

# Control module NIBE SMO 20

The NIBE SMO 20 gives optimised control of the climate system and is designed to be combined with NIBE air/water heat pumps to provide an integrated climate system for your home.

The control module, NIBE SMO 20, offers a flexible system solution. The NIBE SMO 20 is connected to additional components for efficient heating, cooling and hot water for a customised installation.

Thanks to smart technology, the product gives you control over your energy consumption and will be a key part of your connected home. The efficient control system automatically adjusts the indoor climate for maximum comfort, and you do nature a favour at the same time.

- User-friendly and intelligent control system for your climate system.
- Flexible, customised system solution.
- Part of your smart home – control your comfort online using NIBE Uplink.



# This is how NIBE SMO 20 works

SMO 20 can be connected together with other products from NIBE in several different ways, some of which are shown below (accessories may be required).



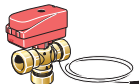



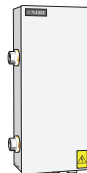

More information about the alternatives is available at [nibe.eu](http://nibe.eu) and in the relevant assembly instructions for the accessories used.

Installations with SMO 20 can produce heating and hot water.

On cold days of the year when the access to energy from the air is reduced the additional heating can compensate and help to produce heat. The additional heating is also good to have as assistance if the heat pump ends up outside its working range or if it has been blocked for any reason.

## System solutions

The following combinations of products are recommended for control by SMO 20.

													
Control module	Air/water heat pump	HW control	Accumulator with hot water heater	Circ. pump	Water heater	Addition	Volume vessel						
SMO 20	AMS 10-6 / HBS 05-6	VST 05	VPA 450/300 VPAS 300/450 VPA 300/200 VPA 450/300 VPAS 300/450	CPD 11-25/65 CPD 11-25/75	VPB 200 VPB 300 VPBS 300 VPB 500 VPB 750-2 VPB 1000	ELK 15 ELK 26 ELK 42	UKV 40 UKV 100 UKV 200 UKV 300 UKV 500						
	AMS 10-8 / HBS 05-12												
	F2040 – 6												
	F2040 – 8												
	F2120 – 8	VST 11											
	AMS 10-12 / HBS 05-12												
	F2040 – 12												
	F2120 – 12												
	F2120 – 16												
	AMS 10-16 / HBS 05-16	VST 20											
	F2040 – 16												
	F2120 – 20												

# Outdoor modules

## COMPATIBLE AIR/WATER HEAT PUMPS

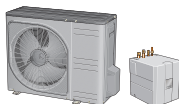
### *NIBE SPLIT HBS 05*

*AMS 10-6*

*HBS 05-6*

Part no. 064 205

Part no. 067 578



*AMS 10-8*

*HBS 05-12*

Part no. 064 033

Part no. 067 480

*AMS 10-12*

*HBS 05-12*

Part no. 064 110

Part no. 067 480

*AMS 10-16*

*HBS 05-16*

Part no. 064 035

Part no. 067 536

### *F2040*

*F2040-6*

*F2040-8*

Part no. 064 206

Part no. 064 109

*F2040-12*

*F2040-16*

Part no. 064 092

Part no. 064 108



### *F2120*

*F2120-8 1x230V* *F2120-8 3x400V*

Part no. 064 134

Part no. 064 135

*F2120-12*  
*1x230V*

*F2120-12*  
*3x400V*

Part no. 064 136

Part no. 064 137

*F2120-16*  
*3x400V*

*F2120-20*  
*3x400V*

Part no. 064 139

Part no. 064 141



Check the software version of compatible older NIBE air/water heat pumps, see page 9.

# System principles

This is the outline diagram. Actual installations must be planned according to applicable standards.

NIBE does not supply all components in this outline diagram.

See [nibe.eu/ODM](http://nibe.eu/ODM) for more detailed docking options.

## EXPLANATION

*AA25 Control module (SMO 20)*

BT1 Outside sensor

BT6 Temperature sensor, hot water charging

BT7 Temperature sensor, hot water top

BT25 Temperature sensor, external flow line

BT50 Room sensor

BT63 Temperature sensor, external supply line after electric heater

BT71 Temperature sensor, external return line

GP10 Circulation pump, heating medium

QN10 Reversing valve, hot water / heating medium

*EB1 Additional heat*

EB1 Immersion heater

KA1 Auxiliary relay / Contactor

*EB101 Heat pump system*

BT3 Temperature sensor, return

BT12 Temperature sensor, condenser supply line

EB101 Heat pump

FL10 Safety valve, heat pump

GP12 Charge pump

QZ2 Filterball (included)

QM1 Drain valve, heating medium

QM31 Shut-off valve, heating medium, supply

QM32 Shut off valve, heating medium, return

QM43 Shut-off valve

*Miscellaneous*

CM1 Expansion vessel closed, hot water

CP5 Buffer vessel (UKV)

CP10 Accumulator tank with hot water heating

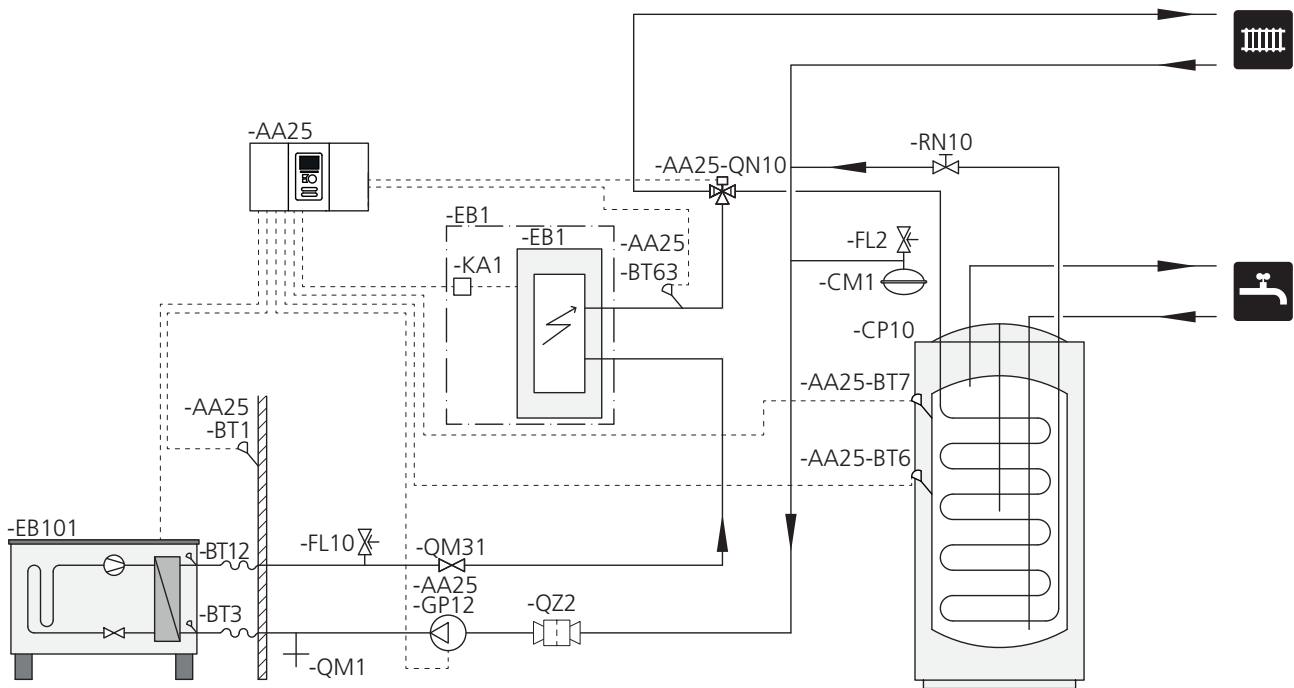
EB20 Immersion heater

FL2 Safety valve, heating medium

KA1 Auxiliary relay / Contactor

RN10 Control valve

## AIR HEAT PUMP TOGETHER WITH SMO 20 AND ELECTRIC HEATER BEFORE REVERSING VALVE FOR HOT WATER (FLOATING CONDENSING)



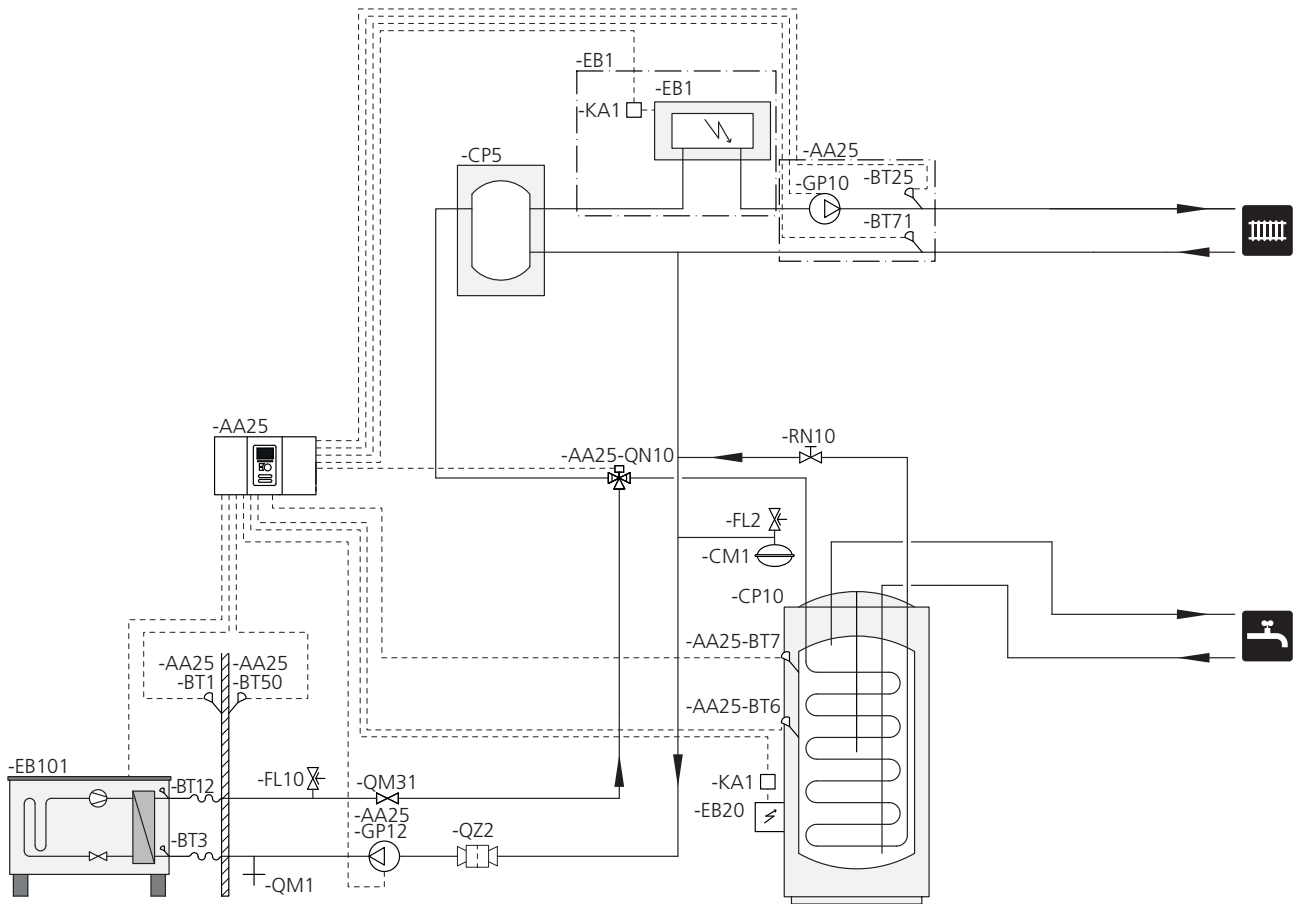
This installation alternative is suitable for basic installations with the focus on heating and hot water demand.

SMO 20 (AA25) starts and stops the heat pump (EB101) to meet the heat and hot water demand of the installation. At simultaneous heating and hot water demand the reversing valve switches (AA25-QN10) periodically between the climate system and the water heater/accumulator tank (CP10). When the hot water heater/accumulator tank is fully charged (CP10), the reversing valve switches (AA25-QN10) to the climate system.

Additional heat (EB1) is connected automatically if the energy demand for the installation exceeds the heat pump capacity. This is used for both heating and charging hot water.

The additional heat can also be used if a higher temperature in the hot water is required than the heat pump can produce.

## AIR HEAT PUMP TOGETHER WITH SMO 20 AND ELECTRIC HEATER AFTER REVERSING VALVE FOR HOT WATER (FLOATING CONDENSING)



This installation alternative is suitable for more complex installations with a focus on comfort.

SMO 20 (AA25) starts and stops the heat pump (EB101) to meet the heating and hot water demand of the installation. During simultaneous heating and hot water demand, the reversing valve (AA25-QN10) switches periodically between the climate system and the water heater / accumulator tank (CP10). When the water heater / accumulator tank (CP10) is fully charged, the reversing valve (AA25-QN10) switches to the climate system.

Additional heat (EB1) is connected automatically when the energy demand for the installation exceeds the heat pump capacity. Immersion heater (EB20) in the water heater / accumulator tank (CP10) is used during this time to produce hot water, if the heat pump (EB101) is used for heating the building at the same time.

The additional heat can also be used if a higher temperature in the hot water is required than the heat pump can produce.

# Good to know about SMO 20

## Supplied components Mounting

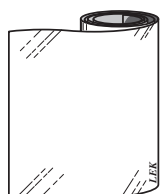
Local differences in the enclosed kit may occur. See relevant installer manual for more information.



Outside sensor



Insulation tape



Aluminium tape



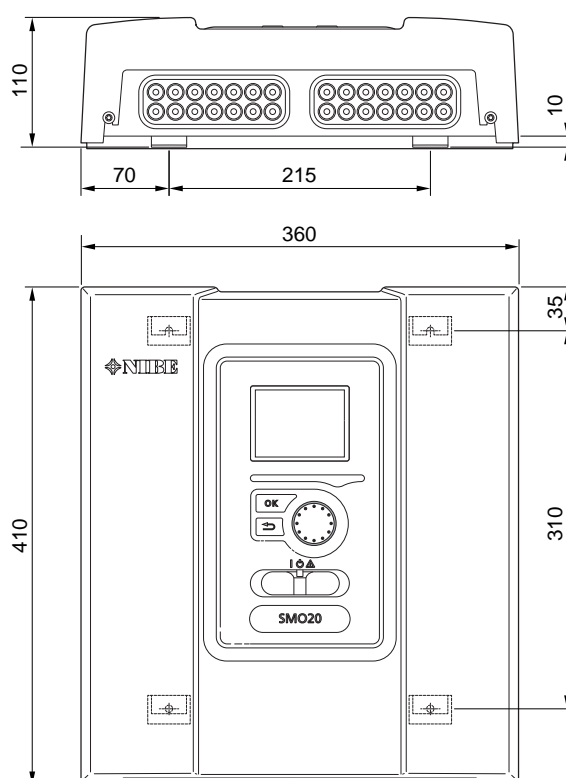
Heating pipe paste



Temperature sensor



Cable ties



Use all mounting points and install SMO 20 upright flat against the wall without any part of the control module protruding beyond the edge of the wall.

Leave at least 100 mm free space around the control module to facilitate access and cable routing on installation and service.

For wall mounting, use screws suitable for the surface. Screws for removing the front cover are reached from underneath.

# 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 and should be documented. The above applies to closed heating systems.

If the heat pump is replaced, the installation must be inspected again.

## Pipe installation

Pipe installation must be carried out in accordance with applicable regulations. See manual for compatible NIBE air/water heat pump for installation of the heat pump.

The pipe dimension should not be less than the recommended pipe diameter according to the table. However, each system must be dimensioned individually to manage the recommended system flows.

### Minimum system flows

The installation must be dimensioned at least to manage the minimum defrosting flow at 100% pump operation, see table.

<i>Air/water heat pump</i>	<i>Minimum flow during defrosting (100% pump speed (l/s))</i>	<i>Minimum recommended pipe dimension (DN)</i>	<i>Minimum recommended pipe dimension (mm)</i>
F2120-8 (1x230V)	0.27	20	22
F2120-8	0.27	20	22
F2120-12	0.35	25	28
F2120-16	0.38	25	28
F2120-20	0.48	32	35

<i>Air/water heat pump</i>	<i>Minimum flow during defrosting (100% pump speed (l/s))</i>	<i>Minimum recommended pipe dimension (DN)</i>	<i>Minimum recommended pipe dimension (mm)</i>
F2040-6	0.19	20	22
F2040-8	0.19	20	22
F2040-12	0.29	20	22
F2040-16	0.39	25	28

<i>Air/water heat pump</i>	<i>Minimum flow during defrosting (100% pump speed (l/s))</i>	<i>Minimum recommended pipe dimension (DN)</i>	<i>Minimum recommended pipe dimension (mm)</i>
HBS 05-6/AMS 10-6	0.19	20	22
HBS 05-12/AMS 10-8	0.19	20	22
HBS 05-12/AMS 10-12	0.29	20	22
HBS 05-16/AMS 10-16	0.39	25	28

An undersized system can result in damage to the machine and lead to malfunctions.

## COMPATIBLE NIBE AIR/WATER HEAT PUMPS

Compatible NIBE air/water heat pump has to be equipped with a control board that, as a minimum, has the software version given in the following list. The control board's version is shown in the heat pump's display (if applicable) at start-up.

Product	Software version
F2015	55
F2016	55
F2020	118
F2025	55
F2026	55
F2030	all versions
F2040	all versions
F2120	all versions
F2300	55
NIBE SPLIT HBS 05: AMS 10-6 + HBS 05-6 AMS 10-8 + HBS 05-12 AMS 10-12 + HBS 05-12 AMS 10-16 + HBS 05-16	all versions

## Electrical connections

- Disconnect SMO 20 before insulation testing the house wiring.
- If the building is equipped with an earth-fault breaker, SMO 20 should be equipped with a separate one.
- SMO 20 must be installed via a circuit breaker with a minimum breaking gap of 3 mm.
- For the electrical wiring diagram for the control module, see the Installer Manual.
- Use a three core, screened cable for communication with the heat pump.
- Communication and sensor cables to external connections must not be laid close to high current cables.
- The minimum area of communication and sensor cables to external connections must be 0.5 mm<sup>2</sup> up to 50 m, for example EKKX, LiYY or equivalent.
- When cable routing into SMO 20, cable grommets (UB1 and UB2, marked in image) must be used.

Electrical installation and service must be carried out under the supervision of a qualified electrician. Cut the current with the circuit breaker before carrying out any servicing. Electrical installation and wiring must be carried out in accordance with the stipulations in force.

See outline diagram for your system for physical location of the temperature sensor that is to be installed.

### Miniature circuit-breaker

The control module's operating circuit and parts of its internal components are internally fused by a miniature circuit breaker.

## EXTERNAL CONNECTION OPTIONS

SMO 20 has software-controlled inputs and outputs for connection of sensors and external switch function.

This means that a sensor or an external switch function can be connected to one of six special connections where the function for connection is determined in the control module software.

# 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 warm seasons. When it gets colder outside, the climate system needs to help heat the house. The colder it is outside, the warmer radiators and underfloor heating systems have to be.

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.

## 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 current outdoor temperature is supplied. The supply temperature of the heat pump will oscillate around the theoretically required value.

### OWN CURVE

SMO 20 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



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 temporary higher hot water demand, there is a function that allows the temperature to be raised temporarily for up to 12 hours or by a one time increase (can be selected in the menu system).

With the Smart Control function activated, SMO 20 learns how much hot water is used and when. The Smart Control function memorises the previous week's hot water consumption and adapts the hot water temperature for the coming week to ensure minimal energy consumption.

It is also possible to set SMO 20 in holiday mode, which means that the lowest possible temperature is achieved without the risk of freezing.

## 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.

## Extra functions

### ROOM SENSOR

A room sensor can be connected to SMO 20. The room sensor has up to three functions:

Show current room temperature in the control module display.

Provides the option of changing the room temperature in °C.

Makes it possible to change/stabilise the room temperature.

SMO 20 operates without the sensor, but if you want to read off the home's indoor temperature in the control module's display, the sensor must be installed. If the sensor is to be used to change the room temperature in °C and / or to change / stabilise the room temperature, the sensor must be activated in the menu.

### RELAY OUTPUT FOR EMERGENCY MODE

The emergency mode relay can be used to activate external additional heat, an external thermostat must then be connected to the control circuit to control the temperature. Ensure that the heating medium circulates through the external additional heating.

No hot water is produced when emergency mode is activated.

### EXTERNAL CIRCULATION PUMP

Heat production is controlled by the outdoor temperature and a theoretical desired value of the indoor temperature. This occurs in accordance with a chosen setting of the regulating curve (curve slope and offset) in the menu..

To reach a high level of heating comfort during the heating phase, the external circulation pump circulates hot water in the heating system even when the domestic hot water output is high.

## The display

SMO 20 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 and save logged information in SMO 20.

Visit [nibeuplink.com](http://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, allowing you to monitor and control the heating and hot water comfort effectively. 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

NIBE Uplink needs the following in order to communicate with your SMO 20:

- network cable
- Internet connection to which SMO 20 can be connected
- web browser with JavaScript activated
- account on [nibeuplink.com](http://nibeuplink.com)

We recommend our mobile apps for NIBE Uplink. For more information, visit [nibeuplink.com](http://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. To use the function, an Internet connection and account on NIBE Uplink are necessary.

## SMART HOME

When you have a smart home system that can communicate with NIBE Uplink, you can control the installation via an app by activating the "smart home" function.

By allowing connected units to communicate with NIBE Uplink, your heating system becomes a natural part of your homesmart home and gives you the opportunity to optimise the operation.

Remember that the "smart home" function requires NIBE Uplink in order to work.

# Technical data

## Technical data c€

<i>SMO 20</i>		
<i>Electrical data</i>		
Supply voltage		230V~ 50Hz
Enclosure class		IP21
Rated value for impulse voltage	kV	4
Pollution degree		2
Fuse	A	10
<i>Optional connections</i>		
Max number air/water heat pumps		1
Max number of sensors		8
Max number of charge pumps		1
Max number of outputs for additional heat step		3
<i>Miscellaneous</i>		
Operation mode (EN60730)		Type 1
Area of operation	°C	-25 – 70
Ambient temperature	°C	5 – 35
Program cycles, hours		1, 24
Program cycles, days		1, 2, 5, 7
Resolution, program	min.	1
<i>Miscellaneous</i>		
Weight, (without packaging and enclosed components)	kg	4.3
Part no. SMO 20		067 224

## Energy labelling

<i>Supplier</i>		<i>NIBE</i>
<i>Model</i>		<i>SMO 20 + F2040 / F2120</i>
Controller, class		II
Controller, contribution to efficiency	%	2.0

# Accessories

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

Not all accessories are available on all markets.

## *Charge pump CPD 11*

Charge pump for heat pump



## *External electric additional heat ELK*

*ELK 15*

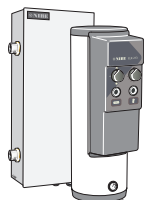
15 kW, 3 x 400 V

*ELK 26*

26 kW, 3 x 400 V

*ELK 213*

7-13 kW, 3 x 400 V

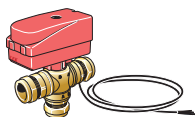


## *Hot water control*

*VST 05*

Reversing valve, Cu pipe Ø22 mm

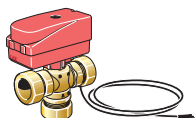
Max. heat pump size 8 kW



*VST 11*

Reversing valve, Cu pipe Ø28 mm

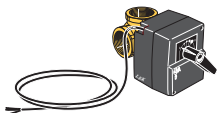
Max. recommended power, 17 kW



*VST 20*

Reversing valve, Cu pipe Ø35 mm

(Max. recommended capacity, 40 kW)



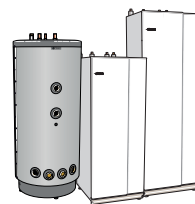
## *Room sensor RTS 40*

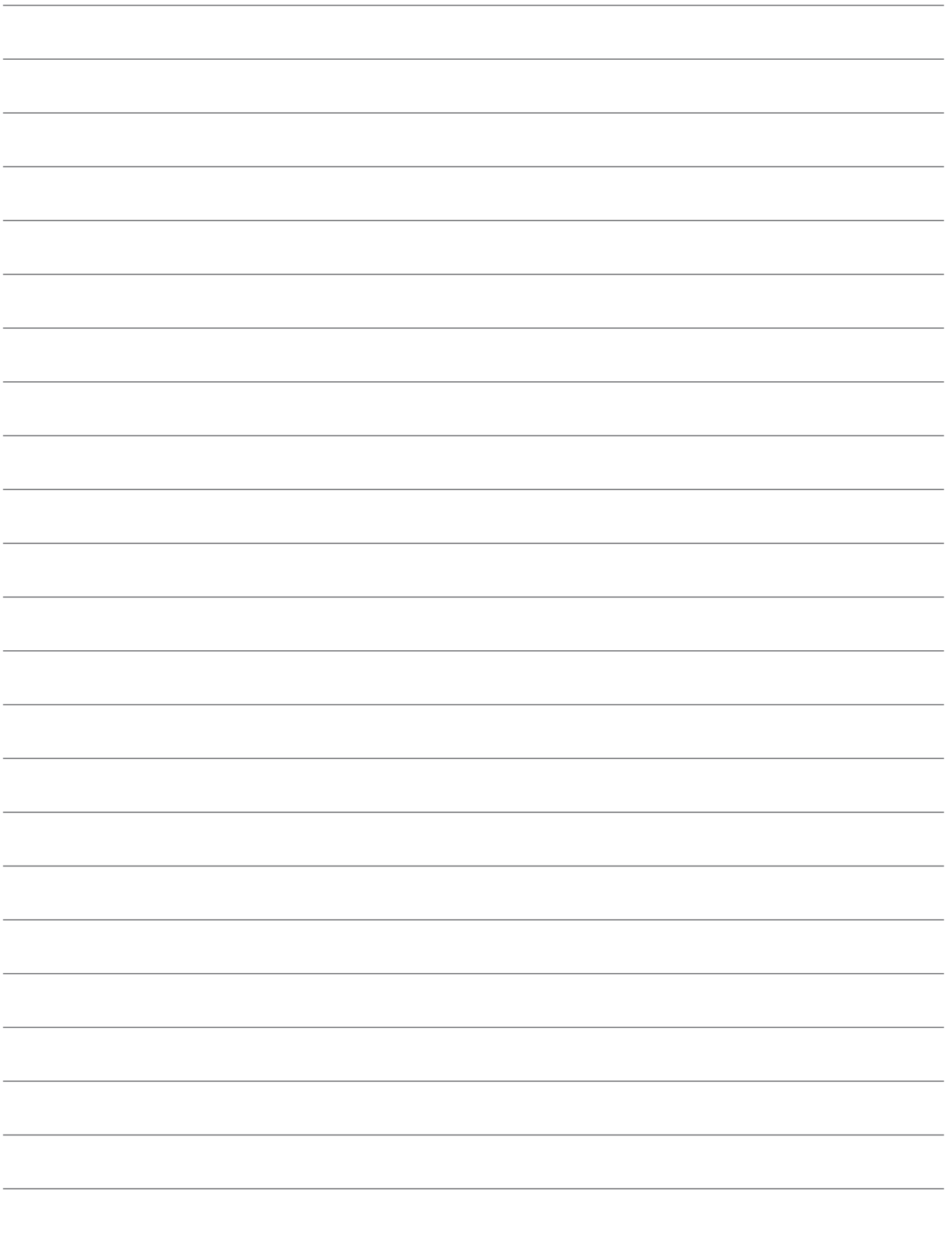
This accessory is used to obtain a more even indoor temperature.



## *Water heater/Accumulator tank*

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





This product sheet is a publication from NIBE Energy Systems. All product illustrations, facts and data are based on current information at the time of the publication's approval. NIBE Energy Systems makes reservations for any factual or printing errors in this product sheet.