Air/water heat pump NIBE SPLIT ACVM 270

The NIBE SPLIT ACVM 270 is a compact inverter-controlled air/water heat pump. The outdoor module AMS 10 is connected with refrigerant pipes to the NIBE ACVM 270. The NIBE SPLIT ACVM 270 ger provides optimum savings since the heat pump automatically adjusts to the property's output requirements all year round.

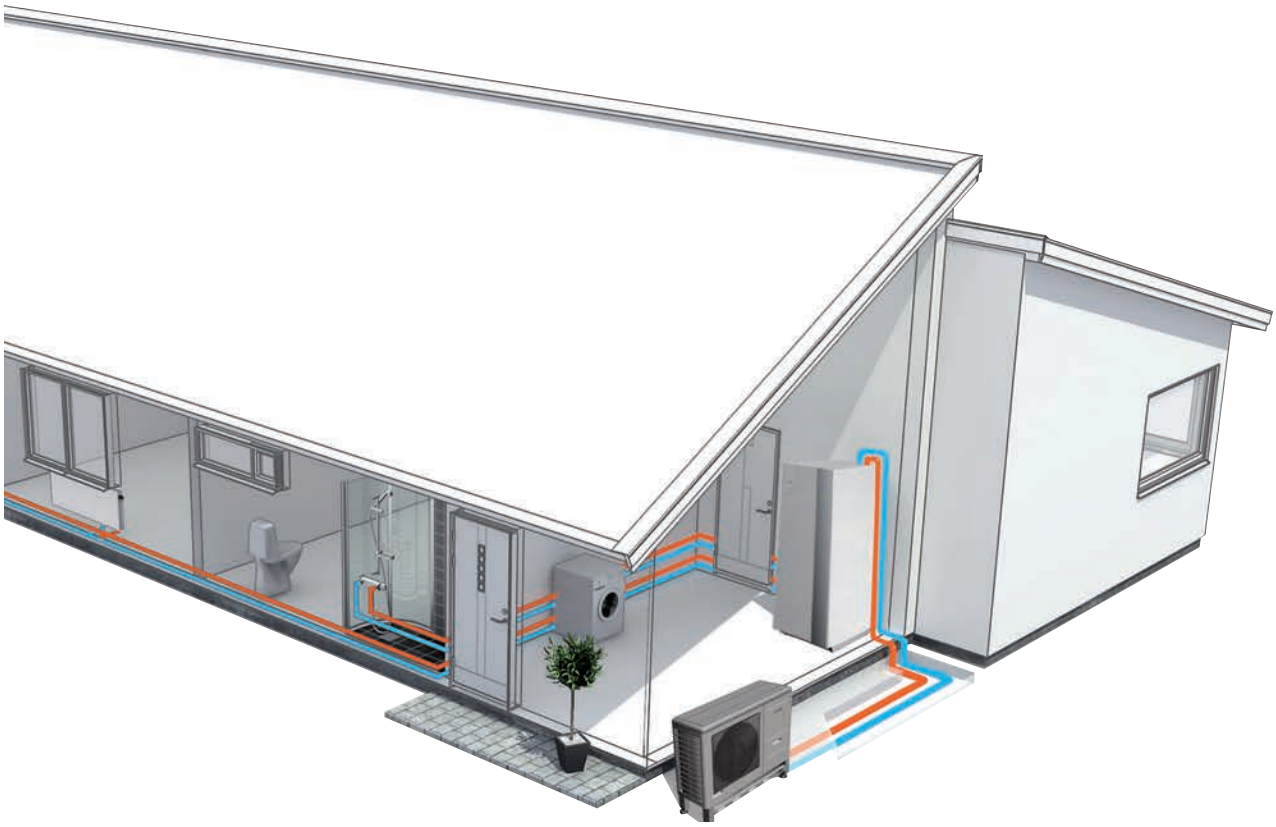
The NIBE SPLIT ACVM 270 works down to an outdoor temperature of -20 °C and supplies up to 58 °C in supply line temperature. The effective cooling function allows the heat pump to deliver a comfortable indoor climate even at high outdoor temperatures.

The NIBE ACVM 270is equipped with a water heater, circulation pump, immersion heater and a control system to ensure safe operation. The indoor module is easy to install and provides compact system installation.

- Compact heat pump that adapts to your home's requirements.
- High capacity even down to -20 °C and well-developed cooling function.
- Simple and easy-to-install indoor module.

This is how NIBE SPLIT ACVM 270 works

Principle of operation



PRINCIPLES OF FUNCTION

The outdoor module NIBE AMS 10 together with the NIBE ACVM 270 creates a complete heat pump that can produce heating, hot water and cooling.

The heat is retrieved from the outdoor air through an outdoor module (AMS 10), where the refrigerant, which circulates in a closed system, transfers the heat from the heat source (outdoor air) to the indoor module (ACVM 270).

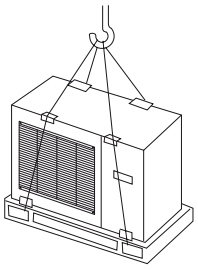
Good to know about NIBE SPLIT ACVM 270

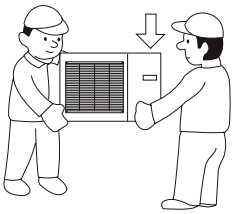
Transport and storage

AMS 10 should be transported and stored vertically.

If the heat pump is to be lifted using lifting straps without packaging, protect as illustrated.

The right-hand side of the heat pump (seen from the front) is heavier.





ACVM 270 can be transported either vertically or horizontally. However it must be stored vertically and in dry conditions.

Location

OUTDOOR MODULE AMS 10

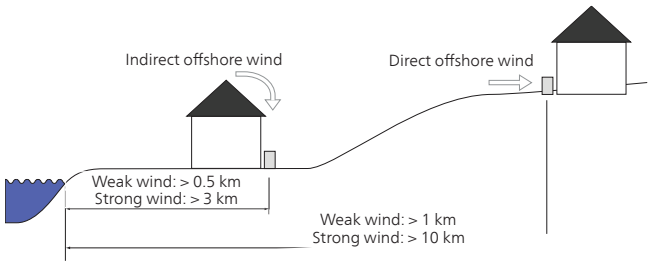
Position AMS 10 outdoors secured to a firm surface, preferably concrete foundation with ground stand near walls or wall mounting.

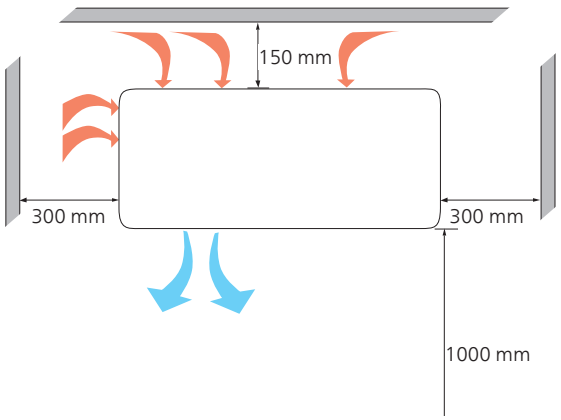
It must be positioned so that the lower edge of the evaporator is at the level of the average local snow depth, however a minimum of 200 mm. AMS 10 should not be positioned next to noise sensitive walls, for example, next to a bedroom. Also ensure that the location does not inconvenience the neighbours. Care must be exercised so that the heat pump is not scratched during installation.

Large amounts of condensation water, as well as melt water from defrosting, can be produced. Provide good drainage at the installation area and make sure water cannot run out onto paths or the like during periods that ice can form.

The distance between AMS 10 and the house wall must be at least 150 mm. Ensure that the free space above AMS 10 measures at least 1,000 mm. AMS 10 *must not be positioned so that the outdoor air can be recirculated. In addition, AMS 10 must not be positioned in a windy location or where it might be exposed to direct, strong winds. This reduces the power and impairs the efficiency, as well as having a negative impact on the defrosting function.*

For wall installation, ensure that vibrations do not affect the inside of the house. Also ensure that the wall and mounting can take the weight of the heat pump.



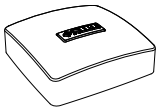


INDOOR MODULE ACVM 270

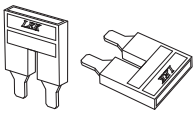
- It is recommended that ACVM 270 is installed in a room with existing floor drainage, most suitably in a utility room or boiler room.
- The surface must be firm, preferably a concrete floor or foundation.
- Install ACVM 270 with its back to an outside wall, ideally in a room where noise does not matter. If this is not possible, avoid placing it against a wall behind a bedroom or other room where noise may be a problem.
- The unit can be aligned using the adjustable feet.
- Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.
- Ensure that there is approx. 500 mm free space in front of and 220 mm above the product for any future service.

Supplied components

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

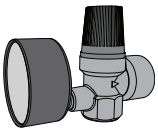


Outside sensor



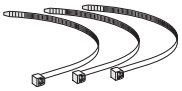
Straps for single phase connection

Current sensor, 3-phase



Safety valve with manometer

Straight connection to safety valve



Cable ties

The enclosed kit is located behind the front service cover in ACVM 270.

Installation

Pipe installation

Pipe installation must be carried out in accordance with current norms and directives. ACVM 270 can work at a temperature up to 65 C. For best savings, we recommend that the climate system be dimensioned for max 55 C.

ACVM 270 is not equipped with shut-off valves. These must be installed outside the indoor module to facilitate any future servicing.

ACVM 270 can be connected to the radiator system, floor heating system and/or fan convectors.

Install the supplied safety valve and manometer.

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

OVERFLOW VALVE

A free flow is required for all docking options, which means that an overflow valve must be installed.

For more information see nibe.eu.

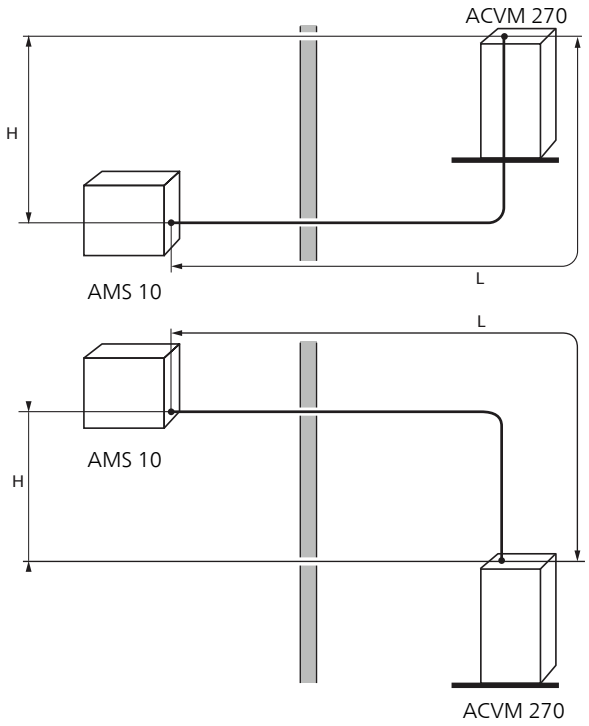
CONNECTING REFRIGERANT PIPES (NOT SUPPLIED)

Install the refrigerant pipes between the outdoor module AMS 10 and ACVM 270.

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

Limitations

- Maximum pipe length, AMS 10-8 and AMS 10-12 (L): 30m.
- Maximum height difference (H): ±7m.



Pipe dimensions and materials

	Gas pipe	*Liquid pipe*
Pipe dimension	Ø15.88 mm (5/8")	Ø9.52 mm (3/8")
Connection	Flare - (5/8")	Flare - (3/8")
Material	Copper quality SS-EN 12735-1 or C1220T, JIS H3300	
Minimum material thickness	1.0 mm	0.8 mm

INSTALLATION REQUIREMENTS

	AMS 10-8	*AMS 10-12*
Max pressure, climate system	0.25 MPa (2.5 Bar)	
Highest recommended supply/return temperature at dimensioned outdoor temperature	55/45 °C	
Max temperature in ACVM 270	+65 °C	
Max flow line temperature with compressor	+58 °C	
Min supply temperature cooling	+7 °C	
Max supply temp. cooling	+25 °C	
Max pipe length, refrigerant pipe	30 m	12 m
Min volume, climate system during heating, cooling*	50 l	80 l
Min volume, climate system during under floor cooling*	80 l	100 l
Max flow, climate system	0.38 l/s	0.57 l/s
Min flow, climate system, 100 % circulation pump speed (defrosting flow)	0.19 l/s	0.29 l/s
Min flow, heating system	0.12 l/s	0.15 l/s
Min flow, cooling system	0.16 l/s	0.20 l/s

Docking external addition	*ACVM 270*
Output external addition	9–18 kW
Recommended docking flow	0.17–0.22 l/s
Max temperature from external heat source	+65 °C

* Regards circulating volume

External circulation pump must be used when the pressure drop in the system is greater than the available external pressure. In such cases, a bypass line with non-return valve must be installed.

Overflow valve must be used if min. system flow cannot be guaranteed.

Electrical connections

ACVM 270 must be installed via a circuit breaker with a minimum breaking gap of 3mm.

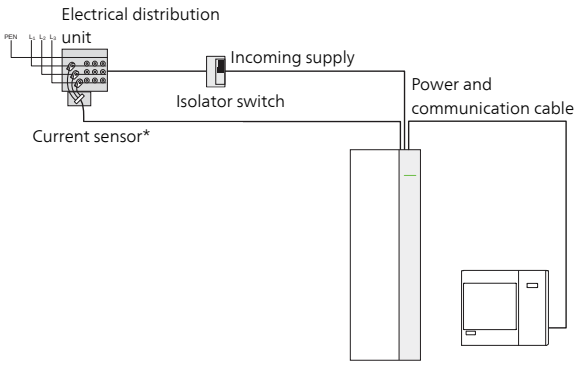
Other electrical equipment, except the outdoor sensors, current sensors and outdoor module AMS 10 is already connected at the factory.

- Disconnect the indoor module ACVM 270 and outdoor module AMS 10 before insulation testing the house wiring.
- For fuse ratings, see technical data, "Fuse protection".
- If the building is equipped with an earth-fault breaker, ACVM 270 should be equipped with a separate one.
- Connection must not be carried out without the permission of the electricity supplier and under the supervision of a qualified electrician.
- 5x2.5 mm^2 cable must be used for the connection between ACVM 270 and AMS 10.
- Cables must be routed so that they are not damaged by metal edges or trapped by panels.
- AMS 10 is equipped with a single phase compressor. This means that phase L3 is loaded with up to 15 A during compressor operation.

Electrical installation and service must be carried out under the supervision of a qualified electrician. Electrical installation and wiring must be carried out in accordance with the stipulations in force.

The switch (SF1) must not be moved to "1" or "⚠" until the boiler has been filled with water. The circulation pump and immersion heater may be damaged.

PRINCIPLE DIAGRAM, ELECTRICAL INSTALLATION



* Only in a 3-phase installation.

Functions

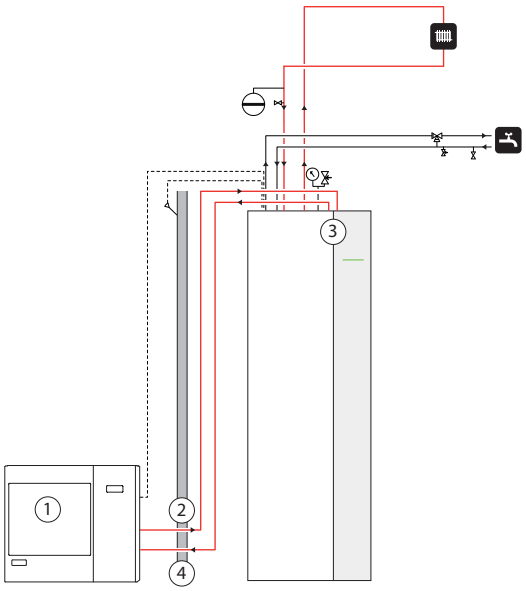
NIBE SPLIT ACVM 270 is a system that can produce heating, hot water and cooling.

The principle during heating can be simplified as follows:

1. The refrigerant in AMS 10 retrieves heat from the outdoor air then compresses it, which increases the temperature further.
2. The hot refrigerant (now in gas state) is routed into ACVM 270.
3. The refrigerant releases the heat for further distribution in the system.
4. The refrigerant (now in liquid state) is routed back to AMS 10 and the process is repeated.

By reversing the process, thereby allowing the refrigerant in AMS 10 to retrieve the heat from the water and release it into the outdoor air, the heat pump can, if necessary, cool instead.

ACVM 270 determines when AMS 10 is to work and not to work, using the collated data from the temperature sensor. In the event of extra heat demands, ACVM 270 can connect additional heat in the form of the internal immersion heater, or any connected external addition.



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.

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

Heat production

The indoor temperature depends on several 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 systems must be.

CONTROLLING HEAT PRODUCTION

Normally, the heat pump heats the water (heating medium) to the temperature required at a certain outdoor temperature. This occurs automatically on the basis of the collected temperature values from the outdoor temperature sensor and sensors on the lines to the climate system (flow line sensors). Extra accessories such as room temperature sensors, can influence the temperature.

The temperature information that the outdoor sensor (mounted on an exterior wall of the house) sends to the heat pump's control computer senses variations in the outdoor temperature early on. It does not have to be cold inside the house before the control system is activated, as soon as the average outdoor temperature drops outside, the temperature of the water to the climate system (supply temp.) inside the house is increased automatically.

The heat pump's supply temperature will hover around the theoretical required value, shown in brackets on the display.

TEMPERATURE OF THE CLIMATE SYSTEM

The temperature of the climate system in relation to the outdoor temperature can be modified by using the "Offset heating curve" knob on the heat pump's front panel.

Cooling production

The condition in order for cooling to be activated is that "On" is selected in menu.

The climate system must manage cooling operation. Settings must be made by the installer when commissioning the system.

Hot water production

The integrated water heater is of coil model and is heated by circulating water, which is heated by the heat pump.

During "normal" consumption it is enough to run the heat pump's compressor to supply the different tapping points of the house with hot water. The temperature of the hot water in the water heater then varies between the set values.

Alarm indications

There are many monitoring functions integrated in NIBE SPLIT ACVM 270 to alert you to any malfunctions, the control computer transmits alarm signals that can be read from the front panel display.

Front panel, indoor module

All the most common settings are made from the panel as well as control computer instructions such as comfort etc. that you require the heat pump system to fulfil.

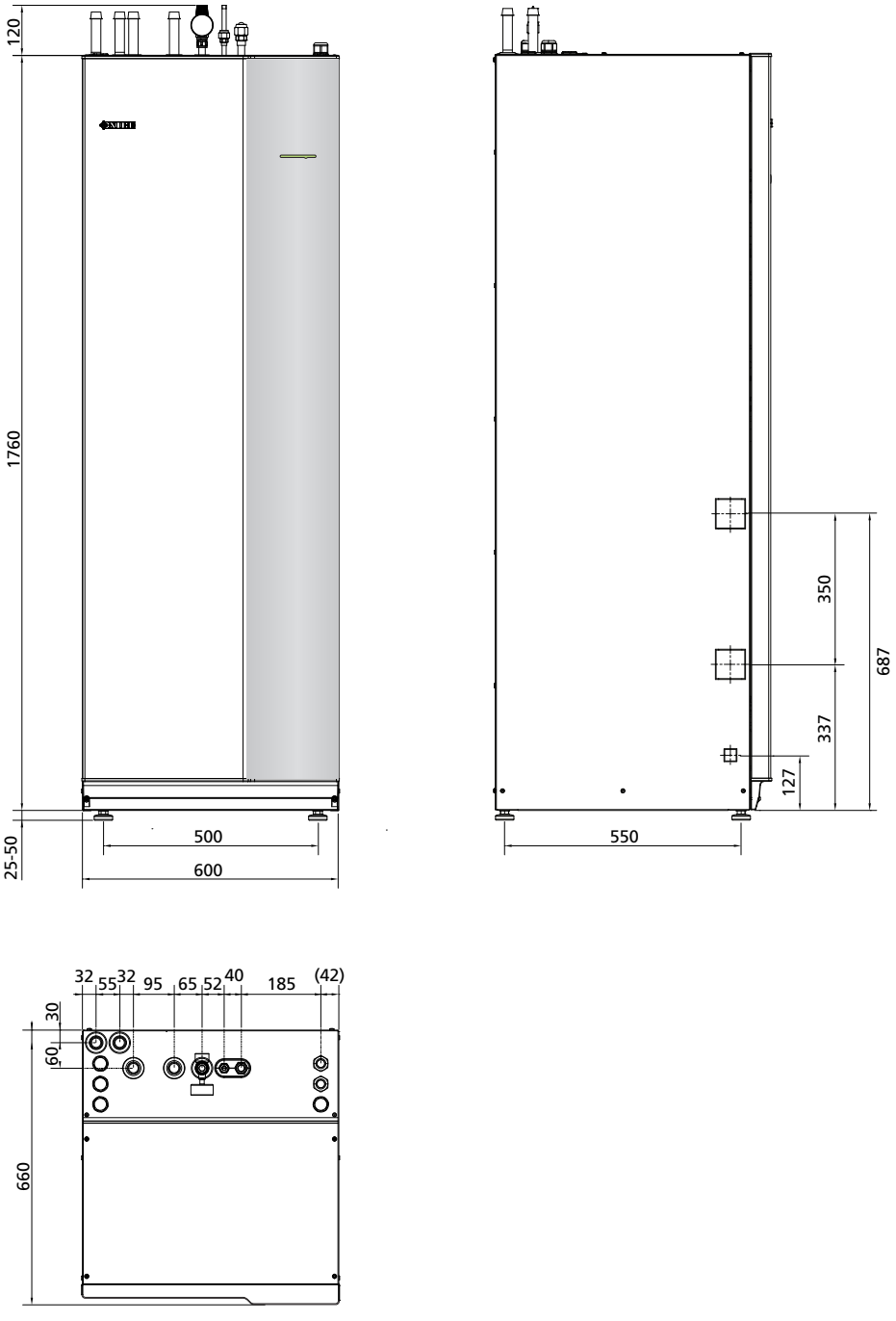
Menu 1.0 (temperature in the water heater) is normally shown on the display.

The plus and minus buttons and the enter button are used to scroll through the menu system as well as to change the set value in some menus.

Technical data

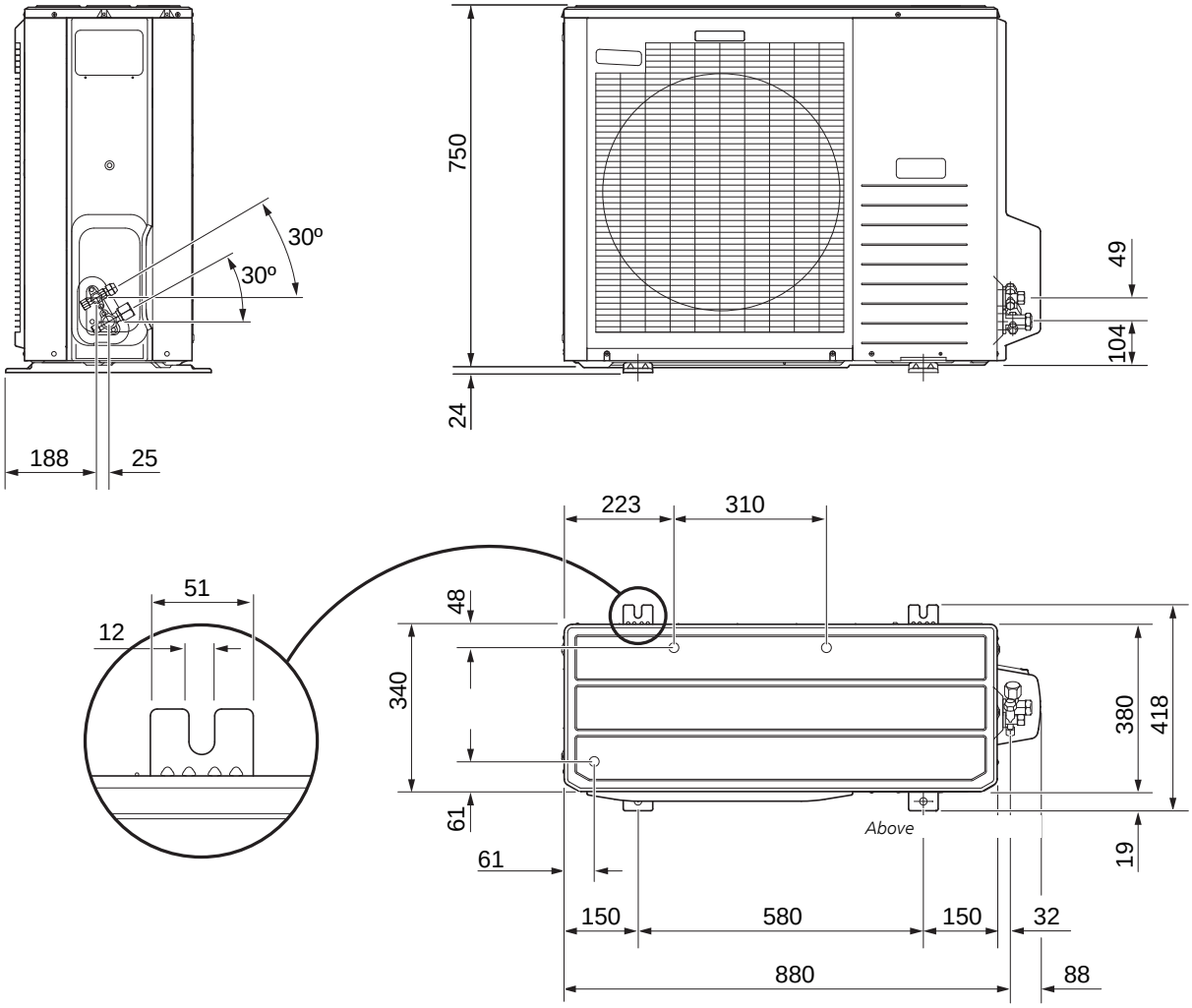
Dimensions

INDOOR MODULE

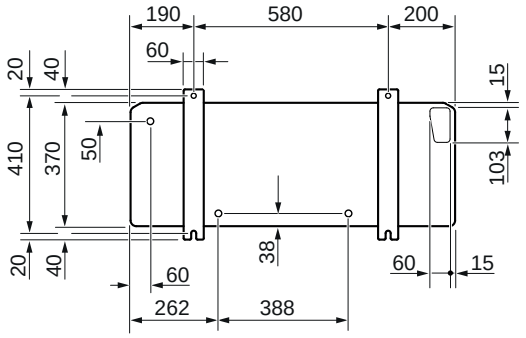


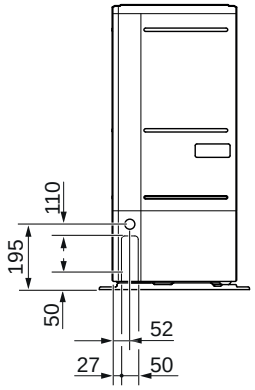
OUTDOOR MODULE

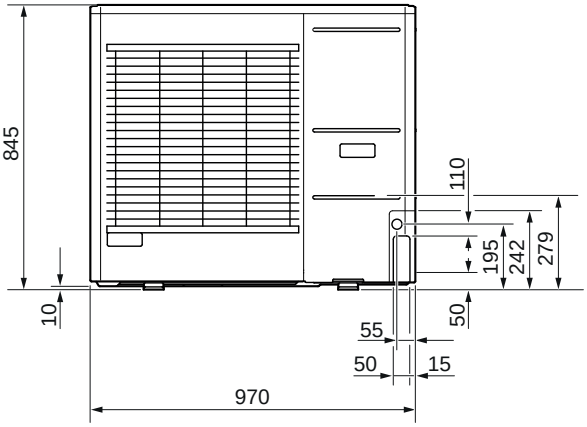
AMS 10-8

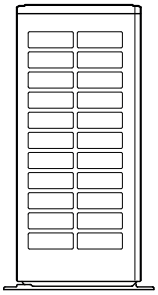


AMS 10-12









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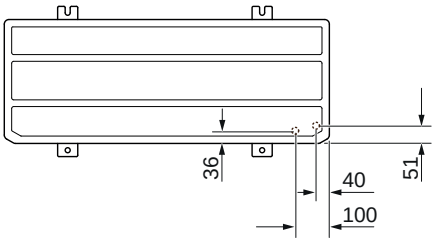
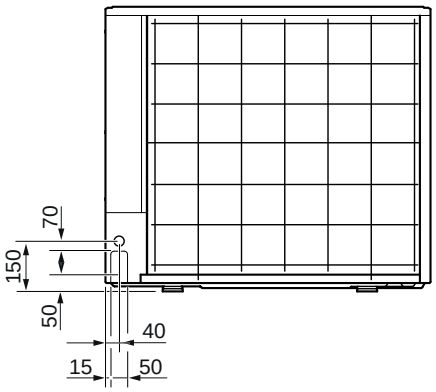
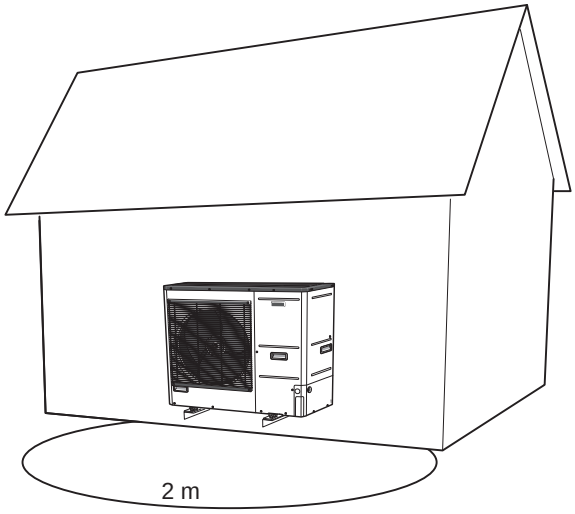




Sound pressure levels

AMS 10 is usually placed next to a house wall, which gives a directed sound distribution that should be considered. Accordingly, you should always attempt to find a placement on the side that faces the least sound sensitive neighbouring area.

The sound pressure levels are further affected by walls, bricks, differences in ground level, etc and should therefore only be seen as guide values.



Noise, AMS 10-8		
Sound power level, according to EN12102 at 7/35 °C (nominal)*	L_W(A)	55
Sound pressure level at 2 m free standing (nominal)*	dB(A)	41

Noise, AMS 10-12		
Sound power level, according to EN12102 at 7/35 °C (nominal)*	L_W(A)	58
Sound pressure level at 2 m free standing (nominal)*	dB(A)	44

* Free space.

Technical data CE

TECHNICAL SPECIFICATIONS

NIBE SPLIT ACVM 270	*1 x 230 V*	*3 x 400 V*
Working range during heating with compressor (ambient temperature)	-20 – +43 °C	
Working range during cooling (ambient temperature)	+15 – +43 °C	
Max temperature flow line	65 °C	
Max temperature flow line, only compressor	58 °C	
Max temperature return line	65 °C	
Min temperature flow line during heating with compressor and continuous operation	25 °C	
Min temperature flow line during cooling	7 °C	
Maximum temperature supply during cooling and continuous operation	25 °C	
Max. current	44 A	16 A
Recommended fuse rating	50 A	16 A
Starting current	5 A	5 A
Incoming supply, deviation	-15 – +10 %	
Dimensions, refrigerant pipe	Gas pipe: OD15.88 (5/8") Liquid pipe: OD9.52 (3/8")	
Pipe connections	Flare	

ACVM 270		
Immersion heater	Max 9 kW	
Possible electrical step	4 (2, 4, 6, 9 kW)	
Circulation pump, output	3–45 W (variable speed)	
Circulation pump, max available pressure	71 kPa (external)	
Circulation pump, max flow	0.52 l/s	
Circulation pump, flow at 20 kPa external pressure drop	0.41 l/s	
	AMS 10-8	AMS 10-12
Min/max system flow, heating operation	0.12 /0.38 l/s	0.15 /0.57 l/s
Min/max system flow, cooling operation	0.15 /0.38 l/s	0.20 /0.57 l/s
Min flow, climate system, 100 % circulation pump speed (defrosting flow)	0.19 l/s	0.29 l/s
Emergency mode thermostat	35–45 °C (factory setting 35 °C)	
Temperature limiter	98 (-8) °C	
Safety valve, climate system	0.25 MPa (2.5 bar)	
Enclosure class	IP 21	
Volume, total	270 l ±5 %	
Volume, hot water coil	14 l	
Material, hot water coil	Stainless steel (AISI316L/AISI316 DIN 1.4404/1.4401)	
Max pressure, vessel	0.25 MPa (2.5 bar)	
Max pressure, hot water coil	1.0 MPa (10 bar)	
Max pressure, cooling system	4.5 MPa	
The water quality, domestic hot water and climate system	≤ EU directive no. 98/83/EF	
Max operating temperature, vessel	65 °C	
Ambient temperature, indoor module	5–35 °C, max relative humidity95 %	
Connection, cold water, domestic hot water	Compression ring 22 mm	
Connection, climate system	Compression ring 22 mm	
Connection, docking	ISO 228/1 G1 internal	

ACVM 270	
Height	1760 mm (+25–50") mm, adjustable feet)
Required ceiling height	2050 mm
Width	600 mm
Depth	660 mm
Weight	140 kg
Electrical connections	230 V 1AC 50 Hz or 400 V 3NAC 50 Hz
Part no.	069 159 / 069 162

AMS 10	*8*	*12*
Compressor	Twin Rotary	
Speed, heating	20–81 Hz (rps)	25–85 Hz (rps)
Speed, cooling	20–86 Hz (rps)	20–80 Hz (rps)
Max fan flow (heating, nominal)	3000 m^3/h	4380 m^3/h
Fan rating	86 W	
Defrosting	Reversing	
Drain pan heater	integrated 100 W	integrated 120 W
Breaking value high pressure	4.15 MPa (41.5 bar)	
Cut-out value low pressure (15 s)	0.079 MPa (0.79 bar)	
Height	750 mm	845 mm
Width	780 mm (+67 mm valve protection)	970 mm
Depth	340 mm (+110 mm with foot rail)	370 mm (+80 mm with foot rail)
Weight	60 kg	74 kg
Colour (two coats powder coating)	Dark gray	
Power and communication connection from indoor module	5 core 2.5 mm^2	
Refrigerant volume (R410A)	2.55 kg	2.90 kg
GWP refrigerant	2,088	
Max. length, refrigerant pipe, one way	30 m*	
Pipe connection option	Right-hand side	Bottom / right-hand side / rear side
Part no.	064 033	064 110

Energy rating, average climate

Model		*AMS 10-8*	*AMS 10-12*
Model hot water heater		*ACVM 270*	*ACVM 270*
Temperature application	*°C*	*35 / 55*	*35 / 55*
Energy efficiency class for space heating		A++ / A+	A++ / A++
Space heating efficiency class of the system[1)]		A++ / A+	A++ / A++
Water heating energy efficiency class		A	A
Declared load profile for water heating		XL	XL

1) Reported efficiency for the system also takes the temperature regulator into account. If the system is supplemented with an external additional boiler or solar heating the total efficiency of the system must be recalculated.

Performance, ACVM 270 and AMS 10-8

Heating	*Outd. temp: / Supply temp.*	*Min*	*Nominal*	*Max*
EN14511 ΔT5K Capacity/power input/COP	7/35 °C (floor)	1.75/0.50/3.50	6.19/1.41/4.40	8.16/1.98/4.13
	2/35 °C (floor)	1.49/0.48/3.12	5.48/1.51/3.63	5.68/1.70/3.34
	-7/35 °C (floor)	1.04/0.45/2.31	4.04/1.45/2.79	5.53/2.06/2.69
	-15/35 °C (floor)	1.25/0.59/2.10	2.74/1.18/2.32	3.92/1.69/2.32
	7/45 °C	2.64/0.81/3.27	6.00/1.72/3.50	7.81/2.47/3.16
	2/45 °C	2.14/0.79/2.71	4.80/1.77/2.72	6.64/2.54/2.61
	-7/45 °C	1.46/0.75/1.95	3.74/1.64/2.28	5.17/2.35/2.20
	-15/45 °C	0.92/0.69/1.33	2.68/1.40/1.91	3.83/2.08/1.84
	7/55 °C	3.08/1.26/2.45	6.09/2.22/2.75	7.36/2.73/2.70
	-7/55 °C	1.88/1.14/1.65	3.33/2.00/1.66	4.64/2.66/1.74

Cooling	*Outd. temp: / Supply temp.*	*Min*	*Nominal*	*Max*
EN14511 ΔT5K Capacity/power input/EER	27/7 °C	2.06/0.38/5.38	5.48/1.69/3.24	7.52/2.37/3.17
	27/18 °C	2.71/0.34/7.88	8.16/2.28/3.57	11.20/3.20/3.50
	35/7 °C	2.10/0.55/3.82	5.17/1.89/2.73	7.10/2.65/2.68
	35/18 °C	2.67/0.71/3.76	7.79/2.28/3.42	10.7/3.19/3.35

Performance, ACVM 270 and AMS 10-12

Heating	*Outd. temp: / Supply temp.*	*Min*	*Nominal*	*Max*
EN14511 ΔT5K Capacity/power input/COP	7/35 °C (floor)	3.54/0.86/4.14	9.27/2.12/4.40	11.20/2.80/4.00
	2/35 °C (floor)	3.11/0.82/3.83	7.21/1.99/3.66	8.25/2.47/3.35
	-7/35 °C (floor)	3.29/1.07/3.09	6.24/2.07/3.05	7.46/2.58/2.89
	-15/35 °C (floor)	3.23/1.32/2.47	4.51/1.89/2.42	6.62/2.69/2.46
	7/45 °C	3.45/0.96/3.61	9.08/2.58/3.55	11.10/3.38/3.28
	2/45 °C	3.11/1.03/3.04	7.05/2.43/2.93	8.73/3.20/2.73
	-7/45 °C	3.14/1.40/2.25	5.84/2.42/2.44	7.22/3.26/2.21
	-15/45 °C	3.19/1.72/1.86	4.24/2.19/1.96	5.95/3.35/1.78
	7/55 °C	4.45/1.64/2.72	8.41/3.08/2.75	8.97/3.49/2.57
	-7/55 °C	3.50/1.99/1.77	4.93/2.80/1.78	5.64/3.52/1.60

Cooling	*Outd. temp: / Supply temp.*	*Min*	*Nominal*	*Max*
EN14511 ΔT5K Capacity/power input/EER	27/7 °C	2.06/0.63/3.28	8.75/1.86/4.72	9.87/3.16/3.13
	27/18 °C	3.41/0.55/6.17	10.82/2.21/4.91	11.7/3.32/3.52
	35/7 °C	1.81/0.70/2.59	6.98/2.54/2.75	9.45/3.41/2.77
	35/18 °C	3.10/0.69/4.48	9.37/2.64/3.56	11.2/3.58/3.12

Accessories

Not all accessories are available on all markets.

Detailed information about the accessories and complete accessories list available at nibe.eu.

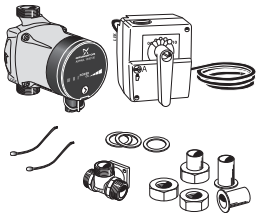
MIXING AND CHARGE PACKAGE

MCU 10

Part no. 067 294

EXTRA SHUNT GROUP ESV 22

Part no. 067 291



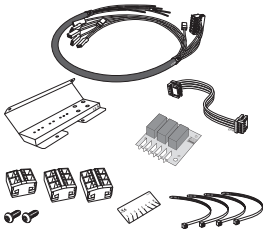
AUXILIARY RELAY HR 10

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

CABLE KIT ACK 22

Cable kit if ESV 22 or VCC 22 is used.

Part no. 067 049



CONDENSATION WATER PIPE

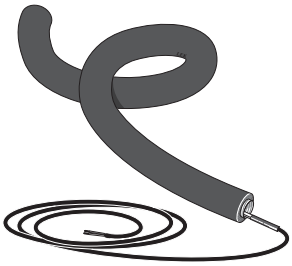
Condensation water pipe, different lengths.

Earth circuit breaker 1-phase.

KVR 10-10 ACVM

1 metres

Part no. 067 239



KVR 10-30 ACVM

3 metres

Part no. 067 241

KVR 10-60 ACVM

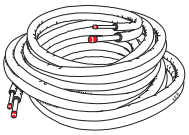
6metres

Part no. 067 243

REFRIGERANT PIPE KIT

3/8" – 5/8", 12 metres, insulated,
for HBS 10-12/16 and AMS 10-8/12/16

Part no. 067 032



RELAY BOX SRB 22

Relay box for solar power control

Part no. 067 109

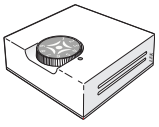
ROOM UNIT RE 10

Room unit.

Part no. 067 004

ROOM SENSOR RG 10

Part no. 018 433

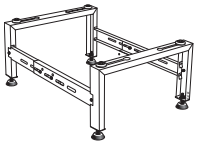


STAND AND BRACKETS

Ground stand

For AMS 10-6, -8, -12, -16

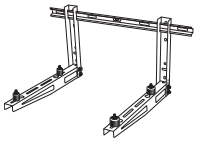
Part no. 067 515



Wall bracket

For AMS 10-6, -8, -12

Part no. 067 600

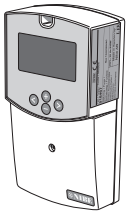


CONTROL MODULE SOLAR

SCU 10

Control module intended for controlling solar heating together with other heating equipment.

Part no. 518 467



BUFFER VESSEL UKV

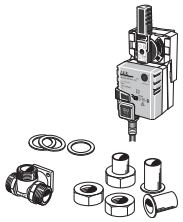
REVERSING VALVE FOR COOLING

VCC 22

Reversing valve, cooling.

For separate cooling and heating systems.

Part no. 067 048



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