fig.57 Closure data-individual view

Input box/checkbox button	Abbreviation	Description
APN	-	Active program number (max. 99)
Text	-	For a note about the APN
Clamp type	-	For inputting the clamp type
Pincer type	-	Selects the pincer type to be used for this closure. The most suitable closure function is suggested. You can however change it if you wish. The characteristic pincer values, e.g. closing gaps and forces, verification data and times, are also set to default values.  The type and number of pincer types is identical to those shown in the pincer type overview table.
close function	-	Selects the closure functions and priorities.  Characteristic pincer data, e.g. closing gaps and forces, are set to default values.

Input box/checkbox button	Abbreviation	Description
<input type="checkbox"/> Open	OF	The pincer jaws are fully open. At the end of closure the pincer jaws are checked to ensure that they are in the fully open state (OF). The value for each pincer type is stored in the process data.  The maximum time to reach OF is stored for each pincer type. "F20 OF ERROR" is displayed if an error occurs.
<input checked="" type="checkbox"/> Open	OS	The pincer jaws close to the opening gap OS. At the end of closure the pincer jaws close via OF to OS. The system checks for the following: <ul style="list-style-type: none"> <li>the pincer jaws open to OF, otherwise error "F20 OF ERROR"</li> <li>the pincer jaws then move to OS ±OS-T, otherwise error "F04 OS ERROR"</li> </ul> The maximum time to reach OS is stored for each pincer type. <b>NOTICE</b> OS values that are greater than the fully open pincer jaws are ignored and do not lead to an error message.
• Open	OF	Pincer jaws are fully open
• Opening gap	OS	Distance between the open pincer jaws, clear width [mm]
• Opening gap tolerance	OS-T	The opening gap tolerance to be monitored [± mm]
• Removal time	OF-Z	The removal time between "Pincer jaws fully open again OF" and "Closing to opening gap OS" can be defined
<input type="checkbox"/> Hold	(disabled)	No hold function
<input checked="" type="checkbox"/> Hold	(enabled)	With hold function
• Holding gap	HS	Dimension required to hold a clamp without deforming it [mm]
• Holding gap tolerance	HS-T	The holding gap tolerance to be monitored [± mm]
• Holding force	HK	Force required to hold a clamp without deforming it [mm]
• Holding force tolerance	HK-T	The holding force tolerance to be monitored [± mm]
<input checked="" type="checkbox"/> Detect	(enabled)	Detection identifies a second closure on the same clamp or Low Profile Clamp and reports it as NO.
<b>NOTICE</b>		
Hold and detect cannot both be set at the same time.		
• Detection gap	DS	Gap expected by the detection force (DK) to determine whether a clamp or Low Profile Clamp is present
• Detection force	DK	Force that is greater than or equal to the force that must be established in the detection gap (DS)

Input box/checkbox button	Abbreviation	Description
Closure	-	The closing values relating to the closing gap SS, closing force SK, tolerances and times are defined in the Closure field
Changeover force	UK	In the case of dual closure, the force at which the changeover from force priority to gap priority is performed is input into this field
<input type="checkbox"/> Contact detection	(disabled)	No contact detection
<input checked="" type="checkbox"/> Contact detection	(enabled)	The contact gap (KS) (distance between the pincer jaws) is output when the predefined contact force (KK) is reached.
• Contact force	KK	The contact gap (KS) is output when the contact force (KK) is reached. Output: <ul style="list-style-type: none"> <li>• Measurement screen</li> <li>• Data output at X3</li> </ul>
• Closing gap	SS	Gap in the closed clamp
• Closing gap tolerance	SS-T	The closing gap tolerance to be monitored
• Closing force	SK	Force on the closed clamp

**NOTICE**

It is critical to use the clamping force established for the clamp together with the specific application.

• Closing force tolerance	SK-T	The closing force tolerance to be monitored
Times	-	for force priority:
• Closing time	OF-SK	Closing time between open (OF) and reaching the closing force (SK)
	OS-SK	Closing time between the opening gap (OS) and reaching the closing force (SK)
	HS-SK	Closing time between the holding gap (HS) and reaching the closing force (SK)
	OF-SS	for gap priority: Closing time between open (OF) and reaching the closing gap (SS)
	OS-SS	Closing time between the opening gap (OS) and reaching the closing gap (SS)
	HS-SS	Closing time between the holding gap (HS) and reaching the closing gap (SS)
• SS holding time	SS-HZ	Holding time between reaching SS and starting to open the pincer (for gap priority)
• SK holding time	SK-HZ	Holding time between reaching SK and starting to open the pincer (for force priority)

Input box/checkbox button	Abbreviation	Description
<input type="checkbox"/> Verification	(disabled)	No verification
<input checked="" type="checkbox"/> Verification	(enabled)	
• Verification value	VW	Gap in the closed clamp in the verification phase
• Verification value tolerance	VW-T	The verification value (VW) tolerance to be monitored
• Verification force	VK	Force required to detect a verification value (VW)
• Verification force tolerance	VK-T	The verification force (VK) tolerance to be monitored
Time		
• Verification force holding time	VK-HZ	Holding time for the verification force (VK)
Read	(disabled)	Reads closure data back from the ELK 02
Send	(enabled)	Sends closure data to the ELK 02
Measure	VW	Opens the Measurement screen to display the closure values. Click OK to return to the individual closure data view.
OK	VW-T	Copies the values from the individual closure data view into the closure data table
Cancel	VK	Discards changed values in the individual closure data view and returns to the closure data table.

Table 29 Input boxes and checkboxes in the individual closure data view

### 9.4.2 Closure function

#### Force priority

##### Function

The force priority closure function closes the pincer jaws until their preset closing force (SK) is reached. The closing gap setting and tolerances are used to check the closing gap (SS) on reaching the pre-selected closing force.

At the end of the closing force holding time (SK-HZ) the pincer jaws are opened.

The output OK/NO is supplied respectively when the pincer jaws have opened (OF) or if the opening gap (OS) is too small.

##### Close pincer jaws from the OPEN position (OF)

The pincer jaws must be open (OF) in order for a closure to be initiated. When a "START" is initiated (depending on the Start definition: see "START system settings", p. 8-52), the pincer jaws close for the closing time (OF-SK) to the pre-selected closing force (SK). Once the closing force is reached, the closing force holding time (SK-HZ) starts.

Immediately before the end of the closing force holding time (SK-HZ) the system checks that the closing force is within the closing force tolerance ( $\pm SK-T$ ) and that the closing gap (SS) is within the closing gap tolerance ( $\pm SS-T$ ).

The pincer jaws are then opened. When the pincer jaws are fully open (OF) the message OK or NO is output (depending on the OK/NO definition: see "System settings for the OK signal", p. 8-55 and "System settings for the NO signal", p. 8-60).

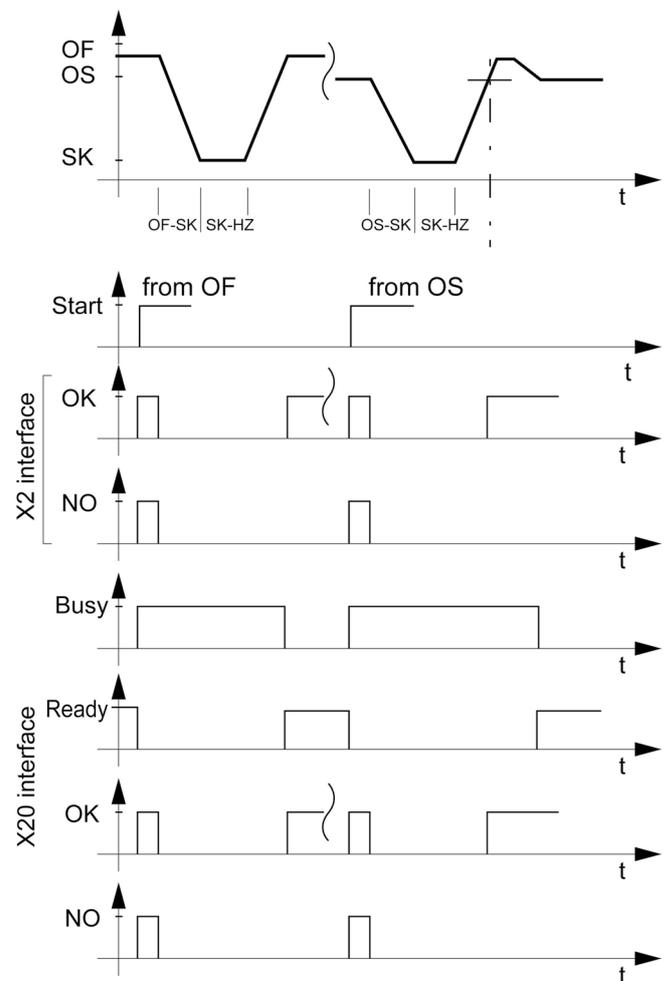


Fig. 58

**Gap priority**

**Function**

The Gap priority closure function closes the pincer jaws until the preset closing gap (SS) is reached. The closing force setting and tolerances are used to check and restrict the necessary closing force (SK) on reaching the pre-selected closing gap (SS).

At the end of the closing gap holding time (SS-HZ) the pincer jaws are opened.

The output OK/NO is supplied respectively when the pincer jaws have opened (OF) or if the opening gap (OS) is too small.

Advantage: Positioning to an exact closing gap with the predefined closing force (SK) as the closing force restriction.

Disadvantage: For physical and control technology reasons, a slow time must be chosen for the closing time from the open position to the closing gap (OF-SS) and the opening gap to the closing gap (OS-SS)

The closing gap (SS) and the resulting closing force (SK) are physically interrelated.

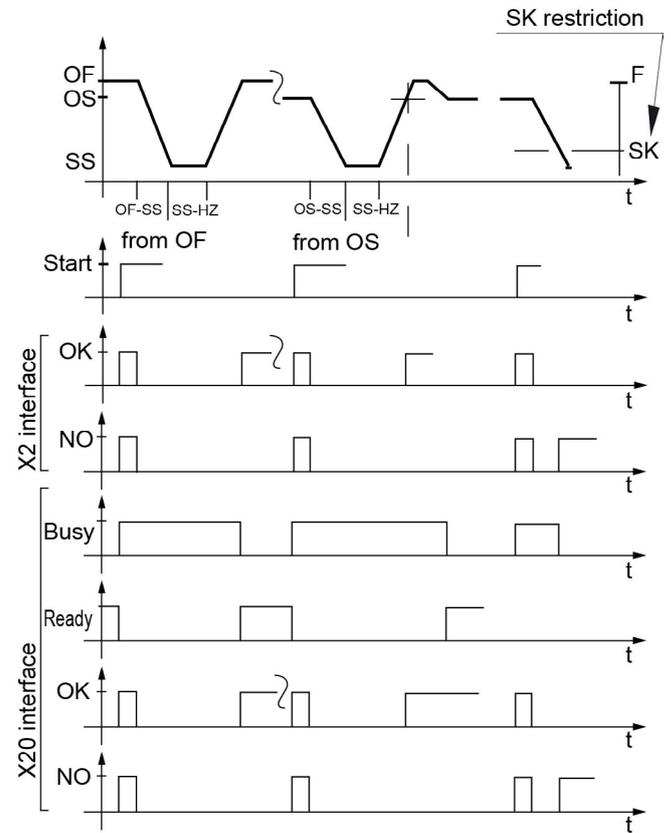


Fig. 59

**Close pincer jaws from the OPEN position (OF)**

The pincer jaws must be open (OF) in order for a closure to be initiated. When a “START” is initiated (depending on the Start definition: see “START system settings”, p. 8-52) via the Start button or the external X2/X20 interface, the pincer jaws close to the pre-selected closing gap (SS), provided that this can be achieved with the maximum pre-selected closing force. On reaching the closing gap the closing gap holding time (SS-HZ) begins.

**INFO**

Once the preset closing force (SK) is reached, the pincer jaws do not close any further.

Immediately before the end of the closing gap holding time (SS-HZ) the system checks that the closing gap is within the closing gap tolerance ( $\pm$ SS-T) and that the closing force is within the closing force tolerance ( $\pm$ SK-T). The pincer jaws are then opened. When the pincer jaws are fully open (OF) the message OK or NO is output (depending on the OK/NO definition: see “System settings for the OK signal”, p. 8-55 and “System settings for the NO signal”, p. 8-60).

**Close pincer jaws from the OPENING GAP position (OS)**

The pincer jaws must be in the opening gap position (OS) within the opening gap tolerance ( $\pm$ OS-T) in order for a closure to be initiated.

When a “START” is initiated (depending on the Start definition: see “START system settings”, p. 8-52) via the Start button or the external X2/X20 interface, the pincer jaws close and establish the pre-selected closing gap (SS). On reaching the closing gap the closing gap holding time (SS-HZ) begins.

Immediately before the end of the closing gap holding time (SS-HZ) the system checks that the closing gap is within the closing gap tolerance ( $\pm$ SS-T) and that the closing force is within the closing force tolerance ( $\pm$ SK-T).

The pincer jaws are then opened. On reaching the opening gap (OS) within the closing gap tolerance the message OK or NO is output (depending on the OK/NO definition: see “System settings for the OK signal”, p. 8-55 and “System settings for the NO signal”, p. 8-60).

**INFO**

- On completion of the closure the pincer jaws open fully (OF) and then close again as far as the opening gap position (OS).
- The larger the opening gap (OS) that is selected, the less accurate is the opening gap position, as it is physically not possible to control very low pressures under the influence of friction.

**Dual closure**

**Function**

Dual closure is an improved type of gap priority closure. The closure starts with force priority until a configurable changeover force (UK) is reached, when the closure switches from force priority to gap priority.

The changeover force (UK) must be up to approx. 10 % less than the force required to achieve the closing gap (SS).

The value set for the closing force (SK) limits the actual closing force value during closure.

The value set for the closing force (SK) should be at least 30 % greater than the anticipated value of the closing force (SK), so as to obtain sufficient control freedom.

Depending on the closure data, the pincer jaws are opened (OF), opening gap (OS) with and without verification.

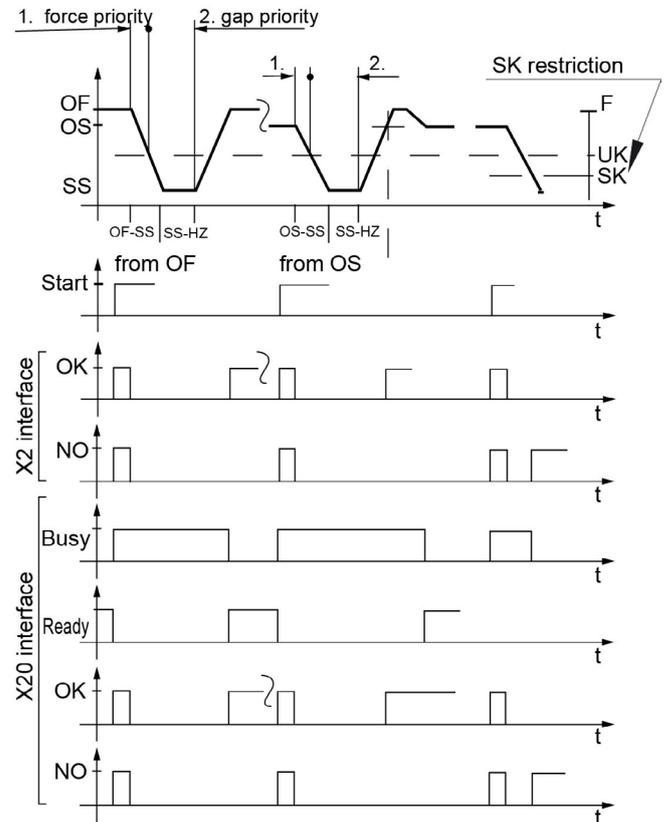


Fig. 60

### 9.4.3 Pincer type

#### HO XX-XX-PG 192 /168 T1

##### Function

Force priority closure with pincer type PG 192 / 168T1 closes Low Profile Clamps, e.g. PG 192 / PG 168T1, for which the closing movement has to be stopped immediately after the retaining hook engages.

Then the system checks that the Low Profile Clamp has been closed correctly.

##### Close pincer jaws from the OPEN position (OF)

The pincer jaws must be in the OPEN position (OF) in order for a closure to be initiated.

When a “START” is initiated (depending on the Start definition: see “START system settings”, p. 8-52)) via the Start button or the external X2/X20 interface, the pincer jaws close with the closing time between the opening gap and the closing force (OF-SK).

From the closing gap (SS) plus the positive +(SS-T) value onwards, the closing process is ready to stop the closing force (SK) once it detects that the retaining hook has engaged.

If this is not detected, the pincer jaws close until they reach the closing gap (SS) minus the -(SS-T) value or until they reach the preset closing force (SK). Then the pincer jaws open with the error message F17 NOT ENGAGED.

If the Low Profile Clamp engages, the system switches immediately to the verification force, but the pincer jaws remain in frictional connection with the Low Profile Clamp in order to ensure a secure engagement by means of the verification value (VW) and the verification value tolerance (VW-T).

Immediately after the verification force holding time (VK-HZ) the system checks that the verification value (VW) is within the verification value tolerance (VW-T) and that the verification force (VK) is within the verification tolerance (VK-T).

The pincer jaws are then opened. When the pincer jaws are fully open (OF) the message OK or NO is output (depending on the OK/NO definition: see “System settings for the OK signal”, p. 8-55 and “System settings for the NO signal”, p. 8-60).

The verification value (VW) is the difference between the closing gap when the maximum closing force is applied and the position when the tensioning hook and tensioning tunnel are correctly engaged.

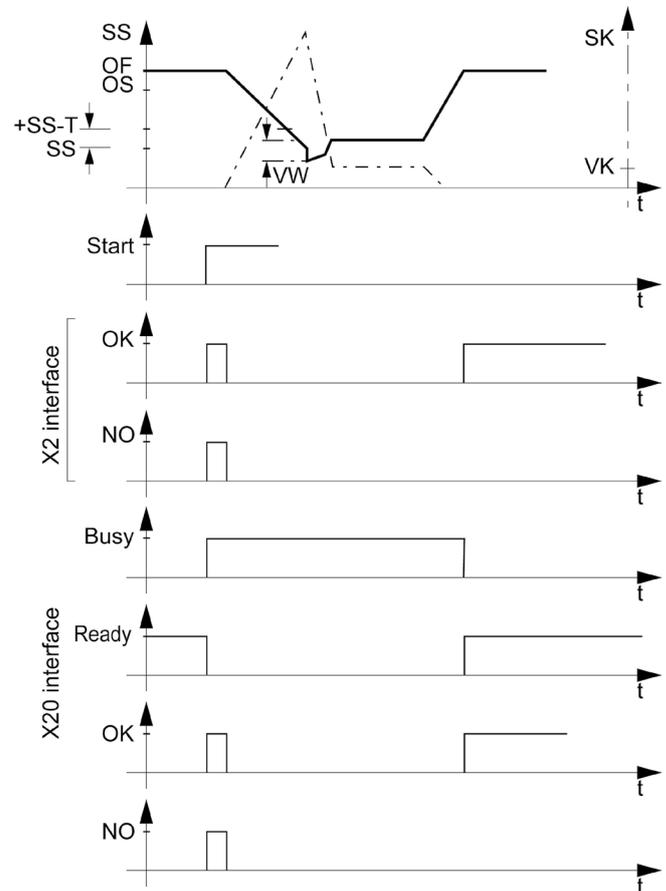


Fig. 61

**HO XX-XX-PG 292**

The closure function is “force priority with verification” and is described in the detail descriptions for force priority & verification.

**9.4.4 Verification**

Verification  is available for all

- closure functions
- pincer types
- other attributes
- types, procedures and functions (see system settings).

On expiry of the closing force holding time (SK-HZ) or closing gap holding time (SS-HZ) the force is reduced to the verification force (VK).

At the end of the verification force holding time (VK-HZ) the system checks that the verification force (VK) is within the verification tolerance ( $\pm VK-T$ ) and that the verification value (VW) is within the verification value tolerance ( $\pm VW-T$ ).

The pincer jaws are then opened. When the pincer jaws are fully open (OF) the message OK or NO is output (depending on the OK/NO definition: see “System settings for the OK signal”, p. 8-55 and “System settings for the NO signal”, p. 8-60).

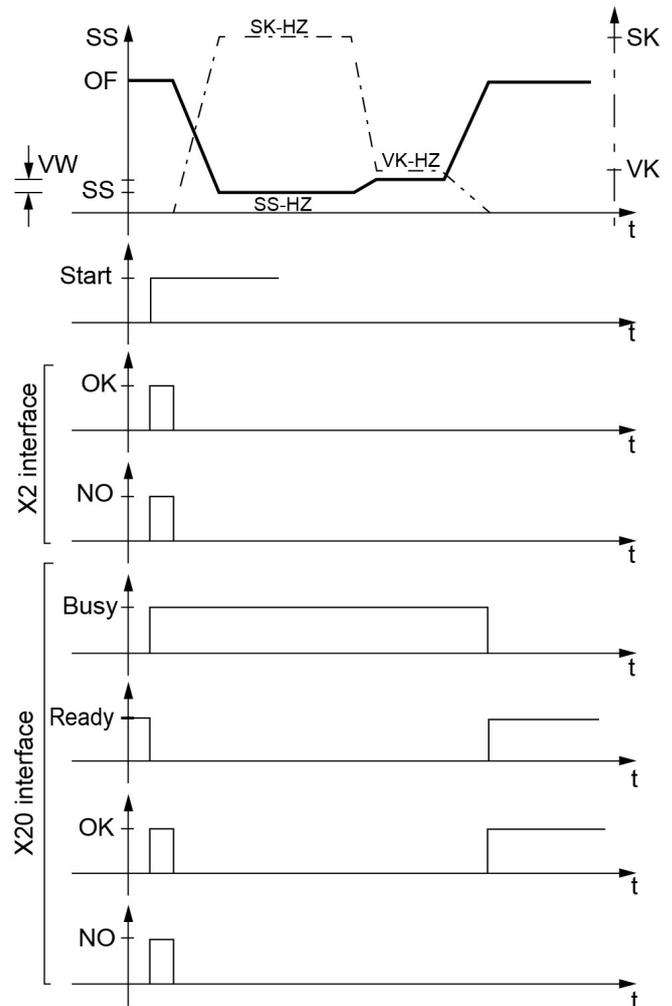


Fig. 62

**ELK 02 display**

If the closure is OK, the display alternates between showing the values of the closing force (SK) and the closing gap (SS) and the value of the verification force (VK) and the verification value (VW).

Close data			Verification data		
	Target	Actual		Target	Actual
SS	XX	XX	VW	XX	XX
SK	XX	XX	VW	XX	XX

Fig. 63

### 9.4.5 Initiating closure with “START”

#### Function

The START function can also be initiated by energizing the following external inputs:

- X2 Start/Acknowledge
- X20 Enable and Start
- START button
- or a combination.

#### Sequence

The start time is the time between the initiation of the START function and the movement of the pincer jaws.

This time is determined by the configuration of

- OK signal, “one pulse on initiation of start function” setting (see “System settings for the OK signal”, p. 8-55)
- NO signal, “one pulse on initiation of start function” setting (see “System settings for the NO signal”, p. 8-60)
- LED function, setting “one pulse on initiation of start function” setting (see “System settings for the LED signal”, p. 8-62)

The delay time between the initiation of the start function and the closing movement of the pincer jaws determines the longest pulse time for the OK or NO signal or the LED function. Initiation takes place in

- touch mode
- pulse mode;
  - single or double click,
  - via the START button or
  - externally via the X2 or X20 inputs (see section “8.5.4 System settings menu”, p. 8-51).

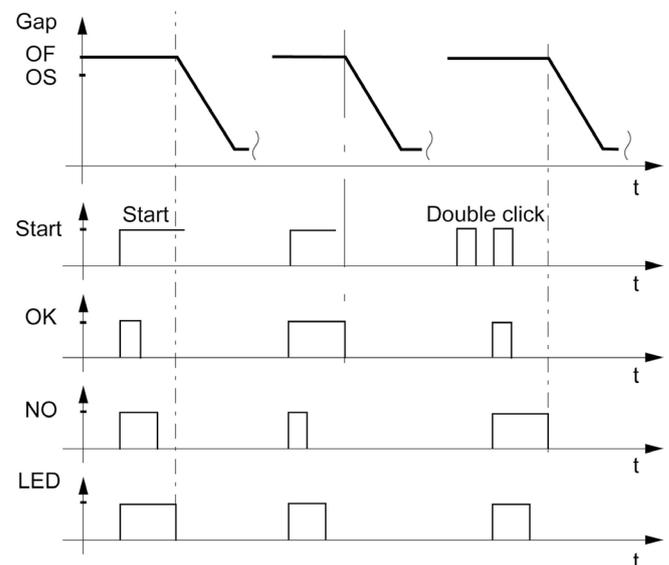


Fig. 64

#### Closure sequence in touch mode

##### INFO

“Touch mode” is a safe way of working.

For safety reasons the closure sequence for the ELK 02 electronically controlled pneumatic pincer has been factory-set to touch mode.

- ▶ Press and hold down the Start button for the duration of the closure sequence.  
If the Start button is released, the closure sequence stops immediately. The pincer jaws open immediately.

### Closure sequence in pulse mode

For operation in automated assembly processes it is possible to run the unit in “pulse mode”.

#### **WARNING**

Risk of crushing at the pincer jaws of the pincer head!

In “pulse mode” the closure sequence can be initiated by means of transient external signals and/or by pressing the Start button.

- ▶ In pulse mode stay clear of the pincer jaws during the closure sequence.
- ▶ In addition to the instructions in the manual, the generally applicable legal and other binding regulations governing accident prevention and other generally recognized health and safety rules must be observed.

If the closure sequence is activated in pulse mode, the adjacent safety notice will be displayed:

- ▶ Once you have read the safety notice, click OK to confirm.

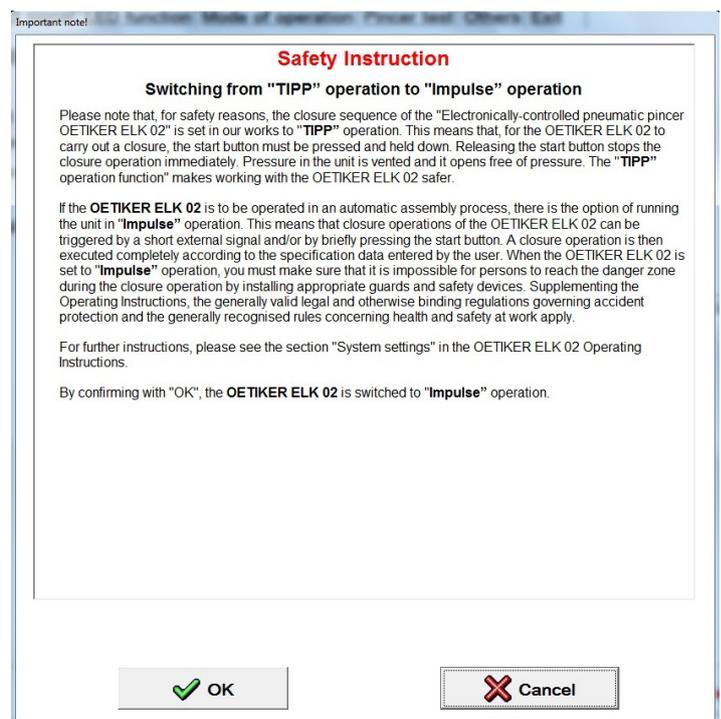


Fig. 65

### 9.4.6 Singular closure

#### Function

Close in accordance with an APN individual closure data view.

#### Sequence

Send closure data for up to 99 APNs.

PC program:

- Close data table
  - Send individual closure data view
- or
- Data exchange
  - Send table to ELK 02

Select an APN:

1. In the ELK 02 display select "Function" – "APN".
  - In the "Current APN" display select "APN"
  - In the "Select APN" display use the ▼ ▲ buttons to select the APN you want and confirm with ✓.
- or
2. Select an APN externally.

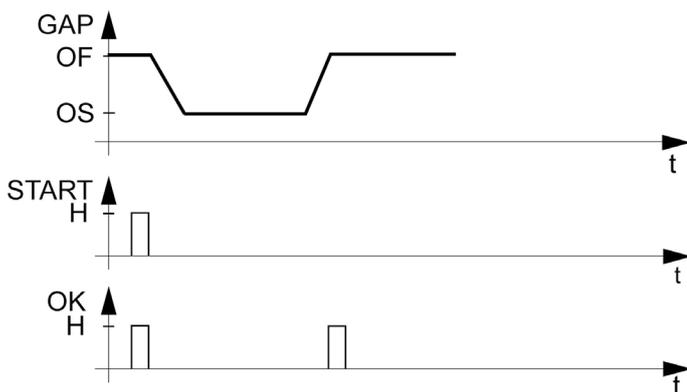


Fig. 67

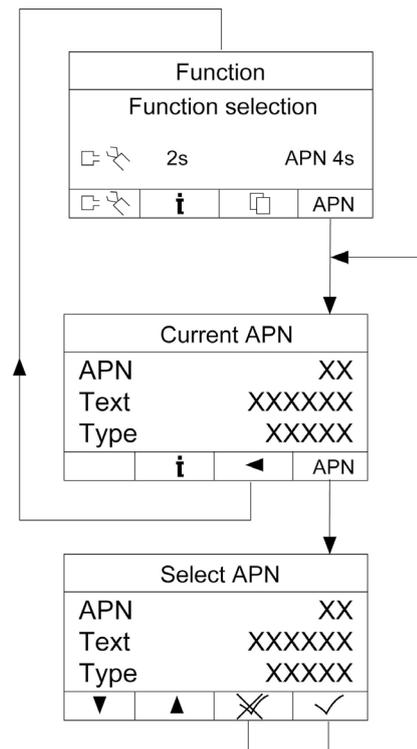


Fig. 66

### 9.4.7 Chaotic closure

#### Function

Send multiple sets of APN closure data in any sequence and perform any number of closures.

#### Sequence

- ▶ Send closure data for 1 to 99 APNs using the PC program via the ELK 02 display, see section 9.4.6 “Singular closure”.

Select an APN, see section 9.4.6, p. 9-98.

Example: Setting bits 3, 1, 4, 2 to select closure data (APNs).

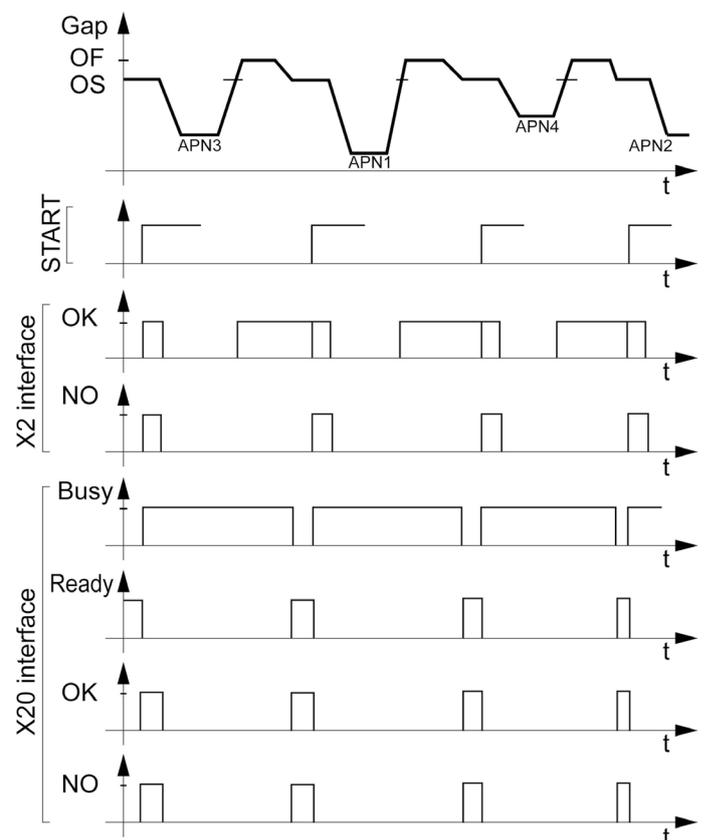


Fig. 68

### 9.4.8 Sequential closure

#### Function

Close multiple APN closure data sets in sequential order.

#### Sequence

Send the closure data of at least 2...99 APNs using the PC program.

Create a sequence:

1. In the Closure data table open the “Sequence” menu (see “Sequence menu”, p. 8-35).
2. Assign any APN from 1 to 99 to the 30 possible closures.  
The sequence ends with the closure in which APN 0 is selected.
3. Send the sequence to the ELK 02.

#### INFO

The order of the APNs determines the sequence.

No APNs may be selected at the X2/X20 inputs.

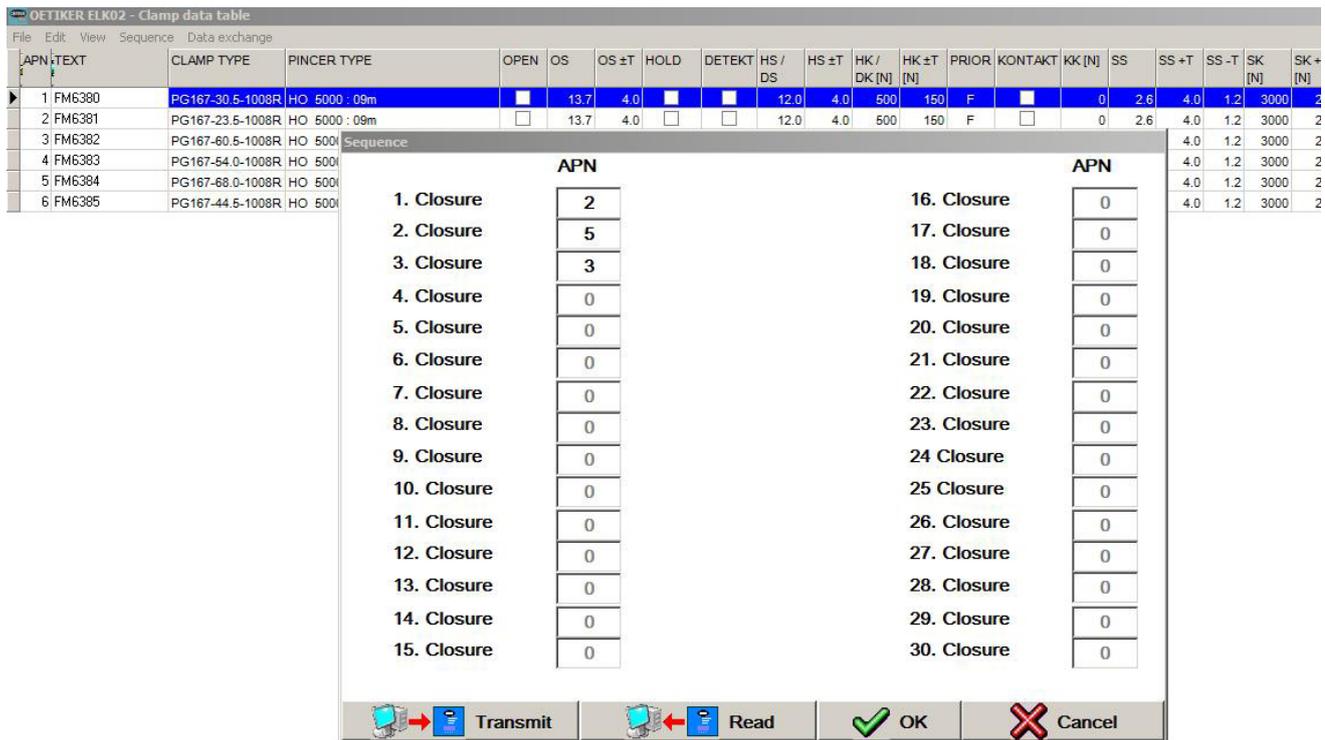


Fig. 69 Sequential closure

**Initiate closure**

- ▶ Press the Start button on the pincer.
- or
- ▶ Initiate the Start function via the external X2/X20 interface.
  - X2: Start/Acknowledge
  - X20: Enable and Start

**Perform the closure**

The order of the APNs determines the sequence (example).

1. Perform the first closure APN3.
2. If OK, continue with the second closure APN1.
3. If NO, you must repeat the APN until an OK message is received.
4. Perform closure of the last APN.

Depending on the setting in the “System settings for the OK signal” menu (see p. 8-55), a continuous signal, a pulse or no output appears at the end of the sequence.

Example: Sequential closure of APN3, APN1, APN4 with a pulse on OK and a continuous signal at the end

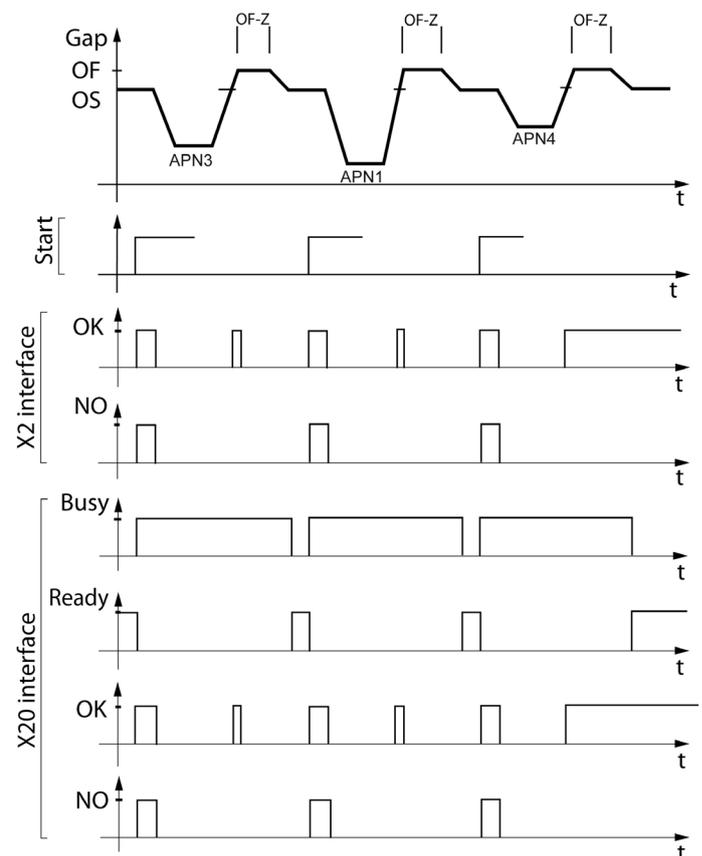


Fig. 70

**Removal time OF-Z**

The removal time OF-Z is relevant only in sequential closure with an active opening gap (OS). It is the time between the last opening to OF (fully open) and closing to the new opening gap (OS). The removal time to closing to the OS is assigned to the corresponding APN.

**INFO**

A removal time OF-Z is necessary if the next APN has a smaller opening gap (OS) than previous APNs.

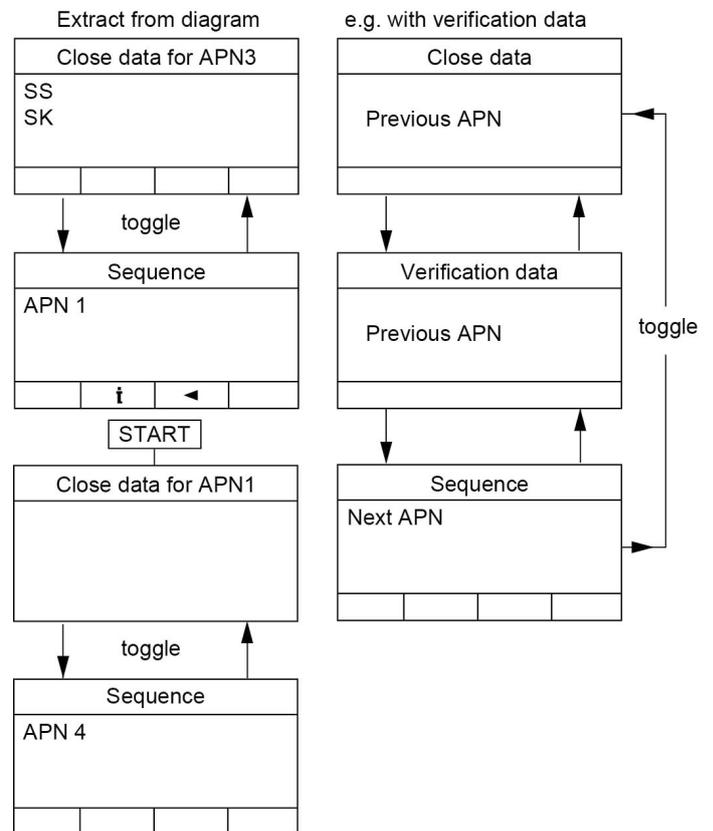


Fig. 71

### 9.4.9 Closure step-by-step

#### Function

Step-by-step closure with the following variants, in which each step is initiated with "START":

1. from open (OF) to the opening gap (OS)
2. from the opening gap (OS) to hold (HS)
3. from hold (HS) to close (SS, SK)
4. from close (SS, SK) to verify (VW, VK)
5. from verify (VW, VK) to open (OF)

On reaching the hold, close and verify position the measured values HK, HS, SS, SK or VW, VK are continuously displayed on the ELK 02 display.

#### Sequence

1. On the PC program select
  - "Options"
  - "System settings"
  - "Operating mode"
  - Step-by-step radio button (see "System settings for operating modes", p. 8-64).
2. Click the "Send" button.  
The values are sent to the ELK 02.

#### Initiate closure

- START button
- Initiate the Start function via the external X2/X20 interface:
  - X2: Start/Acknowledge
  - X20: Enable and Start

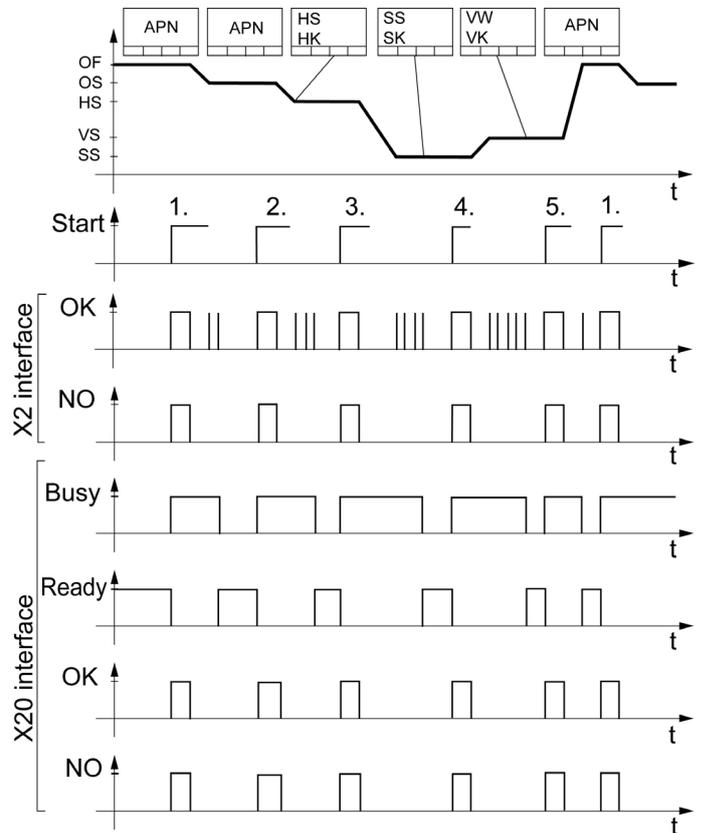


Fig. 72

### 9.4.10 Closing with hold

#### Function

With “hold” it is possible to hold a clamp with a low force (holding force) in such a way that the pincer jaws hold the clamp but do not change its geometry.

#### Sequence

The pincer jaws must be open (OF) or the opening gap (OS) must be within its opening gap tolerance ( $\pm OS-T$ ) in order for a closure to be initiated.

When a “Start” is initiated (Start definition: see section 9.4.5, page 9-96), the pincer jaws close until they touch the clamp ear. The force acting on the ear is defined in the holding force (HK).

On reaching this position the system checks that the holding gap (HS) is within its holding gap tolerance ( $\pm HS-T$ ) and that the holding force (HK) is within its holding force tolerance ( $\pm HK-T$ ).

At the same time the measured HK and HS values are continuously displayed on the ELK 02 display.

The retention time can be as long as you wish.

If a NO is signaled, one of the following error messages appears:

- F 09 HK-Error
- F 10 HS-Error
- F 11 HS-Error

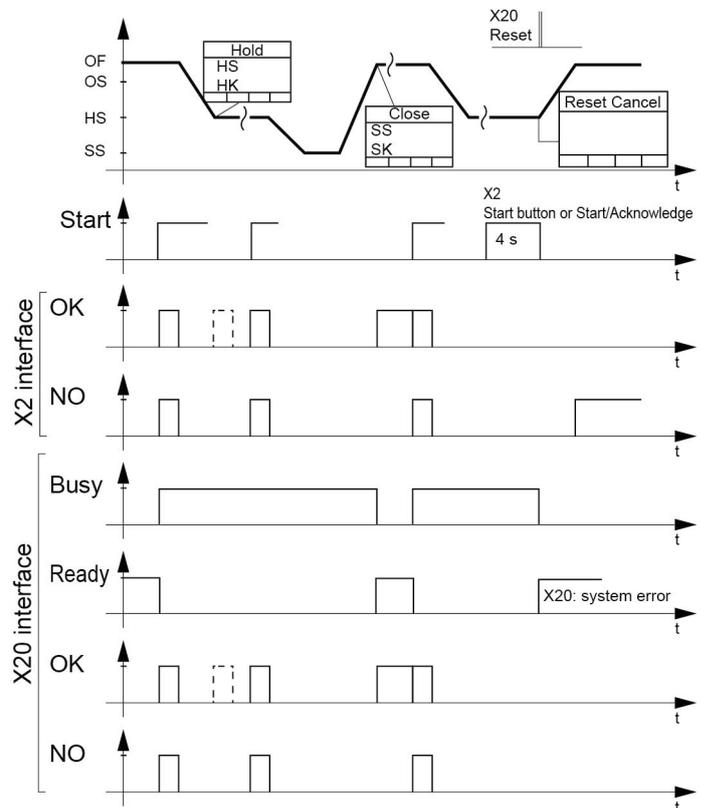


Fig. 73

### Message on OK signal

If an OK is signaled, an OK message can be output.

Setting:

- ▶ In the PC program under “Options” – “System settings” – “OK signal” activate the “One pulse on reaching the HS + HK” checkbox and input a time in the “ms” field (see “System settings for the OK signal”, p. 8-55).

When a “Start” is initiated (depending on the Start definition) the pincer jaws close in accordance with the force or gap priority function.

### Canceling the hold operation

Using the START button:

- ▶ Hold down for 4 s.

Using the X2 interface:

1. Energize with “Start/Acknowledge” for 4 s.
2. The pincer jaws open.

NO → H

Using the X20 interface:

1. Energize with Reset.
2. The pincer jaws open.

System error → H

Error message F19 RESET CANCEL is displayed.

## 9.4.11 Closure with detect

### Function

Detection identifies a second closure on the same clamp or Low Profile Clamp and reports it as NO.

### Sequence

During the closure operation, on passing the detection gap (DS) the system checks whether the actual detection force (DK) is greater than the predefined value. If the detection force is lower or no detection force is present, the pincer opens and a NO is signaled together with the error message F22 DETECTION ERROR.

### INFO

- Default value for the detection gap (DS):
  - Detection gap (DS) = closing gap (SS) plus closing gap tolerance +(SS-T) + 0.5.
- The default value for the detection force (DK) is calculated when the “Detect” checkbox is enabled.
- The detection force must be greater than 100 N.

### 9.4.12 Closure with contact detection

Some OETIKER products, e.g. Low Profile Clamps, can be reduced in diameter to the required engagement position – closing gap (SS) – without systematic plastic deformation. A compression and hence a cross-section reduction of the corresponding material being clamped, e.g. elastomer, is generated before the closing gap (SS) is reached.

The contact detection function determines the contact position of the corresponding clamp with the material being clamped at the start of compression. Following closure, the contact position is output in the form of the measured contact gap (KS) (distance between the pincer jaws) on reaching the predefined contact force (KK) in relation to the particular application. Depending on the chosen contact force (KK), the material being clamped may already have been compressed. This can lead to inaccuracies in determining the contact gap (KS).

Corresponding clamp products are secured with a transit lock to prevent them from opening accidentally during transportation or handling. The desired diameter reduction for fitting this clamping product only begins once the product-specific resistance force of the transit lock has been exceeded. For process control reasons the selected contact force (KK) generally has to be greater than this resistance force. Suitable tests should be carried out with several components to determine the appropriate contact force (KK) for a specific application and product.

## 10 Maintenance and repairs

### 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 these maintenance instructions and accident prevention regulations.  
Failure to observe these instructions and regulations may lead to personal injury and property damage.
- For maintenance and repair work only use tools and original equipment from OETIKER.
- Isolate the ELK 02 from the electrical supply and compressed air supply before starting maintenance work.  
Isolate the unit from the compressed air supply using the swivel coupling provided, and pull the main plug out of the electrical outlet.
- Following initial commissioning, the ELK 02 unit should be cleaned daily or weekly, depending on the degree of soiling.
- Never immerse the ELK 02 in water or other liquids.

### 10.2 Maintenance

#### 10.2.1 Before maintenance work

#### WARNING

##### **Danger of death from electric shock!**

Touching live parts can result in death.

- ▶ Pull the main plug out of the electrical outlet and secure it to prevent it from being plugged in accidentally.
- ▶ Ensure that only qualified and authorized electricians work on the electrical equipment.
- ▶ Ensure that operators only rectify faults that are clearly attributable to operating or maintenance errors.

#### 10.2.2 After maintenance work

- Ensure that disconnected pneumatic and electrical plug connectors are plugged in again following the maintenance and inspection work.
- Check all screw connections.
- Reattach all safety equipment immediately.
- Check all functions of the ELK 02.

### 10.2.3 Weekly preventive maintenance jobs

#### Pincer head

The rollers and plunger on the pincer head are subject to mechanical loading. When the ELK 02 is in regular use, they must be lubricated at least once a week.

Description	Type	Manufacturer
Grease	RENOLIT LX EP 2 (RENOLIT DURAPLEX EP 2)	FUCHS PETROLUB AG Friesenheimer Str. 17 68169 Mannheim, Germany Telephone No. +49 (621) 38 02-00 Fax +49 (621) 38 02-1 90 www.fuchs-oil.de

Table 30 Recommended lubricant

1. Disconnect the compressed air supply and switch off the ELK 02 control unit.
2. Using a grease gun, lubricate the pincer head (Fig. 74/1) at the grease nipple (Fig. 74/3) with RENOLIT LX-EP 2 grease (RENOLIT Duraplex EP 2).
3. Check the pincer jaws (Fig. 74/2) for wear and chipping at the clamping points, and replace if necessary (see tools catalog for item number).
4. Check the pincer and control unit for mechanical damage.
5. Replace defective parts.

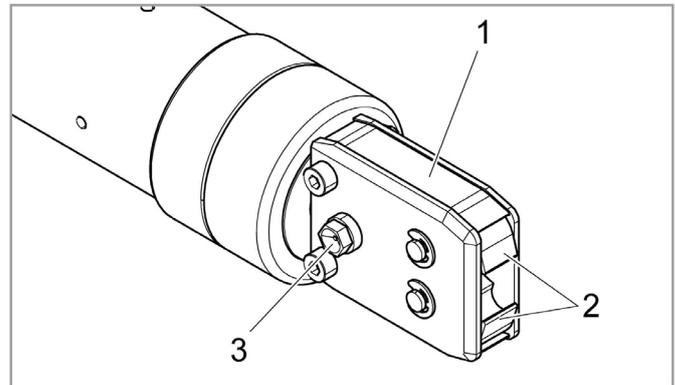


Fig. 74 Lubricating the pincer head

### 10.2.4 Annual preventive maintenance jobs

When the OETIKER EL (T) electronically controlled pneumatic pincer is in regular use, we recommend an annual service. Please contact OETIKER and return the OETIKER EL (T) electronically controlled pneumatic pincer to OETIKER.

### 10.2.5 Other preventive maintenance

At regular intervals, inspect the pre-filter for soiling and replace if necessary. The pre-filter must remain fitted at all times for trouble-free operation.

The recommended filter (item no. 05005930) has a 5 µ screening function.

Other recommended filters or pre-filters:

- FESTO, type LF-M1-G1/4-CS, item no. 182 632, and as a pre-filter in heavily contaminated air FESTO, type LF-M2-G1/4-ES.
- Corresponding holders, e.g. LFPC-M2 or LFPE-M2.

## 10.3 Repairs

### 10.3.1 Changing the pincer jaws

#### INFO

Replacement pincer jaws are available fully assembled in the form of jaw repair sets. In order to ensure the fast and accurate delivery of spare parts, a clear purchase order is essential.

It must include the following information:

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

Corresponding technical details can be found in the tools catalog.

#### Changing the pincer jaws – HO pincers

There is a number engraved on the pincer jaws. You can use this number to order a pincer jaw replacement kit (see also the tools catalog). Only fit the designated pincer jaw type in the pincer head.

#### NOTICE

##### Damage to the pincer from third-party parts.

► Only use original OETIKER pincer jaws. Only fit the designated pincer jaw type in the pincer head.

1. Disconnect the compressed air supply and switch off the ELK 02 control unit.
2. Detach the pincer unit from the ELK 02 control unit.
3. Loosen the lock nut (Fig. 75/1) and unscrew the union nut (Fig. 75/2).

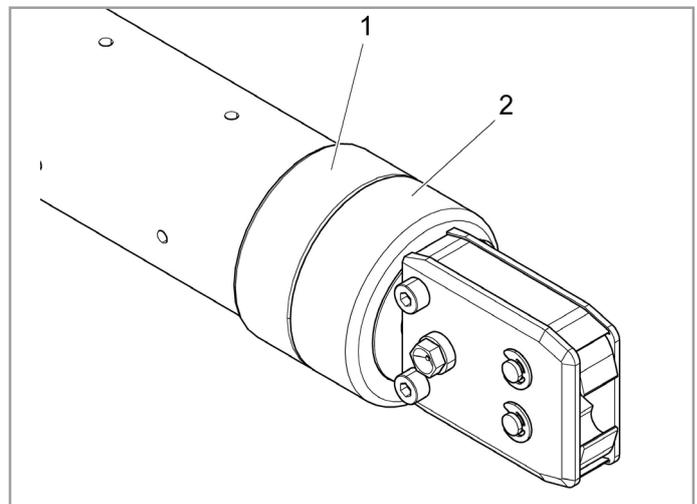


Fig. 75 Unfastening the pincer head

**⚠ CAUTION**

The compression spring (Fig. 76/4) is under tension.

- ▶ Hold on to the pincer head (Fig. 76/6) as you remove it.

4. Separate the pincer head (Fig. 76/6) from the pincer body (Fig. 76/3).  
The plunger (Fig. 76/5) and plunger piston (Fig. 76/7) remain in the pincer body (Fig. 76/3).

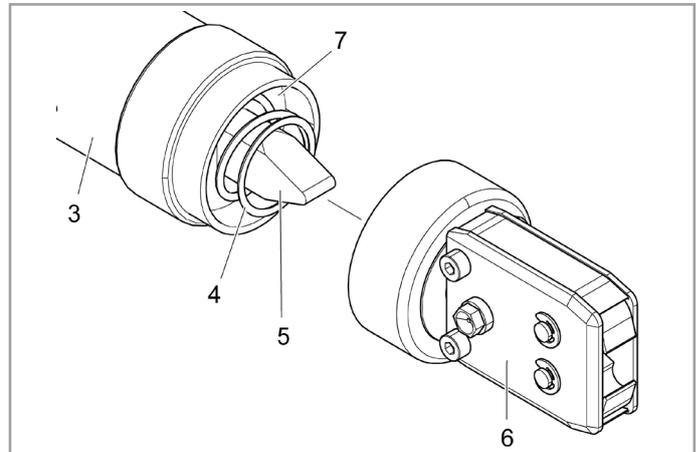


Fig. 76 *Separating the pincer head from the pincer body*

5. Remove the two retaining rings (Fig. 77/9) on the pincer head (Fig. 77/6) on the grease nipple side. Do not push the pins back (Fig. 77/10).
6. Unscrew the two hex nuts (Fig. 77/8) from the hex bolts (Fig. 77/11).

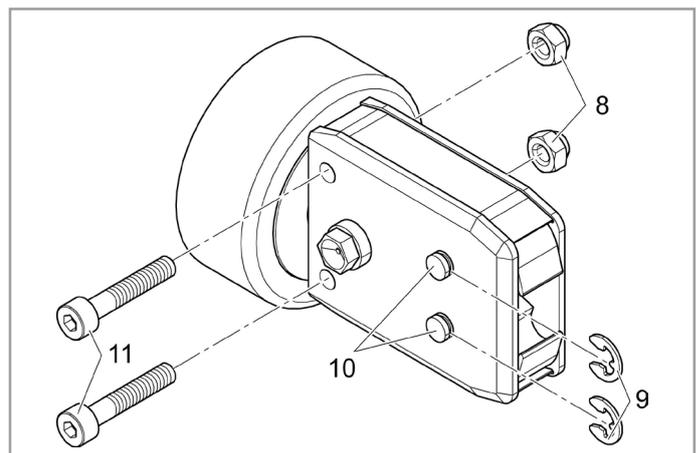


Fig. 77 *Dismantling the pincer head*

7. Remove the pincer plate (Fig. 78/12).

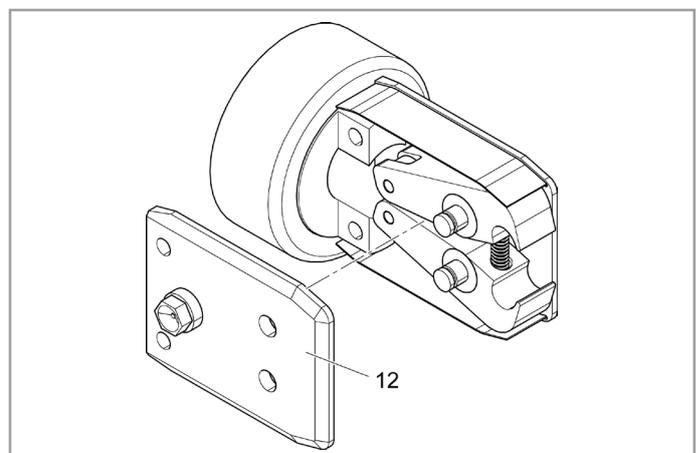


Fig. 78 *Removing the pincer plate*

8. Remove the compression spring (Fig. 79/14), cover plates (Fig. 79/15) and pincer jaws (Fig. 79/13).
9. Grease the replacement pincer jaws (Fig. 79/13) and compression spring (Fig. 79/14) from the pincer jaw replacement kit with RENOLIT LX-EP 2 grease (RENOLIT Duraplex EP 2) and install.
10. Mount the pincer plate (Fig. 78/12). Guide the cover plates on each side (Fig. 79/15) into the grooves (Fig. 79/16) in the pincer plate.
11. Check that the pincer jaws (Fig. 79/13) are moving freely.
12. Screw the pincer head (Fig. 76/6) onto the pincer body (Fig. 76/3) and secure with the lock nut (Fig. 75/1).

The plunger (Fig. 76/5) must be centered between the two pincer jaws.

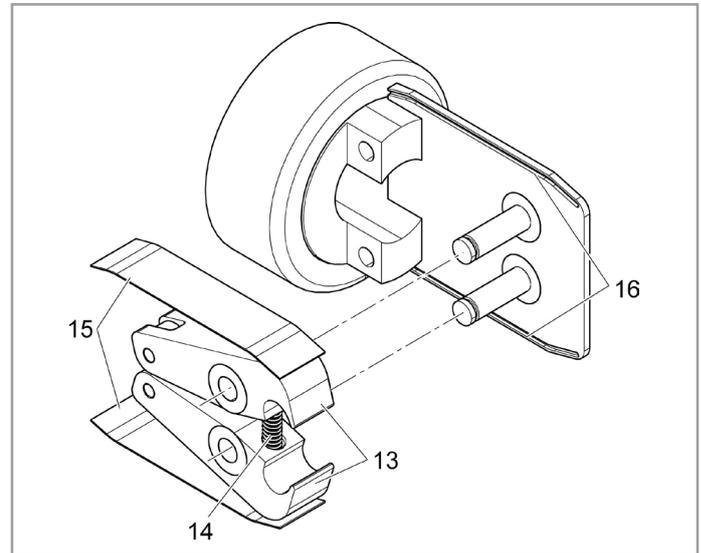


Fig. 79 *Removing the pincer jaws*

### 10.3.2 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 be ejected and cause injury if the pincer head is not mounted.

▶ Never operate the pneumatic pincer unless the pincer head is mounted.

#### **INFO**

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

Scope of supply of a pincer head set

- Lip seal (Fig. 80/1)
- Piston ring with plunger piston (Fig. 80/2)
- Pincer head (Fig. 80/3)
- Wedge (Fig. 80/4)
- Compression spring (Fig. 80/5)
- Spacer shim (Fig. 80/6)

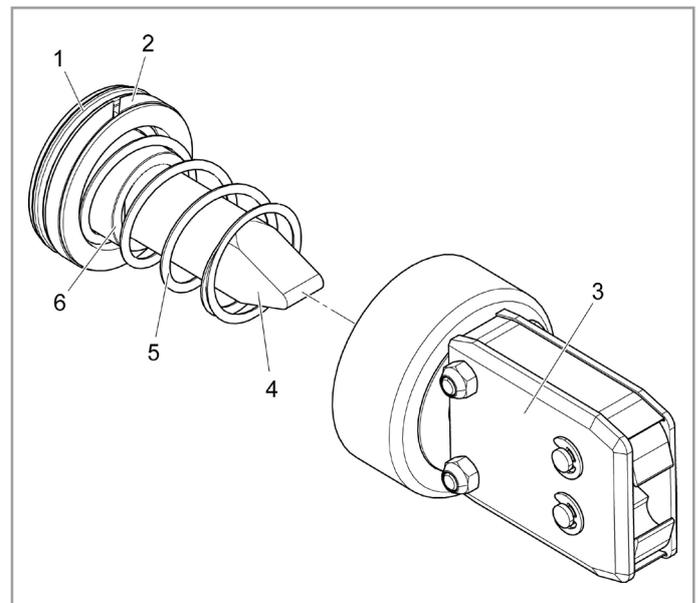


Fig. 80 Pincer head set

**Installing the pincer head set**

1. Disconnect the compressed air supply and switch off the ELK 02 control unit.
2. Detach the pincer unit from the ELK 02 control unit.
3. Separate the pincer head (Fig. 81/7) from the pincer body (Fig. 81/1) (see section 10.3.1, p. 10-109).
4. Remove the plunger (Fig. 81/5), plunger piston (Fig. 81/4), piston ring (Fig. 81/8), lip seal (Fig. 81/3) and compression spring (Fig. 81/6) from the piston body (Fig. 81/1).

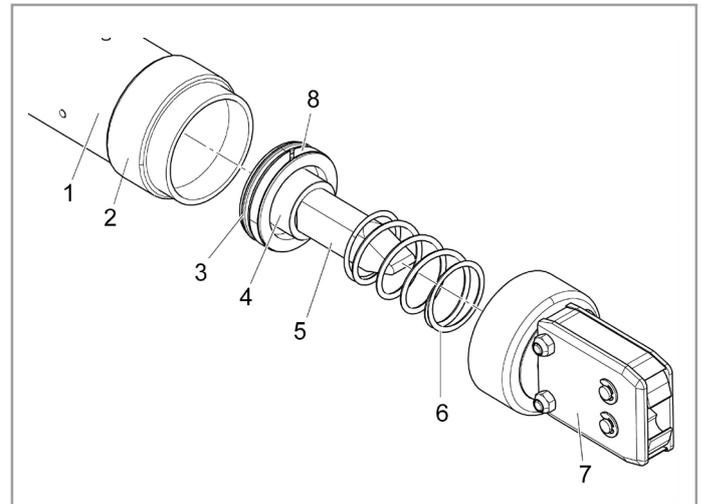


Fig. 81 Replacing the pincer head set

5. Lubricate the plunger piston (Fig. 81/4), plunger (Fig. 81/5), piston ring (Fig. 81/8) and lip seal (Fig. 81/3) from the new piston head set and mount them in the piston body.
  - Piston ring (Fig. 81/8) and lip seal (Fig. 81/3) with RENOLIT IPR 2, OETIKER item no. 08901485.
  - Plunger (Fig. 81/5) with RENOLIT LX-EP 2 (RENOLIT Duraplex EP 2), OETIKER item no. 08901490.

**NOTICE****Damage during installation!**

- Be careful not to damage the piston ring (Fig. 81/8) and lip seal (Fig. 81/3) during installation.

6. Mount the compression spring /6).
7. Screw the new pincer head (Fig. 81/7) on to the pincer body (Fig. 81/1) and secure with the lock nut (Fig. 75/1).  
The plunger (Fig. 81/5) must rest between the two pincer jaws.

## **11 Decommissioning, storage, recommissioning**

### **11.1 Decommissioning and storage**

If the ELK 02 pneumatic pincer is to remain out of service for an extended period, it must be decommissioned.

- Disconnect the pneumatic and electrical plug connectors on the ELK 02.
- Clean the ELK 02 pneumatic pincer before putting it into storage.
- Replace defective parts.
- Store the ELK 02 in a clean, dry location and protect from dust.

### **11.2 Recommissioning**

- Please refer to the HO pincer instruction manual for details of the commissioning procedure.

## 12 Disposal

Dispose of packaging materials in accordance with local regulations.

The unit, all replacement parts and in particular used operating fluids or other environmentally polluting substances must be disposed of by specialist firms in accordance with applicable statutory regulations.

## 13 Technical data

### 13.1 Electrical connection and interfaces

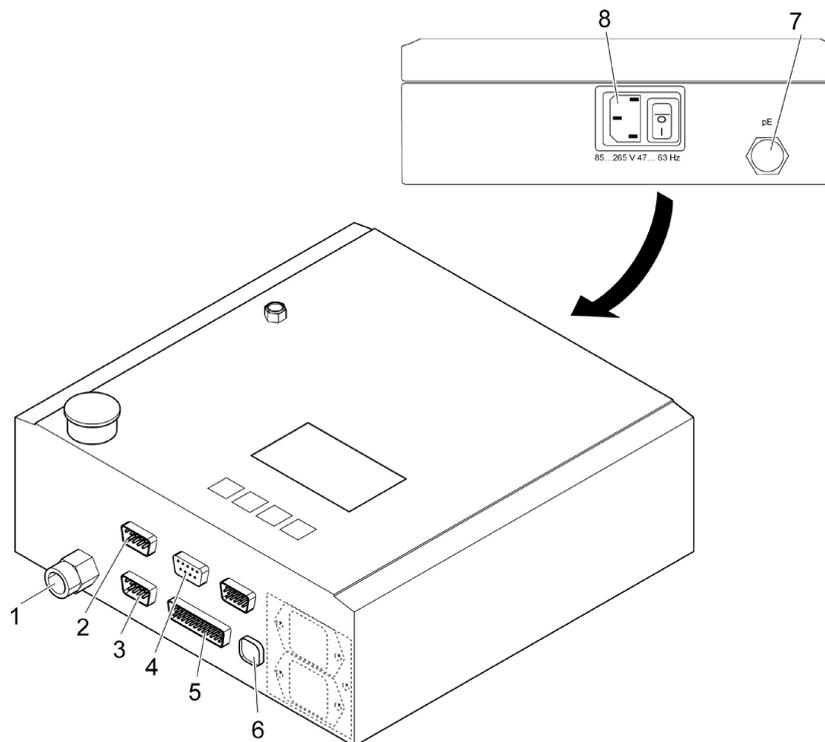


Fig. 82 Control unit, connections

#### 13.1.1 Main plug

(see Fig. 82/8)

#### **WARNING**

**Electric shock if PE conductor (protective earth conductor) not fitted!**

▶ The main power supply must **always** be protected with a PE conductor.

3-pin IEC connector (male)

Operating voltage: 85 - 265 V 47 - 63 Hz

Power consumption: 30 VA

#### **INFO**

10 A backup fuse recommended.

### 13.1.2 X1 interface

(see Fig. 82/2)

- 9-pin SUB-MIN-D (male)
- Pincer connection

### 13.1.3 X2 interface

(see Fig. 82/3)

15-pin SUB-MIN-D (HD) (male)

#### INFO

The cable must be fitted with a ferrite ring at the cable end near the X2 interface.

#### Inputs: Start/Acknowledge/bits 1 ... 8

- Input data for setting Start/Acknowledge/bits 1 to 15
- Opto-decoupled inputs (dedicated GND PIN 15, for all bits)

Nominal value DC 24 V

Signal "0" 0 ... 5 V

Signal "1" 15 - 30 V  
(> 100 ms for start)

Input current 10 mA (at 24 V)

#### Outputs: OK/NO/digital

- Output data (digital)
- Opto-decoupled outputs (dedicated GND PIN 5 for OK/NO)

Operating voltage UB DC 24 V (max. 30 V)

#### Output for connecting lamps, relays, etc.

Output current IA X2.1 or X2.4 < 100 mA

Output voltage Operating voltage UB less approx. 1 V

#### Output for connection to PLC

Output current IA X2.1 or X2.4 < 10 mA

Output voltage Operating voltage UB – (IA x 470 Ohm)

Example: 24 V – (0.01 A x 470 Ohm) = 19.3 V

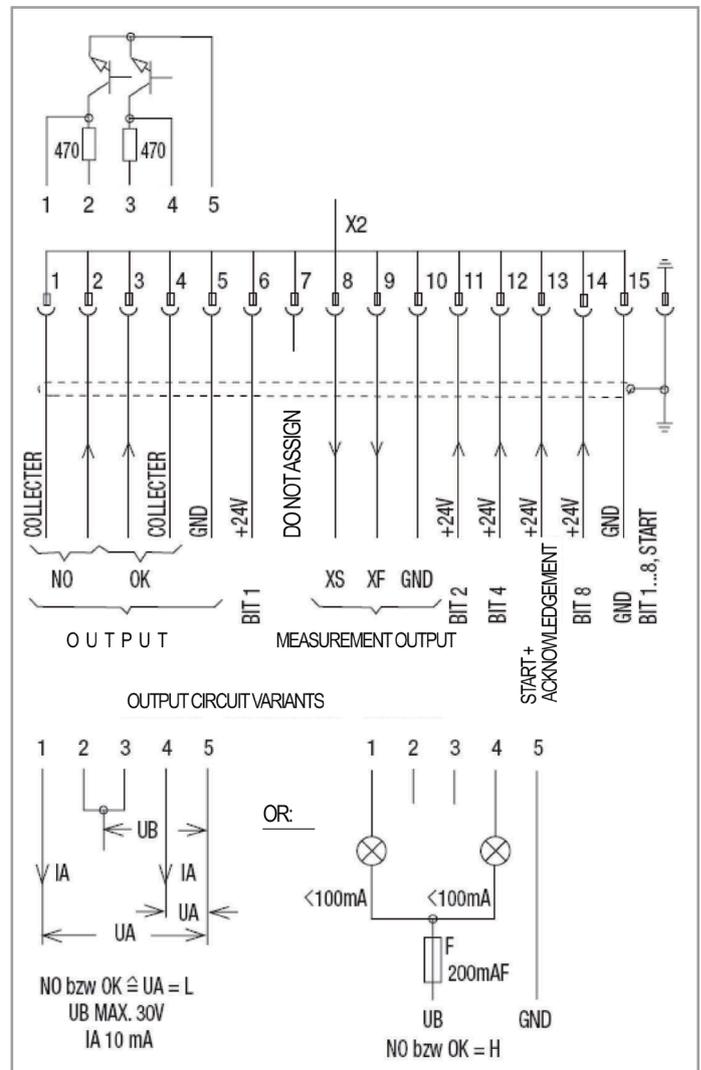


Fig. 83 Connection diagram for the X2 interface

**X2 inputs and outputs**

Symbol		Description
1*	NO	Collector IA < 100 mA
2*	NO	Collector with R470 series resistor
3*	OK	Collector with R470 series resistor
4*	OK	Collector IA < 100 mA
5	GND	for pin 1 to 4
6*	BIT 1	Selection for closure data (APNs)
7	NC	
8	XS	UA = f (gap SS) 0 to 5 V
9	XF	UA = f (force SK) 0 ... 5 V
10	GND	for pin 8 + 9
11*	BIT 2	Selection for closure data (APNs)
12*	BIT 4	Selection for closure data (APNs)
13*	START/Acknowledge	START/ACKNOWLEDGE selection
14*	BIT 8	Selection for closure data (APNs)
15	GND	GND for pin 6, 11, 12, 13, 14
HOUSING	PE	Protective earth conductor

Table31 X2 interface inputs and outputs

\*) opto-decoupled

**XS/XF outputs**

The two analog outputs, pin 8 and 9 referenced to pin 10 (GND) (output voltage 0 to 5 V, output load > 1 M), are suitable for displaying the gap (S) or force (F) values, in particular for visual display on dynamic display devices (oscilloscope).

**Application of the OK/NO outputs**

Two mutually independent outputs are available for the NO and OK functions.

These outputs are opto-decoupled “open collectors”, i.e. an external operating voltage is required in order to energize them.

The three examples below show the following connections:

- Connection for PLC
- Connection for lamps
- Connection for LEDs

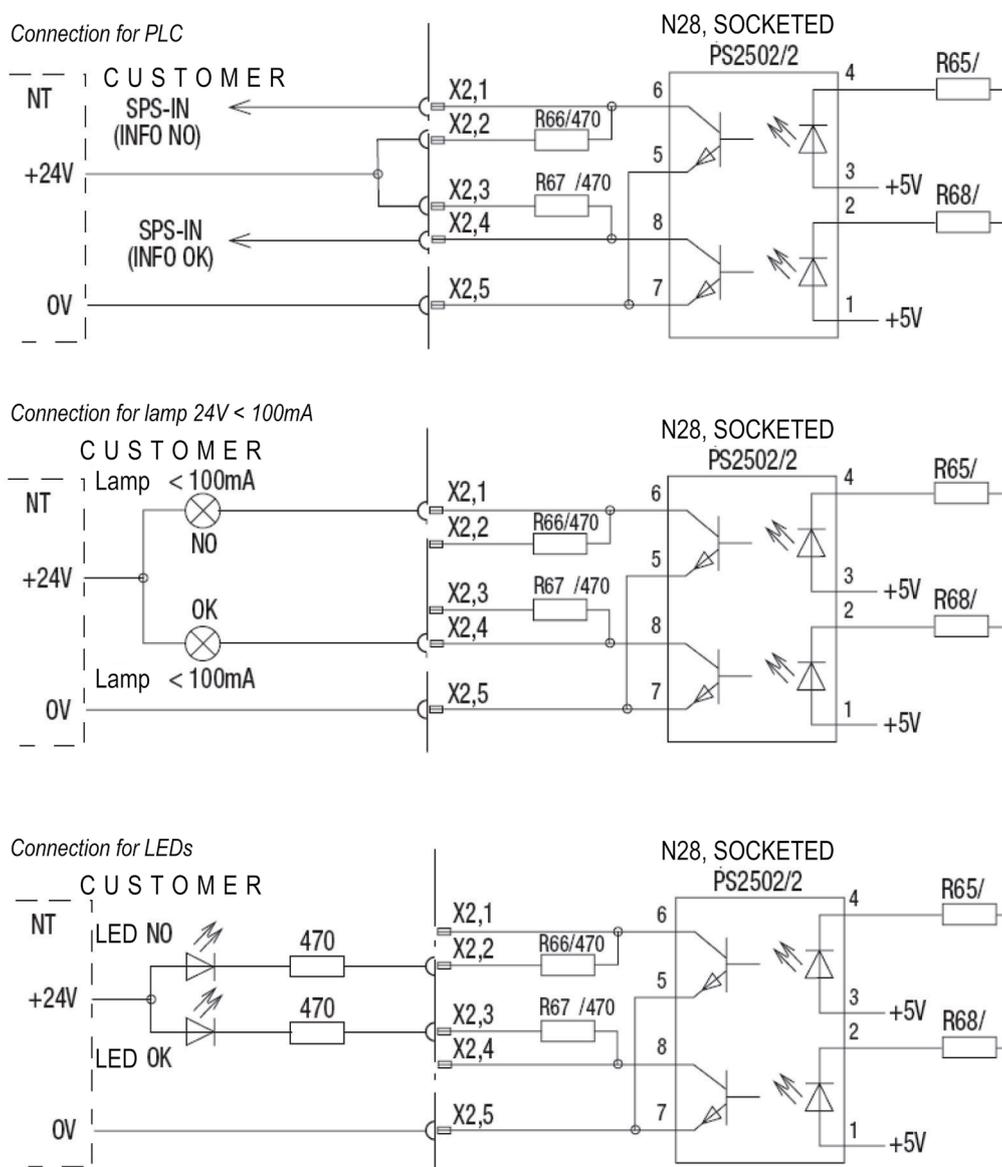


Fig. 84 Connection examples for OK/NO outputs

### 13.1.4 X3 interface (RS232)

#### INFO

The cable must be fitted with a ferrite ring at the cable end near the X3 interface.

- 9-pin SUB-MIN-D (female)
- PC connection RS232 (for communicating with the ELK 02 software)
- CAL 01 connection RS232 (for communicating with the CAL 01 calibrator)
- 9600 baud
- 8 data bits
- 1 stop bit
- Priority: even
- Protocol/handshake: none
- Value separator: tab (chr \$09)
- End of line: CR/LF (chr \$0D/chr \$0A)
- All outputs take the form of readable ASCII characters. Individual values are separated by tabs. Lines end with CR/LF (chr \$0D/chr \$0A).

#### Data output at X3 after system test

Message text	Meaning
_001 SystemTestOK	The system test was successfully completed
_010 PincerTestPrompt1	ELK 02 is waiting for confirmation or acknowledgement of the prompt via the Start button or start signal
_600 UserCancel	The user has skipped the pincer test
_002 Ready for closure	ELK 02 is in the closure level and is waiting for a start from the user

Table32 Data output at X3 after system test

#### Data output at X3 after each pincer test step

Message text	Meaning
_001 SystemTestOK	The system test was successfully completed
_020 PincerTestPrompt2	The ELK 02 is waiting for confirmation of the prompt via the Start button or start signal. A pincer test must be performed
_100 PincerTestStart	The user has confirmed the prompt.
_110 PType: HO 3000 3m/xxx	The current process data is suitable for "HO 3000 3m" pincers. The ELK 02 is waiting for the friction test to be started
_120 FrictionTestStart	The friction test was started and performed by the user
_130 FrictionTestEnd	The friction test was completed
_200 ForceMeasurementStart	The ELK 02 is waiting for a force closure to be started

Message text	Meaning
_210 FN: 2100 N	The reference value for the force closure is currently 2100 N.
_210 FN: 2100 N	A force closure has been started; the reference value is still 2100 N
_290 ForceMeasurementEnd	The reference value of 2100 N was confirmed by the user
_300 GapMeasurementStart	Gap measurement has started; the ELK 02 is waiting for the 1st gauge to be started Measurement gauge
_310 Gauge_1_1_End	Measurement for gauge 1 has been completed; the ELK 02 is waiting for the 2nd gauge to be started Measurement gauge
_320 Gauge_1_2_End	Measurement for gauge 2 has been completed; the ELK 02 is waiting for the 3rd gauge to be started Measurement gauge
_330 Gauge_2_1_End	Measurement for gauge 3 has been completed; the ELK 02 is waiting for the 4th gauge to be started Measurement gauge
_340 Gauge_2_2_End	Measurement for gauge 4 has been completed; the ELK 02 is calculating the results of the gap measurement
_390 GapMeasurementEnd	The calculations have been completed
_500 PincerTestEnd	The pincer test has been successfully completed
_002 Ready for closure	ELK 02 is in the closure level and is waiting for a start from the user

Table 33 Data exchange at X3 after each pincer test step

The following data protocol has been implemented to allow the nominal force to be corrected during the pincer test:

PC output	Meaning	Number of characters
"PDFN"	"Force nominal" parameter	4
"_"	Parameter should be set to new value	1
"1234"	New value (decimal)	4
TAB (chr \$09)	Value separator	1
STX (chr \$02)	Control character STX	1
"\$00D3"	Checksum (hexadecimal)	5
CR (chr \$0D)	Carriage return	1
LF (chr \$0A)	Line feed	1

Table 34 Data protocol for nominal force correction

The checksum is the sum of all characters between "=" and "STX" (exclusive) in 4-digit hexadecimal notation.

**Data output at X3 when ready for closure**

- Standard data output by the ELK 02 after each closure:

The data output occurs at X3 after every closure or with hold or detect, close or verify.

Each value is followed by a tab character as a separator. The data set is ended with a carriage return and line feed.

- On initiation of a closure in automatic mode:

Message text		Meaning												
_002 Ready for closure		The ELK 02 is at the closure level and is waiting for a start from the user V24 standard data output Hold												
Clamp type	Pincer type	Text	H V	9.0	4.0	4.0	9.03	300	150	150	298	0	OK	
		V24 standard data output Close												
Clamp type	Pincer type	Text	S V	6.7	9.0	9.0	9.08	900	900	2000	1042	0	OK	
		V24 standard data output Close												
Clamp type	Pincer type	Text	V V	8.0	2.5	2.5	9.18	20	20	20	22	0	OK	
_002 Ready for closure		The ELK 02 is at the closure level and is waiting for a start from the user												

Table35 Data output ready to close for closure in automatic mode

**Data output at X3 after each closure step**

Message text	Number of characters
Clamp type	16
Pincer type	30
Free text	16
Function (C / H / D / K / S / V) *	1
Priority (F / f / S / s / D / d) **	1
Target values: holding gap or detection gap / closing gap / verification gap	4
+ tolerance settings: holding gap / closing gap / verification gap	4
- tolerance settings: holding gap / closing gap / verification gap	4
Actual values: holding gap or detection gap / closing gap / contact gap / verification gap	4
Target values: holding force or detection force / contact force / closing force / verification force	4
+ tolerance settings: holding force / closing force / verification force	3/4
- tolerance settings: holding force / closing force / verification force	3/4
Actual values: holding or detection force / closing force / contact force / verification force	4
Error number	1/2
Status OK, NO-OK	2/5

Table 36 Data output at X3 after each closure step

<b>*)</b>	<b>Function</b>	<b>**) Priority</b>
C	Clear (Ctrl Del); sends zero value for all measured values when closure is initiated	F Force PRIORITY
H	Holder and measured value	f Force priority with verification
D	Detect and measured values	S Gap PRIORITY
K	Contact detection and measured values	s Gap priority and verification
S	Close and measured values	D Dual closure
V	Verify and measured values	d Dual-closure with verification

Data output at X3 on each completed step in step-by-step

Message text	Meaning
_002 Ready for closure	The ELK 02 is at the closure level and is waiting for a start from the user
OS-OK	The opening gap has been reached. The ELK 02 is waiting for the hold function to be started
F:___0 N	Force value for opening gap
S:_9,99 mm	Opening gap
HS-OK	Holding gap and holding force have been reached. The ELK 02 is waiting for the closure function to be started
F: 344 N	Holding force
S: 10.87 mm	Holding gap
	V24 standard data output (only if this function is enabled)
Clamp type                  Pincer type	Text    H V 12.0 4.0 4.0 10.87 300 150 150 344 0 OK
SS/SK-OK	Closing gap and closing force were reached. The ELK 02 is waiting for the verification function to be started
F: 5035N	Closing force
S: _3.76 mm	Closing gap
	V24 standard data output (only if this function is enabled)
Clamp type                  Pincer type	Text    S V 9.0 9.0 9.0 3.76 5000 250 250 5035 0 OK
VW-OK	Verification gap and verification force have been reached. ELK 02 is waiting for the opening function to be started
F:___84N	Verification force
S:_2.34 mm	Verification gap
	V24 standard data output (only if this function is enabled)
Clamp type                  Pincer type	Text    V V 2.0 1.5 1.5 2.34 100 60 60 84 0 OK
OF-OK	The pincer is open again, the closure has been completed.
F:___0N	Force value for opening gap
S:10.99mm	Opening gap
_002 Ready for closure	The ELK 02 is at the closure level and is waiting for a start from the user

Table37 Data output at X3 at each completed step in step-by-step

Message text	Meaning
Error 8	Error output here: Error 8 "APN not assigned".

Table38 Data output at X3 on error

**Handshake at X3**

Call up the individual measured data records:

Entry at X3	Call up from
GetH=?	Holder measured data
GetD=?	Detection measured data
GetK=?	Contact measured data
GetS=?	Closure function measured data
GetV=?	Verification measured data

Table 39 Call up the individual measured data records

If no measured data are available for call off, the ELK 02 responds at X3:

- Priority: C
- Error number: 99
- Status: NO

Message text	Meaning
Error 8	Error output here: Error 8 "APN not assigned".

Table 40 Data output at X3 on error

**13.1.5 X20 interface**

25-pin SUB-MIN-D (male)

INFO
The cable must be fitted with a ferrite ring at the cable end near the X20 interface.

**Inputs**

Opto-decoupled inputs, supplied by customer:

PIN 1	24 V = (19 - 30 V) (Customer voltage)
PIN 25	GND
Signal "0"	0...5 V
Signal "1"	15 - 30 V (> 100 ms for start)
Input current	10 mA (at 24 V)

**Outputs**

Opto-decoupled outputs, supplied by customer:

PIN 1	24 V = (19 - 30 V) (Customer voltage)
PIN 25	GND
Signal "0"	0 V
Signal "1"	Customer voltage -0.5 V
Output current	typically 20 mA, short-circuit proof

PIN	Assignment	PIN	Assignment
1	+24 V (from customer to activate I/Os)	15*	Bit 64 input
2*	Reset input	16*	Spare input
3*	Enable input	17*	Busy output
4*	Function input	18*	System error output

PIN	Assignment	PIN	Assignment
5*	Start input	19*	Pincer test output
6*	Spare input	20*	Ready output
7*	Pincer test input	21*	OK output
8*	Spare input	22*	NO output
9*	Bit 1 input	23*	Spare output
10*	Bit 2 input	24*	Spare output
11*	Bit 4 input	25	GND (from customer to activate I/Os)
12*	Bit 8 input	HOUSING	PE (protective earth) conductor
13*	Bit 16 input		
14*	Bit 32 input		

Table 41 PIN assignment for X20 interface

\*) Inputs and outputs opto-decoupled

**Description of the PIN assignments for the X20 interface**

PIN assignment	Function	Description	Times
Reset	Input	Cancels a closure function that was started, cancels the pincer test Error message F19 RESET CANCEL	Impulse > 300 ms
Enable	Input	The “Start” function is active only when “Enable” is activated	continuous signal
Function	Input	Acknowledgment of routines in accordance with specifications or diagrams For the “Function” display <ul style="list-style-type: none"> <li>Request pincer test</li> <li>Request APN</li> </ul>	4 s  2 s 4 s
Start	Input	“Start” can initiated only if “Enable” is active	> 100 ms
Pincer test	Input	Skip back to the “Function” display. From here you can select <ul style="list-style-type: none"> <li>Request pincer test</li> <li>Request APN</li> </ul>	2 s 4 s
Bit 1 to bit 64	Input	APN selection <b>NOTICE:</b> The sum of the bits determines the APN Example: APN 40: Bit 8 + 32	continuous signal
Busy	Output	Active on startup after ELK 02 is powered up	
System error	Output	Active with error message F1 to F03, F08, F15, F16, F19 to F21, F23	
Ready	Output	Active: “Close” is enabled	

Table 42 Description of the PIN assignments for the X20 interface

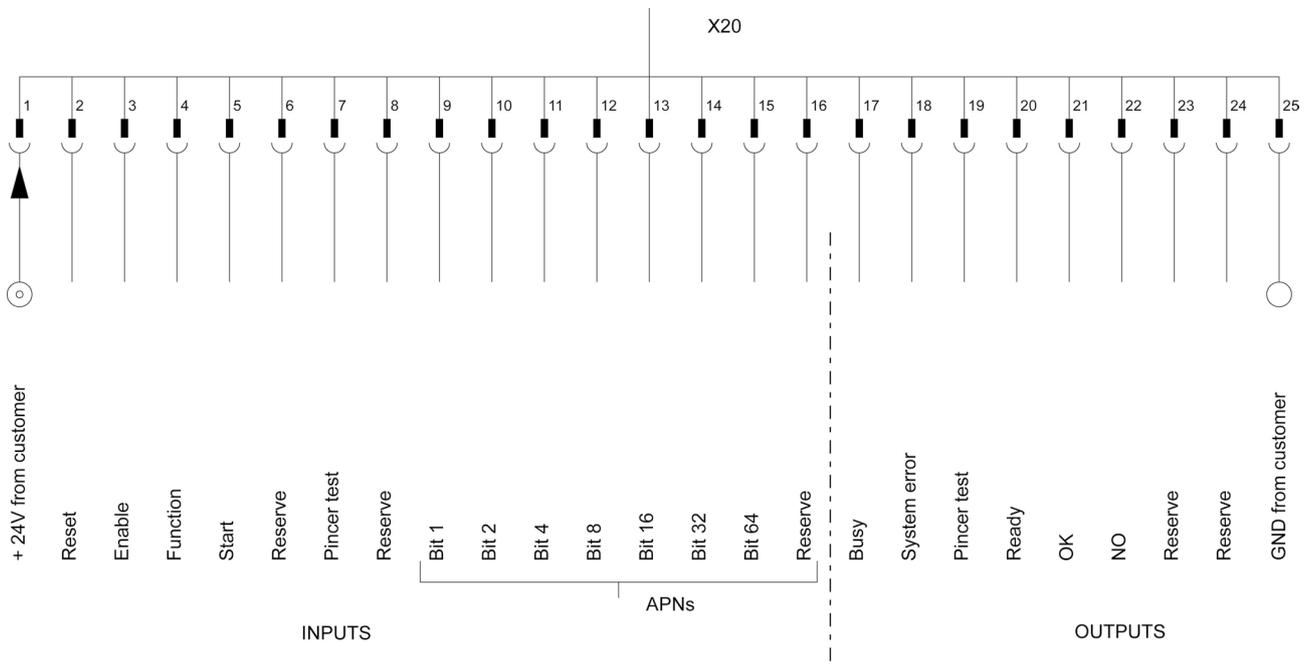


Fig. 85 Connection diagram for the X20 interface

**Output matrix**

Function	Busy	System error	Pincer test	Ready	OK	NO
ELK 02 ON (OETIKER logo) Output test	H	H	H	H	H	H
ELK 02, firmware version, creation date	H					
Pincer test			H			
Error messages F1 to F03, F08, F15, F16, F19 to F21, F23		H				
Ready (enable for closure)				H		
During closure	H					
Closure result OK					H	
Closure result NO						H

Table43 Output matrix

## 13.1.6 USB interface

### INFO

- The cable must be fitted with a ferrite ring at the cable end near the USB socket.
- The USB interface may only be used for data exchange with the PC, not for data outputs.
- A driver must be loaded and installed on the PC before establishing a USB connection between the PC and the ELK 02 for the first time. This installation takes place automatically.  
If the automatic installation is unsuccessful, the driver is located in the installation directory of the PC and can be manually installed.
- Once the USB connection has been plugged in, the ELK 02 PC program may need to be reopened in order to locate the driver.

## 13.2 Technical data

### 13.2.1 Fluidics

### INFO

- As the ELK 02 unit is used for control technology, absolute cleanliness must be ensured during assembly.
- The pE and pA connections must always be closed off when not in use to prevent the penetration of dust.
- The recommended filter must be installed in a vertical position ahead of the ELK 02 control unit.
- An oil- and water-free air supply must be provided.
- For control technology reasons, in particular with long air supply ducts, we recommend installing an accumulator (volume 1 to 5 liters, depending on the pincer size) ahead of the ELK 02, directly on the compressed air supply pE. The applicable regulations must be observed.
- Replacement filter – e.g. FESTO, series M (see maintenance instructions).

### Fluidic inputs and outputs

### NOTICE

Damage caused by broken pincer jaws

- ▶ When using the HO 10000 pincer model, make sure that the compressed air supply pE does not exceed 5 bar.

Compressed air supply pE	> 4 bar... max. 10 bar
Recommended compressed air supply pE	> 6 bar... max. 10 bar
Air quality	< 5 μ, unoiled, dewatered (ISO 8573-1)
Air quantity	2 l/closure (HO 7000)

**Connections for fluids**

- Compressed air supply Connector for 8/6 mm hose
- Compressed air outlet Connector for 8/6 mm hose.

**13.2.2 ELK 02 housing**

External dimensions:	200 x 230 x 70 mm
Weight:	3.7 kg
Color:	light gray, powder-coated.

**13.2.3 Accuracy within the working temperature range**
**INFO**

Prior to use, the ELK 02 should be switched on for approximately 1 hour for warm-up.

**Closing force tolerances within the working temperature range**

	Force priority closure	Gap priority closure
HO 2000 – 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	≥ 1.33	

Table 44: Accuracy within the working temperature range

**13.2.4 Temperature**

Temperature in storage	0° C ...+60° C
Working temperature	+15° C ...+40° C

## 14 Troubleshooting

### 14.1 General notes on faults

- If the closure operation will not start or faults occur during operation, consult the maintenance personnel responsible for the ELK 02.
- Operators must inform their supervisor. Under no circumstances should you try to rectify faults on the ELK 02 yourself. If a fault occurs, please contact OETIKER ([www.oetiker.com](http://www.oetiker.com)).

### 14.2 What to do, when...?

Type of fault	Reason for fault	Actions to rectify fault
Closure operation will not start	Unit not switched on	Switch on unit, execute pincer test
Unit switched on, no display	Control unit fault	Send to OETIKER
Loud noise of rushing air in the control unit	Leaking valves	Send to OETIKER
Display shows incoherent text	Electromagnetic interference above permitted limit	Reload all data

Table44 *Fault table*

### 14.3 Error messages and error correction measures

Error	Cause/Error correction	Output X2	Output X20
F01 SUPPLY PRESSURE	Increase supply pressure	NO → H	System error → H
F02 NO PINCER	Close the pincer Measuring system defective	NO → H	System error → H
F03 MEASURING SYSTEM	Tighten connector screws Pincer defective	NO → H	System error → H
F04 OS - ERROR	Modify OS and OS-T Recalibrate pincer Replace pincer	NO → H	NO → H
F05 SK - ERROR	Increase supply pressure Modify SK and SK-T Modify SK-HZ Recalibrate pincer Replace electronics	NO → H	NO → H

<b>Error</b>	<b>Cause/Error correction</b>	<b>Output X2</b>	<b>Output X20</b>
F06 SS - ERROR	Modify SS and SS-T Modify SS-HZ Recalibrate pincer Replace electronics	NO → H	NO → H
F07 SK + SS - ERROR	Modify SK and SK-T Modify SS and SS-T Modify SK-HZ Modify SS-HZ Recalibrate pincer Replace electronics	NO → H	NO → H
F08 APN DATA	APN data missing Selected APN invalid	NO → H	System error → H
F09 HK - ERROR	Modify HK and HK-T Recalibrate pincer Replace electronics	NO → H	NO → H
F10 HS - ERROR	Modify HS and HS-T Clamp in the pincer? Recalibrate pincer Replace electronics	NO → H	NO → H
F11 HK + HS - ERROR	Modify HK and HK-T Modify HS and HS-T Clamp in the pincer? Recalibrate pincer Replace electronics	NO → H	NO → H
F12 VK - ERROR	Modify VK and VK-T Modify VK-HZ Recalibrate pincer Replace electronics	NO → H	NO → H
F13 VW - ERROR	Modify VW and VW-T Low Profile Clamp jammed Recalibrate pincer Replace electronics	NO → H	NO → H

Error	Cause/Error correction	Output X2	Output X20
F14 VK + VW - ERROR	Modify VK and VK-T Modify VK-HZ Modify VW and VW-T Low Profile Clamp jammed Recalibrate pincer Replace electronics	NO → H	NO → H
F15 DATA STORE EMPTY	Input pincer data Load closure data Load factory data Replace electronics	NO → H	System error → H
F16 CANCEL PROCESS	Touch mode? Incorrect/no measuring device Replace pincer Replace electronics	NO → H	System error → H
F17 NOT ENGAGED	Adjust closure data Check clamp design Unsuitable material being clamped	NO → H	NO → H
F18 QUANTITY	The pre-set number has been reached A pincer test is required	NO → H	NO → H
F19 RESET CANCEL	Cancel via reset input	NO → H	System error → H
F20 OF - ERROR	Pincer not open Recalibrate pincer Replace pincer	NO → H	System error → H
F21 WN_TOO_HIGH	In force calibration with constant nominal force the calculated target value is too high Send pincer type data	NO → H	System error → H
F22 DETECTION ERROR	The same clamp has already been closed No clamp present	NO → H	NO → H
F23 LOSS OF PRESSURE	Increase supply pressure Clean pre-filter Install accumulator	NO → H	System error → H
F24 MAINTENANCE	Send to OETIKER for servicing Replace electronics	NO → H	NO → H
F25 MAX. 20 CLOSURES	Max. number of closures in pincer test mode exceeded	NO → H	System error → H

Table45 Error messages



# 15 Checklists – repair forms

## 15.1 Checklist for ELK 02, control unit

Please fill out this form legibly in BLOCK CAPITALS. Thank you!

Place, date ..... Name: .....

Telephone No.: ..... Fax: .....

Type: ..... Serial no.: .....

Delivery date: ..... Version V: .....

Company name: .....

Address: .....

.....

.....

Department: ..... Production area: .....

Operating hours/day: ..... Last pincer test: .....

Application:  Single  Close function

Sequential  OPEN

Chaotic  Hold;  Detect

Verify

Start:  START button  via PLC, type.....

externally at X2.  In-house control

externally at X20

### Description of fault

Failure:  immediately  after . . . . days  after . . . . months

**Possible faults**

- Electrical:
- O none shown in the display
  - O Incorrect display / illogical display
  - O Display error F..... occurred
  - O Panel-mounted connector defective (mechanical)
  - O Threaded bolt for securing connector defective
  - O OK / NO output signal at X2/X20 not working
  - O Inputs at X2/X20: cannot be activated
  - O Data transfer between PC and ELK 02 not working – check cable first!
  - O Pincer only working intermittently (loose contact at X1, pincer connector)
- Mechanical
- O Loud exhaust noises in housing
  - O Loud exhaust noises at small muffler
  - O Loud exhaust noises at large muffler
  - O Screw connections loose
  - O Pincer permanently open in OS
  - O Pincer permanently closed in SS
  - O Filter dirty



### 15.2 Pincer checklist repair form

Please fill out this form legibly in BLOCK CAPITALS. Thank you!

Place, date ..... Name: .....

Telephone No.: ..... Fax: .....

Type: ..... Serial no.: .....

Delivery date: ..... Version V: .....

Company name: .....

Address: .....

.....

.....

Department: ..... Production area: .....

Operating hours/day: ..... Last pincer test: .....

Start:  START button

Pincer holder:  Manual

Device

Robot or similar

Corrugated hose:  Loose on ELK 02

Mounted as per instructions in instruction manual

#### Description of fault

Failure:  immediately  after . . . . days  after . . . . months



## 16 Warranty conditions

### 16.1 Warranty period

#### Warranty period for pincer

- 24 months for manufacturing faults, excluding wear parts.

#### Warranty period for wear parts

- 6 months.

#### Wear parts

ELK 02	Valves.
Trigger unit EL	Corrugated hose with compressed air hose and cable Gap measuring system Sleeve and pushbuttons
Pincers	Seals, plunger, rollers, pincer jaws

### 16.2 Conditions

- The component must have been commissioned as described in the instruction manual.
- The component must not have been opened up or tampered with.
- The trigger unit EL must not have been detached from the pincer body.

### 16.3 Warranty claims

A defect or the absence of warranted properties, subject to the above conditions, constitutes grounds for a warranty claim.

#### Return

We recommend returning the components in their original packaging.

If that is not possible, the components should be packed in protective packaging. It is a condition of return that the fluid sealing plugs on the control unit and the compressed air hose on the trigger unit are attached. If the component is damaged due to inadequate packaging, the customer shall bear the costs, notwithstanding any justified warranty claims.

#### Claim report

The claim report (part of the instruction manual) must be completed and returned with the component.

If no claim report is provided, all components will have to be tested in full. These costs shall be borne by the customer, notwithstanding any justified warranty claims.

## 16.4 Consequential damage

We accept no liability for consequential damage arising indirectly or directly from the installation of our components.

## 16.5 Costs

Where a warranty claim is justified, we will bear the costs subject to return in the correct manner and submission of a fully filled out claim report (section 15).

If there are no grounds for a claim, the customer will be billed for the costs incurred.

## 17 Declaration of Conformity

### EC Declaration of Conformity

- in accordance with the Machinery Directive (2006/42/EC)
- in accordance with the EMC Directive (2004/108/EC)
- in accordance with the Low Voltage Directive (2006/95/EC)

The products listed below comply with the provisions of the above-mentioned directives:

### Product designation

Electronically controlled pneumatic pincer OETIKER ELK 02.

### Series/Model

Control unit, item no.

136 00 289 (85 to 265 V / 47 to 63 Hz, V1.X)

Pincer with standard heads and add-on unit

Model HO 2000 EL (T) to HO 10000 EL (T).

The following harmonized standards apply

- EN ISO 12100
- EN 60204-1
- EN ISO 4414
- EN 61000-6-4: 2007 + A1: 2011
- EN 61000-6-2: 2005

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