

JUMO dTRANS p20 DELTA Ex d

Differential pressure transmitter with explosion-proof enclosure

Description

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

The differential pressure transmitter with flameproof enclosure can be installed in zone 0. The housing and sensors 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 differential 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 exida according to IEC 61508 -1/-2/-3:2010. 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 403022.

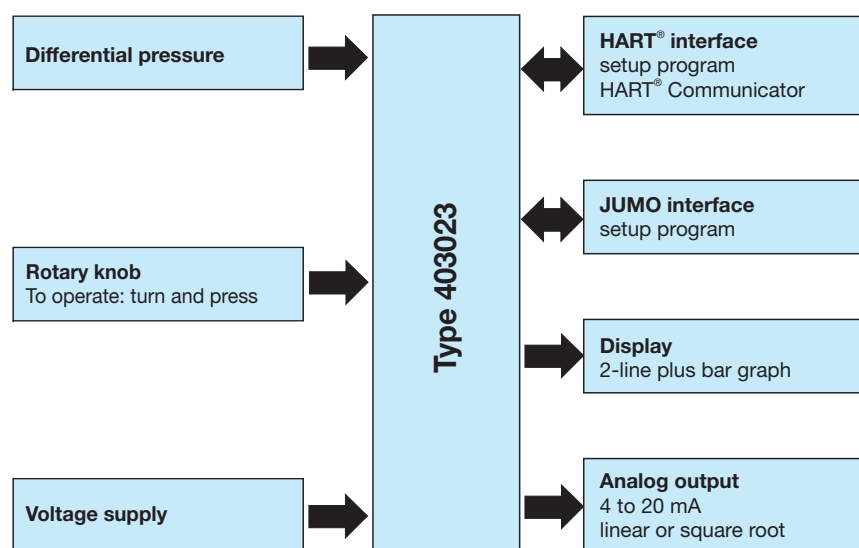
For the relative or absolute pressure versions, see data sheet 403025 and data sheet 403026.



Type 403023



Block diagram



Special features

- Stainless steel case
- SIL certified (exida)
- HART interface
- Explosion protection Ex d (gas and dust) according to ATEX and UKEX
- Linearity 0.07 %
- 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
- Characteristic line and display also adjustable for flow measurement

Approval marks and certificates



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Approval marks and certificates

	Designation	ATEX
	Testing agency	Eurofins Electrosuisse Product Testing AG
	Certificate no.	SEV 10 ATEX 0127 X
	Inspection basis	EN 60079-0, EN 60079-1, EN 60079-26, EN 60079-31
	Valid for	Type 403023
	Designation	UKEX
	Testing agency	Bureau Veritas
	Certificate no.	EPS 22 UKEX 1370 X
	Inspection basis	EN 60079-0, EN 60079-1, EN 60079-26, EN 60079-31
	Valid for	Type 403023 with extra code 085
	Designation	SIL
	Testing agency	exida
	Certificate no.	JUMO 2203088 C001
	Inspection basis	IEC 61508-1/-2/-3:2010
	Valid for	Type 403023 with basic type extension 2

Observe "Special conditions for safe use" in hazardous areas.

Certificates for approved device versions are available for download on the manufacturer's website.

Technical data

General Information

Reference conditions	DIN EN 60770, 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 1	Silicon oil
For measuring system filling medium 2	Halogenized filling oil
Admissible load changes	> 10 million
Position	
Mounting position	Any
Calibration position	Device upright, process connection at the bottom
Zero offset depending on position	≤ 1 mbar A zero offset is possible on-site or via setup
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	inH ₂ O, inHg, ftH ₂ O, mmH ₂ O, mmHg, psi, bar, mbar, kg/cm ² , kPa, torr, MPa, mH ₂ O
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

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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.

Ex identification markings

ATEX, UKEX	II 1/2G Ex db IIC T6 ... T4 Ga/Gb II 2D Ex tb IIIC T105 °C Db
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Electrical data

Voltage supply	DC 12 to 36 V
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Inputs

Nominal pressure					
Nominal measuring range	-10 to +10 mbar DP ^a	-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, optionally PN420		

^a Without SIL

Measuring range and 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.

Differential pressure

	Nominal measuring range				
	-10 to +10 mbar DP ^a	-1 to +1 bar DP	0 to 1 bar DP	-1 to +6 bar DP	-1 to +100 bar DP
Default measuring range	0 to 10 mbar	0 to 1 bar		0 to 6 bar	0 to 100 bar
Smallest MSP ^b	1 mbar ^c	5 mbar ^c		0.350 bar	2.5 bar
Turndown ratio (r) ^d	r ≤ 20	r ≤ 400	r ≤ 200	r ≤ 20	r ≤ 40
Non-linearity for reference conditions	0.1 % for r ≤ 2	0.07 % for r ≤ 10		0.07 % for r ≤ 5	
	r × 0.05 % for 2 ≤ r ≤ 20	r × 0.007 % for 10 ≤ r ≤ 400	r × 0.007 % for 10 ≤ r ≤ 200	r × 0.014 % for 5 ≤ r ≤ 20	r × 0.014 % for 5 ≤ r ≤ 40
Accuracy in % of the set MSP at 20 °C	0.2 % for r ≤ 2	0.1 % for r ≤ 10		0.1 % for r ≤ 5	
	r × 0.1 % for 2 ≤ r ≤ 20	r × 0.01 % for 10 ≤ r ≤ 400	r × 0.01 % for 10 ≤ r ≤ 200	r × 0.02 % for 5 ≤ r ≤ 20	r × 0.02 % for 5 ≤ r ≤ 40
Accuracy in % of the set MSP Range: 20 to 85 °C	0.5 % for r ≤ 2 (only to 60 °C)	0.2 % for r ≤ 10		0.2 % for r ≤ 5	
	r × 0.25 % for 2 ≤ r ≤ 20 (only to 60 °C)	r × 0.02 % for 10 ≤ r ≤ 400	r × 0.02 % for 10 ≤ r ≤ 200	r × 0.04 % for 5 ≤ r ≤ 20	r × 0.04 % for 5 ≤ r ≤ 40
Accuracy in % of the set MSP Range: -40 to +20 °C	1.0 % for r ≤ 2	0.6 % for r ≤ 10		0.6 % for r ≤ 5	
	r × 0.5 % for 2 ≤ r ≤ 20	r × 0.06 % for 10 ≤ r ≤ 400	r × 0.06 % for 10 ≤ r ≤ 200	r × 0.12 % for 5 ≤ r ≤ 20	r × 0.12 % for 5 ≤ r ≤ 40
Accuracy in % of the set MSP Range: 60 to 85 °C	2.0 % for r ≤ 2	2.0 % for r ≤ 2		2.0 % for r ≤ 2	
	r × 1.0 % for 2 ≤ r ≤ 20				
Influence of the static pressure P (bar) in % of the nominal measuring range	≤ 1 %	≤ P × 0.0005 %	≤ P × 0.0003 %	≤ P × 0.0025 %	≤ P × 0.001 %
Long-term stability in % of the nominal measuring range	≤ 0.6 %/year	≤ 0.1 %/year			≤ 0.2 %/year

^a Without SIL.

^b MSP = measuring span

^c For the calibration certificate from JUMO the smallest MSP is 10 mbar. MSPs smaller than 10 mbar can be adjusted by the user.

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

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Outputs

Analog output For output 410 (4 to 20 mA with HART) Jump response time T_{60} Attenuation	4 to 20 mA, two-wire with HART version 7 ≤ 190 ms without attenuation Adjustable 0 to 100 s
Burden For output 410 (4 to 20 mA with HART)	$Burden \leq (U_B - 12 \text{ V}) \div 0.022 \text{ A}$; additional: min. 250 Ω , max. 1100 Ω

Environmental influences

Admissible temperatures Operation	Version	Temperature class	Maximum medium temperature	Ambient temperature ^a	Expanded ambient temperature (extra code 681) ^{a, b, c}
	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 2D Ex tb	T105 °C	100 °C	-40 to +85 °C	-50 to +85 °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	DIN EN 60770-3, IEC 60068-2-29 2 g, 10 to 500 Hz 15 g for 6 ms				
Electromagnetic compatibility Interference emission Interference immunity	DIN EN 61326-2-3:2022 Class B ^d Industry				
Protection type	DIN EN 60529 IP66				

^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. The lid with the inspection glass must also be protected against mechanical impact and shock effects.

^c Without SIL.

^d The product is suitable for industrial use as well as for households and small businesses.

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**Mechanical features**

Process connection Materials Membranes Process connection 20 (stainless steel) Process connection 80 (tantalum) Process connection 82 (HASTELLOY) Flange Seal	316L Tantalum 2.4819/HASTELLOY C-276 316 PTFE
Housing Material Housing Cover Operation 1 (with control knob)	1.4408 1.4408, seal FPM PA
Weight Extra code 694 (increased nominal pressure)	~ 4.0 kg The weight of the device increases by ~ 3.8 kg.

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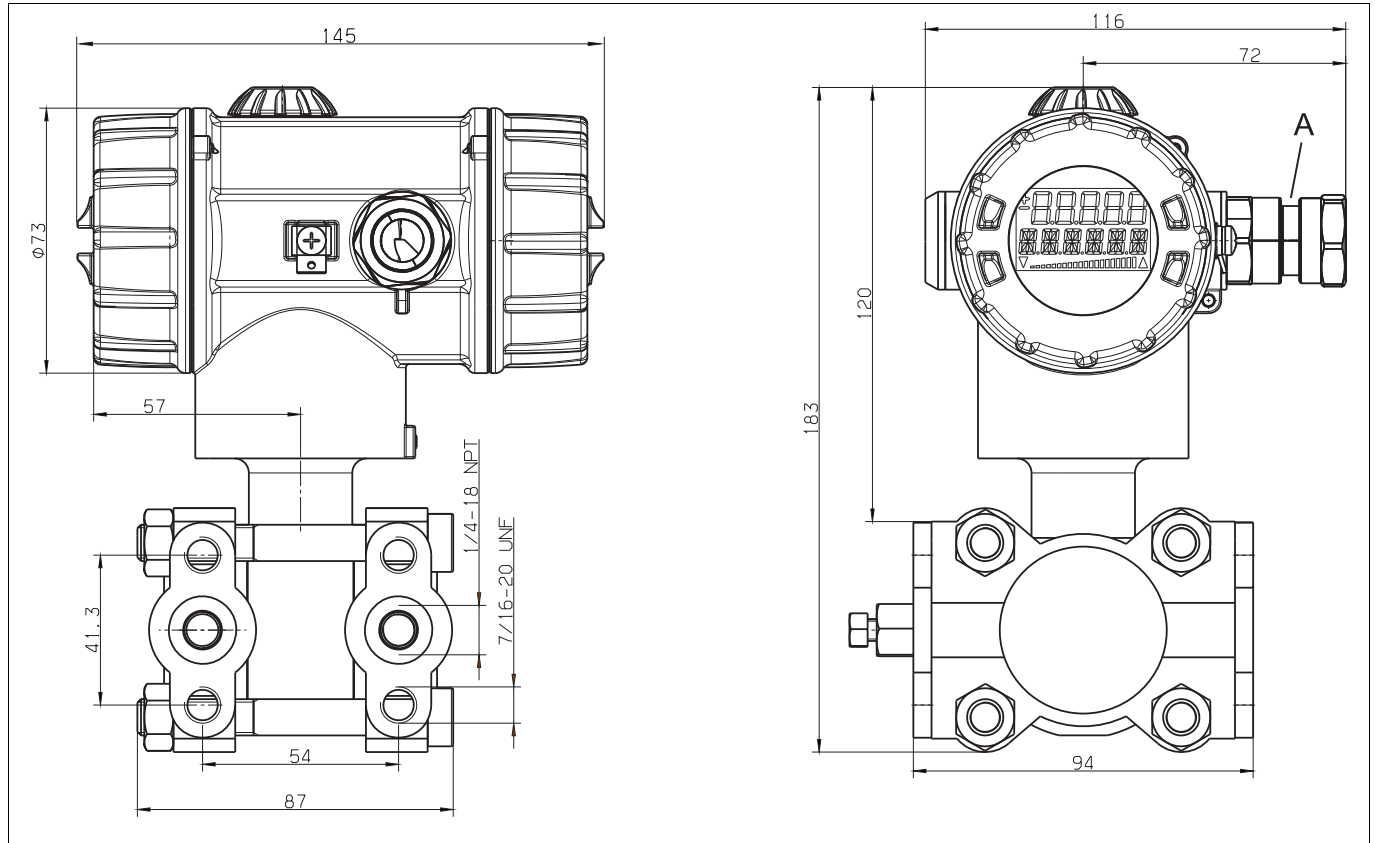
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**Dimensions**

A M20 × 1.5 cable fitting

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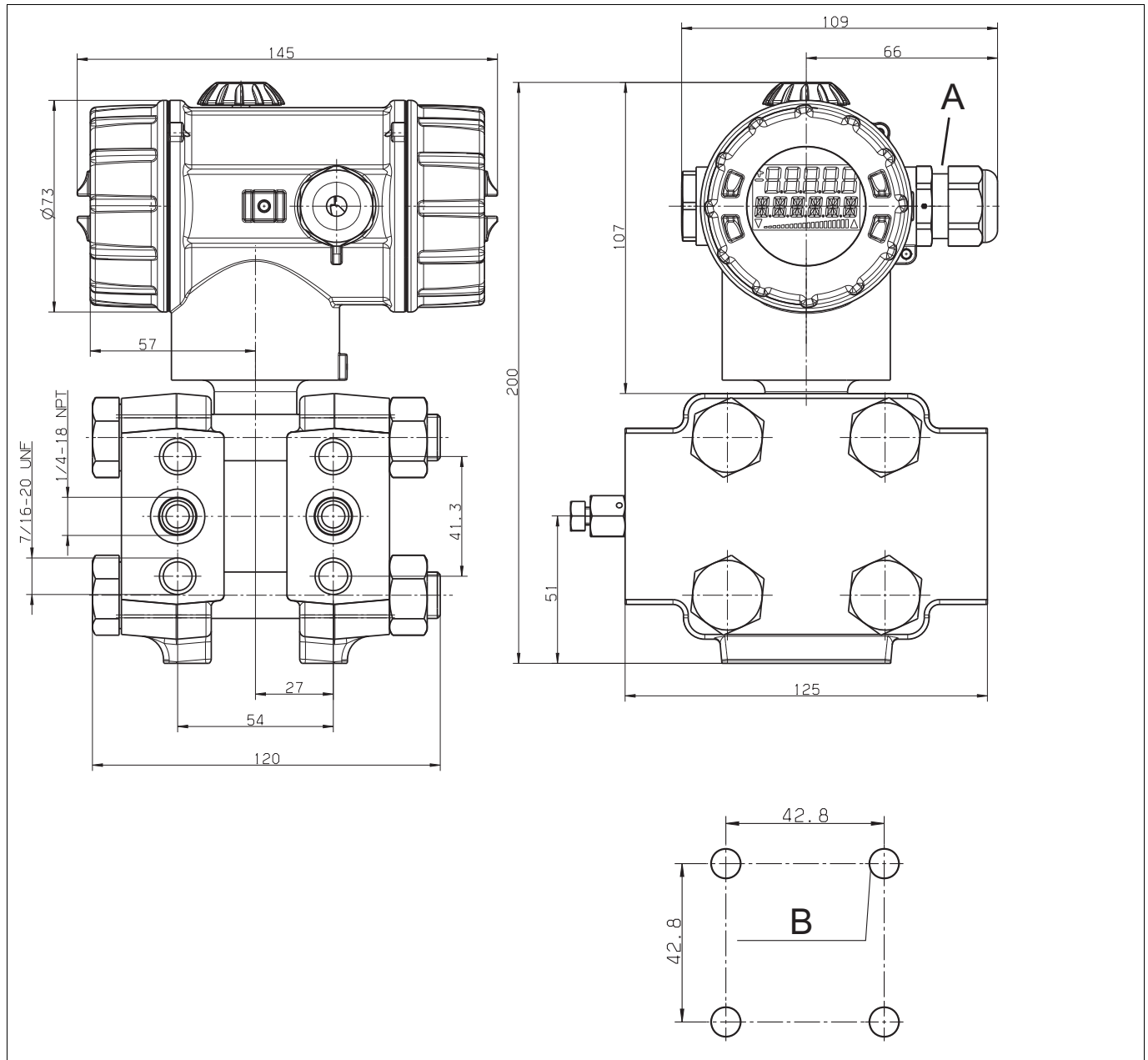
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For extra code 694 (increased nominal pressure PN420)



- A M20 × 1.5 cable fitting
B M8 for installation

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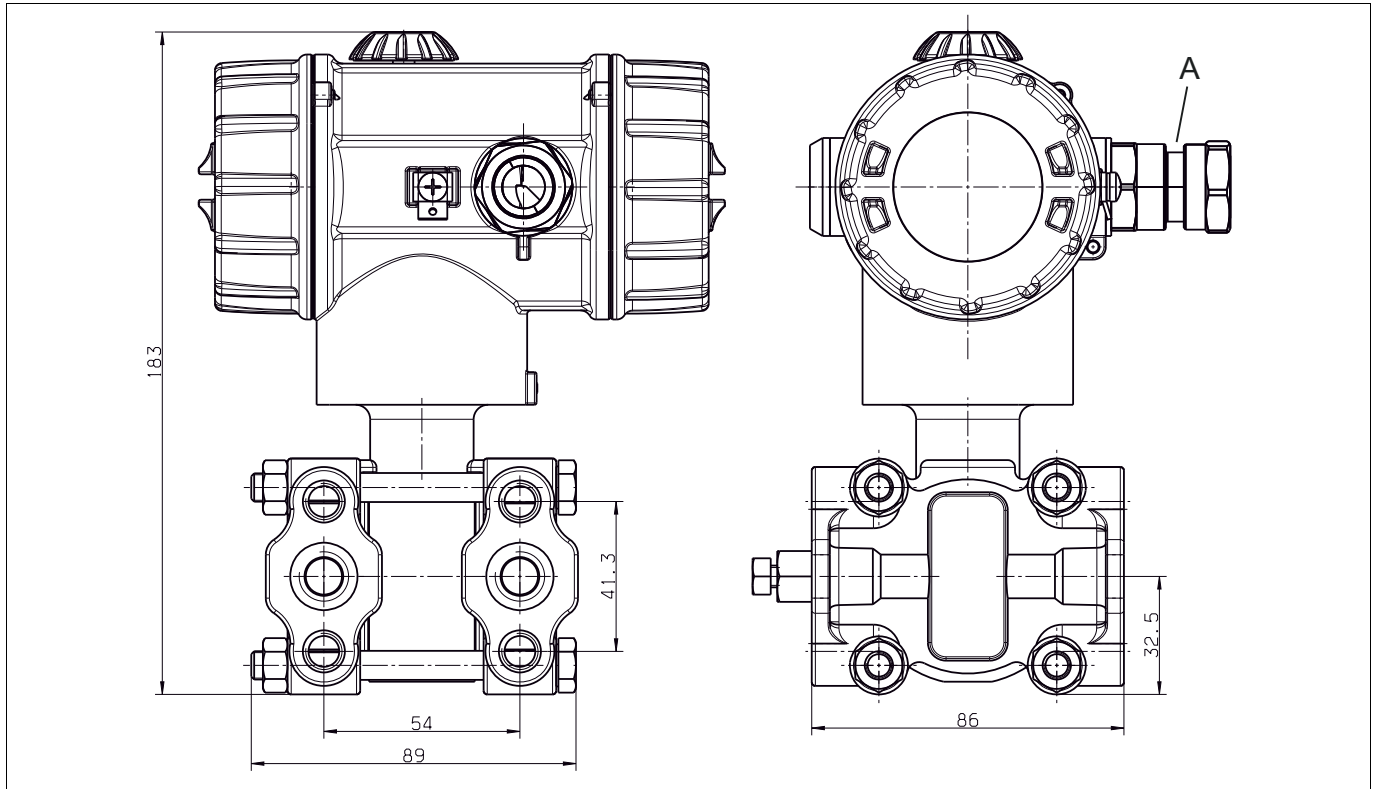
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For nominal measuring range -10 to +10 mbar, nominal pressure PN2 (bar)



A M20 × 1.5 cable fitting

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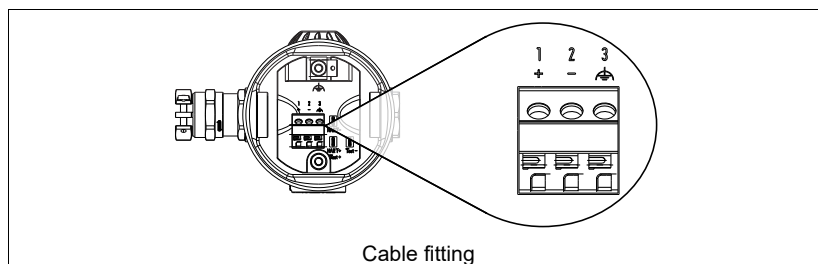
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Connection elements

The connection elements in the data sheet provide information on product selection.

For the electrical connection, only use the installation instructions or the operating manual.



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 -
Functional ground		3
Grounding or potential equalization		Outside of the housing

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Accessories

Designation	Part no.
PC interface with USB/TTL converter	00456352
HART modem, USB	00443447
Mounting bracket for differential pressure transmitter	00543777
Calibration of the mechanical measurement value pressure on site (also DAkkS)	00758363
Designation	Data sheet
Valve blocks	409706
Diaphragm seal with dairy pipe fitting	409772
Diaphragm seal with clamp connection	409774
Diaphragm seal with DRD flange or Varivent socket	409776
Diaphragm seal with ISS/SMS/RJT socket and (grooved) union nut	409778
Diaphragm seal with membrane	409780
Diaphragm seal with screw-in thread DIN ISO 228/1 or ANSI B 1.201	409782
Diaphragm seal with flange connection according to DIN EN 1092-1 with sealing strip form B1	409784
Diaphragm seal with flange connection according to ANSI B 16.5 with sealing strip type RF	409786
Ex-i repeater power supply and input isolating amplifier	707530

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

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

Software

Designation	Part no.
JUMO setup dTRANS p20 series	00537577
SW Device Type Manager (DTM) 403025 DTM	00738288

Trademark information

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