

NIBE™ F1345

Ground source heat pump

Step controlled ground-source heating for large buildings.



- Less than 5 tonnes CO₂ equivalent refrigerant amount per cooling section/installation.
- Coefficient of performance (COP) of up to 4.65 at 0/35 °C.
- 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.
- It also gives you the opportunity to control comfort in your home no matter where you are by using NIBE Up-link™.
- Up to 540 kW with 9 x F1345 in the same system.
- Display unit with easy-to-read colour screen.
- Soft-start relays and load monitor factory installed.
- Prepared for (with accessory):
 - Pool heating for both pool and spa.
 - Control of up to eight heating systems.
- 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.
- The heat pump is available as 24, 30, 40 and 60 kW.

NIBE F1345 is a complete heat pump for heating large buildings such as apartment buildings, churches and industrial premises.

 **NIBE**

A+++

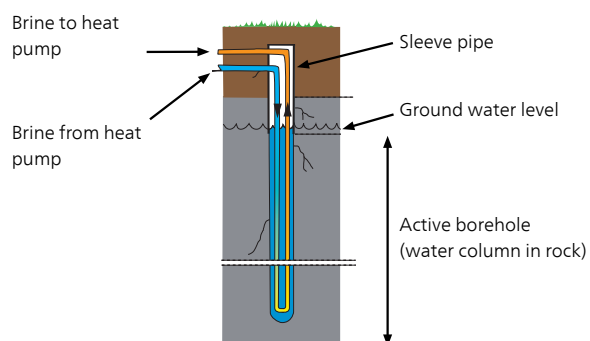
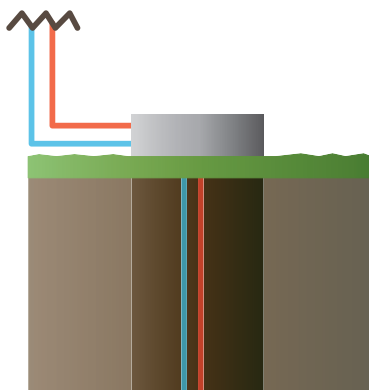
The system's efficiency class for heating 35 °C.

This is how NIBE™ F1345 works

Installation method

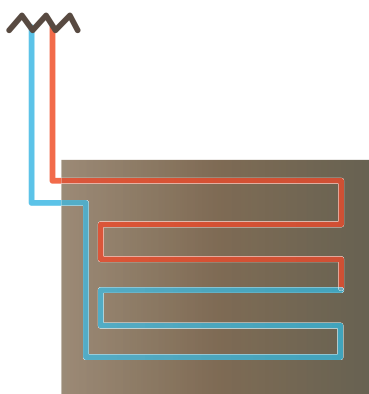
Rock

F1345 collects a proportion of the rock's stored solar energy via a collector in a borehole in the rock.



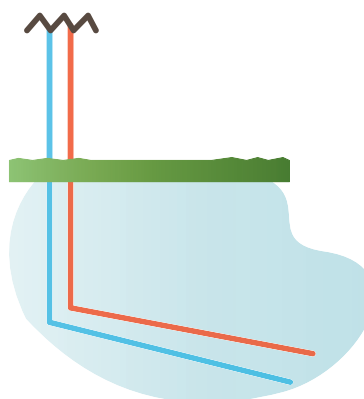
Ground

F1345 collects a proportion of the ground's stored solar energy via a buried ground collector.



Lake

F1345 collects a proportion of the water's stored solar energy via a lake collector that is anchored on the lake bed.



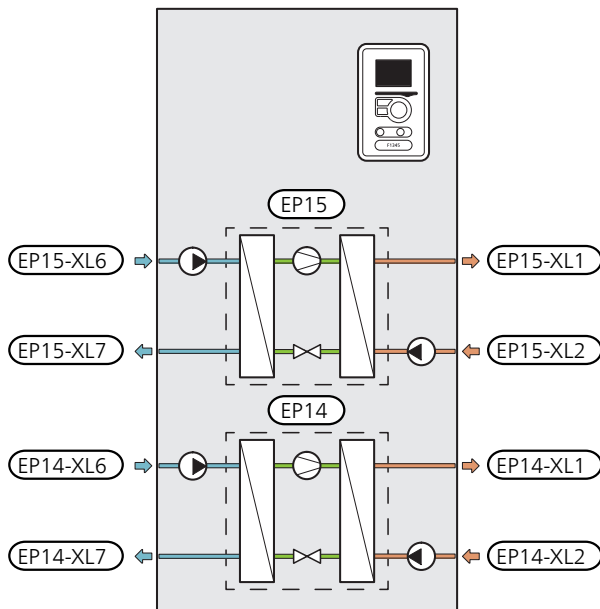
Design

F1345 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

F1345 consists of two heat pump modules, circulation pumps and control system with possibility of additional heat. F1345 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	Compressor module
EP15	Compressor module
XL1	Connection, heating medium flow
XL2	Connection, heating medium return
XL6	Connection, brine in
XL7	Connection, brine out

Good to know about NIBE™ F1345

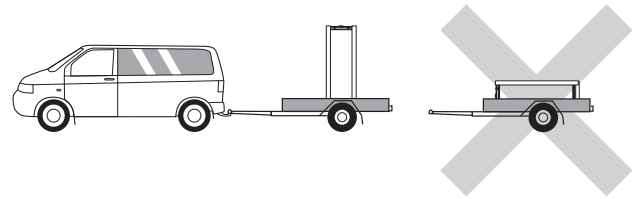
Transport and storage

F1345 should be transported and stored vertically in a dry place. When being moved into a building, F1345 may be leant back 45°.

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

If the cooling modules are pulled out and transported upright, F1345 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.

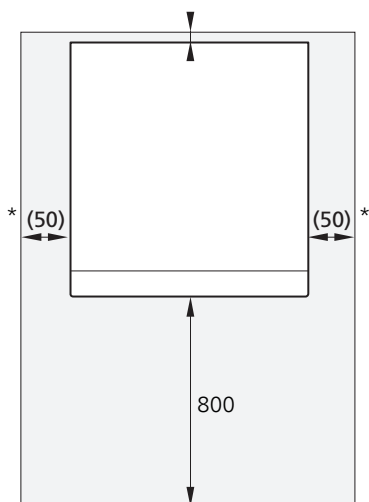
See section "Service" in the Operating Manual for comprehensive instructions about the separation.

Installation and positioning

- Position F1345 on a fixed foundation that can take the weight of the heat pump.
- Because water comes from F1345, 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 F1345 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



Current sensor (not 60 kW)



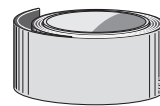
Temperature sensor



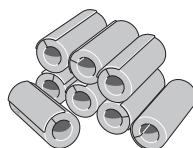
Safety valve
0.3 MPa (3 bar)



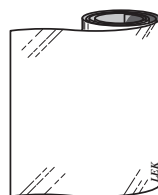
O-rings



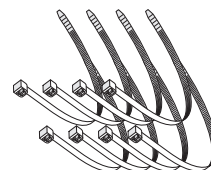
Insulation tape



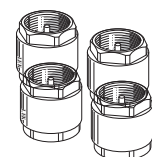
Pipe insulation



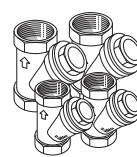
Aluminium tape



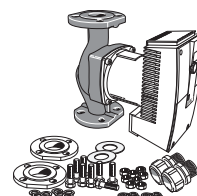
Cable tie



Non-return valves
24 - 30 kW: 4 x G2, internal thread
40 - 60 kW: 2 x G2, internal thread



Particle filter
24 - 30 kW: 4 pcs G1 1/4 (internal thread)
40 - 60 kW: 2 pcs G1 1/4 (internal thread), 2 pcs G2 (internal thread)



External brine pump
(only for 40 and 60 kW)



Heat conducting paste

Location

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

Installation

Inspection of the installation

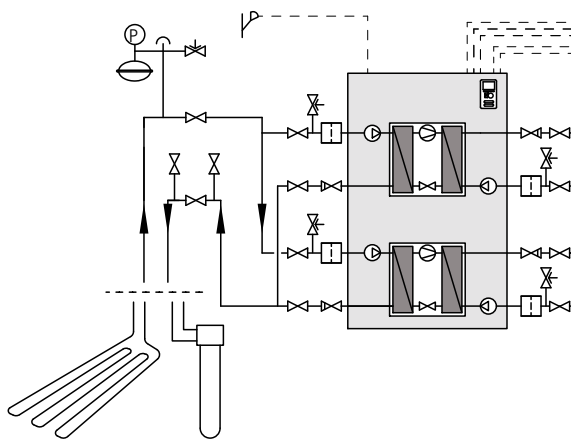
Current regulations require the heating installation to be inspected before it is commissioned. The inspection must be carried out by a suitably qualified person.

Pipe installation

Pipe installation must be carried out in accordance with current norms and directives. F1345 can operate with a return temperature of up to 58 °C and an outgoing temperature from the heat pump of 65 °C.

F1345 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 particle filter and shut off valves (according the outline diagram) are required.
- Fit the supplied particle filter 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.

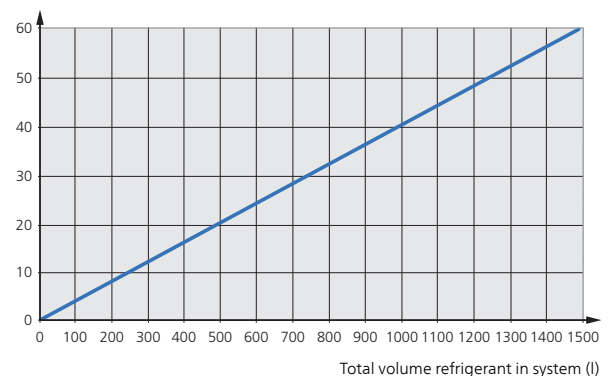
The brine side must be pressurised to at least 0.05 MPa (0.5 bar).

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.

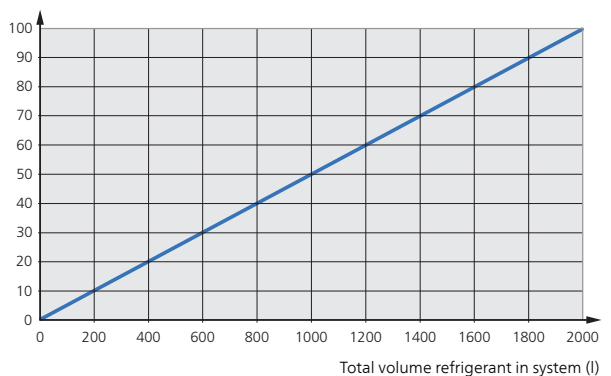
Volume pressure expansion vessel (l)



Ethylene glycol 40% (volume percent)

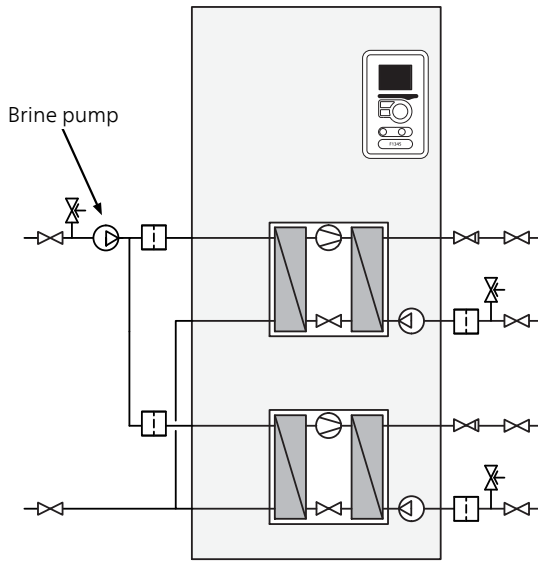
In installations with ethylene glycol (40% volume percent) as the brine the pressure expansion vessel must be dimensioned according to the following diagram.

Volume pressure expansion vessel (l)



Connecting external brine pump (40 and 60 kW only)

Install the brine pump according to the circulation pump manual for connection of incoming brine and between the heat pump and shut off valve (see image).



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 F1345 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 the heat pump as possible so that the flow to individual cooling modules can be shut off).
- Fit the supplied particle filter 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 The heat pump is designed so that heating production can occur with one or two cooling modules. This however 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 in accordance with the water heater manual and be installed on the incoming domestic water line. 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.



Caution The heat pump/system is designed so that hot water production can occur with one or several cooling modules. This however entails different pipe or electrical installations.



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

Fixed condensing

If F1345 is to work with fixed condensing you must connect an external supply temperature sensor according to the Installer Manual. In addition, menu settings must be made (see Installer Manual).

For more information see www.nibe.eu.

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.

F1345 can be docked to an external unit with its own heating controls. F1345 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

F1345 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 VST 20 accessory. If the water heater is docked to F1345 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

F1345 can be used exclusively as an additional heater, to produce heat 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

F1345 has an integrated under floor drying function. This allows for controlled drying of concrete slabs. It is possible to create your own program and to follow a pre-programmed time and temperature schedule.

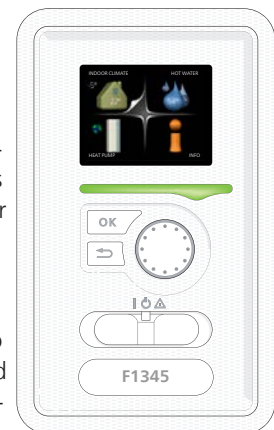
The display

F1345 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 F1345.

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.

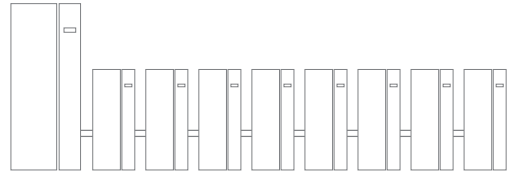
The function is based on hourly rates for the coming day being downloaded via NIBE Uplink™. An internet connection and account on NIBE Uplink™ are necessary to use the function.

Master/slave



Several heat pumps (F1145/F1245/F1345) can be interconnected by selecting one heat pump as master and the others as slaves.

The heat pump is always delivered as master and up to till 8 slaves can be connected to it. In systems with several heat pumps, each pump must have a unique name. Only one heat pump can be "Master" and only one can be for example "Slave 5".



External temperature sensors and control signals must be connected solely to the master, except for external control of the compressor module and reversing valve(s) that can be connected one to each heat pump.

Extended functions

Visit www.nibe.eu for further information about which functions are possible with F1345.

Pool



Up to two different pool systems can be connected to F1345 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 F1345. 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



F1345 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 F1345 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. F1345 has a brine pump that can be automatically controlled in standard mode.

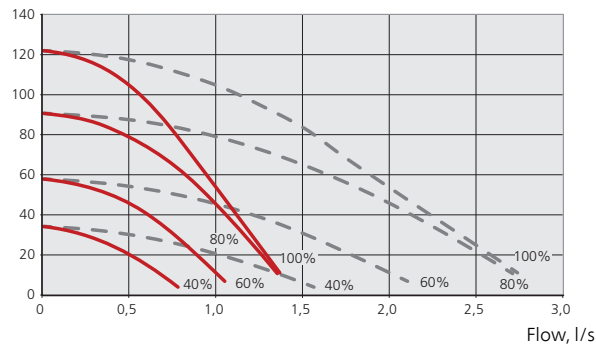
If several F1345 are installed in a master/slave configuration, all F1345 must be the same size (for example 60 kW) for the automatic control to function. If the installation contains a 60 kW and a 40 kW for example, adjustment must be carried out according to manual operation. Refer to the Installer Manual for more information.

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.

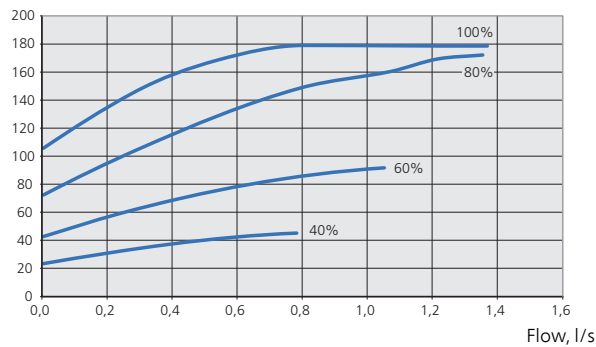
- 1 circulation pump
- - - 2 circulation pumps

F1345 24 kW

External available pressure, kPa

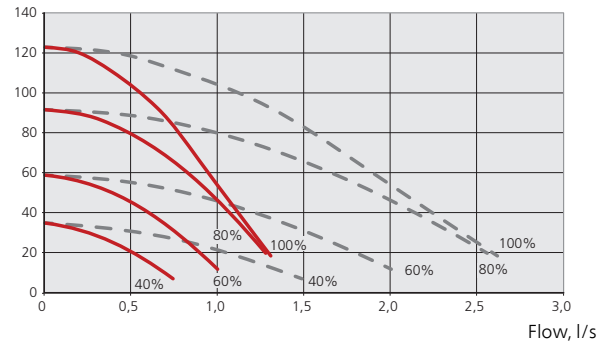


Electrical output per circulation pump, W

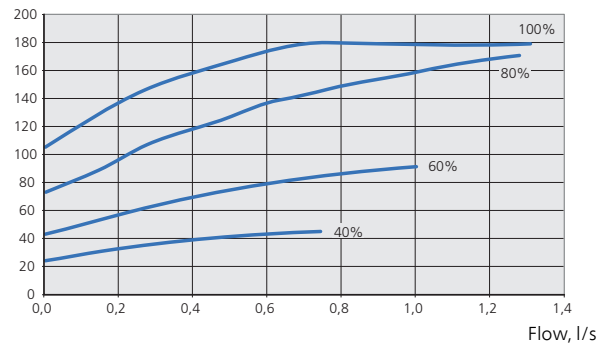


F1345 30 kW

External available pressure, kPa

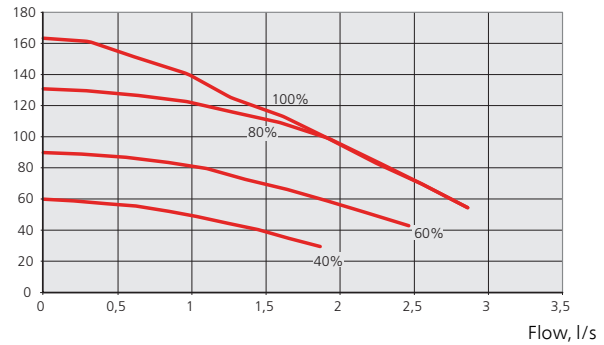


Electrical output per circulation pump, W

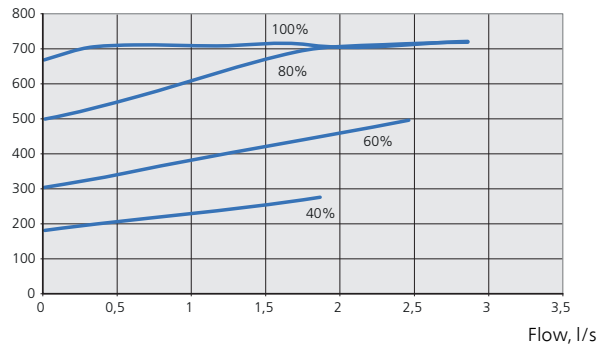


F1345 40 kW

External available pressure, kPa

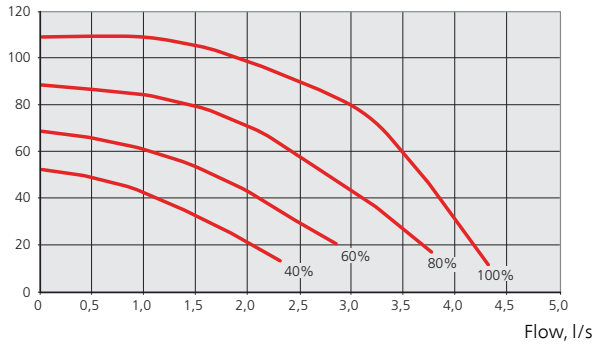


Electrical output circulation pump, W

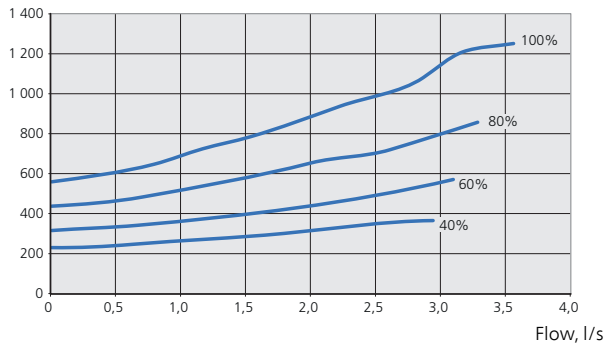


F1345 60 kW

External available pressure, kPa



Electrical output circulation pump, W



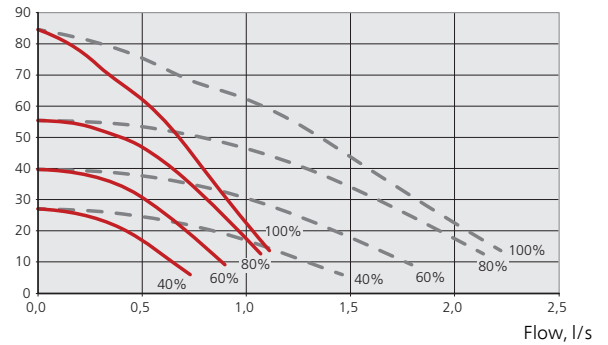
Pump capacity diagrams, heating medium side

The heating medium pump must run at the correct speed for the correct flow in the heating medium system, F1345 has a heating medium pump that can be automatically controlled in standard mode.

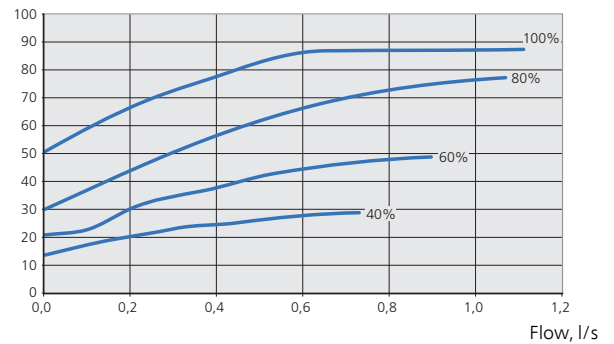
This automatic control occurs when the compressor is running and sets the speed of the heating medium pump, for the present operating mode, to obtain the optimal temperature difference between the supply and return lines.

F1345 24 kW

External available pressure, kPa

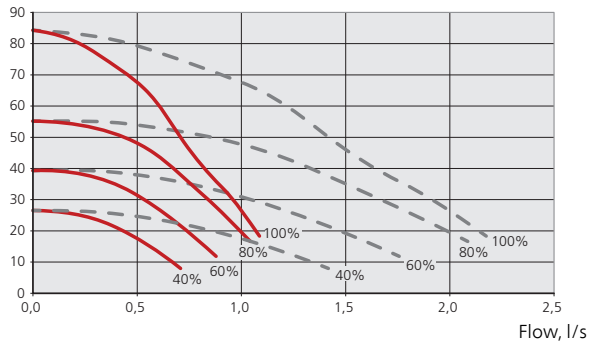


Electrical output per circulation pump, W

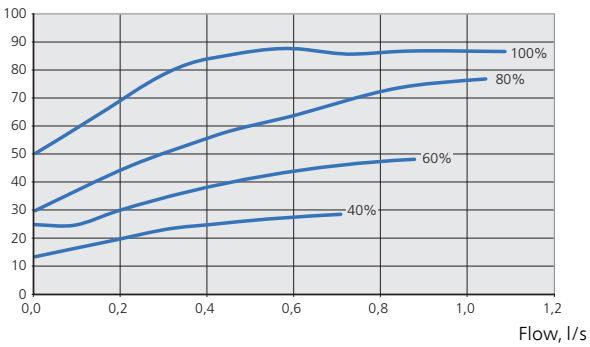


F1345 30 kW

External available pressure, kPa

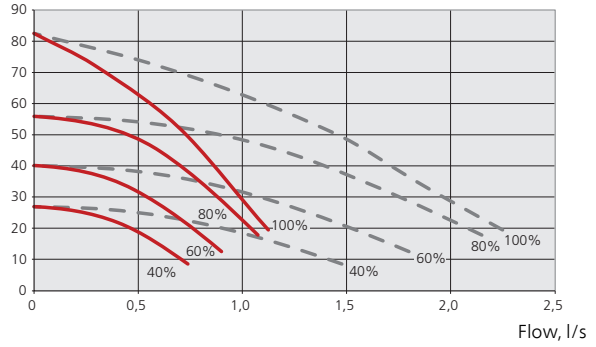


Electrical output per circulation pump, W

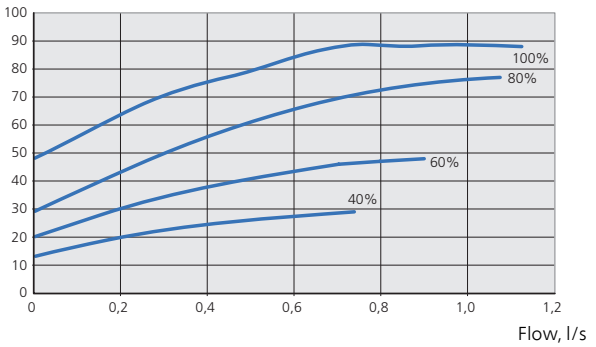


F1345 60 kW

External available pressure, kPa

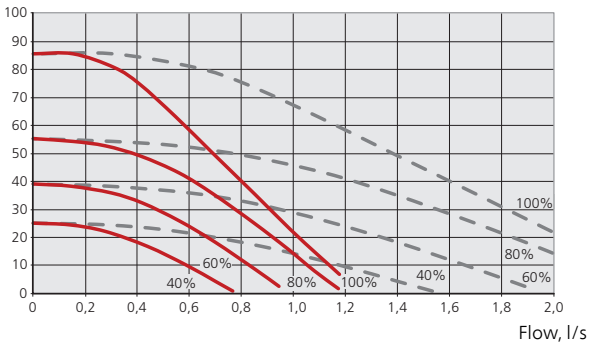


Electrical output per circulation pump, W

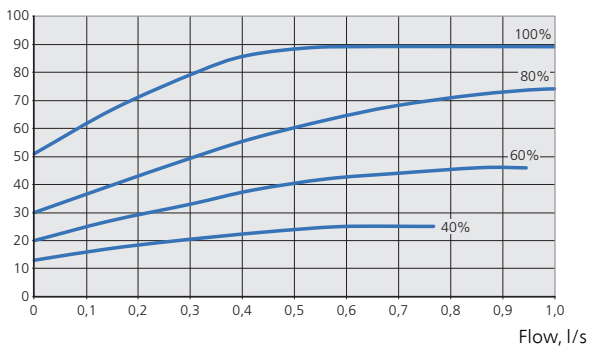


F1345 40 kW

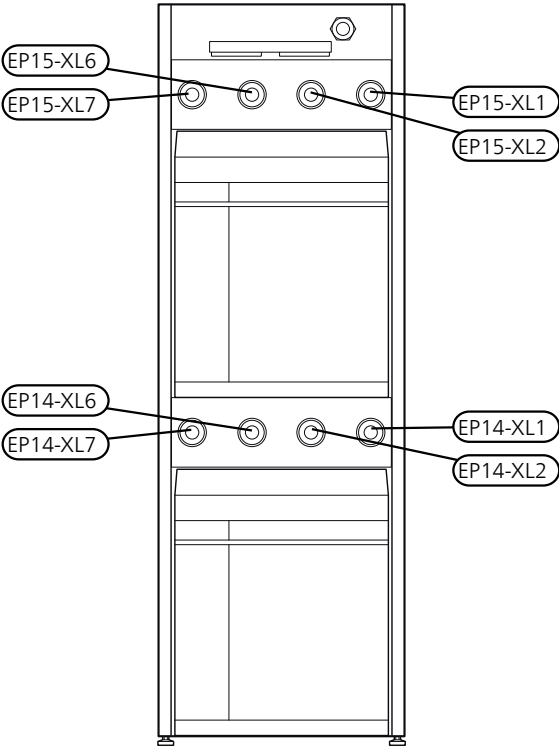
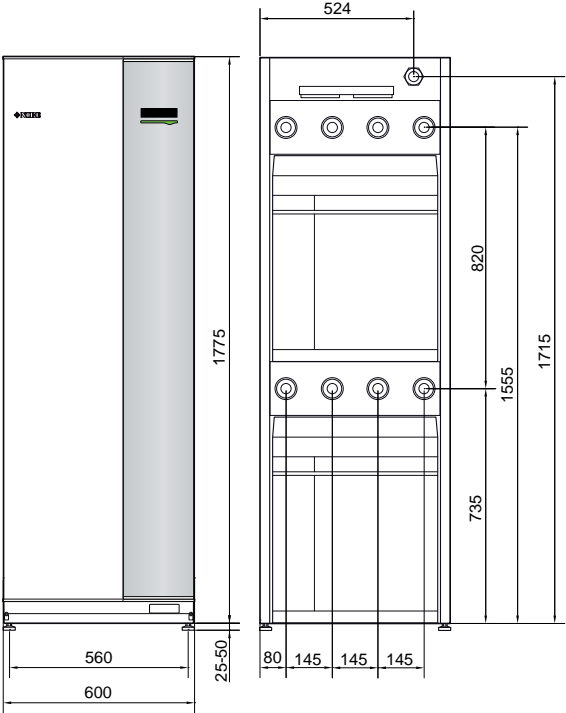
External available pressure, kPa



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 specifications

3x400 V		24	30	40	60
Output data according to EN 14511					
0/35					
Rated output (P _H)	kW	23.00	30.72	39.94	59.22
Electrical input (P _E)	kW	4.94	6.92	8.90	13.72
COP _{EN14511}	-	4.65	4.44	4.49	4.32
0/45					
Rated output (P _H)	kW	21.98	29.74	38.90	56.12
Electrical input (P _E)	kW	5.96	8.34	10.61	16.02
COP _{EN14511}	-	3.69	3.57	3.67	3.50
10/35					
Rated output (P _H)	kW	30.04	40.08	51.71	78.32
Electrical input (P _E)	kW	5.30	7.24	9.81	15.08
COP _{EN14511}	-	5.67	5.53	5.27	5.19
10/45					
Rated output (P _H)	kW	29.28	39.16	50.79	74.21
Electrical input (P _E)	kW	6.34	8.84	11.82	17.60
COP _{EN14511}	-	4.62	4.43	4.30	4.22
Output data according to EN 14825					
Nominal heating output (designh)	kW	28	35	46	67
SCOP _{EN14825} cold climate, 35 °C / 55 °C	-	5.0 / 4.0	4.9 / 3.8	5.0 / 3.9	4.7 / 3.8
SCOP _{EN14825} average climate, 35 °C / 55 °C	-	4.8 / 3.8	4.7 / 3.6	4.8 / 3.8	4.6 / 3.7
Energy rating, average climate					
Space heating efficiency class 35 °C / 55 °C	-	A++ / A++	A++ / A++	A++ / A++	A++ / A++
Space heating efficiency class of the system 35 °C / 55 °C ¹⁾	-	A+++ / A++	A+++ / A++	A+++ / A++	A+++ / A++
Electrical data					
Rated voltage		400V 3N ~ 50 Hz			
Max operating current, heat pump ³⁾	A _{rms}	20.5	25.3	29.5	44.3
Max operating current, compressor	A _{rms}	8.4	11.1	13.1	19.9
Recommended fuse rating	A	25	30	35	50
Starting current	A _{rms}	29	30	42	53
Max permitted impedance at connection point ²⁾	ohm	-	-	-	0.4
Total output, Brine pumps ³⁾	W	6 – 360	6 – 360	35 – 730	40 – 1250
Total output, HM pumps	W	5 – 174	5 – 174	5 – 174	5 – 174
IP class		IP21			
Refrigerant circuit					
Type of refrigerant		R407C			R410A
Fill amount	kg	2 x 2.0	2 x 2.0	2 x 1.7	2 x 1.7
CO ₂ equivalent	ton	2 x 3.55	2 x 3.55	2 x 3.02	2 x 3.55
Brine circuit					
Max system pressure brine	MPa	0.6 (6 bar)			
Min flow	l/s	0.92	1.23	1.59	2.36
Nominal flow	l/s	1.18	1.62	2.09	3.10
Max external avail. press at nom flow ³⁾	kPa	92	75	92	78
Min/Max incoming Brine temp	°C	see diagram			
Min. outgoing brine temp.	°C	-12			

3x400 V		24	30	40	60
Heating medium circuit					
Max system pressure heating medium	MPa	0.6 (6 bar)			
Min flow	l/s	0.37	0.50	0.64	0.92
Nominal flow	l/s	0.54	0.73	0.93	1.34
Max external avail. press at nom flow	kPa	78	72	70	50
Min/max HM-temp	°C	see diagram			
Noise output (L_{WA}) according to EN 12102 at 0/35	dB(A)	47	47	47	47
Sound pressure level (L_{PA}) calculated values according to EN ISO 11203 at 0/35 and a distance of 1 m	dB(A)	32	32	32	32
Pipe connections					
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)			

Miscellaneous		24	30	40	60
Compressor oil					
Oil type		POE	POE	POE	POE
Volume	l	2 x 1.9	2 x 1.1	2 x 1.9	2 x 1.9
Dimensions and weight					
Width	mm	600			
Depth	mm	620			
Height	mm	1,800			
Required ceiling height ⁴⁾	mm	1,950			
Weight complete heat pump	kg	320	330	345	346
Weight only cooling module	kg	130	135	144	144
Part no., 3x400V ⁵⁾		065 297	065 298	065 299	065 300
Part no., 3x400V ⁶⁾				065 301	065 302

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

²⁾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.

³⁾This technical specification applies to the enclosed brine pump.

⁴⁾With feet removed, the height is approx. 1930 mm.

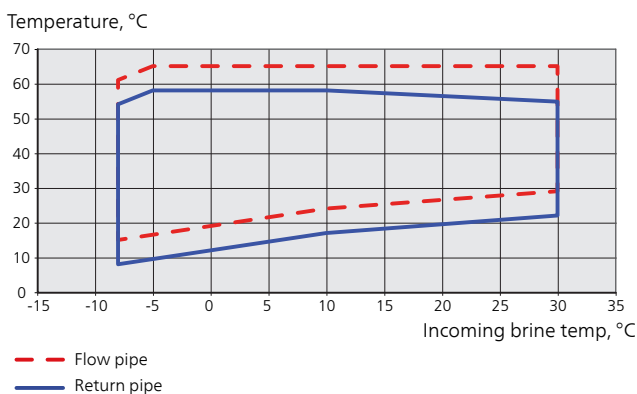
⁵⁾24 and 30 kW with internal brine pump. 40 and 60 kW with supplied external brine pump.

⁶⁾40 and 60 kW without supplied external brine pump.

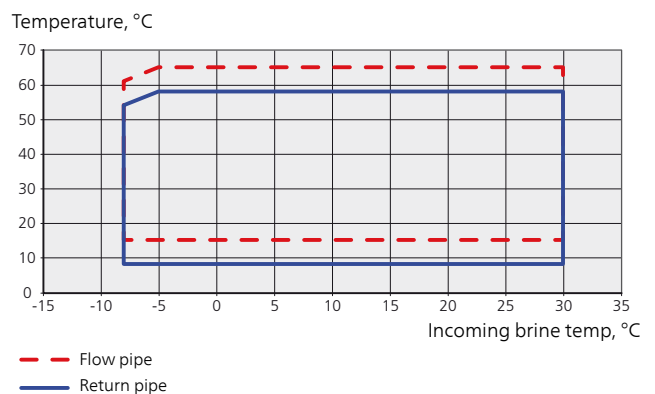
Working range heat pump, compressor operation

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

3x400V 24 kW



3x400V 30 kW, 40 kW, 60 kW

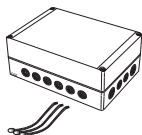


Accessories

Detailed information about the accessories and complete accessories list available at 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 F1345 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

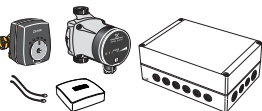
ELK 213

7-13 kW, 3 x 400 V



Extra shunt group ECS 40/ECS 41

This accessory is used when F1345 is installed in houses with two or more different heating systems that require different supply temperatures.



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.



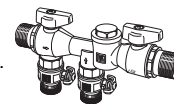
Communications module MODBUS 40

MODBUS 40 enables F1345 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.



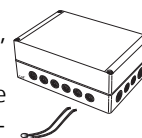
Room unit RMU 40

RMU 40 means that control and monitoring of the heat pump can be carried out in a different part of the accommodation to where F1345 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 F1345 at the same time as the indication of common alarm is activated.



Buffer vessel UKV

UKV 200

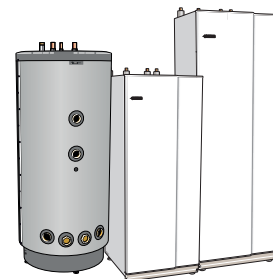
UKV 300

UKV 500



Water heater

For more information regarding suitable water heaters, see www.nibe.eu.



Hot water control

VST 11

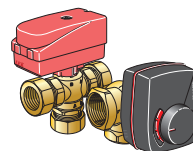
Reversing valve, copper pipe Ø28

(Max recommended power, 17 kW)

VST 20

Reversing valve, copper pipe Ø35

(Max recommended power, 40 kW)



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