HE 5709 Basic / HE 5713 Basic

Solenoid valve controllers in compact housing

Operating instructions

(Translation of Original German version)

HESCH
AUTOMATION

AXXERON
TECHNOLOGIES MEMBER

#370933 | Version 1.3

Legal notice

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1 Legal Provisions

Manufacturer

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

Intended use

- The solenoid valve controllers HE 5709 / HE 5713 Basic (compact housing) are used for time-controlled or differential pressure controlled cleaning of fabric filters. They can be operated without any interference of their safety within the operating and environmental conditions authorised in these operating instructions.
- 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.

Personnel qualification

All work on the devices may only be carried out by qualified electricians with sufficient knowledge in the field 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. To maintain this condition and ensure safe operation, the user must observe all instructions and warnings described in these operating instructions.

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/.
Click on the category **Declarations of Conformity** to select your device.

2 Safety Information

2.1 Symbols and Basic Safety Instructions

This chapter contains important safety regulations and notes. To prevent 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!

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, can 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 cables must be laid separately from the power lines. Connect the protective earth connector (in the respective equipment carrier) to the protective earth conductor.

Danger of Electrocution!
Any interruption of the protective earth conductor in the equipment carrier can result in the device becoming a hazard. Intentional interruptions are not permitted. If it can be assumed that safe operation is no longer possible, put the device out of operation and secure it against unintentional operation.

Danger of Electrocution!
Do **not** open the device while under voltage! When opening the devices or removing covers and parts, live parts may be exposed. Connection points can also be live!

Attention!
Never operate the device despite visible damage!

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 ethyl alcohol and a lint-free cloth.

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

Explosion protection!
The device with closed lid is suitable for use in potentially explosive dust atmospheres in zone 22.
Before opening the device, make absolutely sure that there is no explosive atmosphere.
Before you close the device again, ensure that the device is absolutely dust-free on the inside.

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 you have not found the fault after checking these points, we recommend sending the device to AXXERON HESCH electronics GmbH.

Decommissioning!
Switch off all poles of the power supply if the device is to be taken out of operation. Secure the device against unintentional operation!
If the appliance is connected to other devices and/or equipment, consider the effects before switching off and take appropriate precautions.

2.3.1 Special Regulations

Property damage caused by electrostatic charge!
Clean the device regularly to avoid increased dust generation on the device.
For cleaning the housing, use **moist** cleaning supplies only to prevent electrostatic charging!

Note!
The ATEX approval only remains valid, if the installation is carried out professionally in compliance with the degree of protection specified in the device identification.

Note!
The figures in this document show devices with **already mounted cable glands** of the connection sets #57090088 and #57130088 (*see chapter 11 Accessories)*. The connection sets are **not** within the scope of delivery.
The devices are delivered with blanking plugs.
For further information about the connection sets, please contact the service department of AXXERON HESCH electronics GmbH (*see chapter 12 Maintenance and Service*).

2.4 Device identification and name plates

2.4.1 Device Identification

The devices HE 5709 / HE 5713 Basic (compact housing) are labelled with:

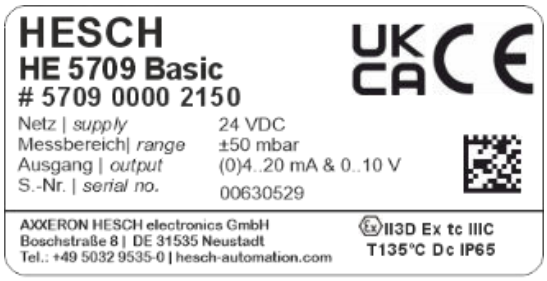
II3D Ex tc IIIC T135°C Dc IP65

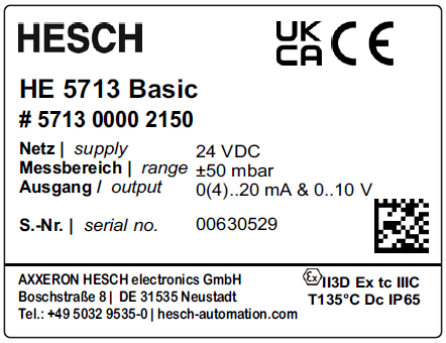
II3D	Device category:	Use in zone 22 for dust during normal operation
Ex	Indicates an electrical equipment. Standards of EN 60079-0ff. have been applied.	
tc	Type of ignition protection:	Protection by housing
IIIC	Explosion group:	conductive dusts
T135°C	Temperature class:	maximum permissible surface temperature
Dc	Device protection level:	Use in zone 22 for dust
IP65	Protection type:	dust-tight and protected against water jets

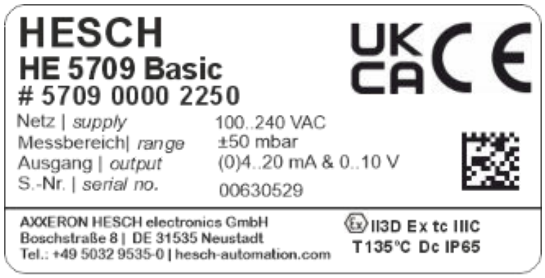
2.4.2 Name plates

Note!
The name plates are located on the right side of the housing.

HE 5709 Basic (compact housing)	HE 5713 Basic (compact housing)
24 V DC:	24 V DC:
100…240 V AC:	100…240 V AC:







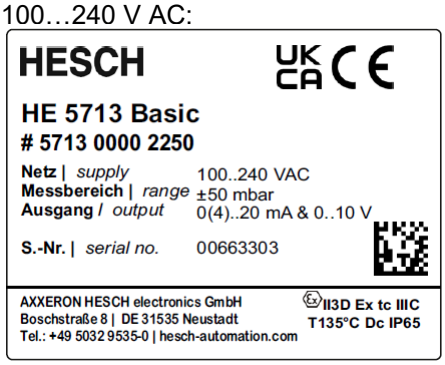


Figure 1 *Name plates HE 5709 / HE 5713 Basic*

3 Technical Data

3.1 Technical Data for solenoid valve controllers

General	
Supply voltage:	100…240 V AC / 50…60 Hz 24 V DC ±10 % with reverse voltage protection Supply by safety extra-low voltage (SELV) or protective extra-low voltage (PELV) **HE 5713:** Up to 7 extension units can be supplied by the master controller
Power consumption:	Max. 0.2 A for 100…240 V AC devices Max. 1.2 A for 24 V DC devices
EMC:	Interference immunity: DIN EN 61000-6-2 Emitted interference: DIN EN 61000-6-4
Ports:	USB / TT port adapter required, (galvanically separated)
Mounting position:	Vertical, wall mounting
Valve outputs:	**HE 5709**: max. 4, 24 V DC / 1 A **HE 5713**: max. 12, 24 V DC / 1 A
Relay outputs:	**HE 5709**: 1 **HE 5713**: 2
Digital inputs:	START, POSTCL (Post-cleaning), ENABLE
Pulse time:	Adjustable between 0.01…9.99 seconds
Pause time:	Adjustable between 1.0…999.0 seconds
7-segment display:	4-digit, 13.2 mm display height, white **Displays the following:** differential pressure, valve indication, parameter and alarm values
Air and creepage distances:	Contamination degree 2, overvoltage category II according to DIN EN 61010-1

Housing	
Housing material:	Polycarbonate Parts in contact with gas: Polyurethane
Dimensions:	**HE 5709:** 151 mm × 125 mm × 90 mm (W × H × D) **HE 5713:** 231 mm × 125 mm × 90 mm (W × H × D)
Protection type:	IP 65

Connections:	
Electrical:	Push-in spring clamp terminal for rigid and flexible conductors
Mains supply:	Up to 2.5 mm² Max. 1.5 mm² with wire end ferrule
Further connections:	Up to 1.5 mm² Max. 0.75 mm² with wire end ferrule
Cable glands:	**HE 5709:** 2 x cable gland M25 **HE 5713:** 4 x cable gland M25 4 x cable gland M16 2 x cable gland M20
Pneumatical:	
Differential pressure:	Plug connection for pneumatic hose with 6 mm diameter

Note!
The figures in this document show devices with **already mounted cable glands** of the connection sets #57090088 and #57130088 (*see chapter 11 Accessories)*. The connection sets are **not** within the scope of delivery. The devices are delivered with blanking plugs.
For further information about the connection sets, please contact the service department of AXXERON HESCH electronics GmbH (*see chapter 12 Maintenance and Service*).

Climatic ambient conditions	
Storage	-20 °C… +70 °C
Transport	-20 °C… +70 °C
Operation	-20 °C…+50 °C In EX zone 22: -20…+50 °C
Relative air humidity	≤ 95% annual average, climatic conditions in accordance with 3K6 according to DIN EN 60721-3 with restrictions, outdoor installation only with protective roof.

Air pressure	
during operation and storage	80 kPa to 106 kPa
during transport	70 kPa to 106 kPa

3.2 Technical data for dp-modules and A-In [1] modules

Note!
Instead of the dp-module, an analogue input module can also be used for connecting an external differential pressure transmitter.

dp-modules	
Number of module slots	**HE 5709:** 1× **HE 5713**: 1×
Current output:	
Dynamic range:	4...20 mA or 0…20 mA
Output load	Load <= 600 Ω
Linearity	< 1 % from final value
Precision	< 1 % from final value
Temperature drift	≤ 0.1 % / 10 K
Voltage output:	
Dynamic range	0...10 V
Output load	Load >= 1 kΩ
Linearity	< 1 % from final value
Precision	< 1 % from final value
Temperature drift	≤ 0.1 % / 10 K

Sensor system [2]			
Sensor	according to information on name plate		
	Max. measuring range	Overpressure[3]	Burst pressure[4]
	± 2.5 mbar	175 mbar	350 mbar
	± 5 mbar		
	± 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 and non-combustible gases		
Measuring system	Piezoresistive		

[1] Abbreviation for Analogue In (analogue inputs module). Is required, when an external differential pressure sensor is used.
[2] Information is for galvanically separated as well as for non-galvanically separated sensors.
[3] The overpressure is defined as the maximum pressure that may be applied to a pressure connection so that the sensor keeps the specifications as soon as the pressure is within the operating pressure range again. Higher pressure can lead to lasting damage on the product.
[4] The burst pressure is defined as the maximum pressure, which can affect a pressure connection relative to the other connection (or if just one pressure connection is connected), without causing leakages in the sensor.

dp-system accuracy			
Measurement range (in mbar)	± 2.5…± 10	± 25…± 100	± 350…± 1000
Basic accuracy	± 1.5 % FSO[5] T = 25 °C	± 1.0 % FSO T = 25 °C	± 0.5 % FSO T = 25 °C
Total errors	± 2 % FSO T = 0…60°C	± 1.5 % FSO T = 0…60°C	± 1.0 % FSO T = 0…60°C
Pneumatic connection	Push-in bulkhead fittings for 6 mm outer diameter of hose (4 mm with reduction)		

Overview of possible dp-modules
1. Not galvanically separated with 0(4)… 20 mA and 0…10 V output
2. Galvanically separated with 0(4)… 20 mA output
3. Galvanically separated with 0… 10 V output

A-In system accuracy		
Measurement range	(0)…20 mA	0…10 V
Basic accuracy	± 1.0 % FSO T = 25 °C	± 1.0 % FSO T = 25 °C
Total errors	± 2.0 % FSO T = 0…60°C	± 2.0 % FSO T = 0…60°C
Input impedance	≥ 150 Ohm	≥ 2 MΩ
Pin type	Push-in spring clamp terminal (*see chapter 6 Electrical Commissioning*).	

[5] Abbreviation for Full Scale Output

4 Mounting

Note!
If you wish to mount the device to the wall, *Figure 2* and *Figure 3* can be used as drilling templates.

Note!
The devices can be installed in **EX zone 22**. You must strictly observe the safety instructions for explosion protection, the information on the name plate as well as the special regulations in *chapter 2.3.1 Special Regulations.*

The ambient temperature at the installation point must not exceed the permissible ambient temperature for operation (see chapter *3 Technical Data)*.

4.1 Dimensions

4.1.1 HE 5709 Basic (compact housing)

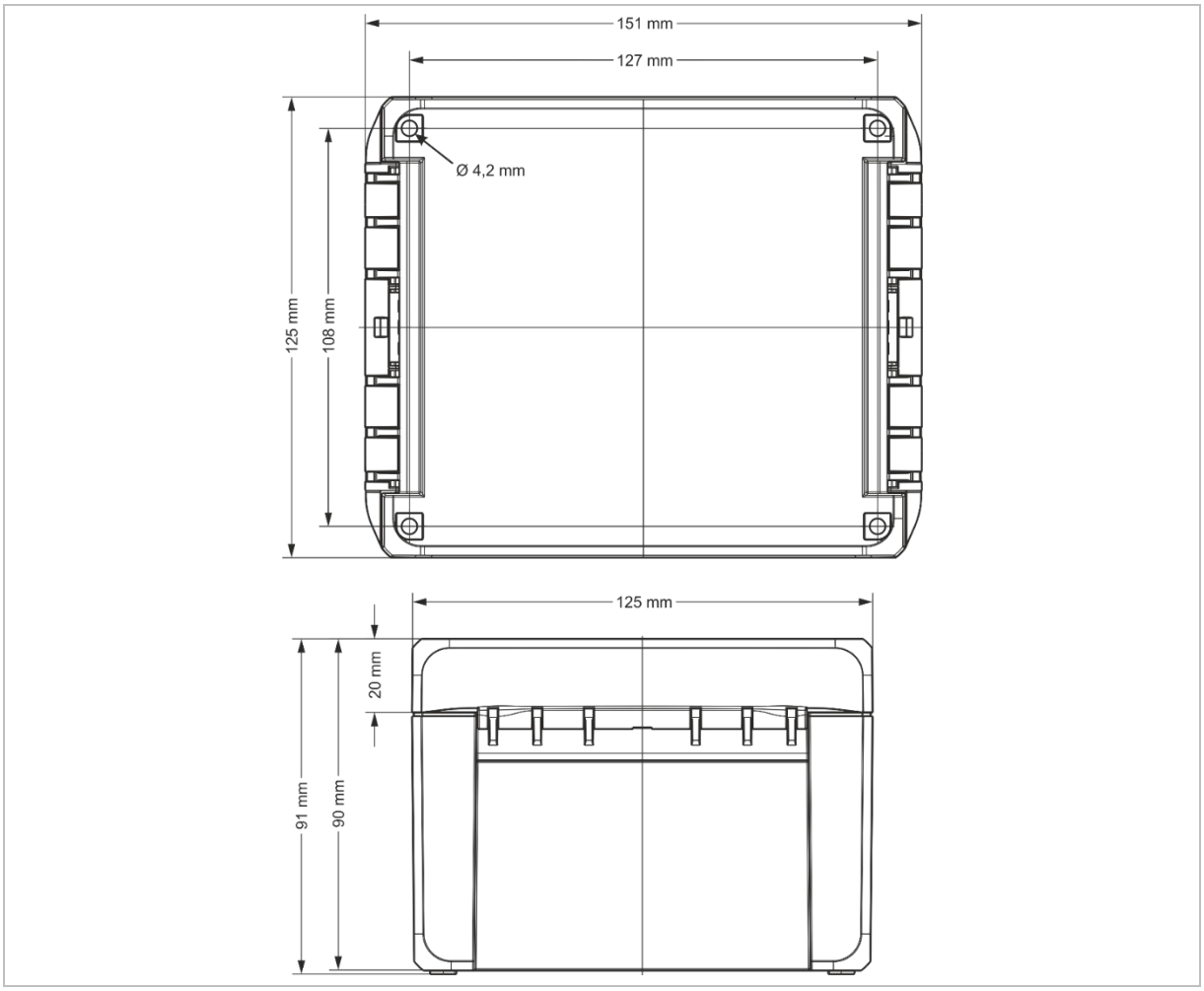


Figure 2 *Dimensions HE 5709 Basic (compact housing)*

4.1.2 HE 5713 Basic (compact housing)

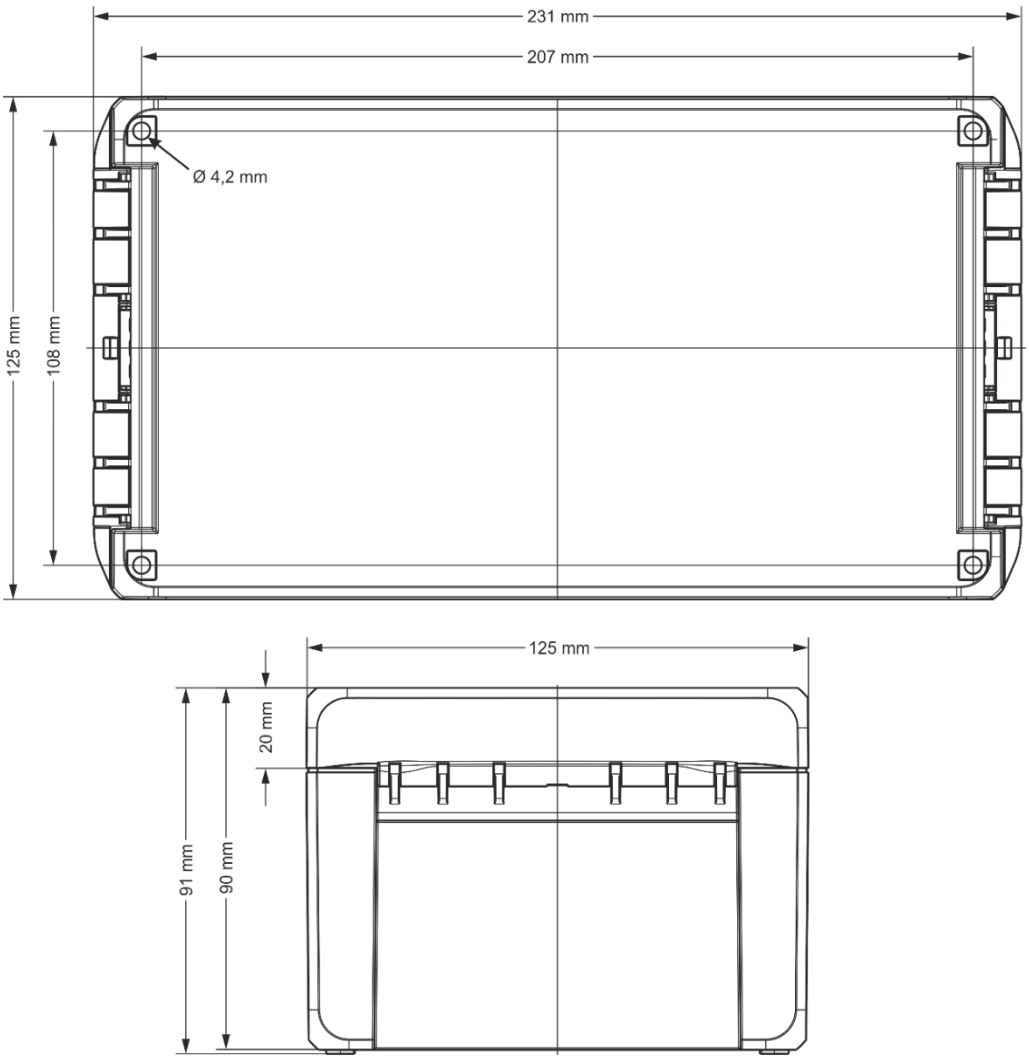


Figure 3 *Dimensions HE 5713 Basic (compact housing)*

4.2 Torques

Note!
When installing the device, you must strictly observe the torques listed in the following tables.

4.2.1 Cable glands

Type	Clamping range for cables												Screw-in thread / Counter nut	Dust cover
	Gasket 1+2+3				Gasket 1+2				Gasket 1				Nm*	Colour
	Min.		Max.		Min.		Max.		Min.		Max.			
	Ø	Nm*	Ø [1,2]	Nm*	Ø	Nm*	Ø[1,2]	Nm*	Ø	Nm*	Ø[2]	Nm*		
M16 × 1.5					5.5	1.0	7.0	1.0	7.0	1.0	10.0	1.4	3.3	white
M20 × 1.5	5.5	1.5	7.0	1.0	7.0	1.5	9.0	1.4	9.5	1.0	13.0	1.7	2.7	white
M25 × 1.5	8.0	1.5	10.0	2.0	10.0	2.3	13.0	2.6	13.5	1.3	17.5	2.3	3.0	white
M32 × 1.5					14.0	3.0	17.0	4.0	17.5	1.5	21.0	1.3	5.0	white

*Test torques at 20 °C
[1] Metal mandrels were used for the tests of the clamping ranges and test torques. The clamping range may vary if you use cables with different manufacturing tolerances and material properties. In the intermediate range, please use the combination of gasket 1+2+3.
[2] The cap nut must be re-tightened when maintenance work is due on the cable glands. This must be taken into account when choosing the gasket rubbers.

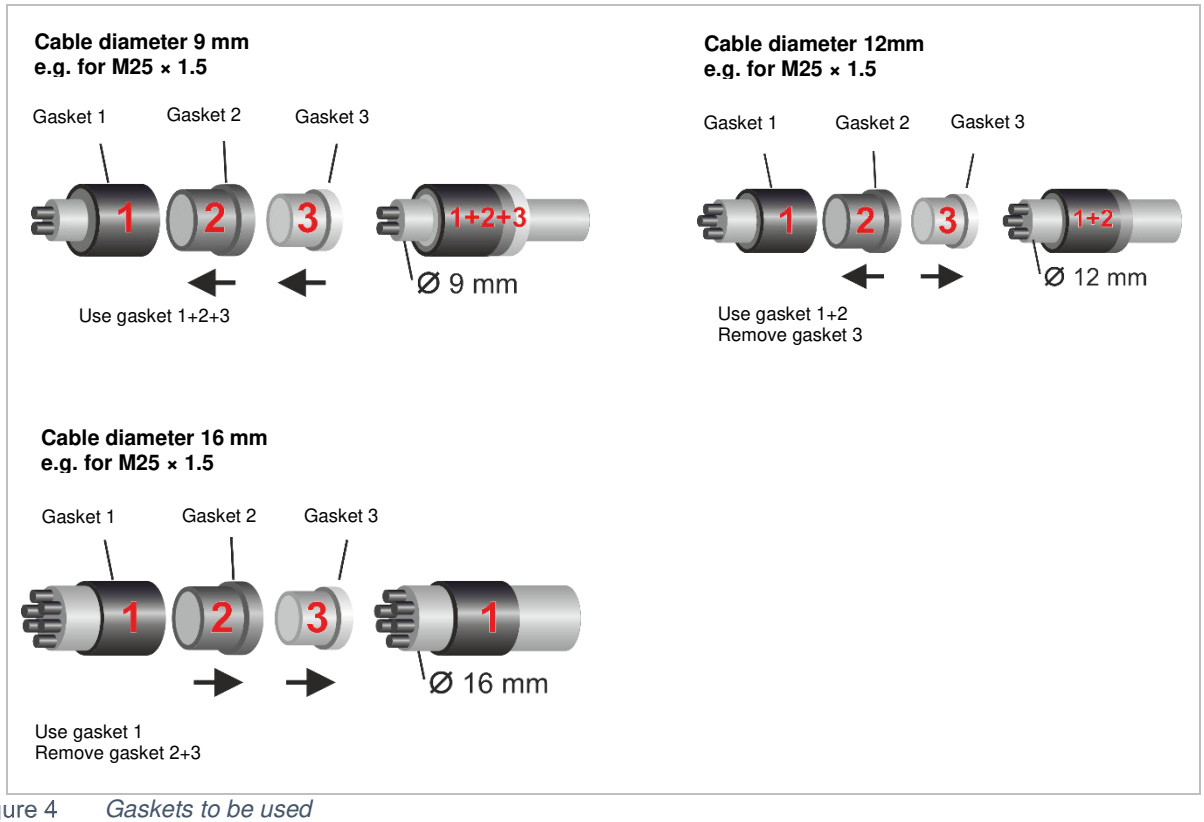


Figure 4 *Gaskets to be used*

4.2.2 Multiple cable glands

Type	Clamping range				
	Gasket 1				
		Min.		Max.	
		Ø	Nm	Ø	Nm
M25 × 1.5 double	2×	4.5	2.0	7.0	2.0
M32 × 1.5 quadruple	4×	5.5	1.5	7.0	1.0

4.2.3 Screw closures

Type	Ø1	L1	L2	L3	Screw-in thread / Counter nut	Weight approx.
M16 × 1.5	21 mm	12 mm	11 mm	4.0 mm	3.3 Nm	2.4 g
M20 × 1.5	25 mm	13 mm	12 mm	4.0 mm	2.7 Nm	4.3 g
M25 × 1.5	30 mm	13 mm	12 mm	4.0 mm	3.0 Nm	6.6 g
M32 × 1.5	37 mm	15 mm	14 mm	5.5 mm	5.0 Nm	12.0 g

4.3 Mounting the device

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

Note!
The position for the bore holes of the screws are the same for every housing. The housing in *Figure 5* is exemplary.

Note!
Alternatively, the wall mounting can be done with wall brackets (for more information, please contact the service of AXXERON HESCH electronics GmbH).

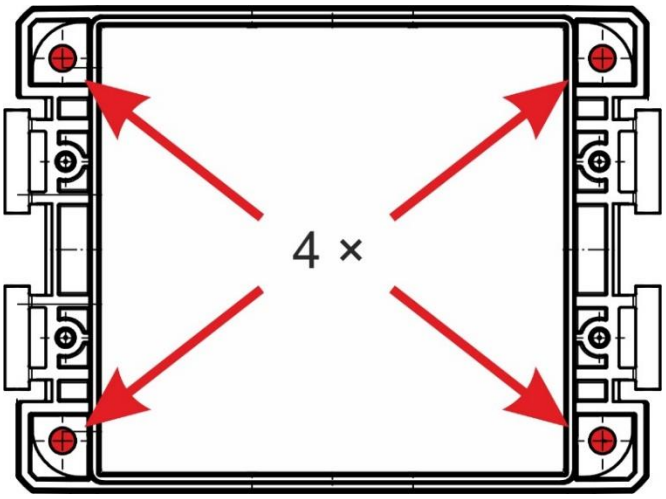


Figure 5 *Rear of housing, exemplary*

4.4 Opening the device

The opening and closing works without screws by means of hinge technology. A flat-tip screwdriver is required to open the device. Place the screwdriver in the designated position on the housing lid, in order to lift up the hinge (*see step 1 in Figure 6*).

Note!
Make sure to move the screw driver **to the right** to open the hinge (*see step 2 in Figure 6).* If the screwdriver is moved to the left, the housing lid can be damaged.

Open the housing lid to the left up to an angle of 105° (*see step 3 in Figure 6*).

Note!
Figure 6 shows a similar device. The opening principle is identical.

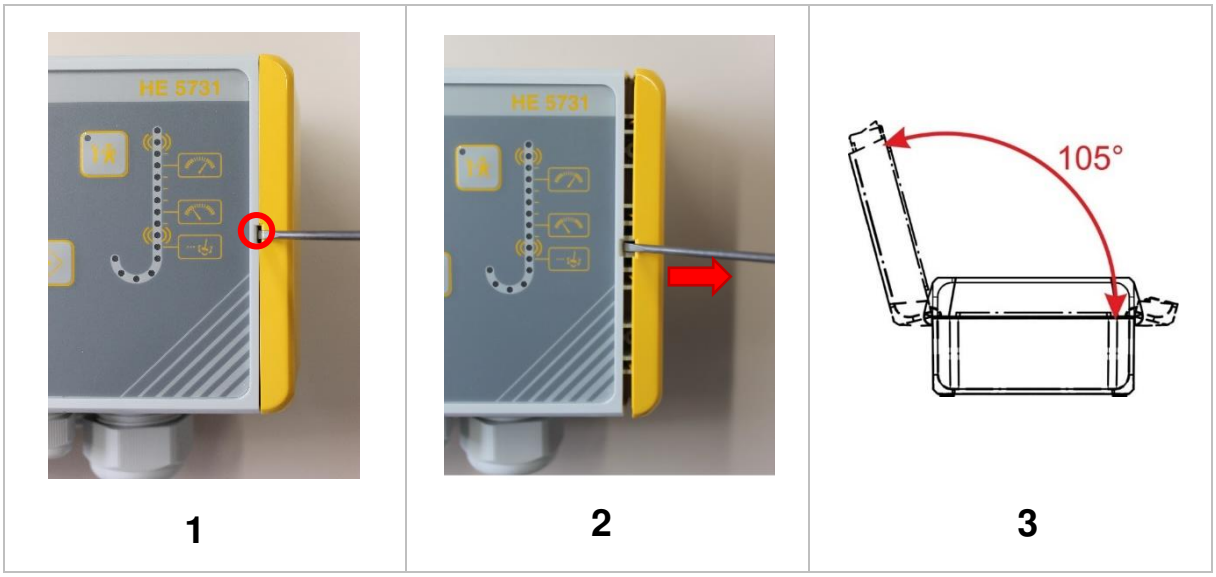


Figure 6 *Opening the housing lid*

Optionally, the housing lid can in addition be closed with 4 screws in order to protect it from unauthorised access. For further information, please contact the service of AXXERON HESCH electronics GmbH (*see chapter 12 Maintenance and Service.)*

The screwless hinge closure is recommended for quick service access.

5 Device Description

Note!
The figures in this document show devices with **already mounted cable glands** of the connection sets #57090088 and #57130088 (*see chapter 11 Accessories)*. The connection sets are **not** within the scope of delivery. The devices are delivered with blanking plugs
For further information about the connection sets, please contact the service department of AXXERON HESCH electronics GmbH (*see chapter 12 Maintenance and Service*).

The solenoid valve controller HE 5709 Basic (compact housing) has 4 valve outputs, the HE 5713 Basic (compact housing) has 12 valve outputs. Both devices are available with 24 V DC or 100…240 V AC.
The HE 5713 can be connected to 7 extension units maximum. This is how the number of valves can be raised up to 96 for this device. Each extension unit has 12 valve outputs.
The HE 5709 Basic **cannot** be extended.

5.1 HE 5709 Basic (compact housing)

Figure 7 *HE 5709 Basic (outer and inner view, exemplary on the device version with 100…240 V AC).*

5.2 HE 5713 Basic (compact housing)

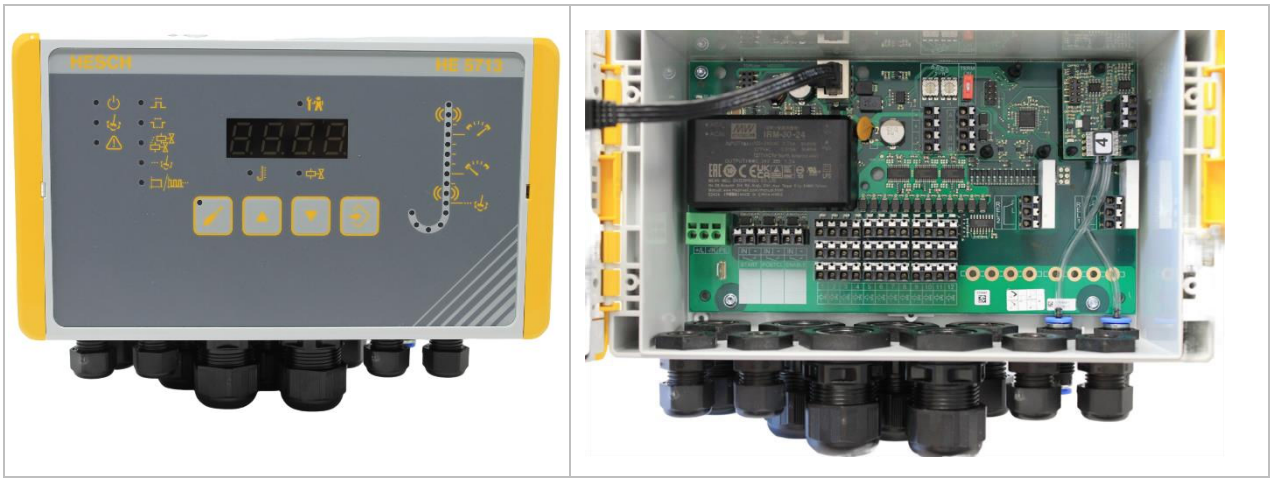


Figure 8 *HE 5713 Basic (outer and inner view exemplary on the device version 100…240 V AC).*

5.3 Extension unit (usage in combination with HE 5713 Basic only)

The device type HE 5713 Basic (compact housing) can be extended to 96 valves maximum, e.g. up to 7 extension units can be connected. The extension unit is basically a HE 5713 Basic (compact housing), only without display and operating elements and without dp modules.

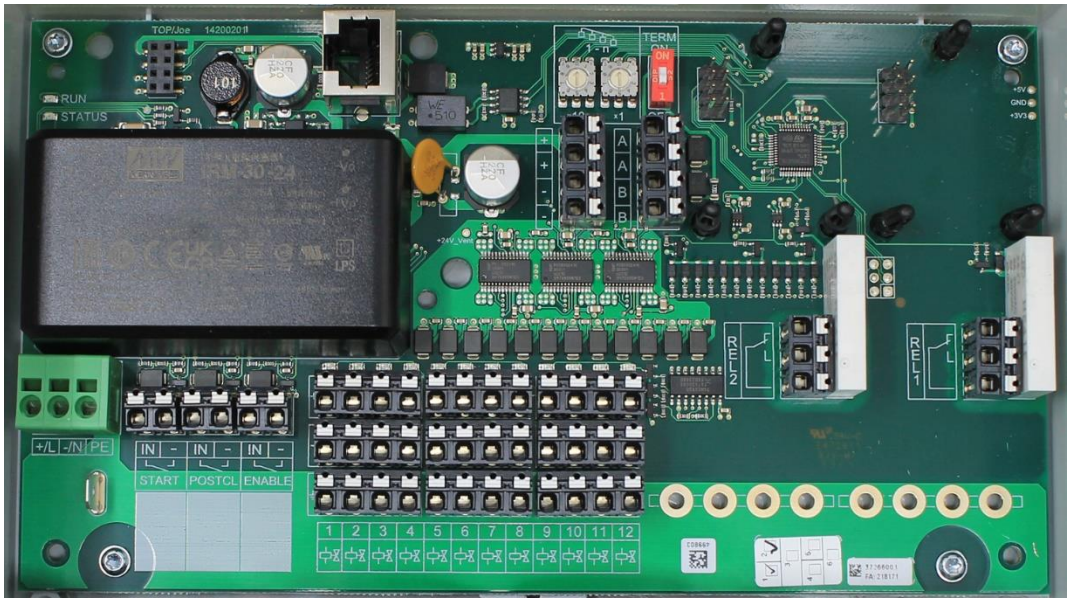


Figure 9 *Internal view of the extension unit for HE 5713*

6 Electrical Commissioning

Please observe the following safety notes before electrical commissioning.

Danger of Electrocution!
Electrical installation must only be carried out when the power is disconnected.

Explosion Prevention!
With closed cover, the device is suitable for use in EX zone **22.** Before opening the device, it is essential to ensure that no explosive environmental conditions, such as dust generation, exist.

Property 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 supply voltage!
The supply voltage must correspond to the voltage indicated on the nameplate.

Note!
Work on the electronic parts may only be carried out by qualified personnel.

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

Note!
Please connect the cables to the cable screw connections properly.

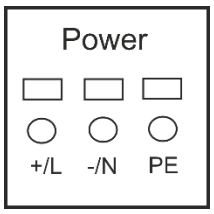
Note!
The temperature limitations specified for the use of the device (*see chapter 3 Technical Data)* must be complied with before and during operation.

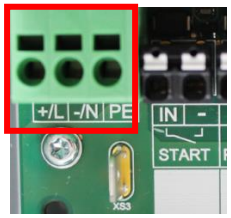
6.1 Wiring diagram

Furthermore, the wiring diagram can be found in the download centre of our website https://www.hesch-automation.com/en/support/download-center/.
Below the heading **EPLAN connection diagrams + macros**, you can select the plan for your device.

6.2 Supply voltage / Operation

Please refer to the name plate for correct supply voltage (100…240 V AC or 24 V DC).





Supply voltage

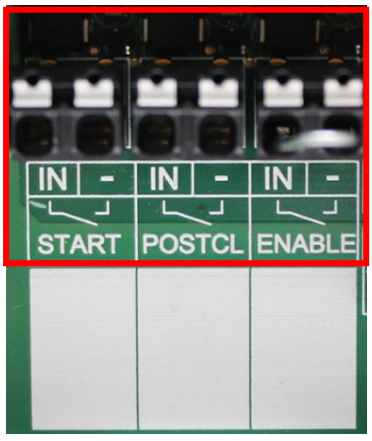
L/+: HE 5709 Basic / HE 5713 Basic 100…240 V AC or 24 V DC

N/-: 0 V

PE: Protective earth

The device is ready for operation, when the supply voltage is applied. The valve cleaning is controlled via the inputs and outputs of the device.
HE 5709 or HE 5713 appears on the display as scrolling text and an LED test is performed, i.e. each LED lights up briefly once.

6.2.1 Digital inputs



To initiate cleaning, the ENABLE input must be closed. Cleaning can be initiated by a closed START input or by exceeding the upper differential pressure threshold or by the dp-operating point (*see chapter 9.5 Functionality of dp-operating point*).

If the ENABLE input is opened during operation, cleaning stops and interrupts all running processes.

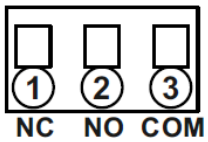
As long as the START input is closed, the solenoid valves are triggered with the set control times. When the START input opens, post-cleaning starts, if the number of `post-cleaning cycles' was set to >0.
Requirement: The ENABLE input is closed.

Note!
In test mode, solenoid valves can also be controlled without enabling.

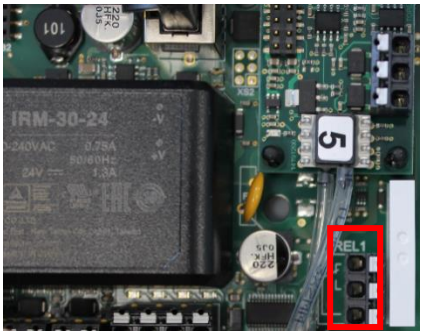
Note!
All digital inputs of a system refer to the same ground (-). It is allowed to use one ground line for several inputs.

Note!
Post-cleaning is suppressed as long as precoating is activated.

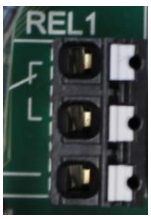
6.2.2 Relay outputs



Status



Relay outputs



HE 5713 has two relay outputs (REL1 + REL2).

6.3 Valve connections and analogue outputs

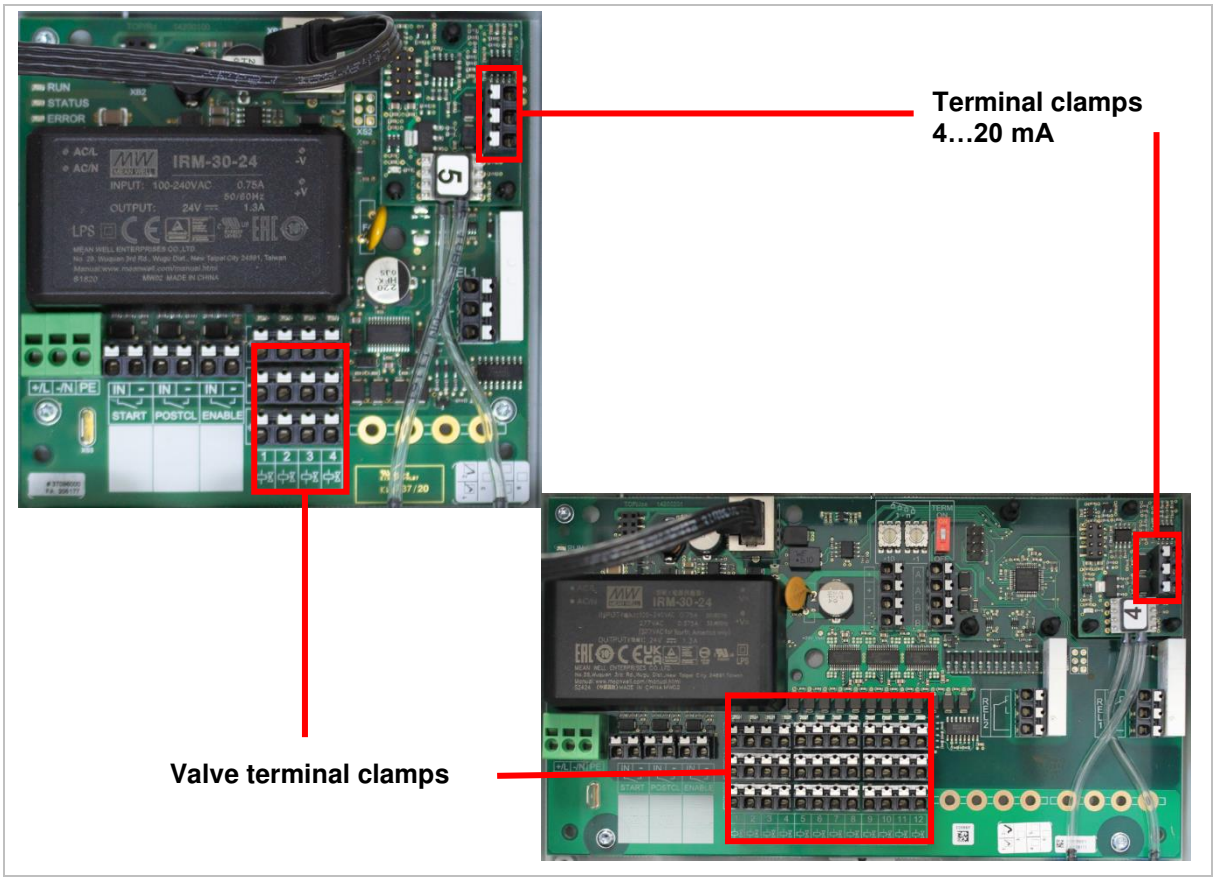


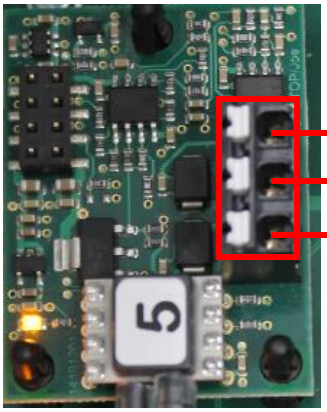
Figure 10 *Valve clamps and analogue outputs*

Four valves maximum can be connected to the HE 5709 and 96 valves maximum to the HE 5713 Basic (when 7 extension units maximum are connected). The solenoid valve connections are arranged vertically one above the other (see *Figure 10*). For each solenoid valve, one clamp is determined for protective earth. The PE connection ensures the dissipation of electrical interferences. For integrated solenoid valves, the PE connection is not necessary.
The valve outputs are designed for 24 V DC and 1 A.

Note!
All digital inputs of a system refer to the same ground (-). It is allowed to use one ground line for several inputs.

Note!
The FE connection can be omitted for fully insulated solenoid systems.

6.3.1 Analogue outputs



The dp-module has an analogue current output and an analogue voltage output.
The current differential pressure is indicated with a 0(4)…20mA & 0…10V signal which is not galvanically separated.

0…10 V

GND

0(4)…20 mA

6.4 Connecting the extension units to HE 5713 Basic (compact housing)

By connecting up to 7 extension units, the number of valves can be increased to a total of 96.

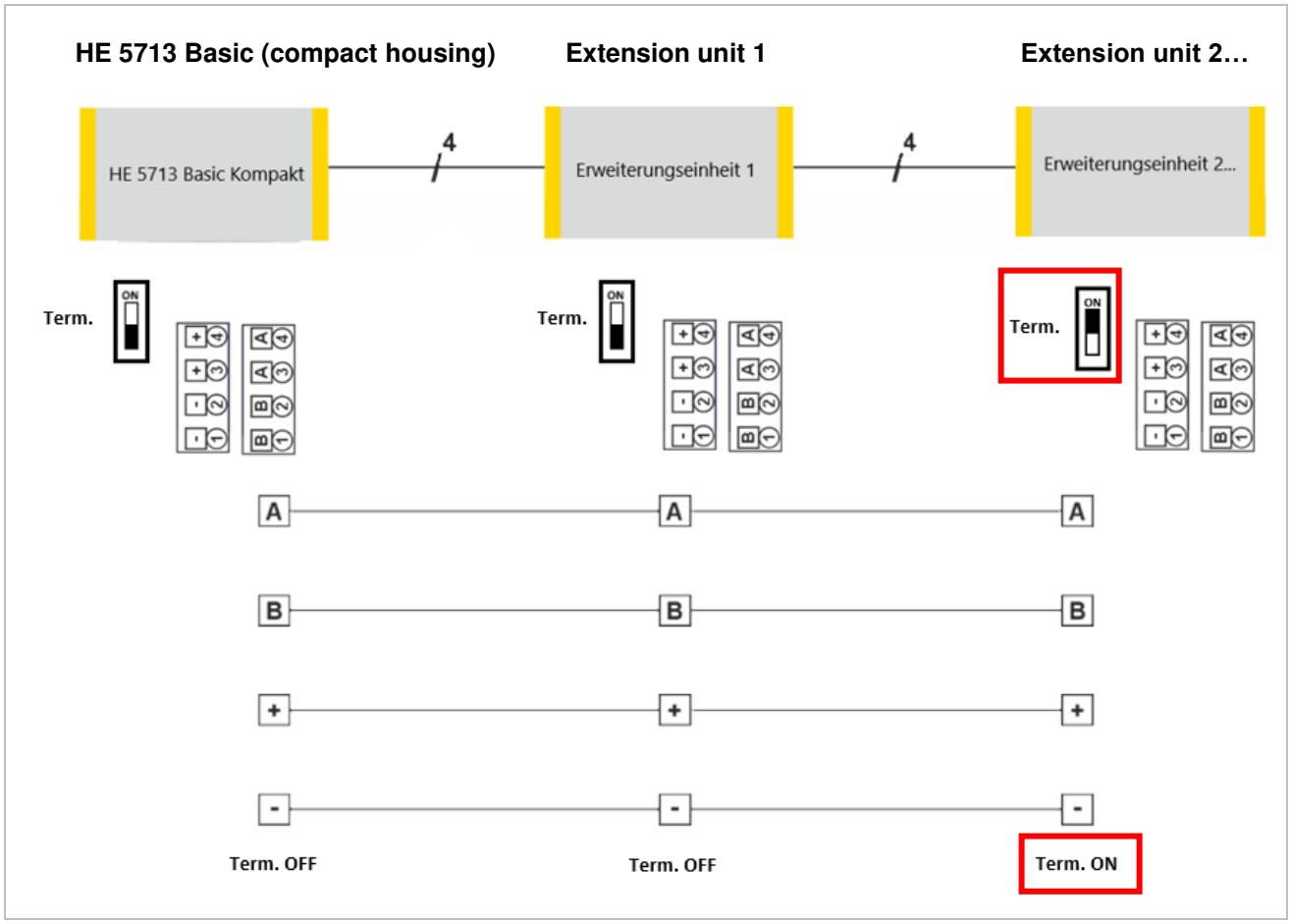


Figure 11 *Connecting extension unit to HE 5713 Basic*

1. The solenoid valve controller is connected to the extension unit by means of a 4-wired cable.
2. Set the rotary coding switch of the soleniud valve controller to **1**.
3. Then set the rotary coding switch of the first extension unit to 2 and further extension units to **3**, **4** and so on.
   The numbers of the respective rotary coding switches may only be assigned once for all connected devices!

Note!
Please note that the bus termination (termination switch **Term.**) of the HE 5713 Basic is switched off (**OFF**) and is only switched on the last connected extension unit, i.e. is set to **ON.**

Note!
If the extension units have their **own mains supply** (230 V or 24 V), the plus (+) connection is not necessary and only the connections A, B and minus (-) are connected to each other.

6.5 Differential pressure measurement

HE 5709:

+p1 raw gas

+p2 pure gas

HE 5713:

+p1 raw gas

+p2 pure gas

Figure 12 *Connections HE 5709 / HE 5713 Basic*

The differential pressure is measured **internally** and can also be transmitted as a 4…20 mA signal to a higher-level controller or display unit.
The current output is scalable via the adjustable differential pressure measuring range.

For example:
0 mbar ≙ 4 mA, differential pressure measuring range ≙ 20 mA

The cleaning process is started during normal operation when the upper threshold is exceeded or when dp-operating point is reached and stops when the values falls below the lower threshold.

When the precoating function is activated, cleaning starts at the upper threshold increased by the precoating offset.

7 Display and Operating Elements

7.1 Display and Operating Elements, externally

Figure 13 *External display and operating elements HE 5709 Basic / HE 5713 Basic*

Symbols/Indicators	Meaning
External	
	**Operation signal**
	Cleaning active
	**Alarms active**
	Pulse time is executed
	**Pause time is executed**
	Number of valve is displayed and can be changed
	**Post-cleaning cycle is executed**
	**Complete cycle/part cycle**
	**Test mode**
	**Differential pressure is displayed** in the (meaning of the LEDs of the differential pressure column, *see chapter 7.2 Differential pressure column.*
	**The currently active valve (number) is displayed.**
	**PARA key** • parametrisation mode ON/OFF
	**UP key** • increasing the displayed value
	**DOWN key** • decreasing the displayed value
	**ENTER key** • confirming the displayed value

Symbols/Indicators	Meaning
External	
	**7-segment display** • regular operation: current differential pressure, current solenoid valve • parametrisation mode: parameter values and error messages • by pressing the keys UP/DOWN, the display mode can be switched.

7.2 Differential pressure column

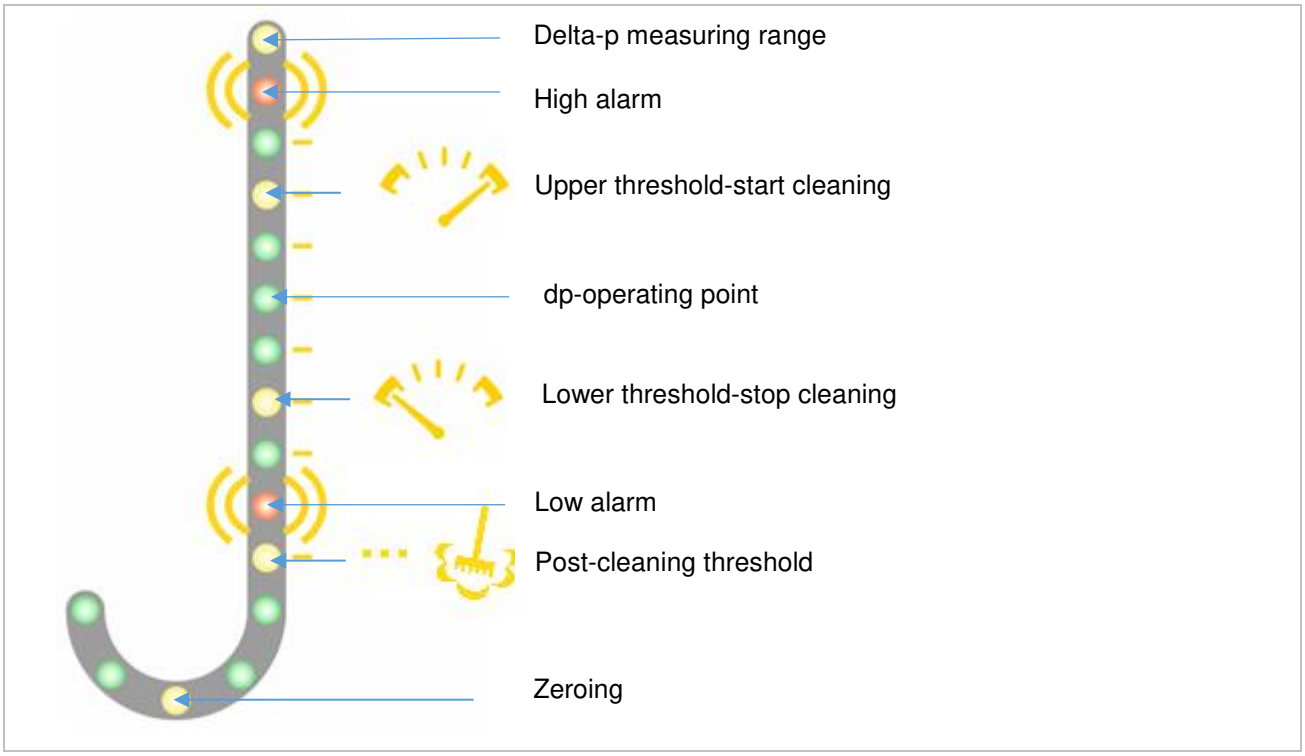


Figure 14 *Differential pressure column and meaning of LEDs*

7.3 Display and Operating Elements on the I/O board

The display and operating elements on the I/O board are used for basic settings or easier troubleshooting during servicing and can only be accessed when the cover is open.

Explosion Protection!
HE 5709 and HE 5713 Basic (compact housing) are, with closed lid, suitable for use in hazardous dust explosive areas of zone 22.
Before opening the device, make absolutely sure that there is no explosive atmosphere.
Before closing the device, please make sure that the device is dust-free on the inside.

Danger of Electrocution!
Do not open the device while under voltage! When opening the devices or removing covers and parts, live parts may be exposed. Connection points can also be live!

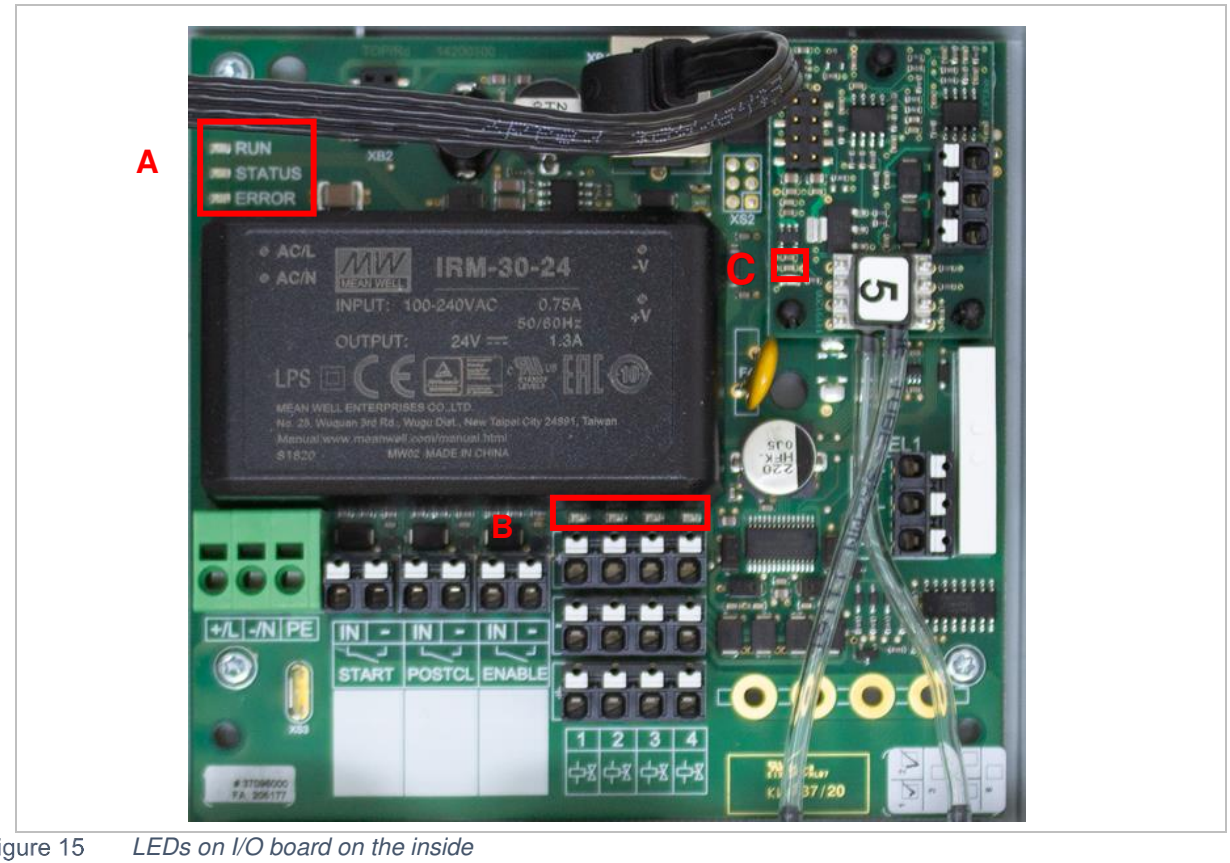


Figure 15 *LEDs on I/O board on the inside*

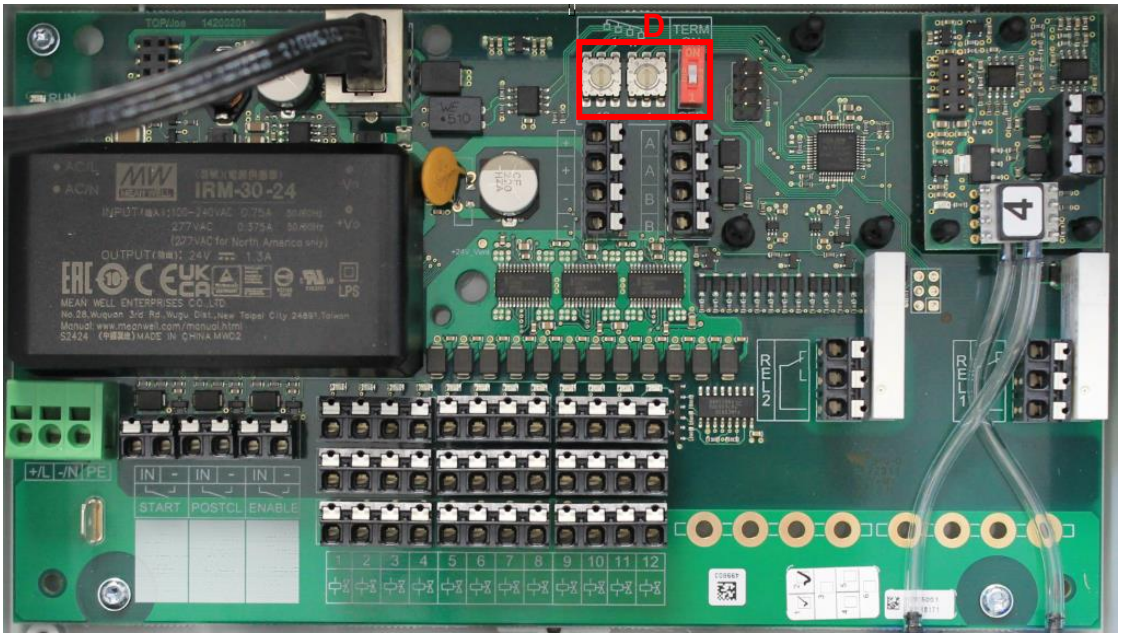


Figure 16 *Slide switch for bus termination*

Symbols / switches	Meaning
Internal	
A	
Status LED green	• Lights up **permanently**, when a supply voltage is applied.
Status LED yellow	• Lights up **permanently**, if there is communication between control and operating unit. • **Flashes**, while waiting for communication between control and operating unit. • **Flashes quickly**, when Bootloader (start programme) is running.
Status LED red	• Is linked to the alarm/operation relay of the software. • LED l**ights up**, if the relay is de-energised (alarm). • LED **goes off**, if the relay is energised (operation).
B	
Valve LEDs	• **Glow**, if a solenoid valve has been detected. • **Light up**, when pulsed.
C	
Status LED on dp module	• **Lights up permanently**, when a supply voltage is applied.
D	
	• Slide switch for bus termination • If no extension unit is connected, the default setting is **ON**.
	• **For HE 5713 only:** The rotary coding switch is used to set the device address. For the basic device HE 5713, the device address to be set is always **1**. The rotary coding switches of the connected extension units must be set to **2, 3** etc.. AXXERON HESCH electronics GmbH delivers the extension units with the preset device address **2**.

8 Operation

8.1 Switching the device on

1. Connect the device to a voltage supply.

   - The device carries out an LED test, i.e. each LED on the operating unit lights up once briefly and goes off again.
   - The display shows HE 5713 as scrolling text and afterwards the currently measured value.
   - The device is ready for operation. The RUN LED **Lights up** green **permanentl**y 

8.2 General operation

During regular operation, 3 display modes are possible.

- Differential pressure 
- Number of the currently active solenoid valve 
- Differential pressure and number of solenoid valve alternating

 	If the differential pressure is displayed in the 7-segment display, the **differential pressure LED** below the display also **lights up** green.
	1. Press the ENTER key once, to switch the 7-segment display to solenoid valve number indication.
	The number of the currently controlled solenoid valve is displayed (e.g. 5) and the **active valve LED lights up** green.
	2. Press the ENTER key once again, to show differential pressure and number of solenoid valve alternating.
	3. Press the ENTER key one more time, to switch the display back to differential pressure indication.

8.3 Test & Service

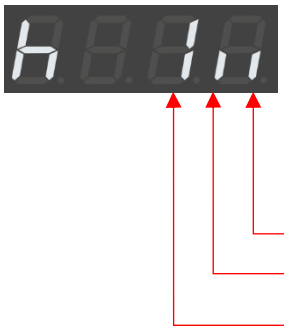
Note!
The test & service menu is cancelled automatically 30 seconds after the last key was pressed!

1. Press the PARA key to enter the test mode of the device.
   - ➢ The LED on the PARA key **lights up** yellow.
   - ➢ The **test mode LED flashes** and the display shows tESt . If you do not press any further key now, the device leaves the test mode automatically after 30 seconds and the test mode LED and the LED on the PARA key go off.

2. Press the ENTER key to enter the test menu.
   - ➢ The **test mode LED flashes** as long as you are still in the test and service menu. If you leave the test mode manually or automatically, this LED goes off again.


or

3. Press the keys UP or DOWN to select the requested test function **(a-f)**.



a. **<u>Display of digital inputs</u>**

(START, Post-cleaning (POSTCL), ENABLE

 = off  = on

Shows the status of the enable signal

Shows the status of the post-cleaning signal

Shows the status of the start signal

The display of the digital inputs depends on the pin assignment of the control inputs.

b. **<u>Output test</u>:** Relay operation / error (for HE 5709 **and** 5713!)

 = off  = on

<u>Output test:</u> dp-relay (for HE 5713 only!)

 = off  = on

Starting the output tests (b.):

Press the ENTER key.

- The decimal point at the bottom right of the display is **flashing**.

Press the ENTER key once again. Output and input are switching. The decimal point in the display is **flashing**.

Press the PARA key twice to leave the menu point **b.**

tESt is displayed again.

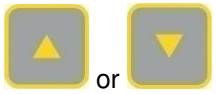
Press the keys UP or DOWN, to select the next test function.

c. Information about extension units

Indication of extension units, if more than one I/O unit is connected.

Press the DOWN key until Eu. 1 is displayed.

Press the ENTER key to enter the extension unit selection.



Press the keys UP or DOWN, to select the requested extension unit. The display switches between the I/O unit and the device address + status.

Example:

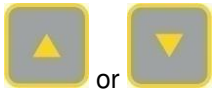
I/O unit 1:		⇔	
I/O unit 1 has the device address 1 and is available.			
I/O unit 2:			
I/O unit 2 has the device address 4 and currently shows a communication error.			
…			

d. Single valve test

Starting the single valve test (d.):

Press the ENTER key to start the single valve test.

- The active valve LED **lights up**.



Press the keys UP or DOWN, to select the requested solenoid valve. The solenoid valve number is displayed.

Press the ENTER key to activate the selected valve.

The right decimal point of the display indicates an ongoing valve control and subsequent pause time. During the valve activation, a test cannot be started. During cleaning / post-cleaning, a test cannot be started either.

The display switches between valve number, status and the current of the last valve control [A].

Example:

Valve 1:		⇔		**Valve ok 0.94 A**
Valve 2:		⇔		Valve interruption
Valve 3:		⇔		Valve short-circuit
…				

Press the PARA key to terminate the test.

- The test is finished.
- The **active valve** LED lights up.

e. Time-controlled cleaning

Starting the time-controlled cleaning (e.):

Press the ENTER key.

- The LED for **time-controlled cleaning lights up**, to start or stop a time-controlled cleaning. This is done independent of the enable signal at the digital input.
- The display indicates a stopped cleaning with  and an ongoing cleaning process with 
- Confirm the start or stop of a time-controlled cleaning by pressing ENTER.

Press the PARA key once to leave the menu for time-controlled cleaning.

1x

- Ongoing cleaning  continues.

Press the PARA key twice to leave the test & service menu.

2x

- Cleaning stops **automatically** 
-  is displayed again.

f. **Post-cleaning**

Starting the post-cleaning (f.):

Press the ENTER key (**post-cleaning LED flashes)** to start or stop the post-cleaning. This is done independently of the enable signal at the digital input.
The display indicates a stopped cleaning with  and an ongoing cleaning with 
Press the ENTER key to confirm a start or stop of post-cleaning.

1x

Press the PARA key **once** to leave the menu for **post-cleaning**.

- Ongoing cleaning  continues.

2x

Press the PARA key **twice** to leave the test & service menu.

- The cleaning then stops automatically.

g. **Cycle counter** (number of cleaning cycles)
In case of less than 10000 cycles, the indication in the display is static. In the range between 10000…9999 9999 cycles, thousands and ones are indicated alternately. The decimal point at the bottom right indicates the thousands separator.
Example: 12 3094 cycles.

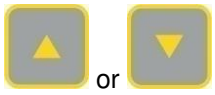
h. **Operating hours counter:**
The indication of operating hours is the same as for the cycle counter (see g.). The LED for complete cycle/part cycle **flashes** during the operating hours indication.

i. **LED for dp-measuring range**

Output of the analogue signal is adjustable from 0…100 %.

Press the ENTER key to start the test operation of the analogue output.

- The LED for **dp-measuring range** as well as the **test mode** LED are **flashing**.



Analogue output (i.):

Press the UP or DOWN button to change the initial value (0…100 %).

Press the PARA key to quit.

- The LED for **dp-measuring range lights up**.

4. Press the PARA key to leave the test mode dp-measuring range.

   ➢ tESt is displayed again.

8.4 Activate / Deactivate precoating

Activate: Press the UP **and** ENTER keys simultaneously.

➢ The display shows PrE alternating with the differential pressure or the number of the active valve. Depending on what has been set in advance.

Deactivate: Press the keys DOWN **and** ENTER simultaneously to deactivate the precoating function.

➢ PrE is no longer displayed.

or:

Once the first cleaning threshold (increased by precoating) is reached, precoating is automatically deactivated!

Note!
Post-cleaning is suppressed as long as **precoating** is activated.

9 Parametrisation

9.1 Parameter Table

Parameter	Setting range	Default setting
Solenoid valve controller:		
Pulse time	0.01…9.99 s	0.10 s
Pause time	1.0…999.0 s	1.0 s
Number of valves	0…96	0 (teach-in)
Post-cleaning cycles	Off (0)…20	Off
Cleaning mode part cycles/complete cycles	0…9	1
I/O jump active (HE 5713 only!)	Off /On	On
Differential pressure:		
dp-measuring range • The analogue output signal is scaled to this measuring range (0…100 %).	0.0…50.0 mbar	50.0 mbar
High alarm [mbar] • Threshold for high alarm message.	Off (0.0)…50.0 mbar	20.0 mbar
Cleaning mode	Threshold, operating point	Threshold
Upper threshold [mbar] • If exceeded, the dp-dependent cleaning starts. • Start of the dp cycle • At 0.0 mbar the dp-dependent cleaning is deactivated. Then, only a time-dependent cleaning is possible. The differential pressure column is switched off.	0.0…50.0 mbar	10.0 mbar
Lower threshold [mbar] • If the differential pressure falls below this threshold, the dp-dependent cleaning stops. • End of the dp-cycle • For easier setting, the lower threshold can be switched off. The device calculates a hysteresis in relation to the upper threshold with 10 % of the dp-measuring range.	Off (0.0)…50.0 mbar	6.0 mbar
Operating point • This function requires that the cleaning mode **part cycle is set to 0**. • This parameter does the same as the upper threshold. Which means that if the operating point is set to 0, there will be no dp-controlled cleaning. Only a time-dependent cleaning is possible. The differential pressure column is switched off.	0.0…50.0 mbar	8.0 mbar
Maximum pause • When this pause has run out, a forced cleaning is performed.	Off (0)…999 s	999 s

Parameter	Setting range	Default setting
Low alarm [mbar] • Threshold for low alarm message • When the post-cleaning threshold is not underrun within 5 minutes, an alarm is generated when the differential pressure falls below the low alarm threshold.	Off (-5.0)…50.0 mbar	Off
Post-cleaning threshold [mbar] • The post-cleaning threshold is activated, if the lower cleaning threshold is exceeded for the first time during operation. • If the post-cleaning threshold is activated and the differential pressure falls below the post-cleaning threshold at the end of operation, post-cleaning starts.	Off (0.0)…50.0 mbar	Off
dp-offset [mbar] • The offset is added to the currently measured differential pressure.	-50.0…50.0 mbar	0.0 mbar
dp-operating range	1…100%	10%
High alarm delay	0.1…30.0 s	2.0 s
Low alarm delay	1…600 s	300 s
Precoating offset[6]	Off (0.0)…50.0 mbar	1.0 mbar
Post-cleaning offset	0.5…10 mbar	2.0 mbar
Background cleaning time	0…999 h	0 h
I/O configuration:		
Number of I/O units (Eu.) • Determines the number of connected I/O units. • The automatic teach-in starts at '0'. • All I/O units connected to the bus, are taken over as target configuration. • If further I/O units are connected during operation, they will be automatically integrated into the target configuration.	0…8	0 (teach-in)

6

Note!
Post-cleaning is suppressed as long as **precoating** is activated.

Parameter	Setting range	Default setting
Number of valves I/O unit 1… 8 • If more than one I/O unit is connected, the number of valves for each I/O unit can be limited or be teached in. • This is done the same way as setting the parameter 'Number of valves'. • The I/O unit with its device address and the number of valves is displayed. Example: I/O unit 2 with 5 solenoid valves 2. 5	0…12	0
Number of valves I/O unit 2	0…12	0
Number of valves I/O unit 3	0…12	0
Number of valves I/O unit 4	0…12	0
Number of valves I/O unit 5	0…12	0
Number of valves I/O unit 6	0…12	0
Number of valves I/O unit 7	0…12	0
Number of valves I/O unit 8	0…12	0
Miscellaneous:		
Password	Off (0)…9999	0001

9.2 Parametrisation with device keys

Note!
All parameters can be set via the device keys as well as via EasyTool Controls 4.0. Solely the **password** can only be set via EasyTool.

1. Press the PARA key to change the values of the system parameters.
   - ➢ The LED on the PARA key is **lights up** yellow
   - ➢ The displays shows tESt
   - ➢ The LED **test mode flashes** yellow

2. Press the DOWN key to select the parameter to be changed.
   - ➢ The LED of the current parameter to be changed **flashes or lights up**.

3. Press the ENTER key.
   - ➢ If a password has been set, the display shows CodE

4. Press ENTER again to enter the password.
   - ➢ The display shows 0000 and the first 0 flashes.

5. a) Press the keys UP or DOWN to set the first digit of the password.

   b) Then press the ENTER key to confirm the entered digit.

   c) The next digit flashes. Set all digits and press ENTER again.

   If you stay in the parameter menu, you do not need to enter the password again!
   - ➢ The current value of the parameter is shown in the display.

   d) Press ENTER.
   - ➢ The first digit of the parameter value flashes.

6. Press the keys UP or DOWN to set the requested parameter value.

7. Press the ENTER key to save the parameter value.

   - The entered value is accepted.

or

or

Press the PARA key to discard the parameter value.

- The set value is discarded.
- The parametrisation mode is terminated and you leave the parameter menu.
- The LED on the PARA key goes off.

8. Press the DOWN key to change the next parameter, if necessary.

9. If all parameters are set as desired, press the PARA key once again.

   - The parametrisation mode is terminated and you leave the parameter menu.
   - The LED on the PARA key goes off.

   In order to re-enter the parameter menu, enter the password once again (*see steps 4+5 in this chapter)*.

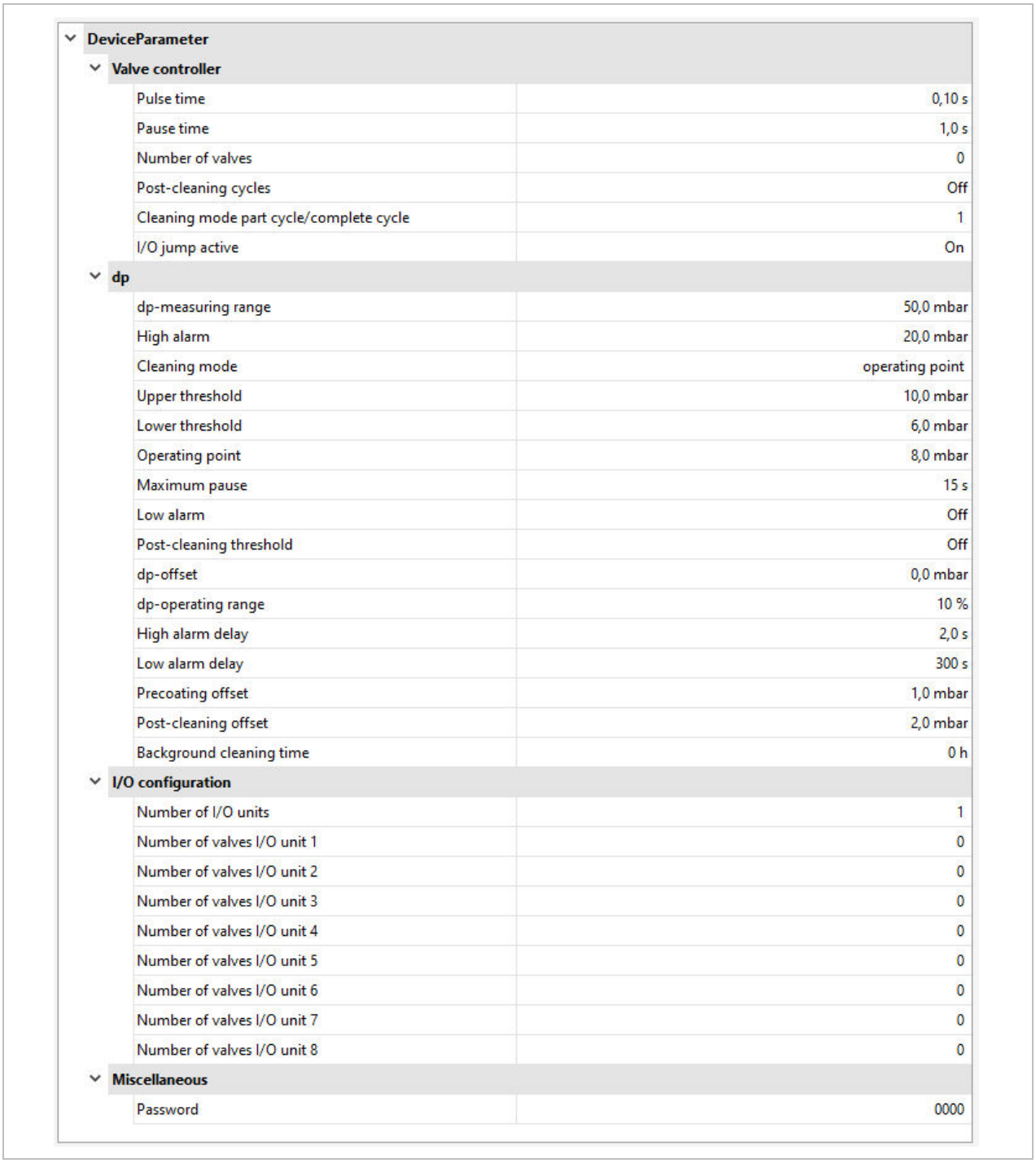
9.3 Parametrisation via EasyTool Controls 4.0

Note!
All parameters can be set via the device keys as well as via EasyTool Controls 4.0. Solely the password can only be set via EasyTool.

The parameters can also be set via EasyTool Controls 4.0. Below the tab **Parameters**, you find a list of the device parameters. To change the values, double-click on the corresponding numeric value or on the set parameter. You can enter the new value manually via the keys or you click the up- and down arrows until the requested value is set 0,00 s.

DeviceParameter	
Valve controller	
Pulse time	0,10 s
Pause time	1,0 s
Number of valves	0
Post-cleaning cycles	Off
Cleaning mode part cycle/complete cycle	1
I/O jump active	On
dp	
dp-measuring range	50,0 mbar
High alarm	20,0 mbar
Cleaning mode	operating point
Upper threshold	10,0 mbar
Lower threshold	6,0 mbar
Operating point	8,0 mbar
Maximum pause	15 s
Low alarm	Off
Post-cleaning threshold	Off
dp-offset	0,0 mbar
dp-operating range	10 %
High alarm delay	2,0 s
Low alarm delay	300 s
Precoating offset	1,0 mbar
Post-cleaning offset	2,0 mbar
Background cleaning time	0 h
I/O configuration	
Number of I/O units	1
Number of valves I/O unit 1	0
Miscellaneous	
Password	0000

Figure 17 *Device parameters in EasyTool Controls 4.0 for HE 5709*



DeviceParameter	
Valve controller	
Pulse time	0,10 s
Pause time	1,0 s
Number of valves	0
Post-cleaning cycles	Off
Cleaning mode part cycle/complete cycle	1
I/O jump active	On
dp	
dp-measuring range	50,0 mbar
High alarm	20,0 mbar
Cleaning mode	operating point
Upper threshold	10,0 mbar
Lower threshold	6,0 mbar
Operating point	8,0 mbar
Maximum pause	15 s
Low alarm	Off
Post-cleaning threshold	Off
dp-offset	0,0 mbar
dp-operating range	10 %
High alarm delay	2,0 s
Low alarm delay	300 s
Precoating offset	1,0 mbar
Post-cleaning offset	2,0 mbar
Background cleaning time	0 h
I/O configuration	
Number of I/O units	1
Number of valves I/O unit 1	0
Number of valves I/O unit 2	0
Number of valves I/O unit 3	0
Number of valves I/O unit 4	0
Number of valves I/O unit 5	0
Number of valves I/O unit 6	0
Number of valves I/O unit 7	0
Number of valves I/O unit 8	0
Miscellaneous	
Password	0000

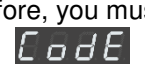
Figure 18 *Device parameters in EasyTool Controls 4.0 for HE 5713*

9.4 Offset for zeroing

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

1. Press the PARA key to change the values of the system parameters.
   - ➢ The LED on the PARA key lights up yellow 
   - ➢ The displays shows 
   - ➢ The LED **test mode** flashes yellow 

2. Press the DOWN key until the LED  is lit and the LED for **zeroing** in the differential pressure column flashes 

3. Press the ENTER key.
   a) If you have left the parameter menu before, you must re-enter the password. The display shows 
   b) Enter the password as described in chapter *9.2* , *steps 4+5.*
   c) If you are still in the parameter menu, you can carry out the zeroing without re-entering the password.

 and 

 or 

4. a) Press the UP and DOWN keys **simultaneously for 2 seconds**. The currently measured value is inverted and accepted as Offset.
   b) Press the keys UP or DOWN separately to set the offset value manually. In this case, step a) is not necessary.

5. Press the ENTER key to confirm the entry.

9.5 Functionality of dp-operating point

If the parameter **operating point** is set, than the currently set pause time is taken as minimum pause. That means that the device cannot clean faster than in this set pause time.
The device waits for this minimum pause time after the valve pulse. Then the pause is extended. This means that the next valve pulse is performed when the expected differential pressure drops until the dp-operating point is reached. The determined differential pressure drop from the previous control is used for this valve.

Note!
The function dp-operating point requires that the cleaning mode **part cycle is set to 0**.

Note!
The advantage of slower cleaning process is that less compressed air is used as when cleaning via the thresholds.

The relevant parameters for this function are:

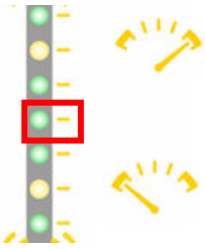
- Cleaning mode
- Operating point
- Maximum pause

The parameter **cleaning mode** is selected via this LED.

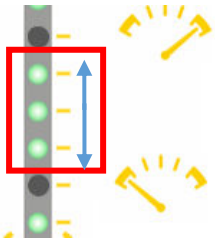
If the parameter is set to **threshold**, (cleaning when upper threshold is exceeded, cleaning is stopped when dp falls below the lower threshold), this is indicated in the 7-segment display like this.

If the parameter is set to **operating point**, it is indicated like this.
Cleaning is carried out time-dependent not differential pressure-dependent.

If the parameter **maximum pause** is set, a forced cleaning is carried out after this pause. The cleaning LED **lights up** and the pause time LED **flashes**.

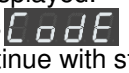


Depending on the set cleaning mode, (threshold or operating point), the LED for upper/lower threshold or operating point in the differential pressure column goes off.
The operating point LED is the one between the upper and lower threshold LED (see on the right).



When **operating point** is set, the operating point LED lights up and the LEDs right above and right below are glowing. If the LED above is glowing, this indicates that it is deviated upwards from the operating point. If the LED below is glowing, it is deviated downwards from the operating point.

9.6 Reset of default settings

1. Switch on the device and keep the keys PARA and ENTER pressed **simultaneously for 5 seconds**.
   - ➢  is displayed.
   - ➢ After 5 seconds  is displayed to enter the password. Continue with step 2.

   If no password has been assigned, the display shows  and the controller starts automatically after 5 seconds with default settings (*see 9.1 Parameter Table).*

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

3. Set your password using the UP and DOWN keys.
   - ➢ After input and confirmation of the last password digit, the controller starts with default settings (*see 9.1 Parameter Table).*

10 Error Messages

Display	Cause	Remedy
The differential pressure display shows **flashing:** 	• EEPROM parameter error	• Restore default settings and check parametrisation. • If this does not succeed, send the device to AXXERON HESCH electronics GmbH for repair.
The differential pressure indicator shows 	• The differential pressure signal is **below** 0.	• Check differential pressure. • Check the external screw connections.
The differential pressure indicator shows 	• The differential pressure signal is **above** the set scaling range	• Check differential pressure. • Check the external screw connections.
The differential pressure indicator shows  and the LEDs for High and Low alarm are alternately flashing 	• Error in dp-module. • The yellow status LED on the dp-module is not lit. • dp-module is not installed or does not fit firmly on the PCB.	• Install dp-module or check and correct if it fits firmly on the PCB. • If the Status LED still does not light up, please contact the service of AXXERON HESCH electronics GmbH (*see chapter 12 Maintenance and Service)*
The High alarm LED is lit. 	• The differential pressure exceeds the set threshold.	• Adapt the set pulse and pause times. • Check the filter element. • Check the solenoid valves for proper mechanical function. • Check the air pressure system.
The Low alarm LED lights up. 	• The differential pressure falls below the set threshold for longer than 5 min. without reaching the post-cleaning threshold.	• Check the number of complete cycles and reduce the number of cycles, if necessary. • The number of cycles must be ≥ 1. • Check the system.

Display	Cause	Remedy
Low alarm and high alarm are flashing alternately. 	• Error in dp-module. • The yellow status LED on the dp-module does not light up. • dp-module is not installed or does not fit properly on the PCB..	• Install dp-module or check and correct if it fits firmly on the PCB. • If the Status LED still does not light up, please contact the service of AXXERON HESCH electronics GmbH (*see chapter 12 Maintenance and Service).* •
The 7-segment display is off or lights up briefly and goes off again immediately.	• No supply voltage. • Faulty connection between I/O unit and operating unit.	• Switch off the device. • Check the connection cable between I/O unit and operating unit for damage. • Eventually the RJ-45 plug is not properly engaged. Place the plug correctly.
Post-cleaning is not working	• No signal at post-cleaning input. • Precoating function is active. • The differential pressure has not exceeded the lower cleaning threshold.	• Deactivate precoating (*see chapter 8.4 Activate / Deactivate precoating).*
Alarm LED flashes 	• no communication with I/O unit	• Check the connection cable between I/O unit and operating unit for damage. • Eventually the RJ-45 plug is not properly engaged. Place the plug correctly.

11 Accessories

Note!
For futher information about accessories, please contact the service department of AXXERON HESCH electronics GmbH (*see chapter 12 Maintenance and Service).*

Wir recommend the following connection sets of AXXERON HESCH electronics GmbH:

Connection set for HE 5709:	**Connection set for HE 5713:**
Article number #57090088	**Article number #57130088**
	

Figure 19 *Connection sets*

12 Maintenance and Service

Maintenance, Repair
The device must be cleaned regularly to avoid an increased formation of dust on the device. Clean dirty contacts with oil-free compressed air or ethyl alcohol and a lint-free cloth.

Disposal
Dispatch metals and plastics for recycling. Electrical and electronic components must be collected separately and disposed of properly. Dispose of equipped circuit boards properly.

Service
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