

# NIBE F1355

Ground source heat pump

## Speed-controlled ground source heat pump for large buildings



- Optimal annual coefficient of performance and minimal operating costs thanks to the inverter controlled compressor.
- The heat pump is available in the sizes 4-28 kW.
- Less than 5 tonnes CO<sub>2</sub> equivalent refrigerant amount per cooling section/installation.
- Annual coefficient of performance (SCOP) of 5.35 at 0/35 °C, cold climate.
- The two scroll compressors can supply up to 65 °C to the heating system.
- Double compressors give better power control, longer operating periods, less wear and greater operational security.
- Separate cooling modules for compressors and refrigerants give reliable service and lower noise levels.
- Option to produce heat and hot water at the same time.
- It also gives you the opportunity to control comfort in your home no matter where you are by using NIBE Uplink.
- Display unit with easy-to-read colour screen.
- Energy measurement via the two pulse meter inputs.
- Prepared for (with accessory):
  - Pool heating for both pool and spa.
  - Control of up to eight heating systems.

NIBE F1355 is a complete heat pump for heating large buildings such as apartment buildings, churches and industrial premises.

 **NIBE**

**A+++**

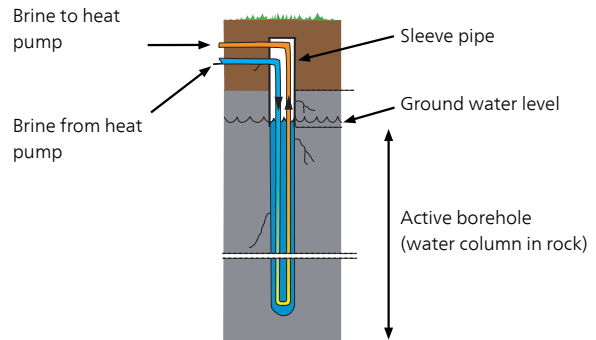
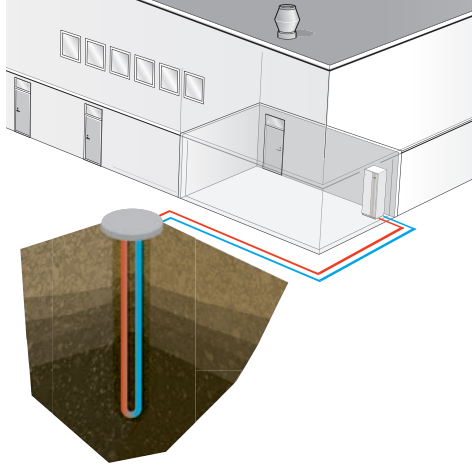
The system's efficiency class for heating.

# This is how NIBE F1355 works

## Installation method

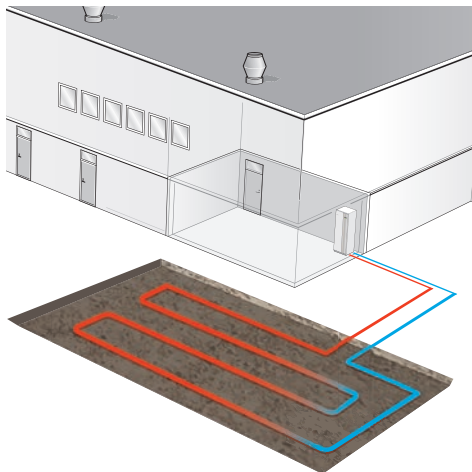
### Rock

F1355 collects a proportion of the rock's stored solar energy via a collector in a borehole in the rock.



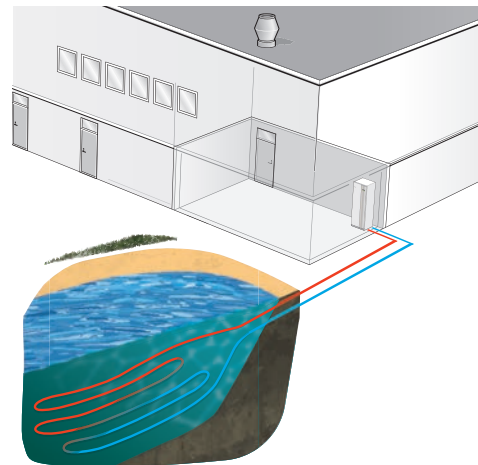
### Ground

F1355 collects a proportion of the ground's stored solar energy via a buried ground collector.



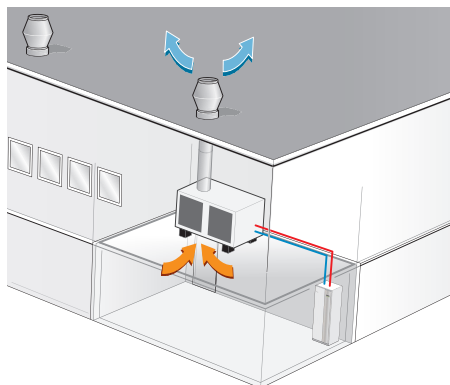
### Lake

F1355 collects a proportion of the water's stored solar energy via a lake collector that is anchored on the lake bed.



### Ventilation recovery

F1355 collects energy from the ventilation air via an air conditioning unit.



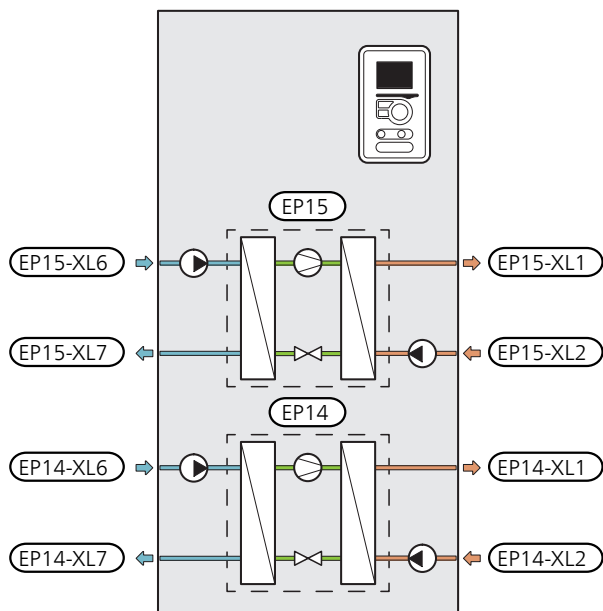
## Design

F1355 is constructed on a robust frame with durable panels and effective soundproofing for the best possible comfort. All panels are easy to remove to facilitate installation and for any servicing.

## Principle of operation

F1355 consists of two heat pump modules, circulation pumps and control system with possibility of additional heat. F1355 is connected to the brine and heating medium circuits.

In the heat pump evaporator, the brine (water mixed with anti-freeze, glycol or ethanol) releases its energy to the refrigerant, which is vaporised in order to be compressed in the compressor. The refrigerant, of which the temperature has now been raised, is passed to the condenser where it gives off its energy to the heating medium circuit and, if necessary, to any docked water heater. If there is a greater need for heating/hot water than the compressors can provide it is possible to connect an external immersion heater.




EP14	Cooling module
EP15	Cooling module
XL1	Connection, heating medium flow
XL2	Connection, heating medium return
XL6	Connection, brine in
XL7	Connection, brine out

## Good to know about NIBE F1355

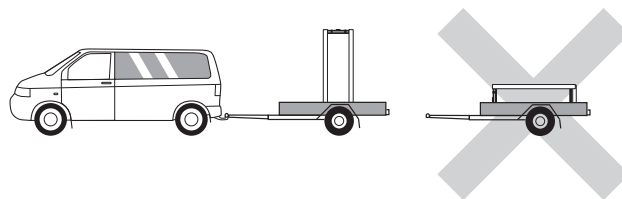
### Transport and storage

F1355 should be transported and stored vertically in a dry place. When being moved into a building, F1355 may be leant back 45°.

 **Caution** The product can be tail heavy.

If the cooling modules are pulled out and transported upright, F1355 can be transported on its back.

Remove the outer panels in order to protect them when moving in confined spaces inside buildings.



### Extracting the cooling modules

To simplify transport and service, the heat pump can be separated by pulling the cooling modules out from the cabinet.

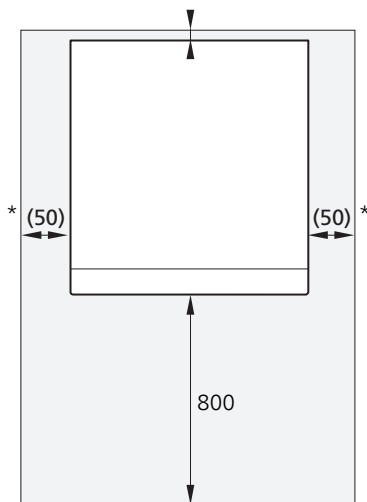
See section "Service" in the Operating Manual for comprehensive instructions about the separation.

## Installation and positioning

- Position F1355 on a fixed foundation that can take the weight of the heat pump.
- Because water comes from F1355, the area where the heating pump is located must be equipped with floor drainage.
- 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.

### Installation area

Leave a free space of 800 mm in front of the product. Approx. 50 mm free space is required on each side, to remove the side panels (see image). The panels do not need to be removed during service. All service on F1355 can be carried out from the front. Leave space between the heat pump and the wall behind (and any routing of supply cables and pipes) to reduce the risk of any vibration being propagated.



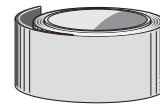
\* A normal installation needs 300 – 400 mm (any side) for connection equipment, i.e. level vessel, valves and electrical equipment.

## Supplied components

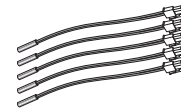
Local differences in the enclosed kit may occur. See relevant installer manual for more information.



Outdoor temperature sensor



Insulation tape



Temperature sensor



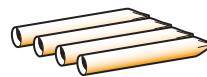
Safety valve  
0.3 MPa (3 bar)



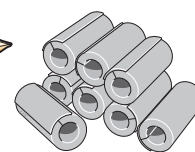
O-rings



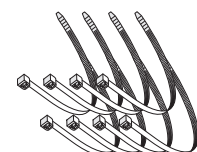
Current sensor



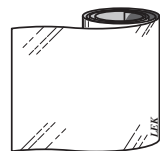
Tubes for sensors



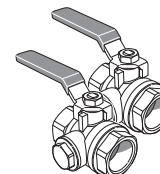
Pipe insulation



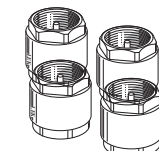
Cable tie



Aluminium tape



Filterball  
4 x G1 1/4 (internal thread)



Non-return valves  
4 x G2, internal thread



Heat conducting paste

### Location

The kit of supplied items is placed in packaging on top of the heat pump.

# Installation

## Inspection of the installation

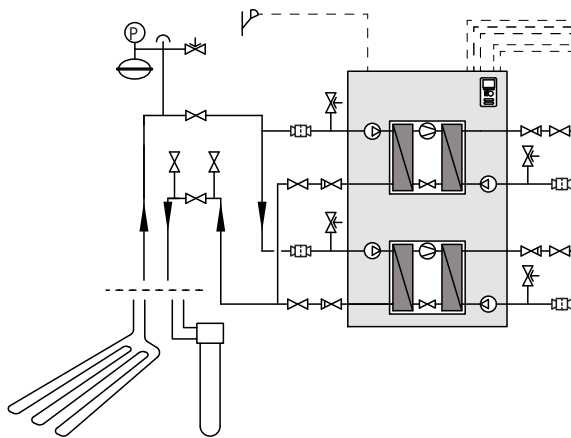
Current regulations require the heating installation to be inspected before it is commissioned. The inspection must be carried out by a suitably qualified person.

## Pipe installation

Pipe installation must be carried out in accordance with current standards and directives. F1355 can operate with a return temperature of up to 58 °C and an outgoing temperature of 65 °C.

F1355 is not equipped with internal shut off valves; these must be installed to facilitate any future servicing.

### Pipe connection brine



- The pipe connections are on the rear of the heat pump.
- Insulate all indoor brine pipes against condensation.



**NOTE** Condensation may drip from the expansion vessel. Position the vessel so that this does not harm other equipment.



**Caution** When necessary you should install venting valves in the brine system.

- Mark the brine system with the antifreeze that is used.
- Install the supplied safety valve at the expansion vessel as illustrated in the outline diagram. The entire length of the overflow water pipe from the safety valves must be inclined to prevent water pockets and must also be frost-free.
- Install shut off valves as close to the heat pump as possible so that the flow to individual cooling modules can be shut off. Extra safety valves between the heat pump and filterballs (according the outline diagram) are required.
- Fit the enclosed filterballs on the incoming pipe.
- Fit the supplied non-return valves on the outgoing pipe.

In the case of connection to an open groundwater system, an intermediate frost-protected circuit must be provided, because of the risk of dirt and freezing in the evaporator. This requires an extra heat exchanger.

### Expansion vessel

The brine circuit must be supplied with a pressure expansion vessel.

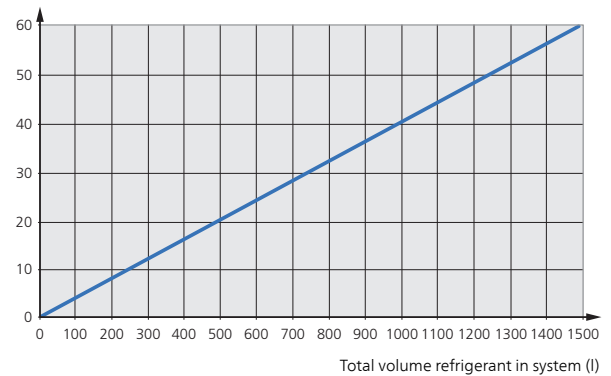
The brine side must be pressurised to at least 0.05 MPa (0.5 bar).

The pressure expansion vessel should be dimensioned as set out in the following diagram, to prevent malfunctions. The diagrams cover the temperature range from 10 °C to +20 °C at pre-pressure 0.05 MPa (0.5 bar) and the safety valve's opening pressure of 0.3 MPa (3.0 bar).

#### Ethanol 28% (volume percent)

In installations with ethanol (28% volume percent) as the brine the pressure expansion vessel must be dimensioned according to the following diagram.

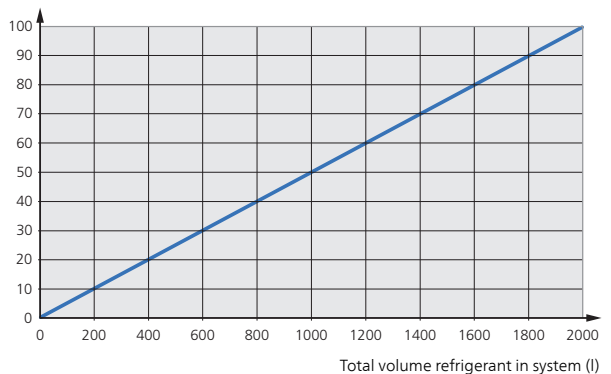
Volume pressure expansion vessel (l)



#### Ethylene glycol 40% (volume percent)

In installations with ethylene glycol (40% volume percent) as the brine the pressure expansion vessel must be dimensioned according to the following diagram.

Volume pressure expansion vessel (l)



## Pipe connection heating medium

### Connecting the climate system

A climate system is a system that regulates indoor comfort with the help of the control system in F1355 and for example radiators, underfloor heating/cooling, fan convectors etc.

- The pipe connections are on the rear of the heat pump.
- Install the necessary safety equipment and shut-off valves (installed as close to F1355 as possible so that the flow to individual cooling modules can be shut off).
- Fit the enclosed filterballs on the incoming pipe.
- The safety valve must have a maximum 0.6 MPa (6.0 bar) opening pressure and be installed on the heating medium return. The entire length of the overflow water pipe from the safety valve must be inclined, to prevent water pockets and must also be frost-free.
- When connecting to a system with thermostats on all radiators, a relief valve must be fitted, or some of the thermostats must be removed to ensure sufficient flow.
- Fit the supplied non-return valves on the outgoing pipe.



**Caution** When necessary you should install vent valves in the climate system.



**Caution** F1355 is designed so that heating production can be performed using one or two cooling modules. However, this entails different pipe or electrical installations.

### Pipe connection water heater

- Any docked hot water heater must be fitted with necessary set of valves.
- The mixing valve must be installed if the setting is changed so that the temperature can exceed 60 °C.
- The safety valve must have a maximum opening pressure of 1.0 MPa (10.0 bar) and be installed on the incoming domestic water line. The entire length of the overflow water pipe from the safety valve must be inclined to prevent water pockets and must also be frost-free.



**Caution** The heat pump/system is designed so that hot water production can be carried out with one or several cooling modules. However, this entails different pipe or electrical installations. Hot water production takes place via cooling module EP14 as standard.



**Caution** Ensure that incoming water is clean. When using a private well, it may be necessary to supplement with an extra water filter.

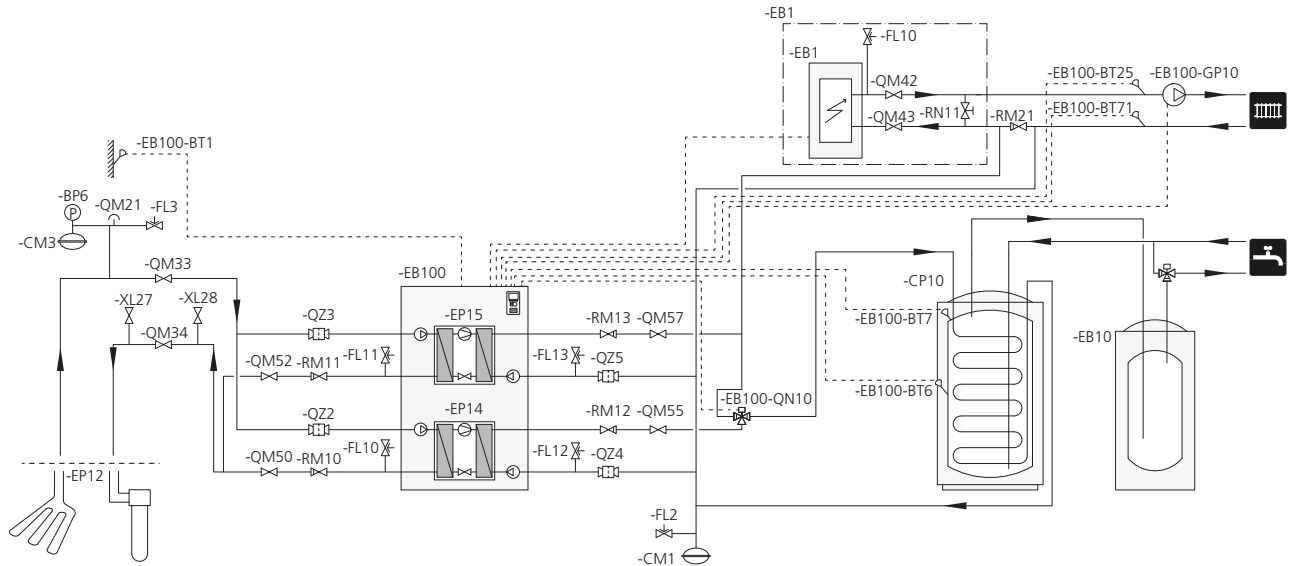
For more information see [www.nibe.eu](http://www.nibe.eu).

## Docking alternatives



F1355 is a flexible product with advanced control equipment and can be adapted to several different system solutions. It is possible to combine F1355 with hot water heating, extra additional heating, ventilation recovery, cooling, etc.

The example below shows F1355 together with hot water heating and step controlled additional heat. Contact your NIBE dealer for more information about how to construct your installation.



## Guideline values for collectors

Type	Surface soil heat, recommended collector length (m)	Rock heat, recommended active drilling depth (m)
28 kW	3x450-4x450	3x150-5x200

Applies to PEM hose 40x2.4 PN 6.3.

These are rough example values. At installation the correct calculations must be made according to local conditions.



**Caution** The length of the collector hose varies depending on the rock/soil conditions, climate zone and on the climate system (radiators or underfloor heating).

Max length per coil for the collector should not exceed 500 m.

The collectors must always be connected in parallel with the possibility of adjusting the flow for the relevant coil.

For surface soil heat, the hose should be buried at a depth determined by local conditions and the distance between the hoses should be at least 1 metre.

For several bore holes, the distance between the holes must be determined according to local conditions.

Ensure the collector hose rises constantly towards the heat pump to avoid air pockets. If this is not possible, airvents should be used.

Because the temperature of the brine system may fall below 0 °C, it must be protected against freezing down to -15 °C. When making the volume calculation, 1 litre of ready mixed brine per meter of collector hose (applies when using PEM-hose 40x2.4 PN 6.3) is used as a guide value.

# Functions

## Control, general

The indoor temperature depends on several different factors. Sunlight and heat emissions from people and household machines are normally sufficient to keep the house warm during the warmer parts of the year. When it gets colder outside, the climate system must be started. The colder it is outside, the warmer radiators and under floor heating system must be.

The heat pump is controlled by built-in supply and return brine temperature sensors (collector). Brine return temperatures can, if necessary, be limited to a minimum e.g. for ground water systems.

Control of the heat production is performed based on the "floating condensing" principle, which means that the temperature level needed for heating at a specific outdoor temperature is produced based on collected values from the outdoor and supply temperature sensors. The room sensor can also be used to compensate the deviation in room temperature.

F1355 can be docked to an external unit with its own heating controls. F1355 then heats up to a fixed temperature level and the heating controls are then controlled by the external unit's regulation device.

## Heat production



The supply of heat to the house is regulated in accordance with the heating curve setting selected. After adjustment, the correct amount of heat for the outdoor temperature is supplied. The supply temperature of the heat pump will hover around the theoretically required value.

Heat production can take place using one or several compressors.

### Own curve

F1355 has pre-programmed non-linear heating curves. It is also possible to create your own defined curve. This is an individual linear curve with a number of break points. You select break points and the associated temperatures.

## Hot water production



This function requires the accessories VST 11 or VST 20. If the water heater is docked to F1355 and there is a hot water demand, the heat pump's software control prioritizes the hot water charging mode with optimal heat pump power. Heating is produced by the second compressor in this mode.

Hot water charging starts when the temperature has fallen to the set start temperature. Hot water charging stops when the hot water temperature at the hot water sensor has been reached.

For occasional higher hot water demand, there is a function called "temporary lux" that allows the temperature to be raised via one time increase or up to 12 hours (selected in the menu system).

## Additional heat only

If F1355 is docked to external additional heat, the installation can be used exclusively with additional heat to produce heating and hot water, for example, before the collector installation is complete.

## Alarm indications

The status lamp lights red in the event of an alarm and the display shows detailed information depending on the fault. An alarm log is created with each alarm containing a number of temperatures, times and operating status.

## Floor drying

F1355 has an integrated underfloor drying function. This allows for controlled drying of concrete slabs. It is possible to create your own program or to follow a pre-programmed time and temperature schedule. External additional heat is required to activate the function.

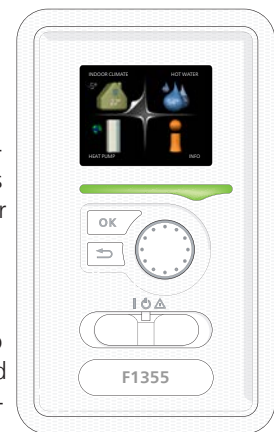
## The display

F1355 is controlled using a clear and easy to use display.

Instructions, settings and operational information are shown on the display. You can easily navigate between the different menus and options to set the comfort or obtain the information you require.

The display unit is equipped with a USB socket that can be used to update the software, save logged information and manage the settings in F1355.

Visit <http://www.nibeuplink.com> and click the "Software" tab to download the latest software for your installation.





## NIBE Uplink



Using the Internet and NIBE Uplink, you can obtain a quick overview and the present status of the installation and the heating in your home. You can obtain a good overall view where you can monitor and control the heating and hot water comfort. If the system is affected by a malfunction, you receive an alert via e-mail that allows you to react quickly.

NIBE Uplink also gives you the opportunity to control the comfort in your home easily, no matter where you are.

### Range of services

You have access to different levels of service via NIBE Uplink. A basic level that is free and a premium level where you can select different extended service functions for a fixed annual subscription fee (the subscription fee varies depending on the selected functions).

NIBE Uplink also available as an app from App Store and Google Play.

### Installation and associated equipment requirements

The following is required in order for NIBE Uplink to function with the installation:

- Network cable Cat.5e UTP (straight, male-male), wired network communication.
- Internet connection (broadband).
- Web browser that supports JavaScript. If Internet Explorer is used, it should be version 7 or higher. See the help file in the web browser for information on how to activate JavaScript.

For further presentation, visit <http://www.nibeuplink.com>.

### NIBE Smart Price Adaption



Smart Price Adaption is not available in all countries. Contact your NIBE dealer for more information.

Smart Price Adaption adjusts the heat pump's consumption according to the time of day that electricity prices are lowest. This allows for savings, provided that the hourly rate subscription has been signed with the electricity supplier.

The function is based on hourly rates for the coming day being downloaded via NIBE Uplink. An internet connection and account on NIBE Uplink are necessary to use the function.

## Extended functions

Visit [www.nibe.eu](http://www.nibe.eu) for further information about which functions are possible with F1355.

### Pool



Up to two different pool systems can be connected to F1355 and controlled individually, however, this requires two POOL 40 accessories.

During pool heating, the heating medium is circulated between the heat pump and the pool exchanger using the heat pump's internal circulation pumps.

### Extra climate system



Up to 7 extra climate systems can be connected to F1355. These can be configured for either heating or cooling.

This function requires the accessory ECS 40/ECS 41 or AXC 50 if larger separate shunt valves are needed.

### Cooling



F1355 can distribute cooling to the climate system together with one of the following accessories:

- AXC 50
- ACS 45
- HPAC 42/45

### Solar heating



With the SOLAR 42 accessory F1355 can use solar heating for hot water charging and heating the building.

# Technical data

## Pump capacity diagrams, collector side

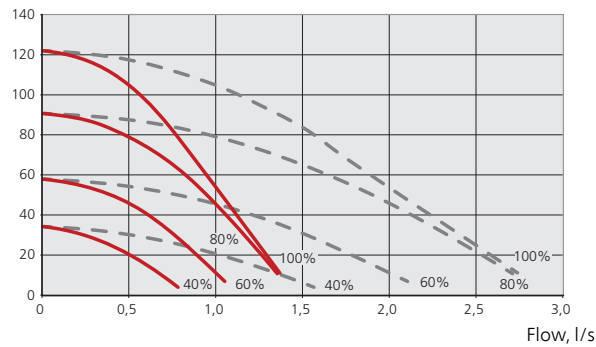
The brine pump must run at the correct speed for the correct flow in the brine system. F1355 has a brine pump that can be automatically controlled in standard mode.

The automatic control occurs when the compressor is running and it sets the speed of the brine pump to obtain the optimal temperature difference between the supply and return lines.

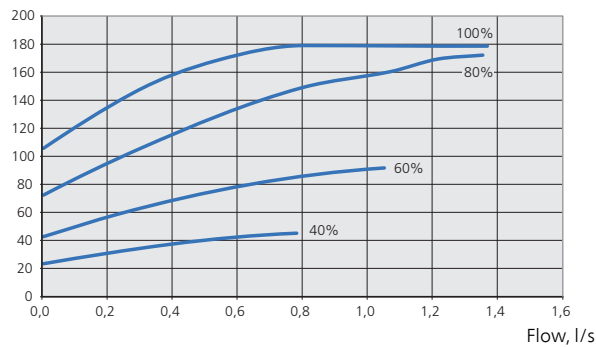
- 1 circulation pump
- - - 2 circulation pumps

### F1355 28 kW

External available pressure, kPa



Electrical output per circulation pump, W



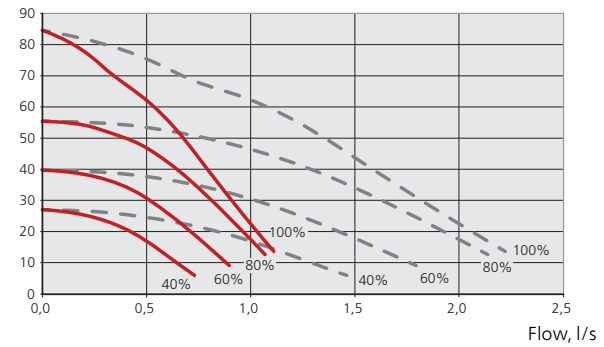
## Pump capacity diagrams, heating medium side

The heating medium pump must run at the correct speed for the correct flow in the heating medium system, F1355 has a heating medium pump that can be automatically controlled in standard mode.

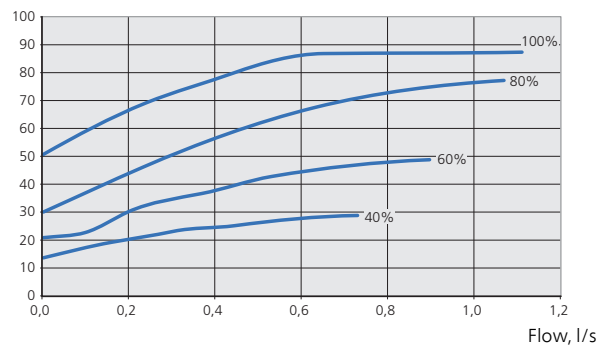
This automatic control occurs when the compressor is running and sets the speed of the heating medium pump, for the present operating mode, to obtain the optimal temperature difference between the supply and return lines.

### F1355 28 kW

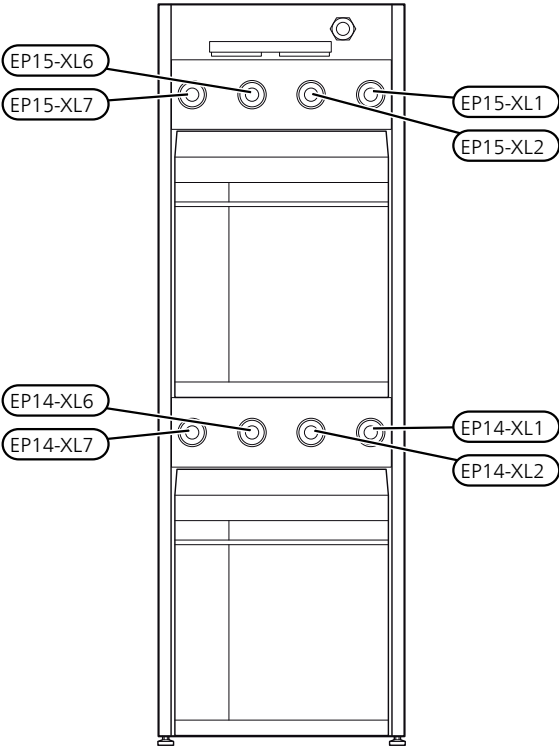
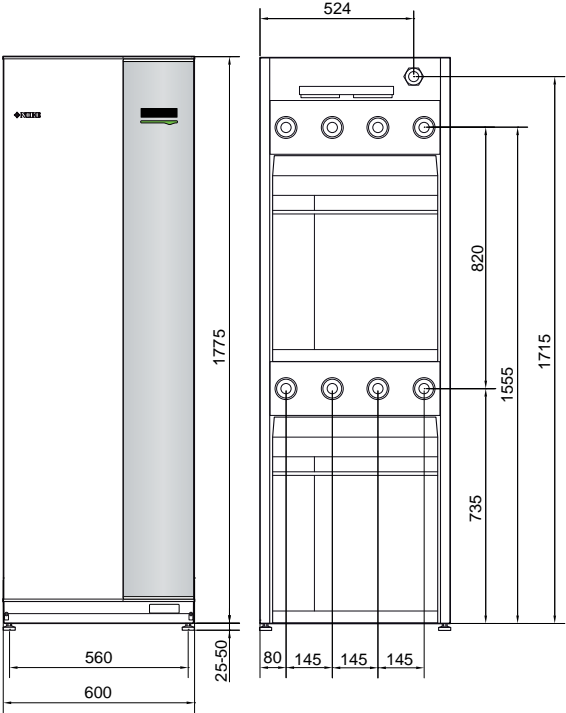
External available pressure, kPa



Electrical output per circulation pump, W



# Dimensions and pipe connections



Connection	
(XL1) Heating medium supply	internal thread G1 1/2 external thread G2
(XL2) Heating medium return	internal thread G1 1/2 external thread G2
(XL6) Brine in	internal thread G1 1/2 external thread G2
(XL7) Brine out	internal thread G1 1/2 external thread G2

## Technical data

Model		F1355-28
<b>Output data according to EN 14511 nominal (50 Hz)</b>		
<b>0/35</b>		
Rated output ( $P_H$ )	kW	20.77
Supplied power ( $P_E$ )	kW	4.56
COP	-	4.55
<b>0/45</b>		
Rated output ( $P_H$ )	kW	19.87
Supplied power ( $P_E$ )	kW	5.54
COP	-	3.59
<b>10/35</b>		
Rated output ( $P_H$ )	kW	26.68
Supplied power ( $P_E$ )	kW	4.76
COP	-	5.60
<b>10/45</b>		
Rated output ( $P_H$ )	kW	25.71
Supplied power ( $P_E$ )	kW	5.84
COP	-	4.40
<b>Output data according to EN 14825</b>		
$P_{designh}$	kW	28
SCOP cold climate, 35 °C / 55 °C	-	5.4 / 4.2
SCOP average climate, 35 °C / 55 °C	-	5.0 / 4.0
<b>Energy rating, average climate</b>		
Space heating efficiency class 35 °C / 55 °C		A++ / A++
Space heating efficiency class of the system 35 °C / 55 °C <sup>1)</sup>		A+++ / A+++
<b>Electrical data</b>		
Rated voltage		400V 3N ~ 50Hz
Max operating current, heat pump	$A_{rms}$	22.1
Max. operating current compressor EP14 / EP15	$A_{rms}$	9.5 / 8.5
Recommended fuse rating	A	25
Starting current	$A_{rms}$	27.7
Max permitted impedance at connection point <sup>2)</sup>	ohm	-
Total output, Brine pumps	W	6 – 360
Total output, HM pumps	W	5 – 174
Enclosure class		IP 21
<b>Refrigerant circuit</b>		
Type of refrigerant		R407C
Fill amount EP14 / EP15	kg	2.2 / 2.0
GWP refrigerant		1,774
CO <sub>2</sub> equivalent EP14 / EP15	ton	3.90 / 3.55
<b>Brine circuit</b>		
Max system pressure brine	MPa	0.6 (6 bar)
Nominal flow	l/s	1.19
Max external avail. pressure at nominal flow	kPa	95
Flow at $P_{designh}$	l/s	1.55
External avail. pressure at $P_{designh}$	kPa	80
Min/Max incoming Brine temp	°C	see diagram
Min. outgoing brine temp.	°C	-12

Model		F1355-28
<b>Heating medium circuit</b>		
Max system pressure heating medium	MPa	0.6 (6 bar)
Nominal flow	l/s	0.48
Max external avail. pressure at nominal flow	kPa	75
Flow at Pdesignh	l/s	0.65
External avail. pressure at Pdesignh	kPa	70
Min/max HM-temp	°C	see diagram
<b>Noise</b>		
Sound power level ( $L_{WA}$ ) according to EN 12102 at 0/35	dB(A)	47
Sound pressure level ( $L_{PA}$ ) calculated values according to EN ISO 11203 at 0/35 and 1 m range	dB(A)	32
<b>Pipe connections</b>		
Brine diam. CU pipe		G50 (2" external) / G40 (1 1/2" internal)
Heating medium diam. CU pipes		G50 (2" external) / G40 (1 1/2" internal)

<sup>1)</sup>Reported efficiency for the system takes the product's temperature regulator into account.

<sup>2)</sup>Max. permitted impedance in the mains connected point in accordance with EN 61000-3-11. Start currents can cause short voltage dips that may affect other equipment in unfavourable conditions. If the impedance in the mains connection point is higher than that stated, it is possible that interference will occur. If the impedance in the mains connection point is higher than that stated, check with the power supplier before purchasing the equipment.

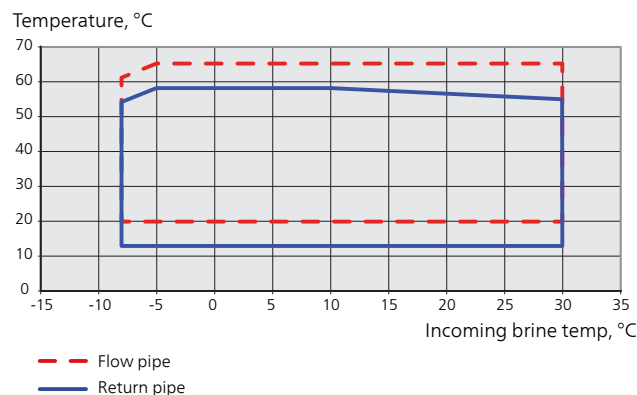
Miscellaneous		F1355-28
<b>Compressor oil</b>		
Oil type		POE
Volume EP14 / EP15	l	1.45 / 1.9
<b>Dimensions and weight</b>		
Width	mm	600
Depth	mm	620
Height	mm	1,800
Required ceiling height <sup>1)</sup>	mm	1,950
Weight complete heat pump	kg	375
Weight only cooling module EP14 / EP15	kg	125 / 130
Part no., 3x400V		065 436

<sup>1)</sup>With feet removed, the height is approx. 1930 mm.

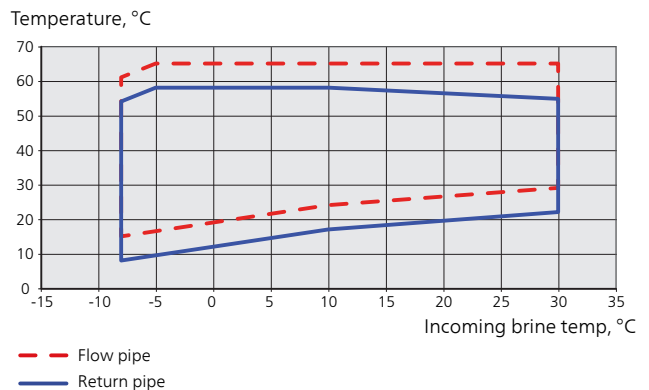
## Working range heat pump, compressor operation

The compressor provides a supply temperature up to 65 °C.

### Cooling module EP14



### Cooling module EP15

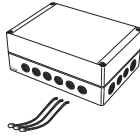


# Accessories

Not all accessories are available on all markets.  
Detailed information about the accessories and complete accessories list available at [www.nibe.eu](http://www.nibe.eu).

## Active/Passive cooling (4-pipe) ACS 45

ACS 45 is an accessory that makes it possible for your heat pump to control the production of heating and cooling independently of each other.



## Active/Passive cooling (2-pipe) HPAC 45

Combine F1355 with HPAC 45 for passive or active cooling.

Intended for heat pumps with outputs 24 – 60 kW.



## External electric additional heat ELK

These accessories may need an accessory board AXC 50 (step controlled additional heat).

### ELK 15

15 kW, 3 x 400 V

### ELK 26

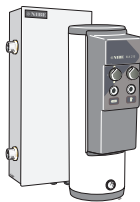
26 kW, 3 x 400 V

### ELK 42

42 kW, 3 x 400 V

### ELK 213

7-13 kW, 3 x 400 V



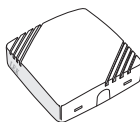
## Extra shunt group ECS 40/ECS 41

This accessory is used when F1355 is installed in houses with two or more different heating systems that require different supply temperatures.



## Humidity sensor HTS 40

This accessory is used to show and regulate humidity and temperatures during both heating and cooling operation.



## Auxiliary relay HR 10

Auxiliary relay HR 10 is used to control external 1 to 3 phase loads such as oil burners, immersion heaters and pumps.



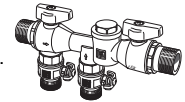
## Communications module MODBUS 40

MODBUS 40 enables F1355 to be controlled and monitored using a DUC (computer sub-centre) in the building.



## Filling valve kit KB 32

Valve kit for filling brine in the collector hose. Includes particle filter and insulation.



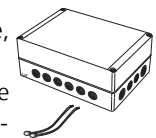
## Room unit RMU 40

RMU 40 means that control and monitoring of F1355 can be carried out in a different part of your home to where it is located.



## Accessory card AXC 50

An accessory board is required if, for example, a ground water pump or external circulation pump is to be connected to F1355 at the same time as the indication of common alarm is activated.



## Buffer vessel UKV

### UKV 200

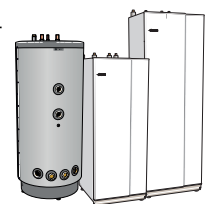
### UKV 300

### UKV 500



## Water heater

For information regarding suitable water heaters, see [www.nibe.eu](http://www.nibe.eu).



## Hot water control

### VST 11

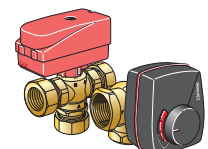
Reversing valve, copper pipe Ø28

(Max recommended power, 17 kW)

### VST 20

Reversing valve, copper pipe Ø35

(Max recommended power, 40 kW)





Subject to printing errors and design changes.



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