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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.



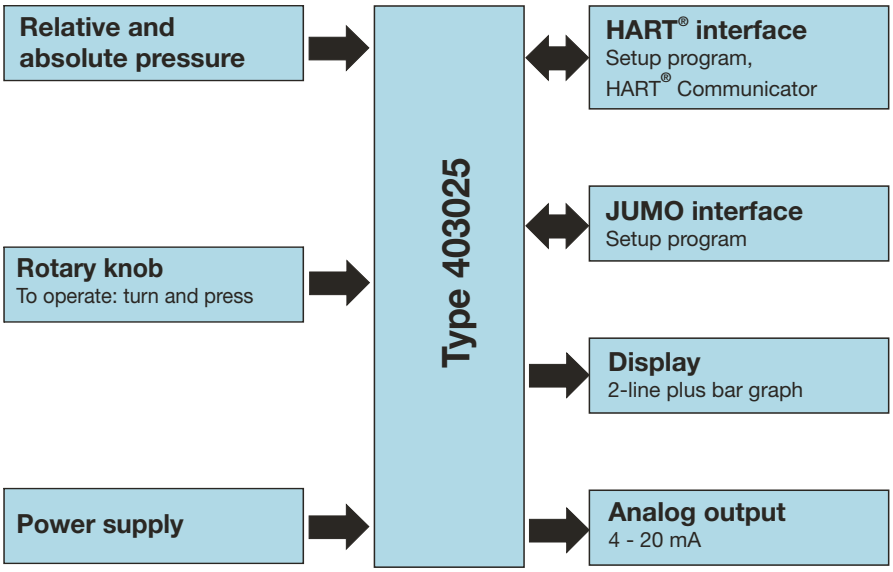
Type 403025/0-0-2-...



Type 403025/0-0-1-..

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

Block diagram



Key features

- Stainless steel housing
- HART® interface
- Ex ia explosion protection (gas and dust)
- 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)

2012-03-05/00535026

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Technical data

General

Reference conditions	DIN 16086, 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 rotate ±160°
Size	Display field 22 x 35 mm / font size 7 mm / 5-digit
Color	Black
Measurement unit display options	
Input pressure	mH_2O, inH_2O, inHg, ftH_2O, mmH_2O, 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[1]
- For output 410 (4 - 20 mA with HART®)	JUMO interface[1] and HART® interface

[1] 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

All measuring ranges can be overloaded to -1 bar (vacuum-proof)

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

Outputs

Analog output	
- for output 405	4 to 20 mA, two wires
- for output 410	4 to 20 mA, 2 wires with HART®
Step response time T63	≤ 190 ms without damping
Damping	adjustable, 0 to 100 s

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Burden	
- for output 405 (4 to 20 mA)	Burden ≤ (U_B-11.5 V) / 0.022 A
- for output 410 (4 to 20 mA with HART®)	Burden ≤ (U_B-11.5 V) / 0.022 A; also: min. 250 Ω, max. 1100 Ω

Power supply

For version	
- explosion protection 0 (none)	11.5 to 36 V DC
- explosion protection 1 (ATEX Ex ia)	11.5 to 28 V DC The power supply must be intrinsically safe and must not exceed the following maximum values: U_i ≤ 28 V DC I_i ≤ 93 mA P_i ≤ 750 mW

Mechanical properties

Process connection	
Material	Stainless steel 316L
- for nominal measuring range 416	Stainless steel 1.4542
Surface	Ra ≤ 0.8 µm
Process seal	
- for process connections 512 and 571	FPM
- for process connection 652	FPM
- for process connection 997 JUMO PEKA	FDA-compliant, EHEDG approved materials: FPM, VMQ, EPDM option, see data sheet 409711
- for all other process connections	Without a seal
Measurement diaphragm	
Material	Stainless steel 316L
Surface	Ra ≤ 0.8 µm
Housing	
Material	
- for housing 1 (short, stainless steel)	Stainless steel 1.4404
- for housing 2 (long, stainless steel)	Stainless steel 1.4404, VMQ
- for housing 3 (precision casting)	Precision casting 1.4408
- for cover material 20 (stainless steel)	Precision casting 1.4408, FPM seal
- for cover material 85 (plastic)	PA, FPM seal
- for electrical connection 36 (M12x1 round plug)	Nickel-plated brass
- for electrical connection 82 (cable gland, plastic)	PA
- for electrical connection 93 (cable gland, metal)	Nickel-plated brass
- for operation 0 (without control knob)	-
- for operation 1 (with control knob)	PA
Explosion protection	
- for explosion protection 0 (none)	The instrument is **not** approved for use in hazardous (Ex) areas
- for explosion protection 1 (ATEX Ex ia)	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/Da
Weight	
Type 403025/0-0-1 (short housing)	approx. 550 g
Type 403025/0-0-2 (long housing)	approx. 850 g
Type 403025/0-0-3 (precision casting housing)	approx. 1600 g

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Ambient conditions

Permissible temperatures					
Operation	Version	Category	Max. medium temperature	Environment temperature[1]	Extended environment temperature (extra code 681)[1, 2]
	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[3]	+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 IEC 60068-2-6
Shock resistance	15 g for 6 ms to IEC 60068-2-27
Electromagnetic compatibility	To EN 61326
Interference emission	Class B
Interference resistance	Industry
Protection	
Version	
- Explosion protection 0 (none)	IP67 to DIN EN 60529
- Explosion protection 1 (ATEX Ex ia)	IP66 to DIN EN 60529

1 Restricted function below -20°C: stationary use, increased danger of broken cable, display does not function.
2 In the range of -40 to -50°C, the cover with the instrument viewing pane must also be protected against mechanical shock and impact. For details please contact JUMO.
3 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 x 0.01% for 10 ≤ r ≤ 20	r x 0.005% for 10 ≤ r ≤ 50	r x 0.005% for 10 ≤ r ≤ 52	r x 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 x 0.02% for 10 ≤ r ≤ 20	r x 0.01% for 10 ≤ r ≤ 50	r x 0.01% for 10 ≤ r ≤ 52	r x 0.01% for 10 ≤ r ≤ 20	
Accuracy at -40 to +85°C as % of the set span	0.3% for r ≤ 10 [2]	0.2% for r ≤ 10		0.2% for r ≤ 10	
	r x 0.03% for 10 ≤ r ≤ 20 [2]	r x 0.02% for 10 ≤ r ≤ 50	r x 0.02% for 10 ≤ r ≤ 52	r x 0.02% for 10 ≤ r ≤ 20	
Long-term stability as % of nominal measuring range	0.1%/year				

2 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 x 0.02% for $5 \leq r \leq 10$	r x 0.005% for $10 \leq r \leq 40$	r x 0.005% for $10 \leq r \leq 50$	r x 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 x 0.04% for $5 \leq r \leq 10$	r x 0.01% for $10 \leq r \leq 40$	r x 0.01% for $10 \leq r \leq 50$	r x 0.01% for $10 \leq r \leq 20$
Accuracy at -40 to +85°C as % of the set span	0.3% for $r \leq 5$ [2]	0.2% for $r \leq 10$		
	r x 0.06% for $5 \leq r \leq 10$ [2]	r x 0.02% for $10 \leq r \leq 40$	r x 0.02% for $10 \leq r \leq 50$	r x 0.02% for $10 \leq r \leq 20$
Long-term stability as % of nominal measuring range	0.1%/year			

[2] 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	Directive 94/9/EG	ATEX Ex ia
EHEDG	TUM MAK	03/2006	Document No.8	Process connection 997 (JUMO PEKA)

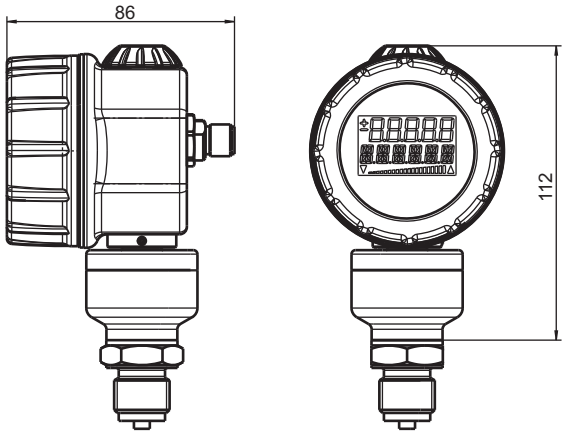
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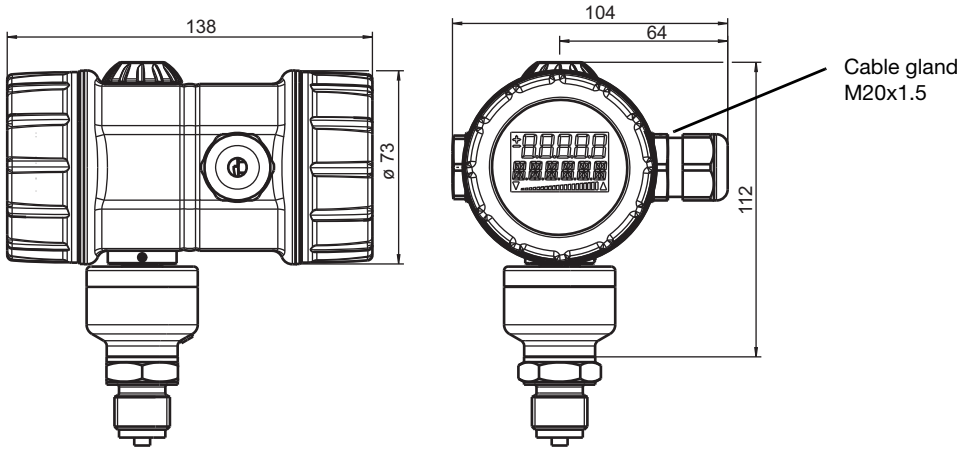
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Dimensions

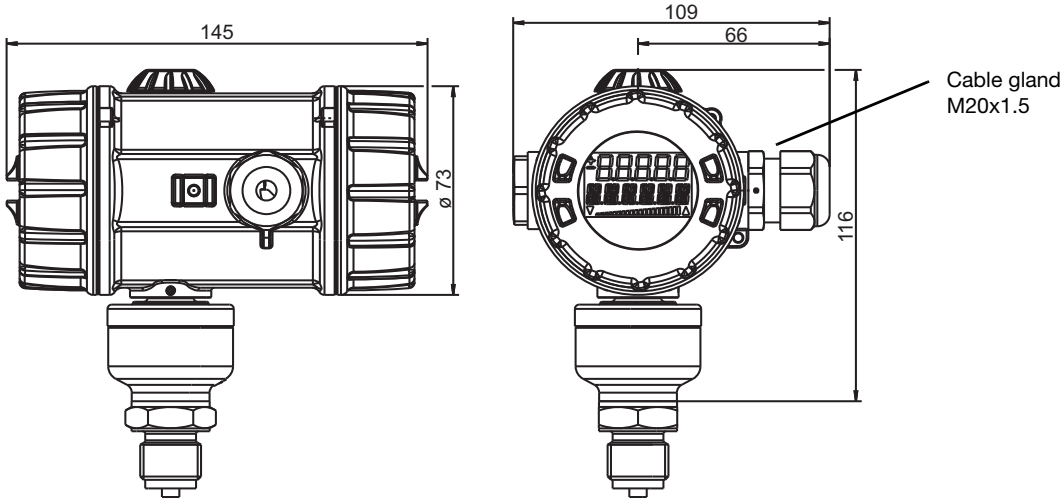
Type 403025/0-0-1 (short, stainless steel, with M12 connection)



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



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

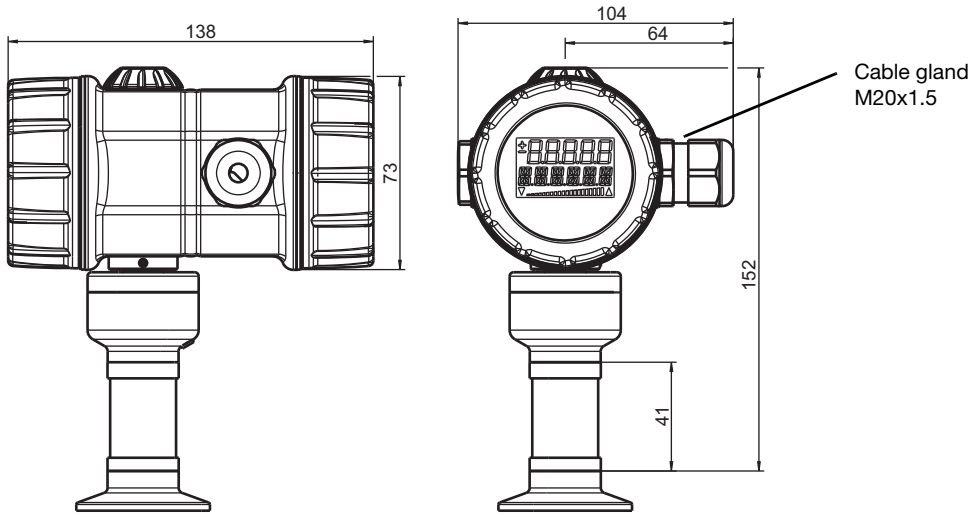


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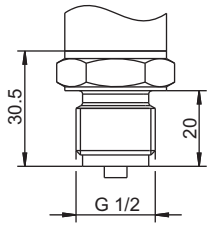
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Dimensions for medium temperature 2 (high-temperature version)
In pressure transmitters suitable for medium temperatures up to 200°C, the increased temperature is dissipated over an extended shaft. The overall height of all the pressure transmitters in this version increases as in the diagram below, by 41 mm.

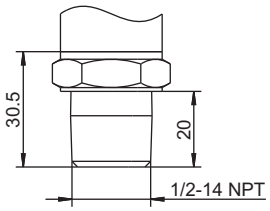


Process connections

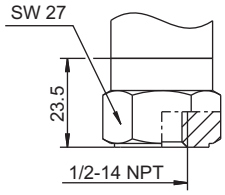
504
(G1/2)



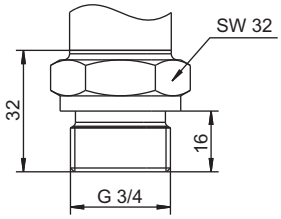
512
(1/2-14 NPT)



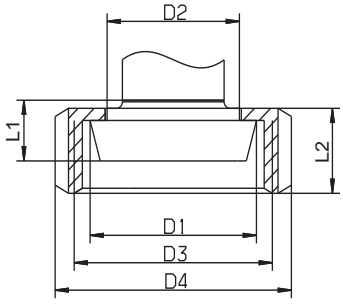
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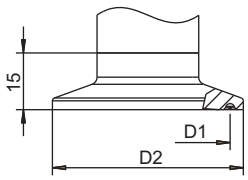
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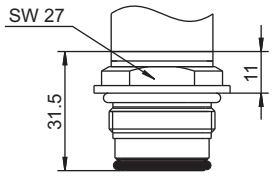
604 and 606
(taper connection nut to DIN 11851)



613 and 616
(clamp to DIN 32676)



997
(JUMO PEKA)



Dimensions of process connections 604, 606, 613 and 616

Conn.	DN	D1	D2	D3	D4	L1	L2
604	25	ø44	ø35	Rd 52x1/6"	ø63	15	21
606	40	ø56	ø48	Rd 65x1/6"	ø78		
613	25	ø43.5	ø50.5				
616	50	ø56.5	ø64				

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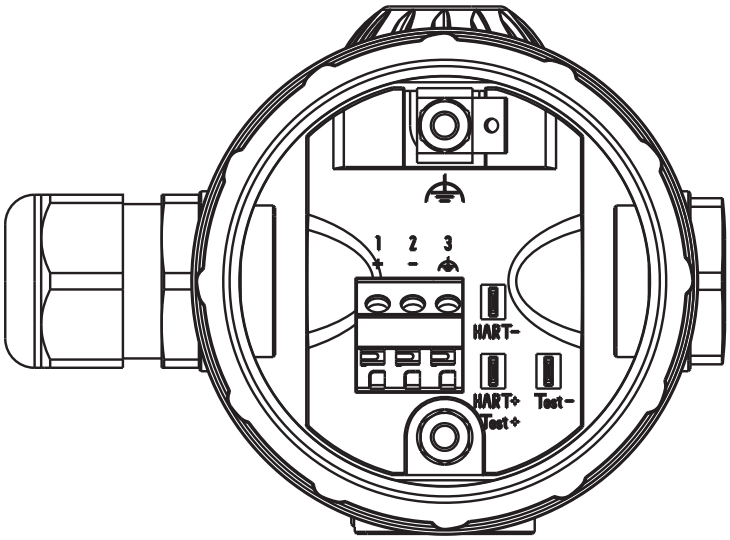
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Electrical connection

Connection	Terminal assignment	
	Cable gland	Round plug, M12x1
Power supply for **non** Ex version 11.5 to 36 V DC for Ex version 11.5 to 30 V DC	1 L+ 2 L-	1 L+ 3 L-
Output 4 to 20 mA two wire Impressed current 4 to 20 mA in power supply	1 L+ 2 L-	1 L+ 3 L-
Current output test connection Inherent resistance of ammeter ≤ 10 Ω	TEST + TEST -	
HART® test connection The burden must be present!	HART + HART -	
Functional ground	3	4

Cable gland



M12x1 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
	(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, M12x1
82		Cable gland, plastic[1]
93		Cable gland, metal
	(6)	**Cover material**
20		Stainless steel
85		Plastic[1]
	(7)	**Display**
0		Without display
1		With display
	(8)	**Operation**
0		Without control knob
1		With control knob
	(9)	**Nominal measuring range**
450		-600 to +600 mbar relative pressure
513		-1 to +4 bar relative pressure
514		-1 to +25 bar relative pressure
515		-1 to +100 bar relative pressure
516		-1 to +600 bar 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
	(10)	**Output**
405		4 to 20 mA, two wires
410		4 to 20 mA, 2 wires with HART®
	(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[2]
604		Taper connection with union nut DN25 to DIN 11 851[2]
606		Taper connection with union nut DN40 to DIN 11 851[2]
613		Clamp DN25 to DIN 32 676[2]
616		Clamp DN50 to DIN 32 676[2]
997		JUMO PEKA[3]
998		Suitable for connecting to a diaphragm seal
	(12)	**Temperature of medium**
1		Up to 120°C[4]
2		Up to 200°C[5]

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(13) Process connection material

20	Stainless steel
82	Hastelloy® C276, mat. no.: 2.4819
99	Special process connection material

(14) Measuring system filling medium

0	none
1	Silicon oil

(15) Extra codes

000	none
100	Customized setting[6]
374	Material inspection certificate 3.1
452	Parts in contact with the medium are electropolished
591	Throttle in pressure channel
624	free of oil and grease
630	Enlarged pressure channel
634	With TAG number (specify TAG no. when ordering)
681	extended permissible environment temperature
691	Partially sealed

[1] Not for ATEX Ex ia.
[2] Not for nominal measuring range -1 to 100 bar relative pressure.
[3] For suitable process connection adapters, see data sheet 409711.
[4] For ATEX Ex ia 115 °C max..
[5] For ATEX Ex ia 175 °C max..
[6] Please specify required setting in plain text. Factory setting see section accuracy.

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

Accessories

Designation	**Explanation**	**Sales No.**
Setup program for the JUMO dTRANS p20 series	The setup program helps to make operation and parameterization of all JUMO dTRANS p20 series instruments more user friendly	40/00537577
HART® modem	The HART® modem forms the connection between the pressure transmitter's HART® interface and a PC's USB interface.	40/00443447
PC interface cable including USB/TTL converter and two adapters (USB connecting cable)	The PC interface cable forms the connection between the pressure transmitter's JUMO interface and a PC's USB interface.	70/00456352
Supply isolator for Ex applications, HART®-enabled	See data sheet 404757	40/00389710
4-pole terminal box M12 x 1, straight, with 2 m PVC cable		40/00404585
4-pole terminal box M12 x 1, angled, with 2 m PVC cable		40/00409334
5-pole terminal box M12 x 1, straight, no cable	Assembly by customer	40/00419130
5-pole terminal box M12 x 1, angled, no cable	Assembly by customer	40/00419133
2-way valve block	See data sheet 409706	
Diaphragm seal	for adaptation to special applications, when conventional pressure connections cannot be used, see data sheets 409772 to 409786.	