

JUMO DELOS S02

Pressure transmitter with display



Bluetooth®



Single Pair Ethernet

Operating manual



40505612T90Z001K000

V4.00/EN/30052944/2026-07-20

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1 About this documentation

1.1 Applicable documentation

Product group	Document type
405056	Security Manual

1.2 Purpose

This documentation is part of the device and includes all information to ensure that it is used safely and as intended across all phases of the product lifecycle.

If you do not follow the documentation and safety information, this may result in risk to life and damage to property due to improper use.

- Read and follow the documentation and the safety information and warnings.
- Store the document in its entirety, in an easily accessible location, and so that it can be read in full at all times.
- Contact the manufacturer if you have any questions about the device and documentation.

1.3 Target group

This documentation is intended to be used by personnel for plant mechanical systems for sanitary, heating and air-conditioning technology, electrical engineering or mechanical and plant engineering throughout all phases of the product life cycle.

1.4 Definition of terms

Use in the documentation	Definition
Device, product	Pressure transmitter
End device	Smartphone, tablet, laptop, PC etc.
Sensor	Pressure sensor, pressure measuring cell
Medium, measurement medium	Gases, vapors, liquids
Product lifecycle	Overall consideration of Product identification, acceptance of the goods, storage, mounting, connection, operation, troubleshooting, maintenance to disposal

1.5 Trademark information

All trademarks and trade and company names used are the property of their rightful owners or authors.

1.6 Symbols



NOTE!

This symbol is used in tables and indicates that further information is provided after the table.



REFERENCE!

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

2.1 Intended use

The pressure transmitter with display measures the absolute or relative pressure of liquid, vaporous, and gaseous media.

The device is suitable for mounting in pipes and containers in various applications. It is mounted using individual process connections.

The documentation is part of the device. The device is only intended for use according to this documentation.

2.2 Qualification of personnel

The personnel deployed must meet the following requirements in all phases of the product lifecycle:

- Trained electrical, mechanical, and plant engineering personnel.
- Members of personnel are familiar with this documentation and the safety information and warnings it contains.

2.3 Hot surfaces

Hot device surfaces pose a risk of injury. Hot device surfaces can be caused by the use of hot media in applications.

- If required, install contact protection.

When working on the device:

- Allow the device and plant to cool down.
- Wear suitable protective equipment.

2.4 Hazardous materials

Using hazardous materials as a medium may result in abrasive and corrosive damage to components of the product that come into contact with the medium. The medium may leak and present a fire hazard and a risk to health.

Carry out a risk assessment taking into consideration the safety data sheet for the relevant hazardous substance for mounting, operation, maintenance, cleaning, and disposal:

- Comparison and systematic checking of the durability of the components of the product that come into contact with the medium and the admissible environmental influences.
- Assessment of the risk to people and the environment.
- Assessment of the fire hazard due to the product materials, the admissible environmental influences, and the voltage supply.

2.5 Mechanical loads

Mechanical load on the device and process connections can lead to leaks.

- Do not place the device and the process connections under mechanical strain.
- Systematically check that the process connections are leak-tight.

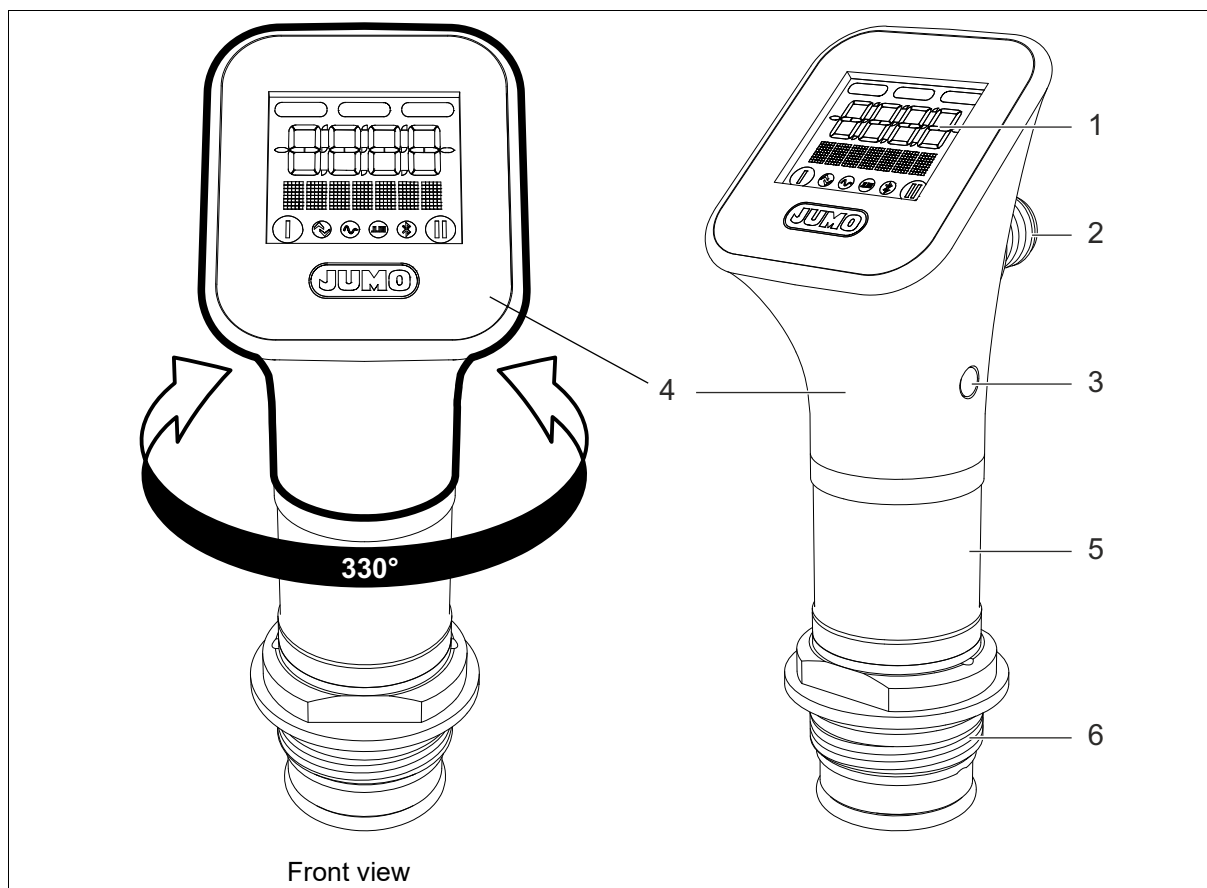
2.6 Transport and storage damage

The device can be damaged if it is insufficiently protected during transport and/or improperly stored.

- Transport the device protected from moisture and dirt in shockproof packaging.
- Protect all electrical and mechanical connections from damage.
- Observe the admissible storage temperature of the device.
- Store the device in a dry and dust-free environment.

3 Description

3.1 Structure



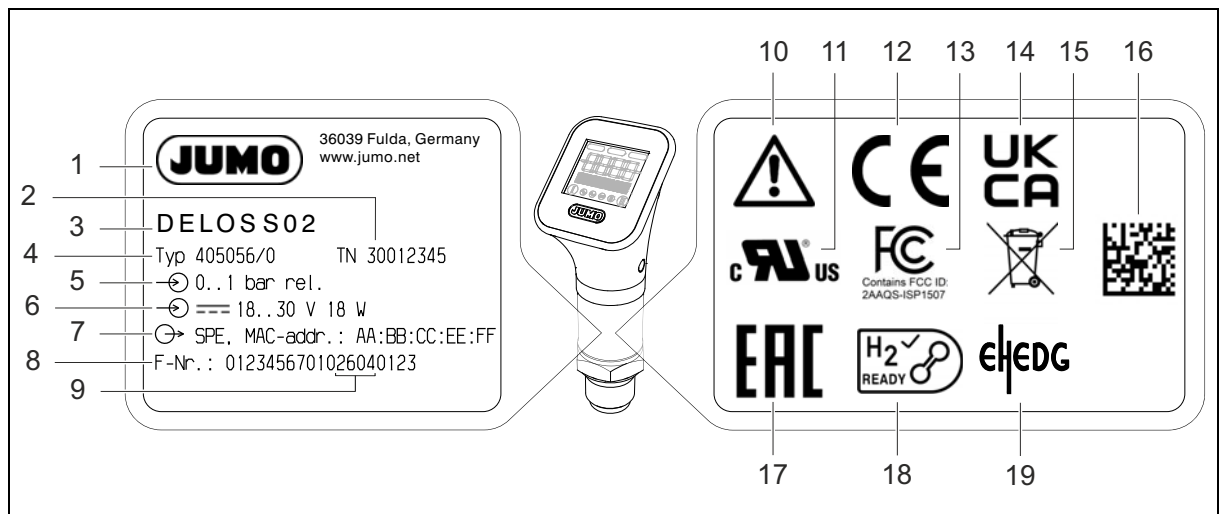
- | | | | |
|---|---|---|---------------------------------------|
| 1 | Display | 4 | Top section of the housing (rotating) |
| 2 | M12 plug connector | 5 | Case bottom section |
| 3 | Pressure compensation element
(only in relative pressure sensor) | 6 | Process connection with sensor |

3.2 Functions

The device measures the absolute or relative process pressure. In this process, the process pressure acts on a pressure measuring cell (sensor) via a membrane. The sensor sends an output signal to the transmitter. The transmitter converts the output signal into the process value. The process value can be read on the display and output to higher-level systems via the interfaces or outputs.

Measurand	Measuring principle
Absolute pressure	Piezoresistive pressure measurement
Relative pressure	

3.3 Nameplate



1	Manufacturer and address	10	Observe device documentation!
2	Part no.	11	UL identification marking
3	Device designation	12	CE identification marking
4	Order code	13	FCC identification marking
5	Measuring range	14	UKCA identification marking
6	Voltage supply (DC)	15	Disposal
7	MAC address	16	Data matrix code
8	Fabrication number	17	EAC identification marking
9	Date of manufacture (YYww)	18	H ₂ ready identification marking
		19	EHEDG identification marking

3.4 Approval marks and certificates



Certificates for approved device versions are available for download on the manufacturer's website.
 Russian documentation upon request.
 H₂ ready is provided as an extra code in the order details.

Submitted:



EHEDG conformity only in conjunction with EHEDG-approved process connections, ⇒ page 22.

Radio Equipment Directive (RED)

JUMO GmbH & Co. KG hereby states that the DELOS S02 device complies with the Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following web address:
qr-405056-en.jumo.info.

3 Description

Radio Equipment Regulations 2017

JUMO GmbH & Co. KG hereby states that the DELOS S02 device complies with the radio equipment regulations UK S.I. 2017 No. 1206. The full text of the UK Declaration of Conformity is available at the following web address: qr-405056-en.jumo.info.

Federal Communications Commission (FCC)

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions.

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

Caution: Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3.5 Scope of delivery

Device in the ordered version
Operating manual

3.6 Further information and downloads

JUMO DELOS S02 – Pressure transmitter with display	 qr-405056-en.jumo.info
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4.1 Electrical safety

Requirements	DIN EN 61010-1:2020 The device must be equipped with an electrical circuit that meets the requirements for "Limited-energy circuits".
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4.2 Electrical data

Voltage supply	DC 18 to 30 V, PELV
Current consumption	≤ 100 mA
Power consumption	≤ 1.8 W
Overvoltage category	II
Pollution degree	2
Protection rating	DIN EN 61140, Class III (protective low voltage)
PoDL class	Class 11, IEEE 802.3cg
PoDL classification	SCCP or Forced Mode
Electrical connection	
Connection element	M12 plug connection
M12 plug connector	IEC 63171-5
Version	2-pole
Connecting cable	IEC 61156-11, IEC 61156-13, IEC 61156-14
Version	2-core, shielded
Bandwidth	≥ 20 MHz
Line length	≤ 500 m ($\geq$ AWG 22 at $\geq$ DC 24 V supply voltage into the cable)
DC loop resistance	< 59 Ω
Temperature resistance	≥ 80 °C
For UL application	
Approved cables ^a	CYJV2/8, CYJV/7, PVVA2/8, PVVA/7

^a The cables must be suitable for the voltage, current and temperature used.

4 Technical data

4.3 Inputs

4.3.1 Measurands

Reference conditions

Basic principles	EN 61298-1, DIN 16086, DIN EN 60770
Installation position	Any
Calibration position	Device upright, process connection at the bottom

Relative pressure

Measuring range bar	Linearity ^a % MSP ^e	Accuracy with		Long-term stability % MSP per year	Overload capability ^b bar	Burst pressure bar
		20 °C ^c % MSP	-20 to +75 °C ^d % MSP			
0 to 0.4 ^f	0.15	0.40	1.00	≤ 0.15	10	20
0 to 1 ^f	0.15	0.30	1.00	≤ 0.15	10	20
0 to 4	0.10	0.25	0.75	≤ 0.10	25	50
0 to 10	0.10	0.25	0.75	≤ 0.10	50	60
0 to 25	0.10	0.25	0.75	≤ 0.10	120	200
0 to 60	0.10	0.25	0.75	≤ 0.10	300	400
0 to 100	0.10	0.25	0.75	≤ 0.10	300	400
-0.1 to +0.1 ^f	0.20	0.50	1.00	≤ 0.20	6	10
-0.4 to +0.4 ^f	0.15	0.40	1.00	≤ 0.20	10	20
-1 to +1 ^f	0.15	0.30	1.00	≤ 0.15	10	20
-1 to +3	0.10	0.25	0.75	≤ 0.10	25	50
-1 to +9	0.10	0.25	0.75	≤ 0.10	50	60
-1 to +24	0.10	0.25	0.75	≤ 0.10	120	200

^a According to limit point setting.

^b All pressure transmitters are vacuum proof.

^c Includes: linearity, hysteresis, repeatability, deviation of measuring range start value and measuring range end value.

^d Includes: linearity, hysteresis, repeatability, deviation of measuring range start value and measuring range end value, thermal effect on measuring range start and measuring span.

^e MSP = measuring span.

^f Not for increased medium temperature.

Absolute pressure

Measuring range bar	Linearity ^a % MSP ^e	Accuracy with		Long-term stability % MSP per year	Overload capability ^b bar	Burst pressure bar
		20 °C ^c % MSP	-20 to +75 °C ^d % MSP			
0 to 0.4 ^f	0.15	0.40	1.00	≤ 0.15	10	20
0 to 1 ^f	0.15	0.30	1.00	≤ 0.15	10	20
0 to 4	0.10	0.25	0.75	≤ 0.10	25	50
0 to 10	0.10	0.25	0.75	≤ 0.10	50	60
0 to 25	0.10	0.25	0.75	≤ 0.10	120	200
0 to 60	0.10	0.25	0.75	≤ 0.10	200	300

^a According to limit point setting.

^b All pressure transmitters are vacuum proof.

^c Includes: linearity, hysteresis, repeatability, deviation of measuring range start value and measuring range end value.

^d Includes: linearity, hysteresis, repeatability, deviation of measuring range start value and measuring range end value, thermal effect on measuring range start and measuring span.

^e MSP = measuring span.

^f Not for increased medium temperature.

4.4 Outputs

Measuring range scaling (turn down)	1:4
Warm-up time	75 s
Step response time T ₉₀	150 ms

4 Technical data

4.5 Interfaces

4.5.1 Bluetooth

Function	Transfer of configuration data and device information, display of process values
Communication	Via end device with JUMO smartCONNECT app
Authentication	Via Bluetooth® radio module and NFC tag
Connection status (configurable)	
Permanently	Active
Temporarily	Restricted (via NFC)
Range	10 m under reference conditions
Radio frequency	
Bluetooth® radio module	2.4 GHz
NFC tag	13.56 MHz
Max. transmission power	
Bluetooth® radio module	0 dBm
NFC tag	–
JUMO smartCONNECT app	
System requirements	
iOS device	iPhone 7 or later (recommended) with iOS 14
Android device	Android 12 or later

4.5.2 SPE

Function	Transfer of process data, configuration data, and device information, voltage supply via PoDL
Communication	Via end device and JUMO Cloud, via Modbus master
SPE standard	10BASE-T1L
Transmission protocol	Integrated JUMO Cloud gateway, Modbus TCP
Data transfer rate	10 Mbit/s

4.6 Display

Type	LCD
Display range	22.5 × 26.0 mm
Resolution	
Process value display	4 × 18-segment
Text line	7 × 5×8 Dot-Matrix
Brightness	11 levels (configurable)
Alignment	0°, 180°

4.7 Environmental influences

The product is UL-approved. The approval stipulates that the product may be used indoors only.

Admissible temperatures	DIN 60068-2-1, DIN 60068-2-2
Medium	
Standard, H ₂ ready ^a	-25 to +100 °C (CIP/SIP processes: max. 135 °C for <1 h/d and T _{amb} <60 °C)
Increased	-25 to +200 °C
Ambient	-25 to +75 °C
Storage	-40 to +85 °C
Climatic conditions	DIN EN 60721-3-3
Climate class	3K6
Air temperature	-25 to +55 °C
Relative humidity	
Storage	≤ 90 %
Operation	≤ 100 % – condensation on device outer shell
Protection type	DIN EN 60529 IP65, IP67
Electromagnetic compatibility (EMC)	DIN EN 61326-2-3:2022
Interference emission	Class B ^b
Interference immunity	Industrial requirements
Vibration resistance	DIN EN 60068-2-6 20 g at 58,1 to 2000 Hz
Shock resistance	DIN EN 60068-2-27 50 g for 11 ms, 100 g for 1 ms
Site altitude	≤ 2000 m above sea level

^a Suitable for mobile hydrogen applications in accordance to CSA/ANSI HGV 3.1.

^b The product is suitable for industrial use as well as for households and small businesses.

4 Technical data

4.8 Mechanical features

4.8.1 Materials

Housing	
Top section of the housing	
Plastic	PBT-GF30, 1.4301 (304)
Stainless steel	1.4404 (316L)
Case bottom section	1.4301 (304), PBT-GF30
Seal	EPDM
Display	PMMA
Sensor	Silicon
Membrane	1.4435 (316L)
Filling oil	Silicone oil, FDA-compliant oil
Process connection	
Without EHEDG certification	1.4571 (316Ti)
With EHEDG certification	1.4404 (316L)
Welding ring	1.4404 (316L)
O-ring, sealing ring	FPM, others available as an optional extra (e.g. EPDM, VMQ)

4.8.2 Surface finish

Wetted parts

Process connection	
Front-flush	
Taper socket with union nut DN 25, DIN 11851	Ra ≤ 0,8 µm, Ra ≤ 0,4 µm on request
Taper socket with union nut DN 40, DIN 11851	Ra ≤ 0,8 µm, Ra ≤ 0,4 µm on request
Tank connection with grooved union nut DN 25 round thread 52 × 1/6	Ra ≤ 0,8 µm
Front-flush, with EHEDG certification	
Clamping socket (clamp) DN 10/15/20, DIN 32676, 1" ISO 2852	Ra ≤ 0,8 µm, Ra ≤ 0,4 µm on request
Clamping socket (clamp) DN 25/32/40, DIN 32676, 1 1/2" ISO 2852	Ra ≤ 0,8 µm, Ra ≤ 0,4 µm on request
Clamping socket (clamp) DN 50, DIN 32676, 2" ISO 2852	Ra ≤ 0,8 µm, Ra ≤ 0,4 µm on request
JUMO PEKA Hygienic process connection	Ra ≤ 0,8 µm

4.8.3 Device

Weight ^a Device version standard, with process connection G 1/2 Plastic Stainless steel	 ~ 160 g ~ 240 g
Alignment Top section of the housing	Can be rotated by 330°

^a Depends on version and DN.

4.8.4 Sensor

Measuring principle	Piezoresistive (absolute pressure sensor, relative pressure sensor)
Admissible load changes	> 10 million

4.8.5 Process connections

Temperature range depends on pressure range and sealing material.

Front-flush

Designation	Max. pressure	Temperature range
G 3/4 front-flush DIN EN ISO 228-1	25 bar	-10 to +150 °C
	40 bar	-10 to +100 °C
G 1/2 front-flush with double seal	25 bar	-10 to +150 °C
	40 bar	-10 to +100 °C
G 3/4 front-flush with double seal	25 bar	-10 to +150 °C
	40 bar	-10 to +100 °C
G 1 front-flush with double seal	40 bar	-10 to +100 °C
Taper socket with union nut DN 25 DIN 11851	40 bar	-10 to +140 °C
Taper socket with union nut DN 40 DIN 11851	40 bar	-10 to +140 °C
Tank connection with grooved union nut DN 25 round thread 52 × 1/6	25 bar	Up to 150 °C
	40 bar	Up to 100 °C

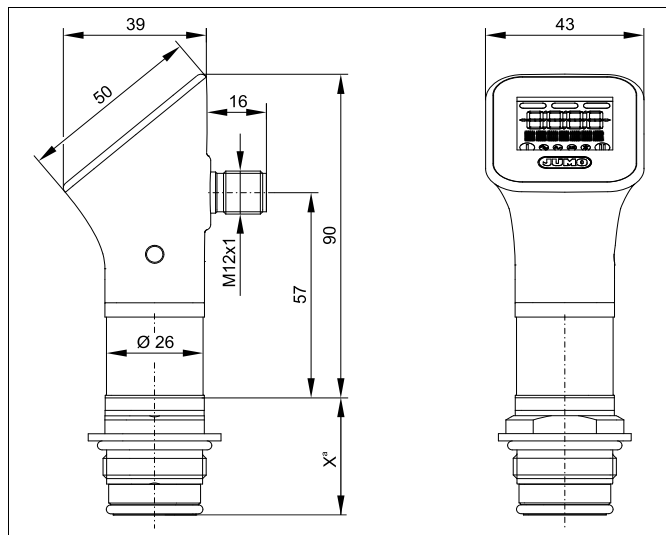
4 Technical data

Front-flush, with EHEDG certification

Designation	Max. pressure	Temperature range
Clamping socket (clamp) DN 10/15/20 DIN 32676, 1" ISO 2852	25 bar	-10 to +140 °C
Clamping socket (clamp) DN 25/32/40 DIN 32676, 1 1/2" ISO 2852	25 bar	-10 to +140 °C
Clamping socket (clamp) DN 50 DIN 32676, 2" ISO 2852	16 bar	-10 to +140 °C
JUMO PEKA Hygienic process connection	25 bar	-10 to +200 °C
	40 bar	-10 to +100 °C

4.9 Dimensions

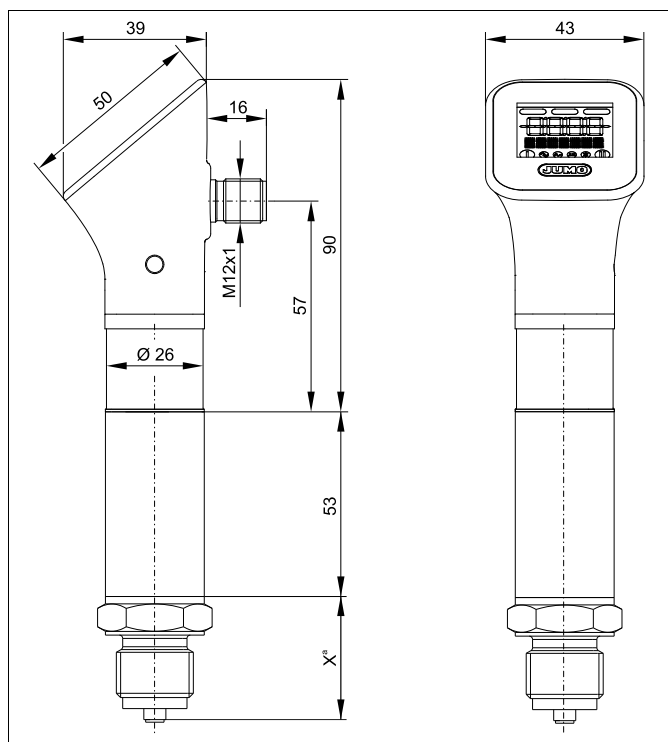
4.9.1 Device version standard



^a Height process connection ⇒ Page 20

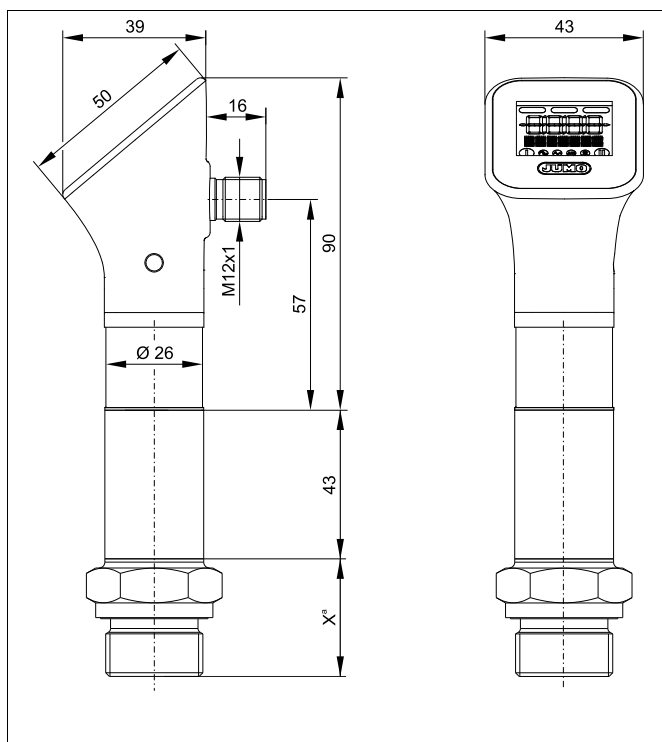
4.9.2 Device version with increased medium temperature

Not front-flush



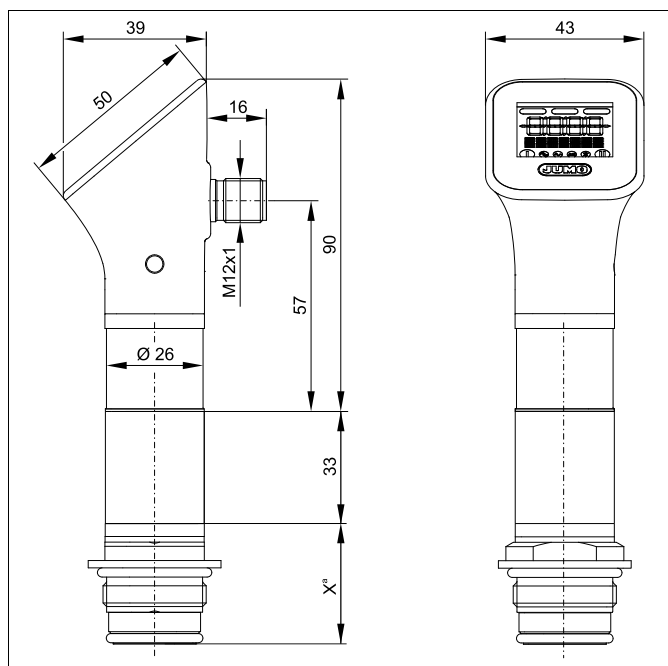
^a Height process connection ⇒ Page 20

Front-flush



^a Height process connection ⇒ Page 20

Front-flush, with EHEDG certification



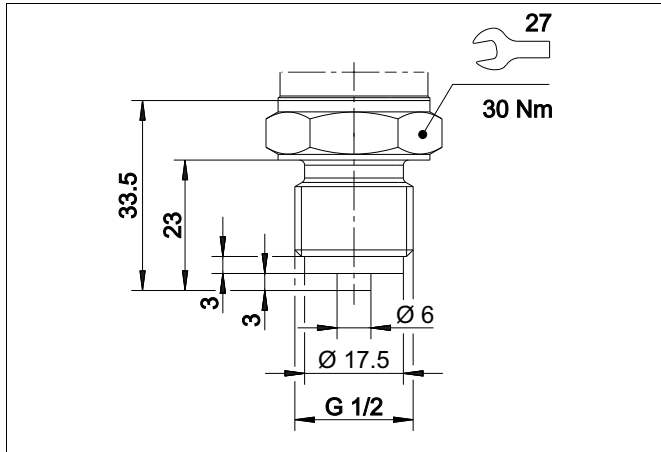
^a Height process connection ⇒ Page 22

4 Technical data

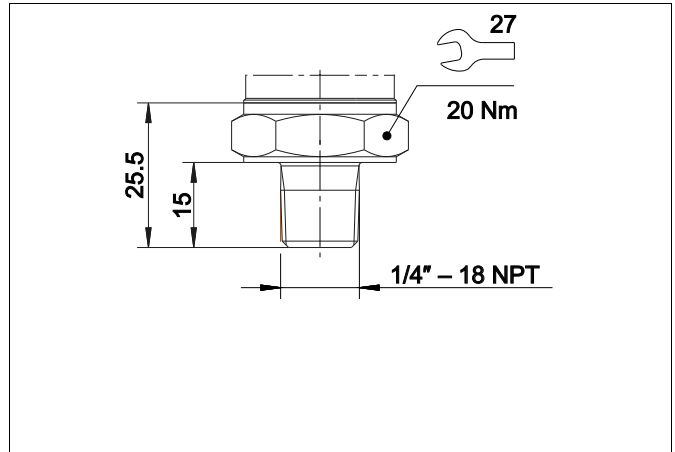
4.9.3 Process connections

Not front-flush

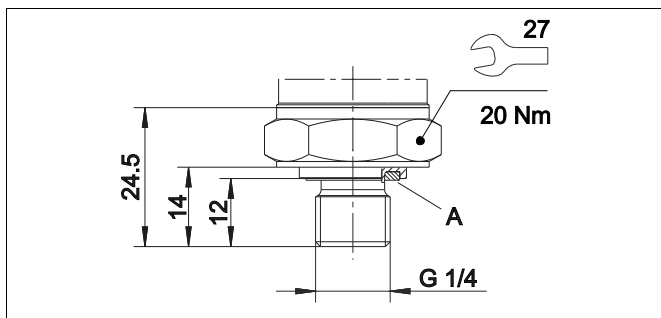
G 1/2 DIN EN 837



1/4" – 18 NPT DIN EN 837

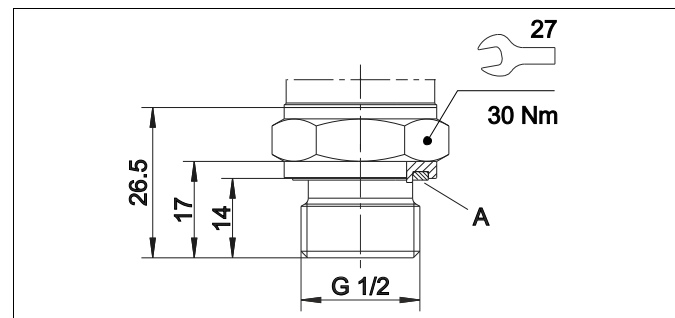


G 1/4 DIN EN 3852-11



A Sealing ring

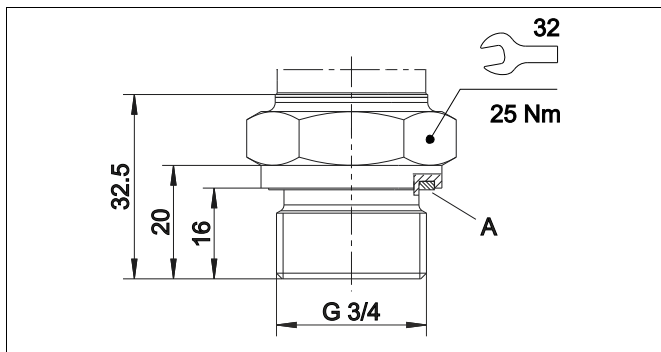
G 1/2 DIN EN 3852-11



A Sealing ring

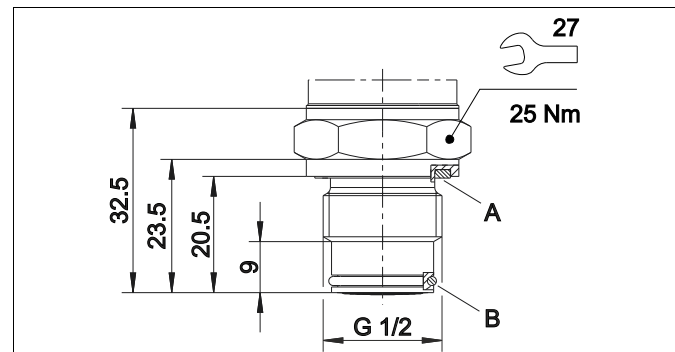
Front-flush

G 3/4 front-flush DIN EN ISO 228-1



A Sealing ring

G 1/2 front-flush with double seal

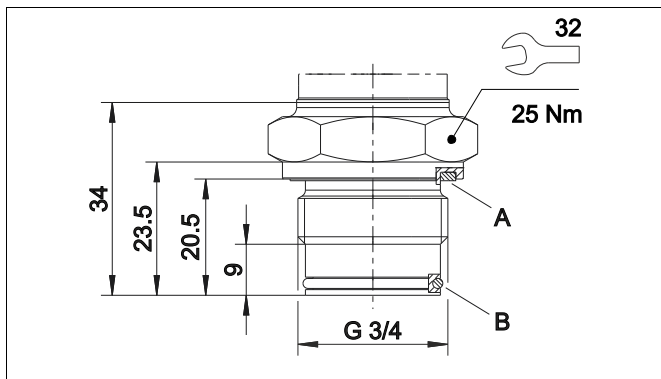


A Sealing ring

B O-ring 15.1 × 1.78

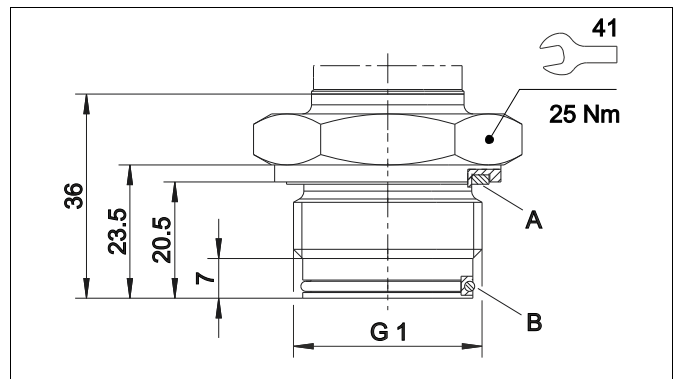
4 Technical data

G 3/4 front-flush with double seal



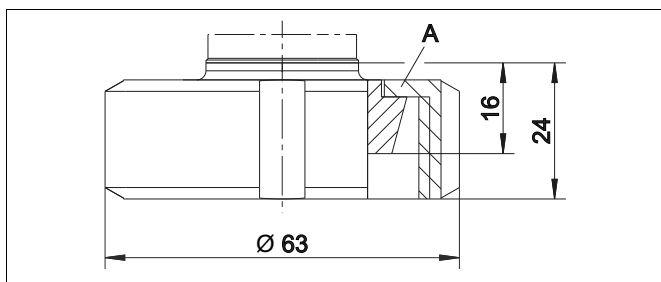
- A Sealing ring
- B O-ring 20.35 × 1.78

G 1 front-flush with double seal



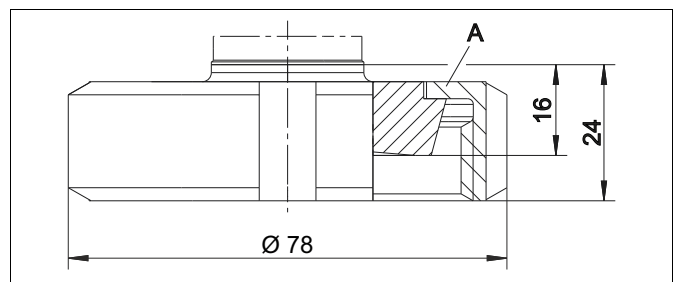
- A Sealing ring
- B O-ring 26.7 × 1.78

Taper socket with union nut DN 25
DIN 11851



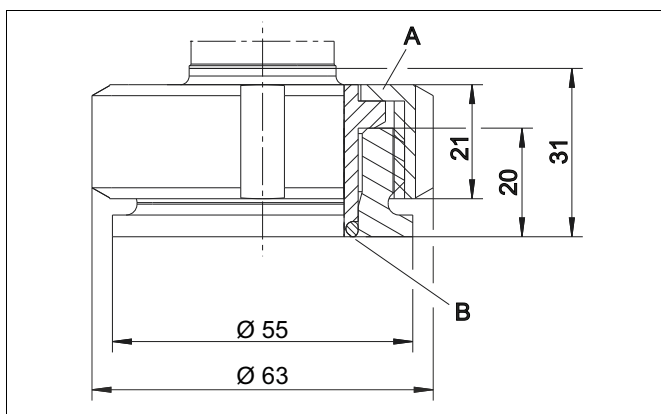
- A Grooved union nut

Taper socket with union nut DN 40
DIN 11851



- A Grooved union nut

Tank connection with grooved union nut, DN 25
Round thread 52 × 1/6

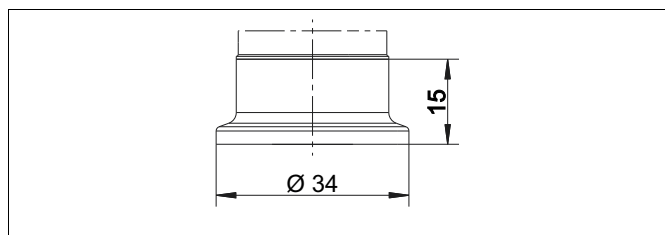


- A Grooved union nut
- B O-ring 29.82 × 2.62

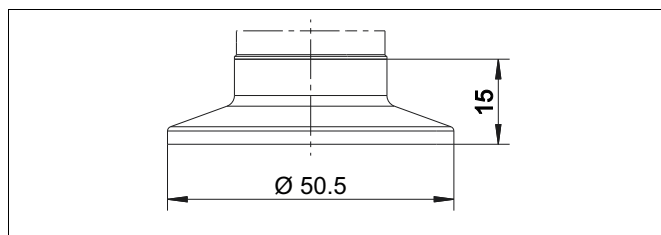
4 Technical data

Front-flush, with EHEDG certification

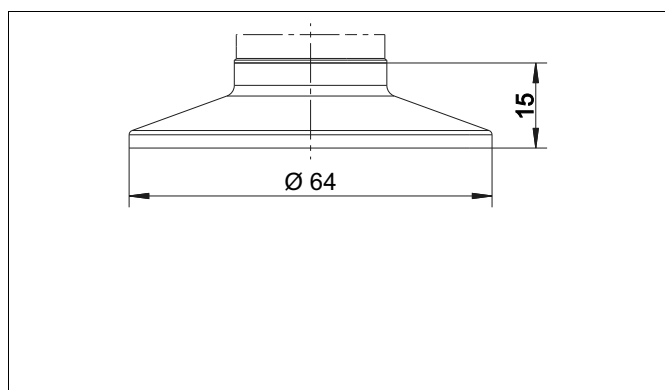
Clamping socket (clamp) DN 10/15/20
DIN 32676, 1" ISO 2852



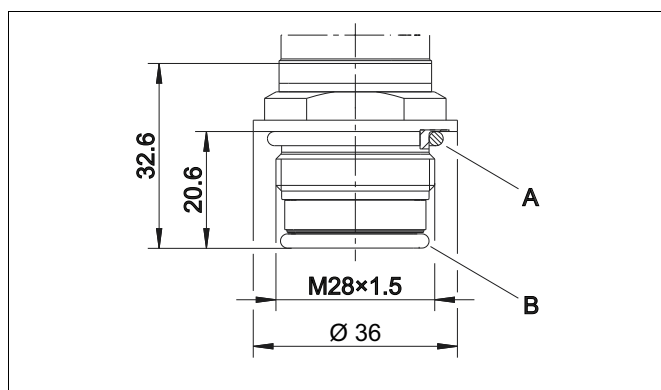
Clamping socket (clamp) DN 25/32/40
DIN 32676, 1 1/2" ISO 2852



Clamping socket (clamp) DN 50
DIN 32676, 2" ISO 2852



JUMO PEKA
Hygienic process connection
⇒ [Data sheet 409711](#)



- A O-ring 26 × 2.5
- B O-ring 21 × 2.5 FPM (not included in the scope of delivery)

5.1 Important information for usage according to EHEDG

The device in combination with one of the following process connections is suitable for use in food production due to its EHEDG approval:

- Clamp connections DN 20, DN 25, DN 32, DN 40, DN 50, DN 100 or 3/4", 1", 1 1/2", 2 1/2", 4" with Tri-Clamp seal Combifit International B.V.
- JUMO PEKA with FKM or EPDM O-ring
- VARINLINE® housing with process connection type N or type G with EPDM O-ring
- VARIVENT® process connections type B, type F, and type N with EPDM O-ring
- Aseptic screw connections DN 25 to DN 50, DIN 11864-1 and DIN 11864-3

The device is suitable for CIP (Cleaning in Place) when installed accordingly.

Observe temperature and material resistance.

Observe EHEDG-compliant integration into the respective systems:

Prefer installation without cavity.

Ensure self-draining installation of the connection spigots.

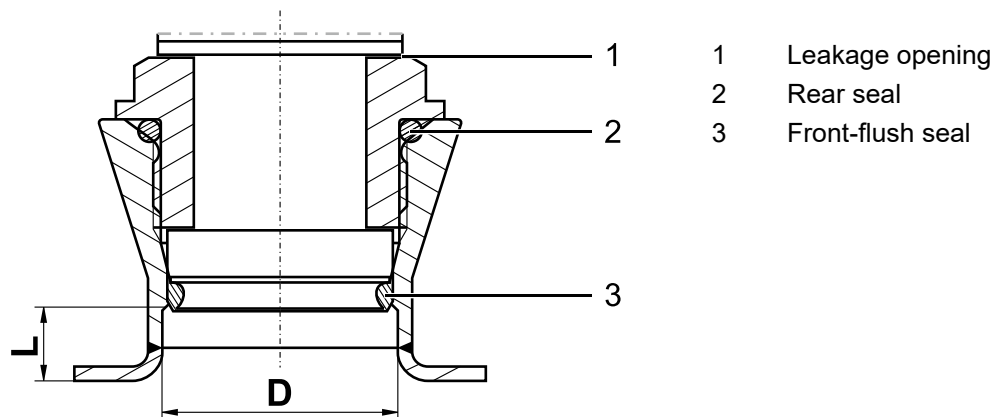
Use only EHEDG approved process connections according to the current EHEDG position paper.

When used on tanks, the installation must be flush with the front. Cleaning by direct illumination must be ensured. It must be possible to detect cavity.

Install leakage opening in a clearly visible position. In the case of vertical lines, install pointing downwards.

The following drawing shows an installation example.

Observe dimensions to avoid cavity: $L < D$



5 Installation

5.2 Preparing for installation

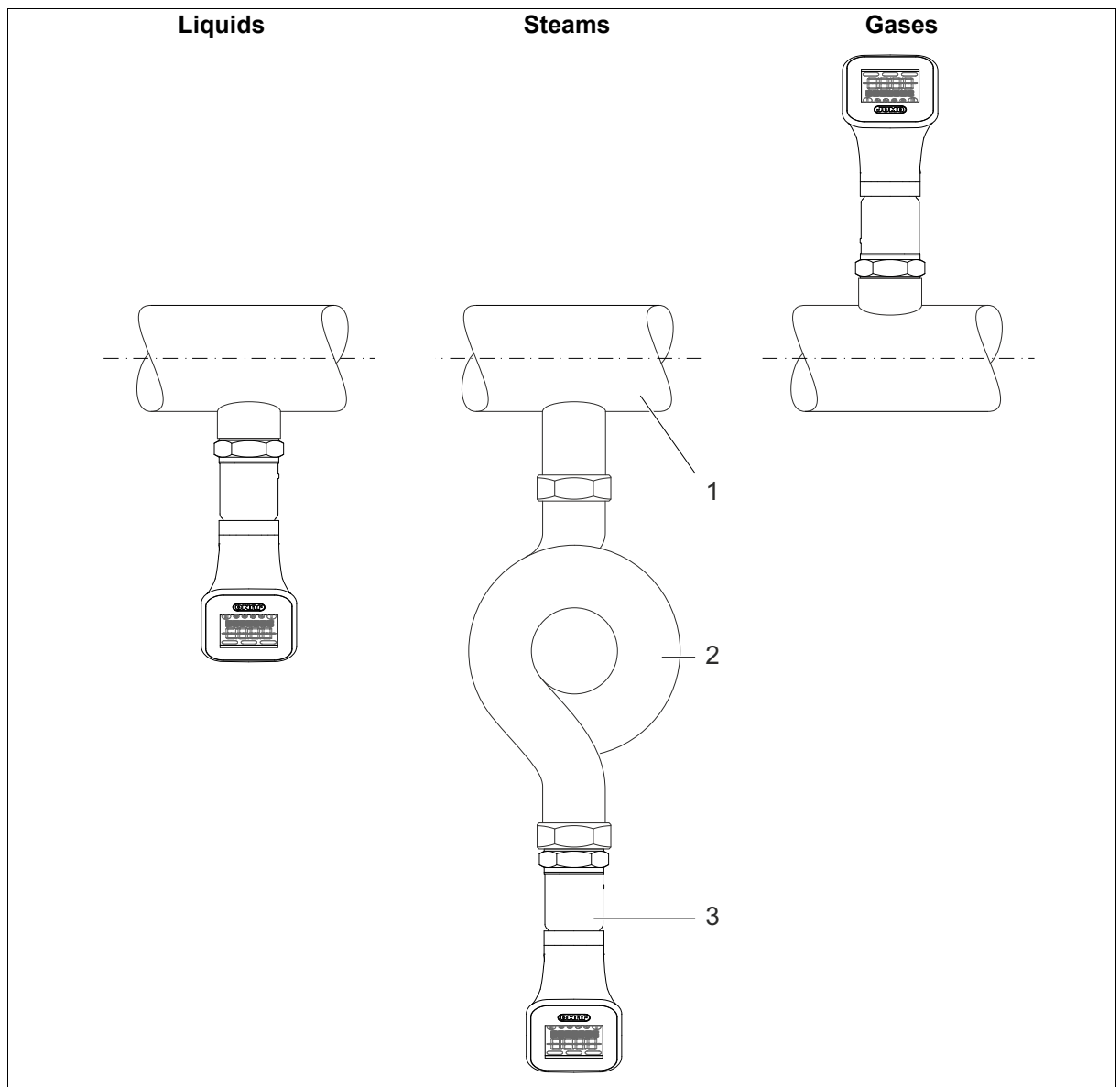
5.2.1 Installation site

Requirements:

- The device is protected from UV radiation and weather influences in outdoor applications through structural measures.
- Observe the admissible environmental influences, see ⇨ "Environmental influences ", Page 15.

5.2.2 Installation position

The device can be installed in any position within systems and solutions. Depending on the physical condition of the measurement medium, the following installation positions are recommended for pressure measurement:



- 1 Pipe
- 2 Siphon
- 3 Device

5.3 Installing the device

Example describes installation of the device version with a G 1/2 process connection DIN EN 837 in a pipe with port. Auxiliary equipment and tightening torques dependent on the selected process connection, ⇒ page 20.

Auxiliary equipment	Torque wrench with open-ended insert, wrench size 27
---------------------	--

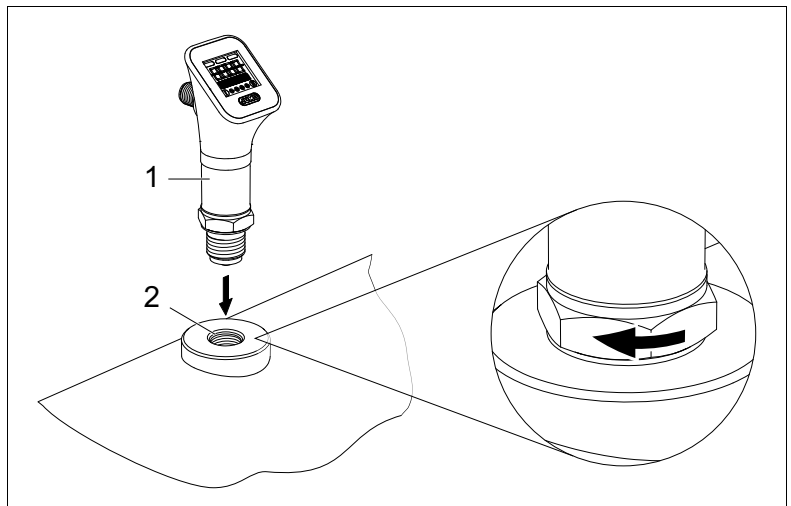
Requirements:

- The system has been de-energized and secured against being switched on again.
- The medium circulation of the plant is stopped.
- The pipe is drained and rinsed.
- Suitable protective equipment has been set up.
- The pipe is prepared for installation.

Procedure:

1. Manually (1) screw the device into the port (2) and tighten with suitable auxiliary equipment.

Tightening torque: 30 Nm

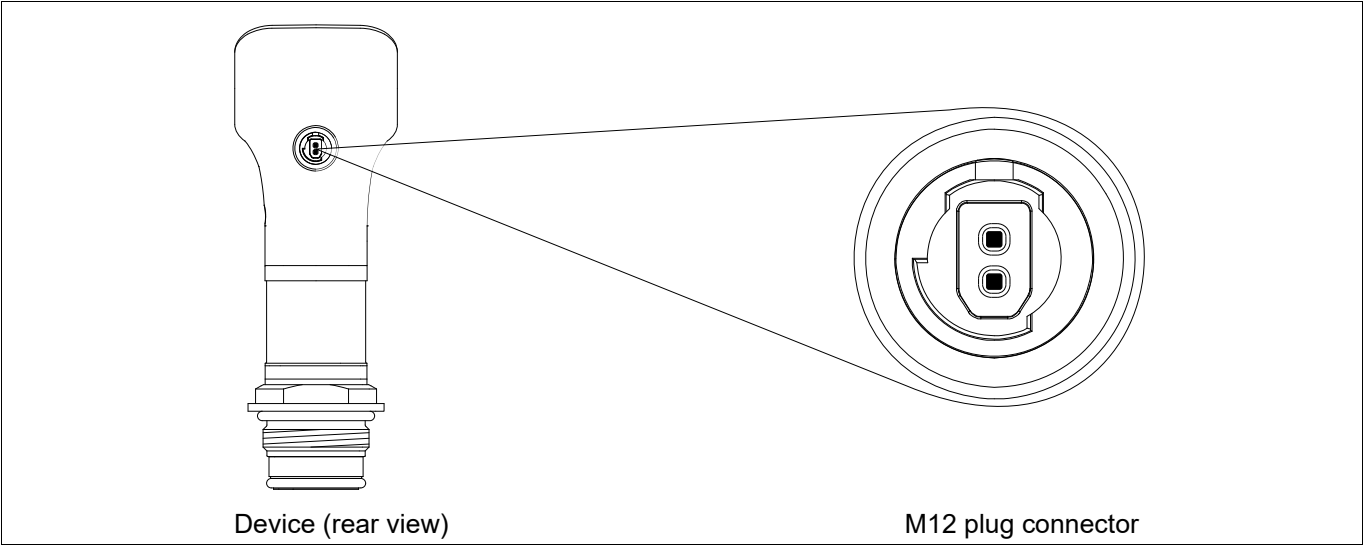


2. Switch on the plant, fill the pipe and check the tightness of the process connections under operating conditions.

The device is now installed in the pipe.

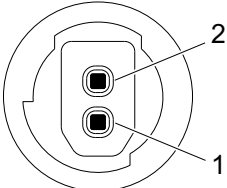
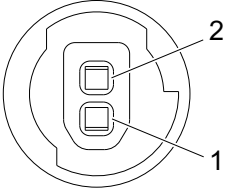
6 Electrical connection

6.1 Connection elements



6.1.1 Terminal assignment

M12 plug connection

Designation	Description	Assignment		
SPE	RxTx+/PoDL+	1 WH (white)		
	RxTx-/PoDL-	2 BU (blue)		
			Device	Connecting cable

6.2 Connecting the device

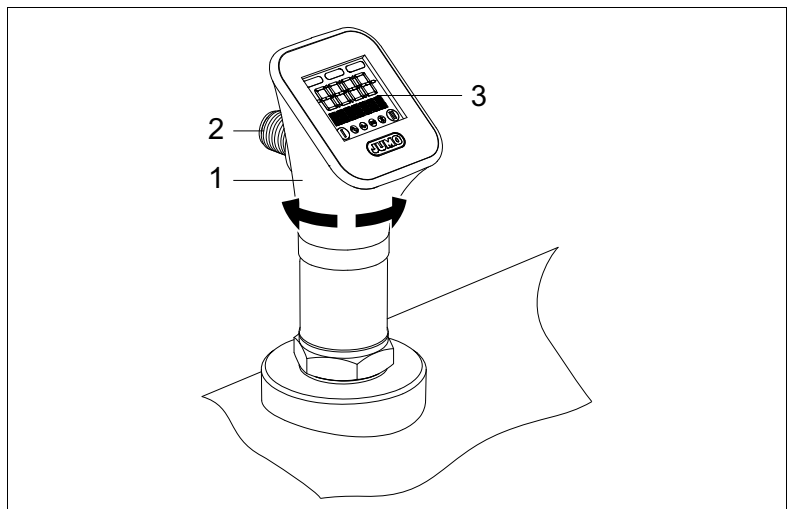
Auxiliary equipment	Torque wrench with socket wrench insert, wrench size 5
Material	Connecting cable for plug connector M12

Requirements:

- The system has been de-energized and secured against being switched on again.
- The connections for the voltage supply and signal processing have been correctly prepared.
- The process connection of the device is grounded.
- The connection cable is temperature resistant according to the process.
- The connection cable is installed at a minimum distance of 30 cm from high-voltage or high-frequency cables.

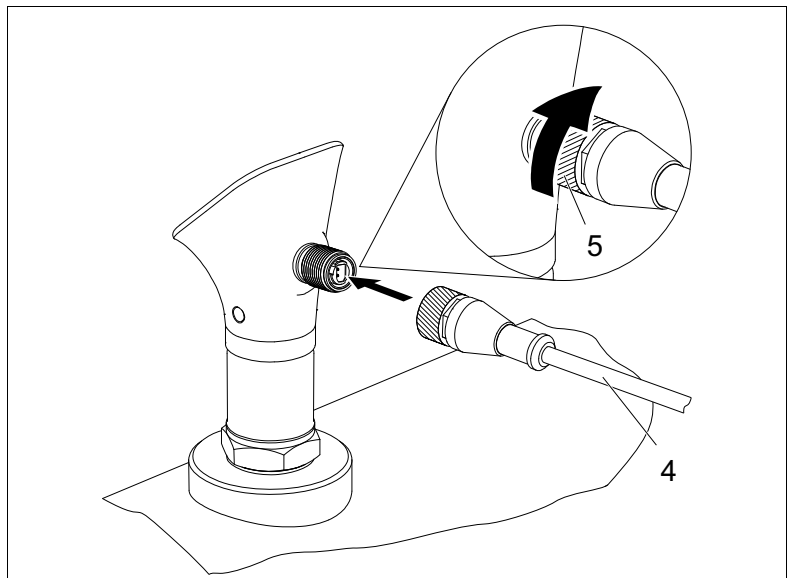
Procedure:

1. Position the top section of the device (1) so that the M12 plug connector (2) is easily accessible and the process display (3) is easy to read.



2. Insert the connecting cable (4) into the M12 plug connector and screw the connecting cable's union nut (5) to the M12 plug connector.

Tightening torque: 0.4 Nm.



3. Connect the connecting cable to the device that is processing the signals and to the voltage supply.
4. Lay the connecting cable so that it is protected from mechanical load.

The device is ready for operation as soon as the voltage supply is established,

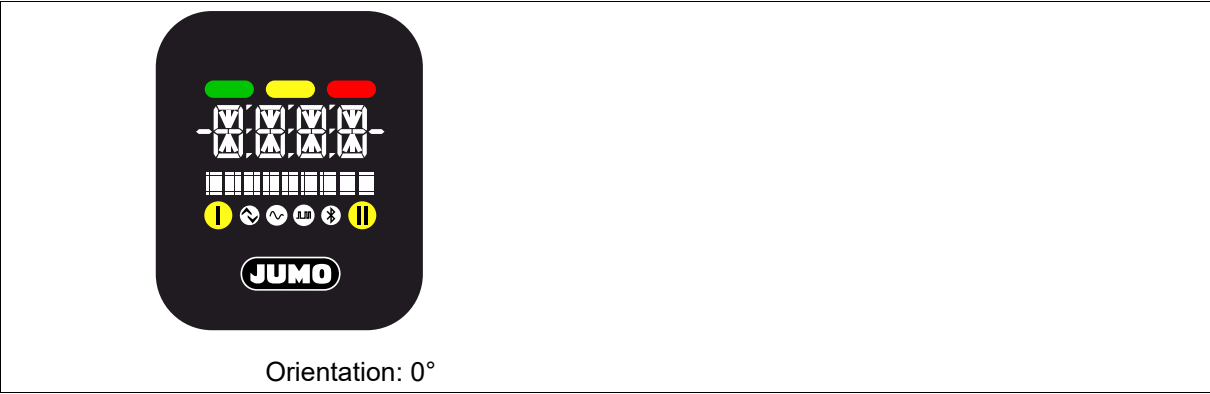
⇒ "Startup display ", Page 28.

7 Operation

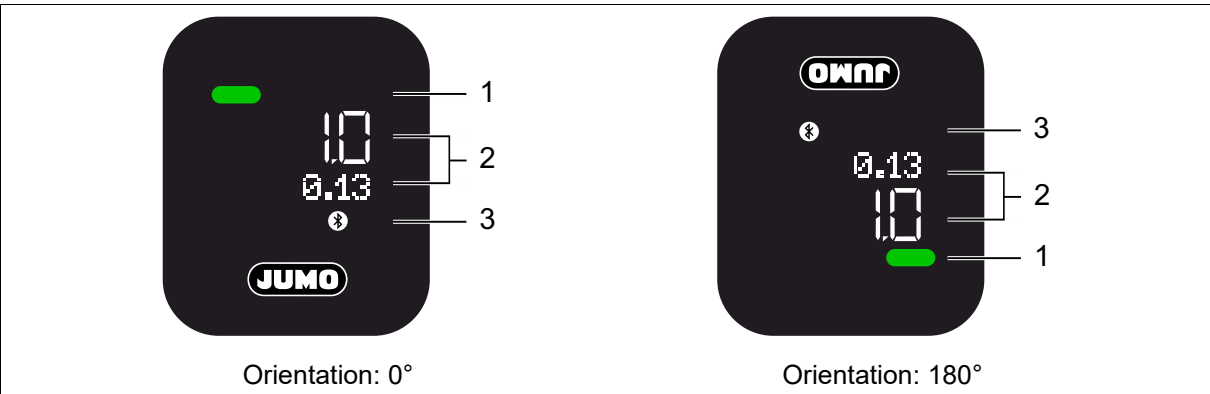
7.1 Display elements

7.1.1 Startup display

The start-up display shows all of the display segments and switches to the device info display after a few milliseconds.



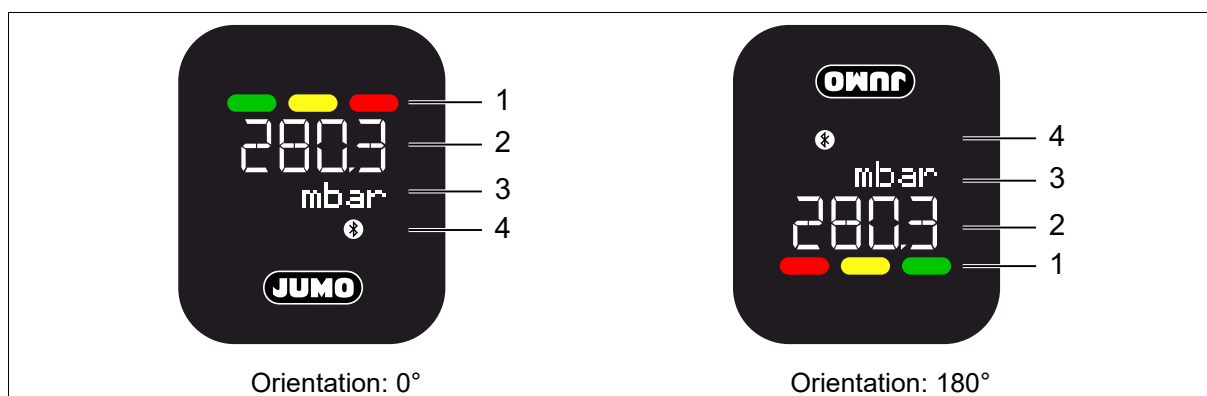
7.1.2 Device info display



Pos.	Designation	Description
1	Device info display	Shows the device status.
2		Shows the device software version, MAC and IP address.
3		Shows the configuration and status of the interfaces.

The device info display switches to the process display after approximately three seconds.

7.1.3 Process display



Pos.	Designation	Description
1	Device status Multicolored	Indicates the device status based on the classification according to NAMUR NE 107: - Steady green = Normal operation - Flashing green = Maintenance required (M) - Steady yellow^a = Outside the specification (S) - Steady red = Failure (F) - Flashing red = Functional check (C)
2	Process value	Shows: - The measured process value - Error messages ⇒ "Error messages ", Page 29
3	Text line	Shows: - The configured unit - Error messages and warnings as running text
4	Toolbar	Shows: The configuration and status of the interface connection

^a Contrary to classification according to NAMUR NE 107, steady yellow instead of flashing red.

Toolbar

Symbol, display	Description
	Interface connection: Bluetooth® - Does not light up if NFC approval is needed for the connection or if Bluetooth® is permanently disabled. - Flashes when Bluetooth® is ready for a connection. - Lights up when a Bluetooth® connection has been established.

7.2 Error messages

Error messages and warnings are specified as running text in the text line – alternately with the unit configured for the display. If there are several error messages, only the error message with the highest priority is displayed.

The illuminated fields that display the device status indicate the error category.

Further information, ⇒ "Troubleshooting ", Page 43.

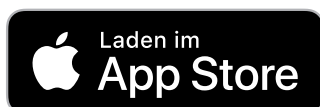
7 Operation

7.3 Interfaces

7.3.1 Bluetooth

The JUMO smartCONNECT app allows the device to be configured and its parameters to be set using an end device. Configuration data and device information are transmitted via Bluetooth. The Bluetooth radio module of the device is permanently active during initial startup.

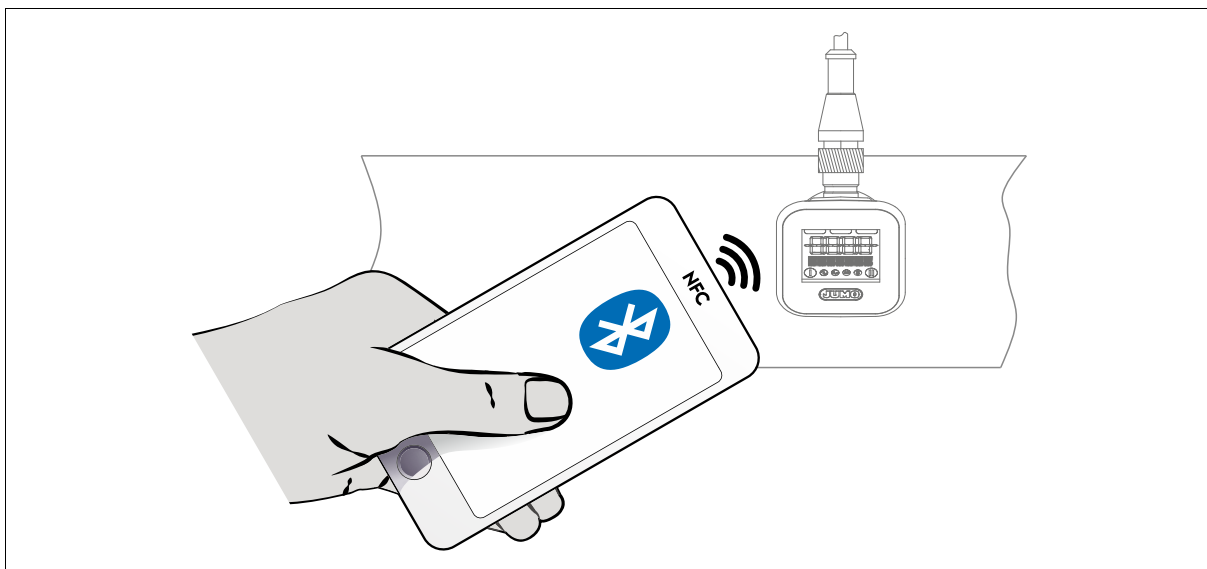
The app is available for free download from the [manufacturer's websites](#) or alternatively using the QR code:



Active: The Bluetooth® radio module is permanently active. The device is detected by the smartCONNECT app as soon as it is within range of the Bluetooth® radio module.

Restricted (via NFC): The Bluetooth® radio module is inactive and can be temporarily activated via an NFC tag in the device. To establish a connection between the NFC tag and the end device, this device must be NFC-capable and held close to the device display.

Inactive: The Bluetooth® radio module can disabled and enabled via SPE.



7.3.2 JUMO Cloud

The device can be connected to the JUMO Cloud or any instance of the audako Cloud. Values can be read out and the device configured via the cloud. However, not all parameters are available.

The prerequisite for connecting to the cloud is configuring the device appropriately. This can be performed on the app or via Modbus TCP.

The gateway required to connect to the cloud is integrated into the device. The device is connected to the network via an SPE switch and the data packets are forwarded accordingly.

The MQTT protocol is used.

Data exchange

Data is transferred from the device to the cloud through the cloud gateway.

The data is buffered before transmission. This allows network failures to be bridged without immediately losing data.

The device sends its data to the cloud ("Historical data") via the buffer at the configured interval.

If the live mode is activated, the data is also sent directly – without buffering – to the device ("live data"). The interval for live mode can be configured.

All process values are always transmitted to the cloud in JUMO base units. This happens regardless of what is configured as the unit for the display or for Modbus TCP.

The relevant JUMO base units are:

bar	Pressure
-----	----------

Startup

In order for the cloud gateway to work, the following things must be set up in the cloud and then transferred to the device.

1. The device must be assigned to a tenant.
2. A data source must be created. This automatically generates the access data – consisting of device ID and password.
3. A data connection must be set up.
4. A signal must be created in the cloud for each value to be sent from the device to the cloud.

The following information is relevant:

- a) Signal type (analog or binary)
- b) Average value / last value
- c) Interval
- d) Address

The Smart Device Wizard in the cloud simplifies startup.

Further information

A detailed description of the JUMO Cloud can be found in the [help center](#).

8 Functional descriptions

The default settings are shown in **bold** in the following tables.

8.1 Limit value monitoring

Parameter	Value	Description
Function	Inactive Single Point Mode Windows Mode Two Point Mode	Inactive: Limit value monitoring function inactive Single Point Mode: Hysteresis mode ("Switching point SP1" and "Hysteresis") Windows Mode: Window mode ("Switching point SP1", "Release point SP2" and "Hysteresis") Two Point Mode: Two-point mode ("Switching point SP1" and "Release point SP2")
Logic	High-active Low-active	The limit value logic can be inverted. High-active: An active limit value monitoring function corresponds to the High signal (logic level 1). Low-active: An active limit value monitoring function corresponds to the Low signal (logic level 0).
Switching point SP1	-1 to +100 bar (0)	–
Switching point SP2	-1 to +100 bar (0)	Only when "Switching function" = "Windows Mode" and "Two Point Mode"
Hysteresis	0 to 100 bar (0)	Only when "Switching function" = "Single Point Mode" and "Windows Mode"
Switch-on delay	0 to 100 s (0)	State is not given to the limit value monitoring function output until after the time has elapsed.
Switch-off delay	0 to 100 s (0)	State is not given to the limit value monitoring function output until after the time has elapsed.
Error behavior	Inactive Active Frozen	Behavior of the limit value monitoring function output signal when there is a process value error. Inactive: Inactive signal (logic level 0) Active: Active signal (logic level 1) Frozen: Last valid value

Two limit value monitoring functions are available for each measurand. All limit value monitoring functions can be configured independently of each other.

Different switching modes are selectable, all of which can be inverted. In addition, the limit value monitoring functions have a switching delay.

Switching delay

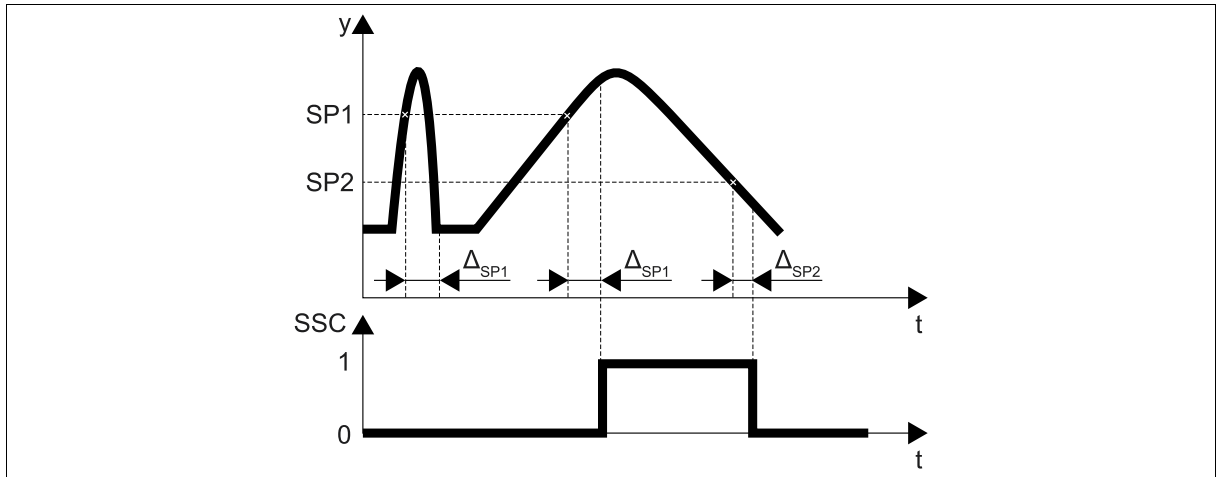
A switching delay for switching on and / or switching off can be configured.

If the switching condition is fulfilled, the set timer for the switch-on delay (Δ_{SP1}) starts to elapse. The state is only output after the time has elapsed. If the switching condition is no longer fulfilled before the time has elapsed, the timer is restarted.

The switch-off delay (Δ_{SP2}) works analogously.

The delay times prevent the output from being switched by measured value peaks or by measured value dips.

8 Functional descriptions



(Δ_{SP1}) Switch-on delay

(SP2) Release point

(Δ_{SP2}) Switch-off delay

(t) Time

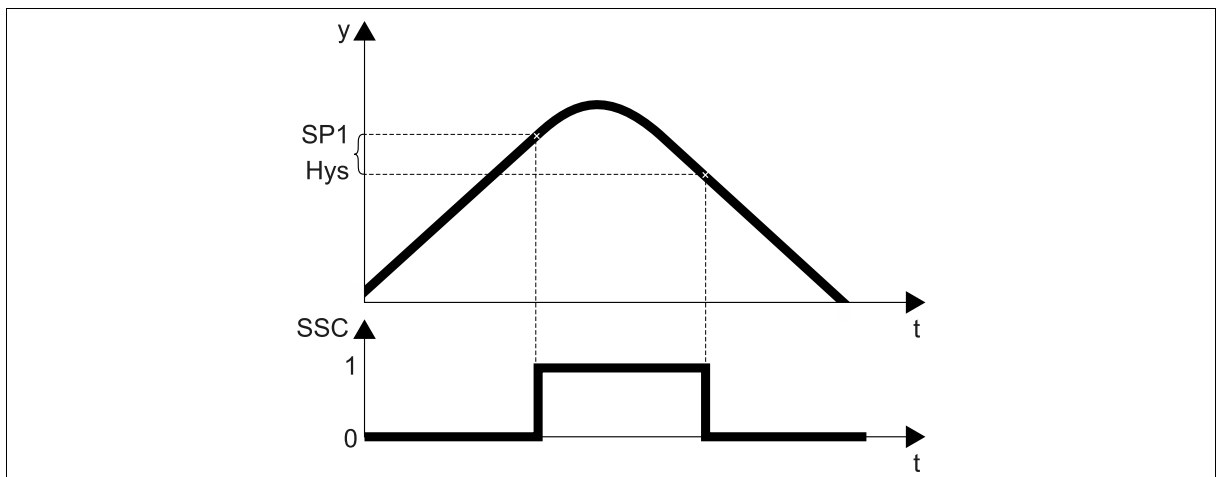
(SSC) Limit value monitoring function output signal

(y) Measured value

(SP1) Switching point

Hysteresis mode

If the process value exceeds the switching point SP1, the output of the limit value monitoring function becomes active. If the switching point SP1 reduced by the amount of the hysteresis is undershot again, the output of the limit value monitoring function becomes inactive again.



(SSC) Limit value monitoring function output signal

(t) Time

(Hys) Hysteresis

(y) Measured value

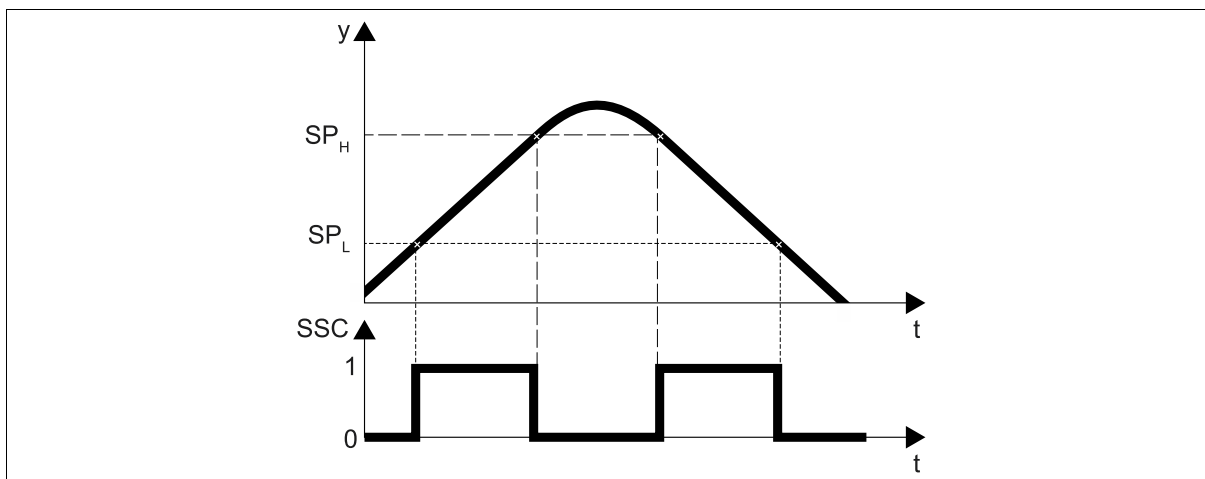
(SP1) Switching point

Window mode

Window mode checks whether the process value is within a certain range. SP_L is defined as the smaller value of switching points SP1 and SP2. SP_H is defined as the larger value of switching point SP1 and SP2.

The hysteresis of the switching points is adjustable.

8 Functional descriptions



(SSC) Limit value monitoring function output signal

(t) Time

(SP_H) High switching point

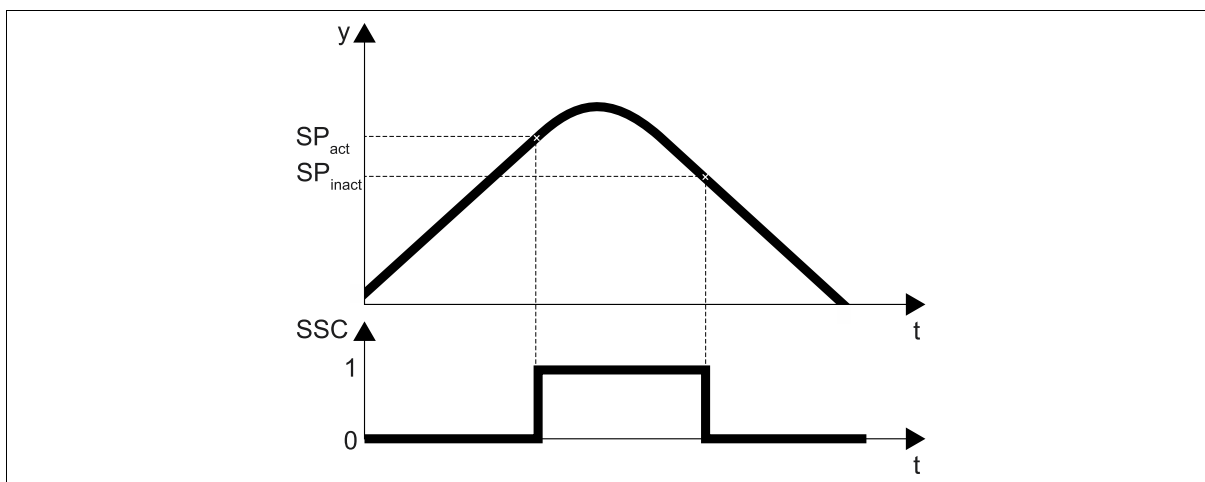
(y) Measured value

(SP_L) Low switching point

Two-point mode

In two-point mode, two switching points are defined. If the process value exceeds the SP_{act} switching point, the limit value monitoring function output becomes active. If the process value falls below the SP_{inact} switching point, the output becomes inactive.

SP_{act} is defined as the larger value of switching points SP_1 and SP_2 , SP_{inact} is correspondingly the smaller of the two values.



(SSC) Limit value monitoring function output signal

(t) Time

(SP_{act}) Active switching point

(y) Measured value

(SP_{inact}) Inactive switching point

9 Configuration via Bluetooth

The device has several interfaces and thus several operating options. The configuration parameters are mostly identical. Since the menu structure differs depending on the interface, the configuration parameters are listed sorted by function.

The default settings are shown in **bold** in the following tables.

9.1 Display on the device

Parameter	Value	Description
Signal selection	None Pressure (physical measurand) Pressure (in % based on the measuring range)	–
Brightness	0 to 10 (5)	Backlight brightness 0 : Display is switched off
Language	German English French Spanish	–
Pressure unit	mbar bar hPa kPa MPa psi	Unit of the physical measurand Pressure in percent is created as an independent measuring channel
Display orientation	0 degrees 180 degrees	–

9.2 Interfaces

9.2.1 Bluetooth

Parameter	Value	Description
Bluetooth mode	Inactive Restricted Active	Inactive : Bluetooth permanently switched off Restricted : Bluetooth is temporarily activated by NFC tag Active : Bluetooth permanently switched on

9 Configuration via Bluetooth

9.2.2 Single Pair Ethernet

Network settings

Parameter	Value	Description
Method	Manual Automatic (DHCP)	Manual: IP address is permanently set in the device Automatic (DHCP): IP address is assigned automatically by DHCP server
IP address	– (0.0.0.0)	Only if "Method" = "Manual"
Subnet mask	– (255.255.0.0)	Only if "Method" = "Manual"
Standard gateway	– (0.0.0.0)	Only if "Method" = "Manual"
DNS server IP automatic	Yes No	Only if "Method" = "Automatic (DHCP)"
DNS server	– (0.0.0.0)	Only if "Method" = "Manual" and "DNS server IP automatic" = "No"

Connection to the JUMO cloud

Parameter	Value	Description
Connection to the cloud	Active Inactive	–
Cloud server	JUMO Cloud Individual	JUMO Cloud: The JUMO Cloud is used. Individual: The cloud server is determined by an individual URL.
Server URL (device)	–	Only if "Cloud Server" = "individual"
Server URL (config)	–	Only if "Cloud Server" = "individual"
Device ID	–	Access data to the cloud (generated by the cloud)
Password	–	Access data to the cloud (generated by the cloud)
Permanent live mode	Active Inactive	If live mode is activated, live data is also transmitted to the cloud in addition to the historical values (for interval, see "Cycle time for live data").
Cycle time for live data	1000 to 25000 ms (1000)	Time for how often the live data is sent from the device to the cloud. Only if "Permanent Live Mode" = "active"

Modbus TCP

Parameter	Value	Description
Port	1 to 1024 (502)	TCP port of the device
Pressure unit	mbar bar hPa kPa MPa psi	The unit of the Modbus transmission can be configured independently of the display unit. Pressure in percent is created as a separate Modbus register.
Interface activated	Active Inactive	Cannot be set via Modbus TCP.

9.3 Pressure measurand

Parameter	Value	Description
Offset	-999 to +999 bar (0)	Offset correction to eliminate detected deviation. Measuring range monitoring occurs before the offset is added to the measured value.
Filter time constant	0 to 99.99 s (0)	The process value can be attenuated by a 2nd order filter. The larger the filter time constant, the slower the change in measured value at the output.
Simulation default value	-1.1 to +110 bar (0)	As an aid to device startup, the process value can be simulated.
Simulation activation	Inactive Statistical value	Simulation is always switched off after a restart.

10 Modbus address tables

Transmission

All data types are transmitted in big-endian format according to Modbus standard.

Access types

- RO = Read-Only (read-only access)
- RW = Read/Write (read and write access)
- WO = Write-Only (write-only access)

Limited write cycles

The numbers of write cycles of memory modules (e.g. EEPROM, flash memory) are limited.

- Do not send write operations to save or commit actions on a non-cyclical basis.

10.1 Version and fabrication number

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
21	0x0015	string	19	RO	Software version number	–
70	0x0046	string	11	RO	Hardware version number	–
110	0x006E	string	10	RO	Fabrication number	–

10.2 Configuration

Display

The following settings of the units concern the display on the device. For the Modbus interface the units can be set separately ⇒ "Modbus TCP ", Page 39.

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
1000	0x03E8	selection	1	RW	Language	0: German 1: English 2: French 3: Spanish
1001	0x03E9	selection	1	RW	Pressure unit	0: mbar 1: psi 2: bar 3: hPa 4: kPa 5: MPa
1002	0x03EA	string	10	RW	Device name	–
1012	0x03EB	string	18	RW	DNS name	Name to access the device in the Ethernet network – instead of the IP address
1100	0x044C	selector	6	RW	Process value	⇒ "Analog selector ", Page 42
1106	0x0452	selection	1	RW	Display orientation	0: 0° 1: 180°
1107	0x0453	integer	2	RW	Display brightness	0 to 10

10 Modbus address tables

Analog input

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
1200	0x04B0	float	2	RW	Offset	-999 to +999
1202	0x04B2	float	2	RW	Filter time constant	0 s to 100 s

Modbus TCP

The following settings of the units concern the Modbus interface. For the display on the device, the units can be set separately ⇨ "Display ", Page 38.

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
1600	0x0640	integer	2	RW	Port gateway	1 to 1024
1602	0x0642	selection	1	RW	Pressure unit	0: mbar 1: psi 2: bar 3: hPa 4: kPa 5: MPa

Network settings

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
1700	0x06A4	selection	1	RW	Method	0: Manual 1: Automatic
1701	0x06A5	string	8	RW	IP address	–
1709	0x06AD	string	8	RW	Subnet mask	–
1717	0x06B5	string	8	RW	Standard gateway	–
1725	0x06BD	boolean	1	RW	Assign DNS server IP automatically	–
1726	0x06BE	string	8	RW	DNS server	–

Bluetooth

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
2100	0x0834	selection	1	RW	Bluetooth mode	0: Inactive 1: Restricted 2: Active

10 Modbus address tables

Limit value function

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
2350	0x092E	float	2	RW	LVS 1: Switching point SP1	-1 bar to +100 bar
2352	0x0930	float	2	RW	LVS 1: Switching point SP2	-1 bar to +100 bar
2354	0x0932	selection	1	RW	LVS 1: Inversion	0: HighActive 1: LowActive
2355	0x0933	selection	1	RW	LVS 1: Switching function	0: Deactivated 1: Hysteresis mode 2: Window mode 3: Two-point mode
2356	0x0934	float	2	RW	LVS 1: Hysteresis	0 bar to 100 bar
2358	0x0936	selection	1	RW	LVS 1: Error behavior	0: Inactive 1: Active 2: Frozen
2359	0x0937	float	2	RW	LVS 1: Switch-on delay	0 s to 100 s
2361	0x0939	float	2	RW	LVS 1: Switch-off delay	0 s to 100 s

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
2375	0x0947	float	2	RW	LVS 2: Switching point SP1	-1 bar to +100 bar
2377	0x0949	float	2	RW	LVS 2: Switching point SP2	-1 bar to +100 bar
2379	0x094B	selection	1	RW	LVS 2: Inversion	0: HighActive 1: LowActive
2380	0x094C	selection	1	RW	LVS 2: Switching function	0: Deactivated 1: Hysteresis mode 2: Window mode 3: Two-point mode
2381	0x094D	float	2	RW	LVS 2: Hysteresis	0 bar to 100 bar
2383	0x094F	selection	1	RW	LVS 2: Error behavior	0: Inactive 1: Active 2: Frozen
2384	0x0950	float	2	RW	LVS 2: Switch-on delay	0 s to 100 s
2386	0x0952	float	2	RW	LVS 2: Switch-off delay	0 s to 100 s

10 Modbus address tables

10.3 Actions

The device only saves the configuration once the relevant action has been performed.

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
3000	0x0BB8	action	2	RW	Save configuration	Save (0xC7E7BC2E) Discard (0xF0864181) Default setting (0x34BFE138)
3627	0x0E2B	action	2	RW	Teach function	Teach SP1 (0x57FBE8) Teach SP2 (0x35800A1)
3650	0x0E42	action	2	RW	Zero point adjustment	Set zero point (0xCEF6D261)

The status of a triggered action can be checked. For this purpose, the Modbus register of the corresponding action can be read back.

Read-back value	Meaning
0x00000000	The action was performed successfully.
0xFFFFFFFF	An error has occurred when performing the action.
<i>The previously written value</i>	The action has not been performed.

10.4 Process values

Measured values

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
6000	0x1770	float	2	RO	Pressure	–
6002	0x1772	float	2	RO	Pressure in percent	–

Transfer of configuration

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
6450	0x1932	boolean	1	RO	Device restart required due to a configuration change	–

10 Modbus address tables

Limit value monitoring function

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
3625	0x0E29	unsigned short integer	1	RW	Measuring channel for which teach process is to be executed	1: Measuring channel 1 (limit value switch 1) 2: Measuring channel 1 (limit value switch 2)
3626	0x0E2A	unsigned short integer	1	RO	Result of the teach process	0: Inactive 1: SP1 successful 2: SP2 successful 7: Error
6900	0x1AF4	boolean	1	RO	Limit value switch 1 output	–
6901	0x1AF5	boolean	1	RO	Limit value switch 2 output	–

10.5 Error

Modbus PDU address		Data type	Number of Modbus registers	Access	Data	Encoding
Dec	Hex					
6400	0x1900	boolean	1	RO	General error	–
6401	0x1901	boolean	1	RO	Pressure faulty	–
6402	0x1902	boolean	1	RO	Configuration faulty	–
6403	0x1903	boolean	1	RO	Calibration faulty	–
6404	0x1904	boolean	1	RO	Device not calibrated	–
6405	0x1905	boolean	1	RO	Simulation active	–
6407	0x1907	boolean	1	RO	Device operating conditions	–

10.6 Analog selector

Transmit the three-part hash values together in a Modbus message.

Selector	Hash value	
	Hex	Dec
No signal	0x0 – 0x0 – 0x0	0 – 0 – 0
Pressure input	0x4E27A4CC – 0xFFC2981 – 0x8C1C81C3	1311220940 – 268183937 – 2350678467
Pressure input in per-cent	0xE595E143 – 0xF2461B10 – 0x745595D5	3851804995 – 4064680720 – 1951765973

11.1 Process value error

Process value errors are displayed instead of the process value.

Appearance	Cause	Remedy
----	The input value is invalid. The sensor is defective or communication to the sensor is impaired.	Contact the manufacturer.
	There is an internal device error.	Contact the manufacturer.
<<<<	The measuring range was undershot.	Operate the device within the device specifications.
>>>>	The measuring range was exceeded.	Operate the device within the device specifications.

11.2 Error messages

Symbol	Classification according to NAMUR NE 107
 Steady red	Error/failure

Error message	Cause	Remedy
Configuration faulty	The checksum of the configuration data is faulty.	Transfer the configuration data to the device again.
Calibration data faulty	The checksum of the calibration data is faulty.	Contact the manufacturer.
Device not calibrated	There is no calibration data.	Contact the manufacturer.
Pressure faulty	The measuring range has been fallen below or exceeded or the pressure sensor has failed.	Operate the device within the device specifications.

Symbol	Classification according to NAMUR NE 107
 Flashing red	Functional check

Error message	Cause	Remedy
Simulation active	Simulation mode is active.	Deactivate simulation mode. Alternatively: Restart device.

11 Troubleshooting

Symbol	Classification according to NAMUR NE 107
 Flashing green	Maintenance required

Error message	Cause	Remedy
Restart the device	The device must be restarted due to a configuration change.	Restart the device.

Symbol	Classification according to NAMUR NE 107
 Steady yellow ^a	Outside the specification

^a Contrary to classification according to NAMUR NE 107, steady yellow instead of flashing red.

Error message	Cause	Remedy
Device operating conditions	The device is being operated outside the device specifications.	Operate the device within the device specifications.

12.1 Maintenance

The device is maintenance-free.

12.2 Cleaning device housing

The device housing can be cleaned when the device has been installed.

Clean the device with a cloth dampened with water.

12.3 Decontamination

Use:

- When the medium is changed in the plant.
- Before replacing sealing rings/O-rings.
- Before returning the device.
- Before disposing of the device.

Requirements:

- The device is uninstalled, ⇒ Page 47.
- If the medium is a hazardous substance: The information in the safety data sheet is taken into account.
- Suitable protective equipment has been set up.
- Ein geeignetes Reinigungsmittel ist einsatzbereit.
- Ein Reinigungsplatz zum Spülen und Neutralisieren aller medienberührten Teile ist vorbereitet.

Procedure:

1. **CAUTION!** Do not damage the sealing ring grooves when removing the sealing rings/O-rings.
Remove the sealing rings/O-rings from the sealing ring grooves.
2. **CAUTION!** Use only cleaning agents that are compatible with the materials used to make the device.
Thoroughly flush and neutralize all parts that come into contact with the medium using a suitable cleaning agent.
3. When disposing the device: ⇒ Page 47.
4. When continuing to use the device: ⇒ Page 45.

12.4 Replacing sealing rings/O-rings

Requirements:

- All components in contact with the medium are decontaminated, ⇒ Page 45.

Proceeding:

1. Check the sealing rings/O-rings previously used for damage and replace them if necessary.
2. Install the device, ⇒ Page 25.

12 Maintenance and cleaning

12.5 Firmware update

JUMO smartCONNECT app

Requirements:

- The latest firmware was downloaded from the manufacturer's website and extracted (Product page > Downloads > Software).
- The JUMO smartCONNECT app is installed and open, ⇨ "Bluetooth ", Page 30.

Procedure:

1. Open the menu by tapping the icon .
2. Select **Firmware update**.
3. Use **Select file** to open the file **xxx.x.x.x.x.bin**.
4. Select **Start transfer**.
5. Connect the device.
 - a) If Bluetooth is set to **Active** connect the device via **Nearby**.
 - b) If the Bluetooth setting is set to **Restricted** connect the device using **Add new device** via NFC.
6. Confirm the transfer by clicking **Start transfer**.
7. Confirm the message with **Start transfer**.

CAUTION! The device's display remains off during the transfer.
The transfer progress is displayed as a percentage. The transfer takes approximately 5 minutes.
8. After the transfer is complete, select **Close**.

The device will restart automatically.
9. Check that the device is functioning properly.

The firmware update is complete and the device is ready for use.

Troubleshooting:

If a firmware update fails, the device enters bootloader mode. The device's display remains off in this state.

Run the firmware update again. The device to be connected is displayed with the designation "Bootloader".

13.1 Uninstallation

Requirements:

- The plant has been de-pressurized, de-energized and secured against being switched on again.
- The medium circulation of the plant is stopped.
- The pipe is drained and rinsed.
- The device has cooled down.
- A clean and dry storage location has been prepared.

Procedure:

1. Manually loosen the union nut of the connecting cable from the M12 plug connection on the device.
2. Pull the connecting cable out of the M12 plug connection and remove from the working range.
3. Use suitable auxiliary equipment to detach the device.
4. **CAUTION!** Make sure that the seals remain in the sealing ring grooves of the process connections of the device.

Carefully remove the device from the plant and put in a clean and dry place.

13.2 Returns

Requirements:

- Clean the device housing ⇒ Page 45.
- Clean the parts that come into contact with the medium ⇒ Page 45.

Procedure:

1. The [supplementary sheet for product returns](#) must first be completed correctly and signed. Then enclose it with the shipping documents and attach it to the packaging, ideally on the outside.
2. Use the original packaging or a suitably secure container for sending the device.

13.3 Disposal

Requirements:

- Clean the device housing ⇒ Page 45.
- Clean the parts that come into contact with the medium ⇒ Page 45.
- Do not dispose of the device or replaced parts in the trash after use.
- Delete programs and data stored on the device.
- Remove batteries, if any, if this can be done without damaging the device.
- Dispose of the device and the packaging material in a responsible and environmentally friendly manner.
- Observe the country-specific laws and regulations for waste treatment and disposal.

In accordance with Directive 2012/19/EU on Waste from Electrical and Electronic Equipment, manufacturers are obliged to offer the option of returning waste equipment. Request the return from the manufacturer.



14 Accessories

Without UL approval

Designation	Part no.
SPE network cable 1 m (with M12 connector)	30062458
SPE network cable 2 m (with M12 connector)	30062457
SPE network cable 5 m (with M12 connector)	30062456
SPE network cable 10 m (with M12 connector)	30062455
SPE connector according to IEC 63171-2 (IP20)	30062461
SPE data cable 2 × 0.35 GY shielded	30071873
Service deployment	00427970
Preconfiguration (Service)	00427968
JUMO smartCONNECT (App)	00770436

With UL approval

Designation	Part no.
SPE network switch 4-port (10BASE-T1L)	30062113
SPE network switch 8-port (10BASE-T1L)	30062447

15 Open-source software

The device software and/or device components were developed using open-source software.

Insofar as the respectively applicable license terms justify a claim on the provision of source code or other information, JUMO GmbH & Co. KG will provide the source code and the license texts on a conventional data carrier at the cost incurred for the provision of the data carrier.

This offer is valid for three years after the software is made available. This offer is valid beyond that time to the extent specified in the license terms.

For questions related to open-source software, please contact:

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15 Open-source software



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