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Instruction Manual

maXYmos TL
Type 5877...

CE

Valid for
Firmware Version 1.7.x

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Foreword

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1. Important notes

Please make absolutely sure you take account of the following notes, which are intended to ensure your personal safety when handling this monitor as well as ensuring a long, fault-free service life. As most of the information in this manual is color-coded it is best to print it in color. You should therefore use the PDF included on the CD or online on www.kistler.com (see download area). You can pass on information, ideas, requirements and any criticisms to us using *maxymos@kistler.com*.

1.1 For your safety

This monitor has been manufactured and tested to CE requirements and EU directive 89/336/EEC, and left the factory in perfect safe condition. To maintain this condition and ensure safe operation, compliance is required with the instructions and warnings in this instruction manual and on the monitor.
It must be assumed that safe operation is no longer possible if the monitor:

- is visibly damaged,
- is no longer responding,
- has been stored under unsuitable conditions for a long time or
- has been treated roughly in transit

1.2 Unpacking

Check all of the packaging of the monitor for any damage in transit. Report such damage to the freight forwarding company and your local Kistler sales center or distributor. Please check that all of the included accessories are present before using the monitor for the first time. Please report any missing parts to your local Kistler sales center or distributor.

1.3 Transportation and storage

If the monitor is to be transported or stored for a long period of time, take the following safety precautions:

- The temperature must lie in the range 0 … 50 °C
- BNC connections must be covered with a non-shorting dust cap
- Ensure no dirt can get into the monitor
- The environment must be as dry and free from vibration as possible
- Store the monitor in such a way that it cannot be subjected to any pressure

1.4 Supply

The monitor is designed for a voltage range from 18 ... 30 VDC (24 VDC). Protective diodes are fitted to prevent the monitor from being irreparably damaged if the polarity is reversed.

1.5 Electromagnetic compatibility (EMC)

The monitor conforms to CE requirements and the EMC standards EN 61000-6-4 (industrial interference) and EN 61000-6-2 (industrial immunity). It has been subjected to an immunity test (electrostatic charges).

1.6 Disposal

Waste electrical and electronic equipment must not be disposed of in domestic refuse. Please take the old equipment to your nearest collection point for disposal of such equipment or contact your Kistler sales office.

1.7 Care/Handling of the MEM and DIM

The DIM has a touchscreen and is delivered without protective foil. The DIM touchscreen should be frequently cleaned with a fluff-free cloth and off-the-shelf cleaning agent suitable for touchscreens. During cleaning the pressure on the screen should not be too high. We recommend switching the device off during cleaning.

The products must only be opened, repaired and maintained by qualified Kistler staff. When opening the devices all warranty claims to Kistler expire. The devices must be protected of mechanical damage and handled with care.

2. Short description

The maXYmos TL (Top Level) captures, analyzes and evaluates the XY curves of two measurands that are required to maintain a precisely pre-determined relationship to each other. XY measurements of this type are used in applications such as

- Press fitting ball bearings or valve seat rings
- Riveting and flanging casing parts
- Pivoting and adjusting joint angles
- Turning key-operated switches
- Moving drawer runners
- Compressing and extending shock absorbers
- Inserting slot-in components
- Crimping of single wires
- Crimping of sheet metal

XY measurements of this kind can be used to monitor the quality of an individual manufacturing step, a series of steps in component assembly or an entire product.

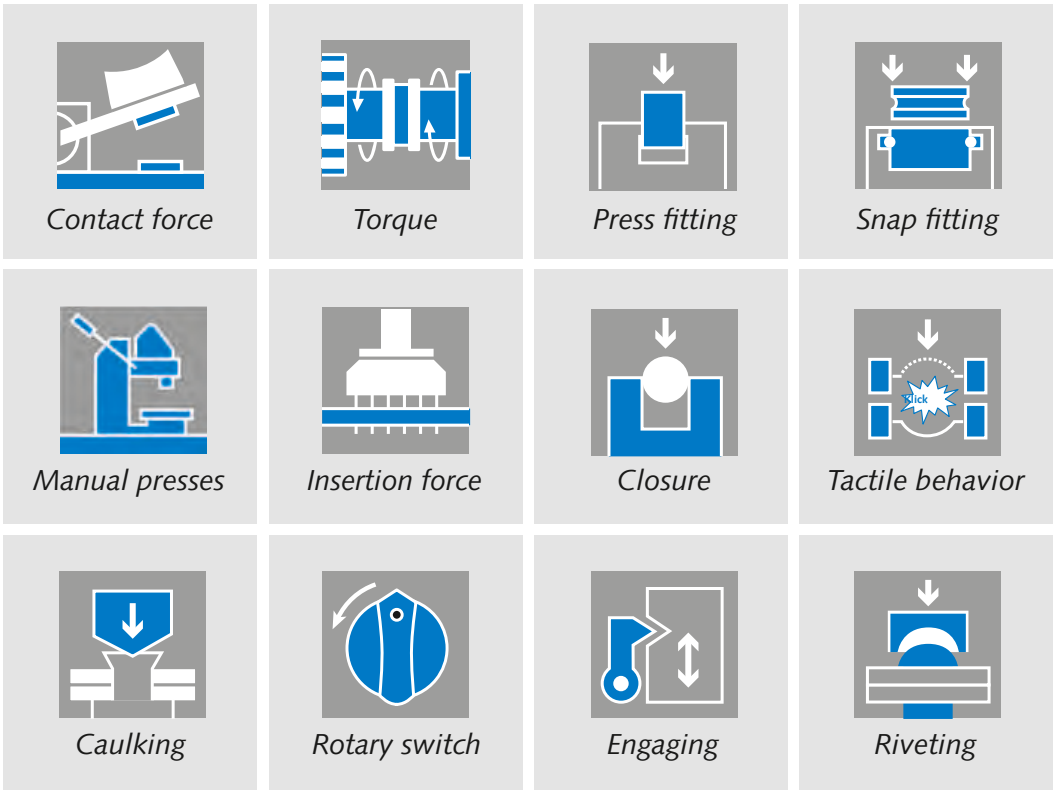
Description

This XY monitor can be used for a whole range of applications - from simple, single-channel force/displacement monitoring right through to complex, multi-channel applications used in product installation and testing. The monitor simultaneously accommodates a cascading display of up to eight XY channel pairs. It is principally designed for sophisticated users who require a maximum of application capability, ease of use and flexibility. With its wide range of high-performance evaluation objects, this device can monitor extremely complex XY measurements. Building on the capabilities of the maXYmos BL (Type 5867B..), the maXYmos TL offers a whole range of additional functions. GET-REF, for example, can identify the coordinates of significant points on a curve, such as the position of slot-in points, and transmit them to a calculation function, which then calculates and evaluates the distance between two such points. Each measurement module (MEM) incorporates the following principal features:

- Up to 8 XY channel pairs (MEMs) in a cascading display
- Y=f(X), Y=f(X,t), Y=f(t), X=f(t) measurement functions
- Curve evaluation using UNI-BOX, ENVELOPE, LINE-X, LINE-Y, NO-PASS, HYSTERESIS-Y, HYSTERESIS-X, GRADIENT-Y, GRADIENT-X, TUNNELBOX-X, TUNNELBOX-Y, BREAK, CALC, AVERAGE, GET-REF, SPEED, TIME, DELTA-Y, DIG-IN, INTEGRAL, DISPLACEMENT RANGE, FORCE RANGE, PASS-THROUGH BOX fracture recognition
- Up to 10 evaluation objects (EOs) per curve
- Dynamic referencing of the EOs along the X and Y axes
- 108 measurement programs and 20 master programs
- Measurement curve incorporating up to 8 000 XY value pairs
- High-speed evaluation, measuring
- Ethernet TCP/IP for measurement data, remote maintenance and channel cascading
- Menu-defined bus type: PROFIBUS DP, EtherNet/IP, PROFINET, EtherCAT
- Digital I/O (24 V) for control and results
- 2 switch signals for X and Y threshold
- 2+1 USB for USB ports and Notebook
- Sensor for X channel: Potientometer, ±10 V, LVDT, Incremental TTL, SSI
- Sensor for Y channel: Strain gauge, ±10 V, ±10 V (2 measurement ranges), or piezoelectric sensors
- Multiple data export formats, e.g. Q-DAS®, QDA9, IPM 5.0, XML, CSV, PDF
- Mounting easily modifiable between desk top, wall or front-panel position
- Powerful NOK diagnostics, process-value trend analysis etc.
- Process-value tables displaying freely configurable content
- Selected process values from curve graphs
- Warnings and alarms, e.g. sequential NOK readings
- Acces protection with various levels of access
- Display module (DIM) with 10.4“ color touch screen and front-facing USB port

Further information is available on www.kistler.com/maxymos

The maXYmos TL monitor is most frequently used to monitor the following processes:

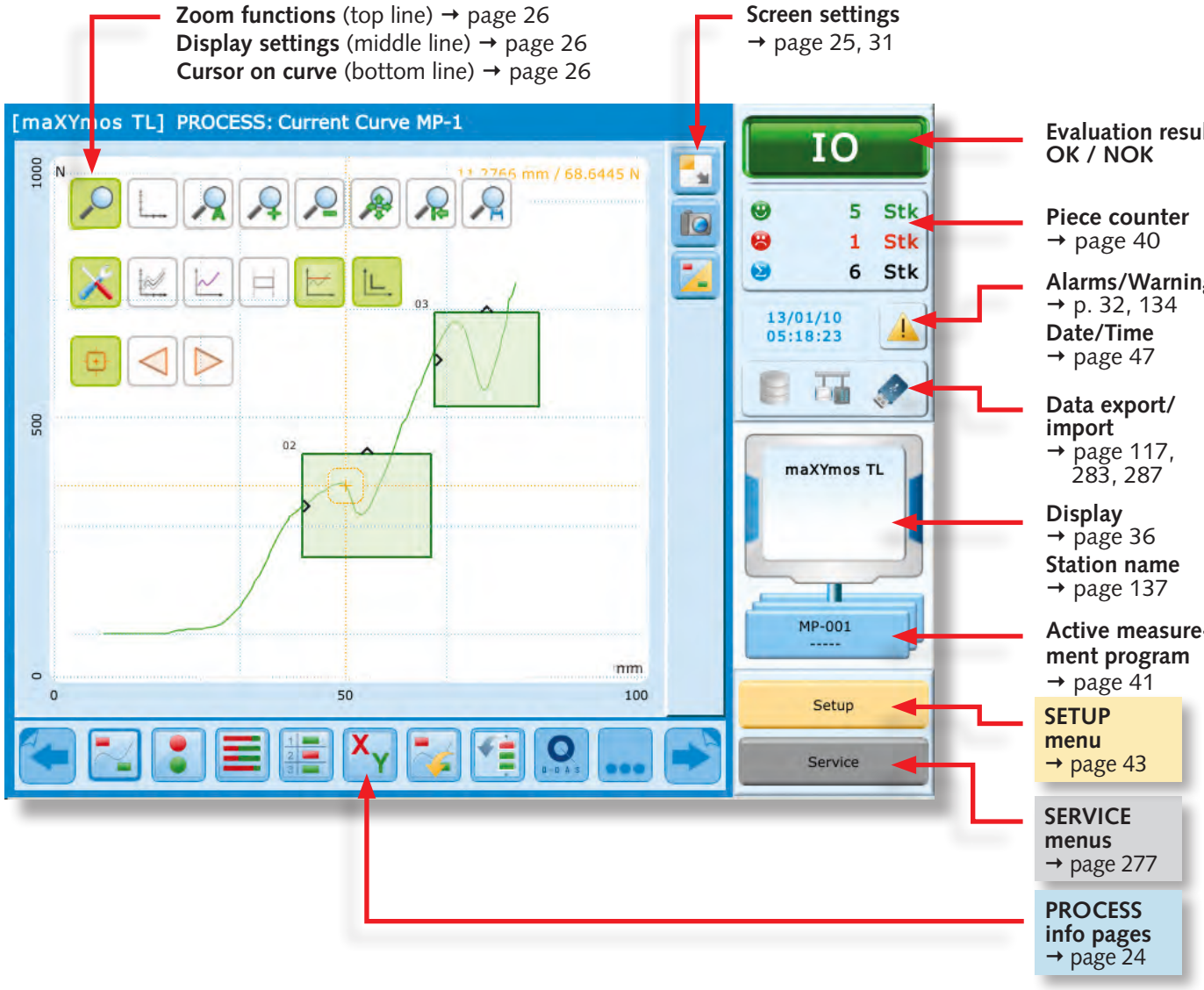


Sensor Channel Y		
Measuring range		Number 4
maXYmos TL Standad **Type 5877B0**		
Measuring range 1	pC	±100 ... ±1 000
Measuring range 2		±1 000 ... ±10 000
Measuring range 3		±10 000 ... ±100 000
Measuring range 4		±100 000 ... ±1 000 000

Sensor Channel Y		
Measuring range		Number 4
maXYmos TL ML Medical Low measuring range **Type 5877B2**		
Measuring range 1	pC	±0 ... ±40
Measuring range 2		±40 ... ±400
Measuring range 3		±400 ... ±1 000
Measuring range 4		±1 000 ... ±10 000

Sensor Channel Y		
Measuring range		Number 4
maXYmos TL L Low measuring range **Type 5877B3**		
Measuring range 1	pC	±0 ... ±40
Measuring range 2		±40 ... ±400
Measuring range 3		±400 ... ±1 000
Measuring range 4		±1 000 ... ±10 000

3. At a glance


Zoom functions (top line) → page 26
Display settings (middle line) → page 26
Cursor on curve (bottom line) → page 26
Screen settings
→ page 25, 31
[maXYmos TL] PROCESS: Current Curve MP-1
IO
5 Stk
1 Stk
6 Stk
13/01/10
05:18:23
maXYmos TL
MP-001
Setup
Service
Evaluation result
OK / NOK
Piece counter
→ page 40
Alarms/Warnings
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import
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Station name
→ page 137
Active measure-
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menus
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→ page 24

KISTLER
measure. analyze. innovate.

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Appendix

4. Quick Start: Initial curve capture (short guide)

This short guide is intended for users who are already familiar with the maXYmos BL monitor and does not therefore go into exhaustive detail.

4.1 Installation/Mounting

Installing/mounting the monitor (→ Section 11 / p. 314)

4.2 Sensors

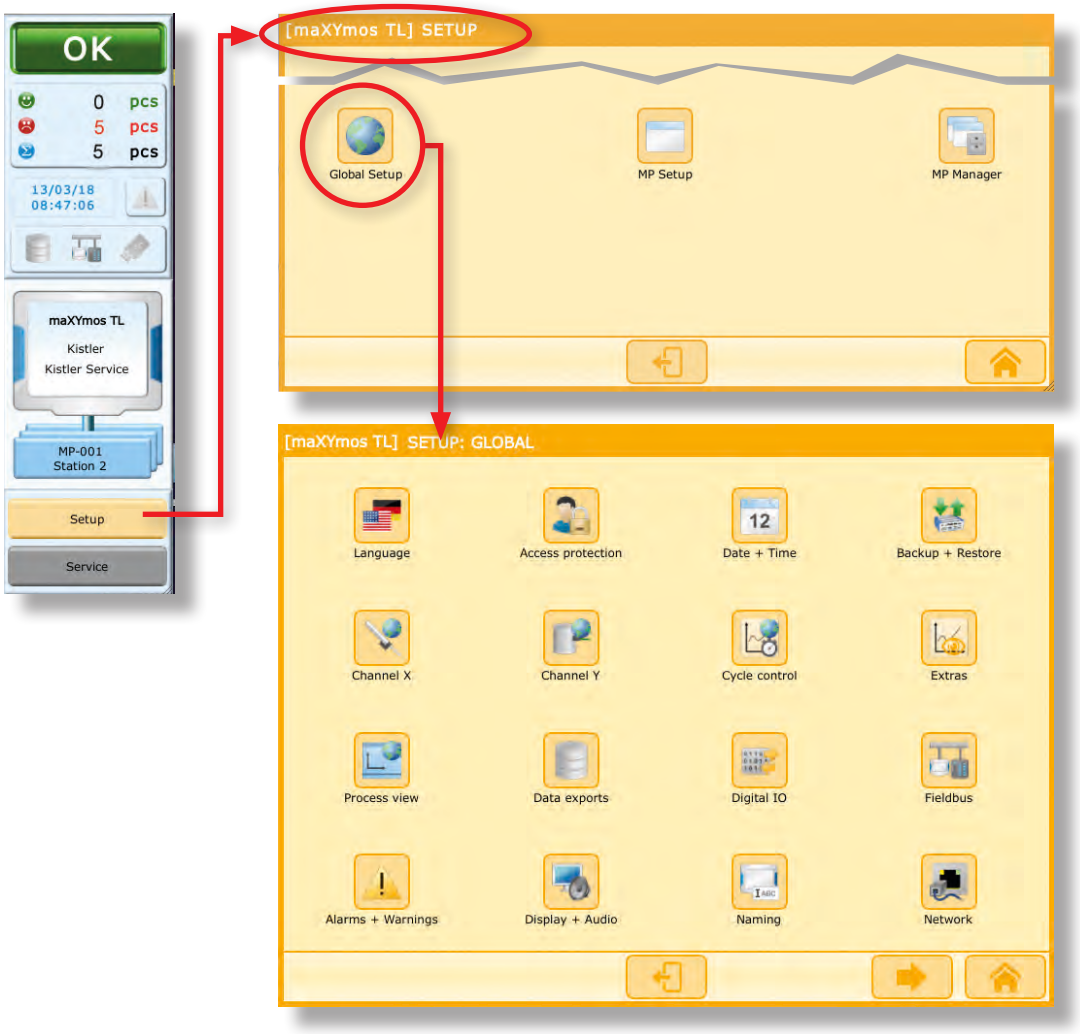
Connecting sensors (→ Section«Sensors» page 321)

4.3 Connecting to power supply/startup

Connect the monitor **to the power supply** (→ Section 9.2.1 / p. 297). As soon as 24 VDC power delivery commences, the maXYmos TL starts up automatically. Once initialized, the monitor displays the blue **process screen** (→ Section 6 / p. 24). This is similar to that used in the smaller maXYmos BL model:

4.4 Configure basic setup parameters

The basic setup parameters are in the orange SETUP menu under "Global setup"



What basic setup parameters are required?

- To set **language** → Setup Menu/GLOBAL Setup/Language
- To set **date/time** → Setup Menu/GLOBAL Setup/Date + Time
- Configure **fieldbus** → Setup Menu/GLOBAL Setup/Fieldbus
- **Network settings** → Setup Menu/GLOBAL Setup/Network
- **Alarms + Warnings** → Setup Menu/GLOBAL Setup/Alarms + Warnings
- **Display + Audio** → Setup Menu/GLOBAL Setup/Display + Audio

4.5 Before making your first measurement

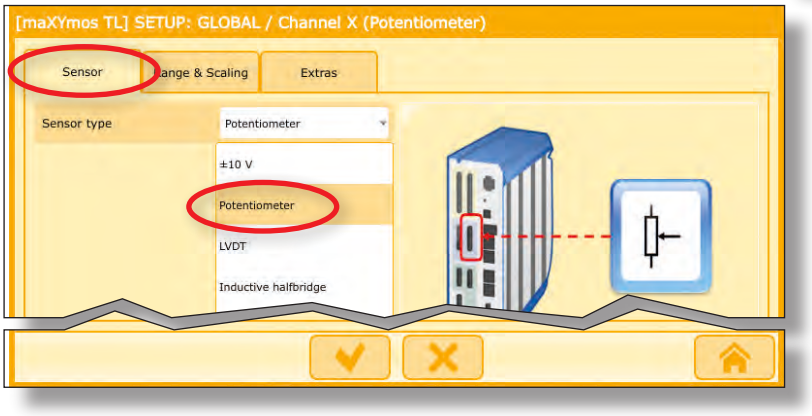
For a measurement curve to be captured, the following settings must have been configured:

1. **Channel X (e.g. displacement)** → Section 7.7.2 / p. 54
2. **Channel Y (e.g. force)** → Section 7.7.3 / p. 57
3. **Cycle Control** → Section 7.8 / p. 82

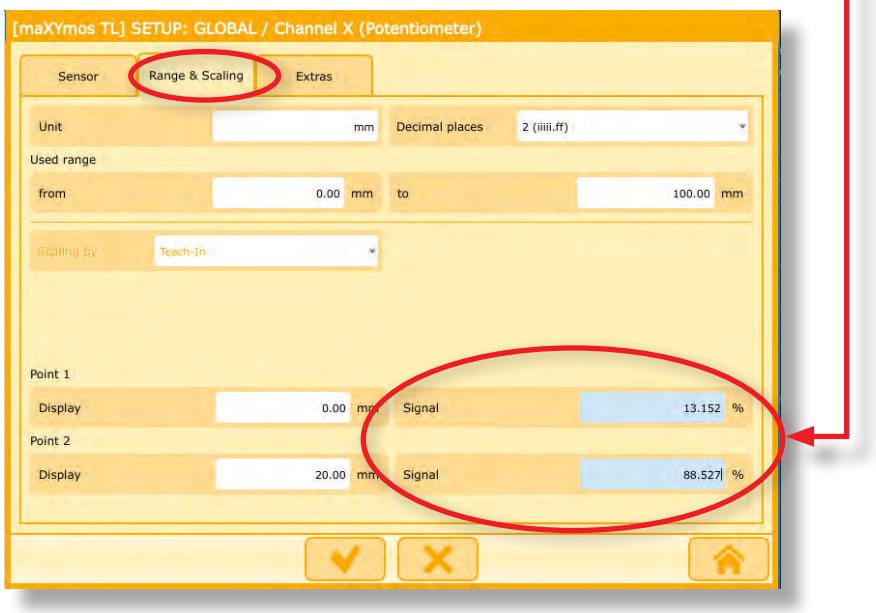
No measurement curve can be captured unless all these settings have been configured.
The factory settings for Channel X and Channel Y are **configured to "Global"** (i.e. all measurement programs receive these values as inputs) → p. 54. To configure a measurement channel to a specific measurement program → page 143, p. <ÜS>.

4.6 Configuring measurement Channel X (Global)

- Setup **SETUP** Menu, then **Global setup** and to open **Channel X**
- Select **Sensor Type** (potentiometer in this example) and confirm with

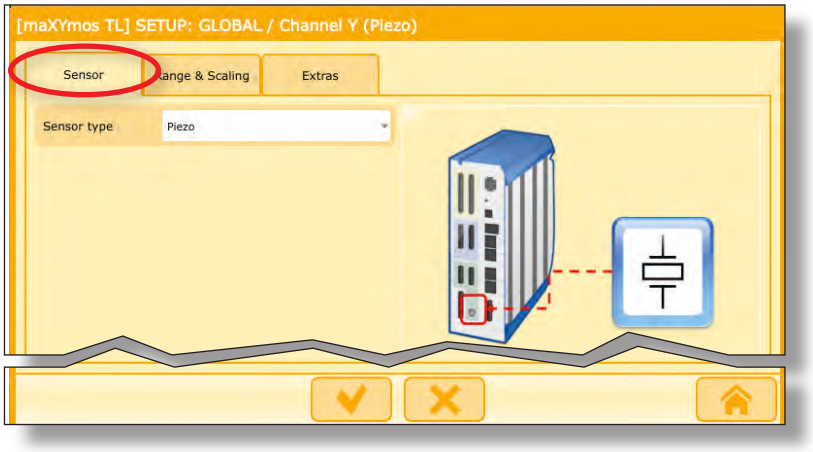


- Define measurement **range** and use end points to "teach in" **scaling** parameters. Tap on to confirm settings.

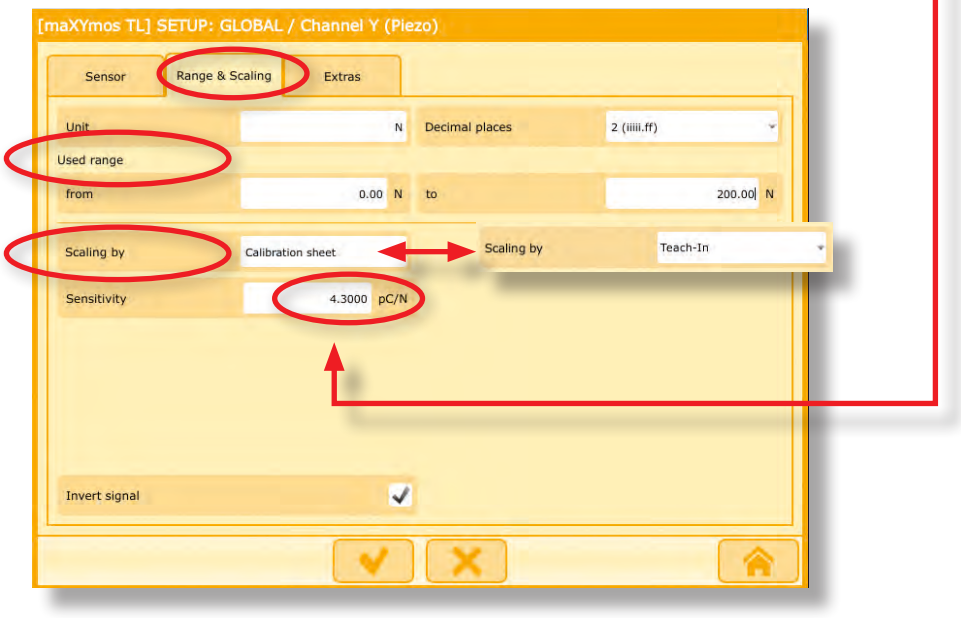


4.7 Configuring measurement Channel Y (Global)

- Setup **SETUP** Menu, then **Global setup** and to open **Channel Y**
- Select **Sensor Type** (Piezo in this case) and confirm with



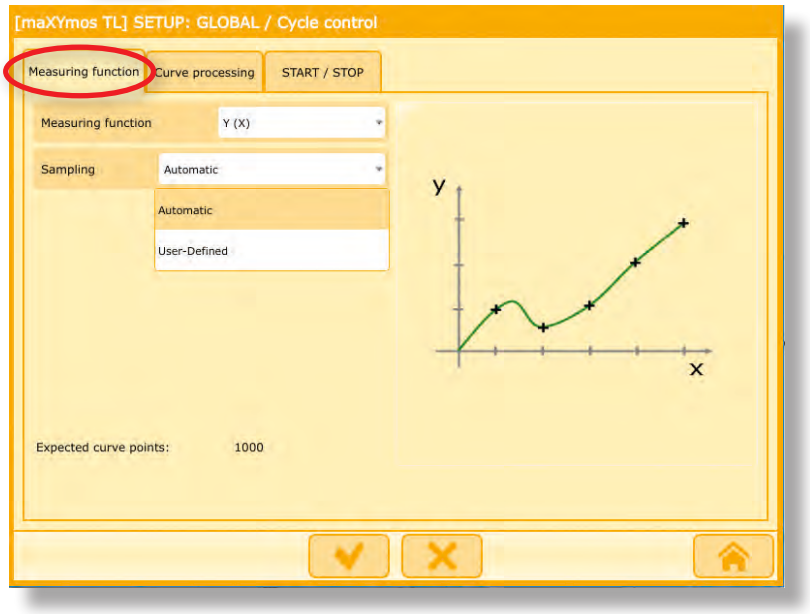
- **Used Range:** Define measurement **range** and scaling
- **Scaling by:** Scaling can be by **either** of the following
  - **Calibration Sheet:** Define sensitivity of sensor (see calibration sheet).
    Important: depending on the sensor type, remember to use a minus (–) sign to define sensitivity where appropriate
  - **Teach-In:** Teach in' the appropriate value (= value will be measured/read)



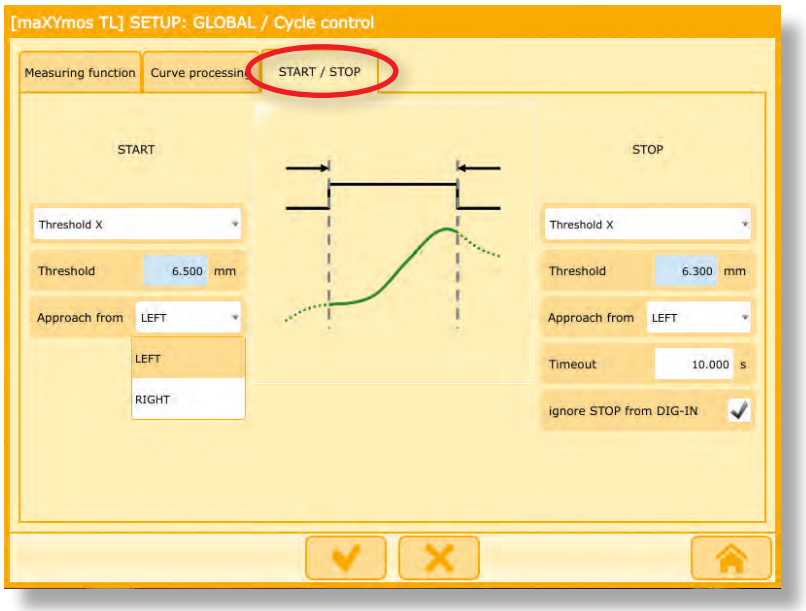
- Click on to confirm.

4.8 Configuring cycle control

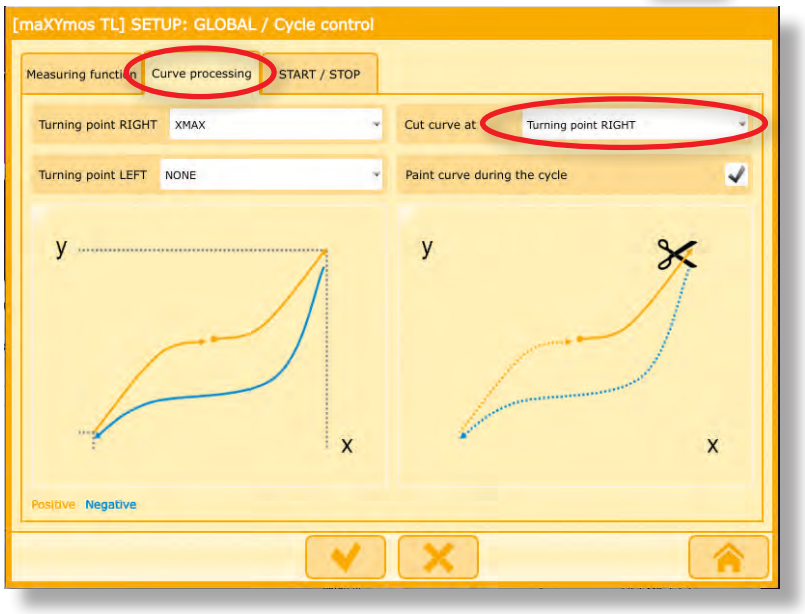
- Setup **SETUP** Menu, then **Global setup** and to open **Cycle Control**
- Define **Measuring function** (in this example «**Y(X)**»), set **Sampling** to **Automatic** and tap on to confirm settings.



- Defining **Start/Stop** settings. In the example below, Threshold X has been used (other Start / Stop settings are available). Approach test positions and "teach them in". On the return leg STOP a little below the Start position (= lower value than initial Start value, now coming from the right). Click on to confirm.

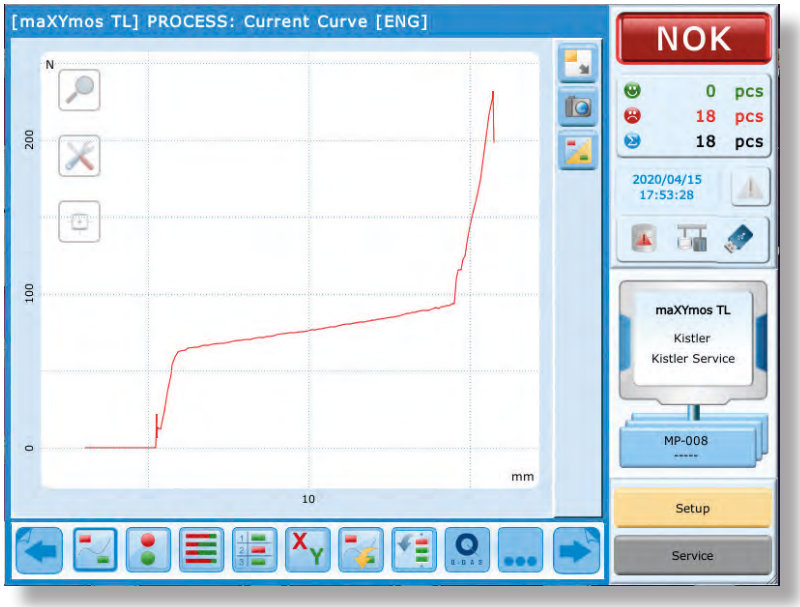


- If required, return leg of curve can be cut at the desired curve point "Xmax or Ymax" (= «Turning Point RIGHT»). Confirm this by clicking on



4.9 Capturing measurement curve

- The key basic settings have been configured and the first measurement curve can now be captured and displayed.



- In order to define evaluation criteria, additional settings must either be configured in the EO Editor, or EOs (= evaluation objects) must be configured
→ Section 7.23 / p. 147

Note: In this example, no EOs have yet been set. No evaluation can therefore yet be made. That is why the NOK (not OK) sign appears and the curve is colored red.

5. Device structure

5.1 Menu structure – The three main levels

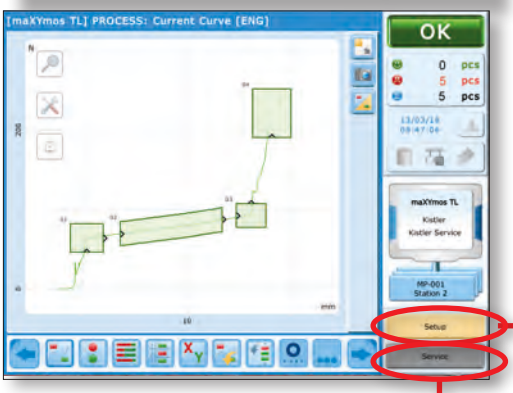
The menu structure comprises three main levels. Each level has its own characteristic border and background color:

1. **The PROCESS level (blue)**
   This level is used for the initial screen display. During operation it displays **measurement curves or results**. The individual sub-levels can be accessed by clicking on blue buttons in the menu bar at the bottom of the screen. → page 24

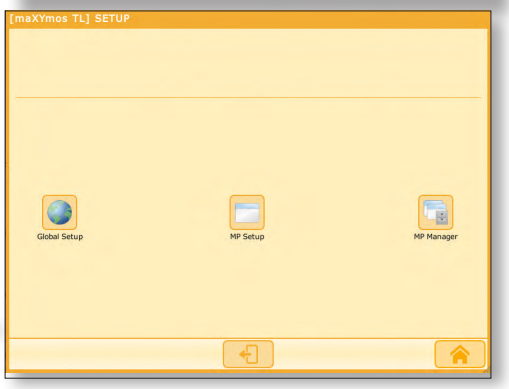
2. **The SETUP level (orange)**
   This level is used to configure **basic settings**, e.g. for the **X** and **Y Channels** and **Cycle Control**, as well as for general settings such as Language, Time, Network etc. The parameters for the **108 measurement programs and 20 master programs** and their EOs (evaluation objects) are also configured here. → page 43

3. **The SERVICE level (grey)**
   This level contains general system information (firmware version etc.), as well as messages on I/O status, in/out tests, firmware updates, resets etc. → page 277

1. PROCESS level (blue) → page 24



2. SETUP level (orange) → page 43



3. SERVICE level (grey) → page 277

5.2 Parameter structure – Parameters and their storage locations

Parameters are configured and stored on the yellow SETUP level. The SETUP level is divided into three sub-levels:

1. **Global setup** for all basic settings, such as Channels X and Y, Language, Time, Network etc. → page 43, 46
2. **MP Setup** for settings specific to individual MPs (measurement programs), such as capturing measurement curves, setting EOs, Channel X/Y settings specific to individual MPs (see tip below) → page 143
3. **MP Manager** for handling MP data → page 274

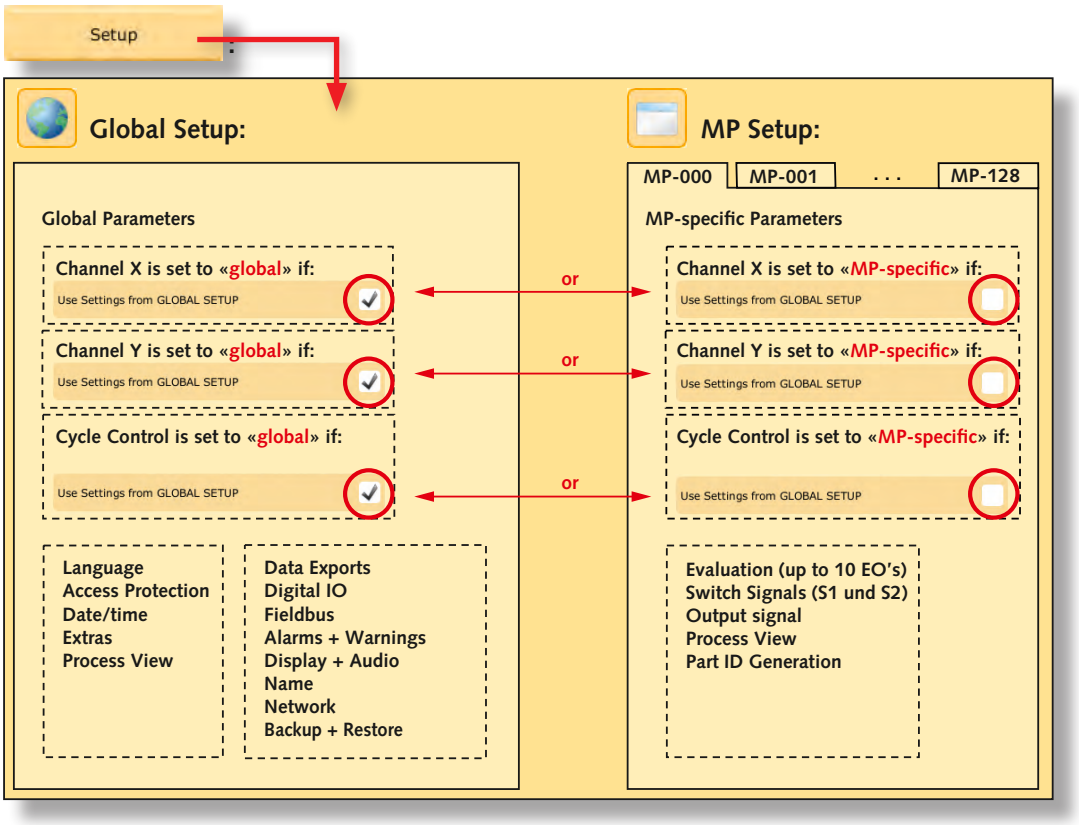
Tip: A special feature of the maXYmos TL is that Channels X and Y can be set up once in the Global setup menu so that all the possible 108 measurement programs and 20 Master programs take their values from there. This is the standard default basic setting. → page 54
Alternatively, the MP Setup program can be used to configure and store Channels X and Y for each individual measurement program, making it MP-specific. → p. 83

Example:

Channels X/Y have global setting (= factory setup).

Channels X/Y have MP-specific setting.

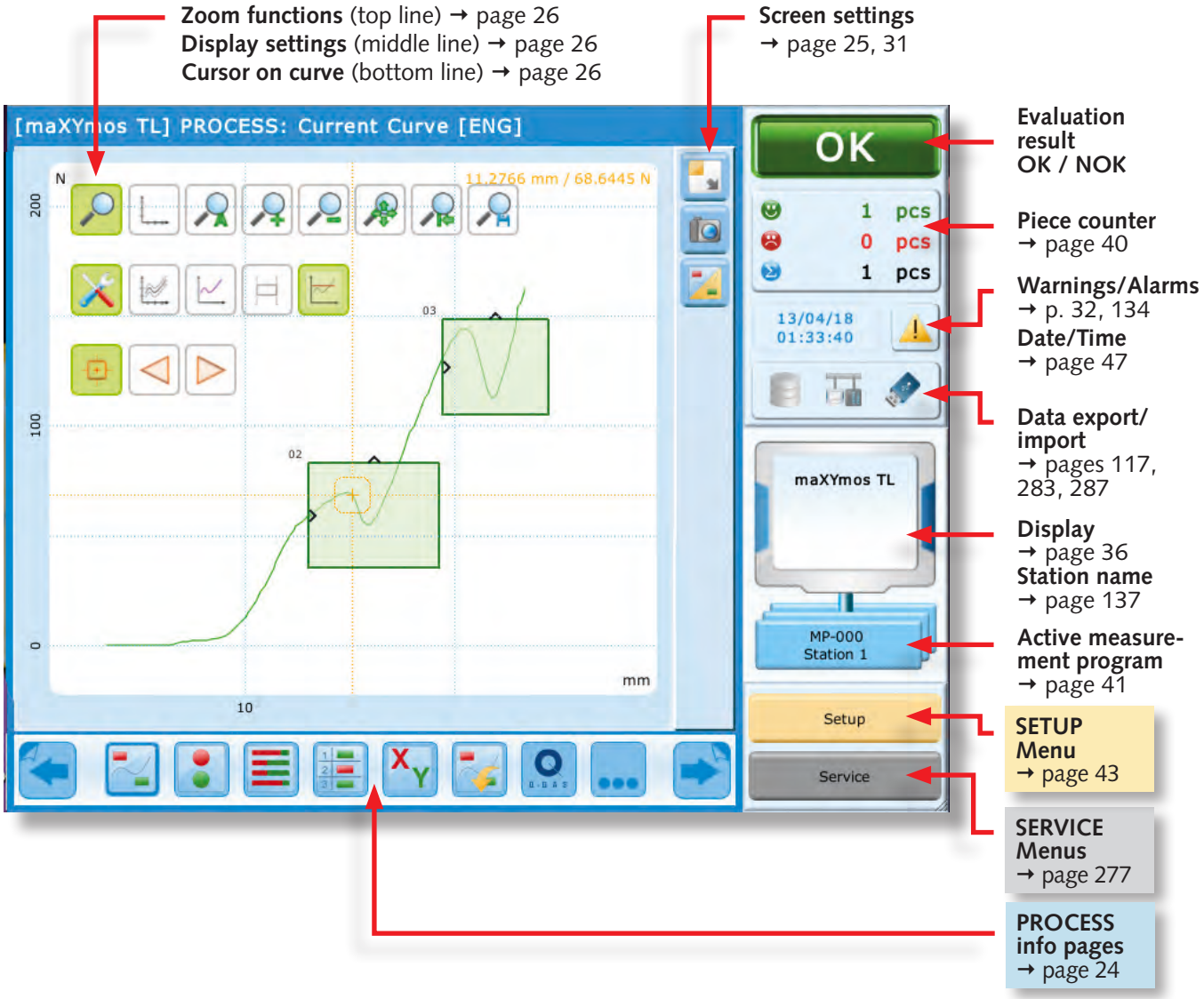
To choose between "global" and "MP-specific" settings, go to:
→ Setup / MP-Setup / MP-000 (until 127) / Erweiterte Einstellungen / X- (oder Y-) Kanal



6. PROCESS Menus – information pages on process status

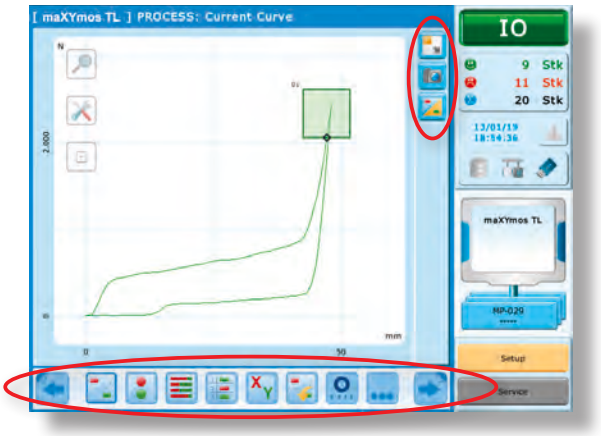
6.1 Main page for PROCESS menu level

When the maXYmos TL initializes (or following a power interruption) the blue PROCESS screen is automatically displayed.
This is the starting point for the PROCESS information pages. The yellow SETUP and grey SERVICE menus can also be accessed from here.
To select these functions, simply tap on the relevant button.



6.2 Directly selecting/Scrolling through PROCESS info pages

The blue PROCESS info pages can be accessed directly by tapping on the relevant button in the menu bar at the bottom of the screen. These pages are briefly described below. The blue arrow buttons (pointing left and right) can also be used scroll through the pages. The border of the currently active button is dark blue, e.g. (pale blue for inactive buttons).



SIDE BAR:

Entire screen. The measurement area is displayed on the entire screen (this removes the lower menu bar etc. from the display). To return to normal display, simply tap on this button again.

Screenshot. This saves the current contents of the screen as a PNG file on the USB memory stick connected to the USB port.

Switching from PROCESS to SETUP view. In the (blue) PROCESS display, curves (incl. their return leg) are green (= OK) or red (= NOK). In the (yellow) SETUP display, curves are orange (= positive) and blue (= negative).

LOWER MENU BAR:

Use these arrows to scroll through PROCESS info pages

Standard display. Displays current measurement curve, EOs etc. In this example, this button is active, which is why its border is dark blue.

Traffic lights display: Measurement curves are evaluated with a green screen = OK = good) or a red screen (= NOK = not good). → pages 27, 111 and 114

Statistics display, showing trends, analysis etc.: A bar chart is used to display the results. → Pages 28, 111 and 113

Process values display: Process values are displayed in tabular form. → p. 29, 111, 176

History curves: Shows the most recent curves (up to 5 000). → pages 29 and 111
By default up to 500 curves are shown. Showing up to 5 000 must be enabled.
Tip: Once you have finished with this function, return to the standard display setting.

Sequence view: Shows the current sequence.

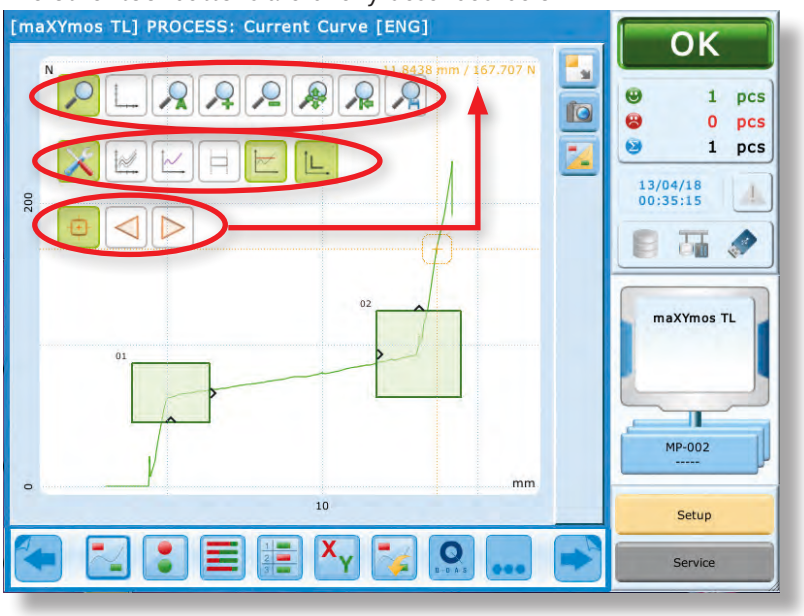
Instant view: The actual measured values are displayed. Also the minimum and maximum measured values for each channel. (always displayed per each measurement.)

Q-DAS

Overview of all PROCESS pages. Shows all process pages. → pages <?>, and 111

6.3 Overview of tool buttons

These functions can be activated by tapping on the relevant button. Tapping the same button again deactivates the function (active buttons have a green background). Even when not currently being displayed, they remain active (like a mechanical switch).
The other tool buttons are briefly described below.



Display or hide the ZOOM FUNCTIONS.

Use axis scale to calibrate zoom manually. Key in the values you require directly into the GUI.

Auto Zoom: Display will zoom into current measurement curve (and its EOs) until borders touch its outer extremities.

Enlarge (+) / Diminish (–):
when button is activated (= green) tapping the screen will enlarge/diminish the section being displayed. Tap on the "center" of the displayed enlargement.

Move the measurement curve: Place your finger on the screen and move the measurement curve in the direction you want.

Default: Set zoom back to stored value.

Save: save current zoom settings. Display will return to these values when Default button is activated.

Display or hide SETTINGS.

Bundle plot function: Bundles of curves will continue to be described with new curves as long as button remains activated (= remains green). → pages 111 ff and 325

Display capture area in yellow → Pages 111 ff, 145, 175

Display switching thresholds → Page 240

Gridlines

Display/hide cursor: Crosshairs are used to display the cursor's position on the measurement curve. Values are displayed in numerical form at the top left.

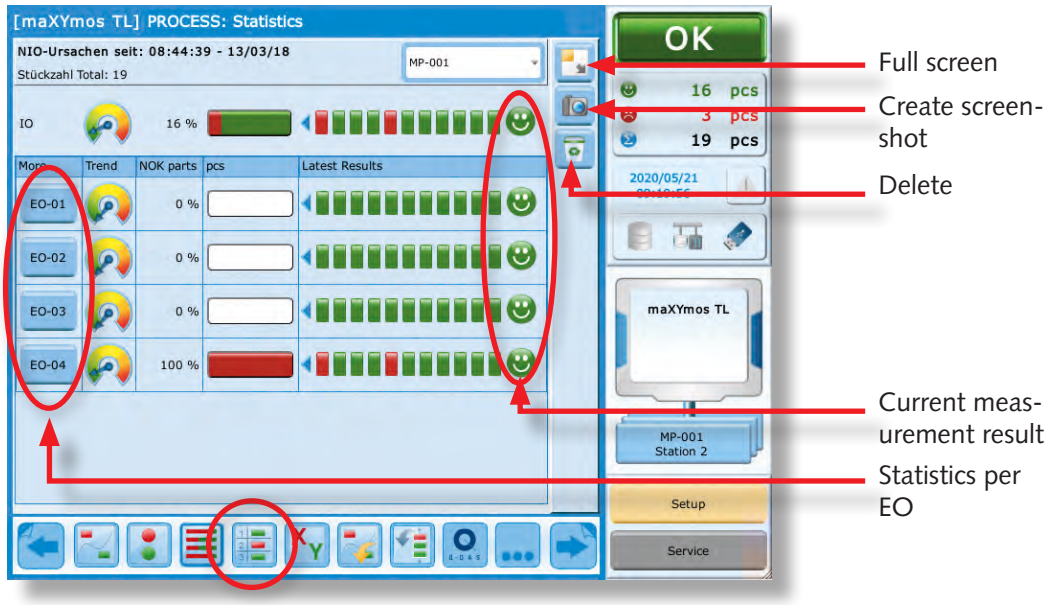
Move cursor: Move cursor on measurement curve. The X/Y values for the cursor's current position are shwn at the top right.

6.3.1 PROCESS information pages: Traffic lights display

This evaluates the measurement curves using a green (= OK) or (= NOK = not OK) symbol. Various types of symbol are available, as is a freely configurable text message. By tapping on the screen, the display fills the entire screen. Tap again to return display to normal size.
The access rights can also be configured to prevent manipulation → page 48.

Configuration: → Page 111
→ Setup / Global setup / Process View / «Traffic Lights» Page

6.3.2 PROCESS info pages: Statistics/bar charts/trend display

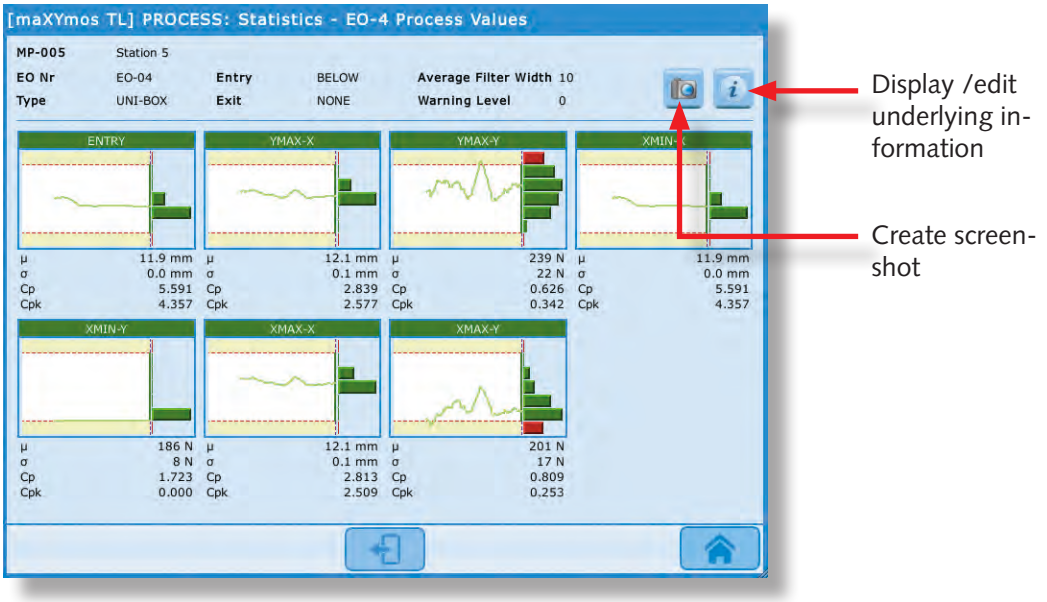


The results in bar-chart form. A bar is assigned to each EO (evaluation object) and to the overall number of measurements in aggregate. In this way, the cause of any problem (EO 04 here) is readily identifiable. This can also be confirmed by checking the recorded History Curves (→ page 29; next page).

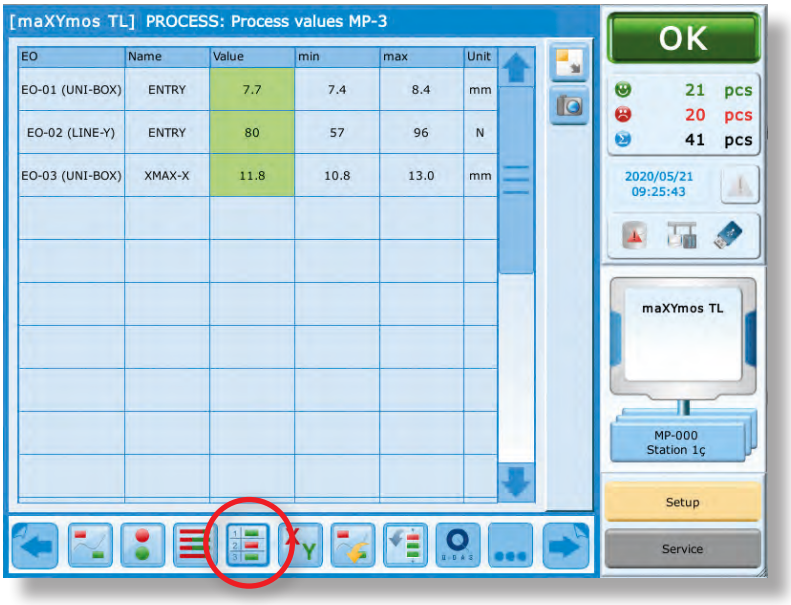
Use trash icon to delete results (for details of how to restrict access to this function → p. 48)

Configuration: → page 111, 113 Setup / Global setup / Process View / «Statistics» Page and → page 242
Setup / MP Setup / Process View / "Statistics" Page

Display **trend data** by tapping on e.g. "EO 04" in picture above:



6.3.3 PROCESS info pages: Process values

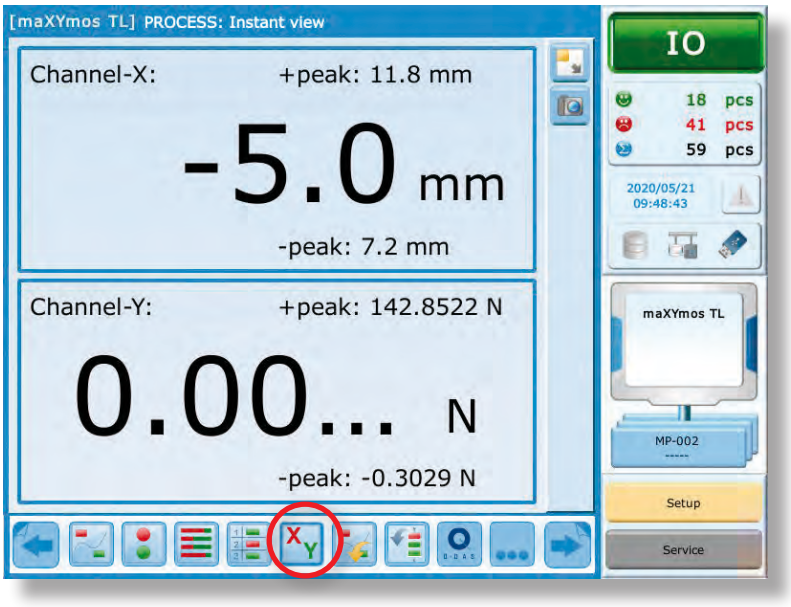


Note:
All values listed in the process value table can be transferred via OPC UA.

The results are displayed in tabular form. The process values displayed in the table can be selected individually

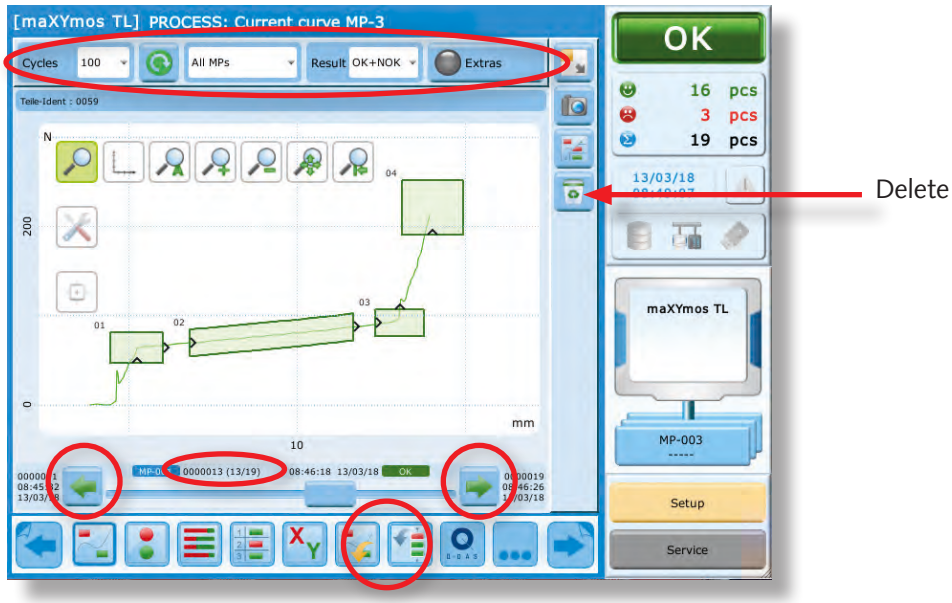
Configuration: → page 111 Global setup / Process View / "Value Table" Page and
→ page 176 Setup / MP Setup / Process View / "Value Table" Page

6.3.4 PROCESS info pages: Instant view



The actual measured values are displayed. Also the minimum and maximum measured values for each channel. (Always displayed per each measurement).

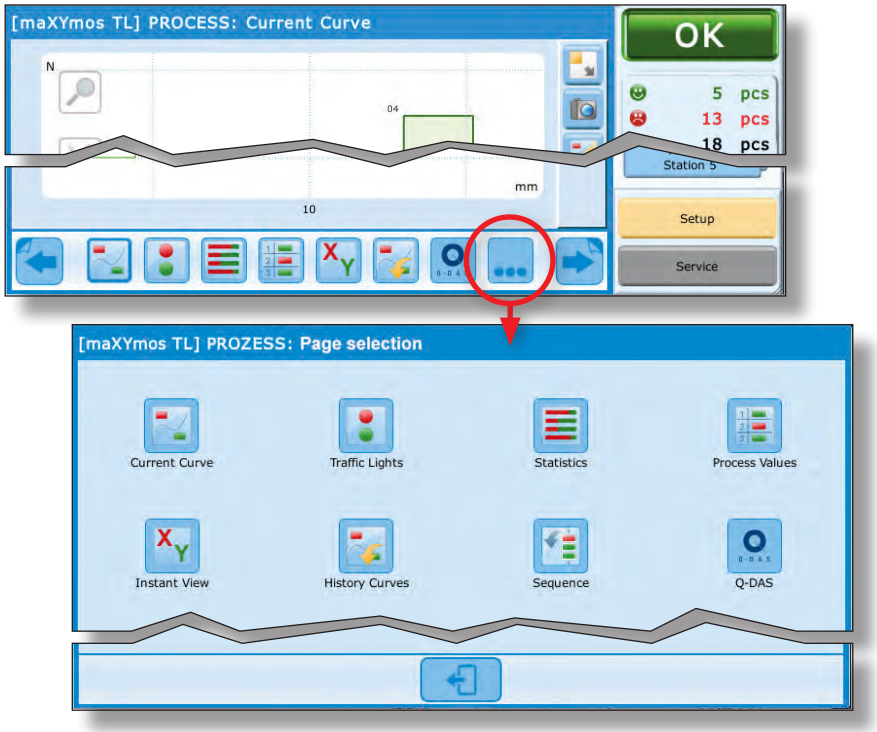
6.3.5 PROCESS info pages: History curves



This displays the most recent measurement curves. The arrows or the "rheostat" can be used to scroll through the most recent measurements. The displays above the "rheostat" and either side of the arrows show the number of measurements and their time and date. The header line can be used to select the number of cycles, MPs (measurement programs) , OKs+NOKs or "Extras". "Extras" offers additional filter functions based on timestamp and Part-Ident.

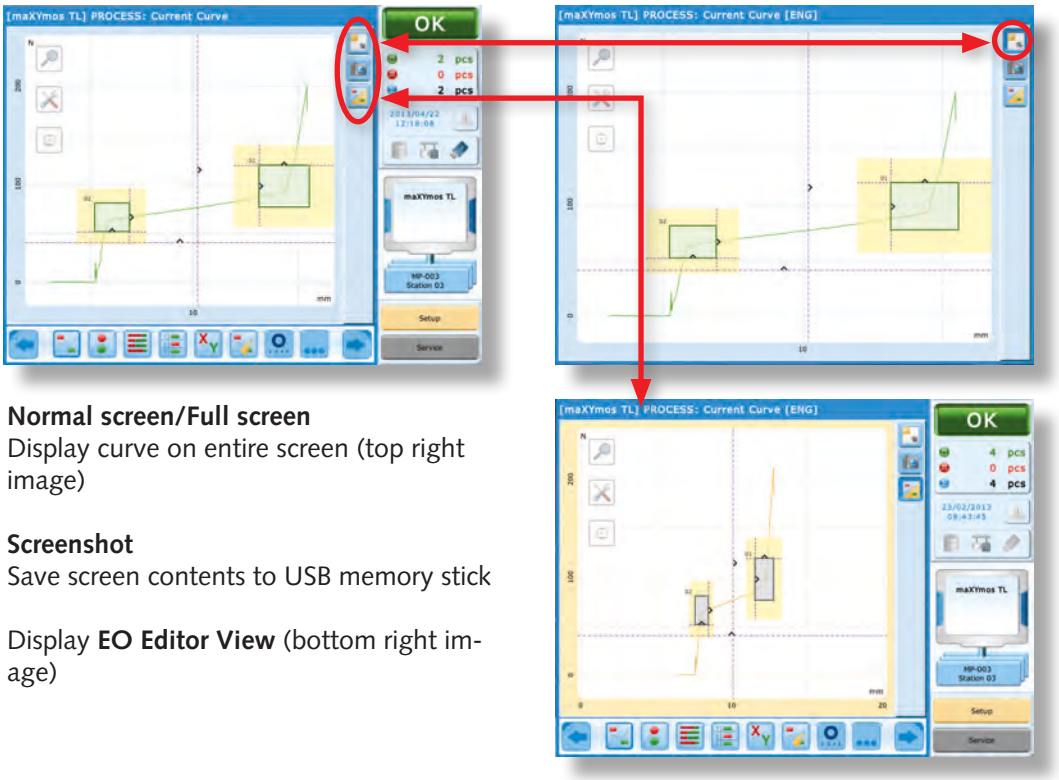
Tip: When you have finished with this function, switch back to standard display mode with (otherwise the new measurement curves will not be visible).

6.3.6 PROCESS info pages: Page selection



Process pages overview.

6.3.7 PROCESS info pages: Full screen/screenshot/editor views



Normal screen/Full screen
Display curve on entire screen (top right image)

Screenshot
Save screen contents to USB memory stick

Display **EO Editor View** (bottom right image)

6.3.8 PROCESS info pages – Warnings and Alarms

The side bar of the PROCESS level display contains a "Warnings and Alarms" button. If any warnings or alarms have been received, the triangle signal on the button will flash.

Display:

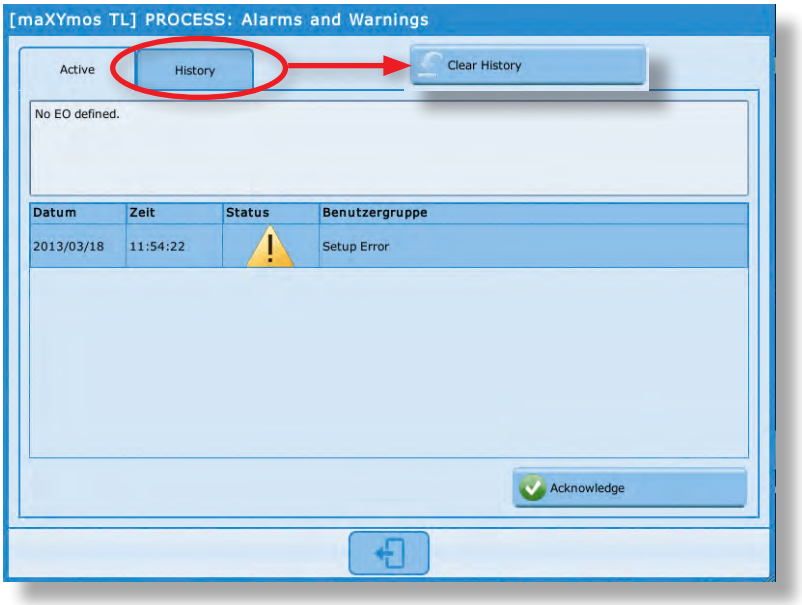
OK - no warnings or alarms have been received.

A **warning** has been received (e.g. an MP was selected for which no EOs are defined).
You can still continue working, however. The measurement curve is red. "O-READY" output is still operational. Intervention is not (yet) necessary.

An **alarm** has been received. You must stop working. "O-READY" is held at "0". Intervention is necessary.

Procedure to follow in the event of warning or alarm (based on example for a warning):

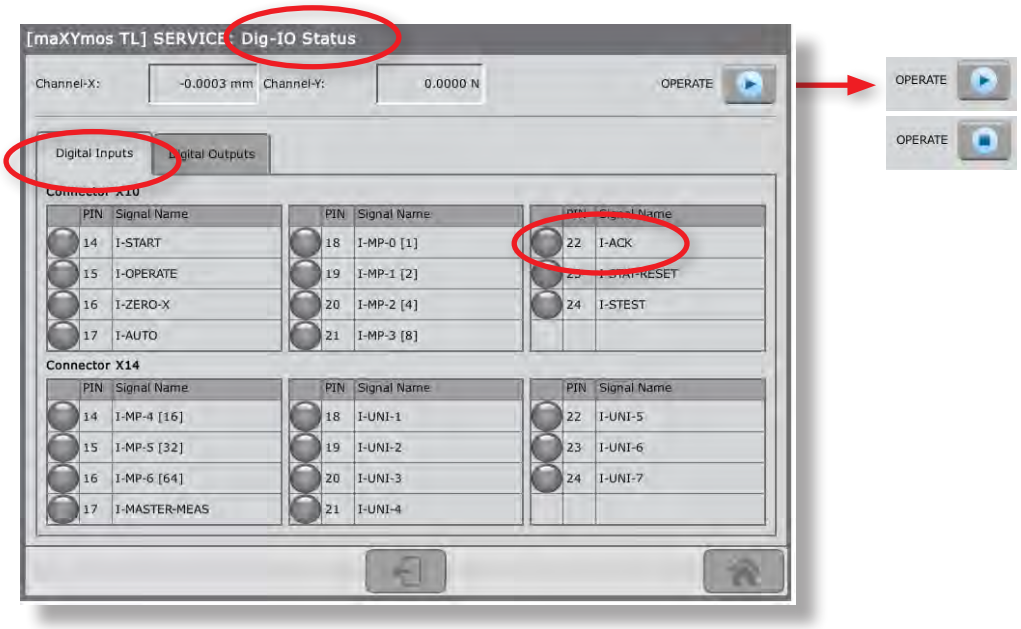
- The warning symbol is flashing
- Tap the warning symbol. This will display a list of current warnings and alarms
- Tap the warning you wish to examine. The white area above the warning will show the cause of the warning, e.g. "No EO defined". The warning line will also show
  - when the alarm occurred
  - who was logged on when the alarm occurred
  - when the alarm was confirmed
  - who confirmed the alarm



Once the alarm has been confirmed manually, the entry will disappear from the display and will appear one page further on in the history list (use History tab to view).

Only authorized users may use the Delete button to delete the entire history list.

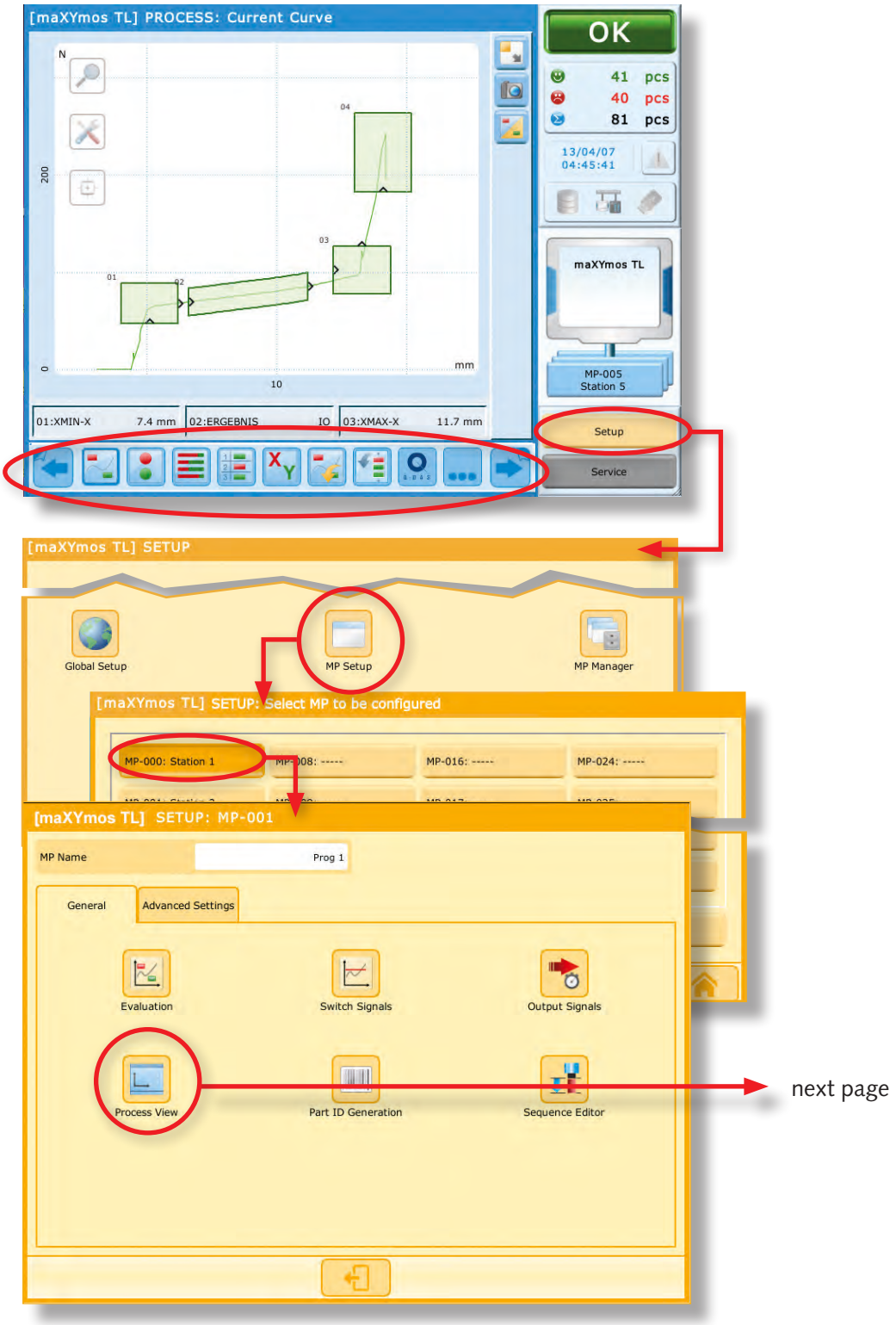
Note: If the yellow warning shows a message with the words "Setup Error / No EO defined", at least one EO must be defined for the current MP (measurement program). Once this is done, the warning will disappear automatically.

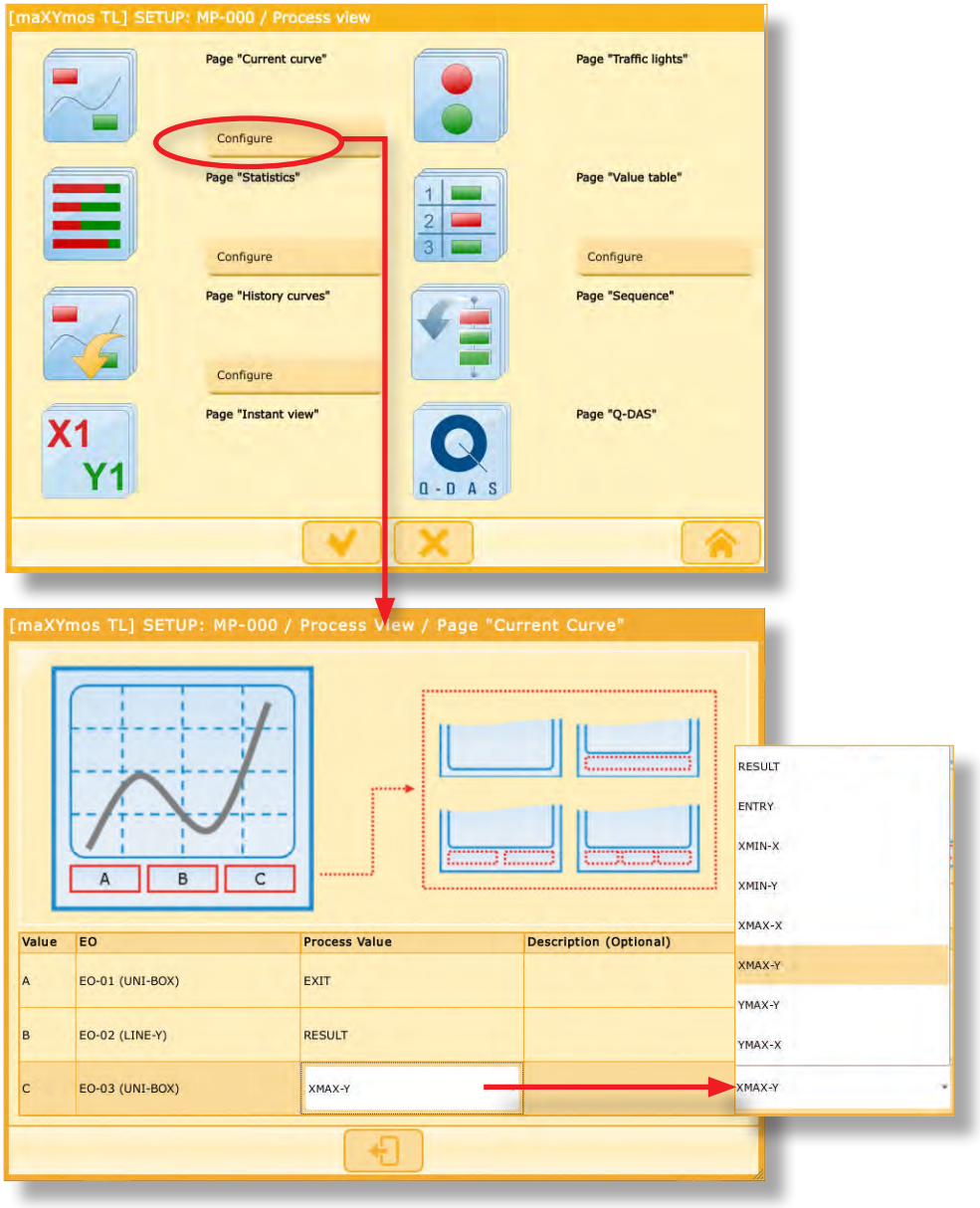


Confirmation or resetting via remote control is carried out using the "I-ACK" digital input.
→ Service / Dig-IO Status → Page 278 and Control Signals p. 315

6.3.9 PROCESS info pages: Displaying values below graphs

Up to three process values may be displayed below a curve. These are individually defined with each MP (measurement program) and are thus independent of the other MPs.





EO
Select the values you require. Both EO-related and curve-related values may be displayed.

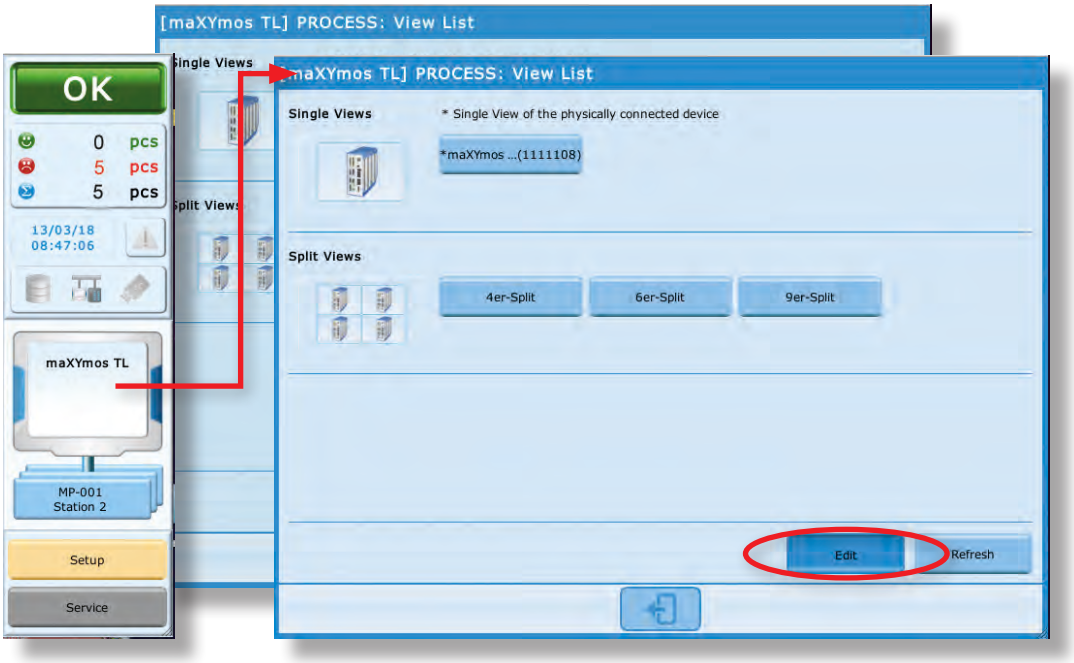
Process value
Select the process value you require here.

Configuration:
→ Setup / MP Setup / MP-xxx (e.g. MP-001) / Process View / "Current Curve" Page / Configure

6.3.10 PROCESS info pages: Split view / displaying oher MEMs

The split view function enables you to display several views simultaneously. The parameters may be taken from one or several MEMs (measurement modules). A simultaneous display of 4, 6 (1+5) or 9 individual views can be configured.

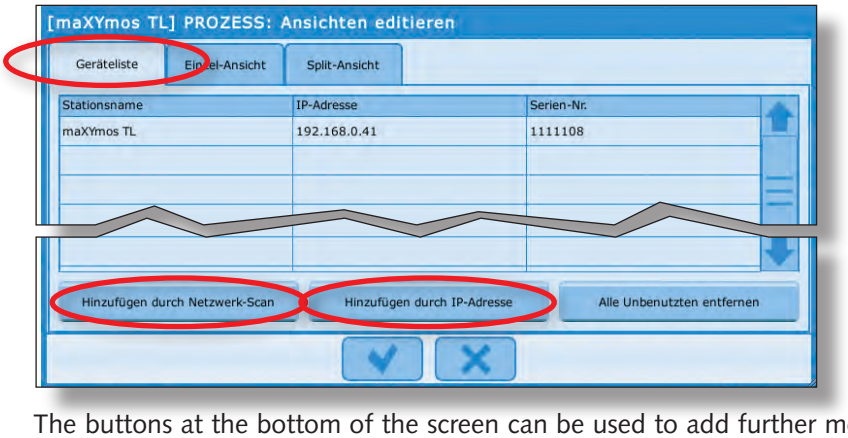
Choosing menu view



Tap on the monitor icon. The upper line will display all devices that are physically linked to the device. Tap on the **Edit** button to configure your chosen split view.

Device list

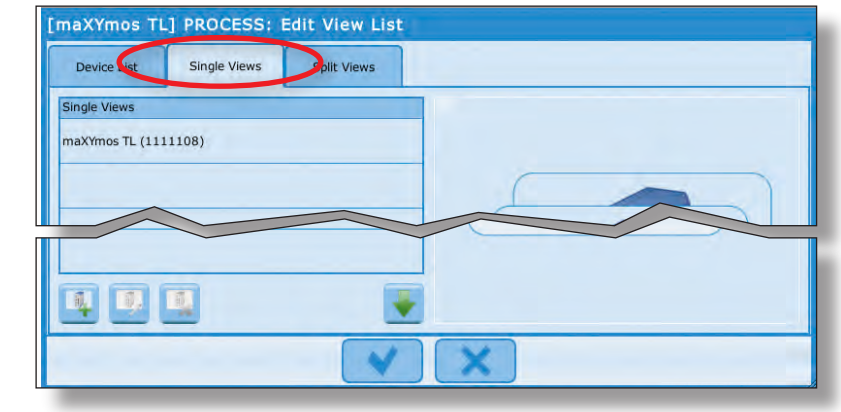
The **Device list** will display all stored measurement modules along with their IP and serial numbers:



The buttons at the bottom of the screen can be used to add further measurement modules from the network (either by scanning the network or directly inputting their IP data).

Individual views

Measurement module selected for display (= Single View/without Split Views):



Add further measurement modules to the "Single Views" list

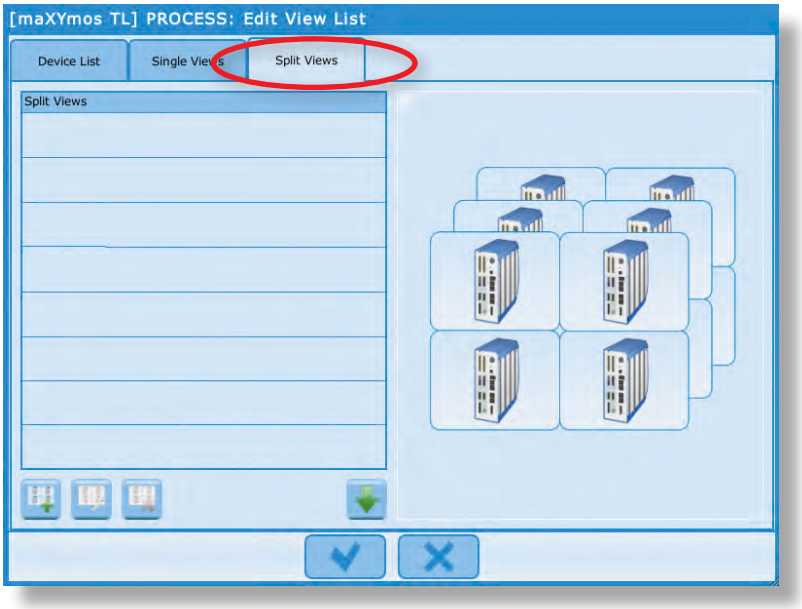
Edit/modify "Single Views" list

Delete a measurement module from the "Single Views" list

The split view may be used only for devices with the same firmware version. A mixed operation of maXYmos NC and TL is up version 1.4.x supported on both devices.

Configuring split views

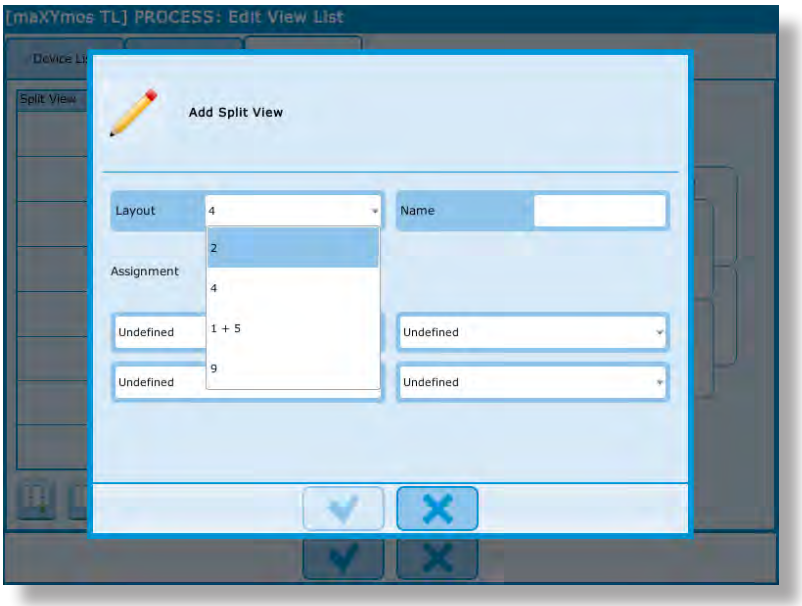
Select the "Split Views" tab to configure a split view:



Set up new split view (see next picture)

Edit/modify a split view

Delete a split view

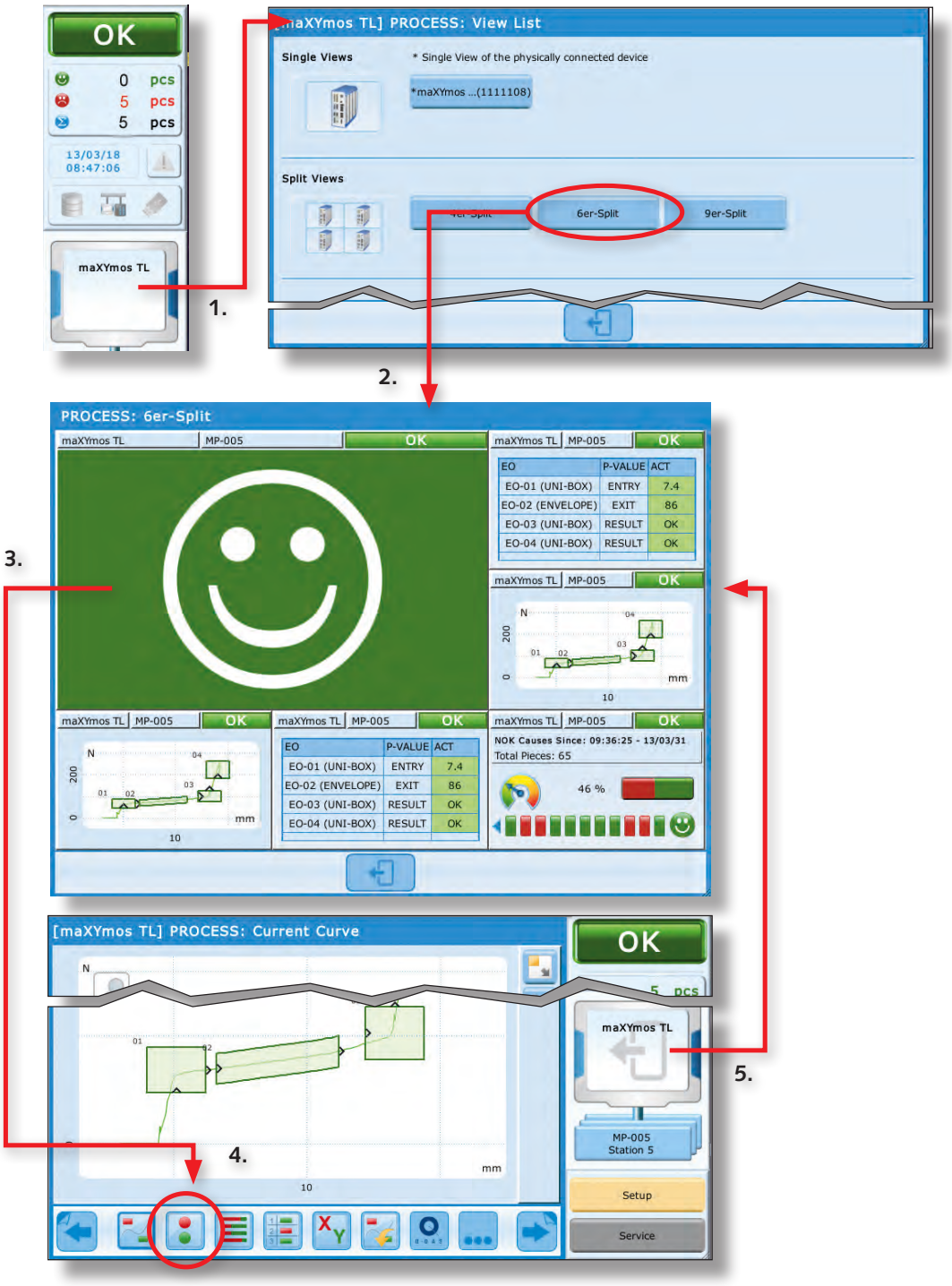


When the "Add Split View" is selected, the GUI above appears:

– **Layout**: select required split view (2, 4, 1+5 or 9)
– **Undefined**: In each field, select the measurement module to be displayed (if only one is connected, then always select that)
– **Name**: Assign a name to the split view, e.g. "4-way split" (this can then be used to select that view in the first display)
– Save your settings to return to the first GUI

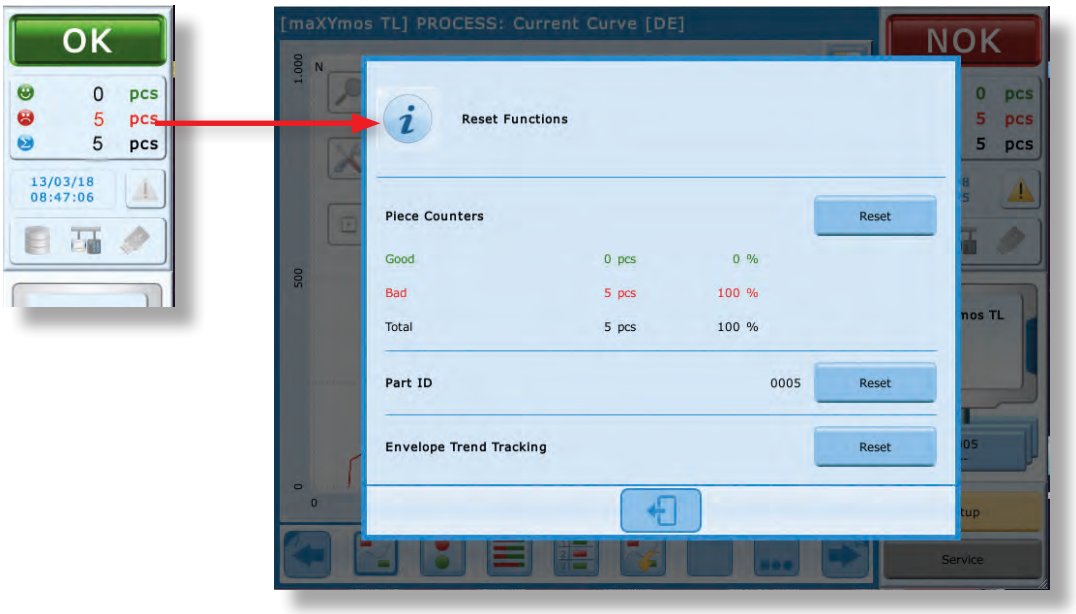
More than one split view can be configured (= simply repeat the procedure).

Select split view / Assign window functions



Switch to "split views" (1.) and select required view, e.g. "6-way split" (2.). The split view you select must already have been defined (→ previous section).
Modify window content: Select required window, e.g. (3.) and use process view to select required display, e.g. traffic lights display (4.).
Returning to "Split views": Tap on screen icon (5.). If the "split views" function is activated, the screen icon will have a grey arrow in its background (5.).
Repeat procedure for other windows. You can assign the process view of your choice from the various measurement modules to each window.
Deactivating "split views": Select and then select "single views".

6.3.11 PROCESS info – checking/resetting piece counter



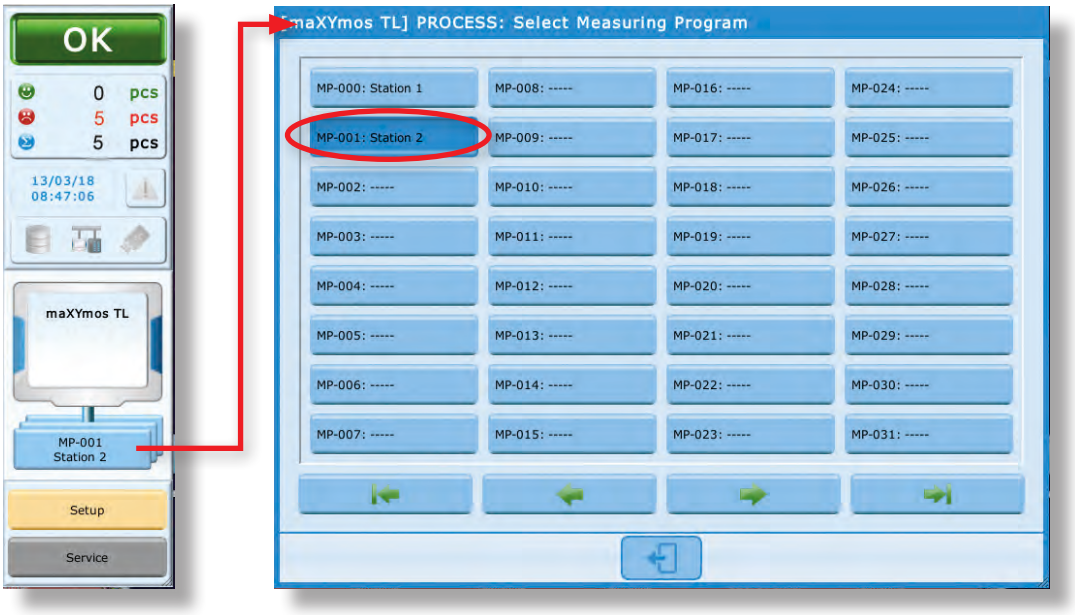
When you select the piece counter icon and the following is displayed:

1. Piece counter data per piece and in %
2. Reset button for piece counter
3. Part ID for last part tested
4. Reset button for part ID counter → page 244,
   → Setup / MP-Setup / MP-000 (to 127) / Part ID generation
5. Reset button for envelope trend tracking

Note: Access rights can be configured to restrict use of the reset buttons for the piece counter and the part ID counter. These can also be configured using the I-STAT-RESET digital input. → pages 48 and 311

6.3.12 Configuring PROCESS MP (Measurement Program) by hand

Select the blue MP selection button to display available programs. The currently active program appears in dark blue. Select the MP you require (MP-000 to 127).

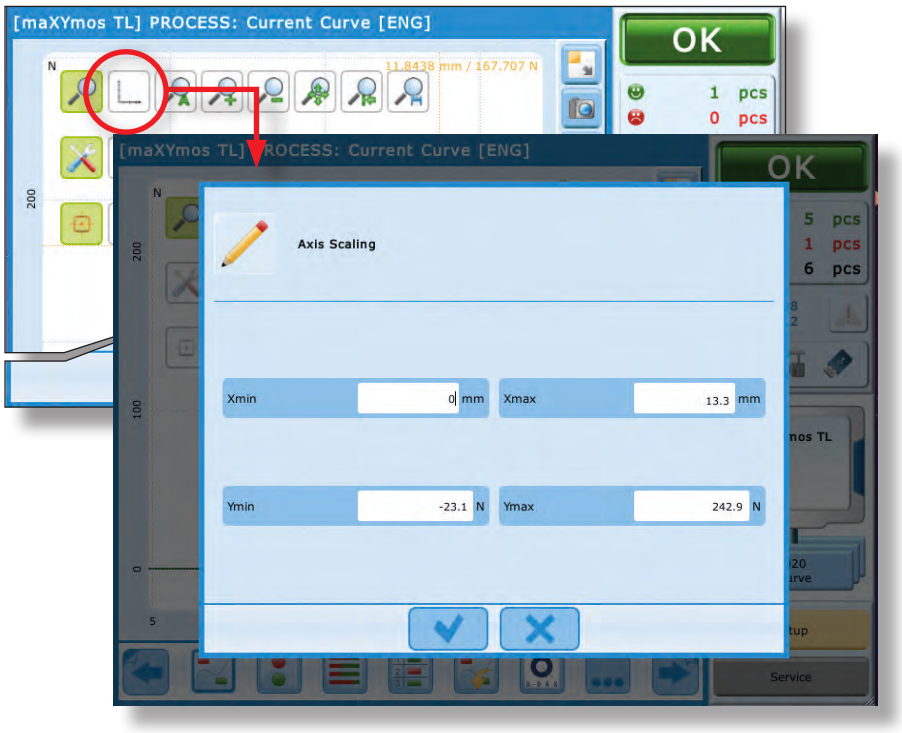


Prerequisites for manual MP configuration:

1. User must be authorized.
2. SPS must allow manual configuration (I-AUTO=0). → pages 311, 306, p. 335.

Note: MP configuration using SPS is described on pages 384 and 386.
The MP manager can be used to hide buttons for MPs not currently in use → page 274

6.3.13 PROCESS info pages: Axis scaling



This GUI is used to define X and Y axis scales - or their minimum and maximum values - by manual numerical input.

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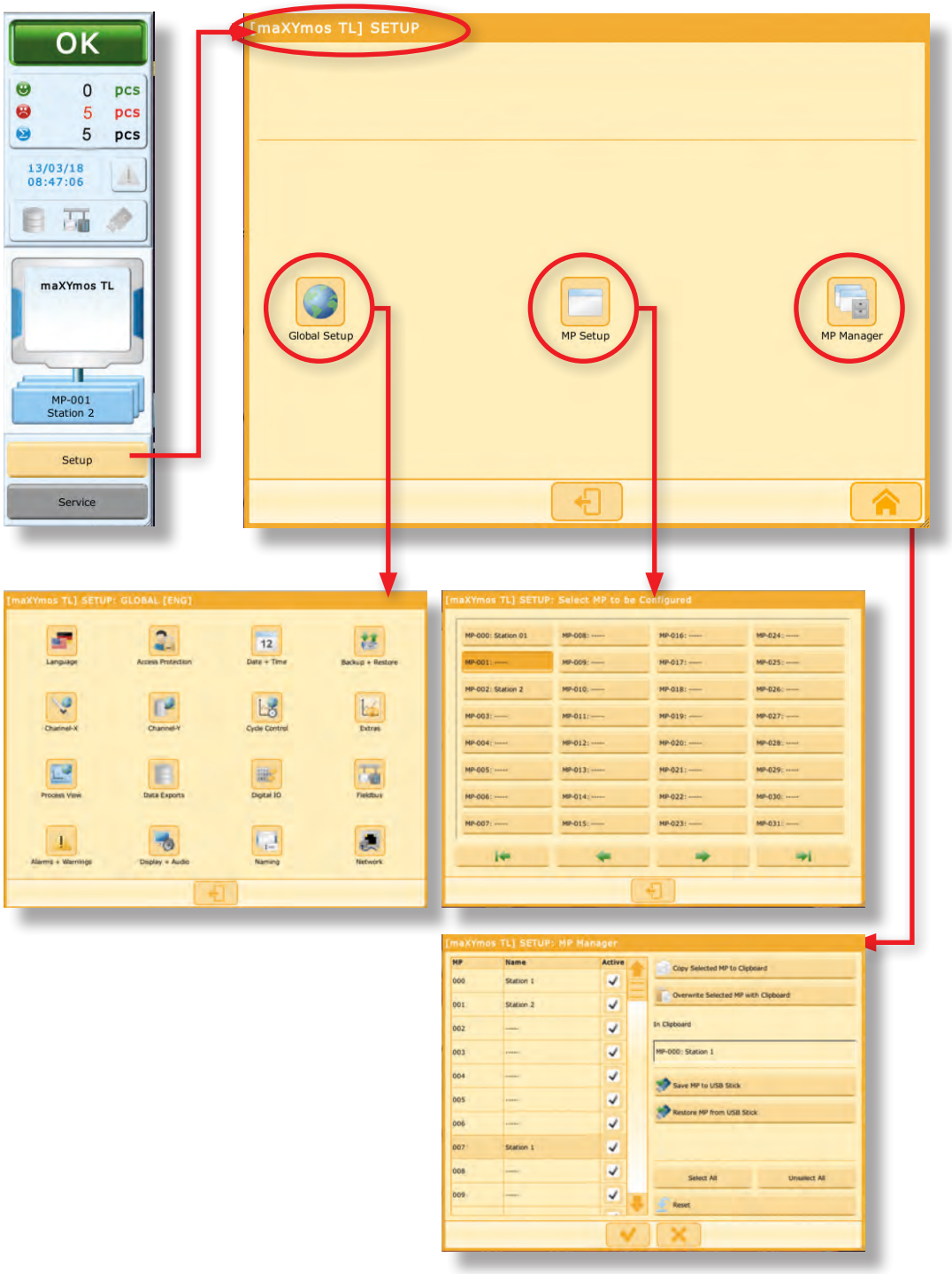
7. SETUP Menu

7.1 Submenus/Parameter configuration paths

The SETUP menu comprises three submenus:

- **Global setup**: This configures the maXYmos TL's basic settings (clock, network, etc.) and its global X and Y channels
- **MP Setup**: This configures the evaluation objects (EOs) used in measurement programs (MPs) → page 143
- **MP Manager**: Use this to save MPs to a USB stick, or to save, copy or restore MPs etc. → page 274



7.2 SETUP Menu: Configuring the monitor's parameters

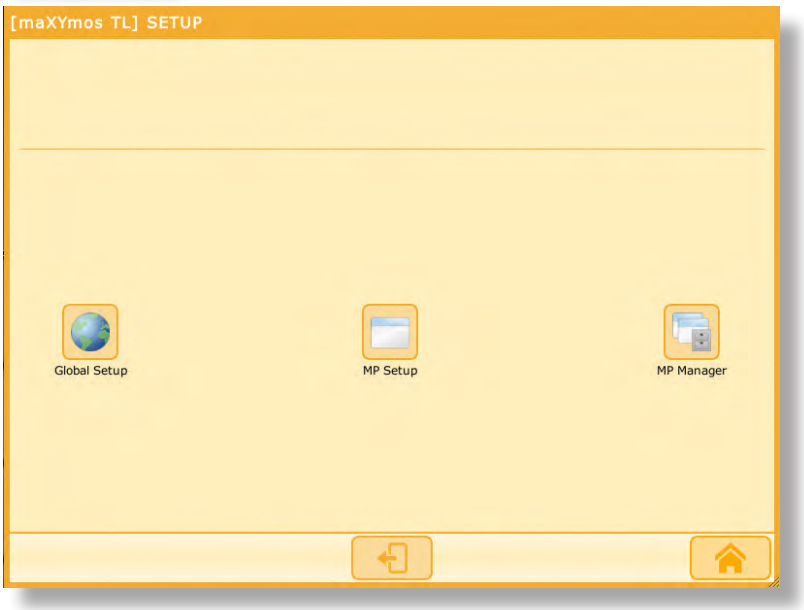
This menu is used to:

- Configure the monitor's basic settings (menu language, TIME, network configuration, etc.)
- Configure the channel X and channel Y settings
- Configure measurement channels
- etc.

SETUP screen displays always have an orange background.

7.2.1 Opening the SETUP Menu

Select the SETUP button. The three submenus will now be displayed:



Note: When the maXYmos TL is delivered from the factory, its access protection feature is not enabled. This means settings can be configured and modified (to modify access protection → p. 48).

Menu selection and navigation principles
The touch-screen menu allows you to select the relevant functions directly:

Touch this to select required **submenu** (e.g. "Global setup")

Touch this to select required **function** (e.g. "Language")

Touch this to **confirm input(s)** (= "OK") and return to previous menu level

Touch this to **cancel an input** and return to previous menu level (changes will not be saved)

Touch this to **exit the menu**

Home Button
Pressing the Home button jumps to the process view. Changes will only be saved if the input has been confirmed with OK (tick).

7.2.2 Inputting one or more values

If a value needs to be input, a numeric input GUI will appear, as in the example below:

«**2012**» Input **required value** (e.g. select "2012" as the year)

✔ **Confirm the input** (= "OK") and return to the previous menu level

✘ **Cancel an input** and return to the previous menu level (changes will not be saved)

CLR **Clear the input field** (= "delete the data in the input field")

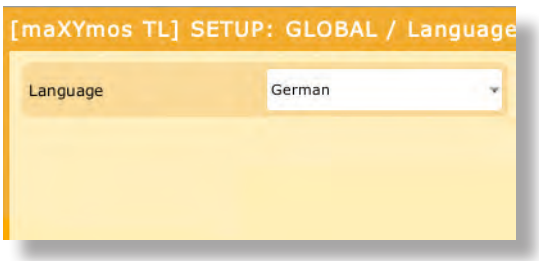
⇦ **Delete figure at far right** (repeating this deletes multiple figures)

Note:

+/- Keys with pale backgrounds cannot be selected, as this would produce a meaningless command (e.g. change sign (+/-) for a year).

Bright yellow fields indicate that an input is incorrect, e.g. "13" for month.

Some GUIs offer a choice of pre-determined inputs, such as:



The current setting is displayed in the white field (e.g. "German"). Touch the white field and ...

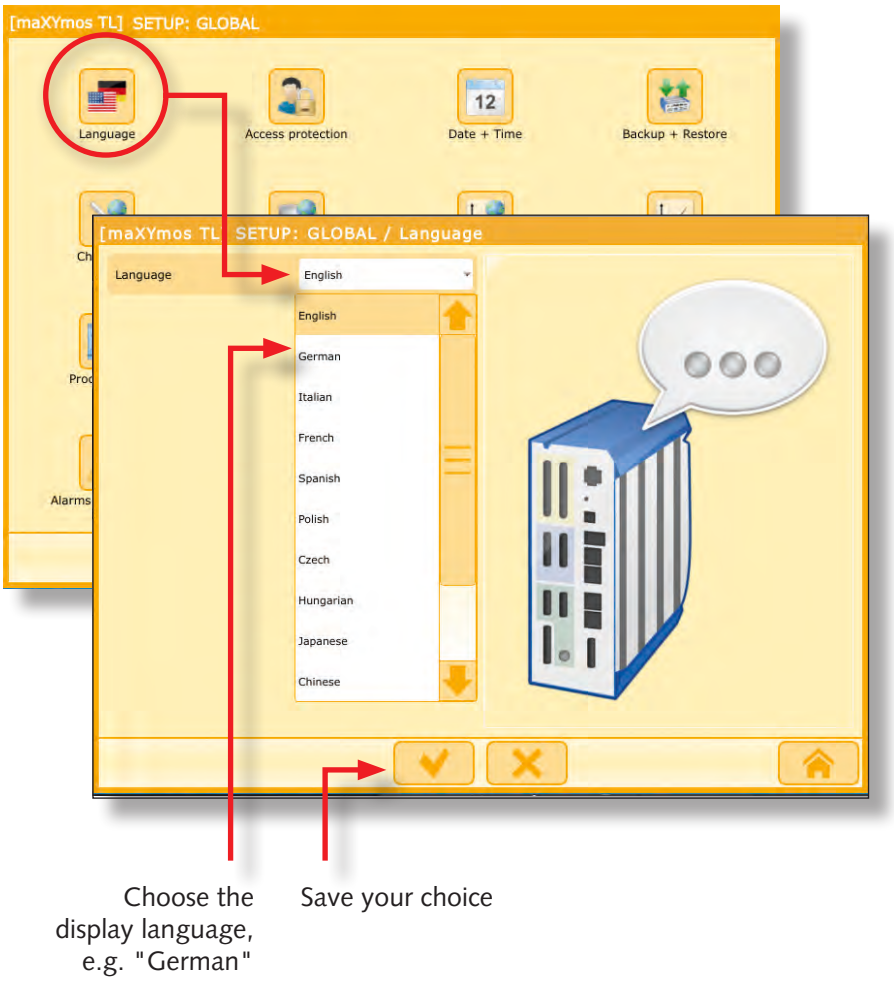
choose the item required (the current choice will appear with an orange background). Save your choice by selecting ✔.

7.3 Choosing the language

The Language button changes the display language.

Setup First open the SETUP menu, then select Global setup → page 43, 46.

Select the "Language" button

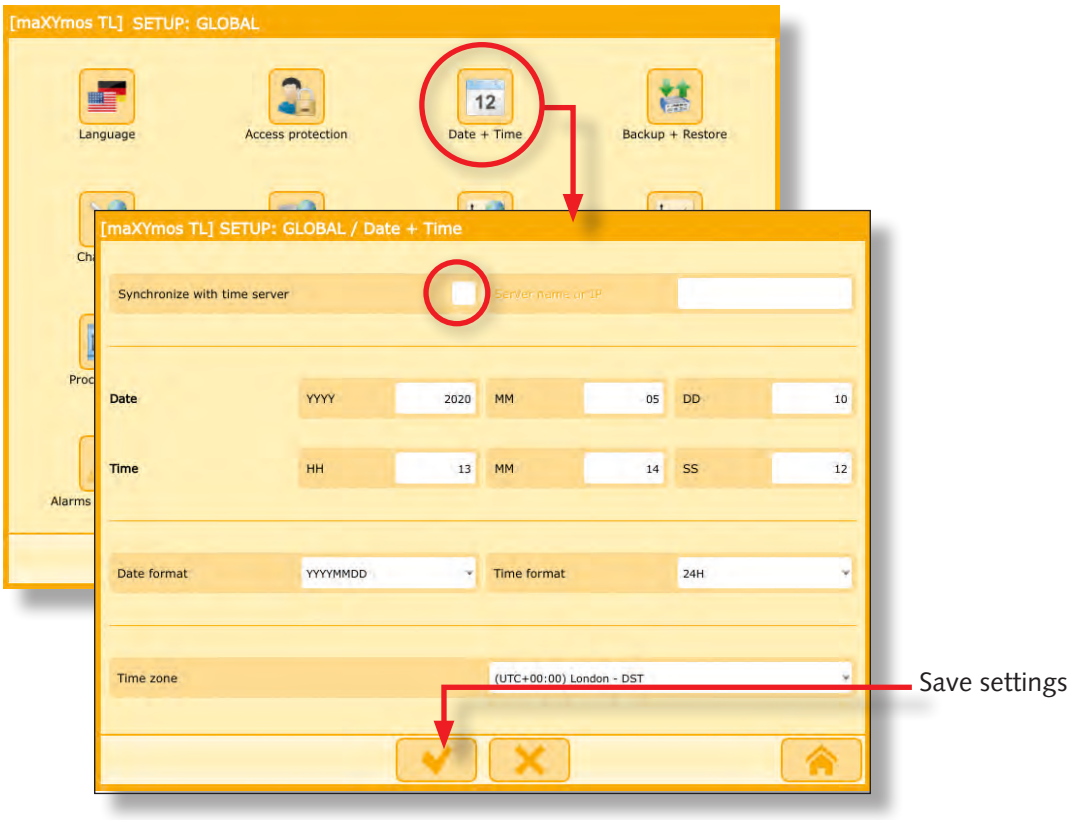


7.4 Setting the Date + Time

Time, date, Time-server and Time-format settings

Setup First open the SETUP menu, then select Global setup → page 43, 46.

Select the "Date + Time" button



Synchronizing with a Time server
If the "Sychronize with Time Server" box is checked, the maXYmos TL will synchonize with an external Time server. This is a useful feature in cases where all the components being used - in an assembly line, for example - need to work to an identical Time base.

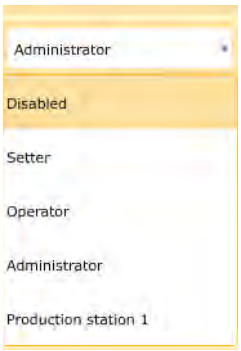
7.5 Access protection

Setting, activating and deactivating the access protection function.

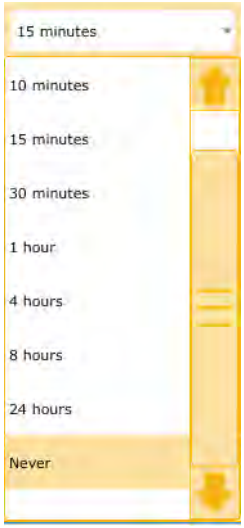
First open the SETUP menu, then select Global setup → page 43

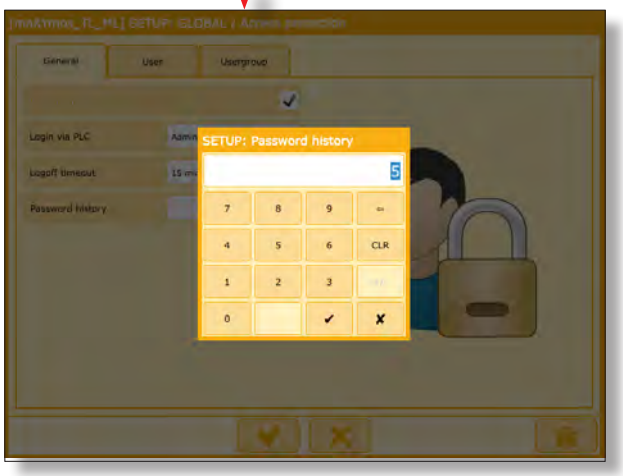
Select the "Access protection" button

Login via SPS



Logoff Timeout





Password history 5 (adjustable)

Operate without access protection
This is the factory setting. This box cannot be unchecked until an administrator has been set up and has logged in.

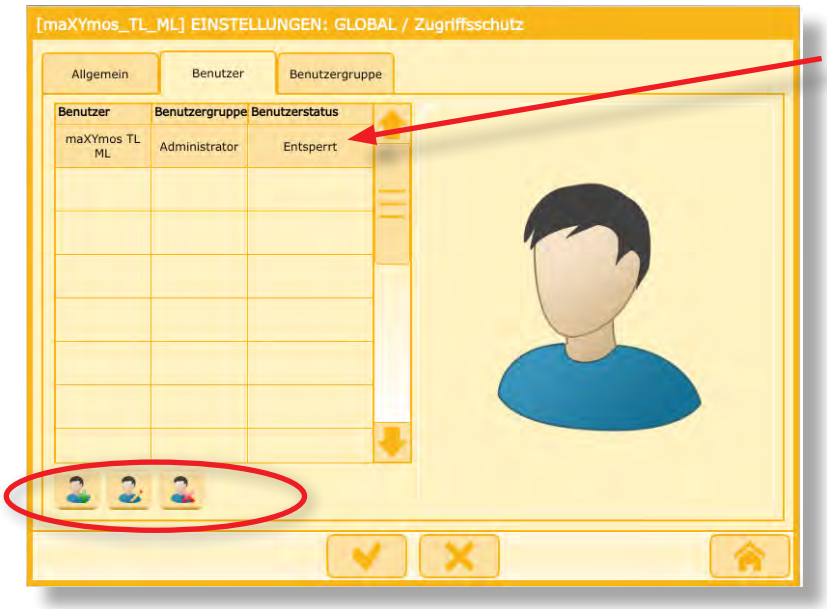
Login via PLC
The PLC can grant remote access to the user group selected here. This is enabled using the ACCESS bit on the fieldbus. The access rights will then be those for the user group specified under "Login via PLC". If other access rights are required, the PLC will need to change the "Login via PLC" parameter accordingly.

Logoff timeout
The user will automatically be logged off after the period of time selected here has elapsed. The period of time commences when the the user logs in.

Password history (only for maXYmos TL ML)
The password history prevents previous passwords to be used again.

Tip: To familiarize yourself with your maXYmos TL and during commissioning it is recommended that you work without access protection (= leave the box checked).

Selecting the "User" tab



User status:
Unlocked / Locked depending on password expiry

Create users

Set up a new user. Use this button to define the user name, password and user group (→ "User Group" tab, next page).

Define/modify a user (this button is displayed only when a user has been selected)**.** Use this button to modify an existing user (e.g. assign to a new user group).

Delete a user: **Take care, no warning message;** this button deletes a user directly.

Selecting the "User group" tab

Set up a new user group. Use this button to define a user group and its rights.

Define/modify a user group (this button is displayed only when a user group has been selected)**.** Use this button to modify an existing user group (e.g. to grant it new rights).

Delete a user group: Take care, no warning message; this button deletes user groups

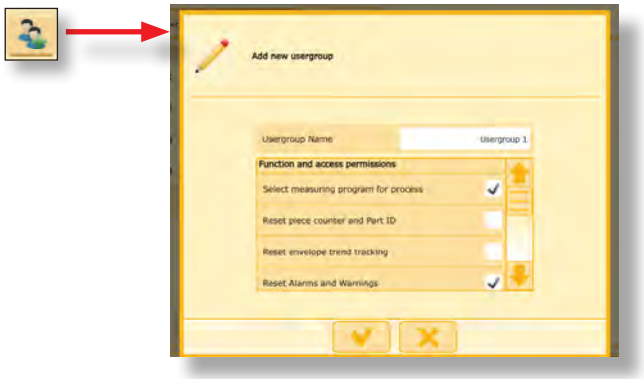
User Management

Two choices:

1. User management at the maXYmos TL ML
2. Operation via Fieldbus. Login via Usergroup only. User passwords can't be safely transferred from PLC to third party devices.

- Password expiration time adjustable in days
- Information about password expiration 30 days and 3 days in advance
- EUnlockable only by administrator or user with respective rights

- 3 login tries max
- Password history 5 (adjustable)



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7.5.1 User groups access rights

You can view all parameters even if you have no access rights. In order to modify any paramters, however, you must have the appropriate access rights. Parameter fields which are locked for the user currently logged on are shown with an orange, instead of a white, background. Locked buttons are dimmed. In the standard configuration, the following three user groups are defined, with the access rights listed below:

Access rights	User Group		
	Administrator	Setter	Operator
PROCESS Menus			
Select MP for process	•	•	•
Reset piece counter	•	•	•
Reset trend tracking	•	•	•
Reset warnings and alarms	•	•	•
Delete history curves	•	•	•
Reset statistics	•	•	•
SERVICE Menus			
Piezo OPERATE via vutton	•	•	
Sensor test via button	•	•	
Tare-Y/Zero-X	•	•	
Dig-Out test function	•		
Update firmware	•		
Reset configuration	•		
SETUP Menus			
Change language	•	•	•
Edit access rights	•		
Date + Time	•	•	
Channel X	•	•	
Channel Y	•	•	
Cycle control	•	•	
Extras	•	•	
Process view	•	•	
Data export	•	•	
Digital IO	•	•	
Fieldbus	•		
Warnings + Alarms	•	•	
Display + Audio	•	•	•
Names	•	•	
Network settings	•		
Backup + Restore	•	•	
Evaluation settings	•	•	
Switch signals	•	•	
Part-ID generator	•	•	
MP Manager	•	•	
Views	•	•	
History filter	•	•	
Q-DAS settings	•	•	

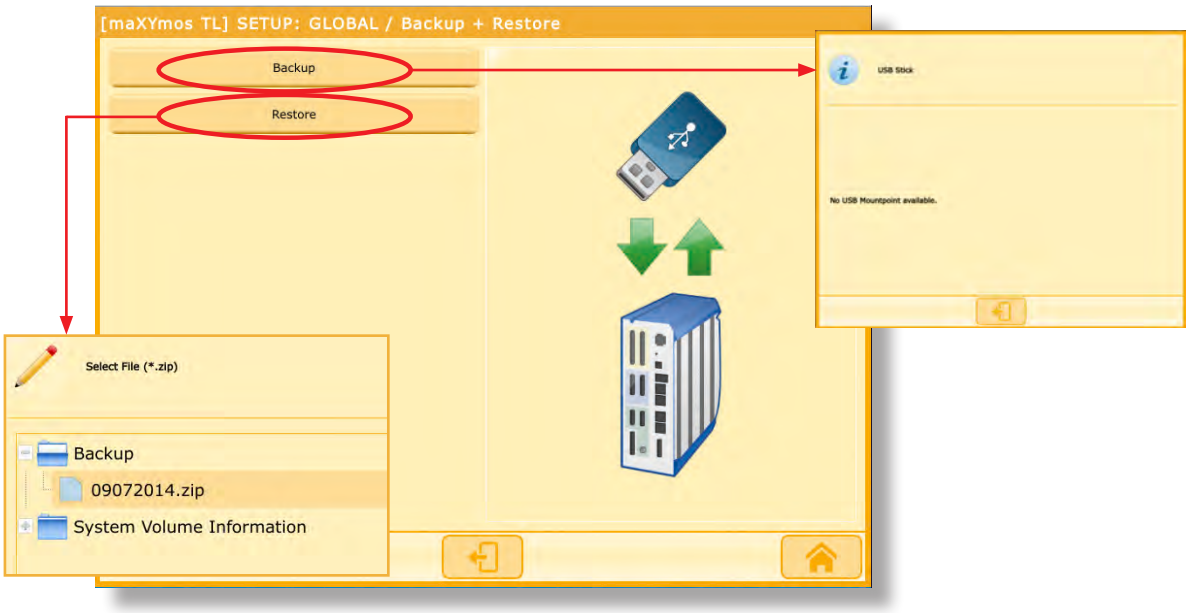
Additional user groups can be set up. Their access rights are freely configurable.

7.6 Backup + Restore functions using a USB Stick

The data on a maXYmos TL can easily be saved to a USB stick. There is a USB port on the front panel.

Setup > GLOBAL Setup > Access Protection > Backup + Restore

Select the "Backup + Restore" button



Backup
Open backup process (the button can only be selected when USB stick is inserted/detected). Enter a name for the backup and start process. An animated bar chart displays the backup process. Wait until 'Backup ready' appears.

Restore
Open restore (the button can only be selected when USB stick is inserted/detected). Choose the desired backup, select the settings and measurement programs to be restored and start the process. An animated bar chart displays the restore process. Wait until 'Restore ready' appears.

7.6.1 Partial restore of a backup

Selection of the settings for restore

After selecting the backup file a window pops up in which the parts of the backup to restore can be selected.
Possibilities for the global setup are e.g. only fieldbus configuration or network configuration

Also single measurement programs can be selected.

Never remove the USB stick or interrupt the power supply during a restore procedure. Doing so could result in data being lost and/or damage to the monitor!

A reboot of the device is necessary after you restore the backup!

These functions (Backup, Restore, and Firmware update) are not possible for a multi-MEM operation! This can be done with a VNC connection, the DIM Cable Extender Type 1200A163 or maXYmos PC software.

7.7 Configuring measurement Channels X and Y

7.7.1 "Global" configuration of Channel X or Channel Y

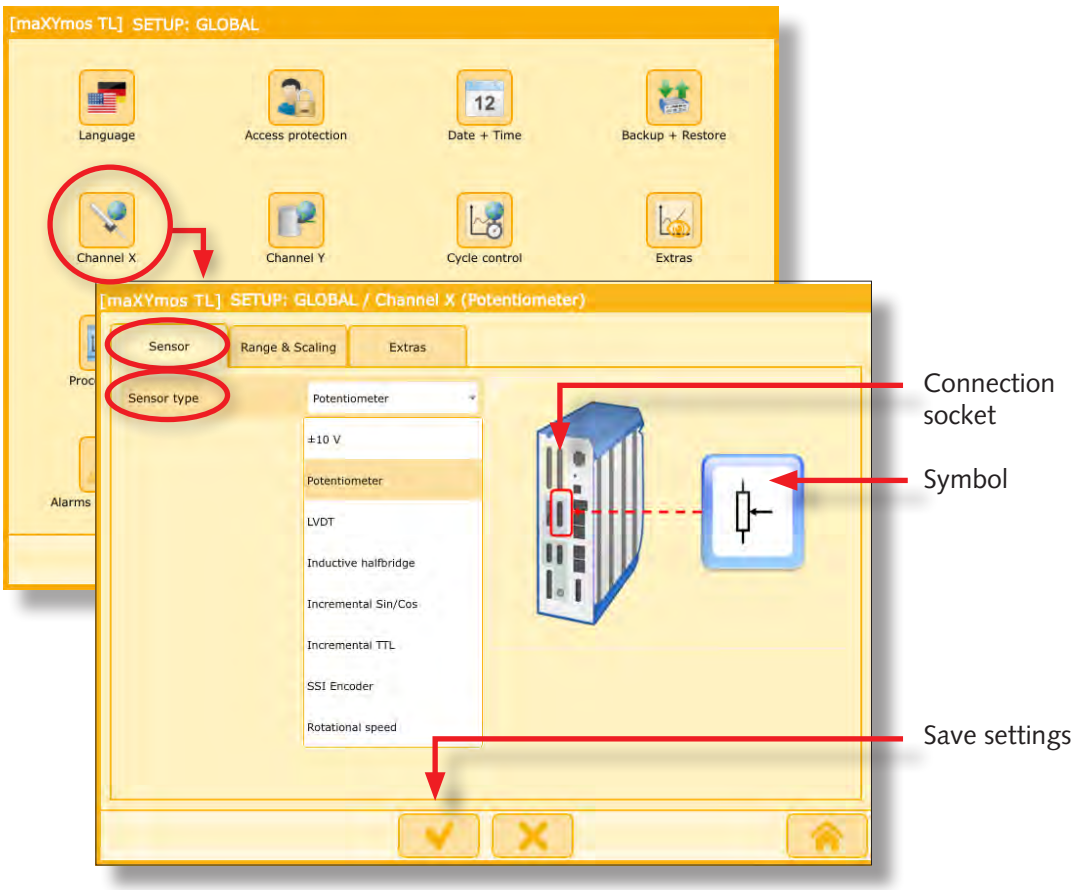
The maXYmos TL Type 5877... allows you to define "global" settings for the X and Y channels. Using this feature means you need only configure these settings once, but it does require that all measurement programs (MPs) use the same sensor scaling and the force and displacement ranges they cover are more or less the same. The shapes of the curves generated may differ, however.
On this setting, all MPs operate on the same "global" channel settings.
For each MP, the MP Setup menu allows you to specify whether the program uses global or MP-specific measurement-channel parameters.
MP-specific settings → pages 143, 245, 246

7.7.2 "Global" settings channel X (e.g. displacement channel)

MP-specific settings → pages 143, 245

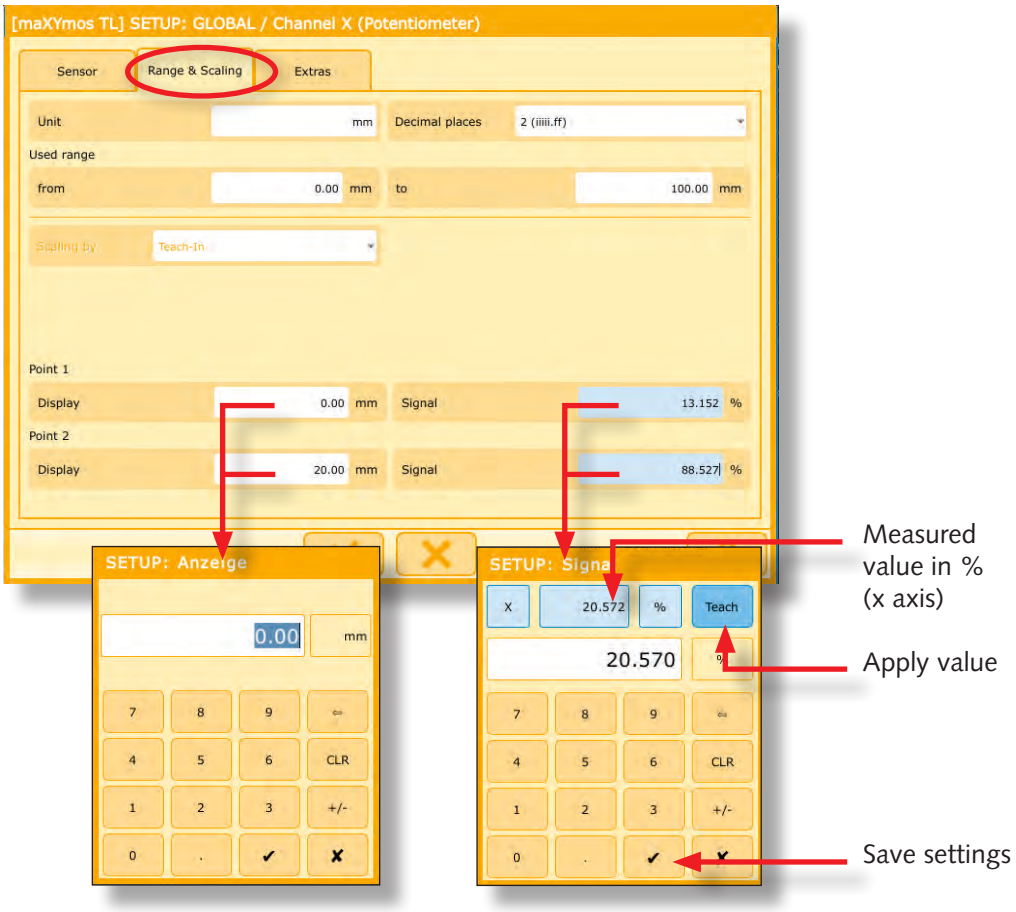
- Setup First select the SETUP menu, then Global setup → page 43, 46

Select channel X, then select the "sensor" tab



Sensor type:
Select sensor type, e.g. potentiometer (the relevant symbol and the location of the connecting socket will be displayed in the right section of the screen).

"Range and scaling" tab



Unit/Decimal places
Select required unit of measurement (freely configurable; e.g. mm) and an expedient number of decimal places (0-5 figures after the decimal point).

Used range:
Enter the sensor range to be used (e.g. from 0 to 50 mm). This determines the X axis of the graph.

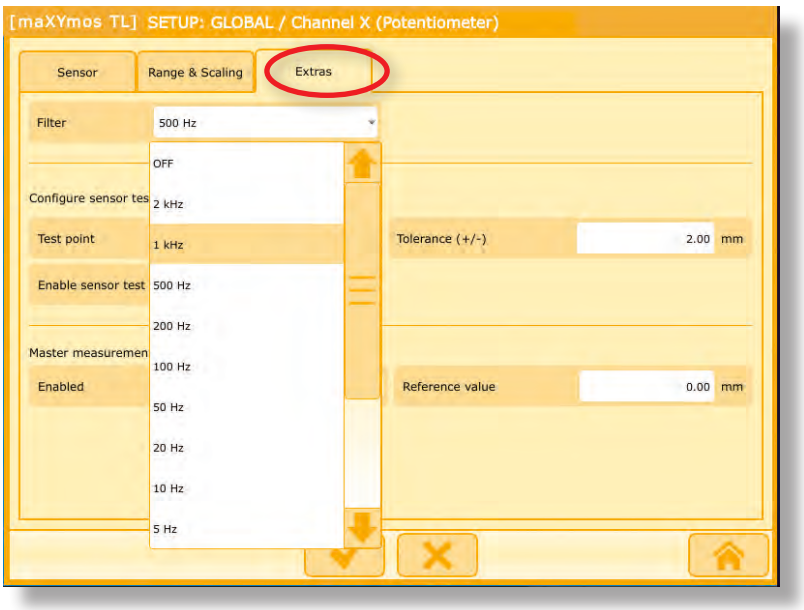
Scaling by:
Uses teach-In (= value will be measured/read) or calibration certificate; when Sensor Type is set to "Potentionmeter" this is automatically set to "Teach-In" and cannot be changed.

Point 1/Display:
Enter first measurement position (e.g. 0 mm).

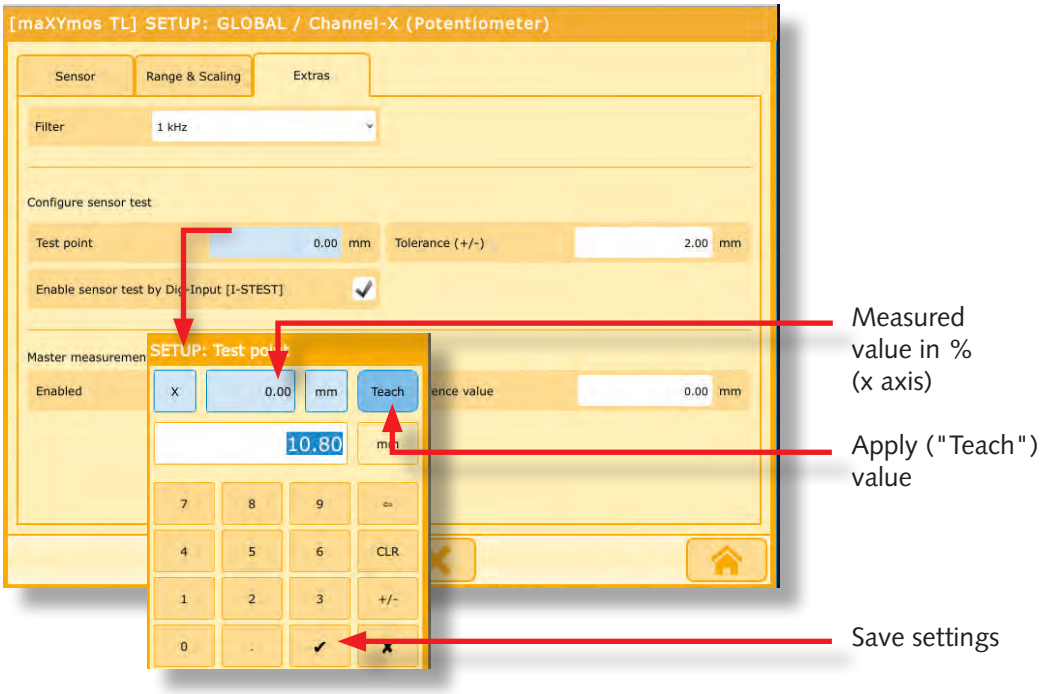
Point 1/Signal:
Approach test piece and click on "Signal" field. Apply value by clicking on "Teach" (= "Teach-In").

Point 2/Display and signal:
As with point 1 above, but for second measurement position.

"Extras" tab



Filter:
4th order low-pass filter. This can be used to eliminate problematic curve ripple and noise. Gradually increase the filter factor until a suitable value is found!



Test point:
Approach the test point mechanically and "teach" the signal emanating from it. Later in the process, this point can be approached cyclically and a PLC control signal or service-menu button can be used to check compliance with it.
Tip: **Use the sensor test function to check Input/Sensor:** → Pages 278, 59, 134

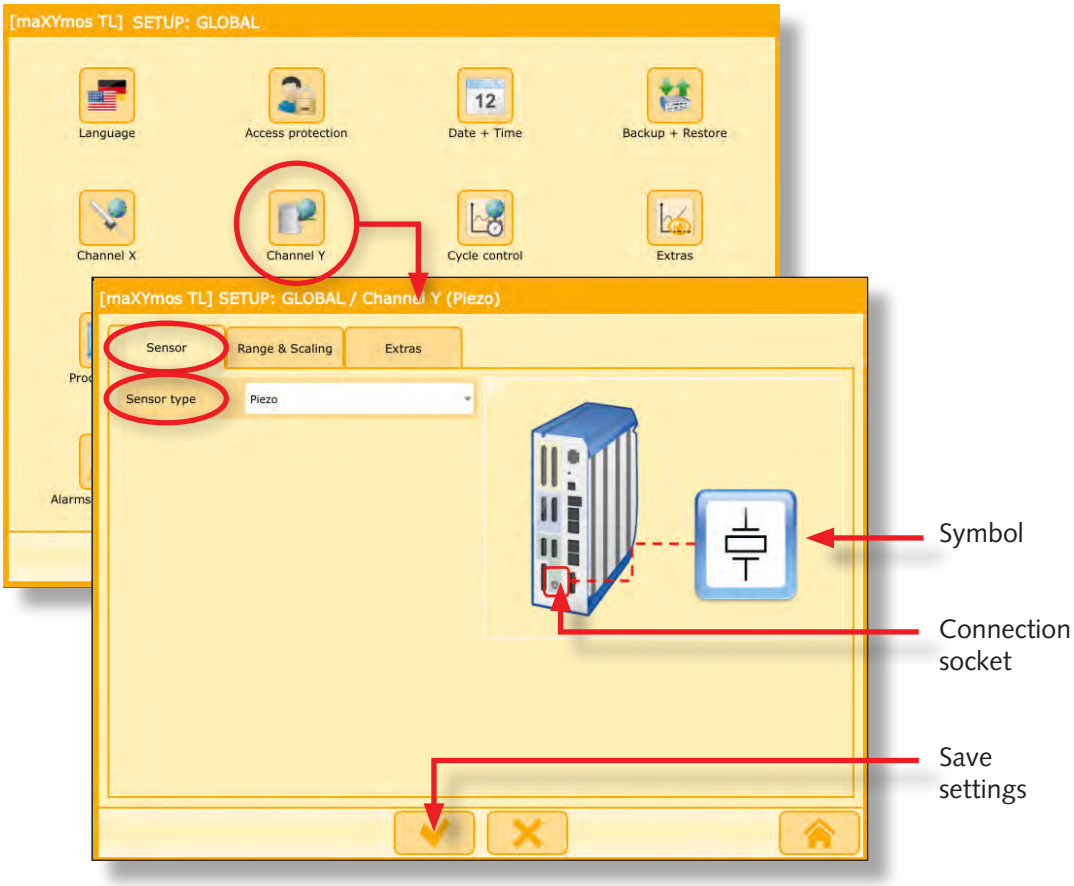
Tolerance:
Enter the permitted variation (±) in the test point you have taught in (e.g. 2 mm).

7.7.3 «Global» config. Channel Y (e.g. force channel)

MP-specific configuration of channel Y → pages 143, 246
Prerequisites for using GLOBAL parameters → page 54

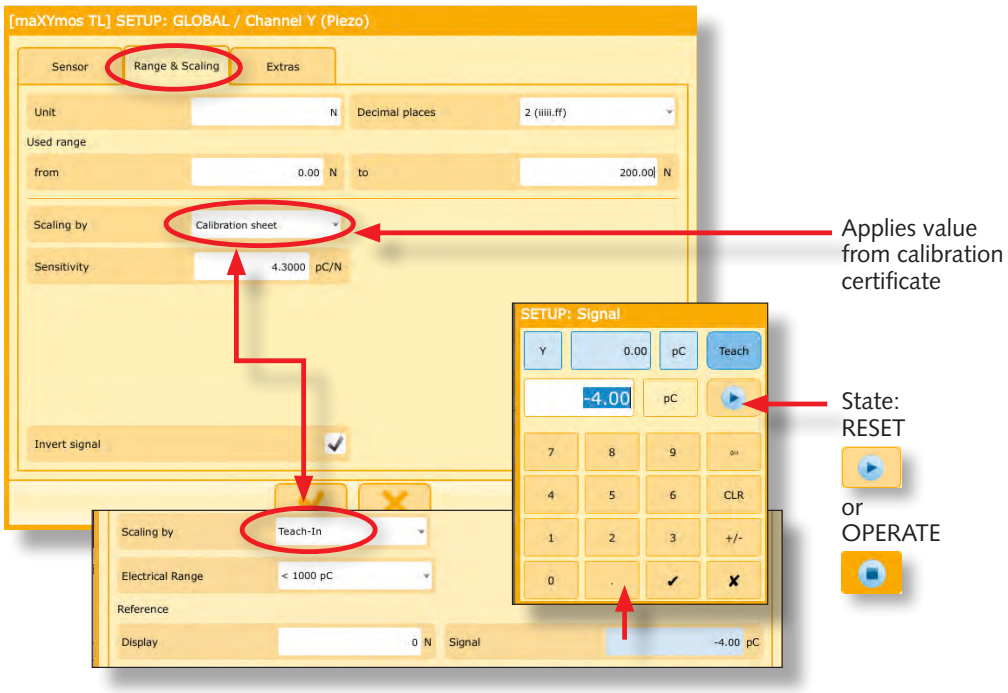
Setup First open the SETUP menu, then select Global setup → page 43, 46.

Select "Channel Y" tab, then "Sensor" tab



Sensor type:
Select sensor type, e.g. piezo (the relevant symbol and the location of the connecting socket will be displayed in the right section of the screen).

"Range and Scaling" tab



Unit/Decimal places
Select required unit of measurement (freely configurable; e.g. N) and an expedient number of decimal places.

Used range: Enter expected limits of range (e.g. 0 to 100 N).
The "to" parameter (e.g. 100.0 N) multiplied by the "Sensitivity" parameter (-4.0 pC/N) determines the maximum expected charge (e.g. -4.0 x 100 = -400 pC). Don't enter unnecessary high values in the "to" field, enter the value to be expected plus reasonable tolerance. Therefore an optimum measuring resolution can be achieved. This value can be adjusted anytime afterwards, e.g. if during commissioning no measuring values under load are available.

Scaling by ... there are two options here: Scaling by calibration certificate or by "Teach-in".
Scaling by calibration certificate: This requires the following calibration-certificate data:

- **Sensitivity:** input this in pC/N, e.g. "**–** 4.000 pC/N".
- **Important**: Remember to enter the "**–" (minus) sign**!

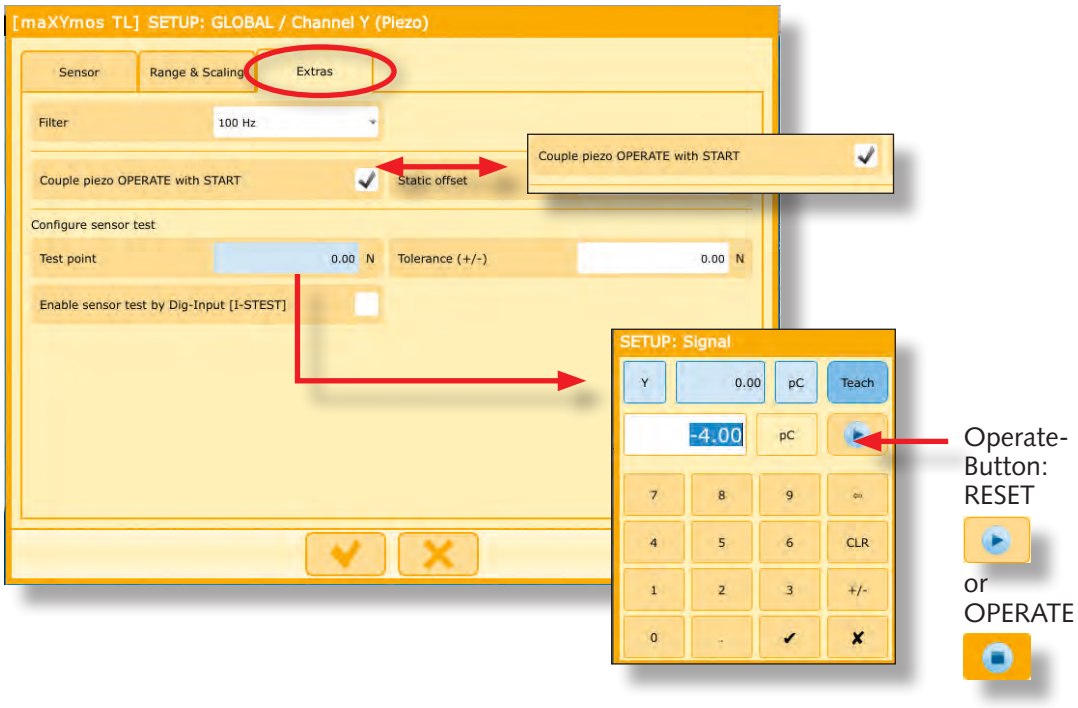
Invert Signal (used only on "calibration certificate" setting): inverts the signal

Scaling by Teach-in: This function is useful, for example, for indirect force measurement using strain sensors on a stirrup (because the relationship between force and charge quantity will not be known initially).
Before teaching in the test point, it may be necessary to press the OPERATE button. This switches the charge amplifier to the OPERATE (= measurement) state.
Significance of the button symbols: RESET = or OPERATE =

Additional settings on strain gauge sensors. The following additional settings are available for strain gauge sensors:

- **Sensitivity / Signal:** Enter the mV/V value shown as "Nominal sensitivity".
- **Zero point / Display:** Enter (0.0).
- **Zero point / Signal**: It is advisable to "teach in" this mV/V value, as the zero points on strain gauges creep with age (even in their original packaging). When this happens, they no longer match the value specified as the "Zero signal" on the calibration certificate. **Important**: Relieve load on sensor during "teach-in" process.

"Extras" tab



Filter:
4th order low-pass filter. This can be used to eliminate problematic curve ripple and noise. Gradually increase the filter factor until a suitable value is found!

Couple piezo-OPERATE with START (applies to piezoelectric sensor only):
When this box is checked it is no longer necessary to monitor the RESET-OPERATE handling of the charge amplifier. It is now permanently coupled to the START state (START=True--> OPERATE, START=False → RESET (or /OPERATE). → 95, 97, 308

Couple TARE to START (applies to strain gauge sensor only):
When START condition is met, e.g. when START-Threshold-X or Input I-START 0-->1 is reached, channel Y is tared automatically (Time required < 0.1ms)

Const. Offset/Static offset:
The constant offset adds a user-defined value to the measured force value. This can be necessary if the tool weigth attached to the sensor should be subtracted from the joining force.

Test point (Stain gauge (DMS) sensor):
Approach test position and teach. Approach this point cyclically in the process and use a control signal (PLC) or button (on the Service menu) to check compliance.

Tolerance:
Enter the permitted variation (±) in the test point.

Enable sensor test using Dig-Input [I_STEST]:
Check this box is a DIG-IN sensor test is required.

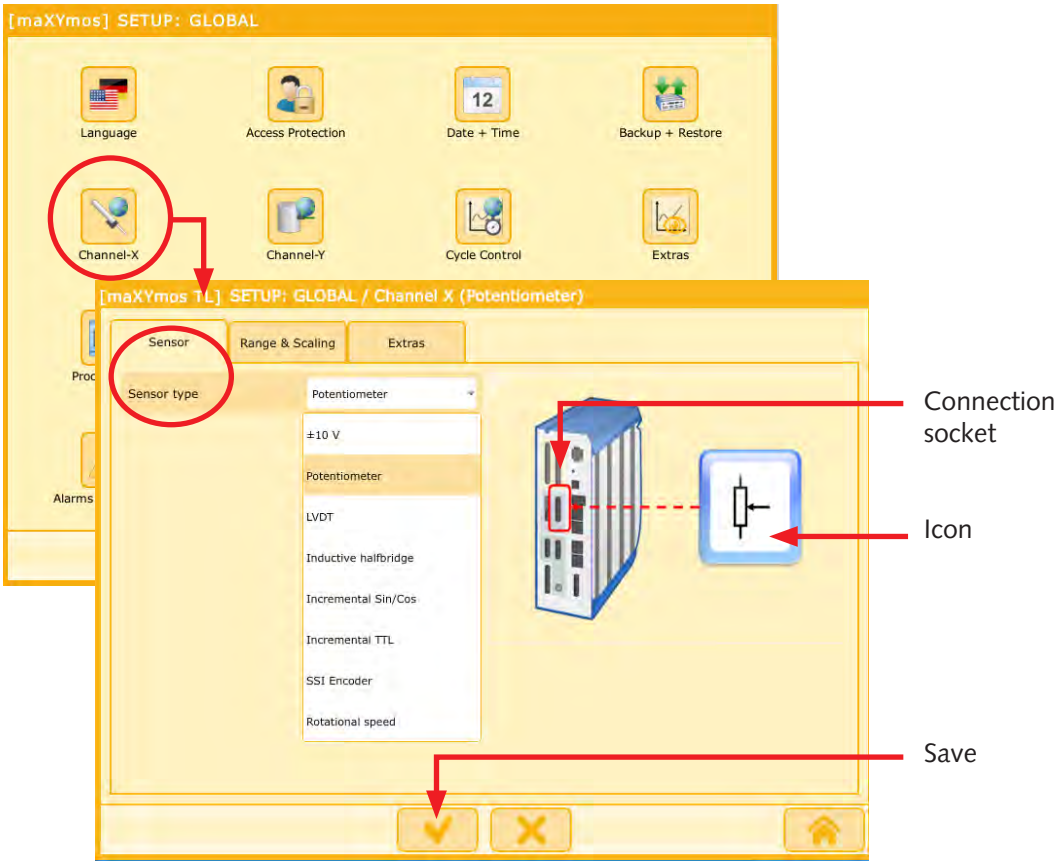
7.7.4 Channel X

Setting the sensor of channel X

The maXYmos TL monitor Type 5877… allows the 'global' setting of the channel X, i.e., the channel must only be configured once. It is required that all measurement programs (= MP) use the same sensor scaling and have approximately the same X ranges. However, the curve forms may differ. All measurement programs can then all be related to these common, 'global' channel settings.

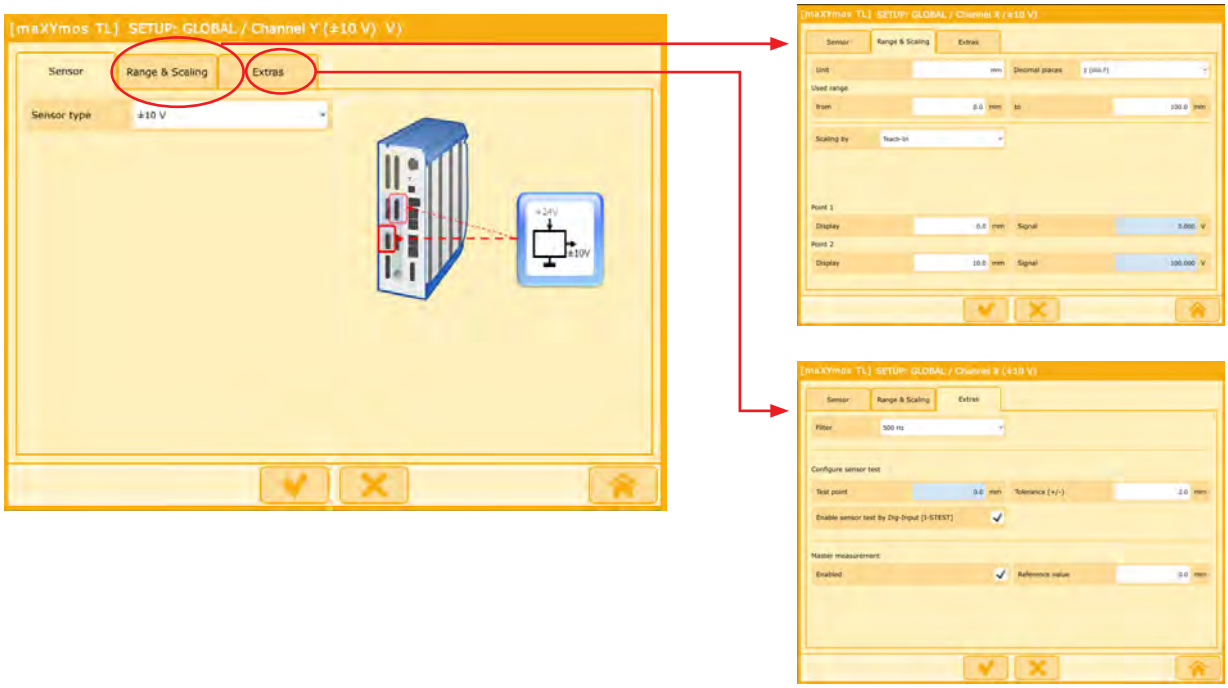
Both 'global' channel settings and MP-specific channel settings can be chosen in MP Setup (MP = measurement program). Thus, it is possible to create configurations for a specific measurement program that deviate from the 'global' channel settings.

7.7.4.1 Select Channel X sensor type

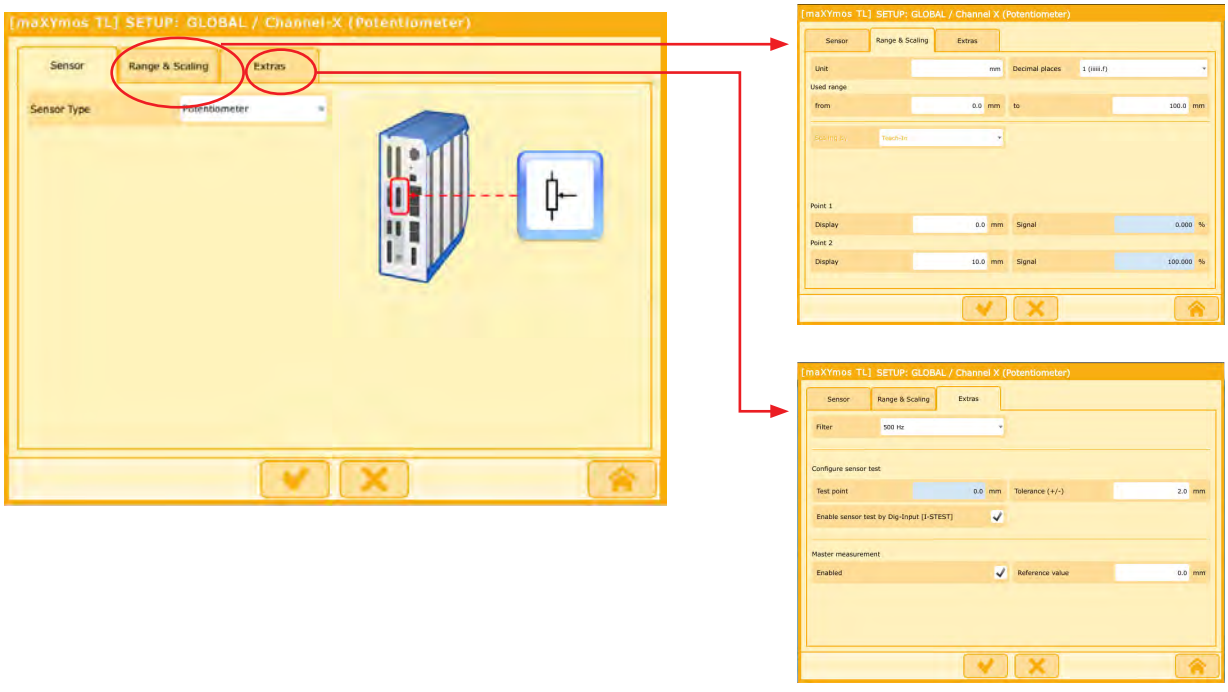


Sensor type
Choose sensor type, e.g. Servo, 10 V, Potentiometer, LVDT, Inductive Halfbridge, Incremental SIN/COS, Incremental TTL, SSI-Encoder, Rotational speed.

7.7.4.2 Channel X sensor type: ±10 V



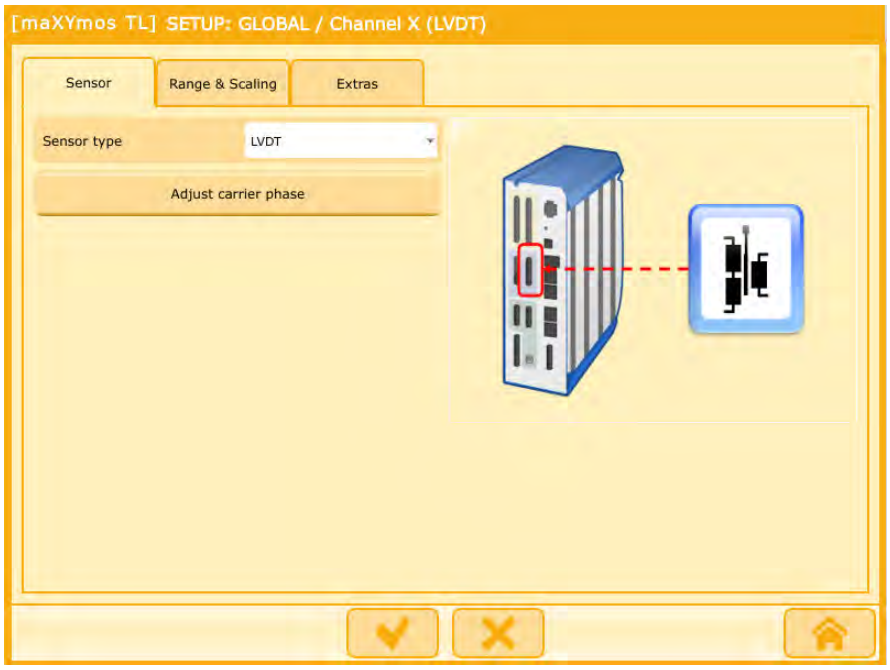
7.7.4.3 Channel X sensor type: Potentiometer



NOTE

The submenus **Range & Scaling** as well as **Extras** are described in the chapters '**Channel X Settings - Range/Scaling' e.g., on the sensor type potentiometer** and '**Channel X Setting – Extra' e.g., on the sensor type potentiometer**.

7.7.4.4 Channel X sensor type: LVDT



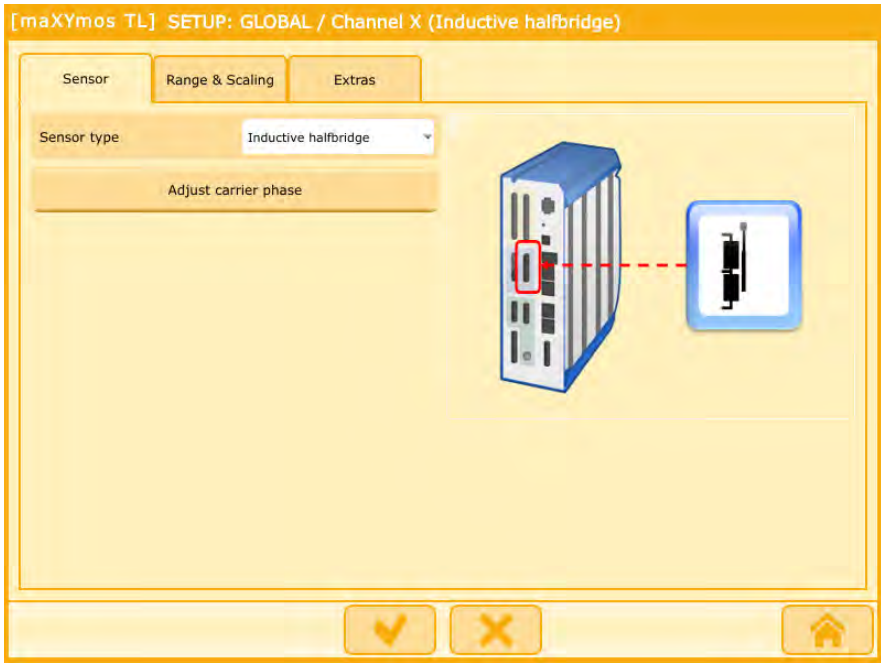
Adjust carrier phase
The phase offset between sensor supply and sensor output signal is compensated **with the function** Adjust Carrier Phase. The adjustment must be carried out in the installed state of the final wiring, as the wiring has an influence on the phase offset.

NOTE

For an optimal adjustment, the sensor must be moved so that a high electrical signal amplitude at the output of the sensor (and thus at the input of the maXYmos TL monitor) is applied.

The submenus **Range & Scaling** as well as **Extras** are described in the chapters '**Channel X Settings - Range/Scaling' e.g., on the sensor type potentiometer** and '**Channel X Setting – Extra' e.g., on the sensor type potentiometer**.

7.7.4.5 Channel X sensor type: Inductive half bridge

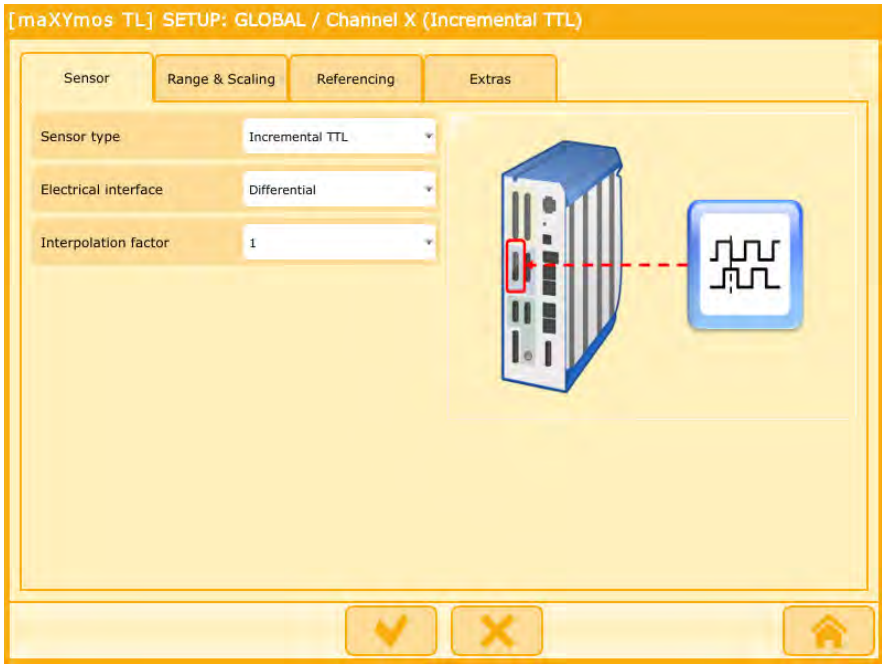


Adjust carrier phase
The phase offset between sensor supply and sensor output signal is compensated **with the function** Adjust Carrier Phase. The adjustment must be carried out in the installed state of the final wiring, as the wiring has an influence on the phase offset.

For an optimal adjustment, the sensor must be moved so that a high electrical signal amplitude at the output of the sensor (and thus at the input of the maXYmos TL monitor) is applied.

The submenus **Range & Scaling** as well as **Extras** are described in the chapters '**Channel X Settings - Range/Scaling' e.g., on the sensor type potentiometer** and '**Channel X Setting – Extra' e.g., on the sensor type potentiometer**.

7.7.4.6 Channel X sensor type: Incremental TTL



Output
Selection of the type of sensor output:

- Differential
- Push-Pull
- Open Collector

NOTE

Pay attention to the data sheet specifications of the sensor being used.

The submenus **Range & Scaling** as well as **Extras** are described in the chapters '**Channel X Settings - Range/Scaling' e.g., on the sensor type potentiometer** and '**Channel X Setting – Extra' e.g., on the sensor type potentiometer**.

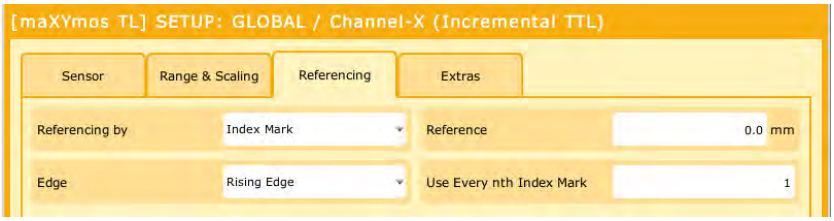
7.7.4.7 Referencing

Referencing by:

I-Zero	Referencing with input signal zero X
I-Start	Referencing for input signal Start (of the measurement)
Index mark	When crossing over the index mark of the encoder. If these variants of referencing are chosen, additional parameters are displayed.

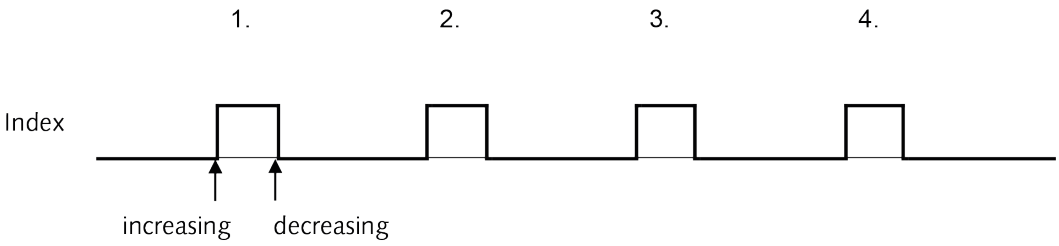
Reference values
X-value which is set to achieve the condition for referencing.

Setting for **referencing by: Index mark**

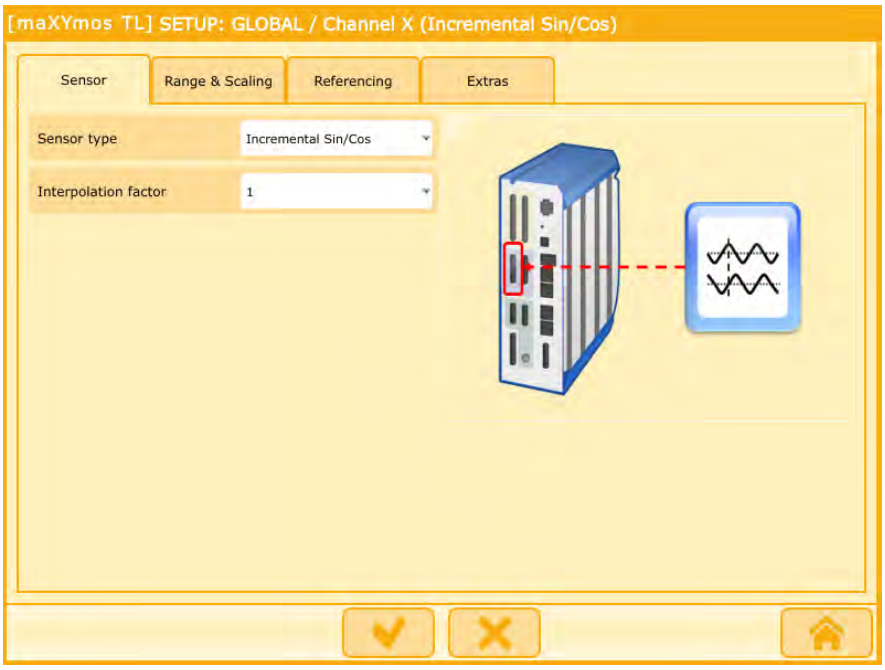


Edge
Selection of the index mark edge, for which parameterized X value is accepted as reference value.

Use any nth index mark
Select the index mark that should be used if multiple index marks follow one another.



7.7.4.8 Channel X sensor type: Incremental Sin/Cos



Output
Differential permanently set.

Interpolation factor
Increasing the resolution by pulse multiplication per sine/cosine period.

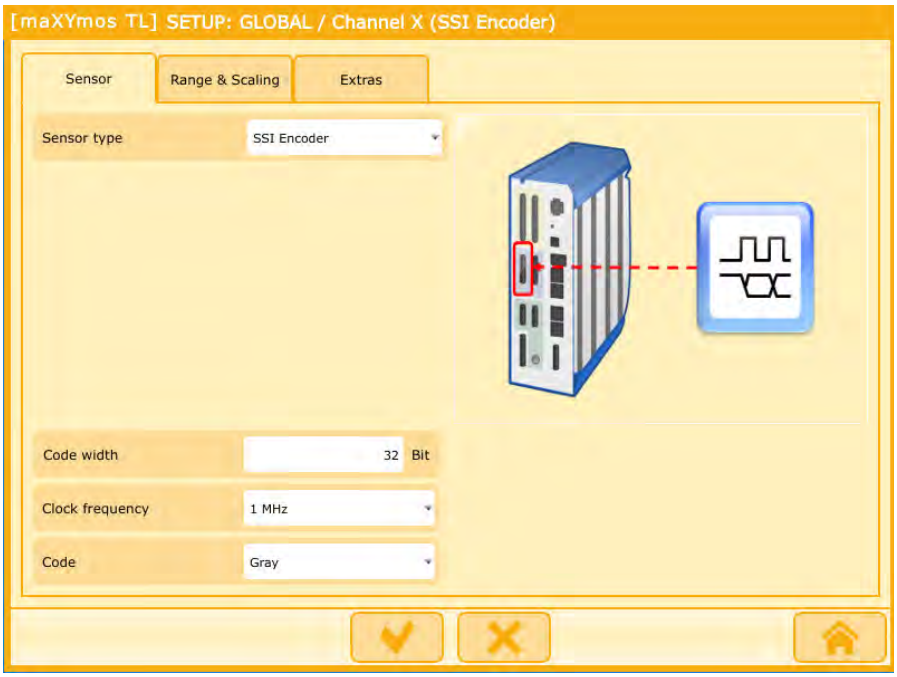
NOTE

A selected interpolation factor that is too high can lead to discontinuities in the channel X values, depending on the signal quality.

The submenus **Range & Scaling** as well as **Extras** are described in the chapters '**Channel X Settings - Range/Scaling' e.g., on the sensor type potentiometer** and '**Channel X Setting – Extra' e.g., on the sensor type potentiometer**.

Submenu Referencing see chapter 'Channel X'
Sensor type: Incremental TTL/Referencing

7.7.4.9 Channel X sensor type: SSI



Code width
Data word length of the sensor output

Clock frequency
Clock frequency for reading the sensor data

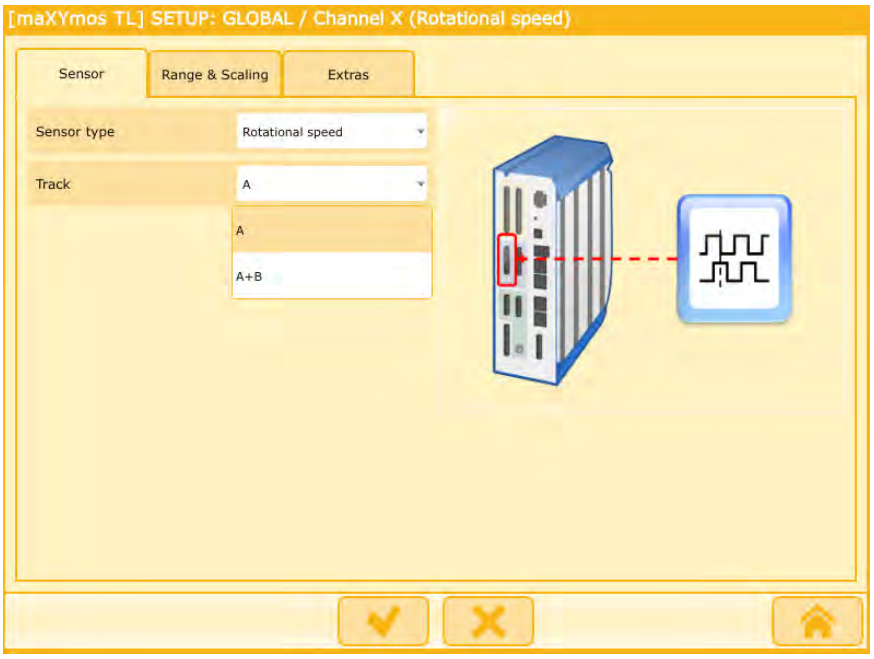
Code
Coding of the data transfer:
- Gray
- Binary

NOTE

Pay attention to the data sheet specifications of the sensor being used. The maximum possible clock frequency can be influenced by the cable length and the cable used.

The submenus **Range & Scaling** as well as **Extras** are described in the chapters '**Channel X Settings - Range/Scaling' e.g., on the sensor type potentiometer** and '**Channel X Setting – Extra' e.g., on the sensor type potentiometer**.

7.7.4.10 Channel-X sensor type: rotational speed

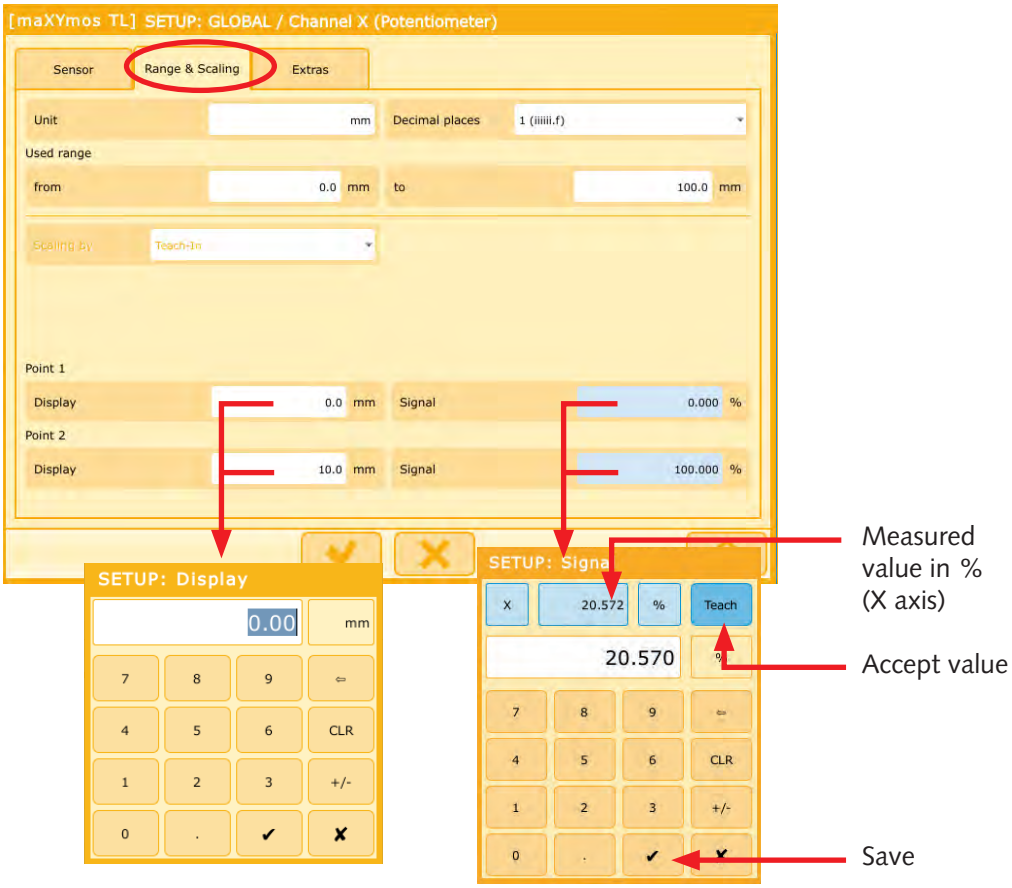


Sensor type
Rotational speed

Track
A: Measuring of the rotational speed
A+B: Measuring of the rotational speed and the direction of the rotation

7.7.4.11 Channel X setting 'Range/Scaling'

For example sensor type potentiometer.
> Channel X > Range & Scaling



Unit/Decimal place
Desired unit (is entered freely, e.g., mm) and select a meaningful decimal point (0 ... 5 digits after the decimal point).

User range
Working range of the sensors (e.g., from 0 ... 50 mm); determines the X axis of the graphs.

Scaling by
Teach-In (= value is measured/read in) or calibration certificate; for sensor type 'potentiometer' is permanently set to 'Teach-In' (cannot be changed).

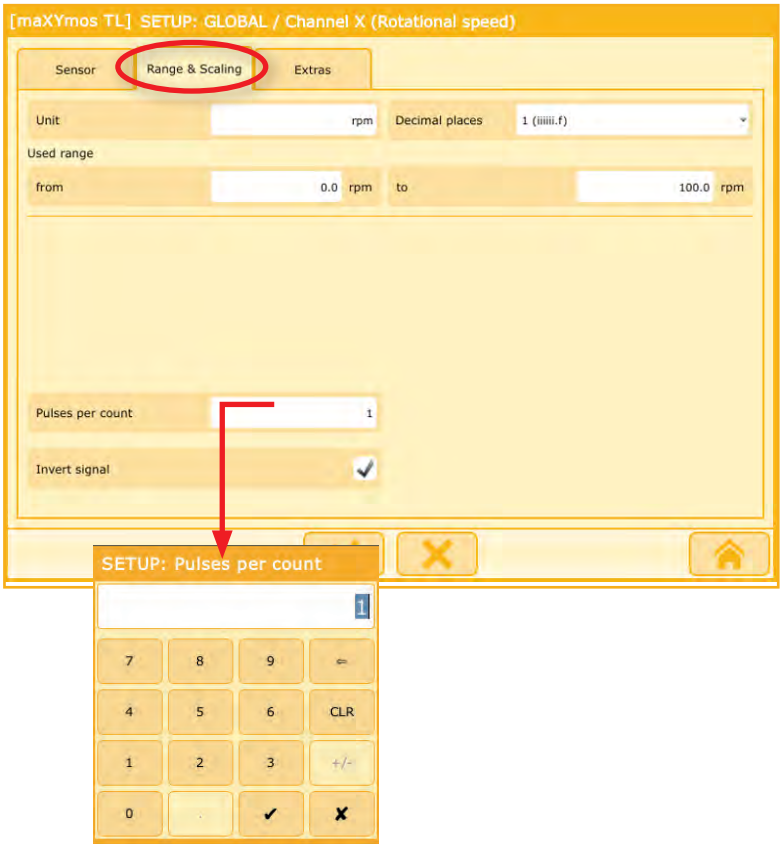
Point 1/Display
Enter first measurement position (e.g., 0 mm).

Point 1/Signal
Start up workpiece and click in 'Signal' field. 'Teach' value accepted by tapping (= 'Teach-In').

Point 2/Display and signal
Like point 1, but with 2 measurement positions.

7.7.4.12 Channel X setting "Range/Scaling" for rotational speed

For example sensor type rotational speed.
> Channel X > Range & Scaling



Unit/Decimal place
Desired unit (is entered freely, e.g., rpm) and select a meaningful decimal point (0 ... 5 digits after the decimal point).

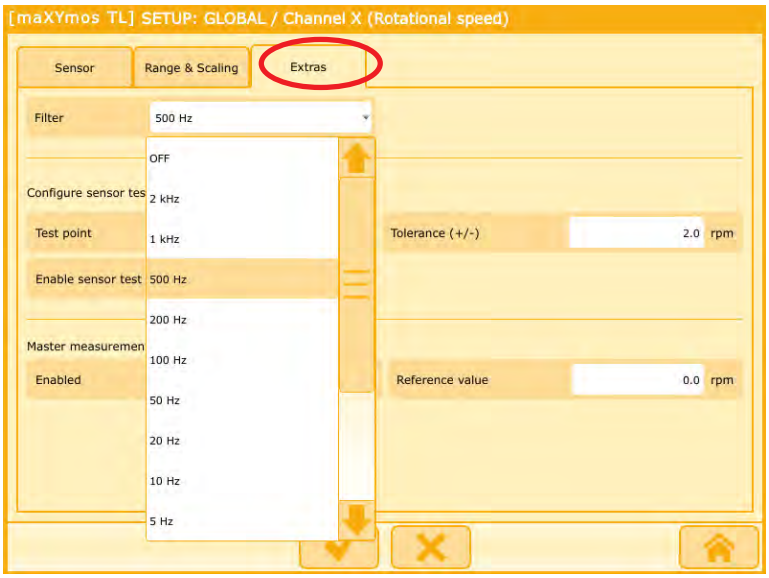
User range
Working range of the sensors (e.g., from 0 ... 1 000 rpm); determines the X axis of the graphs.

Pulses per count
Number of pulses per count of the sensor

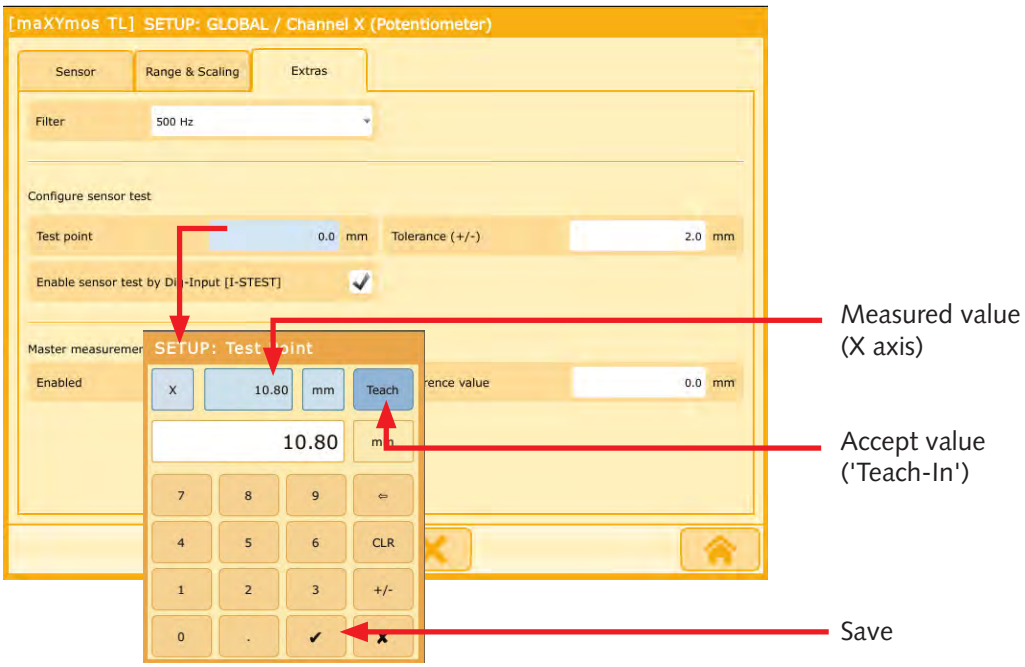
Invert signal
Inversion of the counting direction

7.7.4.13 Channel X setting 'Extra'

For example sensor type potentiometer.
> Channel X > Extra



Filter
Low pass filter 4th order. Interfering curve ripple or noise can be eliminated. Gradually approach the appropriate filter factor!

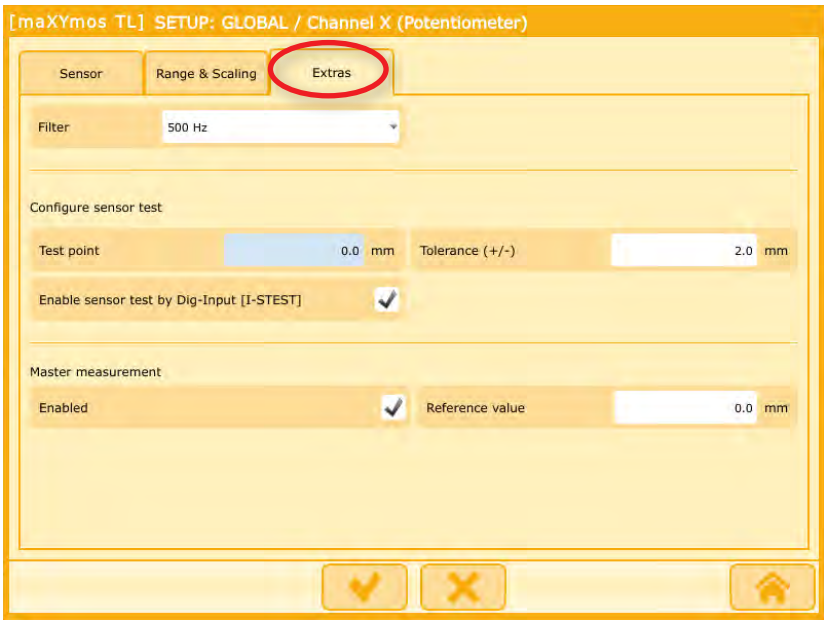


Configure sensor test
Test point
Approach test point mechanically and 'teach-in' the corresponding signal. This point can be cyclically approached later in the process and be checked for compliance by control signal (PLC) or via button (in the service menu).

Tip
Monitor sensor setting with sensor test (menu Service > Sensor Status).

Tolerance (+/-)
Enter permitted tolerance (±) for the taught-in test point (e.g., 2 mm).

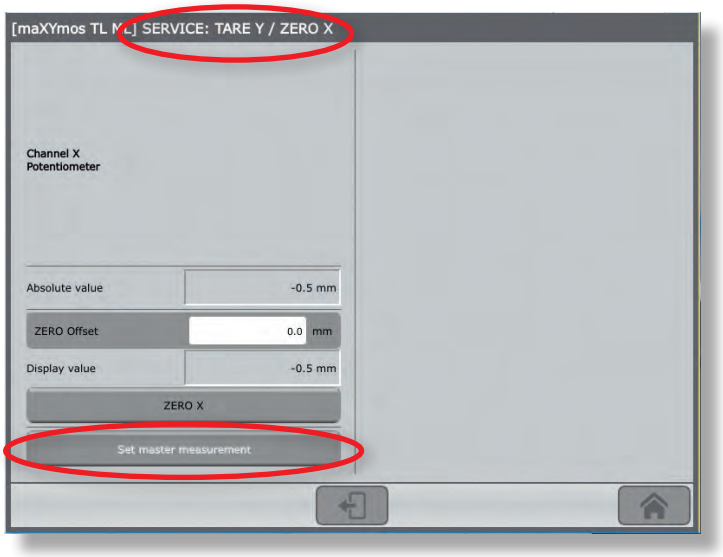
Master measurement



Activated master measurement
A master measurement is possible for this sensor by setting the check mark Activate Master Measurement, and thus the learning of a master part or its master measurement as a measurement standard.

Reference value
Value of the master measurement

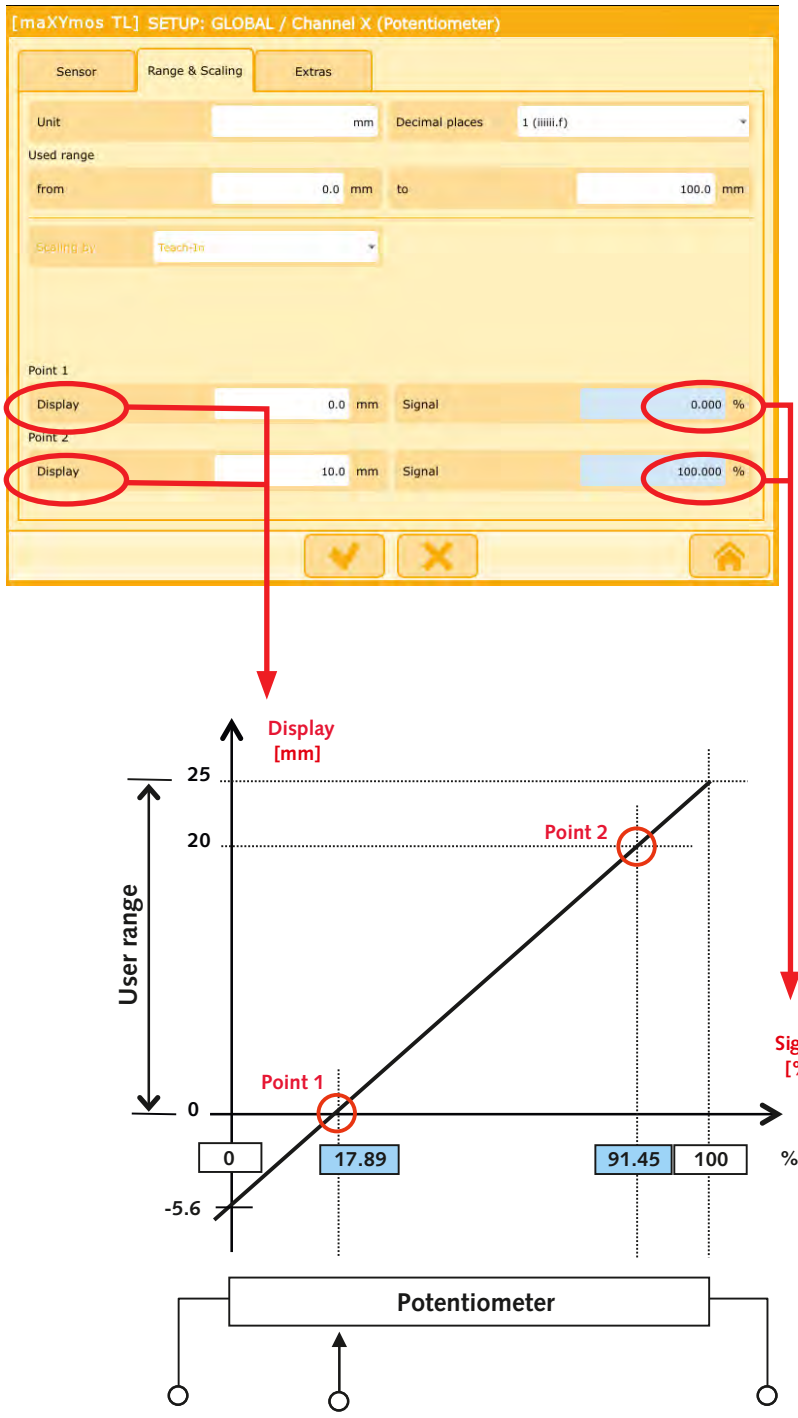
The master measurement can be triggered either manually in the menu Service > TARE Y/ZERO X or via the PLC with the corresponding signal via digital IO or fieldbus.
The master part (standard measurement) must be approached through the sensor for the master measurement. The use of the master measurement requires a correctly set of the X-axis.



7.7.4.14 Principle of two-point scaling, f.e. potentiometer

A potentiometer provides 0 % at the lower cold end, and 100 % of the possible measurement signal at the upper hot end. Within this range, two defined positions are approached (final measurement) and the resulting signals are 'taught'.

Example



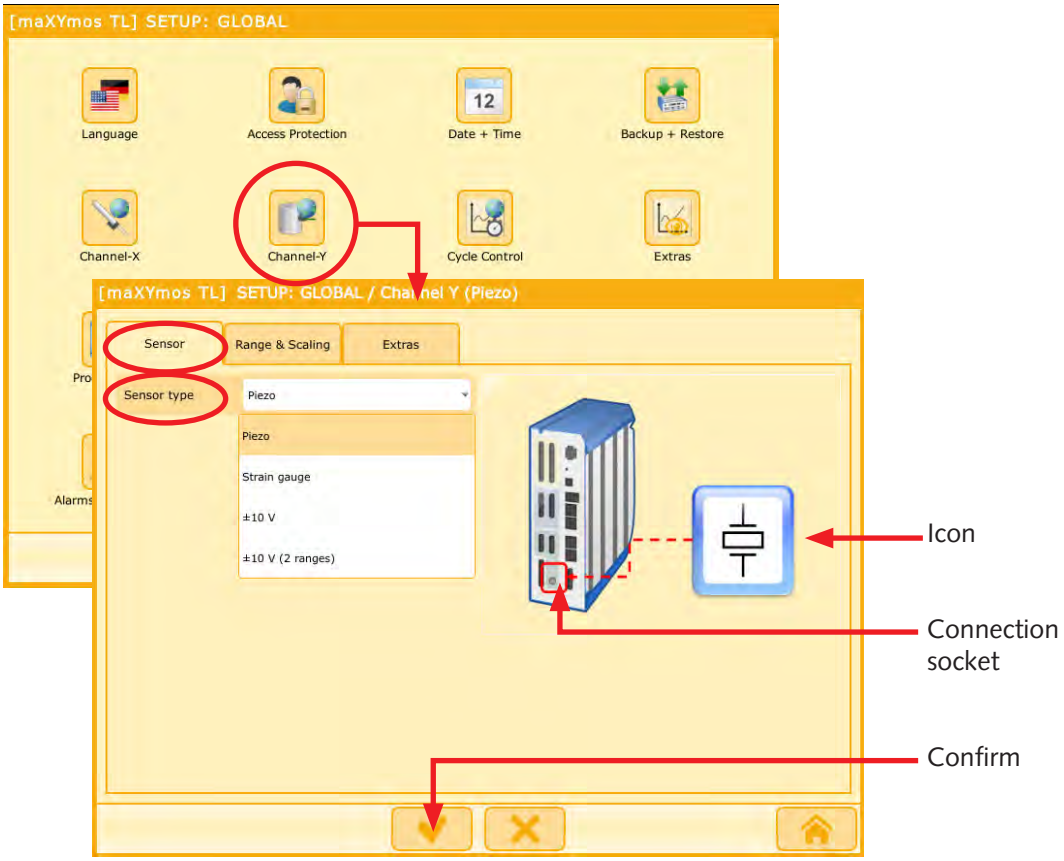
7.7.5 Channel Y

Setting for the sensor of channel Y

The maXYmos TL monitor Type 5877A… allows the 'global' setting of the channel Y, i.e., the channel must only be configured once. It is required that all measurement programs (= MP) use the same sensor scaling and have approximately the same Y ranges. However, the curve forms may differ.
All measurement programs can then all be related to these common, 'global' channel settings. Both 'global' channel settings and MP-specific channel settings can be chosen in MP Setup (MP = measurement program). Thus, it is possible to create configurations for a specific measurement program that deviate from the 'global' channel settings.

7.7.5.1 Select Channel Y sensor type

The selection of the channel Y sensor type defines the channel Y sensor for measurement and evaluation.

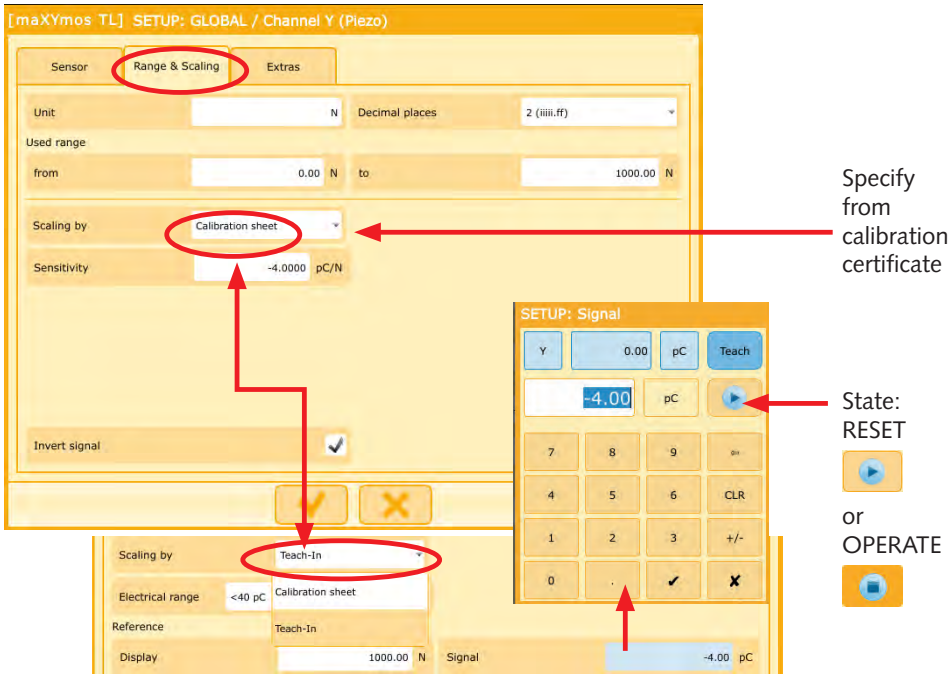


Sensor type
Select sensor type, e.g., piezo (icon and connection socket displayed on the right).

7.7.5.2 Channel Y sensor type piezo

7.7.5.2.1 Channel Y sensor type piezo range & scaling

> Channel Y > Range & Scaling



Unit/Decimal place
Desired unit (is entered freely, e.g., mm) and select a meaningful comma point.

User range
Enter expected range key values (e.g., from 0 ... 100 N). The parameter 'up to' (e.g., 100.0 N) is multiplied by the parameter 'Sensitivity' (–4.0 pC/N) results in the maximum expected amount of charge (e.g., –4.0 x 100 = –400 pC). Don't enter unneccessary high values in the "to" field, enter the value to be expected plus reasonable tolerance. Therefore an optimum measuring resolution can be achieved. This value can be adjusted anytime afterwards, e.g. if during commissioning no measuring values under load are available.

Scaling by ...
Two possibilities are available: Scaling by calibration certificate or 'Teach-In' (= learning).
Scaling by calibration certificate: The following calibration certificates are required:
- **Sensitivity:** entered in pC/N, e.g., '–4.000 pC/N'.
- Important: **'–' (Minus-) sign** do not forget!

Invert signal (only for 'calibration certificate')
Inverting the signal

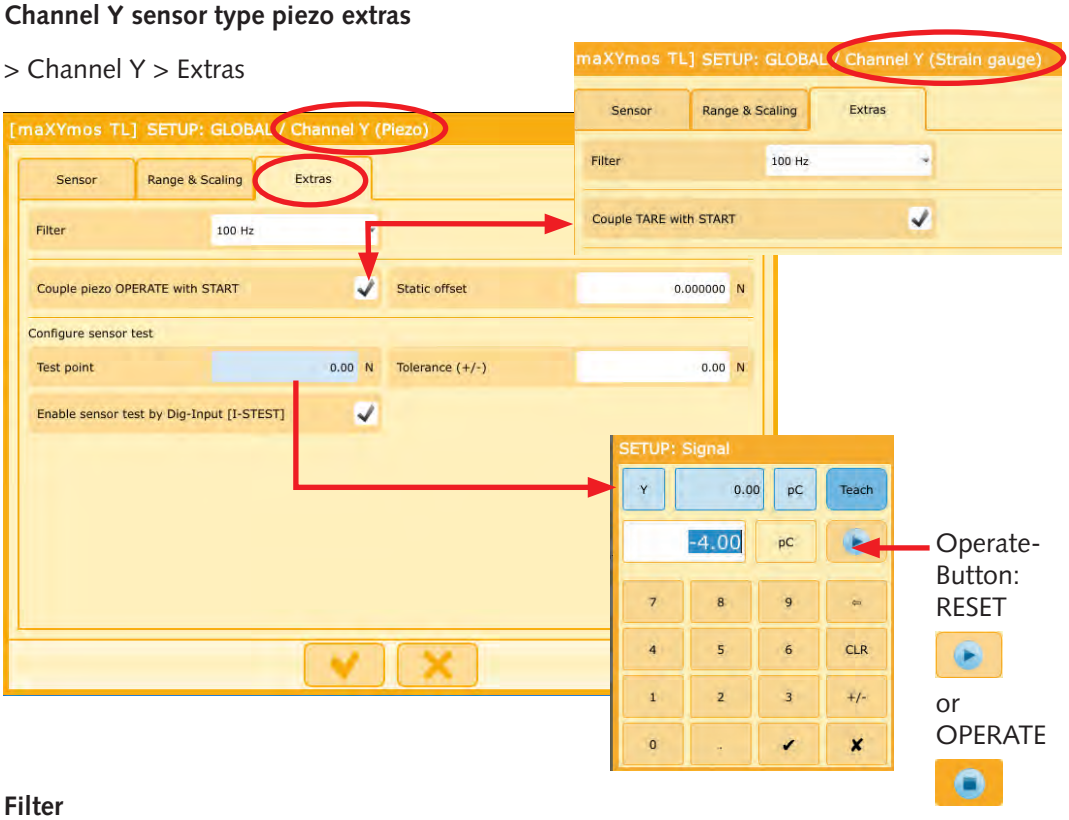
Scaling by Teach-In ('learning')
This function is, for example, helpful in indirect force measurement via piezoelectric strain sensors on a C-clip (because the relationship between force and amount of charge is not initially known). The OPERATE button must be pressed, if necessary, before the learning of the test point. The charge amplifier is thus brought to the state of 'OPERATE'(= measure). Meaning of the button: RESET or OPERATE

NOTE

Release (= without load) sensor for learning ('Teach-In').

7.7.5.2.2 Channel Y sensor type piezo extras

> Channel Y > Extras



Filter
Low pass filter 4th order. Interfering curve ripples or noise can be eliminated. Gradually approach the appropriate filter factor!

Couple Piezo OPERATE on START (only for piezo sensor)
If the check mark is set, there is no need to be concerned about 'RESET-OPERATE-Handling' of the charge amplifier. It is thus tightly coupled to the START state (START = True → OPERATE, START = False → RESET (or. /OPERATE).

Couple tare on START(only for strain gauge sensor)
When the START condition is fulfilled, e.g., by reaching the START-Threshold-X or Input I-START 0 → 1 channel Y is automatically tared (length <0.1 ms).

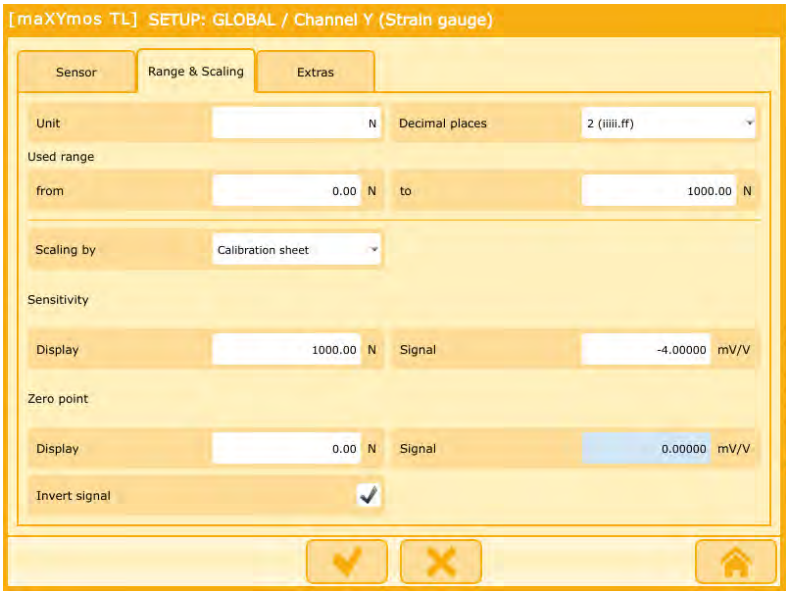
Test point (strain gauge sensor)
Approach and teach test position. Cyclically approach this point in the process and test for compliance by control signal (PLC) or button (in service menu).

Tolerance
Define permissible tolerance (±) for the test point.

Allow sensor test by Dig-Input [I_STEST]
Set check mark, if sensor test by DIG-IN is desired.

7.7.5.3 Channel Y sensor type strain gauge

7.7.5.3.1 Range & Scaling



Unit/Decimal place
Desired unit (is entered freely, e.g., mm) and select a meaningful comma point.

User range
Enter expected range key values (e.g., from 0 ... 1 000 N).

Scaling by ...
Two options are available: Scaling by calibration certificate or 'Teach-In' (= learning).

Scaling by calibration certificate:

- **Sensitivity**
  Display: Displayed value (nominal value) for reaching the specified value under signal:
  Signal: Nominal value of the signal (output signal of the sensor)
- **Zero point**
  Display: Displayed value for zero signal value (typically zero)
  Signal: Zero signal value (zero point). It is recommended to teach this mV/V-value, since zero points of strain gauge sensors shift with age (also in the original packing). They then no longer match the specified value in the calibration certificate under 'zero signal'.

Invert signal
Inverting the signal

Scaling by Teach-In ('learning')
Teaching by control measurement. A second external Y sensor (e.g., force sensor) is necessary for this.
Approach two points and for each of the displayed values of the control measure as value: Enter display and the associated signal value per signal: Apply teach-in.

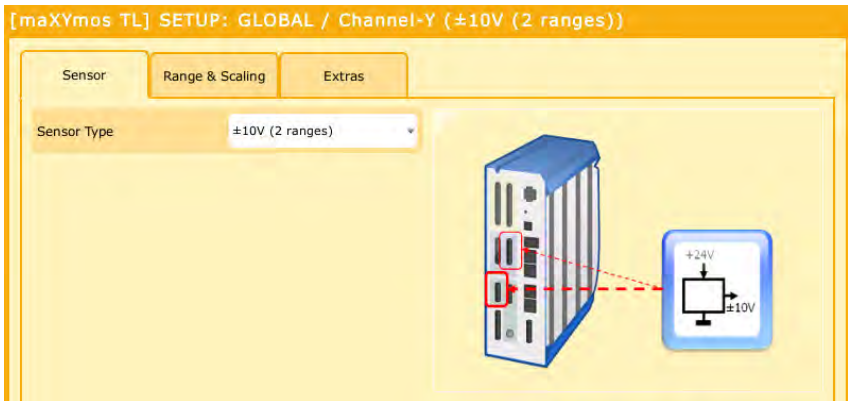
The submenu **Extras** is described at **sensor type piezo**.

7.7.5.4 Channel Y sensor type ±10 V

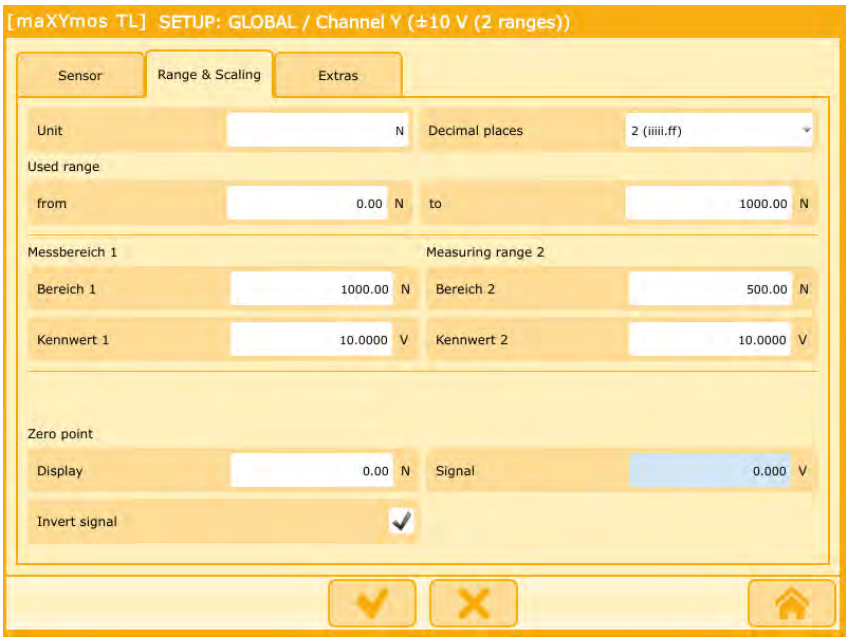
NOTE

The submenus **Range & Scaling** are described in the chapter **'Range/Scaling'** at **Sensor Type Strain Gauge** and Extras at **Sensor Type Piezo**.

7.7.5.5 Channel Y sensor type ±10 V (2 measurement ranges)



7.7.5.5.1 Channel Y type ±10 V (2 ranges) Range & Scaling



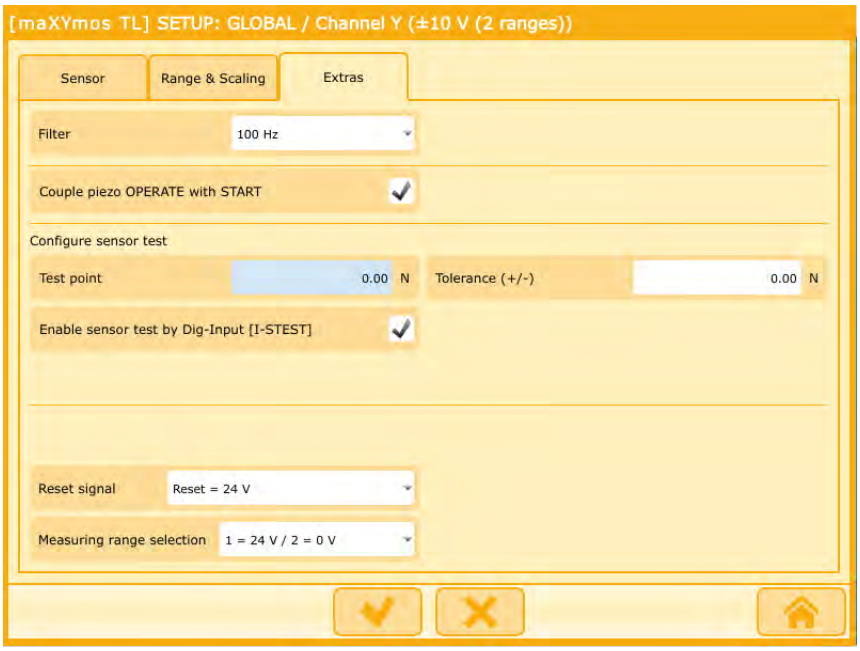
Unit/Decimal place
Desired unit (is entered freely, e.g., mm) and select a meaningful comma point.

User range
Enter expected range key values (e.g., from 0 ... 1 000 N).

Measurement range 1/2

- **Sensitivity**
  Display: Displayed value (nominal value) for reaching the specified value under signal:
  Signal: Nominal value of the signal (output signal of the sensor)
- **Zero point**
  Display: Displayed value for zero signal value (typically zero)
  Signal: Zero signal value (zero point)

7.7.5.5.2 Channel Y extras ±10 V (2 ranges)



Filter
Low pass filter 4th order. Interfering curve ripples or noise can be eliminated. Gradually approach the appropriate filter factor!

Couple piezo OPERATE to START (if sensor is working on the basis of piezo)
If the check mark is set, there is no need to be concerned about 'RESET-OPERATE-Handling' of the external charge amplifier. It is thus tightly coupled to the START state (START = True → OPERATE, START = False → RESET (or. /OPERATE).

Couple tare on START(only for strain gauge sensor)
When the START condition is fulfilled, e.g., by reaching the START-Threshold-X or Input I-START 0 → 1 channel Y is automatically tared (length <0.1 ms).

Test point (strain gauge sensor)
Approach and teach test position. Cyclically approach this point in the process and test for compliance by control signal (PLC) or button (in service menu).

Tolerance
Define permissible tolerance (±) for the test point.

Allow sensor test by Dig-Input [I_STEST]
Set check mark, if sensor test by DIG-IN is desired.

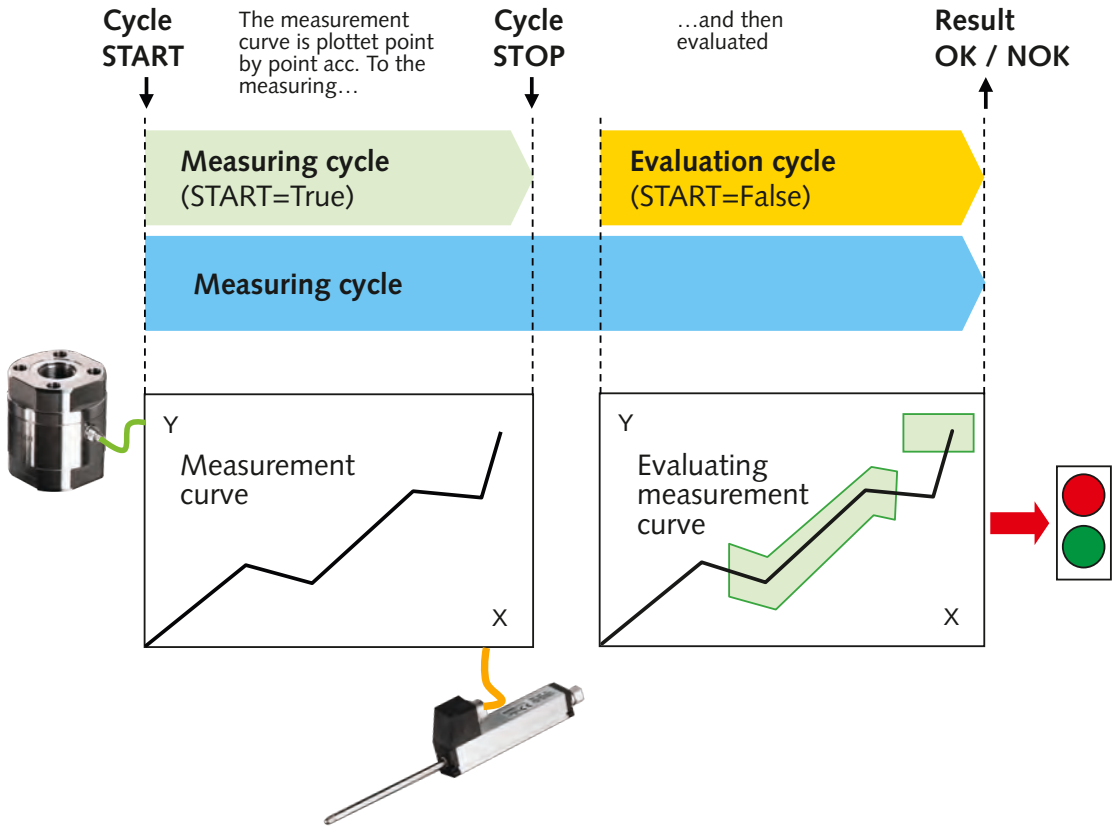
Reset signal
Select the signal level for the reset function for an external charge amplifier.

Select measurement range
Signal level mapping for measurement range 1 and 2 of the measurement range output (range)

7.8 Configuring cycle control

7.8.1 What is a cycle?

A cycle comprises a measurement cycle and an evaluation cycle. It begins when a START condition has been met and ends when a valid evaluation result is generated.



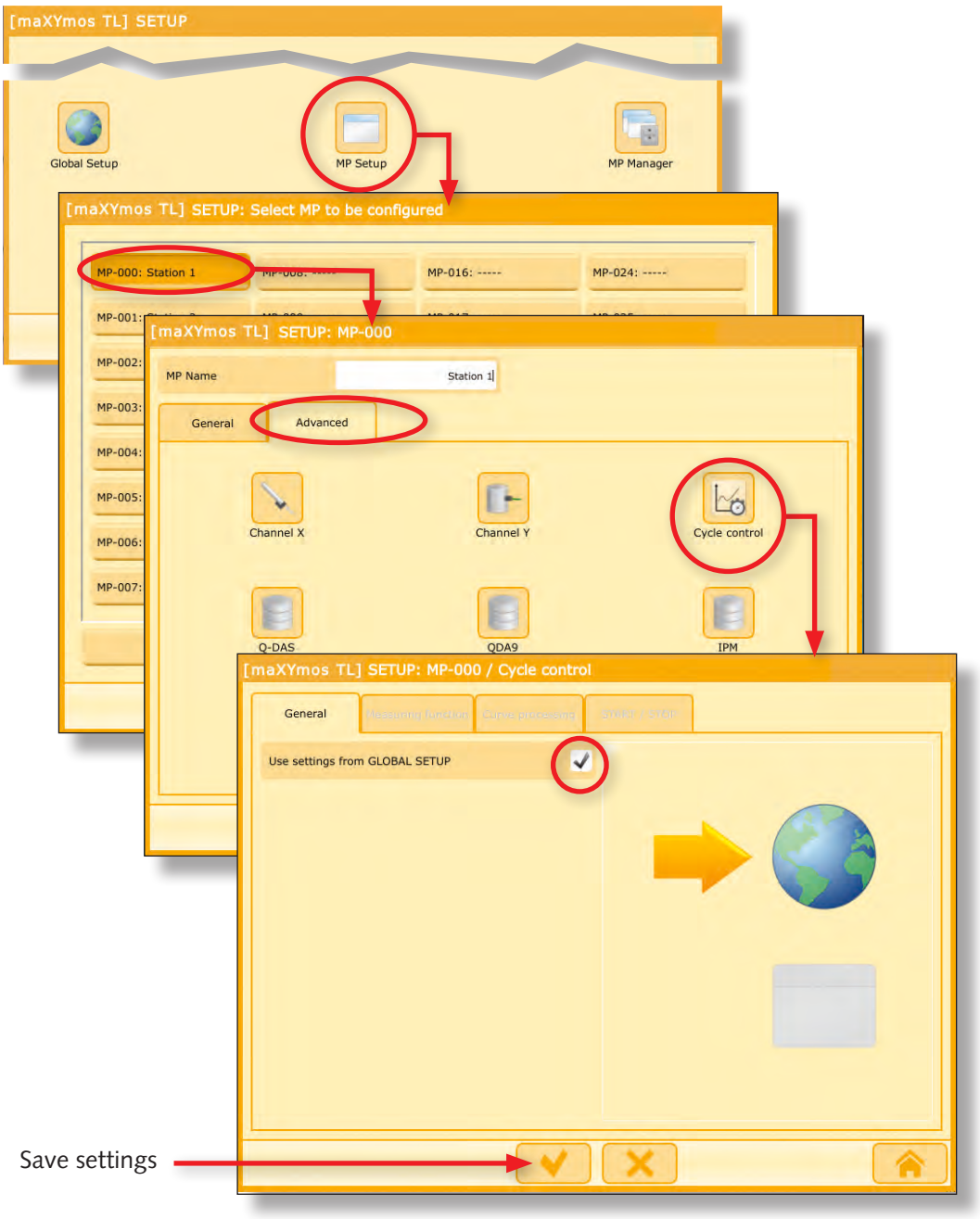
7.8.2 Configuring GLOBAL or MP-specific cycle control

In the MP Setup menu, the "Use GLOBAL Settings" ✓ check box determines whether the cycle-control parameters will be configured and applied based on GLOBAL or MP-specific settings. The factory setting for this is GLOBAL.

It may be necessary to use MP-specific cycle-control settings if, for example:
1. you are capturing a measurement curve for Part 1 using Y=f(X) and for Part 2 using Y=f(t).
2. you want to display the return leg for Part 3 and truncate it for Part 4.
3. Different START conditions apply (Part 5: short displacement, Part 6: long displacement).

Setup First open the SETUP menu, then select Global setup → page 43, 46.

First select MP Setup, then the required MP (e.g. "MP-000")
Select "Advanced configuration", then "Cycle control"

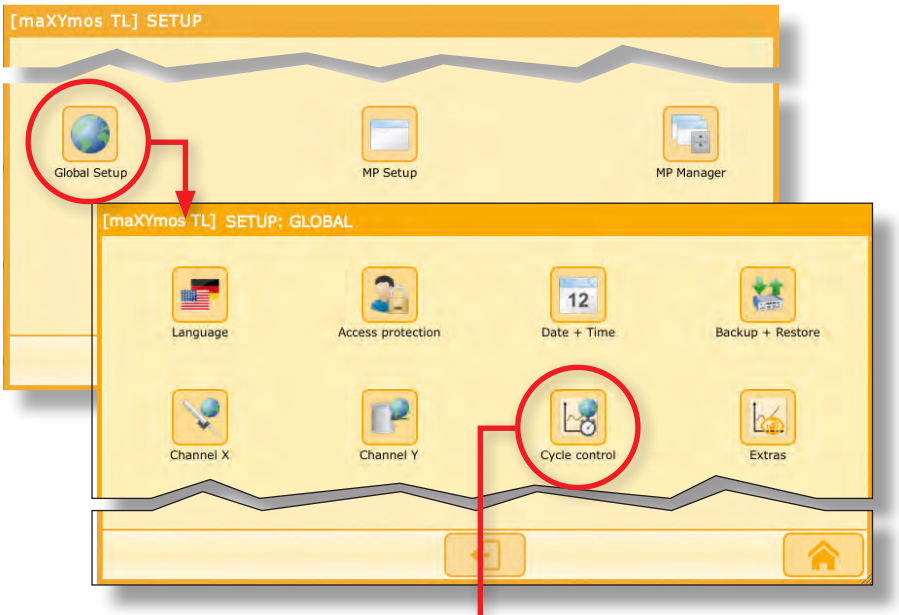


7.8.3 Global cycle control configuration - Access and Menus

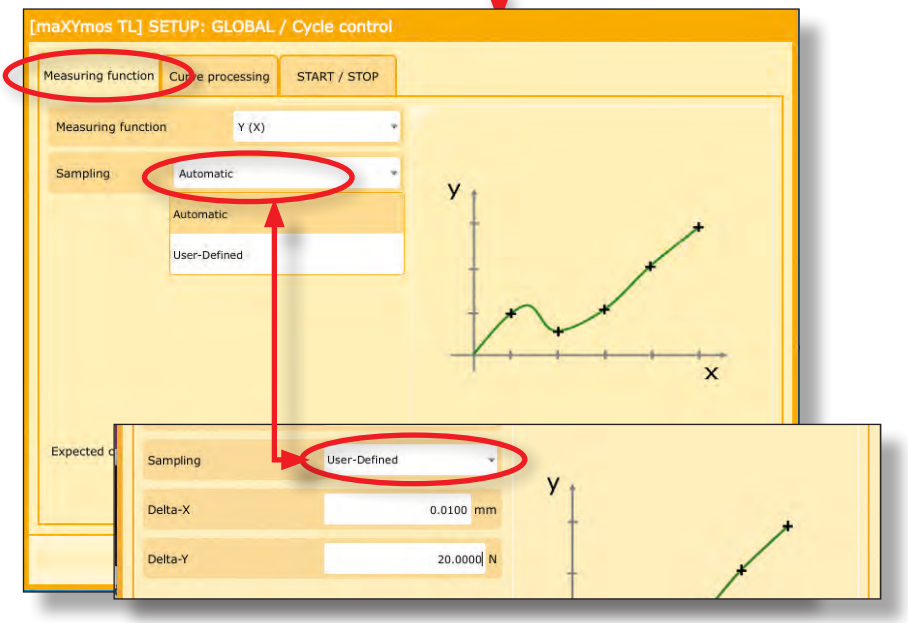
Prerequisites for GLOBAL configuration → page 83
MP-specific cycle-control configuration → page 236

First open the SETUP menu, then select Global setup → page 43, 46.

First select "**Global setup", then "Cycle control"**



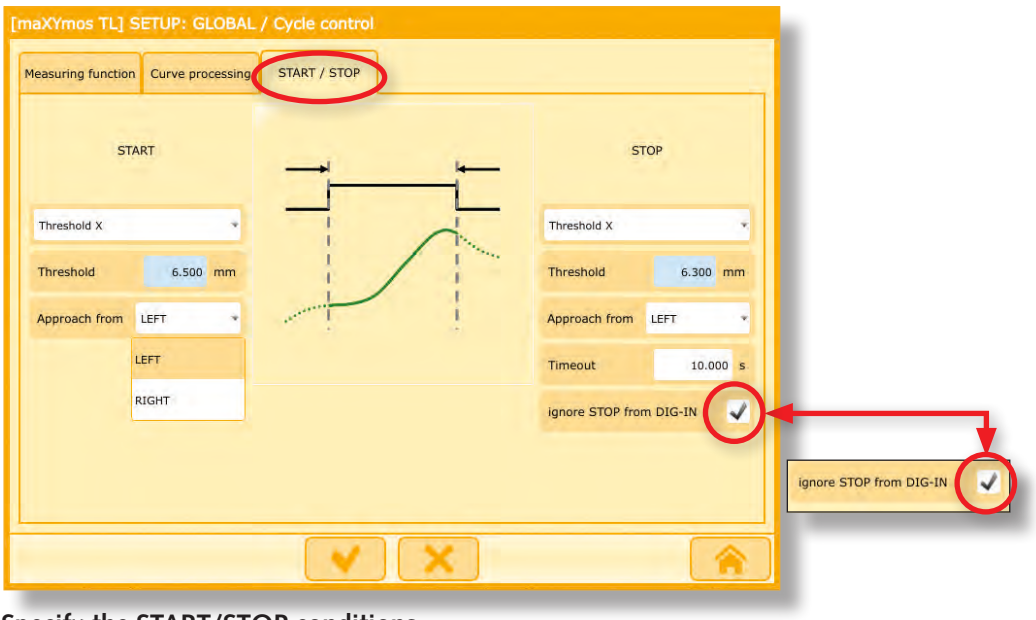
"Measurement Function" tab



Specify measurement function
Choose parameters, e.g. Y (X) → page 86

Specify sampling (Delta-X and Delta-Y)
This can be automatic (factory setting) or user-defined → page 88

"START / STOP" tab

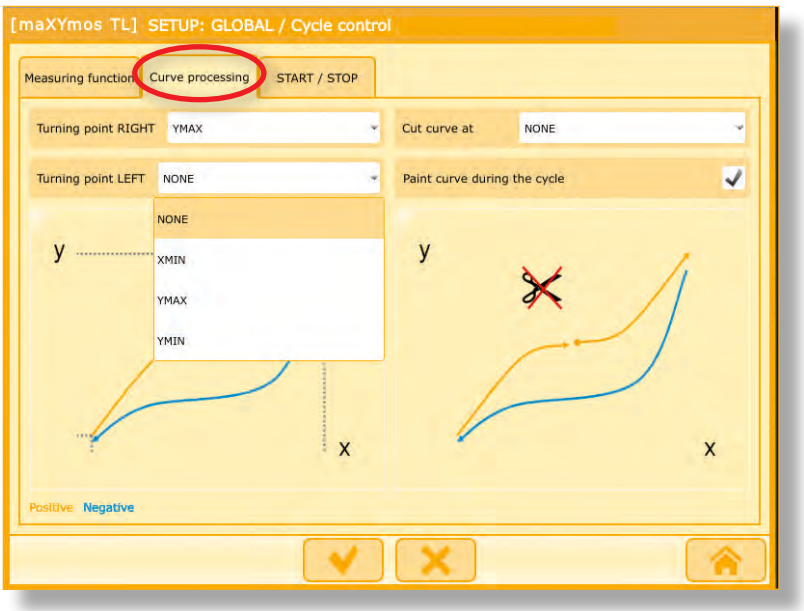


Specify the START/STOP conditions
Specify START and STOP condition ➞ pages 89, 90, 94, 95

Important: Always make the STOP value (e.g. 6.30 mm) smaller than the START value. Otherwise, measurement could end prematurely (e.g. due to a ripple in the displacement signal).

Timeout: Halts measurement after specified interval if no measurement can be made.
Ignore stop Dig Input: This determines whether the falling edge of DIG-IN for START will end the cycle or not.

"Curve Processing" tab



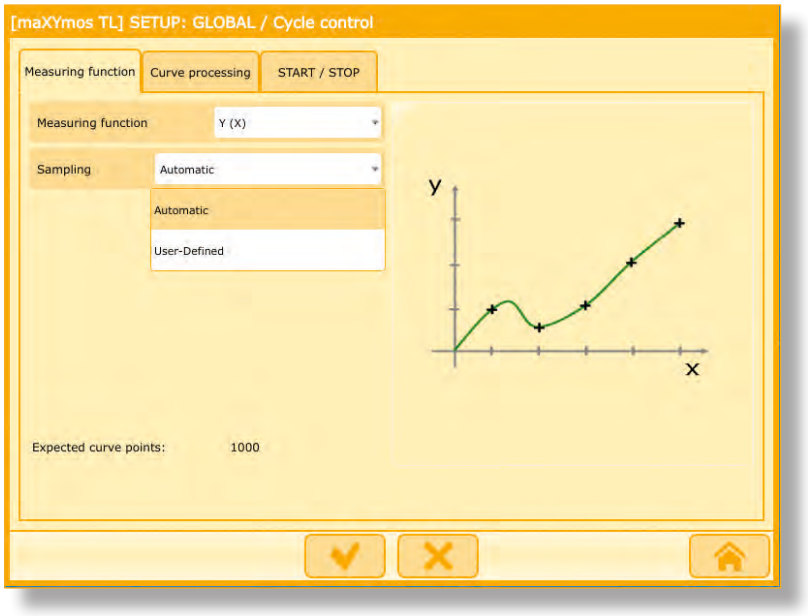
Specify turning point RIGHT and turning point LEFT
➞ page 98
Specify curve truncation point
➞ pages 98, 92, 93

7.8.4 Cycle control - Detailed parameter descriptions

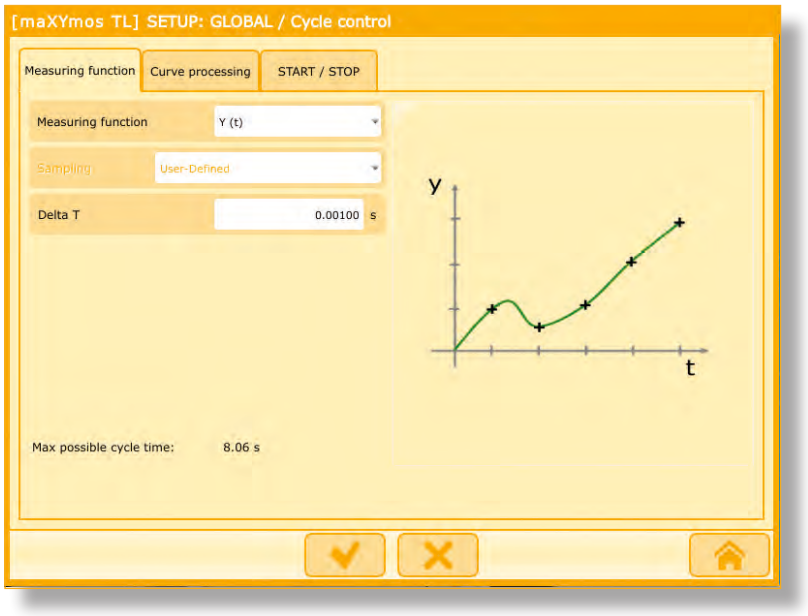
7.8.4.1 Specifying measurement functions - the differences

Access to the menu is explained in section → 7.8.3 / page 84.

Y = f(X)
This function captures a measurand on channel Y against a measurand on channel X. A definable X increment (Delta-X) controls how pairs of X/Y values are read into the system. Values are read only when the curve has passed through Delta-X increment.

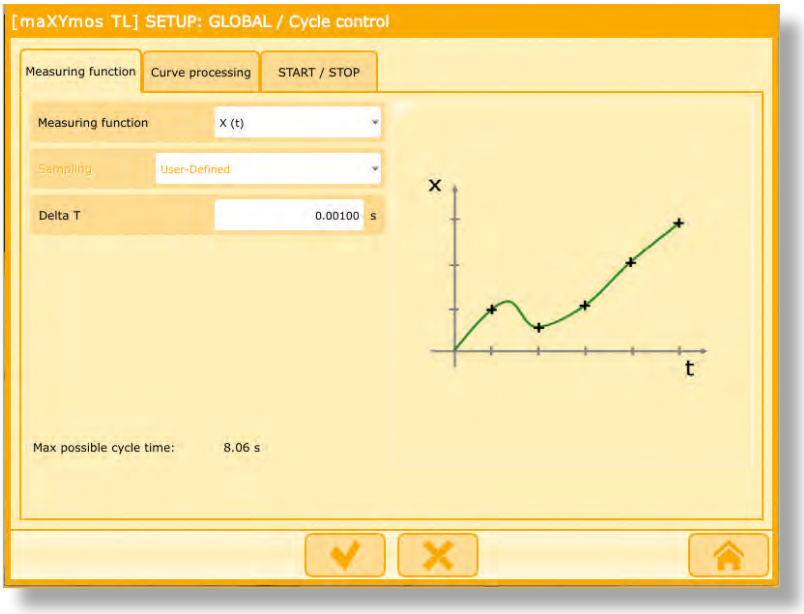


Y = f(t)
This function captures and displays a measurand on channel Y over TIME. A definable TIME increment controls how pairs of X/Y values are read into the system. This obviates the need for an additional channel-X sensor, but does require reproducible feed rates or angular velocities. Otherwise the curve would be compressed in some places and stretched in others.



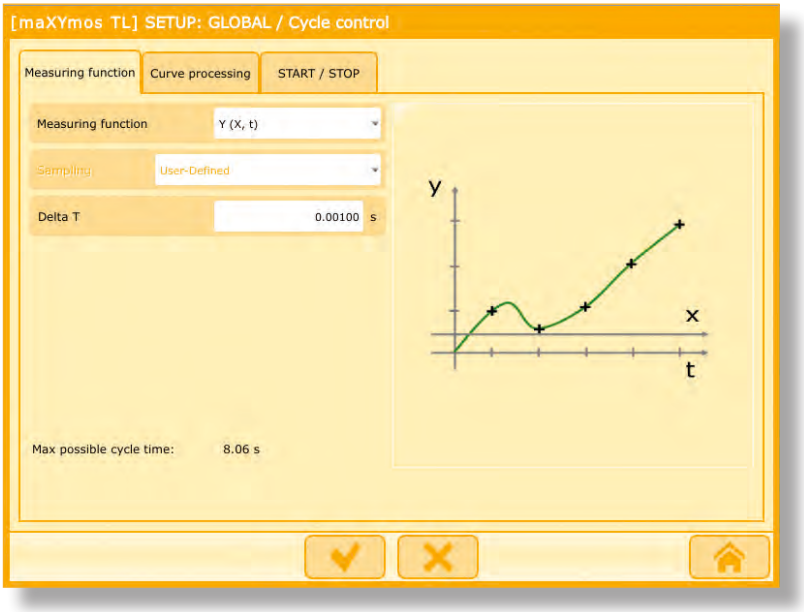
X = f(t)

This function captures and displays a measurand on channel X over TIME. A definable TIME increment controls how pairs of X/Y values are read into the system. It is useful in cases where, for example, changes in displacement or angle need to be monitored over TIME. This requires a connection to an appropriate pontentiometric displacement or angle sensor.



Y = f(X, t)

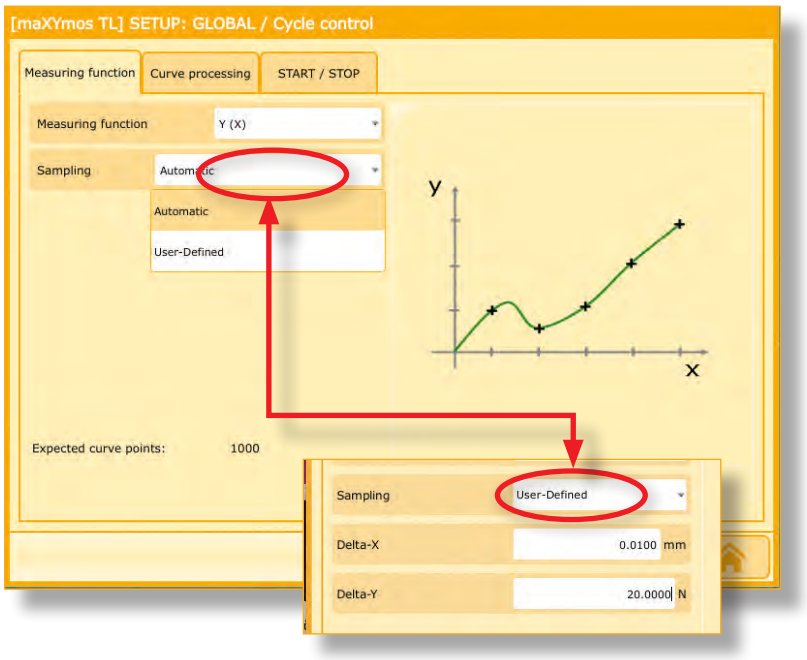
This function captures and displays a measurand on channel Y over TIME. A definable TIME increment (Delta-t) controls how pairs of X/Y values are read into the system, and this is done at preset intervals. This is useful, for example, during press fitting at the block point, when no further Delta-X can be crossed or changes in displacement can occur, but the steep increase in force needs to be recorded.



7.8.4.2 Specifying Delta-X

Access to the menu is explained in section → 7.8.3 / page 84.

This function reads values only when changes in X occur. If Delta-X is set to "Automatic" (the factory setting), the maXYmos TL specifies a value density of approximately 1 000 value pairs per curve. These are distributed between the advancing leg of the curve and its return leg (should it have one). The value shown under "Expected Curve Points" will be reached only if the range (e.g. a displacement) specified under "Used Range" (→ 7.7.2 / page 54) in the channel-X setup is actually crossed by both the advancing and the return leg of the curve. If the measurement curve has only an advancing (POSITIVE) leg, a maximum of half the specified number of curve points will be reached.



Delta-X affects:

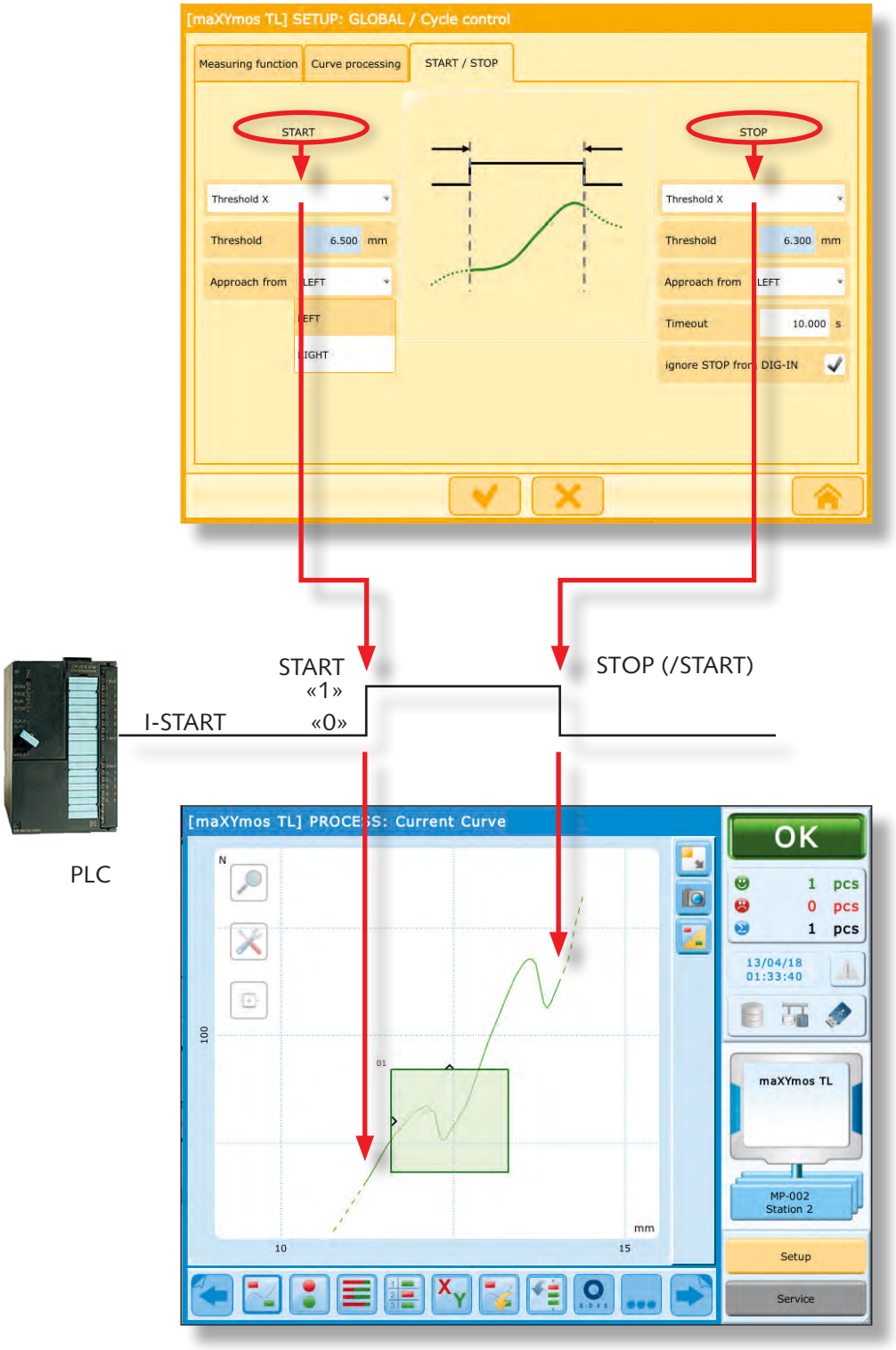
- the number of value pairs per measurement curve
- the evaluation TIME
- the number of values in the CSV log file

7.8.4.3 Specifying the START- / STOP condition

7.8.4.4 Using an external signal to control START and STOP

Access to the menu is explained in section → 7.8.3 / page 84.

In this example, the I-START digital input or the START fieldbus bit are used to bring about START and STOP.



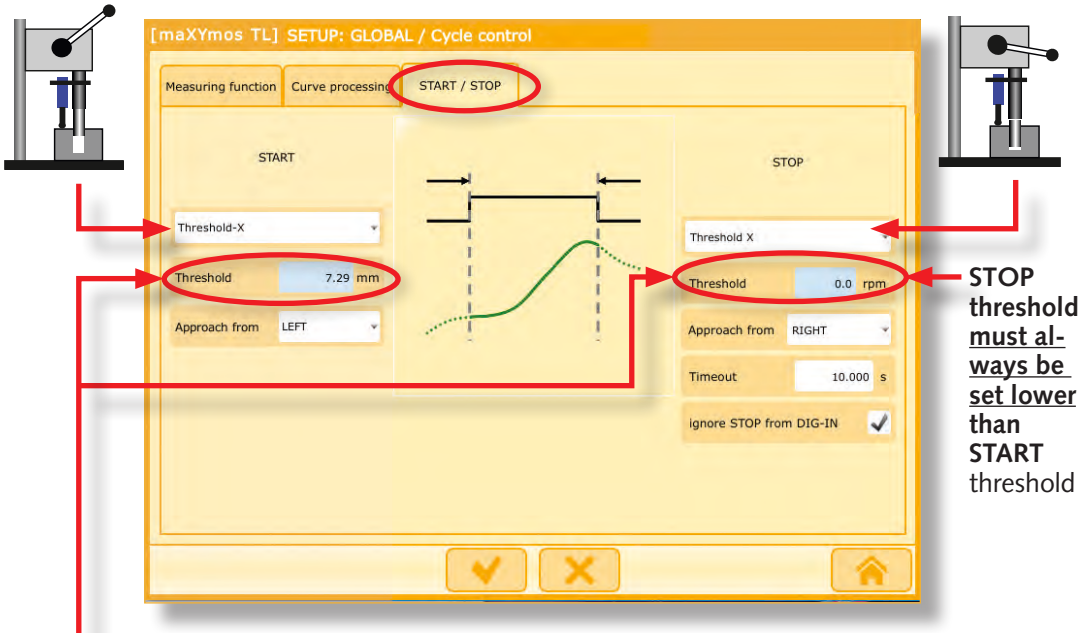
The measurement curve is captured while the PLC has set "I-START" to "1".

7.8.4.5 Using measurands to control START-STOP

Access to the menu is explained in section → 7.8.3 / page 84.

Benefit: The maXYmos TL can be operated independently of external control systems.

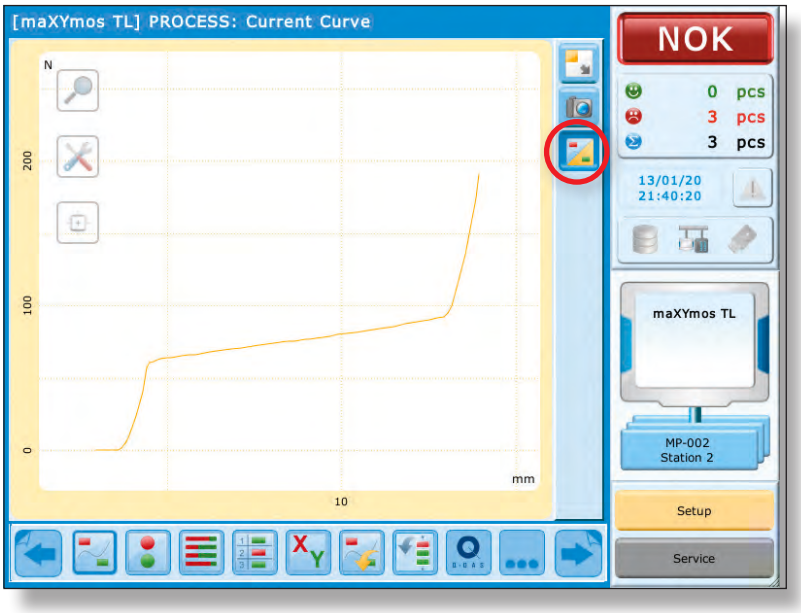
Example 1
START-STOP is controlled by the channel-X measurand. Approach until you have nearly reached the workpiece and "teach in" the relevant value. Once this Threshold-X is reached, the measuring cycle starts, ending when the Threshold-X defined as STOP is reached. Both thresholds can "taught in" or entered via the keyboard.



STOP threshold must always be set lower than START threshold

Important! Always enter a lower STOP value for Threshold-X (in this example "7.20") **than the START value for Threshold-X** (in this example "7.29"). **Rationale**: This prevents X ripples, such as those which may be caused by the slip-stick effect during press fitting, from immediately causing the process to stop again.

Activate the Editor view to differentiate between the negative and positive legs of the curve. **→ 6.3.7 / page 31**

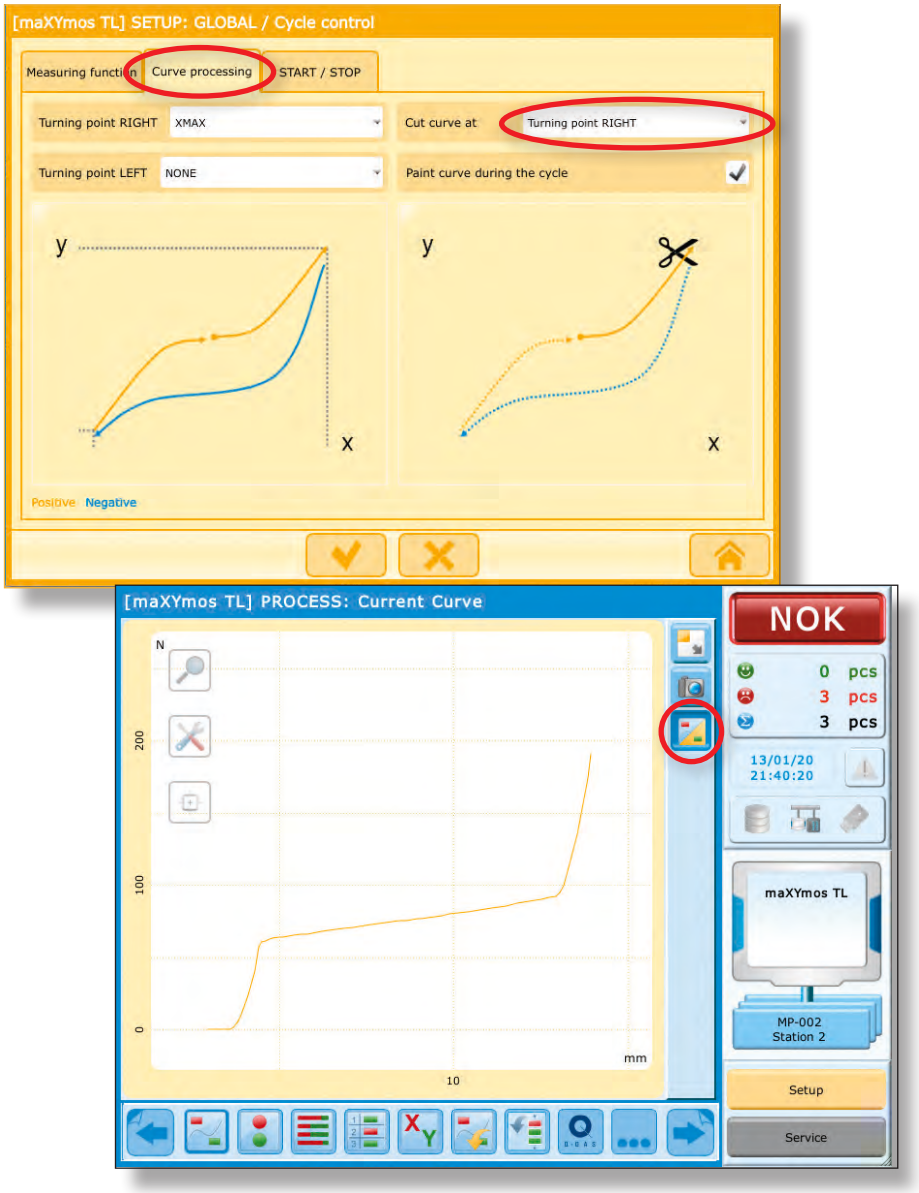


Curve trajectory based on the aforementioned START-STOP conditions: Curve capture commences at 8.3 mm on the advancing leg, approaching from the LEFT (orange section) and ends at 8.0 mm on the return leg, approaching from the RIGHT (blue section).

Advantage The whole curve, including its return leg, is always captured. It is not imperative for a threshold to the right to be reached as a STOP condition.

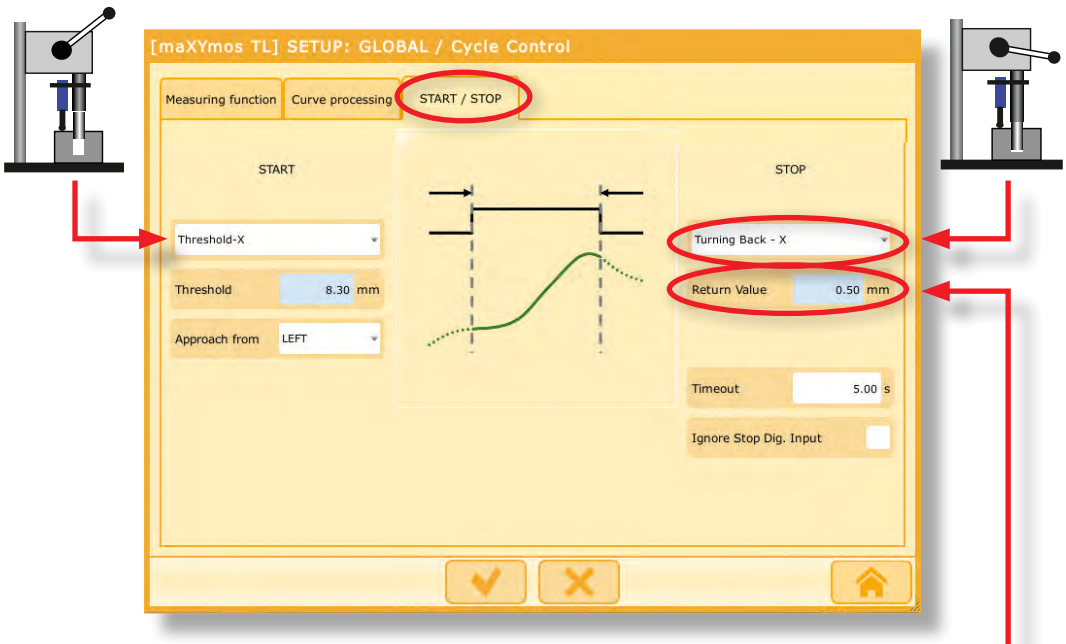
Disadvantage The return stroke cannot be used for the evaluation phase, as it begins only with STOP. This is a drawback when cycle times are fast. In such cases, you may need to choose "Turning Back-X"as the STOP condition (see example 2 on next page).

Tip If the return leg causes problems it can be truncated: First select "Cycle Control", then "Curve Processing" tab. Set "Turning Point RIGHT" to "YMAX". Set "Cut Curve at" to "Turning Point RIGHT" (= curve returning from right).

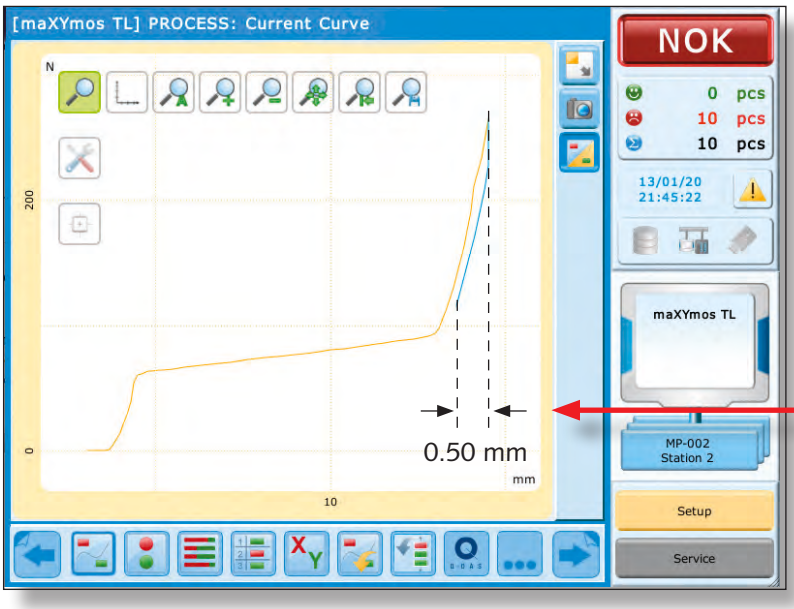


Example 2

START-STOP is again being controlled by the channel-X measurand. Contrary to example 1, the cycle is now stopped when a definable point on the return leg is reached.



For measurement, switch to blue Process view (→ 6.3.7 / page 31) and press button. "NOK" will be displayed, because no evaluation object (EO) has been specified, so no evaluation can be made.



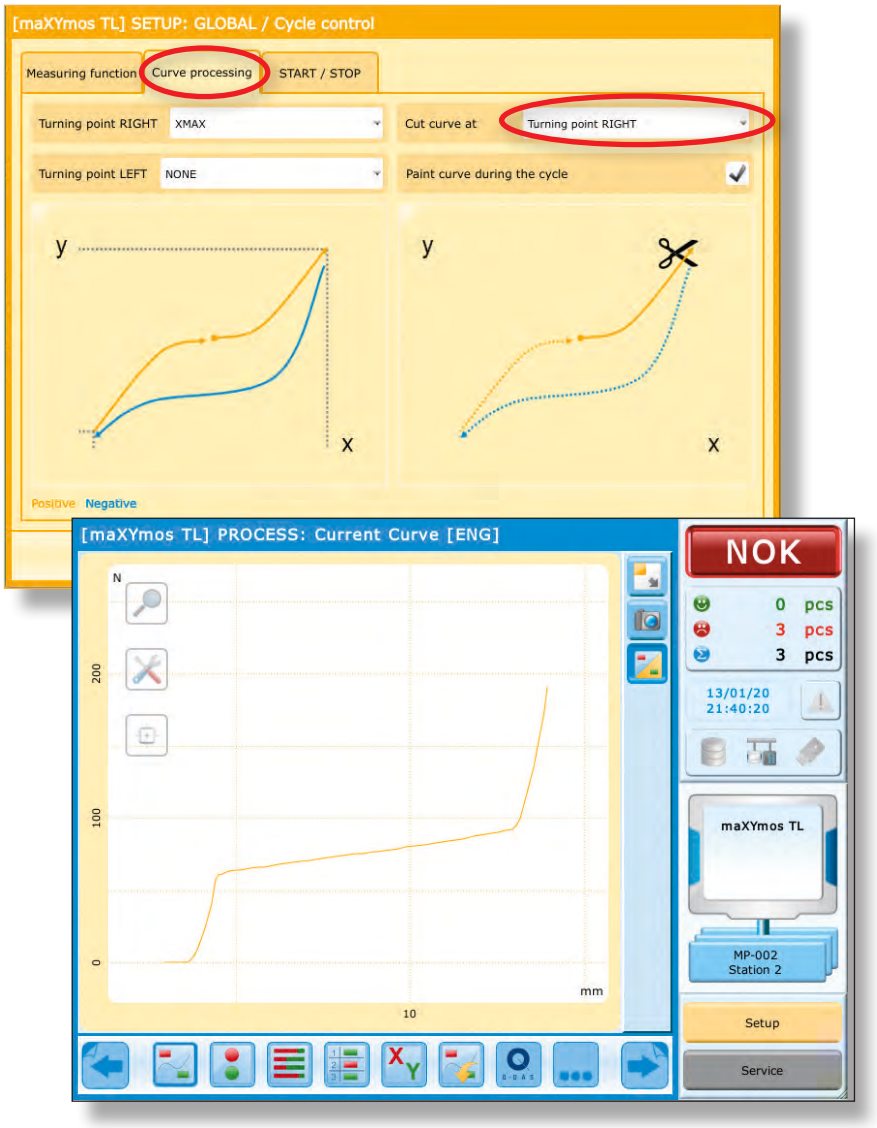
In the example above, curve capture commences at 8.30 mm on the advancing leg, approaching **from the LEFT (orange** section) and now ends after a **return leg of 0.5 mm in length (blue** section), starting at "Turning Point RIGHT" → 7.8.4.8 / page 98.

Note: The blue curve section will be displayed only if the curve is not truncated (→ see next page; Curve processing "cut curve at": "NONE" (= not activated)

Advantge The return stroke of the press can be used for the evaluation phase, because this has already started shortly after the turning point.

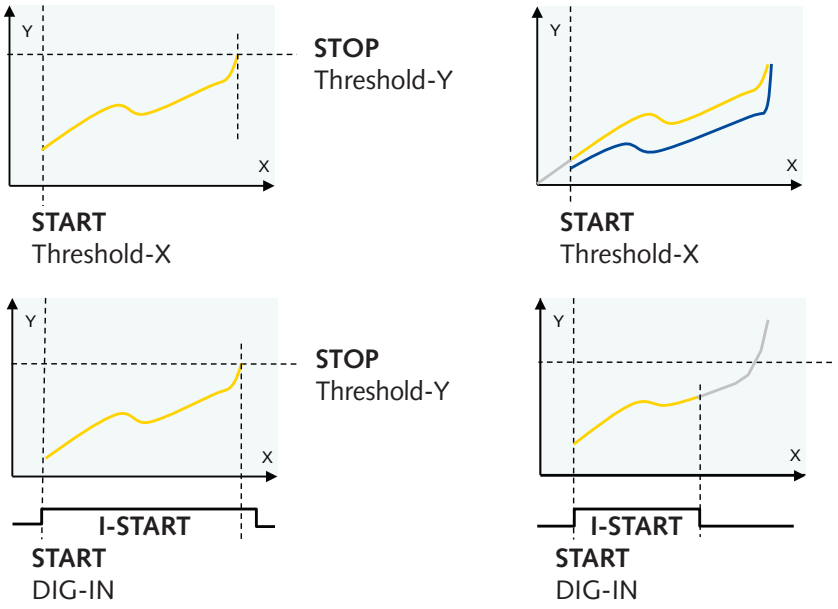
Disadvantage If the return leg is relevant for quality purposes, this method cannot be used. In such cases, use the approach described in example 1.

Tip You should now eliminate the remainder of the return leg by setting "cut curve at" to "turning point RIGHT"! → 7.8.4.9 / page 103



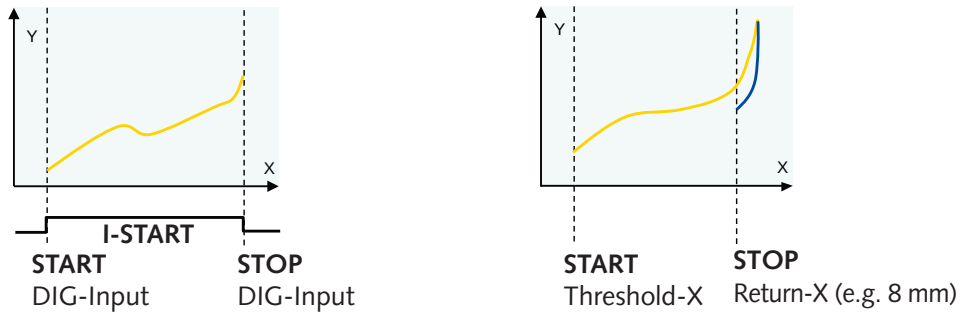
7.8.4.6 Examples of START-STOP combinations

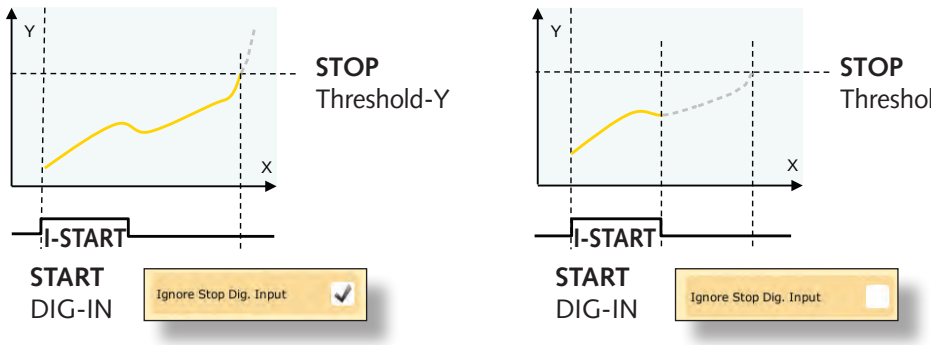
Some typical START-STOP combinations are shown below



STOP Threshold-Y (example 1; definable)

I-START must not be taken to 0 until **STOP-Threshold-Y** is reached (left image). Otherwise the cycle will be prematurely interrupted at the falling edge of I-START (right image)!





STOP Threshold-Y or falling edge (example 2; definable)

Stops when **STOP-Threshold-Y** (image left) is reached or via **falling edge** (image right)!

Note: The falling edge of the DIG-IN signal can also be set to initiate/not initiate the cycle. The option of ignoring the falling edge of the DIG-IN signal is also available for the other STOP conditions.

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7.8.4.7 START-STOP for Y(t) piezoelectric sensor

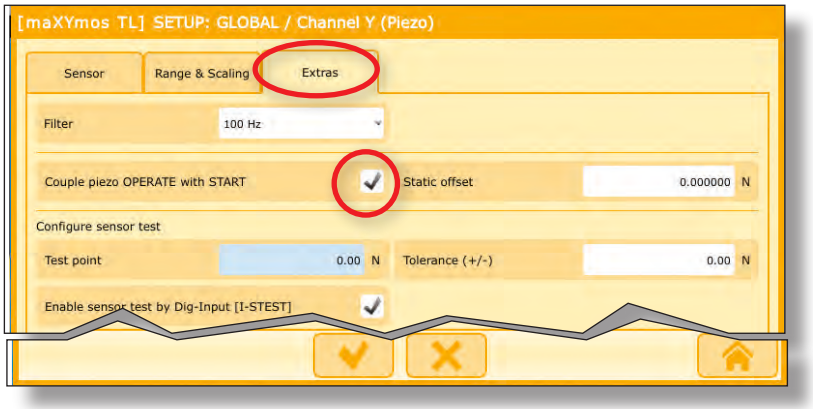
Using the Y(t) function, to measure force against TIME for example, it is no longer possible to use Thresh-X to start the cycle. In such cases, either "Dig.-Input START" or "Threshold-Y" must be used to bring the maXYmos TL into its START state.

1. START using Threshold-Y

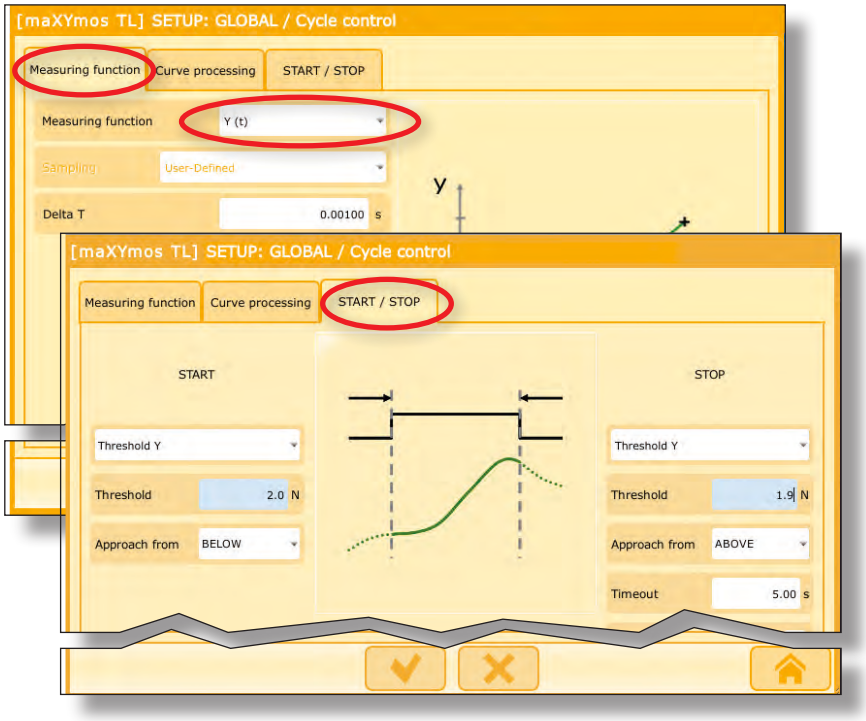
Advantage: Timing only commences when a Y threshold is reached, e.g. at the precise moment when the press comes into contact with the part (see example on next page).

In order for any measurement signal to be generated and Threshold-Y to be reached, the charge amplifier has to be placed in the "OPERATE" (= measure) state by setting "INPUT I-OPERATE" to "1".

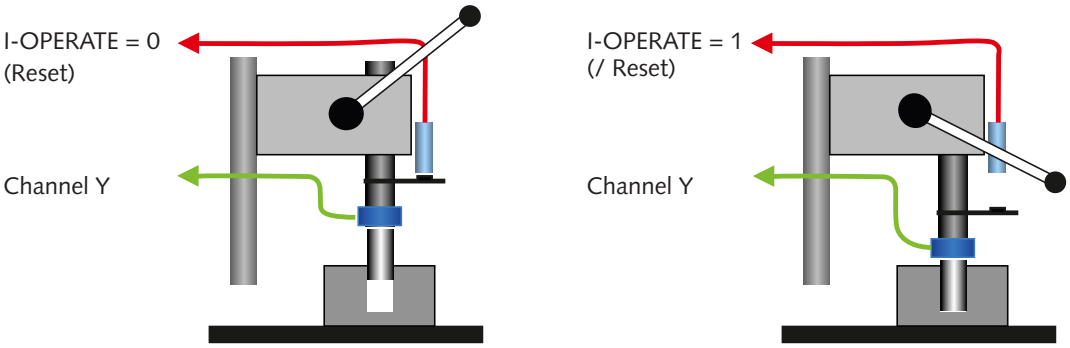
Setup Select **"Channel Y"** (→ **7.7.3 / page 57)** and the "**Extras**" tab. Uncheck the "Couple Piezo OPERATE to START" checkbox. Now set "I-OPERATE" to "1" to enable the charge amplifier separately - required because you need OPERATE to get a signal from the charge amplifier and you need that signal for Thresh-Y to be reached.



Use the "**Cycle Control**" menu (→ 7.8.3 / page 84) to select the appropriate START and STOP thresholds.



Example: The OPERATE signal which enables the charge amplifier is activated by the proximity switch. Once the press leaves the upper position, the charge amplifier is immediately switched on.



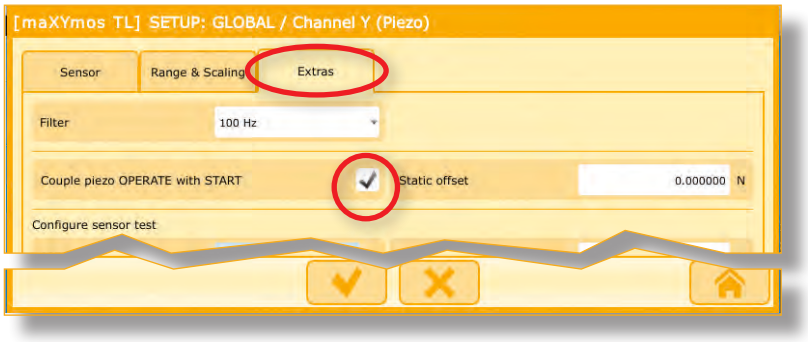
2. START via I-START Digital input

Benefit: This makes it possible also to capture and monitor the preliminary phase of curvve generation.

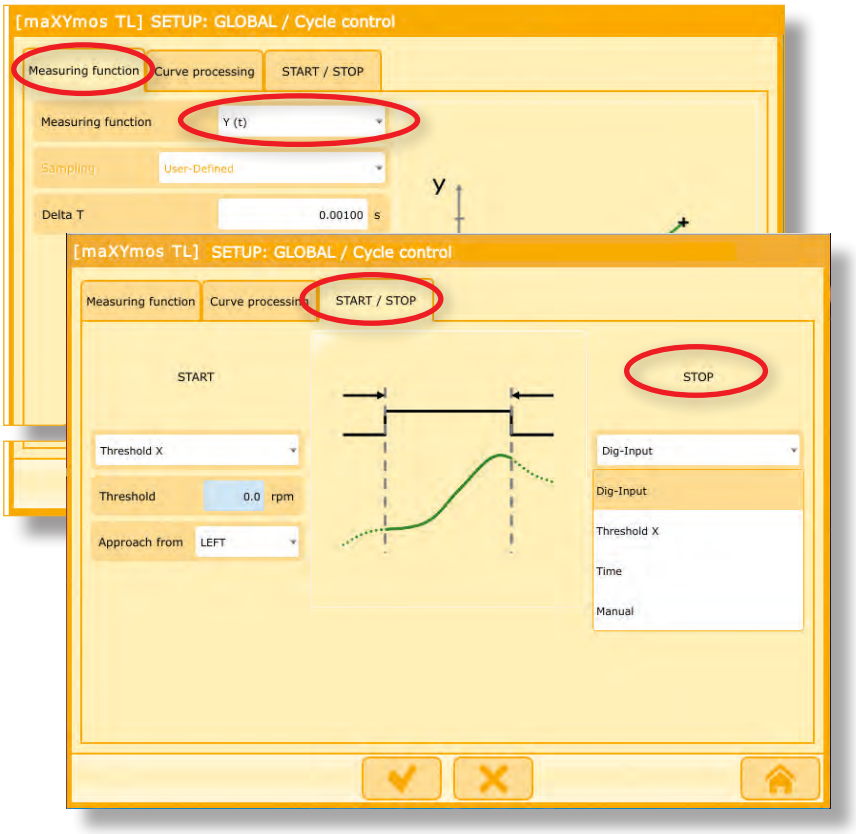
Example: You want to monitor whether the first rise in the curve (after the START signal appears) is within the defined tolerances.

Setup: (see next page)

Setup:



Select "Channel Y" (→ 7.7.3 / page 57) and the "Extras" tab. Check the "Couple Piezo OPERATE to START" box. This eliminates the need for an additional connection for I-OPERATE or to run it via the fieldbus.



Use the "**Cycle Control**" menu (→ 7.8.3 / page 84) to select the appropriate START and STOP thresholds for the relevant application.

7.8.4.8 Dividing the curve into sections - Specifying the turning point

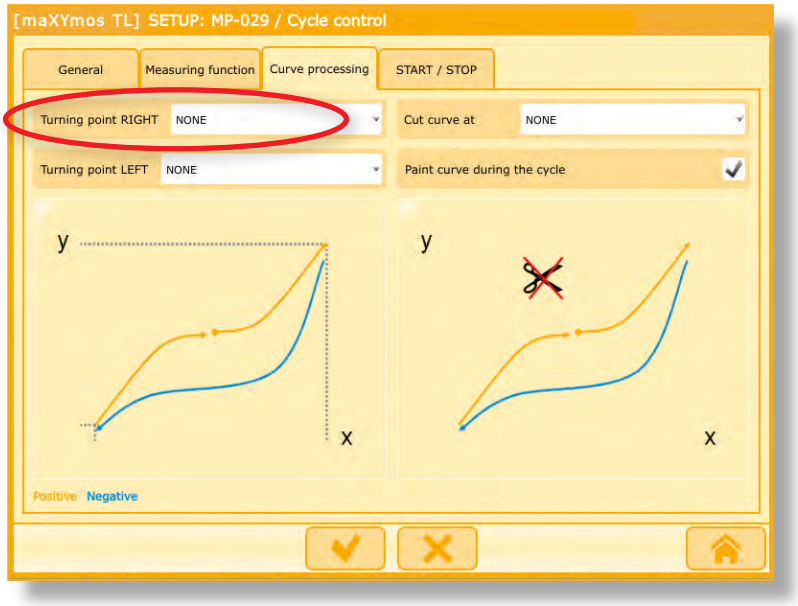
Access to the menu is explained in section → 7.8.3 / page 84.

Benefit: A POSITIVE and/or a NEGATIVE section can be assigned to each EO. This means that any new re-entries through the other part of the curve - which would otherwise result in an NOK message - are ignored by the EO.

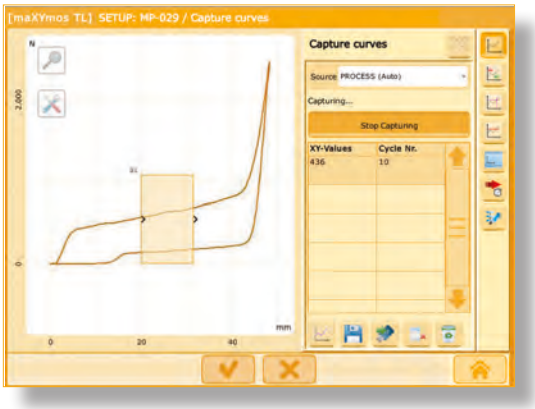
Once the turning points have been defined, the curve will switch from POSITIVE to NEGATIVE (and vice versa) at those points.

Example 1
Here, the entire measurement curve is defined as POSITIVE, because the "Turning point RIGHT" parameter is set to NONE (1). Since the EO is assigned to the POSITIVE section of the curve (2), it also evaluates the re-entry of the return leg of the curve. The result is NOK (3).

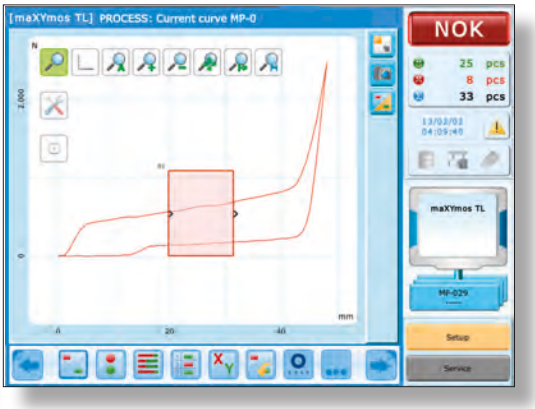
1.



2.



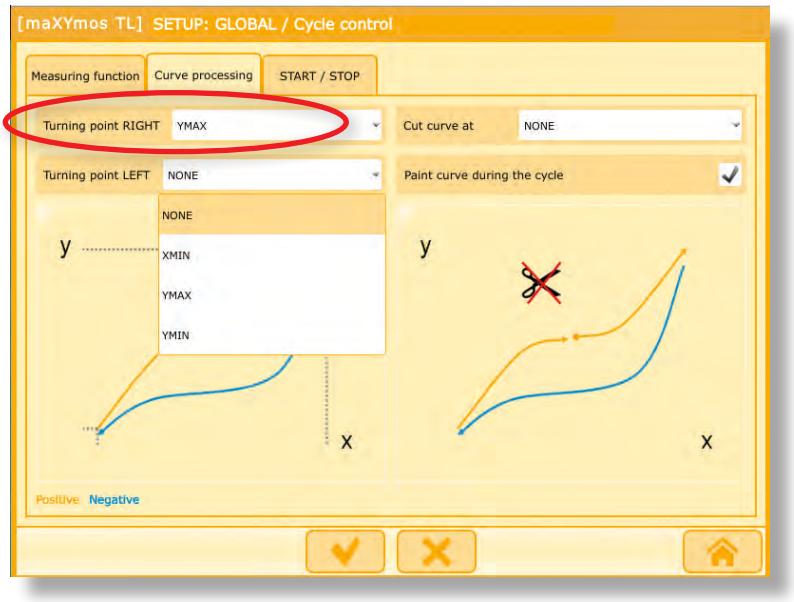
3.



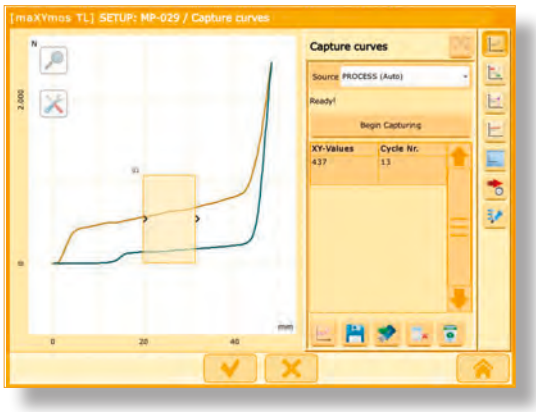
Example 2

Because a Turning Point RIGHT = YMAX (4) has been defined here, the curve switches from POSITIVE to NEGATIVE at YMAX (5). Because the EO has been exclusively assigned to the POSITIVE section of the curve, it ignores the blue return leg (NEGATIVE). The result is OK (6).

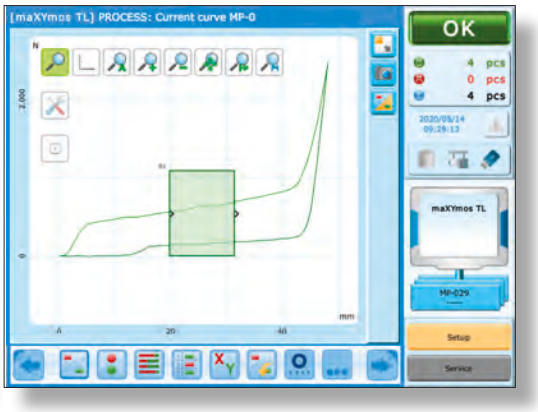
4.



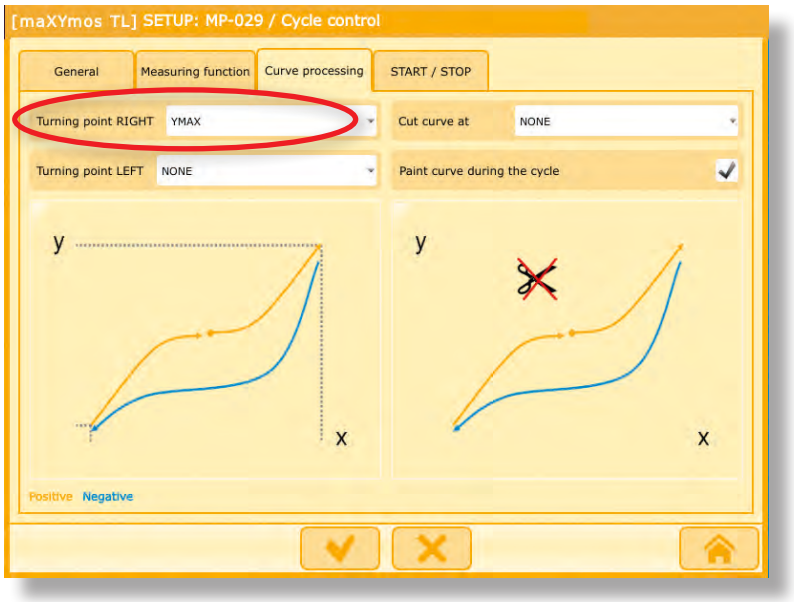
5.



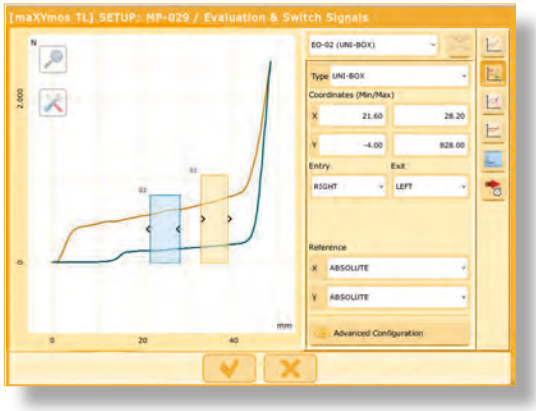
6.



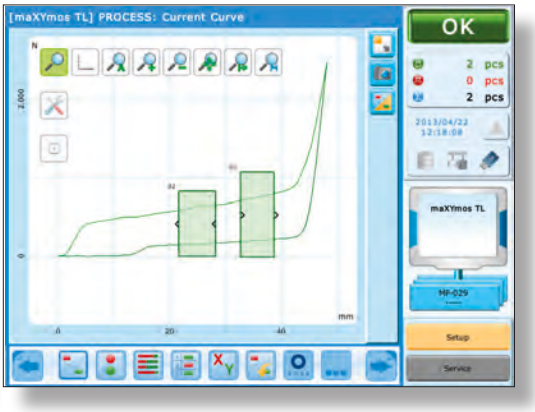
Example 3
An additional evaluation object (EO-2) has been assigned to monitor the blue (NEGATIVE) return leg of the curve. This second EO's "Curve Part" parameter has therefore been set to the NEGATIVE part of the curve (7). This EO is therefore displayed in blue, in accordance with the color of the curve section to which it has been assigned. Both EOs generate OK results (8).



7.

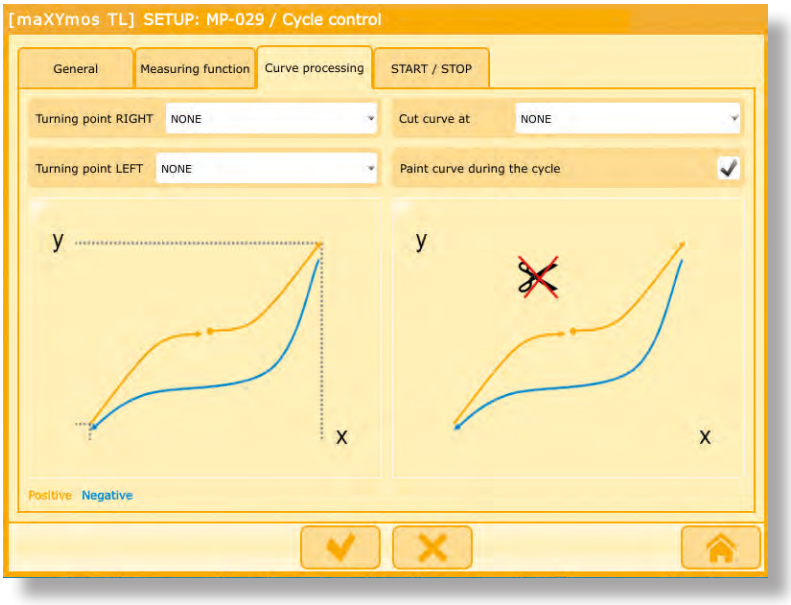


8.

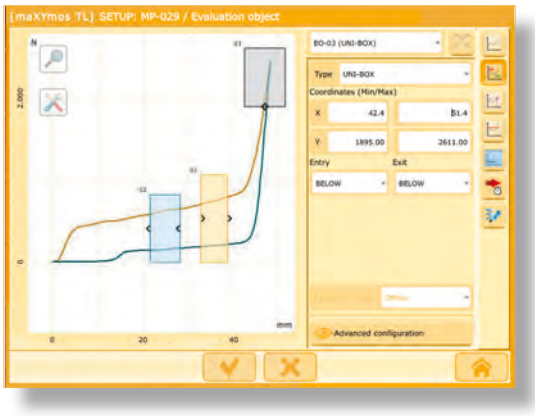


Example 4

EOs which can be intersected by both the POSITIVE and the NEGATIVE section of the curve (EO-3 at the turning point in this example) must have their "Curve Part" parameter set to ANY (9). The EO will then evaluate ANY curve part intersecting it, provided both an entry and an exit occur and provided they intersect the specified box boundary (in this case, entry BELOW, exit BELOW) (10).



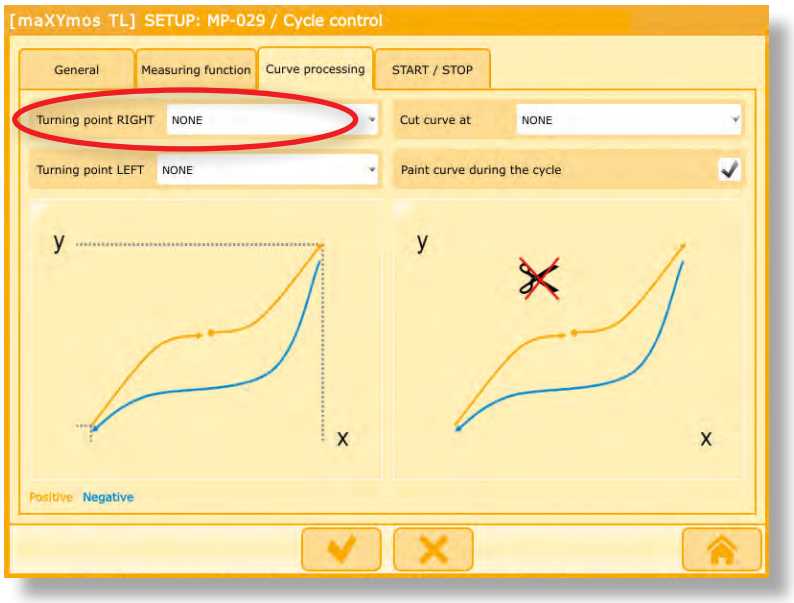
9.



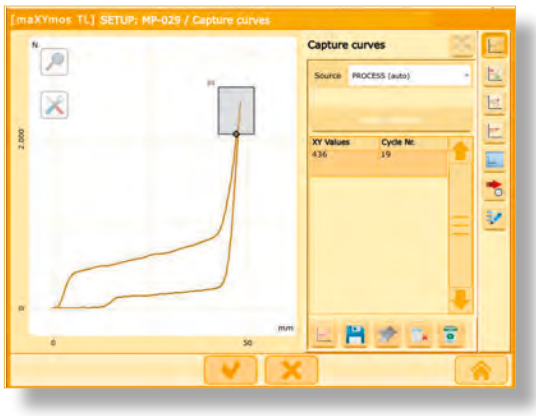
10.

Example 5

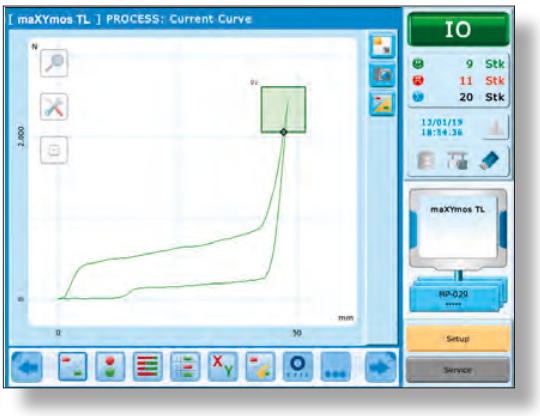
Here, the entire measurement curve is defined as POSITIVE (because the "Turning Point RIGHT" parameter is set to NONE). EO-1 must therefore be assigned either to the POSITIVE section of the curve (or to ANY section). It will generate an NOK result if both the entry and the exit are through the lower boundary.



11.

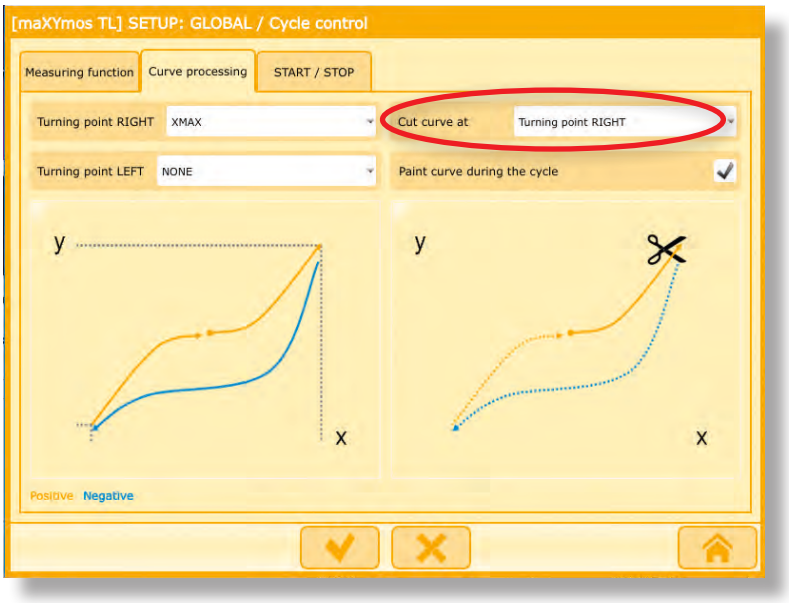


12.



7.8.4.9 Truncating the measurement curve

The return legs of measurement curves can, as a rule, be truncated, provided they do not need to be evaluated. This ensures that only the section of the curve which is relevant for determining the quality of the workpiece is displayed.



Access to this menu is described on → page 84. Once a turning point has been defined, the curve can be truncated at precisely this point.

NOTE

The truncated section of the curve will be irretrievably deleted from the the curve memory. If the curve exhibits a clear YMAX, select YMAX. However, if a significant XMAX is displayed, it is better to select XMAX as the "Turning Point".

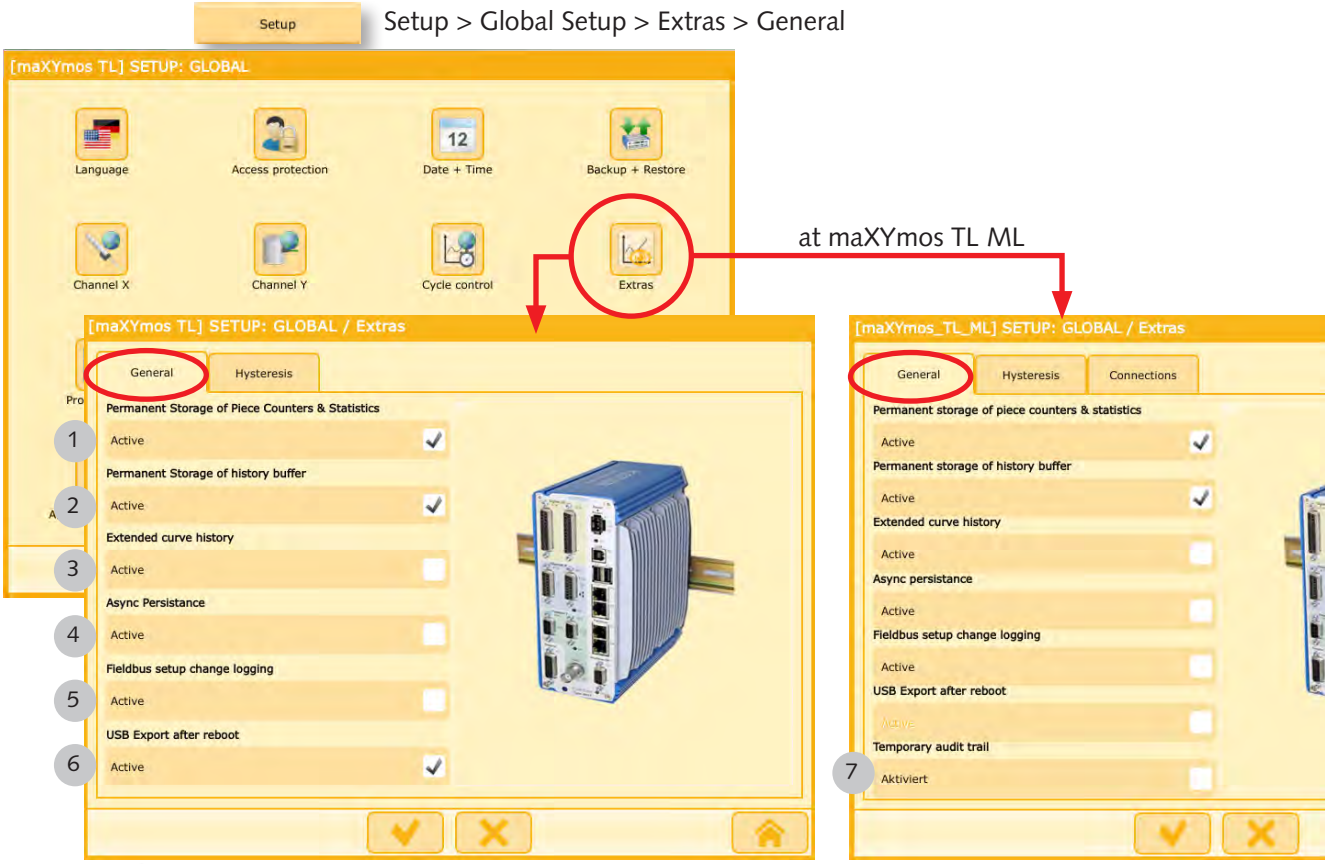
7.9 Extras

The Extras menu is used to:

- Configure permanent storage of piece counter/statistical data
- Configure HYSTERESIS settings for switch signals and Trigger-Y

7.9.1 Permanent storage of piece count/statistical data

Setup > Global Setup > Extras > General



1 **Permanent storage of part/piece counter and statistical data**
This securely stores piece-count and statistical data, even in the event of power loss (recommended)

2 **Permanent storage of history buffer**
Saves historical curves and export buffer also during power failure.

3 **Extended curve history**
Saves up to 5 000 curves

4 **Cyclical storage of the protocol and measurement data/Async persistance**
If this function is activated the protocol and measurement data are saved after each cycle.

5 **Fieldbus setup change logging/Fieldbus logfile**
Logs the complete fieldbus data traffic.

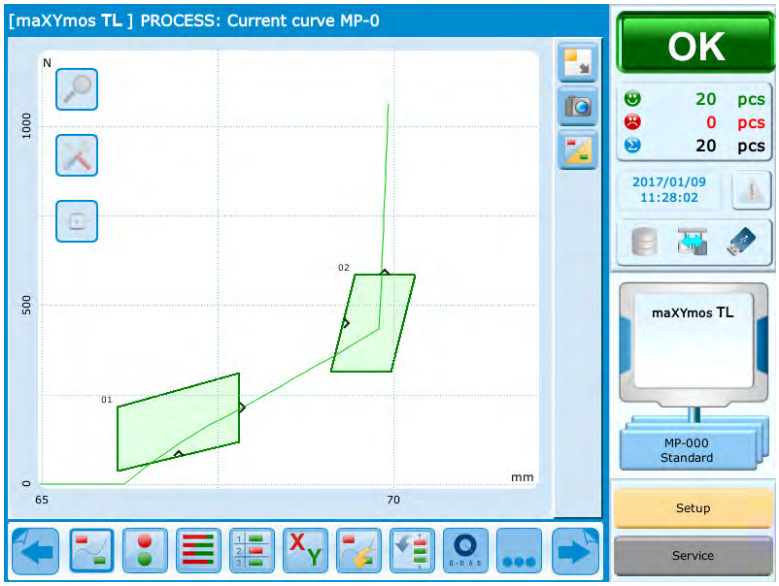
6 **USB Data Export after Reboot**
It is possible to continue the USB data export after reboot of the device automatically.

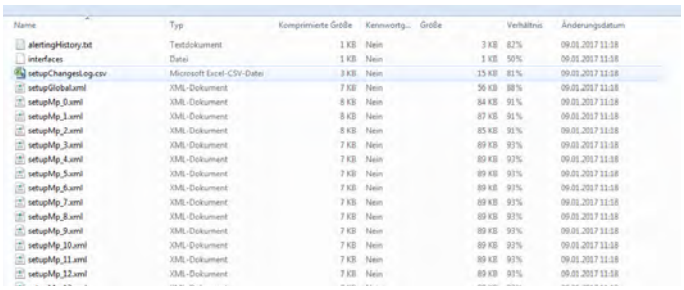
7 **Temporary audit trail** (only for maXYmos TL ML)
This file logs all changes since the last download request. See Audit Trail flowchart page 391

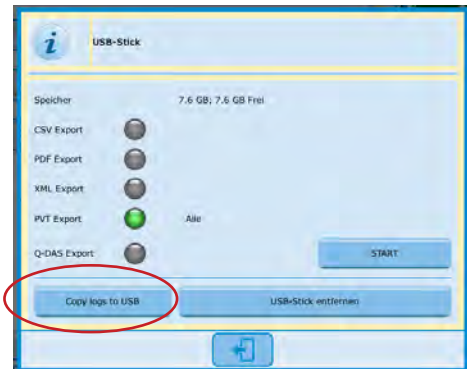
7.9.1.1 Logfile parameter changes

The logfile „setupChangesLog.xls“ is created automatically, all changes of the settings are logged in this file.

This file is part of the backup.





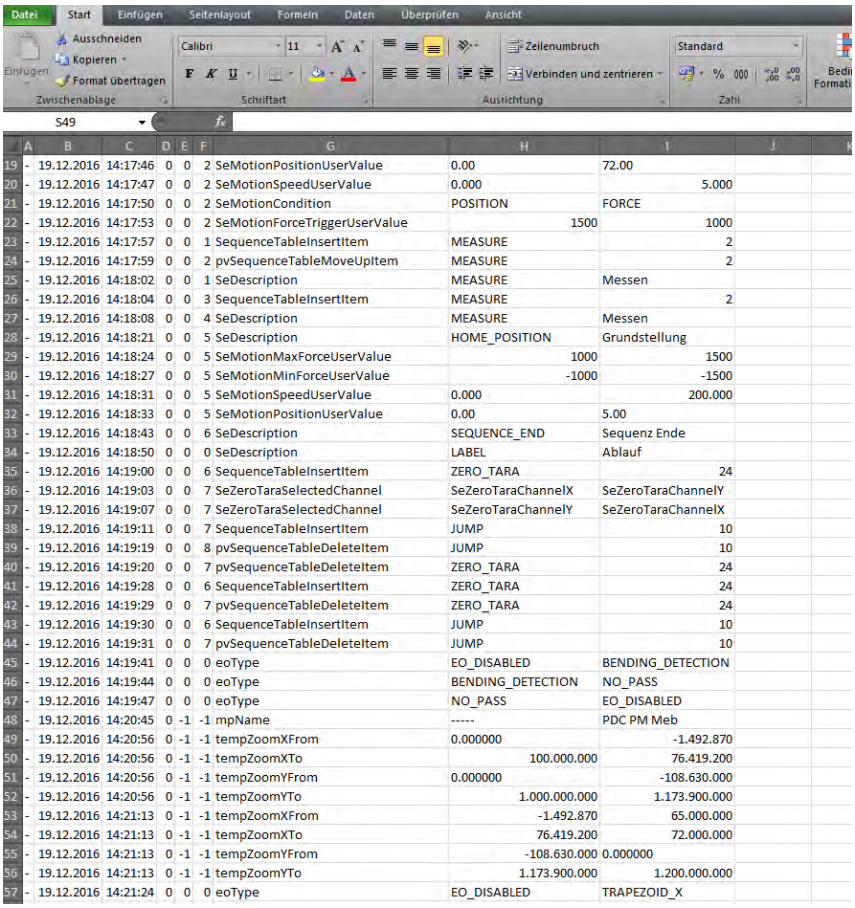


This file can also be copied manually onto an USB memory stick.

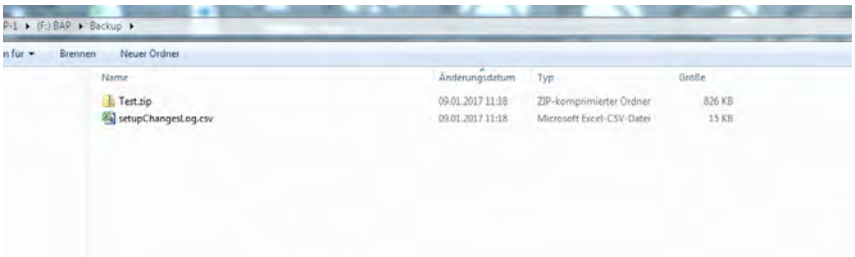
The file contains all parameter changes with time and date stamp as well as the user ID when working with access protection.

Additionally this file contains the following information:

- Recovery of a backup
- Manual change of measurement program
- Copying of measurement programs
- Referencing of the joining system
- Selection/deselection of jog- and automatic menu (service screen)
- Reset to factory defaults as well as partial reset
- Firmware updates



	A	B	C	D	E	F	G	H	I	J
19	-	19.12.2016	14:17:46	0	0	2	SeMotionPositionUserValue	0.00	72.00	
20	-	19.12.2016	14:17:47	0	0	2	SeMotionSpeedUserValue	0.000	5.000	
21	-	19.12.2016	14:17:50	0	0	2	SeMotionCondition	POSITION	FORCE	
22	-	19.12.2016	14:17:53	0	0	2	SeMotionForceTriggerUserValue	1500	1000	
23	-	19.12.2016	14:17:57	0	0	1	SequenceTableInsertItem	MEASURE	2	
24	-	19.12.2016	14:17:59	0	0	2	pvSequenceTableMoveUpItem	MEASURE	2	
25	-	19.12.2016	14:18:02	0	0	1	SeDescription	MEASURE	Messen	
26	-	19.12.2016	14:18:04	0	0	3	SequenceTableInsertItem	MEASURE	2	
27	-	19.12.2016	14:18:08	0	0	4	SeDescription	MEASURE	Messen	
28	-	19.12.2016	14:18:21	0	0	5	SeDescription	HOME_POSITION	Grundstellung	
29	-	19.12.2016	14:18:24	0	0	5	SeMotionMaxForceUserValue	1000	1500	
30	-	19.12.2016	14:18:27	0	0	5	SeMotionMinForceUserValue	-1000	-1500	
31	-	19.12.2016	14:18:31	0	0	5	SeMotionSpeedUserValue	0.000	200.000	
32	-	19.12.2016	14:18:33	0	0	5	SeMotionPositionUserValue	0.00	5.00	
33	-	19.12.2016	14:18:43	0	0	6	SeDescription	SEQUENCE_END	Sequenz Ende	
34	-	19.12.2016	14:18:50	0	0	0	SeDescription	LABEL	Ablauf	
35	-	19.12.2016	14:19:00	0	0	6	SequenceTableInsertItem	ZERO_TARA	24	
36	-	19.12.2016	14:19:03	0	0	7	SeZeroTaraSelectedChannel	SeZeroTaraChannelX	SeZeroTaraChannelY	
37	-	19.12.2016	14:19:07	0	0	7	SeZeroTaraSelectedChannel	SeZeroTaraChannelY	SeZeroTaraChannelX	
38	-	19.12.2016	14:19:11	0	0	7	SequenceTableInsertItem	JUMP	10	
39	-	19.12.2016	14:19:19	0	0	8	pvSequenceTableDeleteItem	JUMP	10	
40	-	19.12.2016	14:19:20	0	0	7	pvSequenceTableDeleteItem	ZERO_TARA	24	
41	-	19.12.2016	14:19:28	0	0	6	SequenceTableInsertItem	ZERO_TARA	24	
42	-	19.12.2016	14:19:29	0	0	7	pvSequenceTableDeleteItem	ZERO_TARA	24	
43	-	19.12.2016	14:19:30	0	0	6	SequenceTableInsertItem	JUMP	10	
44	-	19.12.2016	14:19:31	0	0	7	pvSequenceTableDeleteItem	JUMP	10	
45	-	19.12.2016	14:19:41	0	0	0	eoType	EO_DISABLED	BENDING_DETECTION	
46	-	19.12.2016	14:19:44	0	0	0	eoType	BENDING_DETECTION	NO_PASS	
47	-	19.12.2016	14:19:47	0	0	0	eoType	NO_PASS	EO_DISABLED	
48	-	19.12.2016	14:20:45	0	-1	-1	mpName	-----	PDC PM Meb	
49	-	19.12.2016	14:20:56	0	-1	-1	tempZoomXFrom	0.000000	-1.492.870	
50	-	19.12.2016	14:20:56	0	-1	-1	tempZoomXTo	100.000.000	76.419.200	
51	-	19.12.2016	14:20:56	0	-1	-1	tempZoomYFrom	0.000000	-108.630.000	
52	-	19.12.2016	14:20:56	0	-1	-1	tempZoomYTo	1.000.000.000	1.173.900.000	
53	-	19.12.2016	14:21:13	0	-1	-1	tempZoomXFrom	-1.492.870	65.000.000	
54	-	19.12.2016	14:21:13	0	-1	-1	tempZoomXTo	76.419.200	72.000.000	
55	-	19.12.2016	14:21:13	0	-1	-1	tempZoomYFrom	-108.630.000	0.000000	
56	-	19.12.2016	14:21:13	0	-1	-1	tempZoomYTo	1.173.900.000	1.200.000.000	
57	-	19.12.2016	14:21:24	0	0	0	eoType	EO_DISABLED	TRAPEZOID_X	



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7.9.1.2 Audit Trail logging

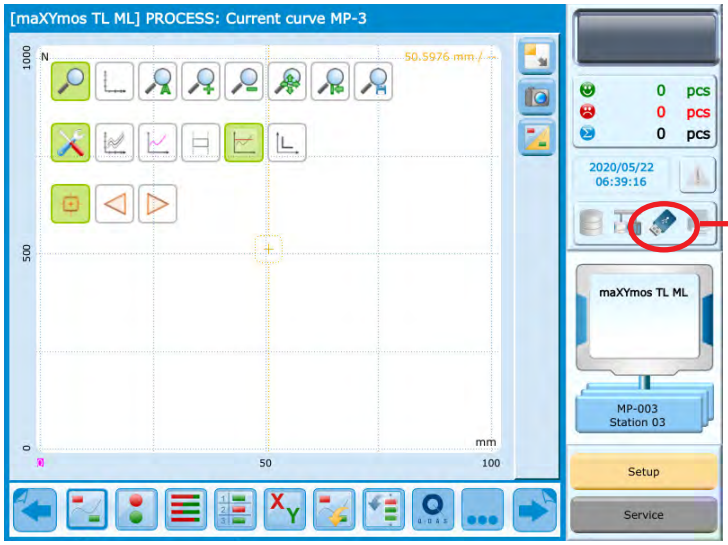
In principle, all changes are logged in an internal file This file is part of the backup.

Audit Trail is available by activating either:
by Fieldbus (store *csv file at a server) or
by request via the GUI (store *csv file on a flash drive)

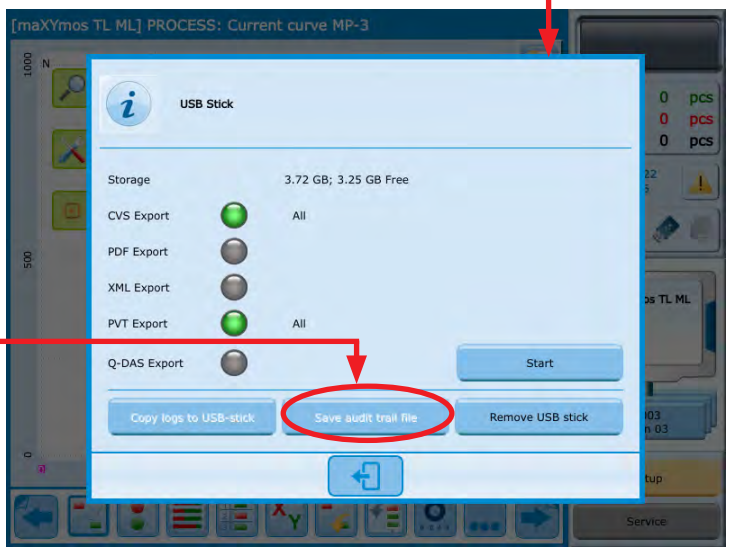
This file logs all changes since the last download request.

User	Date	Time	Internal 1	Internal 2	Internal 3	Internal parameter Name	Old Value	New Value	UTC+02:00 Parameter routing on GUI
-	24.10.2019	14:01:33	-1	-1	0	inputYType	PIEZO	STRAIN_GAGE	UTC+02:00 Global Channel-Y/SensorType ,PrimaryInput
-	24.10.2019	14:01:42	-1	-1	0	inputYUnitStringMp	Mm	Cm	UTC+02:00 Global Channel-Y/Range&Scaling/Unit ,PrimaryInput
-	24.10.2019	14:01:45	-1	-1	0	inputYRangeFrom	0.000	0.200	UTC+02:00 Global Channel-Y/Range&Scaling/RangeFrom ,PrimaryInput
Test_User	24.10.2019	14:01:45	-1	-1	0	inputYZoomFrom	0.000	0.200	UTC+02:00 Global Channel-Y/ZoomFrom ,PrimaryInput
-	24.10.2019	14:01:48	-1	-1	0	inputYRangeTo	1.000.000	1.001.000	UTC+02:00 Global Channel-Y/RangeTo ,PrimaryInput
fieldbus	24.10.2019	14:01:48	-1	-1	0	inputYZoomTo	1.000.000	1.001.000	UTC+02:00 Global Channel-Y/ZoomTo ,PrimaryInput
-	24.10.2019	14:01:50	-1	-1	0	inputYDecimalPlaces	3 (iiii.fff)	2 (iiii.ff)	UTC+02:00 Global Channel-Y/Range&Scaling/DecimalPlaces ,PrimaryInput
-	24.10.2019	14:01:53	-1	-1	0	inputYIsSensitivityInverted	TRUE	FALSE	UTC+02:00 Global Channel-Y/Range&Scaling/InvertSignal ,PrimaryInput

Example of logging “Temporary Audit Trail"



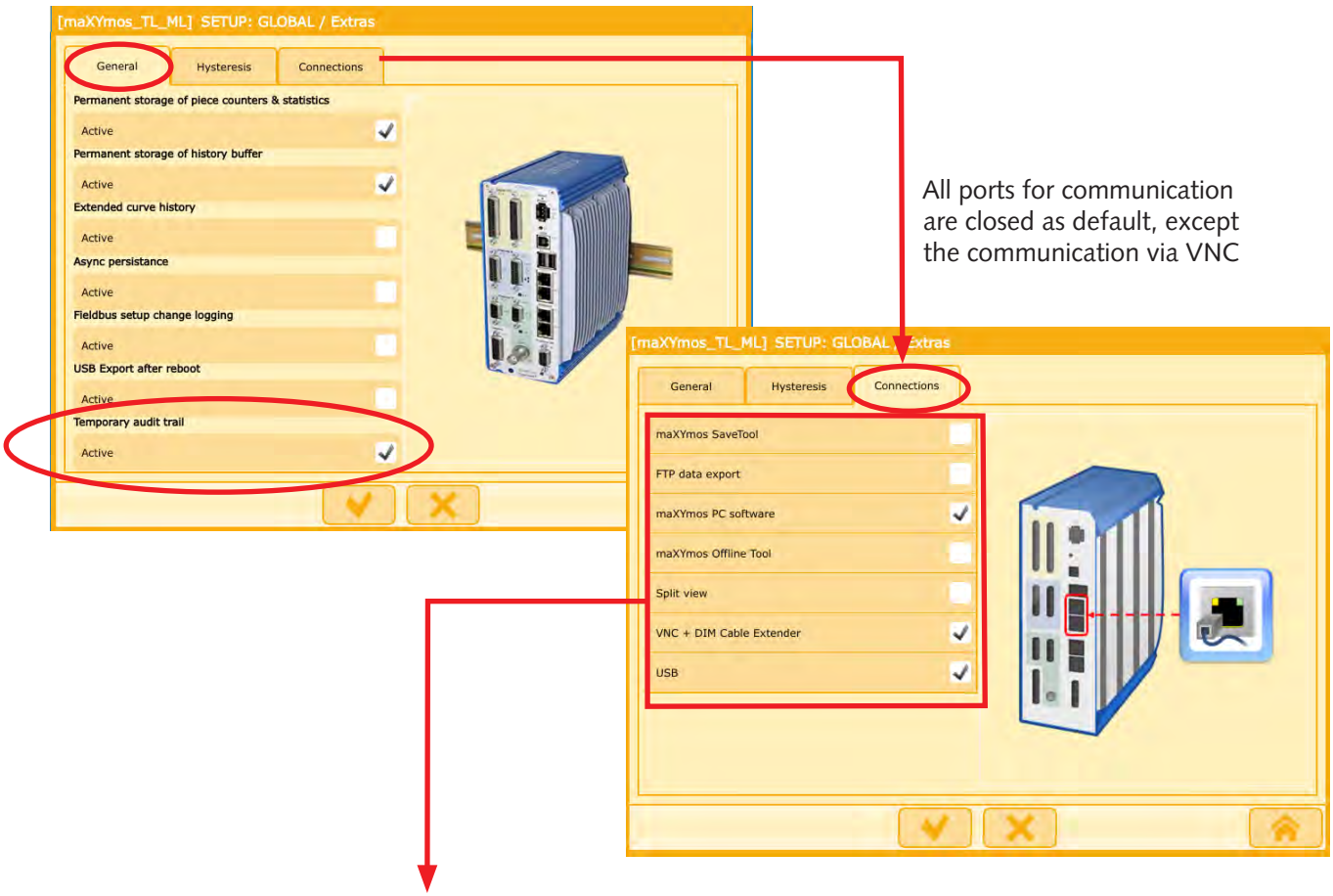
Flash drive activated



Copy *.csv file to flash drive

Only possible if user rights assigned.

7.9.1.3 Activate Temporary Audit Trail (maXYmos TL ML)



SETUP > GLOBAL > EXTRAS > **Connections**

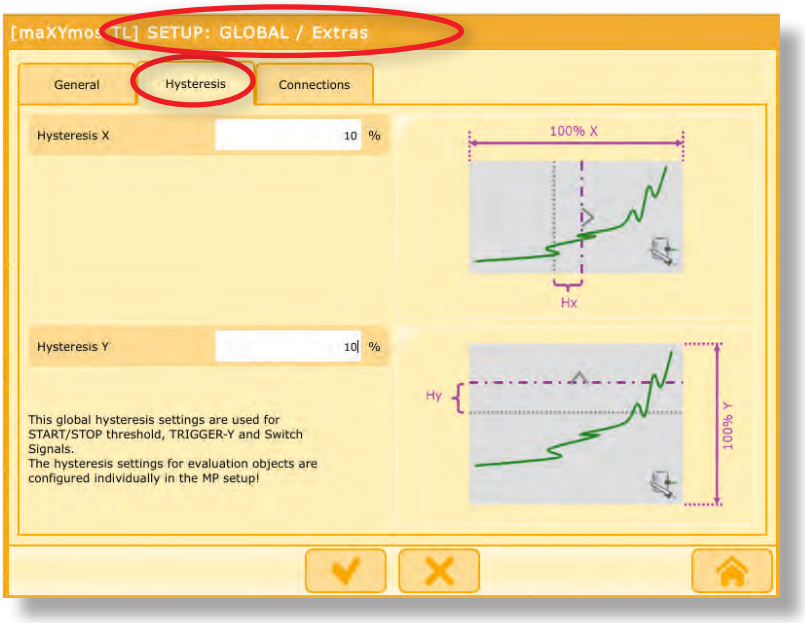
Connection with:

- maXYmos SaveTool
- FTP data export (see „Smart File/FTP-Server/Offline Tool“ an page 313)
- maXYmos PC Software
- maXYmos Offline Tool (see 10.2 / page 313)
- Split view (up to 8 MEMs on one DIM) (see „Split Ansicht“ on page 38)
- VNC view + DIM Cable Extender (see 10.1 / page 311)
- USB port (see 7.6 / page 52)

7.9.2 HYSTERESIS settings for switch signals & trigger-Y (Global)

Setup Open SETUP menu → page 43, 46.

First select "Global setup", then "Extras"
Select the "HYSTERESIS" tab

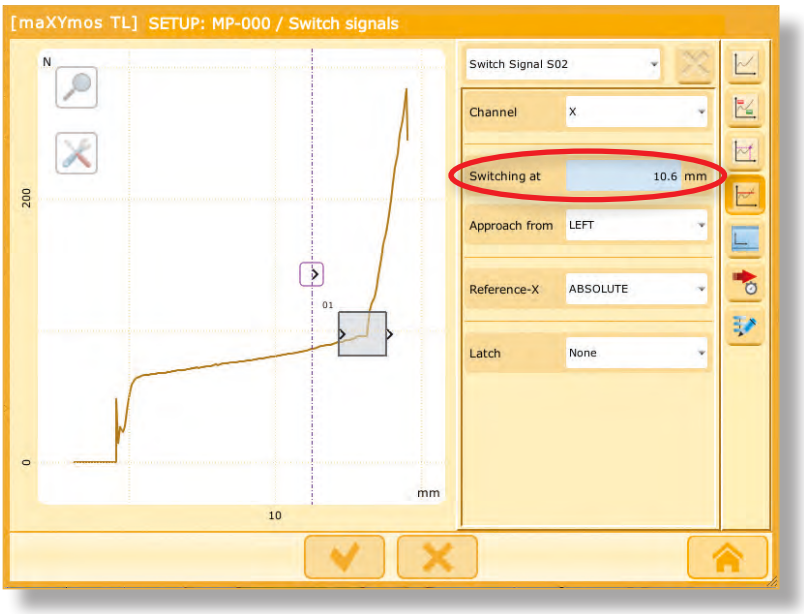


HYSTERESIS X
This affects the threshold of a switch signal relative to the X axis. → image at top on next page.

HYSTERESIS Y
This affects the threshold of a switch signal relative to the Y axis.
It also affects the threshold of the TRIGGER-Y dynamic reference point. → lower image on next page.

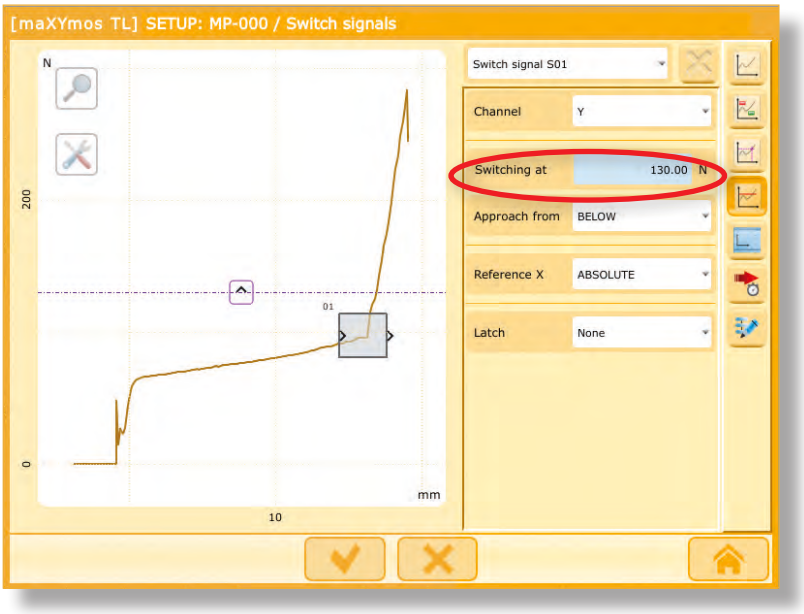
Note
These settings **are globally applicable** to START-STOP thresholds, the TRIGGER-Y threshold and switch-signal thresholds.
HYSTERESIS settings for evaluation objects (EOs) are configured individually for each individual EO, using the relevant MP-Setup menu.
→ Setup / MP Setup / MP-xxx / Evaluation / EOs / Advanced Configuration / HYSTERESIS

Effect of HYSTERESIS X



HYSTERESIS X
This affects the threshold of a switch signal relative to the x axis.

Effect of HYSTERESIS Y»



HYSTERESIS Y
This affects the threshold of a switch signal relative to the Y axis.
It also affects the threshold of the TRIGGER-Y dynamic reference point.

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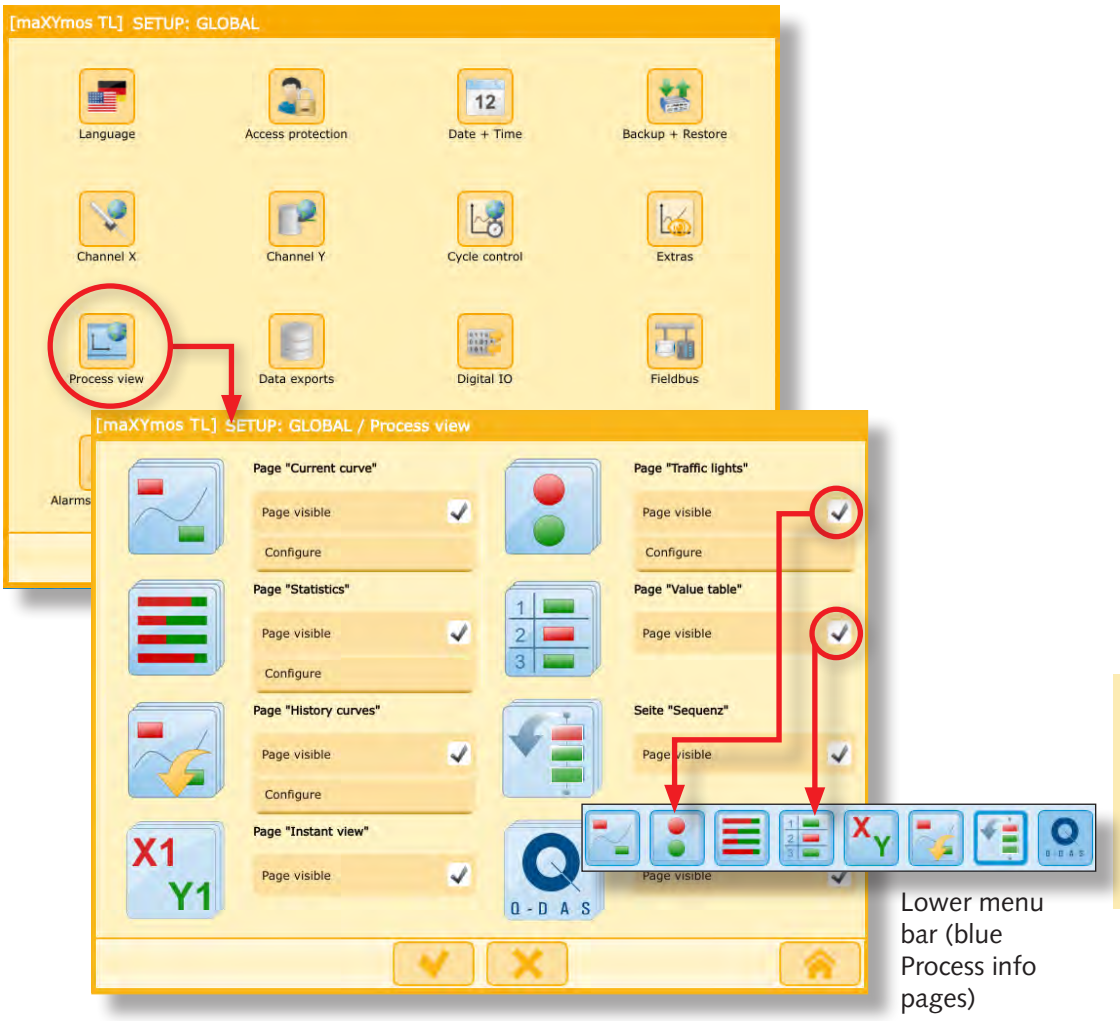
7.10 Specifying the process view

Setup

Select SETUP menu, then select Global setup → page 43, 46.

Select "Process view"



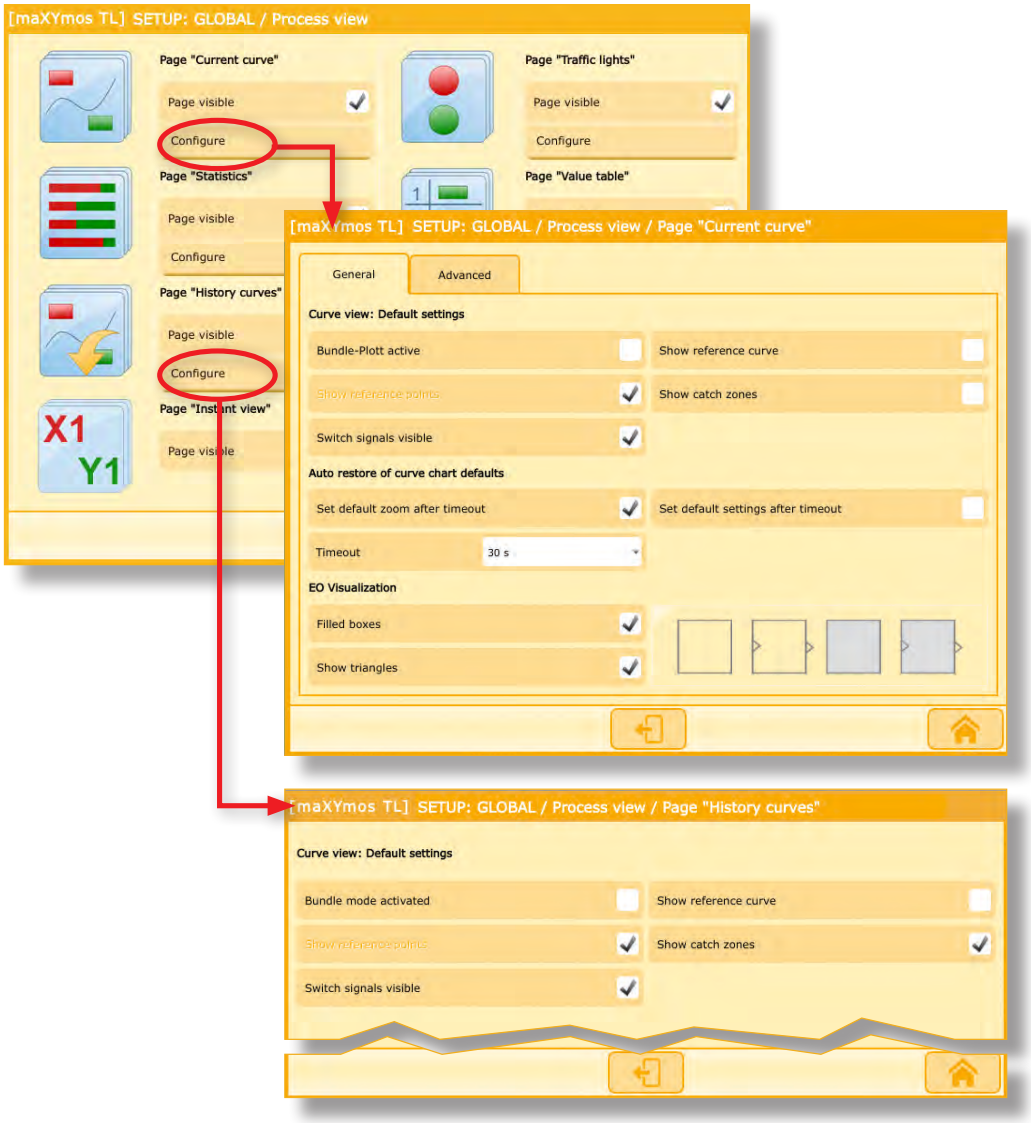
Lower menu bar (blue Process info pages)

Display page
The Process View menu can be configured to display the required process views (✓ = check box to view display).

Configuring displays
Configure the display options. The menu provides a choice between various types of display, e.g. a smiley icon or a "thumbs up" icon.

7.10.1 "Current curve" process view

This is used to configure the default settings. These settings can be temporarily modified in the blue Process View display → 6.3.7 / page 31



Bundle plot active
The measurement curves are displayed as a bundle (= all superimposed over each other)

Display switch signals
Switch signals are displayed. This is the factory setting.

Display reference curve
This displays the reference curve, provided one has been captured.

Display catch zone
Displays the catch zone in pale yellow.

Set default zoom after Timeout
Switches back to default zoom range setting after Timeout.

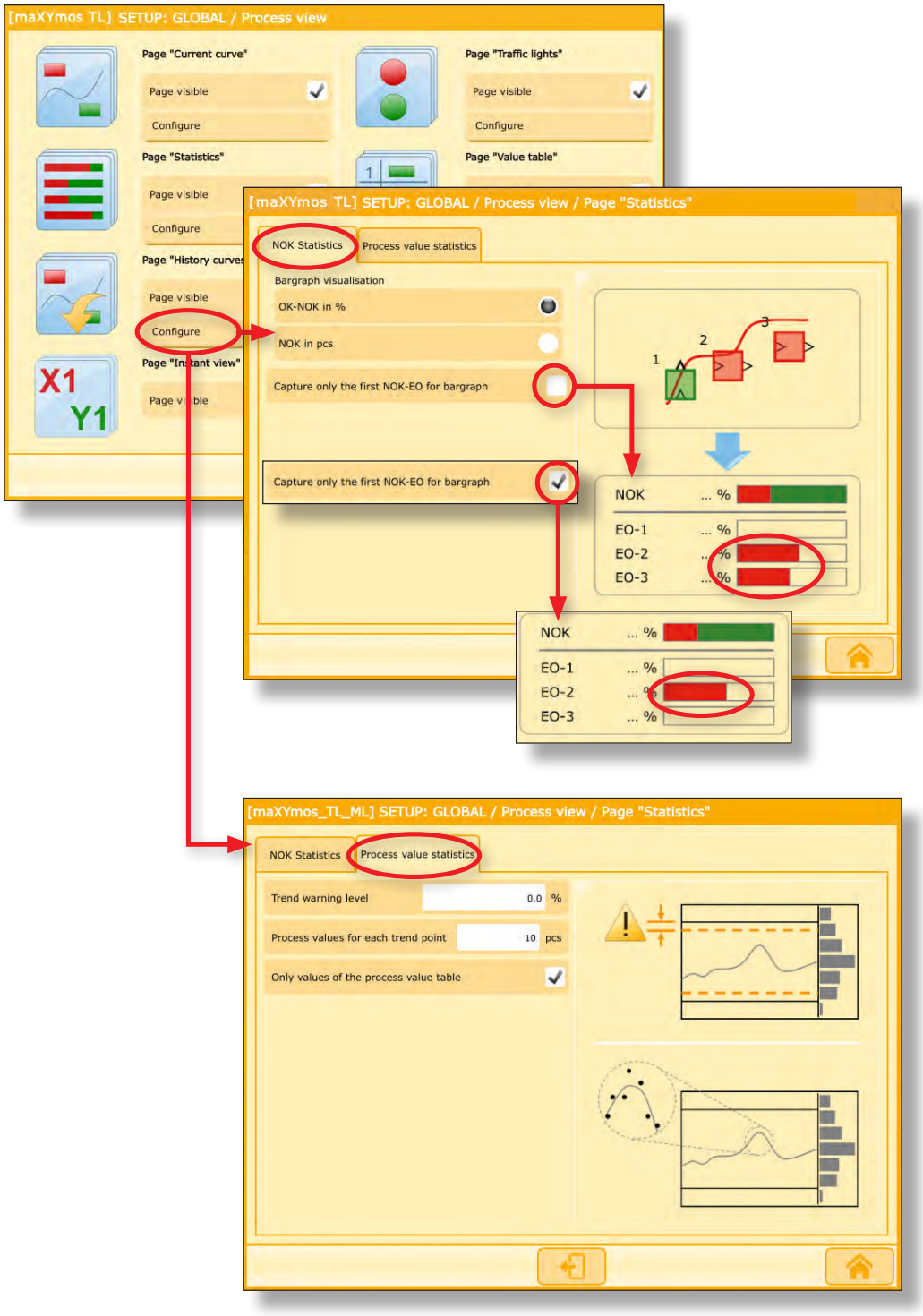
Default settings after timeout
Switches back to default settings after Timeout.

Filled
Evaluation objects (EOs) are displayed in filled state (factory setting).

Display triangles
Displays EOs with their triangles (factory setting)

In the advanced settings for the process view 'Current curve' it is possible to enable keeping the current curve at program change.

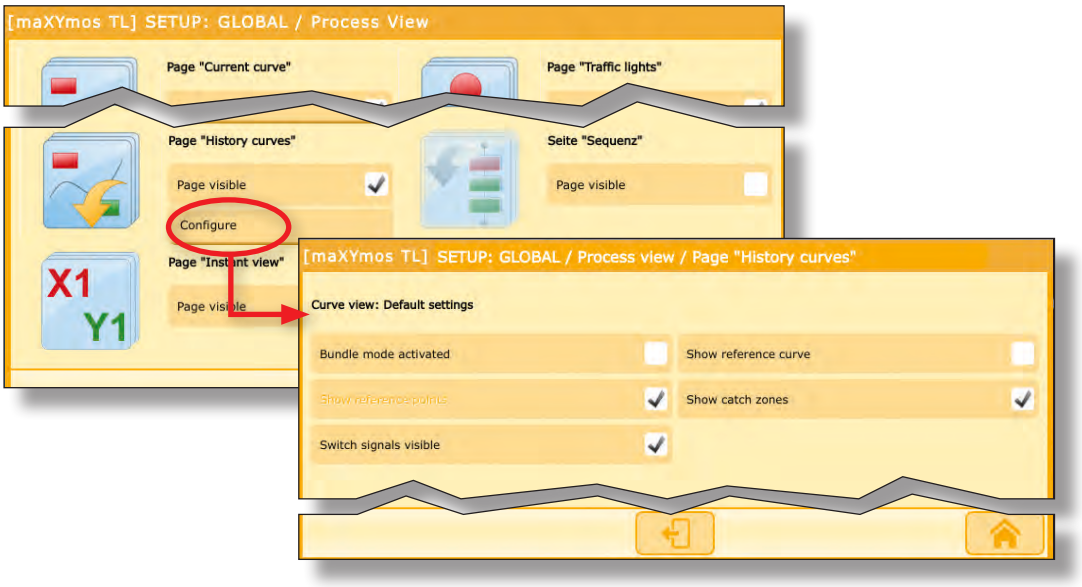
7.10.2 "Statistics" process view



7.10.2.1 Capture only first NOK EO for bar chart/bargraph

Activated: Counting from the starting point of the measurement curve, only the first EO generating an NOK message will be included in the "OK-NOK Distribution" bar-chart statistics.
Not activated: All NOK EOs will be included in the bar-chart statistics, even if they did not cause the problem.

7.10.3 "History curves" process view



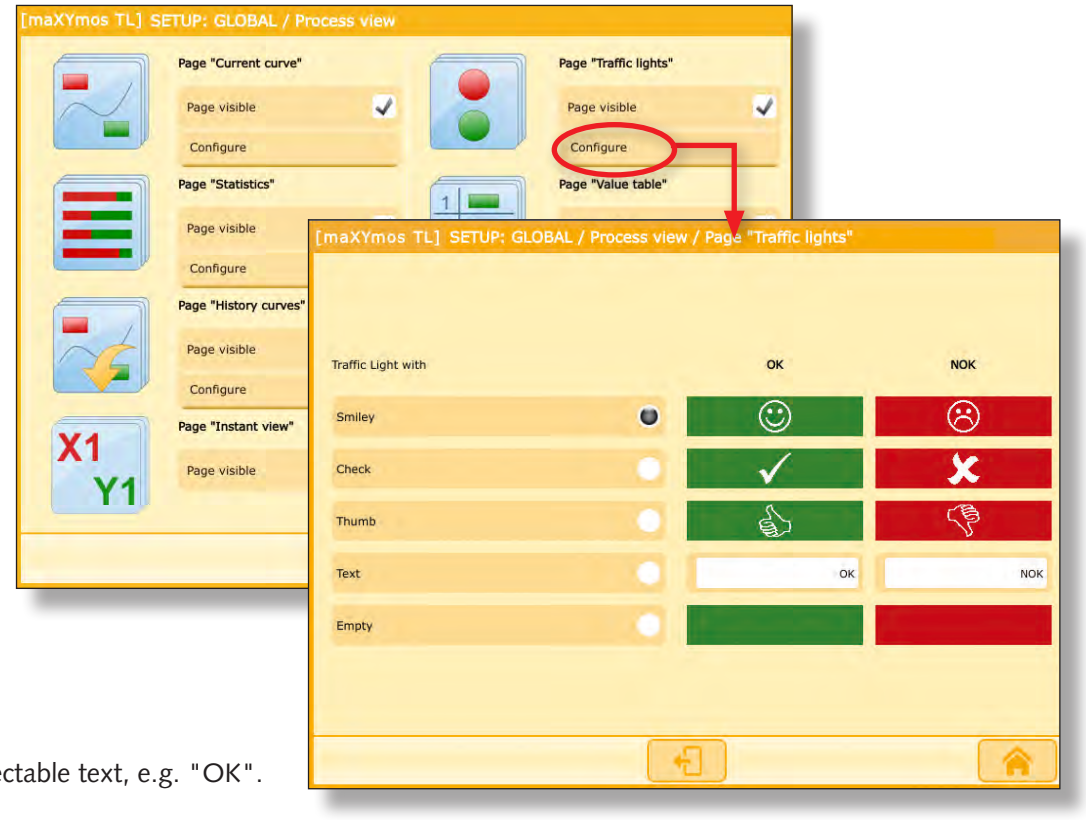
Bundle mode activated
The history-curve display will include all the curves in one bundle.

Switch signals visible
Switch signals are displayed.

Show reference curve
This displays the reference curve.

Show catch zone
Displays the catch zone in pale yellow.

7.10.4 "Traffic light" process view



Text
Freely selectable text, e.g. "OK".

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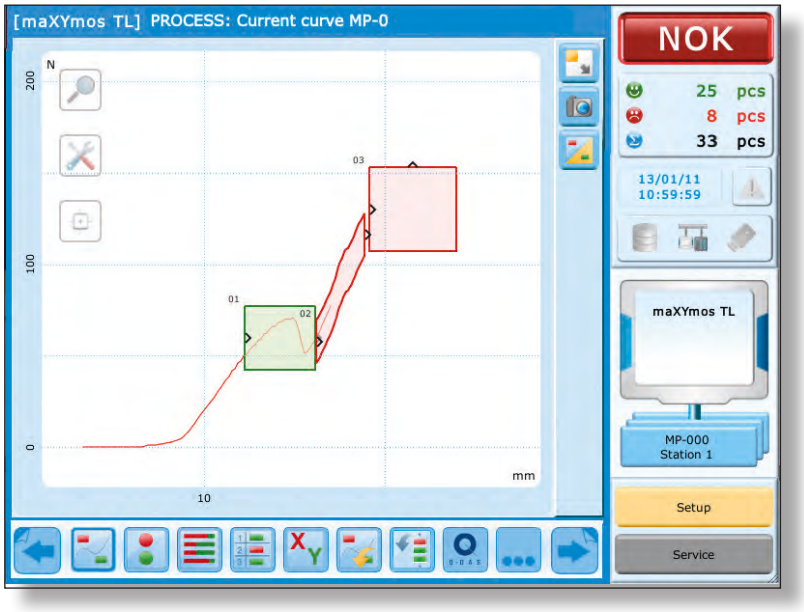
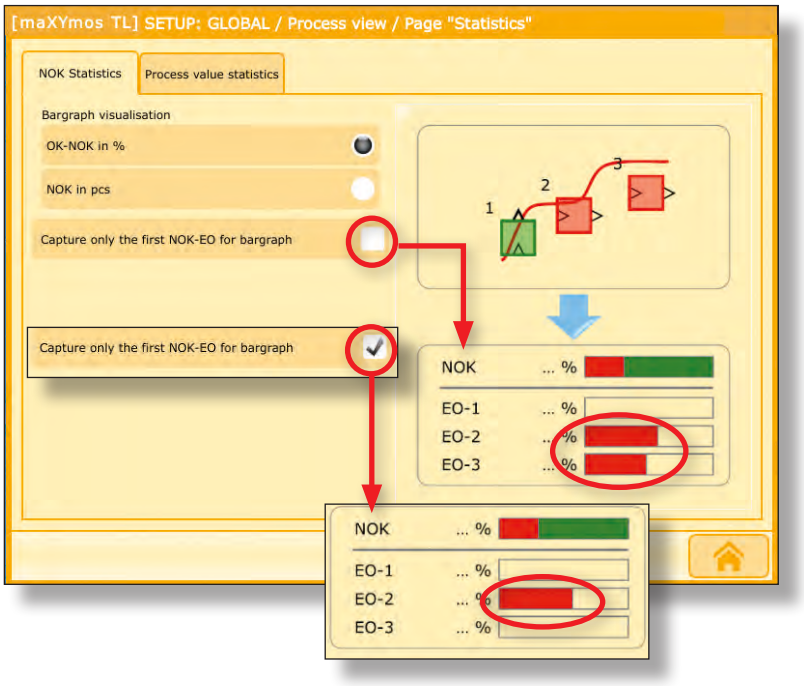
7.10.4.1 The "capture only the first NOK EO for statistics" parameter

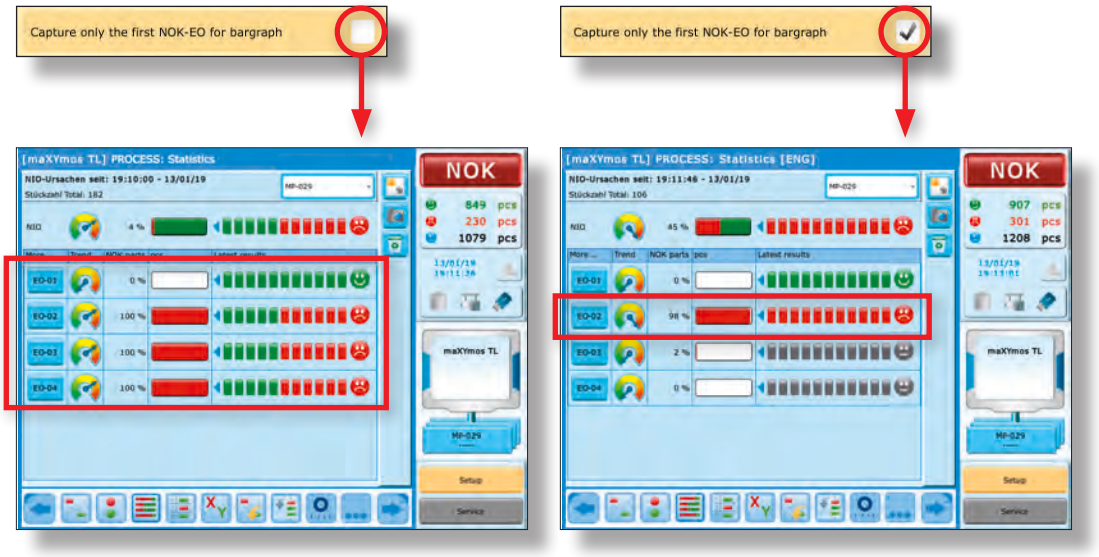
Example

The actual cause of the NOK here is clearly in the EO-2 range. The NOKs from the subsequent EOs are merely a result of this. If they are also included in the bar chart, the cause of the NOK will no longer be clearly identifiable.



The process view menu allows you to choose whether only the first NOK EO should be captured (= by checking the box). (→ Setup / Global setup / Process view / Configure statistics page).





Not activated: Here, the cause of the NOK cannot be identified clearly. The NOKs in EO-3 and EO-4 are merely a consequence of the problem in the EO-2 range. Having these displayed as well makes it much harder to diagnose the cause of the problem.

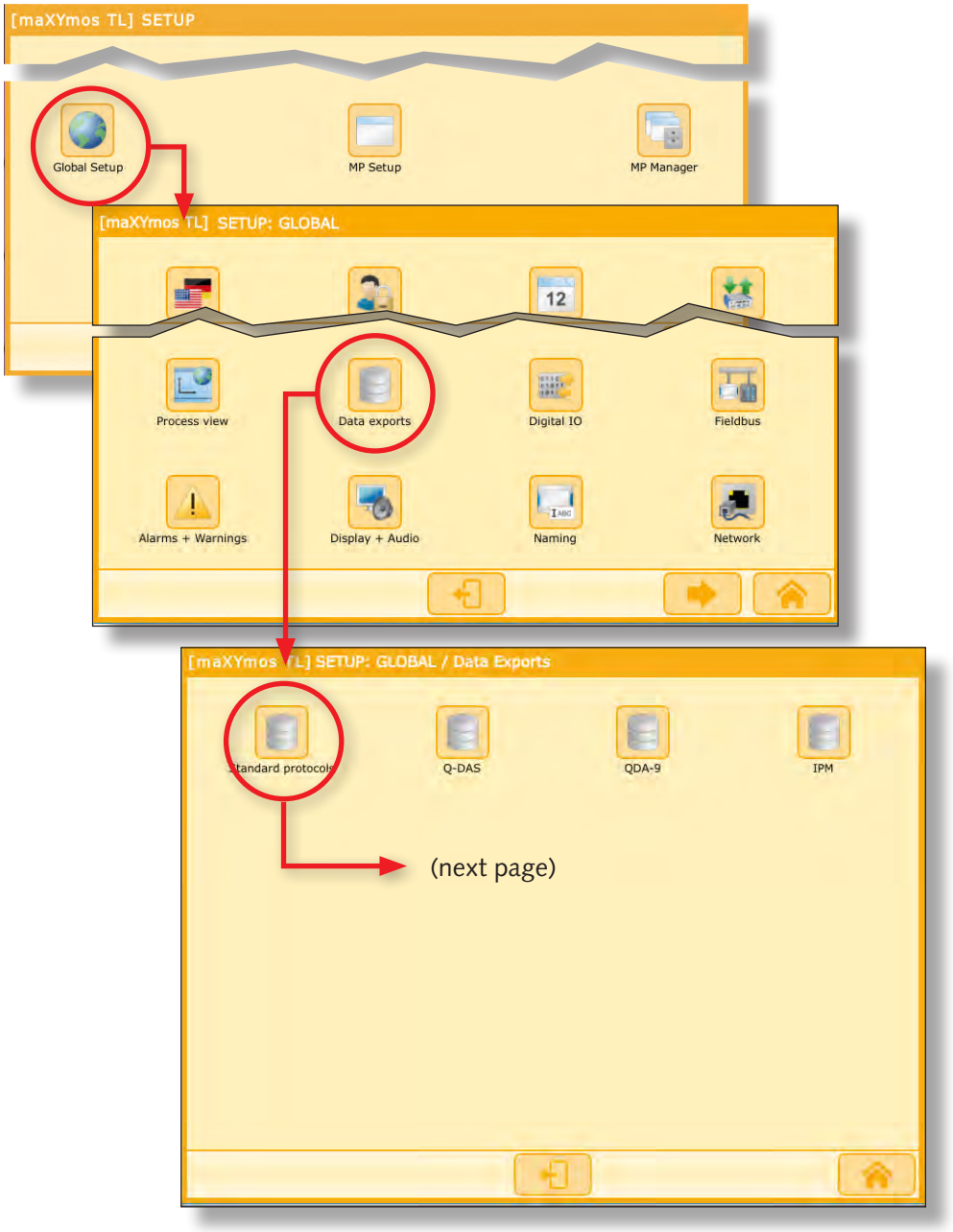
Activated: Now the cause of the overall NOK is clearly identifiable. The EOs which are not relevant to this are displayed in grey.

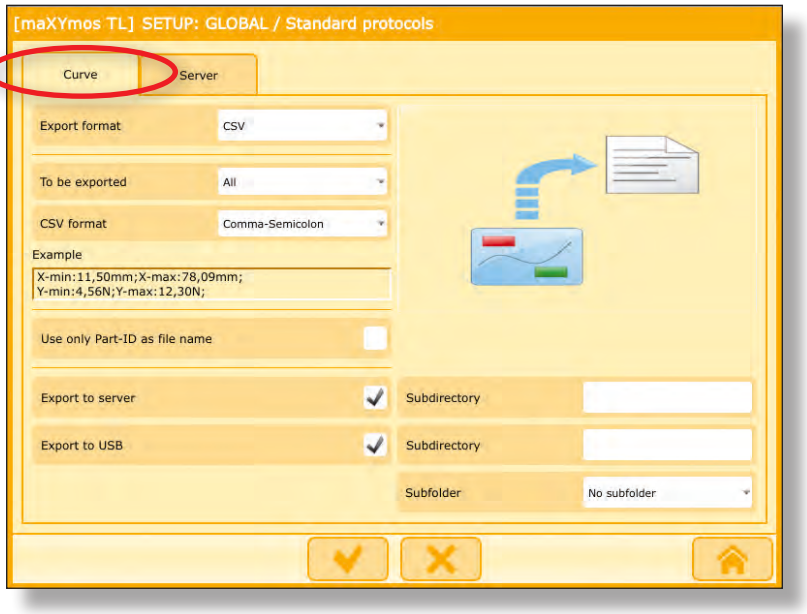
This function will only work properly when the EOs are set up in the right sequence (i.e. their numbering sequence needs to match the order in which the curve is expected to pass through them)!

7.11 Setting up data export – from the maXYmos TL

Setup Open the SETUP menu → page 43, 46.

Select "Global setup", then "Data export" and "Standard log"





Export format
CSV, XML or PDF

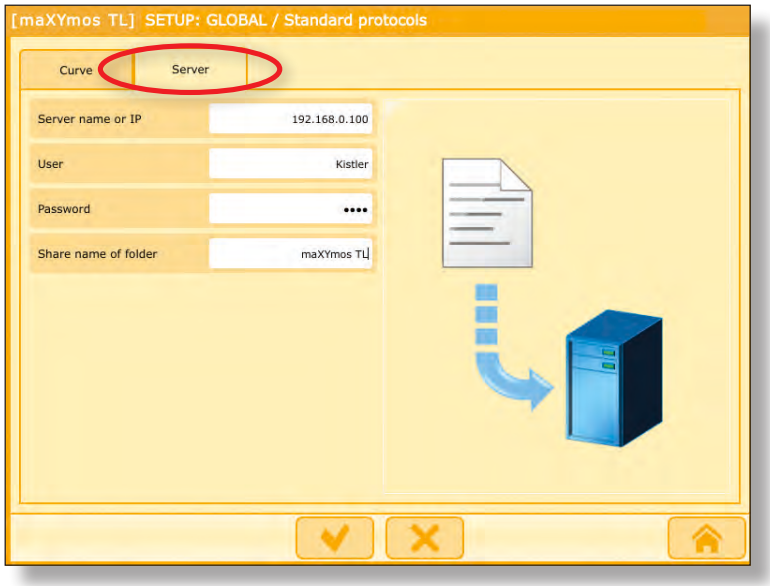
To be exported
Which data? OK+NOK-, OK or NOK?

CSV format (for CSV files only)
Comma-, period-semicolon
or period-comma.

Data export to server (yes/no)
Also indicate sub-directory.
Also indicate automatic generated sub-folder.
Server-access settings are on "Server" tab.

Data export to USB (allow; yes/no)
Enables data to be exported to USB stick.
Also indicate sub-directory.
Also indicate automatic generated sub-folder.

Important: The actual export process must be initiated in the blue Process View menu (select "USB stick symbol" , then select "Start" in pop-up menu)
→ pages 24, 274



Server settings
Enter access data in accordance with Computer Mangement / User settings, select

"Curve" tab and check "Export Data to Server" box .

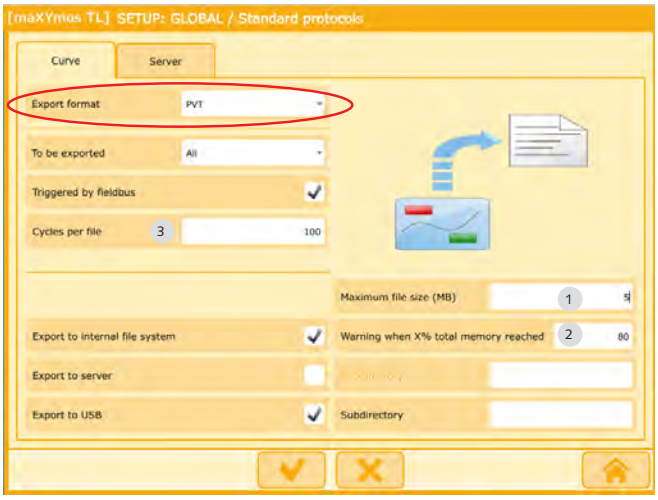
Note: If multiple csv files are generated within a second either the internal serial number generator must be activated or an additional ID must be sent via fieldbus because otherwise files with the same name (date and time) will be generated and therefore overwritten

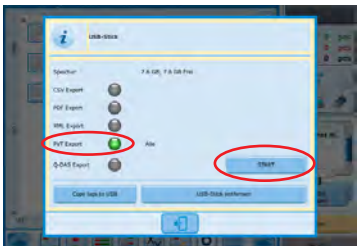
7.11.1 PVT Export

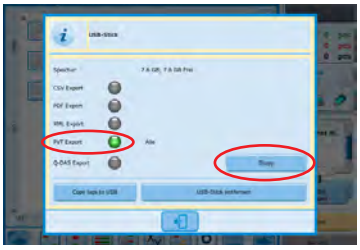
GLOBAL/Datenexport/Standard-Protokoll
The PVT export allows exporting the parametrized process values of the process value table into a textfile.

The file can be stored internally, on a server or on a USB memory stick.

There is also the possibility to decide via PLC, whether to write data or not. This is determined with the fieldbus input signal „SaveToMP“. As long as this signal is „1“, the measurement values will be logged in the textfile.

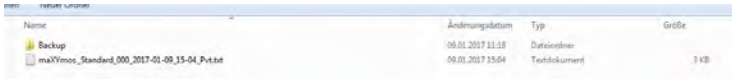






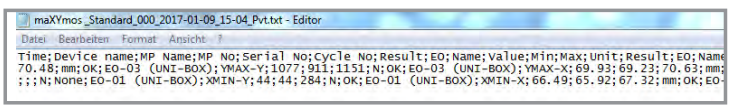
When using the internal memory (500 MB) the maximum file size must be configured (1) (max. 20 MB). If the maximum file size is reached, a new file will be generated and the existing one will be marked as “old”. As soon as the new created file has reached the max. size, the file marked as “old” will be deleted, the existing file will be marked as “old” and a new file is generated.
Additionally a warning limit may be defined (2) (e.g. 80 %). When the memory is filled by this percentage a warning will appear.

When exporting to a server or an USB stick the amount of cycles to be written into the file must be defined (3).



Example: Export to USB

As long as there is no subdirectory defined data will be saved in the root directory of the USB stick.

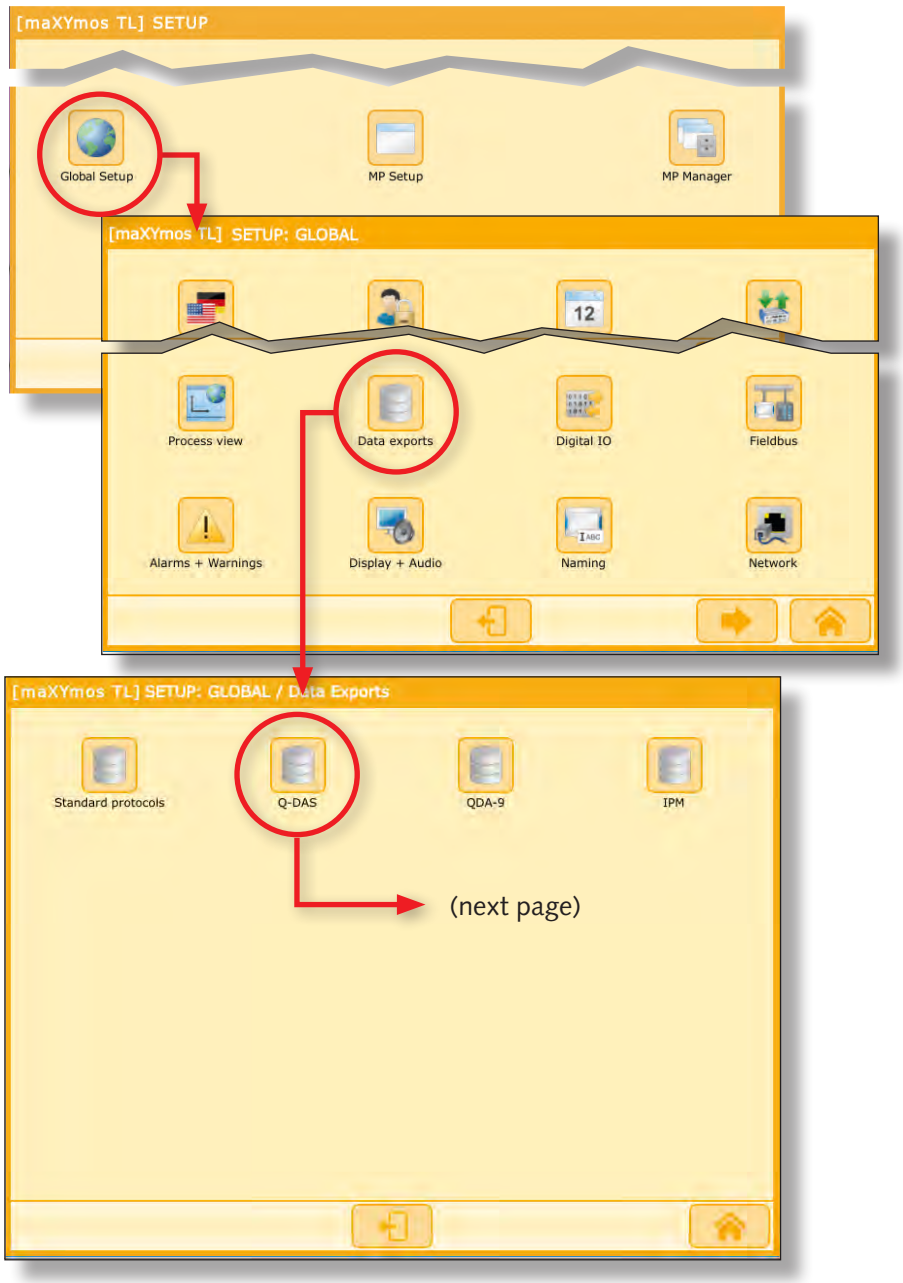


File design

7.12 Setting up Q-DAS® data export – from the maXYmos

Setup Open SETUP Menu → page 43, 46.

Select "Global setup", then "Data export" and "Q-DAS"



7.12.1 Q-DAS® Data export

1 **Data export to the server**
Yes (= check box) / No (= uncheck box). Enter desired subdirectory.

2 **Subdirectory**
Enter desired subdirectory.

3 **Data export to USB**
Yes (= check box) / No (= uncheck box). Enter desired subdirectory.

4 **Q-DAS® parts subfolder**
Enter desired subfolder.
Automatic generated subfolder -
--> Date, Date_Time, Date\Time, Parts ID

1 **Select number of measurements per file**

2 **Output file scheme**
DFD/DFX, DFQ, DFD/DFX

3 **Format of value output**
KEY or INLINE

4 **Use catalog files**
Yes (= check box) / No (= uncheck box). Enter desired name of catalog file. To use the catalog file, it must be in the target directory. You can select the file via an open dialog.

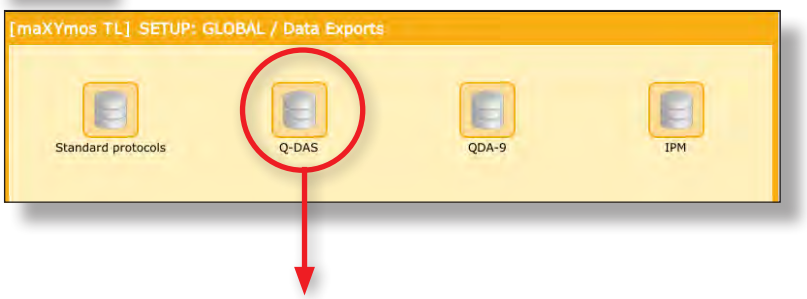
5 **Auto process value min/max**
If the check mark is set, the target value limits are automatically written to K2110/K2111. The K fields do not have to be created for this purpose.

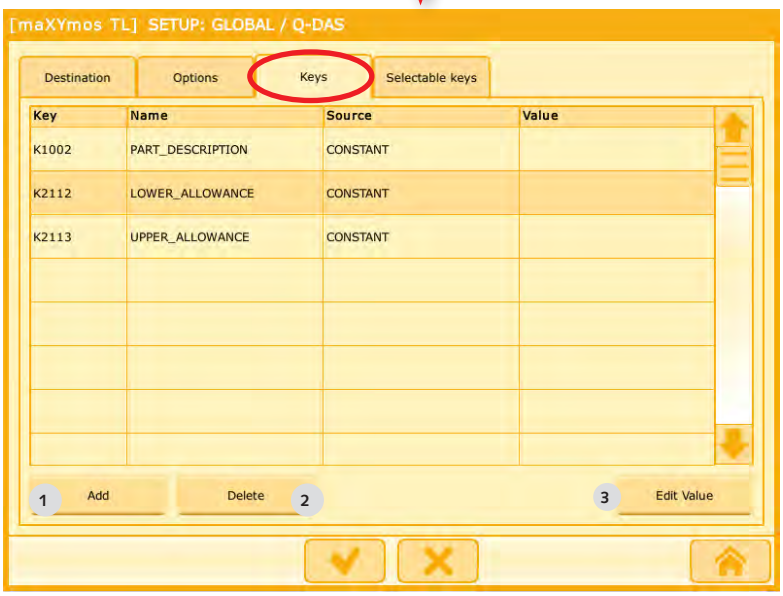
6 **K1001 K1002 value scheme**
You can use the field to define which value should be written automatically to K1001 / K1002. See automatic key content.

7 **Index/Length**
If value schema is at part ID, you can use index and length to define a substring of the part ID, which is automatically stored in K1001/K1002. The text is not cut when length = 0.

7.12.2 Define Q-DAS® Key

Open SETUP menu.
Select 'Global setup', then 'Data Export' and 'Q-DAS'.

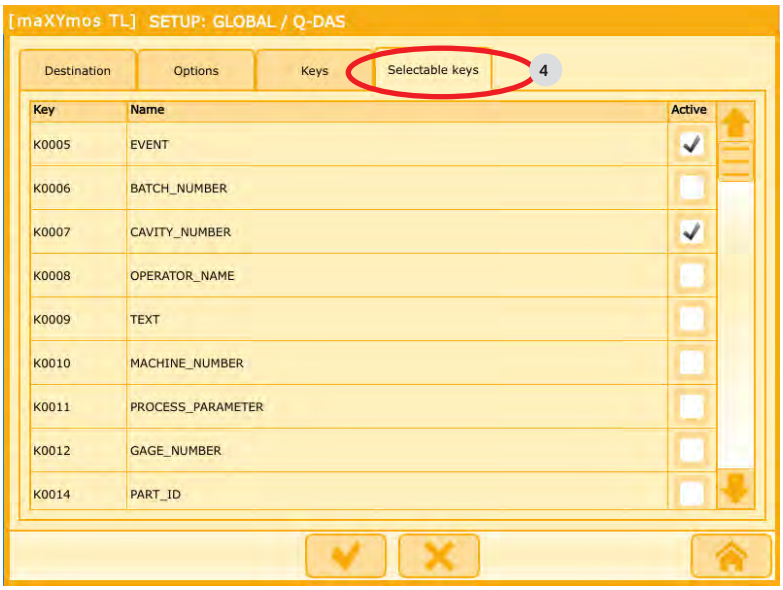




1 Add
To add new key

2 Remove
To delete the selected key.

3 Process Value
To process a key



4 Activate/Deactivate
Selectabele Kays

7.12.2.1 Add key to Q-DAS® protokol

You can use the 'Key' tab to add keys to the Q-DAS protocol.

You can select the key group via the K field type.

Measurements	K00xx
Parts information	K1xxx
Characteristics information	K2xxx
Quality control charts	K8xxx

You can then select the respective key from the key group in the additional input field.

4 Additional keys can be added to the selection if the 'Active' field of the key is selected in the 'Selectable key' tab.

7.12.2.2 Edit Q-DAS® key value

CONSTANT	Key content is defined directly in the Setup
MANUAL	You can define key content via the process page Q-DAS. To do so, you must activate the process page Q-DAS in the Global Menu process view.
FIELDBUS	Key content can be described via the fieldbus. This is done via the field-bus parameters qDAS1..qDAS8
AUTO	Certain key contents can be filled automatically. See Automated Key Contents table.

7.12.2.3 Automated key values

If key content is set to AUTO, the following values are stored:

K0006 Batch number/Ident. number	Parts ident. (max. 20 characters)
K0009 Text	Parts ident. (max. 64 characters)
K0014 Parts ident	Parts ident. (max. 40 characters)
K0053 Order number	Parts ident. (max. 20 characters)
K1001 Part number	Depending on the value scheme selection MP value: MP number PART ID: Parts ident. shortened if necessary via value Section index + section length
K1002 Part name	Depending on the value scheme selection MP value: MP number PART ID: Parts ident. shortened if necessary via value Section index + section length
K1022 Manufacturer name	Name of manufacturing (Global menu name)
K1053 Order	Part ID
K1082 Machine description	Device name (Global menu name)

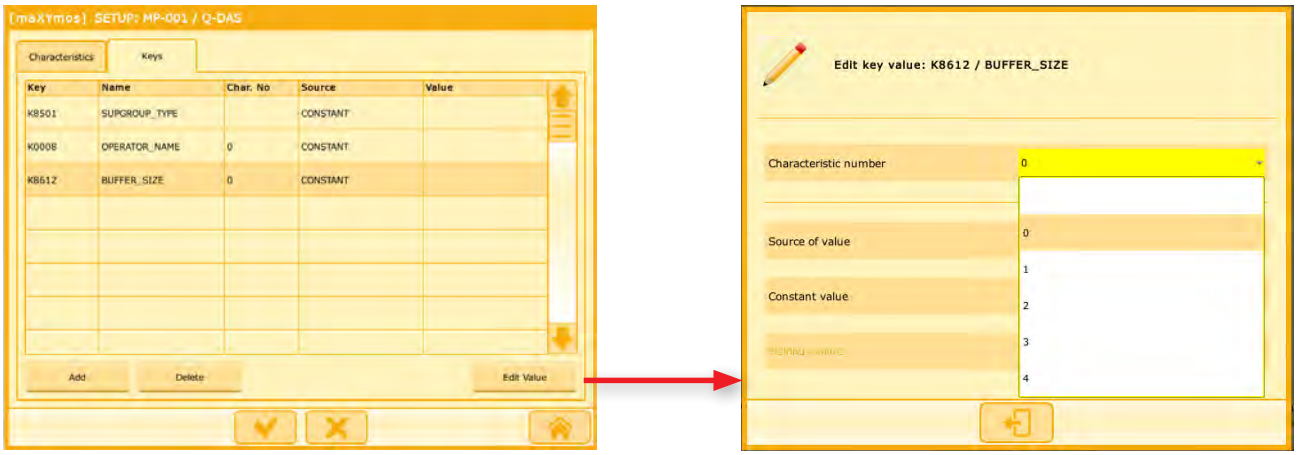
K1231 Measurement program number	MP Number
K2002 Characteristic name	EO Name
K2043 Recording device name	Recording device name device-dependent maXYmos TL/maXYmos NC. Is added with index 0 to the Q-DAS file.
K2110 Lower limit value	Lower target value limit TargetMin
K2112 Lower tolerance	
K2114 Lower scrap limit	K2110 can also be added via the Option menu.
K2111 Upper limit value	Upper target value limit TargetMax
K2113 Upper tolerance	
K2115 Upper scrap limit	K2111 can also be added via the Option menu.
K2213 Normal ActualValue	Average between TargetMax and TargetMin
	ActualValue= TargetMin+(TargetMax-Target-Min)/2
K2302 Machine name	Device name (Global menu name)
K2401 Test instrument number text	Serial number of measuring device
K2402 Test instrument name	maXYmos TL / maXYmos NC
	Is added with index 0 to the Q-DAS file. e.g. K2402/0 maXYmos TL
K2406 Test instrument manufacturer	Kistler Is added with index 0 to the Q-DAS file.
	e.g. K2406/0 Kistler

7.12.2.4 Edit zhe K2xxx key contents

The K2xxx fields can be defined globally or related to the measurement value.
This is defined via the characteristic No.

0	Global. Content applies equally to all process values
1 … n	Value refers to the respective process value (characteristic)

The characteristic values no. 0 ... 5 are provided for 5 process values.



If you select 0 for the characteristic no., the key cannot be defined again.
For characteristic no. != 0, the K key can be defined several times for the other process values.

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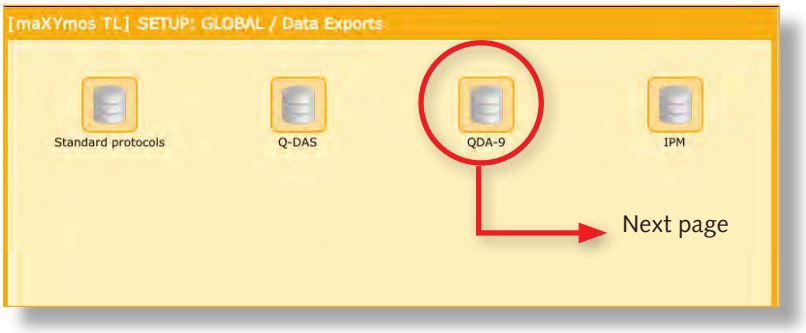
7.13 QDA9-Setting up data export – maXYmos

Setup Open SETUP menu.

Select „Global-Setup“, then „Data Export“ and „QDA9“



1 **Data Export to server**
Yes (=check box) / No (=uncheck box)

2 **Subdirectory CSV**
Enter required subdirectory for CSV export

3 **QDA9 Subdirectory**
Enter required subdirectory for QDA-9 export

4 **Subfolder**
Automatic generated subfolder –
…/Subfolder
…/Subdirectory CSV/Subfolder
…/Subdirectory QDA9/Subfolder

5 **Plant**
Enter detail information about the plant

6 **Department**
Enter detail information about the department

7 **Line**
Information about line

8 **Cluster name**
Enter cluster name

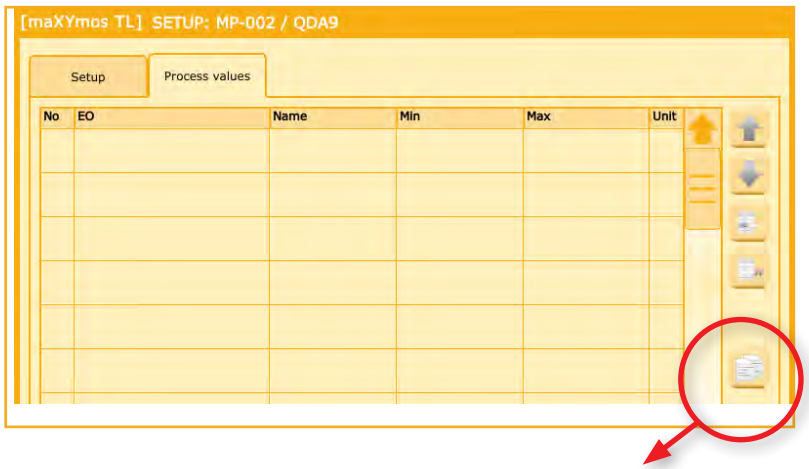
9 **Station name**
Enter station name

10 **Test reason**
Enter details to the test

QDA9 setup
QDA9 export exports a CSV file and a Q-DAS DFQ file. These can be stored in separate folders. The target server is defined in the standard protocols. The settings are divided into global and program-specific settings.

QDA9 export does not work in conjunction with Q-DAS export.

MP setup process values



Copies the settings of the 'Process value table' view in the QDA9 protocol.

Input field assignment

	DFQ file CSV file (first cell A1)	DFQ file CSV file (first cell A1)
Plant	K1303	-
Unit	K1101	-
Line	K1802	-
System name	K1201	-
Device name	K1202	-
Process	K1086	B3
Process field	K1087	B4
Test plan name	K1002	B2
Characteristic	K2002* (is extended by generated	B9 (wird mit generiertem Text erweitert)
text)	B9 (is extended by generated	B6
text)	K1203	B5
Test type	K1209	B6
Test reason	K1203	B5

Characteristic extension of DFQ file -> [UserSetup]_[No]-[Type]-[ProcessValue]-[Size]

No:	
00	Curve (curve-relevant process values)
01 ... 10	EO number

Type:	
CU	Curve (curve-relevant process values)
NP	NO-PASS
LX	LINE-X
LY	LINE-Y
UB	UNI-BOX
EN	ENVELOPE
GR	GET-REF
CA	CALC (Calculator)
GX	GRADIENT-X
GY	GRADIENT-Y
HX	HYSTERESIS-X
HY	HYSTERESIS-Y
TX	TUNNELBOX-X
TY	TUNNELBOX-Y
SP	SPEED
TI	TIME
AV	AVERAGE
BR	BREAK
KN	IFLEXION
IN	INTEGRAL
DI	DIG-IN
DY	DELTA-Y
	DISPACEMENT RANGE
	FORCE RANGE
	PASS-THROUGH BOX

ProcessValue	
Curve-related process values	
CPPX	Curve peak peak X
CPPY	Curve peak peak Y
CSTAX	Curve start X
CSTAY	Curve start Y
CENDX	Curve end X
CENDY	Curve end Y
CBX	Curve block X
CBY	Curve block Y
CRX	Curve reference X (trigger Y)

EO-related process values	
STAT	Result
XmaxX	XMax-X
XmaxY	XMax-Y
YmaxX	YMax-X
YmaxY	YMax-Y
XminX	XMin-X
XminY	XMin-Y
YminX	YMin-X
YminY	YMin-Y
ENTRY	Entry
EXIT	Exit
TIME	Measured time
SPEED	Measured speed
REFX	Reference point X
REFY	Reference point Y
BENDV	Bend detection value
AVERA	Average value
INTEG	Integral (work)
COX	Coordinate X
COY	Coordinate Y
VIX	Violation X
VIY	Violation Y
DELYX	DeltaY X
DELY	DeltaY
PosX1	Lower left window position X
PosY1	Lower left window position Y
PosX3	Upper right window position X
PosY3	Upper right window position Y
PosX2	PosX2/Y2 - lower right window position
PosX4	PosX2/Y2 - upper right window position

Square EOs are described only with Pos1 and Pos3.
Line EOs are described with Pos1 and Pos2.

Size:	
See symbol assignment	
S	Displacement
F	Force
T	Time

Examples:	
Characteristic: KuLa-Li	
K2002 KuLa-Li_02-UB-YmaxY-F	
02 -> 2nd EO	
UB -> UNI-BOX	
YmaxY –> maximum Y value	
F -> Y value refers to force	

Examples:	
Characteristic: KuLa-Li	
K2002 Kula-Li_00-CU-CPPX-S	
00 –> curve-related value	
CU -> curve-related value	
CPPX -> curve peak peak X	
S -> X value refers to displacement	

K1001 generation (DFQ file)

K1001 contains the first 11 characters of the order number.

If the order number is greater than or equal to 30 characters, the first character of the substring, depending on the first character of the order number, is replaced as follows:

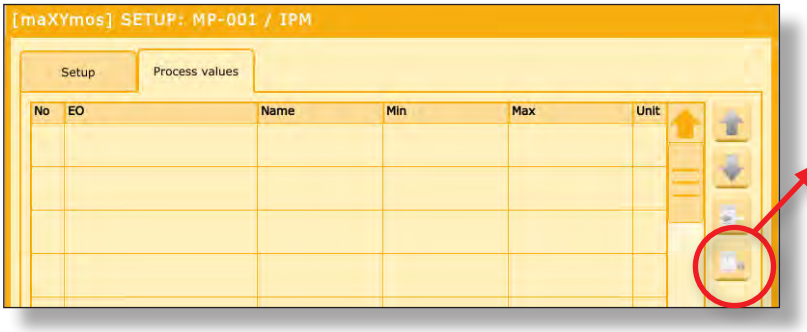
First character	First character substring (K1001)
1	A
0	R
Other	?

7.14 I-P.M 5.0 – maXYmos side

Open SETUP Menu.
Select "Global setup", then 'Data export' and "IPM".

Open SETUP Menu.
Select "MP Setup", then "MP---" and "Advanced settings".

For the I-P.M. 5.0 protocol, you must enter the AFO.

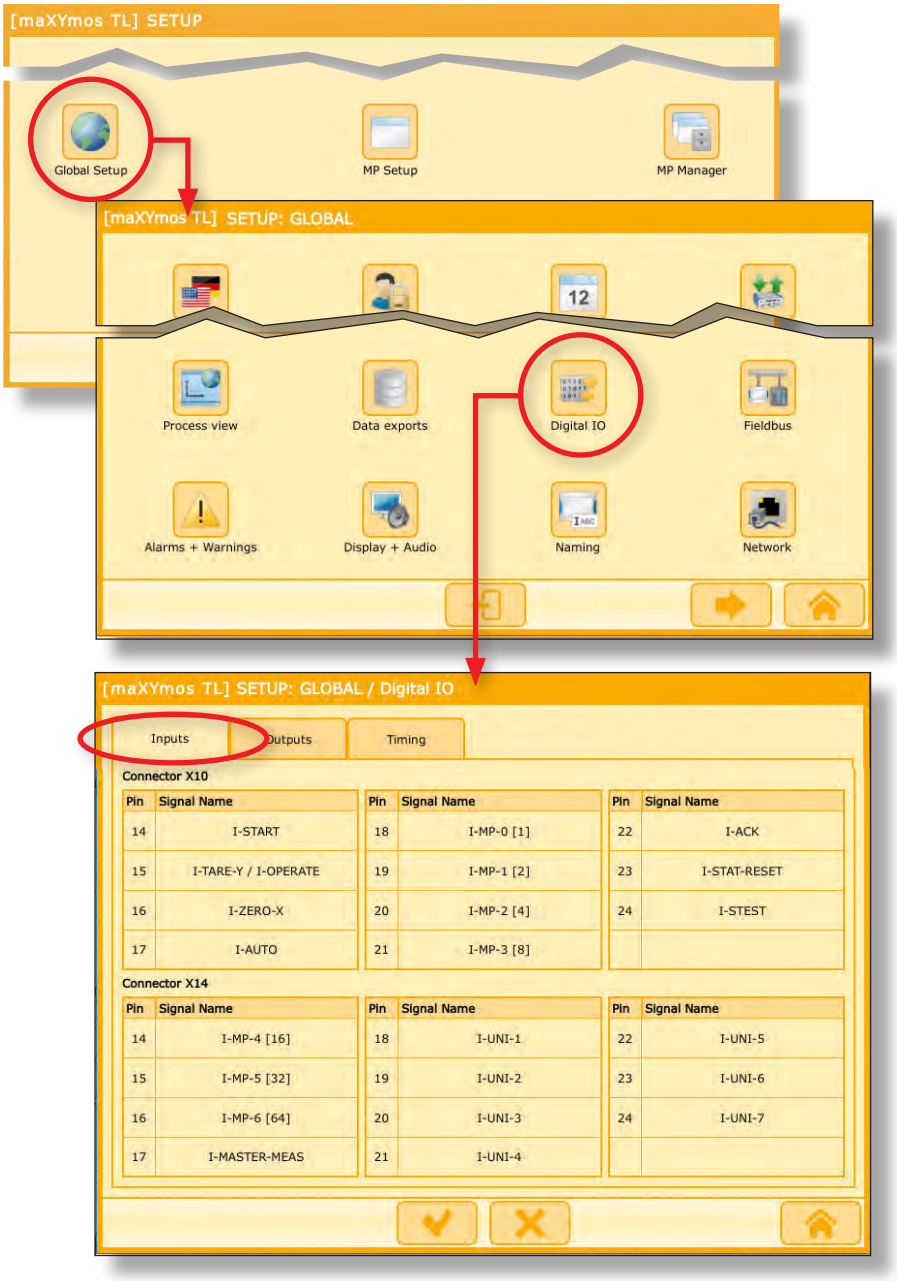


Copies the settings of the "Process value Table" view to the I-P.M. protocol.

7.15 Configuring Digital IOs

Setup Open the SETUP menu

Select "Digital IO" tab

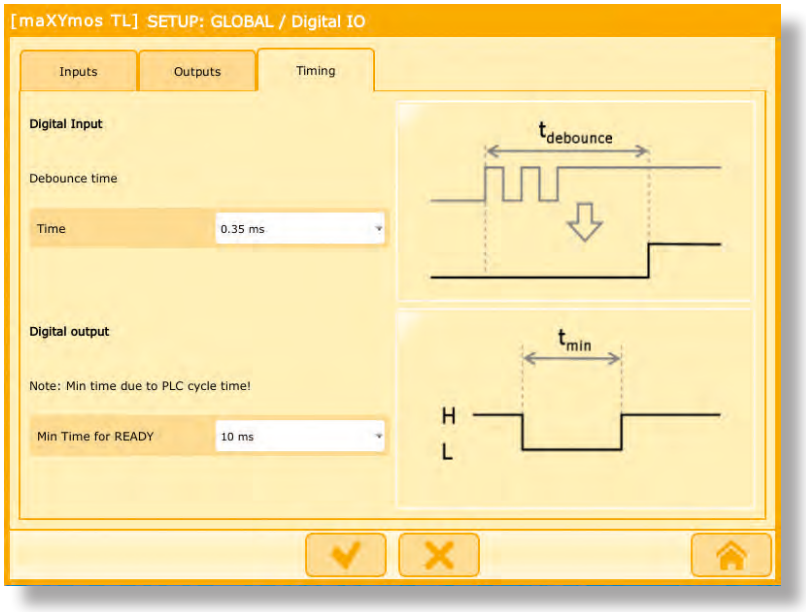


Digital inputs
Pin allocation for the X10 and X14 connections will be displayed.

"Digital outputs" tab

Digital outputs
Pin allocation for the X10 and X14 connections will be displayed. By selecting „Invert“ you are able to invert the signal on each single pin.

The "Debounce Time" tab



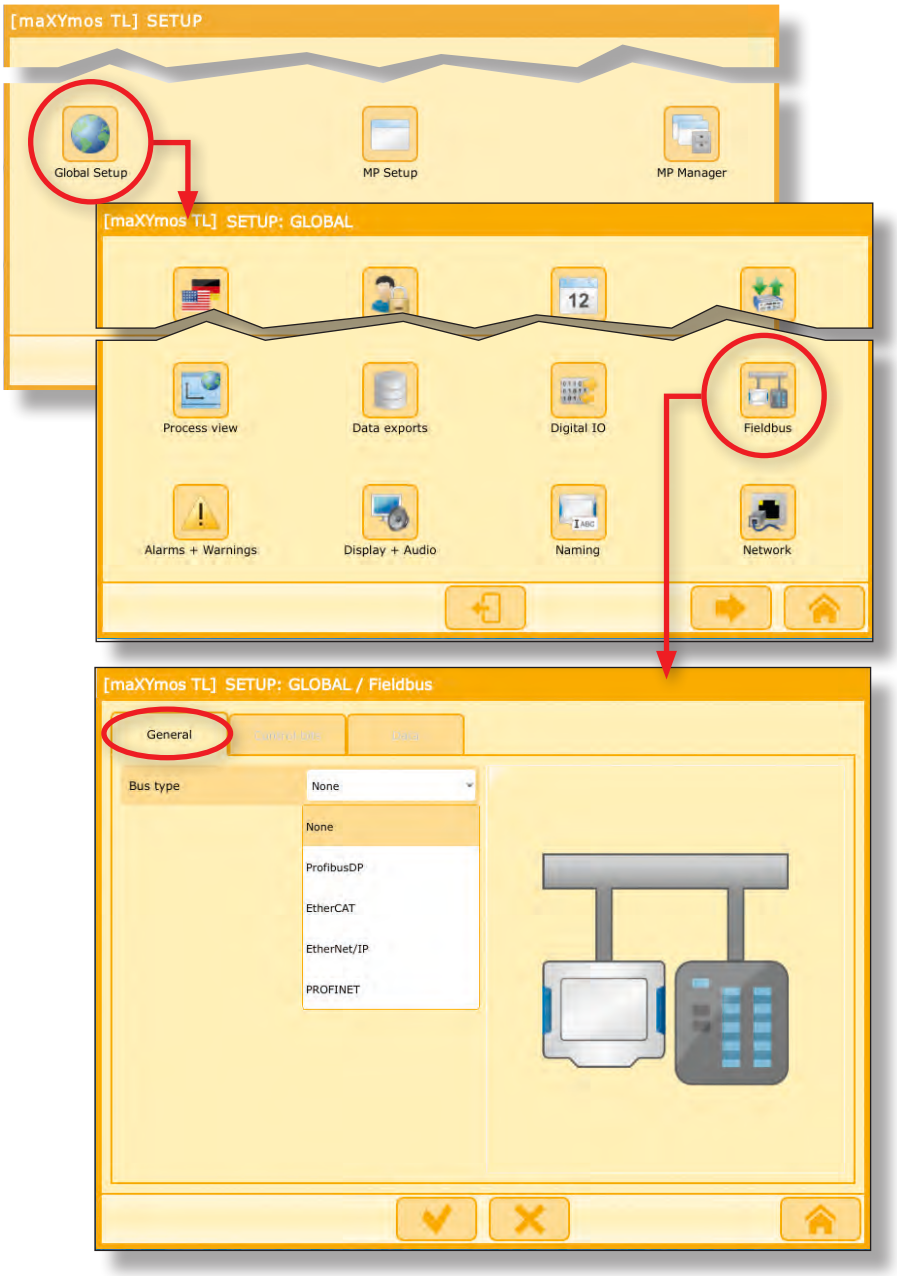
Digital inputs / Debounce time
The debounce time specified here affects all the inputs. Should you encounter problems, try experimenting with different times.

Digital outputs / Debounce time
To adapt to excessive PLC cycle times READY=0 signal can be artifcially prolonged.

7.16 Configuring the fieldbus

Setup Open the SETUP menu → page 43, 46.

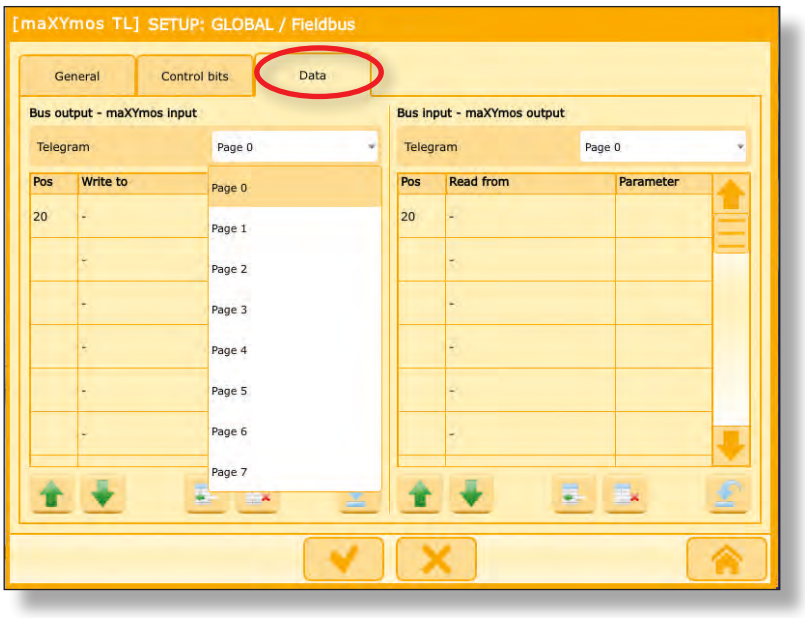
Select "Digital IO"



Bus type
Select and configure the required bus type.

"Control bits" tab
(this can be selected only if a bus type has been selected in the "General" tab).

"Data" tab
(this can be selected only if a bus type has been selected in the "General" tab).



NOTE

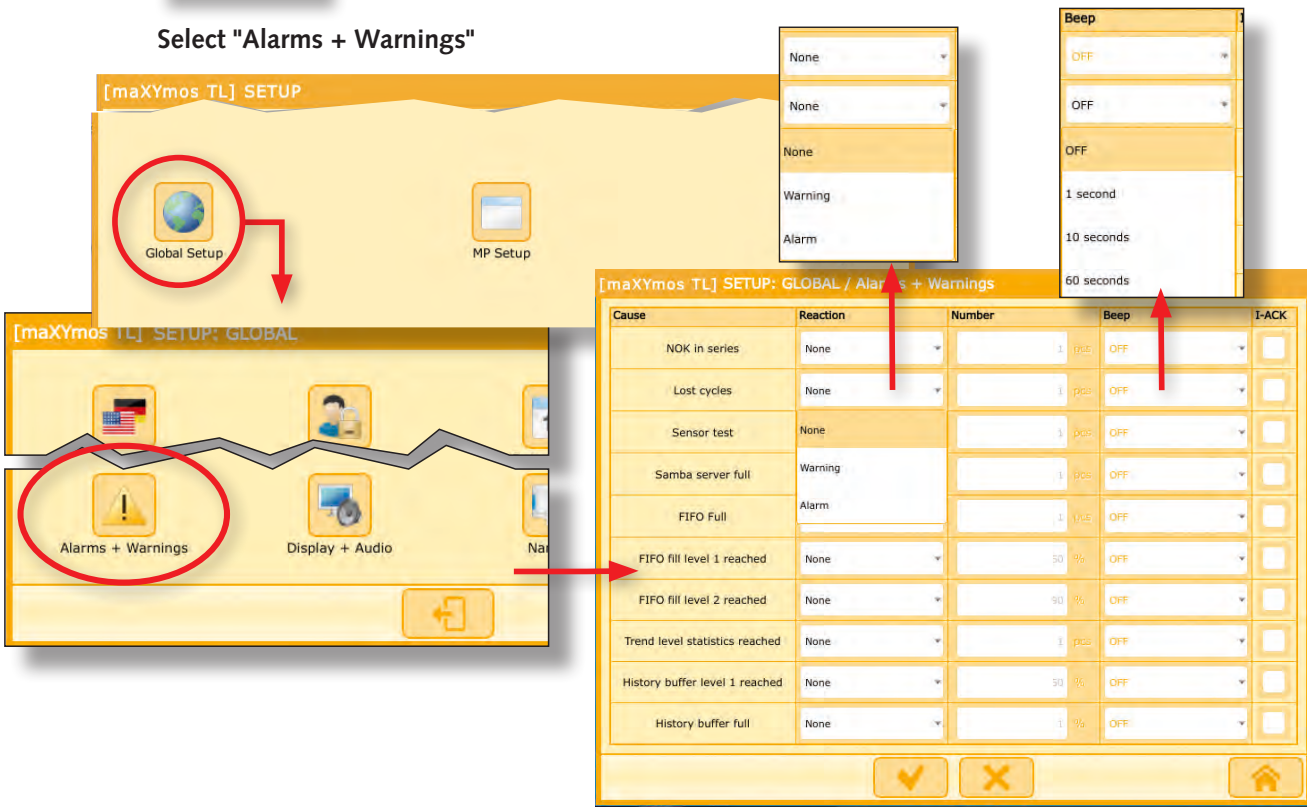
Use of the fieldbus is explained in detail in the appendix.

→ Section 15 / page 326

7.17 Configuring Alarms and warnings

Setup Open the SETUP menu → page 43, 46.

Select "Alarms + Warnings"



Possible Causes of Alarms/Warnings:
"NOK in Sequence" Problem
This is used to determine the response to a specified number of NOKs (= not OK messages) in sequence. The sequence of NOKs must originate from the same MP → 7.21 / page 143.

Lost cycles in sequence
A "lost cycle" occurs if the **maXYmos TL** receives a START command in the form of an external START=1 signal before the preceding cycle has ended (generating a READY=0 message).
Important: Configuring the Ready Signal (High) into the PLC start settings should prevent this occurring.
Sensor test. Reaction following a failed sensor test
Samba server full. Reaction after a "Samba Server Full" message is generated

Early detection of network interruptions and memory overflow:
FIFO fill level 1 and 2 reached: Pre-warning level FIFO. Reaction after x% of the fill level of the FIFO is reached.
Trend level statistics reached: Reaction after the trend level of the process value statistic is reached.
History buffer level 1 reached: Pre-warning level history buffer.
Reaction after x% of the fill level of the history buffer is reached.
History buffer full: Reaction after the history buffer is full.

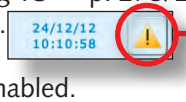
I-ACK. This is signaled by I-ACK yes/no

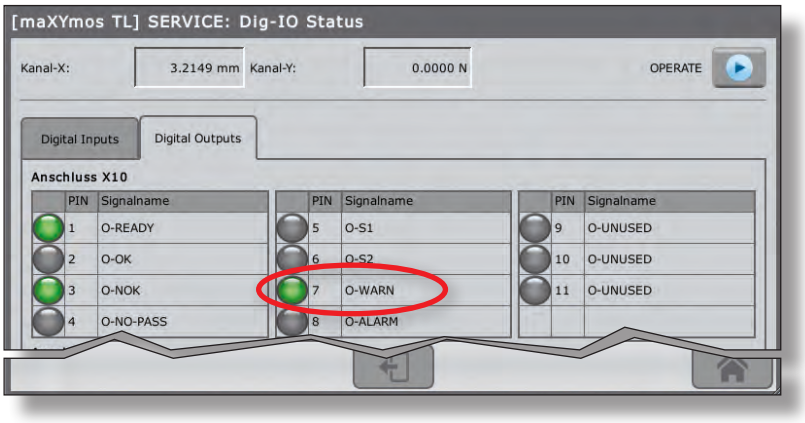
Possible Alarm/Warning settings:
Reaction: None (no alarm or warning is generated)
Number: Number of events that may occur before an alarm or warning is generated
Beep: Length of beep signal (1, 10, 60 seconds or until acknowledged)

To enable selection of the "Number" (used only in "NOK in Sequence" and "Lost Cycles" messages), "Beep" or "I-ACK" fields, "Reaction" field must be set to "Warning" or "Alarm".

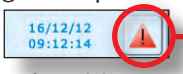
Difference between Warning and Alarm:

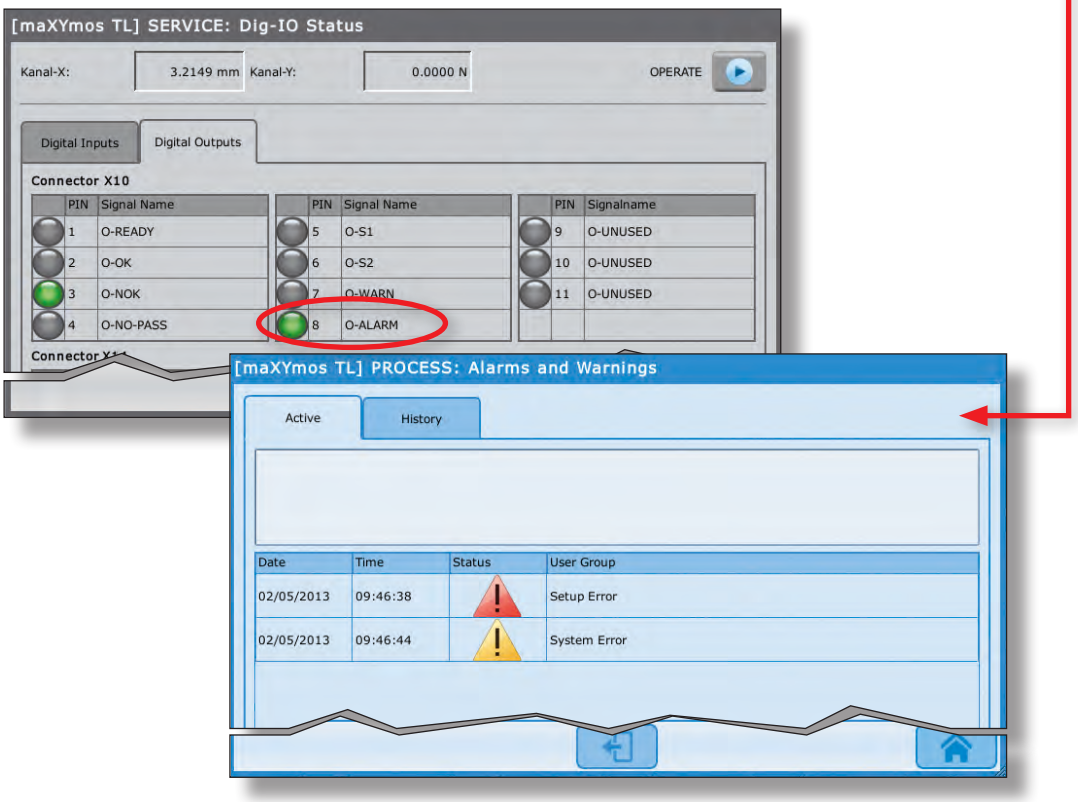
Warning 1. Sets O-WARN output (see Service men / Dig-IO → p. 278/280)
2. Yellow warning signal on the sidebar flashes.
3. List shows cause of warning.
4. Production can continue, as READY is still enabled.





Alarm 1. Sets O-ALARM output (see Service menu / Dig-IO → p. 278/280).
2. Red alarm signal on the sidebar flashes.
3. List shows cause of the alarm.
4. Production cannot continue, as READY will remain set to zero until acknowledgement is received. Intervention is required!





NOTE

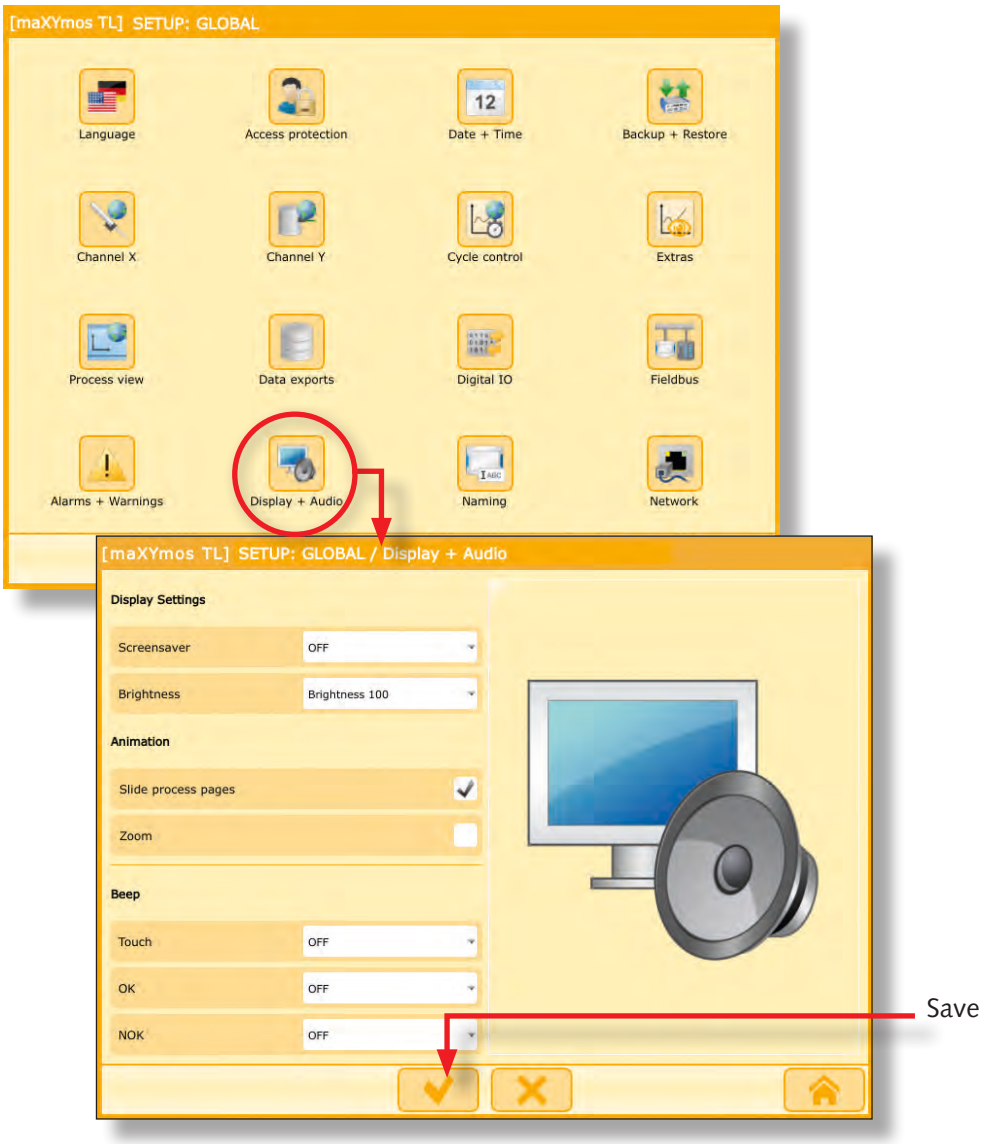
Handling of warnings and alarms is described in → 6.3.8 / page 32

7.18 Display + Audio settings

These configure the screen saver, brightness, animation and beep tones.

Setup Open the SETUP menu → page 43, 46.

Select "Display + Audio"



Display settings:
Use these to activate/deactivate the screen saver, set its startup interval and specify the background brightness of the display in %.

Beep signal
Use this submenu to specify whether system beeps on "OK", "NOK" and key depression.

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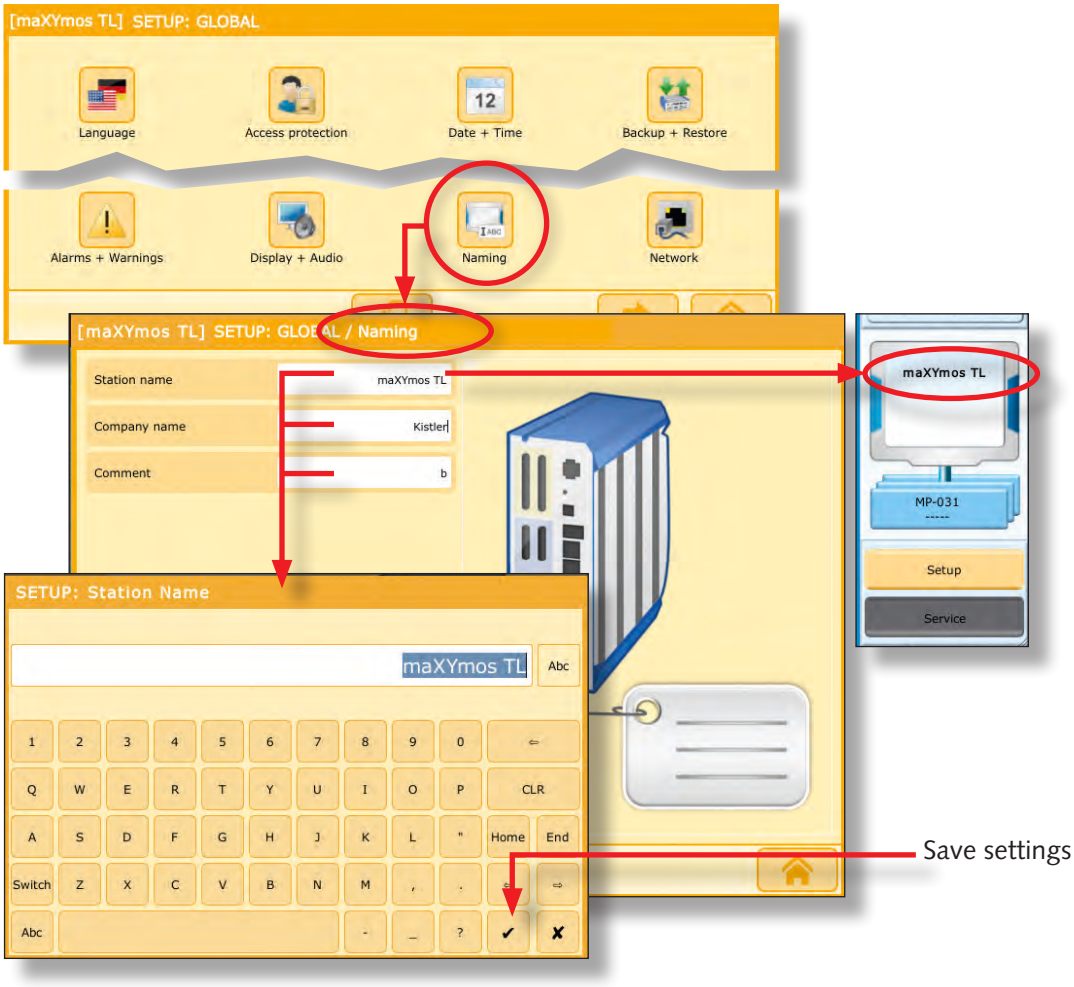
7.19 Configuring (station) Name

This function is used to enter station name (device name).

Setup — Open the SETUP menu → page 43, 46.

Select the "Global-Setup" menu, then select the "Naming" button



Station name (device name)
Enter the name of your choice. This will be displayed on the screen icon shown on the blue startup screen (or process menu). It also appears, in square brackets, in the header bar of the menus. If you enter a company name and a comment, these will appear in the exported CSV log files.

Company name
Enter the name of your choice. This will appear in the exported CSV log files.

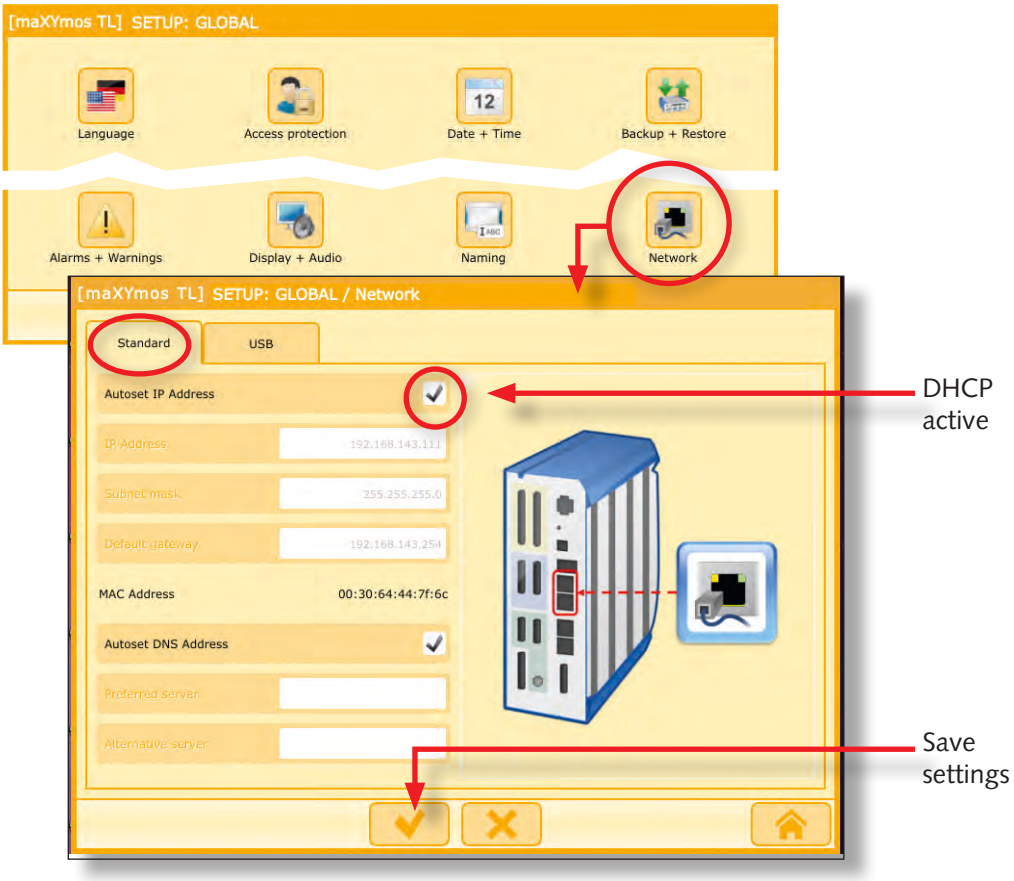
Comment
Enter the comment of your choice. This will appear in the exported CSV log files.

7.20 Network

This menu is used to configure the network settings.

Setup → Open the SETUP menu → page 43, 46.

Select the "Global-Setup" menu, then select the "Network" button

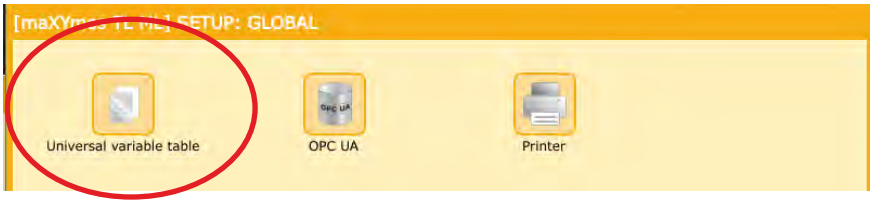


Automatic IP Address
When delivered from the factory, the IP address on the monitor is set to 192.168.61.252. If you check the DHCP box, an IP address will automatically be allocated to the **maXYmos TL**, provided there is an active DHCP server on the network. If not, an individual IP address can be entered. Once this address has been confirmed, the **maXYmos TL** can be accessed via this address, by VNC remote access, for instance, as explained in → Section 10.1 / p. 311.

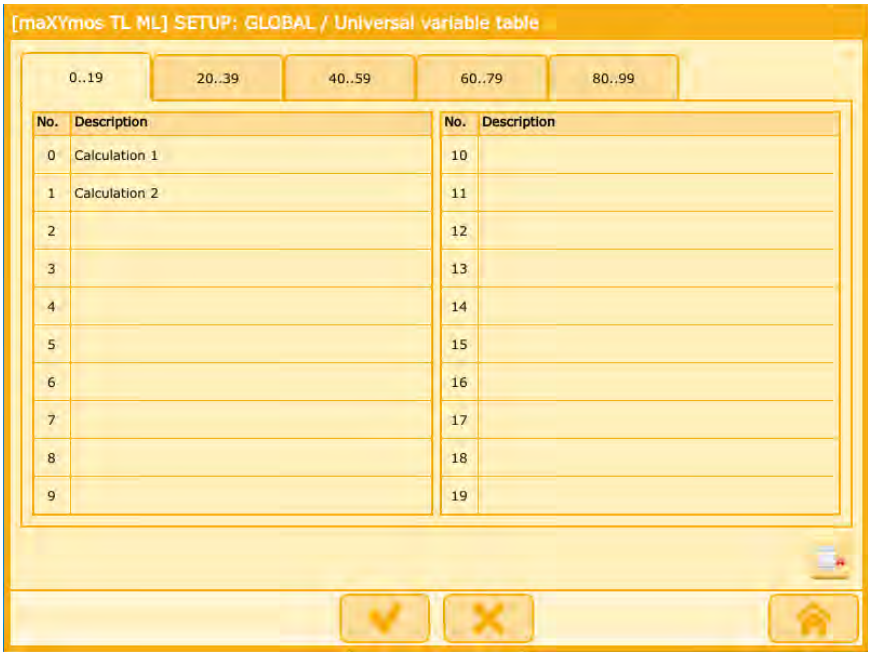
If the IP adress iss et automatically (DHCP) and the device does not have a display (DIM), access via VNC is not possible any more because the IP adress is unknown. Multiview operation is also not possible because fix IP addresses are necessary.

7.21 Universal variable table

Setup > Global Setup > Universal Variable Table



Universal variable table



Up to 100 universally applicable variables (0 ... 99) can be defined. 20 variables are shown per menu.

These variables can be assigned to calculation results of the CALCULATION function of the sequence flow or used as input variables (Variable 1, Variable 2 of the CALCULATION function) for calculation.

The values of variables can be read or written via the fieldbus of the PLC.

By double-clicking on the table object, an input field for entering the variable name is opened.

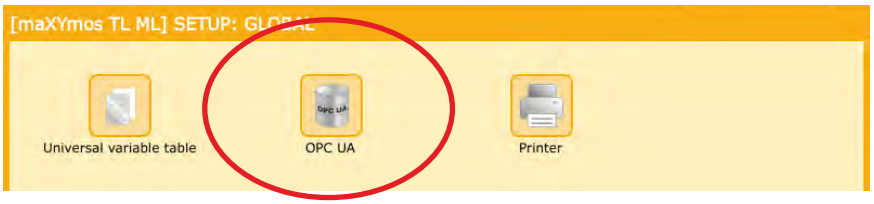
With , a table object can be deleted.

7.22 OPC UA

Setup > Global Setup > OPC UA

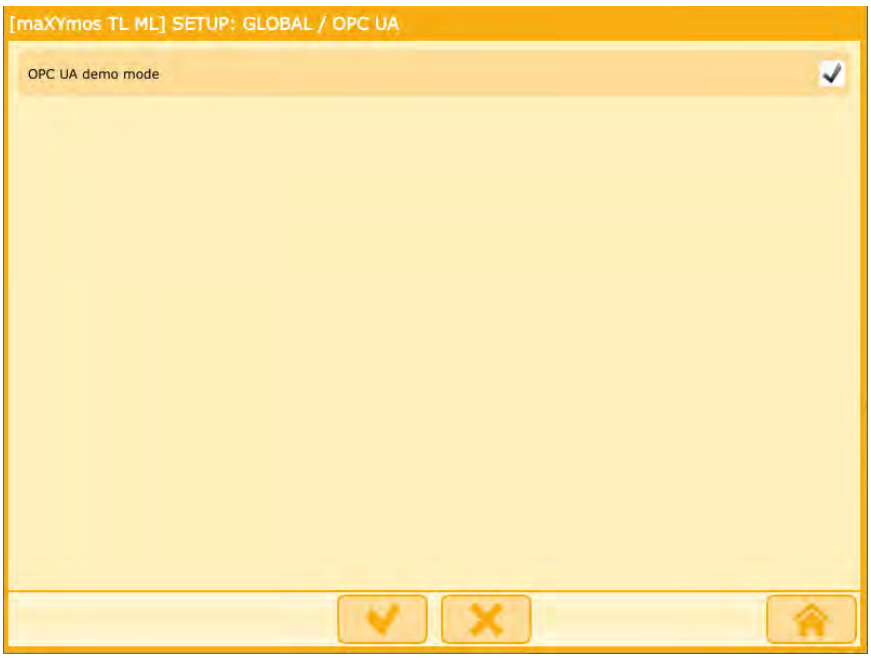
The maXYmos TL contain an OPC UA server. Any OPC UA client can connect to it, maximum 3 OPC UA clients can connect to the OPC UA Server at the same time

With the OPC UA interface, all process parameters can communicate with an OPC UA server.



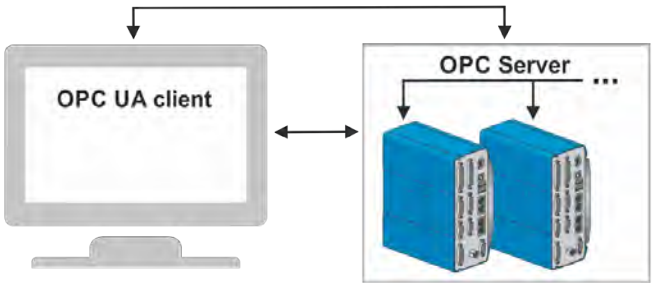
OPC UA selection (in software version v1.7.x the OPC UA is available as demo)

The OPC UA server can be enabled and disabled, by default it is disabled.



The OPC UA server provides after each measurement the cycle data via an event, the "CycleDoneEvent". Any OPC UA client subscribed to that event receives the event containing the cycle data.

The event mechanism guarantees data consistency of the cycle data.



7.22.1 OPC UA Interfaces maXYmos

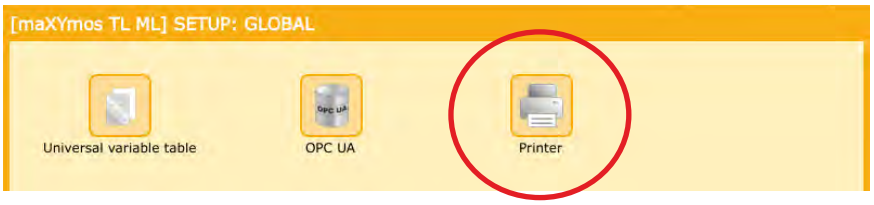
The event “CycleDoneEvent” contains the following data:

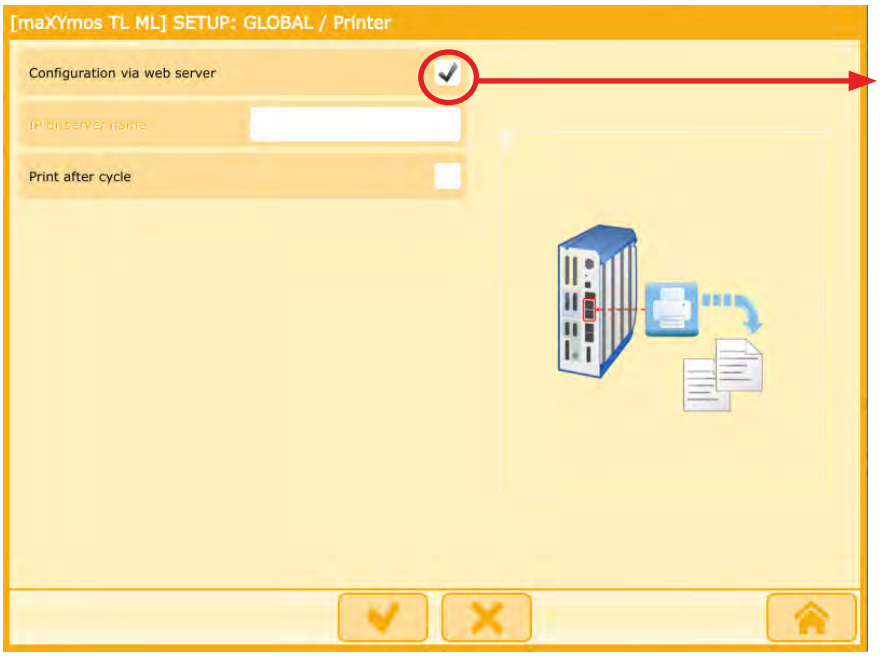
Cycle number
Cycle start time
Cycle length
Device name
Range of the process value selected in the process value table
Name of the process value selected in the process value table
Value of the process value selected in the process value table
Result of the evaluation of the process value selected in the process value table
Source of the process value selected in the process value table
Measuring program name
Measuring program number
Part serial number

7.23 Printer

Setup > Global Setup > Printer

Hier kann der Drucker aktiviert werden.



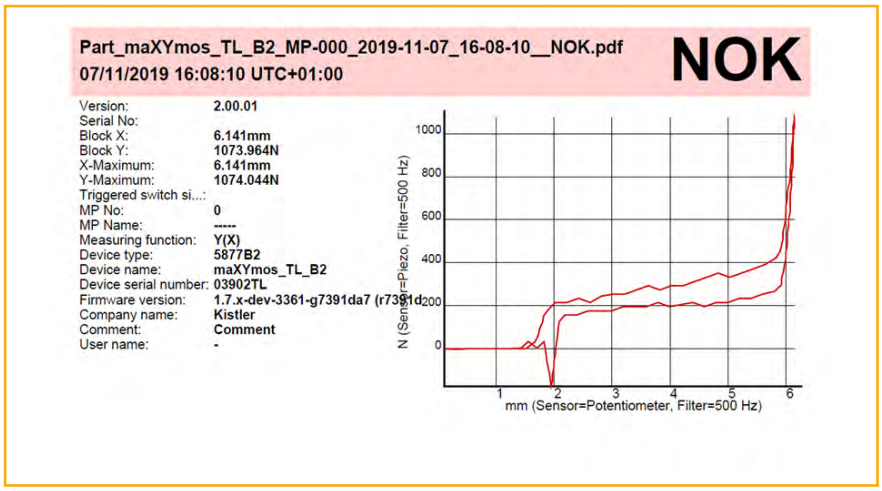


Activate configuration via web server

Configuration via web server.

IP or server name.

Print after cycle.

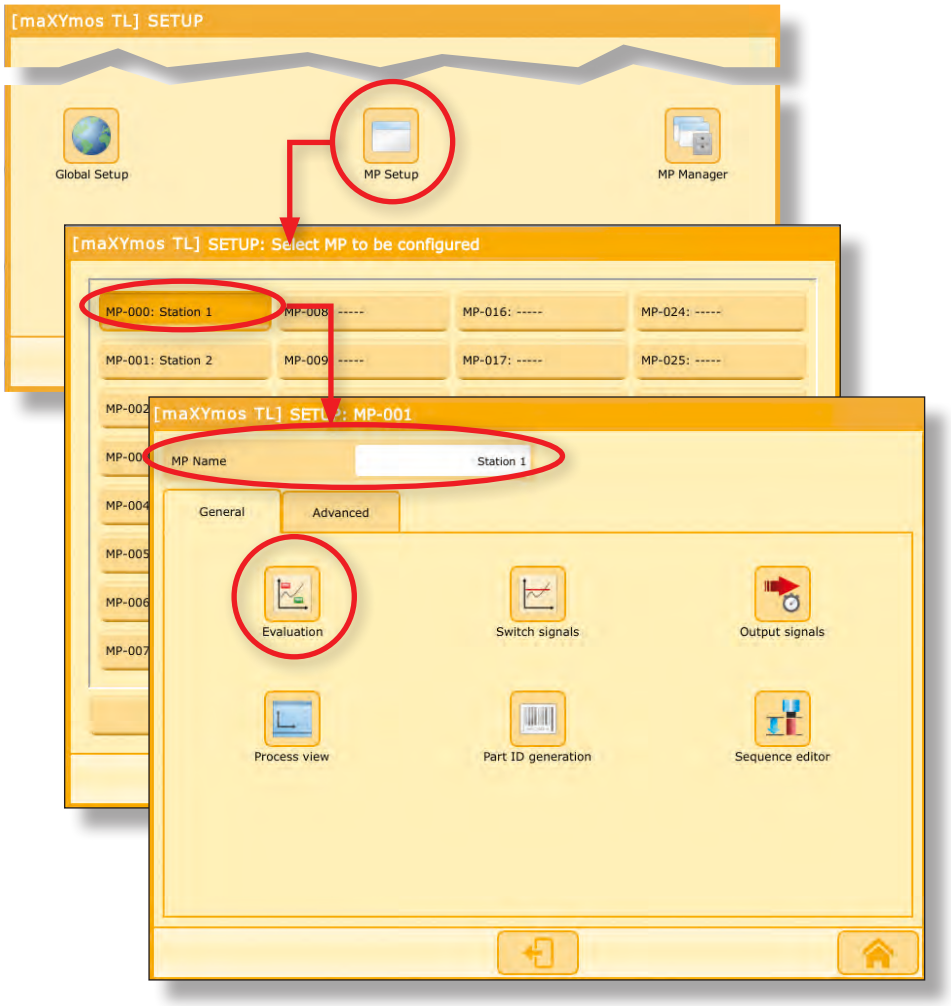


7.24 Measurement program (MP) specific setup

7.24.1 Accessing MP-specific setup

Setup → Open Setup menu → page 43, 46

Select MP Setup, then select required measurement program, e.g. MP-000.
Note: If access protection function is activated, you will first need to enter your user name and password.



MP-000 to MP-127
Select measurement program required (up to 128).

MP Name
An individual name (e.g. Station 1) can be assigned to each MP (measurement program). The factory setting is configured to "----".

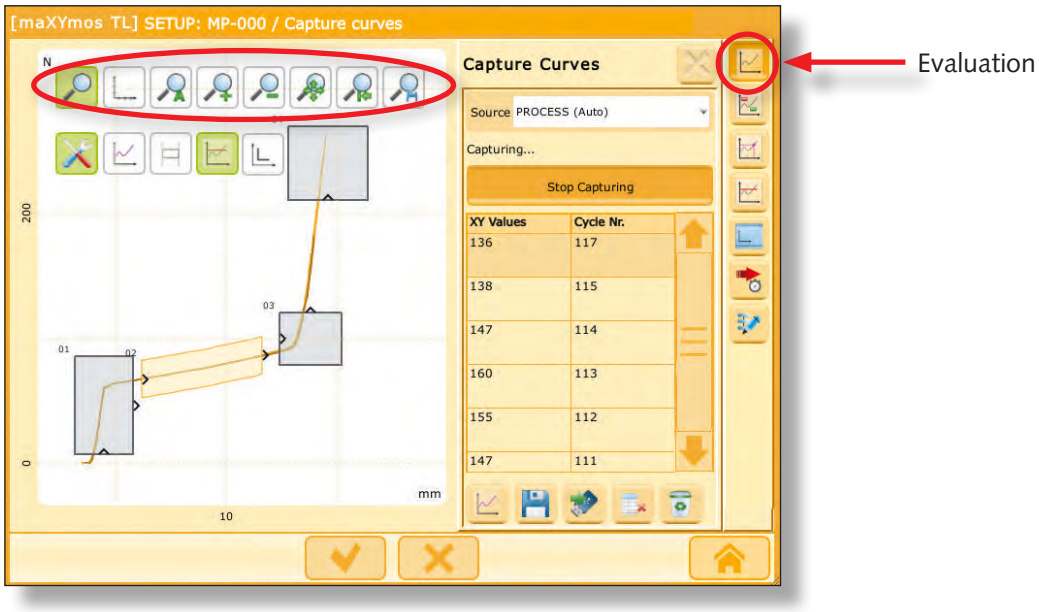
Evaluation
→ section 7.22.2 / page 145

7.25 Editing EOs (evaluation objects)

7.25.1 Overview of tool buttons in EO editor (part 1)

Setup Open Setup menu → page 43, 46

Select **MP Setup, then select required measurement program, e.g. MP-000.**
Note: If access protection function is activated, you will first need to enter your user name and password. Select **Evaluation.**



Zoom Functions

Active buttons have a green background. To deactivate an active button, simply tap it again. Activated buttons remain active even when hidden (like a mechanical switch).

Display / hide zoom functions.

Use axis scaling to configure zoom. Enter required values directly into the GUI.

Auto zoom: This zooms the current measurement curve (and its EOs) to its limits.

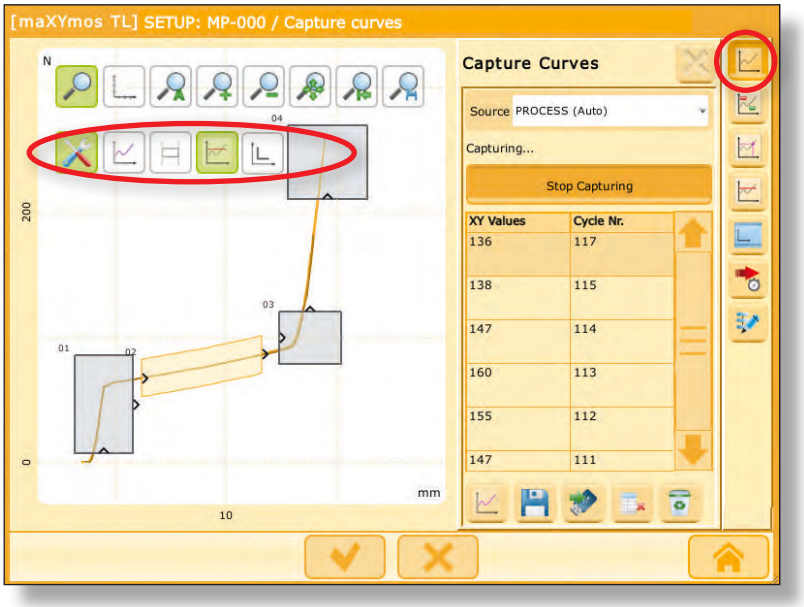
Zoom in (+) / zoom out (–):
Each tap on the active (= green) button zooms one step in / out. To do this, tap the center of the enlargement.

Move measurement curve: Place your fingertip on the screen and move the curve in the direction required.

Default: Return zoom setting to saved value.

Save: Save current zoom settings. Selecting the Default button will return display to these settings.

7.25.2 Overview of tool buttons in EO editor (part 2)



Settings

Active buttons have a green background. To deactivate an active button, simply tap it again.

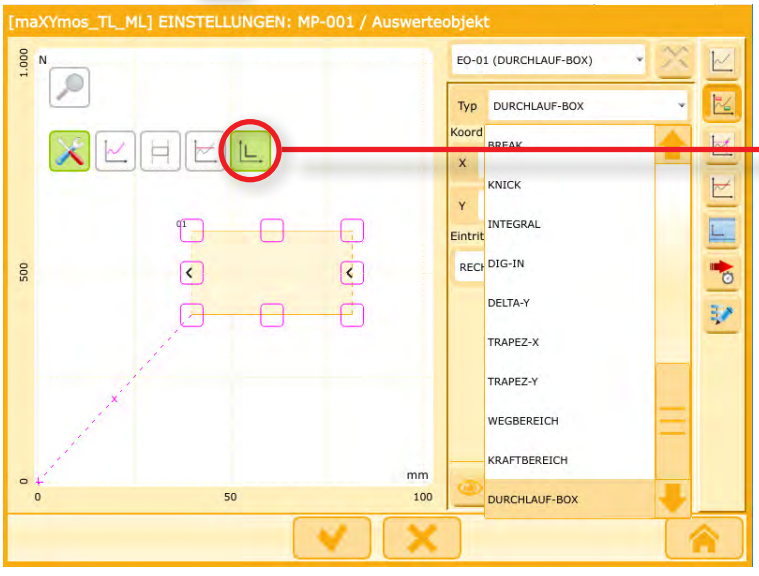
Display / hide settings.

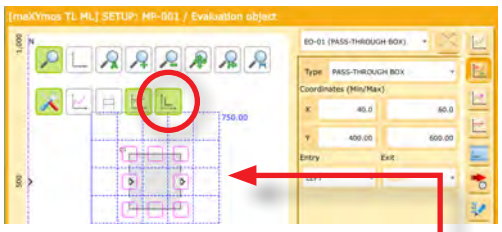
Bundle-plot function: This will continue to add new curves to the displayed bundle as long as button remains active (= green).

Display capture area in yellow.

Display switch thresholds.

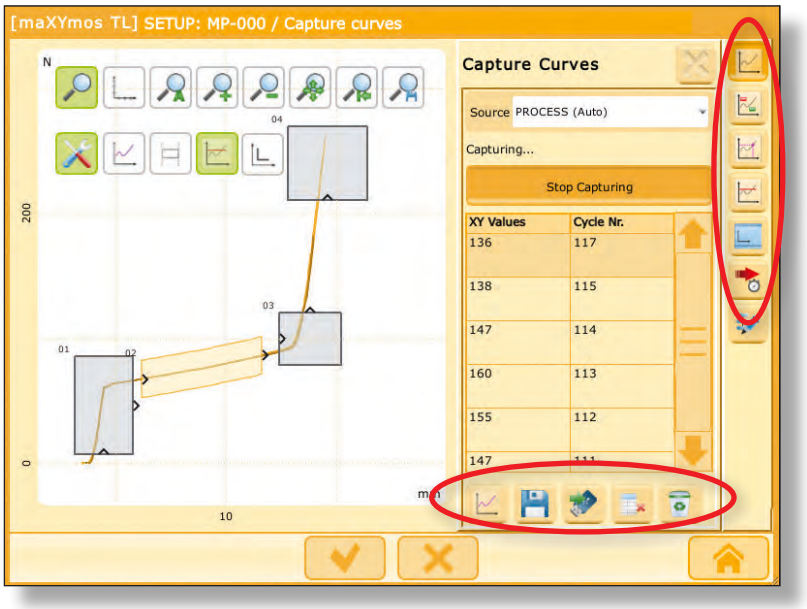
Show Gridlines.





Additional grid lines
(only at maXYmos TL ML)

7.25.3 Overview of tool buttons in EO editor (part 3)



Editor Functions (top left)

Active buttons have a green background. To deactivate an active button, simply tap it again.

Capture measurement curves: Tap again to **switch measurement-curve display to full-screen mode** (and again to return to regular display)

Capture EOs. Up to 10 EOs can be configured for each measurement program.

Set reference point X to ABSOLUTE, TRIGGER-Y or BLOCK

Set switch signal S01 or S02. This is used to assign a real-time switch signal to the relevant output.

Virtual process view to preview / adjust the EOs: Switches on virtual process view within MP Setup menu.

Assign switch signals to outputs.

Save / Delete Option (in footer line)

Configure active curve as reference.

Save locally: Saves measurement curves locally. Enter required filename in GUI.

Save to USB: Saves measurement curves to USB stick (stick icon will be displayed in color if stick inserted).

Delete line: Deletes individual selected line from the table on which it is superimposed.

Delete all: Deletes all measurement curves in superimposed table.

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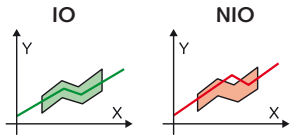
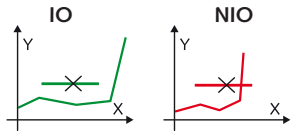
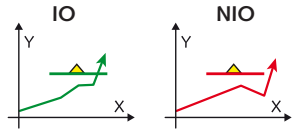
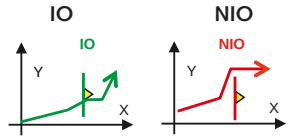
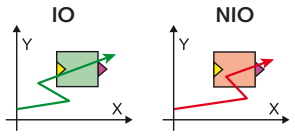
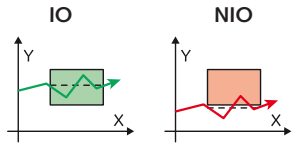
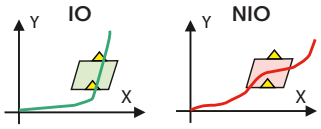
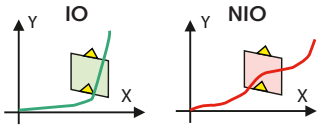
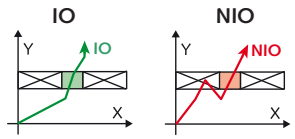
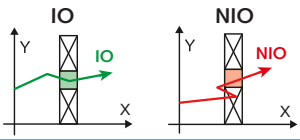
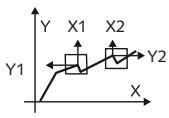
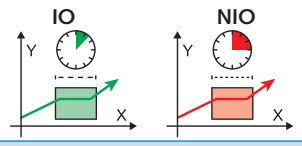
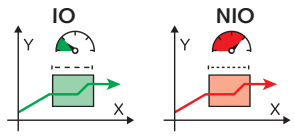
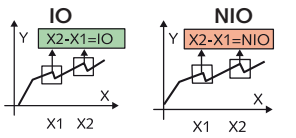
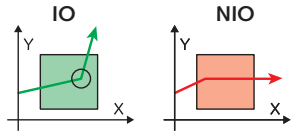
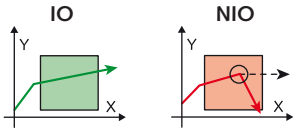
7.26 Overview of available evaluation object types

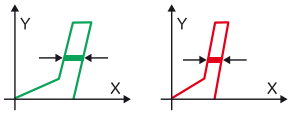
The maXYmos TL supports a total of 17 different types of Evaluation Objects (EOs). In the monitor itself these can be assigned names from EO 01 to EO 17. A maximum of 10 EO types can be assigned to each measurement curve or measurement program.
The illustrations and descriptions below explain the various types of EO available:

The measurement curve must not cross the upper or lower line of the envelope. This evaluation object is easy to master.	**Type ENVELOPE** 	*The line may not be crossed. Otherwise, NOK and "NO-PASS" real-time signal.*	**Type NO-PASS** 
The line must be crossed once. An X-value at the point of intersection is monitored.	**Type LINE-X** 	*The line must be crossed once. An Y-value at the point of intersection is monitored.*	**Type LINE-Y** 
Entry and exit as specified. No crossing of "closed" sides allowed. Each side can be defined as entry or exit.	**Type UNI-BOX** 	*Evaluates the average of all Y-values in the box region.*	**Type AVERAGE** 
Entry and exit as specified. No crossing of "closed" sides allowed. Each side can be defined as entry or exit.	**Type TRAPEZOID-X** 	*Entry and exit as specified. No crossing of "closed" sides allowed. Each side can be defined as entry or exit.*	**Type TRAPEZOID-Y** 
Entry and exit as specified. Crossing of the "closed" sides generates a real-time signal.	**Type TUNNELBOX-X** 	*Entry and exit as specified. Crossing of the "closed" sides generates a real-time signal.*	**Type TUNNELBOX-Y** 
Box detects significant curve features and their XY coordinates in the expectancy range. This information can be used as reference points for other EOs or as an input for the CALC object	**Type GET-REF** 	*Evaluation criterion is the time between the entry and exit points in a special box.*	**Type TIME** 
Evaluation criterion is the speed between the entry and exit points in a special box.	**Type SPEED** 	*Object references two selectable process values and performs calculations, e.g. the X-difference between two ripples, and evaluates them.*	**Type CALC** 
A defined gradient change is expected within the expectancy range (box) and can be used as a further switching condition in the sequence.	**Type INFLEXION** 	*Provides NOK and online signal in case of sudden gradient change within an expectancy range (box), e.g. in case of tool breakage.*	**Type BREAK** 

Evaluates the X-hysteresis between forward and reverse curves on a horizontal line.

Type HYSTERESIS-X

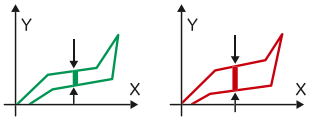
IO NIO



Evaluates the Y-hysteresis between forward and reverse curves on a vertical line.

Type HYSTERESIS-Y

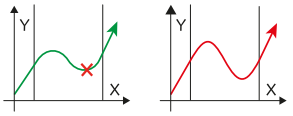
IO NIO



If the curve throughput is within the defined range, the system checks for the presence of a digital signal.

Type DIG-IN

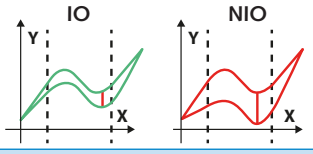
IO NIO



If the curve throughput is within the defined range, the maximum curve displacement is determined and verified between the advancing and the returning curve.

Type DELTA-Y

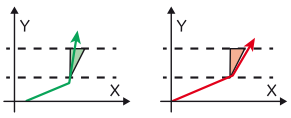
IO NIO



Evaluates the gradient dX/dY between two horizontal lines.

Type GRADIENT-X

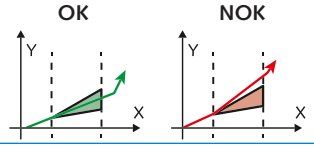
IO NIO



Evaluates the gradient dX/dY between two vertical lines.

Type GRADIENT-Y

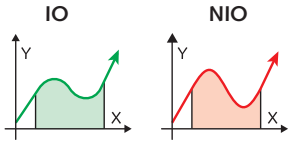
OK NOK



The area beneath the curve is determined and evaluated.

Type INTEGRAL

IO NIO

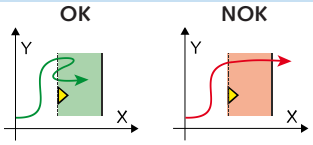


Evaluates the displacement end position and detects the max. value

The curve must reach the X range. The upper limit must not be reached.

Type DISPLACEMENT RANGE

OK NOK

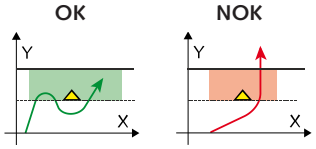


Evaluates the force end position and detects the max. value.

The curve must reach the Y range. The upper limit must not be reached.

Type FORCE RANGE

OK NOK

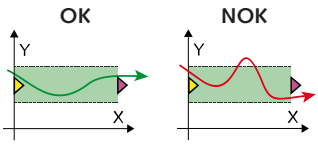


Evaluates passing through.

The curve must pass the whole box in the preset direction. Evaluation is done over the whole range.

Type PASS-THROUGH BOX

OK NOK



7.26.1 Setting up EOs / Initial curve capture

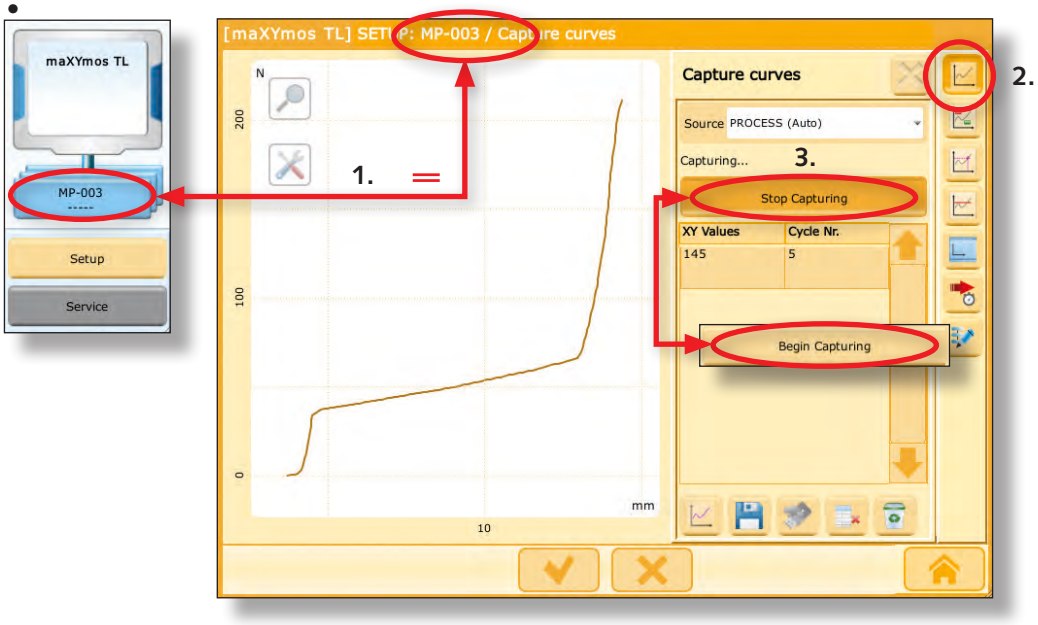
This section provides detailed instructions for setting up a UNI BOX EO. The same principles apply to setting up the other EOs.

Setup Open Setup menu → page 43, 46

Select MP Setup, then select required measurement program, e.g. MP-000.

Good to know:

- If access protection function is activated, you will first need to enter your user name and password.
- The background of the currently active MP will be dark, e.g. MP-001: -----.
- **Process MP No. = SETUP MP No. : The selected orange measurement program "MP-...." must display the same MP number as that displayed on the blue process page. Otherwise, the monitor cannot capture any curves (1.)**
-



First configure the following:
Channel X (→ p. 54), channel Y (→p. 57) and cycle control (→ p. 82).

Initial curve capture
Select **Capture curves** menu (2.; top right). Then select source: PROCESS (auto) (= standard setting), PROCESS (manual), file, USB stick or History.
Then select **Capture curves** (3.; the button will now display "Stop Capturing").
Measure first test piece (e.g. activate a press). Monitor displays measurement curve. Then capture approximately another 5 measurement curves. A maximum of 20 measurement curves can be captured.
Select **Stop capturing**. The table will display the individual curves. Individual "outliers" can be selected directly and deleted by selecting the command. The command deletes all the measurement curves. To save curves locally, select . To save curves to a USB stick, select .

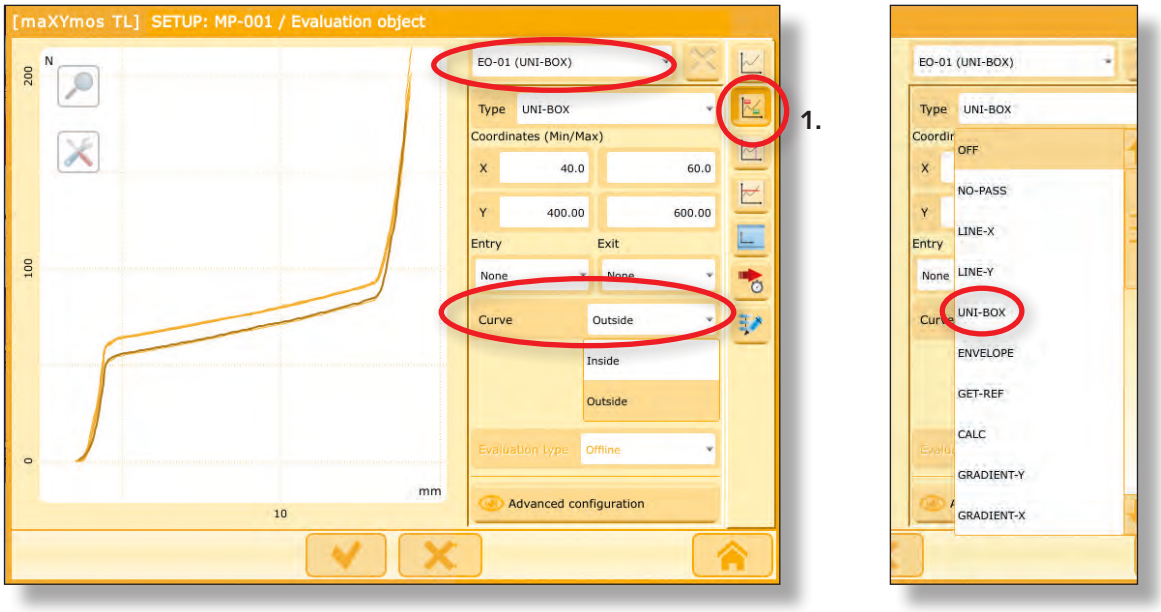
Tips:

- **Stop capturing** cannot be activated: Check whether the MP selected in the blue process view (e.g. "MP-001") and the MP selected in the orange process view are one and the same. Check whether channel X, channel Y and cycle control are all properly configured.
- Curve not/barely visible: first select and then Auto Zoom .
- Truncate / do not truncate return leg of measurement curve (→ p. 103).

7.26.2 Setting up EOs (example)

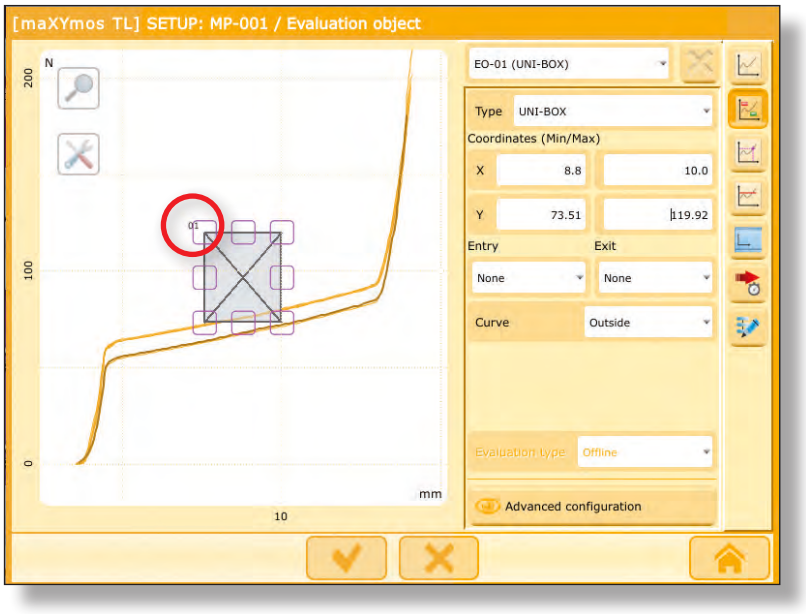
General
This section describes how to set up Evaluation Objects (EOs). This example relates to the UNI BOX EO. The same principles apply to setting up the other EOs.

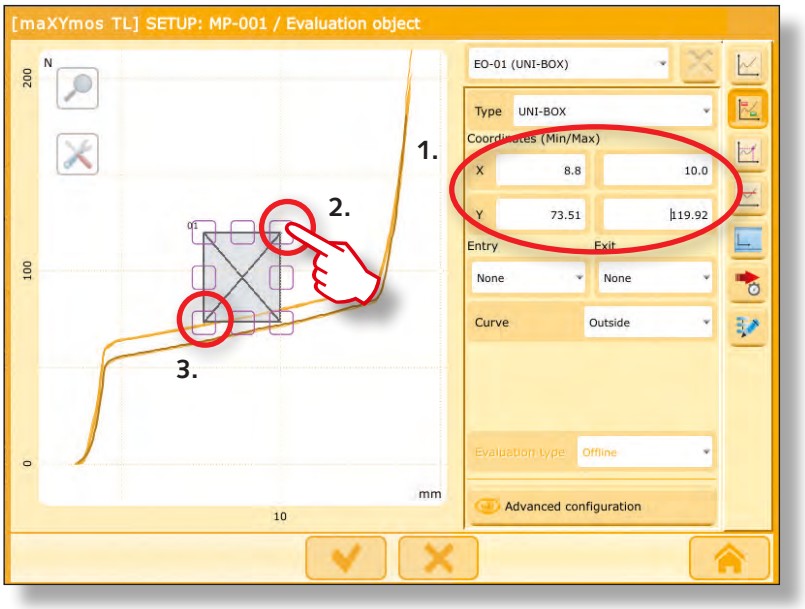
Capture curves (see previous page)
Select **Capture EOs** (1.; top right)



Select EO
Select one of the 10 EOs. If OFF appears in brackets after an EO, that EO is not active. For EOs which are active, the EO type will appear in brackets after the EO number, e.g. "(UNI BOX)".

(EO) Type
Select the type you require - "UNI BOX" in this example. Once selected, most EO types will be displayed in the middle of the measurement graph area (see below). The EO number will be displayed in the top left-hand corner of the EO (e.g. "01").
Tip: If you are using several EOs, make sure you initially set them up in the correct sequence (sequence cannot be changed retroactively).





UNI BOX setup (continued)
The UNI BOX EO can be set up in the following three ways:

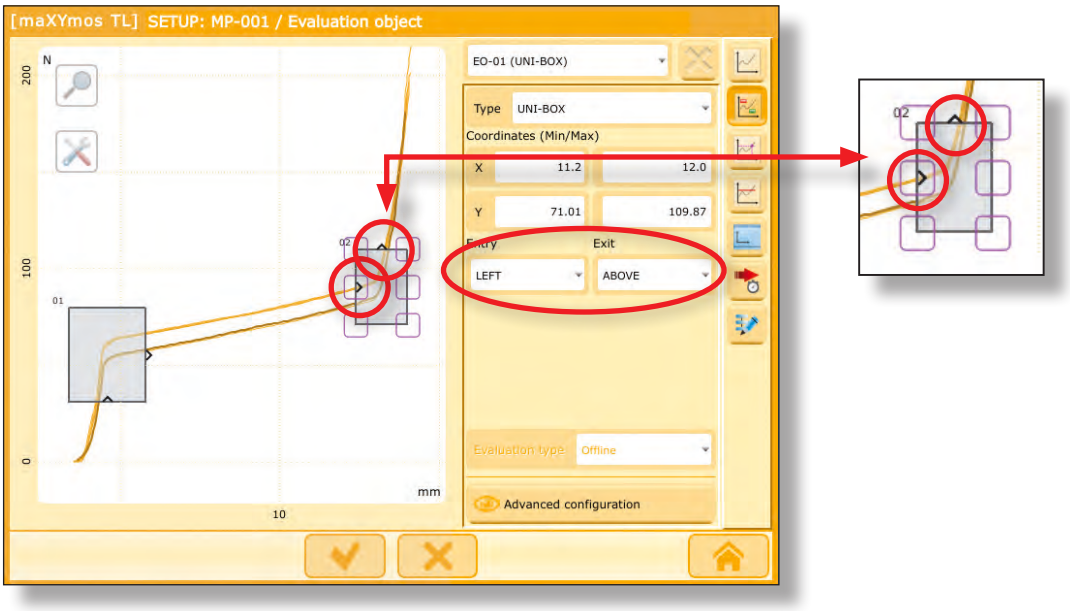
1. **By direct numerical input** of X/Y coordinates (on the screen or via VNC).
2. **By moving and resizing** it with your fingertip directly **on the screen.**
3. **By moving and resizing via** a **PC/MAC** (using a VNC connection to the monitor).

Moving/resizing the UNI BOX

- **To move the UNI BOX**: "Hold" UNI BOX by selecting its gray area and then move to required position.
- **To resize the UNI BOX**: "Hold" one of the four sides (side will turn pink when selected) and "move" to required position.

Tip: If EO is very small, it is better to use the tip of a pen.

Entry/Exit
This determines where the curve should enter / exit the UNI BOX. The side selected is shown by a small triangle. If "NONE" is selected, the curve must not enter / exit the box.



Reference point
→ next section / page 153

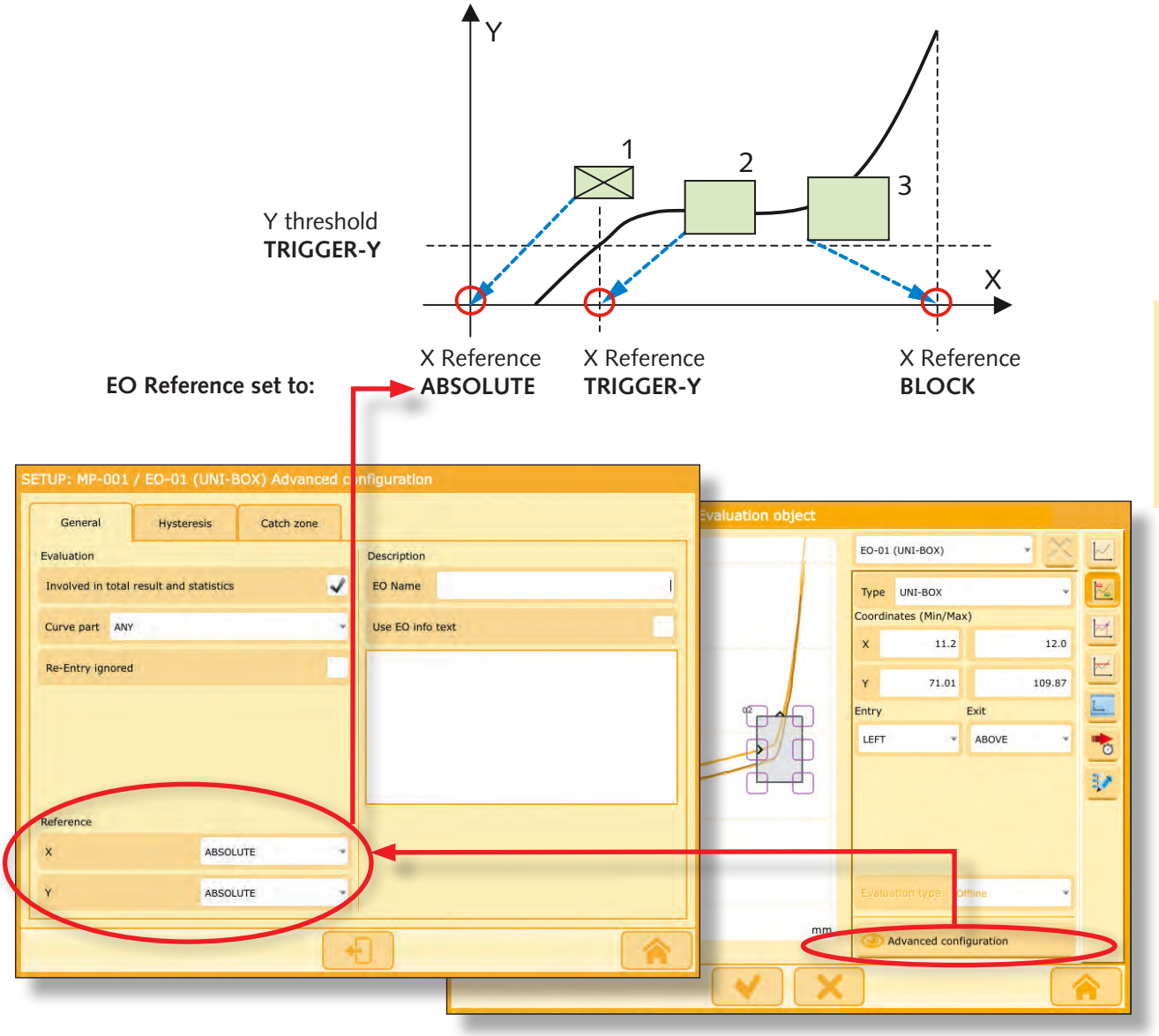
Advanced Configuration
→ next section / page 153 ff

7.26.3 Configuring reference points for curves and EOs

7.26.3.1 How do the various reference points differ from each other?

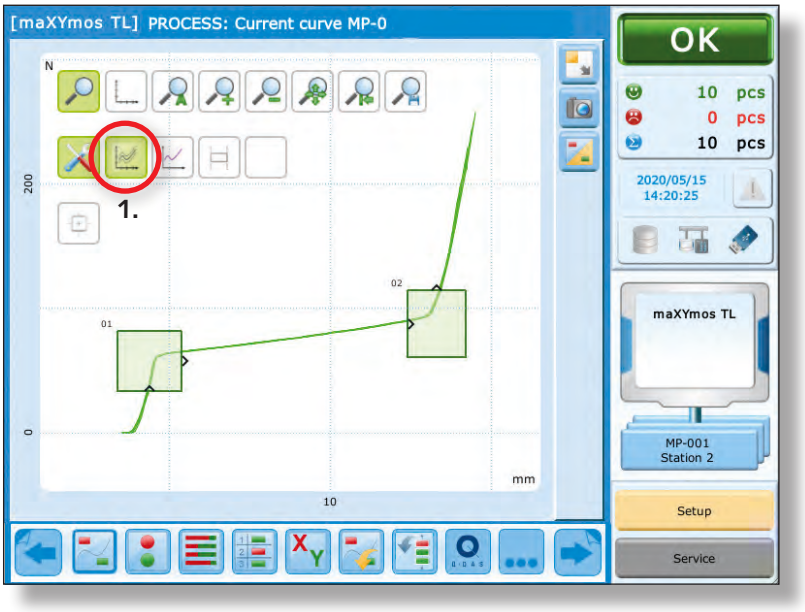
The previous section (→ p. 149) describes how to superimpose EOs on a measurement curve. Initially, the "Ref Graph on" parameter is set to ABSOLUTE (this is the factory setting). This means that the selected EO is specified relative to the absolute (or in some instances tared) zero point of channel X.
In addition to the ABSOLUTE setting, the maXYmos TL can also be configured to TRIGGER-Y and BLOCK and reference points:

It is recommended that you first experiment with the ABSOLUTE factory setting before going on to familiarize yourself with the dynamic TRIGGER Y and BLOCK reference points.



7.26.3.2 ABSOLUTE static EO reference point

If there are no problematical external tolerances and it is possible to ensure that the test pieces are always placed in the same position (e.g. under a press), the reference point for the EOs can be left on the ABSOLUTE setting (= the factory setting).



The curves generated for the 10 test pieces in this example are in a virtually congruent bundle (1.). The positioning and X/Y characteristics of these parts appear to be perfectly reproducible.

In this example, the ABSOLUTE reference point - both for curves and EOs - generates evaluation results that can be considered reliable because they can be reproduced. Inspection of the History curves display at the PROCESS level confirms this.

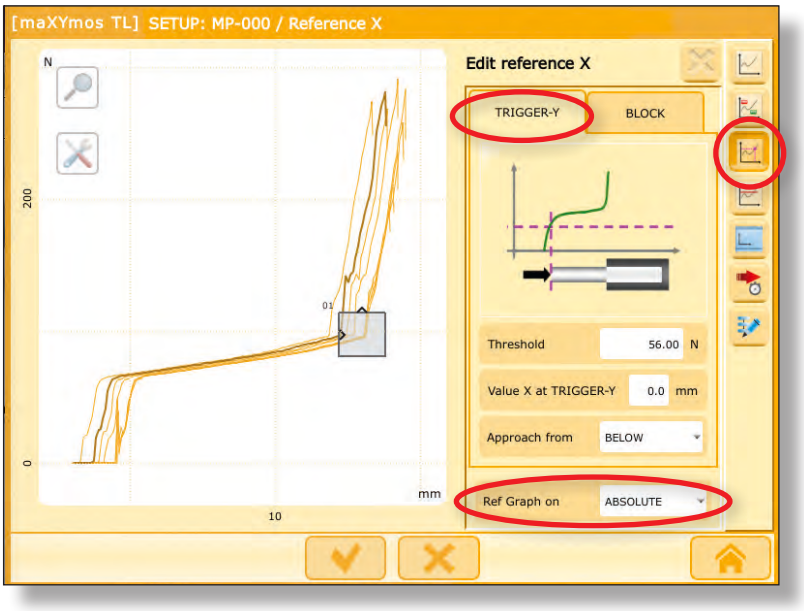
NOTE

The most effective way of testing the effect of external and positioning tolerances by combining the curves for several test pieces into a bundle → section-Section 7.23.4.4 / p. 166

7.26.3.3 TRIGGER-Y dynamic reference point

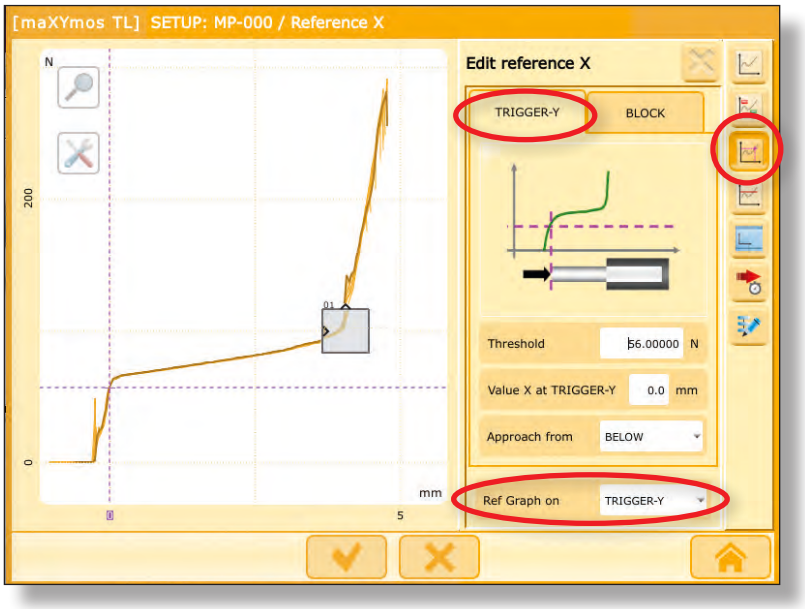
In cases where test pieces are subject to large positioning-related or external tolerances, the ABSOLUTE setting is not appropriate as the zero point for channel X. Positioning errors could result in one and the same part being evaluated as OK in one test and NOK in the next test.

1. "Ref Graph on" parameter initially still on ABSOLUTE setting



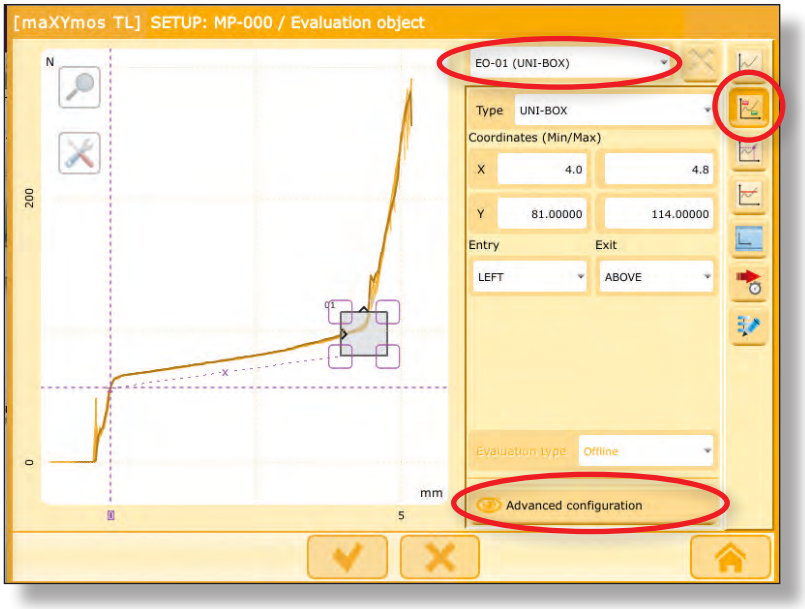
This screenshot shows marked dispersion in the X dimension, presumably due to positioning differences. The bundle of curves is extremely fuzzy. Retaining the ABSOLUTE reference point would subsequently lead to many pieces being classified as NOK. An alternative reference point must be found.

2. Switching "Ref graph on" parameter to TRIGGER-Y setting



This screenshot shows the same bundle of curves after switching from ABSOLUTE to TRIGGER-Y. All the curves are now specified relative to the X position (dashed vertical line) once the TRIGGER-Y threshold (dashed horizontal line) has been reached. Subsequent tests with this reference point will generate results with much better reproducibility.

3. X/Y Parameter reference also set to TRIGGER-Y

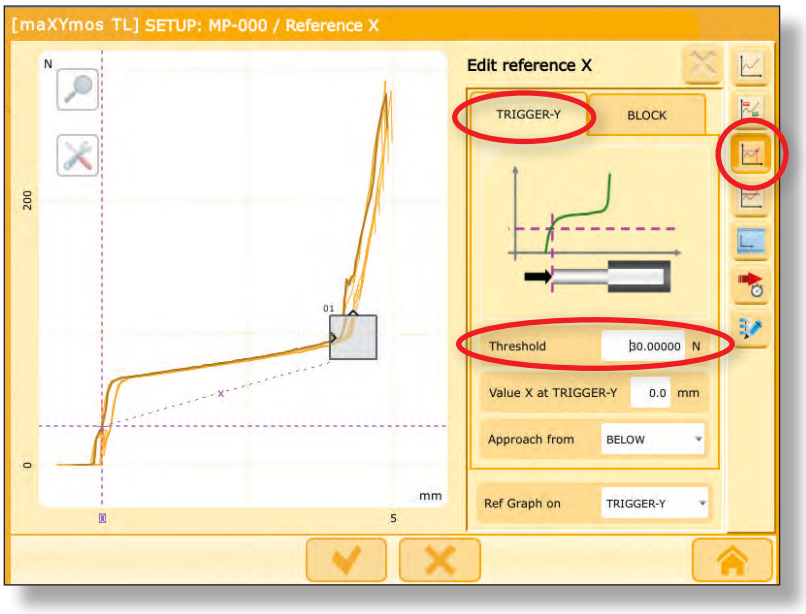


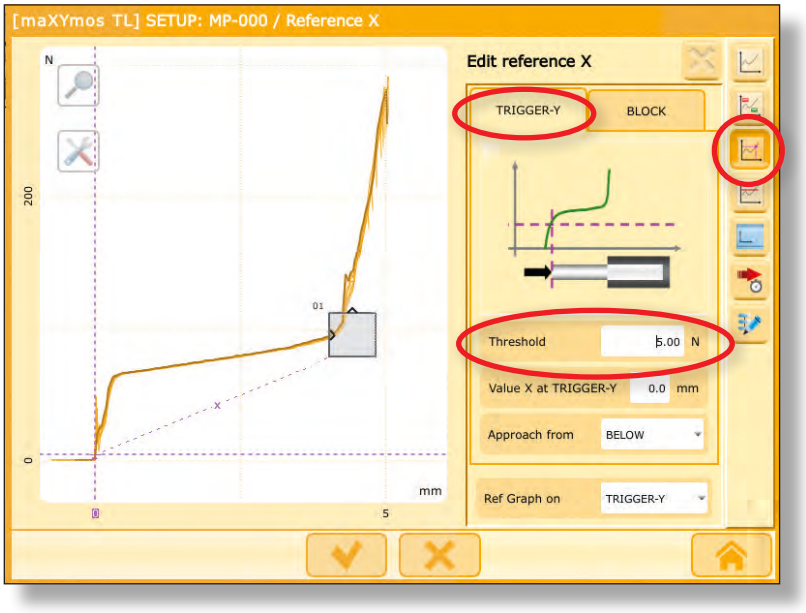
After fine-tuning the EO positions, these have now also been set to TRIGGER-Y. It is however possible to leave individual EOs on the ABSOLUTE (under "Advanced configuration") setting if, for example, absolute fluctuations of the block position need to be monitored.

7.26.3.4 Editing the TRIGGER-Y threshold

Try experimenting with the level of the trigger threshold. You will see that this changes the dispersions in the different ranges of the curve bundle. The lower you set the threshold, the more accurately the dispersion will be represented. Your measurements can then really start from the slightest contact, e.g. between the feed feed unit and the test piece (e.g. for a spring).
The "Edit reference X on TRIGGER-Y" parameter can be set to the scale of the display. This also positions all the EOs in accordance with the scale to which the display is set.

For more on this, please also refer to section "determining the appropriate reference point" → 7.23.4.3 / page 163.
The use and purpose of dynamic reference points are also described in → 7.23.4.5 / page 168

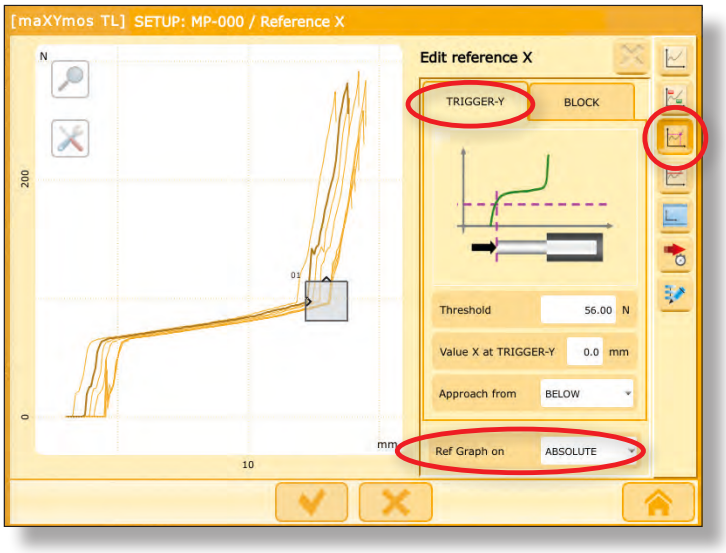




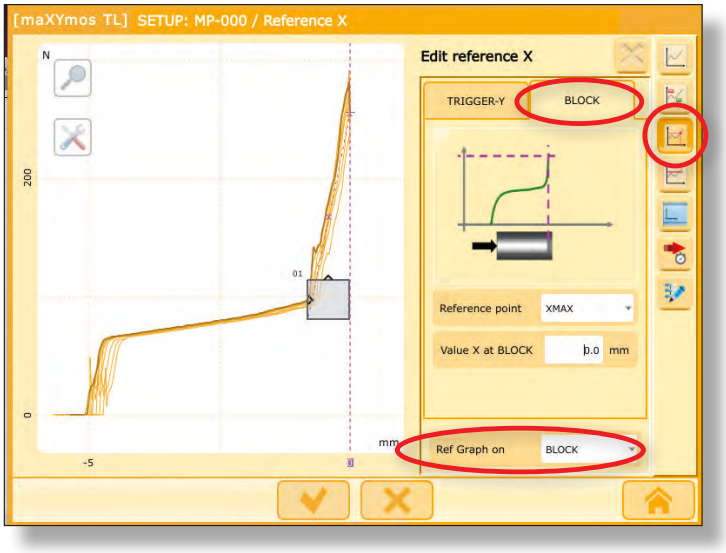
7.26.3.5 BLOCK dynamic reference point

The ABSOLUTE and TRIGGER-Y reference points may prove unsuitable if there is excessive dispersion in the X dimension. This can be the case if there positioning tolerances and test-piece-related dispersion occur simultaneously in the X dimension (e.g. in the insertion area for parts which are being joined).
In such cases, the BLOCK reference point, i.e. the position at the BLOCK point, can be the appropriate choice. This can be a location such as the lowest point in a bore against which a pin is pressed. The EOs are then referenced retrospectively (= once the complete measurement curve is available in the memory) relative to the position of this BLOCK point.

1. "Ref graph on" parameter still set to ABSOLUTE
Note the marked dispersion in the X dimension below, presumably due to positioning differences.The curve bundle is extremely fuzzy. Retaining the ABSOLUTE reference point would subsequently result in multiple NOK readings. An alternative reference point must be found.

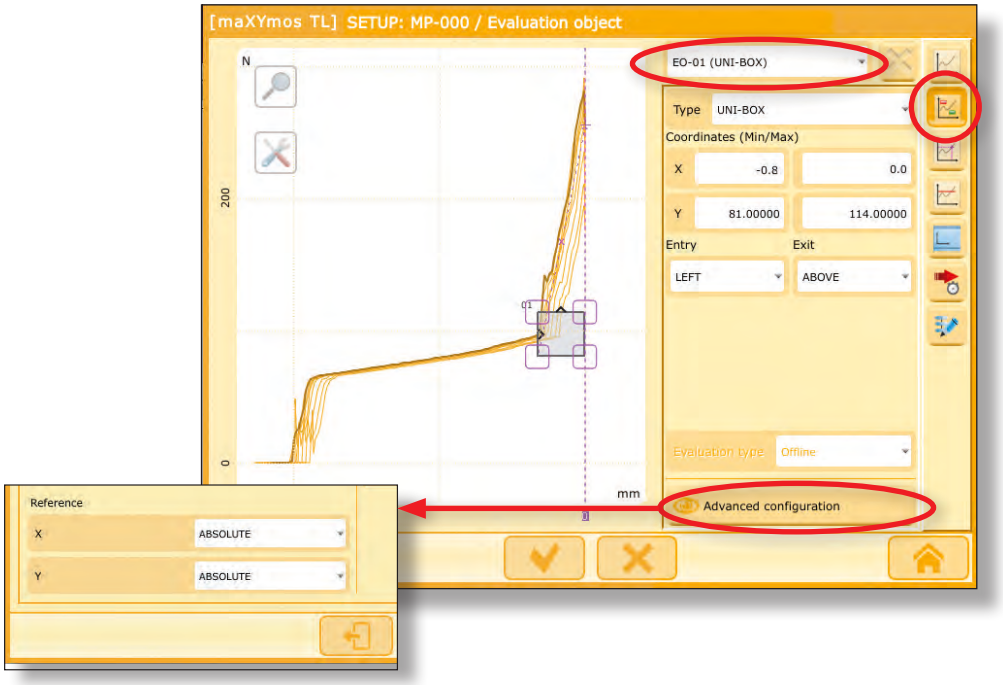


2. Switching the "ref graph on" parameter to BLOCK setting
The same curve bundle after switching from ABSOLUTE to BLOCK. All the curves are now referenced to the X position (vertical dashed line) at BLOCK point. All the curves' XMAX-X points now converge on this line. This clearly demonstrates that using the BLOCK reference point will result in signficantly more precise results from subsequent tests.



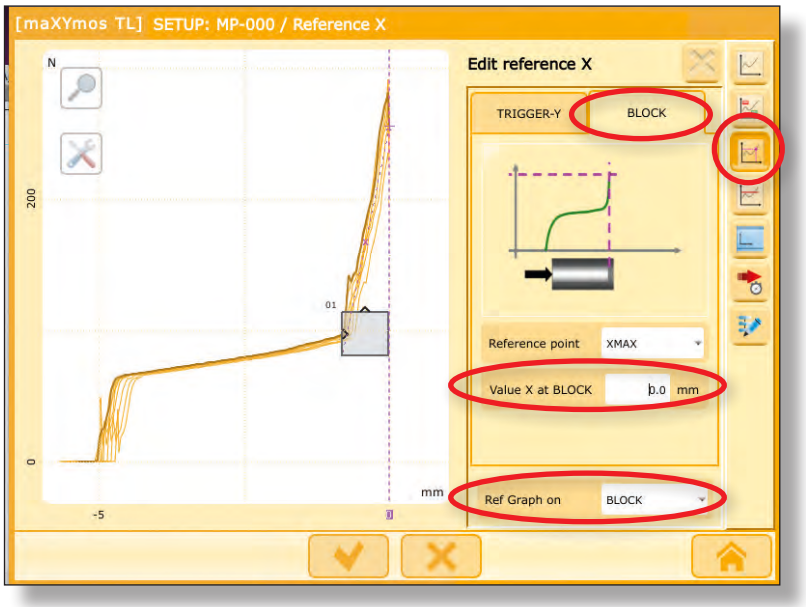
3. EO Reference parameter also set to BLOCK

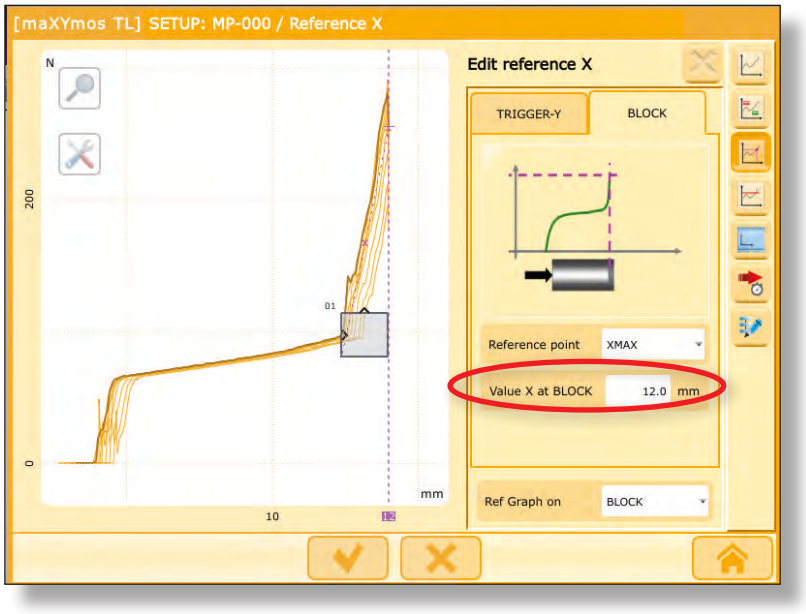
After undergoing any necessary fine-tuning, the EO positions have now also had their setting switched to BLOCK. They are thus now at a fixed distance from the dashed BLOCK line. It is however possible to leave individual EOs on the ABSOLUTE setting if, for example, absolute fluctuations of the block position need to be monitored.



7.26.4 Editing the BLOCK reference

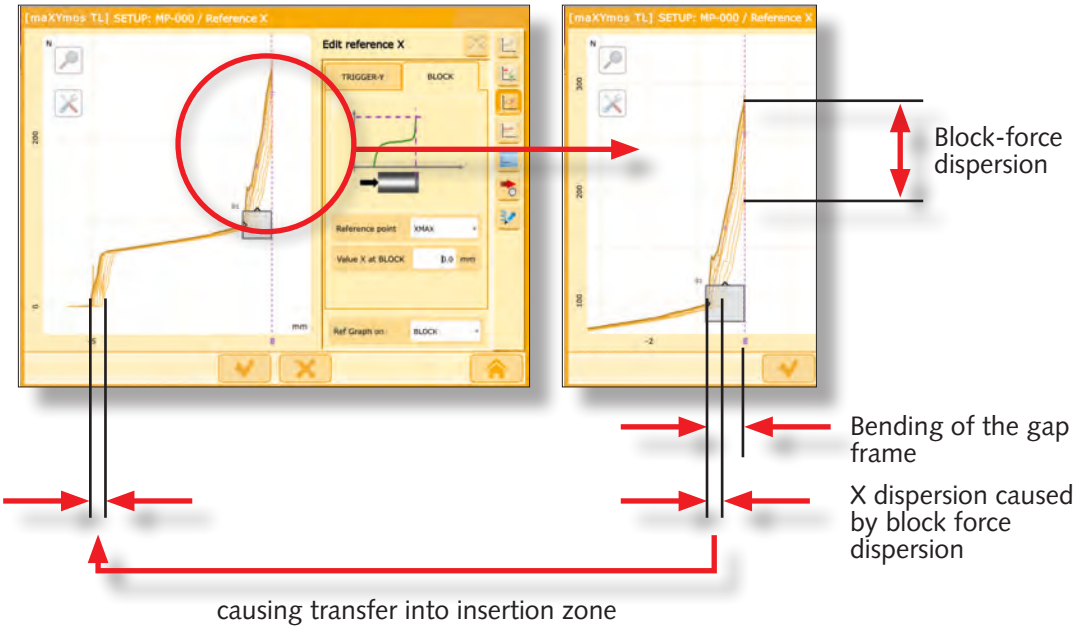
The "Value X at BLOCK" parameter can be used to adjust the BLOCK point to fit the scale of the display (12.0 mm in this example). This also positions all the EOs in accordance with the scale to which the display is set. The factory setting for this parameter is "0". In this example, the X coordinates of all the EOs to the left of the BLOCK line have negative values.
For more on this, see also → p. 163. The use and purpose of dynamic reference points are also described on → p. 166.





7.26.4.1 Optimizing the BLOCK reference point for improved reproducibility

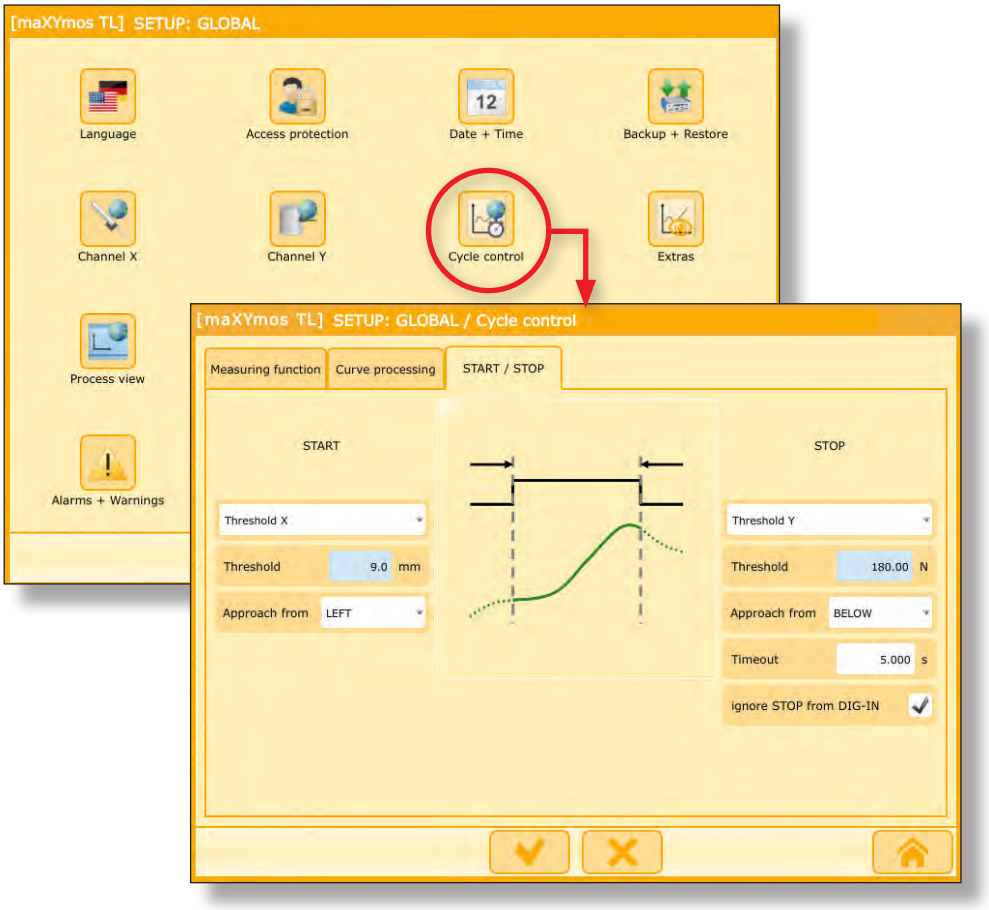
The blocking forces on manual presses often depend on how much force an individual operator applies. If the "Ref. Graph on" and "EO Reference" curves are referenced relative to BLOCK, blocking-force-related displacements of the measurement curves along the X axis can occur, with the result that the evaluation results are unclear:



The bending and its resulting X dispersion at the blocking point necessarily continues into the front insertion zone of the curve. This produces an apparent lengthening of the displacement trajectory due to the force. Accordingly, the setpoint limits (for EO-1 in this case) need to be set more generously than required by the actual tolerance specifications.

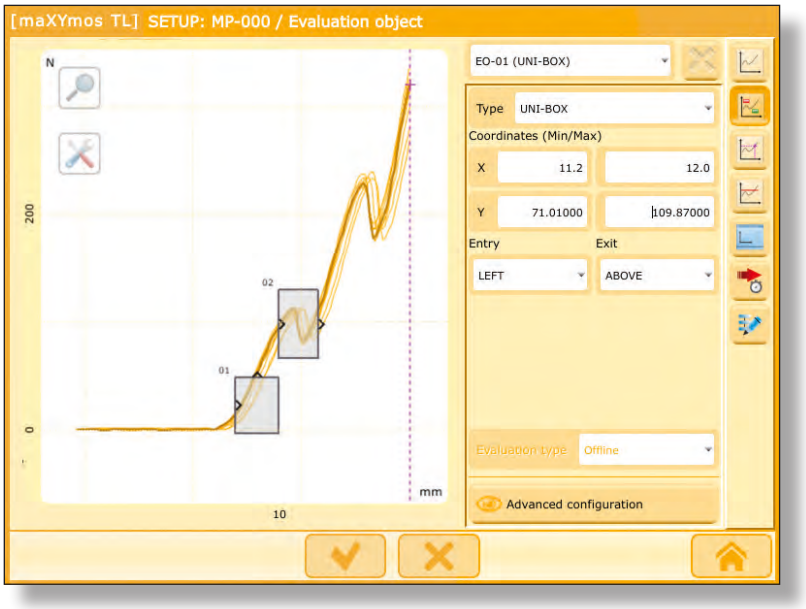
7.26.4.2 Eliminating dispersions resulting from block force

Set the STOP condition to "Threshold-Y". Select a value that the operator must always reach, 180 N in this example. Subsequent curve capture will cease once this precise value is reached. The amount of bending at the STOP point will then be the same for all curves.



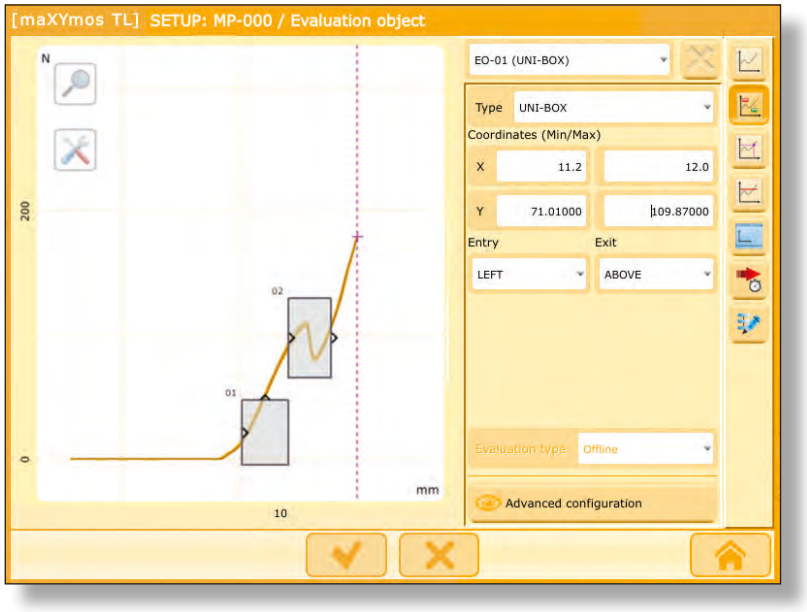
Before

The bundle comprises 10 **non-congruent** curves.



After

The bundle now comprises 10 curves which are almost congruent. Each curve is now truncated at 180 N with its XMAX point converging on the BLOCK line.

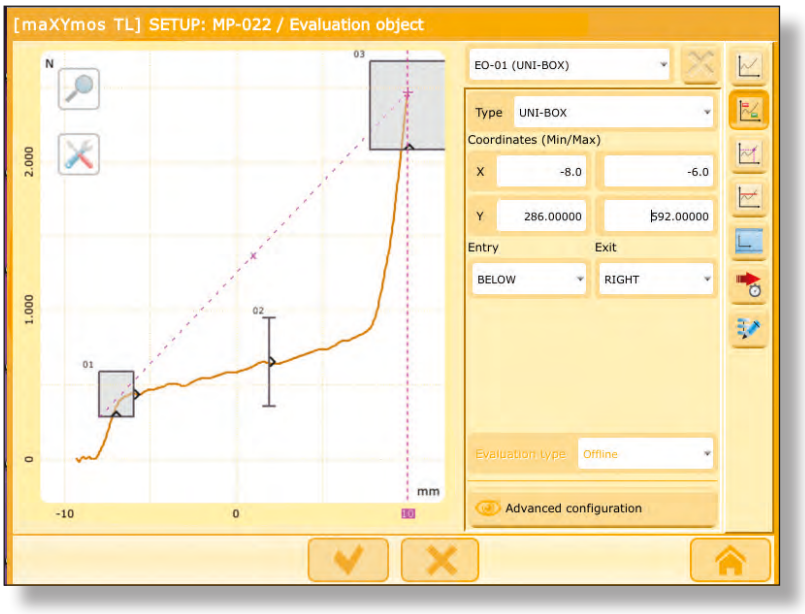


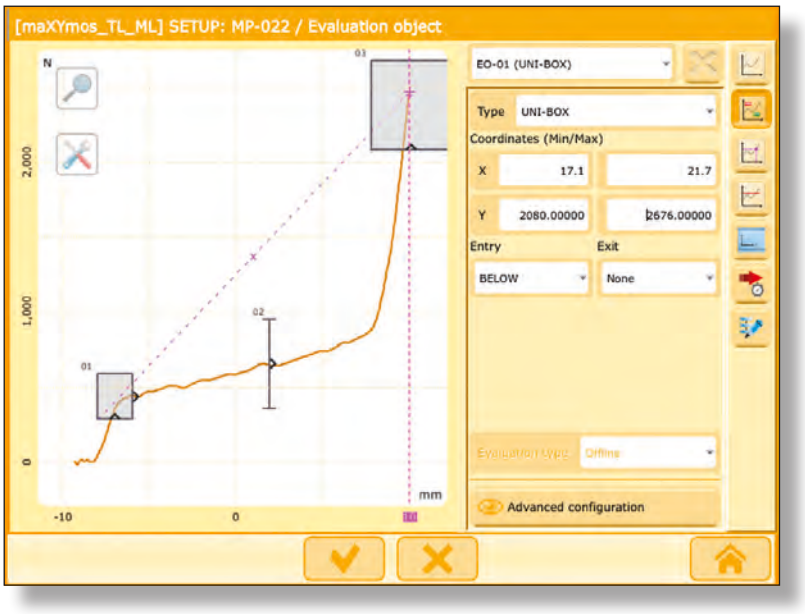
7.26.4.3 Practical example using the BLOCK reference

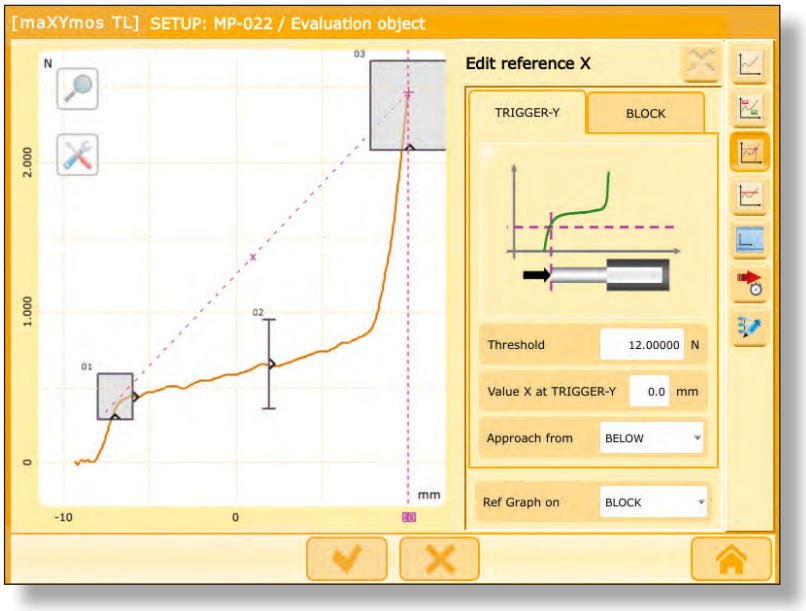
The process of press fitting a pin into a housing is being monitored. Because of external tolerances on the housing, BLOCK has been chosen as the reference point. The measurement curve and all the EOs (except EO-3) are specified relative to this reference point.

SETUP in EO Editor:

EO-3 is intended to monitor the dispersion of the absolute block positions. It has therefore been set to ABSOLUTE. It also supplies the table of process values and the PROFIBUS with the ABSOLUTE positions determined at the end of each blocking.

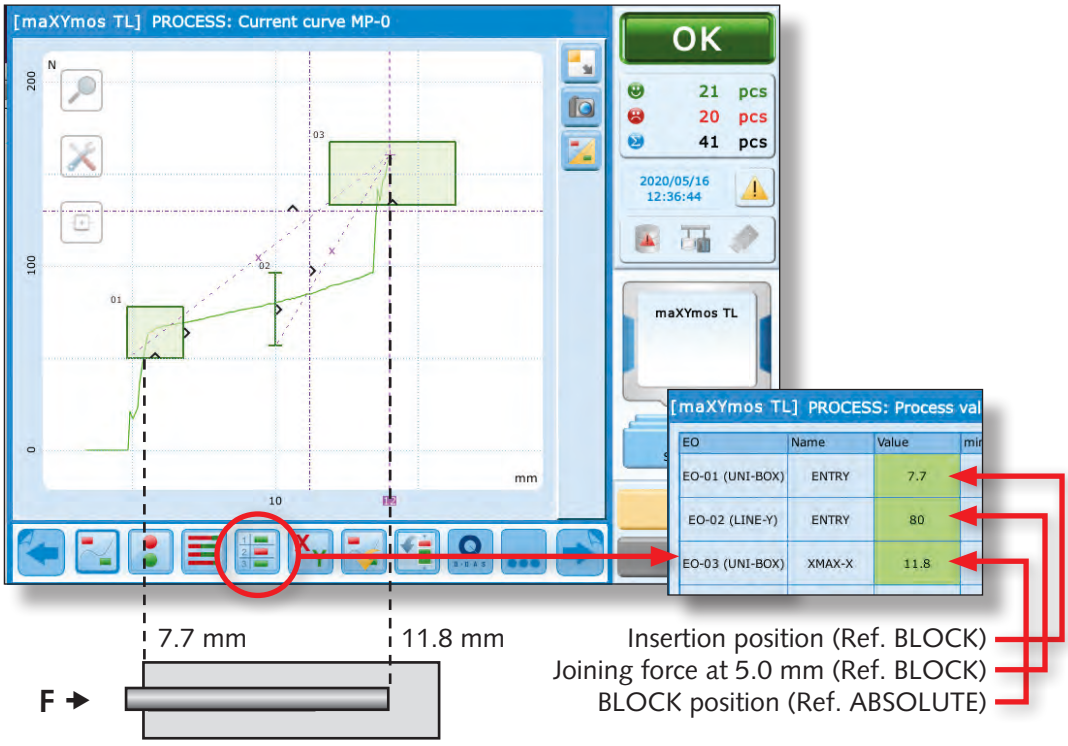




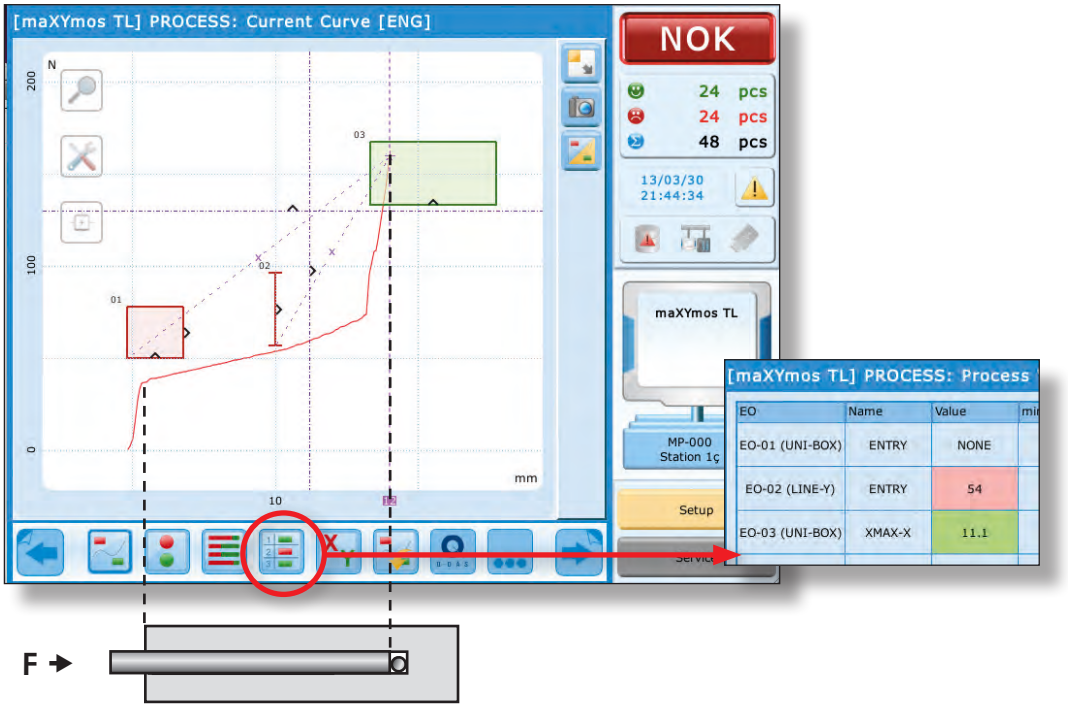

[maXYmos TL] SETUP: MP-022 / Evaluation object
N
2.000
1.000
0
-10
0
mm
01
02
03
Edit reference X
TRIGGER-Y
BLOCK
Threshold
12.00000
N
Value X at TRIGGER-Y
0.0
mm
Approach from
BELOW
Ref Graph on
BLOCK

PROCESS Results

OK result: The entire press-fitting displacement is covered. The curve's length and shape are within the specified tolerances. The insertion position is at the correct distance from the block point, and EO-1 has interpreted this is as OK.



NOK result: In the screenshot below, a foreign body is constraining the press-fitting process, causing the block point to be reached earlier. The insertion position is thus too close to the block point, causing EO-1 to be missed and generating an NOK result.

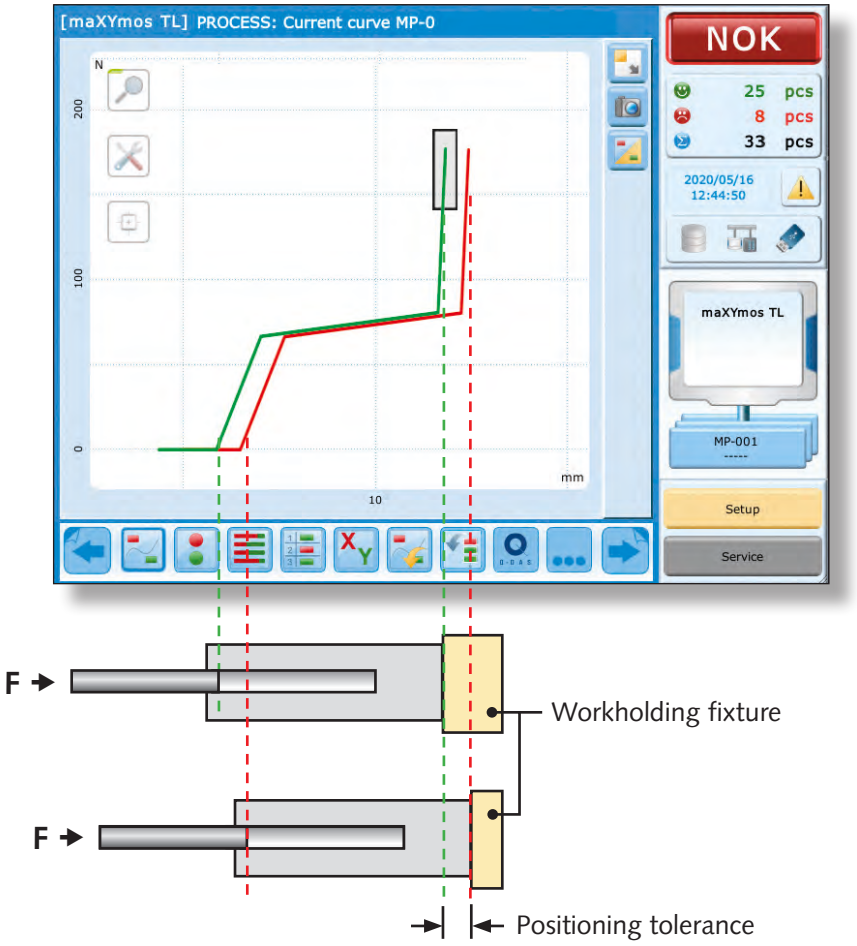


7.26.4.4 Why use dynamic reference points?

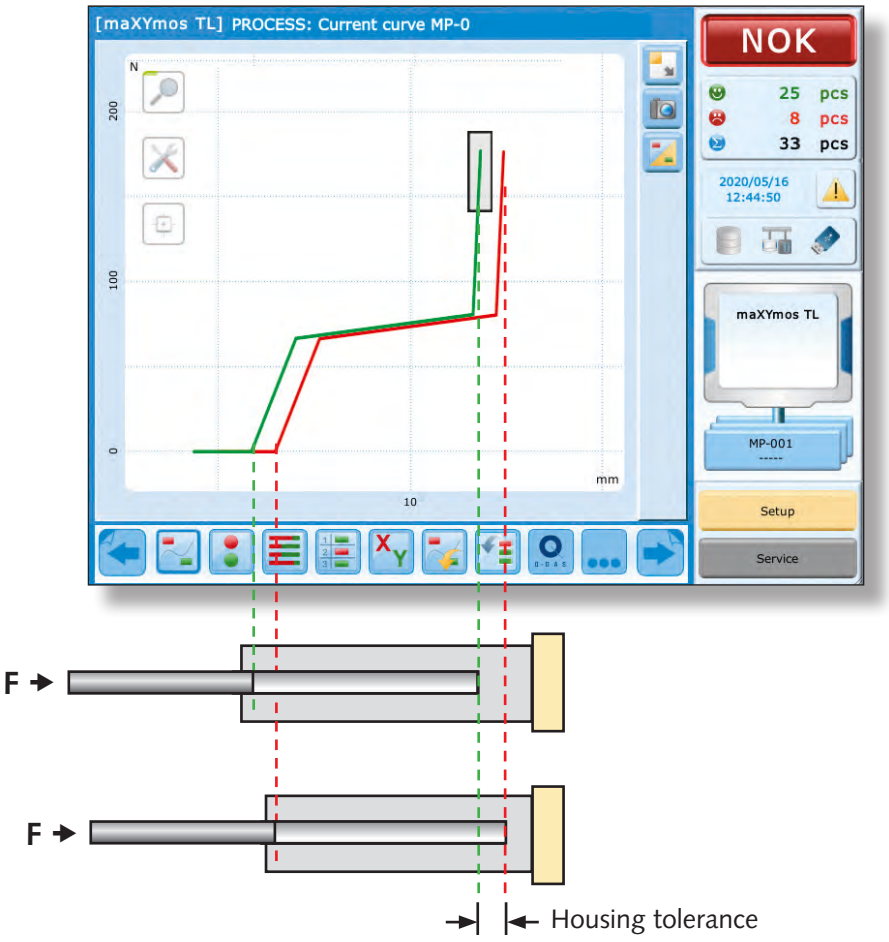
External tolerances are often not covered during quality control but are still superimposed on the measurement curve in the X dimension. When an ABSOLUTE static reference point is set, these tolerances inevitably result in a horizontal displacement of the measurement curve and thus to NOK readings. When this happens, even GOOD parts are evaluated as NOK.

Example: Horizontal displacement of the measurement curve caused by:

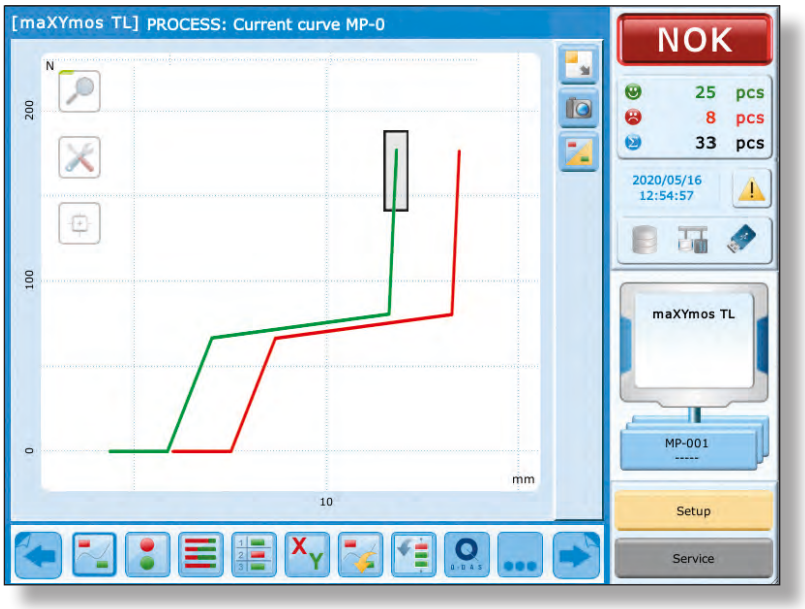
1. Superimposition of positioning tolerances from the workholding fixture



2. Superimposition of external tolerances from the workpiece housing



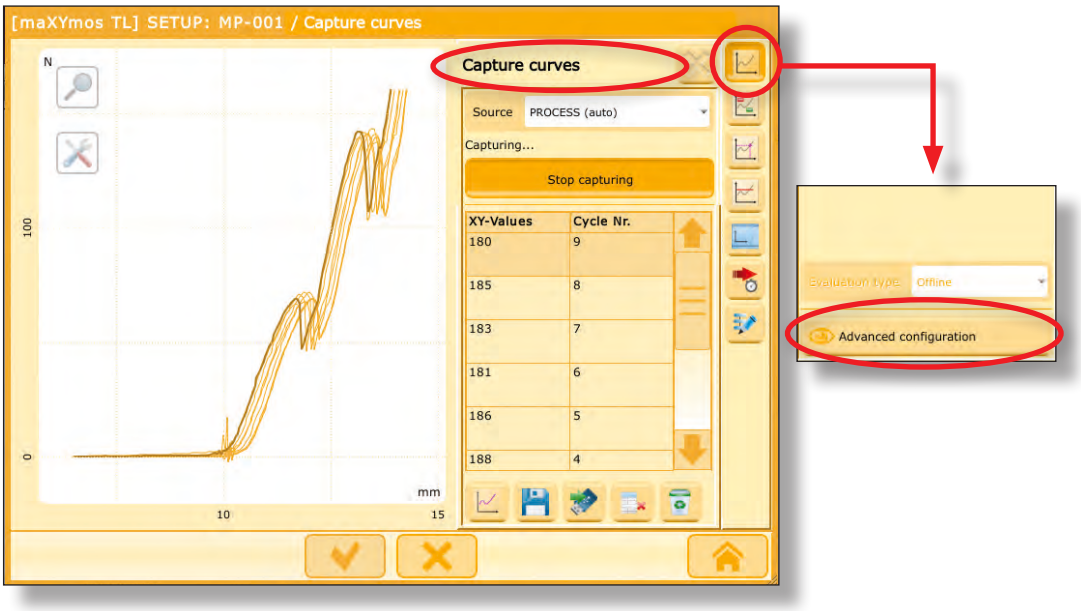
3. Simultaneous superimposition of positioning and housing tolerances from the workpiece



7.26.4.5 Determining the appropriate reference point

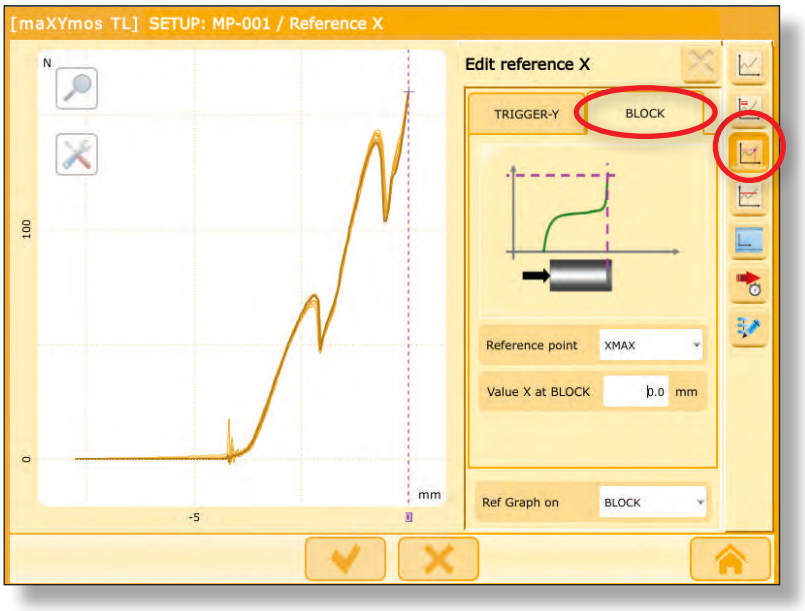
Once a bundle of curves has been "adjusted", the most appropriate reference point can be determined by the administrator subsequently switching to TRIGGER-Y, BLOCK or ABSOLUTE.

1. All curves and the EO are referenced relative to ABSOLUTE. This means that they are now referenced relative to the absolute (or in some cases tared) zero point for channel X. There is clear evidence of dispersion in the X dimension here, presumably due to positioning tolerances.



2. The same bundle of curves after switching to a TRIGGER-Y reference. All the curves now pass through the intersection point (trigger point) where the two dashed lines cross (e.g. with a threshold of 20 N).

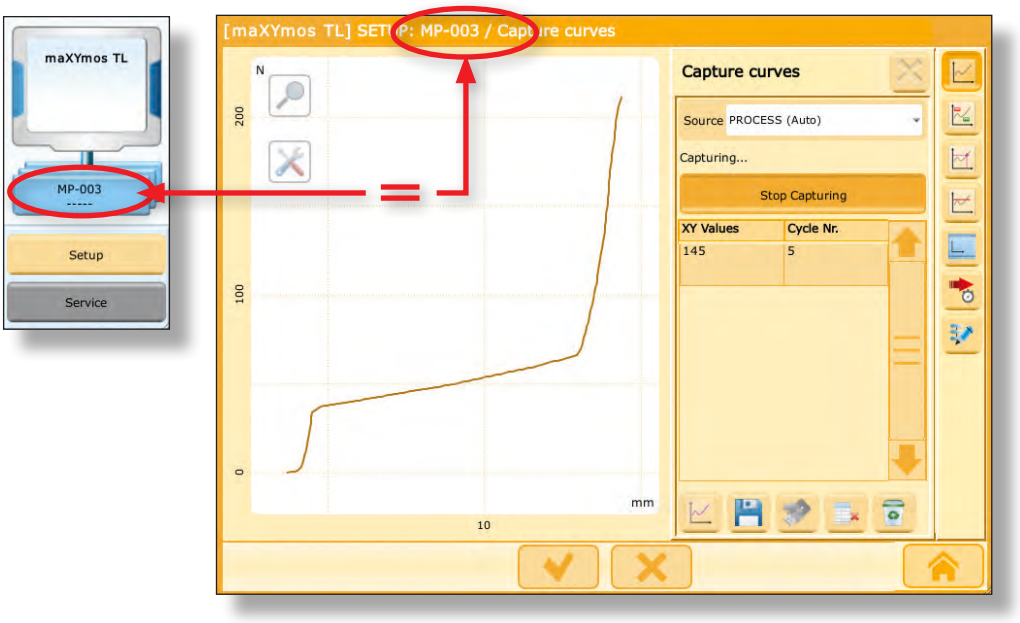
3. The same bundle of curves after switching to a BLOCK reference: The vertical dashed line represents BLOCK as the common reference point. The XMAX points for all the curves now converge on this line.



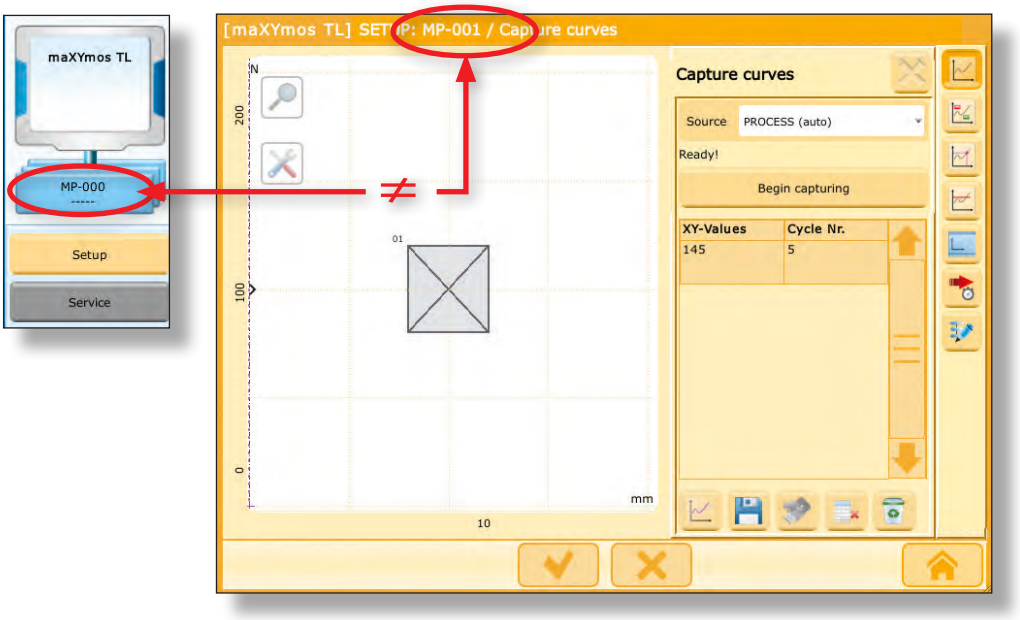
7.26.4.6 No curve in EO editor

In order for a curve to be visible, the number designating the active PROCESS MP (= in the blue box) must match the number designating the Setup MP (= orange box):

PROCESS MP No. = **SETUP MP No.** (menu sequence below is abbreviated here!)



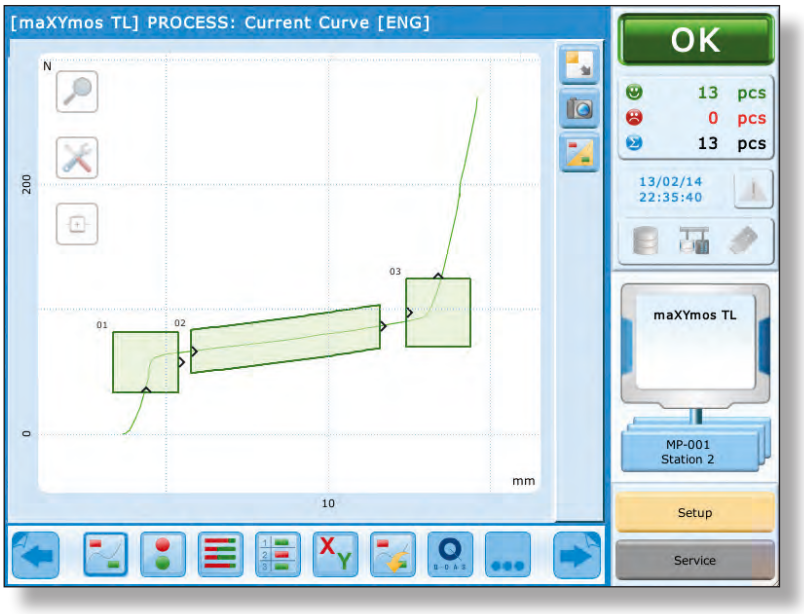
PROCESS MP No. ≠ **SETUP MP No.** (menu sequence below is abbreviated here!)



7.26.5 Testing newly configured evaluation objects

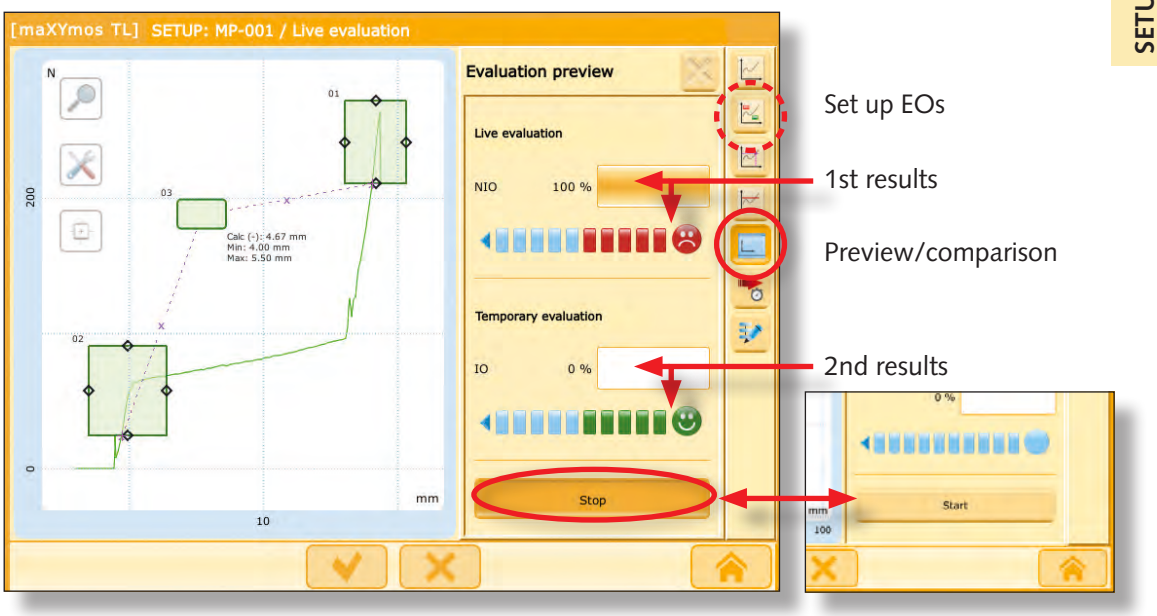
To test the EOs, first switch to the blue PROCESS main menu.

Once EOs are set up, run several cycles and assess the evaluation results. Correct the reference points and/or EOs where required.



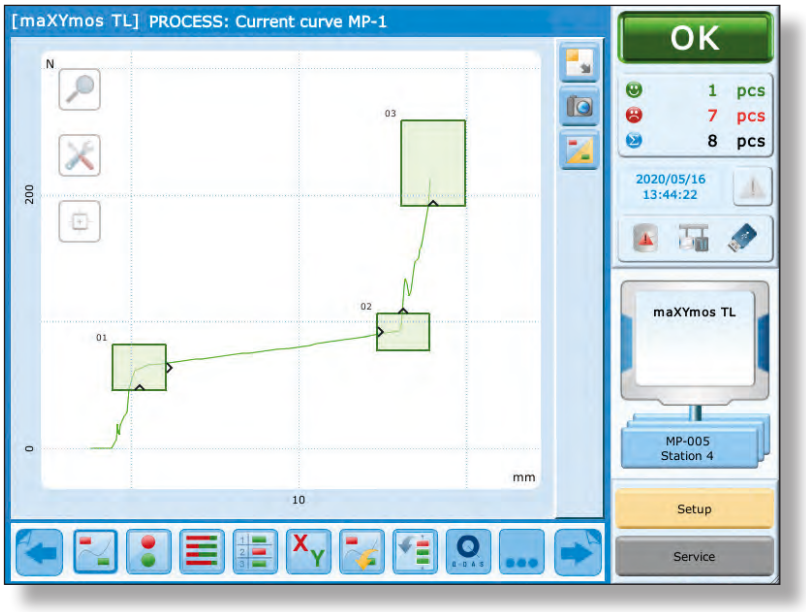
7.26.6 Checking modified EOs in setup menu (= Virtual process view)

With the maXYmos TL, any EOs that have been changed or modified can easily be checked. This can be done in the Evaluation Preview section of the MP SETUP menu.



After you have set up the changed/modified EOs, select Evaluation Preview. Select the Start button (bottom right), run several cycles and assess the evaluation results:
1st results = previous setting, 2nd results = new setting. In this example, the new setting clearly produces better results. If necessary, use EO menu to correct the reference points and/or EO coordinates.

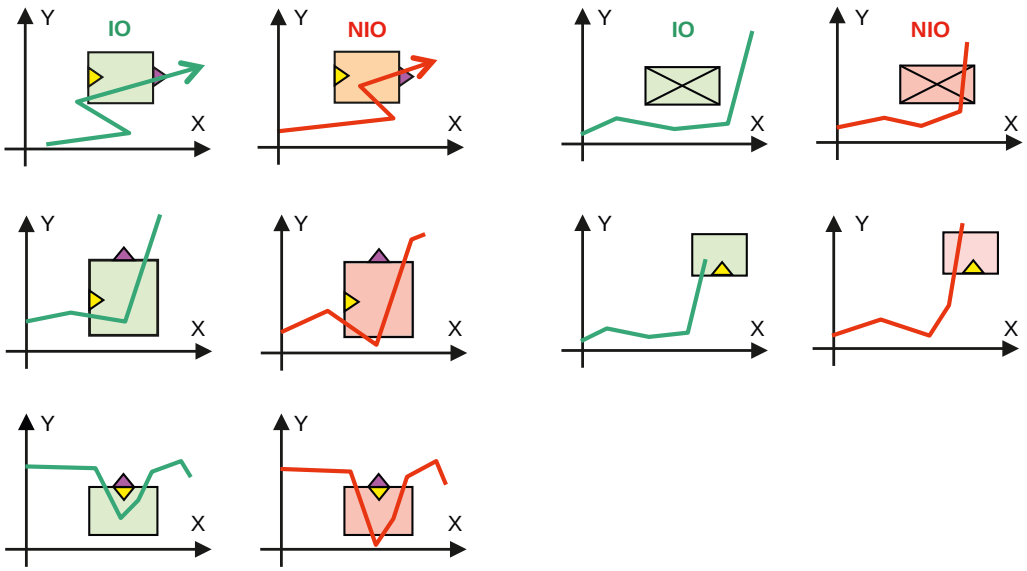
7.26.7 UNI-BOX Evaluation object (EO)



7.26.7.1 Evaluation criterion

The measurement curve must enter once through the specified entry side and exit once through the specified exit side. Any side can be specified as the entry or exit side. The first point at which the curve crosses a box boundary is the entry event, and its next intersection with a box boundary thereafter is the exit event.

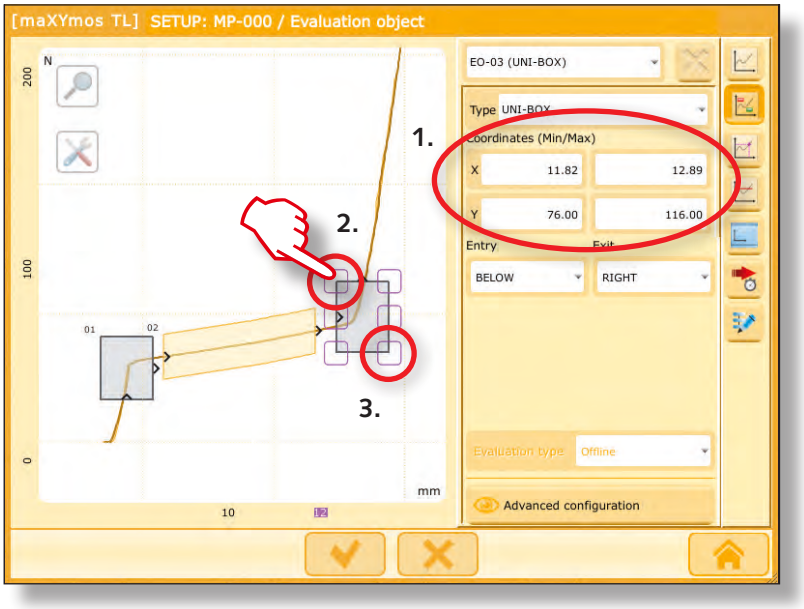
Example cases:



7.26.7.2 Positioning the UNI BOX over the measurement curve

See also → SectionSection 7.23.2 / p. 150

A UNI BOX can be positioned by:
1. numerical input,
2. touching the screen with your finger/a stylus or
3. via PC/MAC (if VNC connection established).



The UNI BOXes on the previous page are displayed in the PROCESS view.

7.26.7.3 Obtaining process values from the UNI BOX EO

How UNI BOX process values are delivered depends on the configuration used. The best way to view them for a given EO is by selecting Process View, Value Table →p. 29, → p. 176, →p. 242). These process values can either be displayed later in the PROCESS Value Table or transferred by means of the fieldbus.

ENTRY Process value
This is captured at the point where the curve first intersects the box line designated as the ENTRY side and from there to the boundary of the catch zone (extended entry line). A value will only be generated if an entry side has been defined.

EXIT Process value
This is captured at the point where the curve first intersects the box line designated as the EXIT side and from there to the boundary of the catch zone (extended exit line). A value will be only be generated if an exit side has been defined.

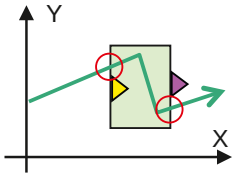
Note! For horizontal box lines the process value will always be an X value and for vertical box lines it will always be a Y value.

Example cases (see next page):

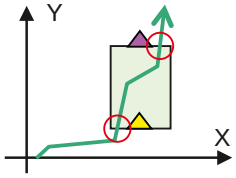
Example cases:

Min-Max Process values

EINTRITT (Y)
AUSTRITT (Y)



EINTRITT (X)
AUSTRITT (X)

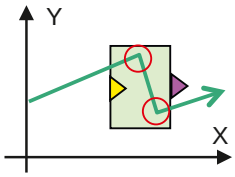


These will be displayed inside the boundaries of the box and, beyond those boundaries, up to the limits of the catch zone (if one has been defined). Depending on the configuration being used, these values can be:

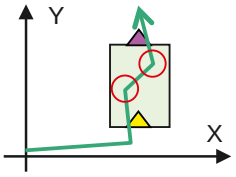
XMIN-X / XMIN-Y (the lowest X value and its corresponding Y value)
XMAX-X / XMAX-Y (the highest X value and its corresponding Y value)
YMIN-Y / YMIN-X (the lowest Y value and its corresponding X value)
YMAX-Y / YMAX-X (the highest Y value and its corresponding X value)

Example cases:

YMAX-Y / YMAX-X
YMIN-Y / YMIN-X



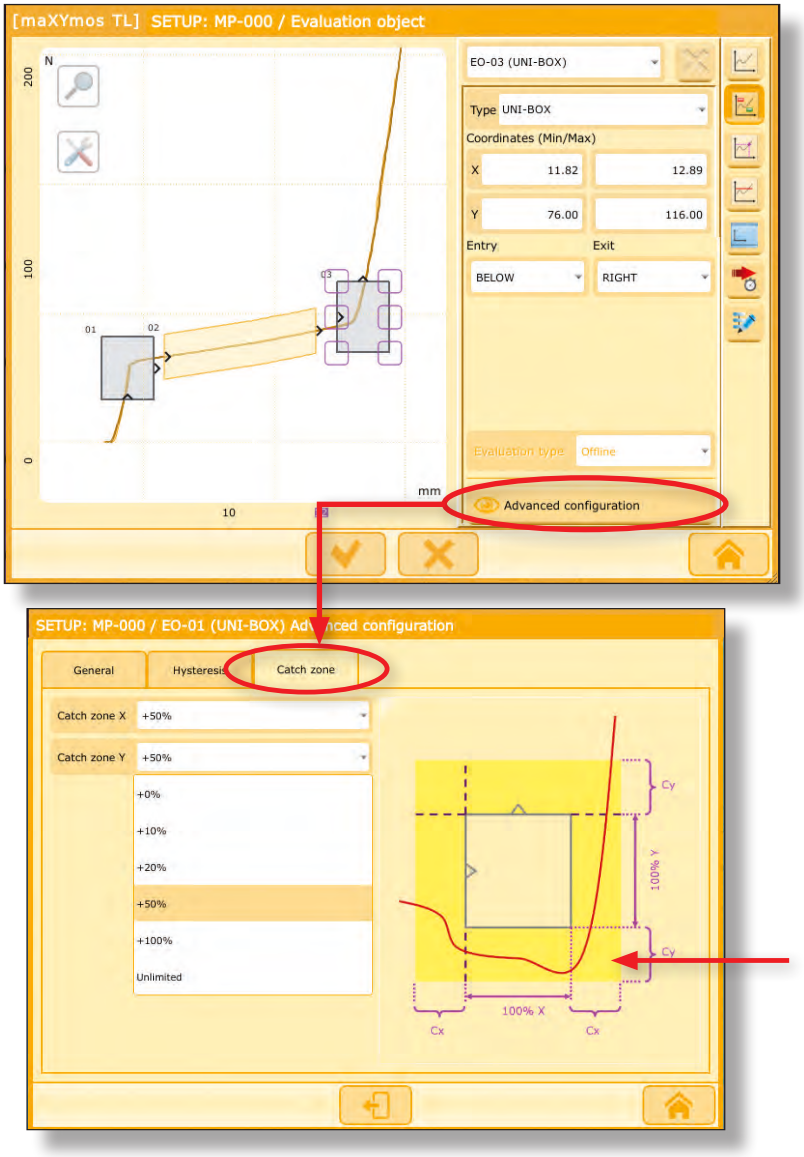
XMAX-X / XMAX-Y
XMIN-X / XMIN-Y



7.26.7.4 Specifying the UNI BOX catch zone

Also see Section → "Catch zone for Process Values"page 229.

Example:



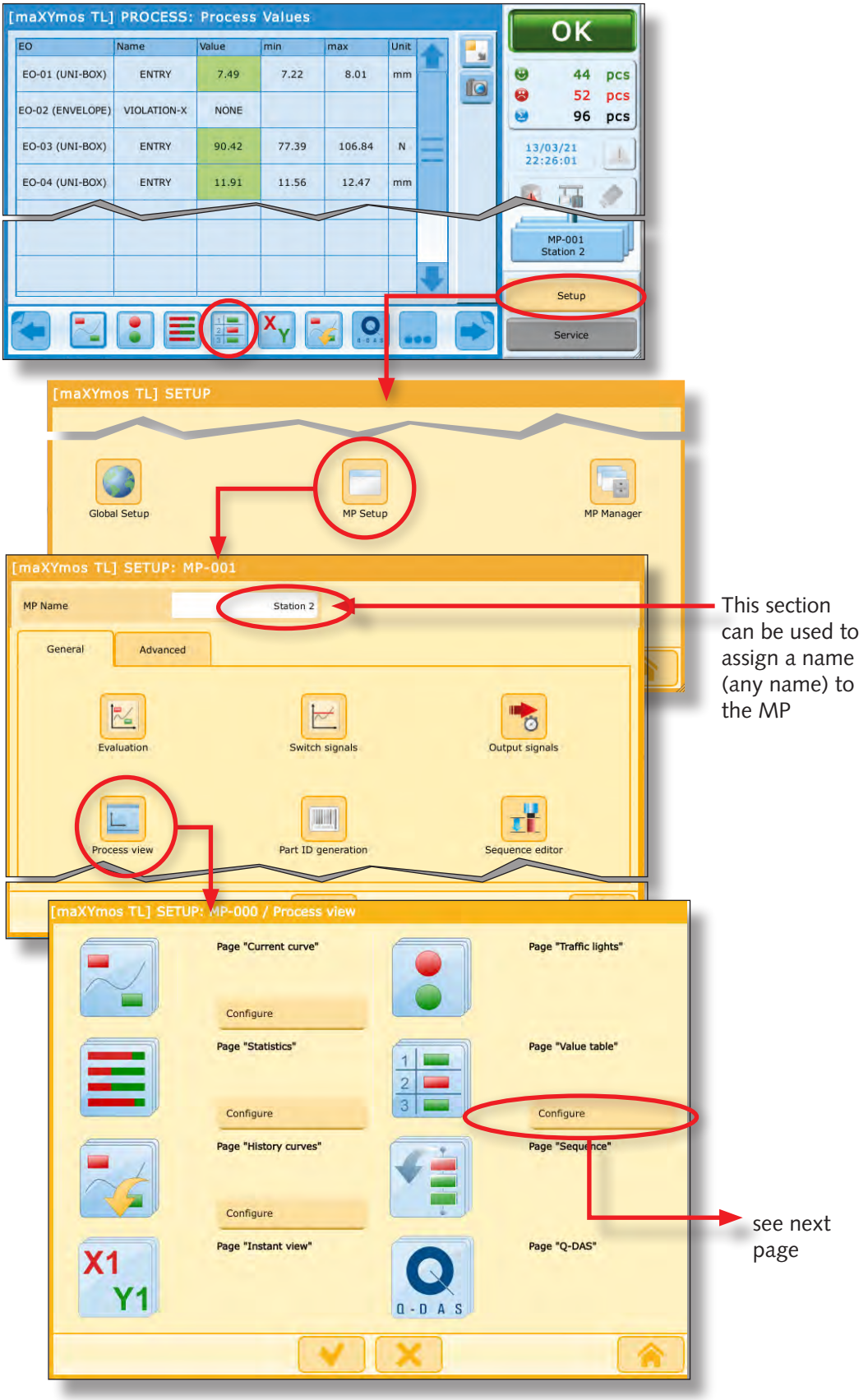
Select advanced configuration button, then catch zone tab
The catch zones, i.e. the zones within which process values are "captured", must be specified for each EO individually in the EO Editor.

In the example above, a 50 % catch zone has been defined for EO-01 in both the X and Y dimensions (the yellow area). Within this zone, the process values defined in the relevant EO configuration are "captured". (Selection is explained in next section → Displaying Process Values in the UNI BOX Values Table page 176)

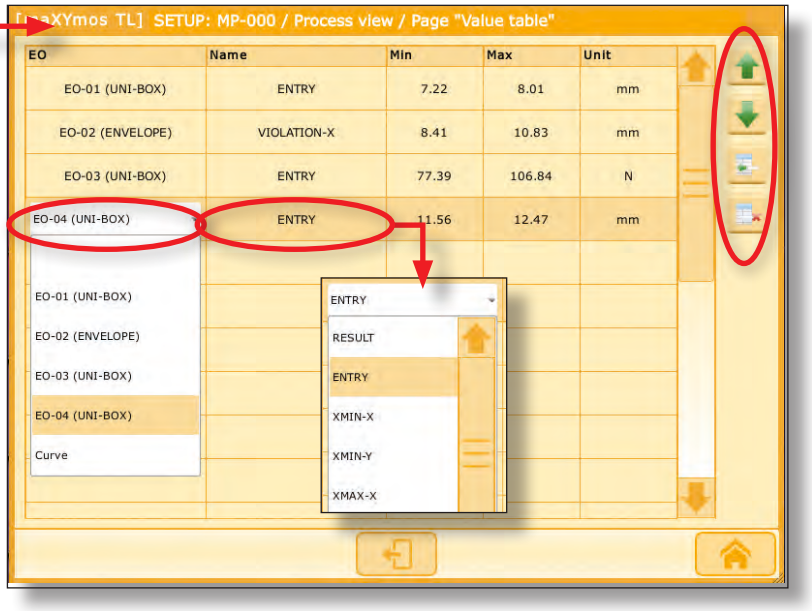
Important!
OK-NOK evaluation is carried out only inside the boundaries of the box. The catch zone merely serves to ensure that process values outside these box boundaries are also recorded. If, for example, a curve failed to intersect the entry side of the box, knowing by what margin it missed the entry boundary could be of statistical interest.

7.26.7.5 Displaying process values in the UNI BOX value table

The values can be displayed in the (blue) process values table.



continued...



Setup:
Choose the measurement program you require, e.g. MP-001 (→ Setup / MP Setup / MP-001). First select the Process View, then the Configure button for Value Table page.
Select EO column header, then required EO in column, e.g. EO-04.
Select Name field, followed by required measurement value, e.g. ENTRY for entry value.

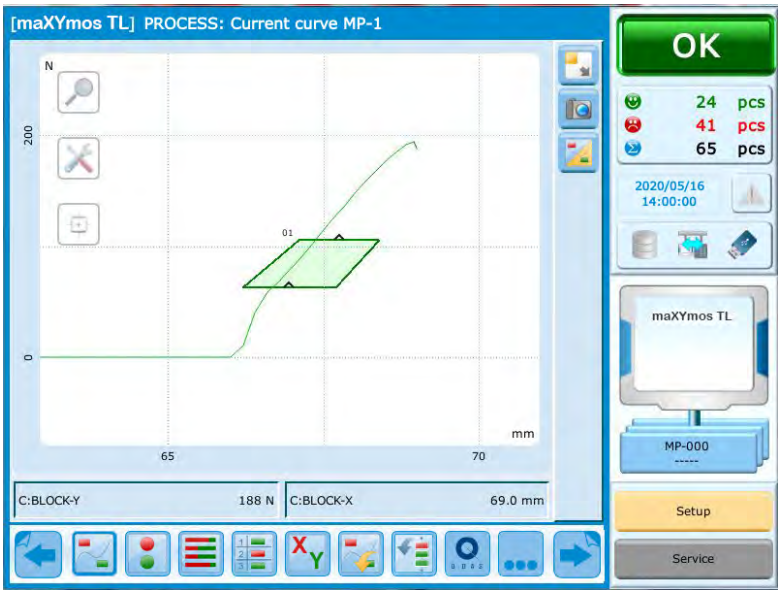
Move line:
Move selected line up/down

Insert line.

Delete line.

7.26.8 Evaluation objects/EO in detail TRAPEZOID

7.26.8.1 EO TRAPEZOID-X/TRAPEZOID-Y

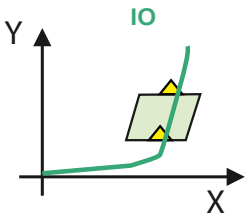


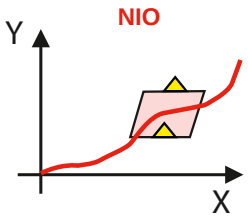
7.26.8.2 Evaluation criterion EO TRAPEZOID

The measurement curve must enter once through the specified entry side and exit once through the specified exit side. Any side can be specified as the entry or exit side. The first point at which the curve crosses a box boundary is the entry event, and its next intersection with a box boundary thereafter is the exit event.

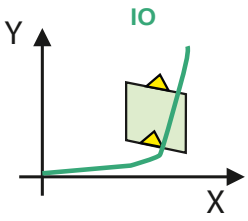
Example cases

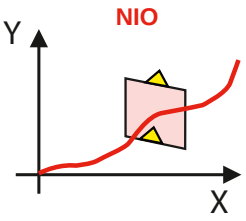
TRAPEZOID-X





TRAPEZOID-Y

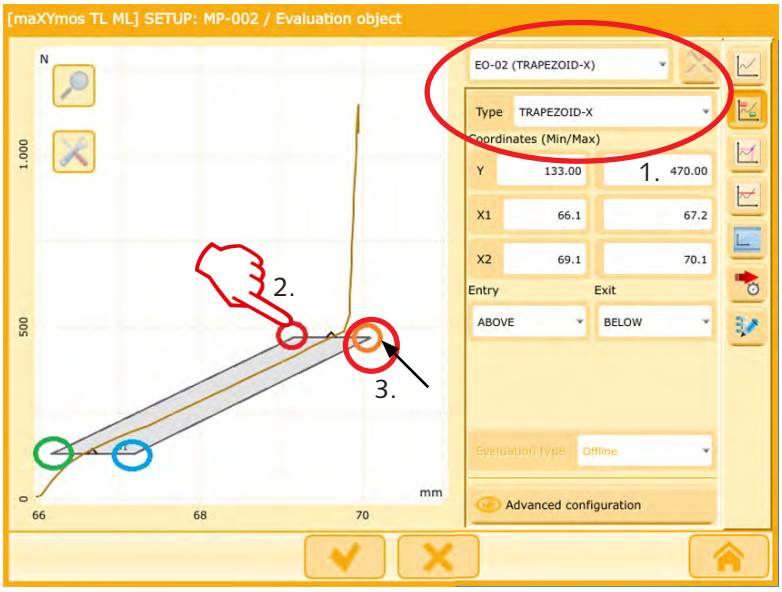




- Evaluation of the Trapezoid EO X/Y correlates with the UNI-BOX
- Entry and exit as designated
- No violation of „closed“ sides allowed
- Each side defineable as entry or exit

7.26.8.3 Positioning EO TRAPEZOID

A TRAPEZOID cab be positioned by:
1. numerical input,
2. touching the screen with your finger/a stylus or
3. via PC/MAC (if VNC ® connection established).



Setpoint input

The TRAPEZOID EO X Needs 6 setpoints to be entered:
Force (Ymin and Ymax) Displacement 1 (X1min and X1max) Displacement 2 (X2min and X2max)

The advanced configu-ration is similar to the UNI- BOX.

On the previous page the TRAPEZOID EO's are shown in the PROCESS view.

7.26.8.4 Obtaining Process Values from the TRAPEZOID EO

How TRAPEZOID process values are delivered depends on the configuration used. The best way to view them for a given EO is by selecting Process View, Value Table. These process values can either be displayed later in the PROCESS Value Table or transferred by means of the fieldbus.

Entry – Process value
This is captured at the point where the curve first intersects the box line designated as the ENTRY side and from there to the boundary of the catch zone (extended entry line). A value will only be generated if an entry side has been defined.

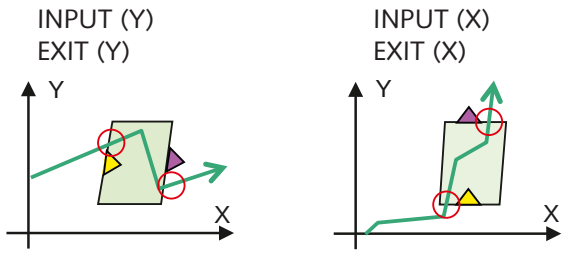
EXIT– Process value
This is captured at the point where the curve first intersects the box line designated as the EXIT side and from there to the boundary of the catch zone (extended exit line). A value will be only be generated if an exit side has been defined.

TRAPEZOID-X:
Entry and exit as specified. No violation of closed sides permitted. Any side to be specified as entry or exit. Inclination scalable in X direction.
TRAPEZOID-Y:
Entry and exit as specified. No violation of closed sides permitted. Any side to be specified as entry or exit. Inclination scalable in Y direction.

In case of horizontal box lines the process value is always an X-value, in case of vertical box lines an Y-value.

Example cases

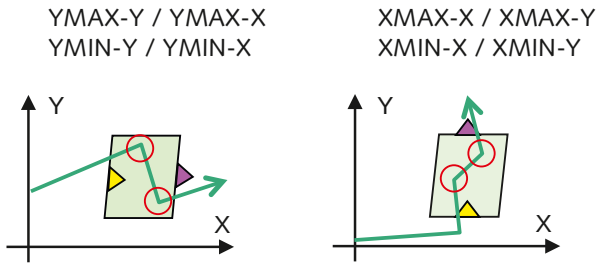
Min-Max Process values



These will be displayed inside the boundaries of the box and, beyond those boundaries, up to the limits of the catch zone (if one has been defined). Depending on the configuration being used, these values can be:

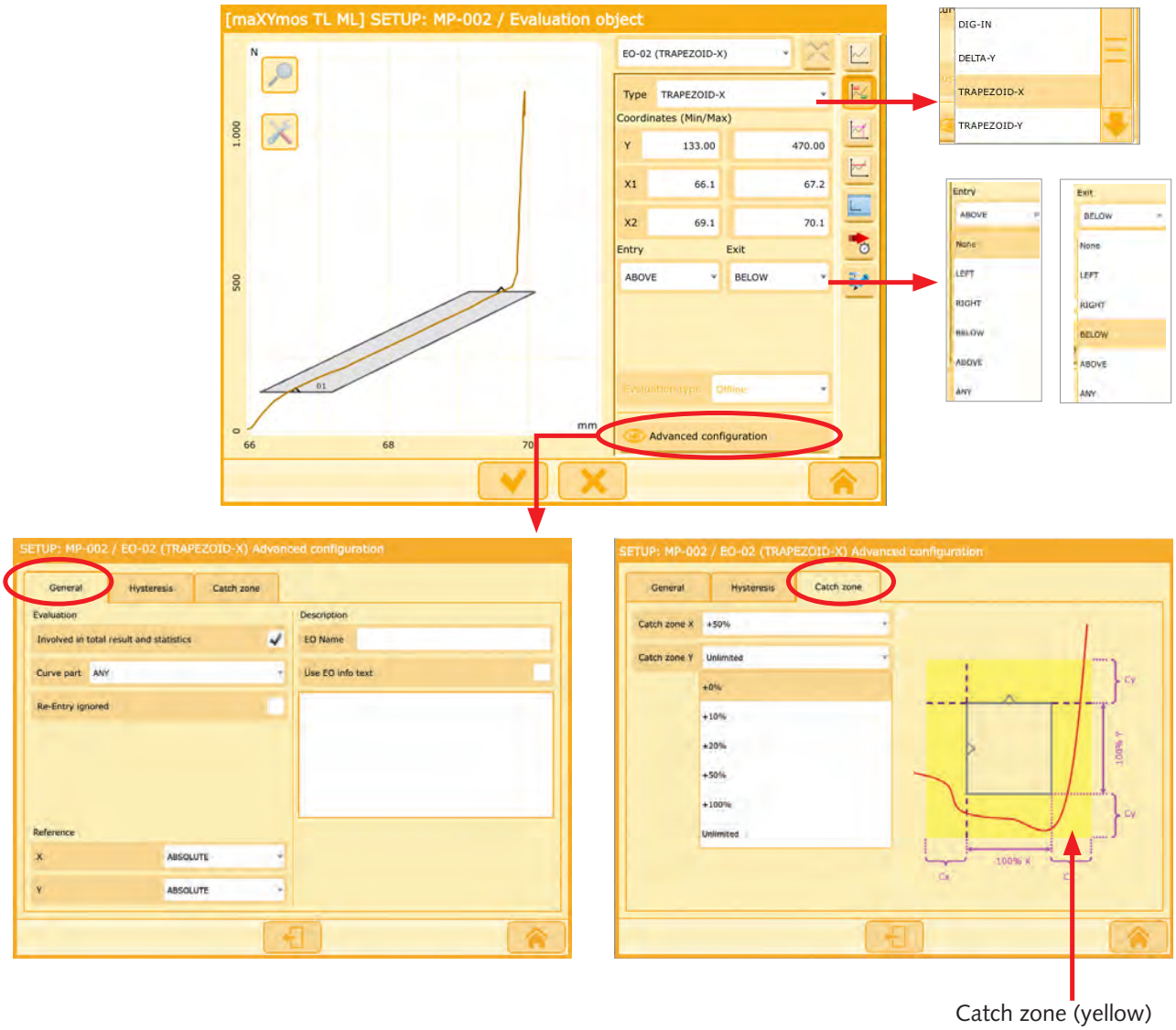
XMIN-X / XMIN-Y (the lowest X value and its corresponding Y value)
XMAX-X / XMAX-Y (the highest X value and its corresponding Y value)
YMIN-Y / YMIN-X (the lowest Y value and its corresponding X value)
YMAX-Y / YMAX-X (the highest Y value and its corresponding X value)

Example cases



7.26.8.5 Specifying catch zone of the EO TRAPEZOID

See also 'Catch Zone for process values'



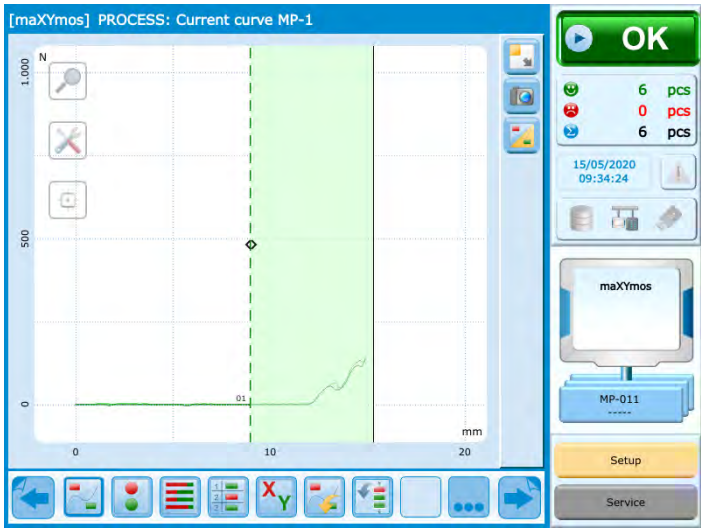
Advanced settings button and then choose the 'Catch Zone' tab
The catch zones, i.e. the zones within which process values are 'captured', must be specified for each EO individually in the EO Editor.

Here, a Catch zone of 50 % in X and Y direction is defined (yellow area) for EO-01. Inside this Catch zone, the specified process values of the respective EO configuration are captured.

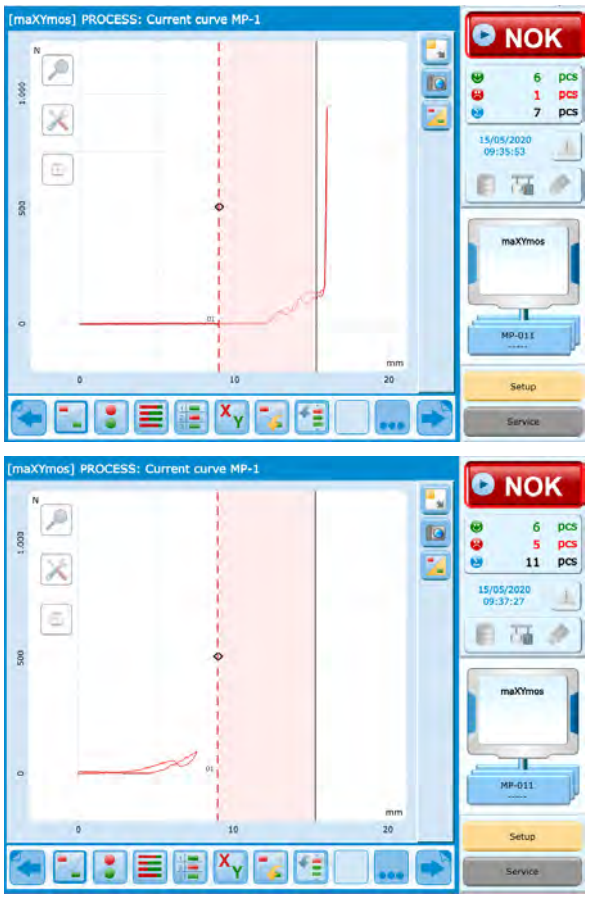
Important: The OK/NOK evaluation is only performed inside the box boundaries. The Catch zone simply ensures that in addition, the process values are also recorded over these box boundaries. If, for example, the entry side of a box is missed, it may be a statistical interest to know the distance of the curve to the entry boundary.

7.26.9 Evaluation objects/EO in detail DISPLACEMENT RANGE

7.26.9.1 EO DISPLACEMENT RANGE



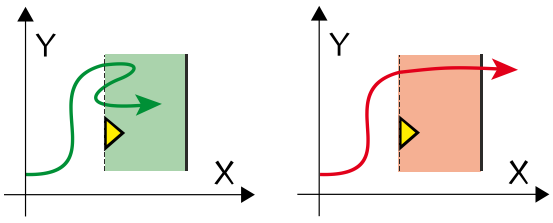
NOK DISPLACEMENT RANGE



7.26.9.2 Evaluation criterion EO DISPLACEMENT RANGE

The measurement curve must enter the specified entry side, an exit side does not exist. Any side can be specified as entry.

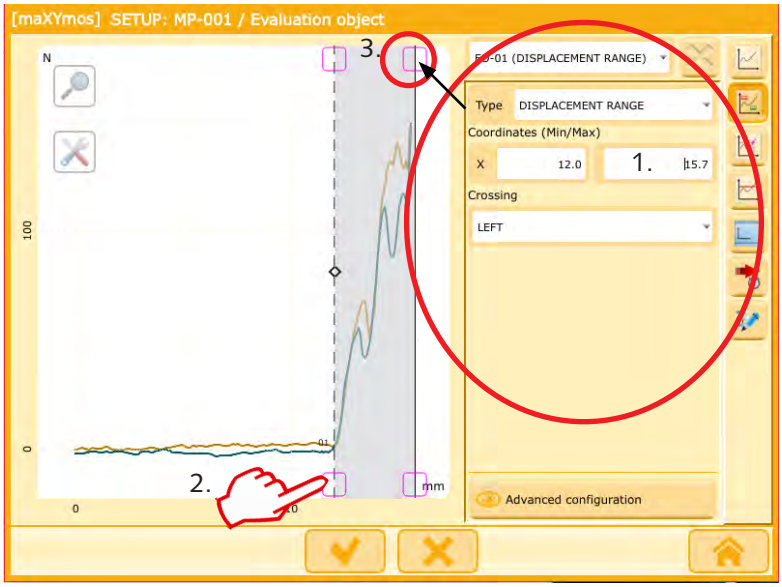
Example case DISPLACEMENT RANGE



- Entry as designated, exit not allowed
- No violation of „closed“ sides allowed
- Each side defineable as entry

7.26.9.3 Positioning DISPLACEMENT RANGE

A DISPLACEMENT RANGE cab be positioned by:
1. numerical input,
2. touching the screen with your finger/a stylus or
3. via PC/MAC (if VNC ® connection established).



Setpoint input

The EO DISPLACEMENT RANGE needs 2 setpoints to be entered:

Displacement (X^{min} and X^{max})

On the previous page the DISPLACEMENT RANGE EO's are shown in the PROCESS view.

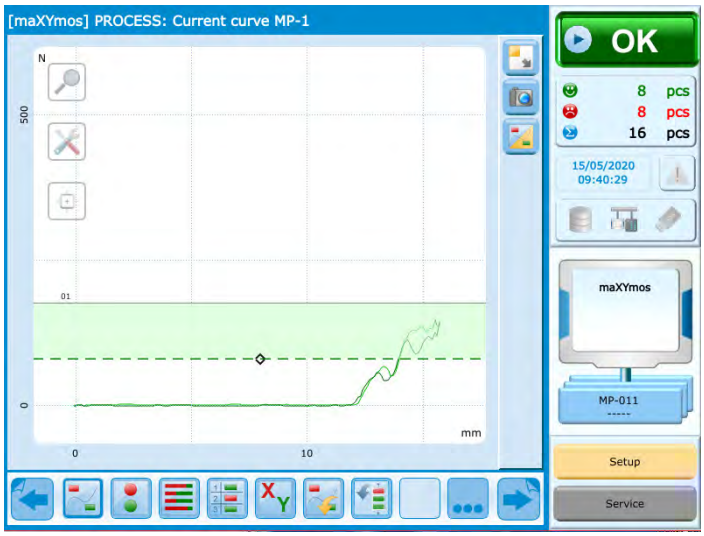
7.26.9.4 Obtaining process values from the EO DISPLACEMENT RANGE

How EO DISPLACEMENT RANGE process values are delivered depends on the configuration used. The best way to view them for a given EO is by selecting process view, value table. These process values can either be displayed later in the PROCESS Value Table or transferred by means of the fieldbus.

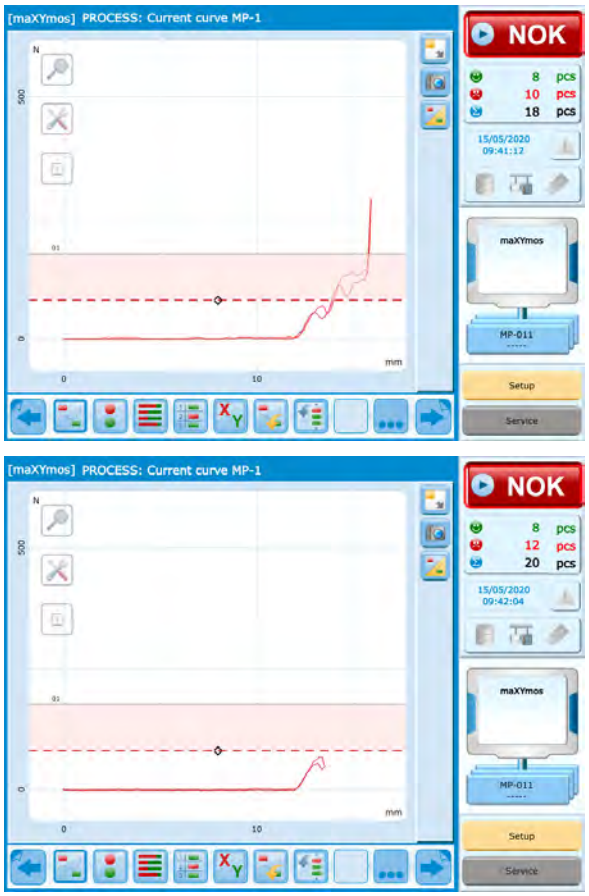
DISPLACEMENT-RANGE
The maximum displacement is evaluated, independet of the force.

7.26.10 Evaluation objects/EO in detail FORCE RANGE

7.26.10.1 EO FORCE RANGE



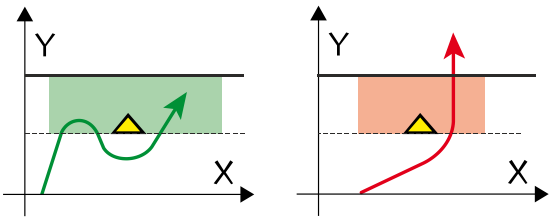
NOK FORCE RANGE



7.26.10.2 Evaluation criterion EO FORCE RANGE

The measurement curve must enter the specified entry side, an exit side does not exist. Any side can be specified as entry.

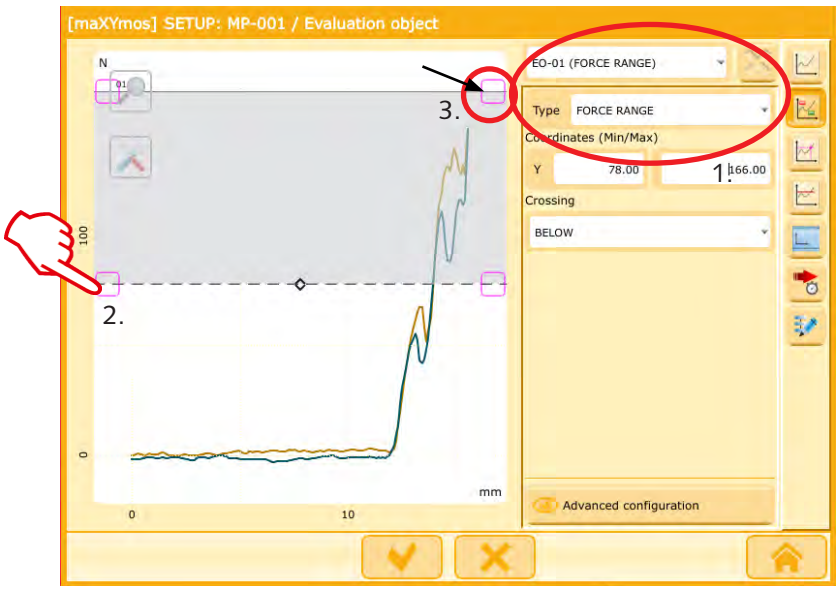
Example case FORCE RANGE



- Entry as designated, exit not allowed
- No violation of „closed“ sides allowed
- Each side defineable as entry

7.26.10.3 Positioning FORCE RANGE

A FORCE RANGE cab be positioned by:
1. numerical input,
2. touching the screen with your finger/a stylus or
3. via PC/MAC (if VNC ® connection established).



Setpoint input

The EO FORCE RANGE needs 2 setpoints to be entered:
Force (Y^{min} and Y^{max})

On the previous page the FORCE RANGE EO's are shown in the PROCESS view.

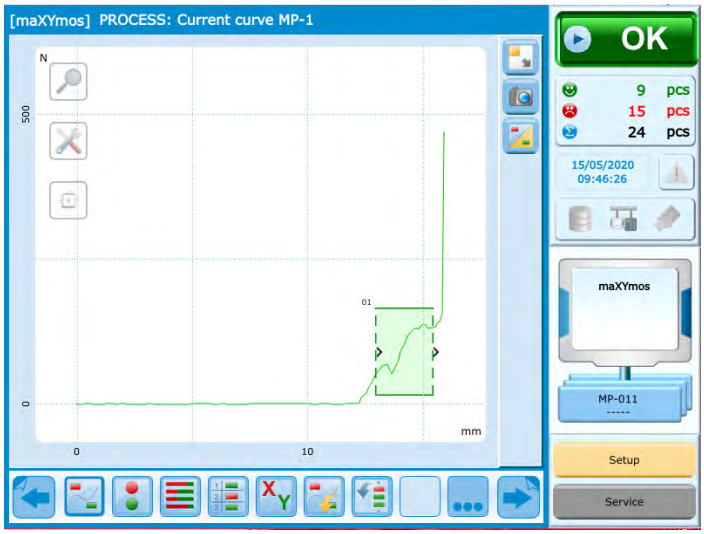
7.26.10.4 Obtaining process values from the EO FORCE RANGE

How EO FORCE RANGE process values are delivered depends on the configuration used. The best way to view them for a given EO is by selecting Process View, Value Table. These process values can either be displayed later in the PROCESS Value Table or transferred by means of the fieldbus.

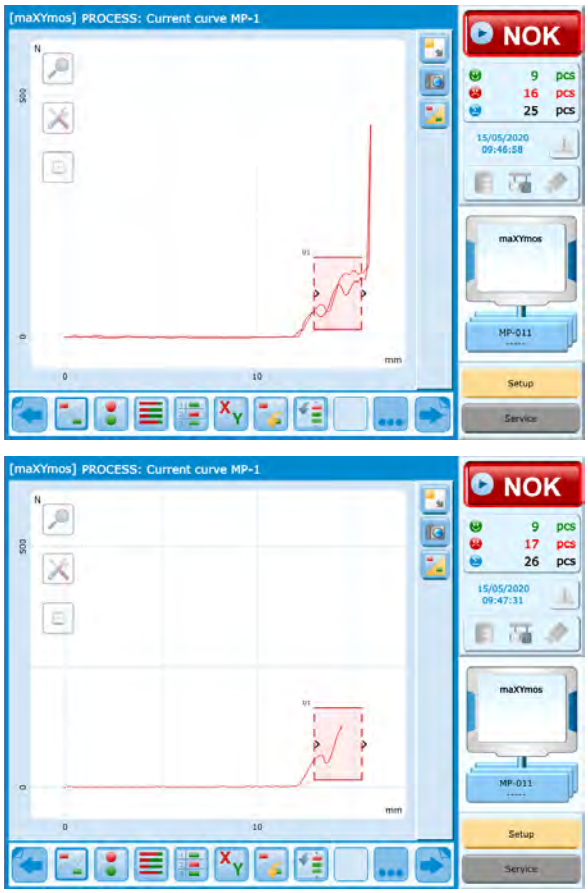
FORCE RANGE
The maximum force of the curve is evaluated, independet of the displacement..

7.26.11 Evaluation objects/EO in detail PASS-THROUGH BOX

7.26.11.1 EO PASS-THROUGH BOX



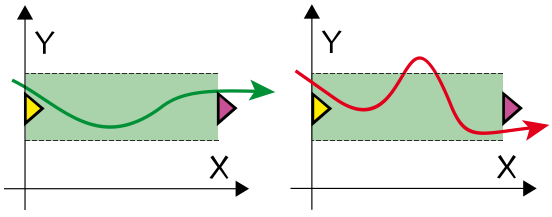
NOK PASS-THROUGH BOX



7.26.11.2 Evaluation criterion EO PASS-THROUGH BOX

The measurement curve must enter the specified entry side and exit the specified exit side. Any side can be specified as entry and exit.

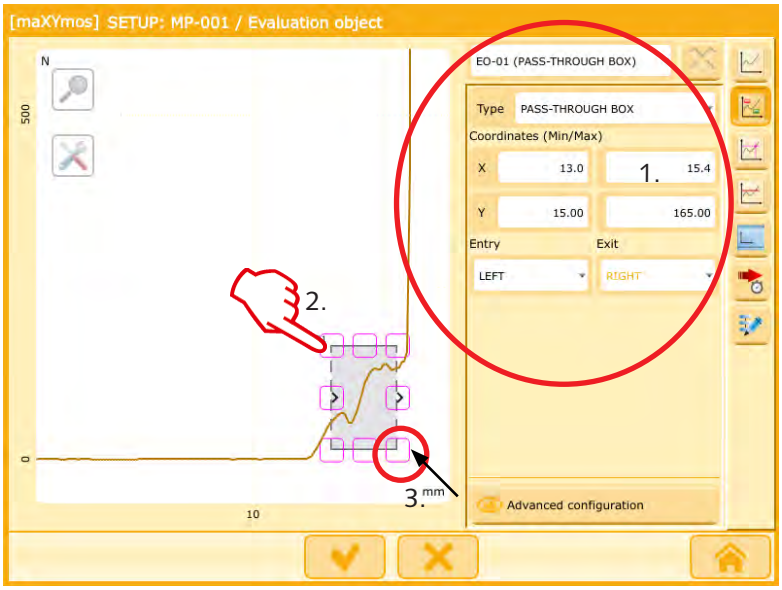
Example case PASS-THROUGH BOX



- Entry and exit as designated
- No violation of „closed“ sides allowed
- Each side defineable as entry and exit

7.26.11.3 Positioning PASS-THROUGH BOX

A PASS-THROUGH BOX cab be positioned by:
1. numerical input,
2. touching the screen with your finger/a stylus or
3. via PC/MAC (if VNC ® connection established).



Setpoint input

The EO PASS-THROUGH BOX needs 4 setpoints to be entered:
Displacement (X^{min} and X^{max})
Force (Y^{min} and Y^{max})

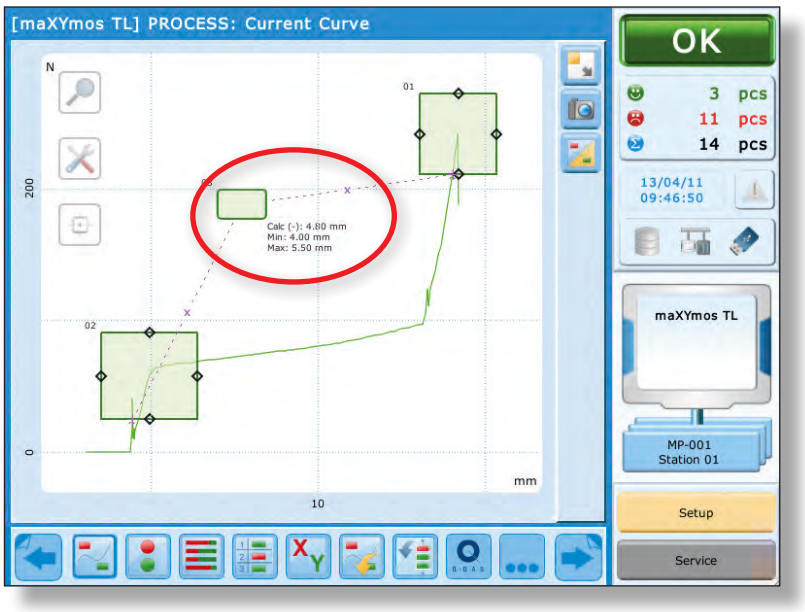
On the previous page the PASS-THROUGH BOX EO's are shown in the PROCESS view.

7.26.11.4 Obtaining process values from the EO PASS-THROUGH BOX

How EO PASS-THROUGH BOX process values are delivered depends on the configuration used. The best way to view them for a given EO is by selecting Process View, Value Table. These process values can either be displayed later in the PROCESS Value Table or transferred by means of the fieldbus.

PASS-THROUGH BOX
The force is evaluated within the specified displacement range.

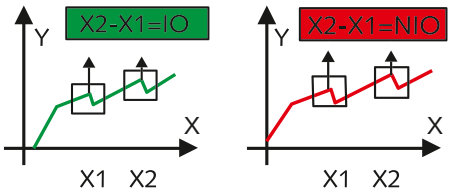
7.26.12 Evaluation objects/EO CALC (= CALCulate)



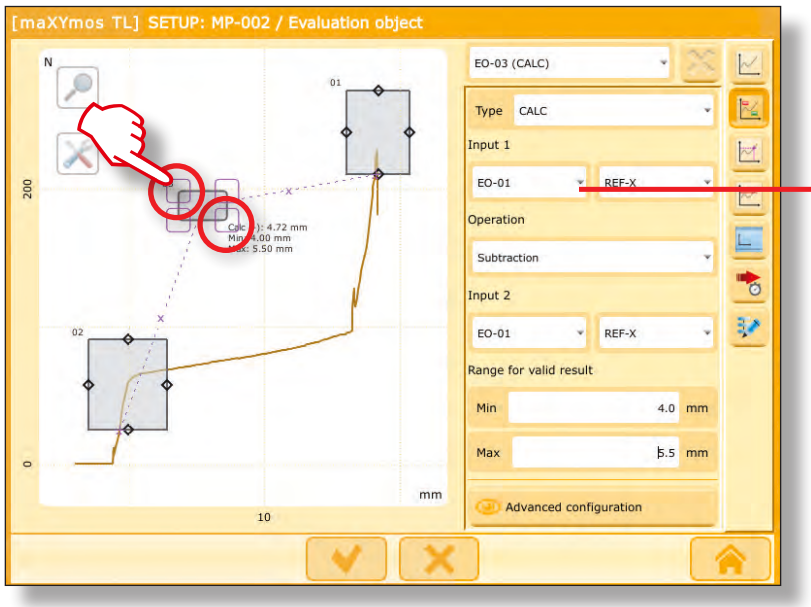
7.26.12.1 Evaluation criterion

This EO takes two user-definable process values and uses them to make a calculation - e.g. the X difference between two ripples - which it then evaluates.

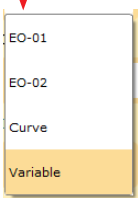
Example case



7.26.12.2 Positioning CALC

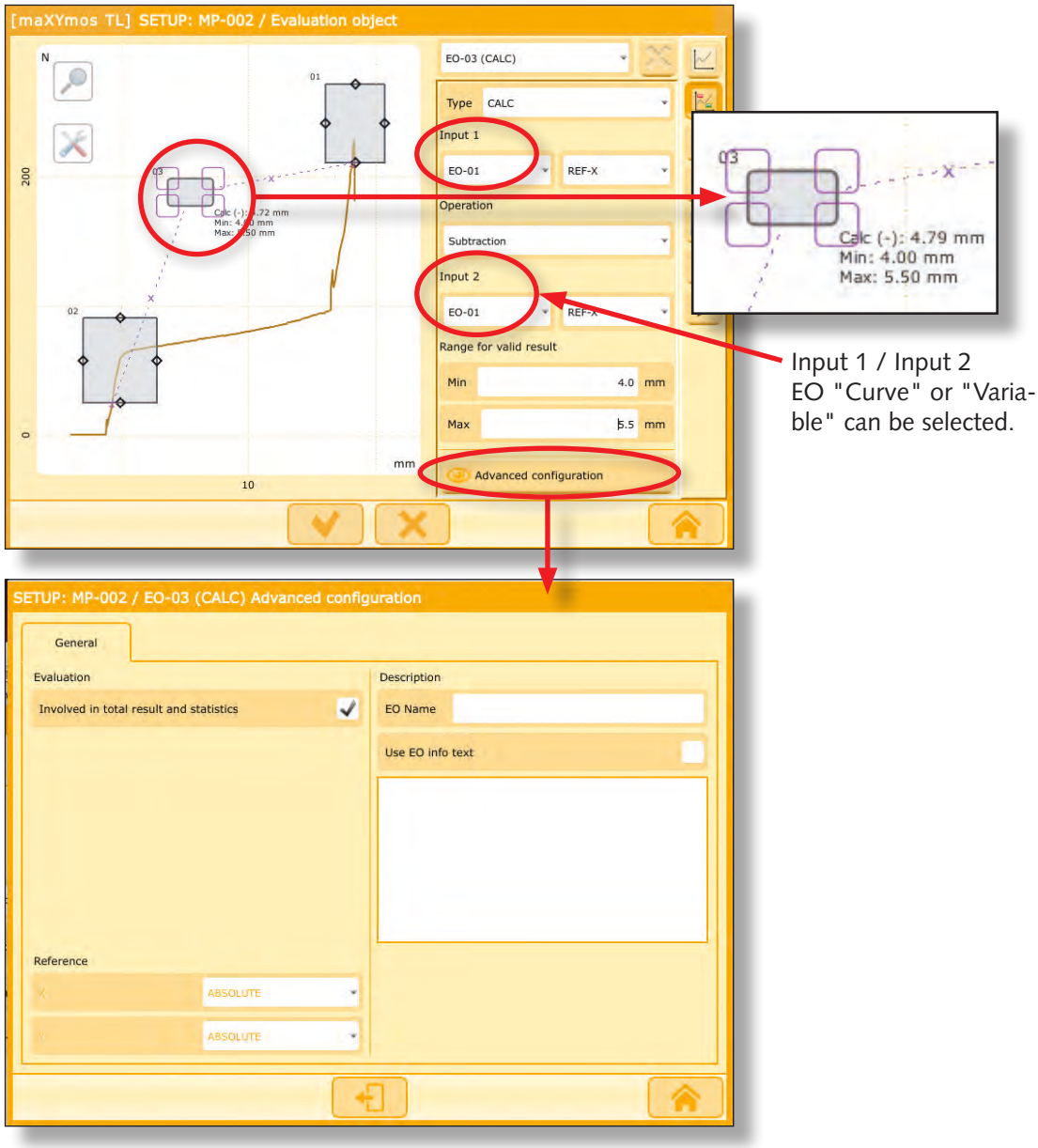


Use a numerical input, your fingertip or a VNC command to position the CALC EO in the required location.



Measured values can be calculated with variables.

7.26.12.3 Configuring CALC

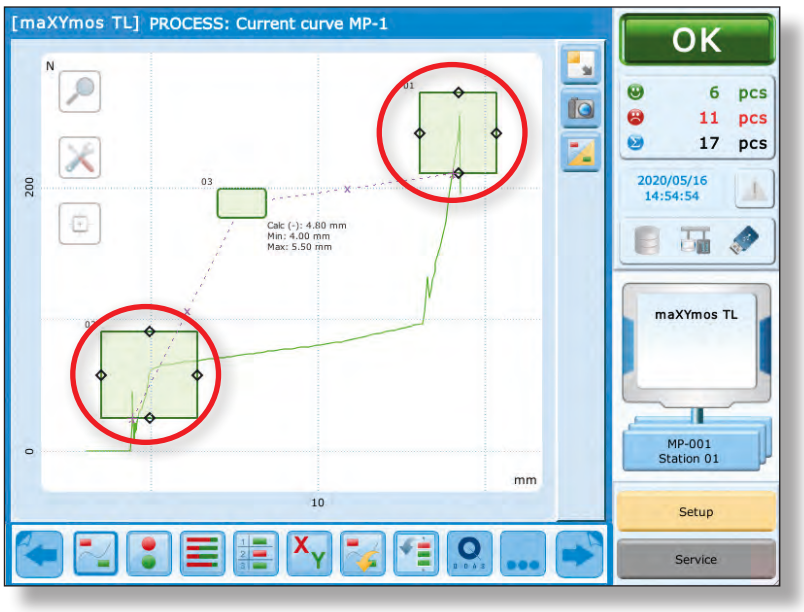


Select the CALC EO. Define Input 1 and Input 2, e.g. as EO-01 and EO-02 or Curve, Variable. Define measurement values for the inputs, e.g. REF-X and the required Operation, e.g. Subtraction.
In the example above, the EO-02 REF-X value is being subtracted from the EO-01 REF-X value.

Define Min. and Max. values in Range for Valid Result; these values are displayed along with the result at the bottom right corner of the EO.

The advanced configuration menu also allows you to assign a name to the EO field (which will be displayed at the top left with the EO number) as well as text with additional information.

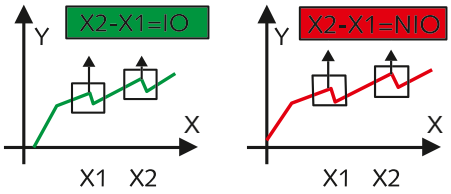
7.26.13 Evaluation objects/EO GET-REF (= REFerence)



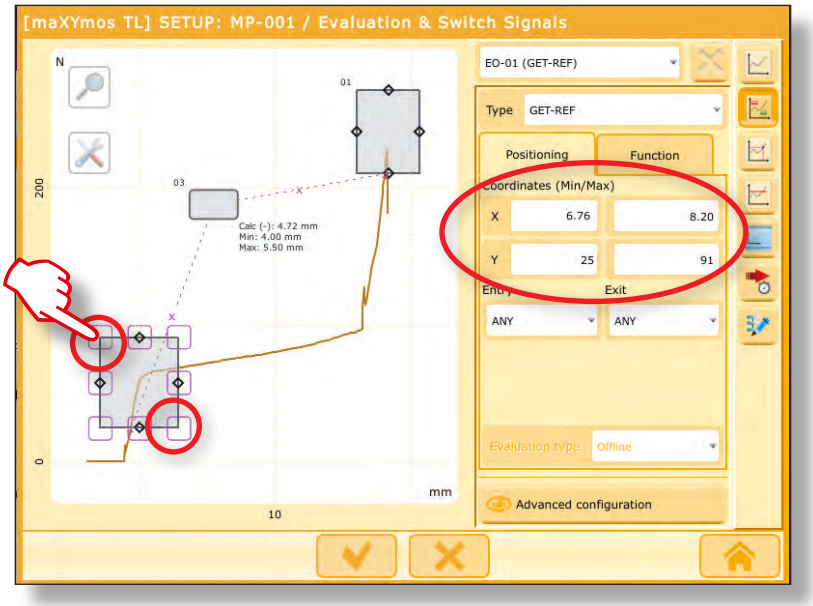
7.26.13.1 Evaluation criterion

This EO detects significant curve attributes and their X/Y coordinates within the expected range. These can then be used as reference points for other EOs or as inputs into the CALC EO → p. 188

Example cases

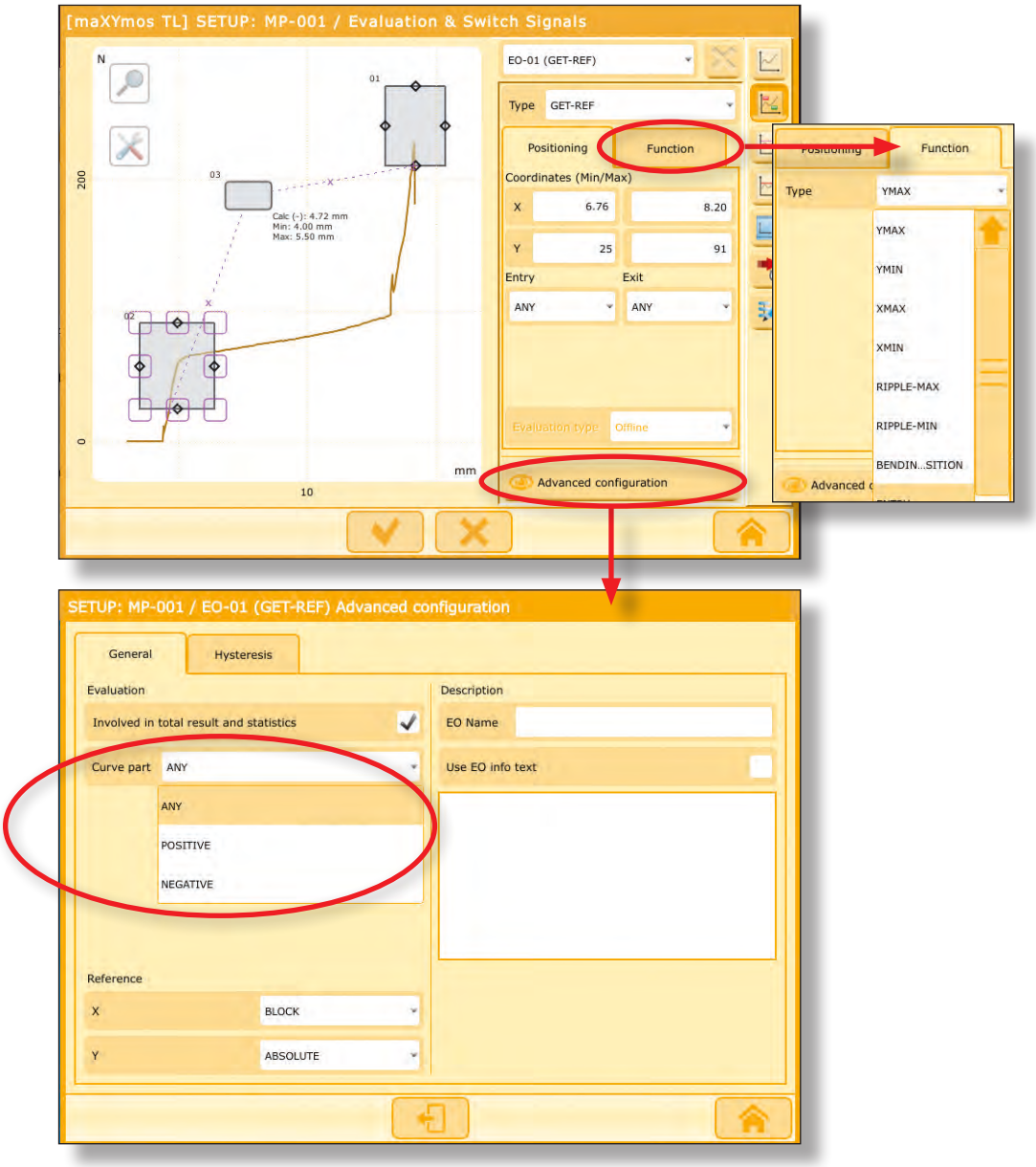


7.26.13.2 Positioning GET-REF



Use a numerical input, your fingertip or a VNC command to position the GET-REF EO in the required location.

7.26.13.3 Configuring GET-REF

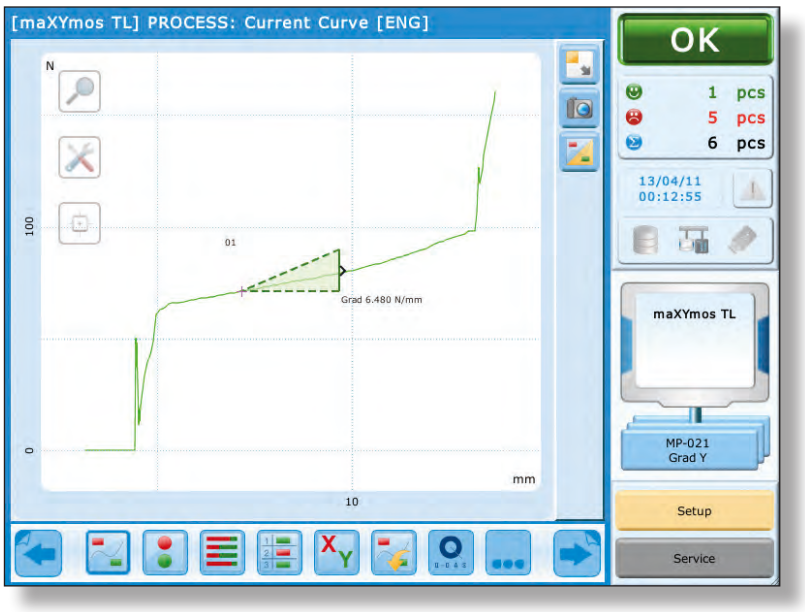


Select the GET REF EO. Select the Function tab, then select the required measurement function, e.g. Entry.

Using the advanced configuration menu, you can also define which section of the curve you wish to analyze: ANY, POSITIVE or NEGATIVE.
You can also specify whether a re-entry should be ignored or not.

By selecting the HYSTERESIS tab, you can also specify the X and Y HYSTERESIS settings.

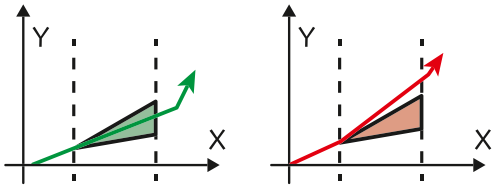
7.26.14 The GRADIENT-Y evaluation object (EO)



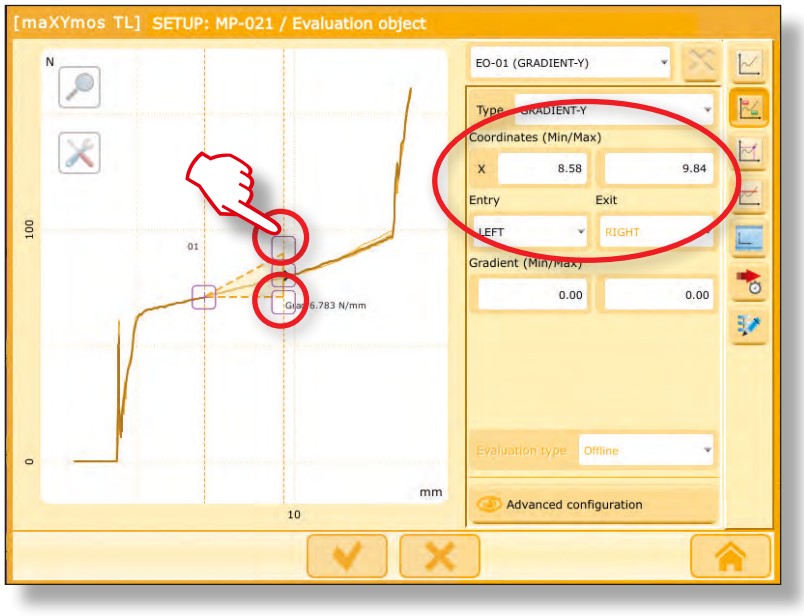
7.26.14.1 Evaluation criterion

This EO evaluates the dY/dX gradient between two vertical lines.

Example cases

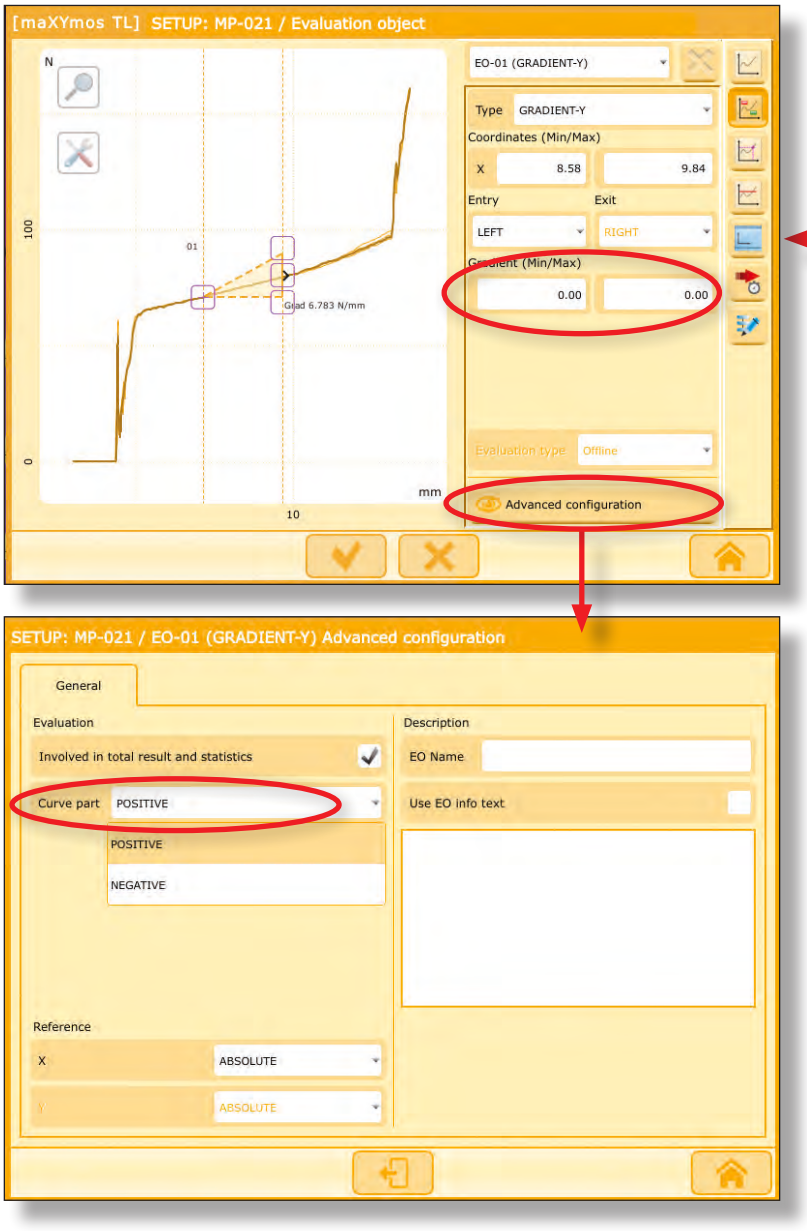


7.26.14.2 Positioning GRADIENT-Y



Use a numerical input, your fingertip or a VNC command to position the GRADIENT-Y EO in the required location.

7.26.14.3 Configuring GRADIENT-Y

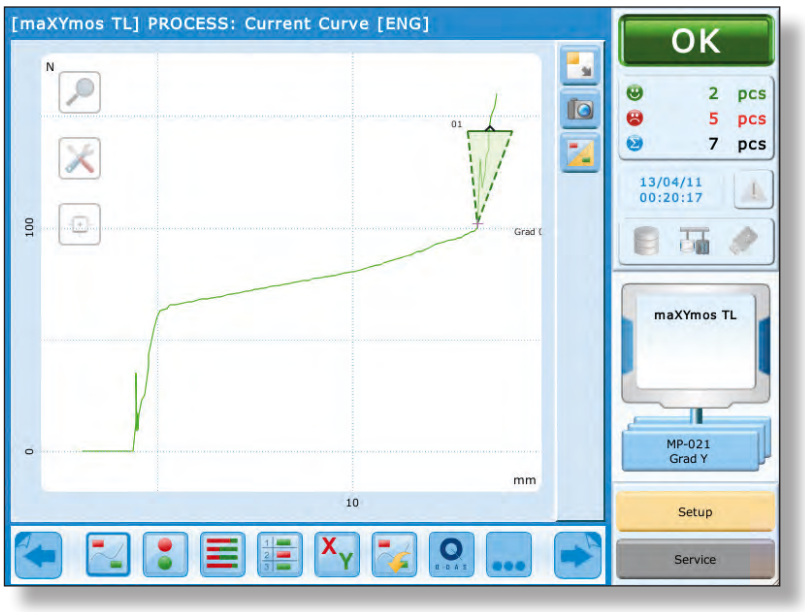


If Entry „LEFT“ is selected the EO is relevant for the positive curve section.
If Entry „RIGHT“ is selected the EO is relevant for the negative curve section.

Select the GRADIENT-Y EO. Define the range of acceptable values (in the Gradient Min./ Max fields).

Using the advanced configuration menu, you can also define which section of the curve you wish to analyze: POSITIVE or NEGATIVE.
An EO name and additional EO information text can also be assigned.

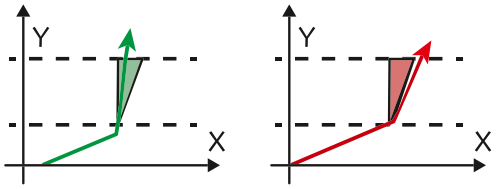
7.26.15 The GRADIENT-X (x GRADient) Evaluation object (EO)



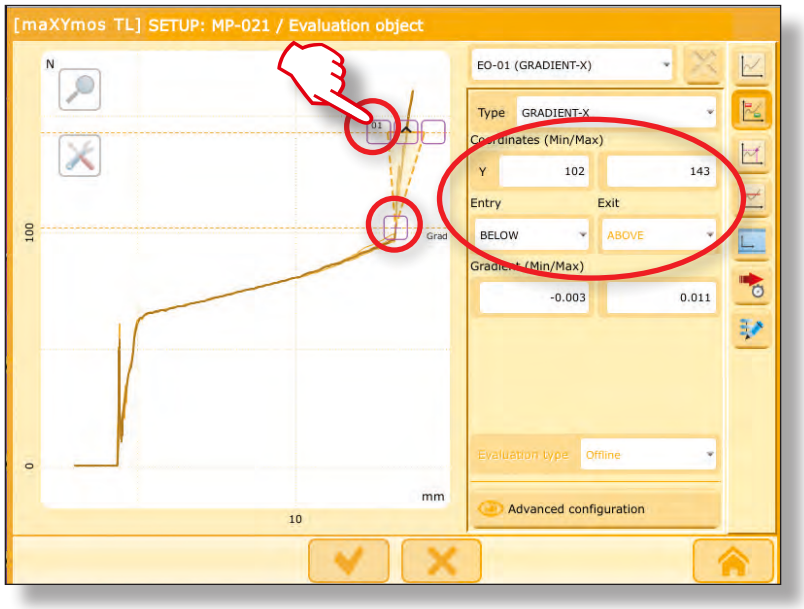
7.26.15.1 Evaluation criterion

This EO evaluates the dY/dX gradient between two horizontal lines.

Example cases

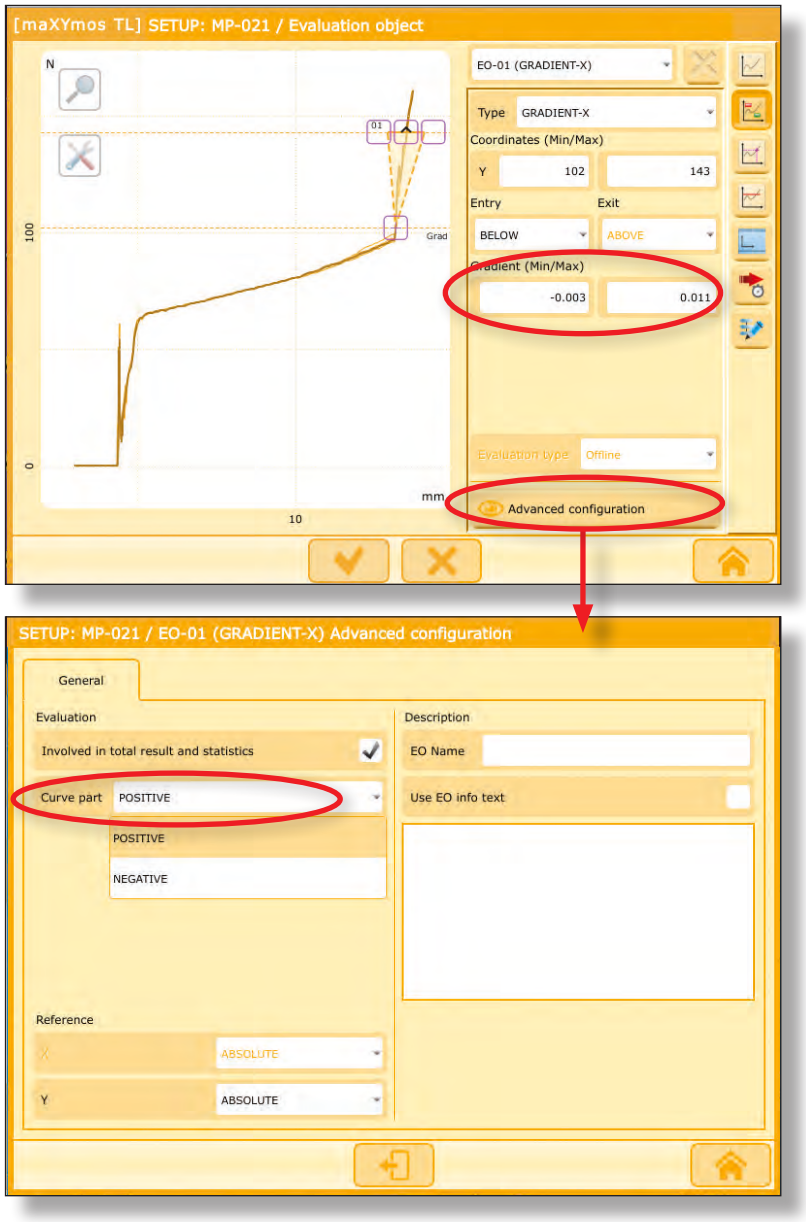


7.26.15.2 Positioning GRADIENT-X



Use a numerical input, your fingertip or a VNC command to position the GRADIENT-X EO in the required location.

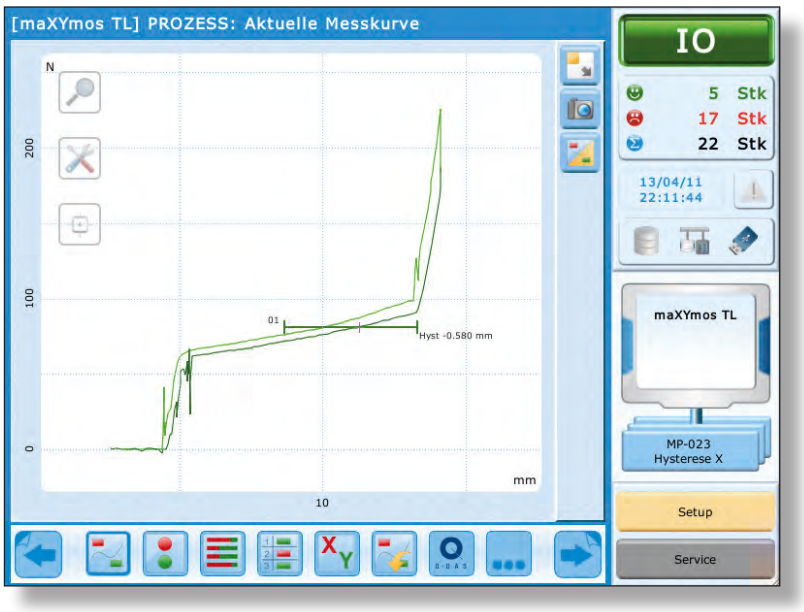
7.26.15.3 Configuring GRADIENT-X



Select the GRADIENT-X EO. Define the range of acceptable values (in the Gradient Min./ Max fields).

Using the Advanced Configuration menu, you can also define which section of the curve you wish to analyze: POSITIVE or NEGATIVE.
An EO name and additional EO information text can also be assigned.

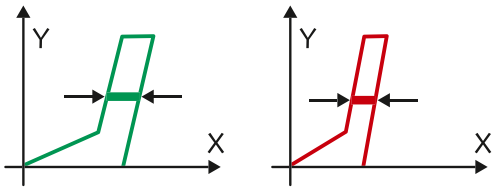
7.26.16 Evaluation objects/EO HYSTERESIS-X



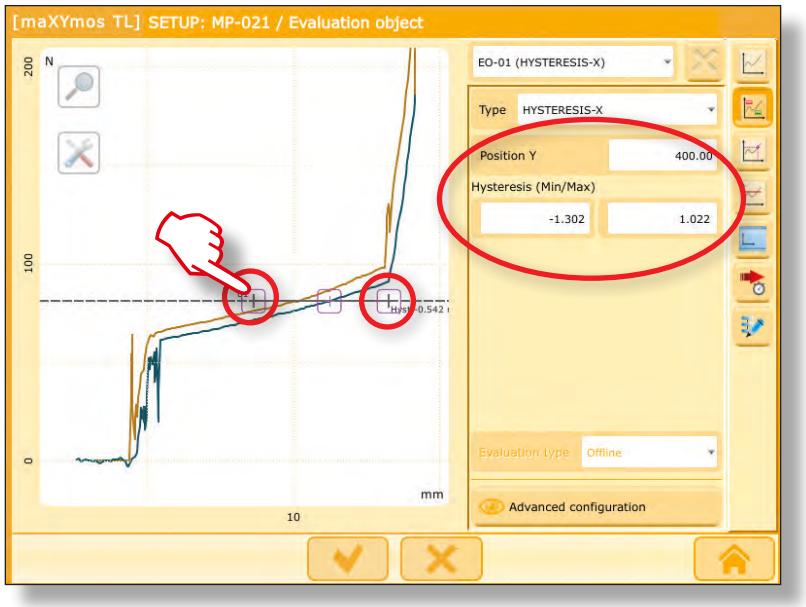
7.26.16.1 Evaluation criterion

This EO evaluates X HYSTERESIS between an advancing and a retreating curve against a horizontal line.

Example cases



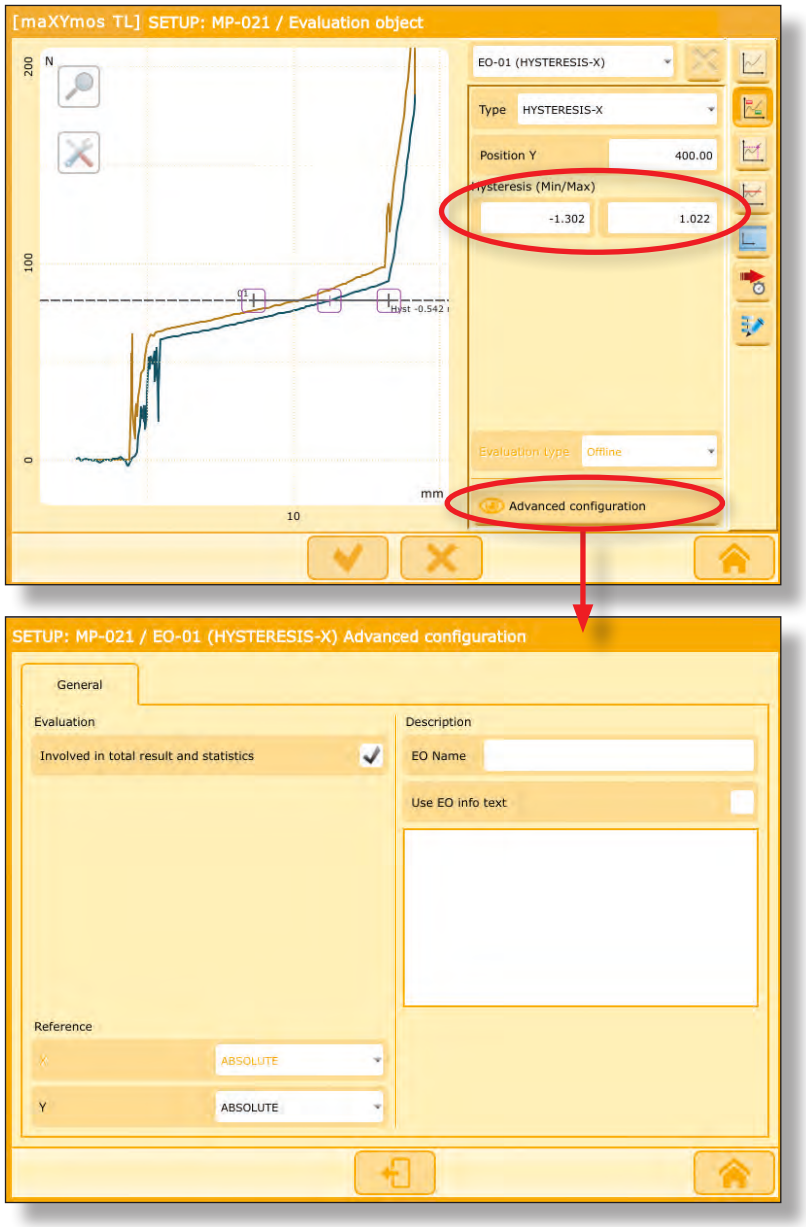
7.26.16.2 Positioning HYSTERESIS-X



Use a numerical input, your fingertip or a VNC command to position the HYSTERESIS-X EO in the required location.

Important: If HYSTERESIS-X EO cannot be positioned
→ next page

7.26.16.3 Configuring HYSTERESIS-X



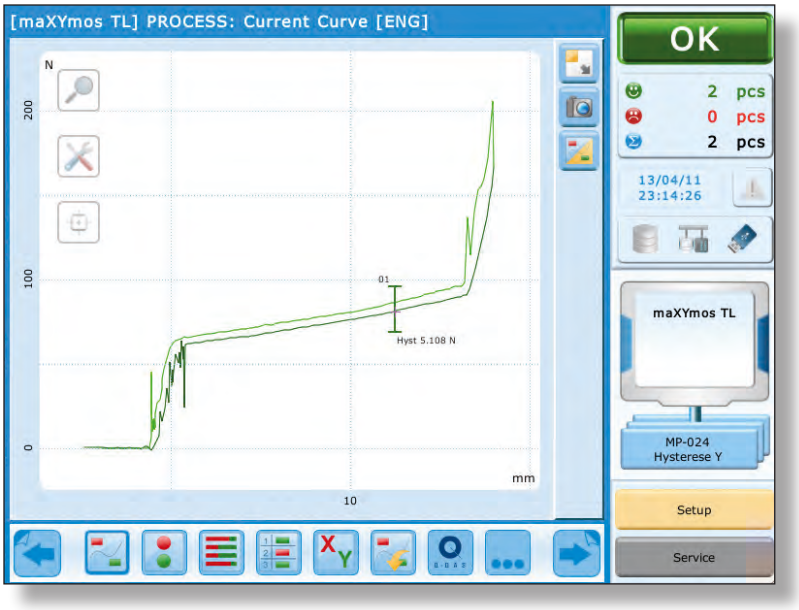
Select HYSTERESIS-X EO and enter required values in HYSTERESIS Min./ Max. fields.

Using the Advanced Configuration menu, an EO name and additional EO information text can also be assigned.

Note: **The HYSTERESIS-X EO will not function, or cannot be positioned, if:**

1. the return leg of the curve is hidden! → Setup / Global setup / Cycle Control / Curve Processing / set "Cut Curve at" pull-down field to NONE
2. the STOP threshold in the Cycle Control menu is incorrectly defined (the Stop condition defines the return leg). → Setup / Global setup / Cycle Control / START/STOP / define STOP threshold
3. points 1 and 2 above have been corrected, but the old curves have not been deleted and replaced with newly captured curves. → Capture Curves (icon at top right of screen)

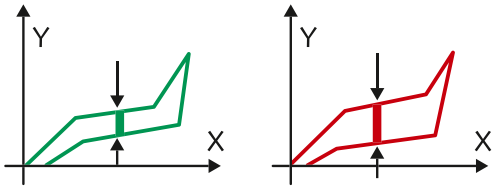
7.26.17 Evaluation objects/EO HYSTERESIS-Y



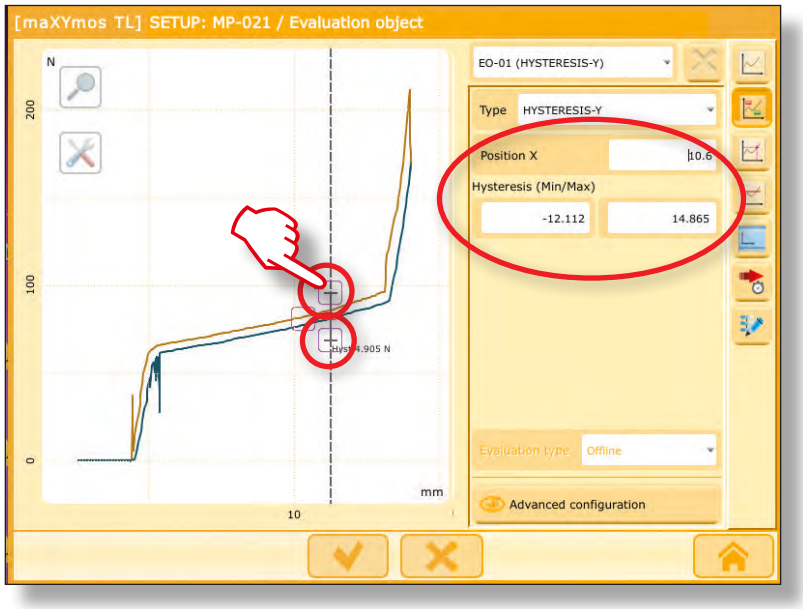
7.26.17.1 Evaluation criterion

This EO evaluates Y HYSTERESIS between an advancing and a retreating curve against a vertical line.

Example cases



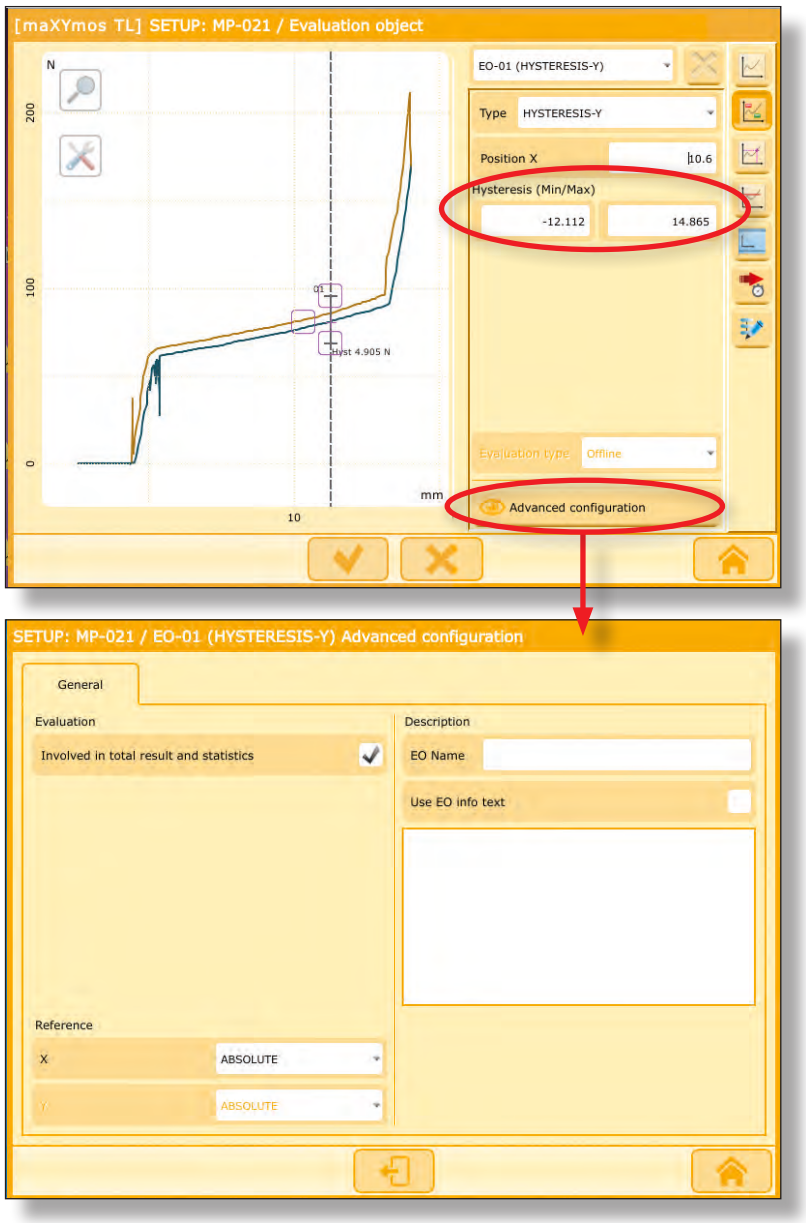
7.26.17.2 Positioning HYSTERESIS-Y



Use a numerical input, your fingertip or a VNC command to position the HYSTERESIS-Y EO in the required location.

Important: If HYSTERESIS-Y EO cannot be positioned
→ next page

7.26.17.3 Configuring HYSTERESIS-Y



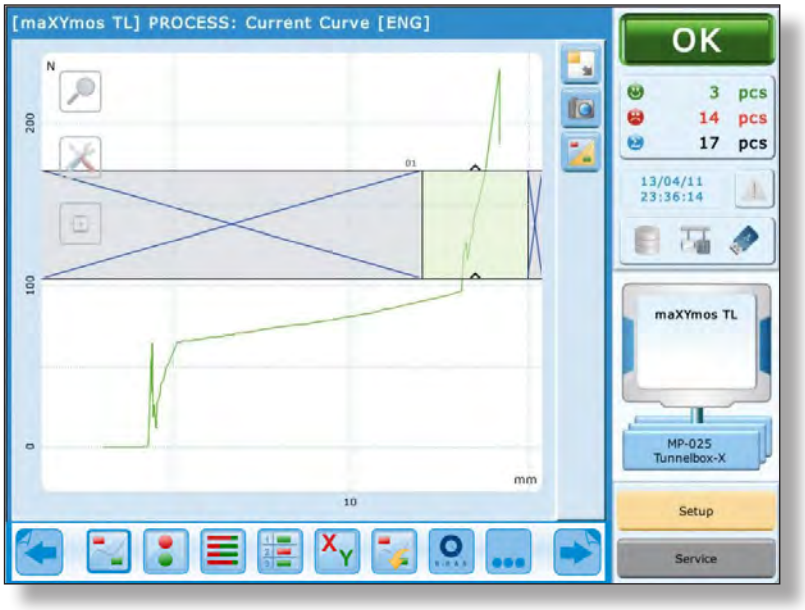
Select HYSTERESIS-Y EO and enter required values in HYSTERESIS Min./ Max. fields.

Using the advanced configuration menu, an EO name and additional EO information text can also be assigned.

Note: **The HYSTERESIS-Y EO will not function, or cannot be positioned, if:**

1. the return leg of the curve is hidden! → Setup / Global setup / Cycle Control / Curve Processing / set "Cut Curve at" pull-down field to NONE
2. the STOP threshold in the Cycle Control menu is incorrectly defined (the Stop condition defines the return leg). → Setup / Global setup / Cycle Control / START/STOP / define STOP threshold
3. points 1 and 2 above have been corrected, but the old curves have not been deleted and replaced with newly captured curves. → Capture Curves (icon at top right of screen)

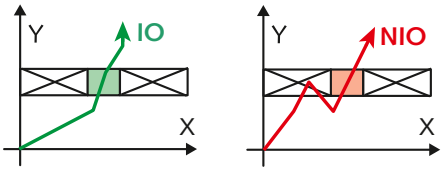
7.26.18 Evaluation objects/EO TUNNELBOX-X



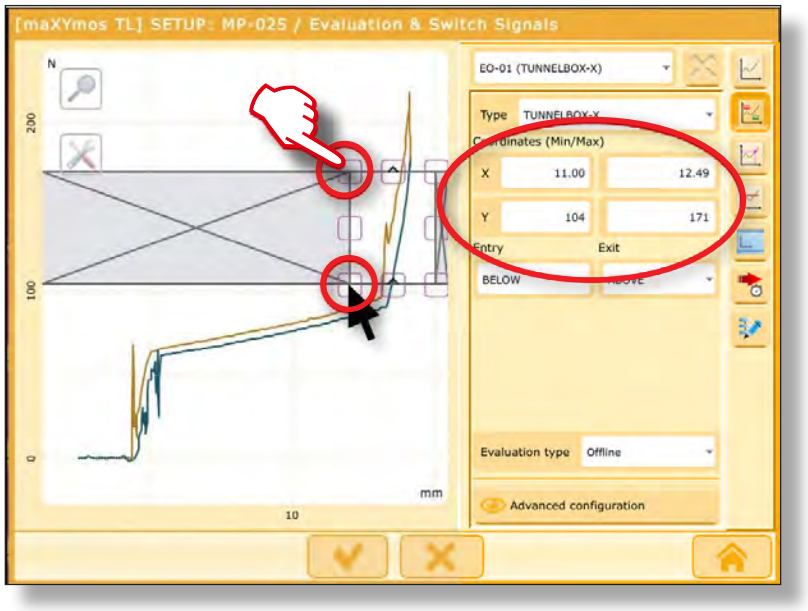
7.26.18.1 Evaluation criterion

This EO evaluates entries into and exits from a defined box. The curve must not cross the closed sides of the box. If these closed sides are crossed, a real-time signal is generated.

Example cases



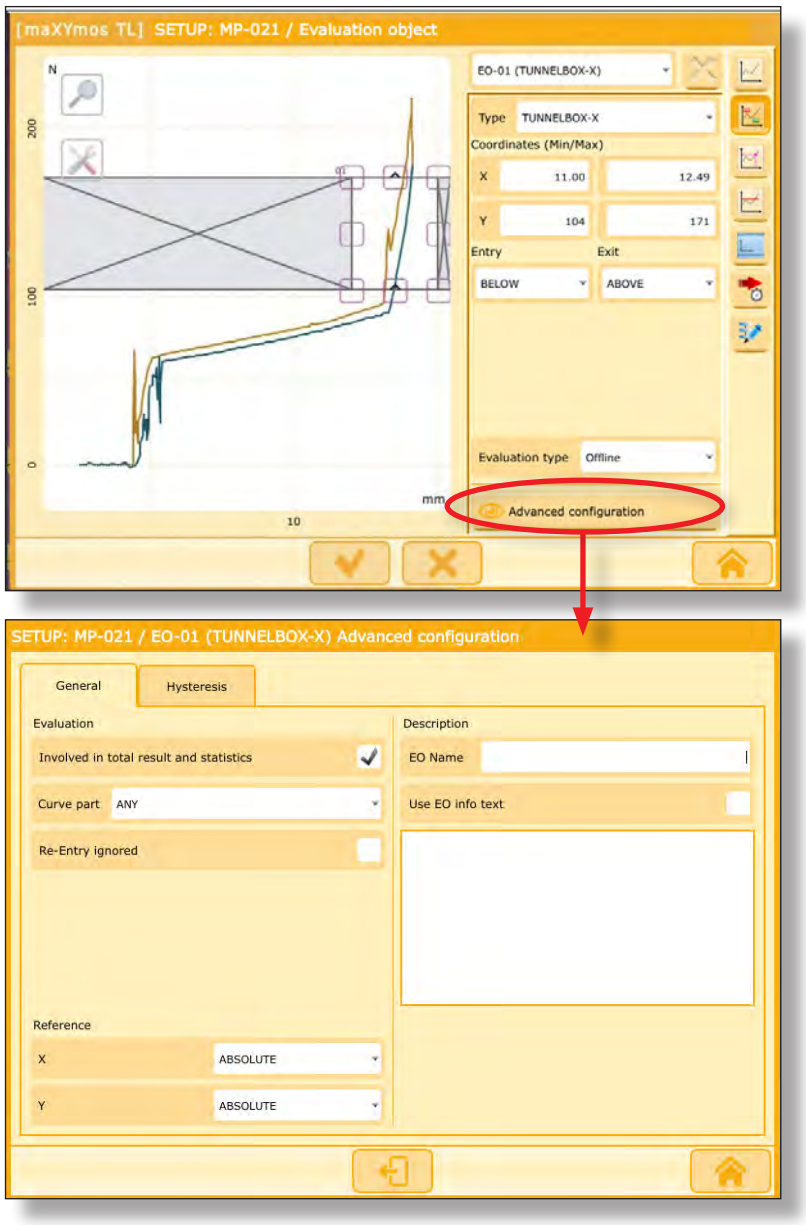
7.26.18.2 Positioning TUNNELBOX-X



Use a numerical input, your fingertip or a VNC command to position the TUNNELBOX-X EO in the required location.

Via the evaluation type you can define if an online evaluation should be done.

7.26.18.3 Configuring TUNNELBOX-X

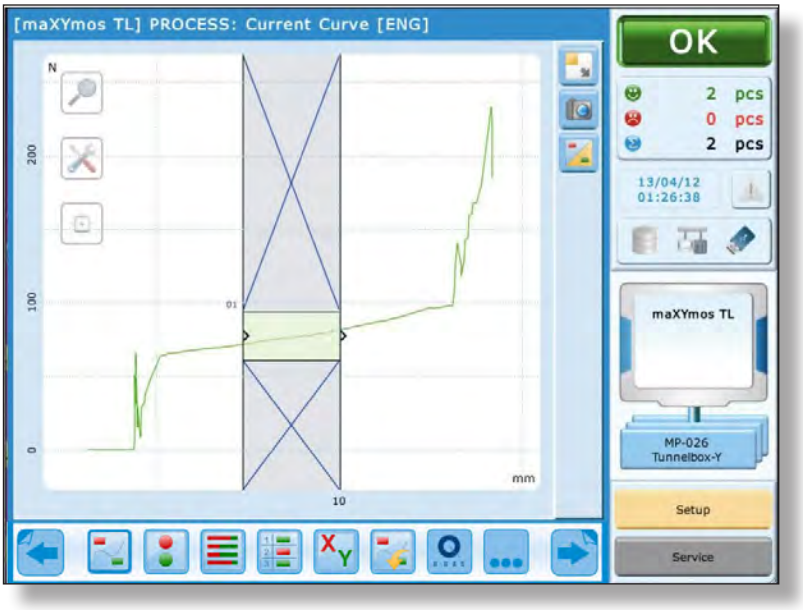


Select TUNNELBOX-X EO and specify entry and exit directions.

Using the advanced configuration menu, you can also define which section of the curve you wish to analyze: ANY, POSITIVE or NEGATIVE.
You can also specify whether a re-entry should be ignored or not.
An EO name and additional EO information text can also be assigned. The EO name will be displayed at the top left, next to the EO number.

X and Y HYSTERESIS parameters can also be entered using the HYSTERESIS tab.

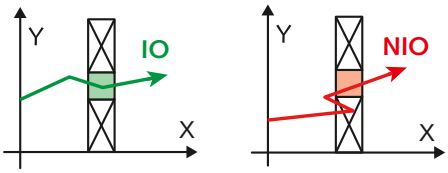
7.26.19 Evaluation objects/EO TUNNELBOX-Y



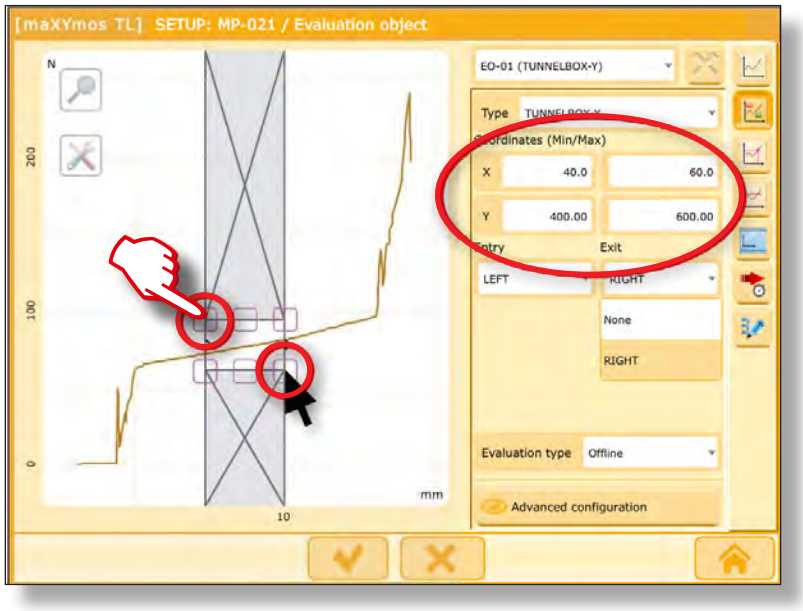
7.26.19.1 Evaluation criterion

This EO evaluates entries into and exits from a defined box. The curve must not cross the closed sides of the box. If these closed sides are crossed, a real-time signal is generated.

Example cases



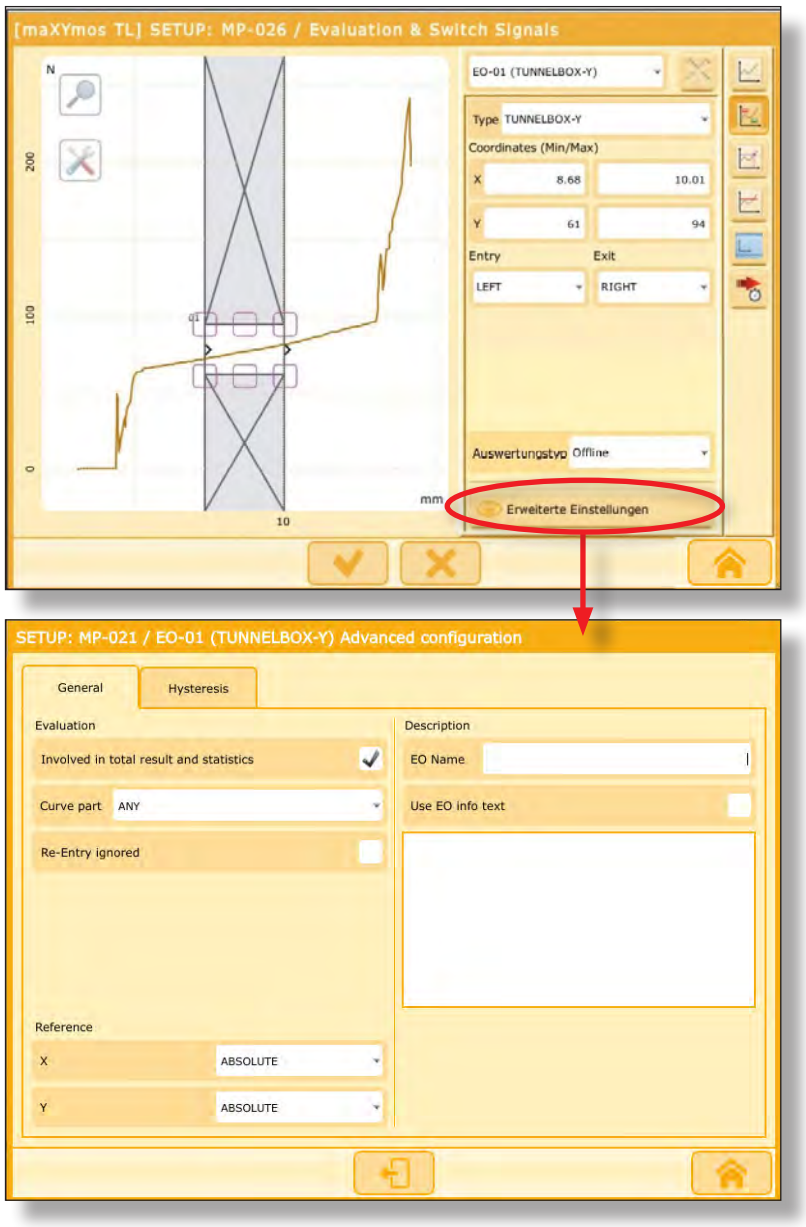
7.26.19.2 Positioning TUNNELBOX-Y



Use a numerical input, your fingertip or a VNC command to position the TUNNELBOX-Y EO in the required location.

Via the evaluation type you can define if an online evaluation should be done.

7.26.19.3 Positioning TUNNELBOX-Y

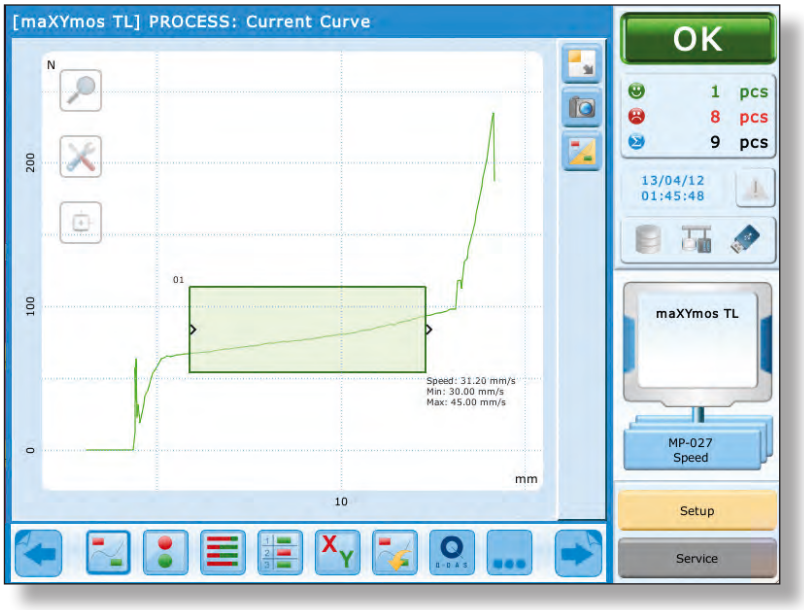


Select TUNNELBOX-Y EO and specify entry and exit directions.

Using the advanced configuration menu, you can also define which section of the curve you wish to analyze: ANY, POSITIVE or NEGATIVE.
You can also specify whether a re-entry should be ignored or not.
An EO name and additional EO information text can also be assigned. The EO name will be displayed at the top left, next to the EO number.

X and Y HYSTERESIS parameters can also be entered using the HYSTERESIS tab.

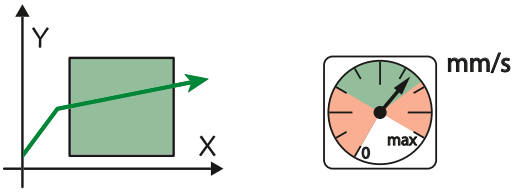
7.26.20 Evaluation objects/EO SPEED



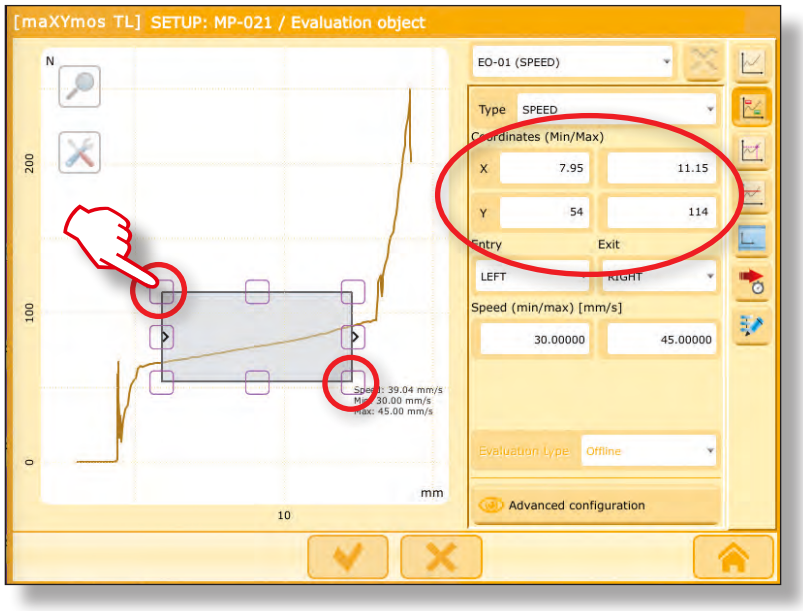
7.26.20.1 Evaluation criterion

This EO measures curve speed between entry into and exit from a defined zone.

Example cases

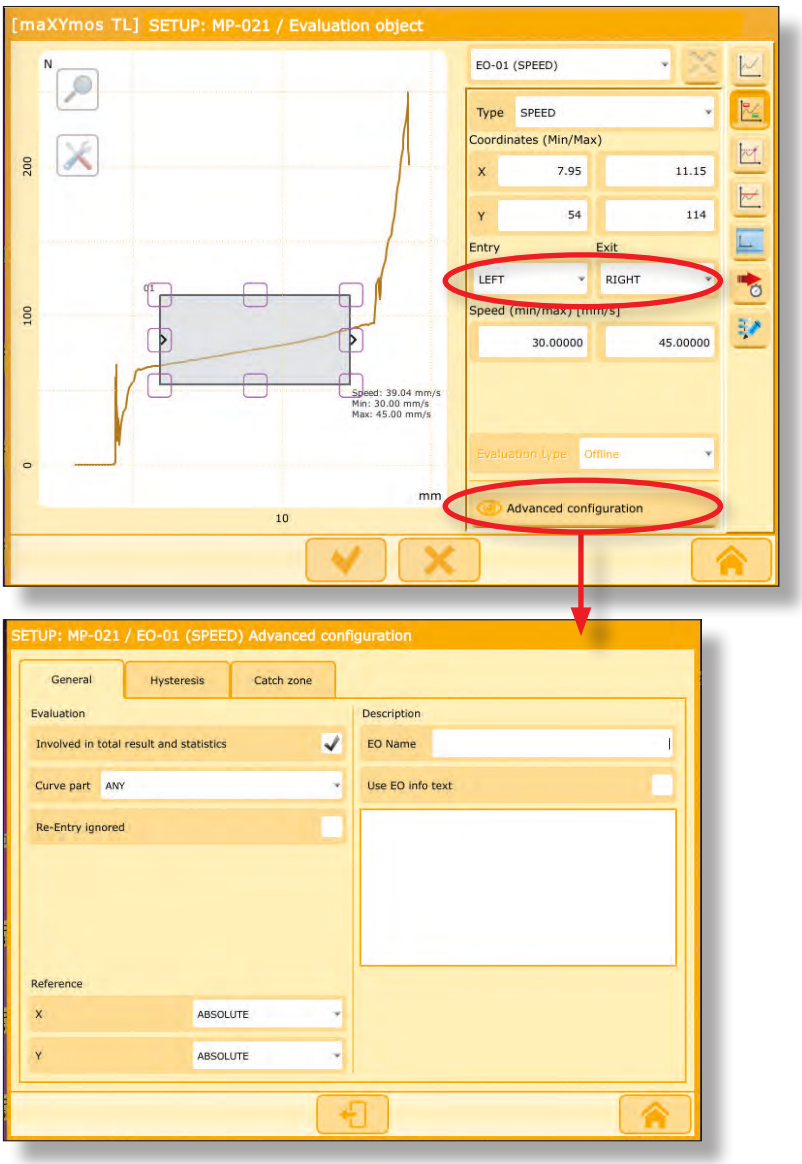


7.26.20.2 Position the SPEED EO



Use a numerical input, your fingertip or a VNC command to position the SPEED EO in the required location.

7.26.20.3 Configuring the SPEED EO



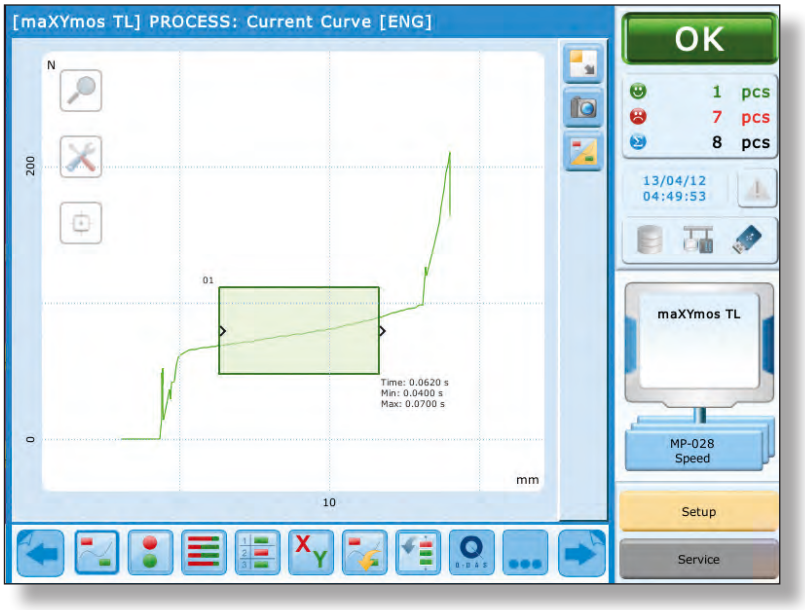
Select SPEED EO and Entry and Exit directions. Input minimum and maximum speeds.

Using the Advanced Configuration menu, you can also define which section of the curve you wish to analyze: ANY, POSITIVE or NEGATIVE.
You can also specify whether a re-entry should be ignored or not.
An EO name and additional EO information text can also be assigned. The EO name will be displayed at the top left, next to the EO number.
X and Y HYSTERESIS parameters can also be entered using the HYSTERESIS tab.

Select advanced configuration, then select the catch zone tab.
The catch zones, i.e. the zones within which process values are "captured", must be specified for each EO individually in the EO Editor.

Important!
OK-NOK evaluation is carried out only inside the boundaries of the box. The catch zone merely serves to ensure that process values outside these box boundaries are also recorded. If, for example, a curve failed to intersect the entry side of the box, knowing by what margin it missed the entry boundary could be of statistical interest.

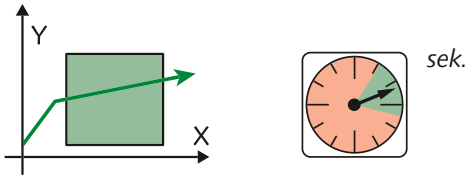
7.26.21 Evaluation objects/EO TIME



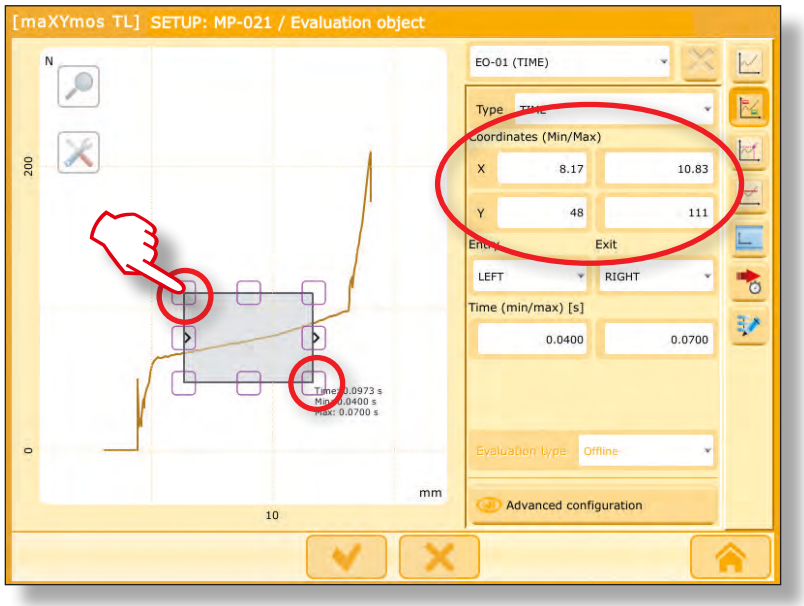
7.26.21.1 Evaluation criterion

This EO evaluates the time which elapses between the entry and the exit point.

Example cases

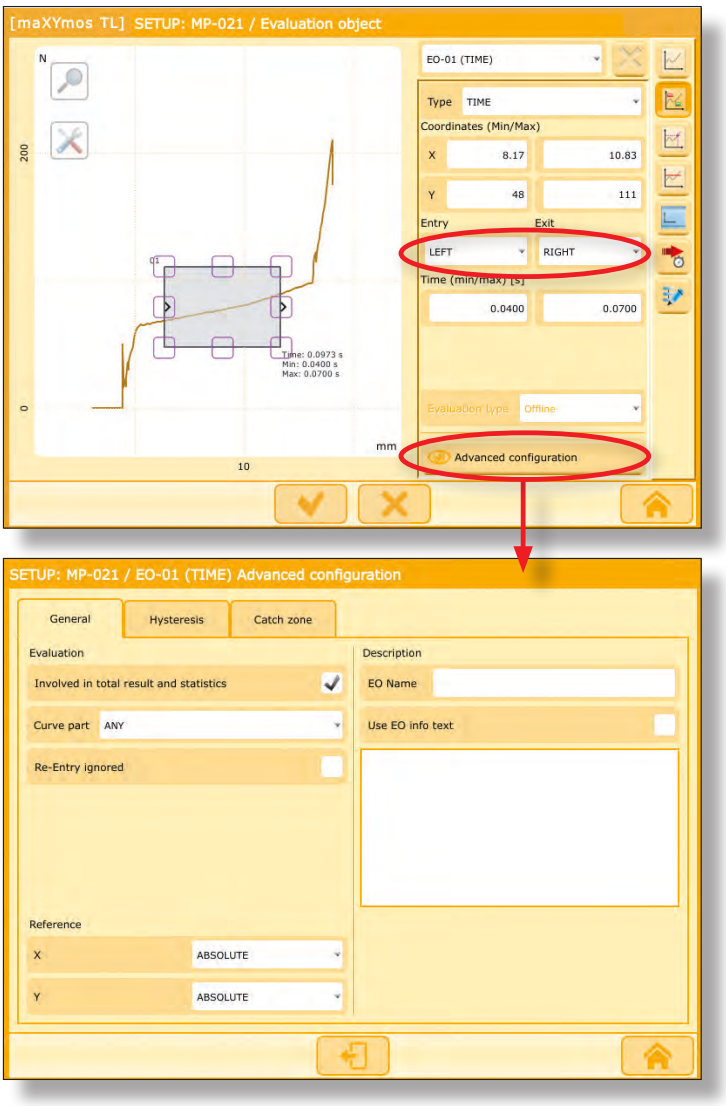


7.26.21.2 Positioning the TIME EO



Use a numerical input, your fingertip or a VNC command to position the time EO in the required location.

7.26.21.3 Configuring the TIME EO



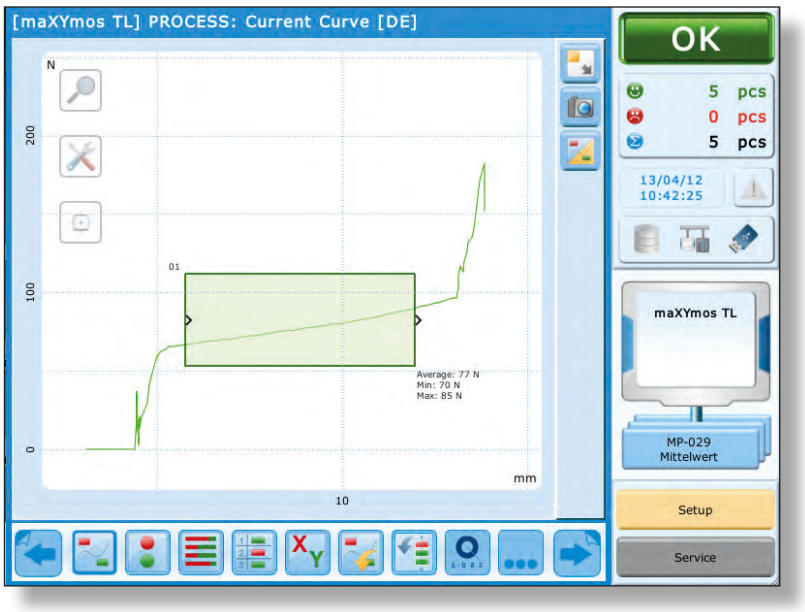
Select time EO and Entry and Exit directions. Input minimum and maximum time intervals.

Using the Advanced Configuration menu, you can also define which section of the curve you wish to analyze: ANY, POSITIVE or NEGATIVE.
You can also specify whether a re-entry should be ignored or not.
An EO name and additional EO information text can also be assigned. The EO name will be displayed at the top left, next to the EO number.
X and Y HYSTERESIS parameters can also be entered using the HYSTERESIS tab.

Select advanced configuration, then select the catch zone tab.
The catch zones, i.e. the zones within which process values are "captured", must be specified for each EO individually in the EO Editor.

Important!
OK-NOK evaluation is carried out only inside the boundaries of the box. The catch zone merely serves to ensure that process values outside these box boundaries are also recorded. If, for example, a curve failed to intersect the entry side of the box, knowing by what margin it missed the entry boundary could be of statistical interest.

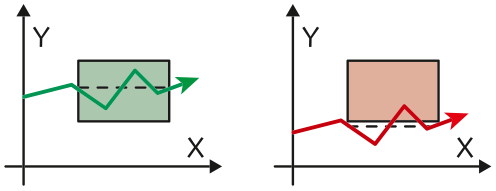
7.26.22 Evaluation objects/EO AVERAGE



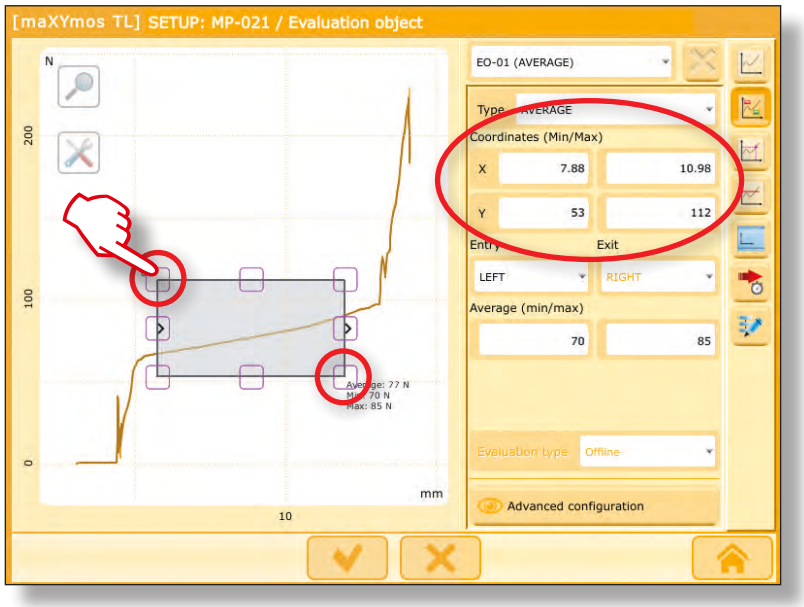
7.26.22.1 Evaluation criterion

This EO evaluates the AVERAGE of all Y values in the box area.

Example cases

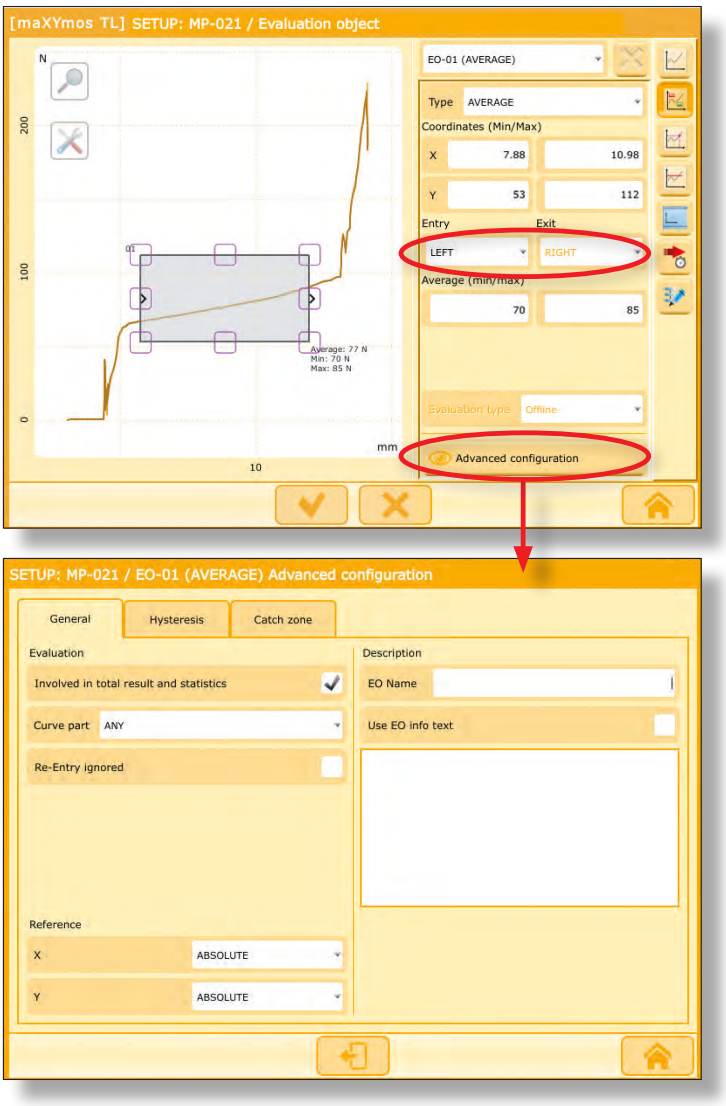


7.26.22.2 Positioning the AVERAGE EO



Use a numerical input, your fingertip or a VNC command to position the AVERAGE EO in the required location.

7.26.22.3 Configuring the AVERAGE EO



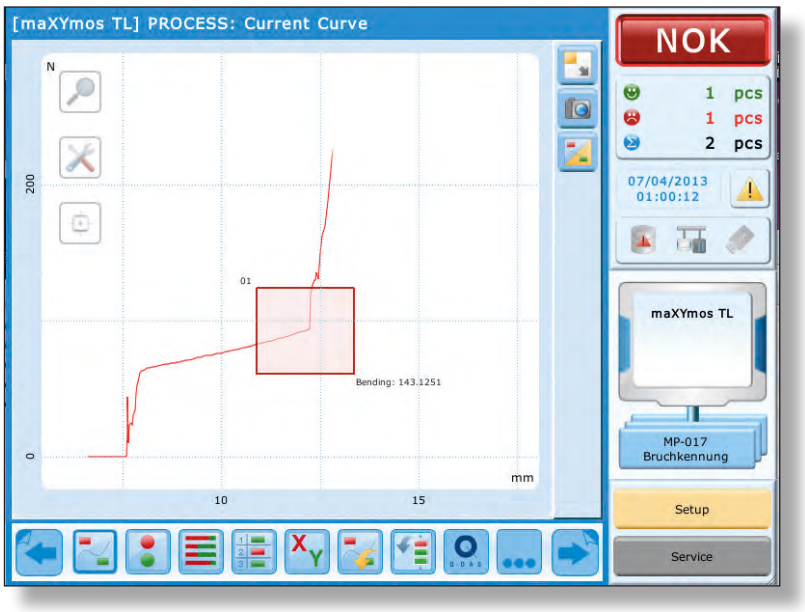
Select AVERAGE EO and Entry and Exit directions. Input minimum and maximum AVERAGEs.

Using the Advanced Configuration menu, you can also define which section of the curve you wish to analyze: ANY, POSITIVE or NEGATIVE.
You can also specify whether a re-entry should be ignored or not.
An EO name and additional EO information text can also be assigned. The EO name will be displayed at the top left, next to the EO number.
X and Y HYSTERESIS parameters can also be entered using the HYSTERESIS tab.

Select advanced configuration, then select the catch zone tab.
The catch zones, i.e. the zones within which process values are "captured", must be specified for each EO individually in the EO Editor.

Important!
OK-NOK evaluation is carried out only inside the boundaries of the box. The catch zone merely serves to ensure that process values outside these box boundaries are also recorded. If, for example, a curve failed to intersect the entry side of the box, knowing by what margin it missed the entry boundary could be of statistical interest.

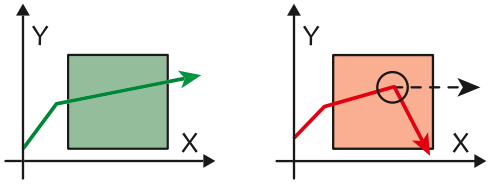
7.26.23 Evaluation objects/EO BREAK



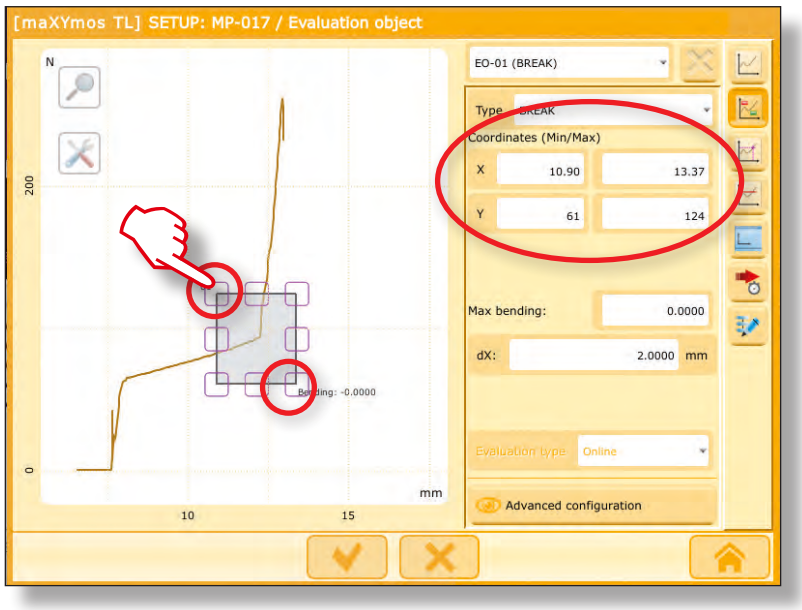
7.26.23.1 Evaluation criterion

BREAK-DETECTION monitors any abrupt changes in curve gradient observed in the area where breaks are expected to occur (defined as a box area).
It is not relevant in this case whether the curve suddenly declines (when the workpiece shatters) or suddenly points upwards (when remains of the broken workpiece block the feed).

Example cases

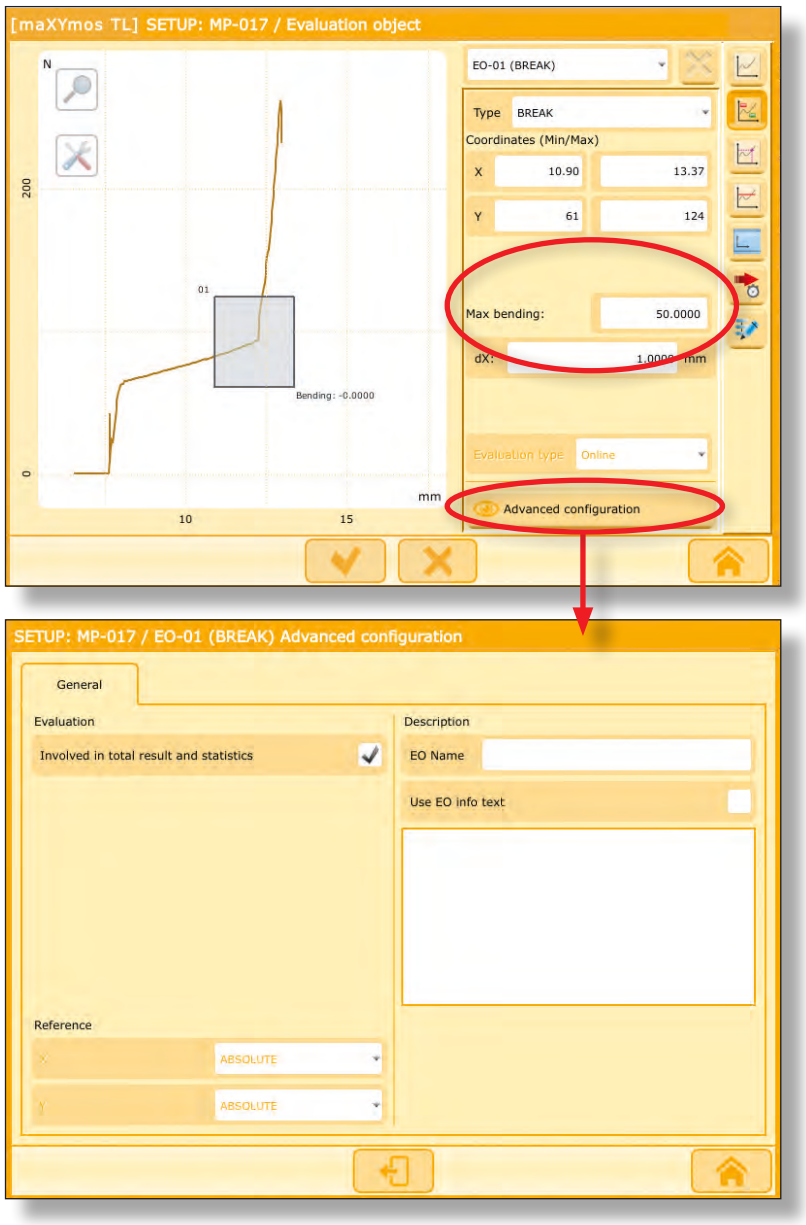


7.26.23.2 Positioning the BREAK EO



Use a numerical input, your fingertip or a VNC command to position BREAK EO in the required location.

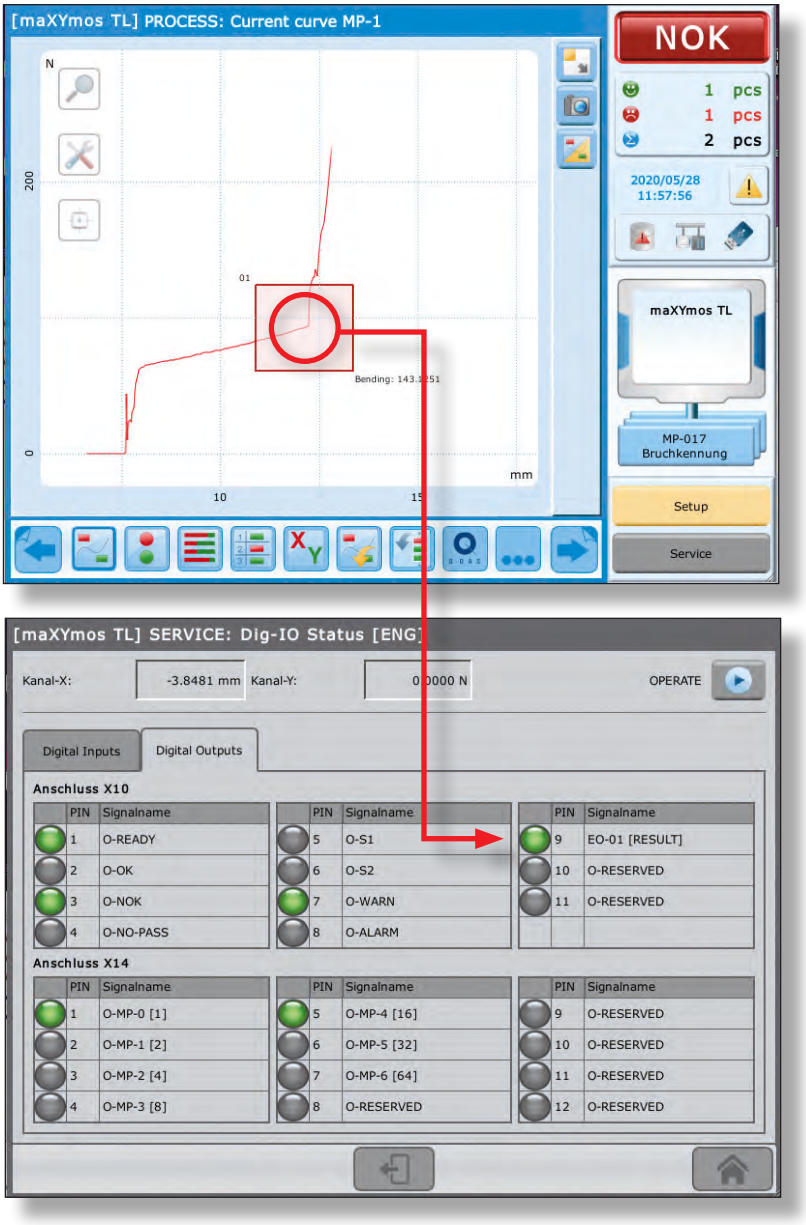
7.26.23.3 Configuring the BREAK EO



The **Advanced configurations** menu can be used to assign a name to the EO and to append additional EO information text. The EO name will be displayed at the top left, next to the EO number.

Important!
OK-NOK evaluation is carried out only inside the boundaries of the box. The catch zone merely serves to ensure that process values outside these box boundaries are also recorded. If, for example, a curve failed to intersect the entry side of the box, knowing by what margin it missed the entry boundary could be of statistical interest.

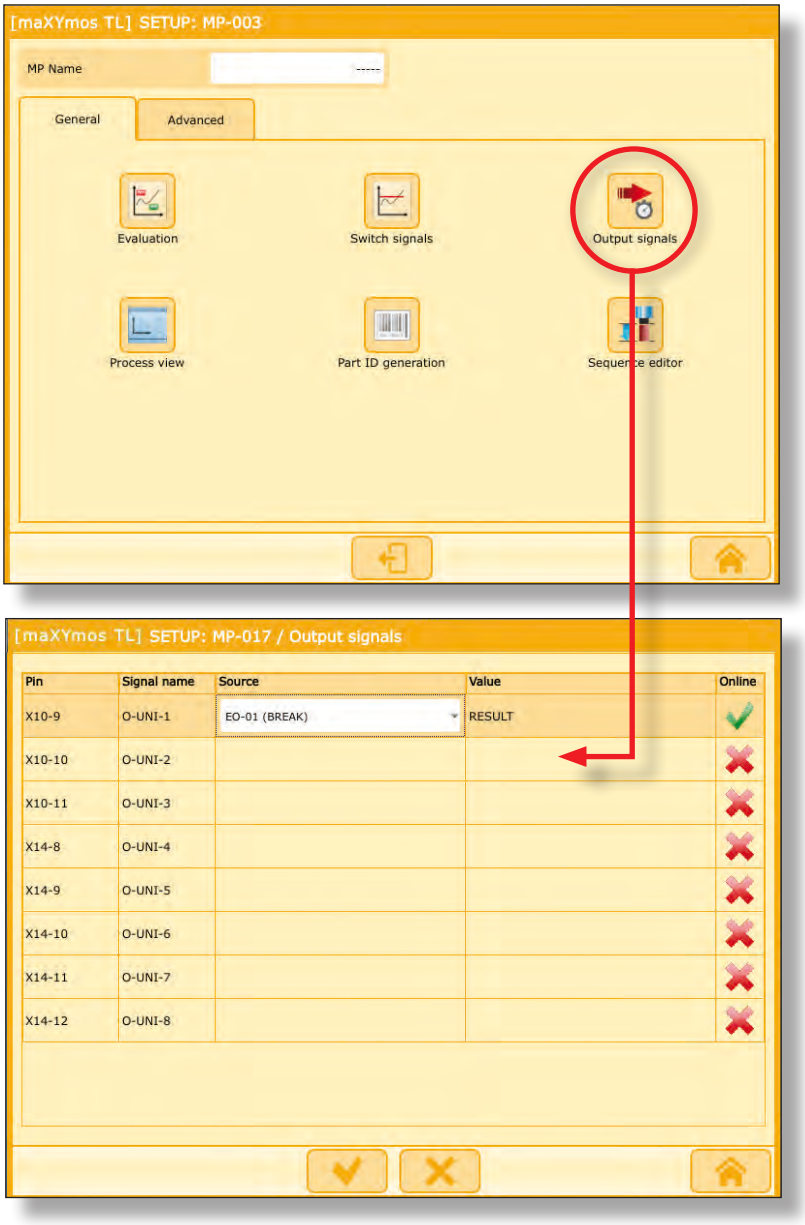
7.26.23.4 Setup Online-signal



Online-signal

Certain EO's can be transmitted as an online signal. For that to happen, online signal has to be set up in the measurement program → next page. The MP Setup menu has an Output Signals submenu which allows up to 8 possible outputs to be defined. In the example above, PIN 9 on socket X10 has been selected.

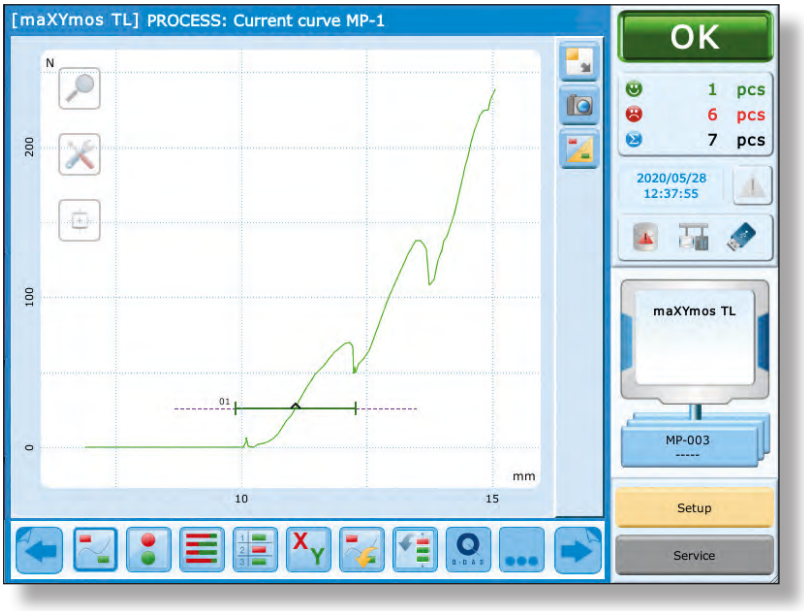
To display the switching parameters in the Service menu: → Service / Dig-IO Status / Digital Outputs tab.



Setting up an online-signal

The measurement program's SETUP menu is used to configure an online signal (in this example, MP-017 has been selected): → SETUP / MP SETUP / (e.g.) MP-017 / Output Signals
The Output Signals submenu allows you to select up 8 possible outputs. In this example, PIN 9 on socket X10 has been selected.
Select the required EO in the "Source" column (in this example, EO-01 has been chosen). The far-right column indicates the online status of the connection (✓ = activated).

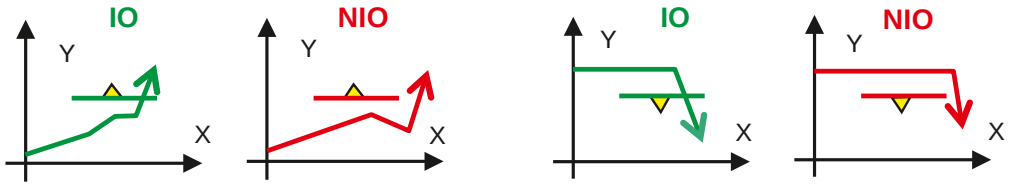
7.26.24 Evaluation objects/EO LINE-X



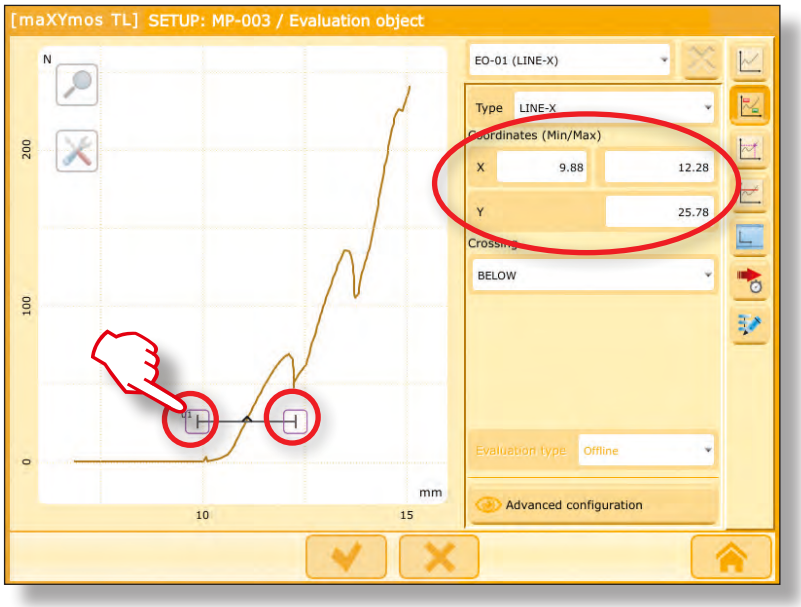
7.26.24.1 Evaluation criterion

The measurement curve must cross LINE-X once and must do so from the defined direction (i.e. from BELOW or ABOVE). The LINE-X EO monitors whether the X value is within the defined XMIN and XMAX tolerance. The process value is also an X value.

Example cases



7.26.24.2 Positioning the LINE-X EO over the measurement curve

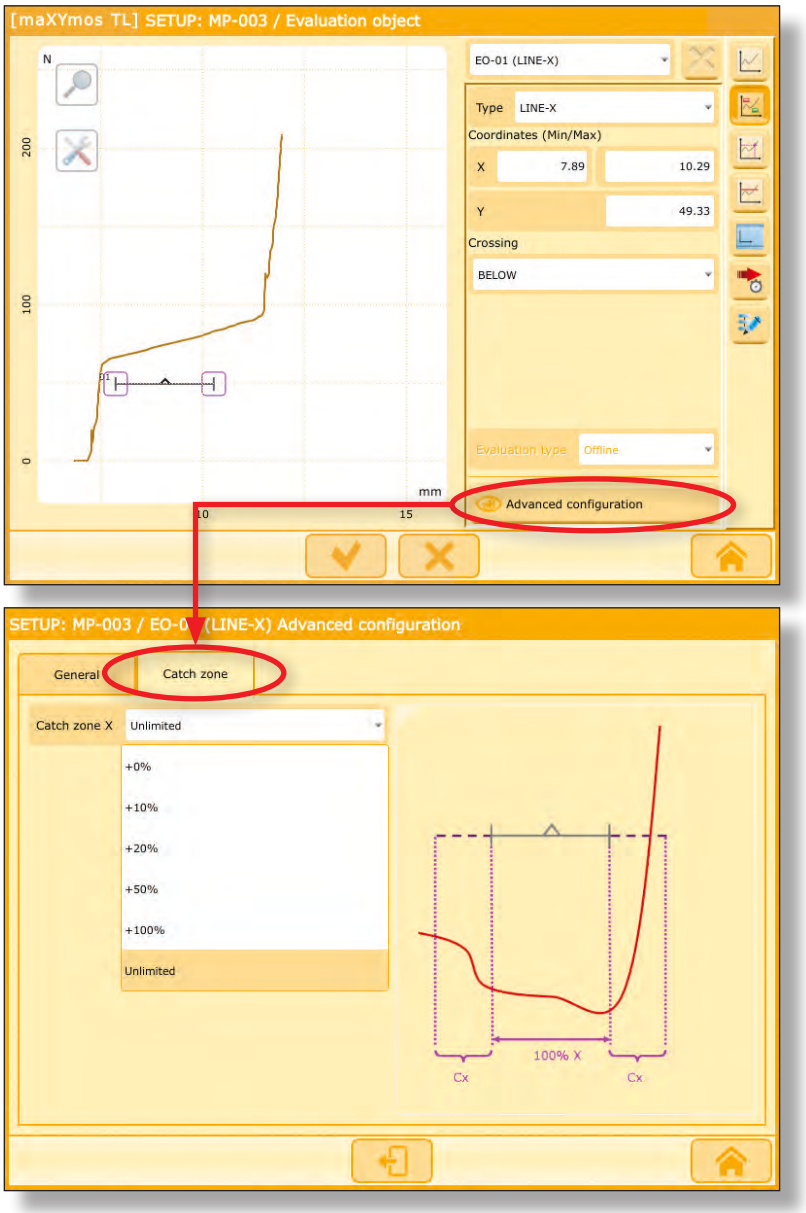


In the EO Editor, use a numerical input, your fingertip or a VNC command to position the LINE-X EO in the required location.

7.26.24.3 Specifying the LINE-X catch zone

Also see Section → "Catch zone for process values"page 229.

The catch zone, i.e. the zone within which process values are "captured", must be specified for each EO individually in the EO Editor (see left section of lower screen shot below).

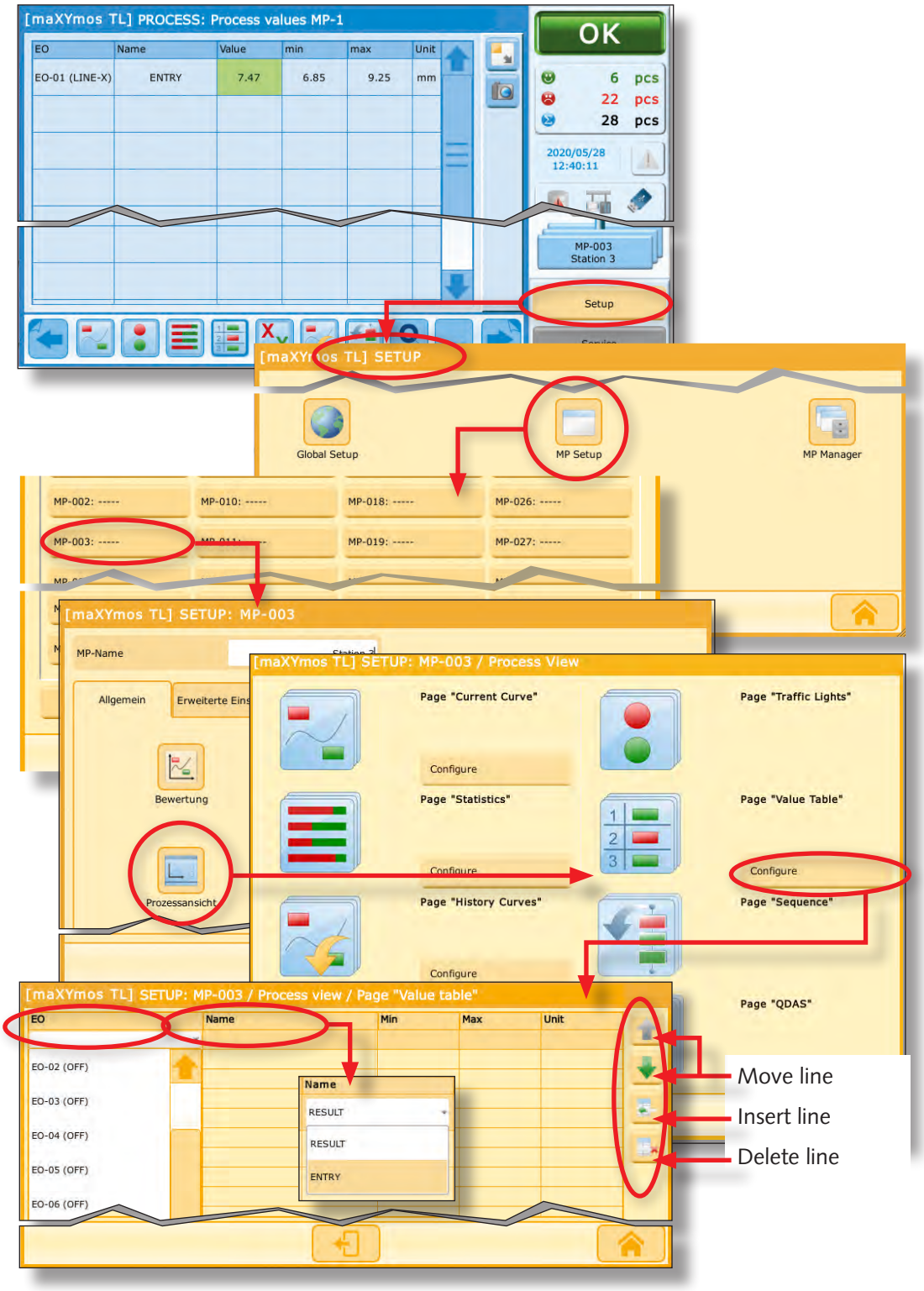


In this example, the catch zone has been set to "Unlimited". On this setting, process values will be recorded up to the border of the horizontally extended (dashed) line, which in this case is the limit up to which data can be measured in Channel Y.

Important!
The actual evaluation is performed solely on the basis of the LINE-X borders. Extending the catch zone beyond this line ensures that process values beyond the the LINE-X borders will be recorded. If, for example, a curve failed to meet LINE-X, knowing by what margin it missed LINE-X could be of statistical interest.

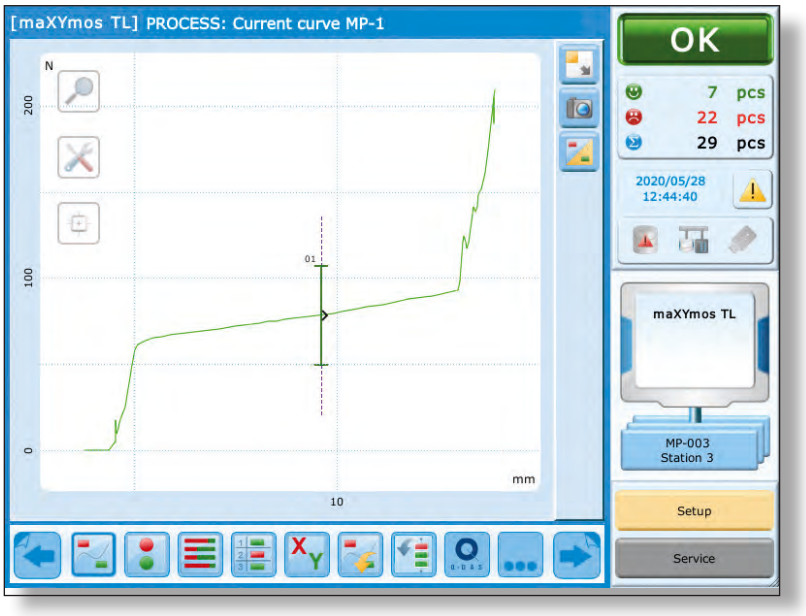
7.26.24.4 Displaying LINE-X process values in the value table

The process values can be displayed in the (blue) values table.



Setup:
Choose the measurement program you require, e.g. MP-003 (→ Setup / MP Setup / MP-003). First select Process View, then Configure for Value Table page.
Select EO column header, then required EO in column, e.g. EO-01.
Select Name field, followed by required measurement value, e.g. ENTRY for entry value.

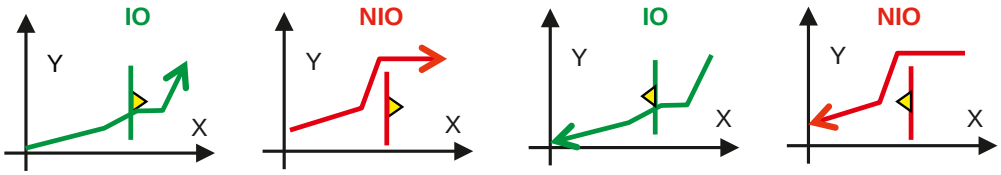
7.26.25 Evaluation objects/EO LINE-Y



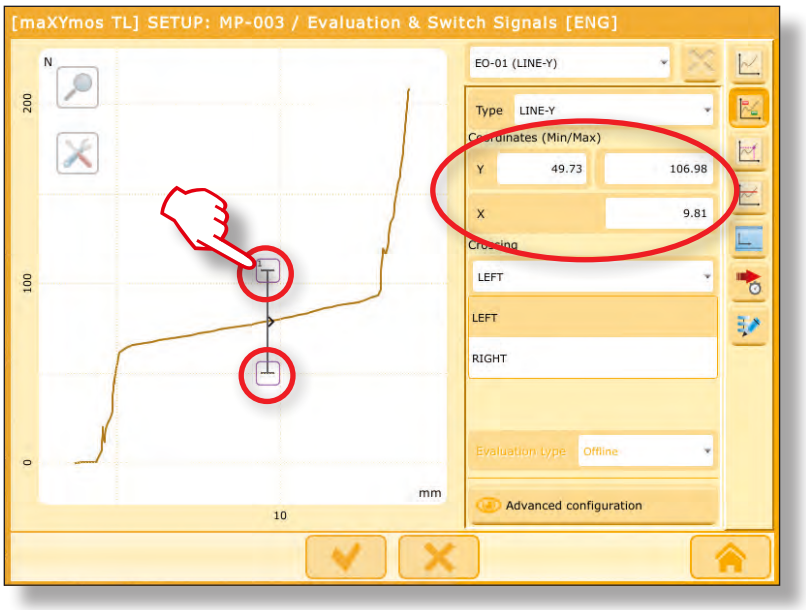
7.26.25.1 Evaluation criterion

The measurement curve must cross LINE-Y once and must do so from the defined direction (i.e. from the RIGHT or LEFT). The LINE-Y EO monitors whether the Y value is within the defined YMIN and YMAX tolerance. The process value is also a Y value.

Example cases:



7.26.25.2 Positioning the LINE-Y EO Over the measurement curve



In the EO Editor, use a numerical input, your fingertip or a VNC command to position the LINE-Y EO in the required location.

7.26.25.3 Obtaining process values from the LINE-Y EO

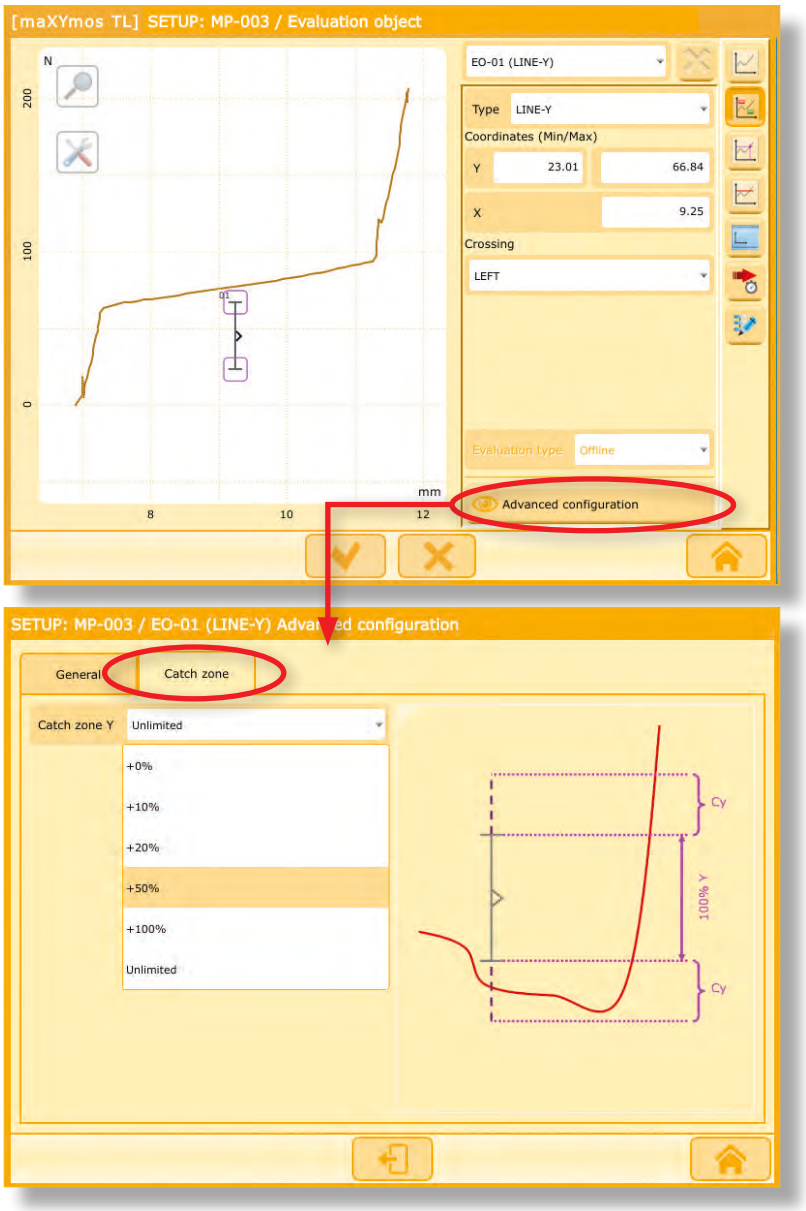
The ENTRY process value is the X value at the point where the measurement curve intersects the LINE-Y EO and from there into its vertical extension within the catch zone. This value can be viewed in the Value Table on the PROCESS page → p. 29, 199. It can also be transferred by means of the fieldbus.

The LINE-Y EO supplies the Y value at the point where the curve either intersects the line (see red circle in left diagram above) or intersects the line's extension within the catch zone (see circle around dashed line extension in right diagram above).

7.26.25.4 Specifying the LINE-Y catch zone

Also see Section → "catch zone for Process Values"page 229.

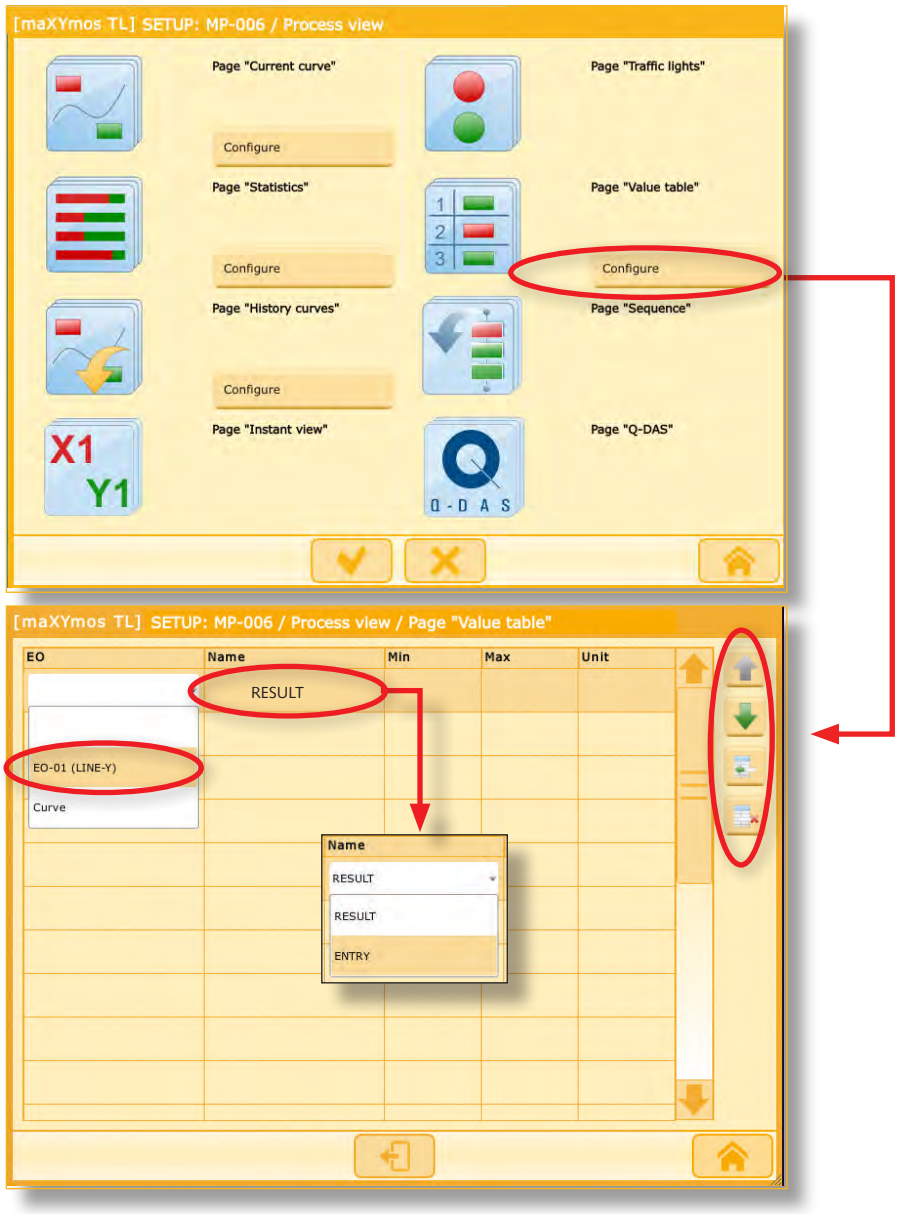
The catch zone, i.e. the zone within which process values are "captured", must be specified for each EO individually in the EO Editor (see left section of lower screen shot below).



In the example above, a 50% catch zone has been selected. On this setting, process values intersecting line Y at any point along its length (now extended by a further 50% upwards and a further 50 % downwards, relative to the position of the LINE-Y EO) will also be recorded.

Important!
The actual evaluation is performed solely on the basis of the LINE-Y borders. Extending the catch zone beyond this line ensures that process values beyond the the LINE-Y borders will be recorded. If, for example, a curve failed to meet LINE-Y, knowing by what margin it missed LINE-Y could be of statistical interest.

7.26.25.5 Process value LINE-Y



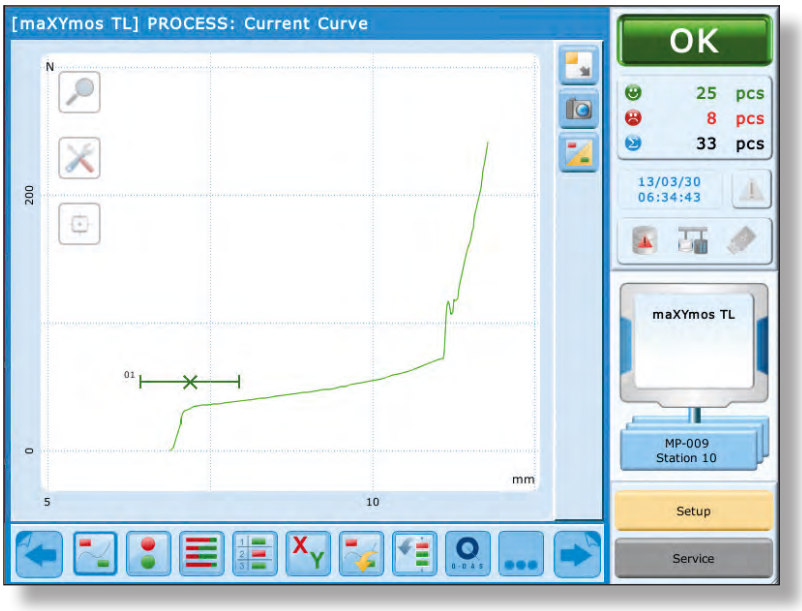
Setup:
Choose the measurement program you require, e.g. MP-006 (→ Setup / MP Setup / MP-006). First select Process View, then Configure button for Value Table page.
Select EO column header, then required EO in column, e.g. EO-01.
Select Name field, followed by required measurement value, e.g. ENTRY for entry value.

Move line:
Move selected line up/down

Insert line.

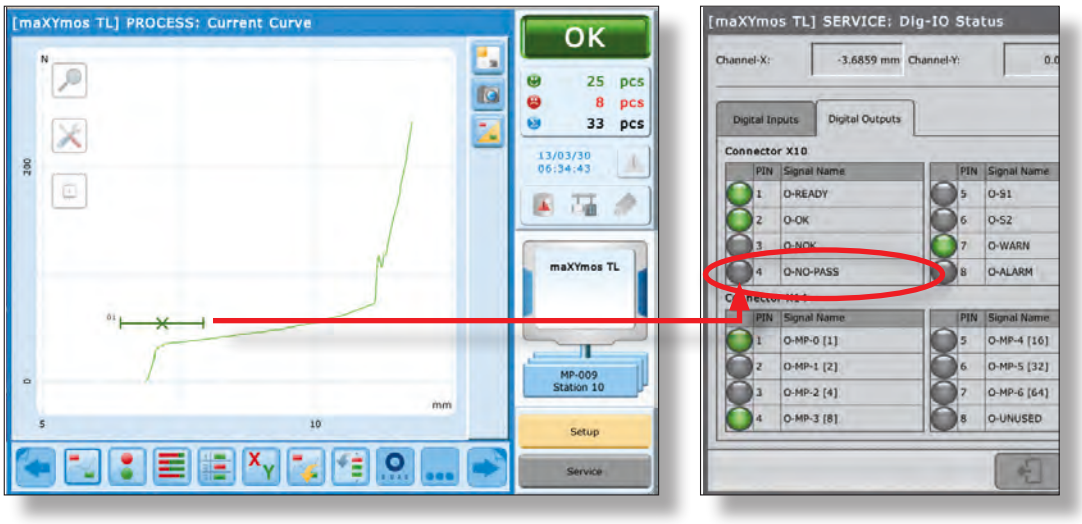
Delete line.

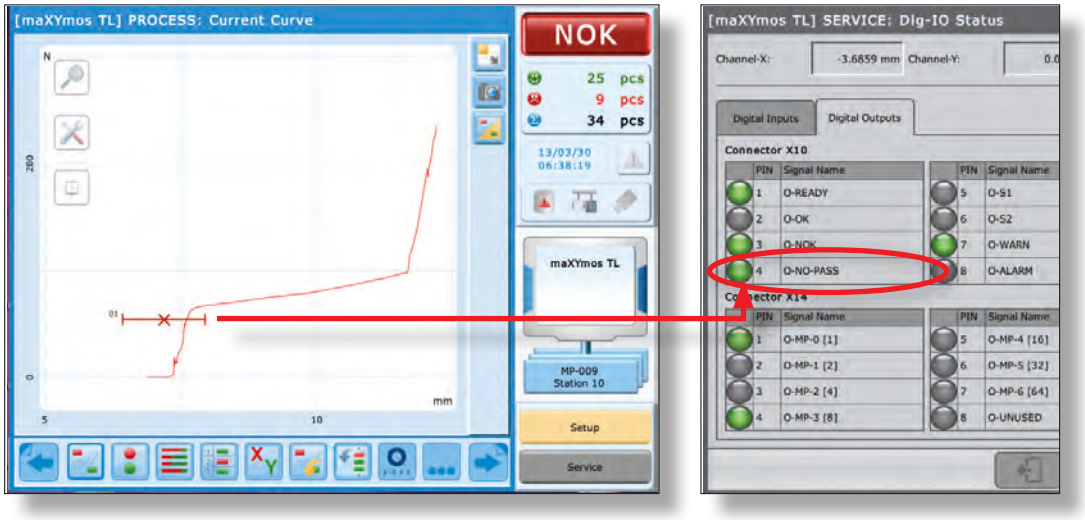
7.26.26 Evaluation objects/EO NO-PASS



7.26.26.1 Evaluation criterion

The measurement curve must not intersect this EO. If the EO is intersected, an NOK message will be generated and the O-NO-PASS output will be set to "1" in real time (in <1ms) → page 196; Service / Dig-IO Status / Digital outputs.
The O-NO-PASS output will maintain a "1" setting until the next result which fulfills the START condition is recorded. The NO-PASS EO can be referenced solely to ABSOLUTE. Only 1 NO-PASS EO can be configured for each measurement program.

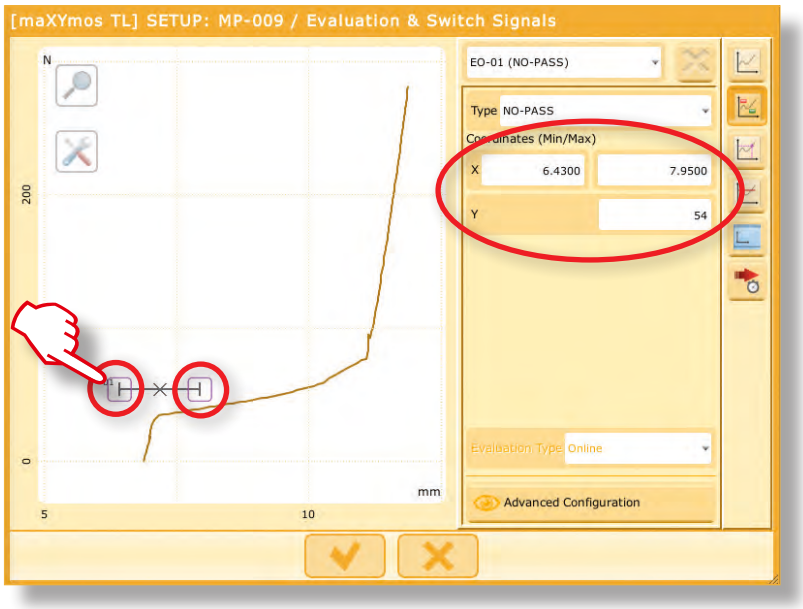




This EO is mainly used in cases where it is important to obtain a rapid response, for example in the insertion zone during press-fit processes. Excessively steep force gradients in this zone indicate skewing of the parts being joined, which results in the NO-PASS line being infringed. O-NO-PASS can then be used, for example to initiate the press-return stroke.

7.26.26.2 Positioning the NO-PASS EO

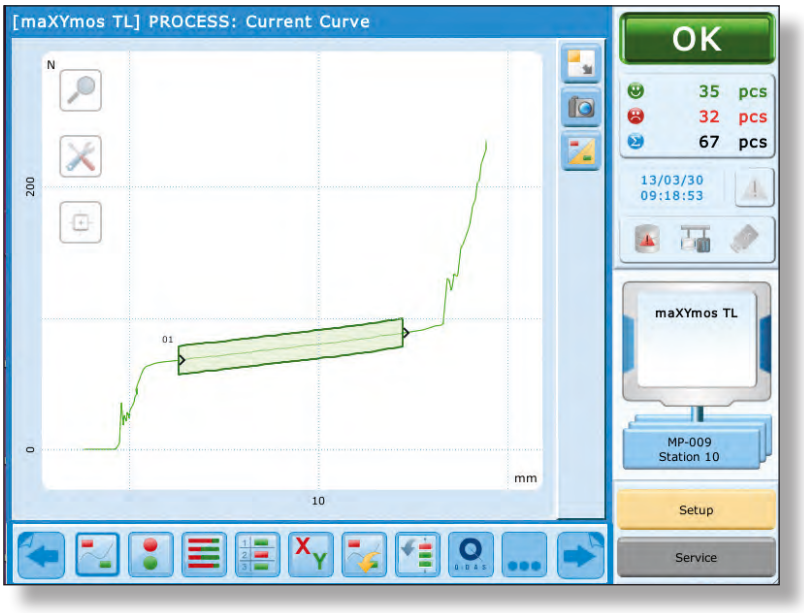
The NO-PASS threshold is generally positioned in areas which the measurement curve must not penetrate. NO-PASS is often positioned over the insertion zone of a press-fit curve (see screen shots below).



7.26.26.3 Obtaining Process Values from the NO-PASS EO

NO-PASS does not provide any process values and therefore has no catch zone.
(The catch zone is described in Section → "Catch zone for Process Values" «Catch zone for Process Values»).

7.26.27 Evaluation objects/EO ENVELOPE



7.26.27.1 Evaluation criterion

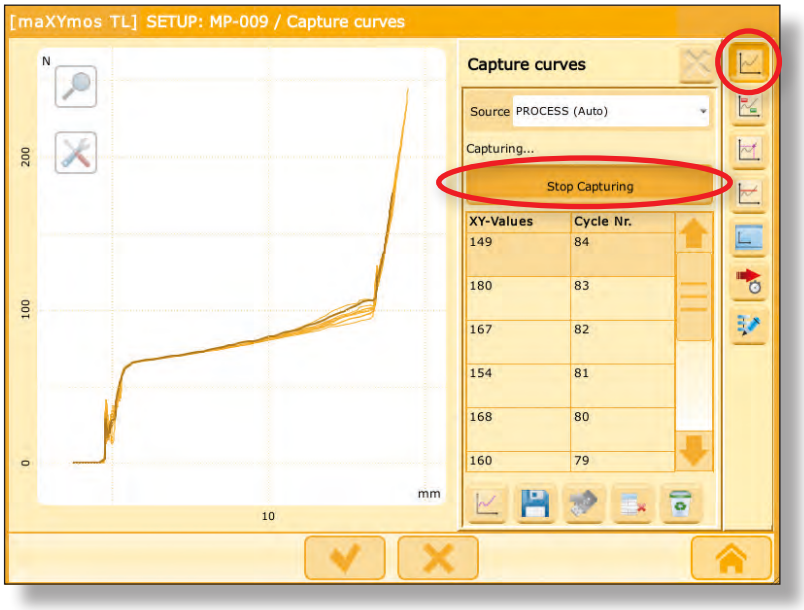
This EO requires the measurement curve to enter the ENVELOPE through its defined ENTRY side and leave it through its defined EXIT side, without infringing either the top or bottom boundary in the process.

Example cases

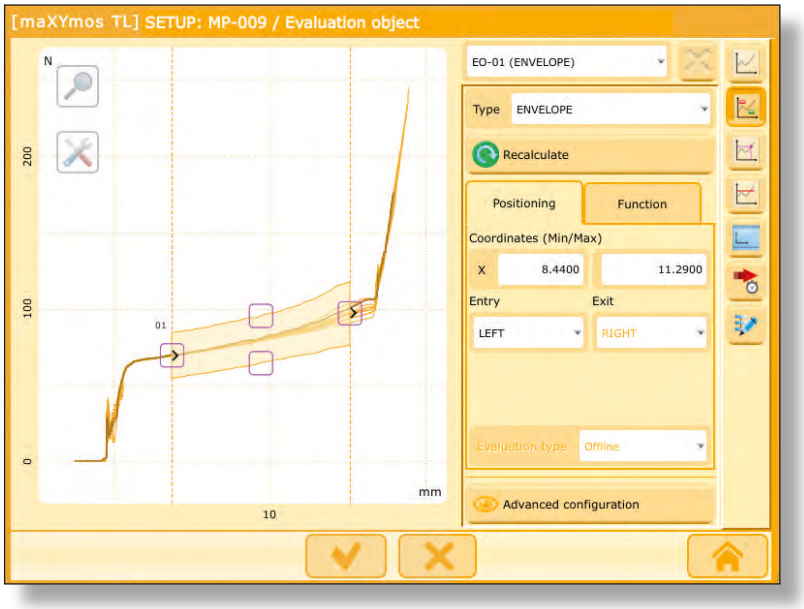
The ENVELOPE EO is generally used in cases where evaluation objects need to be learned quickly. It is also suitable for evaluating inclined sections of a curve, where a UNI BOX EO or a sequence of LINE-X EOs would provide only patchy coverage.

7.26.27.2 Positioning the ENVELOPE EO

If necessary, first consult → p. 150 before reading this section.



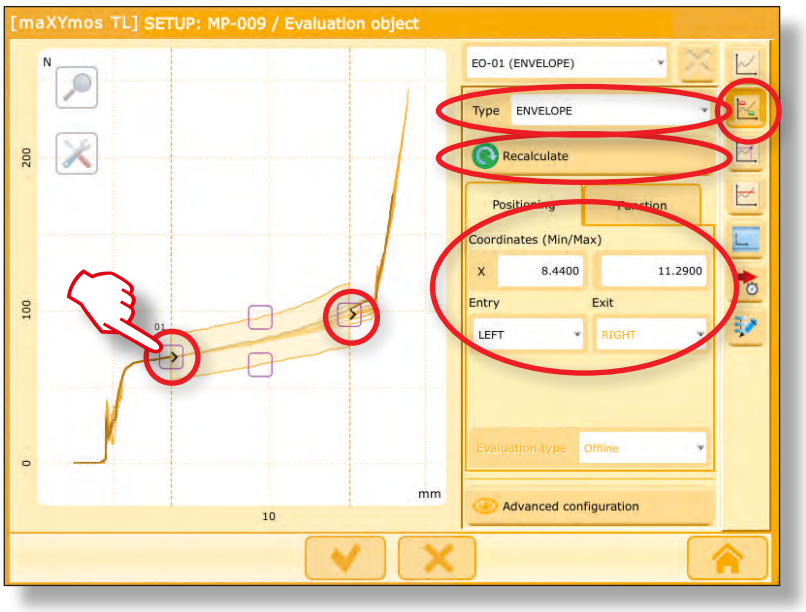
Initially a bundle of curves is captured, whose external contours will then be used to generate the envelope automatically. It is therefore important to reject any curves identified as outliers. This can be done by using the Yes/No procedure and selecting "No" for the rejected curves. Unless this is done, outliers will affect the shape calculated for the envelope.



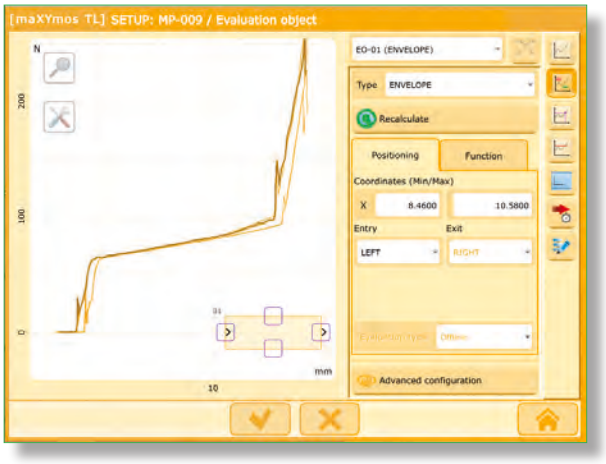
Now activate an ENVELOPE-type EO. The envelope will automatically wrap itself around the external contours of the curve bundle.

KISTLER
measure. analyze. innovate.

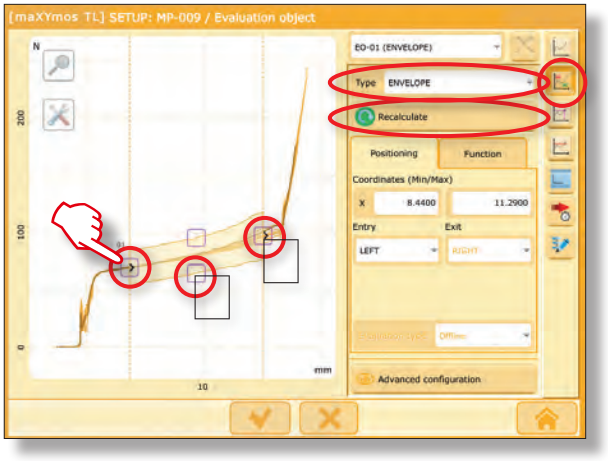
7.26.27.3 Positioning the ENVELOPE EO



Like the UNI BOX, the ENVELOPE can be positioned as a graphic object, using the "handles" shown in the screenshot above, or by numerical input. Each time it is moved, its boundaries are automatically recalculated. This process can also be activated by pressing the Recalculate button.

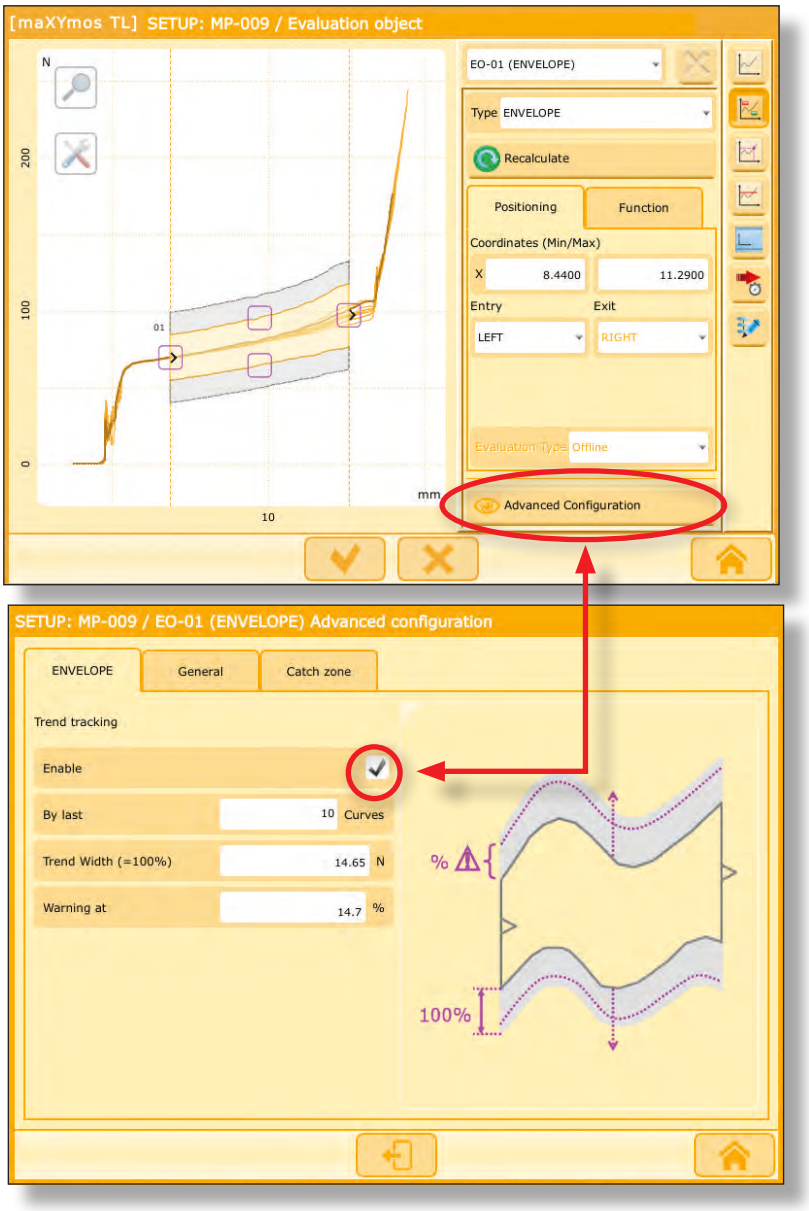


Only those measurement curves that cover the complete X range of the envelope are included in its generation. In the example above none of the curves meet this condition, so the ENVELOPE "drops" onto the X-axis.



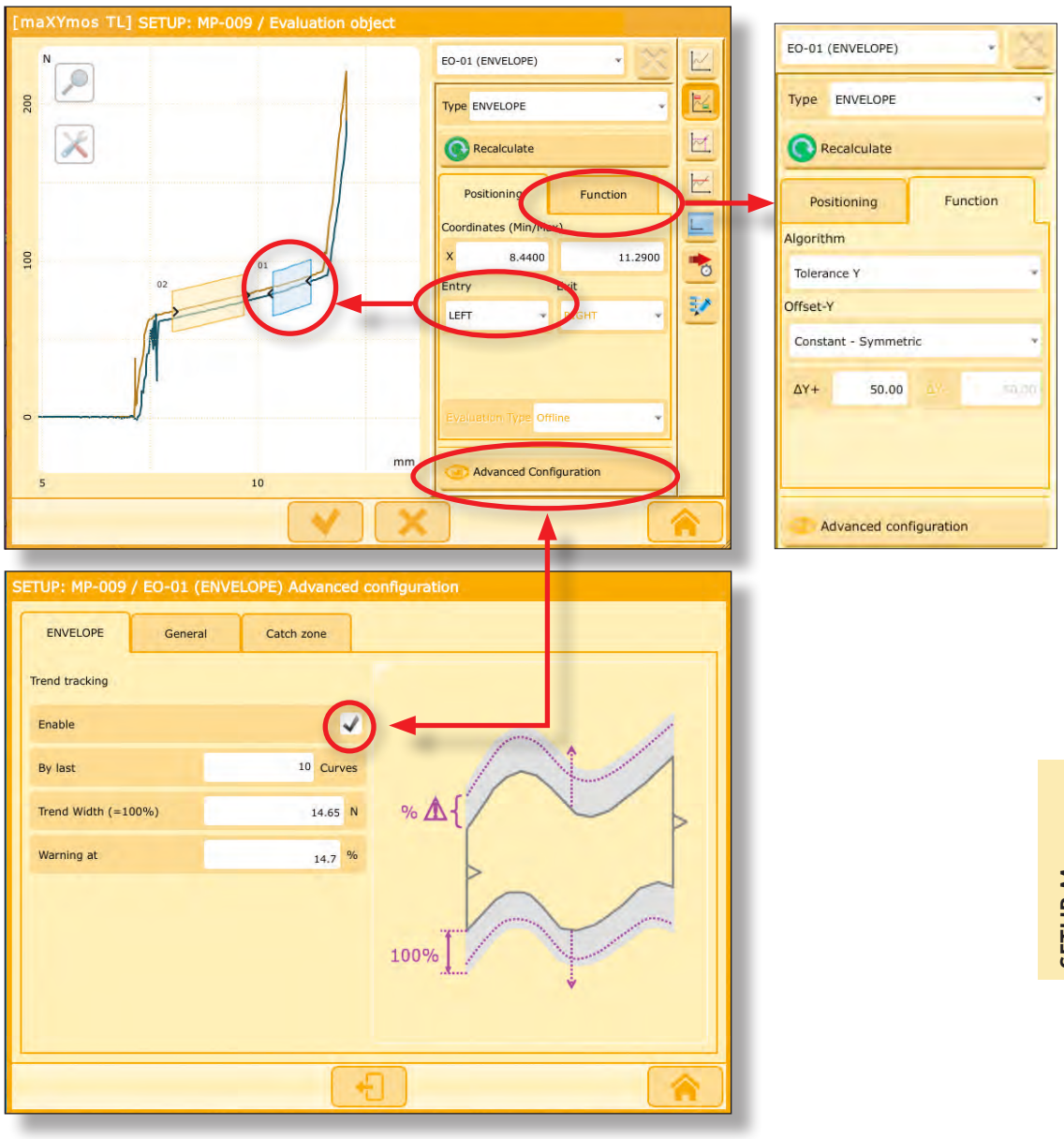
However, as soon as these conditions have been met, for example by moving the right-hand exit side to the left, the envelope will spring back onto the bundle.

7.26.27.4 Activating trend tracking



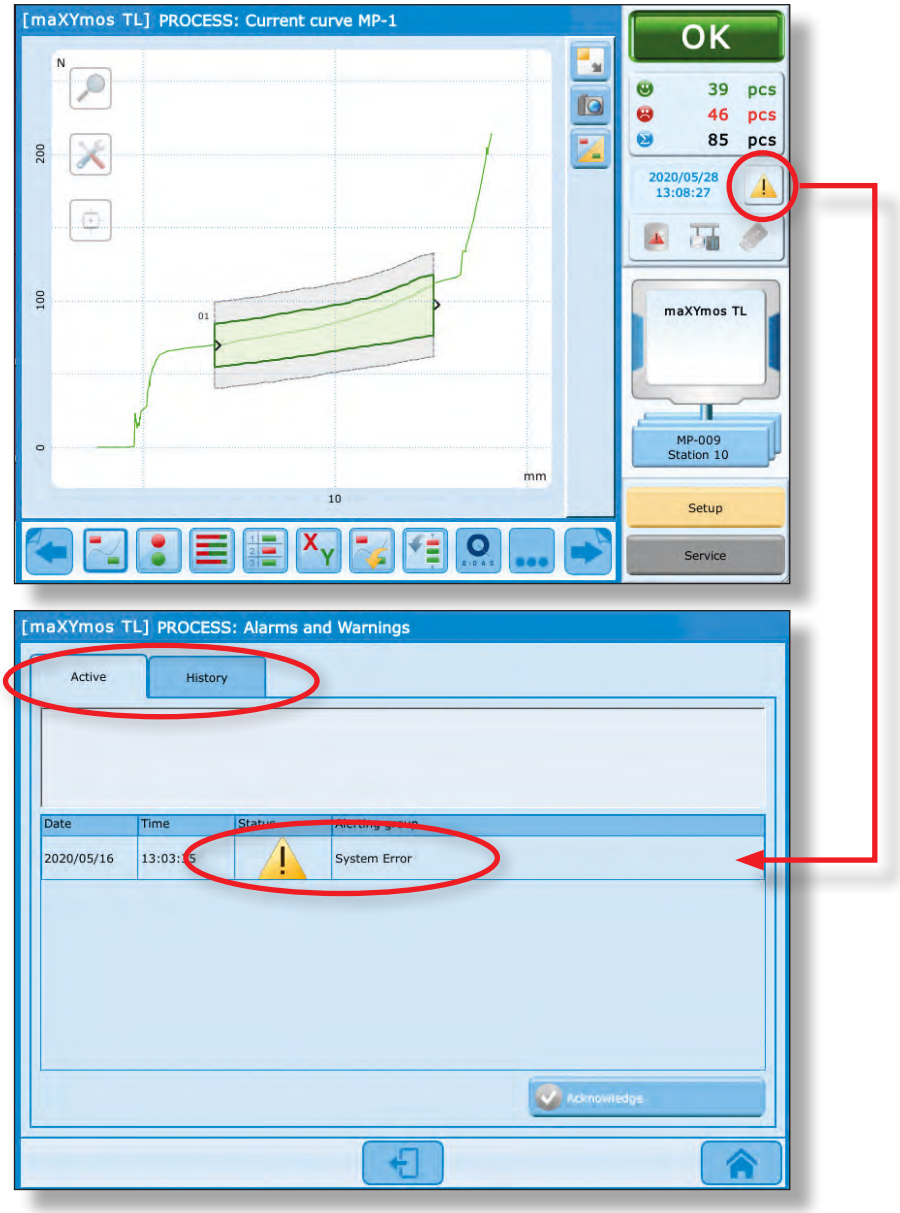
To activate the trend-tracking function, go to the Advanced Configuration menu, select the Envelope tab and check the Enable checkbox. It is important to use this function when, for example, tools become worn and it is therefore necessary for the testing procedure to apply greater force. The function extends envelope curves within the parameters entered by the user.
If the envelope exceeds the outside trend limit, a warning message is generated. See also → page 228

7.26.27.5 Assigning the ENVELOPE to a section of the curve



Assigning the ENVELOPE to a section of the curve

Each of the two assignable envelope bands can be assigned to a POSITIVE section of the curve (brown) or a NEGATIVE section (blue). The brown envelope band will then evaluate only the brown section and the blue envelope band will evaluate only the blue section. These curve sections are assigned using the Entry parameter (in the example above, a section of the blue return leg of the curve is being configured to commence with an Entry point from the RIGHT).



The envelope above has now migrated and has nearly reached the upper trend limit (screen-shot above).

Note! The Trend Tracking function takes account of OK curves only. NOK curves are ignored.

The envelope has reached the trend limit. This sets an ALARM.
The alarm message is shown in the alarm list. It must either be reset using the counter reset function → page 40. or else acknowledged with the I-ACK input → page 32, 134, 311. The envelope is also reset to its original position, though this takes effect in the next cycle only.

Note! When the curve reaches the trend limit, this does not necessarily mean that the test result is NOK.

The procedure for resetting envelope trend tracking is described on → p. 40.

7.26.27.6 Obtaining process values from the ENVELOPE EO

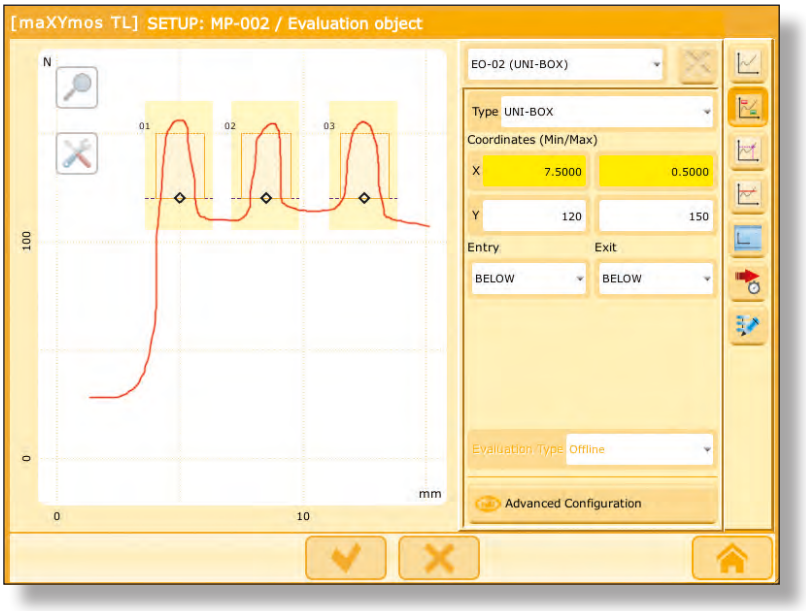
The ENVELOPE EO generates two process values, the ENTRY value (at the point where the curve intersects the entry line) and the EXIT value (at the point where the curve intersects the exit line). These values can be viewed in the Value Table on the PROCESS page → pages 24, 29, 176 ff). They can also be transferred by means of the fieldbus.

Note! No catch zone can be defined for the ENVELOPE EO!

7.26.27.7 Catch zone for process values

The sole purpose of the catch zone defined for an EO is to ensure that process values continue to be captured even beyond the boundaries of the box. The catch zone has no effect on the evaluation result (OK or NOK).

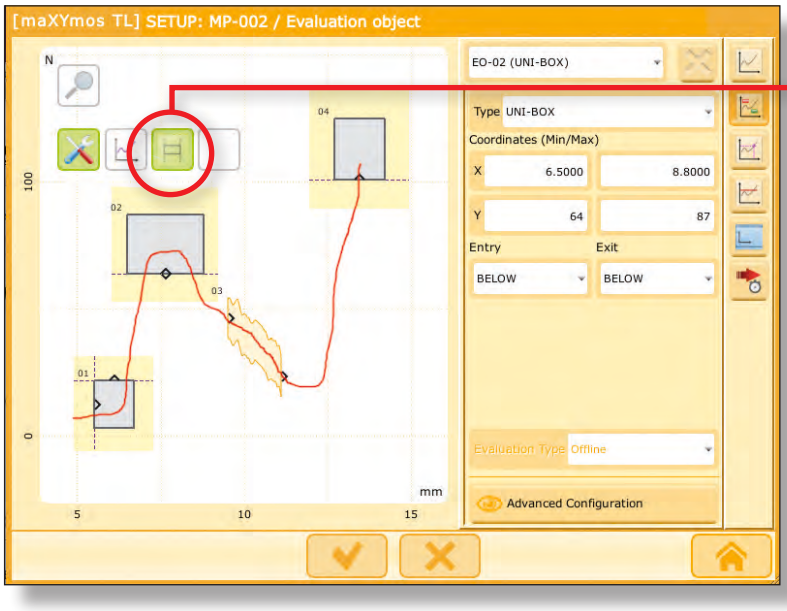
7.26.27.8 Use and purpose of catch zones



To ensure process values are properly allocated – specifically, to be able to identify which process value belongs to which EO – the catch zones must not overlap. To ensure this, a clearly demarcated catch zone must be allocated to each EO. For diagnosing the causes of NOK results, and for analyzing NOK statistics, it is important that process values outside the required limits can also be identified – so as to determine, for example, by what margin the curve missed the entry line.

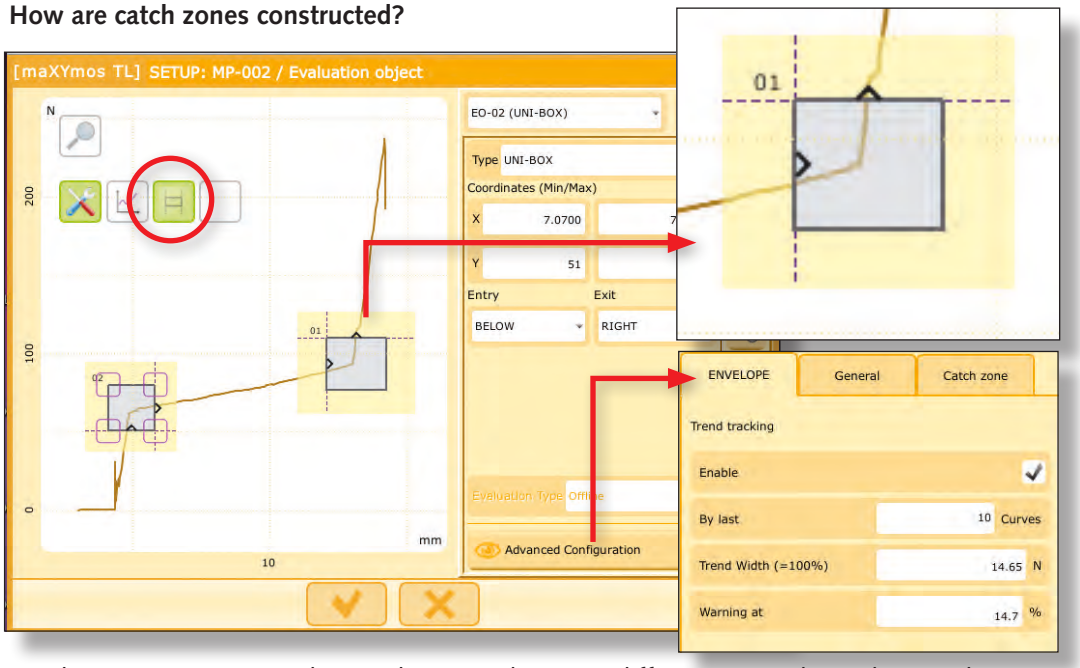
7.26.27.9 Specifying the size of a catch zone

The span of the catch zone can be set separately for each EO. The percentage input refers to the width of the particular box boundary in the X or Y dimension. If no catch zone is required, the parameter is set to 0 % for the dimension concerned.



The "Display Catch zone" button. When this is pressed, the catch zone appears in yellow.

7.26.27.10 How are catch zones constructed?

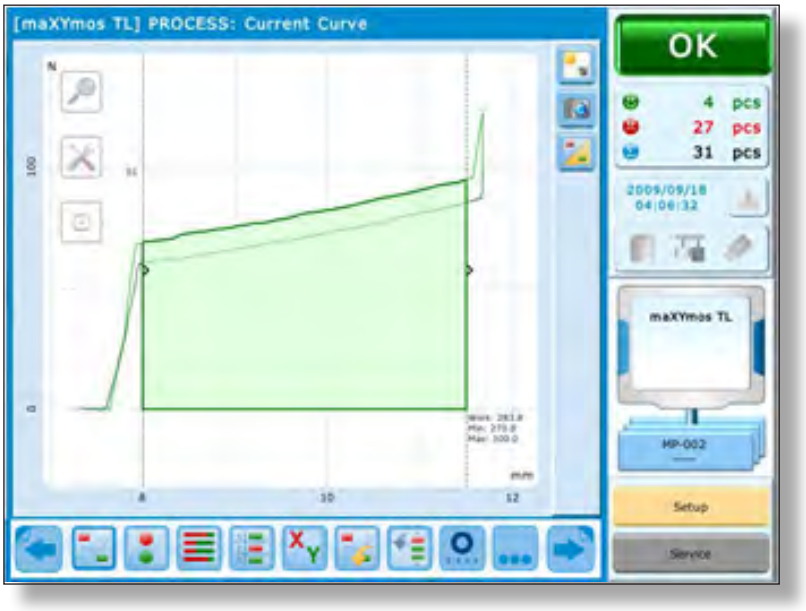


Catch zones are positioned around a particular EO in different ways, depending on the entry and exit configuration specified. When EO configuration is complete, touch the "Display Catch zone" button (see top of page). The catch zones now appear on the graph as yellow areas. Try experimenting with the percentage inputs to adjust the X and Y dimension.

The ENTRY and EXIT process values are captured when they intersect the BOX lines defined as entry and exit sides and from there along their extensions (marked by dashed lines) until the boundary of the catch zone.

Process values for vertical setpoint lines will be Y values, for horizontal lines they will be X values.

7.26.28 Evaluation objects/EO INTEGRAL

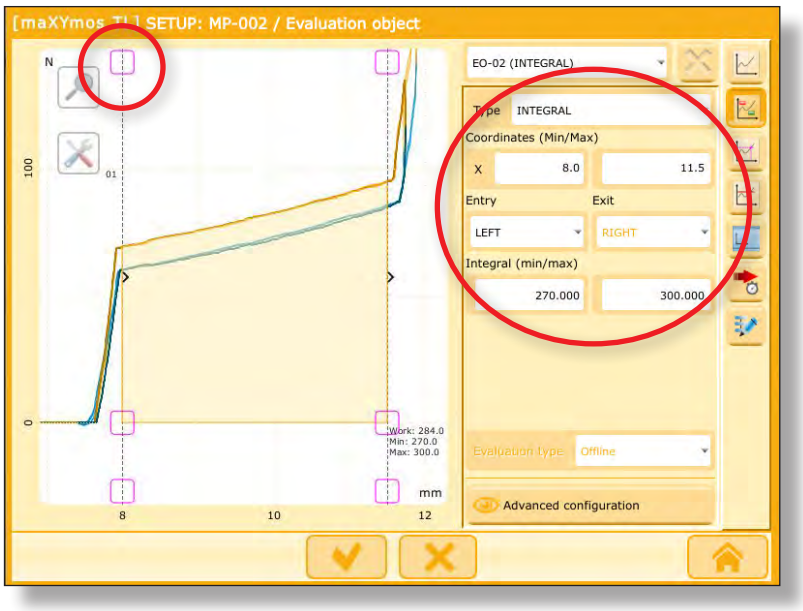


7.26.28.1 Evaluation criterion

The area under the curve is determined and evaluated.

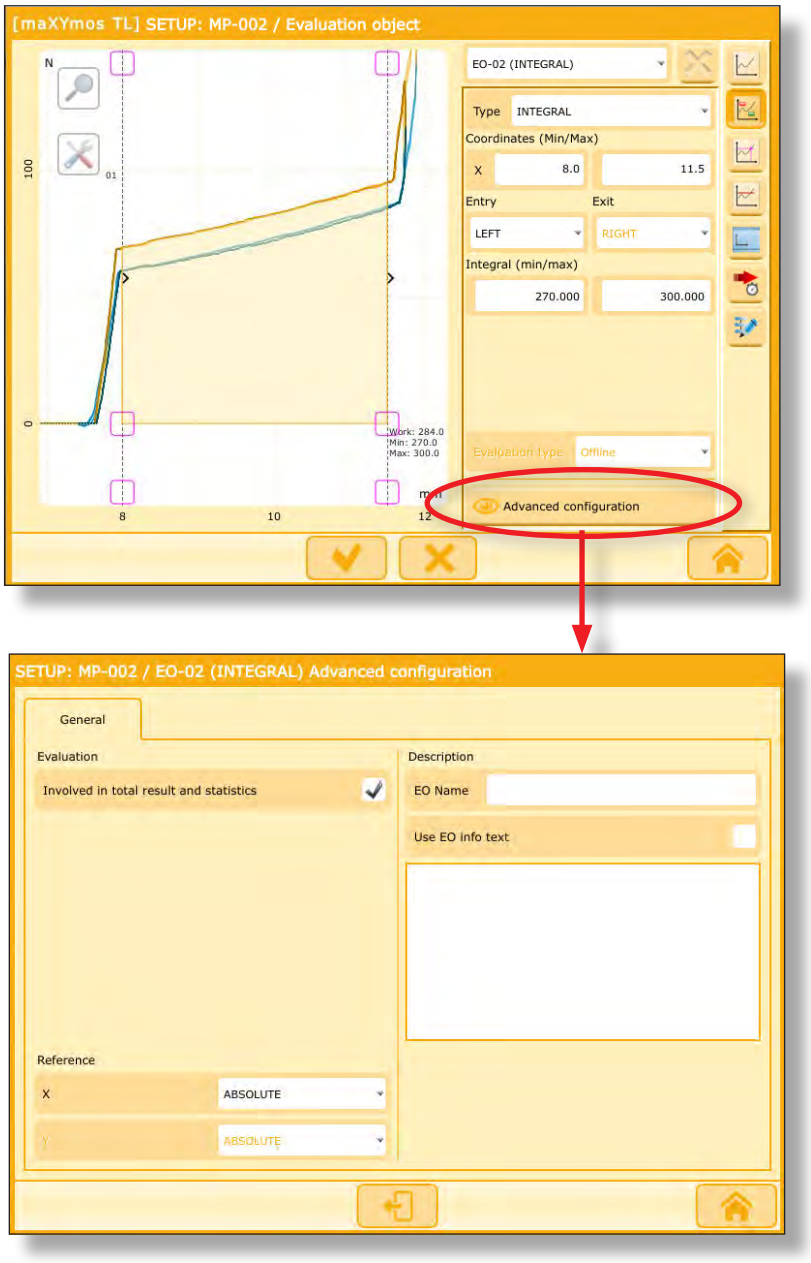
Example cases

7.26.28.2 Positioning EO INTEGRAL



Position INTEGRAL to the desired position by means of numeric entry, finger or VNC®.

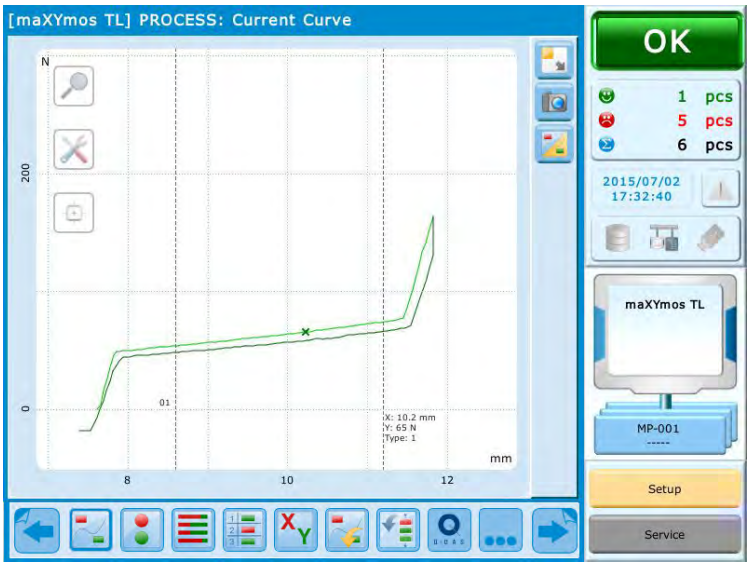
7.26.28.3 Setting up EO INTEGRAL



NOTE

Reference Y is always absolute.

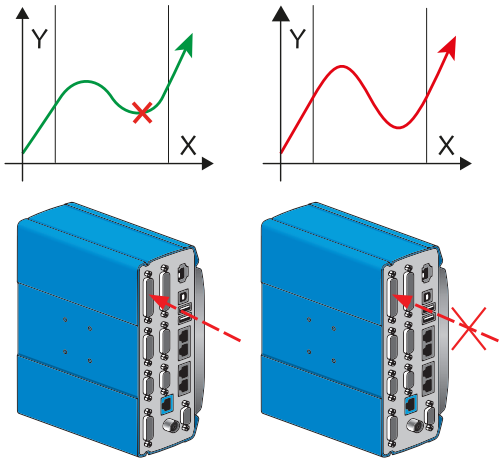
7.26.29 Evaluation objects/EO DIG-IN



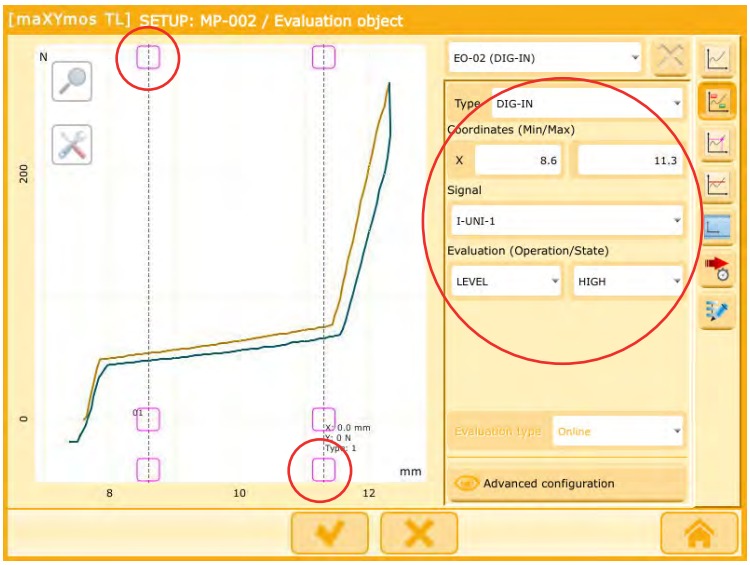
7.26.29.1 Evaluation criterion

During cycle maXYmos should receive a digital input on the pre-selected pin.

Example cases:

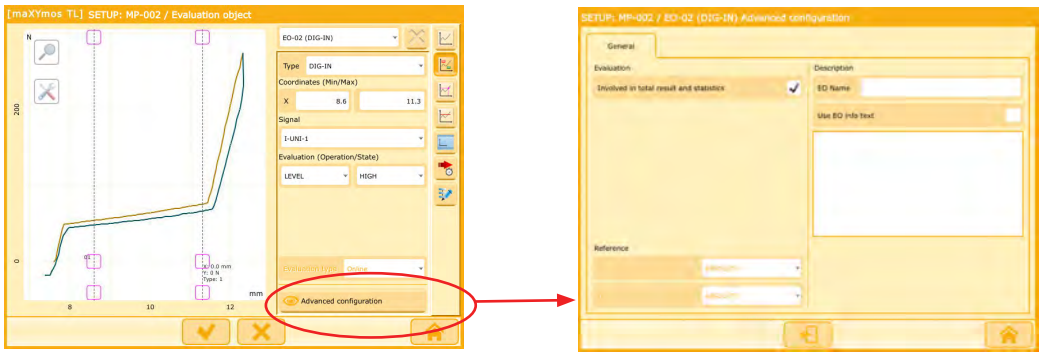


7.26.29.2 Positioning EO DIG-IN



Position DIG-IN to the desired position by means of numeric entry, finger or VNC®.

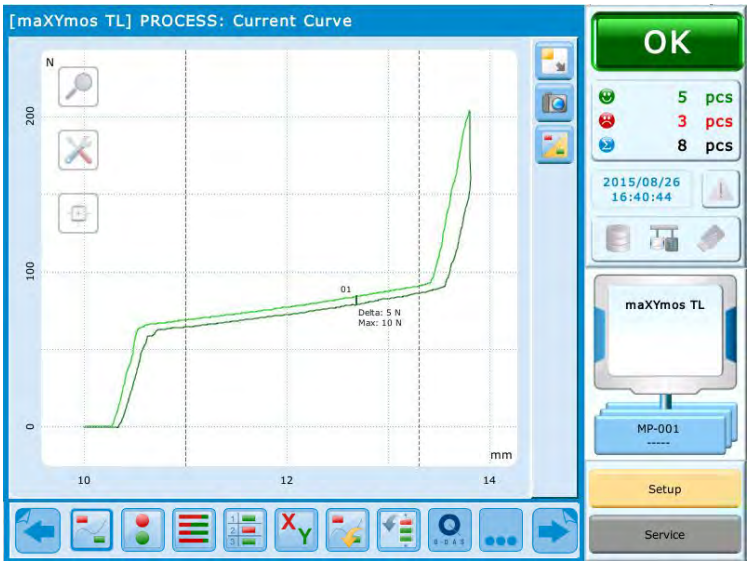
7.26.29.3 Setting up EO DIG-IN



NOTE

Reference X and Y is always absolute.

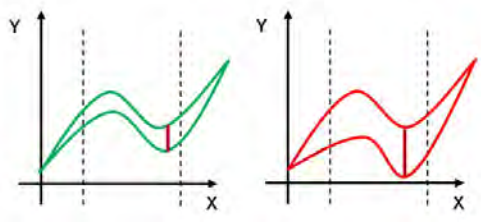
7.26.30 Evaluation objects/EO DELTA-Y



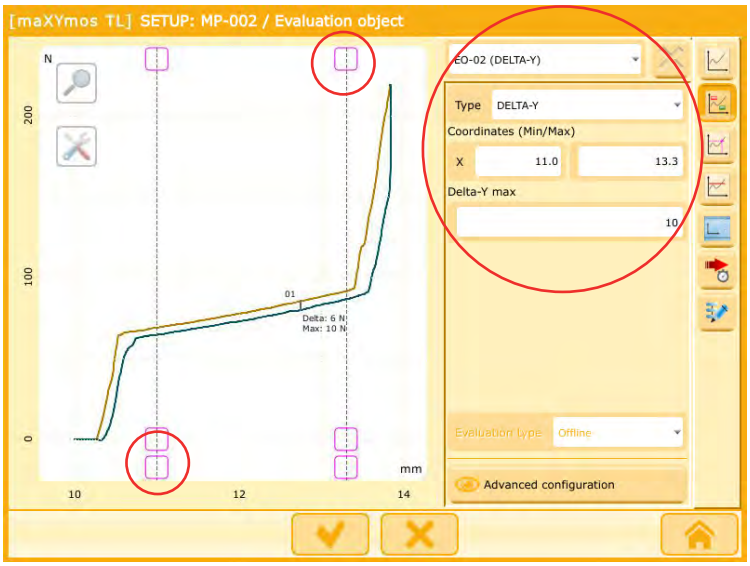
7.26.30.1 Evaluation criterion

The maximal hysteresis between the forward and rewind curve is determined and evaluated.

Example cases:

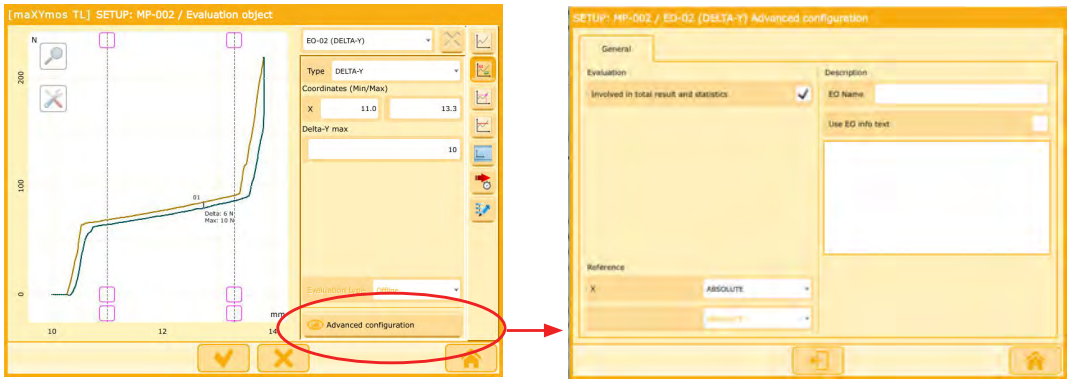


7.26.30.2 Positioning EO DELTA-Y



Position DELTA-Y to the desired position by means of numeric entry, finger or VNC® .

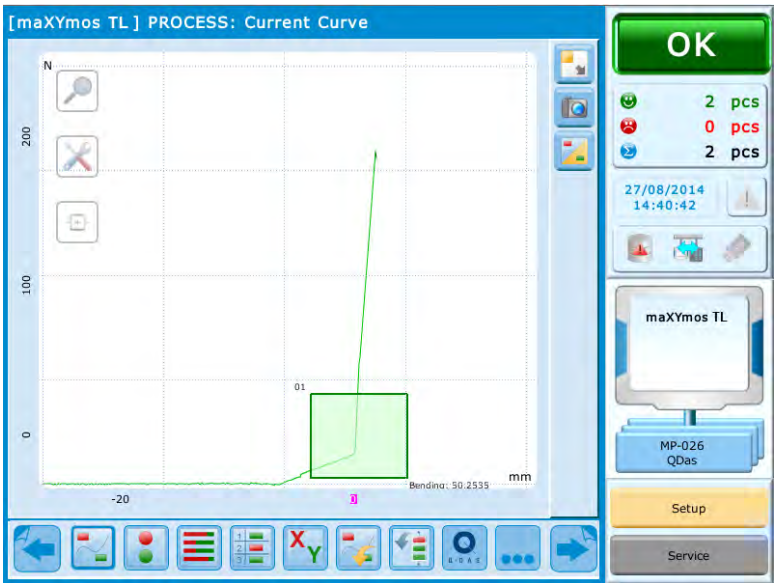
7.26.30.3 Setting up EO DELTA-Y



NOTE

Reference Y is always absolute.

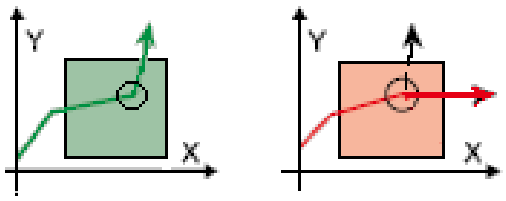
7.26.31 Evaluation objects/EO INFLEXION



7.26.31.1 Evaluation criterion INFLEXION

EO INFLEXION monitors for abrupt gradient changes within the Inflexion expectation range (box area). It does not matter whether it is a sudden drop (e.g., locking of a locking ring in the free section) or a sudden increase in the measurement curve (e.g., landing of a workpiece part/material).

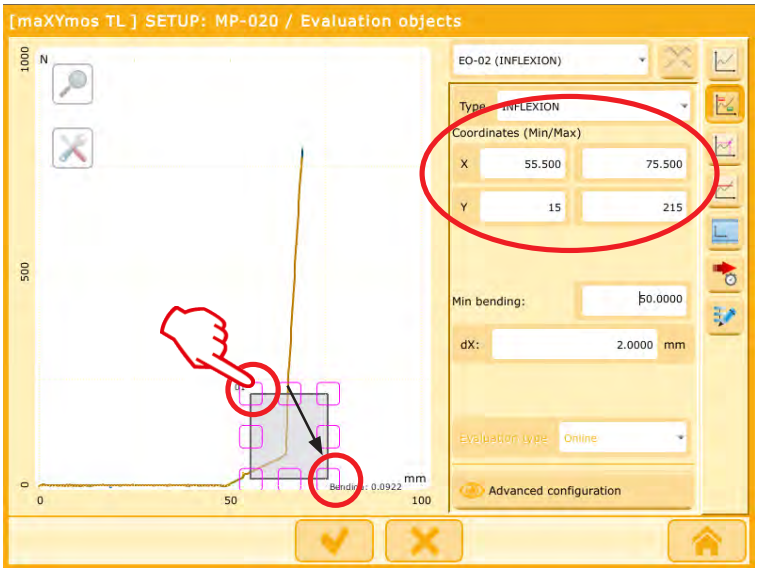
Example Cases:



NOTE

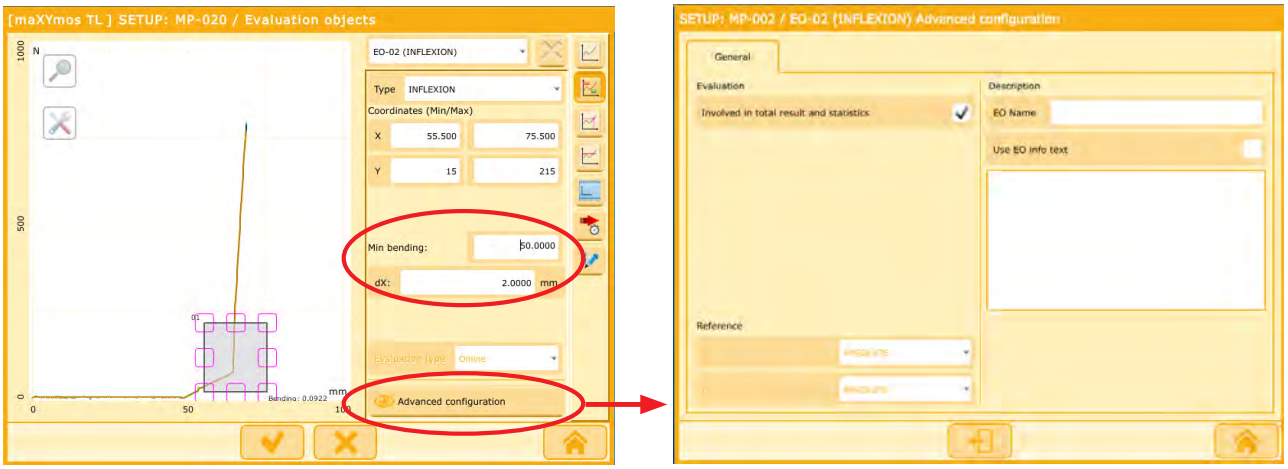
Recognition of the knick is the IO condition (for EO BREAK = NOK).

7.26.31.2 Positioning EO INFLEXION



Position Inflexion to the desired position by means of numeric entry, finger or VNC® .

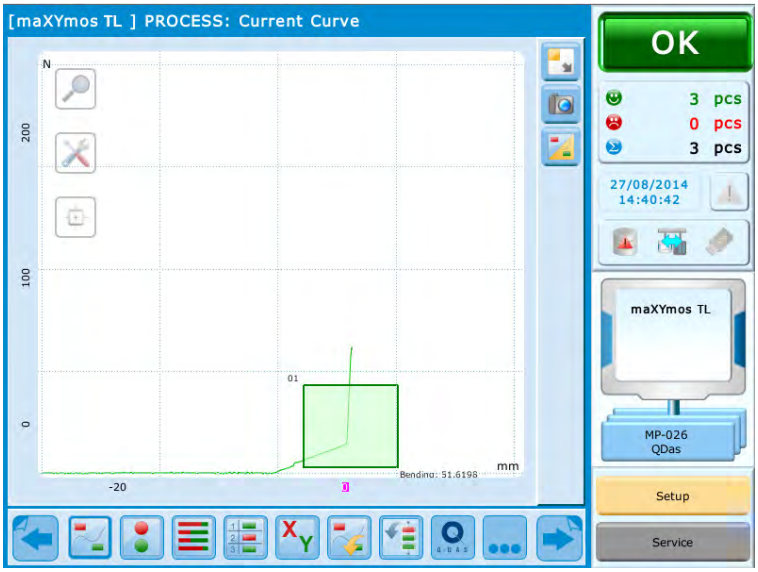
7.26.31.3 Configuring EO INFLEXION



A name and information can be assigned under 'Advanced settings'. The name is displayed next to the EO number above left.

Important: The OK/NOK evaluation is only performed inside the box boundaries. The Catch zone simply ensures that in addition, the process values are also recorded over these box boundaries. If, e.g., the entry side of a box is missed, it can be of statistical interest to learn the distance of the curve from the entry limit.

7.26.31.4 INFLEXION recognition as online signal



Online INFLEXION report
A Inflexion message can be output as an online signal. The online inflexion message must be set up in the measurement program. 8 possible outputs are available in this menu 'Output Signals'.

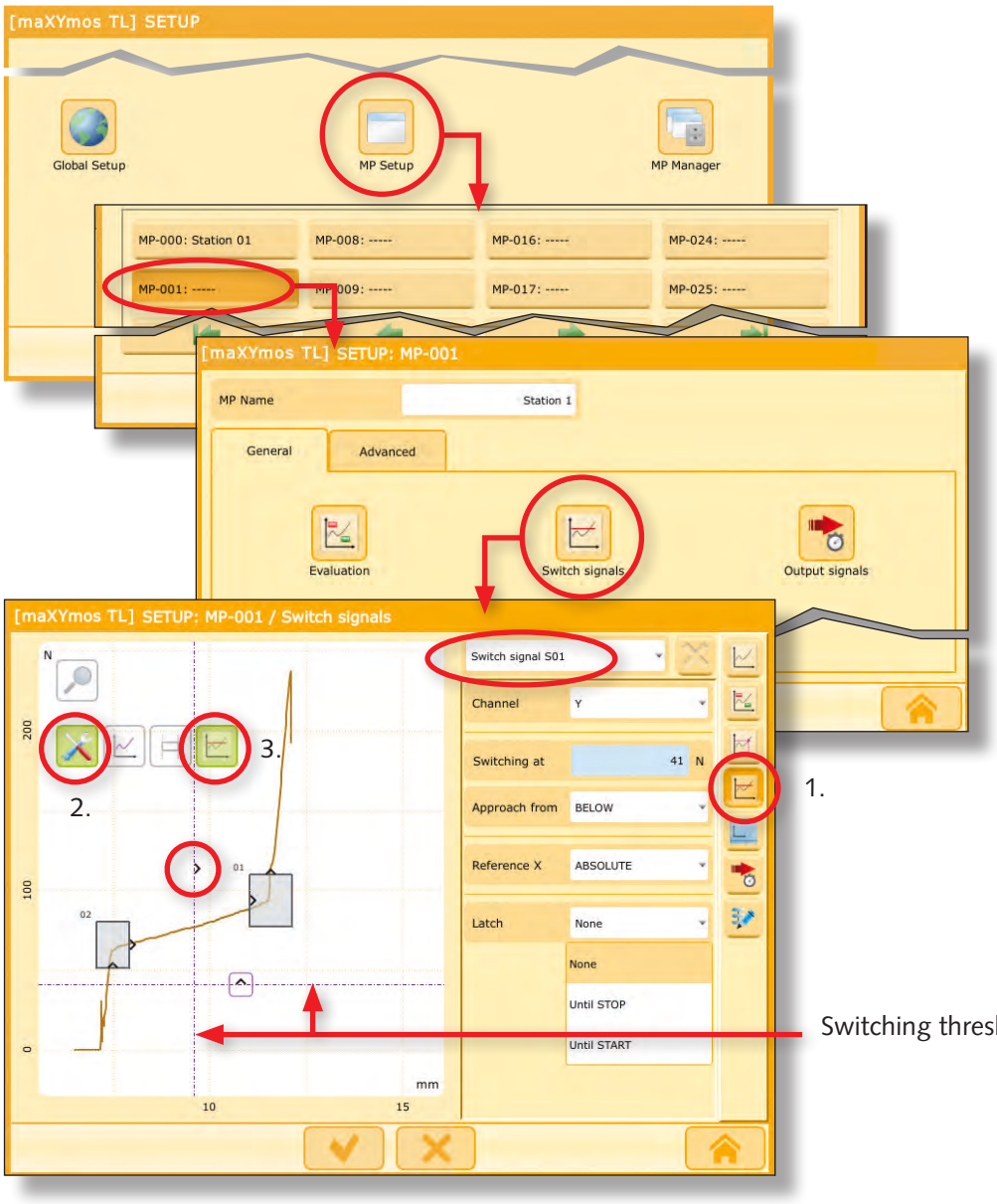
Display switching state in SERVICE menu → **Service > Dig-IO Status > Tab Digital outputs**

Inflexion recognition can also be parameterized as step enabling condition of the objects movement in the process of the sequence **(see menu MP-Setup > Sequence Editor > Object Movement > Additional Functions > Condition).**

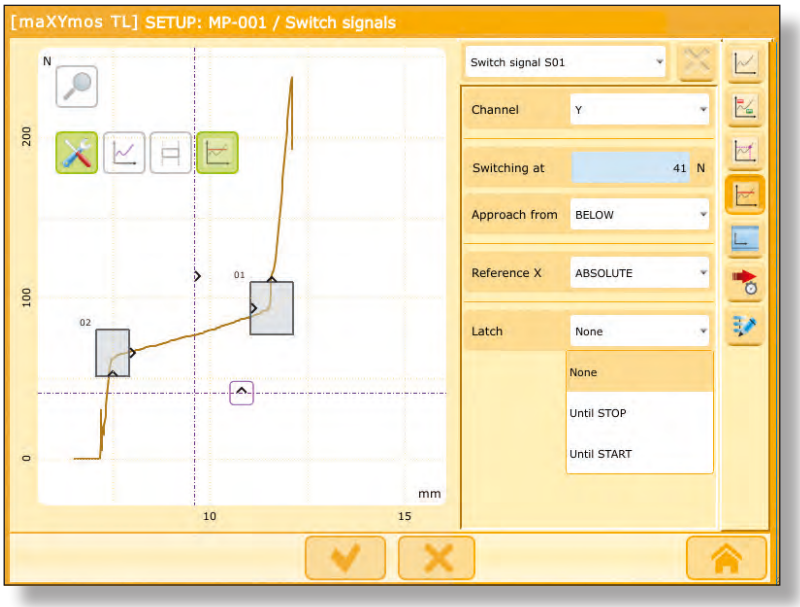
Curve progression for condition of inflexion recognition of the objects movement for the inflexion is recognized.

7.26.32 Configuring switch signals

The maXYmos has two switch signal outputs (O-S1 and O-S2), each of which can be allocated either to channel X or channel Y. They can be used for simple control tasks, such as switching a feed unit from "fast" to "slow".
Once a freely selectable threshold on a particular allocated channel is reached, a real-time signal is generated.



Configuring switching thresholds:
Select the "Switch Signal" button (1.) (on vertical menu bar at right). Then select "Display Settings"button (2.) and "Display Switching Thresholds" button (3.)
Select **switching threshold** "S01" and/or "S02" (a maximum of 2 thresholds can be selected for each MP). Then select **Channel X or Channel Y**. The threshold now appears as a horizontal or vertical axis (depending on the axis chosen). In the screenshot above, for example, the vertical switching threshold corresponds to the X-axis scale, because the threshold and the curve (the "Ref. Graph on" parameter = ABSOLUTE) are relative to ABSOLUTE-X.

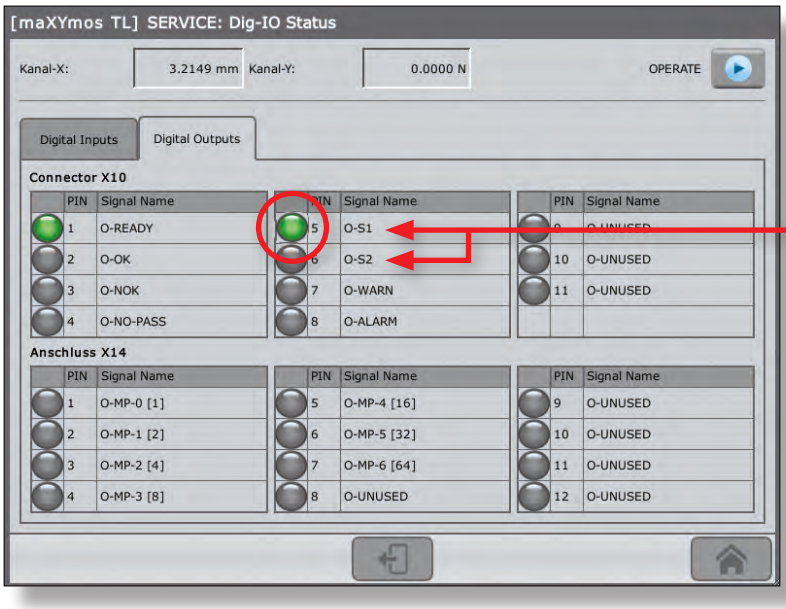


Select the "**Switching at**" button (either by directly inputting values in the field provided or by moving the symbol). Depending on the channel being used, set "**Approach from**" (= the direction from which the threshold approach is measured) to RIGHT/LEFT or ABOVE/BELOW.

TRIGGER-Y can be configured only if the curve has been referenced to TRIGGER-Y. Enter the reference point for the switch signal in the "Reference X" field. Note that this will also apply to a signal received from Channel X! The switching threshold for TRIGGER-Y is referenced to the position of the trigger threshold.

Latch (= hold/lock in position)
Without: Output changes to "1" if threshold is exceeded and returns to "0" if its is undershot.
Until STOP: Output is held until STOP.
Until START: Output is held until the next START.

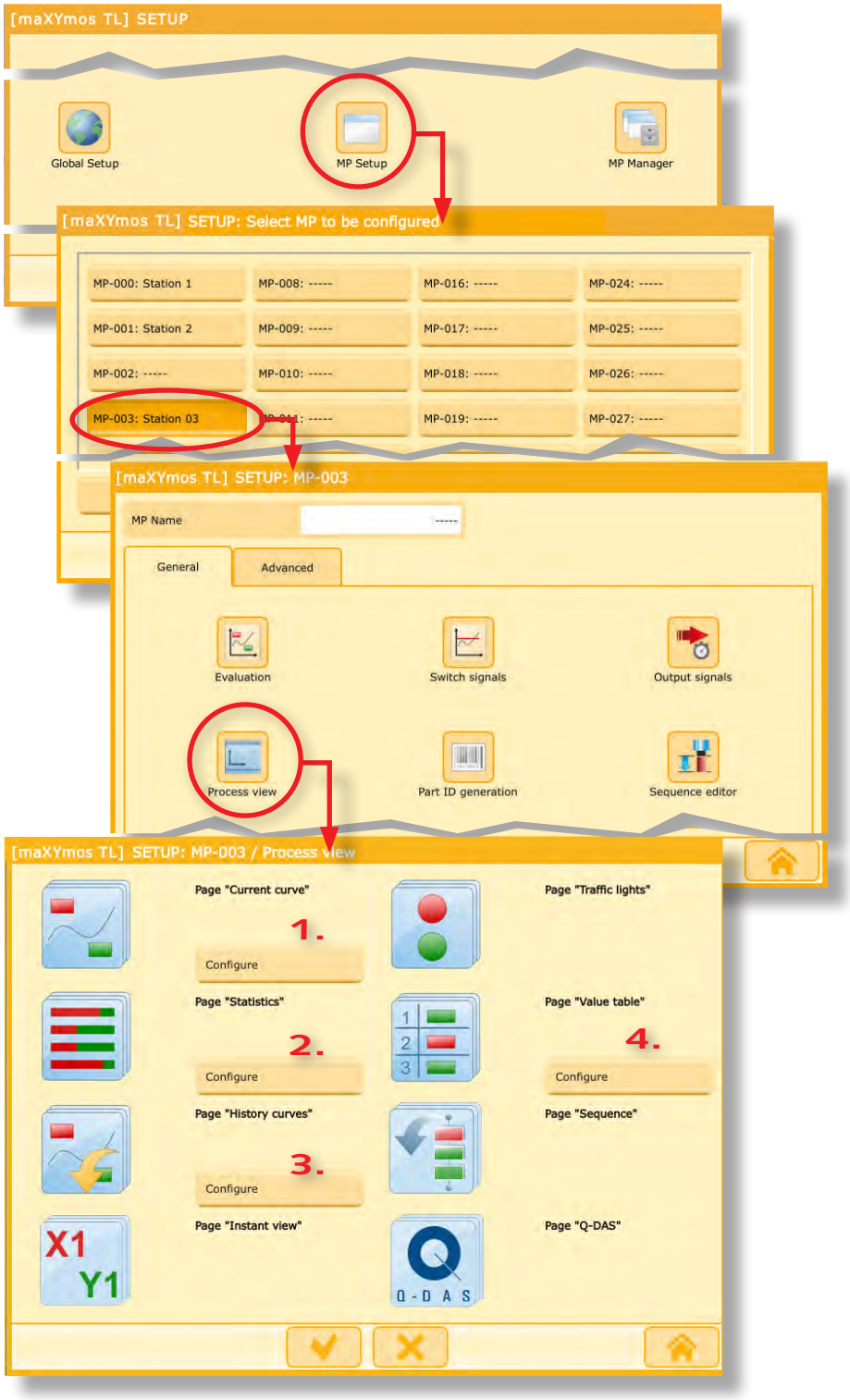
Check the settings on the Digital outputs tab of the SERVICE menu. When the threshold is reached, the allocated output must switch to "1" (LED = green).
→ Service / Dig-IO Status / Digital outputs / O-S1 and/or O-S2



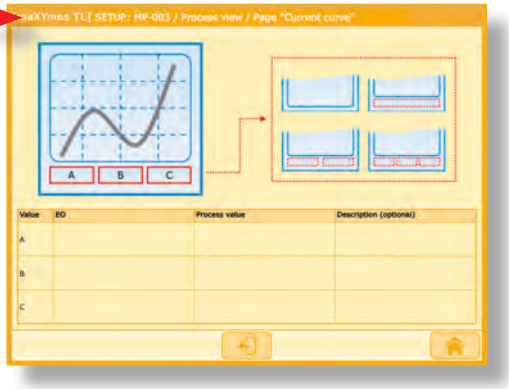
Switching thresholds O-S1 and O-S2

7.26.33 Specifying the process view

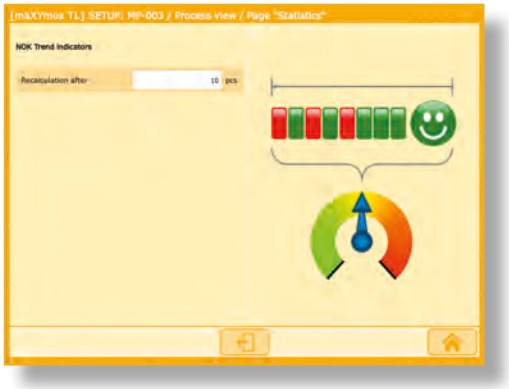
The Process View menu can be used to enter MP-specific configurations.



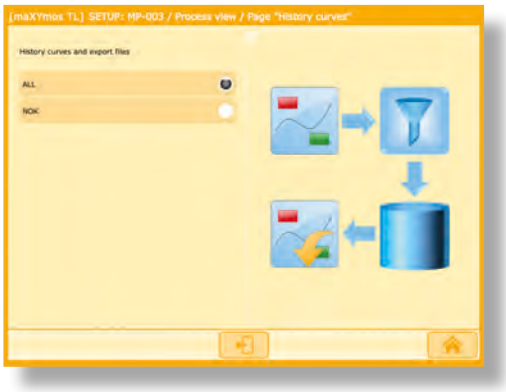
continued



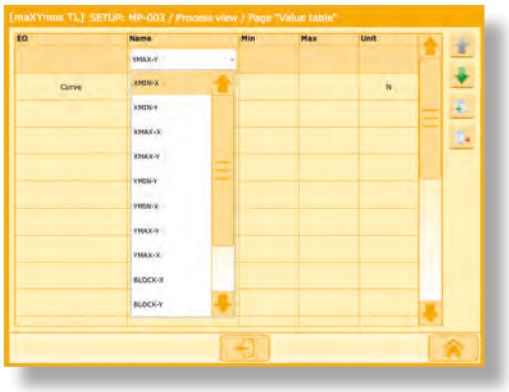
1. Current curve
This displays process values below the curve graphs
→ page 34



2. Statistics
Use this menu to select NOK trend indicators (by changing the "Recalculation after x pcs" setting).
→ page 28

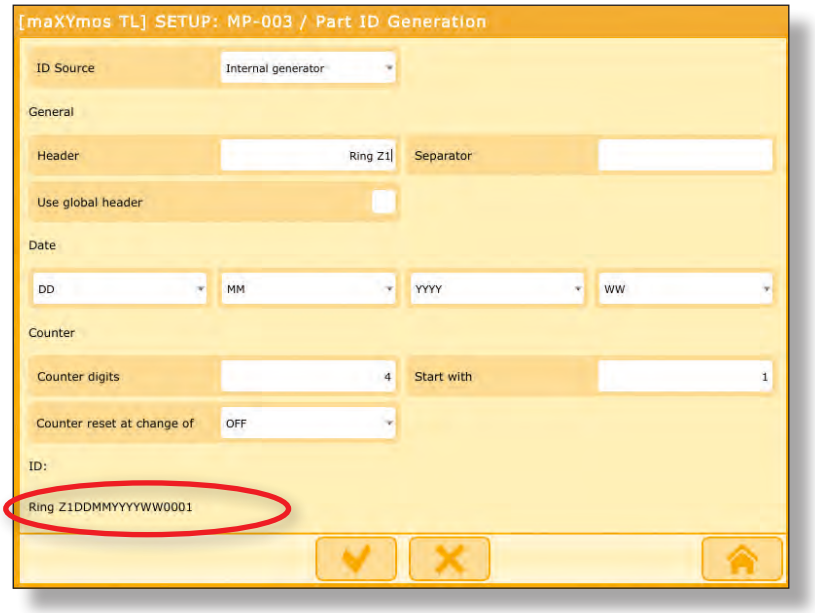


3. History curves
Allows you to select whether OK and NOK or only NOK results are shown
→ pagepage 28 and 29



4. Value table
Allows you to choose the measurement values/results to be used for statistical analysis.
→ page 28

7.26.34 Part ID generation - Determining source of Part-ID data



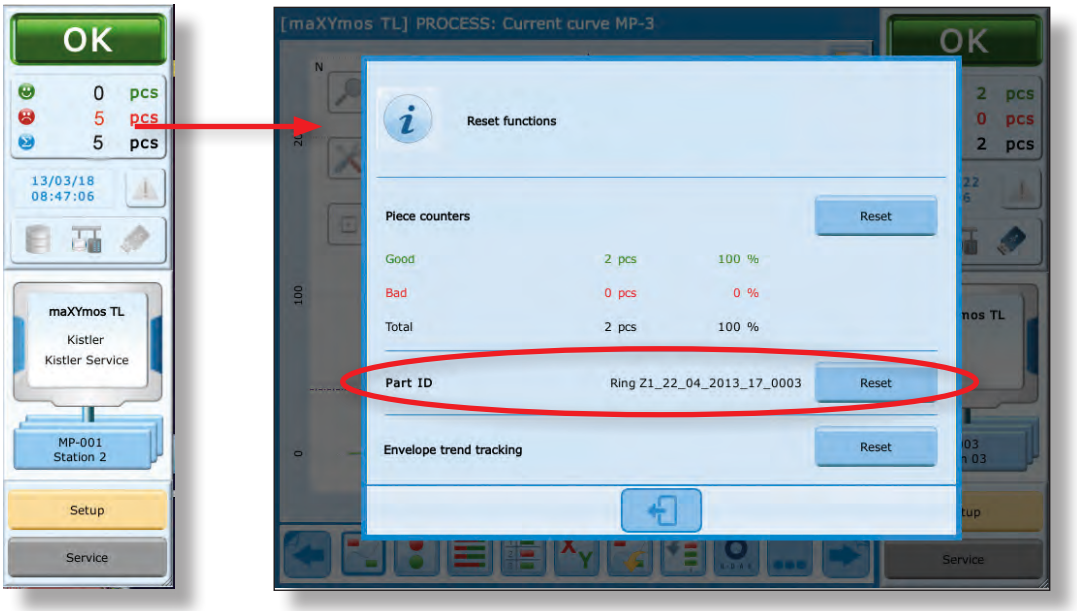
The part ID is displayed later in the piece counter box on the blue PROCESS level (see below), in the file name of the CSV log file and in the log file itself.
→ Setup / MP-Setup / MP-xxx / Part ID Generation

ID Source: Internal generator or fieldbus

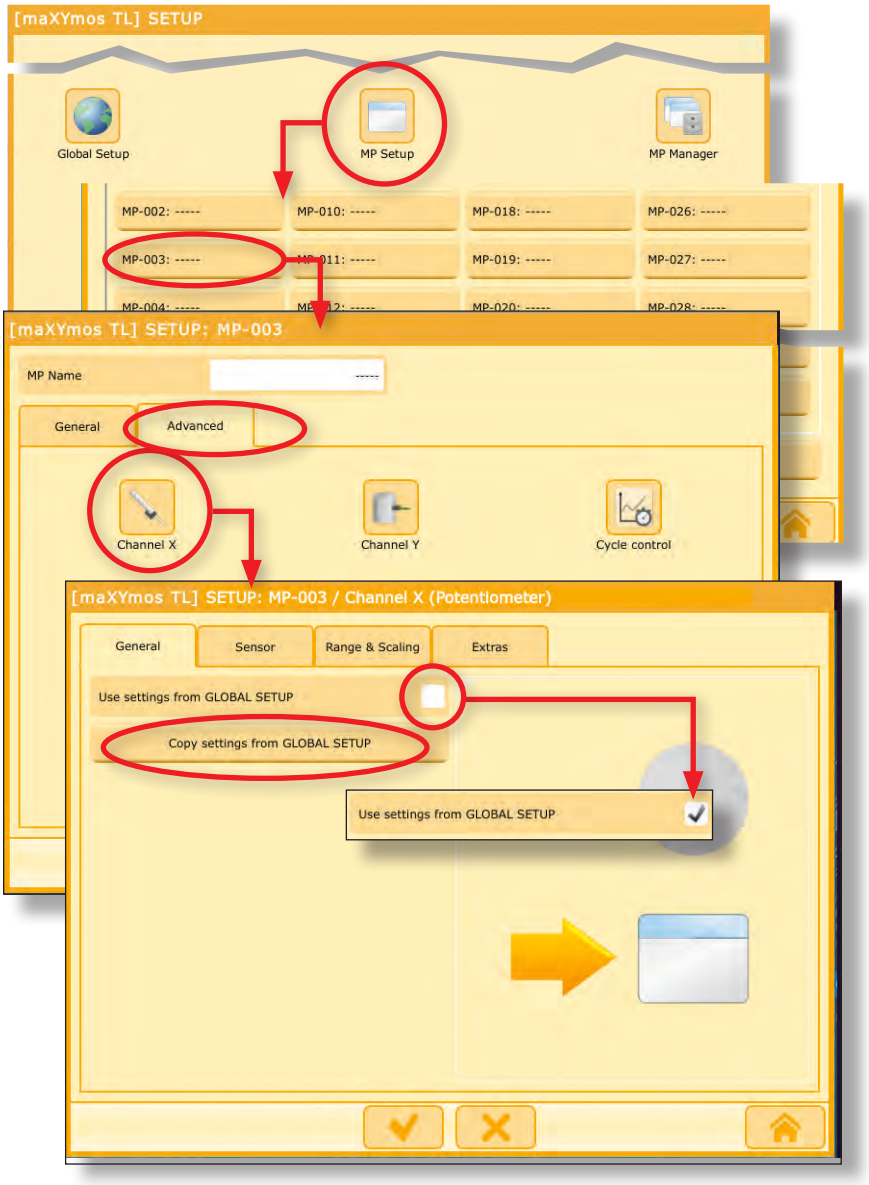
General header: Enter name, e.g. "Ring". **Separator**: This separator can (if so required) be placed automatically between the individual identifications, e.g. "_"

Date: Enter date format, e.g. DD (day), MM (month), YYYY (year), WW (week)

Counter: Specify automatic counter digit attributes, e.g. 4 digits starting with "1". Define whether, and when, the counter should be automatically reset (OFF = no automatic reset). In the Piece Counter process view, the part ID counter can be manually reset to piece "0" (see screenshot below).



7.26.35 MP-specific configuration of Channel X

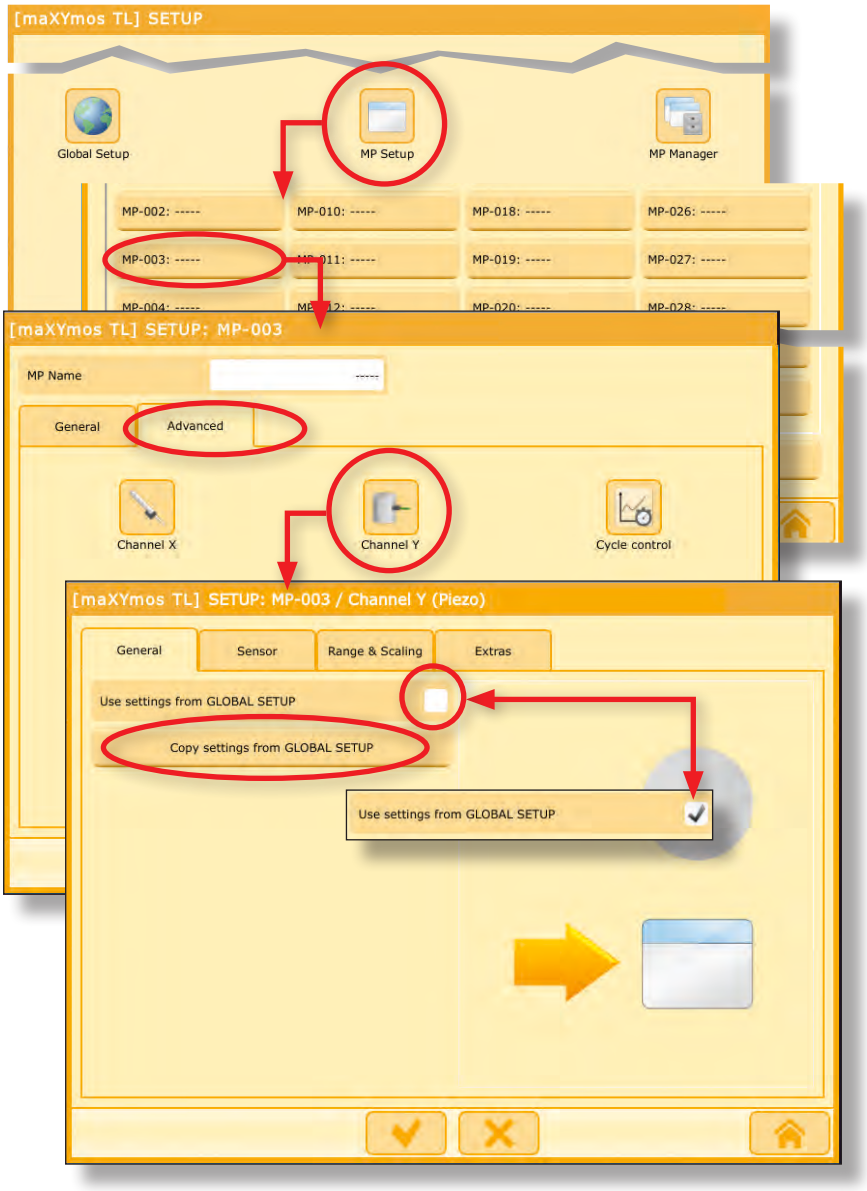


If an MP requires special measuring-channel settings, for instance because a part type needs a higher filter factor, its channel parameters can be uncoupled from the Global setup and have MP-specific settings assigned to them. The factory setting for all MPs is always "Global".

To do this, uncheck the "Use Settings from Global setup" checkbox. This will now make the parameters for channel X MP-specfic. It will also activate the setup menus for the MP-specific setup of channel X.
By selecting "Use Settings from Global setup", you can transfer the global settings to the MP and then modify them in the MP itself, by modifying the filter factor, for example.

The menus and procedure are exactly the same as those described in Global setup
→ page 51
→ Setup / Global setup / Channel-X

7.26.36 MP-specific configuration of Channel Y

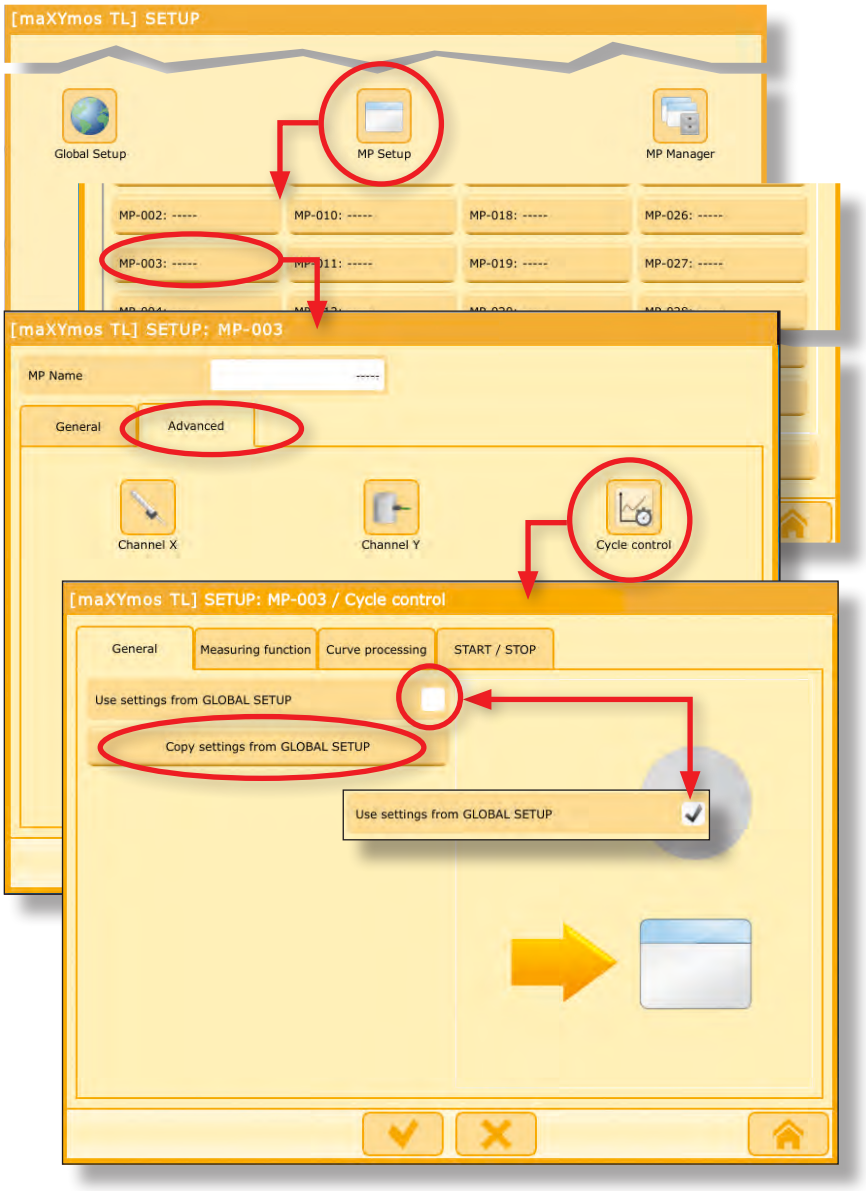


If an MP requires special measuring channel settings, for instance because a part type needs a higher filter factor, its channel parameters can be uncoupled from the Global setup and have MP-specific settings assigned to them. The factory setting for all MPs is always "Global".

To do this, uncheck the "Use Settings from Global setup" checkbox. This will now make the parameters for channel Y MP-specfic. It will also activate the setup menus for the MP-specific setup of channel Y.
By selecting "Use Settings from Global setup", you can transfer the global settings to the MP and then modify them in the MP itself, by modifying the filter factor, for example.

The menus and procedure are exactly the same as those described in Global setup
→ page 54
→ Setup / Global setup / Channel-Y

7.26.37 MP-specific configuration of cycle control



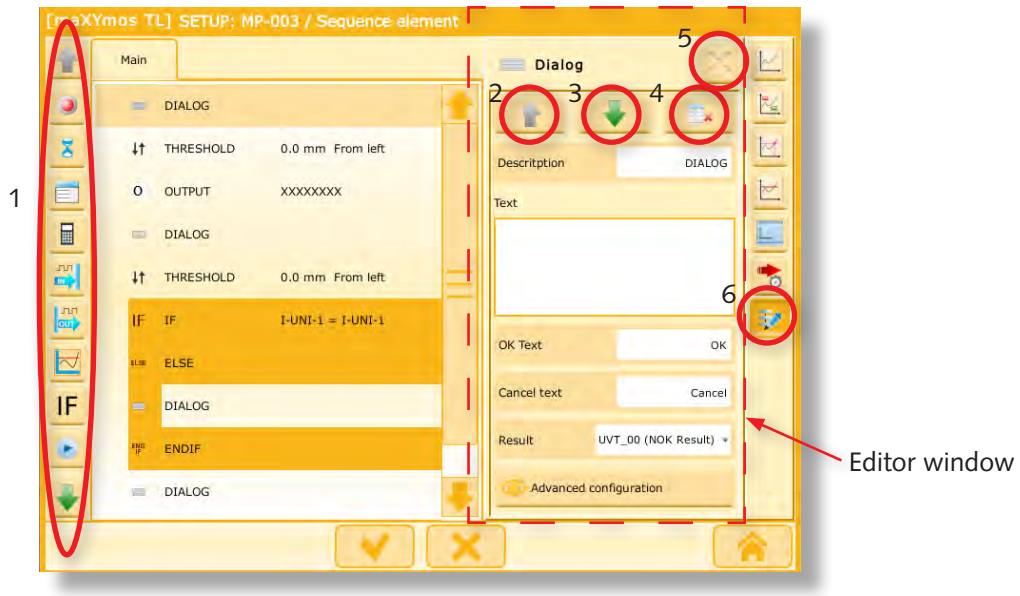
In most cases the parameters for cycle control are specified only once and this is done GLOBALLY. All the measuring programs then use these centrally stored parameters. However, the "MP-specific Setup" procedure does allow each individual MP to be uncoupled from this global cycle control and to use its own parameters. This may be necessary if, for example, one type of part makes special START-STOP settings necessary or a problematic return leg of a curve has to be cut off (truncated).

To do this, uncheck the "Use Settings from Global setup" checkbox. This will now make the parameters for Cycle Control MP-specfic. It will also activate the setup menus for the MP-specific setup of Cycle Control.
When you check the "Use Settings from Global setup" checkbox, the parameters will be imported from the Global Settings and can then be modified in the MP.

The menus and procedure are exactly the same as those described in Global setup → p. 82
→ Setup / Global setup / Cycle Control

7.27 Sequence mode

7.27.1 Significance of the tool buttons in the sequence editor



Button	Description	Comments
1	Element-bar	At the lowest position of the sequence, a new program element is inserted. You can select from 12 different elements types.
2	Move up	When pressed selected program element is shifted upward.
3	Move down	When pressed selected program element is shifted downward.
4	Delete element	The currently selected program element is deleted by pressing the button.
5	Close editor	If you press this button, the Editor will be closed.
6	Edit sequencer mode	By pressing button (Pos. 6) the sequence editor will be opened. Also you can activate and deactivate the editor window.

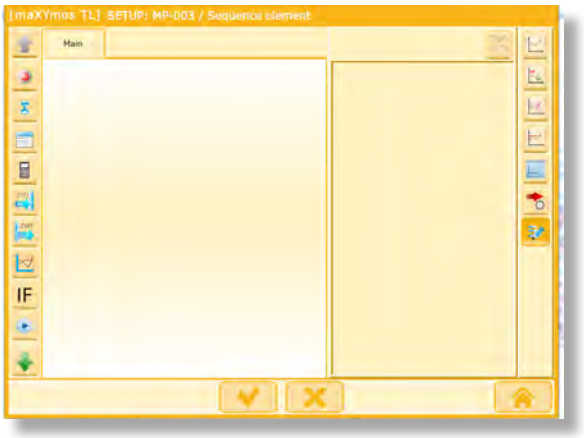
7.27.2 Capturing curves, setting up evaluation

Since a sequence, once programmed, will always remain active, capturing a reference curve and setting up an evaluation requires additional preparation. You can use the "Start/Stop" buttons described in section 5.24.4 to stop the sequence you have programmed.
Once you have stopped the sequence, you can capture a reference curve and set the objects necessary for the evaluation.

KISTLER
measure. analyze. innovate.

7.27.3 Programming elements

At the Element-bar you can select the program elements which you want to add to your sequence.



Sequencer mode offers 12 different programming elements:

MP Switching element "SWITCH_BACK", by using this element you can change to and return from one of the 20 master measurement programs (MP 108 ... 127) in one of the 108 measurement programs.

Calculator element "CALCULATOR", by using this element you are able to calculate with determined values.

Measurement start/stop element "MEASURE", this element starts and stops the measurement. When measurement stops, evaluation is performed according to the parameterized evaluation elements.

TIMER element "TIMER", this element delays execution of the subsequent element by the configured time. Use as, for example, a setting time under force.

IF/ELSE element "IF", this element permits a conditional branch, i.e. a branch in the sequential program according to the query condition or result.

Restart element "SEQUENCE_RESET", branching option to the start of the sequence.

Piezo operate element "PIEZO_OPERATE", this element is used to perform a variable measurement start/stop of the integr. charge amplifier included in the sequence.

Threshold element "THRESHOLD", this element serves to record the learned positions on the X and Y axes. These positions act as a progressive switching or query condition in the sequence.

Output element "OUTPUT", when this element is activated, the correspondingly configured output is set on the device.

Input element "INPUT", when this element is activated, the system waits for the configured digital input signal and then continues the sequence.

Dialog element "DIALOG", this element enables interaction with the user. It can be used, for example, to forward useful information to the user. The dialog must be confirmed by the user at the visualization or will be hidden automatically after a configured period of time.

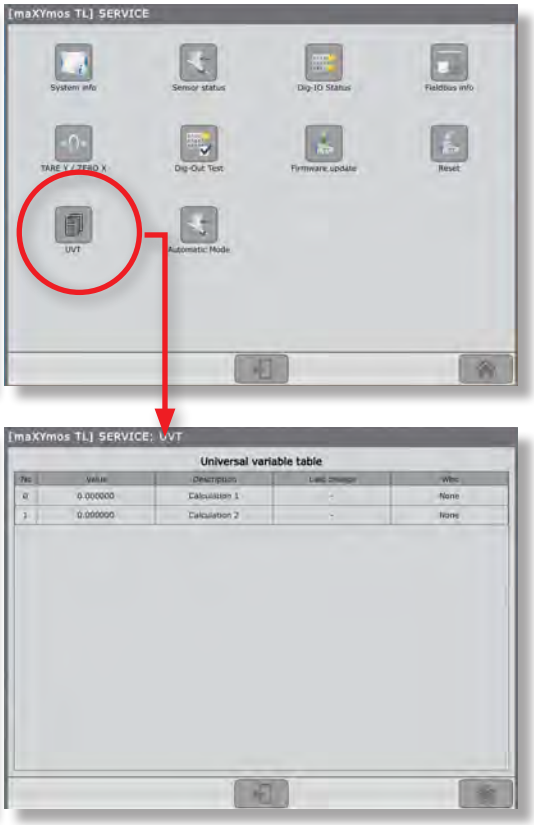
Zero Tara element "ZERO_TARA", this ZERO TARA element can be used to set the sensor to zero on the X or Y channel in the sequence.

Barcode-Reader element "BARCODE", this element can be used to read a barcode.

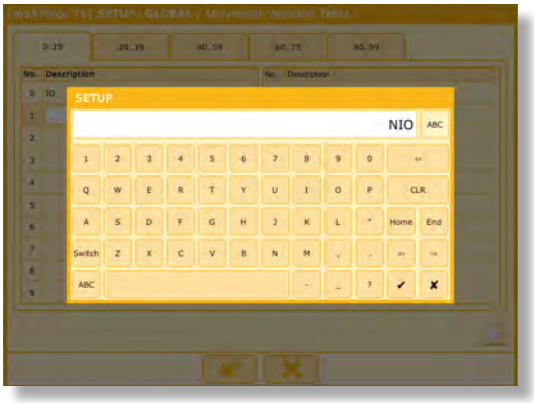
7.27.3.1 Universal variable table UVT

Query results of the sequence, e.g. IF/ELSE, etc., or values, for example, from the counter element can be saved in the UVT and used as input values for additional steps in the sequence. Users can choose from 100 different variables and use them in the corresponding sequence mode element in any way they require.

In Global settings you can set for each UVT a defined description.



In the service menu, the individual UVT can be viewed with the allocated values.

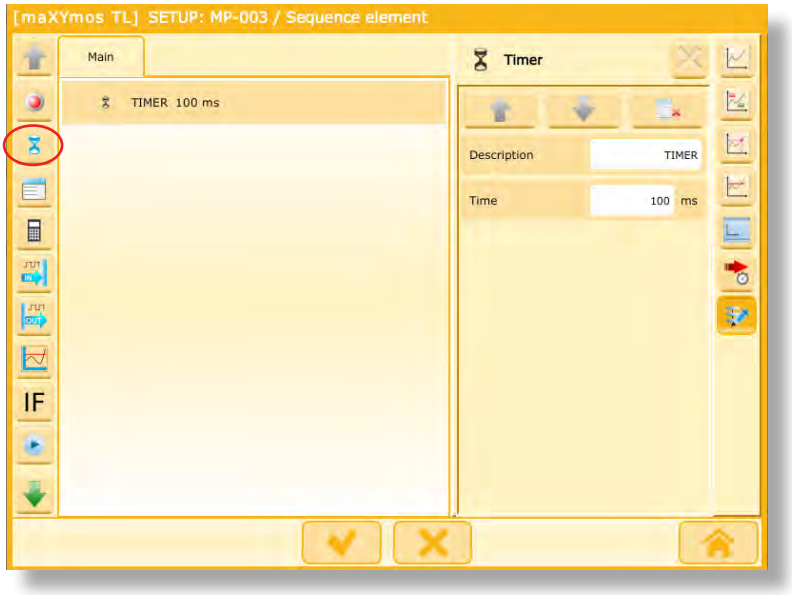


NOTE

To use the UVT in Sequencer mode they must be necessarily provided with a description.

7.27.3.2 Element TIMER

The timer element delays execution of the subsequent element by the configured time. Use as, for example, a setting time under force.

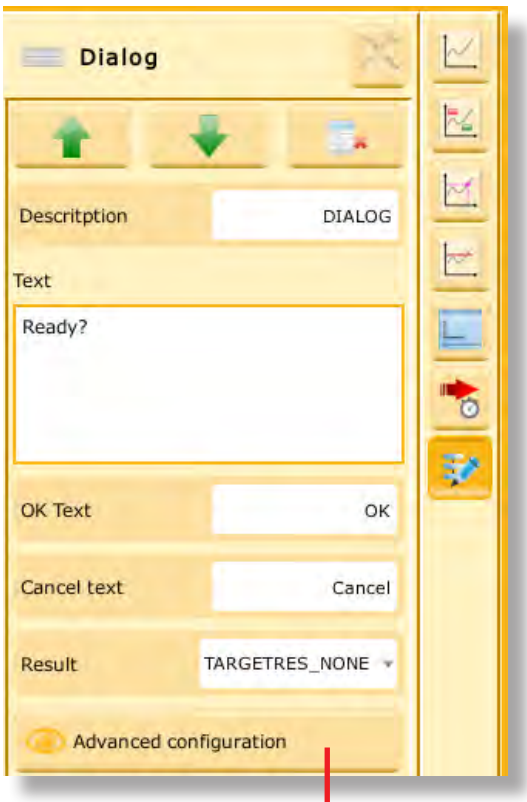


Description
The description can be chosen freely (maximum 30 characters, where the maximum number of characters can be reduced with the use of special characters according to the UTF8 standard).

Time
Enter the wait time in ms.

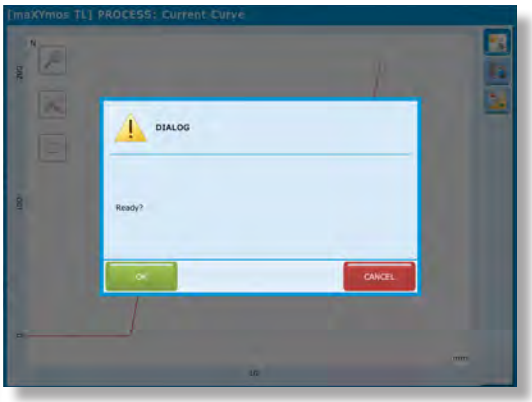
7.27.3.3 Element DIALOG

The DIALOG element enables interaction with the user. It can be used, for example, to forward useful information to the user. The dialog must either be confirmed by the user at the visualization or will be hidden automatically after a configured period of time.

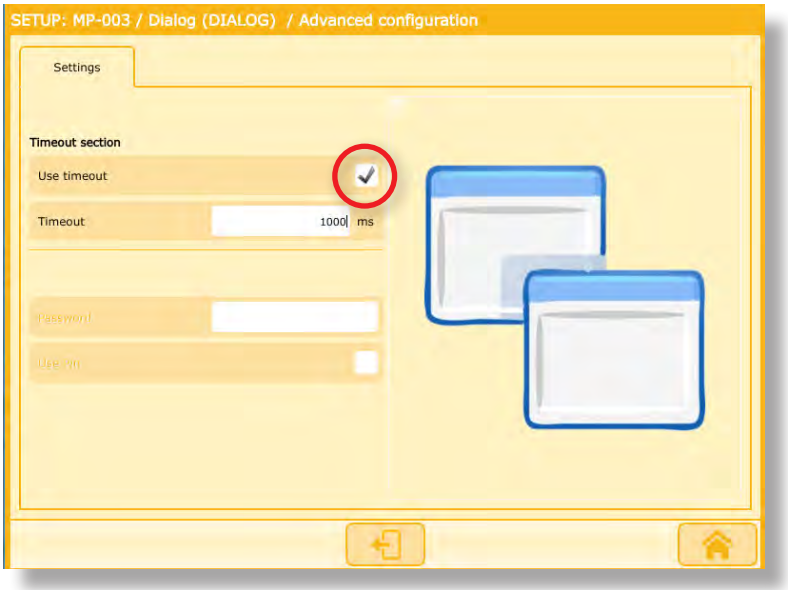


The input text can be customized.

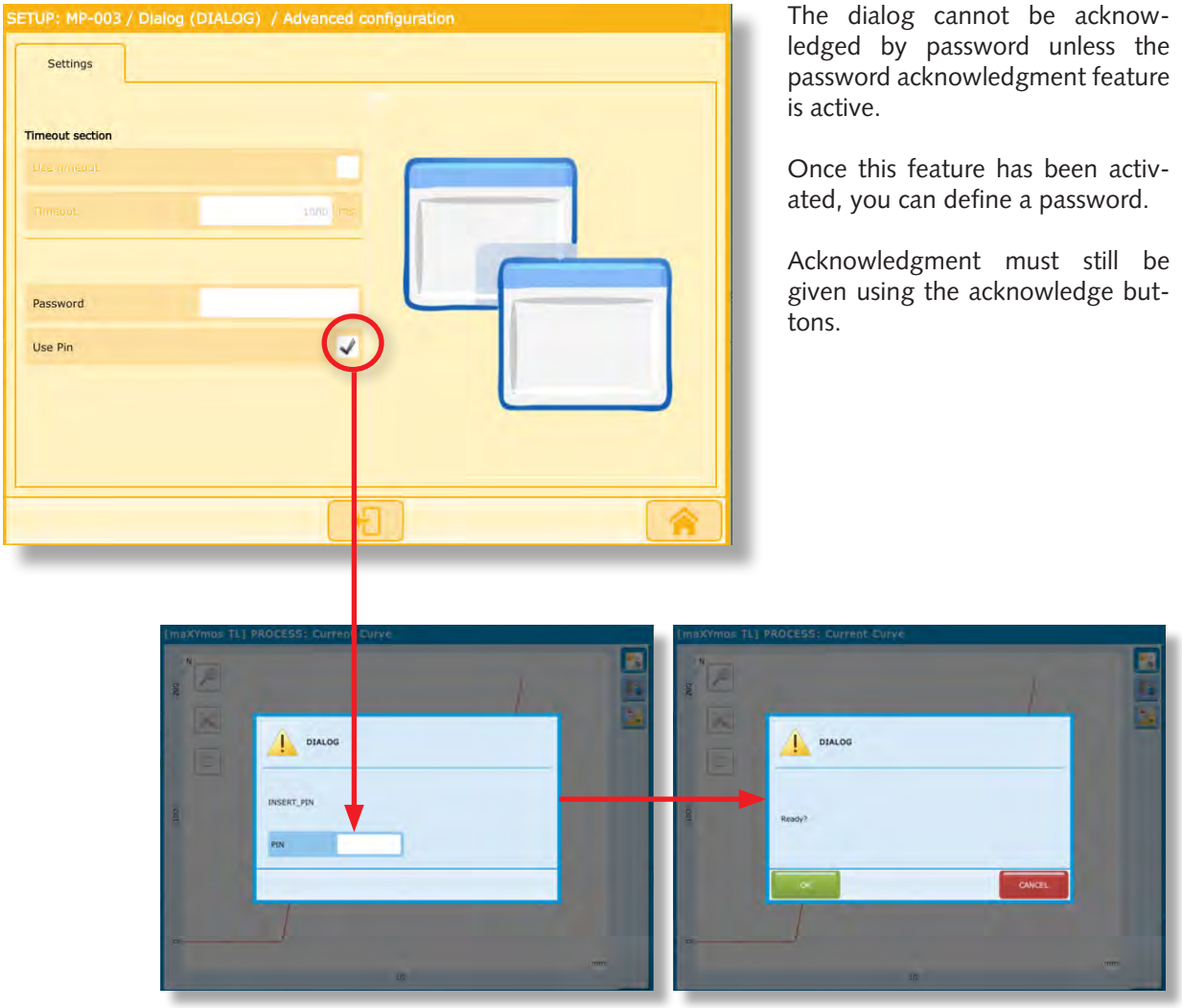
Just as the text, the acknowledge buttons can be customized to fit individual requirements.



The result of the corresponding dialog can be stored in the UVT.



Acknowledgment of the dialog requires that the timeout feature be active.
Once you have activated timeout, you can set the display duration to the period you require.



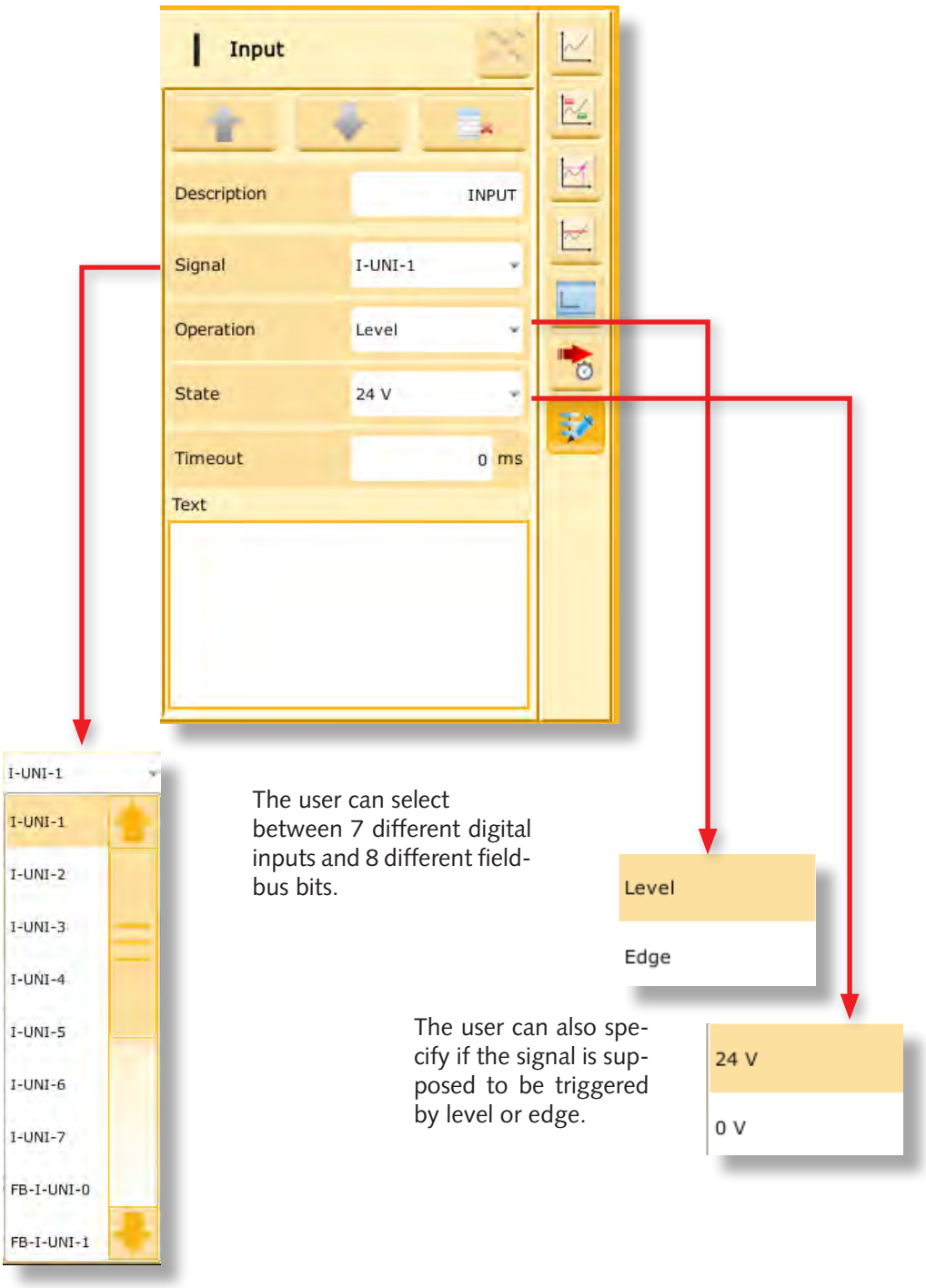
The dialog cannot be acknowledged by password unless the password acknowledgment feature is active.

Once this feature has been activated, you can define a password.

Acknowledgment must still be given using the acknowledge buttons.

7.27.3.4 Element Input

If set in a sequence, the INPUT element causes the system to wait for the signal previously configured for the corresponding input. The sequence will not resume with the next programmed element until this signal has been received.

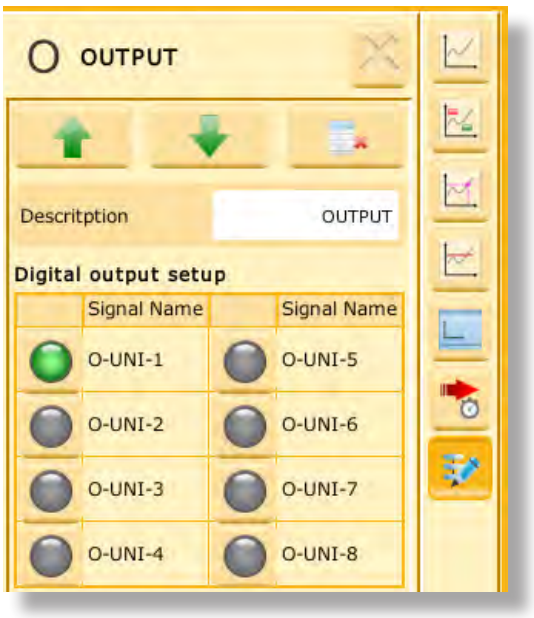


The status can be used to define if a response is supposed to be triggered by a High or a Low (for the digital inputs), 1 or 0 (for the fieldbus bits) or by an increasing or decreasing signal level.

The time setting can be used to define the timeout applicable to the signal.

7.27.3.5 Element OUTPUT

The OUTPUT element can be used to designate any of the 8 available digital outputs to output a digital signal, e.g. in order to activate a press.



Select one of the 8 available outputs for the transmission of the signal.

At first touch (green signal) the output will be set on high (24 V)

At second touch (red signal) the output will be set on low (0 V)

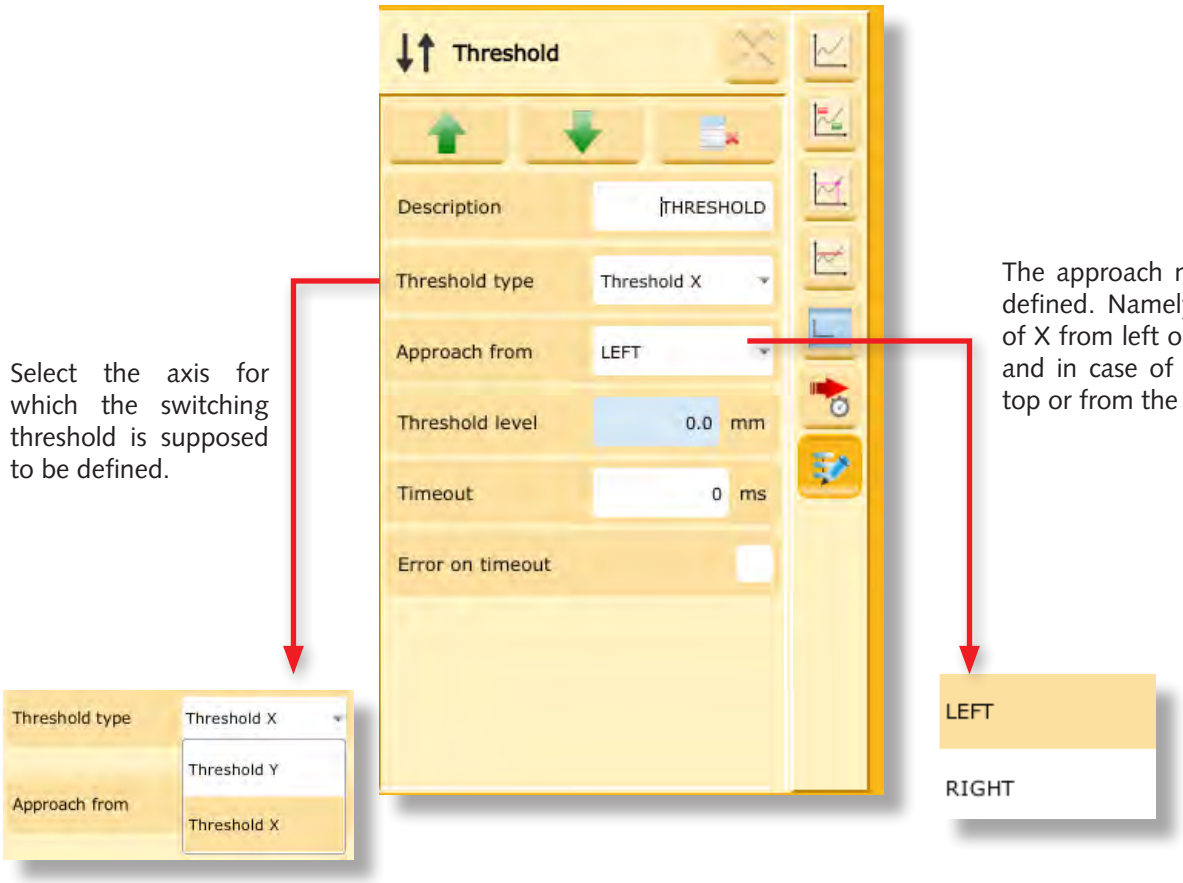
At third touch (inactive) the output will be deactivated

NOTE

On the digital outputs of maXYmos no security-related components are eligible to serve.

7.27.3.6 Element THRESHOLD

The THRESHOLD element can be used to define a switching threshold on the X or the Y axis. The value to be set can be defined freely.

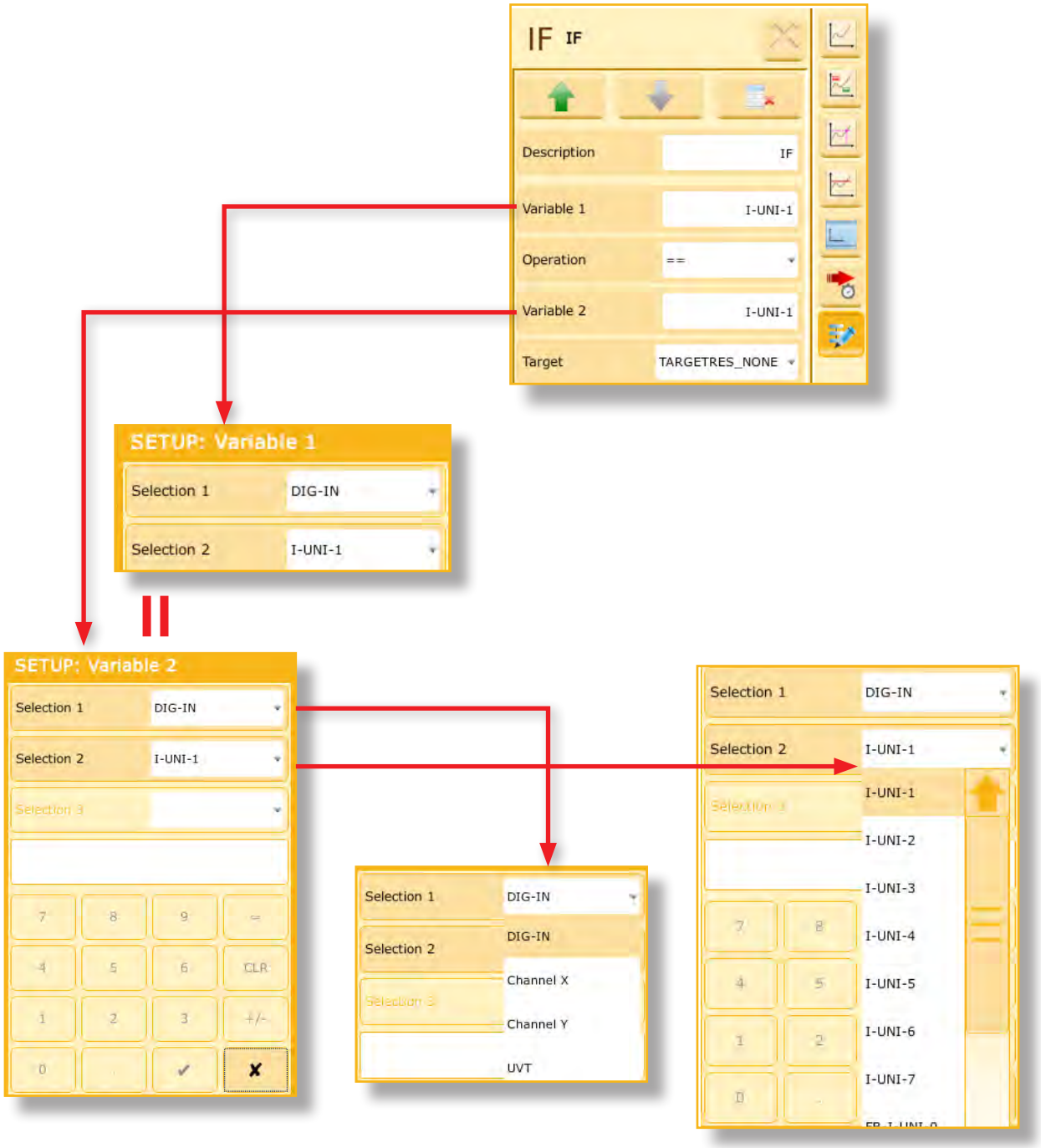


You can enter the desired threshold value on the keyboard or using the teach-in function.

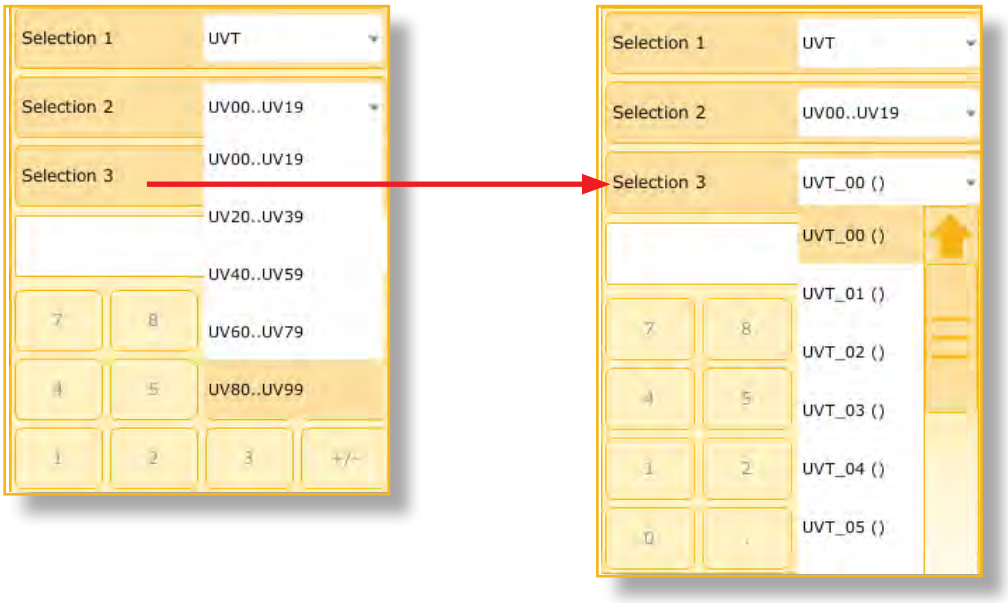
7.27.3.7 Element IF/ELSE

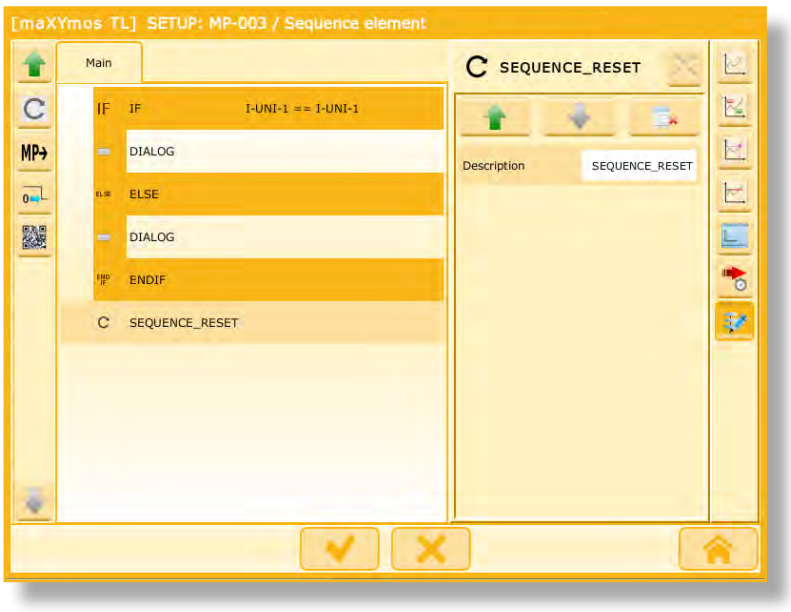
IF

The IF/ELSE element permits a conditional branch, i.e. a branch in the sequential program according to the query condition or result. It can effect a specific decision by means of a comparison. And, the result can also be stored in the UVT.



If the UVT is selected, you can choose between the UVT areas. And after its a certain UVT can be choosen in the selected range.



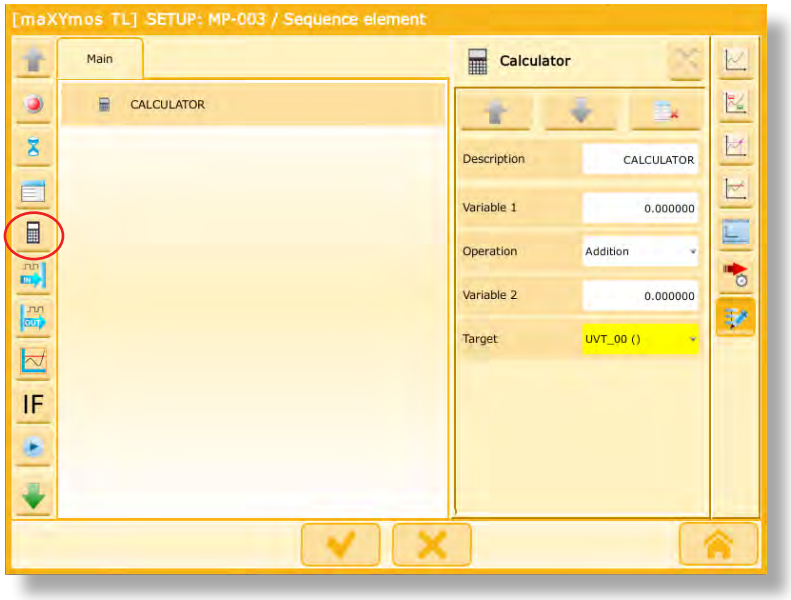


After storing the parameters effecting the decision in the element, you can define follow-up functions for the corresponding decisions. You can add these functions as usual by pressing the "Add element" button.

The remainder of the program sequence can be programmed following the ENDIF action.

7.27.3.8 Element CALCULATOR

With the CALCULATOR Element you can calculate with designated events. The calculated value can be stored in the desired UVT.



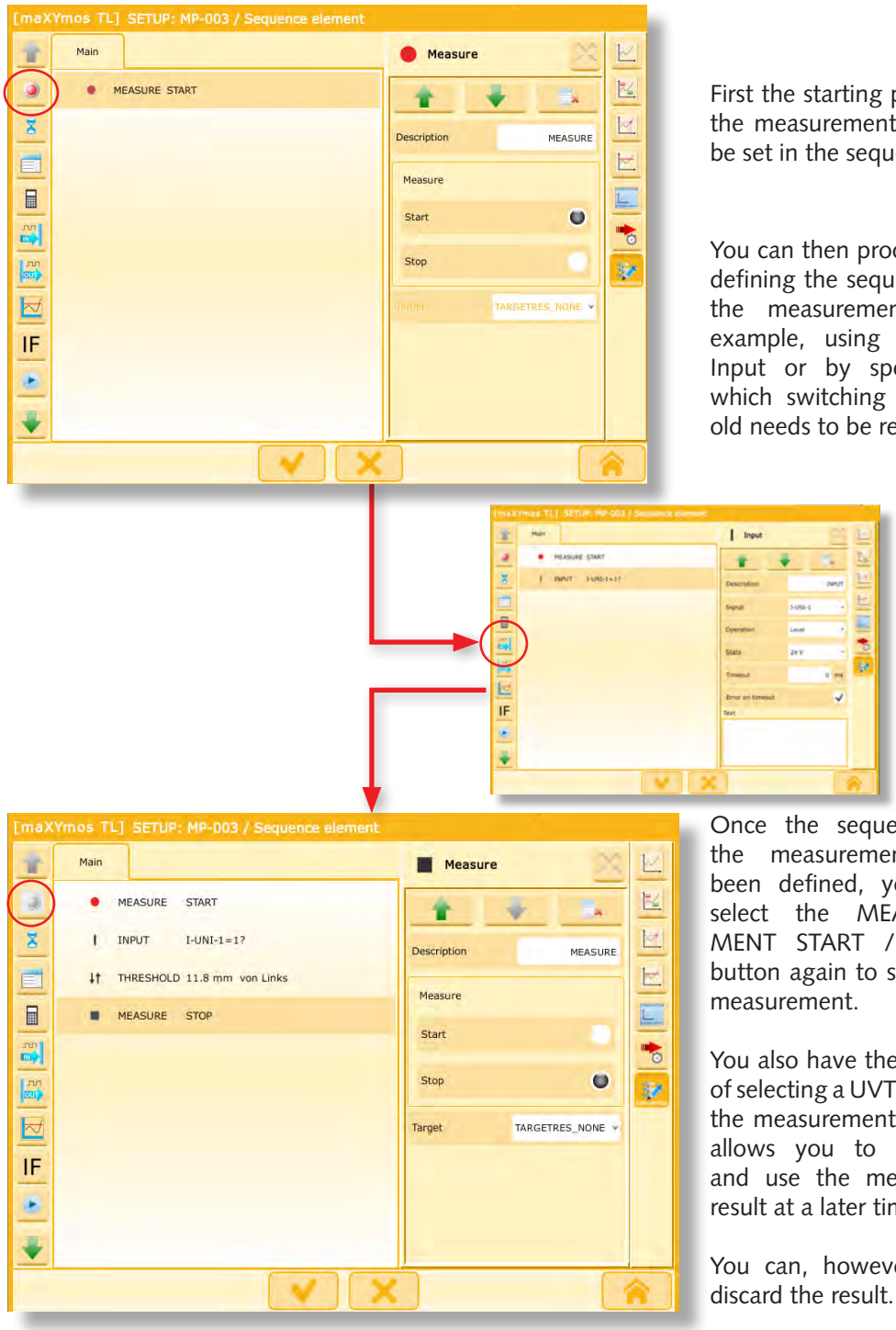
Variable

There are 5 different possibilities how to define a variable.

Selection	Description
Direct	With this selection you can directly enter a value
EO	Through this selection a reference can be made to a value of an EO
Curve values	If you select this you can reference a curve value
Variables	This used to reference previously saved values from a UVT
Actual value	Through this selection current values (e.g. strain gauge (DMS) force value) can be referenced

7.27.3.9 Element START/STOP "MEASURE"

The MEASUREMENT START/STOP element starts and stops the measurement. After the measurement stop command is given, evaluation is performed according to the parameterized evaluation elements.



First the starting point of the measurement has to be set in the sequence.

You can then proceed by defining the sequence of the measurement. For example, using a Dig. Input or by specifying which switching threshold needs to be reached.

Once the sequence of the measurement has been defined, you can select the MEASUREMENT START / STOP button again to stop the measurement.

You also have the option of selecting a UVT to save the measurement, which allows you to retrieve and use the measuring result at a later time.

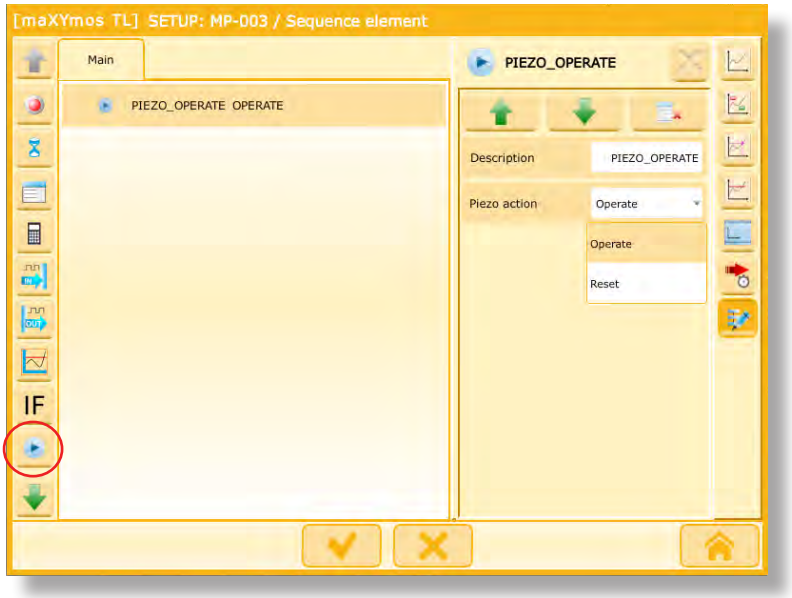
You can, however, also discard the result.

NOTE

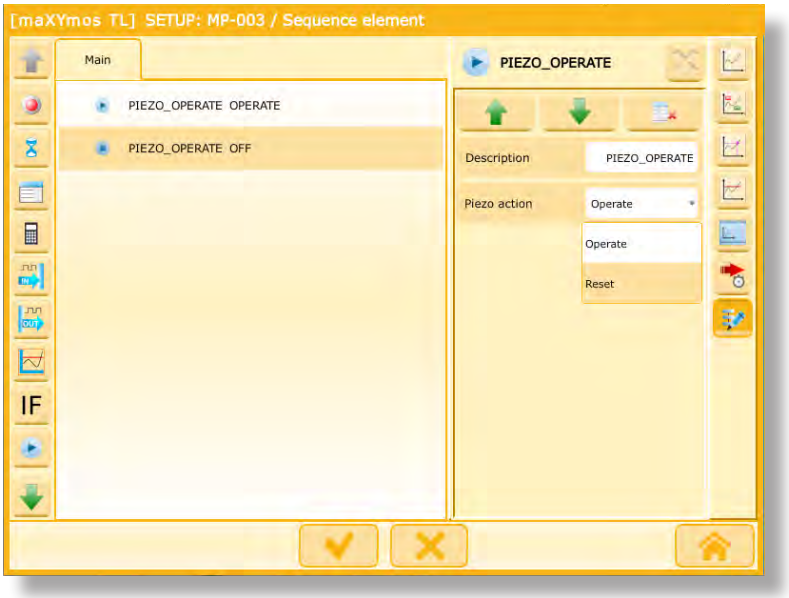
You can only perform one measurement per sequence.
In the 20 Master MP's (108 ... 127) you cannot perform measurements.

7.27.3.10 Element PIEZO OPERATE

The element PIEZO OPERATE sets the integrated charge amplifier in OPERATE or RESET.



Through the Action "Operate" the integrated charge amplifier is activated.



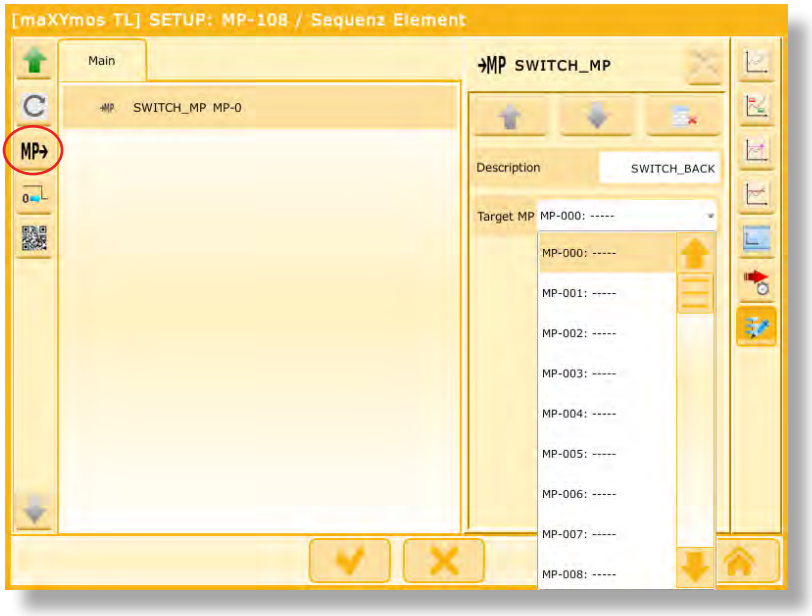
By taking action "Reset" the integrated charge amplifier is switched off again.

As a general rule, the piezo sensor is set to OPERATE. Consequently, there is no need to activate it.

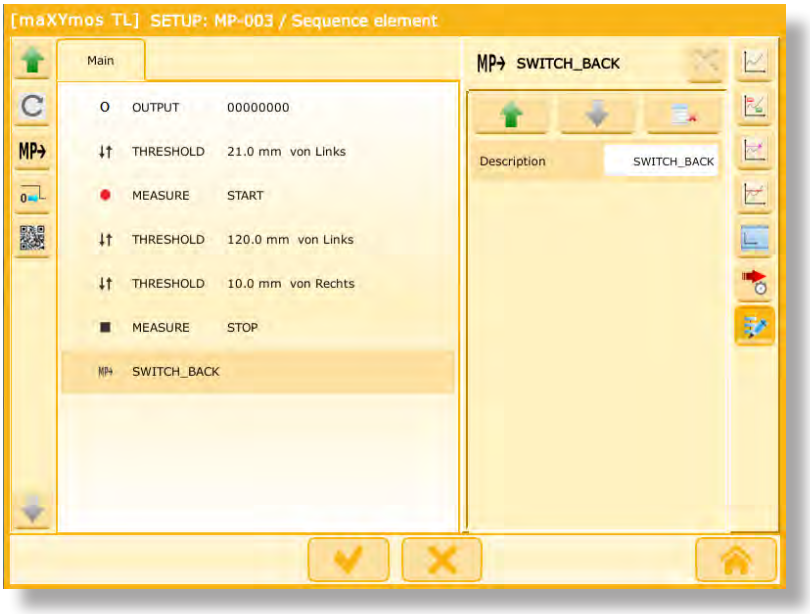
The PIEZO OPERATE element connection X12/X16 is without function.

7.27.3.11 Element MP-SWITCHING "SWITCH_BACK"

Throug the MP-SWITCHING Element you are able to switch out of one of the 20 Master MP's into one of the 108 Sub MP's. After going through this Sub MP you can switch back into the original Master MP.



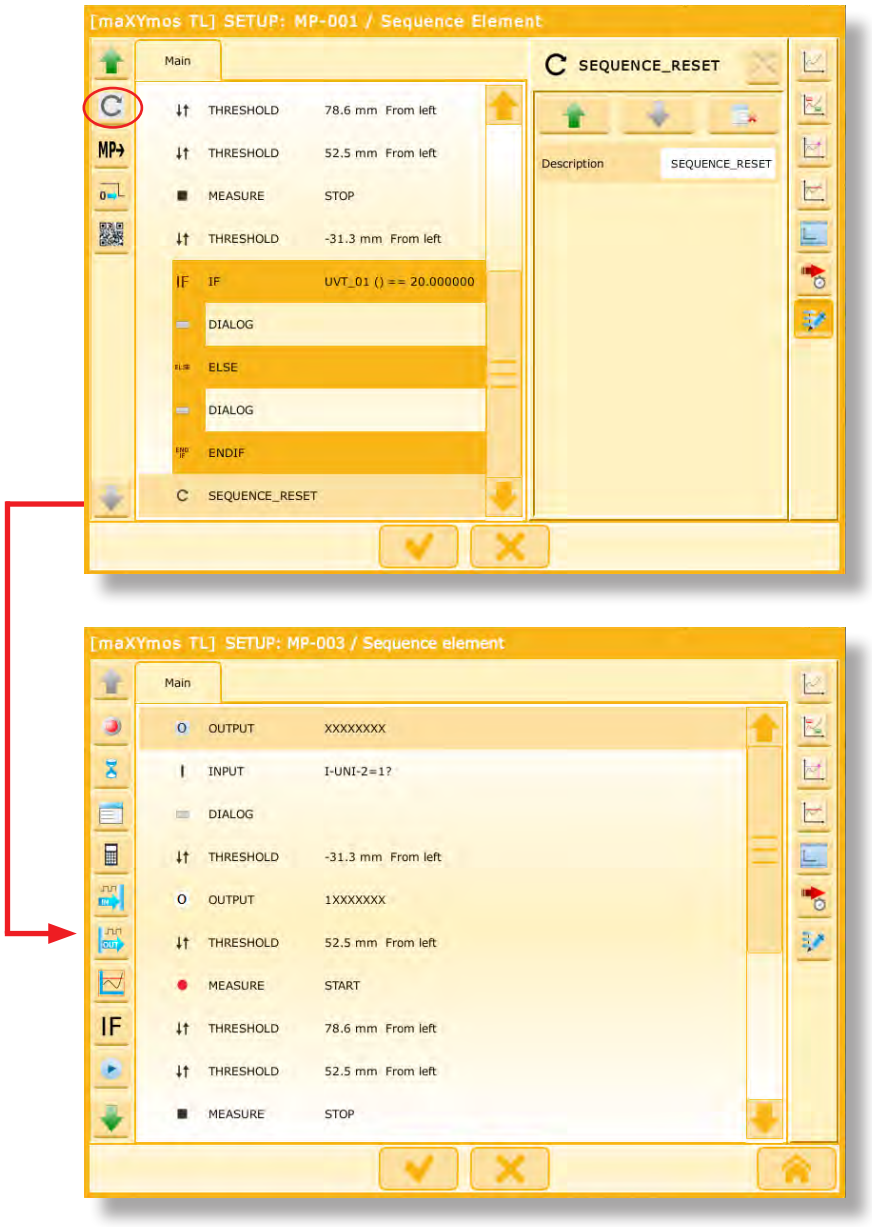
After going through the Sub MP you are able to set the element „SWITCH BACK". In this case you get back into the original Master MP.



7.27.3.12 Element RESTART

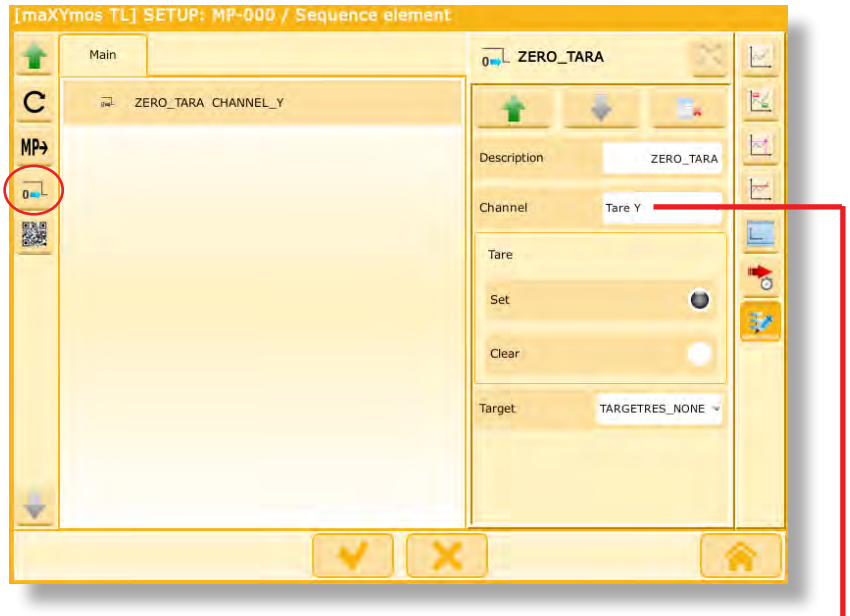
The RESTART element lets you jump back to the beginning of the sequence.

If the RESTART element is set at the end of the sequence, the sequence returns to the beginning immediately.

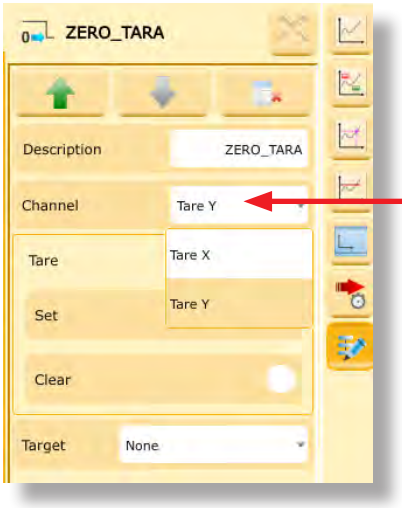


7.27.3.13 Element ZERO TARA

The TARA element can be used to set the sensor to zero on the X or Y channel in the sequence.



When setting the ZERO TARA element, the X or Y channel has to be selected.



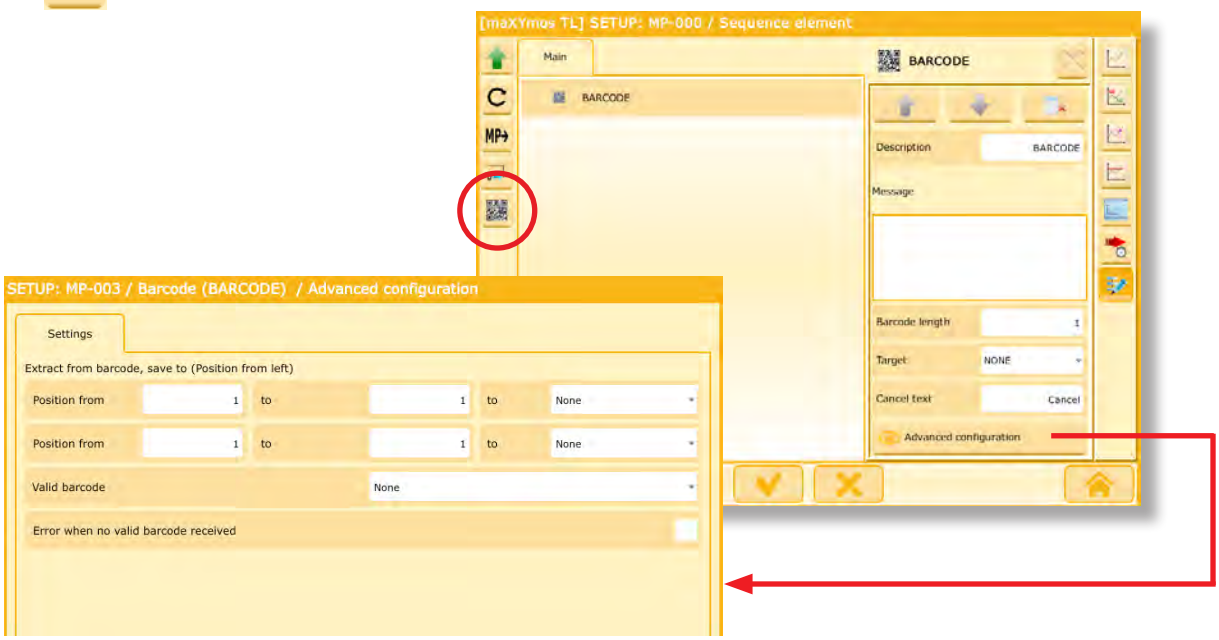
Taring
Set: the sensor selected by channel will be set to zero
Reset: the sensor selected by channel will be reset to the previous value

Target
The tared value can be stored in the UVT

Taring during the motion
If „Taring during motion“ is selected taring will be done during the motion, otherwise before or after the motion.

7.27.3.14 Element BARCODE

This element BARCODE can be used to scan a barcode in the sequence.



During the execution of the element a dialog which waits for the input of a barcode is shown. The barcode can be inserted by scanning a barcode with a barcode scanner or by inserting the barcode with the keyboard.

The execution of the element is finished:
- if a barcode was successfully scanned with the barcode scanner or inserted with the keyboard.
- if an invalid barcode was scanned with the barcode scanner or inserted with the keyboard.
- if the user cancels the procedure.

Description
The description can be chosen freely.

Message
Message shown in the dialog

Barcode length
Length of the scanned barcode

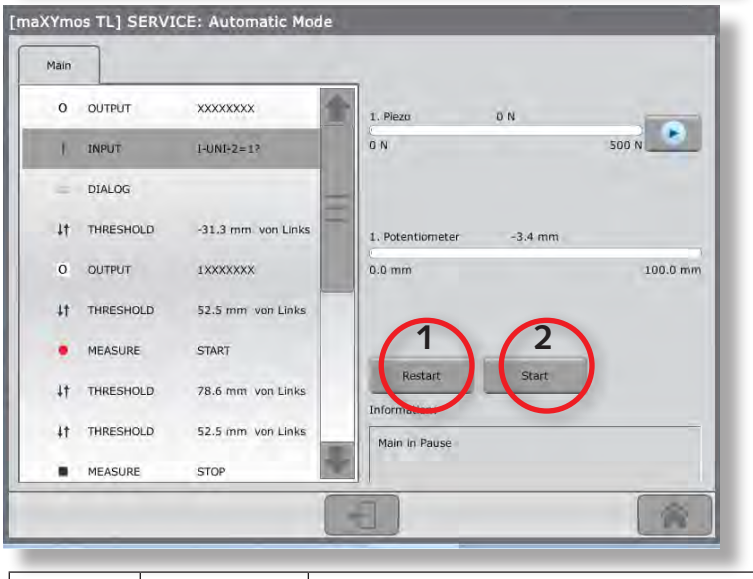
Target
It is possible to store the scanned barcode at the Part-ID. For this purpose the ID source in the Part-ID-Generation must be set to “Barcode”.

Cancel text
Text of the button to cancel the procedure.

Advanced configuration
Parts of the scanned barcode can be extracted and stored in the UVT.
A valid barcode can be stored in the UVT.
An error can be generated, if the barcode is invalid or the procedure is canceled.

7.27.4 SERVICE view automatic mode

Under "Automatic mode" in the SERVICE View you can see and control the actual running sequence step by step. You are also able to restart and pause the sequence.



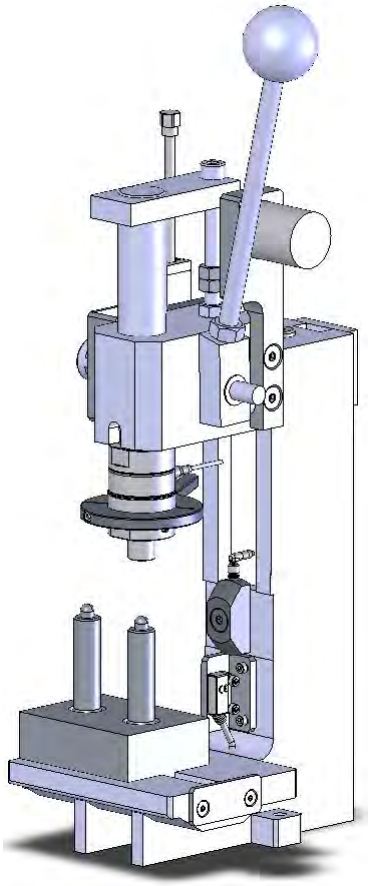
Button	Indication	Description
1	Restart	Through the button „restart" you are able to stopp the actual sequence and immediately restart it.
2	Start/Stop	With the button „Start/Stop" you can stop the sequence. If you want you are able to restart the sequence from the same step again. For example to record a reference curve and set up a evaluation afterwards.

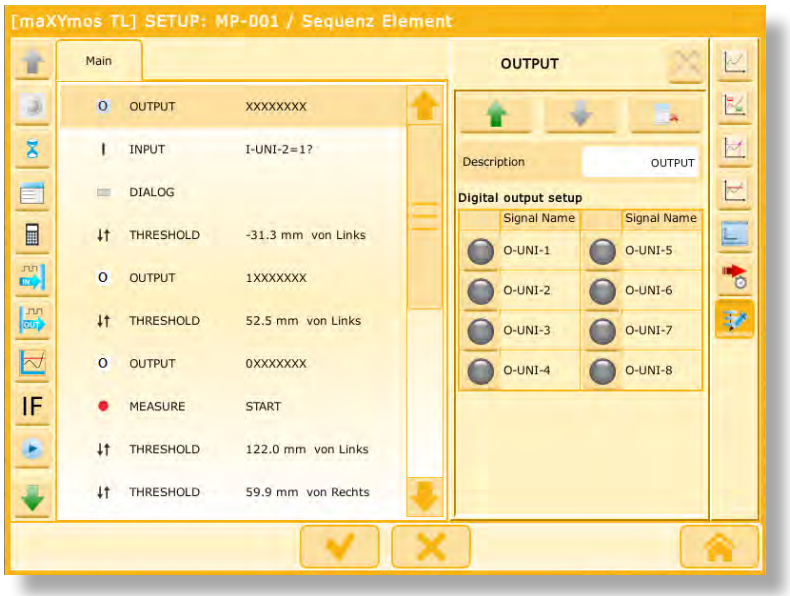
NOTE

While a sequence (measurement) is ongoing, all process views remain available as usual, and the evaluation is performed in the background. OK/NOK parts are still visualized using the OK/NOK button.

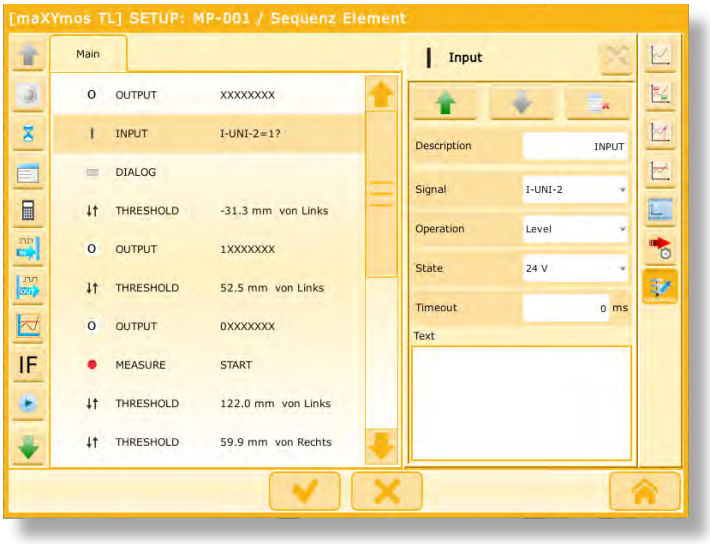
7.27.5 Program example

The program example given below explains the individual elements at their place in a complete sequence, thus illustrating a possible application of sequencer mode.

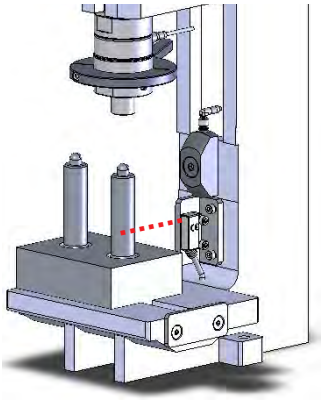


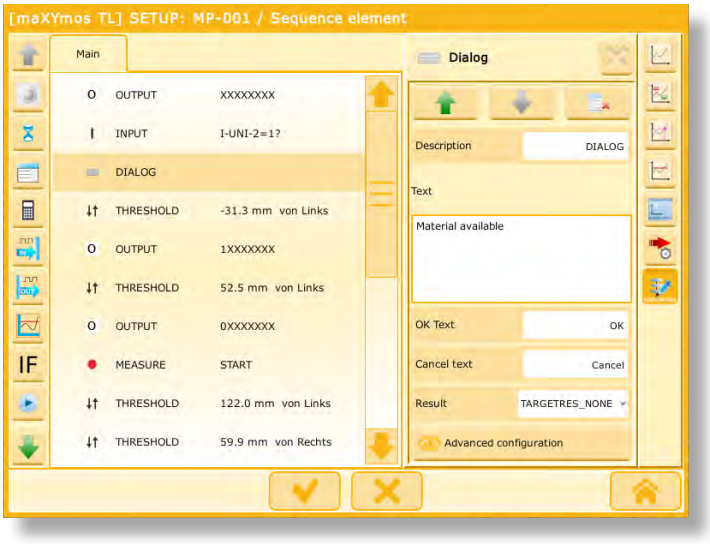


Set all outputs to 0 to ensure that the device is not sending any signals.

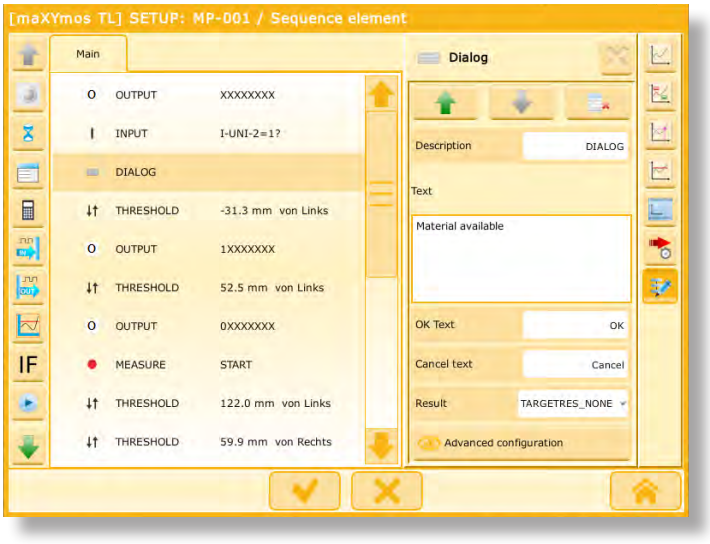


To check if material was used, the system waits for the signal from the sensor.

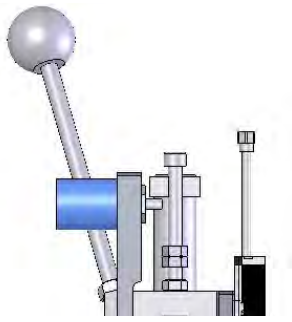


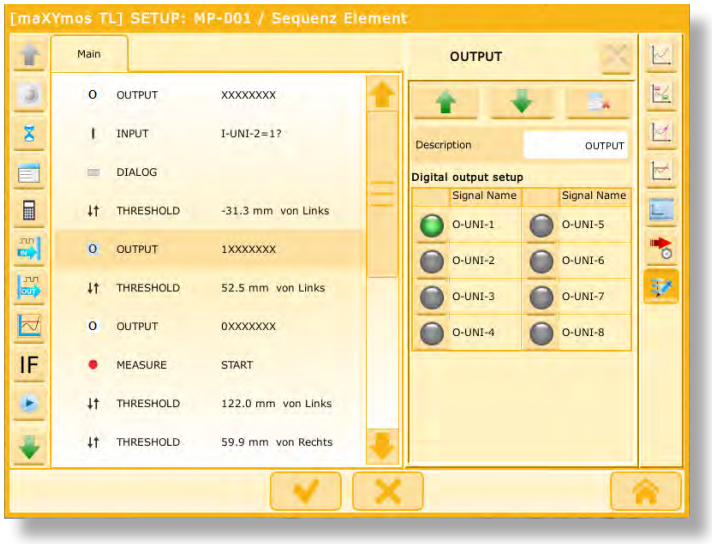


As soon as the material has been detected, a dialog will inform the user accordingly.

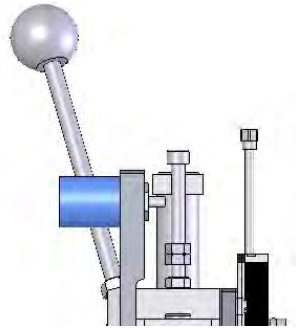


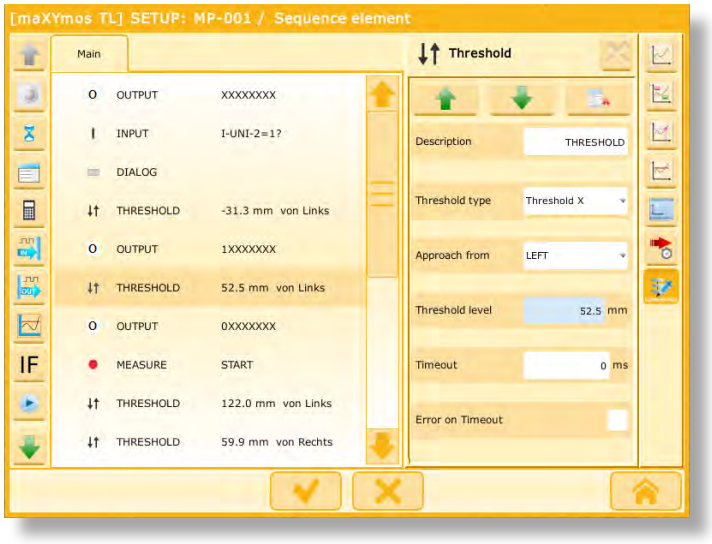
Next, the system needs to approach the defined threshold position.



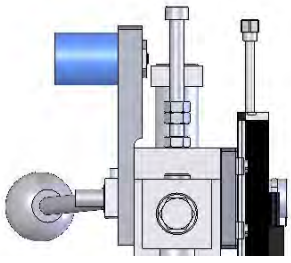


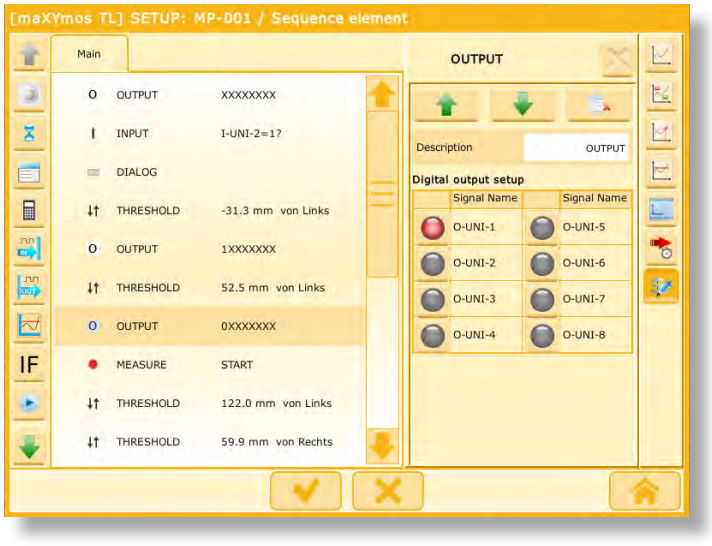
Once the defined switching threshold position has been reached, a digital signal is output in order to, for example, actuate the solenoid switch of a mechanical lock.



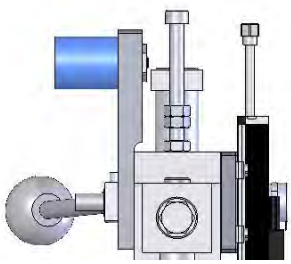


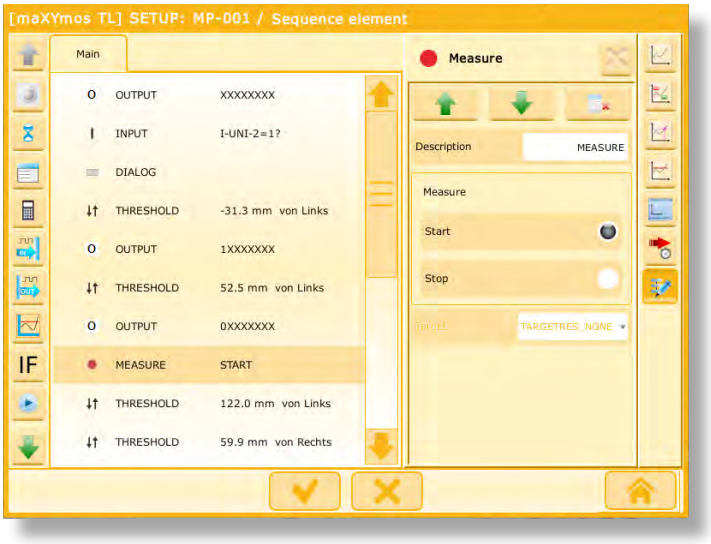
The system will afterwards approach another threshold.





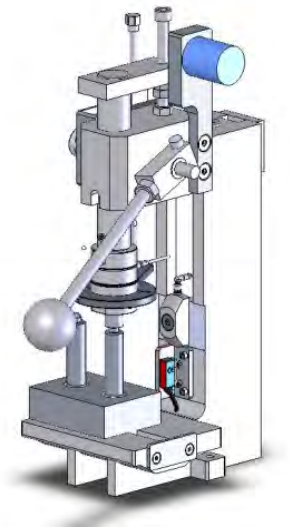
The threshold is approached to switch the output digital signal off again when the system has passed over the mechanical lock.



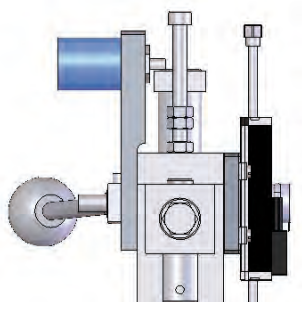


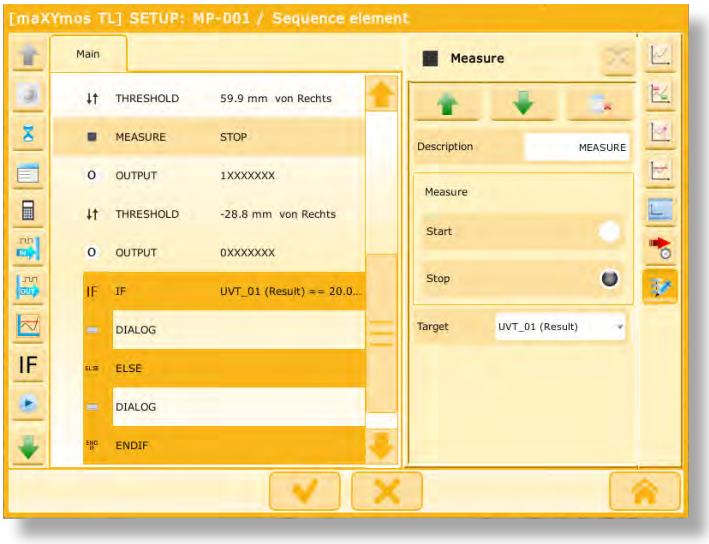
In the next step, the measurement is started.

The system will now approach the turning point XMAX.



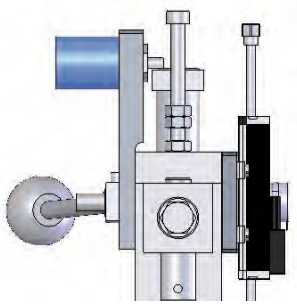
Once the turning point has been reached, the press will be released, and the system will approach another threshold.

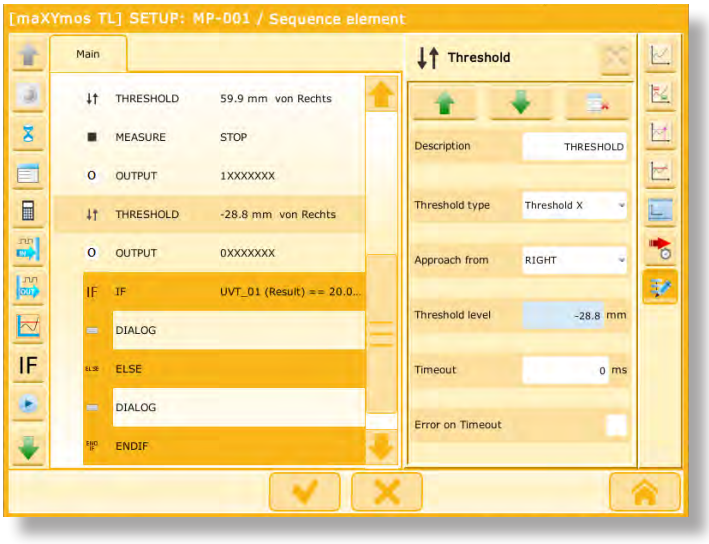




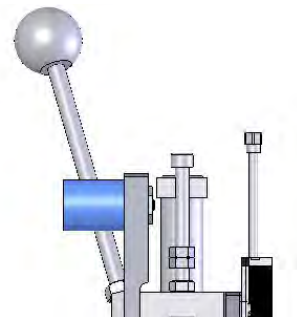
The measurement is stopped as soon as this switching threshold is reached.

Now, another digital output signal is emitted to deactivate the mechanical lock.

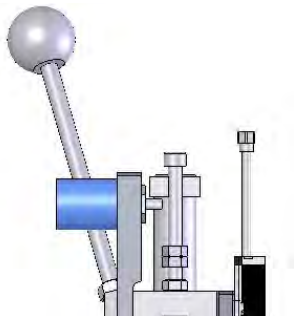




The system will afterwards approach another threshold.

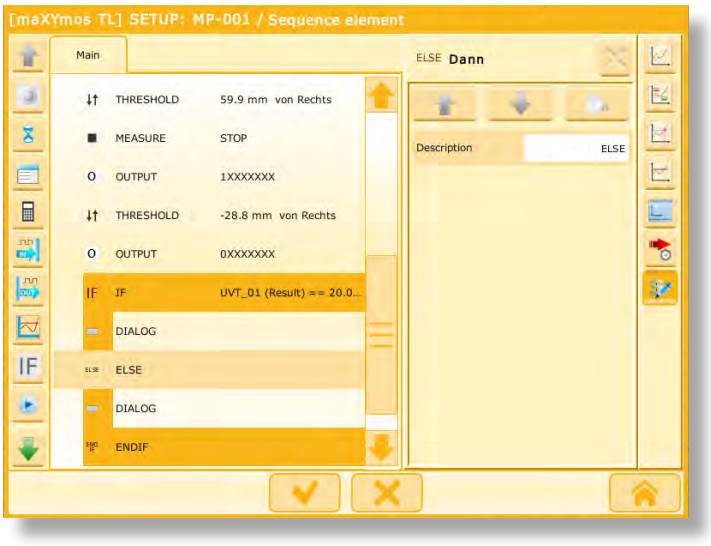


The digital output signal is reset to 0 to engage the mechanical lock.

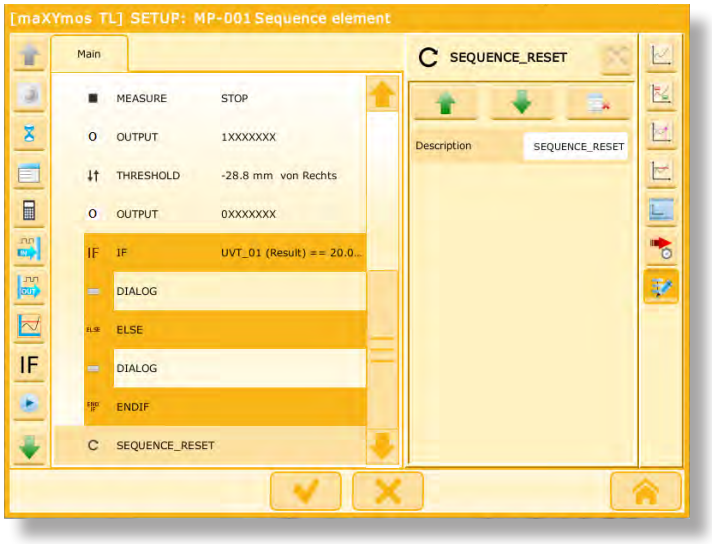


Next, the result stored in the UVT is supposed to be evaluated based on a constant value using the IF/ELSE element.

If the result was found to be OK, the user will be shown the following dialog:



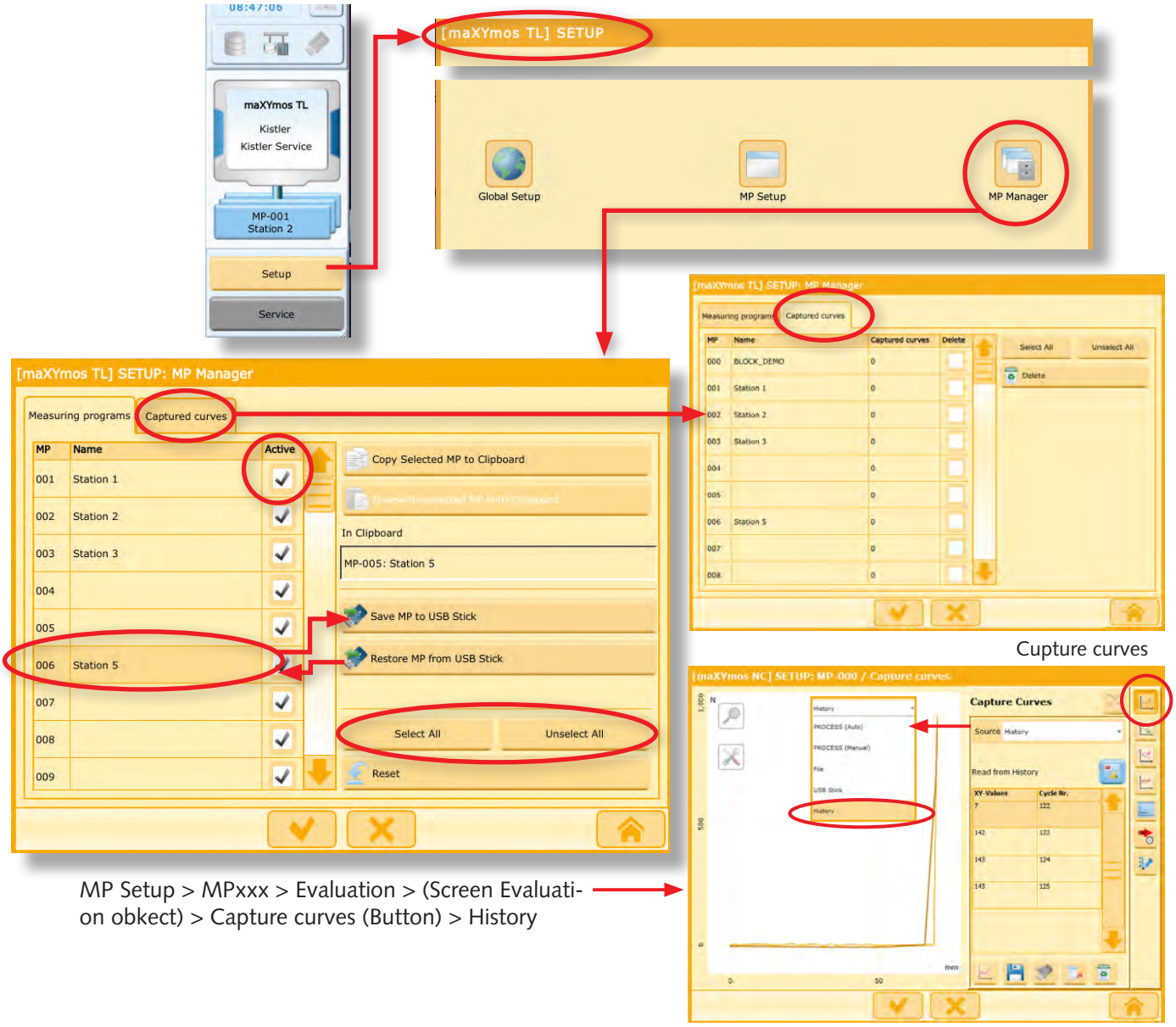
If the result was found to be NOK, the user will be shown the following dialog:



After reaching the end, the sequence is restarted using the RESTART element.

7.28 The MP Manager

The **MP Manager** can be used to copy, delete and transfer measurement programs (MPs). It can also be used to save MPs to/restore MPs from a USB stick. The MP Manager can also be used to remove MPs which are not in use from the MP Setup display and from the Process View menu. This helps the user to get a clear picture of the task in hand.
MPs saved to a USB stick can also easily be transferred/saved to other maXYmos-TL monitors.



Cupture curves

MP Setup > MPxxx > Evaluation > (Screen Evaluation obkect) > Capture curves (Button) > History

Active (= display/hide MPs)
MPs whose checkbox is activated are displayed, those that are unchecked are hidden. The "Select All" and "Unselect All" buttons enable all MPs to be displayed/hidden simultaneously.

Captured curves
Here all captured curves (reference curves for evaluation) of the corresponding programs are shown. As soon as the upper limit of 160 curves is reached no more reference curves can be added.

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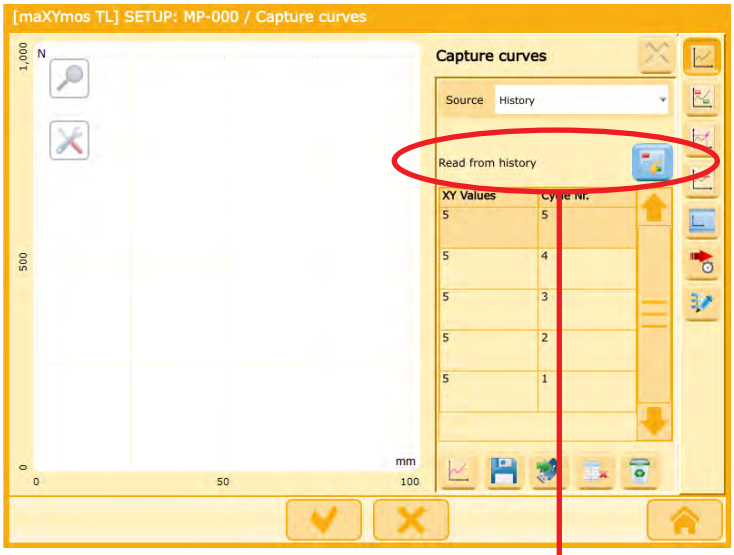
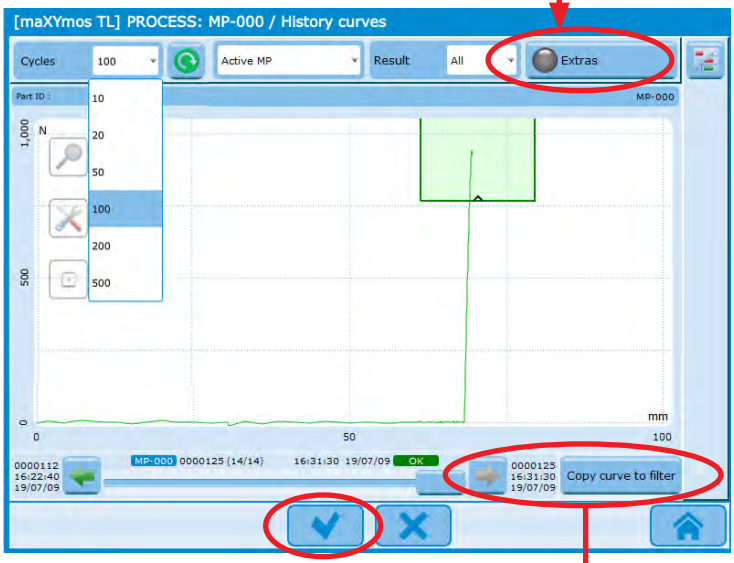
7.28.1 Additional curves for import

Here the curve import in connection with the curve history will be described.

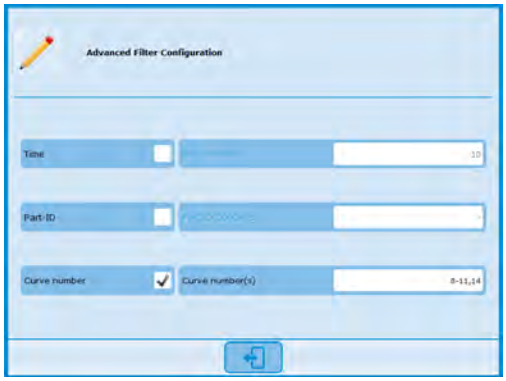


1. Step
"Get / select curves from curve history"



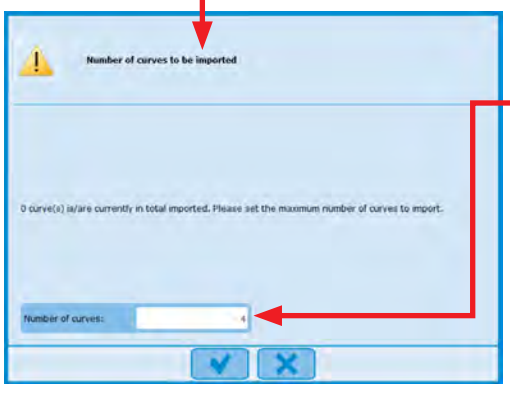
3. Step "Extras"
"Advanced Filter Configuration"

The selected curves can now be imported as reference curves into the measurement program by using the extended filter settings in "Extras"



2. Step
"Copy curve to filter"
Curves can now be selected when importing from the curve history.

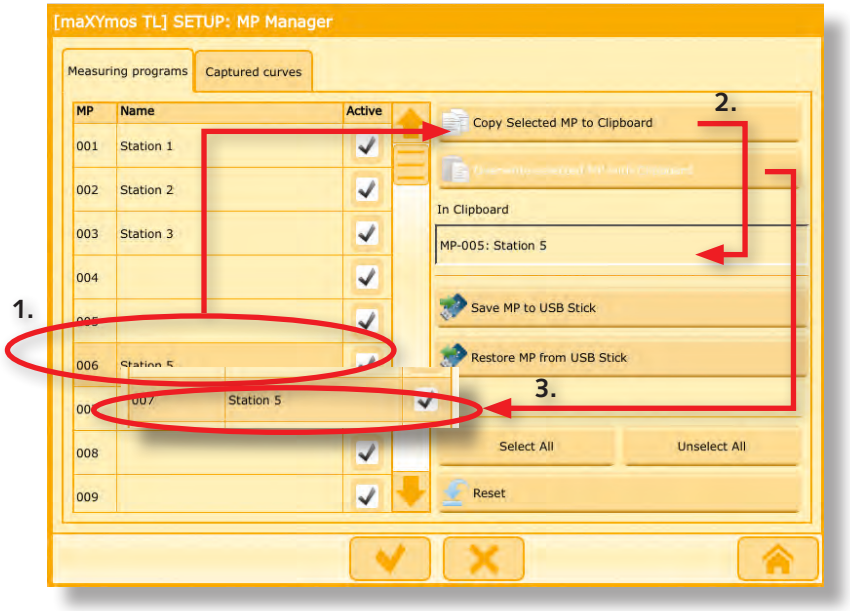
4. Step "Confirm"
"Number of curves to be imported"



The amount of curves to import can be selected.

Independant of the measurement programs a total of 160 curves can be imported.

Saving an MP to (or retrieving an MP from) a USB stick
Select the button for the required MP ("005" has been selected above, and thus has a dark background). Use the "Save MP to USB Stick" or "Restore MP from USB Stick" buttons to save MPs as required.



Duplicating MPs
You can also use the MP Manager to duplicate a measurement program (MP) and save it in a different MP location.
This feature can be useful when you want to run slightly modified MP tests without permanently modifying an existing MP.
First select the MP you want to duplicate (1.), e.g. "MP-005" (with a dark background in the screenshot above). Then select the "Copy Selected MP to Clipboard" button to copy this to the clipboard (2.); the name of the MP you have stored in the clipboard will now appear in the field underneath "In Clipboard", e.g. here "MP-005: Station 5".
Now use the "Overwrite Selected MP with Clipboard" button to select the MP to which you want to save the MP you have stored in the clipboard, e.g. here "MP-007" (3.). You can now use the MP Setup menu to modify the "new" MP you have created.
Note: Overwrite changes made to MPs cannot be undone!

Deleting MPs
You can also use the MP Manager to delete individual (or all) MPs or to return individual (or all) MPs to their original factory settings. To delete, first select the MP(s) you want to delete and then select "Reset" (if you want to delete all the MPs, simply select "Reset"). Then, in the next GUI, choose whether you want to delete all the MPs or only the selected one(s). If no individual MPs were previously selected, then your only option is to select "Restore all MPs to Factory Settings".
Note: Once an MP has been deleted, that deletion cannot be reversed!

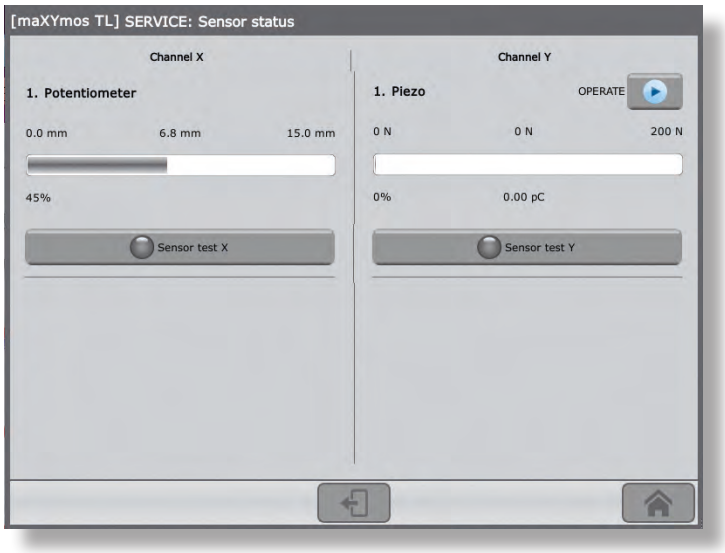
8. SERVICE menus – Tools f. com., maintenance and tests

This menu contains system information (e.g. firmware version), sensor-status and digital input/output status information, fieldbus information, digital output tests and firmware-update and reset functions.

8.1 SERVICE menu: System information

This displays system information, such as the serial number, firmware version, the IP address and so on.

8.2 SERVICE menu: Sensor status

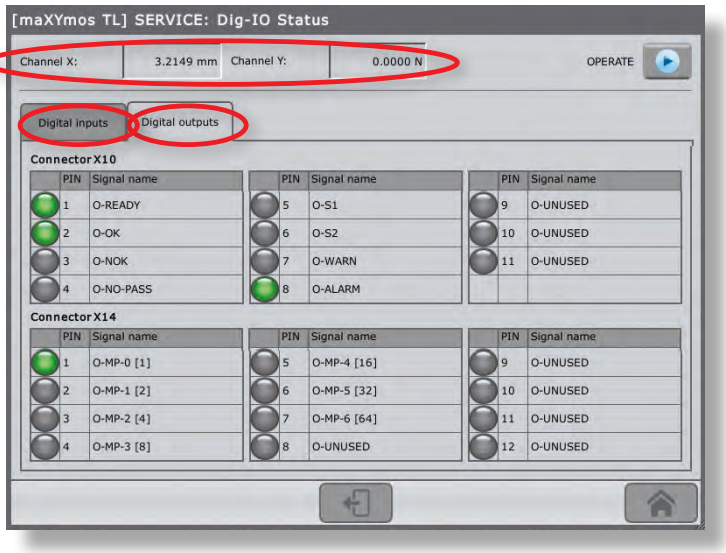


This is used to check the channel-X and channel-Y sensors. Current values are displayed in the relevant measurement units, as percentages and in bar-chart form.
To carry out a sensor test, you first need to teach in or input the correct test points and tolerances for the channel-X and channel-Y settings (in Global menu → p. 54 in MP Setup menu → p. 245/246). Then approach the workpiece physically and tap the test button.

In the piezoelectric version, the charge amplifier may need to be set to the OPERATE state!

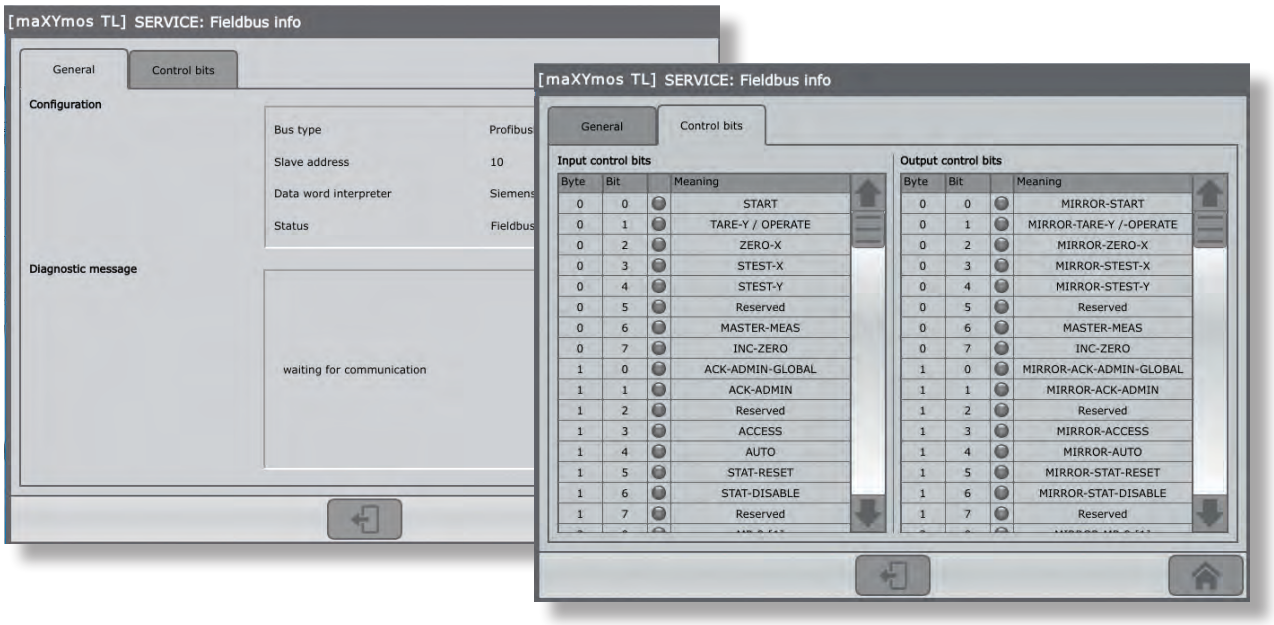
An automatic PIEZO reset is set when you exit the screen.

8.3 SERVICE menu: Dig-IO status



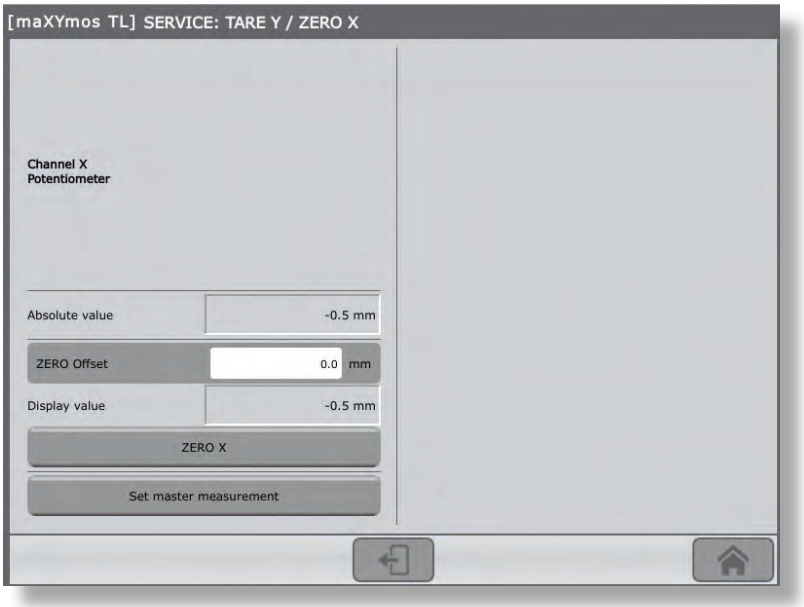
This displays the input/output signals passing through sockets X10 and X14 (green = signal) along with the numerical values for channel X and channel Y.

8.4 SERVICE menu: Fieldbus info



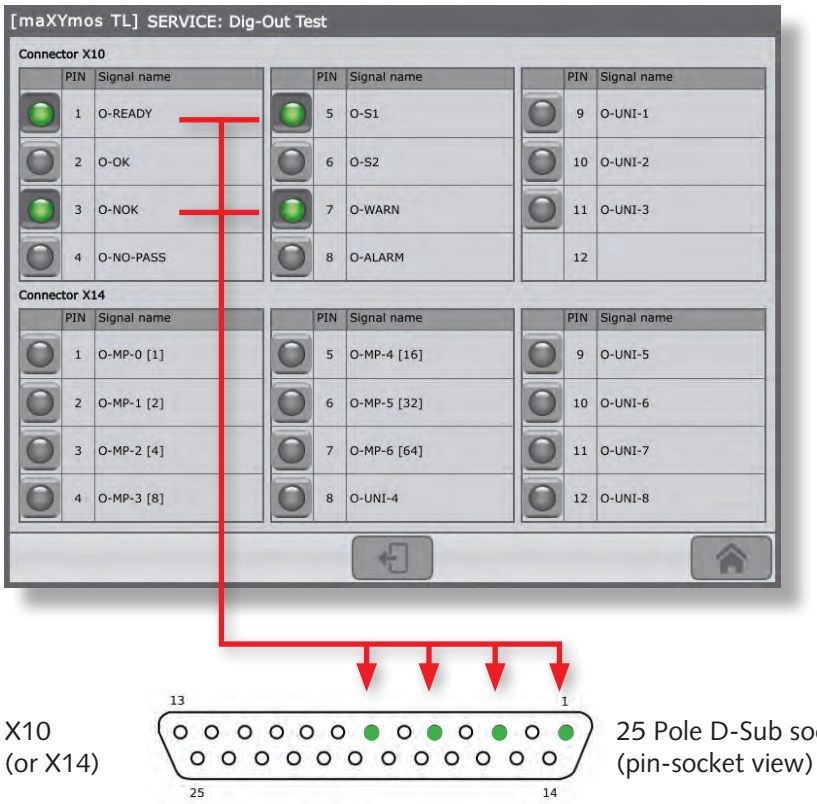
This displays fieldbus information.

8.5 SERVICE menu: Tare-Y/ZERO-X



This is for strain gauge and ±10 V sensors. The sensor-test function is activated manually. The test point must be taught in beforehand (see "Test Point" parameters → p. 56, 58, 59, 278). Approach the test point physically before initiating the test!

8.6 SERVICE menu: Dig-Out test

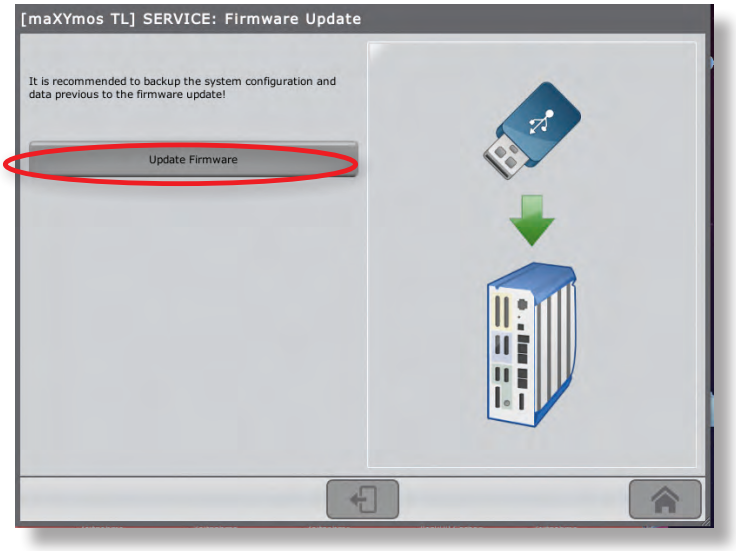


X10
(or X14)

25 Pole D-Sub socket (female)
(pin-socket view)

Clicking on an LED changes the relevant output for sockets X10 and X14 to its alternate state. When you exit the menu, control of the outputs is once again determined by the status of the monitor.
Connections / plugs → p. 290, 307

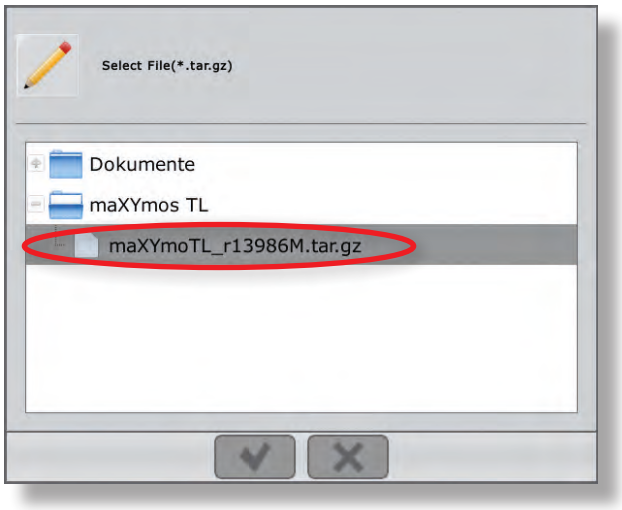
SERVICE menu: Firmware update



Updating firmware

Firmware can easily be updated from a USB stick. Proceed as follows:

– Make a backup of the system configuration
→ p. 52, 274 → Global setup / Backup + Restore
– Insert a USB stick with the new firmware version in the USB port.
– Once the stick has been recognized, the "Update Firmware" button can be selected.

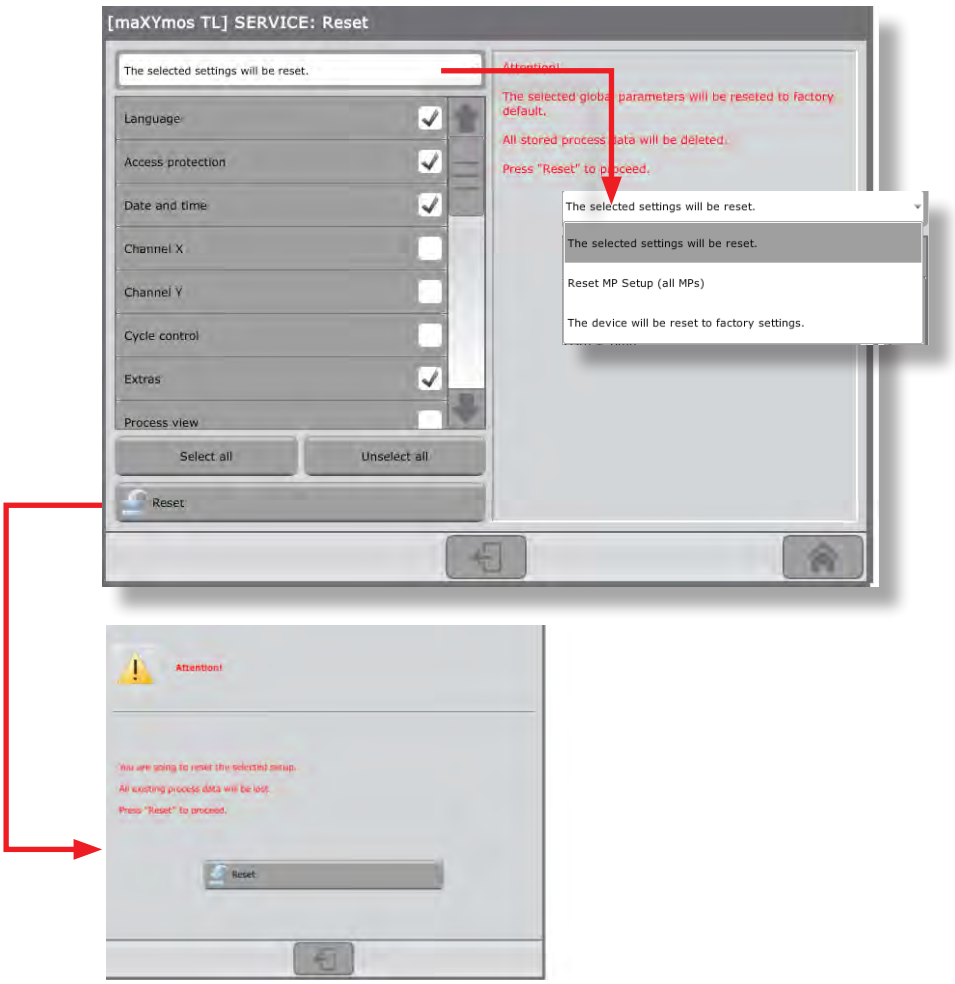


– In the directory, select the required maXYmos TL firmware file (the name will end with "*.tar.gz"). Confirm by clicking on the checkbox at the bottom of the GUI.

Important:
Never interrupt the process, interrupt the power supply or remove the USB stick during an update. Else functioning of the device could be impaired!

For upgrades from 1.1.12 auf 1.2.16 it is recommended to follow closely our Short Manual "Firmware upgrade 1.1.12 to 1.2.16 maXYmos TL Type 5877", to avoid loss of parameters or corruption of the device system.

SERVICE menu: Reset



The Reset function allows you to reset various settings:

– "**The selected settings will be reset**": allows you to reset either individual settings.
– "**Reset MP Setup (all MPs)**": Reset all Measurement Programs (MPs) and process data
– "**The device will be reset to factory settings**"

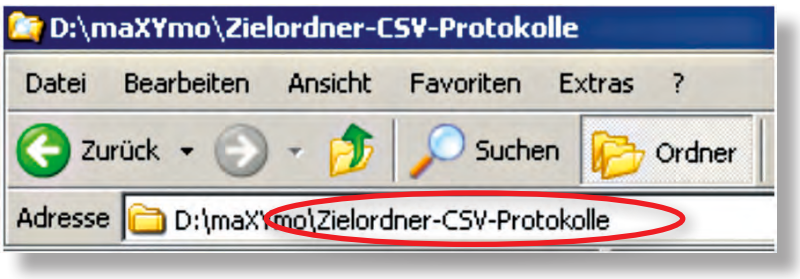
Tip: For safety's sake, make a backup of your configuration before executing a reset. Once a reset has been executed, the previous data will be irretrievably deleted.
→ p. 52, 274 → Global setup / Backup + Restore

Important:
Never interrupt the process, interrupt the power supply or remove the USB stick during an update. Else functioning of the device could be impaired!

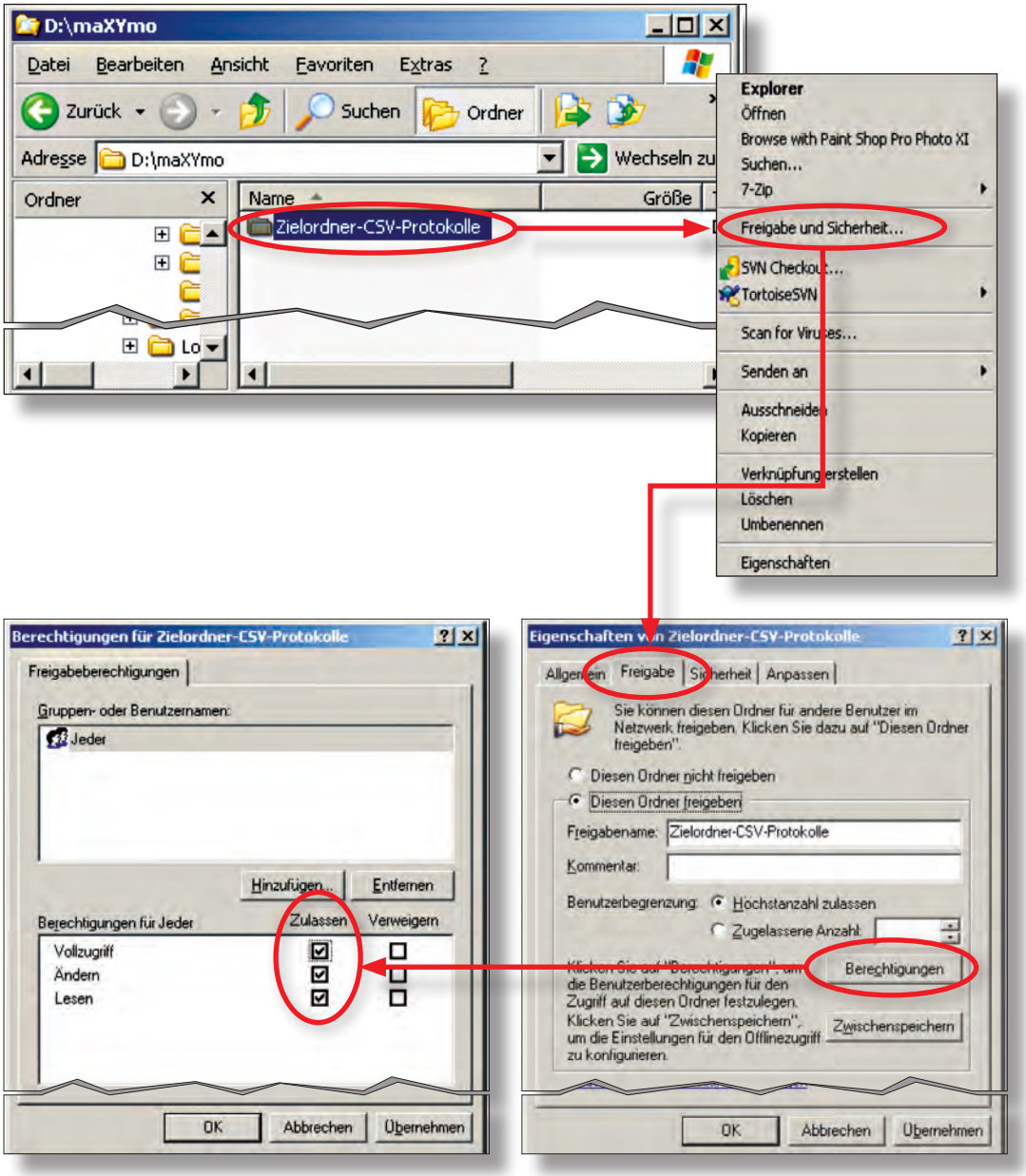
8.7 Configuring measurement data export (Windows XP®)

8.7.1 Configuring the server – creating and sharing the target directory

Create target directory, e.g. "Target Directory - CSV Log Files":

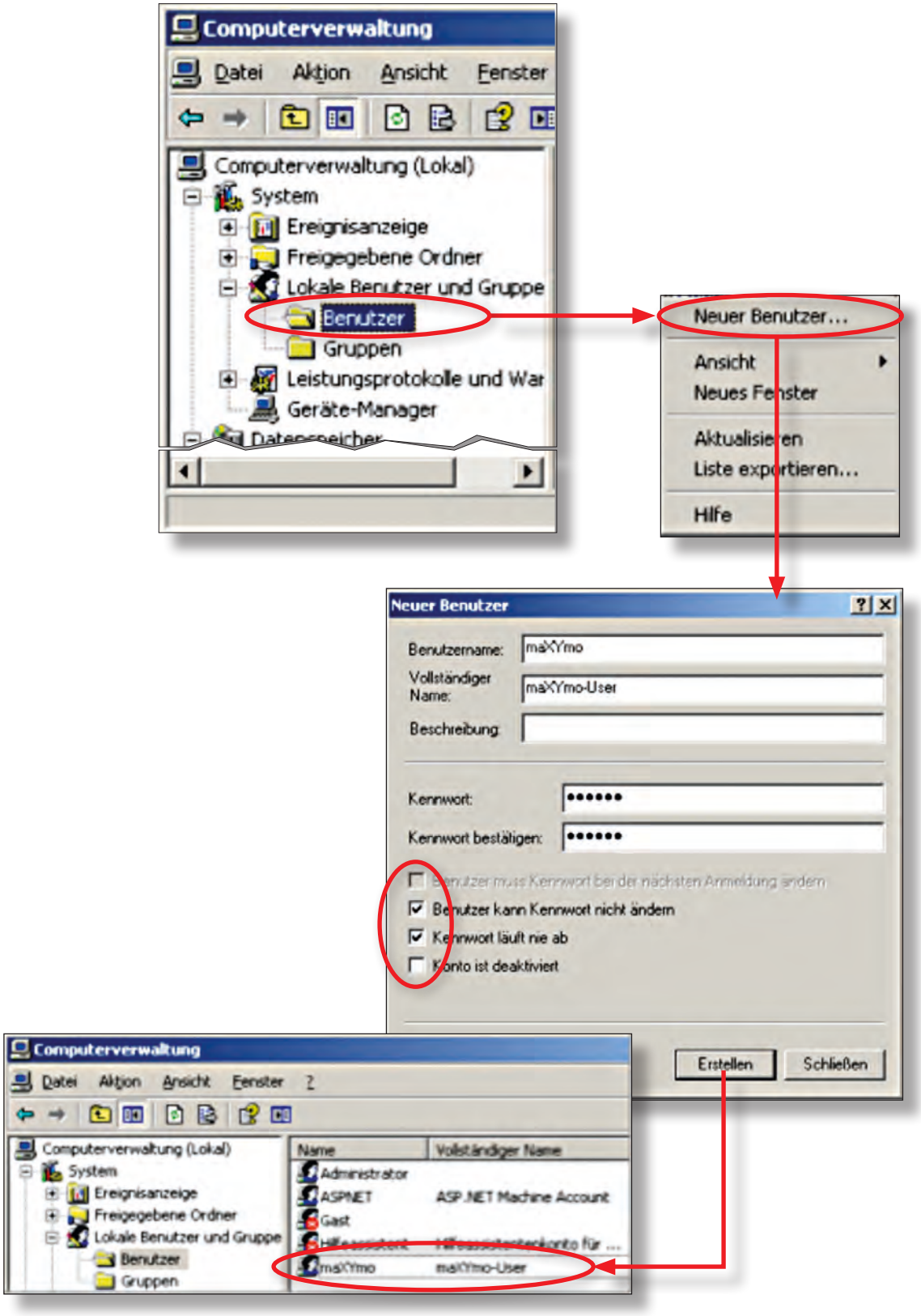


Right click on target directory:



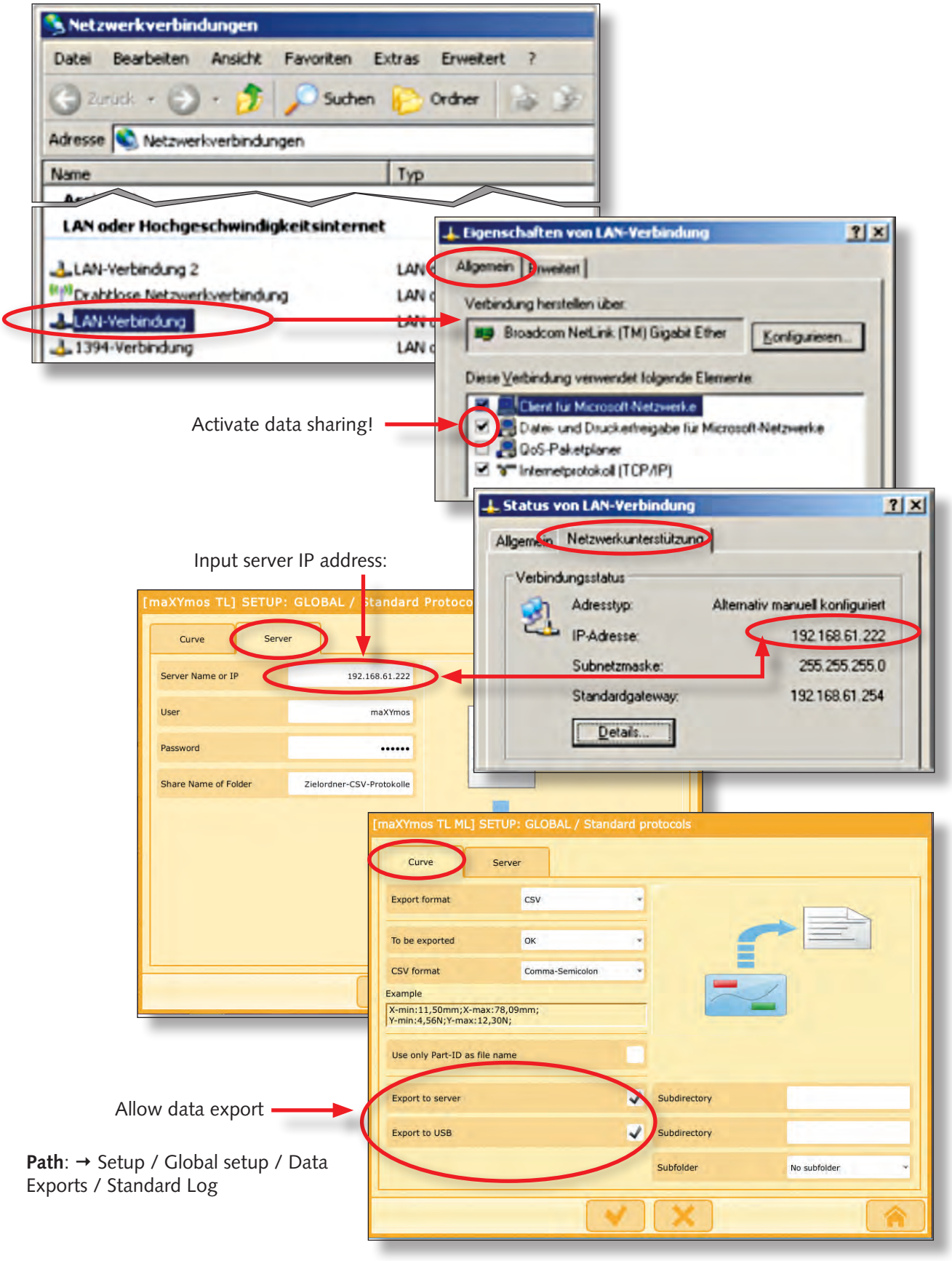
8.7.2 Setting up a user in the (PC) system

Control Panel → Administrative Tools → Computer Management → Local Users and Groups → Users



8.7.3 Prepare LAN connection for data export

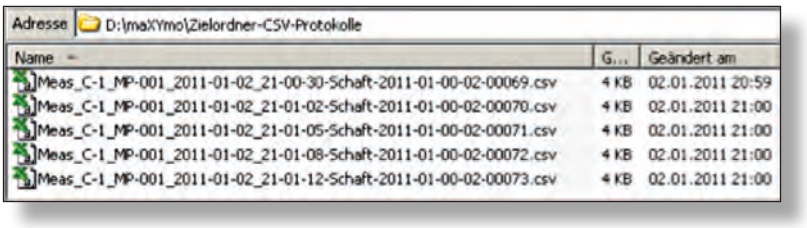
Network connection → LAN connection



Path: → Setup / Global setup / Data Exports / Standard Log

8.7.4 Generating log files

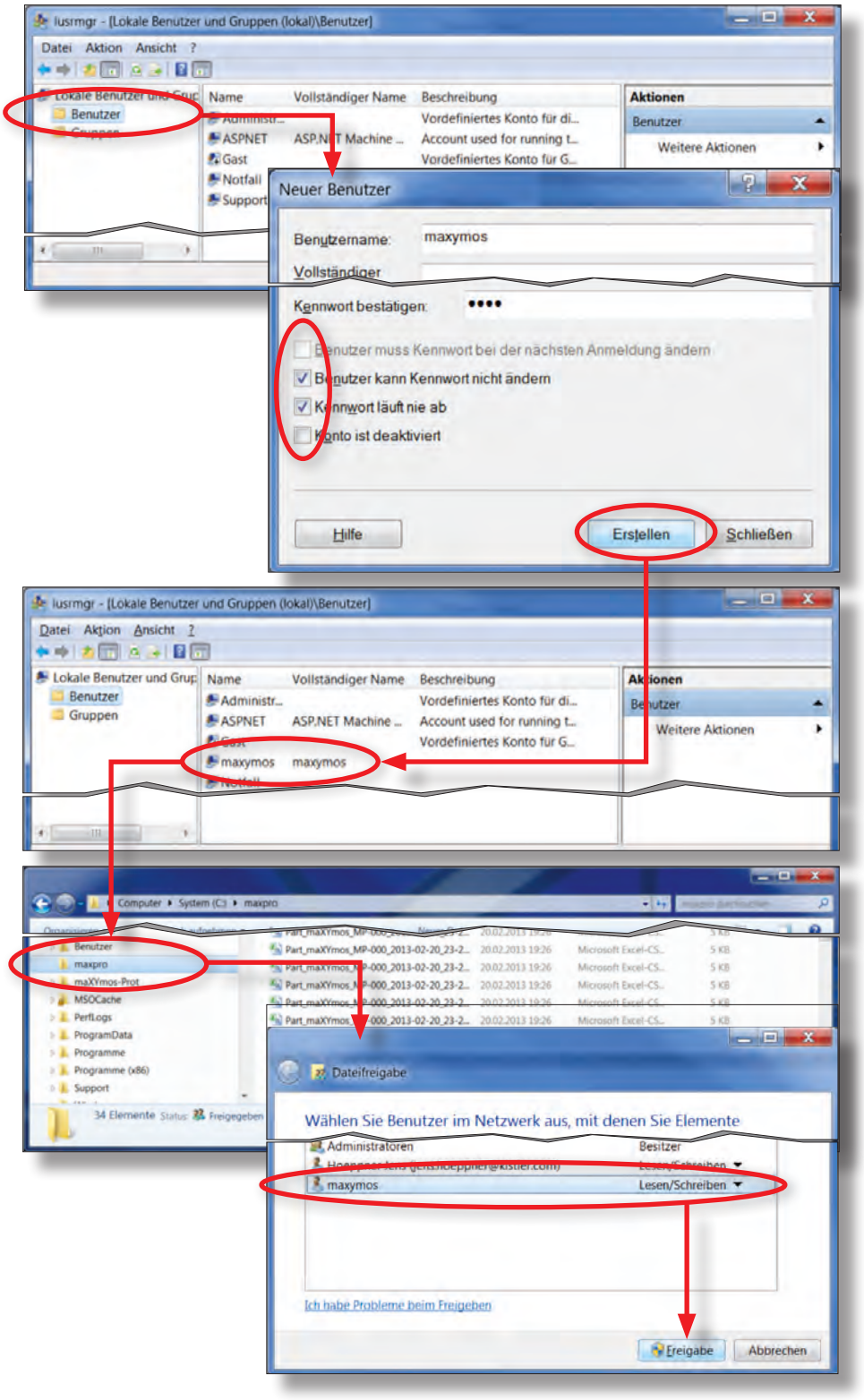
First run the necessary cycles. The log files should now appear in the target directory. If they fail to appear, check your settings again.



8.8 Configuring measurement data export (Windows WIN 7®)

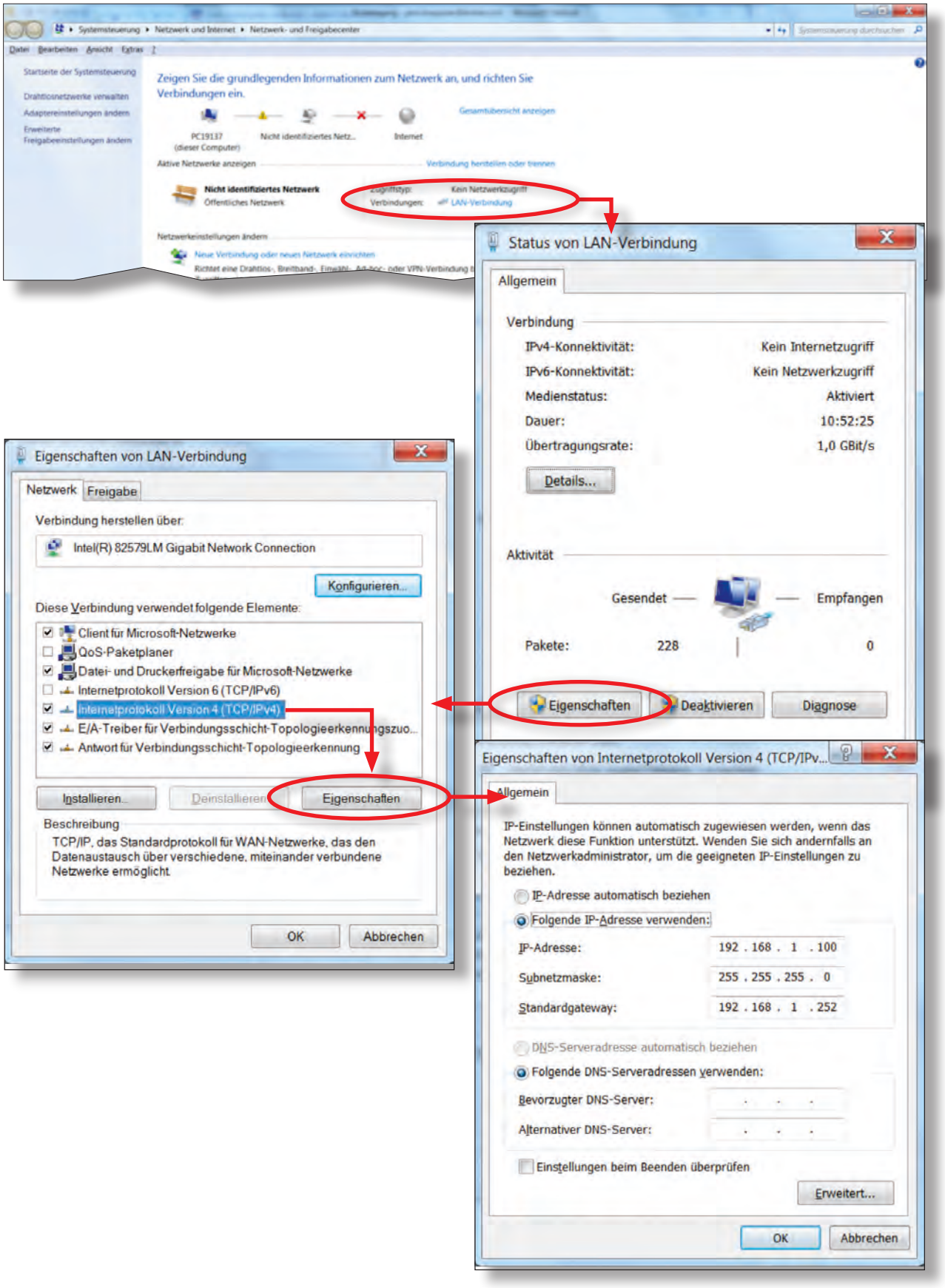
8.8.1 Setting up a user in the (PC/WIN 7®)

System Control → User Accounts → Add/delete user accounts → Create new account → Change password



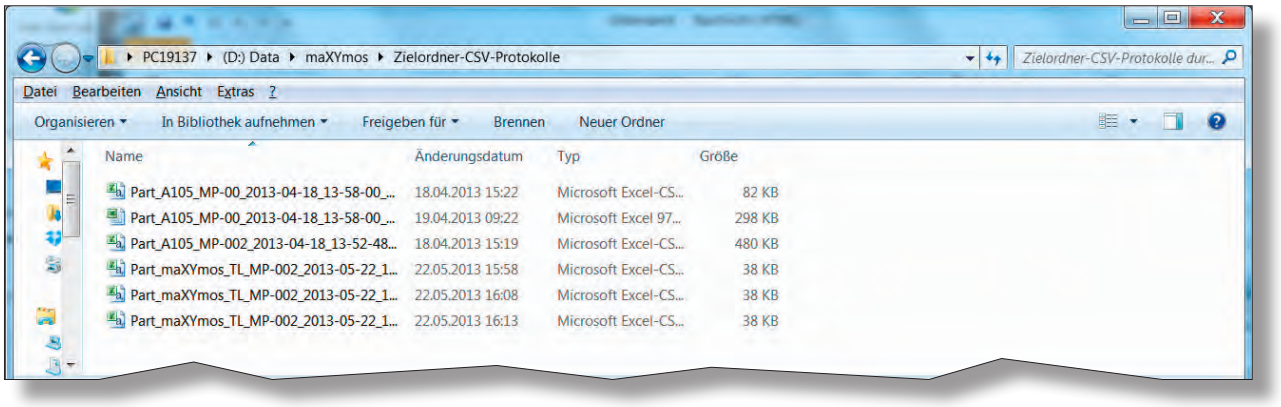
8.8.2 Prepare LAN connection for data export

Network connection → LAN connection



8.8.3 Generating log files

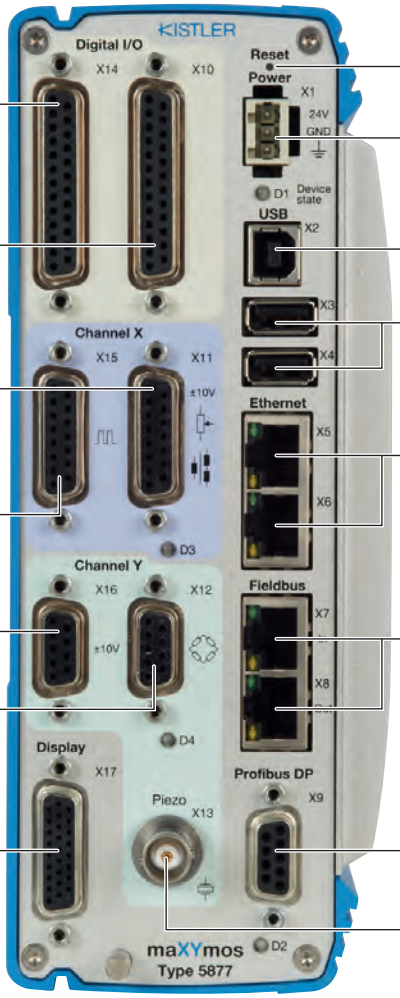
First run the necessary cycles. The log files should now appear in the target directory. If they fail to appear, check your settings again.



9. Connections and signal flows

9.1 Socket layout

Measurement and Evaluation Module (MEM)



Digital IO (X14) (1)
Additional signals for special functions

Digitale IO (X10) (2)
Basic signals: START, READY, OK, NOK, etc . Pin configuration matches maXYmos BL

Channel X (X11) (1):
Analog sensors: Poti, ±10 V, LVDT, Induktive

Channel X (X15) (2)
Digital sensors: Incremental, SSI

Channel Y (X16) (1)
Transmitter ±10 V

Channel Y (X12) (2)
Strain gauge sensors

Display interface (X17)
MEM-DIM coupled

Reset (interrupts power supply!)

Power supply 24 VDC (X1) (plug included)

USB (X2) (device) for laptop

USB (X3, X4) (Host) for USB stick

Ethernet TCP/IP (X5, X6)
Data export, remote access, channel cascading

Feldbus (X7, X8) (1)
EtherNet/IP, PROFINET, EtherCAT

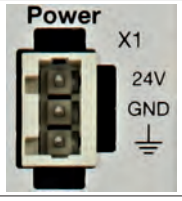
Fieldbus (X9) (2)
PROFIBUS DP

Channel Y (X13) (3)
Piezoelectric sensors

9.2 Connections

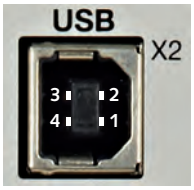
9.2.1 Connections X1 to X9

Power (X1)



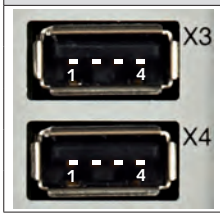
PIN	Description
1	E 24 V
2	EGND
3	Shield (case)

USB device (X2)



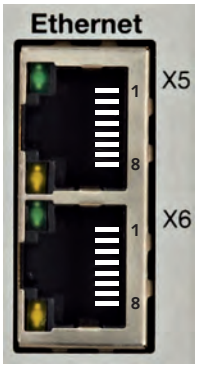
PIN	Description
1	5 V
2	D–
3	D+
4	GND

USB 2.0 Master (X3 and X4)



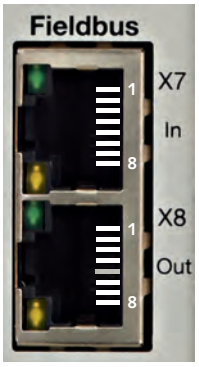
PIN	Description
1	5 V
2	D–
3	D+
4	GND

Ethernet 10/100 (X5 and X6)



PIN	Description
1	Rx+
2	Rx–
3	Tx+
4	5
5	4
6	Tx–
7	8
8	7

Version Fieldbus (X7 and X8)



PIN	Description
1	Rx+
2	Rx–
3	Tx+
4	5
5	4
6	Tx–
7	8
8	7

Version PROFIBUS (X9, DSUB-9)

PIN	Description
1	n.c.
2	n.c.
3	A
4	DE
5	GND
6	+5 V
7	n.c.
8	B
9	n.c.

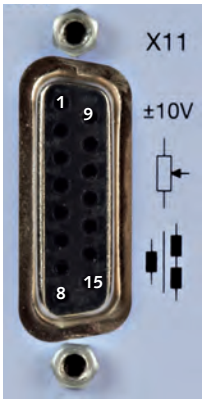
9.3 Connection display (X17)

Display for DIM (X17)	
	Internal interface to DIM (Display modul). Note: Only the maXYmos display can be connected to this socket. It cannot be used to connect a conventional PC screen.

9.4 Connection Channel X analog (X11)

9.4.1 Socket configuration/connecting the various sensors

Channel X Analog (X11)



PIN	Description	Pot	10 V	IH	IV	LVDT
1	24V_S		EXT			
2	n.c.					
3	X_X_MONI					
4	X_X_10V_IN+		SIG			
5	X_X_INDU_SUPP-	EXT-		EXT-	EXT-	EXT-
6	X_X_INDU_SUPP+	EXT+		EXT+	EXT+	EXT+
7	X_X_TEDS					
8	X_X_INDU_IN+	SIG		SIG	SIG+	SIG+
9	GND					
10	n.c.					
11	X_X_10V_IN-		GND/ SIG-			
12	X_X_INDU_SENS-			(SENS-)	(SENS-)	(SENS-)
13	X_X_INDU_SENS+			(SENS+)	(SENS+)	(SENS+)
14	GND		(GND)			
15	X_X_INDU_IN-				SIG-	SIG-

Abbreviations	
Abb.	**Description**
Pot	Potentiometric sensor
10 V	Active sensor with electrical output
H	Inductive half bridge

Abbreviations	
Abb.	**Description**
V	Inductive full bridge
LVDT	Linear voltage differential sensor
EXT	Supply
SIG	Signal

9.5 Channel X analog (X11)

9.5.1 Technical data for sensor feeds (24V_S, GND)

Sensor feeds (24V_S, GND)		
Voltage	VDC	24 V ±5 %
Maximum aggregate current (X and Y channels combined)	mA	200
Short-circuit protection		yes

9.5.2 Technical data for 10 V power input

10 V Power input		
Input type		Differential
Measurement range (nominal)	V	±10.0
Measurement range (incl. overload)	V	±11.0
Linearity error	% FS	<±0.05
TK0	ppm/K	<±30
TKE	ppm/K	<±50
Input resistance	MΩ	1
Common-mode range	V	±10
Common-mode rejection (50/60 Hz)	dB	>60
Frequency range (–3 dB)	kHz	0 ... >5
Interfering signal	%FS	<±0.05

9.5.3 Technical data for potentiometer input

Potentiometer input		
Supply		
Voltage	VDC	4.4 ±0.2
Short-circuit protection		yes
Measurement range	%	0 …100
Track resistance	kΩ	1 …5
Wiper current	µA	<1
Linearity error	% FS	<±0.05
TK0	ppm/K	<±50
TKE	ppm/K	<±50
Frequency range (–3 dB)	kHz	0 ... >5
Interfering signal (100 Hz Filter)	%FS	<±0.05

9.5.4 Technical data for monitor output

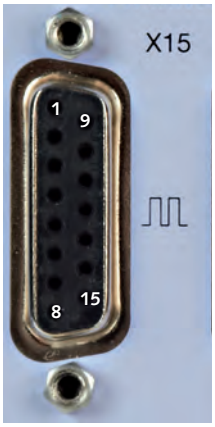
Monitor output for potentiometer input (X_X_MONI)		
Output voltage for		
Potentiometer setting 0 %	VDC	0.3 ±5 %
Potentiometer setting 100 %	VDC	4.3 ±5 %
Permissible load	kΩ	>10
Frequency range	kHz	0 ... >5
Interfering signal	mVpp	10
Linearity error	% FS	<±0.05
TK0	ppm/K	<±50
TKE	ppm/K	<±50

9.5.5 Technical data for inductive input

Inductive input		
Sensor supply		
Voltage (Sine)	Veff	1.8 ±5 %
Frequency	kHz	5.2 ±0.5 %
Short-circuit protection		yes
Sensor types		Half bridge
		Full bridge
		LVDT
Measurement range	V/V	1
Linearity error	% FS	<±0.1
TK0	ppm/K	<±50
TKE	ppm/K	<±100
Frequency range (–3 dB)	kHz	0 ... 1
Interfering signal	%FS	TBD

9.6 Channel X digital (X15)

9.6.1 Socket configuration, connecting the various sensor types



Channel X digital (X15)					
PIN	Description	ABZ sym	ABZ asym	Sinus Cosine	SSI
1	24V_S		EXT		
2	5V_S				
3	* YGND				
4	* Y_Y_10V_IN+				
5	X_X_INC_A_CLK+	A+	A	SIN+	CLK+
6	X_X_INC_B_DATA+	B+	B	COS+	DATA+
7	X_X_TEDS	(X)	(X)	(X)	(X)
8	X_X_INC_Z+	Z+	Z	Z+	
9	GND	GND	GND	GND	GND
10	GND	(GND)	(GND)	(GND)	(GND)
11	* Y_Y_10V_IN-				
12	X_X_INC_A_CLK-	A-		SIN-	CLK-
13	X_X_INC_B_DATA-	B-		COS-	DATA-
14	GND	(GND)	(GND)	(GND)	(GND)
15	X_X_INC_Z-	Z-		Z-	

*) To connect a torque sensor

9.6.2 Technical data for incremental encoder input

Incremental encoder input		
Interfaces supported		
ABZ Signal, symmetrical (RS-422)		
ABZ Signal, asymmetrical, 5 V Pegel		
ABZ Signal, asymmetrical, open collector (1k pull-up)		
Sinus Cosine signal (1 Vss, 320 kHz max.)		
Maximum input frequency RS-422	MHz	10
Maximum input frequency for asymmetrical input	MHz	10
Maximum input frequency for sine cosine signal	MHz	1.2

9.6.3 Technical data for absolute encoder input

Absolute encoder input		
Protocols supported		
SSI		
Signal level		RS-422
Maximum clock frequency	MHz	1

9.6.4 Technical data for sensor feeds (24 V_S, GND)

→ See section on this → "Channel X analog (X11) / Technical data sensor feeds"

9.6.5 Technical data for sensor feeds 5 V (5 V_S, GND)

Sensor supply 5 V		
Supply voltage	VDC	5 ±5 %
Maximum aggregate current	mA	300

The incremental displacement sensor Type 2115A30… can only be connected at maXYmos TL with notice of pin assignment X15 or with usage of cable type 1200A173A… !

9.7 Channel Y strain gauge (X12)

→ See also chapter "*Connecting strain gauge sensors*"

9.7.1 Connection configuration (X12)

Channel Y strain gauge (X12)		
	PIN	**Description**
	1	Y_Y_SG_SUPP+
	2	Y_Y_SG_IN+
	3	Y_Y_SG_SENS-
	4	YGND
	5	n.c.
	6	Y_Y_SG_SENS+
	7	Y_Y_SG_IN-
	8	Y_Y_SG_SUPP-
	9	Y_Y_TEDS

9.7.2 Technical data strain gauge input (24V_S, GND)

Strain gauge input (24V_S, GND)		
Supply	VDC	5 ±5 %
Permissible bridge resistance	Ω	≥300
Measurement range	mV/V	±5
Linearity error	% FS	<±0.05
TK0	ppm/K	<±30
TKE	ppm/K	<±50
Frequency range	kHz	0 ... >5
Interfering signal (100 Hz filter, 2 mV/V)	% FS	0.05

9.8 Channel Y 10 V (X16)

9.8.1 Connection configuration (X16)

Channel Y 10 V (X16)		
	PIN	**Description**
	1	n.c.
	2	Y_Y_10V_IN+
	3	GND
	4	YGND
	5	24V_S
	6	Y_Y_RANGE
	7	Y_Y_10V_IN-
	8	Y_Y_RESET
	9	Y_Y_TEDS

9.8.2 Technical data 10 V Input (24V_S, GND)

10 V Input (24V_S, GND)		
Measurement range (nominal)	V	±10.0
Measurement range (incl. overload)	V	±11.0
Linearity error	% FS	<±0.05
TK0	ppm/K	<±30
TKE	ppm/K	<±50
Input resistance	MΩ	1
Common-mode range	V	±10
Common-mode rejection (50/60 Hz)	dB	>90
Frequency range (–3 dB)	kHz	0 ... >5
Interfering signal	% FS	0.01

9.8.3 Technical data for outputs (Y_Y_RANGE , Y_Y_RESET)

Outputs (Y_Y_RANGE, Y_Y_RESET)		
Type	24 V	push-pull driver
Maximum current per output	mA	30
Short-circuit protection		yes
Minimum output voltage		
High-Pegel (U^{OH})	VDC	E24V*) -1
Low-Pegel (U^{OL})	VDC	1

*) 24 V Input voltage

9.9 Channel Y Piezo (X13)

9.9.1 Connection configuration (X13)

Channel Y Piezo (X13)		
	PIN	**Description**
	1	Charge input
	2	GND

9.9.2 Technical data for piezoelectric input

Piezoelectric input		
Interference voltage (range 1, digital filter off)	pCpp	1
Frequency range (–3 dB)	kHz	= 0 ... >5
Linearity error	% FS	<±0.05
TKE	ppm/K	<±100
Drift (25 °C, rel Humidity <50 %)	pC/s typ.	<±0.05

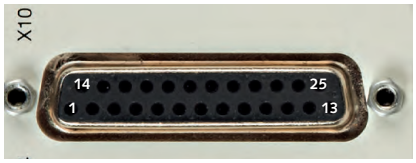
Sensor Channel Y		
Measuring range		Number 4
maXYmos TL Standad **Type 5877B0**		
Measuring range 1	pC	±100 ... ±1 000
Measuring range 2		±1 000 ... ±10 000
Measuring range 3		±10 000 ... ±100 000
Measuring range 4		±100 000 ... ±1 000 000

Sensor Channel Y		
Measuring range		Number 4
maXYmos TL ML Medical Low measuring range **Type 5877B2**		
Measuring range 1	pC	±0 ... ±40
Measuring range 2		±40 ... ±400
Measuring range 3		±400 ... ±1 000
Measuring range 4		±1 000 ... ±10 000

Sensor Channel Y		
Measuring range		Number 4
maXYmos TL L Low measuring range **Type 5877B3**		
Measuring range 1	pC	±0 ... ±40
Measuring range 2		±40 ... ±400
Measuring range 3		±400 ... ±1 000
Measuring range 4		±1 000 ... ±10 000

9.10 Digital Input/Output (IOs) (X10 and X14)

Plug X10 Dig-IO



(View of socket)

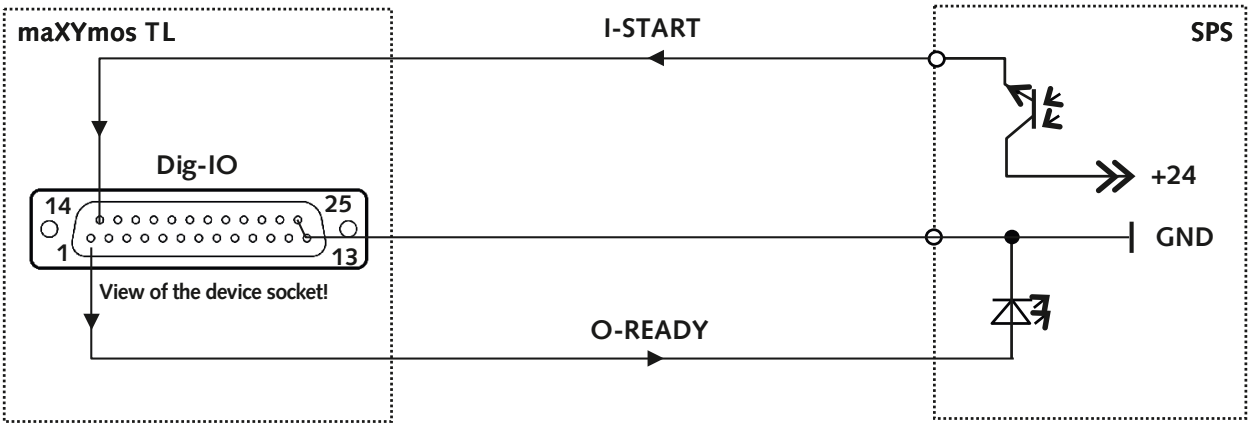
DO-xx = **D**igital **O**utput
DI-xx = **D**igital **I**nput

Level to DIN EN 61131
"0" state: 0 … 5 V
"1" state: 15 … 30 (24) V
I input: approx. 8 mA at 24 V
I output: max.100 mA/Out
Overcurrent protection from:
370 mA/Out

Important!
The monitor's supply voltage is displayed directly at the digital inputs. To meet the requirements of DIN EN 61131, this has to be +24VDC! Pins 13 and 25 are connected and are at the GND of the monitor's power supply!

PIN	Dig-I/O	Signal name	Meaning of signal
1	DO-1	O-READY	Ready
2	DO-2	O-OK	Result GOOD
3	DO-3	O-NOK	Result BAD
4	DO-4	O-NO-PASS	NO-PASS crossed
5	DO-5	O-S1	Switch signal S1
6	DO-6	O-S2	Switch signal S2
7	DO-7	O-WARN	WARNING mirror
8	DO-8	O-ALARM	ALARM mirror
9		O-UNI-1	Universal output
10		O-UNI-2	Universal output
11		O-UNI-3	Universal output
12		+24 V	Output, e.g. for proximity switch
13		DO-GND	Dig.-Out-Ground
14	DI-1	I-START	Cycle START
15	DI-2	I-OPERATE or I-TARA-Y	Piezo-OPERATE (at Piezo sensor) or TARA Channel-Y (at e.g. strain gauge sensor)
16	DI-3	I-ZERO-X	Channel X-Zero
17	DI-4	I-AUTO	Control via PLC
18	DI-5	I-MP-0 [1]	MP switchover
19	DI-6	I-MP-1 [2]	MP switchover
20	DI-7	I-MP-2 [4]	MP switchover
21	DI-8	I-MP-3 [8]	MP switchover
22	DI-9	I-ACK	External acknowledgement
23	DI-10	I-STAT-RESET	Reset statistics
24	DI-11	I-STEST	Trigger sensor test
25		DI-GND	Dig. In ground

Connection Example:



9.10.1 Technical data for inputs

Data for inputs		
Number		22
Maximum input voltage	VDC	30
Minimum input voltage	VDC	0
Minimum input voltage, high level (U^{IH})	VDC	10
Maximum input voltage, low level (U^{IL})	VDC	5
Input current (typical at 24 V, X/Y curve similar to IEC 61131-2)	mA	5

9.10.2 Technical data for outputs

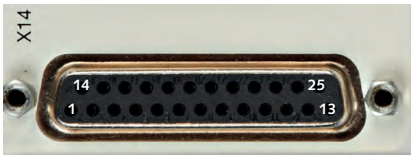
Data for outputs		
Number		23
Nominal output voltage	VDC	24
Type	High-Side Switch	
Maximum output current per channel	mA	500
Maximum aggregate output current	mA	1 500
Short-circuit protection	yes	
Maximum leakage when switched off	µA	10
Minimum output voltage, high level (U^{OH})	VDC	(E24 V*) -2)

24 V Input voltage

9.10.3 General technical data

General		
Power supply voltage	VDC	18 ... 30
Typical current consumption (24 VDC, w/o peripherals)	mA	600
Operating temperature range	°C	0 ... 45
Life of lithium battery for RTC (typical)	Years	5
Relative air humidity (non-condensing)	%	10 ... 90
IP code (EN 60529), plug and cable below	IP	53
Standard rail version	IP	20
Oscillation (IEC 60068, part 2-6 oscillations)		
10 ... 40 Hz (constant amplitude)	mm	0.3
40 ... 150 Hz (constant acceleration)	g	1
Shock resistance (IEC 68, part 2-27/half sine test)	g	15
	ms	11
	No.	6

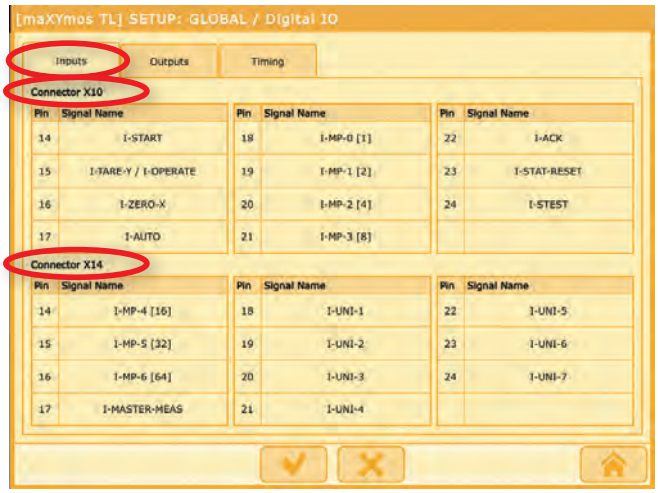
Plug X14 Dig-IO



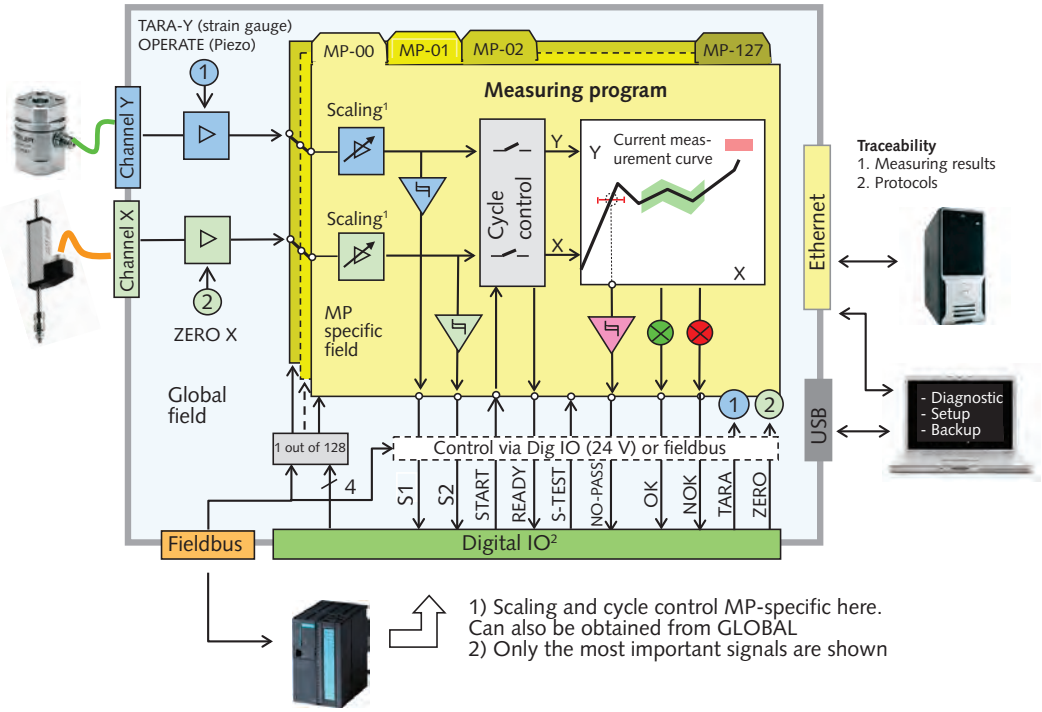
(View of socket)

DO-xx = **D**igital **O**utput
DI-xx = **D**igital **I**nput

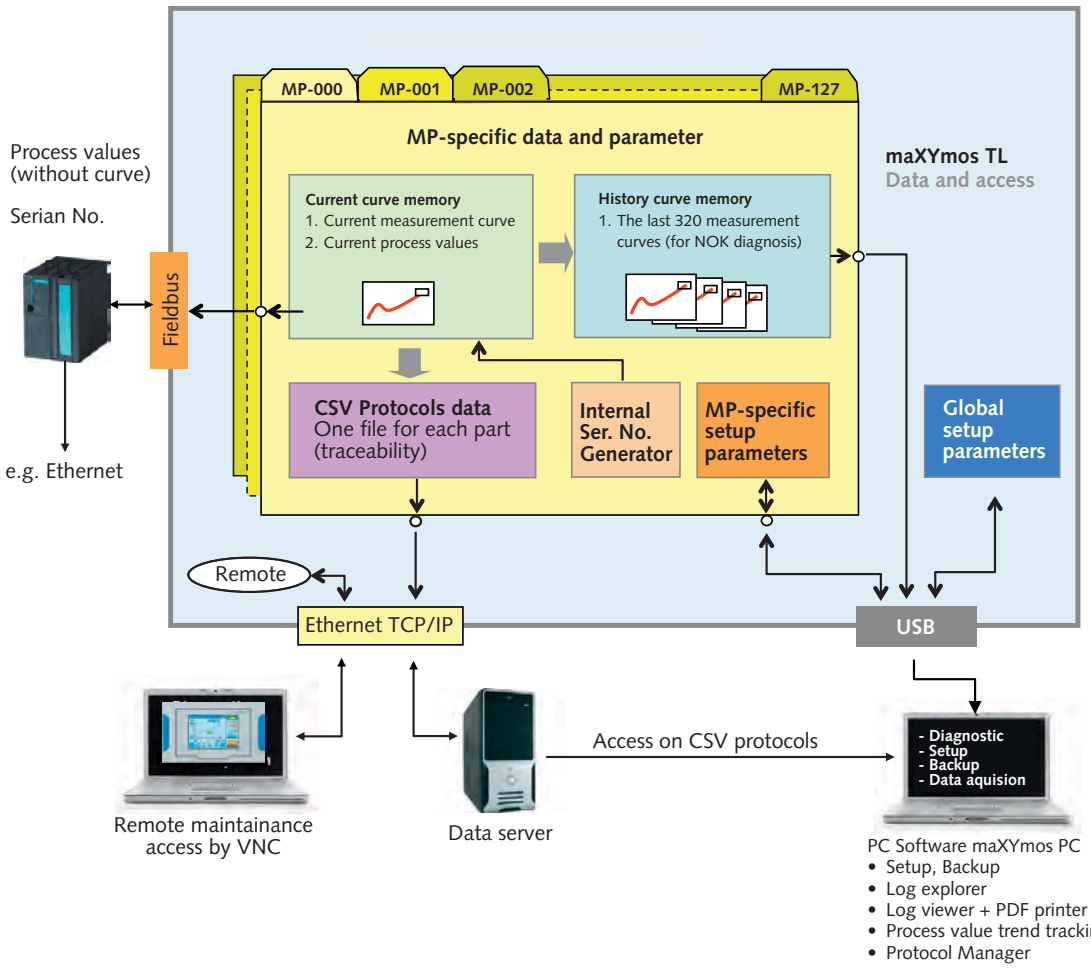
PIN	Dig-I/O	Signal name	Meaning of signal
1	DO-12	O-MP-0 [1]	Meaning of signal
2	DO-13	O-MP-1 [2]	Meaning of signal
3	DO-14	O-MP-2 [4]	Meaning of signal
4	DO-15	O-MP-3 [8]	Meaning of signal
5	DO-16	O-MP-4 [16]	Meaning of signal
6	DO-17	O-MP-5 [32]	Meaning of signal
7	DO-18	O-MP-6 [64]	Meaning of signal
8	DO-19	O-UNI-4	Universal output
9	DO-19	O-UNI-5	Universal output
10	DO-19	O-UNI-6	Universal output
11	DO-19	O-UNI-7	Universal output
12	DO-19	O-UNI-8	Universal output
13		DO-GND	Dig. Out ground
14	DI-12	I-MP-4 [16]	MP switchover
15	DI-13	I-MP-5 [32]	MP switchover
16	DI-14	I-MP-6 [64]	MP switchover
17	DI-15	I-MASTERMEAS	Master measurement
18	DI-16	I-UNI-1	Universal input
19	DI-17	I-UNI-2	Universal input
20	DI-18	I-UNI-3	Universal input
21	DI-19	I-UNI-4	Universal input
22	DI-20	I-UNI-5	Universal input
23	DI-21	I-UNI-6	Universal input
24	DI-22	I-UNI-7	Universal input
25		DI-GND	Dig. In ground



9.11 Interfaces and signal paths



9.12 Data and access paths

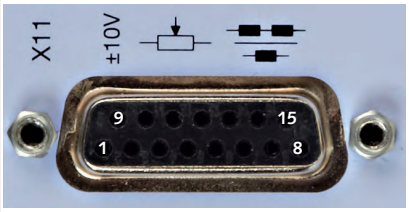


9.13 Interfaces

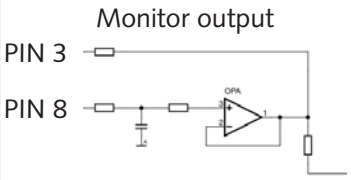
9.13.1 Connecting a potentiometer

→ See also chapter "*Channel X analog (X11)*"

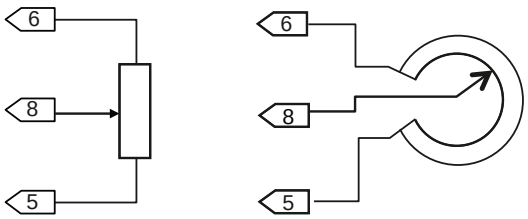
Plug X11 / Channel X
(analog sensors, potientometer, ±10 V, LVDT, inductive)



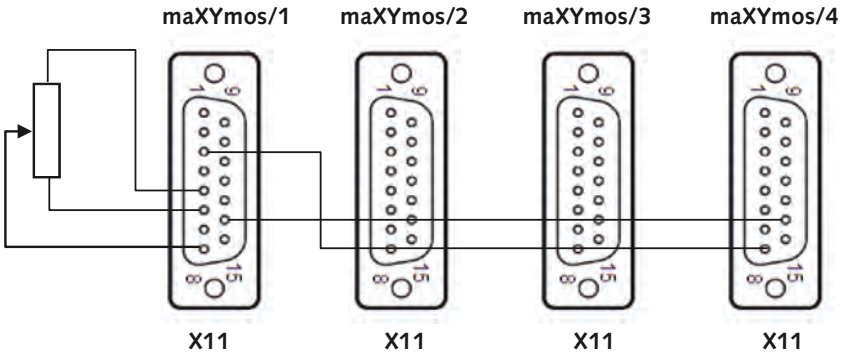
(View of socket)



PIN	Description
1	n.c.
2	n.c.
3	Monitor output
4	n.c.
5	Supply –
6	Supply +
7	n.c.
8	Signal +
9	n.c.
10	n.c.
11	n.c.
12	n.c.
13	n.c.
14	Signal GND
15	n.c.
Case	Shield (PE)



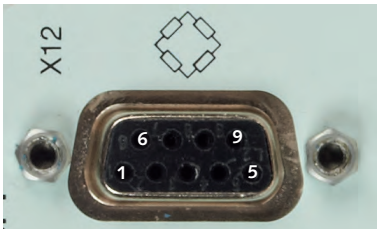
Connection example:
One common displacement sensor onto 4 maXYmos TL (4x press: 1x displacement, 4x force).

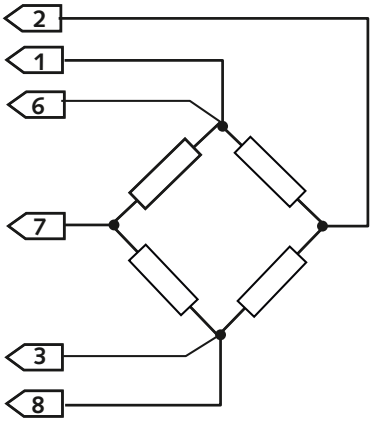


View on the connectors of the device

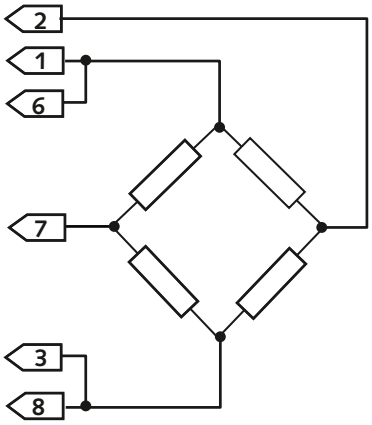
9.13.2 Connecting strain gauge sensors

→ see also chapter "*Channel Y strain gauge (X12)*"

Plug X12 / Channel Y (Strain gauge sensors)	**PIN**	**Description**
	1	Supply +
	2	Signal +
	3	Sense –
	4	n.c.
	5	n.c.
	6	Sense +
	7	Signal –
	8	Supply –
	9	n.c.
	Case	Shield (PE)



Strain gauge sensors with sense lines to the measurement element.



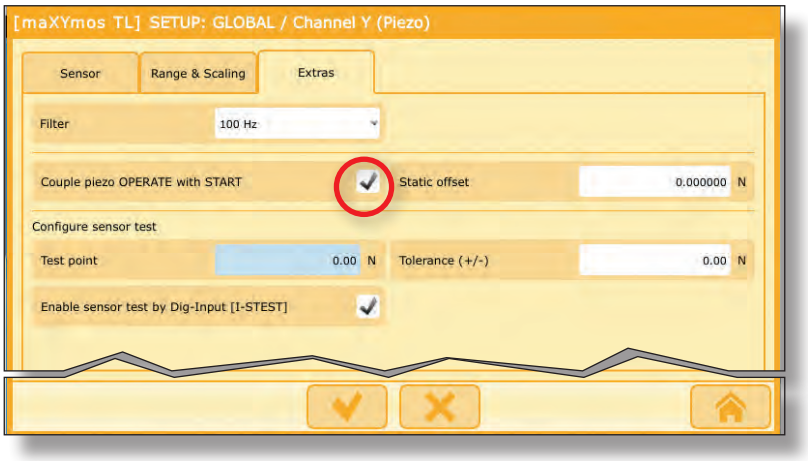
Strain gauge sensors without sense lines. Bridges between supply and sense are in the sensor plug!

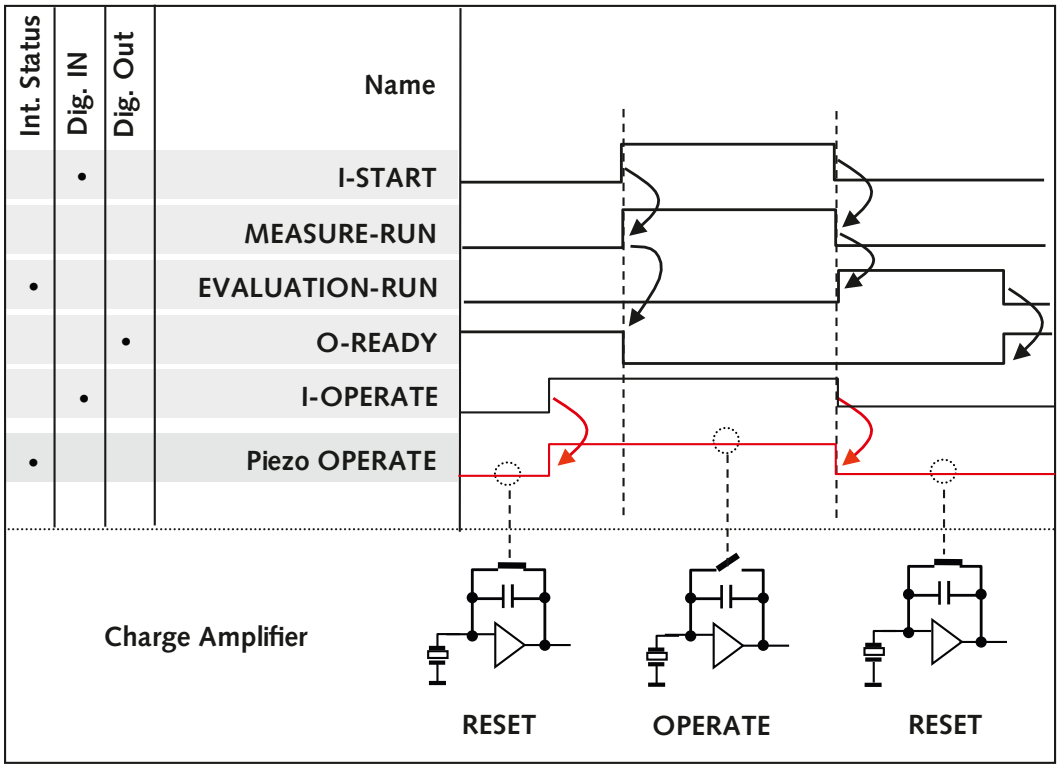
9.14 Control via PLC – The signal flow charts

9.14.1 Using I-OPERATE Dig. input to trigger Piezo-OPERATE

The I-OPERATE control signal can be used to enable the charge amplifier using a PLC, or to bring it into the RESET (I-OPERATE=0) state. To do this, first deactivate "Couple piezo OPERATE to START" (= uncheck box) (➞ Setup / Global setup / Channel-Y / Extras)

Advantage: Events on channel Y can be handled both before and after START, for example monitoring the force threshold in a fast-stroking press.
Disadvantage: The PLC needs to monitor the state of the charge amplifier.

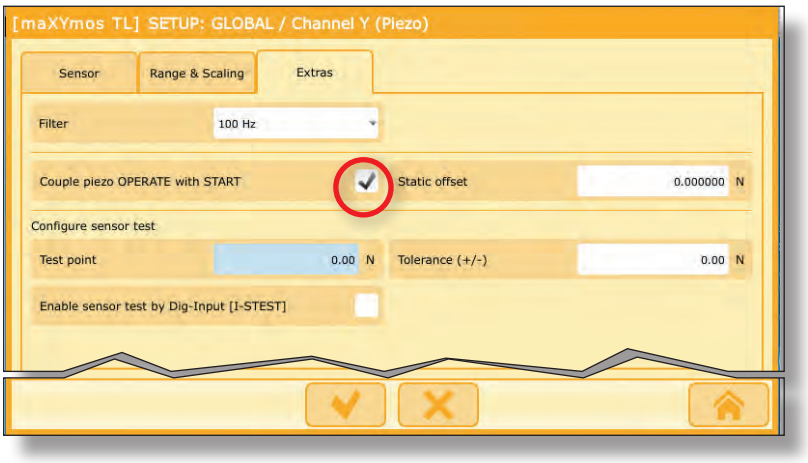


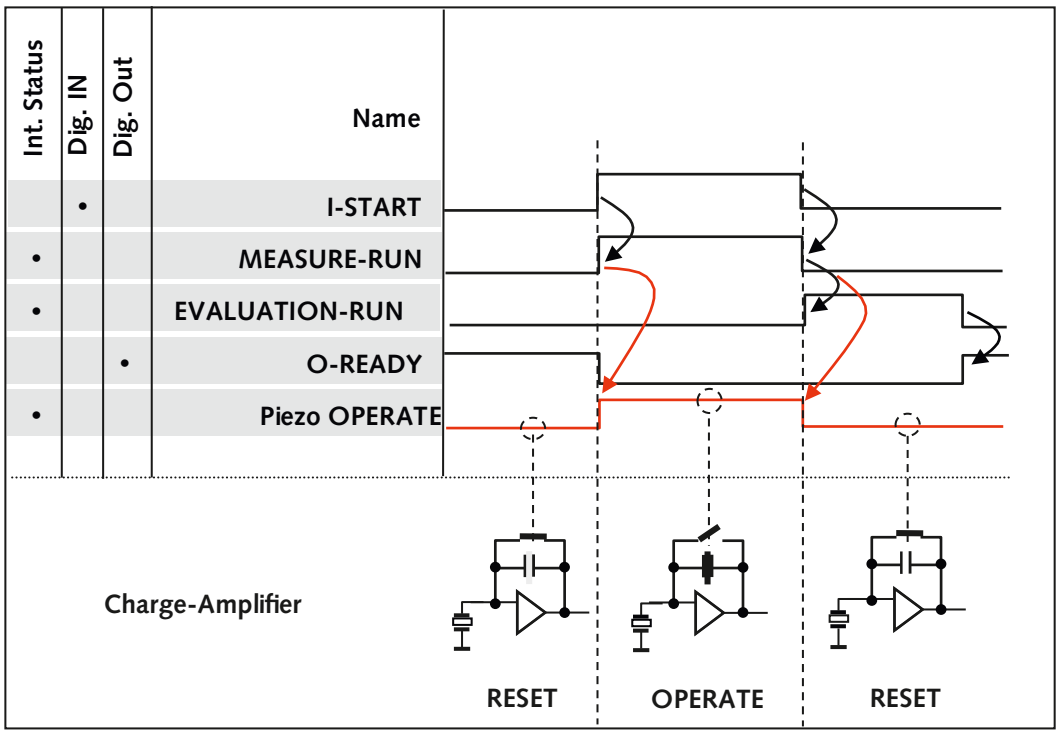


9.14.2 Coupling Piezo-OPERATE to START

RESET / OPERATE of the charge amplifier can be permanently coupled to the measurement start. In this case it does not matter whether START is triggered by digital input (or Fieldbus) or by an internal START condition being met (see section "Specifying START-STOP condition").
Activate "Couple Piezo OPERATE to START" (= check box) (→ Setup / Global setup / Channel-Y / Extras)

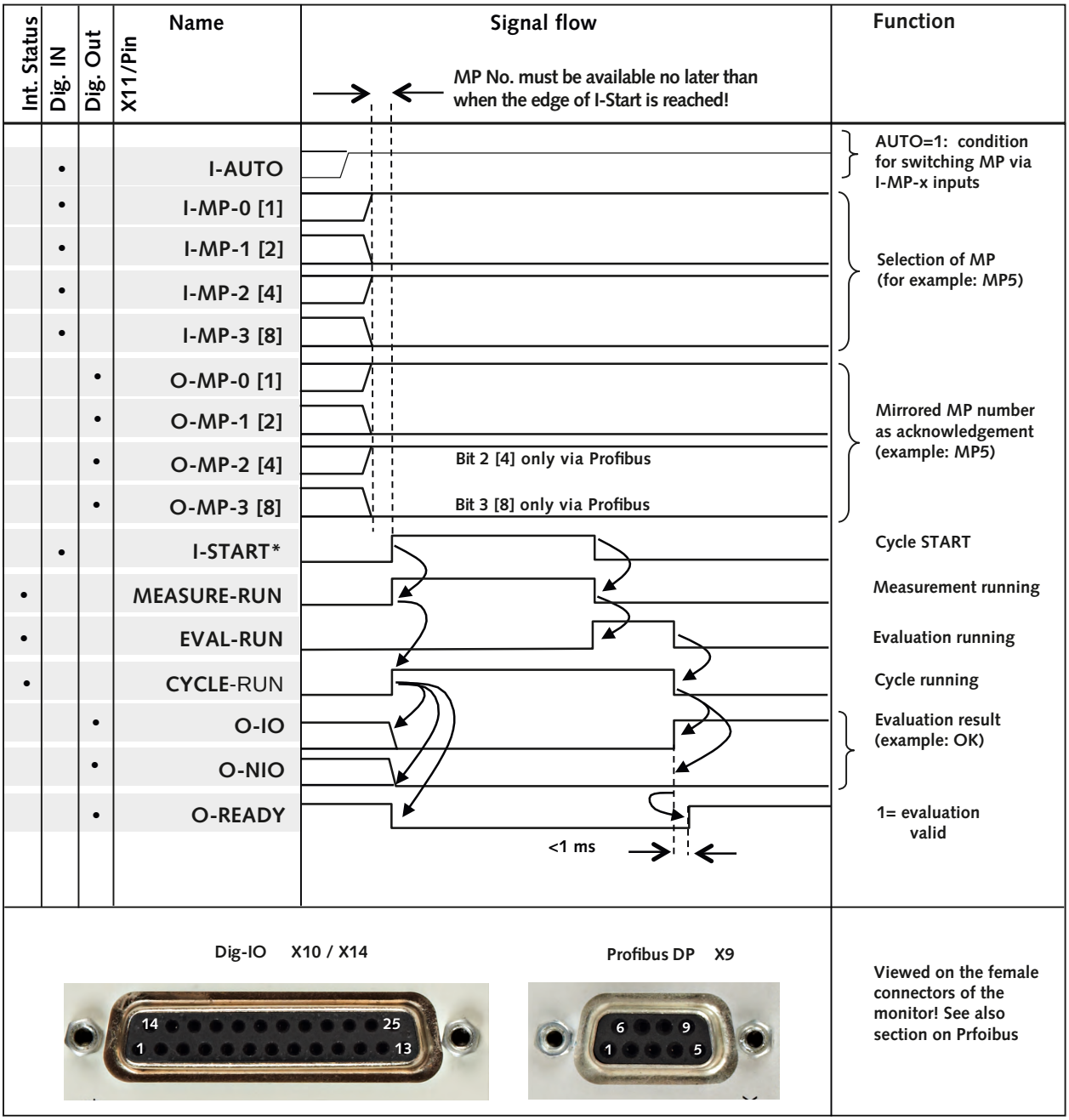
Advantage: The PLC need not monitor the state of the charge amplifier.
Disadvantage: The charge amplifier is not in the OPERATE state before and after capture of the measurement curves. Events that occur in this period of TIME, such as collisions of the press plunger during fast stroking, are therefore not detected. This is the case unless START, and hence capture of measurement curves, are already activated outside the part of the curve to be evaluated.





9.14.3 Switching the MP via a PLC – Measurement and evaluation cycle

→ see also p. 298 and 307



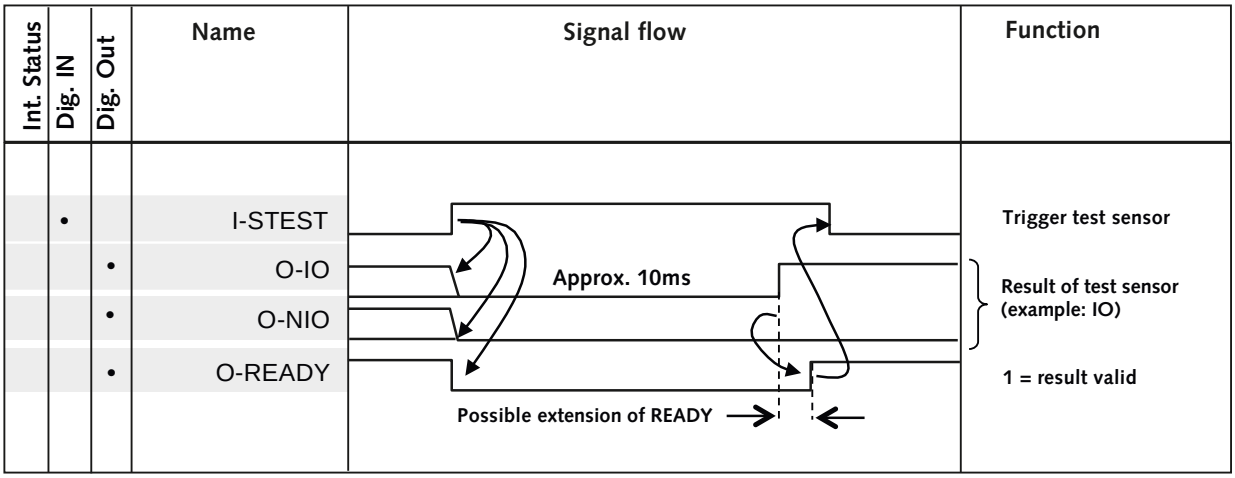
*) or internal START condition, e.g. using threshold X (derived from displacement measurement)

The state on the lines I-MP-0 [1] … I-MP-3 [8], i.e. the MP number shown on them, is only adopted when I-AUTO=1. The MP number for the following cycle can be created while the preceding cycle is still running, i.e. while READY is still set to "0". As soon as READY then changes to "1", the MP is switched for the following cycle.

Important: Ready signal must be integrated into the customer control.

9.14.4 Using a PLC to trigger the "sensor test" function

For details of test-point configuration → p. 56

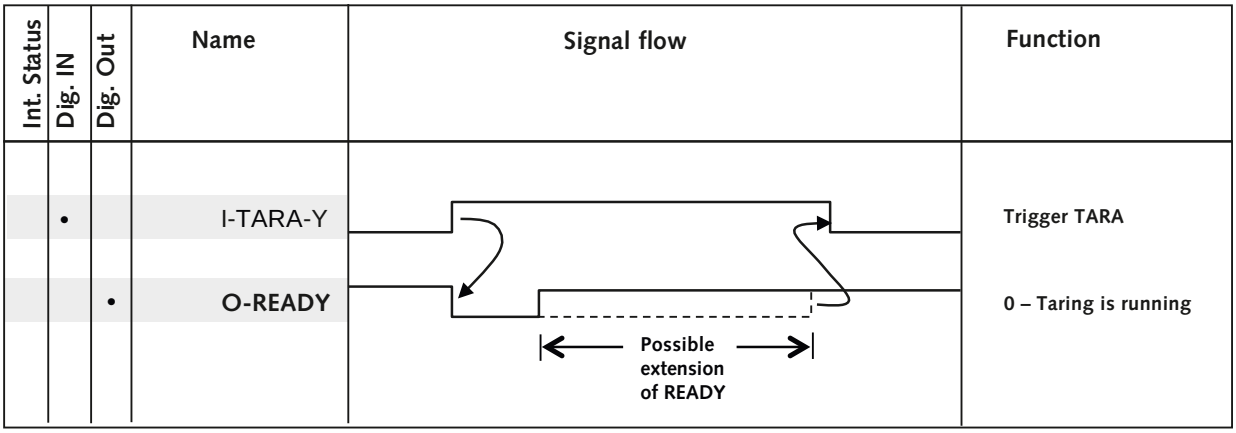


The "Sensor Test" function can also be triggered manually from the SERVICE menu → Sensor Status → p. 278, 56.

9.14.5 Using PLC to trigger TARE Y function (taring channel Y)

The TARE Y Function is available only on the strain gauge models. On the piezoelectric model, this input corresponds to the RESET or /OPERATE function.

The TARE offset for the MP which is active at the time taring occurs is permanently saved in battery-backed memory. However, if this MP is using GLOBAL parameters, the TARE value is allocated to the global channel setup.

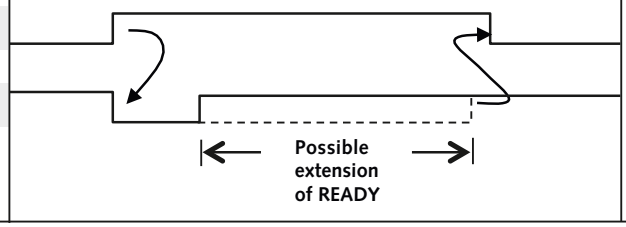


The "TARE Y" function can also be triggered manually from the SERVICE menu → TARE - ZERO. See also → page 279

9.14.6 Using a PLC to rrigger the ZERO-X function (zeroing channel Y)

The Zero-X offset for the MP which is active at the relevant Zero-X time is permanently saved in battery-backed memory. However, if this MP is using GLOBAL parameters, the Zero-X value is allocated to the global channel setup.

Int. Status	Dig. IN	Dig. Out	Name	Signal flow	Function
	•		I-ZERO -X		Set channel X to ZERO
		•	O-READY		ZEROing is running

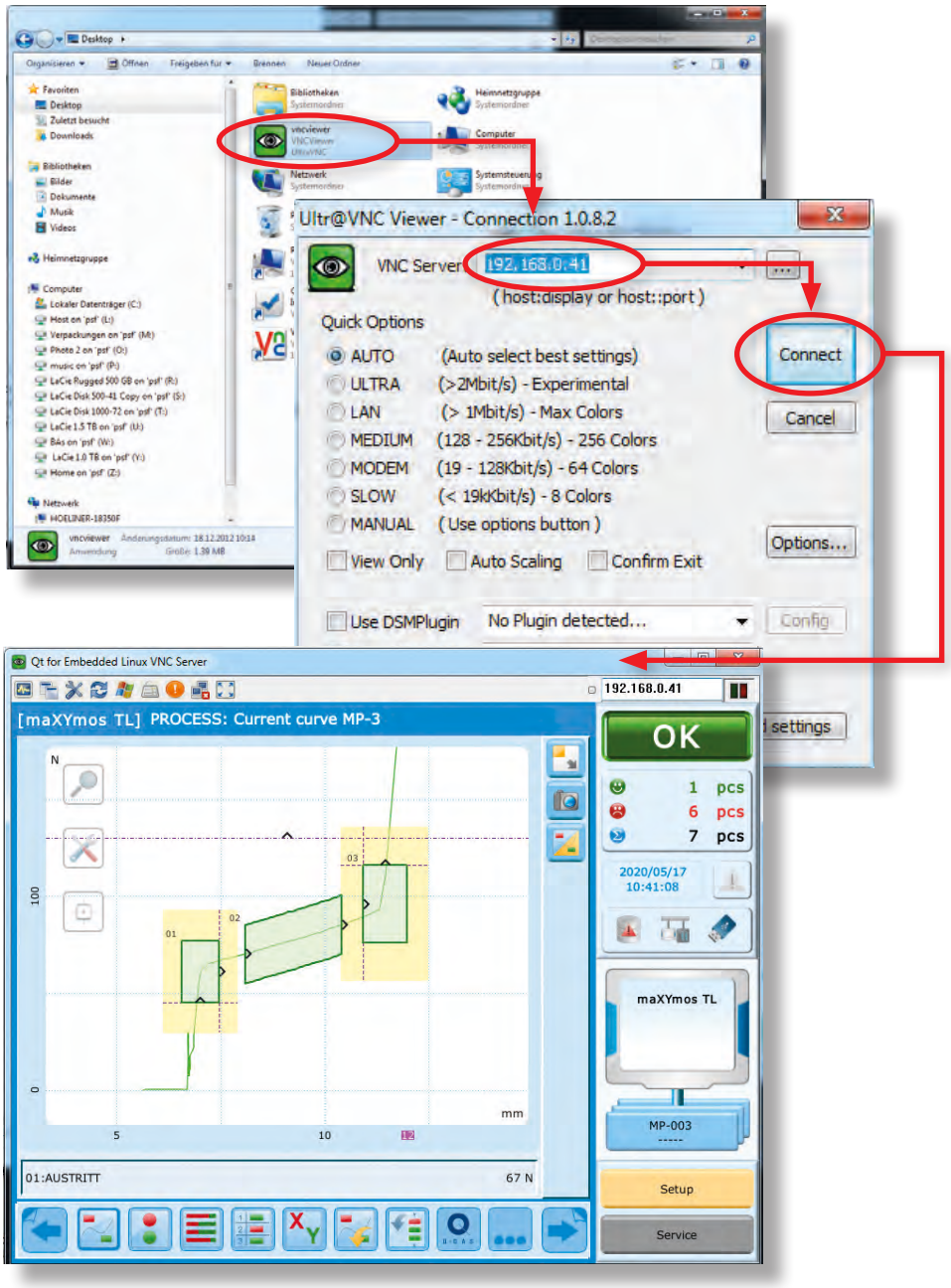


The Zero-X function can be triggered manually from the SERVICE menu → TARE - ZERO.
See also → page 279

10. Remote maintenance

10.1 Remote access via VNC

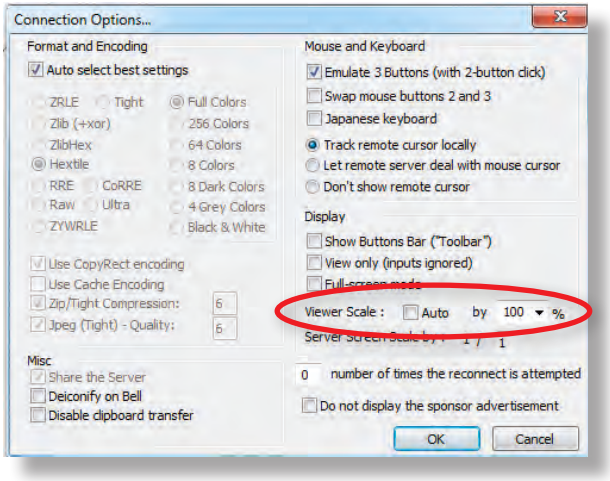
With a VNC, it is possible to access the maXYmos TL via an Ethernet connection (using the X5 or X6 sockets). Either use a VNC client already installed on your PC or use the "vncviewer" on the CD supplied.



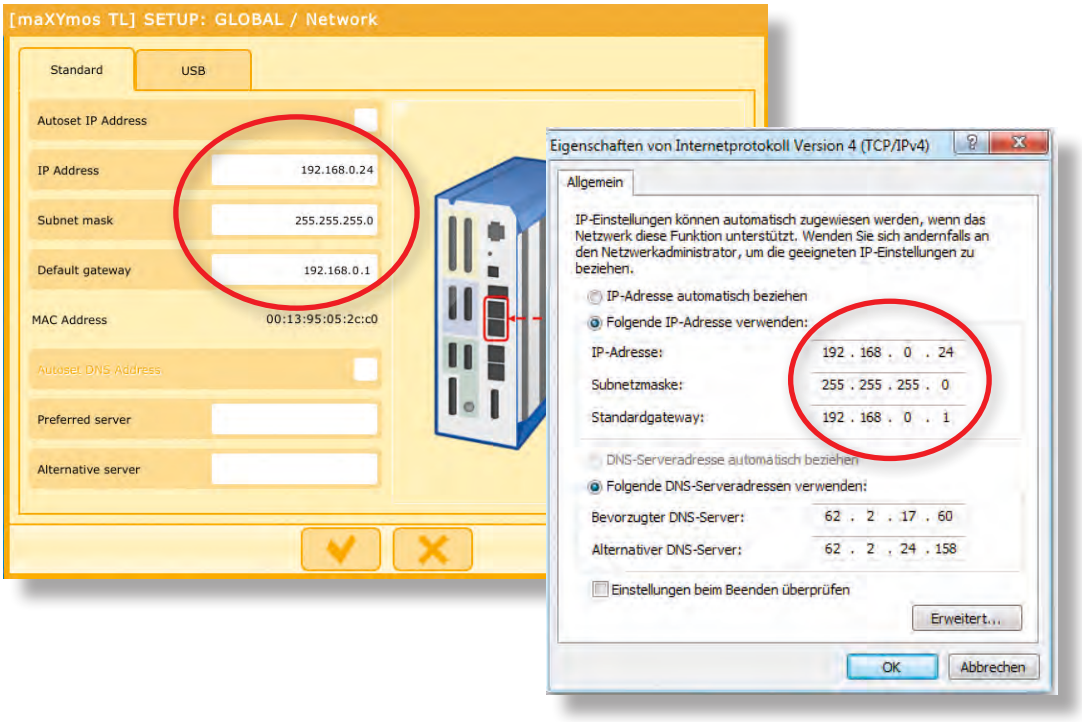
Install and initialize the "vncview" VNC client. Enter the IP address in the "VNC Server" field and select the "Connect" button to establish a connection. The menus and buttons displayed then give you full control over the maXYmos TL via the VNC.

Tip: This is particularly useful for remote diagnosis and support.

▶▶▶



The "Connection Options" menu allows you to adjust the zoom scale.

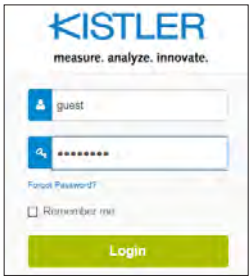


When using a direct point-to-point connection (PC → maXYmos TL), you need to make sure that the LAN settings on the PC match the network setup of the maXYmos TL (with the same subnet address). The screen shots above show a workable configuration.

Path (maXYmos TL): Setup / Global setup / Network
Path (WIN 7): System Control / Network and Internet / Network Connections / LAN Connection / Properties / Internet protocol Version 4 / Properties

10.2 Offline parametrization by the offline tool

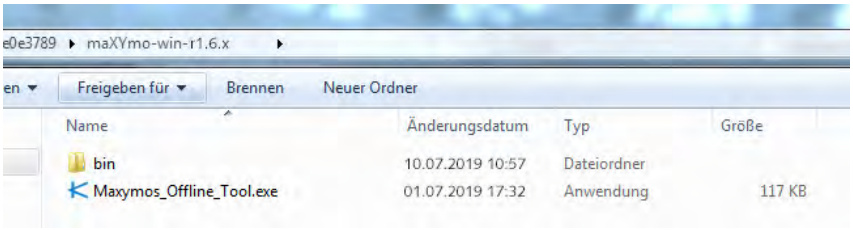
The offline tool can be used via a PC for the maXYmos TL/NC. It is possible to download the offline tool via Smart File, an FTP server or the Kistler website. It may be used for the offline parametrisation of the devices. The settings can be saved onto an USB memory stick and afterwards be restored onto a „real“ maXYmos TL/NC.
It is also possible to open available backups of „real“ devices and check the parametrisation.

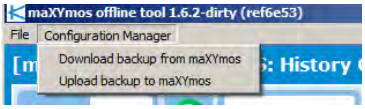


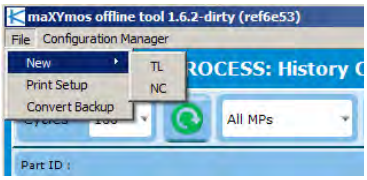
NOTE

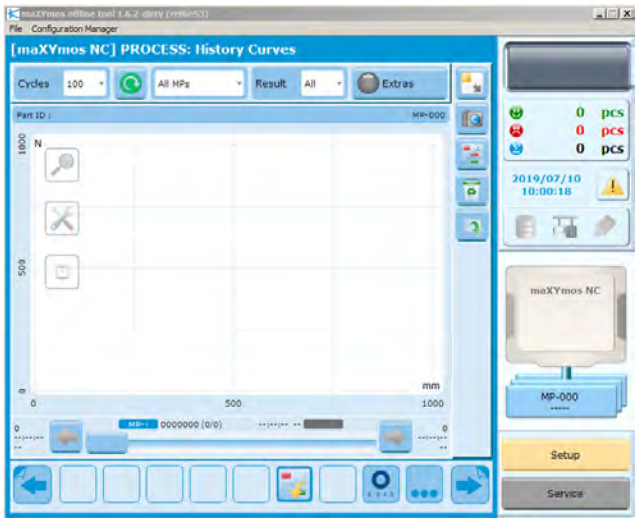
Smart file download
The offline-tool is available on Kistler Smartfile:
Access: https://smartfile.kistler.com
Username: guest Password: download

Access is also possible by FTP program, e.g. Filezilla.
e.g. download path in Smart File: Software-Tools > 5847-5877-5867 maXYmosNC-TL-BL > maXYmos Offline-Tool > make desired selection maXYmo-win-r1.x.xx.zip







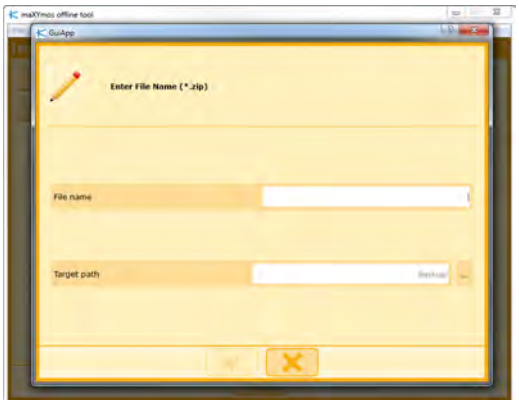


It is possible to import curves, i.e. it is possible to parametrize the evaluation objects by using a reference curve.

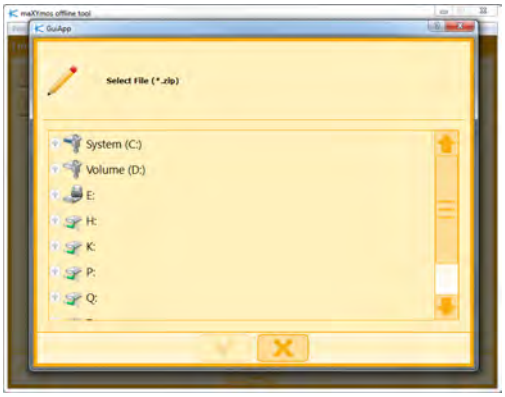
After finishing the parametrization a backup can be created.

Saved backup can be uploaded to maXYmos and downloaded from maXYmos.

In the offline tool global settings and measuring programs can be saved as pdf and also printed.



Backups already available can be opened.



11. Installing and mounting the monitor

11.1 Mounting options for display module

Desktop mounting	Wall mounting	Built-in/front panel mounting
		Unscrew the frame (using the 16 x 2.5 mm Allen-key screws)
		Place board between display and frame
		Screw back into position

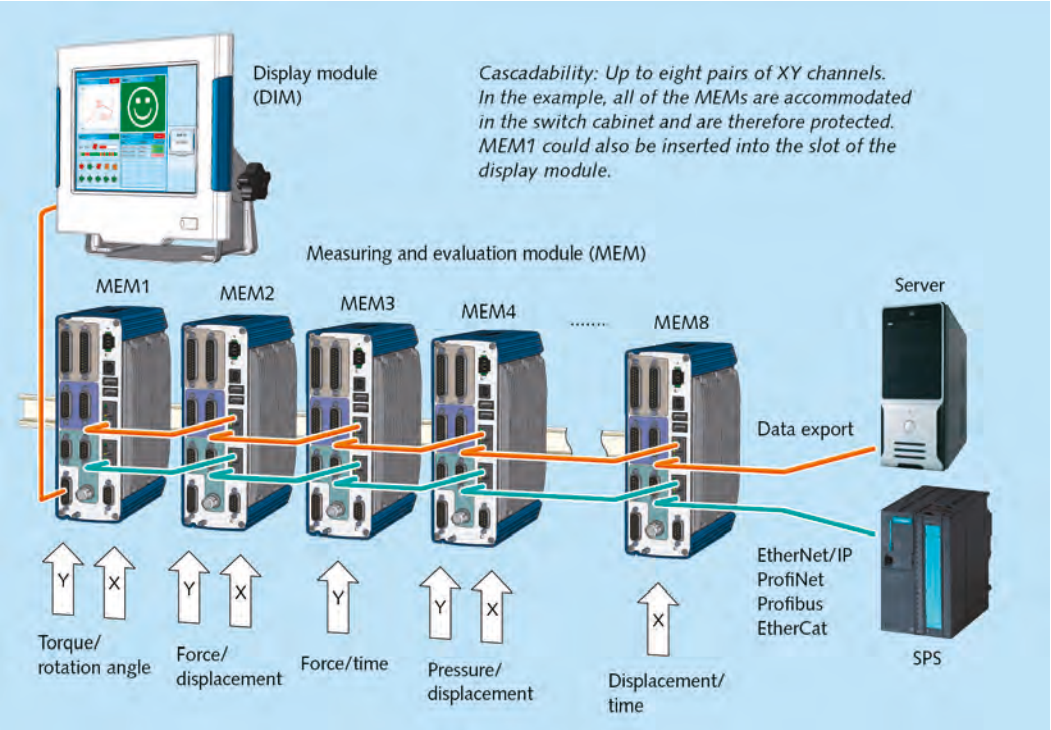
11.2 MEM measurement & evaluation module mounting options

MEM on display module (DIM)
Carefully slide the MEM onto the display module (using the guide rails at the side). The 26 pole SUB-D sub-connector provides the electrical connections.
Place the plastic top cover on the MEM. Screw on the top cover (using the 2 x 2.5 mm Allen-key screws)

11.3 Separate MEM and DIM, MEM as a Black-Box module

Separate MEM and display modules	MEM as a Black-Box module
The MEM (MEM, 5877B0, 5877B2, 5877B3) and display module (DIM Typ 5877AZ000) can be connected using an LVDS cable. **Note**: No PC monitor can be connected to the MEM!	Since the MEM is entirely autonomous, it can also be operated without a DIM (display module). In this case the setup and process visualization procedures can be carried out using the PC-compatible GUI. Access will then be via a VNC or an Ethernet interface.

11.3.1 Scope to expand to up to eight XY channel pairs



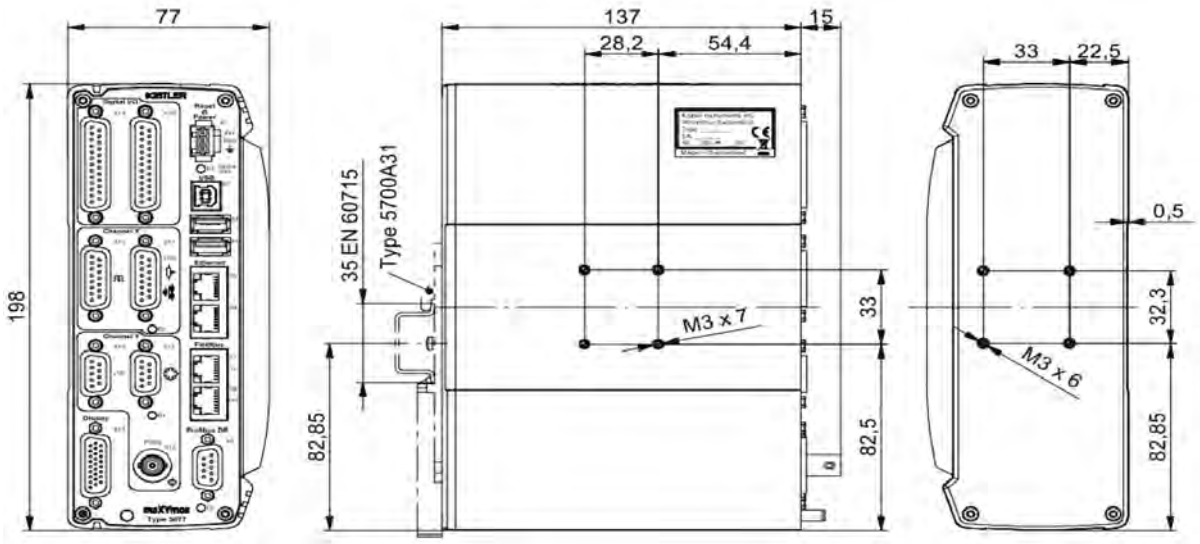
- For this setup, the MEMs are connected to the Ethernet interface via patch cables. No external switches are required. The Ethernet is simply looped through the MEMs via the In-Out sockets.

Cable lengths >5 m between DIM and MEM can be implemented with accessory DIM Cable Extender Type 1200A163.

All MEM's in a cascade must have the same software version.

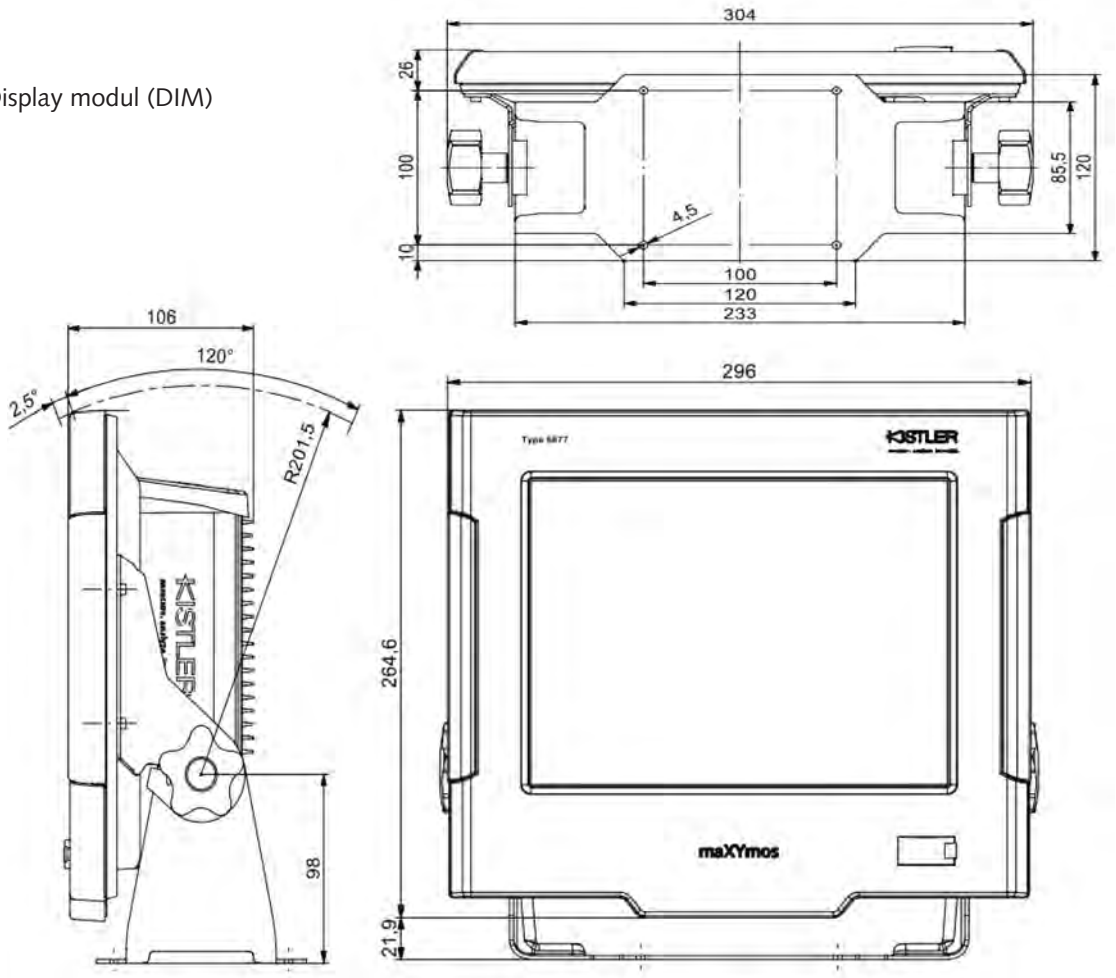
The Ethernet TCP/IP interface and the fieldbus Ethernet interface must be physically separated.
Operation of the Ethernet TCP/IP interface via an Ethernet based fieldbus interface is not possible.

11.4 Case and mounting dimensions



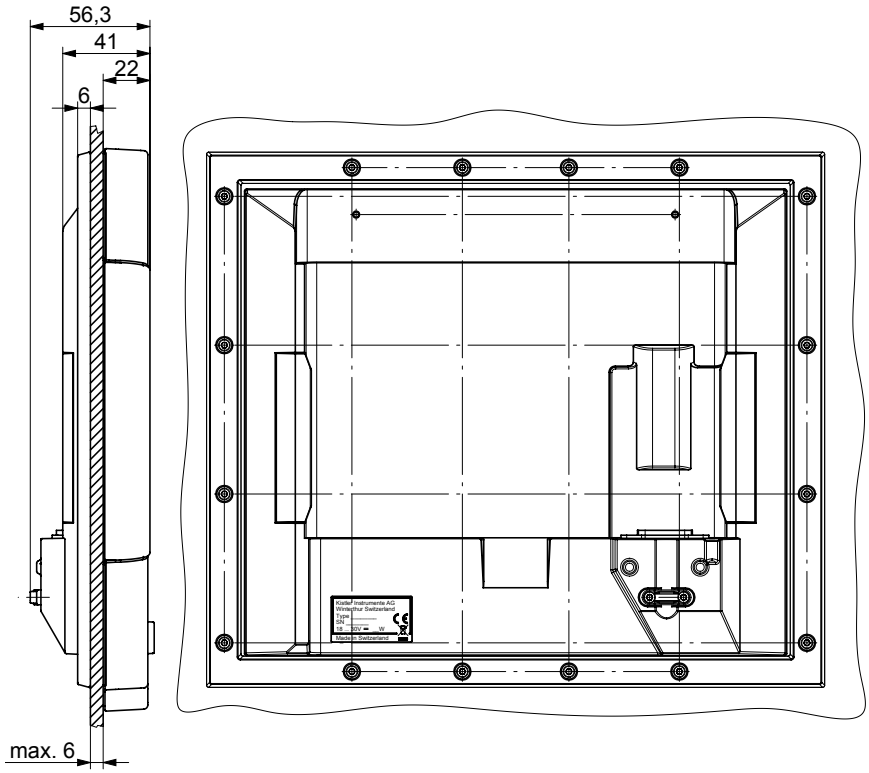
Note: Observe minimum spacing of >10 mm between the MEM's!

Display modul (DIM)

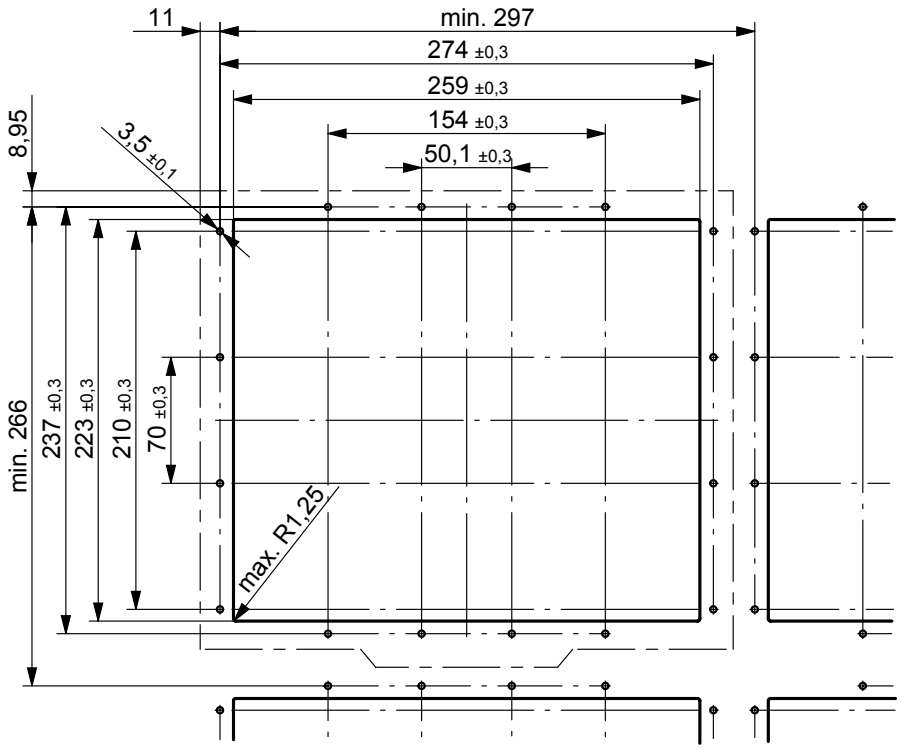


11.5 Panel cut-out DIM for switch cabinet

Display Module (DIM) switch panel mounting



Display Module (DIM) – panel cut-out for switch panel mounting.
With lateral distance to adjacent displays.



12. Technical data

Technical data

Measuring and evaluation module (MEM)

Degree of protection	IP	40
Operating temperature	°C	0 ... 45

Measuring channels

Number		1 X-channel, 1 Y-channel
Sampling rate X/Y max.	kHz	20
Resolution per (analog) channel	bit	24
Accuracy class	%	0,3
Low-pass filter per channel (in stages)	Hz	0,1 ... 2 000

Sensors channel X

Sensor Type 1		Potentiometer
Linearity error	%FS	±0,05
Track resistance	kΩ	1 ... 5
Supply voltage	V	4 (4,16)
Connection system	3-wire	
Wiper current	µA	<1,0
Sensor Type 2		Process signal ±10 V
Signal output	V	±10
Linearity error	%FS	±0,05
Transmitter supply	VDC	24 ±5 %
max. mA X+Y Channel	mA	500
Sensor Type 3		Incremental TTL
Signal output		Sinus/Cos, RS-422 (A+B)
Reference marker		yes
Counting depth	bit	32
Counting frequency	MHz	10 (RS-422)
	MHz	1 (sine/cos)
Impedance	Ω	120
Sensor Type 4		Inductive
Principle		LVDT, half-, full-bridge
Sensor supply	Veff	1,8 ±5 %
	kHz	5,2 ±0,5 %
Linearity error	%FS	±0,05
Frequency range (–3 dB)	kHz	0 ... 1
Sensor Type 5		SSI
Signal output		RS-422
Clock frequency max.	MHz	1

Sensors channel Y

Sensor Type 1		Piezo
Measuring ranges see following page 3		
Range selection		automatic
Drift	pC/s	0,05
Linearity error	%FS	±0,05
TKE	ppm/K	<±100
Frequency range (–3 dB)	kHz	0 ... 5
Low-pass filter (in stages)	Hz	in stages 0,1 ... 2 000
Sensor Type 2		DMS
Measuring range	mV/V	0 ... ±5
Supply voltage	VDC	5 ±5 %
Connection system		4-wire, 6-wire
Bridge resistance	Ω	≥300
Linearity error	%FS	±0,05
Frequency range (–3 dB)	kHz	0 ... 5
Sensor Type 3		Process signal ±10 V
Signal output	V	±10 ±10 (2 measurement ranges)
Linearity error	%FS	±0,05
Transmitter supply	VDC	24 ±5 %
max. mA X+Y Channel	mA	500

Cycle control

Start – Stopp	Dig-Input/Fieldbus/Threshold X/Threshold Y/ Time/Manual

Measuring functions

Measurement curve according to	Y=f(X), Y=f(t), Y=f(X,t), X=f(t)

Curve memory

Current curve	XY-pairs	max. 8 000
Historic curves (for NOK diagnosis)		the last 500

Evaluation Objects (EOs)

EO types	NO-PASS, LINE-X, LINE-Y, UNI-BOX, ENVELOPE, GET-REF, CALC, GRADIENT-Y, GRADIENT-X, HYSTERESIS-Y, HYSTERESIS-X, TUNNELBOX-X, TUNNELBOX-Y SPEED, AVERAGE, BREAK, INFLEXION, INTEGRAL, DIG-IN, DELTA-Y, TIME, TRAPEZOID-Y, TRAPEZOID-X, DISPLACEMENT RANGE, FORCE RANGE, PASS-THROUGH BOX
Reference points	Absolute X, Dynamic: Block point X, Dynamic: X on trigger Y, Referencing in X and Y directions possible
Editing	Remote VNC®, via touchpanel

Data export

Protocol	Q-DAS®, QDA9, IPM 5.0
Format	XML, CSV, PDF
Destination	USB, Server
Medium	USB, Ethernet

Visualization

Type	across VNC®, or Display Modul (DIM)

Serielle interfaces

Ethernet	TCP/IP 100 Base TX with 2 Port Switch
USB	3 x USB (Device + Host)
BUS	PROFIBUS DP
	PROFINET, EtherCAT, EtherNet/IP,
	2 Port Switch

Dig-In/Out

Norm		DIN EN61131
Level state "0"	V	0 ... 5
Level state "1"	V	15 ... 30
Number of inputs		22
Input current max.	mA	8 (at 24 V)
Number of outputs		23
Output current max. (per channel)	mA	500 (at 24 V)
Output current max. (in total)	mA	1500 (at 24 V)

Measurement programs

Number measuring programs		108
Number master programs		20
Switchover via		Menu/Dig.-In/BUS
Switchover time	ms	<50

Switching signals

Number	2
Channel assignment	X or Y (selectable)
Switching point	Threshold X exceed/underrun
	Threshold Y exceed/underrun
Output	Dig.-Out or Fieldbus
Mode	Free-running or latch
Influence on evaluation	No

Real-time reactions

Switching signals	ms	<1
EO type "NO-PASS"	ms	<1

Power supply

Voltage VDC	24	(18 … 30)
Power consumption (typical)	VA	45
Power consumption (max.)	VA	80
Lossy line (MEM)	W	18
Screw-type/plug-in connector,		1 supplied with device
		Wago, order no. 734-103/037-000
		Housing: order no. 734-603

Environment

Working temperature	°C	0 ... 45
Storage temperature	°C	0 ... 50
IP degree of protection (EN 60529)		
– Connector and cable running downwards	IP	53
– Standard rail version	IP	20

Display module (DIM)

Size	Inches	10,4
Color		yes
Touchscreen		yes
Resolution	Pixels	800x600 (SVGA)
Technology		TFT-LCD
Backlighting		LED
Supply voltage (of MEM)	VDC	24
Power consuption	VA	6
IP degree of protection (EN 60529)		
– Front	IP	65
– Rear	IP	53
Operating temperature range	°C	0 ... 45

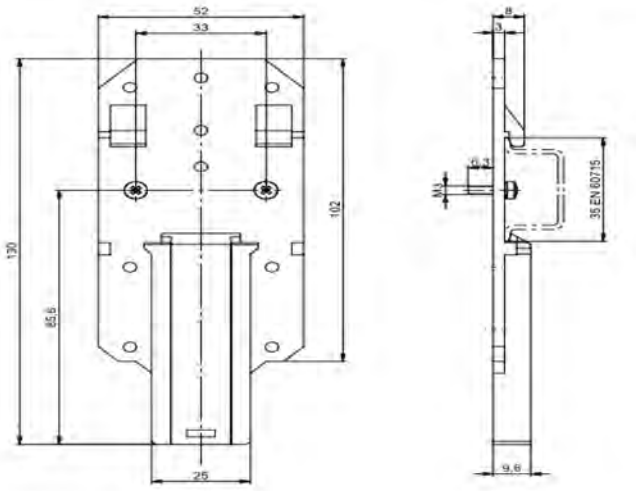
Sensor Channel Y		
Measuring range		Number 4
maXYmos TL Standad **Type 5877B0**		
Measuring range 1	pC	±100 ... ±1 000
Measuring range 2		±1 000 ... ±10 000
Measuring range 3		±10 000 ... ±100 000
Measuring range 4		±100 000 ... ±1 000 000

Sensor Channel Y		
Measuring range		Number 4
maXYmos TL ML Medical Low measuring range **Type 5877B2**		
Measuring range 1	pC	±0 ... ±40
Measuring range 2		±40 ... ±400
Measuring range 3		±400 ... ±1 000
Measuring range 4		±1 000 ... ±10 000

Sensor Channel Y		
Measuring range		Number 4
maXYmos TL L Low measuring range **Type 5877B3**		
Measuring range 1	pC	±0 ... ±40
Measuring range 2		±40 ... ±400
Measuring range 3		±400 ... ±1 000
Measuring range 4		±1 000 ... ±10 000

13. Ordering key and accessories

Accessories	Type
• Display module (DIM)	5877AZ000
• Set of connectors maXYmos TL for sensors, digital I/0 and supply	5877AZ010
• Connecting cable between MEM and DIM, length 2,5 m	1200A161A2,5
• Connecting cable between MEM and DIM, length 5 m	1200A161A5
• Ethernet connecting cable between MEM's, length 0,5 m	1200A49A3
• Ethernet connecting cable between MEM's, length 5 m	1200A49
• Power supply 90 - 264 VAC/24 VDC ready for connection max. 90 W (3,75A), configurable country cable	5781B5
• DIN rail clip for MEM control cabinet mounting	5700A31
• DIM Cable Extender	1200A163



DIN rail clip for MEM control cabinet mounting

Windows®-Software maXYmos PC (Basic) **2830A1**
- Organize firmware updates
- Save device settings in a backup file
- Restore settings to the device

(included in the scope of delivery of the measuring and evaluation module type 5877B)

Windows®-Software maXYmos PC (Plus) **2830A2**

Like Basic version, but in addition:
- All device settings applied on PC (Setup editor)
- Log explorer opens and interprets exported test records
- Generation of an Excel® statistical file with selected process values
- Cursor measurement, bundle presentation of curves, etc.
- Final Y(X) curves can also be presented as Y(t) or X(t)
- PDF print function for test records

Included accessories for Type 5877B0	Type/Mat. No.
• Set of connectors maXYmos TL for sensors, digital I/0 and supply	5877AZ010
• Windows software maXYmos PC Basis	2830A1
• Ethernet connecting cable between MEM's, length 0,5 m	1200A49A3

Ordering key for

XY Monitor display module (DIM) **Type 5877AZ000**

Ordering key for

Measuring and evaluation module
XY Monitor maXYmos TL (MEM) **Type 5877B** ☐

MEM **maXYmos TL** Standard	**0**
MEM **maXYmos TL ML** Medical Low measuring range	**2**
MEM **maXYmos TL L** Low measuring range	**3**

13.1 Sensors

Kistler supplies a wide range of sensors for measurands such as force, torque, displacement, and angle. These sensors are based on piezoelectric, strain gauge or potentiometric measurement processes.

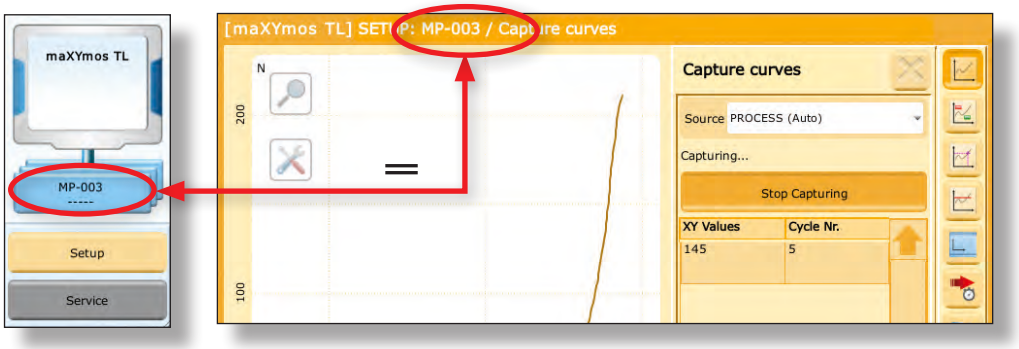
14. Error Identification/Troubleshooting

This section examines typical problems/errors/incorrect uses and how to remedy them. You can help us and other users by sharing your own experience.

14.1 Error: "no measurement curve displayed"

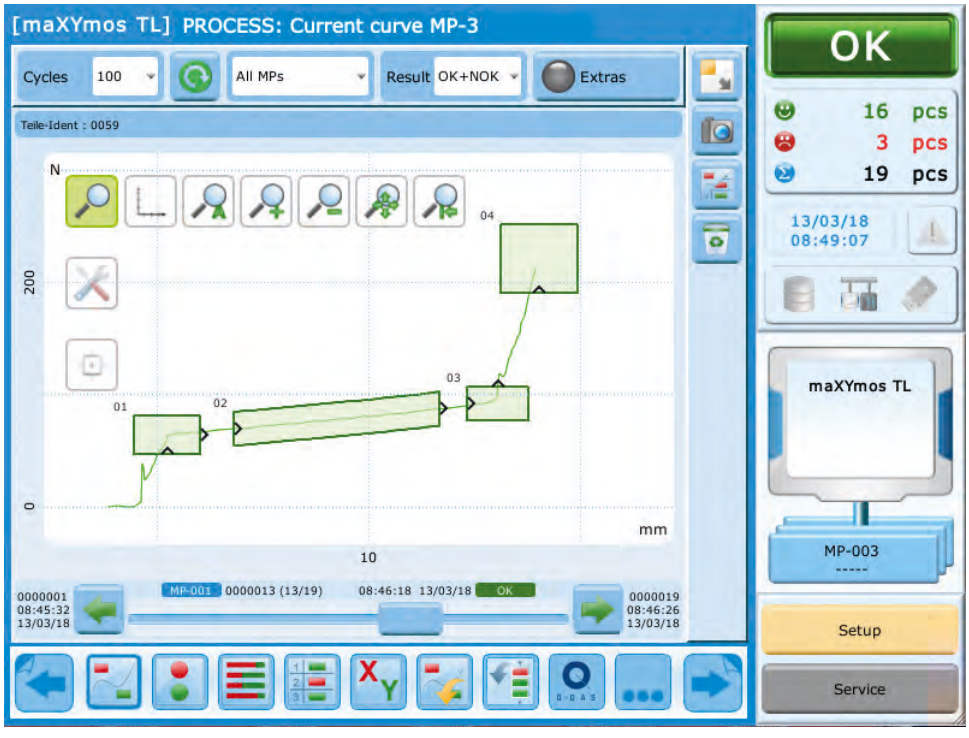
14.1.1 No curve in EO editor

Error: No measurement curve is displayed in the EO Editor
Cause: Selected measurement program (MP) in (blue) Process View and in (orange) setup menu do not match
Solution: The SAME MP must be selected in both menus, e.g. MP-001 → page 149, 170



14.1.2 Process view set to "History curves"

Error: Curve is not displayed even though "OK" or "NOK" is shown after measurement
Cause: View has been set to "History Curves"
Solution: Switch to standard display → page 29



14.2 Error: "cannot input command or data"

14.2.1 Not react and has pale background/is barely visible

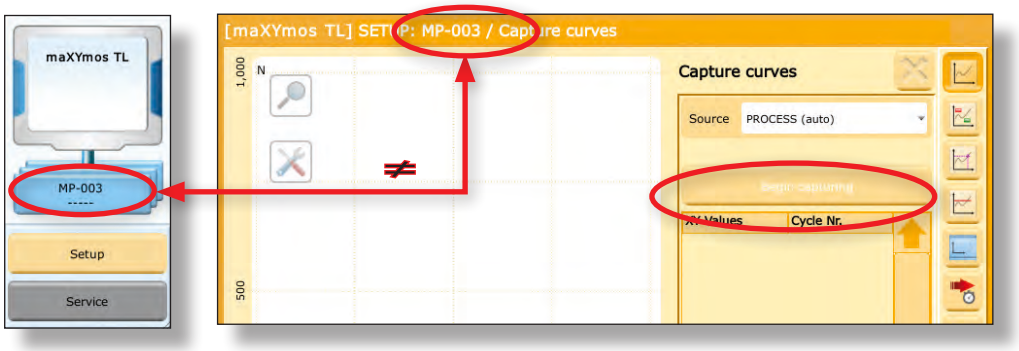
Cause: Access protection is activated or input is not meaningful
Solution: Deactivate access protection → page 48 → Setup / Global setup / Access Protection

14.2.2 Input field turns yellow when input is made

Cause: Input does not make sense / is erroneous (e.g. 13 as input for month)
Solution: Input correct value

14.2.3 Measurement curve cannot be started

Cause: The measurement program (MP) selected in the Process view does not match the MP selected in the (orange) Setup menu.
Solution: To capture a curve, the MP selected in the (blue) Process menu and the MP selected in the (orange) Setup menu must be the same, e.g. "MP-001" → page 149, 170



14.3 Error: Red "NOK" display (= not OK)

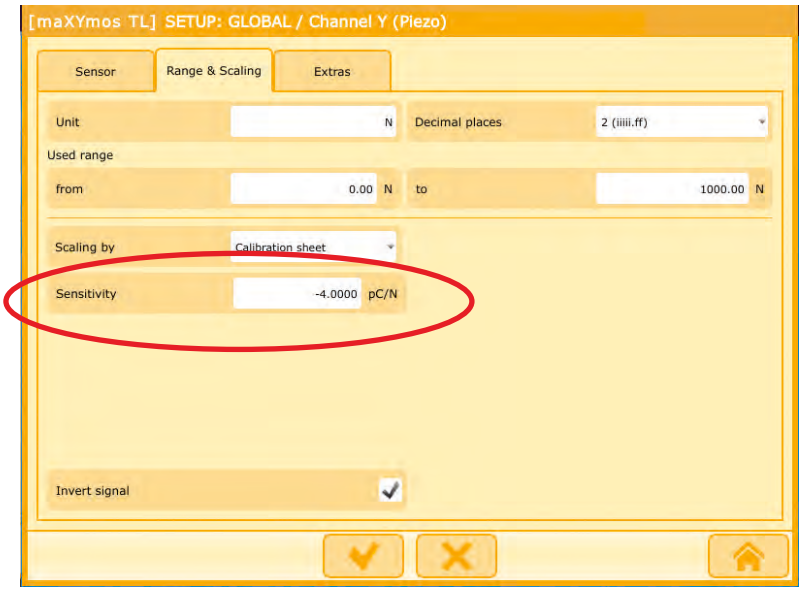
Problems and solutions: some typical errors are listed below

14.3.1 After first measurement curve is captured

Error: Although measurement curve is displayed as correct, "NOK" nevertheless appears and the yellow warning light ⚠ is flashing
Cause: No evaluation objects (EOs) have yet been defined and so no evaluation can be made → page 21
Solution: Configure evaluation objects (EOs) → page 149
Path: Setup / MP Setup / MP-000 (to 127) / Evaluation

14.3.2 When using piezoelectric measurement sensor

Error: Measurement curve is not visible in window or appears in negative range (on x axis)
Cause: Piezoelectric sensitivity is either wrongly configured or lacks a preceding "–" (minus) sign in pC/N setting.
Solution: Configure sensitivity according to calibration certificate, e.g. to "– 4.0000 pC/N" → page 55.
Path: Setup / Global setup / Channel-Y / Range & Scaling



14.3.3 Using HYSTERESIS EO

Error: Although measurement curve is displayed in Process view, "NOK" is nevertheless displayed or HYSTERESIS EO either cannot be positioned using the EO Editor or else continuously jumps down on x axis (using HYSTERESIS X) or Y axis (using HYSTERESIS Y).

Cause: 1. The return leg of the curve is hidden (="blue return leg" is not visible)
2. The STOP threshold has been wrongly configured in the Cycle Control menu
3. Points 1 and 2 above have been corrected, but EO still cannot be positioned correctly.

Solution: 1. Display the return leg of the curve (= make "blue line" visible) → page 103,
Path: Setup / Global setup / Cycle Control / Curve Processing / "Cut Curve at" set to "NONE".
2. Define STOP threshold (correctly) - it should be lower than START threshold → page 103, page 90
Path: Setup / Global setup / Cycle Control / START/STOP / configure STOP Threshold
3. When points 1 and 2 above have been fixed, you first have to delete the previous curves (using "Capture Curves" menu) before recording new curves → pages 21, 149, 150.
Path: Setup / MP-Setup / MP-xxx / Capture Curves (Icon at top right)

14.4 Error: "data not saved to USB stick"

Cause: Data export not authorized and not started manually

Solution: 1. Authorize data export to USB stick → page 118 (Setup / Global setup / Data Exports / Standard Protocol / Data Export to USB

2. Start data export → page 24 (Process page / select USB icon and start export by selecting "Start" button)

14.5 Error: "HYSTERESIS EO cannot be positioned correctly"

Fehler: HYSTERESIS EO either cannot be positioned using the EO Editor or else continuously jumps down on x axis (using HYSTERESIS X) or Y axis (using HYSTERESIS Y).

Cause: 1. The return leg of the curve is hidden (="blue return leg" is not visible)

2. The STOP threshold has been wrongly configured in the Cycle Control menu

3. Points 1 and 2 above have been corrected, but EO still cannot be positioned correctly.

Solution: 1. Display the return leg of the curve (= make "blue line" visible) → pagepage 10379,

Path: Setup / Global setup / Cycle Control / Curve Processing / "Cut Curve at" set to "NONE".

2. Define STOP threshold (correctly) - it should be lower than START threshold → page 103, page 90

Path: Setup / Global setup / Cycle Control / START/STOP / configure STOP Threshold

3. When points 1 and 2 above have been fixed, you first have to delete the previous curves (using "Capture Curves" menu) before recording new curves → pages 21, 149, 150.

Path: Setup / MP-Setup / MP-xxx / Capture Curves (Icon at top right)

14.6 Error: "curves keep being superimposed"

Error: All the curves displayed in the blue Process view are superimposed over each other (= bundle plot).

Cause: The "Bundle Plot Active" checkbox in the Process view is activated → page 112.

Solution: 1. Temporary solution: select and then (= so that button is no longer green) → page 26.

2. Permanent solution: Uncheck "Bundle Plot Active" checkbox in Process view → page 112.

Path: Setup / Global setup / Process view / "Current Curve", then uncheck "Bundle Plot Active" checkbox and select "Configure"→ page 112.

15. Fieldbus

The maXYmos TL Type 5877… monitor is equipped with a fieldbus interface via which it can communicate directly with the system PLC. The fieldbus can also be used to control and configure the monitor. The process values generated during evaluation can also be transmitted to the system PLC via the fieldbus.

15.1 Fieldbus configuration

15.1.1 General information

When the fieldbus connection is configured this supports bidirectional transmission of control signals (control bits) and bidirectional transfer of data objects in a telegram. The length of the telegram can be up to 220 bytes (see notes in relevant fieldbus configuration), of which up to 200 bytes (one page) can be freely defined as data objects chosen by the user. Up to eight of these pages can be created, providing a maximum of 1 600 bytes for transferring data objects.

A detailed description is provided in the sections on Telegram Structure (→ page 332) and Data Objects (→ page 348, 350).

The telegram structure, data objects and the data transfer sequence are all independent of the type of fieldbus being used. It is only during basic monitor configuration that a distinction is drawn between fieldbus types.

The **Global setup: Fieldbus** menu is used to configure the monitor. Configuration is in two parts, which are described in the sections on **Basic Monitor Configuration** and **Telegram Configuration**.

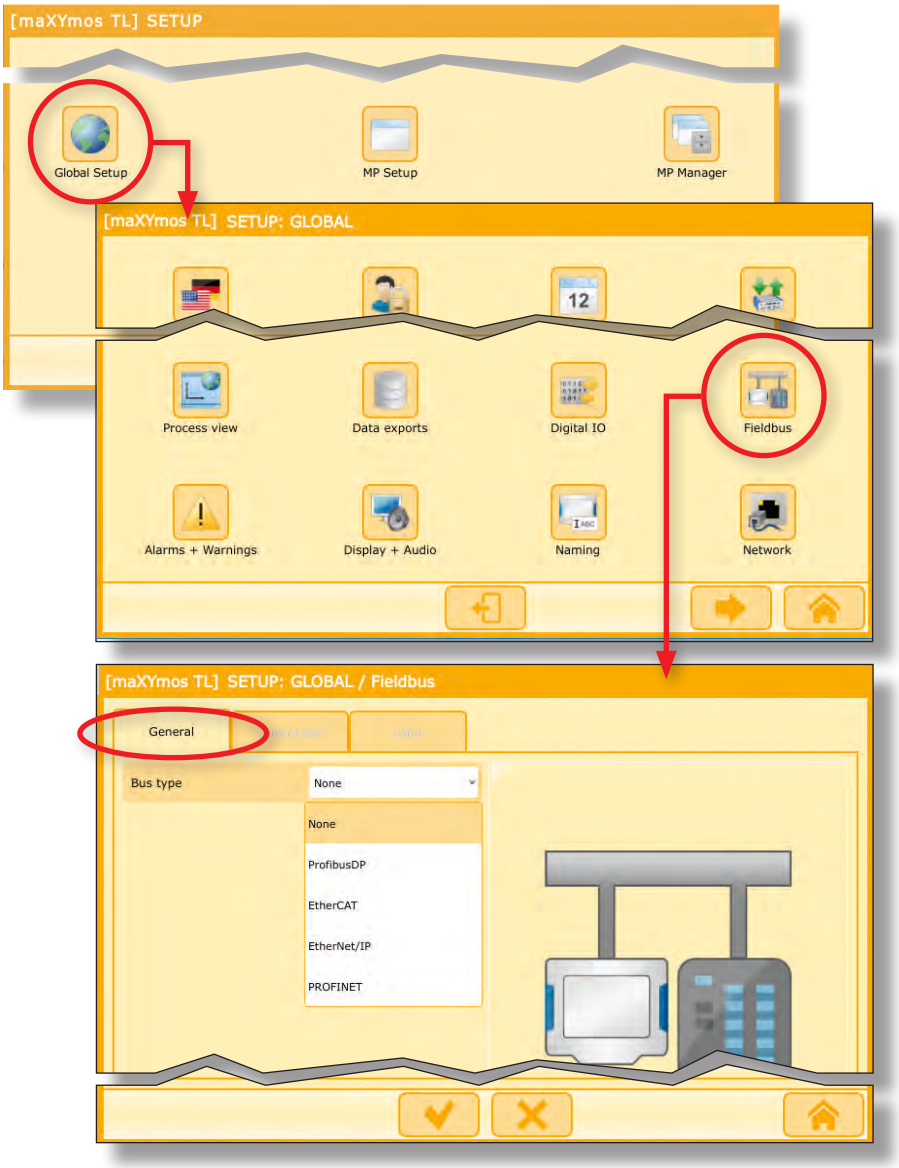
To configure the system PLC, please use the appropriate GSD file (for PROFIBUS) or EDS file (for EthernetIP).

Always use the GSD/EDS file which is currently valid for the monitor. This file can be found on the documentation USB stick supplied with the monitor. Please check which version of the firmware is currently installed on the monitor.

15.2 Fieldbus monitor setup

Setup open SETUP Menu (→ Section 7.2.1 / page 44)

Select Digital OK



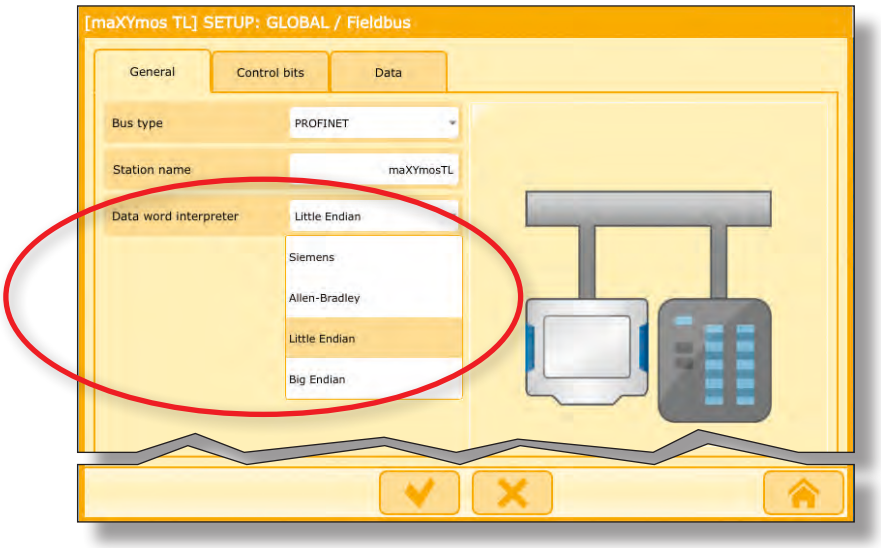
Bus type
Select and configure required bus type.
Selection: **None, ProfibusDP, EtherCAT, EtherNet/IP, PROFINET**

GEFAHR

Before activating the fieldbus, check the slave address. If the slave address defined on the monitor has already been allocated, first unplug the fieldbus connector and disconnect the monitor from the fieldbus. Then activate (select) the fieldbus type, changing the slave address if necessary. An incorrect or invalid slave address will cause an address conflict which can stop the system or cause control to fail. Use only a slave address not allocated elsewhere. Consult your system operator if necessary.

15.2.1 Basic data word interpreter setup

All fieldbus types which allow data format to be configured by data word interpreter must be set up in accordance with the manufacturer's format specifications for the PLC being used.



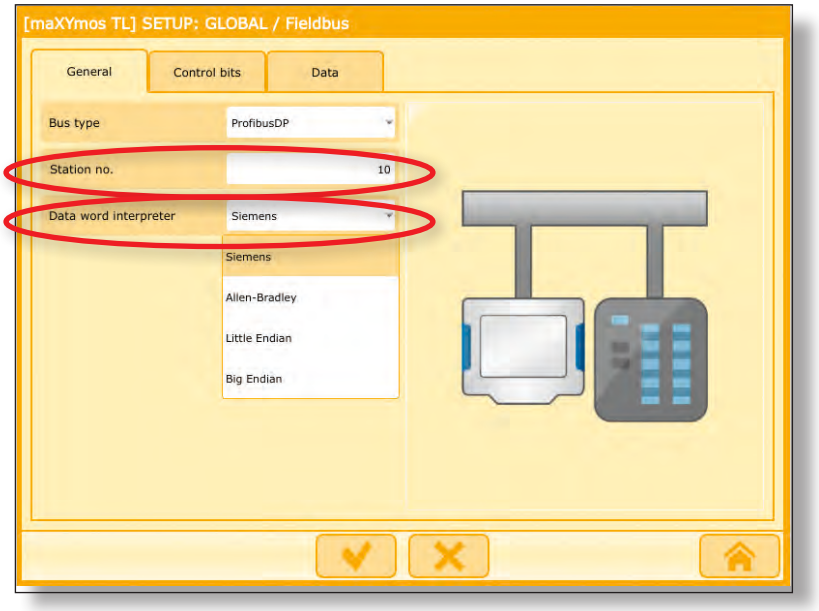
Pin	Byte sequence B3 B2 B1 B0 used in data format:	
Data type	Little Endian	Big Endian
Byte	B0	B0
Word	B0 B1	B1 B0
DWord	B0 B1 B2 B3	B3 B2 B1 B0

NOTE

Little Endian is the Intel format, BigEndian is the Motorola format.
Example: Hex 12 34 56 78 (Dec = 305 419 896)
Big Endian (Motorola): 12 34 56 78
Little Endian (Intel): 78 56 34 12.

15.2.2 Basic PROFIBUS configuration

When the **PROFIBUS DP** configuration is selected, 20 bytes of control signals and up to 200 bytes of freely configurable data are supported in a telegram.



Slave address
Enter the slave address configured in the Profibus master for the monitor.

Data word interpreter
Set the data format to match that of the PLC data format (→ section on basic data word interpreter setup).

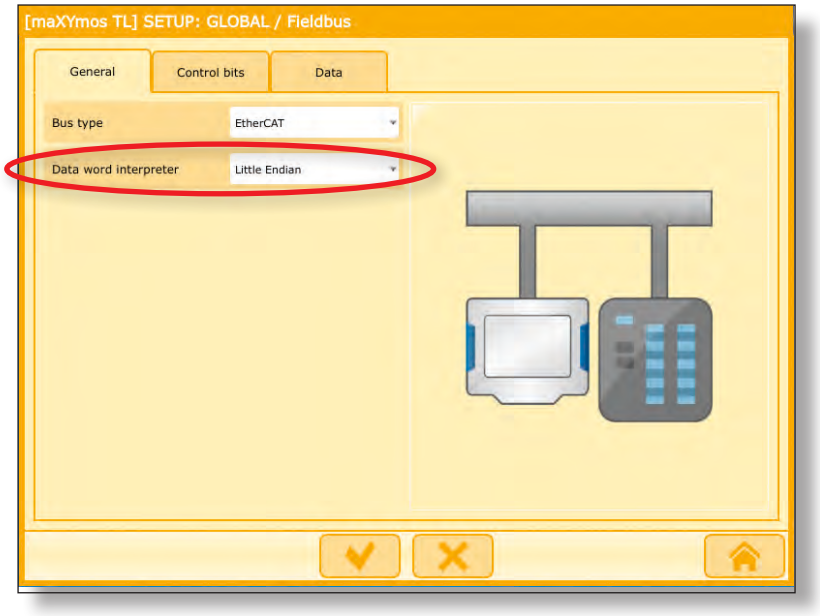
NOTE

Baud rate is detected automatically. The following baud rates are supported: 12 MBit/s, 6 MBit/s, 3 MBit/s, 1.5 MBit/s, 500 kBit/s, 187.5 kBit/s, 93.75 kBit/s, 45.45 kBit/s, 19.2 kBit/s, 9.6 kBit/s.

Once you select **ProfibusDP** and save the settings by quitting the menu, the fieldbus is activated.

15.2.3 Basic EtherCAT setup

When the **EtherCAT** configuration is selected, 20 bytes of control signals and up to 180 bytes of freely configurable data are supported in a telegram.

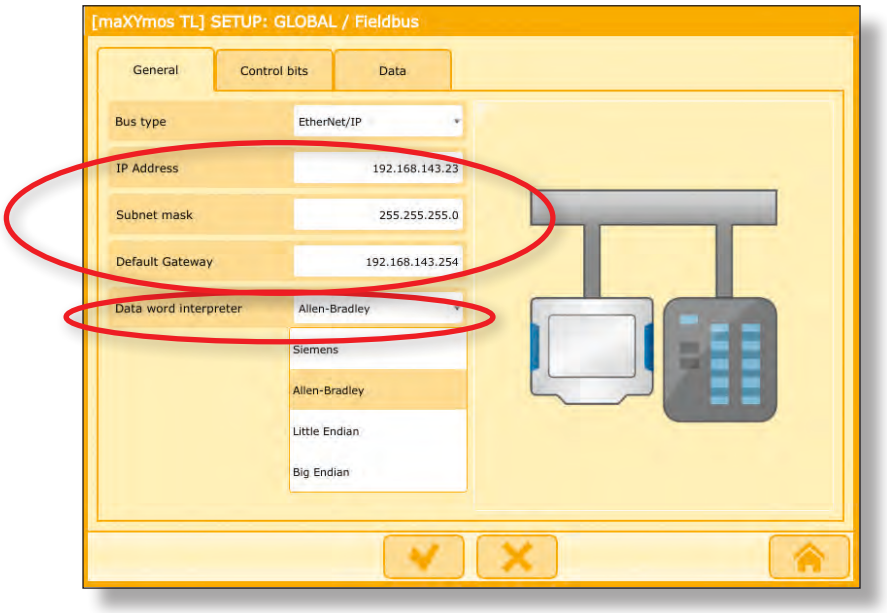


Data word interpreter
Set the data format to match that of the PLC data format (→ Section on basic data word interpreter setup).

Once you select **EtherCAT** and save the settings by quitting the menu, the fieldbus is activated.

15.2.4 Basic EtherNet/IP setup

When the **EtherNet/IP** configuration is selected, 20 bytes of control signals and up to 200 bytes of freely configurable data are supported in a telegram.



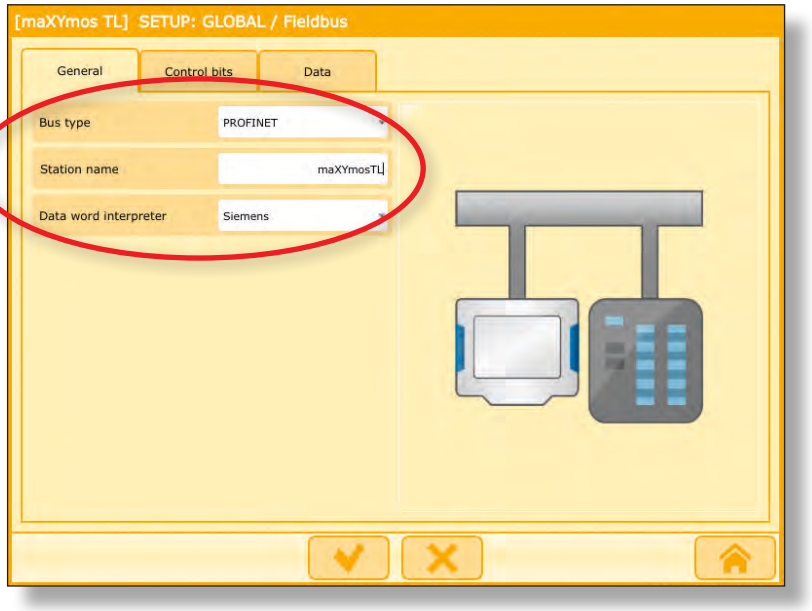
IP Address / Subnet Mask / Default Gateway
In the IP address field enter the IP address configured for the monitor in the Ethernet IP master. In the Subnet Mask field enter the IP address for the EtherNet/IP. In the Default Gateway field enter the IP address for the fieldbus network.

Data word interpreter
Set the data format to match that of the PLC data format (→ Section on basic data word interpreter setup).

Once you select **EtherNet/IP** and save the settings by quitting the menu, the fieldbus is activated.

15.2.5 Basic PROFINET setup

When the **PROFINET** configuration is selected, 20 bytes of control signals and up to 200 bytes of freely configurable data are supported in a telegram.



Station name
Setting the station name according to DNS conventions in RFC1034 where only [A ... z], [0 ... 9], [.] and [-] are permitted as possible characters.

Data word interpreter
Set the data format to match that of the PLC data format
(→ Section on basic data word interpreter setup).

Once you select **Profinet** and save the settings by quitting the menu, the fieldbus is activated.

15.3 Telegram structure

The structure of the telegram is divided into the fixed telegram header from byte 0 to byte 19 and the freely configurable part from byte 20 (up to a maximum of byte 219), referred to in the description below as a page. This structure applies to both input and output telegrams. Eight pages can be defined for each transmission direction.

The extended bit range from Byte 20 to Byte 27 is not used in the maXYmos TL.

8 pages can be defined for both transmission directions.

maXYmos TL IN			maXYmos TL OUT		
	PROFIBUS EtherNet/IP PROFINET EtherCAT			PROFIBUS EtherNet/IP PROFINET EtherCAT	
	Byte [Dec]	Description		Byte [Dec]	Description
$RYxx_{Hex}$	0	Control Bits IN	$RXxx_{Hex}$	0	Mirrored Control Bits IN
	1	Control Bits IN		1	Mirrored Control Bits IN
	2	Control Bits IN		2	Mirrored Control Bits IN
	3	Reserved		3	Reserved
	4	Reserved		4	Reserved
	5	Reserved		5	Reserved
	6	Reserved		6	Control Bits OUT
	7	Reserved		7	Control Bits OUT
	8	Reserved		8	Reserved
	9	Reserved		9	Reserved
	10	Reserved		10	Reserved
	11	Reserved		11	Reserved
	12	Reserved		12	Reserved
	13	Reserved		13	Reserved
	14	Config/Control Page Area		14	Config/Control Page Area
	15	Config/Control Page Area		15	Config/Control Page Area
	16	Config/Control Page Area		17	Config/Control Page Area
	17	Config/Control Page Area		18	Config/Control Page Area
	18	Config/Control Page Area		18	Config/Control Page Area
	19	Config/Control Page Area		19	Config/Control Page Area
RWw_{Hex}	20	Fully configurable (Page) IN	RWr_{Hex}	20	Fully configurable (Page) OUT
	21			21	
	...			...	
	...			...	
	218			218	
	219			219	

When the fieldbus is activated, the signals at the digital (control) inputs are no longer used to control the monitor, which can then only be controlled by means of the fieldbus. The digital outputs will continue to be updated and represent the relevant control bits of the fieldbus.

When the fieldbus is activated, the fieldbus monitor function and the signal states of the fieldbus control bits can be displayed on the **Service: Fieldbus** menu.

15.3.1 Control signals (control bits)

The fieldbus control bit functions correspond to those of the digital input and output signals from the X10 and X14 Dig-IO interface, where these are present.

Control bit allocation is displayed on the **SETUP: GLOBAL / Fieldbus menu** on the **Control Bits tab**:

The scroll bar allows you to select and display a specific byte.

15.3.1.1 Control signals – Input control bits

The structure of the telegram is divided into the fixed telegram header from byte 0 to byte 19 and the freely configurable part from byte 20 (up to a maximum of byte 219), referred to in the description below as a page. This structure applies to both input and output telegrams. Eight pages can be defined for each transmission direction.

maXYmos TL IN			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Description**	**Description**
0	0	START	Measuring START
	1	TARE-Y / OPERATE	TARE-Y or reset piezo
	2	ZERO-X	Zero channel X
	3	STEST-X	Trigger test for sensor for channel X
	4	STEST-Y	Trigger test for sensor for channel Y
	5	Reserved	
	6	MASTER-MEAS	Master measurement
	7	INC-ZERO	Zero incremental encoder

maXYmos TL IN			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Description**	**Description**
1	0	ACK-ADMIN-GLOBAL	Acknowledgment with Admin rights (e.g., corresponding warning, alarm) for all measuring programs [MP]
	1	ACK-ADMIN	Acknowledgement with Administrator rights (e.g. regarding corresponding warnings or alarms)
	2	Reserved	
	3	ACCESS	Allows the PLC to grant the user access rights. The object accessPlcLogon is used to set which group of rights (Setter, Operator or Administrator) is active. If ACCESS = 1 the user can use these rights (does not have to log on separately), ACCESS = 0 corresponds to a logoff.
	4	AUTO	The AUTO bit must be set (byte 1.4 = 1) if the measuring program is to be switched by means of the PLC fieldbus. With AUTO=1 the PLC has full control over the maXYmos. This also blocks setting up manually!
	5	STAT-RESET	Reset statistics
	6	STAT-DISABLE	Disable statistics
	7	Reserved	
2	0	MP-0 [1]	Measuring bit selection (see also byte 14: Page control input control/config bits).
	1	MP-1 [2]	
	2	MP-2 [4]	
	3	MP-3 [8]	
	4	MP-4 [16]	
	5	MP-5 [32]	
	6	MP-6 [64]	
	7	Reserved	

maXYmos TL IN			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Description**	**Description**
3	0	Reserved	
	1	Reserved	
	2	RESET-SN-GENERATOR	Resetting of global serial number generator
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	EXPORT-PVT-START	Start PVT Export Precondition: Data Export Type PVT and “Triggered by Fieldbus” must be activated. Function: Data export type PVT can be started and stopped via field-bus. When 0 -> 1, a new file will be created and written. When 1 -> 0, file will be closed.
	7	Reserved	
4	0	I-UNI-0	Configurable input signal
	1	I-UNI-1	
	2	I-UNI-2	
	3	I-UNI-3	
	4	I-UNI-4	
	5	I-UNI-5	
	6	I-UNI-6	
	7	I-UNI-7	
5	0…7	Reserved	
6	0…7	Reserved	
7	0…7	Reserved	
8	0…7	Reserved	
9	0…7	Reserved	
10	0…7	Reserved	
11	0…7	Reserved	
12	0…7	Reserved	
13	0…7	Reserved	

15.3.1.2 Control signals – Output control bits

Bytes 0 … 13 of the telegram

maXYmos TL OUT			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Descrpition**	**Descrpition**
0	0	MIRROR-START	Mirrored cycle START
	1	MIRROR-TARE-Y /-OPERATE	Mirrored channel Y tare or reset piezo
	2	MIRROR-ZERO-X	Mirrored zeroing of channel X
	3	MIRROR-STEST-X	Mirrored trigger test of sensor for channel X
	4	MIRROR-STEST-Y	Mirrored trigger test of sensor for channel Y
	5	Reserved	
	6	MASTER-MEAS	Mirrored master measurement
	7	INC-ZERO	Mirrored incremental sensor zeroing
1	0	MIRROR-ACK-ADMIN-GLOBAL	Mirrored acknowledgment with administrative rights (e.g., corresponding warning, alarm) for all MPs
	1	MIRROR-ACK-ADMIN	Mirrored acknowledgement with Administrator rights (e.g for corresponding warnings and alarms)
	2	Reserved	
	3	MIRROR-ACCESS	Mirrored ACCESS
	4	MIRROR-AUTO	Mirrored production mode; no editing of setup possible
	5	MIRROR-STAT-RESET	Mirrored reset of statistics
	6	MIRROR-STAT-DISABLE	Mirrored disabling of statistics
	7	Reserved	

maXYmos TL OUT			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Descrpition**	**Descrpition**
2	0	MIRROR-MP-0 [1]	Mirrored selection of measuring program
	1	MIRROR-MP-1 [2]	
	2	MIRROR-MP-2 [4]	
	3	MIRROR-MP-3 [8]	
	4	MIRROR-MP-4 [16]	
	5	MIRROR-MP-5 [32]	
	6	MIRROR-MP-6 [64]	
	7	Reserved	
3	0	Reserved	
	1	Reserved	
	2	RESET-SN-GENERATOR	Mirrored resetting of global serial number
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	MIRROR-EXPORT-PVT-START	Mirrored start PVT export
	7	Reserved	
4	0	MIRROR-I-UNI-0	Mirrored configurable input signal
	1	MIRROR-I-UNI-1	
	2	MIRROR-I-UNI-2	
	3	MIRROR-I-UNI-3	
	4	MIRROR-I-UNI-4	
	5	MIRROR-I-UNI-5	
	6	MIRROR-I-UNI-6	
	7	MIRROR-I-UNI-7	

maXYmos TL OUT			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Description**	**Description**
5	0…7	Reserved	
6	0	READY	Ready for the next cycle
	1	OK-TOTAL	Result OK (GOOD)
	2	NOK-TOTAL	Result NOK (BAD)
	3	NO-PASS	Overstep NO-PASS
	4	Reserved	
	5	Reserved	
	6	WARNING	Warning
	7	ALARM	Alarm
7	0	S1	Switch signal S1
	1	S2	Switch signal S2
	2	Reserved	
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	Reserved	
	7	Reserved	
8	0	O-UNI	Reserved for freely configurable digital output signals.
	1	O-UNI	
	2	O-UNI	
	3	O-UNI	
	4	O-UNI	
	5	O-UNI	
	6	O-UNI	
	7	O-UNI	
9	0…7	Reserved	
10	0…7	Reserved	
11	0…7	Reserved	
12	0…7	Reserved	
13	0…7	Reserved	

15.3.1.3 Page control (control/config)

Page control – Input control/config bits

Bytes 14 … 19 of the telegram

maXYmos TL IN			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Description**	**Description**
14	0	CFG-MP-0 [1]	Selection of measuring program as destination for the data transmission. This applies to both read and write. See note below. Byte 15.7 has to be set if objects have to be interpreted as global.
	1	CFG-MP-1 [2]	
	2	CFG-MP-2 [4]	
	3	CFG-MP-3 [8]	
	4	CFG-MP-4 [16]	
	5	CFG-MP-5 [32]	
	6	CFG-MP-6 [64]	
	7	Reserved	
15	0	Reserved	
	1	Reserved	
	2	Reserved	
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	Reserved	
	7	Reserved	
16	0	CFG-ADDRESS	Address in the fully configurable part of the telegram from which the data is to be transmitted. The address area starts with 00 and ends with 199. This makes it possible to also transmit just sub-areas of the total of 200 bytes. If the entire area is to be transmitted, the address must be set to 00. Please note that the address 00 corresponds to the absolute address 20 of the complete telegram (see also "Page Description").
	1	CFG-ADDRESS	
	2	CFG-ADDRESS	
	3	CFG-ADDRESS	
	4	CFG-ADDRESS	
	5	CFG-ADDRESS	
	6	CFG-ADDRESS	
	7	CFG-ADDRESS	
17	0	CFG-LENGTH	Number of fully configurable bytes to be transmitted in the telegram. The maximum number is 200.
	1	CFG-LENGTH	
	2	CFG-LENGTH	
	3	CFG-LENGTH	
	4	CFG-LENGTH	
	5	CFG-LENGTH	
	6	CFG-LENGTH	
	7	CFG-LENGTH	

maXYmos TL IN			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Description**	**Description**
18	0	MIRROR-SELECT-PAGE	Selection of the page in address range which is to be described from address 20.
	1		
	2		
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	Reserved	
	7	Reserved	

If the values of the telegram currently being read are intended to relate to the current measurement program, the same program number must be set in byte 14 as in Control Signals - Input Control Bits, byte 2, Measurement program selection

maXYmos TL IN			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Description**	**Description**
19	0	SAVE-TO-MP	If this bit is set (19.0 = 1), received data is stored in non-volatile form in the chosen measuring program. If the bit is not set, the received data is only stored in RAM.
	1	STROBE	Starts data transmission / command.
	2	Reserved	
	3	Reserved*	*See note below
	4	RSET-CHANGED-SELECTED-MP	Resets change flag of the currently selected measuring program (see byte 19.4 of the output telegram).
	5	Reserved	
	6	RSET-CHANGED-GLOBAL	Resets the global change flag (see byte 19.6 des of the output telegram).
	7	BACKUP-REQUEST	Requirement to create a backup on the export server

15.3.1.4 Page control – Output control/config bits

Byte 14 … 19 of the telegram

maXYmos TL OUT			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Description**	**Description**
14	0	MIRROR-CFG-MP-0 [1]	Mirrored selection of measuring program of the input telegram
	1	MIRROR-CFG-MP-1 [2]	
	2	MIRROR-CFG-MP-2 [4]	
	3	MIRROR-CFG-MP-3 [8]	
	4	MIRROR-CFG-MP-4 [16]	
	5	MIRROR-CFG-MP-5 [32]	
	6	MIRROR-CFG-MP-6 [64]	
	7	Reserved	
15	0	Reserved	
	1		
	2		
	3		
	4		
	5		
	6		
	7		
16	0…7	MIRROR-CFG-ADDRESS	Mirrored CFG-ADDRESS (up V1.2.x, V1.3.x)
17	0…7	MIRROR-CFG-LENGTH	Mirrorede CFG-LENGTH (up V1.2.x, V1.3.x)

maXYmos TL OUT			
PROFIBUS EtherNet/IP PROFINET EtherCAT			
Byte [Dec]	**Bit [Dec]**	**Description**	**Description**
18	0	MIRROR-SELECT-PAGE	Mirrored page selection of the input telegram
	1	MIRROR-SELECT-PAGE	
	2	MIRROR-SELECT-PAGE	
	3	Reserved	
	4	Reserved	
	5	Reserved	
	6	Reserved	
	7	Reserved	
19	0	TRANSMISSION-FAULT	Error flag for transmission error. This is set in case of a faulty transmission with resetting the bit ACK.
	1	ACK	Confirmation flag is set (bit 19.1 = 1) when maXYmos executes the required action triggered by the bit strobe. After receiving Bit ACK, bit Strobe can be cleared. With clearing of bit strobe, bit ACK bit is reset.
	2	DEVICE-AVAILABLE	If bit is set, the maXYmos device can be addressed via fieldbus. The bit is set after booting the device and remains permanently while in operation.
	3	Reserved	
	4	CHANGED-SELECTED-MP	Change flag when measurement program changed. Flag is set (= 1) when it is detected that data has been modified in the measurement program since the last measurement. The flag is set after the measurement. Bit is only set if input bit is 19.4 = 0
	5	Reserved	
	6	CHANGED-GLOBAL	Change flag when global settings changed. Flag is set (= 1) when it has been recognized that global settings have been changed since the last measurement. Bit is only set if input bit is 19.6 = 0.
	7	BACKUP-COMPLETE	Backup successfully complete

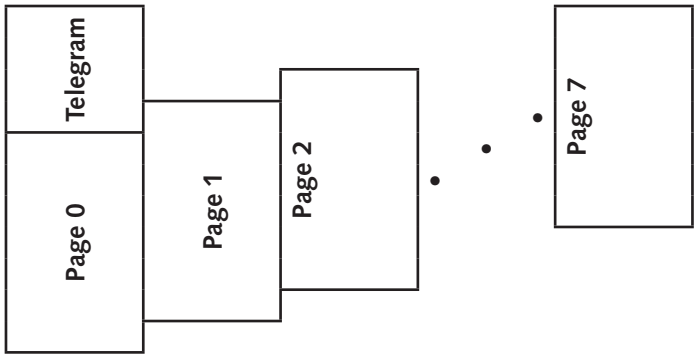
15.3.1.5 Page description

Bytes 20 … 219 of the telegram

The description applies to both input and output telegrams. A telegram structure with three data objects (1 … 3) is shown by way of example. Data objects 1 and 3 each consist of four bytes (A B C D), data object 2 consists of two bytes (A B). The data content shown in this example has a total of 10 bytes, i.e. CFGLEN = 10.

PROFIBUS EtherNet/IP PROFINET EtherCAT				
Byte [Dec]	**CFGADR [Dec]**		**Format length**	**maXYmos TL IN oder OUT**
0 … 2		Telegram header		Control Bits IN / OUT
3 … 5				Reserved
6 … 7				Reserved / Control Bits OUT
8 … 13				Reserved
14 … 15				Config/Control 200 Byte Page
16 … 17				Config/Control 200 Byte Page / Reserved
18 … 19				Config/Control 200 Byte Page
20	0	Page Fully configurable area	4	Data object 1 (Byte A)
21	1			Data object 1 (Byte B)
22	2			Data object 1 (Byte C)
23	3			Data object 1 (Byte D)
24	4		2	Data object 2 (Byte A)
25	5			Data object 2 (Byte B)
26	6		4	Data object 3 (Byte A)
27	7			Data object 3 (Byte B)
28	8			Data object 3 (Byte C)
29	9			Data object 3 (Byte D)
30	10			
31	11			
…	…			
…	…			
219	199			

Up to 8 pages can be created in this way. The data objects and their formats/length are described in the section on **Data Objects**. Their configuration is described in the section on **Telegram Configuration**.



If only the green highlighted data is to be transferred, CFGADR must be = 4 and CFGLEN = 6.

This makes it possible to transfer just one sub-area of a page, for instance just the order number or serial number, without having to create a separate page for this process.

PROFIBUS EtherNet/IP PROFINET EtherCAT					
Byte [Dec]	**CFGADR [Dec]**		**Format length**	**maXYmos TL IN oder OUT**	**CFGLEN**
0 … 2		Telegram header		Control Bits IN / OUT	
3 … 5				Reserved	
6 … 7				Reserved / Control Bits OUT	
8 … 13				Reserved	
14 … 15				Config/Control 200 Byte Page	
16 … 17				Config/Control 200 Byte Page / Reserved	
18 … 19				Config/Control 200 Byte Page	
20	0	Page - Fully conf. area	4	Data object 1 (Byte A)	
21	1			Data object 1 (Byte B)	
22	2			Data object 1 (Byte C)	
23	3			Data object 1 (Byte D)	
24	4		2	Data object 2 (Byte A)	1
25	5			Data object 2 (Byte B)	2
26	6		4	Data object 3 (Byte A)	3
27	7			Data object 3 (Byte B)	4
28	8			Data object 3 (Byte C)	5
29	9			Data object 3 (Byte D)	6
30	10				
31	11				
…	…				
219	199				

By default, when **CFGADR** = 0, the number of bytes defied in the page configuration is automatically adopted. In this case CFGLEN must be to = 0.

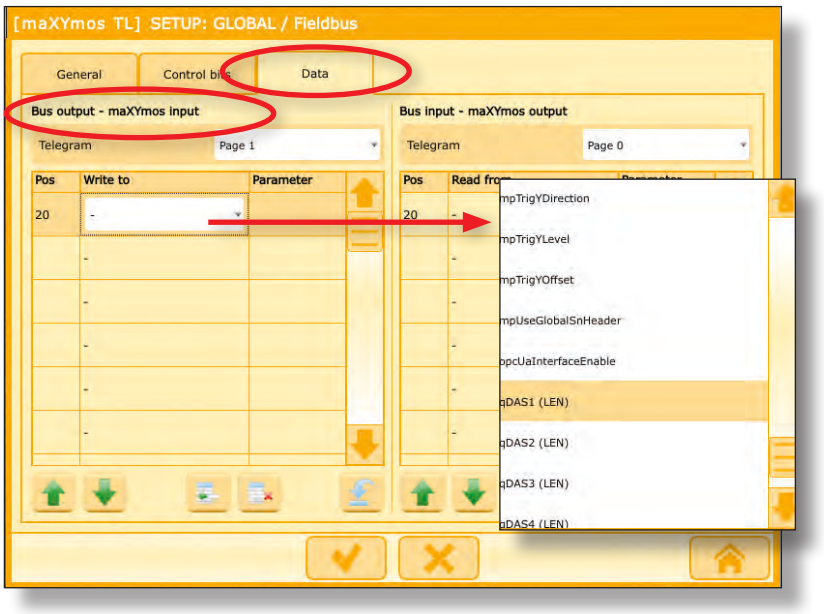
When **CFGADR** K 0 and/or CFGLEN K 0, it is necessary to ensure that the relevant data objects in the page configuration have been defined.

15.3.2 Telegram configuration

Configuration of the individual pages of the telegram is carried out in the **SETUP / Global setup / Fieldbus / Tab data** menu:

15.3.2.1 Input telegram

The table in the left section of the GUI is used to configure the input telegram:
Bus output – maXYmos input



Telegram page «x»
Select the page required for input. A maximum of 8 pages are available.

Pos
This column displays the byte number (position) in the telegram. Bytes are counted sequentially from 0 … 19 of the control signals and page control. LIkewise, when data objects are entered in the Write to column their data length is taken into account automatically. A maximum of 200 bytes is available. In this case the last position is 219.

Write to
The required data object is entered in the Write to column. When you select the field, its background coloring turns dark, indicating that it has been selected. If you select it again, a pop-up menu appears which you can configure as required.

Parameter
This column is used to enter the parameter that will be applied to the data object. The section on Data Objects describes which objects require a parameter as well as the content of the parameters. Typical parameters are the EO number or the character length of a string.

Move entry up/down

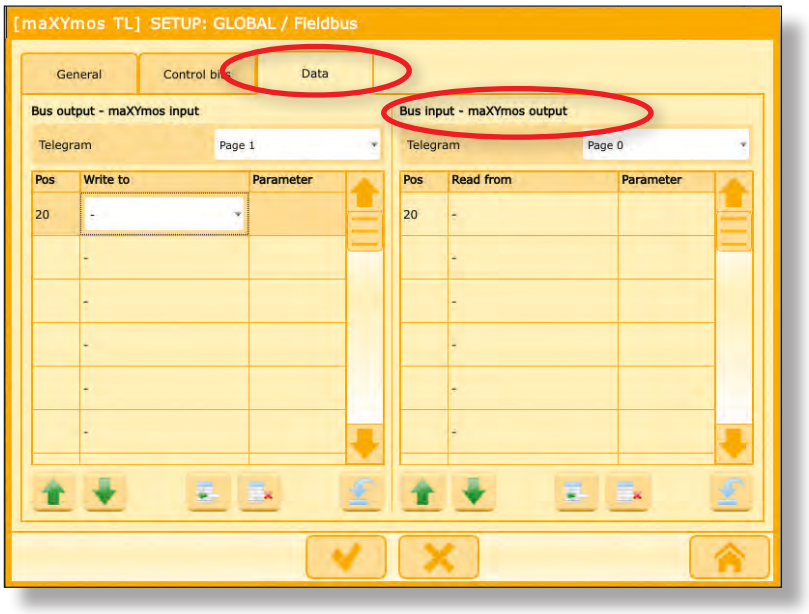
Insert a blank entry

Delete an entry

Load default values

15.3.2.2 Output telegram

The table in the right section of the GUI is used to configure the output telegram:
Bus Input – maXYmos Output



The configuration is performed like the input telegram. The function of the input objects is the same as for **Bus output – maXYmos input.** The required output data objects are entered in the column Read From.

15.3.3 Data objects in the freely configurable area

15.3.3.1 Specifying data formats

The following data formats are used for the data objects.

Data type	Length in bytes	Description/value range
Bool	1	True/False
Byte	1	0, 1, … 255
Word	2	0, 1, … 65 535
DWord	4	0, 1, … 4 294 967 295
Int	2	–32 767, … 0, … 32 768
DInt	4	–2 147 483 648, … 0, … 2 147 483 647
Real	4	V (1), E (8), M (23) V = Sign E = Exponent M = Mantissa (X) = Number of bits
NCod	1	Allocation / coding, for example: 0 = Description A 1 = Description B 2 = Description C ... Corresponds to data type: **byte**. Allocation and coding are described in the section on **Data Objects**
Char	1 or var.	One character, for example : "T" A string is specified as an array of characters (Char) of a specified length. When the string length is freely definable by the user, its length parameter is specified as "var." (variable). Only the individual characters of the string to be described as Char may be transmitted. No PLC-specific string control bytes or terminations are allowed to be transmitted. The length is specified by the monitor in the telegram configuration of the particular data object, as a **parameter** in the Parameter field.

The PLC contains strings which may include additional (control) bytes. These bytes must not be transmitted to the maXYmos TL as Char. The monitor expects to receive only the actual characters of the string. For example, if Siemens begins a string with two additional bytes before the actual characters: [Length][Number][Character]…[Character][Termination], only the [Character]…[Character] section of this string may be transmitted.

15.3.3.2 Specifying data objects

The tables below are divided into object groups to provide an overview. The description of the data types and number of bytes corresponds to that used in the section on Data Formats. The data direction indicates whether a data object can only be written by the PLC (IN), only read (OUT) or can be read and written (BOTH). The "Related" column specifies what the object relates to (**EO** = evaluation object, **MP** = measurement program, **SW** = switch signal). If, in the tables below, a particular Object Identifier is suffixed with **X**, the corresponding fieldbus parameter (e.g. (EO No.) or (length)) needs to be entered in the **Parameter** field.

Group: EvaluationObjects						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direc-tion**		**EO**	**MP**
eoType (EO)	NCod	1	BOTH	EO Types 0 = OFF (EO deactivated) 1 = NO-PASS 2 = LINE-X (horizontal threshold) 3 = LINE-Y (vertical threshold) 4 = UNI-BOX 5 = ENVELOPE 6 = GET-REF 7 = CALC 8 = GRADIENT-Y 9 = GRADIENT-X 10 = HYSTERESIS-X 11 = HYSTERESIS-Y 12 = TUNNELBOX-X 13 = TUNNELBOX-Y 14 = SPEED 15 = TIME 16 = AVERAGE 17 = Reserved 18 = BREAK 19 = INFLEXION 20 = INTEGRAL 21 = DIG-IN 22 = DELTA-Y 23 = TRAPEZOID_X 24 = TRAPEZOID_Y 25 = DISPLACEMENT RANGE 26 = FORCE RANGE 27 = PASS-THROUGH BOX	X	
eoRefTypeX (EO)	NCod	1	BOTH	EO Reference point X 1 = ABSOLUTE 2 = TRIGGER-Y (Threshold) 4 = BLOCK 8 = GET-REF	X	
eoRefTypeY (EO)	NCod	1	BOTH	EO Reference point-Y 1 = ABSOLUTE 4 = BLOCK 8 = GET-REF	X	
eoXMin (EO)	Real	4	BOTH	EO Limit Xmin	X	
eoXMax (EO)	Real	4	BOTH	EO Limit Xmax	X	
eoYMin (EO)	Real	4	BOTH	EO Limit Ymin	X	
eoYMax (EO)	Real	4	BOTH	EO Limit Ymax	X	

Group: EvaluationObjects						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direc-tion**		**EO**	**MP**
eoEntrance (EO) (until v1.4.x) **eoEntry (EO)** (from v1.5.x)	NCod	1	BOTH	EO Entry Side 0 = NONE 1 = LEFT 2 = RIGHT 3 = BELOW 4 = ABOVE 5 = ANY	X	
eoExit (EO)	NCod	1	BOTH	EO Exit Side 0 = NONE 1 = LEFT 2 = RIGHT 3 = BELOW 4 = ABOVE 5 = ANY	X	
eoDirection (EO)	NCod	1	BOTH	EO active at respective throughput direction 0 = ANY, EO active for forward and backward direction 1 = POSITIVE, EO active for positive throughput direction (left > right) 2 = NEGATIVE, EO EO active for negative throughput direction (right > left)	X	
eoCatchZoneX (EO)	NCod	1	BOTH	EO Catch Zone X Direction 0 = 0 % (no Catch zone) 1 = 10 % 2 = 20 % 3 = 50 % 4 = 100 % 5 = Catch zone unlimited	X	
eoCatchZoneY (EO)	NCod	1	BOTH	EO Catch Zone Y Direction 0 = 0 % (no Catch zone) 1 = 10 % 2 = 20 % 3 = 50 % 4 = 100 % 5 = Catch zone unlimited	X	
eoHysteresisX (EO)	Real	4	BOTH	Hysteresis in the X direction in % of the width of the respective EOs	X	
eoHysteresisY (EO)	Real	4	BOTH	Hysteresis in the Y direction in % of the height of the respective EOs	X	
eoName (EO)	Char.	20	BOTH	String for the EO name	X	
eoReEntryIgnored (EO)	Bool	1	BOTH	Ignore re-entry of the curve in EO TRUE = ignore FALSE = do not ignore	X	
eoGenerateStatistics (EO)	Bool	1	BOTH	Influencing total evaluation and statistics through EO TRUE = YES FALSE = NO	X	

Group: EvaluationObjects						
Objectidentifier	Data			Designation/Description/Example	Reference	
	Type	Byte-Count	Direc-tion		EO	MP
eoGetRefFunction (EO)	NCod	1	BOTH	Function type for EO type GET-REF 0 = YMax 1 = YMin 2 = XMax 3 = XMin 4 = RIPPLE-MAX 5 = RIPPLE-MIN 8 = BENDING-POSITION 9 = Entry 10 = Exit	X	
eoGetRefRippleMax (EO)	Real	4	BOTH	Ripple height max for EO type GET-REF and function RIPPLE-MAX or RIPPLE-MIN	X	
eoGetRefRippleMin (EO)	Real	4	BOTH	Ripple height min for EO type GET-REF and function RIPPLE-MAX or RIPPLE-MIN	X	
eoShowInfo (EO)	Bool	1	BOTH	Use INFO-Text-Function for EO with (EO No.) TRUE = YES FALSE = NO	X	
eoCurveInsideBox (EO)	Bool	1	BOTH	Curve must: TRUE = be inside of the EO with (EO No.) FALSE = be outside of the EO with (EO No.)	X	
eoRefXIndex (EO)	NCod	1	BOTH	Reference EO for X reference -1 = no EO selected 0 = EO-01 1 = EO-02 2 = EO-03 3 = EO-04 4 = EO-05 5 = EO-06 6 = EO-07 7 = EO-08 8 = EO-09 9 = EO-10	X	
eoRefYIndex (EO)	NCod	1	BOTH	Reference EO for Y reference 1 = no EO selected 0 = EO-01 1 = EO-02 2 = EO-03 3 = EO-04 4 = EO-05 5 = EO-06 6 = EO-07 7 = EO-08 8 = EO-09 9 = EO-10	X	

Group: EvaluationObjects						
Objectidentifier	Data			Designation/Description/Example	Reference	
	Type	Byte-Count	Direc-tion		EO	MP
eoDownSamplingRate (EO)	DInt	4	BOTH	Support points reduction in the low-pass filter for ripple measurement	X	
eoAverageLimitMax (EO)	Real	4	BOTH	Value: Average (max) for EO-Type AVER-AGE	X	
eoAverageLimitMin (EO)	Real	4	BOTH	Value: Average (min) for EO-Type AVERAGE	X	
eoAverageFilterWidth (EO)	Real	4	BOTH	Filter width for EO-Type Average	X	
eoGradientMax (EO)	Real	4	BOTH	Value: Gradient (max) for EO-Type GRADIENT-YX or GRADIENT-XY	X	
eoGradientMin (EO)	Real	4	BOTH	Value: Gradient(min) for EO-Type GRADIENT-YX or GRADIENT-XY	X	
eoSpeedMax (EO)	Real	4	BOTH	Value: Speed (min) for EO-TYP SPEED	X	
eoSpeedMin (EO)	Real	4	BOTH	Value: Speed (max) for EO-TYP SPEED	X	
eoHysteresisMax (EO)	Real	4	BOTH	Value: Hysteresis (Max) for EO-Type HYSTERESIS-X or HYSTERESIS-Y	X	
eoHysteresisMin (EO)	Real	4	BOTH	Value: Hysteresis (Min) for EO-Type HYSTERESIS-X or HYSTERESIS-Y	X	
eoIntegralMax (EO)	Real	4	BOTH	Value: Integral (Max) for EO-Type INTEGRAL	X	
eoIntegralMin (EO)	Real	4	BOTH	Value: Integral (Min) for EO-Type IN-TEGRAL	X	
eoBreakDetectionMaxBending(EO)	Real	4	BOTH	Value: Max bending for EO-Type BRUCH-ERKENNUNG	X	
eoBendDetectionDeltaX (EO)	Real	4	BOTH	Value: dX for EO-Type KINK-DETEC-TION	X	
eoBendDetectMinBending (EO)	Real	4	BOTH	Value: Min bending for EO-Type KINK-DETECTION	X	
eoGetRefBendingDeltaX (EO)	Real	4	BOTH	Value: dX for EO-TYP GET-REF and function KINK-POSITION	X	
eoGetRefBendingMax (EO)	Real	4	BOTH	Value: Kink (Max) for EO-TYP GET-REF and function KINK-POSITION	X	
eoGetRefBendingMin (EO)	Real	4	BOTH	Value: Kink (Min) for EO-TYP GET-REF and function KINK-POSITION	X	
eoTimeMax (EO)	Real	4	BOTH	Value: Time max for EO-Type TIME	X	
eoTimeMin (EO)	Real	4	BOTH	Value: Time min for EO-Type TIME	X	

Group: EvaluationObjects						
Object identifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
eoEnvTrendEnabled (EO)	Bool	1	BOTH	Trend tracking TRUE = activated FALSE 0 = deactivated	X	
eoEnvLowerBoundFactor (EO)	Real	4	BOTH	Value: σ- for function Offset-Y: Standard deviation-asymmetric	X	
eoEnvUpperBoundOffset (EO)	Real	4	BOTH	Value: ΔY- for function Offset-Y: Constant asymmetric or standard deviation asymmetric	X	
eoEnvOffsetType (EO)	NCod	1	BOTH	Function Offset-Y: 0 = constant - symmetric 1 = constant - asymmetric 2 = standard deviation - symmetric 3 = standard deviation - asymmetric	X	
eoEnvTrendWeight (EO)	Real	4	BOTH	Weighting for switched trend tracking	X	
eoEnvTrendLimit (EO)	Real	4	BOTH	Limit for trend tracking with activated trend tracking	X	
eoEnvTrendWarnLimit (EO)	Real	4	BOTH	Limit value for warning trend (Warn at)	X	
eoEnvUpperBoundFactor (EO)	Real	4	BOTH	Value: σ+for function Offset-Y: Standard deviation - asymmetric or standard deviation - symmetric	X	
eoEnvUpperBoundOffset (EO)	Real	4	BOTH	Value: ΔY+ for function Offset-Y	X	
eoEnvAlgorithm (EO)	NCod	1	BOTH	Algorithm for calculating the envelope: 0 = Tolerance Y 1 = Tolerance band	X	

Group: EvaluationObjects						
Objectidentifier	**Data**			**Designation/Description/Example**	**Refer-ence**	
	Type	**Byte-Count**	**Direc-tion**		**EO**	**MP**
eoCalcInput1EoIndexNo (EO)	NCod	1	BOTH	Source for Input1 for EO-Type CALC 0 = EO-01 1 = EO-02 2 = EO-03 3 = EO-04 4 = EO-05 5 = EO-06 6 = EO-07 7 = EO-08 8 = EO-09 9 = EO-10 10 = Curve	X	
eoCalcInput1ProcessValue (EO)	NCod	1	BOTH	Value for Input1 for EO-Type CALC 2 = Entry 3 = Exit 4 = REF-X 5 = REF-Y 7 = XMIN-X 8 = XMIN-Y 9 = XMAX-X 10 = XMAX-Y 11 = YMIN-Y 12 = YMIN-X 13 = YMAX-Y 14 = YMAX-X 15 = Time 16 = Speed 17 = INTEGRAL 18 = DIG-IN X 19 = DIG-IN Y 20 = AVERAGE 21 = VIOLATION-X 22 = VIOLATION-Y 24 = DELTA-Y 25 = X at DELTA-Y 26 = Entry-X (EO Trapez) 27 = Entry-Y (EO Trapez) 28 = Exit-X (EO Trapez) 29 = Exit-Y (EO Trapez) 30 = BLOCK-X 31 = BLOCK-Y 32 = TRIGGER-Y 33 = PP-X 34 = PP-Y	X	

Group: EvaluationObjects						
Objectidentifier	**Data**			**Designation/Description/Example**	**Refer-ence**	
	Type	**Byte-Count**	**Direc-tion**		**EO**	**MP**
eoCalcInput2EoIndexNo (EO)	NCod	1	BOTH	Source for Input2 for EO-Type CALC 0 = EO-01 1 = EO-02 2 = EO-03 3 = EO-04 4 = EO-05 5 = EO-06 6 = EO-07 7 = EO-08 8 = EO-09 9 = EO-10 10 = Curve	X	
eoCalcInput2ProcessValue (EO)	NCod	1	BOTH	Value for Input1 for EO-Type CALC 2 = Entry 3 = Exit 4 = REF-X 5 = REF-Y 7 = XMIN-X 8 = XMIN-Y 9 = XMAX-X 10 = XMAX-Y 11 = YMIN-Y 12 = YMIN-X 13 = YMAX-Y 14 = YMAX-X 15 = Time 16 = Speed 17 = INTEGRAL 18 = DIG-IN X 19 = DIG-IN Y 20 = AVERAGE 21 = VIOLATION-X 22 = VIOLATION-Y 24 = DELTA-Y 25 = X at DELTA-Y 26 = Entry-X (EO Trapez) 27 = Entry-Y (EO Trapez) 28 = Exit-X (EO Trapez) 29 = Exit-Y (EO Trapez) 30 = BLOCK-X 31 = BLOCK-Y 32 = TRIGGER-Y 33 = PP-X 34 = PP-Y	X	
eoCalcOperation (EO)	NCod	1	BOTH	Operation for EO-Type CALC 0 = Addition 1 = Subtraction 2 = Multiplication 3 = Division	X	
eoCalcLimitMax (EO)	Real	4	BOTH	Target limit max for EO-Type CALC	X	
eoCalcLimitMin (EO)	Real	4	BOTH	Target limit min for EO-Type CALC	X	

Group: EvaluationObjects						
Objectidentifier	**Data**			**Designation/Description/Example**	**Refer-ence**	
	Type	**Byte-Count**	**Direc-tion**		**EO**	**MP**
eoXMax1 (EO) (until v1.4.x) **eoTrapezXMax1** (EO) (from v1.5.x)	Real	4	BOTH	Trapezoid Limit XMax 1	X	
eoXMax2 (EO) (until v1.4.x) **eoTrapezXMax2 (EO)** (from v1.5.x)	Real	4	BOTH	Trapezoid Limit XMax 2	X	
eoXMin1 (EO) (until v1.4.x) **eoTrapezXMin1 (EO)** (from v1.5.x)	Real	4	BOTH	Trapezoid Limit XMin 1	X	
eoXMin2 (EO) (until v1.4.x) **eoTrapezXMin2 (EO)** (from v1.5.x)	Real	4	BOTH	Trapezoid Limit XMin 2	X	
eoYMax1 (EO) (until v1.4.x) **eoTrapezYMax1 (EO)** (from v1.5.x)	Real	4	BOTH	Trapezoid Limit YMax 1	X	
eoYMax2 (EO) (until v1.4.x) **eoTrapezYMax2 (EO)** (from v1.5.x)	Real	4	BOTH	Trapezoid Limit YMax 2	X	
eoYMin1 (EO) (until v1.4.x) **eoTrapezYMin1 (EO)** (from v1.5.x)	Real	4	BOTH	Trapezoid Limit YMin 1	X	
eoYMin2 (EO) (until v1.4.x) **eoTrapezYMin2 (EO)** (from v1.5.x)	Real	4	BOTH	Trapezoid Limit YMin 2	X	

Group: Global setup						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
globalHysteresisX (until v1.4.x) **globHysteresisX** (from v1.5.x)	Real	4	BOTH	Global HYSTERESIS-X in % of the set measuring range		
globalHysteresisY (until v1.4.x) **globHysteresisY** (from v1.5.x)	Real	4	BOTH	Global HYSTERESIS-Y in % of the set measuring range		
globDateYear	Int	2	BOTH	Date: Year (e.g., 2010 = 0x07DA hex)		
globDateMonth	Int	2	BOTH	Date: Month (e.g., Nov. = 0x0B hex)		
globDateDay	Int	2	BOTH	Date: Day (e.g., 28. = 0x01C hex)		
globTimeHour	Int	2	BOTH	Time Hour (e.g., 15:00 = 0x0F hex)		
globTimeMinute	Int	2	BOTH	Time Minute (e.g., 45 min. = 0x02D hex)		
globTimeSecond	Int	2	BOTH	Time Second (e.g., 53 s = 0x035 hex)		
globLanguage	NCod	1	BOTH	GlobLanguage 0 = English 1 = German 2 = Italian 3 = French 4 = Spanish 5 = Polish 6 = Czech 7 = Hungarian 8 = Russian 9 = Japanese 10 = Chinese 11 = Portuguese 12 = Romanian		
globSaveStatCount	Bool	1	BOTH	Permanent storage of part counter and statistics TRUE = activate FALSE = deactivate		
globDevName (LEN)	Char	Var.	BOTH	Device name		
globCompanyName (LEN)	Char	Var.	BOTH	Company name		
globDevComment (LEN)	Char	Var.	BOTH	Comment		
globSnHeader (LEN)	Char	Var.	BOTH	String for the head of the iden¬ti-ty (the serial number) -Only relevant if "mpUseGlobalSnHeader " is selected		
eoGlobalFirstNokOnly (bis v1.4.x) **globEoFirstNokOnly** (ab v1.5.x)	Bool	1	BOTH	TRUE = For bar graph only first NOK EO counts		

Group: MP-Setup						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
mpCycleCtrlUseGlobal	Bool	1	BOTH	Cycle control: TRUE = Use global settings FALSE = MP-specific		X
mpRefXBlockType	NCod	1	BOTH	Reference point BLOCK (Point at) 1 = XMAX 2 = XMIN		X
mpRefXBlockValue	Real	4	BOTH	Block measure		X
mpInputXUseGlobal	Bool	1	BOTH	Channel X Sensor: TRUE = Use global settings FALSE = MP-specific		X
mpInputYUseGlobal	Bool	1	BOTH	Channel Y sensor: TRUE = Use global settings FALSE = MP-specific		X
mpTrigYOffset	Real	4	BOTH	X value at the trigger point		X
mpTrigYLevel	Real	4	BOTH	Y trigger threshold		X
mpTrigYDirection	NCod	1	BOTH	Overshoot direction 3 = from BELOW 4 = from ABOVE		X
mpName (LEN)	Char	Var.	BOTH	Name of the measurement program (MP-Name)		X
mpEnabled	Bool	1	BOTH	Measurement program enabled = TRUE		X
mpSerialSource	Ncod	1	BOTH	Identity source (serial number source) 0 = Internal Generator 1 = Fieldbus		X
mpSerialHeader (LEN)	Char.	Var.	BOTH	String for the head of the identity (the serial number)		X
mpSerialNumber (LEN)	Char	Var.	BOTH	Current serial number		X
mpUseGlobalSnHeader	Bool	1	BOTH	Activate / deactivate GlobalSnHeader		X

Group: Switch Signals						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
switchType (SW)	NCod	1	BOTH	Signal selection (channel) 0 = deactivated (SWITCH-SIGNAL-OFF) 1 = X (SWITCH-SIGNAL-X) 2 = Y (SWITCH-SIGNAL-Y)	X	
switchValue (SW)	Real	4	BOTH	Switching threshold (Switch at)	X	
switchDirection (SW)	NCod	1	BOTH	Overshoot direction (starting from) 0 = deactivated (no switching threshold) 1 = from LEFT for switchType = 1 2 = from RIGHT for switchType = 1 3 = from BELOW for switchType = 2 4 = from ABOVE for switchType = 2	X	
switchLatchType (SW)	NCod	1	BOTH	Latch behavior 0 = Without 1 = Until Stop (up to the end of the current cycle) 2 = Until Start (up to the start of the following cycle)	X	
switchRefType (SW)	NCod	1	BOTH	Reference point X 0 = Absolute 1 = TRIGGER-Y (for swType = 2 not possible)	X	

Group: CycleControl						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
ccCutCurve	NCod	1	BOTH	Truncate curve at 0 = NONE 1 = Reversal point RIGHT 2 = Reversal point LEFT		X
ccCycleTimeout	Real	4	BOTH	Timeout Cycle		X
ccIsLiveCurveEnabled	Bool	1	BOTH	Draw curve during the cycle TRUE = YES FALSE = NO		X
ccMeasuringFunction	NCod	1	BOTH	Measurement function 0 = measurement function y = f(x) 1 = measurement function y = f(t) 2 = measurement function x = f(t) 3 = measurement function y = f(x,t)		X
ccStartMeasureEvent	NCod	1	BOTH	Measurement Start At (condition) 0 = Dig. Input (Start Bit to fieldbus for fieldbus operation) 1 = Threshold-X 2 = Threshold-Y		X
ccStartMeasureOption	NCod	1	BOTH	Overshoot direction (starting from) 0 = NO 1 = from LEFT for Threshold X 2 = from RIGHT for Threshold X 3 = from BELOW for Threshold Y 4 = from ABOVE for Threshold Y 5 = ANY		X
ccStartMeasureValue	Real	4	BOTH	Value for switching threshold when at CycleControl - ccStartMeasureEvent a switching threshold was selected		X
ccStopMeasureEvent	NCod	1	BOTH	Measurement Stop At (condition) 0 = Dig. Input (Stop Bit to fieldbus for fieldbus operation) 1 = Threshold-X 2 = Threshold-Y 3 = Path reverse 4 = Time		X
ccStopMeasureIgnoreDI	Bool	1	BOTH	Function Dig. Input for measurement stop Ignore TRUE = YES FALSE = NO		X
ccStopMeasureOption	NCod	1	BOTH	Overshoot direction (starting from) 0 = NO 1 = from LEFT for Threshold X 2 = from RIGHT for Threshold X 3 = from BELOW for Threshold Y 4 = from ABOVE for Threshold Y 5 = ANY		X
ccStopMeasureValue	Real	4	BOTH	Value for switching threshold when for CycleControl - ccStopMeasureEvent a switching threshold was selected		X

Group: CycleControl						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
ccXMaxReturn	NCod	1	BOTH	Reversal point RIGHT 0 = NONE 1 = XMAX 3 = YMAX (at Xmax) 5 = YMIN (at Xmax)		X
ccXMinReturn	NCod	1	BOTH	Reversal point LEFT 0 = NONE 2 = XMIN 4 = YMAX (at Xmin) 6 = YMIN (at Xmin)		X
ccXSamplingInterval	Real	4	BOTH	Delta t (Sampling)		X
ccXSamplingMode	NCod	1	BOTH	Setting sampling 0 = automatic 1 = manual (for manual setting, the sampling Delta-t must be defined with the parameter ccXSamplingInterval)		X
ccYSamplingInterval	Real	4	BOTH	Delta t (Sampling)		X

Group: Q-DAS						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
qDAS1 (LEN)	Char	Var.	BOTH	Fieldbus value1 for QDAS-log		
qDAS2 (LEN)	Char	Var.	BOTH	Fieldbus value2 for QDAS-log		
qDAS3 (LEN)	Char	Var.	BOTH	Fieldbus value3 for QDAS-log		
qDAS4 (LEN)	Char	Var.	BOTH	Fieldbus value4 for QDAS-log		
qDAS5 (LEN)	Char	Var.	BOTH	Fieldbus value5 for QDAS-log		
qDAS6 (LEN)	Char	Var.	BOTH	Fieldbus value6 for QDAS-log		
qDAS7 (LEN)	Char	Var.	BOTH	Fieldbus value7 for QDAS-log		
qDAS8 (LEN)	Char	Var.	BOTH	Fieldbus value8 for QDAS-log		

Group: Protection						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
accessUserState (USER) (only maXYmos TL ML)	Bool	1	BOTH	Lock and unlock the selected user with (USER). 0 = unlock (in) / unlocked (out) 1 = lock (in) / locked (out)		
accessProtDisabled	Bool	1	BOTH	TRUE = access protection deactivated		
accessPLCLogon	NCod	1	BOTH	Access through PLC enable 0 = Saved 1 = Installer 2 = Operator 3 = Administrator 4 ... 12 = Self-created user groups		
accessTimeout	NCod	1	BOTH	Time Logout after Timeout 0 = 1 hours 1 = 4 hours 2 = 8 hours 3 = 24 hours 4 = never		

Group: Data Storage/Data Export						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
exportCsvResults	NCod	1	BOTH	Export content (exported will be) 0 = all curves 1 = OK curves 2 = NOK curves		
exportServer (LEN)	Char	Var.	BOTH	Server name or IP address (for IP address length = 15 usefull)		
exportServerPath (LEN) (until V1.4.x) **exportServer-ShareFolder (LEN)** (from v1.5.x)	Char	Var.	BOTH	Share name from the server		
exportUsername (LEN)	Char	Var.	BOTH	User name		
exportPassword (LEN)	Char	Var.	BOTH	Password		
exportCsvLimiter	NCod	1	BOTH	Formating of the export file 0 = comma-semicolon (x,xx;x,xx) 1 = period-semicolon (x.xx;x.xx) 2 = period-comma (x.xx,x.xx)		
exportCsvEnabled	Bool	1	BOTH	CSV data export to the server: TRUE = activate FALSE = deactivate		
exportCsvFolder (LEN)	Char	Var.	BOTH	Subdirectory path for the CSV export to server		
exportCsvAutoSubfolder	NCod	1	BOTH	Selection of the automatically generated subfolder: 0 = Off 1 = Date 2 = Date_Time 3 = Date/Time (2 level) 4 = Part-ID		
dataExportCSVToUsbAllowed (until v1.4.x) **exportCsvToUsbEnabled** (from v1.5.x)	Bool	1	BOTH	Activation data export CSV to the server		
exportCsvUsbFolder (LEN)	Char	Var.	BOTH	Subdirectory path for CSV export to USB stick		

Group: Data Storage/Data Export						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
exportPdfEnabled	Bool	1	BOTH	PDF data export to the server TRUE = activate FALSE = deactivate		
exportPdfResults	NCod	1	BOTH	Export content for PDF export (are exported): 0 = all curves 1 = OK curves 2 = NOK curves		
exportPdfFolder (LEN)	Char	Var.	BOTH	Subdirectory path for the PDF export to server		
exportPdfAutoSubfolder	NCod	1	BOTH	Selection of the automatically generated subfolder: 0 = Off 1 = Date 2 = Date_Time 3 = Date/Time (2 level) 4 = Part-ID		
exportPdfStyle	NCod	1	BOTH	Format type of the PDF protocol 0 = FULL 1 = BRIEF		
exportPdfToUsbEnabled	Bool	1	BOTH	Activation of data export PDF to the server		
exportPdfUsbFolder (LEN)	Char	Var.	BOTH	Subdirectory path for the PDF export to USB stick		
exportXmlEnabled	Bool	1	BOTH	XML data export to the server TRUE = activate FALSE = deactivate		
exportXmlResults	NCod	1	BOTH	Export content for XML export (are exported) 0 = all curves 1 = OK curves 2 = NOK curves		
exportXmlFolder	Char	Var.	BOTH	Subdirectory path for XML export to server		
exportXmlAutoSubfolder	NCod	1	BOTH	Selection of the automatically generated subfolder: 0 = Off 1 = Date 2 = Date_Time 3 = Date/Time (2 level) 4 = Part-ID		
exportXmlToUsbEnabled	Bool	1	BOTH	Activation of data export XML to the server		
exportXmlUsbFolder (LEN)	Char	Var.	BOTH	Subdirectory path for the XML export to USB stick		

Group: Data Storage/Data Export						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direc-tion**		**EO**	**MP**
ipmConnectionState (until v1.4.x) **exportIpmConnectStatus** (from v1.5.x)	Bool	1	OUT	IPM Connection state		
ipmGlobalpAddress (until v1.4.x) **exportIpmAddress (LEN)** (from v1.5.x)	Char	Var.	BOTH	IPM Global IP address		
ipmGlobalPort (until v1.4.x) **exportIpmPort** (from v1.5.x)	Int	4	BOTH	IPM Global port		
ipmIsServerEnabled (until v1.4.x) **exportIpmEnable** (from v1.5.x)	Bool	1	BOTH	Activation of data export IPM to the server		
ipmMpSetupAfo (until v1.4.x) **exportIpmAfo (LEN)** (from v1.5.x)	Char	Var. (max 30)	BOTH	IPM Afo Indentification		X
ipmMpSetupAfoText (until v1.4.x) **exportIpmAfoText (LEN)** (from v1.5.x)	Char	Var. (max 50)	BOTH	IPM Afo Text		X
ipmMpSetupCurveIncluded (until v1.4.x) **exportIpmIncludeCurve** (from v1.5.x)	Bool	1	BOTH	IPM if curve is included in export		X
ipmMpSetupToolId (until v1.4.x) **exportIpmToolId (LEN)** (from v1.5.x)	Char	Var. (max 10)	BOTH	IPM tool ID		X
ipmMpSetupType (until v1.4.x) **exportIpmType (LEN)** (from v1.5.x)	Char	Var. (max 99)	BOTH	IPM Type		X

Group: Data Storage/Data Export						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
ipmMpSetupCarrierId (until v1.4.x) **exportIpmCarrierId (LEN)** (from v1.5.x)	Char	Var.	BOTH	ID of the workpiece carrier Only for IPM Protocol		X
ipmLostConnectionBufferSizeState (until v1.4.x) **exportIpmBufferStatus** (from v1.5.x)	DWord	4	OUT	Number of non-transmitted IPM telegrams. (Buffer status)		
dataExportPvtCyclesPerFile (until v1.4.x) **exportPvtCycles** (from v1.5.x)	DWord	4	BOTH	Number of cycles per export file if data export type PVT to Samba/USB		
dataExportPvtMaxTotalSize (until v1.4.x) **exportPvtMaxSize** (from v1.5.x)	DWord	4	BOTH	Maximun size total file size, used when export to internal file system		
dataExportPVTMode (until v1.4.x) **exportPvtResults** (from v1.5.x)	Byte	1	BOTH	[ALL|OK|NOK] Contain all or ok or nok cycles		
dataExportPvtServerSubdir (until v1.4.x) **exportPvtFolder (LEN)** (from v1.5.x)	Char	Var.	BOTH	Subdirectory name on file server		

Group: Data Storage/Data Export						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
dataExportPvtSizePercentageWarning (until v1.4.x) **exportPvtWarning** (from v1.5.x)	DWord	4	BOTH	When export to internal file system, all PVT files total size > x% of defined maximum allowed size. Show WARNING		
dataExportPvtStopWhenMaxSize (until v1.4.x) **exportPvtOverwriteFile** (from v1.5.x)	Bool	1	BOTH	When maximum file size arrives Y: stop writing file N: delete the oldest file in within all MP, continue writing		
dataExportPvtToInternalFlashAllowed (until v1.4.x) **exportPvtInternalEnabled** (from v1.5.x)	Bool	1	BOTH	Switches export to internal file system		
dataExportPvtToServerAllowed (until v1.4.x) **exportPvtEnabled** (from v1.5.x)	Bool	1	BOTH	Switches export to file server ON/OFF		
dataExportPvtToUsbAllowed (until v1.4.x) **exportPvtToUsbEnabled** (from v1.5.x)	Bool	1	BOTH	Switches export to USB medium ON/OFF		
dataExportPvtTriggerByFieldbus (until v1.4.x) **exportPvtEnableFbTrigger** (from v1.5.x)	Bool	1	BOTH	PVT export only activated when this bit = 1. When 0 ->1, a new PVT file is cre- ated. The following cycles will be writen into same file until bit 1 ->0-		
dataExportPvtUSBSubdir (until v1.4.x) **exportPvtUsbFolder (LEN)** (from v1.5.x)	Char	Var.	BOTH	Subdirectory name on USB medium		

Group: Data Storage/Data Export						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
exportQda9Enable	Bool	1	BOTH	Enables data export to the server		
exportQda9CsvFolder (LEN)	Char	Var.	BOTH	Name for subfolders to store the CSV files		
exportQda9QdasFolder (LEN)	Char	Var.	BOTH	Name for subfolders to store the QDAS files		
exportQda9AutoSubfolder	NCod	1	BOTH	Selection of the automatically generated subfolder: 0 = OFF 1 = Date 2 = Date_Time 3 = Date/Time (2 level) 4 = Part-ID		
exportQda9Afo (LEN)	Char	Var.	BOTH	Name for QDA operation		X
exportQda9AfoText (LEN)	Char	Var.	BOTH	Name for QDA operation field		X
exportQda9Testplan (LEN)	Char	Var.	BOTH	Name for QDA test plan		X
ExportQda9Testtype (LEN)	Char	Var.	BOTH	Name for QDA test type		X
exportQda9CharactDescr (LEN)	Char	Var.	BOTH	Name for QDA character description		X
exportQda9SymbolX (LEN)	Char	Var.	BOTH	Name for QDA Symbol-X		X
exportQda9SymbolY (LEN)	Char	Var.	BOTH	Name for QDA Symbol-Y		X
exportQda9SymbolTime (LEN)	Char	Var.	BOTH	Name for QDA Symbol-Z		X

Group: InputX						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
inputXType	NCod	1	BOTH	Sensor type X 1 = ±10 V 2 = Potentiometer 6 = LVDT 7 = Inductive half bridge 8 = Incremental sin/cos 9 = Incremental TTL 10 = SSI-Encoder 11 = EnDat-Encoder (in preparation) 12 = BiSS-Encoder (in preparation) 13 = Rotational speed		X
inputXRangeFrom	Real	4	BOTH	Used measurement range from		X
inputXRangeTo	Real	4	BOTH	Used measurement range to		X
inputXScalingMode	NCod	1	BOTH	Type of scaling 0 = Calibration 1 = Teach-In		X
inputXSensitivity	Real	4	BOTH	Sensor sensitivity		X
inputXInverted	Bool	1	BOTH	Signal inversion (True = Signal X inverted)		X
inputXSensDisplay	Real	4	BOTH	Sensitivity in display units		X
inputXSensSignal	Real	4	BOTH	Sensitivity in sensor signal units		X
inputXZeroDisplay	Real	4	BOTH	Zero point in display units		X
inputXZeroSignal	Real	4	BOTH	Zero point in sensor units		X
inputXRefDisplay1	Real	4	BOTH	Teach-In point 1 in display units		X
inputXRefSignal1	Real	4	BOTH	Teach-In point 1 in sensor signal units		X
inputXRefDisplay2	Real	4	BOTH	Teach-In point 2 in display units		X
inputXRefSignal2	Real	4	BOTH	Teach-In point 2 in sensor signal units		X
inputXUnitString (LEN)	Char	Var.	BOTH	X unit		X
inputXDecimalPlaces	NCod	1	BOTH	Decimal places channel X 0 = XXXXXX 1 = XXXXX.X 2 = XXXX.XX 3 = XXX.XXX 4 = XX.XXXX 5 = X.XXXXX		X

Group: InputX						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
inputXFilterFrequency	NCod	1	BOTH	Filter (low pass cutoff frequency) 0 = OFF (no filter 1 = 2kHz 2 = 1kHz 3 = 500 Hz 4 = 200 Hz 5 = 100 Hz 6 = 50 Hz 7 = 20 Hz 8 = 10 Hz 9 = 5 Hz 10 = 2 Hz 11 = 1 Hz 12 = 0.5 Hz 13 = 0.2 Hz 14 = 0.1 Hz		
inputXTestValue	Real	4	BOTH	test point (expected value for sensor test)		X
inputXTestTolerance	Real	4	BOTH	Permissible tolerance of the test value		X
inputXTestEnabled	Bool	1	BOTH	Sensor test by DigIN = TRUE		X
inputXZoomFrom	Real	4	BOTH	Display range from		X
inputXZoomTo	Real	4	BOTH	Display range to		X
inputXMasterMeasEnabled	Bool	1	BOTH	Master measurement: TRUE = activate FALSE = deactivate		X
inputXMasterMeasValue	Real	4	BOTH	Value for master measurement		X
InputXZero	Real	4	BOTH	Offset value X		
inputXTrack	Bool	1	BOTH	Selection of the track of the speed sensor: 0 = Track A 1 = Track A+ B		X
inputXPulsePerCount	Int	2	BOTH	Number of pulses per rotatation: Min: 1 Max: 8192		X

Group: InputY						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
inputYType	NCod	1	BOTH	Sensor type Y 4 = piezo sensor 5 = strain gauge sensor 6 = ±10 V 7 = ±10 V (2 measurement ranges)		X
inputYRangeFrom	Real	4	BOTH	Used measurement range from		X
inputYRangeTo	Real	4	BOTH	Used measurement range to		X
inputYScalingMode	NCod	1	BOTH	Type of scaling: 0 = Calibration certificate 1 = Teach-In		X
inputYSensitivity	Real	4	BOTH	Sensor sensitivity		X
inputYInverted	Bool	1	BOTH	Signal inverting		X
inputYSensDisplay	Real	4	BOTH	Sensitivity in display units		X
inputYSensSignal	Real	4	BOTH	Sensitivity in sensor signal units		X
inputYZeroDisplay	Real	4	BOTH	Zero point in display units		X
inputYZeroSignal	Real	4	BOTH	Zero point in sensor signal units		X
inputYRefDisplay1	Real	4	BOTH	Teach-In point 1 in display units		X
inputYRefSignal1	Real	4	BOTH	Teach-In point 1 in sensor signal units		X
inputYRefDisplay2	Real	4	BOTH	Teach-In point 2 in display units		X
inputYRefSignal2	Real	4	BOTH	Teach-In point 2 in sensor signal units		X
inputYExtForce1	Real	4	BOTH	Display units measurement range1 at Sensor type ±10 V (2 measurement ranges)		X
inputYExtForce2	Real	4	BOTH	Display units measurement range2 at Sensor type ±10 V (2 measurement ranges)		X
inputYExtSignal1	Real	4	BOTH	Parameter measurement range1 at Sensor type ±10 V (2 measurement ranges)		X
inputYExtSignal2	Real	4	BOTH	Parameter measurement range2 at Sensor type ±10 V (2 measurement ranges)		X
inputYUnitString (LEN)	Char	Var.	BOTH	Y unit, e.g. kN		X
inputYDecimalPlaces	NCod	1	BOTH	Decimal places channel Y 0 = XXXXXX 1 = XXXXX.X 2 = XXXX.XX 3 = XXX.XXX 4 = XX.XXXX 5 = X.XXXXX		X

Group: InputY						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
inputYElectricalRange	NCod	1	BOTH	Charge range of the piezo amplifiers 0 = <1000 pC 1 = <10000 pC 2 = <100000 pC 3 = <1000000 pC		X
inputYFilterFrequency	NCod	1	BOTH	Filter (low pass cutoff frequency) 0 = OFF (no filter) 1 = 2kHz 2 = 1kHz 3 = 500 Hz 4 = 200 Hz 5 = 100 Hz 6 = 50 Hz 7 = 20 Hz 8 = 10 Hz 9 = 5 Hz 10 = 2 Hz 11 = 1 Hz 12 = 0.5 Hz 13 = 0.2 Hz 14 = 0.1 Hz		X
inputYTestValue	Real	4	BOTH	test point (expected value for sensor test)		X
inputYTestTolerance	Real	4	BOTH	Permissible tolerance of the test value		X
inputYTestEnabled	Bool	1	BOTH	Sensor test by DigIN = TRUE		X
inputYTareCycleStart	Bool	1	BOTH	True = link tare with Start		X
inputResetPiezoMode	Bool	1	BOTH	True = Piezo reset at cycle start		X
inputYZoomFrom	Real	4	BOTH	Display range from		X
inputYZoomTo	Real	4	BOTH	Display range to		X
inputYExtVoltageRange	NCod	1	BOTH	Selection measurement range for sensor type ±10 V (2 measurement ranges) 0 = Measurement range 1 1 = Measurement range 2		X
inputYExtRangeSig	NCod	1	BOTH	Selection signal measurement range for sensor type ±10 V (2 measurement ranges) 0 = MB1 =0 V / MB2 = 24 V 1 = MB1 = 24 V / MB2 = 0 V		X
inputYExtResetSig	NCod	1	BOTH	Reset for sensor type ±10 V (2 measurement ranges) 0 = not used 1 = connect with I-STEST 2 = Reset = 24 V 3 = Reset = 0 V		X

Group: ProcessData						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
pvOKCycles	DInt	4	OUT	OK part counter		X
pvNOKCycles	DInt	4	OUT	NOK part counter		X
pvCycles	DInt	4	OUT	Part counter total		X
pvNOKPercent	DInt	4	OUT	Trend overall statistics		X
pvEoNOKCycles	DInt	4	OUT	EO related part counter NOK	X	
pvEoCycles	DInt	4	OUT	EO related part counter total	X	
pvEoLastResult (EO)	NCod	1	OUT	EO related last results 0 = no evaluation 1 = Good (OK) 2 = Bad (NOK) 3 = Null	X	
pvEoNOKPercent (EO)	DInt	4	OUT	Trend EO related statistics of the EO (EO No.)	X	
pvSamplesPerEo (EO)	DInt	4	OUT	Count of the curve points inside of the EO with (EO No.). Only available for EO with corresponding calculation	X	
pvBlock-X	Real	4	OUT	Process value block position X		X
pvBlock-Y	Real	4	OUT	Process value block position Y		X
pvRef-X	Real	4	OUT	Process value position trigger Y		X
pvRefCrossed	Bool	1	OUT	Trigger Y threshold was exceeded = TRUE		X
pvEoEntryOK (EO)	NCod	1	OUT	Results of monitoring the entry condition of the selected EO with (EO No.)	X	
pvEoExitOK (EO)	NCod	1	OUT	Results of monitoring the exit condition of the selected EO with (EO No.)	X	
				0 = no evaluation 1 = OK 2 = NOK		
pvEoEntry (EO)	Real	4	OUT	Curve entry for the selected EO with (EO No.)	X	
pvEoExit (EO)	Real	4	OUT	Curve exit for the selected EO with (EO No.)	X	
pvEoEntryMax (EO)	Real	4	OUT	Maximum limit curve entry for the selected EO with (EO)	X	
pvEoEntryMin (EO)	Real	4	OUT	Minimum limit curve entry for the selected EO with (EO)	X	
pvEoExitMax (EO)	Real	4	OUT	Maximum limit curve exit for the selected EO with (EO)	X	
pvEoExitMin (EO)	Real	4	OUT	Minimum limit curve exit for the selected EO with (EO)	X	
pvCurrentValueX	Real	4	OUT	Actual measurement X-input (tared)		
pvCurrentValueY	Real	4	OUT	Actual measurement Y-input (tared)		
pvEoYMinOk (EO)	NCod	1	OUT	Results of monitoring YMin condition of the selected EO with (EO No.)	X	
pvEoYMaxOk (EO)	NCod	1	OUT	Result YMax condition	X	
pvEoXMinOk (EO)	NCod	1	OUT	Result XMin condition	X	
pvEoXMaxOk (EO)	NCod	1	OUT	Result XMax condition 0 = no evaluation 1 = OK 2 = NOK	X	

Group: ProcessData						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
pvXMinX (EO)	Real	4	OUT	Process value XMinX of the selected EO with (EO No.)	X	
pvXMinY (EO)	Real	4	OUT	Process value XMinY	X	
pvXMaxX (EO)	Real	4	OUT	Process value XMaxX	X	
pvXMaxY (EO)	Real	4	OUT	Process value XMaxY	X	
pvYMinX (EO)	Real	4	OUT	Process value YMinX	X	
pvYMinY (EO)	Real	4	OUT	Process value YMinY	X	
pvYMaxX (EO)	Real	4	OUT	Process value YMaxX	X	
pvYMaxY (EO)	Real	4	OUT	Process value YMaxY	X	
pvEoCalculated (EO)	Real	4	OUT	Process value of a selected EO (EO No.) whose process value is calculated (e.g.GRADIENT, ...)	X	
pvEoBasepointX	Real	4	OUT	X Value of a determined EO base point (e.g. with EO GET-REF)	X	
pvEoBasepointY	Real	4	OUT	Y Value of a determined EO base point (e.g. with EO GET-REF)	X	
pvYMinOK (EO)	NCod	1	OUT	Results of monitoring the YMin condition of the selected EO with (EO No.)	X	
pvYMaxOK (EO)	NCod	1	OUT	Results of the YMax condition	X	
pvXMinOK (EO)	NCod	1	OUT	Results of the XMin condition	X	
pvXMaxOK (EO)	NCod	1	OUT	Results of the XMax condition	X	
pvEoCalculatedOK (EO)	NCod	1	OUT	Results of the calculated EO condition 0 = no evaluation 1 = OK 2 = NOK	X	
pvCurveXMin-X	Real	4	OUT	Process value XMin-X of the curve		X
pvCurveXMin-Y	Real	4	OUT	Process value XMinY of the curve		X
pvCurveXMaxX	Real	4	OUT	Process value XMax-X of the curve		X
pvCurveXMax-Y	Real	4	OUT	Process value XMax-Y of the curve		X
pvCurveYMin-X	Real	4	OUT	Process value YMin-X of the curve		X
pvCurveYMin-Y	Real	4	OUT	Process value YMin-Y of the curve		X
pvCurveYMax-X	Real	4	OUT	Process value YMax-X of the curve		X
pvCurveYMax-Y	Real	4	OUT	Process value YMax-Y of the curve		X
pvCurvePeakPeak-X	Real	4	OUT	Process value Peak-Peak X of the curve		X
pvCurvePeakPeak-Y	Real	4	OUT	Process value Peak-Peak Y of the curve		X
pvLastMeasStartDate	DWord	4	OUT	Time Stamp (Date) of last measurement start		X
pvLastMeasStartTime	DWord	4	OUT	Time Stamp (Hour) of last measurement start		X

If an EO is not achieved or no evaluation for a corresponding process value can be performed, these data objects provide variations from the table value: **NO** in the process display, as output 0.0. It is therefore recommended to check the evaluation status of the respective EOs with the objects **pvEoEntryOK** and **pvEoExitOK**.

Group: Statistic (only maXYmos TL ML)						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
statEntryAverage (EO)	Real	4	OUT	Average curve entry for the selected EO with (EO)	X	
statEntryXCp (EO)	Real	4	OUT	Cp value curve entry for the selected EO with (EO)	X	
statEntryCpk (EO)	Real	4	OUT	Cpk value curve entry for the selected EO with (EO)	X	
statEntryStdDeviation (EO)	Real	4	OUT	Standard deviation curve entry for the selected EO with (EO)	X	
statExitAverage (EO)	Real	4	OUT	Average curve exit for the selected EO with (EO)	X	
statExitXCp (EO)	Real	4	OUT	Cp value curve exit for the selected EO with (EO)	X	
statExitCpk (EO)	Real	4	OUT	Cpk value curve exit for the selected EO with (EO)	X	
statExitStdDeviation (EO)	Real	4	OUT	Standard deviation curve exit for the selected EO with (EO)	X	
statXMaxXAverage (EO)	Real	4	OUT	Average XMAX-X for the selected EO with (EO)	X	
statXMaxXCp (EO)	Real	4	OUT	Cp value XMAX-X for the selected EO with (EO)	X	
statXMaxXCpk (EO)	Real	4	OUT	Cpk value XMAX-X for the selected EO with (EO)	X	
statXMaxXStdDeviation (EO)	Real	4	OUT	Standard deviation XMAX-X for the selected EO with (EO)	X	
statXMaxYAverage (EO)	Real	4	OUT	Average XMAX-Y for the selected EO with (EO)	X	
statXMaxYCp (EO)	Real	4	OUT	Cp value XMAX-Y for the selected EO with (EO)	X	
statXMaxYCpk (EO)	Real	4	OUT	Cpk value XMAX-Y for the selected EO with (EO)	X	
statXMaxYStdDeviation (EO)	Real	4	OUT	Standard deviation XMAX-Y for the selected EO with (EO)	X	
statXMinXAverage (EO)	Real	4	OUT	Average XMIN-X for the selected EO with (EO)	X	
statXMinXCp (EO)	Real	4	OUT	Cp value XMIN-X for the selected EO with (EO)	X	
statXMinXCpk (EO)	Real	4	OUT	Cpk value XMIN-X for the selected EO with (EO)	X	
statXMinXStdDeviation (EO)	Real	4	OUT	Standard deviation XMIN-X for the selected EO with (EO)	X	
statXMinYAverage (EO)	Real	4	OUT	Average XMIN-Y for the selected EO with (EO)	X	
statXMinYCp (EO)	Real	4	OUT	Cp value XMIN-Y for the selected EO with (EO)	X	
statXMinYCpk (EO)	Real	4	OUT	Cpk value XMIN-Y for the selected EO with (EO)	X	
statXMinYStdDeviation (EO)	Real	4	OUT	Standard deviation XMIN-Y for the selected EO with (EO)	X	

Group: Statistic (only maXYmos TL ML)						
Objectidentifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
statYMaxXAverage (EO)	Real	4	OUT	Average YMAX-X for the selected EO with (EO)	X	
statYMaxXCp (EO)	Real	4	OUT	Cp value YMAX-X for the selected EO with (EO)	X	
statYMaxXCpk (EO)	Real	4	OUT	Cpk value YMAX-X for the selected EO with (EO)	X	
statYMaxXStdDeviation (EO)	Real	4	OUT	Standard deviation YMAX-X for the selected EO with (EO)	X	
statYMaxYAverage (EO)	Real	4	OUT	Average YMAX-Y for the selected EO with (EO)	X	
statYMaxYCp (EO)	Real	4	OUT	Cp value YMAX-Y for the selected EO with (EO)	X	
statYMaxYCpk (EO)	Real	4	OUT	Cpk value YMAX-Y for the selected EO with (EO)	X	
statYMaxYStdDeviation (EO)	Real	4	OUT	Standard deviation YMAX-Y for the selected EO with (EO)	X	
statYMinXAverage (EO)	Real	4	OUT	Average YMIN-X for the selected EO with (EO)	X	
statYMinXCp (EO)	Real	4	OUT	Cp value YMIN-X for the selected EO with (EO)	X	
statYMinXCpk (EO)	Real	4	OUT	Cpk value YMIN-X for the selected EO with (EO)	X	
statYMinXStdDeviation (EO)	Real	4	OUT	Standard deviation YMIN-X for the selected EO with (EO)	X	
statYMinYAverage (EO)	Real	4	OUT	Average YMIN-Y for the selected EO with (EO)	X	
statYMinYCp (EO)	Real	4	OUT	Cp value YMIN-Y for the selected EO with (EO)	X	
statYMinYCpk (EO)	Real	4	OUT	Cpk value YMIN-Y for the selected EO with (EO)	X	
statYMinYStdDeviation (EO)	Real	4	OUT	Standard deviation YMIN-Y for the selected EO with (EO)	X	

Group: AlarmStatus								
Objectidentifier			Data			Designation/Description/Example	Reference	
			Type	Byte-Count	Direction		EO	MP
statusAlarmState			Byte	8	OUT	8-byte length bit-coded status word of the active alarms. Note: It is recommended to consistently read in 8 bytes.		
	Byte	Bit						
	0	0				**ALARM_SETUP_MISMATCH** Error during setup, e.g. MinX > MaxX. Incorrect values are highlighted in yellow. Remedy: Correct erroneous entries.		
		1				**ALARM_X_SENSOR_CALIBRATION** Invalid values for the X sensor calibration, e.g. referenceSignal2 == referenceSignal1. Incorrect values are highlighted in yellow. Remedy: Correct erroneous entries.		
		2				**ALARM_Y_SENSOR_CALIBRATION** Invalid values for the Y sensor calibration, e.g. referenceSignal2 == referenceSignal1. Incorrect values are highlighted in yellow. Remedy: Correct erroneous entries.		
		3				**ALARM_SENSOR_TEST** "*Sensor test fail*" Sensor test was incorrect. Possible causes: Sensor is outside of the prescribed tolerance. Sensor is defective. Tolerance is set too small or test point does not match the sensor value. Remedy: Check sensor value to verify whether it is plausible. Replace if necessary.		
		4				Reserved		
		5				**ALARM_OVER_PIEZO_RANGE** "*Alerting info over piezo*" Entry for piezo force range is set too small/large. Range must be within 1kpC – 1MpC. Incorrect entry is highlighted in yellow. Remedy: Adjust piezo range so that it is within valid limits.		
		6				**ALARM_NO_EO_CONFIGURED** "*No EO defined*" No EO has been configured for the selected measurement program. Remedy: Define at least 1 EO for the selected measurement program.		
		7				Reserved		

Group: AlarmStatus								
Objectidentifier			Data			Designation/Description/Example	Reference	
			Type	Byte-Count	Direc-tion		EO	MP
statusAlarmState			Byte	8	OUT	8-byte length bit-coded status word of the active alarms. Note: It is recommended to consistently read in 8 bytes.		
	Byte	Bit						
	1	0				Reserved		
		1				Reserved		
		2				**ALARM_INACTIVE_MP_SELECTED** "*Inactive MP selected*" A deactivated MP has been selected Remedy: Activate the selected MP in the MP manager. Select a different activated MP.		
		3				**ALARM_NOK_IN_SEQUENCE** "*Too many NOK in sequence*" Number of consecutive NOKs has exceeded the permitted amount. Remedy: Alarm can be deactivated by acknowledging it. The NOK counter will be reset.		
		4				Reserved		
		5				**ALARM_LOST_CYCLES** "*Cycles lost*" Number of missed measurements exceeds the permitted value. Remedy: Alarm can be deactivated by acknowledging it. The missed measurements counter will be reset.		
		6				Reserved		
		7				**ALARM_NOK_PERCENTAGE_EXCEEDED** "*NOK percentage exceeded*" NOK measurements exceed the prescribed threshold percentage. Remedy: Alarm can be deactivated by acknowledging it. The counter for percentage-based NOK monitoring will be reset.		
	2	0				**ALARM_ENVELOPE_TREND** "*Envelope trend limit exceeded*" Warning is triggered if the envelope curve with trend tracking hits the trend limit. Remedy: Warning can be deactivated by acknowledging it. The trend shift will be reset.		
		1				**ALARM_ENVELOPE_WARNING** "*Envelope warning limit exceeded*" Warning is triggered if the envelope curve with trend tracking hits the trend limit. Remedy: Warning can be deactivated by acknowledging it. The trend shift will be reset.		
		2				**ALARM_SELFTEST_STRAIN_GAGE_NOK** "*No sensor or cable break on channel-Y*" Alarm is triggered if strain gauge sensor is not connected or is defective. Remedy: Check sensor connection. If the alarm does not stop, replace the sensor.		

Group: AlarmStatus								
Objectidentifier			Data			Designation/Description/Example	Reference	
			Type	Byte-Count	Direc-tion		EO	MP
statusAlarmState			Byte	8	OUT	8-byte length bit-coded status word of the active alarms. Note: It is recommended to consistently read in 8 bytes.		
	Byte	Bit						
	2	3				**ALARM_DIG_IO_SHORT_CIRCUIT** "*Short circuit on dig-output*" Digital output was shorted. Remedy: Check connections for short circuits. The alarm will stop when the short circuit is remedied.		
		4				**ALARM_SELFTEST_5V_SENSOR_POWER** "*Error: self test 5 V*" Requirement for 5 V sensor supply is not met Remedy: Check 24 V supply voltage. If the 24 V supply is live, the device must be sent in.		
		5				**ALARM_SELFTEST_24V_SENSOR_POWER** "*Error: self test 24 V*" Requirement for 24 V supply voltage is not met Remedy: Check 24 V supply voltage. If the 24 V supply is live, the device must be sent in.		
		6				**ALARM_SAMBA_NO_NETWORK_WARNING** "*SAMBA: Network not connected*" Network connection to the server is down. Remedy: Check network connection. Check server.		
		7				**ALARM_SAMBA_MEMORY_FULL** "*SAMBA: Memory is full, warning*" Target directory has no free memory. Remedy: Remove files from target directory. Increase server memory.		

Group: AlarmStatus								
Objectidentifier			Data			Designation/Description/Example	Reference	
			Type	Byte-Count	Direc-tion		EO	MP
statusAlarmState			Byte	8	OUT	8-byte length bit-coded status word of the active alarms. Note: It is recommended to consistently read in 8 bytes.		
	Byte	Bit						
	3	0				Reserved		
		1				**ALARM_MEMORY_CARD_FULL_WARNING** "*Memory card is full, warning*" USB stick does not have enough free memory. Remedy: Remove content from the USB stick. Use a different, blank USB stick.		
		2				**ALARM_FIFO_FULL** "*FIFO full warning*" Intermediate buffer for broken connections is full. Remedy: Restore server connection, delete intermediate buffer.		
		3				Reserved		
		4				**ALARM_READING_UV_WITHOUT_DESCRIPTION** Access to unnamed variable. Remedy: Give the assigned variable a name.		
		5				Reserved		
		6				Reserved		
		7				**ALARM_SEQ_CALCULATOR_IN_MEASUREMENT** "*Calculator: Calculator between sequence element meas. start and meas. stop defineed*" Sequence element calculator was placed between MeasurementStart/MeasurementStop. Remedy: Place calculator outside of Measurement-Start/MeasurementStop. Reason: Calculator can access measurement results not yet available.		

Group: AlarmStatus								
Objectidentifier			Data			Designation/Description/Example	Reference	
			Type	Byte-Count	Direc-tion		EO	MP
statusAlarmState			Byte	8	OUT	8-byte length bit-coded status word of the active alarms. Note: It is recommended to consistently read in 8 bytes.		
	Byte	Bit						
	4	0				**ALARM_SEQ_DYNAMIC_CALC_DIV_BY_ZERO** *"Calculator: division by zero"* Sequence element calculator was instructed to divide by 0. Remedy: Rework calculation.		
		1				Reserved		
		2				Reserved		
		3				Reserved		
		4				Reserved		
		5				Reserved		
		6				Reserved		
		7				Reserved		
	5	0				Reserved		
		1				Reserved		
		2				Reserved		
		3				Reserved		
		4				Reserved		
		5				Reserved		
		6				**ALARM_SEQ_DYNAMIC_UNKNOWN_ERROR** *"SEQUENCE: Unknown errro in sequence (DEBUG)"* Unknown error of sequence. Remedy: Please contact Kistler technical support.		
		7				**ALARM_SEQ_DIGITAL_INPUT_TIMEOUT_BEFORE_SIGNAL** Digital input reaches time out before signal changed. Remedy: Increase time out, check process		
	6	0				Reserved		
		1				Reserved		
		2				Reserved		
		3				Reserved		
		4				Reserved		
		5				Reserved		
		6				Reserved		
		7				**ALARM_QDAS_INVALID_DATA** *"QDAS: invalid data available"* Invalid data was configured for the Q-DAS protocol. e.g. K2xxx fields without allocation of measurement. Remedy: Correct incorrect entry.		

Group: AlarmStatus								
Objectidentifier			Data			Designation/Description/Example	Reference	
			Type	Byte-Count	Direction		EO	MP
statusAlarmState			Byte	8	OUT	8-byte length bit-coded status word of the active alarms. Note: It is recommended to consistently read in 8 bytes.		
	Byte	Bit						
	7	0				**ALARM_QDAS_CATALOG_NOT_LOADED** "*QDAS: catalog file could not be loaded*" Q-DAS catalog file could not be loaded. Remedy: Check catalog file for errors.		
		1				**ALARM_IPM_ACKNOWLEDGMENT_ERROR** "*IPM export error (Code:)*" Server rejected IPM telegram. Remedy: Inspect the server log about the error.		
		2				**ALARM_SAMPLER_BUFFER_FULL_WARNING** "*Warning: Buffer full*" The sampler buffer is full. The device cannot record any more measurements. Remedy: Optimize the sample settings in the cycle controller, e.g. enlarge the sampler delta-X,Y.		
		3				**ALARM_INVALID_SETUP_FILE_LOADED** "*Invalid setup file loaded*" At device startup, the system detected an error when loading the settings. It is not possible to guarantee that the device loaded the full configuration. Remedy: Load backup onto the device. Contact Kistler Service.		
		4				**ALARM_SETUPBACKUP_FAILED** "*Backup failed!*" An error occurred during setup of a backup. Possible causes: Drive is read-only. The server connection failed during the backup.		
		5				**ALARM_SAVING_SETUP_FILE_FAILED** "*Saving setup failed*" An error occurred when saving the setup settings. Remedy: Contact Kistler Service.		
		6				**ALARM_SERVER_NOT_ALIVE** "*ALERTING_SERVER_NOT_ALIVE*" NTP server is not available. Remedy: Check the IP address of the NTP server. Remedy: Check whether the NTP server is accessible.		
		7				Reserved		

Group: SystemStatus						
Object identifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
statusDevType (LEN)	Char	Var.	OUT	Device type (recommended length = 6)		
statusDevSerial (LEN)	Char	Var.	OUT	Serial No. (recommended length = 8)		
statusFwVersion (LEN)	Char	Var.	OUT	Firmware Version (recommended length = 10)		
statusHwVersion (LEN)	Char	Var.	OUT	Hardware Version (recommended length = 10)		
statusExportFreeSpace	DInt	4	BOTH	Freely available memory on shared server		
statusExportConnection	Bool	1	BOTH	With server: TRUE = connected FALSE = not connected		
statusExportBuffer	DInt	4	BOTH	Number of cycles that are still waiting to export		
usbDeviceAvailableSizeState	Bool	1	BOTH			
usbStorageState	Bool	1	BOTH			

Group: UniversalVariableTable (UVT)						
Object identifier	**Data**			**Designation/Description/Example**	**Reference**	
	Type	**Byte-Count**	**Direction**		**EO**	**MP**
uvSingle (ADR)	Real	4	BOTH	Individual variable in the universal variable table at the address (ADR) 0 ... 99		
uvBlock (ADR)	10x Real	40	BOTH	Block of 10 variables in the Universal Variable Table from the address (ADR) 0 ... 90		

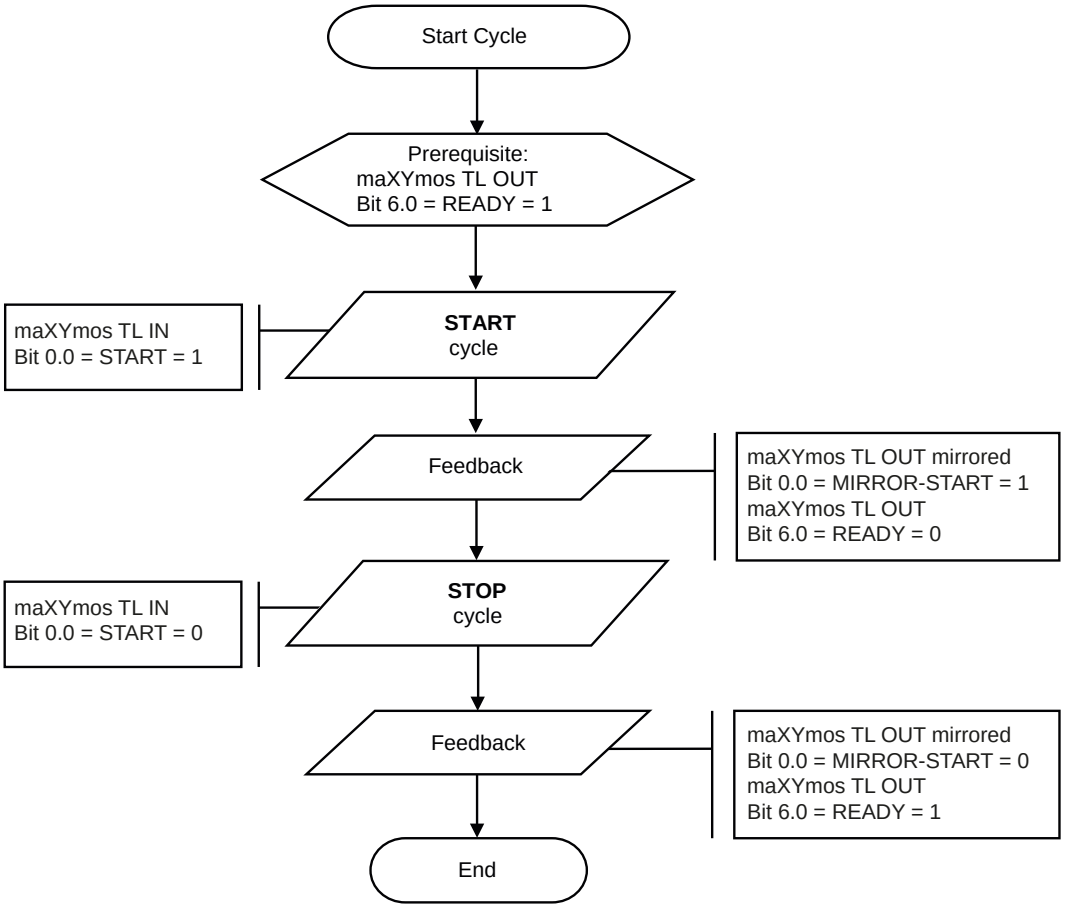
15.3.4 Control / Data transfer

15.3.4.1 General information

The maXYmos OUT control signals are transparent and constantly updated. These signals can be constantly requested by the PLC. All maXYmos IN control inputs are mirrored for acknowledgement.

Control must observe the following sequences.

15.3.4.2 Control: Starting/Stopping cycle via the PLC



NOTE

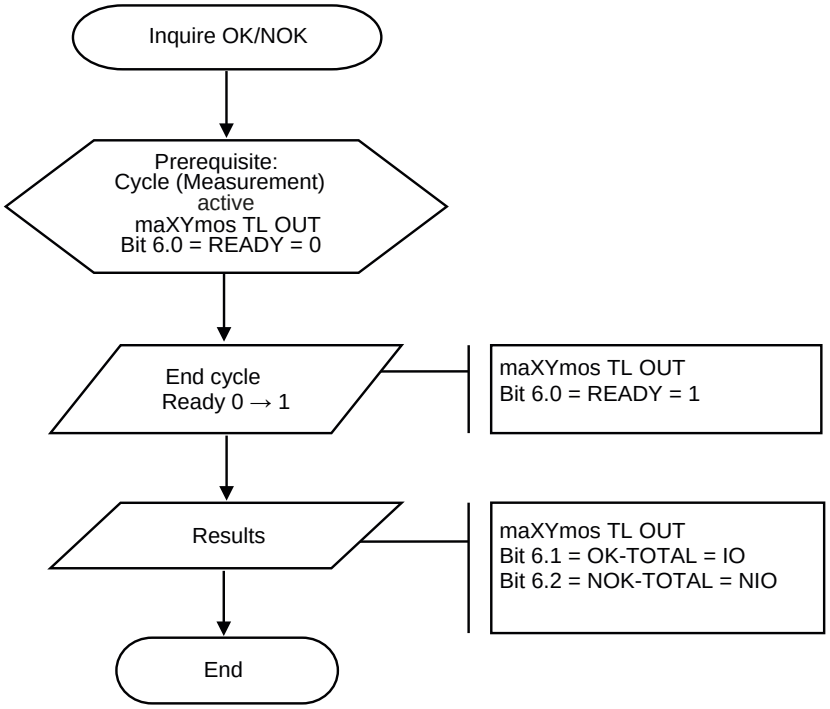
If thresholds have been configured as **Start at** (StartMeasureEvent), the relevant condition for READY = 0 must be met. Resetting **START** interrupts the cycle, even if the configured Stop at (StopMeasureEvent) has not been reached.

NOTE

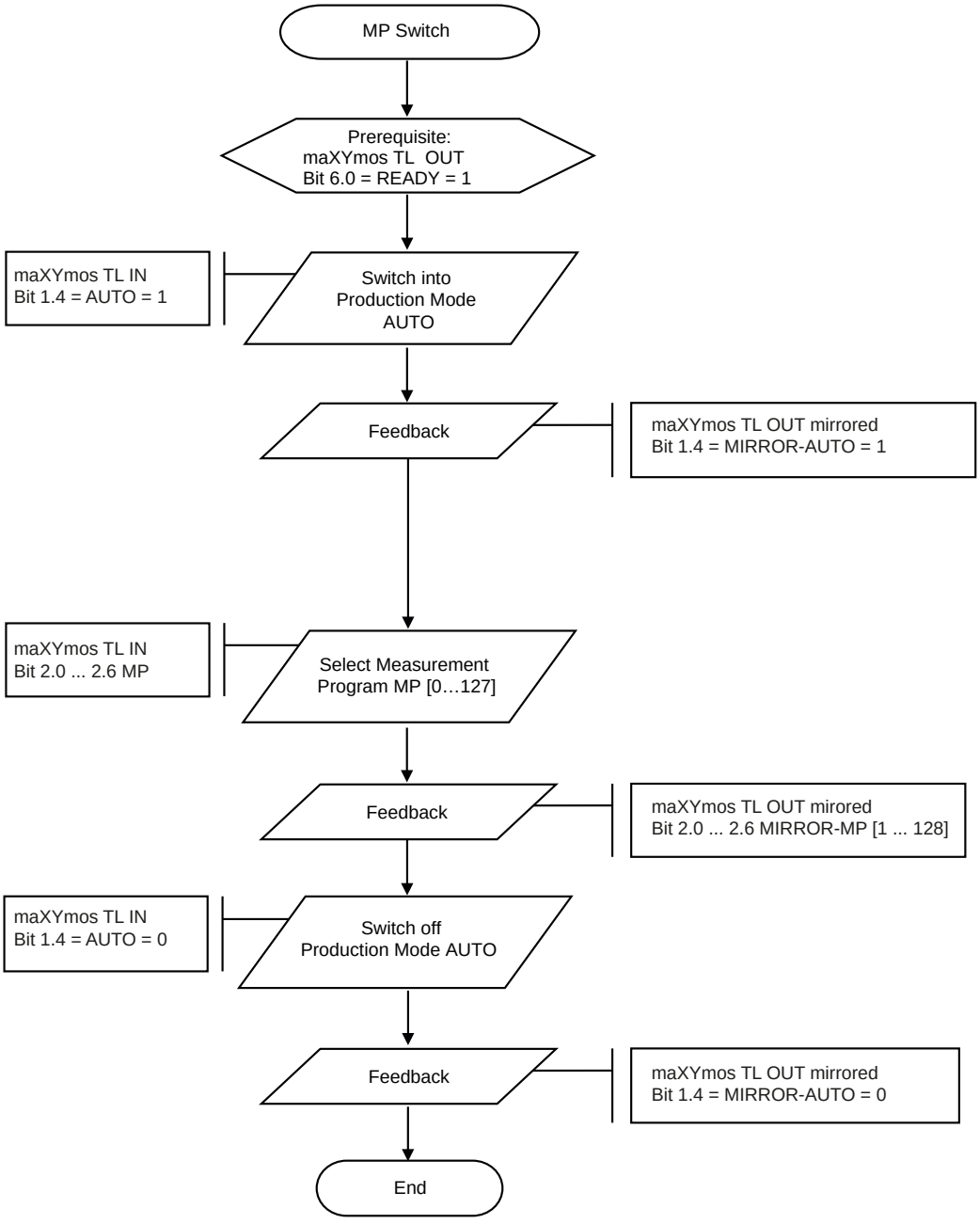
When control input is set to **AUTO** = 0 the measurement program which has been set manually is used. If the measuring program is intended to be preset by the PLC, program selection must be set to AUTO = 1. See section on **Control: Switching Measurment Program via PLC.**

15.3.4.3 Data request: OK/NOK Event valid

The OK/NOK event at the end of a measuring cycle becomes valid with the change in the edge of the **maXYmos READY** output signal from 0 to 1. Control: Starting/Stopping Cycle via the PLC

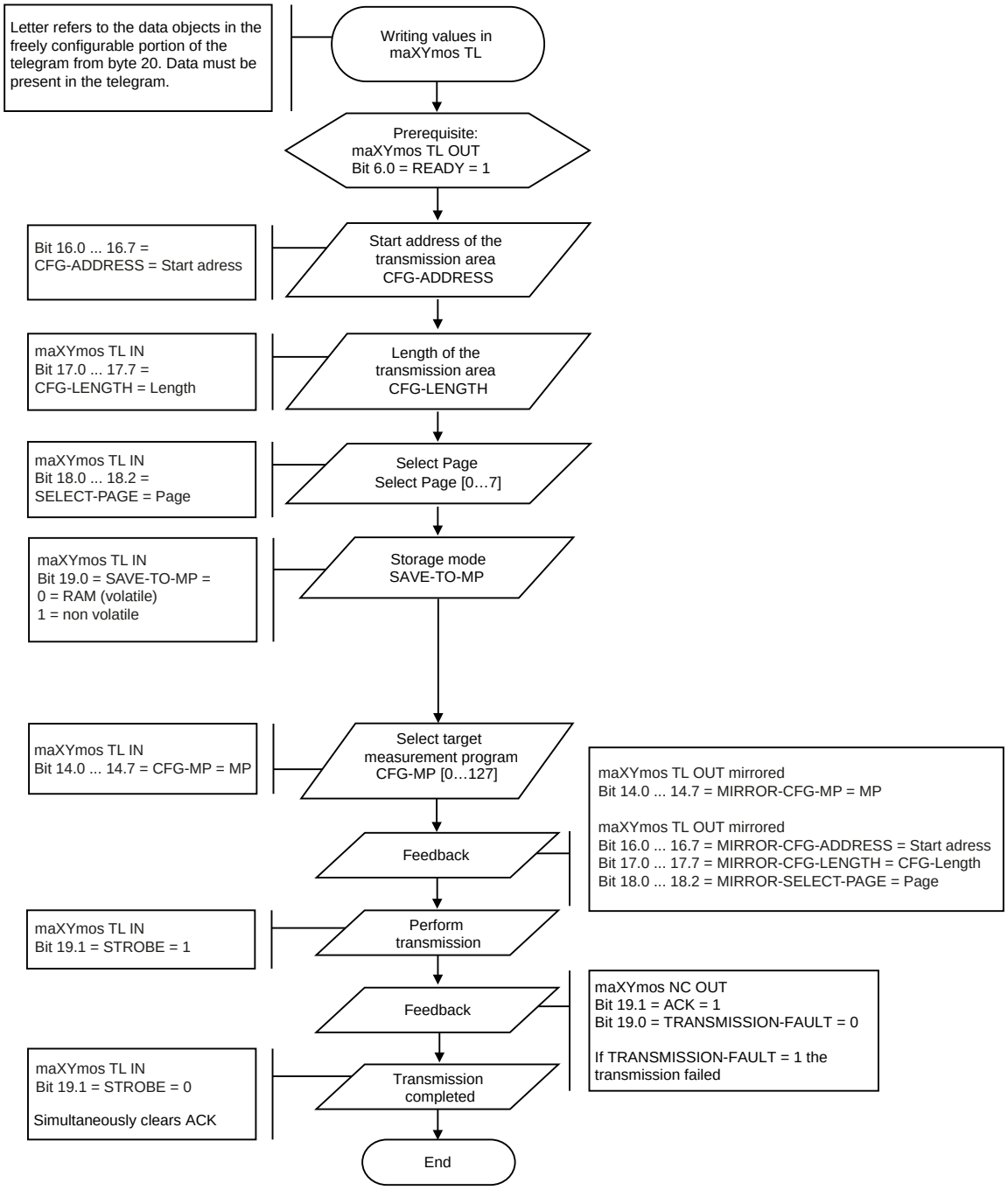


15.3.4.4 Control: Switching measurement program via PLC



Switching off the production mode allows the operator to choose the MP manually by entering the details on the screen.

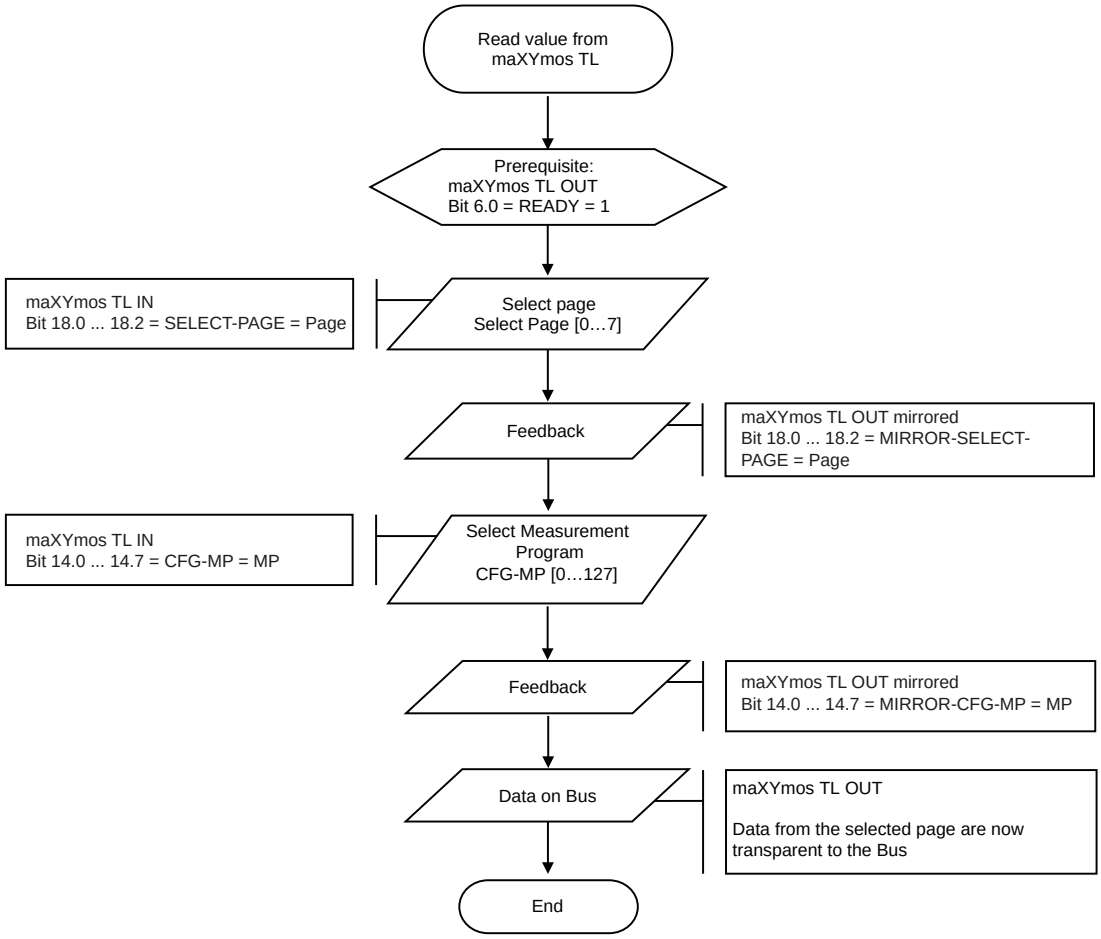
15.3.4.5 Writing values from PLC in maXYmos TL



It must be ensured that the corresponding data object in the configuration page of the telegram is defined for **CFGADR** ≠ 0 and/or CFGLEN ≠ 0.

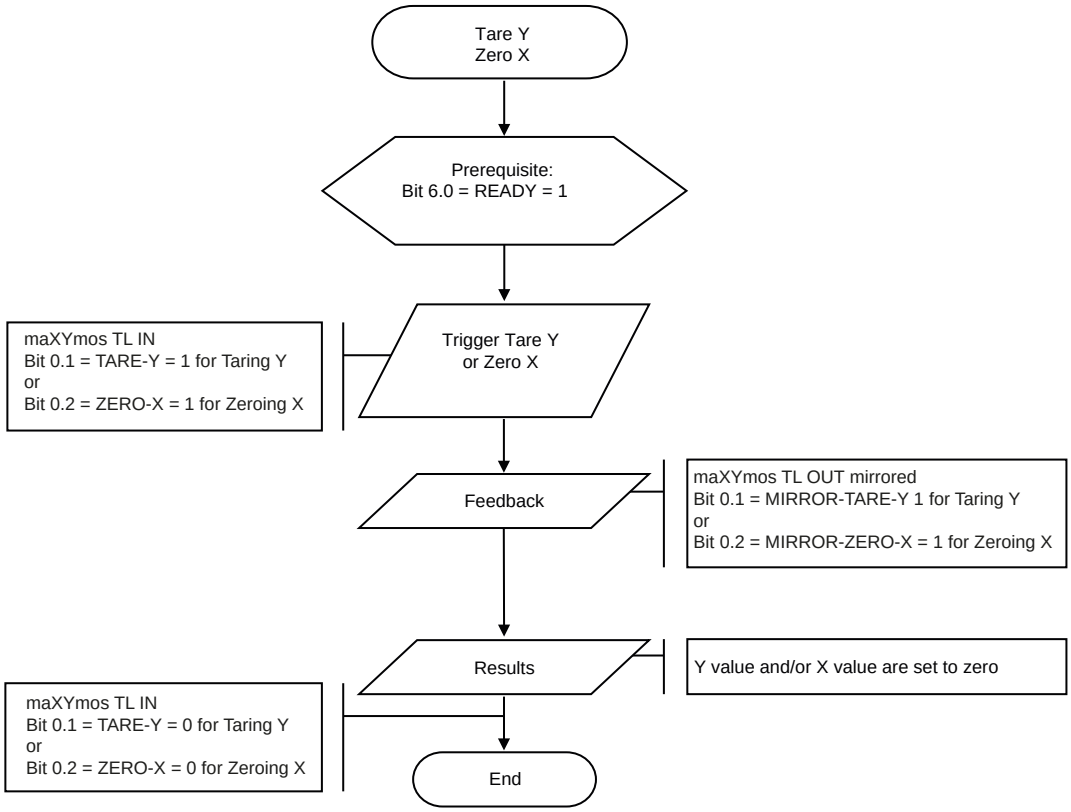
When **CFGADR** = 0, the number of bytes defined in the page configuration is applied automatically. In this case **CFGLEN** must be set to = 0.

15.3.4.6 Reading values from maXYmos TL to PLC



Current measurement values (e.g. statusMeasValueX) are continuously updated. The change of the signal edge from READY = 0 → 1 must be taken into account when capturing the measurement results and process values and checking their validity.

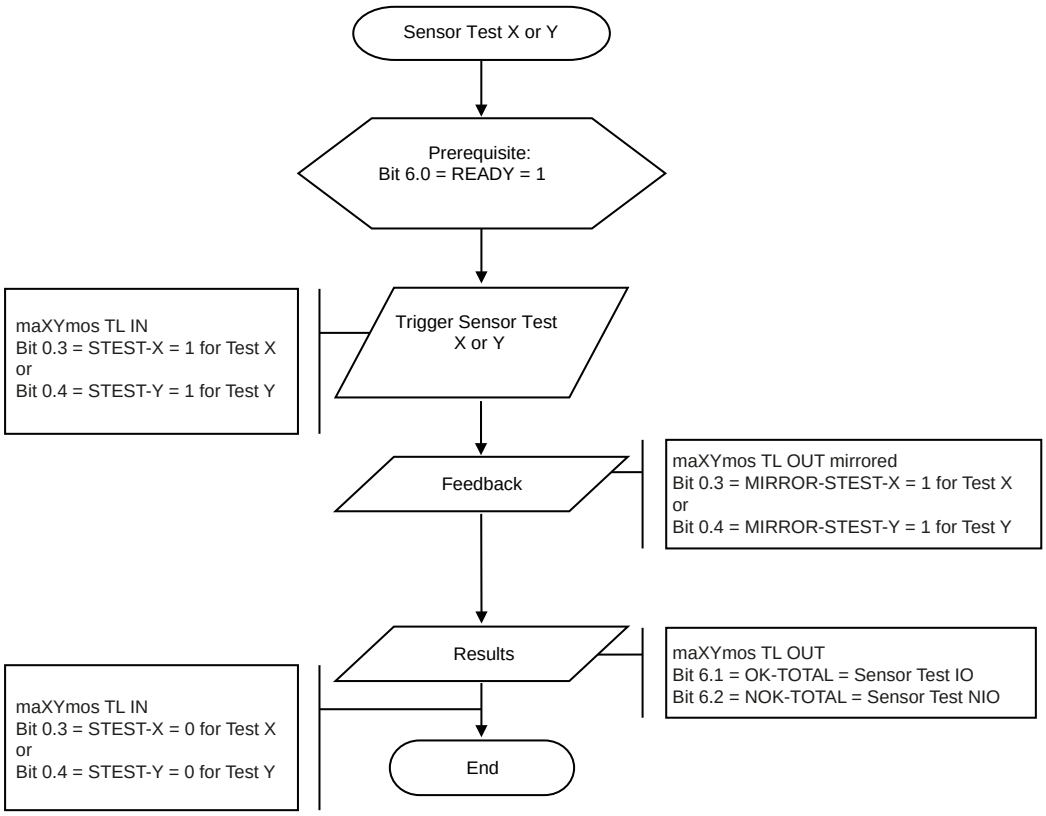
15.3.4.7 Triggering TARAY, ZEROX signals



If thresholds have been defined by teach-in before the **TARAY** or **ZEROX** function is triggered (e.g. as **Start at** (StartMeasureEvent)), the teach-in procedure may have to be repeated.

Setting the control signals during a measurement can lead to erroneous process values.

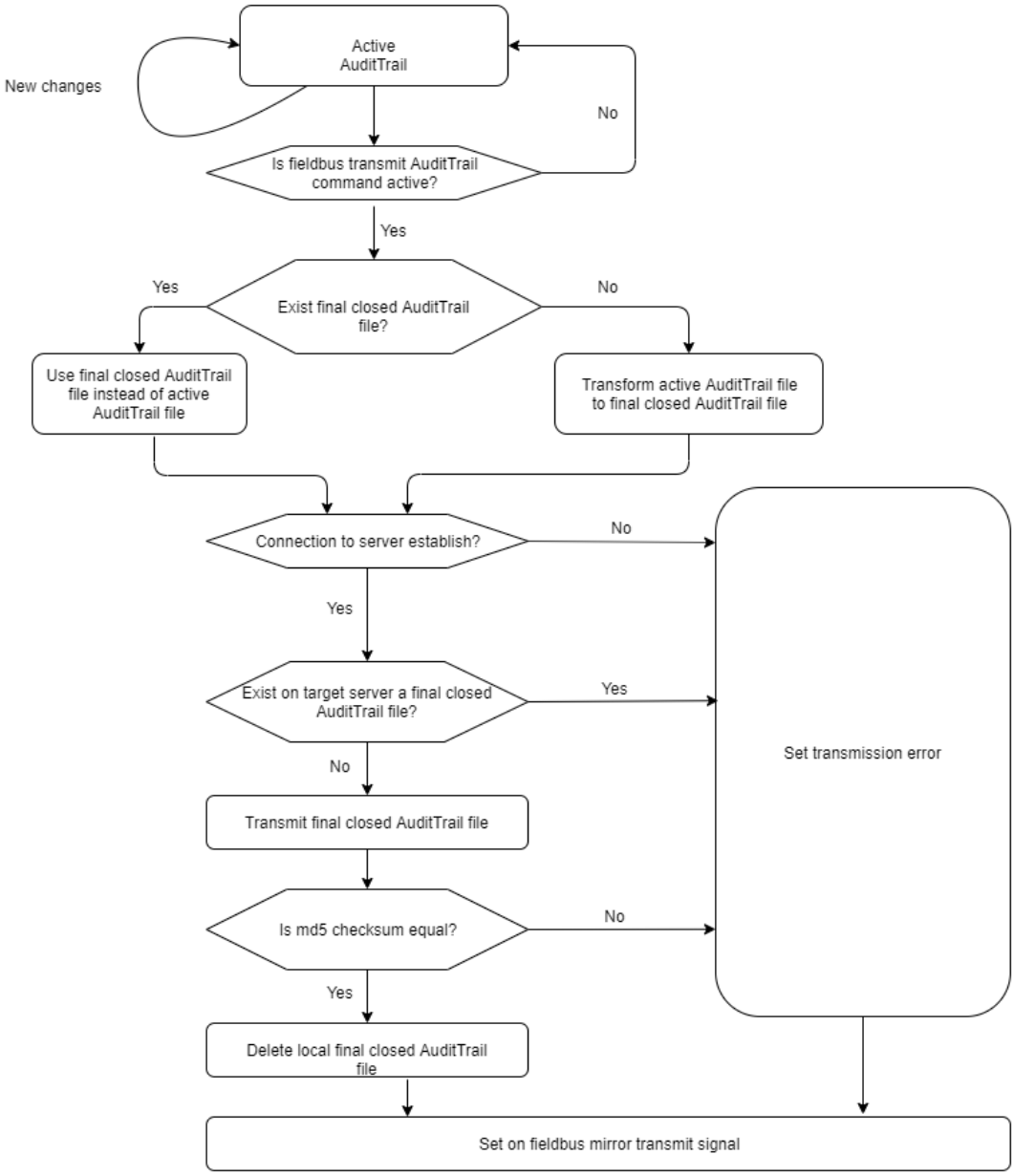
15.3.4.8 Triggering TESTX, TESTY (sensor test) signals



Triggering the **TESTX** or **TESTY** function allocates the **OKTOTAL** and **NOK-TOTAL** outputs to these functions so that they no longer correspond to the result of the last measurement cycle. After a new measurement cycle the **OK-TOTAL** and **NOKTOTAL** are allocated to the measurement result again.

In the event of miscalibration the relevant alarm bits are set in the bit-coded 64-bit **alarmState** status word.

15.3.4.9 Control flow diagram AuditTrail



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