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**JUMO Instrument Co. Ltd.**  
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**JUMO Process Control, Inc.**  
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Internet: www.jumousa.com



## JUMO dTRANS p33

### Pressure Transmitter and Level Probe for use in hazardous areas



- II 1/2G Ex ia IIC T6 ... T4 Ga/Gb (without extra code 406, 407)
- II 1/2D Ex ia IIIC T60 °C ... T100 °C Da Db (without extra code 406, 407)
- II 2G Ex ia IIC T6 ... T4 Gb (for extra code 406)
- II 1G Ex ia IIB T6 ... T4 Ga (for extra code 407)

#### Brief description

The pressure transmitter measures the pressure in both corrosive and non-corrosive gases, vapors, liquids and dusts. It operates on the piezoresistive measuring principle. The output signal is a DC current that is proportional to the input pressure.

The pressure transmitter fulfills the following requirements for equipment group II:

- In zone 1 and 2 areas with an explosion hazard arising from gas (Gas).  
The pressure connection (process connection) may, however, also be mounted on to zone 0.
- In zone 21 and 22 areas with an explosion hazard arising from dust (Dust).  
The pressure connection (process connection) may, however, also be mounted on to zone 20.

The pressure transmitter can also be used as a level probe.

Type 404753/000-xxx-405-658-20-12-1/406

- Explosion group II, category 2G with extra code 406
- Explosion group II, category 1G with extra code 407

The EC type-examination certificate is designated: SEV 09 ATEX 0140 X.



Type 404753/000-xxx-405-504-20-61-1/000

#### Approvals/approval marks



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## Technical data

Reference conditions	To DIN 16086 and DIN IEC 770/5.3
Measurement ranges	See order details
Overload limit	
For ranges < 100 bar	4× full scale
For ranges ≥ 100 bar	2× full scale
Burst pressure	10× full scale, 2000 bar max.
Parts in contact with medium	
Standard	Stainless steel 316 L, 316 Ti
For range ≥ 60 bar	Stainless steel 316 Ti, 630
With extra code 406 (level probe: IP68 protection, attached cable, class 2G, zone 1)	Cable material PE (polyethylene), standard
Output	4 to 20 mA, two-wire
Zero offset	≤ 0.3 % MSP <sup>a</sup>
Thermal hysteresis	
For ranges ≤ 0.6 bar	≤ ±1 % MSP
For ranges > 0.6 bar	≤ ±0.5 % MSP
Ambient temperature error	
For ranges 0.25 and 0.4 bar	
Zero	≤ 0.03 %/K typical, ≤ 0.05 %/K max.
Span	≤ 0.02 %/K typical, ≤ 0.04 %/K max.
For ranges above 0.6 bar	
Zero	≤ 0.02 %/K typical, ≤ 0.04 %/K max.
Span	≤ 0.02 %/K typical, ≤ 0.04 %/K max.
Deviation from characteristic	≤ 0.5 % MSP (limit setting)
Hysteresis	≤ 0.1 % MSP
Stability per year	≤ 0.5 % MSP
Voltage supply	DC 11 to 28 V (from intrinsically safe circuit) <sup>b</sup> U <sub>max</sub> ≤ 28 V I <sub>K max</sub> ≤ 120 mA
Ripple	The voltage peaks must not go above or below the limits specified for the voltage supply.
Max. current drawn	≤ 45 mA (at DC 24 V)
Voltage supply influence	≤ 0.03 %/V
Permissible ambient temperature	-40 to +85 °C
Storage temperature	-40 to +85 °C
Permissible medium temperature	
Standard	-40 to +85 °C
For type 404753/004	-40 to +200 °C
With extra code 406 (level probe: IP68 protection, attached cable, class 2G, zone 1)	-40 to +70 °C
With extra code 407 (level probe: IP68 protection, attached cable, class 1G, zone 0)	-40 to +70 °C
Electromagnetic compatibility	EN 61326
Interference emission	Class B <sup>c</sup>
Interference immunity	Industrial requirements

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Mechanical shock	100 g/1 msec (to DIN IEC 68-2-27)																														
Mechanical vibration	Max. 10 g at 15 to 2000 Hz (to DIN IEC 68-2-6)																														
Protection type	<p>With connector screwed on IP65 to EN 60529</p> <p>With extra code 406 (level probe: IP68 protection, attached cable, class 2G, zone 1) IP68 to EN 60529</p> <p>With extra code 407 (level probe: IP68 protection, attached cable, class 1G, zone 0) IP68 to EN 60529</p>																														
Housing	Stainless steel 304																														
Nominal position	Unrestricted																														
Weight	350 g (with process connection G 1/2)																														
Permissible measurement media	<p>The pressure transmitter with extra code 407 may be used in the following media:</p> <ul style="list-style-type: none"> <li>• Diesel (blue-colored)</li> <li>• Diesel with 5 to 20 % Biodiesel admixture</li> <li>• Low-sulfur heating oil</li> <li>• Methyl alcohol (pure, for use with motors)</li> <li>• Ethyl alcohol</li> <li>• E10 (Benzine95 with admixture of ethyl alcohol 5 to 20 %)</li> <li>• E50 (Benzine95 with admixture of ethyl alcohol 21 to 74 %)</li> <li>• E85 (Benzine95 with admixture of ethyl alcohol 75 to 98 %)</li> <li>• Vegetable oil</li> <li>• Diesel</li> <li>• Unleaded gasoline</li> <li>• Super leaded</li> <li>• Super unleaded</li> <li>• Super plus unleaded (98)</li> <li>• Kerosene</li> <li>• Jet A1</li> <li>• Biodiesel</li> <li>• Heating oil extra light</li> <li>• Heating oil light</li> <li>• Heating oil extra medium</li> <li>• Heating oil with additives</li> <li>• Low-sulfur diesel</li> <li>• Aviation fuel AVGAS</li> <li>• Leaded gasoline</li> <li>• Two-cycle fuel</li> </ul>																														
Permissible temperatures (gas)	<p>For areas with a gas explosion hazard, please note:</p> <p>The following table lists the maximum permissible supplied power (<math>P_{su}</math>) as a function of the maximum permissible ambient temperature (<math>T_a</math>) as well as the temperature class:</p> <table border="1"> <thead> <tr> <th>Temperature class</th> <th>Ambient temperature <math>T_a</math></th> <th>Maximum permissible supplied power <math>P_{su}</math></th> </tr> </thead> <tbody> <tr> <td>T4</td> <td>+95 °C</td> <td>0.8 W</td> </tr> <tr> <td>T4</td> <td>+80 °C</td> <td>1.5 W</td> </tr> <tr> <td>T4</td> <td>+75 °C</td> <td>1.8 W</td> </tr> <tr> <td>T5</td> <td>+85 °C</td> <td>0.8 W</td> </tr> <tr> <td>T5</td> <td>+75 °C</td> <td>1.5 W</td> </tr> <tr> <td>T5</td> <td>+70 °C</td> <td>1.8 W</td> </tr> <tr> <td>T6</td> <td>+70 °C</td> <td>0.8 W</td> </tr> <tr> <td>T6</td> <td>+60 °C</td> <td>1.5 W</td> </tr> <tr> <td>T6</td> <td>+55 °C</td> <td>1.8 W</td> </tr> </tbody> </table>	Temperature class	Ambient temperature $T_a$	Maximum permissible supplied power $P_{su}$	T4	+95 °C	0.8 W	T4	+80 °C	1.5 W	T4	+75 °C	1.8 W	T5	+85 °C	0.8 W	T5	+75 °C	1.5 W	T5	+70 °C	1.8 W	T6	+70 °C	0.8 W	T6	+60 °C	1.5 W	T6	+55 °C	1.8 W
Temperature class	Ambient temperature $T_a$	Maximum permissible supplied power $P_{su}$																													
T4	+95 °C	0.8 W																													
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T4	+75 °C	1.8 W																													
T5	+85 °C	0.8 W																													
T5	+75 °C	1.5 W																													
T5	+70 °C	1.8 W																													
T6	+70 °C	0.8 W																													
T6	+60 °C	1.5 W																													
T6	+55 °C	1.8 W																													

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Permissible temperatures (dust)	The following rule applies to areas with an explosion hazard with combustible dust:  The following table lists the maximum permissible supplied power ( $P_{su}$ ) as a function of the maximum permissible ambient temperature ( $T_a$ ) as well as the maximum surface temperature:		
	Maximum surface temperature	Ambient temperature $T_a$	Maximum permissible supplied power $P_{su}$
	T100 °C	+95 °C	0.8 W
	T85 °C	+80 °C	1.5 W
	T80 °C	+75 °C	1.8 W
	T90 °C	+85 °C	0.8 W
	T80 °C	+75 °C	1.5 W
	T75 °C	+70 °C	1.8 W
	T75 °C	+70 °C	0.8 W
	T65 °C	+60 °C	1.5 W
	T60 °C	+55 °C	1.8 W
Explosion protection	 II 1/2G Ex ia IIC T6 ... T4 Ga/Gb (without extra code 406, 407) II 1/2D Ex ia IIIC T100 °C ... T60 °C Da Db (without extra code 406, 407) II 2G Ex ia IIC T6 ... T4 Gb (for extra code 406) II 1G Ex ia IIB T6 ... T4 Ga (for extra code 407)  According to EN 60079-0 According to EN 60079-11 According to EN 60079-26		
EC type examination certificate	SEV 09 ATEX 0140 X		

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

<sup>b</sup> Intrinsically safe circuit in conjunction with Ex-i Power supply/input isolating amplifier, type 707530

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

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## Dimensions

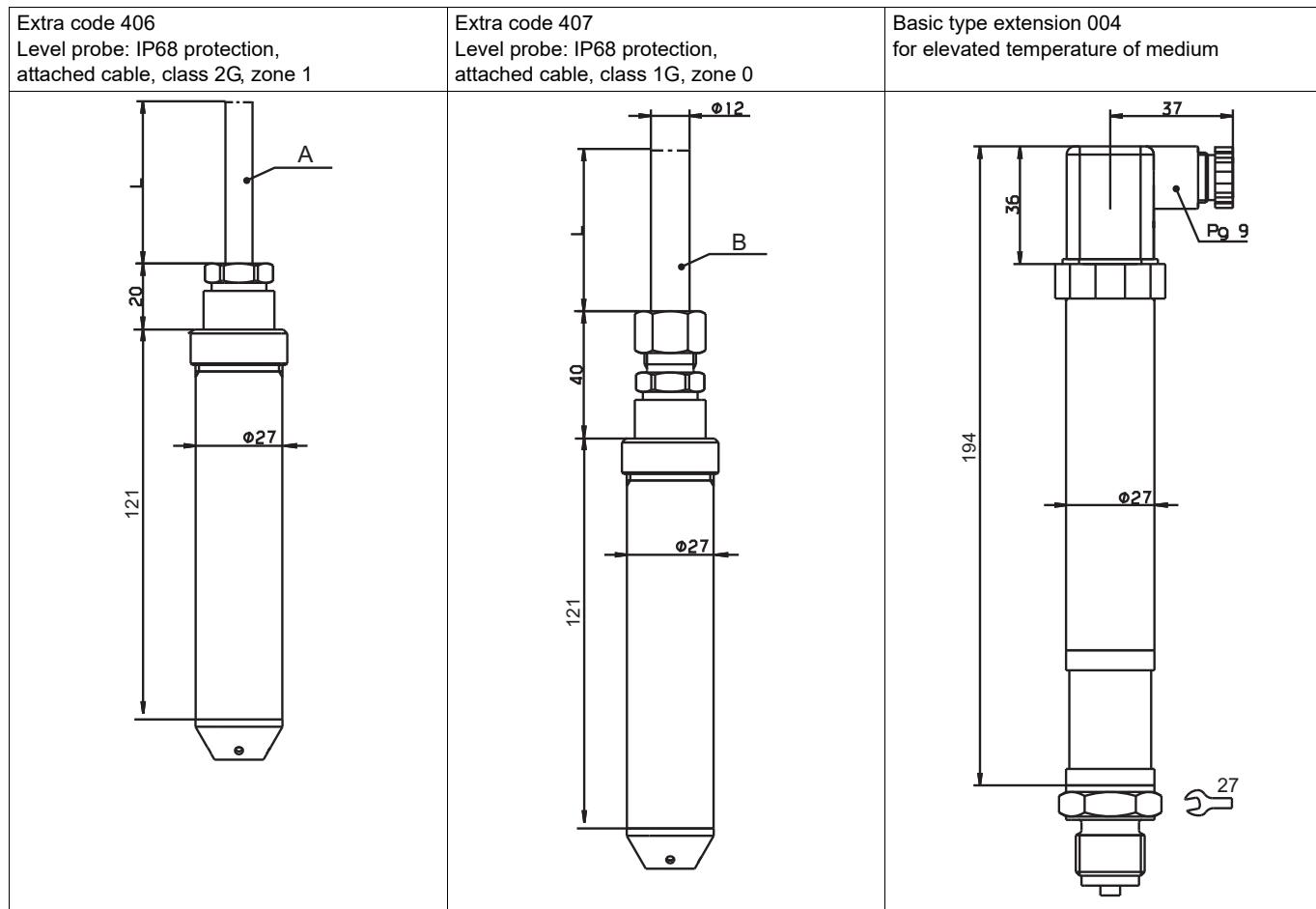
### Electrical connection

<p>Electrical connection 12 Attached cable</p>	<p>Electrical connection 36 Round plug M12 x 1</p>
<p>Electrical connection 61 Cable socket</p>	<p>Electrical connection 75 Terminal head</p>

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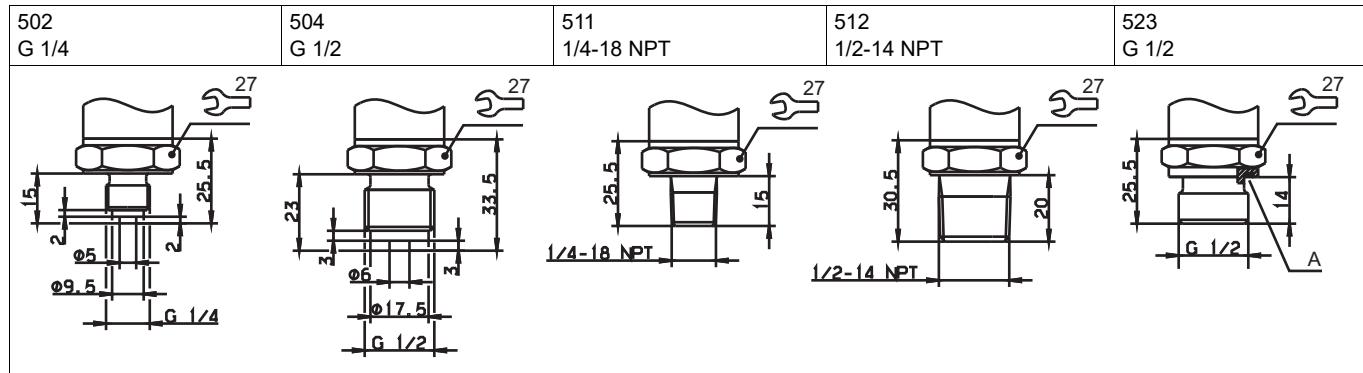
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A Fixed connecting cable

B Customer-supplied protection tube, see Operating Instructions

## Process connections, not front-flush



A Profile seal DN G 1/2

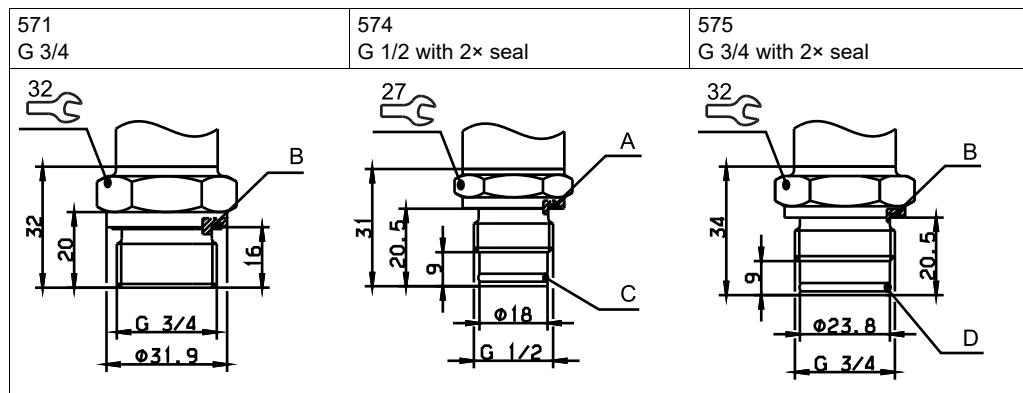
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## Process connections, front-flush

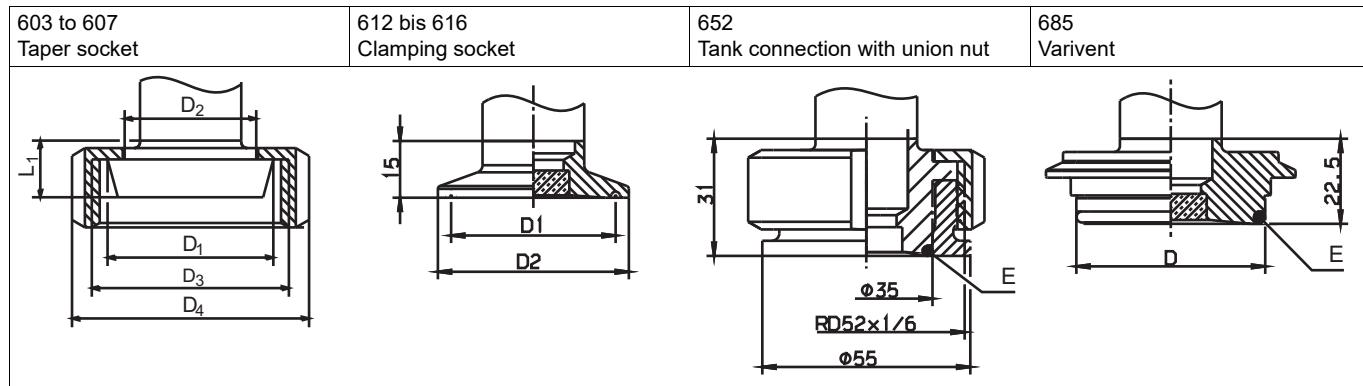


A Profile seal DN G 1/2

B Profile seal DN G 3/4

C O-ring 14 x 1.78

D O-ring 20.35 x 1.78



D O-ring 20.35 x 1.78

E O-ring

603 to 607 Taper socket						
Process connection	DN	$\varnothing D_1$	$\varnothing D_2$	$\varnothing D_3$	$\varnothing D_4$	$L_1$
603	20	36.5	30	RD 44 x 1/6	54	13
604	25	44	35	RD 52 x 1/6	63	15
605	32	50	41	RD 58 x 1/6	70	15
606	40	56	48	RD 65 x 1/6	78	15
607	50	68.5	61	RD 78 x 1/6	92	16

612 to 616 Clamping socket			
Process connection	DN	$\varnothing D_1$	$\varnothing D_2$
612	20	27.5	34
613	25	43.5	50.5
615	40	43.5	50.5
616	50	56.5	64

685 Varivent		
Process connection	DN	$\varnothing D$
685	25 to 30	50

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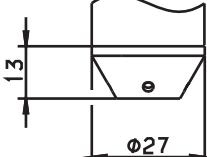
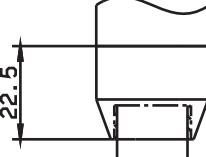
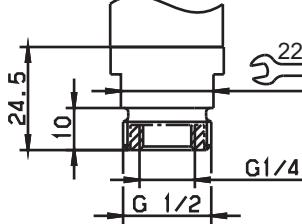
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## Process connection for level probes

(extra codes 406, 407)

658 Connection closed underneath	659 Connection open underneath	567 G 1/4 internal
		

F Protective cap

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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.

Connection	Terminals				
12 Attached cable	36 Round plug M12 x 1	61 Cable socket	75 Terminal head		
<b>4 to 20 mA, two-wire (output 405)</b>					
Voltage supply DC 11 to 28 V intrinsically safe	U <sub>B</sub> /S+ 0 V/S-	WH GY	1 BN 3 BU	1 2	1 2
Potential equilibration (FE)			2	<sup>a</sup>	3
Screen A shielded cable must be used for the connection! The shield must be grounded on both sides!	BK				

<sup>a</sup> Symbol on cable socket

<b>Color coding: connecting cable round plug M12 x 1</b>	1 BN	Brown
	2 WH	White
	3 BU	Blue
	4 BK	Black
	5 GY	Grey

The color coding is **only** for A-coded standard cables!

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## Order details

<b>(1) Basic type</b>	
404753/000	JUMO dTRANS p33 – Pressure transmitter and level probe for use in hazardous areas
404753/004	JUMO dTRANS p33 – Pressure transmitter and level probe for use in hazardous areas, elevated temperature of medium <sup>a</sup>
<b>(2) Nominal input range</b>	
451	0 to 0.25 bar relative pressure
452	0 to 0.4 bar relative pressure
453	0 to 0.6 bar relative pressure
454	0 to 1 bar relative pressure
455	0 to 1.6 bar relative pressure
456	0 to 2.5 bar relative pressure
457	0 to 4 bar relative pressure
458	0 to 6 bar relative pressure
459	0 to 10 bar relative pressure
460	0 to 16 bar relative pressure
461	0 to 25 bar relative pressure
462	0 to 40 bar relative pressure
463	0 to 60 bar relative pressure
464	0 to 100 bar relative pressure
465	0 to 160 bar relative pressure
466	0 to 250 bar relative pressure
467	0 to 400 bar relative pressure
468	0 to 600 bar relative pressure
475	-0.25 to 0 bar relative pressure
476	-0.4 to 0 bar relative pressure
477	-0.6 to 0 bar relative pressure
478	-1 to 0 bar relative pressure
479	-1 to +0.6 bar relative pressure
480	-1 to +1.5 bar relative pressure
481	-1 to +3 bar relative pressure
482	-1 to +5 bar relative pressure
483	-1 to +9 bar relative pressure
487	0 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
494	0 to 16 bar absolute pressure
495	0 to 25 bar absolute pressure
998	Special range absolute pressure
999	Special range relative pressure
<b>(3) Output</b>	
405	4 to 20 mA, two-wire
<b>(4) Process connection</b>	
502	G 1/4 to DIN EN 837
504	G 1/2 to DIN EN 837
511	1/4-18 NPT to DIN EN 837
512	1/2-14 NPT to DIN EN 837



523	G 1/2 to DIN 3852-11
567	Level probe: G 1/4 internal <sup>b, c</sup>
571	G 3/4 front-flush to DIN EN ISO 228-1 <sup>d</sup>
574	G 1/2 front-flush with 2x seal <sup>e</sup>
575	G 3/4 front-flush with 2x seal <sup>f</sup>
576	G 1 front-flush with 2x seal <sup>f</sup>
603	Taper socket with union nut to DIN 11851, DN 20 (dairy pipe fitting) <sup>g</sup>
604	Taper socket with union nut to DIN 11851, DN 25 (dairy pipe fitting) <sup>g</sup>
605	Taper socket with union nut to DIN 11851, DN 32 (dairy pipe fitting) <sup>g</sup>
606	Taper socket with union nut to DIN 11851, DN 40 (dairy pipe fitting) <sup>g</sup>
607	Taper socket with union nut to DIN 11851, DN 50 (dairy pipe fitting) <sup>g</sup>
612	Clamping socket to DIN 32676, DN 10/15/20 <sup>g</sup>
613	Clamping socket to DIN 32676, DN 25/32/40 <sup>g</sup>
616	Clamping socket to DIN 32676 (2" ISO 2852), DN 50 <sup>g</sup>
652	Tank connection with union nut, DN 25 <sup>g</sup>
658	Level probe: connection closed underneath <sup>b, h</sup>
659	Level probe: connection open underneath <sup>b, h</sup>
685	VARIVENT connection, DN 32/25 <sup>g</sup>
<b>(5) Material of process connection</b>	
20	CrNi (stainless steel)
<b>(6) Electrical connection</b>	
12	Attached cable, screened
36	Round plug M12 x 1
61	Cable socket to DIN EN 175301-803, form A
75	Terminal head
<b>(7) Filling medium for measurement system</b>	
0	None
1	Silicone oil
<b>(8) Calibration certificate</b>	
j	With
n	None (standard)
<b>(9) Extra code</b>	
000	None
406	Level probe: IP68 protection, attached cable, class 2G, zone 1 <sup>i</sup>
407	Level probe: IP68 protection, attached cable, class 1G, zone 0 <sup>i, j</sup>
452	Parts in contact with the medium electro-polished
634	TAG number

<sup>a</sup> The basic type 404753/004 can not be supplied with nominal input range 451, 452, 453, 465, 466, 467, 468, 475, 476, 477, 487.

<sup>b</sup> The process connections 567, 658 and 659 can be supplied only with nominal input range 451, 452, 453, 454, 455, 456, 457, 458 and 459.

<sup>c</sup> The process connection 567 is not possible in conjunction with extra code 407.

<sup>d</sup> The process connection 571 is not possible in conjunction with nominal input range 465, 466, 467 and 468.

<sup>e</sup> The process connection 574 is not possible in conjunction with nominal input range 451, 452, 453, 468, 475, 476, 477 and 487.

<sup>f</sup> The process connections 575 and 576 can not be supplied with nominal input range 465, 466, 467 and 468.

<sup>g</sup> The process connections 603, 604, 605, 606, 607, 612, 613, 616, 652 and 685 can not be supplied with nominal input range 462, 463, 464, 465, 466, 467, 468.

<sup>h</sup> The process connections 658 and 659 can be supplied only with extra codes 406 and 407.

<sup>i</sup> Please clearly specify the cable length for extra codes 406 and 407. The standard material is PE. Select at electrical connection 12 "attached cable" for order code.

<sup>j</sup> The operator must select an overall system that will ensure the correct zone isolation for the relevant application. This must be implemented by including a protection tube and screw connection as described in EN 60079-1. The applicable requirements are described in the operating instructions.

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Order code</b>									
<b>Order example</b>	404753/000	- 451	- 405	- 504	- 20	- 61	- 1	- n	/ 000

## Accessories

Item	Description	Part no.
	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. The cable clamp is compatible with all JUMO level probes. The clamping range is 5.5 to 10.5 mm. The maximum tensile strength is 2.5 kN. The case is made of hot-dip galvanized steel sheet. The clamping jaws and guide clips are made of glass fiber reinforced polyamide. A stainless steel variant is also available upon request.	0061389
	For closed containers or water wells with a well head, the cable should be guided through and fastened by a sealing screw. The sealing screw is made up of a G 1 1/2" thread and is used to route the cable.	00333329
	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. 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.	00061206
Pressure compensation filter for cable	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.	00382632
	Manifolds can be supplied in conjunction with pressure measuring devices. They serve to isolate and thus to zero adjustment of the pressure gauge.	00561605
2-valve manifold, PN 420, DN 5, version 1/2-NPT/G 1/2		00550362

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Item	Description	Part no.
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. 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 B707530.0.</p>	00577948