

**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  
Email: mail@jumo.net  
Internet: www.jumo.net


**JUMO Instrument Co. Ltd.**  
JUMO House  
Temple Bank, Riverway  
Harlow, Essex, CM20 2DY, UK  
Phone: +44 1279 63 55 33  
Fax: +44 1279 62 50 29  
Email: sales@jumo.co.uk  
Internet: www.jumo.co.uk

**JUMO Process Control, Inc.**  
6733 Myers Road  
East Syracuse, NY 13057, USA  
Phone: +1 315 437 5866  
Fax: +1 315 437 5860  
Email: info.us@jumo.net  
Internet: www.jumousa.com



# JUMO dTRANS p02 DELTA

## Pressure transmitter

 II 1/2 G Ex ia IIC T6 Ga/Gb

### General application

The JUMO dTRANS p02 DELTA pressure transmitter measures the differential pressure in both corrosive and non-corrosive gases, vapors and liquids. The pressure transmitter makes use of the piezo-resistive effect to make the measurement. The output signal is a DC current which is linearly proportional to the input pressure. With flow-through measurements, it is possible to set up the output signal to be proportional to the square-root of the input pressure.

In the version "with Ex protection Ex II 1/2 G Ex ia IIC T6 Ga/Gb", the transmitter can be mounted within the hazardous area Zone 1, for connection to Zone 0.

A wide spectrum of pressure separators is available for special applications such as level measurements, or for corrosive media.

#### Display options:

- Pressure with choice of 13 different units
- Measurement in % or scaled with freely selectable dimensional unit
- Output current in mA
- Sensor temperature in °C or °F
- Measurement error, out-of-range measurement
- Minimum and maximum pressures (peak-reading pointer)
- Pressure and sensor temperature can be shown simultaneously (2 lines)

#### Setting options via keys:

- Start and end of measurement with pressure input
- Start and end of measurement without pressure input (blind setting)
- Damping or time constant
- Current generator function
- Output signal on error
- Key inhibit
- Reset min. and max. measured value (peak-reading pointer)
- Square-root characteristic (adjustable starting point), or linear
- Density correction for different measurement media
- Display of temperature of medium in °C or °F

The JUMO dTRANS p02 DELTA pressure transmitter can also be used with a HART® communicator or a PC in conjunction with a HART® modem and the JUMO setup program running under Windows®.



Type 404382

### Approvals/marks of conformity



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## Technical data

### Explosion protection (only with type 404382/1)

 II 1/2 G Ex ia IIC T6 Ga/Gb  
PTB 98 ATEX 2194

The supply must be intrinsically safe and must not exceed the following maximum values:

$U_i = DC 30 V$   
 $I_i = 100 mA$   
 $P_i = 750 mW$

### Reference conditions

as per DIN 16086 and IEC 770/5.3

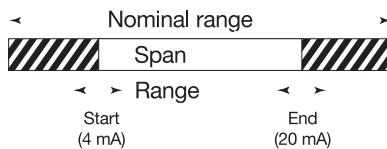
### Nominal input range

see Order details

### Range setting

The measurement range can be set from the transmitter keys, by using the setup program or a HART® communicator as described below:

Start and end of the measurement range can be continuously adjusted within the nominal range. The span should not go below 10 % of the nominal range.



### Displayable units

mH<sub>2</sub>O, inH<sub>2</sub>O, inHg, ftH<sub>2</sub>O, mmH<sub>2</sub>O, mm Hg, psi, bar, mbar, kg/cm<sup>2</sup>, kPa, Torr, MPa;  
Measurement: % or scaled with freely adjustable unit

Output current: mA

### Additional displays

indication of sensor temperature, minimum pressure, maximum pressure.  
Indication on overrange and on error.

### Density correction

adjustable within the range from 0.100 to 5.000 kg/dm<sup>3</sup>

### Nominal pressure

PN 160  
option: PN 420

### Parts in contact with medium

as standard:  
stainless steel, mat. ref. 1.4401, 1.4404  
flanges: stainless steel, mat. ref. 1.4408  
O ring: FPM  
option: NiMo, mat. ref. 2.4819

### Pressure connection

see order details

### Output

4 to 20 mA burden  $\leq (U_B - 11.5 V) / 0.022 A$   
burden with HART® max. 1100  $\Omega$ , min. 250  $\Omega$   
with HART® protocol V 5.3.  
Complies with the Directives of the HCF (HART® Communication Foundation)

### Characteristic

linear or square-root. Adjustable starting point with square-root characteristic (exfactory is linear up to 9.4 %).

### Burden error

$< 0.1 \%$

### Zero offset / adjustment accuracy

$\leq 0.01 mA$

### Effect of static pressure

zero:  $\leq 0.015 \%/10 bar$   
span:  $\leq 0.020 \%/10 bar$

### Ambient temperature error

within range  $-20$  to  $+85$  °C (compensated temperature range)  
zero:  $\leq 0.005 \%$  per °C typical,  $\leq 0.01 \%$  per °C max.  
span:  $\leq 0.005 \%$  per °C typical,  $\leq 0.01 \%$  per °C max.

### Deviation from characteristic

limit point adjustment:  
 $\leq 0.1 \%$  of full scale of nominal range; as per DIN 16086

### Hysteresis

$\leq 0.02 \%$  of full scale; as per DIN 16086

### Reproducibility

$\leq 0.02 \%$  of full scale; as per DIN 16086

### Response time

150 msec approx., no damping

### Damping

adjustable from 0 to 100 sec

### Stability per year

$\leq 0.1 \%$  of full scale (for nominal range at reference conditions as per IEC 770)

### Supply

DC 11.5 to 36 V for type 404382/0  
DC 11.5 to 30 V for type 404382/1  
DC 11.5 to 36 V for type 404382/5  
Supply unit for output signal transmission with or without HART® communication, in intrinsically safe version, see Data Sheet 404757.

**Note:** Minimum DC 17 V (250  $\Omega$ ) for communication via HART® protocol.

### Supply voltage error

$\leq 0.1 \%$  of full scale per 10 V change (nominal supply voltage DC 24 V)

### Permissible temperature of medium

$-40$  to  $+120$  °C

### Permissible ambient temperature

to DIN 16086  
 $-40$  to  $+85$  °C for type 404382/0  
 $-40$  to  $+60$  °C for type 404382/1  
 $-40$  to  $+85$  °C for type 404382/5 (the LCD display may not be readable at temperatures below  $-20$  °C)

### Storage temperature

$-40$  to  $+85$  °C

### Electromagnetic compatibility (EMC)

as per EN 61326

### Mechanical shock

50 g/11 msec

### Mechanical vibration

5 g max. at 10 to 2000 Hz

### Protection

with connecting cable  
IP65 to EN 60529

### Insulation resistance

100 M $\Omega$ ; DC 50 V

### Breakdown strength

$\geq 500 V_{eff}$ .

### Housing

aluminium die-casting GDAl Si 12

### Flange screws

steel, yellow-chromed  
option: stainless steel

### Climatic conditions

$\leq 80 \%$  rel. humidity with condensation, annual mean

### Electrical connection

clamping case with screw cover, 2-pole and earthing terminal, plastic cable gland M20  $\times$  1.5 for cable diameters 6 to 12 mm

### Nominal position

ex-factory: upright vertical (pressure cell below)  
any operating position

### Weight

3.9 kg approx.

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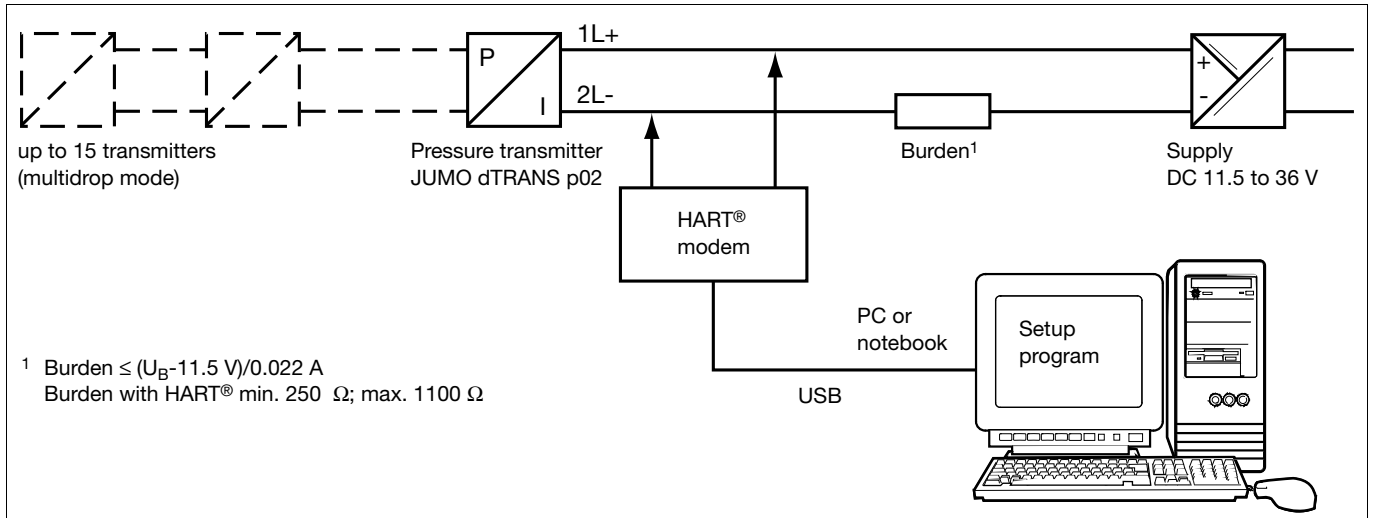
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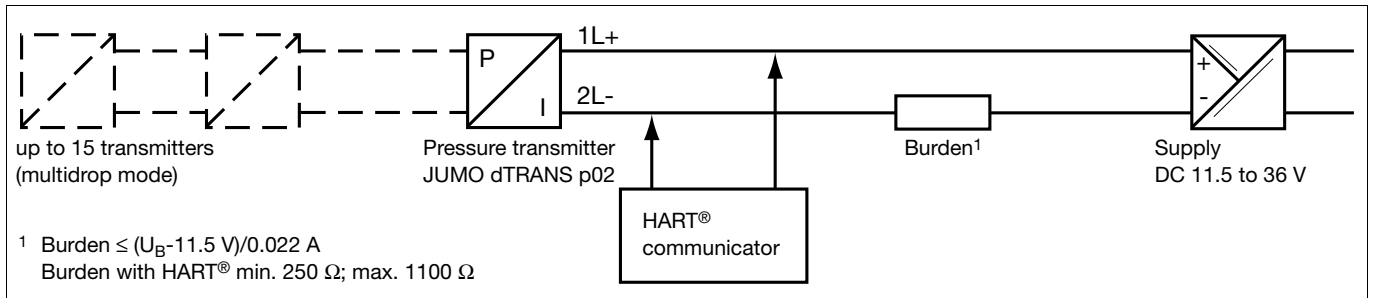


## HART® communication

### between PC and pressure transmitter



### between HART® communicator and pressure transmitter



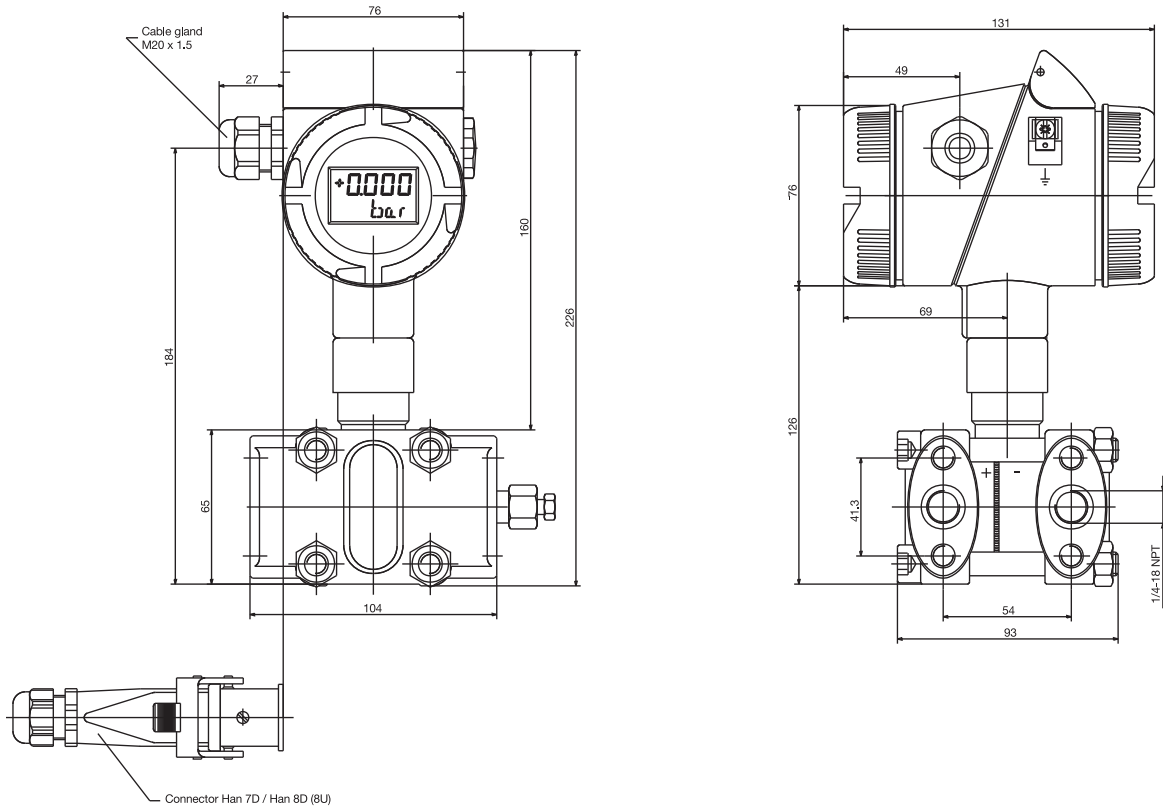
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## Dimensions



## Electrical connection

Connection		Terminals
Supply DC 11.5 to 36 V		1 L+ 2 L-
Output 4 to 20 mA, 2-wire		1 L+      Proportional current 4 to 20 mA 2 L-      in supply
Test connection for current output	Internal resistance of ammeter $\leq 10 \Omega$	TEST + TEST -
Test connection for HART®	Burden must be present!	TEST + HART®
Potential equilibration (for intrinsically safe circuit)		
Shielding		
<b>Caution:</b> Ground the device! (Pressure connection and shielding)		

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**Order details**

<b>(1) Basic type</b>	
404382/0	JUMO dTRANS p02 DELTA - Pressure transmitter
404382/1	JUMO dTRANS p02 DELTA - Pressure transmitter with Ex protection Ex II 1/2 G Ex ia IIC T6 Ga/Gb
404382/5	JUMO dTRANS p02 DELTA - Pressure transmitter with increased nominal pressure PN 420 <sup>a</sup>
<b>(2) Nominal input range</b>	
413	60 mbar differential pressure
451	0.25 bar differential pressure
454	1 bar differential pressure
457	4 bar differential pressure
461	25 bar differential pressure
<b>(3) Output</b>	
405	4 to 20 mA with HART® protocol
<b>(4) Process connection</b>	
511	2× pressure connection 1/4-18 NPT, DIN 837
998	Suitable for connection to diaphragm-type pressure separators
<b>(5) Material for process connection</b>	
20	CrNi (stainless steel)
82	NiMo
<b>(6) Fastening thread</b>	
113	M10 (standard)
152	7/16-20 UNF
<b>(7) Seals</b>	
601	FPM
603	PTFE (suitable for comestibles)
604	FFPM
<b>(8) Measuring system filling medium Füllmedium Messsystem</b>	
1	Silicone oil
2	Halogenized filling oil for oxygen applications
<b>(9) Flange screws</b>	
2	Stainless steel

<sup>a</sup> Please specify the measurement range to be set and the dimensional unit in plain text.

<b>Order code</b>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Order example</b>	404382/0	- 451	- 405	- 511	- 20	- 113	- 601	- 1	- 2

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**Accessories**

Type	Part no.
Setup program for all instruments of the JUMO dTRANS p02 series	00365072
HART® modem USB	00443447
Mounting bracket for fastening thread M10	00314729
Mounting bracket for fastening thread 7/16-20 UNF	00543777
Triple valve block to DIN 19213, stainless steel, PN 400, for fastening thread M10	00308191
Triple valve block to DIN 19213, stainless steel, PN 400, for fastening thread 7/16-20 UNF	00552040
Oval flange 1/2" NPT to DIN 19213, stainless steel, for fastening thread M10, set of 2, with screws	00398914
Oval flange 1/2" NPT to DIN 19213, stainless steel, for fastening thread 7/16-20 UNF, set of 2, with screws	00543775

	Data sheet
Ex-i Power supply/input isolating amplifier	707530
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