IHB EN 1841-5
331432

INSTALLATION MANUAL

Exhaust air module NIBE F135

NIBE

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1 Important information

Safety information

This manual describes installation and service procedures for implementation by specialists.

The manual must be left with the customer.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

Rights to make any design or technical modifications are reserved.

Symbols

NOTE

This symbol indicates danger to person or machine .

Caution

This symbol indicates important information about what you should consider when installing or servicing the installation.

TIP

This symbol indicates tips on how to facilitate using the product.

Marking

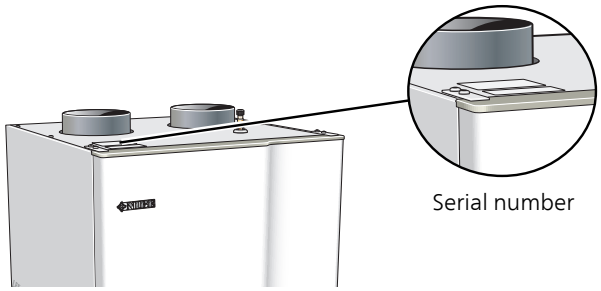
CE The CE mark is obligatory for most products sold in the EU, regardless of where they are made.

IP21 Classification of enclosure of electro-technical equipment.

Read the Installer Manual.

Serial number

The serial number can be found to the left, on top of F135.



Caution

You need the product's (14 digit) serial number for servicing and support.

Recovery

Leave the disposal of the packaging to the installer who installed the product or to special waste stations.

Do not dispose of used products with normal household waste. It must be disposed of at a special waste station or dealer who provides this type of service.

Improper disposal of the product by the user results in administrative penalties in accordance with current legislation.

Inspection of the installation

Current regulations require the heating installation to be inspected before it is commissioned. The inspection must be carried out by a suitably qualified person.

✔	*Description*	*Notes*	*Signature*	*Date*
Ventilation, exhaust air (page 15)				
	Setting the ventilation flow			
	Exhaust air filter			
Heating medium (page 23)				
	System flushed			
	System vented			
	Circulation pump setting			
	Setting heating medium flow			
	System pressure			
Electricity (page 20)				
	Supply connected 230 V			
	Circuit fuses			

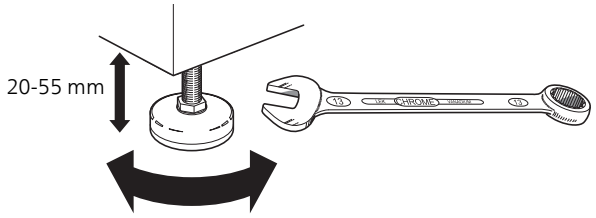
2 Delivery and handling

Transport

F135 should be transported and stored vertically in a dry place.

Assembly

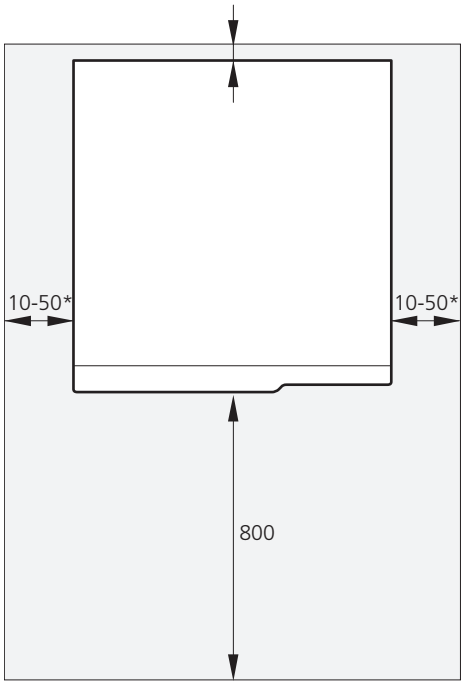
- F135 is installed freestanding on brackets or a suitable flat surface. Noise from the circulation pump, fan and compressor can be transferred to the brackets or the surface that F135 is placed on. Use the product's adjustable feet to obtain a horizontal and stable set-up.



- F135 must be positioned with the back towards a wall. Install the brackets or position F135 against an outside wall, ideally in a room where noise does not matter, in order to eliminate noise problems. If this is not possible, avoid placing it against a wall behind a bedroom or other room where noise may be a problem.
- Wherever the unit is located, walls to sound sensitive rooms should be fitted with sound insulation.
- Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.

INSTALLATION AREA

Leave a free space of 800 mm in front of the product. Leave free space between F135 and wall/other machinery/fittings/cables/pipes etc. It is recommended that a space of at least 10 mm is left to reduce the risk of noise and of any vibrations being propagated.



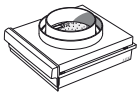
* Depending on whether the panels can be removed or not.

NOTE

Ensure that there is sufficient space (300 mm) above the heat pump for installing ventilation hoses.

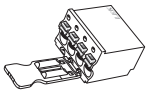
Supplied components

Silencer

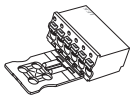


Filter cartridge

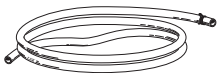
Choke washer Ø 22 mm



4-pin terminal block



6-pin sensor connector

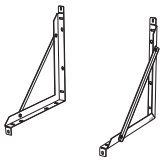


Drain hose Ø 20 mm
Length 2200 mm

Power supply cable

Communication cable

Circulation pump



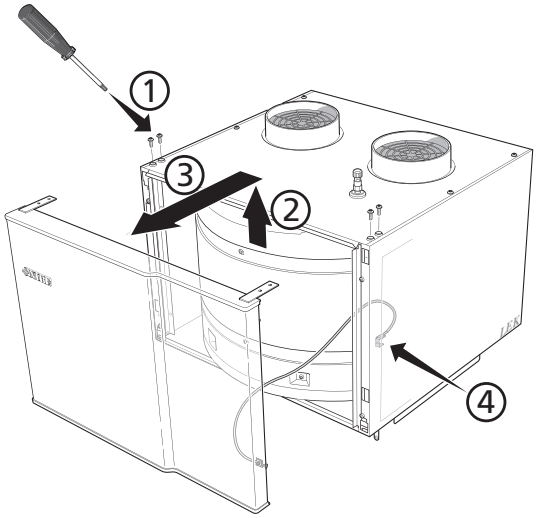
2 x bracket
6 x screws
6 x nuts
4 x washers

LOCATION

The kit of supplied items is placed on top of the product.

Removing the covers

FRONT HATCH

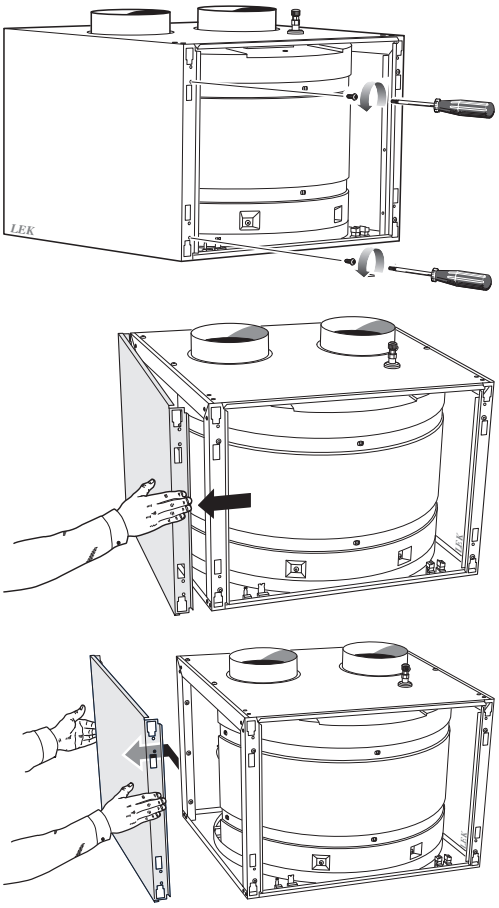


1. Slacken off the screws for the securing plate above F135.
2. Slide the hatch upwards and pull it towards you.
3. Pull the hatch towards yourself.

> *NOTE*
>
> An earth cable is installed in the hatch, which can therefore only be lifted out 35 cm. If the hatch needs to be removed completely, the cable must be disconnected.

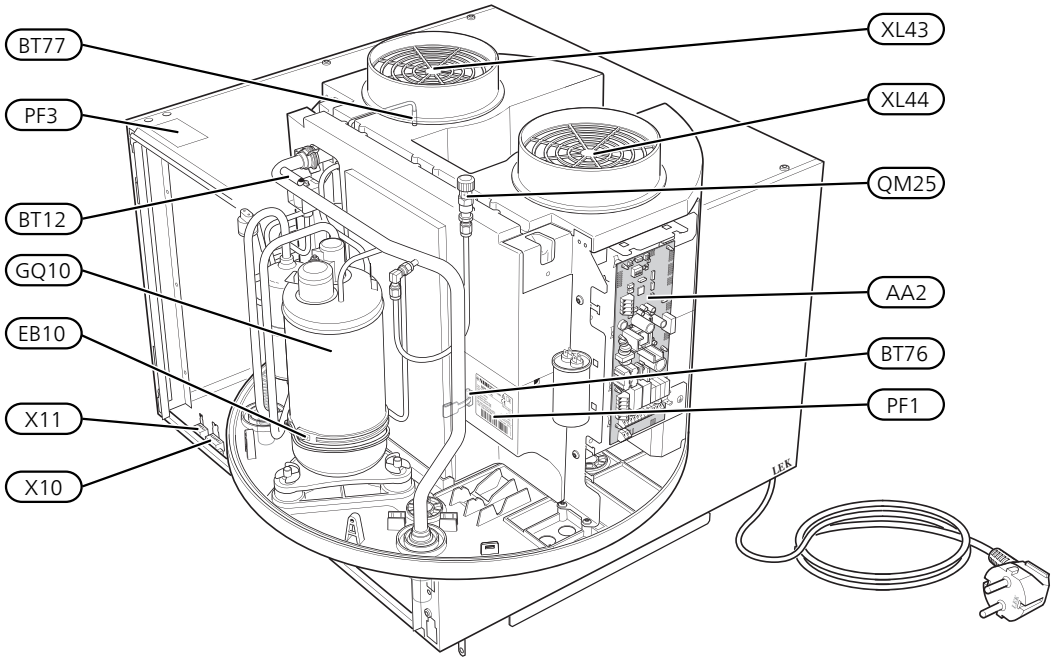
SIDE PANELS

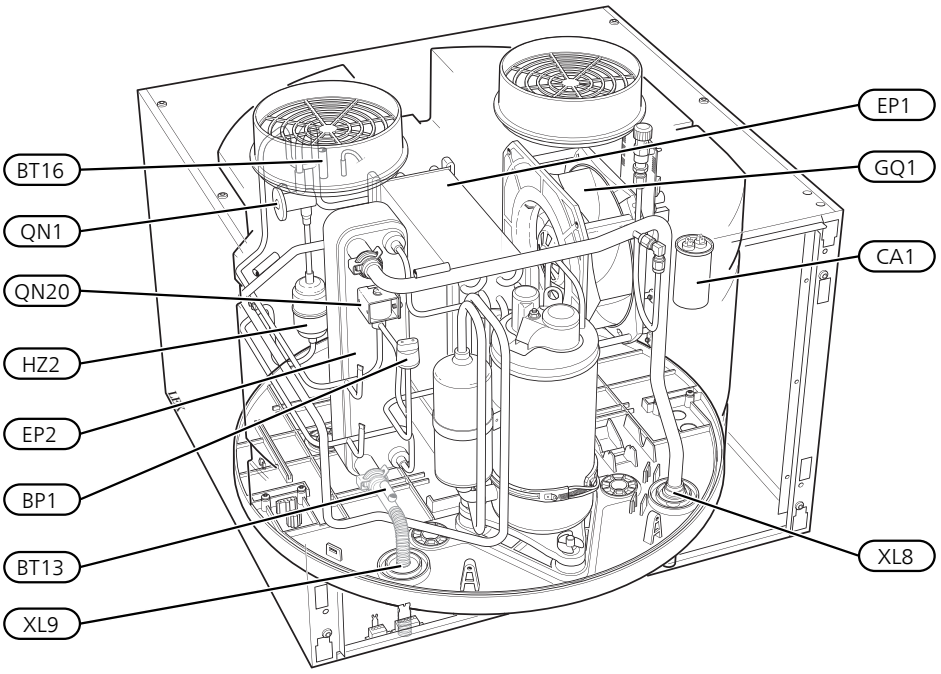
1. Undo the screws at the edge.
2. Twist the cover slightly outward.
3. Move the side cover outwards and backwards.
4. Assembly takes place in the reverse order.



3 The exhaust air module design

Component positions





List of components

PIPE CONNECTIONS

XL8	Heating medium connection, supply
XL9	Heating medium connection, return
XL43	Connecting incoming air
XL44	Connecting outgoing air
WM2	Overflow water discharge[1]

HVAC COMPONENTS

QM25	Venting, hot water

SENSORS

BP1	High pressure pressostat
BT12	Temperature sensor, condenser out
BT13	Temperature sensor, heating medium return before condenser
BT16	Temperature sensor, evaporator
BT76	Temperature sensor, defrosting
BT77	Temperature sensor, incoming air

ELECTRICAL COMPONENTS

AA2	Base card
CA1	Capacitor
EB10	Compressor heater
X10	PWM switch, circulation pump
X11	Terminal block, communication with indoor module

COOLING COMPONENTS

EP1	Evaporator
EP2	Condenser
GQ10	Compressor
HZ2	Drying filter
QN1	Expansion valve
QN20	Solenoid valve, defrosting

VENTILATION

GQ1	Fan
HQ12	Air filter[1]

MISCELLANEOUS

PF1	Rating plate
PF3	Serial number plate

[1]Not visible in the image

Designations in component locations according to standard IEC 81346-1 and 81346-2.

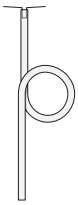
4 Pipe and air connections

General pipe connections

Pipe installation must be carried out in accordance with current norms and directives.

F135 is only designed for upright installation. All connections are equipped with smooth pipe for compression ring couplings.

Overflow water from the evaporator's collecting trough is routed via the supplied plastic hose to a drain. Shape the hose into a water seal (see image).
The entire length of the overflow water pipe must be inclined to prevent water pockets and must also be frost-proof.



To make the installation economical, NIBE recommends that all pipes between F135 and the water heater are insulated. The insulation should be at least 12 mm thick.

NOTE

The pipe systems need to be flushed out before F135 is connected so that any debris cannot damage component parts.

SYMBOL KEY

Symbol	*Meaning*
	Unit box
	Shut-off valve
	Non-return valve
	Circulation pump
	Expansion valve
	Fan
	Compressor
	Shut off valve
	Particle filter
	Temperature sensor
	Reversing valve/shunt
	Heat exchanger
	Indoor module
	Cooling system
	Air/water heat pump
	Pool
	Ventilation

SYSTEM DIAGRAM

F135 is an exhaust air module.

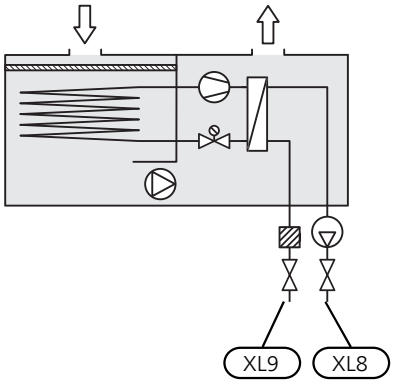
When the air passes through the evaporator, the refrigerant evaporates because of its low boiling point. In this way the energy in the air is transferred to the refrigerant.

The refrigerant is then compressed in a compressor, causing the temperature to rise considerably.

The warm refrigerant is led to the condenser. Here, the refrigerant gives off its energy to the hot water, whereupon the refrigerant changes state from gas to liquid.

The refrigerant then goes via filters to the expansion valve, where the pressure and temperature are reduced.

The refrigerant has now completed its circulation and returns to the evaporator.

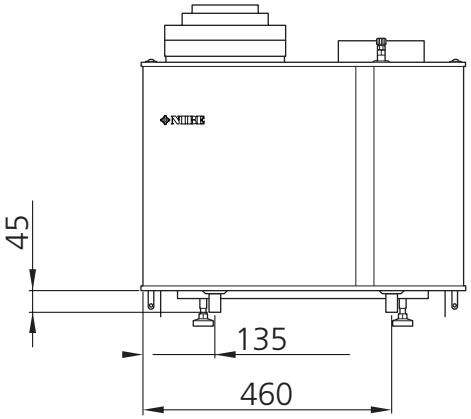


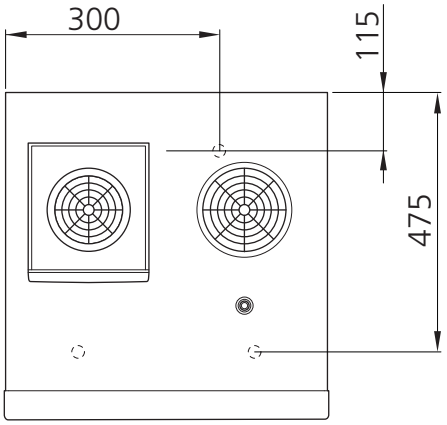
XL8	Heating medium connection, supply
XL9	Heating medium connection, return

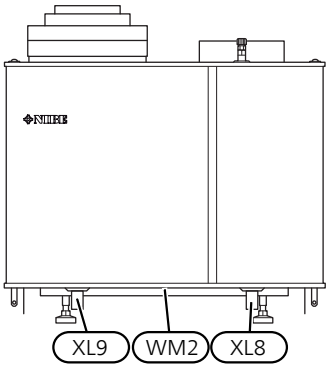
Caution

This is a principle of operation, differences may occur in the installation in question.

Dimensions and pipe connections







PIPE DIMENSIONS

Connection		
XL8 Heating medium connection, supply ext Ø	(mm)	22
XL9 Heating medium connection, return ext Ø	(mm)	22
WM2 Overflow water discharge int Ø	(mm)	20

Mounting

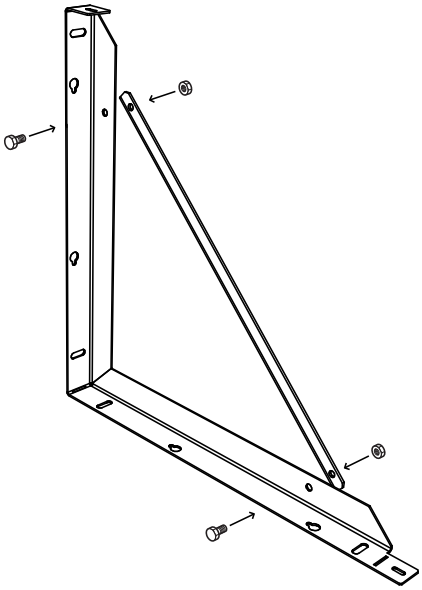
The exhaust air module is wall-mounted using the brackets enclosed. The exhaust air module can also be placed on a suitable flat surface.

> *NOTE*
>
> Check that the mountings are located in the intended grooves on the exhaust air module.
>
> Ensure that the exhaust air module is installed horizontally.

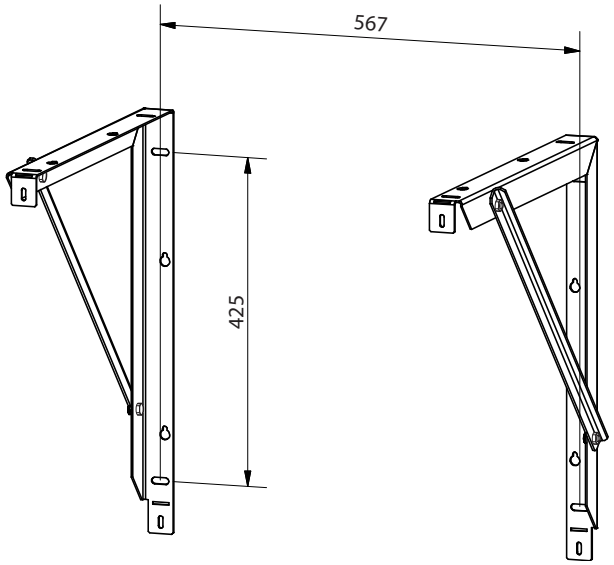
INSTALLING ON BRACKETS

Installing brackets

1. Install the brackets together using the M6 screws and nuts supplied.

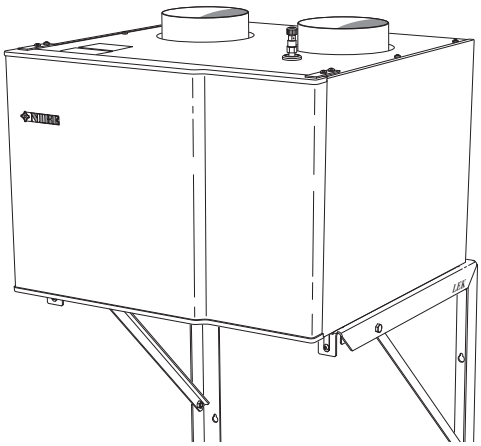


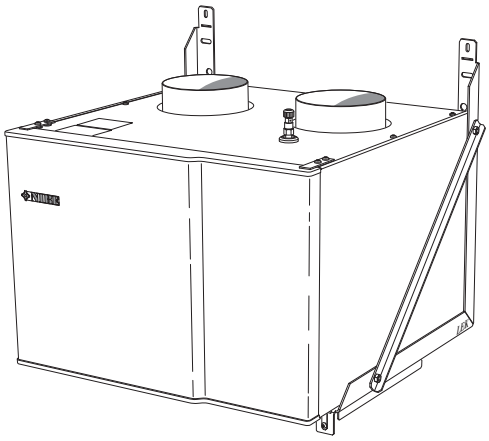
2. Drill holes in the wall as illustrated.



3. Mount the brackets on the wall.

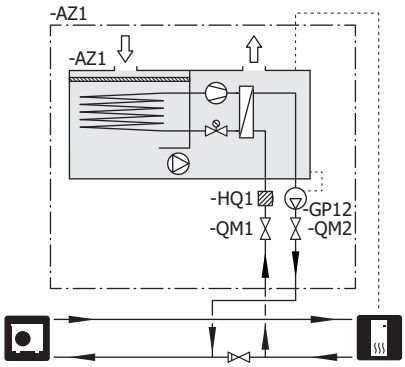
4. Screw F135 into place in the brackets using the M5 screws and nuts supplied.





Connection to indoor module and air/water heat pump

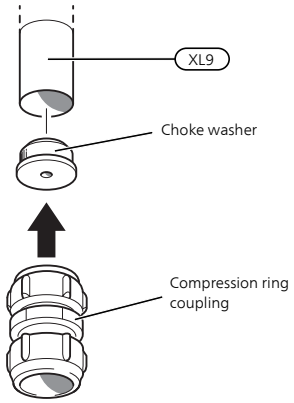
Heating medium connection, supply (XL8) and heating medium connection, return (XL9) are connected to the return line between the indoor module and the air/water heat pump. The particle filter must be installed before F135 to prevent dirt from being deposited in F135. Install the shut-off valves outside F135 to facilitate any future servicing.



INSTALLING CHOKE WASHER

For optimal operation in VVM310/VVM500 install the enclosed choke washer.

Install the washer in the heating medium connection, return (XL9) before the installing the compression connection.

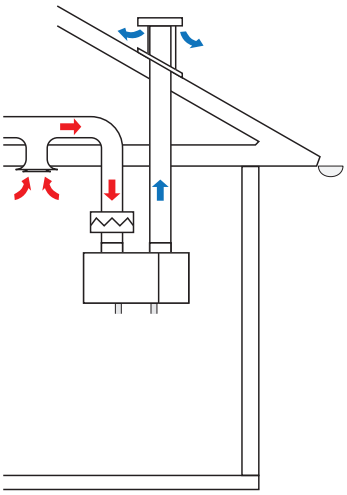


Installation exhaust air

F135 must be connected according to the instructions in this manual.

Installation must be carried out in accordance with current standards and directives.

EXHAUST AIR



Connecting the exhaust air

The heat pump uses the heat that is in the building's ventilation air to heat the building and the hot water at the same time that the house is ventilated.

The hot air is transferred from the rooms to the heat pump via the exhaust air module.

NOTE

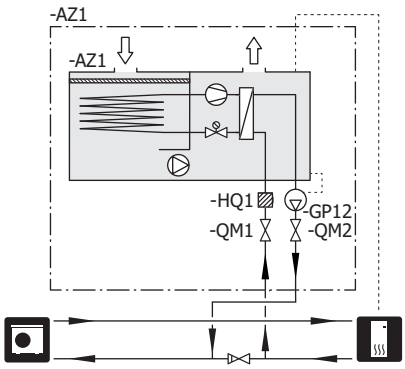
An air filter (HQ12) (enclosed), minimum classification G2, is required on the exhaust air duct for this connection. The filter must be cleaned regularly.

Caution

Noise from the fan can be transferred via the ventilation ducts.

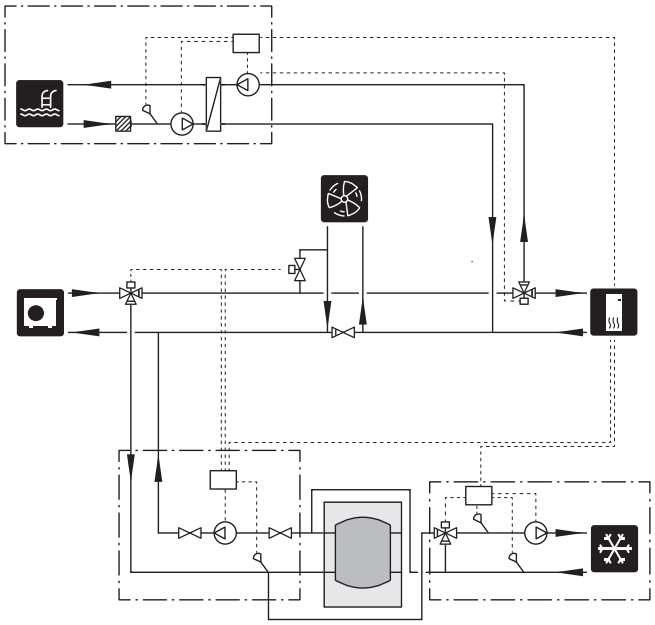
DOCKING NIBE AIR/WATER HEAT PUMP

The demand on F135 is controlled by the indoor module in the system. The pump and fan speed are also controlled from the menu in the indoor module.



DOCKING F135, NIBE HWM, AIR/WATER HEAT PUMP, POOL, COOLING

F135 connected in air/water system with 4-pipe cooling. In such instances, 4-pipe cooling must be connected between the air/water heat pump and F135. When there is also a pool, F135 must be connected between 4-pipe cooling and the pool. The demand on F135 is controlled by the indoor module in the system. The pump and fan speed are also controlled from the menu in the indoor module.



General ventilation connections

- Ventilation installation must be carried out in accordance with current norms and directives.
- Connections must be made via flexible hoses, which should be installed so that they are easy to replace.
- Provision must be made for inspection and cleaning of the duct.
- Make sure that there are no reductions of cross-sectional area in the form of creases, tight bends, etc., since this will reduce the ventilation capacity.
- The air duct system must be a minimum of air tightness class B.
- To prevent fan noise being transferred to the ventilation devices, silencers should be installed in the duct system. In the event of ventilation devices in noise-sensitive rooms, silencers must be installed.
- Ducts that may become cold must be insulated with diffusion-proof material (at least PE30 or equivalent) along their entire length.
- Ensure that the condensation insulation is fully sealed at any joints and/or at lead-in nipples, silencers, roof cowls or similar.
- A duct in a masonry chimney stack must not be used for extract air.
- The exhaust air module must be provided with the enclosed air filter.

EXHAUST AIR DUCT /KITCHEN FAN

Exhaust air duct (kitchen fan) must not be connected to F135.

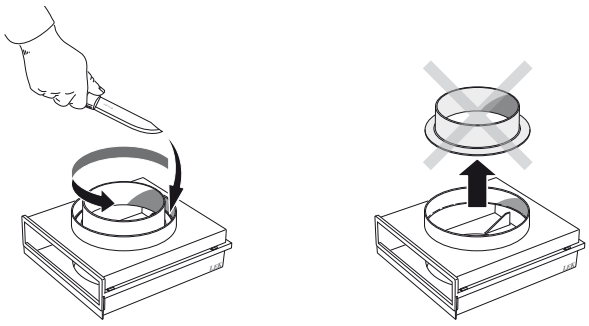
To prevent food vapour being transferred to F135 the distance between the kitchen fan and the exhaust air device must be considered. The distance should not be less than 1.5 m, but this can vary between different installations.

Always use a kitchen fan when cooking.

INSTALL THE FILTER CARTRIDGE

The filter cartridge has two sizes of connector, 125 mm or 160 mm.

1. Check the diameter of the air channel for inlet air.
2. When the air duct has a large diameter (Ø 160 mm) the inner ring must be cut out of the upper section of the filter cartridge.
3. Cut just inside the inner edge of the outer ring using a sharp knife. The plastic is prepared for easy cutting.
4. Press the filter cartridge into place in the connection for incoming air (XL43).



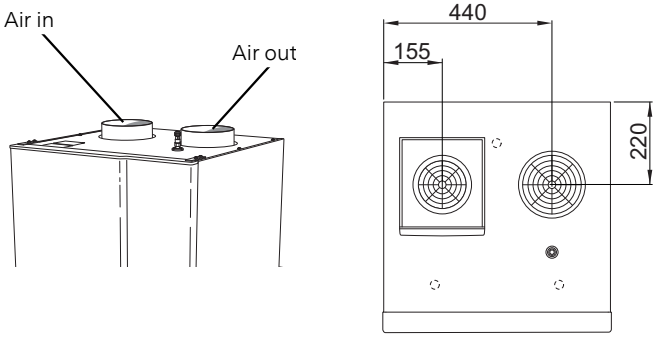
INSTALL THE CONNECTOR

If a filter solution other than that enclosed is used, the enclosed coupling must instead be mounted in the connection for incoming air (XL43).

INSTALL THE SILENCER

1. Remove the plugs from the silencer enclosed.
2. Install the silencer in the connector for outgoing air (XL44).

Dimension and ventilation connections



Ventilation flow (exhaust air)

Connect F135 so that all the exhaust air, except kitchen duct air (kitchen fan), passes through the evaporator (EP1) in the exhaust air module.

The ventilation flow must comply with the applicable national standards.

For the optimum exhaust air module performance, the ventilation flow should not be less than 20 l/s (72 m³/h) at normal exhaust air temperature. At lower exhaust air temperatures, a higher flow is required.

The ventilation capacity is set in the indoor module's menu system (menu 5.1.5).

Adjusting ventilation (exhaust air)

To obtain the necessary air exchange in every room of the house, the exhaust air devices must be correctly positioned and adjusted and the fan in the exhaust air module adjusted.

Immediately after installation adjust the ventilation so that it is set according to the projected value of the house.

Incorrect adjustment of the ventilation may lead to reduced installation efficiency and thus poorer operating economy, and may cause moisture damage in the building

5 Electrical connections

General

Installation must be carried out in accordance with current standards and directives.

When working behind screwed covers, the circuit fuse must be removed or the connection plug pulled out.

Work behind screwed covers may only be carried out under the supervision of a qualified electrician.

- Disconnect F135 before insulation testing the house wiring.
- For electrical wiring diagram for F135, see page 34.
- Signal cables to external connections must not be laid close to high current cables.
- Signal cables to external connections are four core, at least 0.35 mm^2.
- If the supply cable is damaged, it must be replaced by qualified persons.

NOTE

The supply cable must not be connected until the boiler has been filled. Internal components can be damaged.

NOTE

Electrical installation and service must be carried out under the supervision of a qualified electrician. Electrical installation and wiring must be carried out in accordance with the stipulations in force.

Connections

POWER CONNECTION

NOTE

To prevent interference, unscreened communication and/or sensor cables to external connections must not be laid closer than 20 cm from high voltage cables.

F135 is connected to an earthed socket with the factory-installed connection cable (length approx. 2.8 m), which is fitted with a plug. The power connection to the circulation pump must be connected via a circuit breaker with a minimum breaking gap of 3 mm.

NOTE

The circulation pump must not be powered up until F135 is activated in the indoor module.

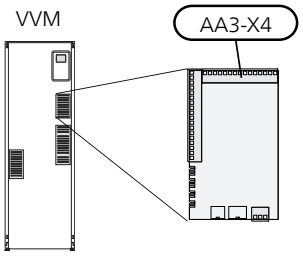
INDOOR MODULE

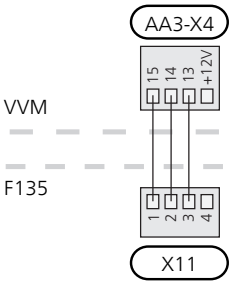
Connect the indoor module's input board (AA3-X4) to the four-pin terminal block X11:1 (15), X11:2 (14) and X11:3 (13).

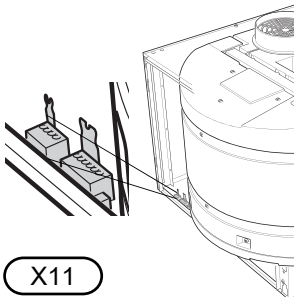
Connect the circulation pump's communication cable to the six pin terminal block in F135 X10:1 (Blue), X10:2 (Brown) and X10:6 (Black).

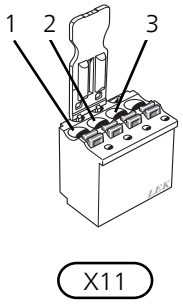
Use a 3 core cable of at least 0.5 mm² cable area.

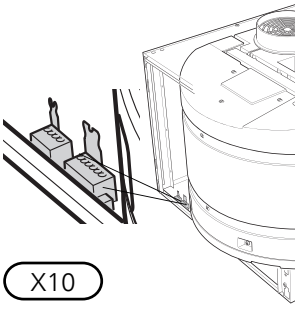
> *NOTE*
>
> Cable between the indoor module and F135 must be a max of 15 m.

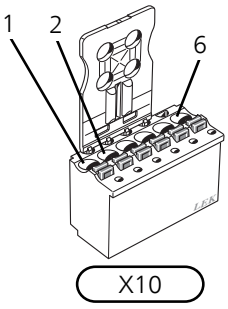


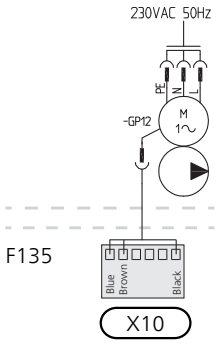










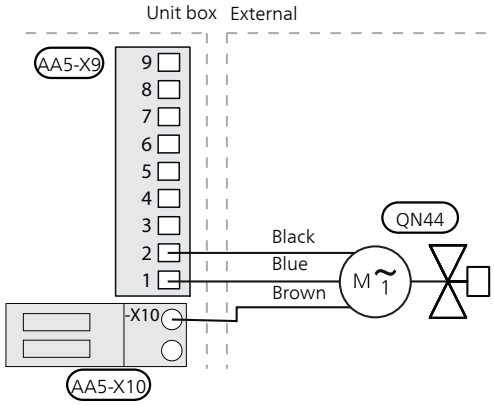


Optional connections

AUX INPUTS

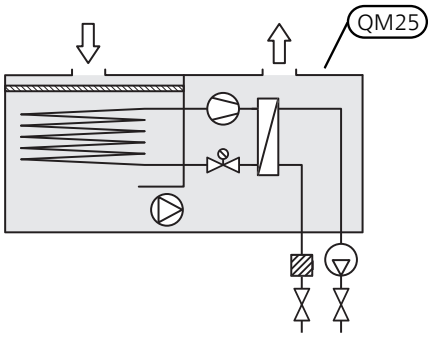
Connecting the shut-off valve (QN44)

Connect the motor (QN44) to AA5-X9:2 (signal), AA5-X9:1 (N) and AA5-X10:2 (230 V).



6 Commissioning and adjusting

Preparations



1. Check that the switch for the indoor module is in position "⏻".
2. Cut the power to F135.
3. Check that the filling valves are fully closed.

Filling and venting

Caution

Insufficient venting can damage internal components in F135.

FILLING THE CLIMATE SYSTEM

1. Check that the externally mounted shut-off valves for the heating system are open.
2. Open the vent valve (QM25).
3. Open the externally mounted filler valves. F135 and the rest of the climate system are filled with water.
4. When the water that exits the vent valve (QM25) is not mixed with air, close the valve. After a while, the pressure rises on the external pressure gauge. When the pressure reaches 2.5 bar (0.25 MPa) the safety valve starts to release water. Close the external filler valve.
5. Reduce the boiler pressure to the normal working range (approx. 1 bar) by opening the vent valve (QM25) or the external safety valve.

VENTING THE CLIMATE SYSTEM

NOTE

Venting may be necessary during installation and after a period of use.

1. Cut the power to the exhaust air module.
2. Vent the exhaust air module via the vent valve (QM25) and the rest of the climate system via the relevant vent valves.
3. Keep topping up and venting until all air has been removed and the pressure is correct.

Start-up and inspection

START-UP WITH NIBE INDOOR MODULE

NOTE

There must be water in the climate system before the switch in the indoor module is set to "I".

NOTE

The circulation pump must not be powered up until F135 is activated in the indoor module.

1. Start F135 by connecting the supply cable.
2. Set the indoor module's switch to "I".
3. Follow the instructions in the start guide in the indoor module display. If the start guide does not start when you start the indoor module, start it manually in menu 5.7.

Commissioning with NIBE indoor module

The first time that the indoor module is started, a start guide begins. The start guide instructions state what needs to carried out at initial start-up together with a run through of the indoor module's basic settings.

The start guide ensures that the start-up is carried out correctly and cannot be bypassed. The start guide can be started later in menu 5.7.

The circulation pump operates at a fixed speed. Can be changed in menu 5.3.14.

Caution

As long as the start guide is active, no function in the installation will start automatically.

The guide will appear at each installation restart until it is deselected on the last page.

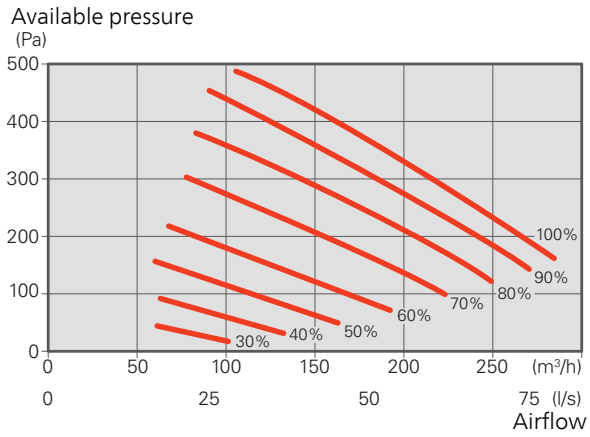
SETTING VENTILATION (EXHAUST AIR)

Ventilation must be set according to applicable standards. Set the fan speed in menu 5.1.5.

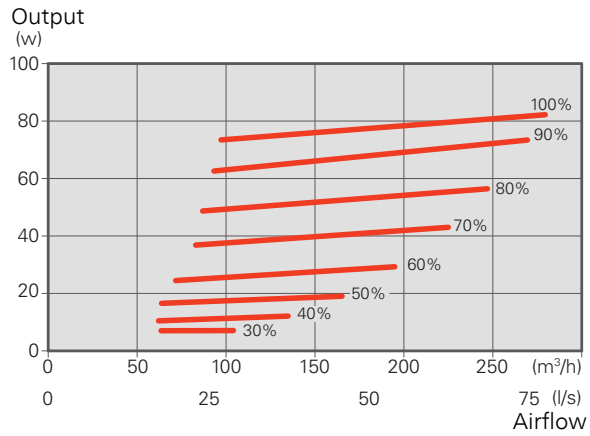
Even if ventilation is roughly set at installation it is important that a ventilation adjustment is ordered and permitted.

> *NOTE*
>
> Order a ventilation adjustment to complete the setting.

Fan capacity



Power, fan



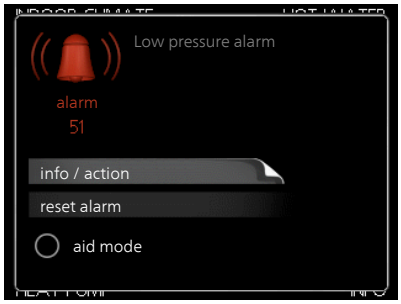
7 Disturbances in comfort

In most cases, the indoor module notes operational interference (operational interference can lead to disturbance in comfort) and indicates this with alarms and shows action instructions in the display.

Info-menu NIBE indoor module

All the indoor module measured values are gathered under menu 3.1 in the indoor module menu system. Looking through the values in this menu can often simplify finding the source of the fault.

Manage alarm



In the event of an alarm, some kind of malfunction has occurred, which is indicated by the status lamp changing from green continuously to red continuously. In addition, an alarm bell appears in the information window.

ALARM

In the event of an alarm with a red status lamp a malfunction has occurred that the indoor module cannot remedy itself. In the display, by turning the control knob and pressing the OK button, you can see the type of alarm it is and reset it. You can also choose to set the indoor module to aid mode.

info / action Here you can read what the alarm means and receive tips on what you can do to correct the problem that caused the alarm.

reset alarm In many cases, it is sufficient to select “reset alarm” for the product to revert to normal operation. If a green light comes on after selecting “reset alarm”, the alarm has been remedied. If the red light is still on, and a menu called “alarm” is visible in the display, the problem causing the alarm still remains. If the alarm disappears and then returns, see the "Troubleshooting" section.

aid mode “aid mode” is a type of emergency mode. This means that the indoor module produces heat and/or hot water, even though there is some kind of problem. This could mean that the heat pump’s compressor is not in operation. In this case, the immersion heater produces heat and/or hot water.

Problems withF135 do not affect heat pump operation. You do not need to select "aid mode" in event of problems with F135.

Caution

To select aid mode an alarm action must be selected in the menu 5.1.4.

Caution

Selecting "aid mode” is not the same as correcting the problem that caused the alarm. The status lamp will therefore continue to be red.

Troubleshooting

If the operational interference is not shown in the display the following tips can be used:

BASIC ACTIONS

Start by checking the following items:

- That the feed cable is connected to F135.
- Group and main fuses of the accommodation.
- The property's earth circuit breaker.

LOW OR A LACK OF VENTILATION (EXHAUST AIR INSTALLATION)

- Filter (HQ12) blocked.
  - – Clean or replace the filter.
- The ventilation is not adjusted.
  - – Order/implement ventilation adjustment.

- Exhaust air device blocked or throttled down too much.
  - Check and clean the exhaust air devices.
- Fan speed in reduced mode.
  - Enter menu 1.2 and select "normal".

LOUD OR DISTURBING VENTILATION (EXHAUST AIR INSTALLATION)

- Filter (HQ12) blocked.
  - Clean or replace the filter.
- The ventilation is not adjusted.
  - Order/implement ventilation adjustment.
- Fan speed in forced mode.
  - Enter menu 1.2 and select "normal".

THE COMPRESSOR DOES NOT START

- There is no heating requirement.
  - The indoor module does not call on heating or hot water.
  - The heat pump defrosts.

GURGLING SOUND

- Not enough water in the water seal.
  - Refill the water seal with water.
- Choked water seal.
  - Check and adjust the condensation water hose.

8 Accessories

More info and images available at nibe.eu.

Not all accessories are available on all markets.

Top cabinet

Top cabinet that conceals the ventilation ducts.

HEIGHT 245 MM

Part no. 089 756
RSK no. 625 06 87

HEIGHT 345 MM

Part no. 089 757
RSK no. 625 06 88

HEIGHT 445 MM

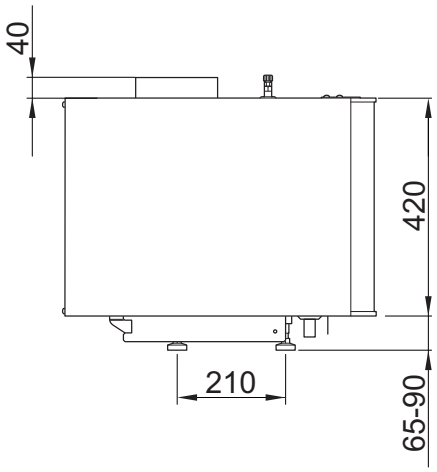
Part no. 067 522
RSK no. 625 12 99

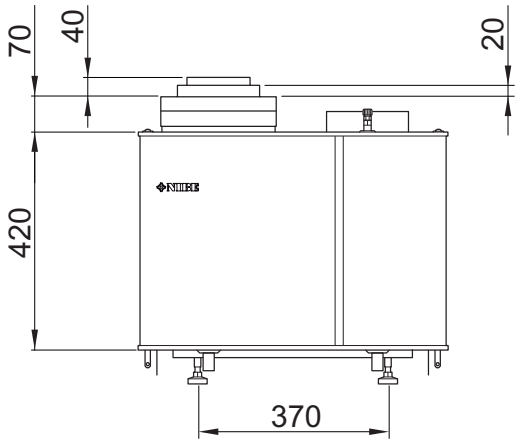
HEIGHT 385-635 MM

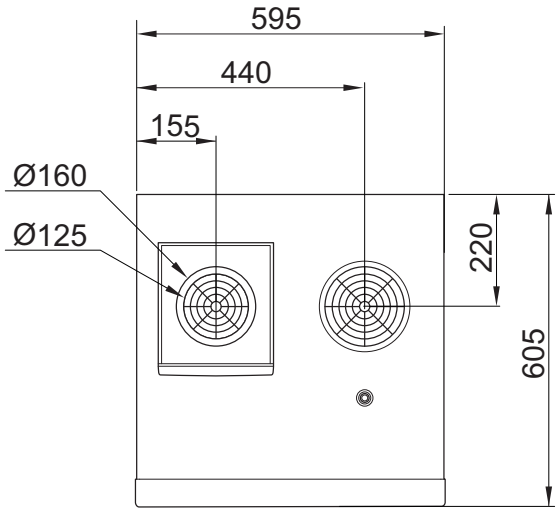
Part no. 089 758
RSK no. 625 06 89

9 Technical data

Dimensions and setting-out coordinates







Technical specifications

1x230 V		*Exhaust air*
Output data according to EN 14 511		
Capacity (P_H)/COP	kW/-	1.42 / 3.87 [1]
Capacity (P_H)/COP	kW/-	1.34 / 3.13 [2]
Capacity (P_H)/COP	kW/-	1.27 / 2.65 [3]
Electrical data		
Rated voltage	V	230 V ~ 50 Hz
Max operating current	A	3.5
Min. fuse rating	A	6
Driving power circulation pump	W	5-20
Driving power fan	W	20-75
Enclosure class		IP21
Refrigerant circuit		
Type of refrigerant		R134A
GWP refrigerant		1430
Volume	kg	0.38
CO_2 equivalent	ton	0.54
Cut-out value pressostat HP	MPa/bar	2.2 / 22.0
Exhaust air module		
Max system pressure	MPa/bar	1.0 / 10.0
Max temperature, supply line	°C	63
Max temperature, return line	°C	54
Air flow requirement		
Min. air flow at exhaust air temperature at least 10°C	l/s	25
Temperature range for compressor operation	°C	10 - 37
Sound effect level according to EN 12 102		
Sound power level ($L_{W(A)}$) [4]	dB(A)	47.0
Sound pressure levels according to EN ISO 11 203		
Sound pressure level in the installation room ($L_{P(A)}$) [5]	dB(A)	43.0
Pipe connections		
Heating medium ext Ø	mm	22
Ventilation ext Ø	mm	160
Filter box ext. Ø	mm	160/125

1 A20(12)W35, frånluftsflöde 50 l/s (180 m³/h), exkl. driveffekt för fläkt
2 A20(12)W45, frånluftsflöde 50 l/s (180 m³/h), exkl. driveffekt för fläkt
3 A20(12)W55, frånluftsflöde 50 l/s (180 m³/h), exkl. driveffekt för fläkt
4 The value varies with the fan speed selected. For more detailed sound data, including sound to ducts, visit nibe.eu.
5 The value can vary with the room's damping capacity. These values apply at a damping of 4 dB.

Other 1x230 V		
Dimensions and weight		
Width	mm	600
Depth	mm	605
Height		490 - 515
Weight	kg	50
RSK No.		625 12 41
Part No.		066 075

Energy labelling

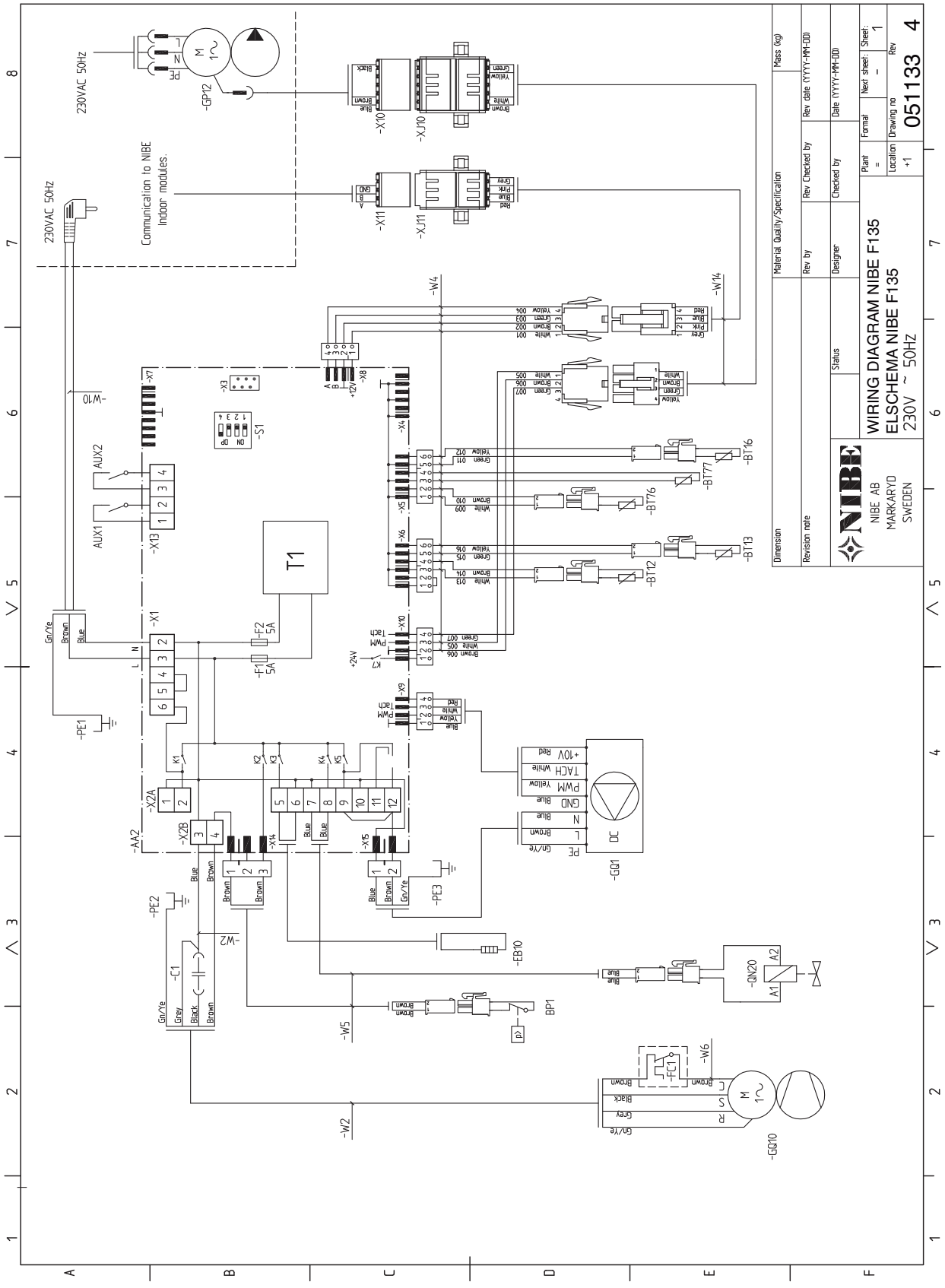
INFORMATION SHEET

Supplier		*NIBE*
Model		*F135*
Temperature application	*°C*	*35 / 55*
Seasonal space heating energy efficiency class, average climate		A+ / A+
Rated heat output ($P_{designh}$), average climate	kW	2
Annual energy consumption space heating, average climate	kWh	879 / 1087
Seasonal space heating energy efficiency, average climate	%	141 / 114
Sound power level L_{WA} indoors	dB	47
Rated heat output ($P_{designh}$), cold climate	kW	2
Rated heat output ($P_{designh}$), warm climate	kW	2
Annual energy consumption space heating, cold climate	kWh	1004 / 1264
Annual energy consumption space heating, warm climate	kWh	587 / 731
Seasonal space heating energy efficiency, cold climate	%	147 / 117
Seasonal space heating energy efficiency, warm climate	%	136 / 110
Sound power level L_{WA} outdoors	dB	-

TECHNICAL DOCUMENTATION

Model		*F135*					
Type of heat pump		☐ Air-water ☒ Exhaust-water ☐ Brine-water ☐ Water-water					
Low-temperature heat pump		☐ Yes ☒ No					
Integrated immersion heater for additional heat		☐ Yes ☒ No					
Heat pump combination heater		☐ Yes ☒ No					
Climate		☒ Average ☐ Cold ☐ Warm					
Temperature application		☒ Average (55 °C) ☐ Low (35 °C)					
Applied standards		EN14825 EN16147					
Rated heat output	Prated	1,5	kW	*Seasonal space heating energy efficiency*	η_s	114	%
Declared capacity for space heating at part load and at outdoor temperature Tj				*Declared coefficient of performance for space heating at part load and at outdoor temperature Tj*			
Tj = -7 °C	Pdh	1.3	kW	Tj = -7 °C	COPd	3.0	-
Tj = +2 °C	Pdh	1.3	kW	Tj = +2 °C	COPd	3.1	-
Tj = +7 °C	Pdh	1.3	kW	Tj = +7 °C	COPd	3.3	-
Tj = +12 °C	Pdh	1.4	kW	Tj = +12 °C	COPd	3.3	-
Tj = biv	Pdh	1.2	kW	Tj = biv	COPd	2.7	-
Tj = TOL	Pdh	1.2	kW	Tj = TOL	COPd	2.8	-
Tj = -15 °C (if TOL < -20 °C)	Pdh		kW	Tj = -15 °C (if TOL < -20 °C)	COPd		-
Bivalent temperature	T_{biv}	-6.9	°C	Min. outdoor air temperature	TOL	-10	°C
Cycling interval capacity	Pcych		kW	Cycling interval efficiency	COPcyc		-
Degradation coefficient	Cdh	0.98	-	Max supply temperature	WTOL	58	°C
Power consumption in modes other than active mode				*Additional heat*			
Off mode	P_{OFF}	0.003	kW	Rated heat output	Psup	0.3	kW
Thermostat-off mode	P_{TO}	0.01	kW				
Standby mode	P_{SB}	0.005	kW	Type of energy input	Electric		
Crankcase heater mode	P_{CK}	0.01	kW				
Other items							
Capacity control	Fixed			Rated airflow (air-water)		150	m^3/h
Sound power level, indoors/outdoors	L_{WA}	47 / -	dB	Nominal heating medium flow		0.13	m^3/h
Annual energy consumption	Q_{HE}	1,087	kWh	Brine flow brine-water or water-water heat pumps			m^3/h
Contact information	*NIBE Energy Systems – Box 14 – Hannabadsvägen 5 – 285 21 Markaryd – Sweden*						

Electrical circuit diagram



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Contact information

AUSTRIA

KNV Energietechnik GmbH
Gahberggasse 11, 4861 Schörfling
Tel: +43 (0)7662 8963-0
mail@knv.at
knv.at

CZECH REPUBLIC

Družstevní závody Dražice - strojírna s.r.o.
Dražice 69, 29471 Benátky n. Jiz.
Tel: +420 326 373 801
nibe@nibe.cz
nibe.cz

DENMARK

Vølund Varmeteknik A/S
Industrivej Nord 7B, 7400 Herning
Tel: +45 97 17 20 33
info@volundvt.dk
volundvt.dk

FINLAND

NIBE Energy Systems Oy
Juurakkotie 3, 01510 Vantaa
Tel: +358 (0)9 274 6970
info@nibe.fi
nibe.fi

FRANCE

NIBE Energy Systems France SAS
Zone industrielle RD 28
Rue du Pou du Ciel, 01600 Reyrieux
Tél: 04 74 00 92 92
info@nibe.fr
nibe.fr

GERMANY

NIBE Systemtechnik GmbH
Am Reiherpfahl 3, 29223 Celle
Tel: +49 (0)5141 75 46 -0
info@nibe.de
nibe.de

GREAT BRITAIN

NIBE Energy Systems Ltd
3C Broom Business Park,
Bridge Way, S41 9QG Chesterfield
Tel: +44 (0)845 095 1200
info@nibe.co.uk
nibe.co.uk

NETHERLANDS

NIBE Energietechniek B.V.
Energieweg 31, 4906 CG Oosterhout
Tel: +31 (0)168 47 77 22
info@nibenl.nl
nibenl.nl

NORWAY

ABK AS
Brobekkveien 80, 0582 Oslo
Tel: (+47) 23 17 05 20
post@abkklima.no
nibe.no

POLAND

NIBE-BIAWAR Sp. z o.o.
Al. Jana Pawla II 57, 15-703 Bialystok
Tel: +48 (0)85 66 28 490
biawar.com.pl

RUSSIA

EVAN
bld. 8, Yuliusa Fuchika str.
603024 Nizhny Novgorod
Tel: +7 831 419 57 06
kuzmin@evan.ru
nibe-evan.ru

SWEDEN

NIBE Energy Systems
Box 14
Hannabadsvägen 5, 285 21 Markaryd
Tel: +46 (0)433-27 3000
info@nibe.se
nibe.se

SWITZERLAND

NIBE Wärmetechnik c/o ait Schweiz AG
Industriepark, CH-6246 Altishofen
Tel. +41 (0)58 252 21 00
info@nibe.ch
nibe.ch

For countries not mentioned in this list, contact NIBE Sweden or check nibe.eu for more information.

NIBE Energy Systems
Hannabadsvägen 5
Box 14
285 21 Markaryd
Tel. +46 433 27 3000
info@nibe.se
nibe.eu

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