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JUMO dTRANS p20

Process pressure transmitter

Brief description

The device with HART® interface combines maximum precision with simple operation. It is used to measure the system pressure of gases, steams, and liquids. The integrated LCD display shows measured values and device data. The version with explosion protection "Ex ia (intrinsically safe)" allows the device to be installed up to zone 0.

The housing and sensor are manufactured from high-grade stainless steel. Diaphragm seals can also be connected for specific process technology applications (see data sheets 409772 to 409784).

The pressure 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 d" explosion protection version, see data sheet 403026.

For the differential pressure version, see data sheet 403022.



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

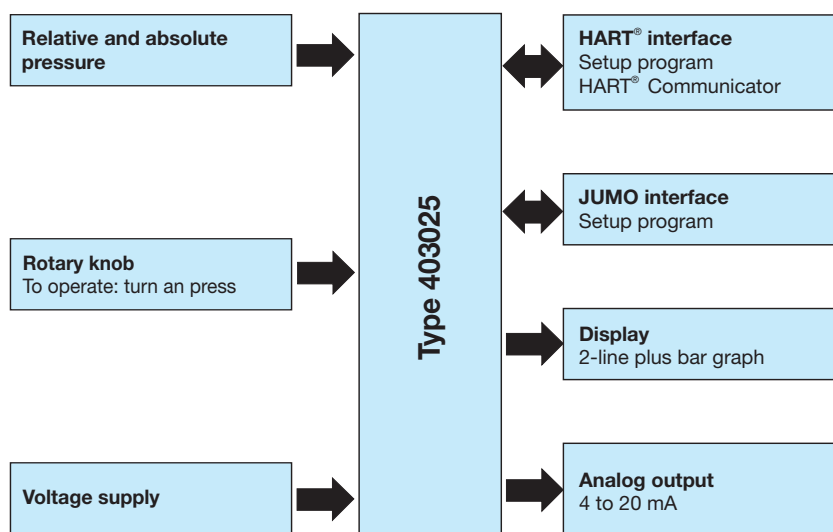


Type 403025/0-0-2-...



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

Block diagram



Special features

- Stainless steel case
- SIL certified (TÜV Nord)
- HART® interface
- Explosion protection Ex ia (gas and dust) according to ATEX, NEPSI, and EAC
- Linearity 0.05 %
- Turn down: 1:50
- Up to 200 °C medium temperature
- 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/thin film sensor
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	Relative pressure: a zero offset is possible on-site or via setup. Absolute pressure: manual readjustment is possible.
For medium temperature 1 (up to 120 °C)	≤ 1 mbar
For medium temperature 2 (up to 200 °C)	≤ 10 mbar
Display ^a	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 ₂ O, inH ₂ O, inHg, ftH ₂ O, mmH ₂ O, mmHg, psi, bar, mbar, kg/cm ² , 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 ^b
For output 410 (4 to 20 mA with HART®)	JUMO interface ^b and HART® interface

^a optional; SIL version only available with display

^b 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) ≤ 190 ms without attenuation Adjustable 0 to 100 s
Burden For output 405 (4 to 20 mA) For output 410 (4 to 20 mA with HART®)	$Burden \leq (U_B - 12 V) \div 0.022 A$ $Burden \leq (U_B - 12 V) \div 0.022 A$; additional: min. 250 Ω , max. 1100 Ω

Voltage supply

For version Explosion protection 0 (without) Explosion protection 1 (ATEX Ex ia)	DC 12 to 36 V DC 12 to 28 V The voltage supply must be intrinsically safe and must not exceed the following maximum values: $U_i \leq DC 28 V$ $I_i \leq 115 mA$ $P_i \leq 750 mW$ $C_i = 6 nF$ $L_i = 105 \mu H$
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Mechanical features

Process connection Material 20 (stainless steel) Material 82 (stainless steel) Surface	316 L for front-flush process connections Otherwise 316 Ti 2.4819 NiMo Ra ≤ 0.8 µm
Process seal Process connection 571 G 3/4 front-flush) and process connection 652 (tank connection with grooved union nut) Process connection 997 (JUMO PEKA) All other process connections	FPM FDA compliant, EHEDG approved materials: FPM, VMQ, EPDM optionally, see data sheet 409711 No seal
Measuring membranes Material 20 (stainless steel) Material 82 (stainless steel) Surface	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 2.4819 NiMo ^a Ra ≤ 0.8 µm
Housing Material Housing 1 (short, stainless steel) Housing 2 (long, stainless steel) Housing 3 (precision casting) Lid 20 (stainless steel) Lid 85 (plastic) Electrical connection 36 (round plug M12 × 1) Electrical connection 82 (cable fitting, plastic) Electrical connection 93 (cable fitting, metal) Operation 0 (without control knob) Operation 1 (with control knob)	Stainless steel 1.4404 Stainless steel 1.4404, VMQ Precision casting 1.4408 Precision casting 1.4408, seal FPM PA, seal FPM Brass nickel-plated PA Brass nickel-plated - PA
Explosion protection Explosion protection 0 (without) Explosion protection 1 (ATEX Ex ia)	The device is not approved for use in an Ex-area. EC type examination certificate SEV 09 ATEX 0138 X  II 1/2G Ex ia IIC T6 ... T3 Ga/Gb II 1/2D Ex ia IIIC T105 °C Da/Db
Weight Type 403025/0-0-1 (housing short) Type 403025/0-0-2 (housing long) Type 403025/0-0-3 (housing precision casting)	Approx. 550 g Approx. 850 g Approx. 1600 g

^a Not available in high-temperature version

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Environmental influences

Admissible temperatures Operation	Version	Temperature class	Maximum medium temperature	Ambient temperature ^a	Expanded ambient temperature (extra code 681) ^{a, b, c}
	Standard		120 °C	-40 to +85 °C	-50 to +85 °C
	High temperature		200 °C	10 to 85 °C ^d	Not available
	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 ^e	175 °C	10 to 85 °C	Not available
II 1/2D Ex ia	T105 °C	100 °C	-40 to +60 °C	-50 to +60 °C	
Storage	-40 to +85 °C				
Admissible humidity Operation Storage	100 % including condensation on the device outer case 90 % without condensation				
Admissible mechanical load Vibration strength Shock resistance	2 g, 10 to 2000 Hz according to DIN EN 60068-2-6 15 g for 6 ms according to IEC 60068-2-27				
Electromagnetic compatibility Interference emission Interference immunity	According to EN 61326 Class B ^f Industry				
Protection type For version Explosion protection 0 (without) Explosion protection 1 (ATEX Ex ia)	IP66/67 according to DIN 60529 IP66 according to DIN 60529				

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

^b 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.

^c Without SIL

^d Low ambient temperatures up to -40 °C are possible, but with limited accuracy.

^e Only for high-temperature version (medium temperature 2)

^f 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 ^a	-1 to +4 bar	-1 to +10 bar ^a
Default measuring range	0 to 0.6 bar	0 to 2.5 bar	0 to 4 bar	0 to 10 bar
Smallest MSP ^b	0.06 bar	0.1 bar	0.1 bar	0.5 bar
Turndown ratio (r) ^c	r ≤ 20	r ≤ 50	r ≤ 50	r ≤ 50
Non-linearity for reference conditions ^d	0.06 %	0.04 %	0.04 %	0.04 %
Accuracy in % der eingestellten MSP Range: -20 to +60 °C	r × 0.12 % for 1 ≤ r ≤ 20	r × 0.08 % for 1 ≤ r ≤ 50	r × 0.08 % for 1 ≤ r ≤ 50	r × 0.08 % for 1 ≤ r ≤ 50
Accuracy in % der eingestellten MSP Range: -40 to -20 °C or 60 to 85 °C	r × 0.18 % for 1 ≤ r ≤ 20 ^e	r × 0.12 % for 1 ≤ r ≤ 50	r × 0.12 % for 1 ≤ r ≤ 50	r × 0.12 % for 1 ≤ r ≤ 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 ^a	-1 to +600 bar ^a
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) ^c	r ≤ 52	r ≤ 20	r ≤ 20	r ≤ 20
Non-linearity for reference conditions ^d	0.04 %	0.04 %	0.04 %	0.08 %
Accuracy in % der eingestellten MSP Range: -20 to +60 °C	r × 0.08 % for 1 ≤ r ≤ 52	r × 0.08 % for 1 ≤ r ≤ 20	r × 0.08 % for 1 ≤ r ≤ 20	r × 0.16 % for 1 ≤ r ≤ 20
Accuracy in % der eingestellten MSP Range: -40 to -20 °C or 60 to 85 °C	r × 0.12 % for 1 ≤ r ≤ 52	r × 0.12 % for 1 ≤ r ≤ 20	r × 0.12 % for 1 ≤ r ≤ 20	r × 0.24 % for 1 ≤ r ≤ 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 ^a	0 to 4 bar	0 to 10 bar ^a
Default measuring range	0 to 0.6 bar	0 to 2.5 bar	0 to 4 bar	0 to 10 bar
Smallest MSP ^b	0.06 bar	0.1 bar	0.1 bar	0.5 bar
Turndown ratio (r) ^c	r ≤ 10	r ≤ 20	r ≤ 40	r ≤ 20
Non-linearity for reference conditions ^d	0.12 %	0.04 %	0.04 %	0.04 %
Accuracy in % der eingestellten 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 % der eingestellten MSP Range: -40 to -20 °C or 60 to 85 °C	r × 0.36 % for 1 ≤ r ≤ 10 ^e	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 ^b	0.5 bar	5 bar		
Turndown ratio (r) ^c	r ≤ 50	r ≤ 20		
Non-linearity for reference conditions ^d	0.04 %	0.04 %		
Accuracy in % der eingestellten MSP Range: -20 to +60 °C	r × 0.08 % for 1 ≤ r ≤ 50	r × 0.08 % for 1 ≤ r ≤ 20		
Accuracy in % der eingestellten 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			

^a Without SIL certification

^b MSP = measuring span

^c r = span of the nominal measuring range ÷ adjusted measuring span

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

^e Only up to -30 °C

Approvals/approval marks

Approval mark	Test facility	Certificates/certification numbers	Inspection 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)
DNV	Det Norske Veritas AS	A-13300	Test report 203951/4 dated 2012-06-13	403025/x-1-.../880
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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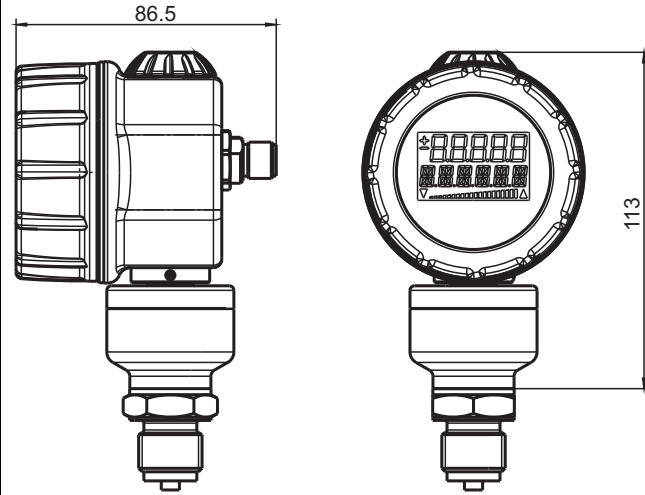
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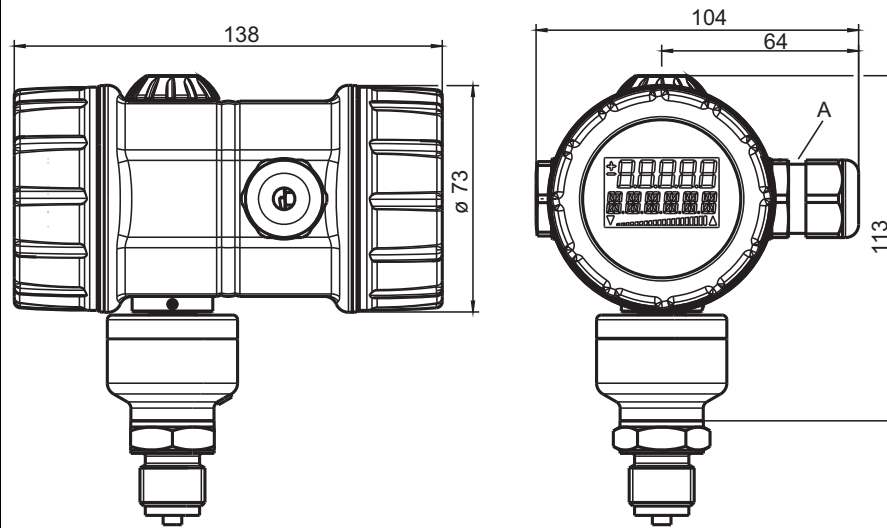


Dimensions

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



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



A M20 × 1.5 cable fitting

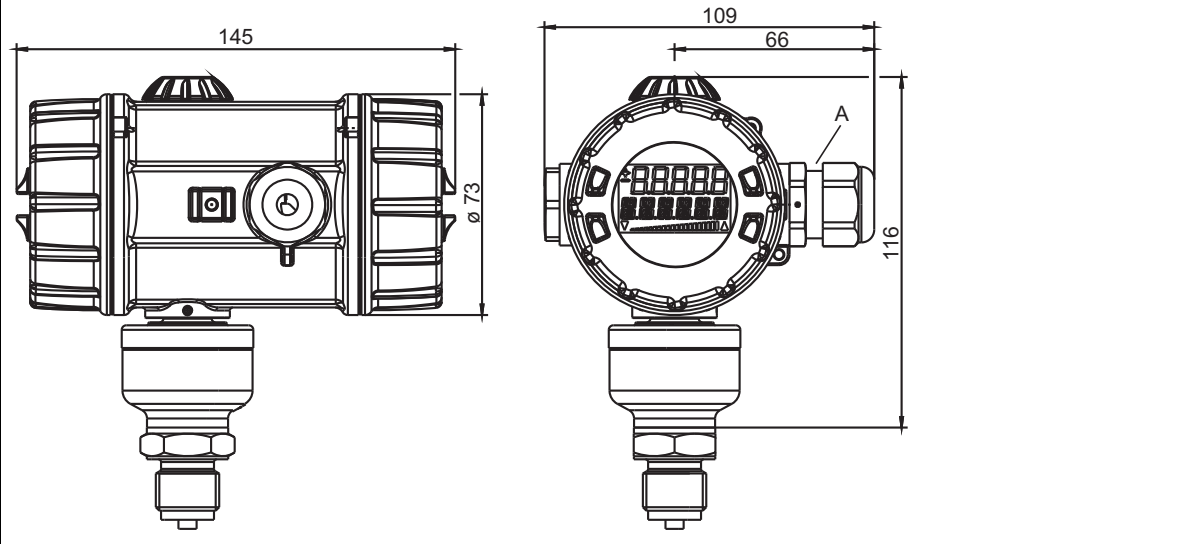
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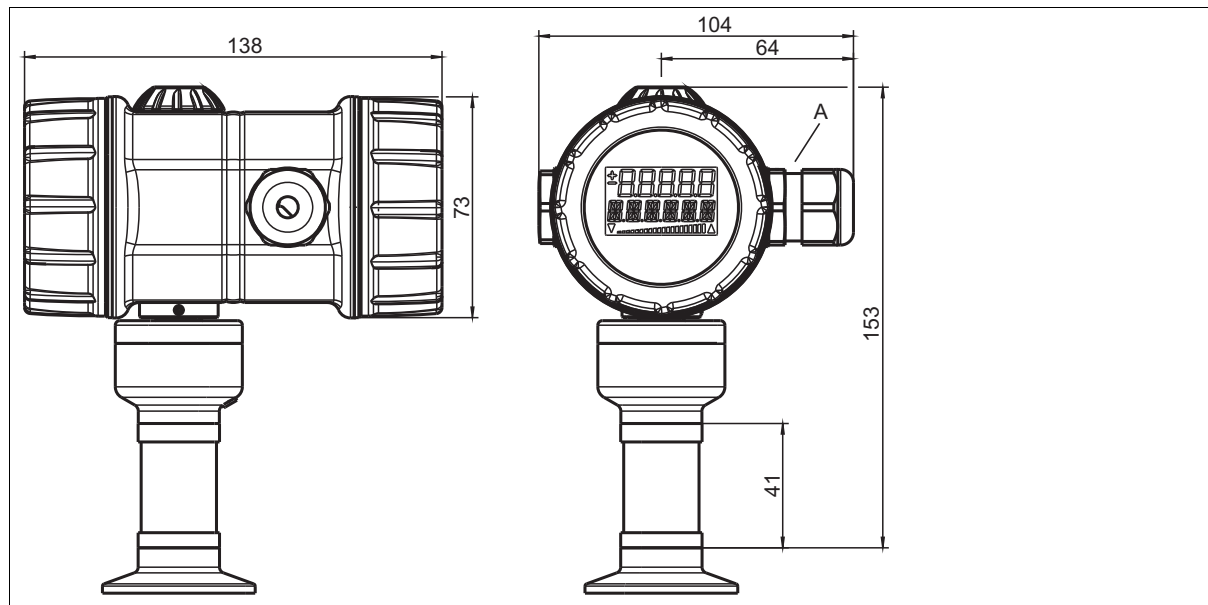
Type 403025/0-0-3 (precision casting, with cable fitting)



A M20 × 1.5 cable fitting

Dimensions at medium temperature 2 (high-temperature version)

Pressure transmitters that are suitable for medium temperatures up to 200 °C have an extended shaft through which the increased temperature is discharged. The total height of all pressure transmitters in this version increases as shown in the following figure by 41 mm.



A M20 × 1.5 cable fitting

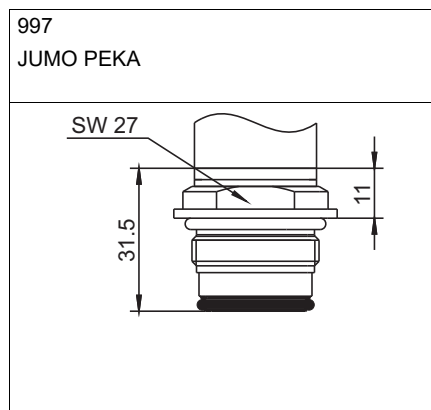
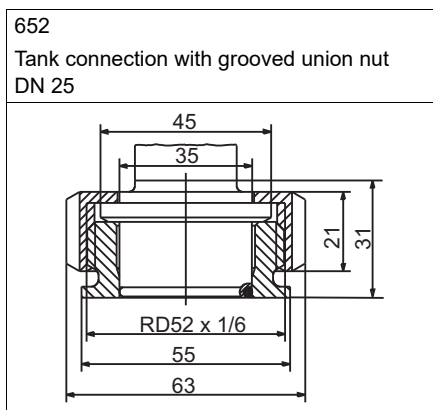
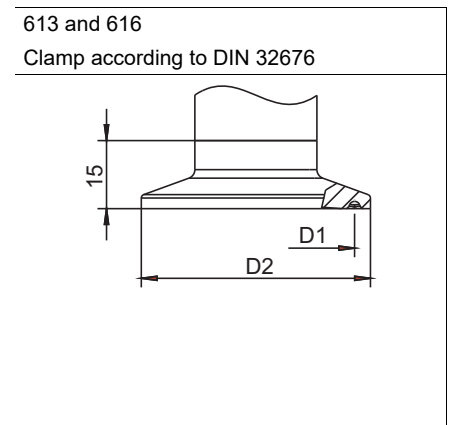
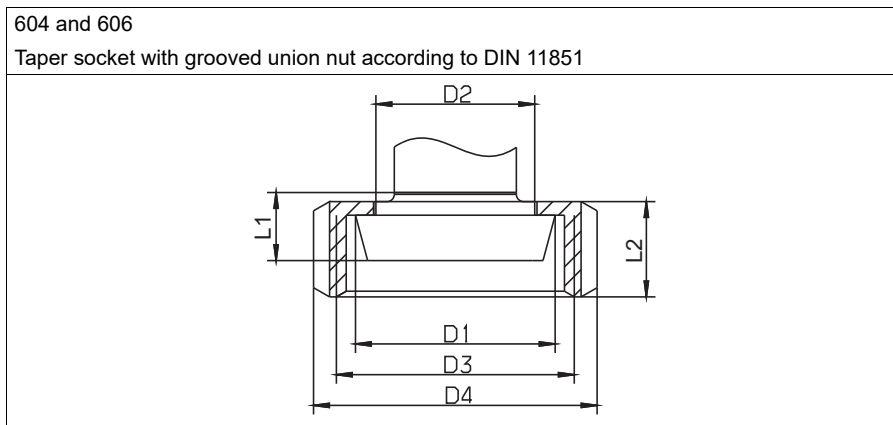
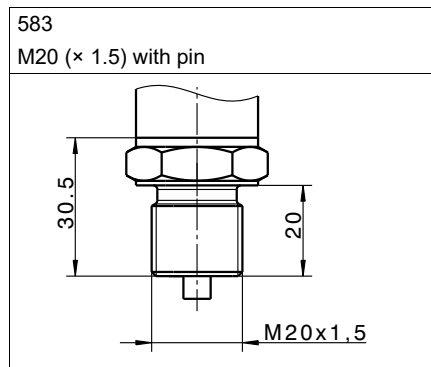
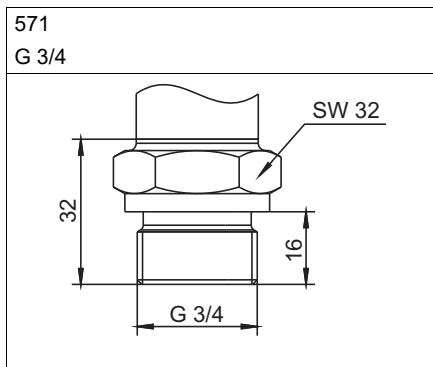
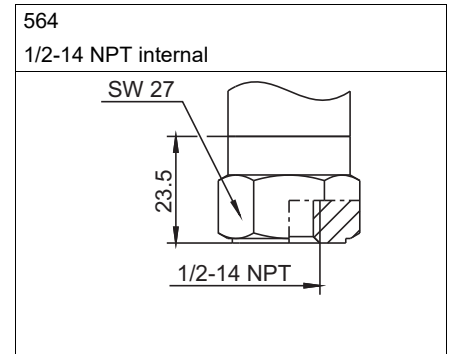
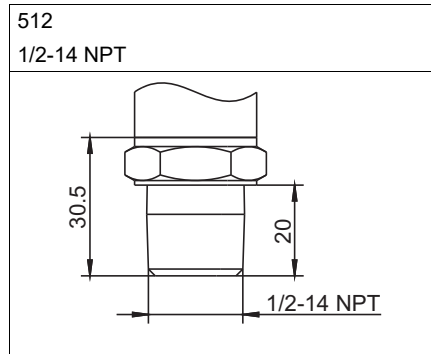
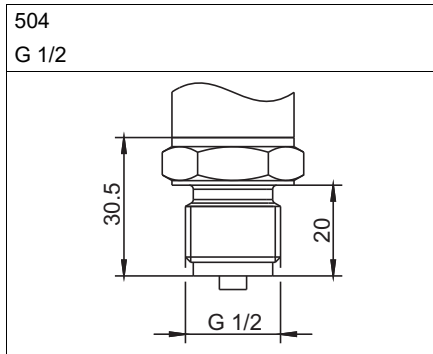
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Dimensions of the process connections 604, 606, 613, and 616

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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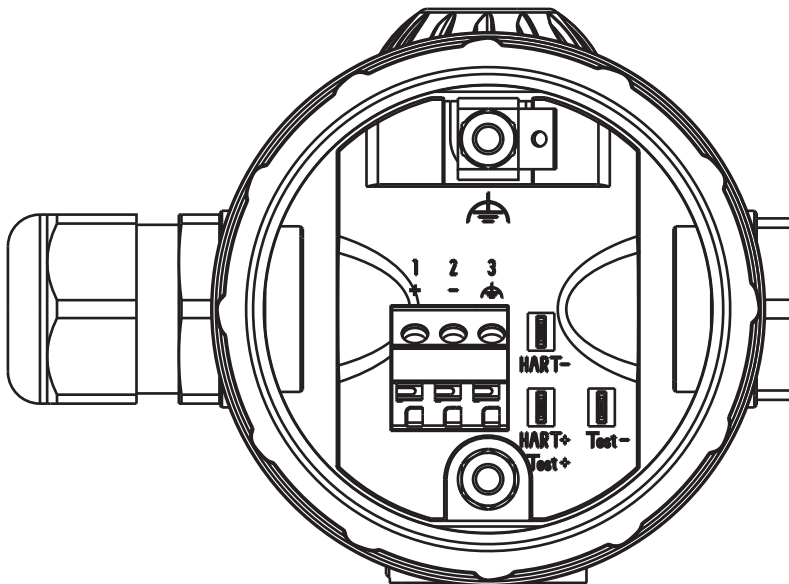


Connection diagram

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	
	82 (plastic), 93 (metal) Cable gland	36 Round plug M12 × 1
Voltage supply DC 12 to 36 V for none Ex version DC 12 to 28 V for Ex version		1 L+ 2 L-
Output 4 to 20 mA, two-wire Impressed current 4 to 20 mA in voltage supply		1 L+ 2 L-
Current output test connection Inherent resistance of ammeter ≤ 10 Ω		TEST + TEST -
HART® test connection Burden must be present!		HART + HART -
Functional ground		3
		4

Cable fitting



Round plug M12 × 1



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Order details

	(1) Basic type
403025	JUMO dTRANS p20 - process pressure transmitter
	(2) Basic type extension
0	None
2	SIL ^a
3	SIL, customer-specific ^a
9	Special version
	(3) Explosion protection
0	None
1	ATEX Ex ia ^b
	(4) Housing
1	Short, stainless steel, with M12 connection ^c
2	Long, stainless steel, with cable fitting
3	Precision casting, with cable fitting
	(5) Electrical connection
36	Round plug M12 × 1
82	Plastic cable fitting
93	Metal cable fitting
	(6) Cover material
20	CrNi (stainless steel)
85	Plastic
	(7) Display
0	None
1	With display (LCD)
	(8) Operation
0	None
1	With control knob
	(9) Input – nominal measuring range
450	-600 to +600 mbar relative pressure
473	-1 to +2.5 bar relative pressure ^d
513	-1 to +4 bar relative pressure
472	-1 to +10 bar relative pressure ^d
514	-1 to +25 bar relative pressure
515	-1 to +100 bar relative pressure ^e
508	-1 to +250 bar relative pressure ^{d, f}
516	-1 to +600 bar relative pressure ^{d, f}
487	0 to 600 mbar absolute pressure
490	0 to 2.5 bar absolute pressure ^d
491	0 to 4 bar absolute pressure
493	0 to 10 bar absolute pressure ^d
495	0 to 25 bar absolute pressure
507	0 to 100 bar absolute pressure ^e
	(10) Output
405	4 to 20 mA, two-wire ^d
410	4 to 20 mA, two-wire with HART® protocol
	(11) Process connection
504	G 1/2 according to DIN EN 837
512	1/2-14 NPT according to DIN EN 837
564	1/2-14 NPT internal

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571	G 3/4 front-flush according to DIN EN ISO 228-1 ⁹
583	M20 (× 1.5) with pin
604	Taper socket with union nut DN 25 according to DIN 11851 (dairy pipe fitting) ⁹
606	Taper socket with union nut DN 40 according to DIN 11851 (dairy pipe fitting)
613	Clamp connection (clamp) DN 25 according to DIN 32676 ⁹
616	Clamp connection (clamp) DN 50 according to DIN 32676 (2" ISO 2852) ⁹
652	Tank connection with grooved union nut DN 25 ⁹
997	JUMO PEKA with EHEDG certification
998	Diaphragm seal process connection
(12) Medium temperature	
1	Up to 120 °C ^h
2	Up to 200 °C ⁱ
(13) Process connection material	
20	CrNi (stainless steel)
82	NiMo ^j
(14) Measuring system, filling medium	
00	None ^k
01	Silicon oil
(15) Extra codes	
000	None
100	Customer-specific factory setting ^l
226	With GOST/EAC approval ^m
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 ⁿ
681	Expanded admissible ambient temperature ^d
691	Improved moisture and vibration protection
880	With DNV approval ^o
932	With HART® version 5, always with SIL version (basic type extension 2 and 3)

- ^a SIL version always with LCD display (display 1), connection 4 to 20 mA (output 410) and HART® version 5 (extra code 932)
- ^b ATEX Ex ia does not apply in connection with a cable fitting made out of plastic (electrical connection 82), a plastic lid (material lid 85), and the connection 4 to 20 mA (output 405).
- ^c Only available with a round plug M12 × 1 (electrical connection 36).
- ^d Without SIL
- ^e Not available with process connections 604, 606, 613, 601
- ^f Not available with process connections 571, 604, 606, 613, 616, 997 or with increased medium temperature (medium temperature 2).
- ^g Only available for measuring spans up to 25 bar
- ^h For ATEX Ex ia (explosion protection 1) a maximum temperature of 115 °C applies.
- ⁱ For ATEX Ex ia (explosion protection 1) a maximum temperature of 175 °C applies.
- ^j Not in high-temperature version
- ^k Only for input nominal measuring range 508 (-1 to +250 bar relative pressure) and measuring range 516 (-1 to +600 bar relative pressure)
- ^l Please specify the setting you want in plain text. For default setting see "Accuracy" section in the data sheet.
- ^m Upon request
- ⁿ Only with NiMo (material process connection 82) and 1/2-14 NPT (process connection 512) or 1/2-14 NPT internal (process connection 564); not for measuring range -0.6 to +0.6 bar relative pressure (input nominal measuring range 450) and 0 to 0.6 bar absolute pressure (input nominal measuring range 487)
- ^o Only with ATEX Ex ia (explosion protection 1) and not with -1 to +600 bar relative pressure (input 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, with 2 m PVC cable	00409334
5-pole terminal box, straight, M12 × 1, without cable	00419130
5-pole terminal box, angled, M12 × 1, without cable	00419133
Mounting bracket for 2" pipe and wall	00597711

Article	Data sheet
Manifolds	409706
JUMO PEKA – Process connection adapter with EHEDG approval	409711
Pressure separator with dairy 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 B1.201	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/inut isolating amplifier	707530

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

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

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