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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

- Approvals and certificates available for explosion protection, shipbuilding, and German Water Resources Act (WHG)
- 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.) ^a	AC 230 V	DC 230 V	AC 230 V	DC 230 V
Switching capacity (max.) ^a	100 VA	100 W	60 VA	60 W
Switching current (max.) ^a	1 A	1 A	1 A	1 A

^a 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") ^a	Switching voltage (max.)	AC ≤ 33 V (AC 46 V peak value)	DC 70 V
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^a Limit values according to EN 61010-1

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Mechanical features

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

Float	Density of medium kg/m ³							
	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 e.g. process connection, float, guide tube	The chemical resistance of the materials should be taken into account for the application. AISI 316 series
Materials of parts not in contact with the medium 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	The chemical resistance of the materials should be taken into account for the application. 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, and connection housing, cube-shaped, large Diameter 6.5 to 11.9 mm for terminal head Ex d Diameter 6 to 8 mm for cable socket Diameter 5 to 12 mm for stainless steel terminal head 0.14 to 2.5 mm ² for connection housing, cube-shaped, small 0.14 to 1.5 mm ² for terminal head Ex d, stainless steel terminal head, and connection housing, cube-shaped, large
Weight	3840 g for guide tube length of 100 mm, process connection flange DN 50, and connection housing Ex d

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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	According to DIN EN 60529
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
Vibration	0.7 g at 13.2 to 100 Hz, according to IEC 60068-2-6
Ambient temperature for electrical connection	Please note: dependent on extension tube length and process temperature, see following diagrams
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)

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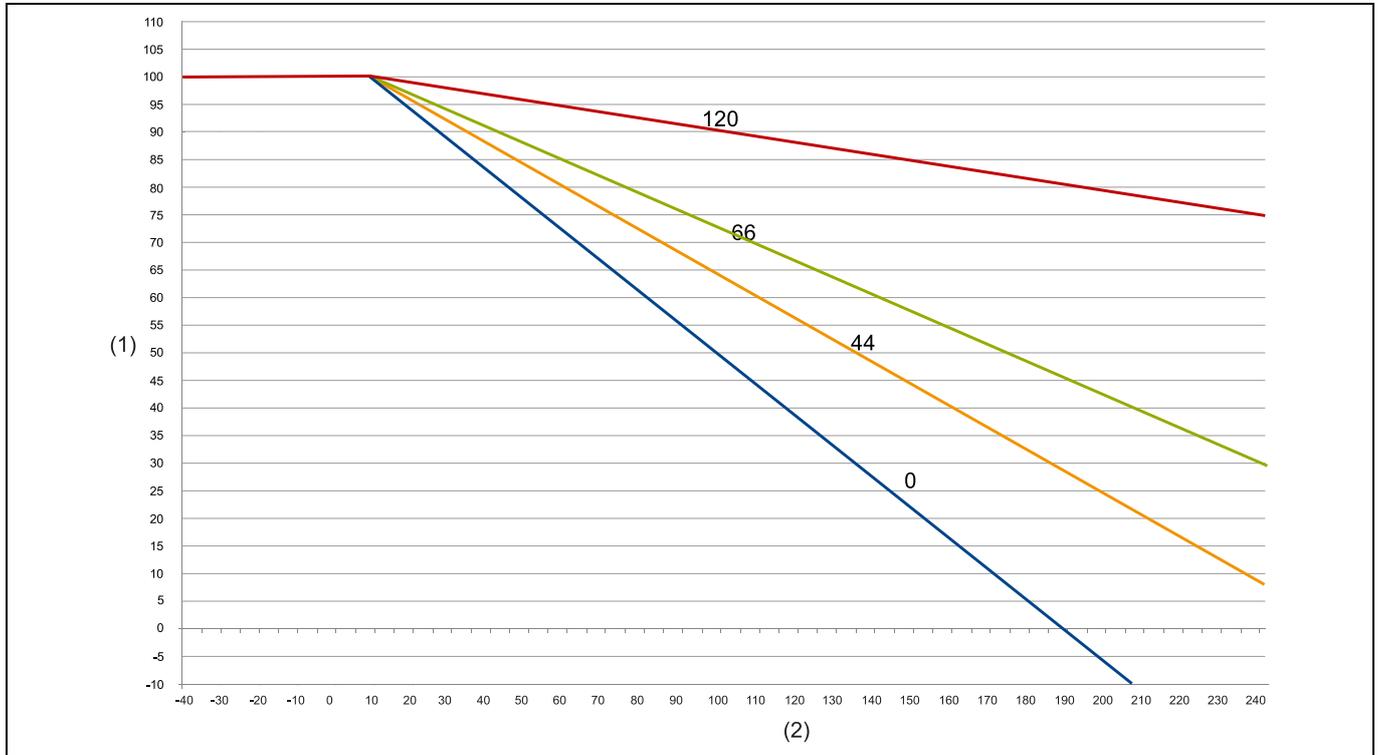
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Maximum ambient temperature depending on the extension tube length and process temperature

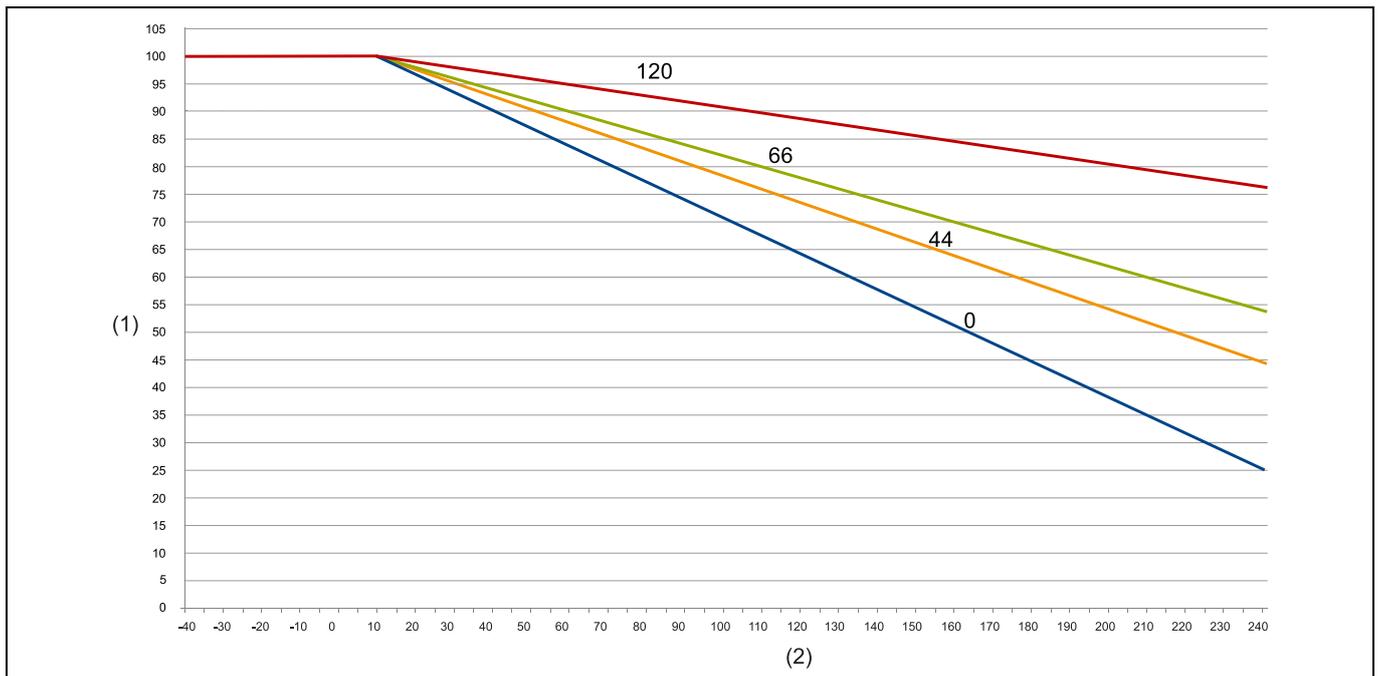
Connection housing small, large, and stainless steel; extension tube lengths in mm



(1) Maximum ambient temperature

(2) Media temperature

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



(1) Maximum ambient temperature

(2) Media temperature

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ATEX, IEC EX, intrinsically safe, Ex i Test facility Certificate/certification number Inspection basis Valid for	Eurofins Electrosuisse Product Testing AG SEV 18 ATEX 0134 X, IECEX SEV 18.0011X (2020-07-14) IEC/EN 60079-0, IEC/EN 60079-11, IEC/EN 60079-26, DIN EN ISO 80079-36, DIN EN ISO 80079-37 Type 408340/263, Type 408340/362, Type 408340/662
ATEX, IEC EX, flameproof enclosure, Ex d Test facility Certificate/certification number Inspection basis Valid for	Eurofins Electrosuisse Product Testing AG SEV 18 ATEX 0133 X, IECEX SEV 18.0010X (2020-08-31) 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 408340/264, Type 408340/462, Type 408340/962
DNV GL Test facility Certificate/certification number Inspection basis Valid for	DNV GL TAA00001VR Class Guidelines CG 0339, November 2016 Type 408340/062, Type 408340/662, Type 408340/962
German Water Resources Act (WHG) Test facility Certificate/certification number Inspection basis Valid for	DIBT Z-65.11-608 Approval principles for safety devices for tanks and pipelines, overfill protection (ZG-ÜS) Type 408340/262, Type 408340/263, Type 408340/264
EAC ^a Test facility Certificate/certification number Inspection basis Valid for	СИСТЕМА КАЧЕСТВА Д-DE.HP15.B.06254/20 Standard TR TS 020/2011 Type 408340/...
EAC-Ex ^a Test facility Certificate/certification number Inspection basis Valid for	ПрофиТест ЕАЭС RU C-DE.HB07.B.00316/20 TR TS 012/2011 Type 408340/263, Type 408340/264, Type 408340/362, Type 408340/462, Type 408340/662, Type 4048340/962 – each with extra code 240

^a Russian documentation upon request

NOTE!

The special conditions for use can be found in the type examination certificate, which is available for download on the Internet on the respective product page.

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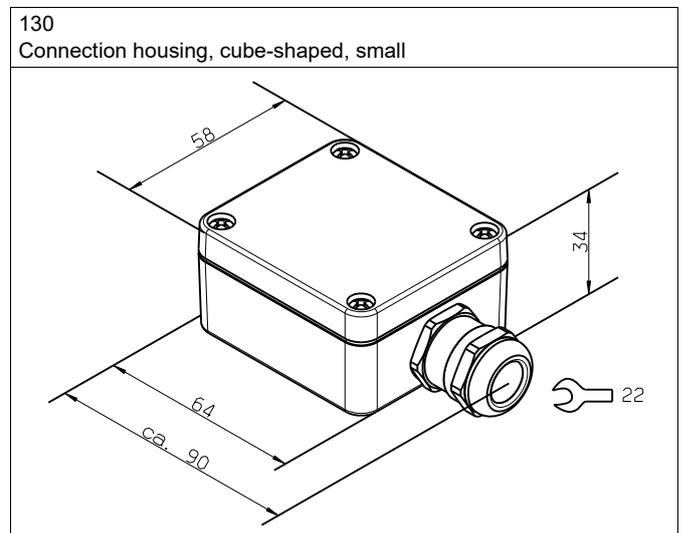
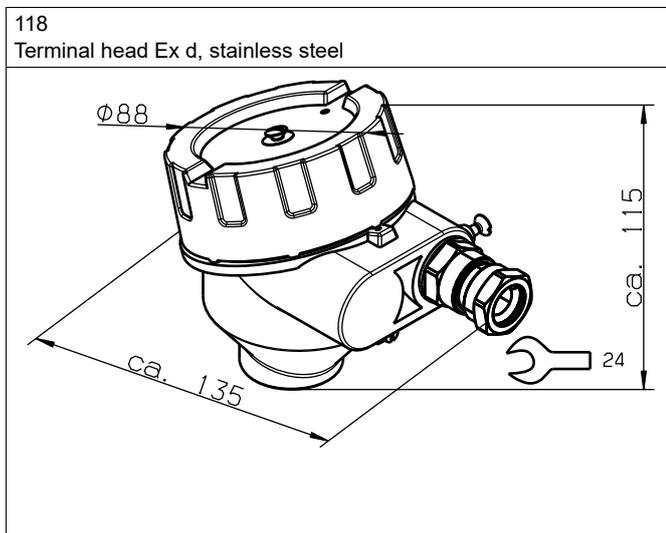
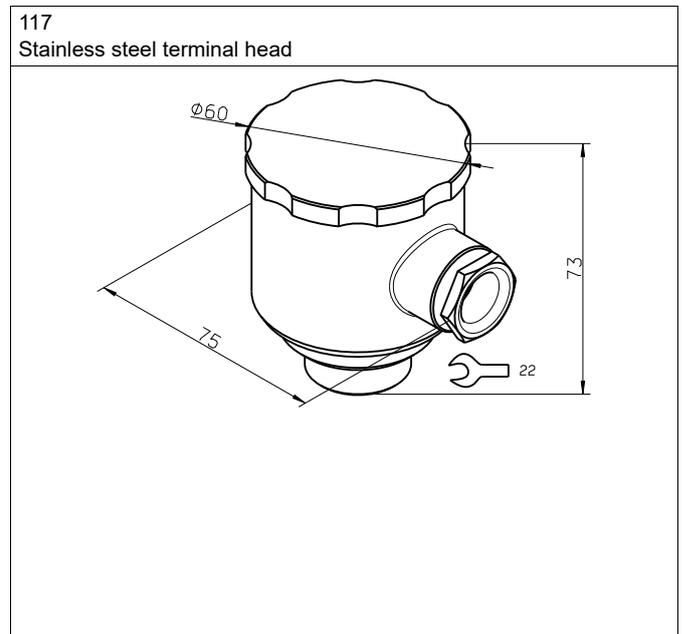
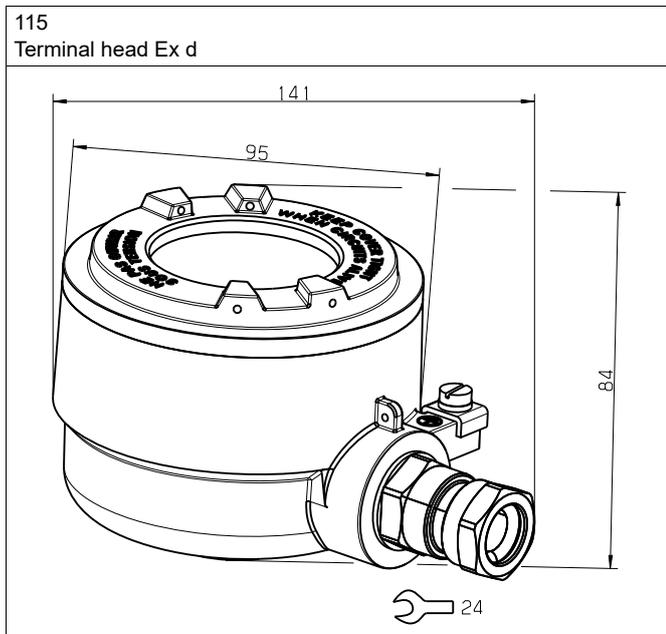
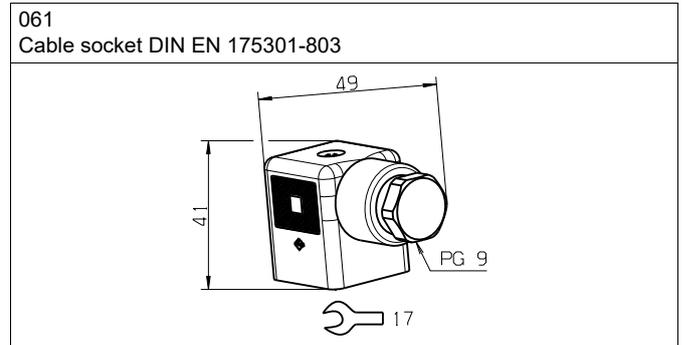
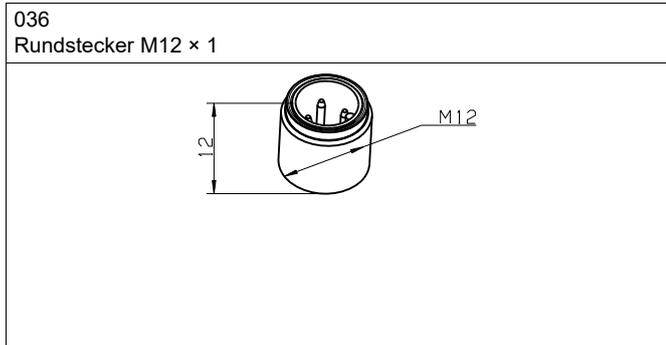
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Dimensions

Electrical connection



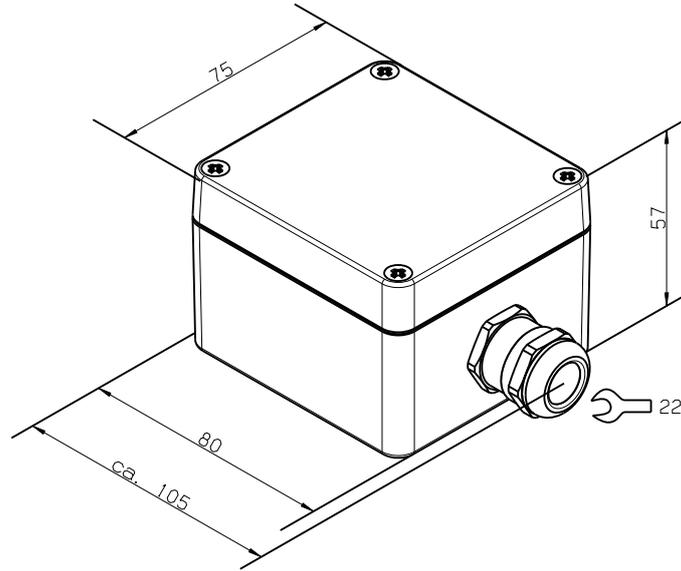
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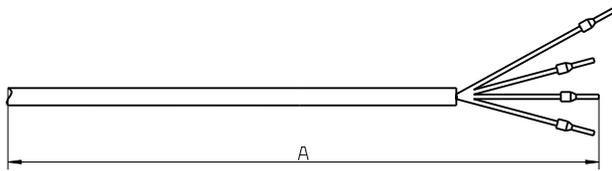
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131
 Connection housing, cube-shaped, large

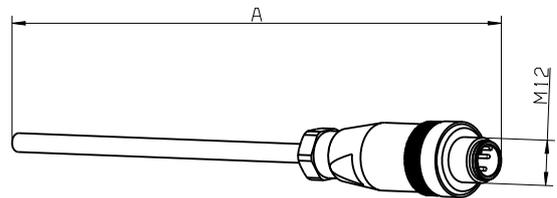


150 PVC, 160 silicone, 170 PUR
 Cable with ferrules



A Cable length, see order details

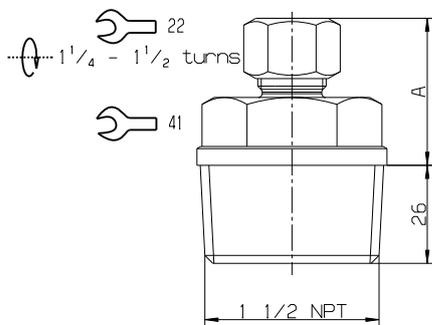
152 PVC, 162 silicone, 172 PUR
 Cable with M12 connector



A Cable length, see order details

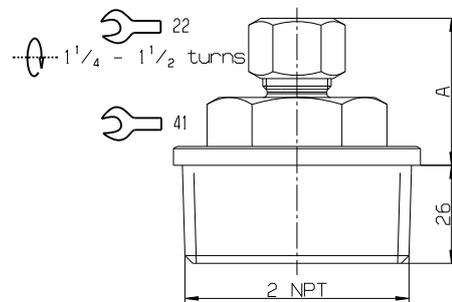
Process connections

515
 1 1/2 NPT



A 39

516
 2 NPT

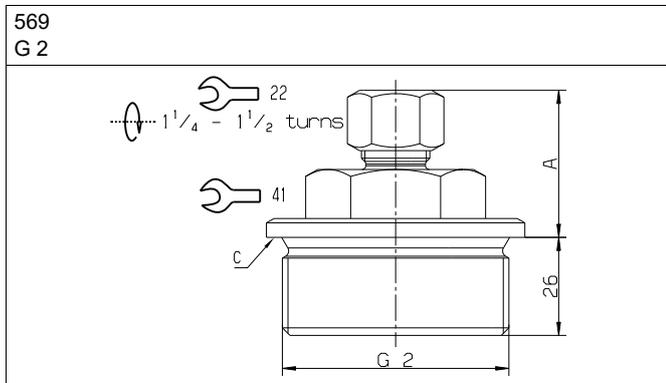


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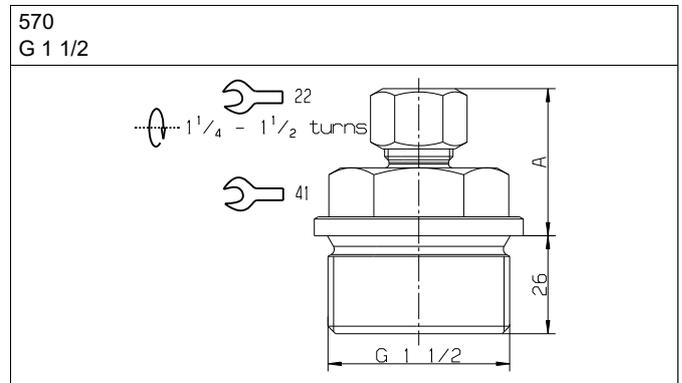
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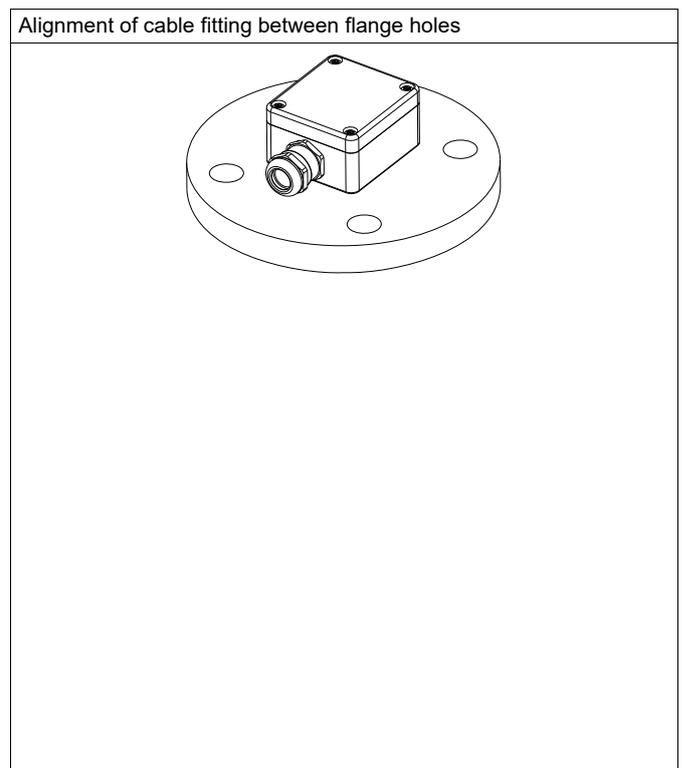
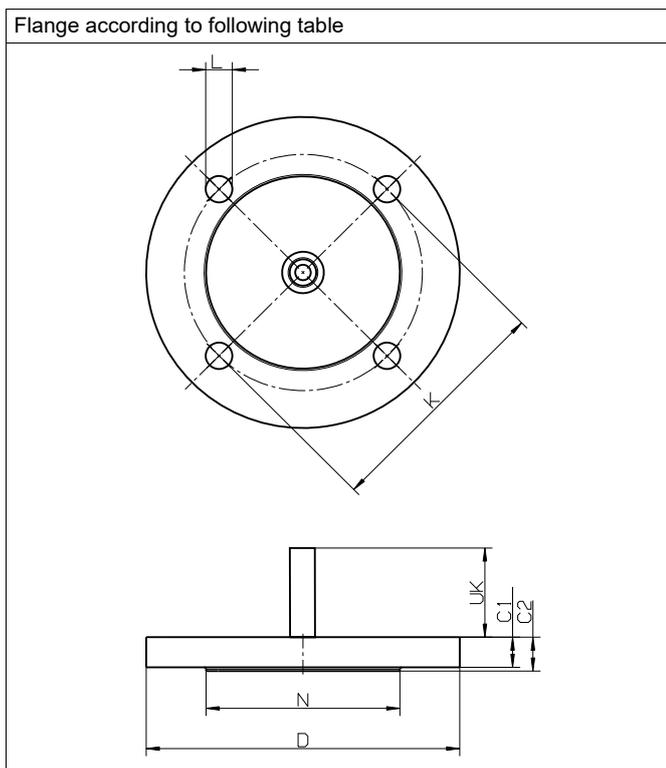


A 39

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



A 39



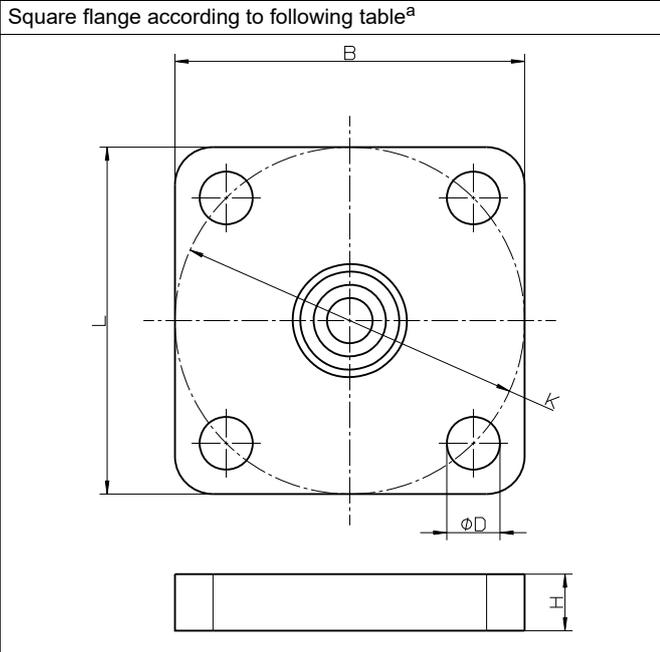
Example of extension tube; also available for other process connections; UK = extension tube length + 9 mm

Order code	Flange designation	Hole circle K	Number of holes	Diameter of holes L	Exterior diameter D	Diameter of sealing strip N	Strength of flange C1	Strength 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	125	4	18	165	102	17	20
784	Flange DN 65, PN40, EN 1092-1, form B1	145	8	18	185	122	19	22
785	Flange DN 80, PN40, EN 1092-1, form B1	160	8	18	200	138	21	24
786	Flange DN 100, PN40, EN 1092-1, form B1	190	8	22	235	162	21	24

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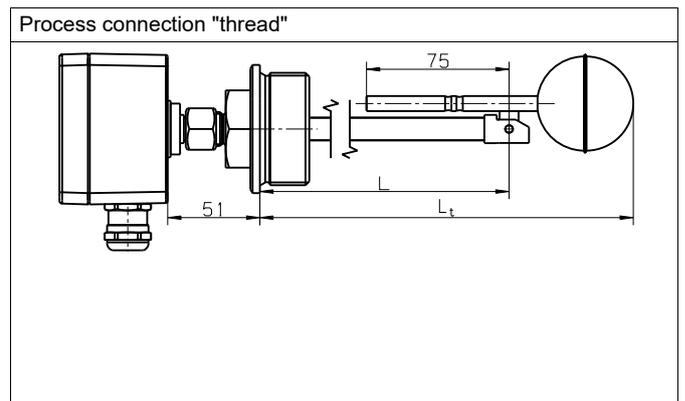
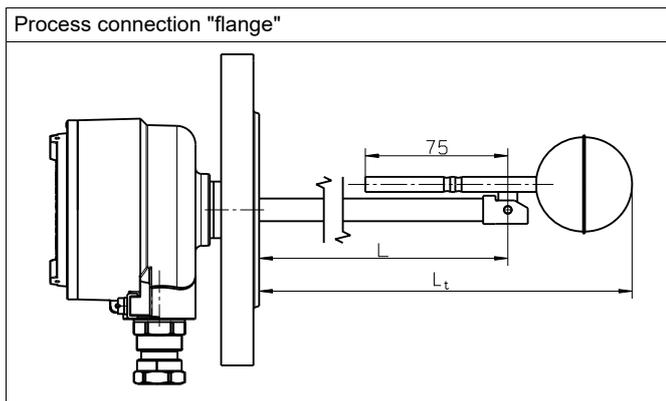


^a For the alignment of the cable fitting please see page 10

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.



L Guide tube length in mm
 for flange version L = 85 mm min.
 for thread version L = 110 mm min.

042 L_t overall insertion length = Guide tube length L + 100 mm
 052 L_t overall insertion length = Guide tube length L + 70 mm

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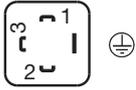
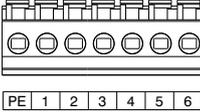
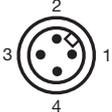
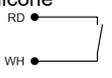
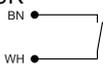
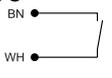
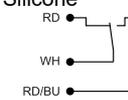
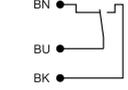
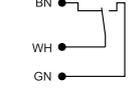
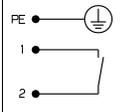
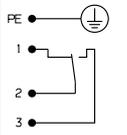
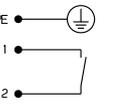
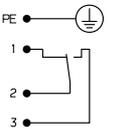
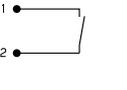
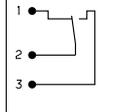
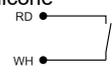
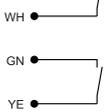
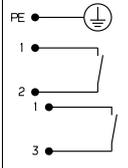
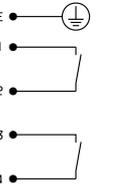
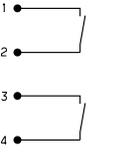
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Connection diagram

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 SPST-NO	SPDT-CO	Cable socket SPST-NO	SPDT-CO	Connection housing SPST-NO	SPDT-CO	Round plug M12 SPST-NO	SPDT-CO
1	<p>Silicone</p>  <p>PUR</p>  <p>PVC</p> 	<p>Silicone</p>  <p>PUR</p>  <p>PVC</p> 						
2	<p>Silicone</p>  <p>PUR</p>  <p>PVC</p> 	-		-		-		-
Protection rating ^a	prepared for 2 according to EN 61010-1		1	1	1	1	3	3

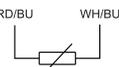
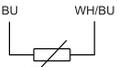
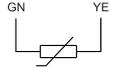
^a According to DIN EN 61140

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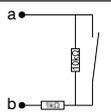
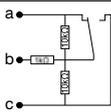
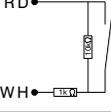
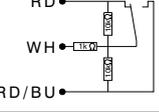


	Cable	Cable socket	Connection housing	Round plug M12
Temperature sensor Pt100 ^a	Silicone ^b  Silicone ^b 	-		
Temperature sensor Pt1000 ^a	PVC ^b 			
Temperature switch ^a	Silicone ^{c, d} 			
	PVC ^{c, e} 			

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

NAMUR circuit, switching signal according to DIN EN 60947-5-6

Versions with NAMUR circuitry may only be operated with switching voltages DC ≤ 15 V. A NAMUR circuit is assigned to each switching contact. Depending on the selected electrical connection, the wiring diagram is identical to the above. The NAMUR circuit can be used to detect line faults (line break, short-circuit) in a suitable evaluation unit (e.g. see Ex-i isolating amplifier accessories).

	SPST-NO/NC	SPDT-CO
Scheme		
Example: 1 switching contact with silicone cable		

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

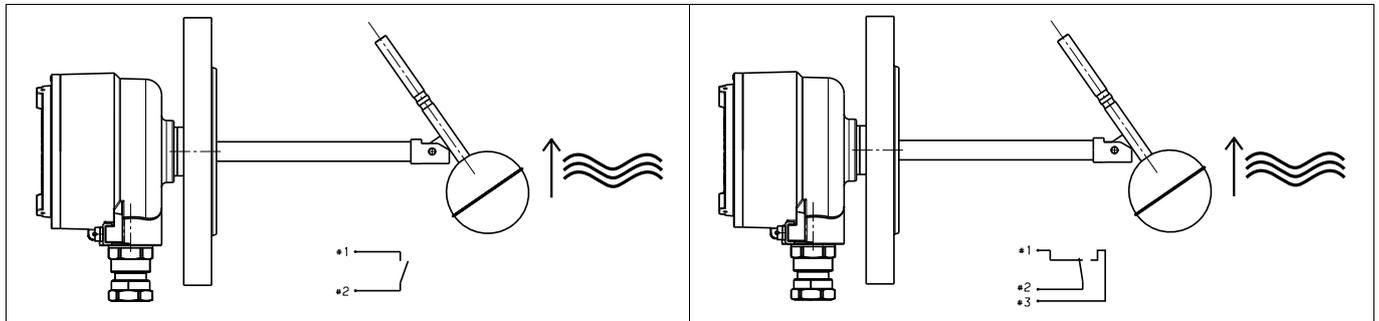
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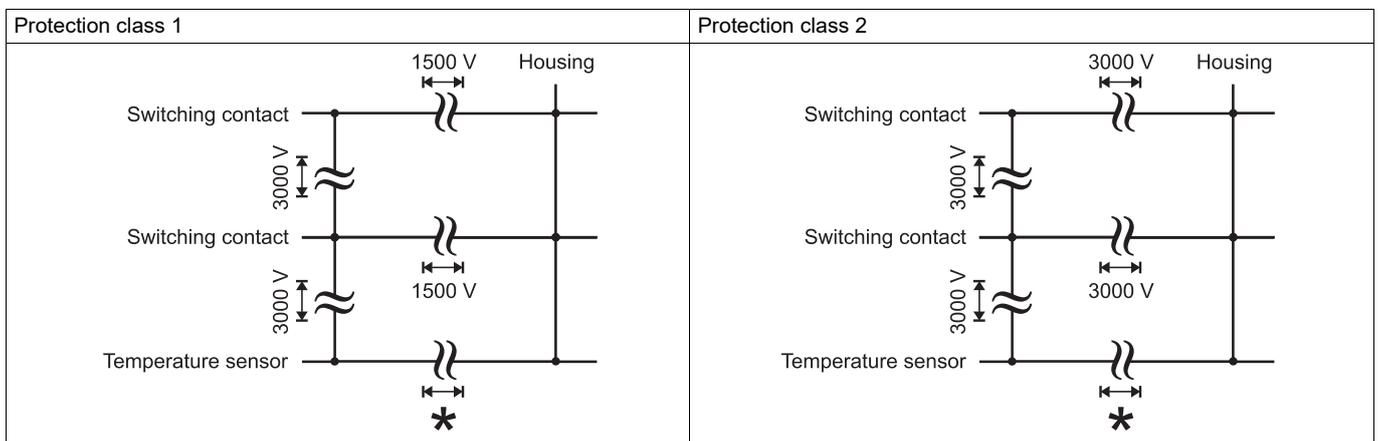
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The switching function is taken into account as follows, depending on how the device is installed in an empty container.



The galvanic isolation is realized as follows:



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 U_i in mA	Max. power P_i in mW	Internal inductance in μH	Internal capacitance in pF
SPST-NO	≤ 30	≤ 100	≤ 750	~0 for cable version 1 $\mu\text{H}/\text{m}$ connecting cable	~0 for cable version 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 U_i in mA	Max. power P_i in mW	Internal inductance in μH	Internal capacitance in pF
Pt100	≤ 30	≤ 55	≤ 413	~0 for cable version 1 $\mu\text{H}/\text{m}$ connecting cable	~0 for cable version 200 pF/m connecting cable
Pt1000					
NAMUR circuit	≤ 15	≤ 60	≤ 225		

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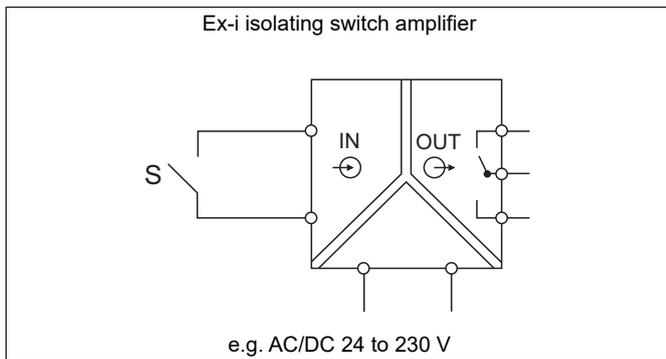
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Connection examples of versions with explosion protection

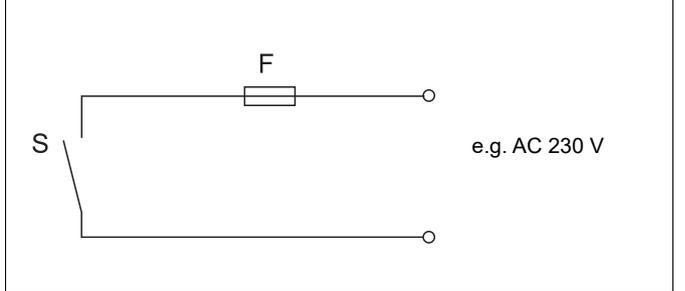
Float switch (S)

Ex i



Ex d

According to operating manual 408301, chapter 6 on "Installation", the fuse (F) must be selected.



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Order details

	(1) Basic type
408340	JUMO NESOS R40 LSH – Horizontal float switch
	(2) Basic type extension
000	None
062	Shipbuilding approval
262	WHG approval (German Water Resources Act)
263	WHG approval (German Water Resources Act), explosion protection, intrinsically safe, Ex i
264	WHG approval (German Water Resources Act), explosion protection, flameproof enclosure, Ex d
362	Explosion protection, intrinsically safe, Ex i
462	Explosion protection, flameproof enclosure, Ex d
662	Shipbuilding approval and explosion protection, intrinsically safe, Ex i
962	Shipbuilding approval and explosion protection, flameproof enclosure, Ex d
	(3) Electrical connection
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
	(4) Cable length
0000	None
2000	2000 mm
5000	5000 mm
100 - 5000	Specifications in plain text (increments of 100 mm)
	(5) Process connection
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
784	Flange DN 65, PN40, EN 1092-1, form B1
785	Flange DN 80, PN40, EN 1092-1, form B1
786	Flange DN 100, PN40, EN 1092-1, form B1
975	Square flange, 80 × 80 × 12
976	Square flange, 92 × 92 × 15
	(6) Guide tube length L^a
100 - 1000	Specifications in plain text (increments of 50 mm)

