

HE 5409

Differential pressure measuring
transducer



Operating instructions

(Original in German)

Legal information

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31.08.2017 / 1.0	Revised version according to redesign of device
08.3.2018 / 1.1	Cover picture updated
27.03.2019 / 1.2	Chapter 6 Technical data: Operating temperature in EX Zone added
12.08.2019 / 1.3	Chapter 3.1: bilingual type label added Chapter 5: clean gas / raw gas corrected
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)

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1. Legal conditions

Manufacturer

HESCH Industrie-Elektronik GmbH, Boschstrasse 8, D-31535 Neustadt, Germany

Intended use

- The differential pressure measuring transducer HE 5409 is an 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.

Qualification of personnel

Only skilled electricians with sufficient knowledge in electrical engineering shall perform all work at the measuring transducer.

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

Please refer to www.hesch.de for a valid declaration of conformity.

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 damages due to electrostatic loading!



Warning against material damages!



Please 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.



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!

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, exist prior to opening the device for e.g. parametrisation.

2.4 Device identification

The device bears the following label:   **II3D Ex tc IIIC T135°C Dc IP65**
 **II3G Ex nR IIC T4 Gc**

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-Off. 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

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-Off. were applied	
nR	Ignition protection type:	Protection by smoke-restricted housing
IIC	Explosion group:	Permitted for gases with an ignition power of <math><60\mu\text{J}</math> (e.g. hydrogen)
T4	Temperature setting:	Maximum permitted surface temperature (135 °C)
Gc	Device protection level:	Use in zone 2 for gas
IP65	Protection type:	Dust proof and splash-water protected



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 to send the device to the supplier in case the error has not been detected after reviewing these points.



Decommissioning!

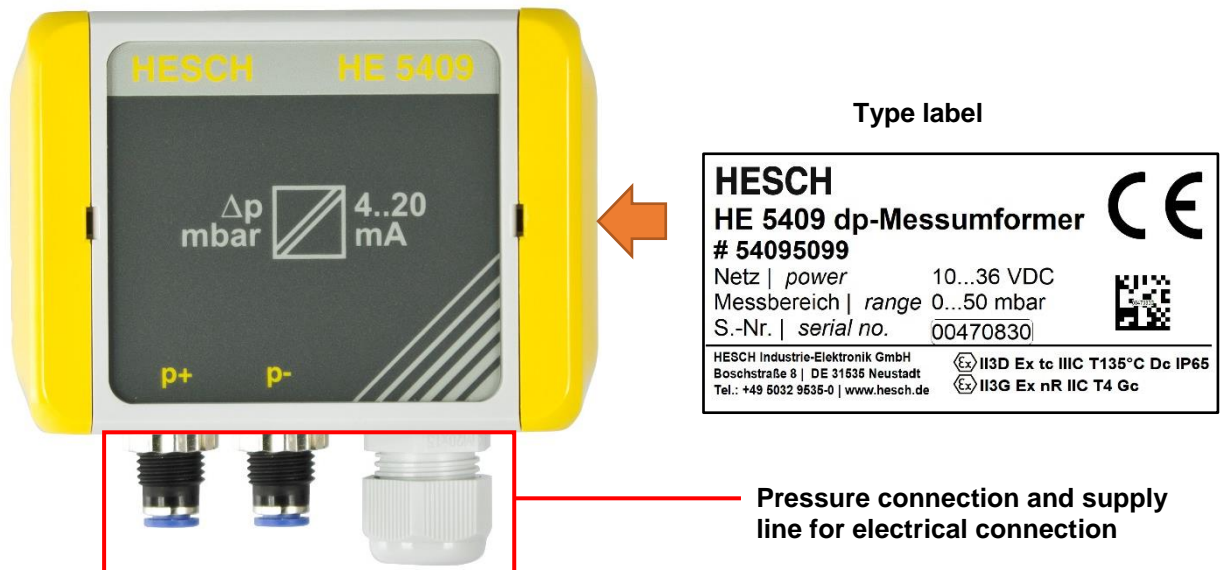
Disconnect the power supply at all poles to decommission the device. Secure the device against unintended operation!
 Prior to the disconnection the impacts must be considered and respective measures must be taken if the device is connected to other devices and / or equipments.

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 zone 22, only in closed condition.
- Ensure the device housing is dust-free prior to closing it.

3. Device description

3.1 Device view



Assembly of measuring hose at the pressure connection

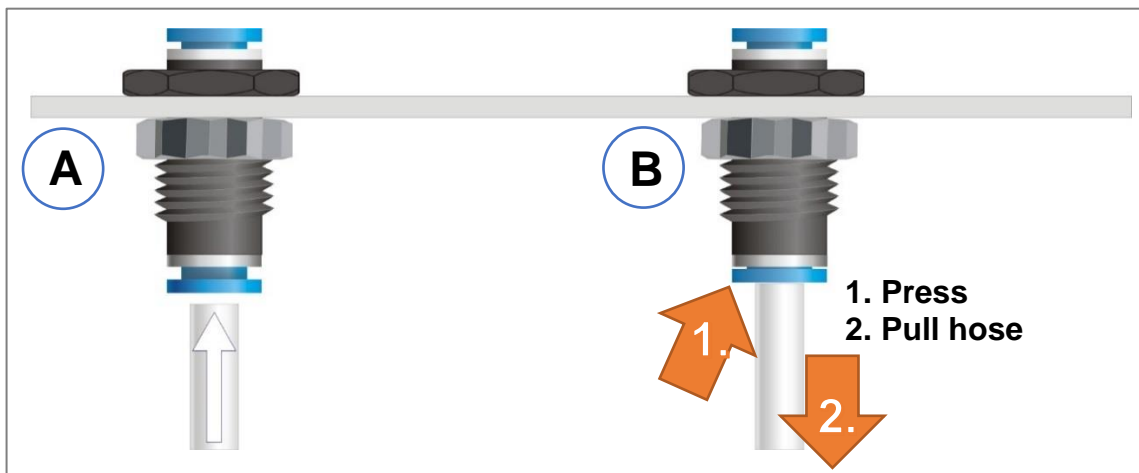


Illustration 1. Assembly of hose at push-in bulkhead connector

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. Assembly



Please note!

Regarding a **drilling template** please refer to our website:

www.hesch.de

Please ensure during printing that the document is printed 1:1. Ensure the dimensional accuracy of the printout prior to drilling.

The assembly of the measuring transducer HE 5409 should possibly not take place in the vicinity of heat sources. The ambient temperature at the assembly site must not exceed the permitted nominal temperature for operation mentioned in the "Technical Data" (page 14). It is permitted to assemble the device in areas of explosion class EX ATEX zone 22 and 2. The special regulations must be observed, see *chapter 2.4 device identification on page 7*.

Dimensions

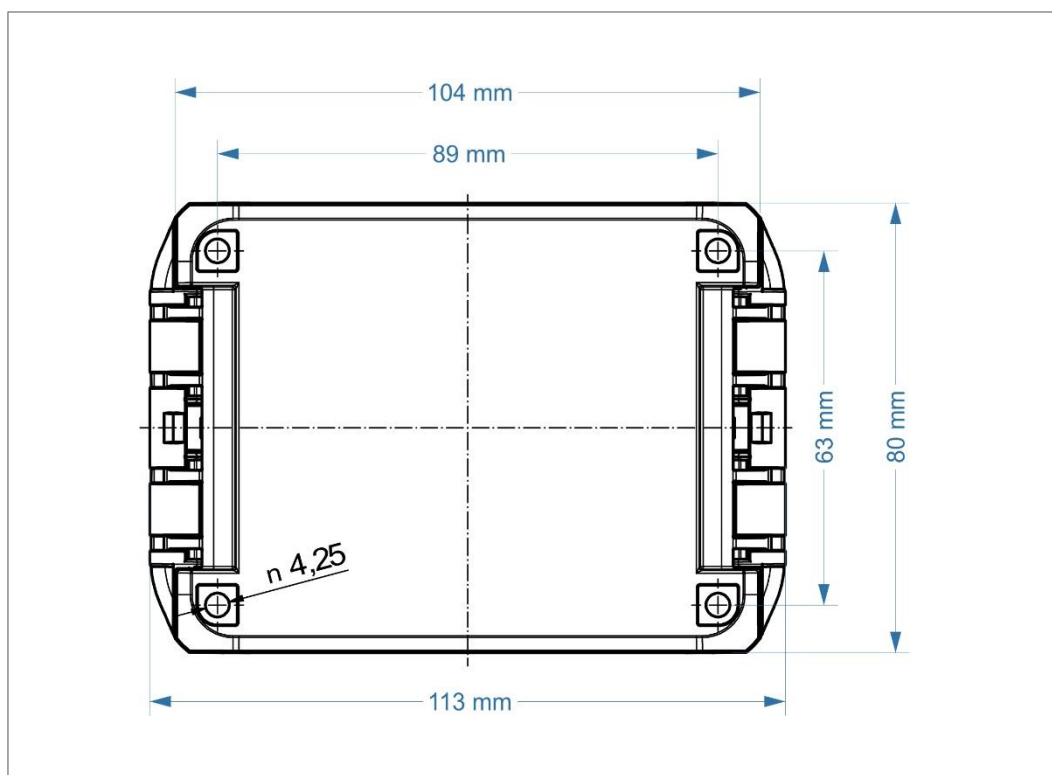


Illustration 2. Reverse side of the housing

Scope of delivery

- HE 5409
- Operating instructions



Please note!

After receipt, check the delivery for completeness and visible defects. Immediately inform your respective HESCH agent in case of a claim.

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 to break the hinge open. The housing lid must be opened to the left up to an angle of 105°.

Optional, in addition, the housing lid can be closed by 4 screws (see accessory list, item no.3 on page 15) to protect it from unauthorised access.

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

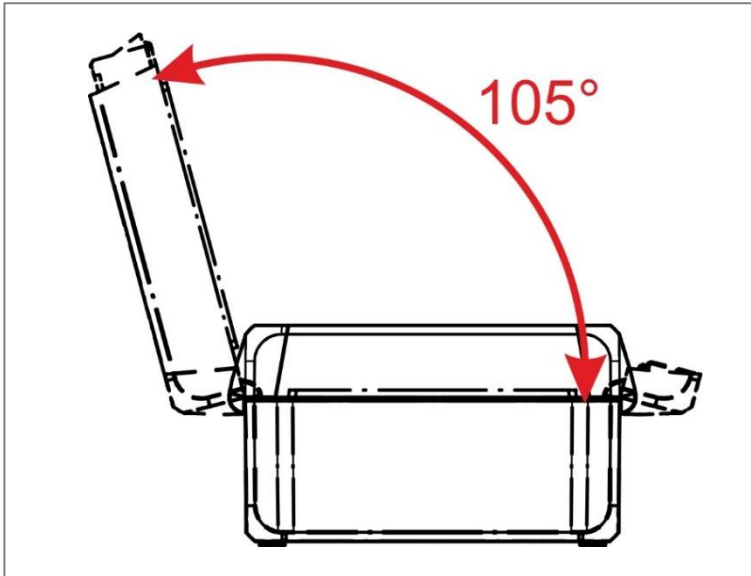


Illustration 3. Open housing lid to the left

Assembling of the device

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

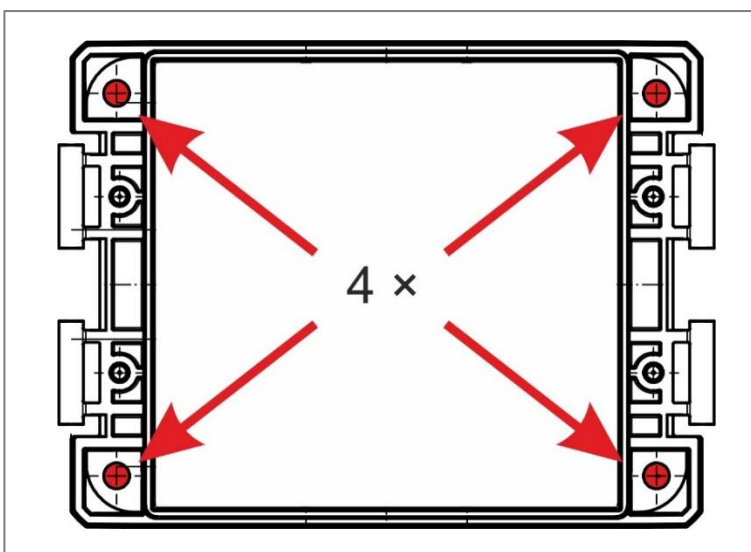


Illustration 4. Housing base

Alternative: wall mounting with wall brackets. (See accessories list on page 15, chapter 7)

5. Commissioning

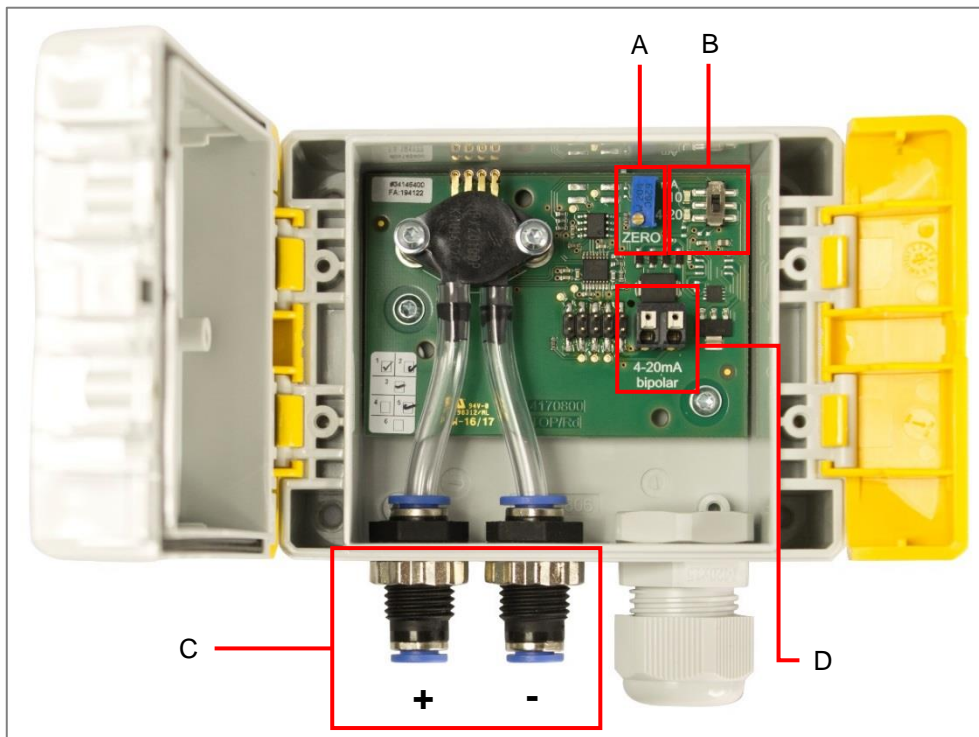


Illustration 5. HE 5409 with open housing lid

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).

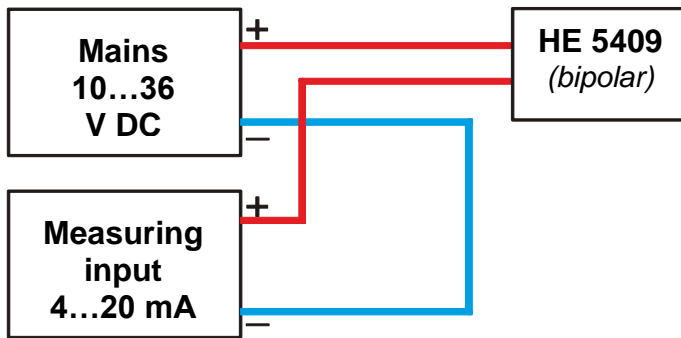
D Electrical connection

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.

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 the information on the type label
Max. differential pressure	750 mbar
Max. ambient pressure	1000 mbar
Medium	Air and dry, not 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	$U_b = 10 \dots 36$ V DC
Analogue output	4...20 mA, 2-conductor technology
Max. load resistance	$R_A \leq (U_b - 9 \text{ V}) / 0.02 \text{ A}$
Pressure connection	Push-in bulkhead connectors for 6 mm hose outer diameter
Housing	Dust-protected housing
Dimension	113 x 80 x 60 (W x H x D)
Protection type	IP 65
Assembly	Wall mounting, assembly position vertical
Connection	Spring force terminal
Cable screw connector	1 x M 20 x 1.5 N for cable diameters of 6...12 mm
Device identification/ explosion protection	  II3D Ex tc IIIC T135°C Dc IP65  II3G Ex nR IIC T4 Gc
Climatic ambient conditions	
Storage	-20 ° ... +70 °C
Transport	-40 ° ... +85 °C
Operation	<ul style="list-style-type: none"> -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

Hesch 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, 30x18x10, crosspoint, left hand thread	B SHR
4		Δp-connector set for HE 54xx and Δp-magnetic valve controls. PVC hose Ø i=4 mm Ø a=6 mm	# 54109999
5		Universal adapter set for push-in screw, PU hose Ø i=4 mm / Ø a=6 mm on Whitworth pipe thread G1/4"	# 54210099

Accessories for magnetic valve controls

6		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

Put metals and plastics for recycling. Electro and electronic components must be collected separately and disposed accordingly. Dispose equipped circuit boards in a professional manner.

Service

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