

JUMO dTRANS p02 DELTA

Pressure Transmitter



B 404382.0
Operating Manual



V2.01/EN/00381278

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1.1 Scope of application

General information

The type dTRANS p02 DELTA pressure transmitter measures the differential pressure of corrosive and non-corrosive gases, vapors and liquids. The pressure transmitter utilizes the piezo-resistive measuring principle. The output signal is a DC current which is linearly proportional to the input pressure. For flow measurements, the output signal can be set up to be proportional to the square root of the input pressure.

Version with Ex protection

The JUMO dTRANS p02 DELTA pressure transmitter in intrinsically-safe version marked  II 1/2 G Ex ia IIC T6 Ga/Gb is suitable for mounting inside the hazardous area Zone 1 for connection to Zone 0.

The EC Type-Examination Certificate No. for the JUMO dTRANS p02 DELTA is:
PTB 98 ATEX 2194

If the pressure transmitter is used in areas with potentially explosive atmospheres, the appropriate regulations for installing and operating equipment in such areas must be observed.

1 General information

2.1 Warning signs



DANGER!

Failure to follow this manual or failure to follow them precisely may result in **injury!**



CAUTION!

Failure to follow this manual or failure to follow them precisely may result in **damage to instruments or data!**

2.2 Reference signs



NOTE!

This sign is used to draw **special attention** to something.

abc¹

Footnote

Footnotes are remarks that **refer to specific points** in the text. Footnotes consist of two parts:

Markers in the text and the footnote text.

The markers in the text are arranged as sequential superscript numbers.

Action instruction

This sign indicates that an **action to be performed** is described.

The individual steps are marked by this asterisk.

Example:

* Loosen Phillips-head screws.

* Press key.

2 Safety information

Operating Manual B 404382.0

This operating manual is a comprehensive guide for the installation, electrical connection, commissioning, operation and parameterization of the dTRANS p02 DELTA pressure transmitter.

JUMO calibration certificate

Each pressure transmitter comes with a JUMO calibration certificate and a SETUP print-out. These documents contain information on the parameter settings and/or the measured characteristic data for the transmitter concerned.

If you lose this calibration certificate, or should you need an additional one, it can be ordered from JUMO by stating the serial No. of the pressure transmitter (see nameplate).

v see **addresses of suppliers** on the back page of this operating manual

Setup program

All the parameters of the pressure transmitter can be conveniently checked and set by using the setup program. Furthermore, additional functions are available such as:

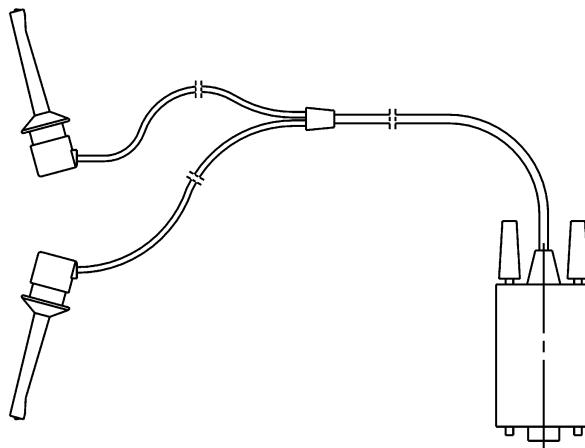
- Recording of measurements.
- Graphical display of temperature and pressure.
- Comprehensive diagnostic messages.
- Indication of the complete order code and instrument configuration (for repeat orders).

The setup program is available on request, at extra cost, part no. 00365072.

HART[®] modem

The HART[®] modem serves to connect the dTRANS p02 DELTA to a PC.

The HART[®] modem is available on request, at extra cost, part no. 00345666.



Power supply

A supply unit with a supply isolator is available on request, at extra cost, part no. 00577948.

Bracket for wall mounting

A bracket for wall/pipe mounting is available on request, at extra cost, part no. 00314729 (option).

3 Delivery package

Triple valve block

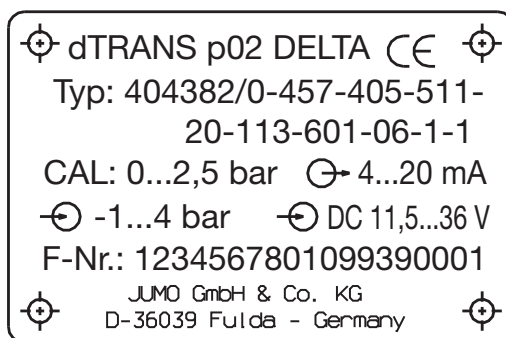
A triple valve block to DIN 19 213 in stainless steel is supplied on request, at extra cost, part no. 00308191 (option).

Other valve types on request.

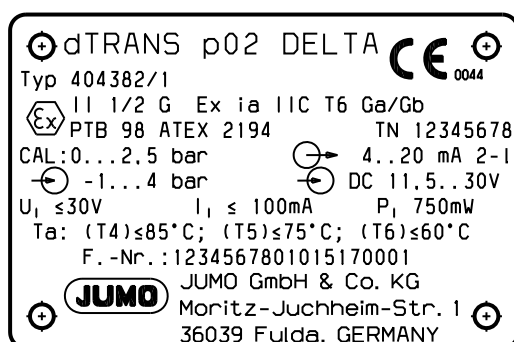
Pressure separator

To suit special applications, where conventional pressure connections cannot be used, see Data Sheets 409770 to 409786.

4.1 Nameplate



Nameplate on a pressure transmitter **without** approval for use inside the hazardous (Ex) area.



Nameplate on a pressure transmitter **with** approval for use inside the hazardous (Ex) area.

4 Instrument identification

4.2 Order details

(1) Basic type	
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 ^a
(2) Nominal input range	
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
(3) Output	
405	4 to 20 mA with HART [®] protocol
(4) Process connection	
511	2× pressure connection 1/4-18 NPT, DIN 837
998	Suitable for connection to diaphragm-type pressure separators
(5) Material for process connection	
20	CrNi (stainless steel)
82	NiMo
(6) Fastening thread	
113	M10 (standard)
152	7/16-20 UNF
(7) Seals	
601	FPM
603	PTFE (suitable for comestibles)
604	FFPM
(8) Measuring system filling medium Füllmedium Messsystem	
1	Silicone oil
2	Halogenized filling oil for oxygen applications
(9) Flange screws	
2	CrNi (stainless steel)

^a Please specify the measurement range to be set and the dimensional unit in plain text.

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

4 Instrument identification

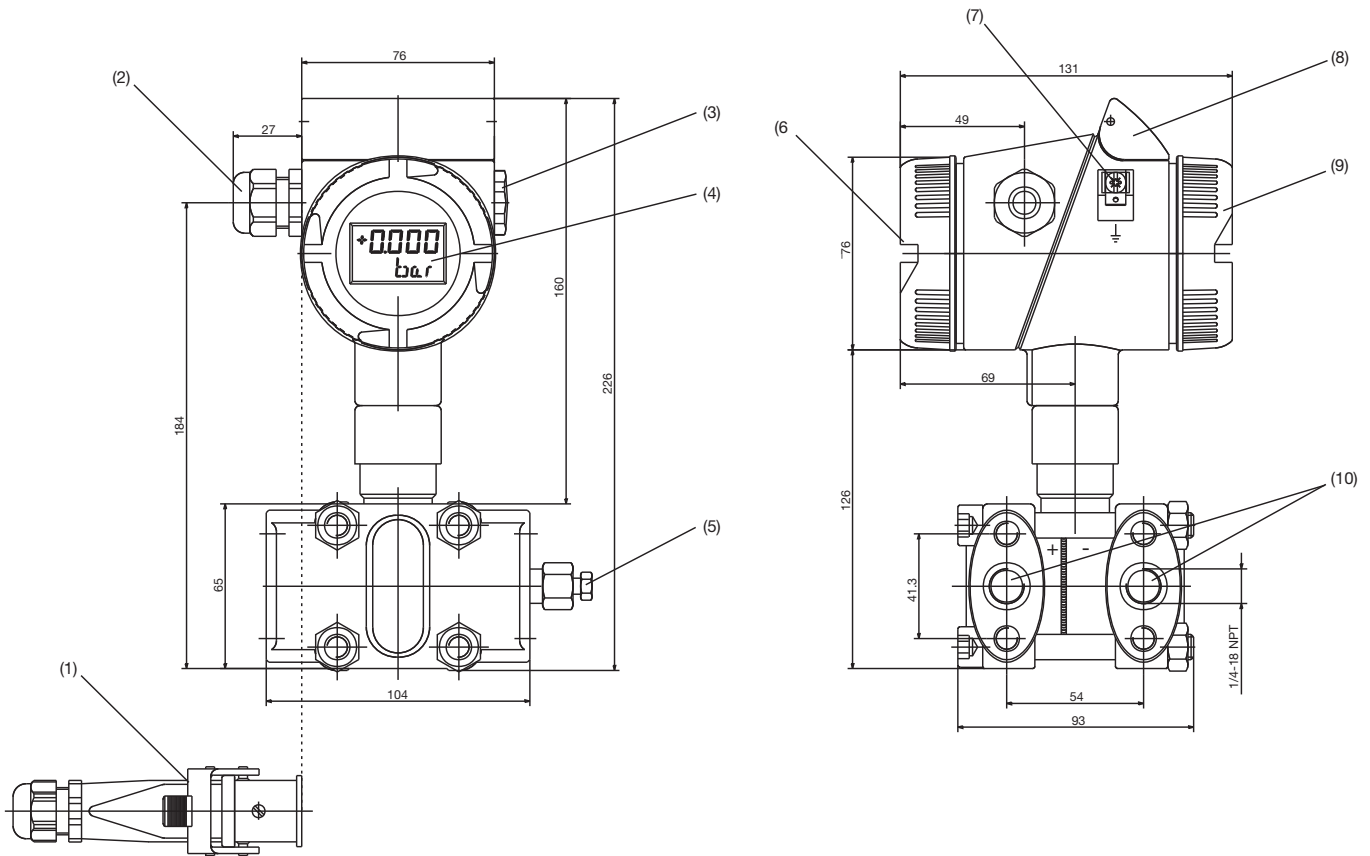
4.3 Accessories

Description	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

4 Instrument identification

4.4 Dimensions/details




- (1) Electrical connection "2":
Harting connector Han 7D/Han 8D (8U)
- (3) Blanking plug
- (5) Vent screw

- (2) Electrical connection "1":
M20 × 1.5 cable gland
- (4) LCD display
- (6) Cover for electrical connection
- (8) Cover flap (keypad underneath)
- (10) Process connection 1/4"-18 NPT

5.1 For pressure transmitters without intrinsic safety

Range

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

v Chapter 4.1 „Nameplate“ 

For setting the measurement start or span:

- v "Measurement start, blind setting", page 43
- v "Measurement span, blind setting", page 44

Mechanical shock

50 g/11 msec

Mechanical vibration

5 g max. at 10 to 2000 Hz

Protection

with connecting cable: IP65 to EN 60529

Material of wetted components

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

Material of housing

aluminium die-casting GDAI Si 12

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
(at temperatures below -20 °C, the LCD display may not be readable).

Storage temperature

-40 to +85 °C

Nominal pressure


PN160
option: PN420

Overload limit

to DIN 16086
-1 bar and 4× full scale or
-1 bar and 2× full scale with ranges ≥ 100 bar

5 Technical data

Explosion protection

 II 1/2 G Ex ia IIC T6 Ga/Gb,
to EN 60079-0, EN 60079-11 and EN 60079-26

EC Type Examination Certificate

PTB 98 ATEX 2194

Permissible ambient temperature

Temperature class		
T4	T5	T6
+85 °C	+75 °C	+60 °C

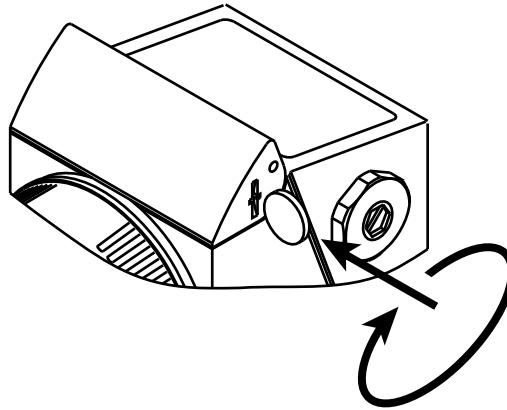
6.1 General

Open cover flap

The cover flap can be opened with a coin.

The keys for operating the dTRANS p02 DELTA can be found underneath the cover flap:

v Chapter 9.1 "The level concept", page 37ff



List of functions

* Affix one of the enclosed list of functions to the cover flap.

6.2 Prior to mounting



CAUTION!

De-pressurize the system before mounting the dTRANS p02 DELTA pressure transmitter!



NOTE!

The installation site should be readily accessible, as close as possible to the measurement point, and largely free from vibration. The permissible ambient temperature must be observed (note possible radiant heat).

The dTRANS p02 DELTA pressure transmitter may be mounted above or below the pressure tapping.



NOTE!

The measurement arrangements below serve as an example and can be altered according to the requirements of the measurement task.

6 Mounting

Operating position

The nominal operating position of the dTRANS p02 DELTA pressure transmitter is vertically upright.

Depending on the conditions of the measurement site, the transmitter can also be mounted in a different orientation. In accordance with the desired operating position, the LCD display can be rotated in 90° steps:

v Chapter 11.1 "Rotating the LCD display", page 49

6.3 Mounting by the valve block

**NOTE!**

The triple valve block to DIN 19213 is supplied as an option, part no. 00308191.

- * Fix the valve block to a wall, a frame or a support pipe using the mounting plate .
- * Screw the pressure transmitter to the valve block by means of four M8 x 20 screws.

6.4 Mounting by the angle bracket for fixing to a wall or pipe

**NOTE!**

The angle bracket for wall/pipe mounting is supplied as an option, part no. 00314729.

- * Use two screws to fix the angle bracket to a wall or frame, or to a vertical or horizontal support pipe (50 to 60 mm dia.) by using a pipe clamp.
- * Use four screws to fix the pressure transmitter to the angle bracket.

6.5 Pressure connection

**CAUTION!**

Please check before the installation if the transmitter for differential pressure complies with the operating conditions (dimensions, process connection, material, measuring span).

The process connection is a 1/4-18 NPT female thread, or an oval flange.

The differential-pressure transmitter can be shut off, for instance by a triple valve block, sales no. 00308191 (option).

The pressure lines have to be arranged as seamless steel tubes 12 mm x 1.5 mm.

6.6 Use inside the Ex area

**DANGER!**

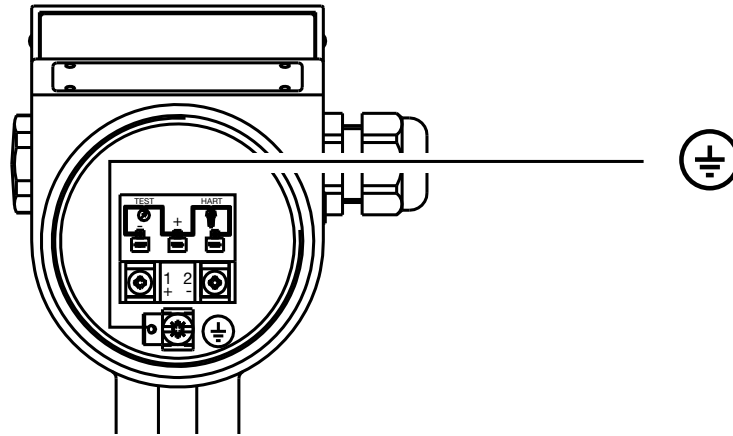
If the transmitter for differential pressure is used inside the Ex area, the regulations for the installation and operation of equipment inside areas with an explosion hazard must be observed!

6 Mounting

7.1 Electrical connection

**NOTE!**

Ground the device!



* Unscrew housing cover.

v "Unscrewing the bezel ring or housing cover", page 47

General notes

- Cable diameter 6 to 12 mm
- Conductor cross-section up to 1.5 mm²
- Route signal lines separately from cables with voltages above > 60 V
- Use shielded cables with twisted cores
- Avoid the vicinity of large electrical systems
- The full specification according to HART[®], version 5.1, will only be achieved with shielded cables

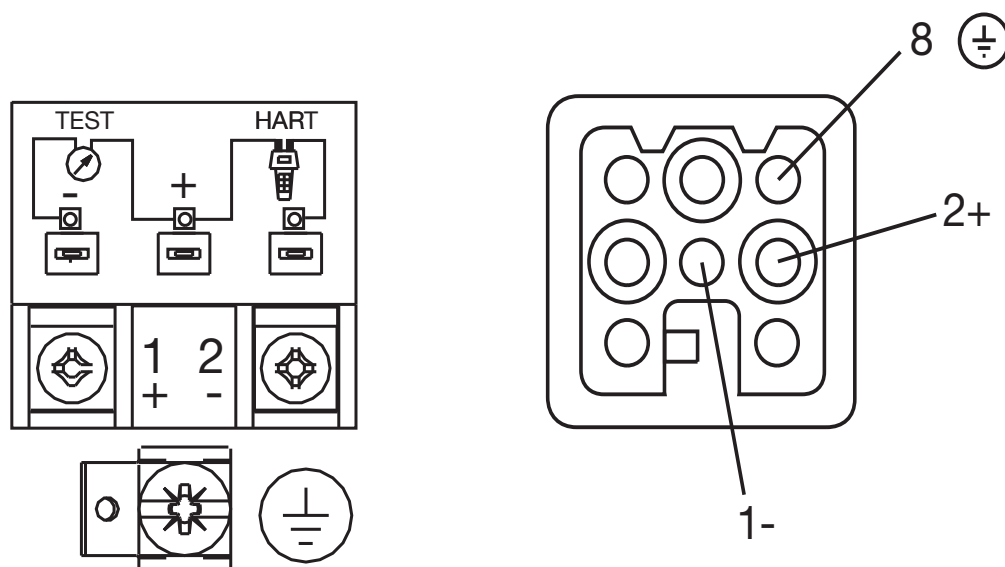
**NOTE!**

Equipment for potentially explosive areas which contain hybrid mixtures has to be especially checked for this use. Hybrid mixtures are potentially explosive mixtures out of combustible gases, vapors, or mists with combustible dust. The operator bears the responsibility of checking if the equipment is suitable for such uses.

7 Installation

7.1.1 Connection with screw terminal/Harting connector Han 7D/Han 8D (8U)

Connection arrangement



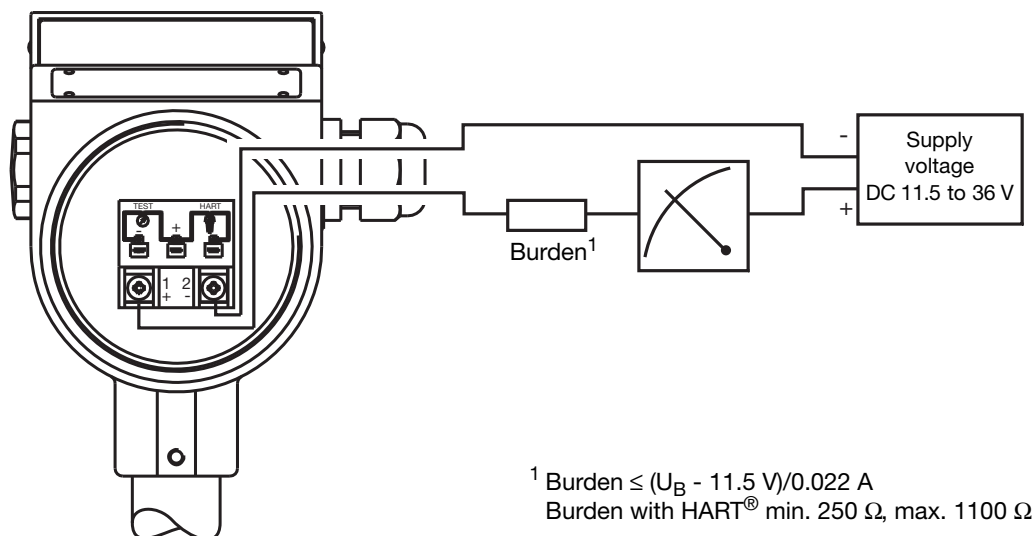
Screw terminals

Harting connector

Assignment of terminals

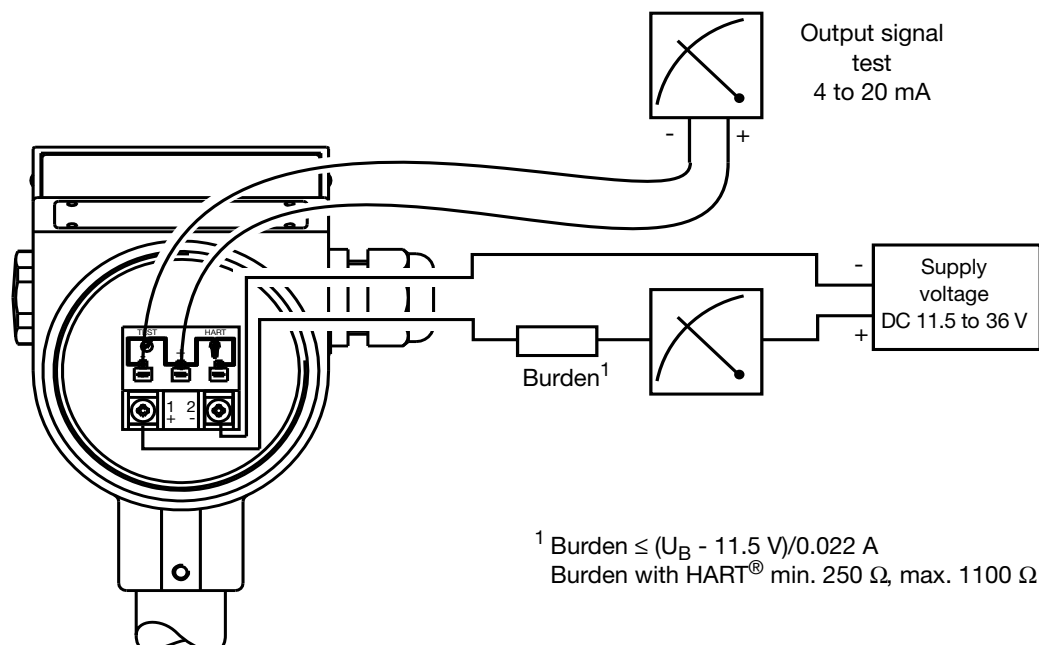
Connection		Terminals
Supply 11.5 to 36 V DC	$\begin{array}{c} + \\ - \end{array} \rightarrow \bigcirc$	1 L+ 2 L-
Output 4 to 20 mA, 2-wire	$\begin{array}{c} + \\ - \end{array} \bigcirc \rightarrow$	1 L+ Proportional current 2 L- 4 to 20 mA in supply
Test connection for current output	Internal resistance of ammeter $\leq 10 \Omega$	TEST + TEST -
Test connection for HART®	Burden must be pre- sent!	TEST + HART®
Potential equalization (with intrinsically-safe circuit)		$\bigcirc \perp$
Shielding		$\bigcirc \perp$
Caution: Ground the device! (Pressure connection and shielding)		

Connection



- * Unscrew the housing cover.
- * Chapter 10.1 "Unscrewing the bezel ring or housing cover", page 47
- * Push connecting cable through cable gland.
- * Make the connection according to the connection diagram.
- * Close the housing cover.

7.2 Testing the output signal



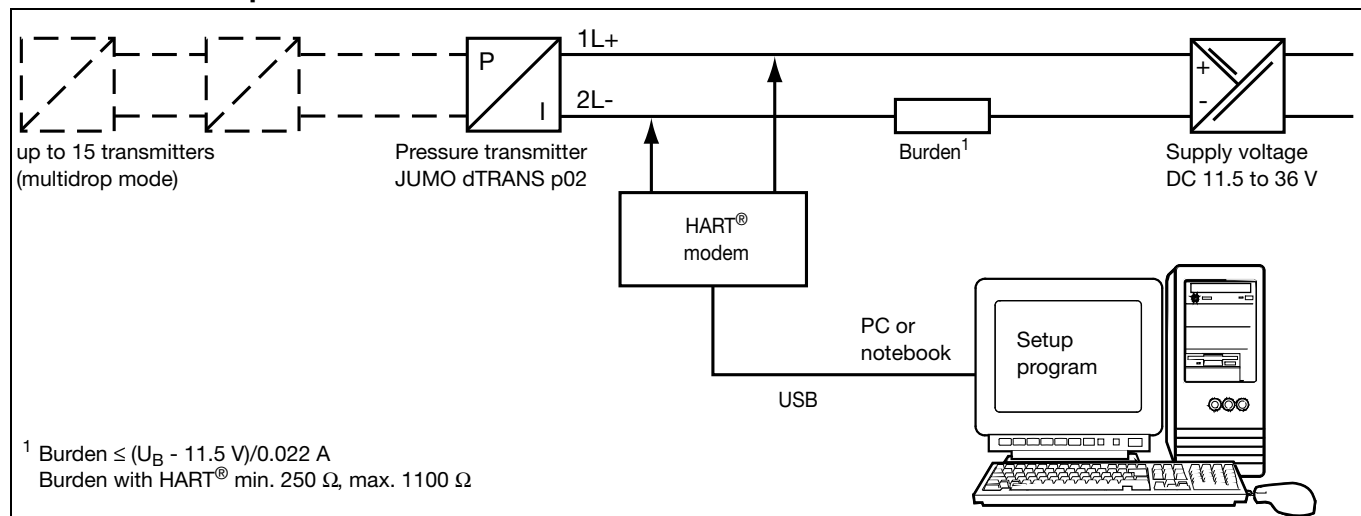
NOTE!

Test connection via faston connectors 2.8 x 0.8 mm or test terminals.

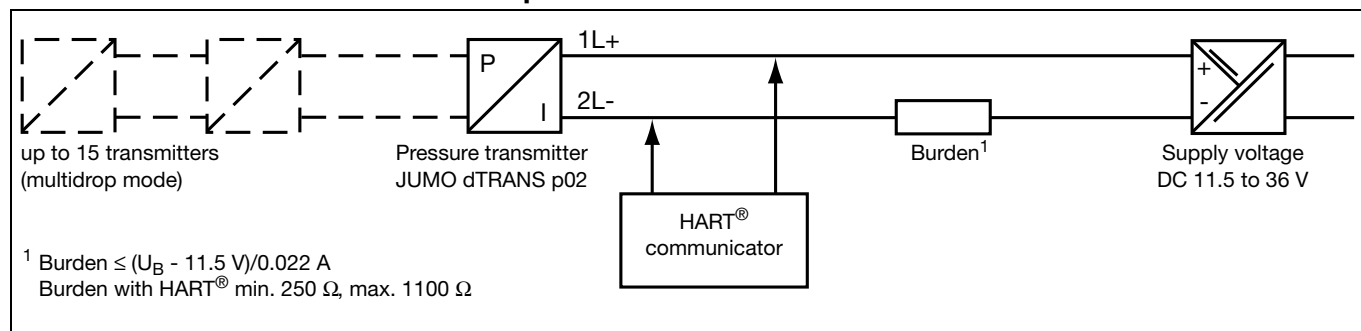
7 Installation

7.3 Connection of a HART® modem

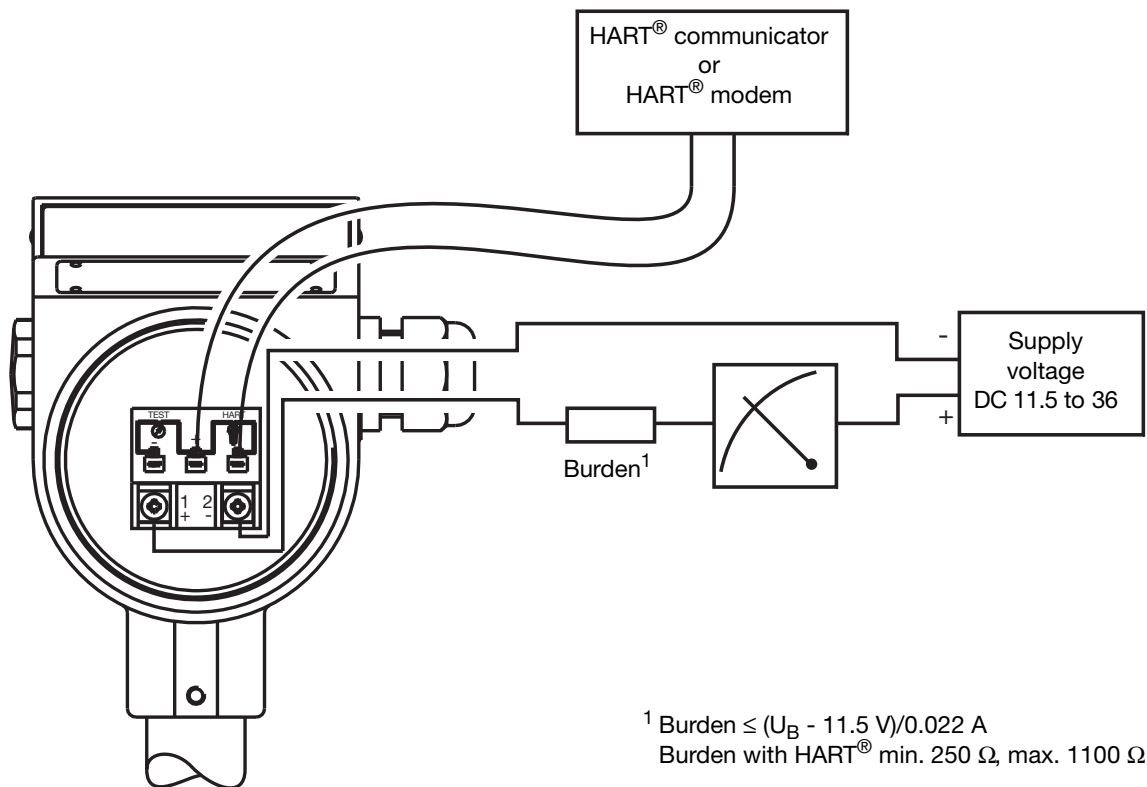
between PC and pressure transmitter



between HART® communicator and pressure transmitter



7.4 Testing the HART® communication



HINWEIS!

Test connection via faston connectors 2.8 mm × 0.8 mm or test terminals.

7 Installation

7.5 Electrical connection in the hazardous (Ex) area

General

The appropriate regulations must be observed when making the electrical connection; inside the area with an explosion hazard these are, in particular:

- The regulations concerning electrical equipment in areas with an explosion hazard (Elex V)
- The regulation for the installation of electrical equipment in areas with an explosion hazard EN 60079-14)
- EC Type Examination Certificate

Only certified measuring devices may be used in intrinsically safe circuits!



DANGER!

The HART[®] modem must not be used inside the hazardous area!

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

U_i: 30 V DC

I_i: 100 mA

P_i: 750 mW

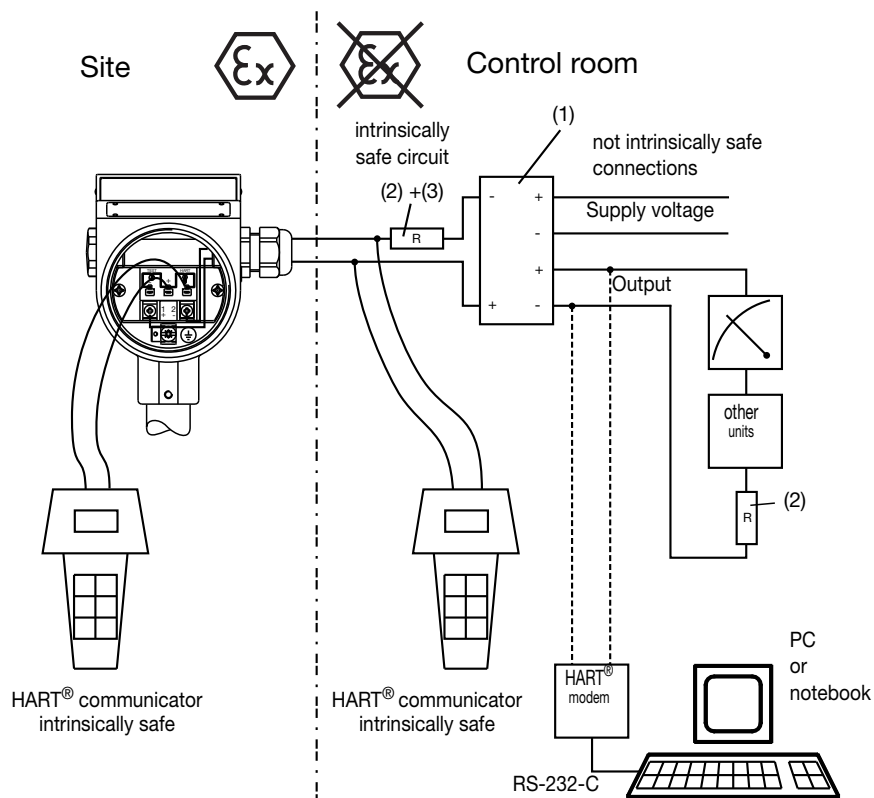


NOTE!

The connection of a HART[®] communicator or a HART[®] modem is optional.

For fault-free communication, the signal circuit has to be loaded with a minimum burden of 250 Ω. When supply isolators are used, the burden will, in most cases, be already integrated.

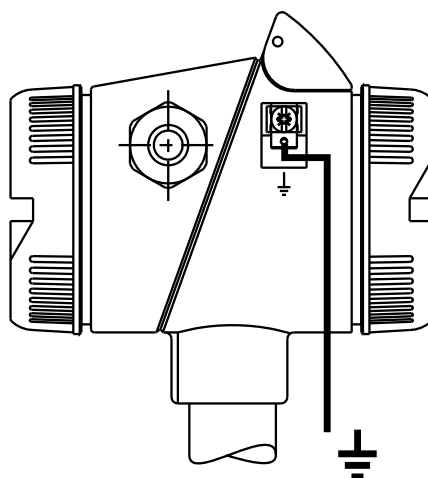
7.5.1 Connection diagram “EX”



- (1) Supply unit with isolating transformer for connecting transmitters with explosion protection
- (2) Total resistance for HART® communicator or HART® modem: minimum 250 Ω , maximum 1100 Ω . The current limiting resistor which is integrated in the supply unit must be included in this calculation.

PE connection

For operating the pressure transmitter inside the Ex area, it must be earthed via the external ground terminal. In addition, the ground terminal inside the housing can be used to connect the cable shielding.



7 Installation

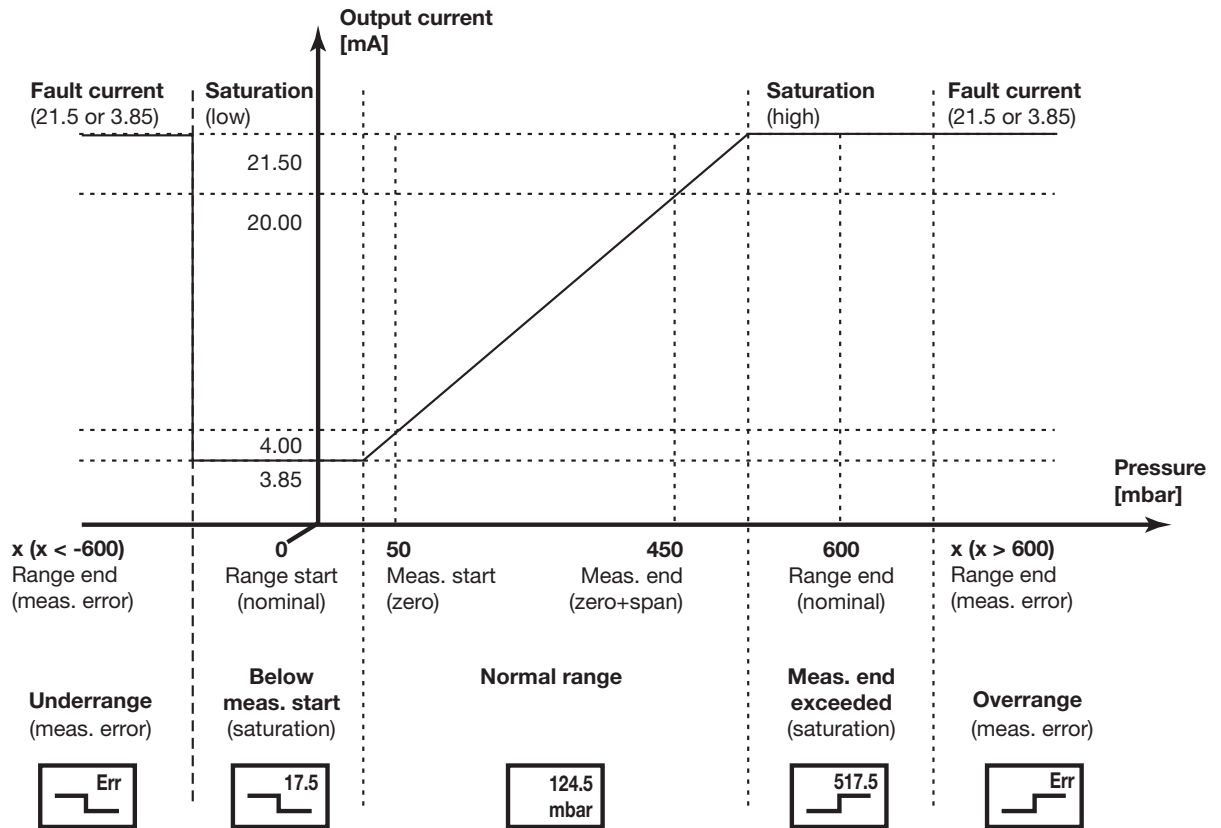
8.1 Characteristic

Output signal and display

Example:

Nominal range 0 to 600 mbar.

Range setting 50 to 450 mbar



(a) linear characteristic

(b) square-root characteristic

Range limits

Depending on the range setting and the applied pressure, the output signal can lie within different ranges:

- Normal range (the example shows the linear correlation between pressure and output signal)
- Saturation range
- Measurement error range

The different ranges are shown in the display as different symbols,

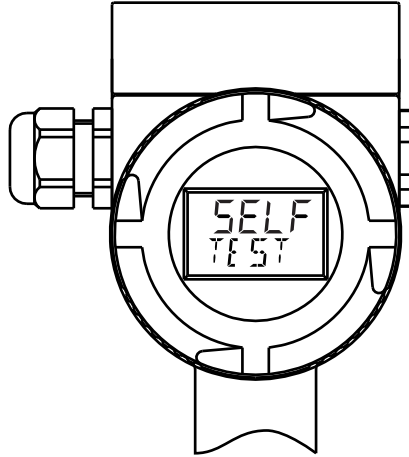
v see above

8 Commissioning

8.2 Self-test

Active

After the supply has been switched on, the differential-pressure transmitter carries out a self-test.

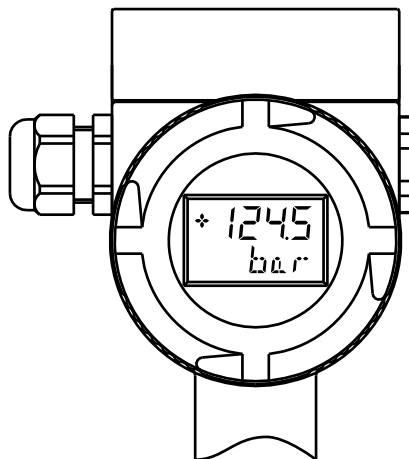


OK

If the result of the self-test is positive, the display that was most recently selected will be shown at the display level after approx. 20 seconds (on new differential-pressure transmitters, the display "Pressure with unit").

v Chapter 9.1 "The level concept", page 37ff

The 4 to 20 mA signal that is available at the output is proportional to the pressure.



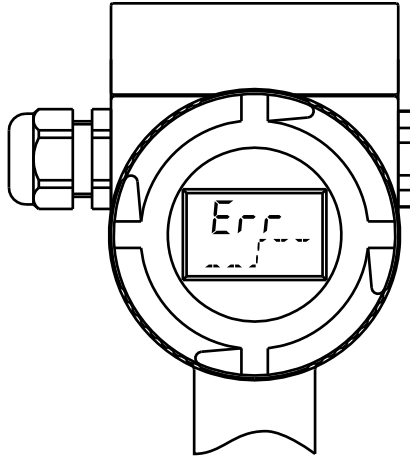
Error

On over/underrange an error signal appears,

v see below

and

v Chapter 12.1 "Trouble-shooting", page 51.



8.3 Warnings



DANGER!

If the purge valve (or vent screw) and/or the cover screw are missing or not tight enough, and/or the valves are handled wrongly or without due care, this may result in injuries or material damage!



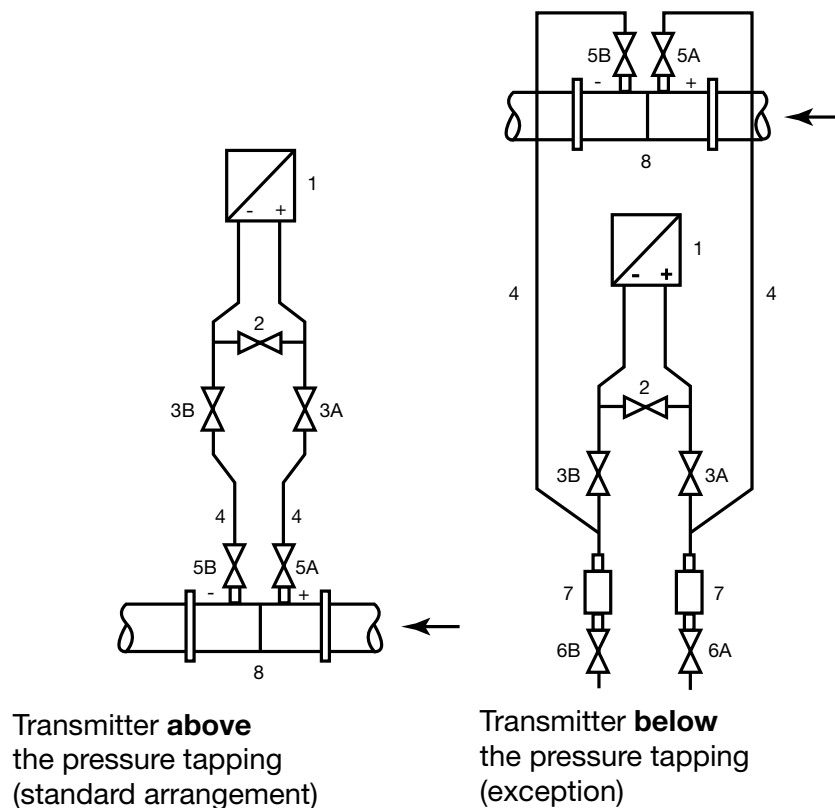
DANGER!

When dealing with hot measurement media, the individual steps must be carried out quickly one after another. If this is not done, it may lead to impermissible overheating, with consequent damage to the valves and the pressure transmitter.

8 Commissioning

8.4 Measuring the differential pressure

Gases



- | | |
|-----------------------|-------------------------------------|
| (1) Transmitter | (2) Balancing valve |
| (3) Pressure valves | (4) Pressure lines |
| (5) Shut-off valves | (6) Blow-down valves |
| (7) Condensation pots | (8) Differential pressure flowmeter |

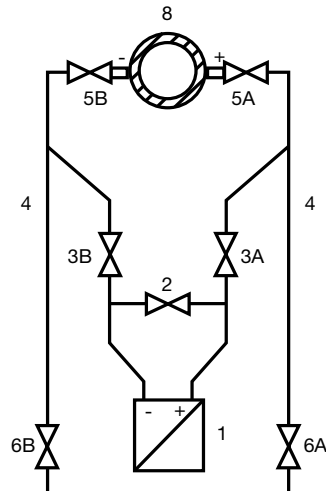
Pressure application

Initial state: all valves closed.

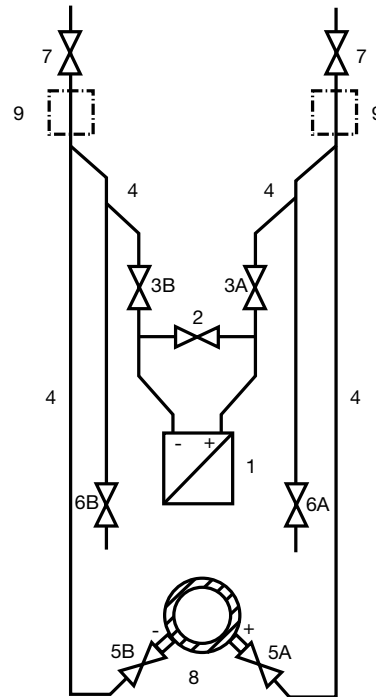
Operate the shut-off fittings in the following order:

- * Open both shut-off valves (5) at the pressure tapping.
- * Open balancing valve (2).
- * Open pressure valve (3A or 3B).
- * At measurement start 0 bar, check the zero (4 mA) and adjust, if necessary.
v "Zero adjustment", page 44
- * Close the balancing valve (2).
- * Open the other pressure valve (3A or 3B).

Liquids



Transmitter **below**
the pressure tapping
(standard arrangement)



Transmitter **above**
the pressure tapping
(exception)

- | | |
|---------------------|-------------------------------------|
| (1) Transmitter | (2) Balancing valve |
| (3) Pressure valves | (4) Pressure lines |
| (5) Shut-off valves | (6) Blow-down valves |
| (7) Purge valves | (8) Differential pressure flowmeter |
| (9) Gas collector | |

Pressure application

Initial state: all valves closed.

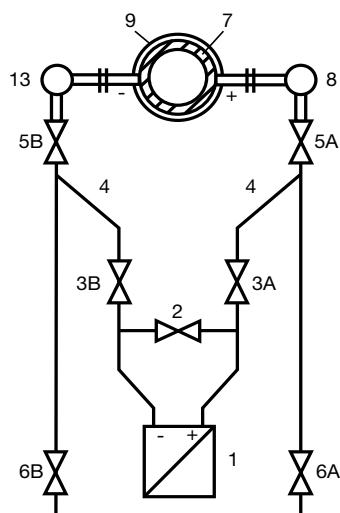
Operate the shut-off fittings in the following order:

- * Open both shut-off valves (5) at the pressure tapping.
- * Open balancing valve (2).
- * With the transmitter below the differential pressure flowmeter:
slightly open both blow-down valves (6), one after another, until gas-free liquid appears.
- * With the transmitter above the differential pressure flowmeter:
slightly open both purge valves (7), one after another, until gas-free liquid appears.
- * Close both blow-down valves (6) or purge valves (7).
- * Slightly open pressure valve (3A) and purge valve on the positive side of the transmitter (1), until gas-free liquid appears.
- * Close purge valve.

8 Commissioning

- * Slightly open purge valve on the negative side of the pressure transmitter (1), until gas-free liquid appears.
- * Close pressure valve (3A)
- * Slightly open pressure valve (3B), until gas-free liquid appears; then close it.
- * Close purge valve on the negative side of the pressure transmitter (1).
- * Open pressure valve (3A) by half a turn.
- * At the measurement start 0 mbar, check the zero (4 mA) and adjust, if necessary.
- v "Zero adjustment", page 44
- * Close balancing valve (2).
- * Fully open pressure valves (3A and 3B).

Vapors



- | | |
|-------------------------------------|--------------------------------------|
| (1) Transmitter | (2) Balancing valve |
| (3) Pressure valves | (4) Pressure lines |
| (5) Shut-off valves | (6) Blow-down valves |
| (7) Differential pressure flowmeter | (8) Pressure equalization reservoirs |
| (9) Insulation | |

Pressure application

Initial state: all valves closed.

Operate the shut-off fittings in the following order:

- * Open both shut-off valves (5) at the pressure tapping.
- * Open balancing valve (2).
- * Wait until vapor has condensed in the pressure lines (4) and the pressure equalization reservoirs (8).
- * Slightly open pressure valve (3A) and purge valve on the positive side of the transmitter (1), until gas-free condensate appears.

- * Close purge valve.
- * Slightly open purge valve on the negative side of the transmitter (1), until gas-free condensate appears.
- * Close pressure valve (3A)
- * Slightly open pressure valve (3B), until gas-free condensate appears; then close it.
- * Close purge valve on the negative side of the transmitter (1).
- * Open pressure valve (3A) by half a turn.
- * At measurement start 0 mbar, check zero (4 mA) and adjust, if necessary.
- v "Zero adjustment", page 44
- * Close balancing valve (2).
- * Fully open pressure valves (3A and 3B).

**DANGER!**

The measurement result is only accurate if the pressure lines (4) contain condensate columns of equal height and at equal temperature.

If necessary, repeat the zeroing operation when these conditions are fulfilled.

If the balancing valve (2) is opened while the shut-off valves (5) and pressure valves (3) are open, the transmitter (1) may be damaged by the vapor flow.

8 Commissioning

9.1 The level concept

Two levels

In order to make the operation of the JUMO dTRANS p02 DELTA differential-pressure transmitter simple and transparent, the transmitter functions have been divided into two levels.

Both levels can be accessed from the keypad of the transmitter.

**NOTE!**

The keypad can be found underneath the cover flap of the differential-pressure transmitter.

▼ "Open cover flap", page 17

**NOTE!**

As an alternative to operation from the keys, all the measured values and parameters can be easily displayed and/or set up using the setup program. The setup program is available on request, at extra cost.

▼ "Setup program", page 9

Display level

In normal operation, the instrument is in the display level.

The display options are: pressure, measurement, output current, sensor temperature or peak-reading pointer. Step on with the ▲ or ▼ keys.

**NOTE!**

After applying the supply voltage, and after the end of the self-test, the instrument is in the display level. The display that was most recently selected will be shown (for new instruments ex-works, this is "Pressure with unit").

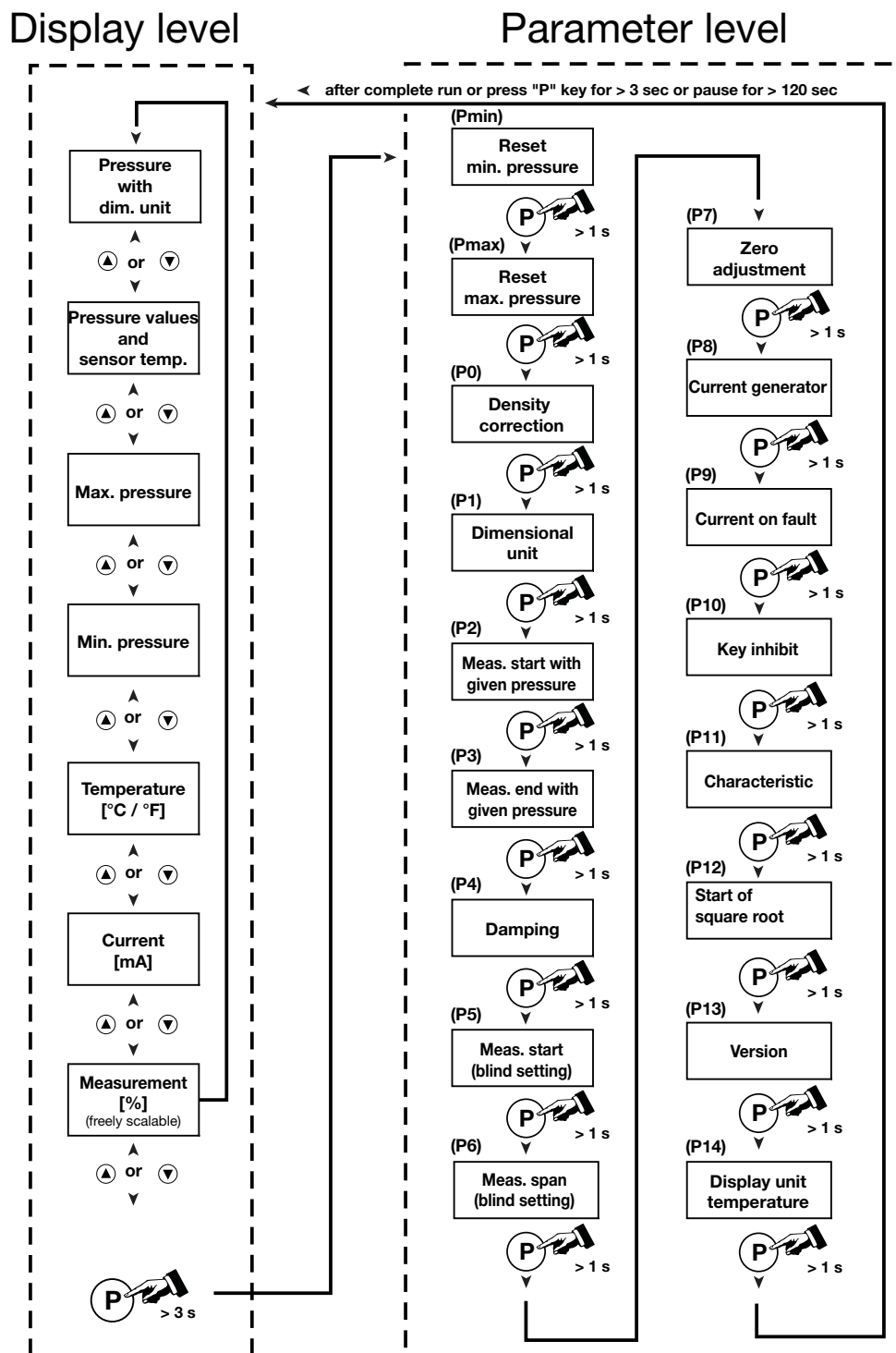
Parameter level

At this level, the parameters that can be checked or altered include the following: measurement start, measurement end, zero, dimensional unit, damping and output current in a fault situation.

9 Adjustment options

9.2 Sequence for keypad operation

Layout



NOTE!

Every altered value is accepted after modification (signalled by a brief display switch-off).
The function "Adjust zero point" is inactive on transmitters for absolute pressure.








9.3 Display level




NOTE!

After switching on the differential-pressure transmitter, the last display that was selected at the display level will be shown.

Sequence






























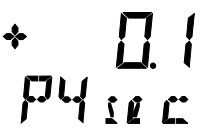


Action ^a	Function	Display (Example)
	Display of pressure with dimensional unit	+ 1422 bar
	Display of pressure value and sensor temperature in the units selected	+ 1422 23.1
	Display of the stored maximum pressure	+4.730 mbar
	Display of the stored minimum pressure	-0.354 mbar
	Display of the sensor temperature in °C or °F	+ 23.1 °C
	Display of the output current in mA	+ 13.1 mA
	Display of the measurement in % ^b or scaled with choice of dimensional unit	+ 56.9 %

^a The sequence can also be stepped through in the opposite direction by using the  key.























^b Factory setting: measurement in %. On request, freely scaleable through setup program (0 to 100 % as -9999 to +9999). Unit can be set (maximum 5 digits, restricted ASCII character set).

9 Adjustment options



















9.4 Parameter level

Action	Function	Display (Example)	Possible setting	with keys	"Detailed explanations", page 43ff
 > 1 second	Reset the stored minimum pressure		reset	 +  > 2 seconds	"Peak-reading pointer", page 43
 > 1 second	Reset the stored maximum pressure		reset	 +  > 2 seconds	"Peak-reading pointer", page 43
 > 1 second	Display and set density correction		0.100 to 5.000	 or 	"Unit of temperature display", page 45
 > 1 second	Display and set dimensional unit of pressure		mbar bar psi mmHg mmH ₂ O ftH ₂ O inHg inH ₂ O mH ₂ O MPa Torr kPa kgcm ²	 or 	"Dimensional unit", page 43
 > 1 second	Display or set output current at measurement start (with pressure input)		3.85 to 21.50 mA 4 mA	 or   +  > 2 seconds	"Output current, measurement start and end", page 43
 > 1 second	Display or set output current at measurement end (with pressure input)		3.85 to 21.50 mA 20 mA	 or   +  > 2 seconds	"Output current, measurement start and end", page 43
 > 1 second	Display or set damping (time constant)		0.0 to 100.0 sec	 or 	"Damping", page 43

9 Adjustment options

Action	Function	Display (Example)	Possible setting	with keys	"Detailed explanations", page 43ff
 > 1 second	Display or set measurement start (blind setting)		-110 % to +110 %	 or 	"Measurement start, blind setting", page 43
 > 1 second	Display or set measurement span (blind setting)		-210 % to +210 % of nominal range	 or 	"Measurement span, blind setting", page 44
 > 1 second	Zero adjustment		0.000	 +  > 2 seconds	"Zero adjustment", page 44
 > 1 second	Set and activate current generator		Select: 3.85 mA 4.00 mA 12.00 mA 20.00 mA 21.50 mA and: activate	 or   +  > 2 seconds	"Current generator", page 44
 > 1 second	Display and set output current in fault situation		21.5 mA 3.85 mA	 or 	"Output current in fault situation", page 44

9 Adjustment options

Action	Function	Display (Example)	Possible setting	with keys	"Detailed explanations", page 43ff
 > 1 second	Display and set key inhibit		0: no inhibit LA: all inhibited LALL: all inhibited (adjustable via setup program only) LS: all inhibited except measurement start and end LO: all inhibited except measurement start	 or 	"Keys inhibited", page 44
 > 1 second	Display and set characteristic		Lin: linear SLin: square root, linear up to starting point SoFF: square root, switched off up to starting point	 or 	"Characteristic", page 45
 > 1 second	Display and set starting point of square-root characteristic in percent of range		5.0 % to 15.0 %	 or 	"Characteristic", page 45
 > 1 second	Display instrument version				"Instrument version", page 45
 > 1 second	Display and set unit of temperature		°C °F	 or 	"Unit of temperature display", page 45

9.5 Detailed explanations

Peak-reading pointer

Minimum and maximum pressures are saved. Both values can be individually indicated and deleted.

**NOTE!**

If the damping is set to 0.0 sec, minimum and maximum pressures will not be saved.

✓ "Detailed explanations", page 43

If the damping is 0.0sec or after a reset of the display,
"- - - -" will be shown.

Density correction

Density correction is important for hydrostatic level measurement for media with densities other than 1 (e.g. pure water).

Possible range setting: 0.100 to 5.000 (kg/dm³).

Example:

Range: 0 to 1 bar

Scaling: 0 to 100 % => 0 to 5000 l

Medium	Density	Measured pressure	Output current	LCD display
Water	1.0	0.5 bar	12 mA	2500 liters
Gasoline	0.8	0.5 bar	14 mA	3125 liters

Dimensional unit

The pressure can be indicated directly in bar or in another pressure unit.

Output current, measurement start and end

The output current in mA that is present at the start (or end) of the measurement can be set within the range +3.85 to +21.5 mA. At the same time, the pressure applied is saved as measurement start or end.

Damping

To dampen an unsteady display caused by rapidly changing pressures, the time constant for the display, T_{63} , can be adjusted from 0.0 to 100.0sec.

**NOTE!**

At a damping of 0.0 sec, the pressure transmitter will **not** save the minimum and maximum pressures, i.e. the peak-reading pointer function is switched off.

Measurement start, blind setting

The measurement start can be set in % of the nominal range. The nominal range is given on the nameplate.

✓ "Nameplate", page 11

Example:

The pressure transmitter has a nominal range of 0 to 25 bar, the output signal needs to be proportional in the range 5 to 20 bar.

9 Adjustment options

The necessary setting for the measurement start is derived as follows:

Nominal range:	0 to 25 bar
Desired measurement start:	5 bar corresponds to 20 % of the nominal range
Setting:	20 %

Measurement span, blind setting

The measurement span can be set in % of the nominal measurement range.

Example 1:

The pressure transmitter has a nominal measurement range from 0 to 25 bar, but the output signal needs to be proportional in the range 5 to 20 bar.

The necessary setting for the measurement span is derived as follows:

Nominal range:	0 to 25 bar
Desired range:	5 to 20 bar => desired span: 15 bar
Desired span:	15 bar corresponds to 60 % of the nominal range
Setting:	60 %

Example 2:

Nominal range:	0 to 600 mbar
Desired range:	-300 to +300 mbar
Measurement start:	-50 %
Span:	100 %

Zero adjustment

When a zero adjustment is made, the transmitter display is set to 0.000. The preset measurement start remains unaffected.

Setting the measurement start:

√ "Output current, measurement start and end", page 43

Current generator

If the "Current generator" function is selected at the parameter level, an adjustable constant current is present at the transmitter output.



NOTE!

There is no time-out for this function; the current can remain indefinitely.

This function can only be ended by pressing the **(P)** key. It is **not** possible in multidrop operation.

√ Chapter 7.3 "Connection of a HART® modem", page 24

In this case, a constant current of 4 mA is present at the output.

Output current in fault situation

In order to indicate measurement errors in the event of over/underrange, or other errors, (e.g. for a connected PLC), the pressure transmitter gives out either 3.85 mA or 21.5 mA.

√ "Output signal and display", page 29

Keys inhibited

To prevent unauthorized modification of parameters, some or all of the parameters can be inhibited.



NOTE!

To remove an inhibit (LA, L0, LS), the **(P)** key must be pressed for longer than 5 seconds in the display “Output current in fault situation” (P9).

The inhibit “LALL” can only be set or deleted in the setup program.

Characteristic

The characteristic of the output current can be selected as:

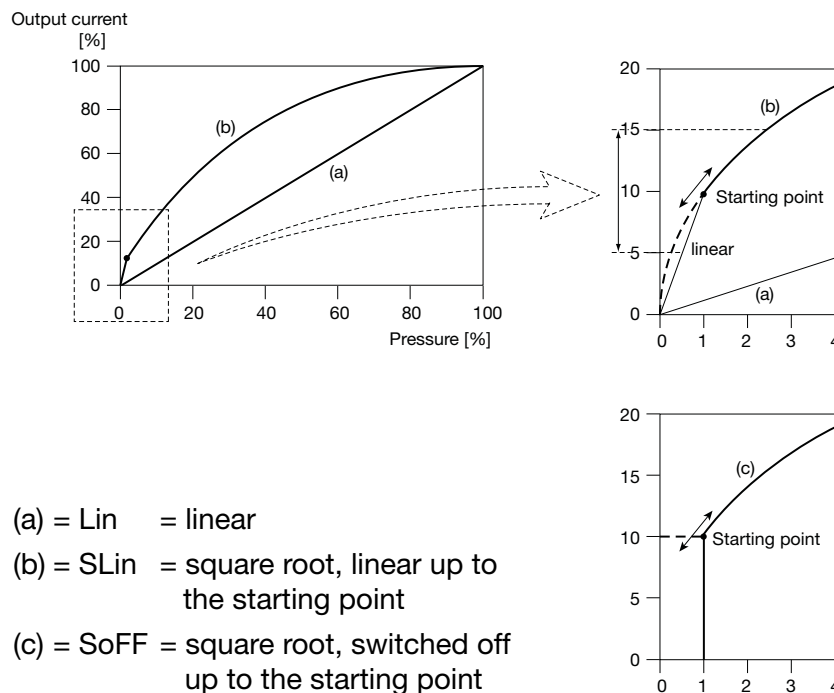
- Lin: linear (proportional to pressure).
- SLin: linear up to the starting point, then square root (proportional to flow).
- SoFF: square root (proportional to flow), but switched off up to the starting point.



NOTE!

The starting point of the square-root characteristic can be adjusted between 5.0 and 15.0 % of the output current.

Characteristics



Instrument version

Display format: xx.yy

xx = hardware version

yy = software version

Unit of temperature display

The display unit of the measured sensor temperature can be selected as:

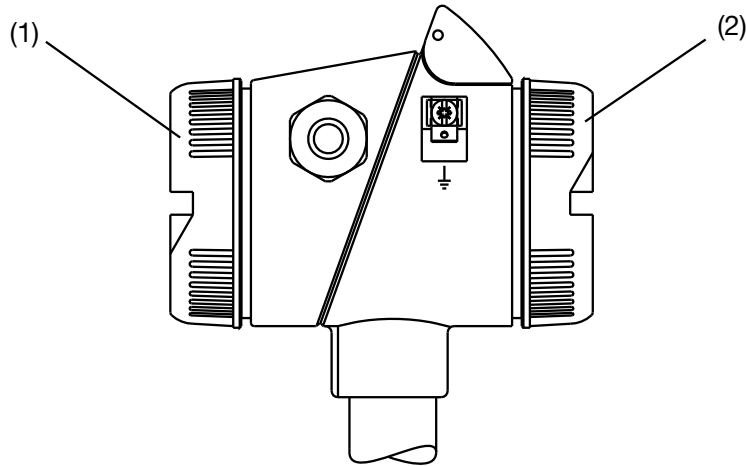
- °C
- °F

9 Adjustment options

10 Opening the instrument

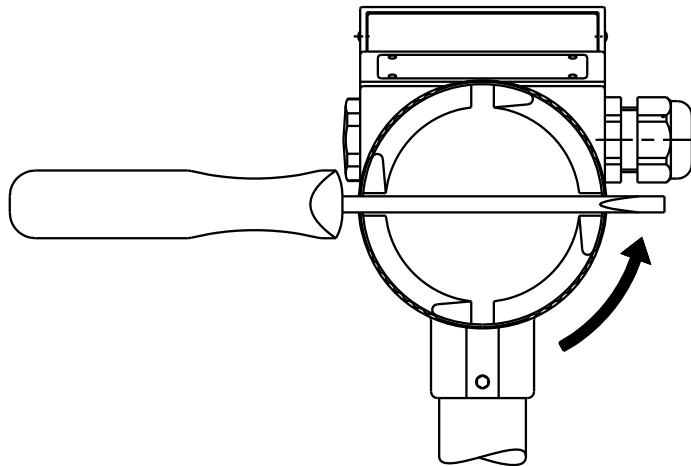
10.1 Unscrewing the bezel ring or housing cover

The bezel ring and the rear housing cover can be unscrewed.



(1) Housing cover

(2) Bezel ring



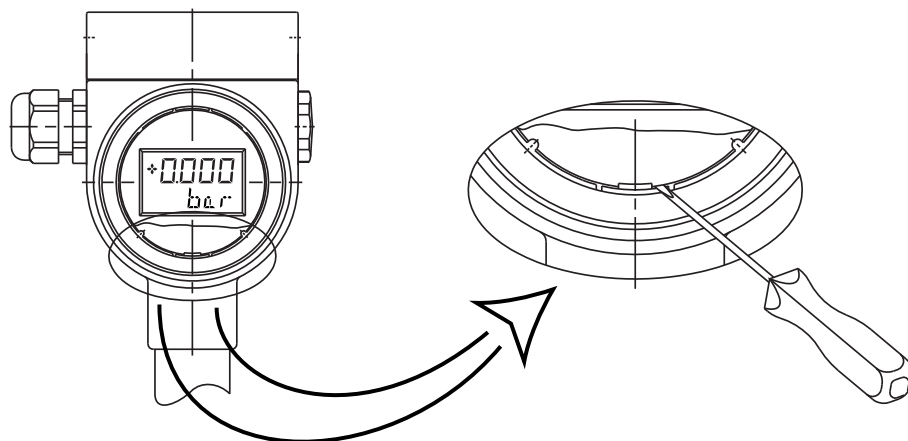
- * Open with a screwdriver
- * Close by hand **without** any tools

10 Opening the instrument

11 Rotating the instrument

11.1 Rotating the LCD display

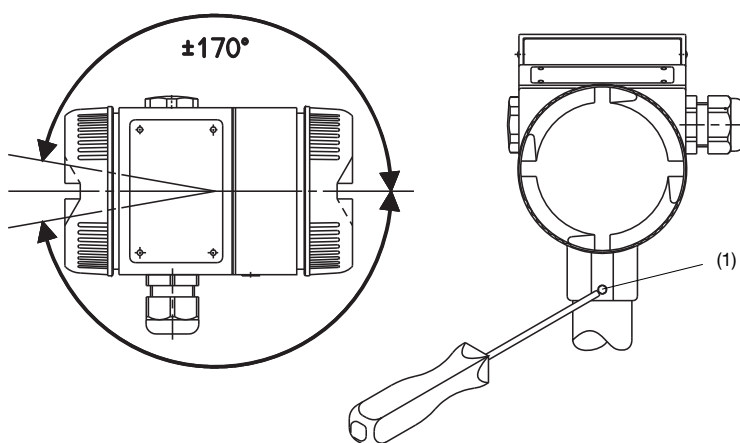
Depending on the required operating position, the LCD display can be rotated in 90° steps.



- * Unscrew the bezel ring.
- v "Rotating the LCD display", page 49
- * Use a small-bladed screwdriver to carefully push out the catch of the LCD fixing and lever out the display board.
- * Set the LCD display to the required position (90° steps) in the notches provided.
- * Screw on bezel ring finger-tight.
Rotate housing.

11.2 Rotating the housing



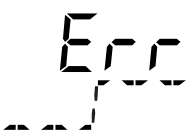



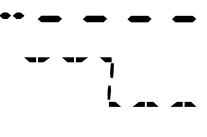


The housing can be rotated through $\pm 170^\circ$



- * Loosen the grub screw (1) with a 2 mm hexagon socket wrench (about half a turn is enough).
- * Rotate the housing into the required position.
- * Screw up grub screw **tightly**.

11 Rotating the instrument

12.1 Trouble-shooting

Error/fault	Possible cause	Remedy
Display: none	no supply voltage	switch on supply
	instrument faulty	send instrument to supplier for repair
Display: 	overrange, excessive pressure	bring pressure back to within range, or adjust range
Display: 	underrange, pressure too low	bring pressure back to within range, or adjust range
Display: 	pressure can no longer be measured; overrange, excessive pressure	bring pressure back to within range, or use instrument with a wider nominal range
	instrument faulty	send instrument to supplier for repair
Display: 	pressure can no longer be measured; underrange, pressure too low	bring pressure back to within range, or use instrument with a wider nominal range
	instrument faulty	send instrument to supplier for repair
Display: 	an error in the electronics was detected during the last self-test	send instrument to supplier for repair
Display: 	temperature probe faulty	send instrument to supplier for repair
Display: 	measurement span too small	increase span (at least 5 %) v "Measurement start, blind setting", page 43
	instrument faulty	send instrument to supplier for repair
Display: 	span too small	increase span (at least 5 %) v "Measurement start, blind setting", page 43
	instrument faulty	send instrument to supplier for repair
 key not responding	instrument faulty	send instrument to supplier for repair

12 Maintenance

 key or	keys inhibited	reset key inhibit v "Keys inhibited", page 44
 key not responding	instrument faulty	send instrument to supplier ^a for repair

^a You can find the suppliers' addresses on the back page of this operating manual.

13.1 Settings


NOTE!

Individual settings can be recorded in this table.

Function	LCD display	Factory setting	Customer's setting
Min. (peak-reading pointer)	P min	–	not adjustable
Max. value (peak-reading pointer)	P max	–	not adjustable
Density correction	P0	1.000	
Dimensional unit	P1	bar or mbar	
Measurement start	P2 mA	4.00	
Measurement end	P3 mA	20.00	
Damping	P4 sec	0.1	
Measurement start (blind setting)	P5 %	0 ^a	
Measurement span (blind setting)	P6 %	100 ^a	
Zero adjustment	P7	0.000	
Current generator	P8 mA	3.85	
Output current in fault situation	P9 mA	21.50	
Keypad/function locking	P10	0	
Characteristic	P11	Lin	
Starting point (EP = Entry Point)	P12 %	9.400	
Version display	P13	01.12	not adjustable
Display unit for temperature	P14	°C	

^a Different factory settings are possible in accordance with customer specifications!

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More than **sensors + automation**

EU-Konformitätserklärung

EU declaration of conformity / Déclaration UE de conformité

Dokument-Nr.

Document No. / Document n°.

CE 689

Hersteller

Manufacturer / Etabli par

JUMO GmbH & Co. KG

Anschrift

Address / Adresse

Moritz-Juchheim-Straße 1, 36039 Fulda, Germany

Produkt

Product / Produit

Name

Name / Nom

Typ

Type / Type

Typenblatt-Nr.

Data sheet no. / N°

Document

d'identification

JUMO dTRANS p02 DELTA

404382

404382

Wir erklären in alleiniger Verantwortung, dass das bezeichnete Produkt die Anforderungen der Europäischen Richtlinien erfüllt.

We hereby declare in sole responsibility that the designated product fulfills the requirements of the European Directives.

Nous déclarons sous notre seule responsabilité que le produit remplit les Directives Européennes.

Richtlinie 1

Directive / Directive

Name

Name / Nom

EMC

Fundstelle

Reference / Référence

2014/30/EU

Bemerkung

Comment / Remarque

Datum der Erstanbringung des CE-Zeichens auf dem Produkt

Date of first application of the CE mark to the product / Date

de 1ère application du sigle sur le produit

1998

Dokument-Nr.

Document No. / Document n°.

CE 689

EU-Konformitätserklärung

Seite: 1 von 4

14 Declaration of conformity

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Angewendete Normen/Spezifikationen

Standards/Specifications applied / Normes/Spécifications appliquées

Fundstelle

Reference / Référence

Ausgabe

Edition / Édition

Bemerkung

Comment / Remarque

EN 61326-1

2013

EN 61326-2-3

2013

Gültig für Typ

Valid for Type / Valable pour le type

404382/...

Richtlinie 2

Directive / Directive

Name

Name / Nom

ATEX

Fundstelle

Reference / Référence

2014/34/EU

Bemerkung

Comment / Remarque

Mod. B+D

**Datum der Erstanbringung des CE-Zeichens
auf dem Produkt**

*Date of first application of the CE mark to the product / Date
de 1ère application du sigle sur le produit*

1998

Angewendete Normen/Spezifikationen

Standards/Specifications applied / Normes/Spécifications appliquées

Fundstelle

Reference / Référence

Ausgabe

Edition / Édition

Bemerkung

Comment / Remarque

EN 60079-0

2012+A11:2013

EN 60079-11

2012

EN 60079-26

2015

Gültig für Typ

Valid for Type / Valable pour le type

404382/1-...

Dokument-Nr.
Document No. / Document n°.

CE 689

EU-Konformitätserklärung

Seite: 2 von 4

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More than **sensors + automation**

EU-Baumusterprüfbescheinigung 2.1

EU type examination certificate / Certificat d'examen de type UE

Fundstelle

Reference / Référence

PTB 98 ATEX 2194 Ausgabe: 1

Benannte Stelle

Notified Body / Organisme notifié

Physikalisch-Technische-Bundesanstalt (PTB)

Kennnummer

Identification no. / N° d'identification

0102

Anerkannte Qualitätssicherungssysteme der Produktion

Recognized quality assurance systems of production / Systèmes de qualité reconnus de production

Benannte Stelle

Notified Body / Organisme notifié

TÜV NORD CERT GmbH

Kennnummer

Identification no. / N° d'identification

0044

Richtlinie 3

Directive / Directive

Name

Name / Nom

RoHS

Fundstelle

Reference / Référence

2011/65/EU

Bemerkung

Comment / Remarque

Datum der Erstanbringung des CE-Zeichens auf dem Produkt

Date of first application of the CE mark to the product / Date de 1ère application du sigle sur le produit

2017

Angewendete Normen/Spezifikationen

Standards/Specifications applied / Normes/Spécifications appliquées

Fundstelle

Reference / Référence

Ausgabe

Edition / Édition

Bemerkung

Comment / Remarque

VDK Umweltrelevante Aspekte V1
bei der Produktentwicklung und
-gestaltung

Dokument-Nr.
Document No. / Document n°.

CE 689

EU-Konformitätserklärung

Seite: 3 von 4

14 Declaration of conformity

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More than **sensors + automation**

Gültig für Typ

Valid for Type / Valable pour le type

404382/...

Aussteller

Issued by / Etabli par

Ort, Datum

Place, date / Lieu, date

Rechtsverbindliche Unterschriften

Legally binding signatures /

Signatures juridiquement valable

JUMO GmbH & Co. KG

Fulda, 2018-06-15

Bereichsleiter Vertrieb Inland / Globales
Produkt- und Branchenmanagement
ppa. Dimitrios Charisiadis

Qualitätsbeauftragter und Leiter Qualitätswesen
i. V. Harald Gienger

Dokument-Nr.
Document No. / Document n°.

CE 689

EU-Konformitätserklärung

Seite: 4 von 4

15 Type Examination Certificate



Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut



(1) EU-TYPE EXAMINATION CERTIFICATE (Translation)

(2) Equipment or Protective Systems Intended for Use in
Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

PTB 98 ATEX 2194

Issue: 1

(4) Product: Pressure transducer, type dTRANS p02
and type dTRANS p02 DELTA

(5) Manufacturer: JUMO GmbH & Co. KG

(6) Address: Moritz-Juchheim-Straße 1, 36039 Fulda, Germany

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential Test Report PTB Ex 18-27147.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012 + A11:2013

EN 60079-11:2012

EN 60079-26:2015

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

(12) The marking of the product shall include the following:



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

Konformitätsbewertungsstelle, Sektor Explosionsschutz

Braunschweig, May 22, 2018

On behalf of PTB:

Dr.-Ing. F. Lienesch
Direktor und Professor



ZSEx001e c

sheet 1/3

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • GERMANY

15 Type Examination Certificate



- (13) SCHEDULE
- (14) EU-Type Examination Certificate Number PTB 98 ATEX 2194, Issue: 1
- (15) Description of Product

The pressure transducers of types dTRANS p02 and dTRANS p02 DELTA are used for the conversion of a measurand into an electrical standardized signal. The equipment is intended for the application inside the hazardous area.

The enclosure for the electronics system is installed in areas requiring equipment of category 2. The process connection elements are mounted into the partition that separates areas from each other where equipment of category 2 or category 1 is required.

The maximum permissible ambient temperature depends on the temperature class as follows:

Temperature class	Ambient temperature
T4	85 °C
T5	75 °C
T6	60 °C

Electrical data

- Supply circuit
(terminals P601 +, P602 -,
or plug connector)

type of protection Intrinsic Safety Ex ia IIC
only for connection to a certified intrinsically
safe circuit.
- Maximum values: $U_i = 30 \text{ V}$
 $I_i = 100 \text{ mA}$
 $P_i = 750 \text{ mW}$
 $C_i = 11 \text{ nF}$
 $L_i = 170 \text{ }\mu\text{H}$
- Display circuit

system-internal circuit of type of protection
Intrinsic Safety Ex ia IIC
- Sensor circuit

type of protection Intrinsic Safety Ex ia IIC, system-
internal or for connection to the associated sensor using
the associated permanently mounted cable.

sheet 2/3

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15 Type Examination Certificate



SCHEDULE TO EU-TYPE EXAMINATION CERTIFICATE PTB 98 ATEX 2194, Issue: 1

Modifications pertaining to previous editions

- Introduction of a new flexprint that interconnects the sensor unit and the electronic module.
- Revision of the type label
- Revision and actualization of the test documents
- Summarization of all specifications from the initial certificate and its supplements 1 through 5 as well as the modifications mentioned above, to represent the current state of production.

(16) Test Report PTB Ex18-27147

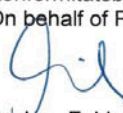
(17) Specific conditions of use
none

(18) Essential health and safety requirements
Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz
On behalf of PTB:

Braunschweig, May 22, 2018


Dr.-Ing. F. Lienesch
Direktor und Professor




sheet 3/3

EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • GERMANY

15 Type Examination Certificate

		产品中有害物质的名称及含量 China EEP Hazardous Substances Information						
产品组别 Product group: 404382		部件名称 Component Name						
		铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)	
外壳 Housing (Gehäuse)		○	○	○	○	○	○	
过程连接 Process connection (Prozessanschluss)		○	○	○	○	○	○	
螺母 Nuts (Mutter)		○	○	○	○	○	○	
螺栓 Screw (Schraube)		○	○	○	○	○	○	
<div>本表格依据SJ/T 11364的规定编制。 This table is prepared in accordance with the provisions SJ/T 11364. ○ : 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。 Indicate the hazardous substances in all homogeneous materials' for the part is below the limit of the GB/T 26572. × : 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。 Indicate the hazardous substances in at least one homogeneous materials' of the part is exceeded the limit of the GB/T 26572.</div>								



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