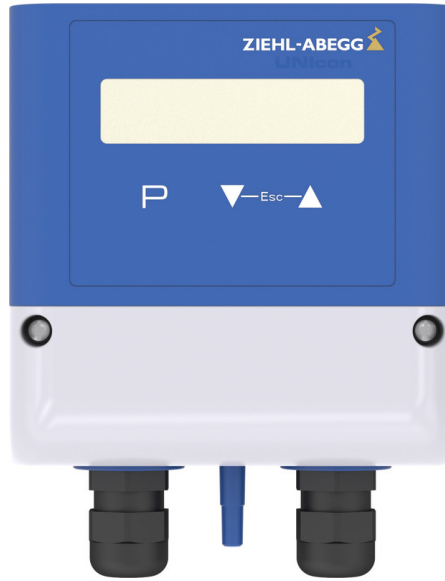
english

UNIcon

CPG-..AV

Sensor-control module for differential pressure and volume flow

Operating Instructions



Keep for reference!

Software version: D4753A from version 1.00

L-BAL-E253-GB 2021/36 Index 005 Part.-No. 00163445

ZIEHL-ABEGG

Content

1 General notes 4
1.1 Structure of the operating instructions 4
1.2 Exclusion of liability 4

2 Safety instructions 5

3 Product overview 6
3.1 Function 6
3.2 Storage 7
3.3 Disposal / recycling 7

4 Mounting 7

5 Electrical installation 8
5.1 EMC-compatible installation of control lines 8
5.2 Connection Voltage supply 8
5.3 Output voltage 0...10 V 9
5.4 Input for switch over Setpoint 1/ 2 9

6 Connection and operating elements 10

7 Programming 11
7.1 Select operation mode 11
7.2 Start-up 11
7.3 Menu structure 12
7.4 Display unit (metric / inch) 13
7.5 Parameter table 14
7.6 Nozzle coefficient (K-Factor) 16
7.7 Zero point adjustment (Autozero / Offset) 17
7.8 Check sensor function 17

8 Enclosure 18
8.1 Technical data 18

8.2 Connection diagram 20
8.3 Dimensions [mm] 20
8.4 Manufacturer reference 21
8.5 Service information 21

1 General notes

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, start-up, maintenance, repair, cleaning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

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 instructions 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 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.

2 Safety instructions



Attention!

- Mounting, 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.
- 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 is operated in perfect working order only.
- Electrical equipment must be checked regularly: Loose connections are to be re-tightened and damaged cables must be replaced immediately.
- 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!

Intended use

These devices are intended exclusively for measured value acquisition of differential pressures (non-aggressive gases). Their operation is only permitted under observance of the specifications in these operating instructions.

Any other use above and beyond this will be considered as improper use. The manufacturer will not be liable for any damage resulting from this. The company using it bears the sole risk.

3 Product overview

3.1 Function

Sensor-control module with differential-pressure sensors in proven ceramic-cantilever technology for climate and clean-room application.
The pressure range from 0 to 6000 Pa *(24 in.wg)* is covered with 3 types of device. With each type four measuring ranges are programmable.
Function when the pressure at the “Plus”- connection exceeds the pressure at the “Minus”- connection.

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

- For operation as pressure sensor the device supplies an output signal (0...10 V) proportional to the measuring range.
- For operation as volume flow 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 measuring device in the inlet ring. The controller calculates the volume flow 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 flow 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.

3.2 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).

3.3 Disposal / recycling



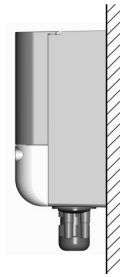
Disposal must be carried out professionally and in an environmentally friendly way in accordance with the respective national legal stipulations.

▷Separate the materials by type and in an environmentally friendly way.

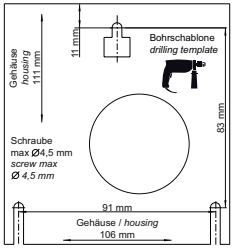
▷If necessary, commission a specialist company with the waste disposal.

4 Mounting

- 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!
- Use the templates printed on the device packing to mark the fastening bore holes.
- 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 / 5 mm. For a firm hold of the hose, its inside diameter must be 1 mm smaller than the outside diameter of the hose nozzle (step spigot 5 / 6 mm).
- Remove the connection cover for mounting and electrical connection. Close the lid again carefully before start-up (tightening torque of the lid screws 1.1 Nm).



Vertical mounting



Drilling template on packing

5 Electrical installation

5.1 EMC-compatible installation of control lines

Pay attention to maintain sufficient distance from powerlines and motor wires to prevent interferences.
When using a shielded cable the shield must be connected (as short and with as low an induction as possible!) to the PE conductor on one side at the signal input (of the evaluation unit).

5.2 Connection Voltage supply

Connection Voltage supply at terminals: “+U_S” and “GND”. Here, it must be strictly observedt hat the mains voltage lies within the llowable olerance pecifications (see Technical data and nameplate affixed to the side).

Danger due to electric current
Only PELV current sources which ensure safe electrical isolation of the operating voltage in accordance with IEC/DIN EN 60204-1 must be used.
There is no potential isolation between supply voltage and output signal.

5.3 Output voltage 0...10 V

Connection to terminals “A” and “GND” (I_{max} see Technical data).

Parallel control of several speed controllers / EC-fans

The maximum possible number of speed controllers / EC fans with 0...10 V input that can be controlled parallel depends on their input resistance and on the maximum admissible load of the 0...10 V output.

Example:

- Supply voltage CPG / CTG: 10 V => I_{max} for 0...10 V output = **0.3 mA** (see Technical data or connection diagram).
- ECblue motor size B: Input resistance R_i > **100 kΩ** (Assembly instuctions fan seeTechnical data or connection diagram).
- The current consumption for one fan is max. **0.1 mA** (I = U / R = 10 V / 100 kΩ)

✓ **Result:**
A maximum of **three** ECblue motor size B can be operated in parallel at one CPG / CTG (total current consumption ≤ I_{max} 0...10 V output CPG / CTG).

Attention!

- It is not permissible to connect outputs of several devices to each other!
- In case of failure of the control module or interruption of the 0...10 V specification signal, all parallel connected EC fans/-speed controllers are no longer controlled. This means that all fans stop!

5.4 Input for switch over Setpoint 1/ 2

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

- Voltage OFF => Setting “Setpoint 1” active
- Voltage ON => Setting “Setpoint 2” active

Setpoint 1active

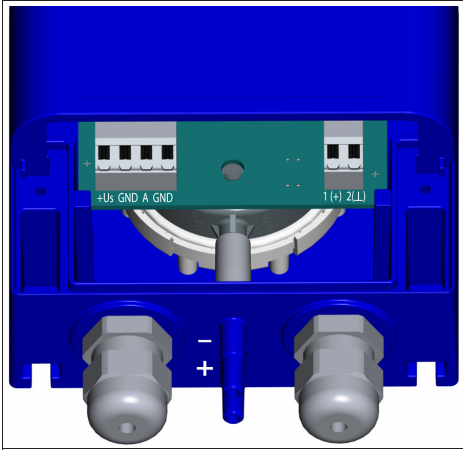
100 Pa *(0.401 in.wg)* Setpoint 1

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

Setpoint 2 active

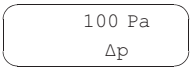
80 Pa ☾ *(0.321 in.wg)* Setpoint 2

6 Connection and operating elements



$+U_S$/ GND	Supply voltage
A / GND	Output signal 0...10 V
1 / 2	Voltage input for switch over Set-point 1 / 2
-	“Minus”- connection in area with lower pressure
+	“Plus”- connection in area with higher pressure

Multipurpose LC display and keyboard



Line 1: 16 figures for actual and desired values
Line 2: 16 figures for menu text



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

Messages on the display

!	Exceeding measuring range
☾	Moon symbol = Adjustment for Setpoint 2 active

7 Programming

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 Start-up

Version

1. You must mount and connect the device in accordance with the operating instructions.
2. Double check that all connections are correct.
3. The supply voltage must match the information on the rating plate.

4. Set the mode, unit and measuring range and adjust the sensor in the **BASE SETUP**.
5. For the modes **4.01**.. and **5.01**.. set under **SETTING** the parameters for control operation.

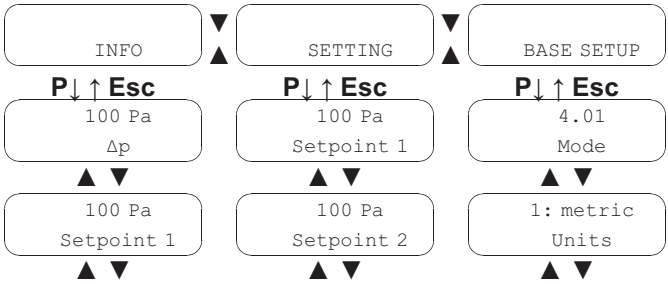
Information
When saving the Operating Mode, the factory settings are stored. Therefore all the settings you have made, are lost.

7.3 Menu structure

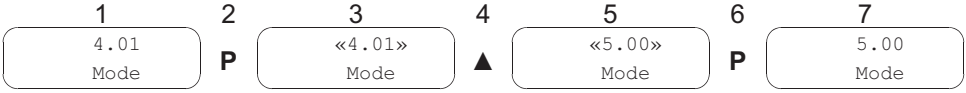
100 Pa Δp	**Display after turning on the voltage supply.** Switch over between actual value display and “INFO” with the key shortcut for Escape (Esc = ▼ + ▲).	INFO

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.

Example for Mode 4.01 (Factory setting)



Reprogramming Mode 4.01 to 5.00 in "BASE SETUP"



7.4 Display unit (metric / inch)

The display can be switched between SI units (factory setting) and imperial (US) units ☞ BASE SETUP / Units.

Conversion factors

- Pressure: 1.0 in.wg = 254 Pa
- Volume flow: 1.0 m^3/h = 0.5885 cfm
  Inlet ring: K-Factor US = 9.3 x K-Factor SI

7.5 Parameter table

Example for CPG-200AV

Parameter	Display / factory setting				Funktion
Mode	**4.00**	**4.01**	**5.00**	**5.01**	Mode
INFO					**Information**
Δp	0 Pa *(0.000 in.wg)*	0 Pa *(0.000 in.wg)*	-	-	Display actual value for differential pressure
qV	-	-	0 m^3/h *(0 cfm)*	0 m^3/h *(0 cfm)*	Display actual value for airflow
Setpoint 1	-	100 Pa *(0.400 in.wg)*	-	530 m^3/h *(310 cfm)*	Display active Setpoint
Range qV	-	-	1060 m^3/h *(620 cfm)*	1060 m^3/h *(620 cfm)*	Air volume measuring range depending on sensor measuring range and K-Factor
Uout	0.0 V	9.9 V	0.0 V	9.9 V	Magnitude of the output voltage 0...10 V
UNIcon	1.00	1.00	1.00	1.00	Software version
Δp	-	-	0 Pa *(0.000 in.wg)*	0 Pa *(0.000 in.wg)*	Display actual value for volume measurement
SETTING 4.01 + 5.01					**Setting**
Setpoint 1	-	100 Pa *(0.400 in.wg)*	-	500 m^3/h *(310 cfm)*	Setpoint 1[1]
Setpoint 2	-	100 Pa *(0.400 in.wg)*	-	500 m^3/h *(310 cfm)*	Setpoint 2[1] (active if voltage at terminals 1, 2)
Pband	-	100 Pa *(0.400 in.wg)*	-	500 m^3/h *(310 cfm)*	Pband[1, 2]
Min. Uout	-	0.0 V	-	0.0 V	Min. output voltage: 0.0...10.0 V (priority over “Max. Uout”)

Parameter	Display / factory setting				Funktion
Max. Uout	-	10.0 V	-	10.0 V	Max. output voltage: 10.0...0.0 V
BASE SETUP					**Base setup**
Mode	**4.00**	**4.01**	**5.00**	**5.01**	**Mode**
Units	metric: Pa, m^3/h, K-Factor *inch: in.wg, cfm, K-Factor US*				SI units or Imperial units (US)
Measuring Range	**1: 0...200 Pa *(0...0.8 in.wg)*)** 2: 0...150 Pa *(0...0.6 in.wg)* 3: 0...100 Pa *(0...0.4 in.wg)* 4: 0...50 Pa *(0...0.2 in.wg)*				**CPG-200AV** Adjustable measuring range
	1: 0...1000 Pa *(0...4.0 in.wg)* 2: 0...500 Pa *(0...2.0 in.wg)* 3: 0...300 Pa *(0...1.2 in.wg)* 4: 0...200 Pa *(0...0.8 in.wg)*				**CPG-1000AV** Adjustable measuring range
	1: 0...6000 Pa *(0...24.0 in.wg)* 2: 0...4000 Pa *(0...16.0 in.wg)* 3: 0...3000 Pa *(0...12.0 in.wg)* 4: 0...2000 Pa *(0...8.0 in.wg)*				**CPG-6000AV** Adjustable measuring range
K-Factor *K-Factor US*	-	-	75 *(697)*	75 *(697)*	Nozzle coefficient (K-Factor) ☞ following table
Autozero	OFF => ON				Automatic “0” offset
Offset	0 Pa *(0.000 in.wg)*				Sensor offset (automatically when “Autozero”) Setting range: +/ - 1000 Pa *(+/- 4.000 in.wg)*

*1 Setting range **4.01**: 0..100 % sensor measurung range, **5.01**: 0...Max. Range qV (depending on K-Factor and sensor measuring range)*

2 small value = quick regulation, great value = slow regulation (high stability)

- Parameter for selected mode not available

(xxx) Values for Imperial units (US)

7.6 Nozzle coefficient (K-Factor)

For the modes **5.00** and **5.01** the K-factors (SI-units) of the following ZIEHL-ABEGG fans can be taken from the table. For fans not listed here, ask the manufacturer for the K-factor.

Size	ZAbluefin	C-series Cpro-series	Vpro-series	M-series	ZAvblue
Impeller diame-ter [mm]		K-Factor	K-Factor	K-Factor	K-Factor
225		47		57	
250		60		68	
280		75	86	86	95
315		95	112	96	120
355		121	144	142	150
400		154	180	172	200
450		197	220	217	240
500		252	291	274	320
560		308	360		400
630		381	445		480
710	530	490			
800	670	620			
900	850	789			
1000	1050	999			
1120	1250				

Subject to technical changes!

Maximum K-Factor depending on the measuring range of the pressure sensor											
Range [Pa] *[in.wg]*	50 *0.2*	100 *0.4*	150 *0.6*	200 *0.8*	300 *1.2*	500 *2.0*	1000 *4.0*	2000 *8.0*	3000 *12.0*	4000 *16.0*	6000 *24.0*
Max. K-Factor *US*	5000 *32767*	5000 *32767*	5000 *32767*	4596 *32767*	3752 *32767*	2906 *32767*	2055 *32500*	1453 *22980*	1186 *18763*	1027 *16250*	839 *13268*

Air volume measuring range [m^3/h], [cfm] depends on selected measuring range of pressure senosr [Pa], [in.wg] and selected “K-Factor (US)”. In menu “INFO” display for “Range qV”. Maximum measuring range at input of each possible maximum “K-Factor (US)”.
Air flow measuring range: max. 65000 m^3/h (*38257 cfm*) depending on setting of measuring range and K-Factor.

7.7 Zero point adjustment (Autozero / Offset)

A zero-point adjustment is possible if the actual value is not “0 Pa Δp” or “0 m^3/h qV” in pressureless state. A zero point calibration is possible with the function “Autozero”.
This may be necessary, for example, in case of heavy thermal fluctuations in the sensor environment or non-vertical mounting.

Version

1. Pull off the pressurised hoses.
2. Switch function “Autozero” in BASE SETUP to “ON” .
3. The display switches to the actual value display and the value “0” is displayed after zero point calibration has taken place.
4. The necessary difference up to “0” is displayed in the BASE SETUP under “Offset”.

Alternatively to the automatic zero point calibration, the offset value can also be set manually (see BASE SETUP / Offset).

7.8 Check sensor function

1. Program Mode **4.00** for pressure sensor.
2. Connect the voltage supply (+U_S / GND), disconnect output 0 ...10 V (A / GND).
3. Remove 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.

8 Enclosure

8.1 Technical data

Type	**CPG-200AV**	**CPG-1000AV**	**CPG-6000AV**
Part-No.	320063	320064	320065
Source of energy	10...24 V DC (+20 %) Protected against reverse polarity		

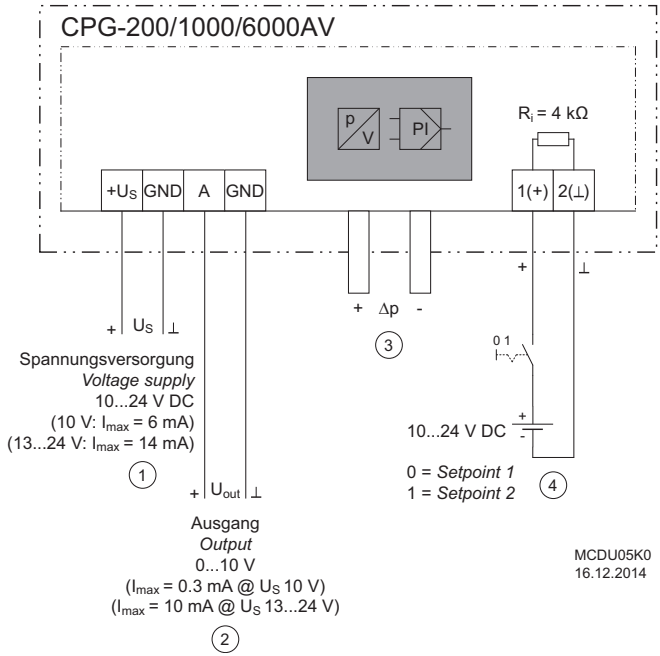
	@ U_S 10 V DC	@ U_S 13...24 V DC
Max. load output 0...10 V (short-circuit-proof)	0.3 mA	10 mA
Max. current consumption ca.	6 mA	14 mA

Pressure connections “+, -”	Hose connectors d = 5 / 6 mm *(0.20 / 0.24 inch)*
Housing	PC (polycarbonate) Fire protection classification UL94V0
Use position	vertical (measuring depends on position)
Protection rating	IP54 according EN 60529
Weight	approx. 230 g *(0.50 lb)*
Permissible ambient temperature	-10...60 °C *(14...140 °F)*
Permissible medium temperature	-10...70 °C *(14...158 °F)*
Permissible temperature range for storage and transport	-30...70 °C *(-22...158 °F)*
Permissible rel. humidity	85 % no condensation
One-sided permissible overload	0.1 bar *(80 in.wg)*
Burst prssure	at room temperature: 0.2 bar *(80 in.wg)*
	at 70 °C (158 °F): 0.15 bar *(60 in.wg)*
Maximum cross section of terminals	1.5 mm^2 / AWG16
Interference emission	according EN 61000-6-3 (domestic household applications)
Interference immunity	according EN 61000-6-2 (industrial applications)

Accuracy and measuring ranges				
Type		**CPG-200AV**	**CPG-1000AV**	**CPG-6000AV**
Pressure measuring range max.		0...200 Pa *(0...0.8 in.wg)*	0...1000 Pa *(0...4.0 in.wg)*	0...6000 Pa *(0...24.0 in.wg)*
Tolerance zero point max.*)	%	+/- 1.35	+/- 0.9	+/- 0.9
Tolerance full scale max.	%	+/- 1.95	+/- 1.3	+/- 0.7
Resolution	%	0.1	0.1	0.1
Total of linearity, hysteresis and repeatability max.	%	1,0	0.6	0.6
Long term stability according to DIN EN 60770	%	+/-1.0	+/- 1.0	+/- 1.0
Temperature coefficient typical	% / 10K	+/- 0.2	+/- 0.2	+/- 0.2
Temperature coefficient max.	% / 10K	+/- 0.4	+/- 0.4	+/- 0.4
Temperature coefficient sensitivity typical	% / 10K	+/- 0.3	+/- 0.2	+/- 0.2
Temperature coefficient sensitivity max.	% / 10K	+/- 0.6	+/- 0.4	+/- 0.4
The accuracy data are percentages and refer to the maximum possible measuring range of the respective type. Test conditions: 25 °C, 45 % RH, voltage supply 12 VDC				

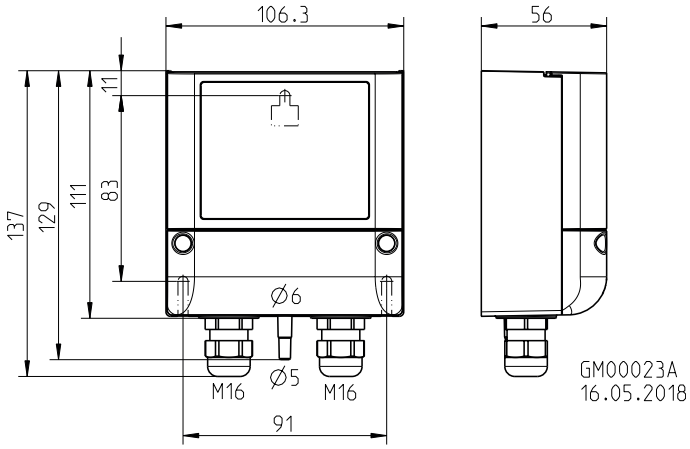
*) *Calibration is possible to reduce the zero point error ☞ zero point calibration*

8.2 Connection diagram



1 *Voltage supply 10...24 V DC*
2 *Output 0...10 V*
3 *Pressure connections*
4 *Voltage input for switch over Setpoint 1 / Setpoint 2*

8.3 Dimensions [mm]



8.4 Manufacturer reference CE

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:

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Heinz-Ziehl-Straße
74653 Künzelsau
phone: +49 (0) 7940 16-0
info@ziehl-abegg.de
http://www.ziehl-abegg.com

8.5 Service information

If you have any technical questions while commissioning or regarding malfunctions, please contact our technical support for control systems - ventilation technology.
phone: +49 (0) 7940 16-800
Email: fan-controls-service@ziehl-abegg.de

Our worldwide contacts are available in our subsidiaries for deliveries outside of Germany, see www.ziehl-abegg.com.