

# JUMO dTRANS p20 Ex d

## Process pressure transmitter with explosion-proof enclosure

### Brief description

The pressure transmitter with HART® interface combines maximum precision with simple operation. It is used to measure the relative or absolute pressures of gases, vapors, and liquids. The integrated LCD display shows the measured values and device data.

The pressure transmitter with flameproof enclosure can be installed up until zone 0. The housing and sensors are manufactured from high-grade stainless steel. Various flush-mounted process connections are available for applications with hygienic requirements, including PEKA connection system (see data sheet 409711).

Diaphragm seals can also be connected for specific process technology applications (see data sheets 409772 to 409784).

The transmitter is programmable and therefore readily adaptable to a variety of different measurement tasks. An easy-to-use setup program is available as an accessory to enable operation via the interfaces. A rotary knob makes manual operation on-site very convenient and quick.

The pressure transmitter with 4 to 20 mA and HART® protocol was evaluated with regard to functional safety and is certified by TÜV Nord according to DIN EN 61508/-1/-2, edition 2.0. These measuring devices are suitable for monitoring process level and process pressure up to SIL2. Further details can be found in the Safety Manual.

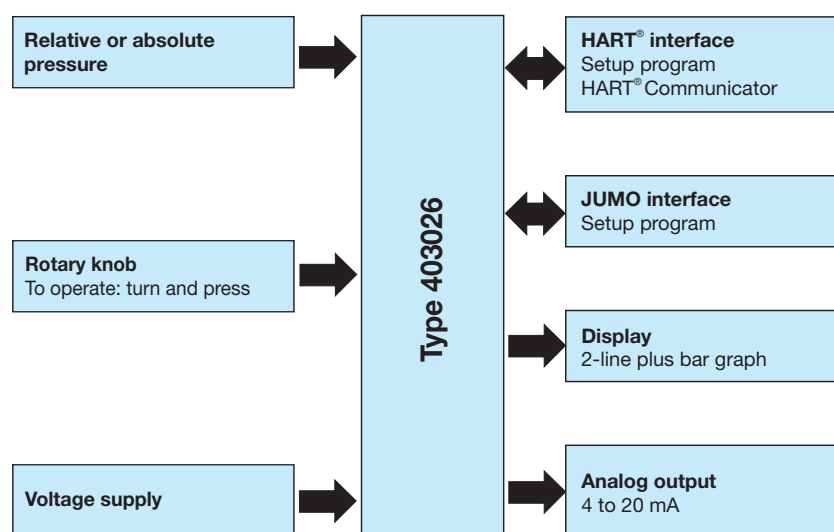
For the „Ex ia“ explosion protection version, see data sheet 403025.

For the differential pressure version, see data sheets 403022 and 403023.



Type 403026

### Block diagram



### Special features

- Stainless steel case
- SIL certified (TÜV Nord)
- HART® interface
- Explosion protection Ex d (gas and dust) according to ATEX, NEPSI, and EAC
- Linearity 0.05 %
- Turn down: 1:50
- Simple operation with rotary knob
- Setup program
- LCD display with bar graph
- Display scaling with a choice of measuring units
- Display of sensor temperature
- Display of minimum and maximum pressures
- Current-generator function

### Approvals/approval marks (see "Technical data")



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## Technical data

### General Information

Reference conditions	DIN EN 60770 and DIN EN 61298
Ambient temperature	22 °C ±5 K
Air pressure	1000 hPa (±25 hPa)
Voltage supply	DC 24 V
Burden	50 Ω
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
Admissible load changes	> 10 million
Position	
Mounting position	Any
Calibration position	Device upright, process connection at the bottom
Zero offset depending on position	A zero offset is possible on-site or via setup.
Display <sup>a</sup>	LCD, two-line with bar graph
Alignment	Display unit rotatable in 90° steps Housing rotatable ±160°
Size	Display 22 × 35 mm, font size 7 mm/5 digits
Color	Black
Portrayable measuring units	
Input pressure	mH <sub>2</sub> O, inH <sub>2</sub> O, inHg, ftH <sub>2</sub> O, mmH <sub>2</sub> O, mmHg, psi, bar, mbar, kg/cm <sup>2</sup> , kPa, Torr, MPa
Measured value	% or scaled with freely adjustable measuring unit
Output current	mA
Sensor temperature	°C, °F
Additional display data	Minimum pressure, maximum pressure, error, overrange, underrange, operating hours, device parameters
Operation	
On-site	With rotary knob and LCD
Setup program	Via interface
Interface	
Standard	JUMO interface <sup>b</sup>
For output 410 (4 to 20 mA with HART®)	JUMO interface <sup>b</sup> and HART® interface

<sup>a</sup> optional; SIL version only available with display

<sup>b</sup> The JUMO interface may not be used in a potentially explosive area! In such a case the device can be operated via the rotary knob or the HART® interface.

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## Input

Relative pressure				
Nominal measuring range	-0.6 to +0.6 bar	-1 to +2.5 bar	-1 to +4 bar	-1 to +10 bar
Overload capability	6 bar	15 bar	30 bar	60 bar
Burst pressure	12 bar	30 bar	60 bar	100 bar
Relative pressure				
Nominal measuring range	-1 to +25 bar	-1 to +100 bar	-1 to +250 bar	-1 to +600 bar
Overload capability	150 bar	300 bar	600 bar	1200 bar
Burst pressure	250 bar	400 bar	700 bar	2000 bar

Absolute pressure						
Nominal measuring range	0 to 0.6 bar	0 to 2.5 bar	0 to 4 bar	0 to 10 bar	0 to 25 bar	0 to 100 bar
Overload capability	6 bar	15 bar	30 bar	60 bar	150 bar	300 bar
Burst pressure	12 bar	30 bar	60 bar	100 bar	250 bar	400 bar

## Output

Analog output For output 410 (4 to 20 mA with HART®) Jump response time T60 Attenuation	4 to 20 mA, two-wire with HART® version 7 (optionally with HART® version 5, extra code 932, always with SIL version) $\leq 190$ ms without attenuation Adjustable 0 to 100 s
Burden For output 410 (4 to 20 mA with HART®)	$\text{Burden} \leq (U_B - 12 \text{ V}) \div 0.022 \text{ A}$ ; additional: min. 250 $\Omega$ , max. 1100 $\Omega$

## Voltage supply

Voltage supply	DC 12 to 36 V
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## Mechanical features

Process connection	
Materials	
For process connection 20 (stainless steel)	316 L for front-flush process connections Otherwise 316 Ti
For process connection 82 (HASTELLOY®)	2.4819 NiMo
Surface	Ra ≤ 0.8 µm
Process seal	
Process connection 571 G 3/4 front-flush) and process connection 652 (tank connection with grooved union nut)	FPM
For process connection 997 (JUMO PEKA)	FDA compliant: FPM, VMQ, EPDM as an option, see data sheet 409711
For all other process connections	No seal
Measuring membranes	
For material lid 20 (stainless steel)	1.4542 for -1 to +250 bar relative pressure (measuring range 508) and -1 to +600 bar relative pressure (measuring range 516) Otherwise 316 L
For material lid 82 (plastic)	2.4819 NiMo
Surface	Ra ≤ 0.8 µm
Housing	
Housing material	Precision casting 1.4408
Cover material	Precision casting 1.4408, seal FPM
Material of control knob	
For operation 0 (without control knob)	-
For operation 1 (with control knob)	PA
Explosion protection	EC type examination certificate SEV 10 ATEX 0127 X  II 1/2G Ex d IIC T6 ... T4 Ga/Gb II 2D Ex tb IIIC T105 °C Db
Weight	Approximately 1.6 kg

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## Environmental influences

Admissible temperatures Operation	Version	Temperature class	Maximum medium temperature	Ambient temperature <sup>a</sup>	Expanded ambient temperature (extra code 681) <sup>a, b, c</sup>
	II 1/2G Ex d	T6	70 °C	-40 to +60 °C	-50 to +60 °C
		T5	85 °C	-40 to +70 °C	-50 to +70 °C
		T4	115 °C	-40 to +85 °C	-50 to +85 °C
	II 2D Ex tb	T105 °C	100 °C	-40 to +85 °C	-50 to +85 °C
Storage	-40 to +85 °C				
Admissible humidity					
Operation	100 % including condensation on the device outer case				
Storage	90 % without condensation				
Admissible mechanical load					
Vibration strength	2 g, 10 to 2000 Hz according to DIN EN 60770-3				
Shock resistance	15 g for 6 ms according to IEC 60068-2-27				
Electromagnetic compatibility	According to EN 61326				
Interference emission	Class B <sup>d</sup>				
Interference immunity	Industry				
Protection type	IP66 according to DIN EN 60529				

<sup>a</sup> Under -20 °C limited function: stationary use, increased danger of cable break, display without function; under -30 °C operation of the device not possible.

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

<sup>c</sup> Without SIL

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

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## Accuracy

Including non-linearity, hysteresis, non-repeatability, zero point and final value deviation (corresponds to measurement deviations according to IEC 61298-2), calibrated at vertical installation position with the process connection at the bottom

Relative pressure				
Nominal measuring range	-0.6 to +0.6 bar	-1 to +2.5 bar <sup>a</sup>	-1 to +4 bar	-1 to +10 bar <sup>a</sup>
Default measuring range	0 to 0.6 bar	0 to 2.5 bar	0 to 4 bar	0 to 10 bar
Smallest MSP <sup>b</sup>	0.06 bar	0.1 bar	0.1 bar	0.5 bar
Turndown ratio (r) <sup>c</sup>	$r \leq 20$	$r \leq 50$	$r \leq 50$	$r \leq 50$
Non-linearity for reference conditions <sup>d</sup>	0.06 %	0.04 %	0.04 %	0.04 %
Accuracy in % of the set MSP Range: -20 to +60 °C	$r \times 0.12 \%$ for $1 \leq r \leq 20$	$r \times 0.08 \%$ for $1 \leq r \leq 50$	$r \times 0.08 \%$ for $1 \leq r \leq 50$	$r \times 0.08 \%$ for $1 \leq r \leq 50$
Accuracy in % of the set MSP Range: -40 to -20 °C or 60 to 85 °C	$r \times 0.18 \%$ for $1 \leq r \leq 20^e$	$r \times 0.12 \%$ for $1 \leq r \leq 50$	$r \times 0.12 \%$ for $1 \leq r \leq 50$	$r \times 0.12 \%$ for $1 \leq r \leq 50$
Long-term stability in % as of the nominal measuring range	0.1 %/year			
Relative pressure				
Nominal measuring range	-1 to +25 bar	-1 to +100 bar	-1 to +250 bar <sup>a</sup>	-1 to +600 bar <sup>a</sup>
Default measuring range	0 to 25 bar	0 to 100 bar	0 to 250 bar	0 to 600 bar
Smallest MSP	0.5 bar	5 bar	12.5 bar	30 bar
Turndown ratio (r) <sup>c</sup>	$r \leq 52$	$r \leq 20$	$r \leq 20$	$r \leq 20$
Non-linearity for reference conditions <sup>d</sup>	0.04 %	0.04 %	0.04 %	0.08 %
Accuracy in % of the set MSP Range: -20 to +60 °C	$r \times 0.08 \%$ for $1 \leq r \leq 52$	$r \times 0.08 \%$ for $1 \leq r \leq 20$	$r \times 0.08 \%$ for $1 \leq r \leq 20$	$r \times 0.16 \%$ for $1 \leq r \leq 20$
Accuracy in % of the set MSP Range: -40 to -20 °C or 60 to 85 °C	$r \times 0.12 \%$ for $1 \leq r \leq 52$	$r \times 0.12 \%$ for $1 \leq r \leq 20$	$r \times 0.12 \%$ for $1 \leq r \leq 20$	$r \times 0.24 \%$ for $1 \leq r \leq 20$
Long-term stability in % as of the nominal measuring range	0.1 %/year			

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Absolute pressure				
Nominal measuring range	0 to 0.6 bar	0 to 2.5 bar <sup>a</sup>	0 to 4 bar	0 to 10 bar <sup>a</sup>
Default measuring range	0 to 0.6 bar	0 to 2.5 bar	0 to 4 bar	0 to 10 bar
Smallest MSP <sup>b</sup>	0.06 bar	0.1 bar	0.1 bar	0.5 bar
Turndown ratio (r) <sup>c</sup>	r ≤ 10	r ≤ 20	r ≤ 40	r ≤ 20
Non-linearity for reference conditions <sup>d</sup>	0.12 %	0.04 %	0.04 %	0.04 %
Accuracy in % of the set MSP Range: -20 to +60 °C	r × 0.24 % for 1 ≤ r ≤ 10	r × 0.08 % for 1 ≤ r ≤ 20	r × 0.08 % for 1 ≤ r ≤ 40	r × 0.08 % for 1 ≤ r ≤ 20
Accuracy in % of the set MSP Range: -40 to -20 °C or 60 to 85 °C	r × 0.36 % for 1 ≤ r ≤ 10 <sup>e</sup>	r × 0.16 % for 1 ≤ r ≤ 20	r × 0.16 % for 1 ≤ r ≤ 40	r × 0.16 % for 1 ≤ r ≤ 20
Long-term stability in % as of the nominal measuring range	0.1 %/year			
Absolute pressure				
Nominal measuring range	0 to 25 bar	0 to 100 bar		
Default measuring range	0 to 25 bar	0 to 100 bar		
Smallest MSP <sup>b</sup>	0.5 bar	5 bar		
Turndown ratio (r) <sup>c</sup>	r ≤ 50	r ≤ 20		
Non-linearity for reference conditions <sup>d</sup>	0.04 %	0.04 %		
Accuracy in % of the set MSP Range: -20 to +60 °C	r × 0.08 % for 1 ≤ r ≤ 50	r × 0.08 % for 1 ≤ r ≤ 20		
Accuracy in % of the set MSP Range: -40 to -20 °C or 60 to 85 °C	r × 0.16 % for 1 ≤ r ≤ 50	r × 0.12 % for 1 ≤ r ≤ 20		
Long-term stability in % as of the nominal measuring range	0.1 %/year			

<sup>a</sup> Without SIL

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

<sup>c</sup>  $r$  = span of the nominal measuring range ÷ adjusted measuring span

<sup>d</sup> Reference conditions: ambient temperature 20 °C (±3 K), air pressure 1000 hPa (±25 hPa)

<sup>e</sup> Only up to -30 °C

## Approvals/approval marks

Approval mark	Test facility	Certificates/certification numbers	Inspection basis	Valid for
ATEX	Electrosuisse	SEV 10 ATEX 0127 X	EN 60079-0 EN 60079-1 EN 60079-26 EN 60079-31	403026/...
EAC	RU	RU C-DE.ME92.B.00440	-	Extra code 226
SIL	TÜV Nord (German Technical Inspection Agency)	No. SEBS-A. 140944/16 V1.0	DIN EN 61508/-1/-2	Basic type extension 2 and 3

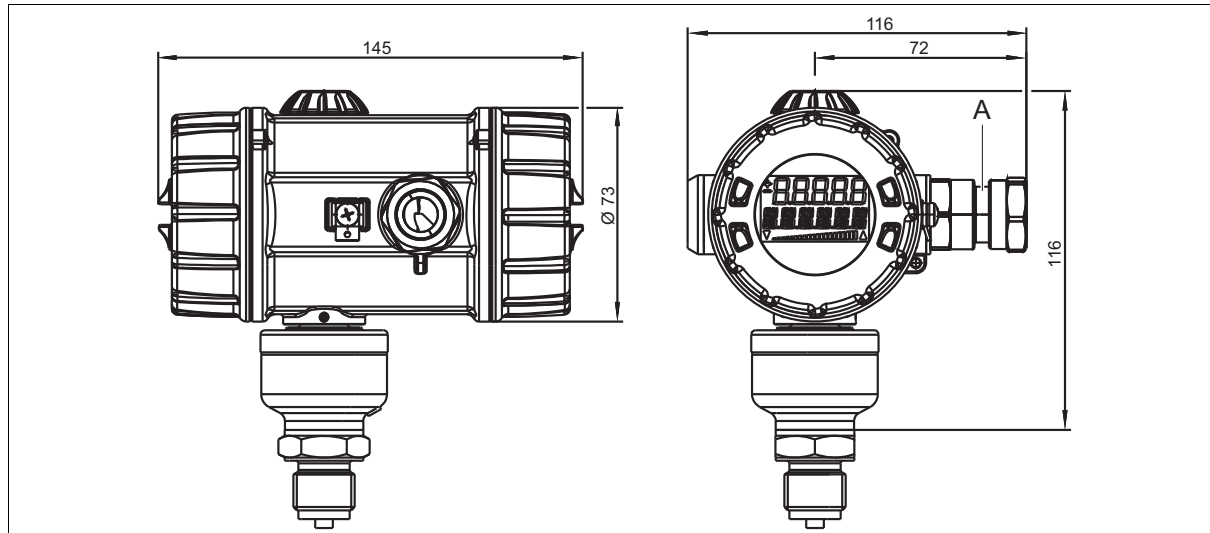
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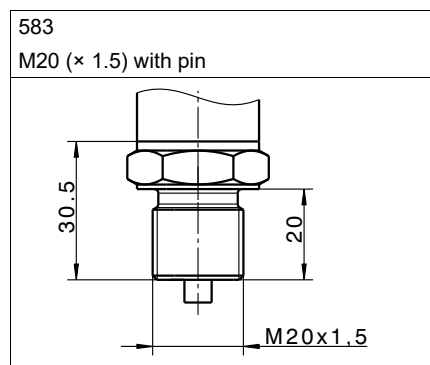
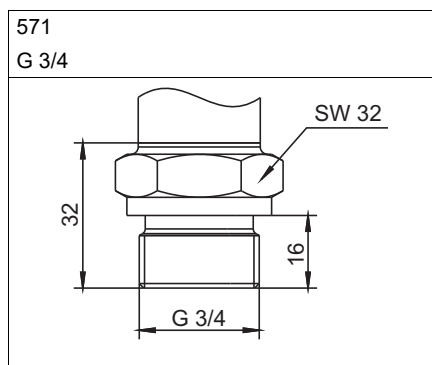
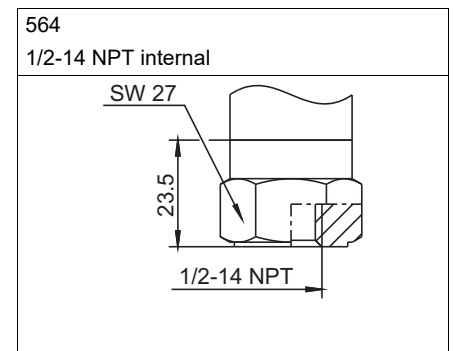
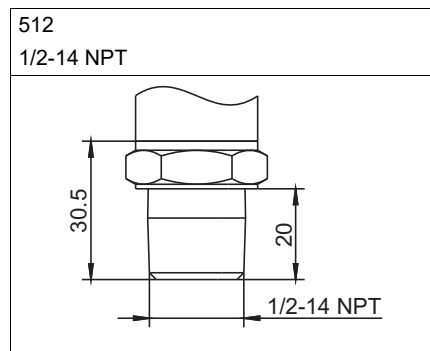
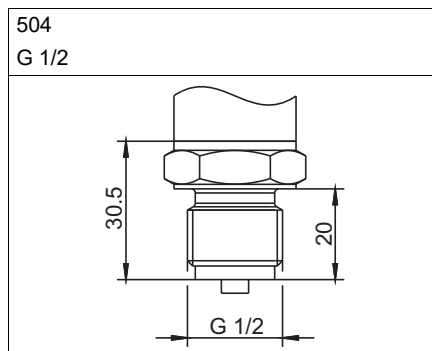


## Dimensions



A Kabelverschraubung M20 × 1,5

## Process connections





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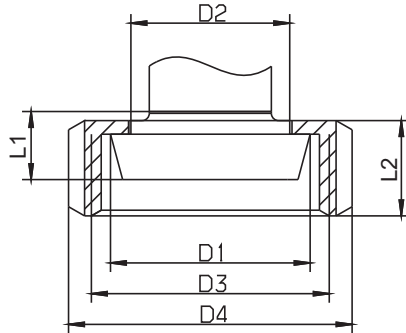
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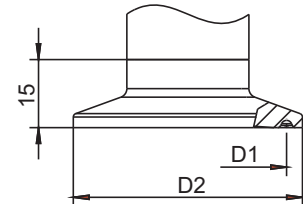
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**604 and 606**

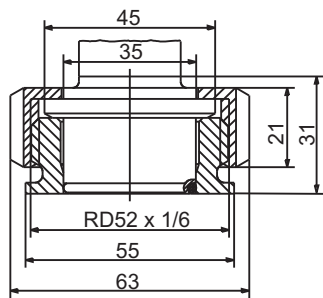
Taper socket with grooved union nut according to DIN 11851

**613 and 616**

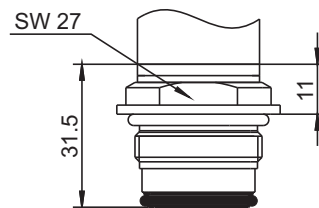
Clamp according to DIN 32676

**652**

Tank connection with grooved union nut DN 25

**997**

JUMO PEKA

**Dimensions of the process connections 604, 606, 613, and 616**

Connection	DN	D1	D2	D3	D4	L1	L2
604	25	Ø 44	Ø 35	Rd 52 × 1/6"	Ø 63	15	21
606	40	Ø 56	Ø 48	Rd 65 × 1/6"	Ø 78		
613	25	Ø 43,5	Ø 50,5				
616	50	Ø 56,5	Ø 64				

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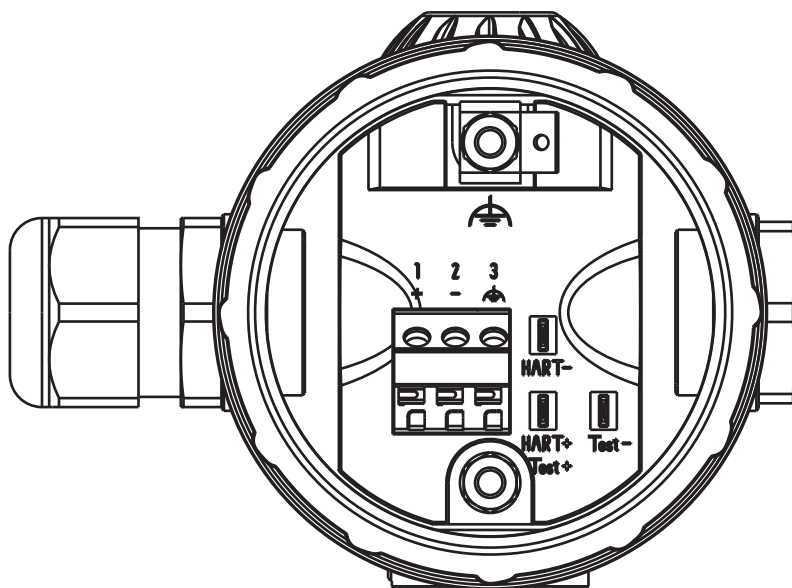


## Connection diagram

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	Terminal assignment
Voltage supply DC 12 to 36 V	1 L+ 2 L-
Output 4 to 20 mA, two-wire Load-independent current: 4 to 20 mA In voltage supply	1 L+ 2 L-
Test connection for current output Internal resistance of the ammeter $\leq 10 \Omega$	TEST + TEST -
Test connection for HART® The burden must be present!	HART + HART -
FE (functional grounding conductor)	3
Grounding or potential equalization	Outside of the housing

### Cable gland



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## Order details

	<b>(1) Basic type</b>
403026	JUMO dTRANS p20 Ex d - process pressure transmitter with flameproof enclosure
	<b>(2) Basic type extension</b>
0	None
2	SIL <sup>a</sup>
3	SIL, customer-specific <sup>a</sup>
9	Special version
	<b>(3) Display</b>
0	None
1	With display
	<b>(4) Operation</b>
0	None
1	With control knob
	<b>(5) Input – nominal measuring range</b>
450	-600 to +600 mbar relative pressure
473	-1 to +2.5 bar relative pressure <sup>b</sup>
513	-1 to +4 bar relative pressure
472	-1 to +10 bar relative pressure <sup>b</sup>
514	-1 to +25 bar relative pressure
515	-1 to +100 bar relative pressure <sup>d</sup>
508	-1 to +250 bar relative pressure <sup>b, c, d</sup>
516	-1 to +600 bar relative pressure <sup>b, d, e</sup>
487	0 to 0.6 bar absolute pressure
490	0 to 2.5 bar absolute pressure <sup>b</sup>
491	0 to 4 bar absolute pressure
493	0 to 10 bar absolute pressure <sup>b</sup>
495	0 to 25 bar absolute pressure
507	0 to 100 bar absolute pressure <sup>d</sup>
	<b>(6) Output</b>
410	4 to 20 mA, two-wire with HART® protocol
	<b>(7) Process connection</b>
504	G 1/2 according to DIN EN 837
512	1/2-14 NPT according to DIN 837
564	1/2-14 NPT internal
571	G 3/4 front-flush according to DIN EN ISO 228-1
583	M20 (× 1.5) with pin
604	Taper socket with grooved union nut DN 25 according to DIN 11851 (dairy pipe fitting)
606	Taper socket with grooved union nut DN 40 according to DIN 11851 (dairy pipe fitting)
613	Clamping socket (clamp) DN 25/32/40 according to DIN 32676
616	Clamping socket (clamp) DN 50 according to DIN 32676/2" ISO 2852
652	Tank connection with grooved union nut DN 25
997	JUMO PEKA hygienic process connection
998	Diaphragm seal process connection
	<b>(8) Process connection material</b>
20	CrNi (stainless steel)
82	NiMo
99	According to customer specifications
	<b>(9) Measuring system, filling medium</b>
00	Without filling medium <sup>f</sup>

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01	Silicon oil
<b>(10) Extra codes</b>	
000	None
100	Customer-specific factory setting <sup>g</sup>
226	With GOST/EAC approval <sup>h</sup>
374	Inspection certificate 3.1 DIN EN 10204 material
452	Wetted, electrolytically polished parts, surface roughness Ra ≤ 0.8 mm
591	Choke in the pressure channel
624	Oil and grease free
630	Enlarged pressure channel
634	With TAG number
635	With NACE manufacturer's declaration <sup>i</sup>
681	Expanded admissible ambient temperature <sup>c</sup>
932	With HART® version 5, always with SIL version (basic type extension 2 and 3)

<sup>a</sup> SIL version always with LCD display (display 1), connection 4 to 20 mA (output 410) and HART® version 5 (extra code 932)

<sup>b</sup> Without SIL

<sup>c</sup> Not available for order with process connections 571, 604, 606, 613, 616, 997 or with increased medium temperature (medium temperature 2).

<sup>d</sup> These inputs are not available with process connections 604, 606, 613, 616, 997.

<sup>e</sup> This input is not available with process connections 571, 604, 606, 613, 616, 997.

<sup>f</sup> Only for input nominal measuring range 508 (-1 to +250 bar relative pressure) and measuring range 516 (-1 to +600 bar relative pressure)

<sup>g</sup> Please specify the setting you want in plain text. For default setting see "Accuracy" section in the data sheet.

<sup>h</sup> Upon request

<sup>i</sup> Only with material process connection 82 (NiMo) and with process connection 512 or 564; not for input nominal measuring range 450 (-0.6 to +0.6 bar relative pressure) and input nominal measuring range 487 (0 to 0.6 bar absolute pressure)

**Order code**                      (1)                      (2)                      (3)                      (4)                      (5)                      (6)                      (7)                      (8)                      (9)                      (10)  
     /  -  -  -  -  -  -  -  -  /   
**Order example**                      403026                      /                      0                      -                      1                      -                      1                      -                      514                      -                      410                      -                      504                      -                      20                      -                      01                      /                      000

## Accessories

Designation	Part no.
PC interface with USB/TTL converter <sup>a</sup>	00456352
HART® modem USB <sup>b</sup>	00443447
Measuring device holder for wall and 2" pipe	00597711

Designation	Data sheet
Valve manifolds	409706
Diaphragm seal with dairy pipe fitting DIN 11851	409772
Diaphragm seal with clamp connection	409774
Druckmittler mit DRD-Flansch oder VARIVENT®-Stutzen	409776
Diaphragm seal with ISS/SMS/RJT socket and (grooved) union nut	409778
Membrane diaphragm seal 4MDV-10	409780
Diaphragm seal with screw-in thread DIN ISO 228/1 or ANSI B1.201	409782
Diaphragm seal with flange connection DIN EN 1092-1 with sealing strip form B1	409784
Diaphragm seal with flange connection according to ANSI B 16.5 with sealing strip form RF	409786

<sup>a</sup> The PC interface cable is the connection between the JUMO interface of the differential pressure transmitter and the USB interface of a PC.

<sup>b</sup> The HART® modem is the connection between the HART® interface of the differential pressure transmitter and the USB interface of a PC.

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## Software

Description	Part no.
JUMO setup dTRANS p20 series	00537577
JUMO dTRANS p20 series, DD (device description)	Upon request
JUMO dTRANS p20 series, DTM (device type manager)	Upon request