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MultiSystem 5070

Universal Portable Measuring System

Operating Instructions

Firmware Version 1.1
Handbook Version 1.0
ENG

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Safety

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Safety

General safety and warning information

- Never cut, damage or modify the power pack cables or place things on it.
- Never touch the power pack with wet or moist hands.
- Only connect the power pack to power supplies for which it is suited (see Chapter **Technical data** on page 19),
- Unplug the power cable from the outlet during a thunderstorm.
- Unplug the power cable if you detect smoke or there is an odor, or if the power cable is damaged.
- Ensure sufficient grounding of your system. Inadequate grounding may cause incorrect measurements.

Handling information for the MultiSystem 5070

- Never expose the instrument to excessive heat or moisture and observe the technical data.
- Do not store the instrument in humid or dusty locations or at temperatures below freezing point.
- Never submerge the instrument into water or other liquids. Never let liquids come into the instrument.
- Never open the instrument.
- Do not use the instrument if it has been dripped or if the casing is damaged.
- Avoid strong magnetic fields. Keep the instrument away from electric motors or other devices which generate electromagnetic fields. Strong magnetic fields may cause malfunctions and influence measurement values.
- Prevent the formation of condensation. If condensation has formed, let the instrument acclimate before you switch it on.

Information about the use of sensors and cables

- Protect the sensors from exceeding the allowed power range, mechanical overload and incorrect pin assignment.
- Make sure you enter the sensor parameters correctly when using sensors without ISDS (Intelligent Sensor Detection System).
- The measuring cables MK 01 and MKS may not be lengthened. Otherwise the shielding will be interrupted.
- The data of an ISDS sensor are read in when the measuring instrument is switched on. If sensors are reconnected the measuring instrument must be switched off and on again to allow the sensor data to be adopted.

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Information about handling batteries

- Always keep batteries away from heat sources and open fire.
- Never submerge batteries into water.
- Never disassemble, repair or modify the batteries.
- Never short-circuit the contacts of batteries.
- Use only batteries that are installed or delivered by HYDROTECHNIK.
- Only charge the battery while it is mounted in the instrument.
- Dispose of used batteries as hazardous waste. Cover the contacts with insulation tape.

Disposal information
Do not dispose of this product with your household waste.
You can find more detailed information on disposal on our website at: www.hydro-technik.com.

Introduction

The information contained in this section is important. If you neglect it, you might lose the right to make guarantee and warranty claims.

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Scope

The manual on hand is valid for measuring instruments named **MultiSystem 5070**. It is intended for the operator of the instrument, that means the person who works with the instrument. This is not a technical manual. Please contact our customer service for questions, that go beyond the contents of this manual.

Copyright

The technical state by the time of delivery of instrument and manual is decisive, if no other information is given. We reserve the right to make technical changes without special announcement. Earlier manuals are no longer valid.

The general conditions of sale and delivery of HYDROTECHNIK GmbH are valid.

Limitation of liability

We guarantee the faultless functioning of our product in accordance with our advertising, the product information we publish and this manual. Further product features are not guaranteed. We assume no liability for the economy and faultless function if the product is used for a different purpose than the one described in the chapter **Intended use**.

Compensation claims are generally excluded, except if intention or culpable negligence by HYDROTECHNIK is proved, or if assured product features are not provided. If the product is used in environments for which it is not suited or that do not represent the technical standard, we shall not be responsible for the consequences.

We assume no liability for damage to installations and systems in the surroundings of the product that is caused by a fault of the product or an error in this manual.

We are not responsible for the violation of patents and/or other rights of third persons outside the Federal Republic of Germany.

We are not liable for damage that results from improper operation and non-compliance with the instructions in this manual. We are not liable for lost profits and for consequential damages that arise from non-compliance with safety and warning information. We assume no liability for damage that results from the use of accessories and wearing parts that were not delivered and/or approved by HYDROTECHNIK.

The products of HYDROTECHNIK GmbH are designed for a long life. They represent the state of the art and their functions have been individually checked before delivery. The electrical and mechanical design corresponds to current standards and regulations. HYDROTECHNIK conducts ongoing product and market research for the further development and continuous improvement of its products.

In case of faults and/or technical trouble, please contact HYDROTECHNIK customer service. We can assure you that we will take immediate measures. The guarantee conditions of HYDROTECHNIKapply; if desired, we will gladly send you these.

Intended use

The measuring instrument **MultiSystem 5070** is a mobile, hand-held instrument for the recording, storage and evaluation of measuring data, collected by sensors connected to the device.

You can connect a large variety of different sensors to the instrument, but they have to meet the requirements defined in the section **Technical data**. Any other use of the measuring instrument is considered improper. If you have any question or want to use the measuring instrument for a different purpose, please do not hesitate to contact our service staff. We will be happy to assist you with any possibly necessary configurations.

Warranty

In accordance with our warranty conditions, we guarantee the condition without defects for this measuring instrument for a duration of six months. Wearing parts and storage batteries are excluded from this warranty. The warranty becomes void if repair work or interventions are executed by unauthorized persons.

Within the warranty period we will repair damage or defects that are caused by a manufacturing fault. We only accept warranty claims if they are reported to us immediately after their discovery, but no later than six months after delivery. The warranty benefit is by our choice through free repair of defective parts or replacement with sound parts.

Please send the instruments for which you have made a warranty claim postage-paid and with a copy of the invoice or the delivery slip to HYDROTECHNIK customer service. You can find the address at the end of this manual.

Customer obligations

The operating authority of this product has to assure, that only persons who

- know the regulations concerning occupational safety and accident prevention
- have been instructed in the operation of this product
- have read and understood this manual

are permitted to operate this product. Persons who operate this instrument are obliged to

- obey all regulations on occupational safety and accident prevention
- read this manual completely, especially the safety instructions in the first chapter.

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Authorized personnel

Persons are considered to be authorized if they have a professional education, technical experience, knowledge of the relevant standards and regulations and if they are able to estimate their duties and recognize possible danger at an early time.

Operator of the instrument

Persons are considered to be authorized if they have been instructed in the operation of the instrument and have read and understood this manual completely.

Personnel for installation and maintenance

Persons are considered to be authorized if they have been trained in all aspects of the instrument and have read and understood this manual completely.

Description of the measuring instrument

Properties of the MultiSystem 5070

The **MultiSystem 5070** is a practice-oriented, user-friendly hand-held measuring instrument assisting the user with daily measuring functions. When using sensors with ISDS (intelligent sensor detection), the **MultiSystem 5070** automatically identifies the connected sensors during switch-on and adopts all parameters: Measurement range, physical measurement variables, unit of measurement, signal output and characteristic curve (linearisation). You can also connect sensors without ISDS designation. The entry of the sensor parameters is then done in clear operation menus.

You can connect up to eight sensors and store all measured values. Calculations from the measuring values as difference, sum and performance, as well as the 1st derivation (e.g. speed from path) are available as additional special channels for display and storage. The buffering of extreme values of the minimum and maximum measurands is always active and can be displayed by the corresponding key selection.

All measurements can be conveniently transferred to a PC using a USB cable. The software **HYDRO***com* is delivered for free with the instrument and offers comprehensive support with functions for the evaluation, presentation and printing of the measured values.

System requirements for your PC:

- Windows 7 / 8 (driver required)
  ⇨ www.hydrotechnik.com
- Windows 8.1 or later

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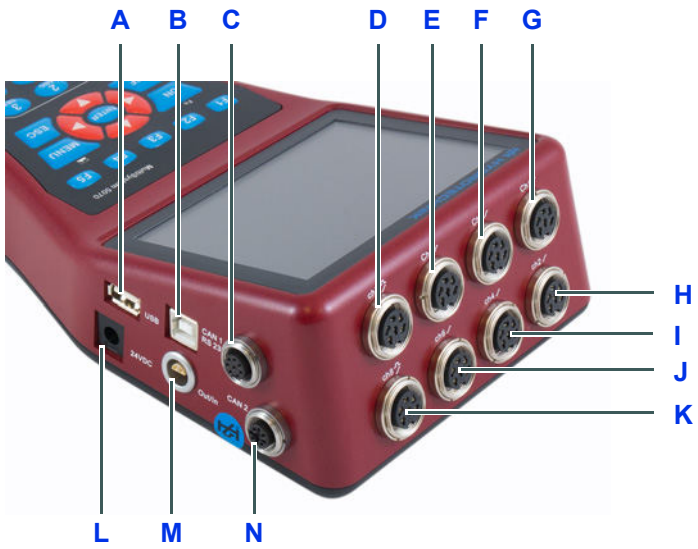
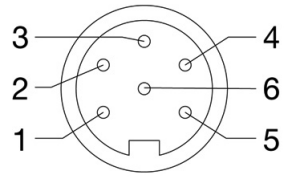
Connections



A	USB – host interface	**H**	Input Ch6 – analog input
B	USB – device interface	**I**	Input Ch4 – analog input
C	Combi-jack CAN1/RS232	**J**	Input Ch6 – analog input
D	Input Ch7 – frequency/analog input	**K**	Input Ch8 – frequency/analog input
E	Input Ch5 – analog input	**L**	Power supply – power pack
F	Input Ch3 – analog input	**M**	Digital input and output
G	Input Ch6 – analog input	**N**	Input CAN2

Characteristics of analog inputs



Number	8 (Ch1 to Ch6)
Signal input	Switchable 0/4 … 20mA; 0/2 … 10V; ± 10V; 0.5 … 4.5V; 1 … 5V
Resolution	13-bit analog/digital converter (12-bit + sign)
Measuring rate	Max. 10,000 values per second
Filter function	Input filter 50 kHz (dynamic mode)
IIR filter	Connectable: 5 kHz (standard mode) / 50 Hz (damped mode)
Connector	6 pin device plug
Protection type	IP40

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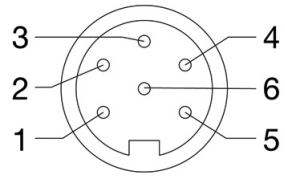
Pin assignment

Pin	Function	R_i	C_i	Limitation	Protection type
1	Signal I [mA]	113 Ω	35 nF	5VDC	Transile diode
2	Ground				
3	Ub[a)]			100mA	Current limiting
4	Signal U [V]	8.8 kΩ	35 nF	± 15VDC	Transile diode
5	Shield				
6	ISDS				

[a)] Power supply during mains operation 24 V

Characteristics of frequency/analog inputs



Number	2 (Ch7, Ch8) frequency/counter inputs with switchable direction detection or analog inputs
Signal input (frequency mode)	5 – 30VDC 0.25 Hz – 5 kHz with direction detection 0.25 Hz – 20 kHz without direction detection
Signal input (analog mode)	Switchable 0/4 … 20mA; 0/2 … 10V; ± 10V; 0.5 … 4.5V; 1 … 5V
Resolution (analog mode)	13-bit analog/digital converter (12-bit + sign)
Measurement rate (analog mode)	Max. 10,000 values per second
Filter function (frequency mode)	Adjustable period measurement for averaging
Filter function (analog mode)	Input filter 50 kHz (dynamic mode)
IIR filter (analog mode)	Connectable: 5 kHz (standard mode) / 50 Hz (damped mode)
Connector	6 pin device plug
Protection type	IP40

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Pin assignment frequency mode

Pin	Function	R_i	C_i	Limitation	Protection type
1	Signal (f)	100 k	33 nF	15VDC	VDR Transile diode
2	Ground				
3	Ub[a)]			100mA	PTC
4	Signal direction	100 k	33 nF	15VDC	VDR Transile diode
5	Shield				
6	ISDS				

[a)] Power supply during mains operation 24 V

Pin assignment analog mode

Pin	Function	R_i	C_i	Limitation	Protection type
1	Signal I [mA]	110 Ω	32 nF	5VDC	Transile diode
2	Ground				
3	Ub[a)]			100mA	Current limiting
4	Signal U [V]	22 kΩ	32 nF	± 15VDC	Transile diode
5	Shield				
6	ISDS				

a) Power supply during mains operation 24 V

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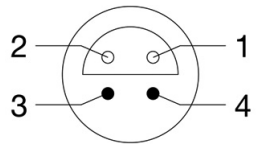
Characteristics of digital signal input

Note

Possible damage to the instrument!
This input may not be connected directly to inductive loads (e.g. coil of a magnetic valve). Otherwise the instrument may be damaged.

Pins of the digital input/output.
The digital signal input is isolated.

Pin assignment



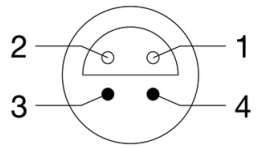
Pin	Function	Limitation	Protection type
3	Signal[a)]	30VDC	VDR Transile diode
4	Ground		

a) 1 mA constant current

Characteristics digital signal output

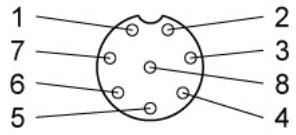
Jacks of the digital input/output.

Pin assignment



Pin	Function	Limitation	Protection type
1	Ground		
2	Signal	Ub/10mA	VDR Transile diode

Characteristics combi-jack CAN / RS 232



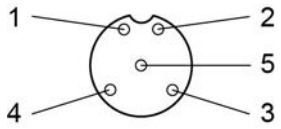
8-pin M12x1

Pin assignment

Pin	Function
1	Ground
2	Power supply for MultiXtend or CAN sensors[a)]
3	DTR
4	CAN_H
5	TXD
6	RTS from PC (input)
7	CAN_L
8	RXD

[a)] ~14.6 to 15V, max. 800mA (mains) / ~ 13VDC / 180mA (battery)

Characteristics combi-jack CAN



5-pin M12x1

Pin assignment

Pin	Function
1	Ground
3	CAN SMLD
4	Power supply for the measuring instrument [a)]
5	CAN_H
5	CAN_L

[a)] The measuring instrument switches the power supply on automatically via the CAN 2 jack. The measuring instrument is then only to be used for data recording.

Characteristics USB interfaces

USB Type A: Host interface

Function	Designation	Remarks
Signal D+	green	twisted cable
Signal D–	white	twisted cable
VCC	red	~ 5 VDC / 500 mA
Ground	black	–

USB Type B: Device interface

Function	Designation	Remarks
Signal D+	green	twisted cable
Signal D–	white	twisted cable
VCC	red	Not used
Ground	black	–

Display

The instrument is equipped with a colour display where all information and measured values are displayed.
Graphical presentations can be configured individually.

Various information can be displayed as icons on the top line of the display:

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	Recording bar	indicates a running recording:
	USB stick	USB stick at USB interface (host) detected
	USB	Instrument is connected to a PC via the USB interface (device)
	Battery	Charge state of the battery; when the icon turns red, the battery should be charged immediately
 	Power supply	Instrument power supply with external power pack; batteries are charged If the measuring instrument detects problems with the power supply, the icon changes to red.
	Page count	Displays the current page and total page count Use ◁ and ▷ to page through the display pages

In normal operation, either the battery or power pack icon is displayed. If the battery icon flashes during mains operation, the batteries are either missing, defective or deep-cycled. Possibly the battery cable isn't plugged correctly.

Keyboard

The membrane keyboard is resistant to moisture and dirt; the keys are assigned as follows:

F1	Function key 1	F2	Function key 2
F3	Function key 3	F4	Function key 4
F5	Function key 5		
ON	Switch device on	MENU	Open **Home** menu:
Fn	Function key Fn: Program favorites and softkeys.		Screenshot (with Fn)
◁	Cursor / page to the left	△	Cursor / highlight up
ENTER	Store input		
▽	Cursor / highlight down	▷	Cursor / page to the right
OFF	Switch device off	ESC	Cancel input/function without storing

You can use the number keys to select a menu quickly. The number keys correspond to the icon position on the display.

1	Input 1	2 ABC	Input 2 or ABCÄ
3 DEF	Input 3 or DEF	4 GHI	Input 4 or GHI
5 JKL	Input 5 or JKL	6 MNO	Input 6 or MNOÖ
7 PQRS	Input 7 or PQRSß	8 TUV	Input 8 or TUVÜ
9 WXYZ	Input 9 or WXYZ		

0 ␣	Input 0 or space[a)]		
-.	Dash, period, special characters	CLR	Delete single character

[a)] Use the 0 ␣ key to enter special digits, e.g. ( ) * / @ ° …

HYDROcom software package

After transferring the measuring data to a PC, you can use this software to evaluate, process and present the data graphically.

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Technical data

Casing	PC+ABS+20GF plastic
Weight	1,277 g
Protection type	IP40
CE conformity mark	Conforms to directive 2014/30/EU (electromagnetic compatibility); Conforms to directive 2014/68/EU (pressure device directive); Conforms to directive 2011/65/EU (restriction of hazardous materials);
Internal power supply	Lithium ion, 7.2V/6.2Ah
External Power supply	14 VDC / 2A
Dimensions	~ 270 x 140 x 69 mm (L x W x H)
Interfaces	USB, USB host, RS232 interface, 2 x CAN
Ambient temperature	-10 °C – 50 °C
Relative humidity	0 – 80 % (not condensing)
Storage temperature	-20 °C – 50 °C
Measured values display	5-digit
Trigger	4 channels as start/stop, or with the connections AND or OR; time trigger
Scanning rate	Selectable between 100 µsec and 999 min
Measuring rate	Analog input max. 10 kHz Frequency inputs 0.25 Hz … 20 kHz (without direction) / 0.25 Hz … 5 kHz (with direction)
Measured value memory	SD card 4 GB, max. 500 series of measurements, max. 8MB per series of measurements (6 million values)
Tolerances	Analog ± 0.10 % of final value, digital ± 0.02 % of measured value (resolution 20 ns)

Commissioning

Check delivery

The measuring instrument is delivered by HYDROTECHNIK and transported by suited shipping companies. At the time of delivery to you, you should check:

- Does the number of delivered items corresponds with the HYDROTECHNIK delivery note?
- Is the packing free of visible damage?
- Are measuring instrument and accessories free of visible damage?
- Are there any indications of rough treatment during transportation (e.g. burn marks, scratches, colour)?

To maintain all claims against the shipping company you should document all possible transportation damage (e.g. by taking photos and signing a written protocol), before you unpack the measuring instrument.
HYDROTECHNIK is not responsible for transportation damage and will assume no liability.

Scope of delivery

Carefully remove the transportation packing. Please observe all rules and regulations for the disposal of packing materials. After unpacking you should find the following parts:

- Measuring instrument **MultiSystem 5070**
- Plug power pack, 230 VAC/24 VDC
- USB data transmission cable

Check the scope of delivery against the delivery note and the order documents. Please report any discrepancies immediately to HYDROTECHNIK. Subsequent claims about incomplete delivery cannot be accepted.

Charge batteries

Note

Battery performance endangered!
Charge the instrument batteries for 2 hours before you put the instrument into operation. Otherwise, there is the risk of excessive discharge, which would impair the battery performance.

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The lithium ion battery integrated in the measuring instrument will be charged as soon as the instrument is supplied by a HYDROTECHNIK power pack.

The instrument is equipped with an internal lithium ion battery. This has only been slightly charged at the factory. Charge them for 2 hours before you put the instrument into operation. A battery with low power will be indicated by a red battery symbol.

Information about handling instrument batteries

The life cycle of lithium ion cells can be very long, but it depends greatly on the conditions of use.

Avoid a complete discharge, continuous charging and immediate re-charging after every use.

You can regenerate the battery with several discharge and charge cycles.

A nearly empty battery will be indicated by a red battery symbol. In this case you should maintain a 2 hour charging time.

In case of longer periods without use you should discharge and charge the batteries monthly.

Display operating instructions

A PDF containing the operating instructions is stored on the measuring instrument.

Connect the measuring instrument to the PC.

⇨ See **Connect a PC and transfer data** on page 33.

The measurement instrument is recognized as a change data carrier. You can open the operating instructions directly from the instrument.

You can also find the operating instructions on our website:

⇨ www.hydrotechnik.com

Operation

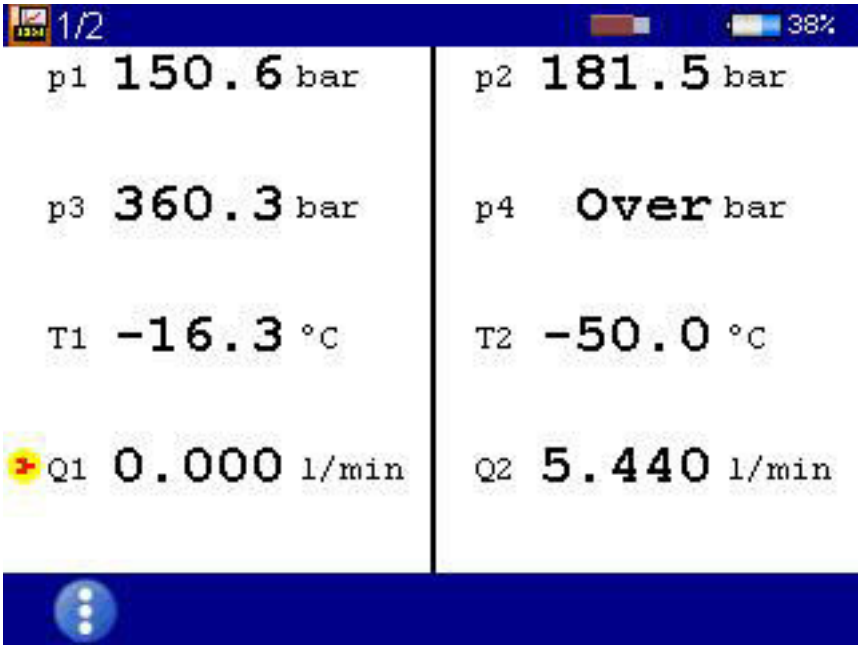
This section will provide you with all information about the daily use of the measuring instrument. The following operations are explained:

- **Switch the instrument On and Off**
- **Select operating language**
- **Connect sensors**
- **Enter sensor parameters**
- **Record measuring data**
- **Connect a PC and transfer data**
- **Delete measuring data**
- **Reset device**

In chapter **Operating software**, you will find a complete description of the instrument software with a chronological presentation and explanation of all menus.

The software **HYDRO***com* which is part of delivery will not be explained in this manual. Please refer to the online help and the separate software documentation.

Switch the instrument On and Off



Make sure that the desired sensors are connected appropriately before switching on (see section Chapter **Connect sensors** on page 29).

If you are using ISDS sensors, the sensor parameters will be set automatically. If you use other sensors, you will first have to program the sensor parameters before you can carry out measurements.

1 Switch on: ON (> 2 sec.)

2 Wait for the self-test until the measurement display or the **Home** menu is displayed.

3 Use instrument.

4 Switch off: OFF (> 2 sec.)

The instrument saves all data and settings before the instrument software is shut down.

If you hold the OFF down for longer than 5 seconds, this switches the instrument off without saving.

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Operation of the instrument software

After you have switched on the instrument, depending on the setting on the **User profiles** menu, the **Home** menu or the measurement display is shown.

If the measurement display is shown, press the MENU key to display the **Home** menu.

Menus have up to 3 x 3 icons. Each icon takes you to the next menu level or to a dialog.

Navigate in the instrument software

Each icon corresponds to a menu or a dialog. There are two ways to select an icon.

Highlight and ENTER

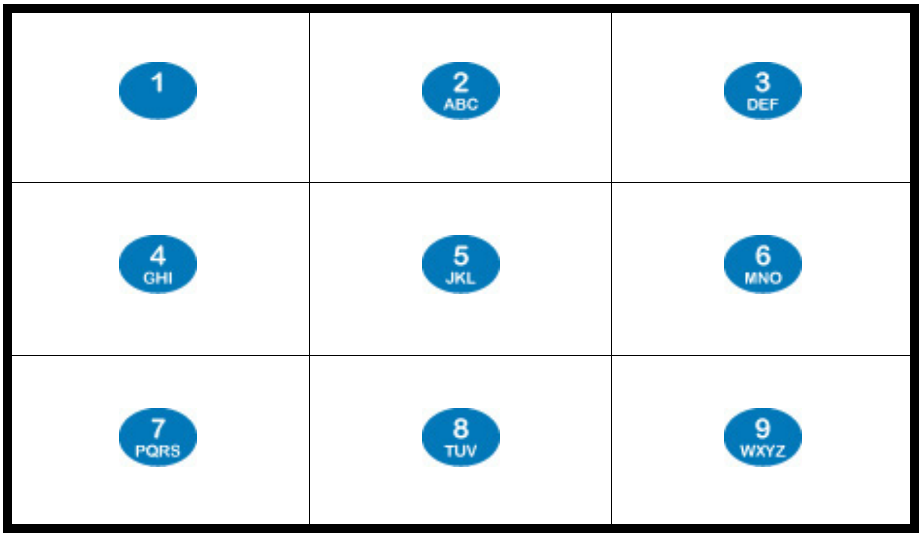
Use the △▽◁▷ keys to highlight the desired icon and press the ENTER key.

The selected menu or dialog is displayed.

Number keys

You can use the number keys to select a menu quickly.

The number keys correspond to the icon position in the menus.



If you press a number key, the corresponding menu or dialog opens.

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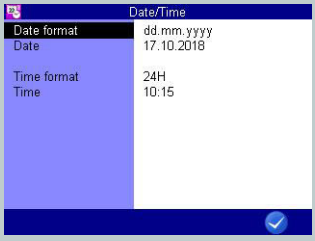
Navigation example Navigate to the **Date/Time** dialog.

Menu/dialog	Action	Highlight and ENTER	Number keys
	Select the **Setting** menu. 	▷ ▽ ENTER	5 JKL
	Select the **Unit** menu. 	▷ ▷ ENTER	3 DEF
	Select the **Date/Time** dialog. 	▽ ENTER	4 GHI
			

Favorites

The **Home** menu has three favorites. You can assign these as you wish so that you have quick access to frequently-used menus or dialogs.

➔ **Assigning a favorite**

1 Select favorite on the menu △▽◁▷

2 Open favorite selection: ON + ENTER (press at the same time)

3 Select and confirm menu or dialog: △▽ ENTER

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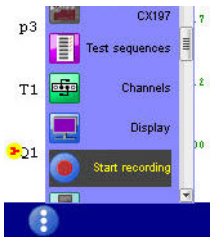
User-defined softkeys

You can use the F2 to F5 keys as user-defined softkeys in the measurement display.



➔ **Create softkeys**

1 Open **Home** menu: MENU

2 Open **Show measurement**: ◁ ▷ △ ▽ ENTER

3 Open favorite selection for the softkey F2: ON + F2 (press at the same time)

4 Select menu or dialog: △ ▽

5 Confirm selection for the softkey: ENTER

The F2 key in the measurement display is now a softkey.

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The keys F3, F4 and F5 can also be created as softkeys.

Select **Favorite** in order to delete a user-defined softkey.

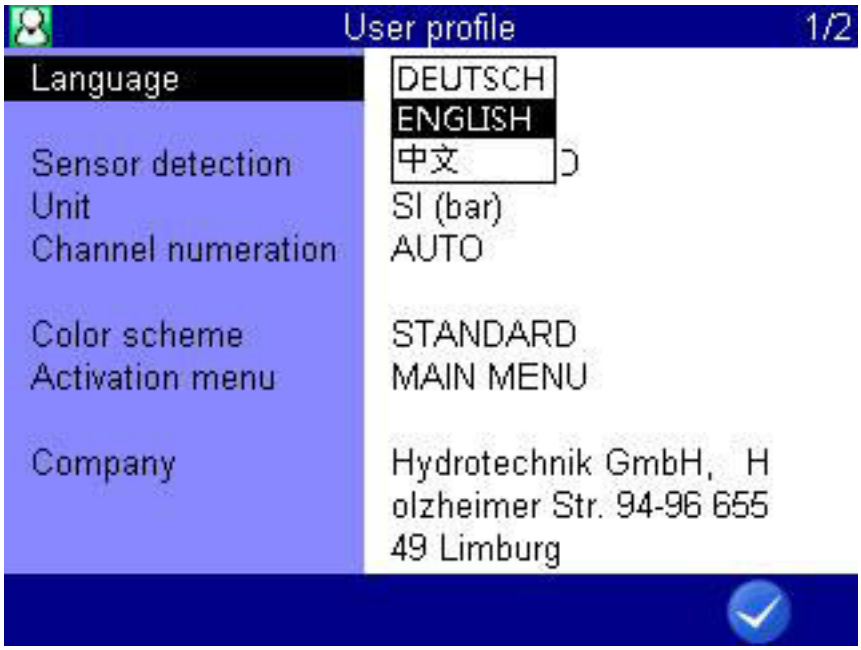
Softkeys: Symbols/text

On the **User profiles** dialog, select whether softkeys are displayed as symbols or text.

⇨ See **Softkeys** on page 92.

⇨ See **Softkeys: Symbols/text** on page 137.

Select operating language



1 Open **Home** menu: MENU

2 Open **Setting** menu: ◁▷ △▽ ENTER

3 Open **Unit** menu: ◁▷ △▽ ENTER

4 Open **General settings** menu: ◁▷ △▽ ENTER

5 Select **Language** with △▽ and open with ENTER dialog field.

6 Select language on the dialog field: △▽ ENTER

7 Confirm changes and exit dialog: F5

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Setting date and time

1 Open **Home** menu: MENU

2 Open **Setting** menu: ◁ ▷ △ ▽ ENTER

3 Open **Unit** menu: ◁ ▷ △ ▽ ENTER

4 Open the **Date/Time** dialog: ◁ ▷ △ ▽ ENTER

5 Enter **Date format**: △ ▽ ENTER △ ▽ ENTER

6 Enter **Date**: △ ▽ ENTER △ ▽ ENTER

7 Enter **Time format**: △ ▽ ENTER △ ▽ ENTER

8 Enter **Time**: △ ▽ ENTER △ ▽ ENTER

9 Confirm changes and exit dialog: F5

■

Connect sensors

1 Switch the instrument off.

2 Connect the desired sensors to the inputs.

⇨ See Chapter **Connections** on page 11.

3 Switch the device on.

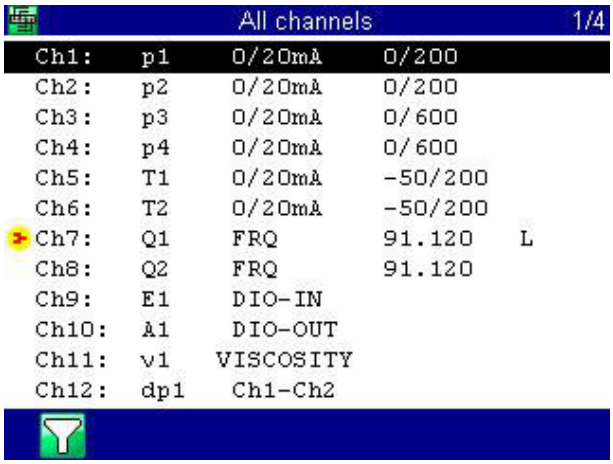
■

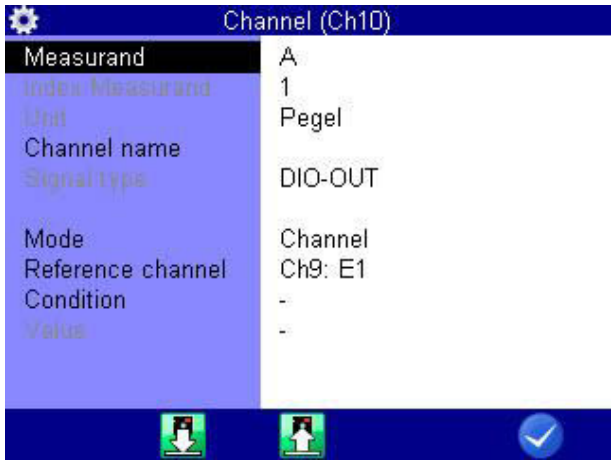
Enter sensor parameters

If you have connected ISDS sensors, the sensor parameters will be detected automatically when the instrument is switched on. Then you can skip this section.

If you have connected sensors without ISDS function, you will have to program the sensor parameters manually. You find the required information e.g. on the type plate or the calibration certificate of your sensor.

ENG





1 Open **Home** menu: MENU

2 Open **Setting** menu: ◁▷ △▽ ENTER

3 Open **Channels** menu: ◁▷ △▽ ENTER

4 Open **All channels** dialog: ◁▷ △▽ ENTER

5 Highlight channel: △▽

6 Start programming: ENTER

7 Highlight and select the dialog entry: △▽ ENTER

8 Highlight value: △▽,
or enter value: z. B. 12,5

9 Confirm value: ENTER

10 Confirm changes and exit dialog: F5

■

Available measurands The instrument is able to process various measurands including pressure, volume flow rate, temperature and speeds. Make sure you select the measurand and unit corresponding to the sensor.

Index variable If several channels are programmed with the same measurand, these will be automatically indexed consecutively. The automatic indexing can be disabled in the device menu to allow manual assignment of index numbers.

Channel name You can assign an individual name to each channel.

Signal types Select between **0/20 mA**, **4/20 mA**, **0/10 V**, **± 10 V**, **0.5/4.5 V**, **1/5 V**, **2/10 V**.

Measuring range Enter the beginning and end of the measuring range. Confirm these two entries with ENTER.

Zero point Press ENTER and START F4 to perform the automatic zero point equalization. A possible zero point deviation will be compensated by the software.

Linearisation If a calibration table is available for the connected sensor, you can enter it here, after selecting **YES** at the menu item **Linearisation**.

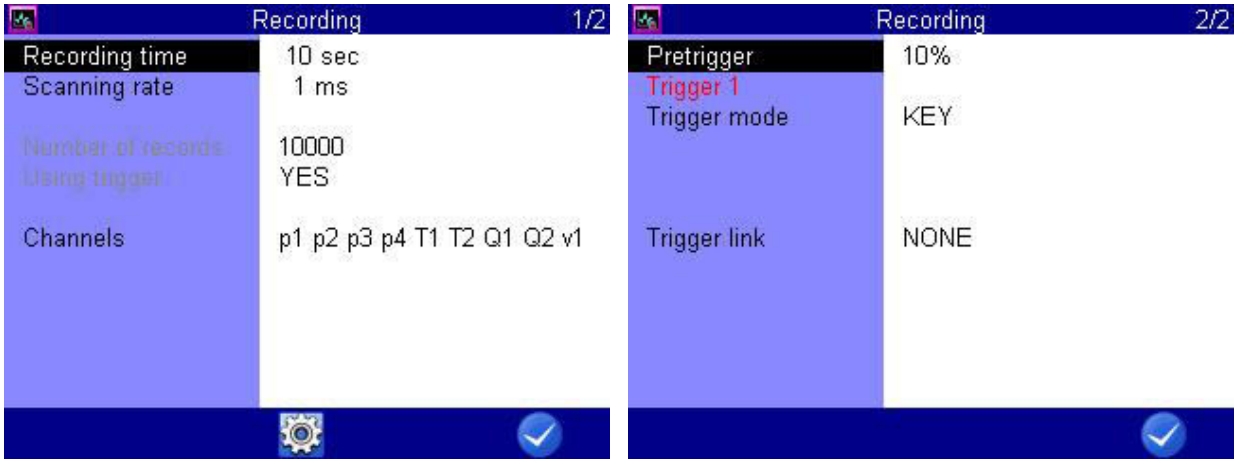
⇨ Please observe the additional information in chapter Chapter **Linearisation table** on page 113.

LOAD Press F2 to load sensor parameters from the sensor data base.

SAVE Press F3 to save the current sensor parameters in the sensor database.

ENG

Record measuring data



Data are collected in series of measurements. These can be configured on the **Memory** dialog.

1 Open **Home** menu: MENU

2 Open **Setting** menu: ◁▷ △▽ ENTER

3 Open **Storage** dialog: ◁▷ △▽ ENTER

4 Make selection: △▽

5 Confirm selection: ENTER

6 Apply changes: F5

7 Return to measured values display: ESC

■

Storing time Enter how long the measurement data is to be recorded. Select the desired time unit.

Scanning rate Define how often the measurement data is to be recorded. Select the desired time unit.

Storing time and scanning rate define, how often and how long measurement data is to be stored. Be aware that if you store too much measurement data, the later evaluation and presentation will become more difficult.

Channels Activate the channels where the measurement data is to be recorded.

Trigger 1 A trigger is a condition that has to happen to make the storing of measurement data start or stop. In this case, no trigger is defined.

⇨ Please see section Chapter **Trigger function** on page 101 for further information on how to use the trigger function.

Connect a PC and transfer data

You have to install the **HYDRO***com* software on your PC, before you can transfer measurement data to your PC.

The measurement instrument is recognized as a change data carrier. You can open the operating instructions directly from the instrument.

ENG

1 Switch on measuring instrument and PC.

2 Make sure that mass storage is selected as USB mode and that at least one volume is enabled.

⇨ See **USB (DEVICE)** on page 87.

3 Plug the supplied USB cable into the connector on the side of the measuring instrument.

4 Plug the USB cable into an available USB port on your PC.

System requirements for your PC:

- Windows 7 / 8 (driver required)
  ⇨ www.hydrotechnik.com
- Windows 8.1 or later

5 Wait until the measuring instrument has been detected by the PC.

6 Perform the data transfer as described in the software documentation.

■

The internal memory has two partitions:

- **DATA-VOL**
  This is the general memory for files (measurement series, images, etc.)
- **DOCU-VOL**
  This is where you will find the operating instructions, data sheets and software for this instrument.

Delete measuring data

In the example shown, the series of measurement 002 and 003 has been selected for deletion already, an * is displayed to the left of the measurement.

If you press F2, the names of the measurement files will be displayed; pressing F1 will provide you more information about the highlighted measurement. Use F4 to sort the measurement data displayed.

1 Open **Home** menu: MENU

2 Open **Saved measurements** menu: ◁▷ △▽ ENTER

3 Open the **Show series** dialog: ◁▷ △▽ ENTER

4 Select measurement series (optional): △▽ ENTER

5 Delete: F5

6 Delete selected measurement series or all measurement series: △▽ ENTER

7 Confirm deletion with F2 or cancel with F4.

The deletion cannot be undone.

■

⇨ Search function, see **Search series** on page 62

Reset device

All user-defined parameters and settings (channels, display, memory, etc.) will be deleted by resetting the device. All data on the SD card remain unaffected (measured values, sensor and CAN database, projects, test runs, databases from test runs, etc.).

1 Switch device off: OFF

2 Switch device on: ON

3 Wait until the beginning of the initialization is displayed and then press: 1 2 ABC 3 DEF

The selection list of the available operation languages will be displayed; here you may select the ones desired. Then the device will be reset and restarted.

■

ENG

Operating software

The operating software of the **MultiSystem 5070** will be presented and explained on the following pages.

ENG

Home

MENU **MENU** opens the **Menu**; you can operate all functions of the **MultiSystem 5070** from here.

For the following explanations, it is assumed that the **Menu** is displayed.

Available menus

Highlight the desired menu with △▽◁▷ and press ENTER.

Start recording starts the recording of measurement data; the configurations from the memory menu (channel selection, storing time, scanning rate, a.s.o.) are applied

Measure Display of the current measured values

Configurations Function for managing device configurations

Series of measurements Indication, display and deletion of the measurement series

Setting Settings for the channels, display, device and saving

Extras Settings for the USB stick, special applications and games

Favorites Here you can save menus or dialogs as favorites.
⇨ See **Favorites** on page 133.

ENG

Start recording

➔ **Start recording**

F5 **OK** Confirms input/saves change

The **Start recording** dialog is a dialog on which the instrument suggests the current time with date as the name of the measurement. The defined storage parameters (channel selection, storage duration, triggers, etc.) can be set on the **Device** menu.

Measurement series name Name of the measurement series; press ENTER to overwrite the proposal

Filename Here you may enter a (different) name for the measurement series data file

Mode Choose from three options:

- **STANDARD**
  The defined recording and parameters will be applied to execute one single recording
- **CYCLIC**
  The defined recording parameters will be applied to execute a recording; then the recording will be repeated until the key **C-STOP** F3 is pressed
- **SINGLE VAL**
  The current value of each selected channel will be recorded when key is pressed

If you want to assign a note to the saving, click **Note** on the second page of the **Save** dialog and press ENTER and enter the desired text. Start the saving with F5.

Note You can enter any free text here

➔ **Open saved measurements**

⇨ See **Series of measurements** on page 46.

➔ **Use USB stick**

⇨ See **Flash drive File manager** on page 107.

Measured values display

Displays the current measured values. You can select on the **Display** menu which channels will be displayed here.

There are different measured values:

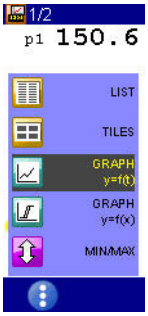
- Measured values together with minimum and maximum values (MinMax)
- Measured values with their units

On the **User profiles** dialog, you can specify that the measured value display is displayed after the measuring instrument is switched on.

⇨ See **General settings** on page 90.

Display change

You can open the display selection with F1. Choose from the following options:



List view

⇨ **Symbols in the measured value display** on page 42

Tile view

⇨ **Tiles/page** on page 77

Graphic view $y=f_{(t)}$

⇨ **Graphic presentation in display menu** on page 119

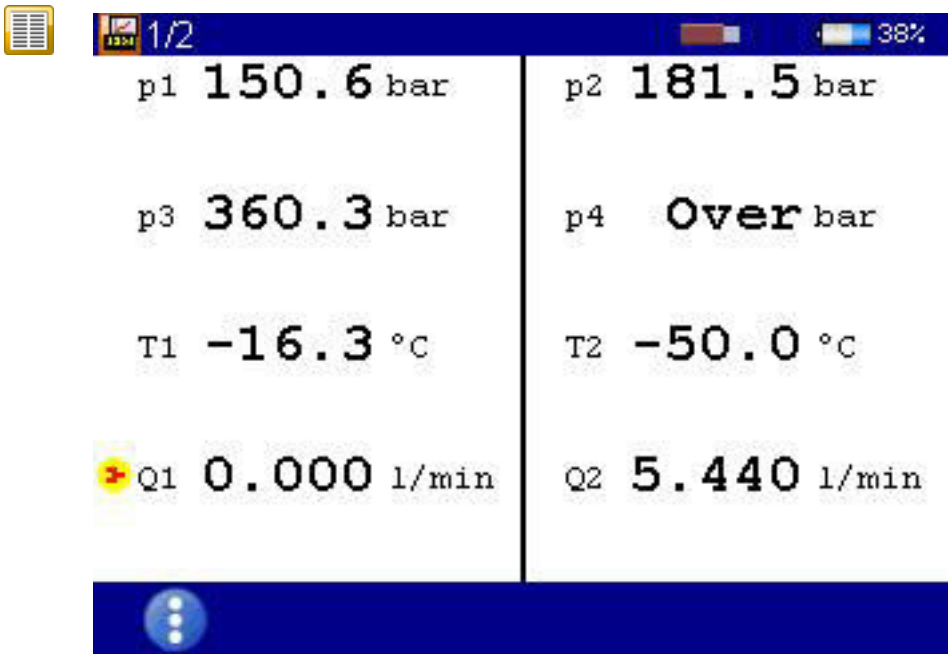
Graphic view $y=f_{(x)}$

⇨ **Graphic presentation in display menu** on page 119

MinMax view

⇨ **Measured values with MinMax** on page 42

Measured values with their units



F1

Display change

⇨ **Display change** on page 40

The units are displayed to the right of each measured value.

ENG

Measured values with MinMax

F1

Display change

⇨ **Display change** on page 40

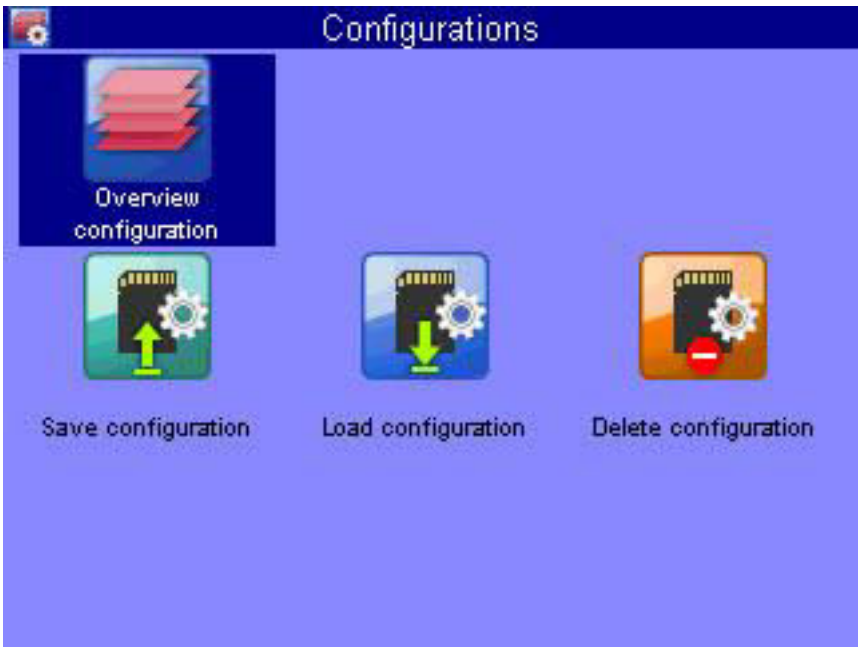
To the right of each measured value display, the measured minimum value (upper left) and maximum value (bottom right) are displayed.

Symbols in the measured value display

Channel with ISDS sensor.

Channel is recorded

Configurations



On the **Configurations** menu, you can view all settings for the measuring instrument and save the settings under a name. You can save as many configurations a you wish and then load or delete them.

Saving a new configuration

1 Select the **Save configuration** dialog: ◁▷ △▽ ENTER

2 Enter **File name** and ENTER.

Use F2 to toggle between capital and small letters.

3 Enter **Description** and ENTER.

Use F2 to toggle between capital and small letters.

4 Save configuration and exit dialog: ✓ F5.

■

ENG

Loading a saved configuration

1 Select the **Load configurations** dialog: ◁▷ △▽ ENTER

2 Select **File name**: ENTER.

3 On the dialog window, select from the list of configurations: △▽ ENTER

4 Load configuration and exit dialog: ✓ F5.

■

Deleting a saved configuration

1 Select the **Delete configurations** dialog: ◁▷ △▽ ENTER

2 Select **File name**: ENTER.

3 On the dialog window, select from the list of configurations: △▽.

4 Delete: ✓ F5.

5 Select between **ALL** and **SELECTED**: ENTER.

6 Confirm deletion with **YES** and exit dialog: F2

■

Transferring a project to another measuring instrument with USB stick

1 Save the configuration on the instrument on the **Save configurations** dialog.

⇨ See **Saving a new configuration** on page 43

2 Copy the configuration from the instrument onto a USB stick.

⇨ See **Storage on the USB stick** on page 108.

3 Plug the USB stick into the measuring instrument to which you want to transfer the configuration.

4 Copy the configuration from the USB stick to the instrument.

⇨ See **Load files from the USB stick** on page 110.

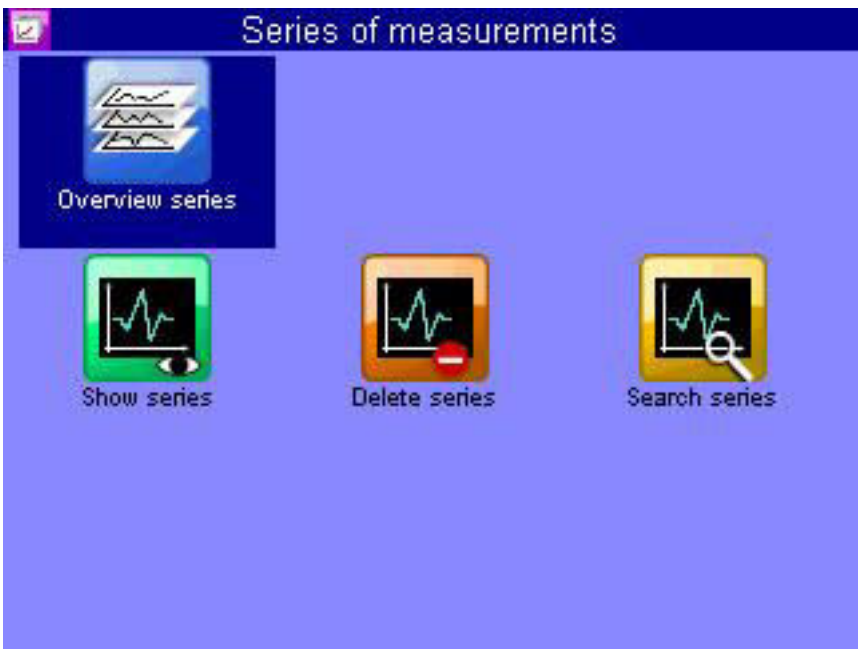
5 Open the **Load configurations** dialog on the target instrument and load the desired configuration.

⇨ See **Loading a saved configuration** on page 44

■

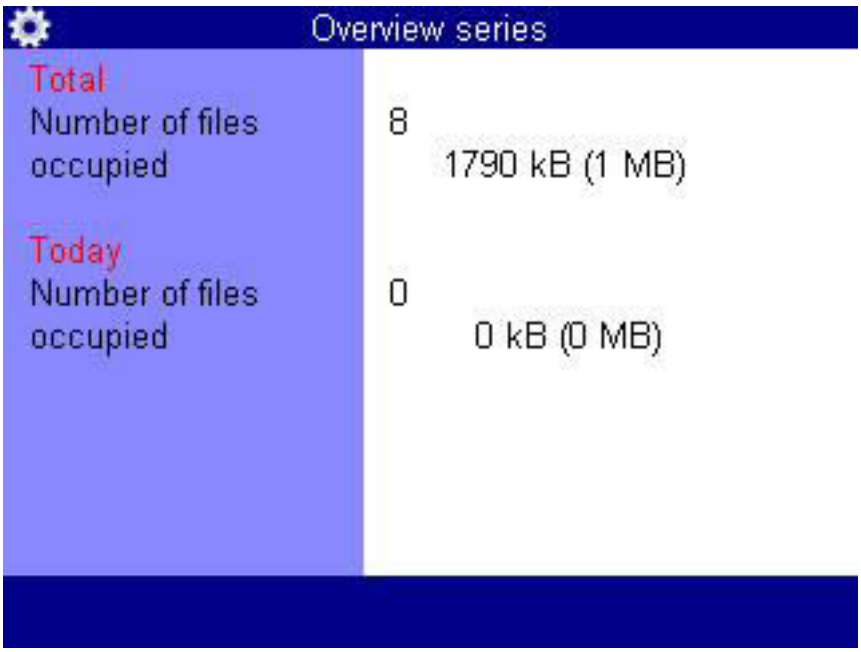
ENG

Series of measurements

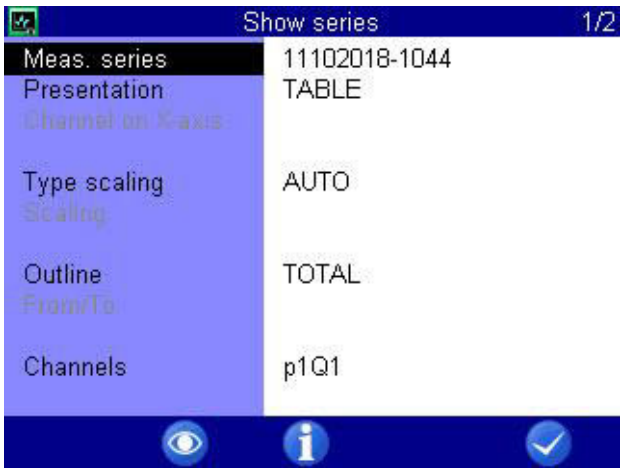


On this menu, you can prepare the data from saved measurement series, display, delete, search it and configure its display.

Overview series



Show series



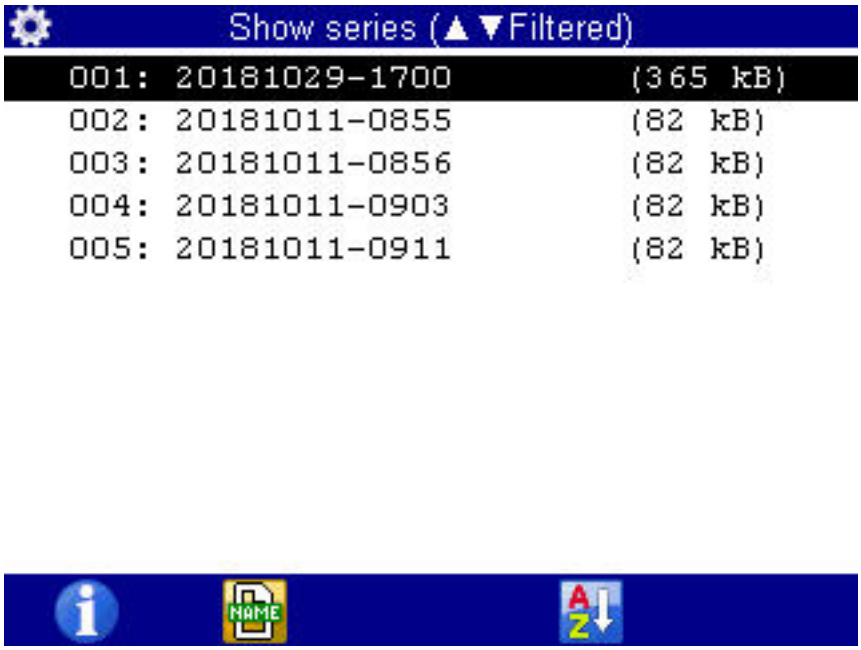
F2 **DISPLAY** Displays the selected measurement.

F3 **INFO** Displays information about the selected object.

F5 **OK** Confirms input/saves change

On the **Show series** dialog, select a measurement series and specify the display. Then press F2 in order to display the measurement series.

Measurement series



F1		**INFO**	Displays information about the selected object.
F2		**FILE**	Converts the display to the file name.
F2	NAME	**NAME**	Converts the display to the measurement series name.
F4		**SORT**	Sorts displayed list/table.

➔ **Select the series of measurements**

1 Open the **Show series** dialog: ◁▷ △▽ ENTER

2 Open the **Show series (▲▼Name)** dialog: △▽ ENTER

- You can press F2 to display the name of the measurement file instead of the recording time.
- You can press F4 in order to sort the measurement series.

3 Select measurement series: △▽ ENTER

- Press F1 while a measurement is highlighted to display information about the measurement.
  Date and time of the measurement, storing time and scanning rate, and possible trigger settings will be displayed.
  Notes, which were entered at the start of the storing, are shown on the third information page. You can edit the notes.

■

ENG

Presentation

The data of the selected measurement series can be presented in four different ways:

- **Table**: Presentation of all measured values of each channel in a table
- **Statistics**: Presentation of the minimum, maximum and average values of each channel
- **Graphic**: two different graphic displays
  - Presentation depending on the time
  - Presentation depending on a selected variable

The graphics are examples for the different types of presentations:

Table Statistics Graph

Information about the different presentation options can be found in the chapters:

⇨ Chapter **Presentation type table** on page 55

⇨ Chapter **Presentation type graph** on page 56

Channel on the x-axis

If you have selected the presentation **GRAPHIC y=f (x)**, you can select the channel for the x-axis. The first channel of the measurement is pre-set.

ENG

Type scaling

F2  **DISPLAY** Displays the selected measurement.

F3  **INFO** Displays information about the selected object.

F5  **OK** Confirms input/saves change

By default, the entire measuring range of a variable is used as scaling.

However, if you want to limit the presentation to a certain part of the measuring range, you can enable the manual scaling:

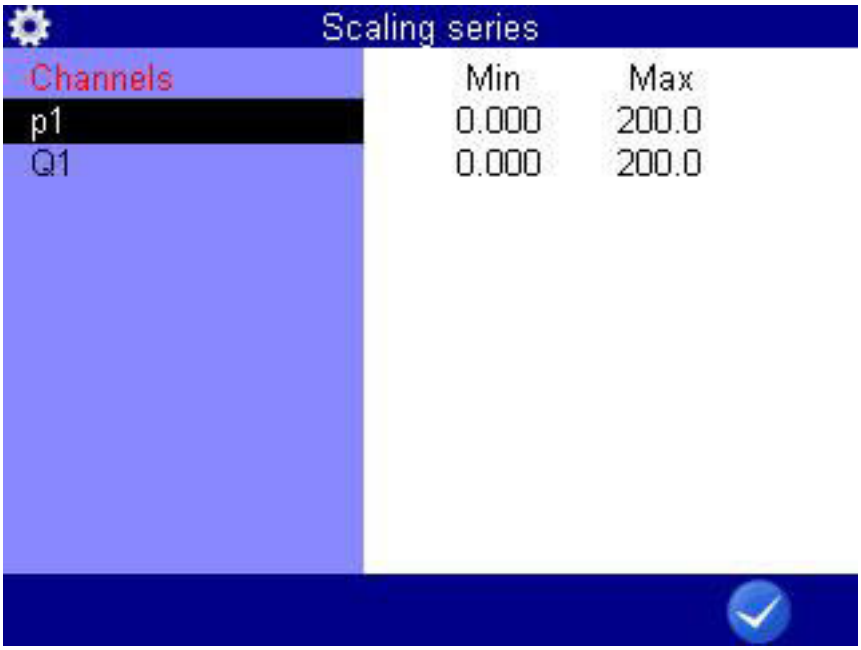
1 Select **Type scaling**: △▽.

2 Select **MANUAL** or **AUTO**: ENTER.

■

ENG

Scaling



F5 

OK Confirms input/saves change

You can set the minimal and maximal values of the measured values to be presented here.

- For **p1** and **Q1** the complete measuring range (0 – 200 bar, resp. 0 – 300 l/min) is to be displayed.
- For **p2** only the measurement values which lie between 40 and 100 bar are to be displayed.

➔ **This is how to change the scaling of a variable:**

1 Select variable: △▽ ENTER

2 Enter minimal value and ENTER.

3 Enter maximum value and ENTER.

4 Save configuration and exit dialog: F5

■

ENG

Scope

F2 

DISPLAY Displays the selected measurement.

F3 

INFO Displays information about the selected object.

F5 

OK Confirms input/saves change

By default, series measurements are presented completely. But you may limit the range of presented values by entering a start and end time. In the example shown, only the range between 0.0 and 10.0 seconds is be shown.

This is how to adapt the range of presentation:

1 Select **Scope**: △▽.

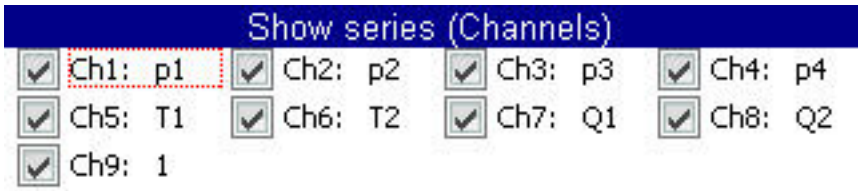
2 Select **CLIPPING**: ENTER

3 Enter time **From/To** and values from, to, and confirm time value with ENTER.

■

ENG

Channels



F3 

ALL Selects all entries.
Removes all selections.

F5 

OK Confirms input/saves change

Opens the **Show series (channels)** dialog. Select the channels that should be presented.

All channels marked with a ☑ check mark are presented.

Select a channel and change the marking with ENTER.

Press F3 in order to select or deselect all channels.

Use symbols

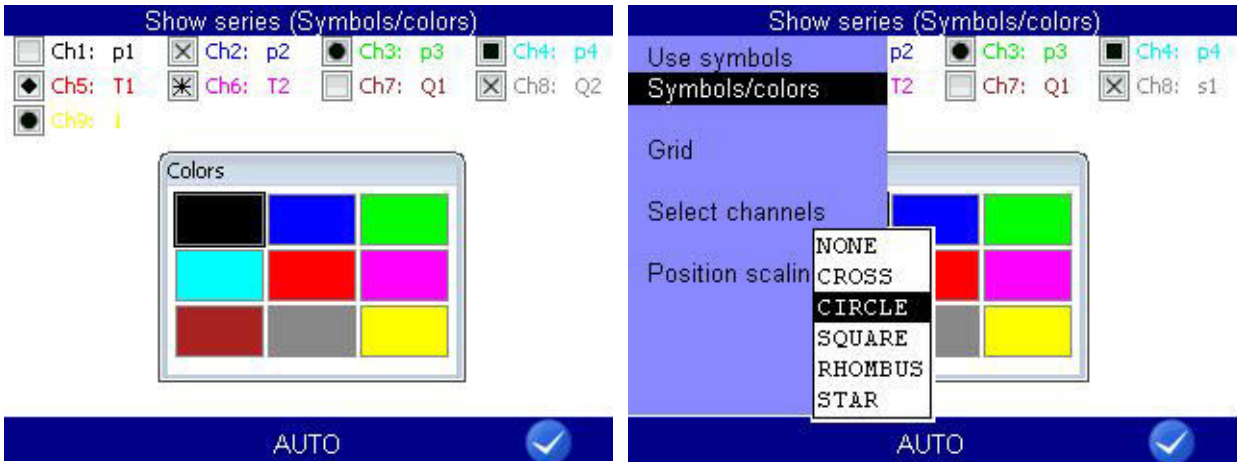
Select whether symbols are to be used for the presentation of the channels.

1 Call up the **Use symbols** dialog entry: △▽ ENTER

2 Select **YES** or **NO**: △▽ ENTER

■

Symbols and colors Select the symbols and colors that are to be used for the presentation of individual channels.



F3 **AUTO** Automatically assigns the symbols and colors.

F5 **OK** Confirms input/saves change

Highlight one of the displayed channels to modify symbols and colors for it.

1 Select a channel: ◁ ▷ △ ▽ ENTER

2 Select the color for the channel: ◁ ▷ △ ▽ ENTER

3 Select the color for the channel: △ ▽ ENTER

Symbols and colors Opens the dialog for selection of the symbols and colors.

Grid Number of the displayed lines in the grid of the diagram (**small grid**, **5 lines**, **10 lines**, **zero lines**).

Channel selection Choose from the following options:

- **AUTO**: For presentation of a different measurement, all channels of this measurement will be selected automatically for the presentation
- **MANUAL**: When presenting other measurements, the last channel selected remains, if possible

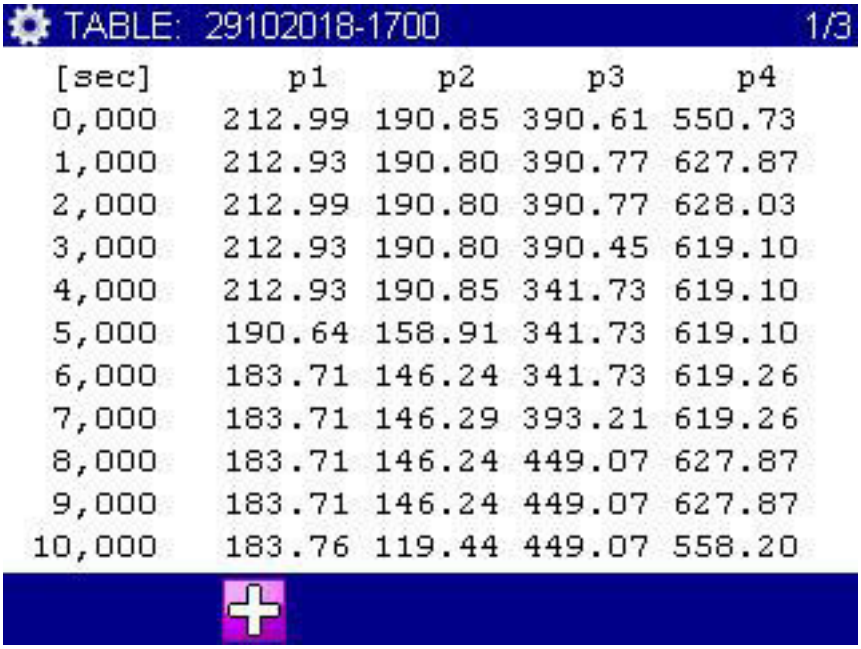
Position scaling defines how the scaling of the channels is displayed.

- For **GLOSS**, the scaling is displayed beneath the graph.
- For **Y-AXIS**, only the scaling one channel is shown on the y axis. There is remaining space for the graphic.

ENG

ENG

Presentation type table



F2 **DETAIL** Presentation type table: Zooms in on the table.

F3 **RESET** Presentation type table: Zooms out on the table.

- Regardless of the recording time, a table will always contain eleven lines:
- Start and end value
- Nine intermediate values

You can zoom into the table to display intermediate values between two displayed values:

1 Press F2.

2 Use △▽ to highlight the lines below which you would like to display the intermediate values.

3 Press ENTER.

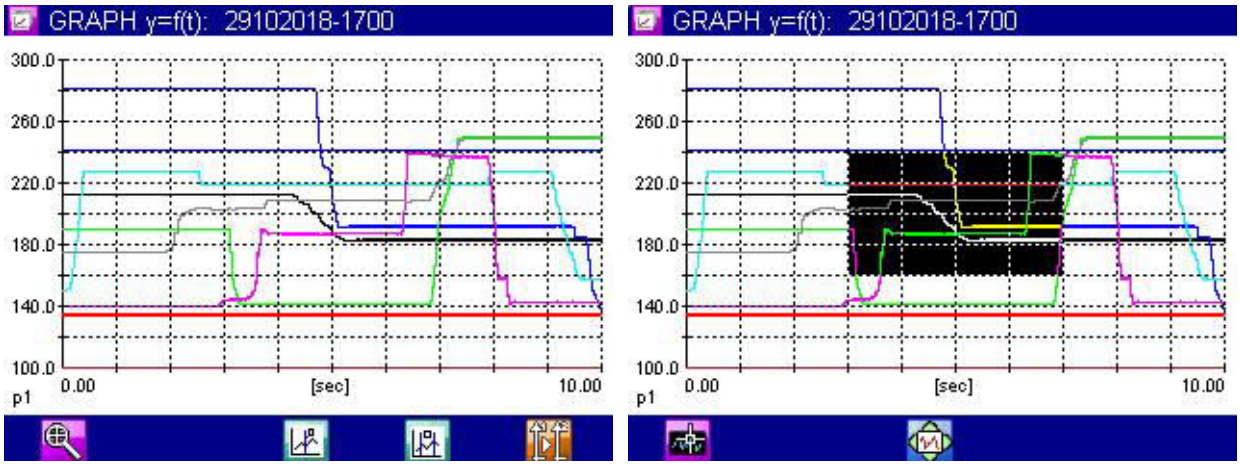
The highlighted value becomes the start and the next the end value, between that nine intermediate values are displayed; if not enough values are contained in the measuring series to display nine values between the start and end value, the next ten measuring values will be displayed after the start value.

4 You can now repeat these steps to show more detailed values, or press F3 to undo the zooming step-by-step.

■

ENG

Presentation type graph



F1		**ZOOM+**	Activates the zoom function.
F2		**ZOOM-**	Zooms out on the graphic.
F1		**POS**	Positions the zoom cutout.
F3		**SIZE**	Changes the zoom cutout.
F3		**SPOT**	Activates the spot function. ⇨ **Spot function** on page 58
F4		**D-SPOT**	Activates the delta spot function. ⇨ **Delta spot function** on page 59
F5		**Y-SCAL**	Toggle the channel for which the scaling is displayed on the y-axis. Only for series of measurements with two or more channels.
F1		**Record**	Changes the step width in the spot and delta spot function.

The selected channels are displayed with the assigned symbols and colors.

➔ **Here's how to use the zoom function**

1 Enable zoom function: F1

A yellow rectangle displayed in inverse video indicates the area that will be enlarged.

You can move and scale the area displayed in inverse.

2 Move area displayed in inverse: F1 ◁ ▷ △ ▽

3 Scale area displayed in inverse: F3 ◁ ▷ △ ▽

4 Display area displayed in inverse (apply zooming): ENTER

You can use the zoom function repeatedly to show the desired area of the graph in an optimised way.

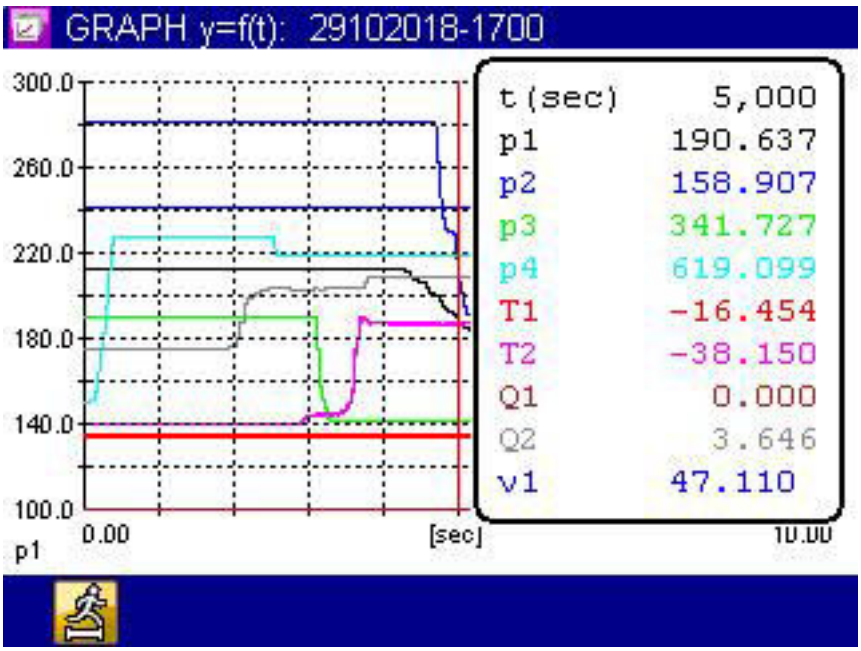
5 End graph presentation: ESC

■

ENG

ENG

Spot function



F1 

Record Changes the step width in the spot and delta spot function.

You can use the spot function to display measured values of a certain time position within the graph:

1 Activate spot function: F4

2 Choose move factor: F1 △▽ ENTER

3 Move spot line: ◁▷

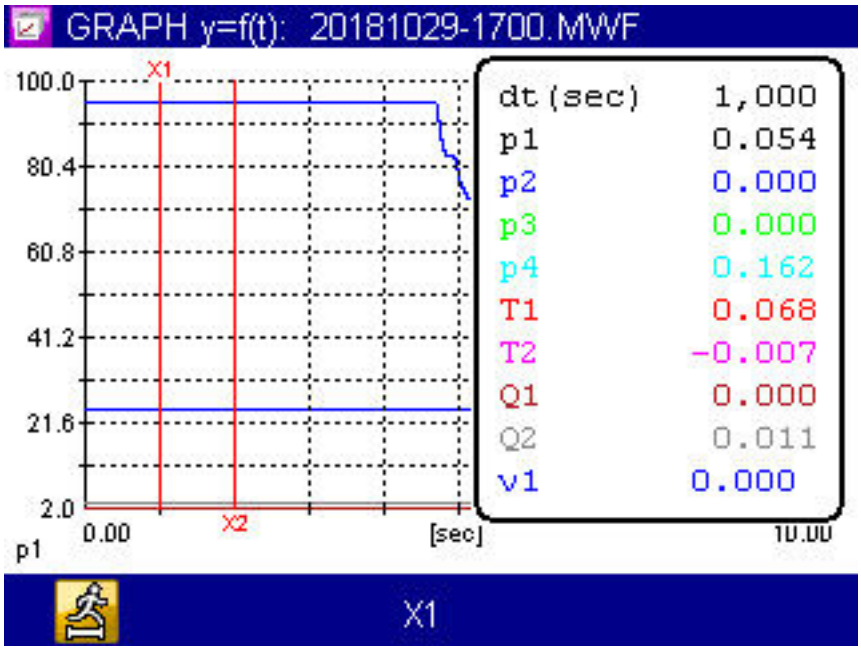
4 Read measured values.

5 End spot function: ESC

■

ENG

Delta spot function



F1 

Record Changes the step width in the spot and delta spot function.

F3

X1
X2
X1+X2

Changes the spot line that is moved with the ◁▷ keys.

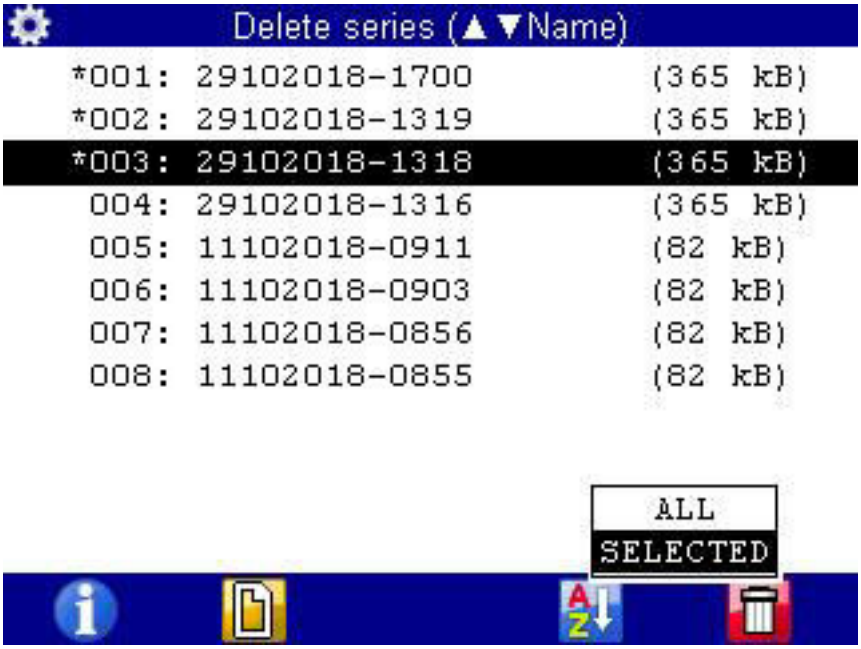
For the delta-spot function, two spot lines are displayed.

The differences between the measured values per channel that are marked by both spot lines on the curve are displayed on the right.

Use F1 to select the movement factors and F3 to specify whether the left (**X1**), the right (**X2**) or both (**X1+X2**) spot lines should be moved.

ENG

Delete series



F1		**INFO**	Displays information about the selected object.
F2		**FILE**	Converts the display to the file name.
F2		**NAME**	Converts the display to the measurement series name.
F4		**SORT**	Sorts displayed list/table.
F5		**DELETE**	Enables the delete function.

Use the functions of this dialog to delete stored measurements.

In the graphic, the measurement series **001**, **002** and **003** are selected for deletion. The measurement series **003** is highlighted. Press F1 to display information on it.

1 Open the **Show series** dialog: ◁ ▷ △ ▽ ENTER

2 Select measurement series (optional): △ ▽ ENTER

3 Delete: F5

4 Delete selected measurement series or all measurement series: △ ▽ ENTER

5 Confirm deletion with F2 or cancel with F4.

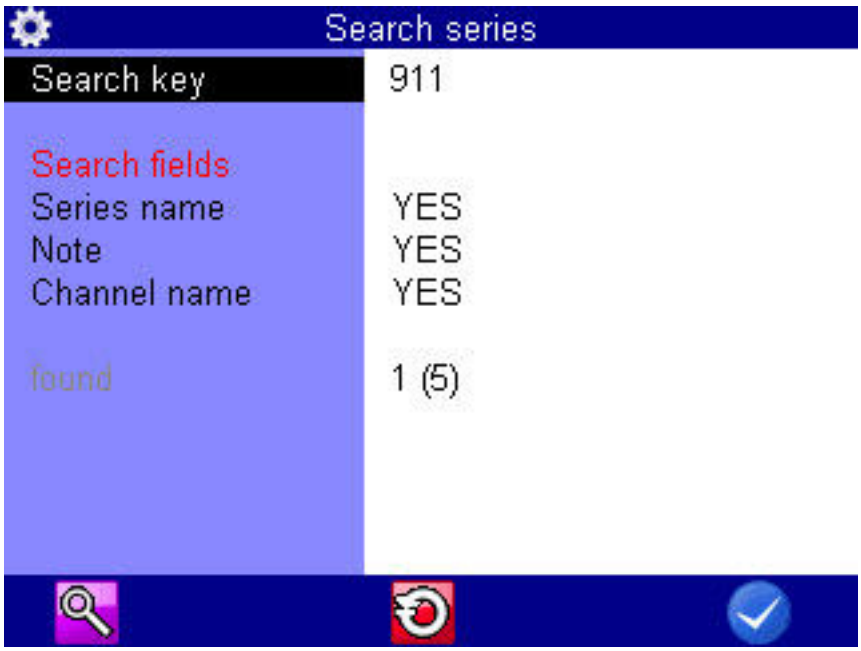
The deletion cannot be undone.

■

ENG

ENG

Search series



F1		**SEARCH**	Starts the search.
F3		**RESET**	Resets the search result.
F5		**OK**	Confirms input/saves change

Use the functions of this dialog to search for stored measurements.

1 Open the **Search series** dialog: ◁ ▷ △ ▽ ENTER

2 Mark and select the **Search term** dialog entry: △ ▽ ENTER

3 Enter search term: e. g. 911 ENTER

4 Perform search and close dialog: F1 F5

1 Open the **Show series** dialog: ◁ ▷ △ ▽ ENTER

2 Open the **Show series (▲▼Name)** dialog: △ ▽ ENTER

The measurement series from the search are displayed in blue.

3 Sort the measurement series according to the search result: F4 △ ▽ ENTER

Select **Filtered**. The measurement series from the search are listed at the beginning of the list.

4 Select measurement series: △ ▽ ENTER

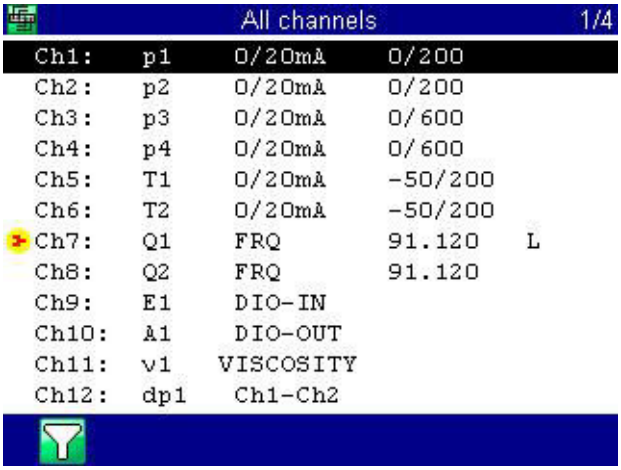
■

Setting

On the **Setting** menu, you can make settings for the channels, the display, the instrument and the storage.

ENG

Channels



F1 

FILTER

Opens the **Filter overview** dialog.

⇨ **Overview Filter** on page 74

- There are 42 channels available:
- **Ch1** ... **Ch8**
  Measuring channels; sensor connectors at the rear side of the device
- **Ch9**
  Trigger input
- **Ch10**
  Trigger output
- **Ch11** ... **K42**
  Special channels for calculations or entry of CAN signals.

Press △▽ to highlight a channel.

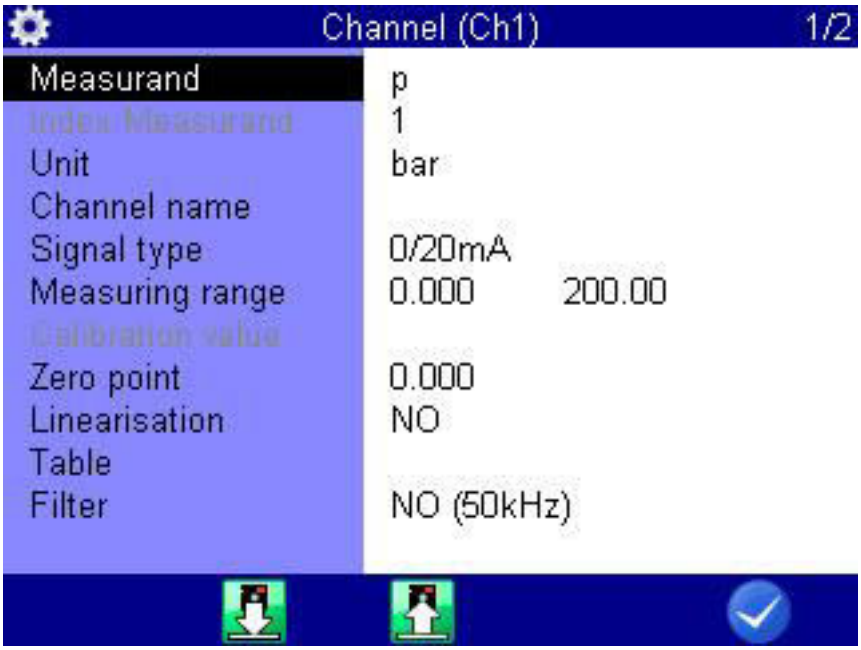
Press ◁▷ to change between the pages of the dialog. The second page contains channels 13 to 24.

ENG

ENG

➔ **Configure measuring channels (Ch1 ... Ch8)**

Measuring channels must only be configured if you use sensors without ISDS capabilities.



F2  **LOAD** Loads stored sensor parameters from the database.

F3  **SAVE** Stores the current sensor parameters in the database.

F5  **OK** Confirms input/saves change

You may configure several parameters for each measuring channel:

Measurement variable (measurand) Selection of measurand and unit; select between 18 different measurands and up to five units per measurand

Index variable If on the **General settings** menu (see **General settings** on page 90) manual channel numbering is set, you can enter the index number of the channel here.

With automatic numbering, this dialog entry cannot be changed.

Unit Selection of the dimension unit.

Channel name You may enter an individual name for each channel

The name will now be shown in the tile display of the measured values display.

⇨ See **Tiles/page** on page 77.

Signal type Sensor-specific

The correct signal type is indicated on the type plate of the sensor or in its documentation.

Measuring range Input of the measuring range of the connected sensor.

Calibration value Enter the factor for the calculation of the measuring value from the frequency signal (for frequency sensors, only)

Zero point Manual zero point alignment of the sensor (see **Do zero point equalisation** on page 67)

Linearisation If available, you may enter or select a linearisation table for the connected sensor. This may increase measuring accuracy.

⇨ You can find more information in Chapter **Linearisation table** on page 113.

Filter Choose from three digital filters:

- **NONE**
  No filter selected; on channels Ch1 and Ch8, peak pressures are up to 10 kHz
- **STANDARD**
  A 5 kHz filter is applied to channels Ch1 and Ch8.
- **DAMPED**
  A 50 Hz hardware filter is applied to Ch1 to Ch6; peak pressures are suppressed; ideal for static measurements or slow processes

Gate Time Frequency inputs are equalised by the gate time. The longer the gate time, the slower the measuring values will change, since a new value is only recorded after a delay. In the mean time, the measuring values remain constant. The result is a signal smoothing.

Min.Frequency Frequencies that are less than the value **Min. Frequency** are displayed as zero.

The value **Min.Frequency** can be set to **0.25**, **1**, **10** or **100** Hz.

For a minimum frequency of 1 Hz, the decrease to zero during the recording is shown with a delay of 1 s. For a minimum frequency of 0.25 Hz, the delay is 4 s.

➔ **Do zero point equalisation**

After selecting the function (ENTER) a display will appear for confirming the zero point alignment.

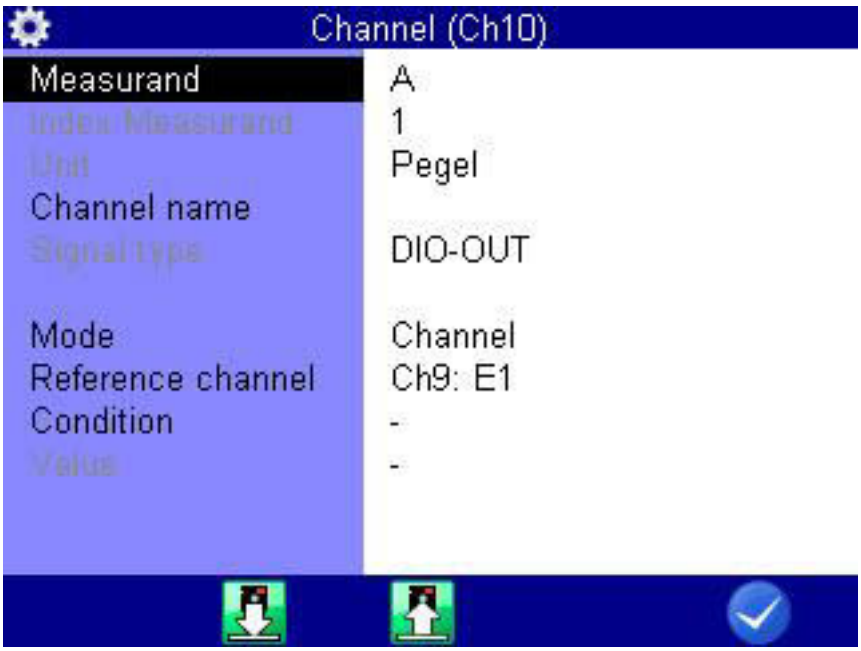
Press F4 to start the zero point alignment. This process is carried out fully automatically, the determined value will be displayed after a few seconds.

➔ **Configure digital signal input (Ch9)**

You can only assign one channel name to the digital signal input. Please observe the technical data (**Technical data** on page 19) for permitted input signals.

ENG

➔ **Configure digital signal output (Ch10)**



F2		**LOAD**	Loads stored sensor parameters from the database.
F3		**SAVE**	Stores the current sensor parameters in the database.
F5		**OK**	Confirms input/saves change

Using the digital signal output, you can carry out event-dependent external control.

You are able to define up to 5 parameters here.

Measurement variable (measurand) shows the internal measurand of the output

Channel name You can assign an arbitrary name here

Mode Source of the triggering event;

- **INACTIVE**
  Trigger off
- **CHANNEL**
  Channel is monitored for the occurrence of the triggering event,
- **SP-TRIG**
  Trigger is set if trigger was detected during saving.
  This allows multiple measuring instruments to be synchronised:
  – Master: Saving of triggering event X (e.g. p1>200) – trigger output: SP_TRIG;
  – Slaves: Saving of triggering event E1
- **MANUAL**: the trigger output is switched manually by pressing a key

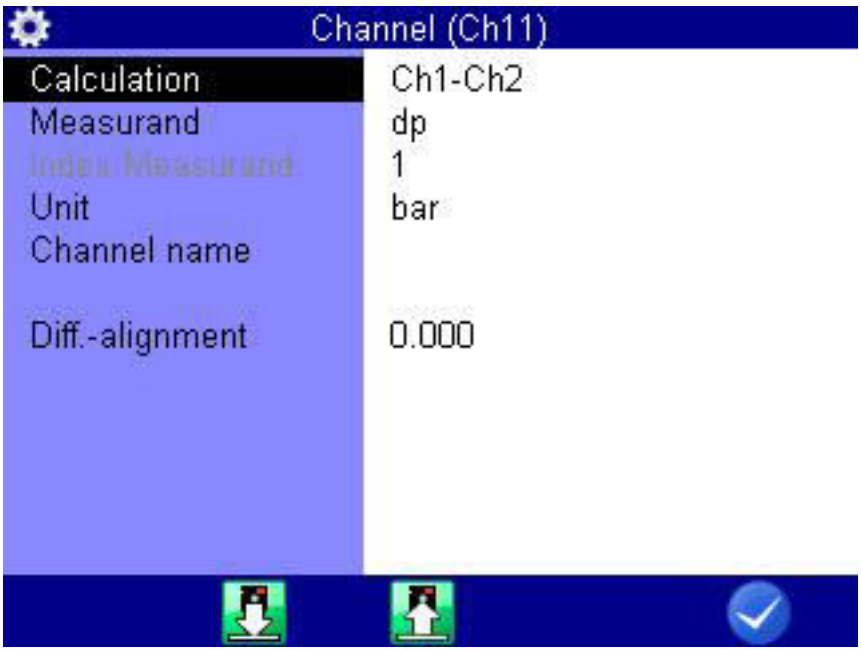
Reference channel Selection of the channel that should serve as reference

Condition for trigger input **OFF**/**ON**

for measurement channels **GREATER THAN**/**LESS THAN**

Value for measuring channels, e.g. 200

➔ **Configure special channels (Ch11 ... Ch42)**



F2  **LOAD** Loads stored sensor parameters from the database.

F3  **SAVE** Stores the current sensor parameters in the database.

F5  **OK** Confirms input/saves change

The special channels are used to mathematically combine the measured values of several sensors and do calculations with these or to be configured as input channels for the CAN bus.

Calculation Choose between the different occupations of the channel (see further below)

⇨ See **Possible assignments of the special channels** on page 70.

Measurement variable (measurand) is entered automatically when using pre-programmed formulas and cannot be edited;

for individual formulas and assignment with CAN or Multimeter you may define the variable here that is provided on this channel

Index variable If on the **General settings** menu (see **General settings** on page 90) manual channel numbering is set, you can enter the index number of the channel here.

Unit is entered automatically when using pre-programmed formulas and cannot be edited;

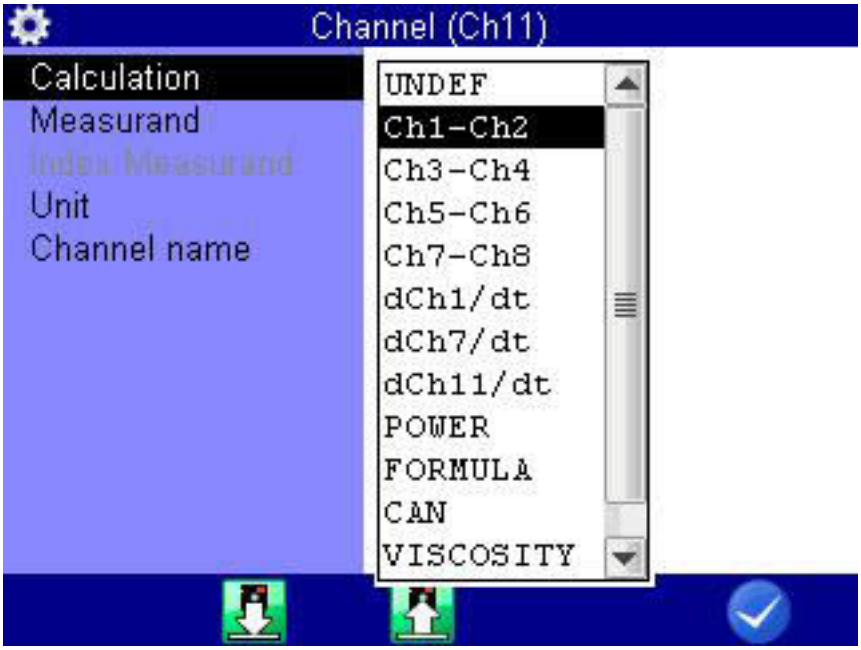
define the unit for channels with individual formulas and assignment with CAN or Multimeter

Channel name You can assign an arbitrary name here

Diff. comparison This functions automatically determines the measured value difference between the selected channels and use it as offset

Formula Enter the desired formula here (only displayed if **Calculation** is set to **FORMULA**, see **Possible assignments of the special channels** on page 70)

➔ **Possible assignments of the special channels**



F2 **LOAD** Loads stored sensor parameters from the database.

F3 **SAVE** Stores the current sensor parameters in the database.

F5 **OK** Confirms input/saves change

UNDEF Channel is not in use

Ch1-Ch2 forms the difference of the measured values from channel 1 and channel 2 (Delta-x)

Here, both channels must be assigned with the same measurand and unit; the resulting measurand and unit are determined automatically

the same applies to the assignments **Ch3-Ch4**, **Ch5-Ch6** and **Ch7-Ch8**

dCh1/dt forms the first derivative of the measured values from channel 1

analogously, the derivation of the channels Ch7 (**dCh7/dt**) and Ch11 (**dCh11/dt**) is also possible

POWER uses the formula *Ch1 x Ch7 / 600* to calculate the hydraulic power

The pressure p in bar is measured on channel 1 and the volume flow rate Q in l/min is measured on channel 7

FORMULA Input of an individual formula

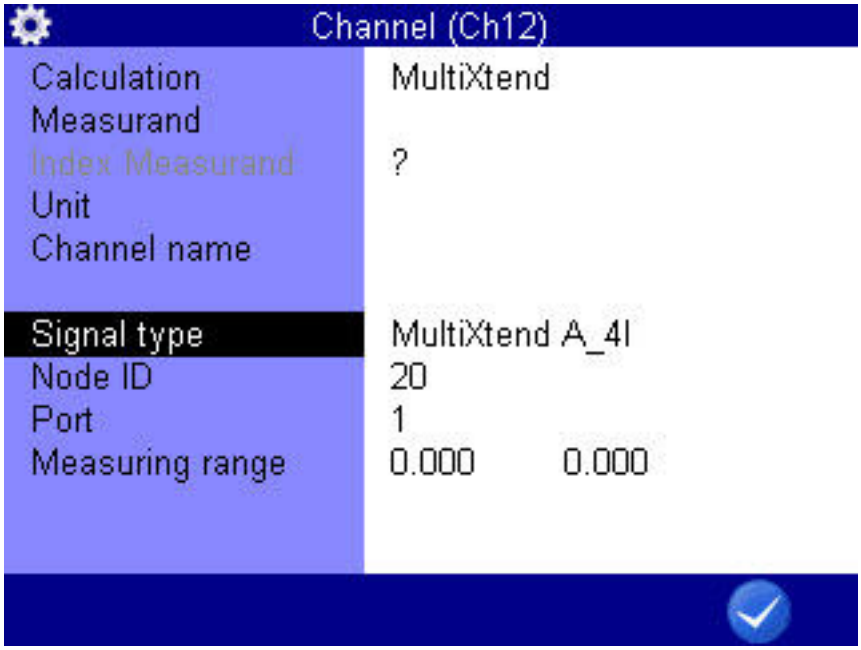
⇨ See **Calculations with formulas** on page 72.

CAN Observe the information in chapter **Define CAN channel** on page 115

Viscosity Calculation of the viscosity

⇨ See **Viscosity-compensated volume flow rate measuring** on page 128.

➔ **Set up MultiXtend**



F5 **OK** Confirms input/saves change

1 Select **Calculation** dialog entry: △▽ ENTER

2 Select **MultiXtend** entry: △▽ ENTER

3 Select the **Signal type** dialog entry: △▽ ENTER

4 Select MultiXtend model: △▽ ENTER

5 For several channel MultiXtend model, select **Port** dialog entry: △▽ ENTER

6 Select port according to the desired channel: △▽ ENTER

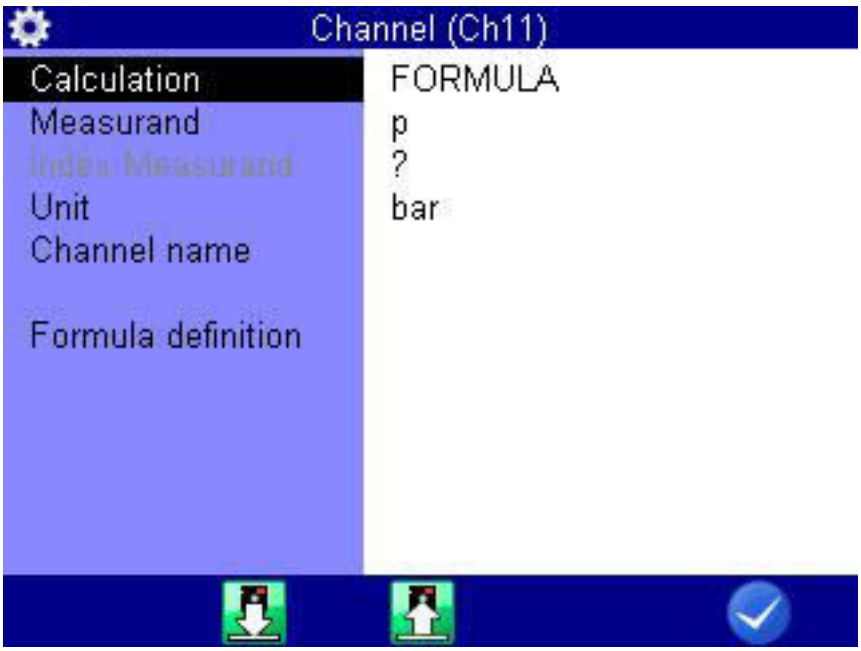
7 Confirm changes and exit dialog: F5

8 Repeat the set-up for each desired channel of your MultiXtend instrument.

■

⇨ See **Connecting MultiXtend A and T** on page 124.

➔ **Calculations with formulas**



F2 

LOAD Loads stored sensor parameters from the database.

F3 

SAVE Stores the current sensor parameters in the database.

F5 

OK Confirms input/saves change

You may perform arbitrary calculations and use the values from all channels in your formula. You may use all basic arithmetic operations. Do not enter spaces. If you need additional mathematical functions, you may create the required calculated channels during the data evaluation with **HYDRO***com*

Example of a formula *Ch13/600*(Ch1-Ch5)*

Values from special channels can only be used if the ordinal number of the used channel is lower.
Possible formula on channel 14: *Ch12+Ch1*, impossible formula on Ch14: *Ch15+Ch1*.

Press the 5 JKL key once to enter a **Ch** (= channel), resp. press twice to enter a **5**. You can only enter numbers with the remaining number keys; special characters with -·.

Confirm the input with ENTER. The measuring system does not check the entered formula for plausibility.

Example of a consumption measurement in [l/min]

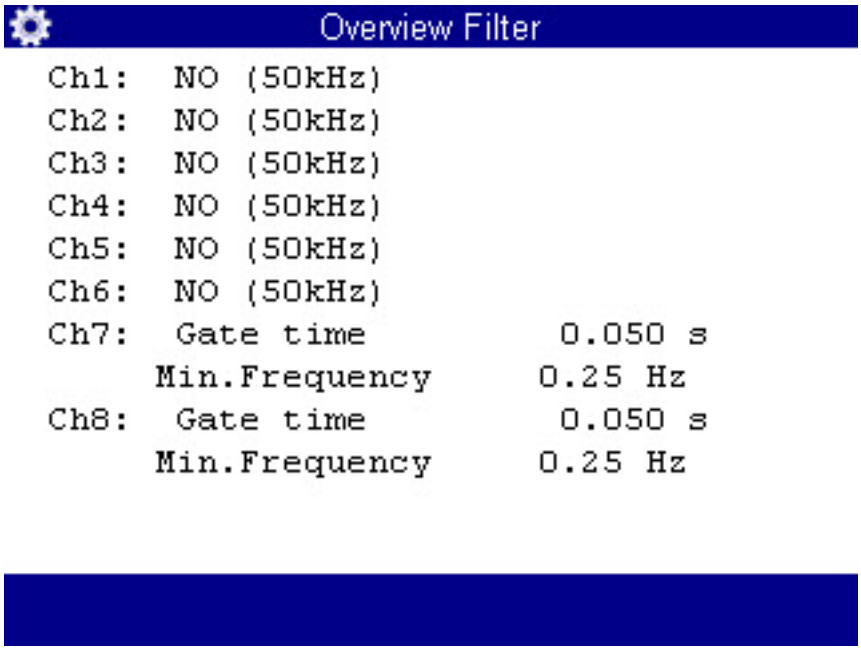
Some measuring channels are absolutely required for this example. They are printed in **bold** letters:

- **Channel 7**: Measurement of volume V1 in litre (l)
- **Channel 8**: Measurement of volume V2 in litre (l)
- Channel 11: Calculation *Ch7 - Ch8 = dV1* in litre (l)
- Channel 12: Calculation *dCh11/dt = Q1* in litre per second (l/s)
- Channel 13: Calculation *Ch12 * 60 = Q2* in litre per minute (l/min)

ENG

ENG

Overview Filter



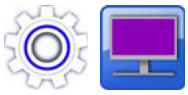
If on the **All channels** dialog you press the F1 key, an overview of all filters is displayed.

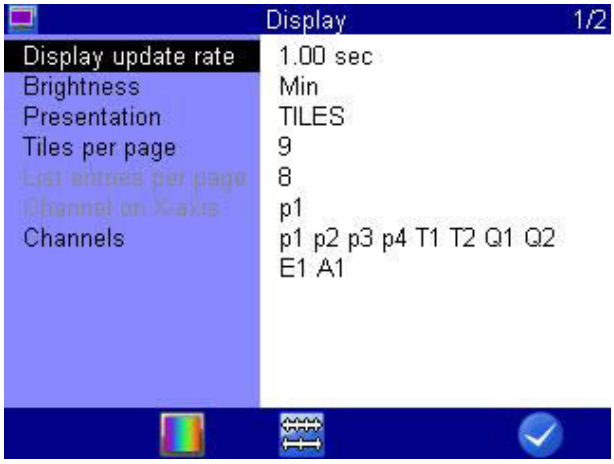
You can execute several special measurements by applying filters.

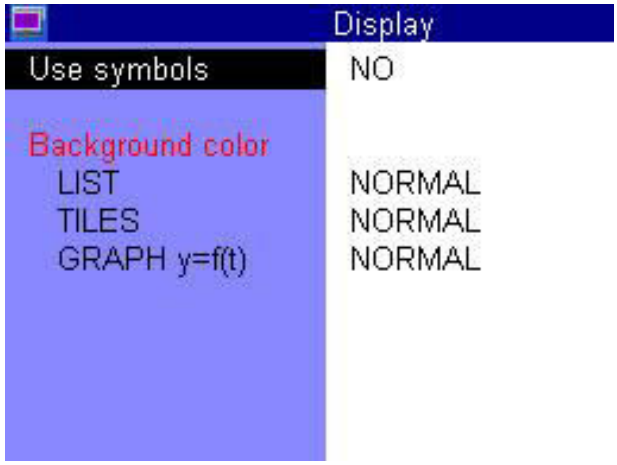
Filter Choose from three digital filters:

- **NONE**
  No filter selected; on channels Ch1 and Ch8, peak pressures are up to 10 kHz
- **STANDARD**
  A 5 kHz filter is applied to channels Ch1 and Ch8.
- **DAMPED**
  A 50 Hz hardware filter is applied to Ch1 to Ch6; peak pressures are suppressed; ideal for static measurements or slow processes

Display







ENG

F2		**COL/SYM**	Opens the **Display (symbols/colors)** dialog.
F3		**SCAL**	Opens the **Scaling display dialog**.
F5		**OK**	Confirms input/saves change

In the **Display** menu, you can select which channels you would like to have displayed in the measured values display. Basic configurations are also possible.

Refresh rate The display defines the refresh rate of the measured values display

Select one of the five possible values

Brightness specifies the brightness value of the display

Select between **Min** and **Max**

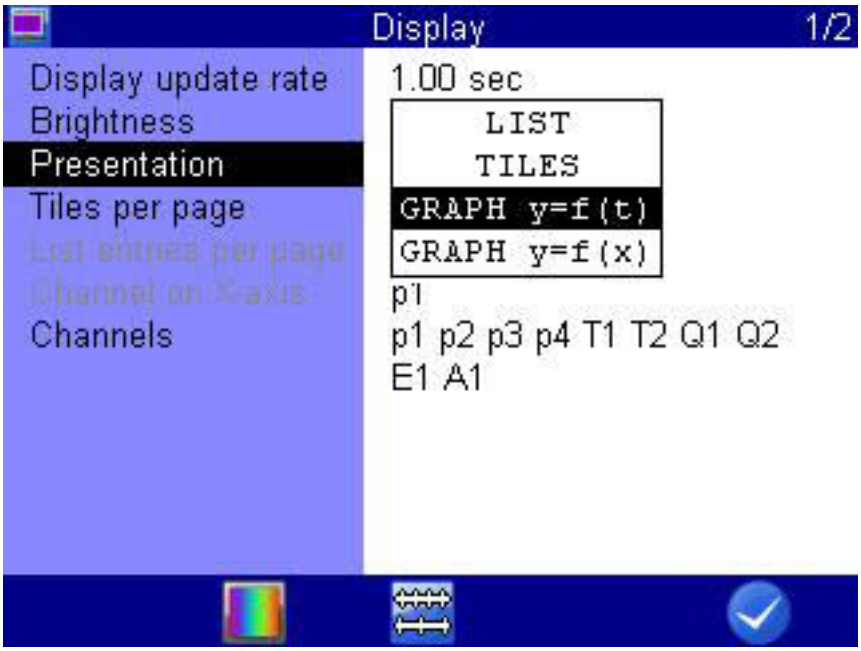
Presentation You can choose between the following options here:

- **LIST**
- **TILES**

You have two possibilities for configuring the graphical presentation:

- **GRAPHIC y = f(t)**
  Presentation of the channels as a function of time
- **GRAPHIC y = f(x)**
  Presentation of the channels as a function of an arbitrary channel

ENG



F2		**COL/SYM**	Opens the **Display (symbols/colors)** dialog.
F3		**SCAL**	Opens the **Scaling display dialog**.
F5		**OK**	Confirms input/saves change

ENG

Tiles/page Here you have three possibilities for the tile presentation:

- **4 panels**
  Shows 4 tiles in the measured values display.
- **9 panels**
  Shows 9 tiles in the measured values display.
- **12 panels**
  Shows 12 tiles in the measured values display.

F1 

Display change

⇨ **Display change** on page 40

The measured values are shown in tiles. Overband, index and units are displayed under each measured value.

The name of the measurement channel is displayed above the measured value. The name of the measurement channel must be configured in the **Channels** submenu.

⇨ See **Configure measuring channels (Ch1 ... Ch8)** on page 65.

If there are more channels selected for display than there are tiles shown, this will be displayed in the top left: (current page/total pages).

Switch to the next page of tiles with ◁▷.

List entries/page For the list display, you can select the display of **1**, **2**, **4**, **6**, **8** or **16** list entries per page.

Channel on x-axis Select the channel on which the function to which the graphical presentation should refer.

Channels Opens the **Display (channels)** dialog. Select the channels that should be presented in the measurement display.

All channels marked with a ☑ check mark are presented.

Select a channel and change the marking with ENTER.

Press F3 in order to select or deselect all channels.

Use symbols Select whether in the graphic display the individual channels should also be marked with symbols.

Background colors Select whether the colors should be displayed as **NORMAL** or **INVERSE**.

COL/SYM You can assign symbols and colours to the channels here.

⇨ See **Display (Symbols/Colors)** on page 79.

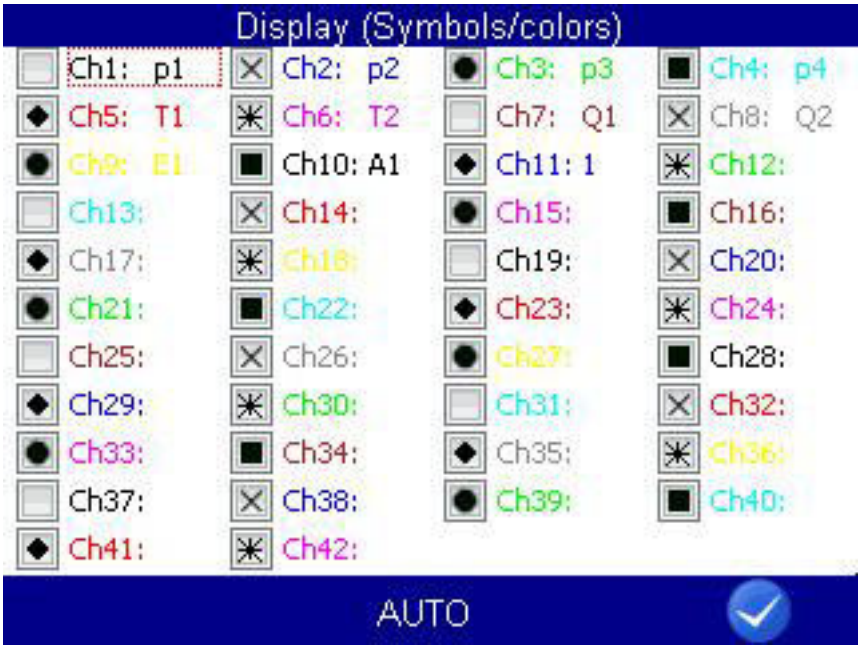
SCAL Select the measurement range of the channel which is to be displayed in the graphical presentation.

⇨ See **Display scaling dialogue** on page 80.

ENG

ENG

Display (Symbols/Colors)



F3

F5

AUTO	Automatically assigns the symbols and colors.
OK	Confirms input/saves change

First, on the **Display** dialog for the **Use symbols** entry:

- **YES**: Symbols and colours are used
- **NO**: Only colours are used

You can assign symbols and colours to the channels after making this basic selection:

Open the **COL/SYM** dialog on the lower display bar with F2.

Press F3 **AUTO** to assign the standard settings to all channels. If a channel is marked, you can use ENTER to open and assign the selection lists for symbols and colors.

1 Highlight a channel – ENTER.

2 Select a color – ENTER.

(only for activated symbols)

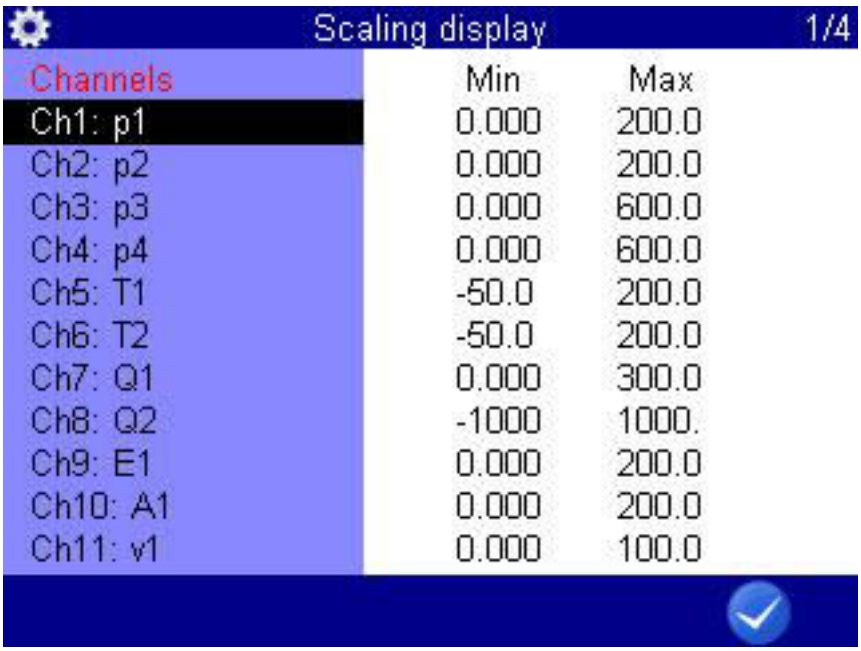
3 Select a symbol – ENTER.

4 Repeat steps 1 to 3 for all desired channels.

5 Confirm changes and exit dialog: F5

■

Display scaling dialogue



F5 

OK Confirms input/saves change

You have defined the measuring range of the channel on the **Channels** menu.

⇨ See **Configure measuring channels (Ch1 ... Ch8)** on page 65.

If desired you can now define a part of the measuring range to be displayed in the graphical presentation.

On the **Display** dialog, use F3 to open the **Scaling display** dialog in order to adjust the display of the measuring range of the individual channels.

1 △▽ ENTER select desired channel.

2 Enter lower limit of display range – ENTER.

3 Enter upper limit of display range – ENTER.

4 Repeat **1** to **3** for all desired channels.

5 Confirm changes and exit dialog: F5

■

ENG

Device

On the **Device** menu you will find basic configurations of the measuring instrument.

Connections Settings for CAN, COM, Lan/WLAN, Bluetooth connections and the internal USB stick

General settings Settings for the language, sensors (menu) color scheme, menu display when switching the instrument on, individual company details and softkey display, operating language

Info Information about the software and hardware of the measuring instrument

Date/Time Setting of date and time

Memory medium Information about the configuration and partitioning of the internal SD card.

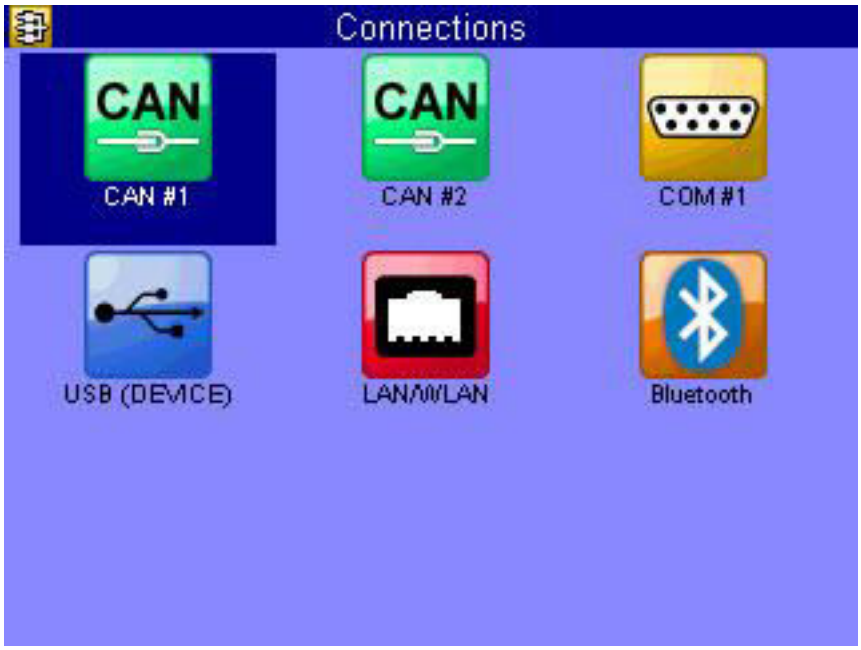
Security Setting of access rights for menus

Calibration setting Specify calibration interval

Hardware Diagnostic Expanded settings for the diagnosis of the hardware (for service personnel)

Battery information Information and current state of the battery

Connections



ENG

CAN #1 and CAN #2

F5 **OK** Confirms input/saves change

Interface Enable/disable CAN bus

Power supply Use this function to switch the power supply of connected CAN sensors ON and OFF. Highlight the dialog entry with △▽ and press ENTER to toggle between **ON** and **OFF**.

Baud rate Set transmission speed for CAN data

➔ **CAN configuration**

You can define a calculation channel as CAN channel (see Chapter **Define CAN channel** on page 115). To enable this you have to activate the CAN bus here and set the data transmission rate.

1 Select **CAN#1** or **CAN#2** on the **Connections** menu: ◁▷ △▽ ENTER
2 Select bus termination: △▽ ENTER △▽ ENTER
3 Toggle to input of the baud rate: △▽ ENTER
4 Select desired baud rate: △▽ ENTER
5 Confirm changes and exit dialog: F5

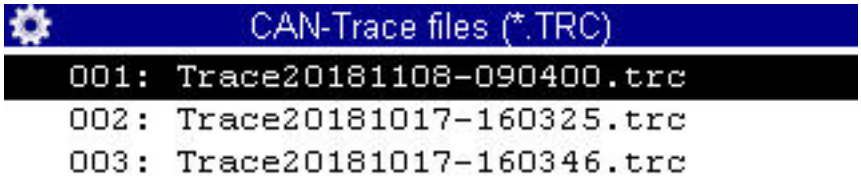
■

Start CANopen Here you can trigger the start command into the CAN bus that requests the connected sensors and adaptor boxes to send data. Select between **AUTO** and **MANUAL**. Start the request with the F3 key.

ENG

TRACE Trace records the CAN messages. Start and stop the recording with the F4 key.

Load an existing recording with the ENTER key.

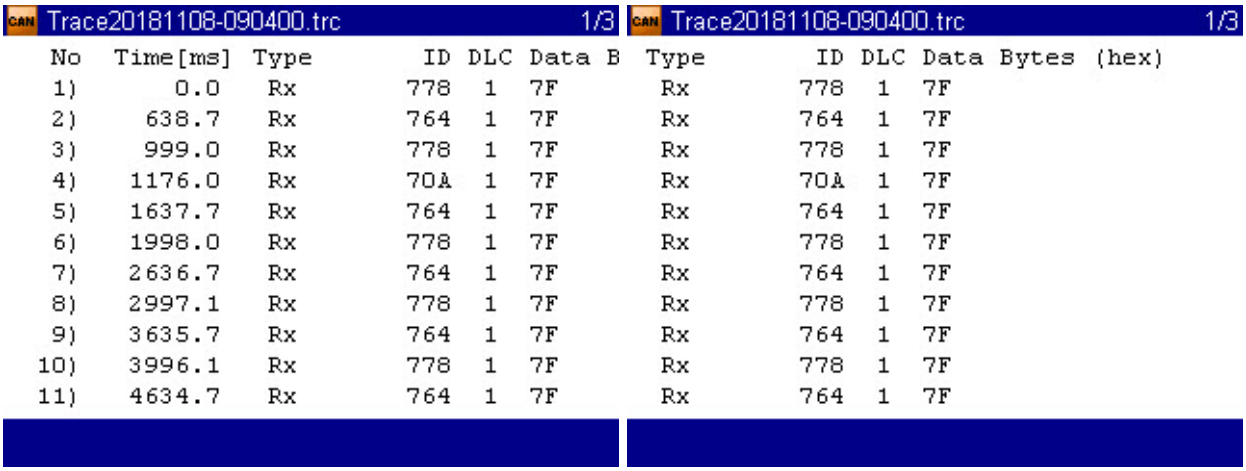


F1		**INFO**	Displays information about the selected object.
F2		**FILE**	Converts the display to the file name.
F2		**NAME**	Converts the display to the measurement series name.
F5		**SORT**	Sorts displayed list/table.

ENG

The number of messages of the loaded recording is displayed in the Messages dialog entry.

Open an existing recording with the F2 key.



Trace20181108-090400.trc 1/3

No	Time[ms]	Type	ID	DLC	Data B
1)	0.0	Rx	778	1	7F
2)	638.7	Rx	764	1	7F
3)	999.0	Rx	778	1	7F
4)	1176.0	Rx	70A	1	7F
5)	1637.7	Rx	764	1	7F
6)	1998.0	Rx	778	1	7F
7)	2636.7	Rx	764	1	7F
8)	2997.1	Rx	778	1	7F
9)	3635.7	Rx	764	1	7F
10)	3996.1	Rx	778	1	7F
11)	4634.7	Rx	764	1	7F

Trace20181108-090400.trc 1/3

Type	ID	DLC	Data Bytes (hex)
Rx	778	1	7F
Rx	764	1	7F
Rx	778	1	7F
Rx	70A	1	7F
Rx	764	1	7F
Rx	778	1	7F
Rx	764	1	7F
Rx	778	1	7F
Rx	764	1	7F
Rx	778	1	7F
Rx	764	1	7F

With the ◁▷ keys, you can see the front or back of a trace line. You can use the △▽ keys to browse.

COM #1

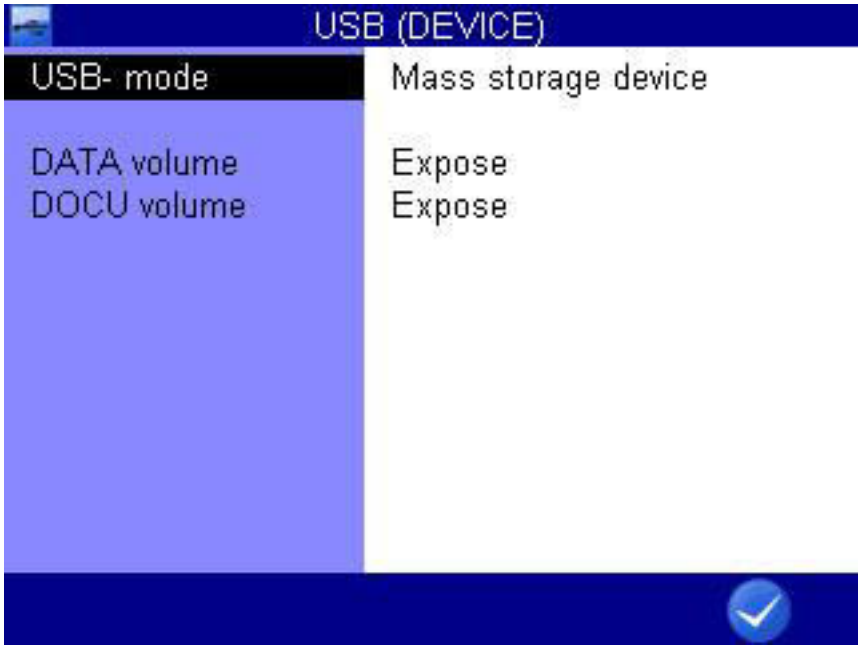
F5 

OK Confirms input/saves change

Interface Switch COM bus on and off

Baud rate Set transmission speed for COM data

USB (DEVICE)



F5 

OK Confirms input/saves change

USB mode

Choose from the following options:

- **USB (DEVICE)**: The measuring instrument is only enabled for communication with the PC. Drives are not enabled for the PC, example: Use the HYDROlink software.
- **Mass storage device**: The measuring instrument is enabled for communication with the PC and at least one drive is enabled for the PC. Drives can be enabled for the PC. The default is that the DOCU-VOL drive is enabled.

  If you would like to transfer measuring data to the PC without additional software, enable the DATA-VOL drive.

⇨ See **Connect a PC and transfer data** on page 33.

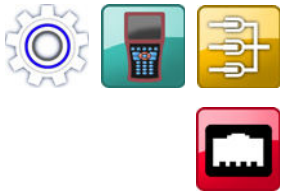
DATA-VOL
DOCU-VOL

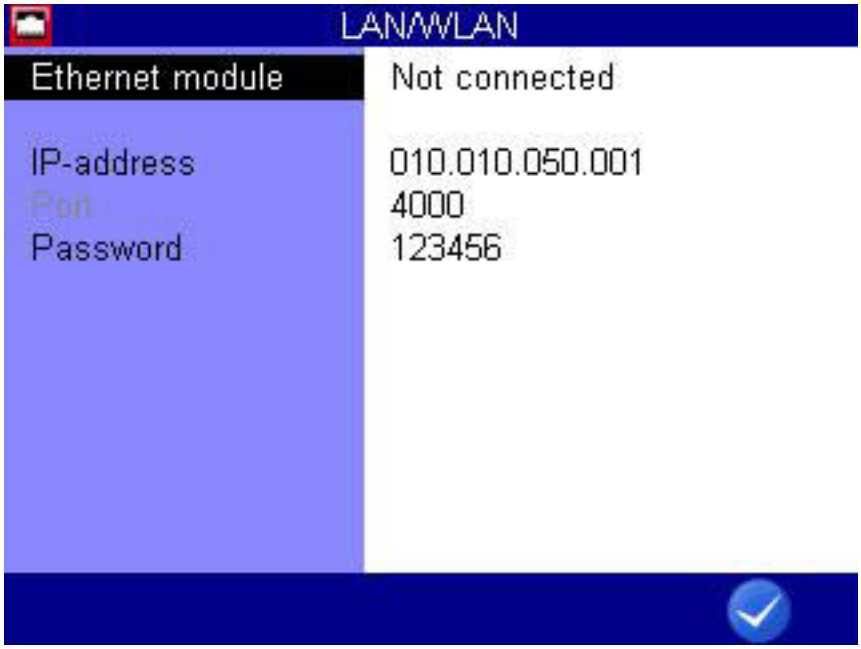
Can only be selected if the **USB mode** is set to **Mass storage device**. Choose from the following options:

- **bind**: The volume is bound to the measuring instrument and cannot be addressed as external drive by the PC.
- **enabled**: The volume is visible on the PC as external drive.

Enable the **DATA-VOL** volume in order to transfer files directly from the measuring instrument to a PC. You can use any file browser for this.

LAN/WLAN





F5  **OK** Confirms input/saves change

Ethernet module for the connection of the Ethernet module, **Not connected**, **MultiXtend/Lan** and **USB/WLAN** can be selected

IP Enter the IP address that the **MultiSystem 5070** is to have in the Ethernet network

Port This is preassigned and displayed for information purposes only

Password Enter the password for the Ethernet network, if a password is required

➔ **Setting up Ethernet functionality**

If you want to use an Ethernet network module connected to the RS232 port, you can configure it here:

These options can be set:

1 Select the Ethernet options: △▽ ENTER

2 Select the desired option: △▽ ENTER

3 Select the desired setting or enter the required information.

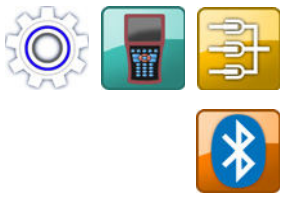
4 Confirm the entries: ENTER

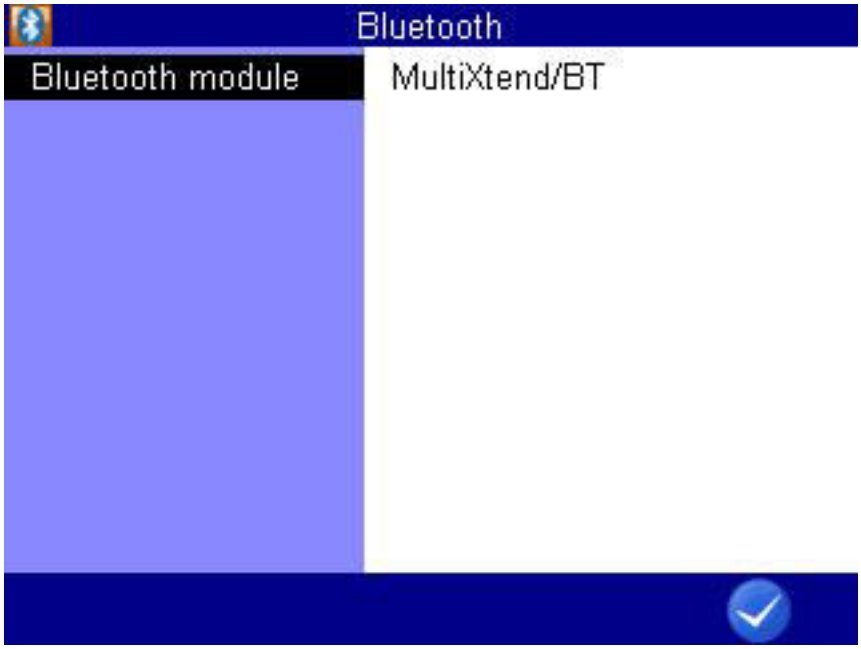
5 Confirm changes and exit dialog: F5

■

ENG

Bluetooth



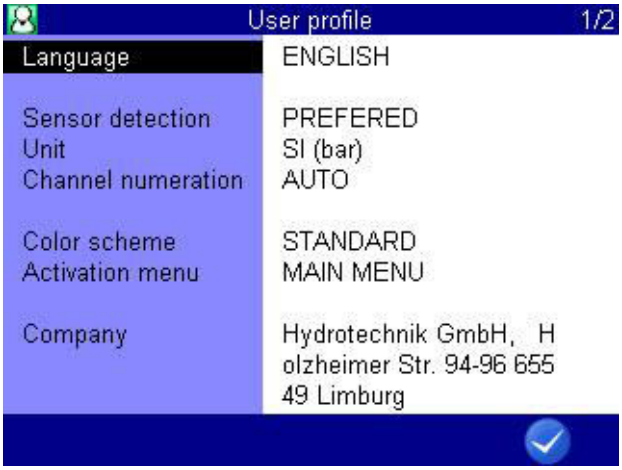


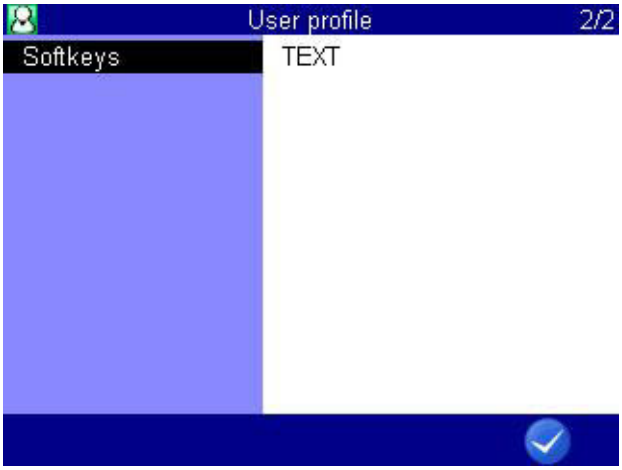
F5 

OK Confirms input/saves change

Select a **Bluetooth module.**

General settings





F5  **OK** Confirms input/saves change

Language You can select from among the languages German, English and Chinese.

➔ **Select operating language**

1 Select **Language** on the **User settings** dialog with ENTER

2 Select language: △▽ ENTER

3 Confirm changes and exit dialog: F5

■

Sensor detection Adjust the instrument's sensor detection

➔ **ISDS configuration**

When using ISDS sensors, the sensor parameters will be stored automatically after connecting the sensor and switching on the instrument. Enable sensor detection and set the unit here if you want to use ISDS sensors.

1 Call up the **Sensor detection** dialog entry: △▽ ENTER

2 Activate sensor detection **YES**: △▽ ENTER

3 Call up the **Unit** dialog entry: △▽ ENTER

4 Select desired unit: △▽ ENTER

5 Confirm changes and exit dialog: F5

The new unit system will be used the next time the instrument is switched on again.

■

ENG

Unit Select the unit system

- SI (bar)
  The measuring instrument uses the units of the SI system. However, for pressure, the unit bar is used.
- US
  The measuring instrument uses the units that are usual in the USA (e.g. psi, °F)
- SI (MPa)
  The measuring instrument uses only the units of the SI system. Pressure will be displayed in Pascal.

Channel numbering Select between automatic or manual channel numbering

➔ **Function Numeration chn.**

As a standard, the MS 5070 numerates all channels with a letter and an index number. If three pressure sensors are connected, the channels will be numerated as p1, p2 and p3 automatically. If you now connect, e.g. a temperature sensor instead of p1, this channel will become T1. The two other channels will be renamed, p2 will become p1 and p3 will become p2.

By changing the Numeration chn. from **AUTO** to **MANUAL**, you can assign fixed index numbers to the channels (see Chapter **Configure measuring channels (Ch1 ... Ch8)** on page 65). These will remain even after the channel assignment has changed. In the example shown above, the three channels would be numerated as T1, p2 and p3.

Highlight the dialog entry with △▽ and press ENTER to toggle between **AUTO** and **MANUAL**.

Color scheme Select the color scheme for the user interface.

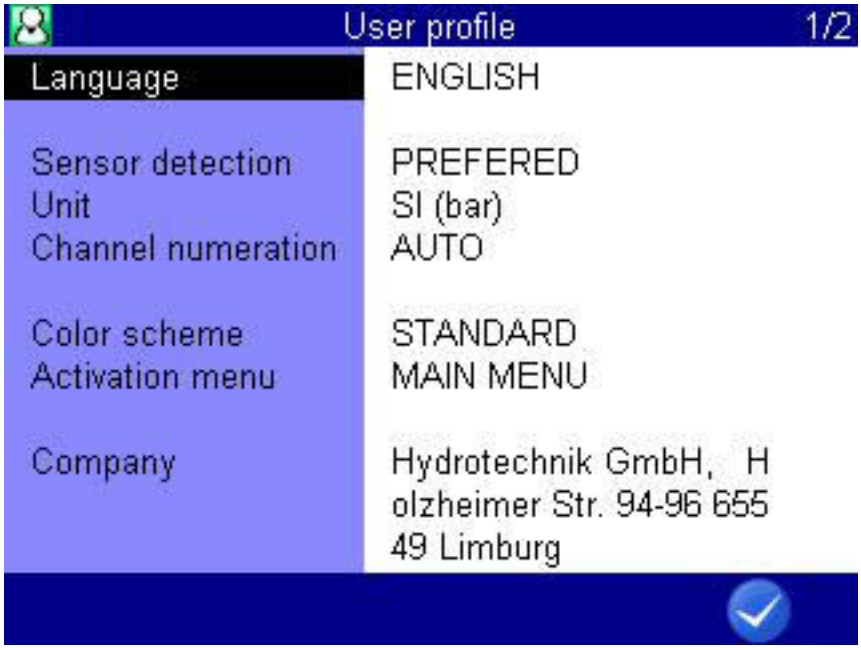
Activation menu Select which display is shown after switching on the measuring instrument:

- **MEASURED VALUES DISPLAY**
- **Main menu** (displays the **Home** menu)

ENG

Company You can enter an individual text that will be shown in the saved logs.

➔ **Enter company**



F5 **OK** Confirms input/saves change

1 On the **User profile** dialog, select the **Company** with △▽ ENTER

2 Enter text and ENTER.

Use F2 to toggle between capital and small letters.

3 Confirm changes and exit dialog: F5

■

Softkeys Select whether softkeys are displayed as **TEXT** or **SYMBOL**.

Info

In case you call HYDROTECHNIK customer service, you should have the required instrument information on hand. This is on the **Info** dialog.

ENG

ENG

Date/Time

F5 

OK Confirms input/saves change

➔ **Select date format**

1 On the **Date/Time** dialog, select the **Date format** with △▽ ENTER

2 Use △▽ ENTER to toggle between

- **DD.MM.YYYY** (day, month, year)
- **MM/DD/YYYY** (Month/Day/Year)
- **YYYY.MM.DD** (year.month.date)

➔ **Enter date**

1 On the **Date/Time** dialog, select the **Date** with △▽ ENTER

2 Select the day with ◁▷ △▽ ENTER

3 Open the dialog for month selection with F2

4 Open the dialog for year selection with F3

➔ **Select time format**

1 On the **Date/Time** dialog, select the **Time format** with △▽ ENTER

2 Use △▽ ENTER to toggle between

- **12h**
- **24h**

➔ **Enter time**

1 On the **Date/Time** dialog, select the **Time** with △▽ ENTER

2 Enter hour and ENTER.

3 Enter minutes and ENTER.

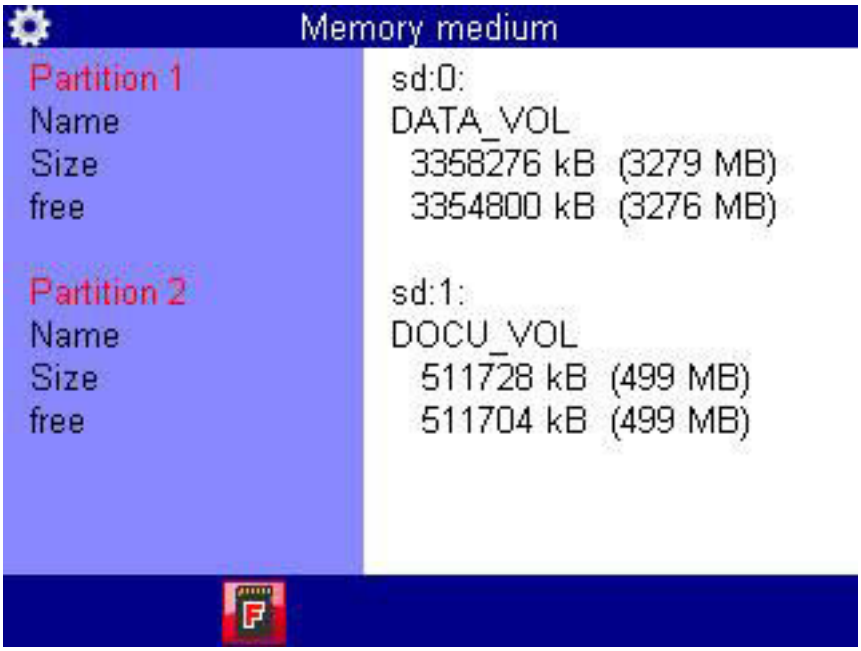
4 Confirm changes and exit dialog: F5

ENG

Memory medium

Note

Loss of data possible
The internal data medium can be formatted on the **Memory medium** dialog.
This will delete permanently delete all contained data and cannot be undone.



F2 

FORMAT Formats the selected volume.

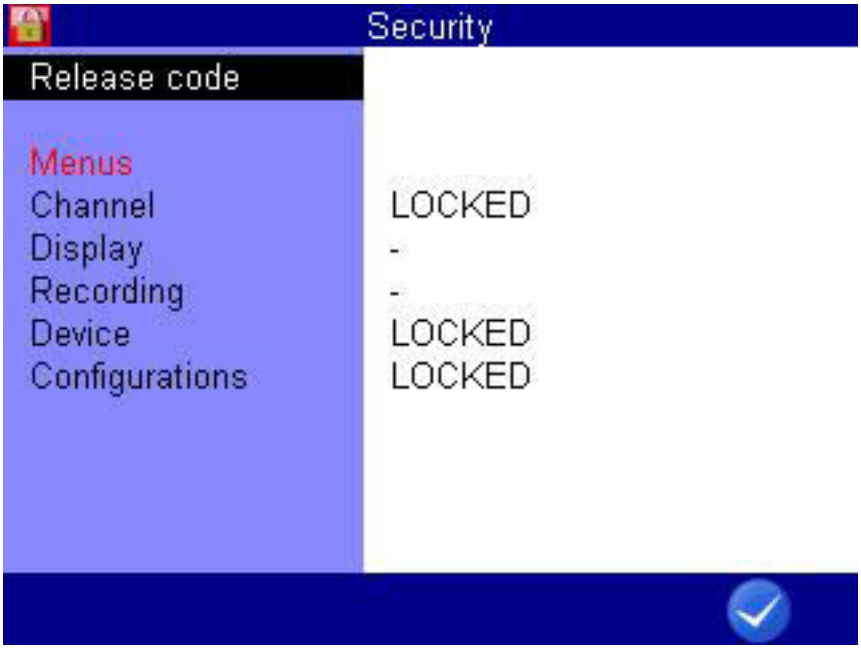
On the **Memory medium** dialog, you can format the internal memory with FORMAT F2. The internal memory is divided up into two partitions.

➔ **Format SD card**

When the **Memory medium** dialog entry is highlighted and the SD card is selected as storage medium, you can press F3 to format the internal SD card. This will delete all data contained on the card (e.g. measurement data). The formatting cannot be undone.

Security

➔ **Locking menus**



F5 

OK Confirms input/saves change

After opening the dialog, you first have to define the release code:

1 Start release code definition: ENTER

2 Enter release code; observe the assignment of the function keys.

3 Confirm release code: ENTER

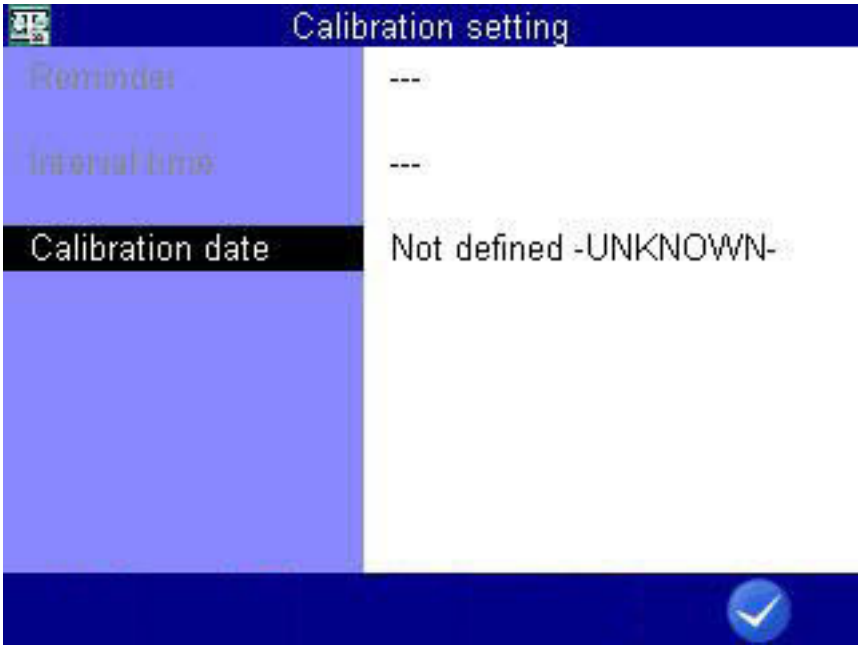
4 Highlight displayed menus: △▽

5 Press ENTER to toggle between **–** (menu released) and **LOCKED**. When trying to do changes in a locked menu, a corresponding warning will be displayed after pressing ENTER.

6 Confirm changes and exit dialog: F5

■

Calibration



F1		**DAY**	Opens the selection for the current day.
F2		**MONTH**	Opens the selection for the current month.
F3		**YEAR**	Opens the selection for the current year.
F4		**DELETE**	Enables the delete function.
F5		**OK**	Confirms input/saves change

The calibration interval is the period of time after which the measuring instrument is to be re-calibrated by the manufacturer.

You can define the calibration interval.

The measuring instrument is also ready for use if no calibration interval is set.

Reminder

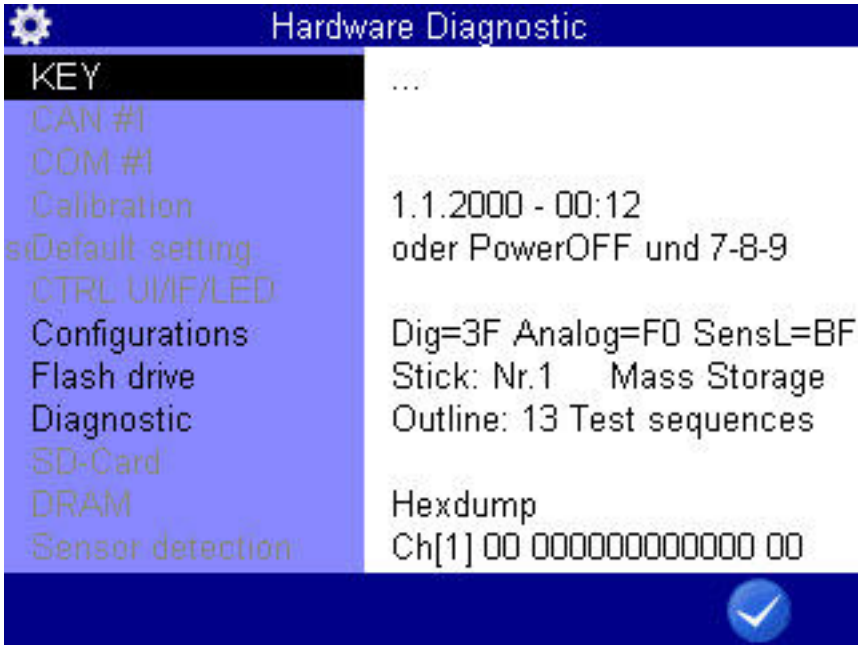
If a calibration interval is exceeded, the measuring instrument displays the message *Calibrate* after switch-on:

You can suppress the message for the selected number of days.

Interval time 6, 12, 18, 24, 30 or 36 months can be set as the calibration interval.

Calibration date Displays the date of the last calibration.

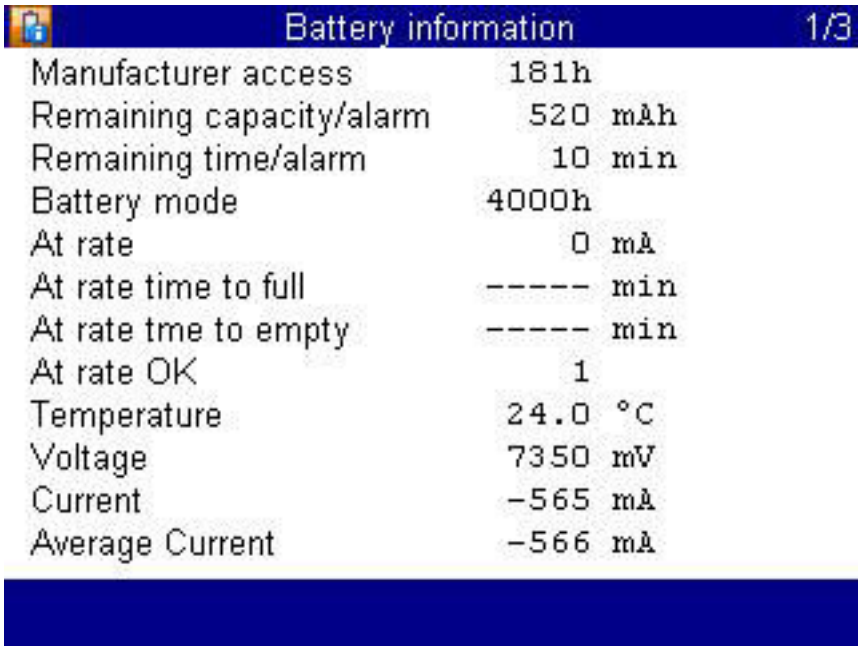
Hardware Diagnostic



OK Confirms input/saves change

The **Hardware Diagnostic** dialog is for service and is locked with a code.

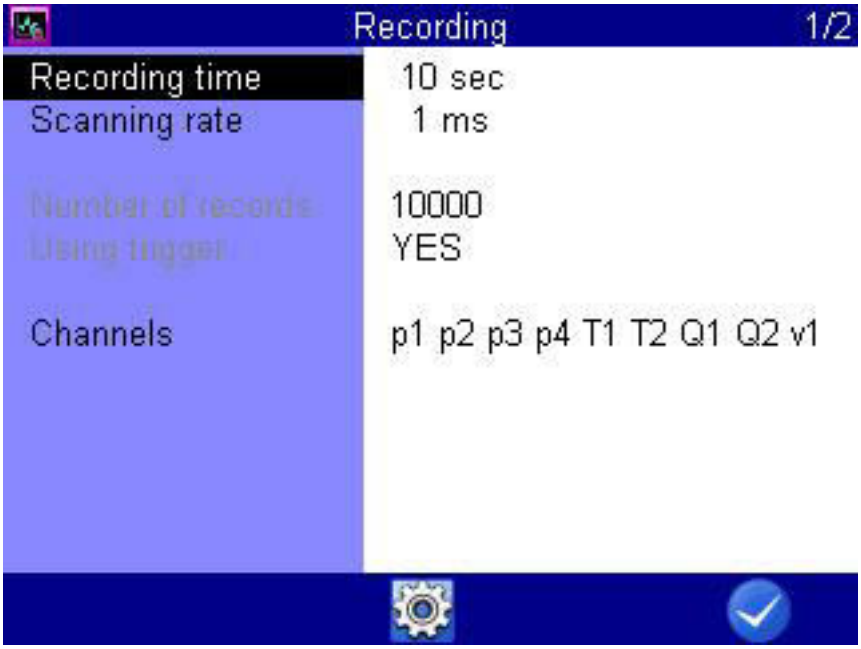
Battery information



ENG

ENG

Recording



F3 

SETUP Opens the **Setup recording** dialog.

F5 

OK Confirms input/saves change

On the **Recording** dialog you can select the channels that you would like to save in measurement series, as well as the storage options.

Storing time Storing duration; ENTER enter time value ENTER – △▽ highlight time unit ENTER

Scanning rate Time distance between two measurements in a series; ENTER enter time value ENTER – △▽ highlight time unit ENTER

Channels Opens the **Display (channels)** dialog. Select the channels that should be stored.

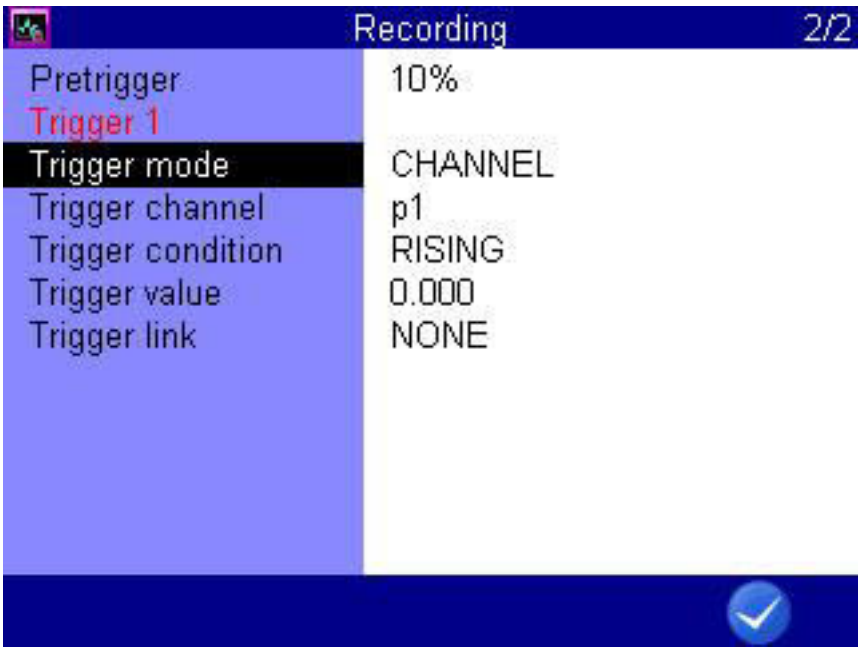
All channels marked with a ☑ check mark are stored.

Select a channel and change the marking with ENTER.

Consider the storing capacity of the measuring device when setting these options. The amount of data will increase if you configure more channels, a longer storing time, and a shorter scanning time. Large amounts of data may make evaluation and estimation of measuring results more difficult.

ENG

Trigger function



F5 

OK Confirms input/saves change

You can use the trigger function to reduce the amount of stored data by letting the instrument start the storing, when the "interesting moments" are coming. Here you can define up to four triggers.

Triggers are defined events that can start or stop a storing.

You may define any measuring channel as trigger, e.g. "if measured value at channel 1 is greater than 10", use a timer function, or use a manual key press.

You can link four triggers logically, e.g. " if measured value at channel 1 is greater than 10 OR measured value at channel 2 is less than 100". The trigger will be started by the first of the two events.

Pretrigger When a pretrigger is defined, the storing starts before the trigger event has happened. The percentage defined as pretrigger is used to store measured values before the trigger event.

Select a percent value as pretrigger – ENTER.

Trigger mode Define the trigger:

- **INACTIVE**
  The trigger is not activated.
- **CHANNEL**
  Definition of a measuring channel as trigger
- **KEY**
  Triggering at the press of a key
- **TIMER**
  Definition of a trigger time

➔ **Definition of a measuring channel as trigger**

1 For the **Trigger mode**, select the **CHANNEL** option.

2 Open the **Trigger condition** dialog entry and highlight the desired option. Then press ENTER.

- **GREATER**: Actuation when trigger value is exceeded
- **LOWER**: Actuation when trigger value is fallen below
- **RISING**: Actuation when trigger value is fallen below by more than 5 % and then exceeded, "rising edge"
- **FALLING**: Actuation when trigger value is exceeded by more than 5 % and then fallen below, "falling edge"

3 △▽ ENTER Enter trigger value ENTER.

4 Confirm changes and exit dialog: F5

■

➔ **Definition of a trigger time**

1 For the **Trigger mode**, select the **TIMER** option.

2 Enter the date of the trigger time – ENTER.

3 Enter the time of day of the trigger time – ENTER.

4 Confirm changes and exit dialog: F5

■

➔ **Trigger linking**

F5 

OK Confirms input/saves change

You can link **Trigger 1** with a second trigger:

1 Select the **Trigger linking** dialog entry: △▽ ENTER

2 Select an option: △▽ ENTER

- **NONE**: Trigger 2 is not used
- **AND**: Trigger 1 and Trigger 2 must occur
- **OR**: Trigger 1 or Trigger 2 must occur
- **START/STOP**: Trigger 1 starts the storing, Trigger 2 stops it

3 Define **Trigger condition** and **Trigger value** for **Trigger 2**.

⇨ See **Definition of a measuring channel as trigger** on page 102.

4 Repeat steps 2 and 3 to define additional triggers.

Example of a trigger recording

A 2-minute recording is to be started when the measured value for p2 falls below 50 bar and temperature T1 rises above 30 °C. The recording is to start 60 seconds before the trigger incident.

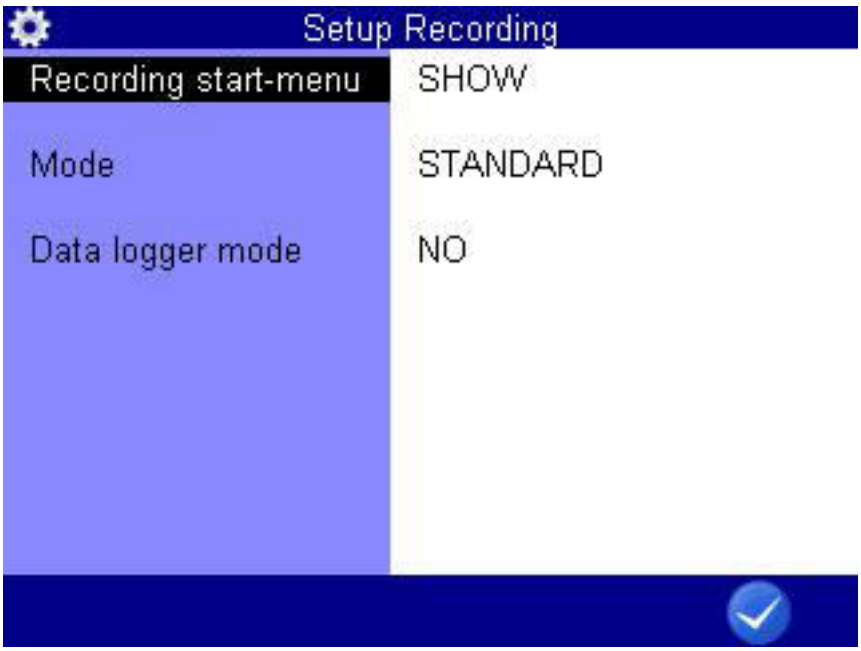
Required programming:

Storing time	2 min.
Trigger 1	p2
Trigger condition	FALLING
Trigger value	50.00
Pretrigger	50 %
Trigger link	AND
Trigger 2	T1
Trigger condition	RISING
Trigger value	30.00

ENG

ENG

Setup Recording



F5 

OK Confirms input/saves change

On the **Setup Recording** dialog, you can make settings for the recording.

Recording start-menu Select whether the **Start recording** dialog is displayed before a recording start or whether the recording should start directly.

Mode Choose from three options:

- **STANDARD**
  The defined recording and parameters will be applied to execute one single recording
- **CYCLIC**
  The defined recording parameters will be applied to execute a recording; then the recording will be repeated until the key **C-STOP** F3 is pressed
- **SINGLE VAL**
  The current value of each selected channel will be recorded when key is pressed

Data logger mode Switch the data logger mode on or off.

When data logger mode is switched on, the measuring instrument starts the recording directly after it is switched on.

For example, you can switch the instrument via the CAN2 socket so that it is started when you switch the machine on and recording begins.

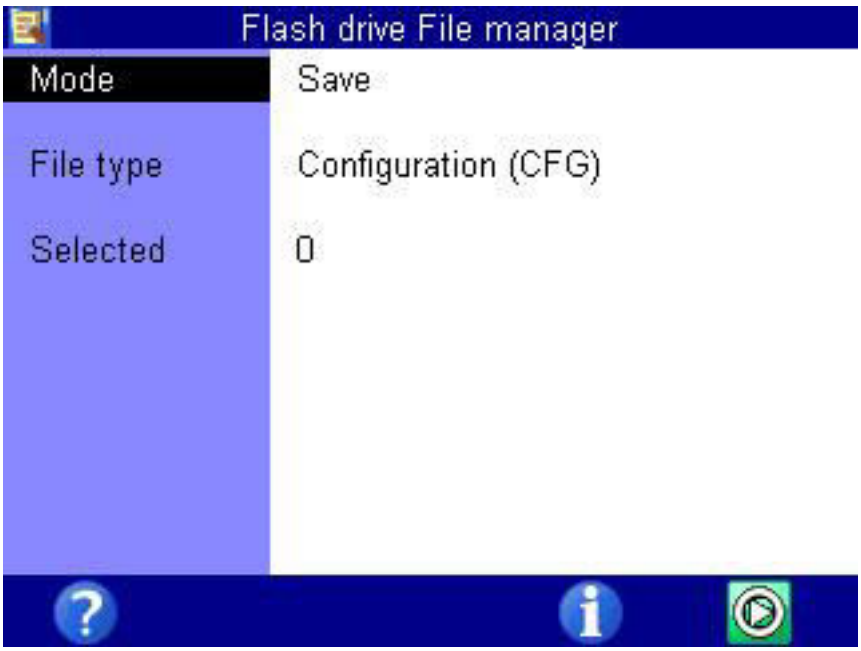
Extras


Extras
Flash drive
File manager
Special
Applications
Games

ENG

Flash drive File manager

On the **Flash drive File manager** you can move the files between stick and measuring system and display information about the USB stick.



F1  Displays help.

F4  **INFO** Displays information about the selected object.

F5  **START** Starts the copy process.

Dialog cannot always be opened
The **Flash drive File manager** dialog can only be opened if a USB stick is inserted and was detected.

➔ **Storage on the USB stick**

To transfer files from the SD card of the measuring instrument onto a USB stick, proceed as follows:

1 Open **Home** menu: MENU

2 Open **Extras** menu: ◁ ▷ △ ▽ ENTER

3 Open **Flash drive File manager** dialog: ◁ ▷ △ ▽ ENTER

4 Select **Save** mode: ENTER

5 Select **File type**: △ ▽ ENTER △ ▽ ENTER

- Measurement (MWF)
- Configuration (CFG)
- Sensor database (SDB)
- CX1 series (TXT)
- CAN trace file (TRC)
- Images (BMP)
- HYDROrun database (DB3)

6 Select files.

⇨ See **Select files** on page 109.

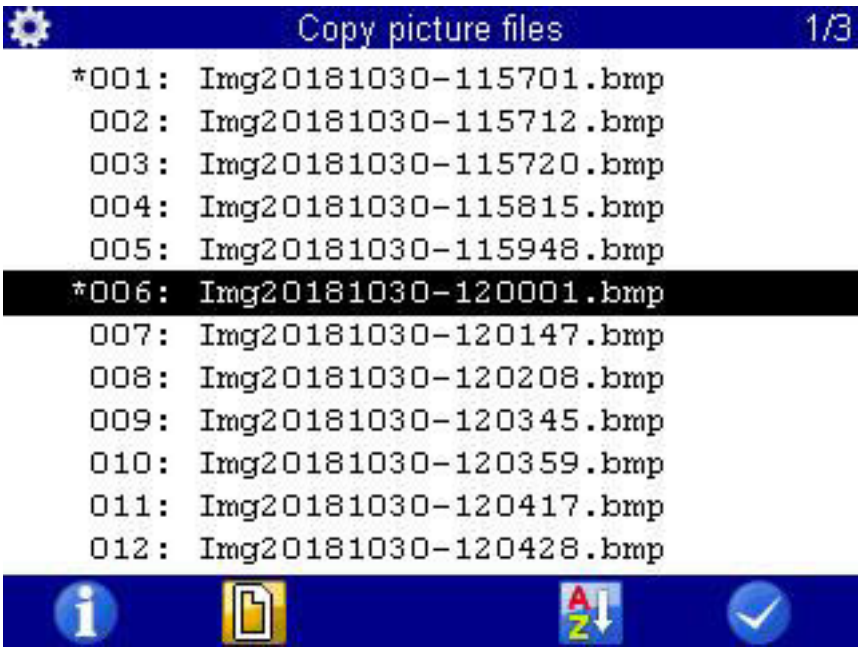
7 Start copying: **START** F5

■

ENG

ENG

➔ **Select files**



F1	**INFO**	Displays information about the selected object.
F2	**FILE**	Only for display of measurements. Converts the display to the file name.
F2	**NAME**	Only for display of measurements. Converts the display to the measurement series name.
F4	**SORT**	Sorts displayed list/table.
F5	**OK**	Confirms input/saves change

1 Highlight **Selected** on the **Flash drive File manager** dialog: △▽

2 Open file selection: ENTER

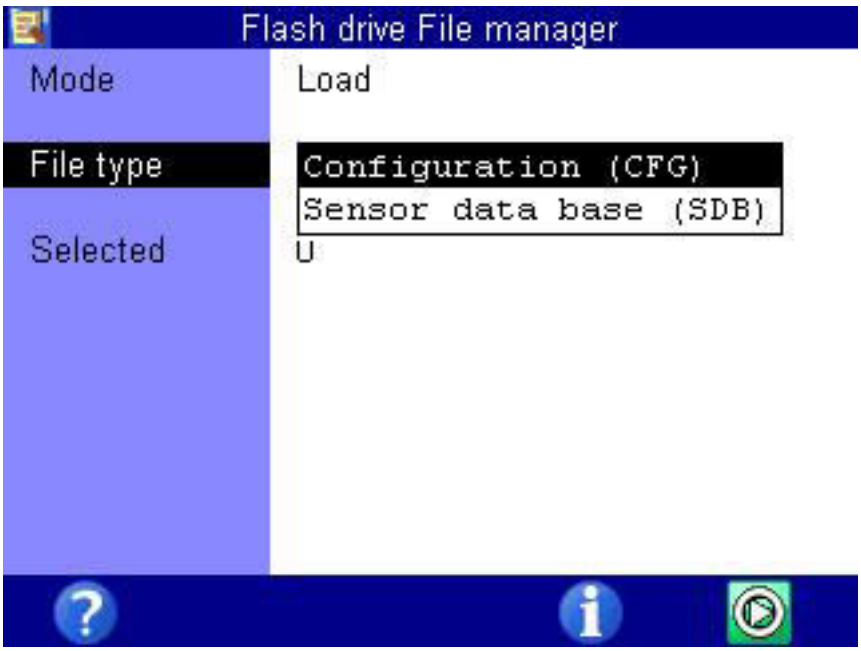
3 Select desired file(s): △▽ ENTER

Selected files are marked with a * to the left next to the line (here the files **001** and **006**).

4 End selection: F5

■

➔ **Load files from the USB stick**



F1  Displays help.

F4  **INFO** Displays information about the selected object.

F5  **START** Starts the copy process.

To transfer files from the USB stick to the measuring instrument, proceed as follows:

1 Open **Home** menu: MENU

2 Open **Extras** menu: ◁▷ △▽ ENTER

3 Open **Flash drive File manager** dialog: ◁▷ △▽ ENTER

4 Select **Load** mode: ENTER

5 Select **File type**: △▽ ENTER △▽ ENTER

- Configuration (CFG)
- Sensor database (SDB)

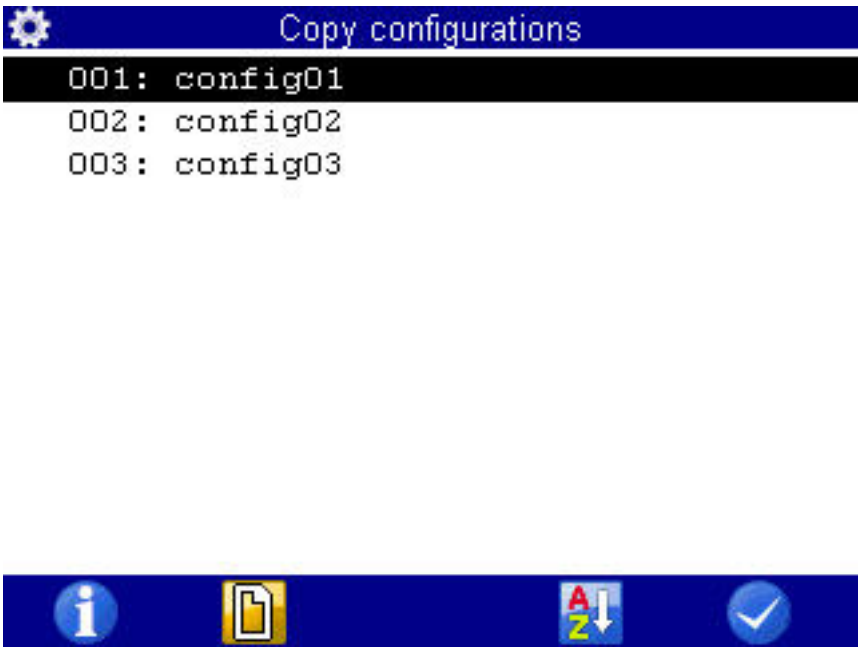
6 Select files.

⇨ See **Select files** on page 111.

7 Start copying: F5

■

➔ **Select files**



ENG

F1		**INFO**	Displays information about the selected object.
F2		**FILE**	Only for display of measurements. Converts the display to the file name.
F2		**NAME**	Only for display of measurements. Converts the display to the measurement series name.
F4		**SORT**	Sorts displayed list/table.
F5		**OK**	Confirms input/saves change

1 Highlight **Selected** on the **Flash drive File manager** dialog: △▽

2 Open file selection: ENTER

3 Select desired file(s): △▽ ENTER

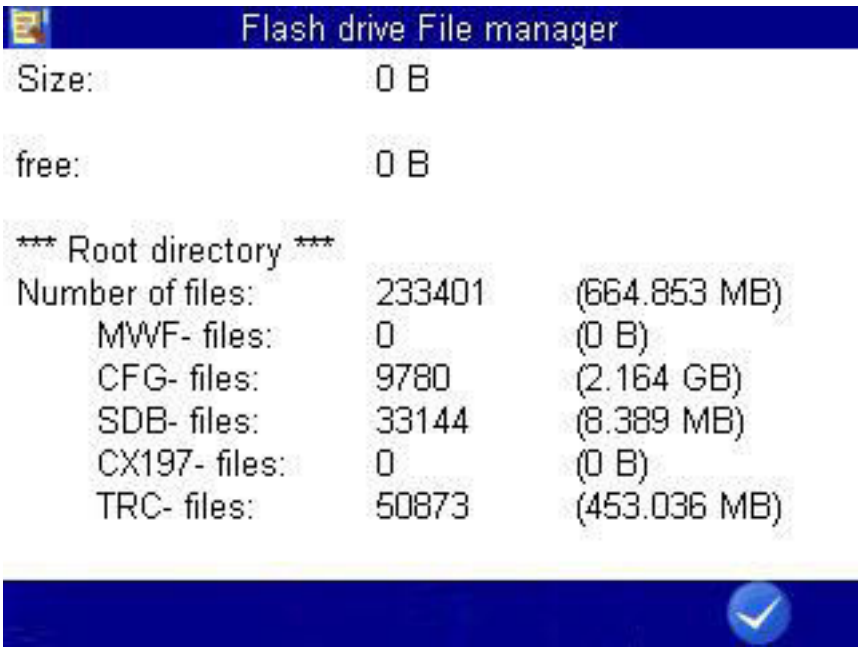
Selected files are marked with a * left next to the line.

4 Confirm changes and exit dialog: F5

■

ENG

➔ **Display information about the USB stick**



While the **Flash drive File manager** dialog is displayed, you can use F4 to display information about the inserted USB stick. First the storage capacity of the USB stick is checked. After that, a screen like the one in the picture appears.

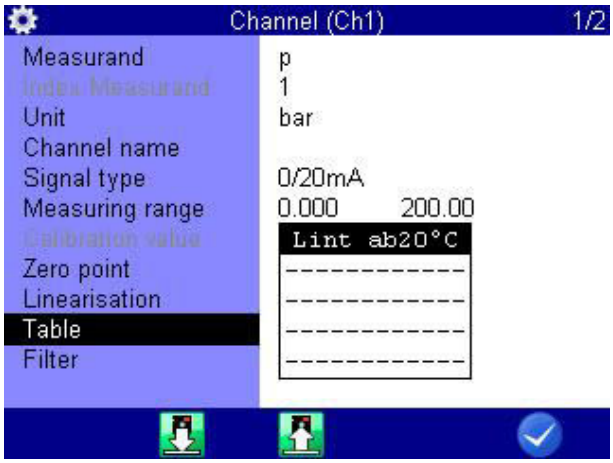
Here you can see the size of the total and available memory as well as a list of files contained on the stick that are interesting for the **MultiSystem 5070**. Press ESC to leave the dialog.

Special functions

Special functions of the instrument, which have been referred to in the previous sections, are explained here.

ENG

Linearisation table



F2		**LOAD**	Loads stored sensor parameters from the database.
F3		**SAVE**	Stores the current sensor parameters in the database.
F3		**DELETE**	Enables the delete function.
F5		**OK**	Confirms input/saves change

The linearisation table can be utilized to compensate for sensor inaccuracies. By calibrating a sensor, you will obtain this table, which can be entered into the measuring instrument. Five different linearisation tables, each with ten values are available for each measuring channel.

1 Select the option **YES** at the **Linearisation** menu option. ENTER.

2 Highlight **Table**: ENTER.

3 Either highlight a stored table, or an empty line if you want to enter a new table: ENTER.

4 Highlight the **Name** entry. ENTER.

5 Enter a name for the new table: ENTER.

6 Highlight **Reference point 1**: ENTER.

7 Enter the first set value: ENTER.

8 Enter the first actual value: ENTER.

9 Repeat steps 7 and 8 for all required lines of the table.

10 Complete the entry of set and actual values: ESC.

11 Confirm changes and exit dialog: F5

The new table is selected as active.

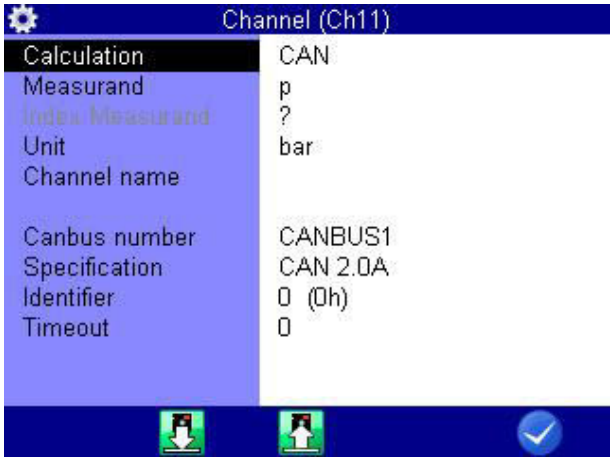
■

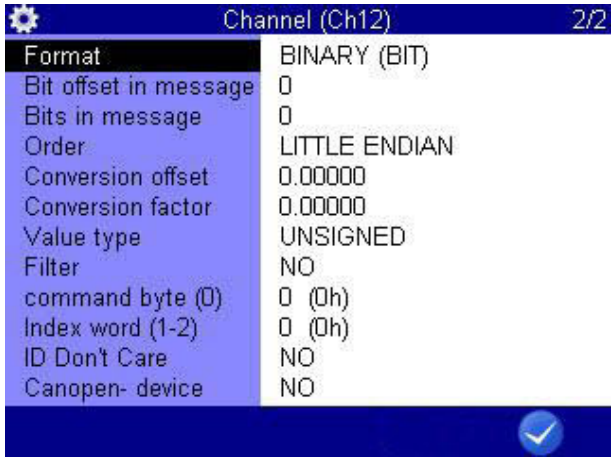
Define CAN channel

Note

The CAN bus must be activated in the device menu to enable the use of a CAN channel. See chapter CAN configuration on page 83

ENG





F2  **LOAD** Loads stored sensor parameters from the database.

F3  **SAVE** Stores the current sensor parameters in the database.

F5  **OK** Confirms input/saves change

After you have set a calculation channel to **CAN**, you can select variable and unit from a list or enter them freely. Then you have to define the CAN parameters. Please have the documentation of the CAN sensor available, all required information is included there.

1 Select the **Specification**: ENTER.

2 Enter the **Timeout**: ENTER.

3 Enter the **Identifier** as decimal or hexadecimal value.

Change the input format (decimal/hexadecimal): F3

The corresponding value is displayed in decimal numbers and the corresponding hexadecimal value is in brackets – ENTER.

4 Select the **Format**: ENTER.
Depending on the selected format, further input options are displayed.

5 Select **Channel name**.

6 ENTER – enter a name, use F2 to toggle between the entry of capital and small letters – ENTER.

7 ENTER – store entered name.

For the use of a **MultiXtend** instrument, select MultiXtend in the **Calculation** dialog entry.

ENG

CAN original format

When entering the CAN specifications you may select the **ORIGINAL** format. Then, the CAN data will not be interpreted by the measuring instrument, but saved digitally in the measurement file. During the subsequent data evaluation with **HYDRO***com* 6, these data can be interpreted.

This allows the storage of so-called “multichannels,” which are channels on which the data from several sources can be transmitted together. These can be switch states (max. 32 switches on a channel), but also various sensor signals.

If you want to record CAN original data, you will only have to define the number of **Offset bits in message** (bits at the beginning of a CAN message that shall be left out) and **Bits in message** (bits after the offset that should be recorded).

Display of Multichannel data

If you include a Multichannel into the measuring display, no measured values but a hexadecimal number in blue digits will be shown. In a max. 5-digit hex number, up to 20 sub-channels can be displayed. If the channel contains more sub-channels, the last four hex digits will be displayed together with a **~** in front of them.

Use of Multichannels

Many machine states (pump on, blinker off, rear light on, motor on, …) are encoded in a CAN message with a single bit. By default, a separate measuring channel of the instrument must be used for each status / status bit. Thanks to the multichannel function, all state bits can be recorded on a single channel. A separation into the individual states can be done later with **HYDRO***com* 6. You may also use **HYDRO***com* 6 to combine single bits of a Multichannel to one measured value. This allows to collect several measured values using one channel of the MS 5070. Due to the HEX format, a readable display of these measured values in the instrument is not possible.

ENG

Examples

Here you save all 32 bits of a Multichannel.

Format:	ORIGINAL
Bit offset:	0
Data bits:	32

Here you save the data bits 8 to 15.

Format:	ORIGINAL
Bit offset:	8
Data bits:	8

Here you save the data bits 6 to 31. If you do not want to save the “uninteresting” bits 8 to 13 and 16 to 23, you will have to assign the Multichannel to three special channels and define different settings:

- 1st channel: Bit offset 6, data bits 2;
- 2nd channel: Bit offset 14, data bits 2;
- 3rd channel: Bit offset 24, data bits 8

Format:	ORIGINAL
Bit offset:	6
Data bits:	26

Here the measured values of a temperature (bits 0 to 7) and a pressure sensor (bits 8 to 15) are coming on one Multichannel. With the shown specifications, you record the measured values of both channels, but they cannot be displayed at the measuring instrument. The decoding will be done later using **HYDRO***com* 6.

You need two special channels to display the measured values with the **MultiSystem 5070**.

- On the first one, you define for the temperature sensor: **Format** = **BINARY**, bit offset = 0, data bits = 8.
- For the pressure sensor, you require a different special channel and define here: **Format** = **BINARY**, bit offset = 8, data bits = 8

Format:	ORIGINAL
Bit offset:	0
Data bits:	16

Graphic presentation in display menu

After configuring the graphic presentation in the display menu (see Chapter **Display** on page 75) in the measured values display, the measured values will then look like this, for example:

F1 

Display change

⇨ **Display change** on page 40

F2 

VALUE Displays current measurement values instead of scaling.

F2 

SCAL Displays scaling instead of current measurement values.

- Channel p1 is displayed as blue line with crosses
- Channel T1 is displayed as red line with diamonds
- The current measured values are displayed beneath the graph

Coupling of several instruments

You can couple several **MultiSystem 5070** measuring instruments and increase the number of available input channels with nearly no limitations. But please be aware that the parameters scanning rate, storage time and pretrigger must be programmed identically at all coupled measuring instruments.

You can also couple **MultiSystem 5070** instruments with **MultiSystem 5060 Plus** instruments.

Connecting a measuring instrument electrically

Note

Malfunctions possible!
Only use the connection cables available from HYDROTECHNIK to connect the instruments.
Otherwise there is the risk of malfunctions.

A Digital input/output

Coupling of two instruments

Use the connection cable TKZ 8824-F2-00.50 and connect the digital input/output jacks.

Coupling of several instruments

Use the connection cable for external trigger TKZ 8824-D8-04.00 and couple the instruments serial or parallel:

ENG

Serial coupling

- Connect the external trigger signal to pins 3+4 [IN] of the Master instrument.
- Connect the pins 1+2 [OUT] of the Master instrument with pins 3+4 [IN] of the first Slave instrument.
- Connect the pins 1+2 [OUT] of the first Slave instrument with pins 3+4 [IN] of the second Slave instrument.
- Couple all instruments in this manner.

Restrictions of the serial coupling

You will see synchronisation delays with the serial coupling:

- max. 1 ms between Master and Slave 1
- max. 1 ms between Slave 1 and Slave 2
- max. 2 ms between Master and Slave 2
- max. 4 ms between Master and Slave 4

If you operate the coupled instruments in the “dynamic mode” (hardware filter switched off), all channels can be scanned with up to 10 kHz. Then the synchronisation delay between two devices is reduced to 0.1 ms.

ENG

Parallel coupling

- Connect the external trigger signal to pins 3+4 [IN] of the Master instrument.
- Connect the pins 1+2 [OUT] of the Master instrument with pins 3+4 [IN] of all Slave instruments
- Connect pin 2 of the Master instrument via a 2.2 kOhm resistor with pin 3 of a free measuring channel [X]

Restrictions of the parallel coupling

The parallel coupling may only be used for the maximum of 10 instruments (1 Master + 9 Slaves). You will see small synchronisation delays of max. 1 ms between all instruments.

Use of the MultiXtend Trigger

For the coupling of more than two instruments we recommend the use of the MultiXtend Trigger (TKZ 316A-00-00.50). This simplifies the coupling and allows the use of the standard connection cables (TKZ 8824-F2-00.50).

Programming instruments

Programming Master instrument

1 Program the memory channels as desired.

2 Program scanning rate, storage time and pretrigger as desired.

3 Program the storage start by a trigger (absolutely required, trigger type can be chosen freely).

4 Program the trigger output **ACTIVE** and set it to **SP_TRIG** (forwarding of the trigger signal to the Slaves).

■

Programming Slave instruments

1 Program the memory channels as desired.

2 Program scanning rate, storage time and pretrigger in the same way as the Master instrument.

3 Program the storage start by a trigger. For **Trigger 1**, program the trigger input **E1** to **ON**.

4 Program the trigger output **ACTIVE** and set it to **SP_TRIG** (forwarding of the trigger signal to the next Slave). This is required for serial coupling, only.

■

Start recording

Activate the recording at each instrument normally. Please be aware of:

- The trigger incident may not happen at the Master instrument, before all Slave instruments have been activated
- There must be sufficient time between the activation of the storage and the happening of the trigger incident to allow all instruments to store the set pretrigger; otherwise the measuring data cannot be synchronised

  Example: the pretrigger is 10 sec (20 % pretrigger at a storage time of 50 sec) and the trigger incident happens 5 sec after the storage activation at the last instrument; this results in a different number of measured values at the coupled instruments
- The storage may not be stopped at any of the coupled instruments, otherwise a synchronisation becomes impossible
- Avoid cyclic storage due to a possible triggering ahead of the desired time

Transfer and evaluate measured values

Transfer the measured values from all instruments to a PC. Use the **Combine** function of the **HYDRO***com* software to combine the measurements.

Programming and recording with HYDROlink
By using the **HYDR***link* software, you can simplify the coupling of devices.
- This PC software programs the master device and the slave devices automatically.
- During the recording, only a MWF file is created, which contains the storage channels of all participating instruments.

ENG

Connecting MultiXtend A and T

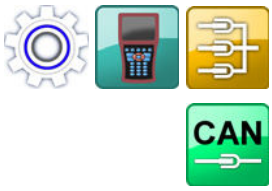
You can use the MultiXtend A and T to connect additional analog sensors or thermocouples to the **MultiSystem 5070**. Their signals are digitalised by the MultiXtend and transmitted to the CAN input of the measuring instrument. The presentation, storage and evaluation of the measuring data is then done in the instrument.

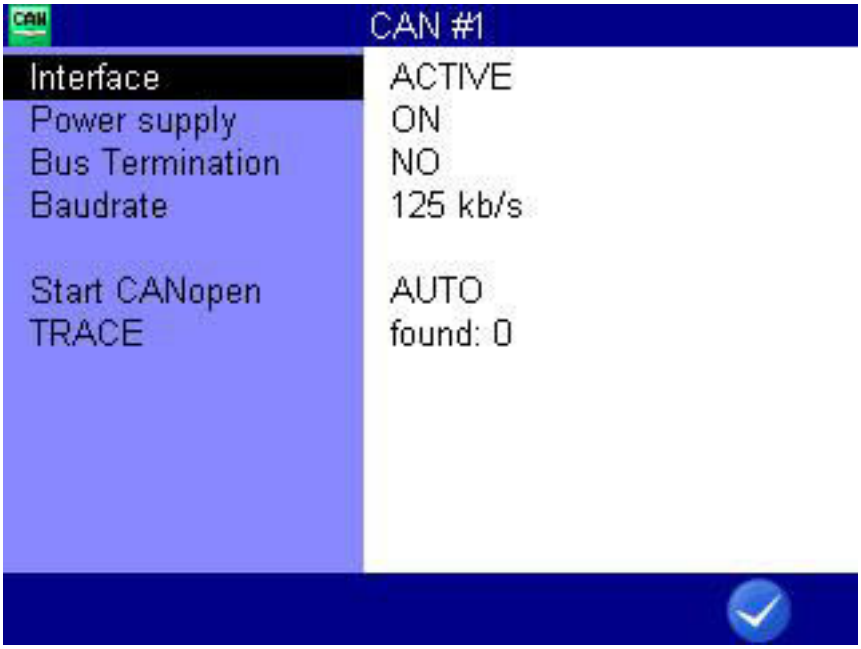
The following steps are required to use the MS 5070:

- Activate CAN bus
- Program CAN channels
- Activate MultiXtend power supply
- Start the MultiXtend

ENG

Activate CAN bus





F5 

OK Confirms input/saves change

At first you will have to activate the CAN bus on the **CAN#1** or **CAN#2** dialog.

Note

Malfunctions possible!
Make sure that the MultiXtend is set to the desired baud rate. Observe item 3 of the short operating instructions.

1 Open **Home** menu: MENU
2 Open **Setting** menu: ◁▷ △▽ ENTER
3 Open **Unit** menu: ◁▷ △▽ ENTER
1 Open **Connections** menu: ◁▷ △▽ ENTER
2 Open **CAN#1** or **CAN#2** dialog: ◁▷ △▽ ENTER
3 Select **Interface**: △▽
4 Set setting to **ACTIVE**: ENTER
5 Toggle to input of the **Baudrate**: △▽ ENTER
6 Select desired baud rate: △▽ ENTER
7 Confirm changes and exit dialog: F5

■

Program CAN channels

Observe the information in chapter **Define CAN channel** on page 115.

In the following example we show an assignment of a MultiXtend A with three sensors:

- Pressure sensor 0 – 600 bar at input 1
- Pressure sensor 0 – 200 bar at input 2
- Temperature sensor 0 – 60 °C at input 3

Program three special channels on the **MultiSystem 5070**: For example, channels 13 to 15.

For each channel in the **Calculation** field, select *MultiXtend*.

Activate MultiXtend power supply

The **MultiXtend** can either be supplied by its own power pack, or by the MS 5070 (CAN1 jack). If the instrument shall supply the required power, this function must be activated:

1 Open **Home** menu: MENU

2 Open **Setting** menu: ◁ ▷ △ ▽ ENTER

3 Open **Unit** menu: ◁ ▷ △ ▽ ENTER

4 Open **Connections** menu: ◁ ▷ △ ▽ ENTER

5 Open **CAN#1** or open: ◁ ▷ △ ▽ ENTER

6 Select **Power supply**: △ ▽

7 Set setting to **ON**: ENTER

8 Confirm changes and exit dialog: F5

■

Starting the MultiXtend

After activating the power supply, the **MultiXtend** must be started. Otherwise it cannot send signals.

Note

After a loss of supply power or the measuring instrument has been switched off, the MultiXtend must be started again.

ENG

1 Open **Home** menu: MENU

2 Open **Setting** menu: ◁ ▷ △ ▽ ENTER

3 Open **Unit** menu: ◁ ▷ △ ▽ ENTER

4 Open **Connections** menu: ◁ ▷ △ ▽ ENTER

5 Open **CAN#1** or open: ◁ ▷ △ ▽ ENTER

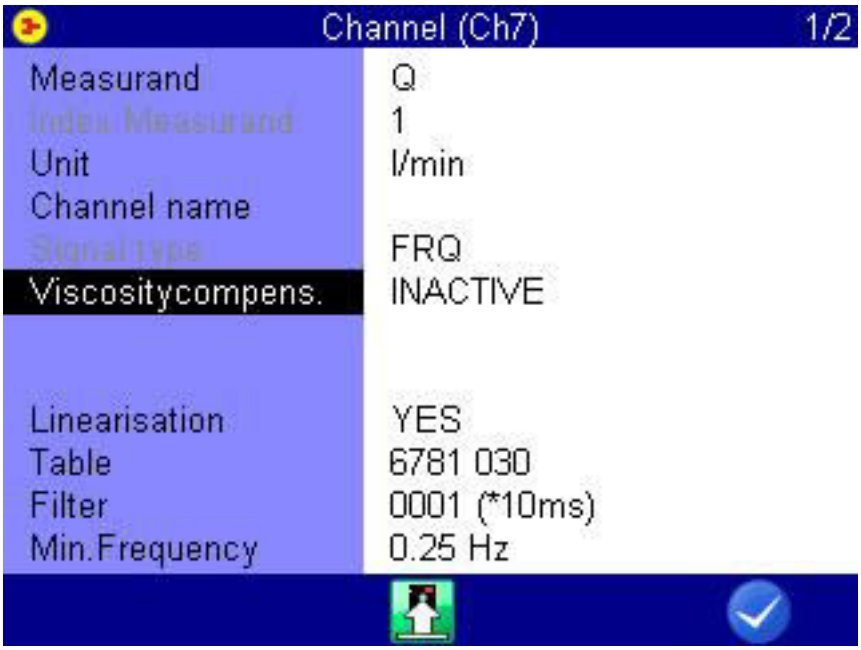
6 Select **Start CANopen**: △ ▽

7 Start the MultiXtend: F3

■

ENG

Viscosity-compensated volume flow rate measuring



F3 

SAVE Stores the current sensor parameters in the database.

F5 

OK Confirms input/saves change

The oil viscosity depends on its temperature. To account for these variations during the measurement of the volume flow, three channels must be programmed correspondingly:

- One measuring channel for temperature (if the viscosity of the oil is not known)
- One measuring channel for the viscosity-compensated volume flow rate measurement
- If the viscosity should be displayed/saved, a virtual channel for the calculation of the viscosity

Sensor For the viscosity-compensated measurement of the volume flow, you will need a suitable turbine volume flow sensor with ISDS function (example: **HySense QT 100**). Use the integrated test point for the temperature measurement.

The dialogs and functions described here are only available when a suitable turbine volume flow sensor is connected to the measuring instrument.

ENG

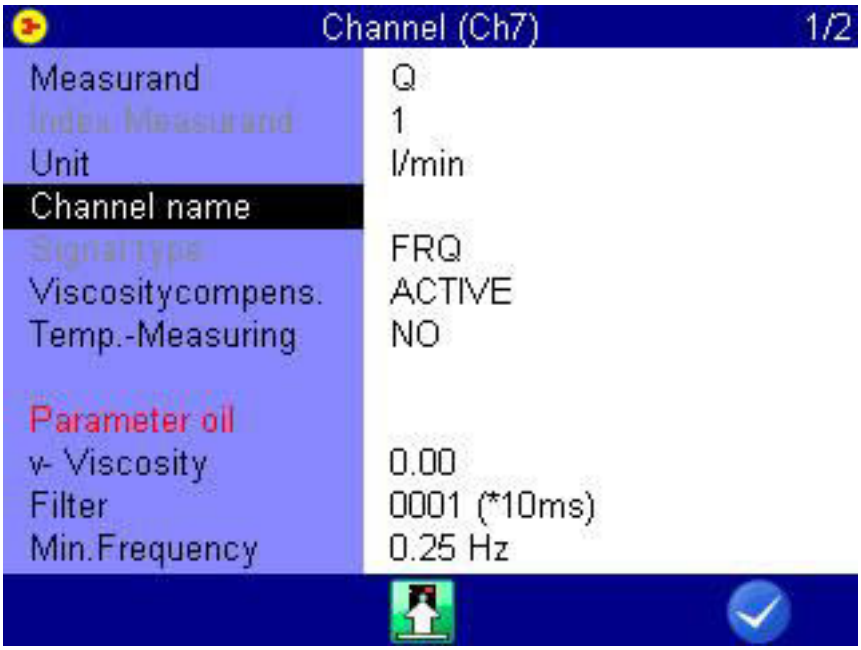
Temperature measurement

Program one measuring channel for temperature measurement. You can find additional information under Chapter **Configure measuring channels (Ch1 ... Ch8)** on page 65.

Volume flow rate measurement

Open the dialog of the measuring channel that you want to use for volume flow rate measurement. Highlight the entry **Viscos.balance** and press ENTER to switch it to **ACTIVE**.

Further options will be displayed:



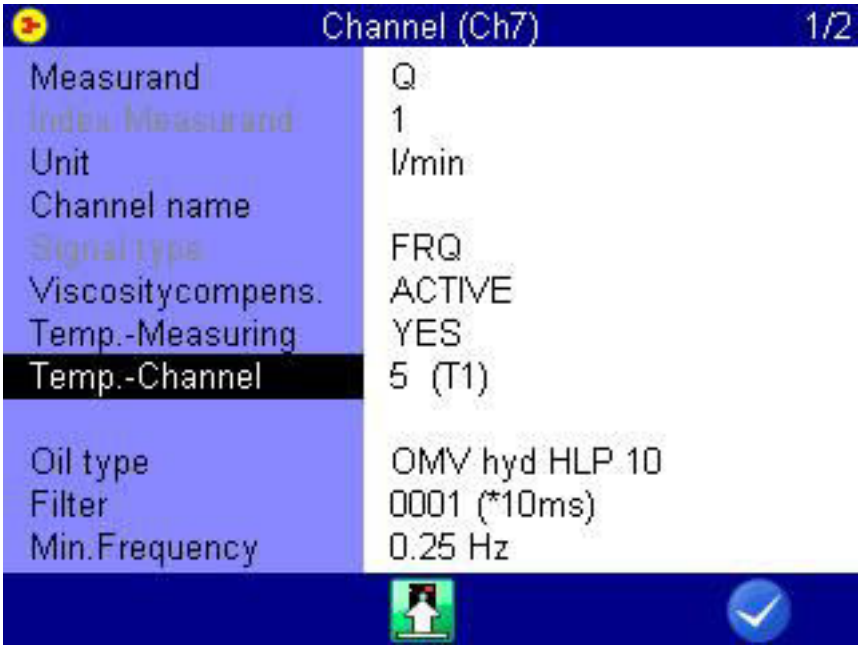
F3  **SAVE** Stores the current sensor parameters in the database.

F5  **OK** Confirms input/saves change

ENG

You can switch temperature measurement ON and OFF in the next line. If disabled, the current viscosity cannot be calculated and the entered oil viscosity value will be used.

Highlight the line **Temp. meas.** and press ENTER to switch it on.

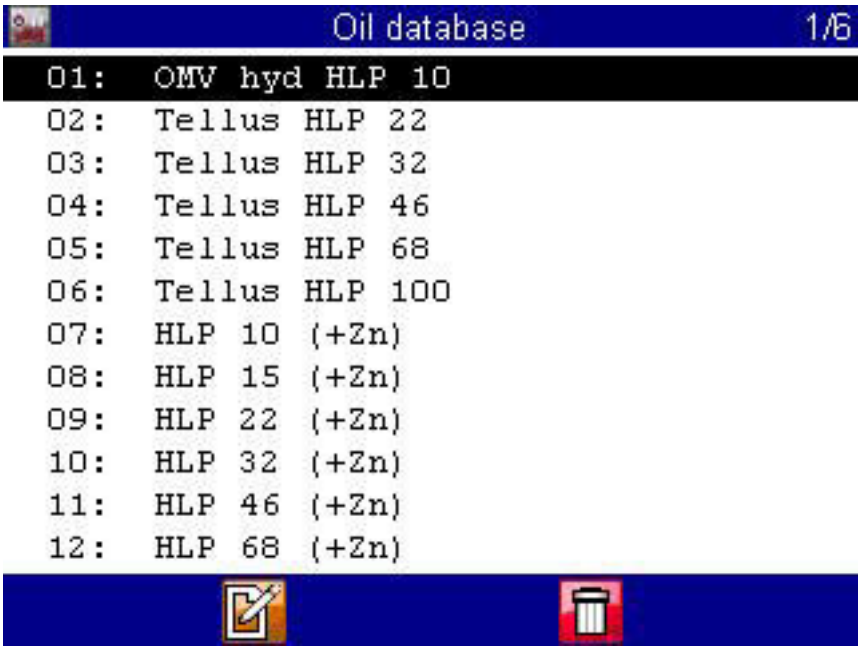


Highlight the next line, press ENTER and select the measuring channel, where the oil temperature is measured.

Then highlight the item **Oil parameter** and press ENTER to select or program the oil being used.

ENG

Selection of the oil in use



F2  **EDIT** Edits the current entry.

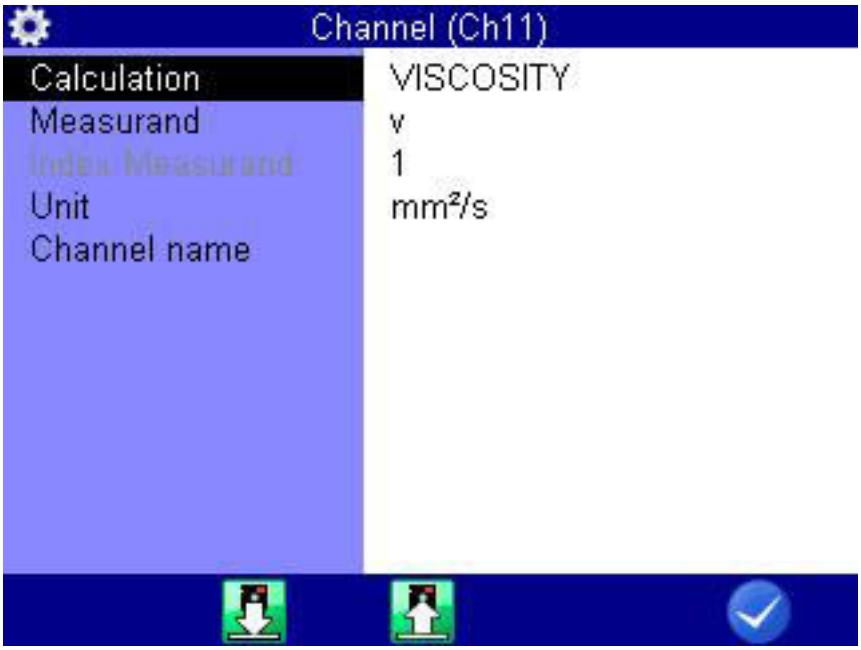
F4  **DELETE** Enables the delete function.

The database already contains several oil sorts. Highlight the item **Name**, press ENTER and select the desired oil.

To write a new oil to the database, select an empty entry (-) from the oil database. Press F2, highlight the parameters and enter the values. Then press F2 to save the new oil.

Press F3 to delete the currently displayed oil from the database.

Virtual channel for viscosity calculation



ENG

F2 

LOAD Loads stored sensor parameters from the database.

F3 

SAVE Stores the current sensor parameters in the database.

F5 

OK Confirms input/saves change

If desired, you can program a virtual channel (see Chapter **Configure special channels (Ch11 ... Ch42)** on page 69) with the calculation **VISCOSITY** and enter the required parameters.

The result of the calculation will be used at the channel for volume flow rate measurement to compensate the viscosity changes dependent on the temperature. You may also display and record this channel.

Reference for the icons

The operating software uses icons.

ENG

Favorites

You can assign the following icons as favorites on the **Home** menu or as soft-keys in the measuring value display.

	**Favorite**	
	**Series of measurements**	**Saved measurements** > **Overview series** ⇨ **Overview series** on page 46
	**Show series**	**Saved measurements** > **Show series** ⇨ **Show series** on page 47
	**Delete series**	**Saved measurements** > **Delete series** ⇨ **Delete measuring data** on page 34 ⇨ **Delete series** on page 60
	**Search series**	**Saved measurements** > **Search series**
	**Overview configurations**	**Configurations** > **Overview configurations**
	**Save configuration**	**Configurations** > **Save configuration** ⇨ **Saving a new configuration** on page 43
	**Load configuration**	**Configurations** > **Load configuration** ⇨ **Loading a saved configuration** on page 44
	**Delete Configurations**	**Configurations** > **Delete configurations** ⇨ **Deleting a saved configuration** on page 44
	**Oil condition**	**Special applications** > **Oil condition** ⇨ **Special applications** on page 143

ENG

	**Load valve**	**Special applications** > **Load valve** ⇨ **Special applications** on page 143
	**Patrick**	**Special applications** > **Patrick** ⇨ **Special applications** on page 143
	**Meas. section CX197**	**Special applications** > **Meas. section CX197** ⇨ **Special applications** on page 143
	**Test procedures**	**Special applications** > **Test procedures** ⇨ **Special applications** on page 143
	**Channels**	**Settings** > **Channels** ⇨ **Enter sensor parameters** on page 30 ⇨ **Channels** on page 64
	**Display**	**Settings** > **Display** ⇨ **Display** on page 75
	**Start recording**	**Start recording** ⇨ **Start recording** on page 38
	**Device**	**Settings** > **Device** ⇨ **Device** on page 81
	**All channels**	**Settings** > **Channels** > **All channels** ⇨ **Enter sensor parameters** on page 30 ⇨ **Channels** on page 64
	**Analog channels**	**Settings** > **Channels** > **Analog channels** ⇨ **Configure measuring channels (Ch1 ... Ch8)** on page 65
	**Frequency channels**	**Settings** > **Channels** > **Frequency channels** ⇨ **Configure measuring channels (Ch1 ... Ch8)** on page 65
	**Digital channels**	**Settings** > **Channels** > **Digital channels** ⇨ **Configure digital signal input (Ch9)** on page 67 ⇨ **Configure digital signal output (Ch10)** on page 67
	**Calculation channels**	**Settings** > **Channels** > **Calculation channels** ⇨ **Configure special channels (Ch11 ... Ch42)** on page 69 ⇨ **Possible assignments of the special channels** on page 70 ⇨ **Calculations with formulas** on page 72
	**CAN channels**	**Settings** > **Channels** > **CAN channels** ⇨ **CAN configuration** on page 83

ENG

	**Date/Time**	**Settings** > **Device** > **Date/Time** ⇨ **Setting date and time** on page 29 ⇨ **Date/Time** on page 94
	**User profile**	**Settings** > **Device** > **General settings** ⇨ **Select operating language** on page 28 ⇨ **General settings** on page 90
	**Info**	**Settings** > **Device** > **Info** ⇨ **Info** on page 93
	**Connections**	**Settings** > **Device** > **Connections** ⇨ **Connections** on page 82
	**Memory medium**	**Settings** > **Device** > **Memory medium** ⇨ **Memory medium** on page 95
	**Security**	**Settings** > **Device** > **Security** ⇨ **Memory medium** on page 95
	**Calibration**	**Settings** > **Device** > **Calibration** ⇨ **Calibration** on page 97
	**Hardware diagnostic**	**Settings** > **Device** > **Hardware diagnostic** ⇨ **Hardware Diagnostic** on page 98
	**CAN #1**	**Settings** > **Device** > **Connections** > **CAN #1** ⇨ **CAN #1 and CAN #2** on page 83
	**CAN #2**	**Settings** > **Device** > **Connections** > **CAN #2** ⇨ **CAN #1 and CAN #2** on page 83
	**USB (DEVICE)**	**Settings** > **Device** > **Connections** > **USB (DEVICE)** ⇨ **USB (DEVICE)** on page 87
	**LAN/WLAN**	**Settings** > **Device** > **Connections** > **LAN/WLAN** ⇨ **LAN/WLAN** on page 88
	**Bluetooth**	**Settings** > **Device** > **Connections** > **Bluetooth** ⇨ **Bluetooth** on page 89
	**COM #1**	**Settings** > **Device** > **Connections** > **COM #1** ⇨ **COM #1** on page 86

	**HOLD**	Only permissible as softkey. “freezes” the measured values display.

Softkeys: Symbols/text

On the **User profiles** dialog, select whether softkeys are displayed on the dialogs as symbols or text.

⇨ See **User-defined softkeys** on page 27.

ENG

	**DETAIL**	Presentation type table: Zooms in on the table.
	**RESET**	Presentation type table: Zooms out on the table.
	**ZOOM+**	Presentation type graph: Activates the zoom function.
	**ZOOM-**	Presentation type graph: Zooms out on the graphic.
	**POS**	Presentation type graph: Positions the zoom cutout.
	**SIZE**	Presentation type graph: Changes the zoom cutout.
	**SPOT**	Presentation type graph: Activates the spot function.
	**D-SPOT**	Presentation type graph: Activates the delta spot function.
	**Y-SCAL**	Presentation type graph: Toggle the channel for which the scaling is displayed on the y-axis. Only for series of measurements with two or more channels.
	**RECORD**	Movement factors in the presentation type graph: Changes the step width in the spot and delta spot function.
	**ESC**	Escape function: Leaves the dialog without saving.
	**BACKSP**	Backspace function: Deletes the character next to the cursor.

ENG

	**ABC**	Toggle function: Changes to CAPITAL LETTERS.
	**abc**	Toggle function: Changes to lower-case letters.
	**POS1**	Positions the cursor at the start of the entry
	**END**	Positions the cursor at the end of the entry
	**DELETE**	Enables the delete function.
	**NO**	Cancel: Declines confirmation.
	**YES**	Confirms the action.
	**START**	Starts action, e.g. scanning of the CAN communication.
	**YEAR**	Opens the selection for the current year.
	**MONTH**	Opens the selection for the current month.
	**DEC**	Converts to decimal numbers.
	**HEX**	Converts to hexadecimal numbers.
	**ALL**	Selects all entries. Removes all selections.
	**COL/SYM**	Opens the **Display (symbols/colors)** dialog.

ENG

	**NOTE**	Adds a note.
	**FORMAT**	Formats the selected volume.
	**FILE**	Converts the display to the file name.
	**NAME**	Converts the display to the measurement series name.
	**SORT**	Sorts displayed list/table.
	**>>**	Pages up.
	**<<**	Pages down.
	**SCAL**	Measured value display, graphic display: Displays scaling instead of current measurement values.
	**VALUE**	Measured value display, graphic display: Displays current measurement values instead of scaling.
	**OK**	Confirms input/saves change
	**INFO**	Displays information about the selected object.
	**DISPLAY**	Displays the selected measurement.
	**SETUP**	Opens the **Setup recording** dialog.
	**SEARCH**	Starts the search.

ENG

	**RESET**	Resets the search result.
	**LOAD**	Loads data, e.g. sensor parameters.
	**SAVE**	Saves data, e.g. sensor parameters.
	**CORR**	Opens the editing function.
	**DETAIL**	Special applications.
	**EDIT**	Edits the current function.
	**FILTER**	Opens the **Filter overview** dialog.
	**SCAN**	Scans the CAN BUS for messages.
	**DAY**	Opens the selection for the current day.

Cleaning and maintenance

Cleaning

Caution

Damage to the instrument is possible!
Switch the instrument off and disconnect from the power supply BEFORE starting to clean. This prevents the risk of a short-circuit, and thereby possible damage to the device.

Caution

Damage to the instrument is possible!
Do NOT use any aggressive cleaning materials, solvents, cleaning solvents or similar chemicals when cleaning the device. This prevents the risk of damage to the casing and/or dulling the display.

- If the casing becomes dirty, wipe it with soft, slightly damp cloth.
- Any stubborn dirt can be removed with a mild household cleaning product.

Sending the measuring instrument

The instrument is equipped with an internal lithium ion battery.

The rechargeable battery was tested according to the test requirements of the UN manual *Tests and criteria, Part 3, Subsection 38.3*. The rechargeable battery is class 9, however the eased transport according to special regulation 188 (ADR, RID, ADN, IMDG) and packaging instruction 965/968, Part 2 and Part 1B (IATA) apply.

When sending the measuring device, heed the hazardous goods transport regulations applicable for your country. You can also send the measuring device without rechargeable battery.

Maintenance

This device is maintenance-free. However, it is still essential to have it recalibrated regularly. If the device is in continuous use, we recommend recalibrating it every 2 years.

HYDROTECHNIK maintains a capable calibration laboratory.
Please contact us:

HYDROTECHNIK GmbH

Holzheimer Straße 94
D-65549 Limburg an der Lahn

Tel.: +49 6431 4004 555

E-Mail: service@hydrotechnik.com
Internet: www.hydrotechnik.com

ENG

Repair

If repair is needed, please contact our customer service department. Please have the following information ready when you contact us. If you are returning the equipment, please also attach the following information:

- Company, department, contact person
- Address, telephone and fax number, email address
- Faulty part (equipment, sensor, cable, power pack)
- PC used (CPU, operating system, RAM, HDD)
- Version of the software used **(HYDRO***com* or **HYDRO***link*)
- Description of fault (please leave the settings on your measuring instrument exactly as they appeared at the time of the fault/error; and please briefly describe the use of instrument, the connection of the sensors, the instrument set-up such as storage parameters, triggers, how many measurements were recorded, etc.)

Manufacturer address and customer service

Please contact the HYDROTECHNIK customer service department:

HYDROTECHNIK GmbH

Holzheimer Straße 94
D-65549 Limburg an der Lahn

Tel.: +49 6431 4004 555

E-Mail: service@hydrotechnik.com
Internet: www.hydrotechnik.com

Special applications

ENG

This submenu contains several functions that enhance the functionality of the MS 5070 or that are required for the operation of external devices:

There is a detailed description of the menus in a separate document.

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