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UNIcon

CPG-200AV, CPG-1000AV, CPG-6000AV

Sensor-control module for differential pressure and volume

Operating Instructions

Software version: D1673A from Version 1.00

L-BAL-E083-GB 0937 Index 001 Part.-No. -

ZIEHL-ABEGG

Content

1 General information

1.1 Structure of the operating instructions

Before installation and start-up, read this manual carefully to ensure correct use!
We emphasize that these operating instructions apply to specific units only, and are in no way valid for the complete system!

Use these operating instructions to work safely with and on the device. They contain safety instructions that must be complied with as well as information that is required for failure-free operation of the device.
Keep these operating insturctions together with the device. It must be ensured that all persons that are to work on the device can refer to the operating instructions at any time.

1.2 Target group

The operating instructions address persons entrusted with planning, installation, commissioning and maintenance and servicing and who have the corresponding qualifications and skills for their job.

1.3 Exclusion of liability

To allow for future developments, construction methods and technical data given are subject to alteration. We do not accept any liability for possible errors or omissions in the information contained in data, illustrations or drawings provided.
We accept no liability for damage caused by misuse, incorrect use, improper use or as a consequence of unauthorized repairs or modifications.

1.4 Copyright

2 Safety information

- Installation, electrical connection, and start-up operation may only be carried out by an electrical specialist in accordance with electrotechnical regulations (e.g. DIN EN 50110 or DIN EN 60204).
- Persons entrusted with the planning, installation, commissioning and maintenance and servicing in connection with the device must have the corresponding qualifications and skills for these jobs. In addition, they must be knowledgeable about the safety regulations, EU directives, rules for the prevention of accidents and the corresponding national as well as regional and in-house regulations.
- The equipment is to be used solely for the purposes specified and confirmed in the order. Other uses which do not coincide with, or which exceed those specified will be deemed unauthorised unless contractually agreed. Damages resulting from such unauthorised uses will not be the liability of the manufacturer. The user will assume sole liability.
- It is strictly forbidden for work to be carried out on any components while they are connected to live voltage.
- The safe isolation from the supply must be checked using a two-pole voltage detector.
- The owner is obliged to ensure that the device are operated in perfect working order only.
- Inspect electrical equipment periodically: retighten loose connections – immediately replace damaged lines and cables.
- Never clean electrical equipment with water or similar liquids.
- A separate fault and performance monitoring-system with an alarm signal function is necessary in order to prevent personal injuries and material damages during malfunctions and in case the device fails. Substitute operation must be taken into consideration!

3 Product overview

3.1 Operational area

Pressure and volume control for ventilation systems.

3.2 Functional description

Sensor with a membrane system suitable for measuring differential or negative pressure of non-aggressive gas.
The differential pressure to be measured takes effect on a spring supported silicone membrane. Function when the pressure at the “Plus”- connection exceeds the pressure at the “Minus”- connection.
Changes in position of the membrane are detected by a differential transformer and converted into an output signal of 0 - 10 V by an electronics unit.
The pressure range from 50 Pa to 6000 Pa is covered with 3 types of device. With each type four calibrated measuring ranges are programmable.

Depending on the programmed Mode the device can be used as sensor or as a control module for pressure or volume.

- For operation as pressure sensor the device supplies an output signal (0 - 10 V) proportional to the measuring range.
- For operation as air volume sensor the device supplies an output signal (0 - 10 V) proportional to the air volume measuring range (☞ INFO / Range qV). Function in combination with centrifugal fans and ring conduit in the inlet duct. The controller calculates the air volume of the fan from the “K-Factor” and pressure differential between the suction side and the inlet duct.
- For operation as control module for pressure or volume the purpose of the device is to reach and maintain the target value set. To accomplish this, the measured actual value (sensor value) is compared with the adjusted target value, and the controlled value is deduced from this. Controlled output (0 - 10 V) e.g. for activating a speed controller for fans or an EC-fan directly.

3.3 Storage

- The device must be stored in its original packaging in a dry and weather-proof room.
- Avoid exposure to extreme heat and cold.
- Avoid over-long storage periods (we recommend a maximum of one year).

3.4 Waste disposal / recycling

Disposal must be carried out professionally and environmentally friendly in accordance with the legal stipulations.

4 Mounting

4.1 General information

Attention!
The following points must be complied with during the mechanical installation to avoid causing a defect in the device due to assembly errors or environmental influences:

- Before installation remove the device from the packing and check for any possible shipping damage!
- Assemble the device on a clean and stable base. Do not distort during assembly! Use the appropriate mounting devices for proper installation of the unit!
- When mounted onto lightweight walls, there must be no impermissibly high vibrations or shock loads. Any banging shut of doors that are integrated into these lightweight walls, can result in extremely high shock loads. Therefore, we advise you to decouple the devices from the wall.
- Do not allow drilling chips, screws and other foreign bodies to reach the device interior!
- **The pressure measuring depends on position, therefore the mounting must be made vertical and as possible on a vibration-free place (cable inlet and pressure connections down).**
- The pressure line´s connection should be with plastic-hose (in building), inside diameter 4 mm.

4.2 Outdoor installation

Outdoor installation is possible up to -10 °C when the controller supply is not switched off. Installation must be protected from the effects of weather as much as possible, including protection from direct sunlight!

4.3 Temperature influences during commissioning

Avoid condensation in the controller and hence functional faults attributable to condensation by storing the controller at room temperature!

5 Electrical installation

5.1 Safety precautions

Danger owing to electric current

- **Work on electric components may only be carried out by trained electricians or by persons instructed in electricity under the supervision of an electrician in accordance with electrical engineering regulations.**
- **The programming of the equipment takes place with switched on supply voltage by opened cover and voltage for change-over Setpoint 1/2. Use power supplies which guarantee reliable electrical isolation of the operating voltage as per IEC/DIN EN 60204-1. Consider also the general requirements for PELV circuits in accordance with IEC/DIN EN 60204-1.**
- Inspect electrical equipment periodically: retighten loose connections – immediately replace damaged lines and cables.
- Never clean electrical equipment with water or similar liquids.

Information

The respective connections are represented in the enclosure of this manual (☞ Connection diagram)!

5.2 EMC-compatible installation of control lines

Pay attention to sufficient distance from powerlines and motor wires to prevent interferences. The control cable may not be longer than 30 m. Screened control cables must be used when the cable length is longer than 20 m.

5.3 Connection Voltage supply

Connection Voltage supply at terminals: “+Ub” and “GND”. Here, it must be strictly observed that the mains voltage lies within the allowable tolerance specifications (☞Technical data and nameplate affixed to the side).

5.4 Output voltage 0 - 10 V

Connection to terminals “A” - “GND” (I_{max} 0.3 mA).

It is not permissible to connect outputs of several devices to each other!

5.5 Input for switch over Setpoint 1 / Setpoint 2

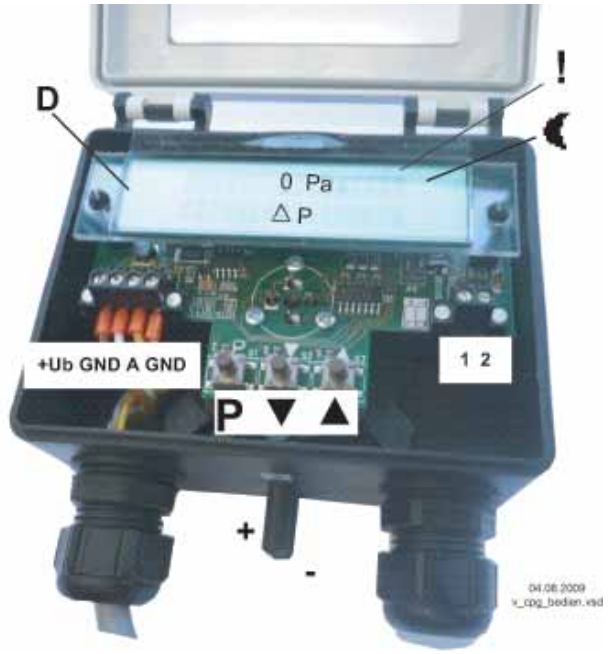
Via voltage at terminals “1” and “2” (10... 24 V DC) a switchover between Setpoint 1 and Setpoint 2 is possible (note polarity☞ connection diagram).

100 Pa Setpoint 1	No voltage at terminals “1” and “2” = adjustment Setpoint 1 active.
80 Pa ***C*** Setpoint 2	Voltage at terminals “1” and “2” = adjustment for Setpoint 2 active.

The active Setpoint is indicated in the menu INFO, a active “Setpoint 2” is signalized by the moon symbol.

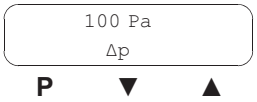
6 Device construction

For the electrical connection and for programming the hinged cover must be screwed off. Subsequently close carefully!



D	LC-Display Moon symbol = Adjustment for Setpoint 2 active **!** = Exceeding measuring range
+Ub / GND	Supply voltage
A / GND	Output signal 0 - 10 V
1 / 2	Voltage input for switch over Setpoint 1 / Setpoint 2
	Pressure connections
+	“Plus”- connection in area with higher pressure
-	“Minus”- connection in area with lower pressure

Multifunction - LC display and internal keyboard



P ▼ ▲

Text line 1 with 16 figures for display of actual and desired values
Text line 2 with 16 figures for display of menu text

P	Program key and open menu
▼	Menu selection, reduce value
▲	Menu selection, increase value
▼ + ▲	ESC-key combination, Escape = leave menu

7 Menu operation

7.1 Select operation mode

Information

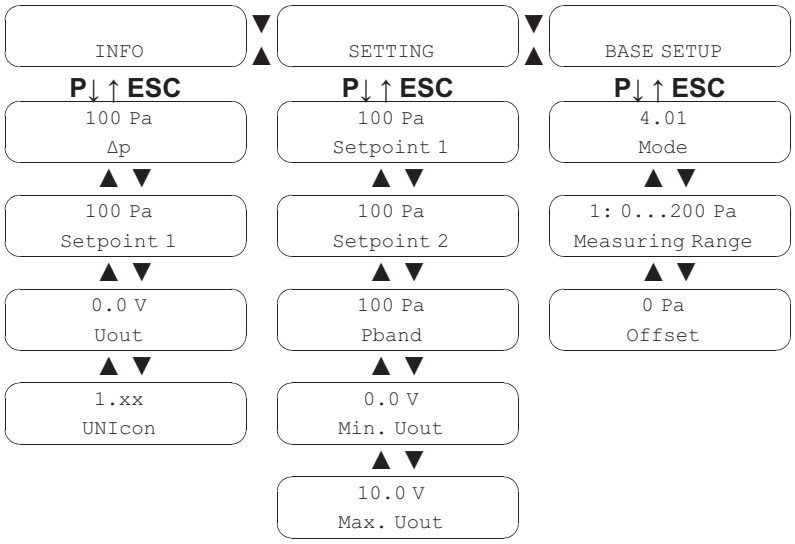
Simple installation is possible through the selection of the preprogrammed mode of operation. This determines the basic function of the device, factory set 4.01.

Mode	Function
4.00	Pressure sensor output 0...10 V proportional to measuring range
4.01	Pressure controller (PID): output 0...10 V depending on adjusted Setpoint and measured actual value.
5.00	Air volume sensor: Output 0...10 V propotional to measuring range (depending on setting for K-Factor)
5.01	Air volume controller (PID): Output 0...10 V depending on adjusted Setpoint and measured actual value

7.2 Menu structure

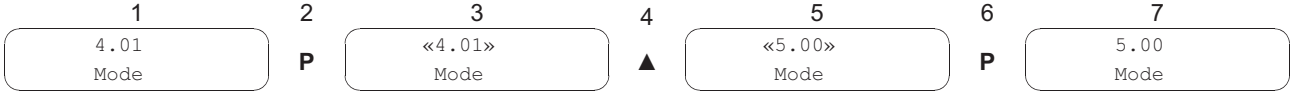
100 Pa Δp	**Display after turning on the voltage supply.** Switch over between actual value display and “INFO” with the key shortcut for Escape (ESC = ▼ + ▲).	INFO

Example for Mode 4.01 (factory setting)



Selection of the menu group (e.g. BASE SETUP) to the right through the ▼-key, to the left through the ▲-key.
You can go to the menu items in the menu groups (e.g. mode) by using the **P** key. Use the arrow keys to move up and down within the menu group.
To make adjustments, press the **P** key after selecting the menu item. If the previously set value starts to flash, it can be adjusted with the ▼ + ▲ keys and then saved with the **P** key. To exit the menu without making any changes, use the “ESC” short-key, i.e., the originally set values remain.

Reprogramming Mode 4.01 to 5.00 in “BASE SETUP”



7.3 Menus of Modes 4.00 - 5.01

Parameter	Factory setting				User Setting	
INFO						
Δp	100 Pa	0 Pa	-	-		Display actual value for differential pressure
qV	-	-	530 m^3/h	0 m^3/h		Display Actual value Air flow
Setpoint 1	-	100 Pa	-	530 m^3/h		Display active Setpoint
Range qV	-	-	1060 m^3/h	1060 m^3/h		Air volume measuring range depending on sensor measuring range and K+Factor
Uout	5.0 V	10.0 V	5.0 V	10.0 V		Height of output voltage 0...10 V
UNIcon	1.00	1.00	1.00	1.00		Software version
Δp	-	-	49 Pa	0 Pa		Display actual value for volume measurement
SETTING						only for 4.01 and 5.01
Setpoint 1	-	100 Pa	-	500 m^3/h		Setting Setpoint
Setpoint 2	-	100 Pa	-	500 m^3/h		Setpoint 2 active, if voltage at terminals 1, 2
Pband	-	100 Pa	-	500 m^3/h		Setting Pband
Min. Uout	-	0.0 V	-	0.0 V		Setting minimal output voltage
Max. Uout	-	10.0 V	-	10.0 V		Setting maximal output voltage
BASE SETUP						
Mode	4.00	4.01	5.00	5.01		**Mode selection**
Measuring Range	**1: 0...200 Pa** 2: 0...150 Pa 3: 0...100 Pa 4: 0...50 Pa	**1: 0...200 Pa** 2: 0...150 Pa 3: 0...100 Pa 4: 0...50 Pa	**1: 0...200 Pa** 2: 0...150 Pa 3: 0...100 Pa 4: 0...50 Pa	**1: 0...200 Pa** 2: 0...150 Pa 3: 0...100 Pa 4: 0...50 Pa		Setting Measuring range Type **CPG-200AV** Factory setting = max. Range
Measuring Range	**1: 0...1000 Pa** 2: 0...500 Pa 3: 0...300 Pa 4: 0...200 Pa	**1: 0...1000 Pa** 2: 0...500 Pa 3: 0...300 Pa 4: 0...200 Pa	**1: 0...1000 Pa** 2: 0...500 Pa 3: 0...300 Pa 4: 0...200 Pa	**1: 0...1000 Pa** 2: 0...500 Pa 3: 0...300 Pa 4: 0...200 Pa		Setting Measuring range Type **CPG-1000AV** Factory setting = max. Range
Measuring Range	**1: 0...6000 Pa** 2: 0...4000 Pa 3: 0...3000 Pa 4: 0...2000 Pa	**1: 0...6000 Pa** 2: 0...4000 Pa 3: 0...3000 Pa 4: 0...2000 Pa	**1: 0...6000 Pa** 2: 0...4000 Pa 3: 0...3000 Pa 4: 0...2000 Pa	**1: 0...6000 Pa** 2: 0...4000 Pa 3: 0...3000 Pa 4: 0...2000 Pa		Setting Measuring range Type **CPG-6000AV** Factory setting = max. Range
K-Factor	-	-	75	75		K-Factor of inlet duct
Offset	0 Pa	0 Pa	0 m^3/h	0 m^3/h		Sensor offset

- Parameter for selected mode not available

8 Start-up

8.1 Procedure

1. You must mount and connect the device in accordance with the operating instructions.
2. Check all connections for correctness once more.
3. The supply voltage must match the information on the rating plate.
4. Set the operating Mode in the **BASE SETUP** (factory settings 4.01).
5. When saving the operating Mode, the respective preset factory operating-mode setting is loaded.
   That means, the settings you have made, e.g., in “SETTING” are lost.

Attention, electrostatic sensitive devices!

Be sure to ground the board at a suitable point in order to prevent damage to the electronic components being caused by electrostatic discharges. Such damage could occur, e.g., if a metal water pipe or heating line are briefly touched.

8.2 Measuring ranges and tolerance of pressure sensor

At the factory the devices are set to the respective highest measuring range (= MB1). As small as possible a measuring range must be chosen for maximum accuracy at maximum resolution of the output signal (☞ BASE SETUP of respective Mode).

Measuring ranges and tolerance (4.00 output 0 - 10 V)					
Type **MB** [Pa]	**NA** [%]	**EA** [%]	**LA** [%]	**A** [%]	**H** [%]
CPG-200AV					
MB1: 0...200	+/-0.5	+/-0.5	+/-0.25	0.1	1.0
MB2: 0...150	+/-0.75	+/-0.6	+/-0.4	0.2	0.7
MB3: 0...100	+/-1.0	+/-0.7	+/-0.5	0.2	0.5
MB4: 0...50	+/-2.0	+/-1.0	+/-1.0	0.3	0.5
CPG-1000AV					
MB1: 0...1000	+/-0.5	+/-0.5	+/-0.25	0.1	0.2
MB2: 0...500	+/-0.7	+/-0.7	+/-0.5	0.2	0.2
MB3: 0...300	+/-0.9	+/-0.9	+/-0.9	0.3	0.2
MB4: 0...200	+/-1.0	+/-1.0	+/-1.25	0.3	0.2
CPG-6000AV					
MB1: 0...6000	+/-0.5	+/-0.5	+/-0.25	0.1	0.2
MB2: 0...4000	+/-0.7	+/-0.7	+/-0.4	0.15	0.2
MB3: 0...3000	+/-0.9	+/-0.9	+/-0.6	0.2	0.2
MB4: 0...2000	+/-1.0	+/-1.0	+/-0.75	0.25	0.2
Temperature drift (related to the highest measuring range) Zero point: +/-0.2 % / 10 K, final value: +/- 0.2 % / 10 K					
MB = Measuring range, **NA** = Zero point deviation, **EA** = Final value deviation, **LA** = Linearity deviation, **A** = Resolution, **H** = Hysteresis					

9 Programming

9.1 Pressure sensor 4.00 / pressure controller 4.01

9.1.1 Base setup 4.00 and 4.01

BASE SETUP	**BASE SETUP**
4.01 Mode	**Mode** Setting of mode e.g. **4.01**
0...200 Pa Measuring Range	**Measuring Range** Setting of desired pressure measuring range Setting range: depending on device type (☞ Technical data) Factory setting: respective max. measuring range
0 Pa Offset	**Offset** Sensor calibration with calibrated comparison device Setting range: -100...+100 Pa Factory setting: 0 Pa

9.1.2 Settings for operation, only 4.01

SETTING	**SETTING**
100 Pa Setpoint 1	**Setpoint 1** Setting range: Setpoint 1: 0...100 % sensor measuring range Factory setting: 50 % sensor measuring range
100 Pa Setpoint 2	**Setpoint 2** Setting “Setpoint 2” e.g. reduced value for night operation. Switch over Setpoint 1/2 by external voltage at terminals 1/2.
100 Pa Pband	**Pband** small control range = short control times big control range = longer control times and (higher controller stability) Setting range Pband: 0...100% sensor measuring range Factory setting: 50 % sensor measuring range
0.0 V Min. Uout	**Min. Uout** Setting range minimal output voltage (basic speed): 0.0 V...10.0 V (setting takes priority over “Max. Uout”) Factory setting: 0.0 V
10.0 V Max. Uout	**Max. Uout** Setting range maximal output voltage (speed limiter): 10.0 V...0.0 V Factory setting: 10.0 V

9.2 Air volume sensor 5.00 / air volume controller 5.01

9.2.1 Base setup 5.01 and 5.01

BASE SETUP	**BASE SETUP**
5.01 Mode	**Mode** Setting of Mode **5.01**
0...200 Pa Measuring Range	**Measuring Range** Setting of desired pressure measuring range Setting range: depending on device type (☞ Technical data) Factory setting: respective max. measuring range
75 K-Factor	**K-Factor** Input of the “K factor” dependent on the fan (inlet duct). Setting range: depending on measuring range of sensor Factory setting: 75
0 m3/h Offset	**Offset** Sensor calibration with calibrated comparison device. Setting range: -1000...+1000 m^3/h Factory setting: 0 m^3/h

Air volume measuring range [m^3/h] depends on selected measuring range of pressure senosr [Pa] and selected “K-Factor”. In menu “INFO” display for “Range qV”. In the case of input of the maximally in each case possible K-Factor theoretically a maximum measuring range of approx. 32,750 ^{3}/h results.

The maximal adjustable K-Factor depends on the selected measuring range of the pressure sensor [Pa].											
Measuring Range [Pa]	50	100	150	200	300	500	1000	2000	3000	4000	6000
Max. K-Factor	**4633**	**3276**	**2675**	**2316**	**1891**	**1465**	**1036**	**732**	**598**	**518**	**423**

9.2.2 Settings for operation, only 5.01

SETTING	**SETTING**
530 m3/h Setpoint 1	**Setpoint 1** Setting range Setpoint 1: 0...Max. Range qV Factory setting: 50 % Max. Range qV
530 m3/h Setpoint 2	**Setpoint 2** Setting “Setpoint 2” e.g. reduced value for night operation. Switch over Setpoint 1/2 by external voltage to terminals 1/2.
530 m3/h Pband	**Pband** small control range = short control times big control range = longer control times and (higher controller stability) Adjustable Pband: 0...Max. Range qV Factory setting: 50 % Max. Range qV
0.0 V Min. Uout	**Min. Uout** Setting range minimal output voltage (basic speed): 0.0 V...10.0 V (setting takes priority over “Max. Uout”) Factory setting: 0.0 V
10.0 V Max. Uout	**Max. Uout** Setting range maximal output voltage (speed limiter): 10.0 V...0.0 V Factory setting: 10.0 V

10 Check sensor function

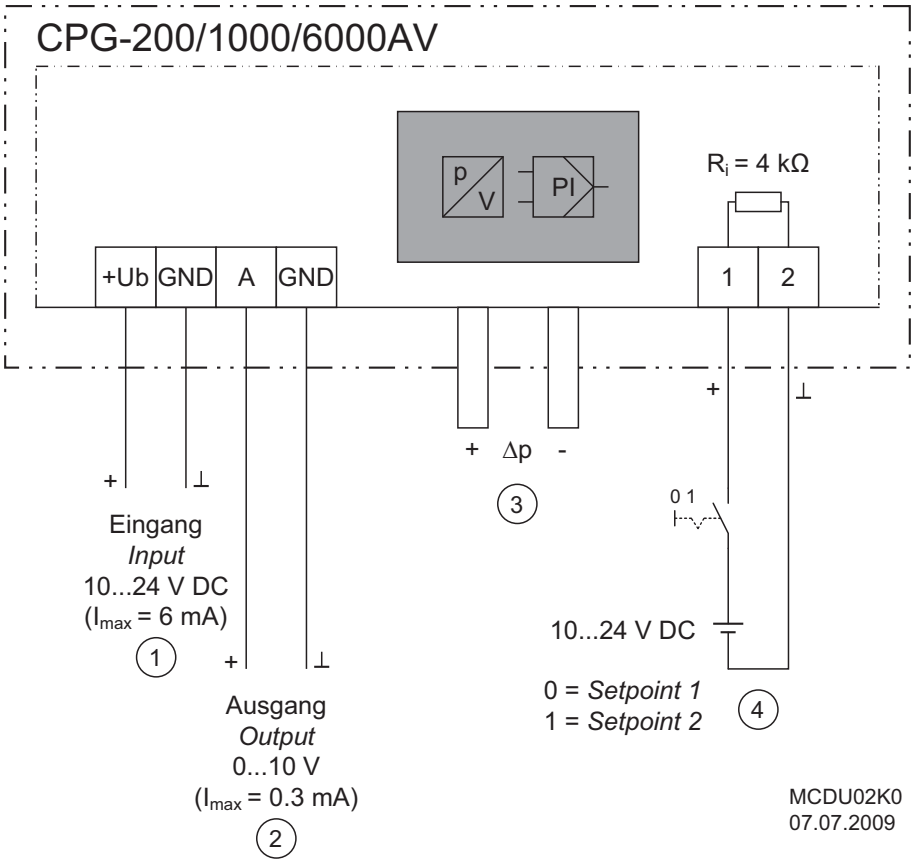
1. Program Mode **4.00** for pressure sensor.
2. Voltage supply (+Ub and GND) connected, output 0 - 10 V (A - GND) disconnected.
3. Pull off pressure hoses and measure output signal, nominal = 0 V.
4. Create pressure at the "+" connection against the "-" connection (e.g. by **carefully** blowing in), measure the output signal (0...10 V ≙ measuring range).
5. If the sensor works, reconnect the pressure hoses and check these if necessary.

11 Enclosure

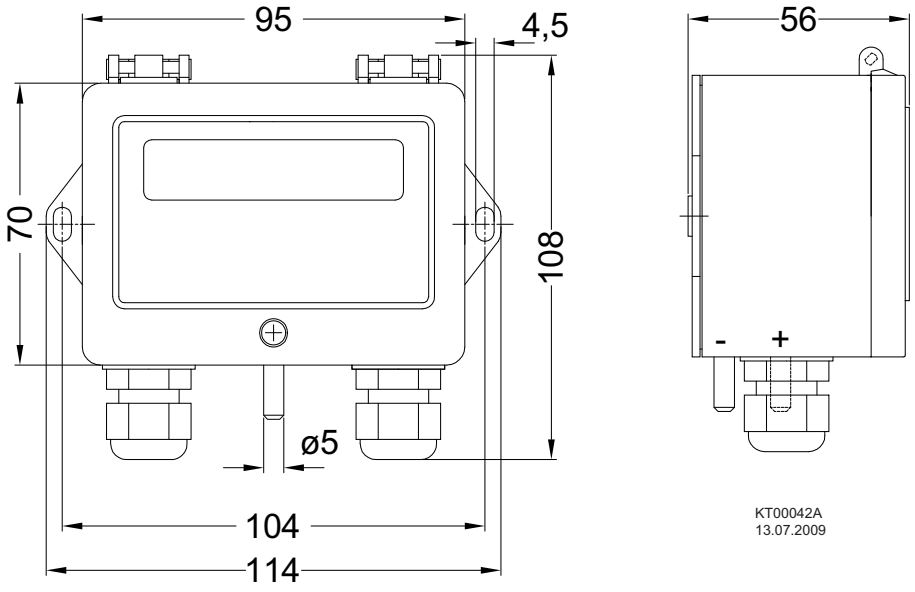
11.1 Technical data

Type	CPG-200AV	CPG-1000AV	CPG-6000AV
Part.-No.	320042	320043	320044
Measuring range 1	0...200 Pa	0...1000 Pa	0...6000 Pa
Measuring range 2	0...150 Pa	0...500 Pa	0...4000 Pa
Measuring range 3	0...100 Pa	0...300 Pa	0...3000 Pa
Measuring range 4	0...50 Pa	0...200 Pa	0...2000 Pa
Voltage supply	10 V...24 V DC Electronic protected against faulty polarization		
Current consumption	6 mA		
Output (0 - 10 V)	I_{max} 0.3 mA (short-circuit-proof)		
Pressure connections	"+, -": tubing d = 5 mm		
Housing	Cover ABS, bottom Polyamid PA 6.6 Fire protection classification UL 94 HB		
Use position	vertical (measuring depends on position)		
Protection class	IP54 according EN 60529		
Weight	approx. 250 g		
Max. permissible ambient temperature	50 °C		
Min. permissible ambient temperature	0 °C (if mains voltage is not switched off up to -10 °C)		
Permissible rel. humidity	85 % no condensation		
Overload protection	0.2 bar		
Static pressure max.	0.2 bar		
Interference emission	according EN 61000-6-3 (domestic household applications)		
Interference immunity	according 61000-6-2 (industrial applications)		

11.2 Connection diagram



11.3 Dimensions [mm]



11.4 Manufacturer reference

Our products are manufactured in accordance with the relevant international regulations. If you have any questions concerning the use of our products or plan special uses, please contact:

Ziehl-Abegg AG
Heinz-Ziehl-Straße
74653 Künzelsau
Telephone: +49 (0) 7940 16-0
Telefax: +49 (0) 7940 16-504
info@ziehl-abegg.de
http://www.ziehl-abegg.de

11.5 Service information

If you have any technical questions while commissioning or regarding malfunctions, please contact our V-STE support department for control systems - ventilation technology.
Our worldwide contacts are available in our subsidiaries for deliveries outside of Germany. ☞ www.ziehl-abegg.com.
If you make returns for inspections or repairs we need certain information in order to facilitate focused trouble shooting and fast repair. Please use our repair tickets for this. It is provided to you after you have consulted our support department.
In addition, you can download it from our homepage. Download - Ventilation Technology - Topic: Control Engineering - Document type: General documents.