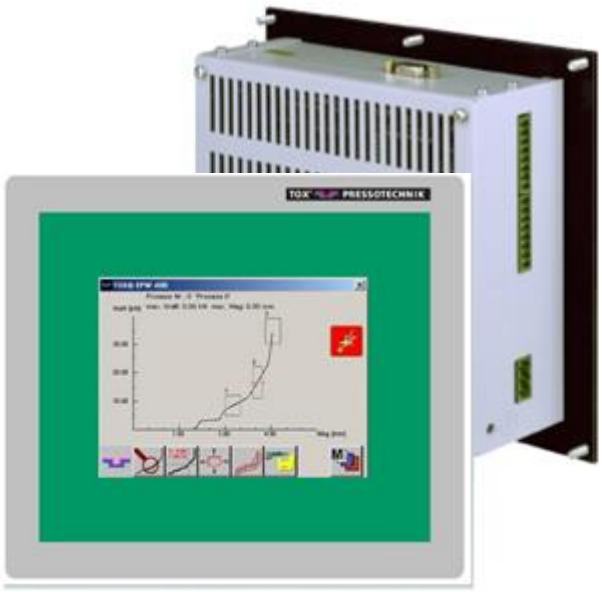
TOX® PRESSOTECHNIK

Operating Manual



Pressing monitor EPW400

- **Force/Distance Measuremsent**

📖 Original operating manual
Firmware Version V1.09.02

TOX® PRESSOTECHNIK GmbH & Co. KG ● Riedstraße 4 ● 88250 Weingarten / Germany
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This operating manual applies to devices running firmware version V1.09.02 or higher.

TOX® PRESSOTECHNIK

EU DECLARATION OF CONFORMITY

Original EU declaration of conformity

TOX® PRESSOTECHNIK GMBH & CO. KG herewith declares that the concept and design of the monitoring system hereinafter and the execution traded by us

Designation/function	terminal for process monitoring
Product name/module	EPW /CEP
Model/type	400.xxx / 400T.xx
Serial number	See type plate

complies with the relevant EU Directives and Applied harmonized standard:

2011/65/EU:2011	RoHS-Directive
2014/30/EU:2014	EMC Directive

Applied harmonized standards:

DIN EN 61000-6-2 :2006	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
DIN EN 61000-6-4 :2011	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Immunity for industrial environments
DIN EN 50581:2012	Technical documentation for the assessment of electrical and electronic equipment with regard to the restriction of hazardous substance

Place, date	Weingarten, 30.01.2020
Manufacturer	TOX® PRESSOTECHNIK GMBH & CO. KG

Signature

Information on the signatory: ppa. Stefan Katzenmaier

This declaration certifies the conformity with the essential requirements of the indicated directive(s), it does not, however, covenant any characteristics. The instructions for safety and installation of the enclosed product documentation have to be observed.

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NOTICE OF COMPLETION
AND
INITIAL PRODUCTION INSPECTION

2019-08-30

TOX-PRESSOTECHNIK L L C
MR. ERIC SEIFERTH
4250 Weaver Pkwy
Warrenville, IL, 60555-3924 USA

Our Reference:	File E503298, Vol. D1	Project Number:	4788525144
Your Reference:	Models EPW 400, Smart9 T070E, Smart9 T057, STE 341-xxx T070, STE346-0005, CEP 400T, Touch Screen PLC's		
Project Scope:	UL Listing to the following standard(s): UL 61010-1, 3rd Edition, May 11, 2012, Revised April 29 2016, CAN/CSA-C22.2 No. 61010-1-12, 3rd Edition, Revision dated April 29 2016		
Subject:	Notice of Project Completion with Initial Production Inspection		

Dear MR. ERIC SEIFERTH:

Congratulations! UL's investigation of your product(s) has been completed under the above Reference Numbers and the product was determined to comply with the applicable requirements. The Test Report and records in the Follow-Up Services Procedure covering the product are completed and are now being prepared (if you do not have a separate CB Report, you can to access the Test Report now). **Please have the appropriate person in your company that is responsible for receiving/managing UL reports access an electronic copy of the Test Report and FUS Procedure through the CDA feature on MyHome@UL, or if you desire another method of receiving the report please contact one of the contacts below. If you are not familiar with our MyHome site or need to create a new account in order to access your reports, please click the link HERE.**

PLEASE NOTE: YOU ARE NOT AUTHORIZED TO SHIP ANY PRODUCTS BEARING ANY UL MARKS UNTIL THE INITIAL PRODUCTION INSPECTION HAS BEEN SUCCESSFULLY CONDUCTED BY THE UL FIELD REPRESENTATIVE.

An Initial Production Inspection (IPI) is an inspection that must be conducted prior to the first shipment of products bearing the UL Mark. This is to ensure that products being manufactured are in accordance with UL LLC's requirements including the Follow-Up Service Procedure. After the UL Representative has verified compliance of your product(s) at the manufacturing locations listed below, authorization will be granted for shipment of product(s) bearing the appropriate UL Marks as denoted in the Procedure (located in the FUS Documentation of the report).

List of all manufacturing locations (please contact us if any are missing):

Manufacturing Facility(ies):
TOX PRESSOTECHNIK GMBH & CO. KG
Riedstraße 4
88250 Weingarten Germany
Contact Name: Eric Seiferth
Contact Phone No.: 1 630 447-4615
Contact Email: ESEIFERTH@TOX-US.COM

It is the responsibility of TOX-PRESSOTECHNIK L L C, the Applicant, to inform its manufacturers of that the IPI must be successfully completed before product may be shipped with the UL Mark. Instructions for the IPI will be sent to our inspection center nearest to each of your manufacturing locations. The contact information of the inspection center is provided above. Please contact the inspection center to schedule the IPI and ask any questions you may have regarding the IPI.

Inspections at your production facility will be conducted under the supervision of:

Area Manager:	ROB GEUIJEN
IC Name:	UL INSPECTION CENTER GERMANY,
Address:	UL INTERNATIONAL GERMANY GMBH ADMIRAL-ROSENDAHL-STRASSE 9, NEU-ISENBURG, Germany, 63263
Contact Phone:	69-489810-0

Email:	

Marks (as needed) may be obtained from:
Information on the UL Marks, including our new Enhanced UL Certification Marks can be found on the UL website at https://markshub.ul.com

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Any information and documentation provided to you involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Feel free to contact me or any of our Customer Service representatives if you have any questions.

UL is strongly committed to providing you with the finest customer experience possible. You may receive an email from ULsurvey@feedback.ul.com inviting you to please participate in a brief satisfaction survey. Please check your spam or junk folder to ensure receipt of the email. The subject line of the email is "Tell is about your recent experience with UL." Please direct any questions about the survey to ULsurvey@feedback.ul.com. Thank you in advance for your participation.

Very truly yours,

Brett VanDoren
847-664-3931
Staff Engineer
Brett.c.vandoren@ul.com

Table of contents

1 Introduction

1.1 Explanation of symbols

➔ An arrow at the beginning of a paragraph indicates the action steps you must complete.

✓ This tick at the beginning of a paragraph indicates a condition that must be met before beginning the next step.

Danger notifications:

Safety

Here you will find instructions for the prevention of damage.
These safety notes must be strictly observed by the operating company and user of the machine.

Operating notes:

Note

Provides information on work sequences and methods that facilitate the use of the machine.

Setting

Indicates important information about setting the operating parameters.

Function

Explains the functioning of the machine or the sequence of a working process.

2 Brief description

The pressing monitor EPW ensures constant monitoring and cares for quality assurance during production.

2.1 Function of the pressing monitor

The Pressing Monitor EPW 400 monitors processes in which precisely defined functional correlations between force and distance have to be verified. For this purpose, the device reads the force/distance data pairs from two measuring channels 'X' and 'Y' during the measuring operation. The data are written to memory and can be displayed graphically. The resulting force/distance function is compared with the specified data limits of the set window values or envelope curve. An OK message is issued if the data limits are complied with, otherwise a NOK message is issued.

2.2 Measuring Mode and Configuration

The device has two operating modes: "measuring" and "configuration". Only during measuring mode can a registration followed by an evaluation be started. If the settings on the EPW 400 are changed, e.g. during a program change or zero point adjustment, or if the settings are being changed via the keyboard, it is not possible to begin a measuring cycle.

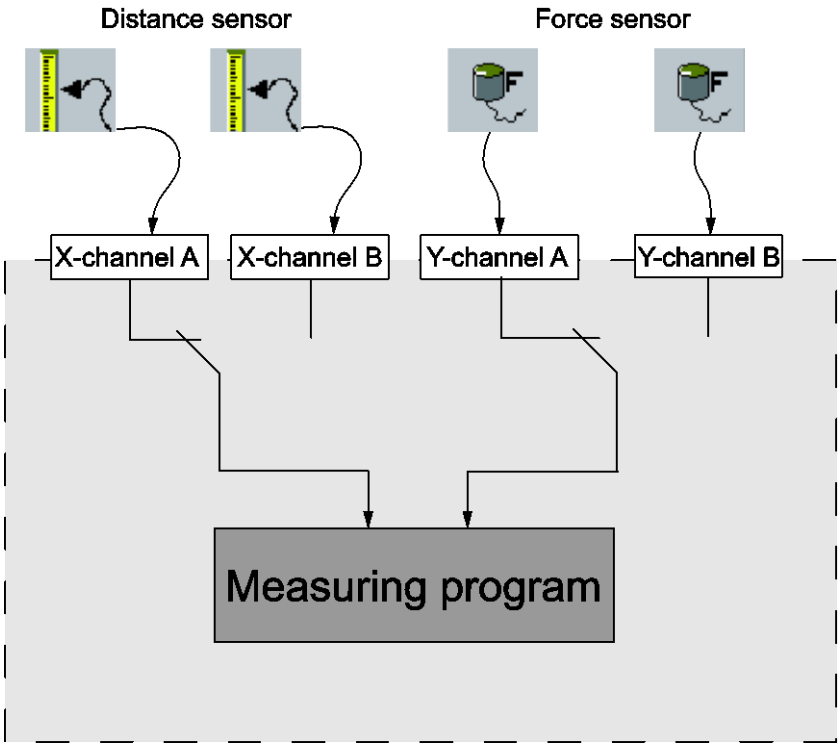
The readiness for measuring is shown on the display by means of ready signal 'RDY'.

2.3 Version .22

Principle display of the Pressing Monitor EPW400 as Version 22, with changeover from channel pair A to channel pair B.

You have the option of setting channels A and B for each process independent of force and distance.

Note
Only the **one** channel pair (**A or B**) can be used to measure and not both simultaneously!



3 Technical data

3.1 General technical data

3.1.1 Power supply

Input voltage:	24 V / DC, ± 25% (incl. 10% residual ripple)
Current consumption:	≤ 1 A

3.1.2 Hardware configuration

CPU	ARM9 processor, frequency 200 MHz, passively cooled
Memory storage	1 x 256 MB CompactFlash (can be expanded to 4 GB)
	2 MB boot flash
	64 MB SDRAM (firmware and parameters)
Data storage	1024 kB RAM, remanent, buffer battery for final values and counter readings
Real-time clock / accuracy	At 25°C ≤ ± -1 s / day,
	at 10 to 70C°: ≤ + 1 s to 11 s / day
Display	TFT, backlit, 5.7" graphics-capable
	TFT LCD VGA (640 x 480)
	Color depth: 16-bit
	Backlit LED, switchable via software
	Contrast 300:1
	Brightness: 220 cd/m2
	Viewing angle vertical 100°, horizontal 140°
	Analog resistive, color depth 16-bit
Interface extensibility	1 x slot for back plane
	1 x keyboard interface for max. 64 buttons with LED
Buffer battery	Lithium cell, pluggable
	Battery type Li 3 V / 950 mAh CR2477N
	Buffer time at 20°C typically 5 years
	Battery monitoring typically 2.65 V
	Buffer time for battery change min. 10 minutes
	Order number: 300215

Battery change

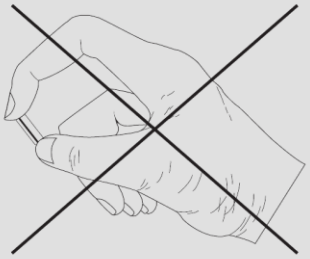
Recommendation: change battery after 2 years.

To avoid data loss while performing the battery change, turn the device on for at least 10 minutes before the change-over.

1. Disconnect the power supply
2. Discharge any electrostatic charges
3. Remove the cover from the lithium battery
4. Remove the battery. (Do not use uninsulated tools - risk of short circuiting)
5. Insert new battery with correct polarity
6. Replace the battery cover

Correct:

Incorrect:



3.1.3 Connections

- 16 digital inputs
- 8 digital outputs
- 1 Ethernet interface
- 1 USB device
- 1 CF memory card

3.1.4 Digital inputs

16 digital inputs	Isolated	
Input voltage	24 V (permissible range: -30 V to +30 V)	
Input current	At rated voltage (24 V): 6.1 mA	
Delay time of standard inputs	tLOW-HIGH	3.5 ms
	tHIGH-LOW	2.8 ms
Input voltage	LOW level:	≤ 5 V
	HIGH level:	≥ 15 V
Input current	LOW level:	≤ 1.5 mA
	HIGH level:	≥ 3 mA
	Input impedance	3.9 kΩ

3.1.5 Digital outputs

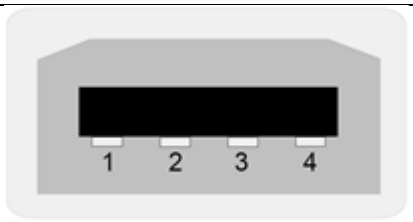
8 digital outputs	Isolated	
Load voltage Vin	Nominal value 24 V (permissible range 18 V to 30 V)	
Output voltage	HIGH level	min. Vin-0.64 V
	LOW level	max. 100 µA • RL
Output current	max. 500 mA	
Parallel connection of outputs possible	Max. 4 outputs with Itot = 2 A	
Short-circuit proof	Yes, thermal overload protection	
Switching frequency	Resistive load 100 Hz	
	Inductive load	2 Hz (dependent on inductance)
	Lamp load	max. 6 W
	Simultaneity factor 100%	

Avoid reversing current
Reversing current at the outputs may damage the output drivers.

On devices with field bus interface, the outputs, such as "Ready for operation", are written on both the digital outputs and the field bus outputs. Whether the inputs are read on the digital inputs or on the field bus inputs is determined in menu 'Additional->Communication parameters->Anybus-S Subprint'.

3.1.6 USB

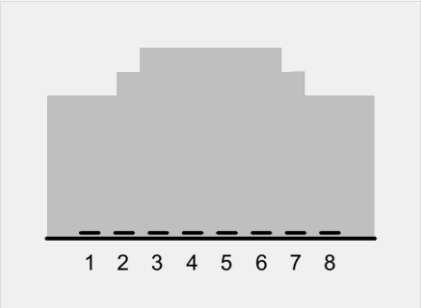
Number of channels	2 x host (full-speed)
	1 x device (high-speed)
USB 2.0	According to USB device specification,
	USB 2.0 compatible, type A and B
	Connection to high-powered hub/host
	Max. cable length 5 m



Pin	MIO
1	+ 5 V
2	Data -
3	Data +
4	GND

Note
With the wall-mounted version of the EPW 400, it is not possible to access all the USB interfaces from the outside.

3.1.7 Ethernet



1 channel	Twisted pair (10/100BASE-T), Transmission according to IEEE/ANSI 802.3, ISO 8802-3, IEEE 802.3u		
Transmission speed	10/100 Mbit/s		
Connecting line	Shielded,	at 0.14 mm²	Max. 300 mm
		At 0.25 mm²:	max. 600 mm
Length	Max. 100 mm		
Cable	Shielded, impedance 100 Ω		
Connector	RJ45 (modular connector)		
LED status indicator	Yellow: transmission	Green: ready	

3.1.8 Environmental conditions

Temperature	Operation	0 to 45°C
	Storage	-25 to +70°C
Relative humidity without condensation (acc. to RH2)		5 to 90%
Vibrations according to IEC 68-2-6	15 to 57 Hz,	Amplitude 0.0375 mm, occasionally 0.075 mm
	57 to 150 Hz,	Acceleration 0.5 g occasionally 1.0 g

3.1.9 Electromagnetic compatibility in line with EC directives

Immunity according to EN 61000-6-2 / EN 61131-2

Electrostatic discharge (EN 61000-4-2)

Contact	min. 8 kV
Clearance	min. 15 kV

Electromagnetic fields (EN 61000-4-3)

80 MHz – 1 GHz:	10 V/m 80% AM (1 kHz)
900 MHz ±5 MHz:	10 V/m 50% ED (200 Hz)

Fast transients (EN 61000-4-4)

Power supply lines	2 kV
Process digital In-output	1 kV
Process analog inputs outputs	0.25 kV
Communication interfaces	0.25 kV

Induced high frequency (EN 61000-4-6)

0.15 – 80 MHz	10 V 80% AM (1 kHz)

Surge voltage 1.2/50: min. 0.5 kV (measured at AC/DC converter input)

Emission interference according to EN61000-6-4 / EN61000-4-5

RFI voltage EN 55011	150 kHz – 30 MHz	(Group 1, Class A)
RFI emissions EN 50011	30 MHz – 1 GHz	(Group 1, Class A)

Compliance with the EC Directive

Compliance with EMC directives requires correct installation in accordance with the device manual.

The person marketing the complete machine is responsible for the electromagnetic compatibility of the overall system into which the control system is integrated.

3.1.10 Sensor: analog standard signals

Measuring is carried out by a sensor with a standardized process signal 0-10 V. The input is selected in menu 'Configuration'.

Nominal force or nominal distance:	Adjustable via the menu
A/D converter:	12 bit = 4096 steps (for EPW 400.x02.1x)
	16 bit = 65536 steps (for EPW 400.x02.0x)
Nominal load of resolution:	Steps see A/D converter, 1 step (bit) = nominal load / steps
Accuracy of measurement:	1%
Max. sampling rate:	2000 Hz (0.5 ms)

3.1.11 Sensor: supply voltage

Auxiliary voltage:	24 V ± 5%, max. 100 mA
Reference voltage:	10 V ± 1% nominal signal: 0 – 10 V

Adjustment value

The entries 'Nominal force' or 'Nominal distance' must not be changed without the agreement of the manufacturer.

3.1.12 Screw sensor with standard signal output

Auxiliary voltage:	24 V ± 5%, max. 100 mA
Nominal signal:	0 – 10 V
Tare signal:	0 V = zero adjustment, > 9 V = measuring mode

Adjustment value

The entry 'Nominal force' must not be changed without the agreement of the manufacturer.

Tightening torque: 14 Nm

Zero adjustment before each work cycle

With some types of force transducers or measuring amplifiers with tare function, a decrease of the measuring accuracy is possible after a certain period of time depending on the process. In order to ensure repeating accuracy, a zero adjustment should be carried out before each work cycle or at regular time intervals (e.g. for ZKN model force transducers after approx. 10 minutes).

3.1.13 DMS signals

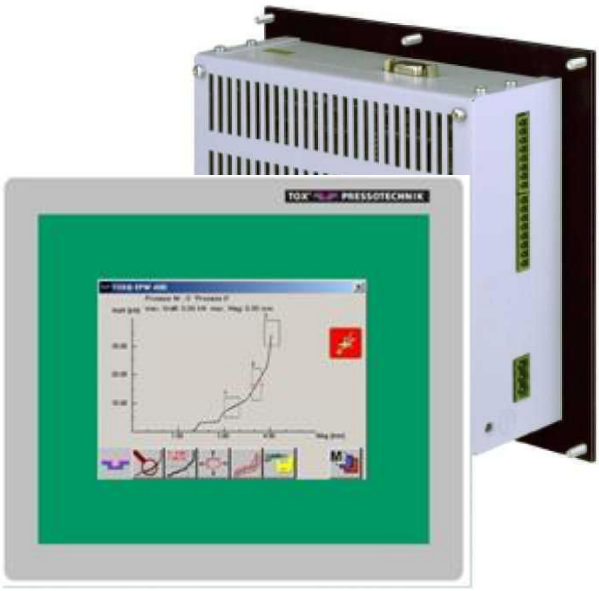
Force measuring (channel Y) via DMS force transducer. The input is selected in menu 'Configuration'.

Nominal force or nominal distance:	Adjustable in the menu
A/D converter:	16 bit = 65536 steps
Nominal load of resolution:	65536 steps, 1 step (bit) = nominal load / 65536
Gain error:	± 0.5 %
Max. sampling rate:	2000 Hz (0.5 ms)
Bridge voltage:	5 V
Characteristic value:	Adjustable via the menu

Adjustment value

The entry 'Nominal force' must not be changed without the agreement of the manufacturer.

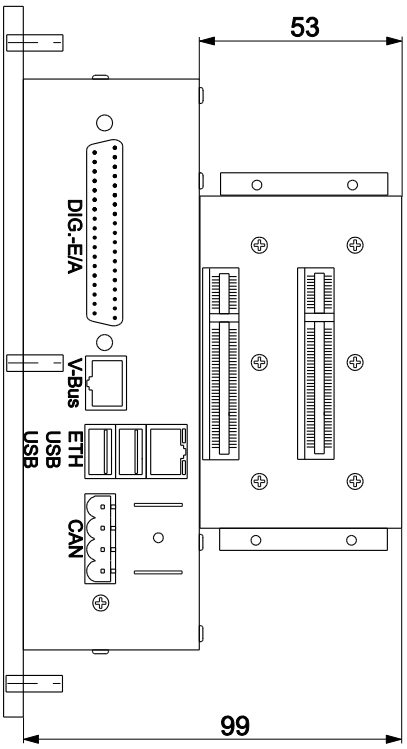
3.2 Overview of built-in version



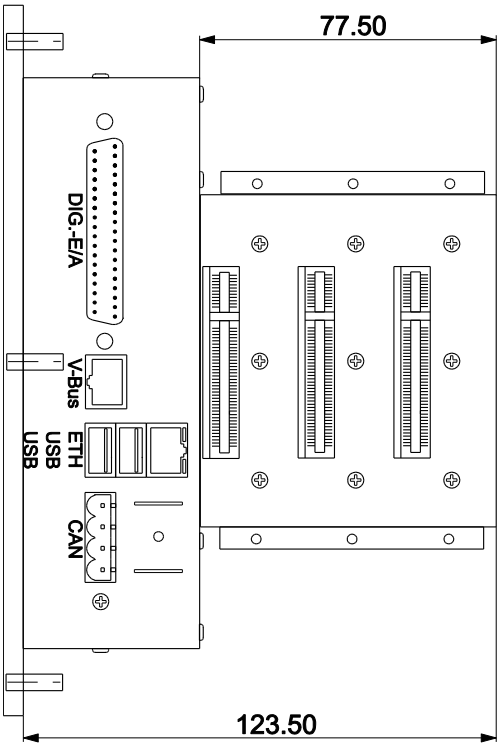
3.2.1 Mechanical specifications

Steel panel installation housing	Zinc-coated
Dimensions (W x H x D)	168 x 146 x 46 mm
Installation aperture (W x H)	175 x 150 mm
Display front panel (W x H)	210 x 185 mm
Weight	approx. 1.600 kg
Plastic front panel	EM-immune, conductive
Attachment method	8 x threaded bolts M4 x 10
Protection class according to DIN 40050 / 7.80	IP 54 (front panel) IP 20 (housing)
Films	Polyester Resistance according to DIN 42115 Alcohols, diluted acids and alkalis, household cleaners

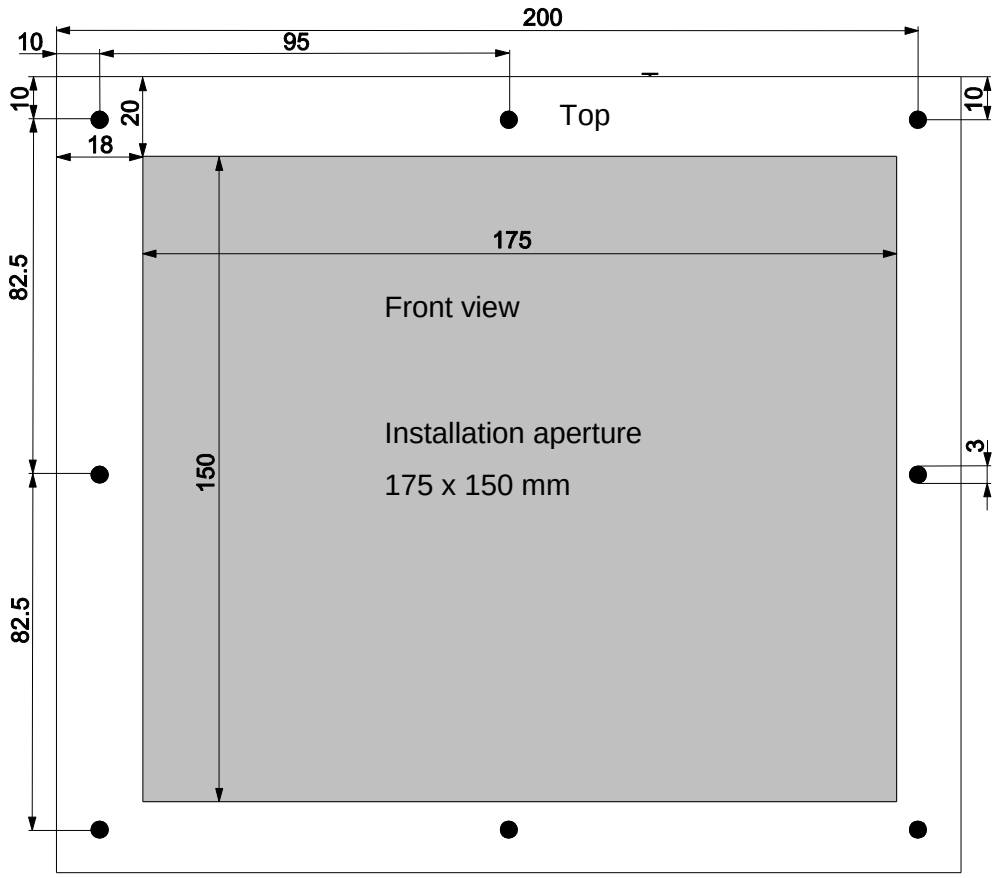
3.2.2 Dimensions of installation housing with two slots



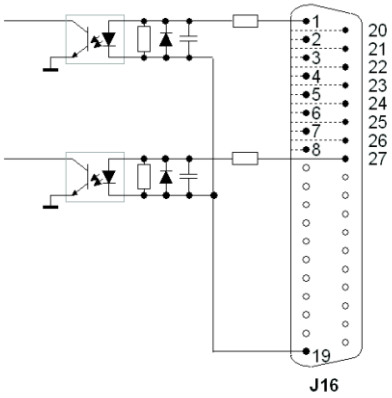
3.2.3 Dimensions of installation housing with three slots



3.2.4 Hole pattern of installation housing (rear view)



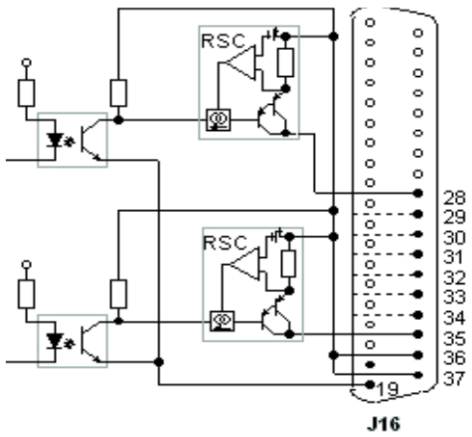
3.2.5 Built-in version: digital inputs I0 – I15 (37-pin connector)



Pin	OK	Designation
1	I 0	Program bit 0
2	I 1	Program bit 1
3	I 2	Program bit 2
4	I 3	Program bit 3
5	I 4	Program bit 4
6	I 5	Program bit 5
7	I 6	Program strobe
8	I 7	Offset external
19	0 V	0 V external
20	I 8	Start measure-ment
21	I 9	Reserve
22	I 10	Control panel in-terlock
23	I 11	Error reset
24	I 12	Reserve
25	I 13	Configurable input
26	I 14	Access level bit 1
27	I 15	Reserve

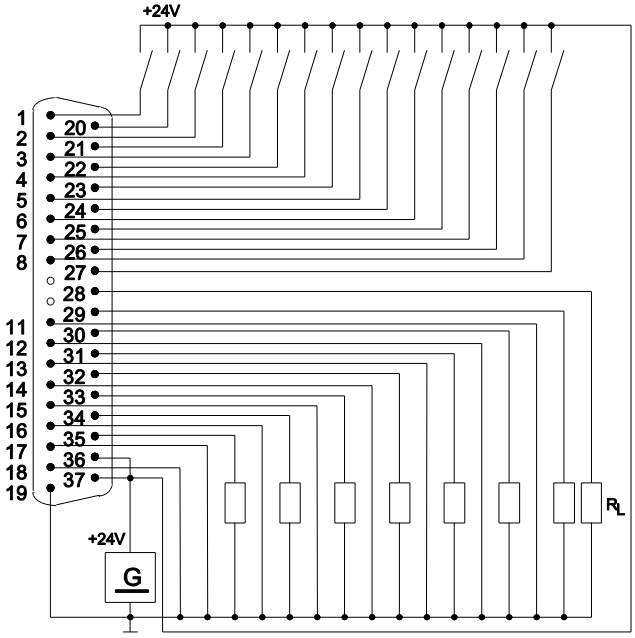
On devices with field bus interface, the outputs, such as "Ready for operation", are written on both the digital outputs and the field bus outputs. Whether the inputs are read on the digital inputs or on the field bus inputs is determined in menu 'Additional->Communication parameters->Anybus-S Subprint'.

3.2.6 Built-in version: digital outputs Q0 – Q7 (37-pin connector)



Pin	OK	Designation
19	0 V	0 V external
28	Q 0	OK
29	Q 1	NOK
30	Q 2	NOK alarm
31	Q 3	Switching point S1[1] / Enable
32	Q 4	Switching point S2[1] / NOK buzzer
33	Q 5	Ready for measurement
34	Q 6	Program ACK
35	Q 7	Switching point 3[1] / Item quantity warning
36	+ 24 V	+24 V external
37	+ 24 V	+24 V external

Connection example of digital inputs and outputs

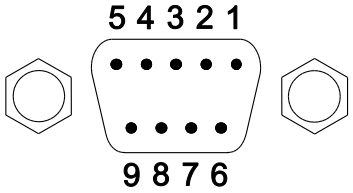


[1] Output function configurable

3.2.7 Built-in version: pin assignment, DMS force transducer (channel Y)

Only hardware model EPW400.002.0X (with DMS subprint)

9-pin D-sub female connector DMS0 for DMS sensors



Pin	DMS signal
1	Measuring signal DMS +
2	Measuring signal DMS -
3	Reserve
4	Reserve
5	Reserve
6	Supply DMS V-
7	Sensor cable DMS F-
8	Sensor cable DMS F+
9	Supply DMS V+

Note

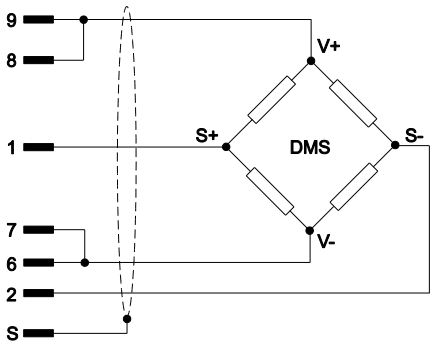
For hardware model EPW 400.022.0X (2-channel) the second analog input card is installed for channel pair 2 X/Y!

The connections are occupied the same as for the first card.

Channel Y DMS force transducer

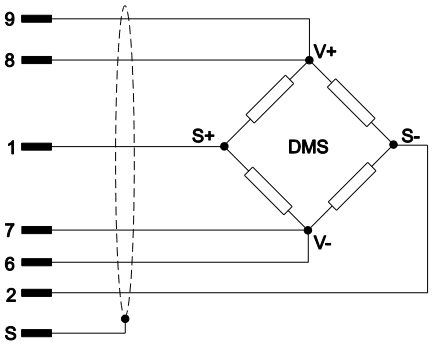
Connection example of DMS0 without sensor cable (CKN / ZAK / ZPS)

9-pin D-sub connector DMS0



Connection example of DMS0 with sensor cable

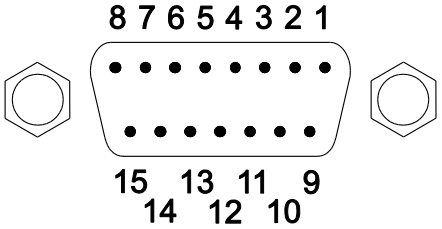
9-pin D-sub connector DMS0



When connecting the DMS using the 4-conductor technique, pins 6 and 7 and pins 8 and 9 are bridged.

3.2.8 Built-in version: pin assignment, analog signals (channel Y force / channel X distance) for analog standard signals

15-pin D-sub female connector (designation analog I/O)



Pin	Type Input/Output	Analog signal
1	I	Force signal 0 - 10 V channel Y /1
3	I	Ground, force signal channel Y /1
4	I	Travel signal 0 - 10 V channel X /2
6	I	Ground, travel signal channel X /2
7	o	Analog output 1: tare +10 V / force / distance[2]
8	o	Ground
13	o	Analog output 2: 0 - 10 V process-bound / force / distance[2]
14	o	Ground
15	o	+10 V sensor supply

Note

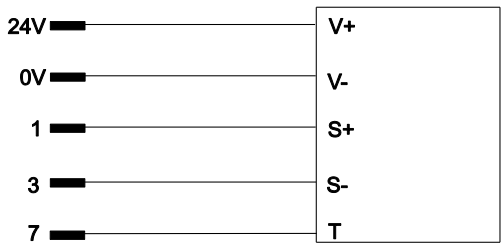
For hardware model EPW 400.022.0X (2-channel) the second analog input card is installed for channel pair 2 X/Y!

The connections are occupied the same as for the first card.

Channel Y force transducer, analog

Connection example of sensor with standard signal 0 - 10 V (ZKN with tare)

15-pin D-sub connector, analog I/O

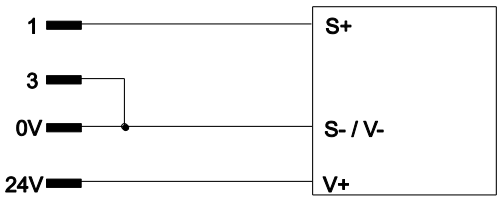


[2] Output function configurable

Channel Y oil pressure sensor

Connection example: ZDO

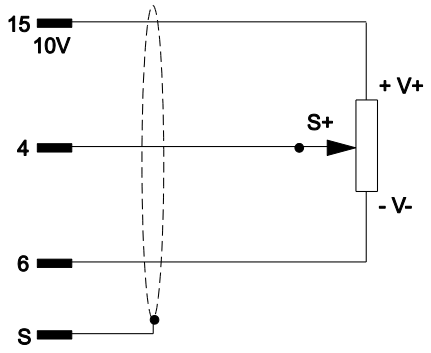
15-pin D-sub connector, analog I/O



Channel X distance transducer

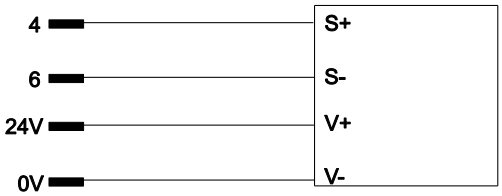
Connection example of distance potentiometer (ZWW 10 V supply voltage)

15-pin D-sub connector, analog I/O



Connection example of distance transducer (ZKW 24 V supply voltage)

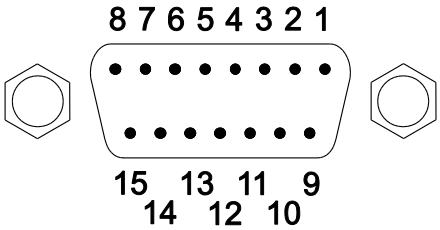
15-pin D-sub connector, analog I/O



3.2.9 Built-in version: pin assignment, analog standard signals

Only hardware model EPW 400.002.1X (without DMS subprint)

Sub-D 15-pole female connector (designation analog I/O)



Pin	Type Input/Output	Analog signal
1	I	Force signal 0 - 10 V channel Y /1
3	I	Ground, force signal channel Y /1
4	I	Travel signal 0 - 10 V channel X /2
6	I	Ground, travel signal channel X /2
7	o	Analog output 1: tare +10 V
8	o	Ground
13	o	Analog output 2: 0 - 10 V process-bound
14	o	Ground
15	o	+10 V sensor supply

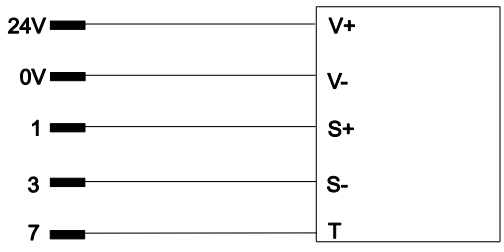
Note

Hardware model (2-channel) Version 22 is not provided with EPW 400.XX2.1X!

Channel Y force transducer

Connection example of sensor with standard signal 0 - 10 V (ZKN with tare)

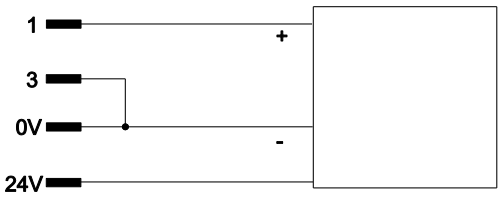
15-pin D-sub connector, analog I/O



Channel Y oil pressure sensor

Connection example: ZDO

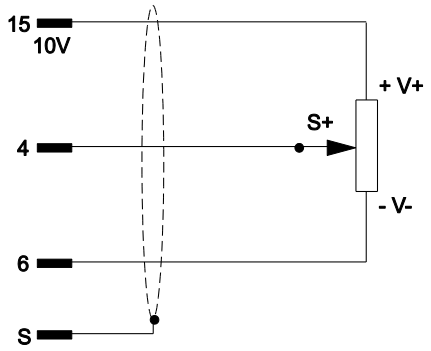
15-pin D-sub connector, analog I/O



Channel X distance transducer

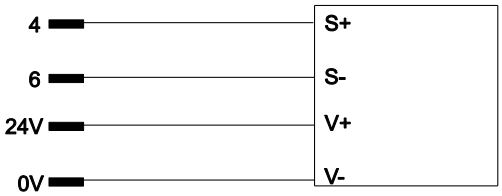
Connection example of distance potentiometer (ZWW 10 V supply voltage)

15-pin D-sub connector, analog I/O



Connection example of distance transducer (ZKW 24 V supply voltage)

15-pin D-sub connector, analog I/O



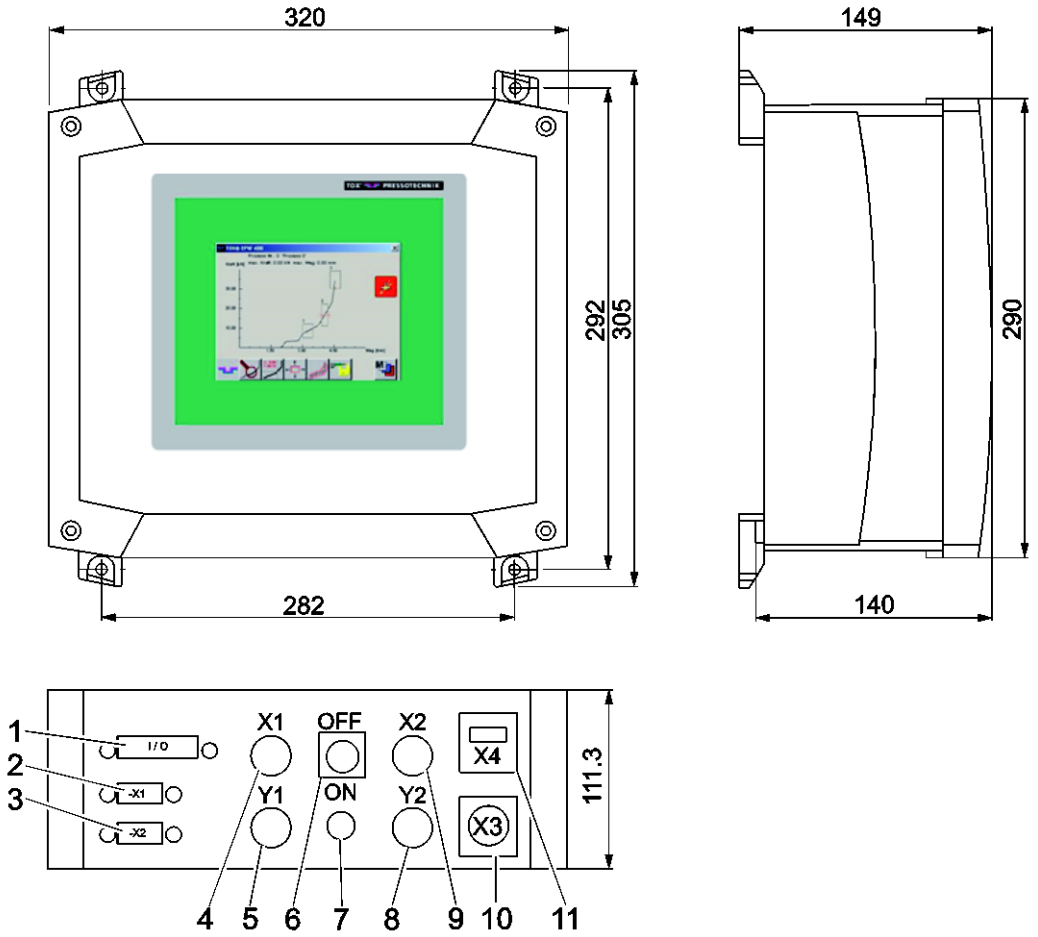
3.3 Overview of wall-mounted version

3.3.1 Power supply

Connection M12 connector

Pin	voltage	Type	Designation
1	24 V DC	I	24 V supply voltage
3	0 V / DC	I	GND supply voltage
5	PE	I	PE

3.3.2 Dimensions of wall-mounted version



1 Input / output

2 Profibus interface (optional)

3 RS232 interface (optional)

4 Distance transducer X1

5 Force transducer Y1

6 Main switch

7 Supply voltage 24 V DC

8 Force transducer Y2 (only Version 22)

9 Distance transducer X2 (only Version 22)

10 Ethernet interface

11 USB interface

3.3.3 Wall-mounted housing: digital inputs I0-I15 (25-pin D-sub female connector)

Pin, D-SUB 25	OK	Color code	Designation
14	I0	White	Program bit 0
15	I1	Brown	Program bit 1
16	I2	GREEN	Program bit 2
17	I3	YELLOW	Program bit 3
9	I4	White-blue[3]	Program bit 4
10	I5	Brown-blue[3]	Program bit 5
18	I6	Grey	Program strobe
19	I7	White-yellow	Offset external
20	I8	White-grey	Start measurement
	I9		Reserve
21	I10	White-pink	Control panel interlock
22	I11	Brown-red[3]	Error reset
	I12		Reserve
13	I13	White-red[3]	Configurable input
25	I14	[3]	Access level bit 1
12	0 V	Brown-green	0 V external (PLC)
11	0 V internal	Blue	0 V internal
23	24 V inter-nal	Pink	+24 V from internal (source)

[3] Must be connected later

3.3.4 Wall-mounted housing: digital outputs Q0-Q7 (25-pin D-sub female connector)

Pin, D-SUB 25	OK	Color code	Designation
1	Q0	Red	OK
2	Q1	Black	NOK
3	Q2	Yellow-brown	NOK alarm
4	Q3	Violet	Switching point S1[4] / Enable
5	Q4	Grey-brown	Switching point S2[4] / NOK buzzer
6	Q5	Grey-pink	Ready for measurement
7	Q6	Red-blue	Program ACK
8	Q7	Pink-brown	Switching point 3[4] / item quantity warning
12	0 V	Brown-green	0 V external (PLC)
24	24 V	White-green	+24 V external (PLC)

[4] Output function configurable

3.3.5 Standard wall-mounted housing: pin assignment, DMS force transducer (channel Y)

Only hardware model EPW 400.202.0X (with DMS subprint)

Note

For hardware model EPW 400.022.0X (2-channel) the second analog input card is installed for channel pair 2 X/Y!

The connections are occupied the same as for the first card.

(12-pin round socket)

The force measurement on channel Y is optionally carried out using a DMS force transducer or a measuring sensor with standardized process signal 0 - 10 V.

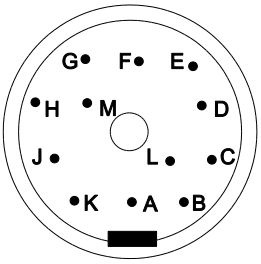
Standardized measuring sensor

Auxiliary voltage: 24 V ± 5%, max. 100 mA (x = 100 mA, y = 100 mA)

Signal: 0 – 10 V

Pin assignment force signal (channel Y)

12-pin round socket

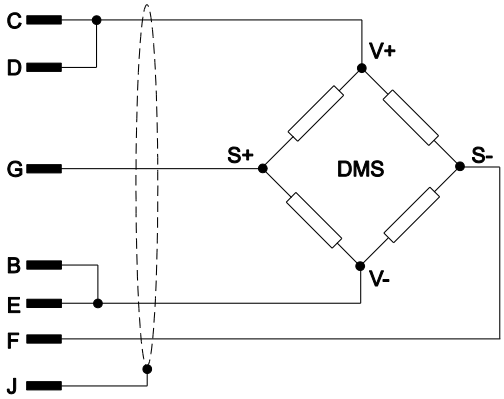


Pin	Signal name	Type Input/Output	Notes
C	V+	o	Supply DMS V+
B	V-	o	Supply DMS V-
f	S- DMS	I	Measuring signal DMS -
G	S+ DMS	I	Measuring signal DMS +
E	F- DMS	o	Sensor cable DMS -
D	F+ DMS	o	Sensor cable DMS+
j	Shield	o	Shield
k	24 V DC	o	Auxiliary power for external measuring sensor 24 V
a	0 V DC	o	Earth external
L	Signal +	I	Input standardized measuring signal
m	Signal -	o	Measuring signal earth
H	Tare		Signal tare

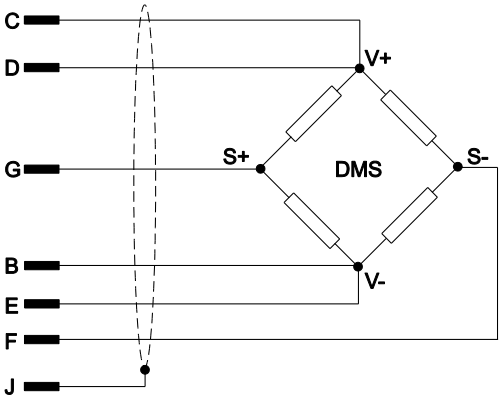
When connecting the DMS using the 4-conductor technique, pins C and D and pins B and E are bridged.

Wall-mounted housing: pin assignment, force transducer (channel Y)
(12-pin round socket)

Connection example: DMS without sensor cable

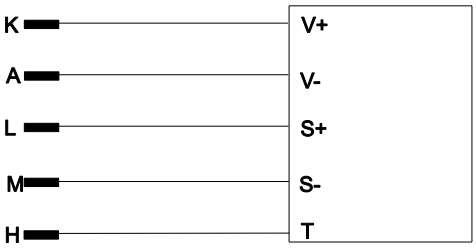


Connection example of DMS with sensor cable

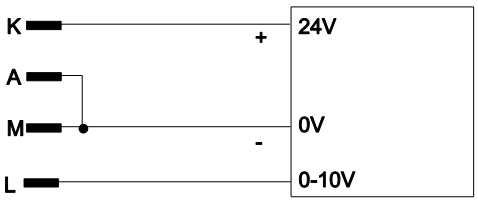


Connection example of sensor with standard signal 0 - 10 V (ZKN with tare)

24 V supply voltage



Connection example: ZDO



Pin assignment distance signal (channel X)

The pin assignment is identical in hardware models EPW400.202.0X and EPW400.202.1X.

Note

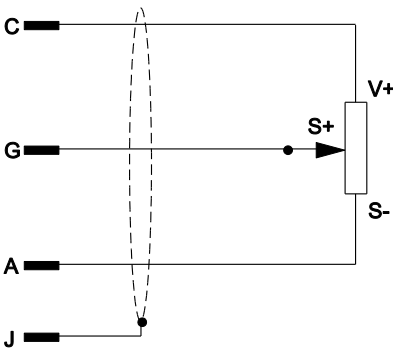
For hardware model EPW 400.022.0X (2-channel) the second analog input card is installed for channel pair 2 X/Y!

The connections are occupied the same as for the first card.

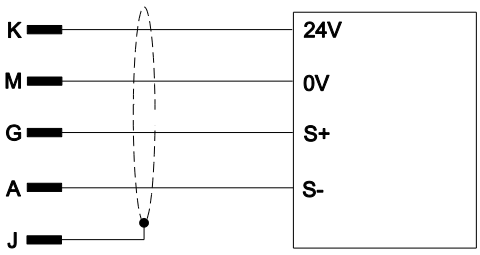
12-pin round socket

Pin	Signal name	Type Input/Output	Notes
C	10 V+	o	Auxiliary power for external measuring sensor 10 V
k	24 V DC	o	Auxiliary power for external measuring sensor 24 V
m	0 V DC	o	Earth external
G	Signal +	I	Input standardized measuring signal
a	Signal -	I	Measuring signal earth
j	Shield	o	Shield
H	Analog	o	Analog output 0 - 10 V process-bound
E	0 V DC	o	Earth analog output

Connection example of distance transducer potentiometer (ZWW 10 V supply voltage)



Connection example: distance transducer (ZKW)



3.3.6 Wall-mounted housing: pin assignment, force transducer (channel Y) Only hardware model EPW 400.202.1X

Note
Hardware model (2-channel) Version 22 is not provided with EPW 400.XX2.1X!

(12-pin round socket)

The force measurement on channel Y is optionally carried out using a DMS force transducer or a measuring sensor with standardized process signal 0 - 10 V.

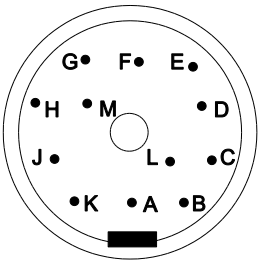
Standardized measuring sensor

Auxiliary voltage: 24 V ± 5%, max. 100 mA (x = 100 mA, y = 100 mA)

Signal: 0 – 10 V

Pin assignment force signal (channel Y)

12-pin round socket

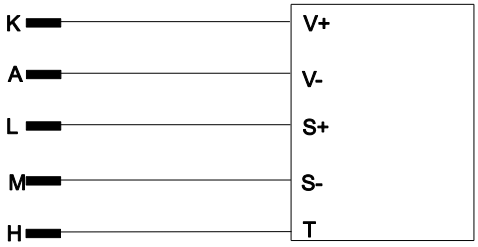


Pin	Signal name	Type Input/Output	Notes
C			
B			
f			
G			
E			
j	Shield	o	Shield
k	24 V DC	o	Auxiliary power for external measuring sensor 24 V
a	0 V DC	o	Earth external
L	Signal +	I	Input standardized measuring signal
m	Signal -	o	Measuring signal earth
H	Tare		Signal tare

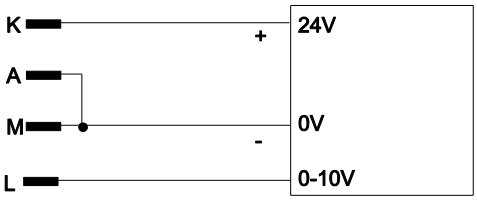
When measuring with internal measuring amplifier, pin E and pin L are bridged.

Connection example of sensor with standard signal 0 - 10 V (ZKN with tare)

24 V supply voltage



Connection example: ZDO

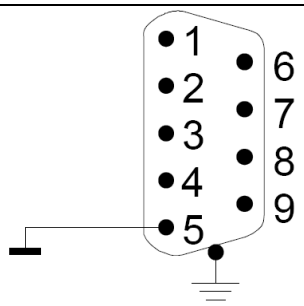


3.4 Interfaces

3.4.1 Profibus

According to ISO/DIS 11898, isolated

	Min.	max.
Output differential voltage	± 1.5 V	± 5 V
Input differential voltage	± 0.2 V	± 5 V
Input offset voltage	- 7 V/+ 12 V (to GND)	
Output drive current	± 55 mA (Udiff = ± 1.5 V)	
Transmission speed	Up to 100 m cable length	Max. 12000 kbit
	Up to 200 m cable length	max. 1500 kbit
	Up to 400 m cable length	max. 500 kbit
	Up to 1000 m cable length	max. 187.5 kbit
	Up to 1200 m cable length	max. 93.75 kbit
Number of subscribers per segment	Without repeater	max. 32
	With repeater	Max. 126 (every repeater used reduces the max. number of subscribers)
Connecting line	Shielded, twisted	Wire cross-section
		Min. 0.34 mm²
		Wire diameter 0.64 mm
Wave impedance	135 to 165 Ω	
Capacitance per unit length	< 30 pf/m	
Loop resistance	110 Ω/km	
Recommended cables	For fixed installation of UNITRONIC® BUS L2/FIP or	
	UNITRONIC® BUS L2/FIP 7-wire	
	For flexible installation of UNITRONIC® BUS FD P L2/FIP	
Node addresses	3 ... 124	



Pin	Profibus
3	RXD/TXD-P
4	CNTR-P (RTS)
5	0 V
6	+ 5 V
8	RXD/TXD-N

Note

The output voltage from pin 6 for termination with a terminating resistor is + 5 V.

3.4.2 Fieldbus interface

Data length: Byte 0-2

Inputs I0-I15	Designation	Field bus byte	Field bus bit
I 0	Program bit 0	0	0
I 1	Program bit 1	0	1
I 2	Program bit 2	0	2
I 3	Program bit 3	0	3
I 4	Program bit 4	0	4
I 5	Program bit 5	0	5
I 6	Program strobe	0	6
I 7	Offset external	0	7
I 8	Start measurement	1	0
I 9	Reserve	1	1
I 10	Control panel interlock	1	2
I 11	Error reserve	1	3
I 12	Reserve	1	4
I 13	Configurable input	1	5
I 14	Access level bit 1	1	6
I 15	Reserve	1	7

Outputs Q0-Q7	Designation	Field bus byte	Field bus bit
Q 0	OK	0	0
Q 1	NOK	0	1
Q 2	NOK alarm	0	2
Q 3	Switching point S1[5]	0	3
Q 4	Switching point S2[5]	0	4
Q 5	Ready for measurement	0	5
Q 6	Program ACK	0	6
Q 7	Switching point S3[5]	0	7

[5] Output function options:

Switching point S1 / Enable

Switching point S2 / Buzzer

Switching point S3 / Warning piece counter

Format of final values via fild bus (bytes 3 – 63):

The end values are written on bytes 3 to 55 on the field bus (if this function is activated).

- Byte X (structure):

7	6	5	4	3	2	1	0	Byte X

Byte 3:	Status (Status 2 = OK / Status 3 = NOK)
Byte 4, 5, 6, 7:	Running number
Byte 8:	Program
Byte 9:	Status Warning*
Byte 10, 11:	Max. force [kN] * 100
Byte 12, 13:	Max. distance [mm] * 100
Byte 14:	Second
Byte 15:	Minute
Byte 16:	Hour
Byte 17:	Day
Byte 18:	Month
Byte 19:	Year
Byte 20, 21:	Window 1, actual force [kN] * 100 (for actual distance [mm])
Byte 22, 23:	Window 1, force upper limit [kN] * 100
Byte 24, 25:	Window 1, force lower limit [kN] * 100
Byte 26, 27:	Window 1, actual distance [mm] * 100
Byte 28, 29:	Window 1, distance upper limit [mm] * 100
Byte 30, 31:	Window 1, distance lower limit [mm] * 100
Byte 32, 33:	Window 2, actual force [kN] * 100 (for actual distance [mm])
Byte 35, 35:	Window 2, force upper limit [kN] * 100
Byte 36, 37:	Window 2, force lower limit [kN] * 100
Byte 38, 39:	Window 2, actual distance [mm] * 100
Byte 40, 41:	Window 2, distance upper limit [mm] * 100
Byte 42, 43:	Window 2, distance lower limit [mm] * 100
Byte 44, 45:	Window 3, actual force [kN] * 100 (for actual distance [mm])
Byte 46, 47:	Window 3, force upper limit [kN] * 100
Byte 48, 49:	Window 3, force lower limit [kN] * 100
Byte 50, 51:	Window 3, actual distance [mm] * 100
Byte 52, 53:	Window 3, distance upper limit [mm] * 100
Byte 54, 55:	Window 3, distance lower limit [mm] * 100
Byte 56, 57:	Actual value force [kN] * 100
Byte 58, 59:	Actual value distance [mm] * 100
Byte 60 - 63:	Reserve

Legend Byte 9

Meaning	Value
No Warning	0
Warning limit: IO error order counter	30
Warning limit: Total error order counter	31
Warning limit: Error shift counter	32
Warning limit: Total error shift counter	33
Warning limit: Tool counter	34

Bytes 56 – 59 Actual Values

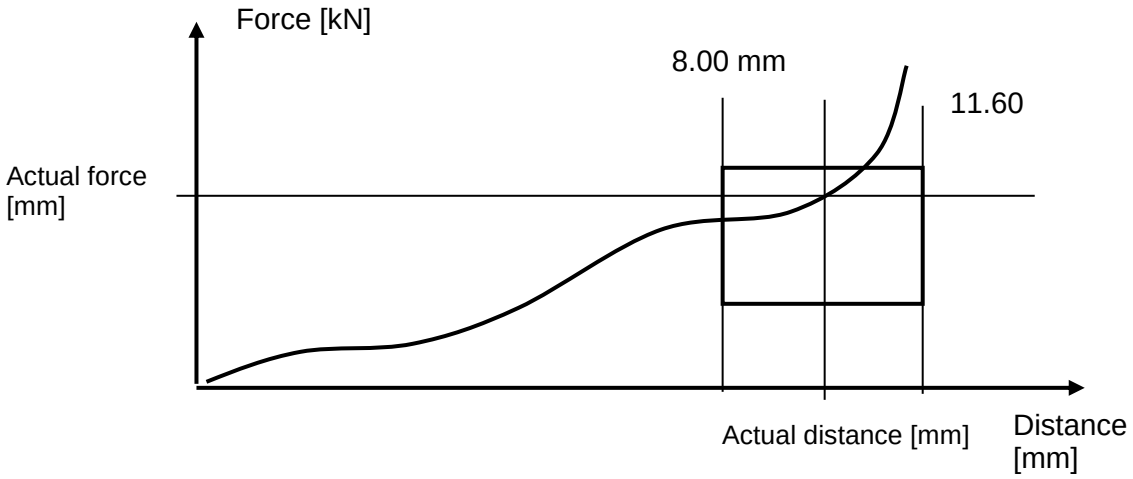
The actual distance [mm] of the respective window is determined as follows:

The **actual distance** [mm] is exactly in the centre of the window in X-direction.

Example:

The window extends from 8.00 mm to 11.60 mm => actual distance [mm] = 9.80 mm.

The **actual force** [kN] is the point where the measurement curve intersects the actual distance [mm].



4 Transport

4.1 Storage

- Cover the electrical connections to protect them from dust, e.g. with adhesive tape.
- Protect the display against sharp-edged objects. If necessary, attach a suitable protective cover (e.g. made of cardboard or hard foam).
- Use a dry, ventilated room for storage.
- Enwrap the device (e.g. with a plastic bag).
- In case of high humidity: add a drying agent to the packaging (e.g. silica gel).

4.2 Transport

- Protective measures: as described in chapter *Storage*.
- Packaging:
  - Use a stable transport container for dispatch that has all-round interior padding.
  - Ensure that there is sufficient distance to the walls of the transport container.
  - Fix the device securely inside the transport container.
- Accompanying documents (see chapter *Dispatch for repair*, p. *45*)

4.3 Dispatch for repair

If you send the device for repair to the manufacturer's works or to an appropriate technical service provider, please include the following notes so that we can return the device to you as quickly as possible:

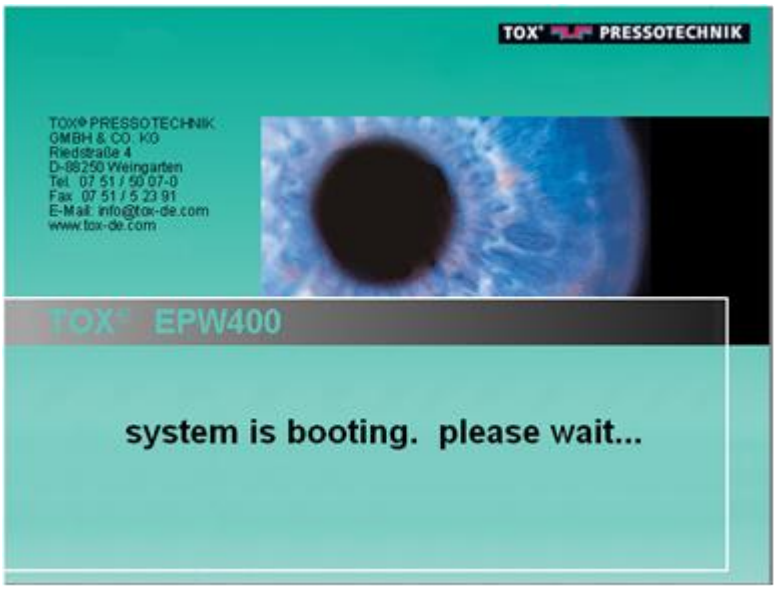
- A detailed, precise description of the fault (however, while keywords are sufficient, the brief note 'device is defective' helps very little); if the malfunction is unclear, include also a brief description of the operating conditions and installations (upstream devices, etc.).
- The name of our employee who is informed about the defect or with whom you have agreed to send the device to the manufacturer.
- The name of the contact person in your company for possible queries.

Please also include information even if the matter has already been discussed in detail with one of our employees.

5 Operating the device

5.1 Switching on the EPW 400

After it has been switched on, the device displays the start screen:



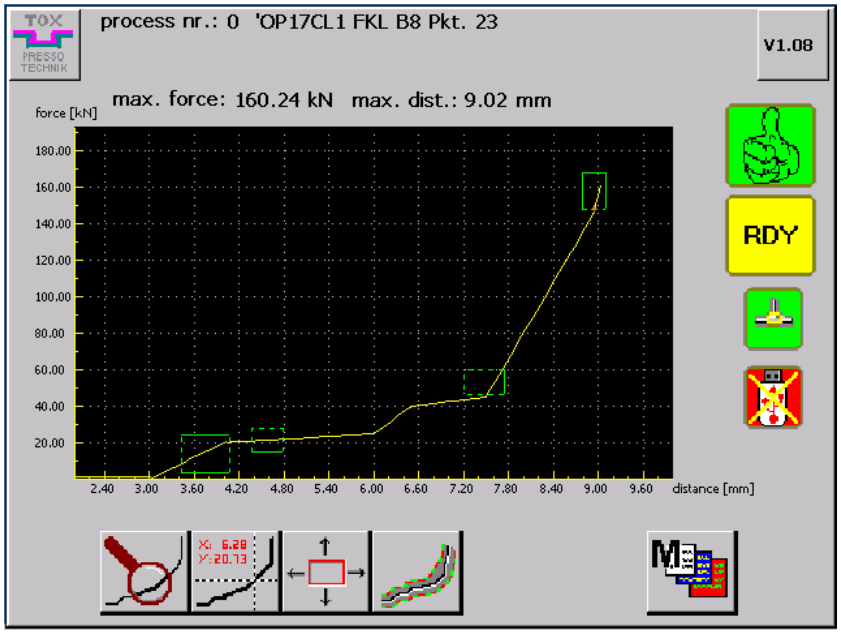
Once Windows CE and the necessary applications have loaded, the device will show the main menu (graphical display of measured values).

5.2 Operating the device via touch screen
(touch-sensitive screen)

The touch screen displays the dialogue boxes for measuring mode or configuration of the EPW 400. Depending on operating mode, the buttons and fields are assigned to different displays and functions. The windows are explained in the corresponding chapters of the operating manual.

The meaning of each button is defined in the description of the different menus.

5.3 Main menu 'Measuring'

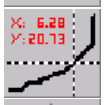
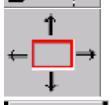
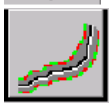


During measuring operation, the measuring display appears. The measurement curve, the configured windows and the envelopes are displayed in graph form. The selected zoom area displays the plotted force/travel area.

In the upper status bar, the current process number is faded in. The second line displays the process number assigned to the process and the EPW 400 process name. The third status bar provides an additional numerical display of the measured values for max. force [kN] and max. distance [mm].

An error is indicated by a red bar, a message by a yellow bar.

5.3.1 Buttons (from left to right)

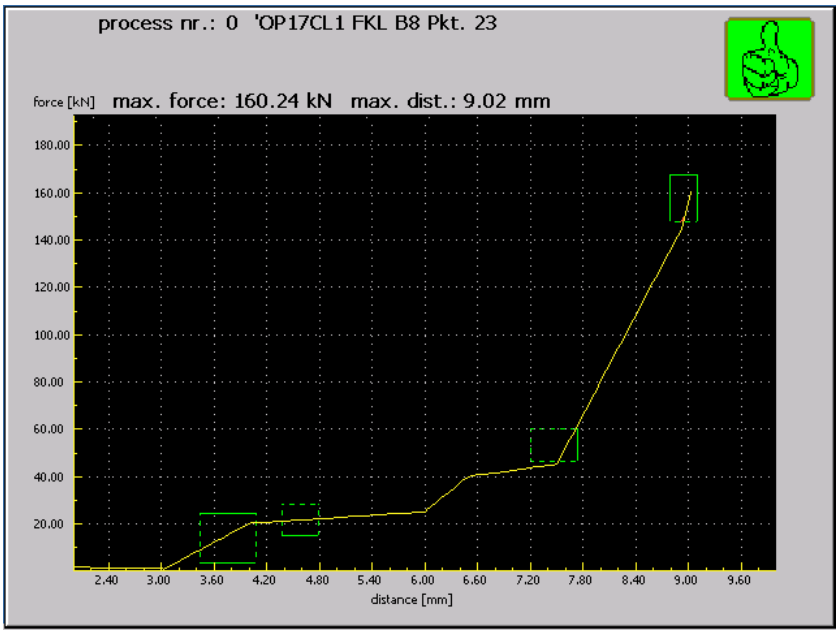
	Zoom	Changes the display detail
	Measure curves	Accessories for curve measuring
	Edit windows	Opens the menu 'Edit window'
	Edit envelope	Opens the menu 'Edit envelope curve'

	Menu	Opens the 'Maintenance' menu
	Error reset	Resets an error. This button appears only in case of an error.
	Firmware version	Reads the firmware version.

5.3.2 Icons

	Measure OK	The last measurement was OK
	Measurement NOK	Last measurement was not OK. At least one evaluation criterion was violated (envelope / window)
	Measure active	Measurement is running, values are being recorded.
	Measurement stopped manually	Measurement stopped by clicking on symbol 'Measurement OK', 'Measurement NOK', or 'Measurement running'. Enable the measurement by clicking on symbol 'Measurement stopped'.
	Device ready to measure	EPW 400 is ready to start a measurement.
	Device not ready to measure	EPW 400 not ready to start a measurement.
	Error	Device signals an error. The exact cause of the error is highlighted in red at the top of the screen.
	Ethernet interface not initialized	Connection via Ethernet to a PC not yet possible.
	Ethernet interface initialized	Connection via Ethernet to a PC realized
	No USB stick inserted	No USB stick found
	USB stick inserted	USB stick detected

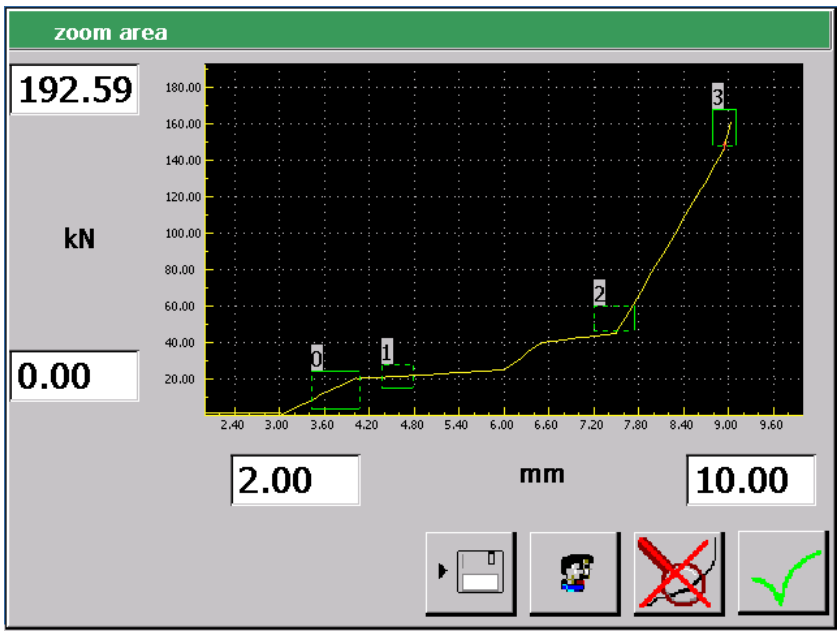
5.3.3 Full screen display:



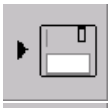
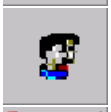
A change between normal display and full screen display is possible by tapping on the diagram. As soon as a measurement is started, a change to full screen mode takes place automatically.

5.4 Menu 'Zoom'

This window contains four text fields with zoom areas (two for each of the X and Y axes).



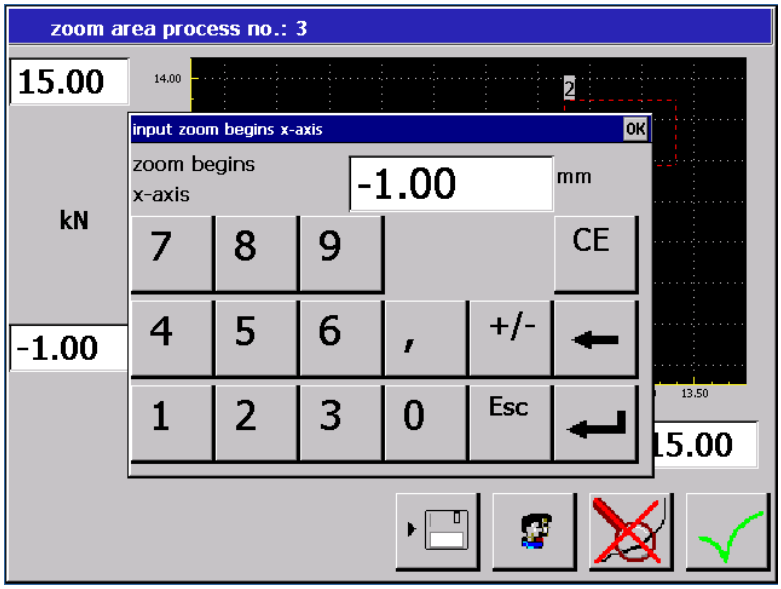
5.4.1 Buttons (from left to right)

	Save user zoom	Saves the current setting as a user zoom
	Restore user zoom	Opens the saved user zoom
	Cancel zoom	Sets the maximum zoom area (fixed by the nominal load of the sensors)
	Enter	Takes over the set zoom area and returns to the main menu
	Undo	Goes back to the previous zoom view; this button appears when a change is made to the zoom setting.

The zoom area can be changed by direct input of the required value.

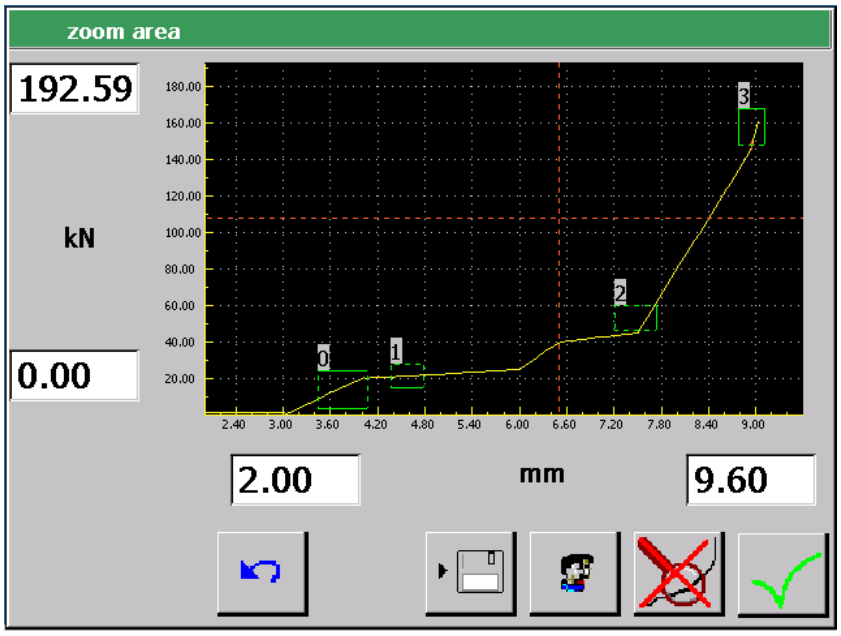
➔ Tap the input field you wish to change.

A window with a numerical tap field will be displayed:

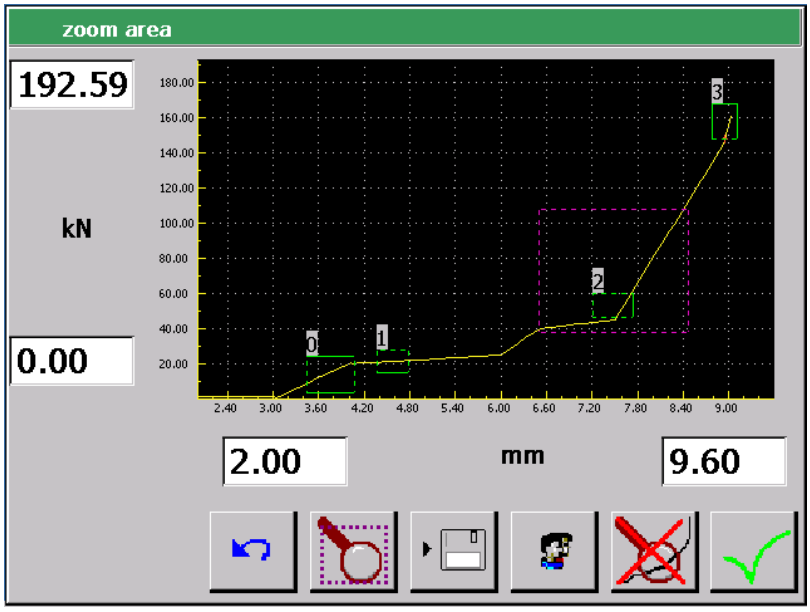


➔ Enter the required value and confirm it with the 'Enter' button.

➔ It is also possible to change the zoom area graphically by first tapping the diagram to bring up a crosshair. This crosshair is the starting point for the zoom section:

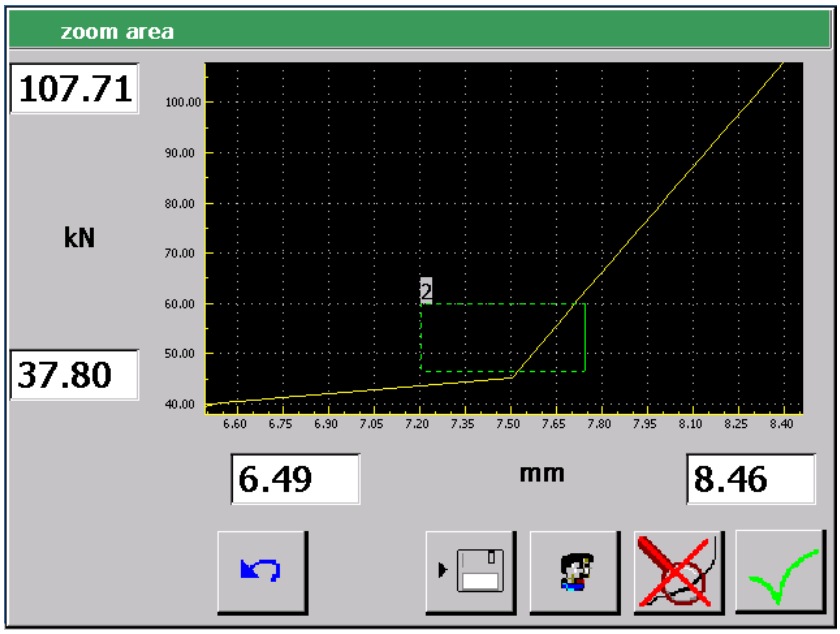


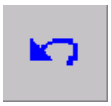
➔ Then tap on the graph again to set the place where the end point of the frame will be:



As soon as a purple frame becomes visible

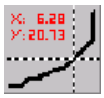
the <Zoom in frame> button appears for zooming in the selected frame;



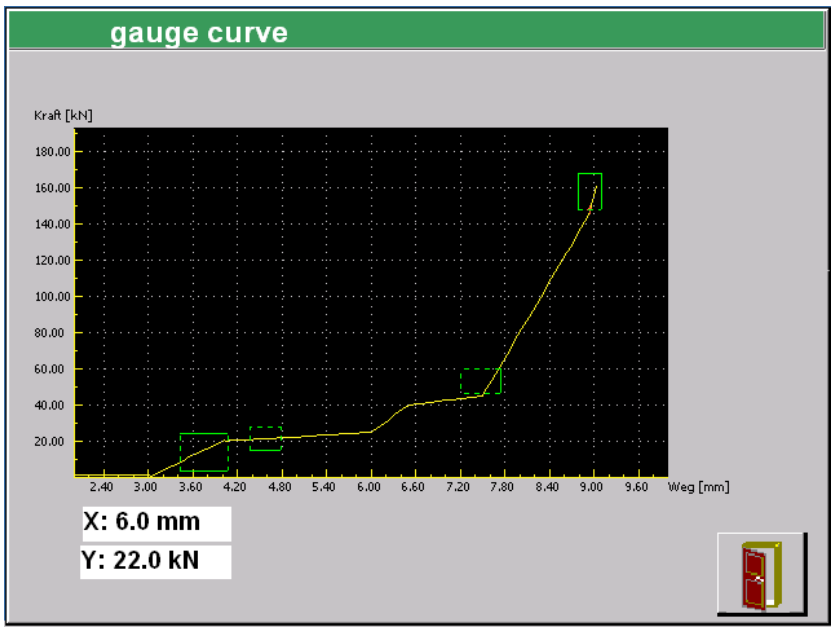


When a change is made to the zoom setting, an 'Undo' button appears, which will take you back to the previous zoom view.

5.5 Menu 'Gauge curve'



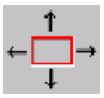
By tapping on the gauge curve, the associated pair of values is shown.



5.5.1 Buttons

Back, goes back to main menu "Measuring mode"

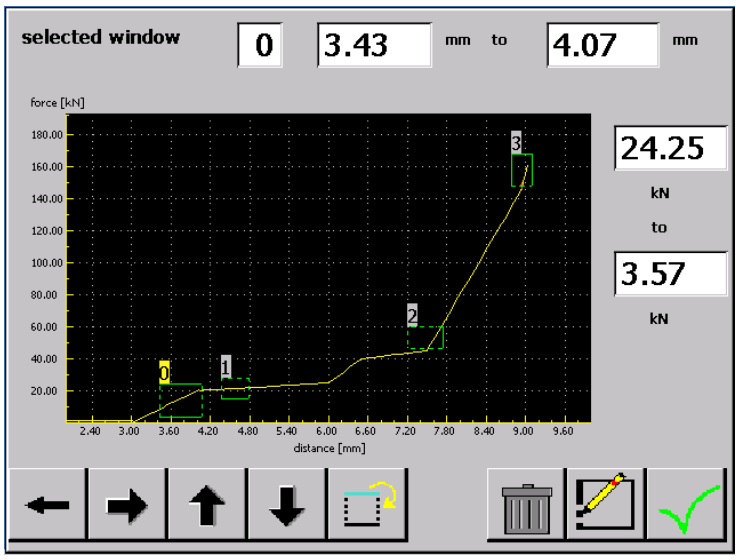
5.6 Menu 'Windows'



The evaluation windows are changed, created or deleted in this menu. The settings in this menu apply to the currently selected process (e.g., process 3).

The process can be changed either by means of an external PLC or in the "Processes" menu (see page 65). A process may include up to 10 windows, with window 0 always being an online window; this window is monitored during measuring. As soon as a violation is identified, a signal is forwarded to the PLC in real time so that action can be taken (e.g. if a press comes down at an angle or there is a premature step-up in force, it will be opened immediately).

Only one window is selected each time and is recognizable by 'Text field selected window' or by the yellow window number. A window is selected by tapping on 'Text field selected window' followed by the input of the window number or by tapping the window to be selected in the diagram. Four text fields show the dimensions of the selected window.



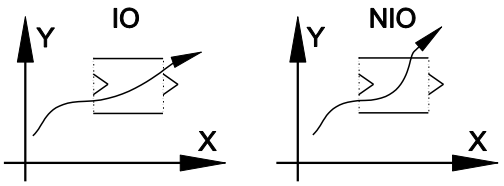
5.6.1 Edit window type

By tapping on button 'Edit window type', it is possible to edit the type of the selected window.

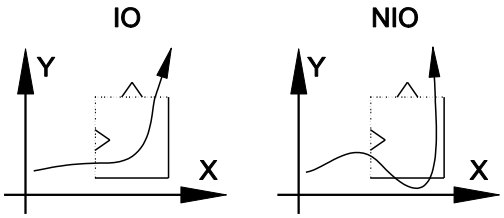
Online window Window '0'

Three window types are available for online window Window '0' which cannot be changed:

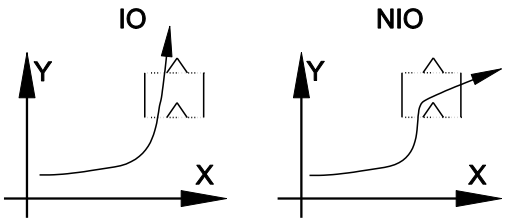
- Online Window TYPE A:



- Online Window TYPE B:

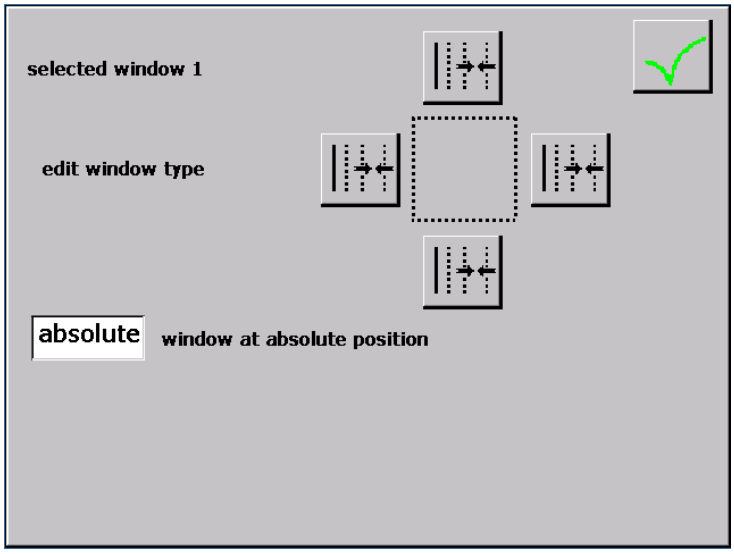


- Online Window TYPE C:



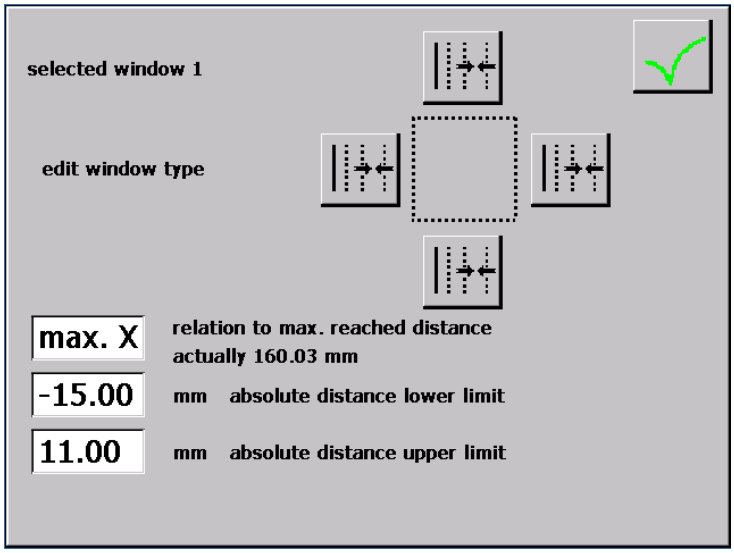
Window '1' to Window '10':

The following submenu appears in which one can switch between modes 'Entry', 'Exit', 'Entry/exit possible' and 'No entry/exit' for each boundary of the window (left, right, top, bottom).



Absolute	The selected window remains in the absolute position
Max. X	The selected window is positioned with reference to the maximum value reached (max. X)
Mean value X	The selected window is positioned with reference to the last specified OK curves stored (mean value X)

Window 'Max. X'



The selected window is positioned with reference to the maximum value reached (max. X).

The position can be defined using the 'Absolute distance lower limit' and 'Absolute distance upper limit' values.

Proceed as follows:

➔ Tap on the input field in front of 'Absolute distance lower limit'.

The input window containing the numerical keypad appears.

➔ Enter the distance lower limit using the numerical keypad (enter a decimal point before any decimal places; if no decimals places are entered, the display will show two decimal places '.00').

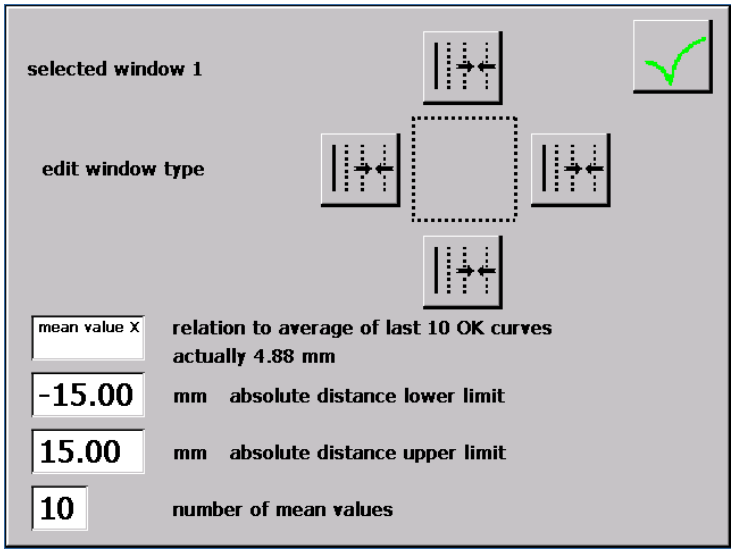
➔ Confirm the entry with the 'ENTER' button.

➔ Tap on the input field in front of 'Absolute distance upper limit'. The input window containing the numerical keypad appears.

➔ Enter the distance upper limit using the numerical keypad (enter a decimal point before any decimal places; if no decimals places are entered, the display will show two decimal places '.00').

➔ Confirm the entry with the 'ENTER' button.

Window 'Mean value X'



The selected window is positioned with reference to the last specified OK curves stored (mean value X)

The position can be defined using the 'Absolute distance lower limit' and 'Absolute distance upper limit' values.

The "Number of mean values" field specifies the number of OK curves used for the calculation.

Proceed as follows:

➔ Tap on the input field in front of 'Absolute distance lower limit'.

The input window containing the numerical keypad appears.

➔ Enter the distance lower limit using the numerical keypad (enter a decimal point before any decimal places; if no decimals places are entered, the display will show two decimal places '.00').

➔ Confirm the entry with the 'ENTER' button.

➔ Tap on the input field in front of 'Absolute distance upper limit'. The input window containing the numerical keypad appears.

➔ Enter the distance upper limit using the numerical keypad (enter a decimal point before any decimal places; if no decimals places are entered, the display will show two decimal places '.00').

➔ Confirm the entry with the 'ENTER' button.

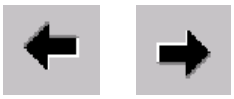
The 'Change window side' button switches between 'left-hand side highlighted', 'right-hand side highlighted', 'top highlighted', 'bottom highlighted' and 'entire window highlighted'. The corresponding side can also be highlighted by tapping the line of the window. The whole window is highlighted by tapping in the centre of the window.

The 'Dustbin' button deletes the selected window.

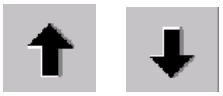
You can change the size of a window

- By entering the required values in the text fields or
- By marking one side and tapping on the 'arrow buttons'

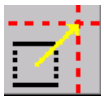
Arrow buttons



Move the highlighted side to the left or the right



Move the highlighted side up or down



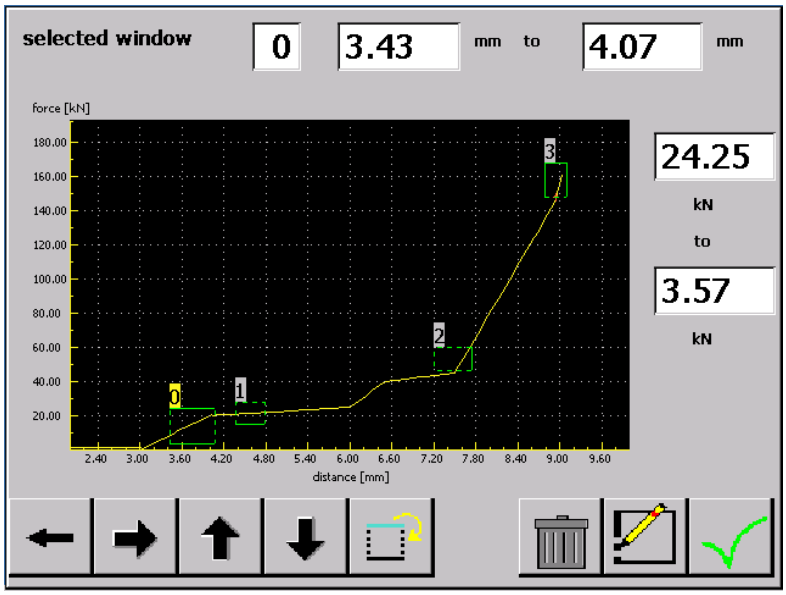
Move window button

The third option for moving and highlighting a side is to tap on the graph and bring up a cross (note: do not tap inside a window, or you will select the window) and then tap the 'Move window' button.

This puts the selected side of the window onto the corresponding axis of the cross.

In the same way as changing the size of a window, also the position can be moved by highlighting the entire window when a cross is visible. Tapping the 'Move window' button will move the center point of the window to the center of the cross.

It is also possible to move the window (with the whole window highlighted) using the arrow keys ⇩, ⇧, ⇨ and ⇦.

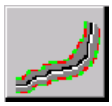


'Accept window' button

Close this window by tapping on the "Accept window" button.

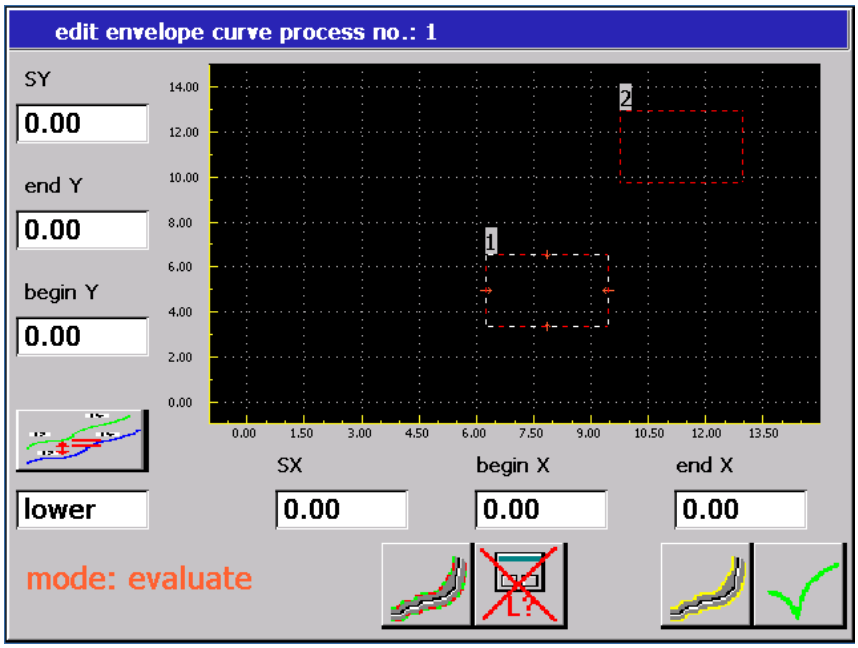
The current window settings will be adopted.

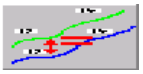
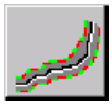
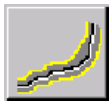
5.7 Menu 'Envelope curve'



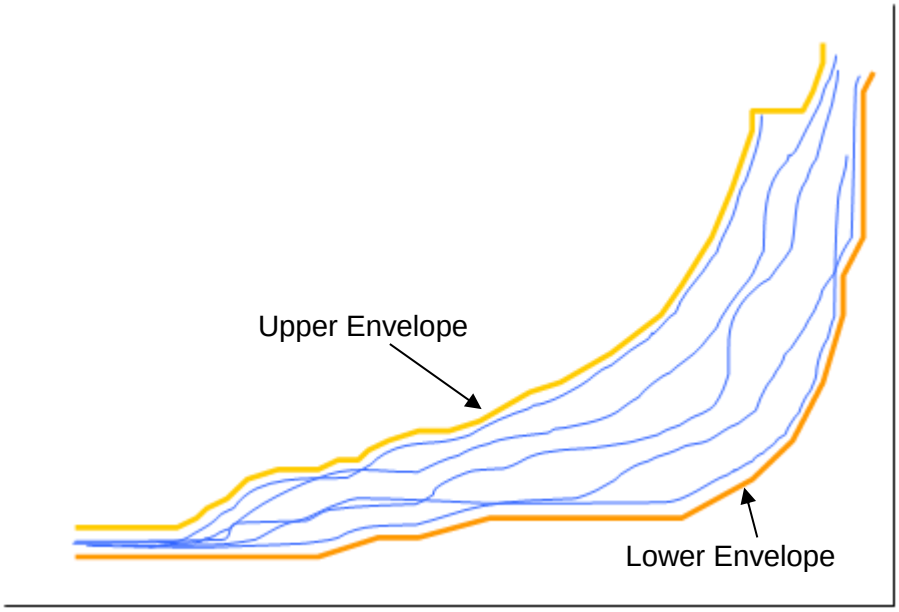
In this menu the envelope parameters can be changed.

The settings in this menu apply to the process currently selected (e.g. process 3).



	Copy envelope curve parameters	Copies the lower entered envelope curve parameters to the upper ones or the upper ones to the lower ones. Depending on what was taught first.
	Change mode	Switches the envelope mode between 'Evaluation', 'Teach' and 'Teach new'
	Teach-in on request	Specifies whether a curve is taught after confirmation by the user or automatically after each measurement.
	Switch envelope function on/off	Switches the monitoring system on or off via the envelope. The set envelope parameters remain unchanged.
	Teach additional curve	Here a NOK curve can be taught. This button only appears after a NOK evaluation of the last curve and a violation of the envelope.
	Apply inputs, return to main menu	The inputs are adopted and the main menu is called up.

In 'Teach' mode, the measured curves are plotted and the envelope limits are generated. This results in an upper and a lower envelope.



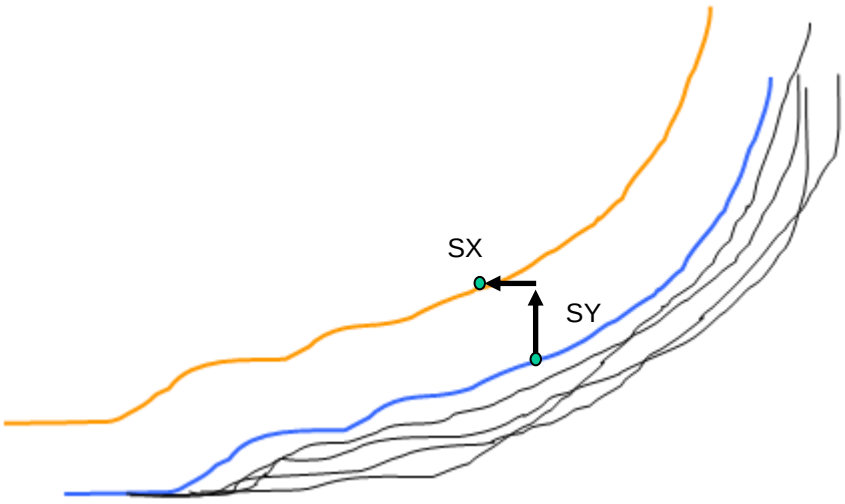
In mode 'Teach new', the existing envelopes are cancelled and the envelope end is built again based on the following measurements.

A change from mode 'Evaluation' to mode 'Teach' is always possible for teaching further curves.

If in mode 'Evaluation' a curve violates the upper or the lower envelope, a button appears in menu 'Envelope' where a teach-in of this curve can be added to the envelope.

5.7.1 Text fields

SY:	Force value by which the selected envelope (upper or lower) is moved vertically in relation to the corresponding envelope curve.
End Y:	Upper limit of the envelope.
Begin Y:	Lower limit of the envelope.
Upper / lower:	Choice of whether the parameter applies to the upper or lower envelope.
SX:	Distance value by which the selected envelope (upper or lower) is moved horizontally in relation to the corresponding envelope curve.
Begin X:	Left-hand limit of the envelope.
End X:	Right-hand limit of the envelope.



To teach an envelope, proceed as follows:

Deactivate the 'Envelope' function and draw at least one curve.

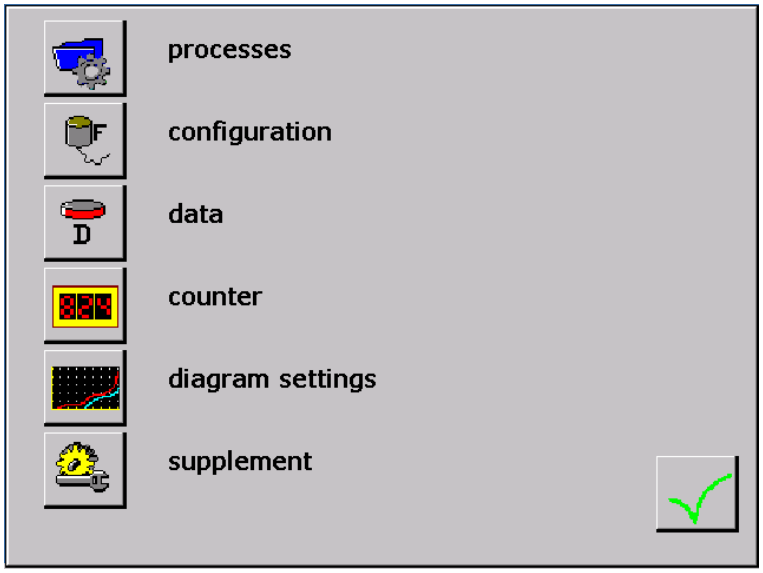
- ➔ Call up the 'Edit envelope' menu.
- ➔ Tap on 'upper' to activate the upper envelope.
- ➔ Tap on 'End X' to set the envelope to the achieved final distance of the curve.
- ➔ Tap on 'Begin X' to set the value to '0'.
- ➔ Tap on 'End Y' to set the envelope to the final force achieved.
- ➔ Tap on 'Begin Y' to set the value to '0'.
- ➔ Tap on 'lower' to activate the lower envelope.
- ➔ Tap on 'End X' to set the envelope to the achieved final distance of the curve.
- ➔ Tap on 'Begin X' to set the value to '0'.
- ➔ Tap on 'End Y' to set the envelope to the final force achieved.

- ➔ Tap on 'Begin Y' to set the value to '0'.
- ➔ Change the mode to 'Teach new', or to 'Teach' if previously taught curves are to be retained.
- ➔ Go to the 'Main menu'.
- ➔ Draw the required number of curves (measure).
- ➔ Go to the 'Envelope' menu again.
- ➔ Using SX and/or SY, move the upper / lower envelope horizontally / vertically by entering the desired value.

  The upper / lower envelope can be limited or expanded horizontally using Begin X / End X and limited or expanded vertically using Begin Y / End Y.
- ➔ Go to 'Evaluate' mode.
- ➔ Go to the 'Main menu'.
- ➔ The curves will now be recorded, and evaluated on the basis of the envelope and any windows that have been set.

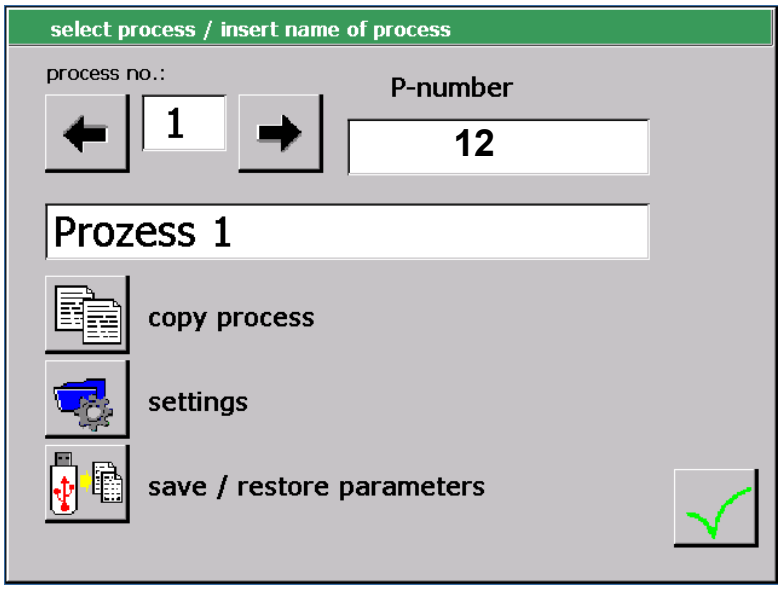
6 Configuring the EPW 400

Tapping the 'Menu' button opens the Configuration menu. Here you can call up the submenus, which enable you to adjust the settings for the following areas:



6.1 ProcessesScreen

- Select process number (e.g. 5)
- Allocate a name to the process (40 characters max., e.g. process 5)
- Copy processes



Close the 'Process' window by tapping on the 'Accept' button. The selected process will be adopted.

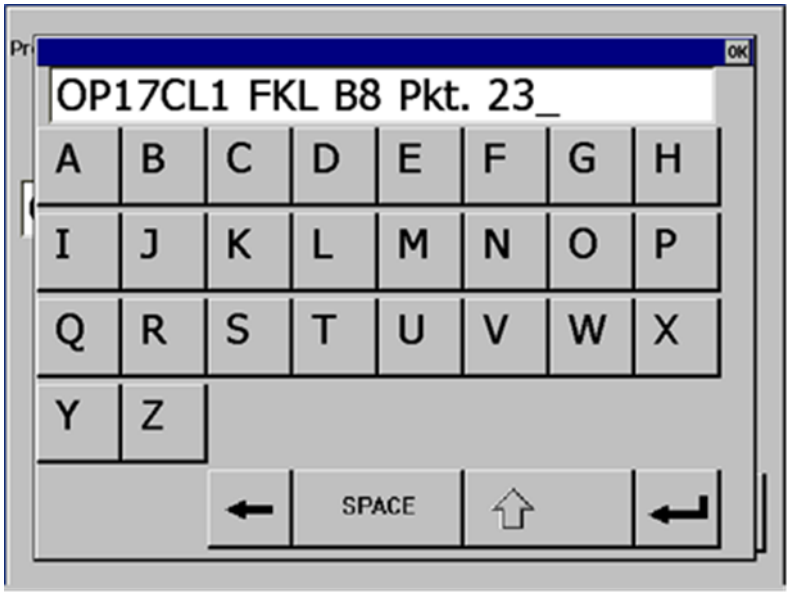
6.1.1 Select process number (64 processes)

- The process number can be selected using the arrows ⇨ and ⇦.
- The process number can be accessed by numerical input:
  Tap the Process No. input field.
  A window containing a numerical keypad will open.

➔ Enter the required process number and confirm this value with the 'Enter' button.

6.1.2 Assign process name (max. 40 characters)

You can assign a name to each process. Tap on Process Name, and a window will open with an alphanumeric keypad for entering the name:



By pressing the shift key ⇧ you can switch to

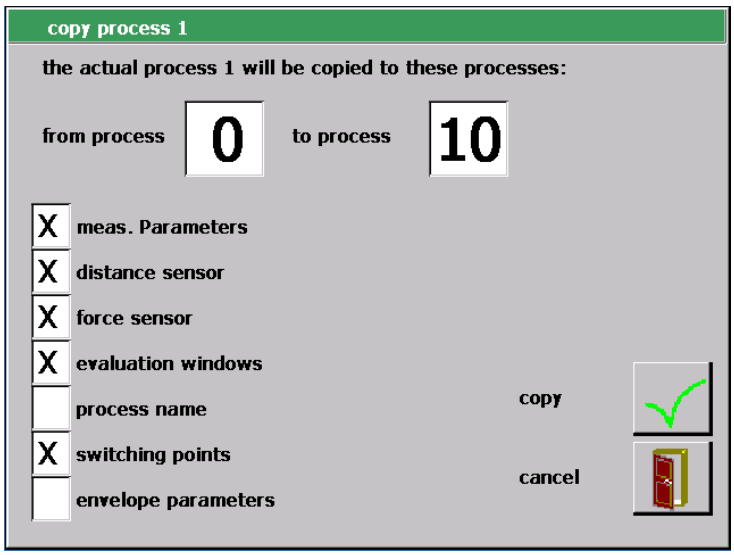
- capital letters
- lowercase letters
- numbers and special characters

➔ The entry is adopted using the 'Enter' button.

➔ You can also enter a number containing up to ten digits for each process. Tap on the number and a window will open with a numerical keypad, which can be used to enter the number.

6.1.3 Copy processes

Tapping on 'Copy Process' opens a window in which you can set the parameters of the current process to be copied to other processes:



By tapping the input fields behind 'from process' and 'to process', the input window with the numerical keypad will be opened for the direct input of the numbers of the processes.

You can specify which process parameters to copy from the current process. Tapping the input fields next to the parameter designations selects (marked by "X") or deselects (empty field) the individual parameters.

In order to copy the selected parameters to one or to several consecutive processes, tap on the input field behind 'from process'. This opens the input window with the numerical keypad. Enter the number of the first process and confirm by pressing 'Enter'. Then tap on the input field behind 'until process'. In the input window with the numerical keypad, enter the number of the last process. A sequence in which process 0 follows process 63 is not allowed.

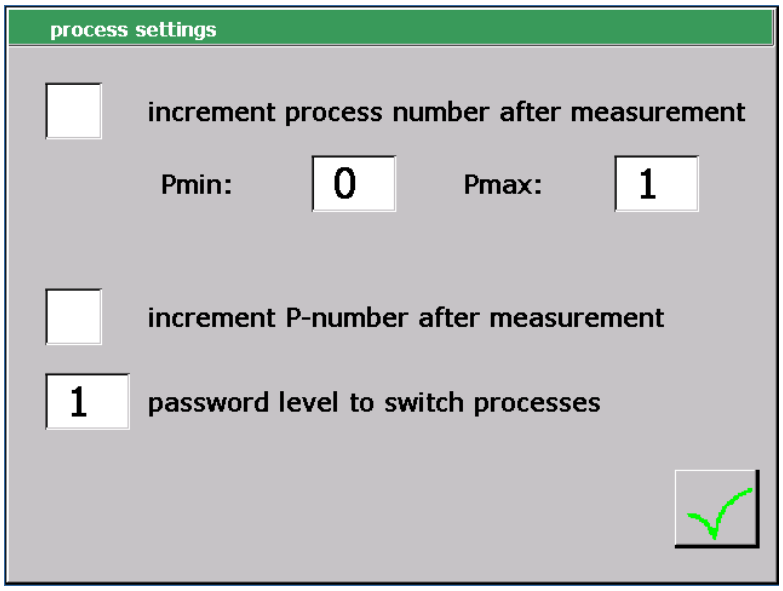
Attention

When copying data to all or some processes, the previous settings for these processes will be lost!

➔ Tap on 'Copy' to start the copying process. Tapping on the "Cancel" button will cancel the process.

6.1.4 Settings

Here the settings for the processes can be made.



X When the "Increment process number after measurement' field is activated, the process number is increased by one (authorization level 1 only). This means that the process is changed over to the next process.

By tapping the input fields behind 'Pmin' and 'Pmax', the input window with the numerical keypad will be opened.

1 In field 'Pmin' enter the start process number the counter is to adopt as starting point.

2 In field 'Pmax' enter the end process number up to which the counter is to increase the process number.

X When the "Increment P-number after measurement' field is activated, the proces number is increased by one (authorization level 1 only).

By tapping the input field in front of 'Password level to switch processes', the input window with the numerical keypad will be opened. Here the authorization level can be set that is necessary for the process changeover (authorization level 3 only).

X When the field 'Process selection without strobe is activated, the process is selected in dependence of the created binary pattern on the process preselection bits without strobe (only authorization level 2 or higher).

6.1.5 Saving / restoring parameters

Actuating button 'Save / restore parameters', opens the submenu for copying all parameters and processes from the USB stick.

Copy parameters to USB stick

Tapping on the 'Save Parameters on USB Stick' copies all parameters and processes to the USB stick.

Load parameters from USB stick

Tapping on 'Load Parameters from USB Stick' copies all parameters and processes from the USB stick.

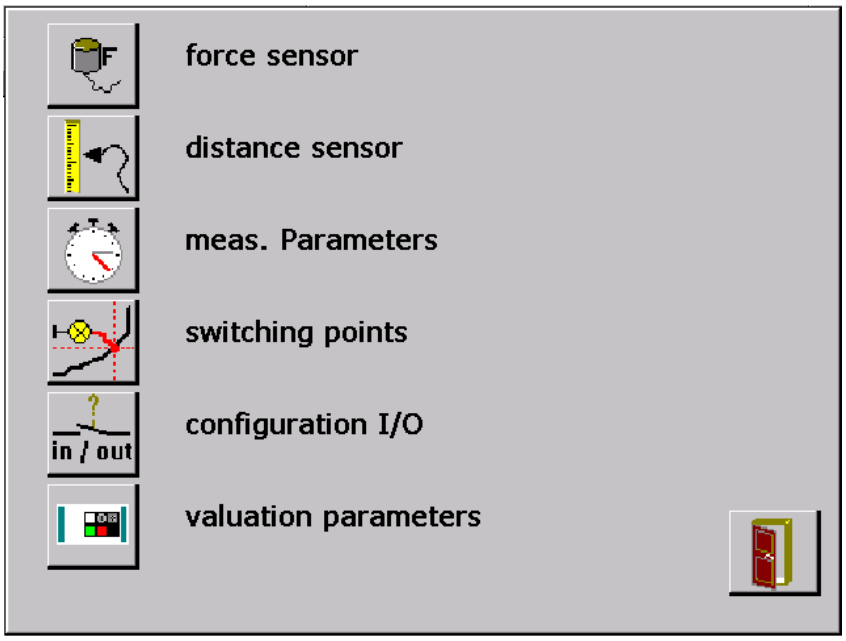
Data will be overwritten

When data are copied from the USB stick to the EPW 400, all processes and parameters will be overwritten. All previous processes and parameters will be lost!

6.2 Configuration

6.2.1 Force sensor

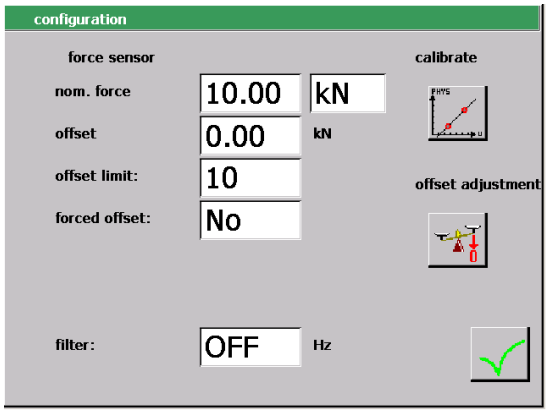
- Configuration of process-dependent parameters: force sensor, distance sensor, measuring parameters (measured data acquisition, start/stop conditions) and switching points.
- Configuration of global parameters (valid for all processes): I/O configuration and valuation options.



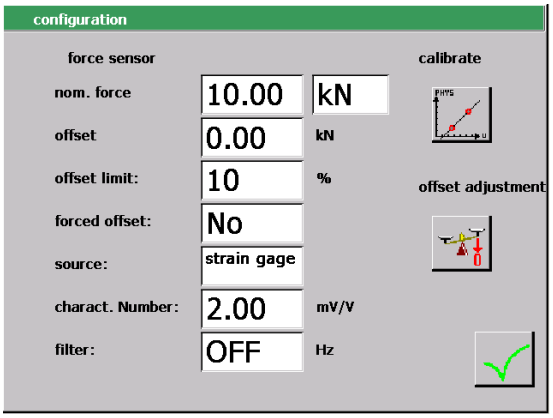
Force sensor, channel Y

In the opened window it is possible to fix the parameters of the force sensor separately for each process. The setting of the current process can be copied to other processes.

EPW 400.X02.X



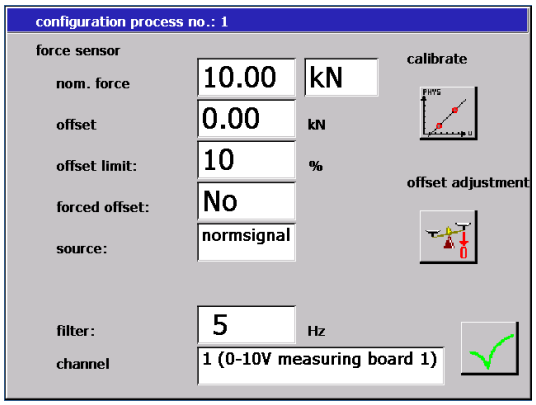
EPW 400.X02.0: DMS hardware version



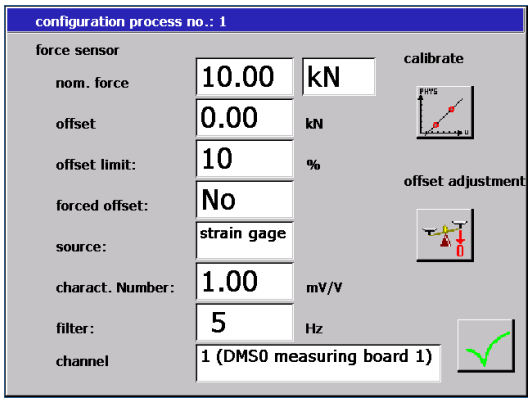
Nominal force of the force sensor (Nominal load) Version 22

In the opened window it is possible to select the parameters of the force sensor separately for each channel pair (measuring board). The setting of the current process can be copied to other processes.

EPW 400.X02.X



EPW 400.X02.0: DMS hardware version



Nominal force of the force sensor (Nominal load)

In this line, you can set the nominal force of the used force sensor. The nominal force is specified in kN. The nominal force is achieved at the max. measuring signal of the force transducer. For a standard signal of 0-10 V, the nominal force is 10 V.

➔ Tap on the input field after 'Nominal force'. The input window containing the numerical keypad appears.

➔ Enter the nominal force using the numerical keypad (enter a point before decimal places; if no decimal places are entered, then the display shows two decimal places '.00').

➔ Confirm the entry with the 'ENTER' button.

➔ By tapping on the measurement unit, a window with an alphanumerical keypad appears. You may enter four characters for the measurement unit.

Offset force sensor

In this line you can enter the offset value of the measuring signal in kN.

The 'Offset' parameter adjusts a possible zero point displacement of the analog measurement signal of the sensor.

➔ Tap on the input field behind 'Offset'. The input window containing the numerical keypad appears.

➔ Enter the offset value using the numerical keypad (enter a point before decimal places; if no decimal places are entered, then the display shows two decimal places '.00').

➔ Confirm the entry with the 'ENTER' button.

Force sensor offset adjustment

By tapping on the 'offset adjustment' button, the actual analog measuring signal of the transmitter is taken as offset.

An offset adjustment is always necessary after changing or adding a force transducer. Make sure the force transducer is not loaded during the adjustment.

Note

Generally, an offset adjustment should be carried out at least once a day or after about 1000 measurements

Offset limit force sensor

The offset limit is used set the maximum tolerated offset to 10%, 20% or 100% of the nominal force.

Offset adjustment for sensor with normal signal output:

- TOX® standard sensor: 10% (20% possible for compensation)

➔ By tapping on the input field behind 'Offset limit', the value of the offset limit can be changed between '10', '20' and '100'. The value displayed last will be adopted.

Forced offset force sensor

If the 'Forced offset' function is activated, the EPW 400 carries out an offset adjustment for the respective channel automatically every time it is switched on. If this function is not activated, the EPW 400 is ready to measure as soon as it is switched on.

➔ Tap on the input field next to 'Forced offset' to switch the forced offset on or off. The last setting displayed will be adopted.

Source force sensor

By tapping on the input field behind 'Source', you can switch between normal signal and DMS. The last source displayed will be adopted.

If DMS is activated, an additional parameter 'Character number' is displayed.

Nominal characteristic value of force sensor

The characteristic for the DMS force transducer is entered using the 'Characteristic number' parameter.

Value range: 0.1 – 8 mV/V

➔ Tap on the input field next to 'Characteristic number'. The input window containing the numerical keypad appears.

➔ Enter the characteristic number using the numerical keypad (enter a point before decimal places; if no decimal places are entered, then the display shows two decimal places '.00').

➔ Confirm the entry with the 'ENTER' button.

Bridge supply voltage

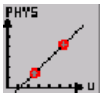
The bridge supply voltage is 5 V.

FilterSettingsScreen

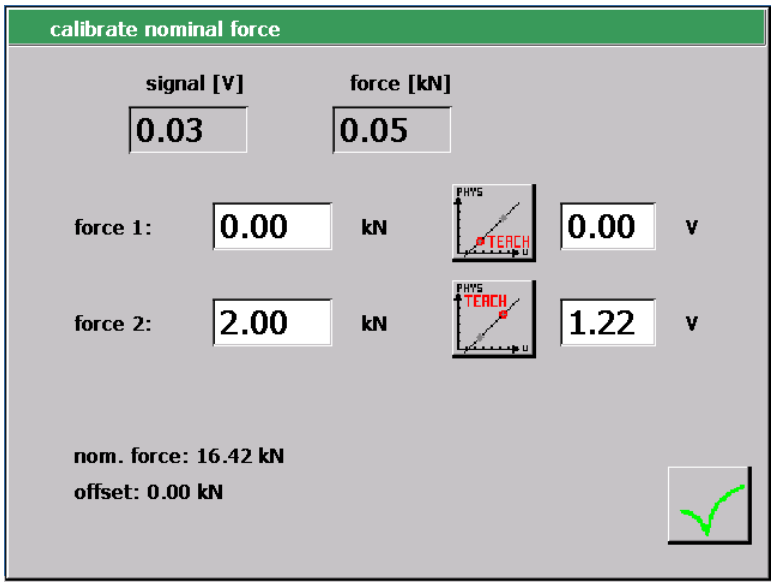
With the parameter 'Filter' the cutoff frequency of the measuring channel can be set.

Value range: 5 Hz - 1000 Hz

Force sensor calibration



Calibration: Specifying the allocation of the electric measuring signal and the measuring value to be displayed. This is a two-point calibration.



Force 1

To teach, click on button 'Teach'.

Read in the current electric measuring signal.

Tap on the 'Force 1' input field.

A window with a numerical tap field will be displayed:

➔ Enter the value of the measuring value to be displayed for the electric measuring signal and confirm this value with the 'Enter' button.

It is also possible to enter the electric measuring signal numerically by tapping on the input field.

Force 2

To teach, click on button 'Teach'.

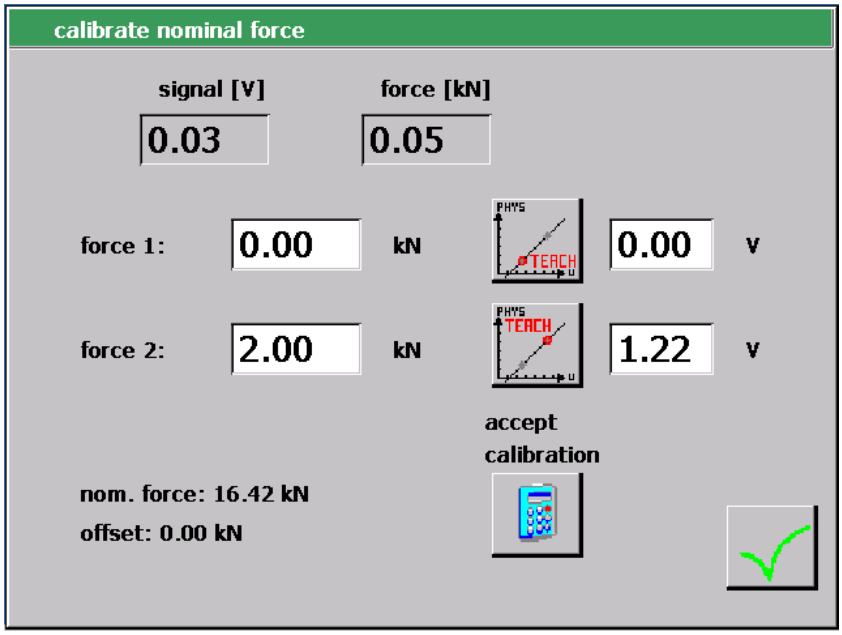
Read in the current electric measuring signal.

Tap on the 'Force 2' input field.

A window with a numerical tap field will be displayed:

➔ Enter the value of the measuring value to be displayed for the electric measuring signal and confirm this value with the 'Enter' button.

It is also possible to enter the electric measuring signal numerically by tapping on the input field.



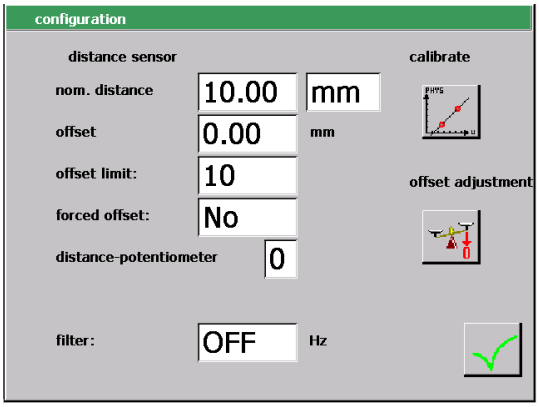
Accept calibration

Close the window 'Enter nominal force' by tapping on button 'Accept calibration'. The configuration will be adopted.

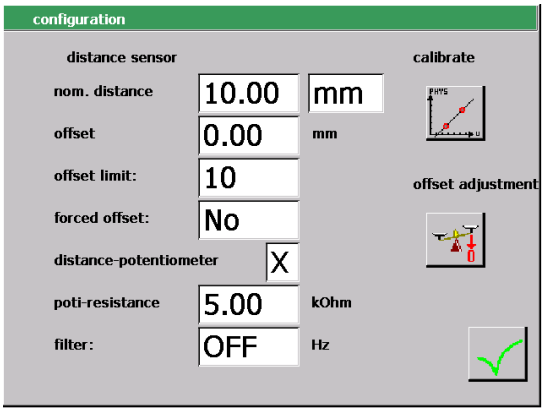
6.2.2 Distance sensor

The parameters for the distance sensor can be specified individually for each process in the window that is called up. The setting of the current process can be copied to other processes.

No resistance potentiometer



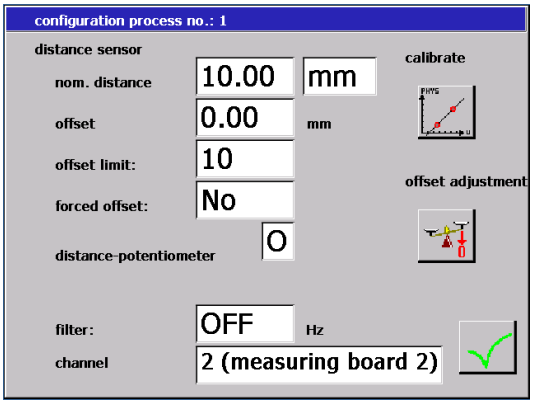
Resistance potentiometer



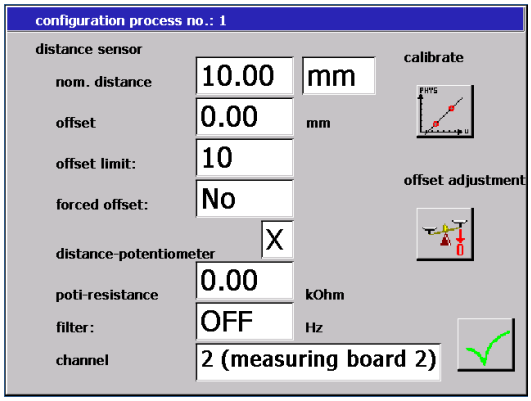
Distance sensor Version 22

In the opened window it is possible to select the parameters of the distance sensor separately for each channel pair (measuring board). The setting of the current process can be copied to other processes.

No resistance potentiometer



Resistance potentiometer



Nominal distance of the distance sensor (nominal load)

In this line you can set the nominal distance for the distance transducer used. The nominal distance is specified in mm. The nominal distance is achieved at the maximum measuring signal (10 V) of the distance transducer. In the above example, the sensor has an output voltage of 10 V for a distance of 50 mm.

➔ Tap on the input field behind 'Nominal distance'. The input window containing the numerical keypad appears.

➔ Enter the nominal distance using the numerical keypad (enter a point before decimal places; if no decimal places are entered, then the display shows two decimal places '.00').

➔ Confirm the entry with the 'ENTER' button.

➔ By tapping on the measurement unit, a window with an alphanumerical keypad appears. You may enter 4 characters for the measurement unit.

➔ When using a resistance potentiometer, you must enter the potentiometer resistance in kΩ (as per data sheet) in order to optimize the linearity of the measuring chain.

Distance sensor offset

In this line the offset value of the measurement signal is entered in mm.

The 'Offset' parameter adjusts a possible zero point displacement of the analog measurement signal of the sensor.

➔ Tap on the input field behind 'Offset'. The input window containing the numerical keypad appears.

➔ Enter the offset value using the numerical keypad (enter a point before decimal places; if no decimal places are entered, then the display shows two decimal places '.00').

➔ Confirm the entry with the 'ENTER' button.

Offset adjustment of distance sensor

By tapping on the 'offset adjustment' button, the actual analog measuring signal of the transmitter is taken as offset.

An offset adjustment is always necessary after changing or adding a distance transducer. Make sure the distance transducer is not loaded during the alignment.

Note

Generally, an offset adjustment should be carried out at least once a day or after about 1000 measurements

Offset limit of distance sensor

The offset limit is used set the maximum tolerated offset to 10%, 20% or 100% of the nominal distance.

Offset adjustment for sensor with normal signal output:

TOX® standard sensor: 10% (20% possible for compensation)

➔ By tapping on the input field behind 'Offset limit', the value of the offset limit can be changed between '10', '20' and '100'. The value displayed last will be adopted.

Forced offset of distance sensor

If the "Forced offset" function is activated, the EPW 400 carries out an offset adjustment for the respective channel automatically every time it is switched on. If this function is not activated, the EPW 400 is ready to measure as soon as it is switched on.

➔ Tap on the input field next to 'Forced offset' to switch the forced offset on or off. The last setting displayed will be adopted.

FilterSettingsScreen

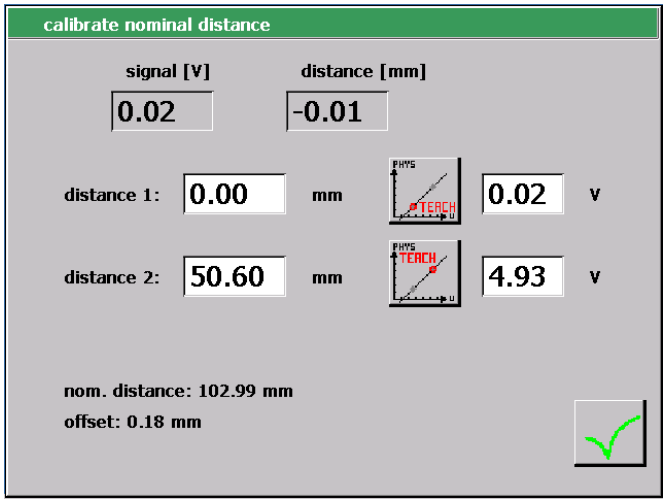
With the parameter 'Filter' the cutoff frequency of the measuring channel can be set.

Value range: 5 Hz - 1000 Hz

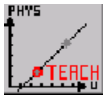
Distance sensor calibration

Calibration:

This function is used to specify the allocation of the electric measuring signal and of the measuring variable to be displayed. This is a pure two-point calibration.



- Distance 1:



To teach, click on button 'Teach'.

Read in the current electric measuring signal.

➔ Tap on the 'Distance 1' input field.

A window will open with a numerical keypad.

➔ Enter the value of the measuring value to be displayed for the electric measuring signal and confirm this value with the 'Enter' button.

It is also possible to enter the electric measuring signal numerically by tapping on the input field.

- Distance 2:

To teach, click on button 'Teach'.

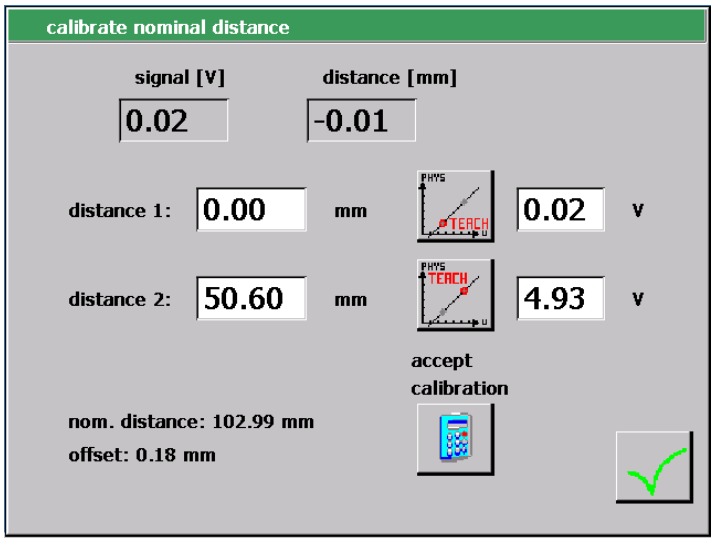
Read in the current electric measuring signal.

➔ Tap on the 'Distance 2' input field.

A window will open with a numerical keypad.

➔ Enter the value of the measuring value to be displayed for the electric measuring signal and confirm this value with the 'Enter' button.

It is also possible to enter the electric measuring signal numerically by tapping on the input field.

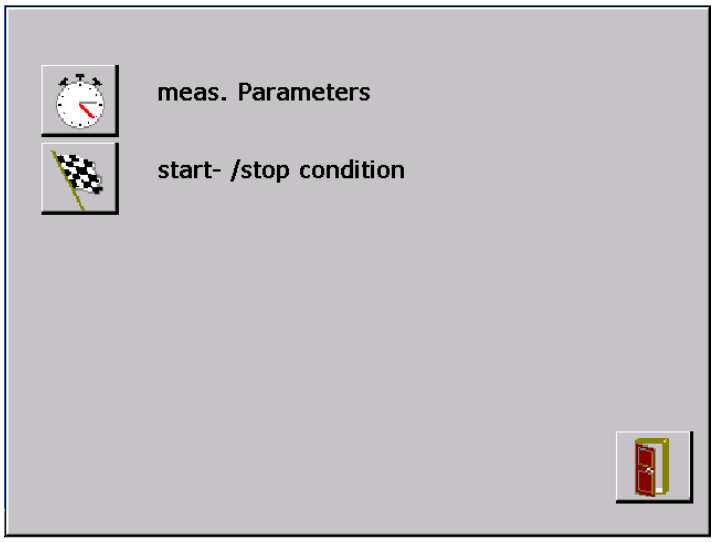


Accept calibration

Close the window 'Enter nominal force' by tapping on button 'Accept calibration'. The configuration will be adopted.

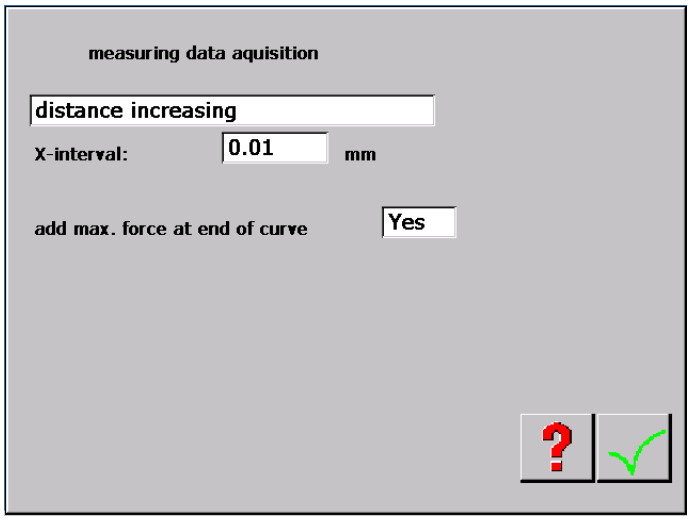
6.2.3 Measuring parameters

By actuating button 'Measuring parameters' a window is opened branching into the menus 'Meas. Parameters' and 'Start/Stop condition':



Measured data acquisition (measuring parameters)

The mode for measuring data acquisition is always set for the process currently activated only. For opening the submenu 'Measuring data acquisition' tap on button 'Meas. parameters':



In the top line, you can switch between the following four options by tapping on the text:

- distance increasing
- distance increasing or decreasing
- force or distance changing
- time triggered

Distance rising

The measured values are measured with max. measuring intervals (2000 Hz) but only stored if the distance compared to the last measured value has changed by the X-interval entered.

This mode is recommended if negative changes of the distance are not intended to be stored (usually clinch applications or pressing applications where only positive distance changes are relevant).

The number of pairs of values to be stored remains small. The measuring curve occupies little storage place and can be quickly drawn and evaluated.

If the final force can increase without changing the distance (block force), the option 'Add max. force at end of curve' can be selected. With this mode, the max. force and the max. distance measured with max. sampling rate are recorded (comparable to a maximum indicator). This pair of values is added to the curve.

distance increasing or decreasing

The difference with regard to the 'distance increasing' mode is that, here, the pairs of values are stored when the distance has changed in the positive or negative direction since the last stored value.

This mode is recommended if also negative distance changes have to be recorded (e.g. pressing application with snap-back effects).

The number of pairs of values to be stored remains small. The measuring curve occupies little storage place and can be quickly drawn and evaluated.

force or distance changing

In this mode, a pair of values is stored if, since the last stored pairs of values, either the distance has changed by the X-interval in the positive or negative direction, or the force has changed by the Y-interval in the positive or negative direction.

This mode is recommended if the force can change without a change in distance taking place (e.g. applications with large slip-in effects).

time triggered

With this mode, a timed storage of a pair of values takes place after x ms each.

If no changes are detected, similar pairs of values offering no information but occupying storage place and decelerating the evaluation and the drawing of the curve are stored with this mode.

Should the work cycle run more slowly than specified in the measurement time, the buffer for the acquisition of measured data will be full before the termination of a cycle and there will be no record of the complete clinching/pressing process. In contrast, the other measurement modes are independent of the execution time of the clinching/pressing process. Therefore, this mode is recommended for special applications only where other modes do not lead to satisfying results.

Tapping on the value after the text "**X interval**" opens the input window with the numerical keypad. Here you can determine the accuracy of measurement up to 1/100 mm.

Insert max. force at the end of the curve

Independent of the acquisition of measured data, the max. force at the end of the curve can be displayed. This function can be switched on or off (practical for 'distance increasing' or 'distance increasing or decreasing').

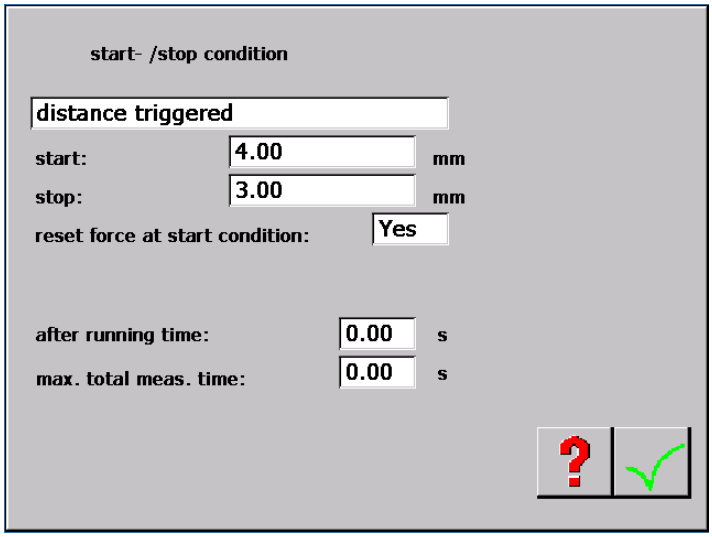
Close the window 'Measuring data acquisition' by tapping on button 'Accept'. The configuration will be adopted.

Maximum sampling rate

The maximum sampling rate is usually 2000 Hz.

Start/stop condition

In menu 'Meas. parameters' you tap on button 'start/stop condition'.



In the top line you may select among the following options by tapping on the entry:

- distance-triggered
- force triggered
- start/stop from PLC

distance-triggered

A measurement is started as soon as the distance set at 'Start' is exceeded, and stopped as soon as the distance set at 'Stop' is not reached. With option 'Set force to zero at start' it is enforced that at the moment of exceeding the start threshold, the actual force is used as offset for measurement.

Force-triggered

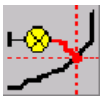
A measurement is started as soon as the force set with 'Start' is exceeded, and stopped as soon as the force set with 'Stop' is not reached. With option 'Set distance to zero at start' it is enforced that at the moment of exceeding the start threshold, the actual distance is used as offset for measurement.

Start/stop from PLC

A measurement is started and terminated via the digital signal of an external control.

Using the option 'Trigger' means that when a particular force or distance value is exceeded, the other measured value is adjusted to zero.

SwitchingPoint ConfigurationScreen

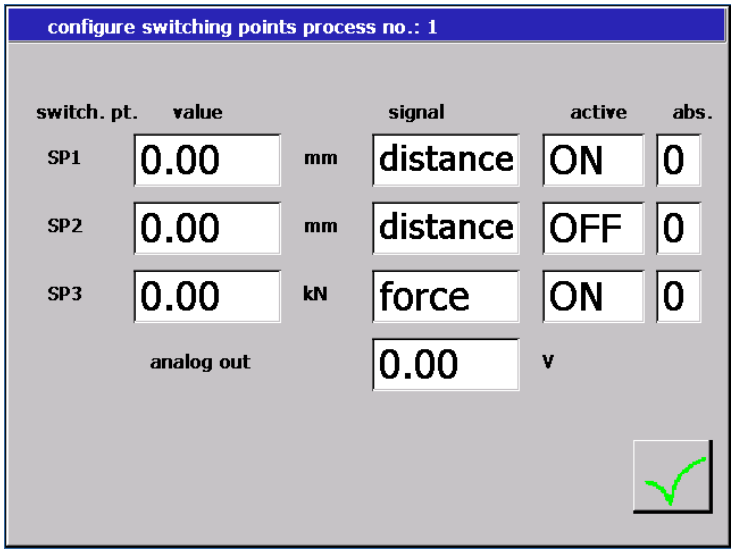


In the opened window you can define for each measurement program separately:

– three switching points, either for a force signal or for a distance

– an analog output signal 0 - 10 V (if it is set)

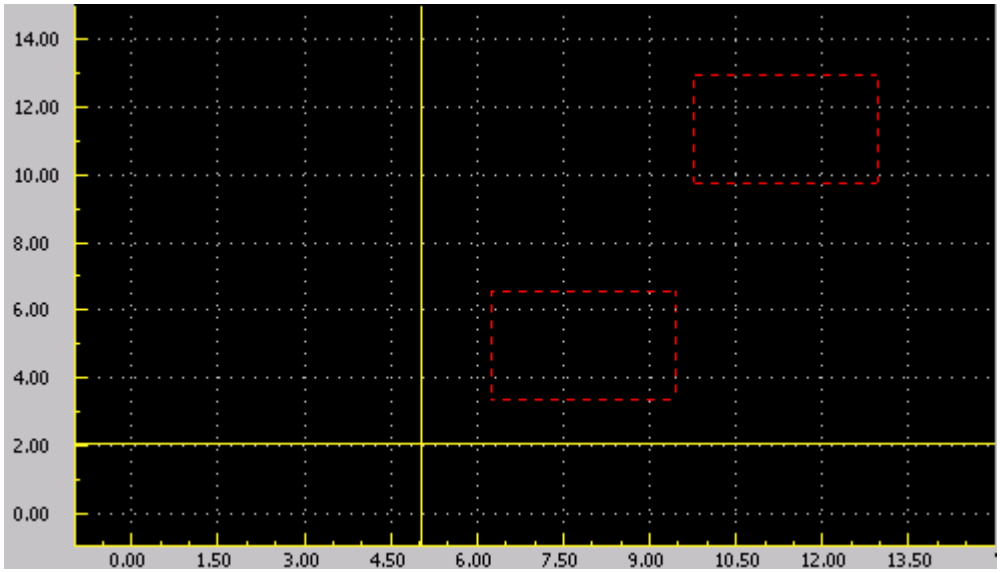
The setting for the current program can be copied into other programs.



In the fields of column 'Value' you enter the value in kN (with signal 'force') or in mm (with signal 'distance') for the switching points SP 1 to SP 3 with the help of the numerical keypad. In column 'Signal' you change between force and distance measurement by tapping on the input fields. With 'Active', the corresponding switching point is activated or deactivated. A switching point can only be activated if it has been activated in the **Configuration I/O** menu.

The field 'abs.' indicates whether or not a triggered measurement is based on the absolute zero point.

The 'analog out' field is only displayed if the analog outputs are configured in the **Configuration I/O** menu.



If a switching point is set, it is visualized with a yellow line in the measuring display.

If the switch point reacts to force, the line is horizontal, if the switch point reacts to distance, it is vertical.

Close the 'switching points' window by tapping on the 'Accept' button. The configuration will be adopted.

Note: Firmware version EPW 400

Up to EPW 400 version V1.06 the outputs of switching points SP1-SP3 are only updated while measurement is in progress.

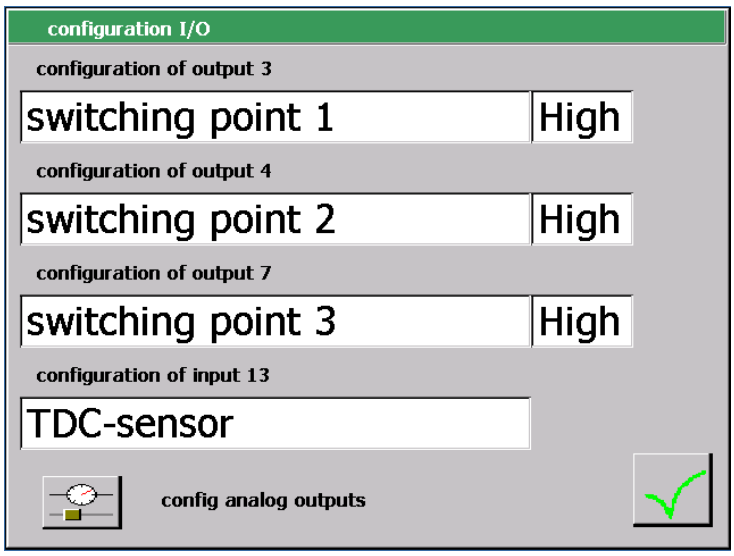
From EPW 400 version V1.07 onwards, the outputs of switching points SP1-SP3 are constantly updated.

6.2.4 Configuration I/O

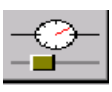
In this window you may fix the switching function of the digital outputs 3, 4 and 7 as well as of the digital input 13:

	Selection	Function
Output 3:	Switching point 1	Refer to switching points
	Release	Change condition at NOK or reset
Output 4:	Switching point 2	Refer to switching points
	NOK buzzer	Change switching state if NOK,
		For activation see 'Evaluation options'
Output 7:	Switching point 3	Refer to switching points
	Warning piece counter	Change of the switching condition when reaching the taught-in number in the order counter, view counter or tool counter.
Input 13:	TDC sensor	For activation see 'Evaluation options'
	Authorization bit 0	After activation, the user level can be selected from a control system.
	Reset	For activation see 'Evaluation options'

The switching logic can be switched between the settings 'High' and 'Low'.



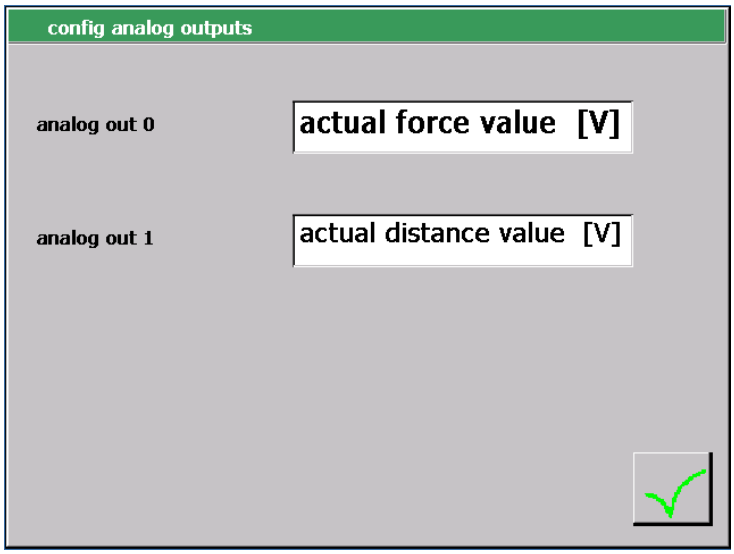
By tapping on the input fields, a shift to the corresponding function takes place.



In this window, the analog outputs are configured.

Close the window 'Configuration I/O' by tapping on the button 'Accept'. The configuration will be adopted.

6.2.5 Configuring the analog outputs



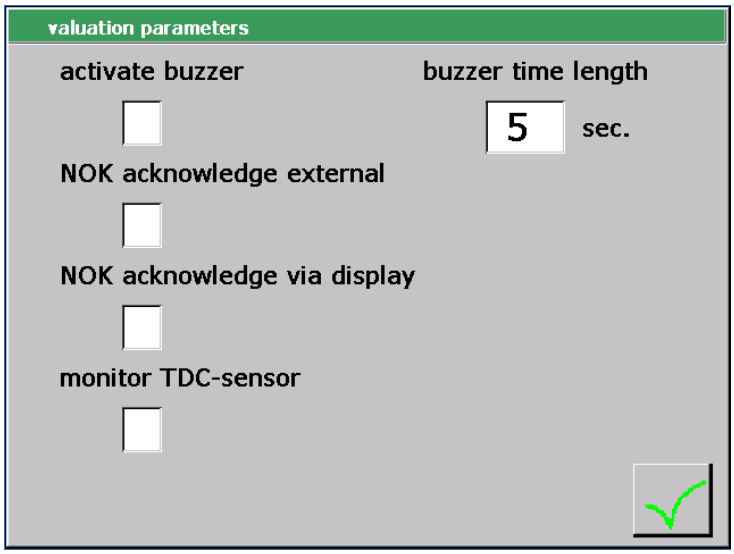
Depending on requirements, the relationship between outputs 0 and 1 can be defined here.

	Selection	Function
Output 0:	Actual distance value [V]	Outputs the actual value of the distance sensor
	Actual force value [V]	Outputs the actual value of the force sensor
	Tare signal	Outputs a tare signal
	Deactivated	Output 0 is deactivated
Output 1:	Actual distance value [V]	Outputs the actual value of the distance sensor
	Actual force value [V]	Outputs the actual value of the force sensor
	Process-dependent value	Outputs a predefined voltage which is set in the 'Switching points' menu
	Deactivated	Output 1 is deactivated

Close the 'Configure analog outputs' window by tapping on the "Accept" button. The configuration will be adopted.

6.2.6 Valuation options

In this window you may enable the following valuation functions (only in combination with the valuation box):



The corresponding function is activated (X) or deactivated by tapping on the input field.

Activate NOK buzzer (NOK buzzer)

In the event of a NOK, an acoustic signal sounds for the duration of the time interval set under 'Buzzer time length'. If 0 sec. is set under 'Buzzer time length' then the acoustic signal sounds until the NOK is acknowledged.

NOK acknowledge external (reset)

Acknowledgement of NOK via digital input I13

NOK acknowledge via display (reset)

Acknowledgement of NOK direct on the display.

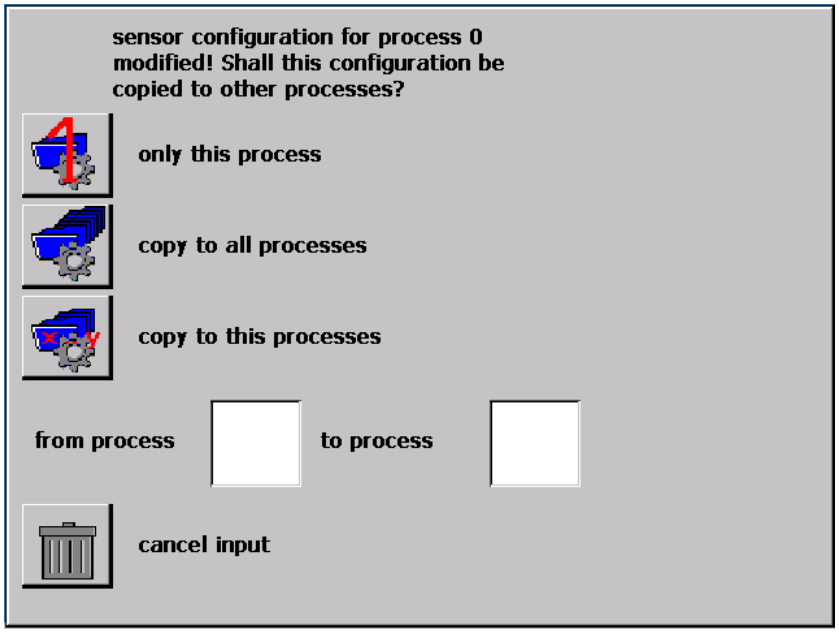
Monitor TDC-sensor

The TDC sensor (TDC position) must be exited when measuring is started, otherwise an error message will be emitted.

Close the window 'valuation parameters' by tapping on the button 'Accept'. The configuration will be adopted.

6.2.7 Apply configuration

After each change you will be asked when leaving the menu whether the change shall be stored for the current process only, be copied to all the 64 processes, or be copied to several consecutive processes:



➔ Tap on the corresponding button in order to adopt the entry for the activated process, for all 64 processes or for several consecutive processes.

Tie rods serve as HZ fastening.

When copying data to all or some processes, the previous settings for these processes will be lost!

To copy the values to several consecutive processes, tap on the input field behind 'from process'. The input window containing the numerical keypad appears. Enter the number of the first process and confirm by pressing 'Enter'. Then tap on the input field behind 'until process'. In the input window with the numerical keypad, enter the number of the last process and confirm by pressing "Enter".

Tie rods serve as HZ fastening.

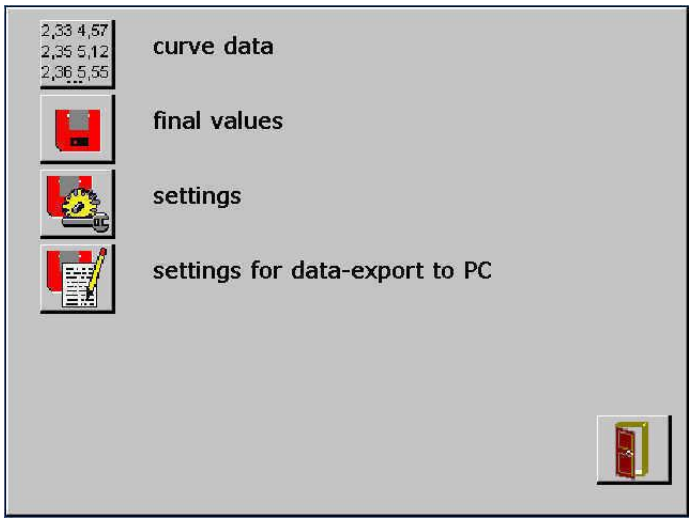
A sequence in which process 0 follows process 63 is not allowed.

You can close this window without applying the values using the 'Cancel input' button.

Thereafter a window will be opened again asking you whether you wish to undo the changes, tip on the button 'yes' or 'no' to answer the question.

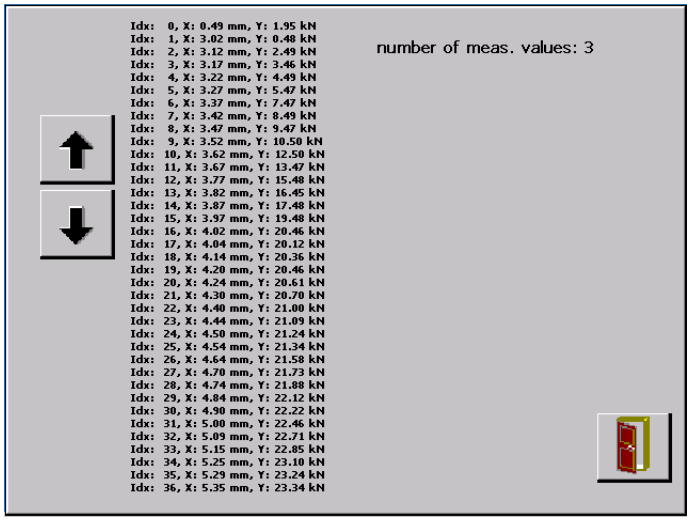
6.3 Data

Here you can see a display of the recorded pairs of distance/force values (curve data) and the final values for the current channel. You can also adjust the settings for the final values and for exporting data.



6.3.1 Curve data

To open this submenu, tap the 'Curve data' button in the 'Data' menu:



This window contains a list of the recorded value pairs (distance/force) on the last measured curve. The list provides the running index numbers (ascending), the X value in mm, and the Y value in kN.

You can scroll up or down using the "⇧" and "⇩" arrow keys. The number of measured values in the last measurement is displayed in the top right-hand corner. The number of measured values should ideally be approximately 250.

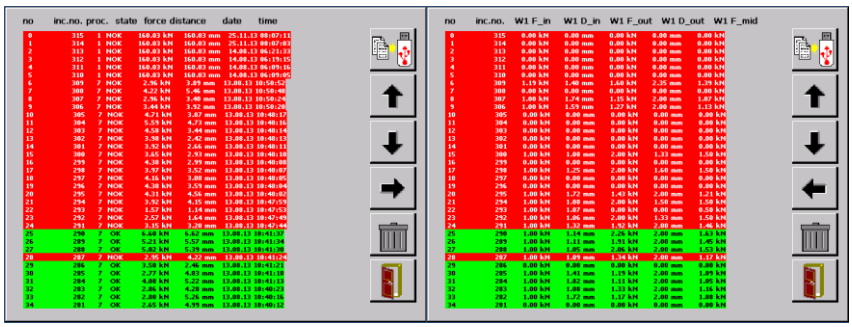
Delete the curve data by tapping the 'Dustbin' button.

This button saves the recorded curves to a connected USB stick as a CSV file. Depending on the size of the recorded curves, up to 100 curves are saved and copied on the USB stick. The name of the EPW 400 device as well as date and time will be used as name of the data file. The data can be found on the USB stick in the "Tox\Archive" folder.

Close the 'Curve data' menu by tapping on 'Exit'.

6.3.2 Final Values

To open this submenu, tap the 'Final values' button in the 'Data' menu:



After each measurement, a dataset of final values is stored. This dataset includes the following information:

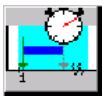
No.	Number of the measurement. 1000 final values are stored in a circular buffer, i.e. with each new measurement, the oldest dataset (= no. 999) is discarded and the newest is added (last measurement = no. 0)
Run. no.	Indicates a unique running number that increases by one after each measurement
Prog.	Assignment of the measurement to a program
Status	State no. '2': Measurement OK (green background) Status no. '3': Measurement NOK (red background) Status (see chapter 9.1 'Listing error and status messages')
Force	maximum force
Distance	Maximum distance
Date	Date of measurement (dd.mm.yy)
Time	Time of measurement (hh:mm:ss)
W1 F_in	Force entry in window 1

W1 D_in	Distance entry in window 1
W1 F_out	Force exit in window 1
W1 D_out	Distance exit in window 1
W1 F_mid	Force average in window 1

You can scroll upwards, downwards, right and left using the arrow keys ⇧, ⇩, ⇨ and ⇦.

Close the 'Curve data' menu by tapping on 'Exit'.

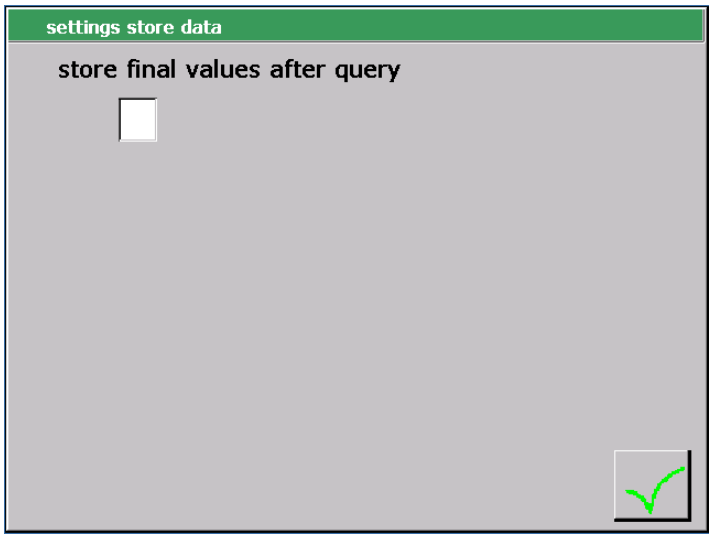
Delete the final values by tapping the 'Dustbin' button.



Additional display of sampling rate and valuation time in ms (authorization level 3 only).

This button saves the recorded curves to a connected USB stick as a CSV file. The last 1000 end value data sets will be saved and then copied to the USB stick. The name of the EPW 400 device as well as date and time will be used as name of the data file. The data can be found on the USB stick in the "Tox\Archive" folder.

6.3.3 Settings

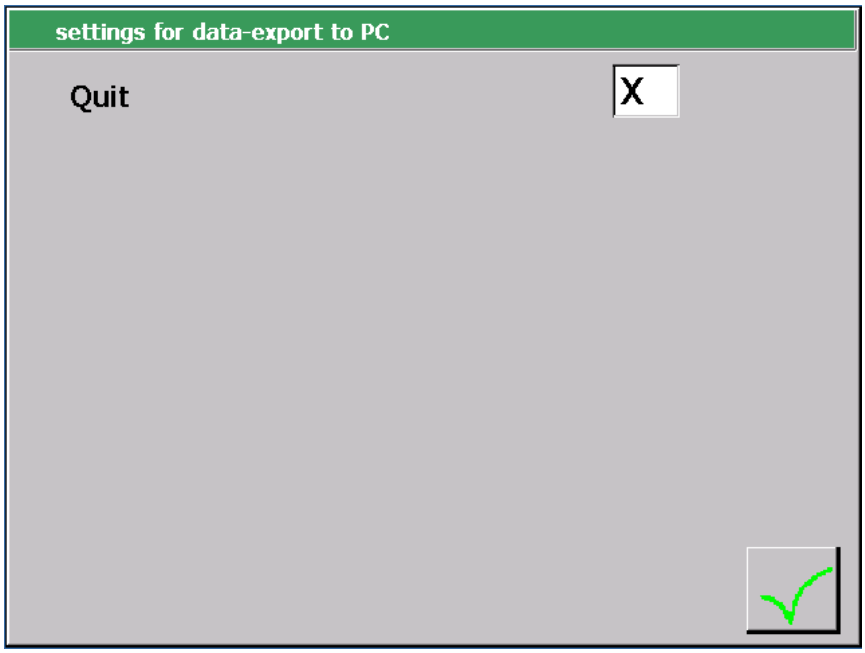


Here you can choose whether to receive a message after a measurement or whether the final values will be stored.

If the control box is activated, the operator must confirm after each measurement whether the measurement shall be saved with the final values or not.

If the control box is not activated, each measurement will be automatically added to the end values.

6.3.4 Settings for data export to PC



Here you can adjust the settings for exporting data to a PC. After the export, the data are available as a '.csv-file' in the corresponding directories (to be set in TOX®soft-Ware).

If the 'Quit' field is ticked, the PC will confirm receipt of the measurement data. If no confirmation takes place, the data transfer has failed and no further measurement is possible.

Close the window 'Settings for data export to PC' by tapping on button 'Accept'. The displayed values will be adopted.

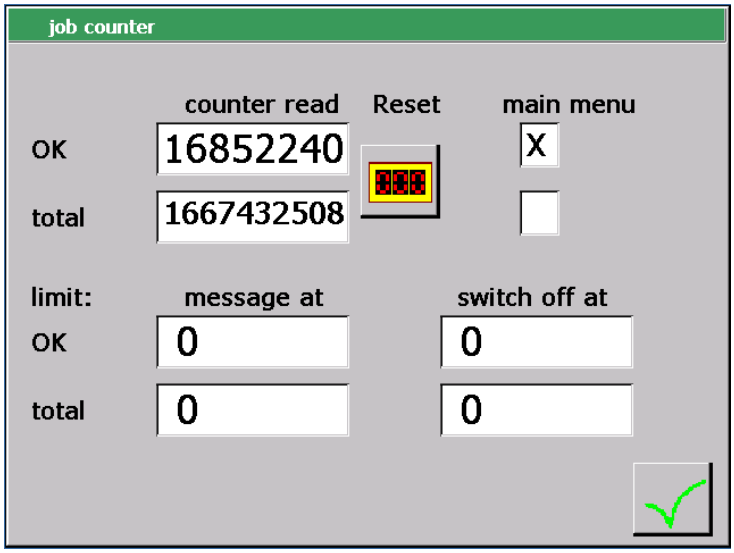
6.4 Lot size

Three independent counters are available in the EPW 400:

OrderCounterConfigScreen	Counts the OK/total parts of an order in progress
Shift counter	Counts the OK/total parts of a shift
ToolCounterConfigScreen	Counts the total parts that have been processed with the current tool set.

6.4.1 OrderCounterConfigScreen

To open this menu, tap on the 'Job counter' button:



In the text fields of the first two bars of this menu, all OK parts as well as the total number of the parts of a current job are displayed. Both counter readings are set to zero by pressing the 'Reset' button.

If in text field 'Message at' a certain quantity of the counter is entered with the numerical keypad, a message with a yellow background will be displayed as soon as this reading is reached. The work cycle is not stopped with this function.

If a certain quantity is entered in text field 'Switch off at' using the numerical keypad, the work cycle will be stopped when this reading is reached. A counter value message (with a red background) is issued. A continuation of the process is only possible after the acknowledgement of the error. The counter reading must first be reset, as otherwise the counter will once more be exceeded and the machine will stop again at the next process.

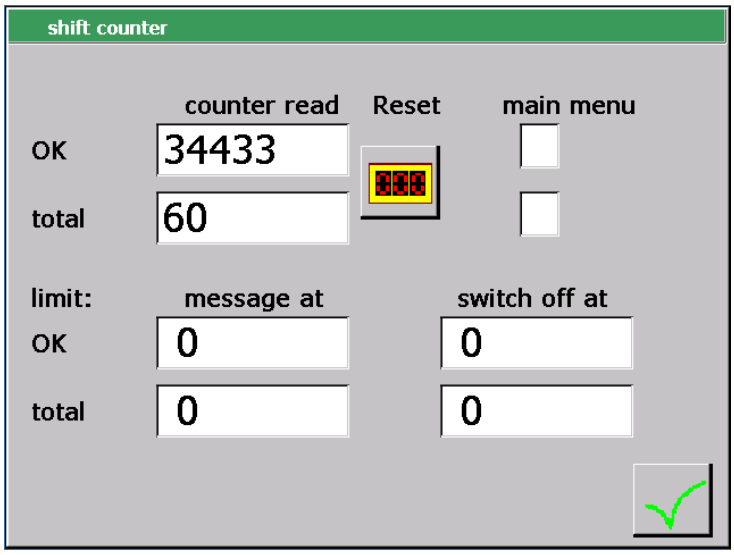
The value '0' of the text fields 'Message at' and 'Switch off at' deselects the corresponding option (no message or no switching-off of the machine).

If the tick is set in 'Main menu', the value will be displayed in the second line of the main menu. Only one counter can be displayed in the main menu.

Close the 'Job counter' window by tapping on the 'Accept' button. The displayed values will be adopted.

6.4.2 Shift counter

To open this menu, tap on the 'Shift counter' button:



In the text fields of the first two lines of this menu all OK parts as well as the total number of parts produced in a shift are displayed. Both counter readings are set to zero by pressing the 'Reset' button.

If in text field 'Message at' a certain quantity of the counter is entered with the numerical keypad, a message with a yellow background will be displayed as soon as this reading is reached. The work cycle is not stopped with this function.

If a certain quantity is entered in text field 'Switch off at' using the numerical keypad, the work cycle will be stopped when this reading is reached. A counter value message (with a red background) is issued. A continuation of the process is only possible after the acknowledgement of the error. The counter reading must first be reset, as otherwise the counter will once more be exceeded and the machine will stop again at the next process.

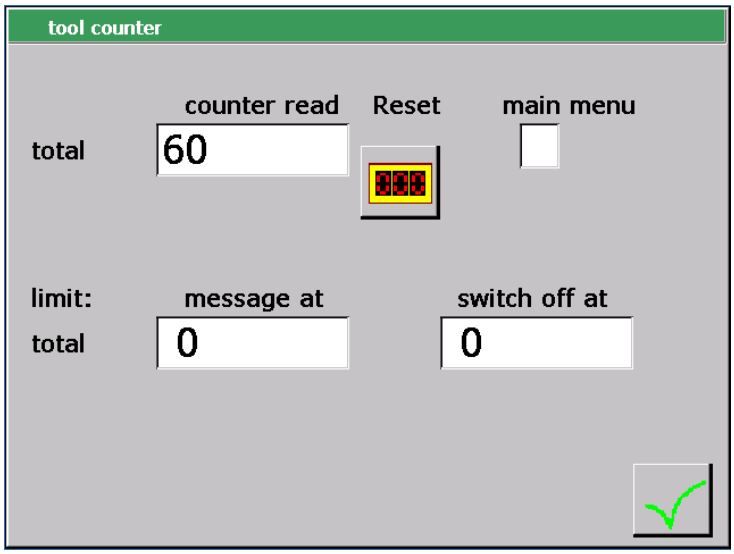
The value '0' of the text fields 'Message at' and 'Switch off at' deselects the corresponding option (no message or no switching-off of the machine).

If the tick is set in 'Main menu', the value will be displayed in the second line of the main menu. Only one counter can be displayed in the main menu.

Close the 'Shift counter' window by tapping on the 'Accept' button. The displayed values will be adopted.

6.4.3 ToolCounterConfigScreen

Tap on button 'Tool counter' to open this menu:



In the text field of the first line of this menu, the total number of parts produced with this tool (OK and NOK parts) is displayed. The counter reading is set to 'zero' by pressing the 'Reset' button.

If in text field 'Message at' a certain quantity of the counter is entered with the numerical keypad, a message with a yellow background will be displayed as soon as this reading is reached. The work cycle is not stopped with this function. It is therefore possible to display, for example, 1000 cycles before the end of the service life of a tool, a message and to change the tool set during the next standstill for service.

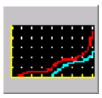
If a certain quantity is entered in text field 'Switch off at' using the numerical keypad, the work cycle will be stopped when this reading is reached. A counter value message (with a red background) is issued. A continuation of the process is only possible after the acknowledgement of the error. The counter reading must first be reset, as otherwise the counter will once more be exceeded and the machine will stop again at the next process.

The value '0' of the text fields 'Message at' and 'Switch off at' deselects the corresponding option (no message or no switching-off of the machine).

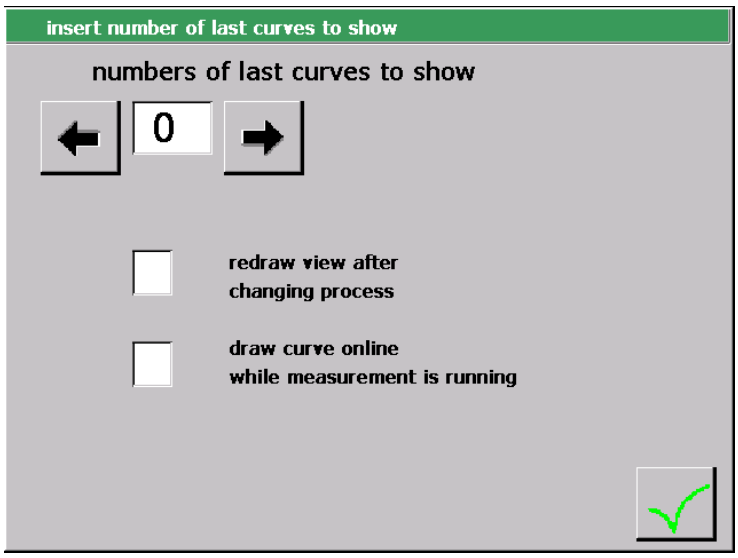
If the tick is set in 'Main menu', the value will be displayed in the second line of the main menu. Only one counter can be displayed in the main menu.

Close the window 'Tool counter' by tapping on button 'Accept'. The displayed values will be adopted.

6.5 Diagram settings



In this window the settings for the display of the diagrams are made.



The number of last curves that can be displayed on the touch screen is increased or decreased using the ⇨ und ⇦ arrows.

The corresponding function is activated (X) or deactivated by tapping on the checkbox (up to the last nine curves can be displayed):

- Redraw view after changing process:

After a process change (program change) the measuring display will be newly drawn, e.g. process-depending Zoom settings become active.

The 'Redraw view after changing process' function will briefly interrupt the machine's readiness to measure, until the display is updated (approx. 100 ms). If the measurement shall be started immediately after the program change, this function must be deactivated. The display will then be updated after the measurement.

If the Function 'draw curve online while measurement is running' is activated, a measurement must not be started before the display is updated completely. That is why the PLC has to request the signal 'Acknowledge process change'.

- Draw curve online while measurement is in progress:

If the curve is drawn on the measurement display during measurement, the optimum sampling rate will be reduced to approx. 200 Hz because of the system load.

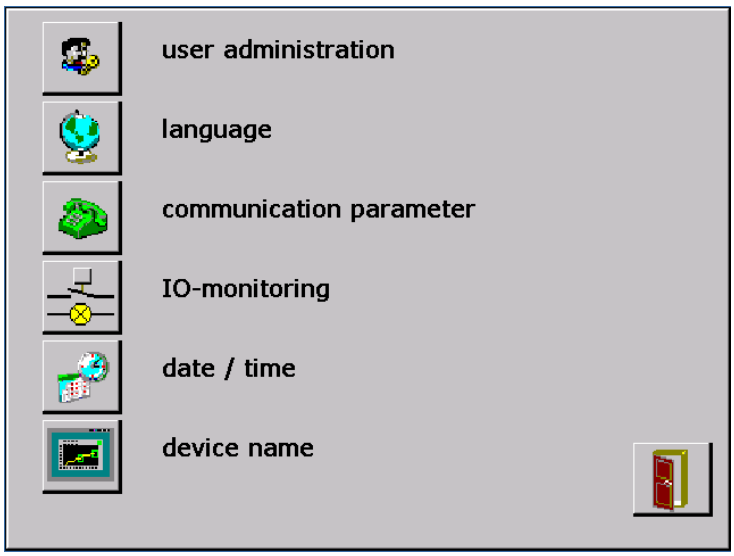
This function may be used for set-up operations or for lever presses.

Close the 'Diagram settings' window by tapping the 'Accept' button. The number of curves displayed on the input field will be adopted.

6.6 Supplemnt

In this menu you reach the following submenus by tapping on the corresponding entry:

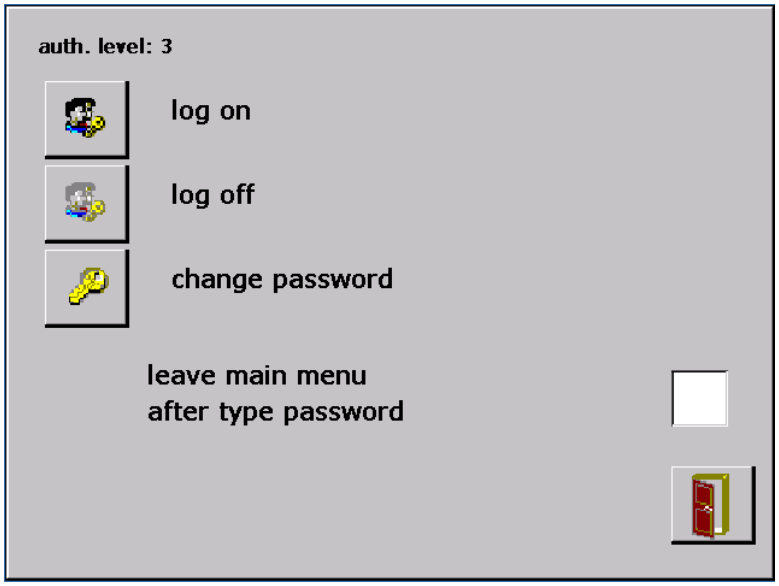
User administration	Manage authorization levels / password
LanguageScreen	Change the language version
Communication parameters	PC interface, field bus parameters
In-/Outputs	Current status of digital inputs/outputs
Date/Time	Display of current time and date
DeviceNameScreen	Enter a designation for the EPW 400



6.6.1 User administration

6.6.1.1 Access administration via user log-on

The rights of the EPW 400 are managed in four authorization levels. After each start, the program will be on authorization level 0. For changing the access level, tap on button 'User administration':



Authorization level 0

Machine operator: permission only for functions related to starting process monitoring and overseeing the process.

Authorization level 1

Level for foreman, supervisor and experienced machine operators: language change, counter reset, error reset, zoom area, diagram settings, date / time, copy parameters to USB stick.

Authorization level 2

Level for authorized staff for setup: configuration of monitoring windows, configuration of sensors, counter setup, copy processes, restore parameters from USB stick.

Authorization level 3

Highest authorization level for plant construction and maintenance: inputs/outputs, configuration of I/O, delete final values, evaluation options.

X When field 'leave main menu after type password' is activated, the sub-menus are only accessible after input of the corresponding authorization level.

➔ Press the 'Log on' button in the icon bar.

➔ In the 'Log on' dialog box, enter the password for the highest access level available to you:

Default setting:	Authorization level 1:	TOX
	Authorization level 2:	TOX2
	Authorization level 3:	TOX3

Note: the system is case-sensitive!

➔ Confirm the password with the 'Enter' button.

Log off when inactive
Log off takes place automatically after 10 minutes of inactivity.

Close the 'User administration' menu by tapping on button 'Exit'. The level selected last will be adopted.

Change password

Pay attention to the authorization level
The change of password will take effect only in the authorization level in which you are logged on. To change the passwords of the other authorization levels you have to log on to those levels and change the password there.

➔ Tap in menu 'User administration' on item 'change password'.

➔ First enter the correct combination of figures from the former password with the help of the keypad window and confirm the entry with 'OK'.

Incorrect entry of a password is indicated by a corresponding message; press the 'Cancel' button to return to the "Extras" menu.

If the input of the password is correct, the window 'New password:' appears

➔ Use the keypad window to enter the new password and confirm by pressing "OK".

➔ In the next window, you will need to re-enter the new password as a check. To apply the new password, close this dialog box by pressing 'OK'.

The message 'Password changed' is displayed.

Access administration via digital inputs

The access level can also be pre-selected via the digital inputs.

For this purpose, Input 13 must be set to 'Authorization Bit 0' (see chapter Configuration I/O, p. 86)

The access level is then pre-selected with inputs 13 and 14.

Input	Status	Input	Status	Access level
I13	1	I14	0	Level 1
I13	0	I14	1	Level 2
I13	1	I14	1	Level 3

6.6.2 Language

In this submenu, you can change the current language. Select your preferred language.

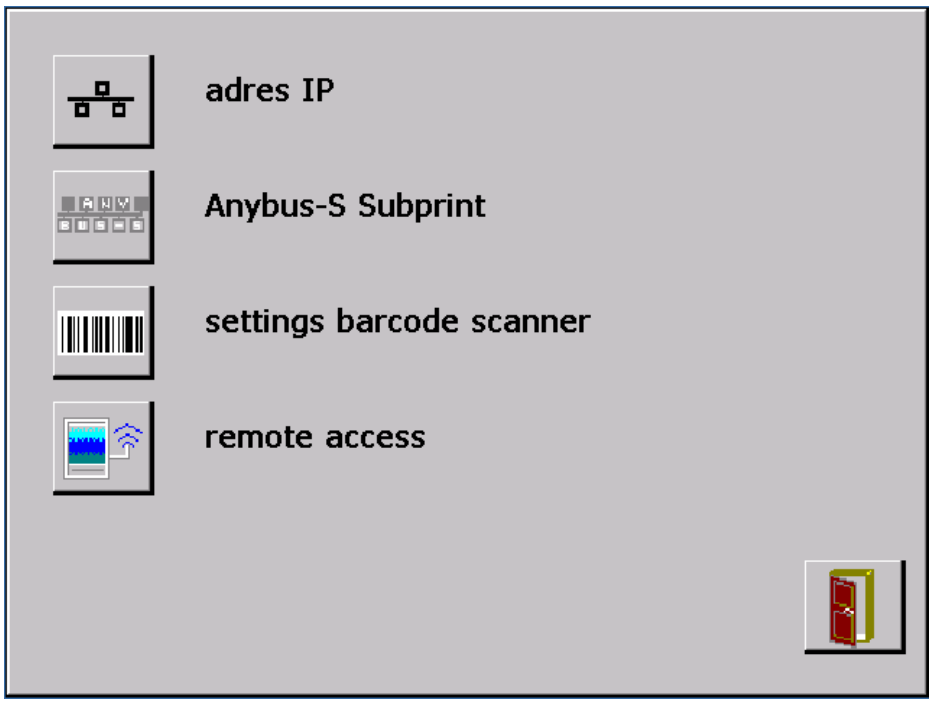
To open this window, tap on the 'Language' button in the 'Supplement' menu.

Tap on the appropriate button to switch to the new language.

Close this window by tapping on the 'Accept' button. The language selected last will be adopted.

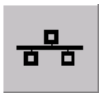
6.6.3 Communication parameters

In this menu, the settings for the PC interface (field bus, Ethernet) are made

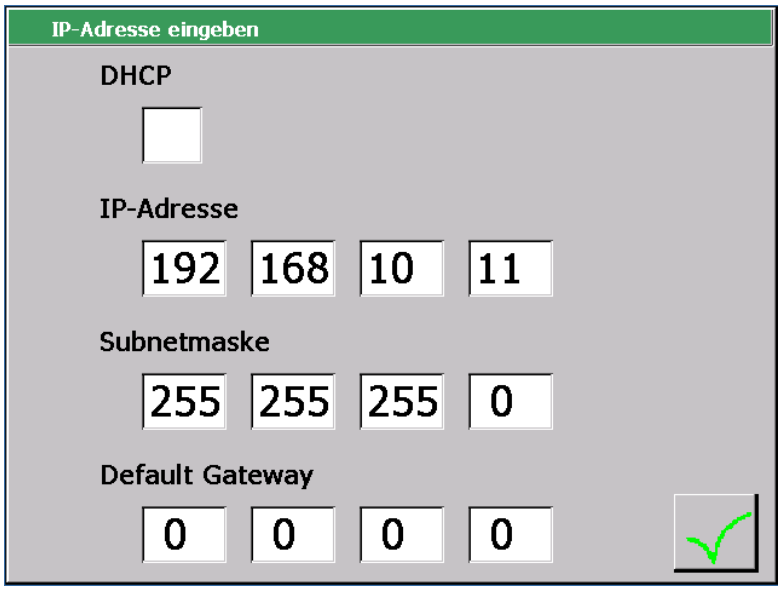


For the version with Profibus an integrated Profibus module is used, for other field buses an Anybus-S module from HMS is used which is available for almost all common field buses.

6.6.3.1 IP address



To change the Ethernet IP address, tap the 'IP-address' button.



Restart required following the change
After changing the IP address, you must restart the device!

Tap the desired input field to enter an address using the numerical keypad. The entry is adopted using the 'Enter' button.

IP address will be automatically obtained from a DHCP server (requires access level 2).

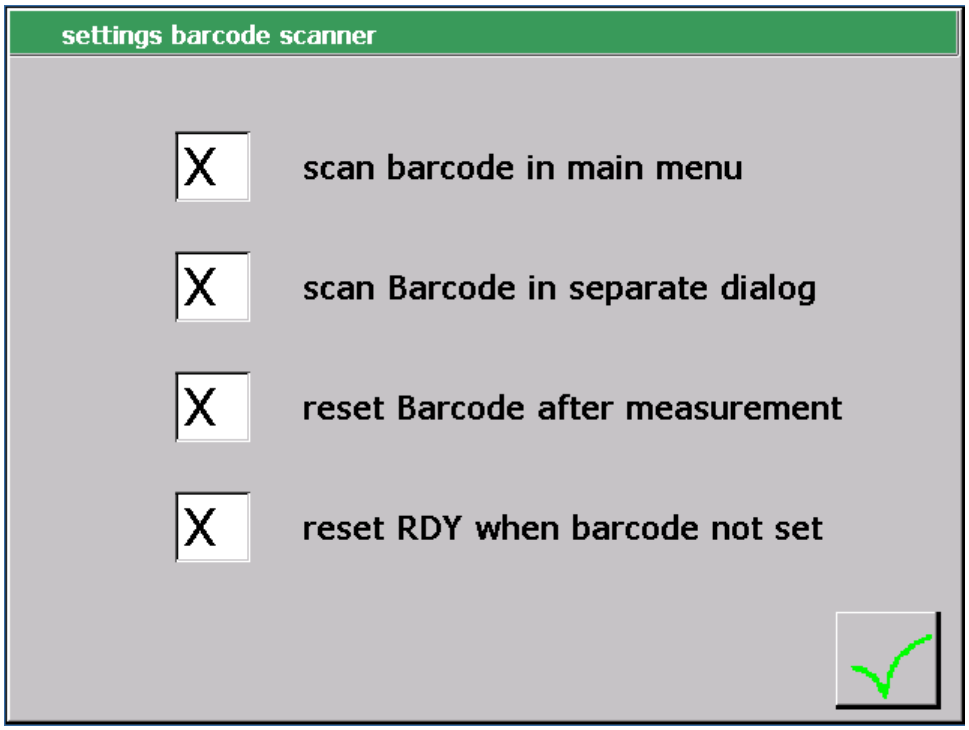
Close this window by tapping on the 'Accept' button. The displayed parameters will be adopted.

6.6.3.2 Settings for barcode scanner

The EPW400 can record a DMC code (Data Matrix Code) with a maximum length of 56 characters and store it with the measured results in the final values.

This DMC code can be written either via the field bus interface, such as from a PLC (see chapter 6.6.6. Field bus parameters), or recorded by a barcode scanner connected to the EPW400 by USB.

The prerequisite for scanning via barcode is that the USB barcode scanner is recognized as input device by WindowsCE 5.0. The function was tested with barcode scanners **Honeywell 1300G – 2** and **SICK Surescan IDM260-100S**



Scanning in the measurement menu:

If the EPW400 is in the main menu, i.e. the diagram with the measuring curve is displayed, the EPW400 responds to inputs via the barcode scanner.

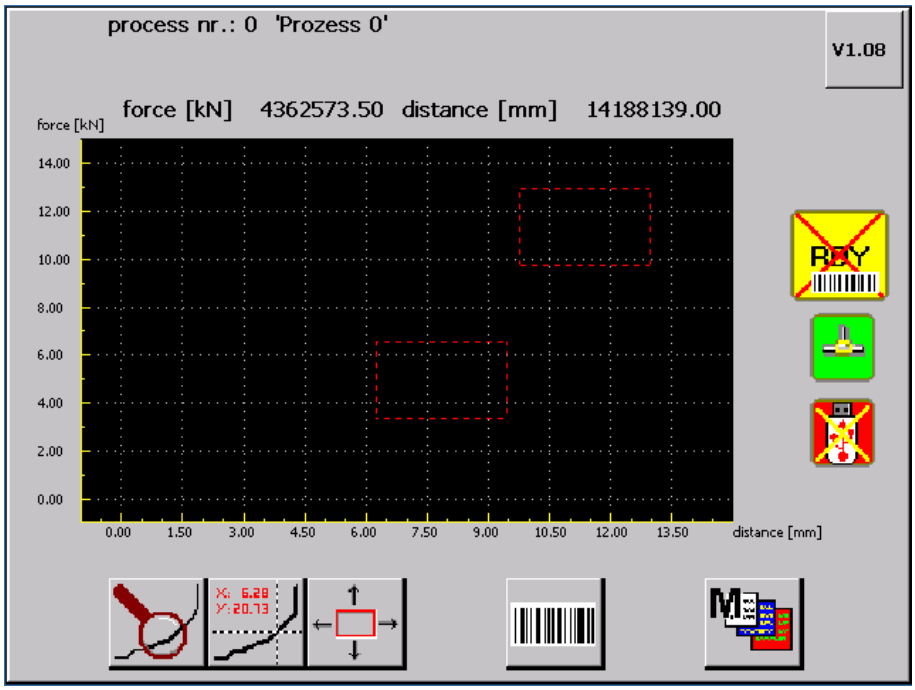
The scanned characters are taken over as DMC code.

Scanning with a separate dialog:

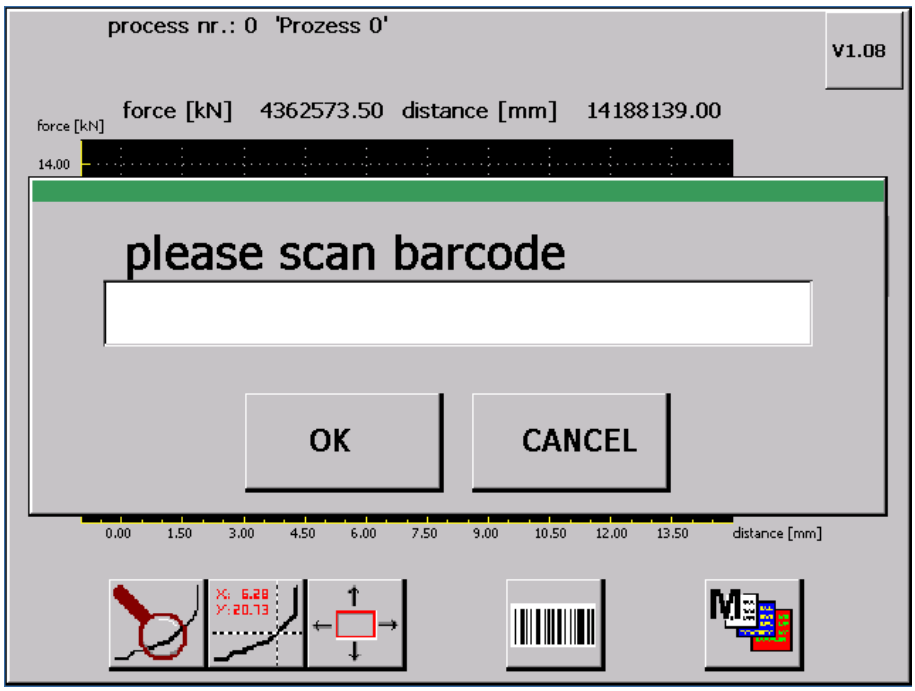
With this option, a button is displayed in the main menu.

The button calls up a dialog in which the barcode can be scanned.

Main menu with the button for calling up the scanner dialog:



Scanner dialog:



The EPW400 responds to inputs via the barcode as long as this dialog is displayed. The scanned characters are taken over in the input text field as DMC code.

Alternatively, the DMC code can also be entered manually.

The screen keypad opens with a click on the input text field, which allows the DMC code to be entered if, for example, the barcode cannot be scanned due to damages to the label.

If both options "Scan barcode in measuring menu" and "Scan barcode in separate dialog" are activated, the barcode can be scanned if it is in the main menu of the EPW400; however, it can also be called up from the main menu of the scanner dialog to be able to enter the DMC code manually.

Deleting code after measurement

If this option is selected, the DMC code is deleted automatically after every measurement.

Removing BTB if the code is not set

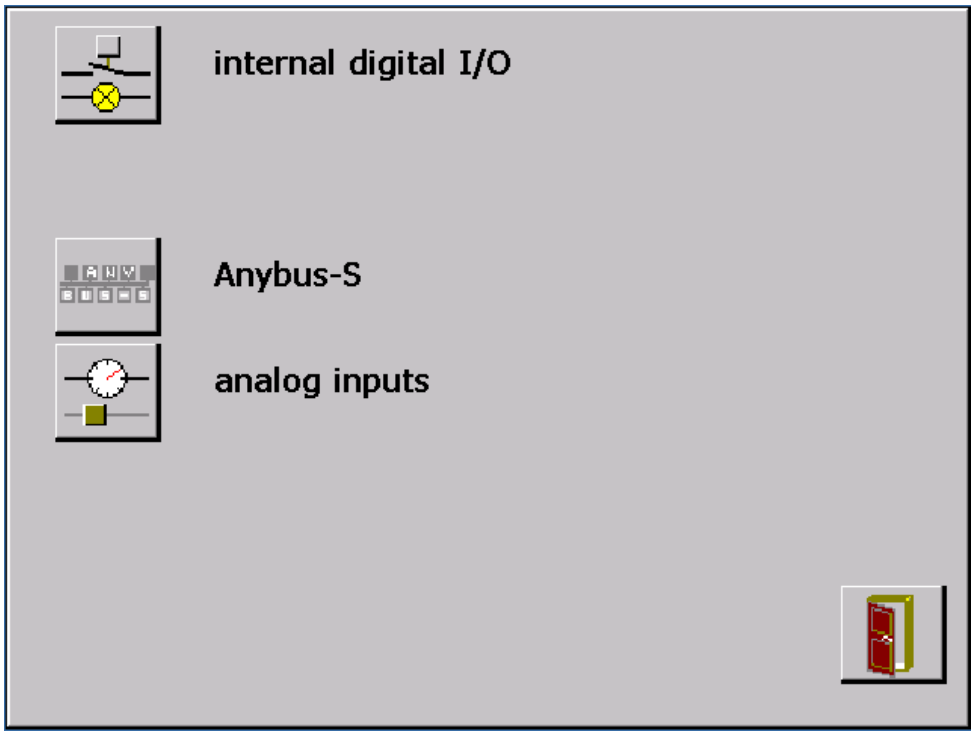
This option only enables the EPW400 for measurement when a DMC code has been scanned or entered. As soon as an entered or scanned code exhibits two or more characters, it is acccepted as valid. If the EPW400 is not ready for measurement because it is waiting on scanning or the entry of a DMC code, the following icon is displayed in the main menu:

6.6.3.3 Remote access

Remote maintenance can be activated after consultation with TOX® PRESSOTECHNIK (requires authorization level 2).

6.6.4 In-/Outputs

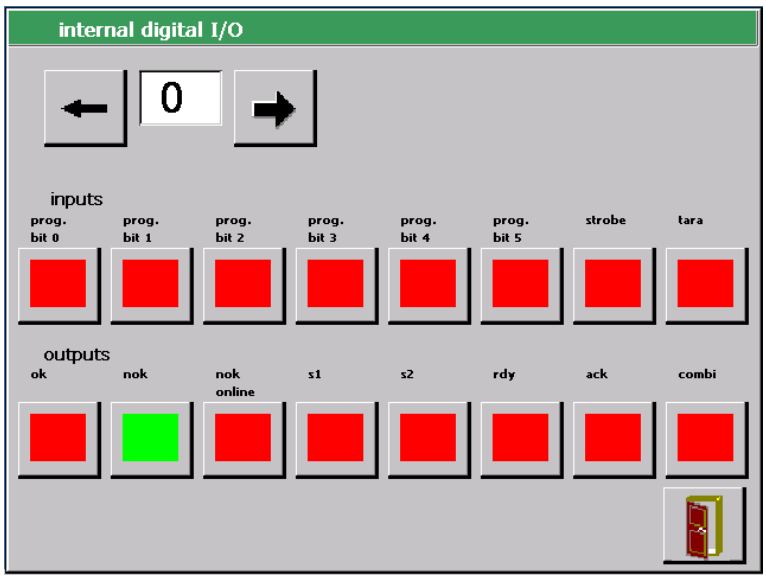
In this window, the actual state of the digital inputs/outputs and of the analog input is monitored. When tapping in menu 'Supplement' on 'inputs/outputs' you reach this selection window:



➔ Tap on the corresponding button for calling up the required submenu.

6.6.5 Internal digital I/O

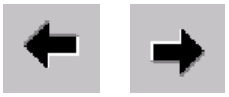
An activated input/output is marked by a green rectangle, a deselected input/output is marked by a red rectangle. The function of the occupied inputs and outputs is described in clear text.



Inputs:	The status of the digital inputs on the EPW 400 is displayed.
Outputs:	The outputs to which a signal is currently being emitted by the EPW 400 are displayed.

➔ By tapping on the button of the corresponding output, the output is activated or deactivated. The color of the rectangle will correspondingly change.

Changes are applied without further confirmation. The changes remain effective until the 'Inputs/outputs' submenu is exited.



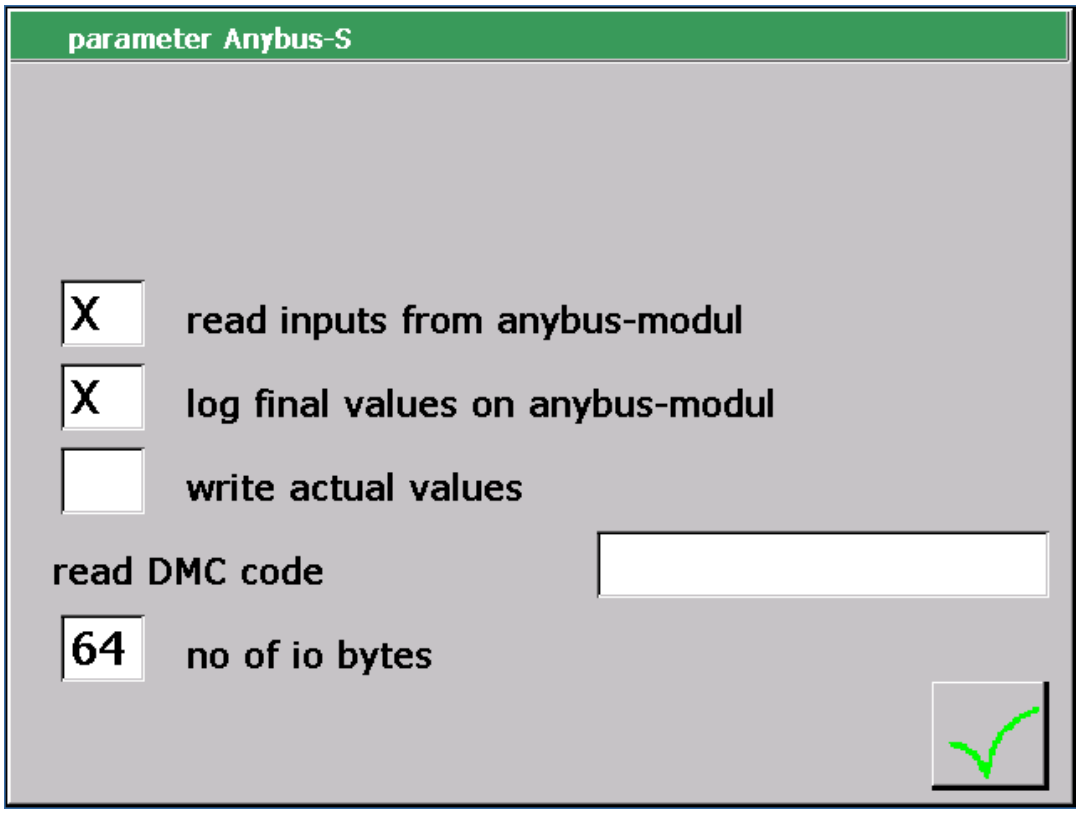
Using the arrow keys you may change between byte 0 and byte 1.

To close the window, tap the 'Exit' button.

6.6.6 Field bus parameters

Only for devices with field bus interface!

For changing the Anybus-S parameters, tap on button 'Parameter Anybus-S'



Profibus address (only for Profibus version)

➔ The arrows ⇦ and ⇨ can be used to decrease or increase the Profibus address by a value of 1 each time.

➔ When tapping on the input field between the arrows, you can change the number of the Profibus address with the help of the numerical keypad.

Note:
After changing the Profibus address, a new start of the device is required!

Read inputs to Anybus-S module

X Activation of the device via field bus

☐ Activation of the device via digital inputs/outputs.

➔ For changeover, tap on the input field next to 'read inputs from anybus module'.

Log final values on field bus

X The final values will be output to the field bus interface

➔ For changeover, tap on the input field before 'read final values on anybus module'.

Close this window by tapping on the 'Accept' button. The displayed parameters will be adopted.

Write actual values

When this checkbox is activated, the measured values of force and distance are continuously output on the field bus.

Read DMC code

This field can be used to specify that the data matrix code is to be read via field bus. The data matrix code is a piece part designation with a max. of 56 characters. The character 0 (0x00) applies as the end of the string for less than 56 characters.

There are options that the string is read with the start of measurement, here it must be applied to the bus before the start of measurement, or at the end of measurement, here it must be applied before the end of measurement.

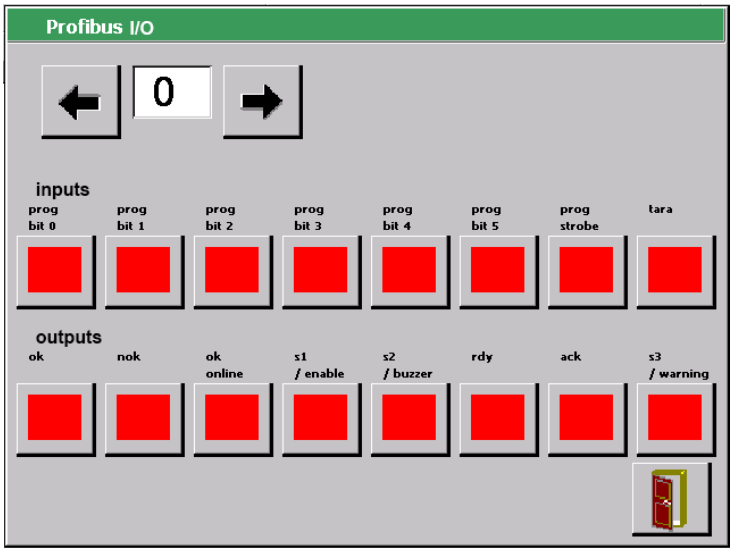
Number of IO bytes

With this field the number of I/O bytes configured on the bus are specified. A maximum of 64 bytes for inputs and outputs is possible.

The value refers each to the inputs and outputs, while the number of inputs and outputs is always equal. The value 16 would therefore activate 16 input bytes and 16 output bytes on the bus. The functions on input and output bytes 17 - 63 could therefore not be reached.

6.6.7 Profibus / Anybus

An activated input/output is marked by a green rectangle, a deselected input/output is marked by a red rectangle. The function of the assigned inputs and outputs is described in plain text. This window displays 8 inputs and 8 outputs. Use the input field in the first row to switch between the inputs and outputs: enter '0' to view inputs/outputs 1 to 8, and enter '1' to view inputs/outputs 9 to 16.



Inputs:	The status of the field bus inputs on the EPW 400 is displayed. A change of the inputs is only possible via field bus.
Outputs:	The field bus outputs to which a signal is currently being emitted by the EPW 400 are displayed.

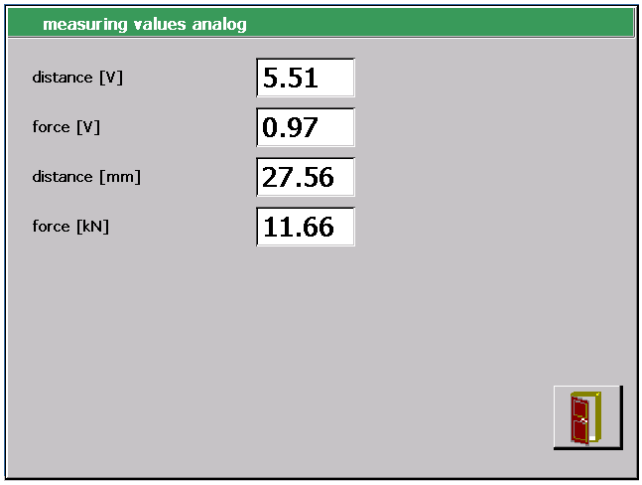
➔ By tapping on the button of the corresponding output, the output is activated or deactivated. The color of the rectangle will correspondingly change.

Changes are applied without further confirmation. The changes remain effective until the 'Inputs/outputs' submenu is exited.

To close the window, tap the 'Exit' button.

6.6.8 Analog inputs

In this window the analog measured values are displayed.

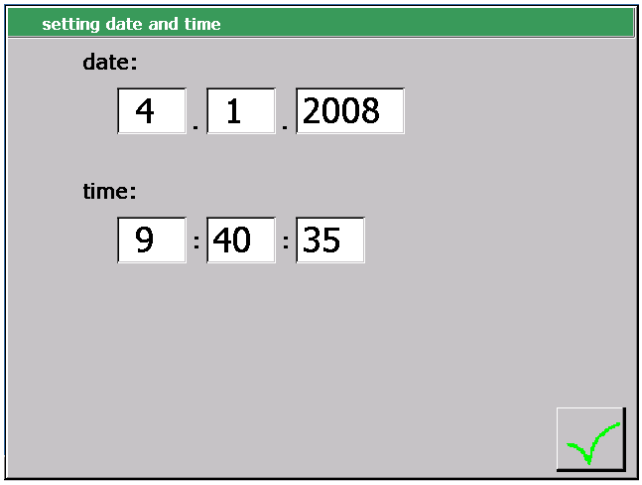


Version 22:
The corresponding value is displayed here depending on which measuring board is selected or set.

To close the window, tap the 'Exit' button.

6.6.9 Date/Time

In this menu the current time as well as the date are displayed.



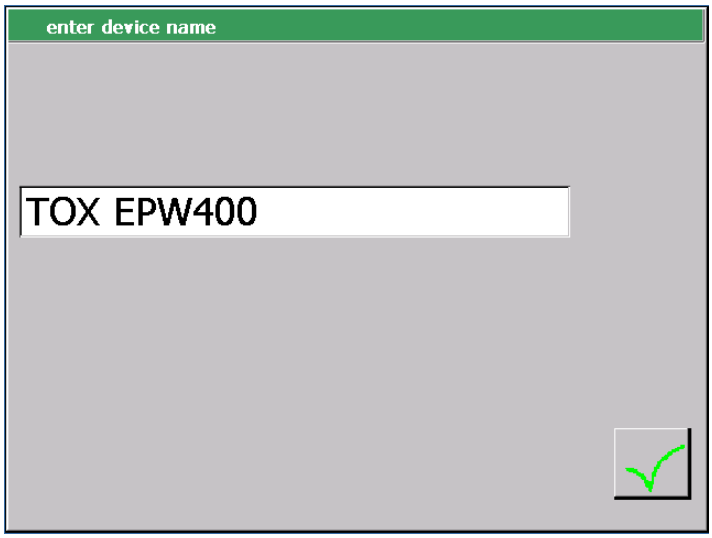
➔ For changing the time or the date, tap on the corresponding field.

The numerical keypad field appears on the display.

➔ Tap on the field for the value that needs to be changed (date: dd.mm.yyyy, time: hh:mm:ss).

Close this window by tapping on the 'Accept' button. The current time and date are adopted.

6.6.10 Device name

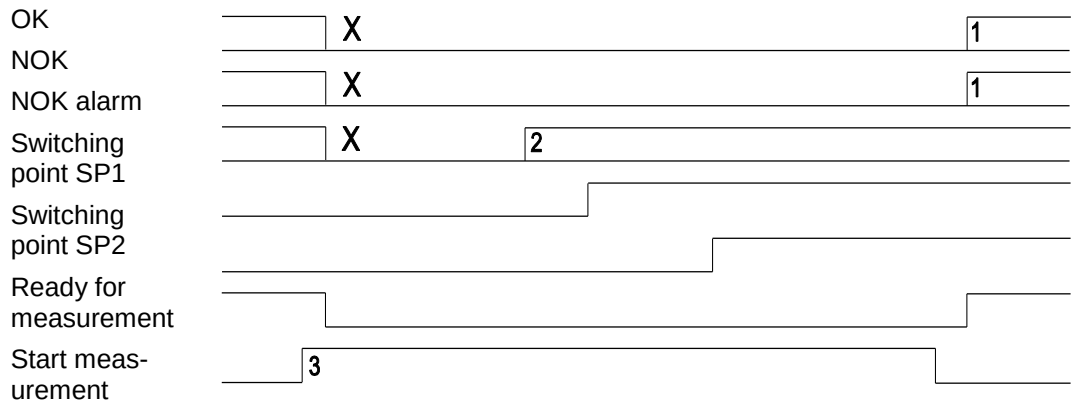


Here a name for the EPW 400 can be allocated.

If several EPW 400 devices are used, it is reasonable to give each EPW 400 device a different name. If, for example, you wish to store data on a USB stick, the assigned name is used as file name, so that the saved data can be allocated to a certain EPW 400 device.

7 PLC interface pulse diagrams

7.1 Start/Stop



1 Output OK or NOK is set dependent on the measured result.

Delay time after start = 0 - 10 ms

2 Output NOK_alarm is set dependent on the measured result in the online window.

3 Start of measuring operation with start signal and any additional start/stop condition

X History of last measurement

Note:

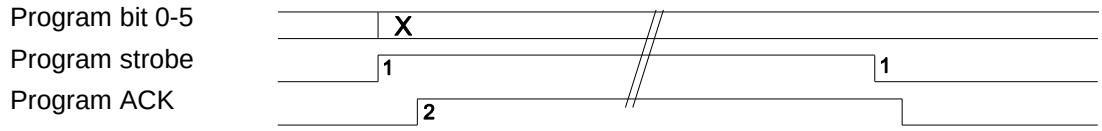
The EPW 400 might not be ready to measure due to a manual input or a fault. It is therefore always necessary prior to an automatic sequence to check the 'Ready' output from the system controller before setting the 'Start measuring' signal.

When measuring has started, the signals 'Ready for measuring', 'OK', 'NOK' and 'NOK_Alarm' are reset. In case of an automatic sequence, this signal condition should be checked by the plant control as feedback for a started measurement.

Up to EPW 400 firmware version V1.06, the outputs of switching points SP1-SP3 are only updated while measurement is in progress.

From firmware version V1.07 onwards, the outputs of switching points SP1-SP3 are constantly updated.

7.1.1 Changing the program number



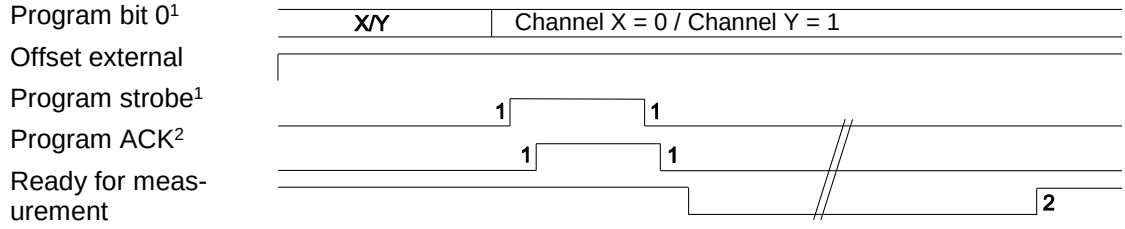
1 Delay time Strobe / Ack: min 10 ms, max. 20 ms

2 New program number applied and data read, max. 100 ms

X History

I5	I4	I3	I2	I1	I0	Program
0	0	0	0	0	0	0
0	0	0	0	0	1	1
0	0	0	0	1	0	2
0	0	0	0	1	1	3
0	0	0	1	0	0	4
1	1	1	1	0	0	60
1	1	1	1	0	1	61
1	1	1	1	1	0	62
1	1	1	1	1	1	63

7.1.2 Zero point adjustment



1 Delay time Strobe / Ack: min 10 ms, max. 20 ms

2 Duration of zero point adjustment: max. 4 sec

➔ Program bit0 = Zero point adjustment either for channel X or channel Y
Program bit0 = 0: X-channel
Program bit0 = 1: Y-channel

➔ Program bit1: If program bit 1 is set, zero point adjustment will take place simultaneously for channel X and channel Y

8 Software module TOX®softWare

- Display and filing of measuring values
- Processing and filing of device configurations
- Offline - setup of device configurations

Please observe the comprehensive separate operating manuals for TOX®softWare WORX and the EPW 400 software module.

8.1 Networking via Ethernet

Transfer of measuring data to the PC – Ethernet

The PC used for data acquisition can communicate with several EPW 400 devices via the Ethernet interface. The IP address of the individual devices can be set via a menu. The central PC cyclically monitors the status of all EPW 400 devices. On termination of a measurement, the result will be read and logged by the PC.

8.2 Network server program EPW 400_Server

The network program EPW 400_Server establishes a connection between the TOX®softWare Worx and the EPW 400.

A connection can only be established between the TOX®softWare Worx and the EPW 400 when the EPW 400_Server has been started.

9 Troubleshooting

9.1 Listing error and status messages

Error- / Statusno.	Error and status message
0	No error
1	Measurement is running
2	Measurement OK
3	Measurement NOK
4	Started, not ready to measure
5	Measurement aborted
8	Not ready to measure
9	Online window violated
10	OK job counter limit reached
11	Total job counter limit reached
12	OK shift counter limit reached
13	Total shift counter limit reached
14	Tool counter limit reached
15	Error transmit online window
16	Piece part NOK
17	TDC sensor not left
18	Measurement not started
26	Measured value buffer full
27	Offset limit force sensor exceeded
28	Offset limit distance exceeded

9.2 Battery buffer

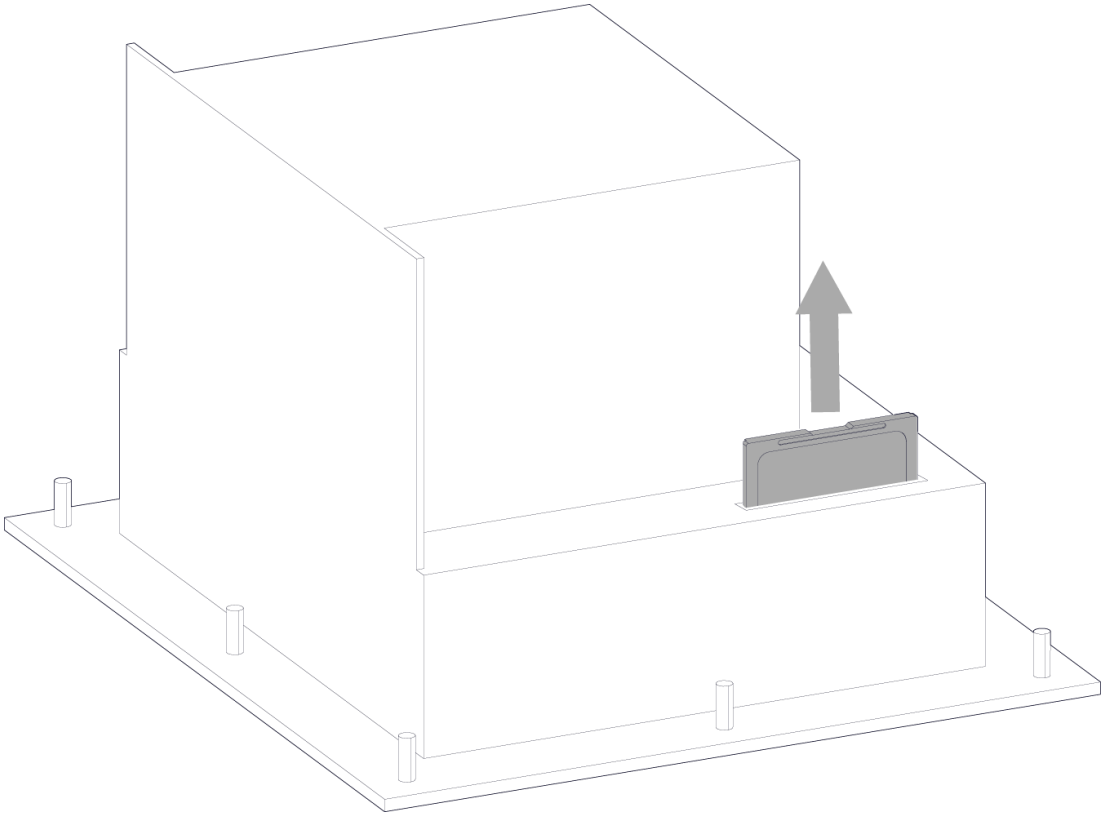
This data is stored on the battery buffered SRAM and may be lost in case of an empty battery:

- Set language
- Currently selected process
- Counter values
- End value data and sequential number of end values

10 Maintenance

10.1 Change flash card

The flash card is located on the back of the inside (display), the housing may have to be dismantled.



✓ Device is de-energized.

✓ Person is electrostatically discharged.

1 Loosen screw and turn safety device to the side.

2 Remove the flash card upwards.

3 Insert new flash card.

4 Slide safety device back over flash card and tighten screw.

10.2 Battery change

Note
TOX® PRESSOTECHNIK recommends a battery change after 2 years at the latest.

- ✓ Device is de-energized.
- ✓ Person is electrostatically discharged.
- ✓ Electrically **non** conductive tool for removing the battery.

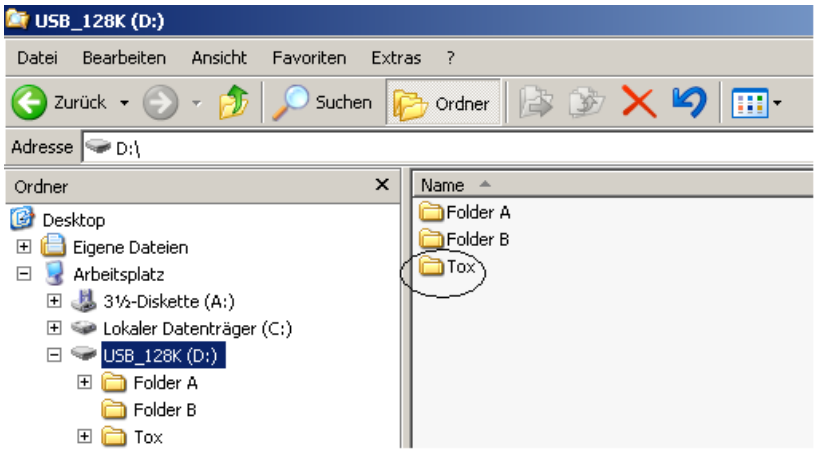
1. Remove the cover of the lithium battery.
2. Pull the battery out with an insulated tool.
3. Install new lithium battery in the correct polarity.
4. Install the cover.

11 Firmware update

11.1 Update from version V1.08

To import new firmware you will need a USB stick.

➔ On this USB stick create a folder 'TOX' directly in the root directory:



Example: LW 'USB_128k (D:) Tox

➔ Unzip the files you have received from TOX® PRESSOTECHNIK into the 'TOX' folder.

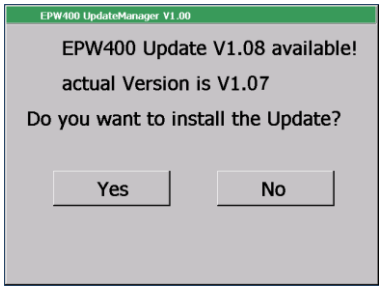
➔ Connect the USB stick to the EPW 400

The 'USB stick' icon should now be highlighted in green (within about 5 s).

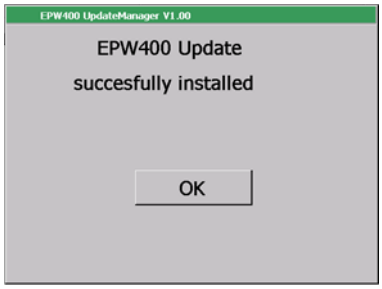
This icon appears in the main menu (see chapter 5.3 'Main menu 'Measuring'')

In the main menu, click on the button with the version number.

Click on button 'firmware update'



➔ Click on button 'Yes' to install the update.
After the update, the following message will appear:



12 Decommissioning

12.1 Storage

- Use original packaging
- Cover the electrical connections to protect them from dust, e.g. with adhesive tape.
- Protect the display against sharp-edged objects. If necessary, attach a suitable protective cover (e.g. made of cardboard or hard foam).
- Use a dry, ventilated room for storage.
- Enwrap the device (e.g. with a plastic bag).
- In case of high humidity: add a drying agent to the packaging (e.g. silica gel).

12.2 Disposal

Environmental protection

When disposing of the battery, the worn and spare parts, and the pressing monitor and its accessories, the national regulations on environmental protection currently in force must be observed.

➔ The batteries and accumulators must not be disposed of in the normal household waste.

➔ The batteries and accumulators must only be disposed of at an approved collection site.

Disposal

Dispose of the packaging sorted according to type.

Use the local options for the collection of paper and cardboard.

Disposal

Old electronic devices must not be disposed of in the household waste.

Dispose of the old pressing monitor at the nearest electronic disposal site or contact TOX® PRESSOTECHNIK.

The labels on the product, accessories and in the associated documentation specify that the product and accessories (e.g. power supply units, USB cables) must not be disposed of in the normal household waste at the end of their service life. Please dispose of this device and its accessories separated from other waste, to prevent the environment and human health from being damaged due to the uncontrolled disposal of waste.

With recycling, the re-use of materials, or other forms of recycling of old devices and accumulators, you make an important contribution to the protection of the environment.