



# Optigo FMS

Slim commercial air coolers

## Instruction manual

Product description	_____
Product labels	_____
Unpacking and lifting	_____
Installation	_____
Maintenance	_____
Spare parts	_____

ORIGINAL INSTRUCTIONS

31612497EN-04



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# 1 Important information

## 1.1 Disclaimer



This Instruction Manual applies to all Optigo FMS air cooler products. Manual must be carefully examined and instructions should be followed up at all times.

Alfa LU-VE does not accept liability for any damage resulting from failure to comply with or incomplete compliance with the instructions as given in the manuals and order-related documents. As the heat exchanger is supplied indirectly, the producer is not acquainted with its actual application.



## 1.2 Safety precautions



Do not modify the unit by removing any of the safety guards or by-passing any of the safety devices. All work on the equipment must be carried out by trained personnel.

For handling, installing and maintenance operations it is essential to comply as follows:

- Employ authorized personnel only.
- Wear protective gloves.
- Overhead loads: never stand or walk below the loads.



All on-site electrical connection are the responsibility of the installer. For electrical wiring operations it is essential to comply as follows:

- Employ authorized personnel only.
- Make sure the power line circuit is open.
- Installation of a main switch is mandatory and is the responsibility of the installer.
- The main switch on the general power panel is open and padlocked.
- The electrical supply is suitable for the equipment supplied.



For header/distributor connection operations it is essential to comply as follows:

- Employ authorized personnel only.
- Make sure the supply circuit is open (no pressure).
- When performing welding operations make sure the flame is not directed towards the equipment (insert a shield if required).

Hydraulic circuit shall comply as follows:

- Refrigerant, temperature and pressure must agree with the data on the product label of the relevant heat exchanger.
- The supplied heat exchanger is optimized for the refrigerants as stated in the data sheet or order documents. Please contact Alfa LU-VE before using any other refrigerants. The allowed maximum pressure (design pressure PS) is noted on the type plate. During production the heat exchanger was subjected to a strength test exceeding the design pressure PS. However, during normal use the design pressure PS may not be exceeded.
- Heat exchangers supplied by Alfa LU-VE are normally not equipped with a high-pressure cut out. The installer is responsible for fitting a high-pressure cut out on the system in which the heat exchanger is used.
- The heat exchanger shall not be blocked in. If the ambient temperature rises, the pressure could rise and exceed the design pressure.

## 1.3 Intended use

Air coolers are partly completed machinery according to Machine Directive 2006/42/EC (EU market) - The Supply of Machinery (Safety) Regulations 2008 (UK market) and are intended for incorporation in cooling systems. Declarations of Incorporation are available on [alfa.luvegroup.com](http://alfa.luvegroup.com).



The product is built according to the following standards and directives:

EU market	UK market
2014/68/EU Pressure Equipment Directive (PED)	Pressure Equipment (Safety) Regulations 2016 (PER)
EN 60204-1 Safety of Machinery - Electrical equipment of machines	The Electrical Equipment (Safety) Regulations 2016
2014/30/EU Electromagnetic Compatibility Directive	Electromagnetic Compatibility Regulations 2016
2014/35/EU Low Voltage Directive	The Electrical Equipment (Safety) Regulations 2016
Any applicable local or national legislation	

However it is forbidden to operate our equipment before the machine incorporating the products or making part thereof has been declared to be in conformity with the EC Machine Directive. It is not permitted to use the heat exchanger for any purpose other than the one it was designed for by Alfa LU-VE.

#### 1.4 Where to find product information

Detailed technical data for individual product models are available in order related documents, on the product label and in product data sheets. Comprehensive technical information for all Alfa LU-VE air heat exchanger products is available on-line on [alfa.luvegroup.com](http://alfa.luvegroup.com). This includes:

- Product manuals
- Instruction manuals
- Product leaflets & brochures
- Product data sheets (selection software)
- Dimensional drawings
- Certificates

Alfa LU-VE offers world-wide service and support. In case of any questions or uncertainty please contact your local Alfa LU-VE representative.















Contact addresses are available at [alfa.luvegroup.com](http://alfa.luvegroup.com).

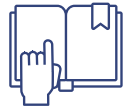


[alfa.luvegroup.com/fms](http://alfa.luvegroup.com/fms)

#### 1.5 Warning symbols

The following warning symbols are used in Alfa LU-VE instruction manuals.

	General warning. Risk of malfunctioning and/or damage.		Hot surfaces. Danger of burns. Wear adequate protection.
	Moving parts. Danger of injuries. Do not operate without protection guard mounted.		Sharp surface. Danger of cutting injuries. Wear adequate protection.
	Overhead load. Never stand or walk below the load.		Mandatory prescription. Follow instructions as provided.
	Forklift trucks or other logistic vehicles. Stay clear of working space.		Risk of injuries. Wear head protection.
	Electrically powered component. Switch off power supply before any maintenance or installation activity.		Risk of injuries. Wear safety footwear.
	Cold parts. Danger of frostbite injuries. Wear adequate protection.		Risk of injuries. Wear protective gloves.
	Danger of crushing. Wear adequate protection.		Manuals must be carefully examined and instructions should be followed up at all times.



### **1.6 Health and hygiene**

If the equipment is used in the food industry, responsibility with regard to hygienic conditions lies with the end user.

### **1.7 Checks at delivery**

At the moment of delivery, carefully check the units.

All finned coils are pressure tested with dry air, sealed and supplied with a slight overpressure. Prior to installation, the leak resistance must be checked with the schrader valve.

Any present damage must be reported on the delivery note with a description of the damage.

Damaged heat exchangers, including when the damage is not externally visible, are to be reported to the shipping agent and Alfa LU-VE within 24 hours.

### **1.8 Return of unused heat exchangers**

Air heat exchangers that have been delivered in accordance with orders are in principle not returnable. Heat exchangers can only be returned under certain conditions and following consultation with Alfa LU-VE. This applies exclusively to unused units. The heat exchangers that are to be returned should be delivered carriage paid to Alfa LU-VE in the original, undamaged and unwritten factory packaging. Not returnable are:

- Heat exchangers older than three months from the invoice date.
- Heat exchangers that have already been built in and/or are damaged.

### **1.9 Guarantee**

For our guarantee conditions, we refer to the Terms of Delivery. In general, the warranty period between Alfa LU-VE and the customer is 24 months from factory invoice date or 12 months of operation, whichever ever comes first. Heat exchangers must not be returned or disposed of, other than in accordance with instructions from Alfa LU-VE. Contact your local Alfa LU-VE representative before any remedial action is taken on the units, otherwise warranty may be void.

### **1.10 Disposal**

After decommissioning the heat exchanger coil should be emptied from refrigerant fluids. Avoid any emissions in the environment. Any refrigerants and oil residuals must be properly disposed of according to applicable environmental regulations. The fully emptied heat exchanger unit, including all electrical components, should be handed in to the proper authorized companies for recycling.

Alfa LU-VE products are made of:

- Plastic materials: polyethylene, ABS, rubber.
- Metallic materials: iron, stainless steel, copper, aluminium (possibly treated).

## 2 Product description

### 2.1 General information and application

Optigo FMS is a commercial slim air coolers line for general application in small to medium-sized cooling and freezing rooms. All FMS models are characterised by a low silhouette for the efficient use of cold room space.

- Refrigerants: HFC (FMSE) and CO<sub>2</sub> (FMSX)
- Capacity range (SC2 with R404): 1.9 up to 10.6 kW
- Air quantity: 920 up to 6,000 m<sup>3</sup>/h

Model	Refrigerant	Max working pressure
FMSE	HFC*	24 bar
FMSX	CO <sub>2</sub>	60/85 bar

\* Fluid group 2 according to EN 378

### 2.2 Standard configuration

- High efficiency coil manufactured from internally grooved Cu tubes and aluminium fins. Maximized performance thanks to the high capacity TURBOCOIL<sup>®</sup> heat exchanger manufactured with internally grooved tubes and TURBOFIN<sup>®</sup> fins.
- Standard fin spacing: 4.5 and 7.0 mm.
- Optigo FMS coolers are available with 1 to 4 fans fitted with AC/EC fan motors, blowing through the coil. Fan diameter 315 mm. Power supply 230/50-60/1. EC 2-speed fan motors, different noise levels. Protection class IP54 for EC motors, IP44 for AC motors.
- Casing: galvanized steel casing powder coated RAL 9003 and aluminium drip tray.
- Dismountable and openable casing for cleaning purposes. FMS units are provided with separated hinges for drip tray and fan plate opening.
- Plastic drain connection.
- Fan motors wired to connection box.
- Fitted with schröder valve on the suction connection for testing purposes. Each heat exchanger is leak tested with dry air and finally supplied with a dry air pre-charge.



## 2.3 Optional features

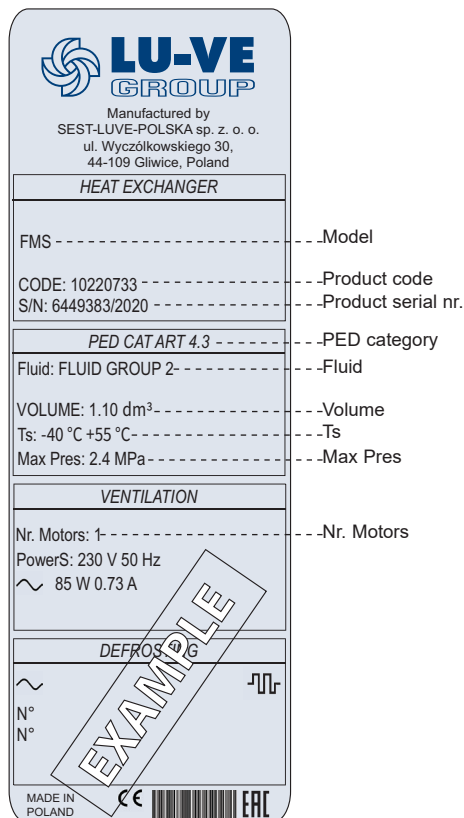
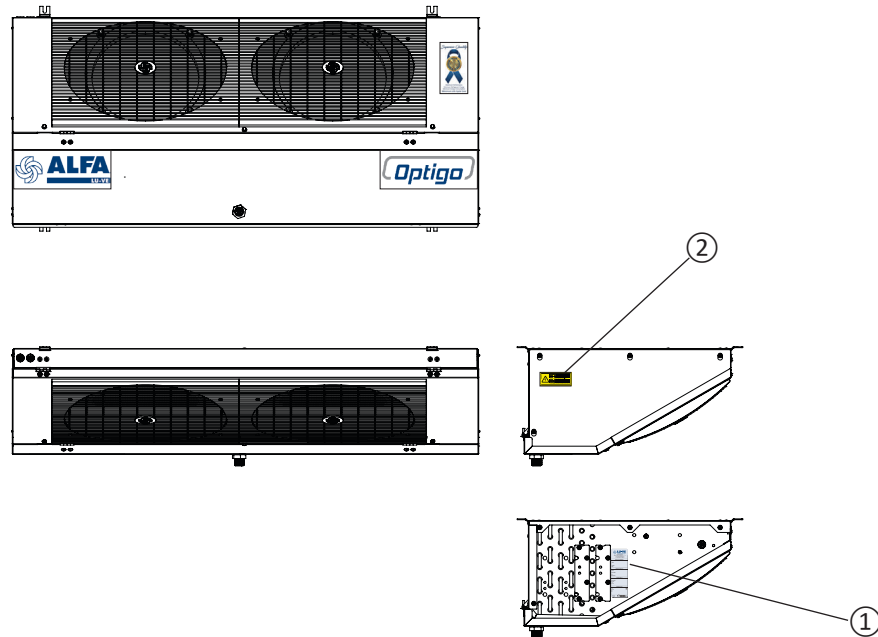
- Electric defrost (E)  
For cold rooms with room temperatures below 4 °C frost build-up is likely, the application of a defrosting system is recommended. The stainless steel defrost elements are connected to dedicated terminal box.
- Drip tray heater (HD)
- Heavy electric defrost kit (EH)  
Additional heaters for low temperature on air inlet side. Supplied as a separated kit for low temperature applications.
- Coil protection: pre-coated aluminium fins (AP)

## 2.4 Code description

FMS	31	E	A	-	1	4	-	4	E	-	AL	BO
1	2	3	4		5	6		7	8		9	10

- Optigo FMS slim commercial air cooler
- Fan diameter (31=315 mm)
- Refrigerant system (E=HFC, X=CO<sub>2</sub>)
- Fan motor type (A=AC, E=EC)
- Number of fans (1 to 4)
- Coil type (1, 2, 3, 4)
- Fin spacing (4=4.5 mm, 7.0 mm)
- Defrost system (N=air defrost, E=electric defrost, HD=drip tray heater, E+HD=electric defrost+drip tray heater)
- Fin material (AL=aluminium, AP=pre-painted aluminium)
- Packing (BO=box, BP=box + pallet, CR=crate)

### 3 Product labels



#### 1. Product label

This label is positioned inside the casing.

Model	Refer to paragraph "2.4 Code description"
Product code	Communicate these when ordering spare parts as they identify the unit
Product Serial nr.	
PED Category	According to PED
Fluid	Refrigerant
Volume	Coil Volume
Ts	Range of operating temperatures for the coil
Max Pres	Max working pressure
Nr Motors	Number of fans



#### 2. Electrical warning

Electrically powered component. Switch off power supply before any maintenance or installation activity.

## 4 Transport and storage

During transportation the heat exchanger must be handled with all required care. Any instruction or warning signs attached to the heat exchanger or the packaging must be followed. Avoid shocks or continuous vibrations during transport. These may cause damage to the product. If required, consult Alfa LU-VE and disassemble during transport any parts that are likely to be set into vibration. Air heat exchangers must be adequately fixed on the transport vehicle. If temporary storage of the heat exchanger is required, the following points should be observed:

- Store the heat exchanger in its packing, in a dry place with sufficient protection against sun and other environmental influences.
- Always place air heat exchangers on an even surface.
- Do not stack air heat exchangers unless explicitly indicated this is allowed.
- Storage temperature between -40 °C and +50 °C.
- Never open or remove the schrader valves. Overpressure in the coil must be maintained.

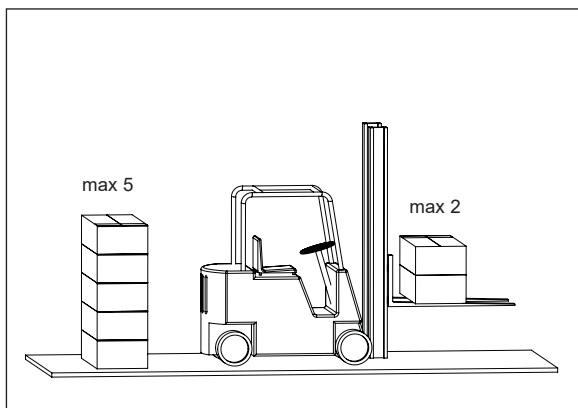
Shelf life of air coolers is one year. If longer storage periods occur, check:

- Proper functioning of the fan motor.
- Mounting brackets, lifting lugs and fan fixings for corrosion.

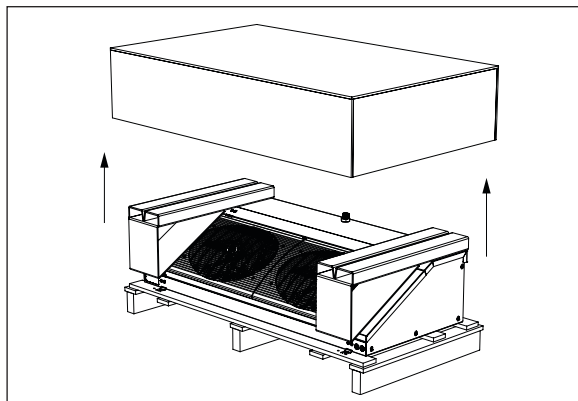
## 5 Unpacking and lifting



Optigo FMS air coolers are delivered in a reinforced cardboard box. Handling and positioning can take place manually. When more units are delivered in a single shipment, packed air coolers may be stacked during transportation.



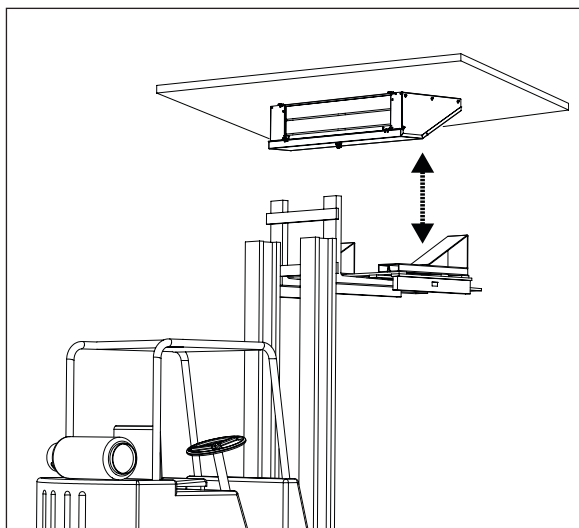
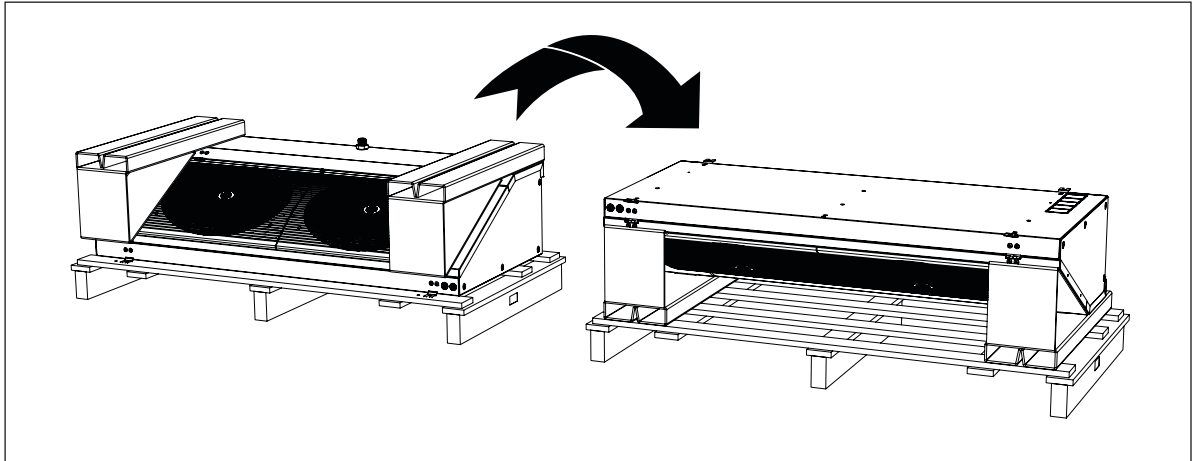
Respect the maximum number of stacked air cooler units.



Remove the cardboard box.

Place the unit on the ground. Unscrew the fixings from the original support pallet and manually turn the air cooler into mounting position on a second wooden pallet. Keep the packaging material in place to prevent the drip trays from damaging.

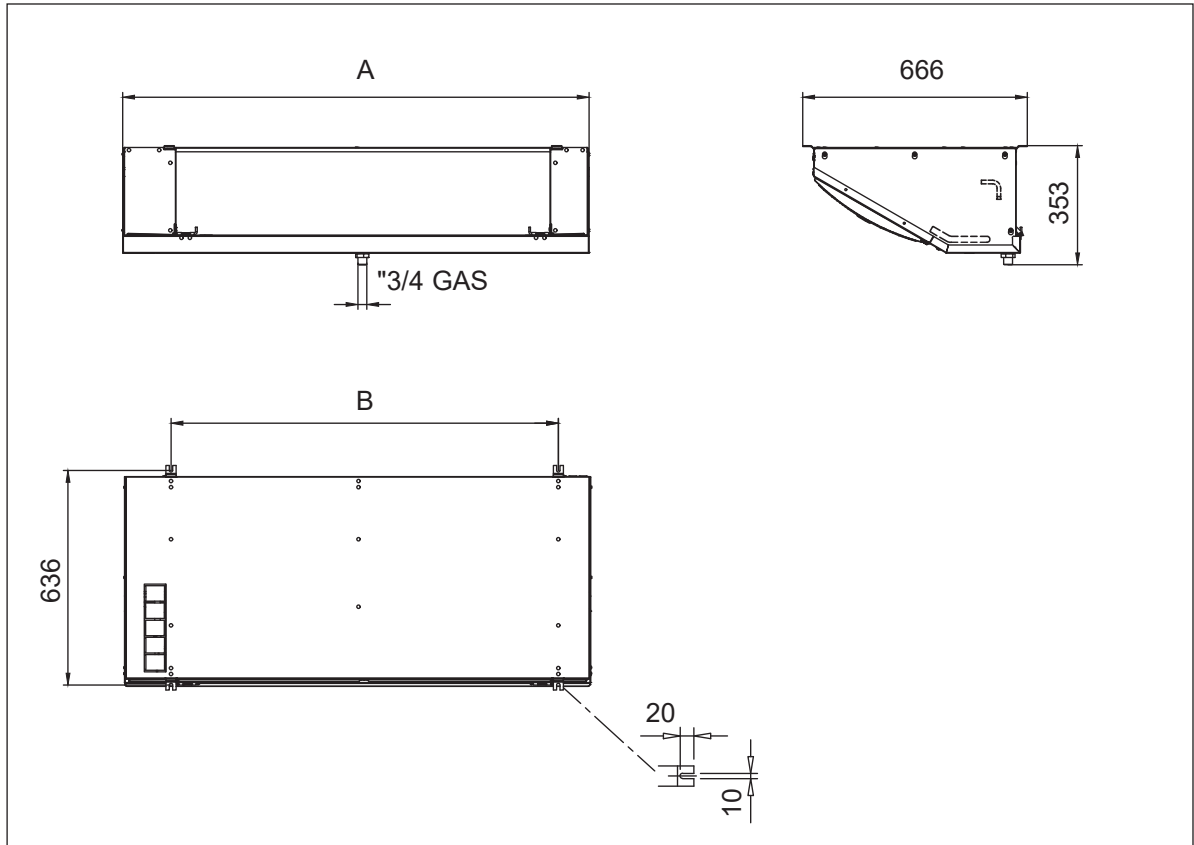
The cooler is now in mounting position.



Ensure that the cooler is not lifted directly onto the drip tray or the finned coil. Utilizing the proper wooden transport beams and/or pallets prevents the cooler bending at the extremes such that the cooling circuit or other components are damaged.

Lift the unit to mounting position and secure following instructions given in chapter "[6 Installation](#)". After having secured the cooler, the forks may be lowered and the remaining packaging materials can be removed.

## 6 Installation



Model	No. fans	Coil type	A (mm)	B (mm)
FMS31	1	1	826	592
FMS31	1	2	826	592
FMS31	1	3	1171	937
FMS31	1	4	1171	937
FMS31	2	1	1381	1147
FMS31	2	2	1381	1147
FMS31	3	1	1936	1702
FMS31	3	2	1936	1702
FMS31	4	1	2491	2257
FMS31	4	2	2491	2257

### 6.1 Mounting dimensions

Coolers must be hung such that the coolers can contract and expand somewhat. Cooler contraction occurs during refrigeration operation, and cooler expansion occurs during defrost. For air coolers with copper tubing this figure runs up to 1.65 mm per meter cooler length. All heat exchangers must be set up level. Weight information are listed on the product label and/or in the relevant product documentation.

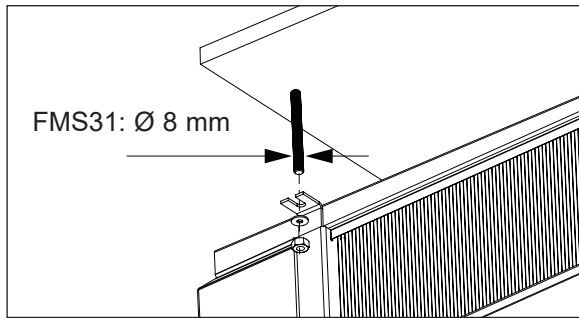
Detailed drawings showing all required mounting and refrigerant connection dimensions are available available for download on [alfa.luvegroup.com](http://alfa.luvegroup.com).



[Dimensional drawings](#)



## 6.2 Mounting bracket



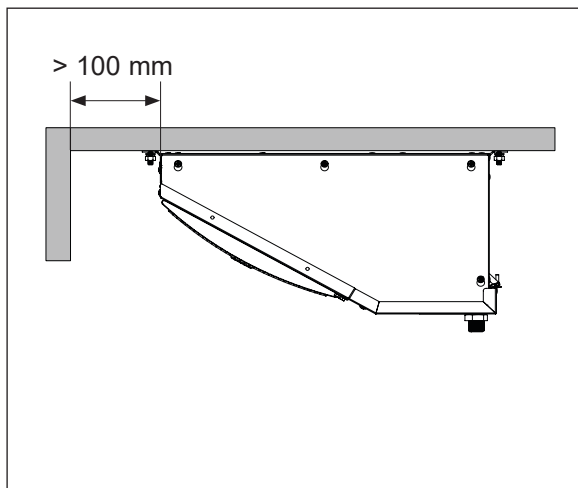
Use suitable studs when mounting the unit to the ceiling.

Fix the unit to cold room ceiling by securely tightening nuts and washers.

## 6.3 Location and technical spaces

Heat exchangers should be positioned such that the following criteria are met:

- Adequate space must be left on the air inlet side of the heat exchanger. The air discharge side should be free of restrictions. Recirculation of air is to be avoided.
- The heat exchangers should not be connected to ducting on either the air inlet side or discharge side, unless the heat exchanger has been specifically designed for such an application.
- Adequate distance from heat sources.
- Adequate distance from sources of radio or electromagnetic emissions.
- Adequate space and illumination must be left for maintenance operations and personnel.
- Installation area free from oils, vapours and flammable gases.
- Installation surface shall support the weight of the unit and minimize vibration transmission.
- Weight information and dimensions are listed on the product label and/or in the relevant product documentation.
- Do not obstruct passageways or doors.
- Coolers must be hung such that the coolers can contract and expand somewhat. Cooler contraction occurs during refrigeration operation, and cooler expansion occurs during defrost. For air coolers with copper tubing this figure runs up to 1.65 mm per meter cooler length. All heat exchangers must be set up level.
- Hazards, position of controls and switch must be correctly signalled. Controls and switch must be positioned so that they are easily accessible and manageable.

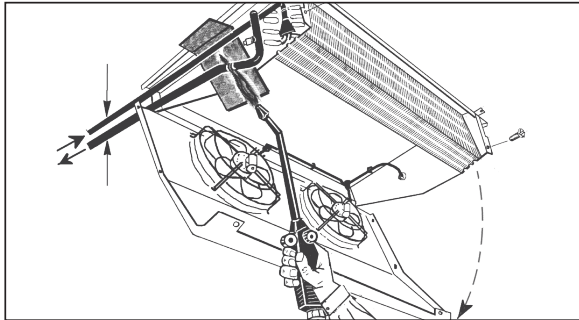


It is important to remember that the total amount of heat to be dissipated depends on receiving the full design air volume at the design entry air temperature which allows this air to be freely discharged after passing through the heat exchanger. Any restrictions may impair the performance of the cooler. If in doubt, please check with Alfa LU-VE.

#### 6.4 Refrigerant connections

Do not adapt headers position to the suction line.

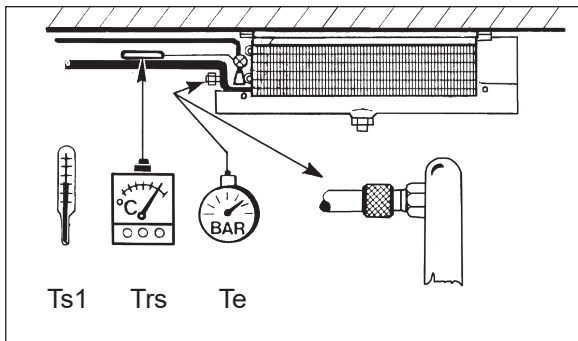
All pipework and connections must be made in accordance with good refrigeration design and installation practice. Ensure that no stresses are transmitted to the pipework. All pipework should be adequately attached to the walls/ceilings of the cold room and not only to the cooler itself. Pipework must be adequately supported to prevent vibration or external load on the cooler headers, etc.



Ensure the supply circuit is closed (no pressure) before connecting the suction lines.

Ensure the flame nozzle is not aimed at the equipment, when welding. Insert a protection shield if required.

#### 6.5 Pressure test



Ts1=cold room air inlet temperature.

Te=evaporating temperature. It is related to the refrigerant pressure on the unit cooler outlet.

Trs=refrigerant superheat temperature, on suction line near thermostatic valve bulb.

$(Trs - Te) = \text{superheat}$

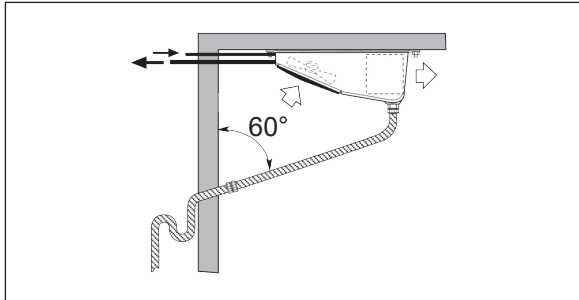
$(Trs - Te) \leq 0.7 \times (Ts1 - Te)$

Keep the superheat as low as possible to obtain maximum unit cooler performance.

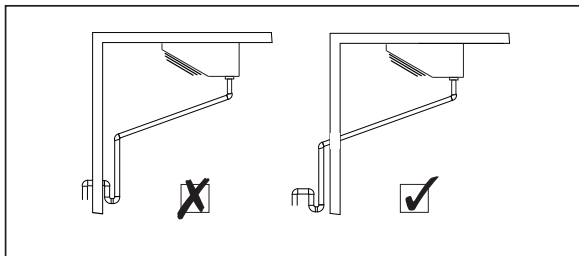
The thermostatic valve fitted must be correctly sized for the installation conditions and adjusted for correct system operation.

## 6.6 Drain line

Check all drain lines and drip trays to ensure that no improper material such as, e.g., packaging material blocks the drain.

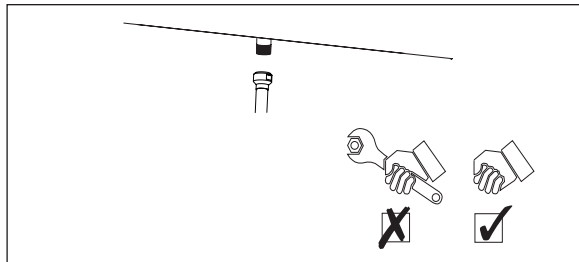


Connect the drain tubing to the drain connection.



The drain line diameter must be at least the size of the drip tray drain diameter and should be laid with an adequate slope. For room temperatures below 0 °C drain line insulation and defrosting are required.

A syphon must be installed on the drain line, outside the cold room.



Tighten drain connection by hand only.

## 6.7 Electrical connections



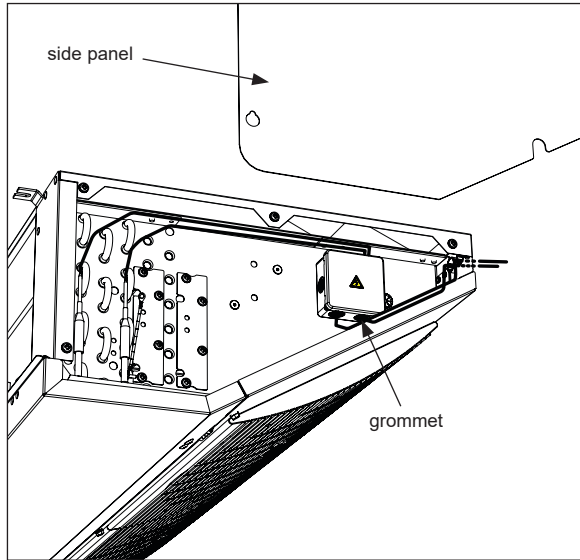
The heat exchanger shall be installed in conformance with the recognized national standards of electrical and refrigeration installation practice. The site supply voltage, frequency, accepted power rating and number of phases must comply with the details on the technical documentation. All electrical supply lines must be connected to the terminal boxes through suitable waterproof glands using bottom entry or, in case of horizontal installation, the cable is routed to form a water trap. Be sure to provide grounding incorrect grounding can cause electric shock.

If the heat exchangers are installed and there is to be an appreciable delay in putting the plant into operation, a temporary electrical supply should be connected to each motor, sufficient to run for at least 4 hours. This procedure should be carried out at least once every 4 weeks, until the heat exchanger is fully operational. It is up to the end user to verify the conditions for protection by automatic disconnection of supply, according to applicable standards. Heat exchangers are designed for TN power systems. The insulation fault protection must be part of power supply of the heat exchanger and is not supplied by the manufacturer.

The following data determine which connection diagram is to be selected and respected for electrical installation:

- Heat exchanger model indication
- Fan motor type
- Electrical options

When in doubt always contact your local supplier or Alfa LU-VE representative for assistance. Ensure complete electrical isolation before performing any wiring.



Remove the side panel. For FMS units follow the instructions as given in chapter ["7.6 Side panels opening"](#).

Insert the cables into the grommet and block them with their respective gland.

Connect terminals by following the wiring diagrams on the cover. When all connections are made refit the terminal block cover.

For systems using electrical defrost thermostat should be used, having a range of 10 °C to 20 °C with a sensor attached to the top return bends of the coil block or buried in the top of the coil block fins. Differential protections and circuit breakers are not included in the scope of supply.

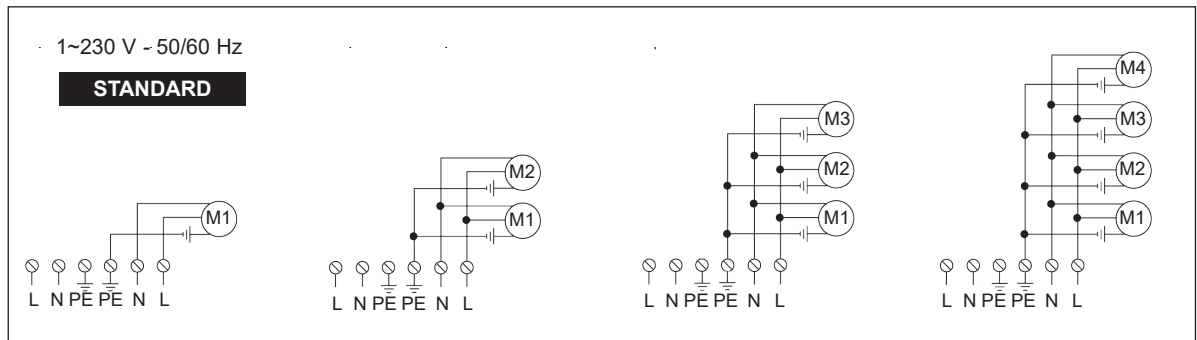
## 6.8 Power failure

In order to avoid damage to the compressor, the refrigerant supply must be closed in the event of power failure, e.g. by closing the magnetic valve. Safety measures elsewhere in the system will prevent the pressure in the heat exchanger from exceeding the design pressure.

## 6.9 Fan motors connections

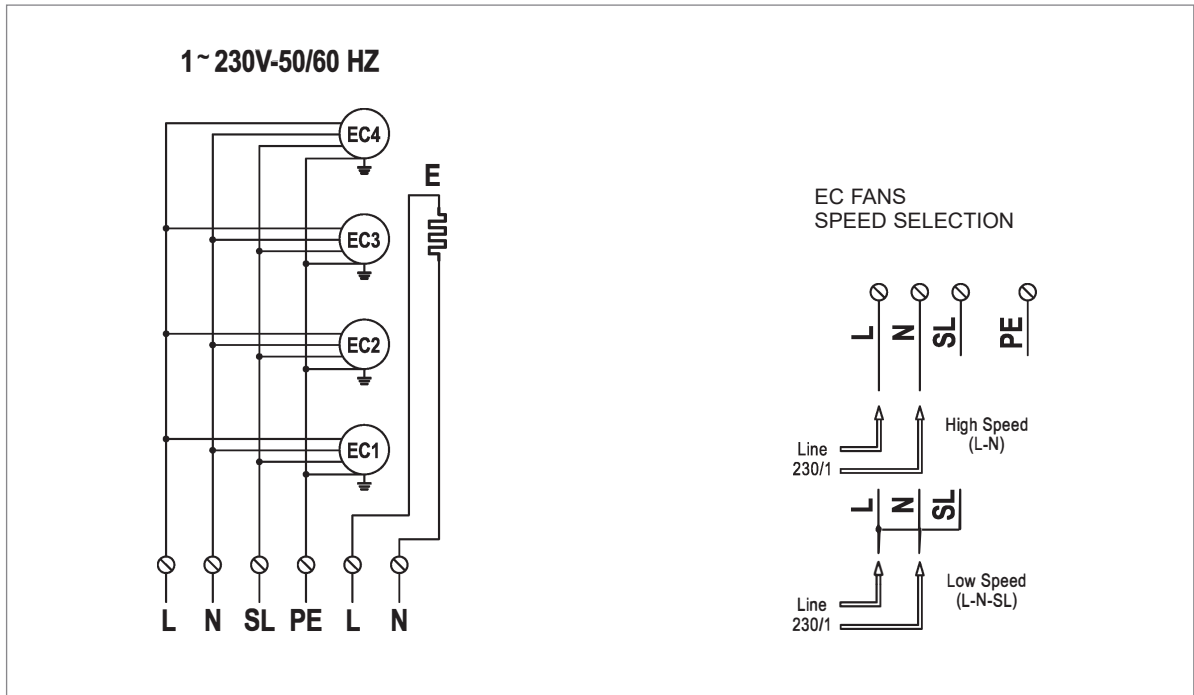


The maximum load of the motors and the recommended settings for the overload relays are to be respected. The electrical control circuit should be arranged with a manual reset device in order to prevent continuous on/off switching (tripping) of the motors. Suppliers and manufacturers of electrical motors provide no guarantee for motors that are combusted through overload. Ensure complete electrical isolation before performing any wiring.



Type	Power supply	Fans Ø (mm)	Motor power consumption
			x 1 fan
AC	1~230 V - 50/60 Hz	315	90/120 W 0.4/0.55 A

## EC motors (optional):



Type	Power supply	Fans Ø (mm)	rpm	Speed	Motor power consumption
					x 1 fan
EC	1~230 V - 50/60 Hz	315	950	low	28 W 0.26 A
EC	1~230 V - 50/60 Hz	315	1300	high	73 W 0.6 A

## 6.10 Defrost

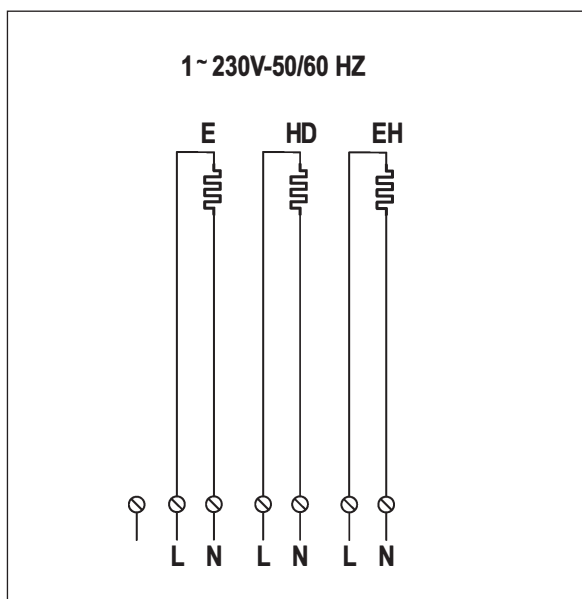


Always refer to the electrical scheme for both connections and nominal voltage of the electrical defrost option. Ground cable must always be wired and connected to the appropriate terminal in the connection box. Always refer to the electrical scheme order to identify the ground terminal. Installation of a switch for defrost line is mandatory and is the responsibility of the installer. Warning about the neutral wire: it must be connected if indicated in the electrical scheme. It must not be connected if it is not shown in the electrical scheme.

Coolers without defrosting facilities may not be used in room temperatures below +2 °C.

If the cooler is working on a time termination cycle, it is suggested that an initial defrost period be set at 35 to 45 minutes (in combination with the number of defrost periods). This setting is to be refined through trial and error, according to the actual defrost requirements depending on cooler model, size, and working conditions. If the defrosting cycle is terminated via a temperature sensor, close attention must be taken in positioning the thermostat sensor. The temperature sensor is usually set at a value between 10 °C and 15 °C. In general it should be positioned where the last traces of frost disappear, usually on the coil.

At room temperatures of around 0 °C the last frost is usually in the top of the coil block. At room temperatures below -20 °C, this is the consequence of the so-called 'chimney effect', usually in the lower half of the coil block at approx. ¼ of the fin height. Unfortunately a number of factors (cooler position relative to an access door or stored products, precise setting of the thermostatic expansion valve, etc.) may cause identical coolers to perform differently. Thermostat sensors should NOT be placed in the direct vicinity of a heater element. The final position of the temperature sensors must be determined through trial and error.



E=electric defrost  
HD=drip tray heater  
EH=heavy electric defrost

### 6.11 Electric defrost (E)

Model	No. fans	Coil type	E			
			no.	rows	V	W
FMS31	1	1	1	4	230	800
FMS31	1	2	1	6	230	1200
FMS31	1	3	1	4	230	1250
FMS31	1	4	1	6	230	1900
FMS31	2	1	1	4	230	1500
FMS31	2	2	1	6	230	2300
FMS31	3	1	1	4	230	2250
FMS31	3	2	1	6	230	3400
FMS31	4	1	1	4	230	3000
FMS31	4	2	1	6	230	4450

### 6.12 Drip tray heater (HD)

Model	No. fans	Coil type	HD		
			no.	V	W
FMS31	1	1	1	230	200
FMS31	1	2	1	230	200
FMS31	1	3	1	230	315
FMS31	1	4	1	230	315
FMS31	2	1	1	230	385
FMS31	2	2	1	230	385
FMS31	3	1	1	230	580
FMS31	3	2	1	230	580
FMS31	4	1	1	230	775
FMS31	4	2	1	230	775



### 6.13 Heavy defrost kit (EH)

Supplied as a separated kit for low temperature applications.

The kit includes a connection box suitable for wiring all defrost elements. Remove the connection box originally supplied with the unit, if any, and connect all the defrost wiring to the new one included in the kit.

For mounting procedure please refer to "[7.10 Heavy defrost kit \(EH\) mounting](#)".

Model	No. fans	Coil type	EH		
			no.	V	W
FMS31	1	1	1	230	450
FMS31	1	2	1	230	450
FMS31	1	3	1	230	670
FMS31	1	4	1	230	670
FMS31	2	1	1	230	800
FMS31	2	2	1	230	800
FMS31	3	1	1	230	1150
FMS31	3	2	1	230	1150
FMS31	4	1	1	230	1500
FMS31	4	2	1	230	1500



## 7 Maintenance

It is essential after delivery that adequate protection and inspection are carried out on the equipment. This is especially important if there is any delay in installing or commissioning the equipment. After commissioning and setting up the defrost systems, the heat exchanger will require maintenance. Regular checks and good maintenance will ensure trouble free operation. The frequency of checks will depend on site location and the specific operating conditions. Equipment installed in industrial or coastal areas, or in any kind of aggressive environment, generally requires more frequent inspections than the same equipment in rural, unpolluted areas. Damage can occur during site installation and during the period prior to commissioning. Inspections and remedial work should take place during this period. On sites where building work is in progress, it is strongly advised that finned block, headers and return bends are covered up to keep them clean and protected from damage until the time of commissioning.

Header and cooler tubes can be extremely cold! Take precautions when maintenance is carried out near the header and cooler tubes.

Ensure complete electrical isolation before performing any maintenance activity.

### 7.1 Shut down periods

Even during prolonged shut down periods, maintenance should be carried out. If the shut down period is extended, all electric motors should be run once every four weeks for a minimum of 4 hours. EC fans must be kept powered during shut down periods.

### 7.2 Moisture in the refrigeration system

Moisture in a refrigeration system is undesirable. Moisture can cause malfunctioning in the refrigeration operation. A lesser known problem is that small amounts of moisture in the refrigeration system can after a time cause leakage through the formation of frost clumps. These frost clumps are the result of moisture seeping from the refrigeration system during defrost, as water seeps into the soldering seams and then freezes, resulting in a volume increase. This process repeats itself during each freeze/defrost cycle, as a result of which the cavities (potholes) thus formed become steadily larger and ultimately burst, causing leakage.

### 7.3 Cleaning and disinfecting

A coil block should be kept clean to guarantee it works well. The user of the heat exchanger should ensure that the cleaning and disinfecting agents that are used do not have a corrosive effect on the materials used by Alfa LU-VE.

### 7.4 Casing

Casework checks should be carried out at least every 3 months. In doing so, inspect for any deterioration of coating and/or corrosion. If such flaws are noted, take immediately remedial action. Should any damage occur during installation, this should be repaired immediately to prevent further deterioration.

### 7.5 Coil and drip tray

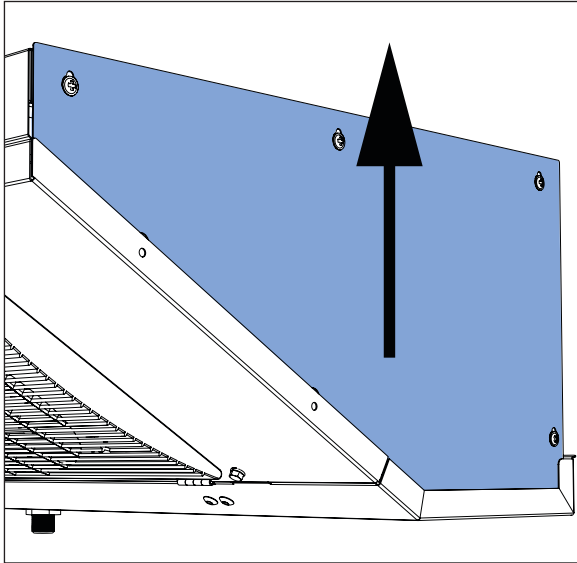
The heat exchanger coil should be checked at least every 3 months, with close inspection being carried out for such things as leaks or chafing of tubes. In addition, any unusual vibration of the fans should be checked. The unit should be cleaned as instructed when necessary using low pressure compressed air, and/or low pressure water hose or a mild detergent wash. Care must be taken not to hose directly onto fan motors or electric control panels or the electrical connection boxes of the heaters. It should be noted that abnormal atmospheric conditions can greatly harm the lifetime of the finned coil.

Please ensure the drip tray is empty before it is disassembled. The weight of any leftover water could injure the operator if the drip tray fell open accidentally.

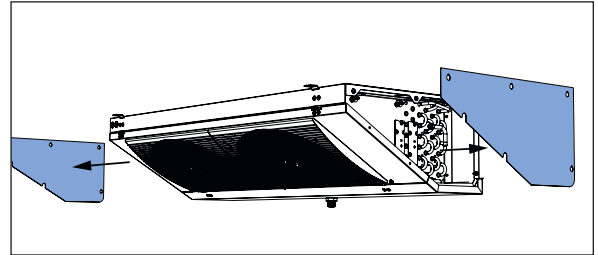
When opening/closing the drip tray, pay attention in order to avoid interference between impellers and fan collars.



## 7.6 Side panels opening

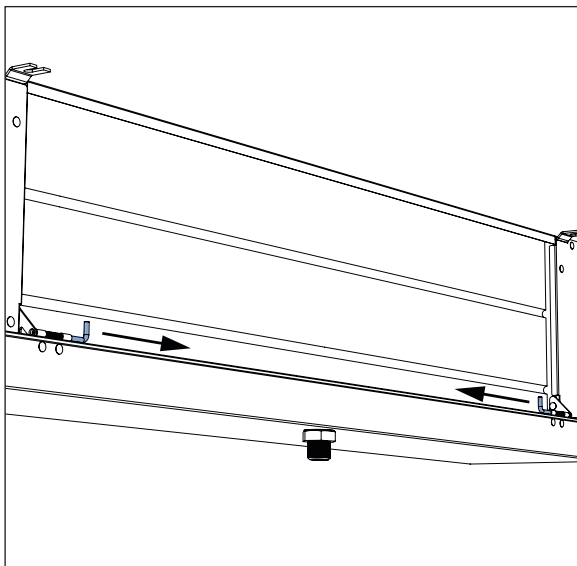


Loosen the screws and slide the panel to release it. Remove the panel.

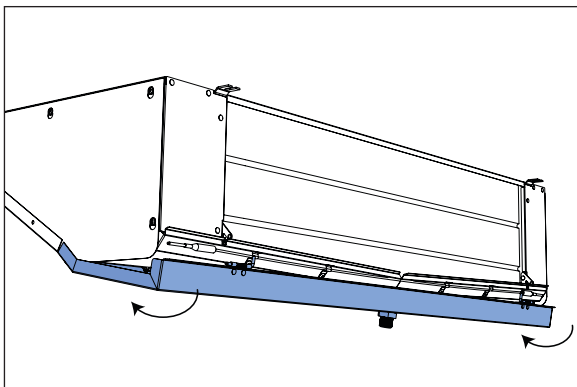


## 7.7 Drip tray and fan plate opening

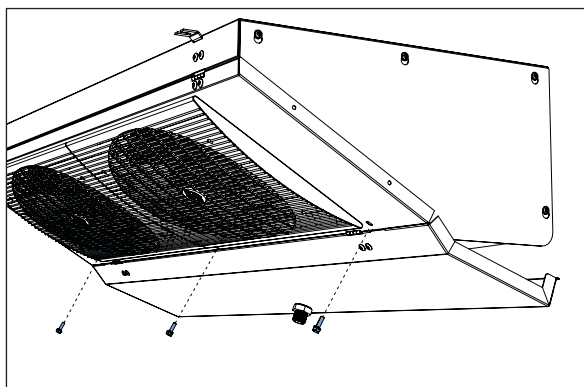
FMS units are provided with separated hinges for drip tray and fan plate opening.



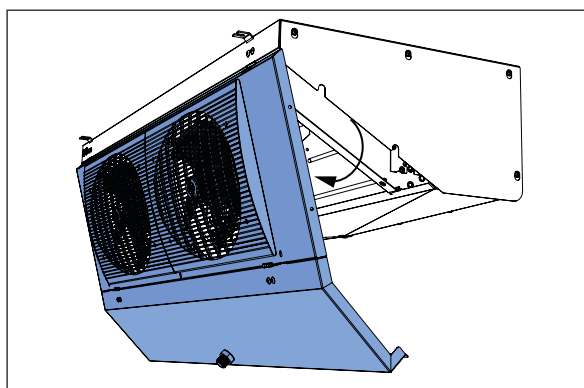
On the coil side, pull inward the spring release hinges.



Open the drip tray.



To open the fan plate, once the drip tray is unlocked, remove the screws on the fan side.



Open the fan plate.



## 7.8 Electric defrost (E) replacement

Before handling heater elements always:

- disconnect power supply
- ensure heaters are at ambient temperature.

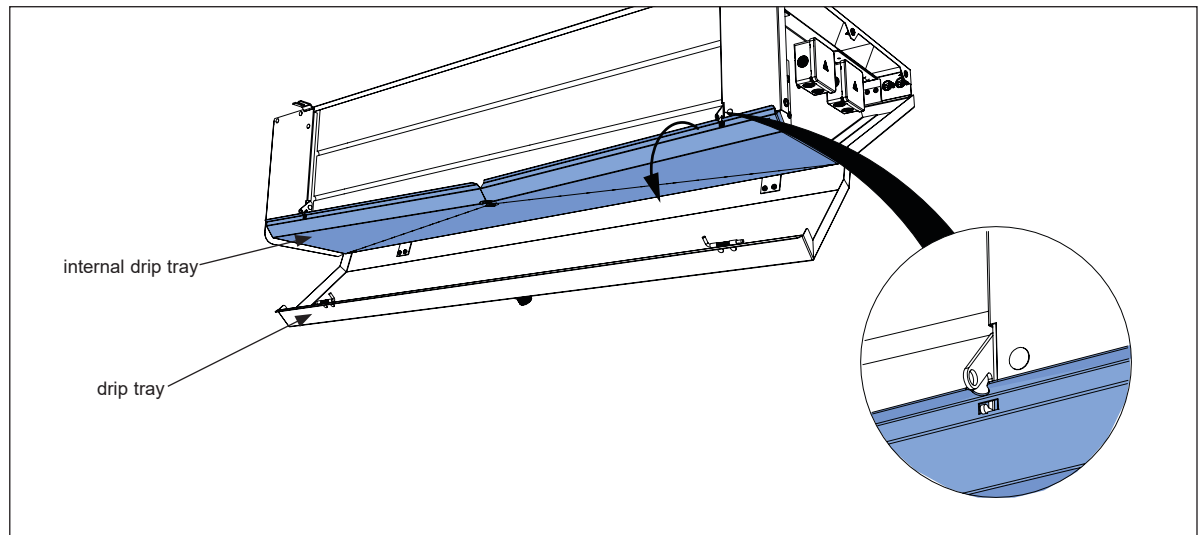


Disconnect the drain line.

Open the drip tray and side panels.



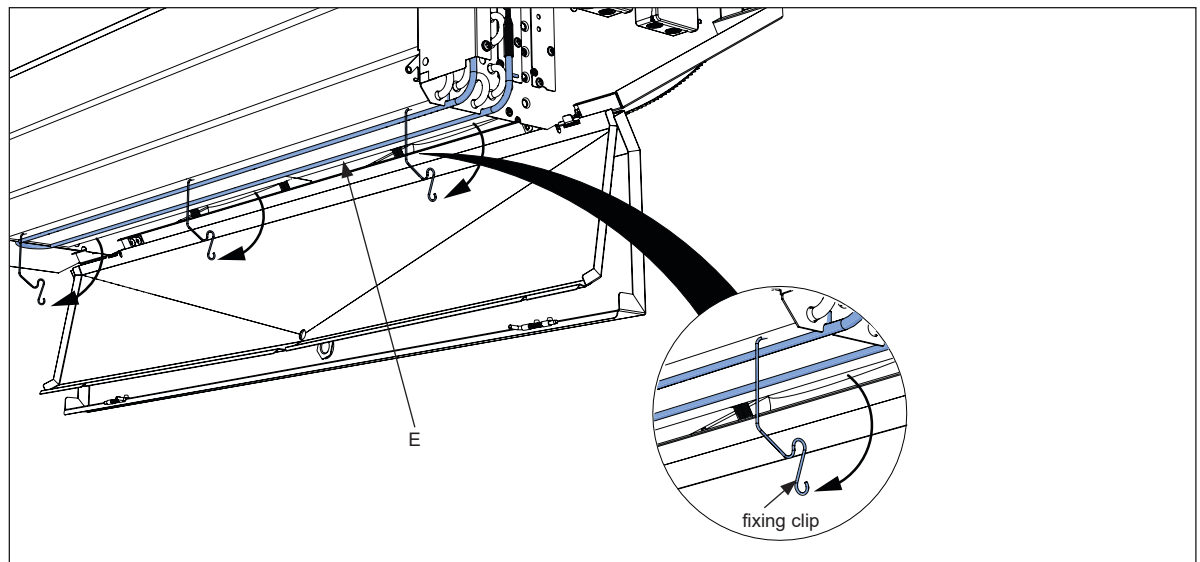
Unhook the internal drip tray.



Disconnect the heater elements from the connection box.

Remove the fixing clips and extract the electric defrost element (E).

Mount new element in reverse order, restore electrical connections and close the unit.





### 7.9 Drip tray heater (HD) replacement

Before handling heater elements always:

- disconnect power supply
- ensure heaters are at ambient temperature.



Disconnect the drain line.

Open the drip tray and side panels.



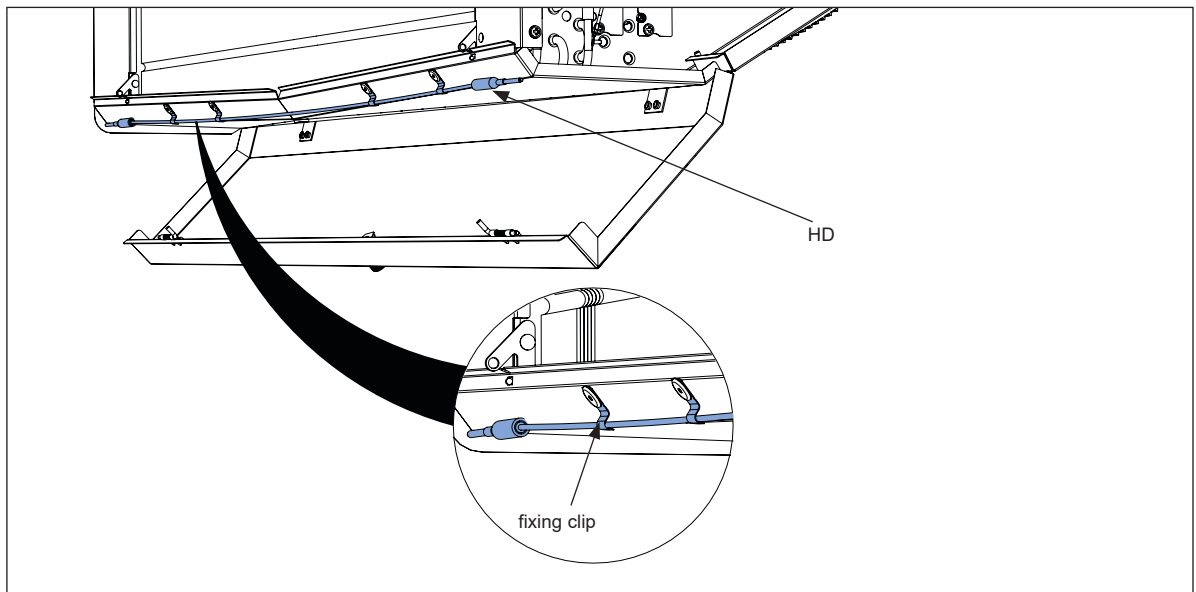
Disconnect HD element from connection box.

HD is fixed to the unit with fixing clips.

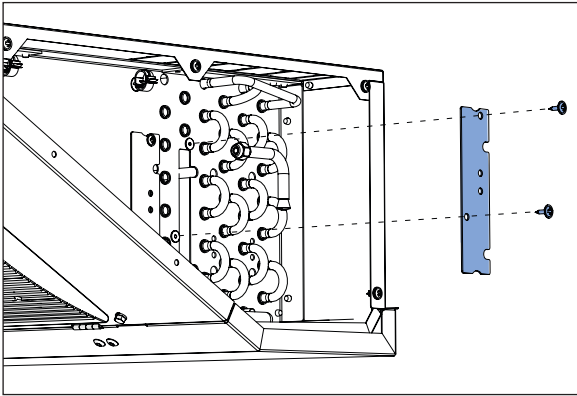
Extract HD element.



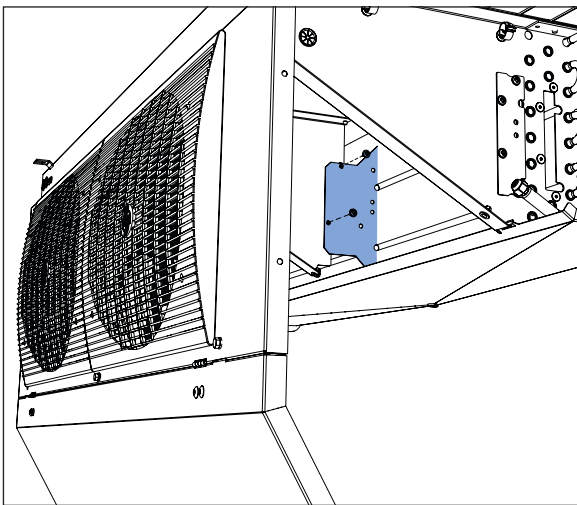
Mount new element in reverse order, close side panels and restore electrical connections.



## 7.10 Heavy defrost kit (EH) mounting



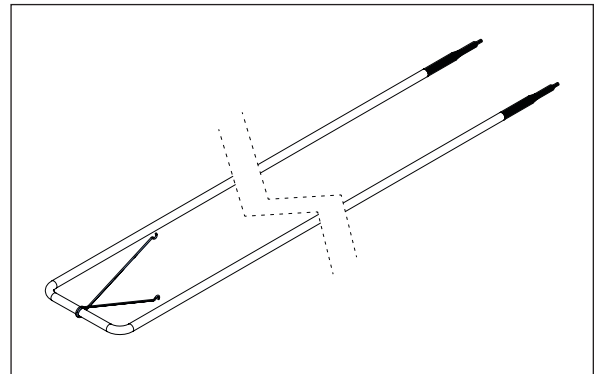
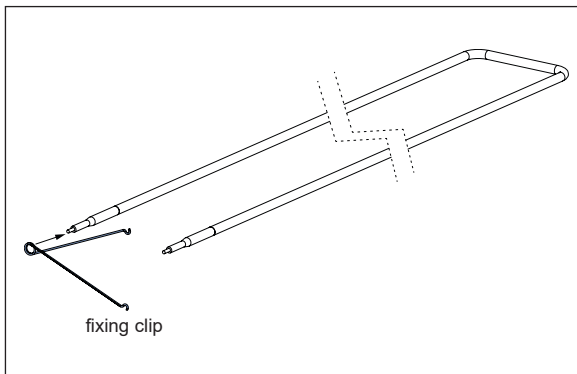
Remove the side panels.  
Remove the outer fixing plates by unscrewing the 2 self-tapping screws. Repeat the procedure on both sides.



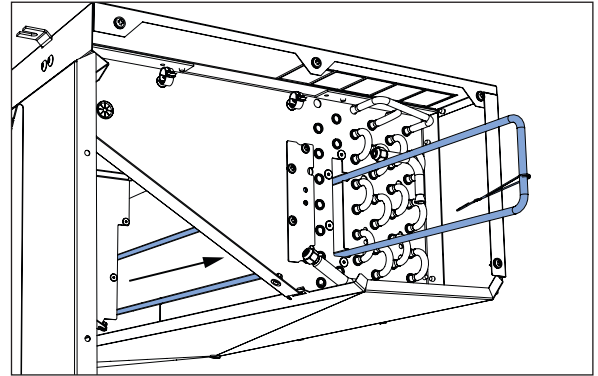
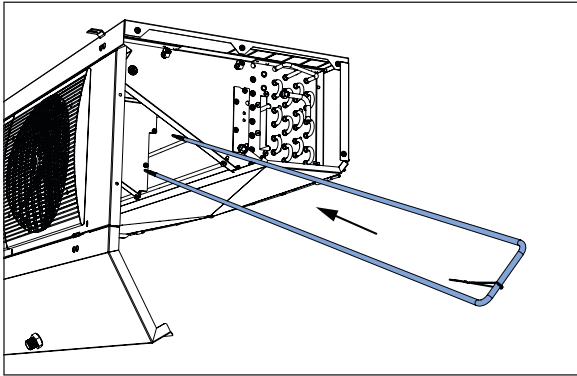
Open the drip tray.

For units with  $\geq 2$  fans, remove the internal fixing plates by unscrewing the 2 self-tapping screws each.

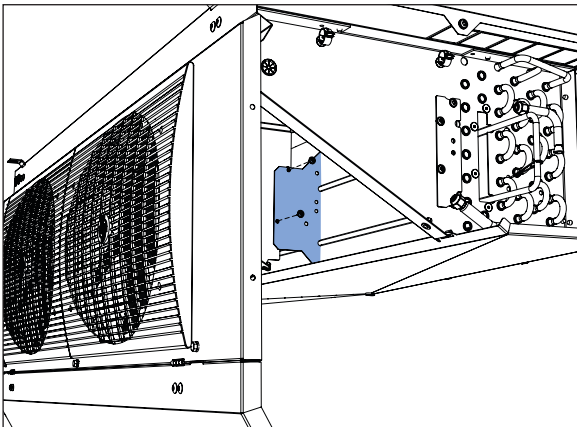
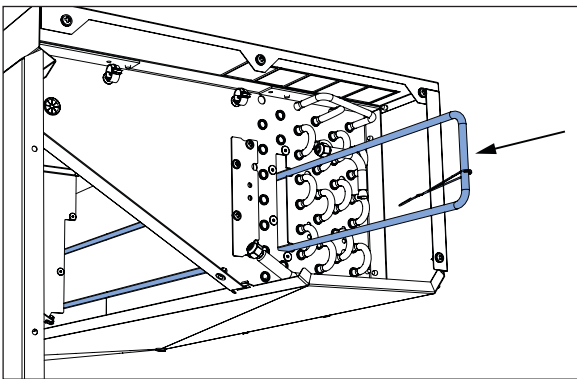
Insert the fixing clip on the heater.



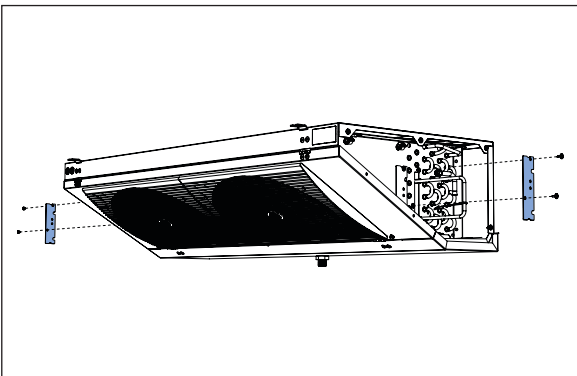
Place the heater by entering it through the bottom.



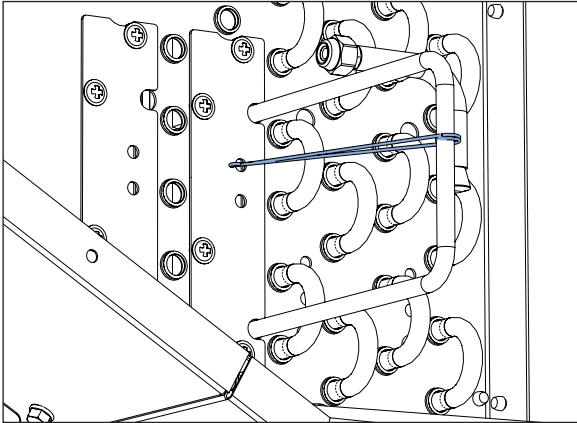
As an alternative, the heater can be inserted by the unit side only if there is adequate space to handle it.



Remount the internal fixing plates, if present, by screwing the 2 self-tapping screws.



On both sides, remount the outer fixing plates with 2 self-tapping screw each.



Use the fixing clip to fix the heater to the unit.

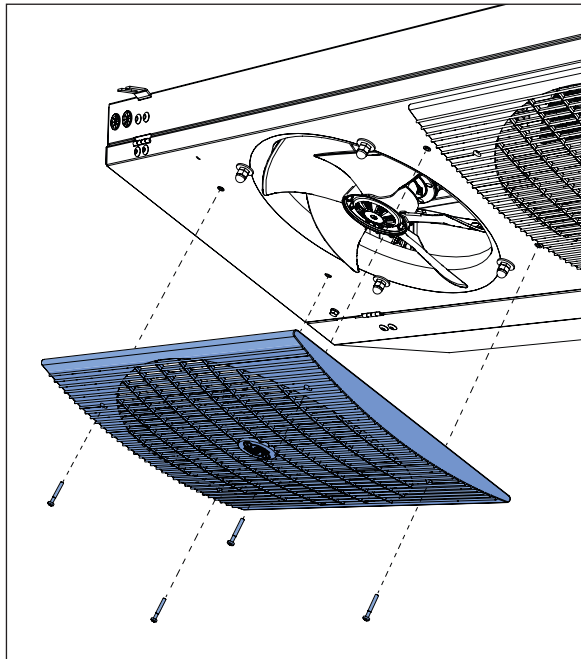
Remount the side panels in reverse order.

### 7.11 Fans

Fans should be checked 3 months after commissioning and thereafter depending on operating conditions and as experience dictates, for any dirt build-up and/or unusual vibration, which could ultimately cause damage to the fan or to the heat exchanger itself. Ensure complete electrical isolation before removing fan guards. Fan blades should also be checked for any erosion or corrosion and remedial action taken as necessary. All dirt and other contamination should be removed to avoid imbalanced running of the fan and motor bearing overheating. The security of the fan fastenings and the integrity of the components should be checked integrally as part of the routine maintenance operation. Particular attention should be paid to the fastening screws and balance of the fan blades.

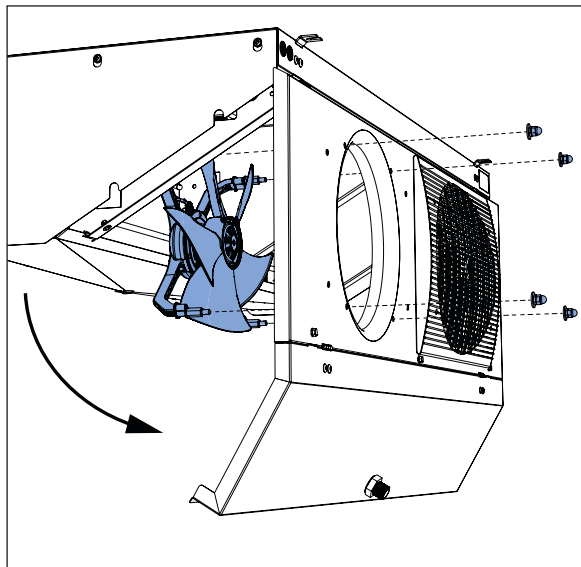


## 7.12 Fan replacement



Unscrew the 4 self-tapping screws and remove the grid.

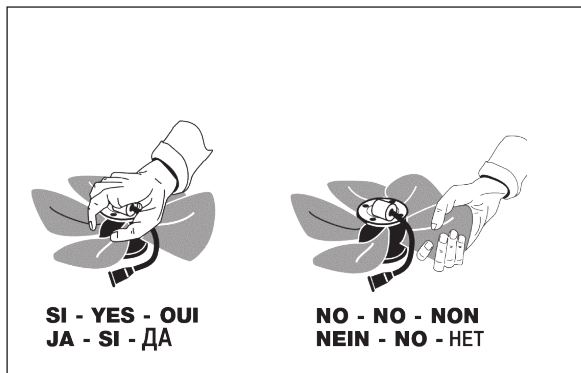
Open the fan plate.



Unscrew the fixing bolts and remove the old fan.

Mount new fan in identical position. Use an anti-corrosion compound when remounting the fixing bolts.

Fan blade can cause injuries to fingers.



Do not grab the fan blades.

Make sure to wear reliable protection during any handling of the unit and maintenance activities.



## 8 Residual risks



- **Sharp edges & corners**

There is a substantial risk of injuries due to sharp edges and corners of coil and casing. Make sure to wear reliable protection during any handling of the unit and maintenance activities.



- **Drip tray**

Ensure the drip tray is empty before lowering or disassembling. The weight of any leftover water or ice could injure the operator if the drip tray fell open accidentally.



- **Side plates**

Removable side plates may only be opened by qualified staff. Ensure the side plates are properly secured after closing.



- **Fans**

Rotating fans can cause injuries to fingers. Never operate fans without the mounted protection grid and take care of loose clothing. Switch power off before any maintenance.



- **Electrics**

Power must be switched off before any work or maintenance on electrical parts of the unit. Secure the unit against unintentional switching on.



- **Burns or frostbite**

(Distributor) tubes can be extremely cold, whereas defrost heater elements and drip tray can get very hot. Use reliable protection.



- **Working fluids**

Working fluids might be toxic and/or flammable. These substances may only be handled by qualified staff while taking all necessary precautions and following any applicable regulations.

- **Fan vibrations**

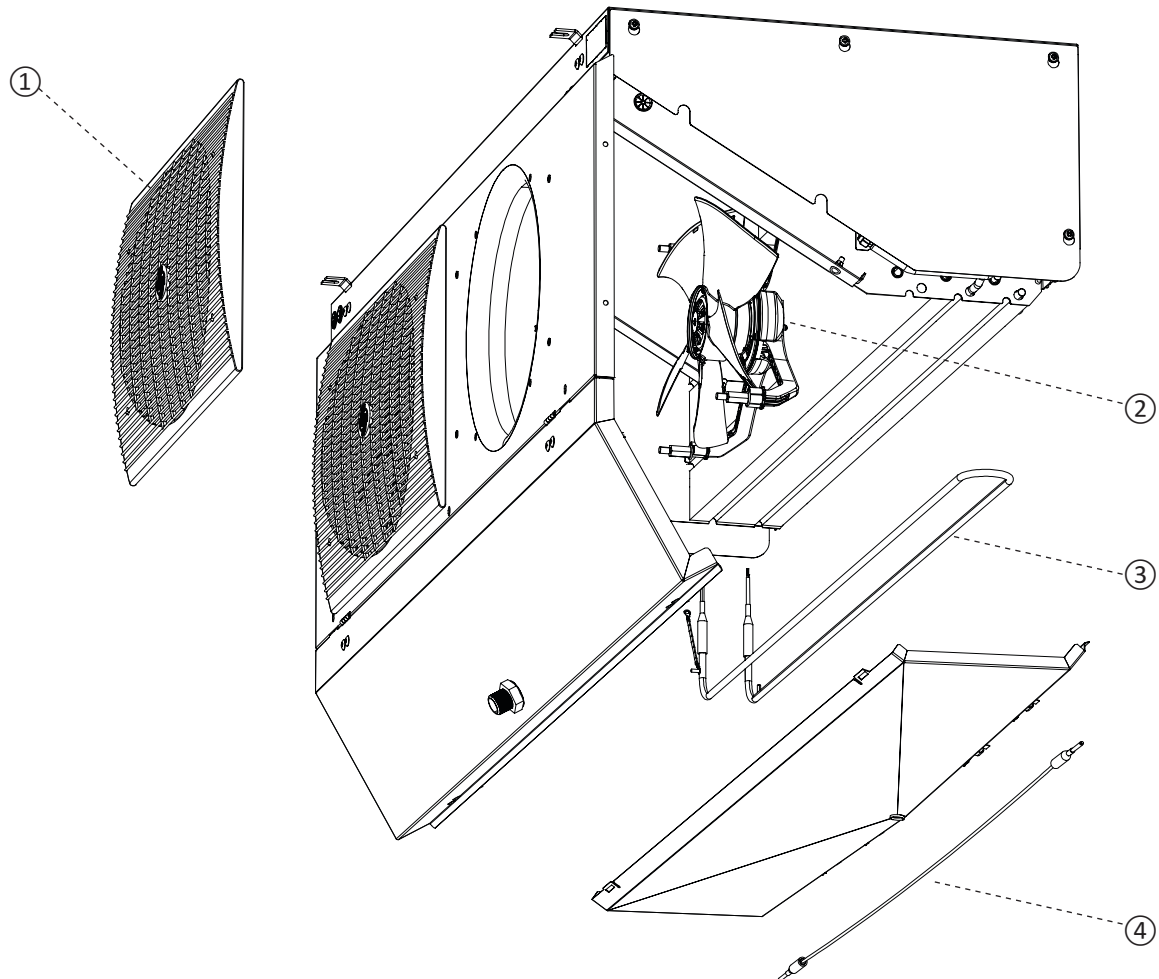
Continuous fan vibrations can cause material failure and hence a risk of injury or damage due to loose parts. Therefore vibrations must be reduced to a minimum at all times.



## 9 Troubleshooting

Fault	Possible cause	Required action
Fan motor not functioning	No power supply	Check/restore power supply.
	No control signal (EC motors)	Check/restore control signal.
	Fan blade blocked	Remove obstruction.
	Fan motor burnt	<ul style="list-style-type: none"> <li>- Check for fan blade obstructions.</li> <li>- Check thermal protection device.</li> <li>- Replace fan motor.</li> </ul>
Excess motor noise	Defective fan motor bearing	Replace fan motor.
Excess vibrations	Loose fan fasteners	Tighten fasteners.
	Unbalanced fan blades	Replace fan blades.
Insufficient capacity	Heat exchanger coil dirty/blocked	Clean coil.
	Coil partly blocked by solid ice	<ul style="list-style-type: none"> <li>- Check defrost cycle settings.</li> <li>- Check defrost heaters.</li> <li>- Perform 100% coil defrost to remove all ice.</li> </ul>
	Fans not (properly) functioning	Check fans.
	Refrigerant supply/pressure insufficient	Restore refrigerant supply/pressure to reference values.
Refrigerant leakage	Refrigerant containing parts damaged	<ul style="list-style-type: none"> <li>- Stop fans.</li> <li>- Close refrigerant supply.</li> <li>- Repair leak.</li> </ul>

## 10 Spare parts



### Spare parts Optigo FMS

- |   |                                  |
|---|----------------------------------|
| 1 | Fan guard                        |
| 2 | Fan motor                        |
| 3 | Electrical defrost (E)           |
| 4 | Drip tray heater (HD) - optional |

Contact your local Alfa LU-VE representative for spare parts order and assistance.



[alfa.luvegroup.com](http://alfa.luvegroup.com)