

JUMO dTRANS p20 DELTA Ex d

Differential pressure transmitter with explosion-proof enclosure

Brief description

The JUMO dTRANS p20 DELTA Ex d type differential pressure transmitter with a HART® interface combines maximum precision with simple operation. It is used to measure the differential pressure of gases, vapors and liquids. The integrated LCD shows measurement values and device data.

The explosion-proof differential pressure transmitter can be mounted in Zone 0.

The enclosure and sensors are made from high-quality stainless steel. 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 interfaces. A rotary knob ensures highly convenient and fast local, manual operation.

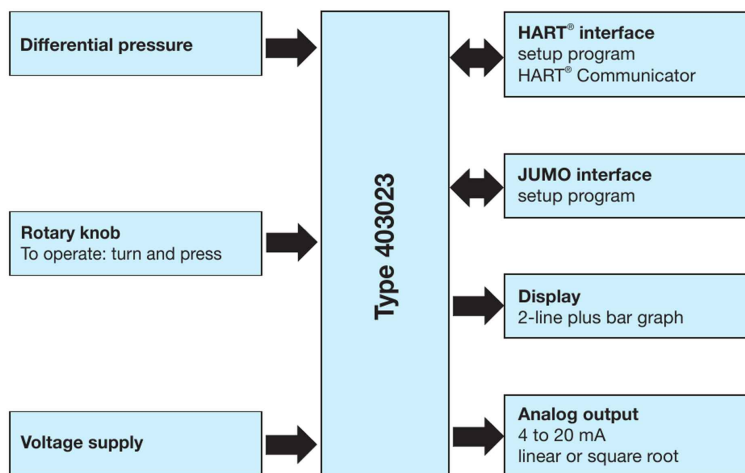
For the "Ex ia" explosion protection version, see data sheet 403022.

For the relative or absolute pressure versions, see data sheets 403025 and 403026.



Type 403023

Block diagram



Key features

- Stainless steel enclosure
- HART® interface
- Ex d explosion protection (gas and dust) according to ATEX, INMETRO and GOST-R
- 0.07 % linearity
- 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
- Characteristic and display also adjustable for flow measurement

Approvals/marks of conformity (see Technical data)



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 1 filling medium	Silicon oil
For measuring system 2 filling medium	Halogenated filling oil
Permissible load changes	> 10 million
Location	
Mounting position	Any
Calibration position	Device standing vertically, process connection on bottom
Position-dependent zero point offset	≤ 1 mbar Zero point correction possible locally or via setup
Display	LCD, two-line with bar graph
Alignment	Display unit can be rotated 90° at a time Enclosure can be rotated ±160°
Size	Display field 22 mm × 35 mm/font size 7 mm/5 digits
Color	Black
Measurement unit display options	
Input pressure	inH ₂ O, inHg, ftH ₂ O, mmH ₂ O, mmHg, psi, bar, mbar, kg/cm ² , kPa, Torr, MPa, mH ₂ O
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 , socket at front
For output 410 (4 to 20 mA with HART®)	JUMO interface ^a and HART® interface

^a The JUMO interface must not be used in a potentially explosive atmosphere! In this situation, the instrument can be operated by the rotary knob or via the HART® interface.

Input

Nominal pressure					
Nominal measuring range	-10 to +10 mbar DP	-1 to +1 bar DP	0 to 1 bar DP	-1 to +6 bar DP	-1 to +100 bar DP
Nominal pressure (bar)	PN2	PN210	PN210, optional PN420		

Output

Analog output	
For output 405	4 to 20 mA, two wire
For output 410	4 to 20 mA, two wire with mit HART®
Step response time T ₆₀	≤ 190 ms without damping
Damping	adjustable 0 to 100 s
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

Voltage supply

Voltage supply	DC 11.5 to 36 V
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Mechanical properties

Process connection	
Materials	
Diaphragm	
For process connection 20 (stainless steel)	Stainless steel 316L
For process connection 82 (Hastelloy®)	Hastelloy® C276, mat. no.: 2.4819
For process connection 80 (tantalum)	Tantalum
Flange	Stainless steel 316
Seal	PTFE
Enclosure	
Enclosure material	Precision casting 1.4408
Cover material	Precision casting 1.4408, FPM seal
Control knob material	
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 to T4 Ga/Gb II 2D Ex t IIIC T105 °C Db
Weight	ca. 4,0 kg
For extra code 694 (increased nominal pressure)	The instrument weight increases by approx. 3.8 kg.

Ambient conditions

Permissible temperatures																								
In operation	<table border="1"> <thead> <tr> <th>Version</th> <th>Category</th> <th>Max. medium temperature</th> <th>Ambient temperature^a</th> <th>Extended ambient temperature (extra code 681)^{a, b}</th> </tr> </thead> <tbody> <tr> <td rowspan="3">II 1/2G Ex d</td> <td>T6</td> <td>+70 °C</td> <td>-40 to +60 °C</td> <td>-50 to +60 °C</td> </tr> <tr> <td>T5</td> <td>+85 °C</td> <td>-40 to +70 °C</td> <td>-50 to +70 °C</td> </tr> <tr> <td>T4</td> <td>+110 °C</td> <td>-40 to +85 °C</td> <td>-50 to +85 °C</td> </tr> <tr> <td>II 1/2D Ex d</td> <td>T105 °C</td> <td>+100 °C</td> <td>-40 to +85 °C</td> <td>-50 to +85 °C</td> </tr> </tbody> </table>	Version	Category	Max. medium temperature	Ambient temperature ^a	Extended ambient temperature (extra code 681) ^{a, b}	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	+110 °C	-40 to +85 °C	-50 to +85 °C	II 1/2D Ex d	T105 °C	+100 °C	-40 to +85 °C	-50 to +85 °C
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II 1/2D Ex d	T105 °C	+100 °C	-40 to +85 °C	-50 to +85 °C																				
Storage	-40 to +85 °C																							
Permissible relative humidity																								
In operation	100% incl. condensation on instrument outer sleeve																							
Storage	90% without condensation																							
Permissible mechanical loading																								
Vibration performance	2 g, 10 to 500 Hz to DIN EN 60770-3																							
Shock resistance	15 g for 6 ms to IEC 60068-2-29																							
Electromagnetic coompatibility	Ton EN 61326																							
Interference emission	Class B																							
Interference immunity	Industrial																							
Protection	IP66 to EN 60529																							

^a Restricted function below -20 °C: stationary use, increased danger of broken cable, display does not function; device cannot be operated when temperature is under -30 °C.

^b In the range of -40 to -50 °C, the cover with the instrument viewing pnae must also be protected against mechanical shock and impact. For details please contact JUMO.

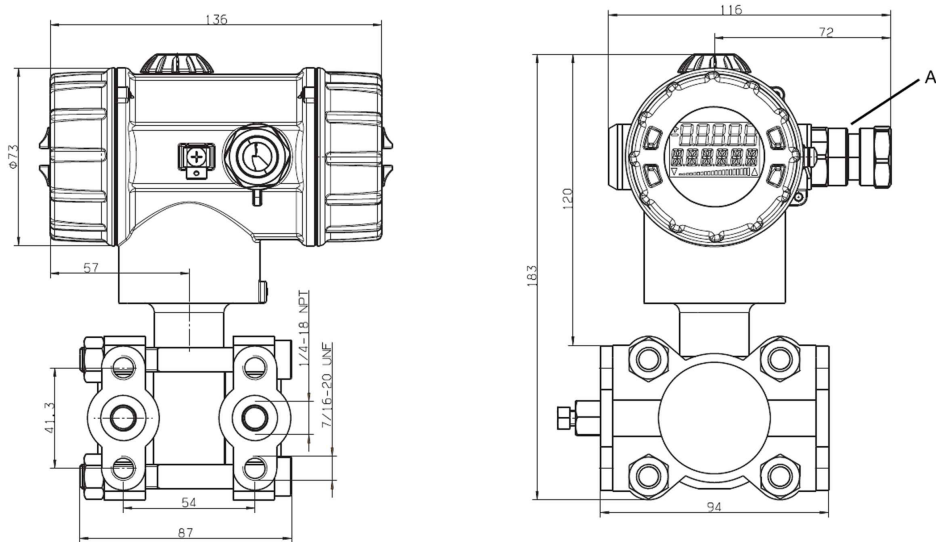
Accuracy

Differential pressure					
Nominal measuring range	-10 to 10 mbar DP	-1 to 1 bar DP	0 to 1 bar DP	-1 to 6 bar DP	-1 to 100 bar DP
Factory setting for measuring range	0 to 10 mbar	0 to 1 bar	0 to 1 bar	0 to 6 bar	0 to 100 bar
Minimum span	1 mbar	5 mbar	5 mbar	0.350 bar	2.5 bar
Turndown ratio (r)	$r \leq 20$	$r \leq 400$	$r \leq 200$	$r \leq 20$	$r \leq 40.4$
Linearity for a linear characteristic as % of the set span	0.1 % for $r \leq 2$	0.07 % for $r \leq 10$		0.07 % for $r \leq 5$	
	$r \times 0.05$ % for $2 \leq r \leq 20$	$r \times 0.007$ % for $10 \leq r \leq 400$	$r \times 0.007$ % for $10 \leq r \leq 200$	$r \times 0.014$ % for $5 \leq r \leq 20$	$r \times 0.014$ % for $5 \leq r \leq 40.4$
Accuracy at +20 °C as % of the set span	0.2 % for $r \leq 2$	0.1 % for $r \leq 10$		0.1 % for $r \leq 5$	
	$r \times 0.1$ % for $2 \leq r \leq 20$	$r \times 0.01$ % for $10 \leq r \leq 400$	$r \times 0.01$ % for $10 \leq r \leq 200$	$r \times 0.02$ % for $5 \leq r \leq 20$	$r \times 0.02$ % for $5 \leq r \leq 40.4$
Accuracy at -20 to +85 °C as % of the set span	0.5 % for $r \leq 2$ (up to +60 °C only)	0.2 % for $r \leq 10$		0.2 % for $r \leq 5$	
	$r \times 0.25$ % for $2 \leq r \leq 20$ (up to +60 °C only)	$r \times 0.02$ % for $10 \leq r \leq 400$	$r \times 0.02$ % for $10 \leq r \leq 200$	$r \times 0.04$ % for $5 \leq r \leq 20$	$r \times 0.04$ % for $5 \leq r \leq 40.4$
Accuracy at -30 to +20 °C as % of the set span	1.0 % for $r \leq 2$	0.6 % for $r \leq 10$		0.6 % for $r \leq 5$	
	$r \times 0.5$ % for $2 \leq r \leq 20$	$r \times 0.06$ % for $10 \leq r \leq 400$	$r \times 0.06$ % for $10 \leq r \leq 200$	$r \times 0.12$ % for $5 \leq r \leq 20$	$r \times 0.12$ % for $5 \leq r \leq 40.4$
Accuracy at +60 to +85 °C as % of the set span	2.0 % for $r \leq 2$				
	$r \times 1.0$ % for $2 \leq r \leq 20$				
Effect of static pressure P (bar) as % of nominal measuring range	≤ 1 %	$\leq P \times 0.0005$ %	$\leq P \times 0.0003$ %	$\leq P \times 0.0025$ %	$\leq P \times 0.001$ %
Long-term stability as a % of the nominal measuring range	≤ 0.6 %/year	≤ 0.1 %/year			≤ 0.2 %/year

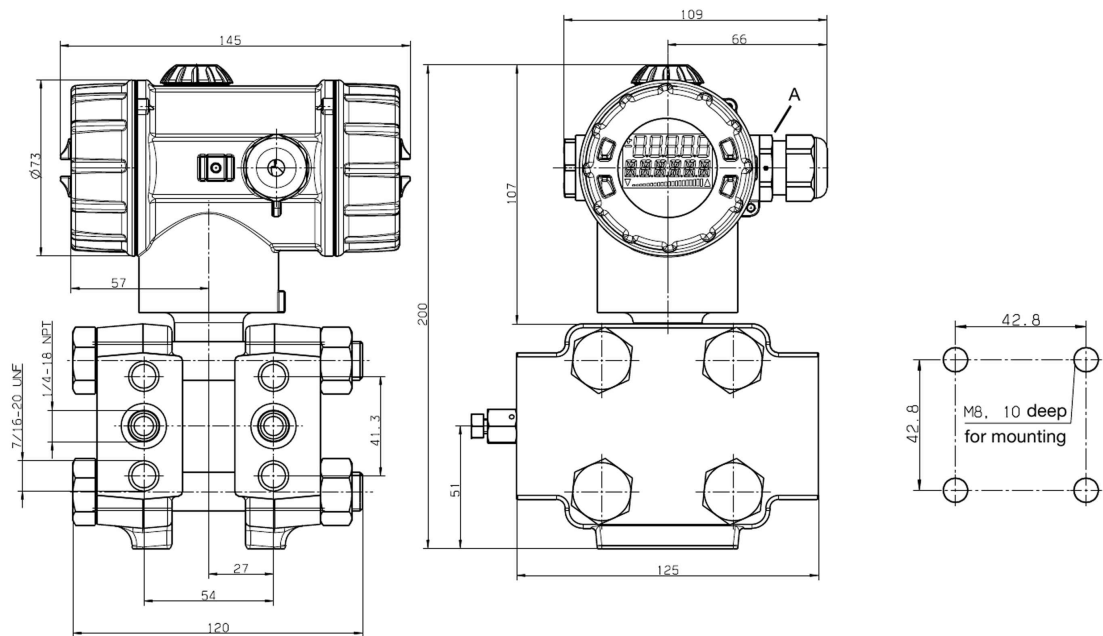
Approvals/marks of conformity

Mark of conformity	Testing laboratory	Certificate/certification number	Test basis	Valid for
ATEX	electrosuisse	SEV 10 ATEX 0127 X	Directive 94/9/EC	ATEX Ex d
INMETRO	CEPEL	CEPEL 13.2214X	IEC 60079 IEC 60529	Extra code 227
GOST-R				

Dimensions






For extra code 694 (increased nominal pressure PN420)

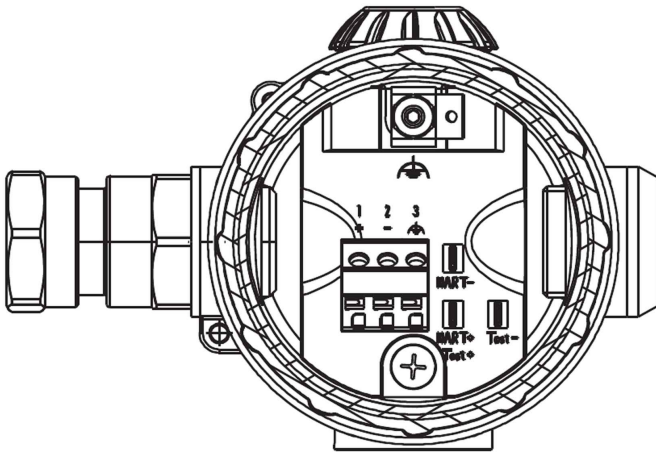


A = Cable gland M20 × 1.5

Electrical connection

Connection		Terminal assignment
Voltage supply DC 11.5 to 36 V		1 L+ 2 L-
Output 4 to 20 mA two wires Impressed current 4 to 20 mA in voltage supply		1 L+ 2 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
Grounding or equipotential bonding		outside, on the enclosure

Cable gland



Order details

(1) Basic type	
403023	JUMO dTRANS p20 DELTA Ex d
(2) Basic type extension	
0	None
9	Special design
(3) Display	
0	Without display
1	With display
(4) Operation	
0	Without control knob
1	With control knob
(5) Nominal measuring range of input	
530	-10 to +10 mbar DP ^{a, b}
531	-1 to +1 bar DP ^b
532	0 to 1 bar DP
533	-1 to +6 bar DP
534	-1 to +100 bar DP
(6) Output	
410	4 to 20mA, two-wire with HART [®] protocol
(7) Process connection	
511	1/4-18 NPT, to EN 837
998	Suitable for connecting to a diaphragm seal
(8) Process connection material	
20	CrNi (stainless steel)
80	Tantalum
82	NiMo
(9) Measuring system filling medium	
01	Silicon oil
02	Halogenated oil
(10) Extra codes	
000	None
100	Customized setting ^c
226	With GOST R approval
227	With INMETRO approval
624	Free of oil and grease
633	With holder for wall and pipe mounting
634	With TAG number
635	With manufacturer declaration NACE ^d
681	Extended permissible ambient temperature
694	Increased nominal pressure PN420 bar

^a This input is only available with a process connection made out of stainless steel (20).

^b The inputs specified above are not available with an increased nominal pressure (694).

^c Please specify the setting you want in plain text. For factory setting see "Accuracy" section in data sheet.

^d Only with process connection material 82 (NiMo)

Order code	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)									
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Order example	403023	/	0	-	1	-	1	-	532	-	405	-	511	-	20	-	01	/	000

Accessories

Article	Part no.
PC interface with USB/TTL converter ^a	00456352
HART® modem USB ^b	00443447
SET oval flange 1/2" NPT/accessories set 7/16-20UNF	00543775
Mounting kit, set includes 7/16-20 UNF screws	00543777
	Data Sheet
Manifolds	409706
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 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

Article	Part no.
JUMO Setup dTRANS p20 series	00537577