HE 5733

Shaker filter controller

Operating instructions

(Translation of Original German version)

HESCH
AUTOMATION
AXXERON TECHNOLOGIES MEMBER

#373501 | Version 1.1

Legal notice

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

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

General Management
Werner Brandis
Published by:
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1 Legal Provisions

Manufacturer

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

Intended use

- The shaker filter controller is a compact controller consisting of an I/O unit and an operating unit. The shaker filter is used for separating dust from raw gases.
- The controller can be operated within the operating and environmental conditions approved in these operating instructions without impairing its safety.
- The manufacturer is not liable for improper use and any resulting personal injury or material damage; the risk is borne solely by the user. Failure to comply with the above criteria for intended use will result in the expiry of the warranty and liability for the device.

Personnel qualification

All work on the device 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 follow all instructions and warnings 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 tab **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 protect against personal injury and material damage, it is necessary to read this chapter carefully before working with the device.

Symbols used

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

Personal injury warning!
The severity of the danger is indicated by the respective signal word.

Explosive area warning sign!

High voltage warning!

Warning of material damage caused by electrostatic charge!

Material damage warning!

Note!
Identifies possible malfunctions and indicates optimum operating conditions.

2.2 Signal words

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

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

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

2.3 Safety in the individual operating phases

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

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

Explosion Prevention!
The device with closed lid is suitable for use in dust explosion hazardous areas of zone 22 (applies to all device versions).
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 the power supply on all poles if the device is to be decommissioned. Secure the device against being unintentionally switched on!
If the device is linked to other devices and/or equipment, consider the impacts and take appropriate precautions before switching it off.

2.3.1 Special Regulations

Property damage caused by electrostatic charge!
Clean the device regularly, to prevent it from increased formation of dust.
For cleaning the housing, use **moist** cleaning supplies only to prevent the device from electrostatic charging!

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

Note!
Close cable glands that are not needed with a locking bolt and housing bores with dummy plugs.

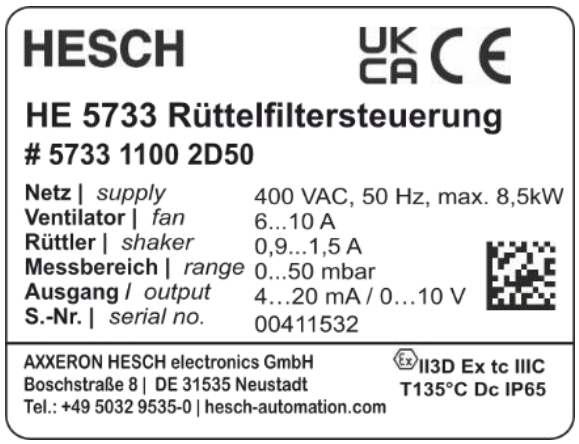
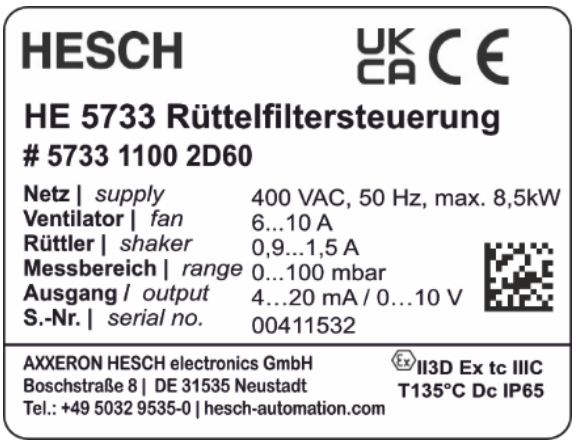
2.4 Device identification and name plates

2.4.1 Device Identification

II3D Ex tc IIIC T135°C Dc IP65

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

2.4.2 Name plates

HE 5733 with measuring range 0…50 mbar	HE 5733 with measuring range 0…100 mbar
	

3 Technical Data

Supply	
Voltage:	400 V AC
Mains frequency:	50 Hz
Max. power consumption:	8.5 kW
Measurement range:	0…50 mbar
Output:	4…20 mbar / 0…10 V
Fan:	6…10 A
Shaker:	0.9…1.5 A

Inputs and outputs	
Output to operating unit:	RJ-45 modular connector
• Supply voltage:	24 V DC
• Communication:	RS485
1 × 24 V DC digital input (Cover switch / Enable):	
• Sensor type:	Potential-loaded NPN switching output
• Sensor supply:	24 V DC max. 50 mA
• Signal:	Digital
• Input current:	approx. 2 mA
• Scanning time:	2 ms
• Connection:	3-wire
• Potential:	no galvanic separation
4 × 24 V DC digital inputs (ext. Start, ext. Stop, fan contactor / MPS, shaker contactor / MPS):	
• Sensor type:	Potential-free contact
• Signal:	digital
• Input current:	approx. 1 mA
• Scanning time:	2 ms
• Connection:	2-wire
• Potential:	no galvanic separation
2 × 24 V DC digital outputs (fan contactor, shaker contactor):	
• Type of output:	Potential-loaded semiconductor switch with flyback diode
• Switching voltage:	24 V DC
• Switching current:	200 mA, short-circuit proof
• Potential:	no galvanic separation

Inputs and outputs	
Relais outputs (run/error, dp-alert):	2 × potential-free relay contact without protective circuit
• Contact type:	1 × changeover each
• Contact rating:	250 V AC / 5A, 24 V DC / 5 A
• Protection:	without

dp-module	
Measuring range differential pressure sensor:	0…50 mbar
Current output:	
• Excise range:	4…20 mA
• Output load:	load ≤ 600 Ω
• Linearity:	< 1 %
• Precision:	< 1 %
• Temperature drift:	≤ 0.1 % / 10 K
• Galvanic separation:	without
Voltage output:	
• Excise range:	0…10 V
• Output load:	load ≥ 1 Ω
• Linearity:	< 1 %
• Precision:	< 1 %
• Temperature drift:	≤ 0.1 % / 10 K
• Galvanic separation:	without

Thermistor module	
Operating voltage:	24 V DC
Current in sensor circuit:	< 1 mA
Connectable PTC resistors:	1…6 pieces according to DIN 44081 or DIN 44082
Switching point:	< 4000 Ω
Measuring range:	< 6000 Ω

Rotating field detection	
Connection:	external conductor L1, L2, L3 (400 V AC / 50 Hz, -10% / +20%)
Potential:	galvanically separated via optocoupler

Interface for software update	
USB/TTL interface adapter:	#58513007

Housing	
Protection type:	IP 65
Material:	polycarbonate
Flammability class:	V0 (UL 94)
Colour:	light grey
Dimensions:	271 × 170 × 120 mm (W × H × D)
Display:	4-digit 7-segment display Display height: 13.2 mm

Environmental conditions	
Storage	-40…+70 °C
Transport	-40…+70 °C
Operation	-20…+50° C -20…+40° C in EX zone 22
Relative air humidity	3K6 according to DIN EN 60721-3 with restrictions 75% annual average, no condensation permitted, no immediate solar radiation
Air pressure:	
during operation and storage	80 kPa to 106 kPa
during transport	70 kPa to 106 kPa
Condensed water	Not permitted
Ice	Not permitted
Max. operating height above sea level	2000 m

Air and creepage distances	
Pollution degree	2
Overvoltage category	II

Power Connection	
Pneumatic connection:	plug connection for pneumatic hose with 6mm outer diameter
Electrical connection:	**Supply:** Cross section rigid/flex: max. 2.5 mm²; flex .: max. 1.5 mm² with wire end ferrule **Rest**: Cross section rigid/flex: max. 1.5 mm²; flex .: max. 0.75 mm² with wire end ferrule
Cable inlet:	3 x cable gland M25 (Input, fan, shaker) 1 x cable gland M20 (dp-alert, enable) 1 x cable gland M16 (Cover switch)

4 Mounting

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

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

Note!
The device can 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 2.3.1 Special Regulations.*

4.1 Dimensions

The dimensions including the connection couplings are 271 × 170 × 120 mm.

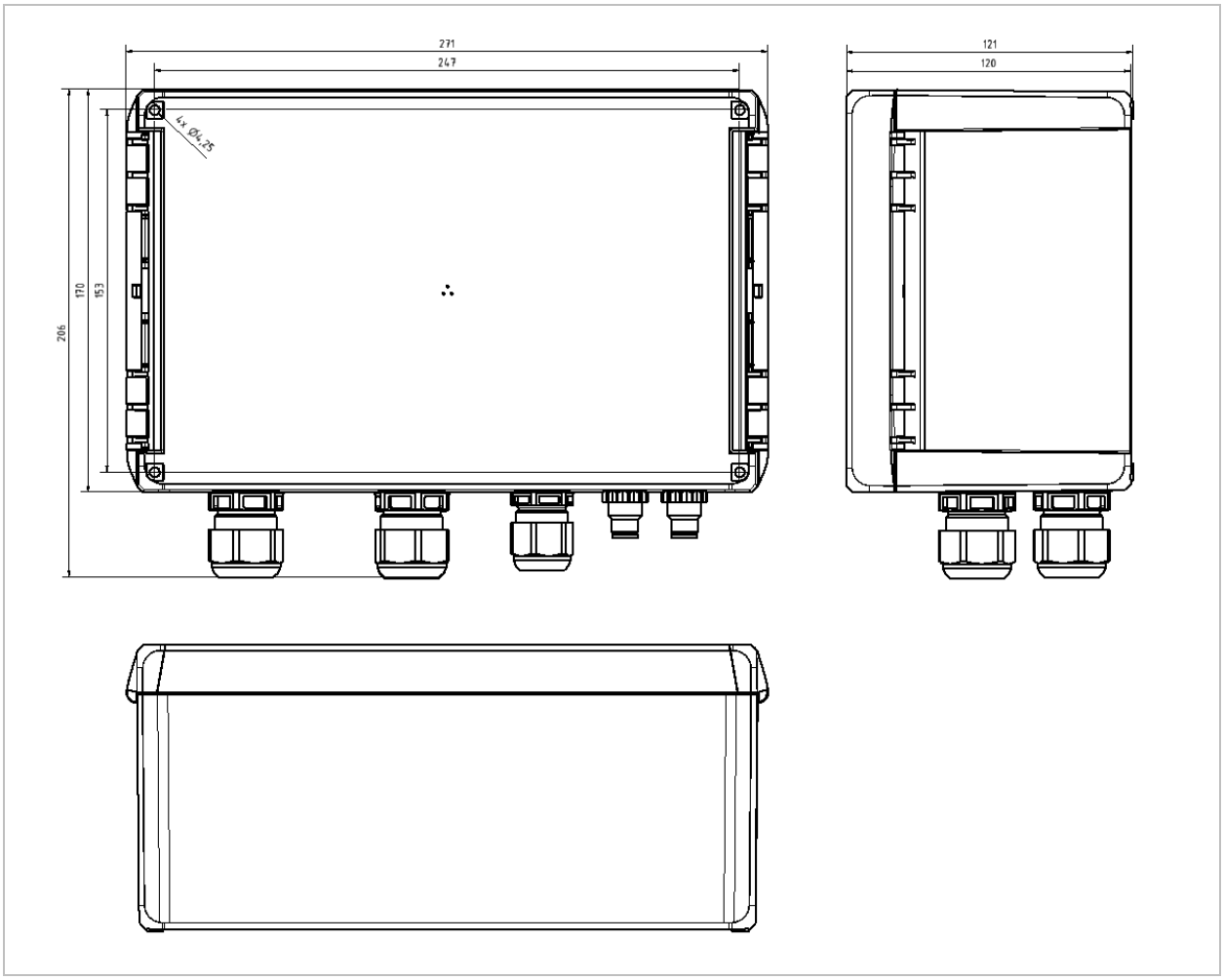


Figure 1 *Dimensions HE 5733*

Scope of Delivery

- HE 5733 Shaker filter controller
- Operating instructions (#373511)

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

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.

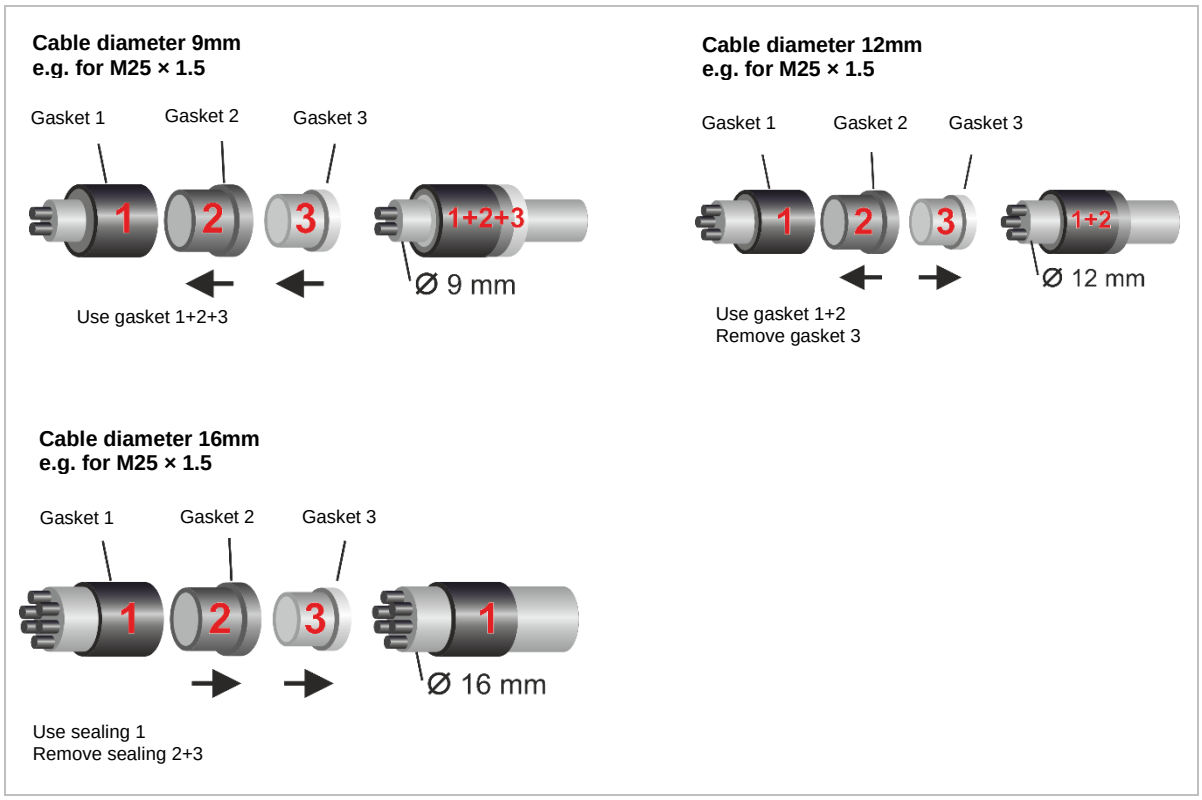


Figure 2 *Sealing to be used*

4.2.2 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 Opening the device

The opening and closing works without screws by means of hinge technology. You need a flat-tip screwdriver to open the device. Apply the screwdriver at the respective position on the housing lid (*see Figure 3 step 1)*.

Note!
Make sure to move the screw driver **to the right** to open the hinge (*see Figure 3 step 2*). If the screwdriver is moved to the left, the housing cover can be damaged.

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

Optionally, the housing cover can be closed with 4 screws to prevent the device from unauthorised access (for further information, please contact the service of AXXERON HESCH electronics GmbH, *see chapter 12 Maintenance and Service).*

For quicker service access, we recommend the screwless hinge closure.

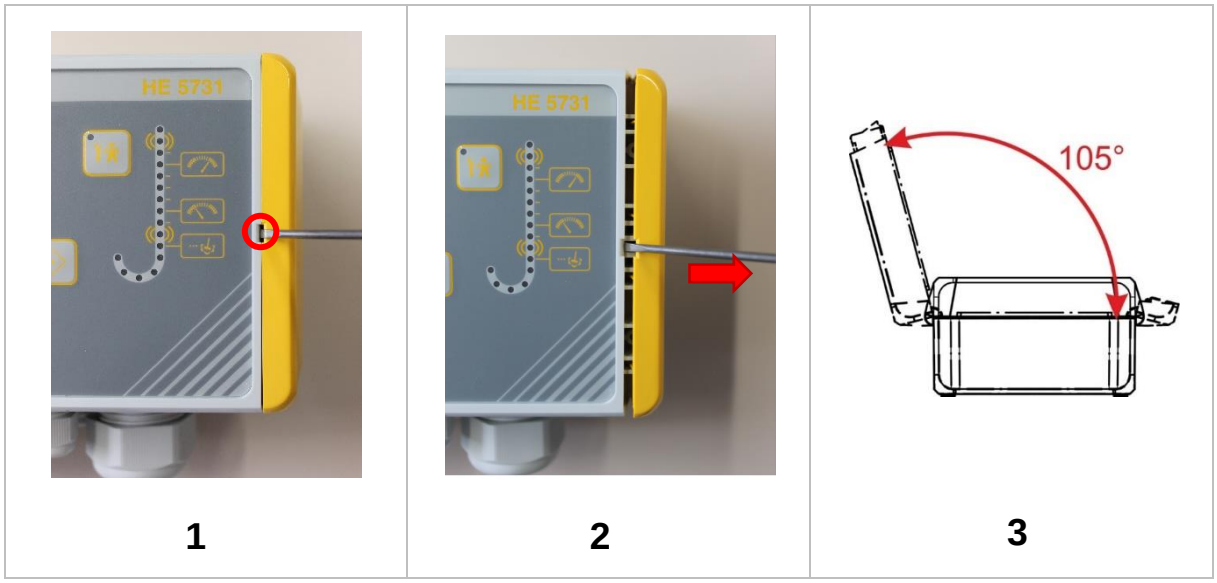


Figure 3 *Opening the housing cover (figure shows similar device with same housing)*

4.4 Mounting the device

You need 4 screws for wall mounting. (**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 4* is an example.

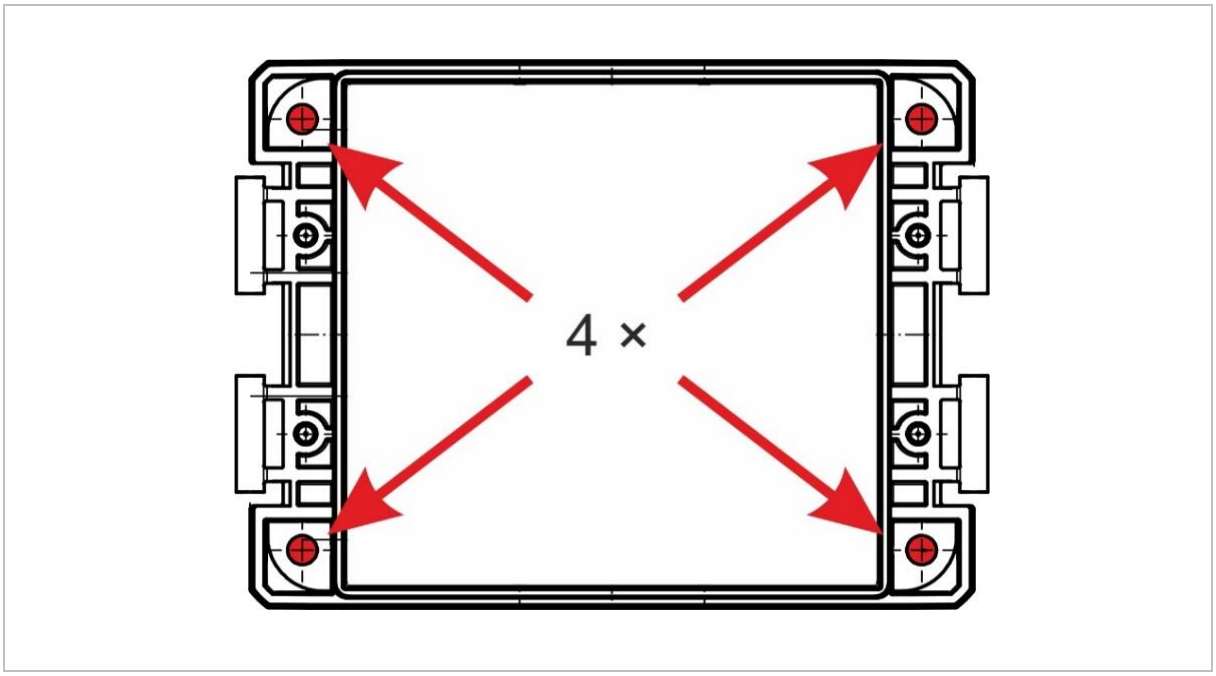


Figure 4 *Example housing rear*

Note!
Alternatively, wall mounting can be done with wall brackets. For more information, please contact the service of AXXERON HESCH electronics GmbH (*see chapter 12 Maintenance and Service).*

5 Device overview

The HE 5733 is currently available in different versions:

- with measuring range 0…50 mbar (#573311002D50)
- with measuring range 0…100 mbar (#573311002D60)

Please see nameplate for correct measuring range of your device.

5.1 HE 5733 shaker filter controller

Figure 5 *Front view HE 5733 shaker filter controller*

5.1.1 Differential pressure module / thermistor module

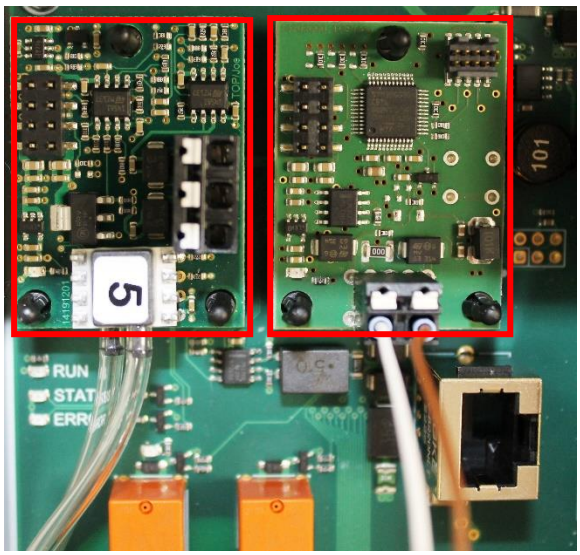


Figure 6 *Differential pressure module left, thermistor module right*

The I/O unit has two slots. The left slot is for the differential pressure module. The differential pressure module offers the following functions:

- EEPROM
- Differential pressure measurement
- Analogue output (with current and voltage output)

Next to the differential pressure module is another slot for the thermistor module.
The thermistor module is used for the temperature monitoring of the fan motor and works with PTC sensors according to DIN VDE V 0898-1-401[1]. Alternatively you can also use a switch contact, which interrupts the switching signal when the fan motor overheats.

Note!
The fan temperature is monitored **permanently**, even when the fan is **not** operating.

[1] Thermistors – Directly heated positive step-function temperature coefficient - part 1-401 Detail specification – Sensing application – Assessment level EZ thermistors

Reading the current resistance value

You can read the current resistance value (in Ohm Ω) in the test & service menu as follows:

1. Press the PARA key.

   - ➢ The LED on the PARA key lights up yellow  .
   - ➢ The display shows  .

   The LED test mode  **flashes** yellow.

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

   - ➢ The display shows  .

3. If you keep pressing the DOWN key, the display shows this:

   If you press the DOWN key **one more time**, the current resistance value is displayed, e.g.

   The LED for test mode  and the LED for error of motor protection switch are flashing.

2× 

4. Press the PARA key **twice** to leave the menu Test & Service again.

   After pressing the PARA key the **first time**, the LED error motor protection switch goes off and the LED test mode  is still flashing and the LED on the PARA key is lit. The display shows  again.

   After pressing the key for the **second time**, the LEDs test mode and PARA go off as well.

HE 5733 during thermistor monitoring

If the sensor resistance increases during operation between 2650 and 4000 Ω, the fan motor might overheat and the thermistor monitoring is released.

This is indicated by:

- LED for motor protection switch **flashes** red
- LED for alarm is lit permanently
- The fan is turned off

If the sensor resistance decreases again between 1650 and 2650 Ω,

- the LED for motor protection switch **goes off** and
- all LEDs on the red OFF key are **flashing**.

Press the red OFF key to acknowledge the error.

- Now, the fan can be started again.

6 Electrical Commissioning

Before switching on the device, observe the following points:

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 explosion 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 must be complied with before and during operation.

6.1 Wiring diagram

You can find the wiring diagram for your device under the following link:
https://www.hesch-automation.com/wp-content/uploads/HE-5733-wiring-diagram.pdf

Furthermore, the wiring diagram can be found in the download centre of our website:
https://www.hesch-automation.com/en/support/download-center/
In tab EPLAN under section EPLAN Wiring diagrams, you can find the right diagram for your device.

6.2 Supply voltage / Operation

Note!
Please observe the name plate in order to apply the correct supply voltage.

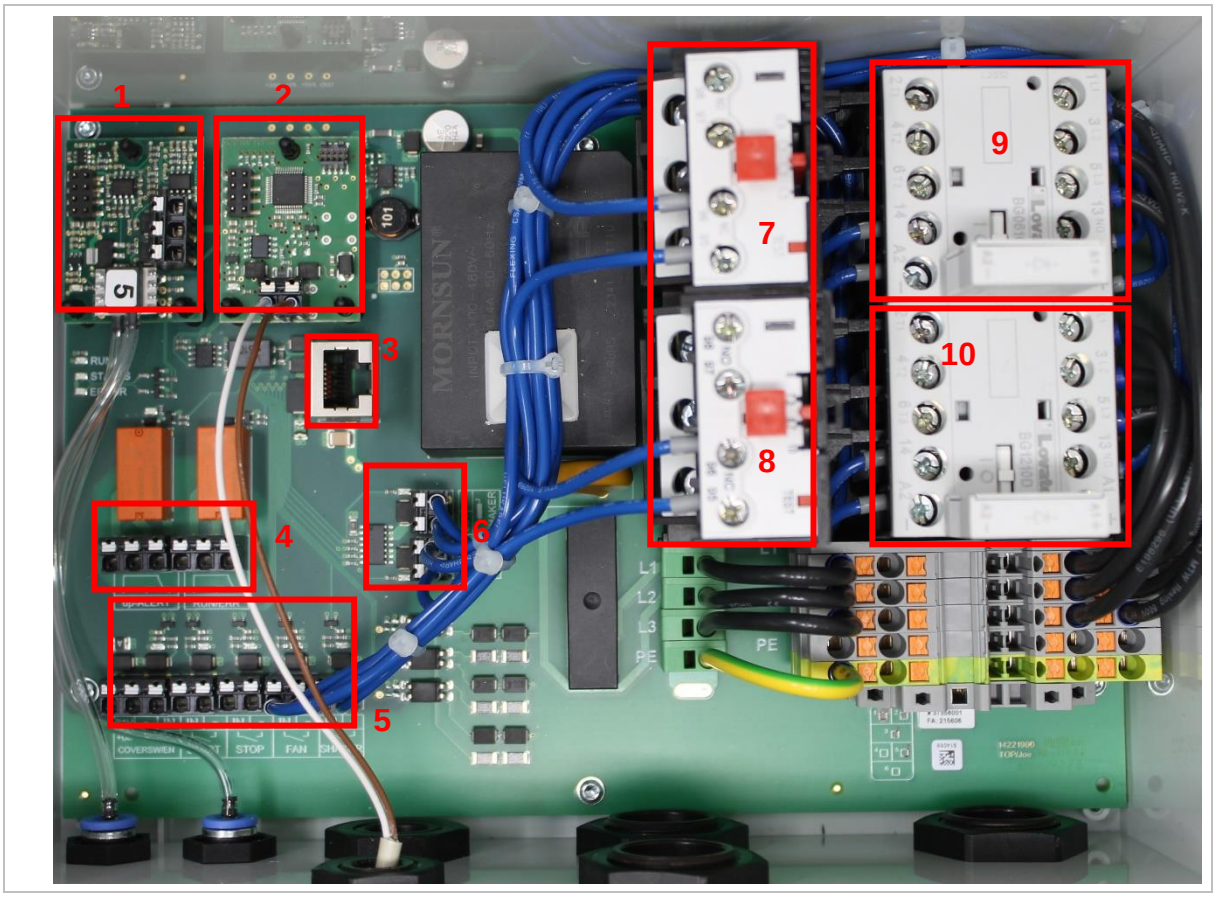
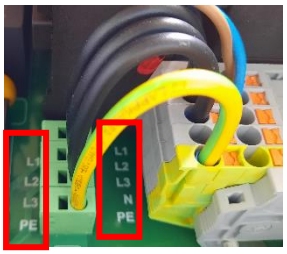


Figure 7 *Inside view*

1 dp-module
2 Thermistor module
3 RJ-45 modular connector for operating unit
4 Relay outputs (RUN/ERR, dp-ALERT)
5 Digital inputs
6 Digital outputs fan and shaker
7 Fan
8 Shaker
9 Power contactor for fan
10 Power contactor for shaker

1. Open the housing as described in chapter *4.3 Opening the device*.



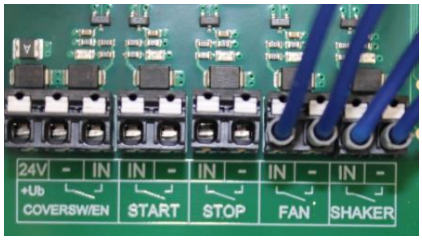
2. a) Apply the supply voltage 400 VAC.

   b) Connect the PE conductors.

The 7-segment display shows HE 5733 as scrolling text and the device carries out an LED test. Each LED lights up shortly once.

6.3 Inputs

6.3.1 Digital inputs



The device has 5 **digital inputs**:

- cover switch/enable (COVERSW/EN)
- Ext. start (START)
- Ext. stop (STOP)
- fan contactor/MPS (FAN)
- shaker contactor/MPS (SHAKER)

The inputs are internally supplied with 24 V DC and are active when they are connected to ground (GND) with a potential-free contact.

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

Note!
If just **one** relay contact or switch is available for an external start / stop, the digital input (STOP) is not needed.
Set the parameter **external start/stop** from dynamic to **static**.
This can **only** be done via EasyTool Controls 4.0 and not via the device keyboard (*see chapter 9.4 Parametrisation via EasyTool Controls 4.0*).

6.4 Outputs

6.4.1 Digital outputs

The device has **two 24 V DC digital outputs** for controlling the

- fan contactor and the
- shaker contactor.

The outputs are protected together by a 200 mA self-resetting fuse.

6.4.2 Relay outputs

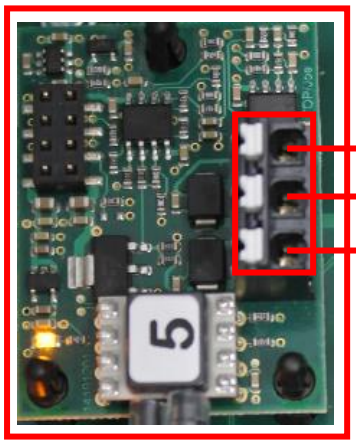
The device has **two potential-free changeover contacts**.

The changeover contacts are used for signalling:

- Operation or error (RUN/ERR)
- dp-ALERT

They can each be loaded with 250 V AC / 5 A or 24 V DC / 5 A.

6.4.3 Analogue outputs



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

6.5 Assembly of measuring hose onto pressure connection

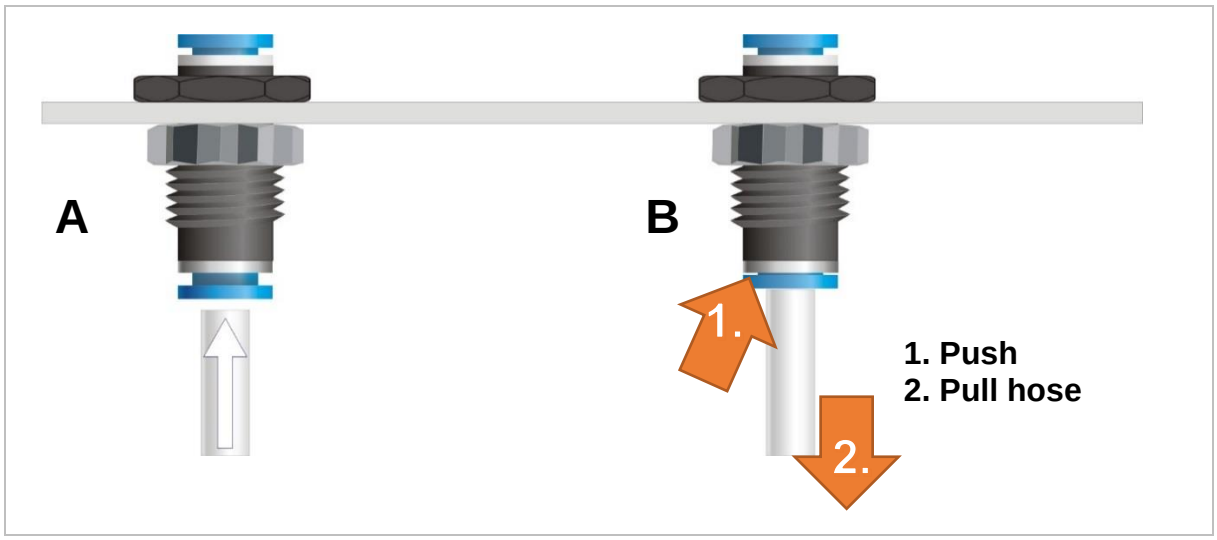


Figure 8 *Assembly of hose onto push-in bulkhead fitting*

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 Operating Elements

7.1 Keys and LED

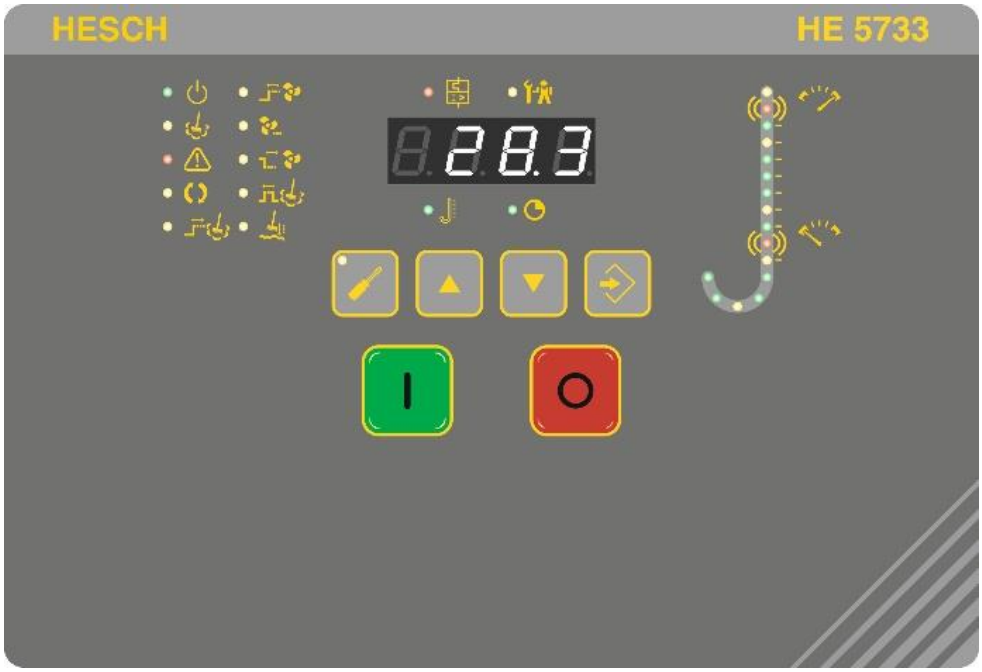


Figure 9 *Display and Operating Elements external*

Symbols/Displays	Meaning
External	
	Operation signal
	Cleaning active
	Alarms active
	Automatic cleaning active
	Pre-warning time automatic cleaning
	Fan start-up time

Symbols/Displays	Meaning
External	
	Fan overrun time
	**Fan run-down time**
	**Duration of cleaning**
	**Settling time of dust**
	**Error motor protection switch / contactor / thermistor module**
	**Test mode**
	**Differential pressure is displayed**
	**Display for setting the time-dependent parameters**
	**PARA key** • Parametrisation mode ON/OFF
	**UP key** • increasing the displayed value
	**DOWN key** • decreasing the displayed value
	**ENTER key** • confirming the displayed value
	**7-segment display** • Normal operation: current differential pressure • Parametrisation mode: Parameter values • Alarm information
	**ON key** • Switching the system on
	**OFF key** • Switching the system off

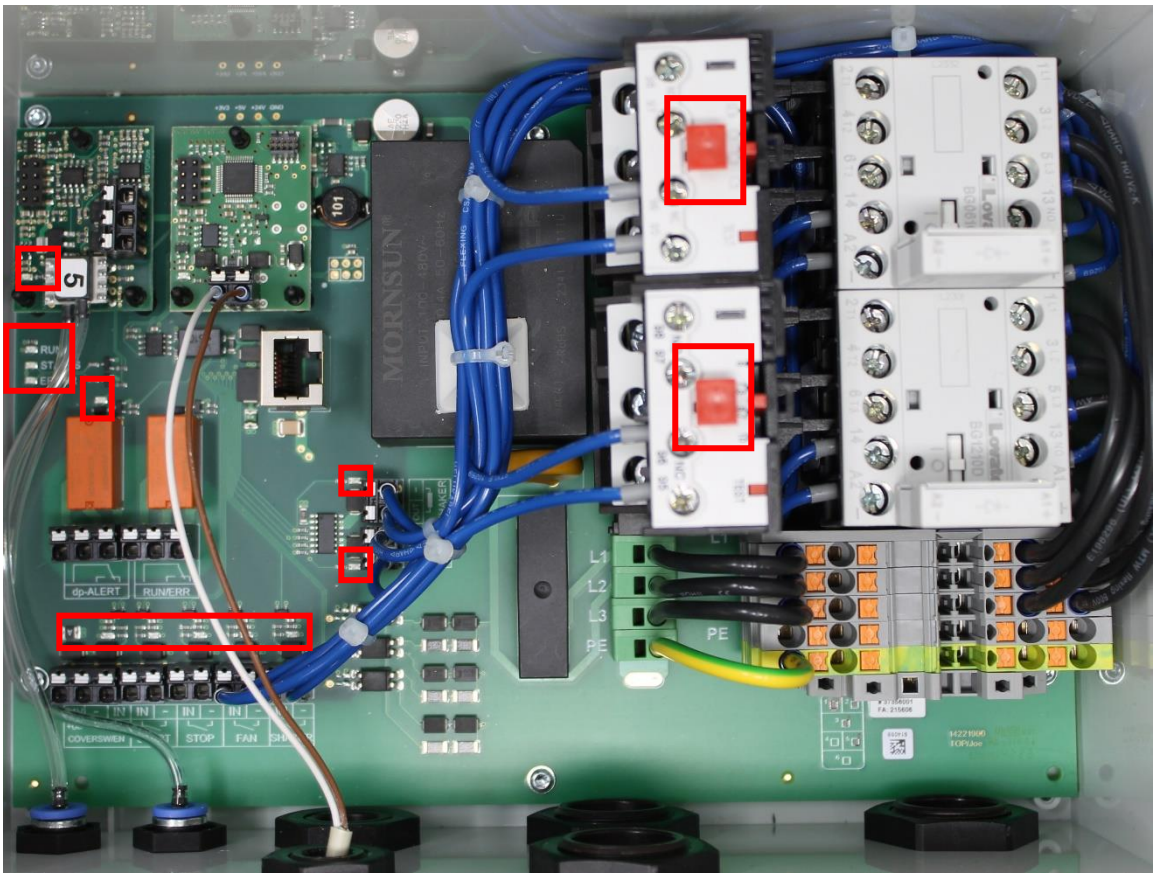
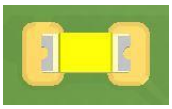
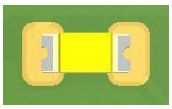
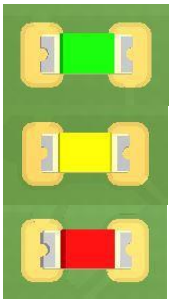
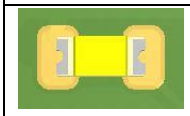
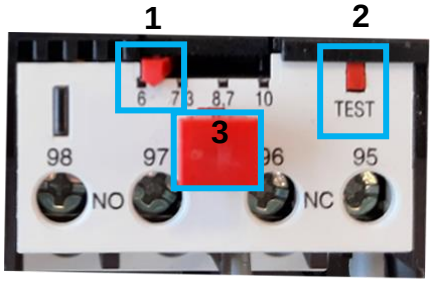


Figure 10 *Display and Operating Elements Internal*

Symbols/Indicators	Meaning
Internal	
 	**LED on dp-module** • Lights up, when dp-module is active
 	**LED on thermistor module** • Lights up, when thermistor module is active
 **RUN** **STATUS** **ERROR**	**LED RUN** • Lights up permanently, when a supply voltage is applied **LED STATUS** • Lights up permanently during operation and if there is communication between controlling and operating unit. • flashes, while waiting for communication between controlling and operating unit • flashes quickly, when Bootloader (start programme) is carried out **LED ERROR** • Is connected to the alarm/operation relay of the software • Lights up, when the relay is de-energised (alarm) • goes off, when the relay is energised (operation)
	The 5 digital inputs, the 2 digital outputs (FAN + SHAKER) as well as the 2 relay outputs (dp-ALERT + RUN/ERR) are each equipped with a status LED. They light up yellow permanently, when the digital inputs or outputs are active. When the digital inputs are inactive, the LED glows.
	**1** Sliding switch for setting the motor current. Must be adapted to the connected motors (shaker motor / fan motor). **2** Test switch for releasing / testing the motor protection switches. **3** Switch for resetting or switching the system back on, when the motor protection switch was released.

7.2 Differential pressure column

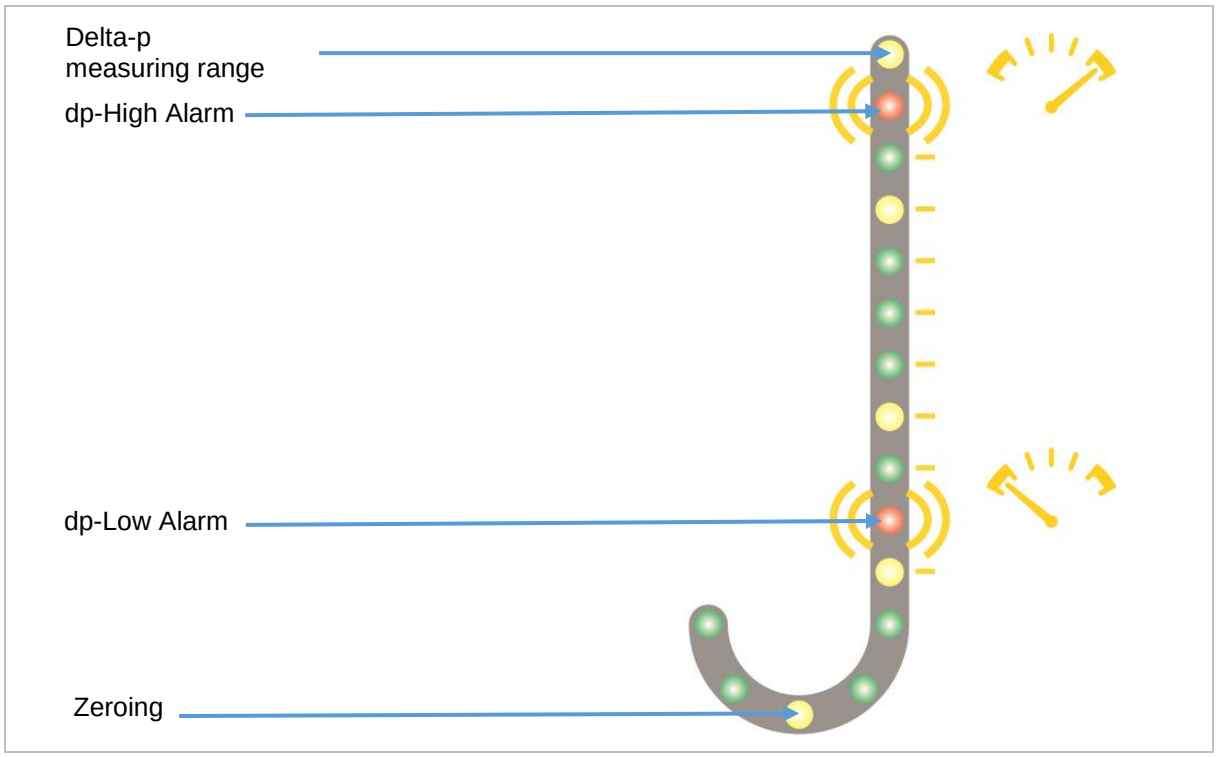


Figure 11 *Differential pressure column*

During normal operation, the LEDs indicate the differential pressure.
During parametrisation mode, the selected parameter value is indicated by the corresponding LED.

8 Operation

Note!
The LED or LED combinations belonging to the parameters mentioned in this chapter, are listed in chapter *9.2 Overview of parameters and their LEDs*.

Note!
For parameter setting, please refer to chapter *9.3 Parametrisation with device keys.*

Note!
If you use one **single switch** for the external start/stop function, then please refer to chapter *8.9 HE 5733 with static switch for start/stop.*

8.1 Switching the device on

1. Apply the voltage supply.

   - The device carries out an LED test.
   - Each LED on the operating unit lights up shortly once and goes out again.
   - The display shows HE 5733 as scrolling text and afterwards the currently measured value.
   - The device is ready for operation. The RUN LED  lights up.

   If the parameter **`System start`** is set to Cleaning On (1), the system starts cleaning immediately after the voltage supply has been applied.

2. If the parameter **`System start`** is set to **Cleaning Off (0)**, press the ENTER key to start the system.

   - The fan switches on.

8.2 Error

If the set minimum differential pressure **dp-min** is not exceeded after the **`fan start-up time`**, the device signalises an error via the error contact of the operation relay.
With the parameter **`Malfunction`** you can determine, whether the fan stays on after an error (On). In that case, the system starts running. Or if the fan switches off (Off) and the system stops.

8.3 Cleaning with differential pressure monitoring

If the set maximum differential pressure **dp-max**. is exceeded, the relay **dp-alert** switches.

- ➢ The device signalises that cleaning is necessary.

1. For the cleaning process, switch off the fan. Press the OFF key.

- ➢ The fan switches off, as soon as the '**fan overrun time'** has run out.
- ➢ The fan keeps running until the '**fan run-down time'** has run out. The deceleration of the fan after switch-off due to the mass can be set with the parameter '**fan run-down time'.**
- ➢ Cleaning starts. During cleaning, the 4 LEDs on the green ON key are flashing. The system cannot be started.

After cleaning is finished and the fan has switched off, the system is ready for operation again.

2. Press the ON key to restart the system.

Please keep in mind, that the ON key is only released again after the dust settling time has elapsed!

8.4 Automatic cleaning

8.4.1 Overview automatic cleaning

The table gives an overview on the different setting opportunities for the parameter '**automatic cleaning**',when using the HE 5733 with or without dp-module.

Parameter	Setting	With dp-module	Without dp-module	Meaning
'Automatic cleaning'	**No**	x	x	**No** automatic cleaning. Neither dp- nor time controlled.
	yes	x		Automatic cleaning' via **dp threshold**
	yes		x	Automatic cleaning **time controlled**

If you have deactivated the parameter '**automatic cleaning'** (No), automatic cleaning will not take place. Neither with nor without dp-module.

8.4.2 With dp-module (parameter setting **Yes**):

If you have activated the parameter **'automatic cleaning'** (Yes), the relay dp-alert switches, when reaching the maximum differential pressure **'dp-max.'.**

- The device signalises that an automatic cleaning starts soon **('Pre-warning time automatic cleaning**').

After **'Pre-warning time automatic cleaning**' has run out:

- the device switches off the fan automatically after the ' **Fan overrun time'** has run out.
- cleaning starts as soon as the **'Fan run-down time'** has run out.
- the device switches the fan back on, as soon as the **'Dust settling time' has run out**

8.4.3 With dp-module (parameter setting **time + dp**)**:**

If you have set the parameter **'automatic cleaning'** to time+dp, cleaning starts as soon as the set maximum dp value was exceeded.
If this value is never reached or exceeded, the device uses the time-controlled cleaning.

8.4.4 Without dp-module

If you have activated the parameter 'automatic cleaning' (Yes), cleaning is time-controlled (*see following chapter 8.5 Time-controlled cleaning*).

8.5 Time-controlled cleaning

If a time-controlled cleaning is requested, you can deactivate the differential pressure controlled cleaning. Set the parameter **'dp-max.'** to 0. For information on how to change parameters, please *see chapter 9.3 Parametrisation with device keys*.

8.6 Cover switch

1. Via the parameter '**Polarity cover switch**' (low = deactivated, high = activated), you can set the logic for the digital input cover switch / Enable):

2. If the digital input is deactivated (low), all outputs are switched off immediately.

   If the digital input is activated again (high), the system is ready for operation. Press the green ON key.

   - The system starts.

8.7 Test & Service

1. Press the PARA key.

   - ➢ The LED on the PARA key lights up yellow 
   - ➢ The display shows 
   - ➢ The LED test mode  flashes yellow.

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

   - ➢ The display shows 

Status display of the 5 digital inputs

(Cover switch/Enable, ext. start, ext. stop, fan contactor / MPS [2], shaker contactor / MPS)

0 = off 1 =on

Shows the status of the cover switch / enable

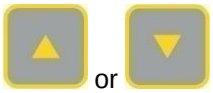
Shows the status of the ext. start input

Shows the status of the ext. stop input

Shows the status of the fan switch/MPS

Shows the status of the shaker switch/MPS

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



3. Press the keys UP or DOWN, to select the requested test function (see a.-d.).

a. <u>Output test:</u> Relay dp-alert

0 = off 1 =on

b. <u>Output test:</u> Relay RUN / ERROR

0 = off 1 =on

c. <u>Output test:</u> fan contactor

0 = off 1 =on

[2] Abbreviation for **motor protection switch**

d. Output test: shaker contactor

0 = off 1 =on

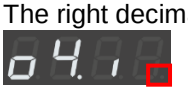
e. Indication of current resistance value of thermistor

4. Press the ENTER key to confirm the selected test function.

- ➢ The LED **test mode** flashes yellow
- ➢ The right decimal point of the display is flashing.

5. Press the PARA key to save the entry.

- ➢ The right decimal point goes off.



e. Analogue output:

Analogue signal from 0…100 mbar.

6. Press the ENTER key to start the test operation of the analogue outputs.


or


7. Press the keys UP and DOWN to change the initial value (0…100 mbar).

8. Press the PARA key to leave the test mode.

8.8 Turning off the device

1. Press the OFF key to turn the system off.

2. Disconnect the device from the voltage supply to turn it off.

- ➢ The LEDs and the display go off.

8.9 HE 5733 with static switch for start/stop

Note!
When using a static switch, please keep in mind that the parameter **'external start / stop**' must be set to **static**, *see chapter 9.4 Parametrisation via EasyTool Controls 4.0*.

Note!
The position of the static switch always has priority over the key operation on the device front.

If the static switch is closed, the fan starts (start function). If the static switch is open, the fan stops (stop function).
When using one static switch, only **one** digital input is necessary. The second digital input (stop function) is not used.

Switch in **stop position:** 1

A static switch **always** has priority, i.e. if the external switch is set to **stop**, you cannot start the fan via the green ON key on the device front.

The device indicates this state via the **flashing** LED on the upper left of the ON key. The other three LEDs are not lit.

Switch in **start position**: 2.

If the external switch is set to **start**, you can initiate cleaning by pressing the red OFF key once.

- The fan stops.

  The LED overrun time of fan is **lit** and afterwards the LED run-down time of fan

  The 4 LEDs on the green ON key are **lit** and **rotate clockwise.**

- Cleaning starts. The LEDs duration of cleaning and cleaning active are **lit**. At the same time all 4 LEDs on the red OFF key are **lit**.

  Afterwards the LEDS cleaning active and settling time of dust are **lit**.

- When cleaning is finished, the LEDs cleaning active as well as the LEDs on the red OFF key go off.

9 Parametrisation

9.1 Parameter Table

The following parameters can be set either via the device keys as well as via EasyTool Controls 4.0:

Parameter	Adjustment range	Step values	Default setting	Unit
System start When set to On (1), the system starts the cleaning process right after a supply voltage has been applied.	Cleaning Off/On (0/1)	1	Cleaning On (1)	
Automatic cleaning	No, yes, time+dp[3]	1	No	
Pre-warning time automatic cleaning Device signalises that an automatic cleaning is pending	0…60	1	5	seconds
Duration of cleaning	5…300	1	10	seconds
Cleaning interval*	1…480	1	15	minutes
Start-up time of fan	0…60	1	5	seconds
Run-down time of fan	0…60	1	5	seconds
Overrun time of fan	0…300	1	10	seconds
Settling time of dust	0…120	1	5	seconds
Malfunction	Fan Off/On (0/1)	1	Off (0)	
Polarity of cover switch	Low/High (0/1)	1	Low (0)	
dp-measuring range**	2.5…1000	0.1	35	mbar
dp-max.**	Off, 0.1…1000	0.1	30	mbar
dp-min.**	0…100	0.1	5	mbar
dp-offset**	-50.0…+50.0	0.1	0	mbar

*Only for control without differential pressure monitoring

**only for control with differential pressure monitoring

[3]time+dp: only used for devices with differential pressure. If the maximum differential pressure is never reached, then the set time is the indicator for cleaning.

The following parameters can be set via EasyTool Controls 4.0 only:

Parameter	Adjustment range	Default setting
Password Protection against unauthorised parameter changes.	0…9999	0001
External start/stop In case of two digital inputs and two external push-buttons for start/stop: Setting ‘dynamic’ If one external switch for start/stop is used, then the second digital input ‘stop’ is obsolete: setting ‘static’	dynamic, static	dynamic

9.2 Overview of parameters and their LEDs

When setting the system parameters, there are these combinations of lit or flashing LEDs:

Parameter name	LED flashes	LED is lit
System start		
Automatic cleaning		
Pre-warning time automatic cleaning		
Duration of cleaning		
Cleaning interval*	+	
Start-up time of fan	+	
Overrun time of fan	+	
Run-down time of fan	+	
Settling time of dust	+	
Malfunction	+	
Polarity of cover switch	+	
dp-parameters		
dp-offset	 +	
dp-min.	 +	
dp-max.	 +	
dp-measuring range	 +	

9.3 Parametrisation with device keys

Note!
All parameters can be set via the device keys as well as via EasyTool Controls 4.0. The **password** and the parameter '**external start/stop**' can only be set via EasyTool Controls 4.0 though.

1. Press the PARA key to change the values of the system parameters.

   - The LED on the PARA key is **lit** yellow 
   - The displays shows 
   - The LED **test mode flashes** yellow 

2. Press the UP key to select the parameter to be changed (*see also chapter 9.1 Parameter Table).*

   - The LED of the current parameter to be changed **flashes** or is **lit** (see chapter *9.2 Overview of parameters and their LEDs.*

3. Press the ENTER key.

   - If a password has been set, the display shows Display 

4. Press ENTER again to enter the password.

   - The display shows  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 within 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 vale 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)*.

9.4 Parametrisation via EasyTool Controls 4.0

Note!
All parameters can be set via the device keys as well as via EasyTool Controls 4.0. The **password** and the parameter '**external start/stop**' can **only** be set via EasyTool Controls 4.0 though.

The parameters can also be set via EasyTool Controls 4.0. Underneath 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 0,00 s until the requested value is set.

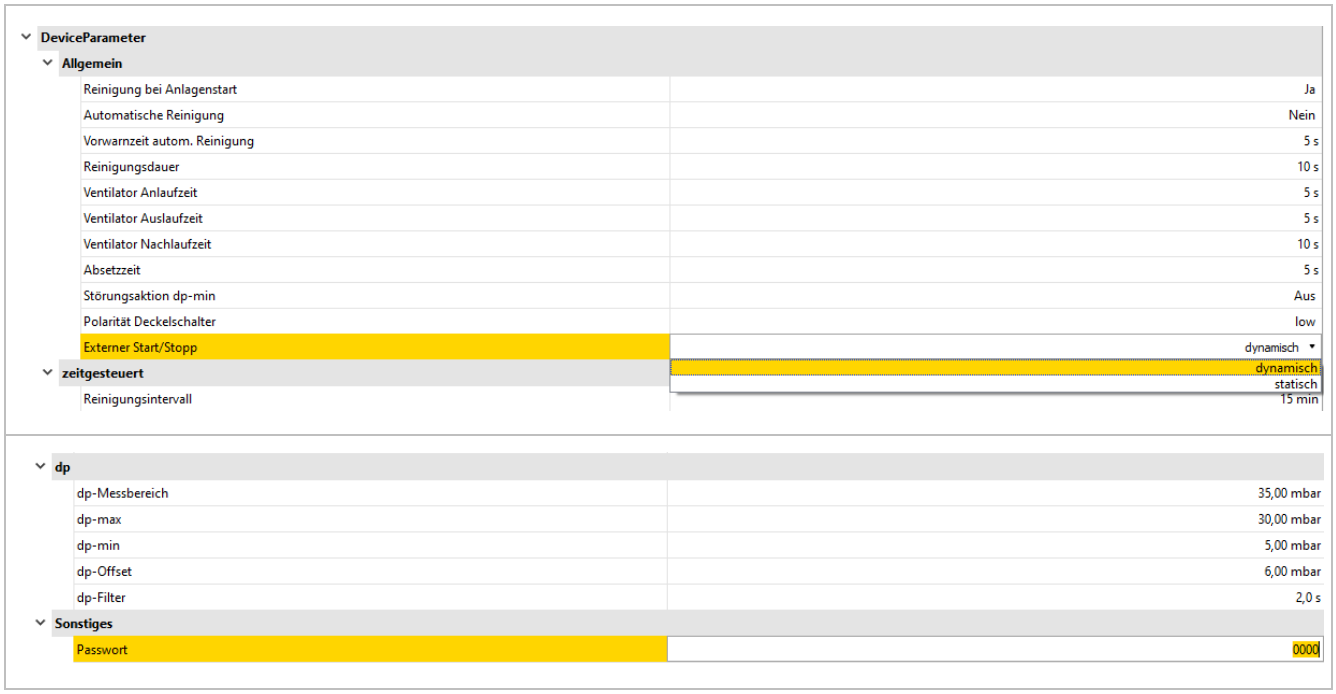


Figure 12 *Parameter setting via EasyTool Controls 4.0*

9.5 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 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) Depending on 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 *9.3 Parametrisation with device keys, steps 4+5*.
   c) If you are still in the parameter menu, you can carry out the zeroing without re-entering the password.

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.

9.6 Reset of default settings

1. Switch on the device and keep the keys PARA and ENTER pressed **simultaneously for 5 seconds**.

   -  is shown in the display.
   - After 5 seconds  is shown in the display for entering the password. Continue with step 2.

   If no password has been assigned, 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 Differential pressure measurement

Figure 13 *Connections for the differential pressure measurement*

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 via the adjustable measuring range.

For example:

0 … 30 mbar ≙ 4 … 20 mA / 0…10 V, 0 … 20 mbar ≙ 4 … 20 mA / 0…10 V

11 Error Messages

Note!
Basically all error messages must be acknowledged.

The manual acknowledgement of errors prevents the fan from restarting automatically, in case of **static** start/stop function.

Once the error has been acknowledged, the fan can restart.

11.1 Acknowledgement of errors

1. The device indicates that an error must be acknowledged when all 4 LEDs on the OFF key are flashing simultaneously.

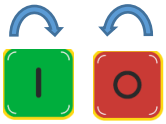
   Press the OFF key once.

   - ➢ The LEDs on the OFF key go off.
   - ➢ Now, the fan can restart.

11.2 List of possible error messages

Display / LED	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 display shows**:** 	The differential pressure signal is below the permissible measuring range.	• Check the differential pressure signal. • Check the external screw connections.
The differential pressure display shows**:** 	The differential pressure signal is above the permissible measuring range.	• Check the differential pressure signal. • Check the external screw connections.

Display / LED	Cause	Remedy
The differential pressure display 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 flashes: 	The differential pressure exceeds the set threshold.	
The Low alarm LED flashes: 	The differential pressure falls below the set threshold	
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.
LED for error MPS/contactor/thermistor and the 4 LEDs on the OFF key are flashing: 	Error motor protection switch	• The flashing LEDs on the OFF key • Press the OFF key to acknowledge the error
LED for MPS/contactor/thermistor is flashing: 	Error thermistor module	• If the error is no longer indicated, press the OFF key to acknowledge the error

Display / LED	Cause	Remedy
LED for operation signal is flashing and the 4 LEDs on the OFF key are flashing counter-clockwise: 	Error of cover switch	• Close the cover
The 4 LEDs on the OFF key are flashing counter-clockwise: 	Error of rotating field	• Apply the correct rotating field
The 4 LEDS on the ON key are flashing clockwise, the 4 LEDs of the OFF key are flashing counter-clockwise: 	Phase failure (L3 only, because device is supplied by L1 and L2)	• Connect L3 or • check the external fuse

12 Maintenance and Service

Maintenance, Repair
The device must be cleaned regularly to avoid an increased formation of dust on the device.

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.

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