

# NIBE FLM

Exhaust air module

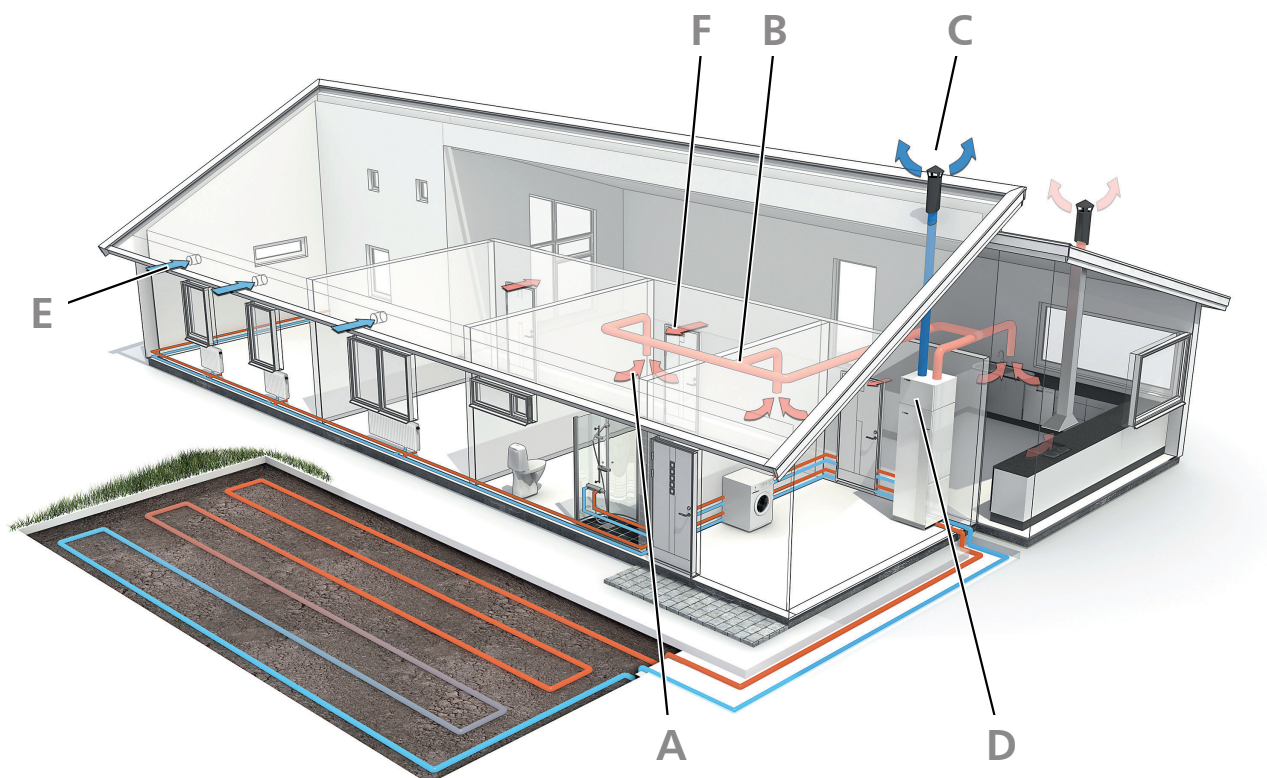
Exhaust air module for ground source heat pump



- Raises the temperature of incoming brine, which increases the efficiency of the heat pump.
- Gives a complete solution for exhaust air and ground source heat.
- NIBE FLM can be docked with NIBE ground source heat pumps regardless of capacity.
- Exhaust air energy is accumulated in the ground.
- The collector length can be reduced if necessary.
- Simple installation.
- Automatic defrosting.
- High fan capacity and low noise level thanks to the energy-efficient DC fan.

# This is how NIBE FLM works

## Principle



NIBE FLM is an exhaust air module with a built-in fan specially designed to combine recovery of mechanical exhaust air with an energy collector in rock or in the ground.

The exhaust air module is easy to install together with any heat pump. When installing together with a compatible heat pump from NIBE, the exhaust air module is connected to the heat pump, allowing you to read off the exhaust air module's values from the heat pump's display.

Energy is recovered from the ventilation air and supplied to the heat pump's brine, which consequently increases in temperature and raises the heat pump's coefficient of performance. Energy is stored in the ground or rock collector even if the heat pump is not in operation, which fully utilises the exhaust air energy.

The heat pump capacity is not bound by the amount of air, rather the capacity of the heat pump can be optimally adapted to suit the size of the house.

NIBE FLM can be placed directly on NIBE F1145/F1155/F1245/F1255 and thereby creates a complete unit. NIBE FLM can also be mounted independently with brackets (accessory) hanging on the wall.

### Compatible NIBE heat pumps

- F1145
- F1155
- F1245
- F1255
- F1345
- F1355

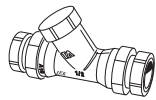
- A** The warm room air is drawn into the air duct system.
- B** The warm room air is fed to NIBE FLM.
- C** The room air is released when it has passed NIBE FLM. The air temperature has then been reduced as NIBE FLM has extracted the energy in the room air.
- D** NIBE FLM raises the temperature of the brine to the heat pump.
- E** Outdoor air is drawn into the house.
- F** Air is transported from rooms with outdoor air devices to rooms with exhaust air valves.

# Good to know about NIBE FLM

## Transport and storage

The exhaust air module should be transported and stored in the dry.

## Supplied components



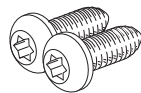
Trim valve (RN1)  
Ø 15 mm



Non-return valve (RM1)  
Ø 32 mm



Condensation water hose  
Ø 20 mm



2 x screws (T25) for installing  
NIBE FLM on NIBE heat pump

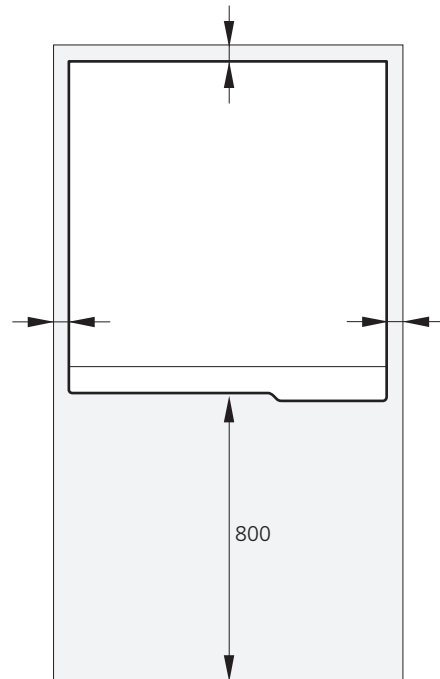
## Installation and positioning

NIBE FLM is installed on top of the ground source heat pump or independently on brackets. Noise from the circulation pump or fan can be transferred to the brackets.

- Install with its back to 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.
- The condensation water hose must be routed directly to the floor drain or other water seal. Ensure that the end of the hose runs out above the water level in the floor drain.

## Installation area

Leave a free space of 800 mm in front of the product. Leave free space between NIBE FLM 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.



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

## Installation

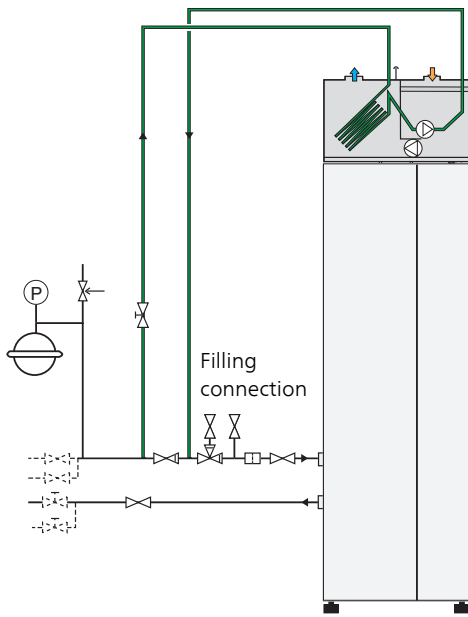
### Pipe installation

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

Pipes and other cold surfaces must be insulated with diffusion-proof material to prevent condensation.

## Outline diagram

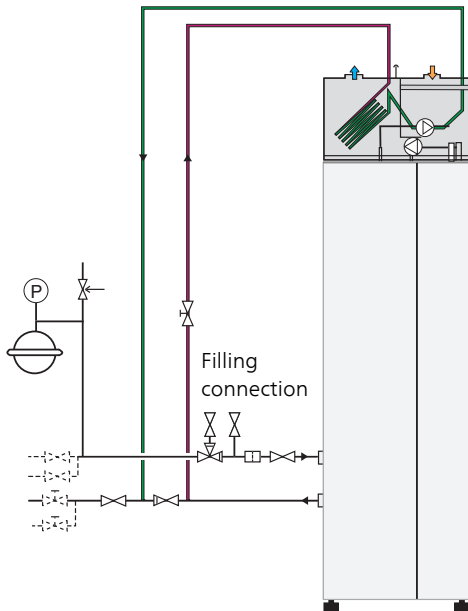
### Pipe coupling, standard (brine)



**NOTE** Venting may be necessary during installation and after a period of use. Vent through vent valve. When venting, the switch for the circulation pump must be set to "0".

### Pipe coupling in event of passive cooling

Where passive cooling can be prioritised, NIBE FLM can be installed in the brine circuit after the heat pump in the direction of flow.



### Brine flow

The brine flow over NIBE FLM is regulated by a circulation pump and trim valve so that the temperature difference between brine in and out through NIBE FLM is 2 – 4°C. Adjustments are made when the heat pump is running. The temperature difference applies at 20 °C room temperature and 0 °C in the brine.

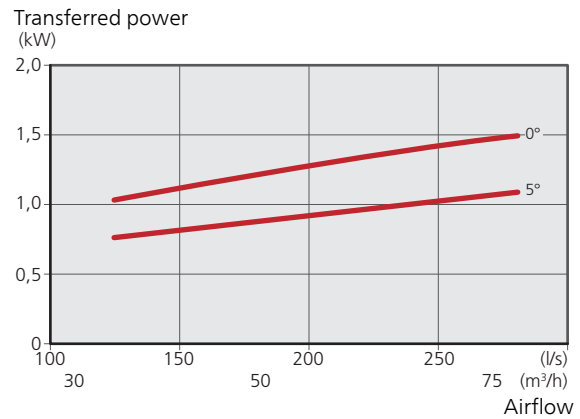
The brine flow through NIBE FLM will be from 0.1 l/s (360 l/h) to 0.15 l/s (540 l/h) at the above temperature difference, depending on the ventilation flow.

When the heat pump is at a standstill, the internal circulation pump in NIBE FLM gives from 0.085 l/s (306 l/h) to 0.125 l/s (450 l/h) in the return charging flow to the collector. This applies to a heat pump with approximately 4 kW capacity. For a 15 kW heat pump, the corresponding flow is from 0.09 l/s (324 l/h) to 0.14 l/s (504 l/h).

The lowest permitted incoming brine temperature is -8 °C.

### Output transfer to brine

#### Output transfer to brine



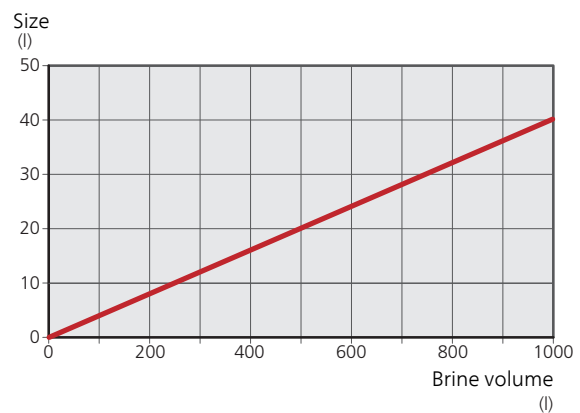
The diagram shows the power that is transferred from the ventilation air to the brine at 0°C and 5°C, and applies to an air temperature of +20°C and 50% relative air humidity.

### Expansion vessel

The brine circuit must be provided with pressure expansion vessel. If there is a level vessel, this should be replaced. The brine side must be pressurised to at least 0.5 bar.

To prevent malfunctions, the pressure expansion vessel should be dimensioned as set out in the diagram. The pressure expansion vessel covers the temperature range from -10°C to +20 °C for the brine at a pre-pressure of 0.5 bar and with the safety valve's opening pressure set at 3 bar.

#### Expansion vessel



## Ventilation

Connect NIBE FLM so that all exhaust air except exhaust air duct air (kitchen fan) passes the evaporator in the exhaust air module. The lowest ventilation flow must comply with the applicable national standards. For optimum exhaust air module performance the ventilation flow should not be less than 25 l/s (90 m<sup>3</sup>/h). On occasions when the exhaust air temperature is lower than 20°C (for example at start-up and when there is nobody at home), the minimum value is 31 l/s (110 m<sup>3</sup>/h).

Ensure that the ventilation openings are not blocked. If the exhaust air module is connected to a compatible heat pump, set the ventilation capacity in the heat pump's menu system. Otherwise, set the ventilation capacity via potentiometer.

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.

Connections must be made via flexible hoses, which should be installed so that they are easy to replace. The extract air duct and ducts intended for supply air for FLM cooling are insulated with diffusion-proof material along their entire length. Exhaust air ducts that are routed in cold areas must be insulated. All joints in the ducting must be sealed and should be screwed/pop-riveted to prevent leakage. The duct system must be a minimum of air tightness class B.

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

A duct in a masonry chimney stack must not be used for extract air.

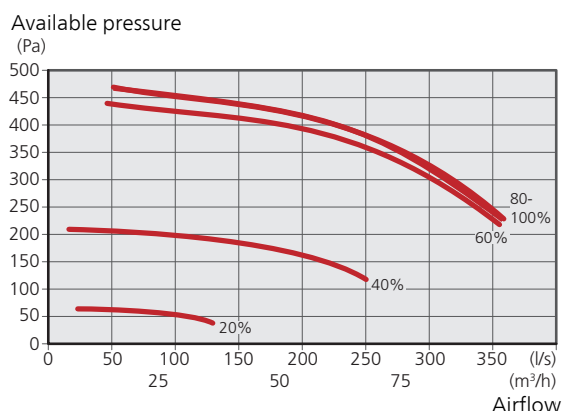
If a stove or similar is installed, it must have airtight doors and be able to take combustion air from outside.

Incorrect ventilation adjustment may lead to reduced installation efficiency and thus poorer operating economy, and may result in moisture damage to the house.

### Fan diagram

Select the ventilation capacity steplessly in the display.

#### Ventilation capacity



## Electrical installation

All electrical equipment is connected at the factory.

- Disconnect NIBE FLM before insulation testing the house wiring.
- Signal cables to external connections must not be laid close to high current cables.
- If the supply cable is damaged, only NIBE, its service representative or similar authorised person may replace it to prevent any danger and damage.



**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.

### Connection of supply to NIBE FLM

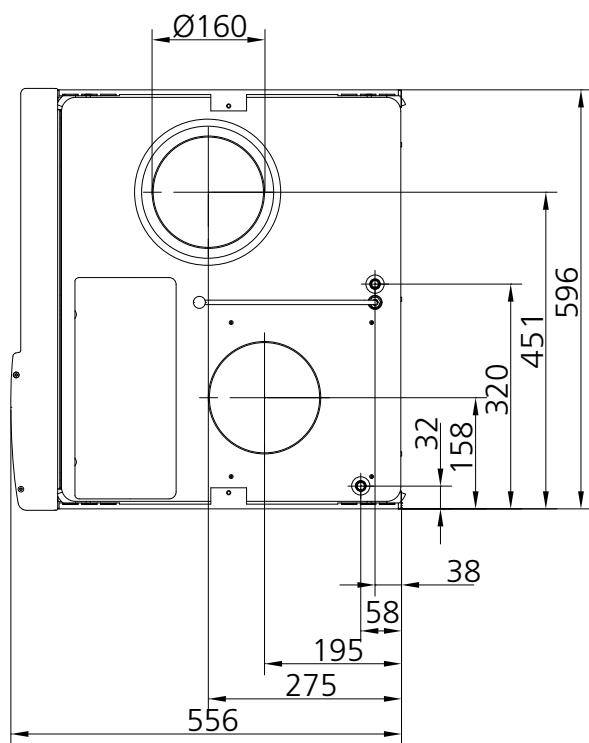
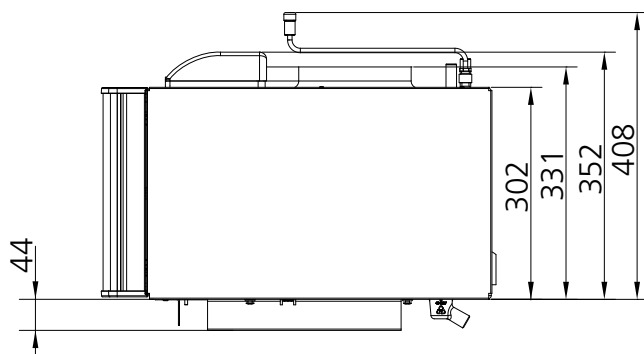
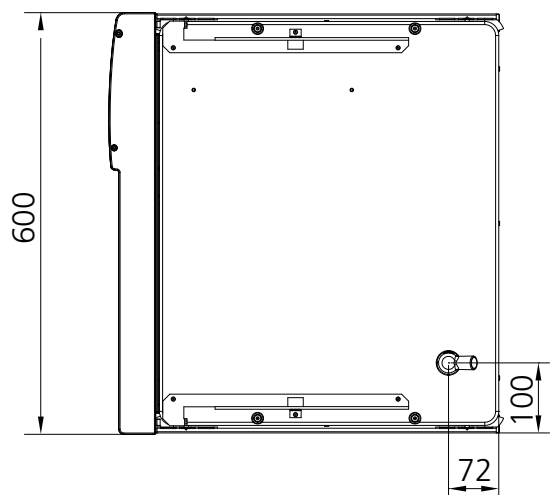
In cases where NIBE FLM is installed together with a compatible heat pump, it is possible to connect the supply for NIBE FLM to the terminal block in the heat pump. If this is the case, remove the plug on the supply cable and then connect the cable to the circuit board in the heat pump.

### Connecting to another heat pump

In cases where NIBE FLM is installed together with another heat pump, connect the exhaust air module to a grounded single phase wall socket or through a permanent installation. For permanent installations, NIBE FLM must be preceded by a circuit breaker with at least a 3 mm breaking gap.

# Technical data

Dimensions (mm)



## Technical data

<b>NIBE FLM</b>		
<b>Electrical data</b>		
Supply voltage	V	230 V NAC 50 Hz
Max driving power circulation pump	W	70
Driving power fan	W	175
Enclosure class		IP21
<b>Ventilation</b>		
Max airflow	m <sup>3</sup> /h	350
<b>Brine circuit</b>		
Minimum incoming brine temperature	°C	-8
Maximum recommended incoming brine temperature	°C	15
Maximum outgoing brine temperature	°C	30
Min pressure brine	MPa/bar	0.02/0.2
Maximum pressure brine	MPa/bar	0.3/3
<b>Sound power level according to EN 12,102</b>		
Sound power level (L <sub>W(A)</sub> ) <sup>1</sup>	dB(A)	36-46
<b>Miscellaneous</b>		
Energy efficiency class		<b>E</b>
Weight	kg	35
Part No.		067 011

<sup>1</sup> The value varies with the selected fan curve.

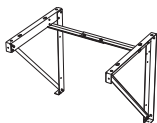
# Accessories

Detailed information about the accessories and complete accessories list available at [www.nibe.eu](http://www.nibe.eu).

Not all accessories are available on all markets.

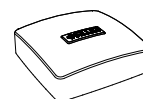
## Bracket BAU 10

Wall mounting of NIBE FLM.



## Room sensor RTS 40

This accessory is used to obtain a more even indoor temperature during cooling.



## Top cabinet

Top cabinet that conceals the ventilation ducts.

