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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.

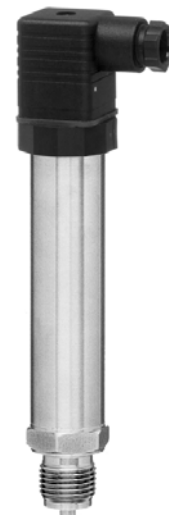
The pressure transmitter can also be used as a level probe.

- 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-405-658-20-12-1/406



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 For ranges ≥ 100 bar | 4× full scale 2× full scale |
| Burst pressure | 10× full scale, 2000 bar max. |
| Parts in contact with medium Standard For range ≥ 60 bar With extra code 406 (level probe: IP68 protection, attached cable, class 2G, zone 1) | Stainless steel 316 L, 316 Ti Stainless steel 316 Ti, 630 Cable material PE (polyethylene), standard |
| Output | 4 to 20 mA, two-wire |
| Zero offset | ≤ 0.3 % MSP ^a |
| Thermal hysteresis For ranges ≤ 0.6 bar For ranges > 0.6 bar | ≤ ±1 % MSP ≤ ±0.5 % MSP |
| Ambient temperature error For ranges 0.25 and 0.4 bar Zero Span For ranges above 0.6 bar Zero Span | ≤ 0.03 %/K typical, ≤ 0.05 %/K max. ≤ 0.02 %/K typical, ≤ 0.04 %/K max. ≤ 0.02 %/K typical, ≤ 0.04 %/K max. ≤ 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 Ripple Max. current drawn | DC 11 to 28 V (from intrinsically safe circuit) ^b U _{max} ≤ 28 V I _{K max} ≤ 120 mA The voltage peaks must not go above or below the limits specified for the voltage supply. ≤ 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 For type 404753/004 With extra code 406 (level probe: IP68 protection, attached cable, class 2G, zone 1) With extra code 407 (level probe: IP68 protection, attached cable, class 1G, zone 0) | -40 to +85 °C -40 to +200 °C -40 to +70 °C -40 to +70 °C |
| Electromagnetic compatibility Interference emission Interference immunity | EN 61326 Class B ^c 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With connector screwed on | IP65 to EN 60529 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With extra code 406 (level probe: IP68 protection, attached cable, class 2G, zone 1) | IP68 to EN 60529 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With extra code 407 (level probe: IP68 protection, attached cable, class 1G, zone 0) | IP68 to EN 60529 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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"> • Diesel (blue-colored) • Diesel with 5 to 20 % Biodiesel admixture • Low-sulfur heating oil • Methyl alcohol (pure, for use with motors) • Ethyl alcohol • E10 (Benzine95 with admixture of ethyl alcohol 5 to 20 %) • E50 (Benzine95 with admixture of ethyl alcohol 21 to 74 %) • E85 (Benzine95 with admixture of ethyl alcohol 75 to 98 %) • Vegetable oil • Diesel • Unleaded gasoline • Super leaded • Super unleaded • Super plus unleaded (98) • Kerosene • Jet A1 • Biodiesel • Heating oil extra light • Heating oil light • Heating oil extra medium • Heating oil with additives • Low-sulfur diesel • Aviation fuel AVGAS • Leaded gasoline • Two-cycle fuel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Permissible temperatures (gas) | <p>For areas with a gas explosion hazard, please note:</p> <p>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 temperature class:</p> <table border="1"> <thead> <tr> <th>Temperature class</th> <th>Ambient temperature T_a</th> <th>Maximum permissible supplied power P_{su}</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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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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 | | |

^a MSP = measuring span

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

^c 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 × 1</p> |
| <p>Electrical connection 61 Cable socket</p> | <p>Electrical connection 75 Terminal head</p> |

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| | | |
|--|--|---|
| <p>Extra code 406 Level probe: IP68 protection, attached cable, class 2G, zone 1</p> | <p>Extra code 407 Level probe: IP68 protection, attached cable, class 1G, zone 0</p> | <p>Basic type extension 004 for elevated temperature of medium</p> |
| | | |

- A Fixed connecting cable
- B Customer-supplied protection tube, see Operating Instructions

Process connections, not front-flush

| | | | | |
|----------------------|----------------------|---------------------------|---------------------------|----------------------|
| <p>502 G 1/4</p> | <p>504 G 1/2</p> | <p>511 1/4-18 NPT</p> | <p>512 1/2-14 NPT</p> | <p>523 G 1/2</p> |
| | | | | |

- A Profile seal DN G 1/2

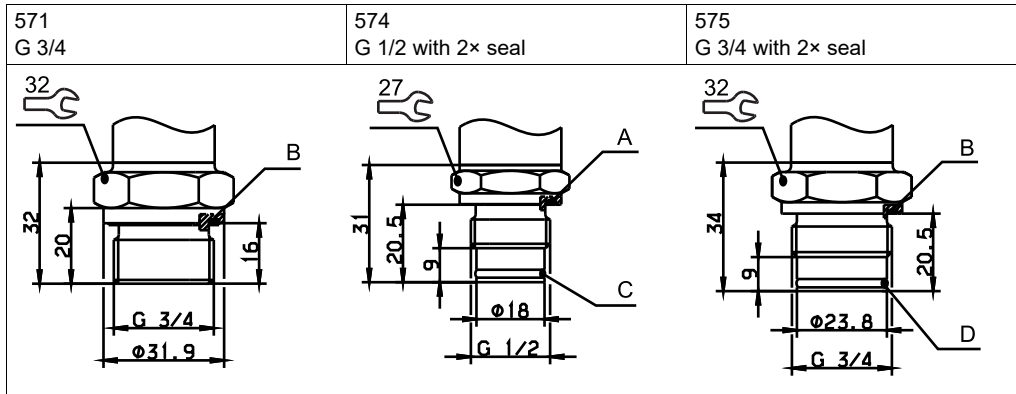
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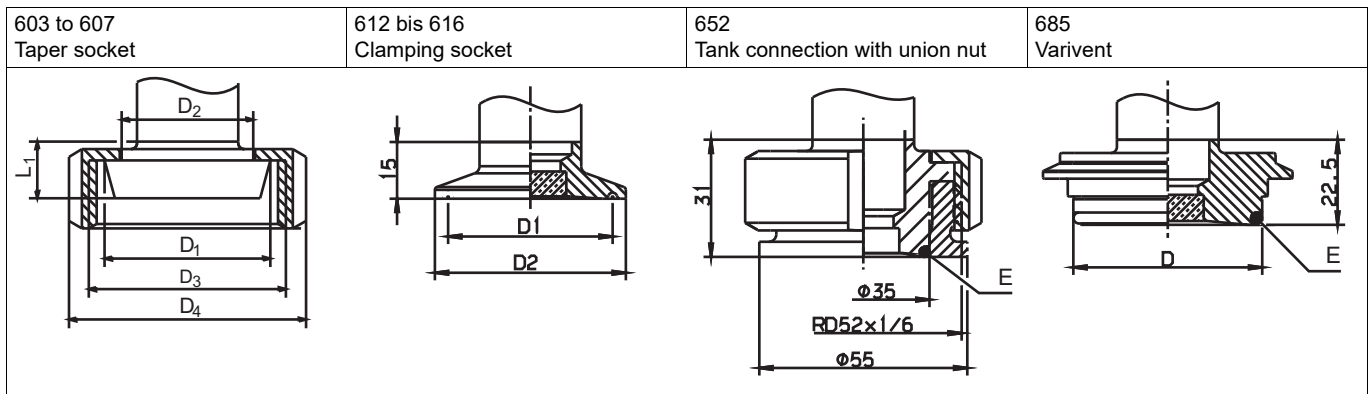


Process connections, front-flush



A Profile seal DN G 1/2
 B Profile seal DN G 3/4

C O-ring 14 × 1.78
 D O-ring 20.35 × 1.78



D O-ring 20.35 × 1.78
 E O-ring

| 603 to 607 Taper socket | | | | | | |
|----------------------------|----|------------------|------------------|------------------|------------------|----------------|
| Process connection | DN | Ø D ₁ | Ø D ₂ | Ø D ₃ | Ø D ₄ | L ₁ |
| 603 | 20 | 36.5 | 30 | RD 44 × 1/6 | 54 | 13 |
| 604 | 25 | 44 | 35 | RD 52 × 1/6 | 63 | 15 |
| 605 | 32 | 50 | 41 | RD 58 × 1/6 | 70 | 15 |
| 606 | 40 | 56 | 48 | RD 65 × 1/6 | 78 | 15 |
| 607 | 50 | 68.5 | 61 | RD 78 × 1/6 | 92 | 16 |

| 612 to 616 Clamping socket | | | |
|-------------------------------|----|------------------|------------------|
| Process connection | DN | Ø D ₁ | Ø 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 | Ø D |
| 685 | 25 to 30 | 50 |

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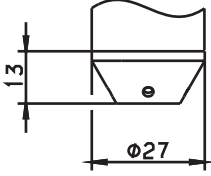
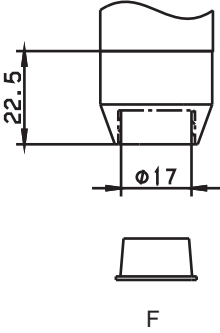
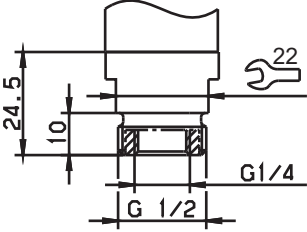
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Process connection for level probes

(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 |
| 4 to 20 mA, two-wire (output 405) | | | | | |
| Voltage supply DC 11 to 28 V intrinsically safe | U _B /S+ 0 V/S- | WH GY | 1 BN 3 BU | 1 2 | 1 2 |
| Potential equilibration (FE) | | | 2 | ^a | 3 |
| Screen A shielded cable must be used for the connection! The shield must be grounded on both sides! | | BK | | | |

^a Symbol on cable socket

| Color coding: connecting cable round plug M12 x 1 | | |
|---|------|-------|
| | 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

| | |
|------------|--|
| | (1) Basic type |
| 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 ^a |
| | (2) Nominal input range |
| 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 |
| | (3) Output |
| 405 | 4 to 20 mA, two-wire |
| | (4) Process connection |
| 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 |

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

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

^b 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.

^c The process connection 567 is not possible in conjunction with extra code 407.

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

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

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

^g 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.

^h The process connections 658 and 659 can be supplied only with extra codes 406 and 407.

ⁱ 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.

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

Accessories


| Item | Description | Part no. |
|--|--|----------|
|  <p>Cable clamp</p> | <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 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.</p> | 0061389 |
|  <p>Sealing screw</p> | <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> | 0033329 |
|  <p>Terminal box with pressure compensation element</p> | <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 |
| <p>Pressure compensation filter for cable</p> | <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 |
|  <p>2-valve manifold, PN 420, DN 5, version 1/2-NPT/1/2-NPT</p> | <p>Manifolds can be supplied in conjunction with pressure measuring devices. They serve to isolate and thus to zero adjustment of the pressure gauge.</p> | 00561605 |
| <p>2-valve manifold, PN 420, DN 5, version 1/2-NPT/G 1/2</p> | | 00550362 |

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| Item | Description | Part no. |
|--|--|-----------------|
| <p>Ex-i supply/input isolating amplifier</p>  | <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 B707530.0.</p> | <p>00577948</p> |