HE 5409

Differential pressure measuring transducer

Operating instructions

(Original in German)

HESCH
AUTOMATION
AXXERON TECHNOLOGIES MEMBER

#341539 version 1.7

Imprint

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Document history

Date / Version	Description	Author
31.08.2017 / 1.0	Revised version according to redesign of device	De
14.12.2017 / 1.1	Chapter 6: update of technical data (max. differential pressure) Chapter 2: Safety instruction added (short-circuit protection)	De
07.03.2018 / 1.2	Picture front page modified	De
25.03.2019 / 1.3	Chapter 6 Technical data: Operating temperature in EX zone added	Bg
20.05.2019 / 1.4	Chapter 3.1: bilingual type label added	De
12.08.2019 / 1.5	Chapter 5: clean gas / raw gas corrected	Bg
20.01.2020 / 1.4	Chapter 6: new cable connection M 20, because from now on the housing of HE 5411 is used (according to change request 5409xxx from 18.09.2019)	Bg
16.02.2023 / 1.7	Validity of operating instructions for ATEX devices and Non-ATEX devices	Bg

Table of content

1. Legal conditions

Manufacturer

AXXERON HESCH electronics GmbH, Boschstrasse 8, 31535 NEUSTADT, GERMANY

Intended use

- The differential pressure measuring transducer HE 5409 is a universal measuring transducer for small and medium pressures.
- The device can be operated within the authorised application and ambient conditions without compromising its safety.
- The manufacturer is not liable for improper use and personal and material damages resulting thereof; the user bears the risk alone. Not complying with the above mentioned criteria regarding the intended use will result in expiration of warranty and liability for the device.

Note!
The device is available as **ATEX-approved device for use in EX zone 22 and 2 as well as without ATEX approval**. If you have ordered an ATEX-approved device, you must necessarily observe the safety instructions for explosion protection, the indication on the name plate as well as the special regulations in *chapter 2.4 Device identification.*

Qualification of personnel

Only skilled electricians with sufficient knowledge in electrical engineering are allowed to perform all work on the device.

Device safety

The device has been built and tested according to VDE 0411 EN 61010-1 and has left the factory in a safety-related impeccable condition. The user must observe the mentioned instructions and warnings in this manual to keep this condition and to ensure a safe operation.

Declaration of Conformity

The valid declaration of conformity is available in the download center of our website https://www.hesch-automation.com/en/support/download-center/. Click on the tab **Declarations of Conformity** to select your device.

2. Safety instructions

2.1 Symbols and general safety instructions

This chapter consists of important safety regulations and instructions. Prior to operating the device, it is mandatory to read this chapter thoroughly to prevent personal and material damages.

Symbols used

Following symbols are used in these operating instructions. All safety instructions are standardised.

Warning against personal injuries!
The respective signal word indicates the level of danger.

Warning against explosive atmosphere!

Warning against dangerous electrical current!

Warning against material damage due to electrostatic loading!

Warning against material damage!

Note!
Indicates possible malfunctioning and provides instructions for optimal operating conditions.

2.2 Signal words

DANGER!
Indicates an immediate danger with *high* risk, which can lead to death or severe personal injury if it is not prevented.

WARNING!
Indicates an immediate danger with *medium* risk, which can lead to death or severe personal injury if it is not prevented.

CAUTION!
Indicates an immediate danger with *low* risk, which can lead to minor or moderate personal injury if it is not prevented.

2.3 Safety during the individual operating phases

Following safety instructions must be observed during the assembly of the device.

Danger due to electric shock!
All utilised power supplies must be switched off prior to the work. The electric cables must be installed according to the respective country regulations (German VDE 0100). The measuring cables must be installed separately from the power cord. The connection between the protective ground conductor connection (in the respective device carrier) and a protective ground conductor must be established.

Danger due to electric shock!
Due to any disconnection of the protective ground conductor in the device carrier the device can become dangerous. Intended disconnections are not permitted. The device must be shut down and secured against unintended use in case it is assumed that a safe operation is no more possible.

Danger due to electric shock!
Do not open live devices! Active parts can be exposed during opening devices or removing covers. Connection points can be active as well!

Attention!
The device shall never be operated despite visible defects.

Warning!
Short-circuit protection must be provided in the feed circuit.

Attention!
Observe the applicable accident prevention regulations for your system, such as e.g. the German Statutory Accident Insurance Association (DGUV) regulation 3 "electrical systems and operating materials" during assembly, commissioning, maintenance and removal of defects.

Attention!
Clean contaminated contacts with oil-free compressed air or spirit and a lint-free cloth.

Material damages due to electrostatic loading!
Observe the safety measures according to DIN EN 61340-51/-3 to prevent an electrostatic loading!

Electrical connection!
The electric cables must be installed according to the respective country regulations (in Germany VDE 0100). The measuring cables must be installed separately from the power cord. The connection between the protective ground conductor connection (in the respective device carrier) and a protective ground conductor must be established.

Explosion protection! (for ATEX approved devices only!)
It is permitted to use the device in explosion zone 22 and 2 with closed lid. It is mandatory to ensure that no explosive ambient conditions, such as e.g. development of dust or gas exist, before opening the device for e.g. parametrisation.

Troubleshooting!
All possibilities of trouble sources at add-on devices respectively supply lines (measuring lines, wiring, sequential devices) must be considered at the beginning of the troubleshooting. We recommend sending the device to the supplier in case the error has not been detected after reviewing these points.

Decommissioning!
Disconnect the power supply at all poles to decommission the device.
Secure the device against unintended operation!
Prior to the disconnection the impacts must be considered and respective measures must be taken, if the device is connected to other devices and / or equipment.

2.4 Device identification

Note!
The device is available as **ATEX-approved device for use in EX zone 22 and 2 as well as without ATEX approval**. If you have ordered an ATEX-approved device, you must necessarily observe the safety instructions for explosion protection, the indication on the name plate as well as the special regulations in *chapter 2.4 Device identification.*

The devices are labelled as follows:

With ATEX:	Without ATEX:
UKCA CE Ex II3D Ex tc IIIC T135°C Dc IP65	UKCA CE
UKCA CE Ex II3G Ex nR IIC T4 Gc	

Ex II3D Ex tc IIIC T135°C Dc IP65

II3D	Device category:	Use in zone 22 for dust in standard operation.
Ex	Indicates an electrical operating material standards of series EN 60079-0ff. were applied.	
tc	Ignition protection type:	Protection by housing
IIIC	Explosion group:	Conductive dust
T135 °C	Temperature setting:	Maximum permitted surface temperature
Dc	Device protection level:	Use in zone 22 for dust
IP65	Protection type:	Dust proof and splash-water protected

Ex II3G Ex nR IIC T4 Gc

II3G	Device category/ Ex-atmosphere:	Use in zone 2 for gas in standard operation
Ex	Indicates an electrical operating material. Standards of series EN 60079-0ff. were applied	
nR	Ignition protection type:	Protection by smoke-restricted housing
IIC	Explosion group:	Permitted for gases with an ignition power of <60µJ (e,g. hydrogen)
T4	Temperature setting:	Maximum permitted surface temperature (135 °C)
Gc	Device protection level:	Use in zone 2 for gas

The following special regulations must be observed:

- Cables must be professionally connected in the screw fitting.
- Not required housing bores must be professionally closed by a locking bolt.
  The ATEX certification remains valid only if the installation is professionally performed according to the protection type mentioned on the labelling.
- The housing shall only be cleaned with damp cleaning cloths to prevent static loading.
- Cleaning is required to prevent increased dust on the device.
- Operation at live parts, in EX zone 22 and 2, only in closed condition.
- Ensure the device housing is dust-free prior to closing it.

3. Device description

3.1 Device view

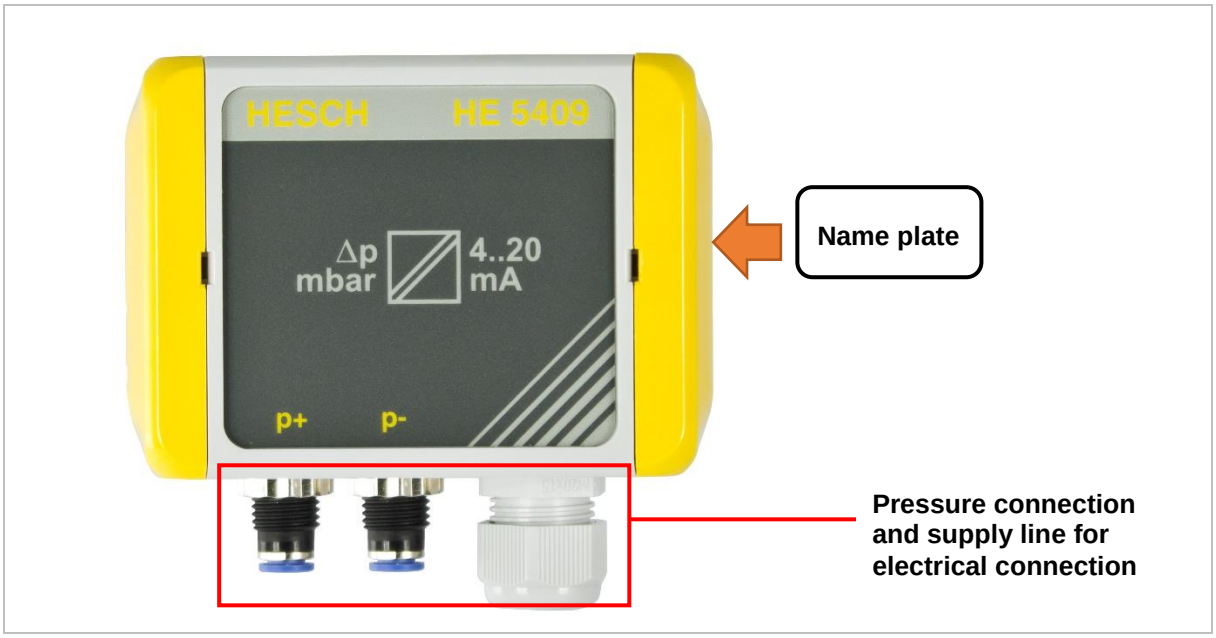

Figure 1. HE 5409 front view

Name plate for <u>ATEX approved</u> devices:	**Name plate for devices <u>without ATEX approval:</u>**
HESCH HE 5409 dp-Messumformer # 5409 5099 Netz | *power* 10...36 VDC Messbereich | *range* 0...50 mbar S.-Nr. | *serial no.* 00594813 HESCH Industrie-Elektronik GmbH Boschstraße 8 | DE 31535 Neustadt Tel.: +49 5032 9535-0 | www.hesch.de II3D Ex tc IIIC T135°C Dc IP65 II3G Ex nR IIC T4 Gc	HESCH HE 5409 dp-Messumformer # 5409 0099 0150 Netz | *power* 10...36 VDC Messbereich | *range* 0...50 mbar S.-Nr. | *serial no.* 00605116 HESCH Industrie-Elektronik GmbH Boschstraße 8 | DE 31535 Neustadt Tel.: +49 5032 9535-0 | www.hesch.de

Figure 2. Name plates

Assembly of measuring hose at the pressure connection

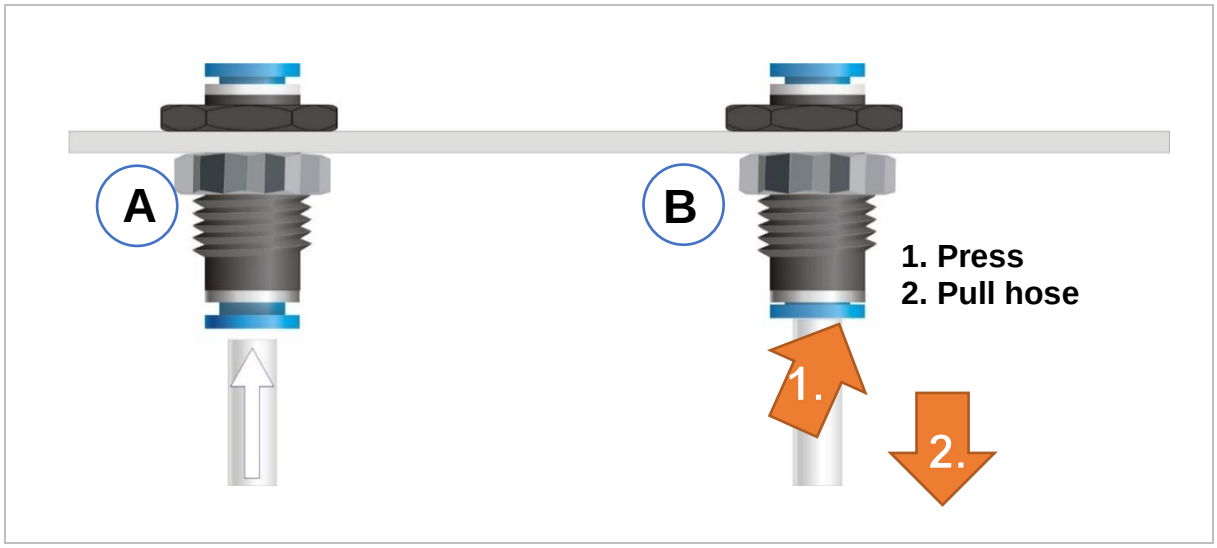

Figure 3. Assembly of hose at push-in bulkhead connector

A Connect hose

Push hose with 6 mm outer diameter into the connection.

B Release hose

1. Press on the blue locking ring to open the closure.
2. Pull the hose out of the connection.

4. Installation

Note!
If you want to drill the device to the wall, *Figure 4* can be used as a drilling template.

The measuring transducer HE 5409 must not be installed near heat sources. The ambient temperature at the place of installation must not exceed the permitted nominal temperature for operation mentioned in *chapter 6 Technical data.*

Note !
ATEX approved devices may be installed **in EX zone 22 and 2**. You must necessarily observe the safety instructions for explosion protection, the indication on the name plate as well as the special regulations' in *chapter 2.4 Device identification.*

Dimensions

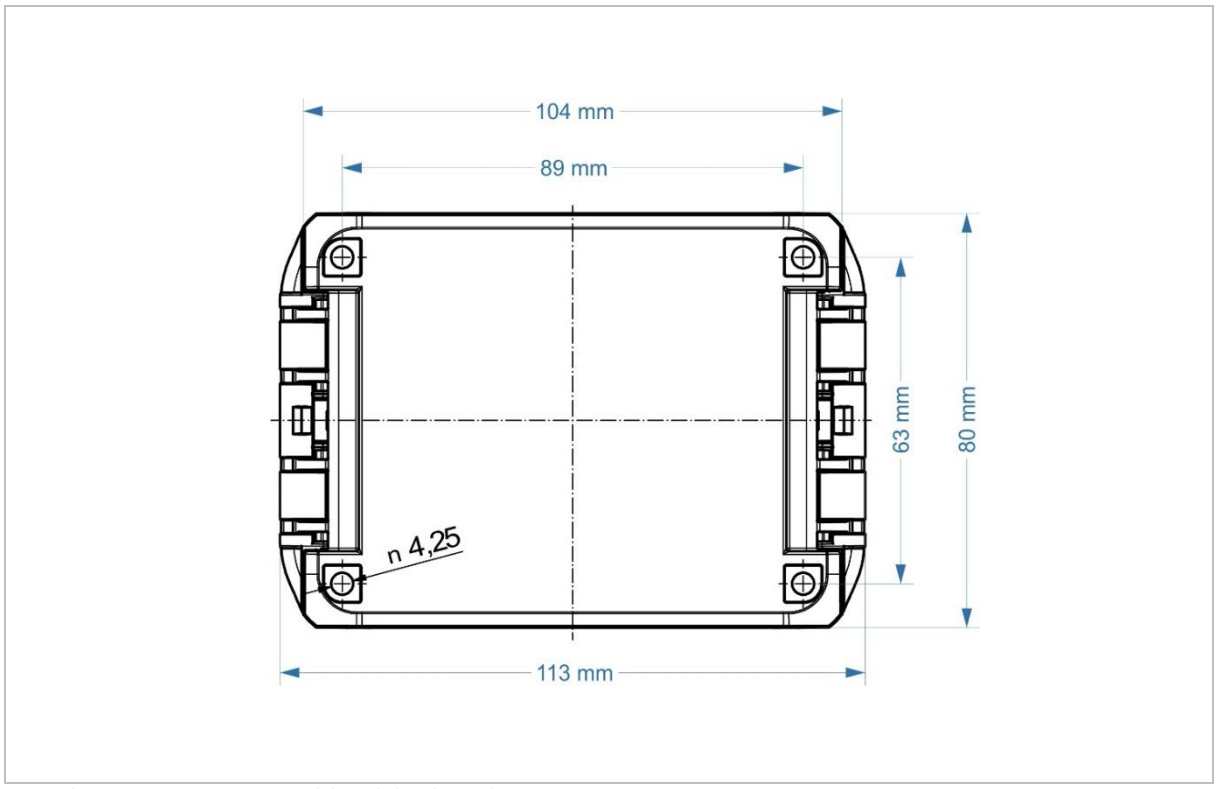

Figure 4. Reverse side of the housing

Scope of delivery

- HE 5409
- Operating instructions

Please note!
After receipt, check the delivery for completeness and visible defects. In case of complaint, contact your responsible representative of AXXERON HESCH electronics GmbH.

Opening of the device

Opening and closing is performed by hinge technology without screws. A slit screwdriver is required to open the device. The screwdriver must be positioned at the intended position at the housing lid (*see Figure 5)*.

Note!
Make sure to move the **screwdriver to the right** to open the hinge (*see Figure 5)*. If the screwdriver is moved to the left, the housing cover may be damaged.

The housing lid can be opened to the left up to an angle of 105°.
Optionally, the housing lid can be closed by 4 screws in addition *(see 7 Accessories)* to protect it from unauthorised access. For futher information, please contact your service representative of AXXERON HESCH electronics GmbH.

The hinge closure without screws is recommended for a quick service access.

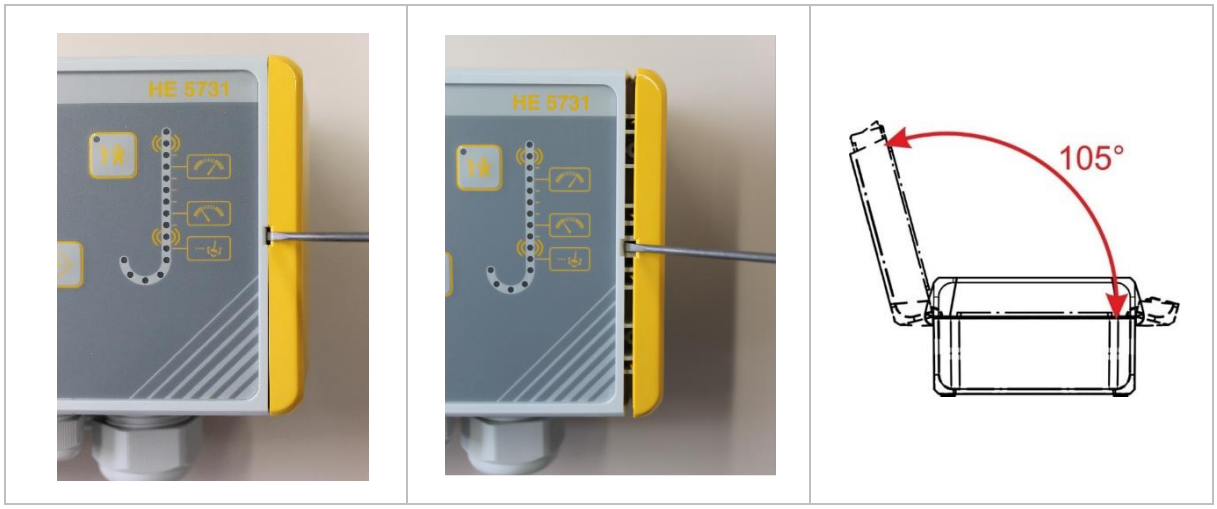

Figure 5. Opening housing lid to the left (figure shows similar device)

Device installation

Screws are required for wall mounting. (Not included in the scope of delivery!)

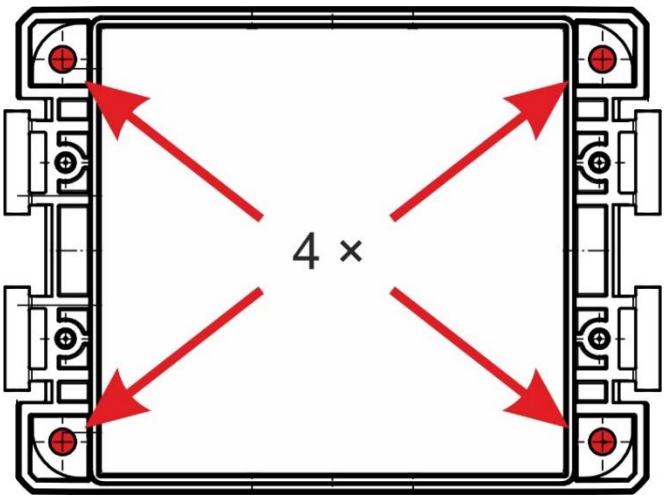

Figure 6. Housing base

Alternative: wall mounting with wall brackets *(see chapter 7 Accessories)*

5. Commissioning

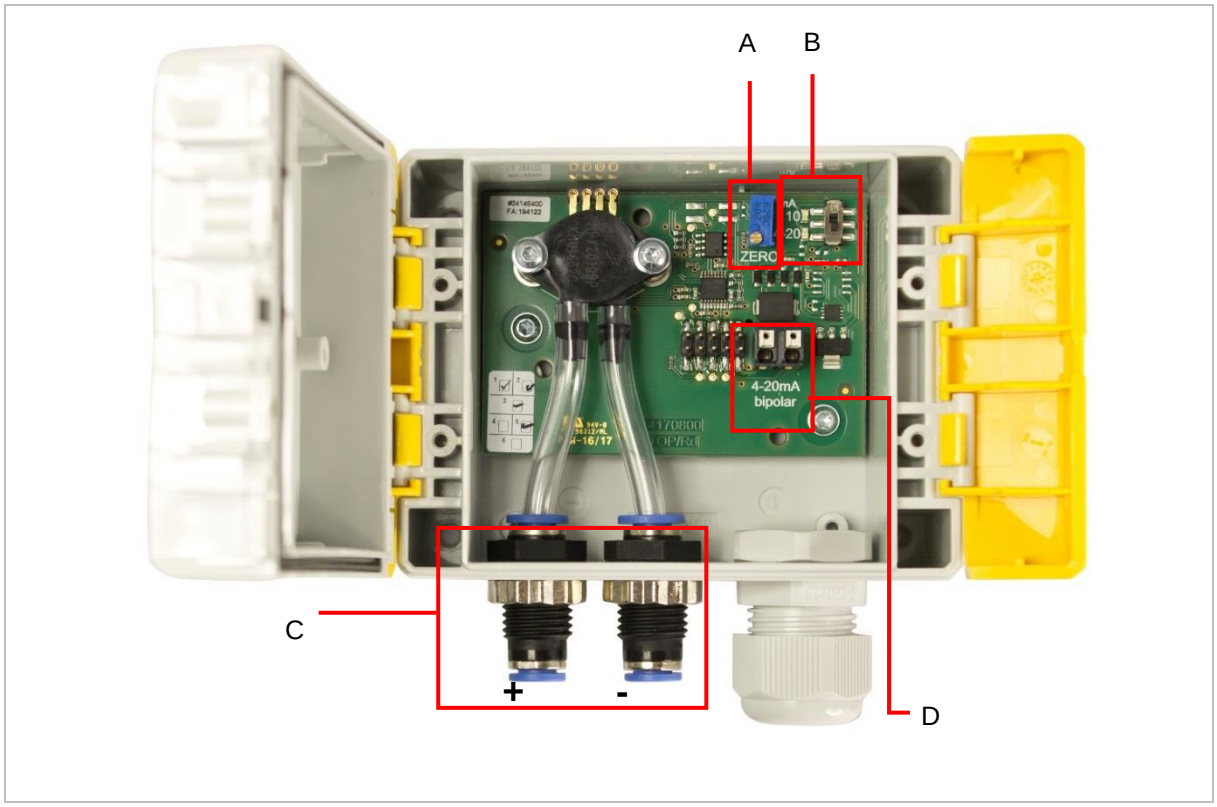

Figure 7. HE 5409 with open lid

A Zero point setting

Please note!
The correct value of the device has been set in the factory and does not need to be changed.

A warm-up time of 30 minutes must be considered if the zero point must be set.
The zero point of the measuring transducer is set on 4 mA by the potentiometer.

B Test switch

The output signal can be switched from 4...20 mA to 10 mA by the switch to control the correct connection.

C Pressure inputs

The pressure inputs must be connected via short hoses.
Attention: p+ (raw gas) greater than p- (clean gas).

D Electrical connection

The device is suitable for the connection at 10…36 V DC. Pay attention to the correct value of the power supply voltage. Otherwise the device will be destroyed.
The connection takes place via spring force terminals for 0.2 … 1.5 mm² conductors.
The input is bipolar and can be connected as needed. The measuring value of the differential pressure corresponds to the power consumption of the device.

Warning!
Short-circuit protection must be provided in the feed circuit.

Connection diagram

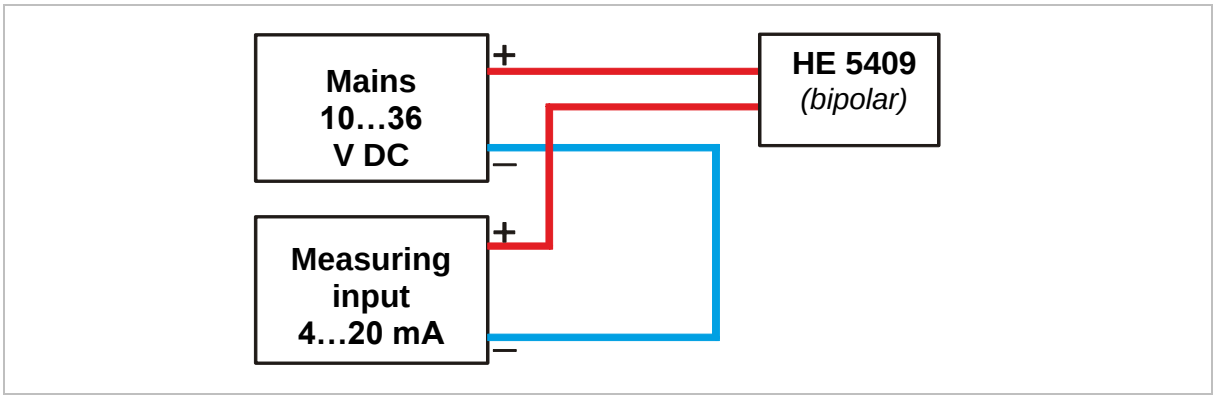

Figure 8. Connection diagram

6. Technical data

Technical data	
Measuring range	0…10 mbar; 0…25 mbar; 0…50 mbar; 0…100 mbar; 0…1000 mbar according to name plate
Max. differential pressure	Measuring range 0…10 mbar: 100 mbar
	Measuring range 0…100 mbar: 750 mbar
	Measuring range 0…1000 mbar: 4000 mbar
Medium	Air and dry, non-aggressive gases
Basic accuracy	± 1 % of final value
Temperature drift	± 0.05 % / K of final value
Hysteresis	± 0.05 % / of final value
Measuring system	Semiconductor sensor
Auxiliary power	U_b = 10…36 V DC
Analogue output	4…20 mA, 2-conductor technology
Max. load resistance	$R_A \leq (U_b - 9\ V) / 0.02\ A$
Pressure connection	Push-in bulkhead connectors for 6 mm hose outer diameter
Housing	Dust-protected housing
Dimension	113 × 80 × 60 (W × H × D)
Protection type	IP 65
Assembly	Wall mounting, installation position vertical
Connection	Spring force terminal
Cable screw connector	1 × M 20 × 1.5 N for cable diameters of 6…12 mm
Device identification with ATEX	UKCA CE Ex II3D Ex tc IIIC T135°C Dc IP65 Ex II3G Ex nR IIC T4 Gc
Device identification without ATEX	UKCA CE
Climatic ambient conditions	
Storage	-20 ° … +70 °C
Transport	-40 ° … +85 °C
Operation	• -20 ° … +55 °C • In EX zone: -20° C…+40° C
Relative humidity	75 % relative humidity, no condensation
Safety related operating figures	
MTBF	646 years
MTTFd	1292 years
Service life	Max. 10 years
Category according to EN-ISO 13849	B
Calculation methods according to EN-ISO 13849	Parts count
Ambient temperature	50 °C

Subject to technical modifications!

7. Accessories

AXXERON HESCH electronics GmbH offers a series of optimal accessories for assembly and connection technology of HE 5409.

Item no.	Illustration	Name	Order number
1		**Wall brackets** for alternative mounting of housing of HE 5409 Colour: Light grey	Upon request
2		**Housing hinge closure** Available in different colours: Light grey, graphite grey, bright red, ultramarine blue	Upon request
3		**Screw set (4 pc.)** for optimal screw connection of the housing Factory standard 1412, 30×18×10, crosspoint, left hand thread	B SHR
4		**Delta-p connection adapter**	# 54990001
5		**Universal adapter set** for push-in screw, PU hose Ø i=4 mm / Ø a=6 mm on Whitworth pipe thread G¼"	# 54210099

Accessories for magnetic valve controllers

6		**AXXERON HESCH Premium valve cable** Incl. of plug and core end sleeve	
		0.65 m	# 63500006
		2.50 m	# 63500002
		5.00 m	# 63500003
		8.00 m	# 67250004

8. Maintenance and service

Maintenance and repair

The device must be cleaned regularly to prevent increased dust on the device.

Disposal

Dispatch metals and plastics for recycling. The electrical and electronic components must be collected separately and disposed of accordingly. Dispose of assembled PCBs in a proper manner.

Service

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