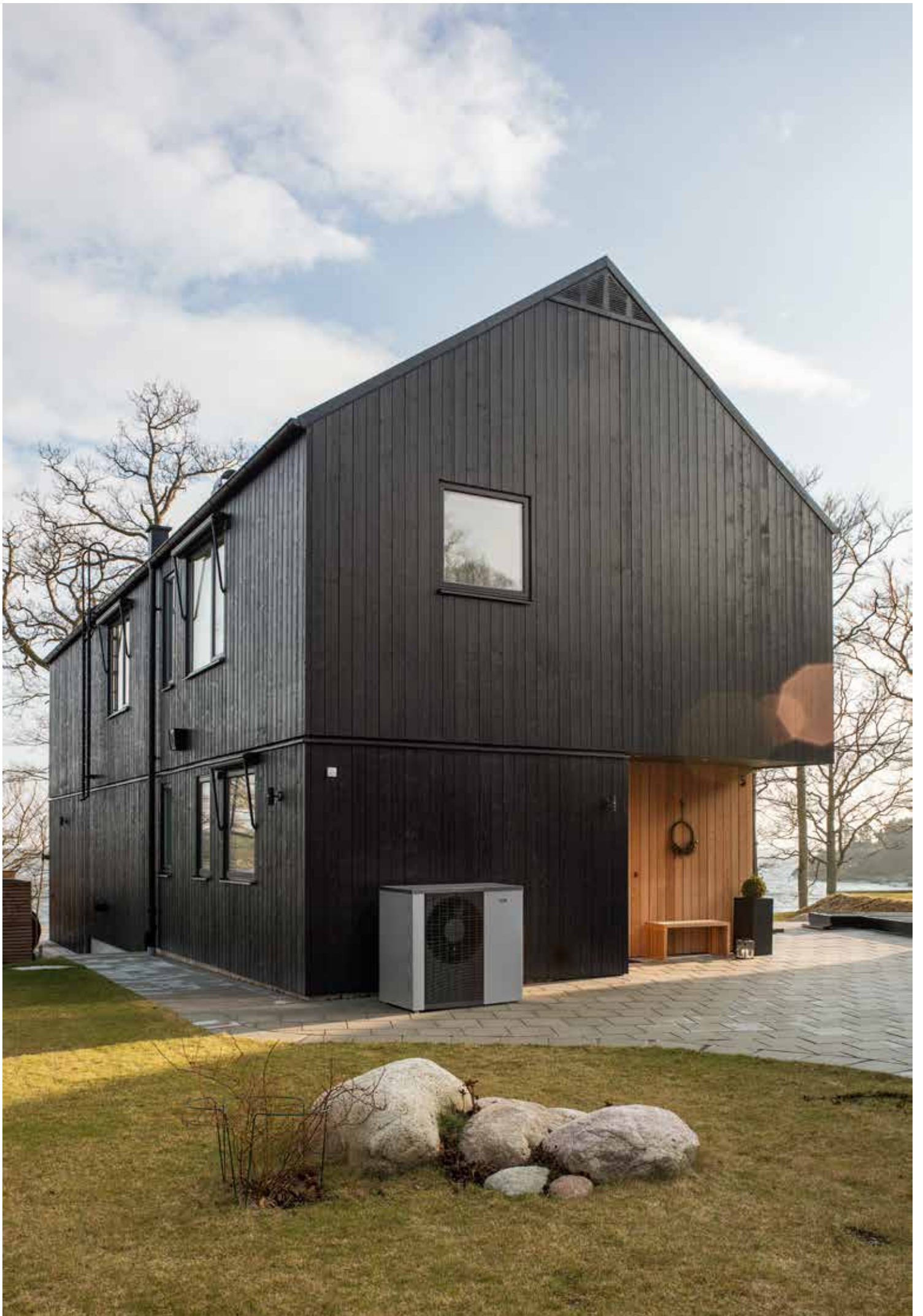


NIBE APARTMENT BUILDINGS AND COMMERCIAL APPLICATIONS



 **NIBE**

NIBE HEAT PUMPS FOR LARGE  
APARTMENT BUILDINGS AND  
COMMERCIAL APPLICATIONS  
Find energy everywhere



## ENERGY OUT OF THIN AIR? IT'S NOT MAGIC. IT'S NIBE.

Look out of your window and you see streets. Or trees. Or maybe open fields. At NIBE we see free sources of energy – from the air around you and the ground beneath your feet.

Fresh air is free. And with a NIBE air/water heat pump you can use it to heat your home. Even at sub-zero temperatures, ambient air contains energy. And when you concentrate that energy using a NIBE heat pump you can heat up your home's water-based radiators – or underfloor heating, and domestic hot water.

Our smart technology uses energy from the ground too. A NIBE ground source heat pump collects solar energy stored in the ground to heat your building. Energy builds up underground from the first days of spring when the surface of the earth starts to thaw, to high summer, when the rays of the midday sun penetrate deep down. By the time autumn leaves fall, there's enough energy stored in the ground to heat up your building throughout the coldest winter.

You can even use our ground source heat pumps for cooling applications through out the year.

Using the energy from outside air, or the ground beneath your feet might sound like magic. But for us it's natural. Our pumps have been heating homes in Sweden using natural elements for over 30 years.

IF WE CAN SAVE BIG BUCKS ON SMALL HOUSES,  
IMAGINE WHAT WE CAN DO WITH  
LARGE APARTMENT BUILDINGS!



Heat pumps have been without doubt the Swedish householder's greatest money-saver in recent years. More and more property owners now realize that heat pumps can deliver major savings and are therefore a smart solution - in both financial and environmental terms. What's more, you don't have to commit to a particular supplier.

NIBE now offers installations up to 540 kW that are capable of covering most needs – even buildings with high energy consumption. Since there is no need for cisterns or fuel storage, you can spread several installations around larger buildings. We're not talking about saving small change here. A heat pump can make a much bigger difference than that. So why burn money when you could be saving it, irrespective of the current interest rate or state of the economy?

### **Climate-smart**

Another important reason to choose a NIBE heat pump is that it's so environmentally friendly. Since the heat pump work by converting stored energy into central heating and warm water, emissions are naturally much lower than those of a traditional fuel-based heating system.

In some countries, subsidies are now granted to homeowners for changing from fossil fuel-based heating systems to more modern, renewable energy sources. Since ground source and air/water heat pumps are officially recognized as a climate-smart option, they are fast becoming the obvious choice.

### **Freedom of choice**

Switching to a heat pump is a great way to control your costs and reduce environmental impact. A heat pump lets you keep your options open. It lets you choose the right type of heating that's best for your property. One that saves you money, and ultimately saves on the natural resources future generations will so badly need.

### **Less hassle**

Another advantage of heat pumps is that they barely require any work. There's no fuel to order. No maintenance, no chimney sweeping. Nothing. Just an electricity metre which you might want to smile at from time to time.



Efficient, safe and problem-free heating and hot water at a fraction of the alternative cost and a fraction of the environmental impact.

### **What's special about apartment buildings?**

To install a heat pump in a private home is one thing. To install one in an apartment building is quite another. There are many variables to take into account. We are here to help you choose the right solution and the right sized installation. We've had years of experience in providing heating solutions to suit every kind of building - from churches to the ice hotel; from factories to pig farms; from schools to apartment buildings. We know where problems can arise and how to avoid them. We know what the common pitfalls are. What's more, we know how to plan an installation that will give you peace of mind. Visit [www.nibe.eu](http://www.nibe.eu) to find out more.

# THERE'S ENERGY EVERYWHERE. WE JUST HELP YOU TO TAP INTO IT.

Heat pumps can extract energy from a variety of different sources. The one you choose will depend on conditions at the site of your building. With an air/water heat pump, energy is extracted from the outside air and concentrated in order to provide heat to warm up the building's water-based radiators, underfloor heating and showers or bath water.

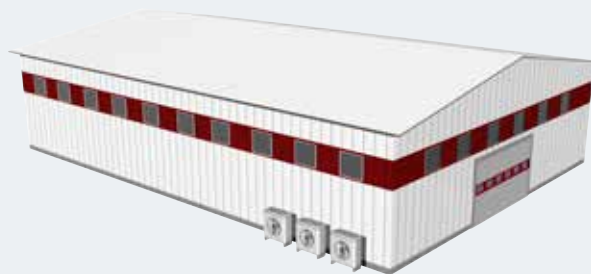
With a ground source heat pump, energy can be collected from several different sources: rock, surface soil, ground water and lake. The most suitable one in each case is determined by factors such as the building's energy needs, its current heating system and the kind of terrain the building is situated on.

## Air/Water heat pump

Takes energy from the outdoor air.

- Simple installation
- No impact on your garden

An air/water heat pump extracts the energy found in the outdoor air. This is achieved by allowing the outdoor air to pass across an air coil in the outdoor unit where energy is transferred to the heat pump's low temperature side. The output decreases as the outdoor temperature drops, which means you need another form of heating during really cold weather.

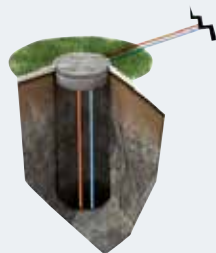
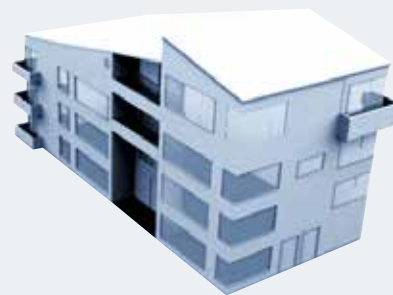


## Rock - using a ground probe

Ideal for refurbishment or adaptation from a fossil fuel based heating system.

- Irrespective of the climate zone
- Space-saving compared to other ground-source heating alternatives
- Excellent output even on the coldest days
- Great reliability, minimal maintenance
- Efficient free cooling performance

A heat source with an almost constant temperature lies in the lower subsoil of the so-called "near-surface geothermal layer". It can be used all year round. The heat pump collects stored solar energy from a collector in a hole drilled into the rock. The depth of the hole can vary between 90 – 200 metres, depending on the size of heat pump selected and on local building regulations. This type of system can be used for all possible building types, large or small, public or private. It requires little space and the ground probe can be drilled in the smallest of gardens.

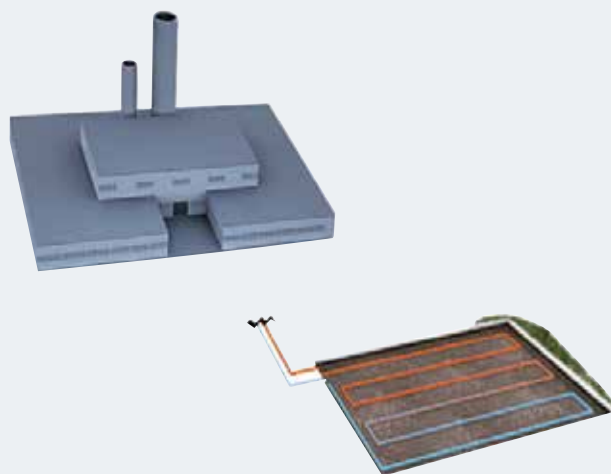


### Surface soil - using a surface collector

Cost-effective energy collection.

- Irrespective of the climate zone
- Excellent output even on the coldest days
- Great reliability, minimal maintenance
- Free-cooling option

During the summer, solar heat is stored in the soil. This is either directly absorbed as insulation or as heat from rain and the air from the near-surface layer of the soil. The heat pump collects this stored solar energy from a buried collector, each hose filled with anti-freeze, and buried at a depth of about 80 – 100 cm. The length of the hose varies between 250 and 400 metres, depending on the size of heat pump selected. Using this energy for heating is a cost effective method. The highest yield can be obtained from soil with a high water content.

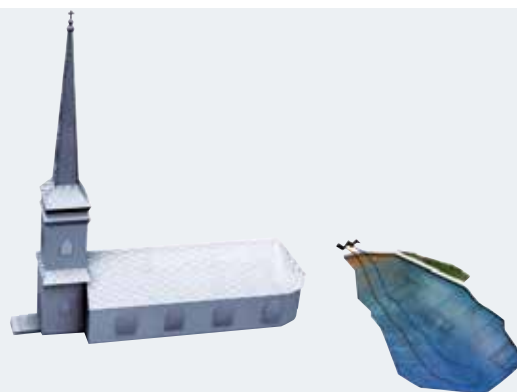


### Lake collector

Cost-effective installation for lakeside buildings.

- Irrespective of the climate zone
- Excellent output even on the coldest days
- Great reliability, minimal maintenance
- Free-cooling option

If your home is built beside a water source such as a lake, heat from the lake water can be extracted using a surface soil collector anchored to the bottom of the lake.

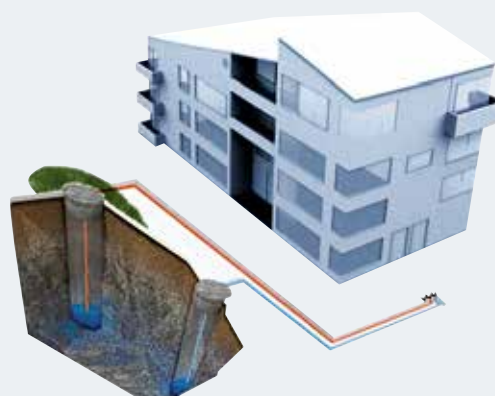


### Ground water

A viable energy source for any building where ground water is easily accessible.

- Irrespective of the climate zone
- Excellent output even on the coldest days
- Great reliability, minimal maintenance
- Free-cooling option
- High seasonal COP

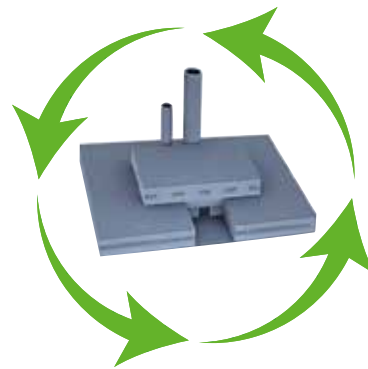
Ground water can also be utilised as a heat source since it has a temperature of between 4 and 12°C all-year round. The heat pump collects solar energy stored in the ground water. Normally, there is one well for drawing up water and one for returning it.



# PROCESS HEAT

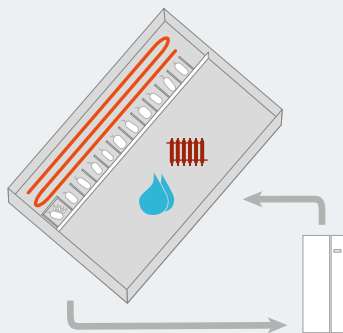
Lots of companies produce heat as a byproduct of their daily operations and do not use it. They just throw it away. Examples are hydraulic presses, heavy machines, dryers, fertilizer, cooking, and storing goods in facilities with at temperatures that are too high.

Many of these process heat sources can be used by a heat pump with excellent results. The warmer the source, the better the savings it delivers. Use your imagination!



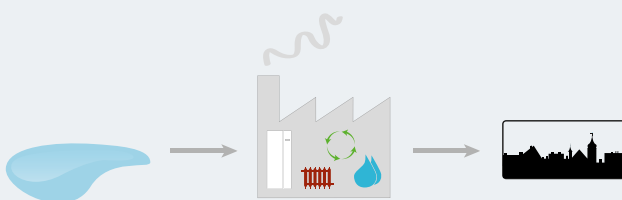
## Manure Heat

A lot of heat is used in pig farming. For this reason, more and more farmers are starting to recycle the heat from their pig manure. They bury heat collecting pipes in the manure in order to take advantage of the heat from the hot slurry and run it through heat pumps. Some farms have already achieved major savings by this method in just a few years.



## Water Heating

A water treatment plant heats its facilities and domestic hot water using the tap water that it treats as an energy source. The incoming water is transported through a separate loop, equipped with heat exchanger, reducing the risk of leakages.

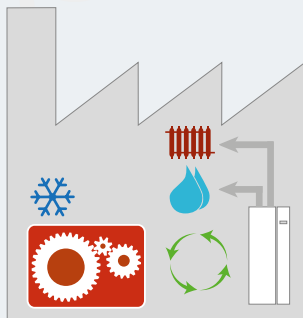


*\* if you need a special system solution, contact your installer.*



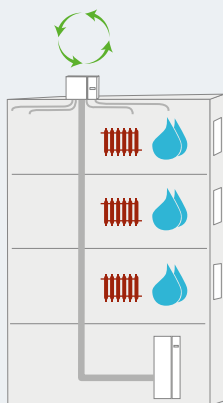
### Hydraulic heat

Waste heat is recycled from hydraulic presses, cooling the oil to keep it at a stable temperature. In a satisfyingly neat cycle the energy recovered produces enough heat to wash and dry the pressed part as well as domestic water to wash and dry the pressed parts.



### Ventilation heat recycling

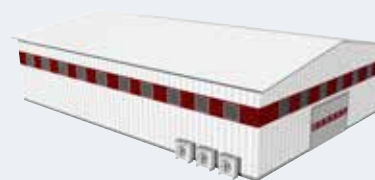
Exhaust air heat pumps have long been common in private homes. In larger buildings, it is also possible to take advantage of this heat source - which would otherwise be lost along with the ventilated air. This is one of the most profitable energy savings for larger apartment buildings.



*\* if you need a special system solution, contact your installer.*

## REFERENCE CASE 1

A SMALL INVESTMENT LED TO MAJOR SAVINGS



### The background

Norskens Wood in Ljungby is a traditional building supplies store. It also makes windows, specialising in circular and half moon shaped frames. In 2009, the company moved south of Ljungby, Sweden into brand new premises. These included a retail store, office and staff areas of approximately 600 square meters on two levels. Norskens Wood turned to the local plumber "Ohlssons Rör" to install a new heating system, explaining that they wanted a solution that demanded a minimum amount of effort.

### Solution

In spite of the large area that needed heating, costs were moderate. This made it hard to evaluate the benefits of a drilling or digging solution. The local plumber "Ohlssons Rör" therefore selected a NIBE air/water heat pump. Air/water heat pumps are slightly less efficient than ground source heat pumps, but since no drilling is necessary, the installation costs are considerably lower. As a guideline, the model you choose will depend on how much heat you need on a "normal day" and how many days a year you need the system to work at full effect.

In Norskens Wood's case the best solution turned out to be three NIBE F2025 14 kW air/water heat pumps. They are supported by a 42 kW electric boiler EP42. All the rooms at Norskens Wood's premises are heated by an under floor heating system, including the upper floor.

### Results

"We've tested the whole system during the coldest winter days without any problem," says Sven-Olof Sjöholm at Norskens. According to NIBE's Fredrik Snygg, "More and more people are realising that air/water heat pumps are a good option for larger premises."

Using a NIBE SMO 40 control unit, you can easily link 8 heat pumps up together in the same system. Providing up to 160 kW (F2300-20) heat, this adequately covers the needs of the majority of buildings in southern Sweden."

## FACTS

- Installer: Ohlssons Rör
- Facility: Construction Retail store Ljungby
- District: South of Sweden
- Dimensioning local outdoor temperature: -23°C
- Heated area: 600 m<sup>2</sup>
- Heat pumps: 3 x NIBE F2025 (14 kW)
- Electric Boiler: EP 42 (42 kW)

## REFERENCE CASE 2

SWEDISH APARTMENT BLOCK  
SLASHES ENERGY USE BY 65%



### The background

The owners of a large (1,200 sq. m.) 1905s building in Laholm, South Sweden rented six apartments to private people and space to a hairdressing salon as well as a café. The salon and café consumed a lot of hot water every day. The owners were looking for an environmentally friendly heating system that would increase profits without them having to increase rents. The price of gas, high ceilings and poor insulation were pushing up energy bills year-on-year – especially in recent very cold winters with temperatures well below minus.

### Solution

The owners agreed on a gas hybrid heat pump solution that would be installed in two stages. In year 1, the owners added a NIBE F2025-14 kW air-water pump, VPA300/200 water heater and NIBE SMO 10 basic controller to their heating system. After two years the owners were so pleased with the savings they achieved that they added one more NIBE F2300 20 kW air-water heat pump.

### Results

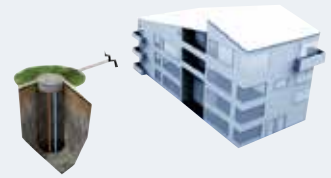
In the first year, energy use was reduced by 35%. After the second installation, energy use was cut by 65%. The complete system comfortably heats a larger property of this size, supplying water at a constant temperature of 65°C. What residents particularly liked was the low noise of the heat pumps, and the significant reduction on environmental impact the system made. This case shows that even though the heat pump covers only a small part of the buildings power demand on the coldest day, the energy savings over the year will be significant.

## FACTS

- Facility: 1905s apartment building
- District: Laholm, South Sweden
- Dimensioning local outdoor temperature: -19°C
- Heated area: Around 1,200 Square metres
- Heat pumps: Year 1 1 x NIBE F2025 air-water heat pump 14 kW.  
Year 2 1 x NIBE F2300 air-water heat pump 20 kW
- Control unit: NIBE SMO 10
- Water heater: VPA300/200, PUB-210

## REFERENCE CASE 3

HEAT PUMPS MAKE THE ICE HOTEL HOT AND THE WORLD COLD.



### The background

When you make your living out of the cold - which is the case for northern Sweden's Ice Hotel –thinking about climate issues is unavoidable. The Ice Hotel is a powerful symbol of mankind's struggle against global warming. Its owners recently launched the concept of CO<sub>2</sub> Negative, which is about alleviating climate change. Not content with becoming CO<sub>2</sub> neutral, the Ice Hotel is determined to go one step further and actually absorb more CO<sub>2</sub> than it emits.

Climate-smart heating plays a major role in the CO<sub>2</sub> Negative initiative. In addition to its well-known hotel, the complex includes some 30 buildings which are kept at a normal room temperature. More and more of these are being heated by ground source heat pumps.

A bonus for the Ice Hotel is that the geothermal heat extraction process actually cools the ground, thus creating an environment where snow and ice will remain longer.

### Solution

The first ground source heat pump was installed at the Ice Hotel in 2000. Today the hotel has 14 NIBE heat pumps, ranging from 7 kW to 40 kW. The latest was installed in the winter of 2009.

Overall, the hotel heats an area of almost 5,000 square meters using heat pumps. Some were installed in new buildings, while others were used to replace existing installations.

### Results

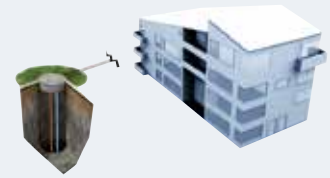
Exact savings are hard to calculate since the installation has been installed gradually. However, there is no doubt that hundreds of tons of CO<sub>2</sub> and millions of SEK have been saved as result.

## FACTS

- Facility: The Ice Hotel
- District: Jukkasjärvi, Northern Sweden
- Dimensioning local outdoor temperature: -30°C
- Heated area: About 5 000 square meters (Reception, inns, cottages, laundry room, staff facilities, etc.)
- Heat pumps: NIBE FIGHTER 1110 (15 kW), 2 FIGHTER 1110 (7 kW), 2 FIGHTER 1115 (13 kW), FIGHTER 1135 (12 kW), 2 FIGHTER 1135 (15 kW), FIGHTER 1210 (7 kW), FIGHTER 1235 (10 kW), FIGHTER 1310 (20 kW), FIGHTER 1330 (22 kW) and FIGHTER 1330 (40 kW)

## REFERENCE CASE 4

### SPANISH VINEYARD COOLS AND HEATS WITH SWEDISH GROUND SOURCE HEATING SYSTEM



#### The background

One of the most important aspects of wine production is to maintain the correct temperature. It has to be right where the wine is growing, and during fermentation and storage. In 2001, Raül Bobet set off on a journey through the Pyrenees in search of a suitable location for a new vineyard. Bearing climate change very much in mind, he was looking for a site that would be affected as little as possible by this. Castel d'Encus proved to be just perfect. In this mountainous area of Pallars Jussà in the Pyrenees, at an altitude of about 1000 metres, monks had been making wine since the 12th century. The ancient fermenting vats, carved out of the rocks by the monks, were still there in good condition. Even in those days, the temperature-retaining properties of the bedrock allowed the fermentation process to be controlled.

#### Solution

NIBE's ground source heat pumps at Castel d'Encus provide heating and cooling that meet all the temperature control needs of this new Spanish vineyard. Castel d'Encus will be showing the greatest possible consideration to the environment as it begins its production of wine. The winery uses no pesticides or herbicides and all the wine that it sells is produced solely on the estate. What is truly innovative, however, is the winery's use of an ancient method in a new way.

The monks used geothermal energy for temperature control, and now state-of-the-art technology from Swedish NIBE is being applied for the same purpose. It is of utmost importance to maintain the exact temperature throughout the fermentation process. And what that temperature is depends on several factors, such as the variety of grapes being used. The vineyard is using a system of five NIBE FIGHTER 1320 pumps, each rated at 40 kW. This sys-

tem provides a total output of 200 kW. It uses a so-called 4-pipe system, which is unique in that it both cools and heats at the same time and that just the one system meets both these needs using the minimum amount of energy. The system has four pipes - two for heated water and two for cooled water. The heat energy and cooling are both extracted from boreholes in the bedrock. The heat pump and the two water systems are controlled by a Building Management System to obtain exactly the right temperature.

#### Results

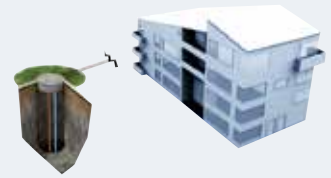
Castel d'Encus also benefits from another technological innovation that makes it possible to operate two wine vats in parallel. Should one of the vats require cooling and the other heating, the surplus energy from one can be used to heat the other. But if more heat is needed, it can be taken from the bedrock. When more cooling is required, the surplus heat is pumped down into the bedrock. The system is expected to have an energy coefficient of performance (COP) of at least 4, but sometimes as much as 5. It is estimated that the system will save Castel d'Encus about 50-60% of the energy it would otherwise have used. All thanks to what is basically the same method used all those centuries ago by the monks.

#### FACTS

- |               |   |
|---------------|---|
| • Facility:   | Wineyard Castel d'Encus                         |
| • District:   | The Pyrenees, Spain                             |
| • Heat pumps: | 5 x NIBE Fighter 1320-40 (200 kW)               |
| • Solution:   | NIBE 4-pipe systeme, active and passive cooling |
| • Savings:    | Approx. 50-60% of the energy consumption        |

# REFERENCE CASE 5

LARGEST GROUND SOURCE HEATING PROJECT EVER!



## The background

Ljuskärnsberget is one of the largest ever ground source heating projects to be conducted in Sweden and Europe. The 500 apartments covered by the project belong to the Ljuskärnsberget tenant-owners' housing association in Saltsjöbaden outside of Stockholm. It is estimated that the new system will save the association an annual total of 3.5 million kWh. That is equivalent to 350 tonnes of CO<sub>2</sub>.

The association is very large, comprising some 500 apartments divided into 13 groups of buildings. All in all, that means 52 buildings to manage and maintain! What really makes this project unusual is that the contracting company, Enstar AB, is installing more than just heat pumps. It is also converting all the apartments from direct electric heating to a distributed water heating system.

Chair of Ljuskärnsberget Association, Mathias Skoglund, explains, "In the past five years, our energy costs have increased by 100% to about SEK 10 million a year".

"We were forced to take action. We were quite powerless to change the situation in any way. But now we'll have a system that not only saves money and benefits the environment, it will also increase the value of all our members' apartments."

## Solution

This project is enormous in all respects. It's no easy job installing distributed water heating systems in 52 buildings and 500 apartments. Not to mention the work of installing a ground source heating system. It involves drilling no less than 156 boreholes to a depth of approximately 230 metres each. The heat from the boreholes is piped to 13 boiler rooms, each equipped with two NIBE F1330 ground source heat pumps and two VPB750 water heaters. That's a total of 26 water heaters and 26 ground source heat pumps each with a capacity of between 40 and 60 kW.

## Results

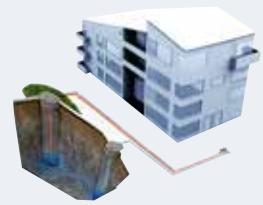
Once everything has been completed, it is estimated that some 3.5 million kWh can be extracted annually from the bedrock - for free. The project is expected to deliver an annual cost saving of almost SEK 5 million. The saving will be even greater if the cost of electricity continues to rise.

## FACTS

- |                  |                                |
|------------------|--------------------------------|
| • Facility:      | Association Ljuskärnsberget    |
| • District:      | Saltsjöbaden Stockholm, Sweden |
| • Heat pumps:    | 26 x NIBE F1330 40-60kW        |
| • Water Heaters: | 26 x NIBE VPB 750              |
| • Savings:       | Approx 5 million SEK / year    |

## REFERENCE CASE 6

### HOTEL STÁCIÓ SAVE MONEY USING RENEWABLE ENERGY FOR HEATING



#### The background

Hotel Stáció opened in August 2006. It is the first four star hotel in the vicinity of Liszt Ferenc International airport in Budapest. Hotel Stáció offers its guests a quiet environment with Mediterranean terraces, a nice garden and a lake. Hotel Stáció is an oasis, surrounded by family homes and the forest area of Vecsés. In 2011 an extension was built on the hotel, which now offers 75 comfortable rooms including 5 exclusive apartments, a 1.000 m<sup>2</sup> wellness area (9x19m pool, jacuzzi), bathing facilities, and 6 conference rooms. The owners wanted to use renewable energy sources for heating and cooling.

#### Solution

Hotel Stáció has a large demand for heating and cooling, domestic hot water and pool heating. Conferences and other business events increase cooling needs in the summer, as does the demand for hot water for the pool. In winter there is a demand for heating rooms and other facilities, while the conference room can need cooling. The building is well insulated, occasionally making the south-facing areas too hot, while the north-facing rooms could be cold during autumn and spring.

The owners overcame these challenges by installing a NIBE ground-source heat pump solution. 3x F1330-60kW units are installed in the hotel and use groundwater wells as a heat source. The NIBE system produces heating and cooling power while supplying domestic hot water and pool heating.

#### Results

"The temperature of each room and common areas can be controlled independently, heating some and cooling others at the same time. For us it means great comfort with minimal energy consumption, thanks to the flexible NIBE system", says the hotel owner.

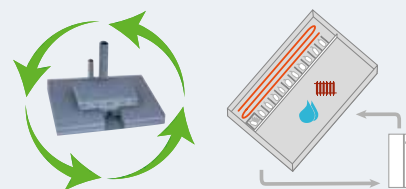
Tamás Szép from NIBE's distributor, Penta-Klíma says, "This solution demonstrates that heat pump technology is an easy way to manage such a complex task. Efficiency is much higher than a simple heat pump installation. Even in the worst case scenario the COP remains as high as 4.17 with each HP delivering 71kW of heat power, 54kW of cooling power and with a consumption of 17kW of electrical power. However, in summer peak COP can reach 7.0. This considerably reduces the owner's heating bills while evening out the flow of heating and cooling duties throughout the complex.

#### FACTS

- Installer: Penta-Klíma Ltd
- Facility: Natural House Ltd.
- Heated area: 5700m<sup>2</sup>
- Heat source: 12 pieces, 20m deep groundwater wells
- Heatpumps: 3 x F1330-60 (200kW heating power)
- Domestic hot water: 3000 liter

## REFERENCE CASE 7

### TAKING ADVANTAGE OF SURPLUS ENERGY



#### The background

Gårsta just outside Hammenhög in Österlen is a major pig breeding farm. 24,000 pigs are born every year in the new facility, an operation that is normally very energy-consuming. "Piglets need to be kept warm", says owner Johan Nilsson. Traditionally they have a bed of straw and a heat lamp, but this is a very inefficient solution. Therefore, underfloor heating was introduced a few years ago. "The alternative for most people is to burn straw", says Johan Nilsson. "But this requires a special building to be built, and also requires a lot of man and machine hours to take care of it all. In addition, it can run out, something that is not always noticed until it's too late.

#### Solution

When Gårstad's large facility was built, they chose to invest in ground source heating - but without the ground! Instead of boring holes or digging ditches, they chose to put the collector hose in the castings under the slurry gutters. 8,000 metres in total. "Pig slurry has a temperature of about 37 degrees when it is fresh," says Lars-Erik Bengtsson at the local plumber, Bengtsson Smide & VVS, who planned and carried out the installation. "It heats the surrounding concrete to about 15 degrees, which is extremely efficient because the system only needs to be a temperature of around 40 degrees." The heat extracted from the gutters does not affect the quality of the slurry. The slightly lowered tempe-

perature causes the evaporation of ammonia and other gases to decrease slightly. The hoses are located in 16 different parts of the building that house 50 sows each, and are gathered in a huge coil for three NIBE FIGHTER 1310s, each of 30 kW output.

#### Results

"The pumps have run for about 140,000 hours combined," says Lars-Erik, "and during that time have consumed 570,000 kWh. But at the same time they have delivered nearly 3.3 million kWh of heat. That's a heating factor of 5.5!" More than 2.5 gigawatt hours have been extracted from the slurry. Over 4.5 years! If one calculates at an average electricity price of 0.80 SEK per unit, it means a saving of nearly 2 million SEK. "This kind of installation costs about 600,000 SEK, so the entire investment is largely paid for after a year and a half!"

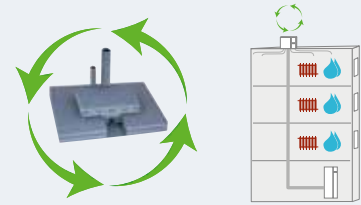
#### FACTS

- |                 |  |
|-----------------|--|
| • Installer:    | Bengtsson Smide & VVS                          |
| • Construction: | Piglet farming - Gårsta, East Ingelstad        |
| • District:     | South of Sweden                                |
| • Heated area:  | 600 m <sup>2</sup>                             |
| • Heat pumps:   | 3 x NIBE FIGHTER 1310                          |
| • Collector:    | 8000 metre hose embedded in the slurry gutters |
| • Savings:      | Approx 440.000 SEK / year                      |



## REFERENCE CASE 8

### GROUND SOURCE HEAT PUMPS WITHOUT BEDROCK REDUCE DISTRICT HEATING COSTS



#### The background

The association "Stockholmskem" owns about 26,000 apartments making it the second largest housing company in Sweden. With hundreds of properties across Stockholm, it also finds itself with exorbitant heating costs to the tune of about SEK 260 million a year! The company is now determined to cut these costs and has decided to invest in ground source heat pumps - without bedrock.

It has about 350 heating systems and an annual heating bill of approximately SEK 260 million.

Gunnar Wiberg of Stockholmskem explains, "The heating systems in our various properties run on district heating, pellets and bio-oil. And we're talking about huge amounts of energy. Some of our systems are larger than the district heating systems in a small Swedish town. District heating covers a substantial share of the heating demand for Stockholmskem's properties. The company has now decided to invest in heat pumps as a complementary heat source and thus achieve substantial energy savings."

#### Solution

District heating covers a substantial share of the heating demand for Stockholmskem's properties. Stockholmskem has determined on a solution that is becoming increasingly popular among large property owners - that of combining exhaust air with a ground source heat pump - but without bedrock. "We are currently in the process of installing no less than 140 heat pumps in line with this method. Instead of placing pipes in a borehole or a coil in the ground, we will be using a heat exchanger to extract the heat from the exhaust air.", says Gunnar.

The equipment being installed is not exhaust air heat pumps, but NIBE's largest unit, the NIBE F1330, which is normally used for bedrock or ground source heating.

The exhaust air is conducted via the normal ventilation system to a heat exchanger coil. The heat transfer fluid passes through this coil to the heat pump. The temperature of the heat transfer fluid becomes higher than in a bedrock/ground source heating system which subsequently results in an even higher coefficient of performance (COP).

#### Results

Gunnar Wiberg of Stockholmskem explains "The performance of the systems that we've been running for a while has surpassed even our most optimistic projections. There is much more energy in the air than we had originally supposed. In some cases, we estimated that we would be extracting up to 120 kW but in fact the figure has been almost as high as 160 kW!

We are using our NIBE F1330s as supplementary systems and this has proved to be a very economical solution. Our district heating bills have fallen by as much as 40% and our annual energy consumption is down by about 70 kWh per square metre.

This means that the new system will have paid for itself within 3 or 4 years perhaps."

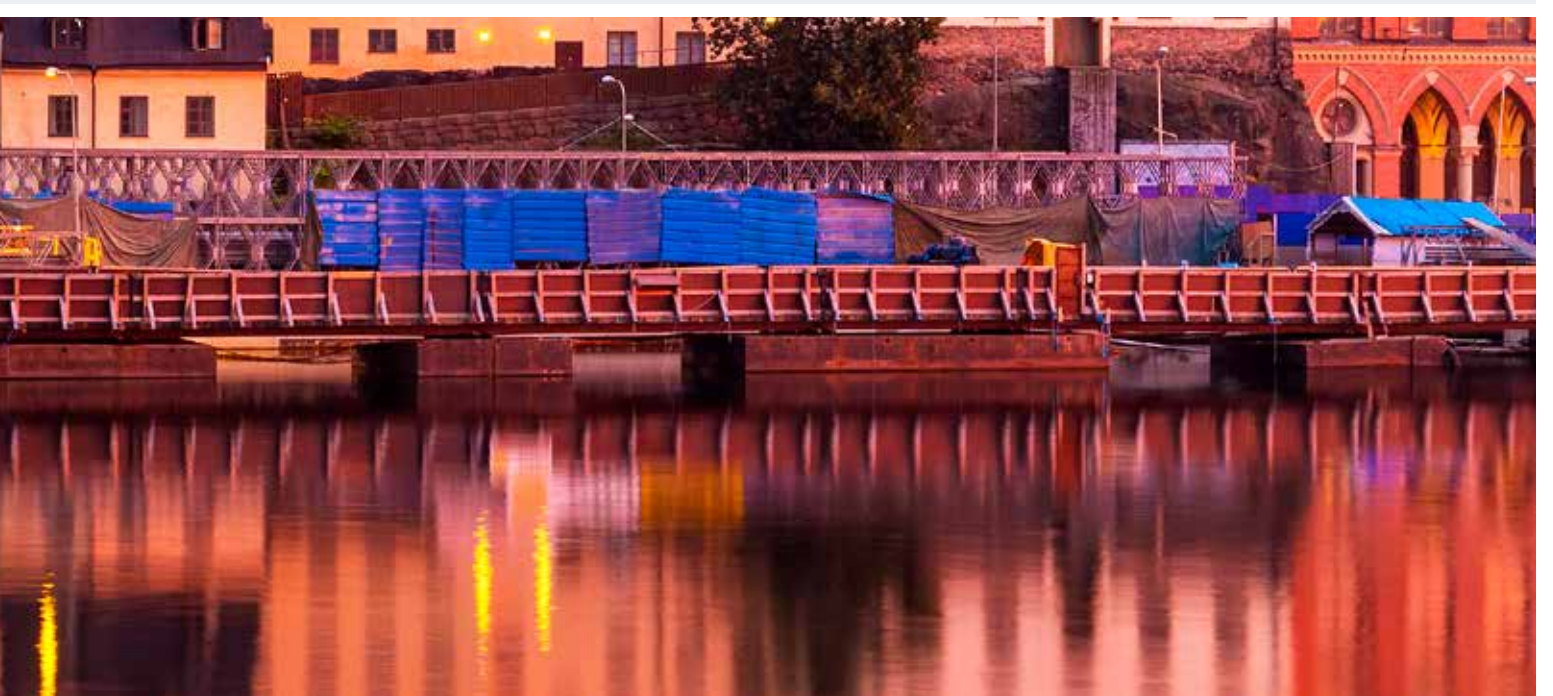
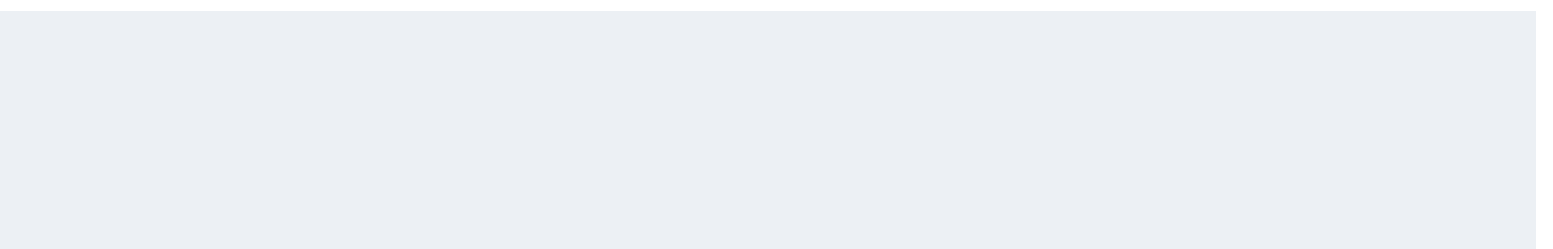
#### FACTS

- Facility: Association Stockholmskem
- District: Stockholm, Sweden
- Heat pumps: 140 x NIBE F1330
- Savings: The district heating bills have fallen by as much as 40% and annual energy consumption is down by about 70 kWh per square metre/year.



## NIBE HEAT PUMPS & ACCESSORIES





# WHAT MAKES NIBE'S GROUND SOURCE HEAT PUMPS SO EFFICIENT AND USER-FRIENDLY?

Some of the most important features of our new heat pump, the NIBE F1345 ground source heat pump, are presented below. Thanks to a combination of state-of-the-art technology and various energy-efficiency enhancing features, the NIBE F1345 delivers unsurpassed annual energy savings and enables you to maintain a comfortable indoor climate all year round, whatever the weather.

And you don't need to be a technical wizard to make it work. A large, clear, multicolour display makes it possible for everyone to exploit the energy-saving potential of this exciting green technology.

Internally fitted low circulation pumps. In 40 kW and 60 kW external brine circulation pump supplied.

Less than 3 kg of refrigerant per installation unit. This means that no inspection is required.

Separate enclosures for the compressors and refrigerant parts give more reliable service and lower noise levels.

The two scroll compressors can deliver up to 65 °C to the heating system. (Max. 58°C return temperature).

Soft starter relays and load monitor are factory installed.

Control with communication options:  
– Check the status and change settings via SMS and with NIBE Mobile App  
– Control the heat pump externally using, e.g. MODBUS.

Passive and active cooling options during summer months.

Prepared for pool heating, sub shunt, HWC.

Double compressors give better output control, longer operating intervals, less wear and greater reliability.

Up to 540 kW with nine F1345s in the same system.



## Modular design

**MAKES IT SIMPLE TO INSTALL ACCESSORIES**  
The heat pump and its accessories have been harmoniously designed to create a streamlined look, with all pipes tucked discreetly out of sight. Whether you decide on a heat pump with an integrated hot-water tank and an extra ventilation unit, or the combination of a heat pump and stand-alone hot water tank, the overall impression will be of one, neat system.

## Energy-saving circulation pumps

**CUTS ENERGY CONSUMPTION AND COSTS**  
The circulation pumps are controlled by the heat pump software which adjusts their speed to the energy requirements of the building and the outdoor temperature. Since only the required amount of energy is generated, this is an extremely economical way to meet energy needs.

## Detachable compressor module

**SIMPLIFIES TRANSPORT, INSTALLATION AND MAINTENANCE**  
The compressor module can be quickly and simply detached from the heat pump making it much easier to transport, handle and install. Should the compressor module need to be serviced, it can be detached and serviced without the heat pump.

## Well-designed interior

**LESS NEED TO USE THE MANUAL**  
Our heat pumps come with the user's manual practically inserted in a special pocket on the inside of the aluminium door. Installers will find the interior of the heat pump so neat and well-designed that they'll hardly ever need to open the manual.

## USB port

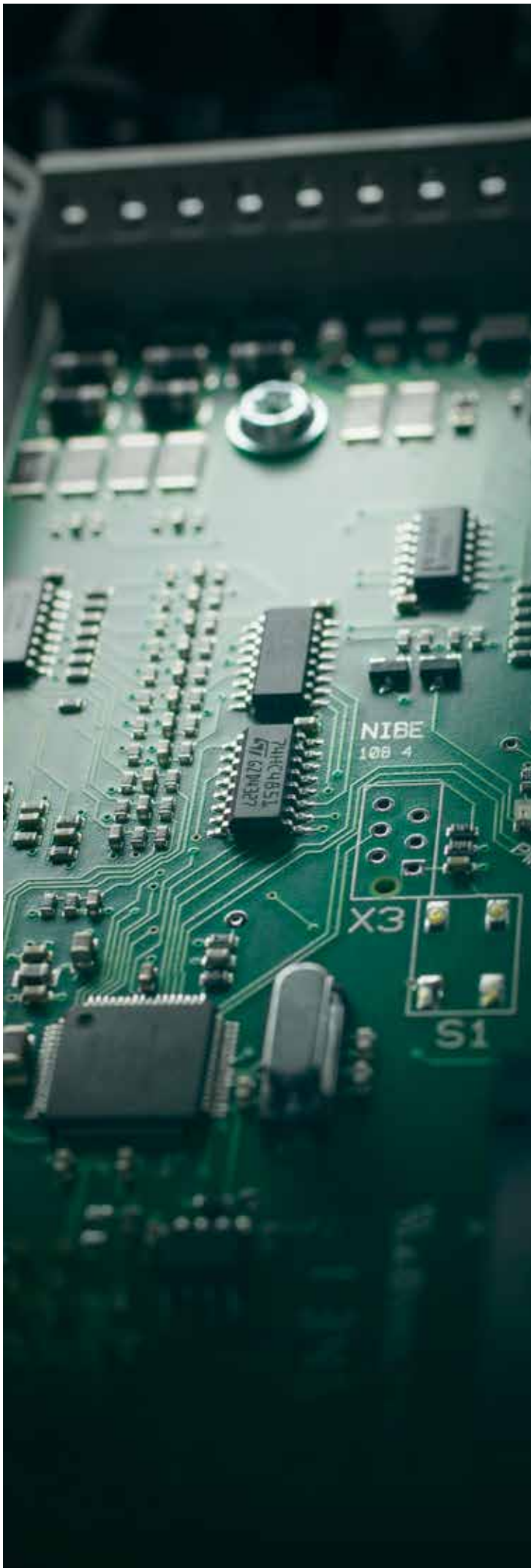
**FOR UPLOADING AND DOWNLOADING DATA**  
The USB port offers multiple advantages. End users can download operating data history to a USB memory stick and give it to their local NIBE specialist instead of having to arrange a visit to the premises.

## External design

**AN ATTRACTIVE DEVICE**  
The main unit of the heat pump is completely white, so it looks perfectly in place in a cellar or utility room. The NIBE F1345 also has an attractive brushed aluminium door with a window over the digital display screen.

## Integrated circulation pumps

**KEEPING THE HEAT PUMP QUIET**  
Our ground source heat pumps are now built with the circulation pumps inside the compressor module which makes them quieter than ever. As a result, they are almost silent in operation.



## NIBE™ F1345

### Ground source heat pump

One of a new generation of heat pumps, designed to supply your home with inexpensive and environmentally friendly heating. Connect to an optional low temperature heat distribution system such as radiators, convectors or underfloor heating. Add accessories, such as a hot water heater, passive cooling, ventilation recovery, pool and other heating systems.

With its two large scroll compressors, NIBE F1345 is the ideal ground source heat pump for multi-occupancy buildings, industrial premises, churches and other buildings with a large heat demand. The compressors collaborate and engage as necessary, giving better power control, less wear and greater operational ability.

The new F1345 is more flexible than ever and with its advanced control system it can be adapted to several system solutions. In systems with up to 9 heat pumps and with a wide range of accessories such as for control of oil, gas, pellet fired or electric boilers, you find the full flexibility for your installation.

NIBE F1345 is equipped with a multicolour display, multi languages support and simply upgradable software via the built in USB port.

### NIBE F1345

Sizes	24, 30, 40, 60 kW
Integrated water heater	No
Supply temperature	65°C
Soft starter included	Yes
Immersion heater	Accessory
Hight/Width/Depth	1800/600/620 mm



## FREEDOM – ANYWHERE, ANY TIME

### NIBE UPLINK™

Using the Internet and NIBE Uplink you can get a quick overview and the present status of your heat pump and the heating in your property. You get a good overall view where you can follow and control your heating and hot water production. If your system is affected by an operational disturbance you receive an alert via e-mail that allows you to react quickly.



NIBE Uplink also gives you the opportunity to control comfort in your property no matter where you are. **We call it NIBE freedom.**

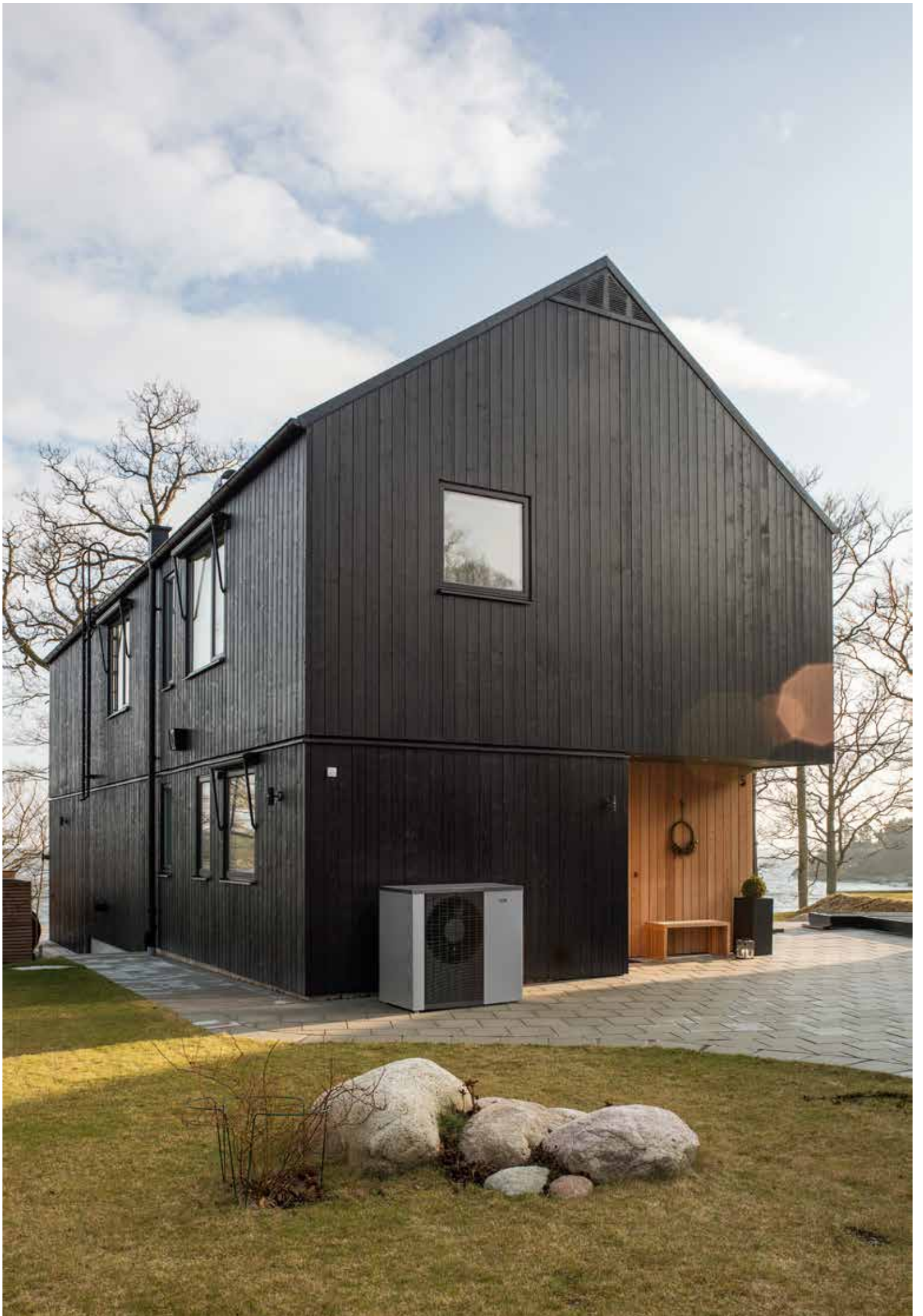


- NIBE introducing a new, efficient tool that gives you quick and easy control over your property's heat pump - wherever you are.
- A web interface over the Internet offers you an instant view of e.g the temperature and current status of the heat pump in your property.
- Provides the benefit of external monitoring for several properties at the same time.
- Clear, easy way of monitoring and controlling heating and water temperatures for maximum comfort.
- In the unlikely event of a system malfunction you receive an alarm directly in your mail, allowing you to respond in the fastest possible time.
- Simple installation with a "click" of an ethernet cable.
- Provides logging of heat pump parameters presented in a user-friendly history chart.

#### New

- API functionality for external integration of e.g home management systems and BMS
- NIBE Uplink app for compatible smart phones









## NIBE™ F2120

Our new F2120-series of air/water heat pumps represent a real breakthrough in housewarming with a SCOP-value of more than 5.0. Or in other words; the pumps deliver more than five times as much heat, on an annual basis, as an electric heater using the same energy. And what's more, they have a class leading working range with a supply temperature of max 65°C and deliver up to an amazing 63°C at ambient temperatures as low as -25°C. All this while keeping noise levels exceptionally low. That's what we call a real breakthrough in house warming. We are well aware that this sounds a bit too good to be true, so talk to your NIBE dealer for a more in-depth explanation or have a look at [www.nibe.eu](http://www.nibe.eu)

- A breakthrough in efficiency - Air/water heat pump with a SCOP value better than 5.0!\*
- Class leading working range - Max 65 °C supply temperature and a up to sensational 63 °C at as low as -25 °C ambient
- Extremely installer-friendly - Self-adjusting control system means true plug-and-play installation
- 3-phase connection for all available sizes - No need to upgrade fuses or rebuild electrical system
- Less noise when it counts - Silent fan with intelligent regulator keeps noise down to a minimum – even under full load.
- Inverter controlled compressor adapts power to meet the current heat demand.
- Provides cooling with flow temperature down to +7 °C.
- NIBE F2120 is intended to be combined with any of the indoor modules VVM, or control modules NIBE SMO.

### NIBE F2120

Voltage	400V 3N-50Hz
Refrigerant amount (R410A) 16/20 kW	3 kg
Max system pressure heating medium	0,45 (4,5 bar)
Heating temp continuous operation	-25 °C/63 °C
Height/Width/Depth	1165/1280/610 mm
Weight	183 kg

\* NIBE F2120-8, -12 SCOP 4,8. NIBE F2120-16, -20 SCOP 5,1



## NIBE™ SMO 40

### Control module

SMO 20/40 is an advanced, intelligence control module equipped with the new generation controller for good comfort, good economy and safe operation. Clear information about status, operating time and all temperatures in the system is shown on the large and easy to read display.

SMO 20/40 supports a broad range of different hydraulic schemes. The SMO 20/40 enables you to combine NIBE air/water heat pump with other equipment and create your own customized heating system. SMO 40 can control as many as eight heat pumps together in the same system.

- Optimized control of the climate system, with up to 8 heat pumps working simultaneous.
- Automatic controlled charge pump as an accessory
- Could be remotely controlled by Uplink. SMS and Modbus are available for the SMO40.
- NIBE SMO40 has wide assortment of accessories available.
- Easy to install.
- Clear information about status, operating time and all temperatures in the system is shown on the large and easy-to-read display.

### NIBE SMO 20/40

Height	410 mm
Width	360 mm
Depth SMO 20/40	110/120 mm
Weight SMO 20/40	4,3/5,15 kg

# ACCESSORIES

## NIBE™ F1345

### NIBE™ VPB 500-1000



#### Large volume water heaters

VPB is a range of efficient water heaters with a wide range of applications, suitable for connection to heat pumps, gas or oil-fired boilers.

All models are intended for properties with large hot water requirements. They are also suitable for connection in parallel for use in larger properties

### NIBE™ HPAC 45



#### Climate exchange module

The NIBE HPAC accessory gives your installation a high degree of flexibility. It is developed to enable the heat pump potential applications - both heating and cooling. Max 60 kW heat pump power.

### NIBE™ FLM



#### Exhaust air module

Developed to work in conjunction with NIBE ground source heat pumps the FLM module recycles old, stale air from the house, extracts the energy from it and reuses it to heat new, clean air from outside.

### NIBE™ ECS 40

### NIBE™ ECS 41

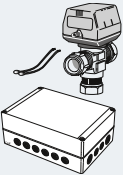


#### Extra heating circuit

ECS is used when heat pump is installed in houses with up to four different climate systems that require different flow line temperatures.

ECS 40 is used for floor heating < 80 m<sup>2</sup>.  
ECS 41 is used for floor heating > 80 m<sup>2</sup>.

### NIBE™ POOL 40



#### Pool heating

For pool heating using a heat pump. Max 17 kW heat pump power.

### NIBE™ SMS 40



#### GSM remote control

With SMS 40 the heat pump can be controlled and monitored remotely via SMS messages in your mobile phone.



Now with NIBE Mobile App

### NIBE™ MOBILE APP



#### Status control

Put full control of your NIBE Heat pump in your pocket. Turn on the heat on your way home or check the status of your indoor climate from anywhere in the world, the possibilities are endless. For Android phones.

### NIBE™ RMU 40



#### Control module

With RMU 40 you can control and monitor your NIBE F1345 from another room in the house.

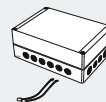
### NIBE™ MODBUS 40



#### Communication module

With MODBUS 40 a NIBE heat pump can be controlled and monitored by external Modbus equipped equipment.

### NIBE™ AXC 50

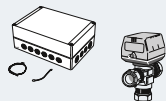


#### Accessory card

This accessory is e.g. used to enable connection and control of:

- Mixing valve controlled additional heat
- Pump for hot water circulation
- Ground water pump

### NIBE™ SOLAR 42



#### Solar heating

NIBE SOLAR enables solar heating with your heat pump. With additional solar panels and VPAS or VPBS you get a complete system.

### NIBE™ ELK 26

### NIBE™ ELK 42



#### Electric boiler

Electric boilers for additional heating for ground source heat pumps.

### NIBE™ UKV

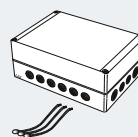


#### Buffer vessels

Buffer vessels for heating systems.

### NIBE™ ACS 45

Active/passive cooling



This accessory makes it possible to control production of heating and cooling independently of each other in a 4-pipe installation.

#### NIBE ACS 45

Net weight	2 kg
Supply voltage	1x230 V, 50 Hz
Height/Width/Depth	175/250/100 mm

## NIBE™ F2300

### NIBE™ VVM 500



#### Indoor module

NIBE VVM 500 is part of a new generation of products for heating and domestic hot water. Heat production is reliable and economical with integrated hot water coil, circulation pumps, solar coil, control system and immersion heater.

### NIBE™ VPB 500-1000 Large volume water heaters



VPB is a range of efficient water heaters with a wide range of applications, suitable for connection to heat pumps, gas or oil-fired boilers.

All models are intended for properties with large hot water requirements. They are also suitable for connection in parallel for use in larger properties

### NIBE™ VPA NIBE™ VPAS



#### Double-jacketed hot water cylinder

NIBE VPAS is an accumulator tank that is primarily designed for connection to heat pumps in combination with solar panels.

VPA 300/200

VPA 450/300

VPAS 300/450

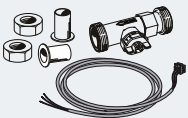
### NIBE™ ECS 40 NIBE™ ECS 41



NIBE ECS is used when heat pump is installed in houses with up to four different climate systems that require different flow line temperatures, e.g. in cases where the house has both a radiator system and an under floor heating system.

ECS 40 is used for floor heating < 80 m<sup>2</sup>.  
ECS 41 is used for floor heating > 80 m<sup>2</sup>.

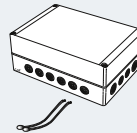
### NIBE™ EMK 300 NIBE™ EMK 500



This accessory is used to measure the amount of energy produced by and supplied by the heating installation for hot water and heating in the building.

The function of the energy meter is to measure flow and temperature difference in the charge circuit.

### NIBE™ AXC 30 NIBE™ AXC 40



This accessory is used to enable connection and control of e.g.:

- Shunt controlled additional heat
- Step controlled additional heat
- Pump for hot water circulation
- Ground water pump

### NIBE™ HR 10



#### Auxiliary relay

Auxiliary relay HR 10 is a connection box housing a contactor and a rotary selector switch.

### NIBE™ KVR 10



#### Condensation water tube

To lead away condensation water from outdoor unit.

### NIBE™ ELK 15 NIBE™ ELK 26 NIBE™ ELK 42



#### Electric boiler

Electric boilers for additional heating for air/water heat pumps.

### NIBE™ UKV



NIBE UKV 40, 100 200, 300 and 500 are buffer tanks used together with heat pumps to increase the volume of water in the system for more even operation. Only NIBE UKV 40 and UKV 100 can be used with the NIBE air/water heat pumps.

### NIBE™ SMS 40



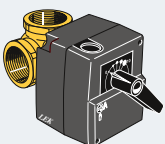
With NIBE SMS 40 the heat pump can be controlled and monitored remotely via SMS messages in your mobile phone.

### NIBE™ MODBUS 40



With MODBUS 40 a NIBE heat pump can be controlled and monitored by external equipment i.e. building management system.

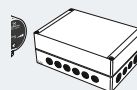
### NIBE™ VST 20



#### Hot water control

This accessory makes hot water priority possible at large heat pump outputs (charging power between 15 and 40 kW), e. g. F2023-14 (together with an SMO 10) and F1345-40. This also requires a hot water accumulator, for example, NIBE VPA.

### NIBE™ CPD 10



To be used together with NIBE SMO 20/SMO 40 as charging pump.

## OVERVIEW ENERGY EFFICIENCY CLASS

FROM 26TH SEPTEMBER 2015, all heat pumps designed for installations up to 70 kW must display an energy label of the type that we are used to seeing on TVs, refrigerators, etc. The purpose is to enable the consumer to compare the energy efficiency of products. G indi-

cates the least efficient performance and A+++ the most efficient. This is all part of EU Directive 2010/30/EU that sets higher demands on drastically lowering the emission levels and energy consumption.

### NIBE™ F1345



Energy efficiency class package label (35 °C)

Product	F1345-24	F1345-30	F1345-40	F1345-60
Nominal heating output (Pdesignh) 35 °C/55 °C (kW)	28/28	35/35	46/46	67/67
SCOP <sub>EN14825</sub> cold climate/average climate, 35 °C	5.0/4.8	4.9/4.7	5.0/4.8	4.7/4.6
Energy efficiency class 35/55 °C product label	A++/A++	A++/A++	A++/A++	A++/A++
Energy efficiency class 35/55 °C package label*	A+++/A++	A+++/A++	A+++/A++	A+++/A++

\* Reported efficiency for the system takes the product's temperature regulator into account.


### NIBE™ F2120



Effektivitetsklass för systemet

Product	F2120-16	F2120-20
Nominal heating output (Pdesignh) 35 °C/55 °C (kW)	11/11,5	
SCOP <sub>EN14825</sub> average climate, 35 °C	5,1	
Energy efficiency class 35/55 °C product label	A++/A++	
Energy efficiency class 35/55 °C package label*	A+++/A+++	

\* Reported efficiency for the system takes the product's temperature regulator into account.



'Do what you can  
with what you've got'.

Taking heat from the ground near your home or the ambient outside air, NIBE's heat pumps appear to defy nature. In fact, the opposite is true; they enable us to live in harmony with nature.

## NIBE OF SWEDEN

Living in harmony with nature

The Swedes have a long and impressive track record of clever, money-saving innovations that use resources sparingly. The simple reason for this is that Sweden was historically a poor agrarian country. A harsh winter climate made food scarce for many months, necessitating careful, forward planning.

Today, Sweden is a technologically advanced country with a successful economy, so this is no longer necessary. However, the mindset continues to be manifested in the form of fabulous, cost-saving innovations.

NIBE is a perfect example of the economical Swedish mind at work!

The company was founded by Nils Bernerup in 1952, after a particularly cold winter. Over the past 60 years, it has become Sweden's leading supplier of domestic heating products, continually driving the development of ever-more efficient heating methods.

Early products included water heaters and pressure vessels. Electric boilers joined the range in the 1970s. Heat pumps and a wide selection of other heating products that meet the needs of European markets have been added successively to the company's portfolio.

Nowadays, NIBE has a leading position in the market for heating and cooling solutions around Europe. We are committed to offering innovative solutions that not only save energy but which also reduce CO<sub>2</sub> emissions.

Together with our customers, we're working towards a more sustainable future, one home at a time.

# SMART, ECONOMICAL ENERGY SOLUTIONS FROM NIBE

## Complete range of products and systems

NIBE Energy Systems offers a complete range of energy-efficient solutions for heating, ventilation, cooling and heat recovery that reflect today's demand for sustainable construction. Our products and services make it easy for private and commercial property owners to choose a system that best suits their needs for indoor climate comfort and hot water. Visit [www.nibe.eu](http://www.nibe.eu) for more information.

## Exhaust air heat pumps

Ideal for heating domestic premises and tap water, an exhaust air heat pump ventilates your building and recovers energy in warm air, reusing it to heat your household water or fuel your central heating system.

## Ground source heat pumps

Drawing heat from surface soil, bedrock or the water in a nearby lake, ground source heat pumps are a great option for heating houses, multiple-unit properties and other larger buildings. Available with or without an integrated water heater.

## Air/water heat pumps

These pumps extract heat from the ambient outside air. Connected to your building's heating system they produce both heating and hot water, a big improvement on simpler types of air-to-air heat pumps.

## Air/air heat pumps

In many homes that are still heated with direct electrical heating, it is not an alternative to install waterborne heat. In these cases, an air source heat pump is the only option if you want to lower your energy consumption.

## Water heaters

For over fifty years, NIBE has been manufacturing products to supply hot water. During that time, we've kept pace with advances in heating efficiency and continually developed new models. We're pursuing the same mission today - to develop even better, even more efficient water heaters, for those chilly mornings in millions of bathrooms all over the world.

## Domestic boilers

With a NIBE domestic boiler you have the flexibility to use almost any other kind of additional energy source as and when it's needed. Examples of docking options include air/water heat pumps, solar panels and, of course, electricity.

## Solar panels

Our solar thermal collectors absorb the sun's rays, delivering free, clean energy to your heating system. They become an integral part of your total energy supply supported by our heat pumps which supply this extra free energy in a smart, controlled way. You can also use our solar collectors in combination with a NIBE bio mass boiler (logs or pellets) or a NIBE water heater powered by electricity or gas.



EXHAUST AIR HEAT PUMPS

GROUND SOURCE HEAT PUMPS

WATER HEATERS

SOLAR PANELS

AIR/AIR HEAT PUMPS

DOMESTIC BOILERS

AIR/WATER HEAT PUMPS

## YOUR NEXT STEP?

Find your local NIBE office at [www.nibe.eu](http://www.nibe.eu). They'll help you locate your nearest NIBE installer and select the best kind of heat pump for your needs.



# 20/20/20

### **European Directive 20/20/20**

The 20/20/20 European directive imposes compulsory targets on the EU's 27 member states, specifying that 20% of energy consumption must be met by renewable sources by 2020. Since NIBE's heat pumps are now classified as a renewable energy source, their installation will help member states reach this ambitious target. And in many cases, local or regional authorities are offering home owners subsidies to switch their existing heating systems to a renewable source such as a heat pump.



## ENERGY FOR LIFE

We've been designed and developed for you and your home. No matter what type of house you have or what your energy requirements are, we'll give you the perfect indoor climate. Year in and year out. We're a smart family, packed with technical innovations that you can easily control as and when you want. Keep tabs on us or tell us what to do through your mobile phone or tablet. From your office or hammock. Our long experience and thousands of hours spent on development are reflected in our extensive range of products.

You can find out more about the NIBE family and other innovations at [nibe.eu](http://nibe.eu)



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