

HE 5422 / HE 5422 HD

Differential pressure regulator



Operating Instructions

(Translation of Original German version)

Imprint

AXXERON HESCH electronics GmbH
Boschstraße 8
31535 NEUSTADT
GERMANY
Phone: +49 5032 9535-0
Internet: www.hesch-automation.com
Email: info@hesch.de

District Court Hanover
HRB 111184
VAT.-Id. No. DE813919106

General Management
Werner Brandis
Published by:
AXXERON HESCH electronics GmbH, Documentation Department

Copyrights



© Copyright 2023 AXXERON HESCH electronics GmbH. All rights reserved. The content including pictures and the design of these operating instructions are subject to copyright protection and other laws for the protection of intellectual property. The distribution or modification of the contents of this manual is not permitted. In addition, this content may not be copied, distributed, changed or made accessible to third parties for any commercial purposes.

Document history

Date / Version	Description / Author
06.07.2020 / 1.0	First issue based on # 342226 / Bg
15.07.2020 / 1.1	Section 6.1 Read and set password added, section 10 images adapted, section 12 Accessories removed, section 13 ordering information added, section 6.2 Supply voltage revised / Bg
25.02.2021 / 1.2	Chapter 3 Technical Data: M16 cable screw connection is now an M25 cable screw connection (Change request 166360).
12.07.2021 / 1.3	Change according to change request no. 564 / Bg
09.03.2023 / 1.4	Validity of operating instructions for ATEX and Non-ATEX devices / Bg

TABLE OF CONTENTS

1	LEGAL PROVISIONS	5
2	SAFETY INFORMATION	6
2.1	SYMBOLS AND BASIC SAFETY INSTRUCTIONS	6
2.2	SIGNAL WORDS	6
2.3	SAFETY IN THE INDIVIDUAL OPERATING PHASES	7
2.4	DEVICE IDENTIFICATION	9
3	TECHNICAL DATA	10
4	INSTALLATION	12
4.1	DIMENSIONS	12
4.2	OPENING THE DEVICE	14
4.2.1	HE 5422	14
4.2.2	HE 5422 HD	15
4.3	MOUNTING THE DEVICE	16
5	DEVICE DESCRIPTION	17
5.1	SUMMARY OF DEVICE VERSIONS	17
5.1.1	HE 5422 with polycarbonate housing	17
5.1.2	HE 5422 HD with die-cast aluminium housing	18
6	ELECTRICAL COMMISSIONING	19
6.1	READ OUT AND SET PASSWORD	20
6.2	SUPPLY VOLTAGE	21
6.3	INPUTS	22
6.4	OUTPUTS	22
6.4.1	Relay	22
6.4.2	Analogue output	22
6.5	MEASURING HOSE ASSEMBLY AT THE PRESSURE CONNECTION	22
7	DISPLAY AND CONTROL ELEMENTS	23
7.1	DIFFERENTIAL PRESSURE COLUMN	25
8	OPERATION	26
8.1	TEST & SERVICE	26
8.2	DIFFERENTIAL PRESSURE MEASUREMENT	27
8.3	SPECIAL KEY COMBINATIONS / OPERATING INSTRUCTIONS	29
8.3.1	Switching the pressure unit to be displayed	29
8.3.2	Activate / deactivate precoating:	29
9	PARAMETERIZATION	30
9.1	PARAMETER TABLE	30
9.2	PARAMETERIZATION WITH DEVICE KEYBOARD	34
9.3	PARAMETER SETTING WITH SERVICE PC	35
9.4	OFFSET FOR ZEROING	35
9.5	RESET FACTORY SETTINGS	36
10	OPERATION	37
10.1	NORMAL OPERATION	37
10.2	FUNCTION HOLD	40
11	ERROR MESSAGES	41
12	MAINTENANCE AND SERVICE	43

1 Legal provisions

Manufacturer

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

Intended use

- The HE 5422 / HE 5422 HD differential pressure controller is used to measure the differential pressure via filter elements in industrial dust removal technology and to control a valve control system. The differential pressure is monitored using two alarm thresholds.
- The control system can be operated without impairing its safety within the operating and environmental conditions permitted in this manual.
- 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!

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

Personnel qualification

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

Device Safety

The device has been constructed and tested in accordance with VDE 0411 / EN 61010-1 and has left the factory in perfect safety condition. The user must observe the information and warnings described in this manual in order to maintain this condition and ensure 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 Information

2.1 Symbols and basic safety instructions

This section contains important safety regulations and notes. To protect against personal injury and material damage, it is necessary to read this section 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!



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 possible *medium-risk* hazard that can result in death or serious physical injury if it is not avoided.

CAUTION!

Indicates a *low-risk* hazard that could result in minor or moderate physical injury if not avoided.

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). Route the test leads separately from the mains leads. Establish the connection between the protective conductor connection (in the respective device rack) and a protective conductor.



Danger of Electrocution!

Any interruption of the protective conductor in the device carrier can cause the device to become dangerous. Deliberate interruptions are not permitted. If it can be assumed that safe operation is no longer possible, the device must be taken out of operation and secured against unintentional operation.



Danger of Electrocution!

Never open the device when live! Live parts can be exposed when the devices are opened or covers and parts are removed. Junction points can also be live!



Danger of Electrocution!

The earthing must be connected via the PE terminal of the VAC supply when using a 24 VDC supply to device variant **HE 5422 HD**. **Otherwise the device is not earthed!**



Attention!

The device must never be put into operation even if damage is recognisable.



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 alcohol 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 test leads are to be laid separately from the mains leads.

**Explosion Prevention! (for ATEX approved devices only!)**

It is permitted to use the device in explosion zone 22 with closed lid. It is mandatory to ensure that no explosive ambient conditions, such as e.g. development of dust exist, before opening the device for e.g. parametrisation.

**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 interconnected with other devices and/or systems, consider any potential effects before switching off and take appropriate precautions.

2.4 Device identification



Note!

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

The devices are labelled as follows:

HE 5712 Compact with ATEX:	Without ATEX:
   II3D Ex tc IIIC T135°C Dc IP65	 

II3D Ex tc IIIC T135°C Dc IP65

II3D	Device category:	Use in zone 22 for dust during normal operation
Ex	designates electrical equipment. Standards of the EN 60079-Off. 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

The following special regulations must be observed:

- The cables must be correctly inserted through the cable ducts by a professional.
- Cable ducts not required must be furnished with sealing bolts by a professional.
- The ATEX certification only maintains its validity if the installation is carried out correctly by a professional under the safeguarding of the protection class specified on the marking.
- Cleaning of the housing is only permitted with moist cleaning materials to avoid static charging.
- Cleaning is necessary to avoid increased dust formation on the device.
- Operation under voltage, in ATEX zone 22 only when closed.
- Before closing, ensure that the device housing is free of dust.

3 Technical Data

Supply			
Voltage	100...240 VAC ± 10 %, 24 VDC ± 10 %		
Power consumption	Maximum 5 W		
Sensor system			
Measuring range (mbar)	± 2.5, ± 5, ± 10, ± 25, ± 50, ± 100, ± 1000 according to the information on the nameplate		
Max. differential pressure	Measurement range	± 2.5 mbar ... ± 10 mbar	< 0.35 bar
		± 25 mbar	< 0.5 bar
		± 50...± 100 mbar	< 1 bar
		± 1000 mbar	< 5 bar
Medium	Air as well as dry, non-aggressive matter		
Measuring system	Piezoresistive		
<u>Measuring ranges (mbar)</u>	± 2.5 ... ± 10	± 25 ... ± 100	± 1000
Basic accuracy	± 1.25 % FSO T = 25 °C	± 1.0 % FSO T = 25 °C	± 0.5 % FSO T = 25 °C
Total error	± 2 % FSO T = 0...60°C	± 1.5 % FSO T = 0...60°C	± 1.0 % FSO T = 0...60°C
Connection type pneumatic	<u>HE 5422:</u> 2 x Schott push-in fittings for 6 mm hose outer diameter <u>HE 5422 HD:</u> 2 x Schott push-in fittings (nickel-plated brass) for 6 mm hose outer diameter		
Input/Output			
Analog output (not galvanically isolated):	0...10 V	0(4)...20 mA	
Max. permissible load	RL ≥ 1 kΩ	RA ≤ 400 Ω	
Digital inputs	Start, post-cleaning, measured value hold function, internally supplied 24 VDC / 1 mA		
Relay output	1 changeover contact: 250 VAC, 5 A as combined operating and error message 1 NO contact: 250 VAC, 5 A as cleaning message 2 changeover contacts: 250 VAC, 5 A as alarm message		
Software / service interface	EasyTool Controls 4.0 with USB / TTL adapter required (HESCH item no.: #61000011)		

Housing	
Model	<p>HE 5422: Dustproof polycarbonate housing (IP 65)</p> <p>HE 5422 HD: Dustproof die-cast aluminium housing (IP 65), powder-coated</p>
Dimensions	<p>HE 5422: 151 × 160 × 61 mm (W × H × D) including screw connection (See section 4.1 Dimensions)</p> <p>HE 5422 HD: 162.7 × 165 × 61.7 (W × H × D) incl. connection coupling (See section 4.1 Dimensions)</p>
Protection class	IP 65
Installation	Wall mounted, vertical mounting position
Cable gland	<p>HE 5422: 2 × M25 with multiple sealing insert for 3 lines of diameter 7mm</p> <p>HE 5422 HD: 2 × M25 with multiple sealing insert for 3 lines of diameter 7mm, nickel-plated brass</p>

Environmental Conditions	
Storage	-20° ... +70° C
Transport	-40° ... +85° C
Operation	<p>-20° ... +55° C</p> <p>In ATEX zone: -20° ... +40° C</p>
Relative air humidity	Relative humidity 95%, no condensation permitted, KUF according to DIN 40040

Air and creepage distances	
Pollution degree	2
Overvoltage category	II

Power Connection	
Connection type	<p>Supply: Cross section rigid/flex: max. 2.5 mm²; flex .: max. 1.5 mm² with wire end ferrule</p> <p>Rest: Cross section rigid / flex .: max. 1.5 mm²; flex .: max. 0.75 mm² with wire end ferrule</p>

4 Installation



Note!

If you want to drill the device to the wall, *Figure 1 and Figure 2* can be used as a drilling templates.

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 ATEX zones must be observed (see *section 2.3 Safety in the individual operating phases*).



Note!

The device with **ATEX approval** may be installed in **EX zone 22**. 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*.

4.1 Dimensions

The dimensions including the screw connections are 151 × 160 × 61 mm for HE 5422.

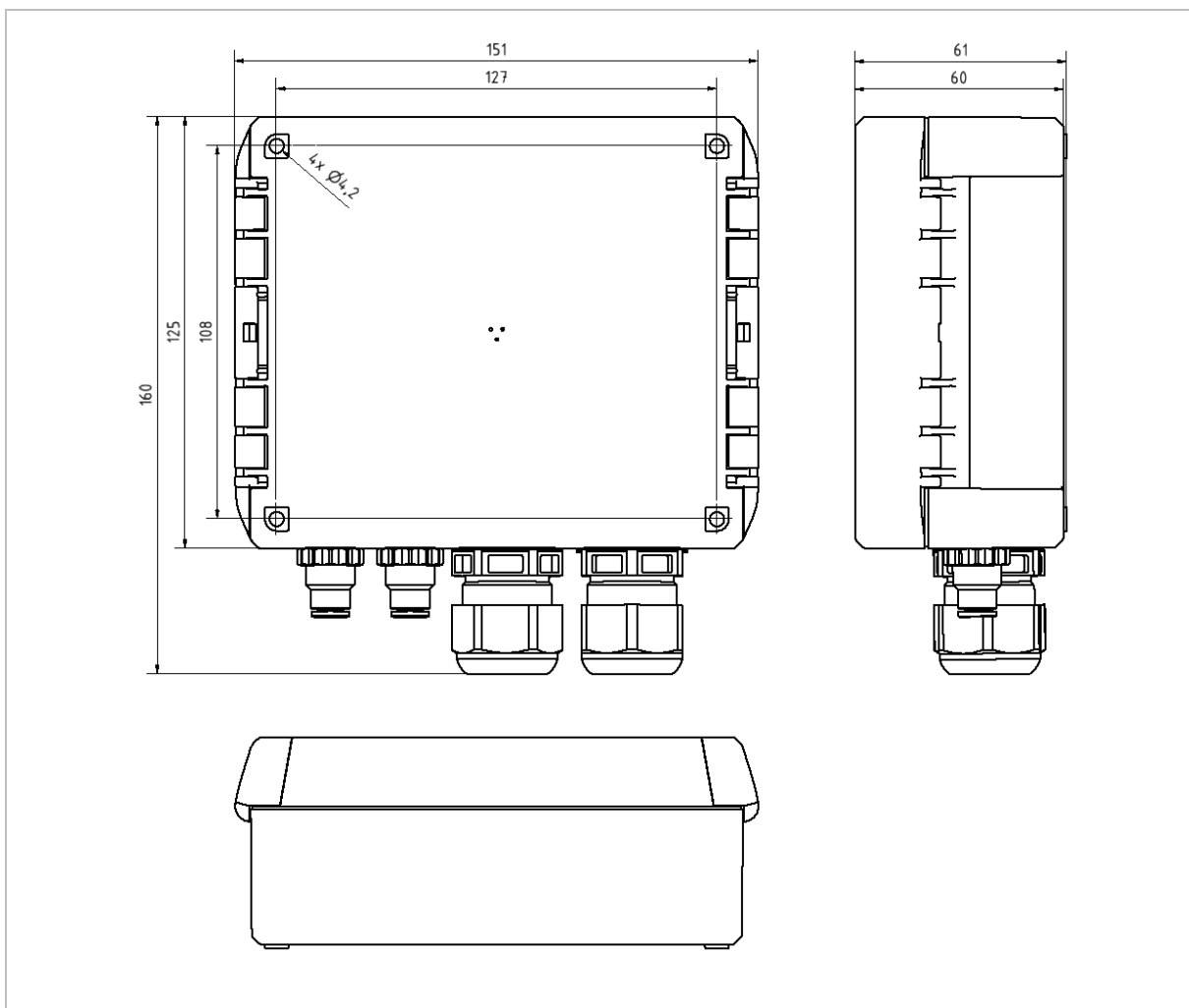


Figure 1 Dimensions HE 5422 (polycarbonate housing)

The dimensions including the screw connections are 162.7 x 165 x 61.7 mm for HE 5422 HD.

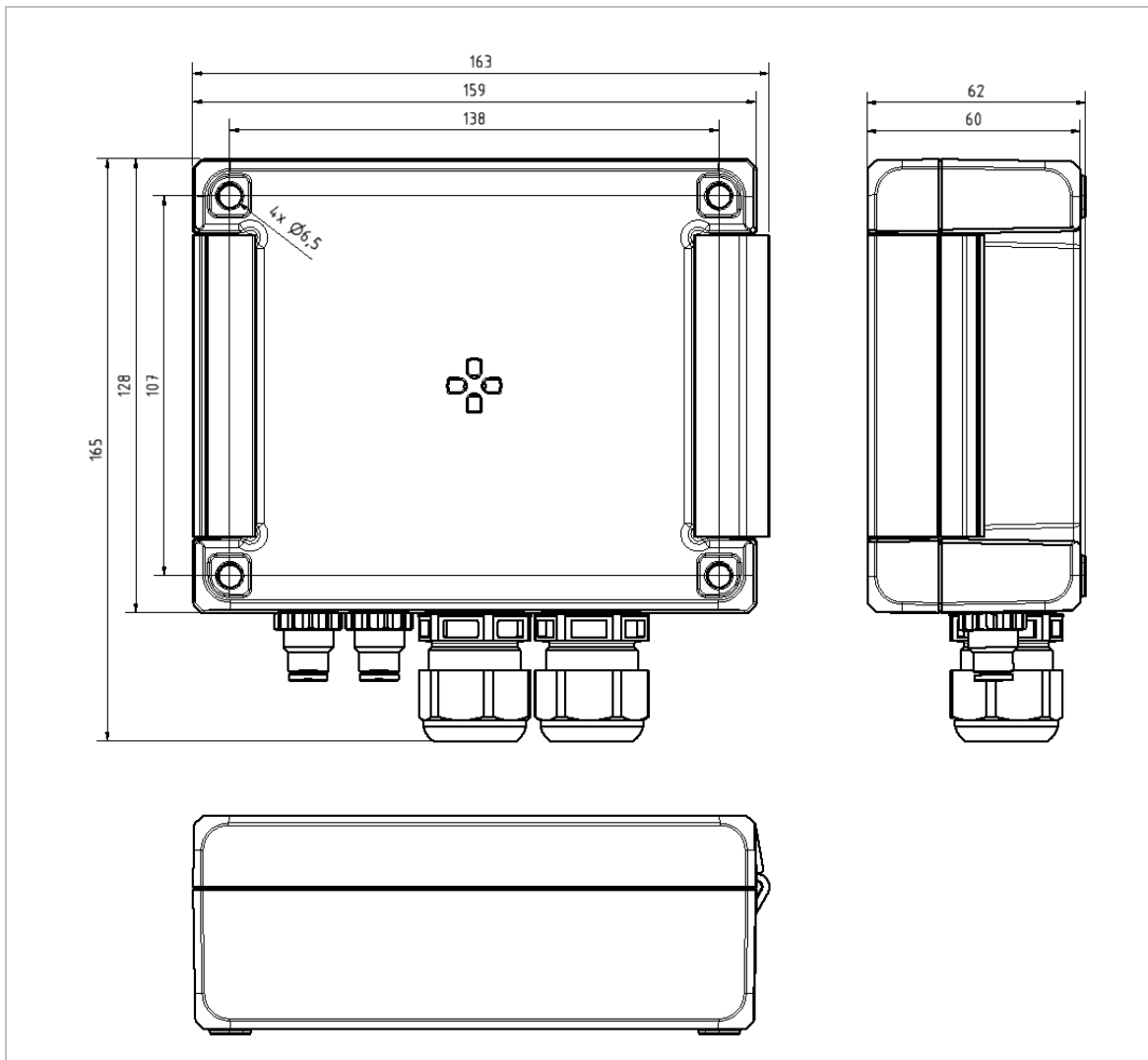


Figure 2 Dimensions HE 5422 HD (die-cast aluminium housing)

Scope of Delivery

- HE 5422 / HE 5422 HD differential pressure regulator
- Operating Instructions



Note!

Check the delivery for completeness and obvious defects after receipt. Please contact your representative at AXXERON HESCH electronics GmbH immediately in the event of a complaint.

4.2 Opening the device

4.2.1 HE 5422

The opening and closing works without screws by means of hinge technology. A flat-tip screwdriver is needed to open the device. Apply the screwdriver to the position intended for this on the housing lid, in order to lift up the hinge.



Note!

Make sure to move the screwdriver to the right to open the hinge (see *Figure 3*). If the screwdriver is moved to the left, the housing cover may be damaged.

Open the case cover to the left up to an angle of 105°.

Optionally, the housing cover can also be fastened with 4 screws to protect the device from unauthorized access (for more information, please contact your service representative of AXXERON HESCH electronics GmbH).

The screwless hinge closure is recommended for quick service access.

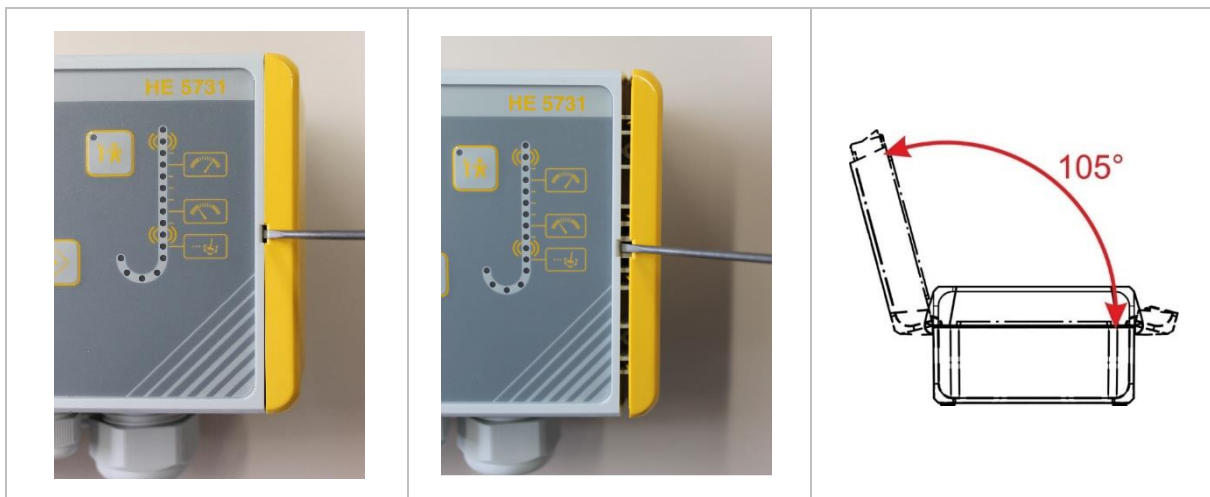


Figure 3 Opening housing cover to the left (figure shows similar device)

4.2.2 HE 5422 HD

The device is opened or closed manually on the right side of the housing. After opening, loosen the two screws (see *Figure 4*) with a screwdriver (bit size: Tx 20) and tighten again when closing the device.



Figure 4 Opening HE 5422 HD housing



Note!

When closing the HE 5422 HD, the screws must be tightened again to ensure protection class IP 65.

4.3 Mounting the device

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

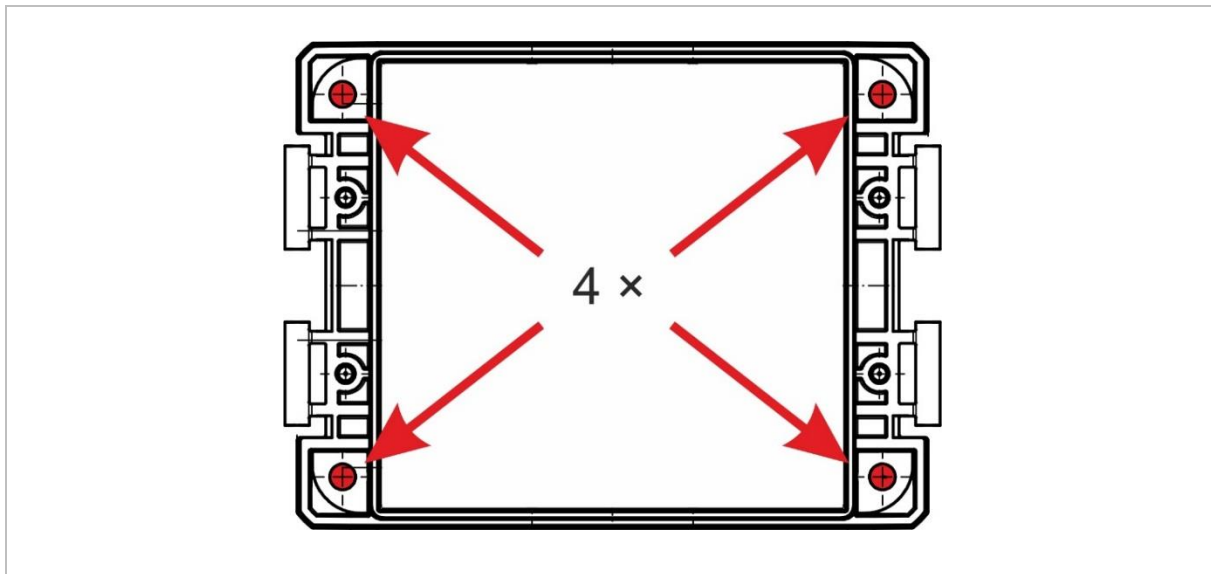


Figure 5 *Rear of housing*

Alternative: Wall mounting with wall brackets (for more information, please contact the service of AXXERON HESCH electronics GmbH).

5.1.2 HE 5422 HD with die-cast aluminium housing

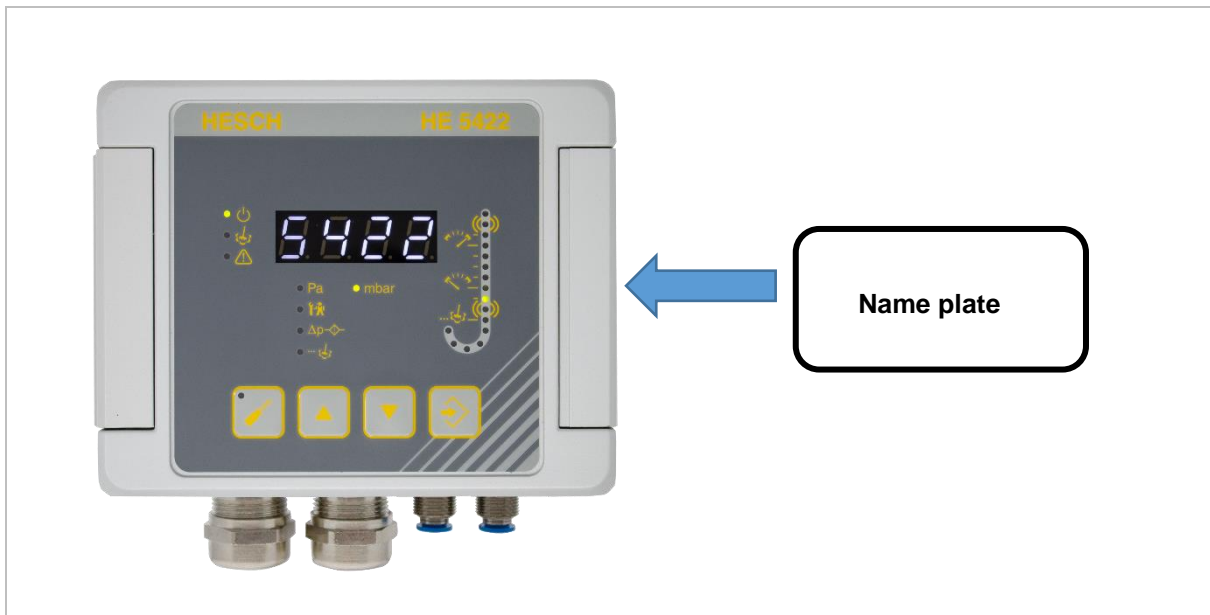


Figure 7 *Front view HE 5422 with die-cast aluminium housing*

<p>Name plate for <u>ATEX approved</u> devices:</p>	<p>Name plate for devices <u>without ATEX approval</u>:</p>
---	---

6 Electrical commissioning

Before switching on the device, observe the following:



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! (for ATEX approved devices only!)

It is permitted to use the device in explosion zone 22 with closed lid. It is mandatory to ensure that no explosive ambient conditions, such as e.g. development of dust exist, before opening the device for e.g. parametrisation.



Note!

Work on the electronic systems may only be carried out by qualified specialised personnel.



Note!

The protective conductor connection in the corresponding equipment rack must be conductively connected to the protective conductor.



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.

6.1 Read out and set password



1. When switching on the device, press the UP and DOWN buttons simultaneously for 5 seconds.

After the 5 seconds "c d E" appears in the display and then the currently set password.

The factory-set password is displayed on delivery (see also 9.1 Parameter table)



2. Press the ENTER key to set a new password.



3. The first digit starts to flash. Set the desired value using the UP and DOWN keys.



4. Press the ENTER key when the required value is displayed.

5. Repeat steps 3 and 4 to set the second and third digits.



6. After the last digit has been confirmed with ENTER, HE 5422 appears on the display and the control system starts.

6.2 Supply voltage



Danger of Electrocutation!

The earthing must be connected via the PE terminal of the VAC supply when using a 24 VDC supply to device variant **HE 5422 HD**. Otherwise the device is not earthed!



Note!

Either 100...240 VAC **or** 24 VDC must be connected.



Figure 8 Inside view

1. Open the housing as described in section 4.2 *Opening the device*.
2. Connect existing supply voltage 100 - 240 VAC **or** 24 VDC. The device has both connections.
3. Connect PE conductor. For **HE 5422 HD**, **it is absolutely necessary to observe** that with a 24 VDC supply, the earth must be connected via the PE terminal on the VAC supply.

6.3 Inputs

The Δp controller has 3 inputs: Start, post-cleaning (Postcl.) and Hold. The inputs are internally supplied with 24 VDC and are active when they are connected to earth (GND) with a potential-free contact.



Note!

The inputs refer to the same earth (-). It is allowed to use one earth line for all inputs.

6.4 Outputs

6.4.1 Relay

The device has 4 potential-free relay outputs. The contacts can each be loaded with 250 VAC / 5 A.

6.4.2 Analogue output

The current differential pressure is reported with a non-galvanic isolated 0 (4) - 20mA & 0 -10V signal.

6.5 Measuring hose assembly at the pressure connection

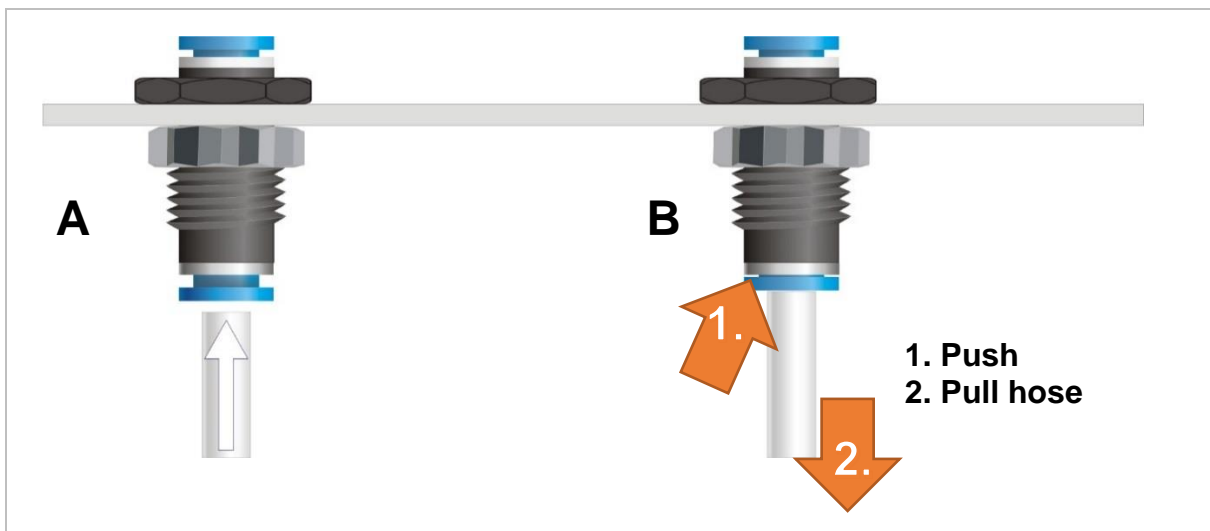


Figure 9 Assembly of hose onto push-in bulkhead fitting

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 control elements

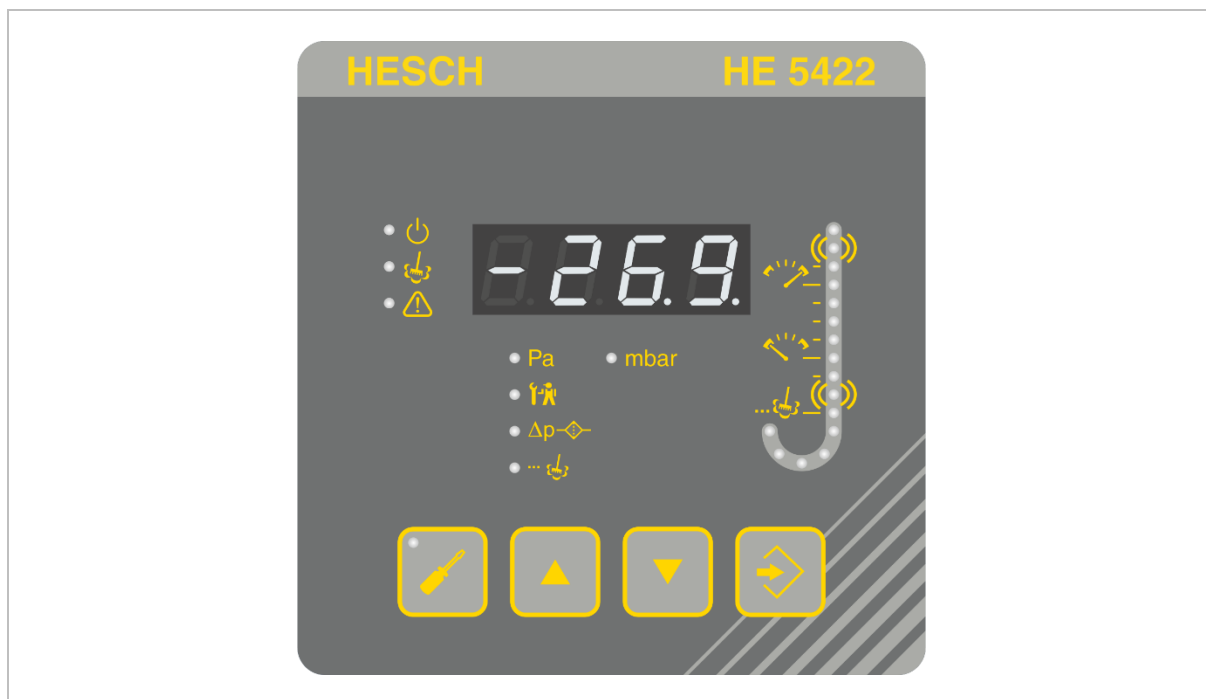


Figure 10 External display and control elements

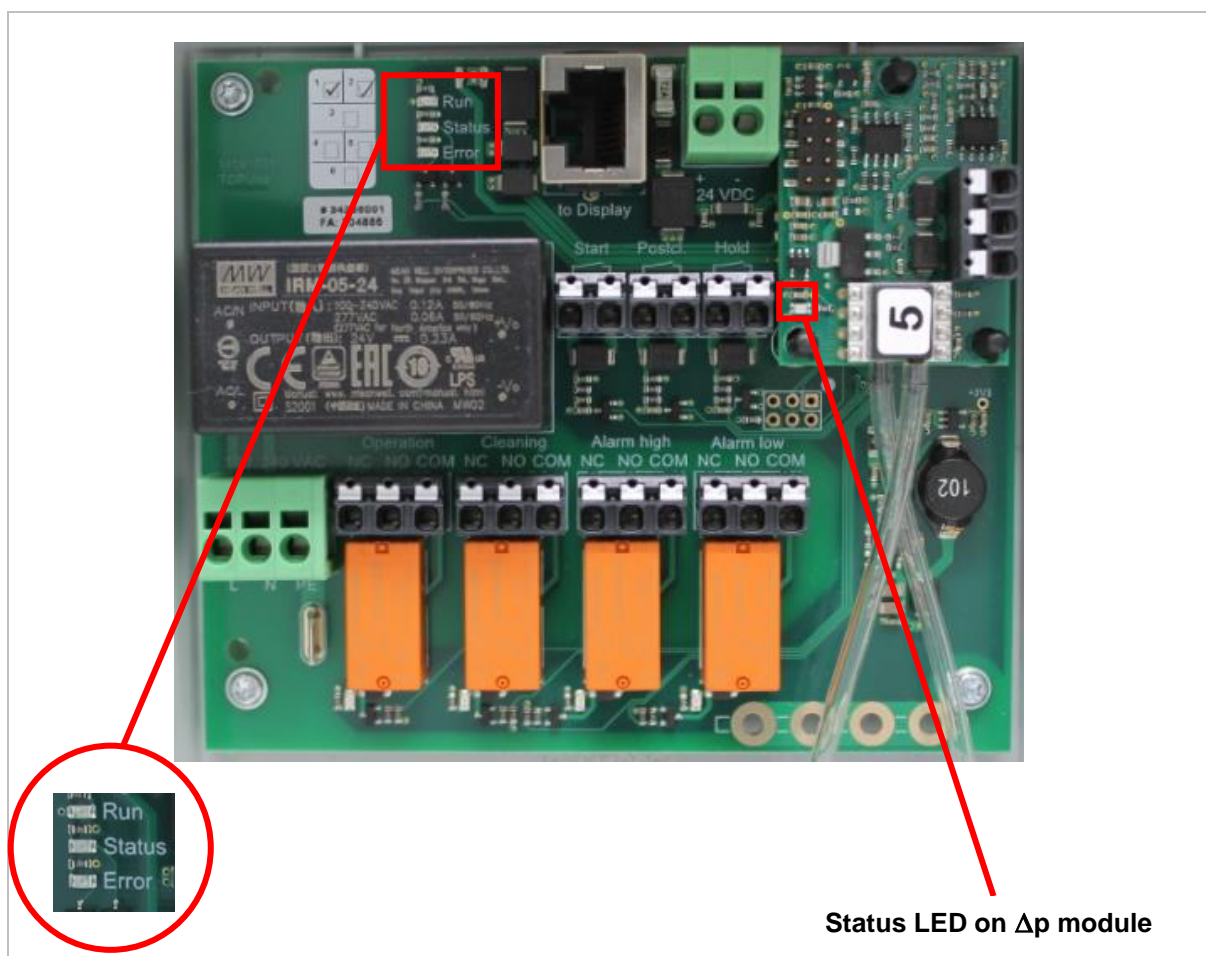













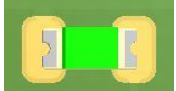
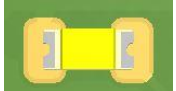



Figure 11 Internal display elements on the PCB

Symbols/Displays	Meaning
	Operating message
	Cleaning active
	Alarms active
	Differential pressure measurement in pascal
	Differential pressure measurement in millibar
	Test & Service
	Filter constant of the differential pressure measurement
	Post-cleaning time <ul style="list-style-type: none"> Normal operation: LED lights up when post-cleaning is active Parameterization mode: LED flashes when the parameter can be selected
	PARA key Parameterization mode ON/OFF
	UP key: increase the displayed value
	DOWN key: decrease the displayed value
	ENTER key: accept the displayed value
	Display: <ul style="list-style-type: none"> Normal operation: current differential pressure Parameterization mode: Parameter values Alarm notices
	Run <ul style="list-style-type: none"> Lights up continuously when there is a supply voltage.
	Status <ul style="list-style-type: none"> Lights up permanently when there is communication between the control system and operating unit. Flashes when waiting for communication between the control system and operating unit. Flashes rapidly when the boot loader (start-up program) is running.
	Error <ul style="list-style-type: none"> Is linked to the alarm / operation relay of the software. LED lights up when the relay drops out (alarm message). LED goes out when the relay picks up (operation).

7.1 Differential pressure column

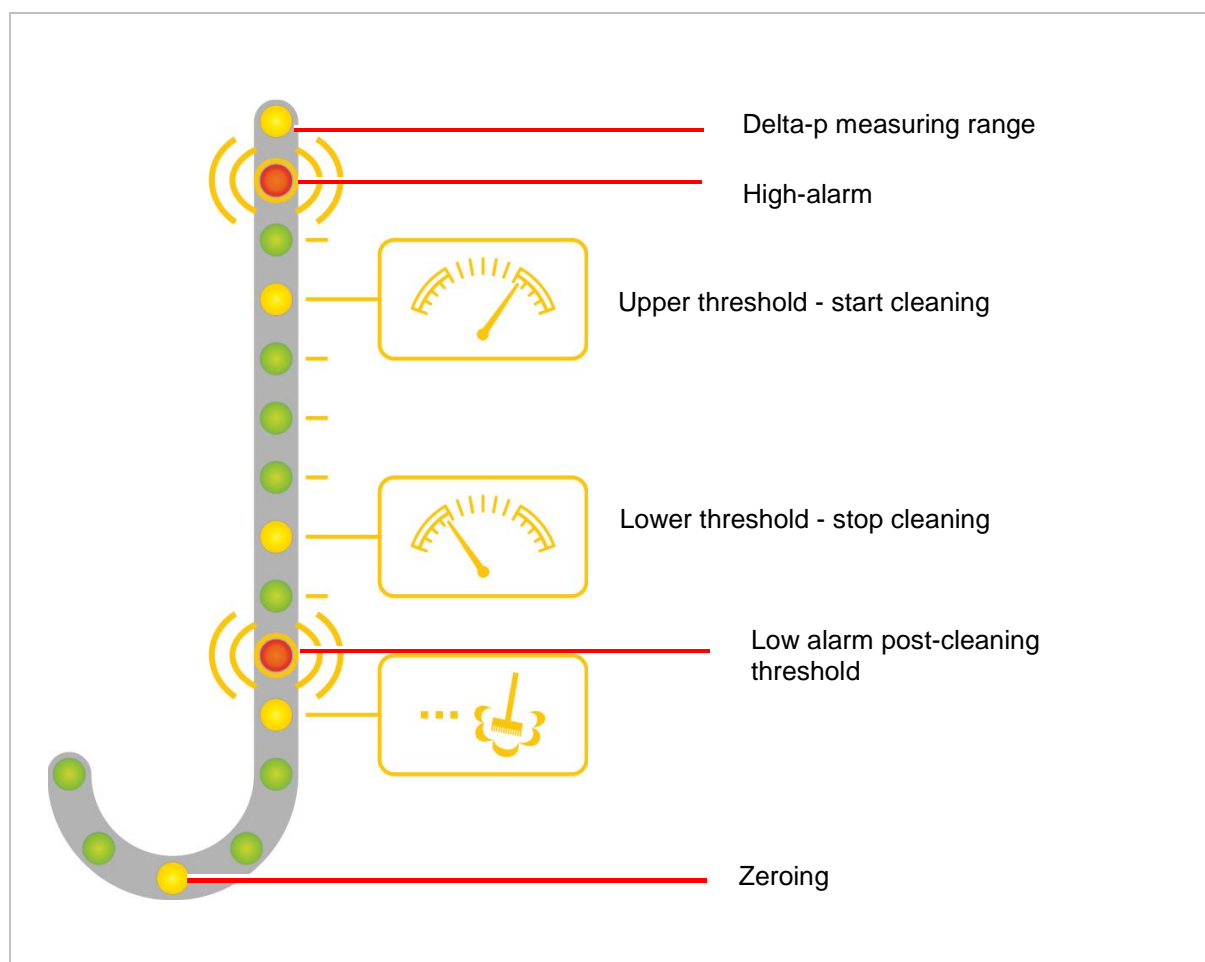


Figure 12 *Differential pressure column*

The LEDs are used in normal operation to display the differential pressure. In parameterization mode, the selected parameter value is indicated by the respective LED flashing.

8 Operation

8.1 Test & Service



1. Press the PARA key. The LED on the PARA key lights up. $\pm P \pm$ appears on the display.

The "Test mode" LED   flashes.



2. Press the ENTER key to open the Test & Service menu.



or



3. Press the UP or DOWN key to select the desired test function (a-e).



- a. Display of digital inputs (start, postcl., hold)

$\text{I} = \text{off}$ $\text{I} = \text{on}$

Shows the status of the start signal.

Shows the status of the post-cleaning signal.

Shows the status of the hold signal.

The digital inputs display depends on how the contact assignment of the control inputs was made.



- b. Output test: Relay operation

$\text{I} = \text{off}$ $\text{I} = \text{on}$



- c. Output test: Relay cleaning

$\text{I} = \text{off}$ $\text{I} = \text{on}$



- d. Output test: Relay alarm high

$\text{I} = \text{off}$ $\text{I} = \text{on}$



- e. Output test: Relay alarm low

$\text{I} = \text{off}$ $\text{I} = \text{on}$



5. LED "Delta-p measuring range"

Analog signal output scalable from 0 - 100%



6. Press the ENTER key to confirm the desired test function.

The "Test mode" LED   and the right decimal point of the display flash.



7. Press the PARA key to save the entry.

8.2 Differential pressure measurement

Figure 13 shows the pressure connections using the example of the device variant with polycarbonate housing. The connections are arranged identically on the heavy duty version with die-cast aluminium housing.

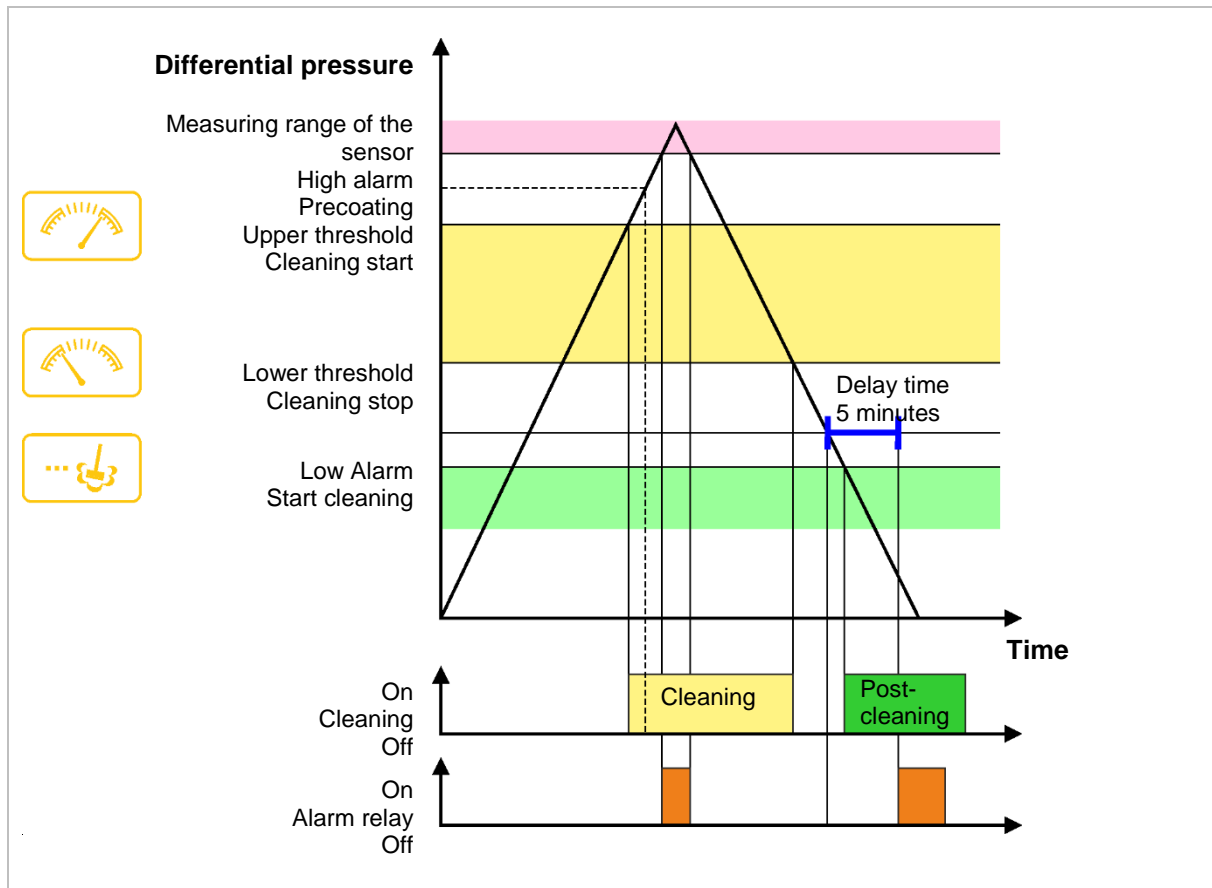


Figure 13 Connections for differential pressure measurement using the example of the variant with polycarbonate housing

The differential pressure is measured internally and passed on as a 4 - 20 mA / 0 - 10 V signal to the higher-level control system or to a display device. The current output is scalable over the adjustable measuring range. For example:

0 - 30 mbar \triangleq 4 - 20 mA / 0 - 10 V, 0 - 20 mbar \triangleq 4 - 20 mA / 0 - 10 V

The cleaning process is started in normal operation when the upper "cleaning" threshold is exceeded and ended when the lower "cleaning" threshold is reached. There is a delay time of 5 minutes in order to carry out post-cleaning in a normal switch-off process without triggering an alarm message by falling below the low alarm. The post-cleaning threshold must be reached before the end of this 5 minute period, otherwise the low alarm will be triggered.



8.3 Special key combinations / operating instructions

8.3.1 Switching the pressure unit to be displayed



1. Press the UP or DOWN key to change the pressure unit from pascal to mbar or vice versa.

The set unit is shown below the 7-segment display.

LED ● **Pa** or ● **mbar** lights up.

8.3.2 Activate / deactivate precoating:



1. Press the UP and ENTER keys simultaneously to activate the precoating function. The display shows $\overline{P_r E}$ alternating with other values.



2. Press the DOWN and ENTER keys simultaneously to deactivate the precoating function. $\overline{P_r E}$ disappears from the display.

9 Parameterization

9.1 Parameter table

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



Note!

The base measuring range is to be taken from 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!

The following parameters can be set using the device keyboard ((see also section 9.2 Parameterization with device keyboard):

Parameter	Adjustment range	Factory Setting	Unit
Password Protection against unauthorized parameter changes.	0...9999	0001	
Δp Filter [s] <ul style="list-style-type: none">Filter constant for the current differential pressure	0.2...60.0	2.0	s
Post-cleaning time [min] <ul style="list-style-type: none">The cleaning relay is closed for post cleaning for the configured time.	OFF, 1...999	10	min
Δp measuring range [mbar] <ul style="list-style-type: none">Is used to convert the current differential pressure into the 4 - 20 mA output signal used.0 mbar = 4 mAUpper range value = 20mA (if this parameter is set to a negative measuring range, the pressure evaluation is inverted. All corresponding parameters are also displayed negatively.)	Sensor Min...Sensor max.	Sensor max. (according to the nameplate)	
High-Alarm [mbar] <ul style="list-style-type: none">Threshold for the high alarm message.If exceeded, the relay contact is closed.	OFF, 0...Sensor max.	30.0	mbar

Parameter	Adjustment range	Factory Setting	Unit
Upper threshold [mbar] <ul style="list-style-type: none"> If exceeded, the Δp-dependent cleaning starts. Start of the Δp cycle. 	0...sensor max.	15.0	mbar
Lower threshold [mbar] <ul style="list-style-type: none"> The Δp-dependent cleaning stops when the temperature falls below this value. End of the Δp-cycle. 	OFF, 0.1...Sensor max.	10.0	mbar
Low - Alarm [mbar] <ul style="list-style-type: none"> Threshold for the low alarm message. If the value falls below the limit, the relay contact is closed unless the post-cleaning threshold is undershot within the low alarm delay. 	OFF, -5.0... Sensor max.	OFF	
Post-cleaning threshold [mbar] <ul style="list-style-type: none"> The threshold is activated when the lower threshold is exceeded. If the threshold is activated and the pressure falls below the threshold, a post-cleaning cycle is triggered and the cleaning relay is closed for the configured post-cleaning time. 	OFF, 0...Sensor max.	2.0	mbar
Δp-Offset [mbar] <ul style="list-style-type: none"> The offset is added to the currently measured differential pressure. 	Sensor min....Sensor max.	0	mbar

The following parameters can only be changed with the "EasyTool Controls 4.0" application:

Parameter	Adjustment range	Factory Setting	Unit
Password Protection against unauthorized parameter changes.	0...9999	0001	
Pressure unit Defines the displayed unit of pressure.	mbar, pascal	mbar	
Precoating Offset <ul style="list-style-type: none"> The precoating offset increases the start threshold of the cleaning (upper threshold). With an offset of 0, the precoating function is deactivated. After reaching the first cleaning threshold (increased by the precoating), the precoating is automatically deactivated.	0.0 (OFF)...Sensor max.	0.0 (OFF)	mbar
Hold time overrun Time for which the differential pressure is still held after the hold signal disappears.	0...999	5	s
Maximum hold time Maximum time for which the differential pressure is recorded.	0...999	30	s
Δp working range [%] Defines the working range below the upper threshold as a % of the measuring range. As an alternative to the lower threshold.	1...100	10	%
High alarm delay [s] Delay after the high alarm threshold is exceeded until the high alarm relay is switched.	0.1...3600.0	1.0	s
Low alarm delay [s] <ul style="list-style-type: none"> Delay after falling below the low alarm threshold until the low alarm relay is switched. The relay is not switched if the post-cleaning threshold is undershot within the delay. 	1...3600	300	s
Low alarm switching mode <ul style="list-style-type: none"> The switching behaviour of the low alarm relay (changeover contact) 	Low, High	Low	
BG cleaning interval [h] <ul style="list-style-type: none"> Cleaning monitoring time. If there is no cleaning within the monitoring time, a background cleaning process with the configured duration is started. 	0...99.9	0	h

Parameter	Adjustment range	Factory Setting	Unit
BG cleaning time [s] <ul style="list-style-type: none"> Duration of background cleaning 	1...3600	300	s



Note!

The threshold values can be set as desired. There is no logical check. If the values of the lower thresholds are parameterized via the values of the upper thresholds, the cleaning and the pressure display cannot work as expected.

9.2 Parameterization with device keyboard



1. Press the PARA key to change the values of the system parameters. The LED on the PARA key lights up yellow.

The LED of the parameter currently to be changed lights up.

`code`

2. If a password has been assigned, `code` appears in the display.



3. Press the ENTER key.



4. Press the UP or DOWN keys to set each place of the password.



5. Press the ENTER key to confirm the password.
As long as you remain in the parameter menu, the password does not have to be entered again.



6. Use the UP and DOWN keys to select the desired parameter.
The current value is shown on the display.



7. Press the ENTER key to change the value of the parameter. The first digit to be changed flashes on the display.



8. Use the UP and DOWN keys to set or change the value.



9. Press the ENTER key to accept the value.
The next digit then flashes on the display.

10. Repeat steps 8 + 9 to set the second and third digits.
The next parameter is offered.



11. Change the next parameter, if necessary.



12. Pressing the PARA key again quits parameterization mode. To return to the parameter menu, the password must be entered again.

9.3 Parameter setting with Service PC

Parameterization with a service PC is recommended when parameterizing multiple devices. The USB / TTL adapter required for this is available from HESCH. The parameters can be changed using a PC and the "EasyTool Controls 4.0" application. The program can be used to save a configuration or to restore a previously saved configuration.



1. Connect the PC to the operating unit via USB cable.
2. Launch "EasyTool Controls 4.0" to transfer the files or data.

Instructions for the most important program functions are available from HESCH.

9.4 Offset for zeroing

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



1. Press the PARA key. The LED on the PARA key lights up. The LED  ΔP  flashes.



2. Press the DOWN key to select zeroing (see *Figure 12*). The "Zeroing" LED flashes.



3. Press the ENTER key to confirm the entry. The first segment of the display flashes.



4.
 - a) Press the UP and DOWN buttons simultaneously for 2 seconds. The currently measured value is inverted and accepted as the offset.



- b) Press the UP or DOWN key individually to set the offset value manually. In this case, step a) is omitted.



5. Press the ENTER key to confirm the entry.

9.5 Reset factory settings



and



1. When switching on the device, press the PARA and ENTER buttons simultaneously for 5 seconds.

EEP

2. EEP is displayed.

code

3. After 5 seconds, code appears to prompt entry of the password.



4. Press the ENTER key to start entering the password.



5. After entering and confirming the last digit of the password, the control system starts with factory-set parameters (see 9.1 *Parameter table*).



6. If no password has been assigned, the control system starts automatically after 5 seconds with the factory-set parameters (see 9.1 *Parameter table*).

10 Operation

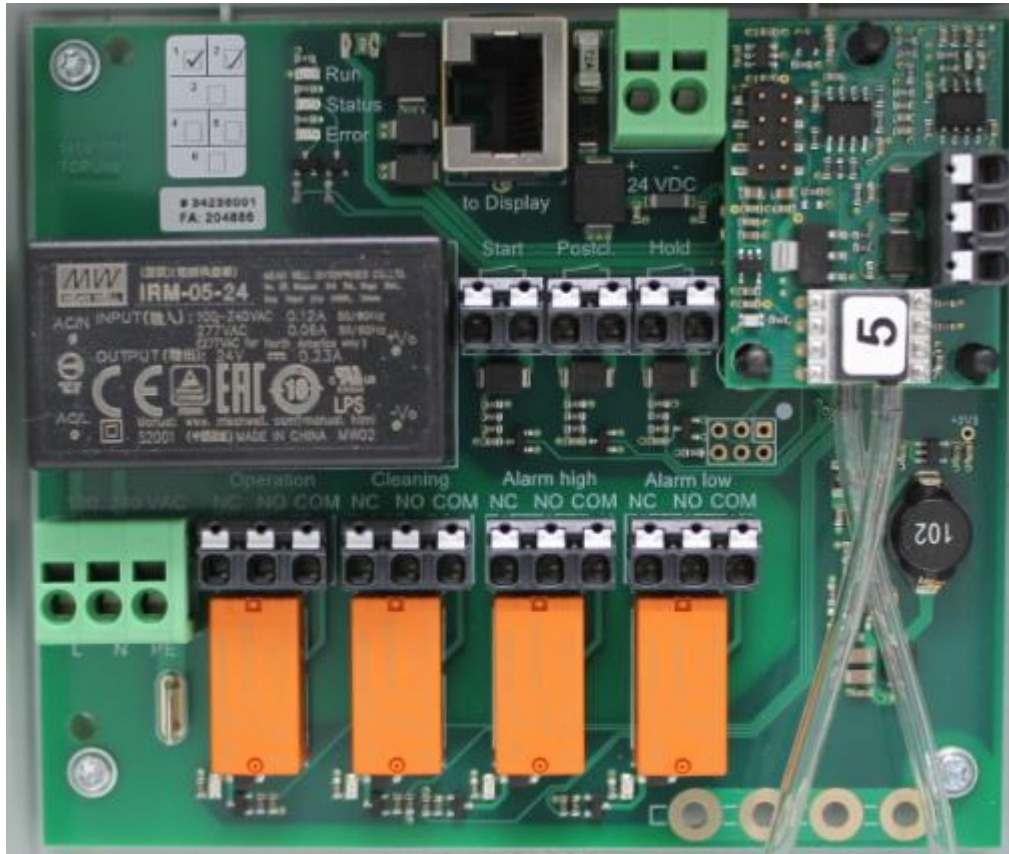
10.1 Normal operation

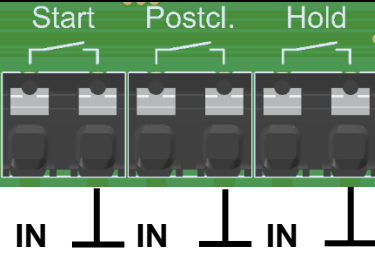
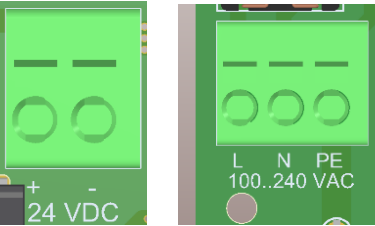
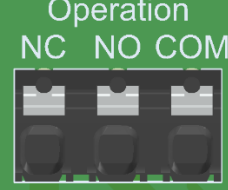


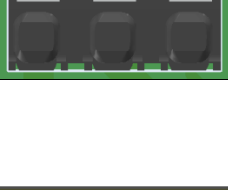
Operation is started by applying the supply voltage. The system is controlled via the differential pressure and the inputs of the device.

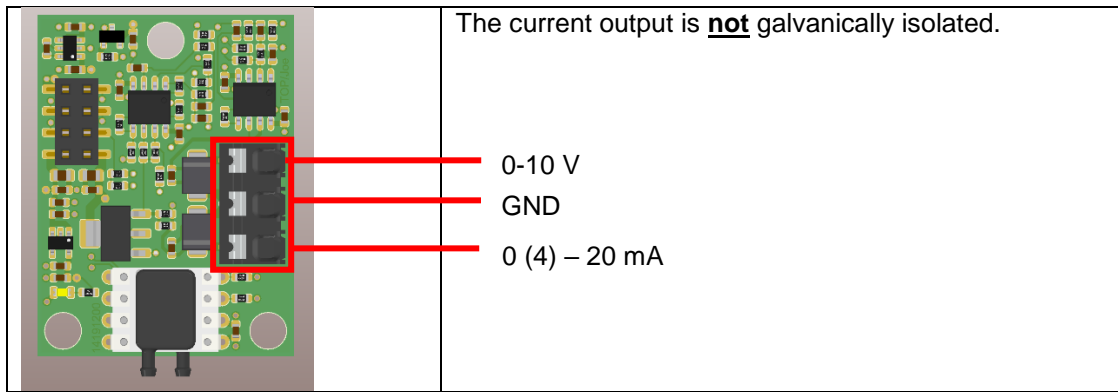


Note!

All digital inputs of a system refer to the same earth (-). It is allowed to use one earth line for all inputs.



	<ol style="list-style-type: none"> 1. The cleaning relay is closed as long as the start input (start) is closed. 2. The cleaning relay is closed for the set post-cleaning time with a sensor signal at the post-cleaning input (Postcl.). 3. The measured value is frozen/hold.
	<p>Supply voltage</p> <p>Please only connect 24 VDC <u>or</u> 100 - 240 VAC!</p> <p><u>For HE 5422 HD it is imperative to note the following:</u></p> <p>When connecting the 24 VDC supply, earth must be connected via the PE terminal of the VAC mains supply.</p>
<p>Operation</p> <p>NC NO COM</p> 	<p>Operating or error signal relay</p> <p>The NC contact is closed during error-free operation. If there is an error, the NC contact is open and the NO contact is closed.</p> <p><u>The following causes lead to an error message (see section 11 Error messages):</u></p> <ol style="list-style-type: none"> 1. Power failure 2. Device fault (parameter error) 3. Δp sensor error / measuring range exceeded
<p>Cleaning</p> <p>NC NO COM</p> 	<p>Cleaning relay</p> <p>The cleaning relay is closed when:</p> <ol style="list-style-type: none"> 1. the "upper threshold" is exceeded and until the value falls below the "lower threshold" 2. the value falls below the "post-cleaning threshold" for the post-cleaning time if the "lower threshold" was previously exceeded 3. closed start input 4. a sensor signal on the post-cleaning input for the post-cleaning time.
<p>Alarm high</p> <p>NC NO COM</p> 	<p>Δp-high alarm relay</p> <p>The relay is closed when the Δp-high alarm threshold is exceeded.</p> <p>A switch-on delay can be parameterized.</p>
<p>Alarm low</p> <p>NC NO COM</p> 	<p>Δp-low alarm relay</p> <p>The relay is closed when the Δp-low alarm threshold is undershot.</p> <p>A switch-on delay can be parameterized.</p> <p>The alarm only becomes active if the post-cleaning threshold is not exceeded within the switch-on delay.</p>



10.2 Function HOLD

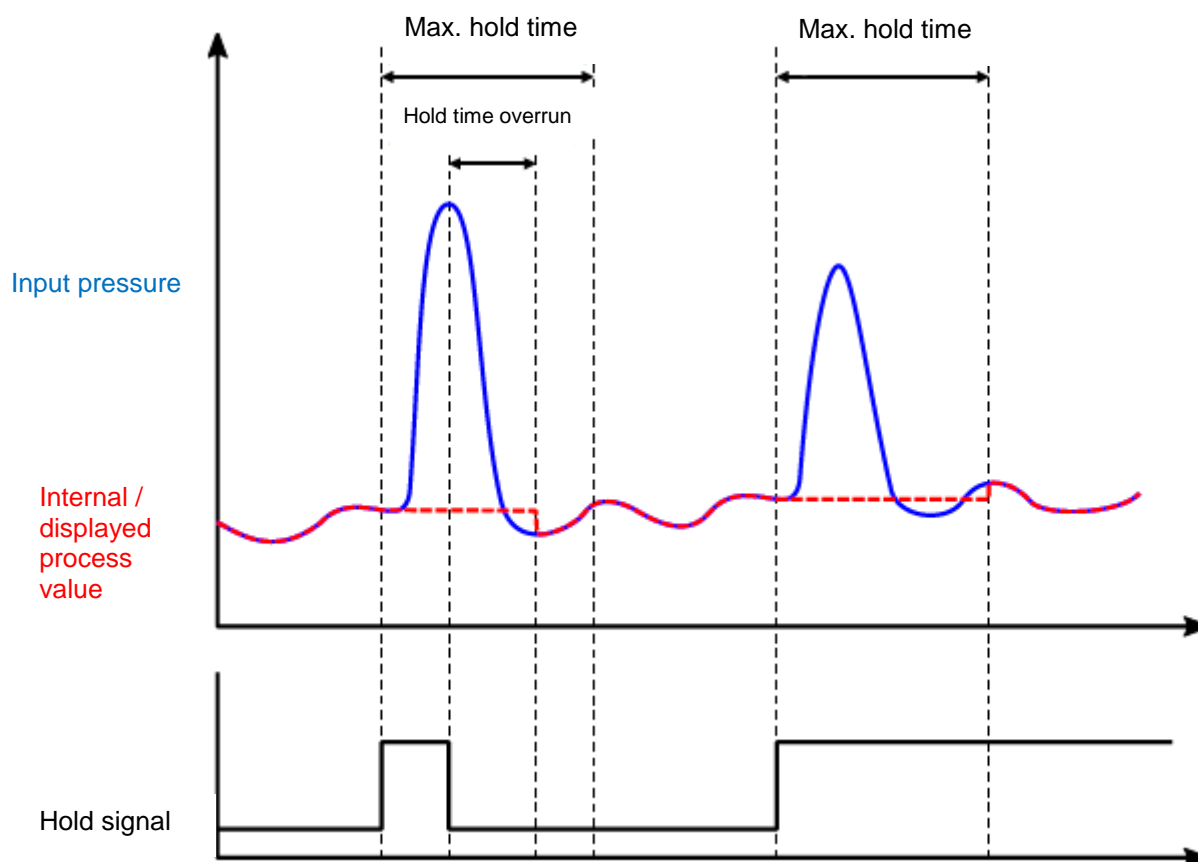










Figure 14 *Function HOLD*

With a rising edge at the hold input, the differential pressure value used for the processes and display is held at the currently existing differential pressure. If the hold signal expires again, i.e. the edge falls again, the differential pressure that is used is only used for the differential pressure value that has been set after the adjustable "hold time after run-on".

If the hold input is still active after the configurable "maximum hold time", i.e. the edge rises again, the hold function is automatically ended.

11 Error messages

Display / LED	Cause	Remedy
<p>The differential pressure display flashes:</p> 	EEPROM parameter error	<ul style="list-style-type: none"> Restore factory settings and check parameterization. If this is not successful, send the device to HESCH for repair.
<p>The differential pressure display shows:</p> 	The differential pressure signal is below the permissible measuring range.	<ul style="list-style-type: none"> Check differential pressure signal. Check external threaded connection.
<p>The differential pressure display shows:</p> 	The differential pressure signal is above the permissible measuring range.	<ul style="list-style-type: none"> Check differential pressure signal. Check external threaded connection.
<p>The differential pressure display shows:</p>  <p>and the high and low alarm LEDs flash alternately</p> 	<p>Fault in Δp-module.</p> <p>The yellow status LED on the Δp module does not light up.</p> <p>Δp module is not inserted or not firmly seated on the PCB.</p>	<ul style="list-style-type: none"> Insert the Δp module or check and correct the fit. If the status LED still does not light up, please contact HESCH service (see <i>chapter 12 Maintenance and Service</i>).
<p>The high alarm LED flashes:</p> 	The differential pressure exceeds the set threshold.	<ul style="list-style-type: none"> Adjust the configured pulse and pause times. Check filter element. Check the solenoid valves for optimal mechanical function. Check the compressed air system.
<p>The low alarm LED flashes:</p> 	The differential pressure falls below the set threshold for more than 5 minutes without reaching the post-cleaning threshold.	<ul style="list-style-type: none"> Adjust the configured pulse and pause times.

Display / LED	Cause	Remedy
<p>Alarm LED flashes:</p> 	No communication with I/O unit	<ul style="list-style-type: none"> • Check the connection cable between the I/O unit and the control unit for damage. • Possibly the RJ-45 connector is not properly engaged. Snap the connector back into place.

12 Maintenance and Service

Maintenance, Repair

The device must be cleaned regularly to prevent increased dust generation 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

AXXERON HESCH electronics GmbH

Boschstraße 8

31535 NEUSTADT

GERMANY

Phone: +49 5032 9535-0

Internet: www.hesch-automation.com

Email: info@hesch.de