

MultiMAXX[®] HE

OPERATION MANUAL



Product Range



Unit Type Code

Fig. 1-1 Unit code

H E 1 1 U N F O K B A K D

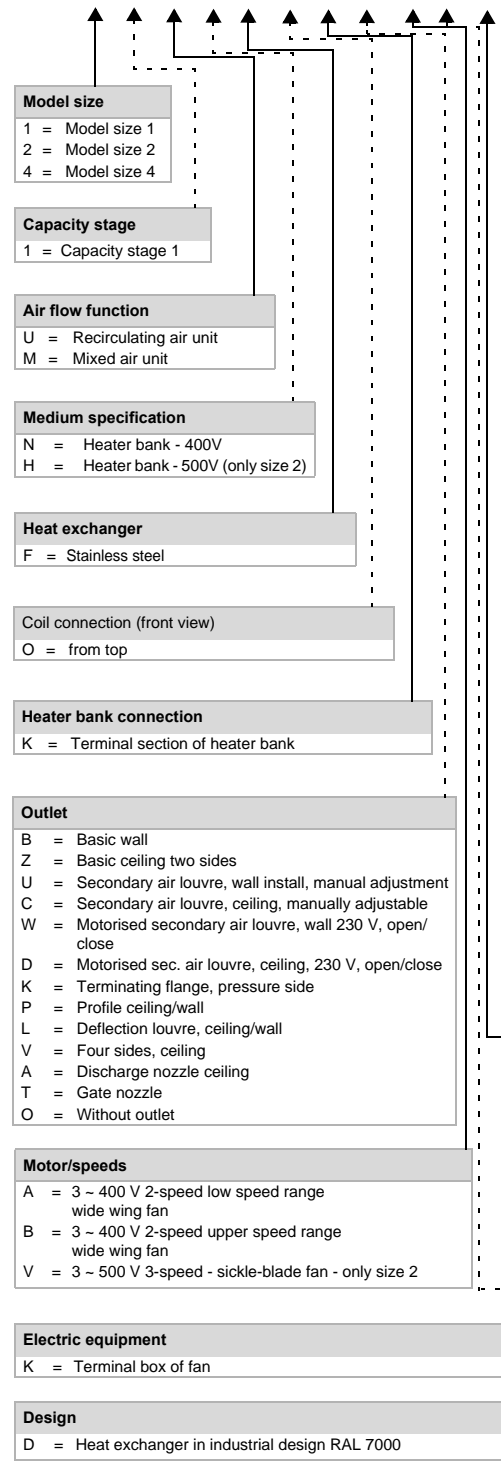


Fig. 1-2 Accessories code

Z H X X X X X

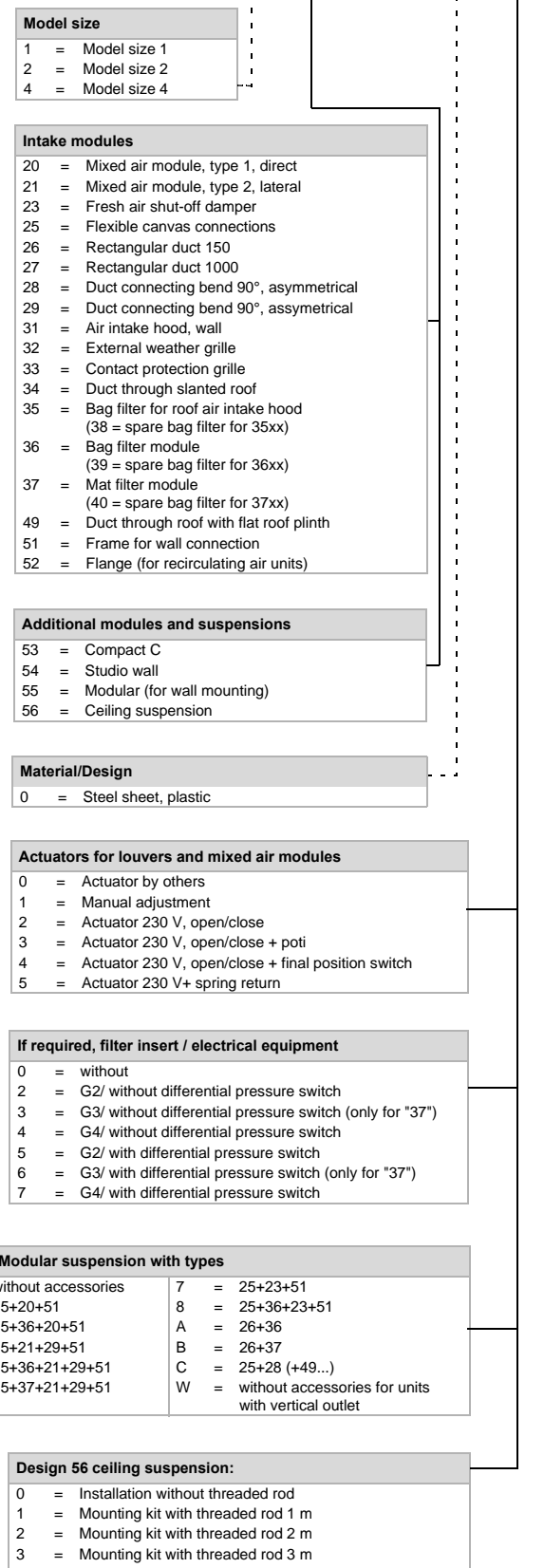


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1 Safety and User Information

This is an original operation manual verified by the manufacturer.

The MultiMAXX HE electric unit heaters are developed and manufactured in accordance with the state-of-the-art technological standards and established technical safety codes and meet the requirements of the EC Directive on Machinery.

The MultiMAXX HE electric unit heaters are reliable in operation and satisfy strict quality standards. This product range combines future-oriented technology with a high level of user friendliness and ease of maintenance.

However, all electric unit heaters could pose unavoidable residual risk of injury or risk of equipment or property-damage only accidents. Therefore your personal safety and the proper operation of the unit depend on the strict observance of the safety instructions. Failure to follow the safety precautions could result in death, serious injury or equipment or property-damage-only accidents.

Observing the safety instructions in the current operation manual will help avoid the risks, ensure economical operation of the unit and enjoy full benefits of the product.

The safety aspects covered by this chapter are valid for the entire operation manual.

1.1 Availability of the operation manual



The accompanying operation manual includes important instructions on safe and correct operation of the MultiMAXX HE electric unit heaters.

This manual must always be available at the site where unit is operating. Every person working on the equipment must read this manual fully before commencing the work and take all relevant information while performing a task into account.

This operation manual applies to operators, building technicians, technical personnel or instructed persons as well as electricians.

1.2 Scope of the operation manual

This operation manual covers critical points on the following subjects:

- Shipping
- Assembly
- Installation
- Electrical connection
- Commissioning and operation
- Maintenance, cleaning and disposal

1.3 Used symbols

The following symbols are used in this manual:

- This symbol is used to indicate normal lists.
- This symbol indicates instructions to follow.
- ✓ The result of an action is indicated with this symbol.



NOTE!

This symbol denotes additional instructions on using the MultiMAXX HE.

**RECYCLING!**

This symbol points out proper procedure for recycling of package material and dis-used unit components, which must be separated depending on the material type.

**PROPER BOOTS REQUIRED!**

This symbol points out that you must wear proper boots.

**WEAR PROTECTIVE GLOVES!**

This symbol points out that you must wear proper gloves.

1.4 Labelling of safety information

**HAZARDOUS VOLTAGE!**

This symbol indicates a risk of electrical shock when carrying out certain job(s).

**PERSONAL INJURY!**

This section specifies procedures and precautions for the prevention of personal injuries due to high pressure.

**DANGER DUE OVERHEAD LOADS!**

This symbol warns about personal injury and damage caused by overhead loads and suspended heavy objects.

**DANGER OF HOT SURFACES!**

This section specifies procedures and precautions for preventing personal injury due to hot surfaces.

**DANGER – SHARP CUTTING EDGES!**

This section specifies procedures and precautions for preventing personal injuries due to cutting on thin metal fins.

**DANGER OF ROTATING UNIT PARTS!**

This section specifies procedures and precautions for preventing personal injury resulting from rotating unit components.

**DANGER OF INFLAMMABLE SUBSTANCES!**

This section specifies procedures and precautions for preventing personal injury resulting from fire hazard.

**ENVIRONMENTAL DAMAGE!**

This symbol warns you about damage to the environment and turns your attention to all existing national environmental protection regulations.

**EQUIPMENT DAMAGE!**

This section specifies procedures and precautions regarding the prevention of damage to the MultiMAXX HE electric unit heater.

1.5 Safety-conscious working

Observe the following instructions during installation, settings, service and maintenance tasks:



HAZARDOUS VOLTAGE!

Disconnect all electric power of the unit and ensure the power cannot be inadvertently energised, earth, short-circuit and block off all neighbouring live parts. Teile abdecken oder abschränken. Non-compliance can lead to death or serious injury.



DAMAGE RISK DUE TO STATIC DISCHARGE!

While carrying out connections or adjustments on the MultiMAXX HE electric unit heater make sure that you discharge yourself statically before touching PC boards and electrical components.

- Fluctuations and imbalance in supply voltage must not exceed tolerance limits specified on the unit identification plate; otherwise this could cause severe unit malfunction, overload states or failure.

1.6 Proper use

The MultiMAXX HE electric unit heaters are installed in industrial, sales and trade facilities as well as warehouses with normal ambient conditions according to the EN 60 721 -3-3 and are used for heating, ventilating or cleaning fresh and indoor air. Accessories can include filters, mixing air modules, intake modules, suspensions and panels or OSHE control cabinet with the relevant sensors.

The implementation of the unit must be carried out in accordance with Regulation (EU) No. 1253/2014



Improper use

Proper use also stipulates the observance of the current operation manual, operating instructions for the accessories of the MultiMAXX HE unit as well as the inspection and maintenance intervals specified by FläktGroup.

Any use other than that described above is considered improper. The manufacturer/supplier is not liable for any damages arising from improper use. The user alone bears the risk.



PERSONAL INJURY AND EQUIPMENT DAMAGE!

The MultiMAXX HE unit may not be operated:

- in locations with explosion danger
- in rooms with high dust or moisture content
- in rooms with strong electromagnetic fields
- in rooms with aggressive environment that may attack plastics.



The following accident prevention regulations are valid (VBG1, BGV A2 (previously: VBG4), VBG7w, VBG9a) and generally recognized codes for machinery and principles of engineering, in particular DIN VDE 0100, DIN VDE 0105.

1.7 Safety regulations and codes

When carrying out installation, commissioning, maintenance and service of the MultiMAXX HE units, all safety regulations and codes as well as generally established technical practices must be considered.

1.8 Modifications and changes

It is not allowed to perform any changes or modifications of the MultiMAXX HE unit. Changes or modifications of the MultiMAXX HE unit by others will render the CE conformity and all warranty claims null and void.

1.9 Spare parts

Only original FläktGroup spare parts are allowed, since FläktGroup is not liable if third-party spare parts are used.

1.10 Disposal

Main and operating supply materials must be disposed of depending on their material type in a safe and environmentally friendly manner - refer to section "Disposal" on page 35.

1.11 Personnel selection and qualification

It must be ensured that every person working on the MultiMAXX HE unit has read and understood entire operation manual. Please read this document fully before commencing any work, and not while performing a task.



NOTE!

Electrical connection must only be carried out by qualified licensed staff or other individuals with proper professional training and experience in the following areas:

- Regulations concerning health and safety in the workplace
- Accident prevention regulations
- Directives and recognized codes of practice

All skilled individuals must be able to assess, what the work entrusted to them entails, and must be able to recognize and avoid all associated dangers.

2 Technical Description

2.1 Technical description and scope of supply

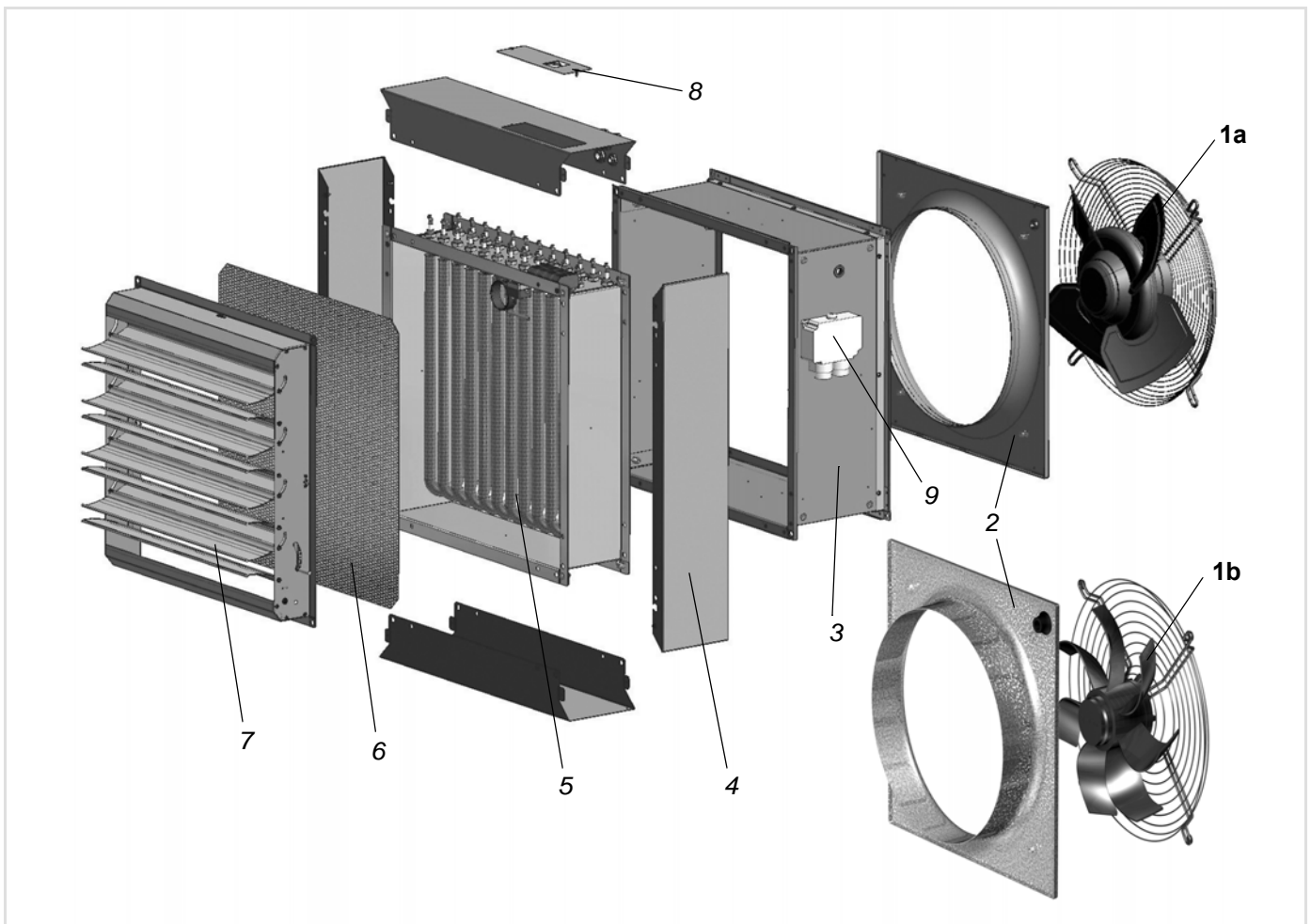


Fig. 2-1: Unit components

Pos. 1a: Wide wing fan - size 1, 2 and 4 (3 x 400 V)

Pos. 1b: Sickle-blade fan - size 2 (3 x 500 V)

Pos. 2: Suction nozzle

Pos. 3: Fan section

Pos. 4: Casing of heater bank

Pos. 5: Heater bank

Pos. 6: Protection grille

Pos. 7: Secondary air louvre (optional)

Pos. 8: Cover for electric connection of heater battery

Pos. 9: Terminal box for electric connection of fan motor

2.1 Specification of material

Unit part	Material
Fan with contact protection grille	Various materials
Intake nozzle	Galvanized metal sheet
Heater bank	Various materials
Unit casing	Galvanized painted metal sheet
Outlet	Galvanized metal sheet + aluminium fins
Terminal box	Various materials

Tab. 2-1: Specification of material

2.2 Functional description of the unit

The MultiMAXX HE electric unit heater comprises a fan and a heater bank with casing. Electrical heating elements are performed in stainless steel and wired in 3 heater groups (see Tab. 2-3) to a terminal strip. Regulation and monitoring of the unit heater is performed by control unit of the OSHE series (refer to section 5.2) or regulation provided by others.

The fan casing is performed in galvanized metal sheet, heater bank casing - in painted metal sheet (RAL 7000). The air discharge opening can accommodate up to 11 different types of discharge louvres. A wide wing or sickle blade fan is located in the fan casing on the rear side of the unit heater. The protection grille (conforming with EN 13857) prevents possible contact with the fan. The unit rear side can be supplied with an extension for mounting air intake accessories. Mounting fittings for suspending the unit with a ceiling or wall suspension are located laterally on the fan box. The components made of non-ferrous metal and galvanized connection parts are not protected by paint.

2.3 Operating limits



NOTE!

Other important data regarding unit capacity, weight, connections and sound power are covered in the „MultiMAXX HE Data and Facts“.

Max. ambient temperature	-20°C to +40°C
Operating voltage	3 x 400 V or 3 x 500 V ~ 50 Hz
Protection class	IP 42
Max. relative humidity	95% at 25°C
Corrosion protection class	C3 - EN ISO 12944-2
Max. dust content	10 mg / m ³
Power consumption	refer to unit identification plate

2.4 Unit dimensions and minimum installation clearance

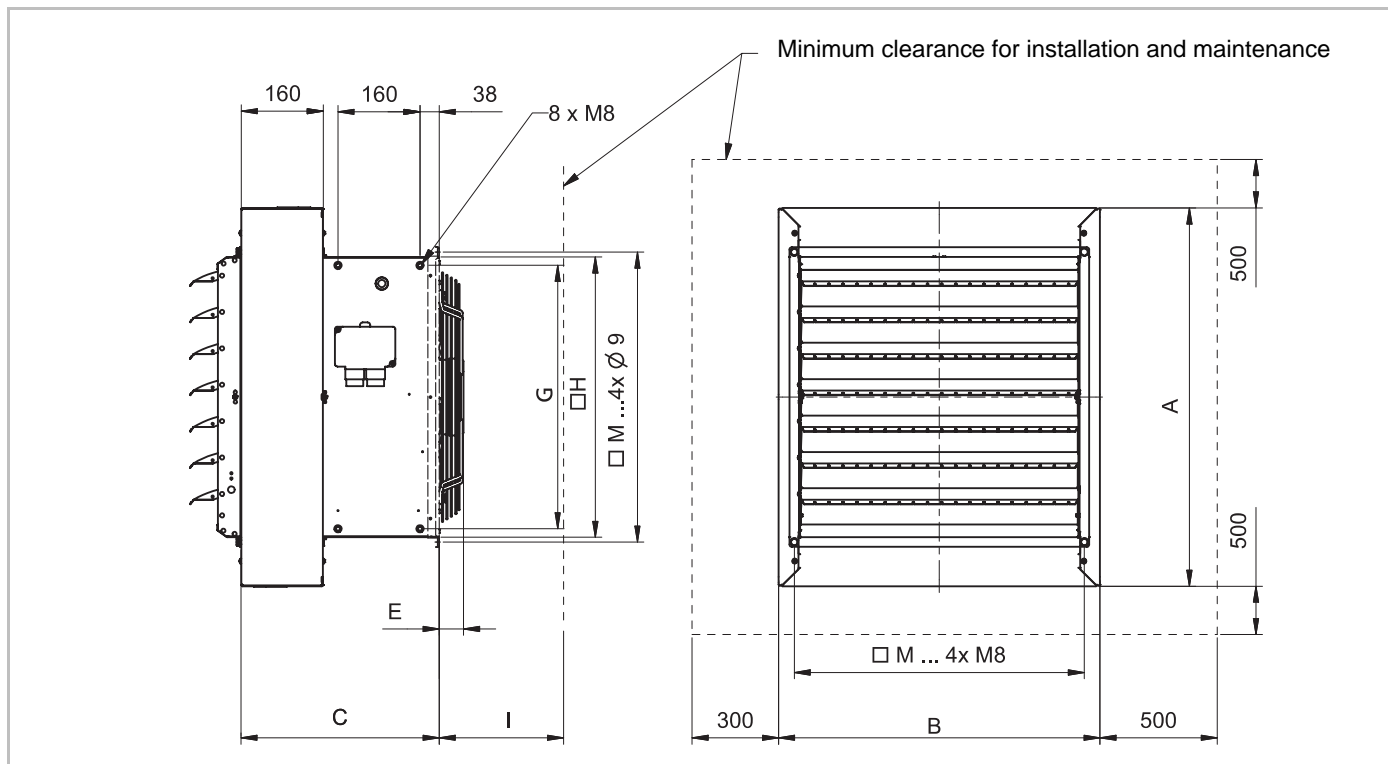


Fig. 2-2: Unit dimensions

Size / unit model size	1	2	4
A [mm]	642	738	1026
B [mm]	520	616	904
C [mm]	387	387	452
E (wide wing fan) [mm]	60	81	112
E (sickle-blade fan) [mm]	-	50	-
G [mm]	418	514	802
H [mm]	451	547	835
I [mm]	300	300	400
M [mm]	470	566	854

Tab. 2-2: Unit dimensions

2.5 Specifications

Model size	Speed	Air flow rate V_L	Heating capacity Q_T				Air heating at max. heating duty ΔT	Voltage U	Max. rated current I	Motor power consumption	Motor current consumption I	Sound power	Sound pressure *	Weight without louvre
			Max.	Speed										
				1	2	3								
[min ⁻¹]	[m ³ /h]	[kW]	[kW]	[kW]	[kW]	[K]	[V]	[A]	[kW]	[A]	[dB(A)]	[dB(A)]	[kg]	
A - 3 ~ 400 V 2-speed (low speed range)														
1	670	1410	12	4	8	12	26	3x400	17.3	0.03	0.05	55	40	28
	860	1620					23			0.05	0.10	61	46	
2	710	2260	21	7	14	21	27		30.3	0.07	0.14	61	46	34
	910	2710					23			0.12	0.30	65	50	
4	500	4610	42	14	28	42	27		60.6	0.15	0.30	59	44	69
	650	6480					19			0.24	0.59	68	53	
B - 3 ~ 400 V 2-speed (high speed range)														
1	1050	1990	12	4	8	12	18	3x400	17.3	0.03	0.14	67	52	28
	1320	2470					15			0.14	0.25	71	56	
2	890	3010	21	7	14	21	21		30.3	0.19	0.29	69	54	34
	1270	3980					16			0.29	0.50	76	61	
4	740	8340	42	14	28	42	15		60.6	0.37	0.61	81	66	69
	910	9900					13			0.51	1.00	76	61	
V - 3 ~ 500 V 3-speed														
2	700	1970	12.2	6.1	9.15	12.2	18	3x500	14.0	0.07	0.14	55	43	36
	1070	2870					13			0.26	0.34	67	52	
	1370	3810					10			0.34	0.50	75	60	

Tab. 2-3: Specifications

* Sound pressure: standard values at 5 m distance to the unit side, at maximum air flow rate and low reflection room. Industrial hall volume 1500 m³, absorption surface 200 m² Sabin, hemispherical radiation = direction coefficient 2. These values can be significantly influenced by the indoor characteristics in a positive or negative way.

2.6 Air side accessories

The following accessories can be supplied for the MultiMAXX HE unit heater:

Description	Order-Nr.	Design
Mixing air module type 1	ZH#.200#	direct; outside and recirculating air offset 90°
Mixed air module, type 2	ZH#.210#	Recirculating and outside air opposite at 180°
Fresh air blocking damper	ZH#.230#	Galvanized metal sheet
Flexible canvas connections	ZH#.2500	Overall length 150 mm
Rectangular duct 150	ZH#.2600	Spacer, overall length 150 mm
Rectangular duct 1000	ZH#.2700	Overall length 1000 mm
Duct connecting bend 90°, symmetrical	ZH#.2800	90° symmetrical, tapered with run-around mounting frame
Duct connecting bend 90°, asymmetrical	ZH#.2900	90° asymmetrical, tapered run-around mounting frame
Air intake hood, wall	ZH#.3100	Galvanized metal sheet
External weather grille	ZH#.3200	Galvanized metal sheet, overall depth 45 mm
Contact protection grille	ZH#.3300	End grille for accessories
Duct through slanted roof	ZH#.3400	Galvanized metal sheet
Air intake hood, roof	ZH#.350#	Metal sheet in RAL 9002 with bird protection grille, without filter insert or with filter insert
Spare filter for air intake hood, roof	ZH#.3802 ZH#.3804	Filter G2 Filter G4
Bag filter module	ZH#.360#	Galvanized metal sheet, module with bag filter
Spare filter for bag filter module	ZH#.3902 ZH#.3904	Filter G2 Filter G4
Mat filter module	ZH#.370#	Galvanized metal sheet
Spare filter for mat filter module	ZH#.4002 ZH#.4003 ZH#.4004	Filter G2 Filter G3 Filter G4
Duct through roof with flat roof plinth	ZH#.4900	Galvanized metal sheet
Frame for wall connection	ZH#.5100	As spacer for wall opening
Flange	ZH#.5200	Only for recirculating air units
Suspension type compact C	ZH#.5300	For recirculating air units
Suspension type studio	ZH#.5400	For recirculating air units
Modular type suspension	ZH#.550#	Only for wall mounting
Ceiling suspension	ZH#.5600 ZH#.5601 ZH#.5602 ZH#.5603	Mounting kit without threaded rod Threaded rod 1 m - M10 Threaded rod 2 m - M10 Threaded rod 3 m - M10

Tab. 2-4: Air side accessories

"#" - see unit identification plate on page 3.



NOTE!

Detailed specification of accessories is presented in project-related documents and is identical for all types of the MultiMAXX HE units.

Accessories are used to secure the unit on the wall or ceiling as well as to provide air mixing and filtering together with the possibility for connecting air-flow ducts and OSHE control box.

2.7 Specification for the Ecodesign Directive passed by the EU Commission 2016/2281

The values presented in the table below are provided to ensure the implementation of the EU Directive 2016/2281. This Directive sets the framework for the requirements to the environmentally-friendly design of energy-related products such as air heaters, air coolers, units for air cooling in industrial processes with high operating temperature and fan coil units.

Unit data:

B₁ - Air heater: no

C₂ - Air heater: no

C₄ - Air heater: no

Fuel type: electrical

Unit size	Units	Electric motor	Heating capacity	Minimum capacity	Casing loss factor	Efficiency of heat transfer	Annual space heating energy efficiency
			P _{rated,h} [kW]	P _{min} [kW]	F _{env} [%]	η _{s,flow} [%]	η _{s,h} [%]
1	HE11.##F###.AKD	AC	12,0	4,0	0,0	96,6	38,4
	HE11.##F###.BKD		12,0	4,0	0,0	97,7	38,8
2	HE21.##F###.AKD	AC	21,0	7,0	0,0	96,3	38,3
	HE21.##F###.BKD		21,0	7,0	0,0	97,3	38,7
	HE21.##F###.VKD		12,2	6,1	0,0	97,0	38,4
4	HE41.##F###.AKD	AC	42,0	14,0	0,0	96,6	38,4
	HE41.##F###.BKD		42,0	14,0	0,0	98,0	39,0

Tab. 2-5: Values according to the EU Directive 2016/2281

3 Shipping and Storage

3.1 Delivery

Manufacturer's instructions regarding shipping and storing of the unit must be followed (see labels on the packing).

- Upon receipt of the MultiMAXX HE unit and prior to unloading, inspect the unit for damage and verify that the shipment is complete (refer to "Unit configuration and scope of supply" on page 9) as specified in the freight bill.
- If required, take photographs of all visible transit damage.



NOTE!

Missing parts or claims of shipping damage must only be reported to the transport insurance, if the damage has been confirmed by the delivering carrier.



NOTE!

We recommend to keep the MultiMAXX HE in its original packaging for protection, ease of handling, shipping and storage. Remove the original packaging only before installation. The packaging poses a health risk and must be disposed of in accordance with the relevant regulations and be kept out of reach of children. If the unit is stored for a period of time before installation or commissioning, it must be protected from damage through elements, build-up of dust and dirt!

3.2 Transport

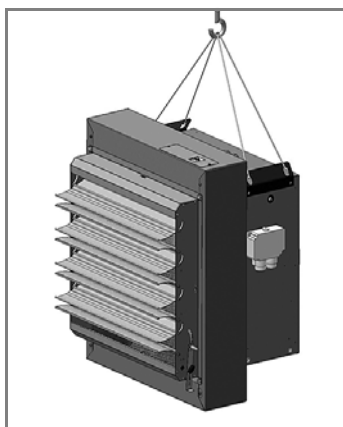


Fig. 3-1: Transport



DANGER DUE TO OVERHEAD LOADS!

Do not suspend or move MultiMAXX HE unit heater overhead.



PERSONAL INJURY!

- Do not use damaged transport devices.
- Use a fork lift truck only if the electric heater is located on a pallet.

- Attach lifting gear to the designated points of the assembly unit.
- Chains/slings should not be knotted and/or be exposed to sharp edges.
- The weight must be evenly distributed!
- Only lifting gear with sufficient load carrying capacity is allowed.
- Never use damaged lifting equipment.
- For your own safety wear gloves and safety footwear when hoisting or shipping the unit

3.3 Storage

Protect the MultiMAXX HE unit from humidity and dirt. The unit must be stored in a weather-proof manner indoors in accordance with class IE12 and EN 60 721-3-1 standard.



NOTE!

Allowable storage conditions / allowable air condition for uninstalled units:

Air temperature: -25 °C to +40 °C

Air humidity: between 50 and 85 % (relative humidity with no condensation)

4 Assembly

4.1 Load-bearing capacity of the installation site



NOTICE ON UNIT ASSEMBLY AND INSTALLATION!

The assembly site must be vibration-free and suitable for permanently supporting the weight of the electric unit heater. If necessary, the approval of a structural engineer or architect has to be received.

For mounting the unit 2 sets with 4 M8 nuts are located on the fan module - refer to Fig. 2-2. The fixing material is enclosed with suspensions.

4.2 Ceiling installation

It is necessary to consider the suspension height, the distance between the units and minimum distance from the ceiling.

The minimum permissible height above the floor amounts to 2.7 m.

Table with suspension height of unit for ceiling mounting

Type	Max. suspension height (m) (outlet C, D)
HE11.##F###.AKD	5.4
	7.0
HE11.##F###.BKD	8.8
	11.7
HE21.##F###.AKD	7.2
	9.2
HE21.##F###.BKD	9.9
	14.3
HE21.##F###.VKD	6.3
	10.1
	14.3
HE41.##F###.AKD	7.0
	10.6
HE41.##F###.BKD	14.1
	14.1
	17.7

The data in the chart are standard values and apply to the discharge temperature, if the latter exceeds indoor temperature by 15 - 20 K.

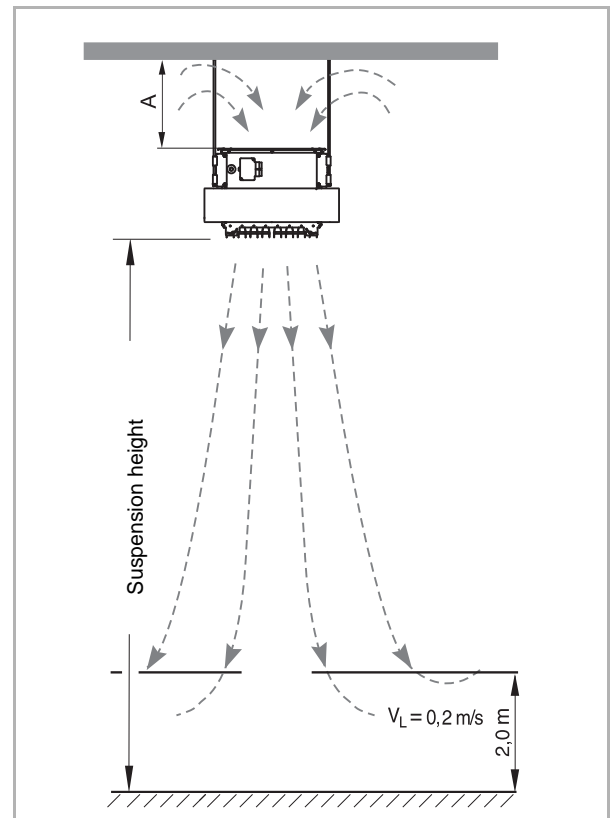


Fig. 4-1: Suspension height for ceiling installation



NOTE!

The maximum height of the unit ceiling installation varies depending on the discharge temperature, reduced speed and air volume flow due to accessories.

Minimum distance from ceiling A (see Fig. 4-1)

Provide minimum distance to ceiling to allow sufficient air circulation and ensure adequate access for maintenance.

Model size	1	2	4
Clearance A [mm]	300	300	400

Unit clearance with ceiling installation (refer to Fig. 4-2)

In order to provide favourable air distribution pattern in the occupied zone we recommend that the following distances between units are maintained:

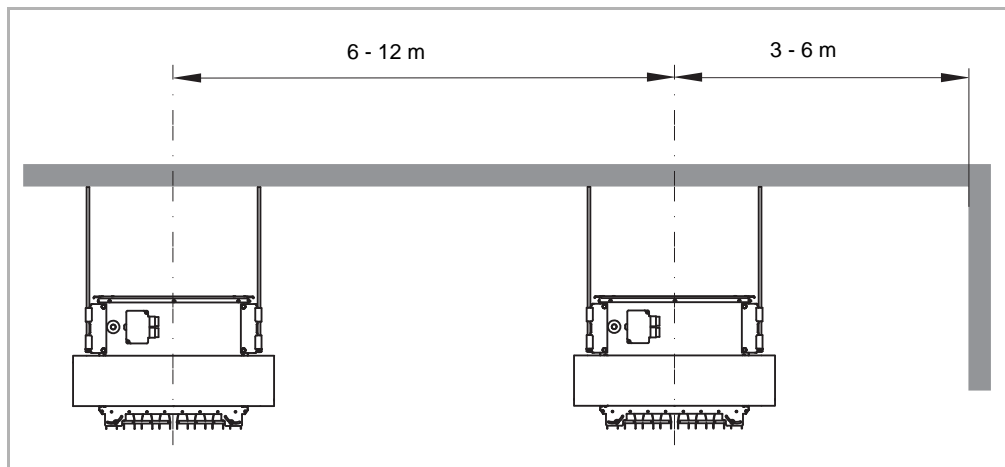


Fig. 4-2: Distance between units with ceiling mounting

The ceiling installation for recirculating air units with suspension „ceiling“ (ZH#.560#) is specified in Fig. 4-5 and for mixed air unit (ZH#.5602) in Fig. 4-9.

4.3 Wall installation

It is necessary to consider the minimum height, the direction of discharged air flow, distance between units and minimum distance from the wall (refer to Fig. 4-3).



PERSONAL INJURY!

The minimum permissible height above the floor amounts to 2.7 m.



NOTE!

Because of heating reasons wall-mounted electric heaters must not be mounted too high in order to ensure good mixing of bottom air layers.

Direction of discharged air flow

Discharge air flow should be directed as to avoid air draughts in the room. The primary air flow must not be directed against walls, beams, cranes, shelves, columns or similar obstacles!

Recommended distances between wall-mounted units (see Fig. 4-3)

The distances between units depend on the heat demand, number of units and their arrangement.

Minimum distance from wall A (see Fig. 4-3)

Provide minimum distance to wall to allow sufficient air circulation and ensure adequate access for maintenance.

Model size	1	2	4
Clearance A [mm]	300	300	400

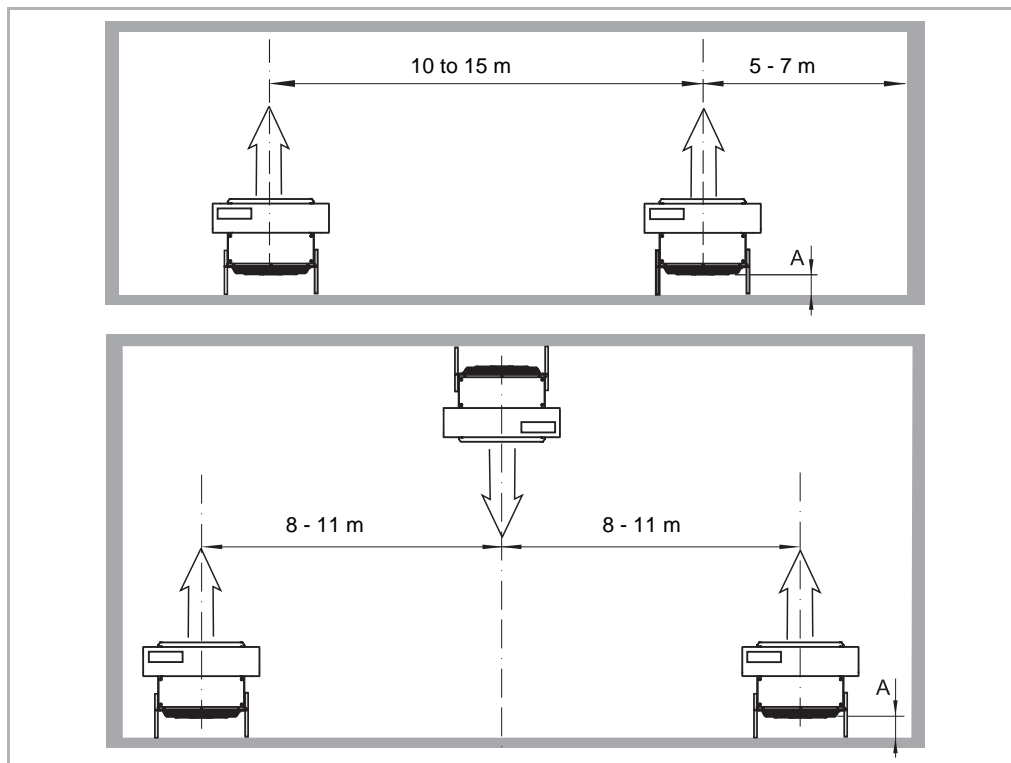


Fig. 4-3: Distance between units with wall mounting

Table - air throws with wall mounting

Type	Air throws [m] Outlet U, W
HE11.##F###.AKD	5.0
	5.9
HE11.##F###.BKD	6.9
	8.4
HE21.##F###.AKD	6.2
	7.3
HE21.##F###.BKD	7.8
	9.9
HE21.##F###.VKD	5.7
	7.8
	10.0
HE41.##F###.AKD	6.5
	8.6
HE41.##F###.BKD	10.3
	12.0

The data in the chart are standard values and apply to the discharge temperature, if the latter exceeds indoor temperature by 15 - 20 K.

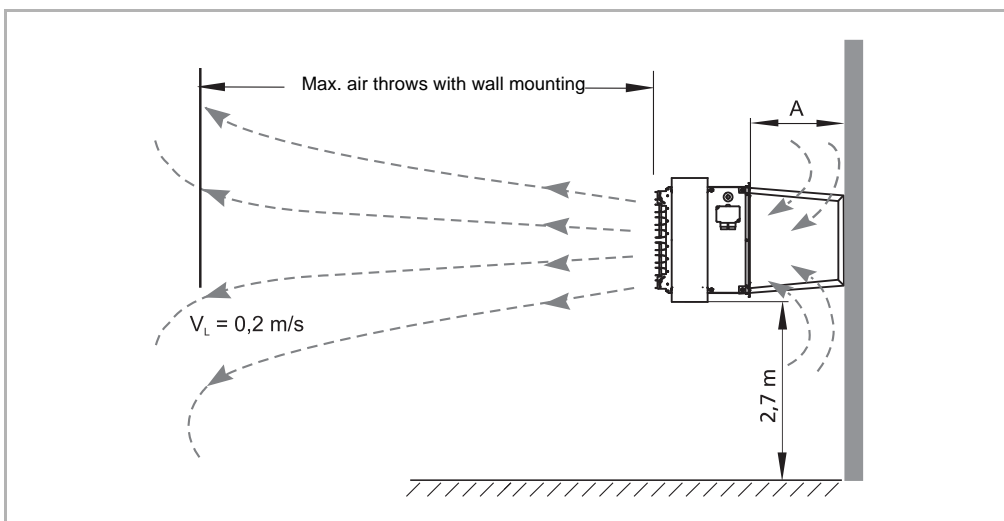


Fig. 4-4: Air throws with wall mounting

Wall installation of a recirculating air unit with „Compact C“ suspension (ZH#.5300) refer to Fig. 4-6, with „Modular“ suspension (ZH#.550#) refer to Fig. 4-7, with „Studio“ suspension (ZH#.5400) refer to Fig. 4-8.

Wall installation of a mixed air unit with „Modular“ suspension (ZH#.5503) refer to Fig. 4-10.

4.4 Safety clearances



NOTE!

When installing an electric unit heater, the safety clearances in regard to combustible materials must be maintained in accordance with CSN 06 1008 and EN 13501-1+A1 regulations. A minimum clearance of 400 mm on the air intake side and 1000 mm in the air discharge direction must be maintained.

4.5 Unit installation

**NOTE!**

Electric unit heaters units must be installed in a safe, reliable and visually adequate manner.

For these reasons, it is recommended to use manufacturer's suspensions and mounting brackets.

**EQUIPMENT DAMAGE!**

The unit must be installed in a stain-free, vibration-free and twist-free way.

**NOTE!**

Fixation points:

Electric unit heaters are secured in at least 4 fixation points.

Use the screws of the transport safety device.

**NOTE!**

Completing assembly and unit operation:

It is not allowed to operate the unit in a dusty environment, e.g. when drilling or grinding of concrete, separation of gypsum wallboards, floor grinding or polishing, etc.



Fig. 4-5: Ceiling mounting of a recirculating air unit with ceiling suspension (ZH#.560#)

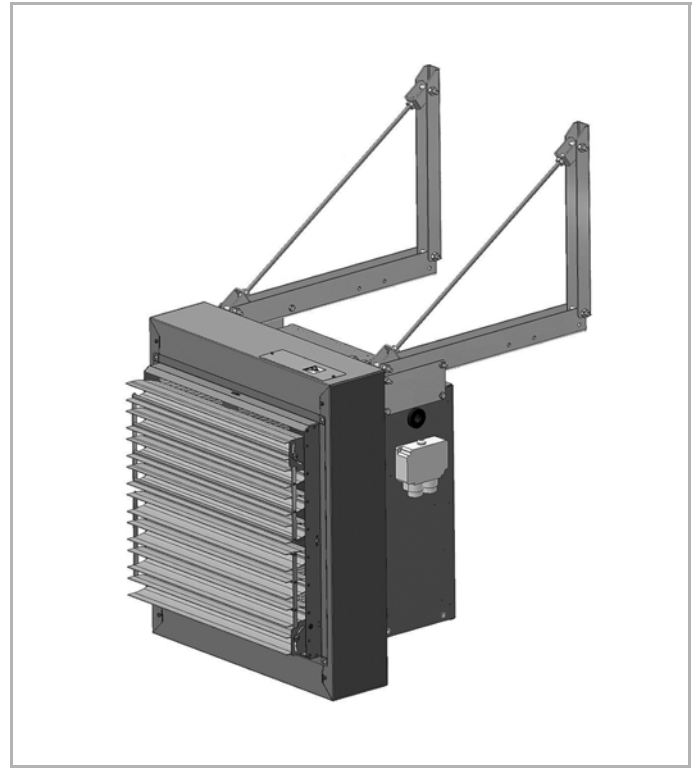


Fig. 4-7: Wall mounting of a recirculating air unit with modular suspension (ZH#.550#)

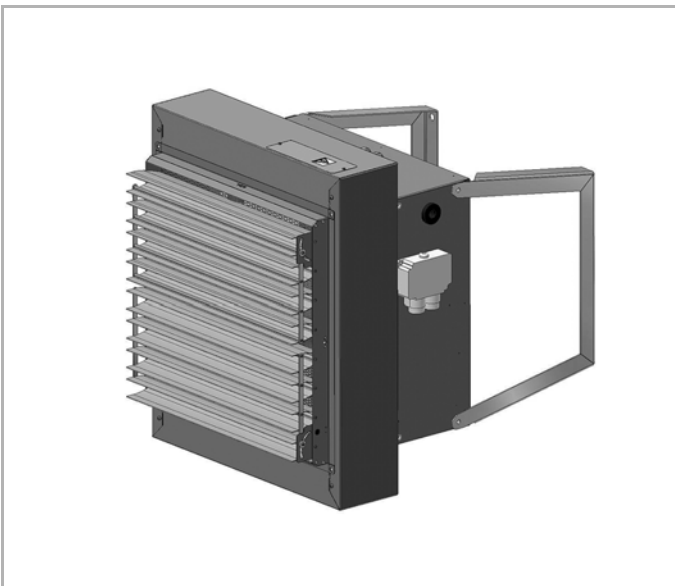


Fig. 4-6: Wall mounting of a recirculating air unit with „Compact C“ suspension (ZH#.5300)

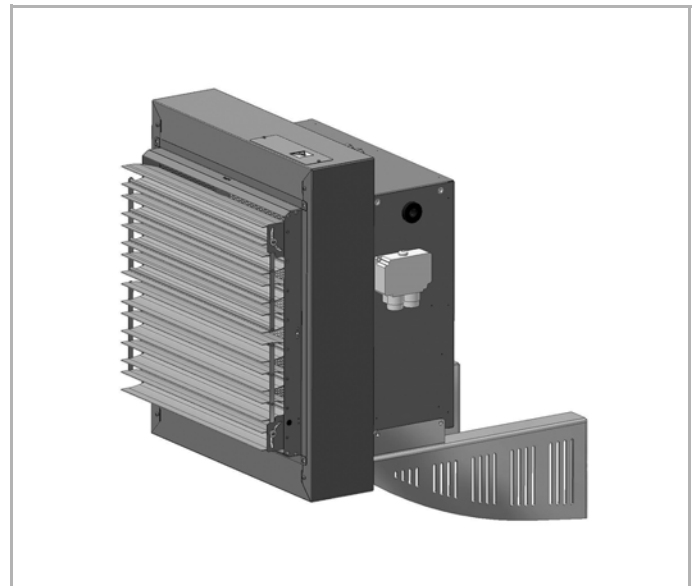


Fig. 4-8: Wall mounting of a recirculating air unit with „Studio“ suspension (ZH#.5400)

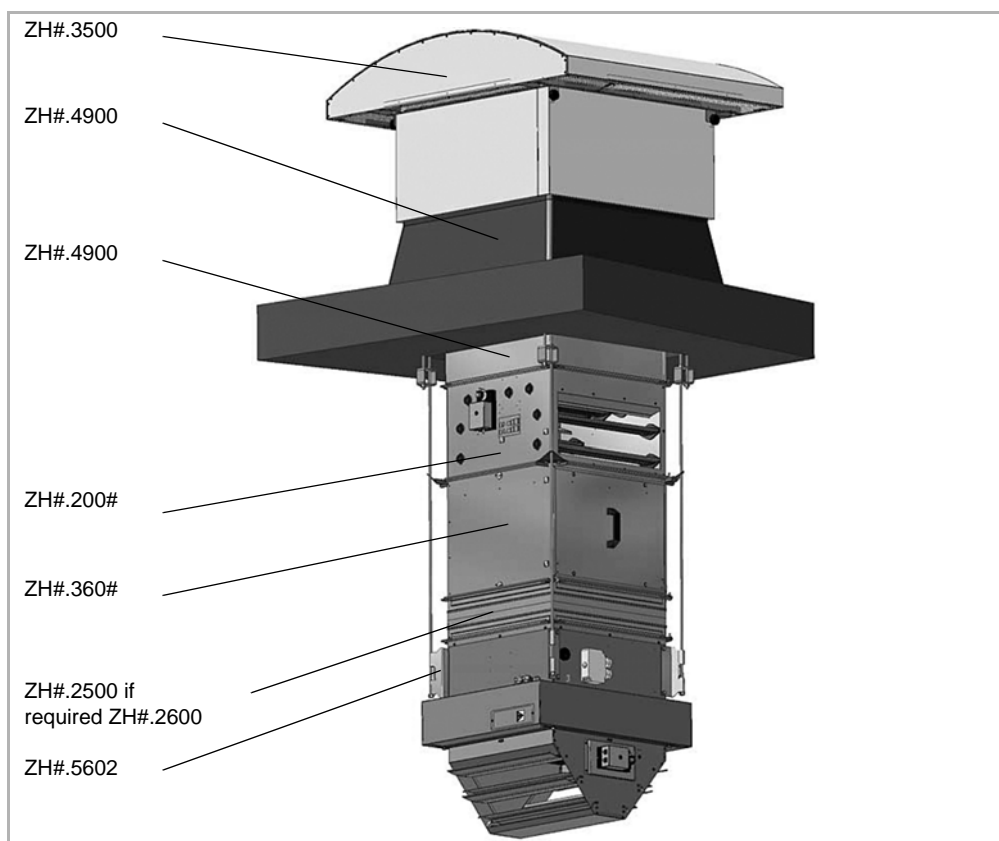


Fig. 4-9: Ceiling mounting of a mixed air unit with accessory items and ceiling suspension (ZHx.5602)

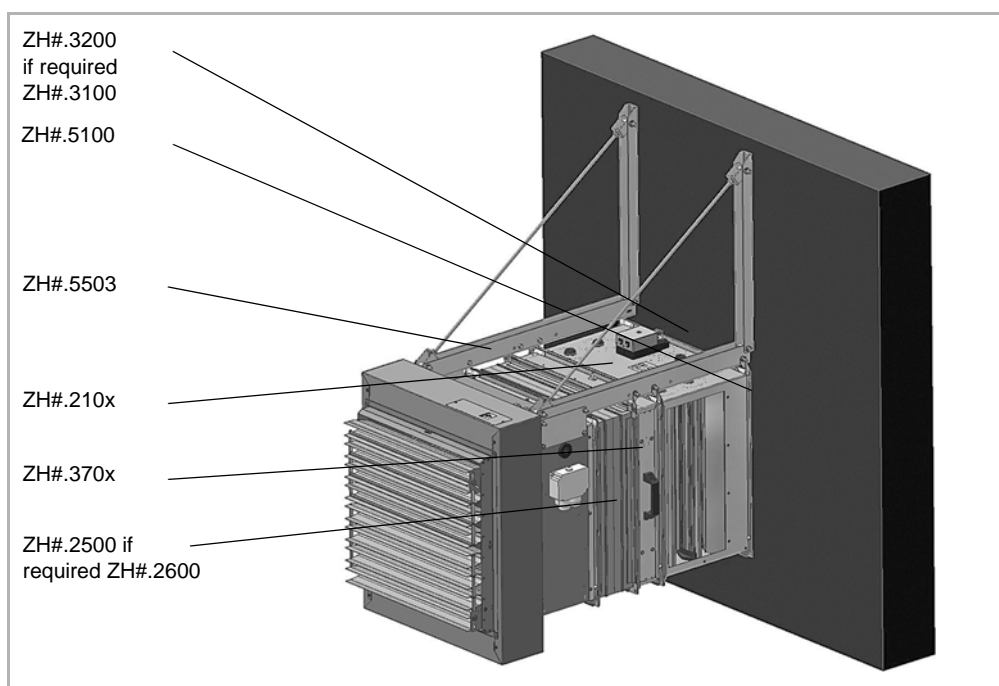


Fig. 4-10 Wall mounting of a mixed air unit with accessory items and „modular“ suspension (ZH#.5503)

With mixed air units the flange for mounting accessory items is secured by the factory. If accessory items are used on the suction side with recirculating air units an additional flange is required (ZH#.5200).

For wall mounting of mixing air modules recirculating air dampers must be secured in a vertical position (refer to Fig. 4-10).

Flexible canvas connection (ZHx.2500) or a rectangular duct 150 mm (ZH#.2600) must be fitted as the first accessory module. Refer to mounting examples in Fig. 4-9 and Fig. 4-10.

5 Electrical Connection



HAZARDOUS VOLTAGE!

The electrical installation of the MultiMAXX HE unit heaters must only be carried out by qualified electricians in observance of this operation manual and following regulations:

- VDE regulations, including safety regulations
- Accident prevention regulations
- Installation instructions.

5.1 Terminal box

MultiMAXX HE electric unit heater is fitted with a plastic terminal box which is used for fan connection. It is side mounted on the fan module. The terminal section of the heater bank is located on the upper part of the unit.

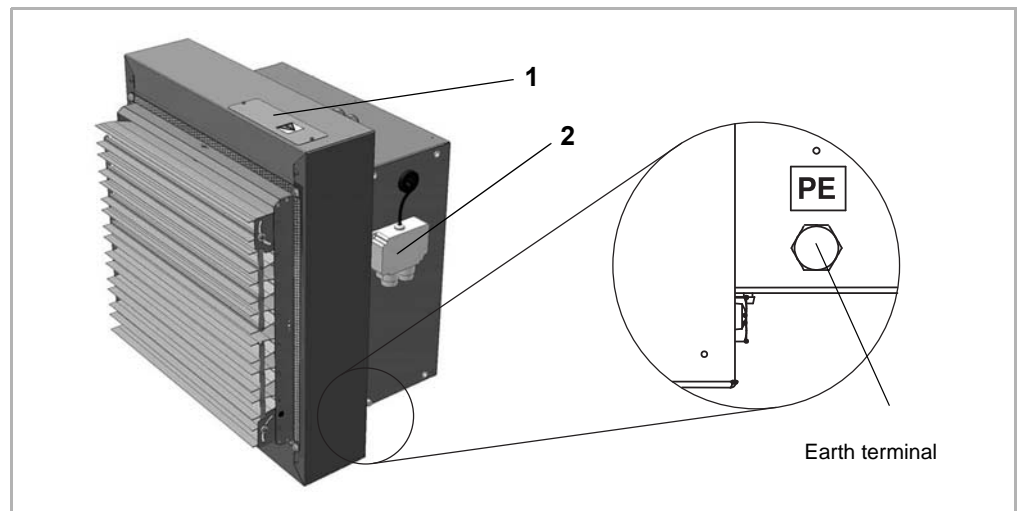


Fig. 5-1: Terminal box and earth terminal
 Pos. 1: Terminal section of heater bank
 Pos. 2: Terminal box of fan

5.2 Wiring diagrams

The electrical connection of MultiMAXX HE unit heater must be performed in accordance with the valid connection diagrams. Connection diagrams are provided on the inner sides of the cover for the unit connection box or are enclosed separately.



HAZARDOUS VOLTAGE!

The connection diagrams do not specify any protective measures. When performing connections currently valid standards and regulations must be observed and checked with the local power company.



NOTE!

An all-pole mains disconnecting device must be provided by others on site which must ensure the unit against inadvertent activation (e.g. with 400 V mains - a lockable switch with a minimum 3 mm contact opening up to rated voltage of 480 V, with 500 V mains - up to rated voltage of 600 V).

5.2.1 Connection to mains network

Electrical connection of fan switches and heater bank, operation of motor actuators of a mixing air module and secondary air louvre, thermal protection of heater bank and connection of room thermostats must be carried out in conformity with the valid connection diagrams. The electrical installation of the MultiMAXX HE unit heaters must only be carried out by qualified licensed electrical engineers in compliance with this operation manual and the current regulations: Cable type and cable cross-section must be selected by authorised staff. After installation of cables and connection of wires all cable connections must be sealed in a waterproof manner.



HAZARDOUS VOLTAGE!

Before opening the unit connection box, the unit heater must be de-energised and isolated at all poles.

- Connections must only be performed in accordance with the unit-specific wiring diagram.

5.2.2 Over-temperature thermostat of heater bank

The heater bank is fitted with 2 safety thermostats.

If supply air temperature exceeds 60°C, the 1st safety thermostat is activated; after cooling down an automatic reconnection is performed; the 2nd safety thermostat deactivates and blocks the unit if supply air temperature exceeds approx. 90°C. For manual enabling - deactivate and isolate the unit first, perform troubleshooting and enable the temperature limiter mechanically by pressing the release button. The release button is fitted and can be accessed behind the terminal box cover of the heater bank.

5.2.3 Motor protection using thermal contact

Fan motors of the MultiMAXX HE unit heaters are standard fitted with thermal contacts. By connecting the thermal contact to OSHE control cabinet the fan motor is secured via motor internal temperature and unit deactivation in fault case. After the fan motor cools down the fan is activated automatically. If the unit is operated by an external regulation system the thermal contact must be incorporated in the safety circuit. In this case FläktGroup can not assume any warranty obligations for such unit.

5.2.4 Connection with control units OSHE or regulation by others



ATTENTION! CONTROL UNITS!

The connection diagrams are supplied with the corresponding control units. Use the following control cables for connection:

- Control cable type depends on the unit configuration and local codes and regulations
- Thermal contact connection using 0.5 mm² control cable with screen performed as aluminium clad sleeve, e.g. J-Y(ST)Y 2x2x0.8.



NOTICE ON CONTROLS BY OTHERS!

For details on connecting individual assemblies (e.g. fan, heater bank) refer to the unit-specific wiring diagram enclosed with the main unit. Before commencing connections, check that the order code of the unit's electrical equipment matches the wiring diagram. Give special attention to the left rotary field while connecting 2-speed motors!

5.3 Motor terminal diagram for 2-speed three phase current external rotor motor, 3 x 400 V (type A, B)

- With thermal contacts
- Switch for cumulative compound motor
- Winding Δ/Y
- Without voltage switch-over!
- Operating voltage: 3 x 400 V

5.3.1 2-speed operation, 3 x 400 V

- With two speed switch (OSHE)
- Connection cable: 6 + PE = 7 wires
- Electrically screened cable: 2 TK connecting wires

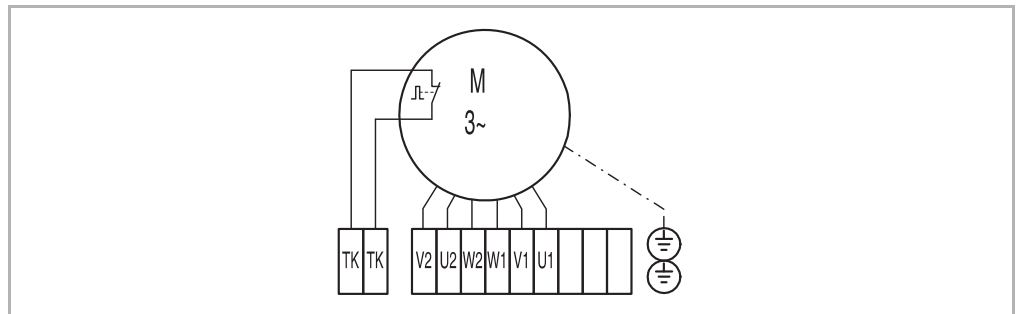


Fig. 5-2: Connection - 2-speed operation

5.3.2 1-speed operation, 3 x 400 V

- Connection cable: 3 + PE = 4 wires
- Electrically screened cable: 2 TK connecting wires

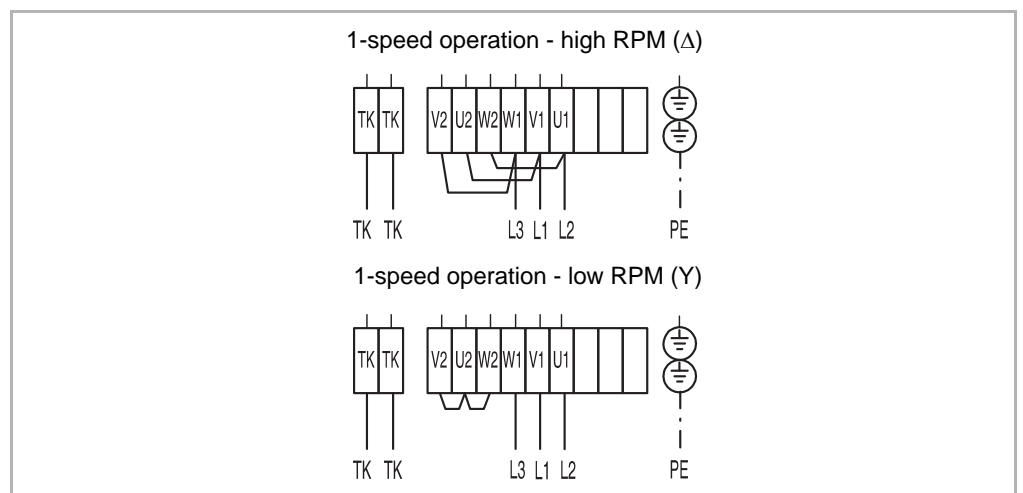


Fig. 5-3: Connection - 1-speed operation



NOTE!

Changing 2 phases enables to swap rotating direction.

5.4 Motor terminal diagram for 3-speed three phase current external rotor motor, 3 x 500 V (type V)

- With thermal contacts
- With pole-changing capability
- Winding $\Delta\Delta/YY/\Delta$
- Without voltage switch-over!
- Operating voltage: 3 x 500 V

5.4.1 3-speed operation, 3 x 500 V

- With external three speed switch
- Connection cable: 9 + PE = 10 wires
- Electrically screened cable: 2 TK connecting wires

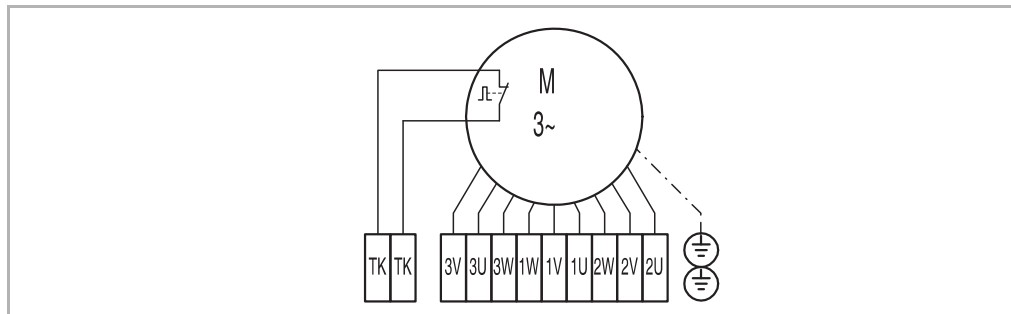


Fig. 5-4: Connection - 3-speed operation

5.4.2 1-speed operation, 3 x 500 V

- Connection cable: 3 + PE = 4 wires
- Electrically screened cable: 2 TK connecting wires

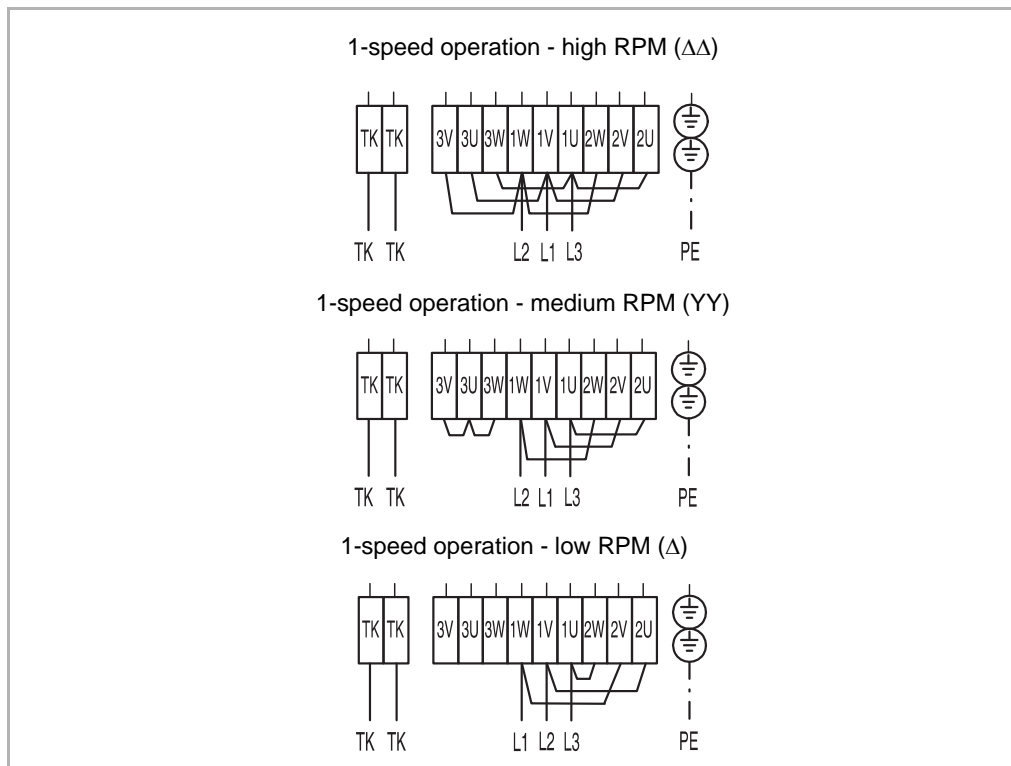


Fig. 5-5: Connection - 1-speed operation



NOTE!

Changing 2 phases enables to swap rotating direction.

5.5 Connecting actuators for mixed air module and blocking damper

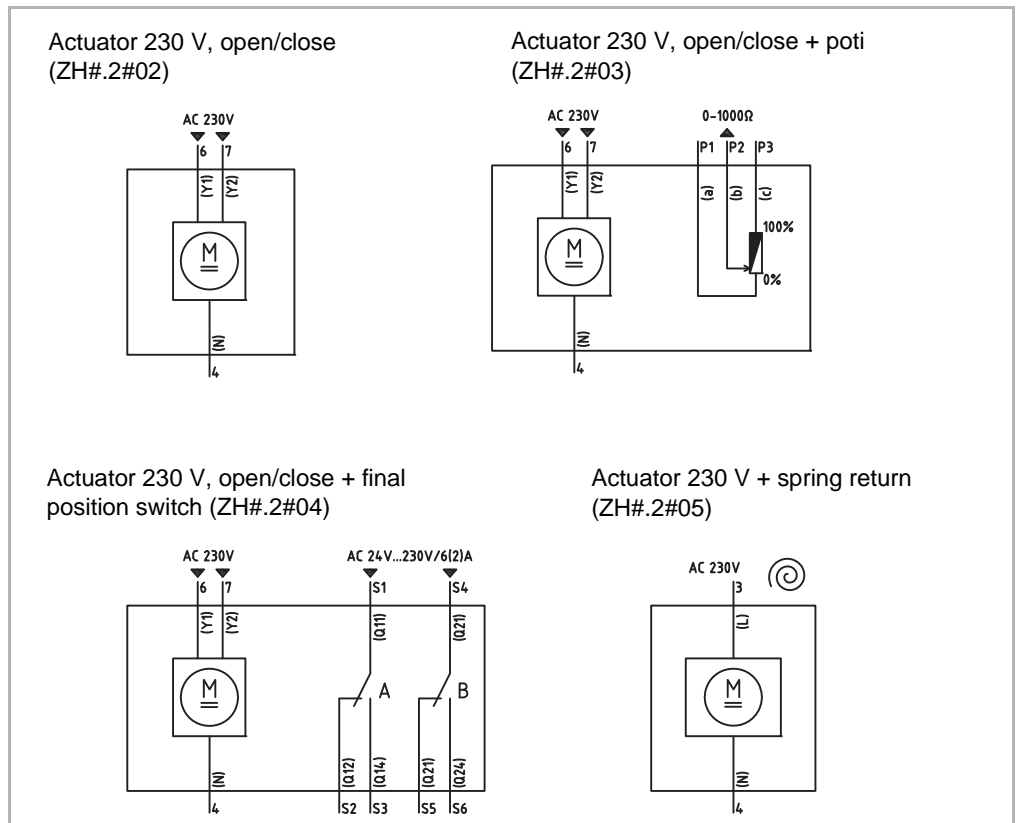


Fig. 5-6: Connection for actuator

5.6 Connecting actuator for secondary air louvre (D, W)

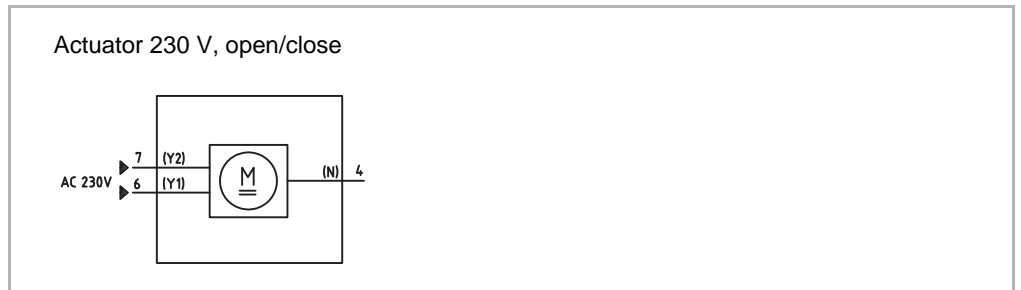


Fig. 5-7: Connection for actuator

5.7 Connection for differential pressure switch



Fig. 5-8: Connection for differential pressure switch

5.8 OSHE control cabinet

Control cabinets incorporate all fuses, MCBs and contactors that are required for unit regulation and protection. The speed selection switch is used to determine the required fan speed (low or high). Heating stages 1, 2 or 3 are selected using a control switch for heating. Activation and deactivation is performed using a room thermostat that must be connected separately. In addition, the release can be performed using an external control signal.

Protection class: IP 44 (IP 20 after open)

Operating temperature: -5 °C to +40 °C

In order to prevent overheating of unit following deactivation, the fan is switched off with a delay with consideration of preset fan overrun time.

Motor monitoring is performed via an integrated regulation of thermal contacts.

With the control response of the first safety thermostat deactivation and activation is performed automatically, with the control response of the second safety thermostat the heater bank is isolated and blocked. At the same time a fault is signalled via a lamp. Unit can only be operated after relevant troubleshooting has been carried out.

Depending on the scope of supply, control cabinets can be equipped with different additional functions.

Function „Z“

Regulation of secondary air louvre. Control switch open/0/close is used to move the louvre into any required position.

Function „K“

Regulation of mixing air dampers. Control switch open/0/close is used to move the mixing air damper into any required position.

Function "F"

Filter lamp. Filter contamination is signalled.

Depending on the scope, dimensions of control cabinets amount to 400 x 500 x 150 mm or 500 x 600 x 155 mm. Mounting drill holes for wall mounting are made on the rear side of the control cabinet.



HAZARDOUS VOLTAGE!

Start-up and deactivation of the unit as well as opening of control cabinet may only be performed by qualified and authorised staff. After hardware installation and wiring an acceptance report must be completed.

Control cabinets of the OSHE series must not be operated if such hardware has been mechanically damaged!



NOTE!

Assembly and installation must only be carried out by qualified and authorised staff. The OSHE control cabinet is mounted on a stable platform and secured using openings on the rear panel and relevant fixing material which is not included in the scope of supply. After installation the fixing screws must be sealed using enclosed caps. Electrical connection of the OSHE control cabinet and the MultiMAXX HE unit must be performed in conformity with the enclosed wiring diagram. Unused cable entry points must be closed and sealed. Control cabinet must be supplied using an external fuse and all-pole main switch.

Before commissioning all functions of the MultiMAXX HE electric unit heater and OSHE control cabinet must be checked.

5.8.1 Connection diagram for MultiMAXX HE 400 V (model size 1) and OSHE 12 - ZKF

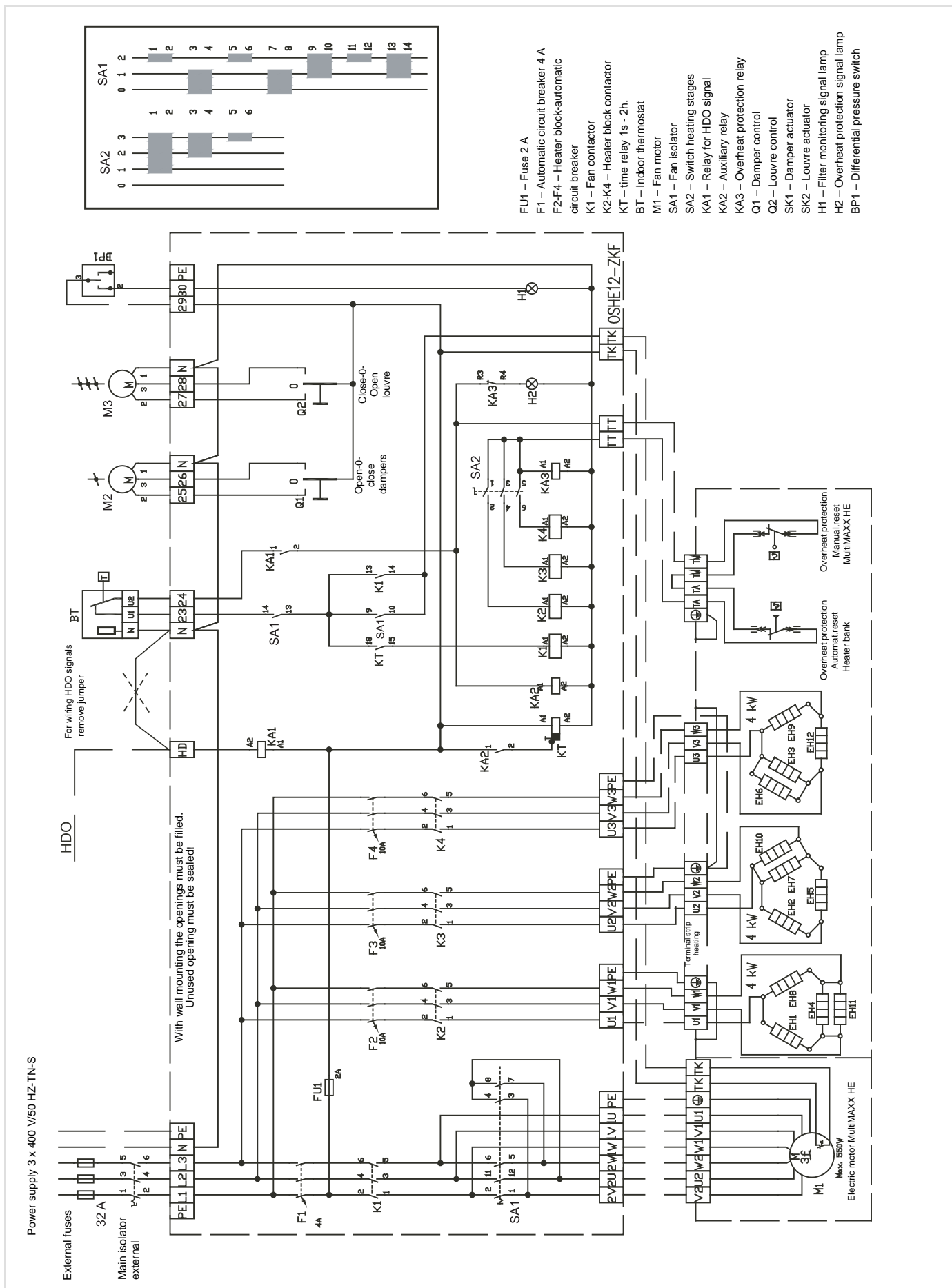


Fig. 5-9: Connection diagram

5.8.3 Connection diagram for MultiMAXX HE 400 V (model size 4) and OSHE 42 - ZKF

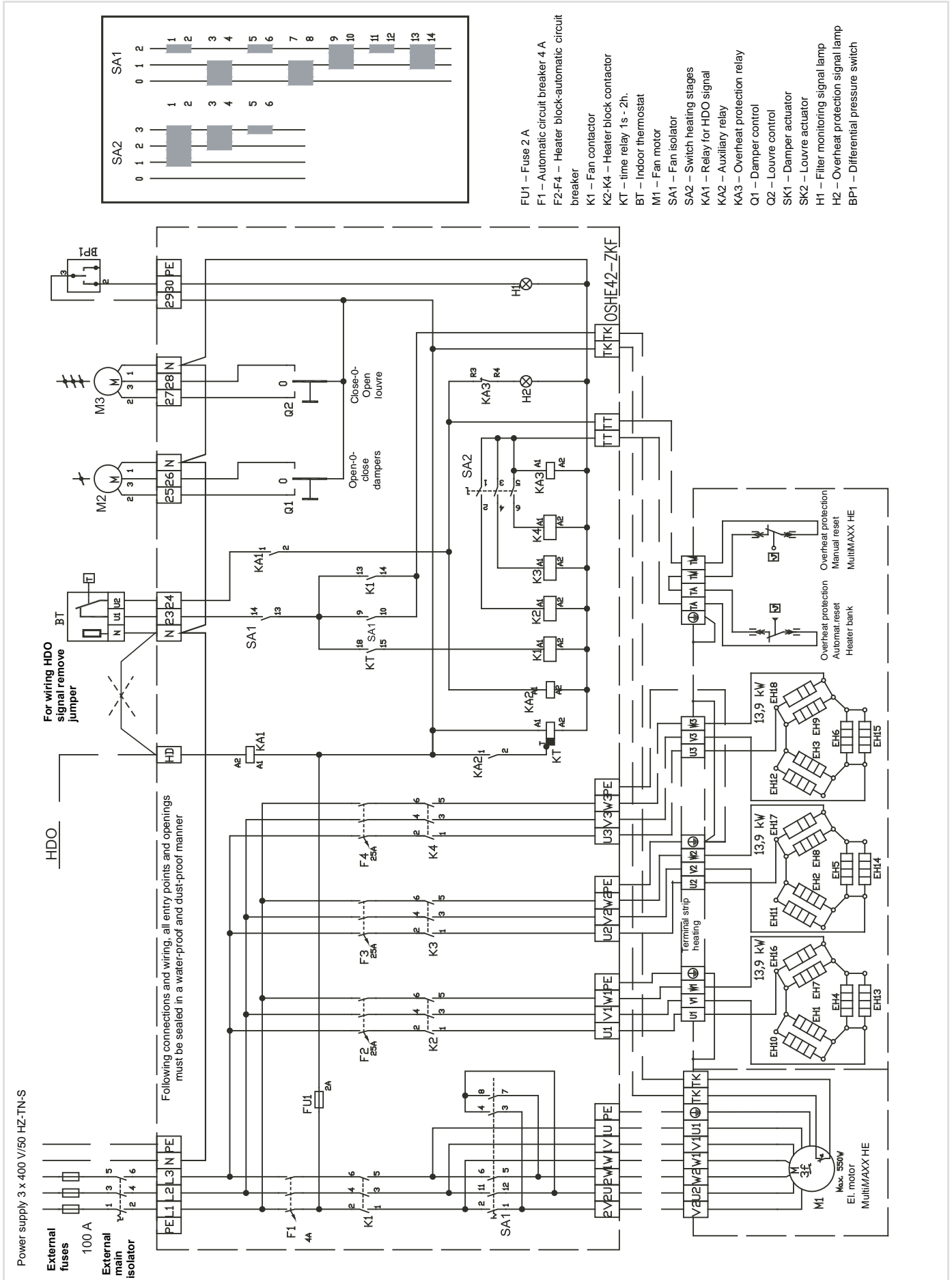


Fig. 5-11: Connection diagram

5.8.4 Connection diagram for MultiMAXX HE 500 V (motor V, size 2)

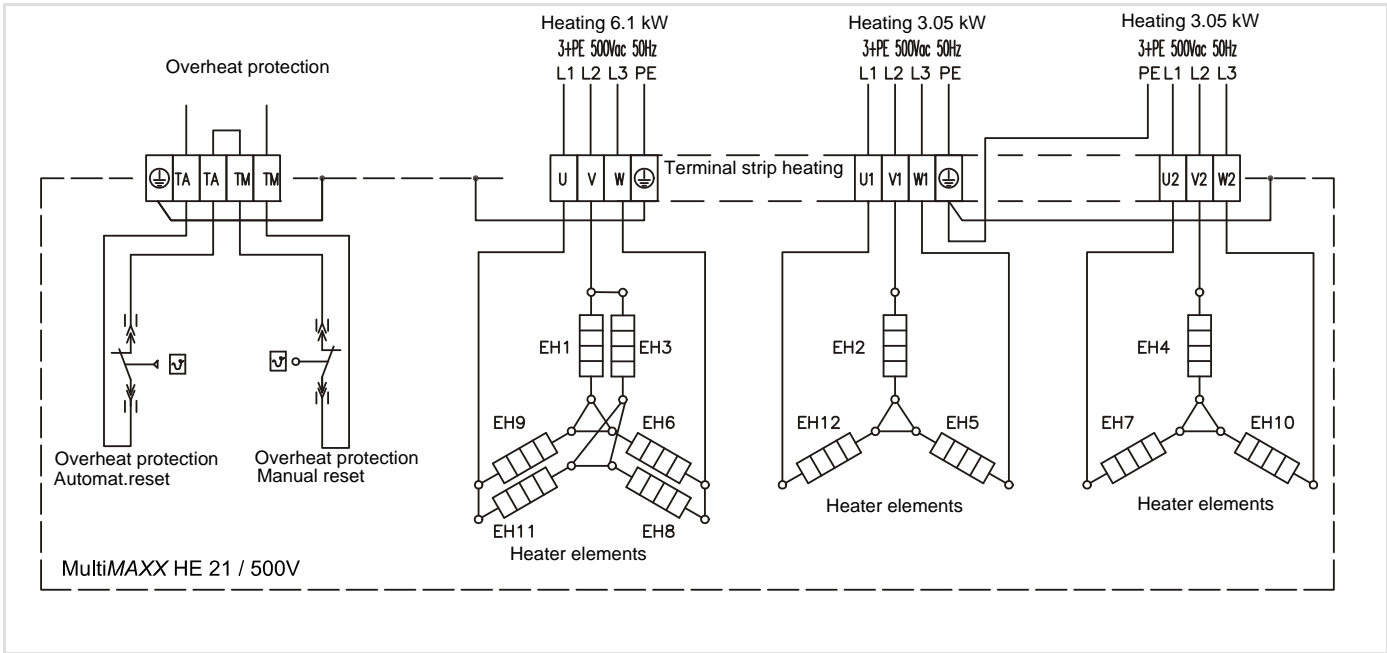


Fig. 5-12: Connection diagram



NOTE!

Connection diagram for heater bank.

For motor connection refer to fig. 5-5 on page 24.

Regulation must be provided by others on site or can be ordered separately with a special control cabinet.

6 Commissioning and Operation



HAZARDOUS VOLTAGE!

Before performing any work on the electric unit heater, ensure that the unit is isolated.

Ensure that the unit is isolated and secured against being energised at an appropriate point of the on-site power supply. Connecting the unit to the mains voltage including all necessary control lines must only be performed by qualified and certified staff.



BURN HAZARD!

Prior to performing any work on the heater bank, ensure the unit is de-energised and proceed only after the heater bank has cooled down.



DANGER OF ROTATING FANS!

Rotating fan wheel poses a risk of injury!

Before performing any work on the unit, ensure that it is isolated.

Ensure that the unit is isolated and secured against being energised at an appropriate point of the on-site power supply.

6.1 Safety check



NOTE!

Unit start-up and safety check must only be performed by qualified and licensed staff.

6.1.1 Pre-commissioning checklist

- The entire system comprising unit heater has been installed both mechanically and electrically.
- The system and unit heater is de-energised and isolated.



NOTE!

Prior to commissioning ensure that

- unit discharge (heater bank)
- and filter are clean.

If necessary, these components must be cleaned or filter medium replaced.

6.1.2 Following pre-commissioning checks must be performed:

- Check that the unit heater is properly mounted.
- Check for proper wiring.

6.1.3 After commissioning:

- Close the terminal box.

6.2 Operation

The unit must only be operated by trained staff and all instructions specified in the current operation manual must be followed. Activation and deactivation of the unit heater is performed using a speed selection switch or a room thermostat or using a signal provided by an external regulation system.

If the unit heater is equipped with mixing air module, the rate of outside and recirculating air is either set manually by using a lever or an actuator, depending on the configuration of the mixing air module.



NOTE!

Free air passage must be provided, do not obstruct air flow.
Hot spots or heat pockets must be avoided!

6.2.1 Regulation of mixed air module

Regulation of the actuator of the mixing air module is performed by a control switch in the OSHE control cabinet (with an additional function "K" or using regulation by others).

6.2.2 Secondary air louvre

The secondary air louvre of the unit heater directs conditioned air in the controlled space. The regulation of the secondary air louvre determines the optimal discharge angle for air flow (fan speed) under current temperature conditions. The occupation zone can be air conditioned in a draught-free way, at the same time formation of indoor temperature layers can be prevented to a large extent.

- Secondary air louvres can be operated manually (refer to Fig. 6-1) or can be fitted with an actuator to be wired to a control switch in the OSHE control cabinet.

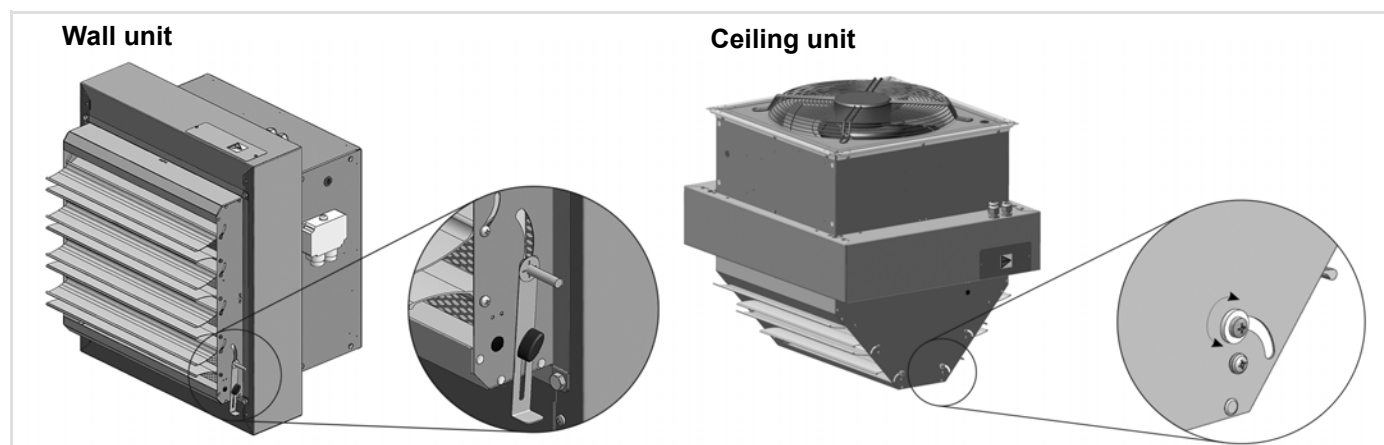


Fig. 6-1: Manual operation

6.2.3 Differential pressure switch for filter

The contact of the differential pressure switch closes if the pre-set pressure value is exceeded. This message is indicated by a signal lamp in the OSHE control box (configuration "F"). In this case the filter insert should be serviced or replaced.

6.3 Deactivating unit

Set the speed selection switch of the control box to "0" position or use the fan isolator.

7 Servicing and Maintenance

7.1 Servicing and cleaning



HAZARDOUS VOLTAGE!

Disconnect all electric power and ensure the power cannot be inadvertently energised, earth, short-circuit and block off all neighbouring live parts. Non-compliance can lead to death or serious injury.

Cleaning must only be carried out after the unit has been de-energised and isolated.



DANGER – SHARP CUTTING EDGES!

When cleaning the unit special attention should be given to thin fins of heater bank in order to prevent injury.

- Compressed air can be used to clean a dirty heat exchanger. Ensure that the fins are not damaged when cleaning the heater bank.

7.2 Maintenance



HAZARDOUS VOLTAGE!

Disconnect all electric power and ensure the power cannot be inadvertently energised, earth, short-circuit and block off all neighbouring live parts. Non-compliance can lead to death or serious injury.



DANGER OF ROTATING FANS!

Rotating fan wheel poses a risk of injury! Before performing any work on the unit, ensure that it is isolated. Ensure that the unit is isolated and secured against being energised at an appropriate point of the on-site power supply. Wait until the fans have come to a standstill before starting maintenance and repair work.



DANGER OF HOT SURFACES!

Wait until the heater bank of the electric unit heater has cooled down, hot surfaces can result in burns and scalding.

The **maintenance** of the unit may **only be carried out by FläktGroup Service or a specialist company**. During maintenance work all safety-relevant codes and practices must be observed. It is recommended to conclude a maintenance contact with a service company.

Maintenance of the electric unit heater must be carried out in form of inspections at regular intervals and troubleshooting of possible malfunctions.

It is recommended to inspect the unit every year before the beginning of the heating season.

Maintenance must only be performed if the electric unit heater is isolated from the mains by authorized and trained staff.

- Inspection **must also comprise function testing of the fan and heater bank**.
- Remove possible dirt and deposits on the heater bank.
- Make sure that the impeller is not obstructed and rotating freely while maintaining equal distance to the inlet nozzle.

Overview of regular maintenance intervals

The following maintenance intervals must be observed within the specified periods.

Components	Maintenance intervals		
	Quarterly	Twice a year	Annually
Checking air filter* (dirt, damage, odour)	x		
Checking air intake openings / grilles*		x	
Checking air discharge openings / grilles*		x	
Checking fans or fan sections*		x	
Checking electrical connections			x
Checking earthing			x

* If necessary, clean and remove foreign objects or replace

Tab. 7-1: Regular maintenance

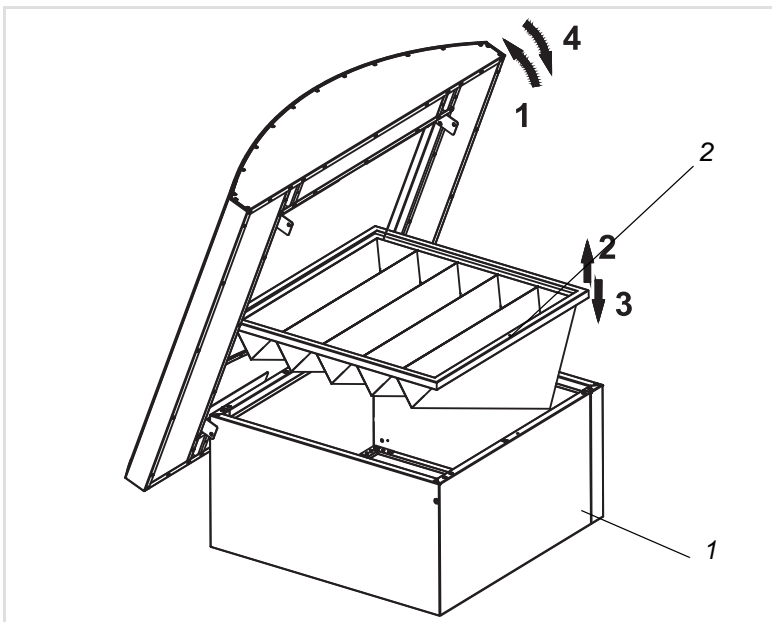
7.3 Quarterly maintenance

7.3.1 Filter replacement

In case of reduced air flow of the unit heater its filter should be inspected and, if necessary, replaced or cleaned.

If the filter assembly of the unit is fitted with a differential pressure switch, the relevant value must be set (not performed by the factory). A signal lamp on the OSHE control cabinet is used to indicate if the filter needs to be replaced.

Use the type code on page 3 for ordering a spare filter.



Pos. 1: Roof intake hood
Pos. 2: G2 or G4 bag filter

- Remove lateral screws and open the top section of the air intake hood.
- Remove and replace the bag filter
- Close the hood and tighten the screws

Fig. 7-1: Roof intake hood: ZHx.350x

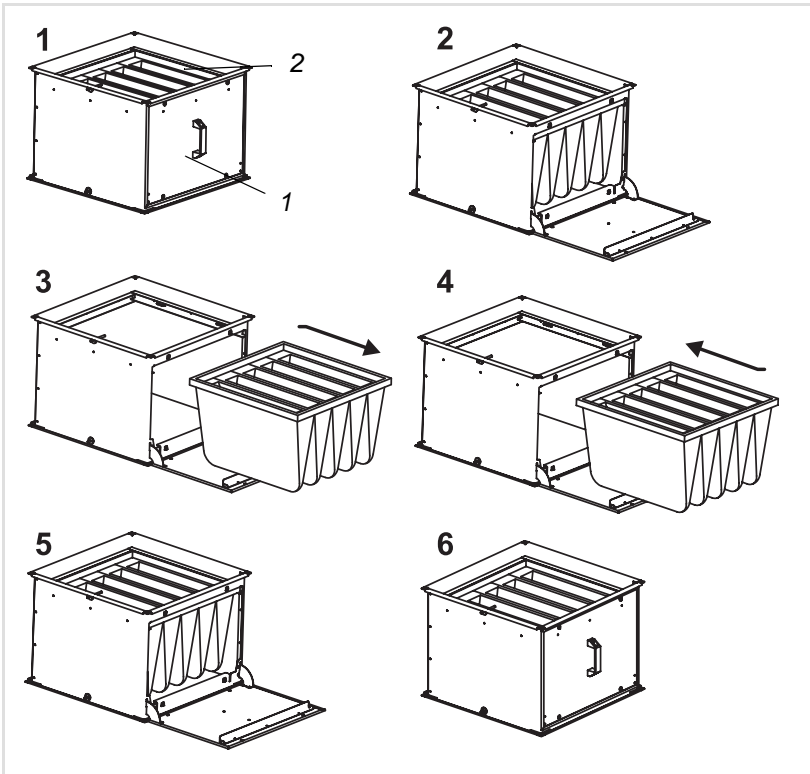


Fig. 7-2: Bag filter module: ZHx.360x

Pos. 1: Bag filter module
Pos. 2: G2 or G4 bag filter

- Loosen filter set by turning quick-action clamps by 90°.
- Pull out the filter assembly.
- Replace the filter insert.
- Close the filter assembly
- Lock by turning quick-action clamps by 90°

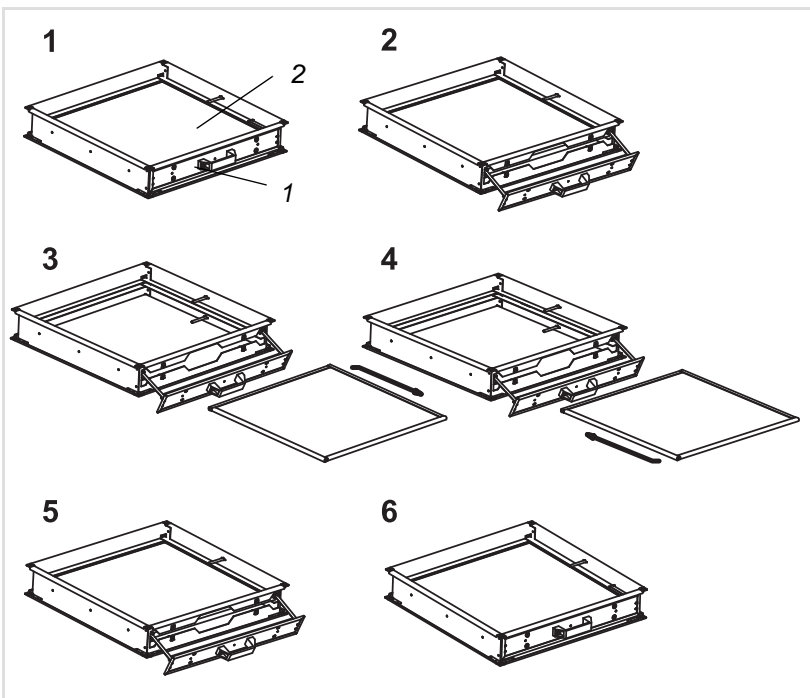


Fig. 7-3: Mat filter module: ZHx.370x

Pos. 1: Mat filter module
Pos. 2: G2, G3 or G4 filter insert

- Loosen filter set by turning quick-action clamps by 90°.
- Pull out the filter assembly.
- Replace the filter insert.
- Close the filter assembly
- Lock by turning quick-action clamps by 90°

7.4 Half-yearly maintenance

7.4.1 Checking fan

To be performed on all units:

- Check that the fan and fan motors are rotating freely.

7.4.2 Cleaning heater bank

If required, remove dirt from the heater bank. Clogged heater bank must be cleaned with compressed air. Ensure that the fins or other unit parts are not damaged.

7.5 Operating faults

Symptom	Possible cause	Action/remedy	
Fan is not rotating Signal LED does not light up	Unit not switched on	Switch on unit	
	No mains voltage	Check fuse/circuit breaker/power supply (technical personnel only)	
	Electric lines not connected	Connect electrical cables (technical personnel only)	
	Faulty unit fuses	Replace fuses (technical personnel only)	
	Controller deactivates fan after room temperature is reached	Use room thermostat to increase setpoint.	
Fan is not rotating, signal LED (error) lights up	Motor protection tripped	Check motor temperature, let the motor cool down and activate again* Investigate reason for overheating if the problem persists	
Fan running but air volume too low Air volume	Air flow blocked or restricted, Filter or heat exchanger dirty.	Ensure free air passage	
	Wrong rotation direction of fan	Change rotating direction of fan	
Unit too noisy	Air intake or discharge areas blocked versperrt	Clear discharge/air intake of obstructions or bends Verengungen und Umlenkungen	
	Noisy fan bearings	Replace faulty fan (technical personnel only)	
	Filter is dirty	Replace filter	
Unit does not heat/heats insufficiently	Fan fails to start	See above	
	Air flow rate of unit too low	Air intake or discharge areas blocked versperrt	
	Air intake or discharge areas blocked versperrt	Clear or clean ducts	
	Fan blocked/faulty	Check fan, replace if necessary (technical personnel only)	
	Filter is dirty	Replace filter	
	No mains voltage	Check fuse/circuit breaker/power supply (technical personnel only)	
	Automatic over-temperature thermostat deactivated the heater bank hat das Heizregister abgeschaltet	Let the heater bank cool down - then it will be activated automatically.	
	Automatic over-temperature thermostat did not activate the heater bank after cool- ing down period	Check over-temperature thermostat and replace if required. (technical personnel only)	
	Manual over-temperature thermostat de- activated the heater bank	Let the heater bank cool down, in cool state investigate the reason. Press „reset“ after performing troubleshooting.	
	Setpoint temperature on room thermostat too low	Use room thermostat to increase setpoint temperature	
	Room thermostat is located above a heat source or exposed to direct sunshine	Locate room thermostat in proper position (technical personnel only)	
	Faulty electric heater bank	Replace electric heater (only technical staff)	
	Controller switches on continuously	Control panel or sensor fitted in the wrong location (e.g. adjacent to open door or window or close to MultiMAXX outlet)	Fit control panel or sensor in proper location where room temperature can be measured representatively (technical personnel only)

* repeated activation after troubleshooting

* First set the speed selection switch to "0" position, then change to the required speed.

If the malfunction cannot be eliminated by the maintenance personnel, please consult our authorized service department.

8 Dismantling and Disposal



ENVIRONMENTAL DAMAGE!

Only qualified licensed staff must dismantle and dispose of the unit!

8.1 Dismantling

To dismantle the electric unit heater proceed as follows:



HAZARDOUS VOLTAGE!

When carrying out decommissioning and dismantling work on the unit, disconnect all power supply connections, ensure the power cannot be inadvertently energised and verify that electric lines have been disconnected. Earth and short-circuit them, and cover or otherwise isolate any neighbouring live parts. Non-compliance can lead to death or serious injury.

- Release the fixing to the wall or ceiling.



PERSONAL INJURY!

Secure the unit against slipping.

- ✓ The unit is ready for transporting.
- All relevant instructions regarding shipping and transportation specified on page 13 must be followed.

8.2 Disposal



RECYCLING!

An authorized appointed contractor specializing in waste processing must dispose of the unit or its individual components. entsprechender Befähigung durchführen. This technical services department must ensure that:

- the components are separated according to material types
- used operating materials are sorted and separated according to their respective properties.



ENVIRONMENTAL DAMAGE!

- Depending on the material type, dispose of all components and operating supply materials in an environmentally-friendly manner in accordance with the local codes, practices and relevant regulations.

EC DECLARATION OF CONFORMITY

pursuant to Directive 2006/42/EC of the European Parliament and of the Council
(original EC Declaration of Conformity)2018/066/5AA89878

Manufacturer:

FläktGroup Czech Republic a.s., Slovanská 781, 463 12 Liberec XXV - Vesec, Czech Republic;
ID No.: 46708375

Entity authorized to compile technical documentation:

FläktGroup Czech Republic a.s., Slovanská 781, 463 12 Liberec XXV - Vesec, Czech Republic;
ID No.: 46708375

Description and identification of machinery:

Electric heating units
SAHARA[®] MAXX / Multi MAXX[®]
Type designation HE##.#####.###

The electric heating units SAHARA[®] MAXX / Multi MAXX[®] type HE serve for the heating, ventilation or filtering of indoor or outdoor air. They are installed in industrial, warehouse, retail and exhibition premises. The electric heating units SAHARA[®] MAXX / Multi MAXX[®] type HE are suitable for mounting on walls or below ceilings. The electric heating units consist of a blower chamber, ZIEHL-ABEGG blower with a protective grid, a suction nozzle, heating battery guard, heating battery, protective grid, shutter, heating battery connection lid and a terminal board for the electric connection of the blower motor. It is possible to order accessories, i.e. filters, air mixing chambers, suction elements, outlet shutters, clips and consoles, or the OSHE control box with the relevant sensors.

Declaration:

The machinery complies with all relevant provisions of Directives 2006/42/EC, 2014/30/EU and 2014/35/EU.

List of harmonized standards applied in the conformity assessment:

EN ISO 14120:2015, EN ISO 3746:2010, EN ISO 11202:2010, EN ISO 13857:2008, EN ISO 12100:2010;
EN 60204-1:2006, EN 61000-6-2:2005

This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user

Issued at Liberec: 1.5.2018

Name, title: Ing. Eduard Horbal', chairman of the board



Signed

Year of manufacture:

EXCELLENCE *IN SOLUTIONS*

FläktGroup is the European market leader for smart and energy efficient Indoor Air and Critical Air solutions to support every application area. We offer our customers innovative technologies, high quality and outstanding performance supported by more than a century of accumulated industry experience. The widest product range in the market, and strong market presence in 65 countries worldwide, guarantee that we are always by your side, ready to deliver Excellence in Solutions.

PRODUCT FUNCTIONS BY FLÄKTGROUP

Air Treatment | Air Movement | Air Diffusion | Air Distribution | Air Filtration
Air Management | Air Conditioning & Heating | Controls | Service

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