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**JUMO Instrument Co. Ltd.**  
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**JUMO Process Control, Inc.**  
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# JUMO MAERA S29 SW

## Titanium or stainless steel level probe

### Applications

#### Level and level measurements

- In tank and storage systems
- Of clarification, settling and rainwater retention basis
- In sewage lifting and pumping stations
- In splash water containers for swimming pools
- In a ballast water tank for ship building

### Special features

- Measuring ranges from 100 mbar relative pressure and 600 mbar absolute pressure are available
- Explosion protection according to ATEX
- Shipbuilding approval according to DNV (titanium)
- Highly resistant to chemical (titanium)
- Proven piezoresistive silicon sensor

### Description

The JUMO MAERA S29 SW level probe is used for the continuous hydrostatic level measurement in ventilated tanks. Measuring is carried out unaffected by electrical medium features or any foam formation.

Approvals are needed for particular ship building requirements (exclusively titanium) and explosion protection.

The level probe can be readily used in depths from as low as 1 mWS. The titanium version has been designed for application in liquids with media containing chlorides. These may be found in ship building, swimming pools, or water and sewage water management.

The cost-optimized level probe made of titanium or stainless steel with a front-flush membrane offers an alternative in highly viscous media. The screwable protective cap protects the membrane.

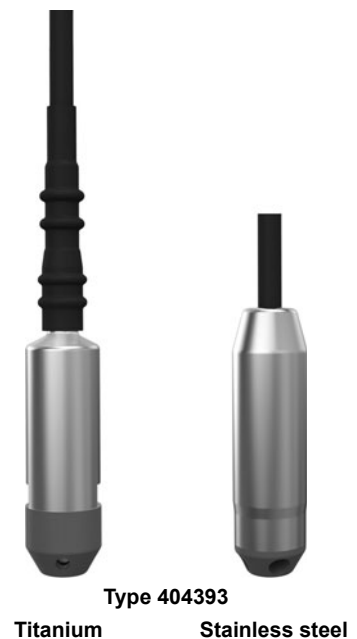
The level probe is equipped with a reverse-polarity protection mechanism, which prevents incorrect polarity during startup.

Another benefit to the measuring system is the extensive range of accessories for an optimum design.

Further information on our level probes from the JUMO MAERA series can be found in the brochure "Limit Level Measurement and Level Measurement" in the documentation.

### Customer benefits

- Improved plant availability
- Standardized signal processing
- Resistant to climate due to improved moisture and vibration protection
- Measurements in very harsh and highly viscous media thanks to the front-flush membrane
- Prevention of build up of resistance
- A complete solution for measurement points thanks to the extensive range of accessories
- Reverse-polarity protection mechanism



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## Approvals

	Designation	ATEX
	Testing agency	Eurofins Electrosuisse Product Testing AG
	Certificate no.	SEV 17 ATEX 0136 X
	Inspection basis	EN 60079-0, EN 60079-11
	Valid for	Type 404393/362, Type 404393/662
	Designation	UKEX
	Testing agency	Bureau Veritas
	Certificate no.	EPS 22 UKEX 1 087 X
	Inspection basis	EN IEC 60079-0, EN 60079-11
	Valid for	Type 404393/.../085
	Designation	IECEX
	Testing agency	Eurofins Electrosuisse Product Testing AG
	Certificate no.	IECEX SEV 20.0010X
	Inspection basis	IEC 60079-0, IEC 60079-11
	Valid for	Type 404393/362, Type 404393/662
	Designation	DNV
	Testing agency	DNV
	Certificate no.	TAA00001TH
	Inspection basis	DNV GL CG-0339
	Valid for	Type 404393/062, Type 404393/662
	Designation	EAC Ex <sup>a</sup>
	Testing agency	Sertium (Сертиум)
	Certificate no.	RU C-DE.ME92.B.01703
	Inspection basis	Standard TR TS 012/2011
	Valid for	Type 404393/363-.../240, Type 404393/662-.../240

<sup>a</sup> Russian documentation available upon request.

For the special conditions for use, observe the examination certificate, which is available for download on the Internet on the respective product page.

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## Technical data

### General Information

Reference conditions	According to DIN 16086 and DIN 61298
Measuring principle	Piezoresistive sensor with separating membrane
Pressure transfer medium	Synthetic oil
Admissible load changes	> 10 million, 0 % to 100 % measuring range
Mounting position	Vertical/hanging from the cable

### Input

#### Measuring range and accuracy

Measuring range	Accuracy at		Long-term stability <sup>a</sup> % MSP per year	Overload capacity	Burst pressure
	20 °C <sup>b</sup> % MSP <sup>d</sup>	10 to 50 °C <sup>c</sup> % MSP			
0 to 1 mH <sub>2</sub> O	1.2	1.9	≤ 0.4	3	4
0 to 1.6 mH <sub>2</sub> O	0.8	1.8		4.8	6.4
0 to 2.5 mH <sub>2</sub> O	0.8	1.7	≤ 0.3	7.5	10
0 to 4 mH <sub>2</sub> O	0.7	1.7		12	16
0 to 6 mH <sub>2</sub> O	0.7	1.6	≤ 0.2	18	24
0 to 10 mH <sub>2</sub> O	0.6	1.3		30	40
0 to 100 mbar relative pressure	1.2	1.9	≤ 0.4	0.3	0.4
0 to 160 mbar relative pressure	0.8	1.8		0.48	0.64
0 to 250 mbar relative pressure	0.8	1.7	≤ 0.3	0.75	1
0 to 400 mbar relative pressure	0.7	1.7		1.2	1.6
0 to 600 mbar relative/absolute pressure	0.7	1.6	≤ 0.2	1.8	2.4
0 to 1 bar relative/absolute pressure	0.6	1.3		3	4
0 to 1.6 bar relative/absolute pressure	0.5	1.3		4.8	6.4
0 to 2.5 bar relative/absolute pressure	0.5	1.2		7.5	10
0 to 4 bar sealed gauge/absolute pressure	0.5	1.2		12	16
0 to 6 bar sealed gauge/absolute pressure	0.5	1.2		18	24
0 to 10 bar sealed gauge/absolute pressure	0.5	1		30	40

<sup>a</sup> Reference conditions EN 61298-1

<sup>b</sup> Includes: linearity, hysteresis, repeatability, deviation from measuring range start (offset), and measuring range end

<sup>c</sup> Includes: linearity, hysteresis, repeatability, deviation from measuring range start (offset) and measuring range end, thermal influences on measuring range start (offset), and measuring span

<sup>d</sup> MSP = measuring span

### Output

Analog output	
Current	
Output 405	4 to 20 mA, 2-wire
Step response t <sub>90</sub>	2 ms
Burden	
Current	
4 to 20 mA, 2-wire	$R_L \leq (U_B - 16 \text{ V}) \div 0.022 \text{ A} (\Omega)$

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## Electrical data

Voltage Supply $U_B$ For basic type extension 000 For basic type extension 062 For basic type extension 362 For basic type extension 662	The voltage peaks must not exceed the specified voltage supply values! DC 16 to 28 V (nominal 24 V) DC 21 to 24 V (nominal 24 V) DC 16 to 28 V (nominal 24 V) DC 21 to 24 V (nominal 24 V)
Reverse voltage protection	Yes
Max. current consumption	23 mA
Electrical circuit Requirement	SELV The device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to „Limited-energy circuits“.

## Cable

### Cable

	6-core, shielded cable with integrated pressure compensation hose, AWG 24 with ferrules	3-core, remote cable with integrated pressure compensation hose, AWG 24 with ferrules
Material Outer sheath Compensation hose	FEP PA	PUR PA
Color	Black	Black
Outer diameter	Approx. 8.4 mm	Approx. 7.5 mm
Conductor cross section	0.25 mm <sup>2</sup>	0.25 mm <sup>2</sup>
Bending radius Moving Fixed	min. 140 mm min. 70 mm	min. 75 mm min. 37.5 mm
Tensile force	4000 N	880 N
Mass	≈ 90 g/m	Approx. 60 g/m
Admissible temperatures	-10 to +70 °C	-10 to +70 °C
UV resistance	Yes, according to DIN ISO 4892-2	Yes, according to DIN ISO 4892-2

## Mechanical features

Ensure the medium durability of the material!

	Titanium	Stainless steel	Stainless steel with mounted protective cage
Material Protective cap Process connection Measuring membranes Case Shrink tubing	PVC Titanium grade 2 Titanium grade 2 Titanium grade 2 Polyolefin	PVC Stainless steel 316 L Stainless steel 316 L Stainless steel 316 L -	- Stainless steel 316 L Stainless steel 316 L Stainless steel 316 L -
Mass (without cable)	109 g	200 g	1700 g (max. freely suspended cable 100 m)
Diameter	27 mm	27 mm	95 mm

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## Environmental influences

Reference conditions	DIN 16086, DIN 61298	
Admissible temperatures Medium	-10 to +60 °C The level probe must <b>not</b> freeze in the medium! A restriction may be required depending on the medium.	
	<b>Ignition protection type Gb</b>	
	Temperature class	Ambient temperature T <sub>A</sub>
	T4	-40 to +85 °C
	T5	-40 to +70 °C
	T6	-40 to +55 °C
	<b>Ignition protection type Db</b>	
	Temperature class	Ambient temperature T <sub>A</sub>
	T100 °C	-40 to +85 °C
	T85 °C	-40 to +70 °C
T70 °C	-40 to +55 °C	
Storage	-25 to +70 °C, dry	
Electromagnetic Compatibility (EC)	DIN EN 61326-2-3:2022	
Interference emission	Class B <sup>a</sup>	
Interference immunity	Industrial requirements	
Protection type	IP68, DIN EN 60529	
Measuring principle	Piezoresistive sensor with separating membrane	
Pressure transfer medium	Synthetic oil	
Admissible load changes	> 10 million, 0 to 100 % measuring range	
Mounting position	Vertical/hanging from the cable	

<sup>a</sup> The product is suitable for industrial use as well as for households and small businesses.

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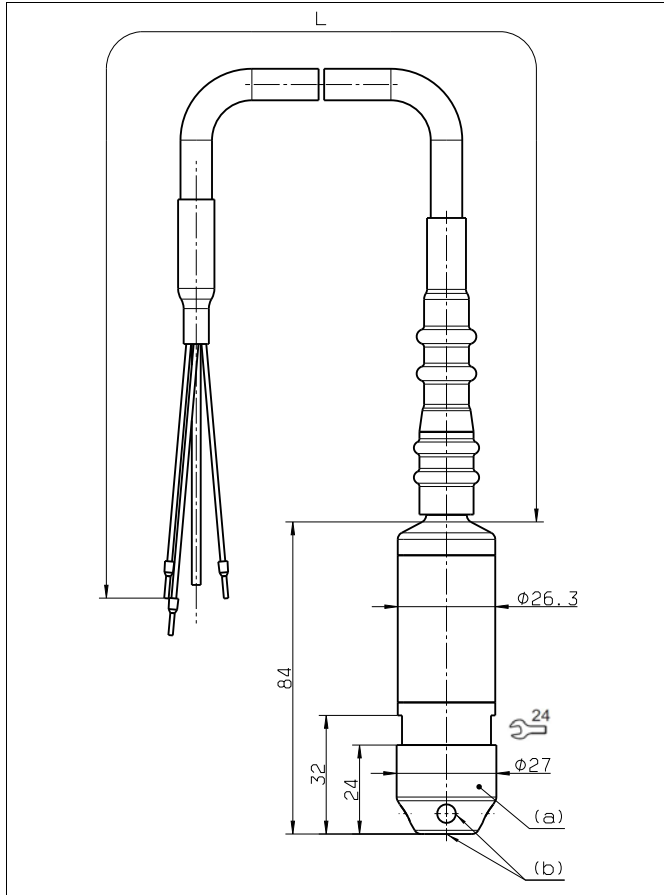
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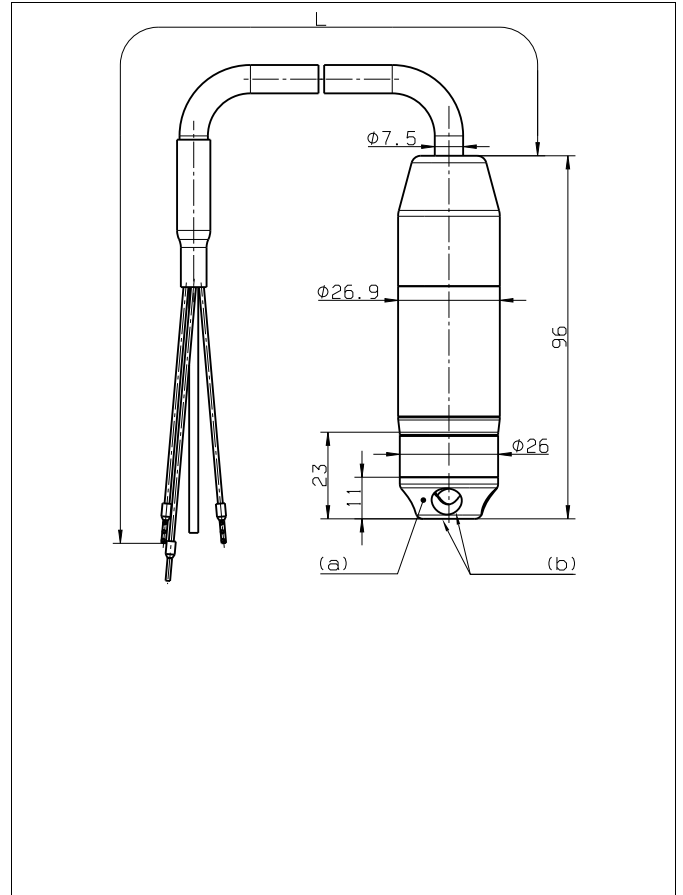
## Dimensions

Titanium



- L Cable length according to customer preference
- (a) Protective cap
- (b) 5 bore holes for every  $\varnothing$  5 mm

Stainless steel



- L Cable length according to customer preference
- (a) Protective cap
- (b) 5 bore holes for every  $\varnothing$  5 mm

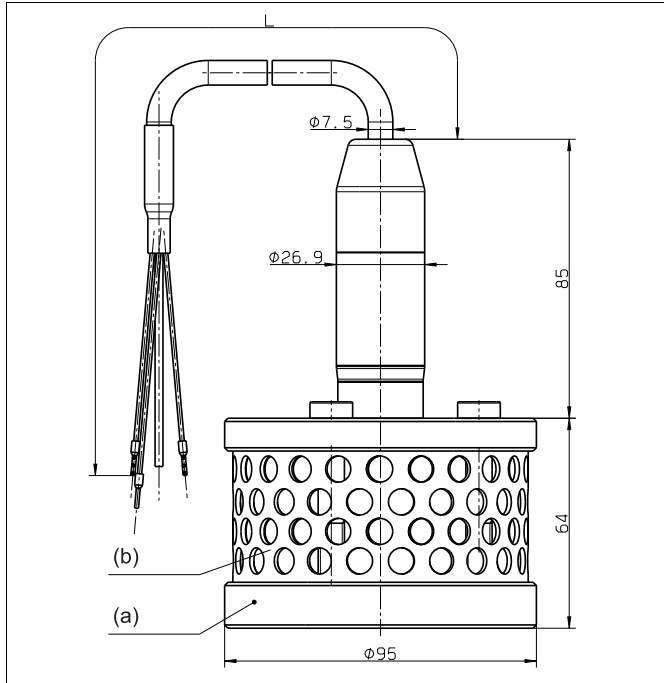
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Stainless steel with mounted cage



- L Cable length according to customer preference
- (a) Protective cage
- (b) Perforated metal grid  $\text{Ø} 8 \text{ mm}$

The stainless steel version with mounted protective cage is designed for difficult level measurements where sludge, turbulence or currents may be present (e.g. pumping stations, wastewater lifting stations).

The additional weight reduces effects on the output signal with strongly moving media.

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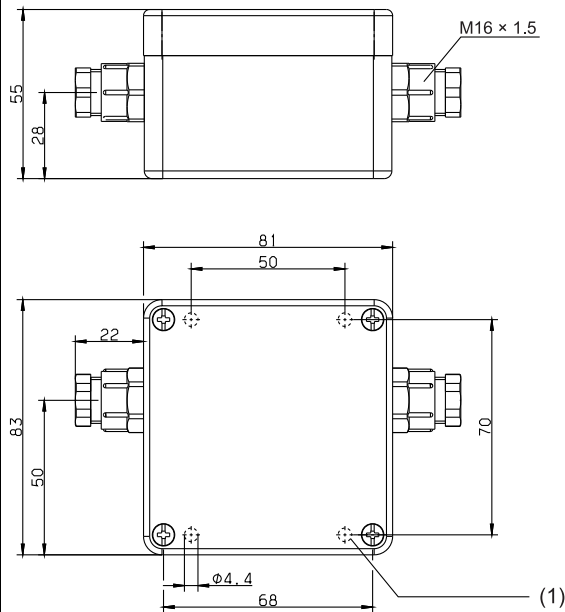
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## Accessories

Terminal box with pressure compensation

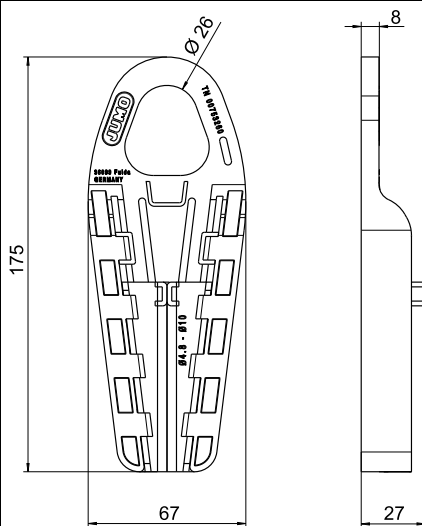
Part no. 00061206



(1) Fastening hole

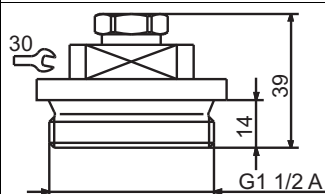
Cable clamp

Part no. 00753260



Sealing screw

Part no. 00333329





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## Connection diagram

The connection diagram in the data sheet provides information on product selection.

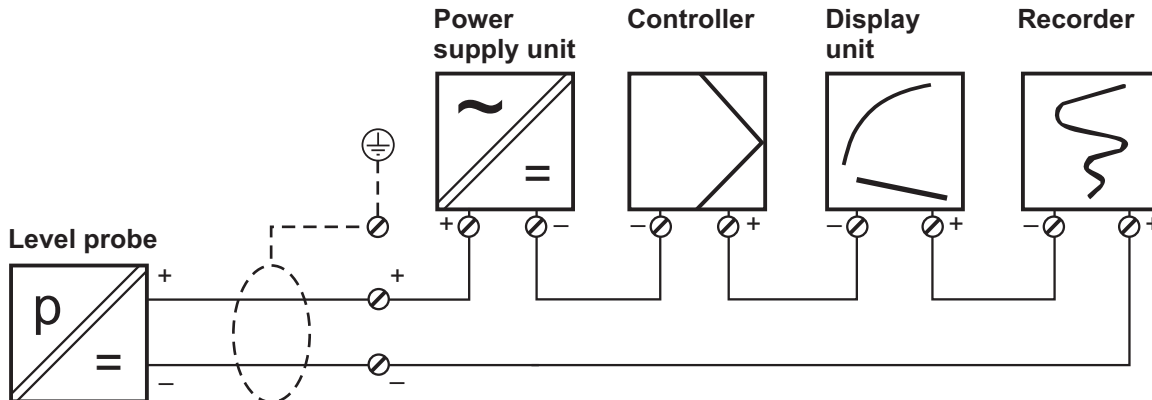
**For the electrical connection, only use the installation instructions or the operating manual.**

Connection		Terminal assignment	
Cable		FEP (electrical connection 25)	PUR (electrical connection 16)
<b>4 to 20 mA, 2-wire</b>			
Rated voltage supply DC 24 V	$U_B/S^{+a}$ 0 V/S-	White Gray	White Brown
<b>Shielding</b>			
Caution: Ground the device! Ground all connected devices (such as pumps and valves) to the same potential!		Black	Black

<sup>a</sup> The voltage peaks must not exceed or fall below the specified voltage supply values!

### Connection example

Current output



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## Order details

	<b>(1) Basic type</b>
404393	JUMO MAERA S29 SW – Level probe made of titanium or stainless steel
	<b>(2) Basic type extension</b>
000	None
062	Shipbuilding approval (only available in titanium version)
362	Explosion protection
662	Shipbuilding approval and explosion protection, intrinsically safe, Ex i (only available in titanium version)
	<b>(3) Input</b>
302	0 to 1.6 mH <sub>2</sub> O
303	0 to 2.5 mH <sub>2</sub> O
304	0 to 4 mH <sub>2</sub> O
305	0 to 6 mH <sub>2</sub> O
306	0 to 10 mH <sub>2</sub> O
414	0 to 100 mbar relative pressure
415	0 to 160 mbar relative pressure
417	0 to 250 mbar relative pressure
424	0 to 400 mbar relative pressure
419	0 to 600 mbar relative pressure
454	0 to 1 bar relative pressure
455	0 bar to 1.6 bar relative pressure
456	0 to 2.5 bar relative pressure
535	0 to 4 bar sealed gauge
536	0 to 6 bar sealed gauge
537	0 to 10 bar sealed gauge
487	0 bar to 0.6 bar absolute pressure
488	0 to 1 bar absolute pressure
489	0 to 1.6 bar absolute pressure
490	0 to 2.5 bar absolute pressure
491	0 to 4 bar absolute pressure
492	0 to 6 bar absolute pressure
493	0 to 10 bar absolute pressure
997	Special measuring range for sealed gauge
998	Special measuring range for absolute pressure <sup>a</sup>
999	Special measuring range for relative pressure <sup>a</sup>
	<b>(4) Output</b>
405	4 to 20 mA, 2-wire
	<b>(5) Process connection</b>
759	Mounted protection cage Ø 95 mm <sup>b</sup>
770	Front-flush process connection with protective cap
	<b>(6) Process connection material</b>
20	CrNi (stainless steel) (only available with PUR cable)
60	Ti (titanium) (only available with FEP cable)
	<b>(7) Electrical connection</b>
16	Cable shielded, fixed, PUR, black, UV-resistant (only available in stainless steel version)
25	Cable shielded, fixed, FEP, black, UV-resistant (only available in titanium version)
	<b>(8) Connecting cable length<sup>c</sup></b>
002	2 m
005	5 m
010	10 m



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## Accessories

The accessories are not checked according to DNV requirements.

Item	Description	Part no.
Terminal box with pressure compensation element 	<p>The terminal case, is used for secure installation of the level probe cable. The end of the pressure compensation tube is always protected from deposits and condensation (IP65). The remaining distribution can be performed with a standard cable without a pressure equalization hose.</p> <p>The terminal case should be mounted as close as possible to the medium surface while still outside the medium to ensure the system is implemented cost-effectively and in the best possible way.</p>	00061206
Cable clamp 	<p>The cable clamp holds the probe in the liquid at a defined depth and provides strain relief. Use of the cable clamp ensures that the cable is not deformed in an unacceptable manner.</p> <p>The cable clamp is compatible with all JUMO level probes.</p> <p>The clamping range is 4.8 mm to 10 mm. The maximum tensile strength is 390 N. The cable clamp is made of UV-resistant, corrosion-free and fiberglass-reinforced polyamide. The central elongated holes are provided for optional, application-dependent fixing of the cable to prevent the clamping jaws from sliding upwards. The side elongated hole is provided for fixing additional cable length.</p>	00753260
Sealing screw 	<p>For closed containers or water wells with a well head, the cable should be guided through and fastened by a sealing screw.</p> <p>The sealing screw is made up of a G 1 1/2" thread and is used to route the cable.</p>	00333329
Pressure compensation filter for cable	<p>The pressure compensation filter is a breathable filter that ensures aeration and exhaust-air ventilation without moisture penetrating. It is fitted at the end of the special cable.</p>	00382632
Ex-i supply/input isolating amplifier 	<p>The Ex-i repeater power supply / input isolating amplifier is designed for operating intrinsically safe transmitters (Ex-i) and mA current sources installed in potentially explosive (Ex) areas.</p> <p>Two-wire transmitters are supplied with energy and analog 0/4 to 20 mA measured values are transmitted from the Ex-area to the non-Ex-area. The output of the module can be operated actively or passively. Further technical data and the relevant safety requirements are available in the operating manual B 707530.0.</p>	00577948