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**JUMO Instrument Co. Ltd.**  
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**JUMO Process Control, Inc.**  
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# JUMO NESOS R40 LSH

## Horizontal float switch

### Applications

- Point level measurement of liquids in storage tanks, containers, oil sumps, and tanks
- Water and wastewater treatment
- Mechanical and plant engineering
- Apparatus and container engineering
- Oil and gas
- Chemical and petrochemical industries

### Brief description

The point level measurement is carried out according to Archimedes' principle for liquids. The float is guided by a joint and moves as the level rises or falls. The magnet in the float actuates the reed contact(s) installed in the guide tube. The switching status of the reed contact can be evaluated and processed through downstream electronic components, relays, or contactors. Alarms, pumps, signal lamps, valves, and horns are typically switched via a contact protection relay.

The float switch is mounted at the side (horizontally) on a tank or container, for example. This means that the same product can be used for applications involving both a minimum (MIN) and a maximum (MAX) point level. On versions with threaded process connections, the float is aligned using a cutting ring fitting.

Float switches with highly configurable guide tube lengths of up to 1 m are available for applications involving container insulation or flange fittings. Variants with a connecting plug help to minimize mounting work.

Depending on the variant ordered, various electrical connections, process connections, guide tube lengths, floats, number of contacts, and functions (SPST-NO [normally open contact] and SPDT-CO [changeover contact]) are available.

With the optional temperature sensor or temperature switch, both the point level measurement and the temperature can be acquired via just one measuring point. Variants for monitoring the reed contact temperature are also available.

Variants in an intrinsically safe [Ex i] version and with a flameproof enclosure [Ex d] are available for applications involving explosion protection. No isolating switch amplifier is required for installations with a flameproof enclosure.

### Customer benefits

- Cost-effective installation and mounting due to spring-cage terminals (Push-In®), for example
- Reduced operating costs due to maintenance-free device design
- Price-performance ratio optimized through the use of standard components
- No isolating switch amplifier required for [Ex d] (flameproof enclosure) applications
- Lower storage costs as the same component can be reused



Type 408340

### Special features

- Approval for explosion protection
- High switching voltages and switching currents
- Wide operating temperature range for media from -52 to +240 °C
- Wide pressure range from -1 to +47 bar
- Up to 2 switching outputs can be freely defined as normally open contact and changeover contact
- Temperature sensor/temperature switch are available

### Approvals and approval marks



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## Technical data

### General Information

Function principle	Magnetic float switch with reed contact			
Installation position	±30°			
Switching function (potential-free)	10 SPST-NO		12 SPDT-CO	
Switching voltage (max.) <sup>a</sup>	AC 230 V	DC 230 V	AC 230 V	DC 230 V
Switching capacity (max.) <sup>a</sup>	100 VA	100 W	60 VA	60 W
Switching current (max.) <sup>a</sup>	1.0 A	1.0 A	1.0 A	1.0 A

<sup>a</sup> The values must also be adhered to in combination.

	Pt100	Pt1000	Temperature switch, N/C contact, max. 2.5 A, AC 230 V, cos φ 0.95 [0.6], 2.5 A [1.6 A]
Measuring range	-40 to +150 °C	-40 to +150 °C	Specify switching point in plain text
Accuracy	DIN class B according to DIN EN 60751 the limit deviation in °C is as follows: ±(0.3 + 0.005  t )  t  = temperature in °C regardless of prefix sign		Tolerance ±5 K Hysteresis 30 K ±15 K

Special features for products with protection rating 3 (see "Connection diagram") <sup>a</sup>	Switching voltage (max.)	AC ≤ 33 V (AC 46 V peak value)	DC 70 V
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<sup>a</sup> Limit values according to EN 61010-1

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## Mechanical features

Float	Form	Material	Outer diameter	Min. density kg/m <sup>3</sup>	Pressure range (nominal pressure) bar
042	Cylinder	AISI 316 series	42	390	-1 to 15
052	Spherical	Stainless steel	52	420	-1 to 47

Float	Density of medium kg/m <sup>3</sup>							
	500	600	700	800	900	1000	1200	1400
	Immersion depth mm							
042	37.8	31.5	27.0	23.6	21.0	18.9	15.7	13.5
052	45	37.5	32.1	28.1	25.0	22.5	18.7	16.0

Materials of parts in contact with the medium <sup>a</sup> e.g. process connection, float, guide tube	AISI 316 series
Materials of parts not in contact with the medium <sup>a</sup> Cable Cable socket Round plug M12 × 1 Terminal head Ex d Stainless steel terminal head Terminal head Ex d, stainless steel Connection housing, cube-shaped, small Connection housing, cube-shaped, large	PVC or silicone or PUR PBT-GF30 PBT-GF30 Aluminum, painted AISI 321 316 Aluminum, painted Aluminum, painted
Clamping range Cable fitting  Terminal block	Diameter 6 to 12 mm for connection housing, cube-shaped, small (electrical connection 130) and connection housing, cube-shaped, large (electrical connection 131) Diameter 6.5 to 11.9 mm for terminal head Ex d (electrical connection 115 and 118) Diameter 6 to 8 mm for cable socket (electrical connection 061) Diameter 5 to 12 mm for stainless steel terminal head (electrical connection 117) 0.14 to 2.5 mm <sup>2</sup> for connection housing, cube-shaped, small (electrical connection 130) 0.14 to 1.5 mm <sup>2</sup> for terminal head Ex d (electrical connection 115), stainless steel terminal head (electrical connection 117 and 118), and connection housing, cube-shaped, large (electrical connection 131)
Weight	3840 g for guide tube length of 100 mm, process connection flange DN 50 (process connection 729), and connection housing Ex d (electrical connection 115)

<sup>a</sup> The chemical resistance of the materials should be taken into account for the application.

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**Environmental influences**

Moisture	
Operation	100 % rel. humidity including condensation on the product outer shell
Storage	90 % rel. humidity without condensation
Protection type for electrical connection <sup>a</sup>	
Cable	IP68
Cable with M12 connector	IP66
Round plug M12 × 1	IP66
Cable socket	IP65
Terminal head Ex d	IP68
Terminal head, stainless steel	IP68
Terminal head Ex d, stainless steel	IP66
Connection housing, cube-shaped, small	IP66
Connection housing, cube-shaped, large	IP66
Ambient temperature for electrical connection <sup>b</sup>	
PVC cable	-5 to +80 °C
Silicone cable	-50 to +180 °C
PUR cable	-40 to +90 °C
PVC cable, with M12 connector	-5 to +80 °C
Silicone cable, with M12 connector	-40 to +85 °C
PUR cable, with M12 connector	-40 to +85 °C
Round plug M12 × 1	-30 to +90 °C
Cable socket	-40 to +125 °C
Terminal head Ex d	-40 to +100 °C
Terminal head, stainless steel	-40 to +100 °C
Terminal head Ex d, stainless steel	-40 to +100 °C
Connection housing, cube-shaped, small	-40 to +100 °C
Connection housing, cube-shaped, large	-40 to +100 °C
Process temperature	
of parts in contact with the medium (e.g. guide tube with float)	-40 to +150 °C (standard) -52 to +240 °C (upon request)

<sup>a</sup> According to DIN EN 60529

<sup>b</sup> Please note: dependent on extension tube length and process temperature, see following diagrams

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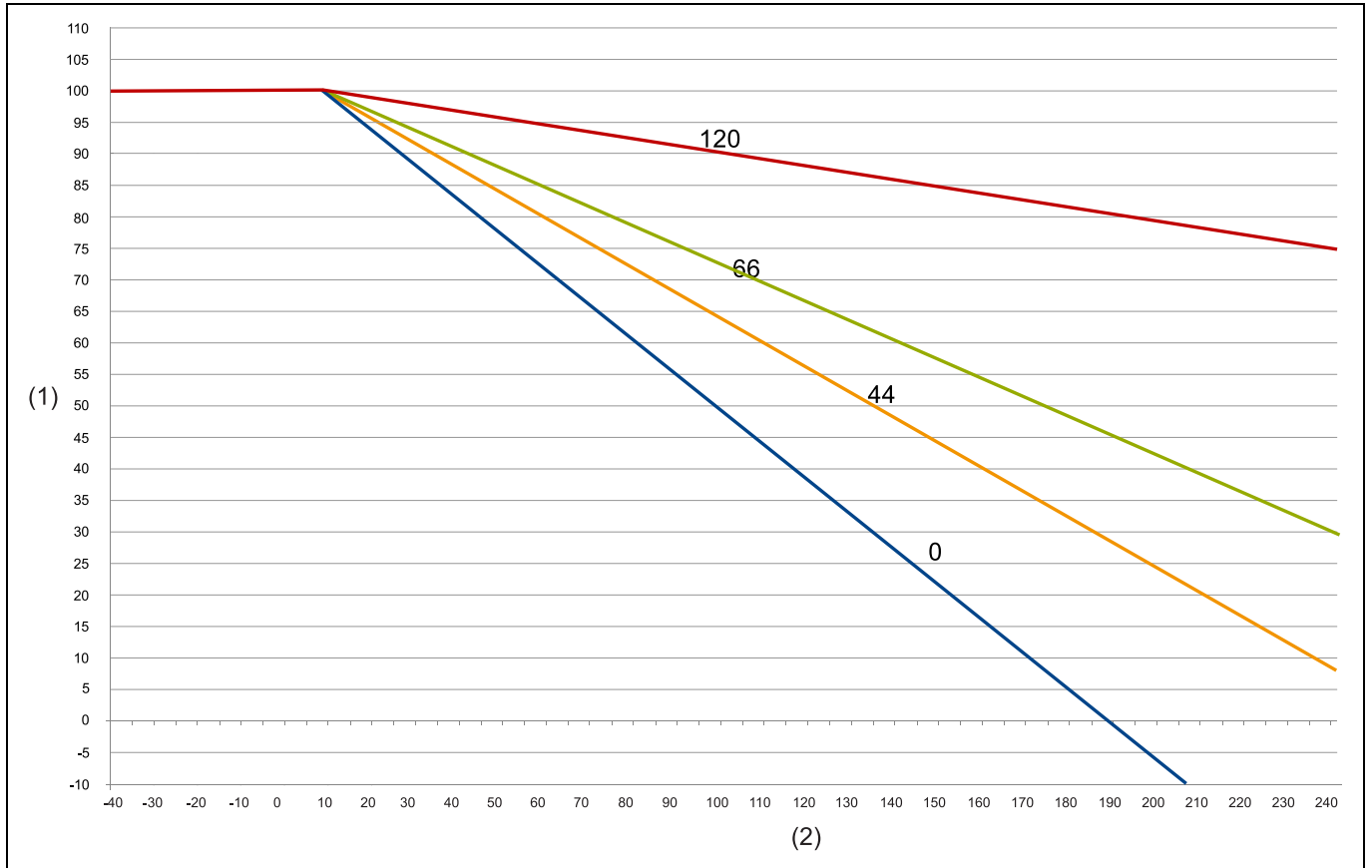
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**Maximum ambient temperature depending on the extension tube length and process temperature**

Connection housing small, large, and stainless steel; extension tube lengths in mm



- (1) Maximum ambient temperature
- (2) Media temperature

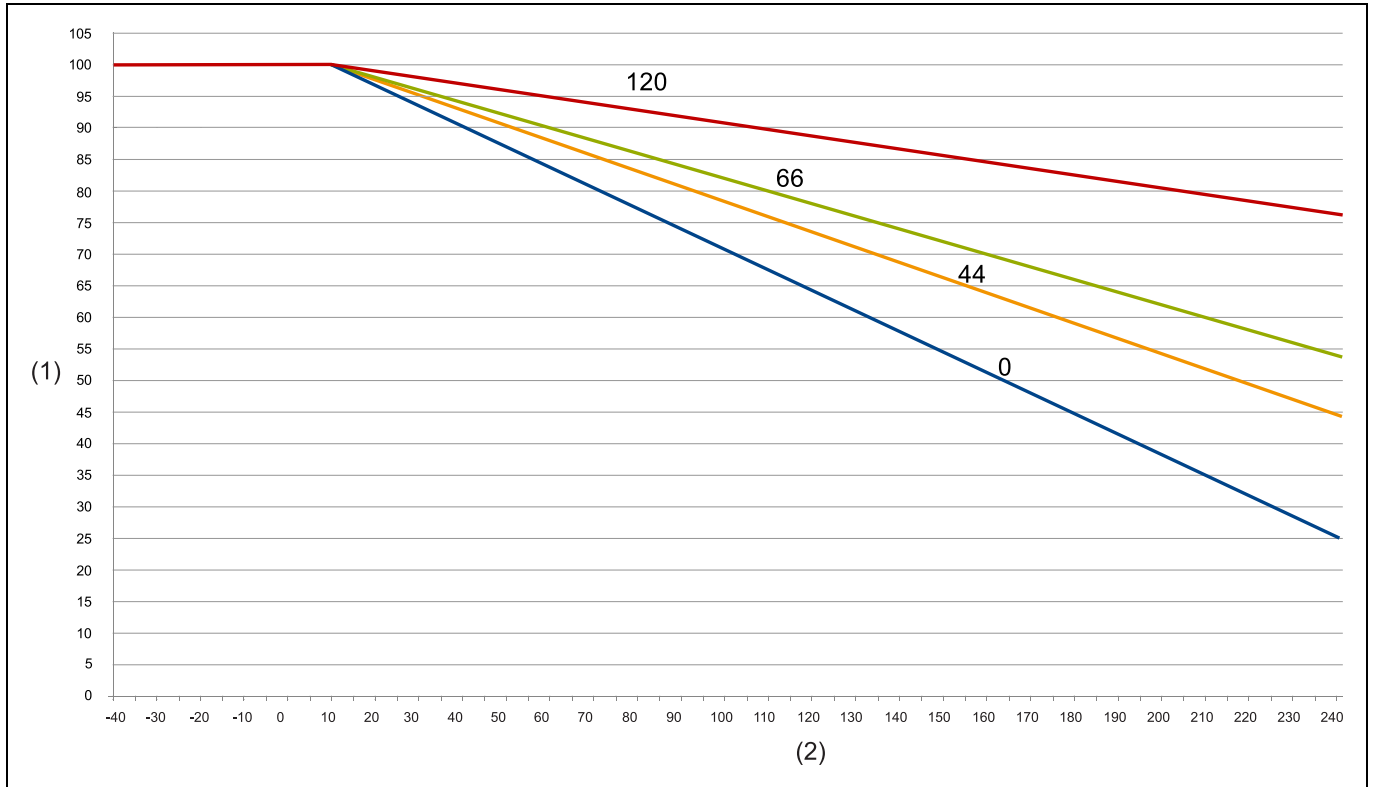
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Connection housing Ex d and Ex d, stainless steel; extension tube lengths in mm



- (1) Maximum ambient temperature
- (2) Media temperature

### Approvals and approval marks

Approval mark	Test facility	Certificate/certification number	Inspection basis	Valid for
ATEX, IEC EX intrinsically safe, Ex i	Eurofins Electrosuisse Product Testing	SEV 18 ATEX 0134 X IECEX SEV 18.0011X	IEC/EN 60079-0 IEC/EN 60079-11 IEC/EN 60079-26 DIN EN ISO 80079-36 DIN EN ISO 80079-37	Type 408340/362
ATEX, IEC EX flameproof enclosure, Ex d	Eurofins Electrosuisse Product Testing	SEV 18 ATEX 0133 X IECEX SEV 18.0010X	IEC/EN 60079-0 IEC/EN 60079-1 IEC/EN 60079-26 IEC/EN 60079-31 DIN EN ISO 80079-36 DIN EN ISO 80079-37	Type 408340/462

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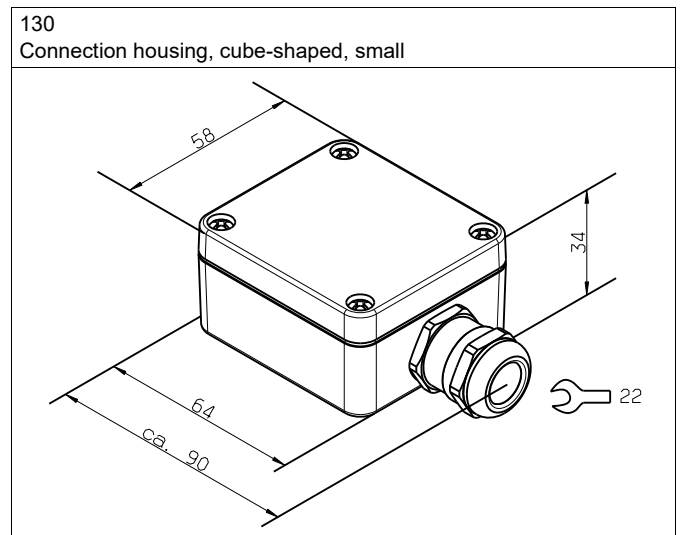
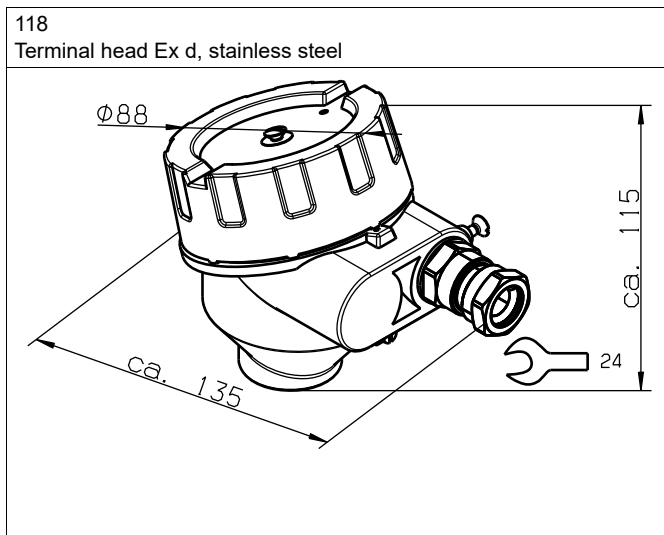
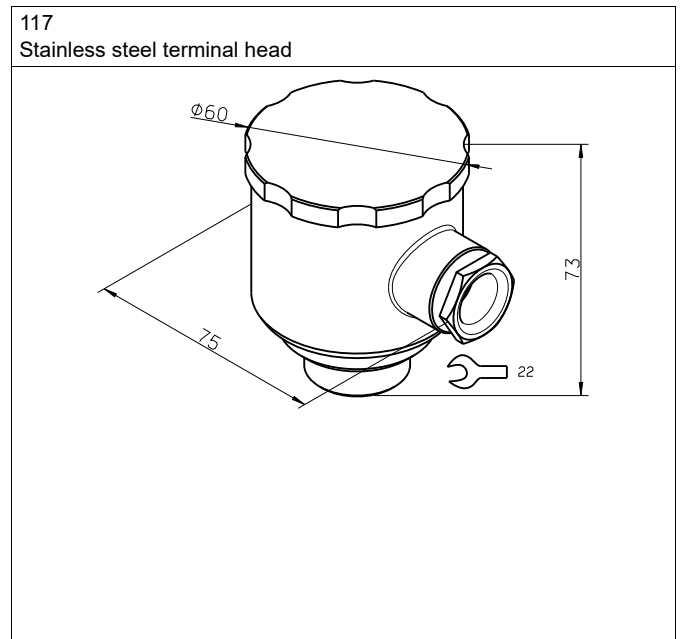
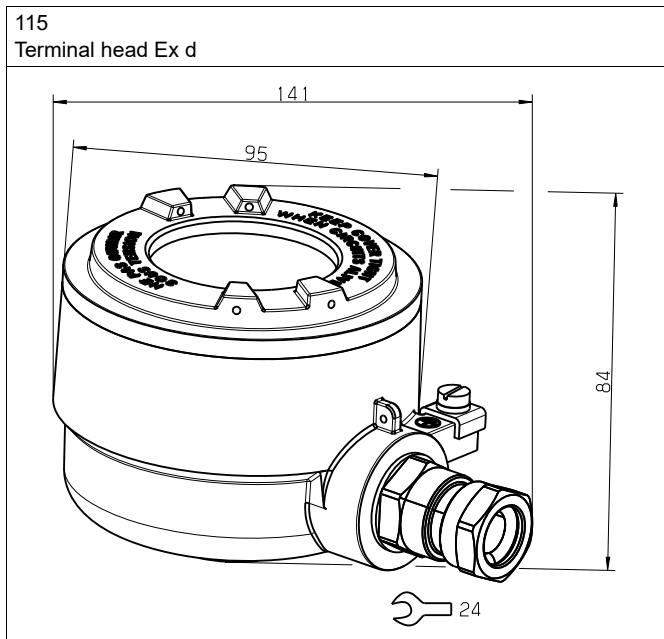
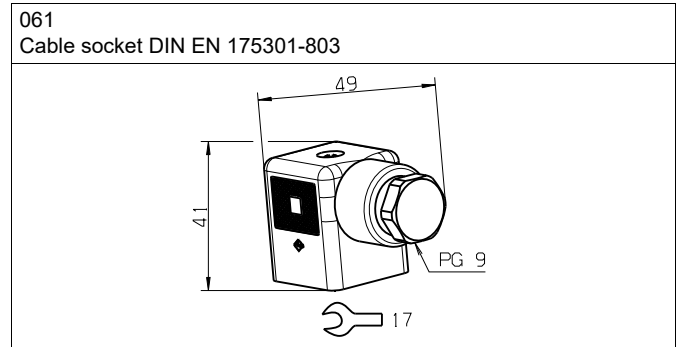
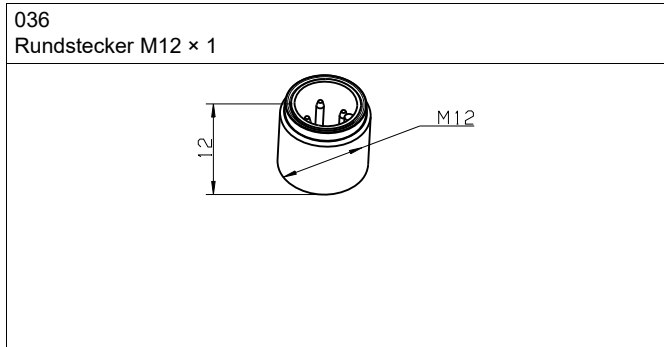
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## Dimensions

### Electrical connection



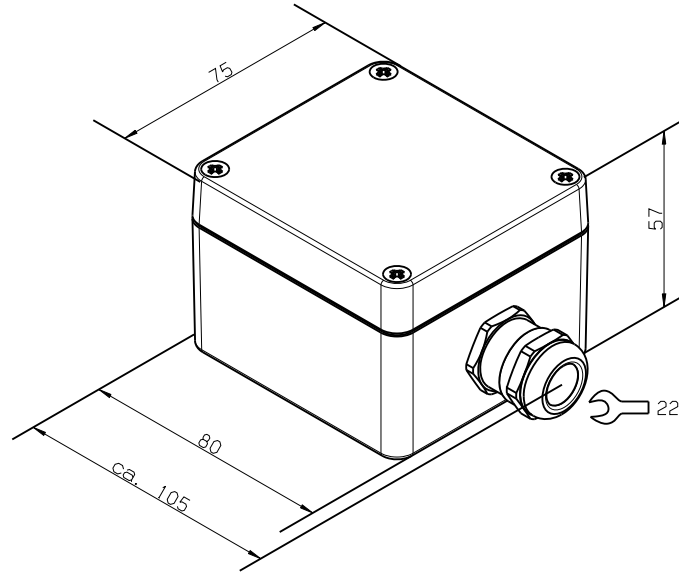
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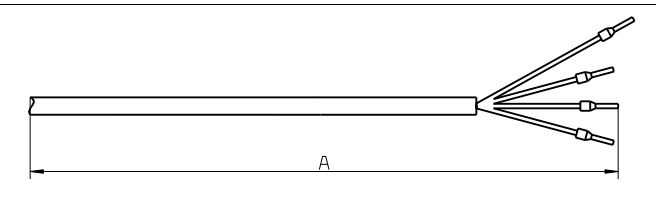
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131  
 Connection housing, cube-shaped, large

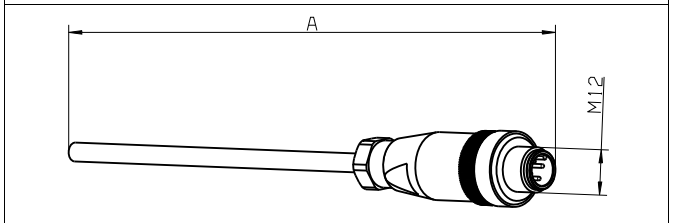


150 PVC, 160 silicone, 170 PUR  
 Cable with ferrules



A Cable length, see order details

152 PVC, 162 silicone, 172 PUR  
 Cable with M12 connector



A Cable length, see order details



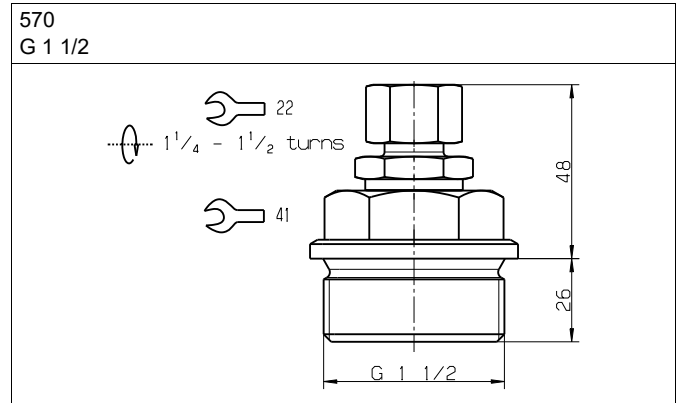
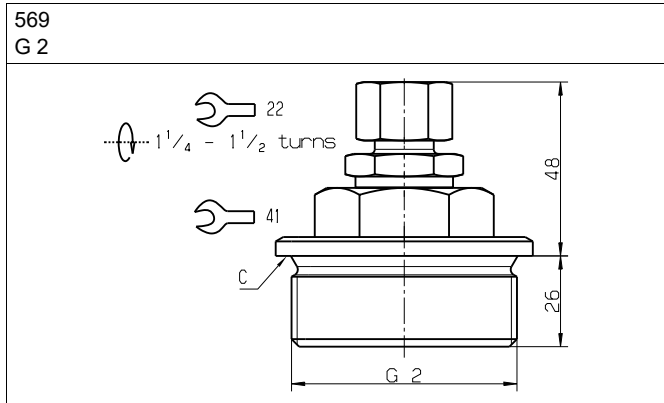
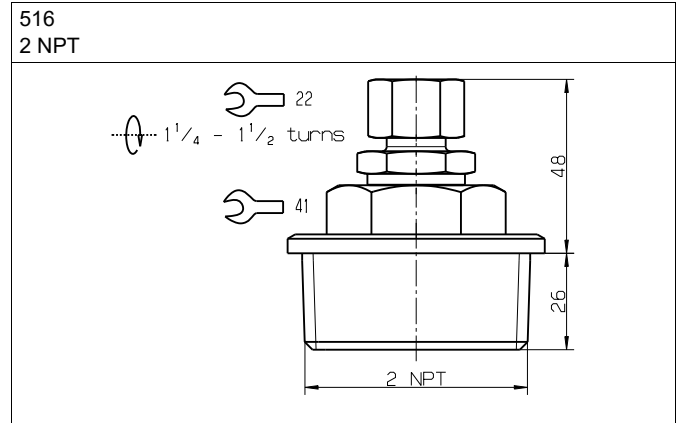
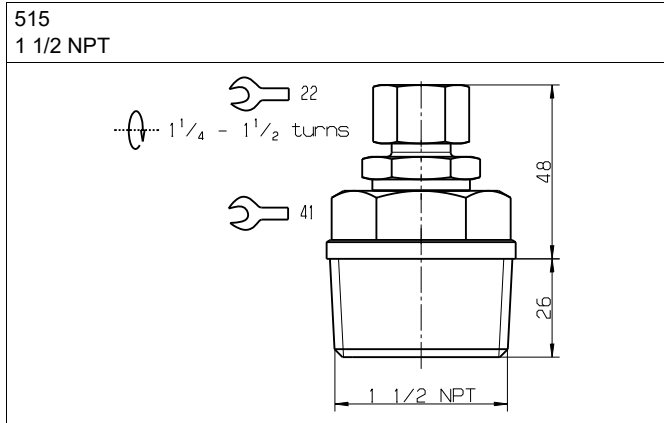
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**Process connections**



c A seal/O-ring with a thickness of at least 2 mm is recommended.

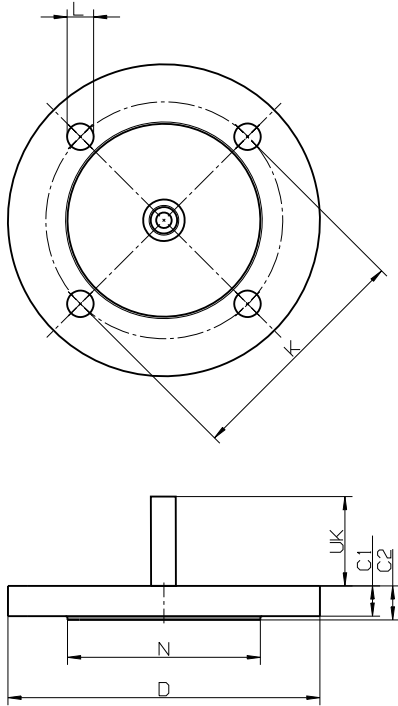
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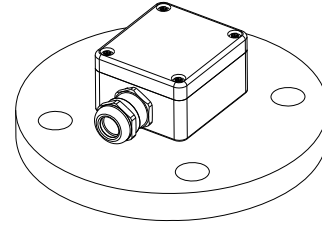
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Flange according to following table



Alignment of cable fitting between flange holes



Example of extension tube; also available for other process connections;

UK = extension tube length + 9 mm

Order code	Flange designation	Hole circle K	Number of holes	Diameter of holes L	Exterior diameter D	Diameter of sealing strip N	Thickness of flange C1	Thickness of flange including sealing strip C2
703	Flange 2.5" 150 lbs ANSI B 16.5 RF	139.7	4	19.1	177.8	104.6	26.8	28.4
713	Flange 2" 150 lbs ANSI B 16.5 RF	120.7	4	19.1	152.4	91.9	23.8	25.4
714	Flange 2" 300 lbs ANSI B 16.5 RF	127	8	19	165.1	92.1	20.6	22.2
729	Flange DN 50, PN40 EN 1092-1, form B1 with sealing strip	125	4	18	165	102	17	20
784	Flange DN 65, PN40 EN 1092-1, form B1 with sealing strip	145	8	18	185	122	19	22
785	Flange DN 80, PN40 EN 1092-1, form B1 with sealing strip	160	8	18	200	138	21	24
786	Flange DN 100, PN40 EN 1092-1, form B1 with sealing strip	190	8	22	235	162	21	24

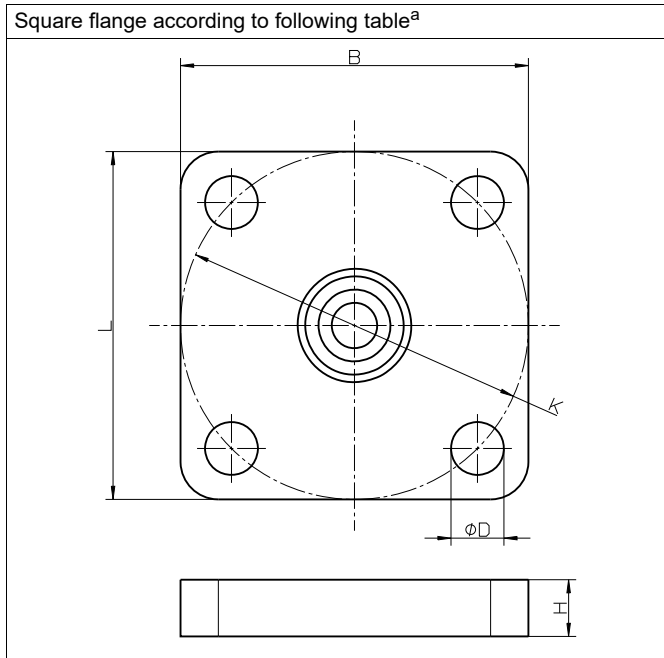
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Square flange according to following table<sup>a</sup>

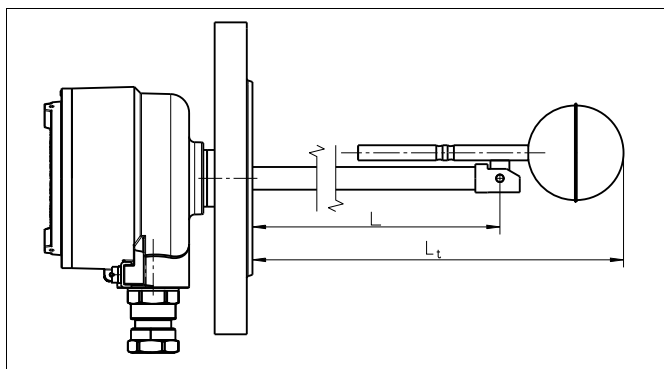


<sup>a</sup> For the alignment of the cable fitting please see page 10

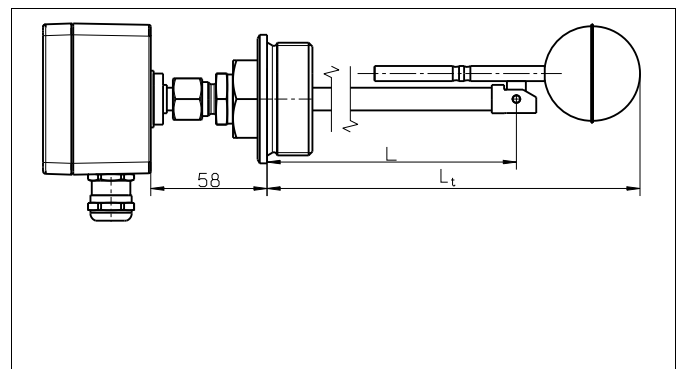
Order code	Length L	Width B	Height H	Number of holes	Hole circle K	Diameter of holes D
975	80	80	12	4	83	9
976	92	92	15	4	92	14

**Important information about the order details**

An example for the dimensions of guide tube length L is shown below.



(1) Process connection "flange"  
 L Guide tube length in mm



(2) Process connection "thread"

042 Lt overall insertion length = Guide tube length L + 85 mm  
 052 Lt overall insertion length = Guide tube length L + 110 mm

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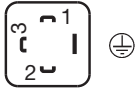
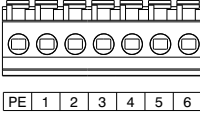
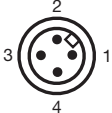
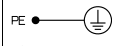
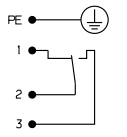
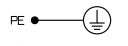
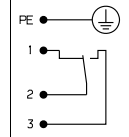

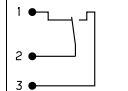
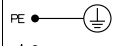
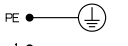
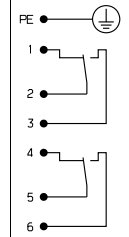
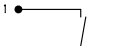
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# Connection diagram

The connection diagram in the data sheet provides preliminary information about the connection options. For the electrical connection, only use the installation instructions or the operating manual. The knowledge and the correct technical compliance with the safety information and warnings contained in these documents are mandatory for mounting, electrical connection, and startup as well as for safety during operation.

Number of contacts								
	Cable		Cable socket		Connection housing		Round plug M12	
	SPST-NO	SPDT-CO	SPST-NO	SPDT-CO	SPST-NO	SPDT-CO	SPST-NO	SPDT-CO
1	<b>Silicone</b> RD WH  <b>PUR</b> BN WH  <b>PVC</b> BN WH	<b>Silicone</b> RD WH RD/BU  <b>PUR</b> BN BU BK  <b>PVC</b> BN WH GN	 PE 1 2	 PE 1 2 3	 PE 1 2	 PE 1 2 3	 1 2	 1 2 3
2	<b>Silicone</b> RD WH RD/BU WH/BU  <b>PVC</b> BN WH GN YE	<b>Silicone<sup>a</sup></b> RD WH BU RD/BU WH/BU BU  <b>PVC<sup>b</sup></b> RD BK BN OG GN YE  <b>PUR<sup>c</sup></b> PK WH YE BN GN GY	 PE 1 2 3	-	 PE 1 2 3 4	 PE 1 2 3 4 5 6	 1 2 3 4	-
Protection rating <sup>d</sup>	prepared for 2 according to EN 61010-1		1	1	1	1	3	3

<sup>a</sup> According to VDE 0298-4 max. current 0.8 A at max. 175 °C or 1 A at max. 170 °C

<sup>b</sup> According to VDE 0298-4 max. current 0.8 A at max. 75 °C or 1 A at max. 70 °C

<sup>c</sup> Only available with protection rating 3.

<sup>d</sup> According to DIN EN 61140

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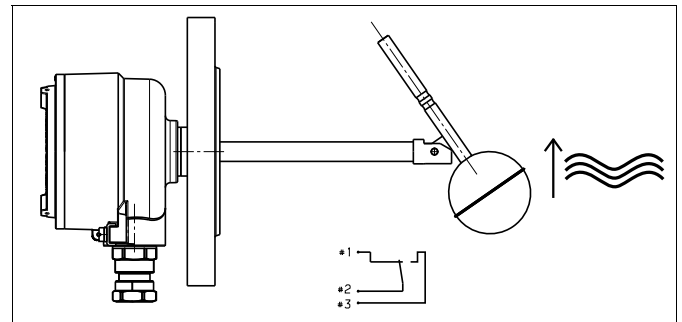
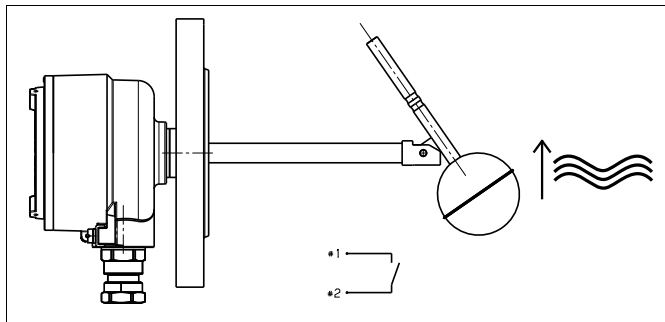
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	Cable	Cable socket	Connection housing	Round plug M12
Temperature sensor Pt100 <sup>a</sup>	Silicone <sup>b</sup>  Silicone <sup>b</sup> 	-		
Temperature sensor Pt1000 <sup>a</sup>	PVC <sup>b</sup> 			
Temperature switch <sup>a</sup>	Silicone <sup>c, d</sup> 			
	PVC <sup>c, e</sup> 			

- <sup>a</sup> Assignment is always to terminals with the highest numbers
- <sup>b</sup> For 1× SPST-NO switching contacts
- <sup>c</sup> For 2× SPST-NO or 1×SPDT-CO switching contacts
- <sup>d</sup> According to VDE 0298-4 max. current 0.8 A at max. 175 °C or 2 A to max. 150 °C
- <sup>e</sup> According to VDE 0298-4 max. current 0.8 A at max. 75 °C or 2 A to max. 50 °C

The switching function is taken into account as follows, depending on how the device is installed in an empty container.



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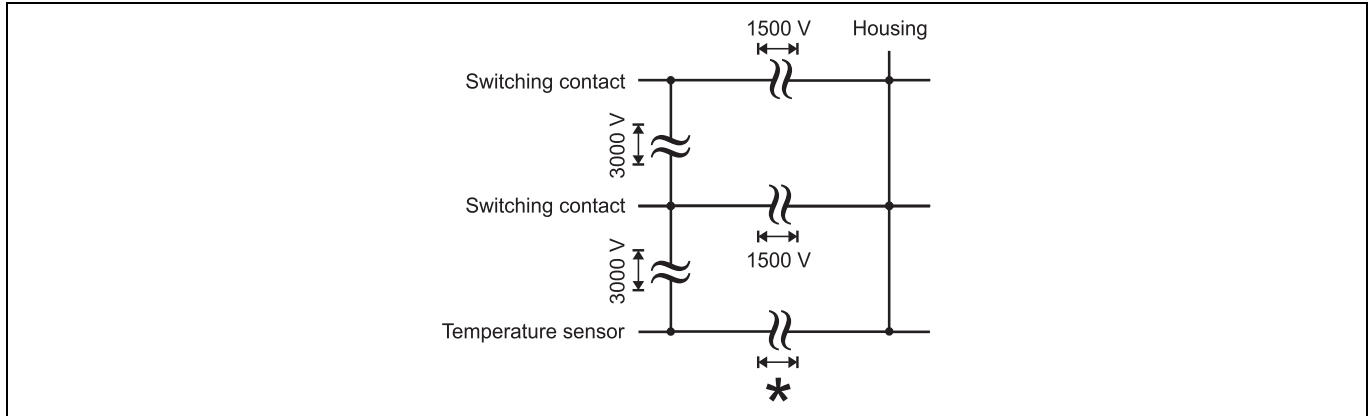
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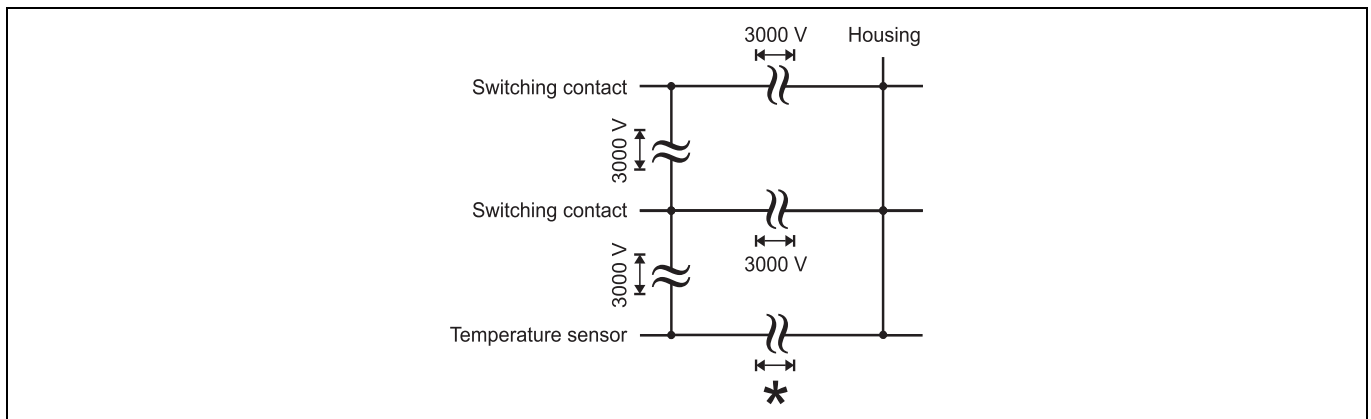


The galvanic isolation is realized as follows:

Protection rating 1



Protection rating 2



**Caution:**

\* Functional galvanic isolation

If connected to a certified intrinsically safe electrical circuit Ex i, the following values are given.

Contact function	Max. voltage $U_i$ in V	Max. current $I_i$ in mA	Max. power $P_i$ in mW	Internal inductance in $\mu$ H	Internal capacitance in pF
SPST-NO	$\leq 30$	$\leq 100$	$\leq 750$	~0 for cable version 1 $\mu$ H/m connecting cable	~0 bei Kabelaus- führung 200 pF/m connecting cable
SPDT-CO					
Temperature switch					

When using explosion-proof versions (intrinsically safe, Ex i, and flameproof enclosure, Ex d), the following values are given.

Contact function	Max. voltage $U_i$ in V	Max. current $I_i$ in mA	Max. power $P_i$ in mW	Internal inductance in $\mu$ H	Internal capacitance in pF
Pt100	$\leq 30$	$\leq 55$	$\leq 413$	~0 for cable version 1 $\mu$ H/m connecting cable	~0 bei Kabelaus- führung 200 pF/m connecting cable
Pt1000					

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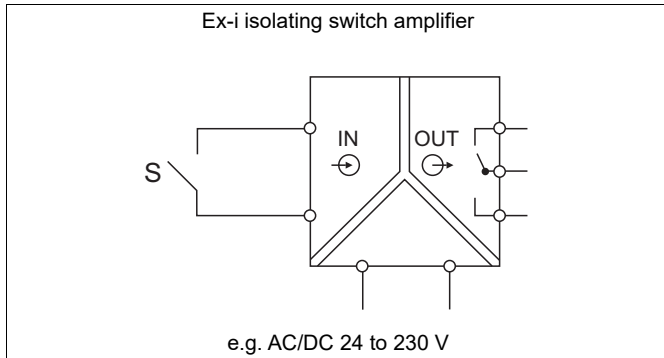


<b>Legend: cable</b>	BN	Brown	GN	Green
	WH	White	RD	Red
	BU	Blue	YE	Yellow
	PK	Pink	GY	Gray

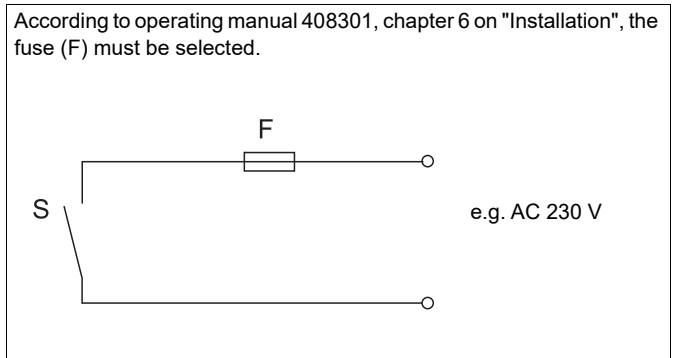
**Connection examples of versions with explosion protection**

**Float switch (S)**

**Ex i**



**Ex d**



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## Order details

	<b>(1) Basic type</b>
408340	JUMO NESOS R40 LSH – Horizontal float switch
	<b>(2) Basic type extension</b>
000	None
362	Explosion protection, intrinsically safe, Ex i
462	Explosion protection, pressure resistant, Ex d
	<b>(3) Electrical connection</b>
036	Round plug M12 × 1
061	Cable socket DIN EN 175301-803, form A
115	Terminal head Ex d
117	Stainless steel terminal head
118	Terminal head Ex d, stainless steel
130	Connection housing, cube-shaped, small
131	Connection housing, cube-shaped, large
150	Cable, PVC
152	Cable, PVC with M12 connector
160	Cable, silicone
162	Cable, silicone with M12 connector
170	Cable, PUR
172	Cable, PUR with M12 connector
	<b>(4) Cable length</b>
0000	None
2000	2000 mm
5000	5000 mm
0100 - 5000	Specifications in plain text (increments of 100 mm)
	<b>(5) Process connection</b>
515	1 1/2 NPT
516	2 NPT
569	G 2
570	G 1 1/2
703	Flange 2.5" 150 lbs ANSI B 16.5 RF
713	Flange 2" 150 lbs ANSI B 16.5 RF
714	Flange 2" 300 lbs ANSI B 16.5 RF
729	Flange DN 50, PN40 EN 1092-1, form B1 with sealing strip
784	Flange DN 65, PN40 EN 1092-1, form B1 with sealing strip
785	Flange DN 80, PN40 EN 1092-1, form B1 with sealing strip
786	Flange DN 100, PN40 EN 1092-1, form B1 with sealing strip
975	Square flange, 80 × 80 × 12
976	Square flange, 92 × 92 × 15
	<b>(6) Guide tube length L<sup>a</sup></b>
100 - 1000	Specifications in plain text (increments of 50 mm)
	<b>(7) Float</b>
042	Cylinder, CrNi (stainless steel), diameter 42, density 390 kg/m <sup>3</sup>
052	Spherical, CrNi (stainless steel), diameter 52, density 420 kg/m <sup>3</sup>
	<b>(8) Switching function</b>
10	SPST-NO, N/O contact (100 VA/AC 230 V/1 A)
12	SPDT-CO, single-pole changeover contact (60 VA/AC 230 V/1 A)



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<b>(9)</b>	<b>Number of contacts</b>
1	1 contact
2	2 contacts
<b>(10)</b>	<b>Extra codes</b>
000	None
005	Integrated temperature sensor Pt1000 <sup>b</sup>
007	Integrated temperature sensor Pt100 <sup>b</sup>
009	Temperature switch <sup>c</sup>
307	Extension tube <sup>d</sup>

<sup>a</sup> The dimensioning is in mm in relation to the contact/locating surface (threaded bushing of the container/tank wall) of the selected process connection (see operating manual chapter on "order details").

<sup>b</sup> The temperature sensor is positioned at the end of the guide tube.

<sup>c</sup> Specify switching temperature in plain text. The temperature switch is positioned at the end of the guide tube.

<sup>d</sup> Specify the extension tube length depending on the process temperature and ambient temperature in plain text (see the chapter "Maximum ambient temperature depending on the extension tube length and process temperature").

**Order code**                            (1)      (2)      (3)      (4)      (5)      (6)      (7)      (8)      (9)      (10)  
 [ ] / [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] / [ ]  
**Order example**                    408340 / 462 - 115 - 0 - 515 - 100 - 042 - 12 - 1 / 000

Minimum order quantity:                    1 piece