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JUMO dTRANS p20

Process pressure transmitter

Brief description

The JUMO dTRANS p20 pressure transmitter with HART® interface combines maximum precision with easy operation. It is used to measure the relative and absolute pressures of gases, vapors and liquids. The integrated LCD shows measurements and device data. In the version with "Ex ia (intrinsically safe)" explosion protection, the pressure transmitter can be fitted up to zone 0.

The housing and sensors are made from high-quality stainless steel. Various front-flush process connections are available for applications to meet hygiene requirements, including the EHEDG-certified PEKA connection system (see data sheet 409711).

A high-temperature version capable of withstanding medium temperatures up to 200°C has been specifically designed for application involving hot media and pipes.

It is also possible to connect remote seals for special process engineering applications (see data sheets 409772 to 409784).

The transmitter is programmable, making it readily adaptable to a variety of different measurement tasks. A user-friendly setup program is available as an accessory, for operation via the interfaces. A rotary knob ensures highly convenient and fast local, manual operation.

For the "Ex d" explosion protection version, see data sheet 403026.

For the differential pressure version, see data sheet 403022.



Type 403025/0-0-1-...

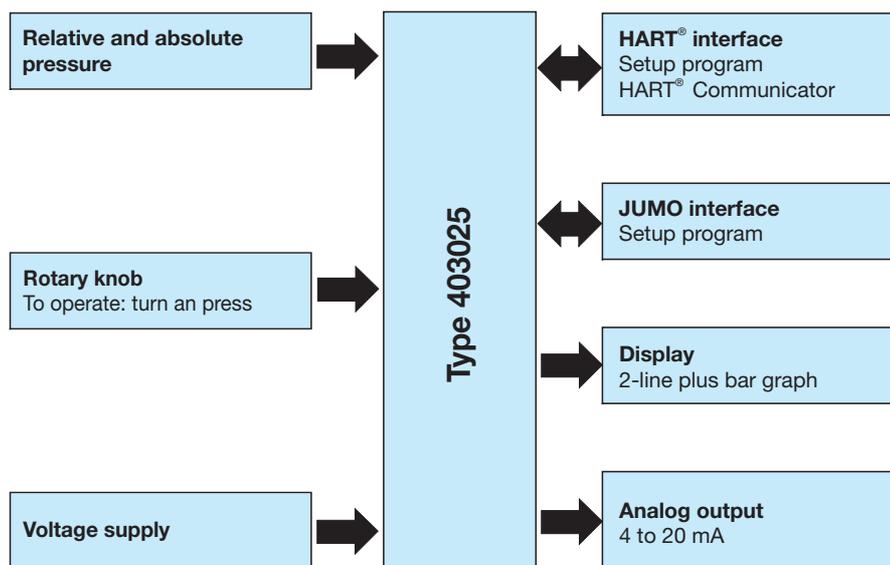


Type 403025/0-0-2-...



Type 403025/0-0-3-...

Block diagram



Key features

- Stainless steel housing
- HART® interface
- Ex ia explosion protection (gas and dust) according to ATEX, INMETRO and GOST-R
- 0.05 % linearity
- Turn Down 1:50
- Medium temperature up to 200 °C
- Rotary knob for ease of operation
- Setup program
- LCD display with bar graph
- Display scaling with a choice of measurement units
- Display of sensor temperature
- Display of minimum and maximum pressures
- Current sensor function

Approvals/marks of conformity (see Technical data)



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Technical data

General

| | |
|---|--|
| Reference conditions | DIN 16086, DIN EN 60770 and DIN IEC 770/5.3 |
| Sensor system | Silicon sensor with stainless steel separating diaphragm |
| Pressure transfer medium | |
| For measuring system filling medium 0 | Without transfer medium |
| For measuring system filling medium 1 | Silicon oil, FDA-compliant |
| Permissible load change | > 10 million |
| Location | |
| Mounting position | Any |
| Calibration position | Device standing vertically, process connection on bottom |
| Location-dependent zero point offset | Zero point calibration possible locally or via setup. |
| For medium temperature 1 (up to 120 °C) | ≤ 1 mbar |
| For medium temperature 2 (up to 200 °C) | ≤ 10 mbar |
| Display | LCD, two-line with bar graph |
| Alignment | Display unit can be rotated 90° at a time Housing can be rotated ±160° |
| Size | Display field 22 × 35 mm/font size 7 mm/5 digits |
| Color | Black |
| Measurement unit display options | |
| Input pressure | mH ₂ O, inH ₂ O, inHg, ftH ₂ O, mmH ₂ O, mmHg, psi, bar, mbar, kg/cm ² , kPa, Torr, MPa |
| Measurement value | % or scaled with a freely adjustable measurement unit |
| Output current | mA |
| Sensor temperature | °C; °F |
| Additional display data | Minimum pressure, maximum pressure, error, overrange, underrange, operating hours, device parameters |
| Operation | |
| Local | With rotary knob and LCD |
| Setup program | Via interface |
| Interface | |
| Standard | JUMO interface ^a |
| For output 410 (4 to 20 mA with HART®) | JUMO interface ^a and HART® interface |

^a The JUMO interface must not be used for instruments with ATEX Ex ia explosion protection! These instruments can be operated by the rotary knob or via the HART® interface.

Input

| | | | | | |
|-------------------------|------------------------|-------------------|--------------------|---------------------|---------------------|
| Relative pressure | | | | | |
| Nominal measuring range | -600 to +600 mbar rel. | -1 to +4 bar rel. | -1 to +25 bar rel. | -1 to +100 bar rel. | -1 to +600 bar rel. |
| Overload capacity | 6 bar | 30 bar | 150 bar | 300 bar | 1200 bar |
| Burst pressure | 12 bar | 60 bar | 250 bar | 400 bar | 2000 bar |
| Absolute pressure | | | | | |
| Nominal measuring range | 0 to 0.6 bar abs. | 0 to 4 bar abs. | 0 to 25 bar abs. | 0 to 100 bar abs. | |
| Overload capacity | 6 bar | 30 bar | 150 bar | 300 bar | |
| Burst pressure | 12 bar | 60 bar | 250 bar | 400 bar | |

Output

| | |
|------------------------|---------------------------------|
| Analog output | |
| For output 405 | 4 to 20 mA, two wire |
| For output 410 | 4 to 20 mA, two wire with HART® |
| Step response time T60 | ≤ 190 ms without damping |
| Damping | adjustable, 0 to 100 s |

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| | |
|---|---|
| Burden For output 405 (4 to 20 mA) For output 410 (4 to 20 mA with HART®) | Burden $\leq (U_B - 11.5 \text{ V}) \div 0.022 \text{ A}$ Burden $\leq (U_B - 11.5 \text{ V}) \div 0.022 \text{ A}$; additional: min. 250 Ω , max. 1100 Ω |
|---|---|

Voltage supply

| | |
|---|---|
| For version Explosion protection 0 (none) Explosion protection 1 (ATEX Ex ia) | DC 11.5 to 36 V DC 11.5 to 28 V The voltage supply must be intrinsically safe and must not exceed the following maximum values: $U_i \leq \text{DC } 28 \text{ V}$ $I_i \leq 93 \text{ mA}$ $P_i \leq 750 \text{ mW}$ |
|---|---|

Mechanical properties

| | |
|--|--|
| Process connection For material 20 For material 82 Surface Process seal For process connection 512 and 571 For process connection 652 For process connection 997 (JUMO PEKA) For all other process connections | 316L at front-flush process connection 316Ti sonst 2.4819 NiMo $Ra \leq 0.8 \mu\text{m}$ FPM FPM FDA-compliant, EHEDG approved materials: FPM, VMQ, EPDM option, see data sheet 409711 Without a seal |
| Measuring membrane For material 20 For material 82 Surface | 1.4542 at measuring range 516 316L sonst 2.4819 NiMo $Ra \leq 0.8 \mu\text{m}$ |
| Housing Material For housing 1 (short, stainless steel) For housing 2 (long, stainless steel) For housing 3 (precision casting) For cover material 20 (stainless steel) For cover material 85 (plastic) For electrical connection 36 (M12 x 1 round plug) For electrical connection 82 (cable gland, plastic) For electrical connection 93 (cable gland, metal) For operation 0 (without control knob) For operation 1 (with control knob) | Stainless steel 1.4404 Stainless steel 1.4404, VMQ Precision casting 1.4408 Precision casting 1.4408, FPM seal PA, FPM seal Nickel-plated brass PA Nickel-plated brass - PA |
| Explosion protection For explosion protection 0 (none) For explosion protection 1 (ATEX Ex ia) | The instrument is not approved for use in hazardous (Ex) areas. EC type examination certificate SEV 09 ATEX 0138 X  II 1/2G Ex ia IIC T6 to T3 Ga/Gb II 1/2D Ex ia IIIC T105 °C Da/Db |
| Weight Type 403025/0-0-1 (short housing) Type 403025/0-0-2 (long housing) Type 4030252/0-0-3 (precision casting housing) | Approx. 550 g Approx. 850 g Approx. 1600 g |

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Ambient conditions

| | | | | | | |
|---|---|-----------------|-------------------------|----------------------------------|---|---------------|
| Permissible temperatures Operation | Version | Category | Max. medium temperature | Ambient temperature ^a | Extended ambient temperature (extra code 681) ^{a, b} | |
| | Standard | | +120 °C | -40 to +85 °C | -50 to +85 °C | |
| | High temperature | | +200 °C | -40 to +85 °C | -50 to +85 °C | |
| | II 1/2G Ex ia | T6 | | +60 °C | -40 to +50 °C | -50 to +50 °C |
| | | T5 | | +70 °C | -40 to +65 °C | -50 to +65 °C |
| | | T4 | | +115 °C | -40 to +85 °C | -50 to +85 °C |
| | | T3 ^c | | +175 °C | -40 to +85 °C | -50 to +85 °C |
| II 1/2D Ex ia | T105 °C | +100 °C | -40 to +60 °C | -50 to +60 °C | | |
| Storage | -40 to +85°C | | | | | |
| Permissible relative humidity Operation | 100 % incl. condensation on instrument outer sleeve | | | | | |
| Storage | 90 % without condensation | | | | | |
| Permissible mechanical loading Vibration performance | 2 g, 10 to 2000 Hz to DIN EN 60068-2-6 | | | | | |
| Shock resistance | 15 g for 6 ms to IEC 60068-2-27 | | | | | |
| Electromagnetic compatibility Interference emission | To EN 61326 | | | | | |
| Interference resistance | Class B Industry | | | | | |
| Protection Version | | | | | | |
| Explosion protection 0 (none) | IP67 to DIN EN 60529 | | | | | |
| Explosion protection 1 (ATEX Ex ia) | IP66 to DIN EN 60529 | | | | | |

^a Restricted function below -20 °C: stationary use, increased danger of broken cable, display does not function.

^b In the range from -40 to -50 °C the device must be permanently in operation. Additionally, the lid with the device inspection glass must also be protected against mechanical impact and shock effects. Please contact JUMO for further details.

^c Only for high temperature version (temperature of medium 2).

Accuracy

| | | | | | |
|--|---|-----------------------------|-----------------------------|-----------------------------|---------------------|
| Relative pressure | | | | | |
| Nominal measuring range | -600 to +600 mbar rel. | -1 to +4 bar rel. | -1 to +25 bar rel. | -1 to +100 bar rel. | -1 to +600 bar rel. |
| Factory setting for measuring range | 0 to 600 mbar | 0 to 4 bar | 0 to 25 bar | 0 to 100 bar | 0 to 600 bar |
| Minimum span | 60 mbar | 0.1 bar | 0.5 bar | 5 bar | 30 bar |
| Turndown ratio (r) | r ≤ 20 | r ≤ 50 | r ≤ 52 | r ≤ 20 | |
| Linearity for linear characteristic as % of the set span | 0.1 % for r ≤ 10 | 0.05 % for r ≤ 10 | | | |
| | r × 0.01 % for 10 ≤ r ≤ 20 | r × 0.005 % for 10 ≤ r ≤ 50 | r × 0.005 % for 10 ≤ r ≤ 52 | r × 0.005 % for 10 ≤ r ≤ 20 | |
| Accuracy at 20 °C as % of the set span | 0.2 % for r ≤ 10 | 0.1 % for r ≤ 10 | | | |
| | r × 0.02 % for 10 ≤ r ≤ 20 | r × 0.01 % for 10 ≤ r ≤ 50 | r × 0.01 % for 10 ≤ r ≤ 52 | r × 0.01 % for 10 ≤ r ≤ 20 | |
| Accuracy at -40 to +85 °C as % of the set span | 0.3 % for r ≤ 10 ^a | 0.2 % for r ≤ 10 | | 0.2 % for r ≤ 10 | |
| | r × 0.03 % for 10 ≤ r ≤ 20 ^a | r × 0.02 % for 10 ≤ r ≤ 50 | r × 0.02 % for 10 ≤ r ≤ 52 | r × 0.02 % for 10 ≤ r ≤ 20 | |
| Long-term stability as % of nominal measuring range | 0.1 %/year | | | | |

^a Only to -30 °C.

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| | | | | |
|---|---|---|---|---|
| Absolute pressure | | | | |
| Nominal measuring range | 0 to 0.6 bar abs. | 0 to 4 bar abs. | 0 to 25 bar abs. | 0 to 100 bar abs. |
| Factory setting for measuring range | 0 to 600 mbar | 0 to 4 bar | 0 to 25 bar | 0 to 100 bar |
| Minimum span | 60 mbar | 0.1 bar | 0.5 bar | 5 bar |
| Turndown ratio (r) | $r \leq 10$ | $r \leq 40$ | $r \leq 50$ | $r \leq 20$ |
| Linearity for linear characteristic as % of the set span | 0.1 % for $r \leq 5$ | | 0.05 % for $r \leq 10$ | |
| | $r \times 0.02$ % for $5 \leq r \leq 10$ | $r \times 0.005$ % for $10 \leq r \leq 40$ | $r \times 0.005$ % for $10 \leq r \leq 50$ | $r \times 0.005$ % for $10 \leq r \leq 20$ |
| Accuracy at 20 °C as % of the set span | 0.2 % for $r \leq 5$ | | 0.1 % for $r \leq 10$ | |
| | $r \times 0.04$ % for $5 \leq r \leq 10$ | $r \times 0.01$ % for $10 \leq r \leq 40$ | $r \times 0.01$ % for $10 \leq r \leq 50$ | $r \times 0.01$ % for $10 \leq r \leq 20$ |
| Accuracy at -40 to +85 °C as % of the set span | 0.3 % for $r \leq 5^a$ | | 0.2 % for $r \leq 10$ | |
| | $r \times 0.06$ % for $5 \leq r \leq 10^a$ | $r \times 0.02$ % for $10 \leq r \leq 40$ | $r \times 0.02$ % for $10 \leq r \leq 50$ | $r \times 0.02$ % for $10 \leq r \leq 20$ |
| Long-term stability as % of nominal measuring range | 0.1 %/year | | | |

^a Only to -30 °C.

Approvals/marks of conformity

| Mark of conformity | Testing laboratory | Certificate/ certification number | Test basis | Valid for |
|--------------------|-----------------------|--------------------------------------|---|---------------------------------------|
| ATEX | electrosuisse | SEV 09 ATEX 0138 X | EN 60079-0 EN 60079-11 EN 60079-26 | 403025/x-1-... |
| EHEDG | TUM MAK | 03/2006 | Document No.8 | Process connection 997 (JUMO PEKA) |
| INMETRO | CEPEL | CEPEL 13.2213X | IEC 60079 IEC 60529 | Extra code 227 |
| DNV | Det Norske Veritas AS | A-13300 | Testing report 203951/4 dated 2012-06-13 | 403025/x-1-.../880 |
| GOST-R | | | | |

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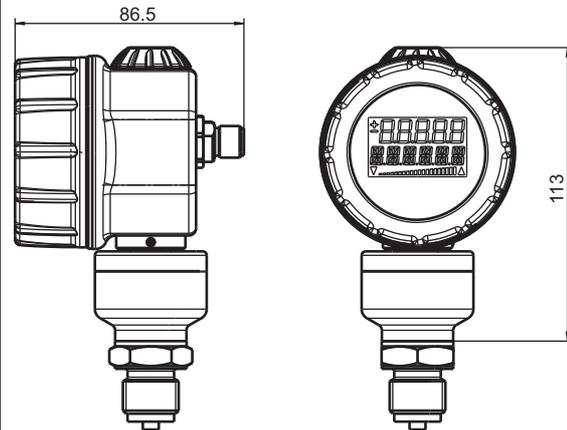
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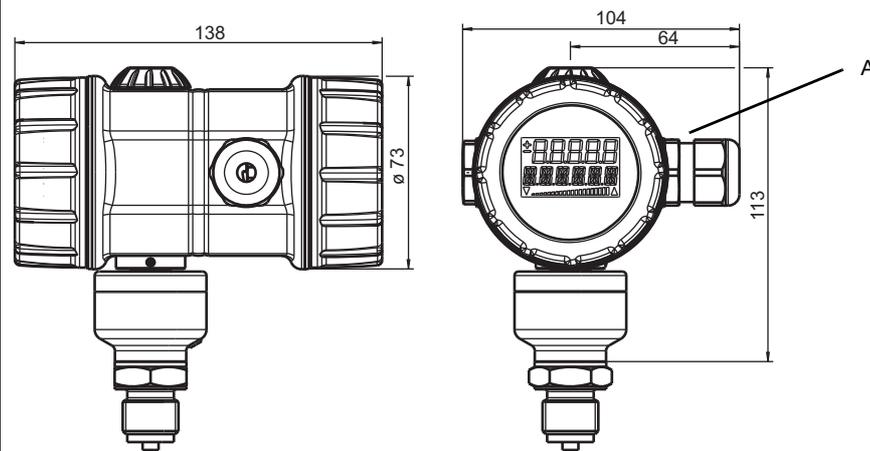


Dimensions

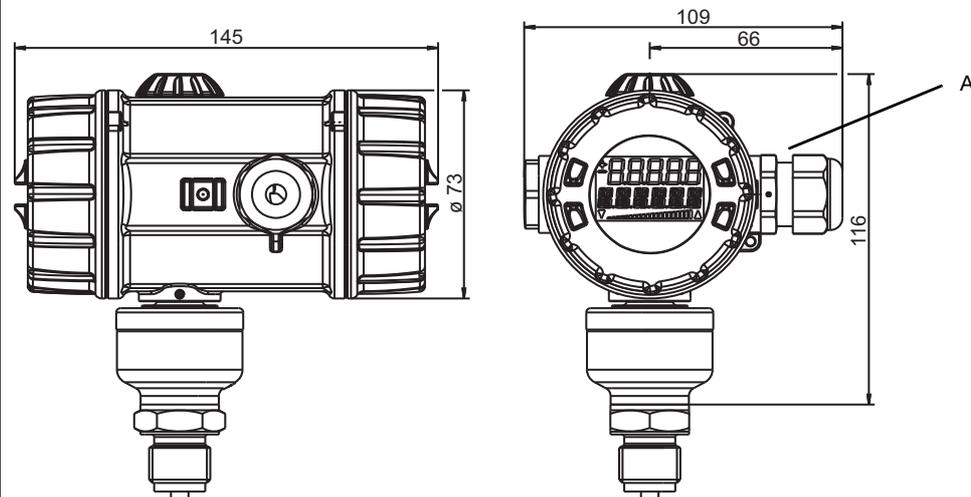
Type 403025/0-0-1 (short, stainless steel, with M12 connection)



Type 403025/0-0-2 (long, stainless steel, with cable gland)



Type 403025/0-0-3 (precision casting, with cable gland)



A Cable gland M20 x 1.5

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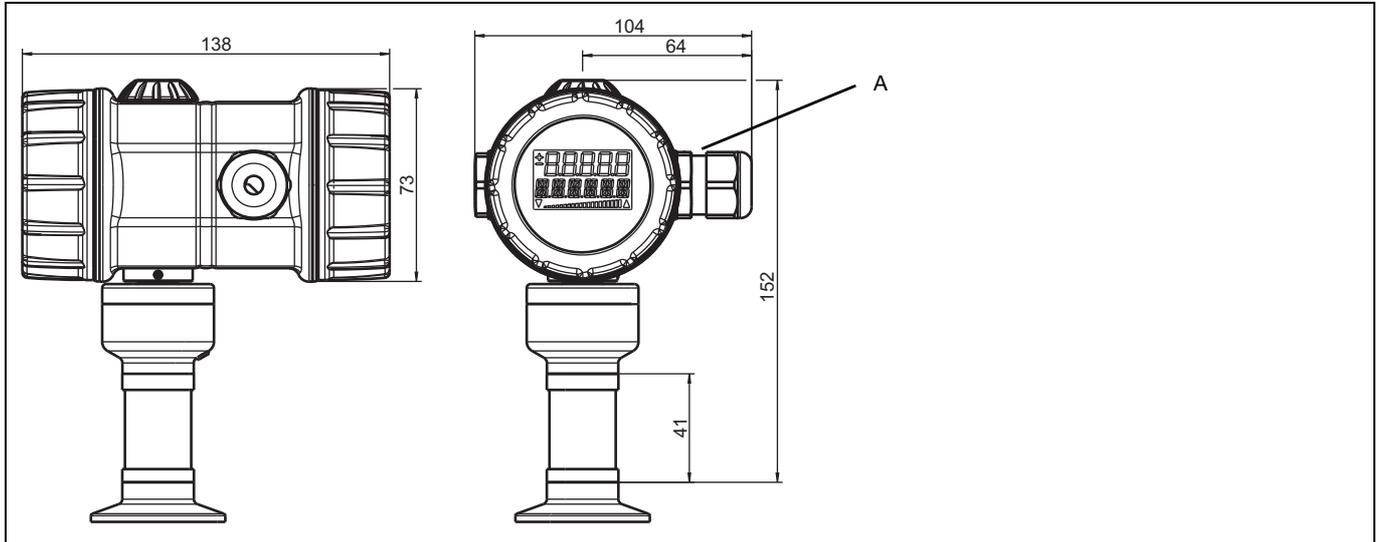
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Dimensions for medium temperature 2 (high-temperature version)

In pressure transmitters suitable for medium temperatures up to 200°C, the increased temperature is dissipated over an extended shaft. The overall height of all the pressure transmitters in this version increases as in the diagram below, by 41 mm.



A Cable gland M20 x 1.5

Process connections

| | | | |
|---------------|---------------------|------------------------------|---------------|
| 504 (G1/2) | 512 (1/2-14 NPT) | 564 (1/2-14 NPT internal) | 571 (G3/4) |
| | | | |

| | | |
|--|-------------------------------------|--------------------|
| 604 and 606 (taper connection nut to DIN 11851) | 613 and 616 (clamp to DIN 32676) | 997 (JUMO PEKA) |
| | | |

Dimensions of process connections 604, 606, 613 and 616

| Connection | DN | D1 | D2 | D3 | D4 | L1 | L2 |
|------------|----|-------|-------|--------------|-----|----|----|
| 604 | 25 | ø44 | ø35 | Rd 52 x 1/6" | ø63 | 15 | 21 |
| 606 | 40 | ø56 | ø48 | Rd 65 x 1/6" | ø78 | | |
| 613 | 25 | ø43.5 | ø50.5 | | | | |
| 616 | 50 | ø56.5 | ø64 | | | | |

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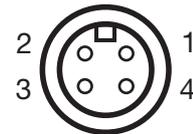
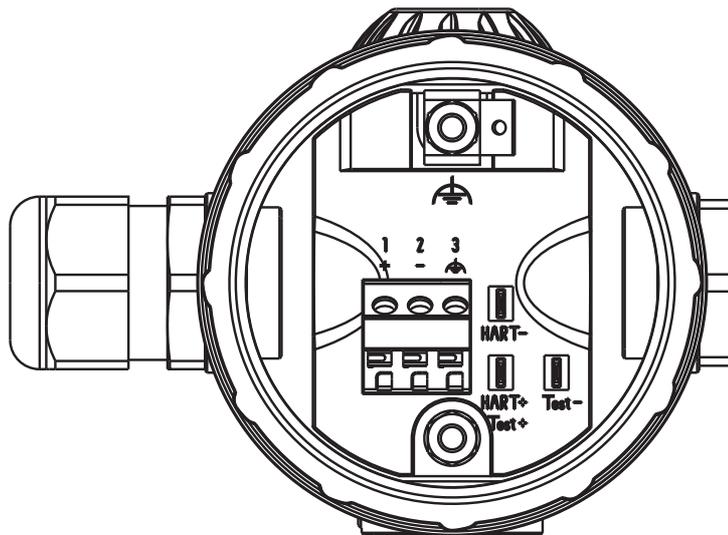


Electrical connection

| Connection | Terminal assignment | |
|---|---------------------|----------------------|
| | Cable gland | Round plug, M12 x 1 |
| Voltage supply for non Ex version DC 11.5 to 36 V for Ex version DC 11.5 to 30 V | | 1 L+ 2 L- 3 L- |
| Output 4 to 20 mA two wire Impressed current 4 to 20 mA in voltage supply | | 1 L+ 3 L- |
| Current output test connection Inherent resistance of ammeter $\leq 10 \Omega$ | | TEST + TEST - |
| HART® test connection The burden must be present! | | HART + HART - |
| Functional ground | | 3 4 |

Cable gland

M12 x 1 round plug



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**Order details**

| | |
|--------|--|
| | (1) Basic type |
| 403025 | dTRANS p20 process pressure transmitter |
| | (2) Basic type extension |
| 0 | None |
| 9 | Special design |
| | (3) Explosion protection |
| 0 | None |
| 1 | ATEX Ex ia ^a |
| | (4) Housing |
| 1 | Short, stainless steel, with M12 connection |
| 2 | Long, stainless steel, with cable gland |
| 3 | Precision casting, with cable gland |
| | (5) Electrical connection |
| 36 | Round plug, M12 x 1 ^b |
| 82 | Cable gland, plastic |
| 93 | Cable gland, metal |
| | (6) Cover material |
| 20 | CrNi (stainless steel) |
| 85 | Plastic |
| | (7) Display |
| 0 | Without display (LCD) |
| 1 | With display (LCD) |
| | (8) Operation |
| 0 | Without control knob |
| 1 | With control knob |
| | (9) Nominal measuring range |
| 450 | -600 to +600 mbar relative pressure |
| 487 | 0 to 0.6 bar absolute pressure |
| 491 | 0 to 4 bar absolute pressure |
| 495 | 0 to 25 bar absolute pressure |
| 507 | 0 to 100 bar absolute pressure ^c |
| 513 | -1 to +4 bar relative pressure |
| 514 | -1 to +25 bar relative pressure |
| 515 | -1 to +100 bar relative pressure ^c |
| 516 | -1 to +600 bar relative pressure ^d |
| | (10) Output |
| 405 | 4 to 20mA, two wire |
| 410 | 4 to 20mA, two wire with HART [®] protocol |
| | (11) Process connection |
| 504 | G 1/2 to EN 837 |
| 512 | 1/2-14 NPT to DIN 837 |
| 564 | 1/2-14 NPT internal |
| 571 | G 3/4 front-flush to DIN 837 |
| 583 | M20 (x 1.5) with adapter |
| 604 | Taper connection with union nut DN 25 to DIN 11851 (milk cone) |
| 606 | Taper connection with union nut DN 40 to DIN 11851 (milk cone) |
| 613 | Clamp DN 25 to DIN 32676 |
| 616 | Clamp DN 50 to DIN 32676/2" ISO 2852 |
| 997 | JUMO PEKA with EHEDG approval |
| 998 | Process connection for pressure separator |

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| | |
|---|---|
| (12) Temperature of medium | |
| 1 | Up to 120°C ^e |
| 2 | Up to 200°C ^f |
| (13) Process connection material | |
| 20 | CrNi (stainless steel) |
| 82 | NiMo |
| (14) Measuring system filling medium | |
| 00 | None |
| 01 | Silicon oil |
| (15) Extra codes | |
| 000 | None |
| 100 | Customized setting ^g |
| 226 | With GOST R approval |
| 227 | With INMETRO approval |
| 452 | Parts in contact with the medium are electropolished, surface roughness Ra ≤ 0.8 μm |
| 591 | Throttle in pressure channel |
| 624 | Free of oil and grease |
| 630 | Enlarged pressure channel |
| 634 | With TAG number |
| 635 | With manufacturer declaration NACE ^h |
| 681 | Extended permissible ambient temperature |
| 691 | Improved humidity/vibration protection |
| 880 | With DNV certification ⁱ |

- ^a ATEX Ex ia does not apply in connection with a cable gland made out of plastic (82), a cover material made out of plastic (85) and the output 4 to 20 mA (405).
- ^b The case is only available with a round plug M12×1 (36) as electrical connection.
- ^c This inputs specified above are not available with the process connections 604, 606, 613, 616.
- ^d This input is not available with the process connections 571, 604, 606, 613, 616, 997.
- ^e For ATEX Ex ia 115 °C max.
- ^f For ATEX Ex ia 175 °C max.
- ^g Please specify required setting in plain text. For factory setting see "Accuracy" section in data sheet.
- ^h Only with process connection material 82 (NiMo) and process connection 512 or 564.
- ⁱ Only with explosion protection 1 (ATEX Ex ia) and not with nominal measuring range 516.

Order code (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15)
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Order example 403025 / 0 - 0 - 2 - 82 - 85 - 1 - 1 - 514 - 405 - 504 - 1 - 20 - 1 / 000

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**Accessories**

| Article | Part no. |
|--|----------|
| PC interface with USB/TTL converter ^a | 00456352 |
| HART® modem USB ^b | 00443447 |
| 4-pole terminal box, straight, M12 × 1, with 2 m PVC cable | 00404585 |
| 4-pole terminal box, angled, M12 × 1, mit 2 m PVC cable | 00409334 |
| 5-pole terminal box M12 × 1, straight, without cable | 00419130 |
| 5-pole terminal box M12 × 1, angled, without cable | 00419133 |
| Mounting bracket for 2" pipe and wall | 00597711 |

| | Data Sheet |
|---|------------|
| Manifolds | 409706 |
| JUMO PEKA - Process connection adapter with EHEDG approval | 409711 |
| Pressure separator with milk pipe fitting DIN 11851 | 409772 |
| Pressure separator with clamp connection | 409774 |
| Pressure separator with DRD flange or Varivent connection | 409776 |
| Pressure separator with ISS connection or SMS connection or RJT connection and slotted ring nut | 409778 |
| Diaphragm chemical seals 4MDV-10 | 409780 |
| Pressure separator with male thread ISO 228/1 or ANSI B 1.201 | 409782 |
| Pressure separator with flange connection EN 1092-1 with sealing lip Form B1 | 409784 |
| Pressure separator with flange connection to ANSI B 16.5 with sealing lip Form RF | 409786 |
| Ex-i Power supply/input isolating amplifier | 707530 |

^a The PC interface cable is the connection between the JUMO interface of the pressure transmitter and the USB interface of a PC.

^b The HART® modem is the connection between the HART® interface of the pressure transmitter and the USB interface of a PC.

Software

| Article | Part no. |
|------------------------------|----------|
| JUMO Setup dTRANS p20 series | 00537577 |