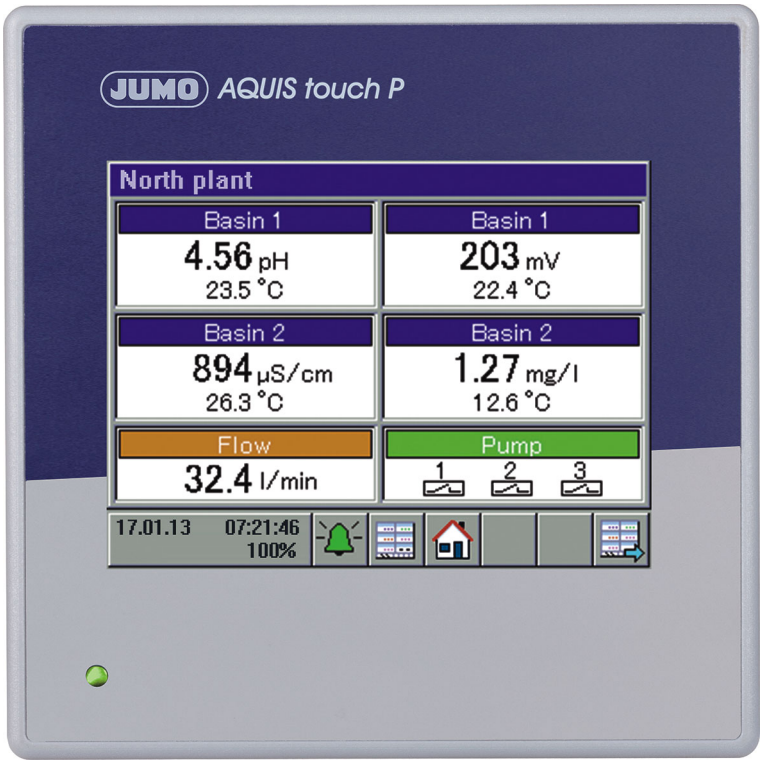
JUMO AQUIS touch P

Modular Multichannel Measuring Device for Liquid Analysis with Integrated Controller and Paperless Recorder



Installation Instructions
Volume 1(2)

20258000T94Z101K000

V12.00/EN/00607982/2024-04-25



Caution!
If the device or a sensor connected to it fails abruptly, it is likely that a dangerous overdosage has occurred!
For this case, appropriate precautionary measures must be taken.



NOTE!
Read this operating manual before putting the device into service.
Keep the operating manual at a location that is readily accessible to all users.

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Content

1.1 Warning symbols



DANGER!
This symbol indicates that personal injury from electrocution may occur if the appropriate precautionary measures are not taken.



WARNING!
In conjunction with the signal word "Warning", this symbol indicates that the risk of personal injury or death exists if the appropriate precautionary measures are not taken.



CAUTION!
In conjunction with the signal word "Caution", this symbol indicates that the risk of equipment damage or data loss exists if the appropriate precautionary measures are not taken.



CAUTION!
This symbol indicates that components of the device can be destroyed by electrostatic discharge (ESD = Electro Static Discharge) if the appropriate precautionary measures are not taken. When returning modules, assemblies, or components from the device, use only the ESD packaging provided.



READ THE DOCUMENTATION!
This symbol, attached to the device, indicates that the associated device documentation must be followed. This is necessary in order to recognize the nature of the potential danger and take the necessary measures to prevent it.

1.2 Note symbols



NOTE
This symbol refers to **important information** about the product, its handling, or additional benefits.



REFERENCE!
This symbol refers to **further information** in other sections, chapters, or other manuals.



DISPOSAL!
At the end of its service life, this device and any batteries present do not belong in the trash! Please ensure that they are **disposed of** properly and in an **environmentally friendly** manner.

1.3 Intended use

The JUMO AQUIS touch P is designed for measurement, control, and automation tasks in industrial environments as specified in the technical data. Other uses beyond those defined are not viewed as intended uses.

⇨ Chapter 23 "Technical data", page 417

The device has been manufactured in compliance with applicable standards and directives as well as the applicable safety regulations. Improper use can result in personal injury or property damage.

To avoid risks, the device may be used only as follows:

- For the intended use
- When in good order and condition
- When taking the technical documentation provided into account

Risks resulting from the application may arise, e.g. as the result of missing safety provisions or incorrect settings, even when the device is used properly and as intended.

1.4 Qualification of personnel

This document contains the information required to ensure use of the device as intended. It is intended for technically qualified personnel who have received special training and have the appropriate knowledge in the field of automation technology (measuring and control technology).

Understanding and technically correct observance of the safety instructions and warnings contained in the supplied documentation are prerequisites for safe mounting, installation, and commissioning as well as safety during operation.

Only qualified individuals have the required technical knowledge to interpret and put into practice the safety instructions and warnings used in this documentation in any given situation.

2 Acceptance of goods, storage, and transport

2.1 Checking the delivery

- Ensure that the packaging and its contents are undamaged
- Check the delivery for completeness against the packing slip and order details
- Inform the supplier immediately if there is any damage
- retain damaged parts until the situation has been clarified with the supplier

2.2 Important information about storage and transport

- store the device in a dry, clean environment
- observe the permissible ambient conditions,
  ⇨ Chapter 23 "Technical data", page 417
- protect the device from shock during transport
- The original packaging offers optimal protection for storage and transport

2.3 Returning goods

- if repairs are needed, return the device in clean condition and in its entirety
- use the original packaging when returning the device

2.3.1 Accompanying letter for repair

Please include the completed accompanying letter for repair when returning goods. Do not forget to state the following:

- Description of the application
- Description of the error that has occurred

The letter of transmittal accompanying the product return can be downloaded from the Internet at www.jumo.de under Services > Repair service.

2.3.2 Protection against electrostatic discharge (ESD)



CAUTION!
Electrostatic charges occur in non-ESD-protected environments.
Electrostatic discharge can damage assemblies or components.
For transport purposes, use only the ESD packaging provided.

To prevent damage from ESD, electronic modules, or components with a high internal resistance must be handled, packaged, and stored in an environment that protects against ESD. Measures that protect against electrostatic discharge and electric fields are described in DIN EN 61340-5-1 and DIN EN 61340-5-2 "Protection of electronic devices from electrostatic phenomena".

When sending back electronic modules or components, please note the following:

- Pack sensitive components only in an environment providing protection against ESD. Workspaces such as this divert electrostatic charges to ground in a controlled manner and prevent static charges due to friction capacities.
- Use only packaging intended specifically for ESD-sensitive modules/components. These must consist of conductive plastics.

No liability is assumed for damage caused by electrostatic discharge (ESD).

3.1 Brief description

Measure

The JUMO AQUIS touch P provides a central platform for the display and processing of pH value, redox voltage, electrolytic conductivity, resistance of high-purity water, temperature, quantities of disinfecting agents such as free chlorine, total chlorine, chlorine dioxide, ozone, hydrogen peroxide and peracetic acid or even flow rates. Pulse frequency inputs (counters) are available for flow measurement. Universal inputs can be used to measure analog measurands using standard signals [0(4) to 20 mA or 0 to 10 V]. The unit can measure and manage up to 23 parameters simultaneously.

Control

Besides numerous simple alarm, limit value or time-controlled switching functions, up to 4 higher-order control loops can be defined in the JUMO AQUIS touch P at the same time. Tried and tested JUMO control algorithms are used for P, PI, PD, and PID control in these applications.

Show

A 3.5" TFT color screen with touch function serves to display all parameters as well as operate and set up the device. The plain text operation philosophy virtually eliminates the need for a manual. German, English, and, on request, French are included in the device at the factory as selectable user interface languages (see order details). Using the PC setup program, the language library of the unit can be expanded to as many as 15 languages. It is also possible to display languages that use Chinese and Cyrillic characters. As a result, the device is predestined for global use.

Recording

A paperless recorder is integrated for data recording. Up to 16 analog measurands and 12 binary signals are recorded and displayed on the screen in their chronological sequence. Storage is tamper-proof and enables official recording obligations to be fulfilled. The data can be extracted via JUMO PCC software or USB flash drive and evaluated using the PC evaluation software JUMO PCA3000.

3 Device description

Application examples

The modular setup and open structure of the device permits a host of potential applications:

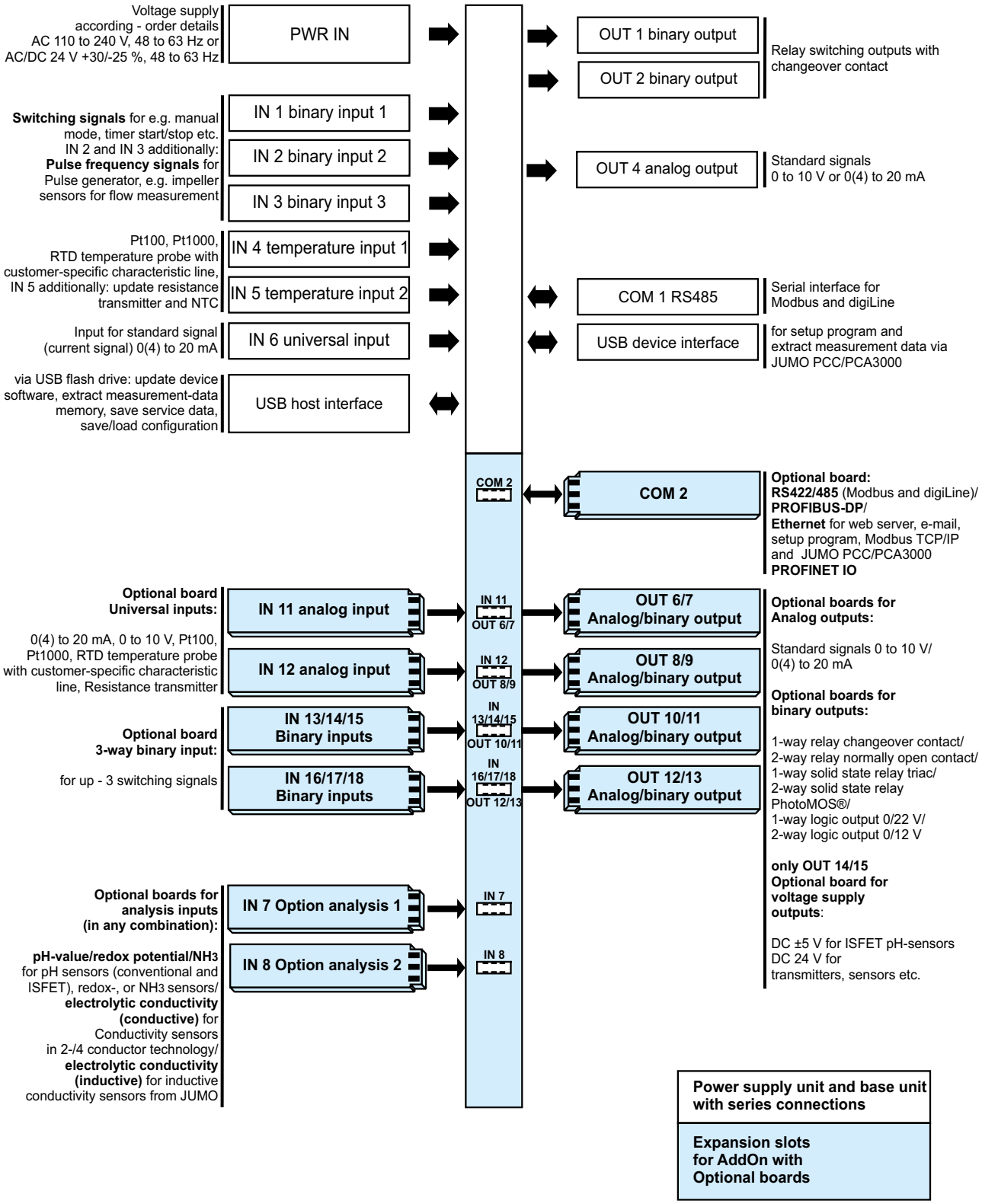
- Municipal and industrial water treatment in wastewater treatment plants
- Process systems
- Drinking and bathing water monitoring
- Pharmaceutical water
- Food and beverage production (CIP/SIP plants)
- Gas scrubbers/air washers
- Cooling tower control
- Ion exchangers
- RO units (reverse osmosis)
- Power stations and energy plants
- Fish breeding
- Desalination of seawater



NOTE

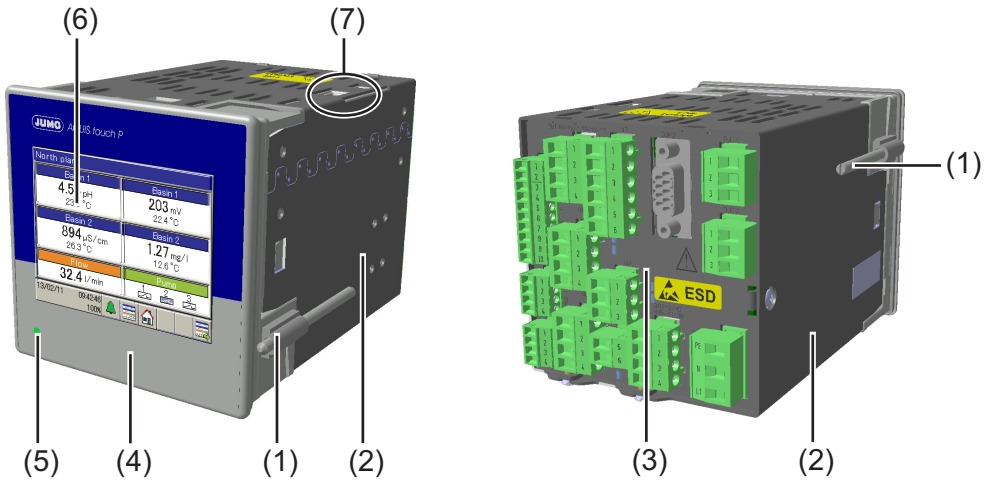
The device is not suitable for use in a potentially explosive atmosphere.

3.2 Block diagram



3 Device description

3.3 Device setup

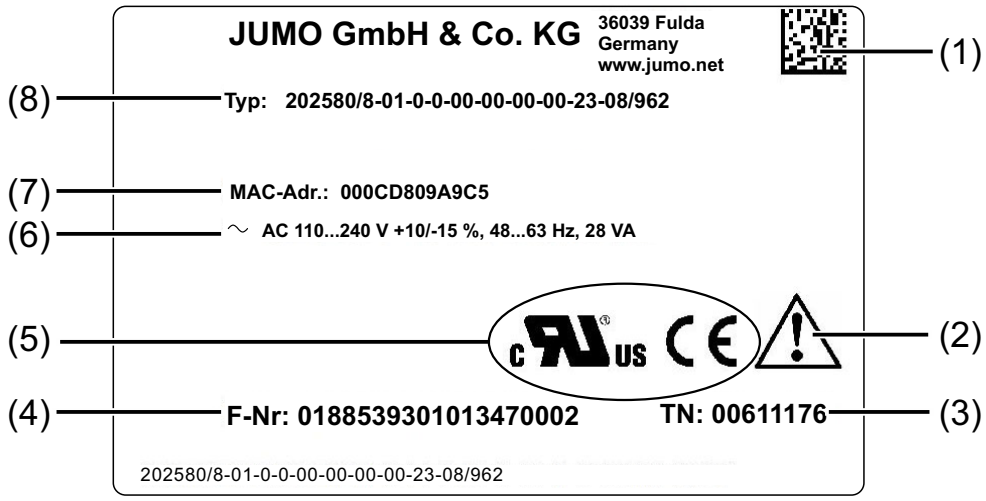


(1) Mounting elements
(2) Metal case barrel
(3) Rear panel with connection terminals (base unit and optional boards)
(4) Housing front
(5) LED (voltage supply turned on)
(6) Touchscreen TFT color screen
(7) USB interfaces

4.1 Nameplate

The nameplate on the device enclosure identifies the device version.

Example of a nameplate



(1) Data matrix code (for service purposes)
(2) Information symbol (Read documentation!
⇨ Chapter 1.1 "Warning symbols", page 7)
(3) Part no.
(4) Fabrication number
(5) Approval mark
(6) voltage supply
(7) MAC address of the Ethernet interface (stored in device and therefore also valid for replaced or retrofitted Ethernet optional boards)
(8) Order code

It is helpful to become familiar with the technical features of the device prior to startup. Compare the type code on the nameplate with the order details.
⇨ Chapter 4.2 "Order details", page 16
In the event of technical questions, please have the information from the nameplate available for the member of our support team.

4 Identifying the device version

4.2 Order details

NOTE

In addition to the standard languages of German, English, and French, 13 additional languages (e.g. Russian, Chinese, Italian etc.) are available. Please use the contact information on the back of this manual to contact JUMO in this regard.

			Slot
	(1)	**Basic type**	
202580		JUMO AQUIS touch P	
	(2)	**Version**	
8		Standard with default settings	
9		Customer-specific configuration (specification in plain text)	
	(3)	**National language**	
01		German	
02		English	
03		French	
	(4)	**Analysis input 1**	**IN 7**
0		Not used	
1		pH/redox/NH_3	
2		CR conductive conductivity measurement (2 and 4-pole)	
3		Ci inductive conductivity measurement	
	(5)	**Analysis input 2**	**IN 8**
0		Not used	
1		pH/redox/NH_3	
2		CR conductive conductivity measurement (2 and 4-pole)	
3		Ci inductive conductivity measurement	
	(6)	**Input/output 1**	**IN 11, OUT 6/7**
00		Not used	
10		Universal input	
11		Relay (changeover contact)	
12		2× relays (normally open contact)	
13		Solid state relay triac 230 V, 1 A	
14		Logic output 0/22 V	
15		2× logic outputs 0/12 V	
16		Analog output	
17		2× solid state relay PhotoMOS®[a]	

	(7)	**Input/output 2**	**IN 12, OUT 8/9**
00		Not used	
10		Universal input	
11		Relay (changeover contact)	
12		2× relays (normally open contact)	
13		Solid state relay triac 230 V, 1 A	
14		Logic output 0/22 V	
15		2× logic outputs 0/12 V	
16		Analog output	
17		2× solid state relay PhotoMOS®[a]	
19		Power supply output DC ±5 V, 24 V	
	(8)	**Input/output 3**	**IN 13/14/15, OUT 10/11**
00		Not used	
11		Relay (changeover contact)	
12		2× relays (normally open contact)	
13		Solid state relay triac 230 V, 1 A	
14		Logic output 0/22 V	
15		2× logic outputs 0/12 V	
16		Analog output	
17		2× solid state relay PhotoMOS®[a]	
18		3× digital inputs	
	(9)	**Input/output 4**	**IN 16/17/18, OUT 12/13**
00		Not used	
11		Relay (changeover contact)	
12		2× relays (normally open contact)	
13		Solid state relay triac 230 V, 1 A	
14		Logic output 0/22 V	
15		2× logic outputs 0/12 V	
16		Analog output	
17		2× solid state relay PhotoMOS®[a]	
18		3× digital inputs	
	(10)	**Voltage supply**	
23		AC 110 to 240 V +10/-15 %; 48 to 63 Hz	
39		AC/DC 24 V +30/-25 %; 48 to 63 Hz	
	(11)	**COM 2 interface**	**COM 2**
00		Not used	
08		Ethernet	
54		RS422/485 Modbus RTU	
63		PROFINET IO	
64		PROFIBUS-DP	
	(12)	**DNV GL tested**	
000		Without approval	
062		With DNV GL approval	

4 Identifying the device version

(13)	Extra codes
000	Without extra code
213	Recording function
214	Math and logic module
962	JUMO digiLine protocol activated

[a] PhotoMOS® is a registered trademark of Panasonic.

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)		(11)	
Order code:		/		-		-		-		-		-		-		-		-		-		-
Order example:	202580	/	8	-	01	-	1	-	2	-	10	-	10	-	13	-	13	-	23	-	64	-

(12) **(13)**

[ ] / [ ] , ...[a]

062 / 213 , 214

[a] List all desired extra codes separated by commas.

4.3 Scope of delivery

JUMO AQUIS touch P according to order details (including 4x fastening elements)
Panel seal
Mini-DVD with JUMO PC setup program as demo version, Adobe Acrobat Reader, operating manual and data sheet in PDF format, GSD generator and JUMO PCC / PCA 3000 as demo version
Installation instructions in 2 volumes

4.4 Accessories

Order code	Type	Part no.
703571 (20258x)/10	Universal input; galvanically isolated	00581159
703571 (20258x)/10	Universal input; galvanically isolated, without DNV approval	00775887
703571 (20258x)/213	Activation of the recording function	00581176
703571 (20258x)/214	Activate math and logic module	00581177
703571 (20258x)/11	Binary output relay (changeover contact)	00581160
703571 (20258x)/12	Binary outputs 2× relay (normally open contact)	00581162
703571 (20258x)/13	Solid state relay triac 230 V, 1 A	00581164
703571 (20258x)/14	Logic output 0/22 V	00581165
703571 (20258x)/15	2 Logic outputs 0/12 V	00581168
703571 (20258x)/16	Analog output	00581169
703571 (20258x)/17	Digital outputs 2× solid state relay PhotoMOS®[a]	00581171
703571 (20258x)/54	Serial interface RS422/485 for Modbus RTU and JUMO digiLine[b]	00581172
703571 (20258x)/64	PROFIBUS-DP	00581173
703571 (20258x)/08	Ethernet	00581174
20258x/3	Analysis input Ci for inductive conductivity	00584265
20258x/2	Analysis input CR for resistive conductivity	00584263
20258x/1	Analysis input pH/Redox/NH_3	00584264
20258x/18	Digital inputs 3× potential-free contact	00592962
20258x/19	Voltage supply output DC ±5 V, 24 V	00592963
	USB flash drive 2.0 (2 GB)[c]	00505592
	USB cable, A-connector to Mini-B connector, length 3 m	00506252
	JUMO PC setup program AQUIS touch S/P, (PG202599)	00594355
	JUMO PCA3000/PCC software package[d]	00431884
	Surface-mounted case for JUMO AQUIS touch P	00628452

[a] PhotoMOS® is a registered trademark of Panasonic.

[b] The accessories required to install a JUMO digiLine bus can be found in the type sheets and operating manual for the JUMO digiLine components (e.g. JUMO digiLine pH/ORP/T type 202705 or JUMO digiLine hub type 203590).

[c] The indicated USB flash drive has been tested and is designed for industrial applications. No liability is assumed for flash drives from other manufacturers.

[d] Communication and evaluation software for stored recording function measurement data

4 Identifying the device version

5.1 Notes



DANGER!

Under no circumstances may the device be installed or removed while under voltage! This poses the risk of electrocution.

Switch-off the entire system beforehand. This work must be performed only by qualified personnel!

The device must never be installed in potentially-explosive areas! Explosion hazard.

Mounting site

When determining the mounting site, it is important to ensure that the device specifications are respected. The relevant tables containing details of case specifications can be found in the chapter entitled "Technical Data". The device must not be exposed to any severe shocks or permanent vibrations. Electromagnetic fields caused by equipment such as motors or transformers must be avoided!

Climatic conditions

The ambient temperature and the relative humidity at the mounting site must correspond to the technical data.

⇨ Chapter 23.12 "Housing", page 430

Installation position

The device can be installed in any position. However, the viewing angle of the TFT touchscreen should be taken into consideration.

⇨ Chapter 23.11 "Screen Touchscreen", page 429

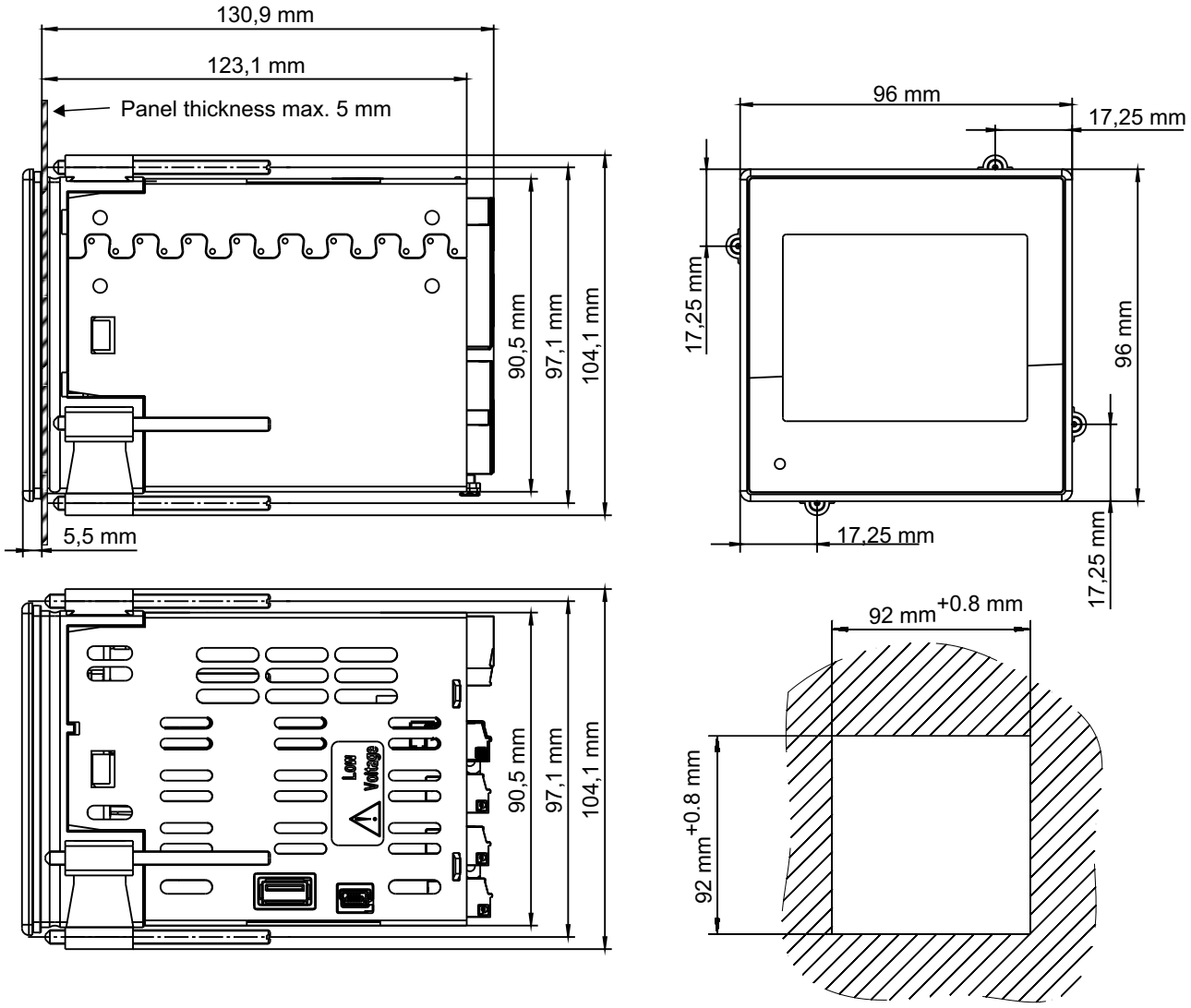
Space requirement

Ensure adequate access to the region around the cable entry points. The minimum bending radius of the cables must be taken into account!

⇨ Chapter 5.2 "Dimensions", page 22

5 Mounting

5.2 Dimensions



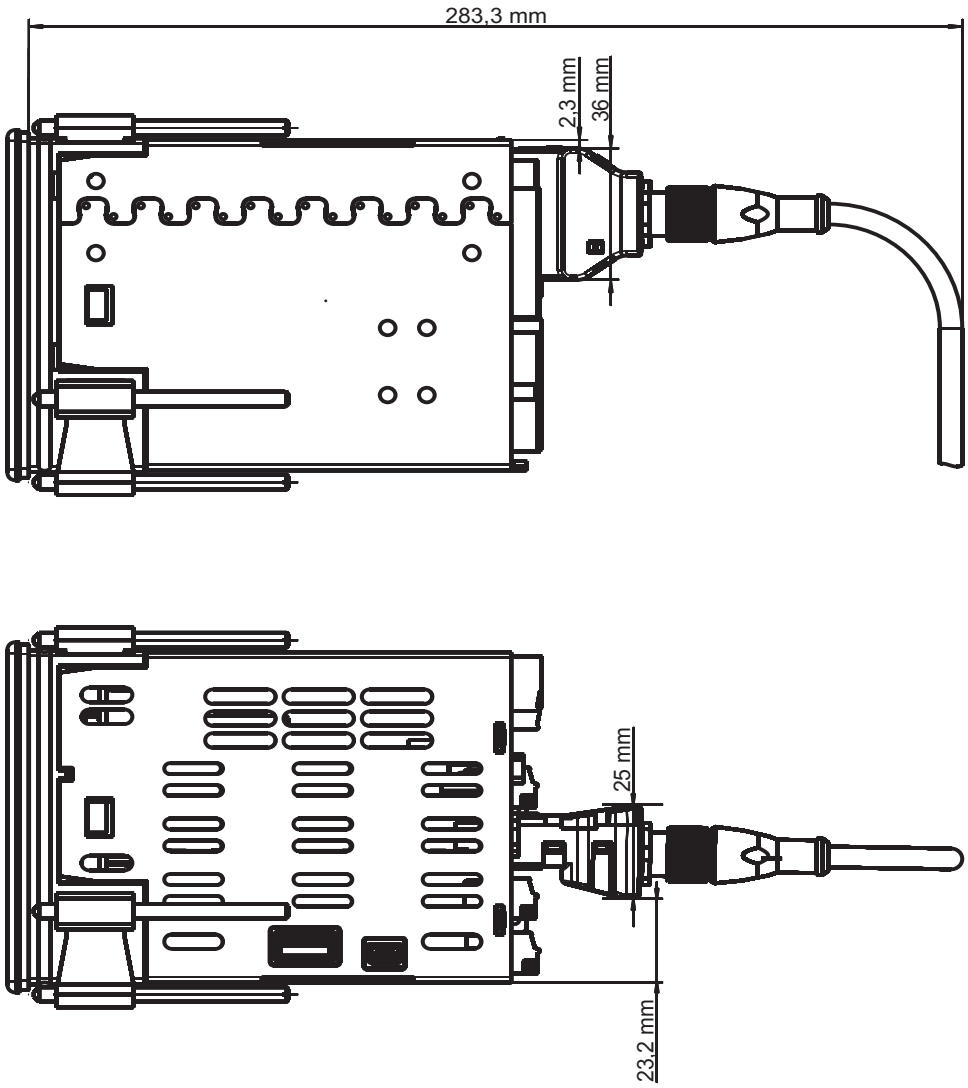
Distances

For sufficient ventilation, the following installation distances to adjacent resources must be adhered to:

- horizontal 35 mm
- vertical 80 mm

When inserting the device, sufficient space for maneuvering the connecting cables must be left behind the case. A Ci-conductivity sensor is connected via a M12 connector adapter. This increases the space requirement with regard to installed depth (see following dimensional drawing).

Mounting depth with Ci-conductivity sensor



5 Mounting

5.3 Panel mounting

The device is designed to be inserted in switch cabinets or machine/system walls. The insertion operation is described below.



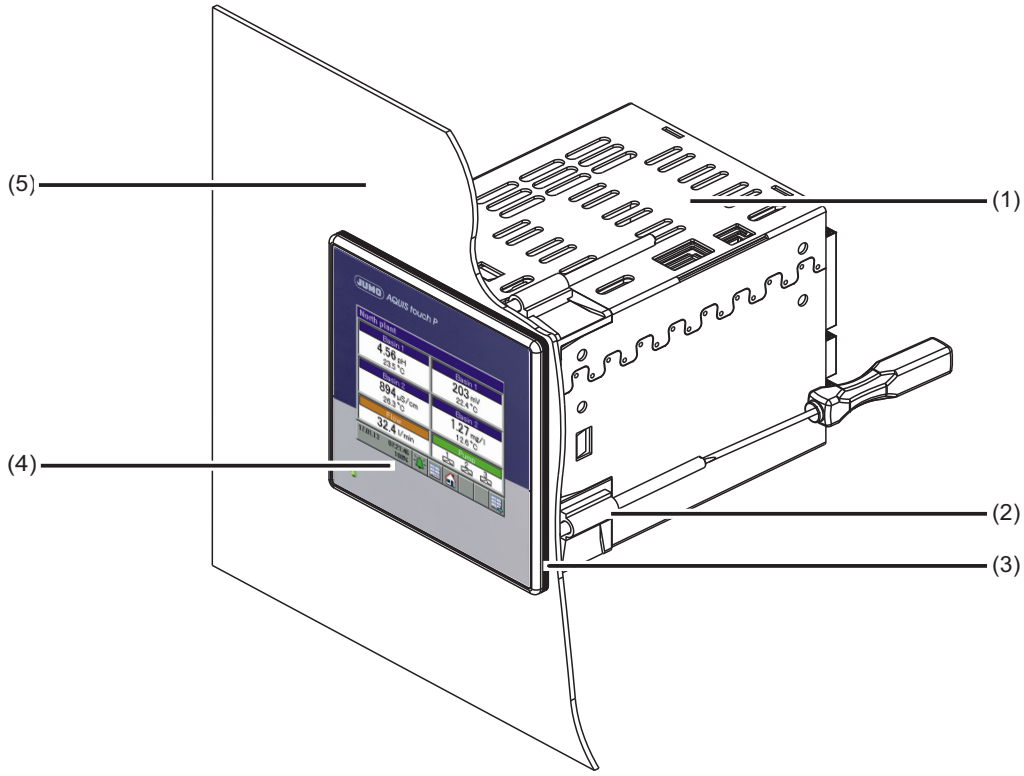
NOTE

Insertion in a control panel provides protection class IP66. When the JUMO AQUIS touch P is inserted in the wall of control cabinets with a protection class higher than IP66, the protection class of the control cabinet lapses and corresponds to the protection class for control panel insertion (IP66).



CAUTION!

Ensure that the control panel provides adequate support for the device.
The weight values listed in the technical data must be taken into account to ensure adequate mechanical stability for control panel installation.
⇨ Chapter 23.12 "Housing", page 430



(1) Metal case barrel of the JUMO AQUIS touch P
(2) Mounting elements
(3) Seal from the scope of delivery for the device
(4) Housing front
(5) Panel/control cabinet

Procedure

Step	Action
1	Push the panel seal provided (3) from the rear panel of the device over the case barrel to the front panel.
2	Place the device in the cutout provided for this purpose in the control panel (5) as shown in the drawing.
3	Insert the mounting elements (2) into the holders on the case provided for this purpose, as shown on the drawing.
4	Screw the mounting element firmly against the panel so that the case front (4) of the device is tight against the panel (5) and the device is firmly seated.

5 Mounting

6.1 Installation notes



DANGER!
Observe the following instructions!

Qualification of personnel

- The electrical connection must only be carried out by qualified personnel.

Electrical wiring

- When selecting the electrical wiring material as well as when installing and connecting the device electrically, the requirements of DIN VDE 0100 "Erection of low voltage installations" and the applicable country-specific regulations (e.g. based on IEC 60364) need to be observed.
- The input, output, and power supply lines must be separated from one another spatially and not laid in parallel.
- Select suitable cables for sensors and interfaces (shielded and twisted or coaxial cable). These lines must not be installed near live electrical components or current-carrying wiring.
- Route sensor lines and bus lines only as uninterrupted lines (not connected via terminal blocks or the like).
- Provide shielding in accordance with the connection diagram on the device.
- At maximum load, the lines must be heat resistant up to at least 80 °C.
- In a star wiring configuration, grounding wires must be connected to an equipotential grounding busbar and insulation must be intact. Keep lines as short as possible. Ensure proper potential equalization.

6 Electrical connection

Electrical safety

- Disconnect all phases of the power supplied to the device (power grid, outside power supply sources for relays/solid state relays etc.) If current-carrying components could be touched while work is being performed.
- Fuses for power supply circuits should be rated at no more than 10 A (slow-blow).
- To prevent destruction of device outputs in the event of an external short circuit, short-circuit currents in circuits with relay or semiconductor outputs should be limited through use of appropriate fuses.
- The device is not suitable for installation in potentially explosive areas.
- Besides incorrect installation, wrong settings on the device can adversely affect performance of the connected process. For this reason, independently operating safety devices, e.g. pressure relief valves, temperature limiters/ monitors, liquid-metering limiters and overflow prevention devices should be provided and adjustment of them restricted only to train technical personnel. Appropriate safety regulations must be observed in this connection.
- Plug-in screw terminal strips should not be unplugged until after the power has been disconnected.

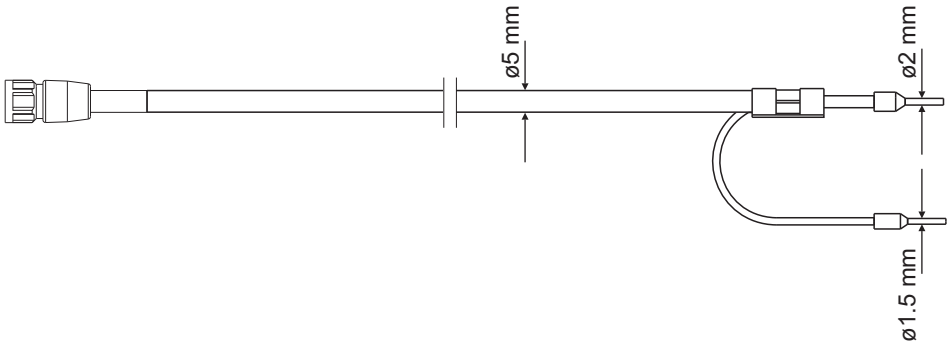
References to other information

- The electromagnetic compatibility conforms to the standards and regulations cited in the technical data.
- The specifications for galvanic isolation must be taken into account during planning and electrical installation.
  ⇨ Chapter 6.3 "Galvanic isolation", page 33

6.2 Connecting cables

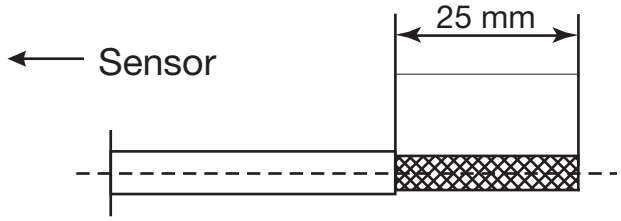
6.2.1 Preparing coaxial cables for pH/redox electrodes

Coaxial cable with Shield-Kon® connector[1]

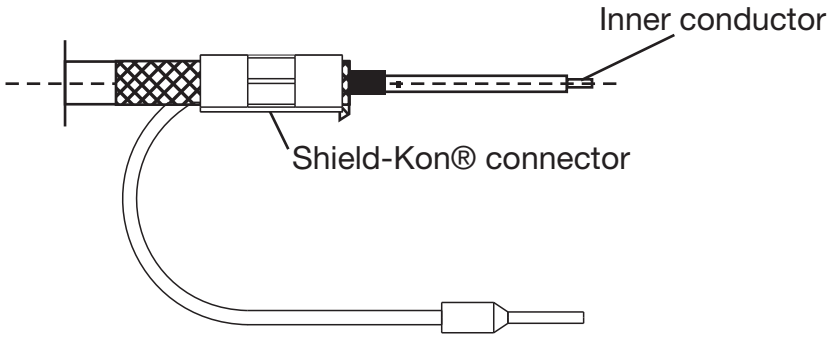


Length	Part no.
1.5 m	00085154
5 m	00307298
10 m	00082649

Preparing your own coaxial cable



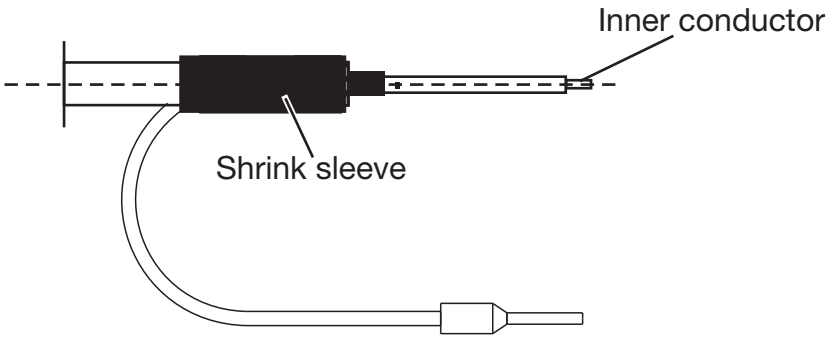
Remove outer sheathing from the cable > Pull back the braided shield



Remove black, semiconducting layer (see image) > Strip insulation off inside conductor > Attach Shield-Kon® connector[1] for shield

1.Shield-Kon is a registered trademark of THOMAS & BETTS INTERNATIONAL, Inc., Wilmington Del., US.

6 Electrical connection

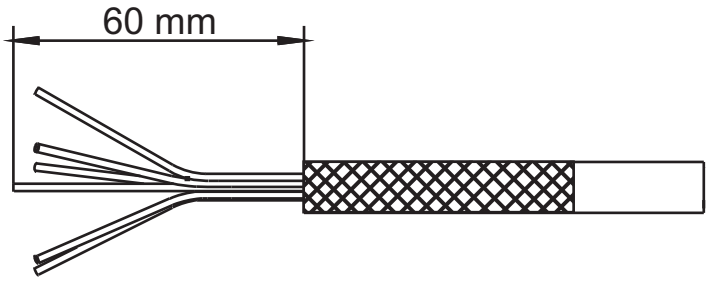


Use shrink tubing to insulate the braided shield

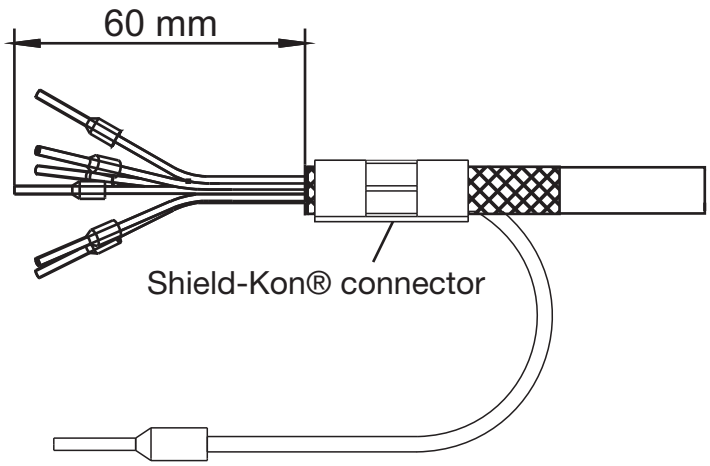
NOTE

The black, semiconducting layer must not touch with the inside conductor! This would short-circuit the signal from the pH electrode.

Preparing a shielded multiconductor cable

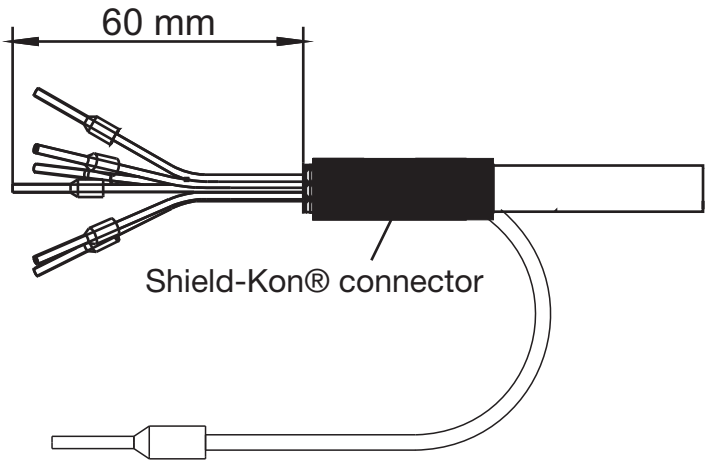


Strip the insulation off the connecting cable and pull back the shield



Attach wire ferrules to the ends of the conductors and a Shield-Kon® connector[1] for shielding

1.Shield-Kon is a registered trademark of THOMAS & BETTS INTERNATIONAL, Inc., Wilmington Del., US.



Use shrink tubing to insulate the shield and Shield-Kon® connector[1]

6.2.2 Conductor cross-sections for base unit and power supply unit

The terminals on the base unit and power supply unit are plug-in screw terminals.

Ferrule	Conductor cross section		Length to strip
	minimal	Maximum	
without ferrule			
Power supply unit voltage supply	0.2 mm^2	2.5 mm^2	7 mm
Power supply unit relay switching outputs	0.2 mm^2	2.5 mm^2	7 mm
Base unit	0.14 mm2	1.5 mm^2	7 mm
Ferrule without lip			
Power supply unit voltage supply	0.25 mm^2	2.5 mm^2	7 mm
Power supply unit relay switching outputs	0.25 mm^2	2.5 mm^2	7 mm
Base unit	0.25 mm^2	1.5 mm^2	7 mm
with ferrule with lip			
Power supply unit voltage supply	0.25 mm^2	2.5 mm^2	7 mm
Power supply unit relay switching outputs	0.25 mm^2	2.5 mm^2	7 mm
Base unit	0.25 mm^2	0.5 mm^2	7 mm
Rigid			
Power supply unit voltage supply	0.2 mm^2	2.5 mm^2	7 mm
Power supply unit relay switching outputs	0.2 mm^2	2.5 mm^2	7 mm
Base unit	0.14 mm2	1.5 mm^2	7 mm

1.Shield-Kon is a registered trademark of THOMAS & BETTS INTERNATIONAL, Inc., Wilmington Del., US.

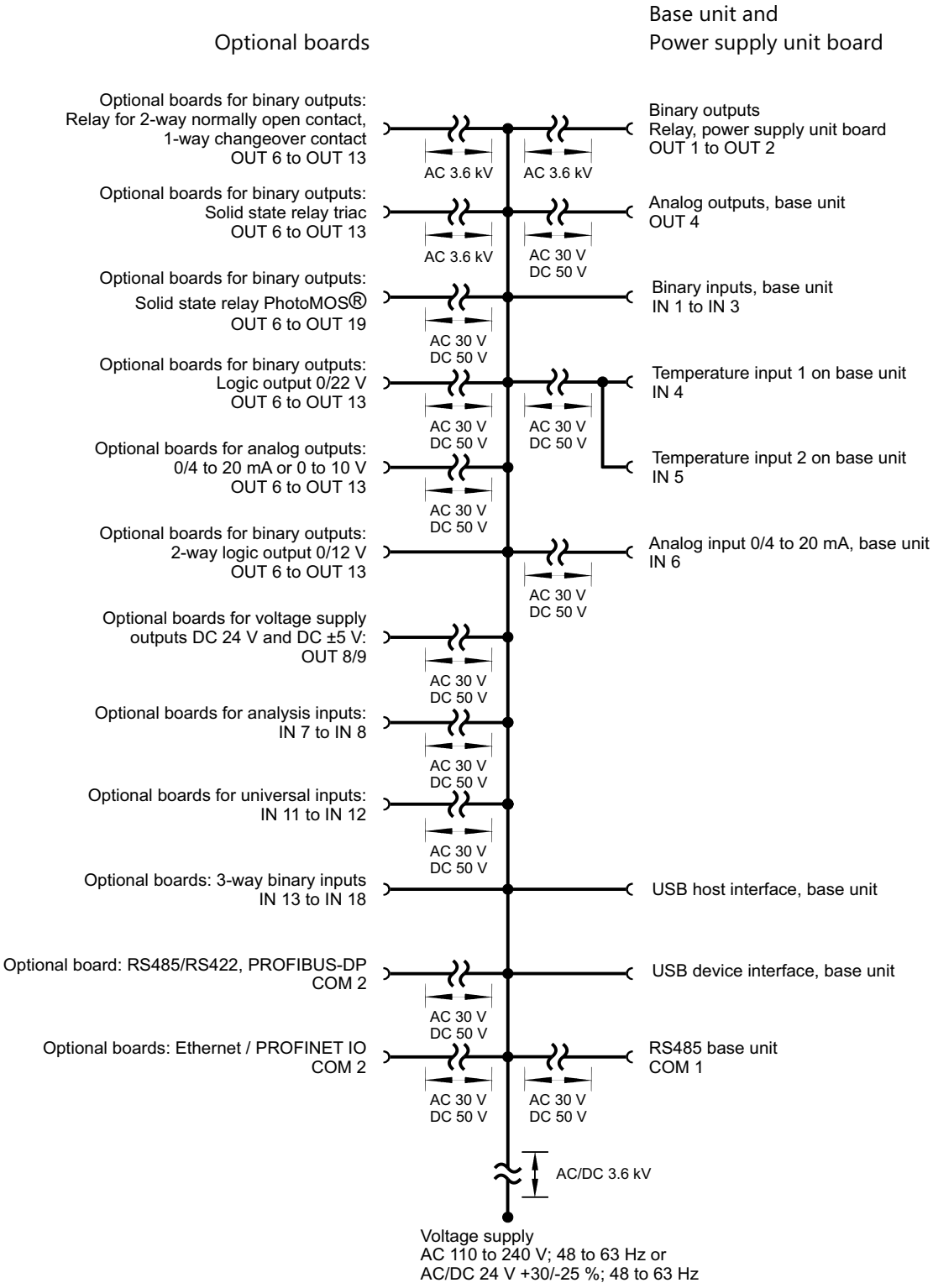
6.2.3 Conductor cross-sections for optional boards

The terminals on optional boards are plug-in screw terminals.

Optional boards for	Ferrule	Conductor cross section		Length to strip
		minimal	Maximum	
Universal inputs Analog outputs Digital inputs Digital outputs PhotoMOS®[a] Logic outputs Voltage supply output	without ferrule	0.14 mm2	1.5 mm^2	7 mm
	with ferrule with lip	0.25 mm^2	0.5 mm^2	7 mm
	Ferrule without lip	0.25 mm^2	1.5 mm^2	7 mm
	Rigid	0.14 mm2	1.5 mm^2	7 mm
Analysis inputs pH/Redox/NH_3 Analysis inputs CR[b] Analysis inputs Ci[c] Digital outputs relay Digital outputs triac	without ferrule	0.2 mm^2	2.5 mm^2	7 mm
	with ferrule with lip	0.25 mm^2	1.5 mm^2	7 mm
	Ferrule without lip	0.25 mm^2	2.5 mm^2	7 mm
	Rigid	0.2 mm^2	2.5 mm^2	7 mm

[a] PhotoMOS® is a registered trademark of Panasonic.
[b] CR analysis inputs = Analysis inputs for resistive conductivity
[c] Analysis inputs Ci = Analysis inputs for inductive conductivity

6.3 Galvanic isolation

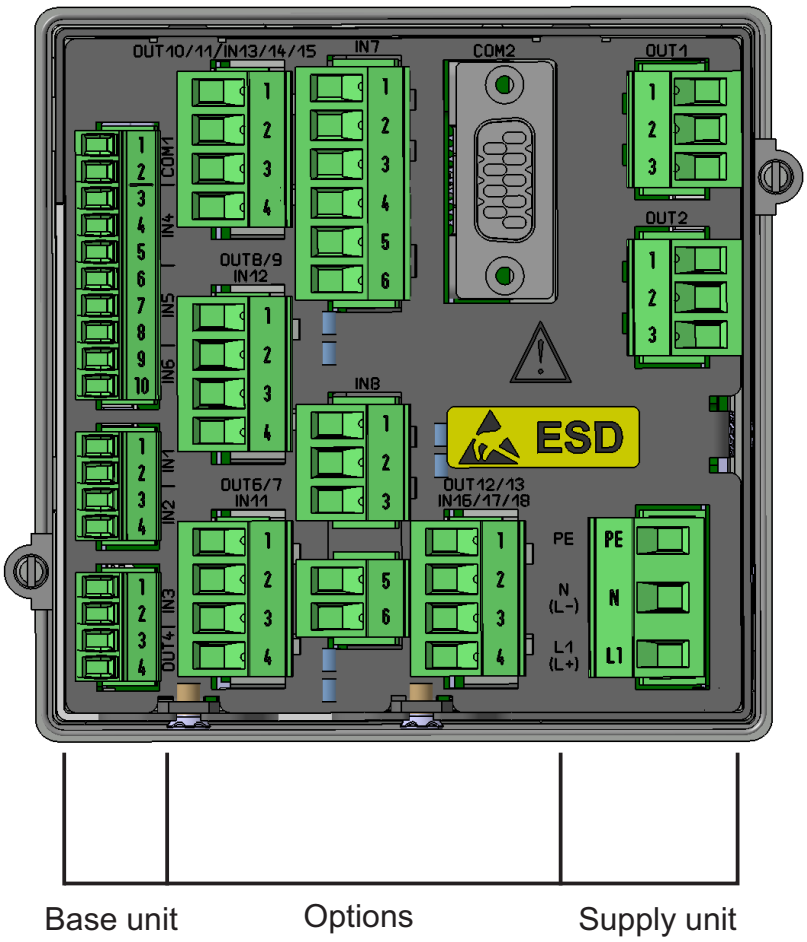


Note!
If sensors that are not electrically isolated are connected to a digital input and supplied by an external power source, potential differences between the internal and external ground can cause problems. Thus, it is preferable to take power from the power outputs of the JUMO AQUIS touch P.

6 Electrical connection

6.4 Connection diagram

6.4.1 Overview of connections



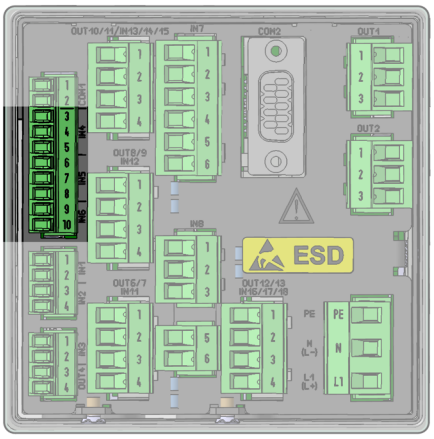
	Module	Connector terminal	Type
Inputs	Base unit	PWR IN	Voltage supply for the device
		IN 1 to IN 3	Digital inputs
		IN 4 to IN 5	Temperature inputs
		IN 6	Universal input
	Option-al boards	IN 7 to IN 8	analysis inputs
	–	IN 9 to IN 10	Not available[a]
	Option-al boards	IN 11 to IN 12	Universal inputs
		IN 13 to IN 18	Digital inputs

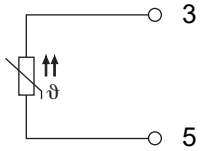
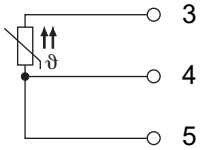
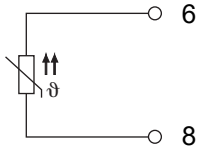
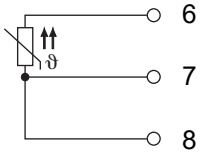
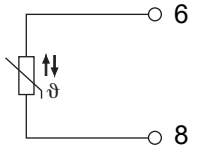
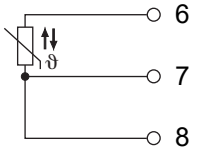
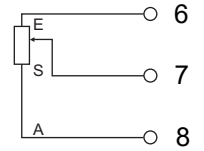
Outputs	Power supply unit	OUT 1 to 2	Digital outputs (relay changeover contact)
	-	OUT 3	Not available[a]
	Base unit	OUT 4	Analog output
	–	OUT 5	Not available[a]
	Option-al boards	OUT 6 to OUT 13	Analog/digital outputs, OUT 8/9 also for voltage supply output DC ±5 V, 24 V
Interfaces	Base unit	COM 1	RS-485
		USB device interface	USB device interface
		USB Host interface	USB Host interface
	Option-al boards	COM 2	Ethernet, PROFINET IO, PROFIBUS-DP or RS422/485

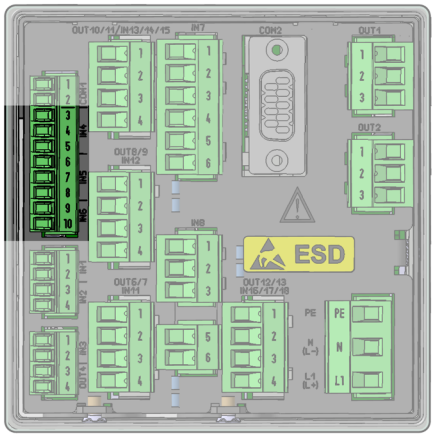
[a] Available only on the AQUIS touch S

6 Electrical connection

6.4.2 Analog inputs base unit



Connector/ terminal	Connection variant	Symbol
IN 4	RTD temperature probe 2-wire circuit Pt100, Pt1000 or customer-specific characteristic line	
	RTD temperature probe 3-wire circuit Pt100, Pt1000 or customer-specific characteristic line	
IN 5	RTD temperature probe 2-wire circuit Pt100, Pt1000 or customer-specific characteristic line	
	RTD temperature probe 3-wire circuit Pt100, Pt1000 or customer-specific characteristic line	
	NTC 2-wire circuit	
	NTC 3-wire circuit	
	Resistance potentiometer A = Start E = End S = Slider	

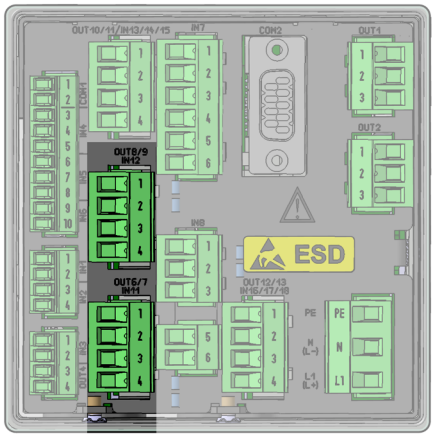


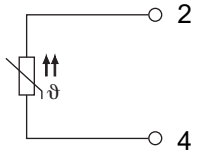
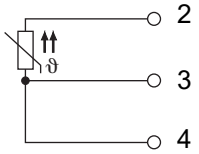
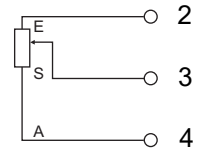
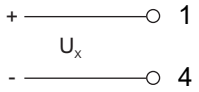
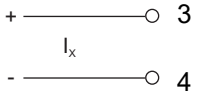
Connector/ terminal	Connection variant	Symbol
IN 6	Standard signal Current 0(4) to 20 mA	+ 9 I_x - 10

6 Electrical connection

6.4.3 Analog inputs optional boards

Universal inputs



Slot	Connection variant	Symbol
IN 11 IN 12	RTD temperature probe 2-wire circuit Pt100, Pt1000 or customer-specific characteristic line	
	RTD temperature probe 3-wire circuit Pt100, Pt1000 or customer-specific characteristic line	
	Resistance potentiometer A = Start E = End S = Slider	
	Standard signal Voltage 0 to 10 V	
	Standard signal Current 0(4) to 20 mA	

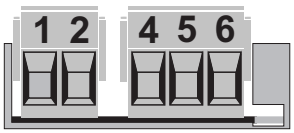
pH/Redox/NH3 analysis inputs

For optional board "analysis pH/Redox/NH3", 2 versions are currently in circulation. The connection diagram contains the connection terminal layout for both version I and version II. To identify the version of your optional board, compare the connection terminal layout to the following illustrations:

I

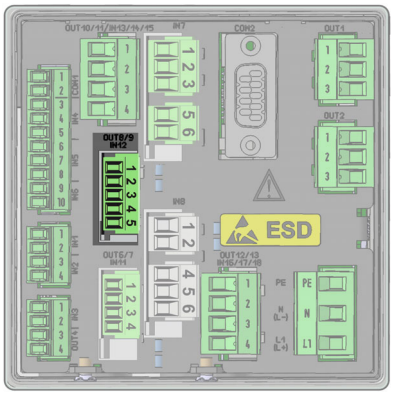


II

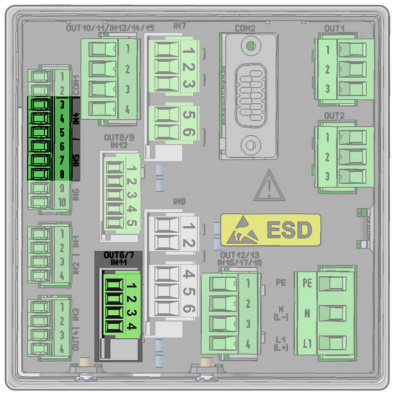


I = First version
II = Revised version

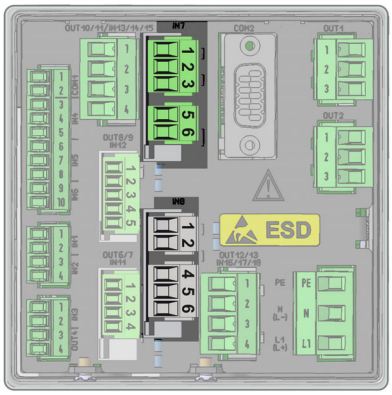
6 Electrical connection



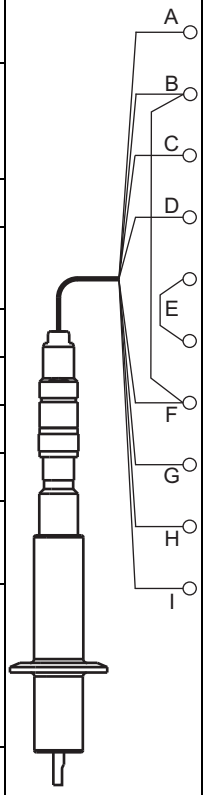
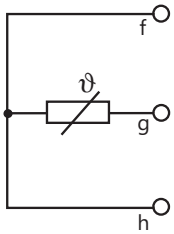
DC ±5 V:
OUT 8/9



Temperature inputs:
IN 4/5/11



Analysis inputs:
IN 7/8

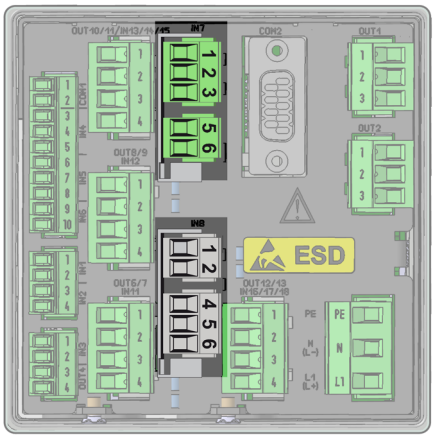
Slot	Option/ connection variant	Wire (color)[a]	Potential	Terminal				Symbol
				DC ±5 V[b]	Temperature input	Analysis input pH/redox		
						I	II	
IN 7 IN 8	ISFET-pH sensor	A (blue)	DC +5 V	3				
		B (black)	GND with jumper to F	4				
		C (green)	DC -5 V	5				
		D (white/ black)	Ion-sensitive gate			1	1	
		E	Bypass			3	4	
						5	5	
		F (yellow)	Reference			6	6	
		G (white)	Compensation thermometer in 3-wire circuit		Connection[c] 			
		H (red/ black)						
		I (red)						
	The RTD temperature probe can be connected to a temperature input or universal input.[d]							

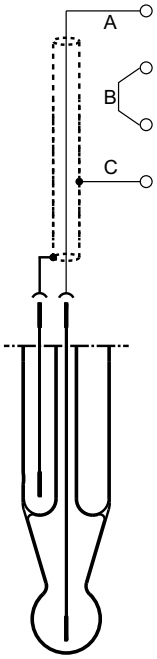
[a] The conductor colors listed refer to JUMO ISFET-pH sensors. The orange-colored conductor is not connected.

[b] The "Voltage supply output DC ±5 V, 24 V" optional board (part no.. 00592963) is needed in slot "OUT 8/9" to supply voltage to the JUMO ISFET pH sensor.

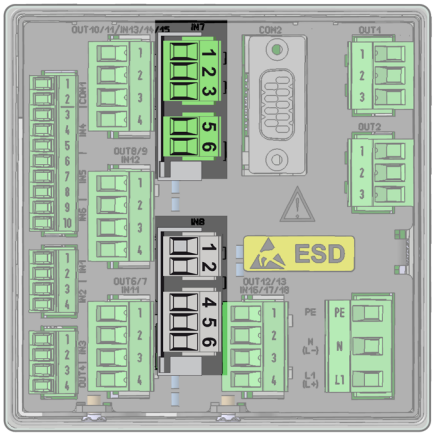
[c] The connection diagram for the selected analog input must be observed when connecting the temperature probe.

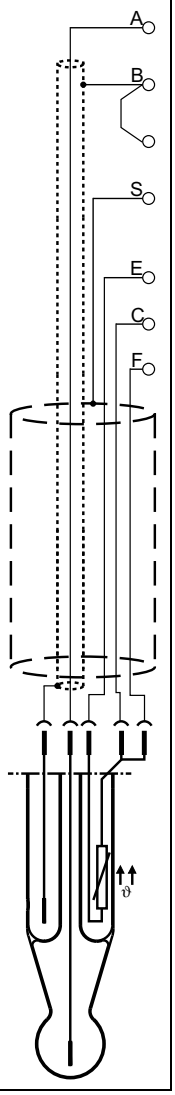
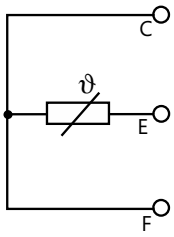
[d] When connecting the temperature probe of JUMO ISFET pH sensors to process connection 615 (NTC 8k55), no customer-specific linearization like that for the JUMO AQUIS 500 pH is needed. The IN 5 temperature input supports connection of 8k55-NTC temperature probes.

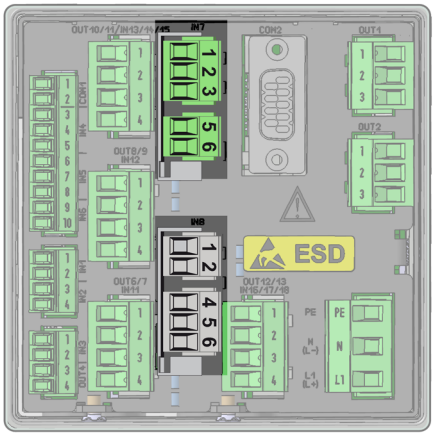


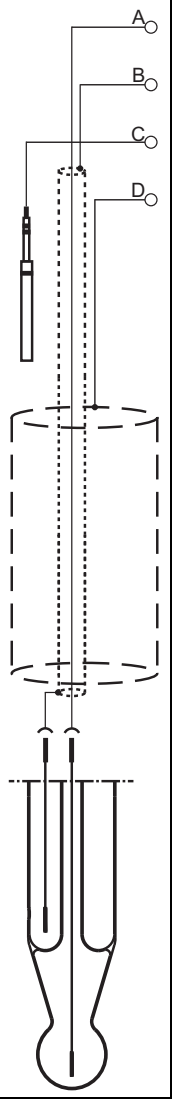
Slot	Option/connection variant	Wire (color)	Potential	Terminal			Symbol
				Temperature input	Analysis input pH/redox		
					I	II	
IN 7 IN 8	pH/redox Asymmetric connection of a combination electrode (Standard connection variant)	A (core)	Glass/metal electrode		1	1	
		B (jumper)	-		3	4	
					5	5	
		C (shield)	Reference electrode		6	6	
	For temperature compensation, a separate temperature sensor can be connected to an analog input.						

6 Electrical connection

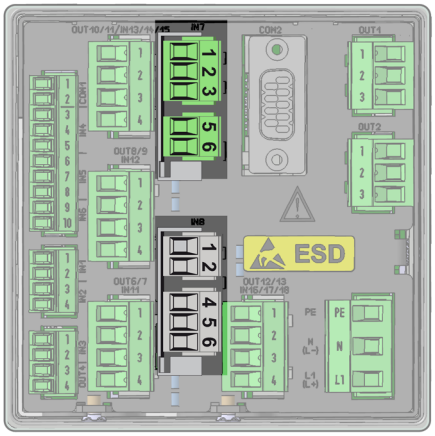


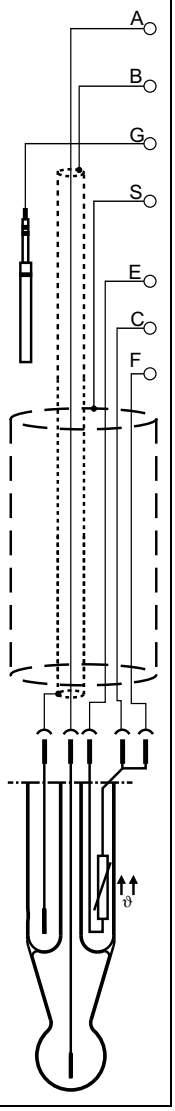
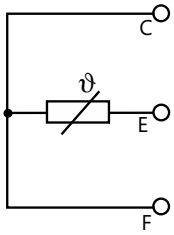
Slot	Option/connection variant	Wire (color)	Potential	Terminal			Symbol
				Temperature input	Analysis input pH/redox		
					I	II	
IN 7 IN 8	pH/redox Asymmetric connection of a combination electrode with integrated RTD temperature probe and VarioPin terminal head	A (core)	Glass/metal electrode		1	1	
		B (inner shield)	Reference electrode		3	4	
					5	5	
		C (gray)	Pt100/1000	Connection[a] 			
		D (blue)	Not used				
		E (white)	Pt100/1000				
		F (green)	Pt100/1000				
		S (outer shield)	Shield		6	6	
	The RTD temperature probe is used to provide a temperature-compensated pH-value measurement, and can be connected to a temperature input or universal input. Terminal 2 at the analysis input is not connected!						



Slot	Option/connection variant	Wire (color)	Potential	Terminal			Symbol
				Temperature input	Analysis input pH/redox		
					I	II	
IN 7 IN 8	pH/redox Symmetric connection of a combination electrode	A (core)	Glass/metal electrode		1	1	
		B (inner shield)	Reference electrode		3	4	
		C (grounding pin, pipe or tank wall at the measuring point)	Liquid potential		5	5	
		D (outer shield)	Shield		6	6	
	Symmetric connection is used to reduce interference from stray electromagnetic fields along the sensor cable. Terminal 2 at the analysis input is not connected!						

6 Electrical connection

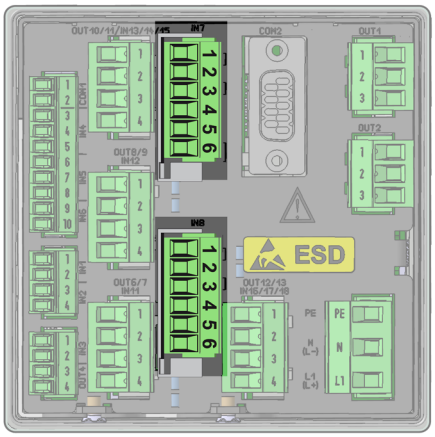


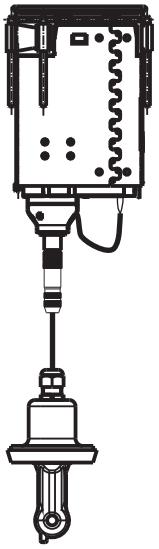
Slot	Option/connection variant	Wire (color)	Potential	Terminal			Symbol
				Temperature input	Analysis input pH/redox		
					I	II	
IN 7 IN 8	pH/redox Symmetric connection of a combination electrode with integrated RTD temperature probe and Vario-Pin terminal head	A (core)	Glass/metal electrode		1	1	
		B (inner shield)	Reference electrode		3	4	
		C (gray)	Pt100/1000	Connection[a] 			
		D (blue)	Not used				
		E (white)	Pt100/1000				
		F (green)	Pt100/1000				
		G (grounding pin, pipe or tank wall at the measuring point)	Liquid potential		5	5	
		S (outer shield)	Shield		6	6	
	Symmetric connection is used to reduce interference from stray electromagnetic fields along the sensor cable. The RTD temperature probe is used to provide a temperature-compensated pH-value measurement, and can be connected to a temperature input or universal input. Terminal 2 at the analysis input is not connected!						

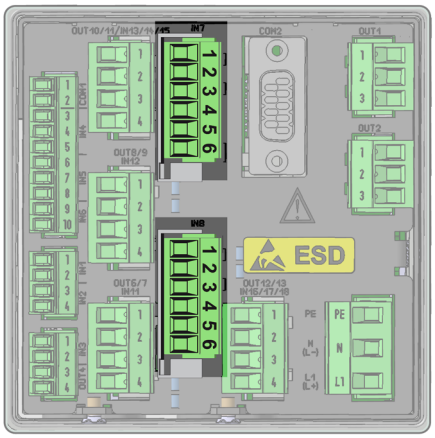
[a] The connection diagram for the selected analog input must be observed when connecting the temperature probe.

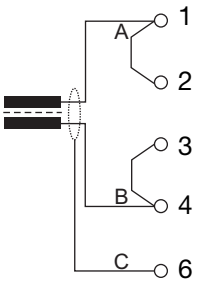
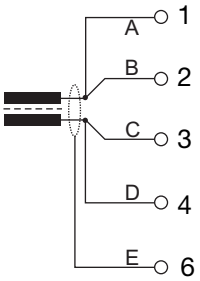
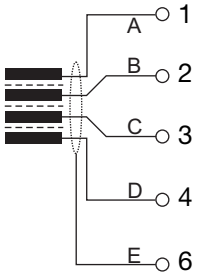
6 Electrical connection

Electrolytic conductivity analysis inputs



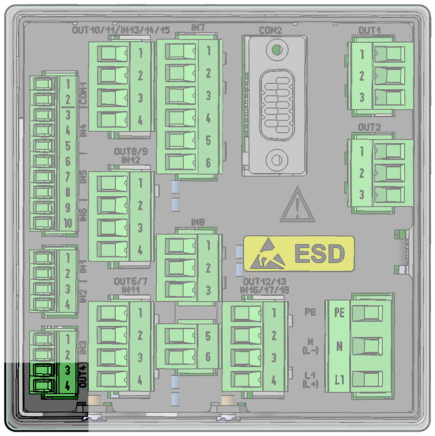
Slot	Option/connection variant	Symbol
IN 7 IN 8	Ci optional board (inductive conductivity measurement) Connection via an M12 plug, Attach connections for compensation thermometer (2-wire cable for socket) to a suitable analog input (2-wire circuit), **The factory-installed wiring must not be changed!**	



Slot	Option/connection variant	Symbol
IN 7 IN 8	CR optional board (conductive conductivity measurement) 2-electrode system with 2-wire conductor Terminal 1 must be connected to the outer electrode on concentric conductivity sensors. A = Outer electrode (core color for JUMO types with fixed cable: White) B = Inner electrode (core color for JUMO types with fixed cable: Brown) C = Shield	
	CR optional board (conductive conductivity measurement) 2-electrode system with 4-wire conductor (Wiring to minimize the measuring error caused by line resistance) Terminal 1 must be connected to the outer electrode on concentric conductivity sensors. A/B = Outer electrode C/D = Inner electrode E = Shield	
	CR optional board (conductive conductivity measurement) 4-electrode system A = Outer electrode 1 (I hi) (core color of CR-4P cable for JUMO types: Red) B = Inner electrode 1 (U hi) (core color of CR-4P cable for JUMO types: Gray) C = Inner electrode 2 (U lo) (core color of CR-4P cable for JUMO types: Pink) D = Outer electrode 2 (I lo) (core color of CR-4P cable for JUMO types: Blue) E = Shield	

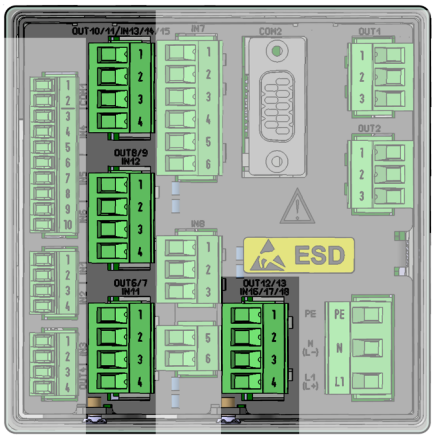
6.4.4 Analog outputs

Base unit



Connector/ terminal	Connection variant	Symbol
OUT 4	Analog output DC 0 to 10 V or DC 0(4) to 20 mA (configurable)	+ ○ 3 U_x / I_x - ○ 4

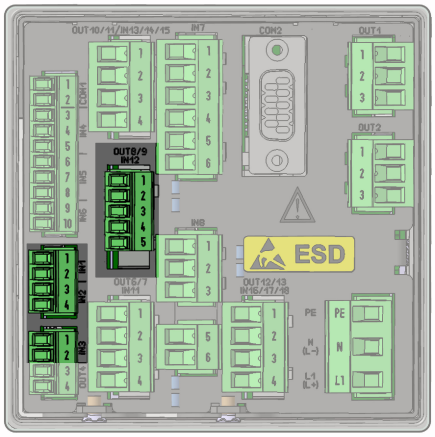
Optional boards

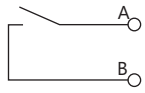
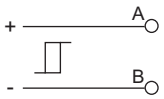
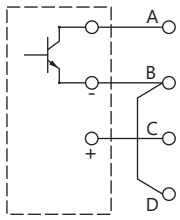
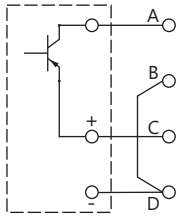


Slot	Option/connection variant	Symbol
OUT 6/7 OUT 8/9 OUT 10/11 OUT 12/13	Analog output DC 0 to 10 V or DC 0(4) to 20 mA (configurable)	+ ○ 1 U_x / I_x - ○ 2

6.4.5 Binary inputs

Base unit

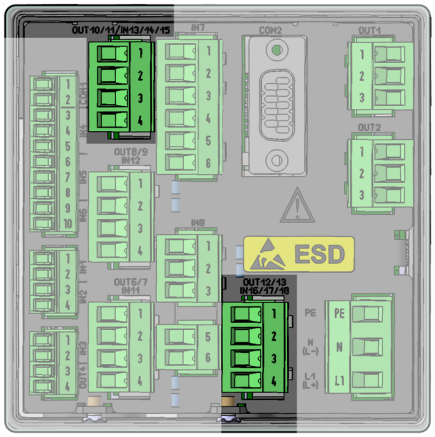


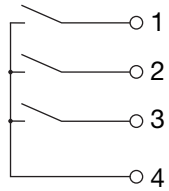
Connector/ terminal	Connection variant	Wire	Potential	Terminal				Symbol
				DC 24 V[a] OUT 8/9	IN 1	IN 2	IN 3	
IN 1 to 3	Digital input (potential-free contact)	A	Potential-free contact		1	3	1	
		B			2	4	2	
	In the digital input configuration, the "Contact" option must be set to "Potential-free contact".							
	Digital input (external voltage source)	A	Logic signal +		1	3	1	
		B	Logic signal -		2	4	2	
	In the digital input configuration, the "Contact" option must be set to "Ext. voltage supply".							
	Digital input (NPN transistor switching output)[b]	A	Switching signal (collector)		1	3	1	
		B	Sensor -		2	4	2	
		C	Sensor +	1				
		D	Sensor -	2				
	In the digital input configuration, the "Contact" option must be set to "Potential-free contact".							
IN 1 to 3	Digital input (PNP transistor switching output)[b]	A	Switching signal (collector)		1	3	1	
		B	Sensor -		2	4	2	
		C	Sensor +	1				
		D	Sensor -	2				
	In the digital input configuration, the "Contact" option must be set to "Ext. voltage supply".							

[a] To provide power to the sensors at DC 24 V, the optional board for power supply voltage (Part No. 00592963)
must be installed in the device.

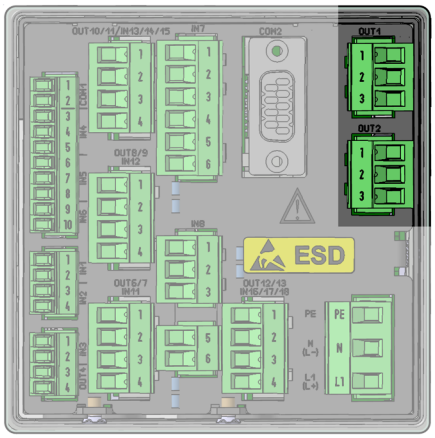
[b] The connection variants for transistor switching outputs (NPN / PNP) are especially important for the flow measurement via impeller sensor (type 406020, part no. 00525530, 00525531) at inputs IN 2 and IN 3 (pulse frequency inputs). However, other sensors with transistor switching output can also be connected.

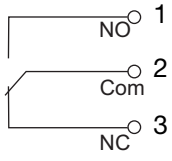
Optional boards



Connector/ terminal	Connection variant	Symbol
IN 13/14/15 IN 16/17/18	3× binary input (potential-free contact)	

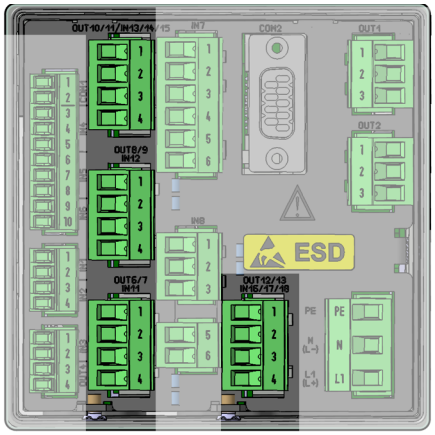
6.4.6 Digital outputs, power supply unit board

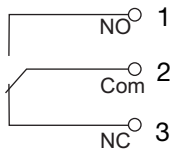
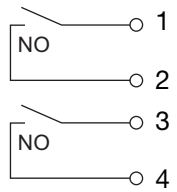
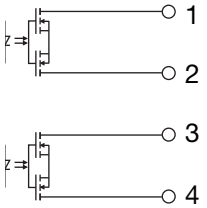
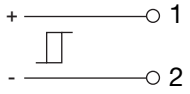
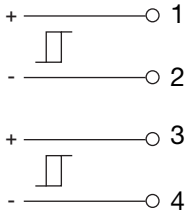


Connector/ terminal	Connection variant	Symbol
OUT 1 OUT 2	Relay Changeover contact	

6 Electrical connection

6.4.7 Digital outputs, optional boards

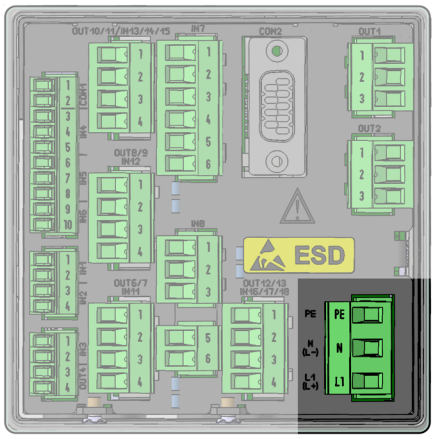


Slot	Option/connection variant	Symbol
OUT 6/7 OUT 8/9 OUT 10/11 OUT 12/13	Relay Changeover contact	
	2× relay Normally open contact	
	Solid state relay triac 230 V/1 A	
	2× solid state relay PhotoMOS®[a]	
	Digital output 0/22 V	
	2× binary output 0/12 V	

[a] PhotoMOS® is a registered trademark of Panasonic.

WARNING!
Combining a mains voltage circuit with a protective low-voltage circuit on the option "dual normally open contacts" is not permissible.

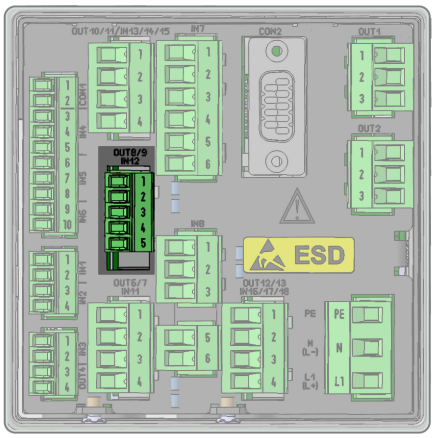
6.4.8 Mains power connection



Connector/ terminal	Connection variant	Symbol
PWR IN	Mains power input	L1 — L1 N — N PE — PE

6.4.9 Voltage supply outputs

Optional board



Slot	Connection variant	Symbol
OUT 8/9	Voltage supply DC 24 V for external transmitters 24 V	+ 1 $U_=$ - 2
	DC ±5 V voltage supply (e.g. for ISFET sensors or JUMO digiLine)	+ 3 $U_=$ ⊥ 4 - 5

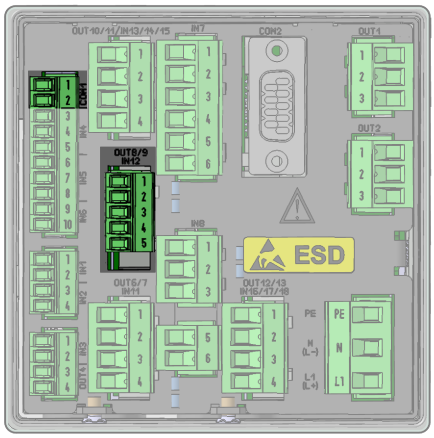
6.4.10 Interfaces for data and bus communication

NOTE

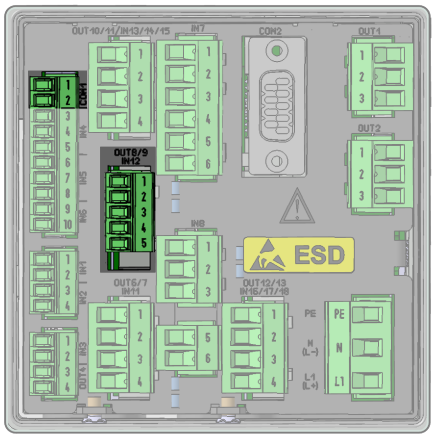
When installing the bus cabling for digital sensors, heed the information regarding line length and number of sensors in the Annex.

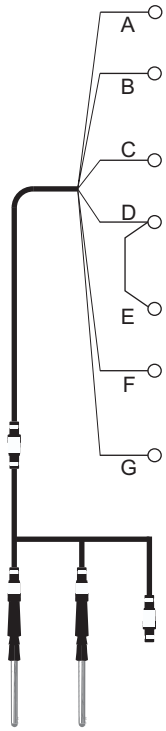
⇨ Chapter 24.2 "Planning the cabling for digital sensors", page 441

Interfaces for data and bus communication - Base unit



Connector/ terminal	Connection variant	Wire (color)	Potential	Terminal			Symbol
				OUT 8/9[a]		COM 1	
				DC ±5 V	DC 24 V		
COM 1	RS-485	RxD/TxD+	RxD/TxD+	-	-	1	RxD/TxD+
		RxD/TxD-	RxD/TxD-	-	-	2	RxD/TxD-



Connector/ terminal	Connection variant	Wire (color)	Potential	Terminal			Symbol
				OUT 8/9[a]		COM 1	
				DC ±5 V	DC 24 V		
COM 1	Digital sensors (Connection to the JUMO M12 master connecting cable)	A (gray)	RxD/TxD+	-	-	1	
		B (black)	RxD/TxD-	-	-	2	
		C (brown)	+5 V	3	-	-	
		D (blue)	GND	4	-	-	
		E (blue)	GND	-	2	-	
		F (white)	+24 V	-	1	-	
		G(black with cable lug for connecting to the grounding)	Shield	Connection screw on the rear sheet metal wall of the device			
	For connection of a JUMO digiLine bus line to operate digital sensors, JUMO offers 5-wire M12 digiLine Master connecting cable. A total of up to 6 digital sensors (JUMO ecoLine/tecLine or sensors with JUMO digiLine electronics) can be operated over a JUMO digiLine bus. The voltage supplies of DC 5 V and DC 24 V for the sensors on the bus are provided by the voltage supply outputs on the device (optional board)[b]. ⇨ Chapter 6.4.9 "Voltage supply outputs", page 54						

[a] To provide power to the digital sensors, the optional board for power supply voltage (Part No. 00592963) must be installed in the device.

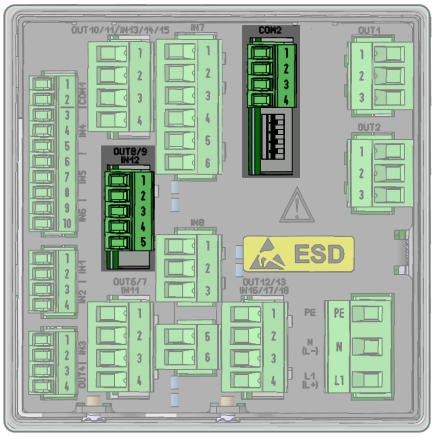
[b] If appropriate, use a JUMO digiLine hub bus distributor for digital sensors (PG 203590). ⇨ Chapter 24.2 "Planning the cabling for digital sensors", page 441



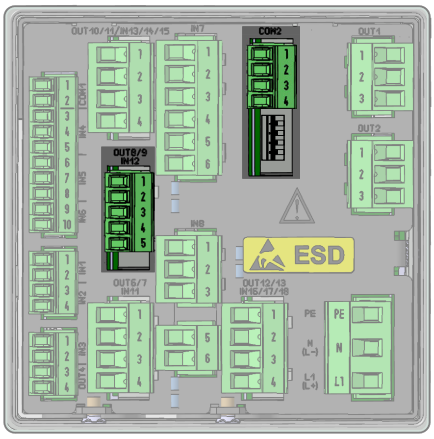
USB device	USB device Type Mini-B (socket)	
USB host	USB host Type A (socket)	

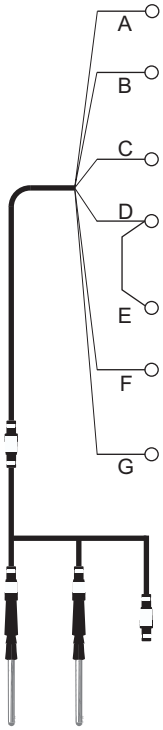
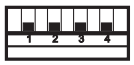
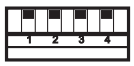
6 Electrical connection

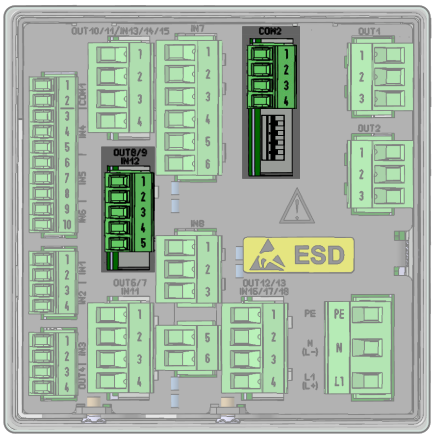
Interfaces for data and bus communication - Optional boards

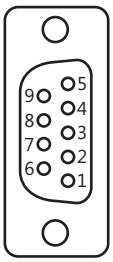
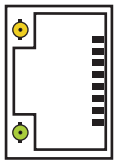
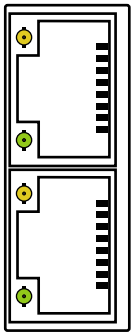


Slot	Option/connection variant	Wire/pin (color)	Potential	Terminal			Symbol
				OUT 8/9[a]		COM 2	
				DC ±5 V	DC 24 V		
COM 2	RS422 terminating resistors with DIP switches on optional board configurable	RxD+	RxD+	-	-	1	RxD+
		RxD-	RxD-	-	-	2	RxD-
		TxD+	TxD+	-	-	3	TxD+
		TxD-	TxD-	-	-	4	TxD-
	RS485 terminating resistors with DIP switches on optional board configurable	RxD/TxD+	RxD/TxD+	-	-	3	RxD/TxD+
		RxD/TxD-	RxD/TxD-	-	-	4	RxD/TxD-



Slot	Option/connection variant	Wire/pin (color)	Potential	Terminal			Symbol
				OUT 8/9[a]		COM 2	
				DC ±5 V	DC 24 V		
COM 2	Digital sensors Connection to optional board: RS422/485 serial interface with JUMO M12 master connecting cable	A (gray)	RxD/TxD+	-	-	3	
		B (black)	RxD/TxD-	-	-	4	
		C (brown)	+5 V	3	-	-	
		D (blue)	GND	4	-	-	
		E (blue)	GND	-	2	-	
		F (white)	+24 V	-	1	-	
		G(black with cable lug for connecting to the grounding)	Shield	Connection screw on the rear sheet metal wall of the device			
	For connection of a JUMO digiLine bus line, JUMO offers 5-wire M12 digiLine master connecting cable. Up to 6 digital sensors (JUMO ecoLine/tecLine or sensors with JUMO digiLine electronics) can be operated over a JUMO digiLine bus. The voltage supplies of DC 5 V and DC 24 V for the sensors on the bus are provided by the voltage supply outputs on the device (optional board)[b]. ⇨ Chapter 6.4.9 "Voltage supply outputs", page 54						
	Located on the front of the serial interface RS422/485 optional board are DIP switches for setting the terminating resistors: with terminating resistors  without terminating resistors 						



Slot	Option/connection variant	Wire/pin (color)	Potential	Terminal			Symbol
				OUT 8/9[a]		COM 2	
				DC ±5 V	DC 24 V		
COM 2	PROFIBUS-DP 3 = RxD/TxD-P 5 = DGND 6 = VP 8 = RxD/TxD-N	3	RxD/TxD-P	-	-	-	
		5	DGND	-	-	-	
		6	VP	-	-	-	
		8	RxD/TxD-N	-	-	-	
	Ethernet Type RJ 45 (socket)	-	-	-	-	-	
	PROFINET IO 2 switch ports RJ-45 (sockets)	--	-	-	-	-	

[a] To provide power to the digital sensors, the optional board for power supply voltage (Part No. 00592963) must be installed in the device.

[b] If appropriate, use a JUMO digiLine hub bus distributor for digital sensors (PG 203590). ⇨ Chapter 24.2 "Planning the cabling for digital sensors", page 441

NOTE

Only 1 serial interface per device can be used for JUMO digiLine (⇨ Chapter 10.21 "Serial interfaces", page 218).
A maximum of 6 sensors can be connected to the selected interface.

6 Electrical connection



WARNING!

Prior to startup, ensure that the device has been installed and connected properly and
in compliance with the installation instructions. Observe the safety instructions in this description.
⇨ Chapter 1 "Safety information", page 7



CAUTION!

A buffer battery is built into the device. Its purpose is to maintain data when the device is switched off or if the voltage supply is interrupted. If the battery approaches the end of its operating life (approximately 7 years) then a battery prealarm will indicate that status. When the battery is empty a battery alarm will indicate that status. The battery must be exchanged before it is empty. The battery must be exchanged by the JUMO Service department! In this case, send in the device!



CAUTION!

The touchscreen must not be operated with sharp or pointed objects, as these could damage the protective film and the touchscreen.

7.1 Initial startup

Step	Action
1	Switch on the supply voltage to the device and wait until it has booted up.
2	Select the operating language.
3	Log in as user "Master" or "Service" in order to have access to the configuration in the device menu. ⇨ Chapter 8.2.1 "Log-on/Log-out", page 89
4	Make all the settings required for a basic setup. ⇨ Chapter 7.2 "Basic setup", page 64
5	Configure the analog and digital inputs you wish to use. ⇨ Chapter 10.5 "Analog inputs", page 143 ⇨ Chapter 10.7 "Digital inputs of base unit and optional boards", page 158
6	Check the hardware functions of the device. ⇨ Chapter 7.4 "Function test", page 72
7	Calibrate the analysis sensors connected to the device if necessary. ⇨ Chapter 12 "Calibration in general", page 235
8	The device is now ready for use. You can configure the displays and functions of the device according to your needs.

7.2 Basic setup

This chapter deals with the most important settings for initial startup of the device. The installation instructions discuss the settings for:

- Analog and digital inputs
- Display and visualization of the input signals on overview screens and individual screens
- Analog and digital outputs

You are now able to activate basic functions such as measuring, alerting, and transmitting analog values in the form of a standard signal to other measuring and control systems, both open- and closed-loop.
The complete range of device functions is described in the operating manual.

⇨ see JUMO AQUIS touch P operating manual

7.2.1 Date and time

The date and time settings are made in the "Parameterization" menu.

The following table explains the parameters for setting the date and time.

Parameter	**Selection/ setting option**	**Explanation**
Current date/time	Date/time entry dialog	Setting the current date and time
Time zone GMT	-720 to +720 min	Difference between local time and GMT
Switch daylight saving time	inactive, automatic	Automatic switch from daylight saving time to standard time
Start DST		
• Month	January to December	Month for switch to daylight saving time
• Day of the week	Monday to Sunday	Weekday for switch to daylight saving time
• Day in month	first second third fourth last	Number of the selected weekday for switch to daylight saving time in the respective month
• Time	hh:mm:ss	Time to switch to daylight saving time
End DST		
• Month	January to December	Month to switch to standard time
• Day of the week	Monday to Sunday	Weekday to switch to standard time

Parameter	Selection/ setting option	Explanation
• Day in month	first second third fourth last	Number of the selected weekday for switch to standard time in the respective month
• Time	hh:mm:ss	Time to switch to standard time

7.2.2 Basic settings

The "Basic Settings" menu of the device contains a set of basic device settings that must be made when starting up the device.

Device Menu > Configuration > Basic Settings



NOTE

Settings in the "Configuration" menu can be changed only if a user with corresponding user rights is logged in.

⇨ Unbekannte Quelle des Querverweises

Explanations of the individual configuration items in the "Basic Settings" menu can be found in the chapter on configuration.

⇨ Unbekannte Quelle des Querverweises

7.3 Digital sensors

NOTE

For operation of digital sensors, you need the extra code "JUMO digiLine protocol activated“ (⇨ Chapter 4.2 "Order details", page 16)

7.3.1 Initial startup

Sensors with JUMO digiLine electronics

NOTE

Only one serial interface of the device can be configured for operation of digital sensors. If your device has 2 serial interfaces (base unit and possibly an optional board), select 1 interface for connection of digital sensors and set its protocol to "Modbus digital sensors".

Thanks to plug & play, startup of sensors with JUMO digiLine electronics is very simple. As soon as a JUMO sensor with digiLine electronics is connected to the bus, the JUMO AQUIS touch P detects and links it to an available (not yet linked) and suitably configured input for digital sensors. The status of the link can be checked in the assignment table. If, prior to connection of the sensor, no input for digital sensors was configured with a suitable sensor type, this can also be done after connection of the sensor. Automatic linking of the sensor to the input for digital sensor occurs here as well. If several sensors of the same kind need to be put into operation, they must be put into operation individually in succession or the link must be established manually in the device menu.
For a sensor to be linked automatically to an input for digital sensors, the following conditions must be met:

- An available (unlinked) input for digital sensors must be configured for the sensor type of the sensor being connected. This can be checked by viewing the assignment table. All configured inputs for digital sensors are listed there with configuration information and link status.
- The sensor type listed for the configured input for digital sensors must match the type of sensor being connected.
- If "TAG check" is activated in the configuration of linkable inputs for digital sensors, the "Sensor TAG" must match the "TAG number" in the JUMO digiLine electronics of the sensor.

Viewing the assignment table:
⇨ Chapter 8.2.7 "Digital sensors", page 95
Manual linking:
⇨ Chapter "**Procedure for manual linking of digital sensors**", page 98
Configuring the inputs for digital sensors:
⇨ Chapter 8.2.7 "Digital sensors", page 95

The following table describes the startup procedure for an individual JUMO sensor with JUMO digiLine electronics.

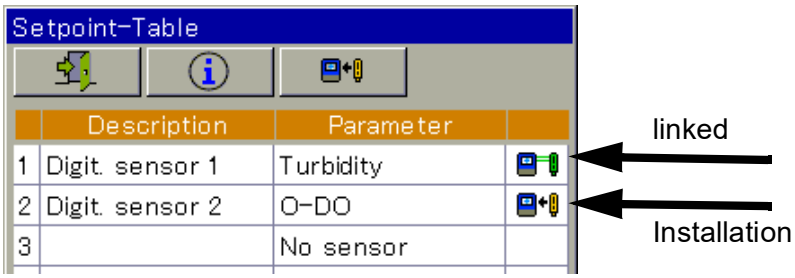
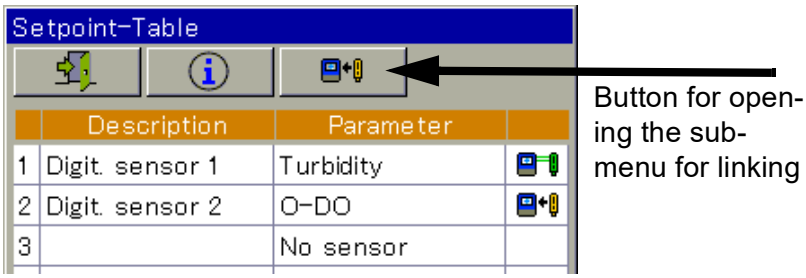
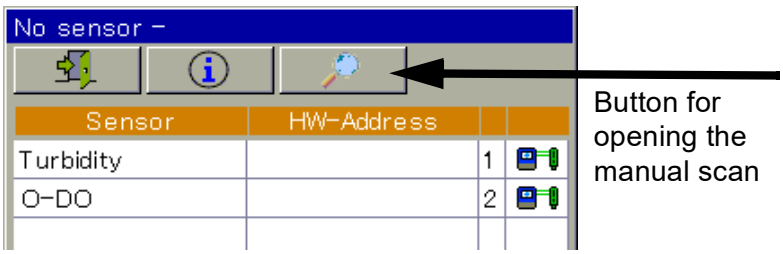
Step	Action
1	Log in as user "Master" or "Service" in order to have access to the configuration in the device menu. ⇨ Chapter 8.2.1 "Log-on/Log-out", page 89
2	Ensure that the serial interface being used for operation of digital sensors is configured correctly. The protocol must be set to "Modbus digital sensors".
3	Open the configuration of the digital sensors, select an available output for digital sensors and enter the type information for the sensor being connected. Open the configuration of the digital sensors: Device Menu > Configuration > Digital Sensors 1 to 6 > General
4	Open the assignment table for the digital sensors and check whether an entry exists for the input for digital sensors that was just configured. The line number must match the number of the input for digital sensors and the assignment table entry must show the status "Installation". The status is visualized by symbols in the right column of the assignment table. Open the assignment table: Device Menu > Digital Sensors ⇨ Chapter 8.2.7 "Digital sensors", page 95
5	Connect the sensor with JUMO digiLine electronics to the bus.
6	Check whether the assignment table entry has changed from "Installation" to "linked". If this is not the case after a waiting period of about 10 seconds, linking has failed. In case of an error, check the correctness of the configuration and bus cabling (⇨ Chapter 24.1 "Troubleshooting and remedies for digital sensors", page 435). For diagnosis, it is helpful to display more information about the assignment table entry. To display the information, press the "Info" button. This opens a text window in which, among other things, the most recent bus fault is displayed. ⇨ Chapter 8.2.7 "Digital sensors", page 95

Digital JUMO ecoLine and tecLine sensors

NOTE
Only one serial interface of the device can be configured for operation of digital sensors. If your device has 2 serial interfaces (base unit and possibly an optional board), select 1 interface for connection of digital sensors and set its protocol to "Modbus digital sensors" and the baud rate to "9600".

Digital JUMO ecoLine and tecLine sensors can communicate with the JUMO AQUIS touch P over the JUMO digiLine bus just like sensors with JUMO digiLine electronics. However, they do not support plug & play and must be put into operation in another way. The following table describes the startup procedure for an individual digital JUMO ecoLine or tecLine sensor.

Step	Action
1	Log in as user "Master" or "Service" in order to have access to the configuration in the device menu. ⇨ Chapter 8.2.1 "Log-on/Log-out", page 89
2	Ensure that the serial interface being used for operation of digital sensors is configured correctly. The required settings are: **Protocol:** Modbus digital sensors **Baud rate:** • JUMO ecoLine: 9600 • JUMO tecLine: 9600, 19200 or 38400 (automatic) **Data format:** 8 - 1 - no parity
3	In the configuration, select an available input for digital sensors and enter the type information in the "General" folder of the sensor being connected. Open the menu: Device Menu > Configuration > Digital Sensors > Digital Sensors 1 to 6 > General ⇨ Chapter 7.3 "Digital sensors", page 67
4	Open the assignment table for digital sensors in the device menu. Open the assignment table: Device Menu > Digital Sensors ⇨ Chapter 8.2.7 "Digital sensors", page 95
5	Localize the entry whose number (1 to 6) matches that selected in step 1 and in the configured input for digital sensors.

Step	Action
6	Check whether this entry has the status "Installation". If this is not the case, check the configuration of the selected input for digital sensors. Example of view showing the status of assignment table entries:  ⇨ Chapter 8.2.7 "Digital sensors", page 95
7	Connect the sensor to the JUMO digiLine bus.
8	Highlight the prepared assignment table entry (status "Installation") by tapping it.
9	Open the "Link" submenu and highlight the assignment table entry that was just created by tapping it.  ⇨ Chapter 8.2.7 "Digital sensors", page 95
10	Using the "Scan Button", start a sensor scan and wait until the sensors scan is completed. If the sensor was detected, it will appear in the list of this menu with its status.  ⇨ Chapter 8.2.7 "Digital sensors", page 95
11	Leave the "Link" submenu by pressing the "Exit" button. This takes you back to the display of the assignment table.

Step	Action
12	Check whether the assignment table entry has changed from "Installation" to "linked". If this is not the case after a waiting period of about 10 seconds, linking has failed. In case of an error, check the correctness of the configuration and bus cabling (⇨ Chapter 24.1 "Troubleshooting and remedies for digital sensors", page 435). For diagnosis, it is helpful to display more information about the assignment table entry. To display the information, press the "Info" button. This opens a text window in which, among other things, the most recent bus fault is displayed. ⇨ Chapter 8.2.7 "Digital sensors", page 95

7.3.2 Restarting

Sensors with JUMO digiLine electronics

A JUMO digiLine electronics assembly that was disconnected from the bus for maintenance and repair is detected again automatically upon reconnection, linked to its original assignment table entry and resumes operation.
When replacing JUMO digiLine electronics assemblies, each electronics assembly must be replaced individually before the next one is disconnected from the bus. In this way, each new JUMO digiLine electronics assembly is linked automatically with the original assignment table entry.

JUMO ecoLine and JUMO tecLine sensors

A digital **JUMO ecoLine or JUMO tecLine sensor** that was disconnected from the bus for maintenance and repair is detected again automatically upon reconnection, linked to its original assignment table entry and resumes operation.
When replacing digital **JUMO ecoLine or JUMO tecLine sensors**, it is necessary to follow the initial startup procedure to put the new digital sensors into operation (⇨ Chapter 7.3.1 "Initial startup", page 67).

7.4 Function test

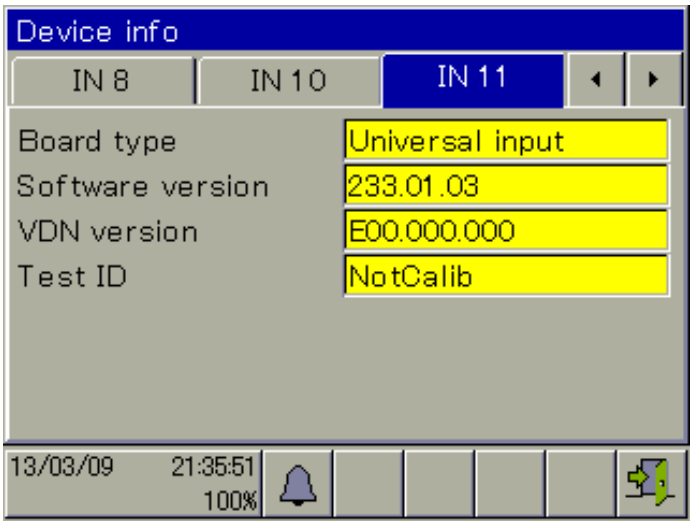
Important hardware information is displayed in the "Device Info" menu.
The functionality of the device can be checked from here.

7.4.1 Checking the optional boards

Open the hardware information for the installed optional boards as follows:
Device Menu > Device Info > Slots

A tab with hardware and software information for each correctly installed optional board now appears.

Sample screen: Hardware Information for an optional board "Universal input"



If no tab appears for an optional board, the board was not recognized and there is a hardware problem. In such cases, check whether the optional board concerned was installed correctly.

⇨ Chapter 9.1 "Installing optional boards", page 111
If this is not successful, contact Technical Support at JUMO.
The contact data can be found on the back of these installation instructions.

7.4.2 Checking sensors and inputs/outputs

To check correct operation of all inputs/outputs, you can display the current analog and binary values.

Device Menu > Device Info > Inputs/Outputs

Depending on the type of input, up to 2 columns will be visible in the Device Info screens for inputs.

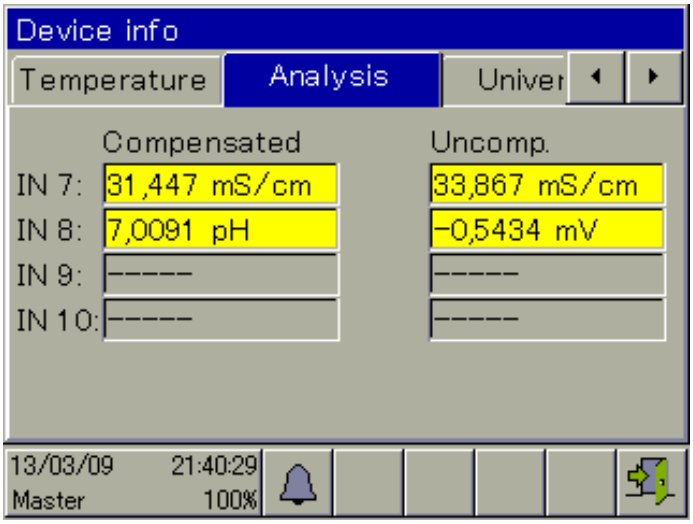
- **Compensated:** Display value that is calculated from the value measured by the sensor through use of an appropriate compensation method and after taking the corresponding calibration values into account.
  This suppresses incorrect measured values that can be caused by outside factors (e.g. temperature) or sensor wear (e.g. a dirty electrode).

- **Uncompensated:** Value measured by sensor (raw value of the measurement input, e.g. pH measuring chain voltage)
  These sensor values are subject to distortion caused by outside factors. Display of uncompensated values is used primarily for diagnostic purposes. The compensated values are used for the actual measurement of analysis variables.

The following example considers analysis inputs in the form of a conductivity measurement input and a pH measurement input.
The device calculates the (compensated) values of the process variable from the (uncompensated) raw measurement data.

Sample screen:
IN 7 measures conductivity
IN 8 measures pH value

IN 9 to 10 are available only



7 Startup

8.1 Operating concept

This chapter explains how to use the functions at the operating level (e.g. controller and data monitor) and access the menu structure for editing device settings. The JUMO AQUIS touch P is operated by means of the touchscreen, using either a finger or stylus with a soft, rounded plastic tip.



CAUTION!

The touchscreen must not be operated with sharp or pointed objects, as these could damage the protective film and the touchscreen.



CAUTION!

Use only a soft cloth to clean the touchscreen. Commercially available cleaners may contain substances that damage the protective film and the display.



NOTE

Operation depends on the user's rights. Operating and setting options are restricted, depending on the user who is logged in.

The "Master" and "Service" users have access to all menus and functions (default setting).

⇨ Chapter 8.1.1 "Passwords and user rights", page 75

8.1.1 Passwords and user rights

The device has 4 users with factory-configured user names, passwords, and user rights. The passwords can be changed in the device.
⇨ Chapter 8.2.1 "Log-on/Log-out", page 89

The JUMO PC setup program is needed to change user names and user rights.

⇨JUMO AQUIS touch P operating manual for user management

The following table provides an overview of the factory-set user accounts.

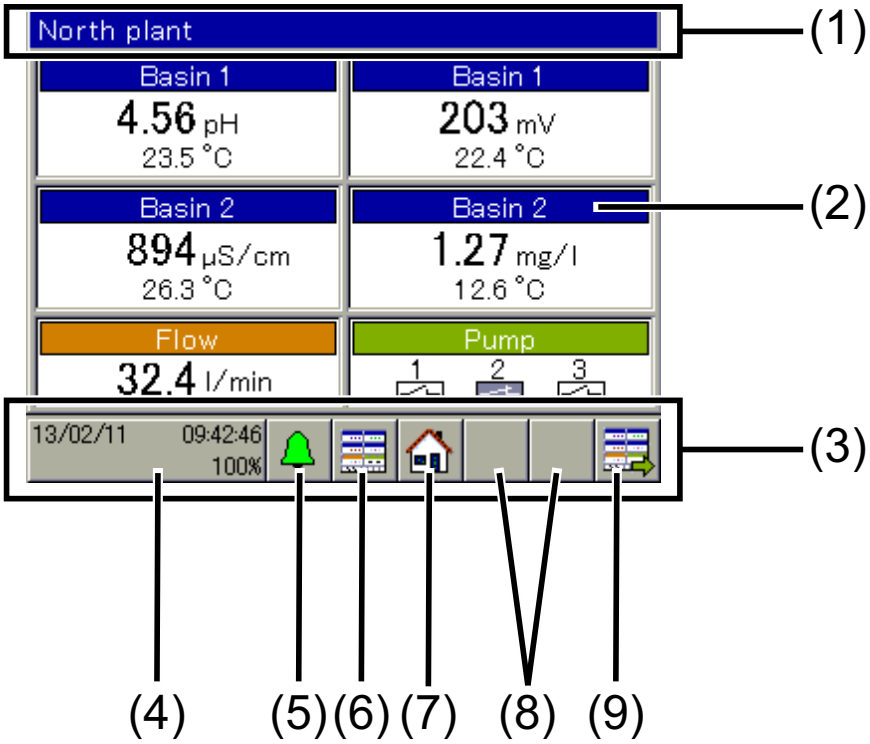
Factory-set passwords

Users	Everyone	User 2	User 1	Service	Master
Factory-set password	-	20	110	3000	9200

Factory-set user rights

User rights \ Users	Every-one	User 2	User 1	Service	Master
Display of: • Current measuring values on overview and detailed screens • Configuration data • parameters • Device info	X	X	X	X	X
Display of: • History of measurement data in the record-ing function • Event and alarm list • Service data **User actions** • Acknowledge alarms • Calibration • Read out history of measurement data in the recording function • Display and change user level parameters • Read out service data • Link digital sensors manually		X	X	X	X
User actions • Operate control functions **Change settings** • Changing the settings at the perimeter level • Set date and time **Configuration** • Initialize calibration			X	X	X
Configuration • Configuration of all functions • Activate extra codes				X	X

8.1.2 Display and control elements



(1) Title bar

(2) Touchscreen

(3) Toolbar with buttons for operation

(4) "Device menu" button with display of:

- Date and time
- Logged-in user
  ("Master" in the example)
- Remaining memory display in percent for recording function
  (in the example: 100 %)

(5) "Alarm/Event List" button

(6) "Select operator screen" button (direct selection of the desired operation screen)

(7) "Home" button (back to main screen)

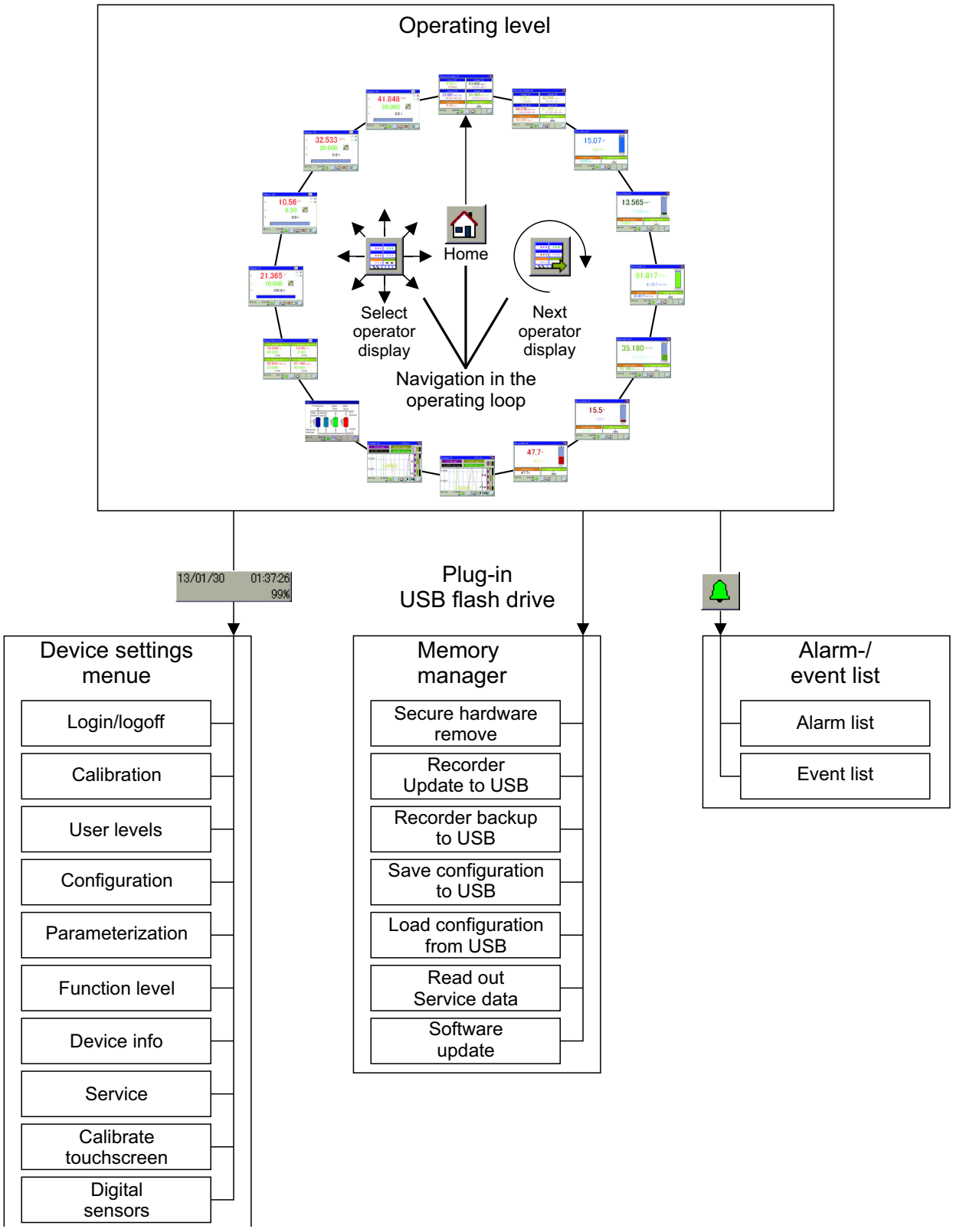
(8) Placeholder for context-sensitive buttons
Assignment depends on the particular operator screen.
Specific buttons are shown in the placeholders on the operation screens for the controller and recording functions.
⇨ JUMO AQUIS touch P operating manual, chapter on controller and recording function

(9) "Next operation screen" button (for scrolling through operator screens)

8.1.3 Menu structure

At the **operating level,** 3 different navigation buttons are available to select appropriate screens for display and control of device functions.
The **"Device menu"** and **"Alarm/event list"** menu levels are also displayed by means of corresponding buttons. The device menu contains submenus for setting, servicing, and diagnosing the device and its functions.
The **memory manager** opens automatically as soon as a USB flash drive is inserted into the USB host interface. It exchanges data between the device and the flash drive.

Overview of the menu structure





NOTE

The "Recorder Update to USB" and "Recorder Backup to USB" items appear in the "Memory Manager" menu only if the extra "Recording function" is enabled.

⇨ Chapter 4.2 "Order details", page 16

Operation screens in the operation loop in the example

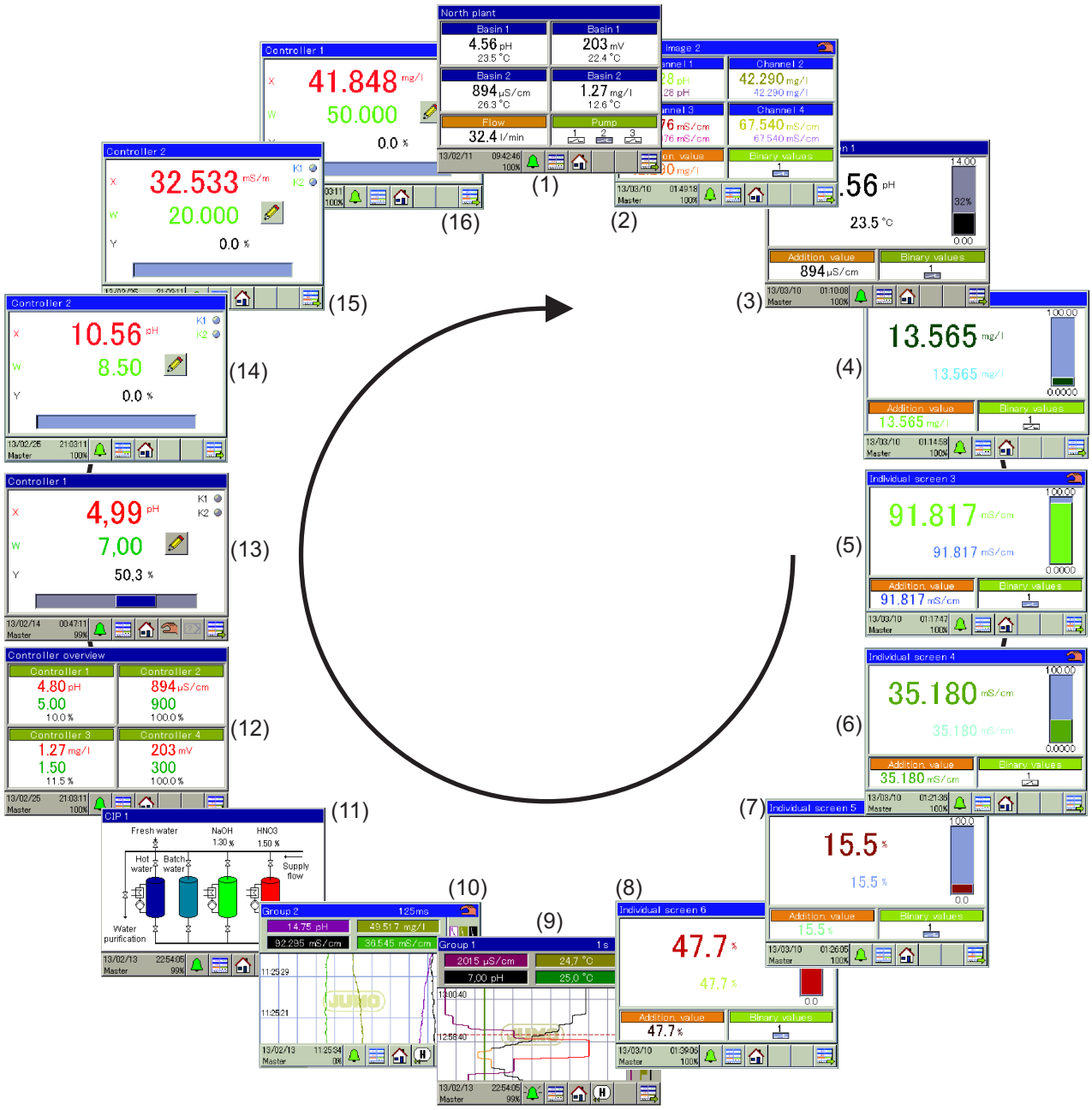


Figure	Operator screen	Description
(1)	General screen 1	User configurable overview display of measuring values and digital signal states The overviews can be configured as a 2-part screen or a 4-part screen. **2-part screen:** Display of 2 primary and 2 secondary measured values per screen, 1 additional measured value and 3 binary values. **4-part screen:** Display of 4 primary and 4 secondary measured values per screen, 1 additional measured value and 3 binary values.
(2)	General screen 2	

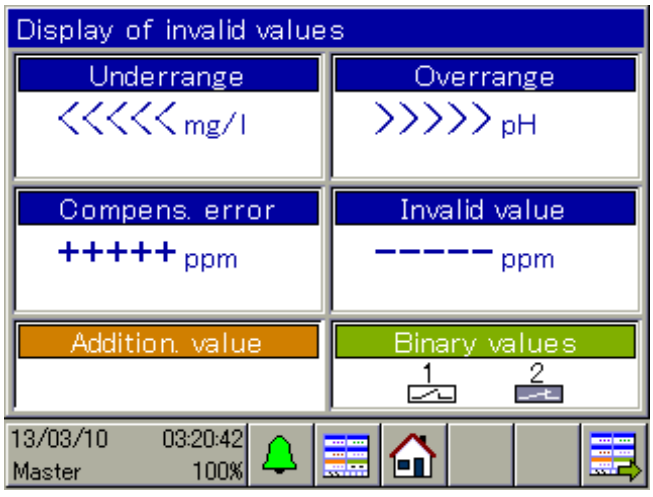
Figure	Operator screen	Description
(3)	Detailed screen 1	User configurable large-section screen Display of 1 main measuring value, 1 second measuring value, 1 additional value and up to 3 binary values, as well as additional visualization of the main measuring value and the alarm limits for an analog input with a bar graph
(4)	Detailed screen 2	
(5)	Detailed screen 3	
(6)	Detailed screen 4	
(7)	Detailed screen 5	
(8)	Detailed screen 6	
(9)	Diagram group 1	Up to 4 analog measured values and 3 binary functions can be displayed on a configurable recorder screen (group). Up to 4 groups can be set up. Diagrams of disabled groups are not available in the operation loop (here in the figure this applies to groups 3 and 4).
(10)	Diagram group 2	
(11)	Process screens 1 to 8	User-defined visualization screen that is user configurable by means of an editor in the PC setup program ⇨ Operating Manual JUMO AQUIS touch P With the aid of static and dynamic graphic and display elements for analog and binary values, it is possible to create a screen that displays the process flow concerned in an especially vivid manner. If no process screen is configured, none is available for the operation loop.
(12)	Controller overview	The active controller channels are visualized here in an overview display. The controller overview becomes available as part of the operating loop only if at least 2 controllers are activated. The current setpoint values, actual values and output levels are displayed for all active controllers. In addition, the operating states of the controllers are displayed (manual mode, hold, self-optimization).
(13)	Controller screen Controller 1	The controllers are visualized in detail on the controller screens. The controller screens are available as part of the operation loop only for the respectively configured channels. The information displayed includes the current setpoint value, actual value and output level. The binary values of switching controller outputs are visualized. In addition, controls for setpoint value entry, manual output level control and self-optimization are available. Access to the operating functions depends on the user rights of the logged-in user.
(14)	Controller screen Controller 2	
(15)	Controller screen Controller 3	
(16)	Controller screen Controller 4	

Display of invalid values

Invalid input signals/measured values or errors in the analog input configuration are detected and shown in the measured value displays as follows:

Type of error	Display
underrange: measuring range underflow	<<<<<
overrange: measuring range overflow	>>>>>
Compensation error: An error occurred when compensating for factors affecting the measurements of the analysis. It is necessary to check the measuring circuits and settings of the compensation signals and the configuration of the analysis measurement input affected.	+++++
Invalid display value Possible errors include: **Incorrect input signal:** An analog input has an incorrect signal or an analog input was selected for which an optional board is not even present. **Errors with digital sensors:** A digital sensor does not deliver valid values because it either is not correctly linked or a scan is in progress on the JUMO digiLine bus. **Error in the formula used by the mathematics module:** The result from a formula is invalid (e.g. division by zero) The extra code "Mathematics and Logic Module" is explained in the operating manual for the JUMO AQUIS touch P ⇨ JUMO AQUIS touch P operating manual	-----
Display overrun: The value to be displayed is outside the limits of -99999 to 99999.	*****

Example of display of invalid values:



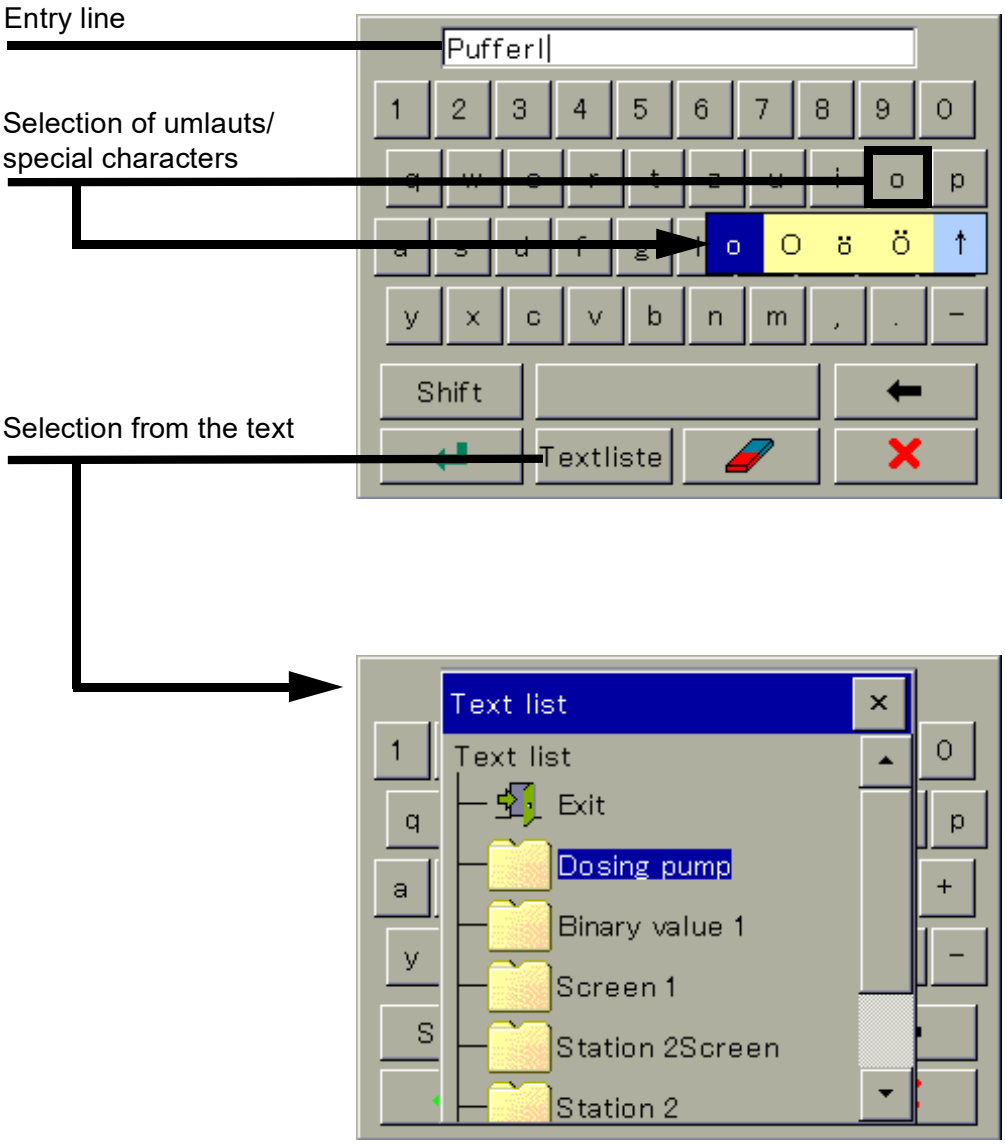
8.1.4 Entry of text and numbers

Dialogs for entry of text or numbers appear automatically when the corresponding entry field is tapped.

Text entry dialog

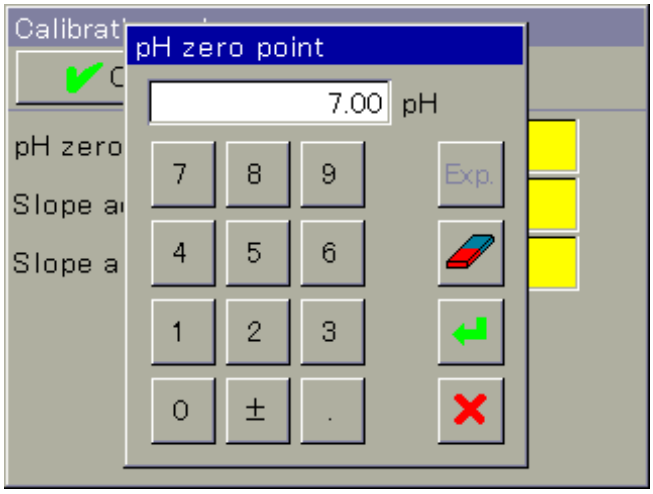
There are 2 special features in addition to conventional entry of characters:

- **Special characters** appear for selection automatically at those buttons that contain special characters.
- **The text list** simplifies entry of frequently used character strings. A history of character strings entered is stored internally in the device. These are then available for selection in the text list and can be copied simply by tapping the line for the entry.



Number entry dialog

This dialog opens if an entry field for numerical values is tapped.
Special feature: The **"Exp" button** permits entry of an exponent as a power of ten.
Procedure:
Enter the numerical base value > Tap "Exp" > Enter the exponent > Confirm the entry



Entry dialog buttons

Explanation	Button
Confirm entry (the value entered is accepted and the dialog closed)	
Cancel entry (the value entered is discarded and the dialog closed)	
Delete 1 character	
Delete entry line completely	
Open text list (select from a history of character strings entered)	
Entry of an exponent as a power of ten	

8 Operation

8.2 Device menu

NOTE

Operation depends on the user's rights. Operating and setting options are restricted, depending on the user who is logged in.

The "Master" and "Service" users have access to all menus and functions (default setting).

⇨ Chapter 8.1.1 "Passwords and user rights", page 75

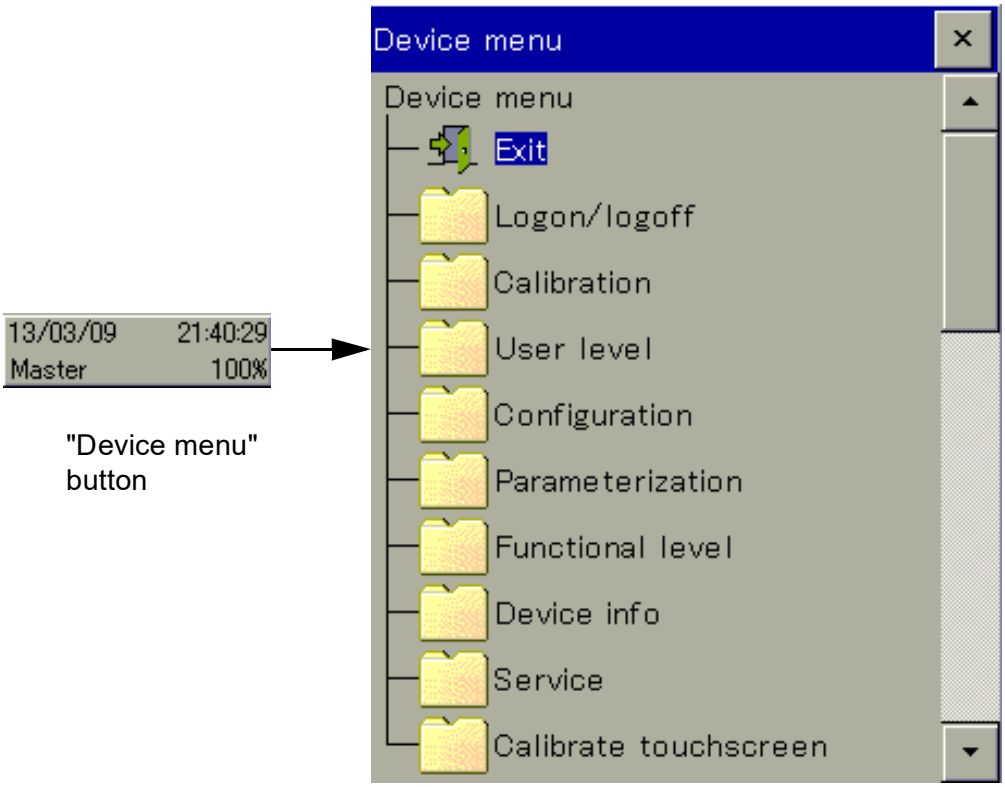
The device menu contains submenus for setting and configuring all device functions.

To open one of the submenus in the device menu, tap the corresponding entry.

The device menu is opened by tapping the "Device menu" button at the operating level.

⇨ Chapter 8.1.2 "Display and control elements", page 77

⇨ Chapter 8.1.3 "Menu structure", page 78

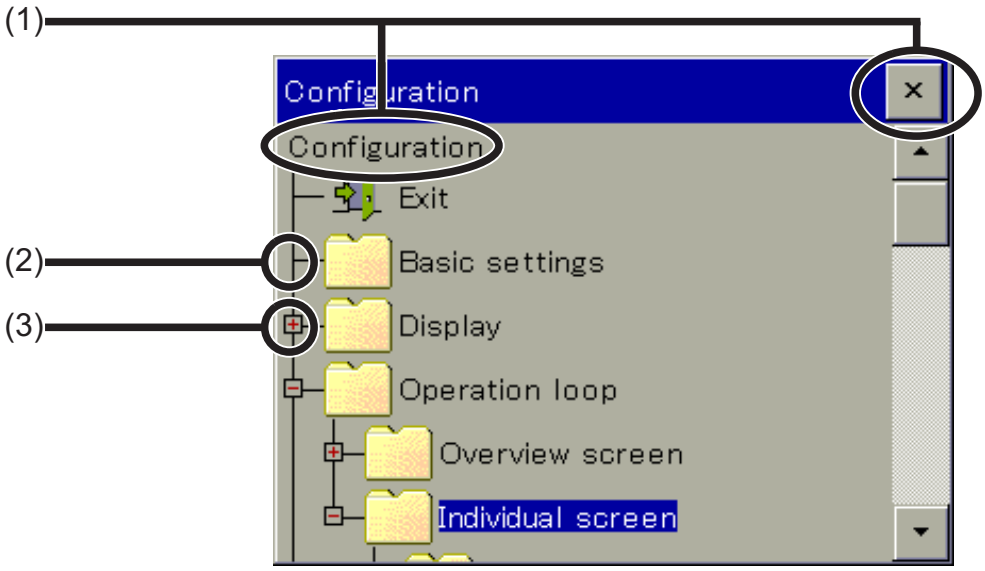


"Device menu" button

Device menu items	Description
Log-on/Log-out	The user logs on and out here. In addition, passwords can be changed here. ⇨ Chapter 8.2.1 "Log-on/Log-out", page 89
Calibration	Sensor calibration can be configured and performed here. In addition, current calibration values and the calibration logbook are displayed. ⇨ Chapter 12 "Calibration in general", page 235

Device menu items	Description
User levels	User levels permit fast and simple access to a selection of up to 50 frequently needed parameters per user level from the parameter level and the configuration level. Up to 16 user levels can be set up. No user level is configured at the factory. The user level must be configured and loaded into the device with the aid of the JUMO PC setup program. The "User Levels" entry does not appear in the device menu as long as no user level is configured. ⇨ Chapter 8.2.2 "User levels", page 90
Configuration	Basic operation of the device inputs and outputs and the device functions is set here. ⇨ Chapter 10.14 "Controller", page 202
Parameterization	Set date and time ⇨ Unbekannte Quelle des Querverweises The setting of controller parameter sets and controller setpoint values is discussed in the operating manual. ⇨ JUMO AQUIS touch P operating manual
Functional level	Manual operation of certain functions for testing and diagnostic purposes (e.g. start wash contact or reset counter) ⇨ Chapter 8.2.3 "Functional level", page 91
Device info	Information about the device hardware and software, viewing of current analog and binary values for all device functions, inputs, and outputs ⇨ Chapter 8.2.4 "Device info", page 93
Service	Displaying and reading service data for diagnostic purposes, saving and loading a default configuration, input of the calibration values from the Final Inspection Protocol of the JUMO digiLine O-DO H10/H20, input of the fine adjustment data of the JUMO flowTRANS US W02 dL ? Chapter 8.2.5 "Service", page 94
Calibrate Touchscreen	Calibration of the touchscreen to ensure the reliability and convenience of touch control ⇨ Chapter 8.2.6 "Calibrating the touchscreen", page 95
Digital sensors	Open an overview of all configured digital sensors (Assignment table), check the link status of the sensors and manually link sensors that are not linked ⇨ Chapter 8.2.7 "Digital sensors", page 95

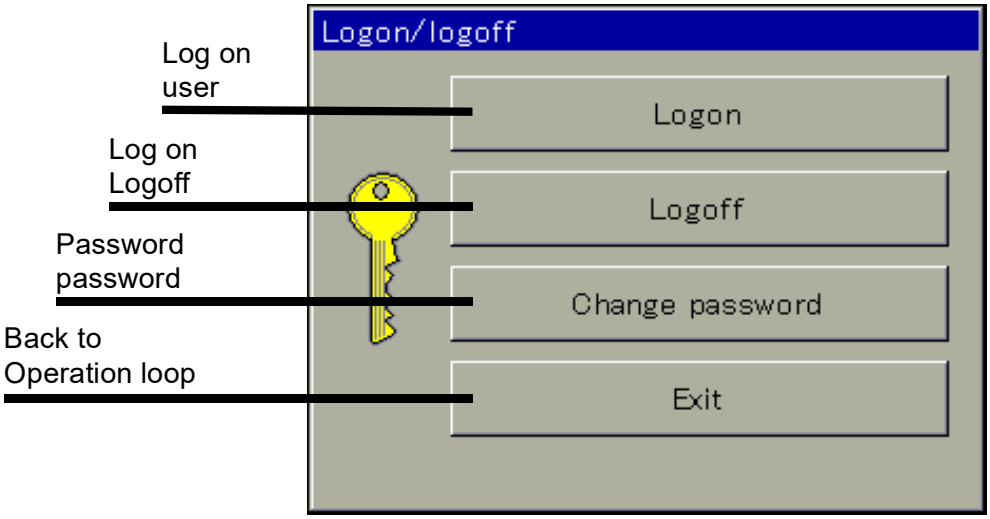
To navigate in submenus, menu items are opened by tapping the folder icons identified with a plus sign. Open menu structures are identified with a minus sign and can be closed again by tapping the folder icon.
Currently open windows can be left either by tapping "Exit" or the "Close window" button. Data are saved automatically when an open window is closed. Settings that were changed in the submenus take effect.



(1) Close window
(2) Closed menu structure (plus sign)
(3) Open menu structure (minus sign)

8.2.1 Log-on/Log-out

To access the "Log-on/Log-out" menu, tap the "Device menu" button and then select the "Log-on/Log-out" menu item. The user can log on/off here and change passwords for the
currently configured user accounts.



An overview of the factory-configured users and their rights can be found in the "User Management" chapter.

⇨ Chapter 8.1.1 "Passwords and user rights", page 75

After the re-authentication time has elapsed, a logged-on user is logged off automatically. It is then necessary to log on again.
The re-authentication timeout does not take effect if:

- The logon/logoff dialog is open
- The memory manager is open
- During calibration of analysis sensors
- During calibration of the touchscreen

The re-authentication time is set using the JUMO PC setup program.

⇨ Chapter 22.8.3 "User list", page 363

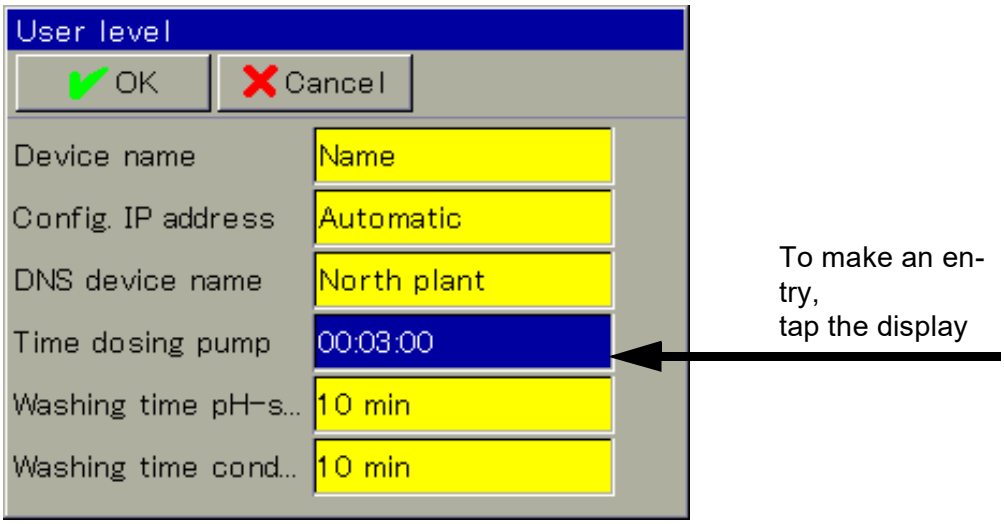
8.2.2 User levels

A user level consists of a user-defined list of parameters and configuration settings. Up to 16 such user levels can be set up. You need the JUMO PC setup program to configure the user level.

⇨ see JUMO AQUIS touch P operating manual, "PC Setup Program" chapter

User levels can be opened from the device menu only if they have been configured beforehand with the aid of the PC setup program. If this has not been done, there is no user level in the device menu.
Opening a user level provides easy and uncomplicated access to the selected parameters and settings. These can be edited from here. The entry dialog is opened by tapping the display field for a desired data point.

View of a user level (example)



NOTE
Changing the date/time settings and the configuration data that are relevant for recording of measurement data initiates a restart of measurement data recording by the data monitor or recording function. This is also the case if the change is made from a user level. The restart terminates the current recording of measurement data. In the case of the "Data monitor" function, the content of the screen is deleted.
⇨ Additional information on the recording function can be found in the operating manual of the JUMO AQUIS touch P.

8.2.3 Functional level

The functional level is used primarily for testing and diagnostic purposes. Analog and binary values of the outputs can be controlled manually here. This may be useful, for instance, for checking an individual piece of equipment in a plant. When performing maintenance and repair work, counters for operating hours, switching actions and flow rates can be reset.



WARNING!

When manually controlling equipment in a system, it is absolutely essential to take appropriate measures to prevent personal injury and property damage.

Ensure that only qualified personnel has access to the functional level. The factory settings restrict access to just "Master" and "Service" users.

Functional level menu items:

- **Flow:** Display the current flow rate, display and reset the total quantity counter
- **Washtimer:** Manually start the wash process, display the time remaining until the wash process and the current binary value
- **Analog outputs:** Read and manually control the current values of analog outputs
- **Digital outputs:** Read current binary values, manually control digital output outputs
- **Counters:** Reset the counters (operating hours and service counters)



NOTE

Manual control of analog and binary outputs is possible only if the "Enable menu. mode" option is activated for the specific output in the configuration. In general, actions at the function level can be executed only by the "Master" and "Service" users.

⇨ Chapter 10.6 "Analog outputs of base unit and optional boards", page 157
⇨ Chapter 10.8 "Digital outputs of base unit and optional boards", page 159
⇨ Chapter 8.2.1 "Log-on/Log-out", page 89

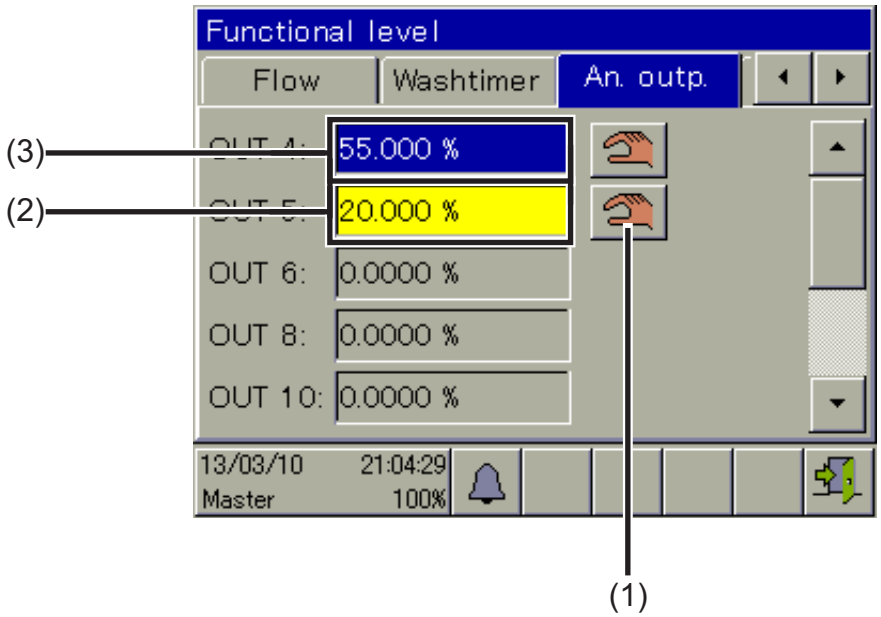
Manual control of analog/digital outputs

Activate the configuration setting "Enable menu mode" for the outputs you wish to control manually. "Manual mode buttons" buttons for manual control for these outputs then appear at the functional level. To adjust output values manually, proceed as follows:

Select Device Menu > Functional Level > Analog or Digital Output tab > Tap "Manual mode" button > Tap Output Display field > Entry dialog opens > Enter value > Confirm

An activated manual mode can be recognized by the green background of the particular output value display at the functional level.

View of functional level analog outputs (example)



(1) "Manual mode" button
(2) Yellow background: Manual mode off
(3) Green background: Manual mode active

Once "Manual mode" has been switched off, the output immediately returns to the value assigned in its configuration. The output display is once again yellow.

8.2.4 Device info

For testing and diagnostic purposes, the "Device info" menu provides access to extensive data about the hardware and software of the device, as well as current analog and binary values.

Device Info menu items:

- **General:** Information about the main board, device software and Ethernet configuration
- **Slots:** Equipping overview of expansion slots, display of diagnostic and version information for the installed optional boards
- **Inputs/outputs:** Overview of all analog and binary values of the inputs and outputs of the device
- **Functions:** This menu is particularly helpful when checking functions after configuration changes. It contains detailed information about all internal functions (math/logic, flow, limit value, timer, washtimer, counter, and controller) via their current status.
- **Ethernet info:** Ethernet communication statistics for diagnosis by trained personnel
- **PROFINET:** If the device is equipped with a PROFINET I/O interface, information on the status of the interface can be viewed here. More detailed information on the data displayed can be found in the PROFINET IO interface description for the device.
- **Digital sensors**: Indication of the connection status of all configured digital sensors 1 to 6 as well as all current values and version information of linked sensors

8.2.5 Service

The "Service" menu is primarily used for in-device troubleshooting and diagnostics. It is intended primarily for trained personnel. When troubleshooting together with Service, the operator can access data that the JUMO service technicians need for diagnosis.

The “Service” menu is also used to acquire the following data:

- Entering the calibration values from the Final Inspection Protocol when changing a sensor cap for the JUMO digiLine O-DO H10/H20 oxygen sensor.
- Input of the fine adjustment data for the ultrasonic flowmeter JUMO flowTRANS US W02 dL.

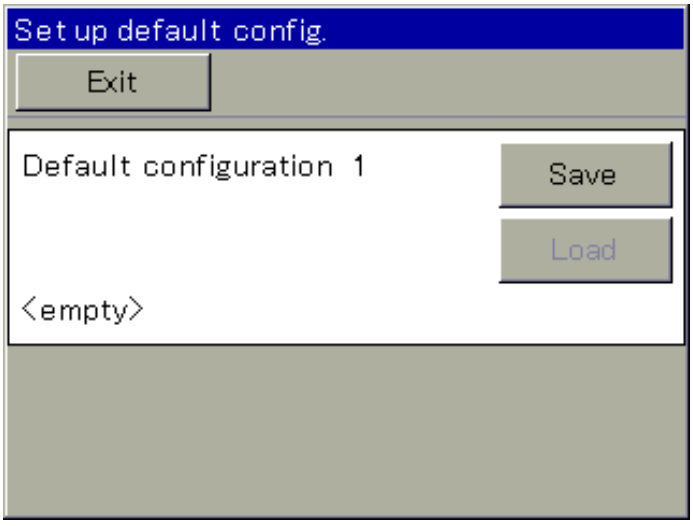
NOTE

The Service menu appears in the Device menu only if a user with corresponding user rights is logged in.

⇨ Chapter 8.2.1 "Log-on/Log-out", page 89

Service Menu items

- **Default-configuration:** The operator can store the current device configuration in the device's memory. This configuration can be reloaded as the active configuration at any time. This is important, for instance, to return to the initial configuration after configuration changes made for testing purposes.



Configurations can also be saved with the PC setup program or on a USB flash drive with the aid of the Memory Manager.

⇨ see JUMO AQUIS touch P operating manual, "PC Setup Program" chapter ⇨ Chapter 8.4 "Memory Manager (USB flash drive)", page 108

- **Debug Window:** The Debug window can be used to check the behavior of the device software in detail. Data are displayed to assist the JUMO service technicians during troubleshooting.

- **Sensor data 1 to 6:** For each digital sensor that is operating on the device, a menu with the following functions is displayed here, depending on the sensor type:
- Reset calibration data of the sensor to default settings
- Enter calibration data from the Final Inspection Protocol after changing the sensor cap (JUMO digiLine O-DO H10/H20).
- Enter fine adjustment data (JUMO flowTRANS US W02 dL).
- **Service data: Status information** that can be evaluated by JUMO service personnel for diagnostic purposes can be read here.
  In addition, the **"Service count."** and **"Internal data"** are displayed. The service counters record the number of switching operations executed by the binary outputs. The **voltage of the buffer battery** and the **board temperature** are shown in the "Internal data".



CAUTION!

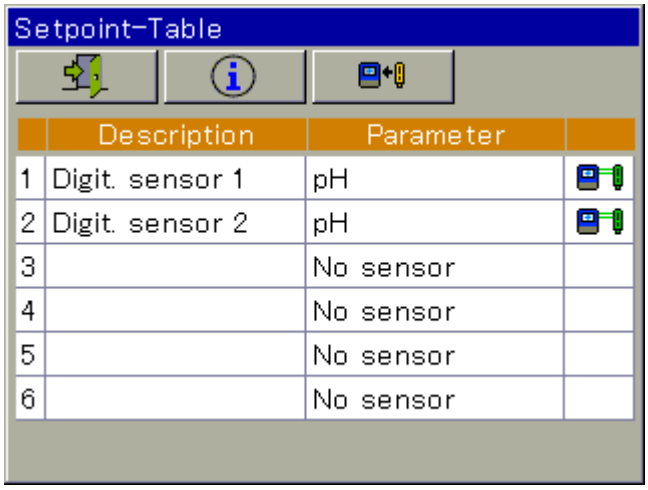
A buffer battery is built into the device. Its purpose is to maintain data when the device is switched off or if the voltage supply is interrupted. If the battery approaches the end of its operating life (approximately 7 years) then a battery prealarm will indicate that status. When the battery is empty a battery alarm will indicate that status. The battery must be exchanged before it is empty. The battery must be exchanged by the JUMO Service department! In this case, send in the device!

8.2.6 Calibrating the touchscreen

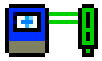
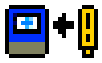
To ensure precise and reliable operation of touchscreen control, you can open the "Calibrate touchscreen" menu.
The device then prompts you tap 4 points on the touchscreen.
Simply follow the instructions on the display.

8.2.7 Digital sensors

The assignment table (list of all configured inputs for digital sensors) is displayed here. Up to 6 digital sensors can be connected and operated via the selected serial interface. The link status of the configured sensors is displayed in the form of a symbol in the right column.



Link status symbols for the assignment table entries

Status	Explanation	Symbol
linked	Communication between the sensor electronics and the JUMO AQUIS touch P has been successfully established. The sensor is operating.	
Installation	The device searches for the individual assignment table entry of a linkable sensor. A new sensor can be linked manually or automatically if the following prerequisites are met: • The sensor type must match the settings of the assignment table entry. • The sensor version must be compatible • Operation of bus communication must be assured through correct interface settings (with JUMO digiLine electronics, the interfaces are configured automatically during the scan) Known sensors are identified and assigned and linked with the known entry After successful assignment, the status changes from "Installation" to "linked" following connection of the sensor to the bus. If a sensor cannot be linked, the status remains "Installation". If the status has not changed from "Installation" to "linked" after a waiting period of about 15 seconds, linking of the sensor electronics has failed. A description of the startup procedure for digital sensors can be found in the chapter on startup. ⇨ Chapter 7.3 "Digital sensors", page 67	

In addition to the "Exit" button, this view also has "Info" and "Link" buttons. The following table explains the function of these buttons.

Explanation	Button
The "Info" button opens an overview of important information to more easily identify the individual sensor connected.	
With the "Link" button, you can access the submenu for linking sensors that are not linked. Digital **JUMO-ecoLine and JUMO-tecLine sensors** must be linked by means of this button during startup. When errors occur during the startup of digital sensors, you usually have the ability here to detect connected digital sensors by means of a bus scan and then to link the detected sensors manually. Help for problems when sensor electronics cannot be detected or linked can be found in the Annex. ⇨ Chapter 24.1 "Troubleshooting and remedies for digital sensors", page 435	

Submenu for linking

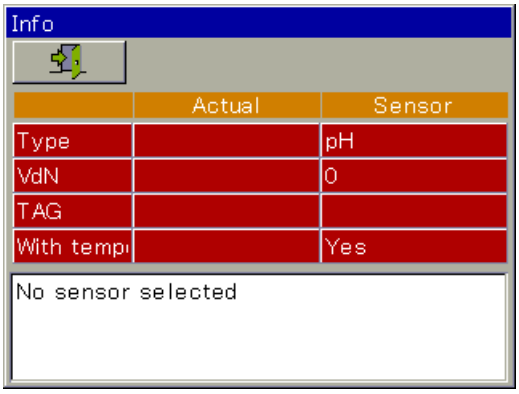
In this menu, the bus can be "scanned" for connected sensors. The sensors detected are displayed in a list. Sensors that are not detected cannot be linked here manually. In addition to the "Exit" button, this view also has "info", "Scan" and "Link" buttons. The following table explains the function of these buttons. In this menu, the bus can be "scanned" for connected sensors. Corresponding user rights are needed to access the "Link" submenu. The default settings authorize the "Master", "User 1", "User 2" and "Service" users for this.

⇨ Chapter 8.1.1 "Passwords and user rights", page 75

The following table explains the function of these buttons.

Explanation	Button
The "Info" button opens an overview of important information to more easily identify the individual sensor connected.	
Pressing the "Scan" button starts the search for sensors connected to the bus. Detected sensors are listed on conclusion of the bus scan. The digital sensors connected do not provide any measurement data for the duration of the scan. Instead of the measured values, the "Invalid display value" symbol appears in the associated measured value displays (⇨ Chapter "Display of invalid values", page 83).	
Detected sensors can be linked manually with the "Link" button in this menu. It appears in this view when one of the detected sensors in the list has been highlighted by a tapping it in this menu. The procedure is described at the end of this table. Help for problems when digital sensors cannot be detected or linked can be found in the Annex. ⇨ Chapter 24.1 "Troubleshooting and remedies for digital sensors", page 435	

Procedure for manual linking of digital sensors

Step	Action
1	In the "Digital Sensors" menu, highlight the assignment table entry to be linked.
2	Open the "Link" submenu by tapping the corresponding button in the "Digital Sensors" menu.
3	Open the "bus scan" by pressing the "Scan" button (magnifying glass).
4	In the list of detected sensors, highlight the one that you wish to link with the previously highlighted assignment table entry. Sensors with JUMO digiLine electronics can be identified by the hardware address on the nameplate of the JUMO digiLine electronics. It is also displayed in the list of detected sensors and in the sensor information ("Info" button).
5	The "Link" button now appears above the table. Press this button to link the selected assignment table entry with the sensor selected from the list of detected sensors.
6	If the link was successful, the previously selected entry now has the status "linked" in the assignment table. If the digital sensor could not be linked, an error message appears. The error message displays a table with information about the selected assignment table entry and the sensor selected from the list of detected sensors. The error message is displayed in the lower area. **Example of an error message:** No assignment table entry was selected before the "Link" submenu was opened. 

Bus status display

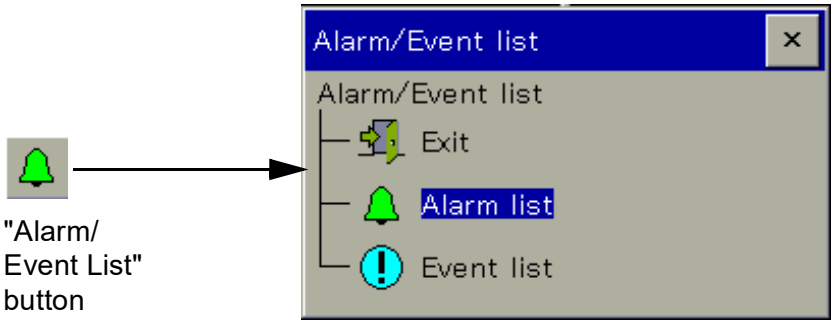
The operating status of the JUMO digiLine bus is visualized in the title bar. The symbols and their meanings are explained in the following table. The symbols and their meanings are explained in the following table.

Green There are no bus errors. All sensors are linked and functioning.	
Red This symbol appears in the title bar when connecting sensor electronics that have not yet been linked with the device. As soon as the sensor electronics are linked, the bus status changes from "Yellow" to "Green". In addition, the status "Red" is also displayed during a bus scan.	
Yellow The "Yellow" status appears in the title bar when digital sensors are not linked, e. g. As the result of defective components in the bus or a faulty configuration (⇨ Chapter 24.1 "Trouble-shooting and remedies for digital sensors", page 435).	

8.3 Alarm/Event list

The JUMO AQUIS touch P offers the option of configuring alarm functions and event functions in numerous functions. In addition, the electronics of the JUMO AQUIS touch S are self-monitoring and trigger corresponding preprogrammed alarms and events in case the internal device malfunctions.
Alarms and events appear in the lists in chronological order. The respective list is opened from the "Alarm/Event List" menu.
The alarm/event list is opened by tapping the "Alarm/event list" button at the operating level.

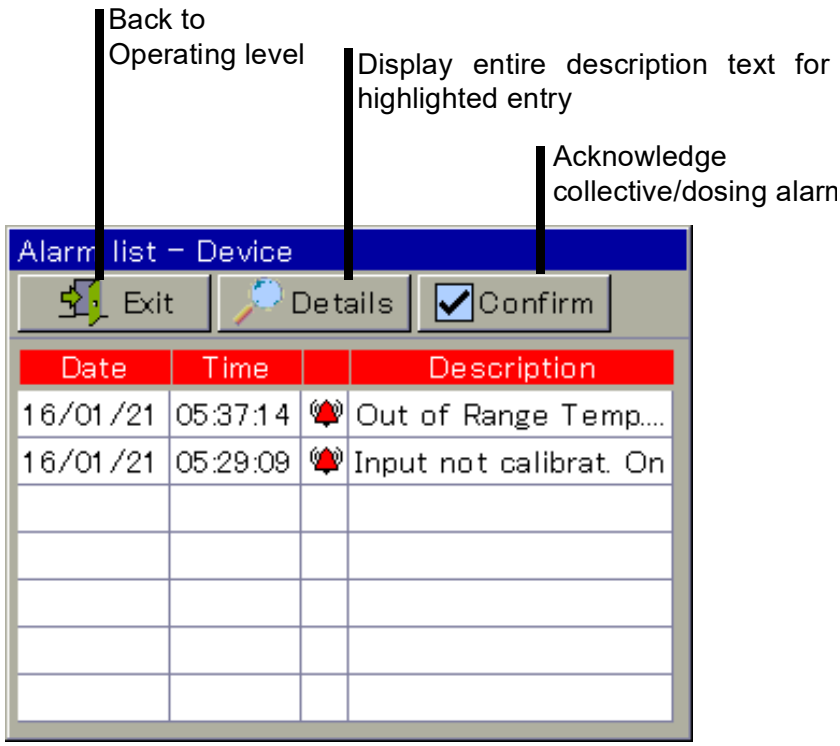
⇨ Chapter 8.1.2 "Display and control elements", page 77
⇨ Chapter 8.1.3 "Menu structure", page 78



8.3.1 Alarm list

The alarm list displays the current alarms. Alarms are cleared upon elimination of the alarm condition. Each alarm triggers a "collective alarm". The alarm list view contains buttons for viewing details about alarms and acknowledging collective and dosing alarms.
⇨ Chapter "Acknowledging collective/dosing alarms", page 103

Example: Alarm list



Alarms are visualized further by the color of the bell icon on the "Alarm/event list" button, in the "Alarm list" menu item of the "Alarm/event list" menu and in the title bar of the operation screens. The symbols used for visual signaling of alarms are listed in the following table.

Meaning	Symbol
at least 1 alarm present Details can be viewed in the "Alarm list" and in the "Event list".	
no alarms	

Visualization of alarms in the title bar can be activated in the configuration. The most recently occurring alarm then flashes red in the title bar of the operation screens.
⇨ Chapter 10.3.1 "General information", page 139

If the alarm from a measurement input disappears, the color of the respective measuring-value display changes in accordance with the color settings.
⇨ Chapter 10.3.3 "Colors", page 140

All alarms are available in the binary selector. In this way, digital outputs or other internal functions of the device can be controlled via alarms.

Acknowledging collective/dosing alarms

The **collective alarm** combines all alarms in the alarm list. It simplifies signaling of one or several active alarms with external indicating devices or to control rooms. The binary signal for the collective alarm is available in the binary selector in 2 versions:

- **Collective alarm:** Is triggered by the occurrence of any alarm and disappears only after all alarms in the alarm list have been cleared.
- **Collective alarm ack.:** Is triggered by the occurrence of any alarm and disappears when the alarm is acknowledged.

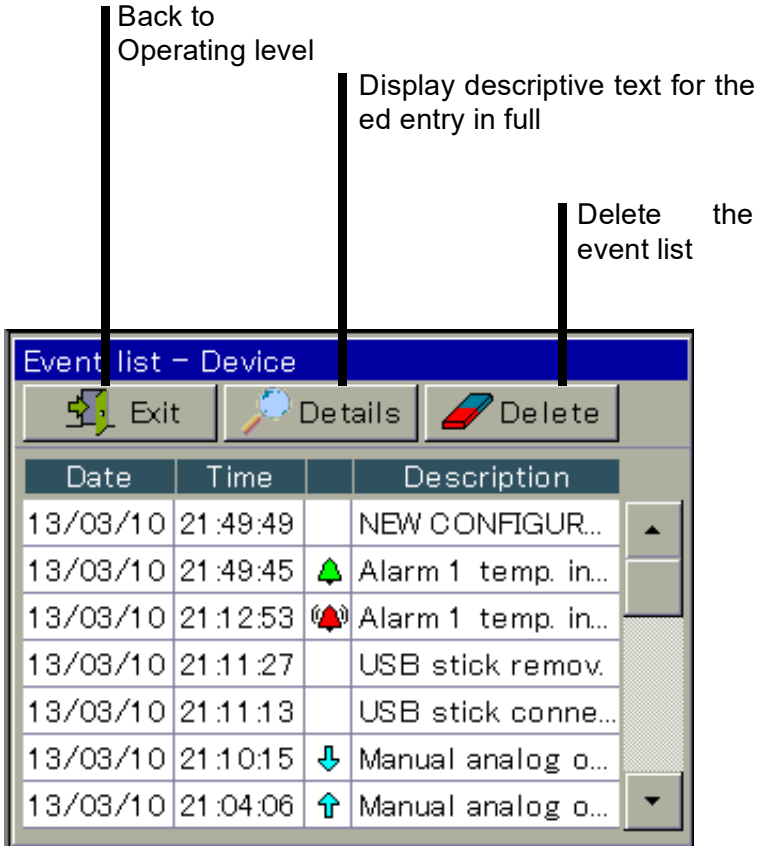
Selection of a collective alarm when configuring device functions and digital outputs:
Binary selection > Alarm and Internal Signals >
Collective Alarm/Collective Alarm Ack.

Dosing alarms are triggered by the controllers when the control deviation is greater than the "alarm tolerance". An "alarm delay" can be set for each dosing alarm. Dosing alarms and acknowledgment of them must be activated in the controller configuration. The "alarm tolerance" and "alarm delay" settings are made in the controller parameters.
⇨ JUMO AQUIS touch P operating manual
Selection of a dosing alarm when configuring internal functions and digital outputs:
Binary Selection > Controller > Dosing Alarm, Controller 1 to 4

Collective and dosing alarms can be acknowledged with the "Confirm" button.

8.3.2 Event list

A number of situations that are essential for tracking and diagnostic purposes are logged in the event list. The entries are identified with corresponding icons on the basis of the type of event. In addition, events are logged with an icon in the data monitor/recording function.
Detailed information on the data monitor/recording function
⇨ JUMO AQUIS touch P operating manual



The following table provides an overview of the possible entries in the event list.

Events	Symbol
Power on	
Power off	
Alarm occurred	
Alarm cleared	
• Configured event (condition occurred) • Calibration start • Timer start • Wash contact start • Controller manual mode on • Controller self-optimization started	
• Configured event (condition ended) • Calibration stop/cancel • Timer stop • Wash contact stop • Controller manual mode off • Controller self-optimization ended	
• Switch DST • No connection to an input module • Configuration change • Reset counter • Reset flow rate measurement • Confirm collective alarm • E-mail sent (with indication of the e-mail index 1 to 5) • E-mail error (with indication of the e-mail index 1 to 5[a] and error number[b])	No symbol

[a] Up to 5 event-controlled e-mail notifications can be set up in the JUMO PC setup program. The notifications are numbered consecutively with an index from 1 to 5. The index corresponds to the tab number on an e-mail template in the JUMO PC setup program. The index corresponds to the tab number on an e-mail template in the JUMO PC setup program.

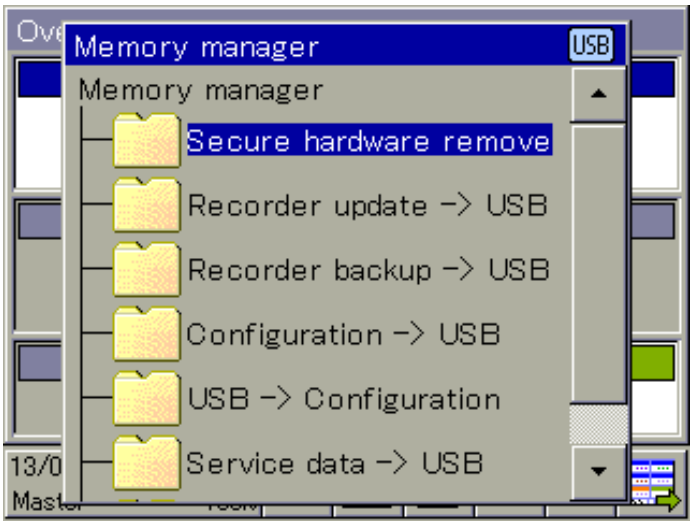
[b] The meaning of each error number is listed in the following table.

Error codes in the event list when sending an e-mail via modem and Ethernet

Error number	Meaning
120	Step error in state automation
121	Invalid response length
122	No CONNECT from modem
123	FCS checksum incorrect
124	Unexpected value or response
125	Conf request not accepted
126	No conf request from opposite end
127	No CHAP request from opposite end
128	Response timeout
129	Unknown modem response
130	Unexpected OK from modem
131	Unexpected CONNECT from modem
132	Unknown frame received
133	Unexpected PROTOCOL from modem
134	Unexpected COMPRESS from modem
135	Invalid PPP packet received
136	Unexpected BUSY from modem
137	Unknown authentication protocol
138	Ignored LCP option
139	Unexpected DELAYED from modem
140	Unexpected NODIALTONE
141	Unknown PPP protocol
142	Unknown PAP code
143	Ignored IPCP option
144	Ignored IPCP code
145	Unknown CHAP code
146	IP checksum incorrect
147	Unknown IP protocol
148	Unknown ICMP type
149	Unknown LCP type
150	Received as client DNS request
151	Unknown DNS error
152	DNS response is split
153	No IP received via DNS
154	Unknown UDP port
155	TCP checksum incorrect
156	Incorrect TCP port
157	Unknown TCP-SYN option
158	TCP port not used
159	Unknown POP3 response
160	Unknown SMTP response
161	Unknown DNS name

162	No MD5 requested for CHAP
163	Authentication error
164	Canceled from opposite end
165	Error creating TCP socket
166	Error binding TCP socket
167	Error during TCP connect
168	Error sending TCP telegram
169	Error closing TCP socket
170	Error during TCP listen
171	Reset during TCP accept
172	Error during TCP accept
173	SMTP server reports syntax error
174	TCP socket is already closed
175	Incorrect frame configuration
176	Already sent from the gateway

8.4 Memory Manager (USB flash drive)



The Memory manager is used to transfer data between the JUMO AQUIS touch P and a USB flash drive. To open the memory manager, close all windows and insert the USB flash drive into the USB host interface. The memory manager will then open automatically. You require the relevant user rights for access to the menu options "USB->Configure devices and "Software update". The factory settings authorize the "Master" and "Service" users for this.

⇨ Chapter 8.1.1 "Passwords and user rights", page 75

Memory Manager menu items:

- **Safely remove hardware:** To prevent hardware damage or loss of data, it is necessary to select this menu item before removing and inserted USB flash drive. Please follow the instructions on the device's display.
- **Recorder Update -> USB:** Use this function for **regular retrieval of recorder data** and **continuous archiving** of measured-data histories.
  Measurement data that have not yet been retrieved are stored on the flash drive together with their configuration data.
  The measurement data are stored in DAT files and the configuration data in SET files. These files can be opened and evaluated with the aid of the JUMO PCA3000 evaluation software. Data that has been extracted is marked internally as retrieved and the available memory display is set to 100 %.



CAUTION!

Ensure that recorder updates are performed in a timely manner!

When the ring memory is full (display of remaining memory in device reads 0 %), measurement data in the ring memory is lost (starting with the oldest).

- **Recorder Backup -> USB:** This function is used to **back up** the recorder data to **prevent data loss**.
  All measurement data in the ring memory (also data already retrieved) are transmitted to the flash memory together with their configuration data.
  The measurement data are stored in DAT files and the configuration data in SET files. These files can be opened and evaluated with the aid of the JUMO

PCA3000 evaluation software.
In contrast to Recorder Update, there is no internal marking of recorder data and no resetting of the available memory display.

NOTE
The "Recorder Update" and "Recorder Backup" functions are available only if the extra code "Recording" is enabled.

NOTE
A measuring data recording session is closed by changing configuration data that are relevant to the data monitor or registration function (e.g. scaling or description of an analog channel). The measurement data accumulated since the beginning of the current recording session are stored in the device in a file with the extension "DAT" together with an additional file with the extension "SET". A new recording session begins as soon as the new configuration goes into effect. One DAT file and one SET file are created for each recording session when recorder data are retrieved via Update or Backup.

The full description of the recording function can be found in the operating manual.

⇨ JUMO AQUIS touch P operating manual

- **Device Config. -> USB:** The complete, current configuration of the device is transmitted to the flash drive and saved in a file with the name "KONF304.SET". If the flash drive already contains a configuration file, a security prompt appears asking whether you are sure you want to overwrite this file. Pressing the "OK" button saves the current configuration to the flash drive and overwrites the previous file.

- **USB -> Device config.:** A configuration that is saved on the flash drive is loaded into the device and activated as the current configuration. Only the currently active configuration is overwritten. The previous default configuration is retained. If desired, the current configuration can be saved as the default configuration.
  ⇨ Chapter "Service Menu items", page 94



NOTE

A check of version compatibility is performed when transferring device configurations from the USB flash memory to the device. If the device setup on the USB flash drive is incompatible with the version of the device software of the destination device, the transfer is terminated. The second term of the device version number must be greater than or equal to the second term of the device version number used to create the device setup file.

Examples of combinations of version levels:

Device software version used to create the configuration = 304.**02**.xx, device software version of the destination device = 304.**02**.xx,
The versions are compatible

Device software version used to create the configuration = 304.**01**.xx, device software version of the destination device = 304.**02**.xx,
The versions are compatible

Device software version used to create the configuration = 304.**02**.xx, device software version of the destination device = 304.**01**.xx,
The versions are not compatible

- **Service data -> USB:** A data record with service-relevant information about the device is transmitted to the flash drive and saved in a file with the name "DEBUG304.SET". The information can be used by JUMO Service for diagnostic purposes.
- **Software Update:** The device software can be updated with the aid of a USB flash drive. To do so, an appropriate update file must have been saved on
  the flash drive in advance; this file can be obtained from JUMO Service.



CAUTION!

It is strongly recommended that the configuration and recorder data be backed up
prior to performing a device software update.

⇨ ⇨ ⇨ ⇨ ⇨ ⇨ ⇨ ⇨ ⇨ ⇨ ⇨ ⇨ ⇨ ⇨

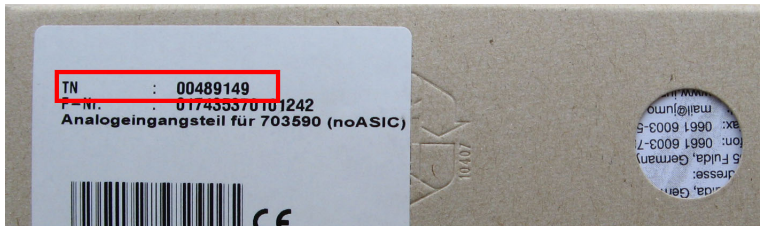
9.1 Installing optional boards

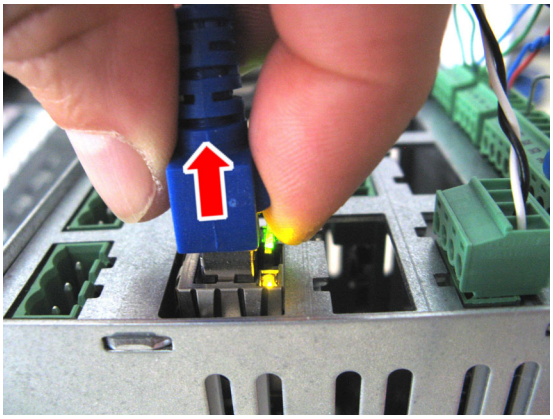
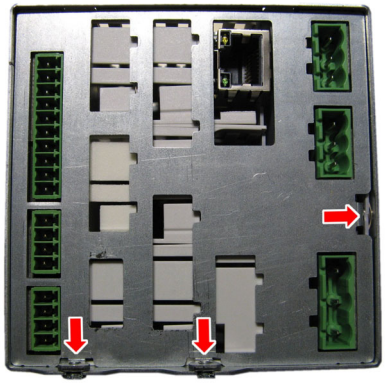
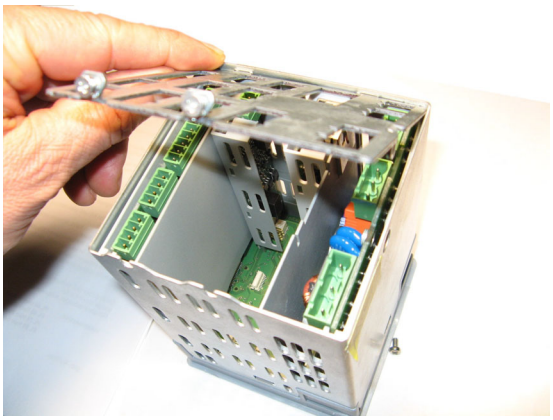
DANGER!
Installation and removal of optional boards must be performed only by qualified personnel. To ensure electrical safety, country-specific regulations must be observed.

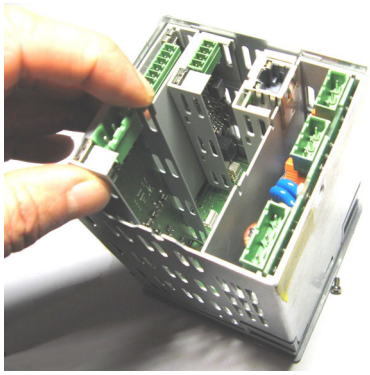
CAUTION!
Optional boards must be carefully inserted into the SMK plug connections on the device's motherboard without tilting. Failure to do this can cause the SMK plug connections on the device's motherboard to break off. This applies in particular for the optional board of the COM 2 slot (serial interface RS422/485 and PROFIBUS-DP). In order to avoid damage:

- always use the plastic board frame provided
- Carefully slide the plastic board frame with the optional board into the slot without tilting
- Apply uniform pressure to insert into the SMK plug connection on both sides of the optional board front and do not tilt.

The following step-by-step table explains in detail the procedure for retrofitting optional boards:

Step	Action
1	Disconnect all phases of the power being supplied to the device (power grid, outside power supply sources for relays/solid-state relays etc.).
2	Identify the optional board from the part number on the sticker attached to the packaging as well as from the connection socket and the accessories table. ⇨ Chapter 4.4 "Accessories", page 19   Using the block diagram, select a suitable slot for the optional board. ⇨ Chapter 3.2 "Block diagram", page 13

Step	Action
3	Disconnect all screw terminals and interface cables connected at the rear of the device. To prevent connections being interchanged, note down the assignment of the connectors to the sockets. 
4	Undo (do not remove) the two countersunk screws on the bottom of the case and remove the pan head screw on the side of the case. 
5	Now open the rear panel of the case and remove it. 

Step	Action
6	Insert the optional board into the selected slot straight and without tilting. Apply uniform pressure to insert at the right and left corners of the optional board front and allow it to engage gently into the SMK plug connection. Ensure that the board is seated correctly. For better guidance of the board, you can fill empty slots with plastic board frames. 
7	Fill all empty slots with plastic board frames.
8	Reinsert the rear panel of the case and fasten with 3 screws. Make sure that all the toothed lock washers for securing the screws are re-inserted (see Step 4). The screws represent the protection conductor connection to the rear panel of the case.
9	Reinsert all the plug-in screw terminals and interface cables that were removed in Step 3 into the correct sockets. For "Ci analysis input" optional boards (inductive conductivity), continue at Step 10; otherwise, at Step 12
10	Connect the inductive conductivity sensor using the M12 socket adapter from the scope of delivery of the Ci optional board to the Ci optional board of the device.
11	Connect the 2-wire temperature sensor cable of the M12 socket adapter to an appropriate analog input (e.g. temperature measurement input). Observe the information regarding the integrated temperature sensor in the conductivity sensor.
12	Now, reconnect the power supply and check whether the new hardware has been recognized. ⇨ Chapter 7.4.1 "Checking the optional boards", page 72
13	Only for Ci optional boards (inductive conductivity): Perform a Ci base calibration. ⇨ Chapter "Performing the Ci base calibration", page 115
14	Only for optional boards for analysis inputs: Calibrate the analysis inputs. ⇨ Chapter 12 "Calibration in general", page 235

9 Retrofitting optional boards

9.2 Ci base calibration

Analysis inputs for inductive conductivity sensors must undergo a Ci base calibration during startup. A Ci base calibration must be performed when:

- A new sensor or a new Ci optional board is being installed for the first time
- The sensor or a Ci optional board was replaced
- A Ci optional board was repositioned to a different optional board slot
- Data loss occurred as the result of failure of the buffer battery while the power was switched off
- Device software was updated

After the basic calibration has been performed, the measurement input can be calibrated. Following successful calibration, the measurement input is ready for use.

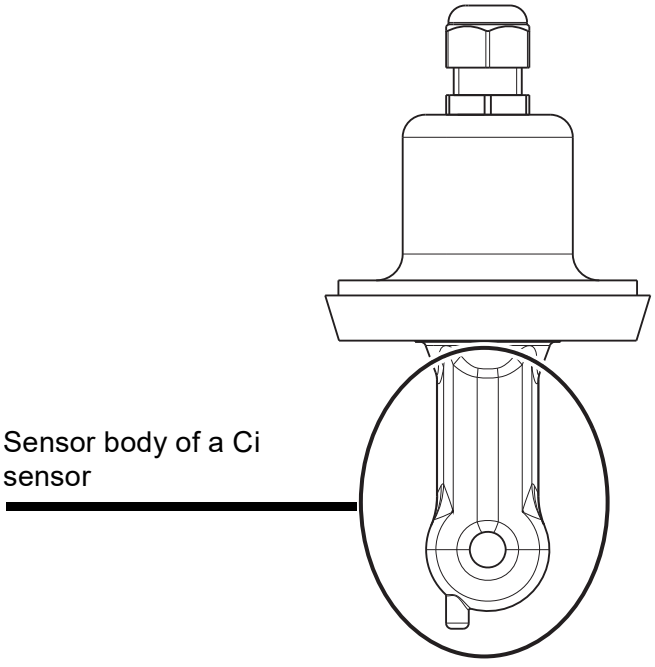


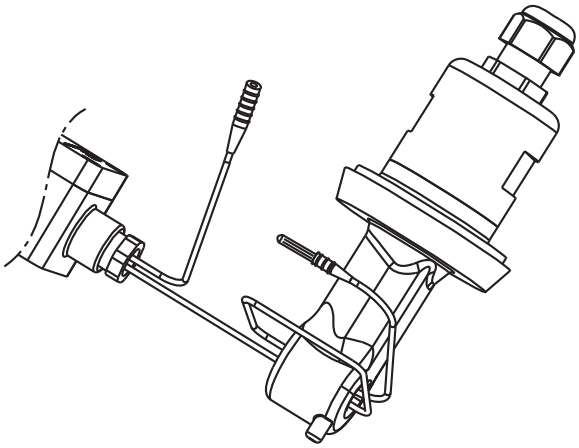
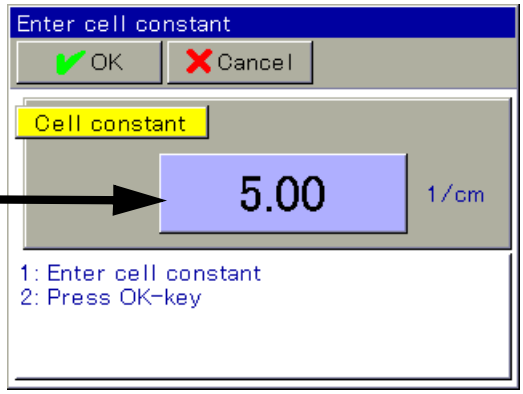
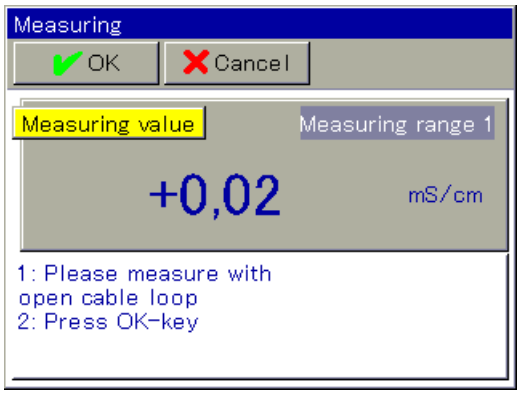
NOTE
For the Ci base calibration, you need the JUMO Type 202711/21 calibration adapter for inductive conductivity sensors (TN 00543395).

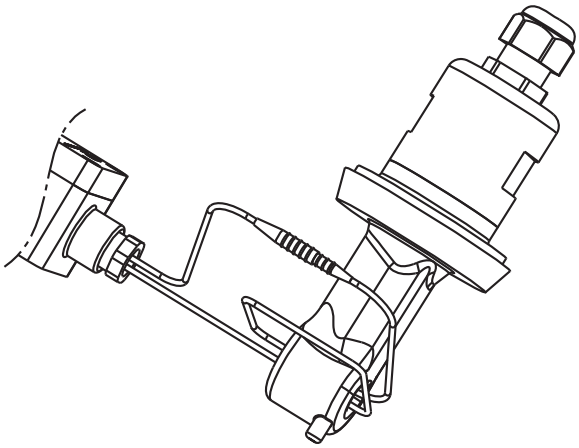
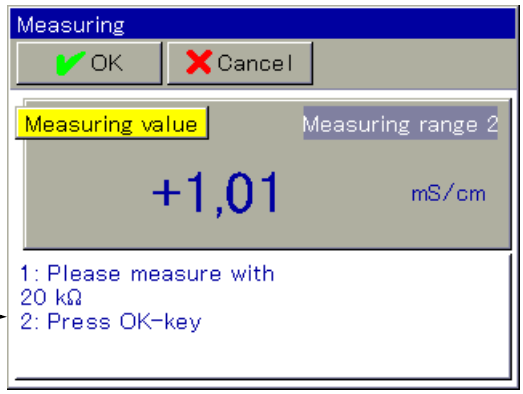


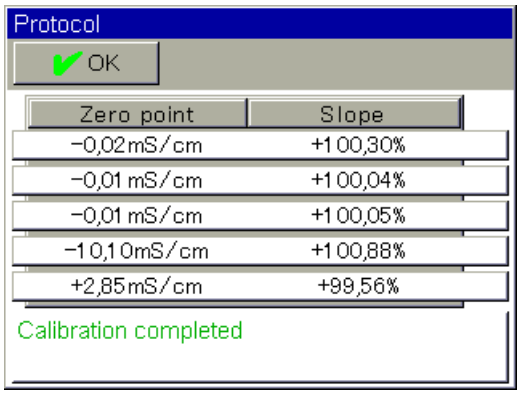
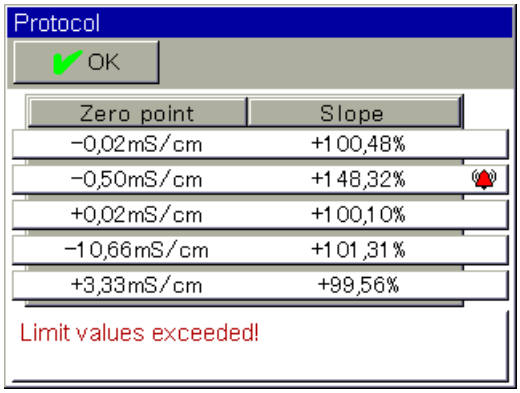
CAUTION!
A buffer battery is built into the device. Its purpose is to maintain data when the device is switched off or if the voltage supply is interrupted. If the battery approaches the end of its operating life (approximately 7 years) then a battery prealarm will indicate that status. When the battery is empty a battery alarm will indicate that status. The battery must be exchanged before it is empty. The battery must be exchanged by the JUMO Service department! In this case, send in the device!

Performing the Ci base calibration

Step	Action
1	Ensure that you have user rights for calibration settings. The default settings authorize the "Master" and "Service" users for this. ⇨ Chapter 8.1.1 "Passwords and user rights", page 75
2	Ensure that the electronics of the JUMO AQUIS touch P have reached operating temperature. You can view the board temperature at: Device Menu > Service > Service Data > "Internal Data" tab Ensure that the ambient temperature specified for the device corresponds to the conditions for the normal operating mode. Wait until the board temperature has reached an approximately constant value.
3	Place the sensor such that the sensor body is suspended freely in air. Observe the following rules during the entire calibration: • Keep all objects away from the sensor body • Do not touch the sensor body • Do not allow the sensor body to lie flat on a surface  Sensor body of a Ci sensor

Step	Action
4	Place the wire of the calibration sensor with 2 windings through the opening in the Ci sensor without connecting the ends of the wires. 
5	Start the Ci base calibration Device menu > Calibration > Select Ci Analysis Input > Ci Base Calibration
6	Enter the cell constant for the sensor and confirm by pressing "OK". Tap button to enter field 
7	The device now performs a measuring with the open cable loop of the calibration adapter open. Wait until the measured value displayed stabilizes and then confirm by pressing "OK". 

Step	Action
8	Connect the ends of the wires forming the conductor loop of the calibration adapter. 
9	Set the calibration adapter to the resistance value shown in the instruction text in the display (in the example: 20 kΩ). Once the measurement displayed has stabilized, confirm by pressing "OK". Instructions instructions 
10	Now follow the instructions on the display. You will be requested to set certain resistance values on the calibration adapter one at a time and then to confirm each measuring by pressing "OK". All resistance value set on the calibration adapter are measured for the end of one measuring range and the beginning of the following measuring range. Each resistance value will thus be confirmed 2 times. Only the last measuring will be confirmed 1 time.

Step	Action
11	Once all measurements have been confirmed, a summary of the calibration data acquired appears. Confirm by pressing "OK". If the Ci base calibration fails, the procedure is canceled without acceptance of the calibration data. Protocol after successful Ci base calibration  Protocol after failed Ci base calibration 
12	Accept the calibration data acquired by pressing "Yes"; discard the data by pressing "No".

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