

JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 E-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM20 2DY, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 E-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-5866
 1-800-554-JUMO
 Fax: 315-697-5867
 E-mail: info.us@jumo.net
 Internet: www.jumousa.com



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.

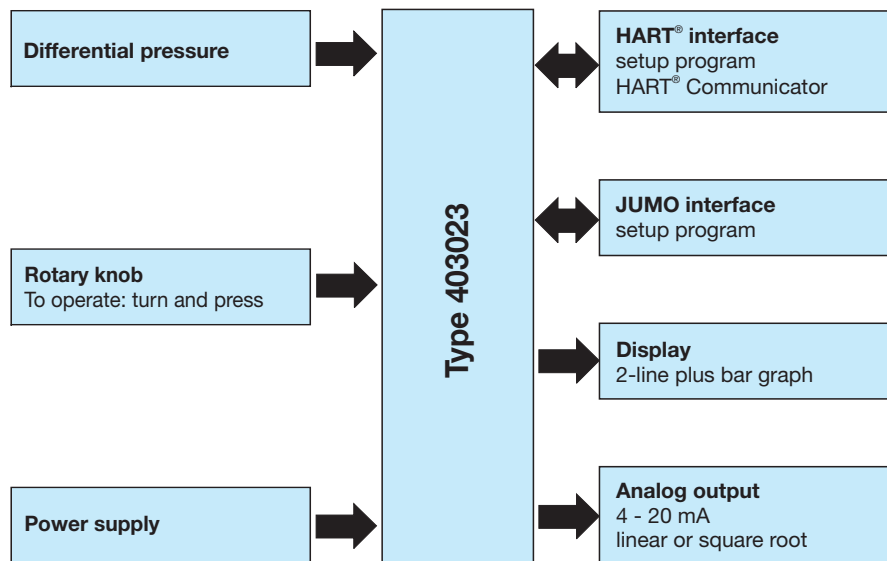
For the "Ex ia" explosion protection version, see data sheet 403022.

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)



JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 E-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM20 2DY, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 E-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-5866
 1-800-554-JUMO
 Fax: 315-697-5867
 E-mail: info.us@jumo.net
 Internet: www.jumousa.com



Technical data

General

Reference conditions	DIN 16086, EN 60770 and DIN IEC 770/5.3
Sensor system Pressure transfer medium for measuring system 1 filling medium for measuring system 2 filling medium Permissible load changes	Silicon sensor with stainless steel separating diaphragm Silicon oil Halogenated filling oil > 10 million
Location Mounting position Calibration position Position-dependent zero point offset	Any Device standing vertically, process connection on bottom ≤ 1 mbar Zero point correction possible locally or via setup
Display Alignment Size Color	LCD, two-line with bar graph Display unit can be rotated 90° at a time Enclosure can be rotated ±160° Display field 22 mm × 35 mm/font size 7 mm/5 digits Black
Measurement unit display options Input pressure Measurement value Output current Sensor temperature	inH ₂ O, inHg, ftH ₂ O, mmH ₂ O, mmHg, psi, bar, mbar, kg/cm ² , kPa, Torr, MPa, mH ₂ O % or scaled with a freely adjustable measurement unit mA °C, °F
Additional display data	Minimum pressure, maximum pressure, error, overrange, underrange, operating hours, device parameters
Operation Local Setup program	With rotary knob and LCD Via interface
Interface Standard For output 410 (4 - 20 mA with HART®)	JUMO interface ^a , socket at front 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 For output 410 Step response time T60 Damping	4 to 20 mA, two wire 4 to 20 mA, two wire with mit HART® ≤ 190 ms without damping adjustable 0 to 100 s
Burden For output 405 (4 to 20 mA) For output 410 (4 to 20 mA with HART®)	Burden ≤ (U _B -11,5 V)/0,022 A Burden ≤ (U _B -11,5 V)/0,022 A; also: min. 250 Ω, max. 1100 Ω

Power supply

Power supply	11.5 to 36 V DC
--------------	-----------------

JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 E-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM20 2DY, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 E-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-5866
 1-800-554-JUMO
 Fax: 315-697-5867
 E-mail: info.us@jumo.net
 Internet: www.jumousa.com



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	FEP
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 - 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. 2.5 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
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																				
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 compatibility	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.

JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 E-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM20 2DY, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 E-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-5866
 1-800-554-JUMO
 Fax: 315-697-5867
 E-mail: info.us@jumo.net
 Internet: www.jumousa.com



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				
GOST-R				

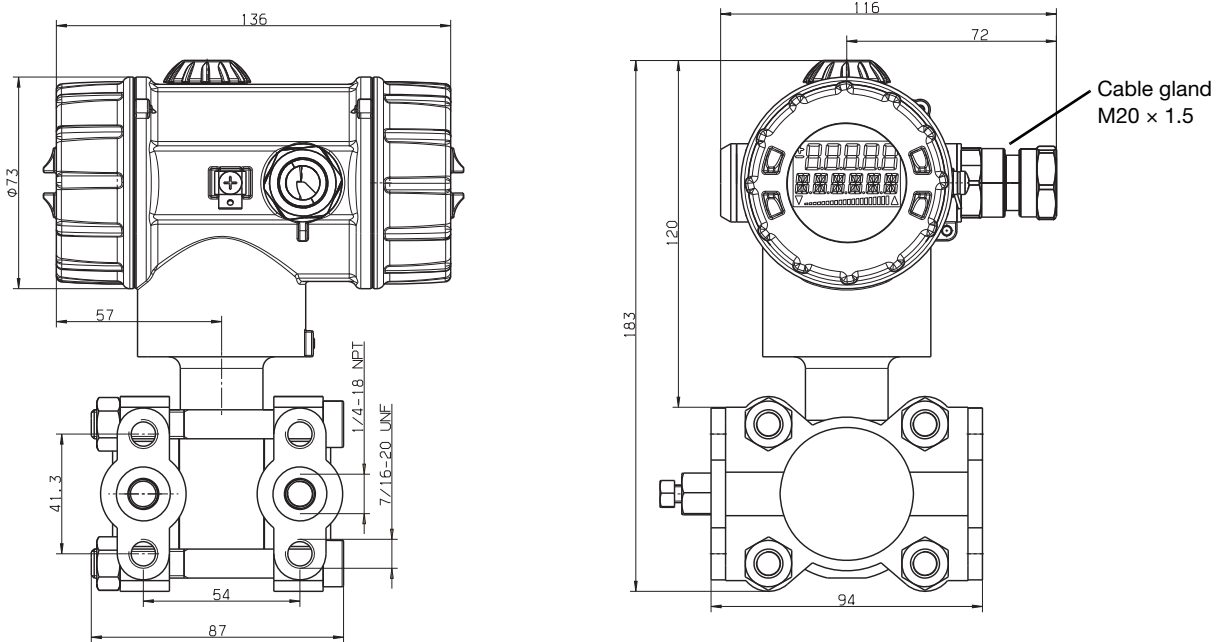
JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 E-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM20 2DY, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 E-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

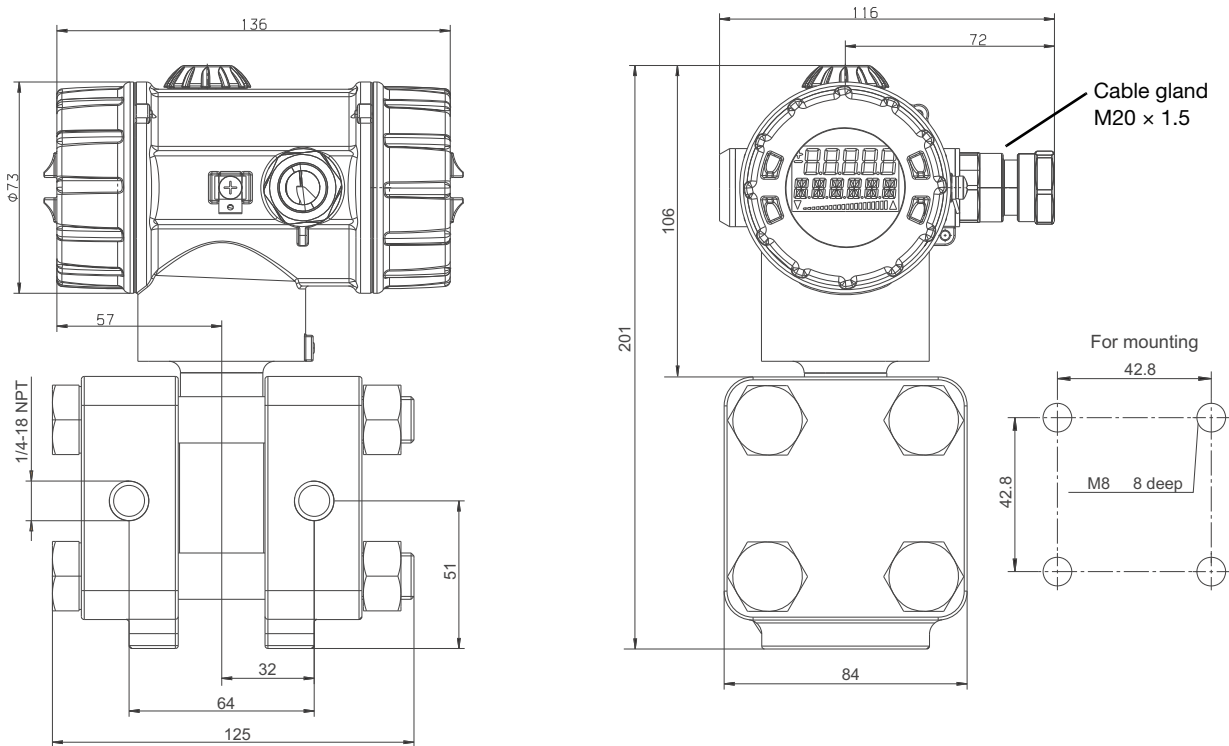
JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-5866
 1-800-554-JUMO
 Fax: 315-697-5867
 E-mail: info.us@jumo.net
 Internet: www.jumousa.com



Dimensions



For extra code 694 (increased nominal pressure PN420)



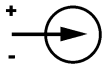
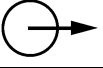

JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 E-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM20 2DY, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 E-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

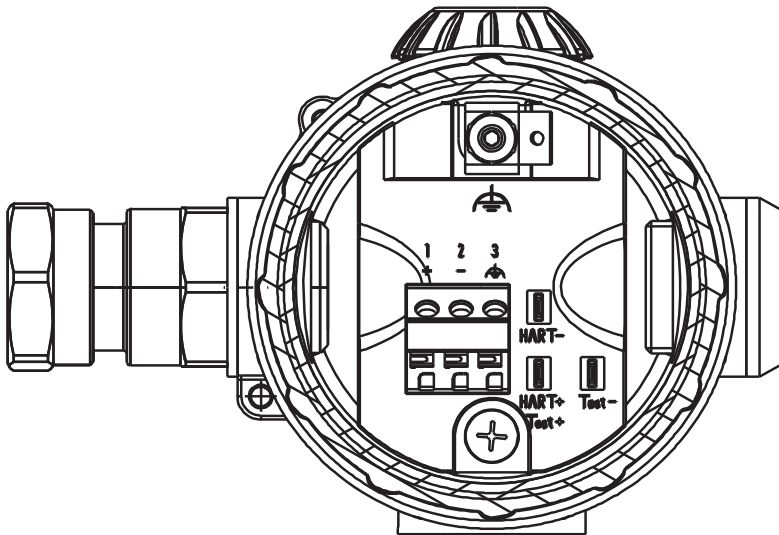
JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-5866
 1-800-554-JUMO
 Fax: 315-697-5867
 E-mail: info.us@jumo.net
 Internet: www.jumousa.com



Electrical connection

Connection		Terminal assignment
Power supply 11.5 to 36 V DC		1 L+ 2 L-
Output 4 to 20 mA two wires Impressed current 4 to 20 mA in power 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



JUMO GmbH & Co. KG

Delivery address: Mackenrodtstraße 14
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
E-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.

JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
E-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.

8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-5866
1-800-554-JUMO
Fax: 315-697-5867
E-mail: info.us@jumo.net
Internet: www.jumousa.com

**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
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.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)									
Order code	<input type="text"/>	/	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	/	<input type="text"/>						
Order example	403023	/	0	-	1	-	1	-	532	-	405	-	511	-	20	-	1	/	000

JUMO GmbH & Co. KG

Delivery address: Mackenrodtstraße 14
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
E-mail: mail@jumo.net
Internet: www.jumo.net

JUMO Instrument Co. Ltd.

JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
E-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

JUMO Process Control, Inc.

8 Technology Boulevard
Canastota, NY 13032, USA
Phone: 315-697-5866
1-800-554-JUMO
Fax: 315-697-5867
E-mail: info.us@jumo.net
Internet: www.jumousa.com

**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
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