HE 5411

Differential pressure transmitter with limit signal



Operating Instructions

(Translation of Original German version)



Legal notice

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TABLE OF CONTENTS

1	LI	EGAL PROVISIONS	5
2	S	AFETY INFORMATION	6
	2.1 2.2 2.3 2.4 2.5	SYMBOLS AND BASIC SAFETY INSTRUCTIONS SIGNAL WORDS SAFETY IN THE INDIVIDUAL OPERATING PHASES SPECIAL REGULATIONS DEVICE IDENTIFICATION	6 7 8
3	T	ECHNICAL DATA	
4	N	MOUNTING	14
	4.1 4.2 4.3	DIMENSIONS OPENING THE DEVICE MOUNTING THE DEVICE	15 16
5	D	DEVICE DESCRIPTION	17
	5.1 <i>5</i> .	OVERVIEW OF DEVICE VERSIONS	
6	El	LECTRICAL COMMISSIONING	19
7	6.2	ELECTRICAL CONNECTIONS	22 24
′			
		Z.1.1 "Limit threshold" mode	27
8	o	PERATION	2 9
	8.1 8.2 8.3 8.4 8.5 8.6	OFFSET FOR ZEROING OFFSET FOR ZEROING WITH DEVICE KEYPAD (HE 5411 PREMIUM) LIMIT VALUE PARAMETER SETTING WITH DEVICE KEYPAD (HE 5411 PREMIUM) ANALOGUE OUTPUT SWITCH SETTING THE MEASURING RANGE TEST MODE	30 31 32
9	P	PARAMETER SETTING WITH SERVICE PC	34
	9.1	Parameter Table	35
10)	ERROR MESSAGES	42
11	L	ACCESSORIES	43
12	2	MAINTENANCE AND SERVICE	45

1 Legal Provisions

Manufacturer

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

Intended use

- The HE 5411 differential pressure transmitter is a universal pressure transmitter, mainly used in dedusting industry. It can also be used for measuring overpressure in clean rooms.
- The device can be operated within the operating and environmental conditions approved in these operating instructions without impairing its safety.
- The manufacturer is not liable for improper use and any resulting personal injury or material damage; the risk is borne solely by the user. Failure to comply with the above criteria for intended use will result in the expiry of the warranty and liability for the device.



Note!

If the device, according to nameplate, is suitable for EX zone 2 and / or 22, you must strictly observe the safety notes for explosion protection!

Devices with a **measuring range of \pm 1.25 mbar**, regardless of the device version, are **not** suitable for use in areas with potentially explosive atmospheres.

Personnel qualification

All work on the differential pressure transmitter may only be carried out by qualified electricians with sufficient knowledge in the field of electrical engineering.

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 centre of our website https://www.hesch-automation.com/en/support/download-center/ underneath section Declaration of Conformity.

2 Safety Information

2.1 Symbols and Basic Safety Instructions

This chapter contains important safety regulations and notes. To protect against personal injury and material damage, it is necessary to read this chapter carefully before working with the device.

Symbols used

The following symbols are used in this manual. All safety instructions have a uniform structure.



Personal Injury Warning!

The severity of the danger is indicated by the respective signal word.



Explosive atmosphere warning sign!



High Voltage Warning!



Warning of material damage caused by electrostatic charge!



Property Damage Warning!



Note!

Identifies possible malfunctions and indicates optimum operating conditions.

2.2 Signal Words

DANGER!

Indicates an imminently hazardous *high* risk situation, which, if not avoided, will result in death or serious injury.

WARNING!

Indicates a potentially hazardous *medium* risk situation, which, if not avoided, could result in death or serious injury.

CAUTION!

Indicates a hazardous *low* risk situation, which, if not avoided, could result in minor or moderate injury.

2.3 Safety in the individual operating phases

When installing the device and during operation, the following safety instructions must be observed.



Danger of Electrocution!

Before working on the device, switch off all power supplies used. The electrical cables must be laid according to the respective national regulations (in Germany VDE 0100). The measuring lines must be laid separately from the mains leads.



Attention!

The device must never be put into operation despite visible damage.



Warning!

Ensure protection against short-circuiting in the supply circuit.



Attention!

During installation, commissioning, maintenance and troubleshooting, observe the accident prevention regulations applicable to your system, e.g. DGUV Regulation 3 "Electrical installations and equipment".



Attention!

Clean dirty contacts with oil-free compressed air or with spirit and a lint-free cloth.



Warning of material damage caused by electrostatic charge!

Observe the safety measures according to BS EN 61340-51/-3 to avoid electrostatic discharge!



Power Connection!

The electrical cables must be laid according to the respective national regulations (in Germany VDE 0100). The measuring lines must be laid separately from the mains leads.



Attention!

Cables must be inserted professionally into the housing through the cable glands.



Explosion Prevention!

HE 5411 Lite, Basic with a supply voltage of 19...36 V DC are, with closed cover, suitable for use in explosion zones 2 and 22.

HE 5411 Lite, Basic and Premium with a supply voltage of 100...240 V AC as well as Premium with 19...36 V DC are, with closed cover, only suitable for use in explosion zone 22.

Devices with a **measuring range of \pm 1.25 mbar** (regardless of the device version) are **not** suitable for use in areas with potentially explosive atmospheres.

Before opening the device, e.g. for parameter setting, it is absolutely necessary to ensure that no explosive atmosphere, such as formation of dust or gas, exist.



Troubleshooting!

At the beginning of troubleshooting, all possible sources of faults on additional devices or supply lines (measuring lines, wiring, downstream devices) should be taken into consideration. If the fault is not found after checking these points, we recommend sending the device to the supplier.



Decommissioning!

Switch off the power supply on all poles if the device is to be decommissioned. Secure the device against unintentional operation! If the device is connected to other devices and / or equipment, the effects must be considered and appropriate precautions taken before switching off.

2.4 Special regulations



Note!

Sealing bolts must be applied professionally to cable glands that are not used.

2.5 Device Identification



Note!

The HE 5411 is available in three different designs. The corresponding device identification can be found on the name plate.

For the 24 V DC devices with M12 connector, the device identifications below are identical (see chapter 6.1.1 Option: electrical connection via M12 connector (for 24 V DC devices only!)



The devices are marked as follows:

HE 5411 Lite 1936 V DC	HE 5411 Basic 1936 V DC	HE 5411 Premium 1936 V DC	HE 5411 measuring range ± 1,25 mbar
SK C €®	II3D Ex tc IIIC 1	135°C Dc IP65	ΩK C €
UK C €			

UK C COL	I3D Ex tc IIIC 1	125°C Do ID66	UK C C
HE 5411 Lite 100240 V AC	HE 5411 Basic 100240 V AC	HE 5411 Premium 100240 V AC	HE 5411 measuring range ± 1,25 mbar

€x II3D	Ex tc IIIC T135°C	Dc IP65	
II3D	Device category:	use in zone 22 for dust during normal operation	
Ex	Denotes electrical equipment. Standards of the EN 60079-0ff. series have been applied.		
tc	Type of ignition protection:	protection by housing	
IIIC	Explosion group:	conductive dusts	
T135°C	Temperature class:	maximum permissible surface temperature	
Dc	Device protection level:	use in zone 22 for dust	
IP65	Protection type:	dust-tight and protected against water jets	
€x II3G	Ex nR IIC T4 Gc		
II3G	Device category/ Ex. Atmosphere:	use in zone 2 for gas during normal operation	
Ex	Denotes electrical equipment. Standards of the EN 60079-0ff. series have been applied.		
nR	Type of ignition protection:	protection by restricted-breathing housing	
IIC	Explosion group:	certified for gases with an ignition power of <60μJ (e.g. hydrogen)	
T4	Temperature class:	maximum permissible surface temperature (135°C)	

Technical Data 3

Supply	
Voltage	1936 V DC oder 100240 V AC
Power consumption	Max. 2W

Sensor system ¹				
	According to name plate			
	max. measuring range	Overpressure ²	Burst pressure ³	
	± 1.25 mbar	500 mbar	1000 mbar	
	± 2.5 mbar	175 mbar	350 mbar	
Sensor	± 5 mbar			
Jenson	± 10 mbar			
	± 25 mbar	250 mbar	500 mbar	
	± 50 mbar	- 500 mbar	1000 mbar	
	± 100 mbar			
	± 350 mbar	2500 mbar	5000 mbar	
	± 1000 mbar			
Medium	Air as well as dry non-aggressive gases			
Measuring system	Piezoresistive			

System accuracy			
Measuring range (in mbar)	± 2.5± 10	± 25± 100	±350±1000
Basic accuracy	± 1.5 % FSO ⁴ T = 25 °C	± 1.0 % FSO T = 25 °C	± 0.5 % FSO T = 25 °C
Total errors	± 2 % FSO T = 060 °C	± 1.5 % FSO T = 060 °C	± 1.0 % FSO T = 060 °C
Pneumatic connection	Push-in bulkhead fittings for 6 mm hose-outer diameter (4 mm with reduction)		

Input / Output		
Analogue output:	010 V	0(4)20 mA
Max. permissible load	RL ≥ 1 kΩ	RA ≤ 500 Ω
Relay output	1 changeover contact 250 VAC, 5 A as limit value relay	
Service interface	USB / TTL adapter HE 5851 required (see chapter 11 Accessories)	

Specifications apply to galvanically isolated and non-galvanically isolated sensors.
 The overpressure is defined as the maximum pressure that may be exerted on a pressure connection so that the sensor

retains the specifications as soon as the pressure returns to the operating pressure range.

The burst pressure is defined as the maximum pressure that can be applied to one pressure port relative to the other port (or while only one pressure port is connected) without causing leakage in the sensor.

Abbreviation for Full Scale Output

Housing	
Туре	Dust-tight polycarbonate housing
Dimensions	113 \times 80 \times 60 (W \times H \times D) 113 \times 110 \times 60 (W \times H \times D) incl. connection coupling
Protection type	IP 65
Mounting	Wall-mounted, vertical mounting position
Cable gland	1 × M20 × 1.5 N (for cable diameters 612 mm) with multiple sealing insert for 2 x cables Ø 6 mm

Climatic environmental conditions		
Storage	-20°+60° C	
Transport	-20°+85° C	
Operation	-20°+55° C In EX zone: -20 °C+40 °C	
Relative air humidity	75% rel. humidity, no condensation	

Air and creepage distances		
Pollution degree	2	
Overvoltage category	II	
Material group	Illa	
Rated voltage	< 150 V AC, ≤ 250 V AC	
Test voltage (basic insulation):	1250 V AC, 1 min	
Test voltage (added insulation):	3000 V AC, 1 min	

Power connection				
Connection type	-push-in-spring connection -or optionally via M12 connector (for 24 V DC devices only)			
Wire size	0.2 mm ² 1.5 mm ²			
Flexible wire size	0.2 mm ² 1.5 mm ²			
AWG ⁵ wire size / kcmil ⁶	2416			
Flexible wire size with ferrule without plastic sleeve	0.2 mm ² 1.5 mm ²			
Flexible wire size with ferrule with plastic sleeve	0.2 mm ² 0.75 mm ²			

Extras	
Special characteristics	silicone free ⁷

 ⁵ American Wire Gauge
 ⁶ Kilo Circular Mils
 ⁷ Silicone is not used in the production process.

Mean Time Between Failures							
MTBF [a ⁸]	Power supply 1936 V DC without limit signal	Power supply 100240 V AC without limit signal	Power supply 1936 V DC with limit signal	Power supply 100240 V AC with limit signal			
Without display	545	167	-	-			
With display	486	161	431	119			

Mean Time to Dangerous Failure							
MTTF _d [a]	Power supply 1936 V DC without limit signal	Power supply 100240 V AC without limit signal	Power supply 1936 V DC with limit signal	Power supply 100240 V AC with limit signal			
Without display	1090	334	-	-			
With display	972	322	862	238			

⁸ anno

4 Mounting



Note!

If you want to mount the device to the wall, *Figure 1* can be used as a drilling template.

The ambient temperature at the installation point must not exceed the permissible temperature for nominal use specified in the technical data. The special regulations for use in EX zones must be observed (see chapter 2.3 Safety in the individual operating phases).

4.1 Dimensions

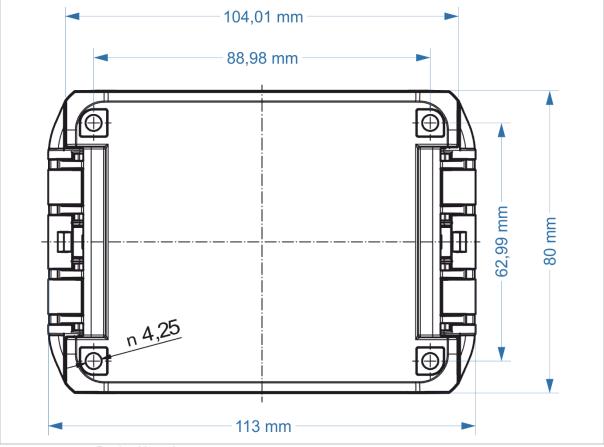


Figure 1. Back of housing

Scope of Delivery

- HE 5411 differential pressure transmitter
- Operating Instructions #340411



Note!

Upon receipt, check the delivery for completeness and visible defects. In case of complaint, contact your responsible representative at AXXERON HESCH electronics GmbH immediately.

4.2 Opening 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 2).



Note!

Make sure to move the **screwdriver to the right** to open the hinge (*see Figure 2*). 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 with 4 additional screws (see chapter 11 Accessories) in order to protect it from unauthorised access. For further information, please contact your service representative of AXXERON HESCH electronics GmbH.



Figure 2. Open the housing lid to the left (figure shows similar device)

4.3 Mounting the device



Note!

If you want to mount the device to the wall, *Figure 1* can be used as drilling template.

4 screws are required to fasten the device to the wall. (Not included in the scope of delivery!)

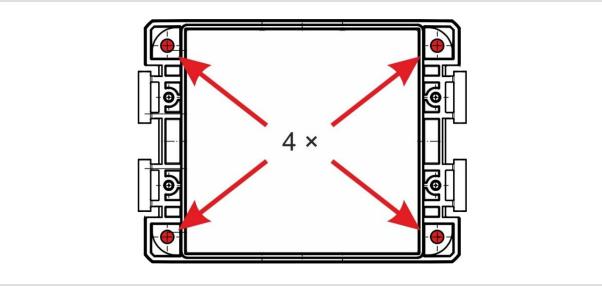


Figure 3. Housing bottom

Alternative: Fastening to the wall with wall brackets (see chapter 11 Accessories).

5 Device description

The differential pressure transmitter records the differential, over- and negative pressure between two pressure inputs, and converts the measurement value into a linear or square-rooted output signal of 0(4)...20 mA or 0...10 V.

The 4-digit 7-segment display of the Basic and Premium version allows the indication of negative pressures.

5.1 Overview of device versions

5.1.1 HE 5411 Lite / Basic / Premium (with limit signal ()



Figure 4. From left to right: HE 5411 Lite, HE 5411 Basic, HE 5411 Premium



Explosion Prevention!

HE 5411 Lite, Basic with a supply voltage of 19...36 V DC are, with closed cover, suitable for use in explosion zones 2 and 22.

HE 5411 Lite, Basic and Premium with a supply voltage of 100...240 V AC as well as Premium with 19...36 V DC are only suitable for use in explosion zone 22 with closed cover.

Devices with a measuring range of \pm 1.25 mbar (regardless of the device version) are not suitable for use in areas with potentially explosive atmospheres.

Before opening the device, e.g. for parameter setting, it is necessary to ensure that no explosive atmosphere, such as formation of dust or gas, exist.

Device versions with 19...36 V DC:

	HE 5411 Lite	HE 5411 Basic	HE 5411 Premium	HE 5411 measuring range ± 1.25 mbar
ATEX	Zone 2 + 22	Zone 2 + 22	Zone 22	9
No ATEX			'	X ¹⁰
With M12 plug connector	Zone 2 + 22	Zone 2 + 22	Zone 22	Х

Device versions with 100...240 V AC:

	HE 5411 Lite	HE 5411 Basic	HE 5411 Premium	HE 5411 measuring range ± 1.25 mbar
ATEX	Zone 22	Zone 22	Zone 22	
No ATEX				X



Note!

Optionally, <u>all 24 V DC devices are available with an M12 connector</u> (see chapter 6.1.1 Option: electrical connection via M12 connector (for 24 V DC devices only!)). The advantage of a device with M12 connector is that it is not necessary to open the device for electrical commissioning.

⁹ = device version not available

¹⁰ = device version available

6 Electrical Commissioning



Danger of Electrocution!

Electrical installation must only be carried out when the power is disconnected.



Warning of material damage caused by electrostatic charge! Observe the safety measures according to DIN EN 61340-51/-3 to avoid electrostatic discharge!



Property damage due to incorrect voltage supply!

The power supply must correspond to the voltage indicated on the nameplate.



Explosion Prevention!

HE 5411 Lite, Basic with a supply voltage of 19...36 V DC are, with closed cover, suitable for use in explosion zones 2 and 22.

HE 5411 Lite, Basic and Premium with a supply voltage of 100...240 V AC as well as Premium with 19...36 V DC are, with closed cover, suitable for use in explosion zone 22.

Devices with a measuring range of \pm 1.25 mbar (regardless of the device version) do not have an ATEX certification and <u>must not</u> be used in potentially explosive areas.

Before opening the device, e.g. for parameter setting, it is absolutely necessary to ensure that no explosive environmental conditions, such as formation of dust or gas, exist.



Note!

Before commissioning, please note the information on the nameplate!



Note!

The cables must be connected professionally to the cable glands.



Note!

The temperature limitations specified for the use of the device must be complied with before and during operation.

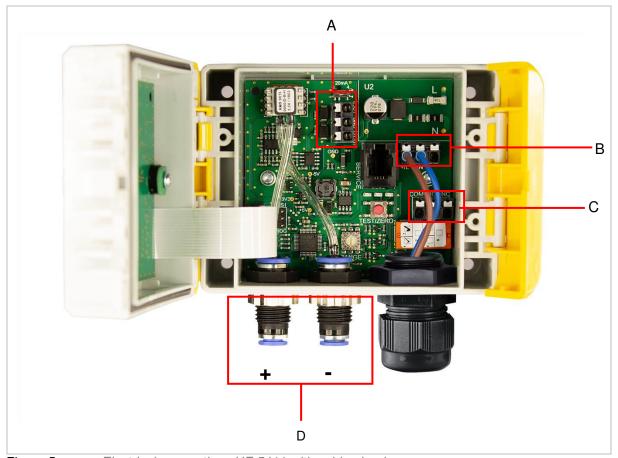


Figure 5. Electrical connections HE 5411 with cable glands

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6.1 Electrical connections

Connections		Meaning		
LOUT GND UOUT	A	Analogue output I OUT Current output 0(4)20 mA GND Ground U OUT Voltage output 010 V		
-000-	В	Supply voltage (Figur	re 5 shows 24 V DC devic	e)
		Connection	DC Signal Version	AC Signal Version
		+/L	1936 V DC	100240 V AC
+/L -/N		-/N	GND	N
	С	Relay output (limit va	llue)	
COM NO NC			NC NO	
+	D	Pressure inputs The pressure inputs ar hoses. These hoses m p+ (raw gas) larger tha		e shortest possible

6.1.1 Option: electrical connection via M12 connector (for 24 V DC devices only!)

Optionally to the regular connection procedure (see chapter 6.1 Electrical connections) all 24 V DC devices can also be electrically connected via an M12 connector.

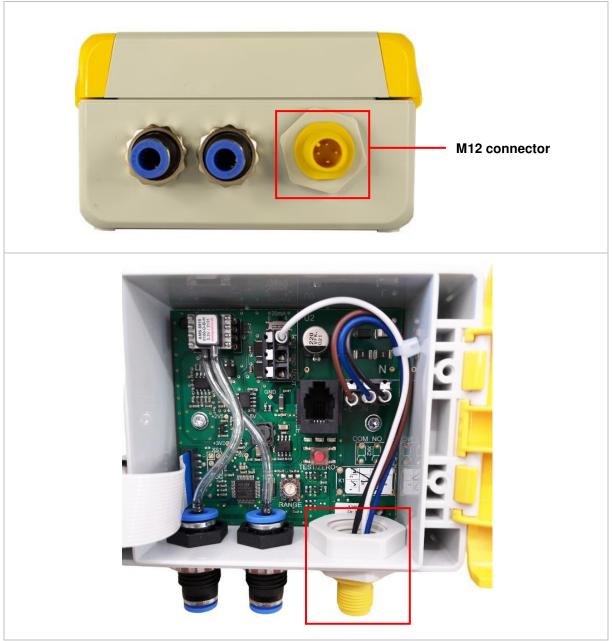


Figure 6. Electrical connection HE 5411 with M12 connector (figures are similar)

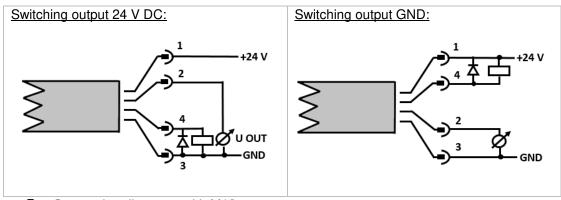


Figure 7. Connection diagrams with M12 connector

Contact	Signal	Colour	Note
1	+24 V supply	Brown	
2	Analogue output 0(4)20mA (Optional: 010V)	White	010 V: terminal XK3.1 0(4)20 mA: terminal XK3.3
3	GND supply / analogue output	Blue	
4	Switching output (for Premium devices only!)	Black	Is put on terminal XK1.3 for devices Lite and Basic => NC
	Possible options: Opening contact / closing contact, +24V / GND		



Material damage possible!
The flyback diode 本 must be installed on the relay 中 to avoid overvoltage and thus a destroyed relay!

6.2 Mounting measuring hose onto pressure connection

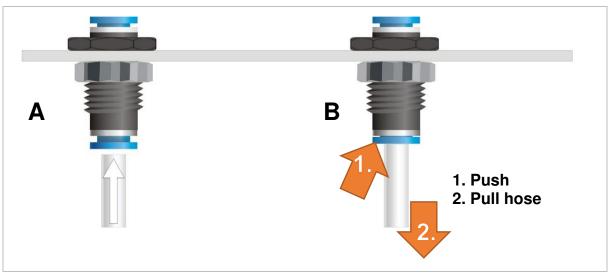


Figure 8. Mounting hose onto push-in bulkhead fitting

A Hose connection

Insert hose with 6 mm outer diameter into the connection.

B Hose disconnection

- 1. Press the blue retaining ring to open the lock.
- 2. Pull the hose out of the connection.

7 **Display and Operating Elements**

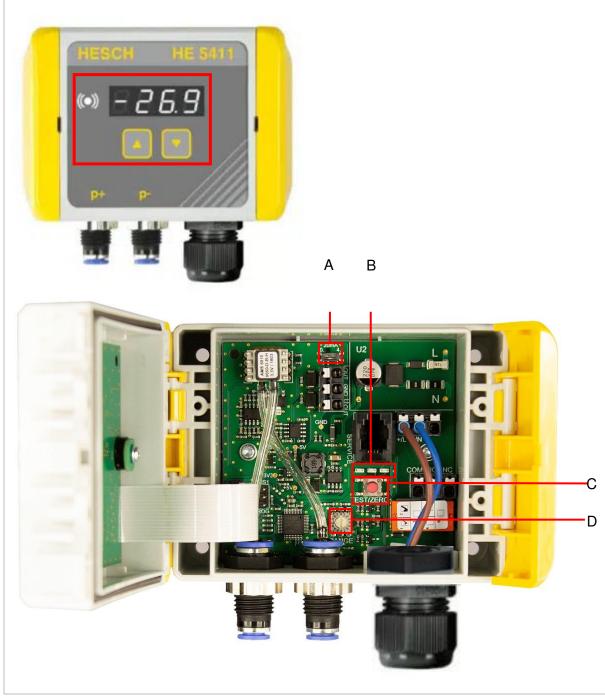


Figure 9. HE 5411 Premium Display and Operating Elements (outside and inside)

- **A** 0(4)...20 mA switch **B** LEDs
- **C** Test button
- **D** Rotary coding switch

Symbols/Displays		Meaning
		UP key: increase the displayed value
		DOWN key: decrease the displayed value
((•))		Limit LED (Premium only): 3-coloured with colour change function for status indication
-26.9		Display: Normal operation: current differential pressure Parameter setting mode: Limit value set Switch between the two with UP / DOWN keys
° 20mA ° 0 4	A	Slide switch: possibility to switch the analogue output between • 020 mA (left) • 420 mA (right)
	В	LEDs (from left to right)
		Flashes continuously (o—o—o—o) when the differential pressure is in the range of ± 10 % from the measuring range end value to the zero point. Flashes continuously (o-o—o-o-o), when an offset has been programmed.
		Lights up as soon as the supply voltage is present.
		Flashes when the supply voltage is wrong or faulty. Lights up when the differential pressure measured is ≥ the limit value set.
		Flashes when the device is in test mode.
TEST/ZERO	С	TEST button: for zeroing / test mode
RANGE	D	Rotary coding switch: 16 levels (0F) to set the measuring range.

7.1 Limit LED (Premium only)

The limit LED serves as a status display for rising or falling pressure. This function is of particular advantage in the case of pressures around the set limit value, since the hysteresis can be read by means of the LED colours.



Note!

The limit relay hysteresis can only be set with the "EasyTool Controls" PC software, Version 4.0 or later. The factory setting of the hysteresis is 1 %.

7.1.1 "Limit threshold" mode

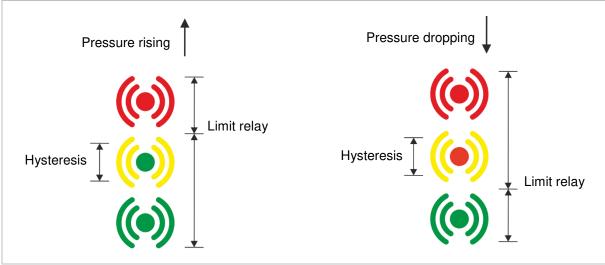


Figure 10. Limit LED status display in "Limit threshold" mode

LED	Meaning
((•))	If the status display shows a single-colour green light, this means that the measured pressure is below the limit value and outside of the set hysteresis range.
	If the status display shows a green/yellow light, this means that the measured pressure is below the limit value and inside the set hysteresis range.
(()	If the status display shows a single-colour red light, this means that the measured pressure is over the limit value and outside of the set hysteresis range.
	If the status display shows a red/yellow light, this means that the measured pressure is over the limit value and inside the set hysteresis range.

7.1.2 "Limit window" mode

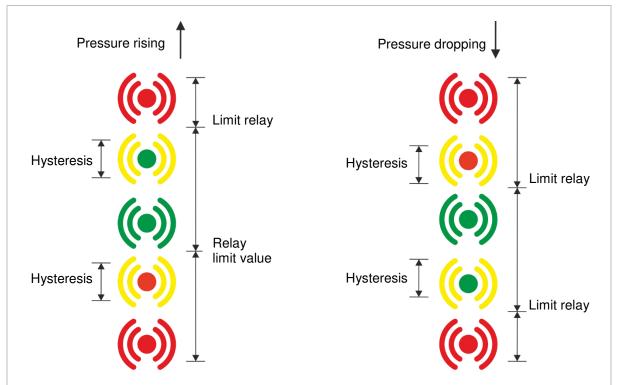


Figure 11. Limit LED status display in "Limit window" mode

LED	Meaning
((•))	If the status display shows a single-colour green light, this means that the measured pressure is between the limit values and outside of the set hysteresis range.
	If the status display shows a green/yellow light, this means that the measured pressure is between the limit values and inside the set hysteresis range.
(()	If the status display shows a single-colour red light, this means that the measured pressure is over or under the limit values and outside of the set hysteresis range.
	If the status display shows a red/yellow light, this means that the measured pressure is over or under the limit values and inside of the set hysteresis range.

8 Operation

8.1 Offset for Zeroing



Note!

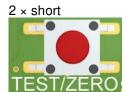
The device has been set to the correct value in the factory and does not need to be modified.



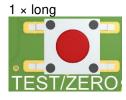
Explosion hazard!

This function must only be used <u>outside of EX zones</u>, since the housing must be opened under voltage. Before opening the housing, make sure that no explosive environmental conditions, such as dust, exist.

If a zeroing has to be done, a warm-up time of 30 minutes must be observed.



 Double clicking on the button will accept the current pressure at the pressure connections as 0 mbar (AUTO ZERO). The measured pressure must be in the range of ±10 % from the sensor measuring range to the zero point in order to achieve a successful zeroing.



2. A long press on the button resets the offset with respect to the zeroing to 0 mbar.

8.2 Offset for zeroing with device keypad (HE 5411 Premium)

Should a zeroing need to be carried out, a warm-up time of 30 minutes must be observed.



Press keys UP and DOWN. The current pressure at the
pressure connections will be accepted as the offset. The
measured pressure must be in the range of ±10 % from the
measuring range end value to the zero point in order to
achieve a successful zeroing.



"Zero" and the offset to be accepted flash alternately on the display.



3. The UP key confirms acceptance.

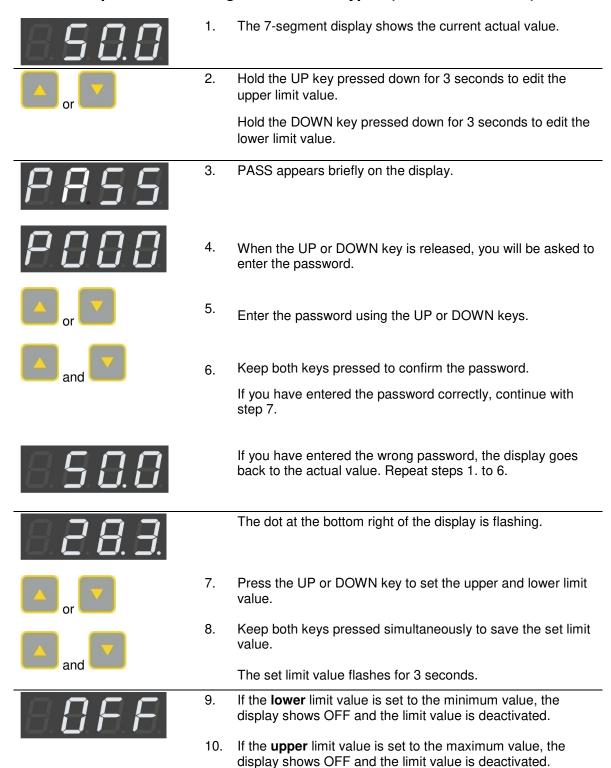


4. "Set" is shown briefly and the device goes into operation mode.

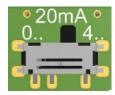


The offset will be set to 0 mbar.

8.3 Limit value parameter setting with device keypad (HE 5411 Premium)



8.4 Analogue output switch



The analogue output can be selected between 0...20~mA or 4...20~mA with the slide switch.

- 0...20 mA (left)
- 4...20 mA (right)

8.5 Setting the measuring range



The measuring range is set with the rotary coding switch. The different spreads depend on the full measuring range of the sensor used.

The following table shows the measuring ranges that can be set:

Position of rotary coding switch	Measurement range	Display
0	Set via PC tool	
1	100 % bidirectional	pressure
2	80 % bidirectional	pressure
3	50 % bidirectional	pressure
4	100 % unidirectional	pressure
5	80 % unidirectional	pressure
6	50 % unidirectional	pressure
7	100 % bidirectional, square rooted	%
8	80 % bidirectional, square rooted	%
9	50 % bidirectional, square rooted	%
Α	100 % unidirectional, square rooted	%
В	80 % unidirectional, square rooted	%
С	50 % unidirectional, square rooted	%
	·	
D	Free (100 % bidirectional)	pressure
E	Free (100 % bidirectional)	pressure
F	Free (100 % bidirectional)	pressure

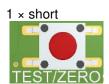
8.6 Test mode

The transmission of the analogue signal can be tested in Test mode.



Explosion hazard!

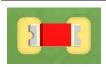
This function must only be used <u>outside of EX zones</u>, since the housing must be opened under voltage. Before opening the housing, make sure that no explosive atmospheres, such as dust or gas, exist.



1. Pressing the "TEST" button once switches the analogue outputs to 50 % (10/12 mA or 5 V).



2. The Mode ends by itself after 300 s, and the analogue outputs display the current measured pressure again. The countdown from 300 s to nought and the word "TEST" are shown alternately on the 7-segment display.



3. The red LED flashes!



4. Pressing the "TEST" button again ends the mode immediately, before the countdown from 300 s expires.

9 Parameter setting with Service PC

The "EasyTool Controls" software from Version 4.x is required to set the parameters with a service PC.

The USB/TTL adapter required for that purpose is available at AXXERON HESCH (see chapter 11 Accessories). The programme allows a configuration to be saved, or a saved configuration to be established again.



Note!

The limit relay hysteresis can only be set with the "EasyTool Controls" PC software, from version 4.x. The factory setting of the hysteresis is 1 %.

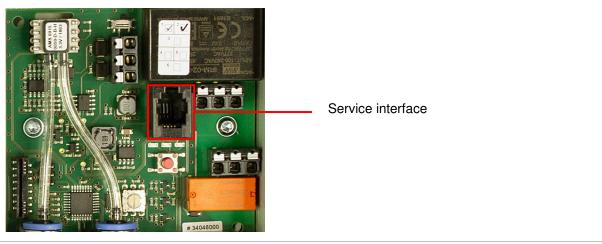


Figure 12. HE 5411 Service interface in the housing

- 1. Connect the PC to the operating unit via USB cable.
- 2. Start "EasyTool Controls".
- 3. Choose the correct interface in the "Settings" menu.
- 4. Documents or data can be transferred now.

9.1 Parameter Table

Sensor Min. = Base measuring range start Sensor Max. = Base measuring range end



Note!

The basic measuring range is indicated on the name plate!



Note!

Please note that, when setting the measuring range start and end, the difference between the two must not be less than 25% of the base measuring range!

Parameter	Adjustment range	Default setting	Unit
Input signal			
 Damping (time constant T) The damping is implemented as a first-order low-pass. It affects the measured value and stabilizes a fluctuating input signal (see Figure 13) Approx. 99 % of the end value are reached, after the fivefold time, set via the parameter 'Damping' (see Figure 14) The higher the damping value, the slower does the output signal respond. 	0.0060.00	2	S
This parameter can also be set on the device itself. (see chapter 8.1 and chapter 8.2)	-10%+10% from base measuring range end	0.00	
 Measuring range start The measuring range start indicates the pressure at which an output signal of 0% is displayed. 	Sensor MinSensor Max	Base measuring range start	mbar
 Measuring range end The measuring range end indicates the pressure at which an output signal of 100% is displayed. 	Sensor MinSensor Max	Base measuring range end	

Parameter	Adjustment range	Default setting	Unit
Characteristic line If the parameter "Characteristic line" is on the table, the characteristic line can be defined with the parameters "Base Output Signal 1", "Base Output Signal 1" and "Base Output Signal 30", "Base Output Signal 30".	linear, square- rooted, table		
Base Output Signal 1	0100		%
Base Input Signal 1	Sensor MinSensor Max		mbar
Base Output Signal 30	0100		%
Base Input Signal 30	Sensor MinSensor Max		mbar
Number of bases	230		

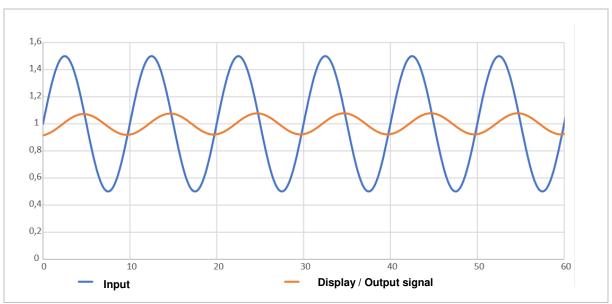


Figure 13. Example for damping a fluctuating signal

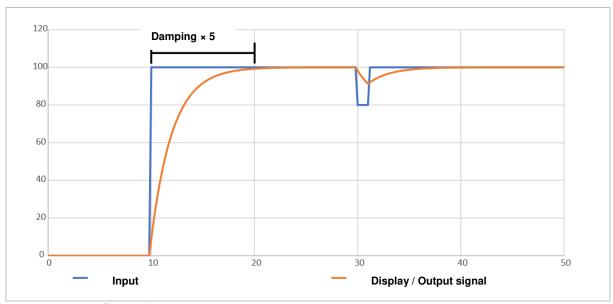


Figure 14. Example for step response

Parameter	Adjustment range	Default Setting	Unit
Display / Output			
Flattens the output signal after root extraction at small differential pressures (around zero).	None, step, linear	Step	
Functionalities: None (function is deactivated)			
Step (the parameter 'creep flow threshold' defines the range around zero. Within this range, the displayed value and the output signal are set to zero, see Figure 15. Is mostly used when the volume flow is subsequently added up.)			
Linear (the parameter 'creep flow threshold' defines the range around zero. Within this range, the square rooted characteristic line is replaced by a linear one => increase around zero is limited, see Figure 16. Mostly used for downstream controls.)			
 Creep flow threshold Min. = Display value start Max. = Display value end 	MinMax.	10% from Max.	
Unit The unit you wish to be displayed can be set with this parameter.	mbar, Pa, inH2O, psi,		
Display value start	-999.009999.00	0.0	
Display value end	-999.009999.00	100.0	
 Upper limit value This parameter can also be set on the device itself. See chapter 7.1 	Sensor MinSensor Max, Off	75% of basic measuring range end	mbar, Pa, inH2O, psi
Upper hysteresis limit value • See chapter 7.1		1% of basic measuring range end	

Parameter	Adjustment range	Default Setting	Unit
See chapter 7.1	Off, Sensor MinSensor Max	Off / 1% of Base measuring range end The lower limit value is deactivated by default for sensors with a unidirectional basic measuring range.	mbar, Pa, inH2O, psi
Lower hysteresis limit valueSee chapter 7.1		75% of basic measuring range end	
Pick-up delay	0.0999.9	0	s
Dropout delay	0.0999.9	0	S
• When the "Fail-Safe Relay" parameter is active, the relay is energised in a non-active state. If the upper or lower limit value is overshot or underrun, the relay is de-energised (see Figure 17).	Inactive, Active	Inactive	

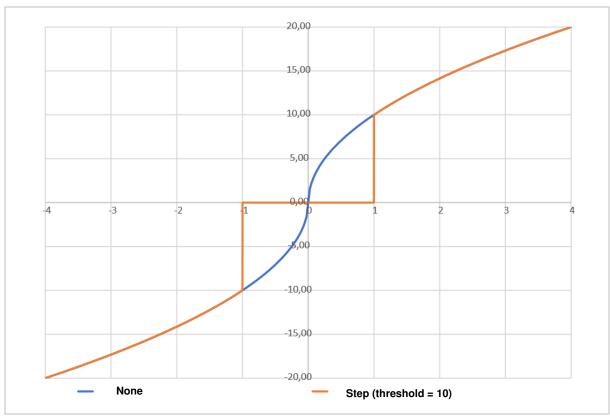


Figure 15. Creep flow suppression 'Step'

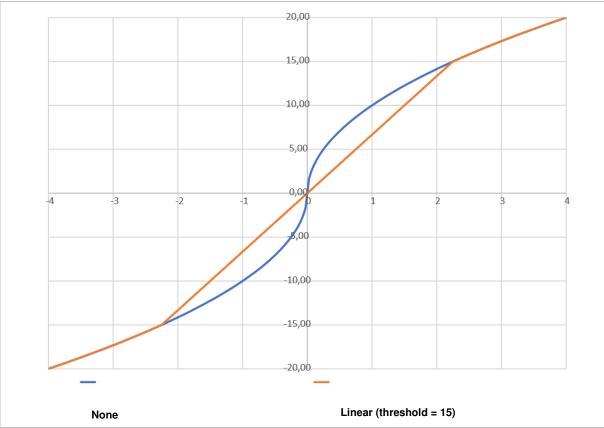


Figure 16. Creep flow suppression 'Linear'

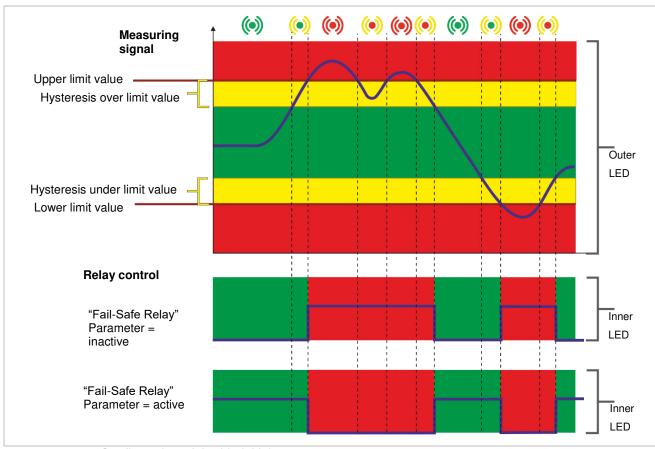


Figure 17. Configuration of the Limit Value

Parameter	Adjustment range	Default setting	Unit
See chapter 8.6			
Test duration	10300	300	S
Test value current signal	0.00100.00	50	%
Test value voltage signal	0.00100.00	50	%

Parameter	Adjustment range	Default setting	Unit
Device settings			
Display brightness	50100	100	%
The password must be entered using the UP and DOWN keys before the parameters "Upper limit value" or "Lower limit value" can be set.	000999	001	

10 Error Messages

Display	Cause	Troubleshooting
The display shows alternating with the currently measured value.	Measurement range overshot or pressure connections reversed.	 Check the measurement range set. Check the pressure connections.
The displays shows alternating with the currently measured value.	Measurement range underrun or pressure connections reversed.	 Check the measurement range set. Check the pressure connections.
The display shows EEEE	The calibration data of the sensor is not valid.	 The error cannot be solved by the customer. Please contact AXXERON HESCH service (see chapter 12 Maintenance and Service).
The display shows E. S. E. IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	The sensor is missing or faulty.	 The error cannot be solved by the customer. Please contact AXXERON HESCH service (see chapter 12 Maintenance and Service).
The display shows EPR alternating with the process value or displayed value.	The stored parameters are not valid (e.g. after a firmware update).	 Write parameters with the software "EasyTool Controls". Or set a parameter at the device, e.g. 'Zeroing' or 'Limit'.
The green LED flashes (see Figure 9: Pos. B) The display remains black	The supply voltage is wrong or faulty (e.g. when connecting 24 V DC to 100240 V AC).	Check supply voltage

11 Accessories

AXXERON HESCH electronics GmbH offers a series of optional accessories for mounting and connecting the HE 5411 differential pressure transmitter

Item	Picture	Name	Order number
1		Wall bracket as an alternative means of fastening the HE 5411 housing Colour: Light grey	upon request
2		Housing hinge closure available in various colours: Light grey, graphite grey, bright red, ultramarine blue	upon request
3	AD NOT THE PARTY OF THE PARTY O	Screws (4 pieces) for the optional screwing of the housing. Factory standard 1412, 30×18×10, cross head, left thread	B SHR
4	ArtNr. 54990001	dp-connection adapter incl. screw connection, seals, filter pads, blind plugs	#54990001
5	The first flat flate Copy	Universal adapter set for push-on bulkhead fitting, PU hose Ø i=4mm / Ø o=6mm onto Whitworth pipe thread G ¹ / ₄ "	# 54210099
6		Reduction 6mm plug nipple x 4 mm hose IQS-Mini	#181452

Item	Picture	Name	Order number
7		Multiple sealing insert 3 × cables Ø 5 mm	upon request
8		USB/TTL adapter Incl. connection cable and "EasyTool Controls" PC software	#61000011
9		M12 connector 4-pole, A-coded Reduction M20 × 1.5M16 × 1.5	Auf Anfrage

12 Maintenance and Service

Maintenance, Repair

The device must be cleaned regularly to prevent increased dust generation on the device. Cleaning of the housing is only permitted with damp cleaning agents.

Disposal

Dispatch metals and plastics for recycling. Electrical and electronic components must be collected separately and disposed of appropriately. Dispose of assembled printed circuit boards professionally.

Service

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