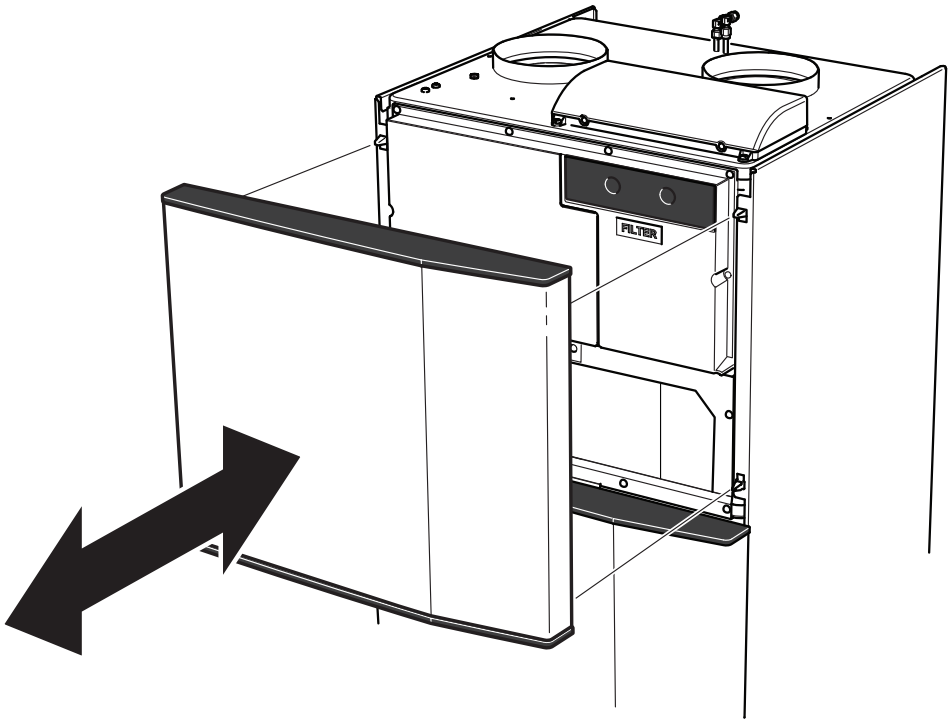
Installer manual

NIBE

Supply air module
SAM S42

IHB EN 2447-2
631636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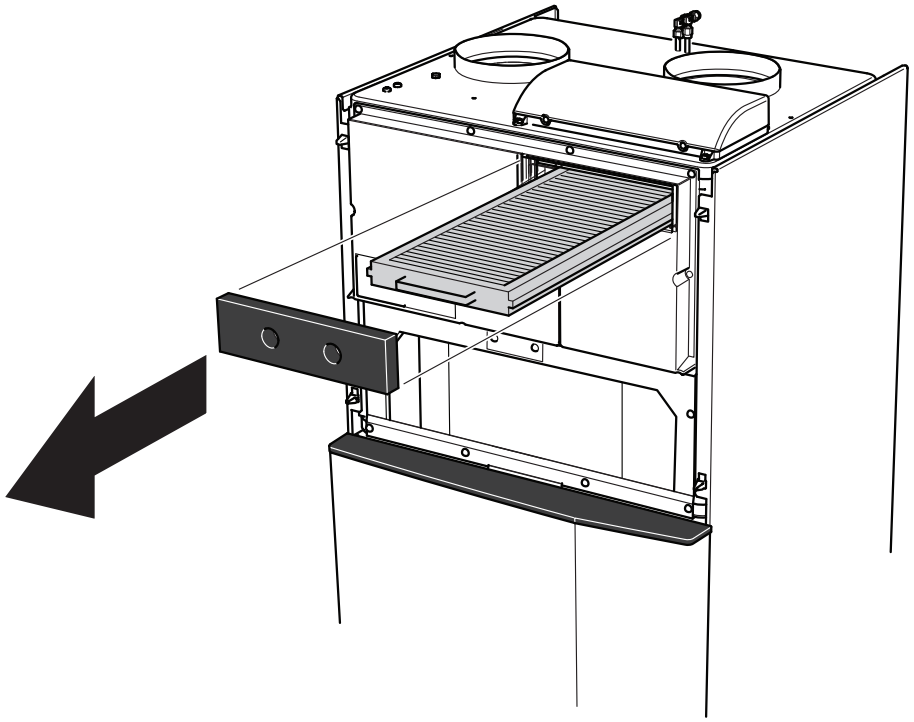


Table of Contents

Important information

Safety information

This manual describes installation and service procedures for implementation by specialists.

The manual must be left with the customer.

For the latest version of the product's documentation, see nibe.eu.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

This is an original manual. It may not be translated without the approval of NIBE.

Rights to make any design or technical modifications are reserved.

System pressure		
Max. system pressure, heating medium	MPa	Defined by main product
Max flow	l/s	Defined by main product
Max. permitted ambient temperature	°C	35

If the supply cable is damaged, only NIBE, its service representative or similar authorised person may replace it to prevent any danger and damage.

SYMBOLS

Explanation of symbols that may be present in this manual.

CAUTION!

This symbol indicates danger to person or machine.

NOTE!

This symbol indicates important information about what you should consider when installing or servicing the installation.

TIP!

This symbol indicates tips on how to facilitate using the product.

MARKING

Explanation of symbols that may be present on the product's label(s).

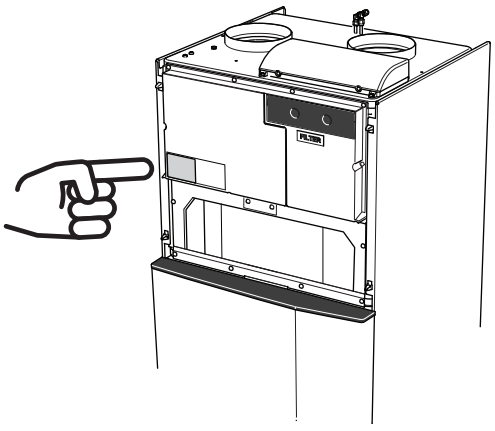
Danger to person or machine.

Read the User Manual.

General

SERIAL NUMBER

The serial number can be found to the left, inside the upper front cover.



NOTE!

You need the product's (14 digit) serial number for servicing and support.

RECOVERY

Leave the disposal of the packaging to the installer who installed the product or to special waste stations.

When disposing of the product, its constituent materials and components, e.g. compressors, fans, circulation pumps and circuit boards, must be disposed of at a special waste station or dealer who provides this type of service.

To access the separate components, refer to the section that shows the construction of the product. No special tools are required for access.

Improper disposal of the product by the user results in administrative penalties in accordance with current legislation.

INSPECTION OF THE INSTALLATION

In addition, fill in the page for the installation data in the User Manual.

Current regulations require the supply air module to be inspected before it is put into service. The inspection must be carried out by a suitably qualified person.

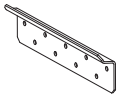
✔	Description	Notes	Signature	Date
Ventilation (page 16)				
	Setting ventilation flow supply air			
Heating medium (page 13)				
	System flushed			
	System vented			
	Check against output and pressure drop diagrams			
	Connected according to outline diagram			
Electricity (page 17)				
	Supply connected 230 V			
	Connected communication			

Delivery and handling

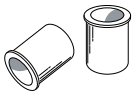
Transport

SAM S42 should be transported and stored in the dry.

Supplied components

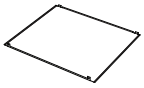


Wall bracket
1 x

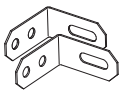


Support bushes
4 x

Vent hose
1 x



Base plate
1 pcs



Angle fitting
2 pcs

Screw M5x9
6 pcs

Wall spacers
2 x

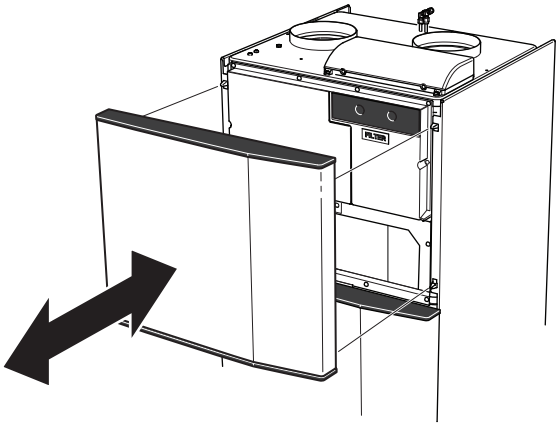
Compatible products

- S735
- S735C

Removing the covers

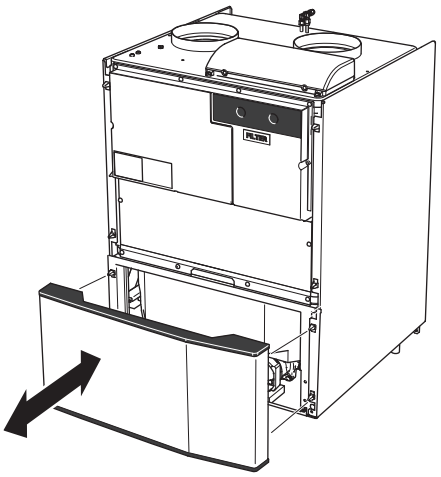
UPPER FRONT COVER

Remove the upper front cover by pulling it straight out.



LOWER FRONT COVER

Unhook the lower front cover.



Assembly

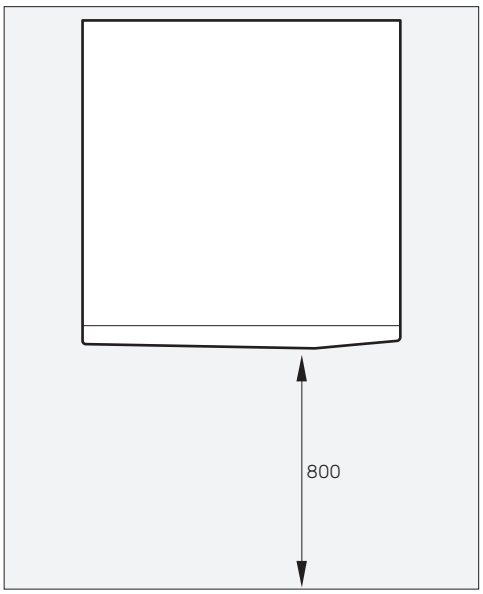
SAM S42 is mounted on the wall using the enclosed wall rail, or on the lower cabinet CAB S12.

Noise from the fan can be transferred to the wall rail/lower cabinet.

- Install with its back to an outside wall, ideally in a room where noise does not matter, in order to eliminate noise problems. If this is not possible, avoid placing it against a wall behind a bedroom or other room where noise may be a problem.
- Wherever the unit is located, walls to sound sensitive rooms should be fitted with sound insulation.
- Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.

INSTALLATION AREA

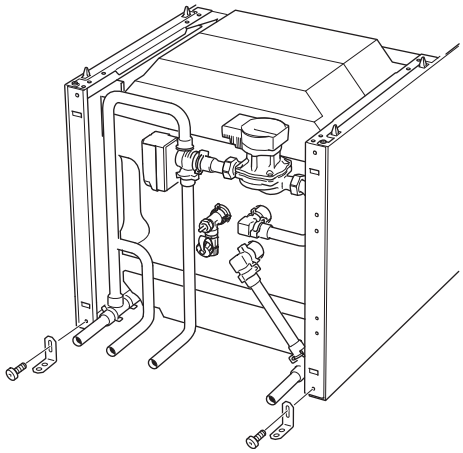
Leave a free space of 800 mm in front of the product. All service on SAM S42 can be carried out from the front.



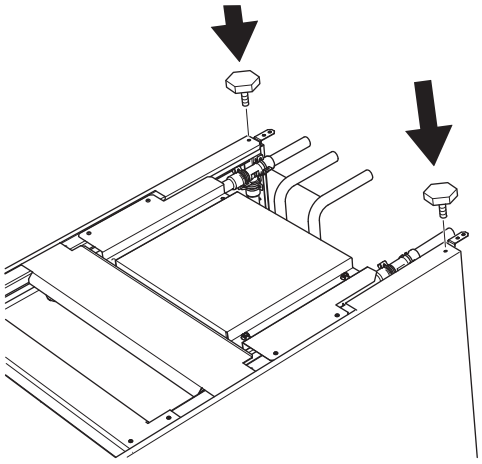
> **CAUTION!**
>
> Ensure that there is sufficient space (300 mm) above SAM S42 for connecting ventilation ducts.

WALL INSTALLATION

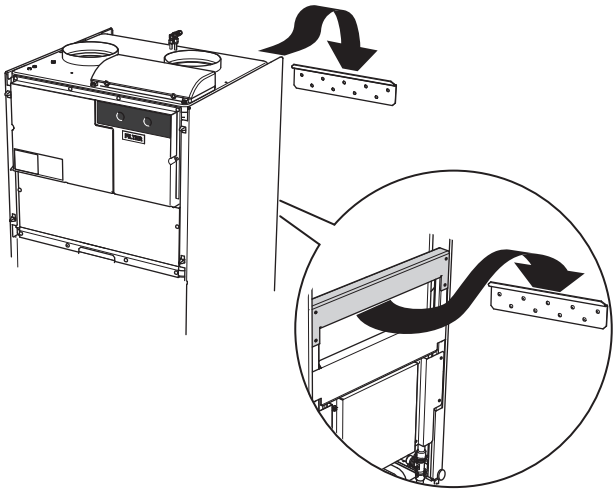
1. Fit the enclosed angle fittings at the rear edge of SAM S42 and secure them in place using the enclosed screws.



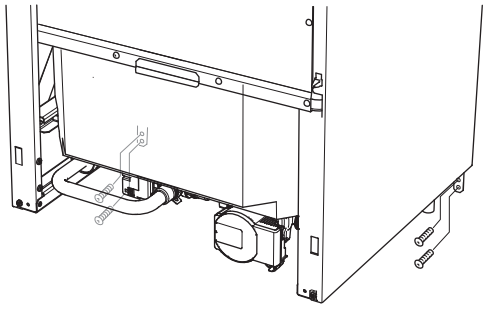
2. Install the enclosed wall spacers. The purpose of the wall spacers is to ensure that SAM S42 hangs flat against the wall.



3. Fit the enclosed rail on the wall. Ensure that the rail is fitted in such a way that it can bear the weight of SAM S42.
4. Fit SAM S42 on the rail as illustrated.



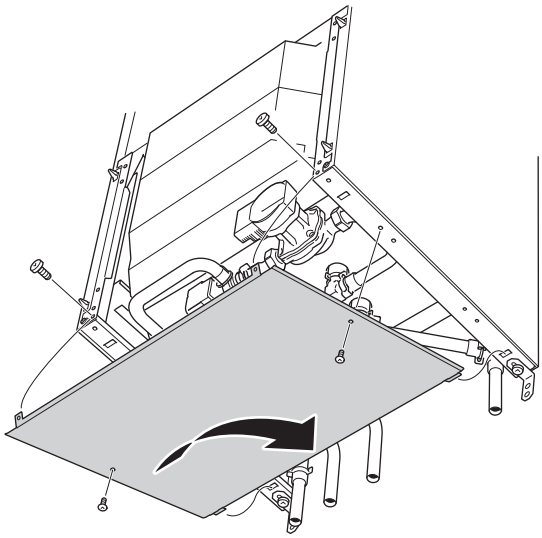
5. Secure SAM S42 at the lower edge with screws in the wall.



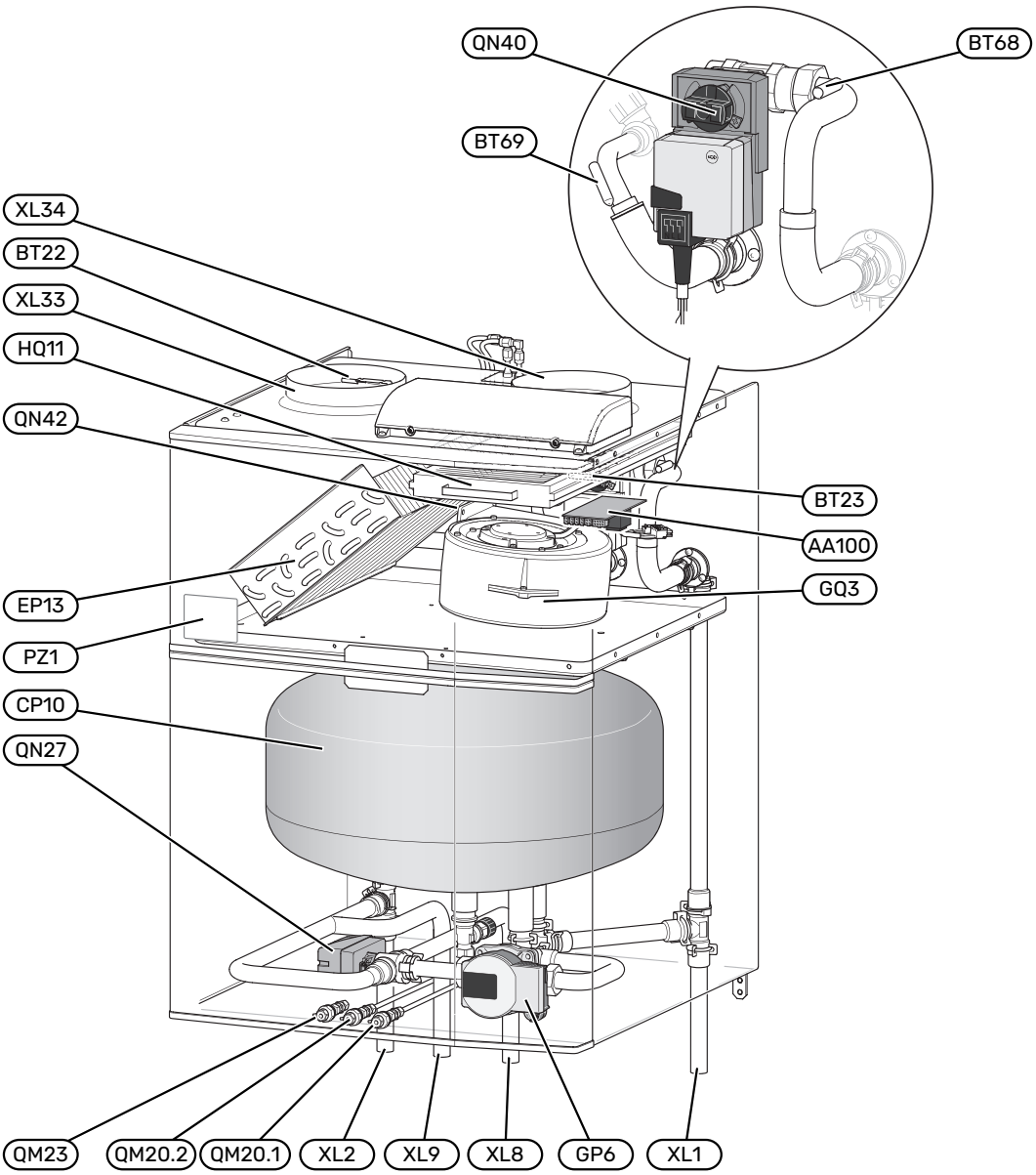
INSTALLATION OF BASE PLATE

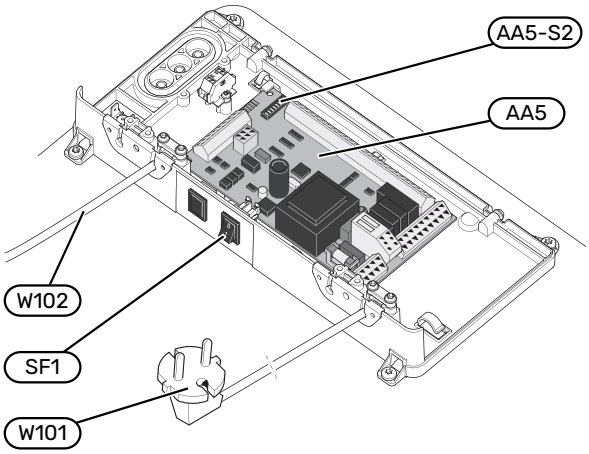
Install the base plate after the heating medium pipes have been connected.

1. Hook on the base plate at the rear edge of SAM S42.
2. Screw the base plate into place using the enclosed screws.



The design of the supply air module





Pipe connections

XL1	Connection, heating medium flow line
XL2	Connection, heating medium return line
XL8	Docking connection, supply line (from heat pump)
XL9	Docking connection, return line (to heat pump)
XL33	Ventilation connection, supply air
XL34	Ventilation connection, outdoor air

HVAC components

CP10	Buffer vessel
GP6	Heating medium pump2
QM20	Vent valve, heating medium
QM23	Vent valve, buffer vessel
QN27	Shuttle valve, climate system/water heater
QN40	Control valve heating medium

Sensors etc.

BT22	Temperature sensor, supply air
BT23	Temperature sensor, outdoor air
BT68	Flow line sensor
BT69	Return line sensor

Electrical components

AA5	Accessory card
AA5-S2	Dip switch
AA100	Joint board
SF1	Switch
W101	Cord with connection plug
W102	Communication cable

Ventilation

EP13	Supply air battery
GQ3	Supply air fan
HQ11	Supply air filter
QN42	Frost protection damper

Miscellaneous

PZ1	Type plate

Designations according to standard EN 81346-2.

Pipe and ventilation connections

General pipe connections

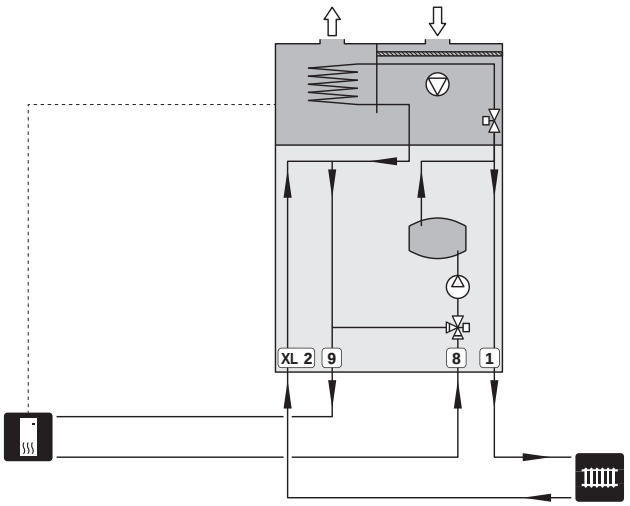
Pipe installation must be carried out in accordance with current norms and directives.

Dimensions and setting-out coordinates can be found at the end of the manual.

SYMBOL KEY

Symbol	Meaning
	Unit box
	Non-return valve
	Circulation pump
	Fan
	Shut off valve
	Control valve
	Temperature sensor
	Reversing valve/shunt
	Heat pump
	Heating system
	Heating system with lower temperature

SYSTEM DIAGRAM



XL1	Connection, heating medium flow
XL2	Connection, heating medium return
XL8	Docking connection, supply
XL9	Docking connection, return

NOTE!

This is a principle of operation. For more detailed information about SAM S42, see section "The design of the supply air module".

Heating medium side

DIMENSIONING THE SYSTEM

1. Check the water flow required for SAM S42 by using the diagrams "Output transfer to the supply air". Select one of the diagrams (supply temperature 35°C, 45°C or 55°C).
2. Check that the climate system's pressure drop is within the recommended range in the diagram for "Working range SAM S42".
3. Check that the pump capacity from the heat pump and SAM S42 is sufficient for the heating system, using the diagram for "Capacity, heating medium pumps".

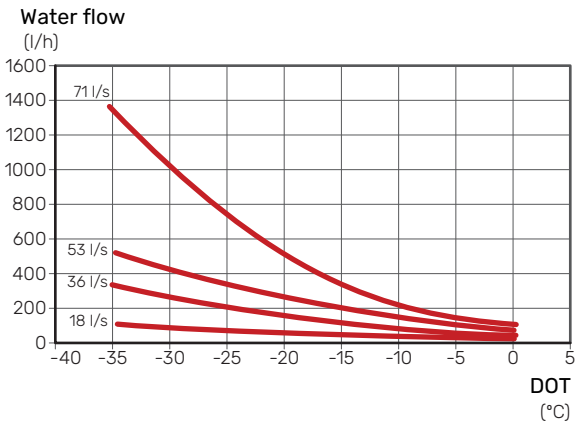
> **CAUTION!**
>
> For supply air flows that are not in the diagrams, an estimate (linear interpolation) can be made.

OUTPUT TRANSFER TO THE SUPPLY AIR

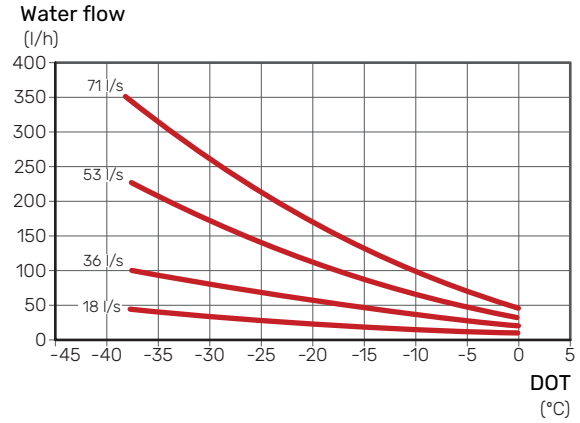
The diagrams show the required water flow through the supply air coil for an 18°C supply air temperature at various supply air flows.

Select the diagram that best matches the system's supply temperature at DOT (Dimensioned Outdoor Temperature). In the diagram, DOT and supply air flow give the water flow required.

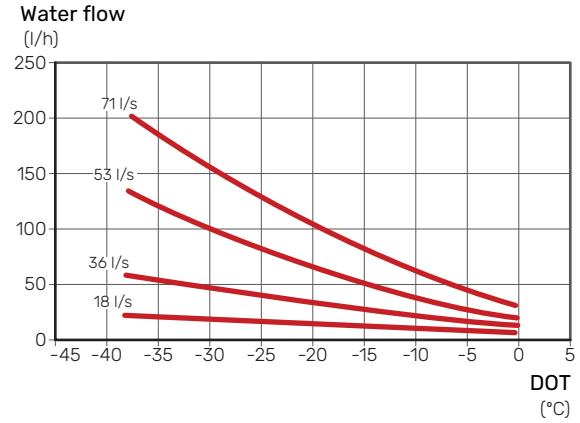
Supply temperature 35°C at DOT



Supply temperature 45°C at DOT

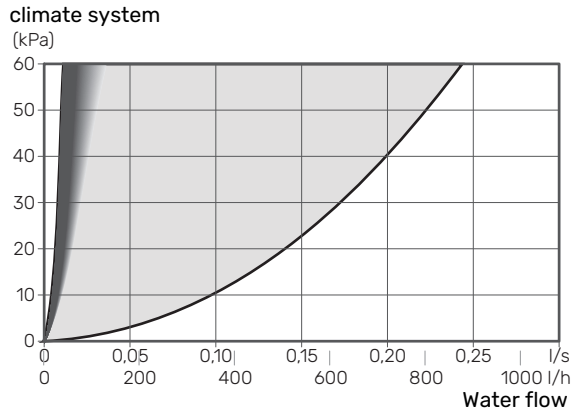


Supply temperature 55°C at DOT



WORKING RANGE SAM S42

Recommended pressure drop in the climate system



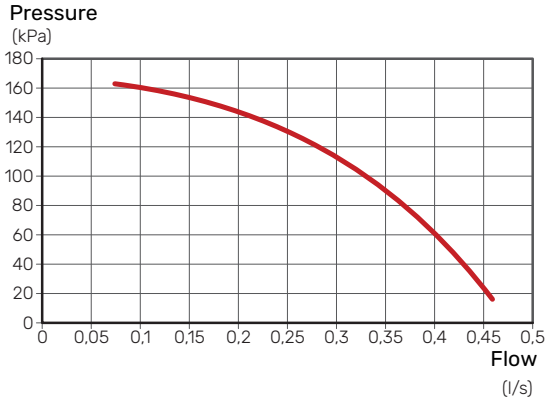
The diagram shows the minimum pressure drop you need in the climate system at a given flow in order to achieve the desired capacity. The pressure drop across SAM S42 is the same as that across the climate system that is parallel with SAM S42.

Check that the working point is inside the grey area. If the working point is inside the dark grey area, to the left in the diagram, it can give rise to an oscillating supply air temperature. If there is too low a pressure drop across the climate system that is parallel with SAM S42, there is a risk of ending up in the white area. In this area, there is a risk of too low a water flow through the supply air module and there is then a risk of freezing.

CAPACITY, HEATING MEDIUM PUMPS

The heat pump's heating medium pump (EB100-GP1) and the supply air module's heating medium pump (AZ20-GP6) together provide the available pressure shown below.

Max capacity, heating medium pumps



THE CLIMATE SYSTEM'S PROJECTED PRESSURE DROP

You need to know this in order to assess whether SAM S42 is suitable for installation in the system:

- DOT
- Supply temperature at DOT
- Supply air flow
- The climate system's projected pressure drop

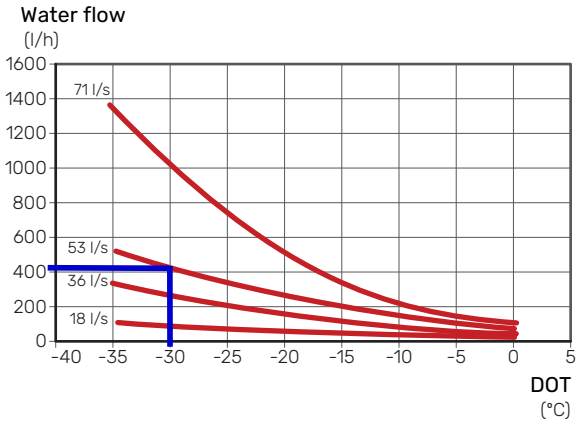
Example

DOT: -30

Supply temperature at DOT: 35 °C

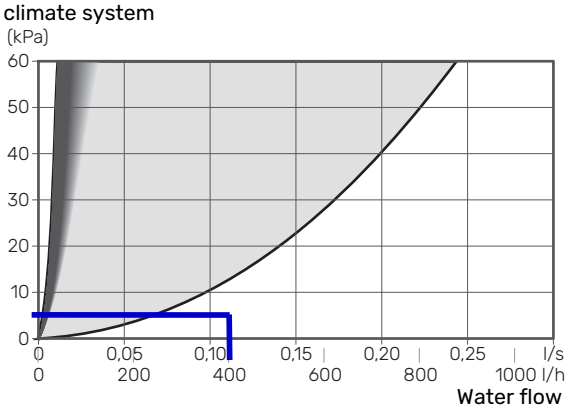
Supply air flow: 53 l/s.

1. Select the diagram titled "Supply temperature 35°C at DOT".
2. Select the graph for 53 l/s.
3. The water flow at DOT -30 is approx. 400 l/h.



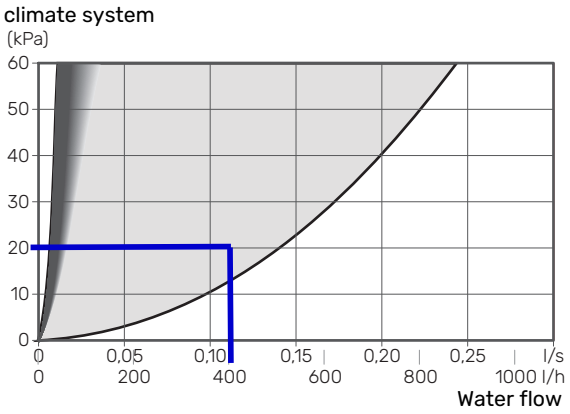
4. In diagram "Recommended pressure drop in the climate system", you check the climate system's projected pressure drop at water flow 400 l/h.
5. The climate system's projected pressure drop is 5 kPa:

   the working point is inside the white area, there is a risk of freezing and there is a risk that the desired supply air temperature will not be attained.



The climate system's projected pressure drop is 20 kPa:

the working point ends up inside the grey, approved area.



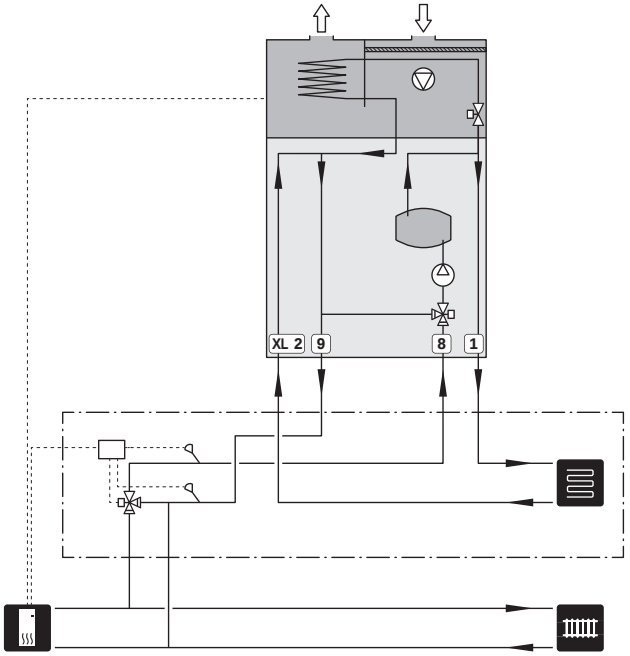
Installation alternative

SAM S42 can be installed in several different ways, some of which are shown here.

EXTRA CLIMATE SYSTEM

In buildings with several climate systems that require different supply temperatures, the accessory ECS 40/ECS 41 can be connected.

SAM S42 is connected to the climate system that has the lowest supply temperature.



General ventilation connection

- Ventilation installation must be carried out in accordance with current norms and directives.
- Connections must be made via flexible hoses, which should be installed so that they are easy to replace.
- Provision must be made for inspection and cleaning of the duct.
- Make sure that there are no reductions of cross-sectional area in the form of creases, tight bends, etc., since this will reduce the ventilation capacity.
- The air duct system must be a minimum of air tightness class B.
- To prevent fan noise being transferred to the ventilation devices, install silencers in suitable locations in the duct system.
- The outdoor air duct must be insulated with diffusion-proof material along its entire length.
- Ensure that the condensation insulation is fully sealed at any joints and/or at lead-in nipples, silencers, roof cowls or similar.
- The air must be routed to the outdoor air duct through an outer wall grille in the facade. The outer wall grille must be installed so that it is protected from the weather and must be designed so that no rainwater and/or snow can penetrate the facade or follow the air into the duct.
- When positioning the outdoor air and extract air hood/grille, bear in mind that the two air flows must not short circuit to prevent the extract air from being drawn into SAM S42 again.
- When external devices that affect the ventilation are used, for example kitchen fans and stoves, the heat pump must be in operation. There is a risk of freezing at low outdoor temperatures.
- It is not permitted to use a duct in a masonry chimney stack for outdoor air.

Ventilation flow

The supply air flow must be lower than the exhaust air flow to prevent over pressure in the house.

Set the ventilation capacity in the main product's menu system (menu 7.1.4 - "Ventilation").

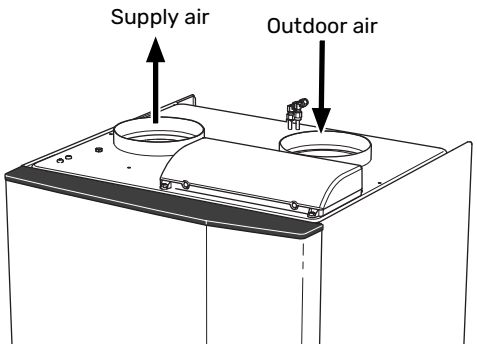
Adjusting ventilation

To obtain the necessary air exchange in every room of the house, the exhaust air device and the supply air device must be correctly positioned and adjusted and the fans in the heat pump and supply air module adjusted.

Immediately after installation adjust the ventilation so that it is set according to the projected value of the house.

Incorrect adjustment of the ventilation may lead to reduced installation efficiency and thus poorer operating economy, a poorer indoor climate and moisture damage in the building.

Ventilation connections



Electrical connections

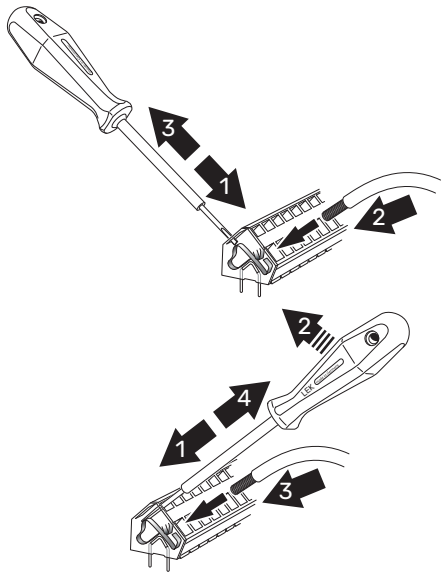
> **CAUTION!**
> All electrical connections must be carried out by an authorised electrician.
>
> Electrical installation and wiring must be carried out in accordance with national provisions.
>
> The main product must be disconnected from the power supply when installing SAM S42.

- To prevent interference, communication cables to external connections must not be laid in the vicinity of high voltage cables.
- The minimum area of communication and sensor cables to external connections must be 0.5 mm² up to 50 m, for example EKKX, LiYY or equivalent.
- SAM S42 restarts after a power failure.

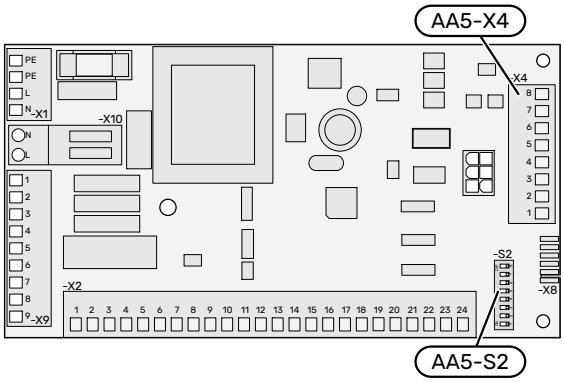
The electrical circuit diagram is at the end of this Installer handbook.

Cable lock

Use a suitable tool to release/lock cables in terminal blocks.



Overview accessory board (AA5)

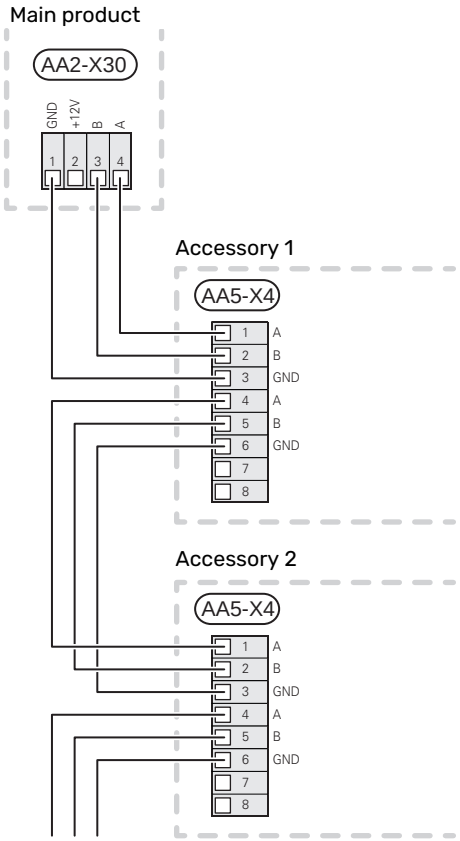


Connecting communication

SAM S42 contains an accessory board (AA5) that connects directly to the main product's PCB (terminal block AA2-X30).

If several accessories are to be connected, or are already installed, the boards are connected in series.

Because there can be different connections for accessories with accessory board (AA5), you should always read the instructions in the manual for the accessory that is to be installed.

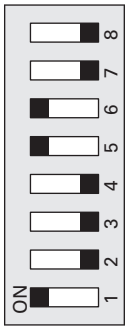


Power connection

SAM S42 is connected to a earthed single-phase wall socket or a permanent installation. For permanent installations, SAM S42 must be preceded by a circuit breaker with at least a 3 mm breaking gap.

DIP switch

The DIP-switch (S2) on the accessory board (AA5) is set in the factory as below.



Commissioning and adjusting

Preparations

1. Make sure the heat pump is switched off.
2. Check that the filling valves are fully closed.

Filling and venting

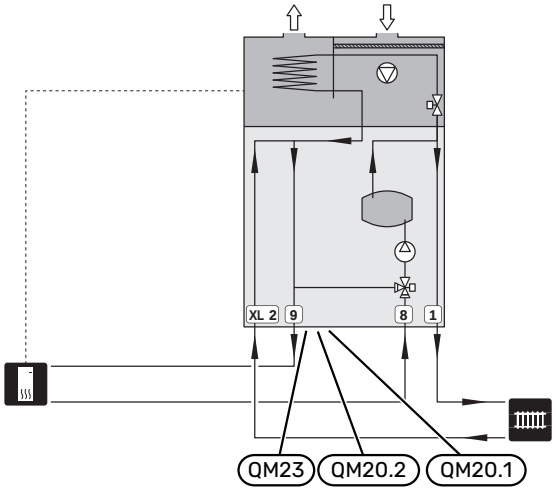
FILLING THE CLIMATE SYSTEM

Fill with water using the filler valve in the heat pump.

VENTING THE CLIMATE SYSTEM

1. Vent SAM S42 through the vent valves (QM20.1), (QM20.2), (QM23) and the rest of the climate system through its respective vent valves.
2. Keep topping up and venting until all air has been removed and the pressure is correct.

> **NOTE!**
>
> Check that the system has been vented prior to the heating season. Air in the supply air module entails a risk of frost damage in cold weather conditions.



Start-up and inspection

STARTING

> **CAUTION!**
>
> There must be water in the climate system before SAM S42 is started.

1. Set switch (SF1) on SAM S42 in position "1".
2. Start the heat pump.
3. Follow the instructions in the display's start guide. If the start guide does not start when you start the heat pump, you can start it manually in menu 7.7.

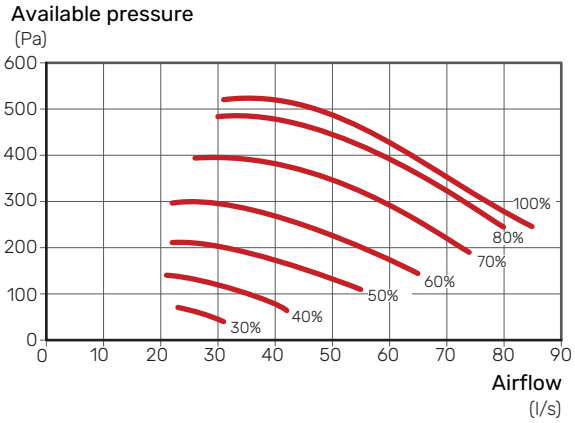
SETTING THE VENTILATION

The ventilation must be set according to applicable standards. The supply air flow is adjusted to approx. 80% of the exhaust air flow. The setting is made in menu 7.1.4.2 - "Fan speed, supply air".

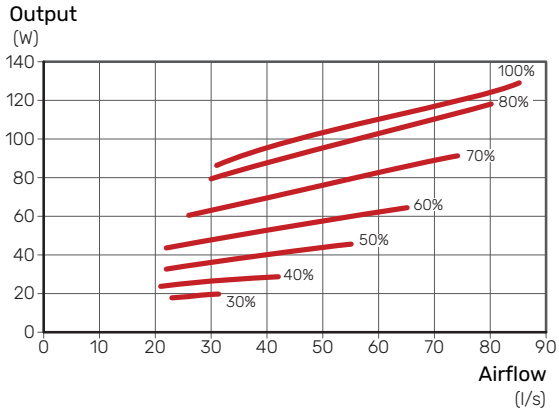
Even if ventilation is roughly set at installation it is important that a ventilation adjustment is ordered and permitted.

> **CAUTION!**
>
> Order a ventilation adjustment to complete the setting.

Ventilation capacity



Fan rating



Activating SAM S42

Activating SAM S42 can be performed via the start guide or directly in the menu system.

The main product's software must be the latest version.

Start guide

The start guide appears upon first start-up after heat pump installation, but is also found in menu 7.7.

Menu system

If you do not make all settings via the start guide or need to change any of the settings, this can be done in the menu system.

MENU 7.2.1 - ADD/REMOVE ACCESSORIES

Here, you state which accessories are installed for the compatible product.

To identify connected accessories automatically, select "Search for accessories". It is also possible to select accessories manually from the list.

MENU 7.2.9 - SUPPLY AIR MODULE (SAM)

Supply air temp. at low outdoor temperature
Outdoor temperature T1
Setting range: -40 - 20 °C

Supply air temperature at T1
Setting range: 16 - 22°C

Supply air temp. at medium outdoor temperature
Outdoor temperature T2
Setting range: -40 - 20 °C

Supply air temperature at T2
Setting range: 16 - 22°C

Supply air temp. at high outdoor temperature
Outdoor temperature T3
Setting range: -40 - 20 °C

Supply air temperature at T3
Setting range: 16 - 22°C

Speed contr., heating medium pump dur. heating
Manual
Alternative: on/off

Max speed, heating medium pump
Setting range: 50 - 100 %

Here, you can set temperatures for different operating conditions and adjust settings for the speed of the circulation pump.

MENU 7.1.4.2 - FAN SPEED, SUPPLY AIR

Fan speed
"Normal" and "Fan speed 1" – "Fan speed 4"

Setting range: 0 – 100%

Set the speed for the five different selectable speeds for the fan here.

NOTE!

Also see the Installer Manual for the main product.

Disturbances in comfort

In most cases, the main product notes a malfunction (a malfunction can lead to disturbance in comfort) and indicates this with alarms and shows action instructions in the display.

Troubleshooting

If the operational interference is not shown in the display the following tips can be used:

BASIC ACTIONS

Start by checking the following items:

- That the heat pump is operating and the supply cable to SAM S42 is connected.
- Group and main fuses of the accommodation.
- The property's earth circuit breaker.

LOW HOT WATER TEMPERATURE OR A LACK OF HOT WATER

- The heat pump has temporarily prioritised supply air ventilation to prevent too low temperatures in the supply air coil.

LOW ROOM TEMPERATURE

- Incorrectly set values for the supply air temperature.
  - Enter menu 7.2.9 - "Supply air module (SAM)" and adjust the setting for the supply air temperature.

HIGH ROOM TEMPERATURE

- Incorrectly set values for the supply air temperature.
  - Enter menu 7.2.9 - "Supply air module (SAM)" and adjust the setting for the supply air temperature.

LOW OR A LACK OF VENTILATION

- Supply air filter (HQ11) clogged.
  - Change the filter.
- The ventilation is not adjusted.
  - Order/implement ventilation adjustment.
- Supply air device closed, blocked or throttled down too much.
  - Check the supply air inlets.
- Fan speed in reduced mode.
  - Enter menu 1.2.1 - "Fan speed" and select "Normal"
- External switch for changing the fan speed activated.
  - Check any external switches.

HIGH OR DISTRACTING VENTILATION

- Supply air filter (HQ11) clogged.
  - Change the filter.
- The ventilation is not adjusted.
  - Order/implement ventilation adjustment.
- Supply air device closed, blocked or throttled down too much.
  - Check the supply air inlets.
- Fan speed in forced mode.
  - Enter menu 1.2.1 - "Fan speed" and select "Normal"
- External switch for changing the fan speed activated.
  - Check any external switches.
- Silencers not correctly installed.
  - Check the silencers.

LOW SUPPLY AIR TEMPERATURE

- Air in the heating system.
  - Vent SAM S42 using vent valve (QM20.1) and (QM20.2).
- Incorrectly set values for the supply air temperature.
  - Enter menu 7.2.9 - "Supply air module (SAM)" and adjust the setting for the supply air temperature.

HIGH SUPPLY AIR TEMPERATURE

- Incorrectly set values for the supply air temperature.
  - Enter menu 7.2.9 - "Supply air module (SAM)" and adjust the setting for the supply air temperature.

Accessories

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

Lower cabinet CAB S12

This accessory is used to place SAM S42 on, if you do not want to or cannot use the enclosed wall rail. The cabinet can also be used to conceal the pipe routing.

Part no. 067 867

Top cabinet TOC 40

Top cabinet, which conceals any pipes/ventilation ducts.

HEIGHT 245 MM
Part no. 089 756

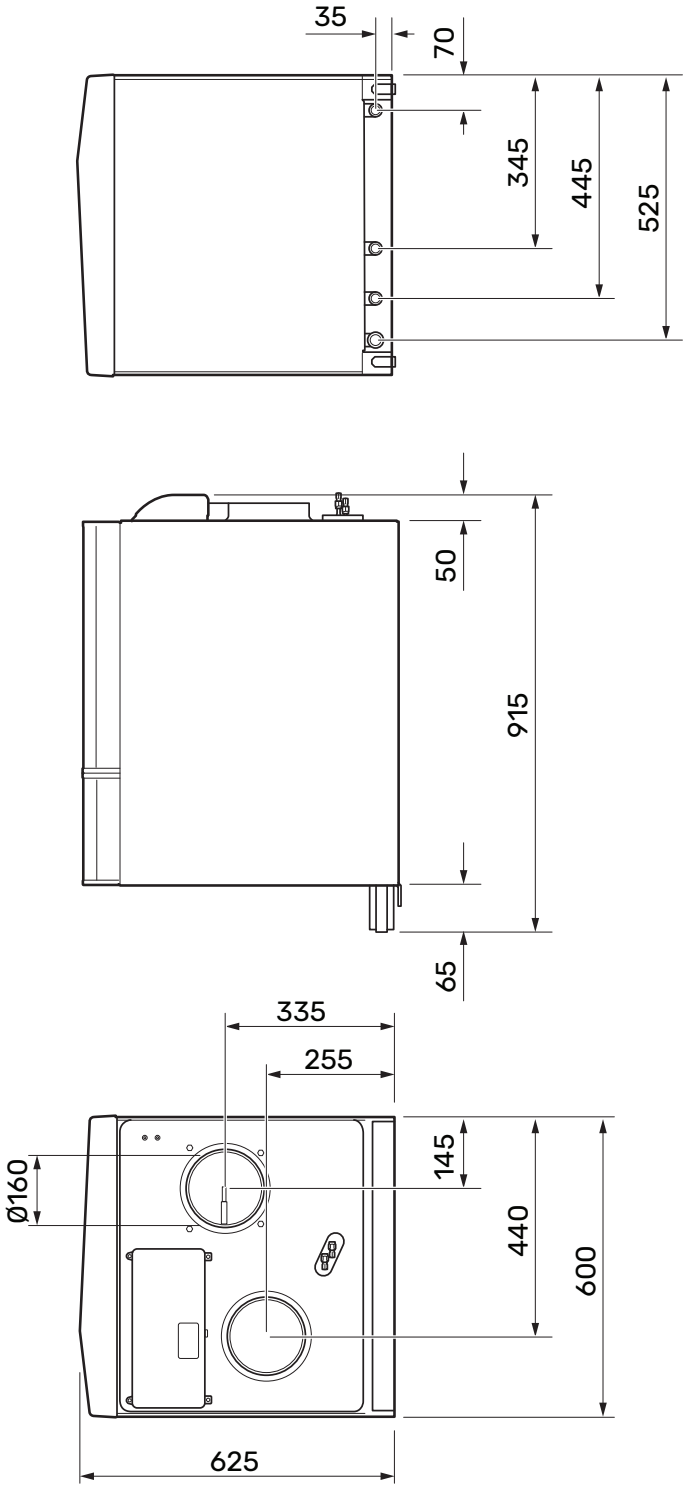
HEIGHT 345 MM
Part no. 089 757

HEIGHT 445 MM
Part no. 067 522

HEIGHT 385 - 635 MM
Part no. 089 758

Technical data

Dimensions



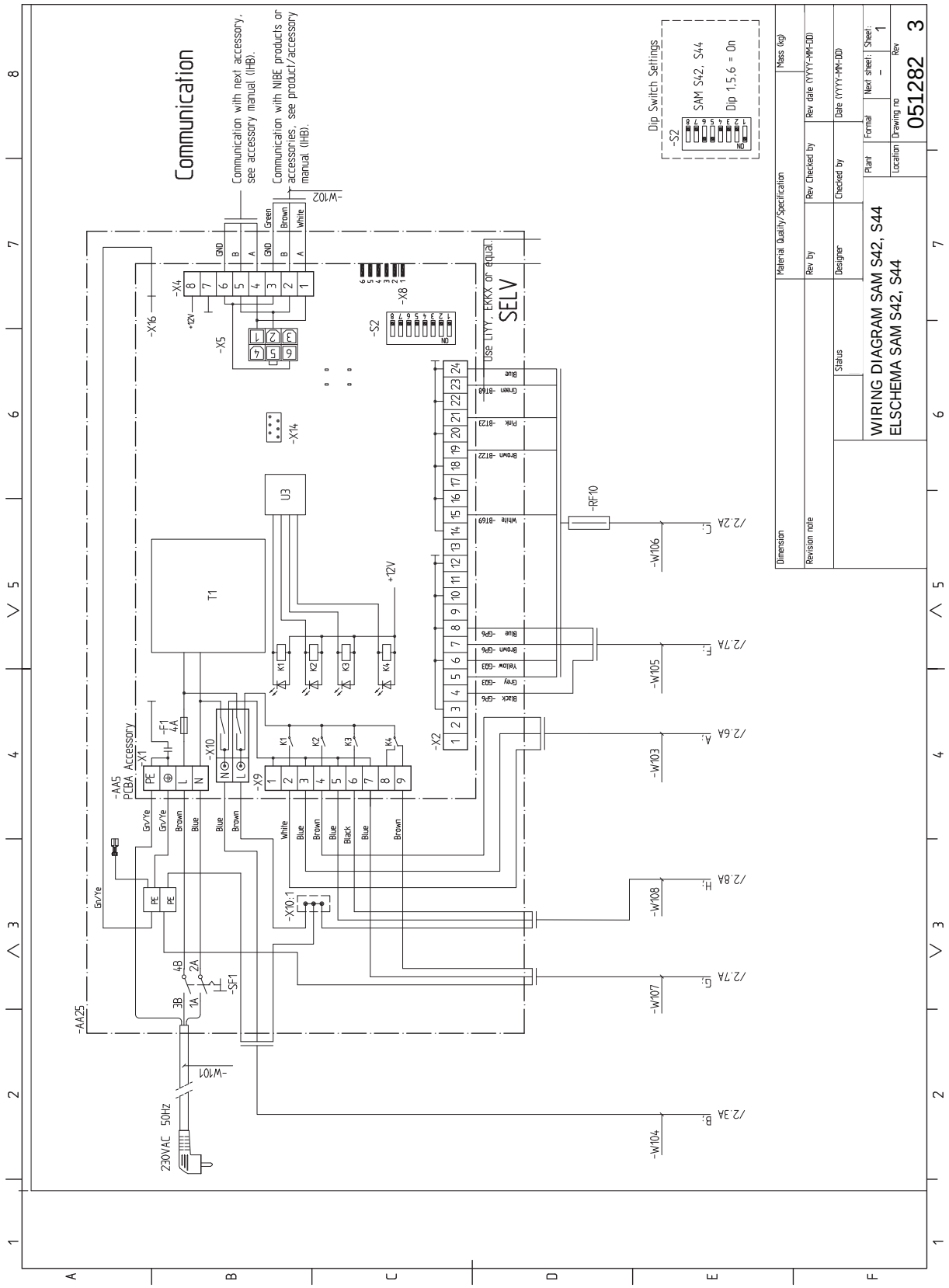
Technical specifications

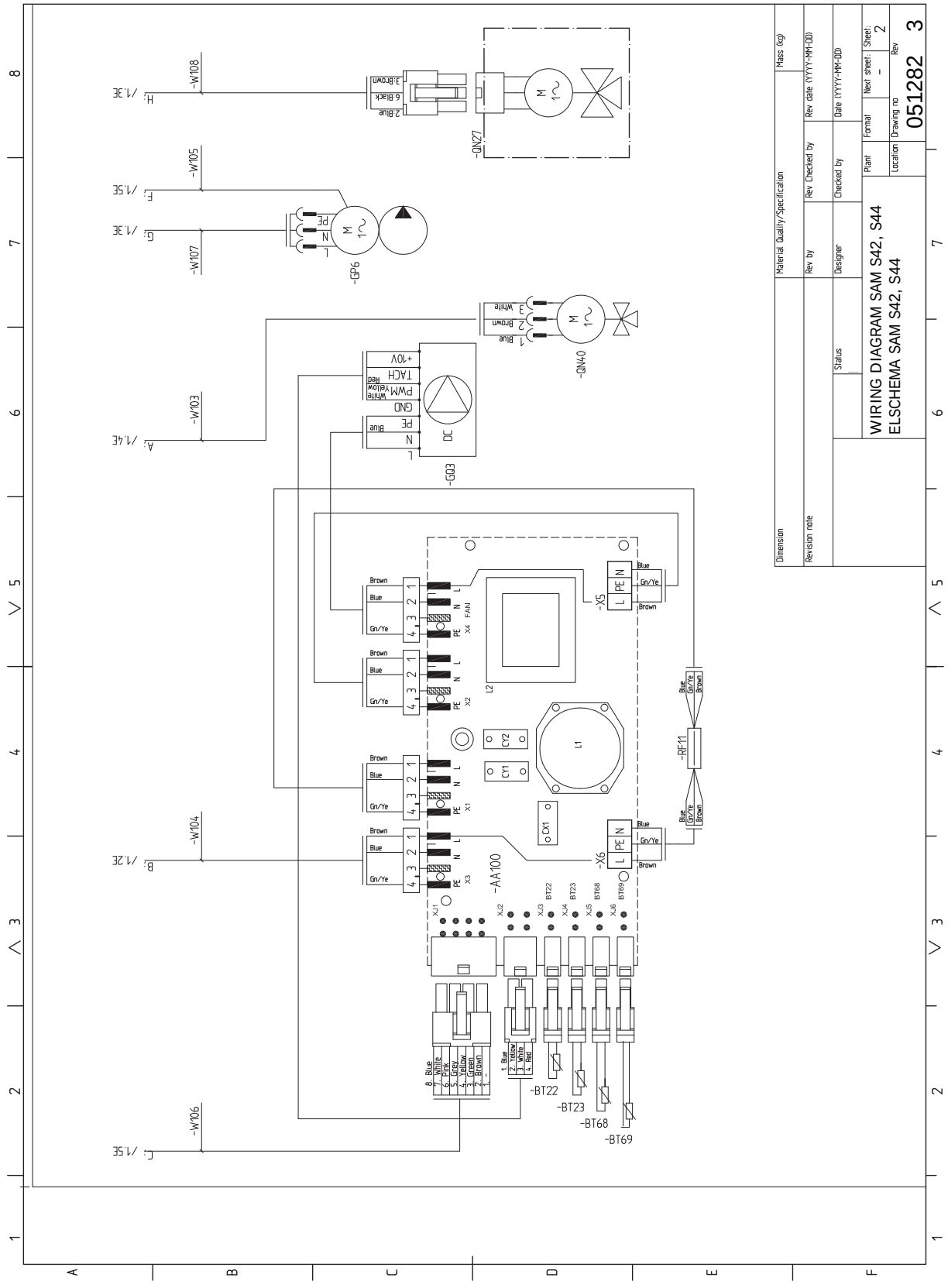
SAM S42		
Electrical data		
Rated voltage	V	230 V ~ 50 Hz
Drive output control valve	W	1.5
Driving power, reversing valve	W	1.5
Drive output heating medium pump	W	75
Driving power fan	W	20-175
Enclosure class		IP 21
Heating medium circuit		
Min pressure	MPa/bar	0.05 (0.5)
Max pressure	MPa/bar	0.25 (2.5)
Volume, heating section incl. buffer vessel	litre	53
Ventilation		
Filter type		ePM1 55%
Sound		
Sound effect level according to EN 12 102 ($L_{W(A)}$)[1]	dB(A)	45-50
Sound pressure level in the installation room ($L_{P(A)}$)[2]	dB(A)	41-46
Pipe connections		
Heating medium ext ⌀	mm	22
Ventilation ⌀	mm	160
Miscellaneous		
Width	mm	600
Depth	mm	625
Height	mm	915
Weight	kg	85
Part No.		067 794

1 The value varies with the selected fan curve. For more detailed sound data, including sound to channels, visit nibe.eu.

2 The value can vary with the room's damping capacity. These values apply at a damping of 4 dB.

Electrical circuit diagram




WIRING DIAGRAM SAM S42, S44
ELSCHEMA SAM S42, S44
051282 3
-GN27
-GP6
-GN40
-GB3
-AA100
-X5
-X6
-RF11
-BT22
-BT23
-BT68
-BT69
-W103
-W104
-W105
-W106
-W107
-W108

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