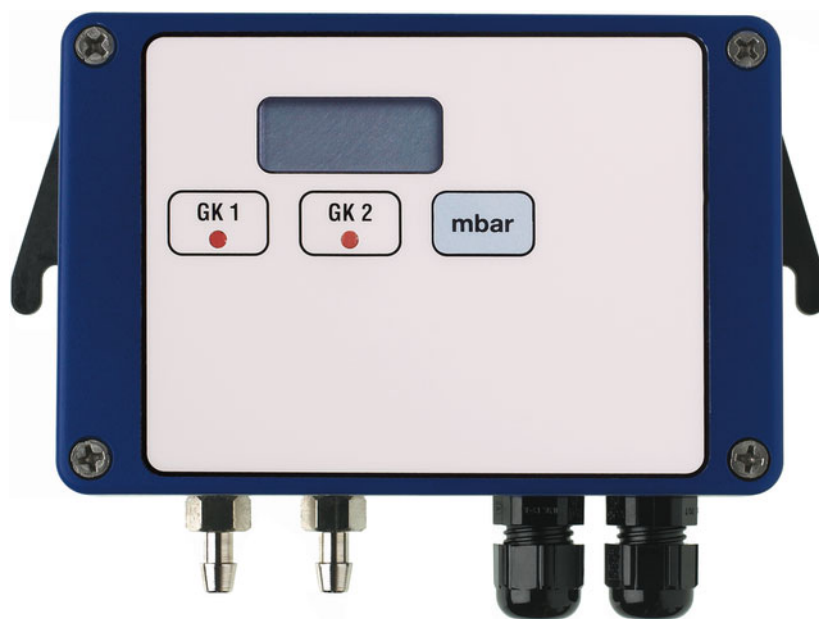


Pressure and differential pressure transmitters



Operating Instructions



40430400T90Z000K000

EN/00392602

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1 Typographical conventions

1.1 Warning signs



Danger

This sign is used when there may be **danger to personnel** if the instructions are disregarded or not followed accurately.



Caution

This sign is used when there may be **damage to equipment or data** if the instructions are disregarded or not followed accurately.

1.2 Note signs



Note

This sign is used when your **special attention** is drawn to a remark.



Reference

This sign refers to **further information** in other chapters or sections.

abc¹

Footnote

Footnotes are notes which **refer to certain points** in the text.

Footnotes consist of two parts:

Marking in the text and the footnote text.

The marking in the text is arranged as continuous superscript numbers.

*

Action

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

The individual steps are marked by this asterisk.

Example:

* Remove crosspoint screw

* Set potentiometer

2 General

2.1 Preface

Please read these Operating Instructions before commissioning the instrument. Keep the instructions in a place which is accessible to all users at all times.

Please assist us to improve these operating instructions, where necessary.

Your suggestions will be welcome.



All the necessary settings are described in this manual. However, if any difficulties should still arise during commissioning, you are asked not to carry out any unauthorized manipulations on the unit. You could endanger your rights under the instrument warranty!

Please contact the nearest subsidiary or the head office in such a case.



When returning modules, assemblies or components, the regulations to EN 100 015 "Protection of electrostatically sensitive components" must be observed. Use only the appropriate **ESD** packaging for transport.

Please note that we cannot accept any liability for damage caused by ESD (electrostatic discharge).

2 General

2.2 Application

General note

Pressure and differential pressure transmitters Type 404304 are used for measuring very low pressures.



Corresponding to the measuring range, the CuBe diaphragm inside the instrument is very sensitive.

Do not blow into the pressure connections, as this may damage or destroy the instrument.

The instrument is suitable for non-corrosive gases only.

The instrument has no Ex approval.

3 Identifying the device vision

3.1 Order details

	(1) Basic type
404304	Pressure transmitter with inductive measuring system
	(2) Basic type extensions
000	none
011	with one limit contact ^a
012	with two limit contacts ^a
013	LCD readout, 3 1/2-digit
014	with one limit contact and LCD readout, 3 1/2-digit ^a
015	with two limit contacts and LCD readout, 3 1/2-digit ^a
	(3) Nominal input range
396	0 to 10 Pa ^{a/b}
397	0 to 20 Pa ^{a/b}
398	0 to 30 Pa ^{a/b}
399	0 to 40 Pa ^{a/b}
400	0 to 0.5 mbar
401	0 to 0.6 mbar
402	0 to 1 mbar
403	0 to 1.6 mbar
404	0 to 2.5 mbar
405	0 to 4 mbar
406	0 to 5 mbar
407	0 to 6 mbar
408	0 to 10 mbar
409	0 to 16 mbar
410	0 to 25 mbar
411	0 to 40 mbar
412	0 to 50 mbar
413	0 to 60 mbar
414	0 to 100 mbar
415	0 to 160 mbar
420	950 to 1050 mbar, absolute ^c
421	900 to 1100 mbar, absolute ^c
422	800 to 1200 mbar, absolute ^c
423	800 to 1000 mbar, absolute ^c
451	0 to 0.25 bar
452	0 to 0.4 bar
453	0 to 0.6 bar
454	0 to 1.0 bar
488	0 to 1.0 bar, absolute ^c
999	Special measuring range

4 Mounting

Fixing

- * Use the lugs to fix the instrument.
-



The instrument should preferably be fixed vertically (pressure connections below), since it has been factory-calibrated in this position.

This ensures that no condensate from the pressure lines will enter the measuring system.

Do not install the instrument close to sources of interference (transformers, transmitters, motors) or heat sources.

Shock or vibration will lead to measurement errors.

5 Installation

5.1 Electrical connection



When connecting the instrument, please observe the VDE regulations concerning work with mains supply voltage, as well as the regulations of the trade insurance associations regarding work on and with electrical equipment and installations.



Never connect the supply voltage to the output terminals!

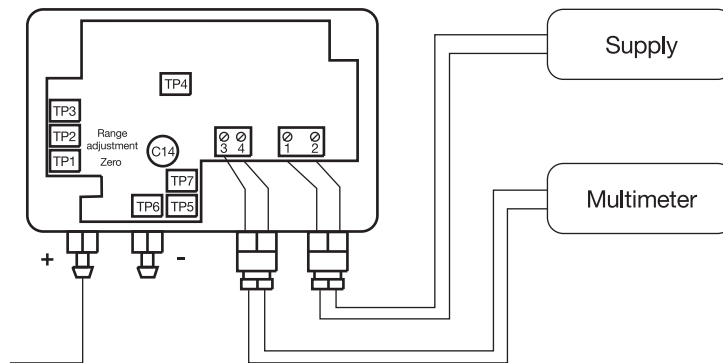
For the required supply voltage, see nameplate.

Instruments with DC supply have a reverse polarity protection.

Opening the instrument

- * Unscrew the four slotted screws
- * Remove cover

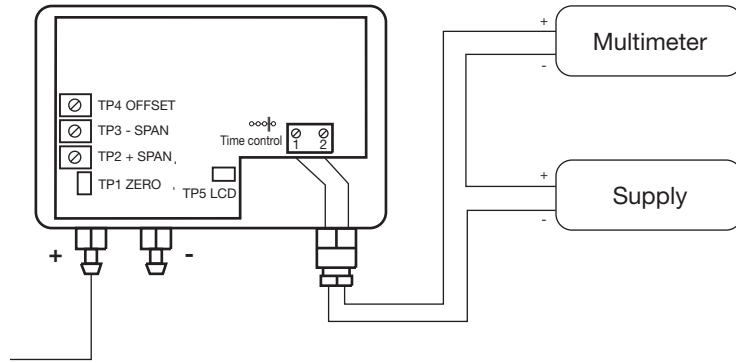
Connection



Connection		Terminals Terminal block	
Voltage supply DC 11.5 to 30 V, 19 to 31V		L - L +	1 2
Voltage supply AC 230 V, 115 V, 24 V		N L 1	1 2
Output 0 to 10 V, 0/4 to 20 mA, 3-wire		- +	3 4

5 Installation

Connection 2-wire



Connection		Terminals Terminal block	
Output 4 to 20 mA, 2-wire DC 12 to 32 V proportional current in supply line		- +	1 2

6 Commissioning

After connecting the supply voltage

The output signal can be measured after the supply voltage has been connected.



For gauge pressure measurement, connect the pressure to be measured to the “+” input. The other pressure connection remains open.

The warm-up time for the instrument is 1 hour.

After this time (at a constant ambient temperature), the output signal with differential pressure measurement must have stabilized at zero.

With short ranges, the mounting position can cause a zero shift. This shift can be compensated after the warm-up time by using the potentiometer TP1 (zero).

7 Calibration

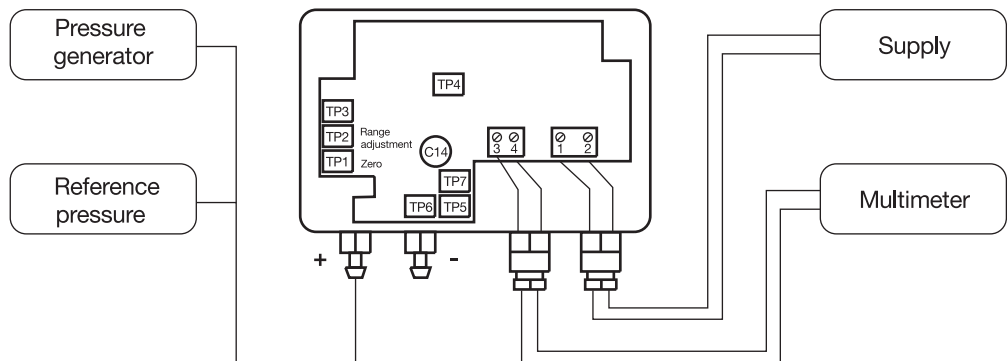


Only adjust the instrument potentiometers listed in the instructions below! The other potentiometers are factory-set and must not be adjusted!

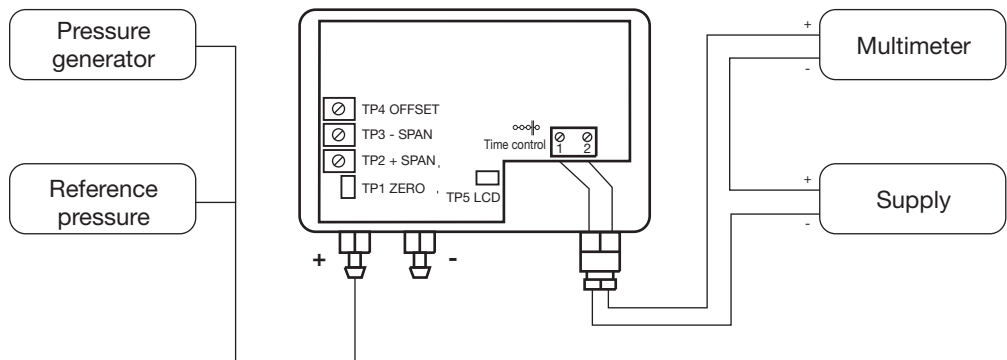
Required aids

- pressure generator
- reference pressure measuring device
- supply for pressure /differential pressure transmitter
- voltmeter/ammeter (multimeter)

Setup



Setup 2-wire



Calibrating

- * Open instrument, see "Opening the instrument", page 11.
- * Connect voltage supply, see "Connection", page 11ff.
- * Connect multimeter, see "Connection", page 11ff.
- * Wait for instrument to warm up (approx. 1 hour).
- * Set zero:
With open pressure connections, set display value of multimeter to 0 V (with current output to 0(4) mA) by using the potentiometer TP1.
- * Set nominal pressure:
Apply nominal pressure to instrument at the "+" pressure connection. Using the potentiometer TP2, set display value of multimeter to 10 V (to 20 mA with current output).

8 Setting the limit contacts

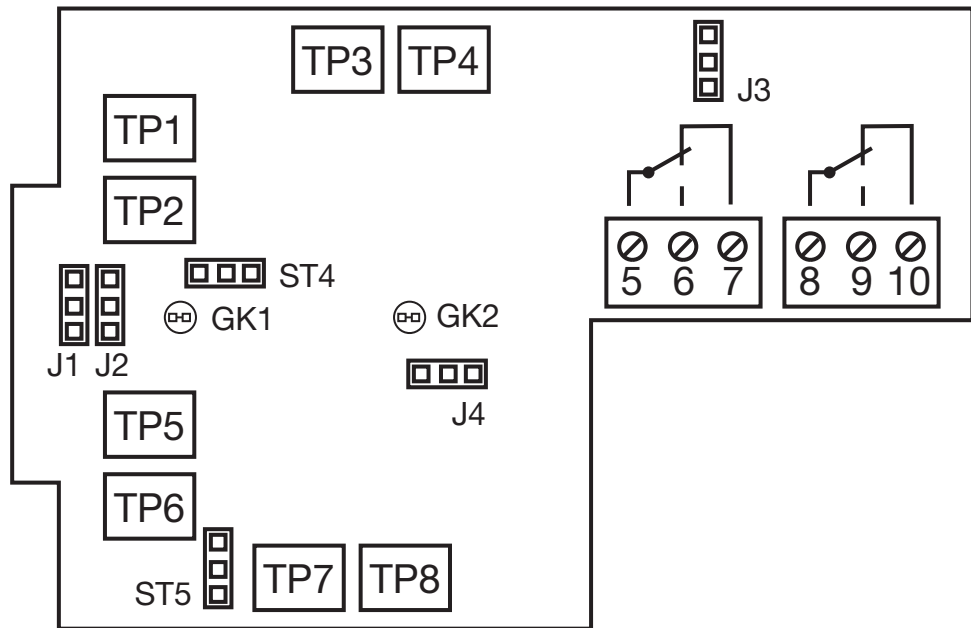


Rating of limit contact: 6 A max. at 230 VAC

Required aids

- pressure generator
- supply for pressure/differential pressure transmitter
- reference pressure measuring device **or** voltmeter/ammeter (multimeter)


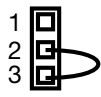
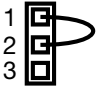
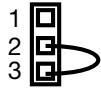

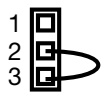


Controls



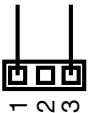

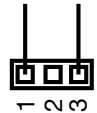
Description

GK1	Terminal 5, 6, 7
GK2	Terminal 8, 9, 10
TP1	Potentiometer for limit of limit contact 1 (GK1) Setting range: 0 to 100 % of full scale
TP2	Potentiometer for hysteresis of GK1 Setting range: 1 to 99 % of full scale
TP3	Potentiometer for switch-on delay of GK1 Setting range: 0 to 10 sec
TP4	Potentiometer for switch-off delay of GK1 Setting range: 0 to 10 sec
TP5	Potentiometer for limit of limit contact 2 (GK2) Setting range: 0 to 100 % of full scale
TP6	Potentiometer for hysteresis of GK2 Setting range: 1 to 99 % of full scale

8 Setting the limit contacts

TP7	Potentiometer for switch-off delay of GK2 Setting range: 0 to 10 sec	
TP8	Potentiometer for switch-off delay of GK2 Setting range: 0 to 10 sec	
J1	Jumper for switching point of GK1 in the positive/negative pressure ranges (for \pm ranges)	
		Bridge 1-2 => GK1 switches in the positive pressure range
		Bridge 2-3 => GK1 switches in the negative pressure range
J2	Jumper for switching point of GK2 in the positive/negative pressure ranges (for \pm ranges)	
		Bridge 1-2 => GK2 switches in the positive pressure range
		Bridge 2-3 => GK2 switches in the negative pressure range
J3	Jumper for relay function of GK1	
		Bridge 1-2 => GK1 = min. limit contact
		Bridge 2-3 => GK1 = max. limit contact
J4	Jumper for relay function of GK2	
		Bridge 1-2 => GK2 = min. limit contact
		Bridge 2-3 => GK2 = max. limit contact

8 Setting the limit contacts

ST4	Multimeter connection for testing limit contact 2 (GK2)	
		1-3 => switching point of limit contact Example 1: measuring range 0 to 3 hPa, switching point at 1.5 hPa (50%) => 0.5 V Example 2: measuring range -2 to +8 hPa, switching point at +3.5 hPa (55%) => 0.55 V
		1-2 => hysteresis of limit contact Example: limit = 0.5 V, hysteresis = 10% => 0.45 V
ST5		Multimeter connection for testing GK2

GK1	LED GK1
GK2	LED GK2

Preparation

- * Open the instrument, see "Opening the instrument", page 11.
- * Connect voltage supply, see "Connection", page 11ff.
- * Connect multimeter, see "Connection", page 11ff.
- * Wait for instrument to warm up (approx. 1hour).

Defining the switching range (only for "+/-" ranges)

- * Use jumper J1 (for GK1) or J2 (for GK2) to determine whether the limit contact switches in the positive or the negative pressure range. For jumper functions, see table above.

Setting the relay function

- * Use jumper J3 (for GK1) or J4 (for GK2) to determine whether the relay switches as *max. limit contact* (relay switches when the actual value is larger than the setpoint) or as *min. limit contact* (relay switches when the actual value is smaller than the setpoint). For jumper functions, see table above.

Setting the limit contact with a reference pressure measuring device

- * Set switch-on and switch-off delay to 0 (turn fully to the left) by using the potentiometer TP3/7 or TP4/8.
- * Apply the pressure at which the limit contact has to **switch** to the pressure transmitter.
- * Keep on adjusting the potentiometer TP1 (for GK1) or TP5 (for GK2), until LED GK1 or GK2 **lights up**.
- * Apply the pressure at which the limit contact has to **switch back** to the pressure transmitter.
- * Keep on adjusting the potentiometer TP2 (for GK1) or TP6 (for GK2), until the LED GK1 or GK2 **goes dark**.

8 Setting the limit contacts

Setting the limit contact by using a multimeter



The range 0—100% always corresponds to 0 to 1 V, e.g.:
pressure range 0 to +3 hPa corresponds to 0 to 1 V
pressure range -3 to +3 hPa corresponds to -0.5 to +0.5 V
pressure range -2 to +8 hPa corresponds to -0.2 to +0.8 V

- * Connect multimeter to connector ST4 (for GK1) or ST5 (for GK2), see table above.
- * Set switch-on and switch-off delay to 0 (turn fully to the left) by using the potentiometer TP3 (for GK1) or TP7 (for GK2) (switch-on delay) and TP4 or TP8 (switch-off delay).
- * Set the voltage that corresponds to the switching point by means of the potentiometer TP1 (for GK1) or TP5 (for GK2).
Example: range 0 to +3 hPa; desired switching point 1.8 hPa => 60 % of range; the corresponding voltage at the connector ST4 or ST5 is 0.6 V

Setting the switching hysteresis by using a multimeter

- * Connect multimeter to connector ST4 (for GK1) or ST5 (for GK2), see table above.
- * Set switch-on delay and switch-off delay to 0 (turn fully to the left) by using the potentiometer TP3 (for GK1) or TP7 (for GK2) (switch-on delay) and TP4 or TP8 (switch-off delay).
- * Using the potentiometer TP2 (for GK1) or TP6 (for GK2), set the voltage that corresponds to the hysteresis.
Example: switching point at 0.5 V; desired hysteresis 10 %; corresponding voltage at the connector ST4 or ST5 is 0.45 V

Setting the switch-on or switch-off delay

- * Set the switch-on delay using the potentiometer TP3 for GK1 or TP6 for GK2 within the range 0 to 10 sec.
 - * Set the switch-off delay with the potentiometer TP4 for GK1 or TP8 for GK2 within the range 0 to 10 sec.
-



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