Manual No. '18 • HM-T-274

MITSUBISHI HEAVY INDUSTRIES

TECHNICAL MANUAL

AIR TO WATER HEAT PUMP

INDOOR UNIT
(ALL IN ONE TYPE)
HMK60
HMK100

(SPLIT BOX)
HSB60
HSB100
HSB140

(TANK UNIT)
PT300
PT500

(CONTROLLER)
RC-HY20
RC-HY40

OUTDOOR UNIT
FDCW60VNX-A
FDCW71VNX-A
FDCW100VNX-A
FDCW140VNX-A

Service code

Outdoor unit	History of service code				Changes
FDCW60VNX-A	1	—			1 : to add new unit 1 → L : to comply with amended safety standard for LVD L → M : to change of control unit (PCB) M → N : to change of connected indoor unit
FDCW71VNX-A	1	L	M	N	
FDCW100VNX-A	1	L	M	N	
FDCW140VNX-A	1	L	M	N	

MITSUBISHI HEAVY INDUSTRIES THERMAL SYSTEMS, LTD.

■ This TECHNICAL MANUAL is for indoor units, HMK series or HSB series.
If indoor unit is not HMK series or HSB series, please refer to Manual No. ‘13-HM-T-193.

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When install the unit, be sure to check whether the selection of installation place, power source specifications, usage limitation (piping length, height differences between indoor and outdoor units, power source voltage and etc.) and installation spaces.

SAFETY PRECAUTIONS

- We recommend you to read this "SAFETY PRECAUTIONS" carefully before the installation work in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNING and ⚠CAUTION . The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNING and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTION . These are very important precautions for safety. Be sure to observe all of them without fail.
- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user

⚠WARNING

- **Installation must be carried out by the qualified installer.**
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury , as a result of a system malfunction.
- **Install the system in full accordance with the instruction manual.**
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- **Use the original accessories and the specified components for installation.**
  If parts other than those prescribed by us are used, It may cause water leaks, electric shocks, fire and personal injury.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant inthe event of leakage.**
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- **Ventilate the working area well in the event of refrigerant leakage during installation.**
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- **After completed installation, check that no refrigerant leaks from the system.**
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- **Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.**
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit.
- **Install the unit in a location with good support.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.**
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- **The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.**
  Power supply with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire.
- **Be sure to shut off the power before starting electrical work.**
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- **Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.**
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- **Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.**
  Loose connections or cable mountings can cause anomalous heat production or fire.
- **Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.**
  Incorrect installation may result in overheating and fire.
- **Do not perform brazing work in the airtight room.**
  It can cause lack of oxygen.
- **Use the prescribed pipes, flare nuts and tools for R410A.**
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- **Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.**
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.

- **Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.**
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, air can be sucked into refrigerant circuit, which can cause bust or personal injury due to anomalously high pressure in the refrigerant.
- **Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulphide gas can occur.**
  Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not run the unit with removed panels or protections.**
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- **Be sure to fix up the service panels.**
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- **Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.**
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.
- **Do not perform any change of protective device itself or its setup condition.**
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- **Be sure to switch off the power source in the event of installation, inspection or servicing.**
  If the power source is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- **Consult the dealer or an expert regarding removal of the unit.**
  Incorrect installation can cause water leaks, electric shocks or fire.
- **Stop the compressor before disconnecting refrigerant pipes in case of pump down operation.**
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit.

⚠CAUTION

- **Carry out the electrical work for ground lead with care.**
  Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting.
- **Use the circuit breaker with sufficient breaking capacity.**
  If the breaker does not have sufficient breaking capacity, it can cause the unit malfunction and fire.
- **Earth leakage breaker must be installed.**
  If the earth leakage breaker is not installed, it can cause electric shocks.
- **Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.**
  Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- **Do not install the unit near the location where leakage of combustible gases can occur.**
  If leaked gases accumulate around the unit, it can cause fire.
- **Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.**
  Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place.
- **When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.**
  If safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- **Do not use the indoor unit at the place where water splashes may occur such as in laundries.**
  Since the indoor unit is not waterproof, it can cause electric shocks and fire.
- **Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics.**
  Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- **Do not install the outdoor unit in a location where insects and small animals can inhabit.**
  Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings
- **Do not use the base flame for outdoor unit which is corroded or damaged due to long periods of operation.**
  Using an old and damage base flame can cause the unit falling down and cause personal injury.
- **Do not install the unit in the locations listed below.**
  - Locations where carbon fiber, metal powder or any powder is floating.
  - Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
  - Vehicles and ships.
  - Locations where cosmetic or special sprays are often used.
  - Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
  - Locations where any machines which generate high frequency harmonics are used.
  - Locations with salty atmospheres such as coastlines.

・Locations with heavy snow. (If installed, be sure to provide base flame and snow hood mentioned in the manual)
・Locations where the unit is exposed to chimney smoke.
・Locations at high altitude. (more than 1000m high)
・Locations with ammonic atmospheres.
・Locations where heat radiation from other heat source can affect the unit.
・Locations without good air circulation.
・Locations with any obstacles which can prevent inlet and outlet air of the unit.
・Locations where short circuit of air can occur. (in case of multiple units installation)
・Locations where strong air blows against the air outlet of outdoor unit.

It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.

- **Do not install the outdoor unit in the locations listed below.**

・Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
・Locations where outlet air of the outdoor unit blows directly to plants.
・Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
・Locations where vibration and operation sound generated by the outdoor unit can affect seriously. (on the wall or at the place near bed room)
・Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
・Locations where drainage cannot run off safely.

It can affect surrounding environment and cause a claim.

- **Do not install the remote control at the direct sunlight.**

It can cause malfunction or deformation of the remote control.

- **Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.**

It can cause the damage of the items.

- **Take care when carrying the unit by hand.**

If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.

- **Dispose of any packing materials correctly.**

Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.

- **Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.**

If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.

- **Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.**

Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.

- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**

If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.

- **Do not touch any buttons with wet hands.**

It can cause electric shocks.

- **Do not shut off the power source immediately after stopping the operation.**

Wait at least 5 minutes, otherwise there is a risk of water leakage or breakdown.

- **Do not control the system with main power switch.**

It can cause fire or water leakage. In addition, the fan can start unexpectedly, which can cause personal injury.

- **Do not touch any refrigerant pipes with your hands when the system is in operation.**

During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.

Notabilia for units designed for R410A

- Only use R410A refrigerant. R410A is the refrigerant whose pressure is 1.6 times as high as that of conventional refrigerant.
- The size of charging port of service valve and check joint for R410A are altered from that for conventional refrigerant in order to prevent the system being charged with the incorrect refrigerant by mistake. And the protruding dimension of pipe for flare processing and flare nut size for R410A are also altered from that for conventional refrigerant in order to reinforce strength against the pressure for R410A. Accordingly the dedicated tools for R410A listed in the below mentioned table should be prepared for installation and servicing.
- Do not use charging cylinder. Using charging cylinder may alter the composition of refrigerant, which results in making the performance of the system worse.
- Refrigerant must be charged always in liquid state from the bottle.

Dedicated tools for R410A	
a)	Gauge manifold
b)	Charge hose
c)	Electronic scale for refrigerant charge
d)	Torque wrench
e)	Flare tool
f)	Protrusion control gauge for copper pipe
g)	Vacuum pump adapter
h)	Gas leak detector

Technical data

Technical specifications

Specifications

Indoor units

All in one type

Model		HMK60	HMK100
General conditions			
Power source		400V 3NAC 50 Hz	
Max current (A)		20	
Recommended fuse (A)		25	
Wire size		5 × 4 mm^2	
Power source deviation (%)		-1.5 ÷ +10	
Power factor		0.99	
Pipe size refrigerant (ref)		Gas piping: OD12.7, liquid: OD6.35 (1/2"; ¼")	Gas piping: OD15.88, liquid: OD9.52 (5/8"; 3/8")
Indoor unit (split type, hydrounit)			
Immersion heater		Max 9 kW	
Capacity steps heater		3 (3,6,9 kW)	
Circulating pump		Wilo Yonos Para	
Pump control sanitary hot water		Variable	
Pump capacity, max head		76 kPa (external)	
Pump capacity, max flow		4 m^3/h	
Pump power		3-76W	
Pump efficiency, max		EEI≤0.21	
Heat exchanger		2 HP Plate type Alfa Laval, ACH-18-52H	3.5 HP Plate type Alfa Laval, ACH-30EQ-80H
Heat exchanger size		0.9 m^2	1.8 m^2
Pressure transmitter		0-4.6 MPa, deviation ±3%	
Water strainer system		0.6 mm^2	
Filter drier refrigeration system		Bi-flow 083	
Emergency thermostat		5-77 °C	
Thermal cut-off		98 (-8) °C	
Motor valves		2 × 3-way, ball type	
Actuator		230V 50 Hz, 8s/60°	
Safety relief valve system		0.25 MPa	
Manometer gauge		0-0.4 MPa	
Expansion vessel		10 ℓ	
IP grade		IP21	
Volume total		180 ℓ ±5%	
Volume coil		4.8 ℓ	
Area coil		1.6 m^2	
Material coil		Steel untreated S235JR	
Material tank		Enamelled steel S235JR 3.0 mm	
Cabinet	Top/side/front bottom	EN10130 DC01	
	Back	DX51D+Z275	

Model	HMK60		HMK100	
Material	Steel 0.7 mm	Galvanized steel 275 g/m^2	Steel 0.7 mm	Galvanized steel 275 g/m^2
Color (powder coated 1 layer)	RAL9016, shine 50, white	Untreated	RAL9016, shine 50, white	Untreated
Isolation heat exchanger	Armaflex			
Isolation tank	PUR			
Stand by heat loss	61.25 W EN12897			
Design pressure tank	1.0 MPa (10 bar)			
Design pressure coil	1.6 MPa (16 bar)			
Design pressure refrigerant system	4.5 MPa			
Water quality sanitary hot water	<EU directive nr 98/83/EF			
Max operating temperature tank	85 °C			
Operating ambient temperature indoor unit	+5 - +35°C, max RH 95%			
Connection water system	compression fitting 22 mm			
Connection sanitary hot water	compression fitting 22 mm			
Height, (adjustment)	1715 + (20-40 mm)			
Width	600 mm			
Depth	610 mm			
Weight netto	165 kg			
Weight incl pallet incl packing	190 kg			
Weight packaging: Wood	25.8 kg			
Weight packaging: EPS	0.5 kg			
Weight packaging: Plastics	0.1 kg			
Packaging volume /dim	0.89 m^3 (1900 × 670 × 700 mm)			
Electrical connection	400V 3NAC 50 Hz			
Wire size	5 × 4 mm^2			
Part number MHIAE	MCD001A007		MCD001A008	
Enclosed				
	1x manometer gauge/safety relief valve			

Split box

Model	**HSB60**	**HSB100**	**HSB140**
General conditions			
Power source	230V 50 Hz		
Recommended fuse	6 A		
Pipe size refrigerant (ref)	Gas: OD12.7, liquid: OD6.35 (1/2"; 1/4")	Gas: OD15.9, liquid: OD9.5 (5/8"; 3/8")	
Capacity	For 6 kW outdoor unit	For up to 12 kW outdoor unit	For 16 kW outdoor unit
Indoor unit (split type, splitbox)			
IP grade	IP21		
Connection water system	Compression fitting 22 mm	Compression fitting 28 mm	
Connection refrigerant system	Flare		
Maximum allowed water pressure	1.0 MPa		
Maximum allowed water temperature	90 °C		
Maximum allowed refrigerant pressure	4.15 MPa		
Maximum allowed refrigerant temperature	110°C		
Supply heating temperature range	25 – 58°C		
Supply cooling temperature range	7 – 25°C		
Heat exchanger	Plate heat exchanger Alfa Laval ACH18-52H-F	Plate heat exchanger Alfa Laval ACH-30EQ-80H	Plate heat exchanger Alfa Laval ACH-30EQ-120H
Total volume heat exchanger (water side)	1 ℓ	3 ℓ	4 ℓ
Water quality	≤ EU-direktiv nr. 98/83/EF		
Ambient conditions	5 - 35°C Max relative humidity 95%		
Height	400 mm		
Width	460 mm		
Depth	250 mm		
Weight net	16 kg	18 kg	23 kg
Weight including packaging	21 kg		26 kg
Part number	MCD001A011	MCD001A012	MCD001A013
Enclosed	Wall bracket for mounting, Ball valve with particle filter		

Tank unit

Model	**PT300**	**PT500**
Volume total	279 ℓ	476 ℓ
Volume coil	9.4 ℓ	13 ℓ
Area coil	1.6 m²	2.13 m²
Material coil	Steel - S235 ϕ33.7 × 2.6 mm	
Material tank	Steel – S275 g=3.0 mm	
Cabinet	Side / Top / – plate (PS)	Side / Top – plate (PS)
Material	Side – plate polystyrene g=1 mm Top - plate polystyrene g=2 mm	
Color (powder coated 1 layer)	Side – White Top – RAL7001	
Isolation tank	EPS200 (30kg/ m³) + Nonwoven PET (1 kg/m²)	
Stand by heat loss	90W (PN-EN 12897:2016;(EU) No 812/2013)	98W (PN-EN 12897:2016;(EU) No 812/2013)
Design pressure tank	1.0 MPa (10 bar)	
Design pressure coil	1.6 MPa (16 bar)	
Power coil 70/10/45°C (2,5m³/h)	26 kW	34 kW
Efficiency coil 70/10/45°C	640 ℓ/h	855 ℓ/h
Water quality sanitary hot water	≤EU directive nr.98/83/EF	
Water quality, system	≤EU directive nr.98/83/EF	
Max operating temperature tank	85°C	
Min operating temperature tank	5°C	
Max operating temperature coil	110°C	
Connection water system	G1” external thread	
Connection sanitary hot water	G1” external thread	
Inner surface corrosion protection	Enamel - DIN 4753-3:2013 - Part 3	
Corrosion protection	Mg-anode	
Height (adjustment)	1634 mm ($20_{+15/-0}$)	1835 mm ($20_{+15/-0}$)
Min required ceiling height	2000 mm	
Width	ϕ673 mm	ϕ832 mm
Depth	743 mm	897 mm
Weight net product	115 kg	156 kg
Weight incl. pallet incl. packing	140 kg	196 kg
Weight packaging: Wood	29 kg	39 kg
Weight packaging: EPS	0.5 kg	
Weight packaging: Plastics	0.1 kg	
Packaging volume /dim	1.1 m³/ 1840 × 790 × 750 (mm)	1.75 m³/ 2040 × 950 × 910 (mm)
Part number	MCD001A009	MCD001A010

Outdoor units

Indoor model					HMK60	HSB60
Outdoor model					FDCW60VNX-A	
Power source					3 phase 400V 50Hz	1 phase 230V 50Hz
Heating nominal capacity			condition 1	kW	2.28 (0.50 - 8.00)	
			condition 2	kW	2.67 (0.50 -7.40)	
Heating power consumption			condition 1	kW	0.63	
			condition 2	kW	0.50	
COP			condition 1		3.62	
			condition 2		5.32	
Cooling nominal capacity			condition 1	kW	4.86 (0.80 -6.00)	
			condition 2	kW	7.03 (1.20 -7.80)	
Cooling power consumption			condition 1	kW	1.84	
			condition 2	kW	2.00	
EER			condition 1		2.64	
			condition 2		3.52	
Operation range (Otutdoor temperature)				Heating	-20 - 43	
				Cooling	15 - 43	
Operation range (Water temperautere)				Heating	25 - 58 (65 with immersion heater)	
				Cooling	7 - 25	
System water flow				ℓ/s	0.09-0.29	
Min system water flow at 100% circulation pump speed				ℓ/s	0.09	
Max current		Indoor		A	20	- (Indoor)
		Outdoor			-	15 (Outdoor)
Recommended fuse rating				A	25	6 (Indoor)
					-	20 (Outdoor)
Starting current				A	5	
Deviation, incoming supply					-15 - +10%	
Max refrigerant pipe length				m	30	
Max height difference between IU and OU				m	7	
Indoor unit	Type of tank				Enamelled tank	-
	Height			mm	1715(+(20-40))	400
	Width			mm	600	460
	Depth			mm	610	250
	Weight (without water in the system)			kg	165	16
	Color				White	
	IP grade				IP21	
	Immersion heater				9kW 3 steps (3, 6, 9)	-
	Circ. pump	Output		W	3-76 (variable speed)	-
		Max available external pressure		kPa	76	-
		Max flow		ℓ/s	1.11	-
		Flow at 20kPa pressure drop		ℓ/s	0.66	-
	Emergency mode thermostat			°C	5 - 77	-
	Temperature limiter			°C	98(-8)	-
	Max operation temperature tank				85	-
	Safety valve			MPa	0.25	-
	Volume total			liter	180±5%	-
	Volume hot water coil			liter	4.8	-
	Material hot water coil				Stainless steel	-
	Max pressure, tank			bar	10	
	Max pressure, hot water coil			bar	16	
	Water quality, domestic hot water				≦ EU directive no 98/83/EF	-
	Volume expansion vessel			liter	10	-
	Ambient temperature, indoor module			°C	5-35, RH95%	
	Dimensions, climate system pipe			mm	22	25.4
	Dimensions, hot water pipe			mm	22	-
	Water pipe connection				Compression fittings	
	External heat source connection				-	
Outdoor unit	Height			mm	640	
	Width			mm	800	
	Depth			mm	290	
	Weight			kg	46	
	Color				Stucco White	
	Sound Power level*1			dB(A)	53	
	Sound Power level (silent mode)			dB(A)	57	
	Sound Power level (Max)			dB(A)	64	
	Sound Pressure level*2			dB(A)	45	
	Sound Pressure level (silent mode)			dB(A)	-	
	Air flow			m^3/min	41.5	
	Type of compressor				RMT5113MCE2	
	Refrigerant oil			liter	0.45 M-MA68	
	Heat exchanger				M fin & inner grooved tubing	
	Refrigerant control				EEV	
	Defrost control				Reversing cycle	
	Fan				Propeller fan x 1	
	Fan motor			W	34x1	
	Shock & vibration absorber				Rubber sleeve (for compressor)	
	Electric heater (crankcase / base)			W	-/110	
	Safety equipment				Internal thermostat for fan motor	
	Power and signal line from indoor unit				5 cores 2.0mm²	3 cores 2.0mm²+ 2 cores 1.5mm²
	Refrigerant				R410A	
	Refrigerant volume (pipe length without additional charge)			kg (m)	1.5(15)	
	Dimensions, refrigerant pipe			mm (inch)	Gas pipe:OD 12.7(1/2"") Liquid pipe:OD 6.35(1/4"")	
	Refrigerant pipe connections				Flare	

Indoor model				HMK100	HSB100
Outdoor model				FDCW71VNX-A	
Power source				3 phase 400V 50Hz	1 phase 230V 50Hz
Heating nominal capacity		condition 1	kW	8.0 (3.0 - 8.0)	
		condition 2	kW	8.3 (2.0 - 8.3)	
Heating power consumption		condition 1	kW	2.40	
		condition 2	kW	2.03	
COP		condition 1		3.33	
		condition 2		4.09	
Cooling nominal capacity		condition 1	kW	7.1 (2.0 - 7.1)	
		condition 2	kW	10.7 (2.7 - 10.7)	
Cooling power consumption		condition 1	kW	2.65	
		condition 2	kW	3.19	
EER		condition 1		2.68	
		condition 2		3.35	
Operation range			Heating	-20 - 43	
(Otutdoor temperature)			Cooling	15 - 43	
Operation range			Heating	25 - 58 (65 with immersion heater)	
(Water temperautere)			Cooling	7 - 25	
System water flow			ℓ/s	0.08 - 0.38	
Min system water flow at 100% circulation pump speed			ℓ/s	0.19	
Max current	Indoor		A	20	- (Indoor)
	Outdoor			-	16 (Outdoor)
Recommended fuse rating			A	25	6 (Indoor)
				-	20 (Outdoor)
Starting current			A	5	
Deviation, incoming supply				-15 - +10%	
Max refrigerant pipe length			m	30	
Max height difference between IU and OU			m	7	
Indoor unit	Type of tank			Enamelled tank	-
	Height		mm	1715(+(20-40))	400
	Width		mm	600	460
	Depth		mm	610	250
	Weight (without water in the system)		kg	165	18
	Color			White	
	IP grade			IP21	
	Immersion heater			9kW 3 steps (3, 6, 9)	-
	Circ. pump	Output	W	3-76 (variable speed)	-
		Max available external pressure	kPa	76	-
		Max flow	ℓ/s	1.11	-
		Flow at 20kPa pressure drop	ℓ/s	0.66	-
	Emergency mode thermostat		°C	5 - 77	-
	Temperature limiter		°C	98(-8)	-
	Max operation temperature tank			85	-
	Safety valve		MPa	0.25	-
	Volume total		liter	180±5%	-
	Volume hot water coil		liter	4.8	-
	Material hot water coil			Stainless steel	-
	Max pressure, tank		bar	10	
	Max pressure, hot water coil		bar	16	
	Water quality, domestic hot water			≦ EU directive no 98/83/EF	-
	Volume expansion vessel		liter	10	-
	Ambient temperature, indoor module		°C	5-35, RH95%	
	Dimensions, climate system pipe		mm	22	25.4
	Dimensions, hot water pipe		mm	22	-
	Water pipe connection			Compression fittings	
	External heat source connection			-	
Outdoor unit	Height		mm	750	
	Width		mm	880 (+88 with valve cover)	
	Depth		mm	340 (+78 with foot rail)	
	Weight		kg	60	
	Color			Stucco White	
	Sound Power level*1		dB(A)	64	
	Sound Power level (silent mode)		dB(A)	61	
	Sound Pressure level*2		dB(A)	48	
	Sound Pressure level (silent mode)		dB(A)	45	
	Air flow		m^3/min	50	
	Type of compressor			RMT5118MDE2	
	Refrigerant oil		liter	0.68 M-MA68	
	Heat exchanger			M fin & inner grooved tubing	
	Refrigerant control			EEV	
	Defrost control			Reversing cycle	
	Fan			Propeller fan x 1	
	Fan motor		W	86 x 1	
	Shock & vibration absorber			Rubber sleeve (for compressor)	
	Electric heater (crankcase / base)		W	20 / 100	
	Safety equipment			Internal thermostat for fan motor	
	Power and signal line from indoor unit			5 cores 2.5mm^2	3 cores 2.0mm^2+ 2 cores 1.5mm^2
	Refrigerant			R410A	
	Refrigerant volume (pipe length without additional charge)		kg (m)	2.55 (15)	
	Dimensions, refrigerant pipe		mm (inch)	Gas pipe: OD 15.88 (5/8") Liquid pipe: OD 9.52 (3/8")	
	Refrigerant pipe connections			Flare	

Technical specifications

Indoor model				HMK100	HSB100
Outdoor model				FDCW100VNX-A	
Power source				3 phase 400V 50Hz	1 phase 230V 50Hz
Heating nominal capacity		condition 1	kW	9.0 (3.5 - 11.0)	
		condition 2	kW	9.2 (3.5 - 10.0)	
Heating power consumption		condition 1	kW	2.62	
		condition 2	kW	2.15	
COP		condition 1		3.44	
		condition 2		4.28	
Cooling nominal capacity		condition 1	kW	8.0 (3.0 - 9.0)	
		condition 2	kW	11.0 (3.3 - 12.0)	
Cooling power consumption		condition 1	kW	2.85	
		condition 2	kW	3.04	
EER		condition 1		2.81	
		condition 2		3.62	
Operation range (Otutdoor temperature)			Heating	-20 - 43	
			Cooling	15 - 43	
Operation range (Water temperautere)			Heating	25 - 58 (65 with immersion heater)	
			Cooling	7 - 25	
System water flow			ℓ/s	0.12-0.57	
Min system water flow at 100% circulation pump speed			ℓ/s	0.24	
Max current	Indoor		A	23	- (Indoor)
	Outdoor			-	23 (Outdoor)
Recommended fuse rating			A	25	6 (Indoor)
				-	30 (Outdoor)
Starting current			A	5	
Deviation, incoming supply				-15 - +10%	
Max refrigerant pipe length			m	30	
Max height difference between IU and OU			m	7	
Indoor unit	Type of tank			Enamelled tank	-
	Height		mm	1715(+(20-40))	400
	Width		mm	600	460
	Depth		mm	610	250
	Weight (without water in the system)		kg	165	18
	Color			White	
	IP grade			IP21	
	Immersion heater			9kW 3 steps (3, 6, 9)	-
	Circ. pump	Output	W	3-76 (variable speed)	-
		Max available external pressure	kPa	76	-
		Max flow	ℓ/s	1.11	-
		Flow at 20kPa pressure drop	ℓ/s	0.66	-
	Emergency mode thermostat		°C	5 - 77	-
	Temperature limiter		°C	98(-8)	-
	Max operation temperature tank			85	-
	Safety valve		MPa	0.25	-
	Volume total		liter	180±5%	-
	Volume hot water coil		liter	4.8	-
	Material hot water coil			Stainless steel	-
	Max pressure, tank		bar	10	
	Max pressure, hot water coil		bar	16	
	Water quality, domestic hot water			≦ EU directive no 98/83/EF	-
	Volume expansion vessel		liter	10	-
	Ambient temperature, indoor module		°C	5-35, RH95%	
	Dimensions, climate system pipe		mm	28	25.4
	Dimensions, hot water pipe		mm	28	-
	Water pipe connection			Compression fittings	
	External heat source connection			-	
Outdoor unit	Height		mm	845	
	Width		mm	970	
	Depth		mm	370 (+80 with foot rail)	
	Weight		kg	81	
	Color			Stucco White	
	Sound Power level*1		dB(A)	64.5	
	Sound Power level (silent mode)		dB(A)	62	
	Sound Pressure level*2		dB(A)	50	
	Sound Pressure level (silent mode)		dB(A)	47	
	Air flow		m^3/min	73	
	Type of compressor			RMT5126MDE2	
	Refrigerant oil		liter	0.9 M-MA68	
	Heat exchanger			straight fin & inner grooved tubing	
	Refrigerant control			EEV	
	Defrost control			Reversing cycle	
	Fan			Propeller fan x 1	
	Fan motor		W	86 x 1	
	Shock & vibration absorber			Rubber sleeve (for compressor)	
	Electric heater (crankcase / base)		W	20 / 120	
	Safety equipment			Internal thermostat for fan motor	
	Power and signal line from indoor unit			5 cores 2.5mm^2	3 cores 2.0mm^2+ 2 cores 1.5mm^2
	Refrigerant			R410A	
	Refrigerant volume (pipe length without additional charge)		kg (m)	2.9 (15)	
	Dimensions, refrigerant pipe		mm (inch)	Gas pipe: OD 15.88 (5/8") Liquid pipe: OD 9.52 (3/8")	
	Refrigerant pipe connections			Flare	

Indoor model				HSB140
Outdoor model				FDCW140VNX-A
Power source				1 phase 230V 50Hz
Heating nominal capacity		condition 1	kW	16.0 (5.8 - 16.0)
		condition 2	kW	16.0 (4.2 - 16.0)
Heating power consumption		condition 1	kW	4.83
		condition 2	kW	3.81
COP		condition 1		3.31
		condition 2		4.2
Cooling nominal capacity		condition 1	kW	11.8 (3.1 - 11.8)
		condition 2	kW	16.5 (5.2 - 16.5)
Cooling power consumption		condition 1	kW	4.45
		condition 2	kW	4.36
EER		condition 1		2.65
		condition 2		3.78
Operation range			Heating	-20 - 43
(Otutdoor temperature)			Cooling	15 - 43
Operation range			Heating	25 - 58 (65 with immersion heater)
(Water temperautere)			Cooling	7 - 25
System water flow			ℓ/s	0.19-0.79
Min system water flow at 100% circulation pump speed			ℓ/s	0.40
Max current	Indoor		A	- (Indoor)
	Outdoor			25 (Outdoor)
Recommended fuse rating			A	6 (Indoor)
				30 (Outdoor)
Starting current			A	5
Deviation, incoming supply				-15 - +10%
Max refrigerant pipe length			m	30
Max height difference between IU and OU			m	7
Indoor unit	Type of tank			-
	Height		mm	400
	Width		mm	460
	Depth		mm	250
	Weight (without water in the system)		kg	23
	Color			White
	IP grade			IP21
	Immersion heater			-
	Circ. pump	Output	W	-
		Max available external pressure	kPa	-
		Max flow	ℓ/s	
		Flow at 20kPa pressure drop	ℓ/s	-
	Emergency mode thermostat		°C	-
	Temperature limiter		°C	-
	Max operation temperature tank			-
	Safety valve		MPa	-
	Volume total		liter	-
	Volume hot water coil		liter	-
	Material hot water coil			-
	Max pressure, tank		bar	10
	Max pressure, hot water coil		bar	16
	Water quality, domestic hot water			-
	Volume expansion vessel		liter	-
	Ambient temperature, indoor module		°C	5-35, RH95%
	Dimensions, climate system pipe		mm	25.4
	Dimensions, hot water pipe		mm	-
	Water pipe connection			Compression fittings
	External heat source connection			-
Outdoor unit	Height		mm	1300
	Width		mm	970
	Depth		mm	370 (+80 with foot rail)
	Weight		kg	105
	Color			Stucco White
	Sound Power level*1		dB(A)	71
	Sound Power level (silent mode)		dB(A)	68
	Sound Pressure level*2		dB(A)	54
	Sound Pressure level (silent mode)		dB(A)	51
	Air flow		m^3/min	100
	Type of compressor			RMT5134MDE2
	Refrigerant oil		liter	0.9 M-MA68
	Heat exchanger			M fin & inner grooved tubing
	Refrigerant control			EEV
	Defrost control			Reversing cycle
	Fan			Proeller fan x 2
	Fan motor		W	86 x 2
	Shock & vibration absorber			Rubber sleeve (for compressor)
	Electric heater (crankcase / base)		W	20 / 120
	Safety equipment			Internal thermostat for fan motor
	Power and signal line from indoor unit			3cores 6mm^2 + 3cores 1.5mm^2
	Refrigerant			R410A
	Refrigerant volume (pipe length without additional charge)		kg (m)	4.0 (15)
	Dimensions, refrigerant pipe		mm (inch)	Gas pipe: OD 15.88 (5/8") Liquid pipe: OD 9.52 (3/8")
	Refrigerant pipe connections			Flare

Test conditions

		Water temperature	Ambient temperature
Heating	condition 1	45°C out / 40°Cin	7°CDB / 6°CWB
	condition 2	35°Cout / 30°Cin	
Cooling	condition 1	7°Cout / 12°Cin	35°CDB
	condition 2	18°Cout / 23°Cin	

*1: Test condition for sound power level
Temperature condition: Heating condition 2
*2: Test condition for sound pressure level
FDCW60VNX
Calculated from the sound power level
FDCW71,100,140VNX
Temperature condition: Heating condition 2
Mike position 1m away in front of outdoor unit at the height of 1m
*3: According to EN255-3

Seasonal space heating energy efficiency (η s) & Rated heat output (Prated)

All in one

Medium-temperature application

Outdoor unit		FDCW60VNX-A		FDCW71VNX-A		FDCW100VNX-A	
Indoor unit		HMK60		HMK100		HMK100	
		Prated (kW)	η s	Prated (kW)	η s	Prated (kW)	η s
η s	55 Average climate	5.3	138	7.0	119	10.0	126
	Seasonal Space Heating Energy Efficiency Class	A++		A+		A++	
η s	55 Warmer climate	4.8	116	8.0	154	12.0	164
η s	55 Cold climate	5.6	179	8.2	102	12.5	108

Low-temperature application

Outdoor unit		FDCW60VNX-A		FDCW71VNX-A		FDCW100VNX-A	
Indoor unit		HMK60		HMK100		HMK100	
		Prated (kW)	η s	Prated (kW)	η s	Prated (kW)	η s
η s	35 Average climate	4.8	188	7.1	149	8.5	165
	Seasonal Space Heating Energy Efficiency Class	A++		A+		A++	
η s	35 Warmer climate	4.2	252	8.0	n/a	12.0	n/a
η s	35 Cold climate	4.0	143	8.2	n/a	13.5	n/a

Outdoor unit		FDCW60VNX-A		FDCW71VNX-A		FDCW100VNX-A	
Indoor unit		HMK60		HMK100		HMK100	
		COP_{DHW}	η_{wh} (*1)	COP_{DHW}	η_{wh} (*1)	COP_{DHW}	η_{wh} (*1)
η wh	Average climate	2.23	89	2.48	99	2.45	98
	Energy Efficiency class	A		A		A	
η wh	Warmer climate	1.75	70	1.95	78	1.95	78
η wh	Cold climate	2.73	109	3.05	122	3.03	121
Load profile		XL		XL		XL	

*1 COP_{DHW} / 2.5 *100

Split box

Medium-temperature application

Outdoor unit		FDCW60VNX-A		FDCW71VNX-A		FDCW100VNX-A		FDCW140VNX-A	
Indoor unit		HSB60		HSB100		HSB100		HSB140	
Tank		PT300		PT300		PT300		PT500	
		Prated (kW)	η s	Prated (kW)	η s	Prated (kW)	η s	Prated (kW)	η s
η s	55 Average climate	5.3	138	7.0	119	10.0	126	13.0	133
	Seasonal Space Heating Energy Efficiency Class	A++		A+		A++		A++	
η s	55 Warmer climate	4.8	116	8.0	154	12.0	164	15.0	168
η s	55 Cold climate	5.6	179	8.2	102	12.5	108	16.0	115

Low-temperature application

Outdoor unit		FDCW60VNX-A		FDCW71VNX-A		FDCW100VNX-A		FDCW140VNX-A	
Indoor unit		HSB60		HSB100		HSB100		HSB140	
Tank		PT300		PT300		PT300		PT500	
		Prated (kW)	η s	Prated (kW)	η s	Prated (kW)	η s	Prated (kW)	η s
η s	35 Average climate	4.8	188	7.1	149	8.5	165	12.5	166
	Seasonal Space Heating Energy Efficiency Class	A++		A+		A++		A++	
η s	35 Warmer climate	4.2	252	8.0	n/a	12.0	n/a	15.0	224
η s	35 Cold climate	4.0	143	8.2	n/a	13.5	n/a	15.0	150

Outdoor unit		FDCW60VNX-A		FDCW71VNX-A		FDCW100VNX-A		FDCW140VNX-A	
Indoor unit		HSB60		HSB100		HSB100		HSB140	
Tank		PT300		PT300		PT300		PT500	
		COP_{DHW}	η_{wh} (*1)	COP_{DHW}	η_{wh} (*1)	COP_{DHW}	η_{wh} (*1)	COP_{DHW}	η_{wh} (*1)
η wh	Average climate	2.27	91	2.25	90	2.22	89	2.21	88
	Energy Efficiency class	A		A		A		A	
η wh	Warmer climate	1.79	72	1.93	77	1.91	76	1.89	76
η wh	Cold climate	2.8	112	2.58	103	2.55	102	2.53	101
Load profile		XXL		XXL		XXL		XXL	

*1 COP_{DHW} / 2.5 *100

This technical information is based on the European regulations listed below.

1. COMMISSION REGULATION (EU) No 813/2013 of 2 August 2013 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for space heaters and combination heaters.
2. COMMISSION DELEGATED REGULATIOIN (EU) No 811/2013 of 18 February 2013 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control and solar device.

Controller

RC-HY 20	
Electrical data	
Power source voltage	230V 50 Hz
Enclosure class	IP 21
Rated value for impulse voltage	4 kV
Electrical contamination	2
Option connections	
Max number of 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
Miscellaneous	
Area of operation	- 25 - 70 °C
Ambient temperature	5 - 35 °C
Dimensions and weight	
Width	354 mm
Depth	123 mm
Height	400 mm
Net weight	4.3 kg
Gross weight	4.5 kg
Part number MHIAE	MCD501A001
Internet connection function*	Included
Language	English, Swedish, German, French, Spanish, Finnish, Lithuanian, Czech, Polish, Dutch, Norwegian, Danish, Estonian, Latvian, Russian, Italian, Hungarian, Slovenian, Turkish, Croatian, Romanian, Icelandic

*Function is provided by myUpTech AB., which monitors operation data and control unit through internet

Technical specifications

RC-HY 40	
Electrical data	
Power source voltage	230V 50 Hz
Enclosure class	IP 21
Rated value for impulse voltage	4 kV
Option connections	
Max number of air/water heat pumps	8
Max number of sensors	8
Max number of charge pumps with internal accessory cards	4
Max number of charge pumps with external accessory cards	8
Max number of outputs for additional heat step	3
Miscellaneous	
Area of operation	- 25 - 70 °C
Ambient temperature	5 - 35 °C
Dimensions and weight	
Width	354 mm
Depth	123 mm
Height	400 mm
Net weight	4.4 kg
Gross weight	4.6 kg
Part number MHIAE	MCD501A002
Internet connection function*	Included
Language	English, Swedish, German, French, Spanish, Finnish, Lithuanian, Czech, Polish, Dutch, Norwegian, Danish, Estonian, Latvian, Russian, Italian, Hungarian, Slovenian, Turkish, Croatian, Romanian, Icelandic

*Function is provided by myUpTech AB., which monitors operation data and control unit through internet

Installation requirements

Indoor unit	HMK60 HSB60	HMK100 HSB100	HMK100 HSB100	HSB140
Outdoor unit	FDCW60VNX-A	FDCW71VNX-A	FDCW100VNX-A	FDCW140VNX-A
Max pressure, climate system	0.25 MPa (2.5 Bar)			
Max temperature, climate system	65℃			
Max temperature in indoor unit	65℃			
Max temperature from external heat source	65℃			
Max supply temperature with compressor	58℃			
Min supply temperature cooling	7℃			
Max supply temperature cooling	25℃			
Min volume, climate system without underfloor cooling application	20 ℓ	50 ℓ	80 ℓ	150 ℓ
Min volume, climate system with underfloor cooling application	50 ℓ	80 ℓ	100 ℓ	150 ℓ
Max flow, climate system	0.29ℓ/s	0.38ℓ/s	0.57ℓ/s	0.79ℓ/s
Min flow, climate system	0.09ℓ/s	0.19ℓ/s	0.29ℓ/s	0.39 ℓ/s
Nominal system flow heating (△T=5K)	–	0.38ℓ/s (8kW,7/45℃)	0.43ℓ/s (9kW,7/45℃)	0.79ℓ/s (16.5kW,7/45℃)
Nominal system flow cooling (△T=5K)	–	0.34ℓ/s (7.1kW,35/7℃)	0.38ℓ/s (8kW,35/7℃)	0.56ℓ/s (11.8kW,35/7℃)

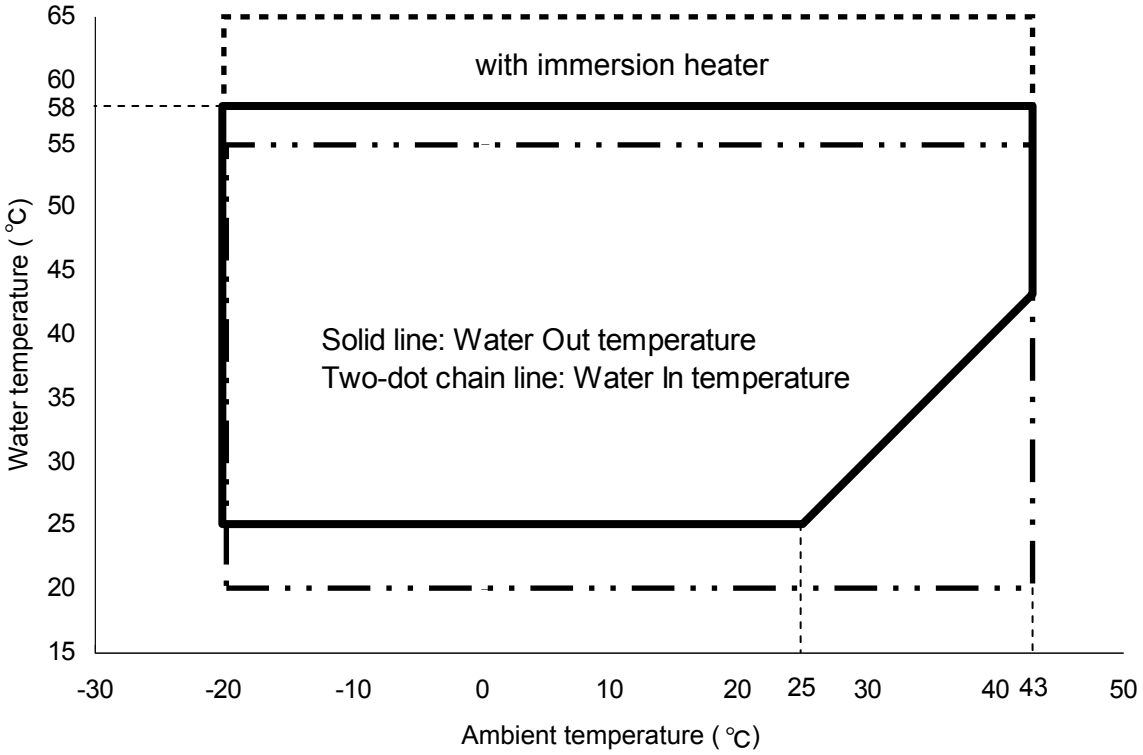
External circulation pump must be used when the pressure drop in the system is greater than the available external pressure. In such case, a bypass line with non-return valve must be installed.

Use an overflow valve if system flow cannot be guaranteed.

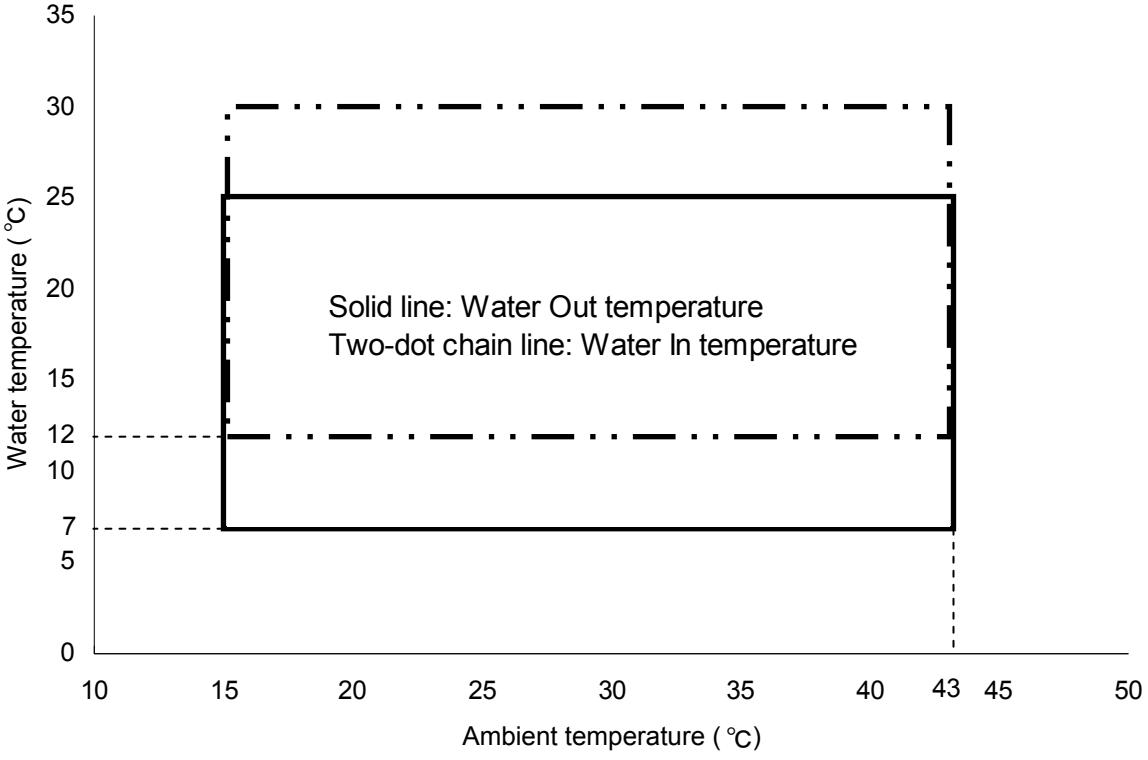
Operating temperature range

FDCW60VNX-A, 71VNX-A, 100VNX-A, 140VNX-A

<Heating/Hot Water>



<Cooling>



NOTE

1. *Avoid installing outdoor unit where wind blows stronger than 5m/s. In strong wind enviroment, operable temperature range is drastically narrowed if wind protection is not used.*
2. *In case outdoor unit is installed where outdoor air temperature drops below 10℃ and wind blows directly into the outdoor unit, install wind protection on outdoor unit.*

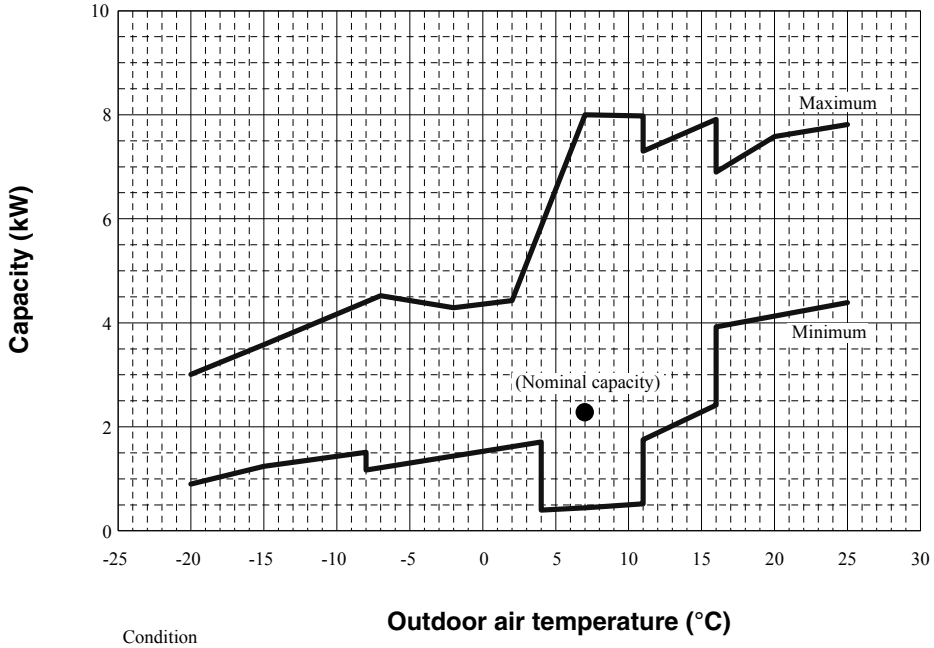
If it is not observed, it will lead to abnormal stop.

Capacity diagram

HMK60–FDCW60VNX

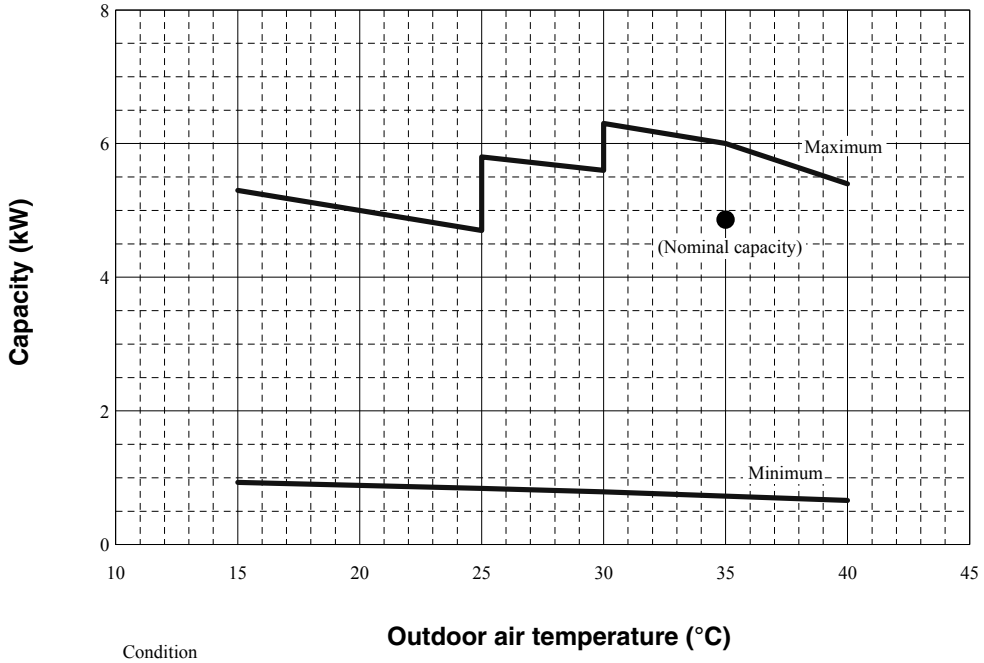
HSB60–FDCW60VNX

Heating



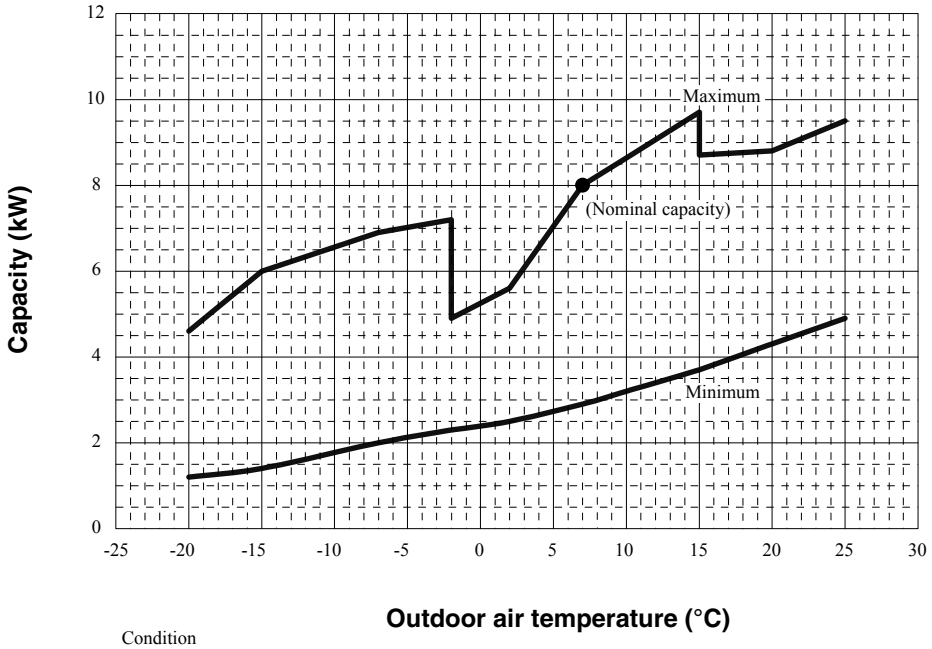
Condition
Supply water temperature : 45ºC
Water flow rate : 1447 ℓ/*h*

Cooling



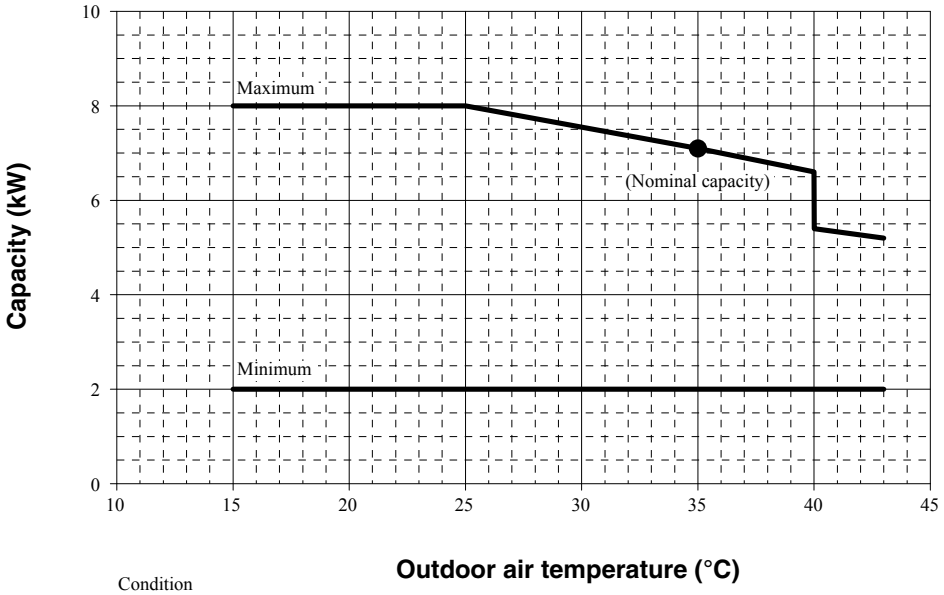
Condition
Supply water temperature : 7ºC
Water flow rate : 1008ℓ/*h*

HMK100–FDCW71VNX
HSB100–FDCW71VNX
Heating



Condition
Supply water temperature : 45ºC
Water flow rate : 1376 ℓ/*h*

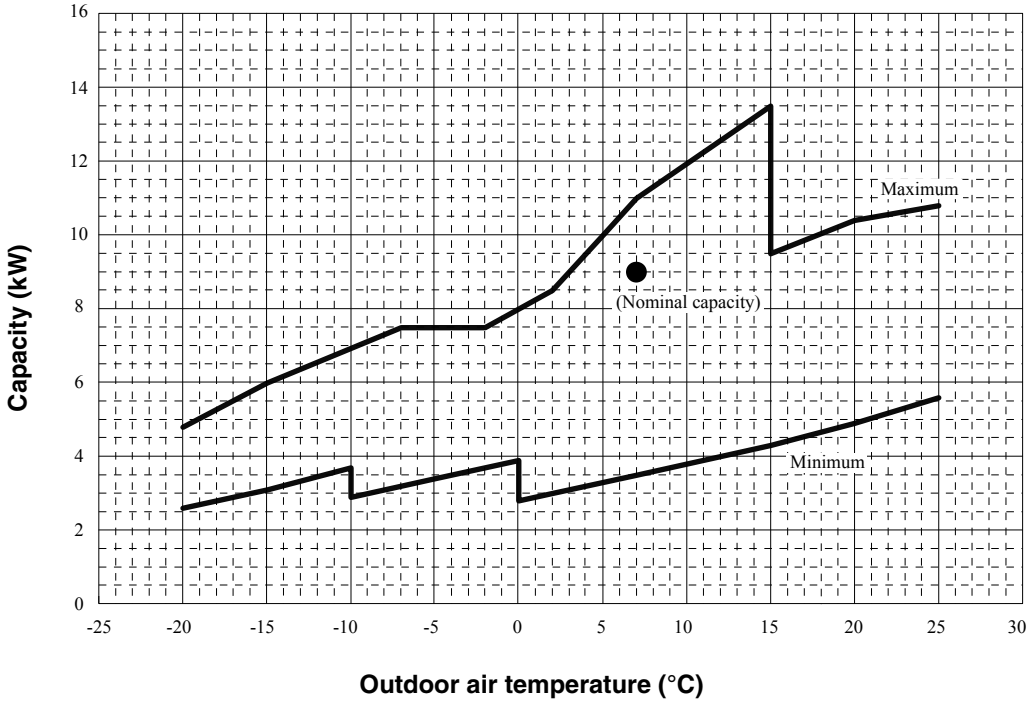
Cooling



Condition
Supply water temperature : 7ºC
Water flow rate : 1221 ℓ/*h*

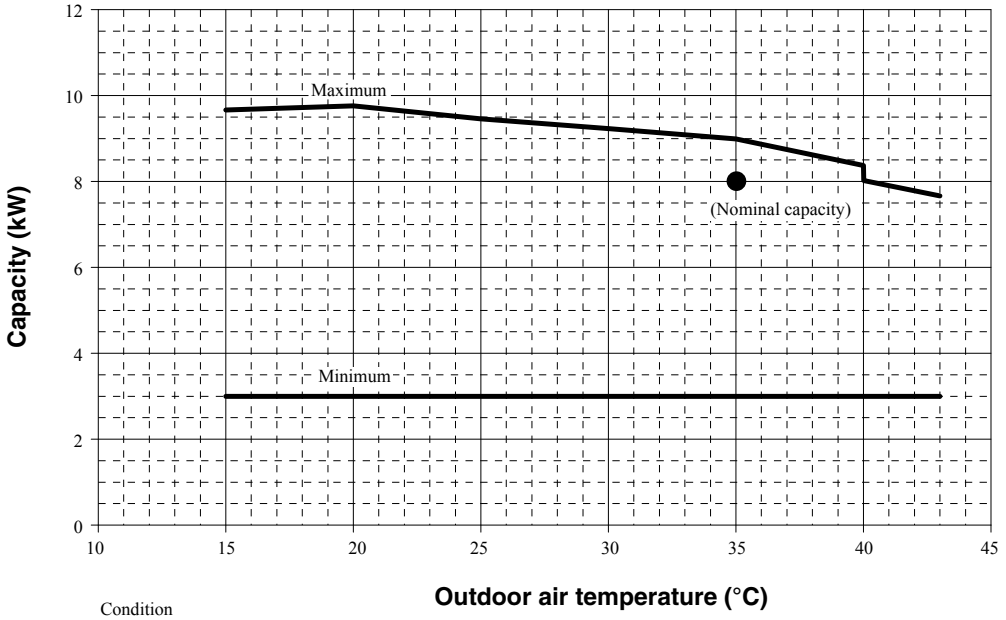
HMK100–FDCW100VNX
HSB100–FDCW100VNX

Heating



Condition
Supply water temperature : 45ºC
Water flow rate : 1548 ℓ/*h*

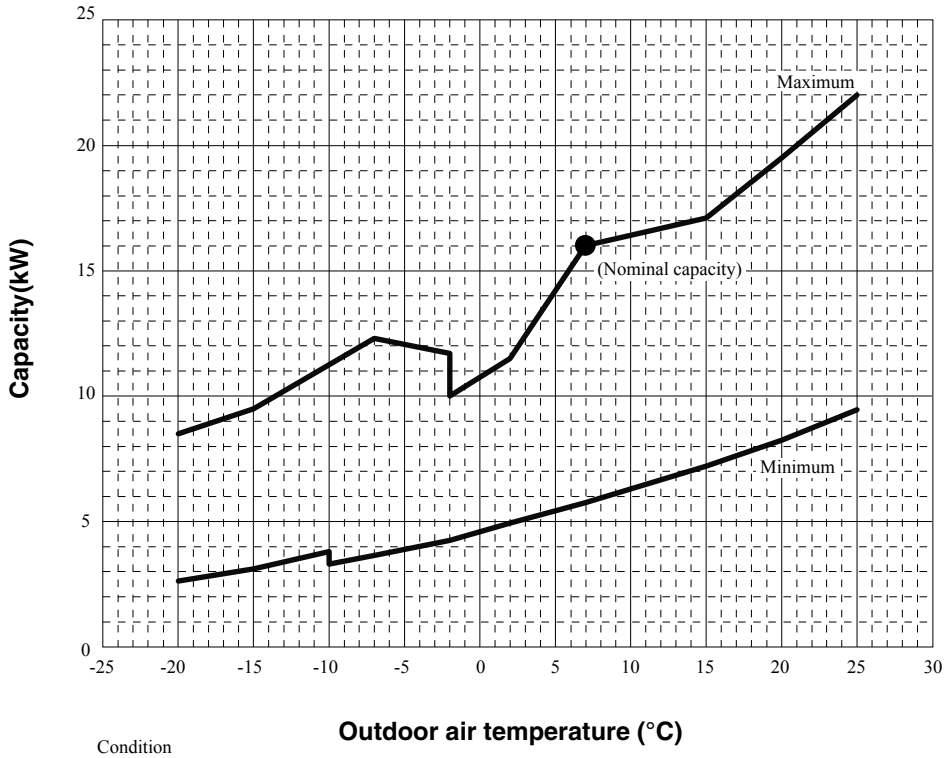
Cooling



Condition
Supply water temperature : 7ºC
Water flow rate : 1376 ℓ/h

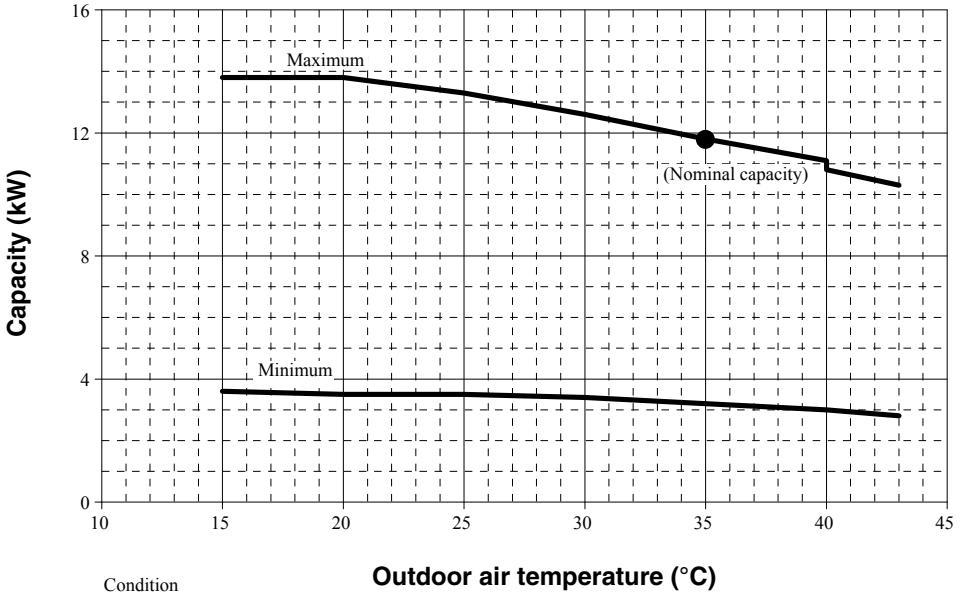
HSB140–FDCW140VNX

Heating



Condition
Supply water temperature : 45ºC
Water flow rate : 2838 ℓ/*h*

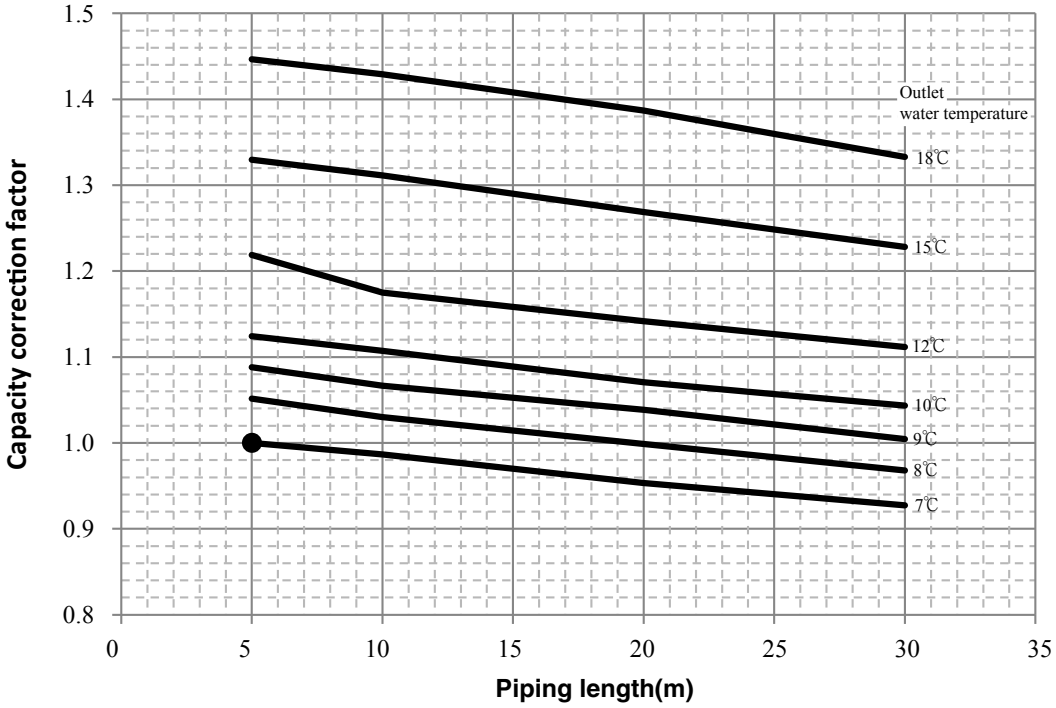
Cooling



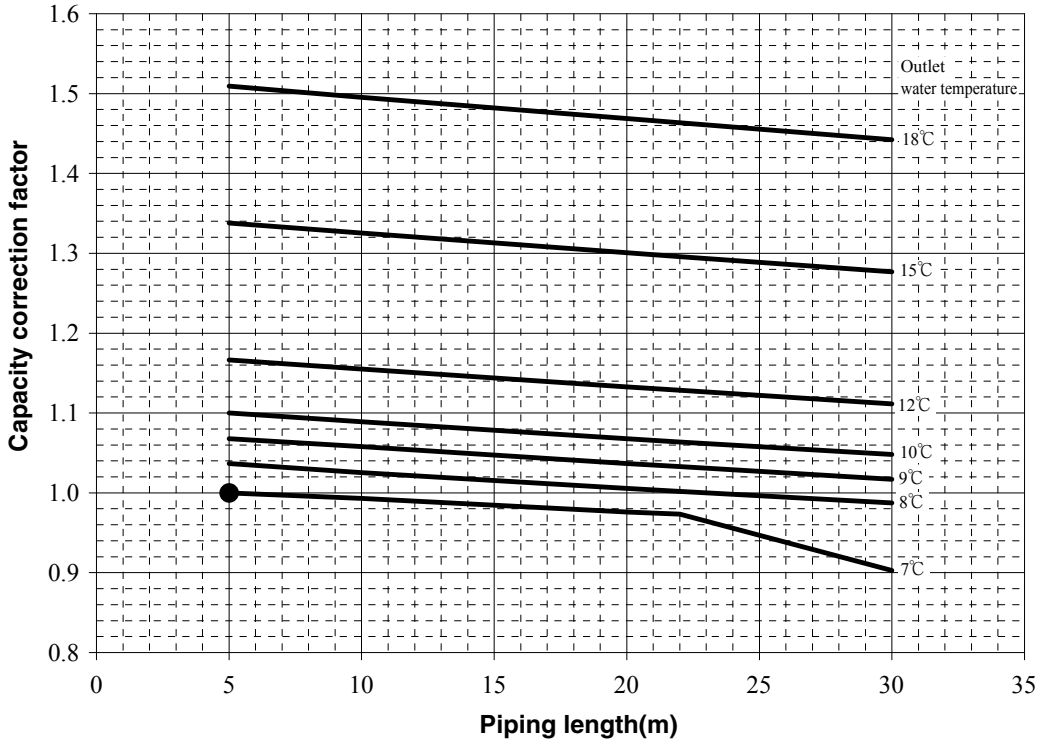
Condition
Supply water temperature : 7ºC
Water flow rate : 2030 ℓ/*h*

Capacity correction factor according to piping length and outlet water temperature in cooling

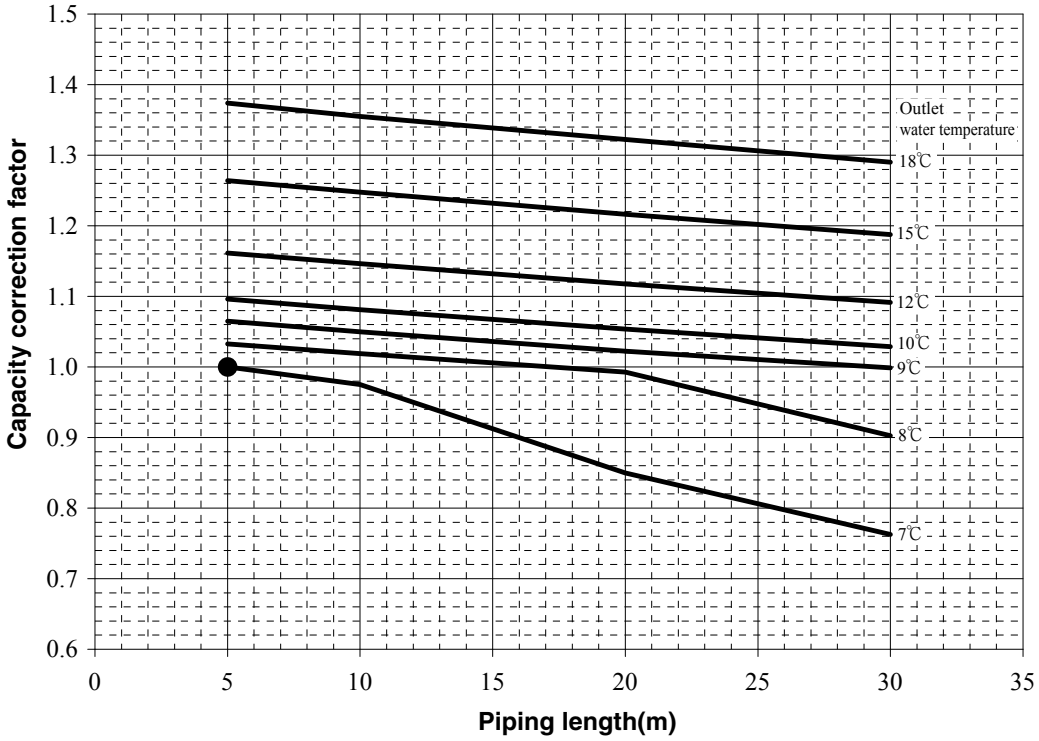
HMK60–FDCW60VNX-A
HSB60–FDCW60VNX-A



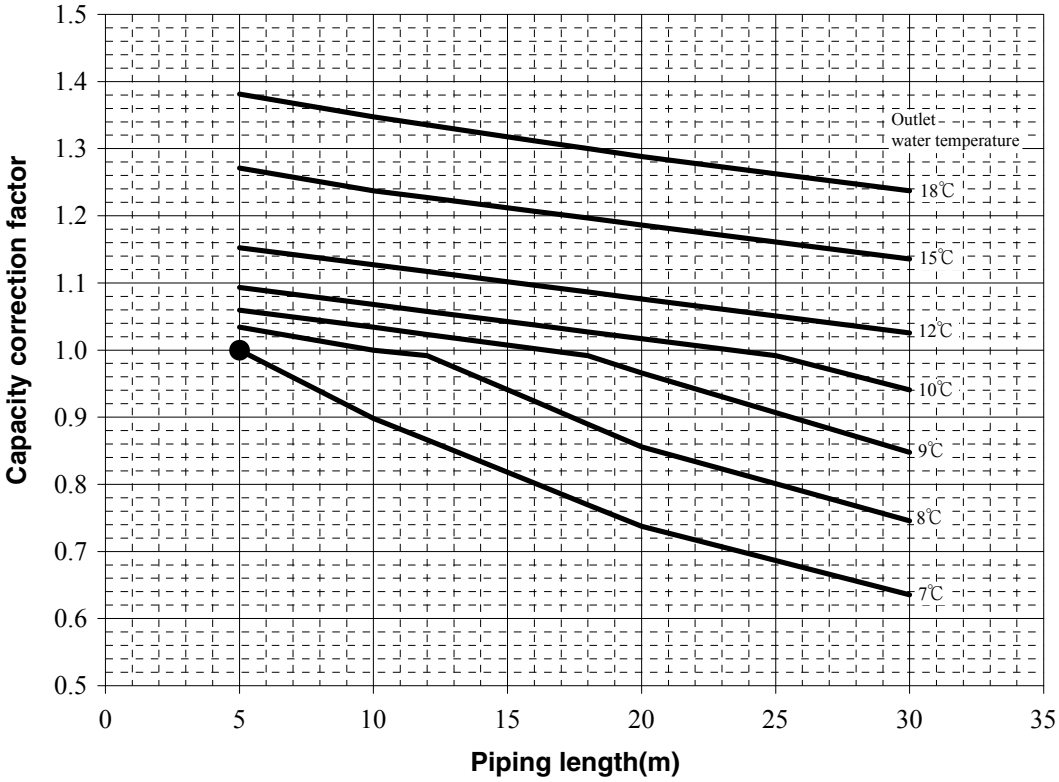
HMK100–FDCW71VNX
HSB100–FDCW71VNX



HMK100–FDCW100VNX
HSB100–FDCW100VNX



HSB140–FDCW140VNX



How to calculate estimated capacity according to ambient temperature, water outlet temperature and piping length

(1) Read the cooling capacity at 7degC outlet and required ambient temperature.
(2) Read the capacity correction factor at required water outlet temperature and piping length.
(3) Multiply the values (1) and (2).

Example: HMK100, Ambient temperature 25degC, Water outlet 8degC, piping length 20m
(1) Capacity at 25degC ambient and 7degC outlet: 8.0kW
(2) Correction factor according to ambient temp and piping length: 1.01
(3) Estimated capacity: 8.0 × 1.01 = 8.0kW

Example: HSB140, Ambient temperature 25degC, Water outlet 8degC, piping length 20m
(1) Capacity at 25degC ambient and 7degC outlet: 13.2kW
(2) Correction factor according to ambient temp and piping length: 0.85
(3) Estimated capacity: 13.2 × 0.85 = 11.2kW

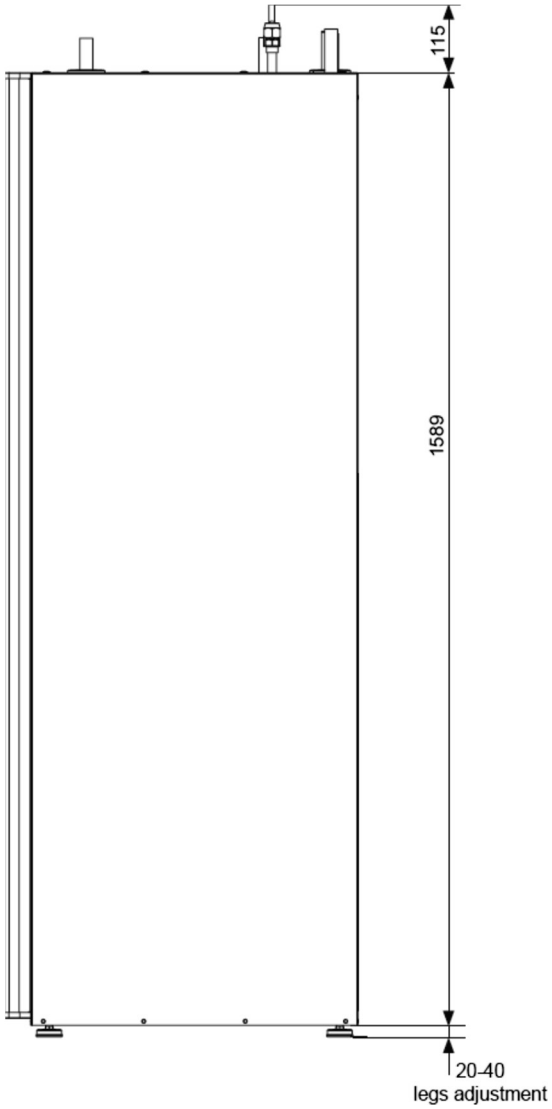
Note: The calculation result is only advisory and is not accurate.

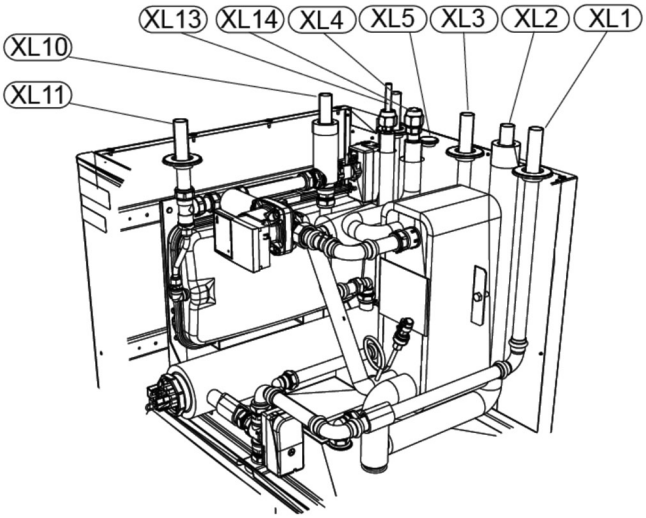
Dimensions

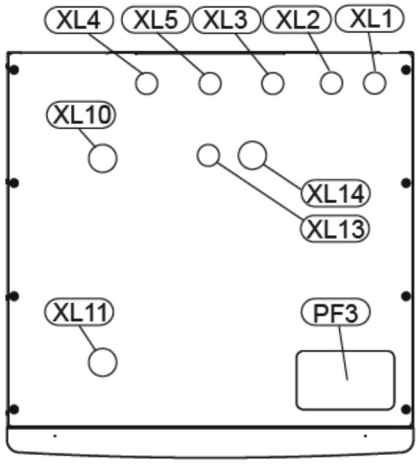
Indoor units

All in one type

HMK60/HMK100





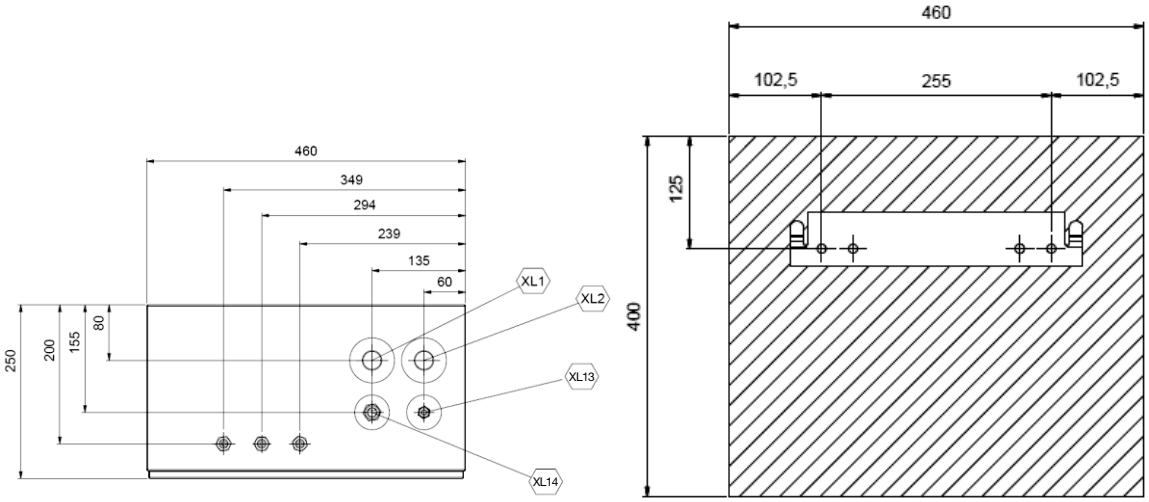


Meaning of symbol

Symbol	Content		
		HMK60	HMK100
XL1	Connection, heating medium supply	ϕ22 mm	
XL2	Connection, heating medium return	ϕ22 mm	
XL3	Connection, cold water	ϕ22 mm	
XL4	Connection, hot water	ϕ22 mm	
XL5	Connection, circulation	ϕ15 mm	
XL10	Connection, cooling	ϕ22 mm	
XL11	Connection, safety group, manometer	ϕ22 mm	
XL13	Connection, liquid cooling medium	¼"	⅜"
XL14	Connection, gas cooling medium	½"	⅝"
PF3	Serial number plate		

Split box

HSB60/HSB100/HSB140

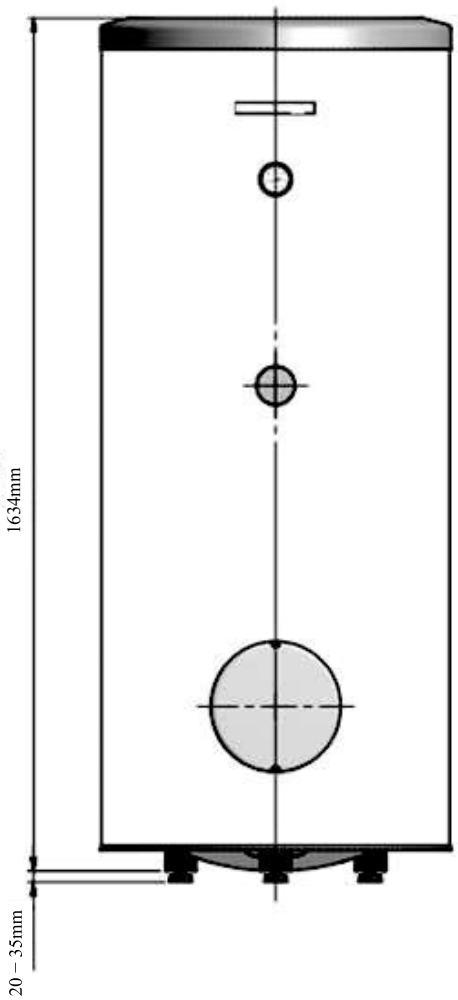


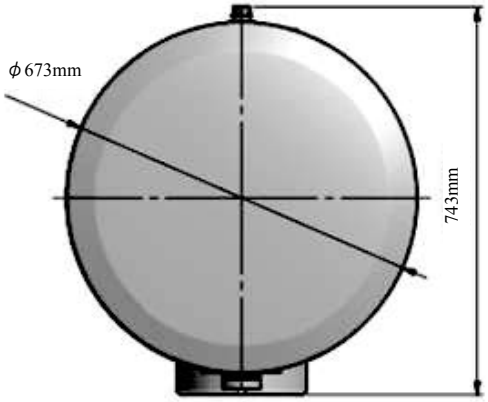
Meaning of symbol

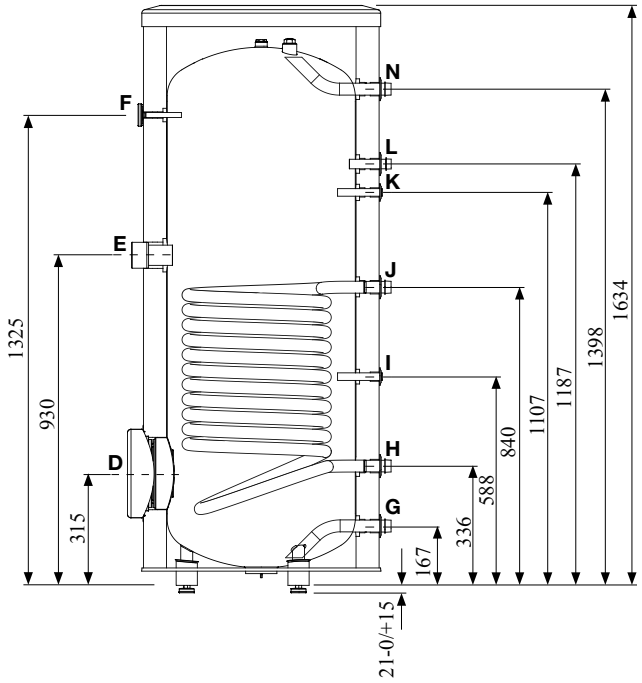
Symbol	Content			
		HSB60	HSB100	HSB140
XL1	Climate system supply	ϕ22 mm	ϕ28 mm	
XL2	Climate system return	ϕ22 mm	ϕ28 mm	
XL13	Connection, liquid line	¼”	⅜”	
XL14	Connection, gas line	½”	⅝”	

Tank unit

PT300

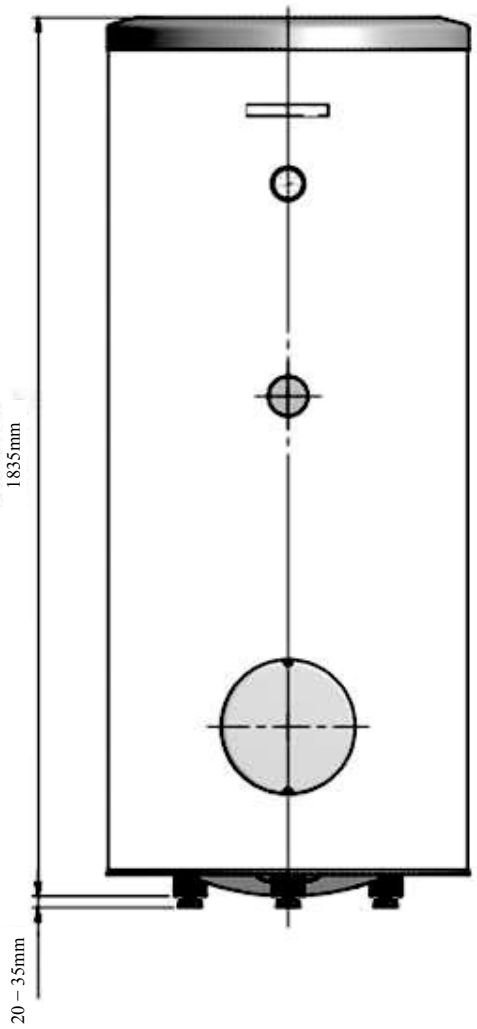


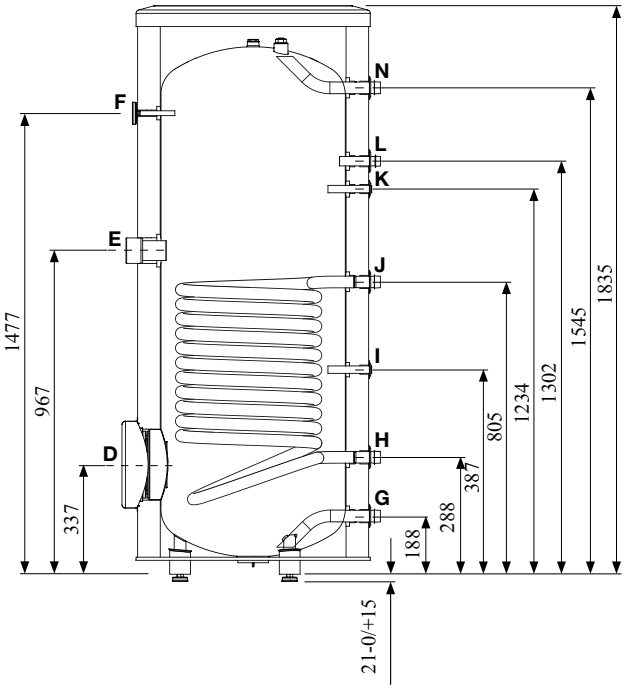


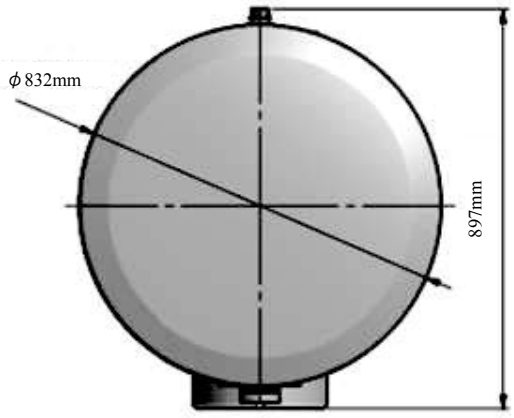


Connection			PT300
D	Inspection opening	mm	ϕ 120
E	Heating unit connection	inch	1½″ Female
F	Thermometer enclosure	mm	ϕ 10 Female
N	Hot water outlet	inch	1″ Male
L	Hot water circulation	inch	¾″ Male
K	Temperature sensor enclosure (BT7)	mm	ϕ 16 Female
J	Coil supply	inch	1″ Male
I	Temperature sensor enclosure (BT6)	mm	ϕ 16 Female
H	Return from coil	inch	1″ Male
G	Cold water input	inch	1″ Male

PT500



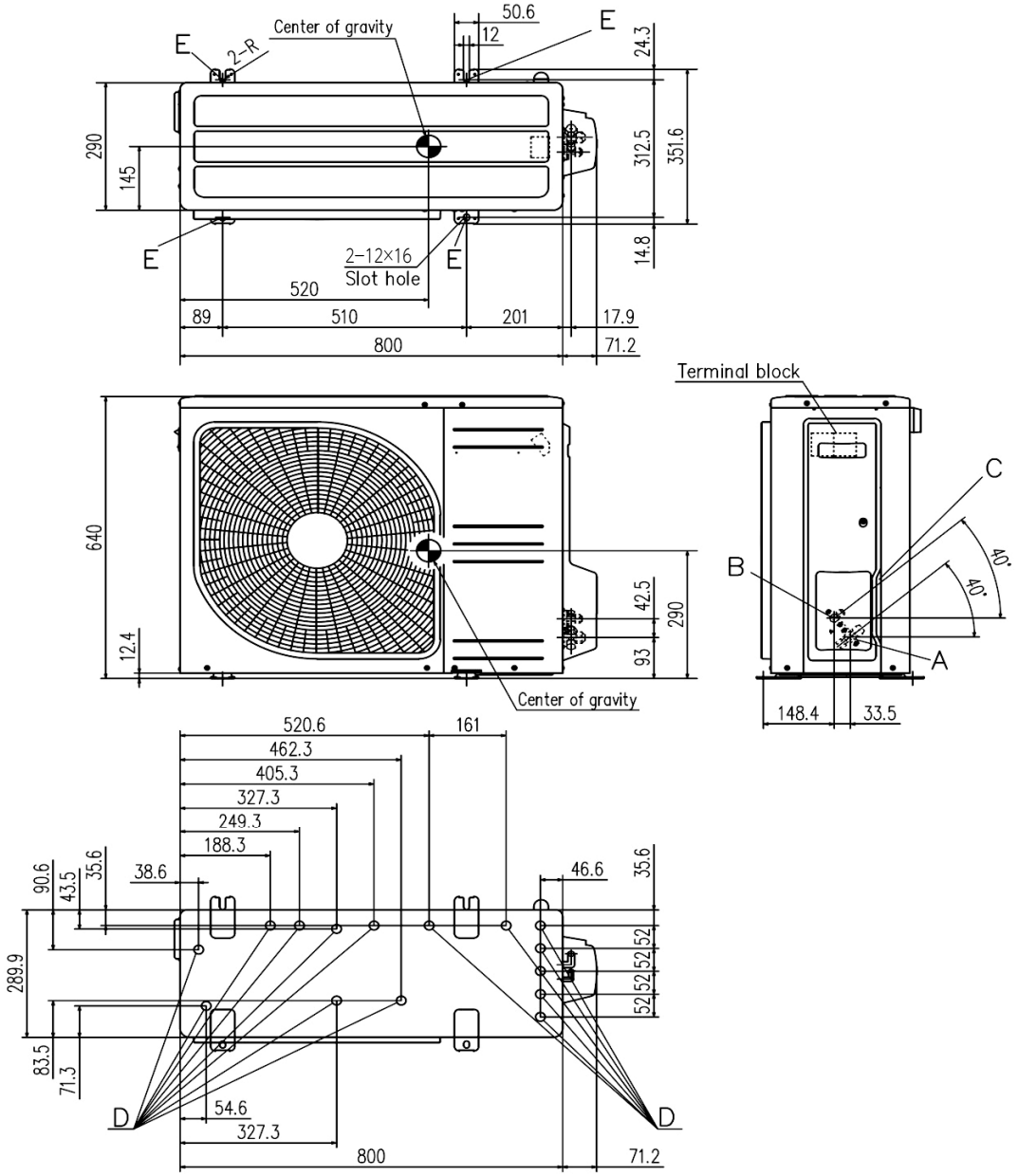




Connection			PT500
D	Inspection opening	mm	ϕ120
E	Heating unit connection	inch	1½″Female
F	Thermometer enclosure	mm	ϕ10 Female
N	Hot water outlet	inch	1″Male
L	Hot water circulation	inch	¾″Male
K	Temperature sensor enclosure (BT7)	mm	ϕ16 Female
J	Coil supply	inch	1″Male
I	Temperature sensor enclosure (BT6)	mm	ϕ16 Female
H	Return from coil	inch	1″Male
G	Cold water input	inch	1″Male

Outdoor unit

FDCW60VNX-A

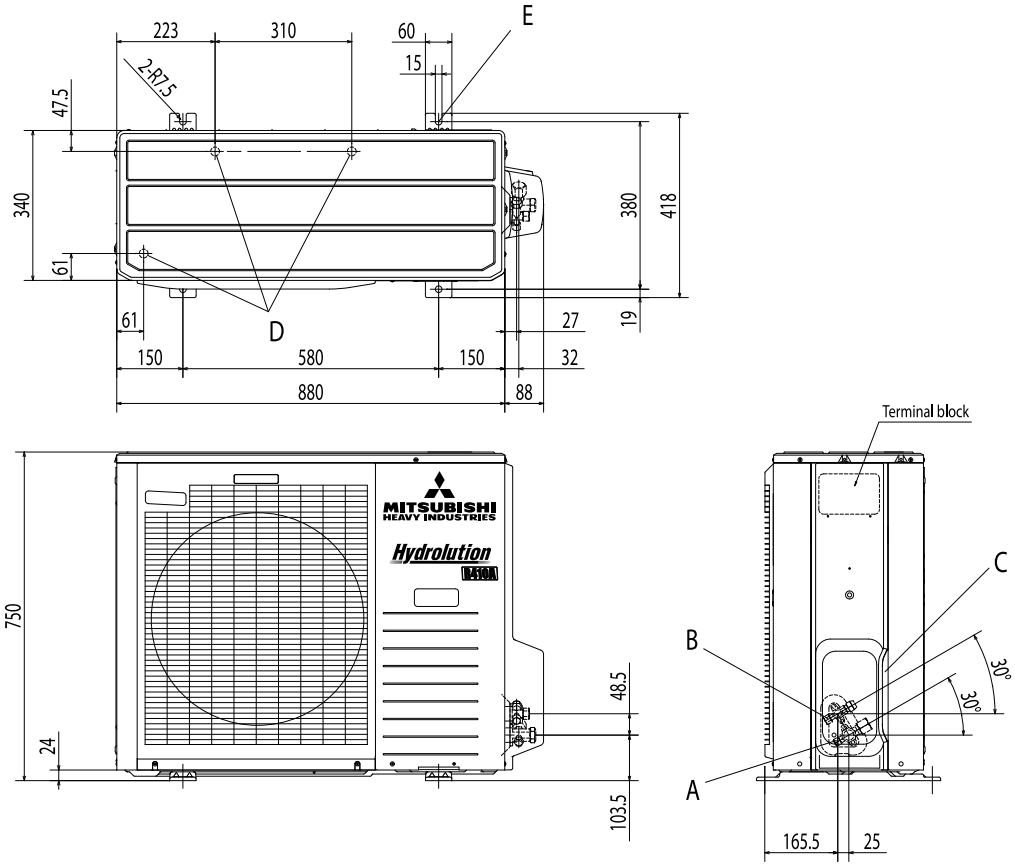


Meaning of symbol

Symbol	Content	
A	Service valve connection (gas side)	φ12.7 (1/2") (Flare)
B	Service valve connection (liquid side)	φ6.35 (1/4") (Flare)
C	Pipe/cable draw-out hole	
D	Drain discharge hole	φ20×15 places
E	Anchor bolt hole	M10×4 places

Notes
(1) It must not be surrounded by walls on the four sides.
(2) The unit must be fixed with anchor bolts. An anchor bolt must not protrude more the 15mm.
(3) Where the unit is subject to strong winds, lay it in such a direction that the blower outlet faces perpendicularly to the dominant wind direction.
(4) Leave 1m or more space above the unit.
(5) A wall in front of the blower outlet must not exceed the units height.
(6) The model name label is attached on the lower right corner of the front panel.

FDCW71VNX-A

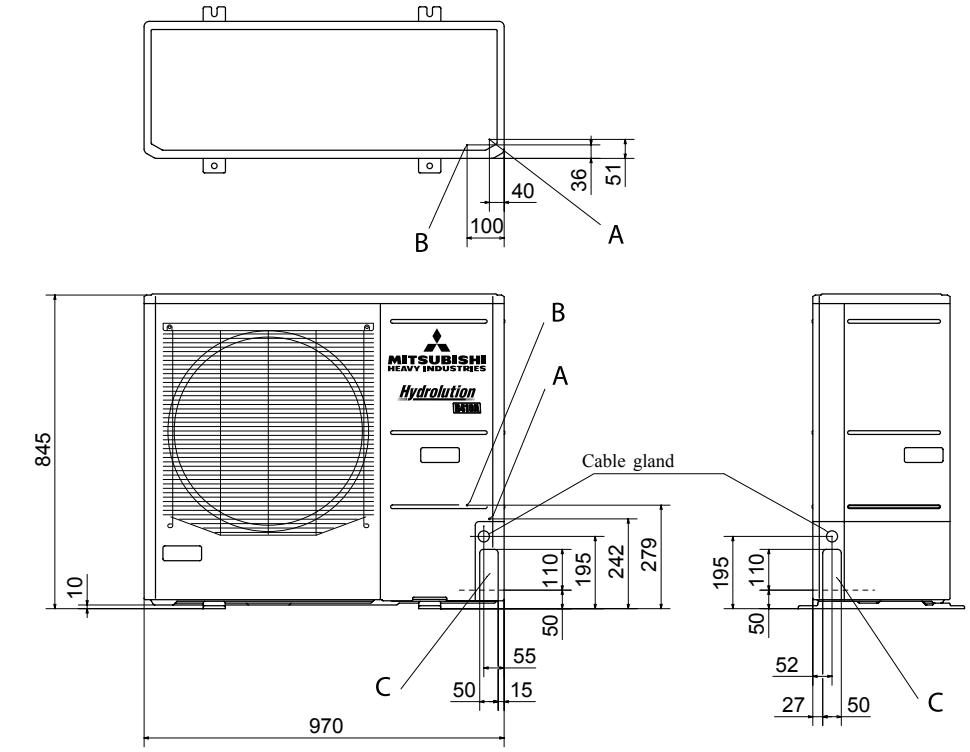


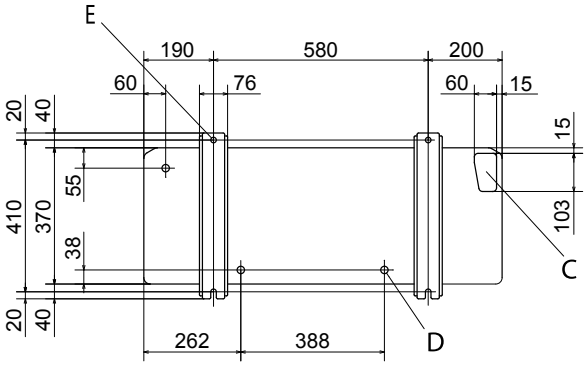
Meaning of symbol

Symbol	Content	
A	Service valve connection（gas side）	φ15.88（5／8"）（Flare）
B	Service valve connection（liquid side）	φ9.52（3／8"）（Flare）
C	Pipe／cable draw-out hole	
D	Drain discharge hole	φ20×3 places
E	Anchor bolt hole	M10×4 places

Notes
（1）It must not be surrounded by walls on the four sides.
（2）The unit must be fixed with anchor bolts. An anchor bolt must not protrude more the 15mm.
（3）Where the unit is subject to strong winds, lay it in such a direction that the blower outlet faces perpendicularly to the dominant wind direction.
（4）Leave 1m or more space above the unit.
（5）A wall in front of the blower outlet must not exceed the units height.
（6）The model name label is attached on the lower right corner of the front panel.

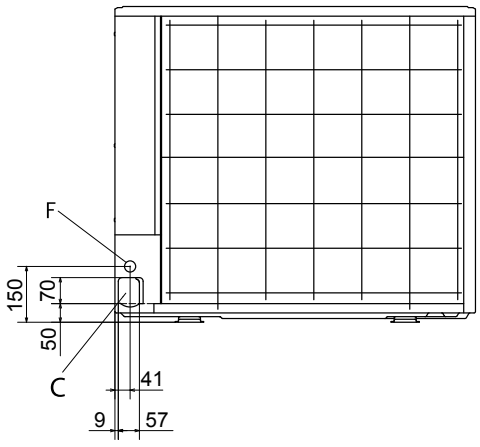
FDCW100VNX-A





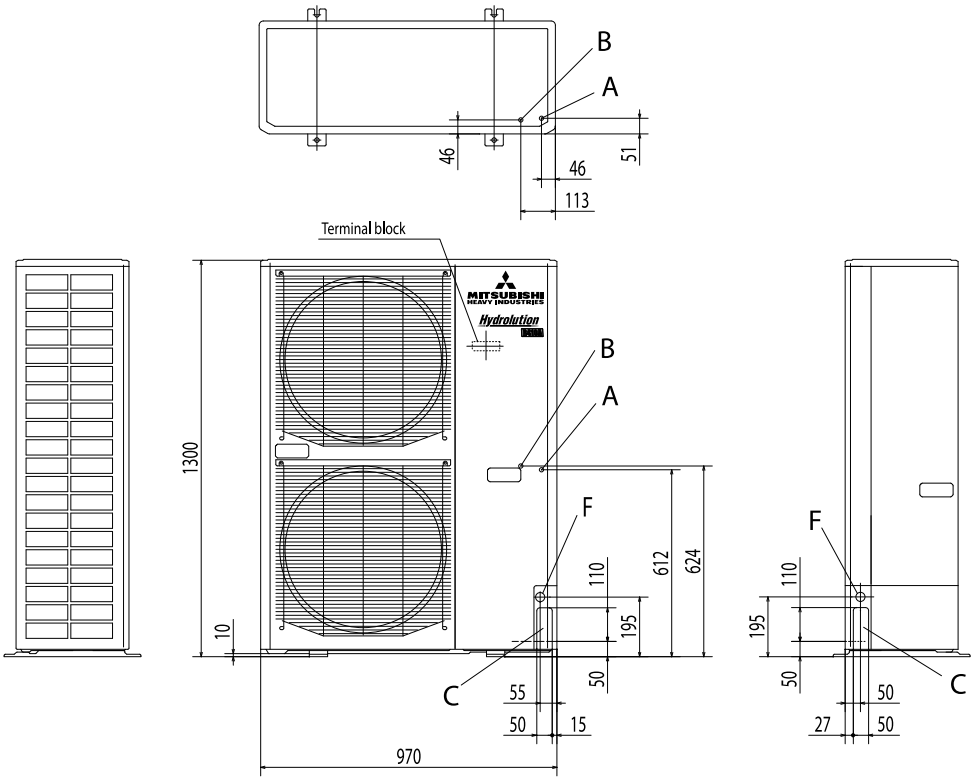
Meaning of symbol

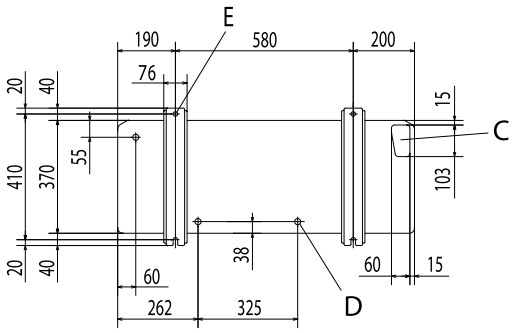
Symbol	Content	
A	Service valve connection (gas side)	ϕ15.88 (5/8") (Flare)
B	Service valve connection (liquid side)	ϕ9.52 (3/8") (Flare)
C	Pipe/cable draw-out hole	
D	Drain discharge hole	ϕ20 × 3 places
E	Anchor bolt hole	M10 × 4 places
F	Cable draw-out hole	ϕ30 (front) ϕ45 (side) ϕ50 (back)



Notes
(1) It must not be surrounded by walls on the four sides.
(2) The unit must be fixed with anchor bolts. An anchor bolt must not protrude more than 15mm.
(3) Where the unit is subject to strong winds, lay it in such a direction that the blower outlet faces perpendicularly to the dominant wind direction.
(4) Leave 1m or more space above the unit.
(5) A wall in front of the blower outlet must not exceed the units height.
(6) The model name label is attached on the lower right corner of the front panel.

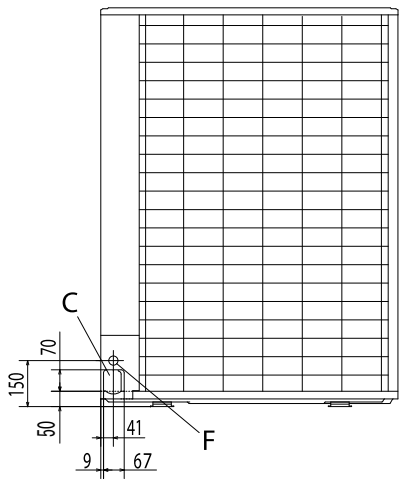
FDCW140VNX-A





Meaning of symbol

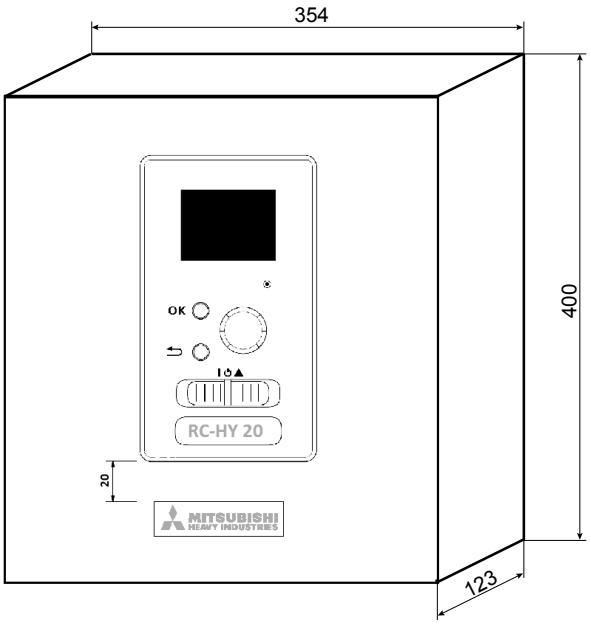
Symbol	Content	
A	Service valve connection (gas side)	φ15.88 (5/8") (Flare)
B	Service valve connection (liquid side)	φ9.52 (3/8") (Flare)
C	Pipe/cable draw-out hole	
D	Drain discharge hole	φ20×3 places
E	Anchor bolt hole	M10×4 places
F	Cable draw-out hole	φ30 (front) φ45 (side) φ50 (back)



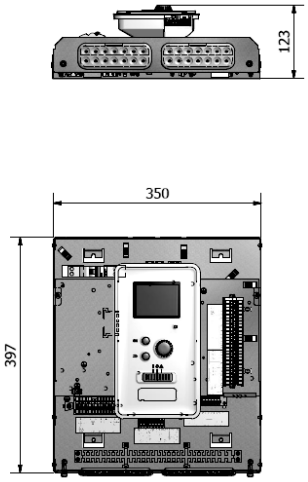
Notes
(1) It must not be surrounded by walls on the four sides.
(2) The unit must be fixed with anchor bolts. An anchor bolt must not protrude more than 15mm.
(3) Where the unit is subject to strong winds, lay it in such a direction that the blower outlet faces perpendicularly to the dominant wind direction.
(4) Leave 1m or more space above the unit.
(5) A wall in front of the blower outlet must not exceed the units height.
(6) The model name label is attached on the lower right corner of the front panel.

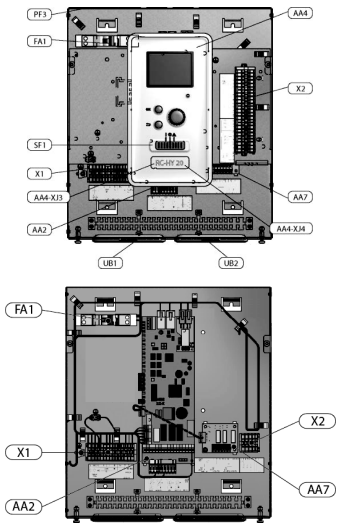
Controller

Outside : RC-HY20/40



Inside : RC-HY20



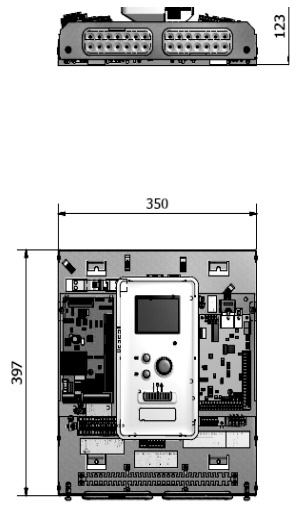


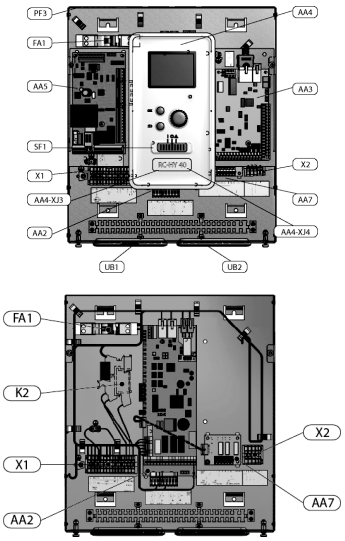
Meaning of symbol

Symbol	Content
AA2	Base card
AA4	Display unit
AA4-XJ3	USB socket
AA4-XJ4	Service outlet (No function)
AA7	Extra relay circuit board
FA1	Miniature circuit breaker
X1	Terminal block, incoming electrical supply
X2	Terminal block, control signal circulation pump, sensors, AUX inputs and heat pump
SF1	Switch
PF3	Serial number plate
UB1	Cable grommet, incoming supply electricity, power for accessories
UB2	Cable gland, signal

Designations in components locations according to standard IEC 81346-1 and 81346-2

Inside : RC-HY40





Meaning of symbol

Symbol	Content
AA2	Base card
AA3	Input circuit board
AA4	Display unit
AA4-XJ3	USB socket
AA4-XJ4	Service outlet (No function)
AA5	Accessory board
AA7	Extra relay circuit board
FA1	Miniature circuit breaker
X1	Terminal block, incoming electrical supply
X2	Terminal block, AUX4 – AUX6
SF1	Switch
PF3	Serial number plate
UB1	Cable grommet, incoming supply electricity, power for accessories
UB2	Cable gland, signal

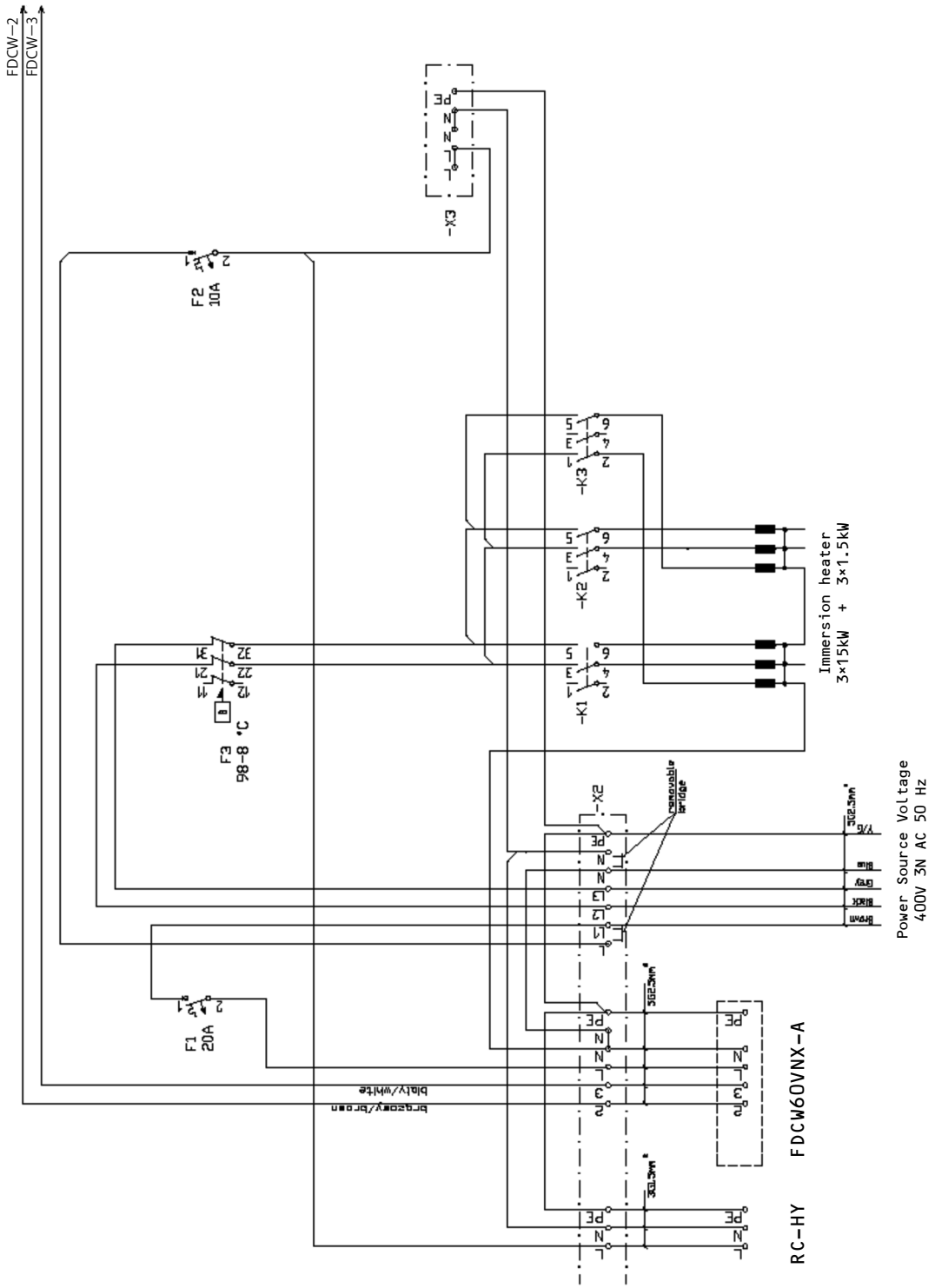
Designations in components locations according to standard IEC 81346-1 and 81346-2

Electrical circuit diagram

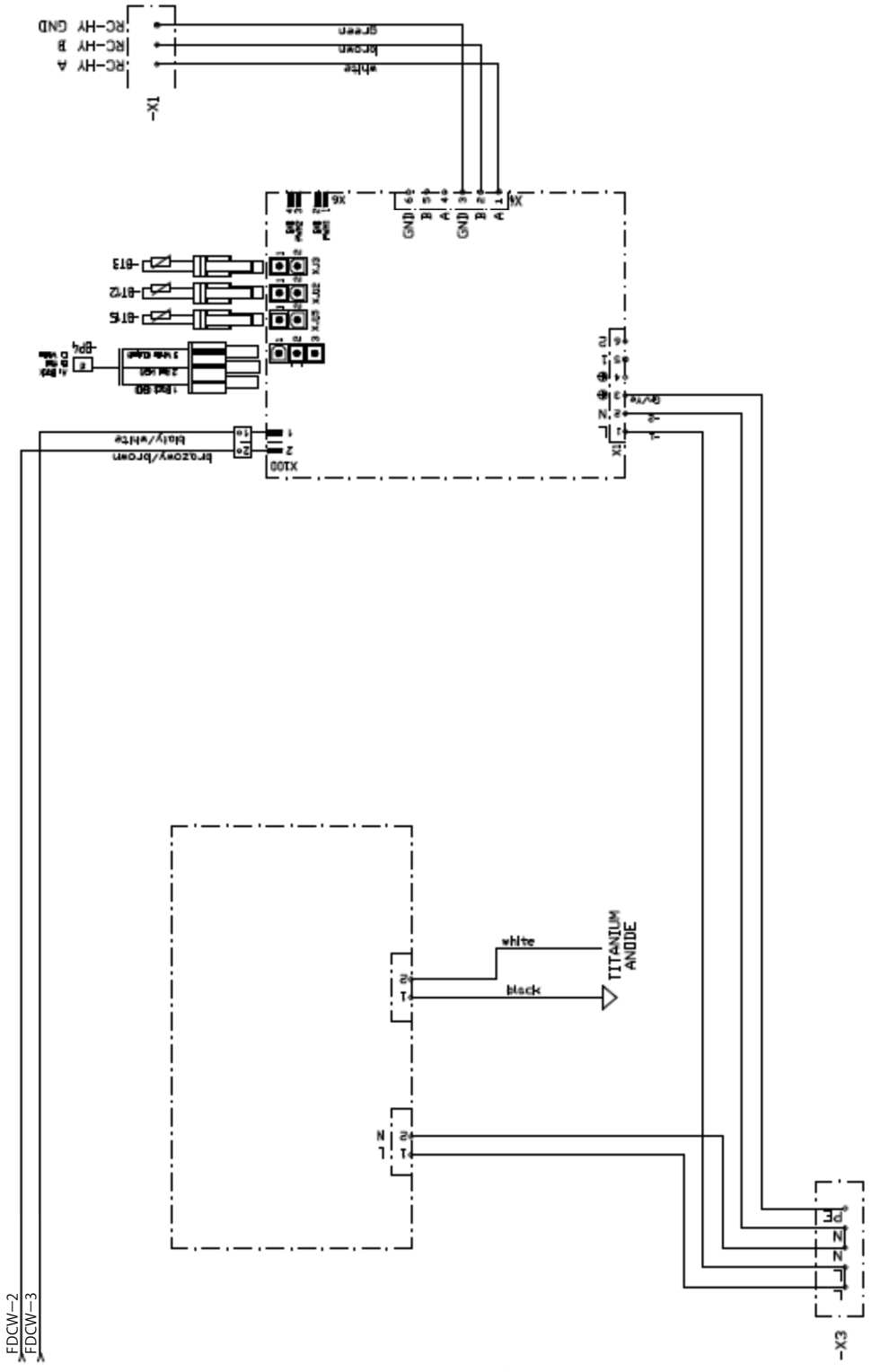
Indoor unit

All in one type

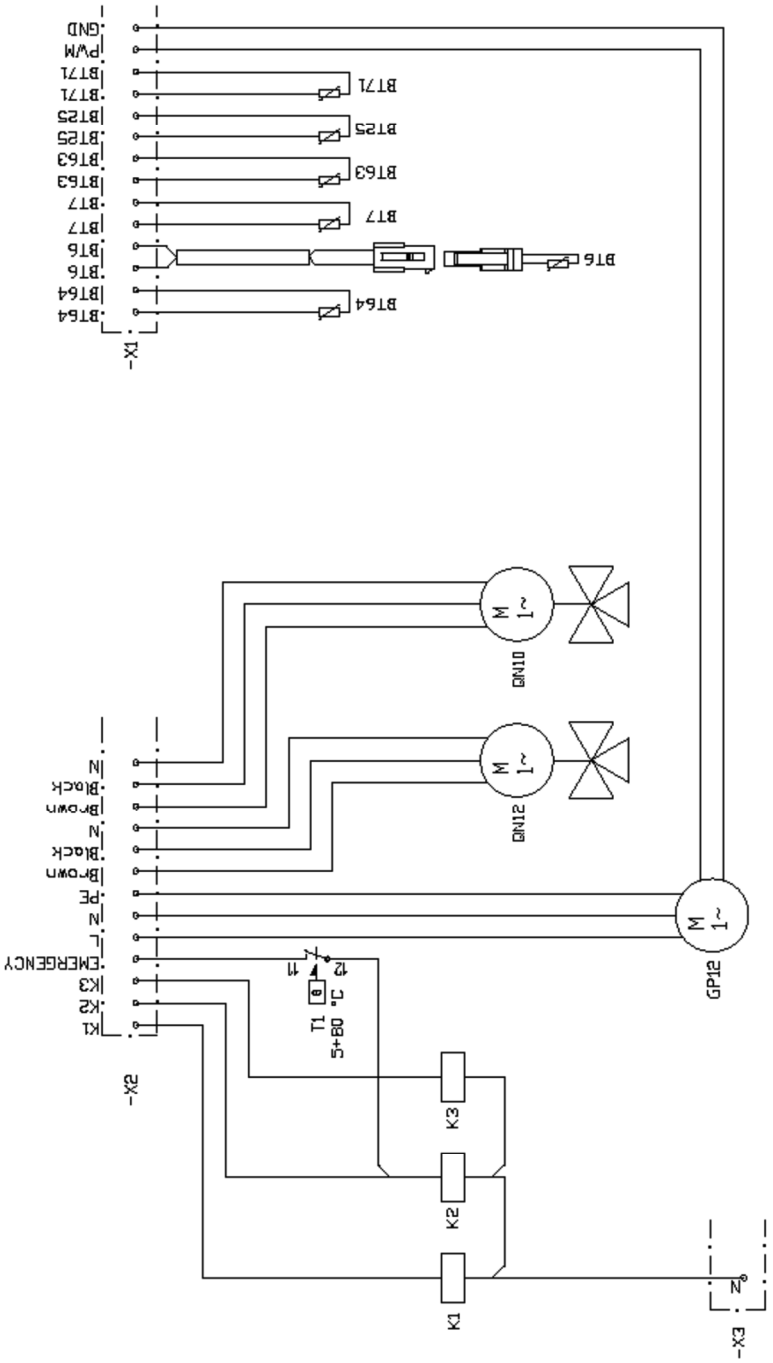
HMK60 - sheet 1



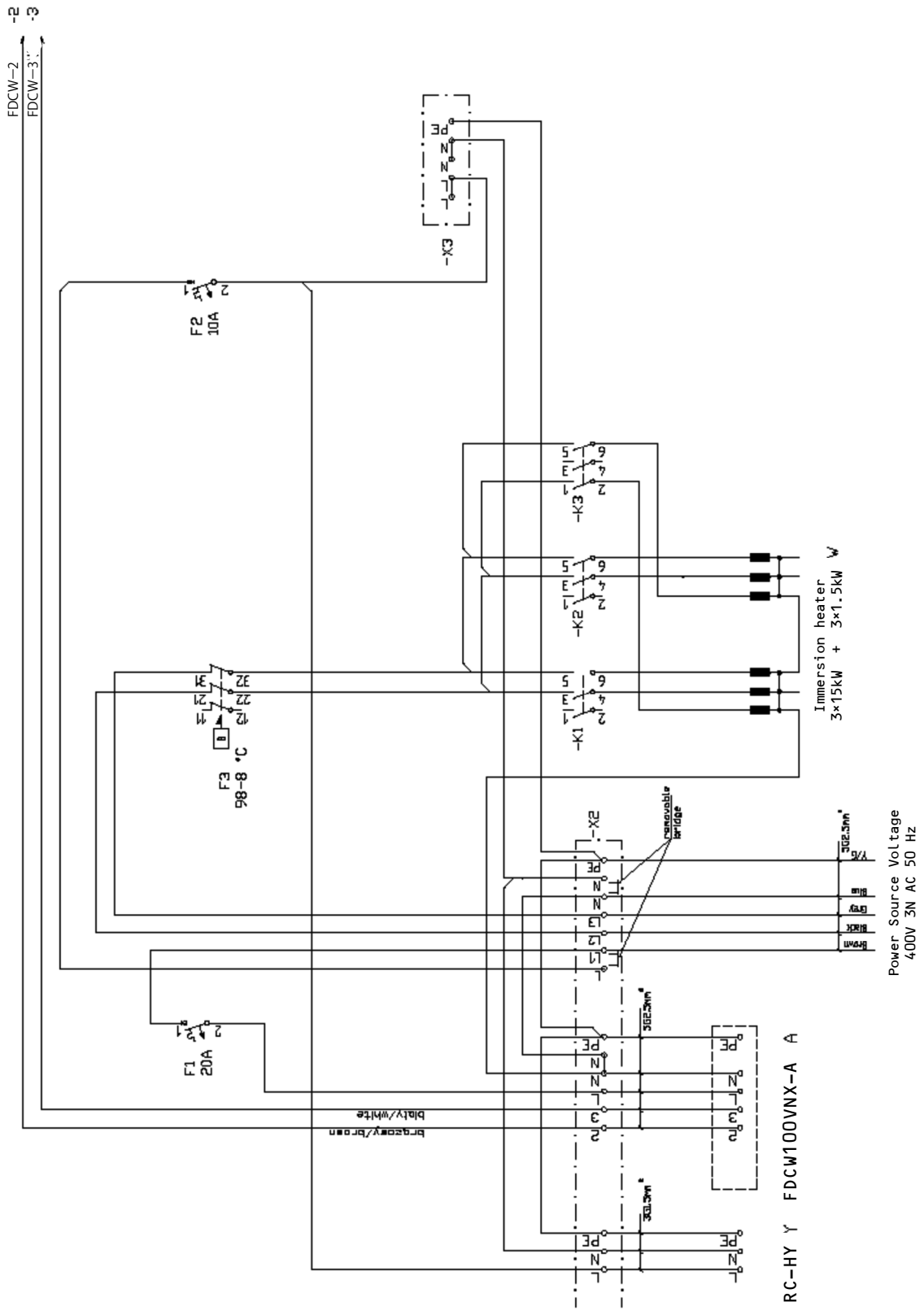
HMK60 - sheet 2



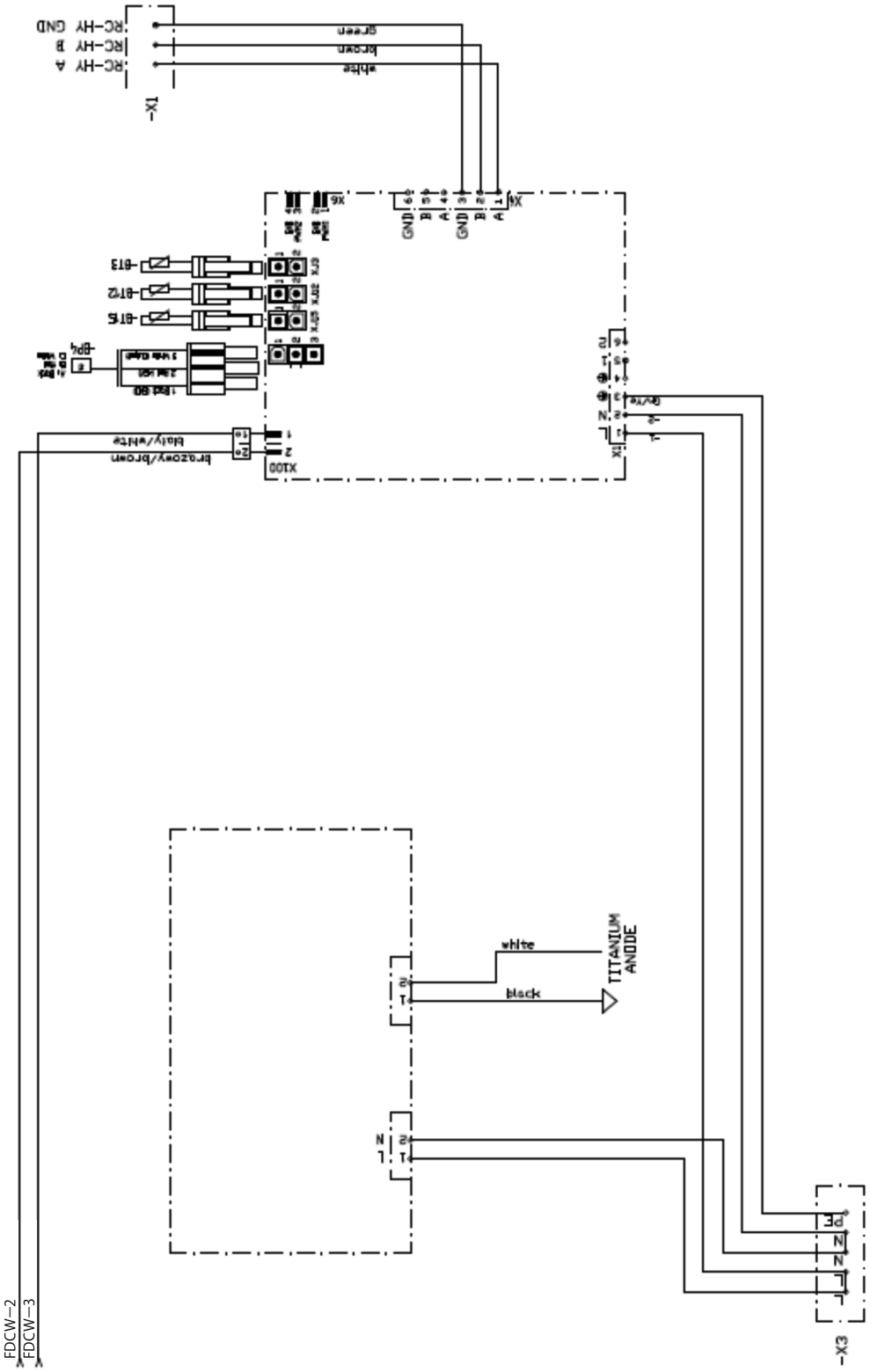
HMK60 - sheet 3



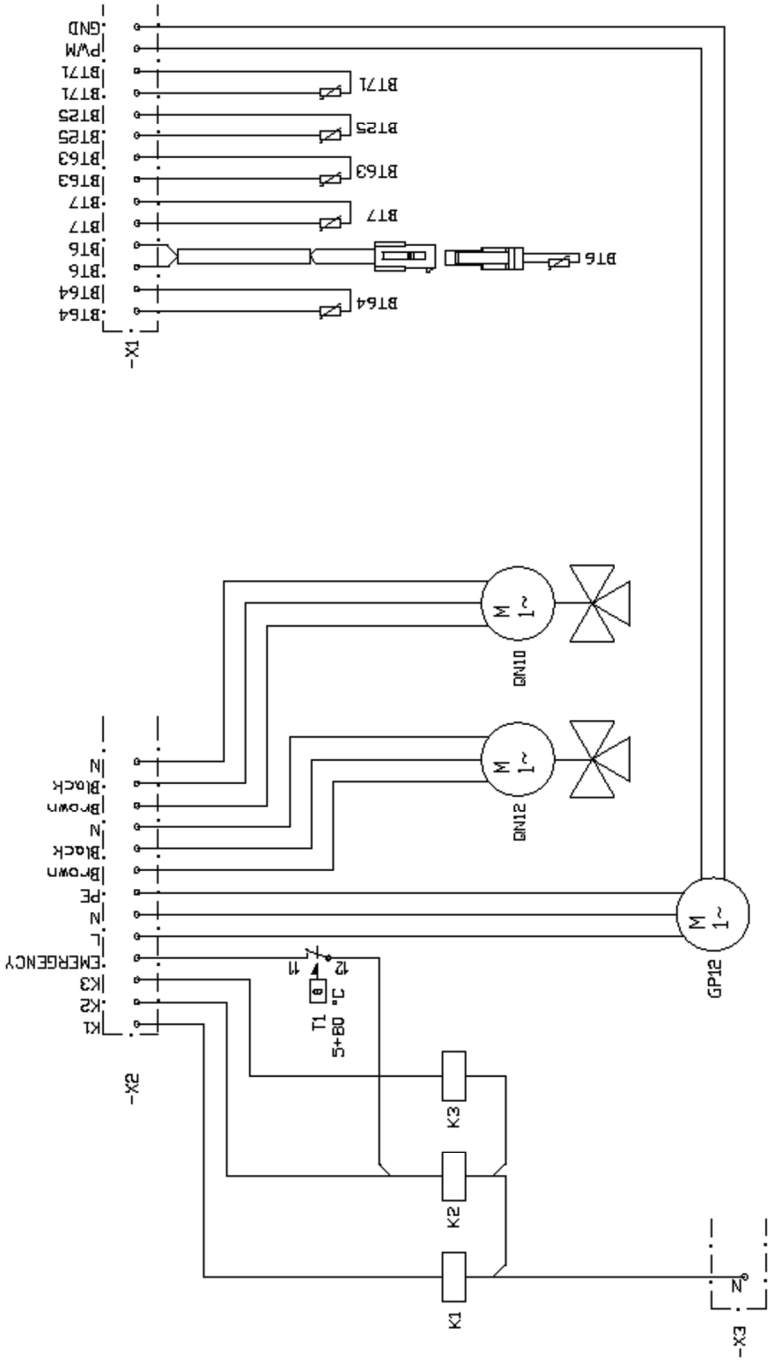
HMK100 - sheet 1



HMK100 - sheet 2

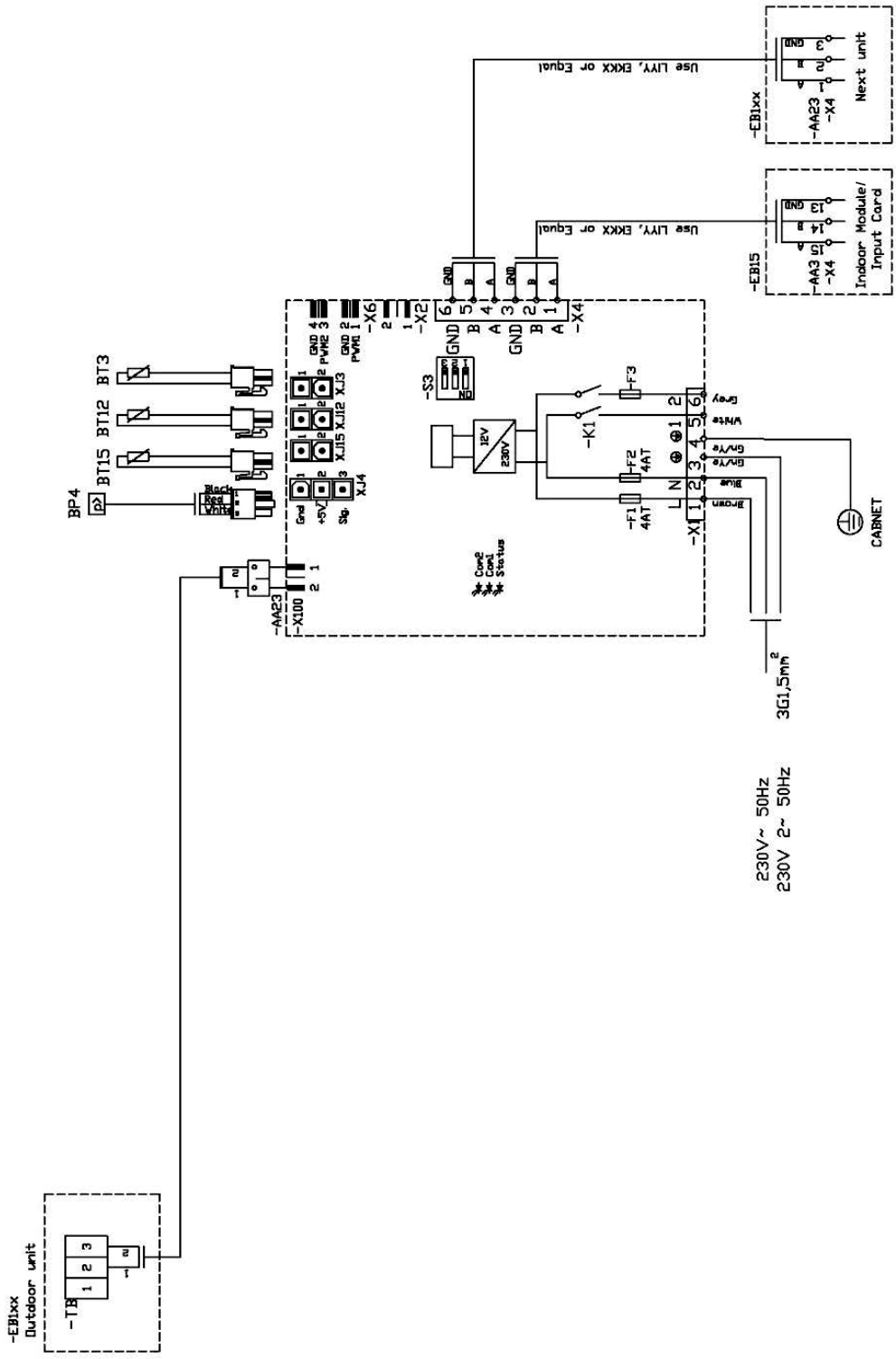


HMK100 - sheet 3

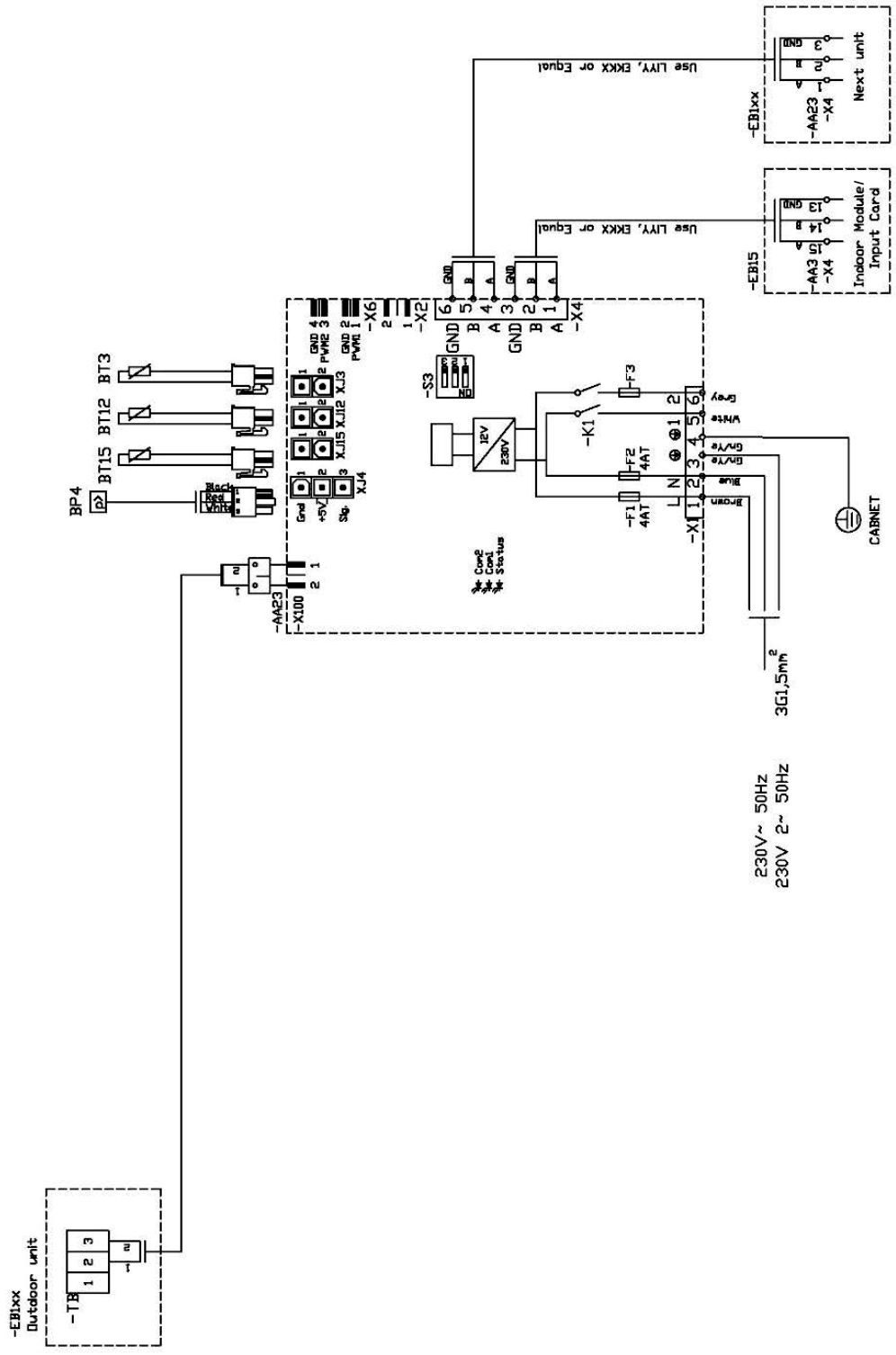


Split box

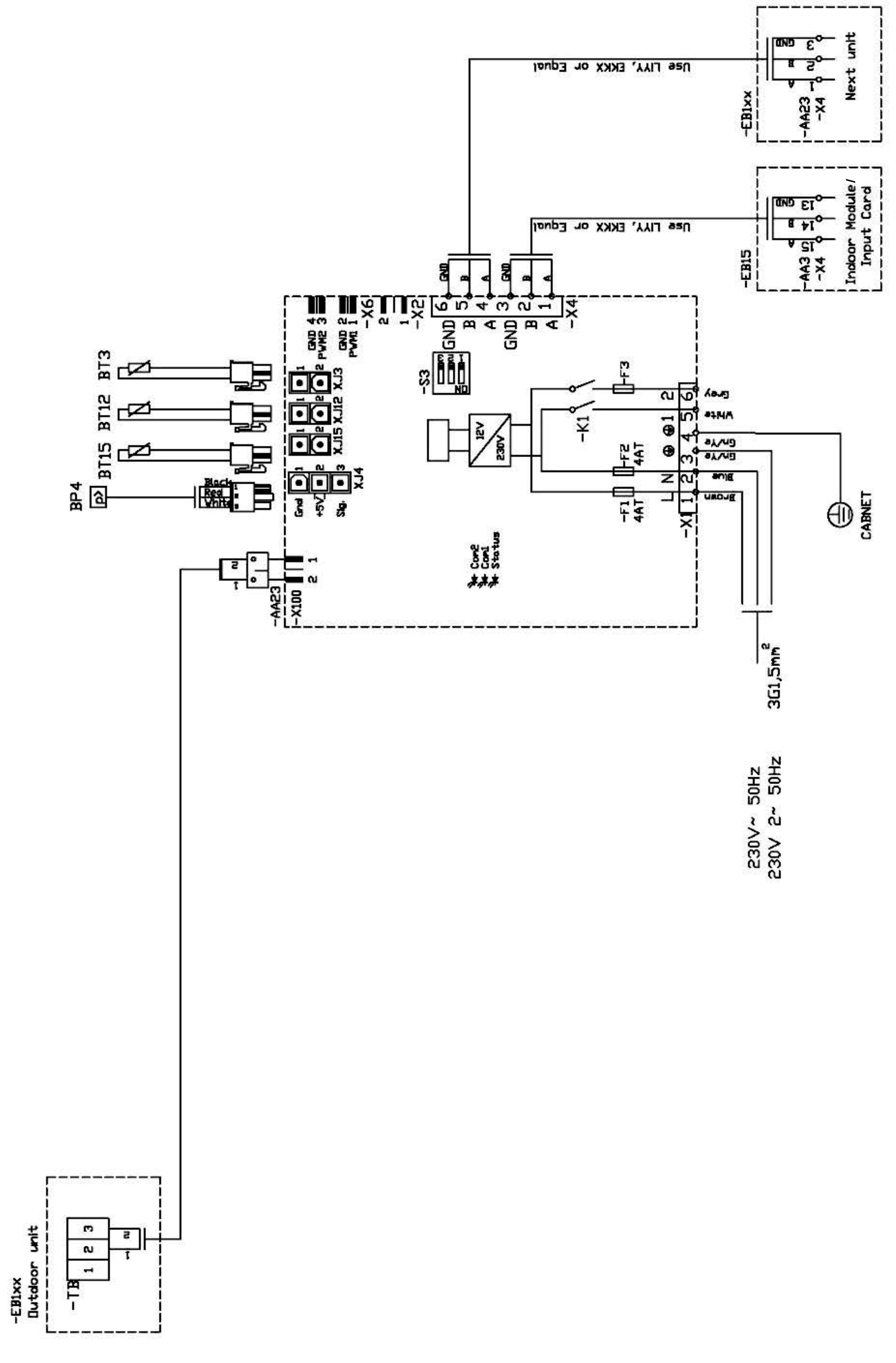
HSB60



HSB100

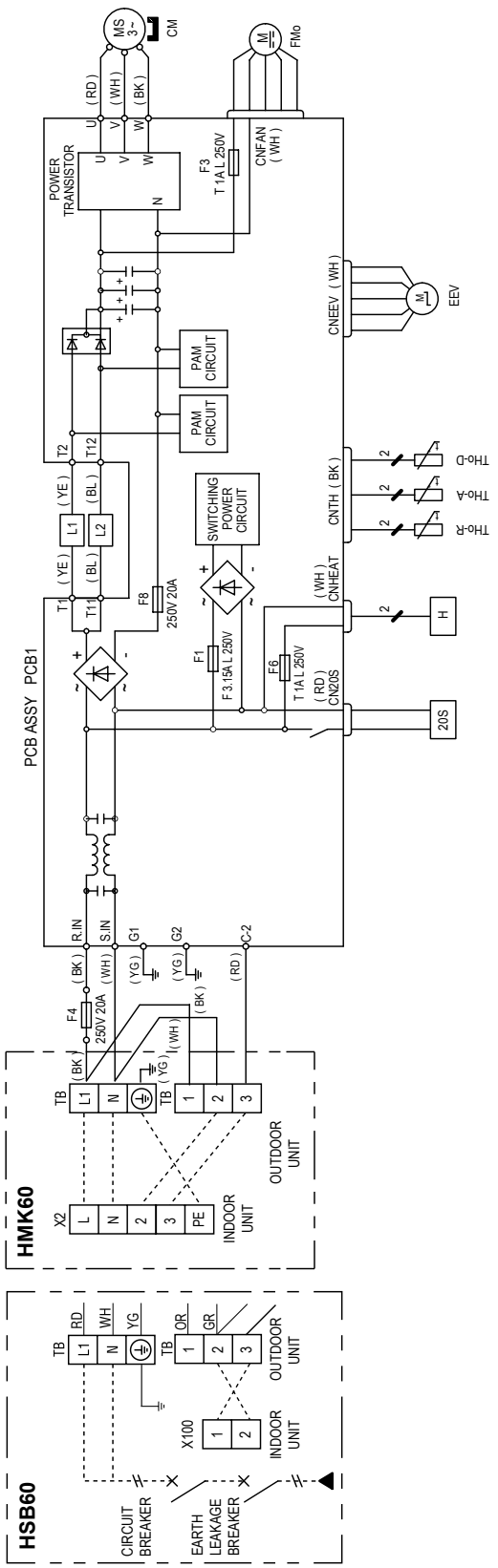

-EB1xx
Outdoor unit
-TB
-AA23
-X100
-X6
-X2
-X4
-S3
-K1
-F3
-F2
4AT
-F1
4AT
-X1
BT3
BT12
BT15
BP4
X.J3
X.J12
X.J15
X.J4
12V
230V
Use LIYY, EKKX or Equal
-EB1xx
-AA23
-X4
Next unit
-EB15
-AA3
-X4
Indoor Module/
Input Card
CABNET
3G1,5mm²
230V~ 50Hz
230V 2~ 50Hz

HSB140


Use LIYY, EKKX or Equal
Use LIYY, EKKX or Equal
Next unit
Indoor Module/
Input Card
-EB15
-EB1xx
BT3
BT12
BT15
BP4
CABNET
3G1,5mm²
230V~ 50Hz
230V 2~ 50Hz
-EB1xx
Outdoor unit

Outdoor unit

FDCW60VNX-A



Meaning of marks

Item	Description
20S	Solenoid coil for 4-way valve
CN20S CNEEV CNFAN CNTH CNHEAT	Connector
CM	Compressor motor
EEV	Electric expansion valve (coil)
FMo	Fan motor
H	Heater
L1,2	Reactor
THo-R	Heat exchanger sensor
THo-A	Outdoor air temperature sensor
THo-D	Discharge pipe temperature sensor

Color marks

Mark	Color
BK	Black
BL	Blue
RD	Red
WH	White
YE	Yellow
YG	Yellow/Green

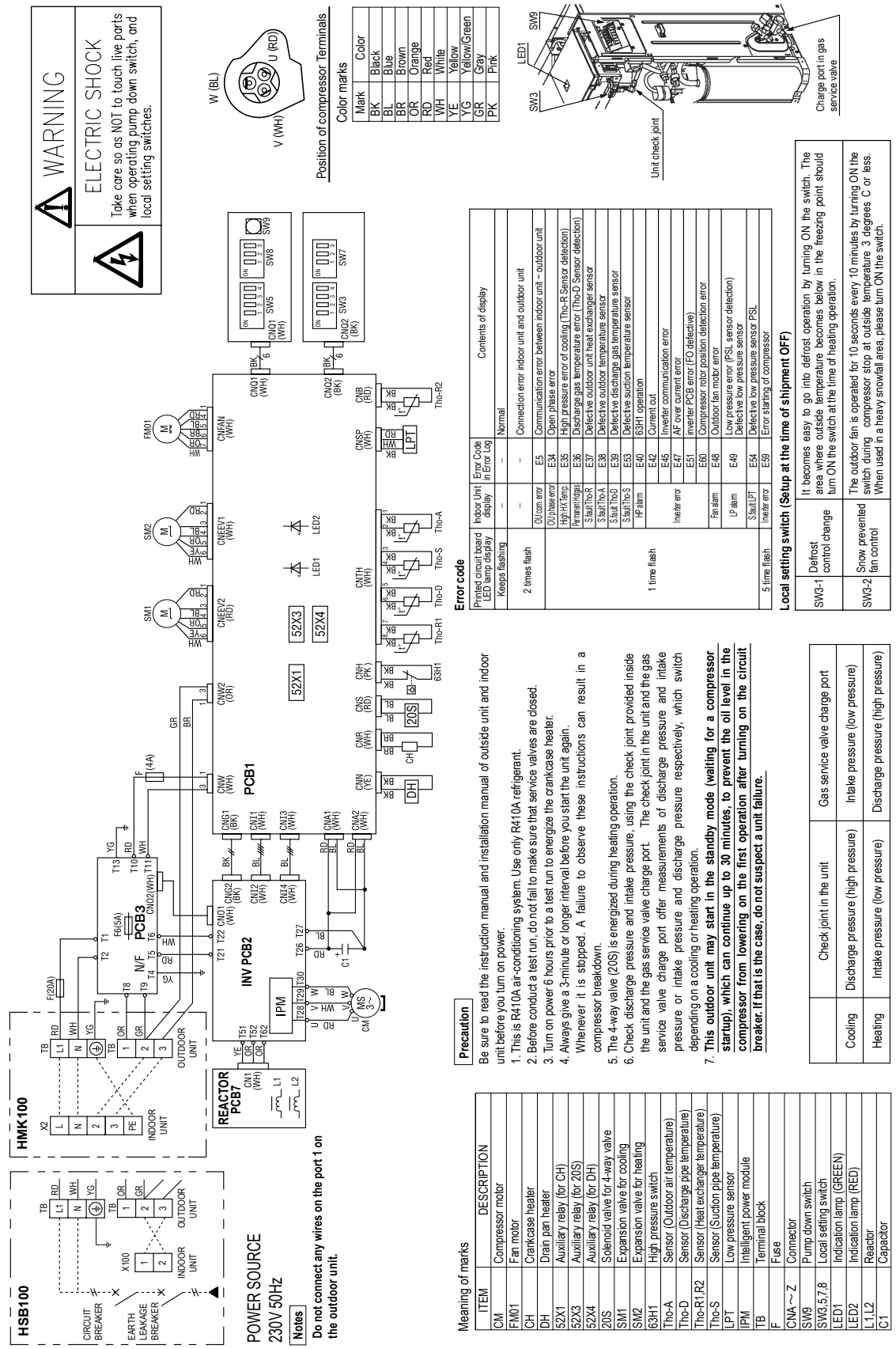
Power cable, indoor–outdoor connecting wires

Model name	MAX running current (A)	Power cable wire size x number*	Power cable length (m)	Connecting cable wire size x number*
FDCW60VNX-A	15	2.0mm² x 3	13	1.5mm² x 3

* The wire numbers include Earth wire (Yellow/Green).
• Switchgear or Circuit breaker capacity should be chosen according to national or regional electricity regulations.
• The power cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the national or regional electricity regulations.

Electrical circuit diagram

FDCW 71VNX-A



Precaution

Be sure to read the instruction manual and installation manual of outside unit and indoor unit before you turn on power.

1. This is R410A air-conditioning system. Use only R410A refrigerant.
2. Before conduct a test run, do not fail to make sure that service valves are closed.
3. Turn on power 6 hours prior to a test run to energize the crankcase heater.
4. Always give a 3-minute or longer interval before you start the unit again.
   Whenever it is stopped. A failure to observe these instructions can result in a compressor breakdown.
5. The 4-way valve (20S) is energized during heating operation.
6. Check discharge pressure and intake pressure, using the check joint provided inside the unit and the gas service valve charge port. The check joint in the unit and the gas service valve charge port offer measurements of discharge pressure and intake pressure or intake pressure and discharge pressure respectively, which switch depending on a cooling or heating operation.
7. **This outdoor unit may start in the standby mode (waiting for a compressor start up), which can continue up to 30 minutes, to prevent the oil level in the compressor from lowering on the first operation after turning on the circuit breaker. If that is the case, do not suspect a unit failure.**

	Check joint in the unit	Gas service valve charge port
Cooling	Discharge pressure (high pressure)	Intake pressure (low pressure)
Heating	Intake pressure (low pressure)	Discharge pressure (high pressure)

Meaning of marks

ITEM	DESCRIPTION
CM	Compressor motor
FM01	Fan motor
CH	Crankcase heater
DH	Drain pan heater
52X1	Auxiliary relay (for CH)
52X3	Auxiliary relay (for 20S)
52X4	Auxiliary relay (for DH)
20S	Solenoid valve for 4-way valve
SM1	Expansion valve for cooling
SM2	Expansion valve for heating
63H1	High pressure switch
Tho-A	Sensor (Outdoor air temperature)
Tho-D	Sensor (Discharge pipe temperature)
Tho-R1,R2	Sensor (Heat exchanger temperature)
Tho-S	Sensor (Suction pipe temperature)
LPT	Low pressure sensor
IPM	Intelligent power module
TB	Terminal block
F	Fuse
CNA～Z	Connector
SW9	Pump down switch
SW3,5,7,8	Local setting switch
LED1	Indication lamp (GREEN)
LED2	Indication lamp (RED)
L1,L2	Reactor
C1	Capacitor

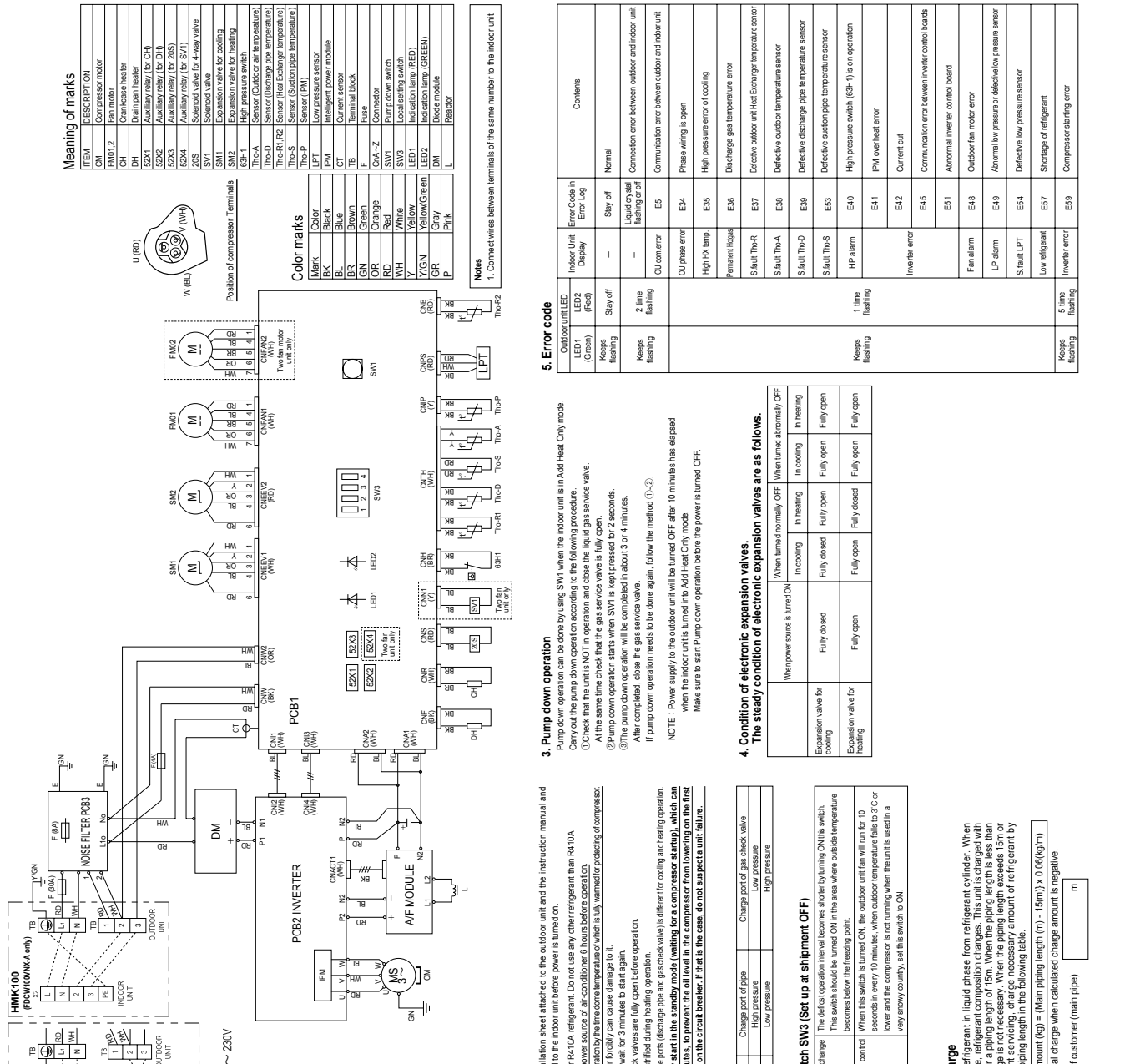
Error code

Printed circuit board LED lamp display	Indoor Unit display	Error Code in Error Log	Contents of display
Keeps flashing	–	–	Normal
2 times flash	–	–	Connection error indoor unit and outdoor unit
	OU com. error	E5	Communication error between indoor unit - outdoor unit
	OU phase error	E34	Open phase error
	High P/X Temp.	E35	High pressure error of cooling (Tho-R Sensor detection)
	Permanent stops	E36	Discharge gas temperature error (Tho-D Sensor detection)
	S.fault Tho-R	E37	Defective outdoor unit heat exchanger sensor
	S.fault Tho-A	E38	Defective outdoor temperature sensor
	S.fault Tho-D	E39	Defective discharge gas temperature sensor
	S.fault Tho-S	E53	Defective suction temperature sensor
	HP alarm	E40	63H1 operation
1 time flash		E42	Current cut
		E45	Inverter communication error
	Inverter error	E47	AF over current error
		E51	inverter PCB error (FO defective)
		E60	Compressor rotor position detection error
	Fan alarm	E48	Outdoor fan motor error
	LP alarm	E49	Low pressure error (PSL sensor detection)
			Defective low pressure sensor
	S.fault LPT	E54	Defective low pressure sensor PSL
5 time flash	Inverter error	E59	Error starting of compressor

Local setting switch (Setup at the time of shipment OFF)

SW3-1	Defrost control change	It becomes easy to go into defrost operation by turning ON the switch. The area where outside temperature becomes below in the freezing point should turn ON the switch at the time of heating operation.
SW3-2	Snow prevented fan control	The outdoor fan is operated for 10 seconds every 10 minutes by turning ON the switch during compressor stop at outside temperature 3 degrees C or less. When used in a heavy snowfall area, please turn ON the switch.

FDCW 100VNX-A, 140VNX-A



Precaution

Be sure to read the installation sheet attached to the outdoor unit and the instruction manual and installation sheet attached to the indoor unit before power is turned on.

1. This unit is designed for R410A refrigerant. Do not use any other refrigerant than R410A.
2. Be sure to turn on the power source of air-conditioner 6 hours before operation.
   This units NOT under operation by the time dome temperature of which is fully warmed for protecting of compressor.
   Starting the compressor forcibly can cause damage to it.
3. When operation stops, wait for 3 minutes to start again.
4. Reconfirm that the check valves are fully open before operation.
5. The 4-way valve is electrified during heating operation.
6. Detected pressure of otage ports (discharge pipe and gas check valve) is different for cooling and heating operation.
7. **This outdoor unit may start in the standby mode (waiting for a compressor startup), which can continue up to 30 minutes, to prevent the oil level in the compressor from lowering on the first operation after turning on the circuit breaker. If that is the case, do not suspect a unit failure.**

	Charge port of pipe	Charge port of gas check valve
Cooling operation	High pressure	Low pressure
Heating operation	Low pressure	High pressure

1. local setting switch SW3 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrost operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 10 seconds in every 10 minutes, when outdoor temperature falls to 3˚C or lower and the compressor is not running when the unit is used in a very snowy country, set this switch to ON.

2. Refrigerant charge

* Be sure to charge refrigerant in liquid phase from refrigerant cylinder. When charging in gas phase, refrigerant composition changes and the unit is charged with wrong refrigerant. For a piping length of 15m, When the piping length is less than 15m, additional charge is not necessary. When the piping length exceeds 15m or re-charge refrigerant servicing, charge necessary amount of refrigerant by calculating from the piping length in the following table.

Additional charge amount (kg) = (Main piping length (m) - 15(m)) x 0.06(kg/m)

* No need of additional charge when calculated charge amount is negative.

Piping length of customer (main pipe) ____ m

3. Pump down operation

Pump down operation can be done by using SW1 when the indoor unit is in Add Heat Only mode.
Carry out the pump down operation according to the following procedure.
①Check that the unit is NOT in operation and close the liquid gas service valve.
At the same time check that the gas service valve is fully open.
②Pump down operation starts when SW1 is kept pressed for 2 seconds.
③The pump down operation will be completed in about 3 or 4 minutes.
After completed, close the gas service valve.
If pump down operation needs to be done again, follow the method ①-②.

NOTE : Power supply to the outdoor unit will be turned OFF after 10 minutes has elapsed when the indoor unit is turned into Add Heat Only mode.
Make sure to start Pump down operation before the power is turned OFF.

4. Condition of electronic expansion valves.
The steady condition of electronic expansion valves are as follows.

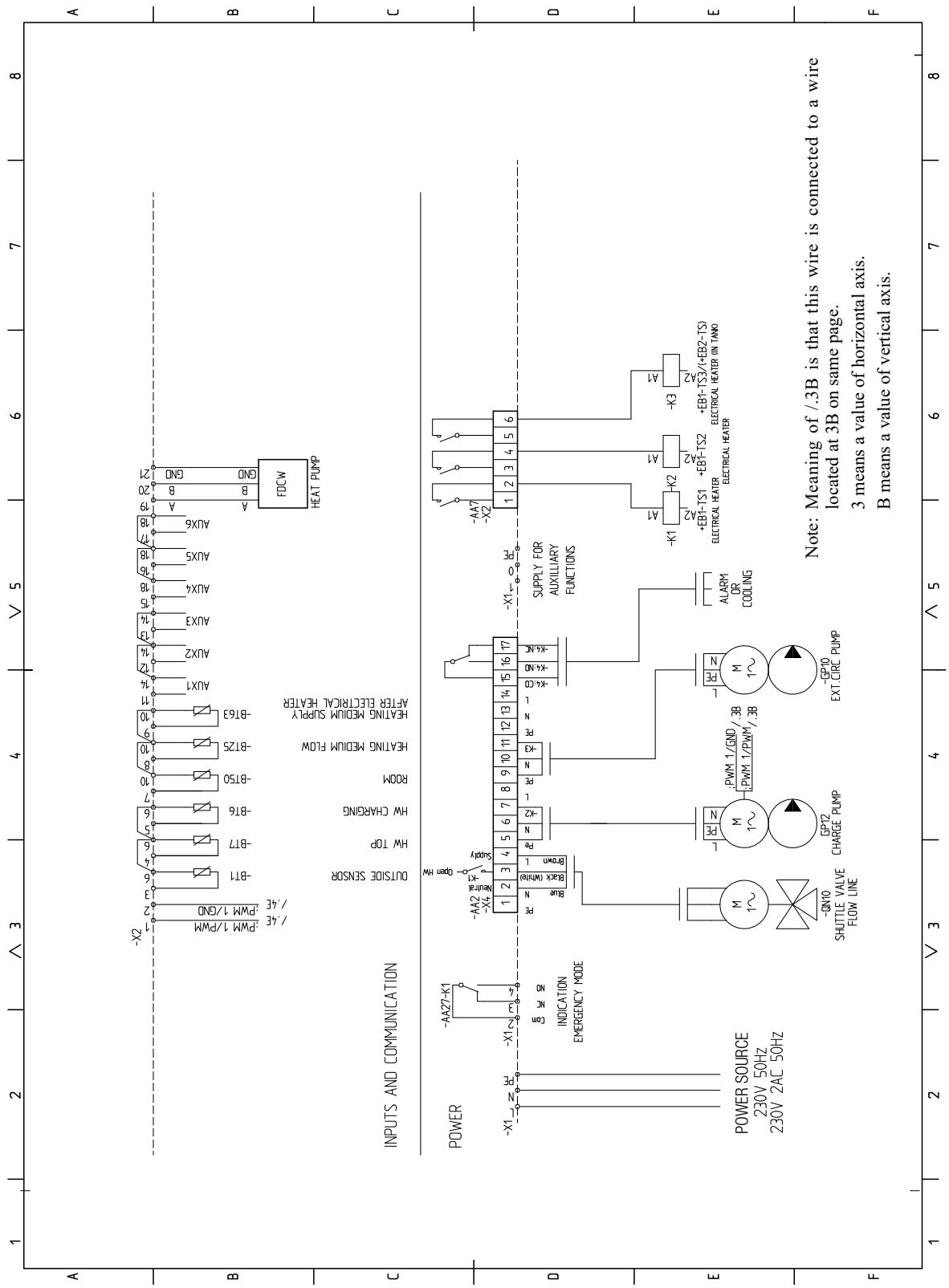
	When power source is turned ON		When turned normally OFF		When turned abnormally OFF	
			In cooling	In heating	In cooling	In heating
Expansion valve for cooling	Fully closed		Fully closed	Fully open	Fully open	Fully open
Expansion valve for heating	Fully open		Fully open	Fully closed	Fully open	Fully open

5. Error code

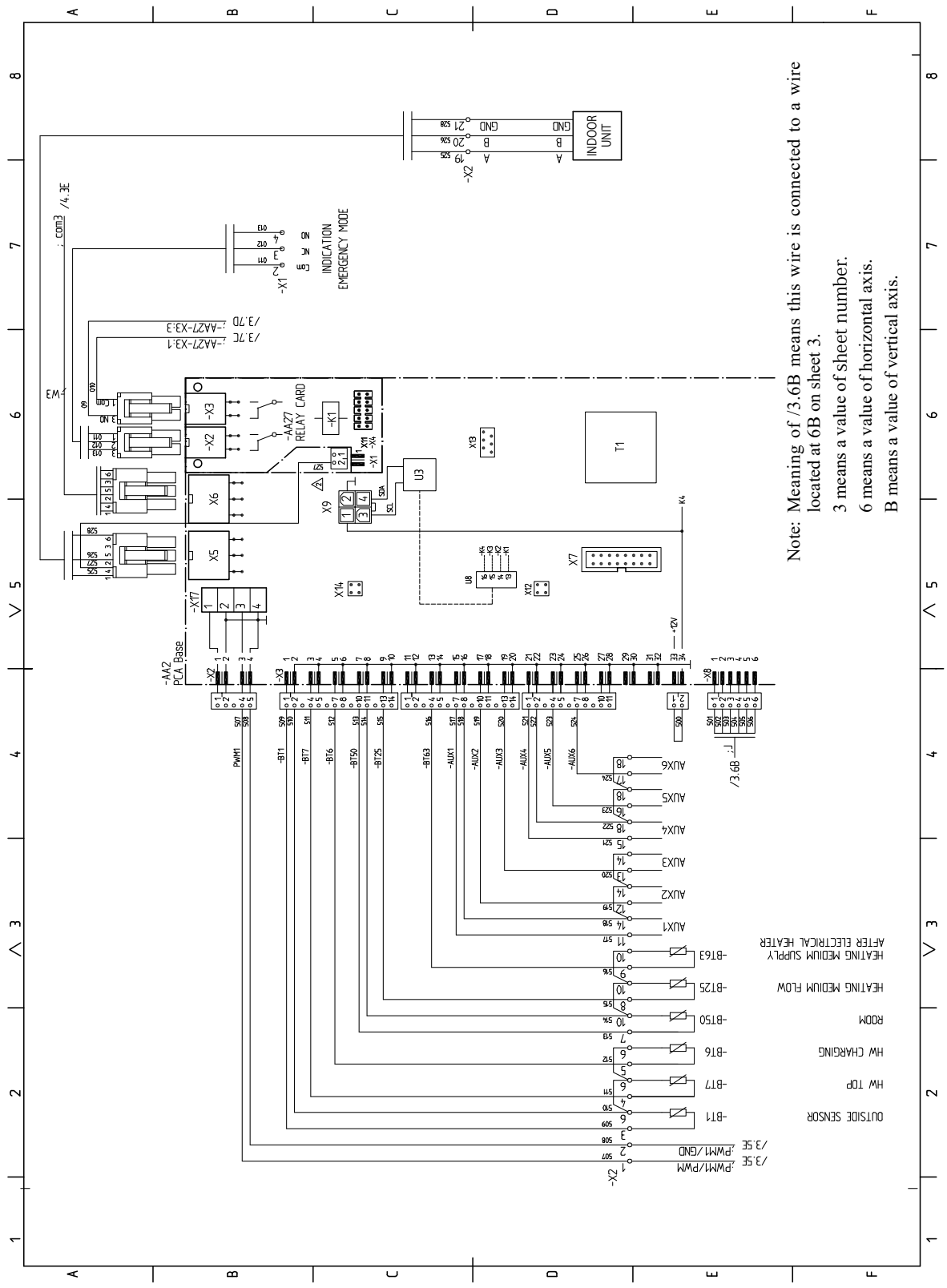
Outdoor unit LED		Indoor Unit Display	Error Code in Error Log	Contents
LED1 (Green)	LED2 (Red)			
Keeps flashing	Stays off	—	Stay off	Normal
Keeps flashing	2 time flashing	—	Liquid crystal flashing or off	Connection error between outdoor and indoor unit
		OU com.error	E5	Communication error between outdoor and indoor unit
		OU phase error	E34	Phase wiring is open
		High HX temp.	E35	High pressure error of cooling
		Permanent Hdgas	E36	Discharge gas temperature error
		S.fault Tho-R	E37	Defective outdoor unit Heat Exchanger temperature sensor
		S.fault Tho-A	E38	Defective outdoor temperature sensor
		S.fault Tho-D	E39	Defective discharge pipe temperature sensor
		S.fault Tho-S	E53	Defective suction pipe temperature sensor
Keeps flashing	1 time flashing	HP alarm	E40	High pressure switch (63H1) is on operation
		Inverter error	E41	IPM overheat error
			E42	Current cut
			E45	Communication error between inverter control boards
			E51	Abnormal inverter control board
		Fan alarm	E48	Outdoor fan motor error
		LP alarm	E49	Abnormal low pressure or defective low pressure sensor
		S.fault LPT	E54	Defective low pressure sensor
		Low refrigerant	E57	Shortage of refrigerant
Keeps flashing	5 time flashing	Inverter error	E59	Compressor starting error

Controller

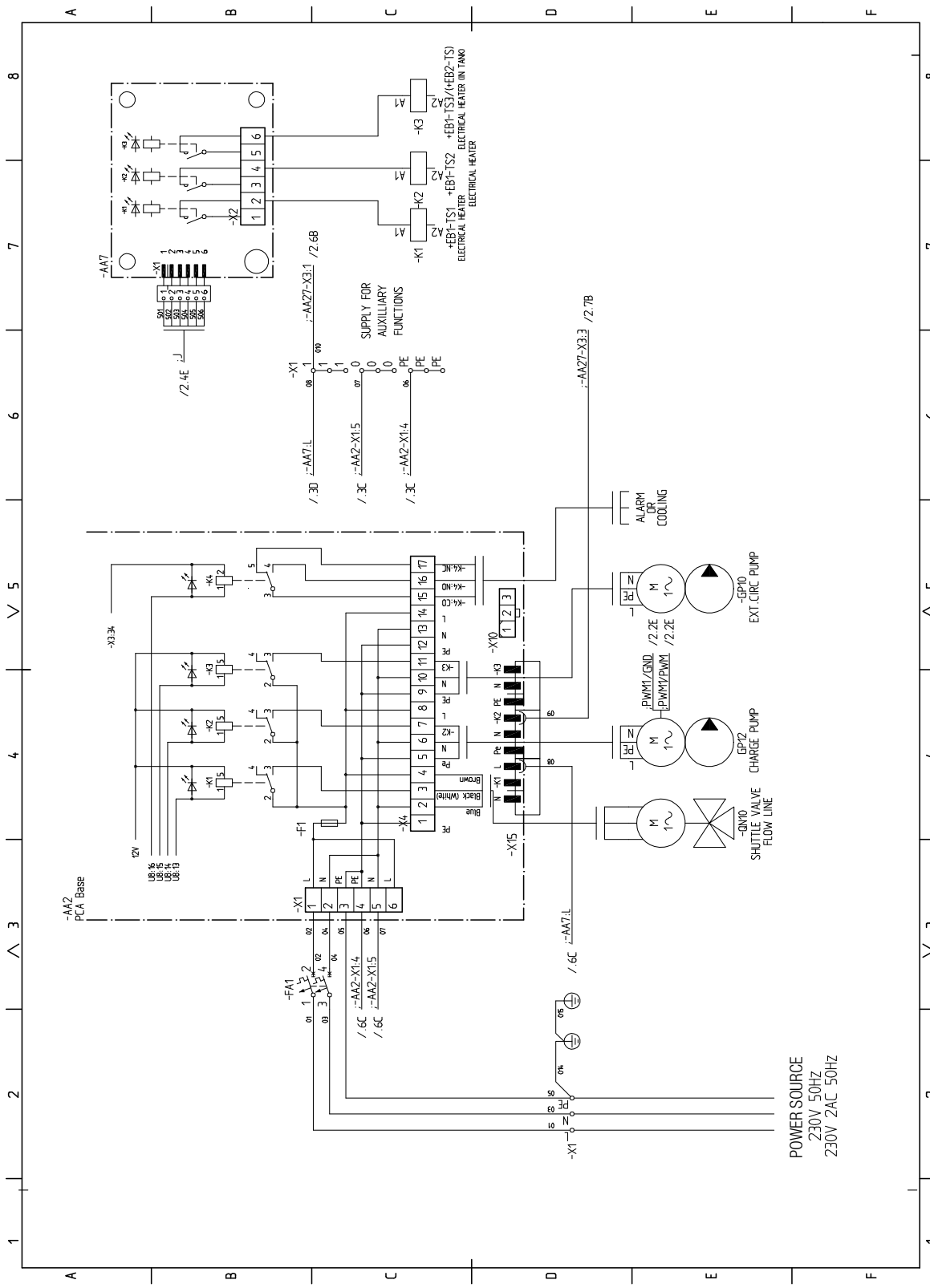
RC-HY20 - sheet 1



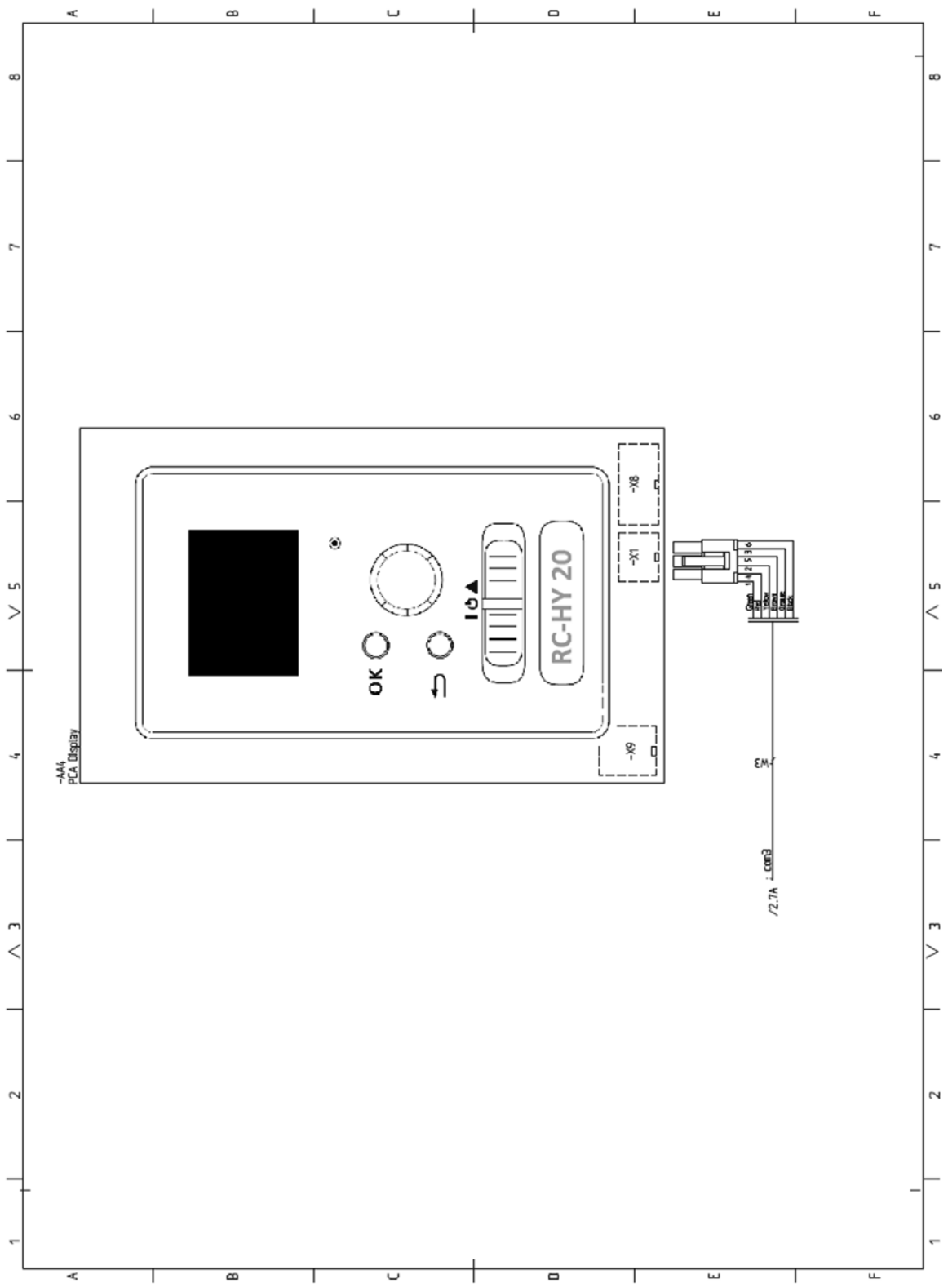
RC-HY20 - sheet 2



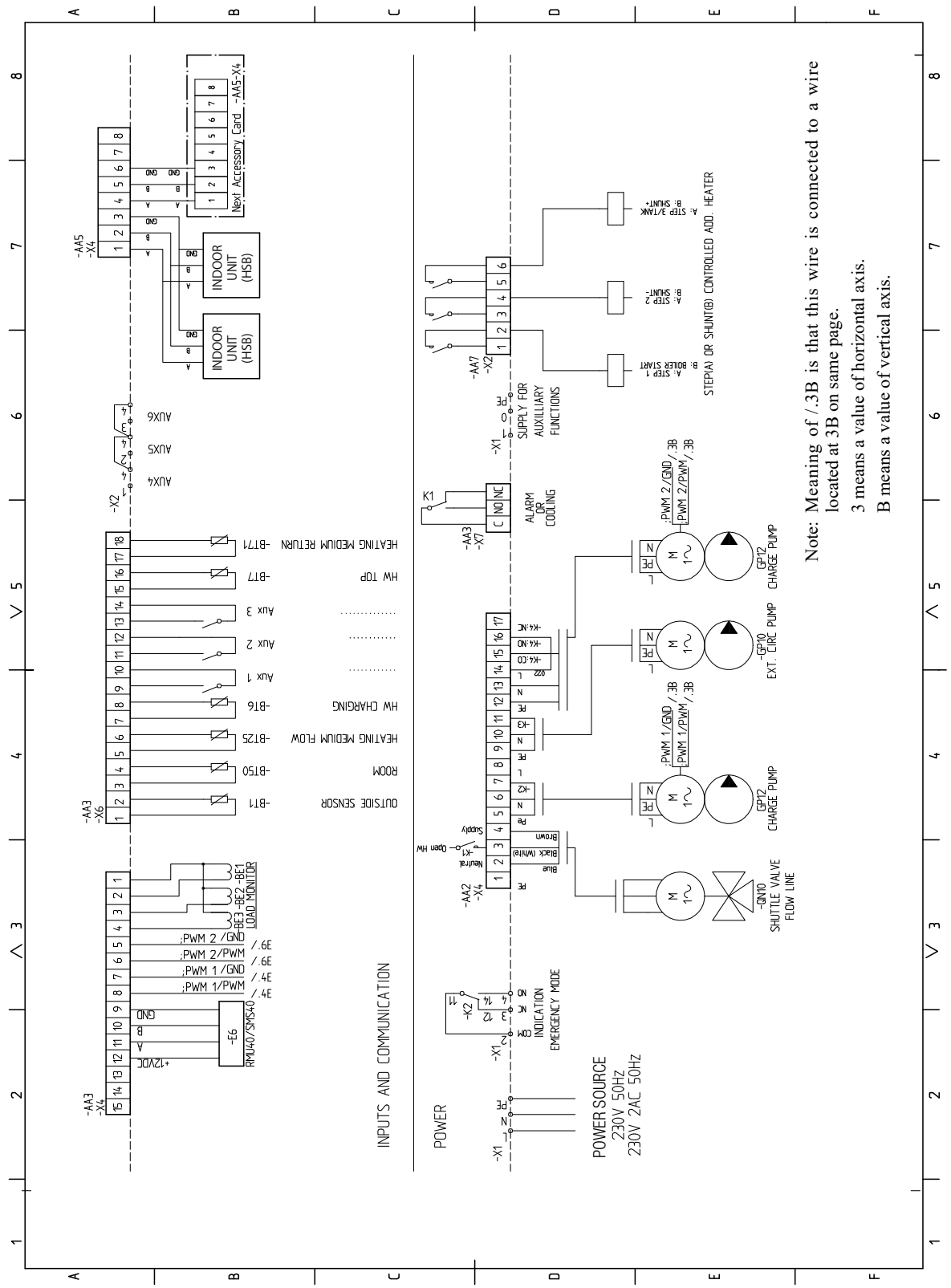
RC-HY20 - sheet 3



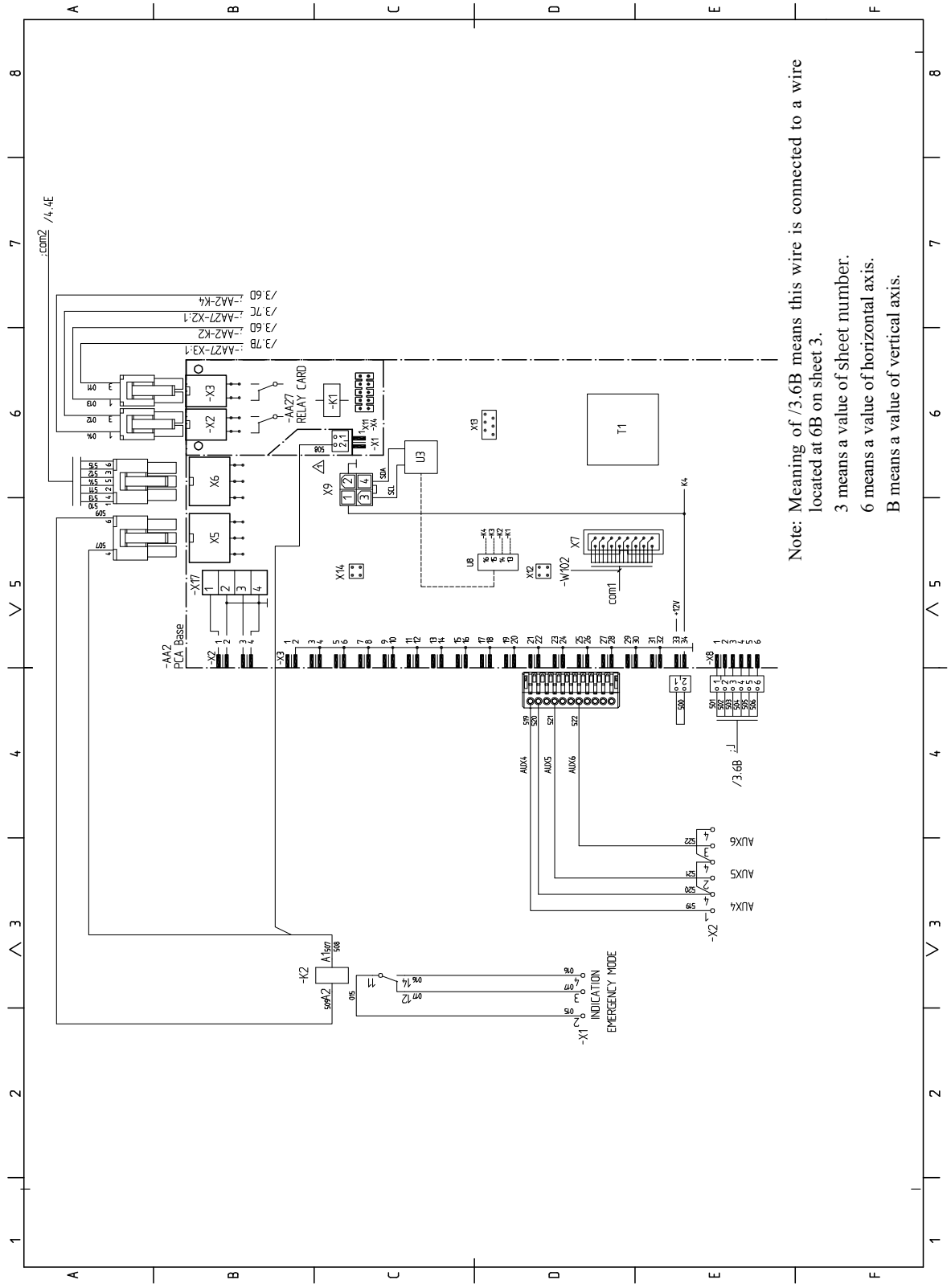
RC-HY20 - sheet 4



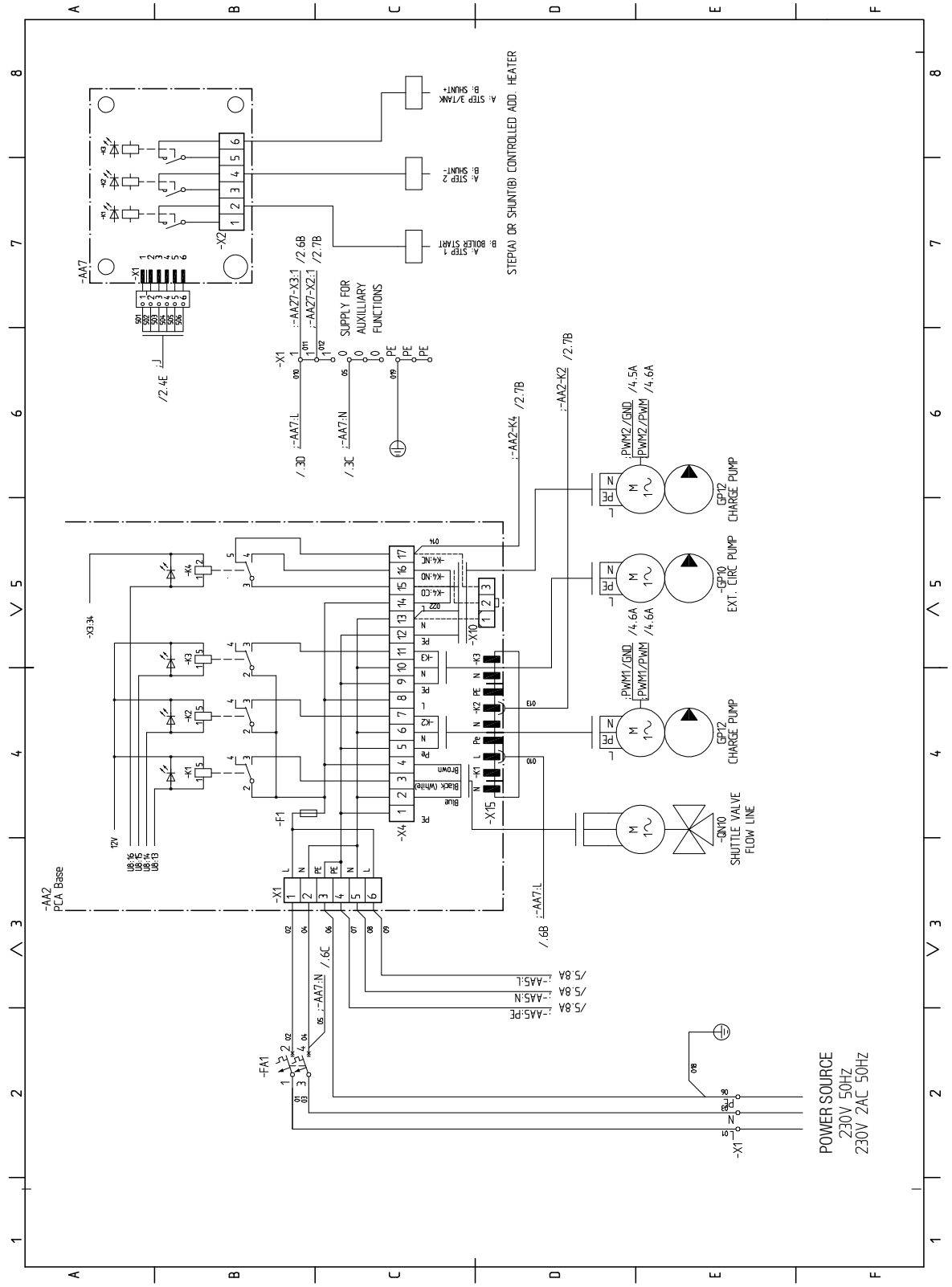
RC-HY40- sheet 1



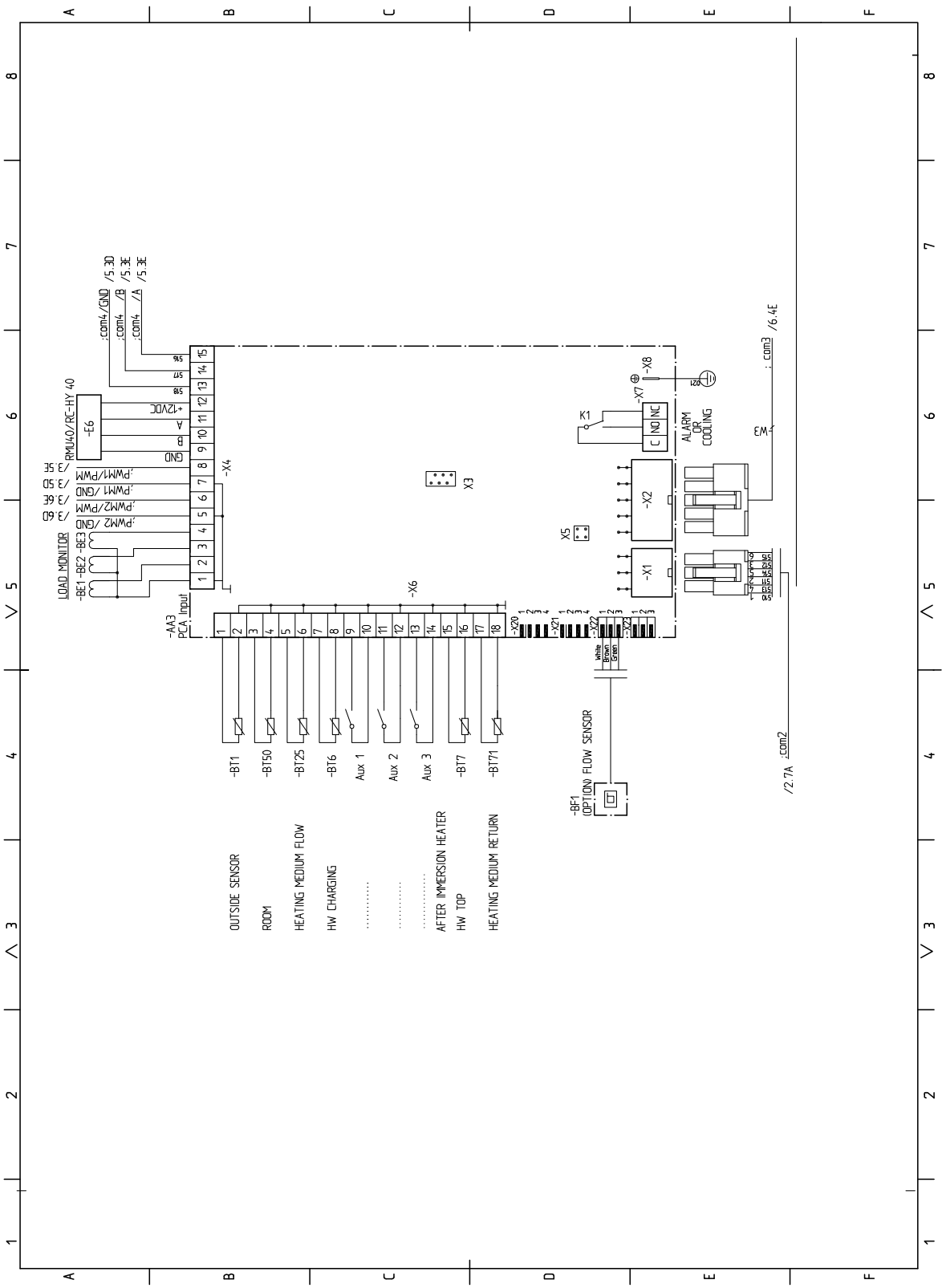
RC-HY40- sheet 2



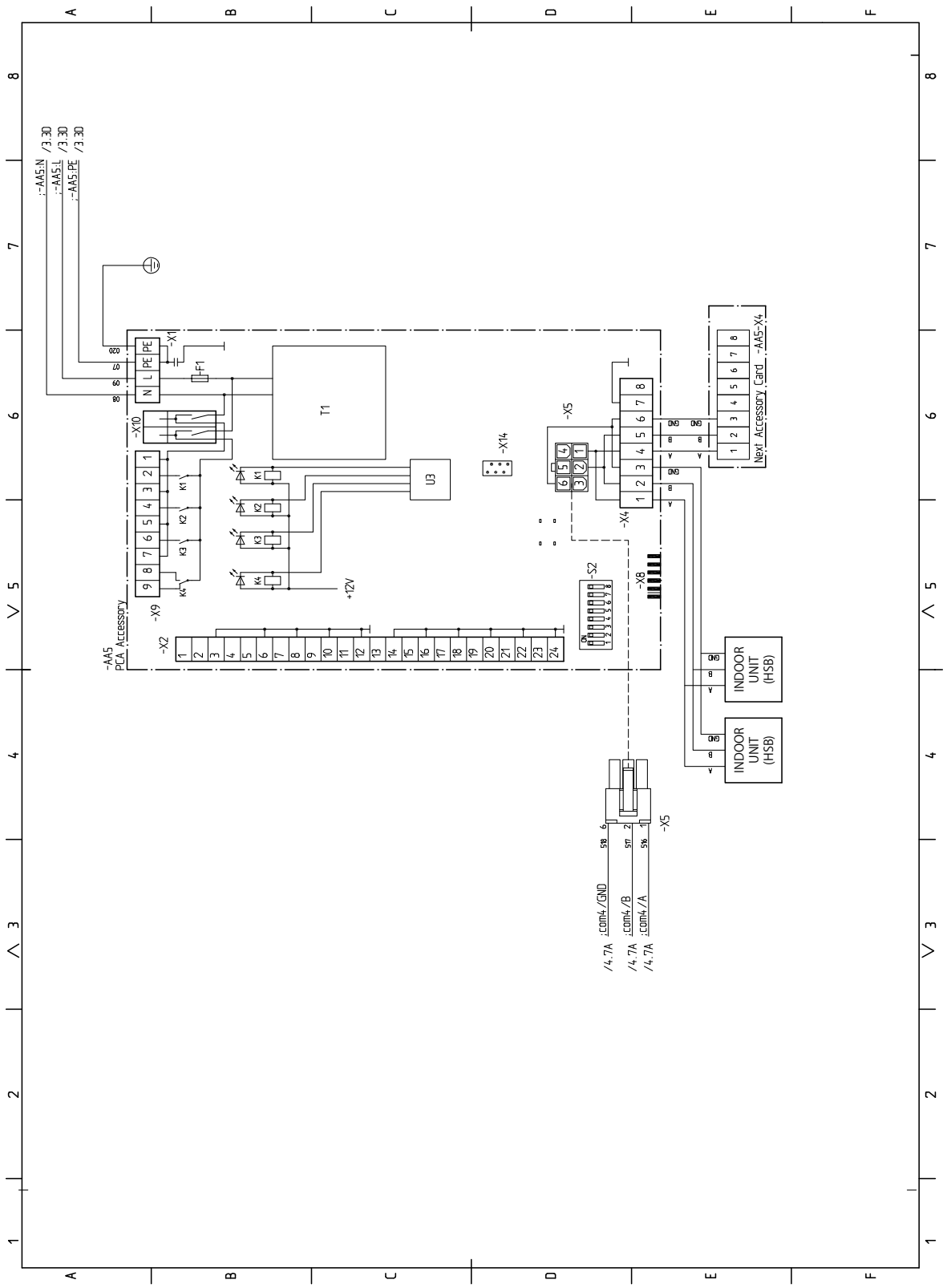
RC-HY40- sheet 3



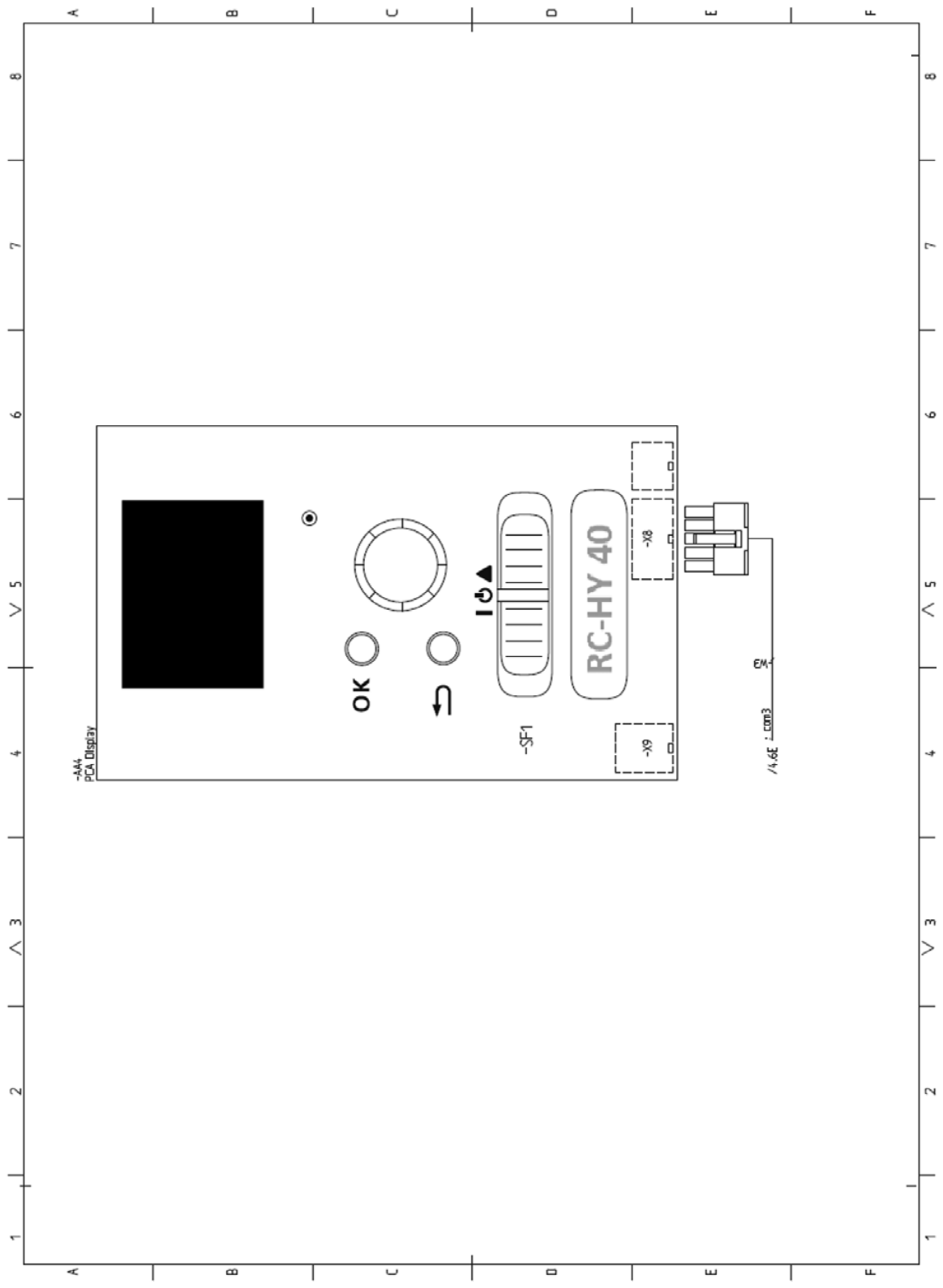
RC-HY40- sheet 4



RC-HY40- sheet 5



RC-HY40- sheet 6



For Home Owners

General

Hydrolution is a system for heating, cooling and producing hot water for small houses. The system consists of an outdoor unit, which utilises the energy in the outdoor air and sends it to the indoor unit, which takes care of the regulation and heat distribution in the house. In order to get the best benefi t from the system Hydrolution you should read through the User's Manual.
Hydrolution is a quality system offering a long service life and reliable operation.

NOTE

This Product contains fl uorinated greenhouse gases.
Do not vent R410A into the atmosphere: R410A is a fluorinated greenhouse gas with a Global Warming Potential (GWP) = 2088.
Refer to a label on outdoor unit for the weight of fluorinated greenhouse gas and CO_2 equivalent.

RC-HY20/40 – An excellent choice

RC-HY20/40 is an electric control module, which has been introduced to supply your home with inexpensive and environmentally friendly heating. Heat production is reliable and economical with a MTH air/water heat pump and indoor units.

An additional heater (for example electric/oil/gas boiler) can engage automatically if something unexpected should occur or as reserve operation.

Excellent properties for RC-HY20/40:

■ Easy to read display

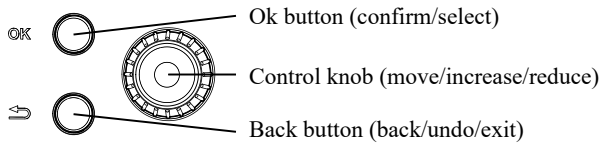
The control module has an easy-to-read colour display with easy-to-understand menus that facilitate setting a comfortable indoor climate.

■ Checks all of your installation

RC-HY20/40 is installed together with one or more compatible MTH air/water heat pumps. The control module is connected to the heat pumps which means that all important settings can be made in RC-HY20/40. RC-HY20/40 can control the whole heating installation and support many accessory functions.

Quick guide

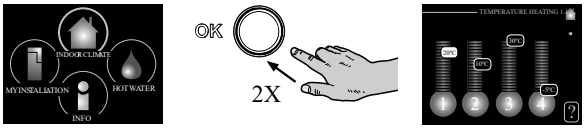
Navigation



A detailed explanation of the button functions can be found on page 63.

How to scroll through menus and make different settings is described on page 65.

Set the indoor climate



The mode for setting the indoor temperature is accessed by pressing the OK button twice, when in the start mode in the main menu. Read more about the settings on page 68.

Increase hot water volume

To temporarily increase the amount of hot water (if a hot water heater is installed to your RC-HY20/40), first turn the control knob to mark menu 2 (water droplet) and then press the OK button twice. Read more about the settings on page 76.

In event of disturbances in comfort

If a disturbance in comfort of any type occurs there are some measures that can be taken before you need to contact your installer. See page 91 for instructions.

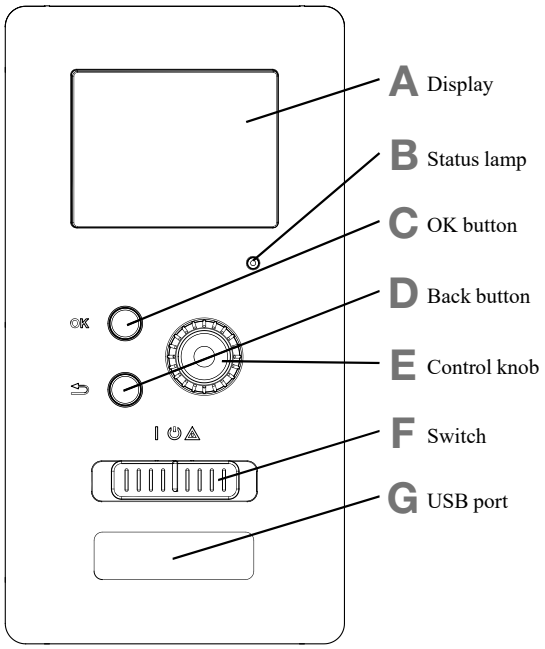
The control module – the heart of the house

Control module's function

RC-HY20/40 is a simple electrical control module, which, together with MTH air/water heat pump, accumulator/ water heater and additional heater (e.g. electric/oil/gas boiler), creates a complete installation. Among other things, it controls the heat pump, circulation pumps, reversing valves and additional heat to supply your home with inexpensive and environmentally friendly heating in the most efficient way.

Contact with RC-HY20/40

Display unit



There is a display unit on the front of the control module, which is used to communicate with RC-HY20/40. Here you:

- switch on, switch off or set the installation to emergency mode.
- set the indoor climate and hot water as well as adjust the installation to your needs.
- receive information about settings, status and events.
- see different types of alarms and receive instructions about how they are to be rectified.

A Display

Instructions, settings and operational information are shown on the display. The easy-to-read display and menu system, make it easy to navigate between various menus and options, set comfort and get the necessary information.

B Status lamp

The status lamp indicates the status of the control module. It:

- lights green during normal operation.
- lights yellow in emergency mode.
- lights red in the event of an alarm.

C OK button

The OK button is used to:

- confirm selections of sub-menus/options/set values/page in the start guide.

D Back button

The back button is used to:

- go back to the previous menu.
- change a setting that has not been confirmed.

E Control knob

The control knob can be turned to the right or left. You can:

- scroll in menus and between options.
- increase and decrease values.
- change pages in multiple page instructions

(for example help text and service info).

F Switch (SF1)

The switch shows three positions:

- On (|)
- Standby (⏻)
- Emergency mode (⚠)

Emergency mode must only be used in the event of a fault on the control module. In this mode, the compressor in the heat pump is turned off and the immersion heater is activate. The control module display is not illuminated and the status lamp lights yellow.

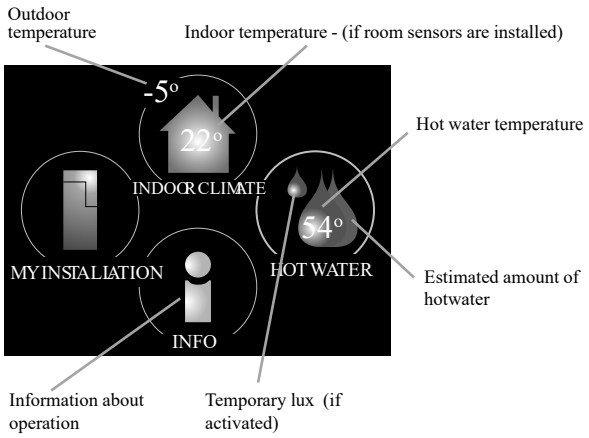
G USB port

The USB port is hidden behind the plastic badge of the product name.

The USB port is used to update the software.

Menu system

The menu system's four main menus are shown in the display as well as certain basic information.



Menu 1 - INDOOR CLIMATE

Setting and scheduling the indoor climate. See page 68.

Menu 2 - HOT WATER

Setting and scheduling hot water production. See page 76. This menu only appears if a water heater is installed in the system.

Menu 3 - INFO

Display of temperature and other operating information and access to the alarm log. See page 79.

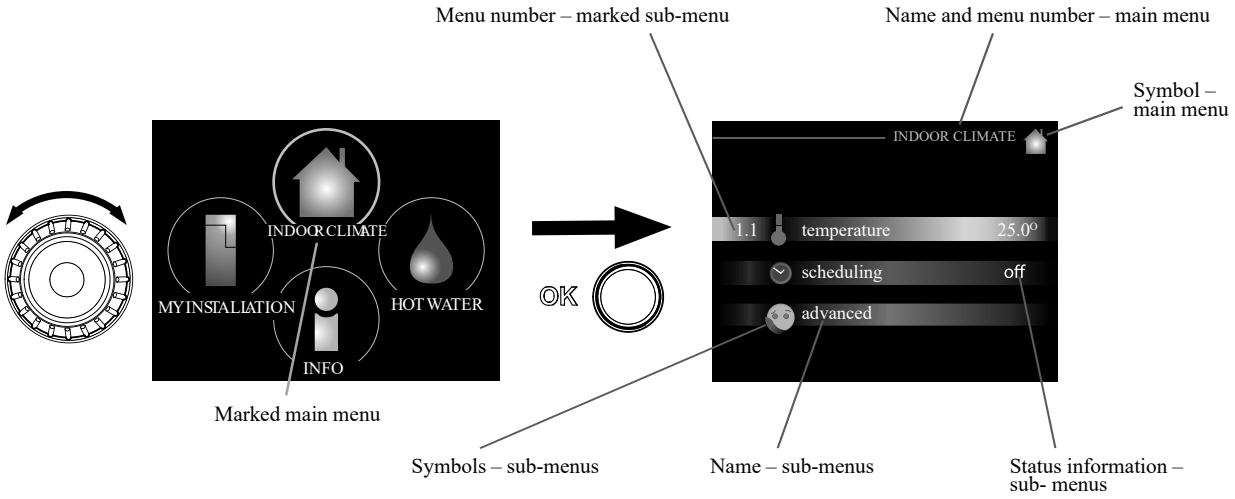
Menu 4 - MY INSTALATION

Setting time, date, language, display, operating mode etc. See information in the help menu or user manual.

Symbols in the display

The following symbols can appear in the display during operation.

Symbol	Description
	This symbol appears when there is information to be noticed in menu 3.1.
	These two symbols indicate whether the compressor in the outdoor unit or additional heat in the installation is blocked via controller. These functions will be blocked for example, when either of the operation mode is blocked in menu 4.2, when blocking of either function is scheduled in menu 4.9.5, or when an alarm for blocking the operation occurs.  Blocking the compressor.  Blocking additional heat.
	This symbol appears if periodic increase or lux mode for the hot water is activated.
	This symbol indicates if "holiday setting" is active in menu 4.7.
	This symbol indicates if the controller has contact with myUpway™.
	This symbol indicates if cooling is active.



Operation

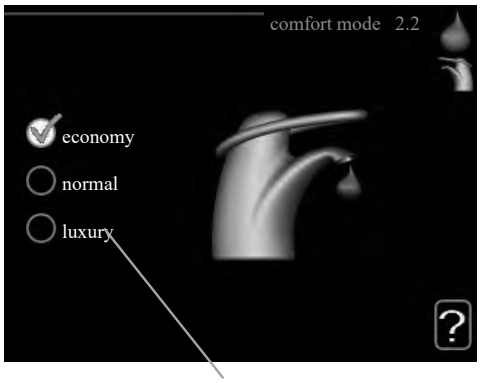
To move the cursor, turn the control knob to the left or the right. The marked position is brighter and/or has a light frame.

Selecting menu

To advance in the menu system select a main menu by marking it and then pressing the OK button. A new window opens with sub-menus.

Select one of the sub-menus by marking it and then pressing the OK button.

Selecting options

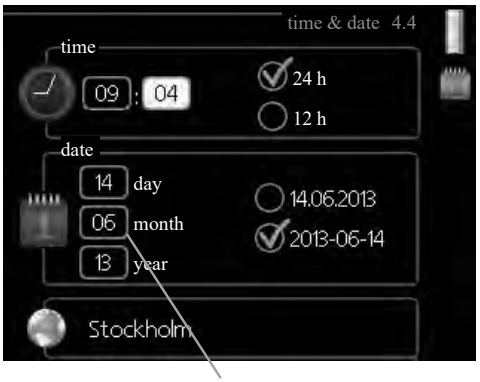


In an options menu the current selected option is indicated by a green tick.

To select another option:

1. Mark the applicable option. One of the options is pre-selected (white).
2. Press the OK button to confirm the selected option. The selected option has a green tick.

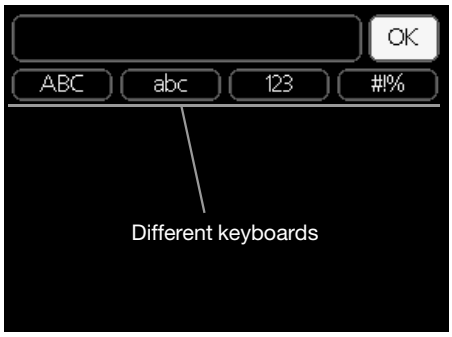
Setting a value



To set a value:

1. Mark the value you want to set using the control knob. 
2. Press the OK button. The background of the value becomes green, which means that you have accessed the setting mode. 
3. Turn the control knob to the right to increase the value and to the left to reduce the value. 
4. Press the OK button to confirm the value you have set. To change and return to the original value, press the Back button. 

Use the virtual keyboard



In some menus where text may require entering, a virtual keyboard is available.

Depending on the menu, you can gain access to different character sets which you can select using the control knob. To change character table, press the Back button. If a menu only has one character set, the keyboard is displayed directly.

When you have finished writing, mark "OK" and press the OK button.

Scroll through the windows

A menu can consist of several windows. Turn the control knob to scroll between the windows.

Scroll through the windows in the start guide

1. Turn the control knob until one of the arrows in the top left corner (at the page number) has been marked.
2. Press the OK button to skip between the steps in the start guide.

Help menu

In many menus there is a symbol that indicates that extra help is available.

To access the help text:

1. Use the control knob to select the help symbol.
2. Press the OK button.

The help text often consists of several windows that you can scroll between using the control knob.

Maintenance of RC-HY20/40

Regular checks

Your heat pump requires minimal maintenance after commissioning. On the other hand, it is recommended that you check your installation regularly. For more information regarding the maintenance of heat pumps and/or accumulator tanks/water heaters, refer to the relevant manual.

If something unusual occurs, messages about the malfunction appear in the display in the form of different alarm texts. See alarm management on page 91.

Saving tips

Your heat pump installation produces heat and hot water. This occurs via the control settings you made.

Factors that affect the energy consumption are, for example, indoor temperature, hot water consumption, the insulation level of the house and whether the house has many large window surfaces. The position of the house, e.g. wind exposure is also an aff ecting factor.

If you activate "Hot water Economy", less energy is used.

Power consumption

If you increase one degree of the desired indoor temperature, increases power consumption by approx. 5%.

Domestic electricity

In the past it has been calculated that an average Swedish household has an approximate annual consumption of 5000 kWh domestic electricity/year. In today's society it is usually between 6000-12000 kWh/year.

Equipment	Normal Output (W)		Approx. annual con-sump-tion (kWh)
	Opera-tion	Standby	
TV (Operation: 5 h/day, Standby: 19 h/day)	200	2	380
Digital box (Operation: 5 h/day, Standby:19 h/day)	11	10	90
DVD (Operation: 2 h/week)	15	5	45
TV games console (Operation: 6 h/week)	160	2	67
Radio/stereo (Operation: 3 h/day)	40	1	50
Computer incl. screen (Operation: 3 h/day,standby 21 h/day)	100	2	120
Bulb (Operation 8 h/day)	60	-	175
Spot light, Halogen (Operation 8 h/day)	20	-	58
Cooling (Operation: 24 h/day)	100	-	165
Freezer (Operation: 24 h/day)	120	-	380
Stove, hob (Operation: 40 min/day)	1500	-	365
Stove, oven (Operation: 2 h/week)	3000	-	310
Dishwasher, cold water connection (Operation 1 time/day)	2000	-	730
Washing machine (Operation: 1 times/day)	2000	-	730
Tumble drier (Operation: 1 times/day)	2000	-	730
Vacuum cleaner (Operation: 2 h/week)	1000	-	100
Engine block heater (Operation: 1 h/day, 4months a year)	400	-	50
Passenger compartment heater (Operation:1 h/day, 4 months a year)	800	-	100

These values are approximate example values.

Example: A family with 2 children live in a house with 1 flat-screen TV, 1 digital box, 1 DVD player, 1 TV games console, 2 computers, 3 stereos, 2 bulbs in the WC, 2 bulbs in the bathroom, 4 bulbs in the kitchen, 3 bulbs outside, a washing machine, tumble drier, fridge, freezer, oven, vacuum cleaner, engine block heater = 6240 kWh domestic electricity/year

Energy meter

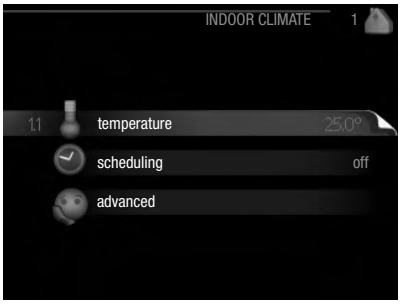
Check the accommodation's energy meter regularly, preferably once a month. This will indicate any changes in power consumption.

RC-HY20/40 – at your service

Set the indoor climate

Overview

Sub-menus



For the menu "INDOOR CLIMATE" there are several sub-menus. Status information for the relevant menu can be found on the display to the right of the menus.

"**temperature**" Setting the temperature for the climate system. The status information shows the set values for the climate system.

"**scheduling**" Scheduling heating and cooling. Status information "set" is displayed if you set a schedule but it is not active now, "holiday setting" is displayed if the vacation schedule is active at the same time as the schedule (the vacation function is prioritised), "active" displays if any part of the schedule is active, otherwise it displays " off".

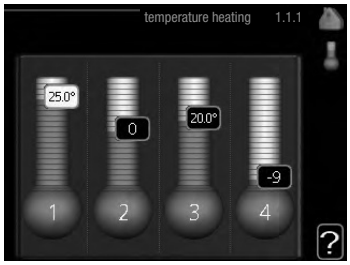
"**advanced**" Setting of heat curve, adjusting with external contact, minimum value for supply temperature, room sensor and cooling function.

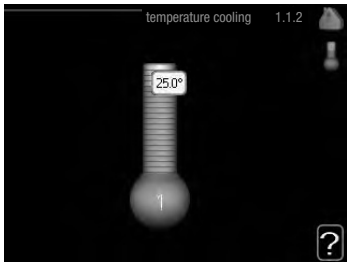
Menu 1.1 - temperature

If the house has several climate systems, this is indicated on the display by a thermometer for each system.

Choose heating or cooling and then set the desired temperature in the next menu "temperature heating/cooling" in menu 1.1.

Set the temperature (with room sensors installed and activated):





heating

Setting range: 5 – 30 °C
Default value: 20

cooling (accessory is required)

Setting range: 5 – 30 °C
Default value: 25

The value in the display appears as a temperature in °C if the climate system is controlled by a room sensor.

CAUTION

A slow heat-releasing heating system, such as for example, underfloor heating, may not be suitable for control using the heat pump's room sensor.

To change the room temperature, use the control knob to set the desired temperature in the display. Confirm the new setting by pressing the OK button. The new temperature is shown on the right-hand side of the symbol in the display.

Setting the temperature (without room sensors activated):

Setting range: -10 to +10
Default value: 0

The display shows the set values for heating (curve offset). To increase or reduce the indoor temperature, increase or reduce the value on the display.

Use the control knob to set a new value. Confirm the new setting by pressing the OK button.

The number of steps the value has to be changed to achieve a degree change of the indoor temperature depends on the heating installation. One step is usually enough but in some cases several steps may be required.

The new value is shown on the right-hand side of the symbol in the display.

CAUTION

An increase in the room temperature can be slowed by the thermostats for the radiators or under floor heating. Therefore, open the thermostats fully, except in those rooms where a cooler temperature is required, e.g. bedrooms.

TIP

Wait 24 hours before making a new setting, so that the room temperature has time to stabilise.

If it is cold outside temperature and the room temperature is too low, increase the curve slope in menu 1.9.1.1 by one increment.

If it is cold outside temperature and the room temperature is too high, reduce the curve slope in menu 1.9.1.1 by one increment.

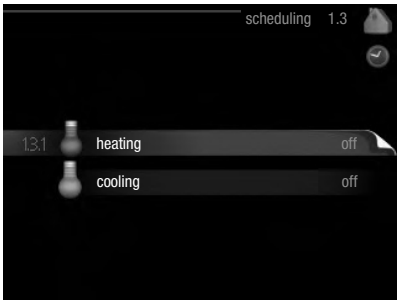
If it is warm outside temperature and the room temperature is too low, increase the value in menu 1.1.1 by one increment.

If it is warm outside temperature and the room temperature is too high, reduce the value in menu 1.1.1 by one increment.

Menu 1.3 - temperature scheduling

In the menu scheduling indoor climate (heating/cooling) is scheduled for each weekday.

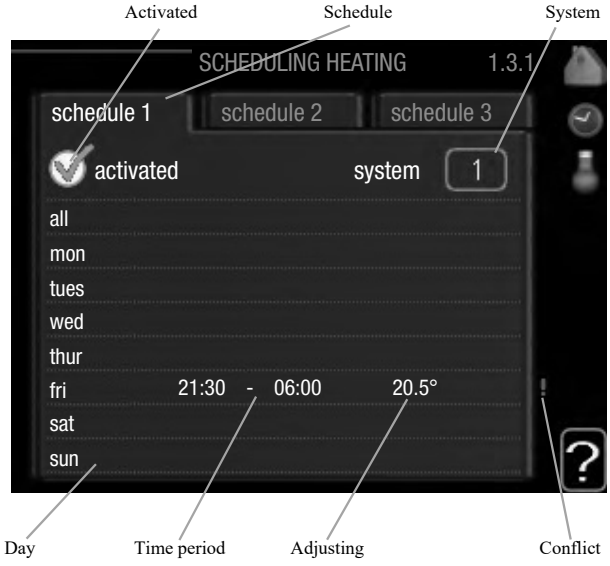
You can also schedule a longer period during a selected period (vacation) in menu 4.7.



Menu 1.3.1 - heating

Increases or decreases in the accommodation temperature can be scheduled here for up to three time periods per day. One step is usually enough to change the room temperature by one degree, but in some cases several steps may be required for the accommodation temperature.

If a room sensor is installed and activated, the desired room temperature (°C) is set during the time periods.



Schedule: The schedule to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

System (RC-HY40 only): Which climate system the schedule is for is selected here. This alternative is only displayed if more than one climate system is present.

Day: Select which day or days of the week the schedule is to apply to here. To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Adjusting: How much the heating curve is to be offset in relation to menu 1.1 during scheduling is set here. If the rooms sensor is installed and activated, the desired room temperature is set in °C.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.

TIP

If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

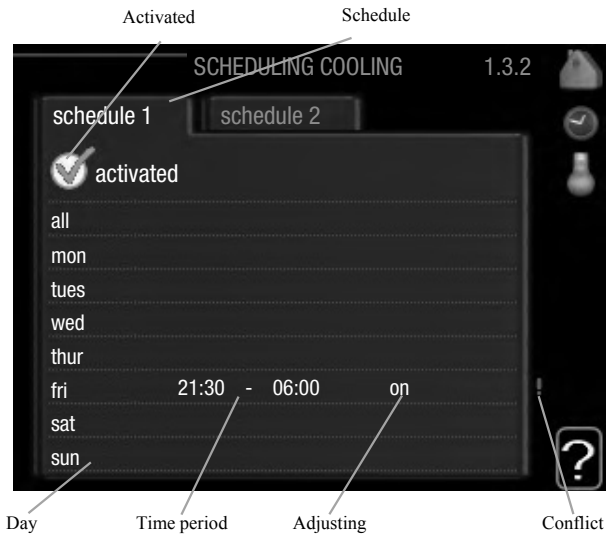
Scheduling always starts on the date that the start time is set for.

CAUTION

Changes of temperature in accommodation take time. For example, short time periods in combination with underfloor heating will not give a noticeable difference in room temperature.

Menu 1.3.2 - cooling

Here you can schedule when cooling is permitted in the accommodation for up to two different time periods per day.



Schedule: The schedule to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

Day: Select which day or days of the week the schedule is to apply to here. To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Adjusting: Here, you set when active cooling will not be permitted.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.

TIP

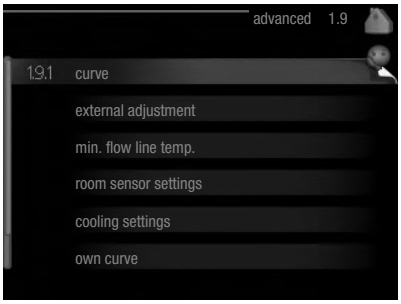
If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

Scheduling always starts on the date that the start time is set for.

Menu 1.9 - advanced



Menu "advanced" has orange text and is intended for the advanced user. This menu has several sub-menus.

"**curve**"Setting the curve slope for heating and cooling.

"**external adjustment**" Setting the heat curve offset when the external contact is connected.

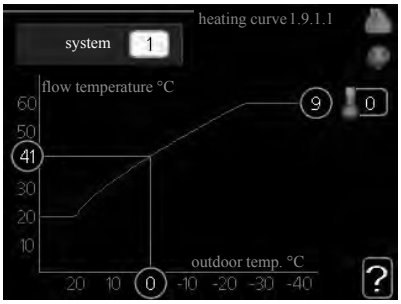
"**min. flow line temp.**" Setting minimum permitted flow line temperature.

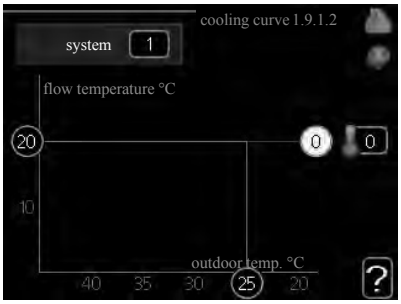
"**room sensor settings**" Settings regarding the room sensor.
"**cooling settings**" Settings for cooling.

"**own curve**" Setting own curve for heating and cooling.

"**point offset**" Setting the offset of the heating curve or cooling curve at a specific outdoor temperature.

Menu 1.9.1 - Heating/cooling curve setting





heating curve

Setting range: 0 – 15
Default value: 9

cooling curve (accessory required)

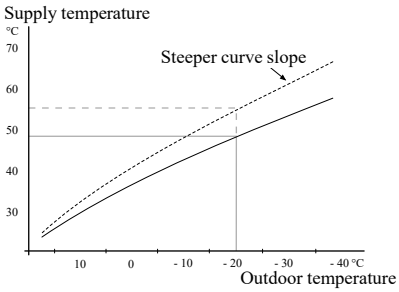
Setting range: 0 – 9

Default value: 0

The prescribed heating curve for your house can be viewed in the menu "heating curve". The task of the heating curve is to give an even indoor temperature, regardless of the outdoor temperature, and thereby energy efficient operation. From this heating curve, the control module determines the temperature of the water to the heating system, supply temperature, and therefore the indoor temperature. Select the heating curve and read off how the supply temperature changes at different outdoor temperatures here. If there is cooling function, the same settings can be made for the cooling curve.

Curve coefficient

The heating/cooling curve shows the relation between the target supply temperature and the corresponding outdoor temperature. A steep curve indicates that supply temperature becomes higher at low outdoor air temperature in heating and it becomes lower at high outdoor air temperature in cooling.



The optimum slope depends on the climate conditions in your location, the type of heating device (radiators or under floor heating) and how well insulated the house is.

The curve is set when the heating installation is installed, but may need adjusting later. Normally, the curve will not need further adjustment.

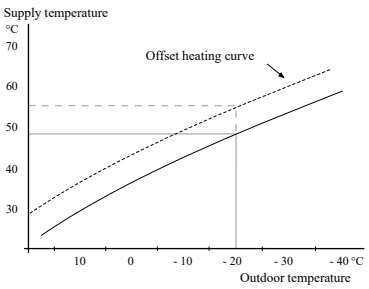
CAUTION

In the event of making fine adjustments of the indoor temperature, the curve must be offset up or down instead, this is done in menu 1.1 "temperature".

Curve offset

The target temperature can be offset in parallel over the entire outdoor temperature range by this function. This is offset by 5 °C by adjusting 2 steps.

The target temperature can be parallel offset in the entire outdoor temperature range with this function. It is offset by 5 °C by adjusting 2 steps.



Flow line temperature – maximum and minimum values

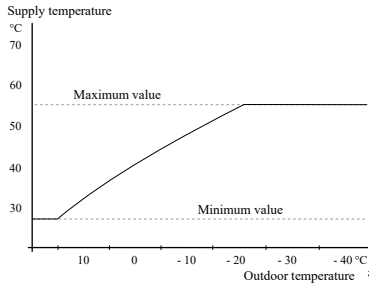
This function is used in order to limit max-min supply temperature. The heating / cooling curve becomes flat beyond max / min target temperature.

CAUTION

Underfloor heating systems are normally "max flow line temperature" set between 35 and 45°C. Take care not to cause low temperature burns in case it is set higher than 35°C.

Must be restricted with underfloor cooling min. flow line temp. to prevent condensation.

Check the max temperature for your floor with your installer/floor supplier.



The figure at the end of the curve indicates the curve number. The figure beside the thermometer icon gives the curve offset. Use the control knob to set a new value.

Confirm the new setting by pressing the OK button.

Curve 0 is an own curve created in menu 1.9.7.

To select another curve (slope):

1. Press OK button to access the setting mode
2. Select a new curve. The curves are numbered from 0 to 15, and the bigger number curve has steeper slope.

   Curve 0 means that "own curve" (menu 1.9.7) is used.
3. Press OK button to exit the setting.

To read off a curve:

1. Turn the control knob so that the ring on the shaft with the outdoor temperature is marked.
2. Press OK button.
3. Follow the grey line up to the curve and out to the left to read off the value for the supply temperature at the selected outdoor temperature.
4. You can now select to take read outs for different outdoor temperatures by turning the control knob to the right or left and read off the corresponding flow temperature.
5. Press OK or Back button to exit read off mode.

TIP

Wait 24 hours before making a new setting, so that the room temperature has time to stabilise.

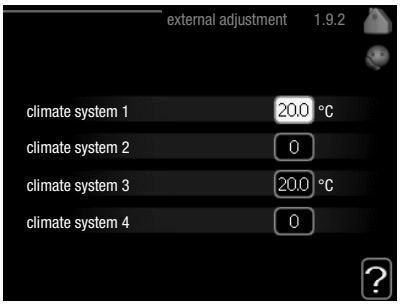
If it is cold outdoors and the room temperature is too low, increase the curve slope by one increment.

If it is cold outdoors and the room temperature is too high, lower the curve slope by one increment.

If it is warm outdoors and the room temperature is too low, increase the curve offset by one increment.

If it is warm outdoors and the room temperature is too high, lower the curve offset by one increment.

Menu 1.9.2 - external adjustment



*If there is one climate system, display shows "climate system 1" only.

climate system

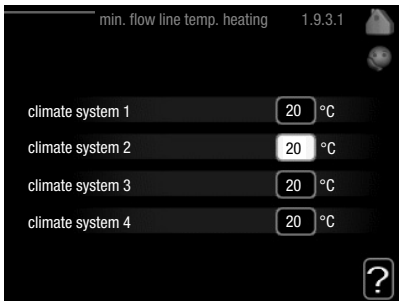
Setting range: -10 to +10 or desired room temperature if the room sensor is installed.

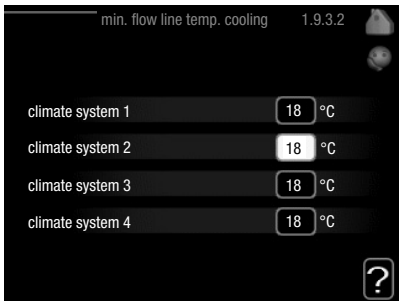
Default value: 0

Connecting an external contact, for example, a room thermostat or a timer allows you to temporarily or periodically increase or decrease the room temperature while heating. When the contact is on, the heating curve offset is changed by the number of steps selected in the menu. If a room sensor is installed and activated the desired room temperature (°C) is set.

If there is more than one climate system the setting can be made separately for each system.

Menu 1.9.3 - min. flow line temp.





*If there is one climate system, display shows "climate system 1" only.

heating

Setting range: 5 – 70 °C
Default value: 20 °C

cooling (heat pump with cooling function required)

Depending on which cooling function (2-pipe /4-pipe system) is used, the lower limit of the setting range can vary from 7 to 18 °C.

Setting range: 7 – 30 °C
Factory setting: 18 °C

In menu 1.9.3 you select heating or cooling, in the next menu (min. supply temp. heating/cooling) set the minimum temperature on the supply temperature to the climate system. This means that RC-HY20/40 never calculates a temperature lower than that set here.

If there is more than one climate system the setting can be made separately for each system.

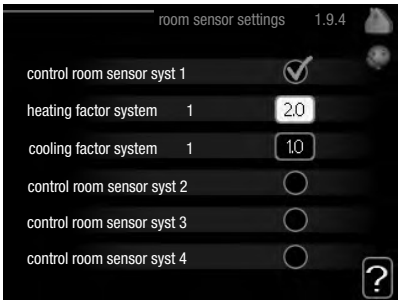
TIP

The value can be increased if you have, for example, a cellar that you always want to heat, even in summer.

You may also need to increase the value in "stop heating" menu 4.9.2 "auto mode setting".

Menu 1.9.4 - room sensor settings

factor system



*If there is one climate system, display shows "control room sensor system 1" only.

heating

Setting range: 0.0 – 6.0
Factory setting heating: 2.0

cooling (accessory required)

Setting range: 0.0 – 6.0
Factory setting cooling: 1.0

Room sensors to control the room temperature can be activated here.

CAUTION

A slow heat-releasing heating system, such as for example, underfloor heating, may not be suitable for control using the heat pump's room sensor.

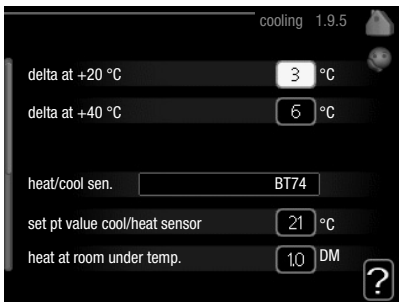
Here you can set a factor (a numerical value) that determines how much an over or sub normal temperature (the difference between the desired and actual room temperature) in the room is to affect the supply temperature to the climate system. A higher value gives a greater and faster change of the heating curve's set offset.

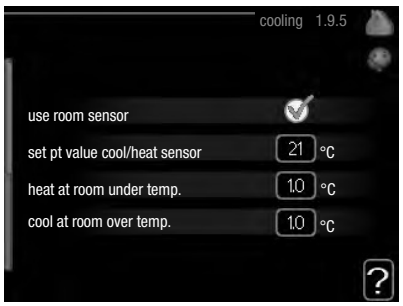
NOTE

Too high a set value for "factor system" can (depending on your climate system) produce an unstable room temperature.

If several climate systems are installed the above settings can be made for the relevant systems.

Menu 1.9.5 - cooling settings





delta at +20 °C

Setting range: 3 – 10 °C
Factory setting: 3

delta at +40 °C

Setting range: 3 – 20 °C
Factory setting: 6

heat/cool sen.

Setting range: BT74 (BT50, RMU-BT50)
Factory setting: BT74

set pt value cool/heat sensor

Setting range: 5 – 40 °C
Factory setting: 21

heat at room under temp.

Setting range: 0.5 – 10.0 °C
Default value: 1.0

cool at room over temp.

Setting range: 0.5 – 10.0 °C
Default value: 3.0

start active cooling

Setting range: 10 – 300 DM
Factory setting: 30 DM

step difference compressors (RC-HY40 only)

Setting range: 10 – 150
Default value: 30

degree minutes cooling (RC-HY40 only)

Setting range: -3000 – 3000 cooling degree minutes
Factory setting: -1

time betw. switch heat/cool

Setting range: 0 – 48 h
Factory setting: 2

You can use RC-HY20/40 to cool the house during hot periods of the year.

CAUTION

Certain setting options only appear if their function is installed and activated in RC-HY20/40.

delta at +20 °C

Set the desired temperature difference between supply and return lines to the climate system during cooling operation when the outdoor temperature is +20 °C. RC-HY20/40 then attempts to get as close to the set temperature as possible.

delta at +40 °C

Set the desired temperature difference between supply and return lines to the climate system during cooling operation when the outdoor temperature is +40 °C. RC-HY20/40 then attempts to get as close to the set temperature as possible.

heat/cool sen.

If a particular room will determine how the whole installation will work, a room sensor (BT74) is used. If room sensor (BT74) is connected to RC-HY20/40, room sensor (BT74) determines when it is time to switch between cooling and heating operation for the whole installation.

CAUTION

When the heating/cooling sensors (BT74) have been connected and activated in menu 5.4, no other sensor can be selected in menu 1.9.5.

set pt value cool/heat sensor

Here you can set at which indoor temperature RC-HY20/40 is to shift between heating respectively cooling operation.

heat at room under temp.

Here you can set how far the room temperature can drop below the desired temperature before RC-HY20/40 switches to heating operation.

cool at room over temp.

Here you can set how high the room temperature can increase above the desired temperature before RC-HY20/40 switches to cooling operation.

start active cooling

Here you can set when active cooling is to start.

Degree minutes are a measurement of the current heating demand in the house and determine when the compressor, cooling operation respectively additional heat will start/stop.

step difference compressors (RC-HY40 only)

CAUTION

This setting option only appears if cooling is activated in menu 5.2.4.

The degree minute difference for controlling when the next compressor is to start is set here.

degree minutes cooling (RC-HY40 only)

This selection is only available when the connected accessory itself counts cooling degree minutes.

After a min or max value has been set, the system will automatically set the real value in relation to the number of compressors that are running cooling.

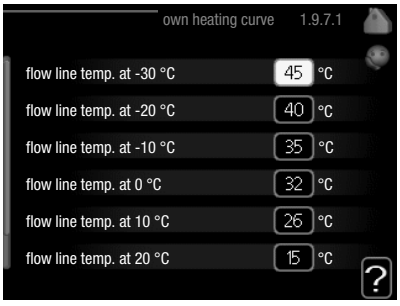
time betw. switch heat/cool

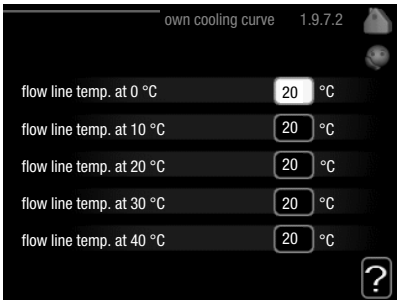
This selection is only available in cooling 2-pipe systems.

Here you can set how long RC-HY20/40 is to wait before it returns to heating mode when the cooling demand has ceased or vice versa.

Menu 1.9.7 - own curve

supply temperature





heating

Setting range: 5 – 70 °C

cooling (accessory required)

Depending on which accessory is used the setting range can vary.

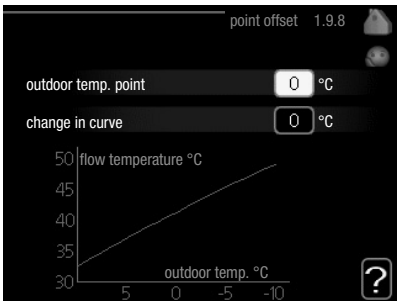
Setting range: -5 – 40 °C

Create your own heating or cooling curve here, by setting the desired supply temperatures for different outdoor temperatures.

CAUTION

Curve 0 in menu 1.9.1 must be selected for own curve to apply.

Menu 1.9.8 - point offset



outdoor temp. point

Setting range: -40 – 30 °C
Default value: 0 °C

change in curve

Setting range: -10 – 10 °C
Default value: 0 °C

Select a change in the heating curve at a certain outdoor temperature here. One step is usually enough to change the room temperature by one degree, but in some cases several steps may be required.

The heat curve is affected at ± 5 °C from set outdoor temp. point.

It is important that the correct heating curve is selected so that the room temperature is experienced as even.

TIP

If it is cold in the house, at, for example -2 °C, "outdoor temp. point" is set to "-2" and "change in curve" is increased until the desired room temperature is maintained.

CAUTION

Wait 24 hours before making a new setting, so that the room temperat- ure has time to stabilise.

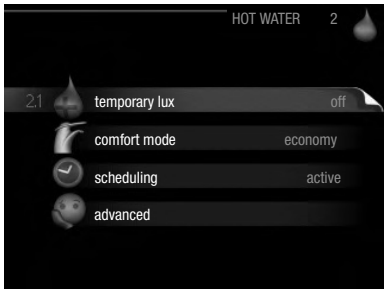
Set the hot water capacity

Overview

Sub-menus

This menu only appears if a water heater is docked to the heat pump.

For the menu "HOT WATER" there are several sub-menus. Status information for the relevant menu can be found on the display to the following menus.



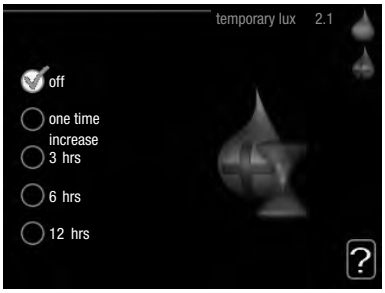
"**temporary lux**" Activation of temporary increase in the hot water temperature. Status information displays “off" or what length of time of the temporary temperature increase remains.

"**comfort mode**" Setting hot water comfort. The status information displays what mode is selected, "economy", "normal" or "luxury".

"**scheduling**" Scheduling hot water comfort. The status information "set" appears if you have set scheduling but it is not currently active, "holiday setting" appears if holiday setting is active at the same time as scheduling (when the holiday function is prioritised), "active" appears if any part of scheduling is active, otherwise "off" appears.

"**advanced**" Setting periodic increase in the hot water temperature.

Menu 2.1 - temporary lux



Setting range: 3, 6 and 12 hours
and mode "off" and "one time increase"
Default value: "off"

When hot water requirement has temporarily increased this menu can be used to select an increase in the hot water temperature to lux mode for a selectable time.

CAUTION

If comfort mode "luxury" is selected in menu 2.2 no further increase can be carried out.

The function is activated immediately when a time period is selected and confirmed using the OK button. The remaining time for the selected setting is shown to the right.

When the time has run out RC-HY20/40 returns to the mode set in menu 2.2. Select “off" to switch off temporary lux .

Menu 2.2- comfort mode

Setting range: economy, normal, luxury
Default value: normal

The difference between the selectable modes is the temperature of the hot tap water. Higher temperature means that the hot water lasts longer.

economy: This mode gives less hot water than the others, but is more economical. This mode can be used in smaller households with a small hot water requirement.

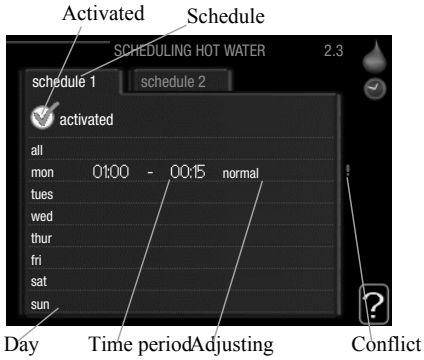
normal: Normal mode gives a larger amount of hot water than the economy mode and is suitable for most households.

luxury: Lux mode gives the greatest possible amount of hot water. In this mode, the immersion heater, as well as the compressor, is used to heat hot water, which may increase operating costs.

Menu 2.3 - scheduling

Two different periods of hot water comfort per day can be scheduled here.

Scheduling is activated/deactivated by ticking/unticking" activated". Set times are not affected at deactivation.



Schedule: The schedule to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

Day: Select which day or days of the week the schedule is to apply to here.

To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Adjusting: Set the hot water comfort that is to apply during scheduling here.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.

TIP

If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

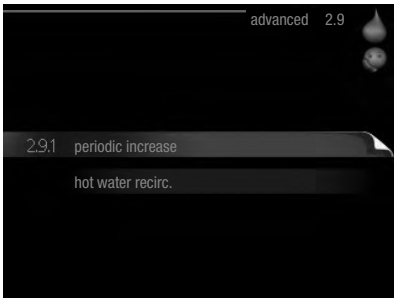
TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

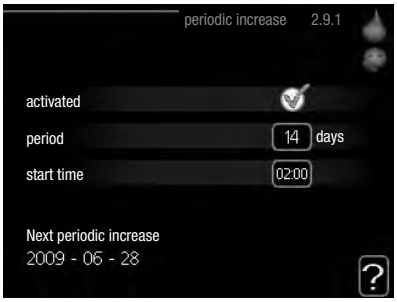
Scheduling always starts on the date that the start time is set for.

Menu 2.9 - advanced

Menu "advanced" has orange text and is intended for the advanced user. This menu has several sub-menus.



Menu 2.9.1 - periodic increase



period

Setting range: 1 – 90 days

Default value: 14 days

start time

Setting range: 00:00 – 23:00

Default value: 00:00

To prevent bacterial growth in the water heater, the heat pump and any additional heater can increase the hot water temperature for a short time at regular intervals.

The length of time between increases can be selected here. The time can be set between 1 and 90 days. Factory setting is 14 days. Tick/untick "activated" to start/switch off the function.

Menu 2.9.2 - hot water recirc. (accessory required)

operating time

Setting range: 1 – 60 min

Default value: 60 min

downtime

Setting range: 0 – 60 min

Default value: 0 min

Set the hot water circulation for up to three periods per day here. During the set periods the hot water circulation pump will run according to the settings above.

"operating time" decide how long the hot water circulation pump must run per operating instance.

"downtime" decide how long the hot water circulation pump must be stationary during operating instances.

Hot water circulation is activated in menu 5.4 "soft inputs and outputs".

Get information

Overview

Sub-menus

For the menu "INFO" there are several sub-menus. No settings can be made in these menus, they just display information. Status information for the relevant menu can be found on the display to the following menus.

"**service info**" shows temperature levels and settings in the installation.

"**compressor info**" shows operating times, number of starts etc. for the compressor in the heat pump.

"**add. heat info**" displays information about the additional heat's operating times etc.

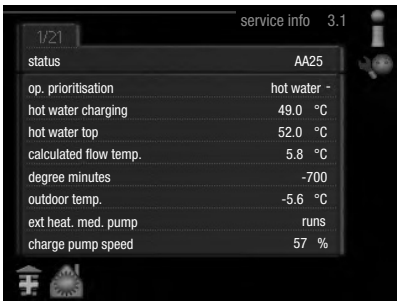
"**alarm log**" shows the latest alarms.

"**indoor temp. log**" the average temperature indoors week by week during the past year.

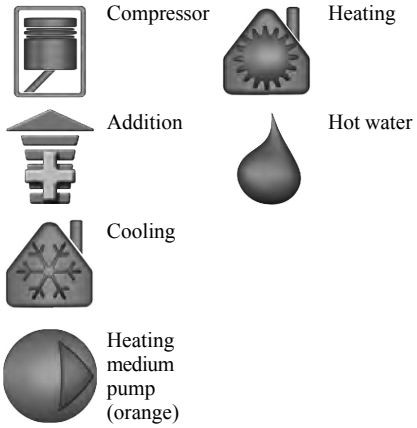
Menu 3.1 - service info

Information about the actual operating status of the installation (e.g. current temperatures etc.) can be obtained here. But no changes can be made.

The information is on several pages. Turn the control knob to scroll between the pages.



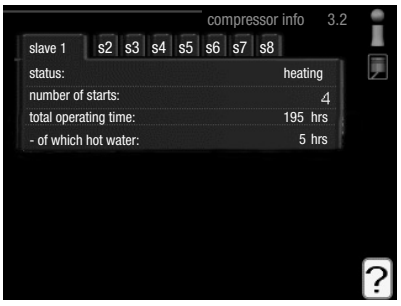
Symbols in this menu:



Menu 3.2 - compressor info

Information about the compressor's operating status and statistics can be obtained here. But no changes can be made.

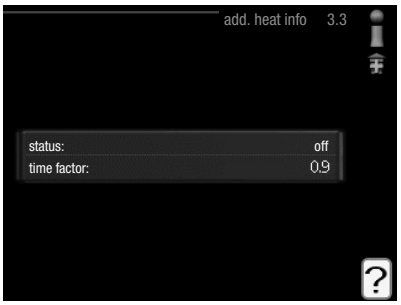
If there is more than one climate system the information is on several pages. Turn the control knob to scroll between the pages.



Menu 3.3 - add. heat info

Information about the additional heat's settings, operating status and statistics can be obtained here. But no changes can be made.

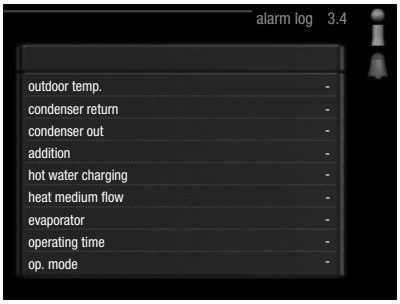
If there is more than are climate system the information is on several pages. Turn the control knob to scroll between the pages.



Menu 3.4 - alarm log

To facilitate fault-finding the installation's operating status at alarm alerts is stored here. You can see information for the 10 most recent alarms.

To view the run status in the event of an alarm, mark the alarm and press the OK button.



Information about an alarm.

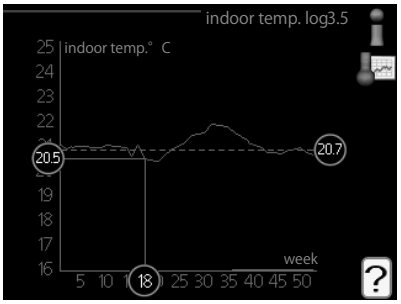
Menu 3.5 - indoor temp. log

Here you can see the average temperature indoors week by week during the past year. The dotted line indicates the annual average temperature.

The average outdoor temperature is only shown if a room temperature sensor/room unit is installed.

To read off an average temperature

1. Turn the control knob so that the ring on the shaft with the week number is marked.
2. Press the OK button.
3. Follow the grey line up to the graph and out to the left to read off the average indoor temperature at the selected week.
4. You can now select to take read outs for different weeks by turning the control knob to the right or left and read off the average temperature.
5. Press the OK or Back button to exit read off mode.



Adjust the heat pump

Overview

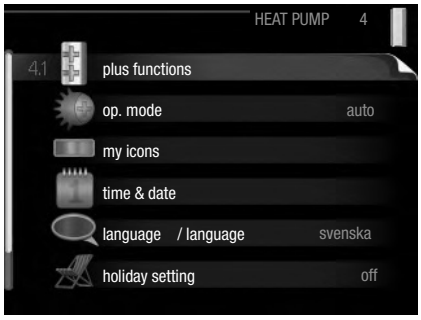
Sub-menus

For the menu "MY SYSTEM" there are several sub-menus. Status information for the relevant menu can be found on the display to the right of the menus.

"**plus functions**" Settings applying to any installed extra functions in the heating system.

"**op. mode**" Activation of manual or automatic operating mode. The status information shows the selected operating mode.

"**my icons**" Settings regarding which icons in the control module's user interface that are to appear on the hatch when the door is closed.



"**time & date**" Setting current time and date.

"**language**" Select the language for the display here. The status information shows the selected language.

"**holiday setting**" Vacation scheduling heating, hot water and ventilation. Status information "set" is displayed if you set a vacation schedule but it is not active at the moment, "active" is displayed if any part of the vacation schedule is active, otherwise it displays " off".

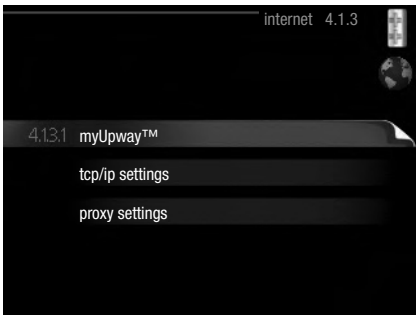
"**advanced**" Settings of control module work mode.

Menu 4.1 - plus functions

Settings for any additional functions installed in RC-HY20/40 can be made in the sub-menus.

Menu 4.1.3 - internet

Here you make settings for connecting RC-HY20/40 to the internet.



NOTE

For these functions to work the network cable must be connected.

Menu 4.1.3.1 - myUpway™

Here you can manage the installation's connection to myUpway™ (www.myUpway.com) and see the number of users connected to the installation via the internet.

A connected user has a user account in myUpway™, which has been given permission to control and/or monitor your installation.

Request new connection string

To connect a user account on myUpway™ to your installation, you must request a unique connection code.

1. Mark "request new connection string" and press the OK button.
2. The installation now communicates with myUpway™ to create a connection code.
3. When a connection string has been received, it is shown in this menu at "connection string" and is valid for 60 minutes.

Disconnect all users

1. Mark “switch off all users" and press the OK button.
2. The installation now communicates with myUpway™ to release your installation from all users connected via the internet.

NOTE

After disconnecting all users, none of them can monitor or control your installation via myUpway™ without requesting a new connection code

Menu 4.1.3.8 - tcp/ip settings

You can set TCP/IP settings for your installation here.

Automatic setting (DHCP)

1. Tick “automatic". The installation now receives the TCP/IP settings using DHCP.
2. Mark “confirm" and press the OK button.

Manual setting

1. Untick "automatic", you now have access to several setting options.
2. Mark “ip-address" and press the OK button.
3. Enter the correct details via the virtual keypad.
4. Mark “OK" and press the OK button.
5. Repeat 1 - 3 for "net mask", "gateway" and "dns".
6. Mark “confirm" and press the OK button.

CAUTION

The installation cannot connect to the internet without the correct TCP/IP settings. If unsure about applicable settings use the automatic mode or contact your network administrator (or similar) for further information.

TIP

All settings made since opening the menu can be reset by marking "reset" and pressing the OK button.

Menu 4.1.3.9 - proxy settings

You can set proxy settings for your installation here.

Proxy settings are used to give connection information to a intermediate server (proxy server) between the installation and Internet. These settings are primarily used when the installation connects to the Internet via a company network. The installation supports proxy authentication of the HTTP Basic and HTTP Digest type.

If unsure about applicable settings, contact your network administrator (or similar) for further information.

Setting

1. Tick “use proxy" if you do not want to use a proxy.
2. Mark “server" and press the OK button.
3. Enter the correct details via the virtual keypad.
4. Mark “OK" and press the OK button.
5. Repeat 1 - 3 for "port", "user name" and "password".
6. Mark “confirm" and press the OK button.

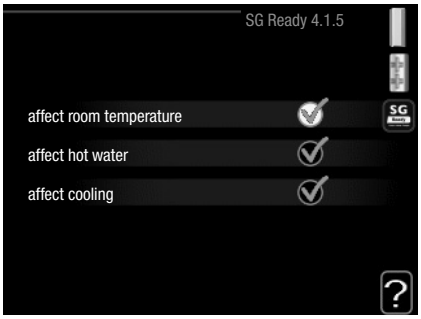
TIP

All settings made since opening the menu can be reset by marking "reset" and pressing the OK button.

Menu 4.1.5 - SG Ready

This function can only be used in SG Ready 4.1.5 mains networks that support the "SG Ready"-standard .

Make settings for the function "SG Ready" here.



affect room temperature

Here you set whether room temperature should be affected when activating "SG Ready".

With low price mode on "SG Ready" the parallel offset for the indoor temperature is increased by "+1". If a room sensor is installed and activated, the desired room temperature is instead increased by 1 °C.

With over capacity mode on "SG Ready" the parallel offset for the indoor temperature is increased by "+2". If a room sensor is installed and activated, the desired room temperature is instead increased by 2 °C.

affect hot water

Here you set whether the temperature of the hot water should be affected when activating "SG Ready".

With low price mode on "SG Ready" the stop temperature of the hot water is set as high as possible at only compressor operation (immersion heater not permitted).

With over capacity mode of "SG Ready" the hot water is set to "luxury" (immersion heater permitted).

affect cooling (accessory required)

Here you set whether room temperature during cooling operation should be affected when activating "SG Ready".

With low price mode of "SG Ready" and cooling operation the indoor temperature is not affected.

With over capacity mode on "SG Ready" and cooling operation, the parallel offset for the indoor temperature is reduced by "-1". If a room sensor is installed and activated, the desired room temperature is instead reduced by 1 °C.

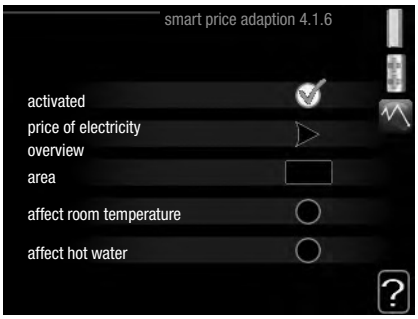
NOTE

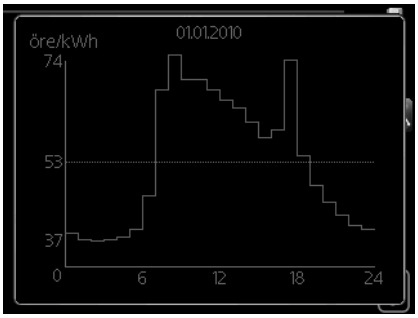
The function must be connected and activated in your RC-HY20/40.

Menu 4.1.6 - Smart price adaption™

area

In this menu you state where the heat pump is located and how great a role the electricity price should play. The greater the value, the greater the effect the electricity price has and the possible savings are larger, but at the same time there is an increased risk of affecting comfort. Smart price adaption is available on selected markets, at present Austria, Denmark, Estonia, Finland, Norway and Sweden.





price of electricity overview

Here you can obtain information on how the electricity price varies over up to three days.

affect room temperature

Setting range: 1 – 10
Factory setting: 5

affect hot water

Setting range: 1 – 4
Factory setting: 2

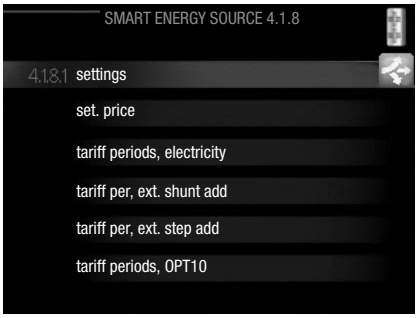
affect cooling

Setting range: 1 – 10
Factory setting: 3

Smart price adaption™ moves the heat pump's consumption over 24 hours to periods with the cheapest electricity tariff, which gives savings for hourly rate based electricity contracts. The function is based on hourly rates for the next 24 hours being retrieved via myUpway™ and therefore an internet connection and an account for myUpway™ are required.

Deselect "activated" to switch off Smart price adaption™.

Menu 4.1.8 - smart energy source™ (RC-HY40 only)



settings

set. price

CO2 impact*

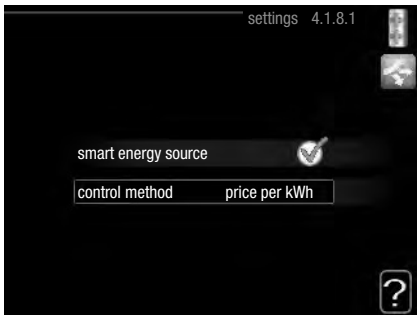
tariff per, ext. shunt add

tariff per, ext. step add

The function prioritises how / to what extent each docked energy source will be used. Here you can choose if the system is to use the energy source that is cheapest at the time. You can also choose if the system is to use the energy source that is most carbon neutral at the time.

*Select control method "CO_2" under settings to open this menu.

Menu 4.1.8.1 - settings



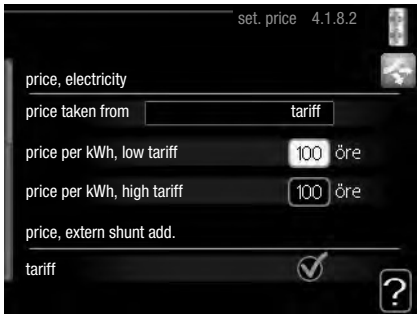
smart energy source™

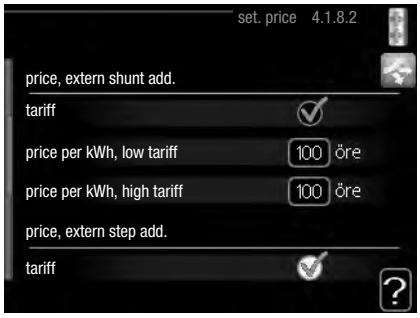
Setting range: Off/On
Factory setting: Off

control method

Setting range: Price /CO_2
Factory setting: Price

Menu 4.1.8.2 - set. price





price, electricity

Setting range: spot, tariff, fixed price
Factory setting: fixed price
Setting range fixed price: 0 – 100,000*

price, extern shunt add.

Setting range: tariff, fixed price
Factory setting: fixed price
Setting range fixed price: 0 – 100,000*

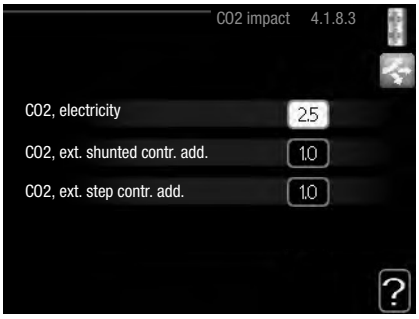
price, extern step add.

Setting range: tariff, fixed price
Factory setting: fixed price
Setting range fixed price: 0 – 100,000*

Here you can choose if the system is to exercise control based on the spot price, tariff control or a set price. The setting is made for each individual energy source. Spot price can only be used if you have an hourly tariff agreement with your electricity supplier.

*The currency varies depending on the country selected.

Menu 4.1.8.3 - CO2 impact



CO2, electricity

Setting range: 0 – 5
Default value: 2.5

CO2, ext. shunted contr. add.

Setting range: 0 – 5
Default value: 1

CO2, ext. step contr. add.

Setting range: 0 – 5
Default value: 1

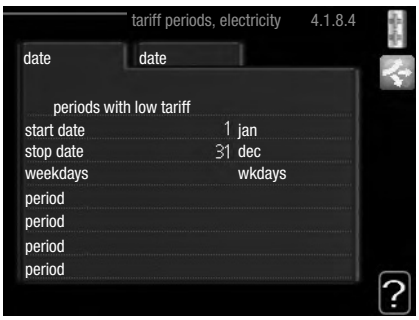
Here you set the size of the carbon footprint for each energy source.

The carbon footprint is diff erent for diff erent energy sources. For example, the energy from solar cells and wind turbines can be considered carbon dioxide neutral and, therefore, has a low CO2 impact. Energy from fossil fuels can be considered to have a higher carbon footprint and, therefore, has a higher CO2 impact.

Menu 4.1.8.4 - tariff periods, electricity

Here you can use tariff control for the electric additional heat.

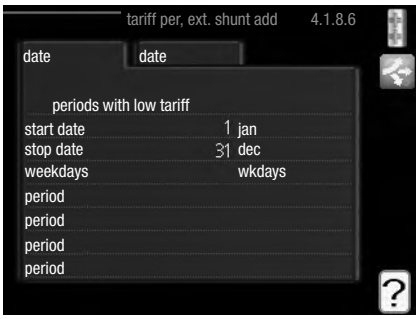
Set the lower tariff periods. It is possible to set two diff erent date periods per year. Within these periods, it is possible to set up to four diff erent periods on weekdays (Monday to Friday) or four diff erent periods on weekends (Saturdays and Sundays).



Menu 4.1.8.6 - tariff per, ext. shunt add

Here you can use tariff control for the external shunted additional heat.

Set the lower tariff periods. It is possible to set two different date periods per year. Within these periods, it is possible to set up to four different periods on weekdays (Monday to Friday) or four different periods on weekends (Saturdays and Sundays).



Menu 4.1.8.7 - tariff per, ext. step add

Here you can use tariff control for the external step controlled additional heat.

Set the lower tariff periods. It is possible to set two different date periods per year. Within these periods, it is possible to set up to four different periods on weekdays (Monday to Friday) or four different periods on weekends (Saturdays and Sundays).

Menu 4.2 - op. mode

op. mode

Setting range: auto, manual, add. heat only
Default value: auto

functions

Setting range: compressor, addition, heating, cooling

The control module operating mode is usually set to "auto". It is also possible to set the control module to "add. heat only", when only additional heat is used, or "manual" and then select what functions are to be permitted.

Change the operating mode by marking the desired mode and pressing the OK button. When an operating mode is selected it shows what in the control module is permitted (crossed out = not permitted) and selectable alternatives to the right. To select selectable functions that are permitted or not, mark the function using the control knob and press the OK button.

Operating mode auto

In this operating mode the control module automatically selects what functions are permitted.

Operating mode manual

In this operating mode you can select what functions are permitted. You cannot deselect "compressor" in manual mode.

Operating mode add. heat only

In this operating mode the compressor is not active, only additional heat is used.

CAUTION

If you choose mode "add. heat only" the compressor is deselected and there is a higher operating cost.

CAUTION

You cannot change from only additional heat if you do not have a heat pump connected.

Functions

"compressor" is that which produces heating and hot water for the accommodation. If "compressor" is deselected, a symbol is displayed in the main menu on the symbol for the control module. You cannot deselect "compressor" in manual mode.

"addition" is what helps the compressor to heat the accommodation and/or the hot water when it cannot manage the whole requirement alone.

"heating" means that you get heat in the accommodation. You can deselect the function when you do not wish to have heating running.

"cooling" means that you get cooling in the accommodation in hot weather. This alternative requires an accessory for cooling or that the heat pump has a built in function for cooling and is activated in the menu. You can deselect the function when you do not wish to have the cooling running.

Menu 4.4 - time & date

Set time and date, display mode and time zone here.

TIP

Time and date are set automatically if the heat pump is connected to myUpway™. *To obtain the correct time, the time zone must be set.*

Menu 4.6 - language

Choose the language that you want the information to be displayed in here.

Menu 4.7 - holiday setting

To reduce energy consumption during a holiday you can schedule a reduction in heating and hot water temperature. Cooling can also be scheduled if the functions are connected.

If a room sensor is installed and activated, the desired room temperature (°C) is set during the time period. This setting applies to all climate systems with room sensors.

If a room sensor is not activated, the desired offset of the heating curve is set. One step is usually enough to change the room temperature by one degree, but in some cases several steps may be required. This setting applies to all climate systems without room sensors.

Vacation scheduling starts at 00:00 on the start date and stops at 23:59 on the stop date.

TIP

Complete holiday setting about a day before your return so that room temperature and hot water have time to regain usual levels.

TIP

Set the vacation setting in advance and activate just before departure in order to maintain the comfort.

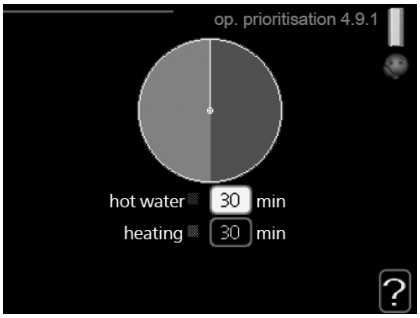
CAUTION

If you choose to switch off hot water production during the vacation "periodic increase" (preventing bacterial growth) are blocked during this time. "periodic increase" started in conjunction with the vacation setting being completed.

Menu 4.9 - advanced

Menu "advanced" has orange text and is intended for the advanced user. This menu has several sub-menus.

Menu 4.9.1 - op. prioritisation



op. prioritisation

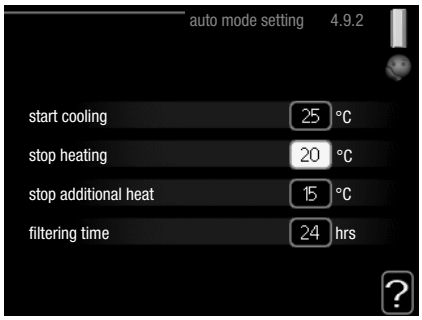
Setting range: 0 – 180 min
Default value: 30 min

Choose here how long the installation should work with each requirement if there are several requirements at the same time. If there is only one requirement the installation only works with that requirement.

The indicator marks where in the cycle the installation is.

If 0 minutes is selected it means that requirement is not prioritised, but will only be activated when there is no other requirement.

Menu 4.9.2 - auto mode setting



start cooling (accessory auto mode setting required)

Setting range: 15 – 40 °C
Factory setting: 25

stop heating

Setting range: -20 – 40 °C
Default values: 17

stop additional heat

Setting range: -25 – 40 °C
Factory setting: 5

filtering time

Setting range: 0 – 48 h
Default value: 24 h

When the operating mode is set to "auto", the control module selects when start and stop of additional heat and heat production is permitted, depending on the average outdoor temperature. If the heat pump has the integrated cooling function and it is activated in the menu you can also select the start temperature for cooling.

Select the average outdoor temperatures in this menu.

You can also set the time over which (filtering time) the average temperature is calculated. If you select 0, the present outdoor temperature is used.

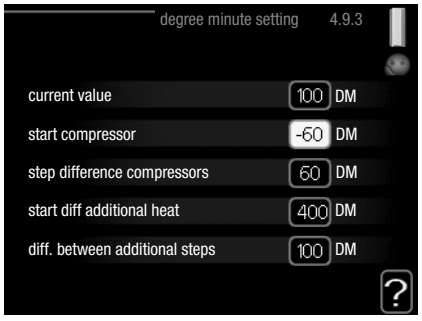
CAUTION

It cannot be set "stop additional heat" higher than "stop heating".

CAUTION

In systems where heating and cooling share the same pipes "stop heating" cannot be set higher than "start cooling" if there is not a cooling/heating sensor.

Menu 4.9.3 - degree minute setting



current value

Setting range: -3000 – 3000

start compressor

Setting range: -1000 – -30
Default value: -60

step difference compressors (RC-HY40 only)

Setting range: 10 – 2000
Default value: 60

start diff additional heat

Setting range: 100 – 2000

Factory setting: 400

diff. between additional steps

Setting range: 10 – 1000
Factory setting: 30

Degree minutes are a measurement of the current heating requirement in the house and determine when the compressor respectively additional heat will start/stop.

CAUTION

Higher value on "start compressor" gives more compressor starts, which increase wear on the compressor. Too low value can give uneven indoor temperatures.

Menu 4.9.4 - factory setting user

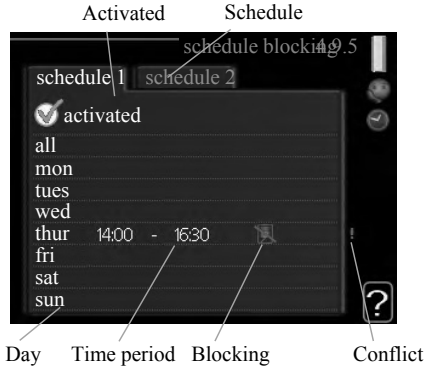
All settings that are available to the user (including advanced menus) can be reset to default values here.

CAUTION

After factory setting, personal settings such as heating curves must be reset.

Menu 4.9.5 - schedule blocking

The additional heat can be scheduled to be blocked for up to two different time periods here.



When scheduling is active the relevant blocking symbol is shown in the main menu on the symbol for the control module.

Schedule: The period to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

Day: Select which day or days of the week the schedule is to apply to here. To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Blocking: The desired blocking is selected here.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.

Blocking the compressor in the outdoor unit.

Blocking additional heat.

TIP

If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

Scheduling always starts on the date that the start time is set for.

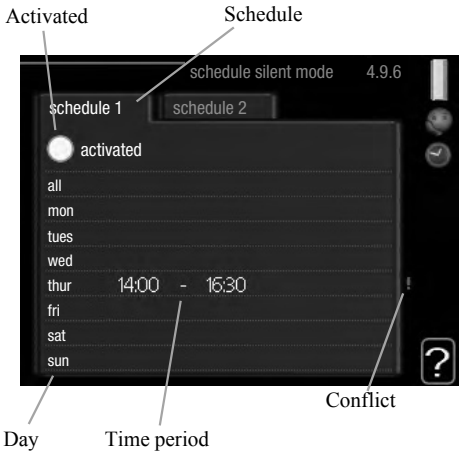
CAUTION

Long term blocking can cause reduced comfort and operating economy.

Menu 4.9.6 - schedule silent mode

The compressor can be scheduled to be set to "silent mode" (the heat pump must support this) for up to two different time periods here.

When scheduling is active the "silent mode" symbol is shown in the main menu on the symbol for the control module.



Schedule: The period to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

Day: Select which day or days of the week the schedule is to apply to here. To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.

TIP

If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

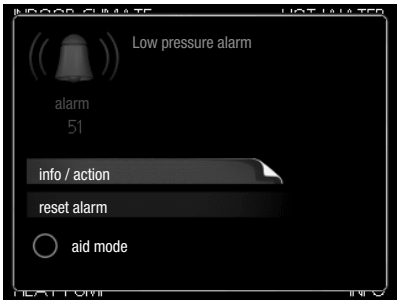
Scheduling always starts on the date that the start time is set for.

CAUTION

Long term scheduling of "silent mode" can cause reduced comfort and operating economy.

Disturbances in comfort

In most cases, the control module notes a malfunction and indicates this with alarms and shows instructions to rectify it in the display. See "Manage alarm" for information about managing alarms. If the malfunction does not appear in the display, or if the display is not lit, the following troubleshooting guide can be used.



Manage alarm

In the event of an alarm, some kind of malfunction has occurred, which is indicated by the status lamp changing from green continuously to red continuously. In addition, an alarm bell appears in the information window.

Alarm

In the event of an alarm with a red status lamp a malfunction has occurred that the heat pump and/or control module cannot remedy itself. In the display, by turning the control knob and pressing the OK button, you can see the type of alarm it is and reset it. You can also choose to set the installation to aid mode.

info / action: Here you can read what the alarm means and receive tips on what you can do to correct the problem that caused the alarm.

reset alarm: In most cases it is enough to select "reset alarm" to correct the problem that caused the alarm. If a green light illuminates after selecting "reset alarm" the alarm has been remedied. If a red light is still visible and a menu called ”alarm” is visible in the display, the problem that caused the alarm remains. If the alarm disappears and then returns, contact your installer.

aid mode: ”aid mode” is a type of emergency mode. This means that the installation produces heat and/or hot water despite there being some kind of problem. This can mean that the heat pump's compressor is not running. In this case any electrical addition produces heat and/or hot water.

CAUTION

Selecting "aid mode" is not the same as correcting the problem that caused the alarm. The status lamp will therefore continue to be red.

If the alarm does not reset, contact your installer for suitable remedial action.

NOTE

Always give the product's serial number (14 digits) when reporting a fault.

Troubleshooting

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

Basic actions

Start by checking the following possible fault sources:

- The switch's position.
- Group and main fuses of the accommodation.
- The property's earth circuit breaker.
- Correctly set load monitor (if installed).

Low hot water temperature or a lack of hot water

This part of the fault-tracing chapter only applies if the water heater is installed in the system.

- Closed or choked filling valve
  - Open the valve.
- Mixing valve (if there is one installed) set too low.
  - Adjust the mixer valve.
- Control module in incorrect operating mode.
  - If mode "manual" is selected, select "addition".
- Large hot water consumption.
  - Wait until the hot water has heated up. Temporarily increased hot water capacity (temporary lux) can be activated in menu 2.1.
- Too low hot water setting.
  - Enter menu 2.2 and select a higher comfort mode.
- Too low or no operating prioritisation of hot water.
  - Enter menu 4.9.1 and increase the time for when hot water is to be prioritised.

Low room temperature

- Closed thermostats in several rooms.
  - Set the thermostats to max, in as many rooms as possible. Adjust the room temperature via menu 1.1, instead of choking the thermostats.
- Control module in incorrect operating mode.
  - Enter menu 4.2. If mode "auto" is selected, select a higher value on "stop heating" in menu 4.9.2.
  - If mode "manual" is selected, select "heating". If this is not enough, select "addition".
- Too low set value on the automatic heating control.
  - Enter menu 1.1 "temperature" and adjust the offset heating curve up. If the room temperature is only low in cold

weather the curve slope in menu 1.9.1 "heating curve" needs adjusting up.

- Too low or no operating prioritisation of heat.
  - − Enter menu 4.9.1 and increase the time for when heating is to be prioritised.
- "Holiday mode" activated in menu 4.7.
  - − Enter menu 4.7 and select "Off".
- External switch for changing the room heating activated.
  - − Check any external switches.
- Air in the climate system.
  - − Vent the climate system.
- Closed valves to the climate system.
  - − Open the valves (contact your installer for assistance in finding them).
- Incorrectly adjusted flow across the heat pump.
  - – Check whether alarm high condenser in (163) or high condenser out (162) is in the alarm log. Follow the instructions for adjusting charge flow.

High room temperature

- Too high set value on the automatic heating control.
  - – Enter menu 1.1 (temperature) and reduce the offset heating curve. If the room temperature is only high in cold weather the curve slope in menu 1.9.1 "heating curve" needs adjusting down.
- External switch for changing the room heating activated.
  - – Check any external switches.

Low system pressure

- Not enough water in the climate system.
  - – Top up the water in the climate system.

The compressor does not start

- There is no heating requirement.
  - – The heat pump does not call on heating nor hot water.
- Temperature conditions tripped.
  - – Wait until the temperature condition has been reset.
- Minimum time between compressor starts has not been reached.
  - – Wait 30 minutes and then check if the compressor has started.
- Alarm tripped.
  - – Follow the display instructions.

Additional heating only

If you are unsuccessful in rectifying the fault and are unable to heat the house, you can, whilst waiting for assistance, continue running the heat pump in ”add. heat only”. This means that additional heating only is used to heat the house.

Set the installation to additional heat mode

1. Go to menu 4.2 op. mode.
2. Mark ”add. heat only” using the control knob and then press the OK button.
3. Return to the main menus by pressing the Back button.

CAUTION

When commissioning without MHI air/water heat pump an alarm communication error may appear in the display.

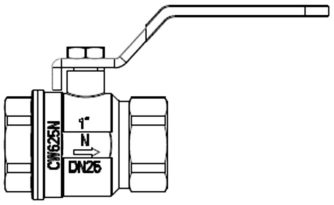
The alarm is reset if the relevant heat pump is deactivated in menu 5.2.2 ("installed slaves")

Maintenance

HSB series

The particle filter in the suppied ball valve which right picture shows shall be cleaned according to the following procedure after installation.

1. Turn the handle to off-position and undo the filter cap.
2. Clean the filter cartridge, reassemble and turn the handle to on-position.

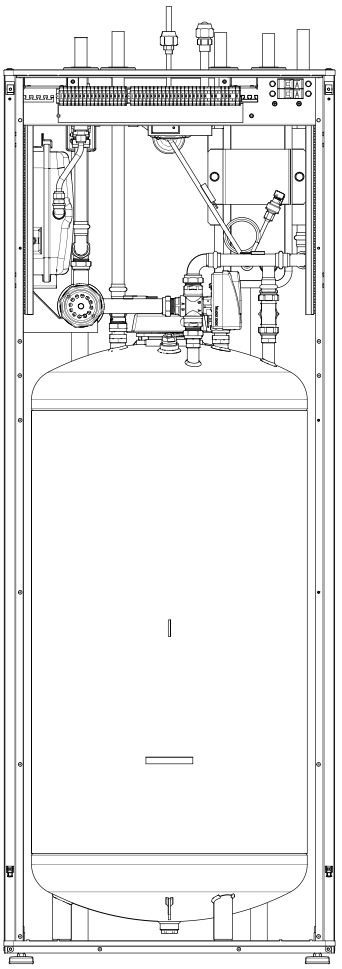


HMK series

IMPORTANT

Maintenance service must only be performed by persons with the required technical knowledge.

When replacing components in HMK60, use exclusively original spare parts.



Emergency mode

Emergency mode is used in the event of problems with operation and during maintenance service. In this mode, the volume of domestic hot water is limited.

Emergency mode is switched on by appropriately setting the switch.

(SF1) in the mode "⚠". This means that:

- Status control is on in yellow.
- The display is not on, and the controller is not connected.
- Temperature at the flow-through heater is controlled by the thermostat (T1).
- Only the circulation pumps and the electric heating module are on. The capacity of the electric heating module in emergency mode is set on the card (AA1).

Emptying the DHW tank

A siphon principle is applied to empty the domestic hot water tank. This can be done via the drain valve on the pipeline supplying cold water, or by placing the hose at the cold water connection.

Emptying the heating system

In order to make maintenance of the heating system easier, the system must first be emptied using the filling valve.

IMPORTANT

When emptying the side of the heating medium / heating system, remember that the pipes might be filled with hot water. There is a risk of burning your skin.

1. Connect the hose to the bottom valve for heating medium filling.
2. Open the valve to empty the heating system.

PT series

Periodic inspections and maintenance are the conditions of continuous operational readiness, reliability and a long service life of the product.

Maintenance activities include the following:

- routine inspections and replacement of the protective magnesium anode
- cleaning of the storage tank

CAUTION

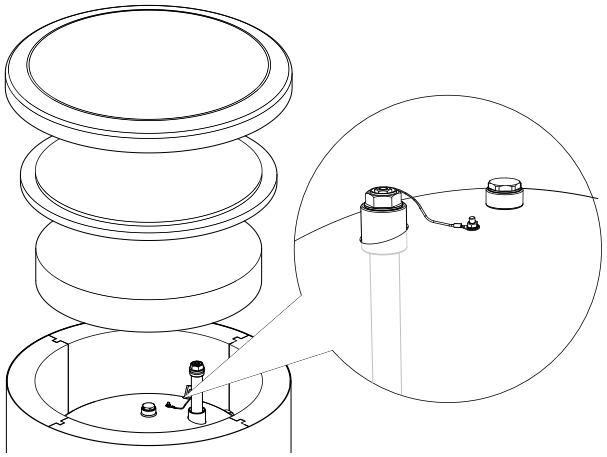
Check the safety valve performance as specified by the valve manufacturer periodically (min. every 14 days) or before each start-up of the heater after decommissioning.

Inspection of the Protective Magnesium Anode

Storage tanks with one coil of PT series are, in order to protect them against corrosion, coated inside with ceramic enamel and in addition, protected with isolated protective magnesium anode. The anode corrodes first under normal operation, thus protecting the storage tank jacket. Therefore, you have to inspect its condition from time to time. Corrosion rate of the protective anode is different and depends upon the quality of water in the area. We recommend checking the protective anode condition once a year in order to ensure optimum corrosion protection.

INFORMATION

The use of the isolated anode allows you to monitor the degree of wear of the anode by measuring the intensity of the protecting direct current without having to remove it and empty the tank (interrupting operation of the storage tank). This solution simplifies operation and additionally contributes to the reliability and long life time.



Insulated protective magnesium anode

Measurement of the Protective Magnesium Anode Wear

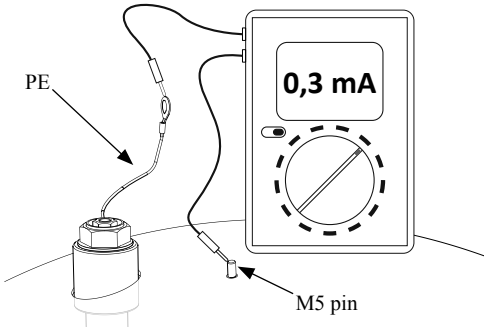
In order to check the degree of wear of the anode, do the following:

1. Remove the housing cover together with thermal insulation.
2. Disconnect the connecting conductor (protective) from the storage tank top head.
3. Connect an electric meter (range in mA) between the protective conductor and the M5 threaded pin and measure the intensity of the protective direct current.

Intensity of the protective direct current should not be lower than 0.3 mA at full storage tank. If it is too low, remove the anode and check its wear visually. If the anode is significantly corroded (above 50 % loss), replace it immediately. Connect the anode protective conductor to the tank after the measurement.

CAUTION

If the current intensity measurements do not indicate any wear of the anode, its max operating time is not longer than 18 months. The anode should be replaced after this time



Measurement of the protective direct current intensity

Replacement of the Protective Magnesium Anode

Replace the protective magnesium anode every 18 months (regardless the measurement). Instead of the magnesium anode, you can use the titanium anode. Install it in accordance with the anode installation manual.

CAUTION

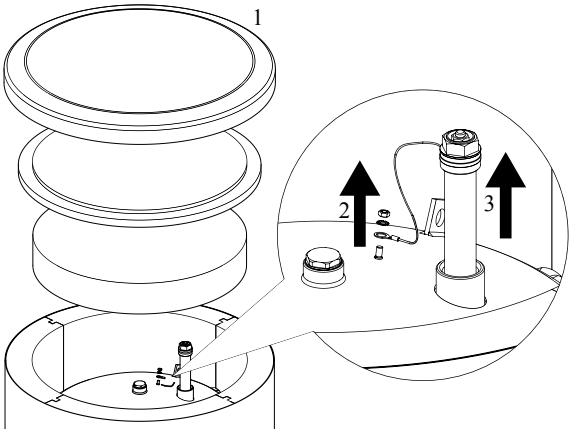
Replace the protective magnesium anode every 18 months. Its timely exchange and proper installation are the conditi-ons to maintain the warranty on the storage tank

When replacing the magnesium anode, follow the procedure below:

1. In units with the electric heating unit installed, disconnect power from the unit first.
2. Switch the storage tank coil heaters OFF and wait until the water inside cools down.
3. Cut-off the hot water supply and drain some water from the tank through the drain valve.
4. Remove the housing cover together with thermal insulation (1).
5. Remove the anode protective conductor (2).
6. Remove the worn magnesium anode (3).
7. Screw the new magnesium anode.
8. Connect the anode protective conductor to the storage tank.
9. Fill the tank with water and vent it as described in par. 4.2 Start-Up.
10. Check tightness of the installed anode.
11. Reinstall the thermal insulation and the housing cover.

Once making the above steps, the storage tank is ready to use.

Ensure that the anode protective conductor is connected to the storage tank top head after installing the new isolated magnesium anode. Lack of contact between the anode and the tank will interfere operation of the anode and the tank will not be protected against corrosion.



Replacement of the protective magnesium anode

Connect the anode protective conductor to the M5 pin fixed to the top head of the storage tank.

Cleaning of the Storage Tank

Boiler scale is precipitated from the heated water during the storage tank operation. The amount of deposited scale depends on the water hardness, the operating temperature and operating time. Heating surfaces covered with boiler scale reduce the heat output of the storage tank, increase power consumption and extend the heating time. It is recommended to clean the storage tank from deposits at least once every two years. In the case of hard or very hard water, cleaning should be carried out at shorter intervals.

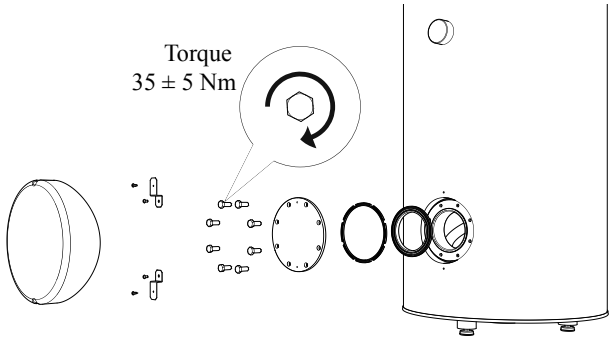
Storage tank cleaning procedure:

1. Prepare a new inspection opening gasket. The old gasket may not be reused (for the list of the inspection opening gaskets, see the manual for PT tank.
2. In storage tanks with the electric heating unit installed, disconnect power from the unit fi rst.
3. Switch the storage tank coil heaters OFF and wait until the water inside cools down.
4. Cut-off the hot water supply and drain the storage tank through the drain valve.
5. Remove the inspection opening blanking plate and gasket
6. Remove the inspection opening screws and flanged cover and flush the storage tank and remove accumulated sludge and lime slurry. If necessary, remove lime deposits from the coil – this guarantees a proper heat exchange. Pay special attention to not damage the ceramic enamel coating.
7. Replace a new gasket and the inspection opening flanged cover. Screw tightening torque: 35±5 Nm.
8. Fill the tank with water and vent it as described in par. 4.2 Start-Up.
9. Check tightness of the inspection opening.
10. Replace the insulation and inspection opening blanking plate.

Once cleaned, the unit is ready to use.

IMPORTANT

During mechanical cleaning, be careful not to damage the enamel. In the case of chemical cleaning, pay special attention to neutralize the chemicals used for cleaning.



Installation of the inspection opening cover (mounting order).

FDCW series

When your heat pump is located outdoors some external maintenance is required.

NOTE

Insufficient oversight can cause serious damage to HSB60, which is not covered by the guarantee.

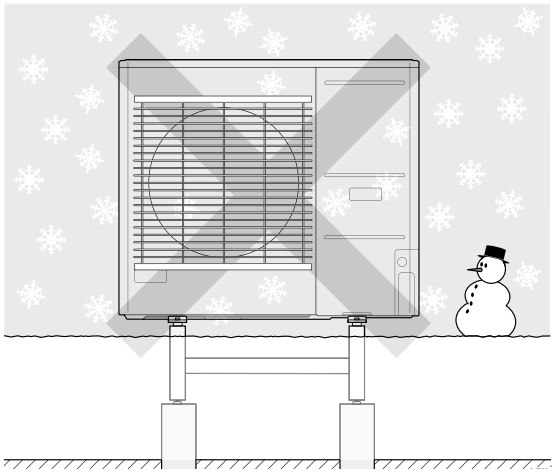
Checking grilles and bottom panel on FDCW

Check that the inlet grille is not clogged by leaves, snow or anything else regularly throughout the year.

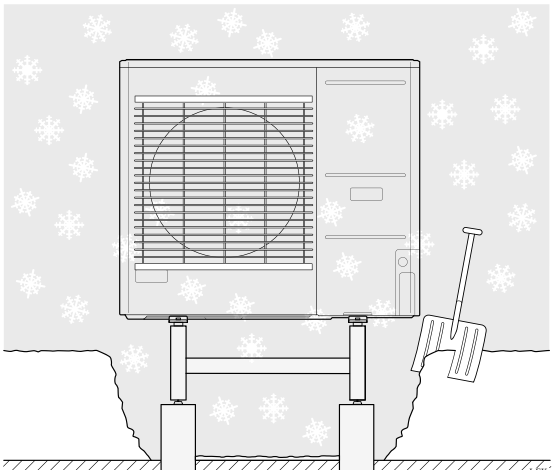
You should be vigilant during windy conditions and/or in the event of snow as the grilles can become blocked.

Also check that the drain holes in the bottom panel (three) are free from dirt and leaves.

Keep free of snow and ice



Prevent snow from building up and covering the grilles and drain holes on FDCW.



Keep free of snow and/or ice.

Cleaning the outer casing

If necessary the outer casing can be cleaned using a damp cloth.

Care must be exercised so that the heat pump is not scratched when cleaning. Avoid spraying water into the grilles or the sides so that water penetrates into FDCW. Prevent FDCW coming into contact with alkaline cleaning agents.

Technical data

Detailed technical specifications for this product can be found in the installation manual.

Check list: Checks before commissioning

Hot water	Notes	Checked
Safety valve	Is it installed in cold water line ?	☐
Mixer valve	Is it installed in right direction ?	☐
		☐

Heating	Notes	Checked
System volume	_____ ℓ	☐
Safety valve	Is FL2 installed ?	☐
Expansion vessel	System volume × 5% or more _____ ℓ	☐
Internal heater	Permitted/prohibited (Menu 5.1.12)	☐
External heat source	Yes → Type _____ Setting (Menu 5.3.2) _____ No	☐
		☐

Cooling	Notes	Checked
Pipe system, condensation insulation		☐
Reversing valve (QN12)	Is it installed in right direction ?	☐
		☐

Refrigerant system	Notes	Checked
Pipe length (within 30m)	_____ m	☐
Height difference (within 7m)	_____ m	☐
Test pressurization	41.5 bar	☐
Leak tracing		☐
End pressure evacuation	-1 bar or lower for one hour	☐
		☐

Electrical installation	Notes	Checked
Property's main fuse	3/1 phase _____ A	☐
Group fuse	3/1 phase _____ A	☐
Current limiter/current sensor	Is it installed properly if the power source is 3 phase ?	☐
		☐

Accessories	Notes	Checked
External circulation pump	Yes/No	☐
Buffer vessel	Yes/No Volume _____ ℓ	☐
Relief valve	Yes/No	☐
Room sensor	Yes/No _____ Setting (Menu 1.9.4, 1.9.5)	☐
		☐

Glossary

Additional heat

The additional heat is the heat produced in addition to the heat supplied by the compressor in your heat pump. Additional heaters can be for example, immersion heater, electric heater, solar power system, gas/oil/pellet/wood burner or district heating.

Calculated flow line temperature

The temperature that the heat pump calculates that the heating system requires for an optimum accommodation temperature. The colder the outdoor temperature, the higher the calculated supply temperature.

Circulation pump

Pump that circulates liquid in a pipe system.

Climate system

Climate systems can also be called heating systems. The building is heated using radiators, under floor coils or convector fans.

Compressor

Compresses the gas state refrigerant. When the refrigerant is compressed, the pressure and the temperature increase.

Condenser

Heat exchanger where the hot gas state refrigerant condenses (cooled and becomes a liquid) and releases heat energy to the house heating and hot water systems.

COP

If a heat pump has COP of 5, this means that you only pay for a fifth of your heating demand. This is the efficiency of the heat pump. This is measured at different measurement values, e.g.: 7 / 45 where 7 stands for the outdoor temperature and where 45 stands for how many degrees the supply temperature is maintaining.

Disturbances in comfort

Disturbances in comfort are undesirable changes to the hot water/indoor comfort, for example when the temperature of the hot water is too low or if the indoor temperature is not at the desired level.

A malfunction in the heat pump can sometimes be noticed in the form of a disturbance in comfort.

In most cases, the heat pump notes operational interference and indicates this with alarms and shows instructions in the display.

Domestic hot water

The water one showers in for example.

DUT, dimensioned outdoor temperature

The dimensioned outdoor temperature differs depending on where you live. The lower the dimensioned outdoor temperature, the lower the value should be selected on "selecting a heat curve".

Efficiency

A measurement of how effective the heat pump is. The higher the value is the better it is.

Electrical addition

This is electricity that, for example, an immersion heater uses as addition during the coldest days of the year to cover the heating demand that the heat pump cannot manage.

Filtering time

Indicates the time the average outdoor temperature is calculated on.

Flow pipe

The line in which the heated water is transported from the heat pump out to the house heating system (radiators/heating coils).

Heat exchanger

Device that transfers heat energy from one medium to another without mixing mediums. Examples of different heat exchangers are evaporators and condensers.

Heat factor

Measurement of how much heat energy the heat pump gives off in relation to the electric energy it needs to operate. Another term for this is COP.

Heating curve

The heating curve determines which heat the heat pump is to produce depending on the temperature outdoors. If a high value is selected, this tells the heat pump that it must produce a lot of heat when it is cold outdoor temperature in order to achieve a warm indoor temperature.

Heating medium

Hot liquid, usually normal water, which is sent from the heat pump to the house climate system and makes the accommodation warm. The heating medium also heats the hot water through the double jacketed tank or coil tank.

Heating medium side

Pipes to the house’s climate system and condenser make up the heating medium side.

Mixing valve

A valve that mixes the cold water with the hot water leaving the heater.

Outside sensor

A sensor that is located outdoors. This sensor tells the heat pump how hot it is outdoors.

Pressostat

Pressure switch that triggers an alarm and/or stops the compressor if non-permitted pressures occur in the system. A high pressure pressostat trips if the condensing pressure is too great. A low pressure pressostat trips if the evaporation pressure is too low.

Radiator

Another word for heating element. They must be filled with water in order to be used with RC-HY20/40.

Return pipe

The line in which the water is transported back to the heat pump from the house heating system (radiators/heating coils).

Return temp

The temperature of the water that returns to the heat pump after releasing the heat energy to the radiators/heating coils.

Room sensor

A sensor that is located indoors. This sensor tells the heat pump how hot it is indoors.

Safety valve

A valve that opens and releases a small amount of liquid if the pressure is too high.

Shuttle valve

A valve that can send liquid in two directions. A shuttle valve that enables liquid to be sent to the climate system, when the heat pump produces heating for the house, and to the hot water heater, when the heat pump produces hot water.

Supply temperature

The temperature of the heated water that the heat pump sends out to the heating system. The colder the outdoor temperature, the higher the supply line temperature becomes.

Water heater

Container where domestic water is heated. Is located somewhere outside the heat pump.

Installation

Outdoor unit installation

PSC012D066J

60VNX
Designed for R410A refrigerant

FDCW60VNX-A

◎This installation manual deals with outdoor units and general installation specifications only. For indoor units, refer to the respective installation manuals supplied with the units.
◎Read this manual carefully before you set to installation work and carry it out according to the instructions contained in this manual.

SAFETY PRECAUTIONS

- We recommend you to read this "SAFETY PRECAUTIONS" carefully before the installation work in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNING and ⚠CAUTION. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNING and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTION. **These are very important precautions for safety. Be sure to observe all of them without fail.**
- The meaning of "Marks" used here are as shown below.

⃠	Never do it under any circumstance.	❗	Always do it according to the instruction

- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual. If unusual noise can be heard during the test run, consult the delar.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user.
- Our company does not assume any responsibility for the damage caused by use of our products without following the instructions mentioned in our manuals.

⚠ WARNING

- **Installation must be carried out by the qualified installer.**
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction.
- **Install the system in full accordance with the instruction manual.**
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- **Be sure to wear protective goggles and gloves while performing installation work.**
  Improper safety measures can result in personal injury.
- **Use the original accessories and the specified components for installation.**
  If parts other than those prescribed by us are used, It may cause fall of the unit, water leaks, electric shocks, fire, refrigerant leak, substandard performance, control failure and personal injury.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage accordance with ISO5149.**
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- **Ventilate the working area well in the event of refrigerant leakage during installation.**
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- **After completed installation, check that no refrigerant leaks from the system.**
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- **Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.**
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit
- **Install the unit in a location with good support.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury
- **The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.**
  Power source with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire,
- **Be sure to shut off the power before starting electrical work.**
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- **Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.**
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- **Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.**
  Loose connections or cable mountings can cause anomalous heat production or fire.
- **Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.**
  Incorrect installation may result in overheating and fire.
- **Do not process, splice or modify the power cable, or share the socket with other power plugs.**
  Improper power cable or power plug can cause fire or electric shock due to poor connection, insufficient insulation or over-current.
- **This appliance must be connected to main power source by means of a circuit breaker or switch with a contact separation of at least 3mm.**
  Improper electrical work can cause unit failure or personal injury.
- **When plugging this unit, a plug conforming to the norm IEC60884-1 must be used.**
  Using improper plug can cause electric shock or fire.
- **Do not perform brazing work in the airtight room**
  It can cause lack of oxygen.
- **Use the prescribed pipes, flare nuts and tools for R410A.**
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- **Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.**
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- **Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.**
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked into refrigerant circuit, which can cause burst or personal injury due to anomalously high pressure in the refrigerant
- **Only use prescribed option parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not perform any change of protective device itself or its setup condition**
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- **Be sure to switch off the power source in the event of installation, inspection or servicing.**
  If the power source is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- **Consult the dealer or an expert regarding removal of the unit.**
  Incorrect installation can cause water leaks, electric shocks or fire.
- **Stop the compressor before closing valve and disconnecting refrigerant pipes in case of pump down operation.**
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit
- **Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.**
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- **Do not run the unit with removed panels or protections**
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- **Be sure to fix up the service panels.**
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- **Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.**
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.
- **Do not use any other refrigerant except the HFC-refrigerant (R410A).**
  It may cause the serious trouble like malfunction or explosion.
- **Do not vent R410A into atmosphere.**
  R410A is a fluorinated greenhouse gas with a Global Warming Potential(GWP)=2088.

⚠ CAUTION

- **Carry out the electrical work for ground lead with care**
  Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting. Never connect the grounding wire to a gas pipe because if gas leaks,it could cause explosion or ignition.
- **Use the circuit breaker for all pole with correct capacity.**
  Using the incorrect circuit breaker, it can cause the unit malfunction and fire.
- **Install isolator or disconnect switch on the power source wiring in accordance with the local codes and regulations.**
  The isolator should be locked in accordanced with EN60204-1.
- **Take care when carrying the unit by hand.**
  If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.
- **Dispose of any packing materials correctly.**
  Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and dispose of it after tear it up.
- **Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.**
  If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.
- **Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.**
  Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **Perform installation work properly according to this installation manual.**
  Improper installation can cause abnormal vibrations or increased noise generation.
- **Earth leakage breaker of appropriate capacity must be installed**
  If the earth leakage breaker of appropriate capacity is not installed, it can cause fire or electric shocks.
- **Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.**
  Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- **Do not install the unit near the location where leakage of combustible gases can occur.**
  If leaked gases accumulate around the unit, it can cause fire.
- **Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.**
  Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place..
- **When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.**
  If safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- **Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics**
  Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- **Do not install the outdoor unit in a location where insects and small animals can inhabit.**
  Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.
- **Do not use the base flame for outdoor unit which is corroded or damaged due to long periods of operation.**
  Using an old and damage base flame can cause the unit falling down and cause personal injury.
- **Do not install the unit in the locations listed below**
  •Locations where carbon fiber, metal powder or any powder is floating.
  •Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
  •Vehicles and ships
  •Locations where cosmetic or special sprays are often used.
  •Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
  •Locations where any machines which generate high frequency harmonics are used.
  •Locations with salty atmospheres such as coastlines
  •Locations with heavy snow (If installed, be sure to provide base flame and snow hood mentioned in the manual)
  •Locations where the unit is exposed to chimney smoke
  •Locations at high altitude (more than 1000m high)
  •Locations with ammonic atmospheres (e.g. organic fertilizer)
  •Locations with calcium chloride (e.g. snow melting agent)
  •Locations where heat radiation from other heat source can affect the unit
  •Locations without good air circulation.
  •Locations with any obstacles which can prevent inlet and outlet air of the unit
  •Locations where short circuit of air can occur (in case of multiple units installation)
  •Locations where strong air blows against the air outlet of outdoor unit
  It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- **Do not install the outdoor unit in the locations listed below.**
  •Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
  •Locations where outlet air of the outdoor unit blows directly to an animal or plants. The outlet air can affect adversely to the plant etc.
  •Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
  •Locations where vibration and operation sound generated by the outdoor unit can affect seriously. (on the wall or at the place near bed room)
  •Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  •Locations where drainage cannot run off safely.
  It can affect surrounding environment and cause a claim
- **Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.**
  It can cause the damage of the items.
- **Do not touch any buttons with wet hands**
  It can cause electric shocks
- **Do not touch any refrigerant pipes with your hands when the system is in operation.**
  During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.
- **Do not clean up the unit with water**
  It can cause electric shocks
- **Do not operate the outdoor unit with any article placed on it.**
  You may incur property damage or personal injure from a fall of the article.
- **Do not step onto the outdoor unit.**
  You may incur injury from a drop or fall.
- **Do not put anything on the outdoor unit.**
  Object may fall causing property damage or personal injury.
- **Do not touch the aluminum fin of the outdoor unit.**
  Aluminium fin temperature is high during heating operation. Touching fin can cause burn.

1. TOOLS

Locally procured parts	
(a)	Anchor bolt(M10-M12)×4 pcs
(b)	Putty
(c)	Electrical tape
(d)	Connecting pipe
(e)	Connecting cable
(f)	Power cable
(g)	Clamp and screw (for finishing work)

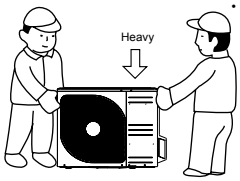
Tools for installation work		
Plus headed driver	Spanner wrench	Vacuum pump*
Knife	Torque wrench [14.0-62.0N/m(1.4-6.2kgf•m)]	Gauge manifold *
Saw	Wrench key (Hexagon) [4mm]	Charge hose *
Tape measure	Flaring tool set *	Vacuum pump adapter* (Anti-reverse flow type)
Pipe cutter	Flare adjustment gauge	Gas leak detector *

*Designed specifically for R410A

2. OUTDOOR UNIT INSTALLATION

1. Haulage

- Always carry or move the unit with two or more persons.
- The right hand side of the unit as viewed from the front (outlet side) is heavier.
  A person carrying the right hand side must take care of this fact. A person carrying the left hand side must hold the handle provided on the front panel of the unit with his right hand and the corner column section of the unit with his left hand.



⚠ CAUTION

When a unit is hauled, take care of its gravity center position which is shifted towards right hand side.
If the unit is not hauled properly, it can go off balance and fall resulting in serious injury.

2. Selecting the installation location

Select the suitable installation location where:

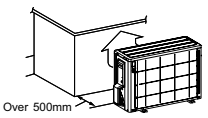
- Unit will be stable, horizontal and free of any vibration transmission.
- There is no obstacle which can prevent smooth air circulation from inlet and outlet side of the unit.
- There is enough space for service and maintenance of unit.
- Neighbours are not bothered by noise or air generating from the unit.
- Outlet air of the unit does not blow directly to animals or plants.
- Drain water can be discharged properly.
- There is no risk of flammable gas leakage.
- There are no other heat sources nearby.
- Unit is not directly exposed to rain or sunlight.
- Unit is not directly exposed to oil mist and steam.
- Chemical substances like ammonia (organic fertilizer), calcium chloride (snow melting agent) and acid (sulfurous acid etc.), which can harm the unit, will not generate or accumulate.
- Unit is not directly exposed to corrosive gases (like sulphide gas, chloride gas), sea breeze or salty atmosphere.
- No TV set or radio receiver is placed within 1m.
- Unit is not affected by electromagnetic waves and/or high-harmonic waves generated by other equipments.
- Strong wind does not blow against the unit outlet.
- Heavy snowfalls do not occur (If installed, provide proper protection to avoid snow accumulation).

NOTE

If the unit is installed in the area where there is a possibility of strong wind or snow accumulation, the following measures are required.

(1) Location of strong wind

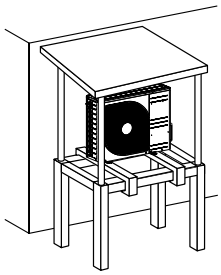
- Place the unit with its outlet side facing the wall.
- Place the unit such that the direction of air from the outlet gets perpendicular to the wind direction.



- Use wind guard in case outdoor unit is installed where ambient temperature drops below -10˚C and natural wind blows into outdoor unit directly.
  For details, refer to technical manual.

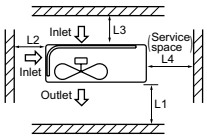
(2) Location of snow accumulation

- Install the unit on the base so that the bottom is higher than snow cover surface.
- Install the unit under eaves or provide the roof on site.



3. Installation space

- There must be 1 meter or larger space between the unit and the wall in at least 1 of the 4 sides. Walls surrounding the unit from 4 sides is not acceptable. The wall height on the outlet side should be 1200 mm or less. Refer to the following figure and table for details.



(mm)

Size \ Example installation	I	II	III	IV
L1	Open	280	280	180
L2	100	75	Open	Open
L3	100	80	80	80
L4	250	Open	250	Open

NOTE

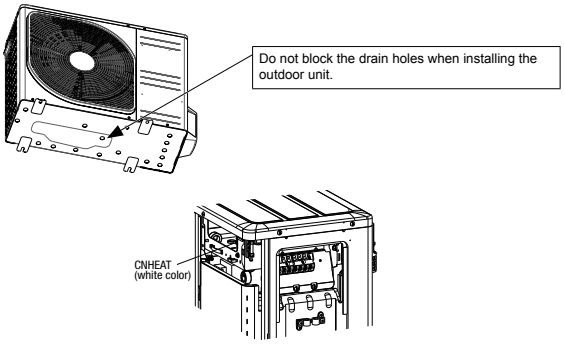
When more than one unit are installed side by side, provide a 250mm or wider interval between them as a service space.

⚠ CAUTION

When more than one unit are installed in parallel directions, provide sufficient inlet space so that short-circuiting may not occur.

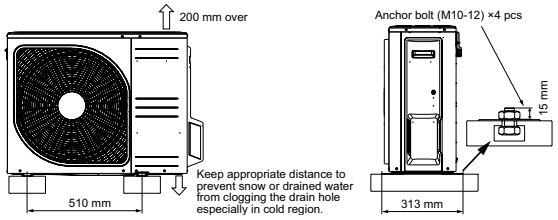
4. Drain piping work (If necessary)

Carry out drain piping work if condensed water needs to be drained out.
(1) Prepare another drain tray made of metallic material for collecting drain when base heater is used.
(2) Do not use drain elbow and grommet made of plastic for drain piping when base heater for outdoor unit is used. Plastic grommet and elbow will be damaged and burnt in worst case.
(3) In case plastic grommet and drain elbow is used in warm climate area, disconnet the connector for heater on PCB shown in the drawing.



5. Installation

- Install the unit on a flat level base.
- While installing the unit, keep space and fix the unit's legs with 4 anchor bolts as shown in the figure below. The protrusion of an anchor bolt from the foundation surface must be kept within 15mm.

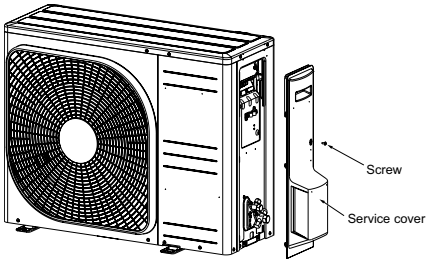


⚠ CAUTION

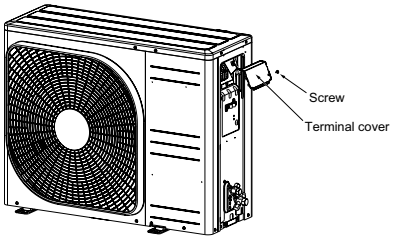
- Install the unit properly so that it does not fall over during earthquake, strong wind, etc.
- Make sure that unit is installed on a flat level base. Installing unit on uneven base may result in unit malfunction.

3. PREPARATION FOR WORK

1. Removing service cover
Remove the screw. Slide service cover downwards and remove it.



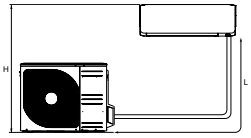
2. Removing terminal cover
Remove the screw and take out terminal cover.



4. CONNECTING PIPING WORK

1. Restrictions on unit installation
Abide by the following restrictions on unit installation.
Improper installation can cause compressor failure or performance degradation.

	Dimensional restrictions
Connecting pipe length(L)	30m or less
Elevation difference between indoor and outdoor units(H)*	7m or less



* Outdoor unit installation position can be higher as well as lower than the indoor unit installation position.

2. Preparation of connecting pipe

2.1. Selecting connecting pipe
Select connecting pipe according to the following table.

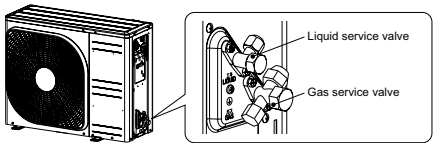
	Pipe diameter (mm)	Minimum thickness (mm)
Gas pipe	ø12.7	0.8
Liquid pipe	ø6.35	0.8

* Pipe material must be O-type (Phosphorus deoxidized seamless copper pipe ICS 23.040.15, ICS 77.150.30).

2.2. Cutting connecting pipe
(1) Cut the connecting pipe to the required length with pipe cutter.
(2) Hold the pipe downward and remove the burrs. Make sure that no foreign material enters the pipe.
(3) Cover the connecting pipe ends with the tape.

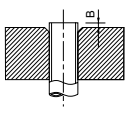
3. Piping work

Check that both liquid and gas service valves are fully closed.
Carry out the piping work with service valves fully closed.



3.1. Flaring pipe
(1) Take out flare nuts from the service valves of outdoor unit and engage them onto connecting pipes.
(2) Flare the pipes according to table and figure shown below.
Flare dimensions for R410A are different from those for conventional refrigerant.
Although it is recommended to use the flaring tools designed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a flare adjustment gauge.

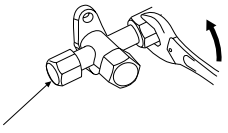
Copper pipe outer diameter	A 0 −0.4
ø6.35	9.1
ø9.52	13.2
ø12.7	16.6



Copper pipe outer diameter	Rigid (clutch) type	
	R410A	Conventional
ø6.35	0–0.5	1.0–1.5
ø9.52		
ø12.7		

3.2. Connecting pipes
(1) Connect pipes on both liquid and gas sides.
(2) Tighten nuts to specified torque shown in the table below.

Service valve size (mm)	Tightening torque (N·m)
ø6.35 (1/4")	14–18
ø9.52 (3/8")	34–42
ø12.7 (1/2")	49–61

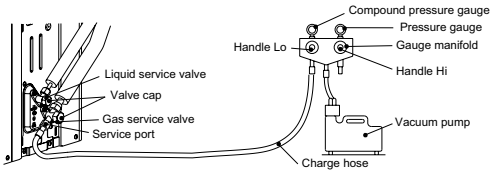


Do not hold the valve cap area with a spanner

⚠ CAUTION
• Do not apply refrigerating machine oil to the flared surface. It can cause refrigerant leakage.
• Do not apply excess torque to the flared nuts. The flared nuts may crack resulting in refrigerant leakage.

4. Evacuation
(1) Connect vacuum pump to gauge manifold. Connect charge hose of gauge manifold to service port of outdoor unit.
(2) Run the vacuum pump for at least one hour after the vacuum gauge shows -0.1MPa (–76cm Hg).
(3) Confirm that the vacuum gauge indicator does not rise even if the system is left for 15 minutes or more.
Vacuum gauge indicator will rise if the system has moisture left inside or has a leakage point.
Check the system for the leakage point. If leakage point is found, repair it and return to (1) again.
(4) Close the Handle Lo and stop the vacuum pump.
Keep this state for a few minutes to make sure that the compound pressure gauge pointer does not swing back.
(5) Remove valve caps from liquid service valve and gas service valve.
(6) Turn the liquid service valve's rod 90 degree counterclockwise with a hexagonal wrench key to open valve.
Close it after 5 seconds, and check for gas leakage.
Using soapy water, check for gas leakage from indoor unit's flare and outdoor unit's flare and valve rods.
Wipe off all the water after completing the check.
(7) Disconnect charging hose from gas service valve's service port and fully open liquid and gas service valves. (Do not attempt to turn valve rod beyond its stop.)
(8) Tighten service valve caps and service port cap to the specified torque shown in the table below.

Service valve size (mm)	Service valve cap tightening torque (N·m)	Service port cap tightening torque (N·m)
ø6.35 (1/4")	20–30	10–12
ø9.52 (3/8")		
ø12.7 (1/2")	25–35	



⚠ CAUTION
• To prevent different oil from entering into the refrigeration system, do not use tools designed for any other refrigerant type (R22, R407C, etc.).
• To prevent vacuum pump oil from entering into the refrigeration system, use a counterflow prevention adapter.

5. Additional refrigerant charge
Additional refrigerant charge is required only when connecting pipe length exceeds 15 m.

5.1 Calculating additional refrigerant charge
Additional refrigerant charge can be calculated using the formula given below.
Additional refrigerant charge (g) = { Connecting pipe length (m) – Factory charged length 15 (m) } x 20 (g/m)

NOTE
• If additional refrigerant charge calculation result is negative, there is no need to remove the refrigerant.
• If refrigerant recharge is required for the unit with connecting pipe length 15m or shorter, charge the factory charged volume as shown in the table below.

Factory charged volume(kg)	1.50

5.2 Charging refrigerant
(1) Charge the R410A refrigerant in liquid phase from service port with both liquid and gas service valves shut. Since R410A refrigerant must be charged in the liquid phase, make sure that refrigerant is discharged from the cylinder in the liquid phase all the time.
(2) When it is difficult to charge a required refrigerant volume, fully open both liquid and gas service valves and charge refrigerant, while running the unit in the cooling mode. When refrigerant is charged with the unit being run, complete the charge operation within 30 minutes.
(3) Write the additional refrigerant charge calculated from the connecting pipe length on the label attached on the service cover.

⚠ CAUTION
Running the unit with an insufficient quantity of refrigerant for a long time can cause unit malfunction.

5. ELECTRICAL WIRING WORK

⚠ WARNING

- Make sure that all the electrical work is carried out in accordance with the national or regional electrical standards.
- Make sure that the earth leakage breaker and circuit breaker of appropriate capacities are installed (Refer to the table given below).
- Do not turn on the power until the electrical work is completed.
- Do not use a condensive capacitor for power factor improvement under any circumstances. (It does not improve power factor. Moreover, it can cause an abnormal overheat accident).

Breaker specifications

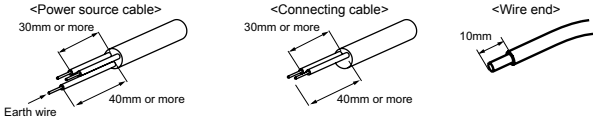
Phase	Earth leakage breaker	Circuit breaker
Single phase	Leakage current: 30mA, 0.1sec or less	Over current: 20A

Main fuse specification

Specification	Parts No.	Code on LABEL,WIRING
250V 20A	SSA564A136A	F4

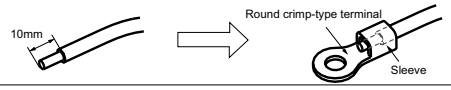
1.Preparing cable

(1) Selecting cable
Select the power source cable and connecting cable in accordance with the specifications mentioned below.
(a) Power source cable
3 cores* 2.0mm^2 or more, conformed with 60245 IEC57
When selecting the power source cable length, make sure that voltage drop is less than 2%.
If the wire length gets longer, increase the wire diameter.
(b) Connecting cable
2 cores* 1.5mm^2, conformed with 60245 IEC57
* 1 Earth wire is included (Yellow).
(2) Arrange each wire length connecting to the outside unit as shown below.
Make sure that each wire is stripped 10mm from the end.



Refer to the installation manual for Indoor unit when arrange each wire connecting to the Indoor unit.

(3) Attach round crimp-type terminal to each wire connecting to the outside unit as shown in the below.
Select the size of round crimp-type terminal after considering the specifications of terminal block and wire diameter.



Refer to the installation manual for Indoor unit when arrange each wire connecting to the Indoor unit.

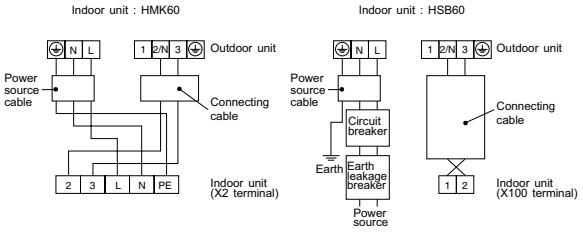
⚠ CAUTION

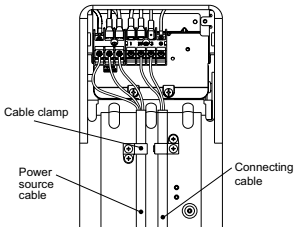
Power source cable and connecting cable must conform to the specifications mentioned in the manual. Using cables with wrong specifications may result in unit malfunction.

2.Connecting cable

(1) Remove the service cover.
(2) Connect the cables according to the instructions and figures given below.
(a) Connect the earth wire of power source cable.
An earth wire must be connected before connecting the other wires of power source cable.
Keep the earth wire longer than the remaining two wires of power source cable.
(b) Connect the remaining two wires (N and L) of power source cable.
(c) Connect the wires of connecting cable. Make sure that for each wire, outdoor and indoor side terminal numbers match.
(3) Fasten the cables properly with cable clamps so that no external force may work on terminal connections.
Moreover, make sure that cables do not touch the piping, etc. When cables are connected, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection.

<Circuit diagram>

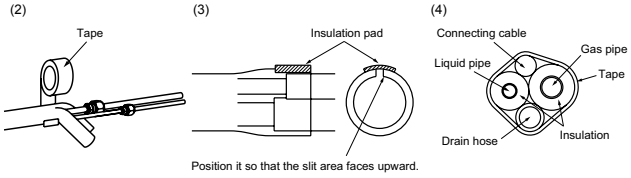




6. FINISHING WORK

1. Heating and condensation prevention

(1) Dress the connecting pipes (both liquid and gas pipes) with insulation to prevent it from heating and dew condensation.
Use the heat insulating material which can withstand 120°C or higher temperature. Make sure that insulation is wrapped tightly around the pipes and no gap is left between them.
(2) Wrap the refrigerant pipings of indoor unit with indoor unit heat insulation using tape.
(3) Cover the flare-connected joints (indoor side) with the indoor unit heat insulation and wrap it with an insulation pad (standard accessory provided with indoor unit).
(4) Wrap the connecting pipes, connecting cable and drain hose with the tape.



NOTE

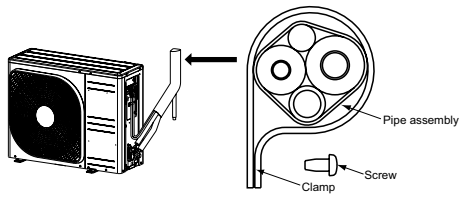
Locations where relative humidity exceeds 70%, both liquid and gas pipes need to be dressed with 20mm or thicker heat insulation materials.

⚠ CAUTION

- Improper insulation can cause condensate(water) formation during cooling operation. Condensate can leak or drip causing damage to household property.
- Poor heat insulating capacity can cause pipe outer surface to reach high temperature during heating operation. It can cause cable deterioration and personal injury.

2.Finishing work

(1) Make sure that the exterior portion of connecting pipes, connecting cable and drain hose is wrapped properly with tape. Shape the connecting pipes to match with the contours of the pipe assembly route.
(2) Fix the pipe assembly with the wall using clamps and screws. Pipe assembly should be anchored every 1.5m or less to isolate the vibration.
(3) Install the service cover securely. Water may enter the unit if service cover is not installed properly, resulting in unit malfunction and failure.



⚠ CAUTION

Make sure that the connecting pipes do not touch the components within the unit. If pipes touch the internal components, it may generate abnormal sounds and/or vibrations.

7. INSTALLATION TEST CHECK POINTS

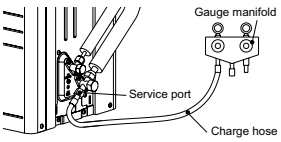
After finishing the installation work, check the following points again before turning on the power.
Conduct test run (Refer to indoor unit installation manual) and ensure that the unit operates properly.

Power source voltage complies with the rated voltage of air-conditioner.	
Earth leakage breaker and circuit breaker are installed.	
Power cable and connecting cable are securely fixed to the terminal block.	
Both liquid and gas service valves are fully open.	

No gas leaks from the joints of the service valves.	
Indoor and outdoor side pipe joints have been insulated.	
Drain hose (if installed) is fixed properly.	
Screw of the service cover is tightened properly.	

8. PUMP DOWN (IN CASE OF RELOCATION OR DISPOSAL OF UNIT)

(1) Connect charge hose of gauge manifold to service port of outdoor unit.
(2) Close the liquid service valve with hexagonal wrench key.
(3) Fully open the gas service valve with hexagonal wrench key.
(4) Carry out forced cooling operation (For forced cooling operation procedure, refer to indoor unit installation manual).
(5) When the low pressure gauge becomes 0.01MPa, close the gas service valve and stop forced cooling operation.



FDCW71, 100, 140VNX-A

PSC012D066M

71VNX, 100VNX, 140VNX
Designed for R410A refrigerant

◎This installation manual deals with outdoor units and general installation specifications only. For indoor units, refer to the respective installation manuals supplied with the units.
◎Read this manual carefully before you set to installation work and carry it out according to the instructions contained in this manual.

SAFETY PRECAUTIONS

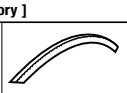
- We recommend you to read this "SAFETY PRECAUTIONS" carefully before the installation work in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNING and ⚠CAUTION. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNING and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTION. **These are very important precautions for safety. Be sure to observe all of them without fail.**
- The meaning of "Marks" used here are as shown below.

⃠	Never do it under any circumstance.	❗	Always do it according to the instruction

- 5 and 6 HP units of single phase power source are equipment complying with IEC 61000-3-12.
- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user.
- Our company does not assume any responsibility for the damage caused by use of our products without following the instructions mentioned in our manuals.

Check before installation work

[Accessory]

Edging		1 piece	knock-out hole protection (100VNX, 140VNX only)

- Model name and power source
- Refrigerant piping length
- Piping, wiring and miscellaneous small parts
- Indoor unit installation manual

⚠ WARNING

- **Installation must be carried out by the qualified installer.**
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction.
- **Install the system in full accordance with the instruction manual.**
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- **Use the original accessories and the specified components for installation.**
  If parts other than those prescribed by us are used, It may cause fall of the unit, water leaks, electric shocks, fire, refrigerant leak, substandard performance, control failure and personal injury.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage accordance with ISO5149.**
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- **Ventilate the working area well in the event of refrigerant leakage during installation.**
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- **After completed installation, check that no refrigerant leaks from the system.**
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- **Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.**
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit
- **Install the unit in a location with good support.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury
- **The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.**
  Power source with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire,
- **Be sure to shut off the power before starting electrical work.**
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- **Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.**
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- **Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.**
  Loose connections or cable mountings can cause anomalous heat production or fire.
- **Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.**
  Incorrect installation may result in overheating and fire.
- **Do not perform brazing work in the airtight room**
  It can cause lack of oxygen.
- **Use the prescribed pipes, flare nuts and tools for R410A.**
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- **Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.**
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- **Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.**
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked into refrigerant circuit, which can cause burst or personal injury due to anomalously high pressure in the refrigerant
- **Only use prescribed option parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not perform any change of protective device itself or its setup condition**
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- **Be sure to switch off the power source in the event of installation, inspection or servicing.**
  If the power source is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- **Consult the dealer or an expert regarding removal of the unit.**
  Incorrect installation can cause water leaks, electric shocks or fire.
- **Stop the compressor before closing valve and disconnecting refrigerant pipes in case of pump down operation.**
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit
- **Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.**
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- **Do not run the unit with removed panels or protections**
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- **Be sure to fix up the service panels.**
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- **Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.**
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.
- **Do not use any other refrigerant except the HFC-refrigerant (R410A).**
  It may cause the serious trouble like malfunction or explosion.

⚠ CAUTION

- **Carry out the electrical work for ground lead with care**
  Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting. Never connect the grounding wire to a gas pipe because if gas leaks,it could cause explosion or ignition.
- **Use the circuit breaker for all pole with correct capacity.**
  Using the incorrect circuit breaker, it can cause the unit malfunction and fire.
- **Install isolator or disconnect switch on the power source wiring in accordance with the local codes and regulations.**
  The isolator should be locked in accordanced with EN60204-1.
- **Take care when carrying the unit by hand.**
  If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.
- **Dispose of any packing materials correctly.**
  Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.
- **Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.**
  If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.
- **Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.**
  Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **Perform installation work properly according to this installation manual.**
  Improper installation can cause abnormal vibrations or increased noise generation.
- **Earth leakage breaker must be installed**
  If the earth leakage breaker is not installed, it can cause fire or electric shocks.
- **Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.**
  Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- **Do not install the unit near the location where leakage of combustible gases can occur.**
  If leaked gases accumulate around the unit, it can cause fire.
- **Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.**
  Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place..
- **When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.**
  If safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- **Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics**
  Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- **Do not install the outdoor unit in a location where insects and small animals can inhabit.**
  Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.
- **Do not use the base flame for outdoor unit which is corroded or damaged due to long periods of operation.**
  Using an old and damage base flame can cause the unit falling down and cause personal injury.
- **Do not install the unit in the locations listed below**
  ·Locations where carbon fiber, metal powder or any powder is floating.
  ·Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
  ·Vehicles and ships
  ·Locations where cosmetic or special sprays are often used.
  ·Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
  ·Locations where any machines which generate high frequency harmonics are used.
  ·Locations with salty atmospheres such as coastlines
  ·Locations with heavy snow (If installed, be sure to provide base flame and snow hood mentioned in the manual)
  ·Locations where the unit is exposed to chimney smoke
  ·Locations at high altitude (more than 1000m high)
  ·Locations with ammonic atmospheres (e.g. organic fertilizer)
  ·Locations with calcium chloride (e.g. snow melting agent)
  ·Locations where heat radiation from other heat source can affect the unit
  ·Locations without good air circulation.
  ·Locations with any obstacles which can prevent inlet and outlet air of the unit
  ·Locations where short circuit of air can occur (in case of multiple units installation)
  ·Locations where strong air blows against the air outlet of outdoor unit
  It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- **Do not install the outdoor unit in the locations listed below.**
  ·Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
  ·Locations where outlet air of the outdoor unit blows directly to an animal or plants. The outlet air can affect adversely to the plant etc.
  ·Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
  ·Locations where vibration and operation sound generated by the outdoor unit can affect seriously. (on the wall or at the place near bed room)
  ·Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  ·Locations where drainage cannot run off safely.
  It can affect surrounding environment and cause a claim
- **Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.**
  It can cause the damage of the items.
- **Do not touch any buttons with wet hands**
  It can cause electric shocks
- **Do not touch any refrigerant pipes with your hands when the system is in operation.**
  During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.
- **Do not clean up the unit with water**
  It can cause electric shocks
- **Do not operate the outdoor unit with any article placed on it.**
  You may incur property damage or personal injure from a fall of the article.
- **Do not step onto the outdoor unit.**
  You may incur injury from a drop or fall.

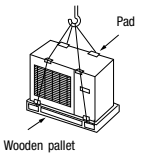
Notabilia as a unit designed for R410A

- Do not use any refrigerant other than R410A. R410A will rise to pressure about 1.6 times higher than that of a conventional refrigerant. A cylinder containing R410A has a pink indication mark on the top.
- A unit designed for R410A has adopted a different size indoor unit operation valve charge port and a different size check joint provided in the unit to prevent the charging of a wrong refrigerant by mistake. The processed dimension of the flared part of a refrigerant pipe and a flare nut's parallel side measurement have also been altered to raise strength against pressure. Accordingly, you are required to arrange dedicated R410A tools listed in the table on the right before installing or servicing this unit.
- Do not use a charge cylinder. The use of a charge cylinder will cause the refrigerant composition to change, which results in performance degradation.
- In charging refrigerant, always take it out from a cylinder in the liquid phase.
- All indoor units must be models designed exclusively for R410A. Check connectable indoor unit models in a catalog, etc. (A wrong indoor unit, if connected into the system, will impair proper system operation)

	Dedicated R410A tools
a)	Gauge manifold
b)	Charge hose
c)	Electronic scale for refrigerant charging
d)	Torque wrench
e)	Flare tool
f)	Protrusion control copper pipe gauge
g)	Vacuum pump adapter
h)	Gas leak detector

1. HAULAGE AND INSTALLATION (Take particular care in carrying in or moving the unit, and always perform such an operation with two or more persons.)

⚠CAUTION When a unit is hoisted with slings for haulage, take into consideration the offset of its gravity center position. If not properly balanced, the unit can be thrown off-balance and fall.

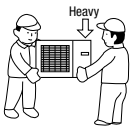


1) Delivery

- Deliver the unit as close as possible to the installation site before removing it from the packaging.
- When some compelling reason necessitates the unpacking of the unit before it is carried in, use nylon slings or protective wood pieces so as not to damage the unit by ropes lifting it.

2) Portage

- The right hand side of the unit as viewed from the front (diffuser side) is heavier. A person carrying the right hand side must take heed of this fact. A person carrying the left hand side must hold with his right hand the handle provided on the front panel of the unit and with his left hand the corner column section.



3) Selection of installation location for the outdoor unit

Be sure to select a suitable installation place in consideration of following conditions.

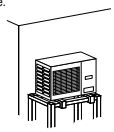
- ○ A place where it is horizontal, stable and can endure the unit weight and will not allow vibration transmittance of the unit.
- ○ A place where it can be free from possibility of bothering neighbors due to noise or exhaust air from the unit
- ○ A place where the unit is not exposed to oil splashes.
- ○ A place where it can be free from danger of flammable gas leakage.
- ○ A place where drain water can be disposed without any trouble.
- ○ A place where the unit will not be affected by heat radiation from other heat source.
- ○ A place where snow will not accumulate.
- ○ A place where the unit can be kept away 5m or more from TV set and/or radio receiver in order to avoid any radio or TV interference.
- ○ A place where good air circulation can be secured, and enough service space can be secured for maintenance and service of the unit safely.
- ○ A place where the unit will not be affected by electromagnetic waves and/or high-harmonic waves generated by other equipment.
- ○ A place where chemical substances like sulfuric gas, chloric gas, acid and alkali (including ammonia), which can harm the unit, will not be generated and not remain.
- ○ A place where strong wind will not blow against the outlet air blow of the unit.

Do not install the unit in places which exposed to sea breeze (e.g. coastal area) or calcium chloride (e.g. snow melting agent), exposed to ammonia substance (e.g. organic fertilizer).

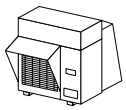
4) Caution about selection of installation location

(1) If the unit is installed in the area where the snow will accumulate, following measures are required. The bottom plate of unit and intake, outlet may be blocked by snow.

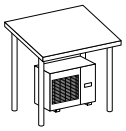
1.Install the unit on the base so that the bottom is higher than snow cover surface.



2.Provide a snow hood to the outdoor unit on site.
Regarding outline of a snow hood, refer to our technical manual.



3.Install the unit under eaves or provide the roof on site.

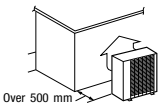


Since drain water generated by defrost control may freeze, following measures are required.

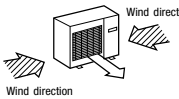
- Don't execute drain piping work. by using a drain elbow and drain grommets (optional parts). [Refer to Drain piping work.]
- Recommend setting Defrost Control (SW3-1) and Snow Guard Fan Control (SW3-2). [Refer to Setting SW3-1, SW3-2.]

(2) If the unit can be affected by strong wind, following measures are required.
Strong wind can cause damage of fan (fan motor), or can cause performance degradation, or can trigger anomalous stop of the unit due to rising of high pressure or dropping of low pressure.

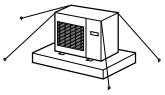
1.Install the outlet air blow side of the unit to face a wall of building, or provide a fence or a windbreak screen.



2.Install the outlet air blow side of the unit in a position perpendicular to the direction of wind.



3.The unit should be installed on the stable and level foundation. If the foundation is not level, tie down the unit with wires.



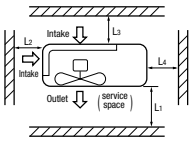
4.Use wind guard in case outdoor unit is installed where ambient temperature drops below -10°C and natural wind blows into outdoor unit directly.
For details, refer to technical manual.

5) Installation space

- Walls surrounding the unit in the four sides are not acceptable.
- There must be a 1-meter or larger space in the above.
- Where a danger of short-circuiting exists, install guide louvers.
- When more than one unit are installed, provide sufficient intake space consciously so that short-circuiting may not occur.
- Where piling snow can bury the outdoor unit, provide proper snow guards.
- A barrier wall placed in front of the exhaust diffuser must not be higher than the unit.
- Advisable to keep the right side service space (L4) more than 300 mm for easy maintenance.

(mm)

Size \ Example installation	71VNX			100VNX, 140VNX		
	I	II	III	I	II	III
L1	Open	Open	500	Open	Open	500
L2	300	250	Open	300	5	Open
L3	100	150	100	150	300	150
L4	250	250	250	5	5	5

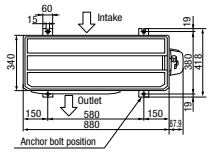


6) Installation

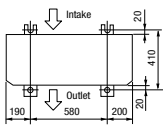
- In installing the unit, fix the unit's legs with bolts specified on the left.
- The protrusion of an anchor bolt on the front side must be kept within 15 mm.
- Securely install the unit so that it does not fall over during earthquakes or strong winds, etc.
- Refer to the left illustrations for information regarding concrete foundations.
- Install the unit in a level area. (With a gradient of 5 mm or less.)
  Improper installation can result in a compressor failure, broken piping within the unit and abnormal noise generation.

① Anchor bolt fixed position

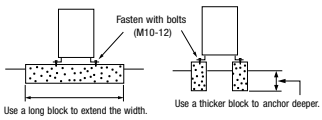
71VNX



100VNX, 140VNX



② Notabilia for installation



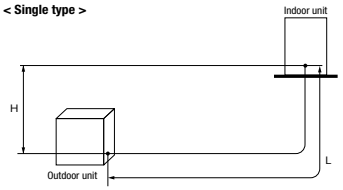
2. REFRIGERANT PIPING WORK

1) Restrictions on unit installation and use

- Check the following points in light of the indoor unit specifications and the installation site.
- Observe the following restrictions on unit installation and use. Improper installation can result in a compressor failure or performance degradation.

Restrictions		Dimensional restrictions			Marks appearing in the drawing on the right
		71VNX	100VNX	140VNX	Single type
One-way pipe length of refrigerant piping		30m or less	30m or less	30m or less	L
Elevation difference between indoor and outdoor units	When the outdoor unit is positioned higher,	7m or less			H
	When the outdoor unit is positioned lower,	7m or less			H

< Single type >



2) Determination of pipe size

- Determine refrigerant pipe size pursuant to the following guidelines based on the indoor unit specifications.

	71VNX, 100VNX, 140VNX	
	Gas pipe	Liquid pipe
Outdoor unit connected	ϕ15.88 Flare	ϕ9.52 Flare
Refrigerant piping	ϕ15.88	ϕ9.52
Indoor unit connected	ϕ15.88	ϕ9.52
Connected indoor unit model	HSB100, HMK100 (71VNX, 100VNX), HSB140 (140VNX)	

3) Refrigerant pipe wall thickness and material

- Select refrigerant pipes of the table shown on the right wall thickness and material as specified for each pipe size.

Pipe diameter [mm]	9.52	15.88
Minimum pipe wall thickness [mm]	0.8	1.0
Pipe material*	O-type pipe	O-type pipe

*Phosphorus deoxidized seamless copper pipe C1220T, JIS H 3300

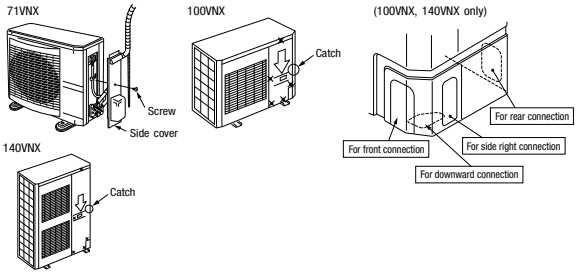
NOTE

- Select pipes having a wall thickness larger than the specified minimum pipe thickness.

4) On-site piping work

⚠IMPORTANT ● Take care so that installed pipes may not touch components within a unit. If touching with an internal component, it will generate abnormal sounds and/or vibrations.

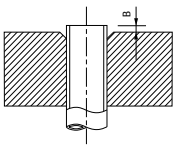
How to remove the service panel First remove the screw (s) (× mark) of the service panel or the side cover and push it down into the direction of the arrow mark and then remove it by pulling it toward you.



- The pipe can be laid in any of the following directions: side right, front, rear and downward. (100VNX, 140VNX)
- Remove a knock-out plate provided on the pipe penetration to open a minimum necessary area and attach an edging material supplied as an accessory by cutting it to an appropriate length before laying a pipe. (100VNX, 140VNX)
- Carry out the on site piping work with the service valve fully closed.
- Give sufficient protection to a pipe end (compressed and blazed, or with an adhesive tape) so that water or foreign matters may not enter the piping.
- Bend a pipe to a radius as large as practical.(R100～R150) Do not bend a pipe repeatedly to correct its form.
- Flare connection is used between the unit and refrigerant pipe. Flare a pipe after engaging a flare nut onto it. Flare dimensions for R410A are different from those for conventional R407C. Although we recommend the use of flaring tools designed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a protrusion control gauge.

Flared pipe end: A (mm)

Copper pipe outer diameter	A 0 −0.4
ϕ6.35	9.1
ϕ9.52	13.2
ϕ12.7	16.6
ϕ15.88	19.7



Copper pipe protrusion for flaring: B (mm)

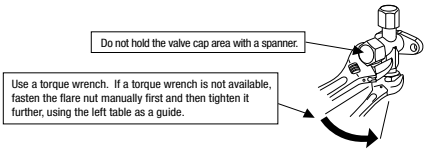
Copper pipe outer diameter	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
ϕ6.35	0～0.5	0.7～1.3
ϕ9.52		
ϕ12.7		
ϕ15.88		

- Tighten a flare joint securely with a double spanner.

⚠ CAUTION **Do not apply force beyond proper fastening torque in tightening the flare nut.**

Fix both liquid and gas service valves at the valve main bodies as illustrated on the right, and then fasten them, applying appropriate fastening torque.

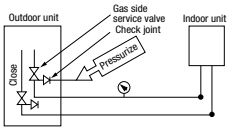
Service valve size (mm)	Tightening torque (N-m)	Tightening angle (°)	Recommended length of a tool handle (mm)
ϕ6.35 (1/4")	14～18	45～60	150
ϕ9.52 (3/8")	34～42	30～45	200
ϕ12.7 (1/2")	49～61	30～45	250
ϕ15.88 (5/8")	68～82	15～20	300



5) Air tightness test

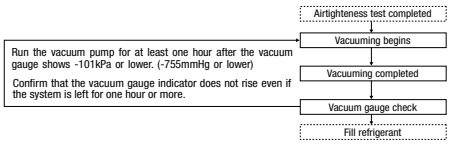
① Although outdoor and indoor units themselves have been tested for air tightness at the factory, check the connecting pipes after the installation work for air tightness from the service valve's check joint equipped on the outdoor unit side. While conducting a test, keep the service valve shut all the time.
a) Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes to see if the pressure drops.
b) Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes to see if the pressure drops.
c) Then raise the pressure to the specified level (4.15 MPa), and record the ambient temperature and the pressure.
d) If no pressure drop is observed with an installation pressurized to the specified level and left for about one day, it is acceptable. When the ambient Temperature fall 1℃, the pressure also fall approximately 0.01 MPa. The pressure, if changed, should be compensated for.
e) If a pressure drop is observed in checking e) and a) – d), a leak exists somewhere. Find a leak by applying bubble test liquid to welded parts and flare joints and repair it. After repair, conduct an air-tightness test again.

② In conducting an air-tightness test, use nitrogen gas and pressurize the system with nitrogen gas from the gas side. Do not use a medium other than nitrogen gas under any circumstances.



6) Evacuation

<Work flow> When the system has remaining moisture inside or a leaky point, the vacuum gauge indicator will rise.
Check the system for a leaky point and then draw air to create a vacuum again.



Pay attention to the following points in addition to the above for the R410A and compatible machines.

○To prevent a different oil from entering, assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R407C, etc.).
○Use a counterflow prevention adapter to prevent vacuum pump oil from entering the refrigerant system.

7) Additional refrigerant charge

(1) Calculate a required refrigerant charge volume from the following table.

	Additional charge volume (kg) per meter of refrigerant piping (liquid pipe ϕ6.35)	Refrigerant volume charged for shipment at the factory (kg)	Installation's pipe length (m) covered without additional refrigerant charge
71VNX	0.06	2.55	15
100VNX	0.06	2.9	15
140VNX	0.06	4.0	15

- This unit contains factory charged refrigerant covering 15m of refrigerant piping and additional refrigerant charge on the installation site is not required for an installation with up to 15m refrigerant piping. When refrigerant piping exceeds 15m, additionally charge an amount calculated from the pipe length and the above table for the portion in excess of 15m.

Formula to calculate the volume of additional refrigerant required

Additional charge volume (kg) = { Main pipe length (m) – Length covered without additional charge 15 (m) } x 0.06 (kg/m)

*When an additional charge volume calculation result is negative, it is not necessary to charge refrigerant additionally.

- **To charge refrigerant again to the system, recover refrigerant from the system first and then charge the same volume as initial charge.**

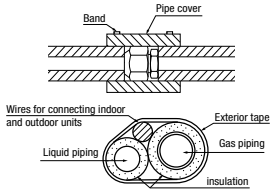
(2) Charging refrigerant

- Since R410A refrigerant must be charged in the liquid phase, you should charge it, keeping the container cylinder upside down or using a refrigerant cylinder equipped with a siphon tube.
- Charge refrigerant always from the liquid side service port with the service valve shut. When you find it difficult to charge a required amount, fully open the outdoor unit valves on both liquid and gas sides and charge refrigerant from the gas (suction) side service port, while running the unit in the cooling mode. In doing so, care must be taken so that refrigerant may be discharged from the cylinder in the liquid phase all the time. When the cylinder valve is throttled down or a dedicated conversion tool to change liquid-phase refrigerant into mist is used to protect the compressor, however, adjust charge conditions so that refrigerant will gasify upon entering the unit.
- In charging refrigerant, always charge a calculated volume by using a scale to measure the charge volume.
- When refrigerant is charged with the unit being run, complete a charge operation within 30 minutes. Running the unit with an insufficient quantity of refrigerant for a long time can cause a compressor failure.

NOTE ● Write down the addifional and total refrigerant volume on the label in front.

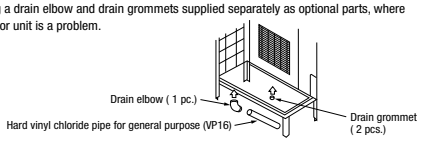
8) Insulation on piping

(1) Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.
(2) Use a heat insulating material that can withstand 120℃ or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.
- Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.
- All gas pipes must be securely heat insulated in order to prevent damage from dripping water that comes from the condensation formed on them during a cooling operation or personal injury from burns because their surface can reach quite a high temperature due to discharged gas flowing inside during a heating operation.
- Wrap indoor units' flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).
- Give heat insulation to both gas and liquid side pipes. Bundle a heat insulating material and a pipe tightly together so that no gaps may be left between them and wrap them together with a connecting cable by a dressing tape.
- **Both gas and liquid pipes need to be dressed with 20 mm or thicker heat insulation materials above the ceiling where relative humidity exceeds 70%.**



3. DRAIN PIPING WORK

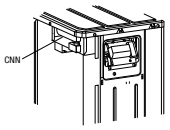
- Execute drain piping by using a drain elbow and drain grommets supplied separately as optional parts, where water drained from the outdoor unit is a problem.



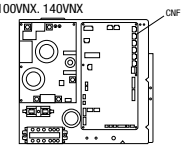
- There are 3 drain holes provided on the bottom plate of an outdoor unit to discharge condensed water.
- When condensed water needs to be led to a drain, etc., install the unit on a flat base (supplied separately as an option part) or concrete blocks.
- Connect a drain elbow as shown in the illustration and close the other two drain holes with grommets.

- Do not use drain elbow and grommet made of plastic for drain piping when base heater for outdoor unit is used. Plastic grommet and elbow will be damaged and burnt in worst case.
- Prepare another drain tray made of metallic material for collecting drain when base heater is used.
- In case plastic grommet and drain elbow is used in warm climate area, disconnet the connector for heater on PCB shown in the drawing.

71VNX



100VNX, 140VNX



4. ELECTRICAL WIRING WORK For details of electrical cabling, refer to the indoor unit installation manual.

Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country.
Electrical installation work must be executed according to the technical standards and other regulations applicable to electrical installations in the country.
- Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire. If impropery grounded, an electric shock or malfunction may result.
- A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.
- Do not lay electronic control cables (remote control and signaling wires) and other cables together outside the unit. Laying them together can result in the malfunctioning or a failure of the unit due to electric noises.
- Fasten cables so that may not touch the piping, etc.
- When cables are connected, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection and then attach the cover securely. (Improper cover attachment can result in malfunctioning or a failure of the unit, if water penetrates into the box.)

- Connect a pair bearing a common terminal number with an indoor-outdoor connecting wire.
- In cabling, fasten cables securely so that no external force may work on terminal connections.
- Grounding terminals are provided in the control box.

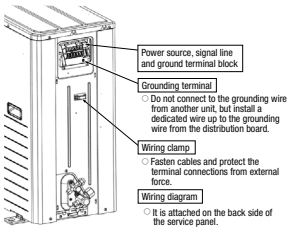
Power cable, indoor-outdoor connecting wires

- Always perform grounding system installation work with the power cord unplugged.

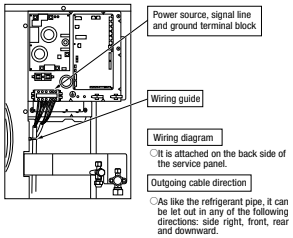
Main fuse specification

Model	Specification	Part No.
71VNX	250V 20A	SSA564A117
100VNX,140VNX	250V 30A	SSA564A161

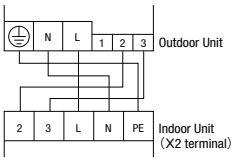
71VNX



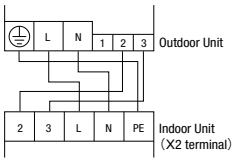
100VNX. 140VNX



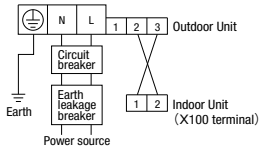
Indoor unit : HMK100
Outdoor unit : 71VNX



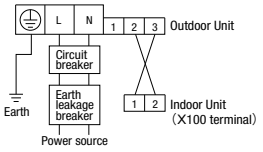
Indoor unit : HMK100
Outdoor unit : 100VNX



Indoor unit : HSB100
Outdoor unit : 71VNX



Indoor unit : HSB100, 140
Outdoor unit : 100VNX, 140VNX



5. COMMISSIONING For details of commissioning, refer to the Indoor unit installation manual

⚠ WARNING

- Before conduct a test run, make sure that the service valves are open.
- Turn on power 6 hours prior to a test run to energize the crank case heater. Do not turn on the power when the ambient temperature is below −20℃ to avoid breakdown of electronic component.
- In case of the first operation after turning on power, even if the unit does not operate for 30 minutes, it is not a breakdown.
- Always give a 3-minute or longer interval before you start the unit again whenever it is stopped.
- Removing the service panel will expose high-voltage live parts and high-temperature parts, which are quite dangerous. Take utmost care not to incur an electric shock or burns. Do not leave the unit with the service panel open.

A failure to observe these instructions can result in a compressor breakdown.

⚠ CAUTION

- When you operate switches (SW3) for on-site setting, be careful not to touch a live part.
- You cannot check discharge pressure from the liquid operation valve charge port.
- The 4-way valve (20S) is energized during a heating operation.
- When power source is cut off to reset the unit, give 3 minutes or more before you turn on power again after power is cut off. If this procedure is not observed in turning on power again, "Communication error between outdoor and indoor unit" may occur.

Items to checkbefore a test run

- When you leave the outdoor unit with power supplied to it, be sure to close the panel.

Item No.used in the installation manual	Item	Check item	Check
2	Refrigerant plumbing	Were air-tightness test and vacuum extraction surely performed?	
		Are heat insulation materials installed on both liquid and gas pipes?	
		Are service valves surely opened for both liquid and gas systems?	
4	Electric wiring	Is the unit free from cabling errors such as uncompleted connection, or reversed phase?	
		Doesn't cabling cross-connect between units, where more than one unit are installed?	
		Do indoor-outdoor connecting cables connect between the same terminal numbers?	
		Is the unit grounded with a dedicated grounding wire not connected to another unit's grounding wire?	
		Are cables free from loose screws at their connection points?	
		Are cables held down with cable clamps so that no external force works onto terminal connections?	

1) Test run method

Refer fo the indoor unit installation manual.

2) Checking the state of the unit in operation

Use check joints provided on the piping before and after the four-way valve installed inside the outdoor unit for checking discharge pressure and suction pressure.
As indicated in the table shown on the right, pressure detected at each point will vary depending on whether a cooling or heating operation has been selected.

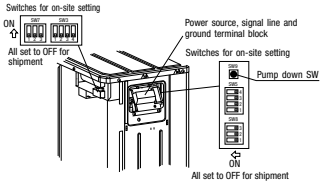
	Check joint of the pipe	Charge port of the gas service valve
Cooling operation	Discharge pressure (High pressure)	Suction pressure (Low pressure)
Heating operation	Suction pressure (Low pressure)	Discharge pressure (High pressure)

3) Setting SW3-1, SW3-2, on-site

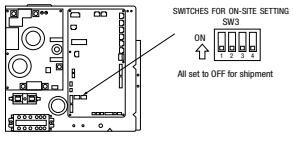
(1) Defrost control switching (SW3-1)
- When this switch is turned ON, the unit will run in the defrost mode more frequently.
- Set this switch to ON, when installed in a region where outdoor temperature falls below zero during the season the unit is run for a heating operation.

(2) Snow guard fan control (SW3-2)
- When this switch is turned on, the outdoor unit fan will run for 10 seconds in every 10 minutes, when outdoor temperature falls to 3℃ or lower and the compressor is not running.
- When the unit is used in a very snowy country, set this switch to ON.

71VNX



100VNX. 140VNX



※ Do not operate SW3-3, SW5, SW8.

4) Failure diagnosis in a test run

Indoor Unit Display	Error Code in Error Log	Printed circuit board LED(The cycles of 5 seconds)		Failure event	Action
		Red LED	Green LED		
High pressure alarm	E40	Blinking once	Blinking continuously	63H1 actuation or operation with service valves shut (occurs mainly during a heating operation)	1. Check whether the service valves are open. 2. If an error has been canceled when 3 minutes have elapsed since a compressor stop, you can restart the unit by effecting Check Reset from the remote control unit.
Low pressure alarm	E49	Blinking once	Blinking continuously	Low pressure error or operation with service valves shut (occurs mainly during a cooling operation)	

- If an error code other than those listed above is indicated, refer to the wiring diagram of the outdoor unit and the indoor unit Installation manual.

5) The state of the electronic expansion valve.

The following table illustrates the steady states of the electronic expansion valve.

	When power is turned on	When the unit comes to a normal stop		When the unit comes to an abnormal stop	
		During a cooling operation	During a heating operation	During a cooling operation	During a heating operation
Valve for a cooling operation	Complete shut position	Complete shut position	Full open position	Full open position	Full open position
Valve for a heating operation	Full open position	Full open position	Complete shut position	Full open position	Full open position

6) Heed the following on the first operation after turning on the power source.

This outdoor unit may start in the standby mode (waiting for a compressor startup), which can continue up to 30 minutes, to prevent the oil level in the compressor from lowering on the first operation after turning on the circuit breaker. If that is the case, do not suspect a unit failure.

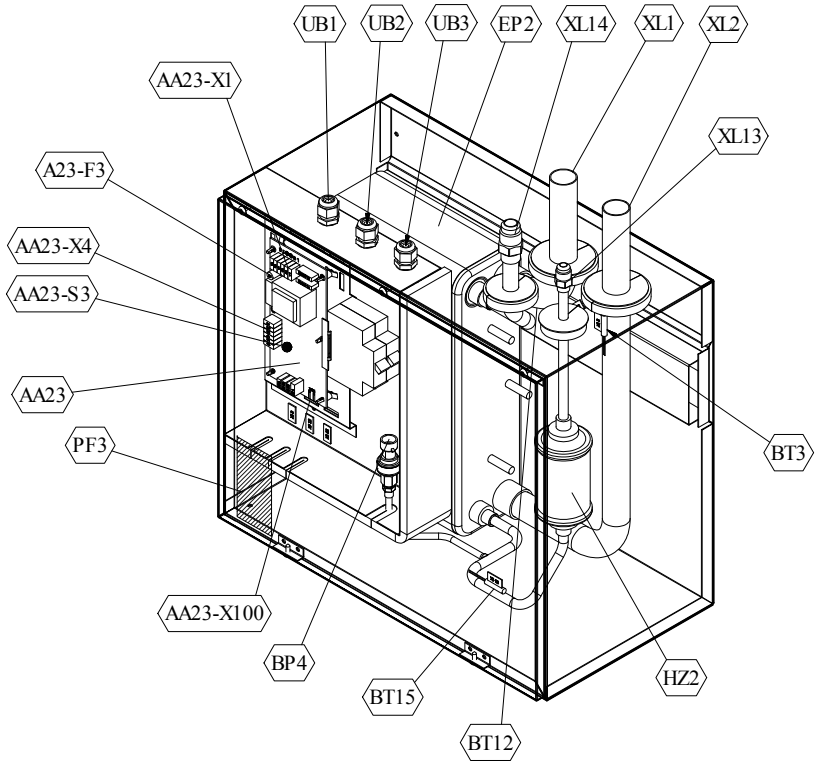
Indoor unit installation

General information for installer

For outdoor unit installation information, see installation manual for outdoor unit.

Over view and design

HSB series



Pipe connections

XL1(Red mark)	Climate system supply
XL2 (Blue mark)	Climate system return
XL14	Connection, gas line
XL13	Connection, liquid line

Valves etc.

EP2	Heat exchanger
HQ1	Particle filter (supplied)
HZ2	Drying filter

Electrical components

AA23	Communication board
AA23-F3	Fuse for external heating cable
AA23-S3	DIP switch, addressing of outdoor unit
AA23-X1	Terminal block, incoming supply, connection of KVR
AA23-X4	Terminal block, communication with indoor module / control module
AA23-X100	Terminal block, communication outdoor module

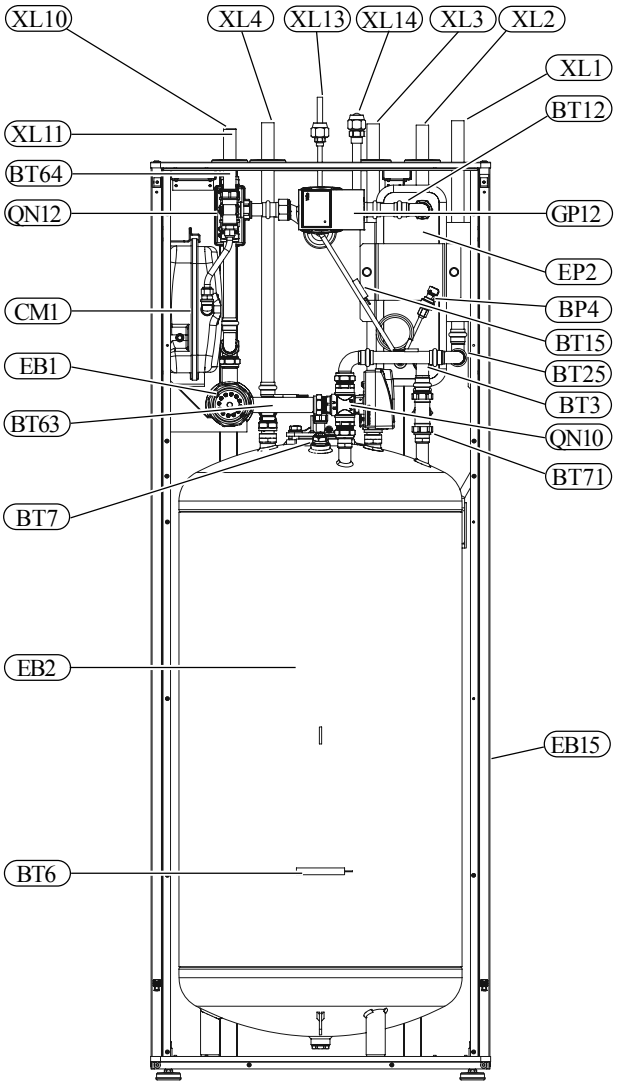
Sensor, thermostats

BP4	Pressure sensor, high pressure
BT3	Temperature sensor, heating medium, return
BT12	Temperature sensor, condenser, supply
BT15	Temperature sensor, fluid pipe

Miscellaneous

UB1	Cable gland
UB2	Cable gland
UB3	Cable gland

HMK series



Pipe connections

XL1 ( )	Connection, heating medium, supply
XL2 ( )	Connection, heating medium, return
XL3	Connection, cold water
XL4	Connection, hot water
XL10	Connection, cooling
XL11	Connection, safety group, manometer
XL13	Connection, liquid cooling medium
XL14	Connection, gas cooling medium

HVAC elements

CM1	Diaphragm expansion vessel, closed
QN10	Isolation valve, domestic hot water/central heating
QN12	Isolation valve, cooling/heating
GP12	Circulation pump
EP2	Heat exchanger

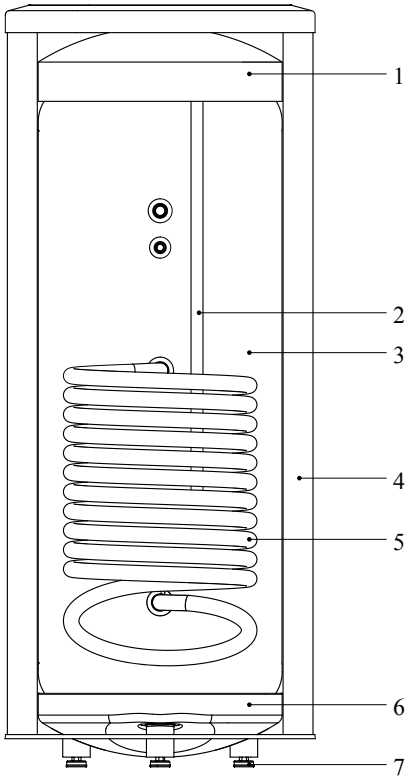
Sensors

BP4	Pressure sensor, high pressure
BT3	Temperature sensor, heating medium return
BT6	Temperature sensor, hot water loading
BT7	Temperature sensor, top of the hot water heater
BT12	Temperature sensor, condenser outlet
BT15	Temperature sensor, liquid
BT25	Temperature sensor, heating medium supply
BT63	Temperature sensor, heating medium supply downstream the submersible heater
BT64	Temperature sensor, cooling medium supply
BT71	Temperature sensor, heating medium re- turn

Others

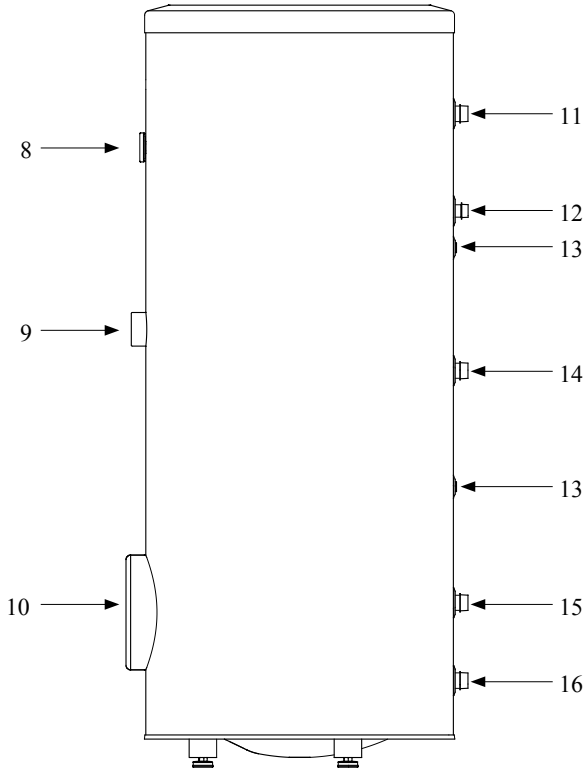
EB15	HMK 60
PF3	Serial number
EB2	Domestic hot water tank

PT series



Section of the PT300 storage tanks

1. Upper insulation of the storage tank
2. Protective magnesium anode
3. Enamelled tank
4. Side insulation of the storage tank
5. Coil
6. Lower insulation of the storage tank
7. Adjustable foot



Side view of the PT300 storage tanks

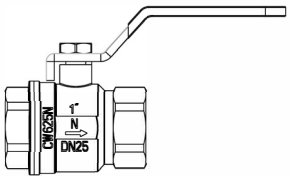
8. Thermometer
9. Connector pipe for mounting electric heating unit
10. Inspection opening
11. Hot water intake connector pipe
12. Hot water circulation connector pipe
13. Temperature sensor cover
14. Coil supply connector pipe
15. Connection of return line from the coil
16. Cold water supply connector pipe

Transport and storage

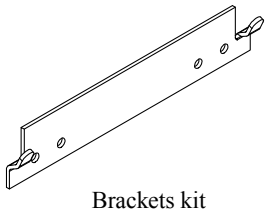
Indoor unit and tank unit must be transported and stored vertically in dry conditions.

Supplied components

HSB series Indoor unit

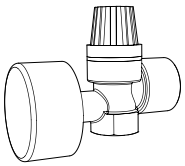


Particle filter R25 (HQ1).



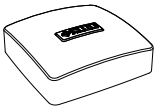
Brackets kit

HMK series Indoor unit with tank

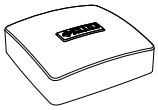


Safety valve with pressure gauge

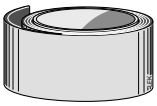
RC-HY20/40 Control unit



Outside sensor

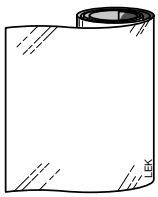


Room sensor (RC-HY40 only)

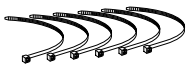


Insulation tape

Temperature sensor

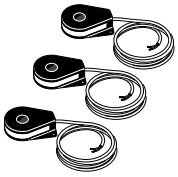


Aluminium tape



Cable ties

Heating pipe paste

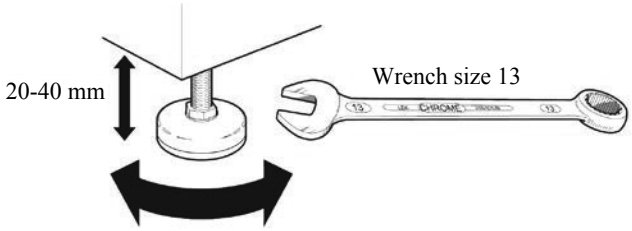


Current sensor (RC-HY40 only)

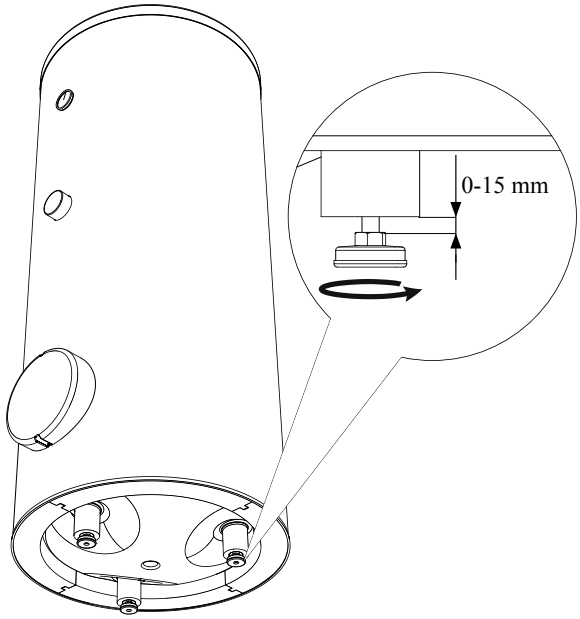
Assembly

- It is recommended that indoor unit is installed in a room with existing floor drainage, most suitably in a utility room or boiler room.
- For indoor unit and control unit, the mounting surface must be firm, flat and vertical, preferably a concrete wall.
- Indoor unit with tank and tank unit must be set on a solid waterproof base that would keep the weight of the unit. The height-adjusting legs allow for levelling and stable setting.

HMK series



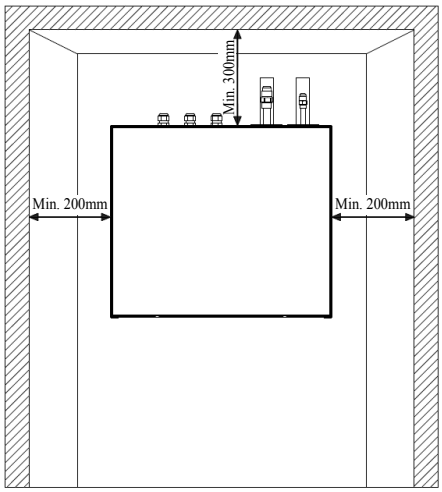
PT series



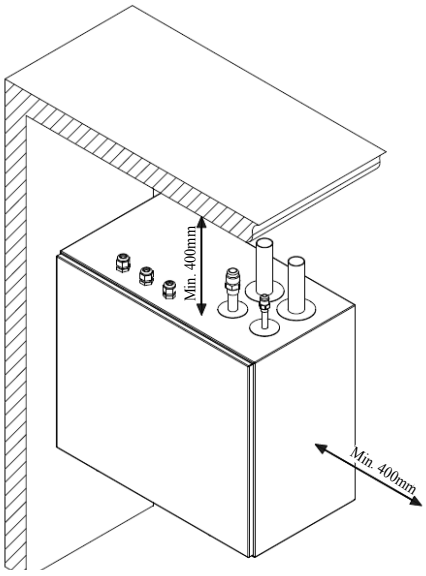
- For indoor unit with tank, floor drain port is required to connect drain hose in case cooling function is used.
- Install indoor unit with its back to an outside wall, ideally in a room where noise does not matter. If this is not possible, avoid placing it against a wall behind a bedroom or other room where noise may be a problem.
- Route pipes so they are not fixed to an internal wall that backs on to a bedroom or living room.
- Install indoor unit with tank, tank unit and its pipings to indoor unit indoors in order to avoid icing.
- Ensure free space described in the following figures for future maintenance.

HSB series

Recommendation for positioning on wall

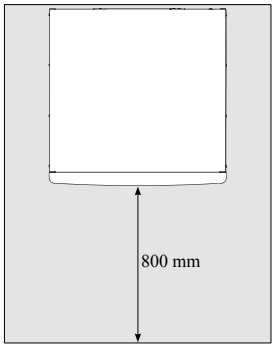


Recommendation for positioning in corner



*Min 800mm is required in front

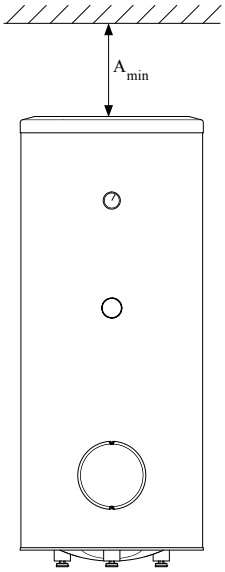
HMK series



IMPORTANT

For HMK60, leave 10 – 25 mm free space between the indoor module and the back wall for cables and piping.

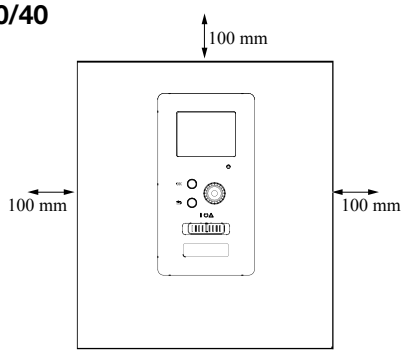
PT series



A_{min} is required on top to replace anode bar, and 500 mm is required in front to replace immersion heater if equipped.

Application	Connector pipe dia.	Type of anode	A_{min}
PT300	1"	Chain ϕ26 × 8	150 mm
	¾"	Titanium anode	200 mm
PT500	1¼"	Chain ϕ33 × 5	150 mm
	¾"	Titanium anode	400 mm

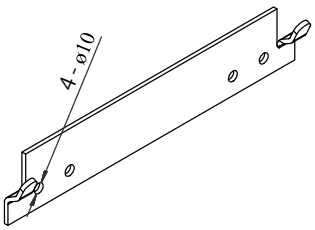
RC-HY20/40



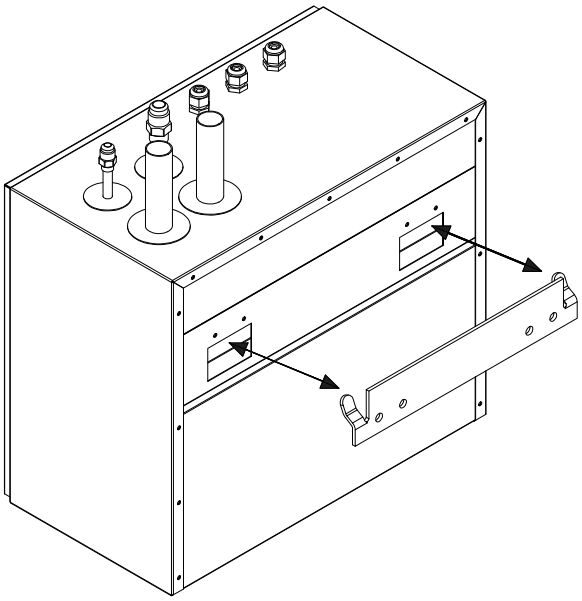
Hanging indoor unit

It is recommended that the split box is installed in a room with existing floor drainage, most suitably in a utility room or boiler room.

1. The bracket for the split box is mounted to the wall by use of appropriate screws.



2. Insert HSB60 in the bracket mounted to the wall.



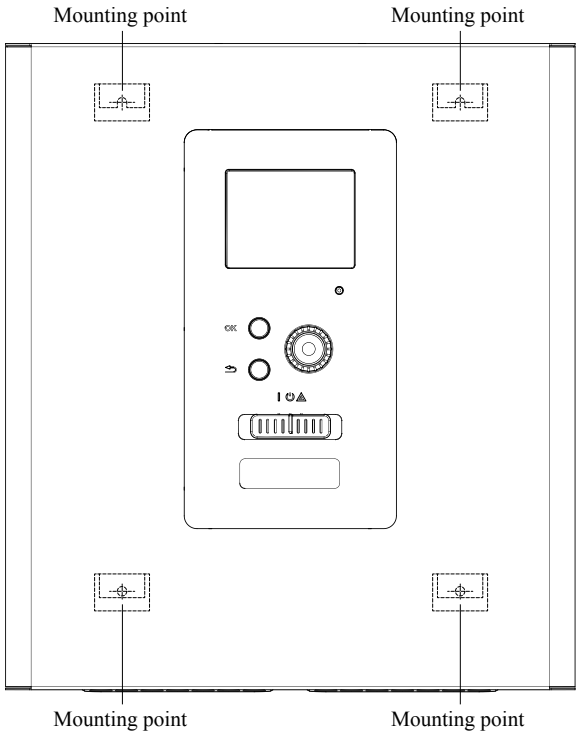
NOTE

Indoor unit weigh A kg excluding water inside.

Indoor unit	A
HSB60	16
HSB100	18
HSB140	23

Hanging control unit

Use all mounting points and install control unit upright against a flat wall. Make sure whole back surface faces the wall.



Dimensioning expansion vessel

The expansion vessel volume must be at least 5% of total water volume in the circulation system.

HMK series is equipped with an expansion vessel with a volume of 10 liters.

Initial pressure and max height difference

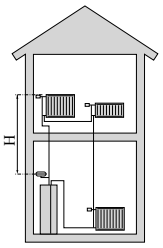
Recommended maximum height difference between expansion vessel and the highest point in the system is 5m.

The initial pressure of the pressure expansion vessel must be dimensioned according to the maximum height (H) between the vessel and the highest positioned radiator, see figure. An initial pressure of 0.5 bar (5 mvp) means a maximum permitted height difference of 5 m.

If the standard initial pressure in the pressure vessel is not high enough it can be increased by filling via the valve in the expansion vessel. The expansion vessel's standard initial pressure must be entered in the check list on User's manua1.

Any change in the initial pressure affects the ability of the expansion vessel to handle the expansion of the water.

Consult local distributor in case height difference exceeds 5m.



Recommended installation order

1. Hang indoor unit and control unit to appropriate position and connect indoor unit and tank unit.
2. Connect indoor unit to climate system, cold and hot water lines as well as any external heat sources. See page 117, 118.
3. Install refrigerant pipes according to the description on the Installation manual for outdoor unit.
4. Connect current limiter, any centralised load control and external contacts as well as the cable between indoor unit and outdoor unit.
5. Connect incoming electricity to indoor unit and/or outdoor unit. See page 133-136.
6. Follow the commissioning instructions on page 137-156.

Pipe installation

General

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

A following table shows plumbing necessary for each product.

	Refrigerant	Plumbing
HSB	Necessary	Necessary
HMK	Necessary	Necessary
PT	—	Necessary
PC-HY	—	—

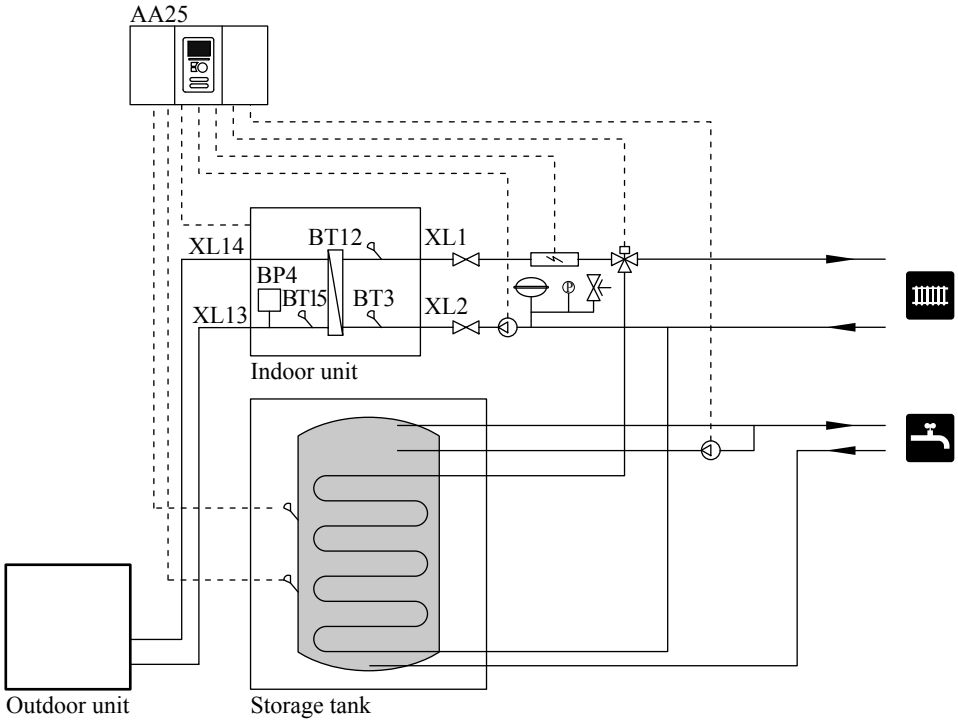
This heat pump system is designed for low or medium temperature heating system. It is recommended water temperature must not exceed 55°C on supply and 45°C on return at lowest design outdoor temperature (DOT) though indoor unit can operate with a return temperature of up to 65°C and an outgoing temperature from the unit of 65°C.
Indoor unit is not equipped with shut off valves; these must be installed outside the heat pump to facilitate any future servicing.
Indoor unit can be connected to the radiator system, floor heating system and/or fan convectors.
Safety valve is not equipped with in indoor unit. Make sure to install safety valve in the circuit.

Installation diagram

FDCW series outdoor unit provides heat for space heating and domestic hot water using free energy in the outdoor air within the range of low temperature up to -20°C. Connection is diff erent according to the type of indoor unit (see below figures). The system is controlled by RC-HY20 or RC-HY40 control unit.

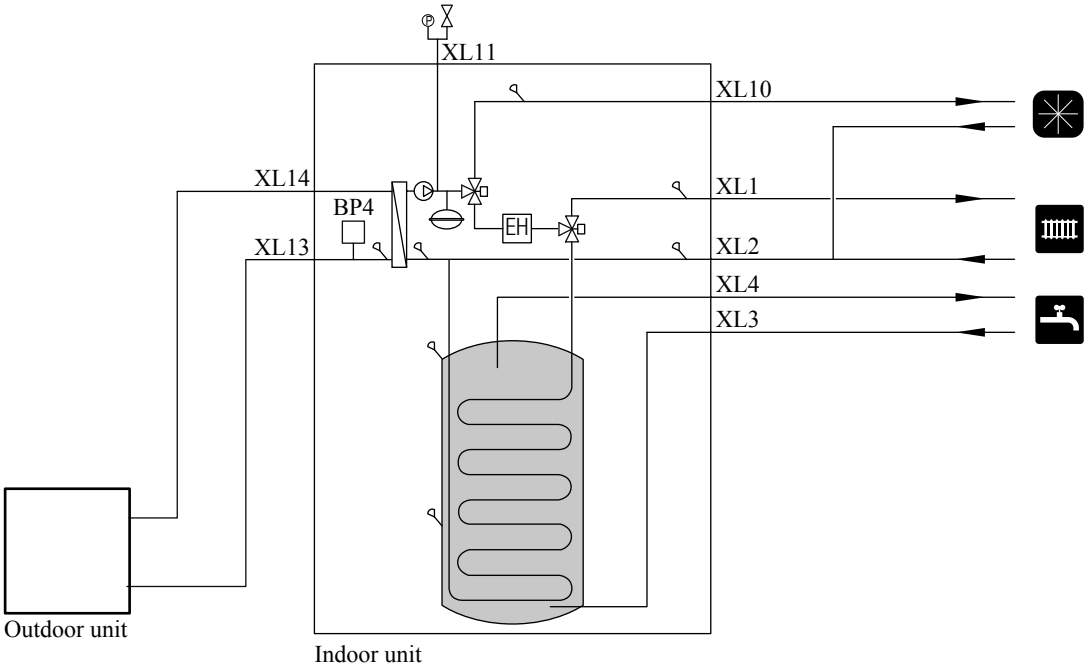
HSB series

HSB series indoor unit is equipped with plate heat exchanger. It needs to install expansion vessel, shut-off valves, safety valve, electric heater and circulation pump to make a complete heating system. In case domestic hot water is required, 3-way valve and tank is also necessary.



HMK series

HMK series indoor unit is equipped with coil water heater, expansion vessel, safety valve, electric heater, plate heat exchanger, sensors and gauge, and circulation pump.



Symbol	Meaning
	Vent
	Cut-off valve
	Water tap
	Non-return valve
	Balancing valve
	3-way valve
	Safety valve
	Thermometer
	Temperature sensor
	Diaphragm expansion vessel

Symbol	Meaning
	Manometer
	Circulation pump
	Particulate filter
	Compressor
	Heat exchanger
	Cooling
	Central heating system
	Domestic hot water
	Heating systems Floor heating
	Cooling system

System requirements

The minimum water volume in the climate system is subject to the values in the table below. If it is not fulfilled, volume vessel must be installed.

(liter)

	With underfloor cooling application	Without underfloor cooling application
HSB60, HMK60 FDCW60VNX-A	50	20
HSB100, HMK100 FDCW71VNX-A	80	50
HSB100, HMK100 FDCW100VNX-A	100	80
HSB140 FDCW140VNX-A	150	150

Overflow valve

NOTE

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

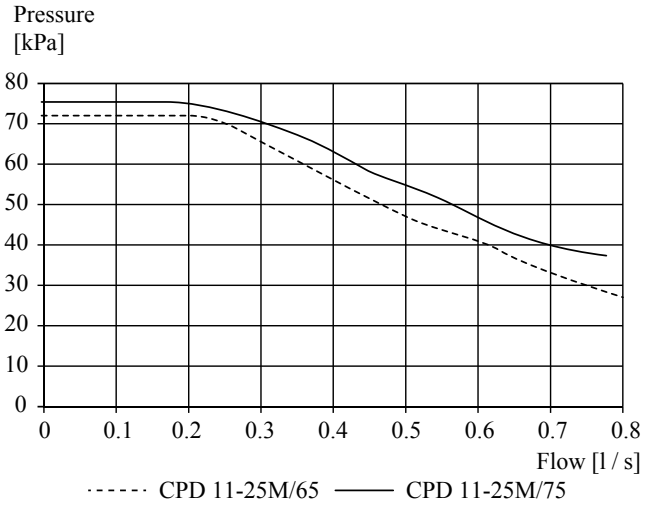
The circulation pump may become damaged.

Pump capacity diagram

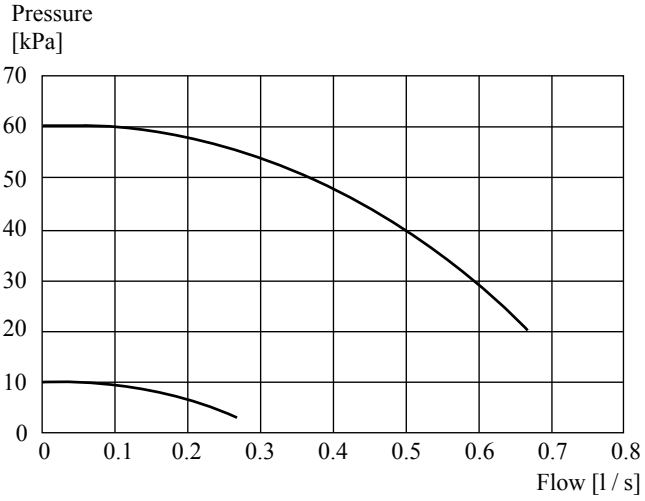
HSB series

HSB series is not equipped with circulation pump.

This graph shows the characteristic of CPD11-25M65 and 75.

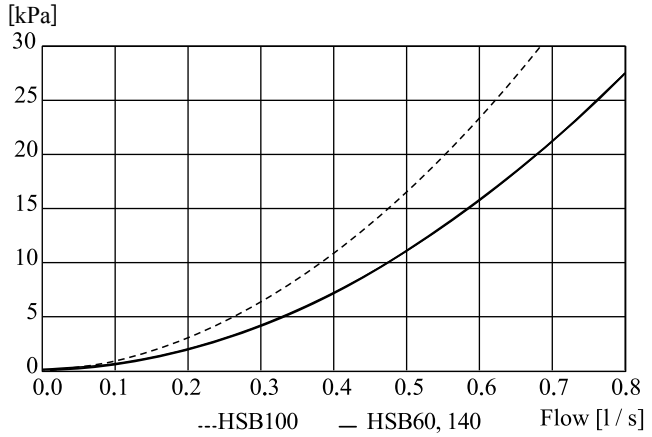


HMK series

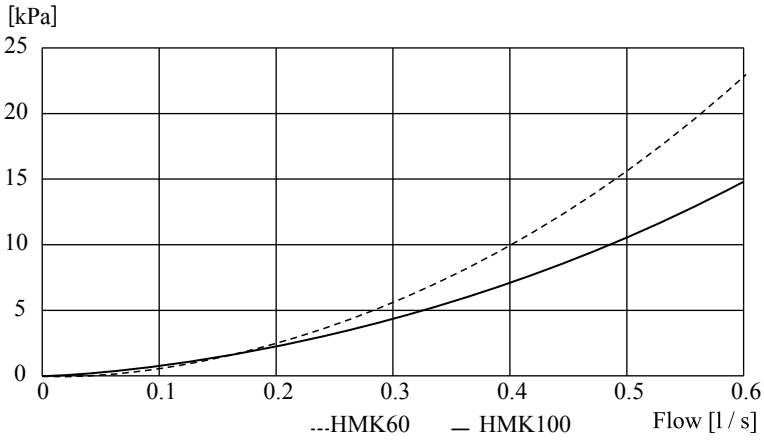


Pressure drop in indoor unit

HSB series



HMK series



Connection of extra circulation pump

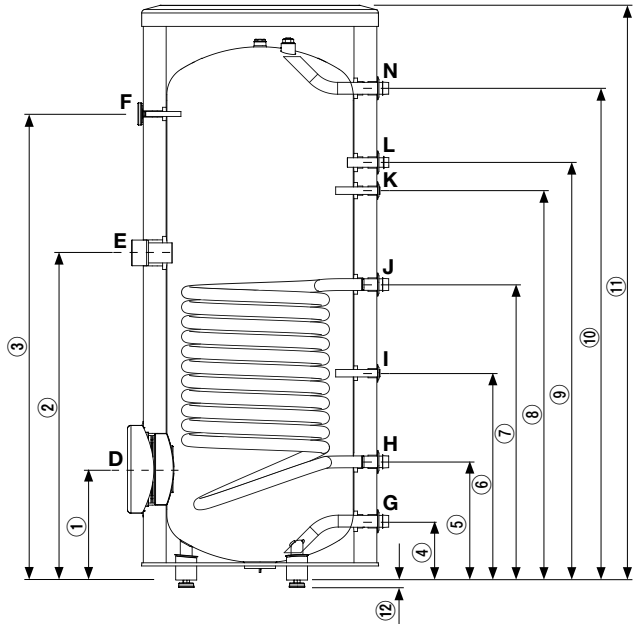
When connecting extra circulation pumps, requirements for pressure, maximum flow etc. must be met.

NOTE

Non-return valve must be installed in case extra circulation pump is used.

The circlulation pump may become damaged.

PT300/500



Connection		U/m	PT300/500
D	Inspection opening	mm	ø120
E	Heating unit connection	inch	1½″Female
F	Thermometer enclosure	mm	ø10 Female
N	Hot water outlet	inch	1″Male
L	Hot water circulation	inch	¾″Male
K	Temperature sensor enclosure (BT7)	mm	ø16 Female
J	Coil supply	inch	1″Male
I	Temperature sensor enclosure (BT6)	mm	ø16 Female
H	Return from coil	inch	1″Male
G	Cold water input	inch	1″Male

Dimensions			
		PT300	PT500
①	mm	315	337
②	mm	930	967
③	mm	1325	1477
④	mm	167	188
⑤	mm	336	288
⑥	mm	588	387
⑦	mm	840	805
⑧	mm	1107	1234
⑨	mm	1187	1302
⑩	mm	1398	1545
⑪	mm	1634	1835
⑫	mm	21-0/+15	

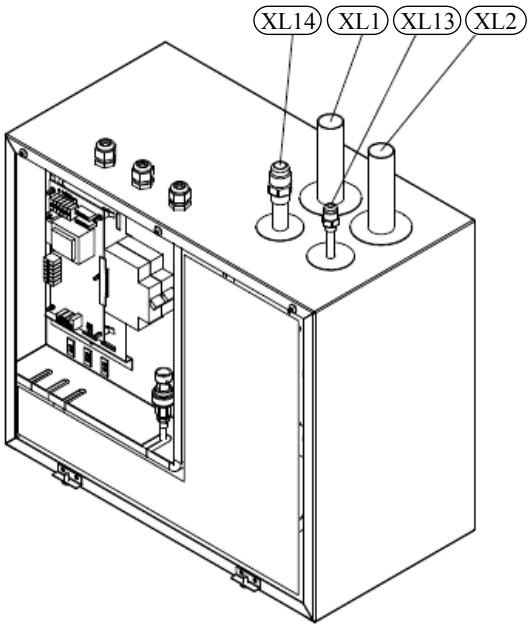
Water circuit

Connection to heating system

Connect XL1 to supply line and XL2 to return line from heating system.

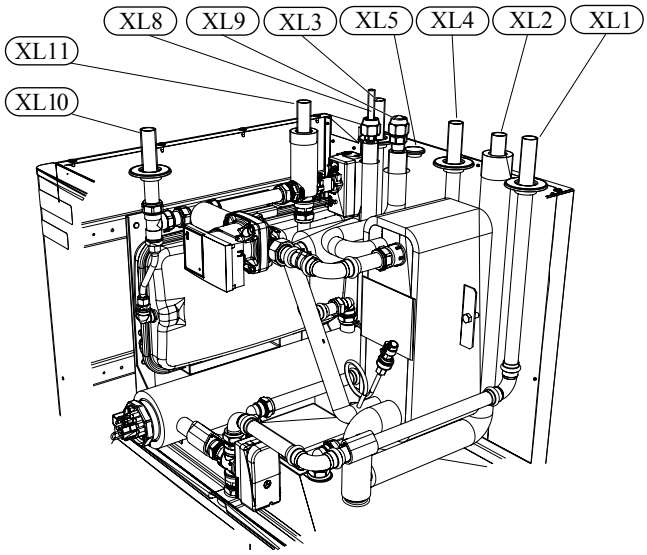
- All required safety devices and shut-off valves must be installed as close to the indoor unit as possible.
- Install bleed valves where necessary, highest point of the water system in usual case.
- When connecting to a system with thermostats on all radiators, install an overflow valve or remove some of the thermostats to ensure sufficient flow.
- Install a safety valve with manometer on heating circuit and hot water circuit. (FL2)
  For HSB series install a safety valve for heating circuit on the water pipe returning to indoor unit since it doesn't have port for FL2.
  The entire length of the overflow water pipe from the safety valves must be inclined to prevent water pockets and must also be frost proof.
- The end of overflow water pipe from the safety valves must left open to the atmosphere. The water may drip from the pipe.

HSB series



Install safety valve as close to XL2 as possible.

HMK series



Install safety valve FL2 on XL11.

Connection to hot water heater

For HSB series indoor unit, it is necessary to connect PT storage tank unit applying 3-way valve in order to use domestic hot water function.

For HMK series indoor unit, 180L tank unit is integrated in indoor unit.

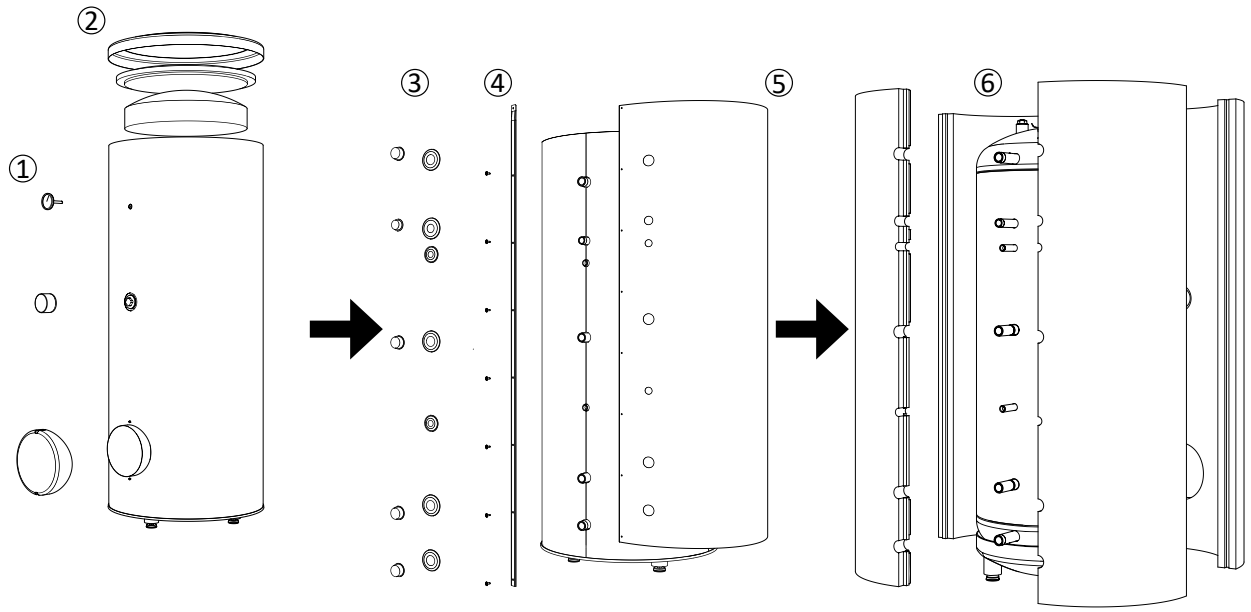
Housing disassembly of tank unit

Removable housing with thermal insulation facilitates transport and installation of the storage tank. Disassembly the housing in the following order (see next page figure):

1. Remove the Temperature gauge, plug of the heating element connector pipe and blanking plate of the inspection opening.
2 Remove the upper cover of the housing together with thermal insulation.
3. Remove the plugs from the connector pipes and black bushings.
4. Remove the fixing screws and the strip connecting the housing jacket.
5. Remove the jacket surrounding the tank (housing jacket).
6. Remove the four-piece thermal insulation.

After the installation of the storage tank in its final location, reinstall the removed components in the reverse order.

Housing and thermal insulation disassembly



Connecting hot water tank to indoor unit

CAUTION

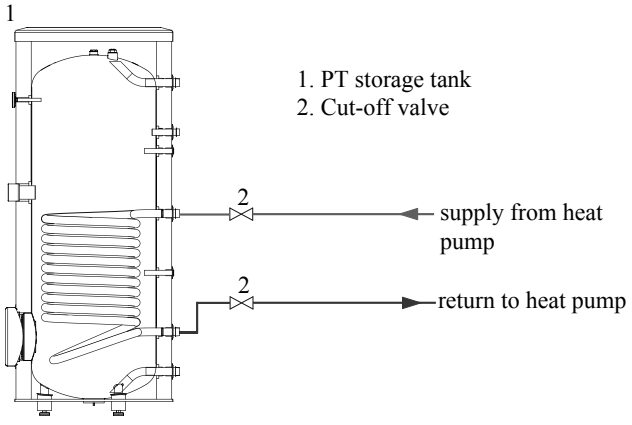
Installation and commissioning of the storage tank shall only be done by appropriately qualified installer. The installer should inform the user of the functions of the product and provide the necessary in formation on its safe use.

Information

We recommend installing a strainer in order to protect the pumps, check valve and the components of the heating system.

- Tank and its pipings to indoor unit must be installed indoors where the temperature wouldn't drop below 15°C in order to prevent pipings from icing.
- Maximum piping length between indoor unit and tank is 10 m.
- Tank unit should be placed on firm, preferably a concrete floor or foundation.
- Tank unit can be aligned using the adjustable feet.
- Protection against overpressure shall be made in accordance with the relevant regulations.
- Connect the heating system according to the installation diagram (see figure).

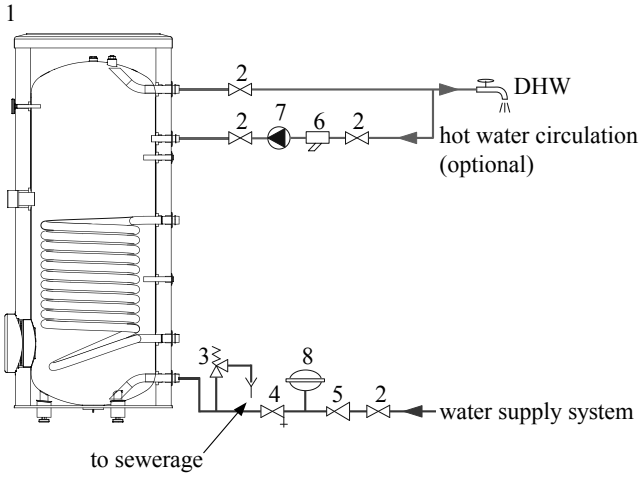
Installation diagram of the PT storage tank with one coil.



Connecting hot water tank to water main

- Install a mixing valve if the temperature exceeds 60 °C.
- It is recommended to install a thermostatic mixing valve for stable temperature hot water supply.
- Connect the storage tank to the water supply system of water pressure at least 1 bar and max 10 bar. Install a pressure reducer if the pressure at the cold water inlet to the tank is higher than allowed.
- Install a safety valve which have a maximum 10.0 bar opening pressure on the incoming domestic water line according to outline diagram in order to protect the storage tank against overpressure. Pressure increases during heating the water.
- During heating the water, small and temporary water flow from the safety valve can occur, which indicates that the pressure has increased above the rated value, which triggered the valve. This may in no way be prevented.
- Safety valve drain line should be installed with a decline, in an environment free of freezing and remain open to the atmosphere. The manufacturer is not responsible for flooding the room through the safety valve.
- Blocked safety valve can cause equipment failure. Drain the outflow from the safety valve to the sewerage or drain grate.
- Connect the water supply system according to the installation diagram.

Installation diagram of the PT storage tank with one coil.



1. PT storage tank
2. Cut-off valve
3. Safety valve
4. Drain valve
5. Pressure reducer (option, if the pressure in the system exceeds the allowable value)
6. Strainer
7. Hot water circulating pump
8. Hot water expansion vessel

Information

In order to minimize the flow of water from the safety valve associated with the thermal expansion of the liquid, it is advisable to install a suitable expansion vessel at the cold water connection (see item 8.)

CAUTION

Installation of the appropriate safety valve in the cold water supply line protecting the unit against overpressure is mandatory!

CAUTION

Installation of necking of any kind (such as reducers, dirt pockets, etc.) and cut-off valves between the storage tank and the safety valve is not allowed. Only a T-pipe with a drain valve and a T-pipe with an expansion vessel may be installed in these line sections.

CAUTION

Never block the safety valve or drain line. This can cause a dangerous overpressure in the storage tank.

CAUTION

When heating water, slight, temporary discharge from the safety valve can occur. This is a correct safety valve function. Any attempt to interfere in its operati on can lead to the danger and destruction of the storage tank.

CAUTION

Never use the equipment with clogged safety valves.

Connection

After the installation and levelling the tank, follow the procedure below (for the connector pipe symbols, refer to page 121):

1. Remove protecting plugs from the connector pipes
2. Connect the hot water intake line (N).
3. Connect the cold water supply line together with the required safety valves (G).
4. If the system has the hot water circulation system, connect it to the connector pipe (L). Otherwise, plug the pipe.
5. Connect the supply (J) and return (H) of the heating medium to the coil.

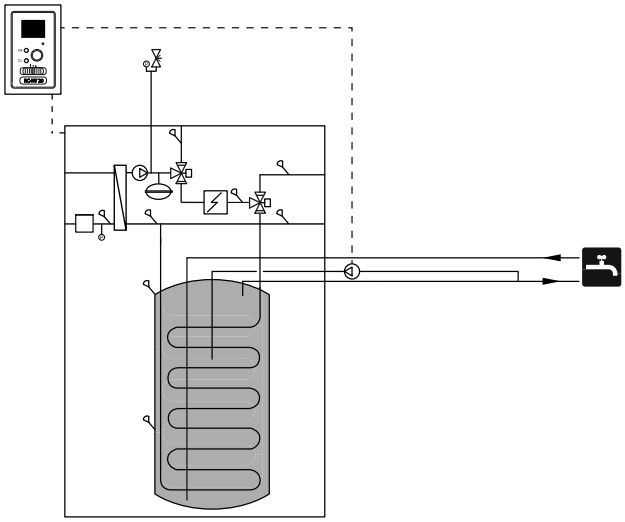
CAUTION

If there is an electric heating module installed in the storage tank, fill the tank with water before connecting it to the electrical installation.

Hot water circulation circuit

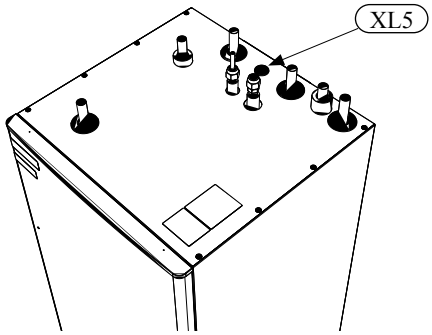
Hot water circulation function is available for HMK series and PT series.

HMK series

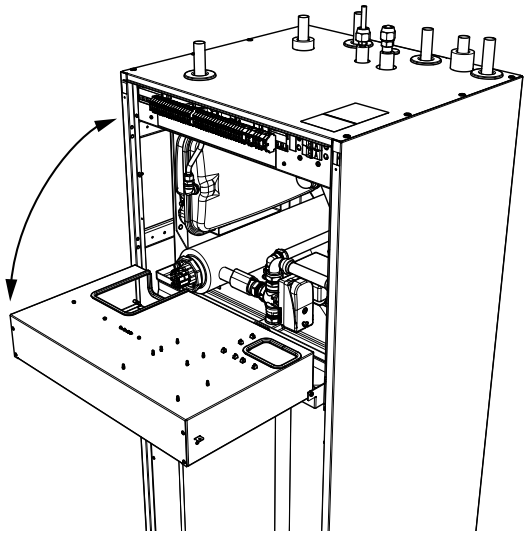


To connect the circulation:

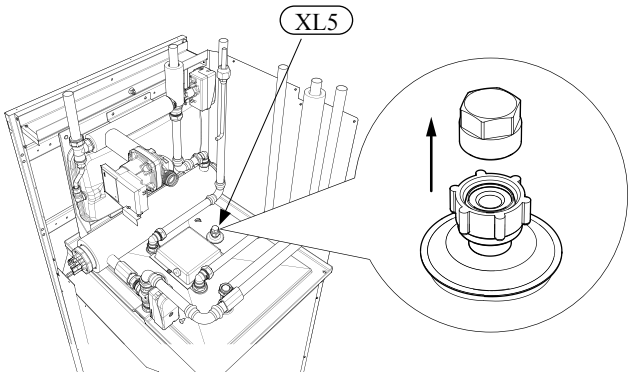
1. Remove the XL5 plug from the top of the housing.



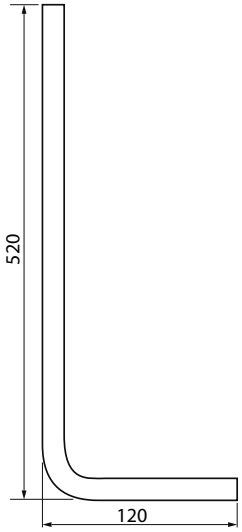
2. Remove the front panel, then slide the control panel down to access the hydraulic connections.



3. Remove the plug from the circulation pipe (XL5).



4. Install the elbow, facing the rear housing, on the circulation pipe.
5. Connect the pipe to the elbow, with the dimensions shown in the figure below, leading pipe in the top of the housing, in place of the XL5 plug. Mount the pipe insulation.



Circulation pipe dimensions (*)

Elbow 15x15 (*)

6. At the outlet of the circulation tube, install the circulation pump and then connect its control to the RC-HY (Chapter 5 Electrical connection).
7. Install the control panel and the front panel.

(*) Prepared on site.

PT series

If the system has the hot water circulation system, connect it to the port L (see page 121).

Then install the Cut-off valves, circulation pump and strainer.

Connection of external heat source

External heat source, e.g. a gas or oil boiler or electric heater, can be connected on supply line of heating system (XL1).

Refrigerant circuit

Connecting refrigerant pipes

See Installation manual for outdoor unit.

Piping insulation

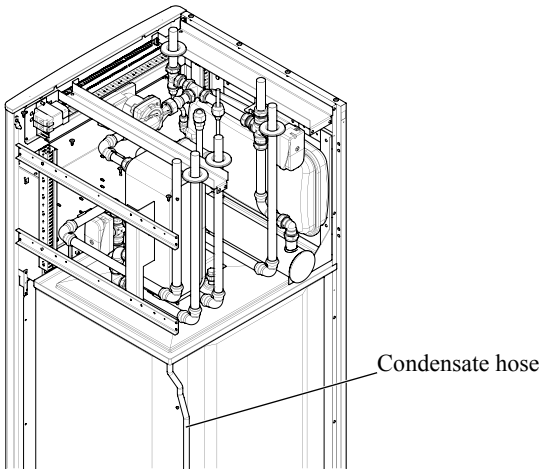
Install insulation on all piping in order to avoid condensation during cooling operation.

It is also strongly recommended to insulate piping for heating only application in order to avoid getting burned or reducing the heating capacity.

The thickness of the insulation should be 20mm where the relative humidity exceeds 70%.

Drain connection

HMK series is equipped with a condensate hose in the heat exchanger section. The hose drains all condensate away from the device to minimize the risk of damage. If necessary, the hose can be extended.



Electrical installation

General

Indoor unit must be installed via an isolator switch in accordance with the local codes and regulations.

For HMK series, electrical equipments, except outdoor air sensor, room sensor, current transformers and outdoor unit has been connected at the factory.

- Disconnect the indoor unit, outdoor unit and control unit before insulation testing of the house wiring.
- If the building is equipped with an earth-fault breaker, Hydrolution should be equipped with a separate one.
- Do not lay communication, sensor or signal cables for external connection close to high voltage lines.
- Minimum cross section of communication, sensor or signal cables for external connection must be 0.5mm^2 up to 50 m, for example EKKX, LiYY or equivalent.
- Use screened three core cable for communication between controller (RC-HY20/40) and indoor unit (HSB series/HMK series).
- When laying cables into indoor units and controllers, be sure to route the cable grommet (UB1 AND UB2).
- Be careful to route cables not to be damaged by metal edge or trapped by panels.
- Outdoor unit is equipped with a single phase compressor. This means that phase L3 is loaded with up to α A during compressor operation.

Outdoor unit	α
FDCW60VNX-A	15
FDCW71VNX-A	16
FDCW100VNX-A	23
FDCW140VNX-A	25

NOTE

Electrical installation and service must be carried out under the supervision of a qualifiedelec trician.

Turn off the circuit breaker before carrying out any servicing.

Electrical installation and wiring must be carried out in accordance with the stipulations in force.

Make sure to turn off the power source during installation.

NOTE

Do not turn on the power on control until the boiler is filled with water.

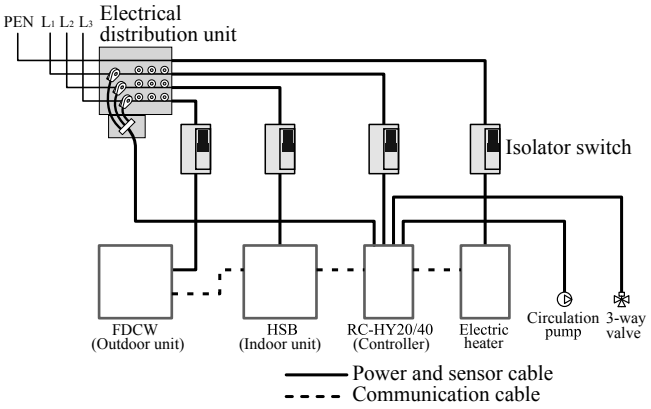
The circulation pump and immersion heater may become damaged.

NOTE

If the power source cable is damaged, only authorised person may replace it to avoid danger or damage.

Principle diagram, electrical installation

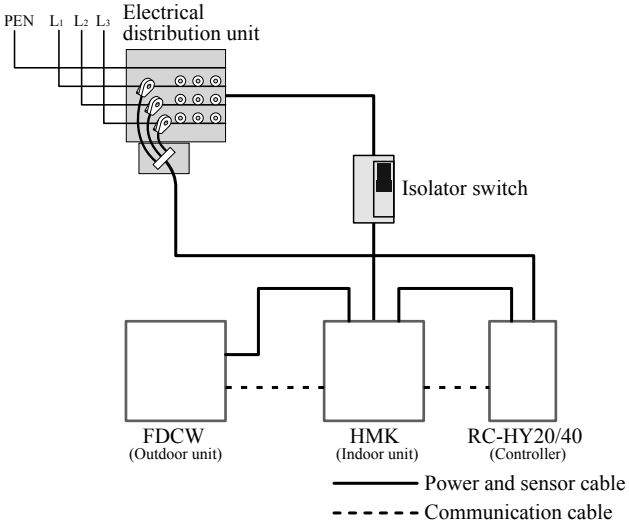
HSB series



	Cable size
Power - HSB60	3 cores, 1.5mm² (power cable)
Power - HSB100	
Power - HSB140	
Power - FDCW60	3 cores, 2.5mm² (power cable)
Power - FDCW71	
Power - FDCW100	
Power - FDCW140	3 cores, 6.0mm² (power cable)
Power - Controller	3 cores, 1.5mm² (power cable)
HSB60 - FDCW60	2 cores, 1.5mm² (communication cable)
HSB100 - FDCW71	
HSB100 - FDCW100	
HSB140 - FDCW140	
Indoor unit - Controller	3 cores, 0.5mm², LiYY,EKKX or equivalent (communication cable)

The cable size shown on the above table is reference value. Choose appropriate size according to local laws and regulations.

HMK series

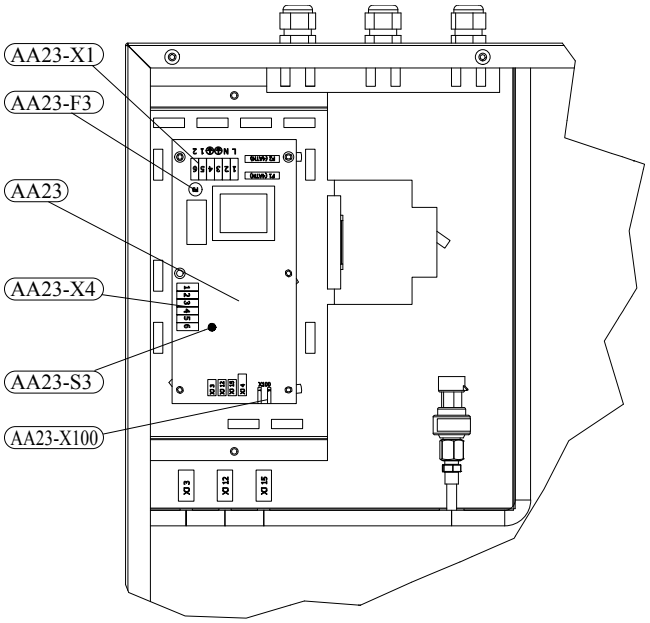


	Cable size
Power - HMK60	5 cores, 2.5mm² (power/communication cable)
Power - HMK100	5 cores, 4.0mm² (power/communication cable)
HMK60 - FDCW60	5 cores, 2.5mm² (power/communication cable)
HMK100 - FDCW71	
HMK100 - FDCW100	
Power - Controller	3 cores, 1.5mm² (power cable)
Indoor unit - Controller	3 cores, 0.5mm², LiYY,EKKX or equivalent (communication cable)

The cable size shown on the above table is reference value. Choose appropriate size according to local laws and regulations.

Electrical components

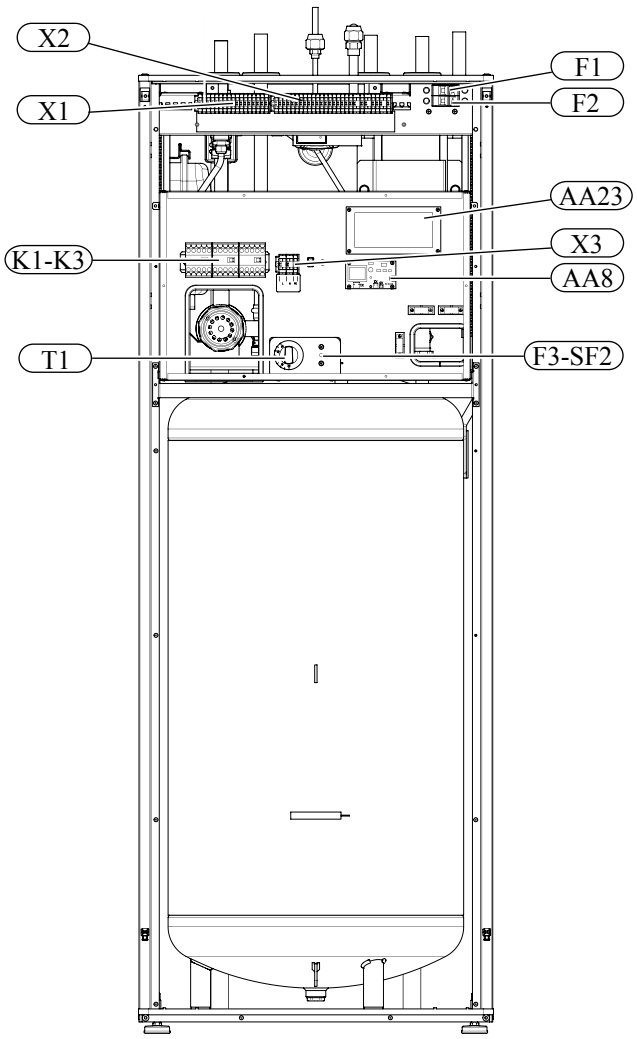
HSB series



Explanation

AA23	Communication board
AA23-F3	Fuse for external heating cable
AA23-S3	DIP switch, addressing of outdoor unit
AA23-X1	Terminal block, incoming supply, connection of KVR
AA23-X4	Terminal block, communication with indoor module / control module
AA23-X100	Terminal block, communication outdoor module FDCW

HMK series



Explanation

X1	Terminal block, sensors
X2	Terminal block, power source
X3	Terminal block
SF1	Controller switch
K1-K3	Submersible heater contact
T1	Thermostat, standby mode
F3	Temperature limiter
AA8	Titanium anode board
AA23	Communication board
F1	Circuit breaker, outdoor unit
F2	Circuit breaker, controller
UB1	Cable grommet
UB2	Cable grommet
F3-SF2	Reset botton, temperature limiter

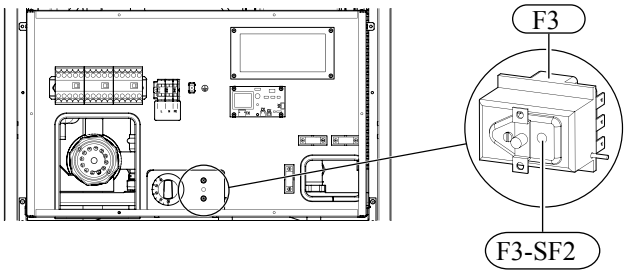
Temperature limiter

Temperature limiter (F3) cuts off the power source of the electrical heating module if the temperature increases to the range of approximately 87 °C, and can be reset manually.

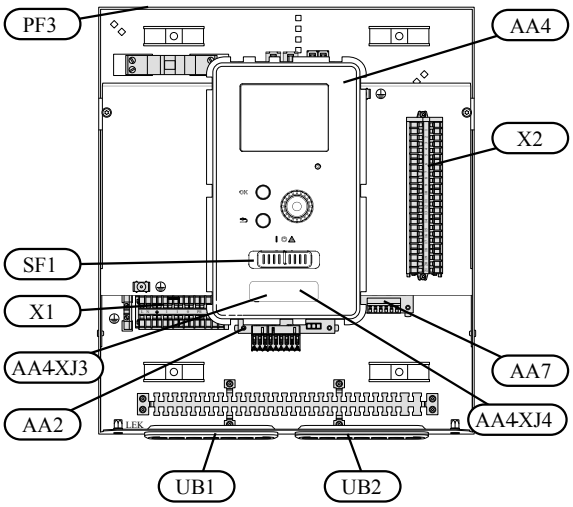
Resetting

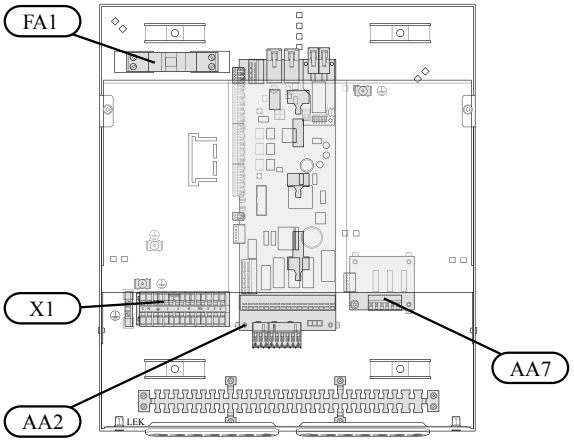
Temperature limiter (F3) is accessible behind the front cover. Temperature limiter is reset by strong pressing of the button (F3-SF2) using a small screwdriver.

Press the button, max. 15 N (approx. 1.5 kg).



RC-HY20

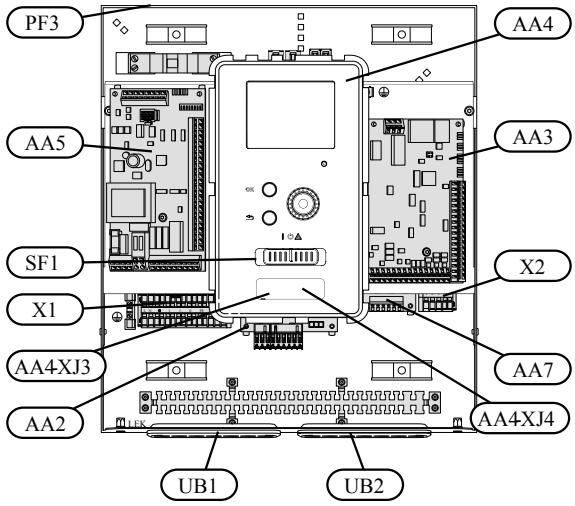


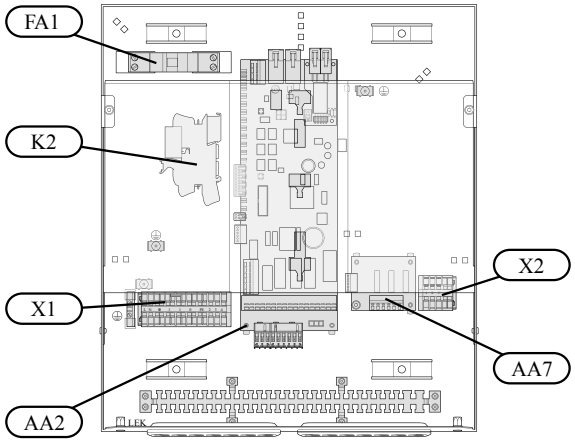


Explanation

AA2	Base card
AA4	Display unit
	AA4-XJ3 USB socket
AA4-XJ4	Service outlet (No function)
AA7	Extra relay circuit board
FA1	Miniature circuit-breaker
X1	Terminal block, incoming electrical supply
X2	Terminal block, control signal circulation pump, sensors AUX inputs and heat pump
SF1	Switch
PF3	Serial number plate
UB1	Cable grommet, incoming supply electricity, power for accessories
UB2	Cable grommet, signal

RC-HY40



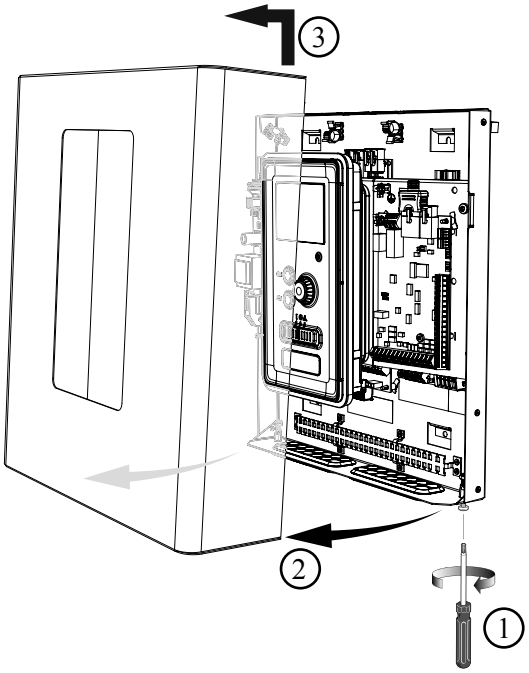


Explanation

AA2	Base card
AA3	Input circuit board
AA4	Display unit
AA4-XJ3	USB socket
AA4-XJ4	Service outlet (No function)
AA5	Accessory card
AA7	Extra relay circuit board
FA1	Miniature circuit-breaker
K2	Emergency mode relay
X1	Terminal block, incoming electrical supply
X2	Terminal block, AUX4 - AUX6
SF1	Switch
PF3	Serial number plate
UB1	Cable grommet, incoming supply electricity, power for accessories
UB2	Cable grommet, signal

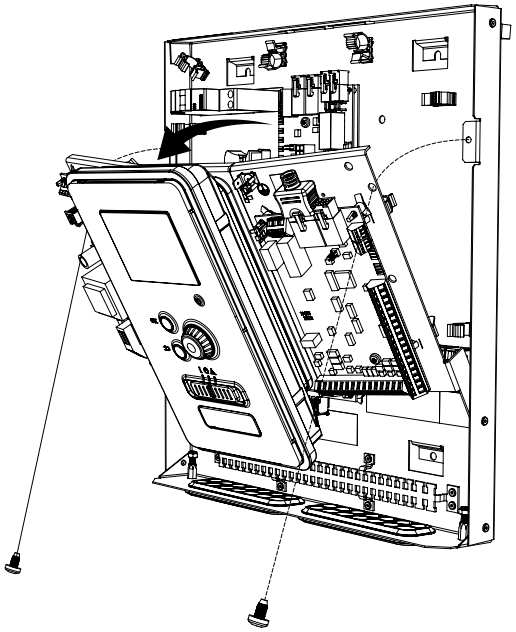
Accessibility, electrical connection for controller

The cover of the control module is opened using a Torx 25 screwdriver. Assembly takes place in the reverse order.

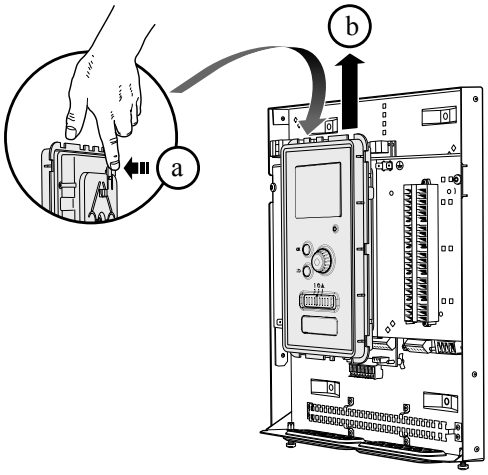


NOTE

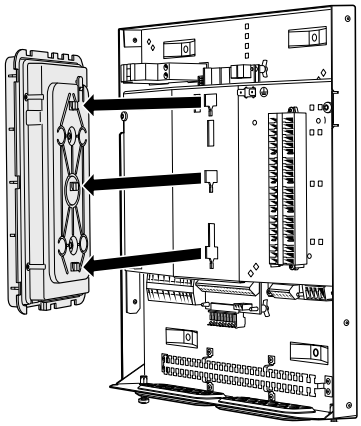
The cover to access the base board is opened using a Torx 25 screwdriver



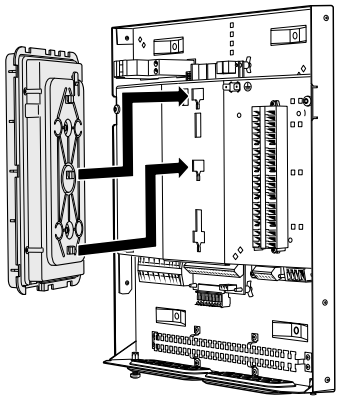
The display may need to be moved for easier access when connecting electrics. This is easily done by following these steps.



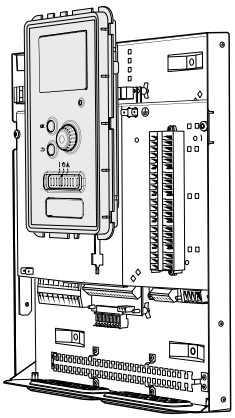
1. Press in the catch on the upper rear side of the display unit towards you (a) and move the display unit upwards (b) so that the mountings unhook from the panel.



2. Lift the display unit from its mountings.



3. Align the two lower mountings on the reverse of the display unit with the two upper holes in the panel as illustrated.



4. Secure the display on the panel.

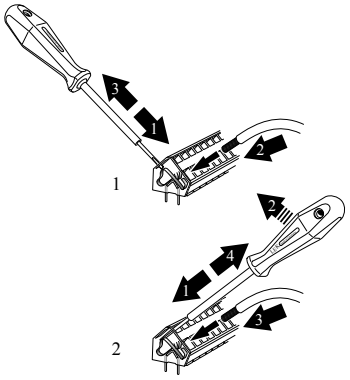
5. When the electrical connection is ready the display must be reinstalled with three mounting points again, otherwise the front cover cannot be installed.

Cable lock

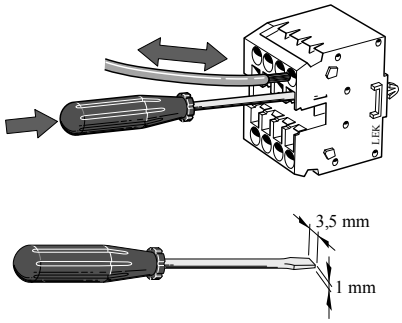
Use a suitable tool to release/lock cables in the terminal block.

HSB series, RC-HY20/40

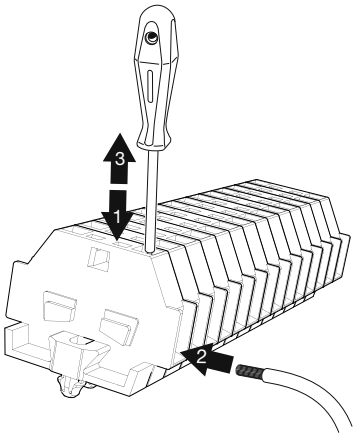
Terminal block on the electrical card



Terminal block



HMK series



Connection

NOTE

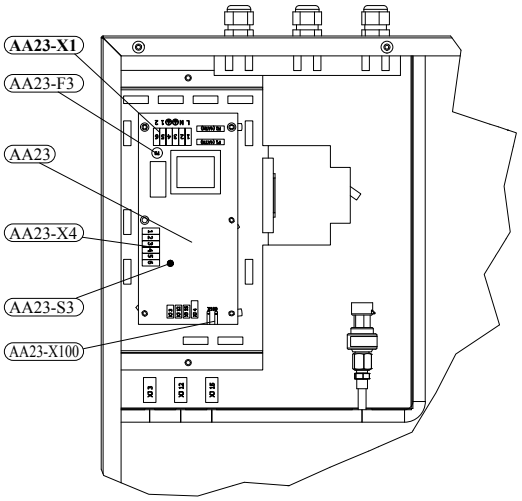
To prevent interference, unscreened communication and/ or sensor cables to external connections must not be laid closer than 20 cm from high voltage cables.

HSB series

Power sourse

In case of HSB series, power sourse is made to indoor unit, outdoor unit and controller separately. 230V 1AC 50Hz is applied.

For indoor unit, incoming supply is connected on AA23-X1 terminal.

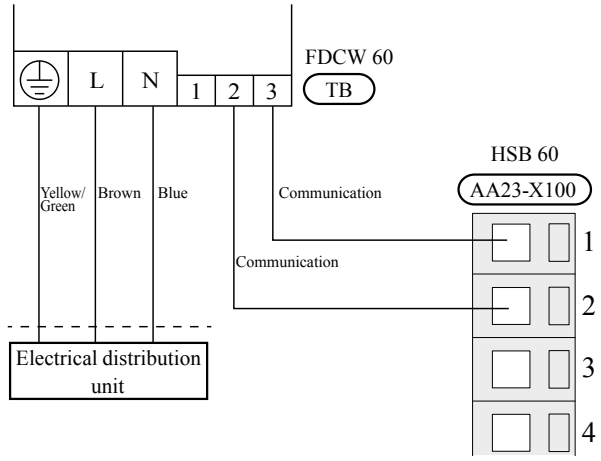


For outdoor unit, incoming supply is connected on TB terminal. See figure on connection between indoor and outdoor unit.

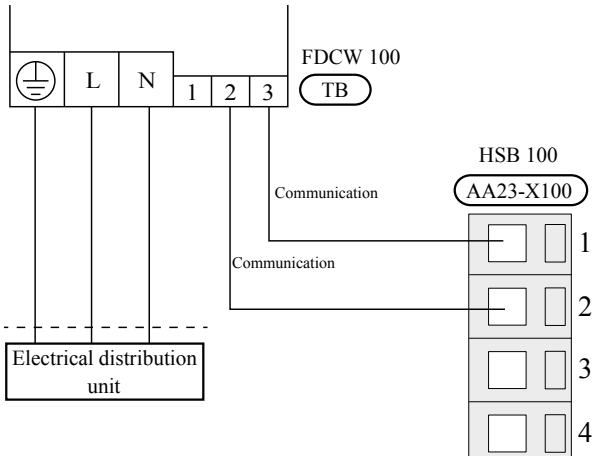
Connection between indoor and outdoor unit

The communication cable between indoor and outdoor unit is connected between terminal AA23-X100 in indoor unit and TB in outdoor unit. Screened 2 cores cable is recommended.

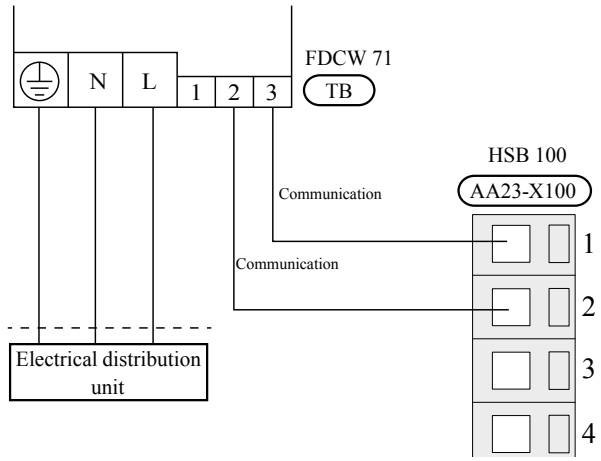
<HSB60 with FDCW60VNX>



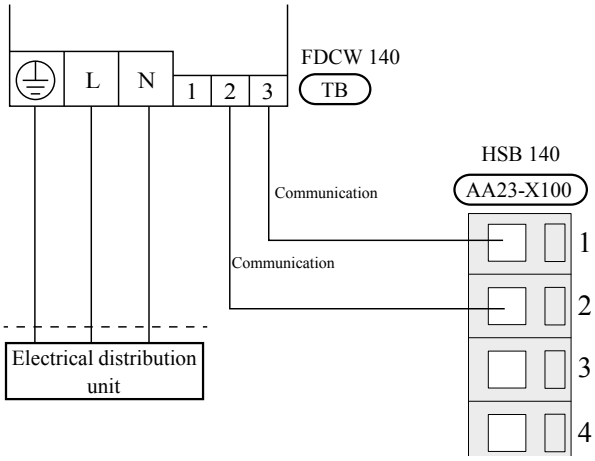
<HSB100 with FDCW100VNX>



<HSB100 with FDCW71VNX>



<HSB140 with FDCW140VNX>



Connection between indoor unit and controller

See connection for RC-HY20/40.

Cascade connection setting

In case of cascade connection system, it is necessary to allot unique address to each indoor unit. Set the DIP switch S3-1, -2 and -3 according to the following table.

Address	S3-1	S3-2	S3-3
1	OFF	OFF	OFF
2	On	OFF	OFF
3	OFF	On	OFF
4	On	On	OFF
5	OFF	OFF	On
6	On	OFF	On
7	OFF	On	On
8	On	On	On

Recommended fuse size for HSB series

The recommended fuse size shown in the following table is reference value. Choose appropriate size according to local laws and regulations.

			Fuse size
Indoor unit	HSB	60	6A/230V 1AC 50Hz
		100	
		140	
Outdoor unit	FDCW	60	20A/230V 1AC 50Hz
		71	
		100	30A/230V 1AC 50Hz
		140	
Controller	RC-HY	20	10A/230V 1AC 50Hz
		40	
Electric heater	ELK	9M	16A/400V 3NAC 50Hz

Recommended cable size for HSB series

The recommended cable size shown in the following table is reference value. Choose appropriate size according to local laws and regulations.

	Cable size
Power - HSB60	3 cores, 1.5mm^2 (power cable)
Power - HSB100	
Power - HSB140	
Power - FDCW60	3 cores, 2.5mm^2 (power cable)
Power - FDCW71	
Power - FDCW100	
Power - FDCW140	3 cores, 6.0mm^2 (power cable)
Power - Controller	3 cores, 1.5mm^2 (power cable)
HSB60 - FDCW60	2 cores, 1.5mm^2 (communication cable)
HSB100 - FDCW71	
HSB100 - FDCW100	
HSB140 - FDCW140	
Indoor unit - Controller	3 cores, 0.5mm^2, LiYY,EKKX or equivalent (communication cable)

HMK series

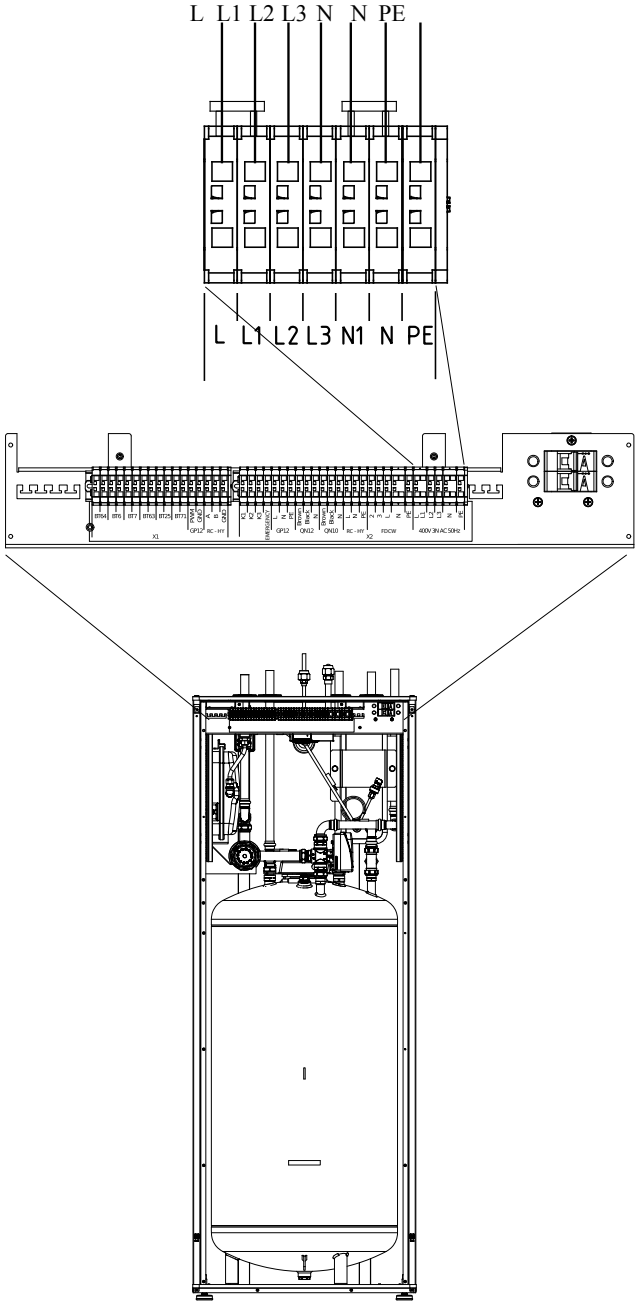
Circuit breaker

HMK series is equipped with internal circuit breakers to protect the system and components. The circuit breaker F1 protects outdoor unit and F2 protects controller.

Power sourse

In case of HMK series, power source is made to indoor unit, and further connected to outdoor unit and controller. 400V 3NAC 50Hz is applied.

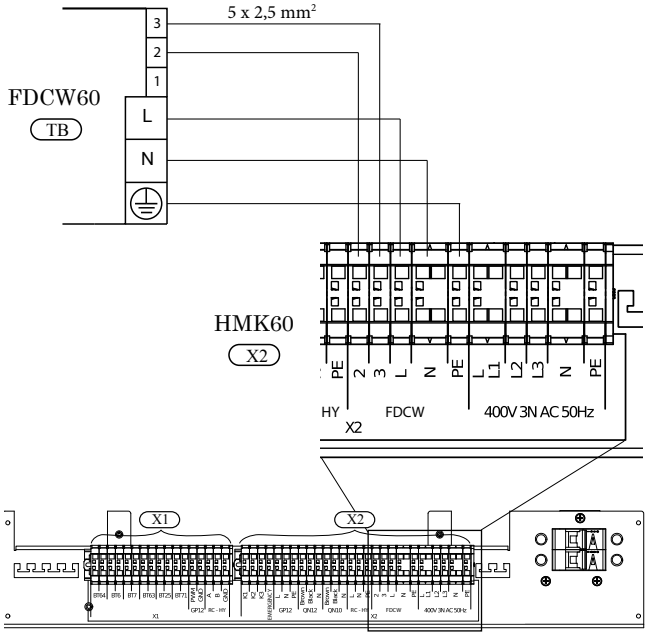
Connect power source cable to the port for power source on X2 terminal as shown below.



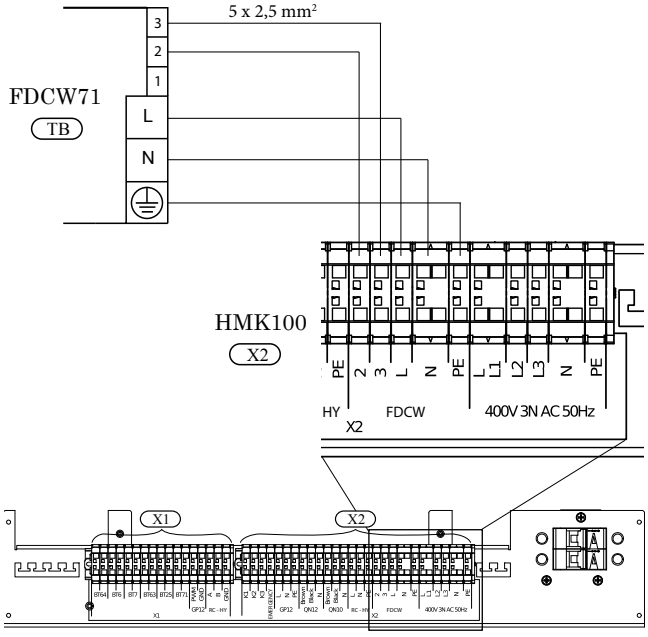
Connection between indoor and outdoor unit

For interconnection cable between indoor unit and outdoor unit, connect 2, 3, L, N and PE port for outdoor unit on X2 terminal on HMK60 to 2, 3, L, N, and ⏚ port on FDCW60 respectively according to the below figure.

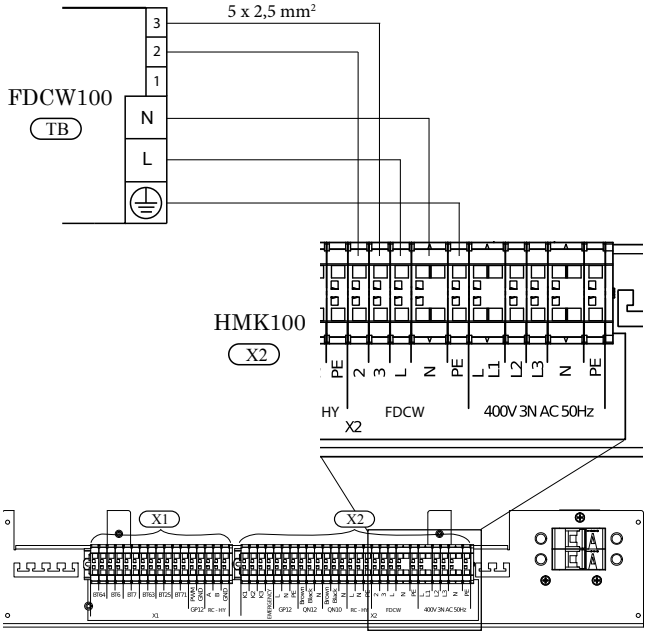
<HMK60 with FDCW60VNX>



<HMK100 with FDCW71VNX>



<HMK100 with FDCW100VNX>



Connection between indoor unit and controller

See Connection for RC-HY20/40.

Recommended fuse size for HMK series

The recommended fuse size shown in the following table is reference value. Choose appropriate size according to local laws and regulations.

			Fuse size
Indoor unit	HMK	60	25A/400V 3NAC 50Hz
		100	

Recommended cable size for HMK series

The recommended fuse size shown in the following table is reference value. Choose appropriate size according to local laws and regulations.

	Cable size
Power - HMK60	5 cores, 2.5mm² (power/communication cable)
Power - HMK100	5 cores, 4.0mm² (power/communication cable)
HMK60 - FDCW60	5 cores, 2.5mm² (power/communication cable)
HMK100 - FDCW71	
HMK100 - FDCW100	
Power - Controller	3 cores, 1.5mm² (power cable)
Indoor unit - Controller	3 cores, 0.5mm², LiYY,EKKX or equivalent (communication cable)

RC-HY20/40

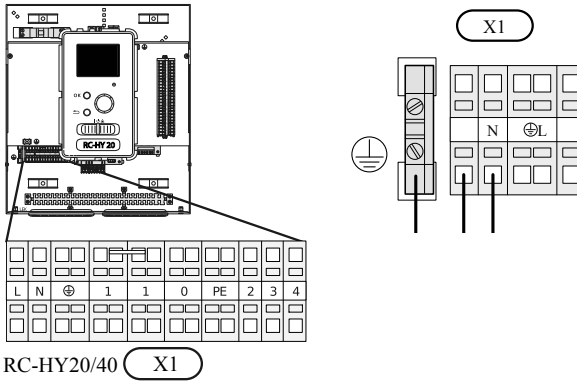
Cable connection is different according to the system structure. Refer to the connection method according to the indoor unit.

Power sourse

HSB series

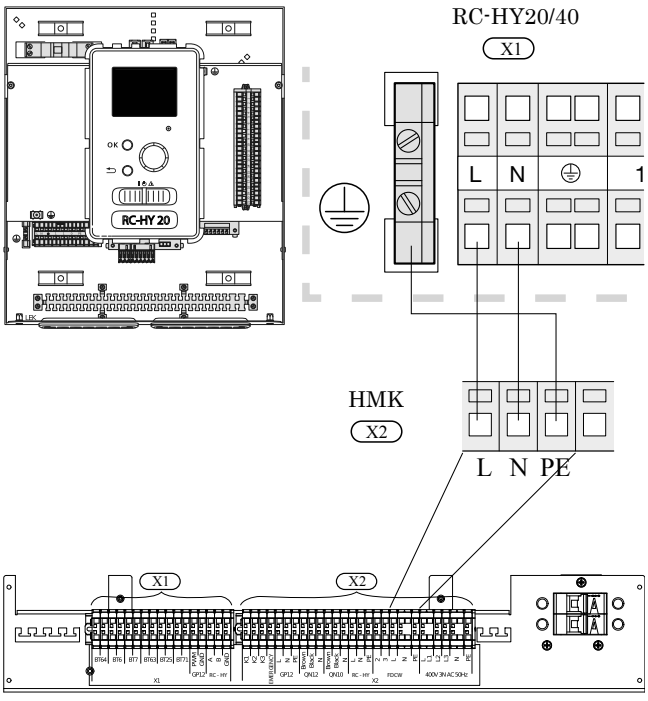
Connect power cable on X1 terminal as shown below.

RC-HY 20/40 must be installed via an isolator switch with a minimum breaking gap of 3 mm. Minimum cable area must be sized according to the fuse rating used.



HMK series

Power is supplied through indoor unit. Connect the port L, N and ⏚ on X1 terminal on RC-HY20/40 to the port L, N and PE for controller on X2 terminal on HMK series respectively as shown below.



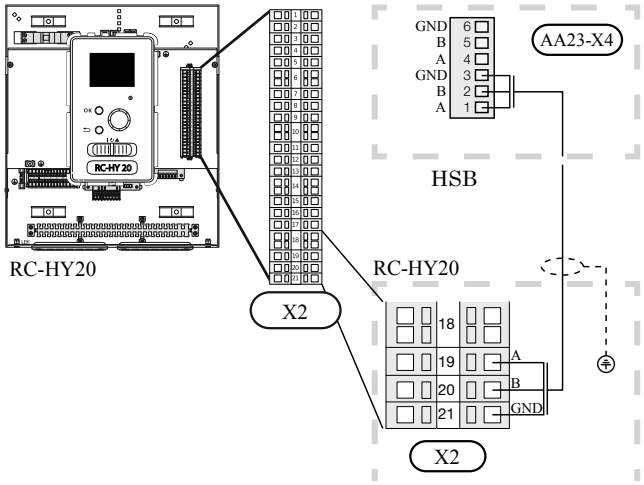
Connection between controller and indoor unit

HSB series

Signal cable is connected between controller and indoor unit with screened 3 cores cable for HSB series. Choose correct terminal according to the type of controller as shown below.

<HSB series with RC-HY20>

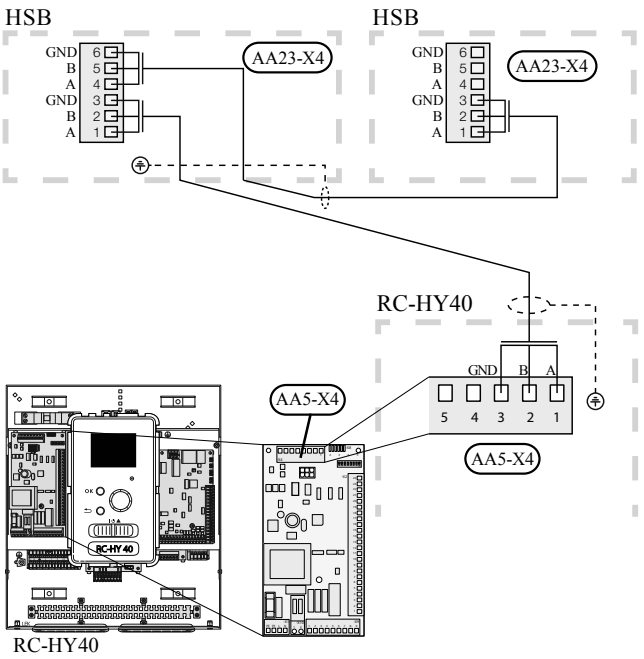
Connect the port 19(A), 20(B) and 21(GND) on X2 terminal on RC-HY20 to the port 1, 2 and 3 on X4 terminal on AA23 board on HSB respectively.



<HSB series with RC-HY40>

Connect the port 1(A), 2(B) and 3(GND) on X4 terminal on AA5 board on RC-HY40 to the port 1, 2 and 3 on X4 terminal on AA23 board on HSB respectively.

In case several systems are connected to one controller, connect the port 4, 5 and 6 on X4 terminal on AA23 board on HSB60 close to the controller to the port 1, 2 and 3 on X4 terminal on AA23 board on another HSB.



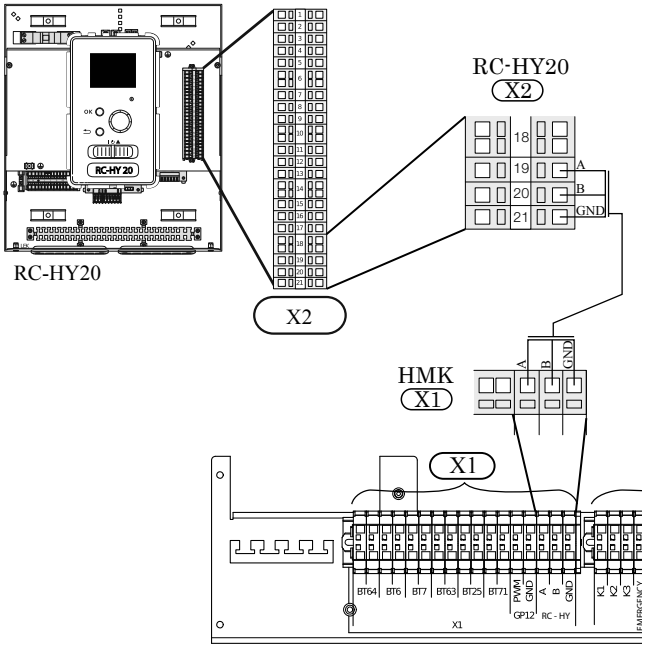
HMK series

Communication cable and pump cable are connected between controller and indoor unit with screened 3 cores cable for HMK series. Choose correct terminal according to the type of controller as shown below.

<HMK series with RC-HY20>

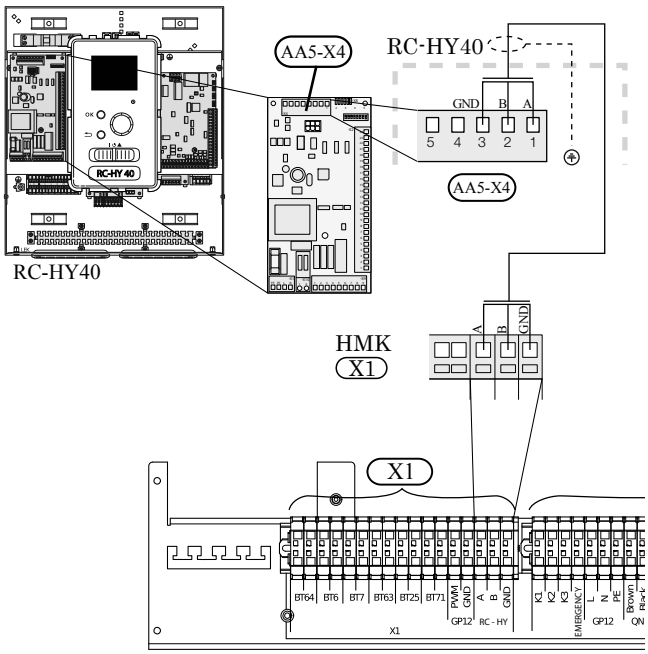
Communication cable

Connect the port 19(A), 20(B) and 21(GND) on X2 terminal on RC-HY20 to the port A, B and GND for EB101 on X1 terminal on HMK respectively.



<HMK series with RC-HY40>

Connect the port 1(A), 2(B) and 3(GND) on X4 terminal on AA5 board on RC-HY40 to the port A, B and GND for EB101 on X1 on HMK respectively.



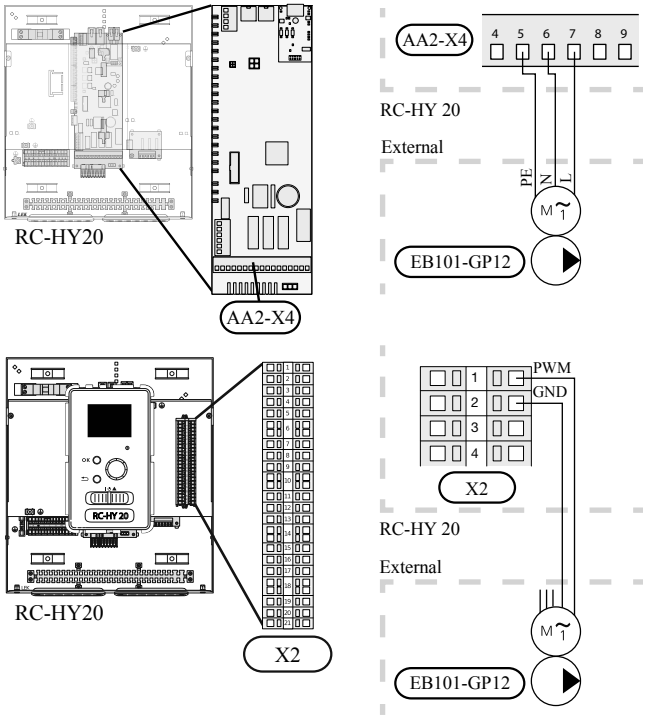
Connection between controller and circulation pump (GP12)

HSB series

For HSB series, circulation pump (GP12) is installed outside of indoor unit. Choose correct terminal according to the type of controller.

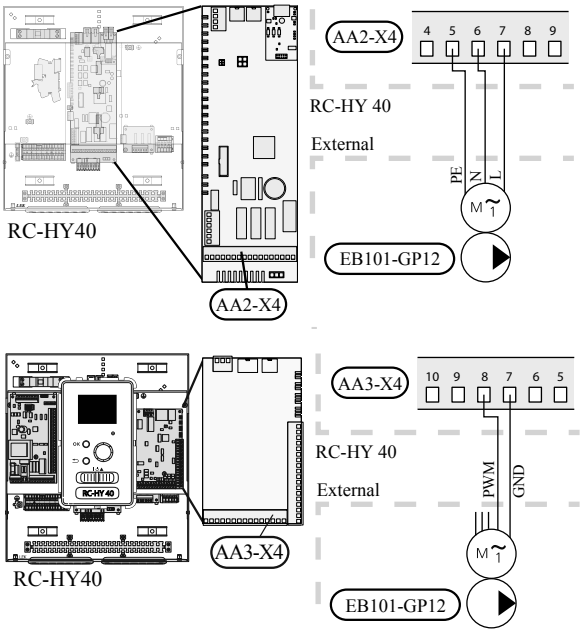
<HSB series with RC-HY20>

Connect the port 5, 6 and 7 on X4 terminal on AA2 board on RC-HY20/40 to the port PE, N and L on circulation pump respectively. Control signal cable is connected between the port 1 and 2 on X2 terminal on RC-HY20 and PWM and GND on circulation pump respectively as shown below.

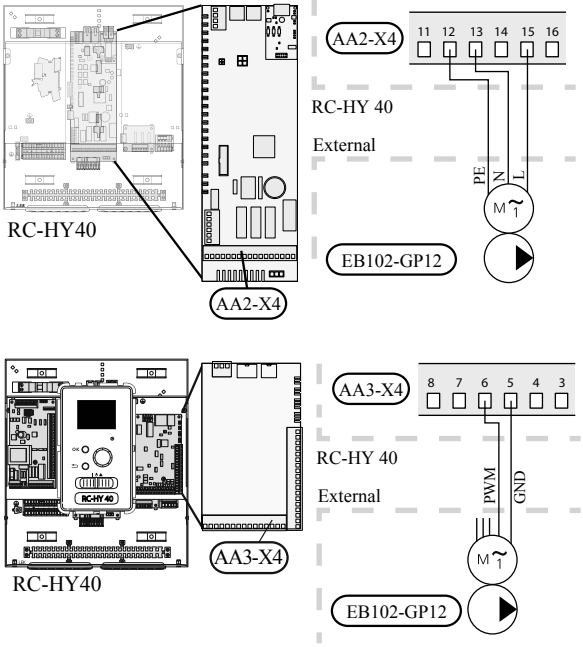


<HSB series with RC-HY40>

Connect the port 5, 6 and 7 on X4 terminal on AA2 board on RC-HY40 to the port PE, N and L on circulation pump (EB101-GP12) respectively. Control signal cable is connected between the port 7 and 8 on X4 terminal on AA3 board on RC-HY40 and GND and PWM on circulation pump respectively as shown below.



RC-HY40 can connect and control up to two pumps. Connect the port 12, 13 and 15 on X4 terminal on AA2 board on RC-HY40 to the port PE, N and L on second circulation pump (EB102-GP12) respectively. Control cable is connected between the port 5 and 6 on X4 terminal on AA3 board on RC-HY40 and GND and PWM on circulation pump respectively as shown below.

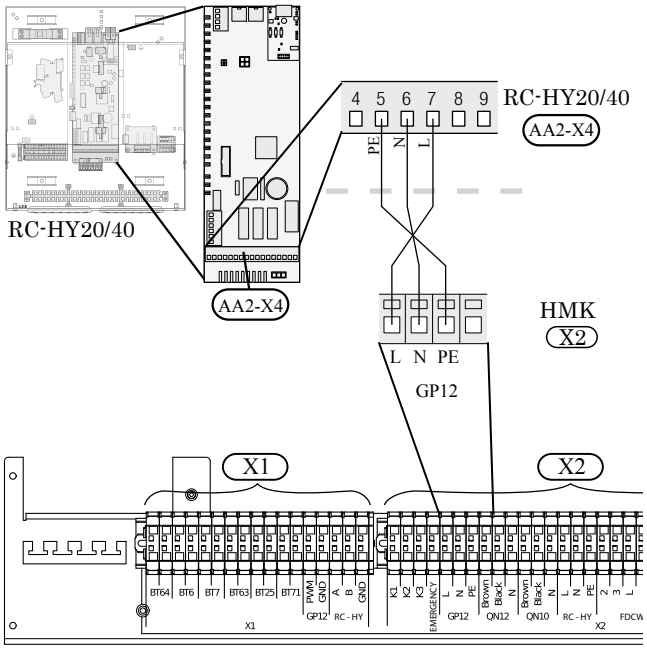


HMK series

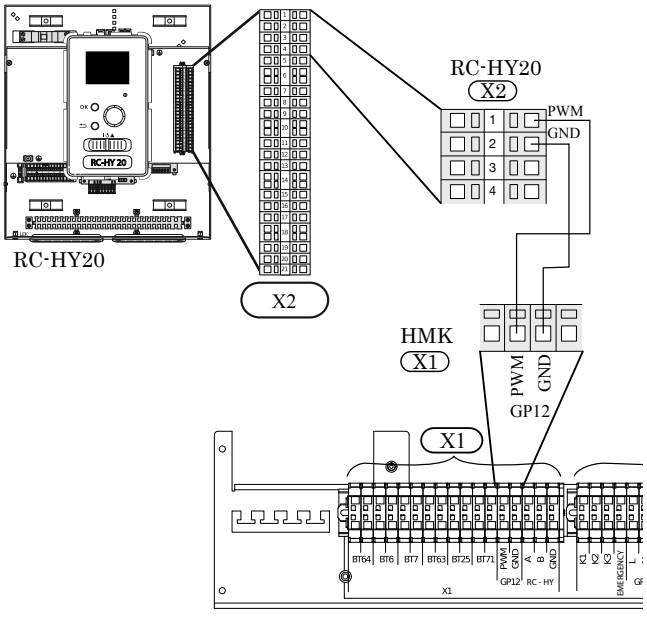
HMK60 is equipped with circulation pump (GP12). Choose correct terminal according to the type of controller.

<HMK series with RC-HY20>

Connect the port 5, 6 and 7 on X4 terminal on AA2 board to the port L, N and PE for GP12 on X2 terminal on HMK respectively.



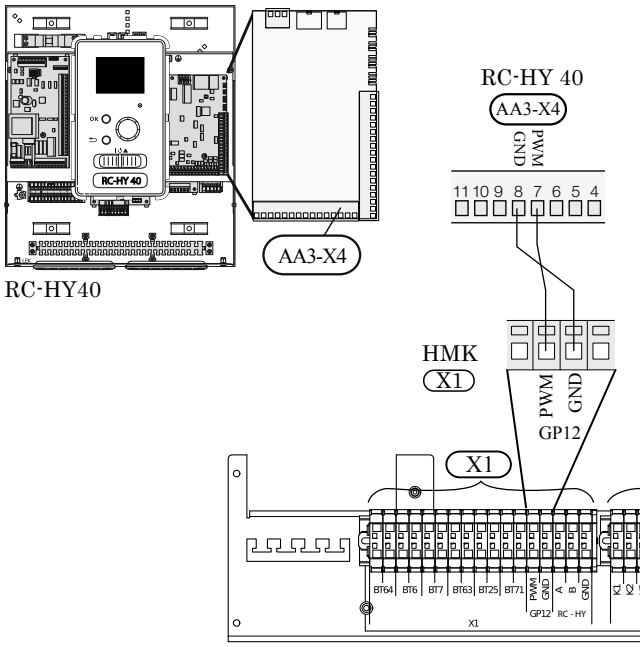
Also, connect the port 1 and 2 on X2 terminal to the port PWM and GND for GP12 on X1 terminal on HMK respectively as shown below.



<HMK series with RC-HY40>

Connect the port 5, 6 and 7 on X4 terminal on AA2 board to the port L, N and PE for GP12 on X2 terminal on HMK60 respectively (same as with RC-HY20).

Also, connect the port 7 and 8 on X4 terminal on AA3 board to the port PWM and GND for GP12 on X1 terminal on HMK respectively as shown below.



Connection between controller and 3-way valve (QN10/QN12)

3-way valve is used for switching heating / hot water production (QN10), or switching heating / cooling (QN12). Install appropriate valves according to the system structure on site.

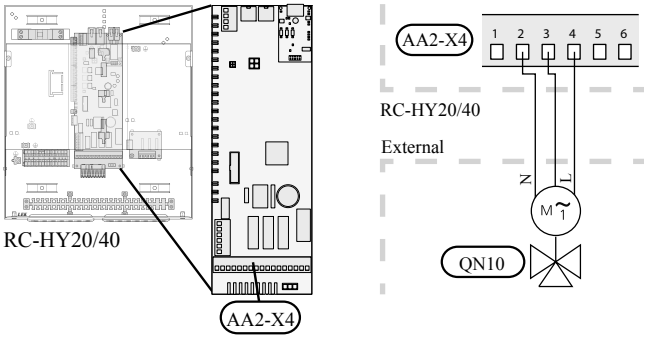
HSB series

HSB series is not equipped with 3-way valve. Install the valves on right position according to the diagram and connect wires on appropriate port according to the type of controller.

<HSB series with RC-HY20>

- **3-way valve for Heating / Hot water (QN10)**

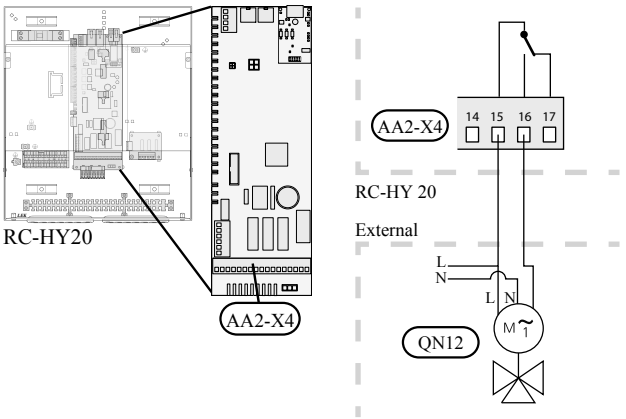
Connect the N, Control and L wire on 3-way valve to the port 2, 3 and 4 on X4 terminal on AA2 board on RC-HY20/40 respectively as shown below.



- **3-way valve for Heating / Cooling (QN12)**

QN12 can be controlled with potential free variable relay. Connect L and Control wire on 3-way valve to the port 15 and 16 on X4 terminal on AA2 board on RC-HY20 respectively. Also, connect L and N wire to power source as shown below.

Additional setting is necessary in menu 5.4. See Menu system for details.



CAUTION

The relay outputs can have a max load of 2 A at resistive load (230V AC).

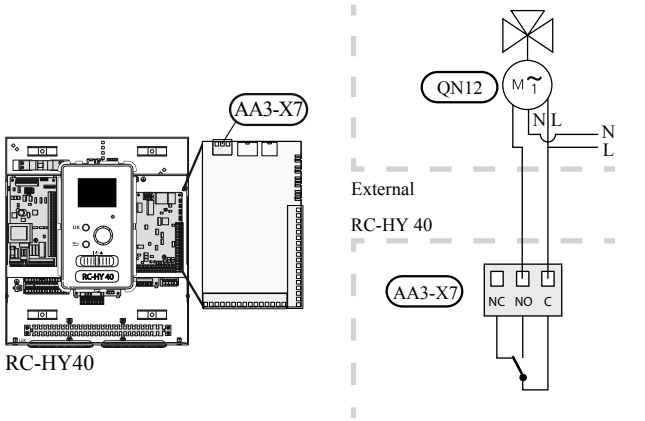
<HSB series with RC-HY40>

- **3-way valve for Heating / Hot water (QN10)**

Refer to 3-way valve connection for HSB series with RC-HY20.

- **3-way valve for Heating / Cooling (QN12)**

QN12 can be controlled with potential free variable relay. Connect L and Control wire on 3-way valve to the port C and NO on X7 terminal on AA3 board on RC-HY40 respectively. Also, connect L and N wire to power source as shown below.



CAUTION

The relay outputs may be subjected to a max load of 2A at resistive load (230V AC).

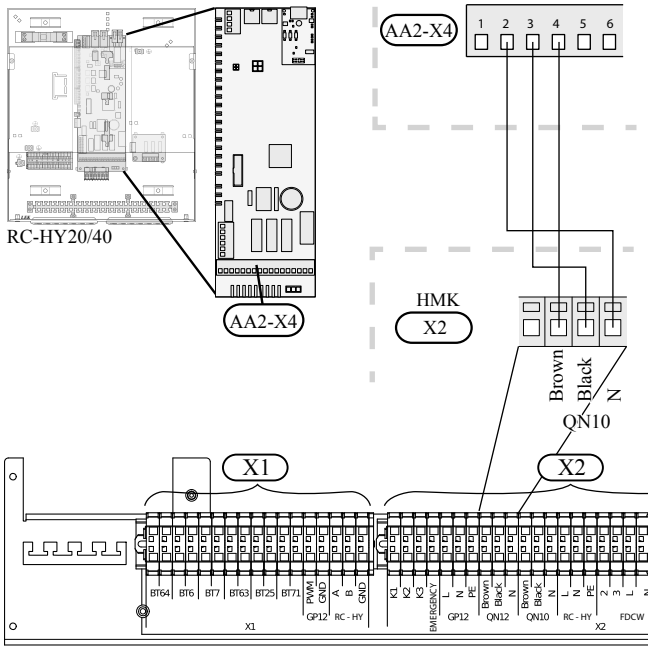
HMK series

HMK series is equipped with both QN10 (for switching heating / hot water) and QN12 (for switching heating / cooling). Connect wires on appropriate port according to the type of controller.

<HMK60 with RC-HY20>

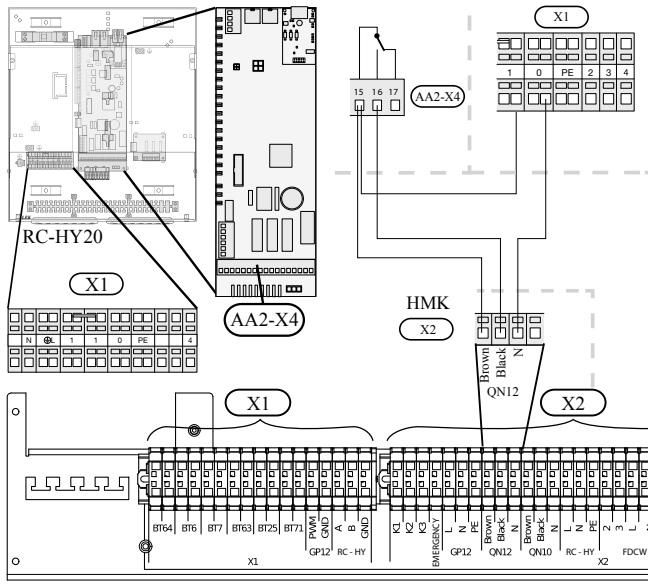
- **3-way valve for Heating / Hot water (QN10)**

Connect the port 2, 3 and 4 on X4 terminal on AA2 board on RC-HY20/40 to the port N, Black and Brown for QN10 on X2 terminal on HMK respectively as shown below.



- **3-way valve for Heating / Cooling (QN12)**

Connect the port 15 and 16 on X3 terminal on AA2 board on RC-HY20 to the port Brown and Black for QN12 on X2 terminal on HMK60 respectively. Also, connect to the port 0 on X1 terminal on RC-HY20 to N port for QN12 on X2 terminal on HMK60. In addition, connect the port 1 on X1 terminal to the port 15 on X4 terminal on AA2 board on RC-HY20.



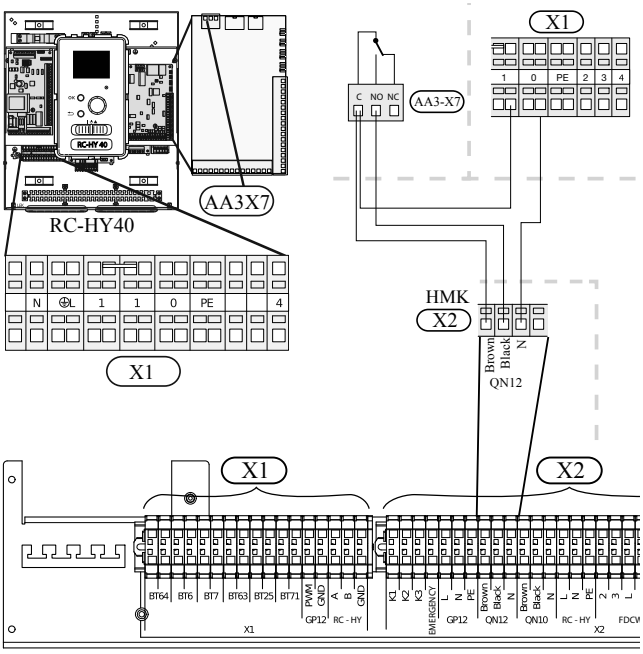
<HMK series with RC-HY40>

- **3-way valve for Heating / Hot water (QN10)**

Refer to 3-way valve connection for HMK series with RC-HY20.

- **3-way valve for Heating / Cooling (QN12)**

Connect the port C and NO on X7 terminal on AA3 board on RC-HY40 to the port Brown and Black for QN12 on X2 terminal on HMK respectively. Also, connect the port 0 on X1 terminal on RC-HY40 to N port for QN12 on X2 terminal on HMK60. In addition, connect the port 1 on X1 terminal to the port C on X7 terminal on AA3 board on RC-HY40.



Connection between controller and sensors

Sensor connection is different according to the combination of indoor unit and controller. Refer to the appropriate combination mentioned below.

Use 2 cores cable with a minimum 0.5mm^2 cross section.

Regarding other sensors not mentioned in this chapter, refer to page 149, Optional connections.

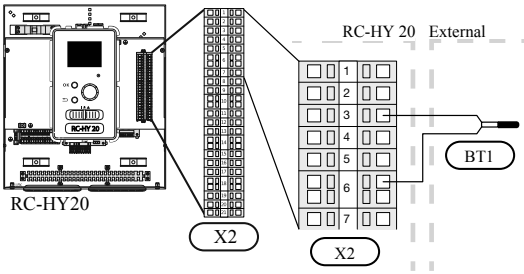
<RC-HY20 with HSB series>

- **Ambient air temperature sensor BT1**

Install ambient air temperature sensor (BT1) in the shade on a wall facing north or north-west, so it is unaffected by the morning sun.

Connect the sensor to the port 3 and 6 on X2 terminal.

If a conduit is used it must be sealed to prevent condensation in the sensor capsule.

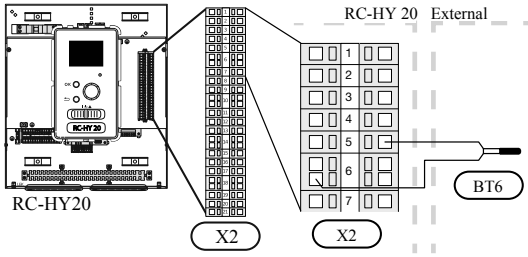


- **Hot water charging sensor BT6 (tank bottom)**

The temperature sensor, hot water charging (BT6) is placed in the submerged tube on the water heater.

Connect the sensor to the port 5 and 6 on X2 terminal.

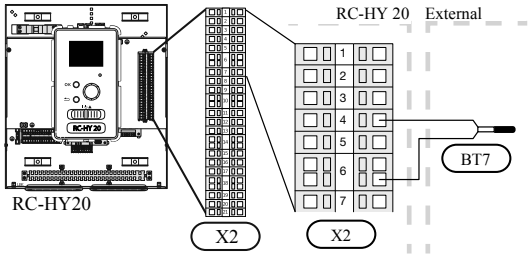
Hot water charging is activated in menu 5.2 or in the start guide.



- **Hot water sensor BT7 (tank top)**

A temperature sensor for hot water top (BT7) can be connected to RC-HY20 to show the water temperature at the top of the tank (if it is possible to install a sensor at the top of the tank).

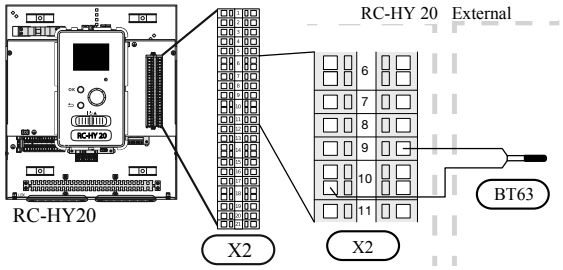
Connect the sensor to the port 4 and 6 on X2 terminal.



- **Temperature sensor BT63, outlet at additional heater**

This sensor is used in case electric heater is placed before 3-way valve (QN10) for switching heating/hot water (see page 290 for diagram).

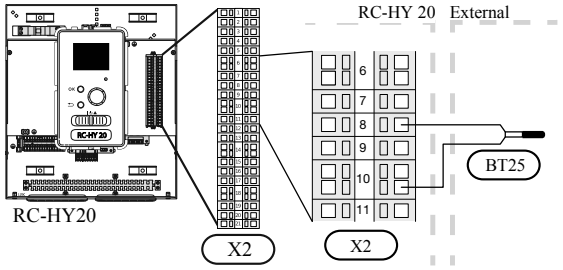
Connect temperature sensor, external supply after electric heater (BT63) to the port 9 and 10 on terminal X2.



- **Temperature sensor BT25, outlet for heating**

This sensor is used in case electric heater is placed after 3-way valve (QN10) for switching heating/ hot water.

Connect temperature sensor, external supply (BT25) to the port 8 and 10 on X2 terminal.



- **Temperature sensor BT71, return line for heating**

This sensor is used in case electric heater is placed after 3-way valve (QN10) for switching heating/ hot water.

For connection, see page 151, AUX inputs.

- **Temperature sensor BT64, outlet for cooling**

This sensor is used in case cooling application is required.

For connection, see page 152, AUX inputs.

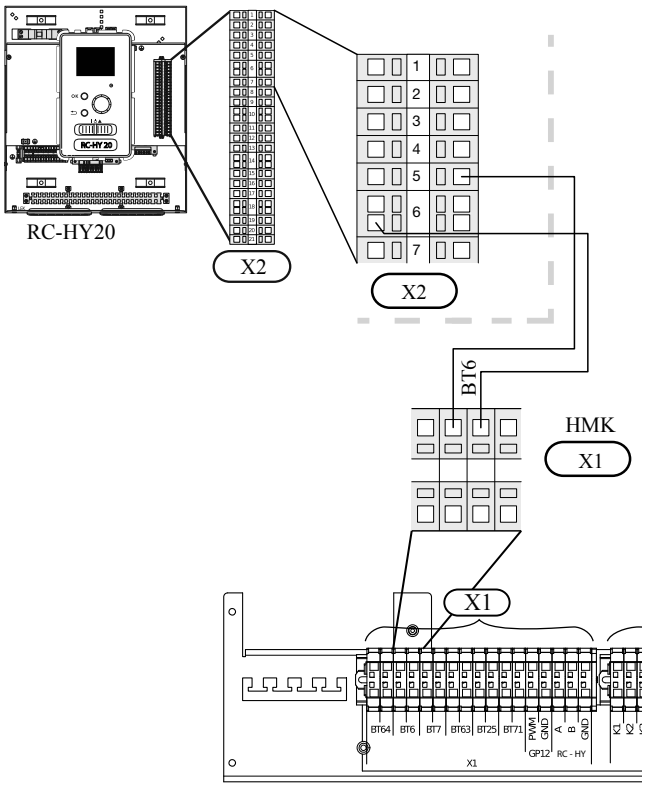
<RC-HY20 with HMK series>

- **Ambient air temperature sensor BT1**

Refer to the connection RC-HY20 with HSB series.

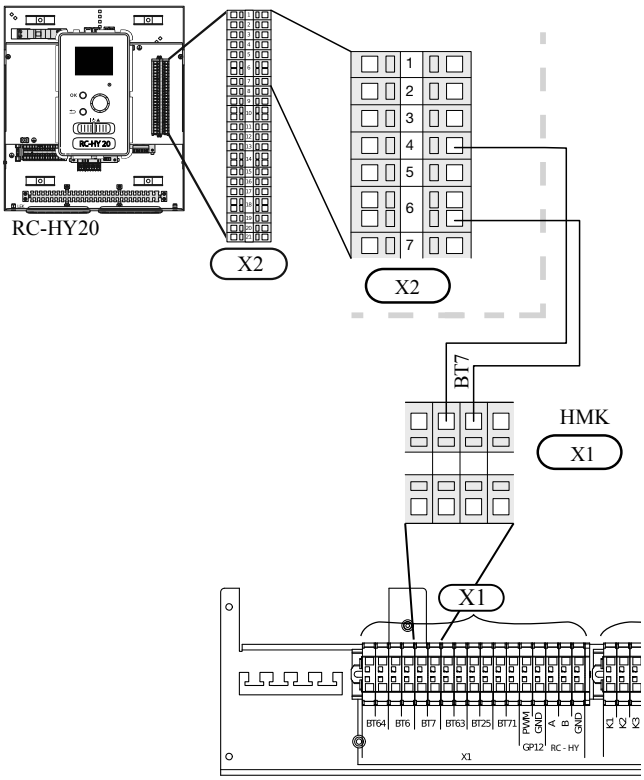
- **Hot water charging sensor BT6 (tank bottom)**

The temperature sensor, hot water charging (BT6) is placed at the bottom part of the water heater. Connect the port 5 and 6 on X2 terminal on RC-HY20 to the port BT6 on X1 terminal on HMK.



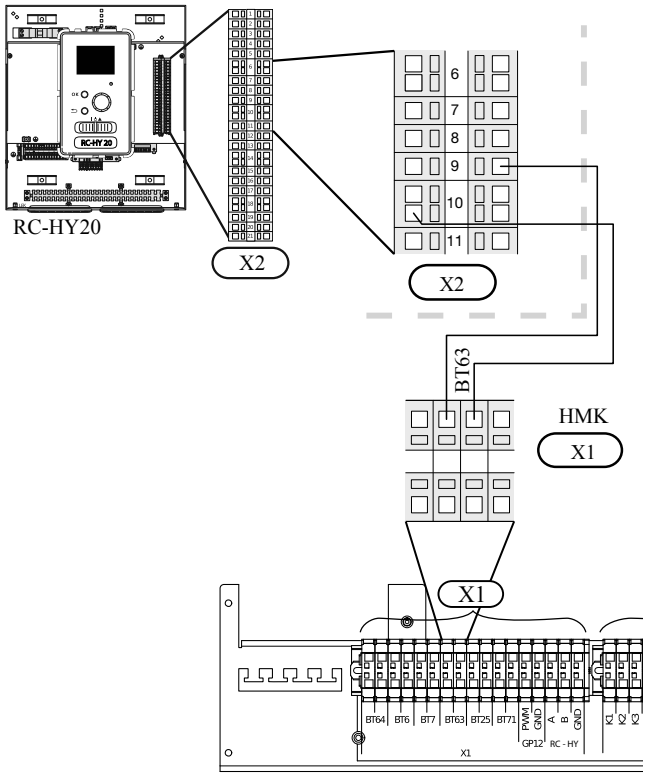
- **Hot water sensor BT7 (tank top)**

The temperature sensor, hot water top (BT7) is placed at the top of the water heater. Connect the port 4 and 6 on X2 terminal on RC-HY20 to the port BT7 on X1 terminal on HMK.



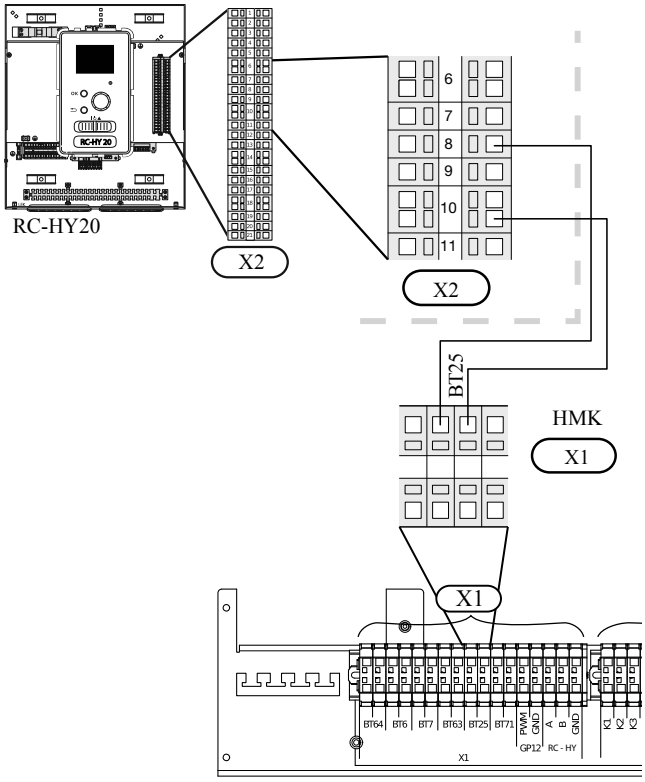
- **Temperature sensor BT63, outlet at additional heater**

The temperature sensor BT63 is placed on the outlet at additional heater. Connect the port 9 and 10 on X2 terminal on RC-HY20 to the port BT63 on X1 terminal on HMK.



- **Temperature sensor BT25, outlet for heating**

The temperature sensor BT 25 is placed on the supply line for heating. Connect the port 8 and 10 on X2 terminal on RC-HY20 to the port BT25 on X1 terminal on HMK.



- **Temperature sensor BT71, return pipe**

The temperature sensor BT71 is placed on the return pipe line for water heater. For connection, see page 151, AUX inputs.

- **Temperature sensor BT64, outlet for cooling**

The temperature sensor BT64 is placed on the supply line for cooling. For connection, see page 152, AUX inputs.

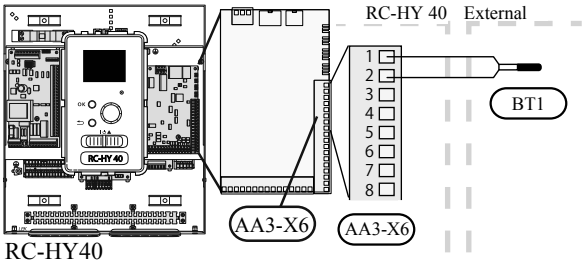
<RC-HY40 with HSB series>

- **Ambient air temperature sensor BT1**

Install ambient air temperature sensor (BT1) in the shade on a wall facing north or north-west, so it is unaffected by the morning sun for example.

Connect the sensor to the port 1 and 2 on X6 terminal on AA3 board.

If a conduit is used it must be sealed to prevent condensation in the sensor capsule.

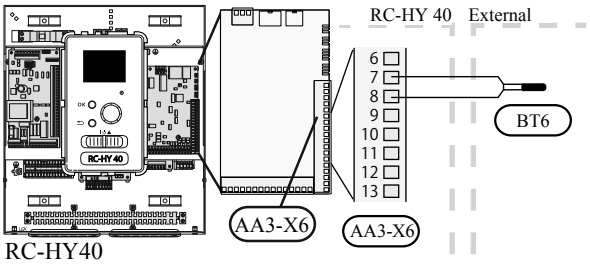


- **Hot water charging sensor BT6 (tank bottom)**

The temperature sensor, hot water charging (BT6) is placed in the submerged tube on the water heater.

Connect the sensor to the port 7 and 8 on X6 terminal on AA3 board.

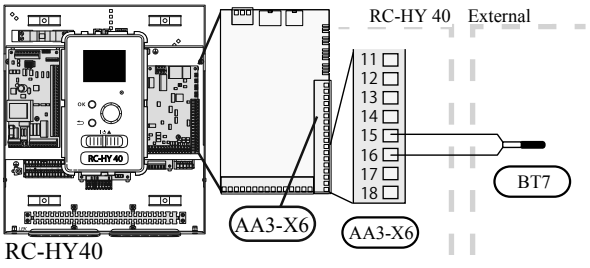
Hot water charging is activated in menu 5.2 or in the start guide.



- **Hot water sensor BT7 (tank top)**

A temperature sensor for hot water top (BT7) can be connected to RC-HY40 to show the water temperature at the top of the tank (if it is possible to install a sensor at the top of the tank).

Connect the sensor to the port 15 and 16 on X6 terminal on AA3 board.



- **Temperature sensor BT63, outlet at additional heater**

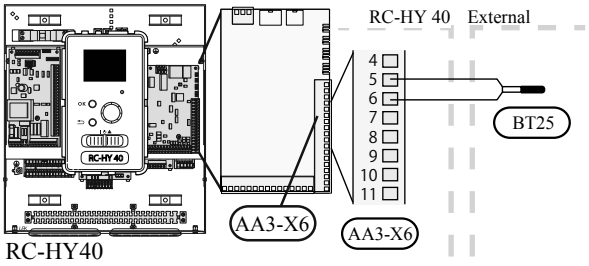
This sensor is used in case electric heater is placed before 3-way valve (QN10) for switching heating/hot water (see page 290 for diagram).

For connection, see page155, AUX inputs.

- **Temperature sensor BT25, outlet for heating**

This sensor is used in case electric heater is placed after 3-way valve (QN10) for switching heating/hot water.

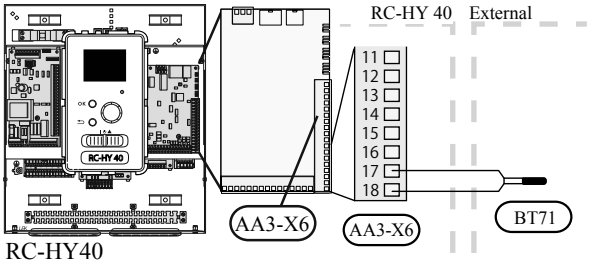
Connect temperature sensor, external supply line (BT25) to the port 5 and 6 on X6 terminal on AA3 board.



- **Temperature sensor BT71, return line for heating**

This sensor is used in case electric heater is placed after 3-way valve (QN10) for switching heating/hot water.

Connect temperature sensor, external return line (BT71) to the port 17 and 18 on X6 terminal on AA3 board.



- **Temperature sensor BT64, outlet for cooling**

This sensor is used in case cooling application is required.

For connection, see page 155, AUX inputs.

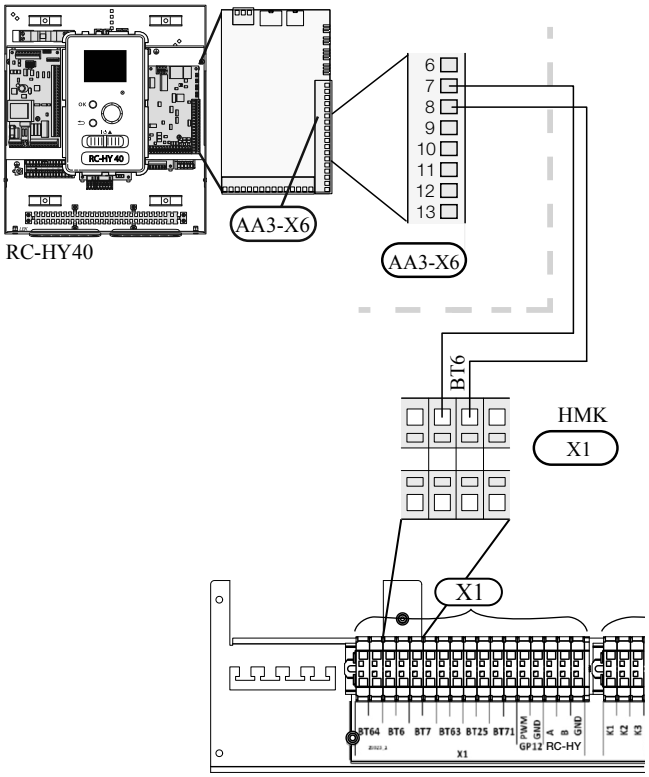
<RC-HY40 with HMK series>

- **Ambient air temperature sensor BT1**

Refer to the connection RC-HY40 with HSB.

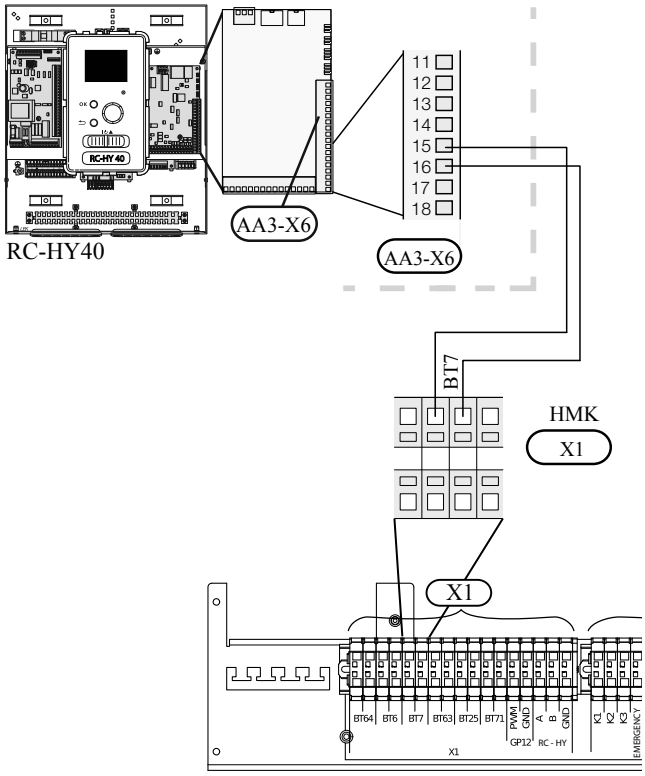
- **Hot water charging sensor BT6 (tank bottom)**

The temperature sensor, hot water charging (BT6) is placed at the bottom part of the water heater. Connect the port 7 and 8 on X6 terminal on AA3 board on RC-HY40 to the port BT6 on X1 terminal on HMK.



- **Hot water sensor BT7 (tank top)**

The temperature sensor, hot water top (BT7) is placed at the top of the water heater. Connect the port 15 and 16 on X6 terminal on AA3 board on RC-HY40 to the port BT7 on X1 terminal on HMK.

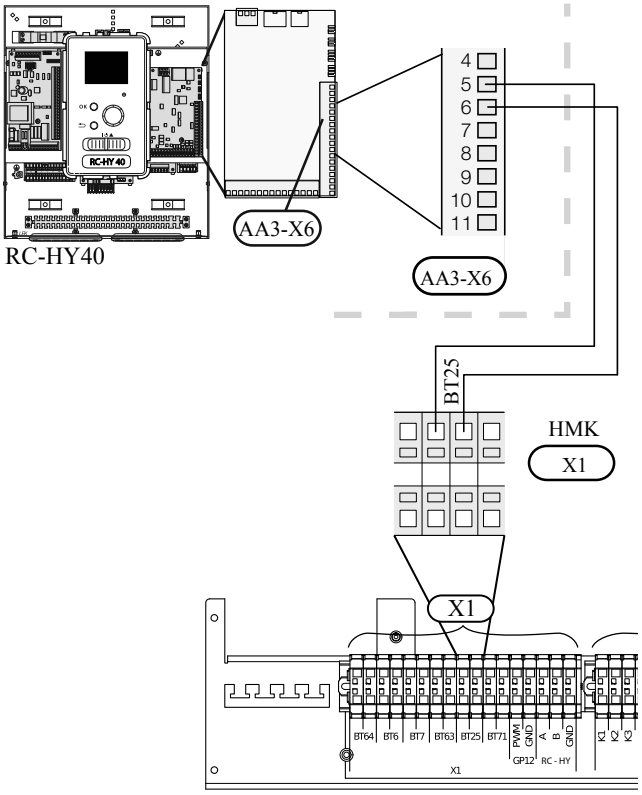


- **Temperature sensor BT63, outlet at additional heater**

The temperature sensor BT63 is placed on the outlet at additional heater. For connection, see page 155, AUX inputs.

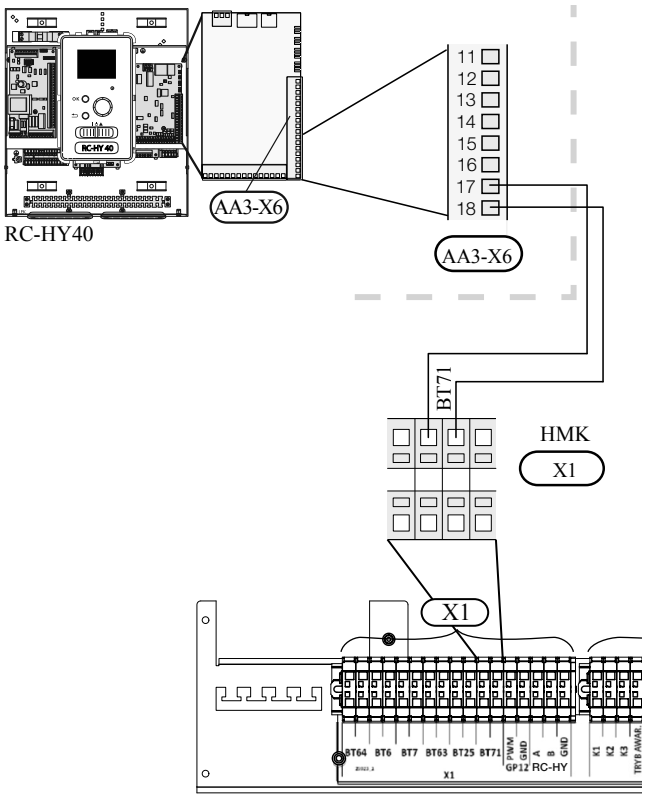
- **Temperature sensor BT25, outlet for heating**

The temperature sensor BT 25 is placed on the supply line for heating. Connect the port 5 and 6 on X6 terminal on RC-HY40 to the port BT25 on X1 terminal on HMK.



- **Temperature sensor BT71, return pipe**

The temperature sensor BT71 is placed on the return pipe line for water heater. Connect the port 17 and 18 on X6 terminal on AA3 board on RC-HY40 to the port BT71 on X1 terminal on HMK.



- **Temperature sensor BT64, outlet for cooling**

The temperature sensor BT64 is placed on the supply line for cooling. For connection, see page 155, AUX inputs.

Optional connections

RC-HY20

- **Room sensor BT50**

Room sensor can be connected to controller.

The room temperature sensor has up to three functions:

1. Show current room temperature in the control module display.
2. Option of changing the room temperature in °C.
3. Makes it possible to change/stabilise the room temperature.

Install the sensor in a neutral position where the set temperature is required. A suitable location is on a free inner wall in a hall approx. 1.5 m above the floor.

Do not install the sensor where correct room temperature cannot be detected such as in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight.

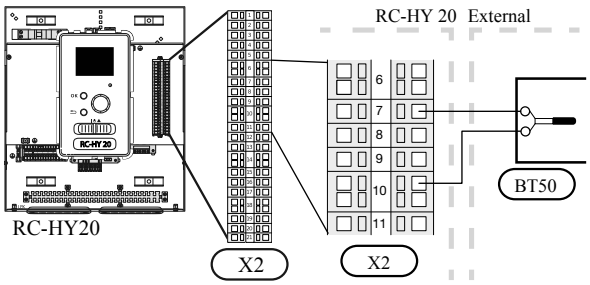
Closed radiator thermostats can also cause problems.

The control module can operate without the sensor, but if user wants to read off the accommodation's indoor temperature in controller display, the sensor must be installed.

Connect the room sensor to the port 7 and 10 on X2 terminal.

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 menu 1.9.4.

If the room sensor is used in a room with underfloor heating, it should only have an indicatory function, not control of the room temperature.



CAUTION

Changes of temperature in accommodation take time. For example, short time periods in combination with underfloor heating will not give a noticeable difference in room temperature.

Use 2 cores cable with a minimum 0.5mm^2 cross section.

- **Step controlled additional heat**

NOTE

Mark up any junction boxes with warnings for external voltage.

External step controlled additional heat can be controlled by up to three potential-free relays in the control module (3-step linear or 7-step binary). Alternatively two relays (2-step linear or 3-step binary) can be used for step controlled additional heat, which means that the third relay can be used to control the immersion heater in the water heater/accumulator tank.

Step in occurs with at least 1 minute intervals and step outs with at least 3 seconds intervals.

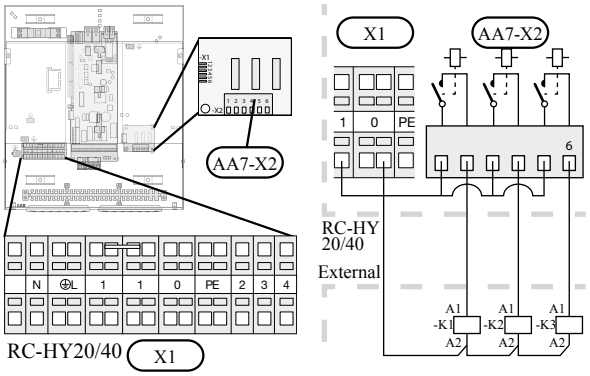
Step 1 is connected to terminal block X2:2 on the additional relay board (AA7).

Step 2 is connected to terminal block X2:4 on the additional relay board (AA7).

Step 3 or immersion heater in the water heater/accumulator tank is connected to terminal block X2:6 on the additional relay board (AA7).

The settings for step controlled additional heat are made in menu 4.9.3 and menu 5.1.12.

All additional heat can be blocked by connecting a potential-free switch function to the software controlled input on terminal block X2 which is selected in menu 5.4.



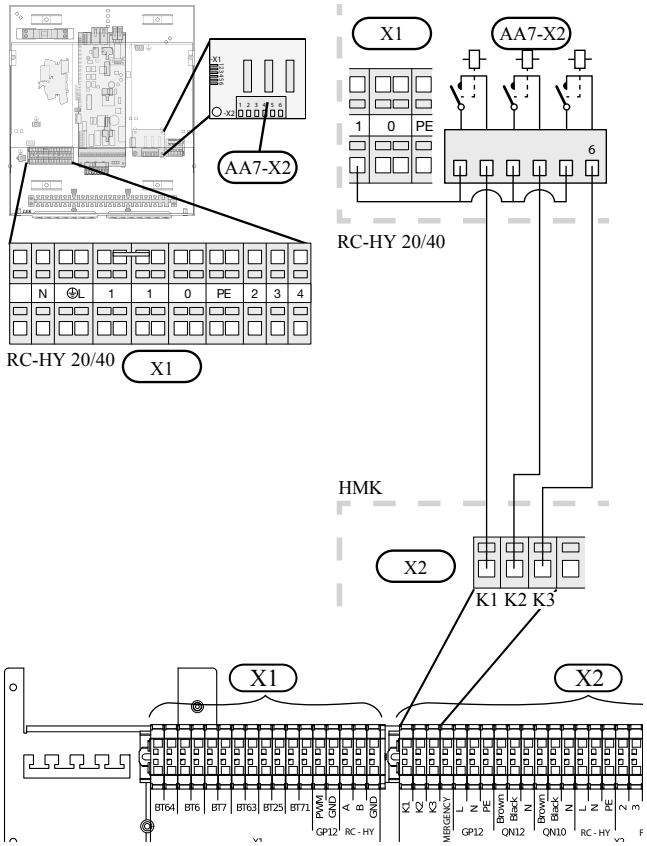
If the relays are to be used for control voltage, bridge the supply from terminal block X1:1 toX2:1, X2:3 and X2:5 on additional relay board (AA7). Connect the neutral from the external additional heat to terminal block X1:0.

Use a cable with appropriate cross section.

For connection, see the installation manual for additional heater.

<Connection example with HMK series>

Connect the port 2, 4, 6 on X2 terminal on AA7 board on RC-HY20/40 to the port K1, K2, K3 on X2 terminal on HMK respectively.



- **Relay output for emergency mode**

NOTE

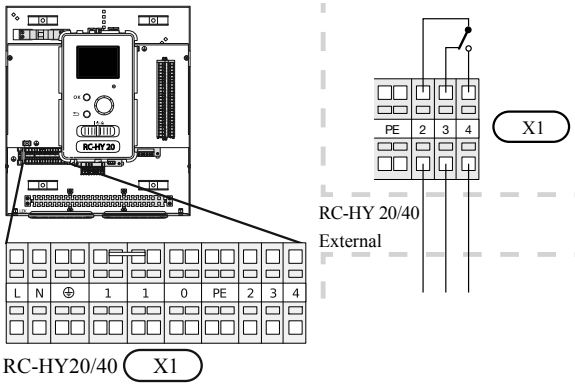
Mark up any junction boxes with warnings for external voltage.

When the switch (SF1) is in "⚠" mode (emergency mode) the circulation pump is activated (EB101-GP12).

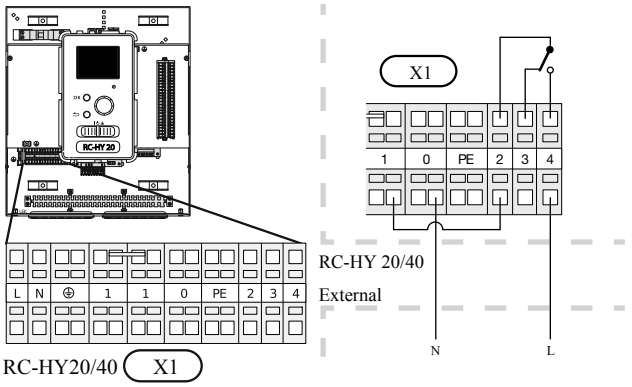
CAUTION

No hot water is produced when emergency mode is activated.

The emergency mode relay can be used to activate external additional heat. Between the port 2 and 4 is closed during emergency mode. An external thermostat must be connected to the control circuit (port 4) to control the temperature. Ensure that the heating medium circulates through the external additional heating.

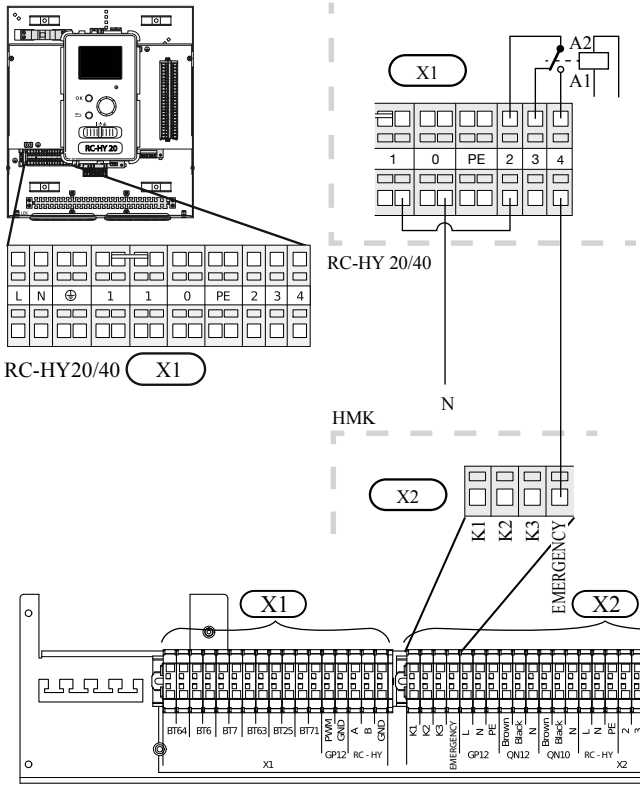


If the relay is to be used for control voltage, bridge the supply from terminal block X1:1 to X1:2 and connect neutral and control voltage from the external additional heat to X1:0 (N) and X1:4 (L).

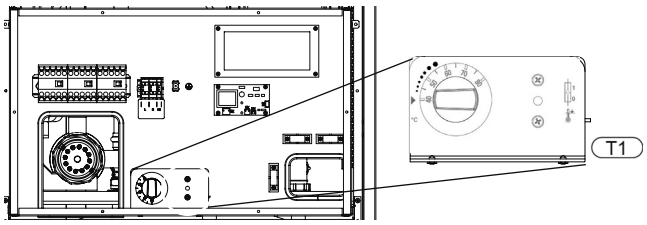


<Connection example with HMK series>

Connect the port 4 on X1 terminal on RC-HY20/40 to EMERGENCY on X2 terminal on HMK60, as well as the port 0 on X1 terminal on RC-HY20/40 to Neutral on HMK.

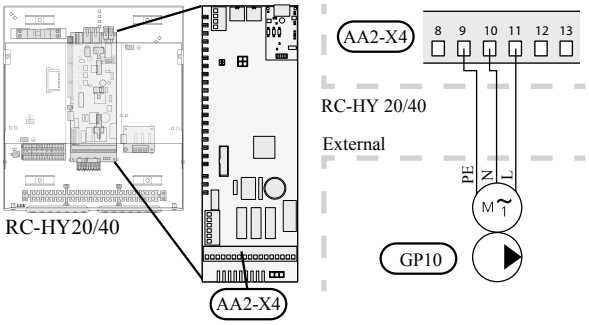


Set the supply temperature with the thermostat T1 in case of emergency mode. The setting range is 6-67°C. For floor heating, the setting must be min 20°C to max 35-45°C in order to preserve heat comfort in the room and ensure effective system operation. When the temperature is set at 35°C or higher, be careful not to cause low temperature burn.



- **External circulation pump**

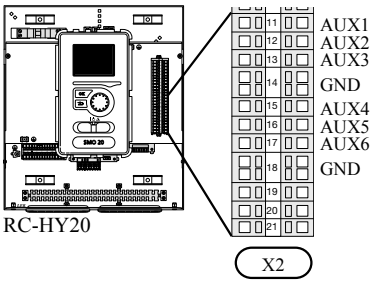
Connect the external circulation pump (GP10) to terminal block X4:9 (PE), X4:10 (N) and X4:11 (230 V) on the base board (AA2) as illustrated.



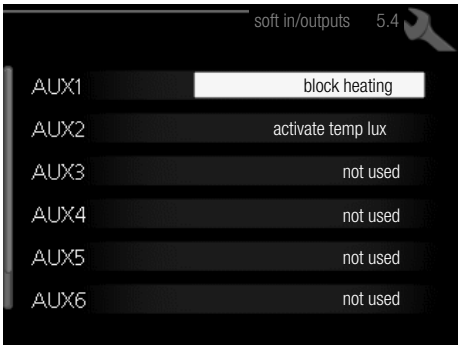
- **AUX inputs**

Other external inputs are available on the port 11 through 18 on X2 terminal on RC-HY20.

AUX1, 2, 3, 4, 5, and 6 correspond to the port 11, 12, 13, 15, 16 and 17 respectively. Port 14 and 18 are GND and are common to the all auxiliary circuit. Connect a sensor or switch between AUX and GND with a 2 cores cable with a minimum cross section of 0.5mm^2.



Select the appropriate function in menu 5.4.



■ Temperature sensor, cooling/heating (BT74)
Additional room sensor (BT74) is applied in case user wants to determine the operation mode (cooling/heating) with a temperature in a particular room.
This option can be chosen only in case cooling function is available.

■ Temperature sensor, external return line (BT71) Temperature sensor BT71 is applied in case additional heater is placed after 3-way valve (see page 289 diagram).

■ Temperature sensor, flow line cooling (BT64)
Temperature sensor BT64 is required in case 4-pipe system is used for cooling operation. (see page 290 for diagram) This option can be chosen only in case cooling function is activated.

■ Contact for external tariff blocking
In cases where external tariff blocking is required it must be connected to terminal block X2.
Tariff blocking means that the additional heat, the compressor, heating and cooling are disconnected by connecting a potential free switch function to the input selected in menu 5.4.
A closed contact results in the electrical output being disconnected.

■ Switch for "SG ready"

NOTE

This function can only be used in mains networks that support the "SG Ready"-standard . "SG Ready" requires two AUX inputs.

This function can only be used in power source networks that support the "SG Ready" standard. "SG Ready" requires two AUX inputs.

"SG Ready" is a smart tariff management scheme in which electricity supplier can aff ect indoor and hot water temperature or simply prohibits additional heat and/or the compressor operation in heat pump at certain period of the day. You can choose which operation mode is affected by this function in menu 4.1.5 after the function is activated.

Choose two external input circuits and connect potential-free switches, and set "SG Ready A" and "SG Ready B" in menu 5.4. The system works diff erently according to the combination of the circuit open/closed.

- Blocking (A: Closed, B: Open)

  "SG Ready" is active. Compressor operation and additional heat is prohibited.
- Normal mode (A: Open, B: Open)

  "SG Ready" is not active. No effect on the system.
- Low price mode (A: Open, B: Closed)

  "SG Ready" is active. The system operates to provide higher capacity than normal mode by using lower tariff electricity. You can select the operation mode (heating/hot water/cooling) affected by this function in menu 4.1.5.
- Overcapacity mode (A: Closed, B: Closed)

  "SG Ready" is active. The system supplies higher capacity than Low price mode since the electricity price is supposed to be very low in this mode. You can select the operation mode (heating/hot water/cooling) affected by this function in menu 4.1.5.

■Contact for activation of "temporary lux"
Temporary hot water production function "temporary lux" is activated with this signal. Connect the terminals with a potential-free switch and choose the function in menu 5.4.
"Temporary lux" is activated only when the switch is closed.

■Contact for activation of "external adjustment"
Target temperature offset for supply temperature or room temperature can be done with this signal.
When a room sensor is connected and activated, the target room temperature is offset in ℃ if the switch is closed.
When a room sensor is not connected, target supply water temperature (heat curve) is offset instead. The degree of off set can be set in menu 5.4.

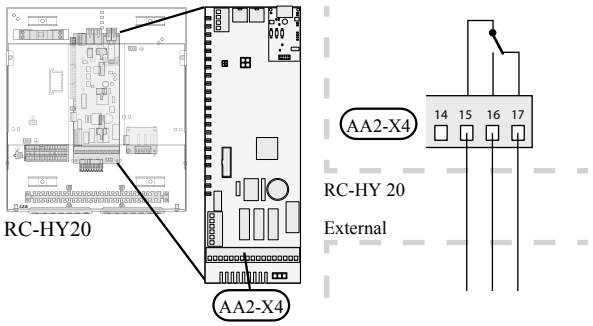
■Switch for external alarm
Alarms from external devices can be connected to the control and appear as an info alarm. Potential-free signal of NO or NC type can be connected.

■Switch for external blocking
This function is used in case certain operation mode needs to be prohibited. The operation at selected operation mode is prohibited when the switch is closed. Following functions can be managed.

- Additional heat
- compressor operation
- heating mode
- cooling mode
- hot water mode

- **AUX outputs**

External output is available on the port 15 to 17 on X4 terminal on AA2 board on RC-HY20. The relay output can have a max load of 2A at resistive load.

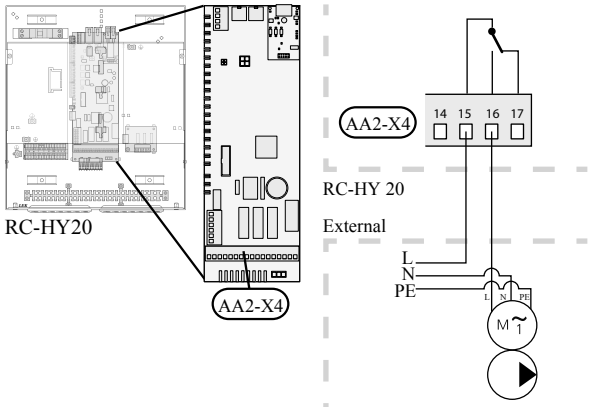


Following functions are available. Select the function in menu 5.4.

- Indication of buzzer alarm
  When an alarm occurs, the circuit becomes closed between the port 15 and 16. During normal operation, the port 15 and 17 is closed.
- Cooling mode indication / Active cooling mode (4-pipe cooling)
  When the system turns into cooling mode, the circuit becomes closed between the port 15 and 16. By using this signal, it is possible to switch 3-way valve for 4-pipe cooling or to assemble a display circuit indicating cooling mode. For details of connecting the 3-way valve, refer to page 141 to 142
- External pump control (GP10)

External pump (GP10) is used in case additional heater is placed after 3-way valve that switches heating/hot water.

Connect the circulation pump as shown below using the port 15 and 16 on X4 terminal.



- Hot water circulation pump control (GP11)
  In case the distance between hot water tap and hot water storage tank is far, the hot water supply line temperature is likely to drop and it may take time to supply hot water from the tap. In that case, hot water circulation pump (GP11) is applied to maintain hot water supply line temperature warm (refer to page 125 for diagram).

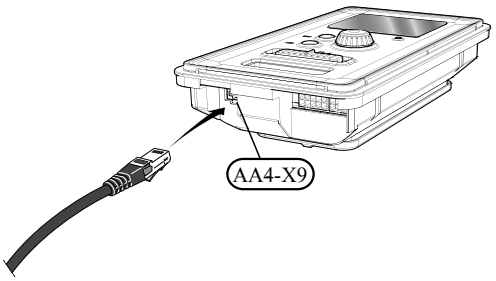
For details of connecting the pump, refer to External pump control (GP10).

NOTE

Mark up any junction boxes with warnings for external voltage.

- **myUpway™**

Connect the network connected cable (straight, Cat.5e UTP) with RJ45-contact (male) to contact AA4-X9 on the display unit (as illustrated). Use the cable grommet (UB2) in the control module for cable routing.



RC-HY40

- **Load monitor**

In case many power electrical appliances are connected in the property and the electric heater is energised at the same time, there is a risk of tripping the main fuse of the property.

The control module has an integrated load monitor that controls the power steps of the electric heater by disconnecting step by step in the event of overload in a phase. It will be reconnected if other current consumption is reduced.

Connecting current sensors

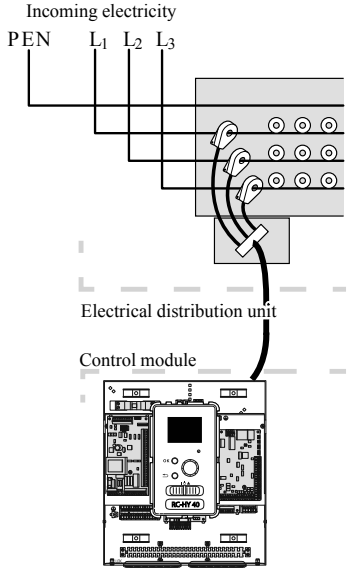
A current sensor (BE1 - BE3) should be installed on each incoming phase conductor in to the electrical distribution unit to measure the current. This is best done in the electrical distribution unit.

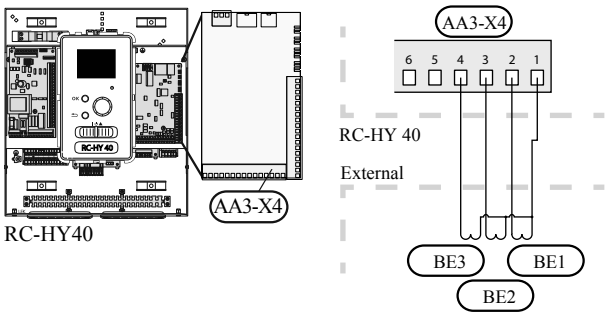
Connect the current sensors to a multi-core cable in an enclosure next to the electrical distribution unit. Use a multi-core cable of at least 0.5 mm² from the enclosure to the heat pump.

Connect the cable to terminal block X4:1 to 4.

X4:1 is the common terminal block for the three current sensors.

Set the size of the property's main fuse in menu 5.1.12.





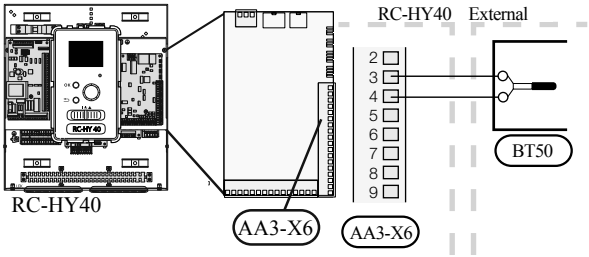
- **Room sensor BT50**

Refer to Room sensor BT50 for RC-HY20 for function and installation place.

Connect the room sensor to terminal block X6:3 and X6:4 on the input board (AA3).

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 menu 1.9.4.

If the room sensor is used in a room with underfloor heating, it should only have an indicatory function, not control of the room temperature.



CAUTION

Changes of temperature in accommodation take time. For example, short time periods in combination with underfloor heating will not give a noticeable difference in room temperature.

- **Step controlled additional heat**

  Refer to the explanation for RC-HY20.

- **Relay output for emergency mode**

  Refer to the explanation for RC-HY20.

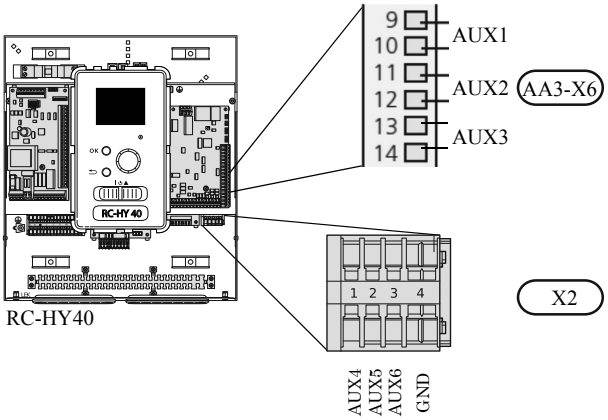
- **External circulation pump**

  Refer to the explanation for RC-HY20.

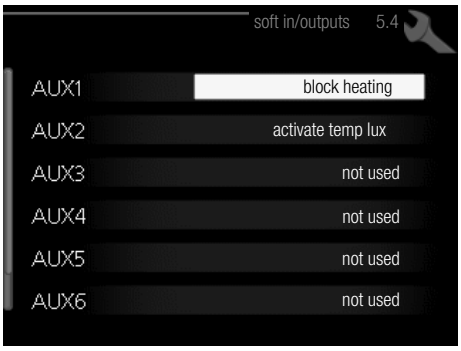
• **AUX inputs**

Up to 6 other external inputs are available on RC-HY40.

AUX1 through 3 correspond to the port 9/10, 11/12, 13/14 respectively on X6 terminal on AA3 board. AUX4 through 6 correspond to the port 1, 2 and 3 on X2 terminal on RC-HY40. Port 4 on X2 terminal is GND and is common to AUX4 through 6. Connect a sensor or switch between AUX and GND with a 2 cores cable with a minimum cross section of 0.5mm^2.



Select the appropriate function in menu 5.4.



■ Temperature sensor, external supply at additional heat before reversing valve (BT63)
Temperature sensor BT63 is applied in case additional heater is placed before 3-way valve (see page 290 for diagram).

The following functions are available. For details, see AUX inputs for RC-HY20.

■ Temperature sensor, cooling/heating (BT74)

■ Temperature sensor, external return line (BT71)

■ Temperature sensor, flow line cooling (BT64)

■ Contact for external tariff blocking

■ Switch for "SG ready"

■Contact for activation of "temporary lux"

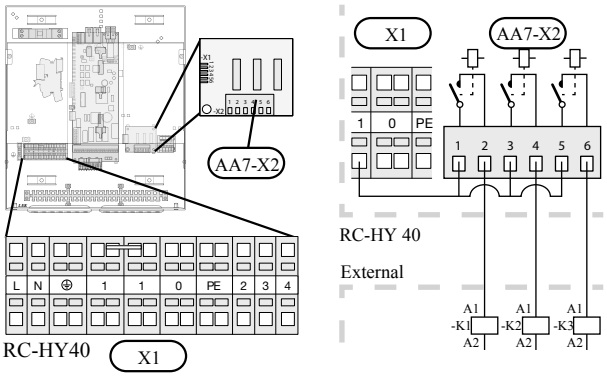
■Contact for activation of "external adjustment"

■Switch for external alarm

■Switch for external blocking

• **AUX outputs**

External output is available on the port NC, NO and C on X7 terminal on AA3 board on RC-HY40. The relay output can have a max load of 2A at resistive load.

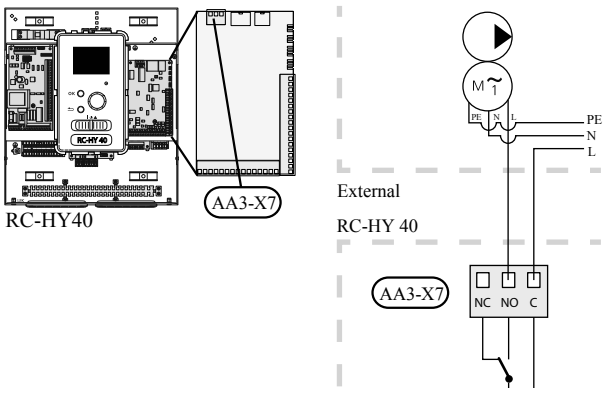


Following functions are available. Select the function in menu 5.4.

• Indication of buzzer alarm
When an alarm occurs, the circuit becomes closed between the port NO and C. During normal operation, the port NC and C is closed.

• Cooling mode indication / Active cooling mode (4- pipe cooling)
When the system turns into cooling mode, the circuit becomes closed between the port NO and C. By using this signal, it is possible to switch 3-way valve for 4-pipe cooling or to assemble a display circuit indicating cooling mode. For details of connecting the 3-way valve, refer to page 141 and 142.

• External pump control (GP10)
External pump (GP10) is used in case additional heater is placed after 3-way valve that switches heating/hot water. Connect the circulation pump using the port NO and C on X7 terminal on AA3 board as shown below.



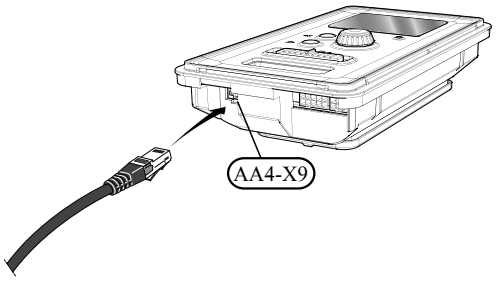
- Hot water circulation pump control (GP11)
  In case the distance between hot water tap and hot water storage tank is far, the hot water supply line temperature is likely to drop and it may take time to supply hot water from the tap. In that case, hot water circulation pump (GP11) is applied to maintain hot water supply line temperature warm (refer to page 125 for diagram).
  For details of connecting the pump, refer to External pump control (GP10).

NOTE

Mark up any junction boxes with warnings for external voltage.

- **myUpway™**

Connect the network connected cable (straight, Cat.5e UTP) with RJ45-contact (male) to contact AA4-X9 on the display unit (as illustrated). Use the cable grommet (UB2) in the control module for cable routing.



Commissioning and adjusting

Preparations

Before starting commissioning, check the followings;

- The signal cable is connected between indoor unit and outdoor unit as well as indoor unit and controller according to the instruction.
- The power cable is connected to indoor unit, outdoor unit and controller according to the instruction.
- Operation switch in controller is in the position ⏻.
- The service valves on outdoor unit (QM35 and QM36) are open.
- Drain valve is closed before filling water in the system.
- Temperature limiter and electrical switch are not tripped.
- The system is filled with water and well vented.
- There are no leaks on the water pipe.

Filling and venting

Hot water tank

1. Open the hot water tap as well as venting valve if applicable, and then open the cold water cut-off valve at the inlet.
2. Fill the storage tank until obtaining uniform water outflow at the hot water tap, and then close the hot water tap and venting valve.
3. Fill the water heater coil in the tank. See Climate system for details.

After the installation and levelling the tank, follow the procedure below (for the connector pipe symbols, refer to page 31):

1. Remove protecting plugs from the connector pipes
2. Connect the hot water intake line (N).
3. Connect the cold water supply line together with the required safety valves (G).
4. If the system has the hot water circulati on system, connect it to the connector pipe (L). Otherwise, plug the pipe.
5. Connect the supply (J) and return (H) of the heating medium to the coil.

CAUTION

If there is an electric heating module installed in the storage tank, fill the tank with water before connecting it to the electrical installation.

CAUTION

Open the hot water intake valves before heating the system up for the first time or after a longer break in its operation in order to check whether the storage tank is filled with water and the cut-off valve at the cold water inlet is not closed.

Climate system

1. Open the vent at the top of the heating system.
2. Open all shut-off valves, where installed, so that water flows into all circuits.
3. Open the valve for filling the heating circuit and fill it with water.
4. Close the vent when water comes out continuously without bubbles.
5. Check the manometer and close the filling valve when the pressure reaches the required value (2 bar is recommended).
6. Start the circulation pump of the heating system, and open the vent from time to time and release the all remaining air in the heating system.
7. Open safety valve until the pressure of the heating system drops down to about 1 bar. If the pressure drops below 1 bar during venting, add additional water in the circuit.

Inspection of installation

Current regulations require that the climate system is inspected before it is commissioned. The inspection must be carried out by a suitably qualifi ed person and must be documented. Do not replace any part of the system without carrying out new checks.

Start-up and inspection

Before start-up

1. In case of cascade connection, check if each indoor unit has a unique address. See Cascade connection setting on page 135 for details.
2. For an outdoor unit equipped with a crank case heater, it is necessary to supply power 6-8 hours before starting compressor operation to heat the compressor with the heater. To do this, supply power to whole system and disable the compressor operation from menu 5.2.2 on the controller. Disable additional heater as well if necessary.
3. After 6-8 hours, enable the compressor operation in menu 5.2.2 on the controller and enable the additional heater in menu 4.9.2 and 4.9.3 on the controller.
4. Start commissioning by the following steps.

*Step 2 and 3 are not necessary for FDCW60VNX-A.

Commissioning with heat pump

Start guide is shown on the display on the controller when it is turned ON for the first time. Follow the start guide in the display, or choose menu 5.7 to show the start guide. For details, see Start guide on page 159.

Commissioning with additional heater only

Follow the start guide in the display as same as commissioning with heat pump, and then follow the list below.

1. Go to menu 4.2 op. mode.
2. Mark ”add. heat only” using the control knob and then press the OK button.
3. Return to the main menus by pressing the Back button.

CAUTION

When commissioning without MTH air/water heat pump an alarm communication error may appear in the display.

The alarm is reset if the relevant heat pump is deactivated in menu 5.2.2 ("installed heat pump").

3-way valve operation check

1. Activate "AA2-K1 (QN10)" in menu 5.6.
2. Check that the reversing valve opens or is open for hot water charging.
3. Deactivate "AA2-K1 (QN10)" in menu 5.6.

AUX function check

To check any function connected to the AUX socket,

1. Activate “AA2-X4 (RC-HY20)” or “AA3-X7 (RC-HY40)” in menu 5.6.
2. Check the desired function.
3. Deactivate “AA2-X4 (RC-HY20)” or “AA3-X7 (RC-HY40)” in menu 5.6.

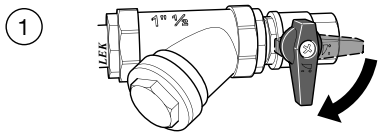
Cooling mode

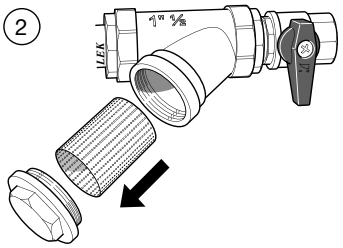
In case the climate system contains a cooling circuit, activate cooling function in menu 5.11.1.1. After that, you can choose cooling mode indication in menu 5.4 for the AUX output.

Cleaning particle filter

Clean the particle fi lter (HQ1) after installation.

1. Close valve QM31 and the valve by the particle filter (HQ1).
2. Open the safety valve (QM20) to ensure that the pressure in HSB series drops.
3. Clean the particle filter (HQ1) as illustrated.





Secondary adjustment

Air is initially released from the hot water and venting may be necessary. If bubbling sounds can be heard from the heat pump, the circulation pump and radiators the entire system will require further venting. When the system is stable (correct pressure and all air eliminated) the automatic heating control system can be set as required.

Start guide

NOTE

Fill in the climate system with water before the switch is set to "|"

1. Set the control module's switch to "|".
2. Follow the instructions in the start guide in the control module display. If the start guide does not start when you start the control module, start it manually in menu 5.7.

TIP

See page 63 for a more in-depth introduction to the installation's control system (operation, menus etc.).

Commissioning

The start guide is displayed when installation is started, It describes what needs to carry out at the first start together with basic settings during installation.

The start guide is displayed so that it cannot be bypassed in order to carry out the start-up correctly. You can start the start guide later in menu 5.7.

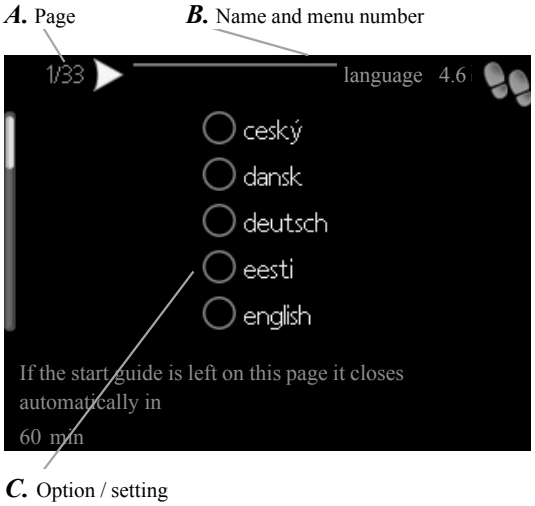
During the start-up guide, reversing valves and the shunt are run back and forth to help vent the heat pump.

CAUTION

As long as the start guide is active, no function in the heat pump will start automatically.

Each time the controller is ON, the guide will appear until it is completed on the last page.

Operation in the start guide



A. Page

You can see the current page of the start guide.

Scroll between the pages of the start guide as follows:

1. Turn the control knob until the arrow is marked in the top left corner (at the page number).
2. Press OK button to proceed to the next page in the start guide.

B. Name and menu number

You can see the menu name of this page. The number refers to the menu number in the control system.

To read more about affected menus, see the help menu or read the user manual.

C. Option / setting

Make settings for the system here.

D. Help menu

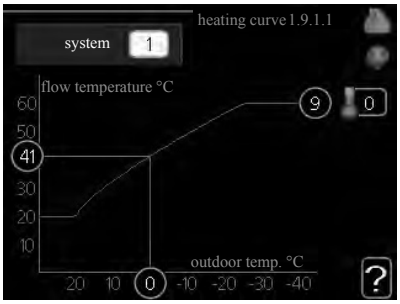
In many menus there is a symbol indicating that extra help is available.

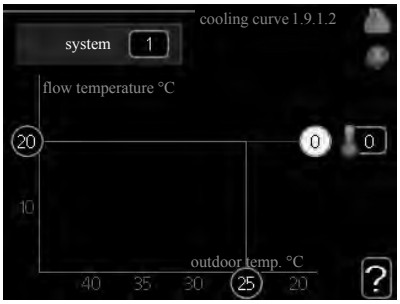
To access the help text:

1. Use the control knob to select the help symbol.
2. Press OK button.

The help text often consists of several windows that you can scroll between using the control knob.

Heating/cooling curve setting





heating curve

Setting range: 0 – 15

Default value: 9

cooling curve (accessory required)

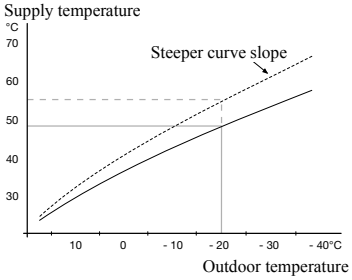
Setting range: 0 – 9

Default value: 0

The prescribed heating curve for your house can be viewed in the menu heating curve . The task of the heating curve is to give an even indoor temperature, regardless of the outdoor temperature, and thereby energy efficient operation. From this heating curve, the control module determines the temperature of the water to the heating system, supply temperature, and there by the indoor temperature. Select the heating curve and read off how the supply temperature changes at different outdoor temperatures here. If there is cooling function, the same settings can be made for the cooling curve.

Curve coefficient

The heating/cooling curve shows the relation between the target supply temperature and the corresponding outdoor temperature. A steep curve indicates that supply temperature becomes higher at low outdoor air temperature in heating and it becomes lower at high outdoor air temperature in cooling.



The optimum slope depends on the climate conditions in your location, the type of heating device (radiators or under floor heating) and how well insulated the house is.

The curve is set when the heating installation is installed, but may need adjusting later. Normally, the curve will not need further adjustment.

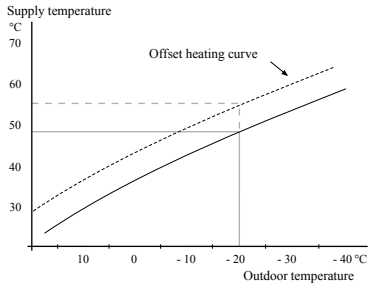
CAUTION

In the event of making fine adjustments of the indoor temperature, the curve must be offset up or down instead, this is done in menu 1.1 temperature .

Curve offset

The target temperature can be offset in parallel over the entire outdoor temperature range by this function. This is offset by 5 °C by adjusting 2 steps.

The target temperature can be parallel offset in the entire outdoor temperature range with this function. It is offset by 5 °C by adjusting 2 steps.



Flow line temperature – maximum and minimum values

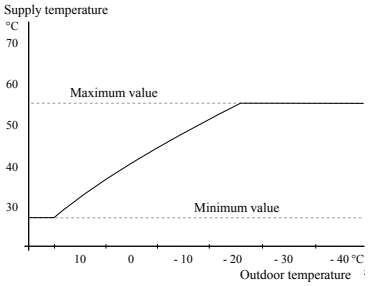
This function is used in order to limit max-min supply temperature. The heating / cooling curve becomes flat beyond max / min target temperature.

CAUTION

Underfloor heating systems are normally max flow line temperature set between 35 and 45°C. Take care not to cause low temperature burns in case it is set higher than 35°C.

Must be restricted with underfloor cooling min. flow line temp. to prevent condensation.

Check the max temperature for your floor with your installer/floor supplier.



The figure at the end of the curve indicates the curve number. The figure beside the thermometer icon gives the curve offset. Use the control knob to set a new value.

Confirm the new setting by pressing the OK button.

Curve 0 is an own curve created in menu 1.9.7.

To select another curve (slope):

1. Press OK button to access the setting mode
2. Select a new curve. The curves are numbered from 0 to 15, and the bigger number curve has steeper slope.
   Curve 0 means that own curve (menu 1.9.7) is used.
3. Press OK button to exit the setting.

To read off a curve:

1. Turn the control knob so that the ring on the shaft with the outdoor temperature is marked.
2. Press OK button.
3. Follow the grey line up to the curve and out to the left to read off the value for the supply temperature at the selected outdoor temperature.
4. You can now select to take read outs for different outdoor temperatures by turning the control knob to the right or left and read off the corresponding flow temperature.
5. Press OK or Back button to exit read off mode.

TIP

Wait 24 hours before making a new setting, so that the room temperature has time to stabilise.

If it is cold outdoors and the room temperature is too low, increase the curve slope by one increment.

If it is cold outdoors and the room temperature is too high, lower the curve slope by one increment.

If it is warm outdoors and the room temperature is too low, increase the curve offset by one increment.

If it is warm outdoors and the room temperature is too high, lower the curve offset by one increment.

Hot water circulation setting

hot water recirc

operating time

Setting range: 1 – 60 min

Default value: 60 min

downtime

Setting range: 0 – 60 min

Default value: 0 min

Set the hot water circulation for up to three periods per day here. During the set periods the hot water circulation pump will run according to the settings above.

"operating time" decide how long the hot water circulation pump must run per operating instance.

"downtime" decide how long the hot water circulation pump must be stationary between operating instances.

Hot water circulation is activated in menu 5.4 "soft inputs and outputs".

SG Ready

This function can only be used in mains networks that support the "SG Ready"-standard .

Make settings for the function "SG Ready" here.

Low price mode means that the electricity supplier has a low tariff and the system uses this to reduce costs.

Over capacity mode means that the electricity supplier has set the tariff very low and the system uses this to reduce the costs as much as possible.

affect room temperature

Here you set whether room temperature should be affected when activating "SG Ready".

With low price mode of "SG Ready" the parallel off set of the indoor temperature is increased by "+1". If a room sensor is installed and activated, the desired room temperature increases by 1 °C.

With over capacity mode of "SG Ready" the parallel offset for the indoor temperature is increased by"+2".

If a room sensor is installed and activated, the desired room temperature increases by 2 °C.

affect hot water

Here you set whether the temperature of the hot water should be affected when activating "SG Ready".

With low price mode on "SG Ready" the stop temperature of the hot water is set as high as possible at only compressor operation (immersion heater not permitted).

With over capacity mode of "SG Ready" the hot water is set to "luxury" (immersion heater permitted).

affect cooling (accessory required)

Here you set whether room temperature during cooling operation should be affected when activating "SG Ready".

With low price mode of "SG Ready" and cooling operation the indoor temperature is not affected.

With over capacity mode of "SG Ready" and cooling operation the parallel off set for the indoor temperature is reduced by"-1". If a room sensor is installed and activated, the desired room temperature decreases by 1 °C.

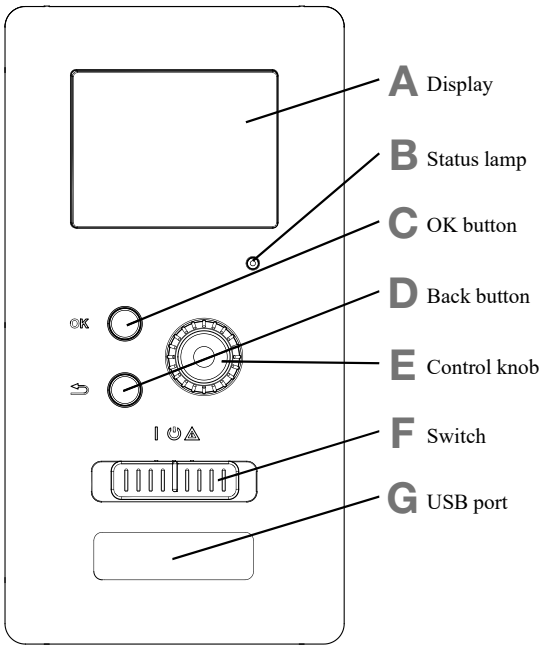
NOTE

The function must be connected to two AUX inputs and activated in menu 5.4.

Control

Control

Display unit



A Display

Instructions, settings and operational information are shown on the display. The easy-to-read display and menu system, make it easy to navigate between various menus and options, set comfort and get the necessary information.

B Status lamp

The status lamp indicates the status of the control module. It:

- lights green during normal operation.
- lights yellow in emergency mode.
- lights red in the event of an alarm.

C OK button

The OK button is used to:

- confi rm selections of sub menus/options/set values/page in the start guide.

D Back button

The back button is used to:

- go back to the previous menu.
- change a setting that has not been confirmed.

E Control knob

The control knob can be turned to the right or left. You can:

- scroll in menus and between options.
- increase and decrease values.
- change pages in multiple page instructions (for example help text and service info).

F Switch (SF1)

The switch shows three positions:

- On (|)
- Standby (⏻)
- Emergency mode (⚠)

Emergency mode must only be used in the event of a fault on the control module. In this mode, the compressor in the heat pump is turned off and the immersion heater is activated.

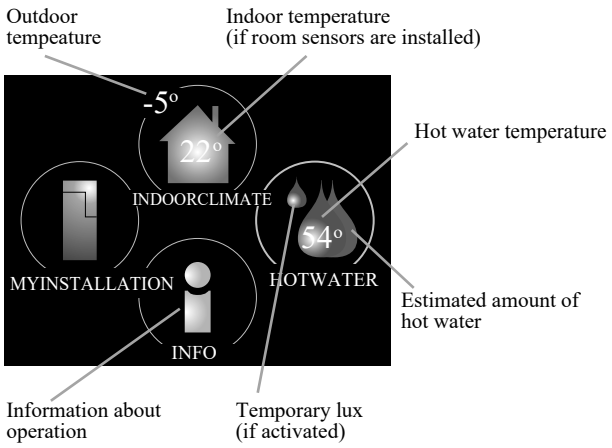
The control module display is not illuminated and the status lamp lights yellow.

G USB port

The USB port is hidden behind the plastic badge of the product name.

The USB port is used to update the software.

Menu system



Menu 1 - INDOOR CLIMATE

Setting and scheduling the indoor climate. See information in the help menu or user manual.

Menu 2 - HOT WATER

Setting and scheduling hot water production. See information in the help menu or user manual.

This menu only appears if a water heater is installed in the system.

Menu 3 - INFO

Display of temperature and other operating information and access to the alarm log. See information in the help menu or user manual.

Menu 4 - MY INSTALLATION

Setting time, date, language, display, operating mode etc. See information in the help menu or user manual.

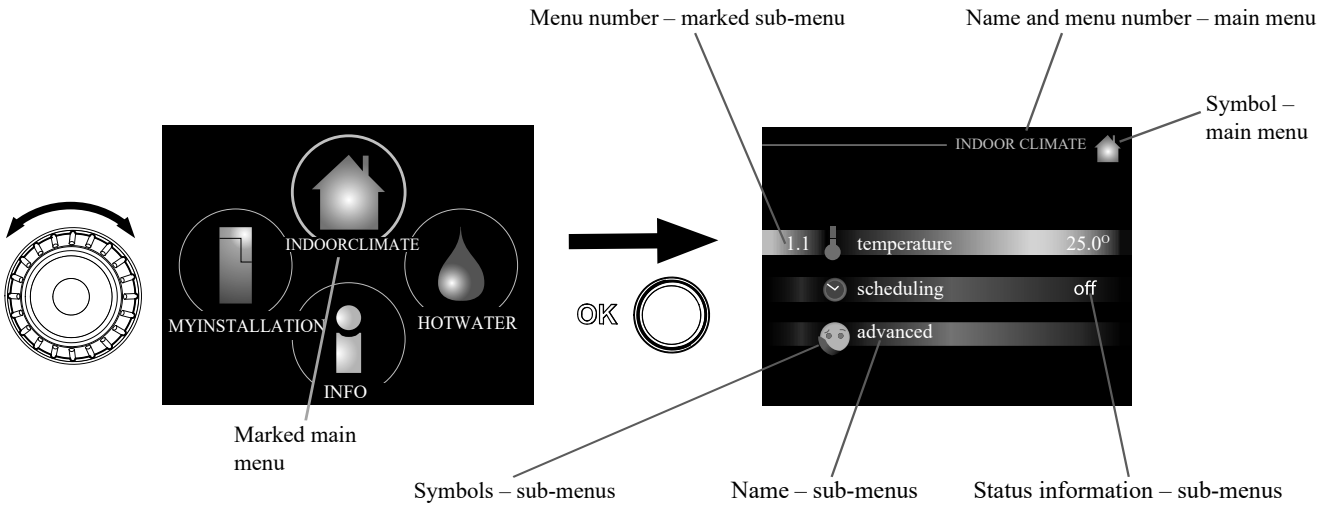
Menu 5 - SERVICE

Advanced settings. These settings are not available to the end user. The menu is made visible by pressing the Back button for 7 seconds in the top screen. See page 68 for details.

Symbols in the display

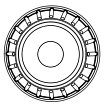
The following symbols can appear in the display during operation.

Symbol	Description
	This symbol appears when there is information to be noticed in menu 3.1.
	These two symbols indicate whether the compressor in the outdoor unit or additional heat in the installation is blocked via controller. These functions will be blocked for example, when either of the operation mode is blocked in menu 4.2, when blocking of either function is scheduled in menu 4.9.5, or when an alarm for blocking the operation occurs.  Blocking the compressor.  Blocking additional heat.
	This symbol appears if periodic increase or lux mode for the hot water is activated.
	This symbol indicates if "holiday setting" is active in menu 4.7.
	This symbol indicates if the controller has contact with myUpway.
	This symbol indicates if cooling is active.



Operation

To move the cursor, turn the control knob to the left or the right. The marked position is brighter and/or has a light frame.

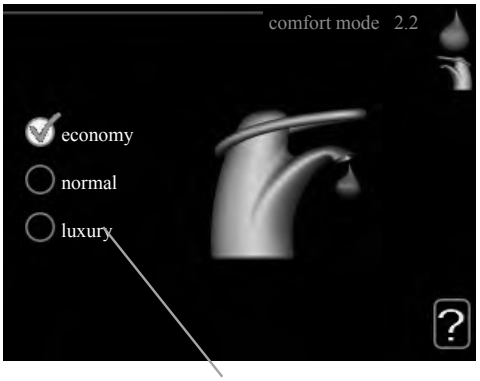


Selecting menu

To advance in the menu system select a main menu by marking it and then pressing the OK button. A new window opens with sub-menus.

Select one of the sub-menus by marking it and then pressing the OK button.

Selecting options



Alternative

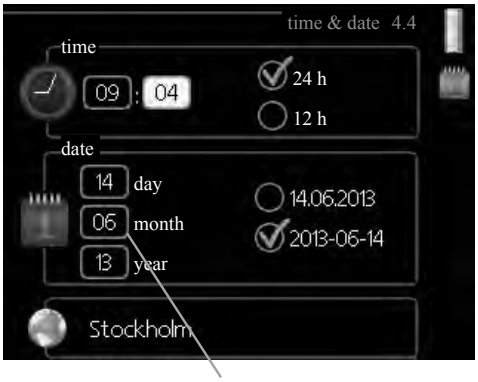
In an options menu the current selected option is indicated by a green tick.

To select another option:

1. Mark the applicable option. One of the options is pre-selected (white).

2. Press the OK button to confirm the selected option. The selected option has a green tick.

Setting a value



Values to be changed

To set a value:

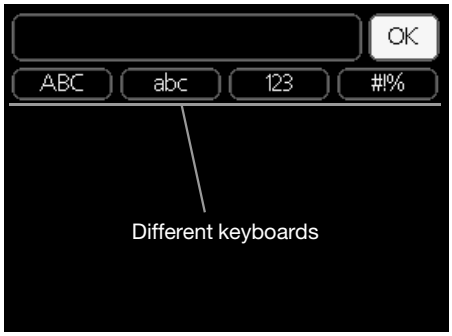
1. Mark the value you want to set using the control knob.

2. Press the OK button. The background of the value becomes green, which means that you have accessed the setting mode.

3. Turn the control knob to the right to increase the value and to the left to reduce the value.

4. Press the OK button to confirm the value you have set. To change and return to the original value, press the Back button.

Use the virtual keyboard



In some menus where text may require entering, a virtual keyboard is available.

Depending on the menu, you can gain access to different character sets which you can select using the control knob. To change character table, press the Back button. If a menu only has one character set, the keyboard is displayed directly.

When you have finished writing, mark "OK" and press the OK button.

Scroll through the windows

A menu can consist of several windows. Turn the control knob to scroll between the windows.

Scroll through the windows in the start guide

1. Turn the control knob until one of the arrows in the top left corner (at the page number) has been marked.
2. Press the OK button to skip between the steps in the start guide.

Help menu

In many menus there is a symbol that indicates that extra help is available.

To access the help text:

1. Use the control knob to select the help symbol.
2. Press the OK button.

The help text often consists of several windows that you can scroll between using the control knob.

Menu list

"* Accessories are needed. ** Heat pump with cooling function required. 40"

MENU			RC-HY20	RC-HY40
1. INDOOR CLIMATE				
1.1 - temperature	1.1.1 heating		✔	✔
	1.1.2 cooling **		✔	✔
1.3 - scheduling	1.3.1 heating		✔	✔
	1.3.2 cooling **		✔	✔
1.9 - advanced	1.9.1 curve	1.9.1.1 heating curve	✔	✔
		1.9.1.2 cooling curve **	✔	✔
	1.9.2 external adjustment		✔	✔
	1.9.3 min. flow line temp.	1.9.3.1 heating	✔	✔
		1.9.3.2 cooling **	✔	✔
	1.9.4 room sensor settings		✔	✔
	1.9.5 cooling settings *		✔	✔
	1.9.7 own curve	1.9.7.1 heating	✔	✔
		1.9.7.2 cooling **	✔	✔
	1.9.8 point offset		✔	✔
2. HOT WATER				
2.1 temporary lux			✔	✔
2.2 comfort mode			✔	✔
2.3 scheduling			✔	✔
2.9 advanced	2.9.1 periodic increase		✔	✔
	2.9.2 hot water recirc. *		✔	✔
3. INFO				
3.1 service info			✔	✔
3.2 compressor info			✔	✔
3.3 add. heat info			✔	✔
3.4 alarm log			✔	✔
3.5 indoor temp. log			✔	✔
4. MY SYSTEM				
4.1 plus functions	4.1.3 internet	4.1.3.1 myUpway™	✔	✔
		4.1.3.8 tcp/ip settings	✔	✔
		4.1.3.9 proxy settings	✔	✔
	4.1.5 SG Ready		✔	✔
	4.1.6 smart price adaption™		✔	✔
	4.1.8 smart energy source™	4.1.8.1 settings	—	✔
		4.1.8.2 set. Price	—	✔
		4.1.8.3 CO2 impact	—	✔
		4.1.8.4 tariff periods, electricity	—	✔
		4.1.8.6 tariff per, ext. shunt add	—	✔
		4.1.8.7 tariff per, ext. step add	—	✔
4.2 op. mode			✔	✔
4.3 my icons			✔	✔
4.4 time & date			✔	✔

"* Accessories are needed. ** Heat pump with cooling function required. 40"

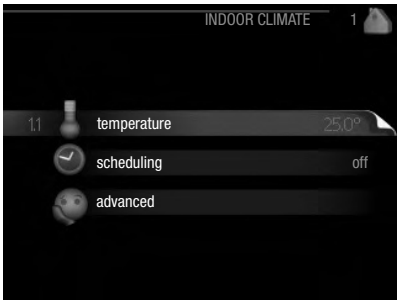
MENU			RC-HY20	RC-HY40
4.6 language			✔	✔
4.7 holiday setting			✔	✔
4.9 advanced	4.9.1 op. prioritisation		✔	✔
	4.9.2 auto mode setting		✔	✔
	4.9.3 degree minute setting		✔	✔
	4.9.4 factory setting user		✔	✔
	4.9.5 schedule blocking		✔	✔
	4.9.6 schedule silent mode		✔	✔
5. SERVICE				
5.1 operating settings	5.1.1 hot water settings *		✔	✔
	5.1.2 max flow line temperature		✔	✔
	5.1.3 max diff flow line temp.		✔	✔
	5.1.4 alarm actions		✔	✔
	5.1.12 addition		✔	✔
	5.1.14 flow set. climate system		✔	✔
	5.1.22 heat pump testing		✔	✔
	5.1.23 compressor curve		✔	✔
5.2 system settings	5.2.2 installed slaves		✔	✔
	5.2.3 docking		✔	✔
	5.2.4 accessories		✔	✔
5.3 accessory settings	5.3.2 shunt controlled add. heat *		—	✔
	5.3.3 extra climate system *		—	✔
	5.3.6 step controlled add. Heat		—	✔
	5.3.8 hot water comfort *		—	✔
	5.3.20 flow sensor*		—	✔
5.4 soft in/outputs			✔	✔
5.5 factory setting service			✔	✔
5.6 forced control			✔	✔
5.7 start guide			✔	✔
5.8 quick start			✔	✔
5.9 floor drying function			✔	✔
5.10 change log			✔	✔
5.11 slave settings	5.11.1 EB101	5.11.1.1 heat pump	✔	✔
		5.11.1.2 charge pump (GP12)	✔	✔
	5.11.2 EB102		—	✔
	5.11.3 EB103		—	✔
	5.11.4 EB104		—	✔
	5.11.5 EB105		—	✔
	5.11.6 EB106		—	✔
	5.11.7 EB107		—	✔
	5.11.8 EB108		—	✔
	5.12 country		✔	✔

RC-HY20/40 – at your service

Set the indoor climate

Overview

Sub-menus



For the menu "INDOOR CLIMATE" there are several sub-menus. Status information for the relevant menu can be found on the display to the right of the menus.

"**temperature**" Setting the temperature for the climate system. The status information shows the set values for the climate system.

"**scheduling**" Scheduling heating and cooling. Status information "set" is displayed if you set a schedule but it is not active now, "holiday setting" is displayed if the vacation schedule is active at the same time as the schedule (the vacation function is prioritised), "active" displays if any part of the schedule is active, otherwise it displays " off".

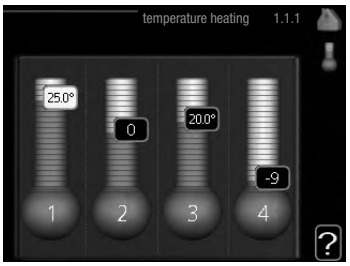
"**advanced**" Setting of heat curve, adjusting with external contact, minimum value for supply temperature, room sensor and cooling function.

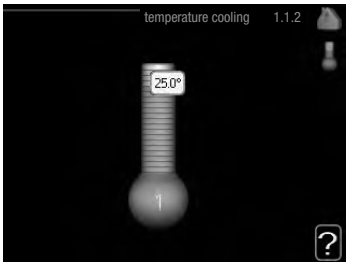
Menu 1.1 - temperature

If the house has several climate systems, this is indicated on the display by a thermometer for each system.

Choose heating or cooling and then set the desired temperature in the next menu "temperature heating/cooling" in menu 1.1.

Set the temperature (with room sensors installed and activated):





heating

Setting range: 5 – 30 °C
Default value: 20

cooling (accessory is required)

Setting range: 5 – 30 °C
Default value: 25

The value in the display appears as a temperature in °C if the climate system is controlled by a room sensor.

CAUTION

A slow heat-releasing heating system, such as for example, underfloor heating, may not be suitable for control using the heat pump's room sensor.

To change the room temperature, use the control knob to set the desired temperature in the display. Confirm the new setting by pressing the OK button. The new temperature is shown on the right-hand side of the symbol in the display.

Setting the temperature (without room sensors activated):

Setting range: -10 to +10
Default value: 0

The display shows the set values for heating (curve offset). To increase or reduce the indoor temperature, increase or reduce the value on the display.

Use the control knob to set a new value. Confirm the new setting by pressing the OK button.

The number of steps the value has to be changed to achieve a degree change of the indoor temperature depends on the heating installation. One step is usually enough but in some cases several steps may be required.

The new value is shown on the right-hand side of the symbol in the display.

CAUTION

An increase in the room temperature can be slowed by the thermostats for the radiators or under floor heating. Therefore, open the thermostats fully, except in those rooms where a cooler temperature is required, e.g. bedrooms.

TIP

Wait 24 hours before making a new setting, so that the room temperature has time to stabilise.

If it is cold outside temperature and the room temperature is too low, increase the curve slope in menu 1.9.1.1 by one increment.

If it is cold outside temperature and the room temperature is too high, reduce the curve slope in menu 1.9.1.1 by one increment.

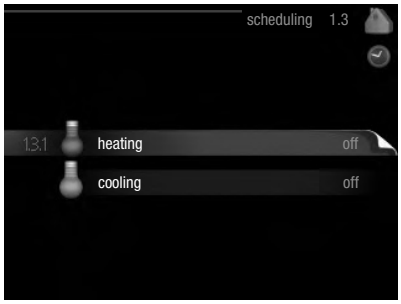
If it is warm outside temperature and the room temperature is too low, increase the value in menu 1.1.1 by one increment.

If it is warm outside temperature and the room temperature is too high, reduce the value in menu 1.1.1 by one increment.

Menu 1.3 - temperature scheduling

In the menu scheduling indoor climate (heating/cooling) is scheduled for each weekday.

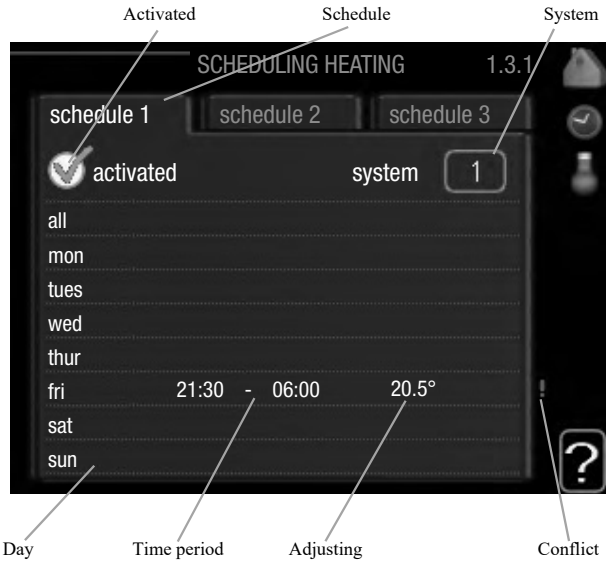
You can also schedule a longer period during a selected period (vacation) in menu 4.7.



Menu 1.3.1 - heating

Increases or decreases in the accommodation temperature can be scheduled here for up to three time periods per day. One step is usually enough to change the room temperature by one degree, but in some cases several steps may be required for the accommodation temperature.

If a room sensor is installed and activated, the desired room temperature (°C) is set during the time periods.



Schedule: The schedule to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

System (RC-HY40 only): Which climate system the schedule is for is selected here. This alternative is only displayed if more than one climate system is present.

Day: Select which day or days of the week the schedule is to apply to here. To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Adjusting: How much the heating curve is to be offset in relation to menu 1.1 during scheduling is set here. If the rooms sensor is installed and activated, the desired room temperature is set in °C.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.

TIP

If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

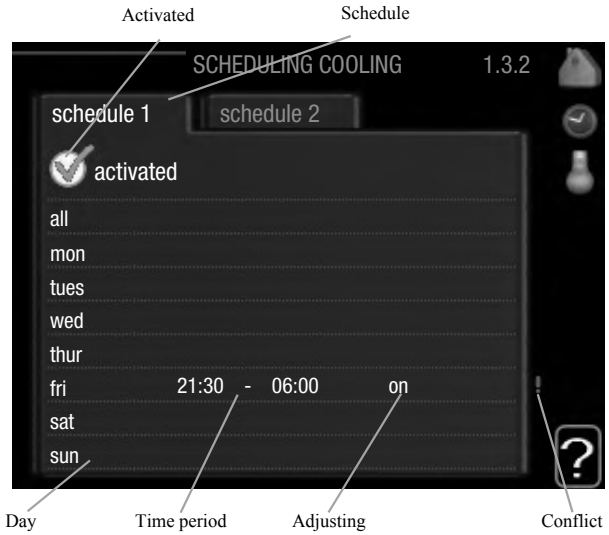
Scheduling always starts on the date that the start time is set for.

CAUTION

Changes of temperature in accommodation take time. For example, short time periods in combination with underfloor heating will not give a noticeable difference in room temperature.

Menu 1.3.2 - cooling

Here you can schedule when cooling is permitted in the accommodation for up to two different time periods per day.



Schedule: The schedule to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

Day: Select which day or days of the week the schedule is to apply to here. To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Adjusting: Here, you set when active cooling will not be permitted.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.

TIP

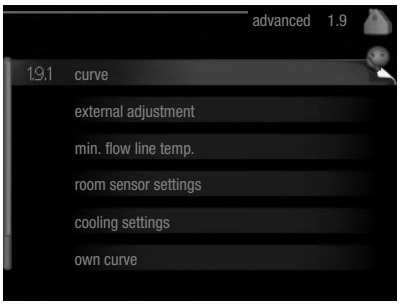
If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

Scheduling always starts on the date that the start time is set for.

Menu 1.9 - advanced



Menu "advanced" has orange text and is intended for the advanced user. This menu has several sub-menus.

"**curve**"Setting the curve slope for heating and cooling.

"**external adjustment**" Setting the heat curve offset when the external contact is connected.

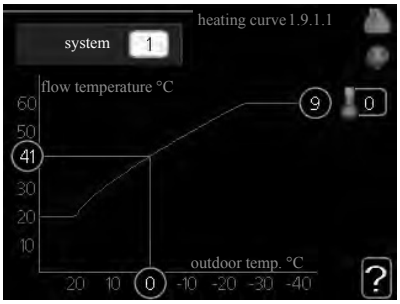
"**min. flow line temp.**" Setting minimum permitted flow line temperature.

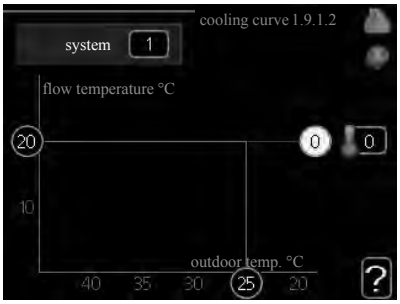
"**room sensor settings**" Settings regarding the room sensor.
"**cooling settings**" Settings for cooling.

"**own curve**" Setting own curve for heating and cooling.

"**point offset**" Setting the offset of the heating curve or cooling curve at a specific outdoor temperature.

Menu 1.9.1 - Heating/cooling curve setting





heating curve

Setting range: 0 – 15
Default value: 9

cooling curve (accessory required)

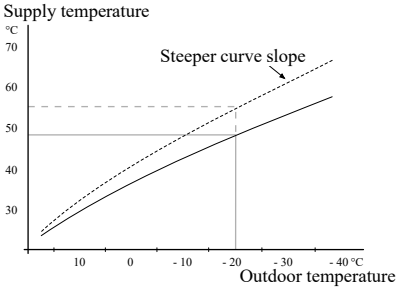
Setting range: 0 – 9

Default value: 0

The prescribed heating curve for your house can be viewed in the menu "heating curve". The task of the heating curve is to give an even indoor temperature, regardless of the outdoor temperature, and thereby energy efficient operation. From this heating curve, the control module determines the temperature of the water to the heating system, supply temperature, and therefore the indoor temperature. Select the heating curve and read off how the supply temperature changes at different outdoor temperatures here. If there is cooling function, the same settings can be made for the cooling curve.

Curve coefficient

The heating/cooling curve shows the relation between the target supply temperature and the corresponding outdoor temperature. A steep curve indicates that supply temperature becomes higher at low outdoor air temperature in heating and it becomes lower at high outdoor air temperature in cooling.



The optimum slope depends on the climate conditions in your location, the type of heating device (radiators or under floor heating) and how well insulated the house is.

The curve is set when the heating installation is installed, but may need adjusting later. Normally, the curve will not need further adjustment.

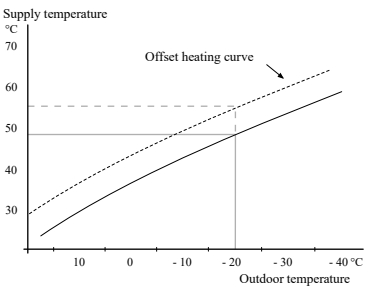
CAUTION

In the event of making fine adjustments of the indoor temperature, the curve must be offset up or down instead, this is done in menu 1.1 "temperature".

Curve offset

The target temperature can be offset in parallel over the entire outdoor temperature range by this function. This is offset by 5 °C by adjusting 2 steps.

The target temperature can be parallel offset in the entire outdoor temperature range with this function. It is offset by 5 °C by adjusting 2 steps.



Flow line temperature – maximum and minimum values

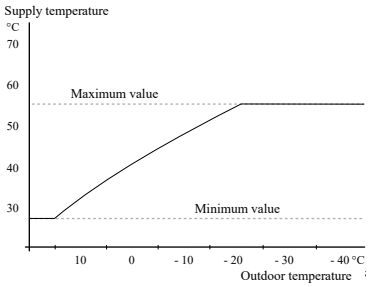
This function is used in order to limit max-min supply temperature. The heating / cooling curve becomes flat beyond max / min target temperature.

CAUTION

Underfloor heating systems are normally "max flow line temperature" set between 35 and 45°C. Take care not to cause low temperature burns in case it is set higher than 35°C.

Must be restricted with underfloor cooling min. flow line temp. to prevent condensation.

Check the max temperature for your floor with your installer/floor supplier.



The figure at the end of the curve indicates the curve number. The figure beside the thermometer icon gives the curve offset. Use the control knob to set a new value.

Confirm the new setting by pressing the OK button.

Curve 0 is an own curve created in menu 1.9.7.

To select another curve (slope):

1. Press OK button to access the setting mode.
2. Select a new curve. The curves are numbered from 0 to 15, and the bigger number curve has steeper slope. Curve 0 means that "own curve" (menu 1.9.7) is used.
3. Press OK button to exit the setting.

To read off a curve:

1. Turn the control knob so that the ring on the shaft with the outdoor temperature is marked.
2. Press OK button.
3. Follow the grey line up to the curve and out to the left to read off the value for the supply temperature at the selected outdoor temperature.
4. You can now select to take read outs for different outdoor temperatures by turning the control knob to the right or left and read off the corresponding flow temperature.
5. Press OK or Back button to exit read off mode.

TIP

Wait 24 hours before making a new setting, so that the room temperature has time to stabilise.

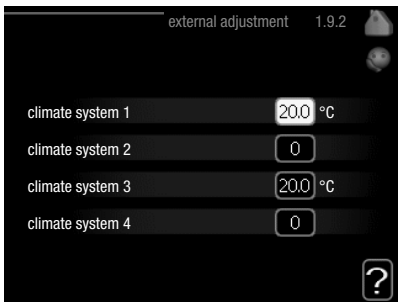
If it is cold outdoors and the room temperature is too low, increase the curve slope by one increment.

If it is cold outdoors and the room temperature is too high, lower the curve slope by one increment.

If it is warm outdoors and the room temperature is too low, increase the curve offset by one increment.

If it is warm outdoors and the room temperature is too high, lower the curve offset by one increment.

Menu 1.9.2 - external adjustment



*If there is one climate system, display shows "climate system 1" only.

climate system

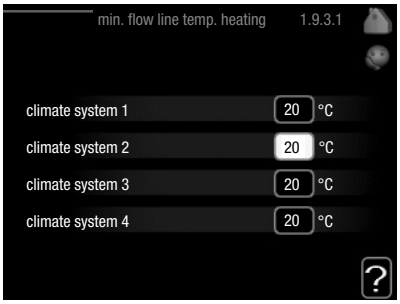
Setting range: -10 to +10 or desired room temperature if the room sensor is installed.

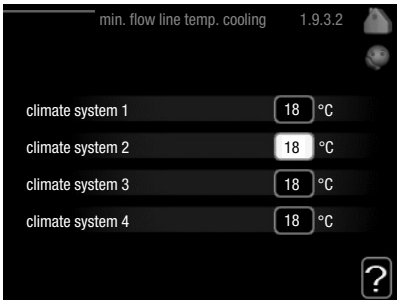
Default value: 0

Connecting an external contact, for example, a room thermostat or a timer allows you to temporarily or periodically increase or decrease the room temperature while heating. When the contact is on, the heating curve offset is changed by the number of steps selected in the menu. If a room sensor is installed and activated the desired room temperature (°C) is set.

If there is more than one climate system the setting can be made separately for each system.

Menu 1.9.3 - min. flow line temp.





*If there is one climate system, display shows "climate system 1" only.

heating

Setting range: 5 – 70 °C
Default value: 20 °C

cooling (heat pump with cooling function required)

Depending on which cooling function (2-pipe /4-pipe-system) is used, the lower limit of the setting range can vary from 7 to 18 °C.

Setting range: 7 – 30 °C
Factory setting: 18 °C

In menu 1.9.3 you select heating or cooling, in the next menu (min. supply temp. heating/cooling) set the minimum temperature on the supply temperature to the climate system. This means that RC-HY20/40 never calculates a temperature lower than that set here.

If there is more than one climate system the setting can be made separately for each system.

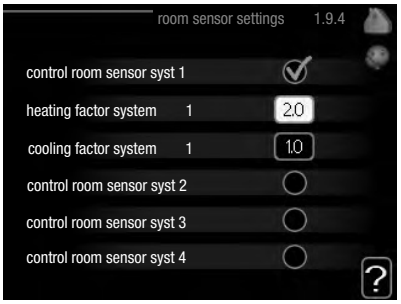
TIP

The value can be increased if you have, for example, a cellar that you always want to heat, even in summer.

You may also need to increase the value in "stop heating" menu 4.9.2 "auto mode setting".

Menu 1.9.4 - room sensor settings

factor system



*If there is one climate system, display shows "control room sensor system 1" only.

heating

Setting range: 0.0 – 6.0
Factory setting heating: 2.0

cooling (accessory required)

Setting range: 0.0 – 6.0
Factory setting cooling: 1.0

Room sensors to control the room temperature can be activated here.

CAUTION

A slow heat-releasing heating system, such as for example, underfloor heating, may not be suitable for control using the heat pump's room sensor.

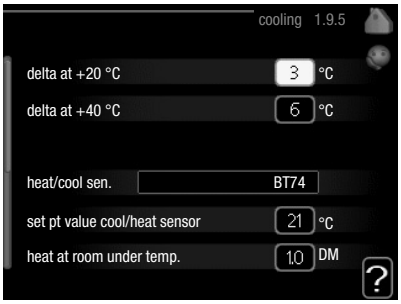
Here you can set a factor (a numerical value) that determines how much an over or sub normal temperature (the difference between the desired and actual room temperature) in the room is to affect the supply temperature to the climate system. A higher value gives a greater and faster change of the heating curve's set offset.

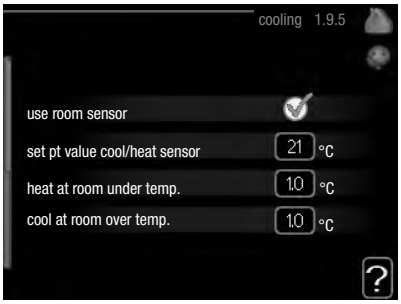
NOTE

Too high a set value for "factor system" can (depending on your climate system) produce an unstable room temperature.

If several climate systems are installed the above settings can be made for the relevant systems.

Menu 1.9.5 - cooling settings





delta at +20 °C

Setting range: 3 – 10 °C
Factory setting: 3

delta at +40 °C

Setting range: 3 – 20 °C
Factory setting: 6

heat/cool sen.

Setting range: BT74 (BT50, RMU-BT50)
Factory setting: BT74

set pt value cool/heat sensor

Setting range: 5 – 40 °C
Factory setting: 21

heat at room under temp.

Setting range: 0.5 – 10.0 °C
Default value: 1.0

cool at room over temp.

Setting range: 0.5 – 10.0 °C
Default value: 3.0

start active cooling

Setting range: 10 – 300 DM
Factory setting: 30 DM

step difference compressors (RC-HY40 only)

Setting range: 10 – 150
Default value: 30

degree minutes cooling (RC-HY40 only)

Setting range: -3000 – 3000 cooling degree minutes
Factory setting: -1

time betw. switch heat/cool

Setting range: 0 – 48 h
Factory setting: 2

You can use RC-HY20/40 to cool the house during hot periods of the year.

CAUTION

Certain setting options only appear if their function is installed and activated in RC-HY20/40.

delta at +20 °C

Set the desired temperature difference between supply and return lines to the climate system during cooling operation when the outdoor temperature is +20 °C. RC-HY20/40 then attempts to get as close to the set temperature as possible.

delta at +40 °C

Set the desired temperature difference between supply and return lines to the climate system during cooling operation when the outdoor temperature is +40 °C. RC-HY20/40 then attempts to get as close to the set temperature as possible.

heat/cool sen.

If a particular room will determine how the whole installation will work, a room sensor (BT74) is used. If room sensor (BT74) is connected to RC-HY20/40, room sensor (BT74) determines when it is time to switch between cooling and heating operation for the whole installation.

CAUTION

When the heating/cooling sensors (BT74) have been connected and activated in menu 5.4, no other sensor can be selected in menu 1.9.5.

set pt value cool/heat sensor

Here you can set at which indoor temperature RC-HY20/40 is to shift between heating respectively cooling operation.

heat at room under temp.

Here you can set how far the room temperature can drop below the desired temperature before RC-HY20/40 switches to heating operation.

cool at room over temp.

Here you can set how high the room temperature can increase above the desired temperature before RC-HY20/40 switches to cooling operation.

start active cooling

Here you can set when active cooling is to start.

Degree minutes are a measurement of the current heating demand in the house and determine when the compressor, cooling operation respectively additional heat will start/stop.

step difference compressors (RC-HY40 only)

CAUTION

This setting option only appears if cooling is activated in menu 5.2.4.

The degree minute difference for controlling when the next compressor is to start is set here.

degree minutes cooling (RC-HY40 only)

This selection is only available when the connected accessory itself counts cooling degree minutes.

After a min or max value has been set, the system will automatically set the real value in relation to the number of compressors that are running cooling.

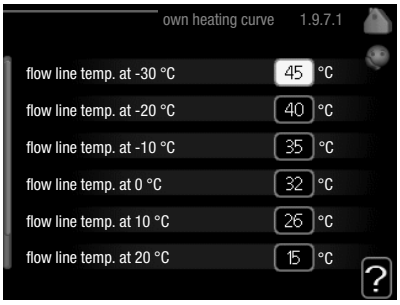
time betw. switch heat/cool

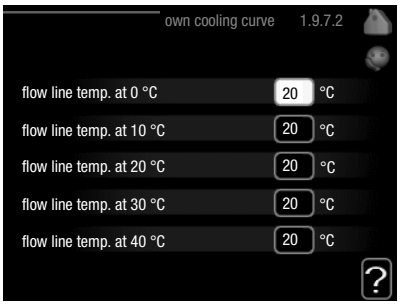
This selection is only available in cooling 2-pipe systems.

Here you can set how long RC-HY20/40 is to wait before it returns to heating mode when the cooling demand has ceased or vice versa.

Menu 1.9.7 - own curve

supply temperature





heating

Setting range: 5 – 70 °C

cooling (accessory required)

Depending on which accessory is used the setting range can vary.

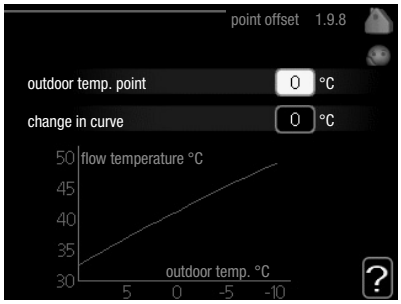
Setting range: -5 – 40 °C

Create your own heating or cooling curve here, by setting the desired supply temperatures for different outdoor temperatures.

CAUTION

Curve 0 in menu 1.9.1 must be selected for own curve to apply.

Menu 1.9.8 - point offset



outdoor temp. point

Setting range: -40 – 30 °C
Default value: 0 °C

change in curve

Setting range: -10 – 10 °C
Default value: 0 °C

Select a change in the heating curve at a certain outdoor temperature here. One step is usually enough to change the room temperature by one degree, but in some cases several steps may be required.

The heat curve is affected at ± 5 °C from set outdoor temp. point.

It is important that the correct heating curve is selected so that the room temperature is experienced as even.

TIP

If it is cold in the house, at, for example -2 °C, "outdoor temp. point" is set to "-2" and "change in curve" is increased until the desired room temperature is maintained.

CAUTION

Wait 24 hours before making a new setting, so that the room temperat- ure has time to stabilise.

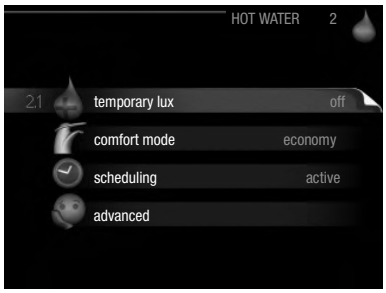
Set the hot water capacity

Overview

Sub-menus

This menu only appears if a water heater is docked to the heat pump.

For the menu "HOT WATER" there are several sub-menus. Status information for the relevant menu can be found on the display to the following menus.



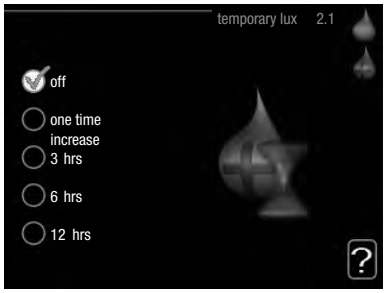
"**temporary lux**" Activation of temporary increase in the hot water temperature. Status information displays “off" or what length of time of the temporary temperature increase remains.

"**comfort mode**" Setting hot water comfort. The status information displays what mode is selected, "economy", "normal" or "luxury".

"**scheduling**" Scheduling hot water comfort. The status information "set" appears if you have set scheduling but it is not currently active, "holiday setting" appears if holiday setting is active at the same time as scheduling (when the holiday function is prioritised), "active" appears if any part of scheduling is active, otherwise "off" appears.

"**advanced**" Setting periodic increase in the hot water temperature.

Menu 2.1 - temporary lux



Setting range: 3, 6 and 12 hours
and mode "off" and "one time increase"
Default value: "off"

When hot water requirement has temporarily increased this menu can be used to select an increase in the hot water temperature to lux mode for a selectable time.

CAUTION

If comfort mode "luxury" is selected in menu 2.2 no further increase can be carried out.

The function is activated immediately when a time period is selected and confirmed using the OK button. The remaining time for the selected setting is shown to the right.

When the time has run out RC-HY20/40 returns to the mode set in menu 2.2. Select “off" to switch off temporary lux .

Menu 2.2- comfort mode

Setting range: economy, normal, luxury
Default value: normal

The difference between the selectable modes is the temperature of the hot tap water. Higher temperature means that the hot water lasts longer.

economy: This mode gives less hot water than the others, but is more economical. This mode can be used in smaller households with a small hot water requirement.

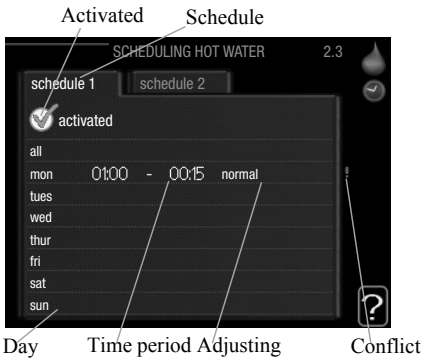
normal: Normal mode gives a larger amount of hot water than the economy mode and is suitable for most households.

luxury: Lux mode gives the greatest possible amount of hot water. In this mode, the immersion heater, as well as the compressor, is used to heat hot water, which may increase operating costs.

Menu 2.3 - scheduling

Two different periods of hot water comfort per day can be scheduled here.

Scheduling is activated/deactivated by ticking/unticking" activated". Set times are not affected at deactivation.



Schedule: The schedule to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

Day: Select which day or days of the week the schedule is to apply to here.

To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Adjusting: Set the hot water comfort that is to apply during scheduling here.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.

TIP

If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

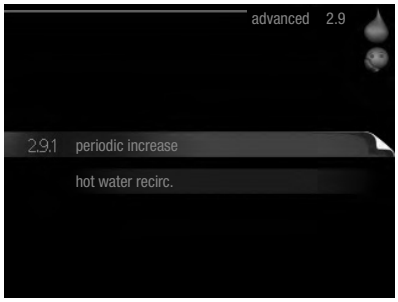
TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

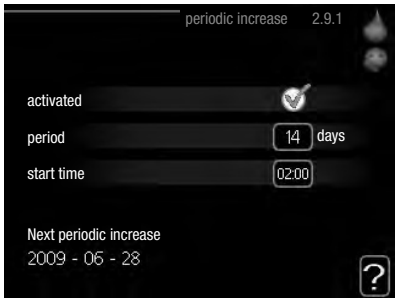
Scheduling always starts on the date that the start time is set for.

Menu 2.9 - advanced

Menu "advanced" has orange text and is intended for the advanced user. This menu has several sub-menus.



Menu 2.9.1 - periodic increase



period

Setting range: 1 – 90 days

Default value: 14 days

start time

Setting range: 00:00 – 23:00

Default value: 00:00

To prevent bacterial growth in the water heater, the heat pump and any additional heater can increase the hot water temperature for a short time at regular intervals.

The length of time between increases can be selected here. The time can be set between 1 and 90 days. Factory setting is 14 days. Tick/untick "activated" to start/switch off the function.

Menu 2.9.2 - hot water recirc. (accessory required)

operating time

Setting range: 1 – 60 min

Default value: 60 min

downtime

Setting range: 0 – 60 min

Default value: 0 min

Set the hot water circulation for up to three periods per day here. During the set periods the hot water circulation pump will run according to the settings above.

"operating time" decide how long the hot water circulation pump must run per operating instance.

"downtime" decide how long the hot water circulation pump must be stationary during operating instances.

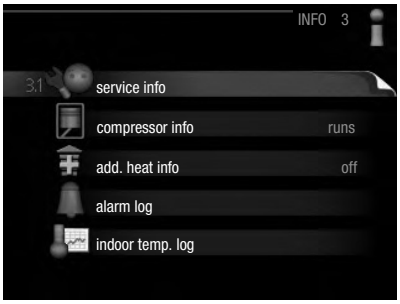
Hot water circulation is activated in menu 5.4 "soft inputs and outputs".

Get information

Overview

Sub-menus

For the menu "INFO" there are several sub-menus. No settings can be made in these menus, they just display information. Status information for the relevant menu can be found on the display to the following menus.



"**service info**" shows temperature levels and settings in the installation.

"**compressor info**" shows operating times, number of starts etc. for the compressor in the heat pump.

"**add. heat info**" displays information about the additional heat's operating times etc.

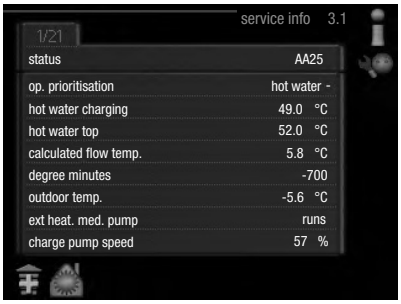
"**alarm log**" shows the latest alarms.

"**indoor temp. log**" the average temperature indoors week by week during the past year.

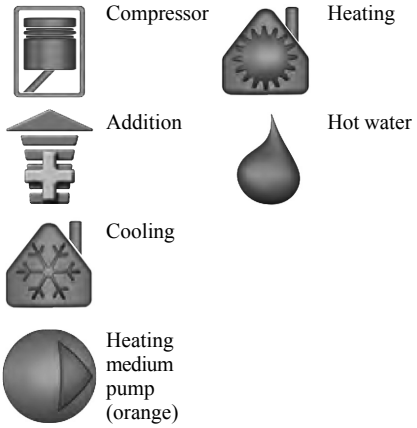
Menu 3.1 - service info

Information about the actual operating status of the installation (e.g. current temperatures etc.) can be obtained here. But no changes can be made.

The information is on several pages. Turn the control knob to scroll between the pages.



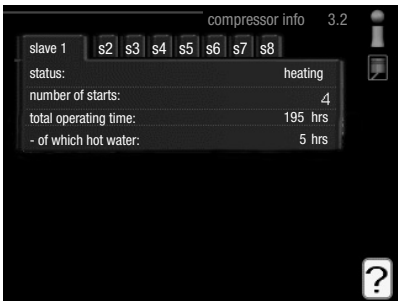
Symbols in this menu:



Menu 3.2 - compressor info

Information about the compressor’s operating status and statistics can be obtained here. But no changes can be made.

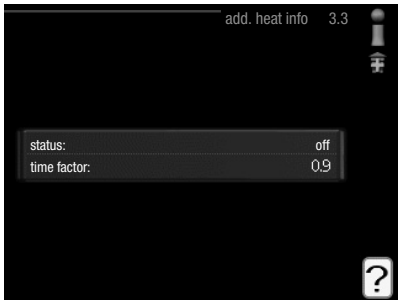
If there is more than one climate system the information is on several pages. Turn the control knob to scroll between the pages.



Menu 3.3 - add. heat info

Information about the additional heat's settings, operating status and statistics can be obtained here. But no changes can be made.

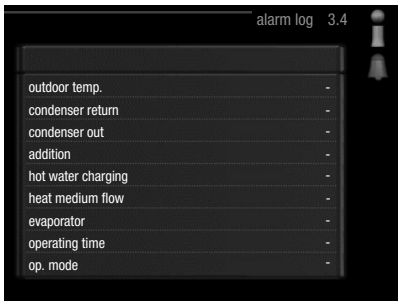
If there is more than are climate system the information is on several pages. Turn the control knob to scroll between the pages.



Menu 3.4 - alarm log

To facilitate fault-finding the installation's operating status at alarm alerts is stored here. You can see information for the 10 most recent alarms.

To view the run status in the event of an alarm, mark the alarm and press the OK button.



Information about an alarm.

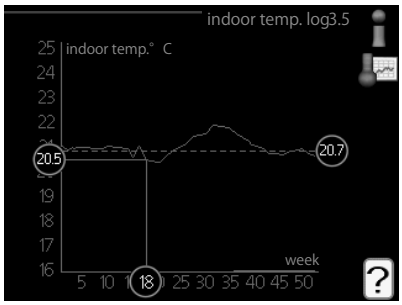
Menu 3.5 - indoor temp. log

Here you can see the average temperature indoors week by week during the past year. The dotted line indicates the annual average temperature.

The average outdoor temperature is only shown if a room temperature sensor/room unit is installed.

To read off an average temperature

1. Turn the control knob so that the ring on the shaft with the week number is marked.
2. Press the OK button.
3. Follow the grey line up to the graph and out to the left to read off the average indoor temperature at the selected week.
4. You can now select to take read outs for diff erent weeks by turning the control knob to the right or left and read off the average temperature.
5. Press the OK or Back button to exit read off mode.



Adjust the heat pump

Overview

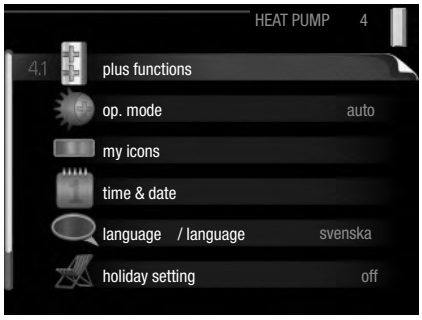
Sub-menus

For the menu "MY SYSTEM" there are several sub-menus. Status information for the relevant menu can be found on the display to the right of the menus.

"**plus functions**" Settings applying to any installed extra functions in the heating system.

"**op. mode**" Activation of manual or automatic operating mode. The status information shows the selected operating mode.

"**my icons**" Settings regarding which icons in the control module's user interface that are to appear on the hatch when the door is closed.



"**time & date**" Setting current time and date.

"**language**" Select the language for the display here. The status information shows the selected language.

"**holiday setting**" Vacation scheduling heating, hot water and ventilation. Status information "set" is displayed if you set a vacation schedule but it is not active at the moment, "active" is displayed if any part of the vacation schedule is active, otherwise it displays " off".

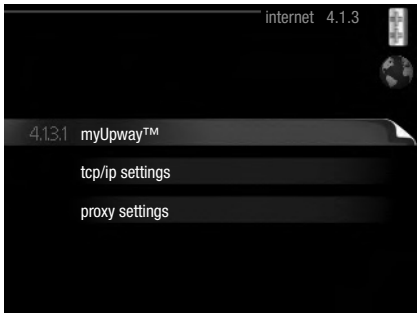
"**advanced**" Settings of control module work mode.

Menu 4.1 - plus functions

Settings for any additional functions installed in RC-HY20/40 can be made in the sub-menus.

Menu 4.1.3 - internet

Here you make settings for connecting RC-HY20/40 to the internet.



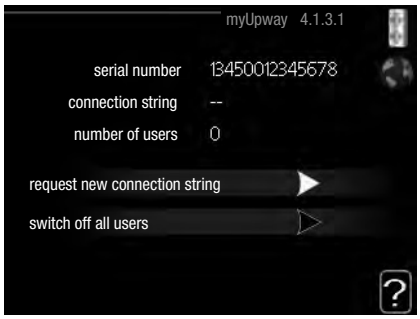
NOTE

For these functions to work the network cable must be connected.

Menu 4.1.3.1 - myUpway™

Here you can manage the installation's connection to myUpway™ (www.myUpway.com) and see the number of users connected to the installation via the internet.

A connected user has a user account in myUpway™, which has been given permission to control and/or monitor your installation.



Request new connection string

To connect a user account on myUpway™ to your installation, you must request a unique connection code.

1. Mark “request new connection string" and press the OK button.
2. The installation now communicates with myUpway™ to create a connection code.
3. When a connection string has been received, it is shown in this menu at "connection string" and is valid for 60 minutes.

Disconnect all users

1. Mark “switch off all users" and press the OK button.
2. The installation now communicates with myUpway™ to release your installation from all users connected via the internet.

NOTE

After disconnecting all users, none of them can monitor or control your installation via myUpway™ without requesting a new connection code

Menu 4.1.3.8 - tcp/ip settings

You can set TCP/IP settings for your installation here.

Automatic setting (DHCP)

1. Tick “automatic". The installation now receives the TCP/IP settings using DHCP.
2. Mark “confirm" and press the OK button.

Manual setting

1. Untick "automatic", you now have access to several setting options.
2. Mark “ip-address" and press the OK button.
3. Enter the correct details via the virtual keypad.
4. Mark “OK" and press the OK button.
5. Repeat 1 - 3 for "net mask", "gateway" and "dns".
6. Mark “confirm" and press the OK button.

CAUTION

The installation cannot connect to the internet without the correct TCP/IP settings. If unsure about applicable settings use the automatic mode or contact your network administrator (or similar) for further information.

TIP

All settings made since opening the menu can be reset by marking "reset" and pressing the OK button.

Menu 4.1.3.9 - proxy settings

You can set proxy settings for your installation here.

Proxy settings are used to give connection information to a intermediate server (proxy server) between the installation and Internet. These settings are primarily used when the installation connects to the Internet via a company network. The installation supports proxy authentication of the HTTP Basic and HTTP Digest type.

If unsure about applicable settings, contact your network administrator (or similar) for further information.

Setting

1. Tick “use proxy" if you do not want to use a proxy.
2. Mark “server" and press the OK button.
3. Enter the correct details via the virtual keypad.
4. Mark “OK" and press the OK button.
5. Repeat 1 - 3 for "port", "user name" and "password".
6. Mark “confirm" and press the OK button.

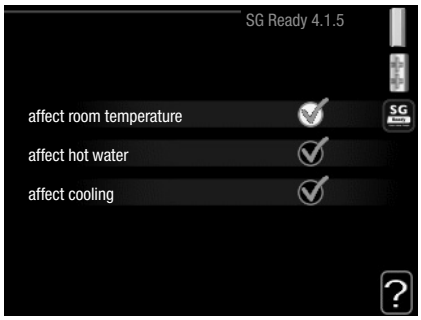
TIP

All settings made since opening the menu can be reset by marking "reset" and pressing the OK button.

Menu 4.1.5 - SG Ready

This function can only be used in SG Ready 4.1.5 mains networks that support the "SG Ready"-standard .

Make settings for the function "SG Ready" here.



affect room temperature

Here you set whether room temperature should be affected when activating "SG Ready".

With low price mode on "SG Ready" the parallel offset for the indoor temperature is increased by "+1". If a room sensor is installed and activated, the desired room temperature is instead increased by 1 °C.

With over capacity mode on "SG Ready" the parallel offset for the indoor temperature is increased by "+2". If a room sensor is installed and activated, the desired room temperature is instead increased by 2 °C.

affect hot water

Here you set whether the temperature of the hot water should be affected when activating "SG Ready".

With low price mode on "SG Ready" the stop temperature of the hot water is set as high as possible at only compressor operation (immersion heater not permitted).

With over capacity mode of "SG Ready" the hot water is set to "luxury" (immersion heater permitted).

affect cooling (accessory required)

Here you set whether room temperature during cooling operation should be affected when activating "SG Ready".

With low price mode of "SG Ready" and cooling operation the indoor temperature is not affected.

With over capacity mode on "SG Ready" and cooling operation, the parallel offset for the indoor temperature is reduced by "-1". If a room sensor is installed and activated, the desired room temperature is instead reduced by 1 °C.

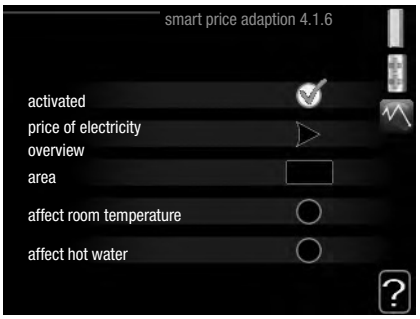
NOTE

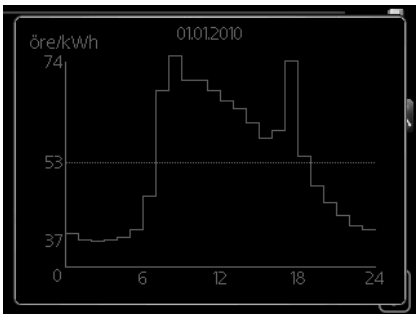
The function must be connected and activated in your RC-HY20/40.

Menu 4.1.6 - Smart price adaption™

area

In this menu you state where the heat pump is located and how great a role the electricity price should play. The greater the value, the greater the effect the electricity price has and the possible savings are larger, but at the same time there is an increased risk of affecting comfort. Smart price adaption is available on selected markets, at present Austria, Denmark, Estonia, Finland, Norway and Sweden.





price of electricity overview

Here you can obtain information on how the electricity price varies over up to three days.

affect room temperature

Setting range: 1 – 10
Factory setting: 5

affect hot water

Setting range: 1 – 4
Factory setting: 2

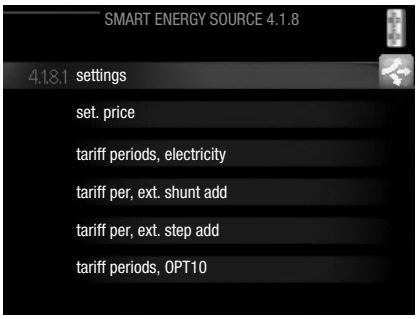
affect cooling

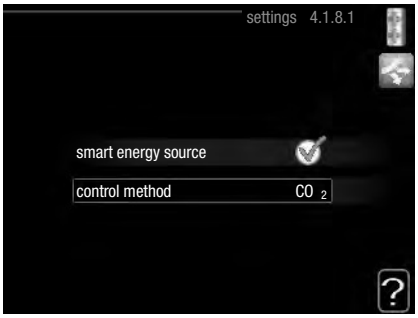
Setting range: 1 – 10
Factory setting: 3

Smart price adaption™ moves the heat pump's consumption over 24 hours to periods with the cheapest electricity tariff, which gives savings for hourly rate based electricity contracts. The function is based on hourly rates for the next 24 hours being retrieved via myUpway™ and therefore an internet connection and an account for myUpway™ are required.

Deselect "activated" to switch off Smart price adaption™.

Menu 4.1.8 - smart energy source™ (RC-HY40 only)





settings

set. price

CO2 impact*

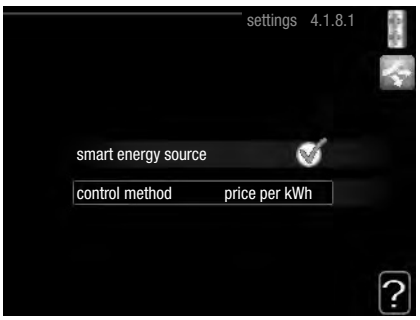
tariff per, ext. shunt add

tariff per, ext. step add

The function prioritises how / to what extent each docked energy source will be used. Here you can choose if the system is to use the energy source that is cheapest at the time. You can also choose if the system is to use the energy source that is most carbon neutral at the time.

*Select control method "CO_2" under settings to open this menu.

Menu 4.1.8.1 - settings



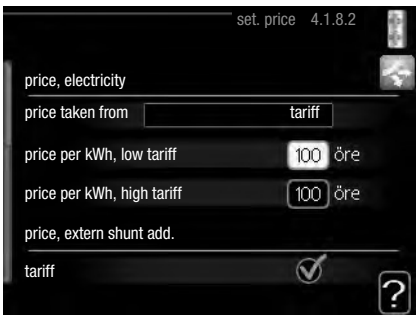
smart energy source™

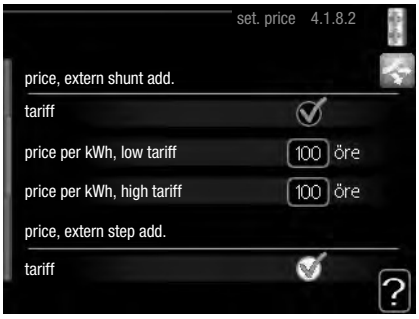
Setting range: Off/On
Factory setting: Off

control method

Setting range: Price /CO_2
Factory setting: Price

Menu 4.1.8.2 - set. price





price, electricity

Setting range: spot, tariff, fixed price
Factory setting: fixed price
Setting range fixed price: 0 – 100,000*

price, extern shunt add.

Setting range: tariff, fixed price
Factory setting: fixed price
Setting range fixed price: 0 – 100,000*

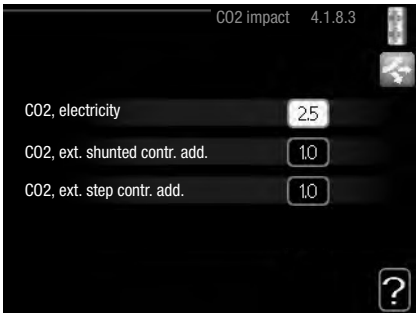
price, extern step add.

Setting range: tariff, fixed price
Factory setting: fixed price
Setting range fixed price: 0 – 100,000*

Here you can choose if the system is to exercise control based on the spot price, tariff control or a set price. The setting is made for each individual energy source. Spot price can only be used if you have an hourly tariff agreement with your electricity supplier.

*The currency varies depending on the country selected.

Menu 4.1.8.3 - CO2 impact



CO2, electricity

Setting range: 0 – 5
Default value: 2.5

CO2, ext. shunted contr. add.

Setting range: 0 – 5
Default value: 1

CO2, ext. step contr. add.

Setting range: 0 – 5
Default value: 1

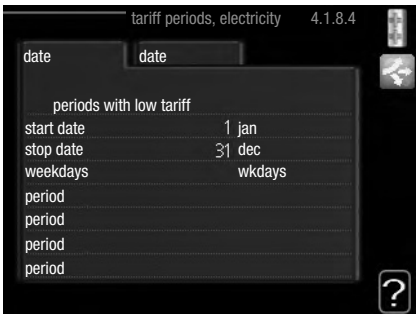
Here you set the size of the carbon footprint for each energy source.

The carbon footprint is diff erent for diff erent energy sources. For example, the energy from solar cells and wind turbines can be considered carbon dioxide neutral and, therefore, has a low CO2 impact. Energy from fossil fuels can be considered to have a higher carbon footprint and, therefore, has a higher CO2 impact.

Menu 4.1.8.4 - tariff periods, electricity

Here you can use tariff control for the electric additional heat.

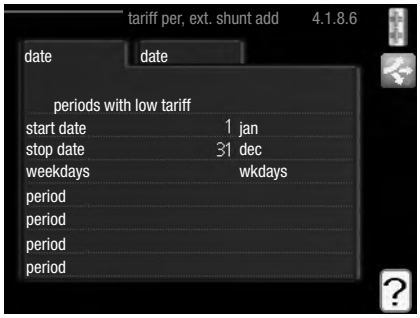
Set the lower tariff periods. It is possible to set two diff erent date periods per year. Within these periods, it is possible to set up to four diff erent periods on weekdays (Monday to Friday) or four diff erent periods on weekends (Saturdays and Sundays).



Menu 4.1.8.6 - tariff per, ext. shunt add

Here you can use tariff control for the external shunted additional heat.

Set the lower tariff periods. It is possible to set two different date periods per year. Within these periods, it is possible to set up to four different periods on weekdays (Monday to Friday) or four different periods on weekends (Saturdays and Sundays).



Menu 4.1.8.7 - tariff per, ext. step add

Here you can use tariff control for the external step controlled additional heat.

Set the lower tariff periods. It is possible to set two different date periods per year. Within these periods, it is possible to set up to four different periods on weekdays (Monday to Friday) or four different periods on weekends (Saturdays and Sundays).

Menu 4.2 - op. mode

op. mode

Setting range: auto, manual, add. heat only
Default value: auto

functions

Setting range: compressor, addition, heating, cooling

The control module operating mode is usually set to "auto". It is also possible to set the control module to "add. heat only", when only additional heat is used, or "manual" and then select what functions are to be permitted.

Change the operating mode by marking the desired mode and pressing the OK button. When an operating mode is selected it shows what in the control module is permitted (crossed out = not permitted) and selectable alternatives to the right. To select selectable functions that are permitted or not, mark the function using the control knob and press the OK button.

Operating mode auto

In this operating mode the control module automatically selects what functions are permitted.

Operating mode manual

In this operating mode you can select what functions are permitted. You cannot deselect "compressor" in manual mode.

Operating mode add. heat only

In this operating mode the compressor is not active, only additional heat is used.

CAUTION

If you choose mode "add. heat only" the compressor is deselected and there is a higher operating cost.

CAUTION

You cannot change from only additional heat if you do not have a heat pump connected.

Functions

"compressor" is that which produces heating and hot water for the accommodation. If "compressor" is deselected, a symbol is displayed in the main menu on the symbol for the control module. You cannot deselect "compressor" in manual mode.

"addition" is what helps the compressor to heat the accommodation and/or the hot water when it cannot manage the whole requirement alone.

"heating" means that you get heat in the accommodation. You can deselect the function when you do not wish to have heating running.

"cooling" means that you get cooling in the accommodation in hot weather. This alternative requires an accessory for cooling or that the heat pump has a built in function for cooling and is activated in the menu. You can deselect the function when you do not wish to have the cooling running.

Menu 4.4 - time & date

Set time and date, display mode and time zone here.

TIP

Time and date are set automatically if the heat pump is connected to myUpway™. *To obtain the correct time, the time zone must be set.*

Menu 4.6 - language

Choose the language that you want the information to be displayed in here.

Menu 4.7 - holiday setting

To reduce energy consumption during a holiday you can schedule a reduction in heating and hot water temperature. Cooling can also be scheduled if the functions are connected.

If a room sensor is installed and activated, the desired room temperature (°C) is set during the time period. This setting applies to all climate systems with room sensors.

If a room sensor is not activated, the desired offset of the heating curve is set. One step is usually enough to change the room temperature by one degree, but in some cases several steps may be required. This setting applies to all climate systems without room sensors.

Vacation scheduling starts at 00:00 on the start date and stops at 23:59 on the stop date.

TIP

Complete holiday setting about a day before your return so that room temperature and hot water have time to regain usual levels.

TIP

Set the vacation setting in advance and activate just before departure in order to maintain the comfort.

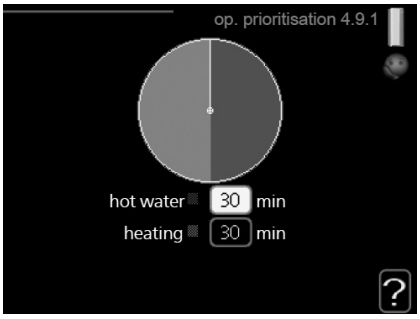
CAUTION

If you choose to switch off hot water production during the vacation "periodic increase" (preventing bacterial growth) are blocked during this time. "periodic increase" started in conjunction with the vacation setting being completed.

Menu 4.9 - advanced

Menu "advanced" has orange text and is intended for the advanced user. This menu has several sub-menus.

Menu 4.9.1 - op. prioritisation



op. prioritisation

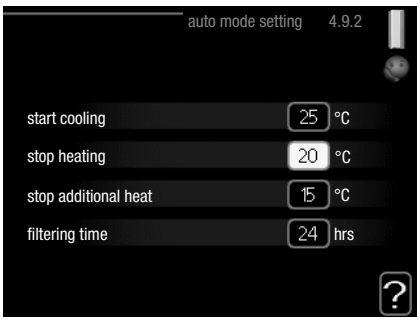
Setting range: 0 – 180 min
Default value: 30 min

Choose here how long the installation should work with each requirement if there are several requirements at the same time. If there is only one requirement the installation only works with that requirement.

The indicator marks where in the cycle the installation is.

If 0 minutes is selected it means that requirement is not prioritised, but will only be activated when there is no other requirement.

Menu 4.9.2 - auto mode setting



start cooling (accessory auto mode setting required)

Setting range: 15 – 40 °C
Factory setting: 25

stop heating

Setting range: -20 – 40 °C
Default values: 17

stop additional heat

Setting range: -25 – 40 °C
Factory setting: 5

filtering time

Setting range: 0 – 48 h
Default value: 24 h

When the operating mode is set to "auto", the control module selects when start and stop of additional heat and heat production is permitted, depending on the average outdoor temperature. If the heat pump has the integrated cooling function and it is activated in the menu you can also select the start temperature for cooling.

Select the average outdoor temperatures in this menu.

You can also set the time over which (filtering time) the average temperature is calculated. If you select 0, the present outdoor temperature is used.

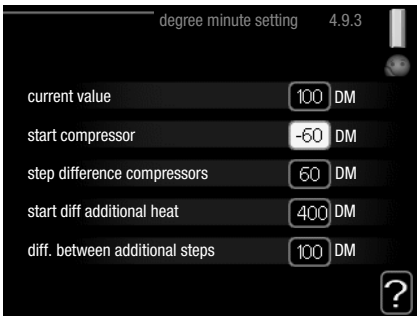
CAUTION

It cannot be set "stop additional heat" higher than "stop heating".

CAUTION

In systems where heating and cooling share the same pipes "stop heating" cannot be set higher than "start cooling" if there is not a cooling/heating sensor.

Menu 4.9.3 - degree minute setting



current value

Setting range: -3000 – 3000

start compressor

Setting range: -1000 – -30
Default value: -60

step difference compressors (RC-HY40 only)

Setting range: 10 – 2000
Default value: 60

start diff additional heat

Setting range: 100 – 2000

Factory setting: 400

diff. between additional steps

Setting range: 10 – 1000
Factory setting: 30

Degree minutes are a measurement of the current heating requirement in the house and determine when the compressor respectively additional heat will start/stop.

CAUTION

Higher value on "start compressor" gives more compressor starts, which increase wear on the compressor. Too low value can give uneven indoor temperatures.

Menu 4.9.4 - factory setting user

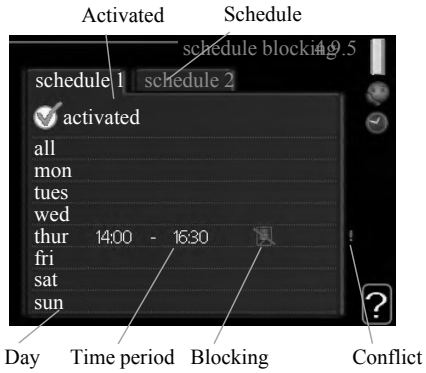
All settings that are available to the user (including advanced menus) can be reset to default values here.

CAUTION

After factory setting, personal settings such as heating curves must be reset.

Menu 4.9.5 - schedule blocking

The additional heat can be scheduled to be blocked for up to two different time periods here.



When scheduling is active the relevant blocking symbol is shown in the main menu on the symbol for the control module.

Schedule: The period to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

Day: Select which day or days of the week the schedule is to apply to here. To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Blocking: The desired blocking is selected here.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.


Blocking the compressor in the outdoor unit.


Blocking additional heat.

TIP

If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

Scheduling always starts on the date that the start time is set for.

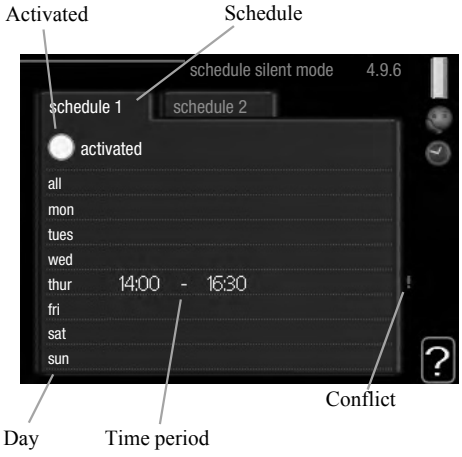
CAUTION

Long term blocking can cause reduced comfort and operating economy.

Menu 4.9.6 - schedule silent mode

The compressor can be scheduled to be set to "silent mode" (the heat pump must support this) for up to two different time periods here.

When scheduling is active the "silent mode" symbol is shown in the main menu on the symbol for the control module.



Schedule: The period to be changed is selected here.

Activated: Scheduling for the selected period is activated here. Set times are not affected at deactivation.

Day: Select which day or days of the week the schedule is to apply to here. To remove the scheduling for a particular day, the time for that day must be reset by setting the start time to the same as the stop time. If the line "all" is used, all days in the period are set for these times.

Time period: The start and stop time for the selected day for scheduling are selected here.

Conflict: If two settings conflict with each other a red exclamation mark is displayed.

TIP

If you wish to set similar scheduling for every day of the week start by filling in "all" and then changing the desired days.

TIP

Set the stop time earlier than the start time so that the period extends beyond midnight. Scheduling then stops at the set stop time the day after.

Scheduling always starts on the date that the start time is set for.

CAUTION

Long term scheduling of "silent mode" can cause reduced comfort and operating economy.

Sub-menus

Menu SERVICE has orange text and is intended for the advanced user. This menu has several sub-menus.

Status information for the relevant menu can be found on the display to the right of the menus.

operating settings: Operating settings for the control module.

system settings: System settings for the control module, activating accessories etc.

soft in/outputs: Setting software controlled in and

outputs on the input card (AA3) and terminal block (X2).

factory setting service: Total reset of all settings (including settings available to the user) to default values.

forced control: Forced control of the different components in the indoor module.

start guide: Manual start of the start guide which is run the first time when the control module is started.

quick start: Quick starting the compressor.

NOTE

Incorrect settings in the service menus can damage the installation.

Menu 5.1 - operating settings

Operating settings can be made for the control module in the sub-menus.

Menu 5.1.1 - hot water settings

economy

Setting range start temp. economy: 5 – 55 °C
Factory setting start temp. economy: 42 °C
Setting range stop temp. economy: 5 – 60 °C
Factory setting stop temp. economy: 48 °C

normal

Setting range start temp. normal: 5 – 60 °C
Factory setting start temp. normal: 46 °C
Setting range stop temp. normal: 5 – 65 °C
Factory setting stop temp. normal: 50 °C

luxury

Setting range start temp. lux: 5 – 70 °C
Factory setting start temp. lux: 49 °C
Setting range stop temp. lux: 5 – 70 °C
Factory setting stop temp. lux: 53 °C

stop temp. per. increase

Setting range: 55 – 70 °C
Factory setting: 55 °C

charge method

Setting range: target temp, delta temp
Default value: delta temp

Here you set the start and stop temperature of the hot water for the different comfort options in menu 2.2 as well as the stop temperature for periodic increase in menu 2.9.1.

The charge method for hot water mode is selected here. "delta temp" is recommended for heaters with charge coil, "target temp" for heaters with domestic coil.

Menu 5.1.2 - max flow line temperature

climate system

Setting range: 5 – 70 °C
Default value: 60 °C

Set the maximum supply temperature for the climate system here. If the installation has more than one climate system, individual maximum supply temperatures can be set for each system. Climate systems 2 – 8 cannot be set to a higher max supply temperature than climate system 1.

CAUTION

Underfloor heating systems are normally max flow line temperature set between 35 and 45°C.

Be careful not to cause low temperature burn if it is set at 35°C or higher.

Check the max floor temperature with your floor supplier.

Menu 5.1.3 - max diff flow line temp.

max diff compressor

Setting range: 1 – 25 °C
Default value: 10 °C

max diff addition

Setting range: 1 – 24 °C
Default value: 7 °C

Here you set the maximum permitted difference between the calculated and actual supply temperature during compressor mode and add. heat mode. Max diff. additional heat can never exceed max diff. compressor

max diff compressor

When the current supply temperature **deviates** from the set value compared to that calculated, the heat pump is forced to stop irrespective of the degreeminute value.

If the current supply temperature exceeds the calculated flow temperature plus the set value, the degree minute value is set to 0. The compressor in the heat pump stops when there is only a heating demand.

max diff addition

If "addition" is selected and activated in menu 4.2 and the present supply temp **exceeds** the calculated temperature plus the set value, the additional heat is forced to stop.

Menu 5.1.4 - alarm actions

Select how to control the heat pump in the event of an alarm. You can choose to stop producing hot water and/or reduce the room temperature.

CAUTION

If no alarm action is selected, it can result in higher energy consumption in the event of an alarm.

Menu 5.1.12 - addition

add type: step controlled

max step

Setting range (binary stepping deactivated): 0 – 3
Setting range (binary stepping activated): 0 – 7
Default value: 3

fuse size

Setting range: 1 – 200 A
Factory setting: 16 A

You can set the maximum number of permitted additional heat steps, if there is internal additional heat in the tank (only accessible if the additional heat is positioned after QN10), whether binary stepping is to be used and the size of the fuse.

<Add. Type: shurt controlled (RC-HY40 only)>

prioritised additional heat

Setting range: on/off
Factory setting: off

minimum running time

Setting range: 0 – 48 h
Default value: 12 h

min temp.

Setting range: 5 – 90 °C
Default value: 55 °C

mixing valve amplifier

Setting range: 0.1 –10.0
Default value: 1.0

mixing valve step delay

Setting range: 10 – 300 s
Default values: 30 s

fuse size

Setting range: 1 – 200 A
Factory setting: 16 A

transformation ratio

Setting range: 300 – 3000
Factory setting: 300

Select this option if shunt controlled additional heat is connected.

Set when the addition is to start, the minimum run time and the minimum temperature for external addition with shunt here. External addition with shunt is for example a wood/oil/gas/pellet boiler.

You can set shunt valve amplification and shunt valve waiting time.

Selecting "prioritised additional heat" uses the heat from the external additional heat instead of the heat pump.

The shunt valve is regulated as long as heat is available, otherwise the shunt valve is closed.

TIP

See the accessory installation instructions for function description.

Menu 5.1.14 - flow set. climate system

presettings

Setting range: radiator, floor heat., rad. + floor heat.
Default value: radiator
Setting range DOT: -40.0 – 20.0 °C

The factory setting of DOT value depends on the country that has been given for the product's location.
The example below refers to Sweden.

Factory setting DOT: -20.0 °C

own setting

Setting range dT at DOT: 0.0 – 25.0

Factory setting dT at DOT: 10.0
Setting range DOT: -40.0 – 20.0 °C
Factory setting DOT: -20.0 °C

Select the type of heating distribution system.

dT at DOT is the difference in degrees between flow and return temperatures at dimensioned outdoor temperature.

Menu 5.1.22 - heat pump testing

NOTE

This menu is intended for testing heat pump according to different standards.

Use of this menu for other reasons may result in your installation not functioning as intended.

This menu contains several sub-menus, one for each standard.

Menu 5.1.23 - compressor curve

Set whether the compressor in the heat pump should work to a particular curve under specific requirements or if it should work to predefined curves.

You can set a curve for each operation mode (heat, hot water, coolingetc.) by unticking "auto", turning the control knob until a temperature is marked and pressing OK. You can set at what temperature max- min frequencies will occur.

This menu consists of several windows (one for each operation mode). Use the navigation arrow in the top left corner to change between the windows.

Menu 5.2 - system settings

Make different system settings for your installation here, e.g. activate the connected heat pump and which accessories are installed.

Menu 5.2.2 - installed heat pump

If a heat pump is connected to the master installation, set it here.

For RC-HY40, you can set slave unit to be connected.

There are two ways of activating connected slaves. You can either mark the alternative in the list or use the automatic function "search installed slaves".

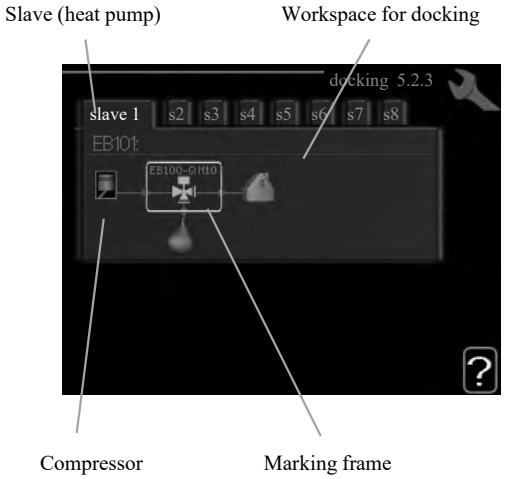
search installed slaves

Mark “search installed slaves" and press the OK button to automatically find connected slaves for the master heat pump.

Menu 5.2.3 – docking (RC-HY 40 only)

Enter how your system is docked regarding pipes, for example to hot water heating and heating the building.

This menu has a docking memory which means that the control system remembers how a particular reversing valve is docked and automatically enters the correct docking the next time you use the same reversing valve.



Slave: Here you select for which heat pump the docking setting is to be made.

Compressor: Select if the compressor in the heat pump is blocked (factory setting), or standard (docked for example to pool heating, hot water charging and heating the building).

Marking frame: Move around the marking frame using the control knob. Use the OK button to select what you want to change and to confirm setting in the options box that appears to the right.

Workspace for docking: The system docking is drawn here.

Symbol	Description
	Compressor (blocked)
	Compressor (standard)
	Reversing valves for hot water, cooling. The designations above the reversing valve indicate where it is electrically connected (EB101 = Slave 1, etc.).
	Hot water charging
	Heating (heating the building, includes any extra climate system)
	Cooling

Menu 5.2.4 - accessories

Set which accessories are installed on the installation here.

If the water heater is connected, hot water charging must be activated here.

Menu 5.3 - accessory settings

The operating settings for accessories that are installed and activated are made in the sub-menus for this.

Menu 5.3.2 - shunt controlled add. Heat

prioritised additional heat

Setting range: on/off
Factory setting: off

start diff additional heat

Setting range: 0 – 2000 GM
Default values: 400 GM

minimum running time

Setting range: 0 – 48 h
Default value: 12 h

min temp.

Setting range: 5 – 90 °C
Default value: 55 °C

mixing valve amplifier

Setting range: 0.1 –10.0
Default value: 1.0

mixing valve step delay

Setting range: 10 – 300 s
Default values: 30 s

Set when the addition is to start, the minimum run time and the minimum temperature for external addition with shunt here. External addition with shunt is for example a wood/oil/gas/pellet boiler.

You can set shunt valve amplification and shunt valve waiting time.

Selecting "prioritised additional heat" uses the heat from the external additional heat instead of the heat pump.

The shunt valve is regulated as long as heat is available, otherwise the shunt valve is closed.

See the accessory installation instructions for function description.

Menu 5.3.3 - extra climate system

use in heating mode

Setting range: on/off
Factory setting: on

use in cooling mode

Setting range: on/off
Factory setting: off

mixing valve amplifier

Setting range: 0.1 – 10.0
Default value: 1.0

mixing valve step delay

Setting range: 10 – 300 s
Default values: 30 s

Here you select which climate system (2 - 8) you wish to set. In the next menu you can make settings for the climate system

that you have selected. If this function is activated, you can set "cooling flow temp. at +20°C" and "cooling flow temp. at +40°C" for each climate system where the function is activated.

CAUTION

This setting option only appears if "cooling permitted" is activated in menu 5.11.1.1.

The shunt amplification and shunt waiting time for the different extra climate systems that are installed are also set here.

See the accessory installation instructions for function description.

Menu 5.3.6 - step controlled add. heat

start addition

Setting range: 0 – 2000 GM
Default values: 400 GM

diff. between additional steps

Setting range: 0 – 1000 GM
Default values: 30 GM

max step

Setting range
(binary stepping deactivated): 0 – 3
Setting range
(binary stepping activated): 0 – 7
Default value: 3

binary stepping

Setting range: on/off
Factory setting: off

Make settings for step controlled addition here. Step controlled addition is for example an external electric boiler.

It is possible, for example, to select when the additional heat is to start, to set the maximum number of permitted steps and whether binary stepping is to be used.

When binary stepping is deactivated (off), the settings refer to linear stepping.

See the accessory installation instructions for function description.

Menu 5.3.8 - hot water comfort

activating imm heater

Setting range: on/off
Factory setting: off

activ. imm heat in heat mode

Setting range: on/off
Factory setting: off

activating the mixing valve

Setting range: on/off
Factory setting: off

outgoing hot water

Setting range: 40 – 65 °C
Default value: 55 °C

mixing valve amplifier

Setting range: 0.1 – 10.0
Default value: 1.0

mixing valve step delay

Setting range: 10 – 300 s
Default values: 30 s

Make settings for the hot water comfort here.

See the accessory installation instructions for function description.

activating imm heater: The immersion heater is activated here if installed in the water heater.

activ. imm heat in heat mode: Activate here whether the immersion heater in the tank (required if the alternative above is activated) will be permitted to charge hot water, if the compressors in the heat pump prioritise heating.

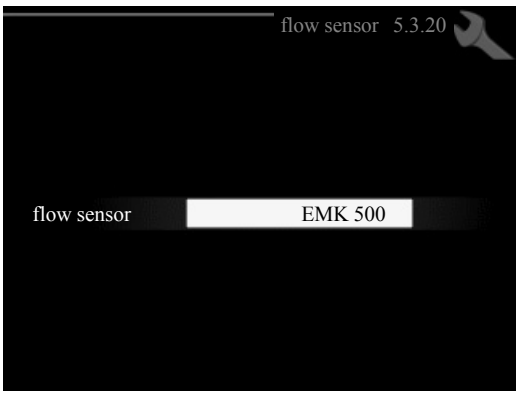
activating the mixing valve: Activate here whether a mixer valve for limiting the temperature of hot water from the water heater is installed.

If this alternative has been activated, you can set the outgoing hot water temperature, shunt amplification and shunt waiting time for the mixer valve.

outgoing hot water: Set the temperature at which the mixing valve is to restrict hot water from the water heater.

See the accessory installation instructions for function description.

Menu 5.3.20 - flow sensor



flow sensor

Setting option: EMK 500, EMK 310 / 300, EMK 150
Factory setting: EMK 500

Here you select which flow sensor is used for the energy measurement.

Menu 5.4 – soft in/outputs

You can set the function of in/output for each terminal (AUX1-6 and output).

Position of the terminal depends on the type of controller.

RC-HY20: port 11-18 on X2 terminal (AUX1-6), X4 terminal on AA2 board (output)

RC-HY40: port 9-14 on terminal X6 and port 1-4 on X2 terminal on AA3 board (AUX1-6), X7 terminal on AA3 board (output)

Menu 5.5 - factory setting service

All settings can be reset (including settings available to the user) to default values here.

NOTE

When resetting, the start guide is displayed the next time the control module is restarted.

Menu 5.6 - forced control

You can force control the different components in the control module and any connected accessories here.

Menu 5.7 - start guide

When the control module is started for the first time the start guide starts automatically. Start it manually here.

See page 62 for more information about the start guide.

Menu 5.8 - quick start

It is possible to start the compressor from here.

CAUTION

There must be a heating or hot water demand to start the compressor.

CAUTION

Do not quick start the compressor too many times over a short period of time as this may damage the compressor and its surrounding equipment.

Menu 5.9 - floor drying function

length of period 1 – 7

Setting range: 0 – 30 days
Factory setting, period 1 – 3, 5 – 7: 2 days
Factory setting, period 4: 3 days

temp. period 1 – 7

Setting range: 15 – 70 °C
Default value:

temp. period 1	20 °C
temp. period 2	30 °C
temp. period 3	40 °C
temp. period 4	45 C
temp. period 5	40 °C
temp. period 6	30 °C
temp. period 7	20 °C

Set the function for under floor drying here.

You can set up to seven period times with different calculated flow temperatures. If less than seven periods

are to be used, set the remaining period times to 0 days.

Mark the active window to activate the underfloor drying function. A counter at the bottom shows the number of days the function has been active.

TIP

If operating mode "add. heat only" is to be used, select it in menu 4.2.

Menu 5.10 - change log

Read off any previous changes to the control system here.

The date, time and ID No. (unique to certain settings) and the new set value is shown for every change.

NOTE

The change log is saved at restart and remains unchanged after factory setting.

Menu 5.11 - heat pump settings

Settings for installed heat pump can be made in the submenus.

Menu 5.11.1 - EB101 - EB108

Make settings specifically for the installed heat pump and charge pump here.

For RC-HY40, it is possible to connect up to 8 heat pumps.

Menu 5.11.1.1 - heat pump

Make settings for the installed heat pump here. To see what settings you can make, see installation manual for the heat pump.

Menu 5.11.1.2 - charge pump (GP12)

op. mode

Heating/cooling
Setting range: auto / intermittent
Default value: auto

Set the operating mode for the charge pump here.

auto: The charge pump runs according to the current operating mode for SMO 20.

intermittent: The charge pump starts and stops 20 seconds before and after the compressor in the heat pump.

speed during operation heating, hot water, cooling

Setting range: auto / manual
Default value: auto

Manual setting

Setting range: 1 – 100 %
Default values: 70 %

speed in wait mode

Setting range: 1 – 100 %
Default values: 30 %

max. allowed speed

Setting range: 80 – 100 %
Default values: 100 %

Set the speed at which the charge pump is to operate in the present operating mode. Select "auto" if the speed of the charge pump is to be regulated automatically (factory setting) for optimal operation.

If "auto" is activated for heating operation, you can also make the setting "max. allowed speed" which restricts the charge pump and does not allow it to run at a higher speed than the set value.

For manual operation of the charge pump deactivate "auto" for the current operating mode and set the value to between 1 and 100 % (the previously set value for "max. allowed speed" no longer applies).

Speed in standby mode (only used if "auto" has been selected for "Operating mode") means the charge pump operates at the set speed during the time when there is neither a need for compressor operation nor additional heat.

5.12 - country

Select here where the product was installed. This allows access to country specific settings in your product.

Language settings can be made regardless of this selection.

NOTE

This option locks after 24 hours, restart of display or program updating.

Service

Operation control function by the indoor unit control

Operation mode

General

The modes mentioned below can be chosen from the control panel.

Mode	Function
(1) Auto	● The mode is automatically switched over between (3) Heating mode and (4) Cooling mode. Automatic switching rule is mentioned below.
(2) Manual	● In this operating mode, you can select what functions are permitted. ● You can't deselect "compressor" in manual mode.
(3) Heating	● Hot water is supplied for heating. ● Hot water operation will be made when the tank water temperature lowers. ● When the outdoor unit can not cover the heat load, electric heater use is allowed and water in the tank is supplied for heating to fulfill the required heat load.
(4) Cooling (Super Cooling)	● Cold water is supplied for cooling. ● Hot water operation will be made when the tank water temperature lowers;
(5) Add. Heat only	● Outdoor unit is not allowed to operate. ● Only electric heater is exclusively used for Heating and Hot water operation.

Note 1 : The measured value of outdoor air temperature (BT1) which is used for control, is averaged in accordance with the prescribed formula.
Note 2 : Heating/Cooling demand is calculated as numeric DM (Degree Minutes) from the supply water temperature (BT12) and its target temperature in accordance with the prescribed formula.
Note 3 : Electric heater can be replaced with external heat source of the docking feature. See Menu 5.1.12 and 5.3.6 for setting.
Note 4 : Two sets of climate system can be controlled with different heating curve. See Menu 1.9.1 for setting.

Actuator operation according to the operation mode

State	Function	Run status	Outdoor unit side			Indoor unit side			
			Compressor CM	Outdoor fan FMo1	4-way valve 20S	Electric heater EB1	Circulation pump GP12	Reversing valve QN10	Cooling shift valve QN12
Heating Alternating mode	Switching between heating and hot water	Heating	ON/OFF	ON/OFF	ON	OFF	ON	Closed	Closed
		Hot water						Active	
Heating Combined mode	Outdoor unit produces heating and electric heater supports lack of capacity	Heating	ON	ON	ON	ON	ON	Active	Closed
Cooling	Switching between cooling and hot water	Cooling	ON/OFF	ON/OFF	OFF	OFF	ON	Closed	Open
		Hot water			ON			Active	Closed
Add. Heat only	Producing heating and hot water with electric heater	Heating	OFF	OFF	ON/OFF	ON	ON	Closed	Closed
		Hot water						Active	
Defrost	Defrosting outdoor unit heat exchanger	Defrost	ON	OFF	OFF	OFF	ON	Closed	Closed
		Tank defrost				ON		Active	
Shutdown	Only in the event of serious alarms	Stop	OFF	OFF	ON/OFF	OFF	ON/OFF	Closed	Closed

Mode transition in Auto mode

Change-over of Heating/Cooling operation is controlled by detection with outdoor air temperature sensor (BT1) of the indoor unit. Threshold value depends on setting on Menu 4.9.2.

Start cooling
If outdoor air temperature is above setting value on Menu 4.9.2, cooling mode is chosen.
If outdoor air temperature is below setting value on Menu 4.9.2 it switches to heating mode.
Default of setting value is 25℃ .
Stop heating
If outdoor air temperature is below setting value on Menu 4.9.2, heating mode is chosen.
If outdoor air temperature is above setting value on Menu 4.9.2, it switches to cooling mode.
Default of setting value is 17℃ .

Mode transition in Auto/manual mode to hot water operation

Change-over of Heating or Cooling/Hot water operation is controlled by detection with temperature sensor (BT6) of the tank unit. Thereshold value depends on setting on Menu 5.1.1.

Setting range start temp. economy/normal/luxury
If tank temperature is below setting value on Menu 5.1.1, hot water mode is chosen.
Default of setting value is the following table.

Hot operation mode	Default value
Economy	42℃
Normal	46℃
Luxury	49℃

Setting range stop temp. economy/normal/luxury
If tank temperature is above setting value on Menu 5.1.1, it swiches to heating or cooling mode.
Default of setting value is the following table.

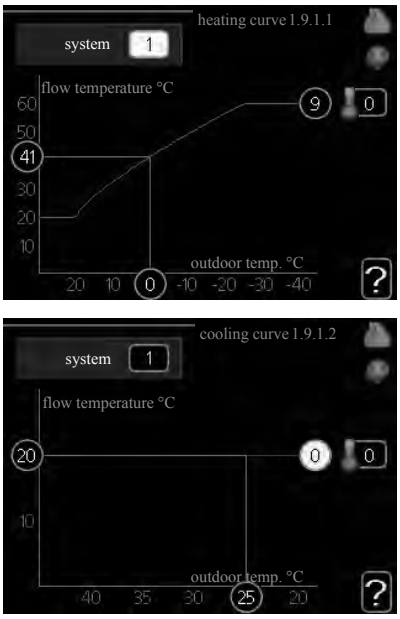
Hot operation mode	Default value
Economy	48℃
Normal	50℃
Luxury	53℃

Supply water temperature control in heating

Target supply water temperature can be seen in Menu 1.1.

Heating curve

Heating/cooling curve setting



heating curve

Setting range: 0 – 15
Default value: 9

cooling curve (accessory required)

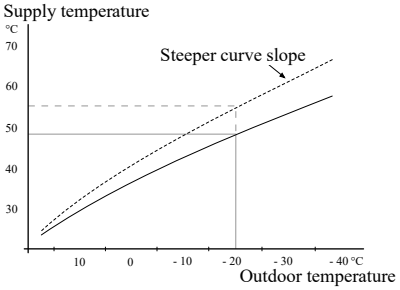
Setting range: 0 – 9

Default value: 0

The prescribed heating curve for your house can be viewed in the menu "heating curve". The task of the heating curve is to give an even indoor temperature, regardless of the outdoor temperature, and thereby energy efficient operation. From this heating curve, the control module determines the temperature of the water to the heating system, supply temperature, and therefore the indoor temperature. Select the heating curve and read off how the supply temperature changes at different outdoor temperatures here. If there is cooling function, the same settings can be made for the cooling curve.

Curve coefficient

The heating/cooling curve shows the relation between the target supply temperature and the corresponding outdoor temperature. A steep curve indicates that supply temperature becomes higher at low outdoor air temperature in heating and it becomes lower at high outdoor air temperature in cooling.



The optimum slope depends on the climate conditions in your location, the type of heating device (radiators or under floor heating) and how well insulated the house is.

The curve is set when the heating installation is installed, but may need adjusting later. Normally, the curve will not need further adjustment.

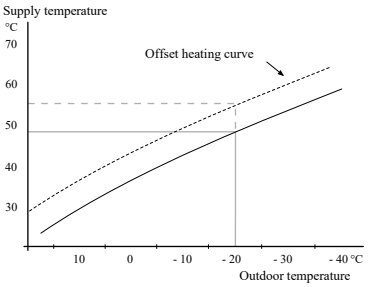
CAUTION

In the event of making fine adjustments of the indoor temperature, the curve must be offset up or down instead, this is done in menu 1.1 "temperature".

Curve offset

The target temperature can be offset in parallel over the entire outdoor temperature range by this function. This is offset by 5 °C by adjusting 2 steps.

The target temperature can be parallel offset in the entire outdoor temperature range with this function. It is offset by 5 °C by adjusting 2 steps.



Flow line temperature – maximum and minimum values

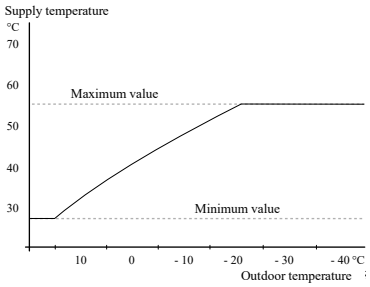
This function is used in order to limit max-min supply temperature. The heating / cooling curve becomes flat beyond max / min target temperature.

CAUTION

Underfloor heating systems are normally "max flow line temperature" set between 35 and 45°C. Take care not to cause low temperature burns in case it is set higher than 35°C.

Must be restricted with underfloor cooling min. flow line temp. to prevent condensation.

Check the max temperature for your floor with your installer/floor supplier.



The figure at the end of the curve indicates the curve number. The figure beside the thermometer icon gives the curve offset. Use the control knob to set a new value.

Confirm the new setting by pressing the OK button.

Curve 0 is an own curve created in menu 1.9.7.

To select another curve (slope):

1. Press OK button to access the setting mode
2. Select a new curve. The curves are numbered from 0 to 15, and the bigger number curve has steeper slope.

   Curve 0 means that "own curve" (menu 1.9.7) is used.
3. Press OK button to exit the setting.

To read off a curve:

1. Turn the control knob so that the ring on the shaft with the outdoor temperature is marked.
2. Press OK button.
3. Follow the grey line up to the curve and out to the left to read off the value for the supply temperature at the selected outdoor temperature.
4. You can now select to take read outs for different outdoor temperatures by turning the control knob to the right or left and read off the corresponding flow temperature.
5. Press OK or Back button to exit read off mode.

TIP

Wait 24 hours before making a new setting, so that the room temperature has time to stabilise.

If it is cold outdoors and the room temperature is too low, increase the curve slope by one increment.

If it is cold outdoors and the room temperature is too high, lower the curve slope by one increment.

If it is warm outdoors and the room temperature is too low, increase the curve offset by one increment.

If it is warm outdoors and the room temperature is too high, lower the curve offset by one increment.

Water temperature control when deviated from the target

When the DM value is significantly small, supply water temperature must be controlled higher than target temperature to reduce the deficit of DM value. However, too big overshoot of the supply temperature will affect comfort.

In order to control the supply water temperature to avoid fluctuation of room temperature, overshoot limit is set in Menu 5.1.3 (Max diff flow-line temp.). When the current supply temperature deviates from the set value compared to that calculated, the heat pump is forced to stop irrspective of the degree minute value.

If the current supply temperature exceeds the calculated flow temperature plus the set value, the degree minute value is set to 0.The compressor in the heat pump stops when there is only a heating demand.

Heating thermo-ON / OFF control

The control by DM value is the basic principle to operate/stop the outdoor unit operation.

DM (Degree-Minutes) value

DM value is integrated value of the gap between the target and actual supply water temperature.

Compressor required speed and electric heater ON/OFF are controlled by the DM value.

Operation state transition according to DM value

According to the DM value, operating state is changed.

Default of DM start heating value (Menu 4.9.3) is -60.

Default of DM start add. heat value (Menu 4.9.3) is 400.

Supply water temperature control in cooling

Principle such as cooling curve, cooling curve offset and upper/lower limit is the same as heating operation.

Target supply water temperaure can be checked inMenu 1.9.

Cooling curve can be chosen in Menu 1.9.1.2.

Cooling curve

Cooling curve is the basic principle to decide the target supply water temperature for cooling.

The higher the outdoor air temperature (BT1) becomes, the lower the target supply water temperture becomes, and the characteristics can be adjusted in Menu 1.9.1.2.

Upper/Lower limit of the supply water temperature

Regardless of the cooling curve setting and the outdoor air temperature, target supply water temperature can not exceed the min/max supply water temperature set in Menu 1.9.3.2 and 5.1.2.

Upper and lower limit is set after various offset correction.

Water temperature control when deviated from the target

When the DM value is significantly big, supply water temperature must be controlled lower than target temperature to reduce the surplus of DM value. However, too big overshoot of the supply temperature will affect comfort.

In order to control the supply water temperature to avoid fluctuation of room temperatre, overshoot limit is set in Menu 9.6.7 (Max diff flow-line temp.). When the current supply temperature deviates from the set value compared to that calculated, the heat pump is forced to stop irrspective of the degreeminute value.

If the current supply temperature exceeds the calculated flow temperature plus the set value, the degree minute value is set to 0.The compressor in the heat pump stops when there is only a heating demand.

Cooling thermo-ON / OFF control

Principle of the control such as DM value is the same as heating operation.

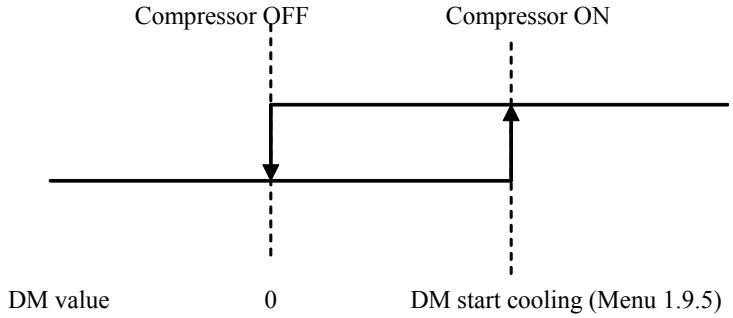
DM (Degree-Minutes) value

DM value is limited in Menu 1.9.5 and does not exceed the limit.

Operation state transition according to DM value

According to the DM value, operating state is changed.

Default of DM start cooling value (Menu 1.9.5) is +30.



Exceptional processing of DM value

Forced outdoor unit operation

In cooling mode, there is no exceptional DM value processing to operate the outdoor unit according to the gap between target and actual supply water temperature.

Forced outdoor unit stop

In case the actual supply water temperature is lower than the target temperature and the gap is bigger than the value set in Menu 5.1.3 when the outdoor unit is operating, the DM value is overwritten to 0, which results in stopping the outdoor unit operation immediately.

Hot water operation control

ON/OFF control

Regardless of the DM value, hot water operation when tank water temperature (BT6) lowers below Start temp HW in Menu5.1.1. It finishes when the tank water temperature reaches Stop temp HW in Menu 5.1.1.

Compressor speed control

During the hot water operation, compressor speed is controlled according to the map linked with the outdoor air temperature. There are two maps. One is high cap map. The other is low cap. These map automatically changed depending on the tank temperature.

Charge methoed

There are two kinds of hot water storage methods.The 2 methods are dt and target temperature charging. They can be chosen in Menu 5.1.1. Dt uses high capacity curve when BT12, BT3 and BT6 allow it and finish the charging with low capacity curve. Target temperature method uses high capacity curve only.

Defrost operation

When frost accumulates on the surface of the outdoor heat exchange, defrost operation starts to remove it.
For detailed operation condition, see outdoor unit control

During defrost operation, indoor unit operates as follows in order to extract heat from the heating system:
- Reversing valve QN10 and QN12 are towards heating system.
- Circulation pump GP12 keeps operation based on general rule.

When at least one of the following conditions is fulfilled, Reversing valve QN12 switches towards hot water to extract heat from the tank.
- Water return temperature < tank defrost temperature level
- Water outlet temperature < 10℃
- Water return temperature – Water outlet temperature > Min Flow Threshold
- Operation of the climate system has been blocked

Protection control

Current protection

Maximum current limit control for the outdoor unit (by indoor unit control)
When the operation current of the outdoor unit comes close to the limit, request compressor speed is retained in order to keep the current.

Freeze protection of water heat exchanger

The freeze protection function shall avold water to freeze inside the heat exchanger during defrost and cooling operation.
(1) In cooling mode
Compressor speed is kept when the low pressure (BP4) reaches 0.75 MPa, and stopped when it reaches 0.65 MPa for 20 seconds. Operation is automatically restarted when it reaches 0.83 MPa and the supply water temperature becomes 14°C or higher, but it will permanently stop if the protection is activated for 10 repeated.

(2) In defrosting mode
Compressor stops when the low pressure (BP4) reaches threshold value for 10 seconds depending on water temperature.
After stopping, the system automatically restarts with heating mode.
When the above action is repeated for 10 times, the system stops and error code is displayed.

Low condenser out

Compressor stops when the supply temperature (BT12) becomes below 5°C and it automatically restarts when the supply temperature (BT12) becomes above 14°C.

High water out

Compressor stops when the supply temperature (BT12) becomes above 60°C and it automatically restarts when the supply temperature (BT12) becomes below 58°C.

High water in

Compressor stops when the return temperature (BT3) becomes above 55°C and it automatically restarts when the return temperature (BT3) becomes below 53°C.

High pressure

Compressor stops when the high pressure (BP4) reaches 4.15MPa and it automatically restarts when the high pressure (BP4) becomes below 3.15MPa.
When the above action is repeated for 5times within an hour, the system will permanently stop.

Operation control function by the outdoor unit control

Determination of compressor speed (frequency)

1) Maximum and minimum frequency under normal operating conditions

(rps)

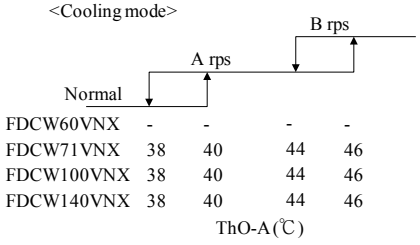
Model	FDCW60VNX		FDCW71VNX		FDCW100VNX		FDCW140VNX	
Operation mode	Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
Maximum frequency	106	110	86	118	80	85	77	120
Mimimum frequency	12	12	20	20	20	25	20	20

2) Maximum required frequency under high outdoor air temperature condition
Maximum required frequency is limited according to the outdoor air temperature (Tho-A)

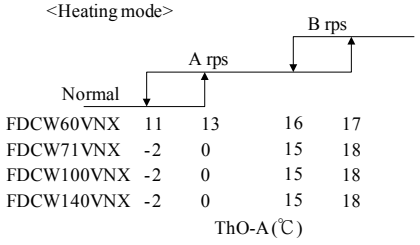
(rps)

Model		FDCW60VNX	FDCW71VNX	FDCW100VNX	FDCW140VNX
Cooling mode	A rps	-	67	75	75
	B rps	-	60	75	70
Heating mode	A rps	90	81	85	85
	B rps	75	74	60	85

<Cooling mode>



<Heating mode>



※ In case of the FDCW60VNX, Maximum required frequency is not limited according to the outdoor air temperature.

3) Maximum frequency under high condensing saturated temperature (CST or Thi-I whichever higher) in heating mode.
Maximum frequency is limited according to the condensing saturated temperature.

< FDCW60VNX >

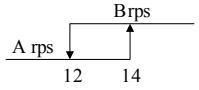
(rps)

Model		FDCW60VNX
Cooling mode	Outdoor air temperature	27℃ <Tho-A ≦ 40℃
	A rps	95
	B rps	-

(rps)

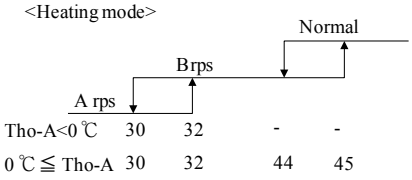
Model		FDCW60VNX	
Heating mode	Outdoor air temperature	Tho-A<0℃	0℃ ≦ Tho-A
	A rps	95	90
	B rps	Normal	100

<Cooling mode>



CST or Thi-L whichever

<Heating mode>

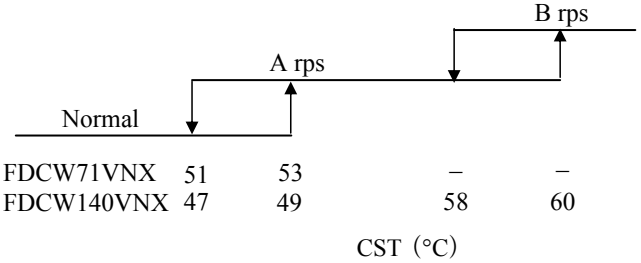


CST or Thi-L whichever higher

< FDCW71, 100, 140VNX >

(rps)

Model		FDCW71VNX	FDCW100VNX	FDCW140VNX
Heating mode	A rps	100	–	100
	B rps	–	–	95

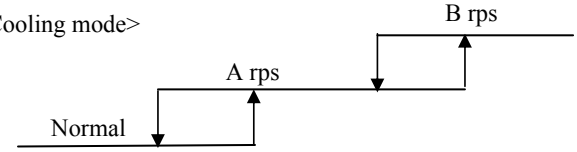


4) Minimum required frequency under high condensing saturated temperature condition.
According to the outdoor heat exchanger temperature (Tho-R) , minimum required frequency in cooling mode is changed as per A or B in below table.
And according to the condensing saturated temperature (CST) detected by indoor unit pressure sensor (BP4) or liquid pipe temperature (Thi-L) detected by indoor unit temperature sensor (BT15), whichever is higher, minimum required frequency in heating mode is changed as per C or D in below table.

(rps)

Model		FDCW71VNX	FDCW100VNX	FDCW140VNX
Cooling mode	A rps	30	–	30
	B rps	40	–	40
Heating mode	C rps	30	25	30
	D rps	40	35	40

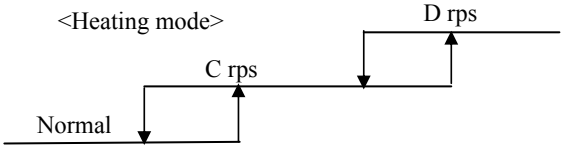
<Cooling mode>



FDCW71VNX	39	41	49	51
FDCW100VNX	–	–	–	–
FDCW140VNX	43	45	49	51

Tho-R (°C)

<Heating mode>



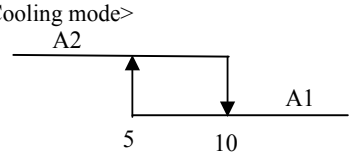
FDCW71VNX	39	41	50	52
FDCW100VNX	36	38	52	54
FDCW140VNX	45	43	50	52

CST or Thi-L whichever higher (°C)

5) Minimum required frequency adjustment under outdoor air temperature (Tho-A) condition
According to the outdoor air temperature, minimum required frequency is offset by as per below table.

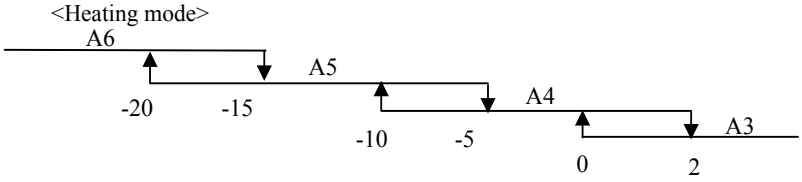
Model		FDCW71VNX	FDCW100VNX	FDCW140VNX
Cooling mode	A1	0		
	A2	+15		
Heating mode	A3	0	0	0
	A4	0	+10	+5
	A5	+10	+20	+15
	A6	+20	+30	+25

<Cooling mode>



Outdoor air temperature (°C)

<Heating mode>



Outdoor air temperature (°C)

6) When any of the controls from 1) - 5) above may duplicate, whichever the smallest value among duplicated controls is taken as the maximum required frequency, and whichever the biggest value is taken as the minimum required frequency.

Compressor start control

1) Compressor starts upon receipt of the thermostat ON signal from the indoor unit
2) However, at initial start-up after turning the power circuit breaker on, the compressor may enter the standby state for maximum 30 minutes in order to prevent from dry-up of oil in the compressor.

Compressor soft start control

＜ FDCW60VNX ＞

1) The pattern 1

Normally, the outdoor unit starts a compressor with this control except the condition mentioned in (2) pattern 2.

- Firstly, compressor starts at 10rps up to the target speed "30rps", and it is acceralated by 5rps/s.
- Compressor acceleration
- The compressor upper limit speed is limited at "A", "B", and "C" rps for "T minutes after compressor starts" respectively.

			Duration from the starting compressor T (min)			
			T ≦ 3min	T ≦ 7min	T ≦ 9min	T ＞ 9min
			A rps	B rps	C rps	
FDCW60VNX	Cooling mode		120	120	120	-
	Heating mode	Tho-A ≧ 0℃	120	120	120	-
		Tho-A ＜ 0℃	48	56	75	-

“When the value in this table is higher than the global highest (Nmaxo) value,
it follows the global highest value.”
In case the pattern 1 condition and the pattern 3 condition are fulfilled at the same time, pattern 3 start-up will be done.

2) The pattern 2

① Control condition

Operation mode is “Heating” and all below condition a) and b) are fullfilled.
but any of 1) ~3) conditions is fulfilled, pattern 1 start-up will be done.

1) Operation mode is changed from “stop” to “Heating”
2) Restarting compressor after Defrost operation.
3) Restart from “Forced-Stop”

a) “Compressor Command” is turned from “OFF” to “ON”
b) When “Compressor commnad” is turned “ON”, Tho-A is less than 10 degree C.

		Duration from the starting compressor T (min)		
		T ≦ 1min	T ≦ 5min	T ≦ 5min
		A rps	B rps	C rps
FDCW60VNX	Heating mode	40	32	-

3) The pattern 3

① Control condition

In case all of the following conditions are fulfilled when the operation mode is not "Stop"

i) Inverter command changes from "STOP" to "RUN".
ii) Taqrget compressor speed is less than Arps.

② Control contents

Compressor lower speed limit is limited at Arps for "a" minites.

	Mode	A rps	a min
FDCW60VNX	Cooling	40	3
	Heating	40	3

If the operation is duplicate the pattern 2 and the pattern 3, the pattern 2 execution is priority.

Compressor soft start control

＜ FDCW71,100,140VNX ＞

1) The pattern 1
[Control condition] Normally, the compressor operation frequency is raised in following start pattern.
[Control contents]
a) It starts the compressor at 55 rps as target frequency.
b) Compressor speed acceleration finishes when the pressure difference becomes bigger than 0.34MPa in heating or when the low pressure reaches 0.8MPa in cooling.
c) At 30 seconds after starting compressor, the target frequency changes to **A** rps and compressor is kept operation at **A** rps as fixed frequency for **B** minutes.

Model	Operation Mode	A rps	B min
FDCW71VNX	Cooling	20	4
	Heating	40	4
FDCW100VNX	Cooling	20	4
	Heating	55	2
FDCW140VNX	Cooling	20	4
	Heating	40	4

2) The pattern 2
[Control condition] The initial start-up of compressor after turning the power source ON
[Control contents] According to the operation mode and the outdoor air temperature (Tho-A), the outdoor unit starts the compressor with the following control.
a) It starts the compressor at 55 rps as target frequency.
b) Compressor acceleration finishes, when pressure difference becomes bigger than 0.34MPa in heating or the low pressure becomes 0.8MPa in cooling.
c) At 30 seconds after starting compressor, the target frequency changes to **A** rps and the compressor is kept operation at **A** rps as fixed frequency for **B** minutes.

Model	Operation Mode	A rps	B min
FDCW71VNX	Cooling	20	10
FDCW100VNX	Cooling	30	10
FDCW140VNX	Cooling	20	10

3) The pattern 3
[Control condition] In case all of the following conditions are fulfilled
a) Restarting the compressor in heating mode after 2 hours or longer stop of compressor.
b) The outdoor air temperature at restart is lower than 0°C.
[Control contents]
a) It starts the compressor at 55rps as target frequency.
b) Compressor acceleration finishes, when pressure difference becomes bigger than 0.34MPa.
c) At 30 seconds after starting compressor, the target frequency changes to **A** rps and the compressor is kept operation at **A** rps as fixed frequency for **B** minutes.

Model	Operation Mode	A rps	B min
FDCW71VNX	Heating	40	15
FDCW100VNX	Heating	40	15
FDCW140VNX	Heating	40	15

Outdoor fan control

＜ FDCW60VNX ＞

1) Relations between Fan speeds and revolutions

			Fan speed (rpm)							
			1st	2nd	3rd	4th	5th	6th	7th	8th
FDCW60VNX	Revolutions	Cooling	150	225	485	520	570	685	740	850
		Heating	150	225	485	520	570	685	800	850

2) Control of fan motor speed

(a) Starting fanmotor speed is fixed by the fanmotor speed excepted below case (i)

(i) Operation mode is “cooling” and Tho-A ＜ 22℃

	Fan speed	Control duration
11℃ ≦ Tho-A ＜ 22℃	2nd	30second after “Compressor ON”
Tho-A ＜ 11℃	1st	30second after “Compressor ON”

If Tho-A changed the condition during 30second, Fan speed does not change.

(ii) Other than case (i)

Follow the table (2).(b)

(b) Control of the fan motor speed in normal mode

		Fan speed (rpm)								
		OFF	1st	2nd	3rd	4th	5th	6th	7th	8th
Compreassor speed	Cooling	0	-	-	-	0-22	22-30	30-58	58-80	80-
(rps)	Heating	0	-	-	-	0-30	30-38	38-78	78-90	90-

※ Fan motor speed down actually delays 60 second from the time that the each change command occurs.
Once the increase command is active even if it is within the above 60 seconds,the fan speed is increased promptly.

※※ When fan motor speed command “OFF” is active, fan motor speed is controlled 0 rpm promptly without delay.

3) Stop fanspeed control.

Fan stop control shows as follows.

① Fan motor stops after fan 6th speed is operated T minutes.

	T (minutes)
Cooling	1min
Heating	1min

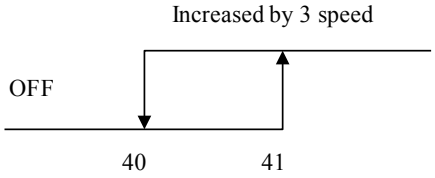
4) Fan speed control during cooling operation

a) Ambient air temperature (Tho-A) is below 25℃ .

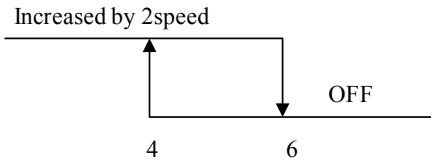
Fan motor speed operates theUp-Down control according to heat exchanger temperature (Tho-R).

Tho-R	Fan speed
Tho-R ≦ 21℃	Decreased by 1 speed
21℃ <Tho-R ≦ 38℃	Retained
38℃ <Tho-R	Increased by 1speed

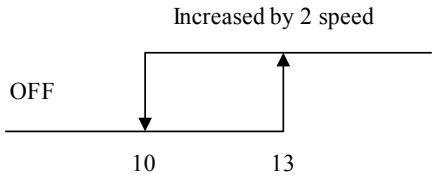
b) Ambient air temperature (Tho-A) is above 41℃ .
Fan motor speed operates the Up control according to ambient air temperature (Tho-A).



5) Fan speed control during heating operation
a) Ambient air temperature (Tho-A) is below 4℃ .
Fan motor speed operates the Up control according to ambient air temperature (Tho-A).



b) Heat exchanger temperature (Tho-R) is above 13℃ .
Fan motor speed operates the Down control according to heat exchanger temperature (Tho-R).



< FDCW71,100,140VNX >

1) Outdoor fan speed

a) Upper limit

According to the relation between the heat exchanger temperature and outdoor air temperature, maximum fan speed is limited as follows.

i) Cooling

FDCW71VNX (rpm)

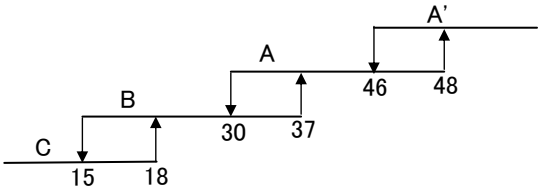
Tho-A / Tho-R	A'	A	B	C
a	850	850	850	710
b	850	850	710	600
c	710	710	600	400
d	600	600	400	200

FDCW100VNX (rpm)

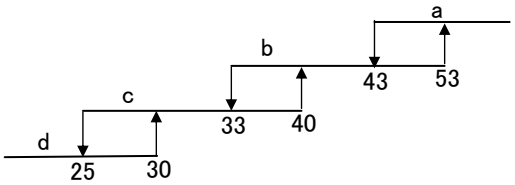
Tho-A / Tho-R	A'	A	B	C
a	820	820	820	740
b	820	820	740	600
c	740	740	600	350
d	600	600	350	200

FDCW140VNX (rpm)

Tho-A / Tho-R	A'	A	B	C
a	745	745	745	640
b	745	745	640	560
c	640	640	560	370
d	560	560	370	200



Outdoor air temperature (°C)



Heat exchenger temperature (°C)

ii) Heating

FDCW71VNX (rpm)

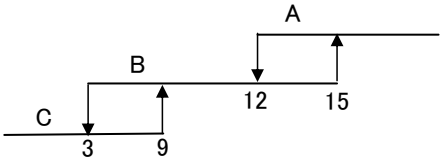
Tho-A / Tho-R	A'	A	B
a	850	850	850
b	850	850	710
c	710	710	600

FDCW100VNX (rpm)

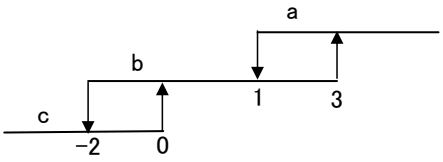
Tho-A / Tho-R	A'	A	B
a	600	600	740
b	600	740	820
c	740	820	870

FDCW140VNX (rpm)

Tho-A / Tho-R	A'	A	B
a	850	850	850
b	850	850	710
c	710	710	600



Outdoor air temperature (°C)



Heat exchenger temperature (°C)

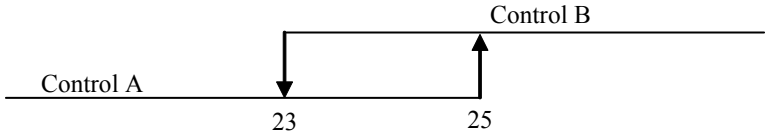
b) Lower limit

Model	Operation Mode	Min.rpm
FDCW71VNX	Cooling	130
	Heating	390
FDCW100VNX	Cooling	130
	Heating	390
FDCW140VNX	Cooling	130
	Heating	370

2) Fan speed control during cooling operation
Fan speed is controlled every 15 seconds according to the outdoor heat exchanger temperature (Tho-R1,-R2), whichever the higher.

Tho-R	Fan speed
Less than 30°C	Reduced by 10 rpm
30°C or higher but 45°C or lower	Retained
Higher than 45°C	Increased by 10 rpm

3) Fan speed control during heating operation
According to the outdoor air temperature (Tho-A), fan speed control is switched between A and B.



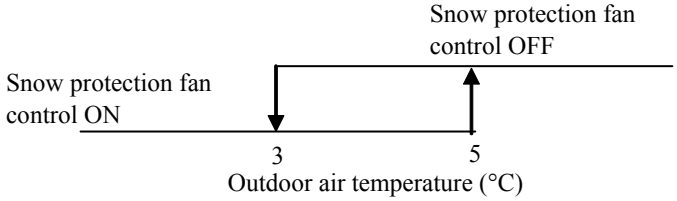
[Control A]
Fan speed is controlled every 15 seconds according to the difference between the outdoor air temperature (Tho-A) and the outdoor heat exchanger temperature (Tho-R1,-R2), whichever the higher.

(Tho-A)-(Tho-R)	Fan speed
Less than 3degC	Reduced by 10 rpm
3degC or more but 6degC or less	Retained
More than 6degC	Increased by 10 rpm

[Control B]
Fan speed is controlled every 15 seconds according to the low pressure (LPT).

LPT	Fan speed
More than 1.1MPa	Reduced by 10 rpm
1.0MPa or more but 1.1MPa or less	Retained
Less than 1.0MPa	Increased by 10 rpm

4) Snow protection fan control
If the DIP switch (SW3-2) on the outdoor control PCB is turned ON, the outdoor fan is operated for 30 seconds at 740 rpm once in every 10 minutes according to outdoor air temperature (Tho-A) shown in below figure in the stop mode or anomalous stop mode.



Silent mode

When outdoor unit receives silent mode signal from indoor unit, silent mode operation starts.
[Control contents]

a) Fan speed upper limits are restricted according to the following table.

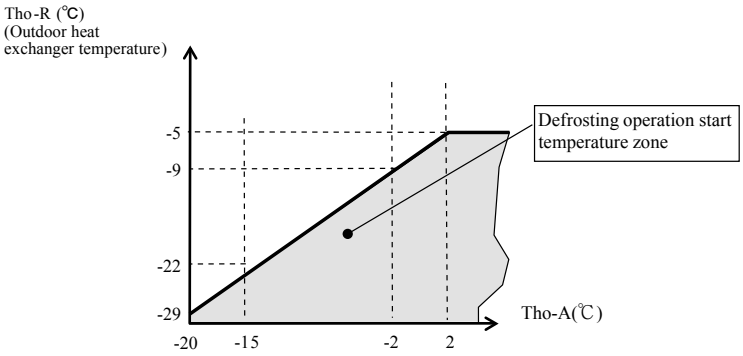
Model	Operation Mode	Max speed (rpm)
FDCW60VNX	Heating / Cooling	570
FDCW71VNX	Heating	600
FDCW100VNX	Heating	600
FDCW140VNX	Heating	560

∗ Compressor speed limits are also restricted by indoor unit control command.

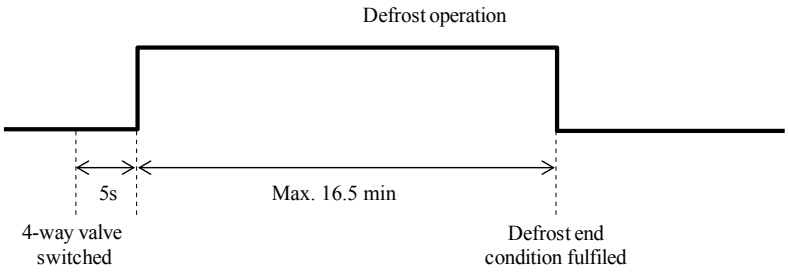
Defrosting

＜ FDCW60VNX ＞

1) Defrosting start conditions
Deafrosting operation can be started only when all of the following condition are met.
a) After start of heat operation
When it elapsed 35 minutes.(Accumulated compressor operating time)
b) After end of defrosting operation
When it elapsed 35 minutes.(Accumulated compressor operation time)
c) Outdoor heat exchanger sensor (Tho-R) temperature
When the temperature has been below -5 ℃ for 3 minutes continuously.
d) The difference between the outdoor air sensor temperature and the outdoor heat exchanger sensor temperature (Tho-A - Tho-R) fulfils the following condition.
・ Tho-A - Tho-R ≧ 7℃

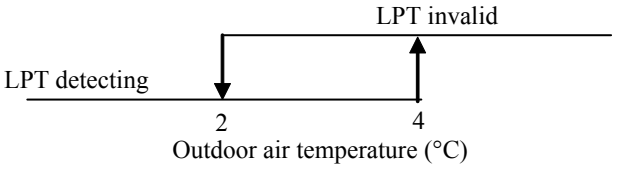


2) Defrosting end conditions
Deafrosting end condition is fullfiled when either one of the following is met.
a) Outdoor heat exchanger sensor (Tho-R) temperature:10℃ or higher
b) Control operation time of defrosting →When 16min 35sec has passed since 4-way valve is switched.



< FDCW71,100,140VNX >

1) Defrosting start conditions
If all of the following defrosting condition A or condition B are met, the defrosting operation starts.
For model 140, SV1 is open when 4-way valve switches, and closed when low pressure keeps 0.55MPa or higher for 5 seconds or longer.
a) Defrosting conditions A
i) Cumulative compressor operation time after the end of defrosting has elapsed 37 [45] minutes (15 minutes in case the previous defrost operation is forcibly finished by indoor unit protection control) and the cumulative compressor operation time after the start of heating operation has elapsed 30 minutes
ii) After 5 minutes from the compressor ON.
iii) After 5 minutes from the start of outdoor fan.
iv) After satisfying all above conditions, if the outdoor heat exchanger temperature (Tho-R1, Tho-R2, whichever the lower) and the outdoor air temperature (Tho-A) become lower than the defrosting start temperature as shown in Fig 4-1 for 15 seconds continuously. Or suction gas saturated temperature (SST), which is detected by the low pressure sensor (LPT), and the outdoor air temperature (Tho-A) stay for 3 minutes within the temperature range lower than the defrosting operation start temperature as shown Fig 4-2. However it is not effective during 10 minutes after the start of compressor and if the outdoor air temperature is within the range of LPT invalid as shown in below figure.



Model 71-140

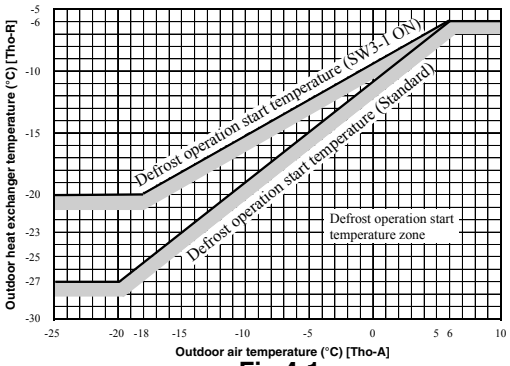


Fig 4-1

Model 71-140

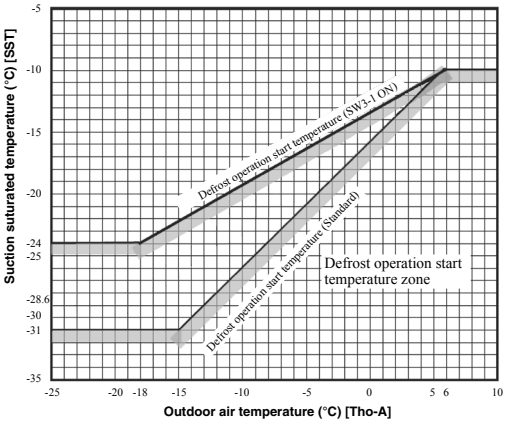


Fig 4-2

Note: Figure in [ ] is for model 71.

b) Defrosting conditions B
i) If the previous defrosting was ended compulsorily due to the time out of defrosting operation period and cumulative compressor operation time after the end of defrosting has elapsed 30 minutes and operation mode is kept heating.
ii) After 5 minutes from the compressor ON.
iii) After 5 minutes from the start of outdoor fan.

2) Defrosting end conditions
When any of following conditions is satisfied, the defrosting operation is ended.
a) When it has elapsed 8 minutes and 20 seconds after the start of defrosting. (After 10 minutes and 20 seconds for model 71)
b) When the outdoor heat exchanger temperatures (Tho-R1, Tho-R2) , whichever the lower, becomes 12°C or higher continuously for 10 seconds.

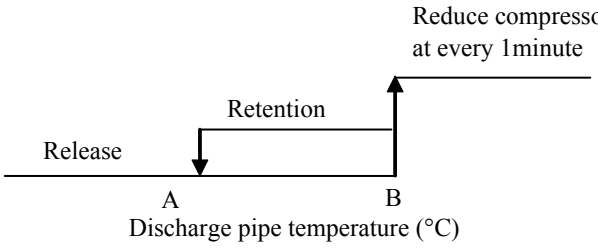
3) Switching of defrosting control with SW3-1
a) If the DIP switch SW3-1 on the outdoor control PCB is turned ON, it makes earlier to enter the defrosting operation. Use this function, if installing the unit in snowing region.
b) Control contents
i) It allows entering defrosting operation under the defrosting condition A when the cumulative heating operation time has elapsed 30 minutes. It is 37 [45] minutes at SW3-1 OFF (factory default)
ii) It allows entering defrosting operation under the defrosting condition B when the cumulative heating operation time has elapsed 20 minutes. It is 30 minutes at SW3-1 OFF (factory default)
iii) It allows entering defrosting operation when the outdoor heat exchanger temperature (Tho-R) and the suction pressure saturated temperature (SST) are higher than normal.
Note (1) Figure in [ ] is for model 71.

Protective control/ anomalous stop control by compressor speed (frequency)

1) Compressor discharge pipe temperature protection

a) Protective control

If the discharge pipe temperature (detected with Tho-D) exceed the setting value, the compressor speed (frequency) is controlled in order to suppress the rise of discharge pipe temperature.



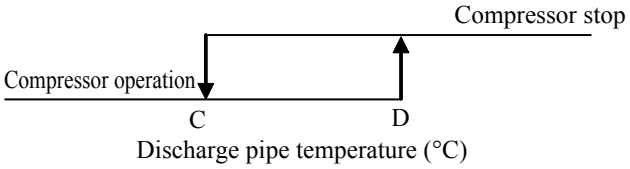
Model	A℃	B℃
FDCW60VNX	95	105
FDCW71, 100VNX	100	105
FDCW140VNX	95	100

Note (1) Figures in [ ] are for model 140.

b) Anomalous stop control

i) If the discharge pipe temperature (detected with Tho-D) exceed the setting value, the compressor stops.

ii) When the discharge pipe temperature anomaly is detected 2 times within 60 minutes or 60 minutes continuously including the time of compressor stopping, discharge pipe temperature error is displayed and E36 is recorded in Error Log and it enters the anomalous stop mode.



Model	C℃	D℃
FDCW60VNX	95	115
FDCW71, 100, 140VNX	85	115

c) Reset of anomalous stop mode

When the discharge pipe temperature drops to the reset value of E°C or lower for F minutes continuously, it becomes possible to restart from control.

Model	FDCW60VNX	FDCW71VNX	FDCW100VNX	FDCW140VNX
E ℃	95	85	85	85
F minutes	Immediately	45	45	45

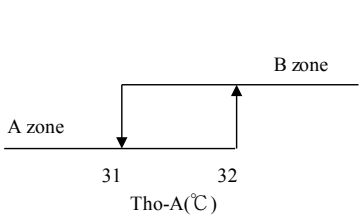
2) Cooling high pressure protection

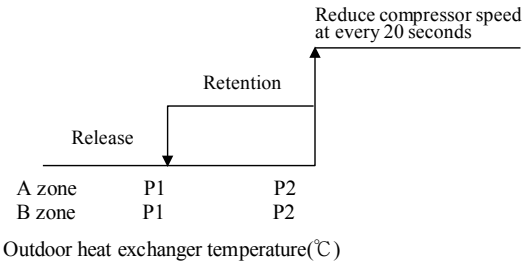
＜ FDCW60VNX ＞

a) Protective control

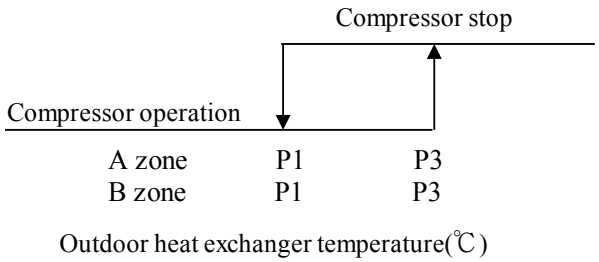
i) When the outdoor heat exchanger temperature (Tho-R) exceeds setting value that be changed by outdoor air temperature,the compressor speed (frequency) is controlled in order to suppress the rise of high pressure.

Model		FDCW60VNX	
		A zone	B zone
Cooling mode	P1	51	53
	P2	53	58
	P3	56	63





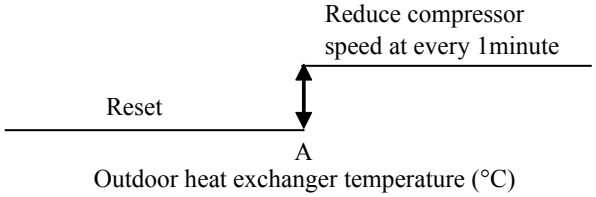
b) Anomalous stop control
   i) If the outdoor heat exchanger temperature (Tho-R) exceeds the setting value, the compressor stop.
   ii) Whe n the outdoor heat exchanger temperature anomaly is detected 5times within 60 minutes, or 60 minutes continuously including the time of compressor stopping, coolinf overload error is displayed and E35 is recorded in the Error Log and it enters the anomalous stop mode.



c) Reset of anomalous stop mode
   When the outdoor heat exchanger temperature drops to the reset value P3 ℃ or lower, it becomes possible to restart from the control.

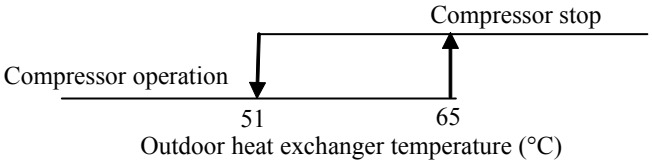
＜ FDCW71, 100, 140VNX ＞

a) Protective control
   i) When the outdoor air temperature (Tho-A) is 40°C or higher and the outdoor heat exchanger temperature (Tho-R) exceeds setting value, the compressor speed (frequency) is controlled in order to suppress the rise of high pressure.
   ii) The control value A is updated to an optimum value automatically according to the operating conditions.



Control value A
54-60°C

b) Anomalous stop control
   i) If the outdoor heat exchanger temperature (Tho-R) exceeds the setting value, the compressor stops.
   ii) When the outdoor heat exchanger temperature anomaly is detected 5 times within 60 minutes, or 60 minutes continuously including the time of compressor stopping, cooling overload error is displayed and E35 is recorded in the Error Log and it enters the anomalous stop mode.



c) Reset of anomalous stop mode
   When the outdoor heat exchanger temperature drops to the reset value of 51°C or lower, it becomes possible to restart from the control.

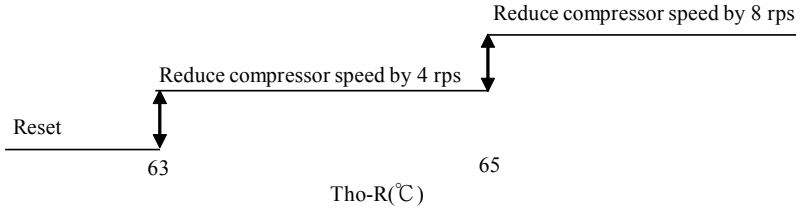
3) Heating high pressure protection

＜ FDCW60VNX ＞

a) Protective control

If the liquid line temperature of water heat exchanger (BT15=Thi-L) or the condensing saturated temperature (CST), whichever the higher.

Exceeds the setting value, the compressor speed (frequency) is controlled at every 10 seconds to suppress the rise of high pressure.

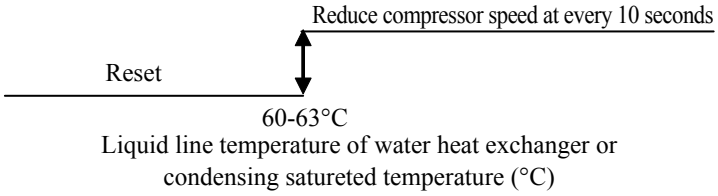


＜ FDCW71, 100, 140VNX ＞

a) Protective control

i) If the liquid line temperature of water heat exchanger (BT15=Thi-L) or the condensing saturated temperature (CST), whichever the higher, exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of high pressure.

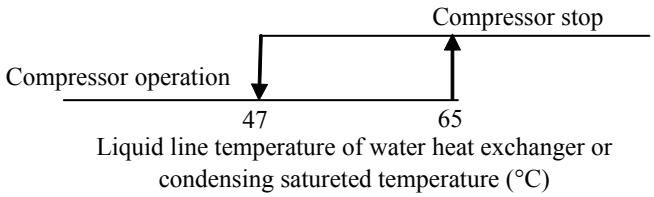
ii) Control value A is updated to an optimum value automatically according to the operating conditions.



b) Anomalous stop control

If the liquid line temperature of water heat exchanger (BT15=Thi-L) or the condensing saturated temperature (CST), whichever the higher, exceeds the setting value for 2 seconds, compressor stops.

The compressor automatically restarts when the temperature gets 47°C or lower.



4) Anomaly detection control by the high pressure switch (63H1)

i) If the high pressure rises and activates the high pressure switch (opens at 4.15MPa/close at 3.15MPa), the compressor stops.

ii) Under any of following conditions, HP alarm is displayed and E40 is recorded in the Error Log, and it enters the anomalous stop mode.

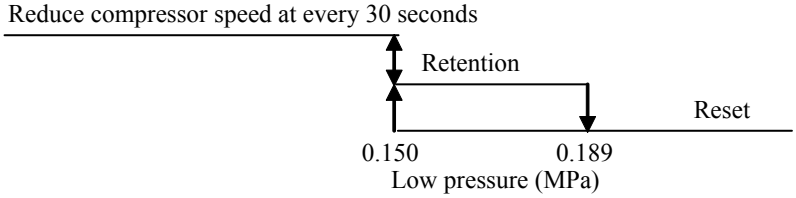
① When high pressure exceeds the setting value and the compressor is stopped by 63H1 5 times. within 60 minutes.

② When 63H1 has been in the open state for 60 minutes continuously including the time of compressor stopping.

5) Low pressure control

a) Protective control

If the value detected by the low pressure sensor (LTP) exceeds the setting value, the compressor speed (frequency) is controlled to restrain the drop of pressure.



b) Anomalous stop control
i) When a value detected by the low pressure sensor (LPT) satisfies any of the following conditions, compressor stops.
① When the low pressure drops to 0.079MPa or lower for 15 seconds continuously.
ii) Under any of the following conditions, LP alarm is displayed and E49 is recorded in Error Log, and it enters the anomalous stop mode.
① When the low pressure drops and the compressor stops under any of above conditions 3 times within 60 minutes.
② When the low pressure sensor detects 0.079MPa for 5 minutes continuously including the time of compressor stopping
③ However, when the control condition ① is established during the control of the compressor protection start Ⅲ, LP alarm is displayed and E49 is recorded in Error Log at the first stop of compressor and it enters the anomalous stop mode.

6) Overcurrent protection

＜ FDCW60VNX ＞

When the inverter primary current (CT current) reaches following value, the compressor speed is reduced until it gets to the cancellation value.

Operation mode	Current (A)
Cooling	11.5
Heating	13.5

＜ FDCW71, 100, 140VNX ＞

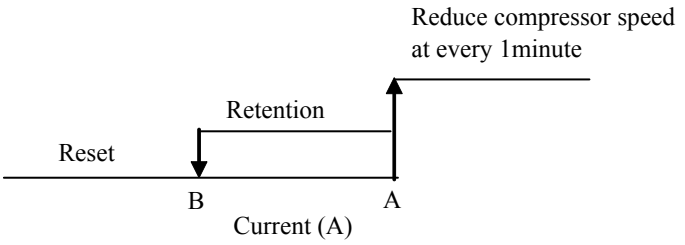
a) Current safe control I

When the inverter primary current (CT current) reaches following value, the compressor speed is reduced until it gets to the cancellation value.

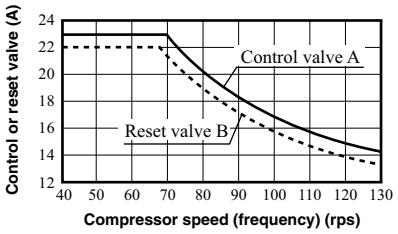
Model	Operation Mode	Current (A)
FDCW71VNX	Cooling	15
	Heating	16
FDCW100VNX	Cooling	17
	Heating	17
FDCW140VNX	Cooling	23
	Heating	25

b) Current safe control II

Detecting the outdoor inverter output (secondary side) current, if the current values exceed setting values, the compressor speed (frequency) is controlled in order to protect the inverter.



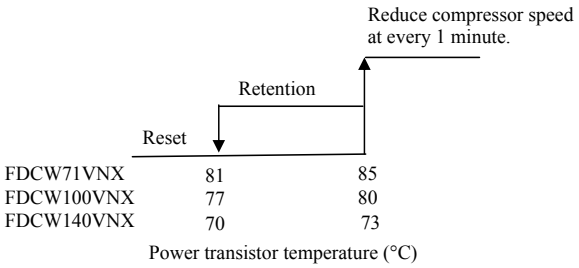
(Fig. C) The control value "A" and the reset value vary depending on the compressor speed.



Model	Cooling		Heating	
	Control value A	Reset value B	Control value A	Reset value B
FDCW71VNX	13	12	13	12
FDCW100VNX	Fig. C	Fig. C	Fig. C	Fig. C
FDCW140VNX				

7) Power transistor temperature control

This control monitors the power transistor temperature (TIP) from the start operation of compressor, and when the following condition is established, compressor speed (frequency) is controlled.



8) Anomalous power transistor current
   a) If the current value of power transistor exceeds the setting value, the compressor stops in order to prevent from overcurrent of inverter.
   b) When the current value of power transistor exceeds the specified value and compressor stops 4 times within 30 minutes, Inverter error is displayed and E42 is recorded in the Error Log. And it enters the anomalous stop mode.

9) Anomalous inverter PCB
   If the power transistor detects any anomaly for 15 minutes including the time of compressor stopping, Inverter error is displayed and E51 is recorded in the Erro Log, and it enters the anomalous stop mode.

10) Anti-freeze control by the compressor frequency control
    It depends on the command from indoor unit

11) Refrigerant amount shortage protection
    Under the control of compressor protection start Ⅲ during cooling operation, the following control is performed by detecting the liquid line temperature of indoor unit (BT15=Thi-L) and inlet water temperature (BT3=Twin).
    [Control condition] When the state that the temperature of indoor unit water heat exchanger (Thi-R=Thi-L) does not become lower than the inlet water temperature (BT3=Twin) by 4°C or more for 1 minute continuously.
    [Control contents] It judges that the flowing of refrigerant into the indoor unit is insufficient so that the compressor is stopped and insufficient refrigerant amount error is displayed and E57 is recorded in the Error Log.

12) Broken wire detection on temperature sensor and low pressure sensor
   a) Outdoor heat exchanger temperature sensor, outdoor air temperature sensor and low pressure sensor, which be not included in FDCW60VNX.
      If the following is detected for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, the compressor restarts but if the same anomaly is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop mode.
      ・Outdoor heat exchanger temperature sensor (Tho-R1, R2): -50°C or lower
      ・Outdoor air temperature sensor (Tho-A): -30°C or lower
      ・Low pressure sensor (LPT): 0 Volt or lower, or 3.49 Volt or higher
      Note : During defrosting operation and for 3 minutes after the end of defrosting operation, this control is not performed.
   b) Discharge pipe temperature sensor, suction pipe temperature sensor, which be not included in FDCW60VNX.
      If the following is detected for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, the compressor restarts but if the same anomaly is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop mode.
      ・Discharge pipe temperature sensor (Tho-D): -10°C or lower
      ・Suction pipe temperature sensor (Tho-S): -50°C or lower
      Note : During defrosting operation and for 3 minutes after the end of defrosting operation, this control is not performed.

13) Fan motor error
   a) If the outdoor fan speed is detected A rpm or lower for 30 seconds continuously under the outdoor fan control mode (with the operation command of fan speed 390 rpm or higher), the compressor stops.
   b) When the outdoor fan speed drops to A rpm or lower 5 times within 60 minutes and the compressor stops, Fan alarm is displayed and E48 is recorded in the Error Log and it enters the anomalous stop mode.

Model	FDCW60VNX	FDCW71VNX	FDCW100VNX	FDCW140VNX
A rpm	75	100	100	100

14) Anomalous stop by the compressor start/stop

＜ FDCW60VNX ＞

   a) When it fails to shift to the rotor position detection operation of compressor DC motor during 5 seconds after establishing the compressor start condition, the compressor stops temporarily and restarts 3 minutes later.

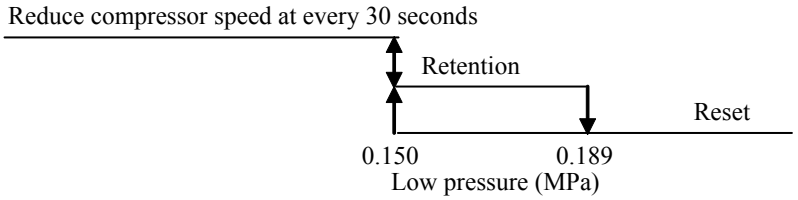
＜ FDCW71, 100, 140VNX ＞

   a) When it fails to shift to the rotor position detection operation of compressor DC motor during 5 seconds after establishing the compressor start condition, the compressor stops temporarily and restarts 3 minutes later.
   b) If it fails to shift to the rotor position detection operation again at second time, it judged the anomalous compressor start and the compressor stops. Compressor startup failure is displayed and E59 is recorded in the Error Log and it enters the anomalous stop mode.

＜ FDCW71, 100, 140VNX ＞

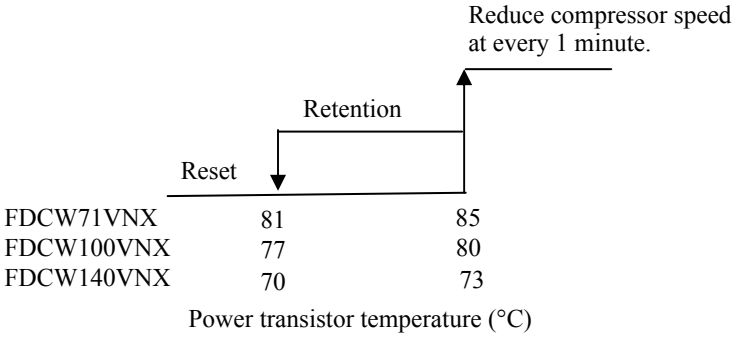
1) Anomaly detection control by the high pressure switch (63H1)
   i) If the high pressure rises and activates the high pressure switch (opens at 4.15MPa/close at 3.15MPa), the compressor stops.
   ii) Under any of following conditions, HP alarm is displayed and E40 is recorded in the Error Log, and it enters the anomalous stop mode.
      ① When high pressure exceeds the setting value and the compressor is stopped by 63H1 5 times. within 60 minutes.
      ② When 63H1 has been in the open state for 60 minutes continuously including the time of compressor stopping.

2) Low pressure control
   a) Protective control
   If the value detected by the low pressure sensor (LTP) exceeds the setting value, the compressor speed (frequency) is controlled to restrain the drop of pressure.



   b) Anomalous stop control
      i) When a value detected by the low pressure sensor (LPT) satisfies any of the following conditions, compressor stops.
         ① When the low pressure drops to 0.079MPa or lower for 15 seconds continuously.
      ii) Under any of the following conditions, LP alarm is displayed and E49 is recorded in Error Log, and it enters the anomalous stop mode.
         ① When the low pressure drops and the compressor stops under any of above conditions 3 times within 60 minutes.
         ② When the low pressure sensor detects 0.079MPa for 5 minutes continuously including the time of compressor stopping
         ③ However, when the control condition ① is established during the control of the compressor protection start Ⅲ , LP alarm is displayed and E49 is recorded in Error Log at the first stop of compressor and it enters the anomalous stop mode.

3) Power transistor temperature control
   This control monitors the power transistor temperature (TIP) from the start operation of compressor, and when the following condition is established, compressor speed (frequency) is controlled.



4) Refrigerant amount shortage protection
   Under the control of compressor protection start Ⅲ during cooling operation, the following control is performed by detecting the liquid line temperature of indoor unit (BT15=Thi-L) and inlet water temperature (BT3=Twin).
   [Control condition] When the state that the temperature of indoor unit water heat exchanger (Thi-R=Thi-L) does not become lower than the inlet water temperature (BT3=Twin) by 4°C or more for 1 minute continuously.
   [Control contents] It judges that the flowing of refrigerant into the indoor unit is insufficient so that the compressor is stopped and insufficient refrigerant amount error is displayed and E57 is recorded in the Error Log.

Pump-down control

＜ FDCW71, 100, 140VNX ＞

It is possible to recover the refrigerant on the piping into the outdoor unit by this function.
Pump-down operation starts when the following conditions are fulfilled.

a) Within ten minutes since the operation mode is changed to Add heat. only mode.
b) SW1 [SW9] on the outdoor unit PCB is pressed for 2 seconds.
[Note]
Pump-down operation doesn't start even though SW1 [SW9] is pressed for 2 seconds, if more than 10 minutes has elapsed since the mode is changed to Add heat. only.
In that case, change the mode other than Add heat. only and set again.
Note (1) Figure in [ ] is for model 71.

1) Control contents
   a) Close the service valve at the liquid side, (the service valve at gas side should be left open.)
   b) The compressor is started with the target speed (frequency) at **A**rps in cooling mode.

Model	A rps
FDCW71VNX	62
FDCW100VNX	55
FDCW140VNX	45

   c) Red and green lamps (LED) flash continuously on the outdoor control PCB.
   d) Each of protection and error detection controls, excluding the low pressure control, is effective.
   e) Outdoor fan is controlled as usual.
   f) Electronic expansion valve is fully opened.

2) Control ending conditions
   Stop control is initiated depending on any of following conditions
   a) Low pressure of 0.087MPa or lower is detected for 5 seconds continuously.
      i) Red LED: stays lighting, Green LED: keeps flashing
      ii) It is possible to restart when the low pressure is 0.087MPa or higher.
      iii) Electronic expansion valve (cooling/heating) is kept fully open.

   b) Stop by the error detection control
      i) Red LED: keeps flashing, Green LED: keeps flashing
      ii) Restarting is prohibited. To return to normal operation, reset the power source.
      iii) Electronic expansion valve (cooling/heating) is kept fully open.

   c) When cumulative operation time of compressor under the pump-down control is elapsed 5 minutes.
      i) Red LED: stays OFF, Green LED: keeps flashing
      ii) It is possible to pump-down again.
      iii) Electronic expansion valve (cooling/heating) is kept fully open.

      Note : After the stop of compressor, close the service valve at the gas side.

Alarm list

Alarm with automatic reset

Alarm No.	Alarm text on the display	Triggers alarm	Resets alarm
157	Low lp cooling	When the low pressure is less than 0.65MPa in cooling mode.	When the low pressure is higher than 0.83MPa and condenser supply (BT12) is greater than 14℃ .
162	High condenser out temperature	When condenser supply (BT12) is greater than 60℃ .	When condenser supply (BT12) is lower than 58℃ .
163	High condenser in temperature	When condenser return (BT3) is greater than 55℃ .	When condenser return (BT3) is lower than 53℃ .
183	Defrosting in progress	During defrost operation	
271	Lw otd tmp	When outdoor air temperature is lower than -20℃ in heating mode.	When outdoor air temperature is higher than -19℃ for more than 1h in heating mode.
		When outdoor air temperature is lower than 15℃ in cooling mode.	When outdoor air temperature is higher than 16℃ for more than 1h in cooling mode.
272	High otd tmp	When outdoor air temperature is higher than 43℃ .	When outdoor air temperature is lower than 42℃ .
343	Low temp water out	When condenser supply (BT12) is less than 5℃ in cooling mode.	When condenser supply (BT12) is greater than 14℃ .
		When condenser supply (BT12) is less than 10℃ in tank defrost mode.	When tank defrost is stopped.
347	Temp high press	When the high pressure is greater than 4.15MPa.	When the high pressure is lower than 3.15MPa.
418	Low temp water out	When the temperature difference between BT12 and BT3 is bigger than threshold during tank defrost.	After compressor stop and when temperature difference between BT12 and BT3 is below threshold.
419	Freeze prot. exch. defr.	When low pressure (BP4) and condenser return (BT3) are below threshold.	After compressor stop

Indoor unit alarm

Alarm No.	Alarm text on the display	Description	May be due to
220	High pressure alarm	The high pressure switch (63H1) deployed 5 times within 60 minutes. 2HP model: BP4 has been above 4,15MPa 5 times within 60 minutes.	- Insufficient air circulation or blocked heat exchanger - Open circuit or short circuit on input for high pressure switch (63H1) - Defective high pressure switch - Expansion valve not correctly connected - Service valve closed - Defective control board in FDCW - Low or no flow during heating operation - Defective circulation pump - Defective fuse, F(4A)
228	Failed defrosting	10 aborted defrost due to alarm: 418,419 or 343	- Too low water flow - Too low return temperatur
294	Incompatible heat pump	Heat pump and indoor module do not work properly together due to technical parameters.	- Outdoor module and indoor module are not compatible.
403	Sensor fault from PCA 154	Sensor fault, Sensor incoming water in HSB and HMK (BT3).	- Open circuit or short circuit on sensor input - Sensor does not work (see section"Disturbances in comfort") - Defective control board AA23 in indoor unit.
404	Sensor fault from PCA 154	Sensor fault, Sensor high pressure heating/ low pressure cooling in HSB and HMK (BP4).	- Open circuit or short circuit on sensor input - Sensor does not work (see section "Disturbances in comfort") Defective control board AA23 in indoor unit.
412	Sensor fault from PCA 154	Sensor fault, Sensor outgoing water in HSB and HMK (BT12).	- Open circuit or short circuit on sensor input - Sensor does not work (see section "Disturbances in comfort") - Defective control board AA23 in indoor unit.
415	Sensor fault from PCA 154	Sensor fault, Sensor fluid pipe in HSB and HMK (BT15).	- Open circuit or short circuit on sensor input - Sensor does not work (see section "Disturbances in comfort") - Defective control board AA23 in indoor unit.

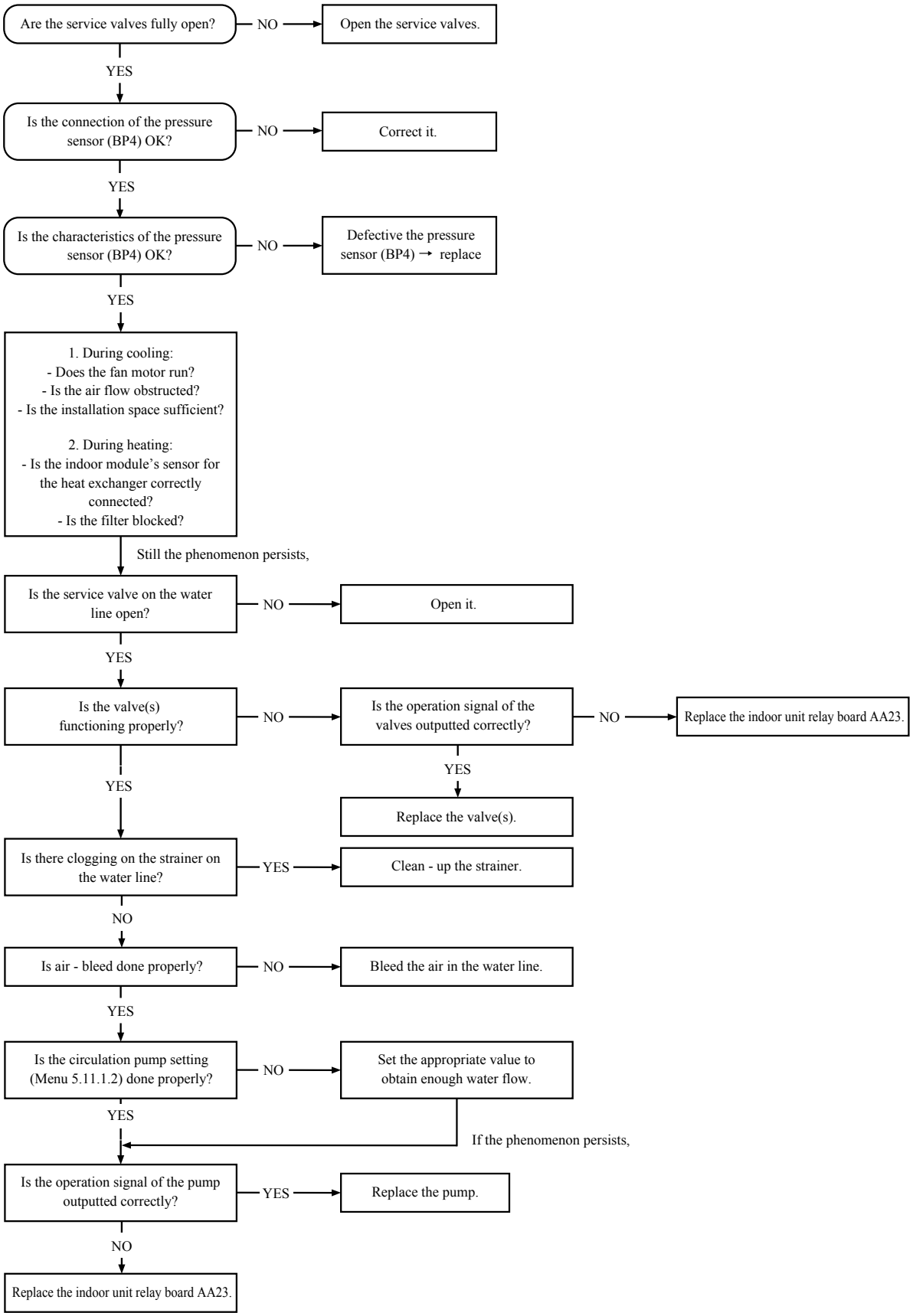
Outdoor unit alarm

Alarm No.	Alarm text on the display	Description	May be due to
E5	Com. flt from the heat pump	Communication between the control board and the communication board is interrupted. There must be 22 Volt direct current (DC) at the switch CNW2 on the control board (PCB1).	- Any circuit breakers for FDCW off - Incorrect cable routing
E35	High HWX temp	Temperature deviation on the heat exchanger sensor (Tho-R1/R2) five times within 60 minutes or for 60 minutes continuously.	- Sensor does not work (see section "Disturbances in comfort") - Insufficient air circulation or blocked heat exchanger - Defective control board in FDCW - Too much refrigerant
E36	Hot gas alarm	Temperature deviation on the hot gas sensor (Tho-D) twice within 60 minutes or for 60 minutes continuously.	- Sensor does not work (see section "Ambient temperature sensor") - Insufficient air circulation or heat exchanger - Blocked - If the fault persists during cooling, there may be an insufficient amount of refrigerant. - Defective control board in FDCW
E37	Sensor fault from heat pump	Sensor fault, heat exchanger in FDCW(Tho-R).	- Open circuit or short circuit on sensor input - Sensor does not work (see section "Disturbances in comfort") - Defective control board in FDCW
E38	Sensor fault from heat pump	Sensor fault, outdoor temperature sensor in FDCW (Tho-A).	- Open circuit or short circuit on sensor input - Sensor does not work (see section "Disturbances in comfort") - Defective control board in FDCW
E39	Sensor fault from heat pump	Sensor fault, hot gas in FDCW (Tho-D).	- Open circuit or short circuit on sensor input - Sensor does not work (see section "Disturbances in comfort") - Defective control board in FDCW
E40	High pressure alarm	The high pressure switch (63H1) deployed 5 times within 60 minutes. 2HP model: BP4 has been above 4,15MPa 5 times within 60 minutes.	- Insufficient air circulation or blocked heat exchanger - Open circuit or short circuit on input for high pressure switch (63H1) - Defective high pressure switch - Expansion valve not correctly connected - Service valve closed - Defective control board in FDCW - Low or no flow during heating operation - Defective circulation pump - Defective fuse, F(4A)
E41	Inv. err.	When IPM (Intelligent power module) displays FO-signal (Fault Output) five times during a 60-minute period.	Can occur when 15V power source to the inverter PCB is unstable.
E42	Inv. err.	Voltage from the inverter outside the parameters four times within 30 minutes.	- Incoming power source interference - Service valve closed - Insufficient amount of refrigerant - Compressor fault - Defective circuit board for inverter in FDCW

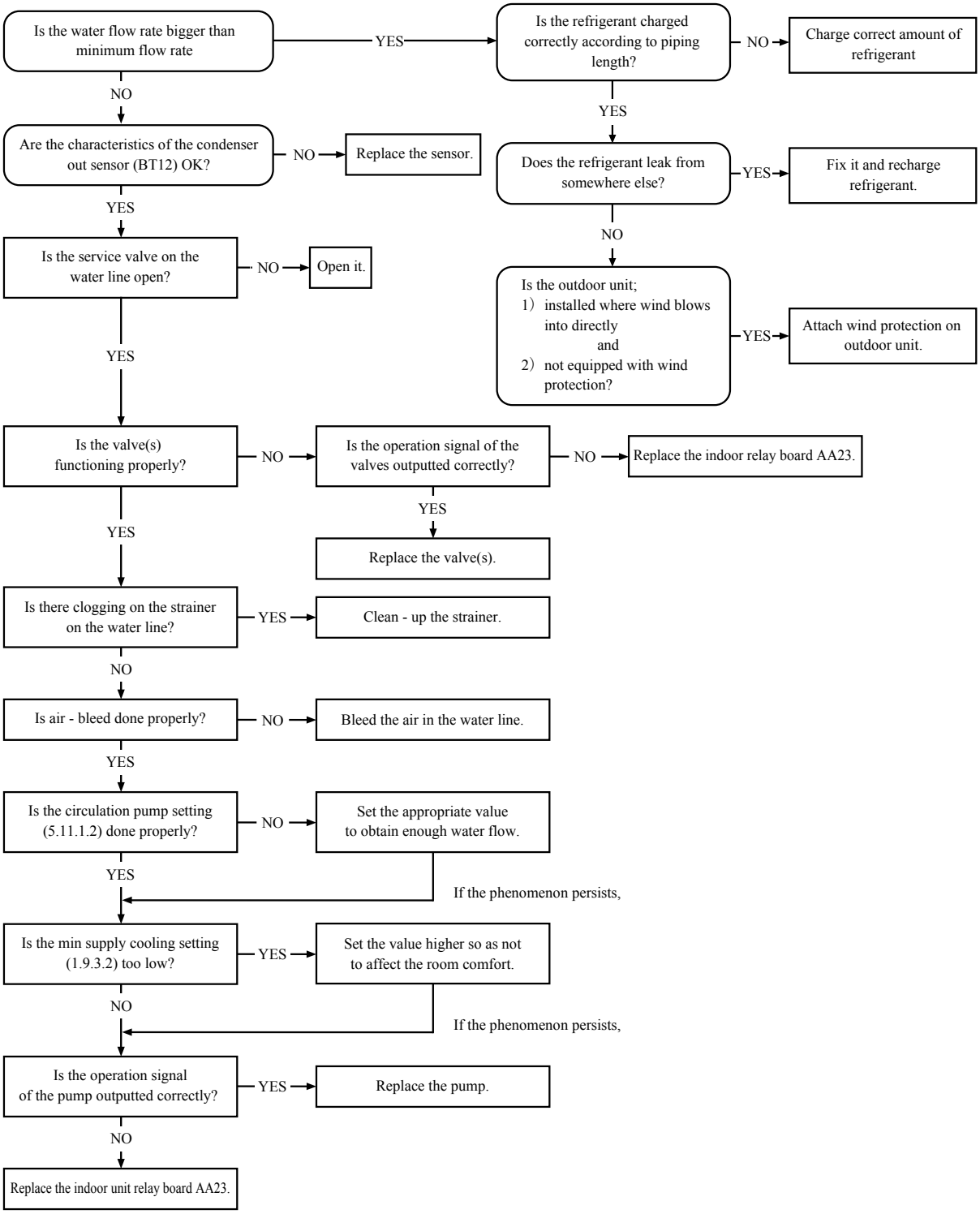
Alarm No.	Alarm text on the display	Description	May be due to
E45	Communication error with Inverter.	Communication between circuit board for inverter and control board broken.	- Open circuit in connection between boards - Defective circuit board for inverter in FDCW - Defective control board in FDCW
E47	Inv. err.	Overcurrent, Inverter A/F module	- Sudden power failure
E48	Fan alarm from heat pump	Deviations in the fan speed in FDCW.	- The fan cannot rotate freely - Defective control board in FDCW - Defective fan motor - Control board in FDCW dirty - Fuse (F2) blown
E49	Low pressure alarm	Too low value on the low pressure sensor 3 times within 60 minutes.	- Open circuit or short circuit on input for low pressure sensor - Defective low pressure sensor - Defective control board in FDCW - Open circuit or short circuit on input for suction gas sensor (Tho-S) - Defective suction gas sensor (Tho-S)
E51	Inv. err.	Continuous deviation on power transistor for 15 minutes.	- Defective fan motor - Defective circuit board for inverter in FDCW
E53	Sensor fault from heat pump.	Sensor fault, suction gas in FDCW (Tho-S).	- Open circuit or short circuit on sensor input - Sensor does not work (see section "Disturbances in comfort") - Defective control board in FDCW
E54	Sensor fault from heat pump	Sensor fault, low pressure transmitter in FDCW.	- Open circuit or short circuit on sensor input - Sensor does not work (see section "Disturbances in comfort") - Defective control board in FDCW - Fault in the refrigerant circuit
E57	Low refrig.	Insufficient refrigerant is detected upon start-up in cooling mode.	- Service valve closed - Loose connection sensor (BT15, BT3) - Defective sensor (BT15, BT3) - Too little refrigerant
E59	Inv. err.	Failed start for compressor	- Defective circuit board for inverter in FDCW - Defective control board in FDCW - Compressor fault

Troubleshooting guide

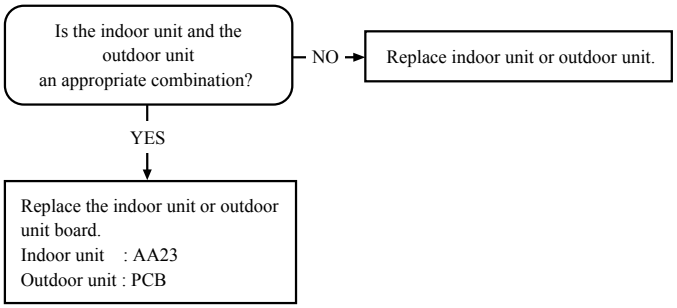
220 - High pressure alarm



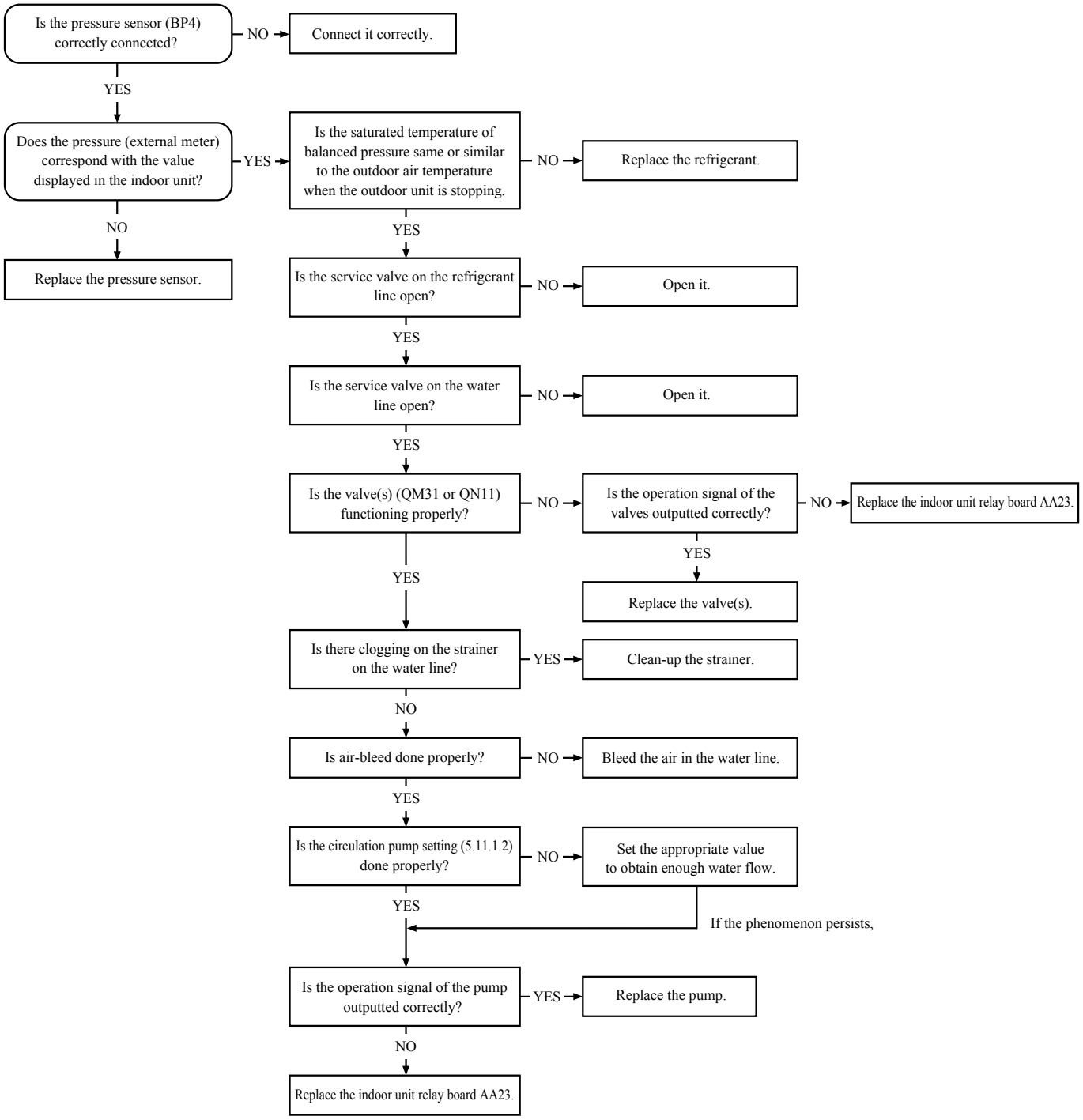
228 - Failed defrosting



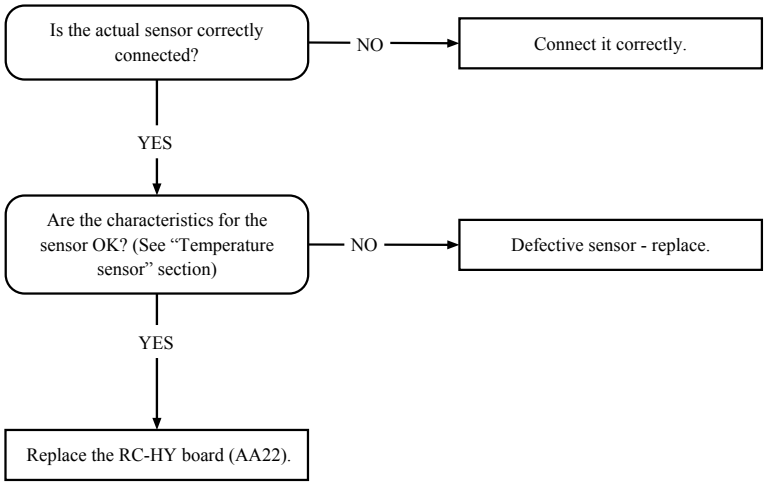
294 - Incompatible heat pump



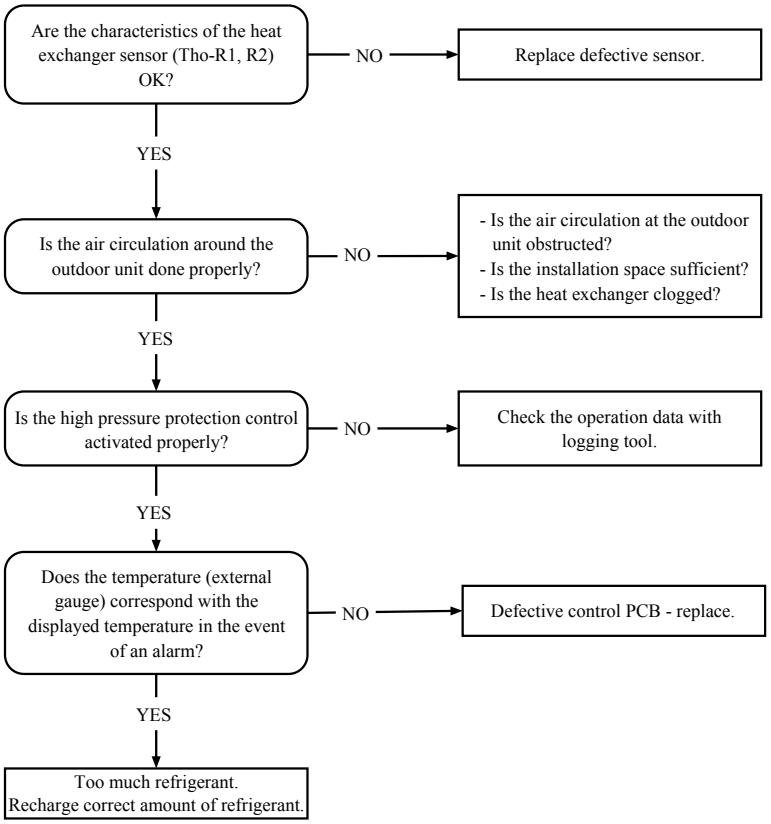
404 - S. fault HP



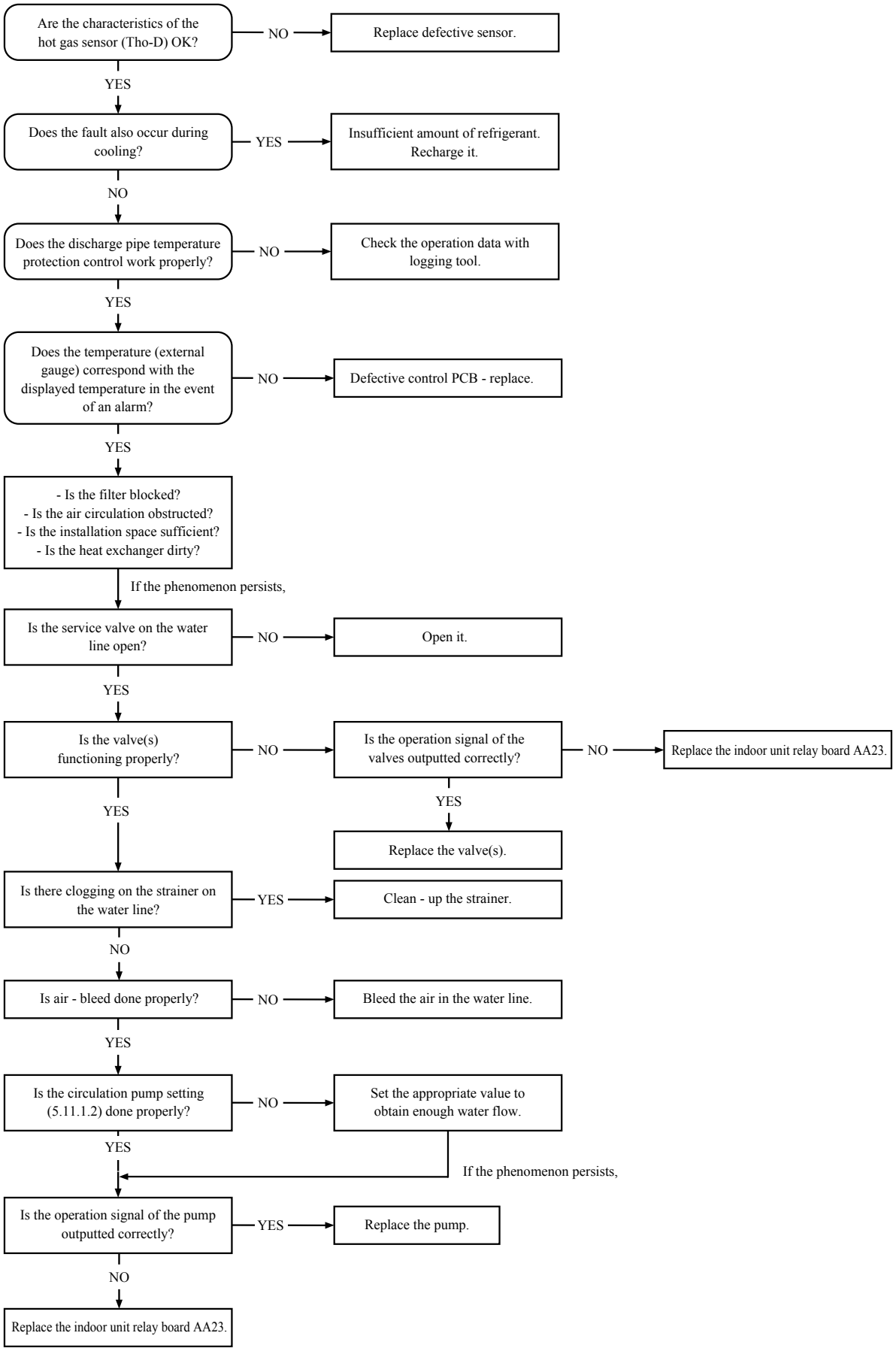
403, 412, 415, - Sensor fault from PCA154



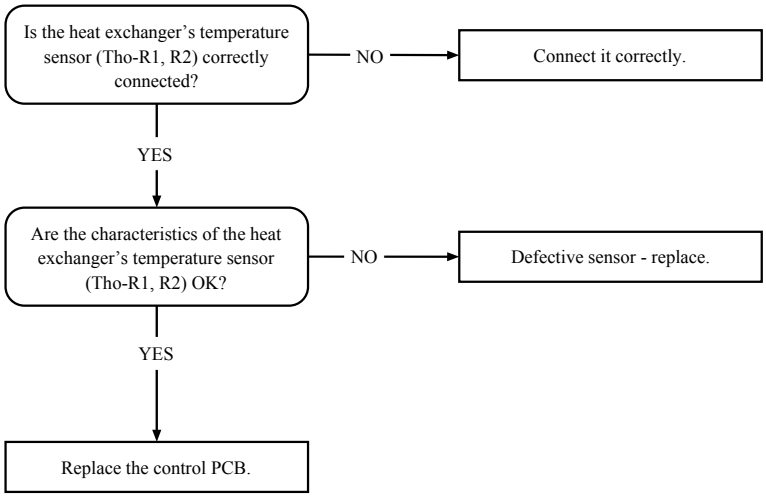
E35 - High HX temp



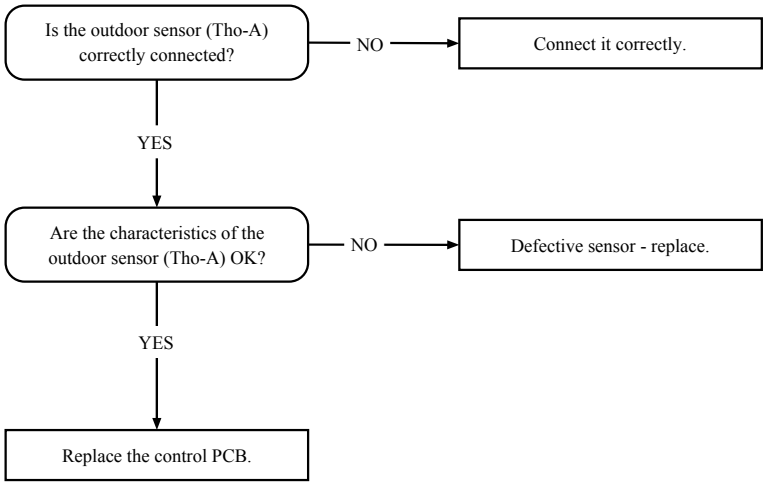
E36 - Hot gas alarm



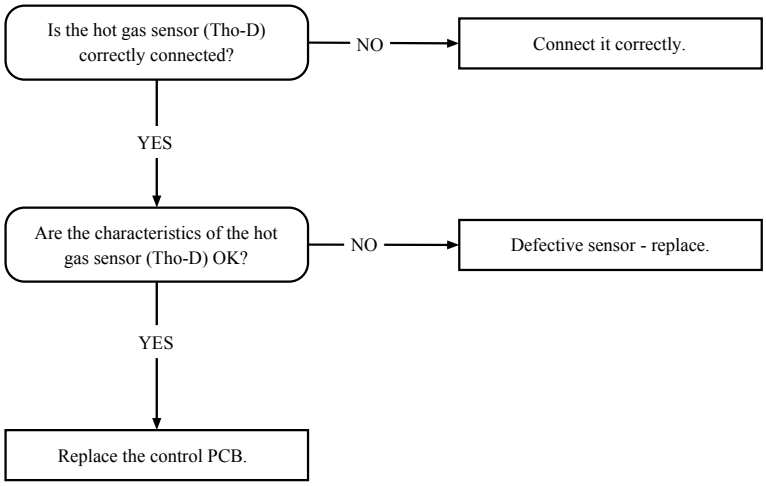
E37 - S. fault Tho-R



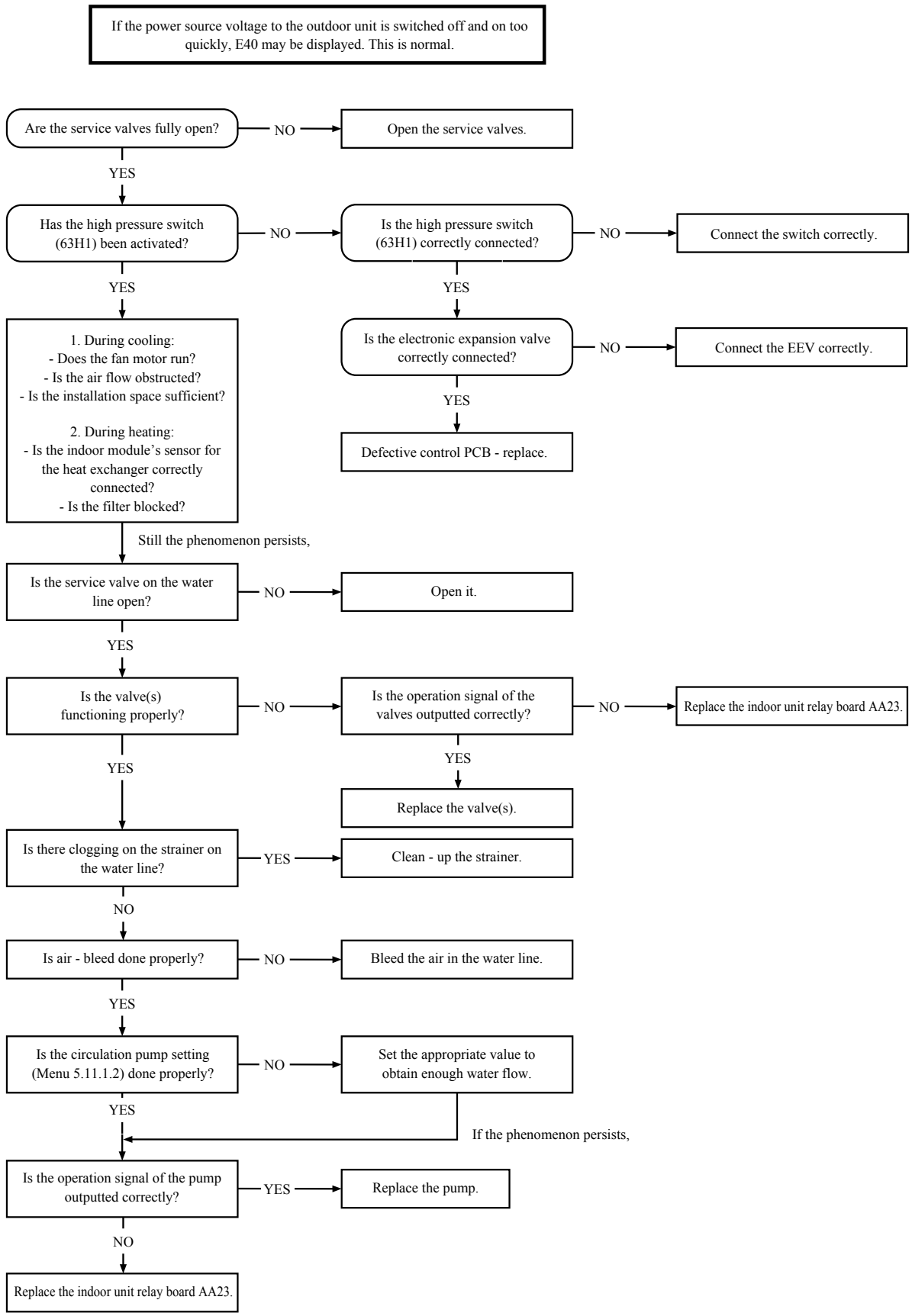
E38 - S. fault Tho-A



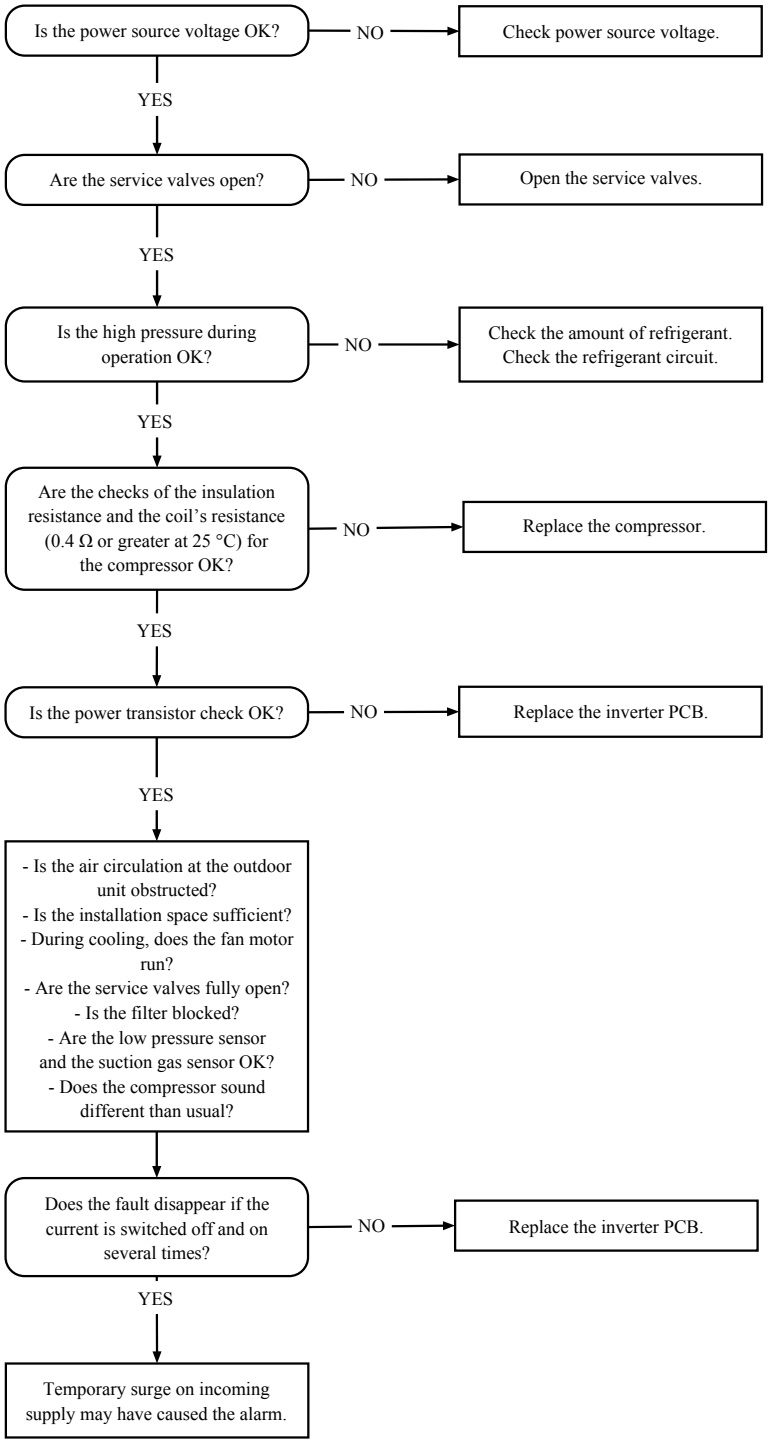
E39 - S. fault Tho-D



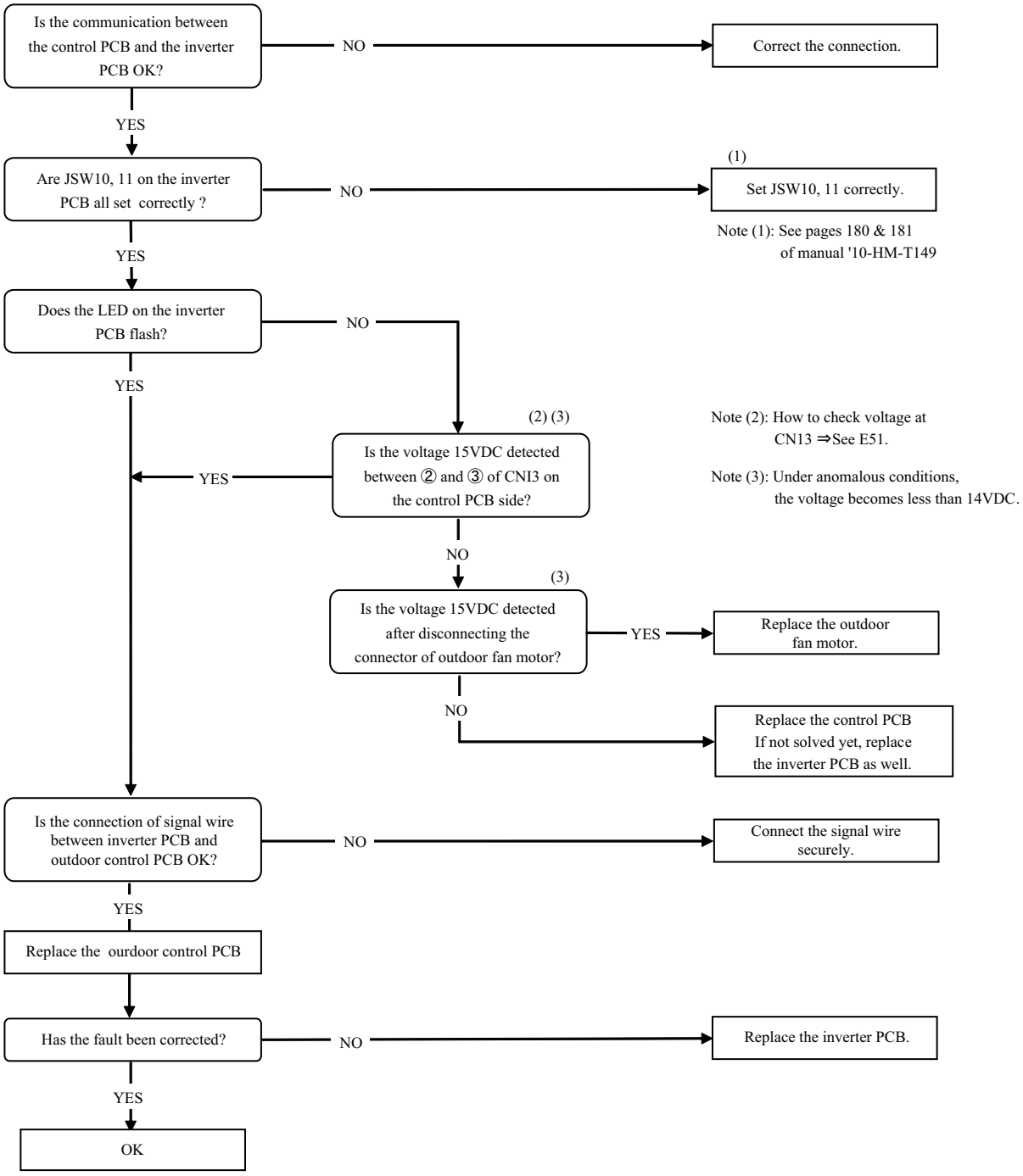
E40 - High pressure alarm



E42 - Current cut



E45 - Inverter communication error

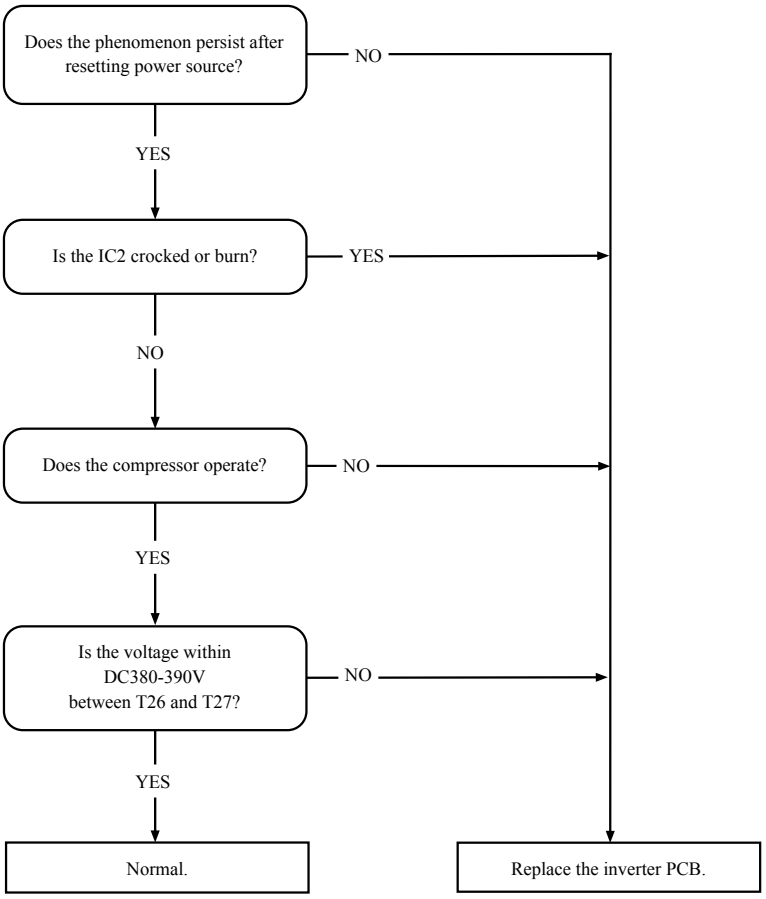


Note (1): See pages 180 & 181 of manual '10-HM-T149

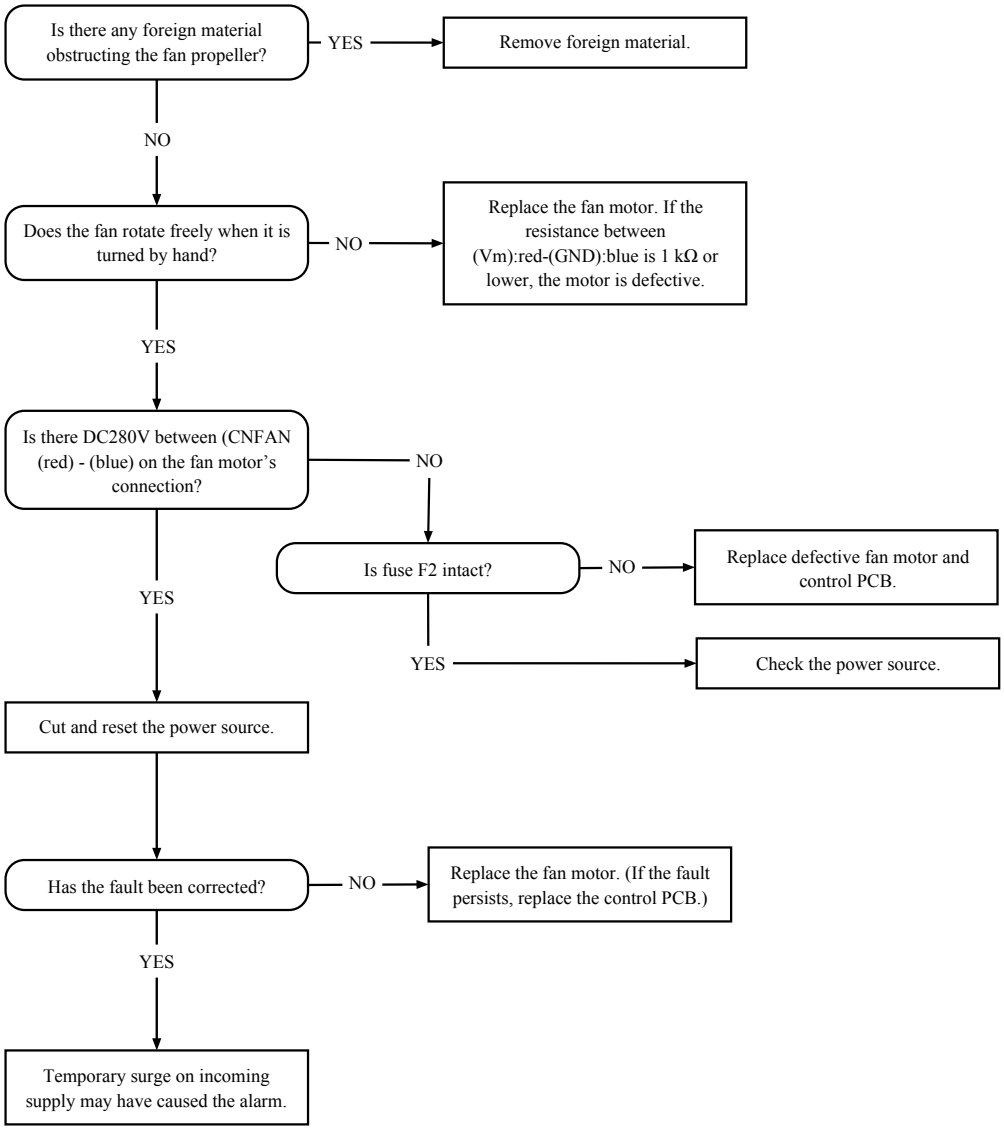
Note (2): How to check voltage at CN13 ⇒See E51.

Note (3): Under anomalous conditions, the voltage becomes less than 14VDC.

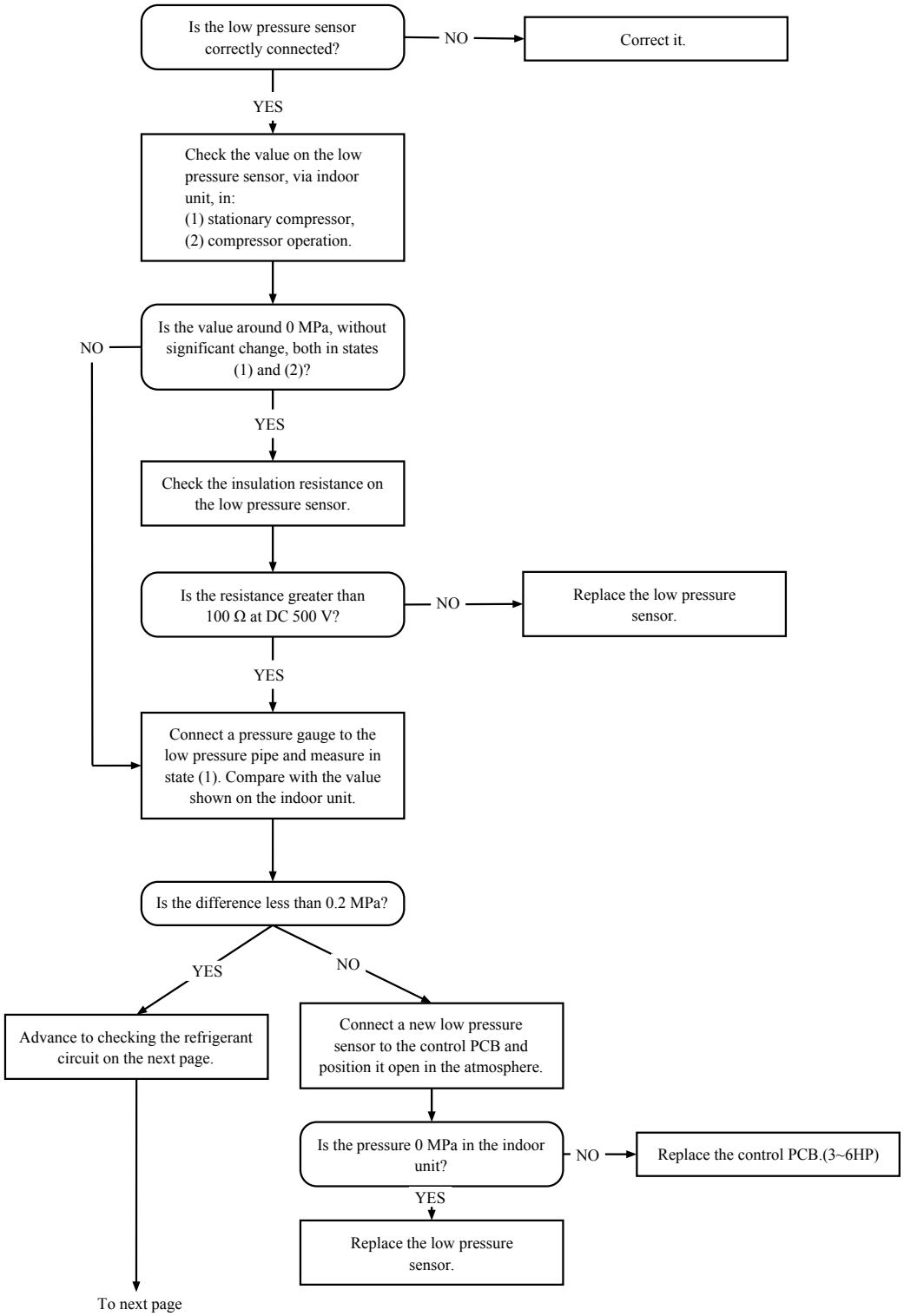
E47 - Inverter A/F module over current

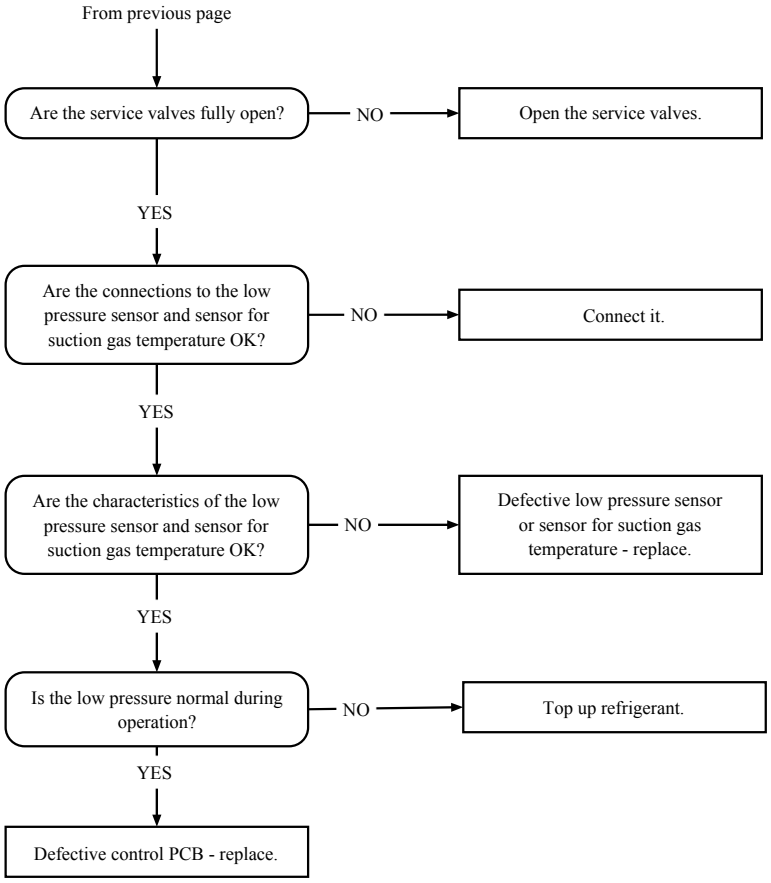


E48 - Fan alarm

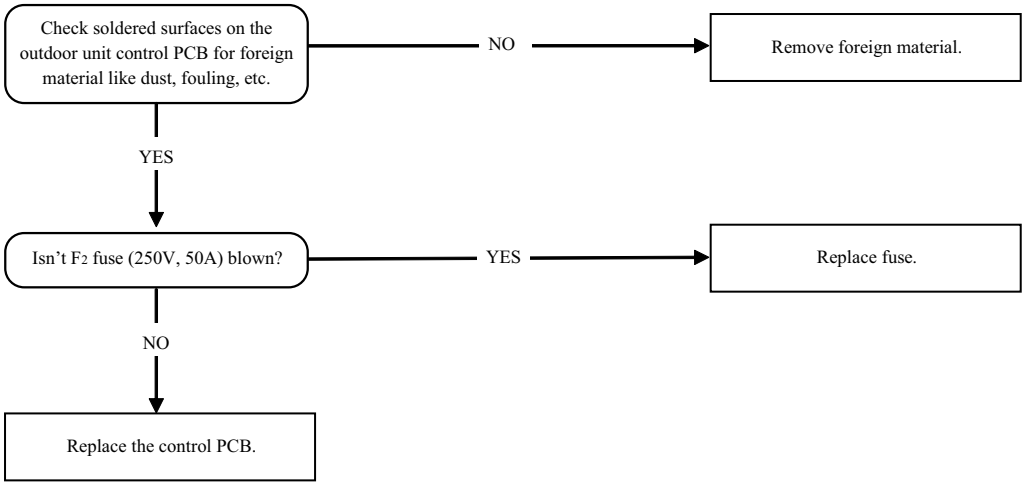


E49 - LP alarm

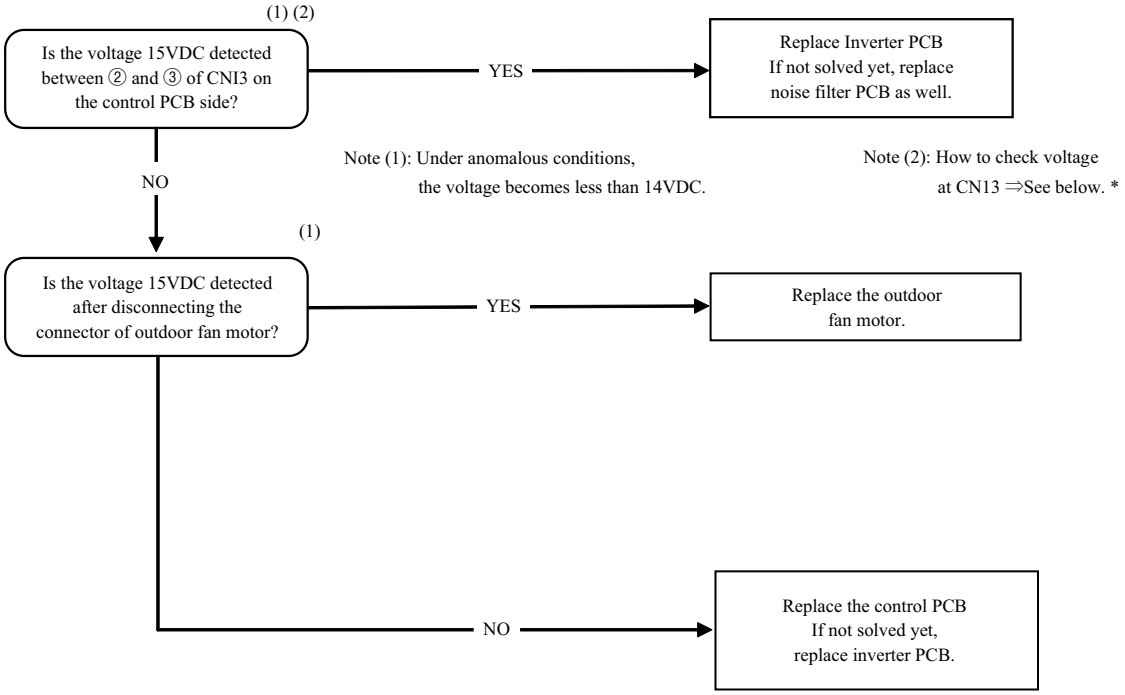

Is the low pressure sensor correctly connected?
NO
Correct it.
YES
Check the value on the low pressure sensor, via indoor unit, in:
(1) stationary compressor,
(2) compressor operation.
Is the value around 0 MPa, without significant change, both in states (1) and (2)?
NO
YES
Check the insulation resistance on the low pressure sensor.
Is the resistance greater than 100 Ω at DC 500 V?
NO
Replace the low pressure sensor.
YES
Connect a pressure gauge to the low pressure pipe and measure in state (1). Compare with the value shown on the indoor unit.
Is the difference less than 0.2 MPa?
YES
NO
Advance to checking the refrigerant circuit on the next page.
Connect a new low pressure sensor to the control PCB and position it open in the atmosphere.
Is the pressure 0 MPa in the indoor unit?
NO
Replace the control PCB.(3~6HP)
YES
Replace the low pressure sensor.
To next page


From previous page
Are the service valves fully open?
NO
Open the service valves.
YES
Are the connections to the low pressure sensor and sensor for suction gas temperature OK?
NO
Connect it.
YES
Are the characteristics of the low pressure sensor and sensor for suction gas temperature OK?
NO
Defective low pressure sensor or sensor for suction gas temperature - replace.
YES
Is the low pressure normal during operation?
NO
Top up refrigerant.
YES
Defective control PCB - replace.

E51 - Inverter and fan motor error (for FDCW60VNX)

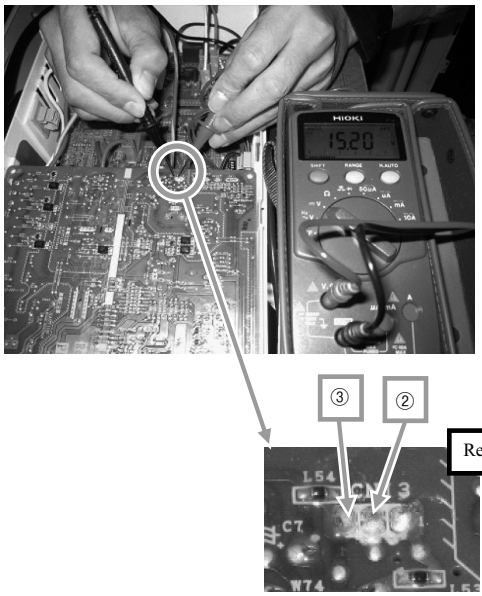


E51(E41) - Inverter and fan motor error (for FDCW71, 100, 140VNX)

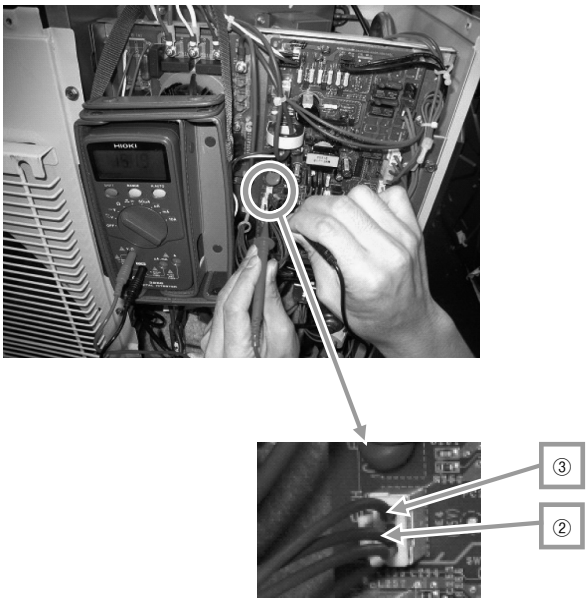


* How to check the voltage between ② and ③ of CNI3

For FDCW71VNX

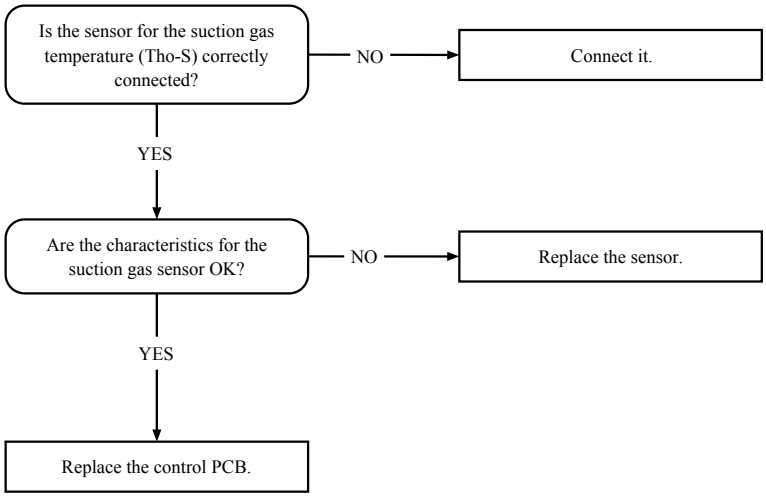


For FDCW100VNX and FDCW140VNX

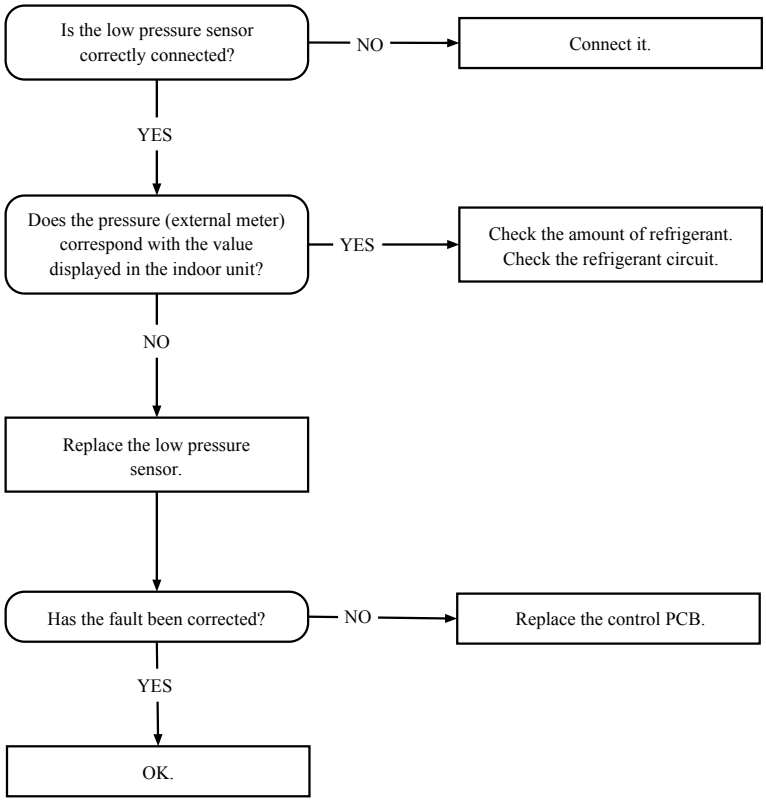


②: 15V (+)
③: GND (–)

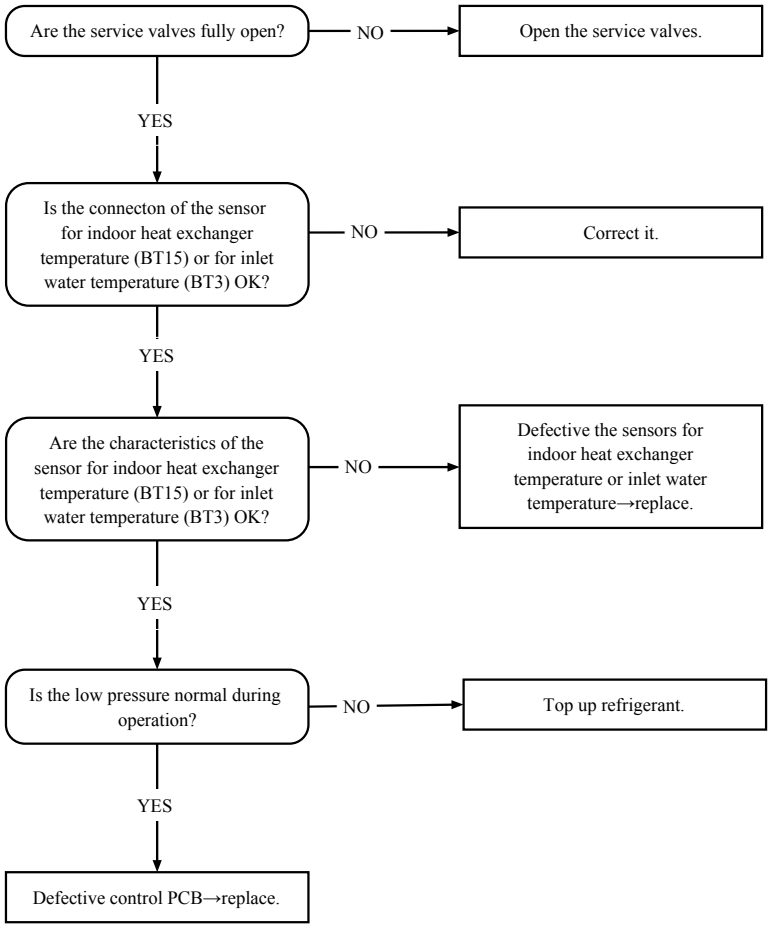
E53 - S. fault Tho-S



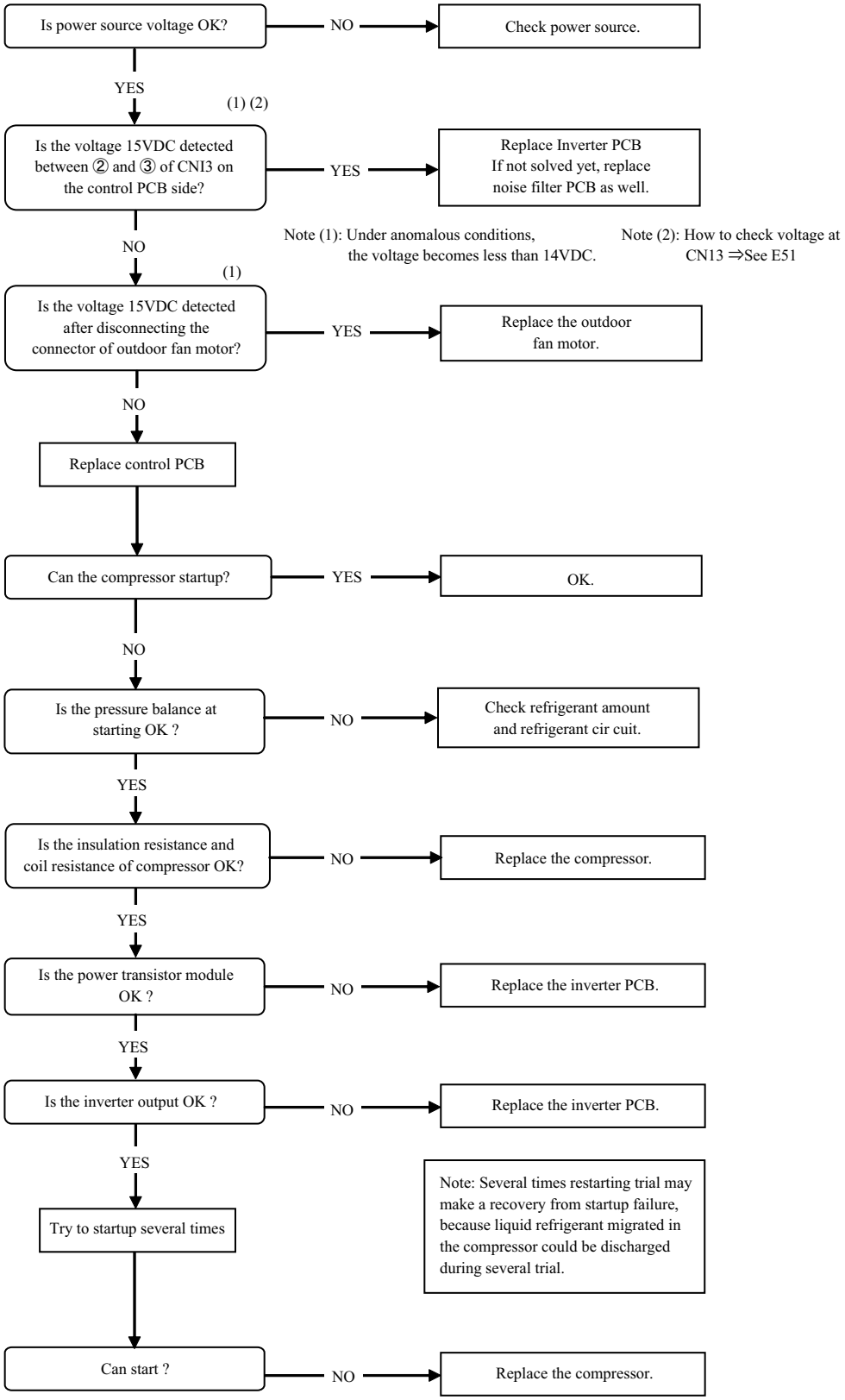
E54 - S. fault LPT (for FDCW71, 100, 140VNX)



E57 - Low refrigerant



E59 - Inverter error



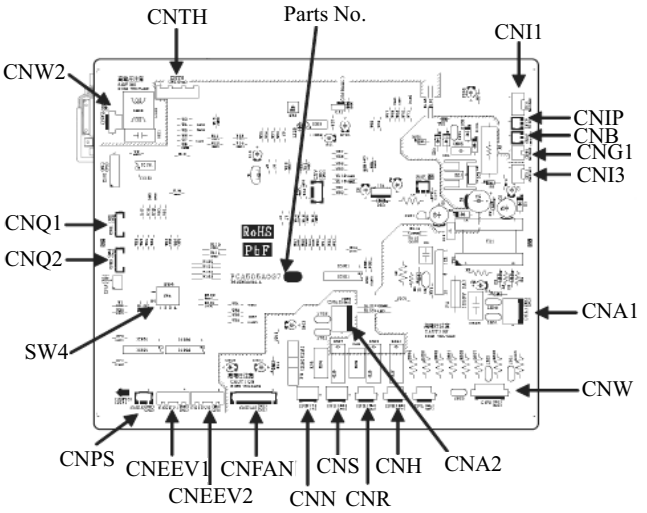
DIP switch setting

FDCW71VNX

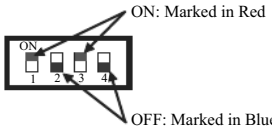
(1) Control PCB

Switch	Factory setting	Remark
SW3-1*	OFF	* See below table
SW3-2*	OFF	* See below table
SW3-3	OFF	Keep OFF
SW3-4	ON	Keep ON
SW4-1	ON	Keep ON
SW4-2	ON	Keep ON
SW4-3	OFF	Keep OFF
SW4-4	OFF	Keep OFF
SW5-1	OFF	Keep OFF
SW5-2	OFF	Keep OFF
SW5-3	OFF	Keep OFF
SW5-4	OFF	Keep OFF
SW7-1	OFF	Keep OFF
SW7-2	OFF	Keep OFF
SW7-3	OFF	Keep OFF
SW8-1	OFF	Keep OFF
SW8-2	OFF	Keep OFF
SW8-3	OFF	Keep OFF
SW9	OFF	Tactile switch

Control PCB



Note: Meaning of marking on the DIP switch

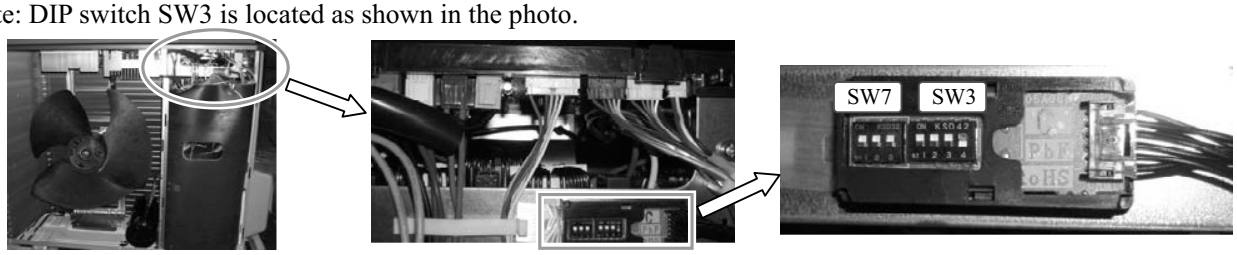


When replacing PCB, set up the DIP switch according to the previous setting with the meaning of marking in mind or with reference to this factory setting list.

* Function of DIP switch

Switch	Function	Setting	
		OFF	ON
SW3-1	Defrost setting	Normal	Cold region
SW3-2	Snow protection control	Normal	Snow protection

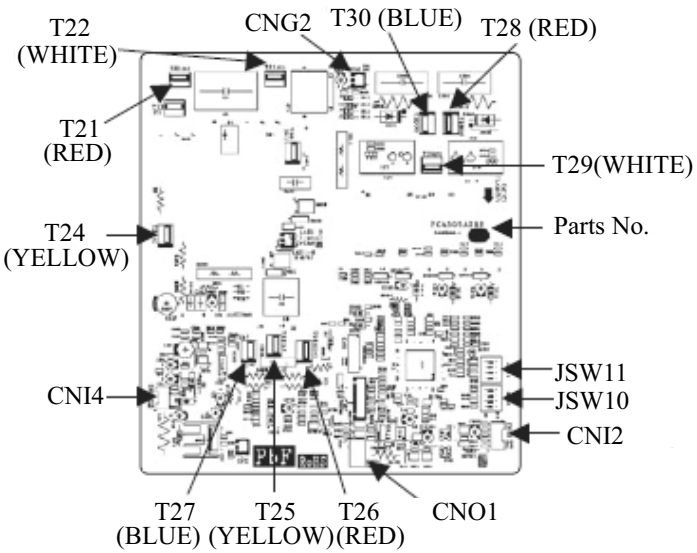
Note: DIP switch SW3 is located as shown in the photo.



(1) Inverter PCB

Switch	Factory setting	Remark
JSW10-1	OFF	Keep OFF
JSW10-2	OFF	Keep OFF
JSW10-3	OFF	Keep OFF
JSW10-4	OFF	Keep OFF
JSW11-1	ON	Keep as factory setting
JSW11-2	ON	Keep as factory setting
JSW11-3	ON	Keep as factory setting
JSW11-4	ON	Keep as factory setting

Inverter PCB



FDCW100VNX, 140VNX

(1) Control PCB

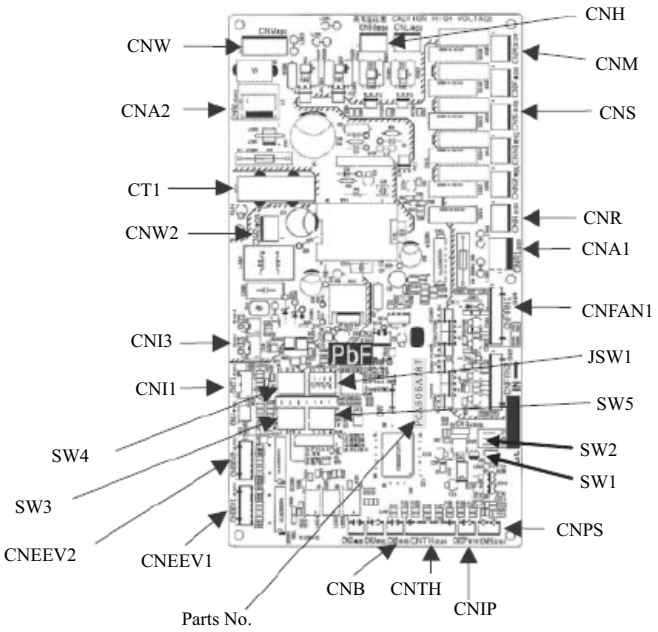
Switch	Factory setting		Remark
	100VNX	140VNX	
JSW1-1	OFF	OFF	Keep as factory setting
JSW1-2	OFF	ON	Keep as factory setting
JSW1-3	OFF	OFF	Keep as factory setting
JSW1-4	OFF	OFF	Keep as factory setting
SW4-1	ON	ON	Keep as factory setting
SW4-2	ON	ON	Keep as factory setting
SW4-3	OFF		Keep OFF
SW4-4	ON		Keep ON
SW3-1*	OFF		Keep OFF
SW3-2*	OFF		Keep OFF
SW3-3	OFF		Keep OFF
SW3-4	OFF		Keep OFF
SW5-1	OFF		Keep OFF
SW5-2	ON		Keep OFF
SW5-3	OFF		Keep OFF
SW5-4	OFF		Keep OFF
J5**	With/ON		Keep With/ON
J6**	With/ON		Keep With/ON
J7**	With/ON		Keep With/ON
SW1	OFF		Tactile switch
SW2-1	ON		Keep ON
SW2-2	ON		Keep ON
SW2-3	ON		Keep ON

* Function of DIP switch

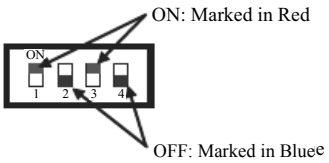
Switch	Function	Setting	
		OFF	ON
SW3-1	Defrost setting	Normal	Cold region
SW3-2	Snow protection control	Normal	Snow protection

** Control PCB on the unit: Jumper,
Control PCB of the spare part: DIP switch

Control PCB



Note: Meaning of marking on the DIP switch

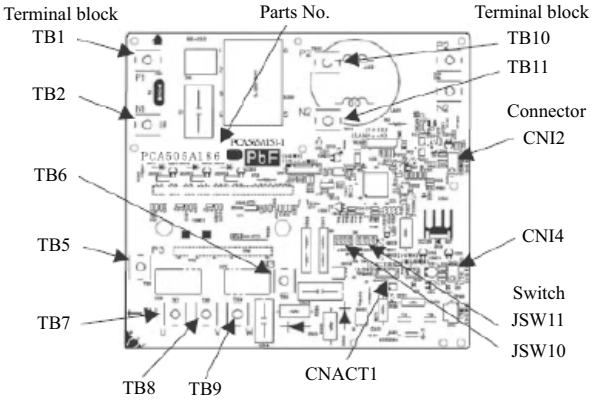


When replacing PCB, set up the DIP switch according to the previous setting with the meaning of marking in mind or with reference to this factory setting list.

(2) Inverter PCB

Switch	Factory setting		Remark
	100VNX	140VNX	
JSW10-1	OFF		Keep OFF
JSW10-2	OFF		Keep OFF
JSW10-3	OFF		Keep OFF
JSW10-4	OFF		Keep OFF
JSW11-1	ON	OFF	Keep as factory setting
JSW11-2	OFF	OFF	Keep as factory setting
JSW11-3	OFF	ON	Keep as factory setting
JSW11-4	ON	ON	Keep as factory setting

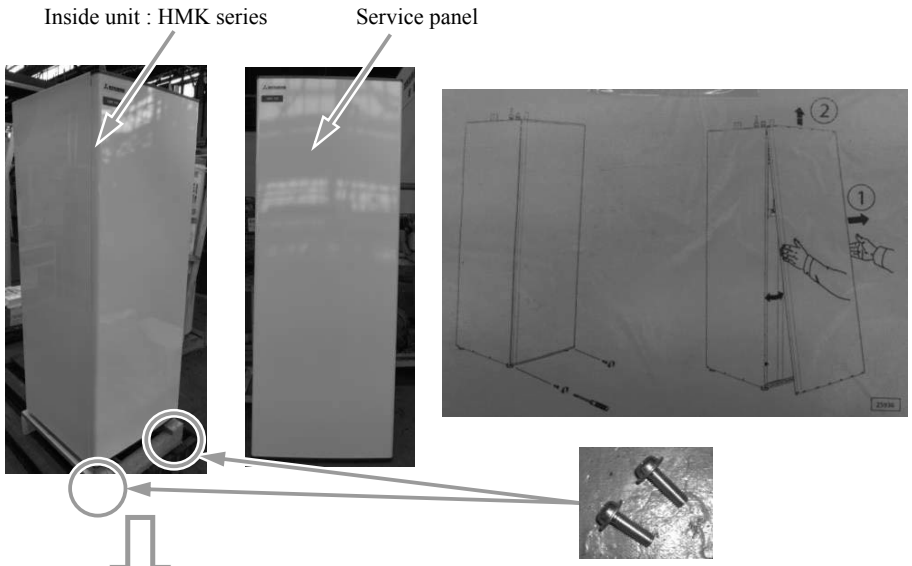
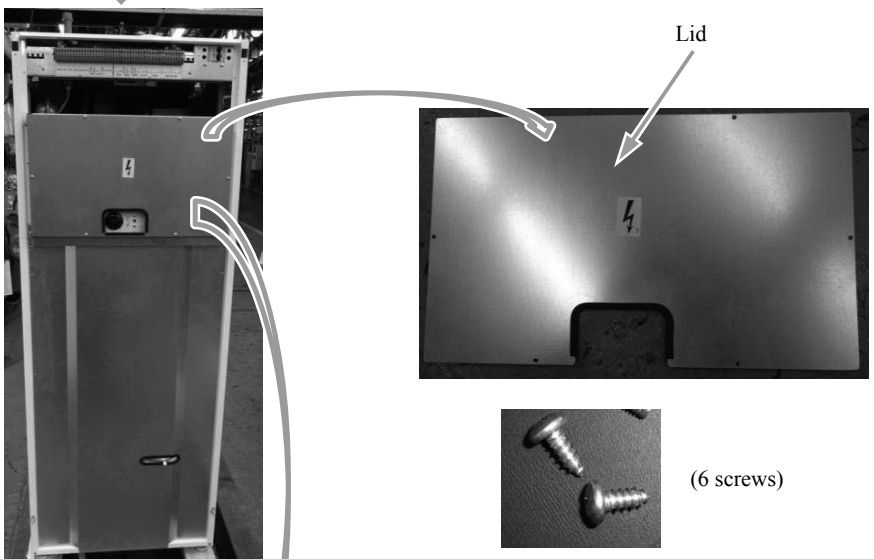
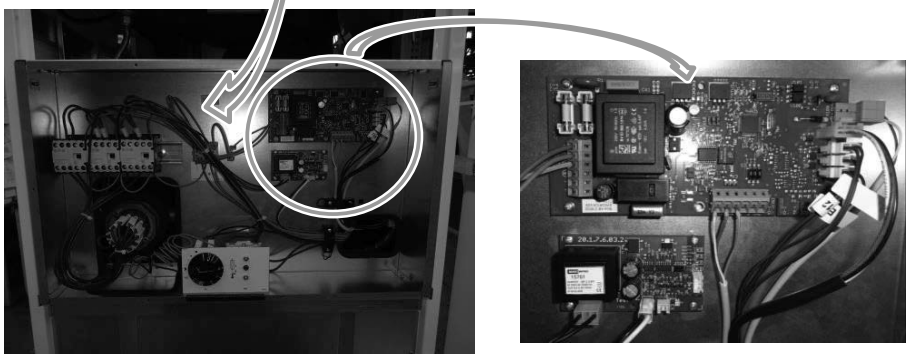
Inverter PCB



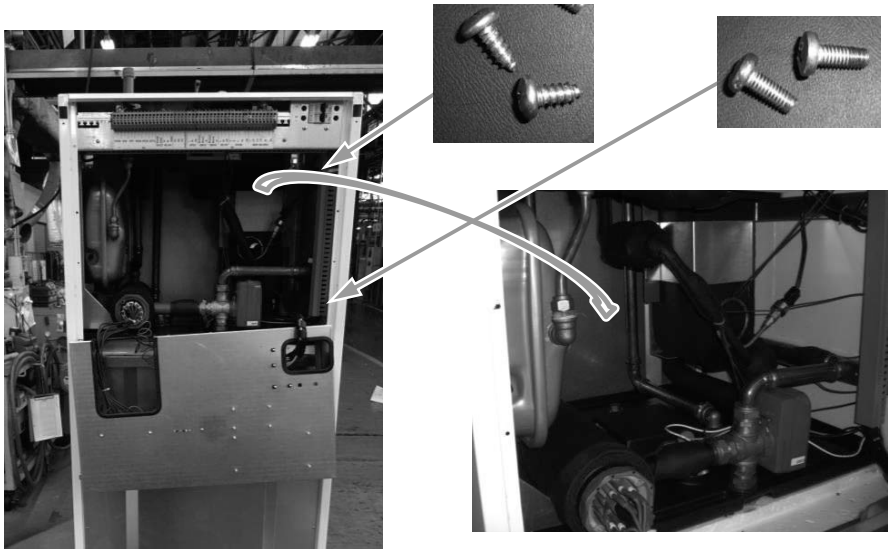
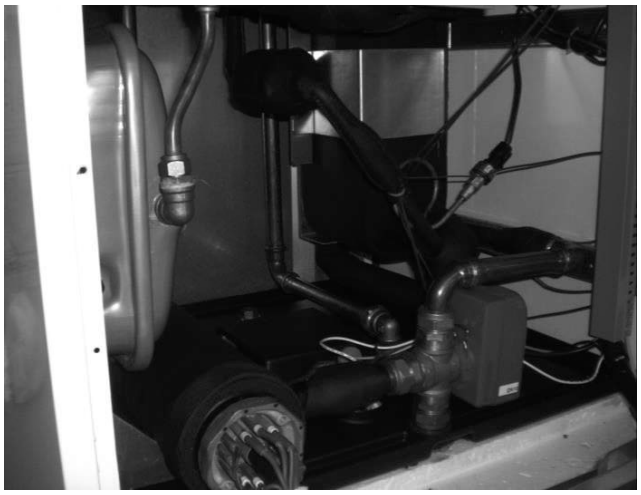
Component replacement

Indoor unit

HMK60/100

Unit of HMK series	
1. Remove service panel. **2.** Remove the service panel form 2 screws of unit.	
3. Check the control box is possible. **4.** Remove the lid from 6 screws of the control box.	
5. Check the inside of the control box.	

HMK60/100

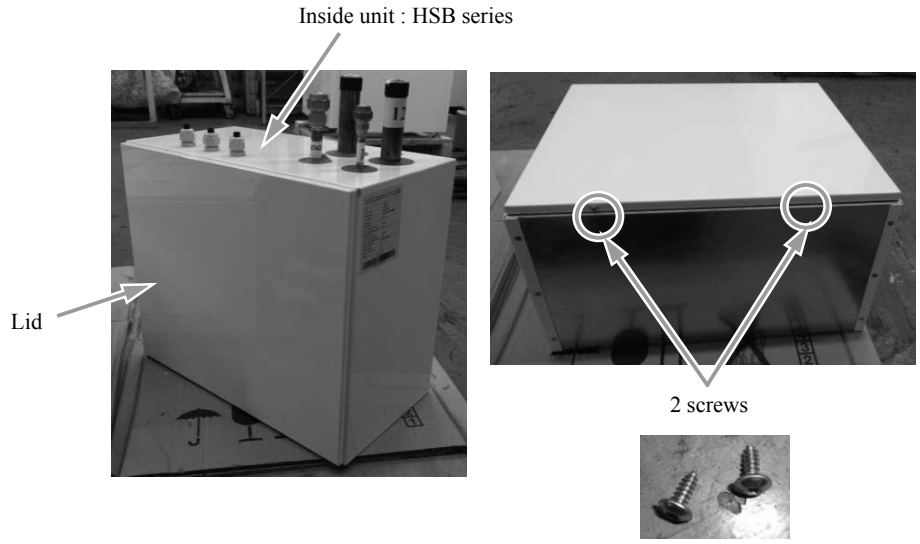
Unit of HMK series	
6. Loosen 4 screws and remove unit of control box.	
7. Service of each parts is possible.	

HSB60/100/140

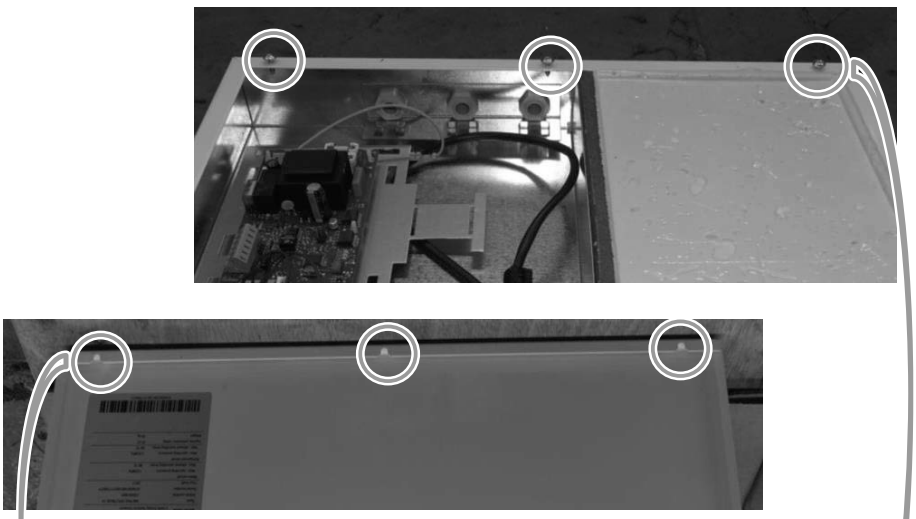
Unit of HSB series

1. Remove lid.

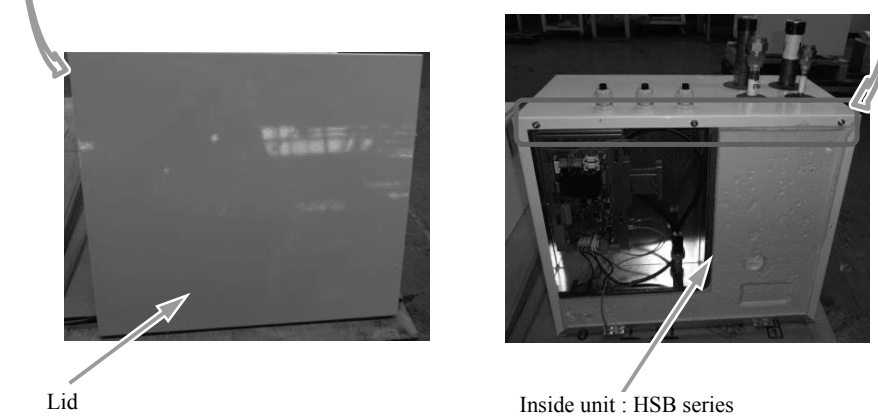
2. Loosen 2 screws and remove unit of lid.



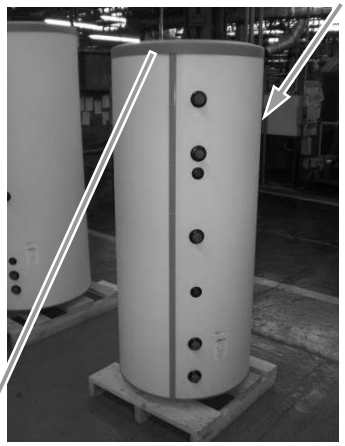
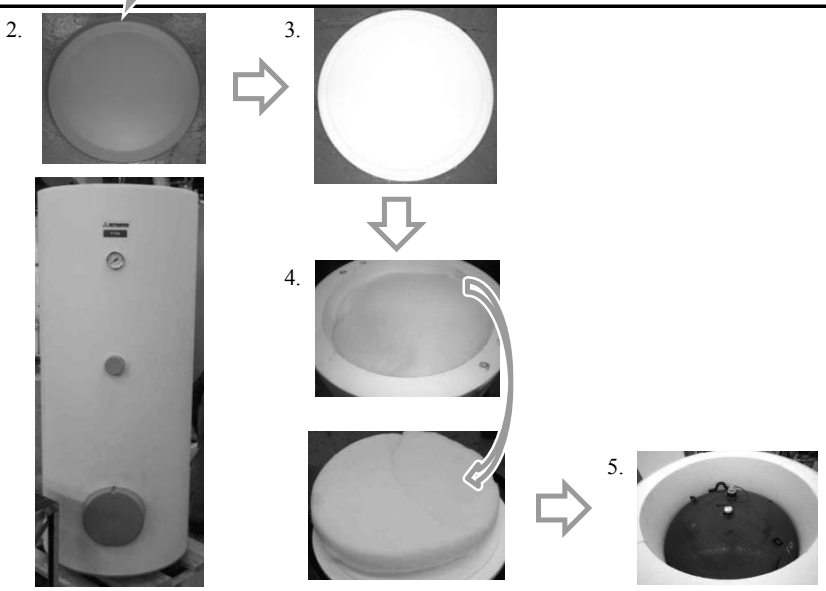
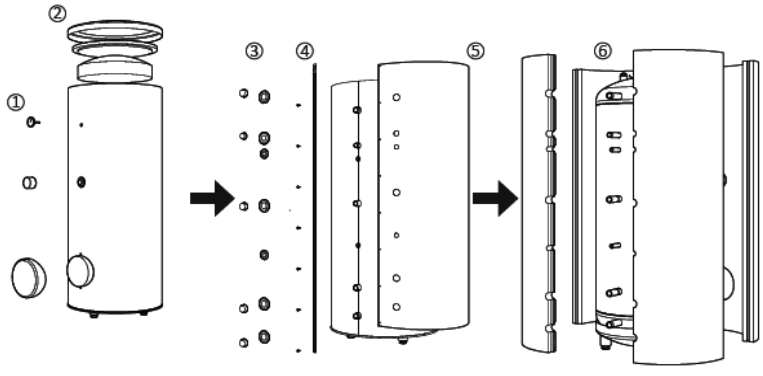
3. Remove the lid from screws of the control.



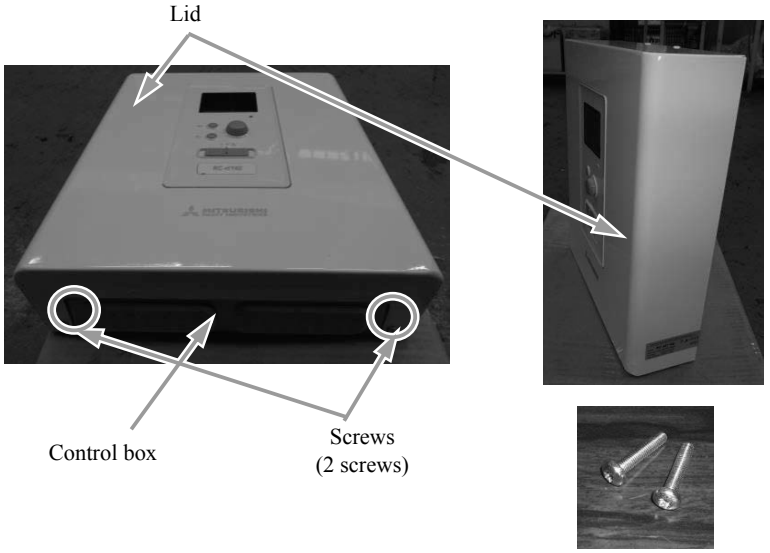
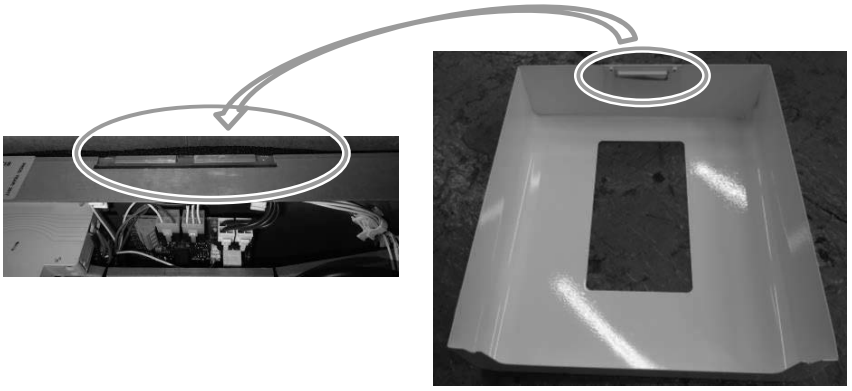
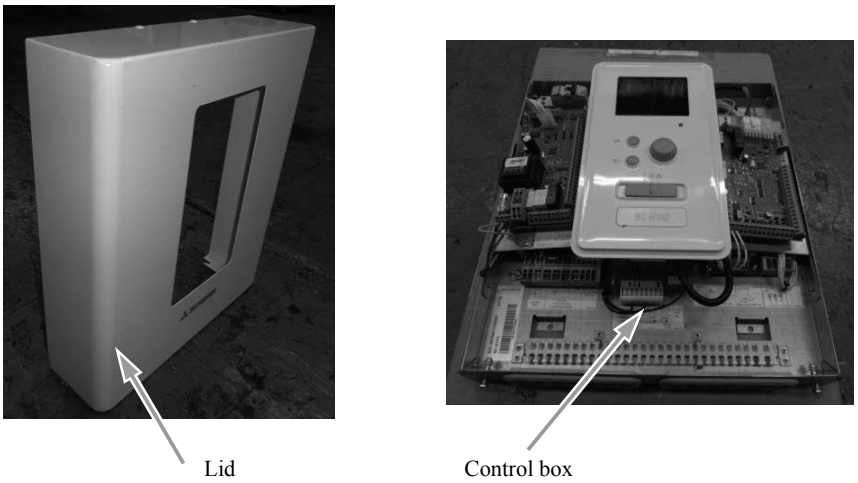
4. Check the inside of the unit.



PT300/500

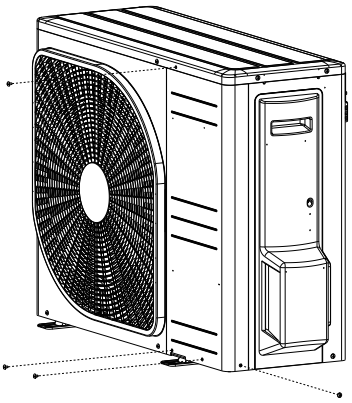
Tank of PT series	
1. Remove the top panel of the tank.	 Tank: PT series
2. Remove the styrofoam. **3.** See the tank.	 2. 3. 4. 5.
4. (Details) (1)Remove the temperature gauge, plug of the heating element connector pipe and blanking plate of the inspection opening. (2)Remove the upper cover of the housing together with thermal insulation. (3)Remove the plugs from the connector pipes and black bushings. (4)Remove the fixing screws and the strip connectings the housing jacket. (5)Remove the jacket surrounding the tank (housing jacket.) (6)Remove the four-piece thermal insulation.	 ① ② ③ ④ ⑤ ⑥

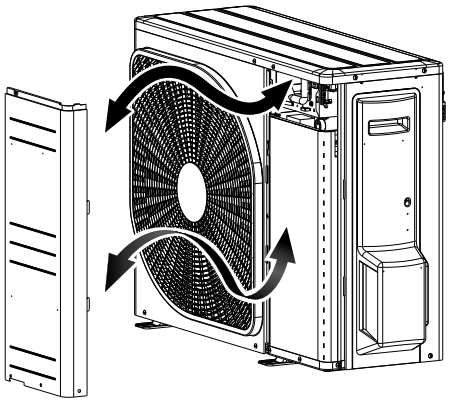
RC-HY20/40

Controller	
1. Loosen the screw and remove the lid and control box first. **2.** Loosen 2 screws and remove the lid of control box.	
3. Remove the bracket of the lid from hole of the control box.	
4. Remove the lid. **5.** Check the inside of the control box.	

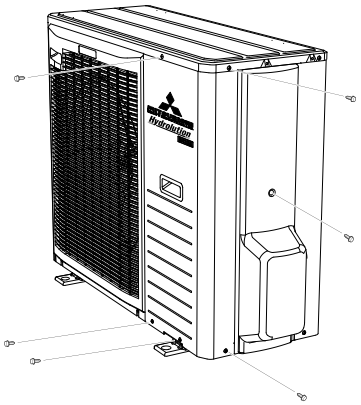
Outdoor unit

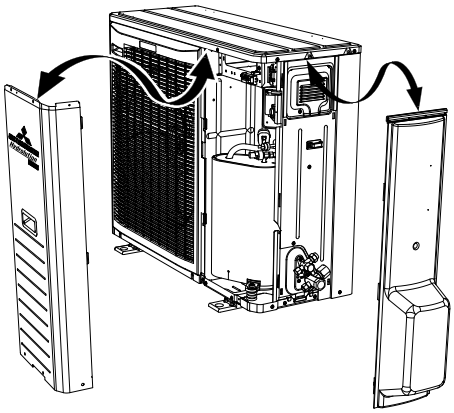
FDCW60VNX



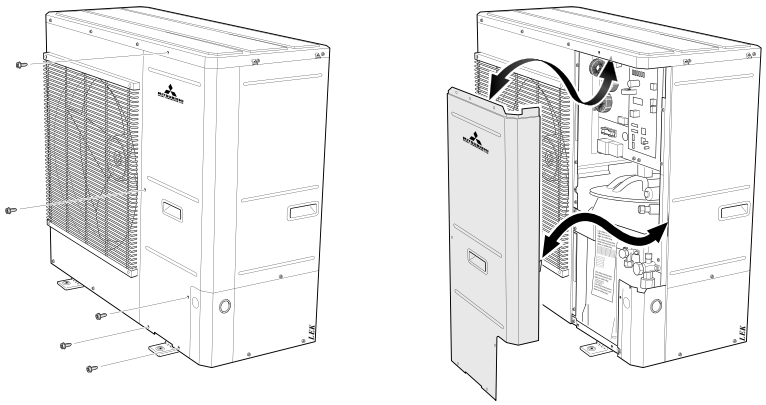


FDCW71VNX

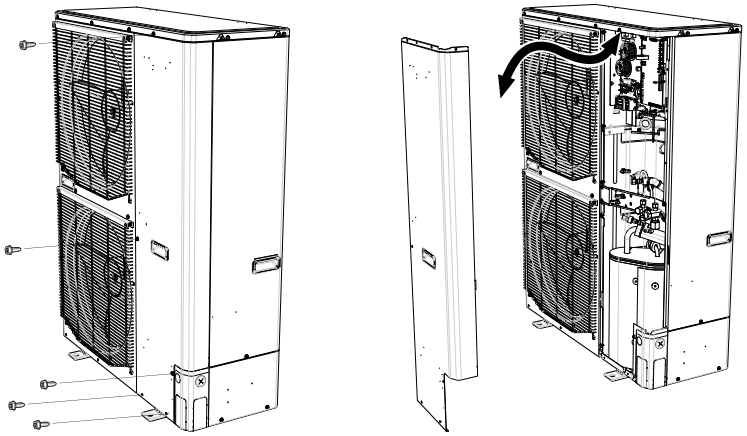




FDCW100VNX



FDCW140VNX

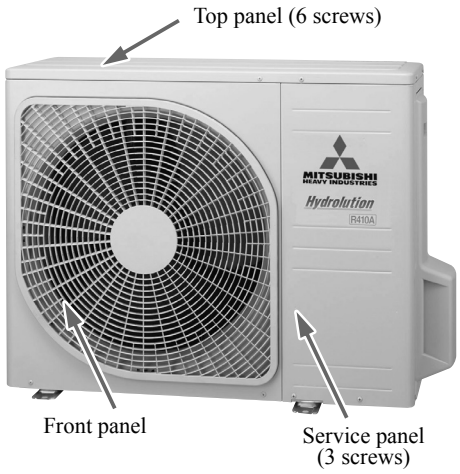


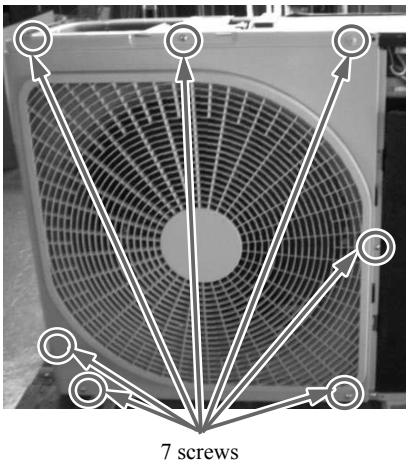
FDCW60VNX

Fan and fan motor (FMo1)

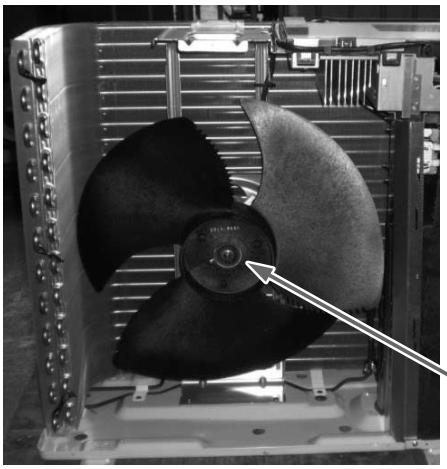
1. Loosen the screw and remove the top panel and service panel first.

2. Loosen 7 screws and remove the panel including fan grills.

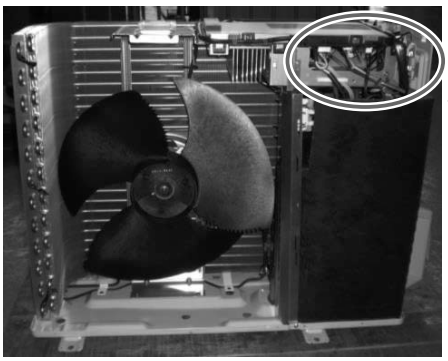


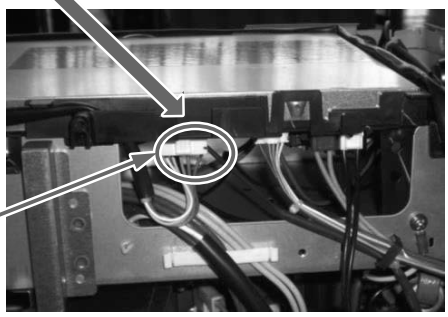


3. Loosen the nut and remove the fan propeller.



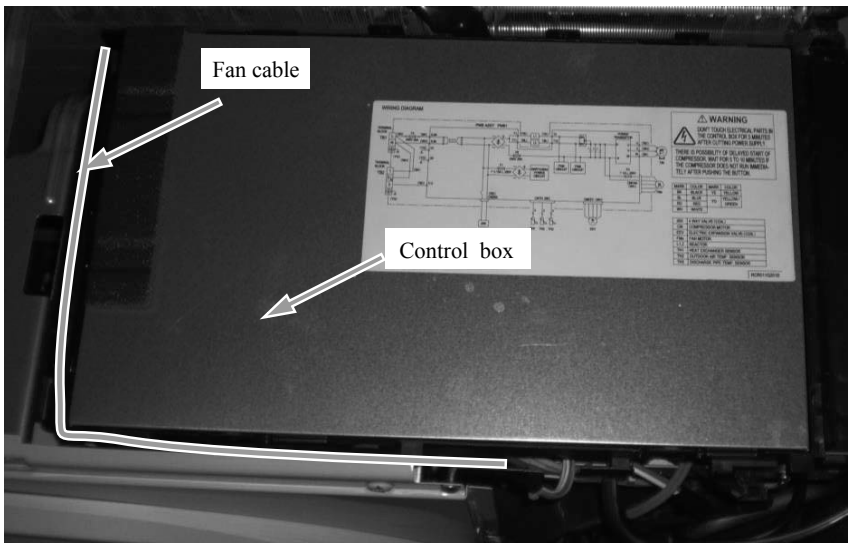
4. Disconnect the connector of CNFAN.





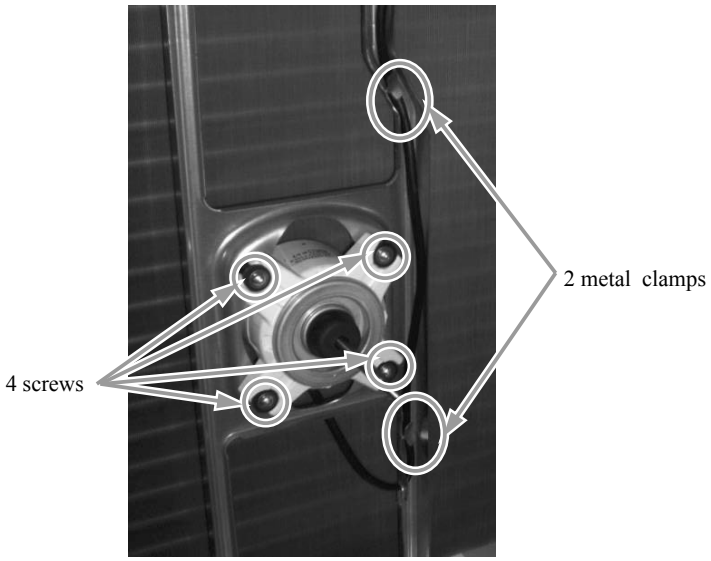
Fan and fan motor (FMo1)

5. Remove band and fan cable.



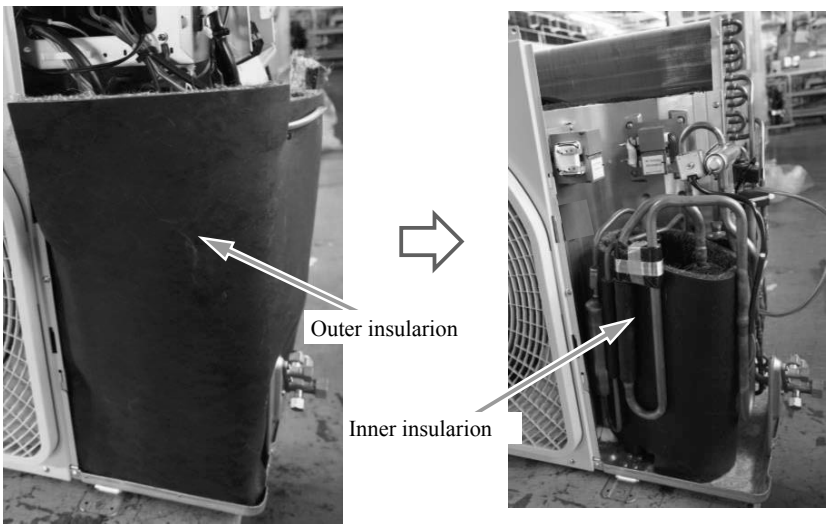
6. Release 2 metal clamps.

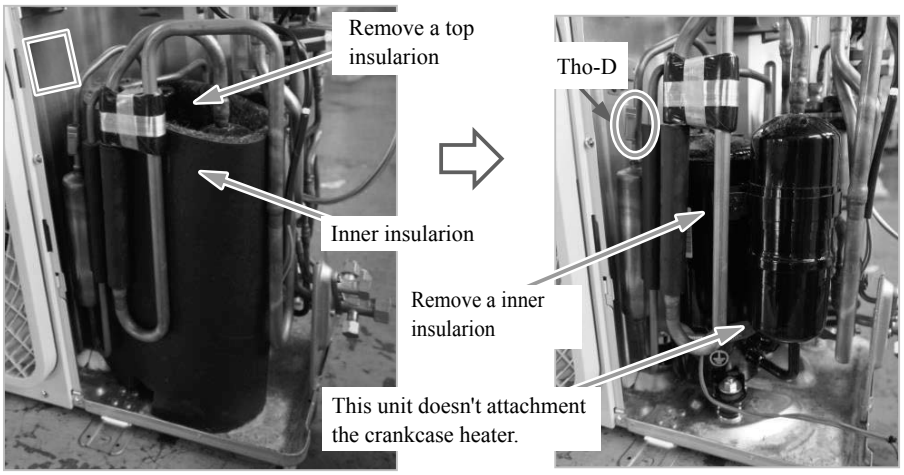
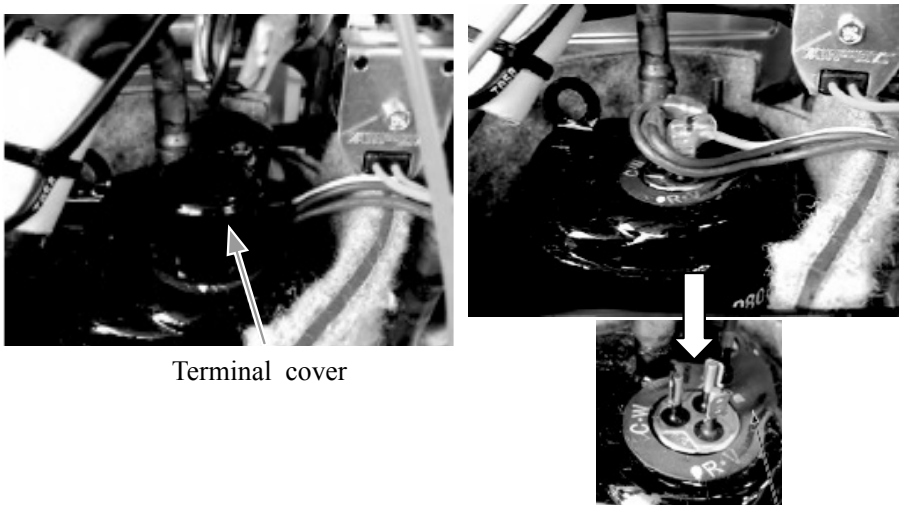
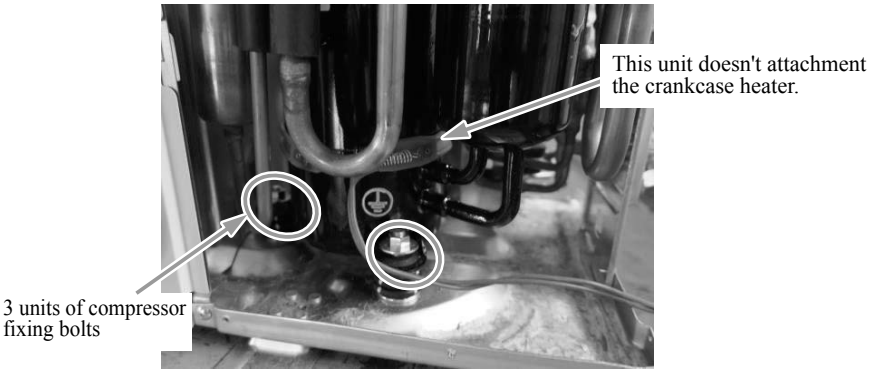
7. Loosen 4 screws and remove fan motor.



Compressor (CM)

1. Unit the strings and remove the outer insulation.

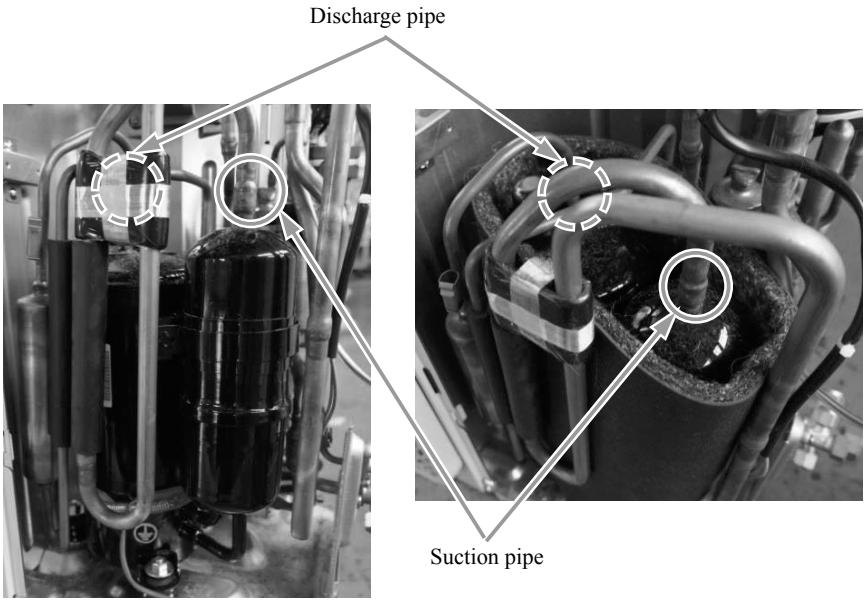


Compressor (CM)	
2. Remove the top and inner insulations. **3.** Take off sprig leaf and pull out sensor (Tho-D).	
4. Remove the terminal cover. **5.** Disconnect the faston terminal connectors from compressor. U：Red cable V：White cable W：Blue cable	
6. Loosen 3 units of compressor fixing bolts.	

Compressor (CM)

7. Disconnect the pipes for suction and discharge.

8. Remove the compressor.



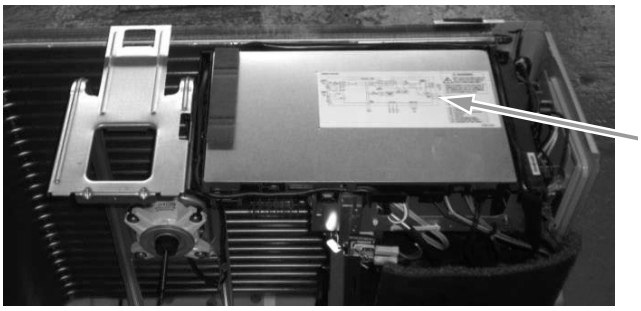
Control PCB(PWB)

1. Open the top panel.

2. Open the control box cover.

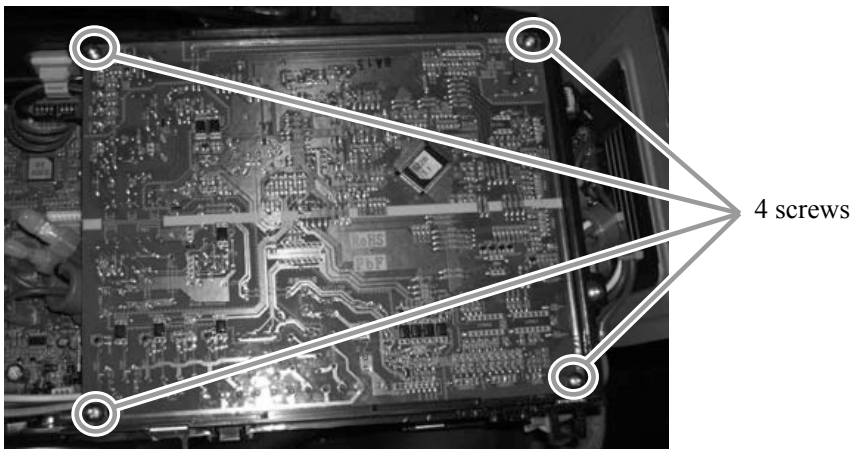
Note：Be sure to do this work after elapsing 3 minuts from OFF.

3. Loosen 4 screws.



Open the control box cover.

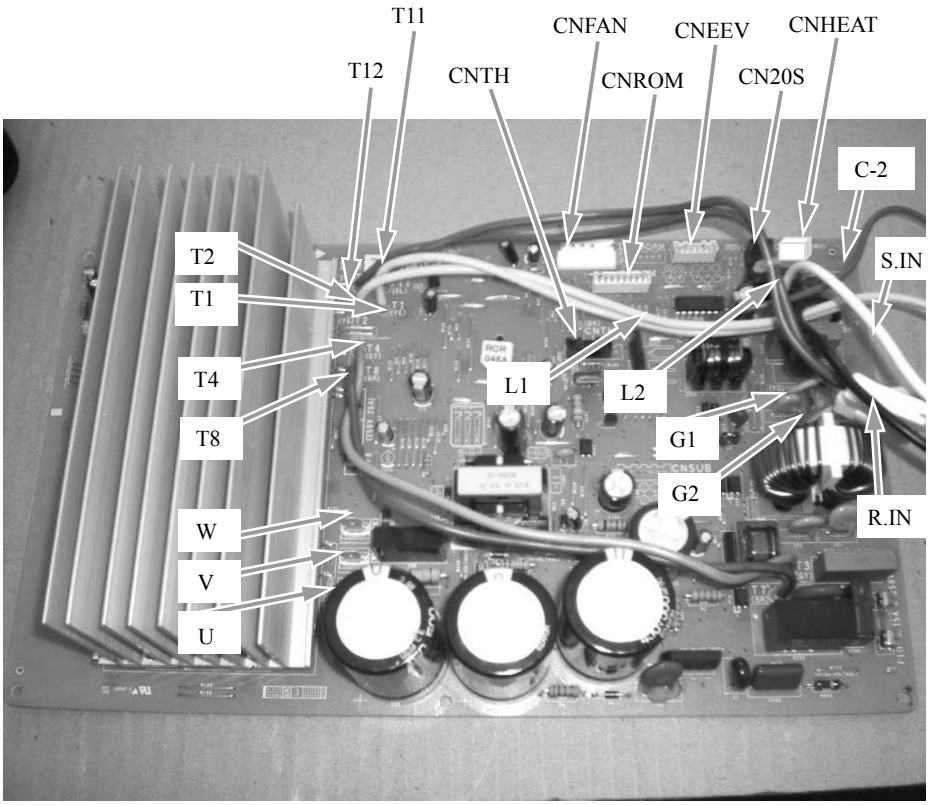
Control PCB



Control PCB (PWB)

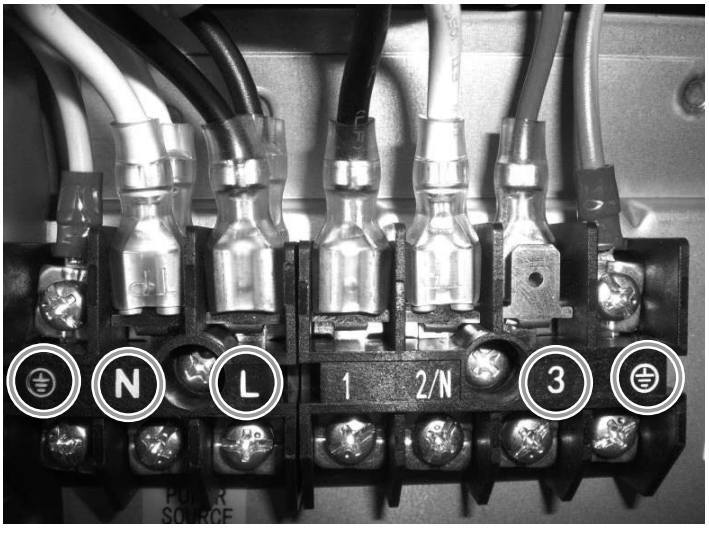
1. Disconnect all connectors and remove the control PCB.

(Connector)
CNHEAT
CN20S
CNEEV
CNROM
CNFAN
CNTH
L1
L2



2. Disconnect all terminals on the terminal block.

(Terminal block)
C-2(Herness color:RED)
S.IN(Herness color:WHITE)
R.IN(Herness color:BLACK)
G1 (Herness color:YELLOW/GREEN)
G2 (Herness color:YELLOW/GREEN)

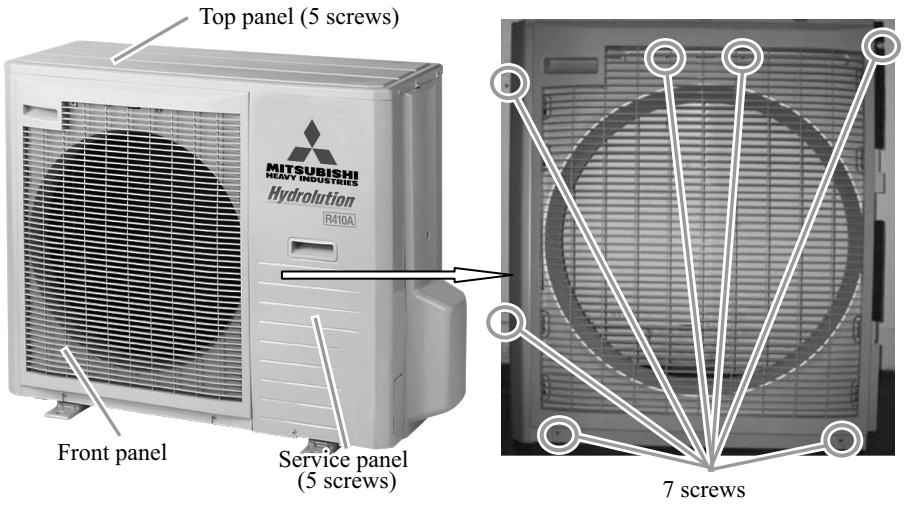


FDCW71VNX

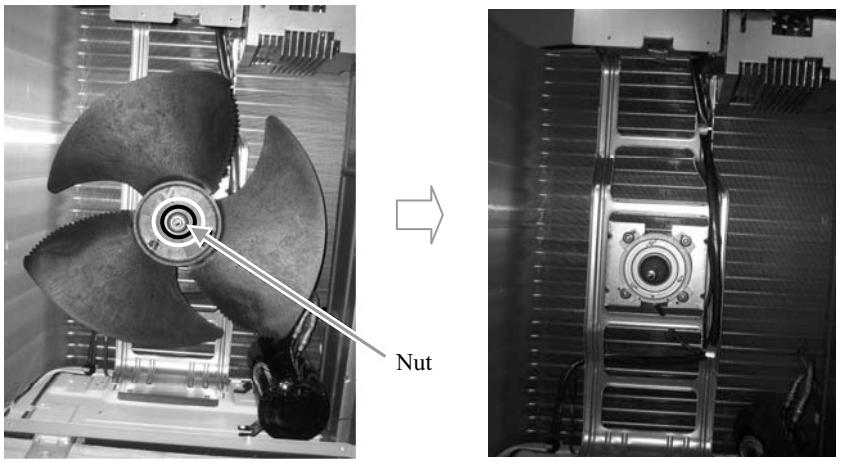
Fan and fan motor (FMo1)

1. Loosen the screws and remove the top panel and service panel first.

2. Loosen 5 screws and remove the front panel including fan grille.

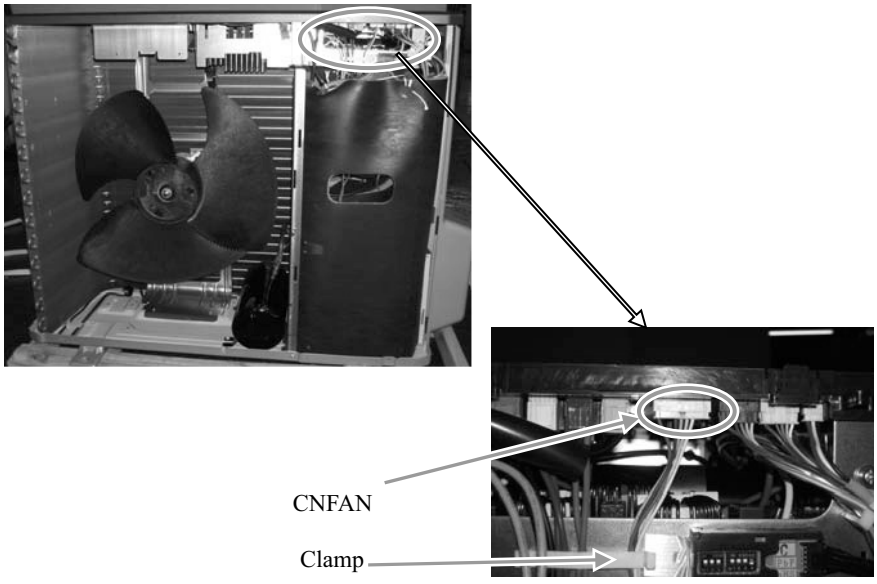


3. Loosen the nut and remove the fan propeller.



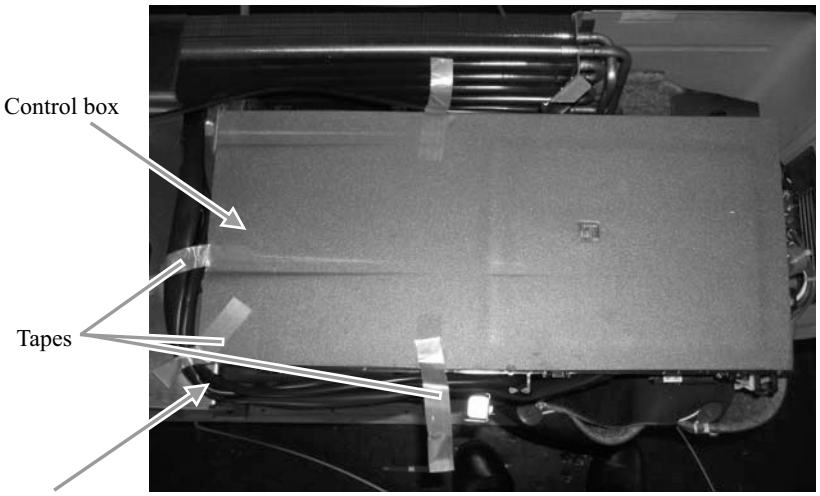
4. Disconnect the connector of CNFAN.

5. Detach the clamp.



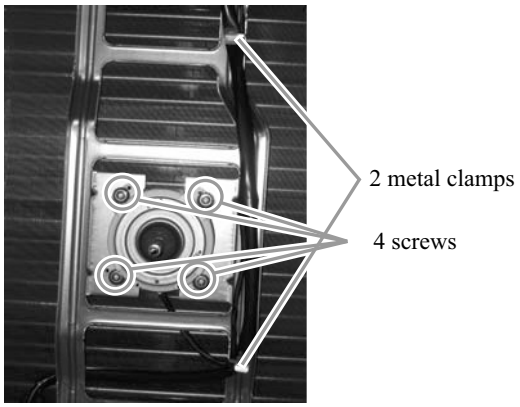
Fan and fan motor (FMo1)

6. Remove tapes and fan cable.



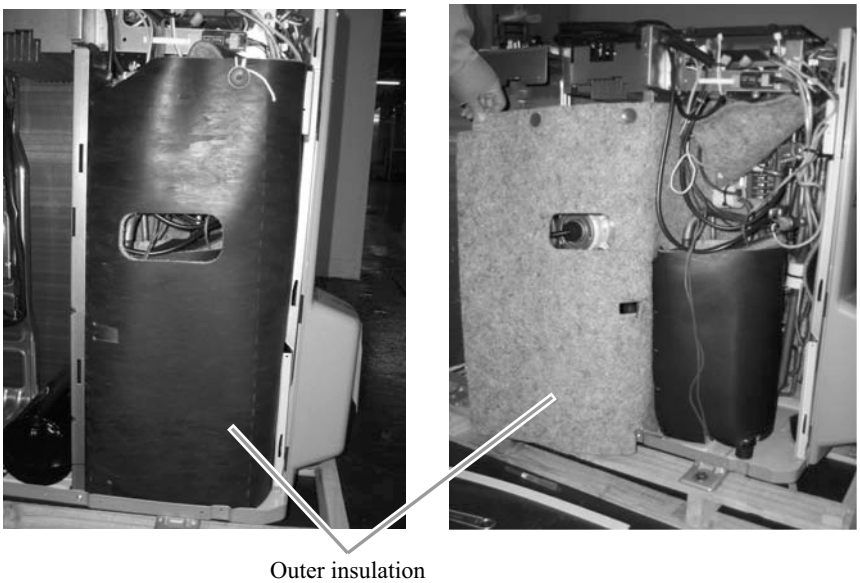
7. Release 2 metal clamps.

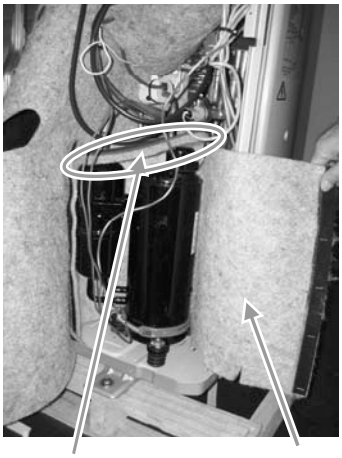
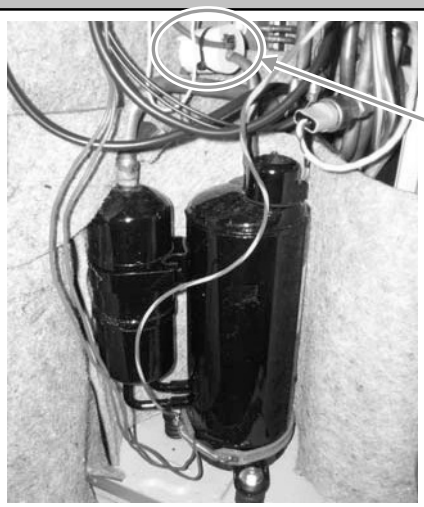
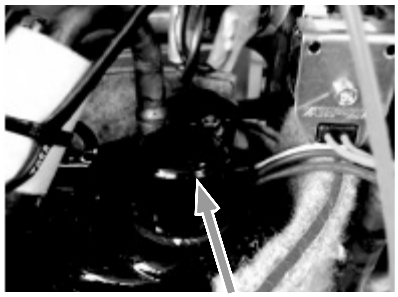
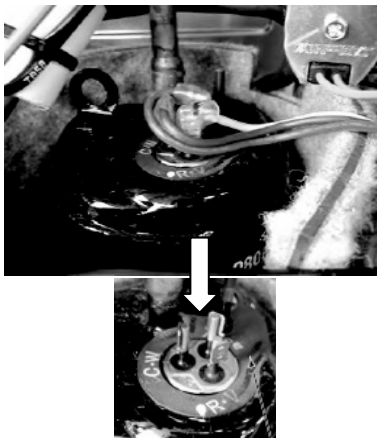
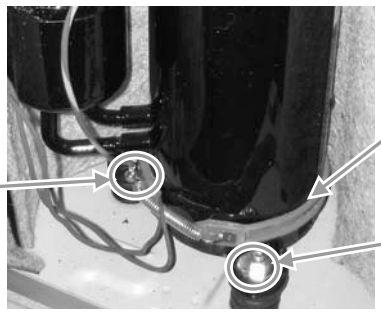
8. Loosen 4 screws and remove fan motor.



Compressor (CM)

1. Untie the strings and remove the outer insulation.



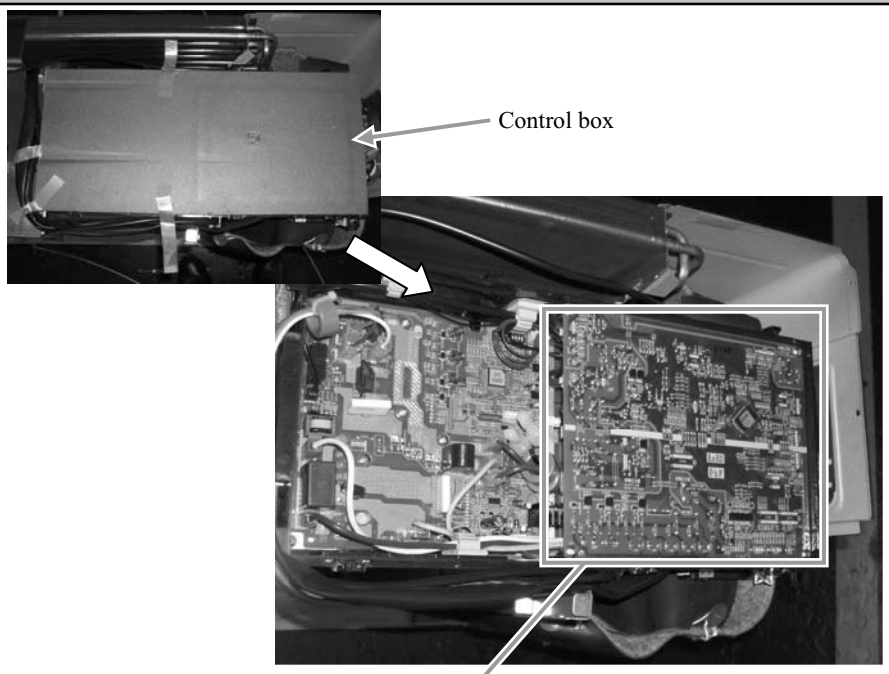
Compressor (CM)	
2. Remove the top and inner insulations. **3** Cut off the strap and pull out the sensor (Tho-D).	 Top insulation Inner insulation  Tho-D
4. Remove the terminal cover. **5.** Disconnect the fasten terminal connectors from compressor. U: Red cable V: White cable W: Blue cable	 Terminal cover 
6. Remove the crankcase heater. **7.** Unscrew and disconnect the grounding cable. **8.** Loosen 3 nuts of compressor fixing bolts.	 Screw for grounding cable Crankcase heater 3 nuts of compressor fixing bolts
9. Disconnect the pipes for suction and discharge. **10.** Remove the compressor.	 Suction pipe Discharge pipe

Control PCB (PWB1)

1. Open the top panel.

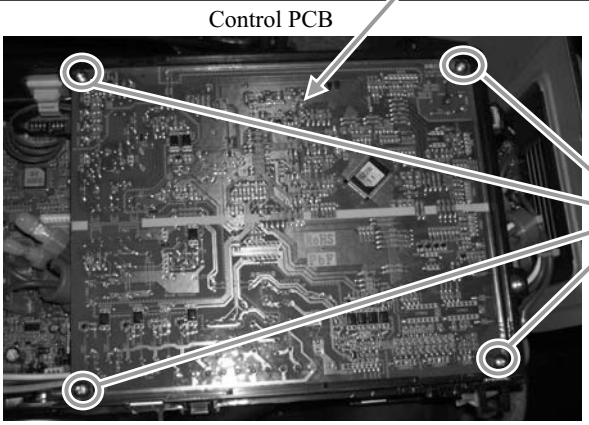
2. Open the control box cover.

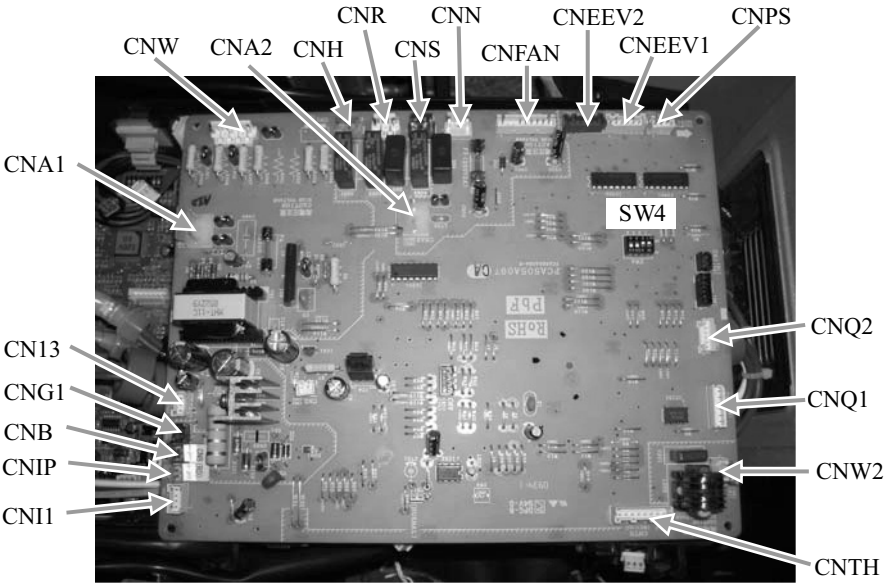
Note: Be sure to do this work after elapsing 3 minutes from power OFF.



3. Loosen 4 screws.

4. Disconnect all connectors and remove the control PCB.

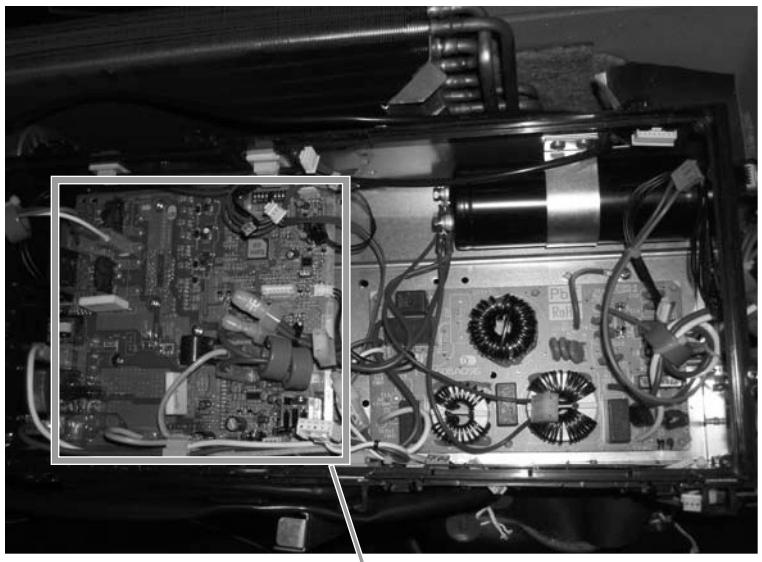




Inverter PCB (PWB2)

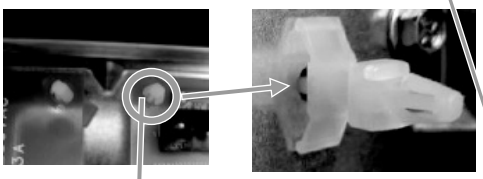
1. Remove control PCB first.

Note: Be sure to do this work after elapsing 3 minutes from power OFF.

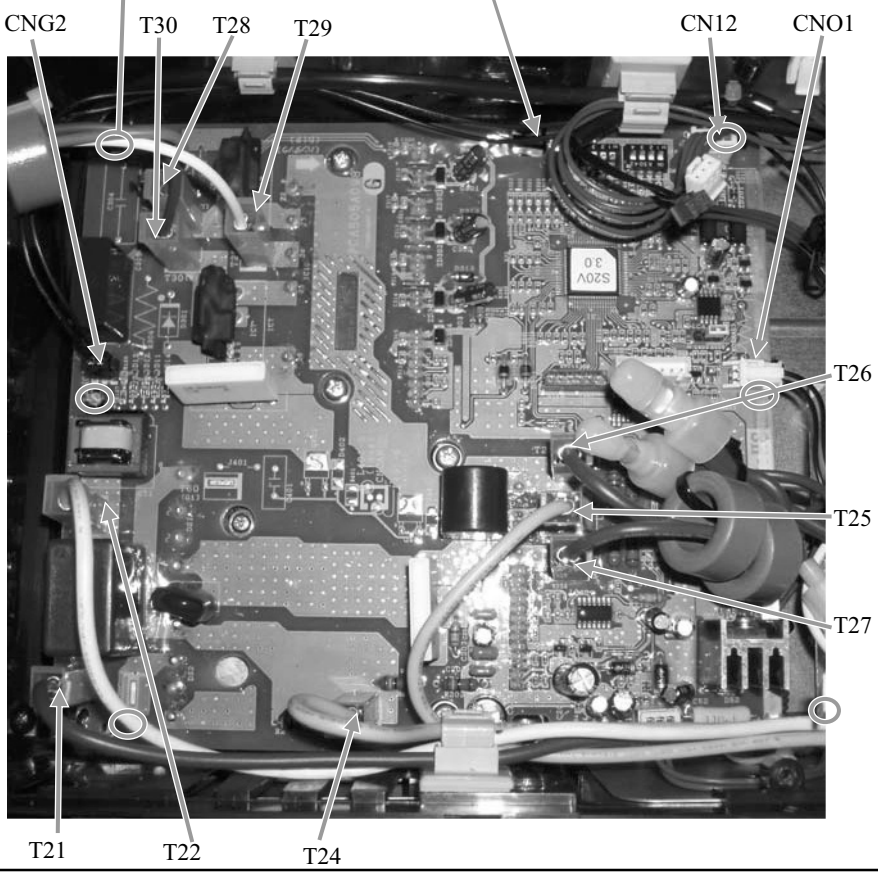


2. Disconnect the connectors.

3. Pinch the head of locking support and remove inverter PCB.



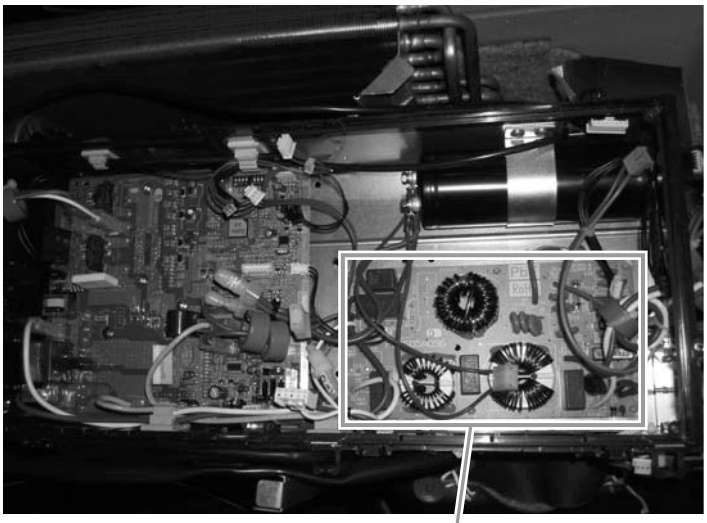
Inveter PCB



Noise filter PCB (PWB3)

1. Remove control PCB first.

Note: Be sure to do this work aftter elapsing 3 minutes from power OFF.



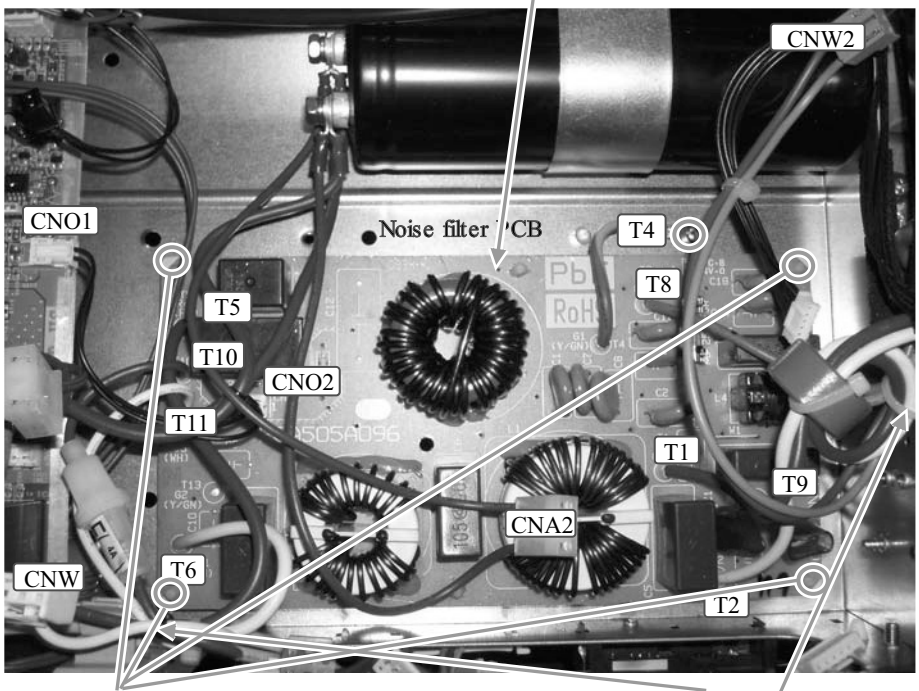
3. Cut straps.

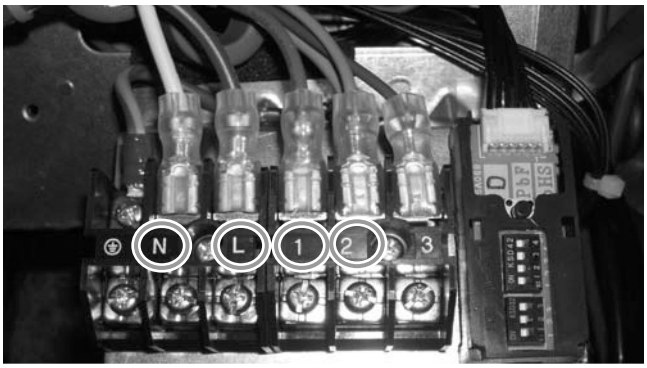
4. Disconect the connectors CNA2 and CNO2 on the noise filter PCB.

5. Unscrew and remove the grounding cable (T4).

6. Disconnect the connectors and terminals as follows.
1) On the inverter PCB
T21 for T5
T22 for T6
2) On the control PCB
CNW for T10 and T11
3) On the terminal block
L1 for T1
N for T2
1 for T8
2 for T9

7. Pinch the head of locking supports and remove the noise filter PCB.

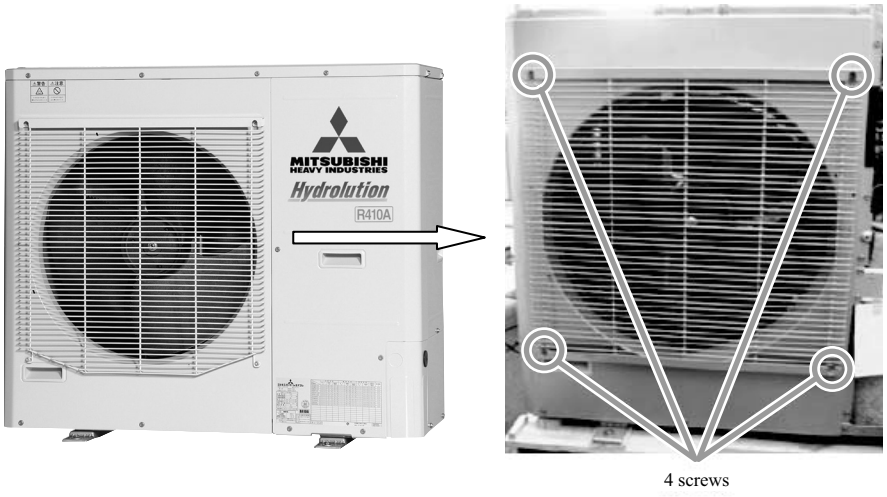




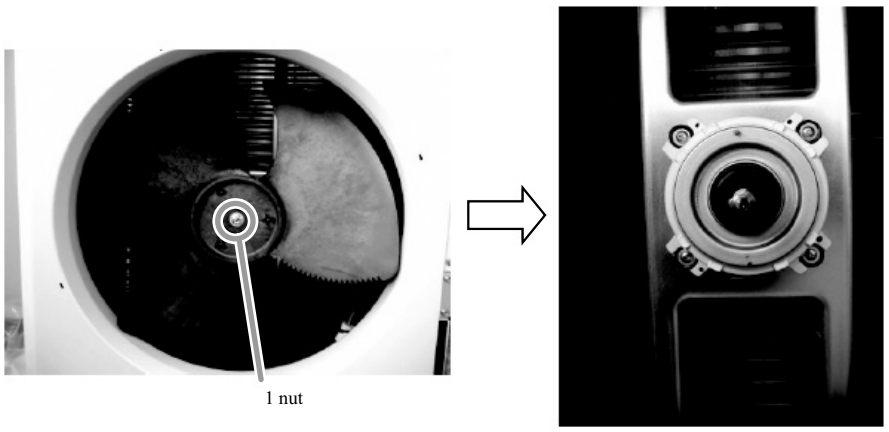
FDCW100VNX

Fan and fan motor (FMo1)

1. Loosen 4 screws and remove the fan grille.

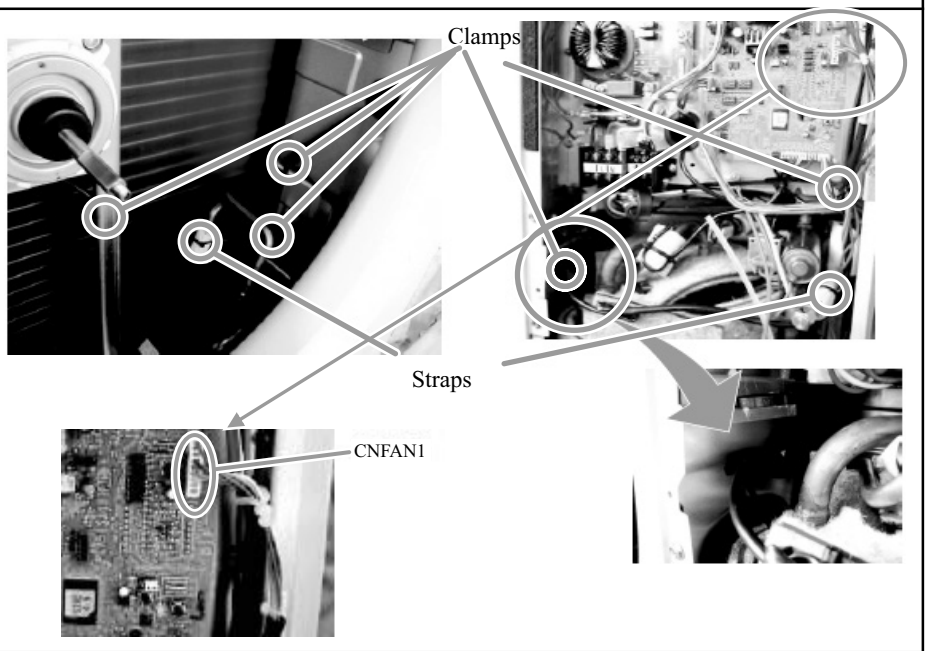


2. Loosen the nut and remove the fan propeller.



3. Detach the clamps and cut off the straps.

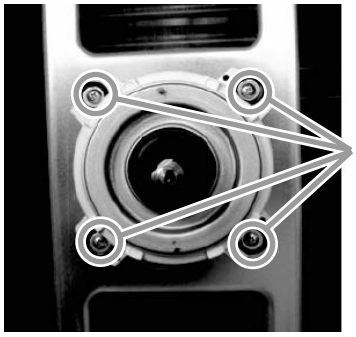
4. Disconnect the connector of CNFAN1.



Fan and fan motor (FMo1)

5. Loose 4 screws.

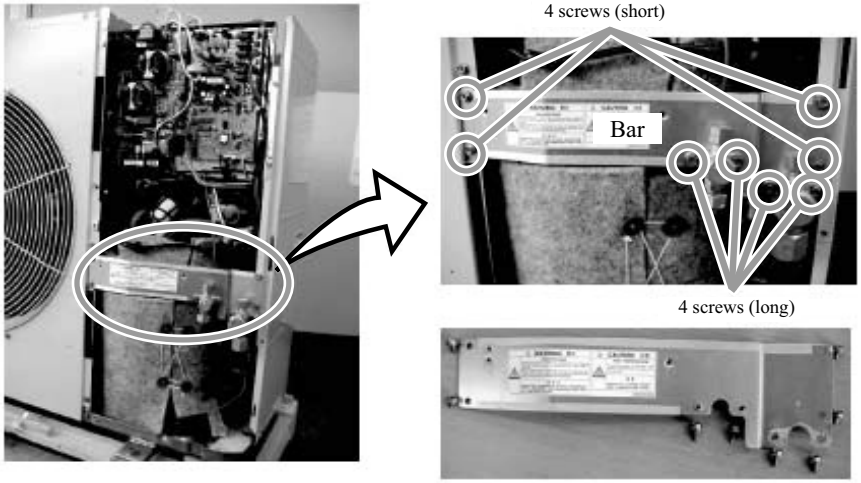
6. Remove the fan motor.



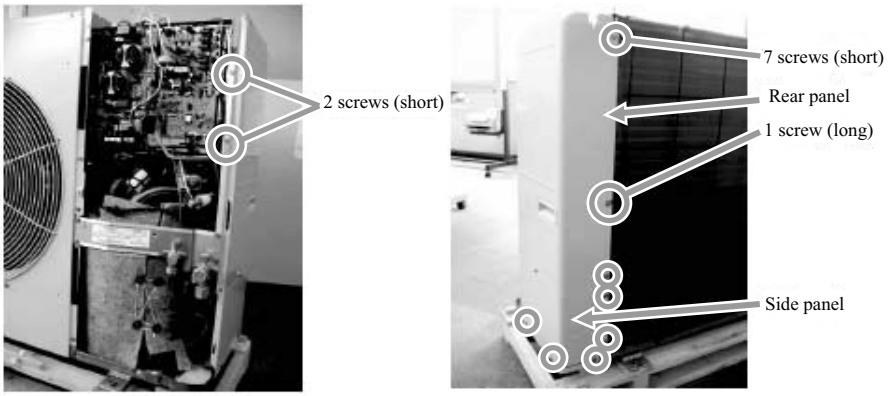
Compressor (CM)

1. Loosen screws and remove the service panel and top panel.

2. Loosen 4 short screws and 4 long screws and then remove the bar for easy access to the compressor.



3. Loosen screws and remove the side panel.

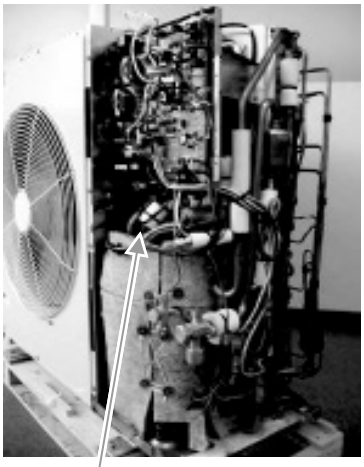


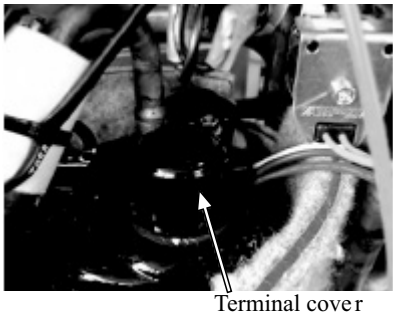
Compressor (CM)

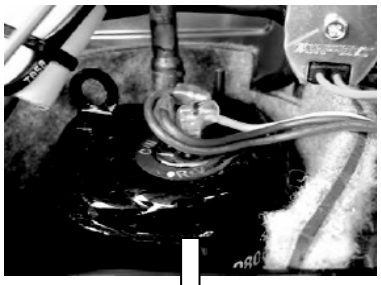
4. Remove the top insulation.

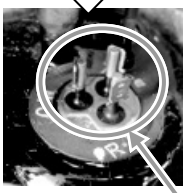
5. Remove the terminal cover.

6. Disconnect the fasten terminal connectors from compressor.
U: Red cable
V: White cable
W: Blue cable

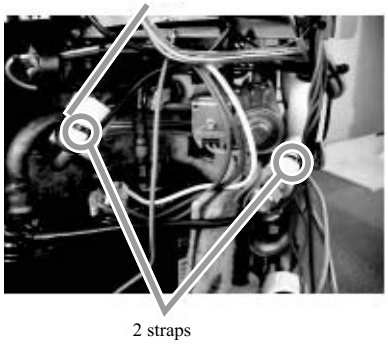








7. Cut off the strap and pull out the sensor (Tho-D).



8. Remove the control unit for easy replacement work of compressor according to following procedure.

1) Disconnect all connectors shown in the photo.

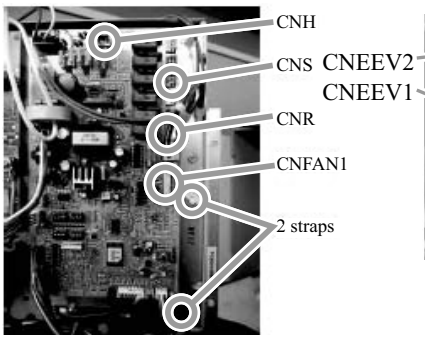
2) Cut off the straps.

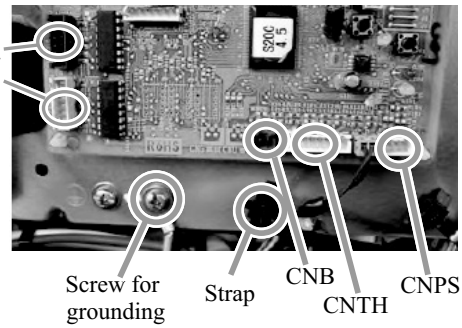
3) Unscrew and disconnect the grounding cable.

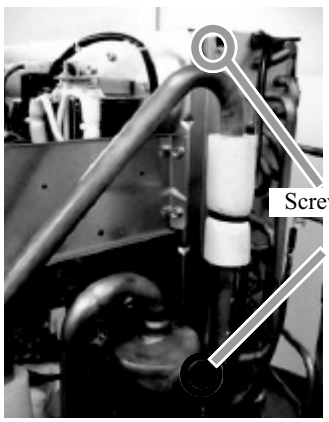
4) Loosen the screws shown in the photo.

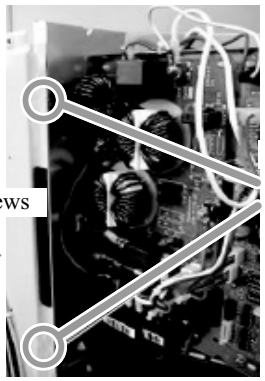
5) Remove the control unit.

Note: Be sure to do above work after elapsing 3 minutes from power OFF.







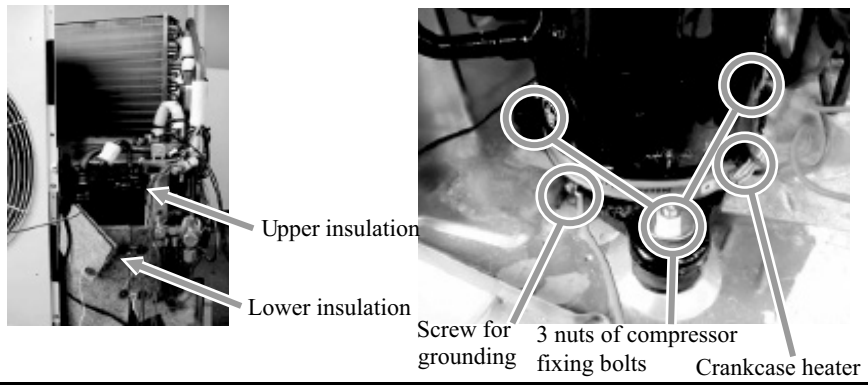


Compressor (CM)

9. Untie the strings and remove the insulations.

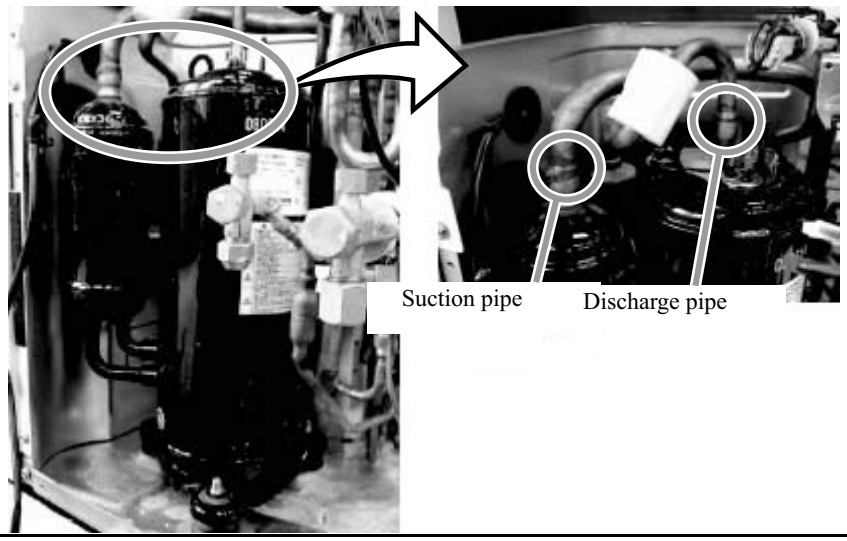
10. Unscrew and disconnect the grounding cable.

11. Loosen 3 nuts of compressor fixing bolts.



12. Disconnect the pipes for suction and discharge.

13. Remove the compressor.

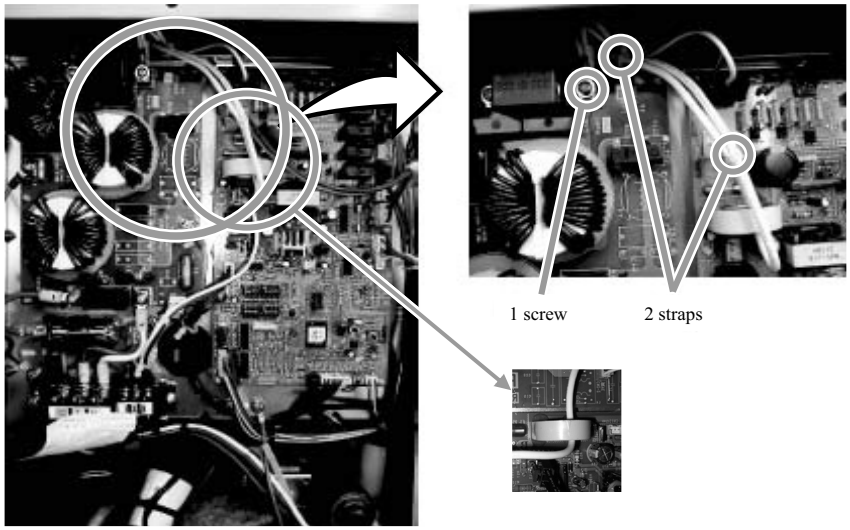


Control PCB (PWB1)

1. Unscrew and disconnect the cable.

2. Cut the straps and take the cable out from CT hole as shown in the photo.

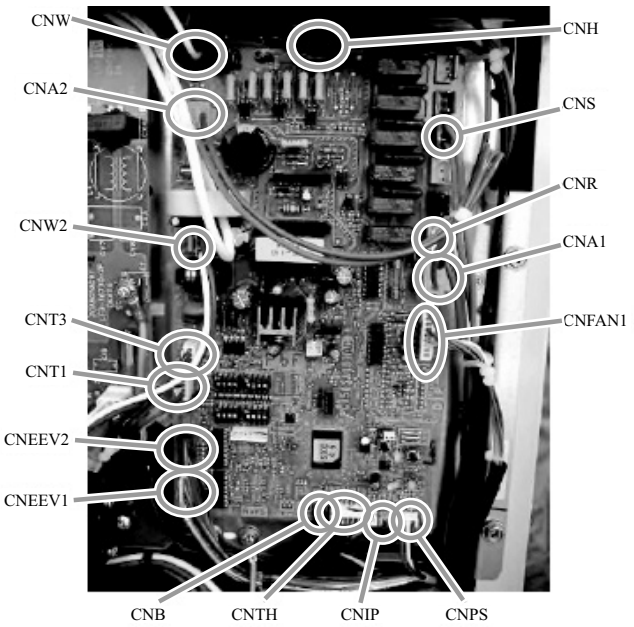
Note: Be sure to do this work after elapsing 3 minutes from power OFF.



Control PCB (PWB1)

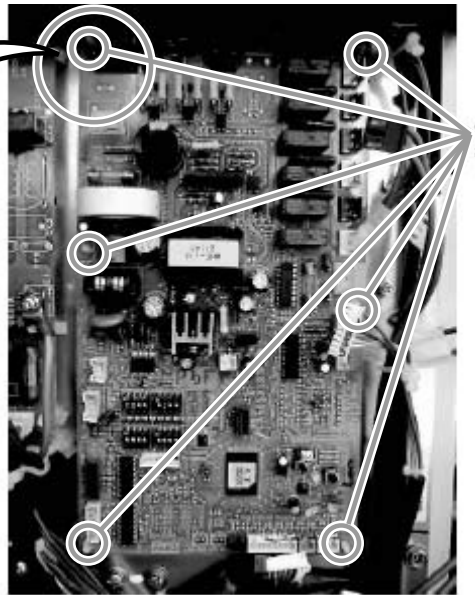
3. Disconnect all connectors.

Control PCB



4. Pinch the head of locking supports and remove the control PCB.

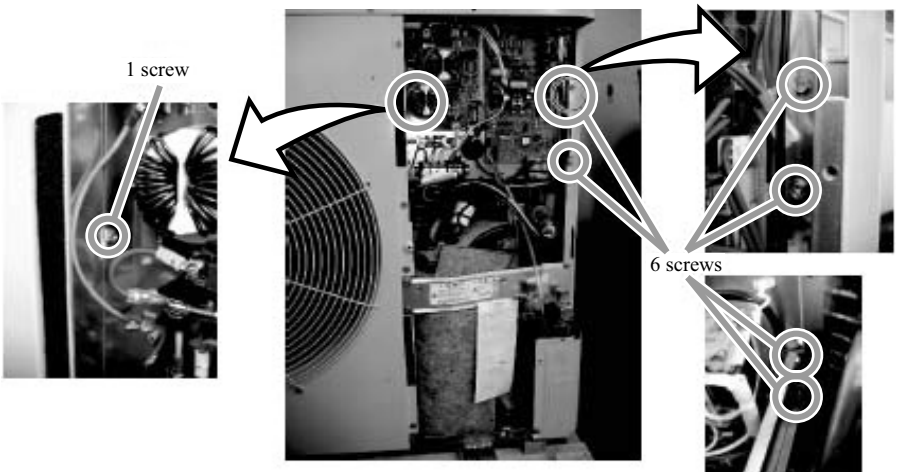
Locking support



Inverter PCB (PWB2)

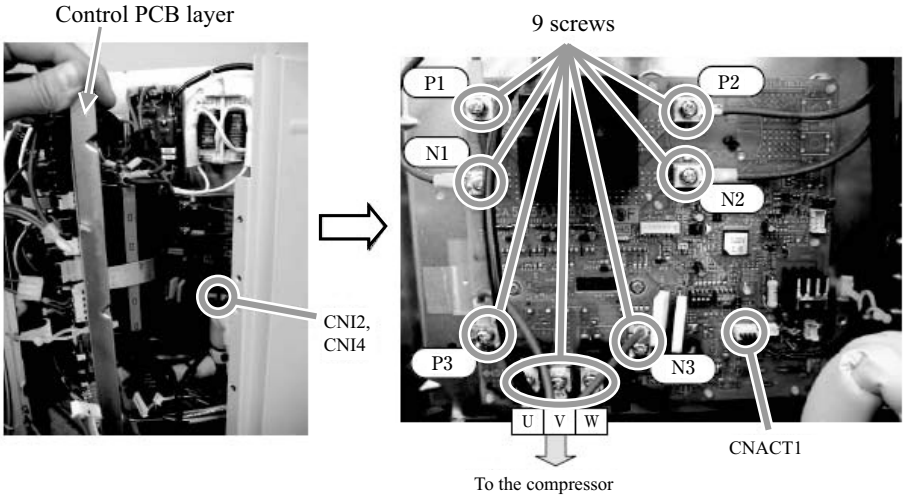
1. Loosen 7 screws and remove the control PCB layer.

Note: Be sure to do this work after elapsing 3 minutes from power OFF.

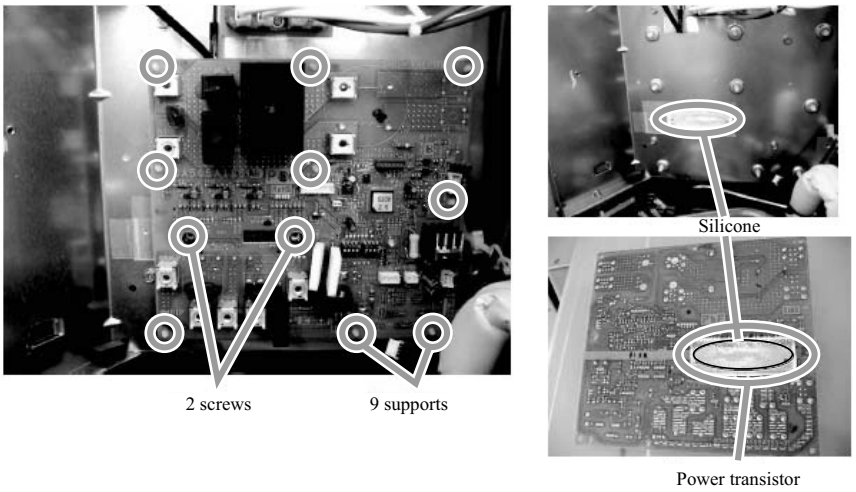


2. Disconnect the connectors of CNI2, CNI4 and CNACT1.

3. Loosen 9 screws and disconnect the cables.



4. Loosen 2 screws and pinch the heads of 9 locking supports and then remove inverter PCB.

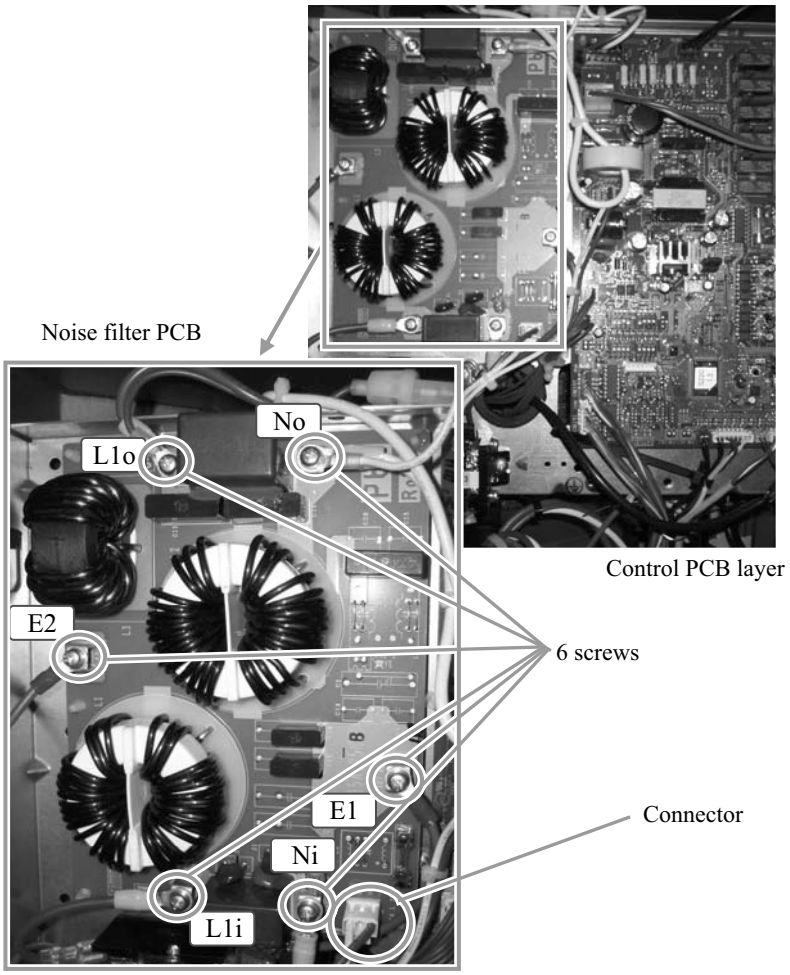


Noise filter PCB (PWB3)

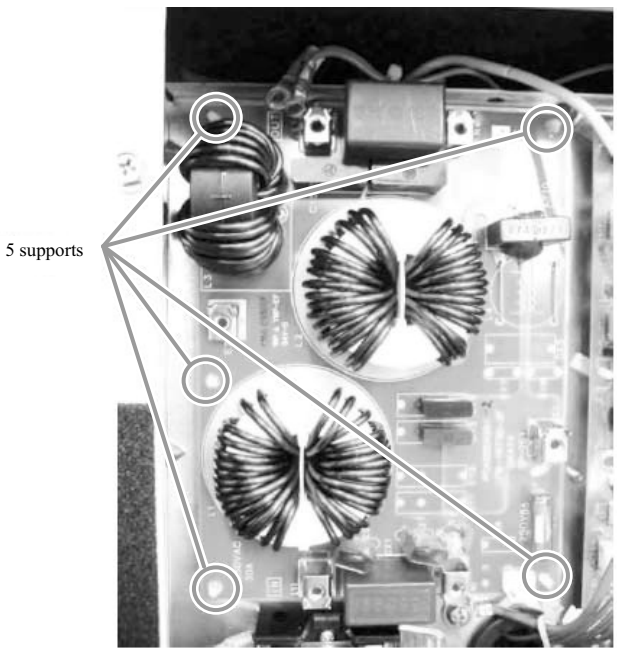
1. Loosen 6 screws and disconnect the cables.

2. Disconnect the connector.

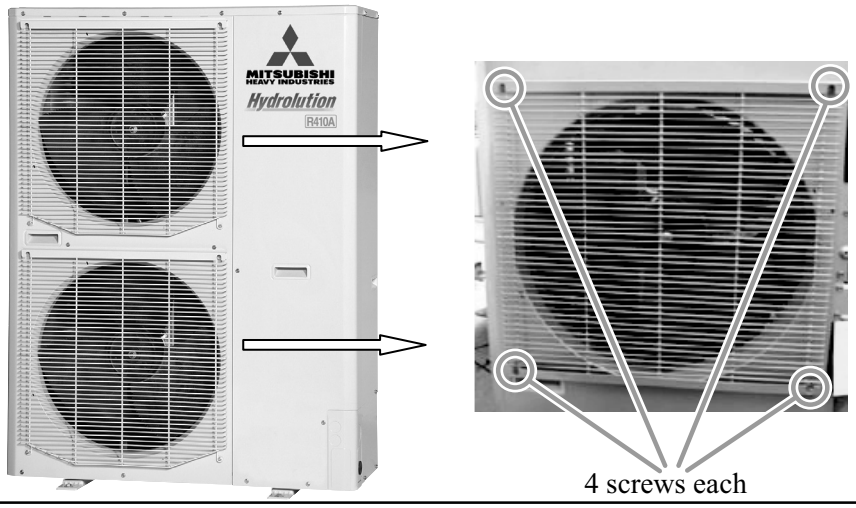
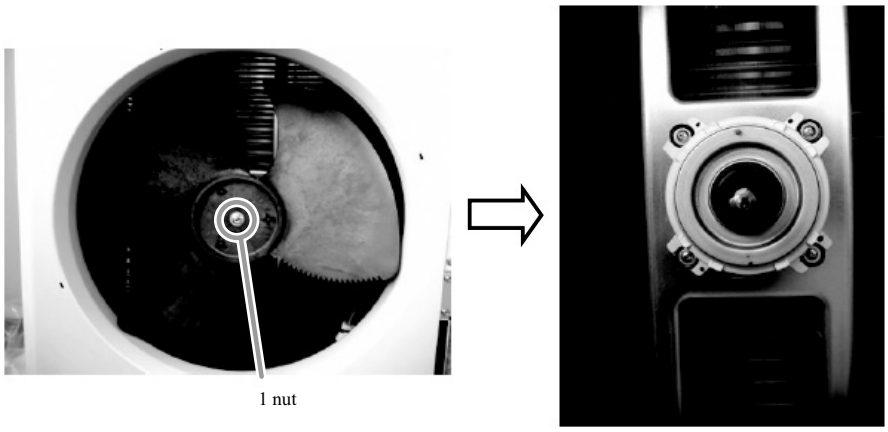
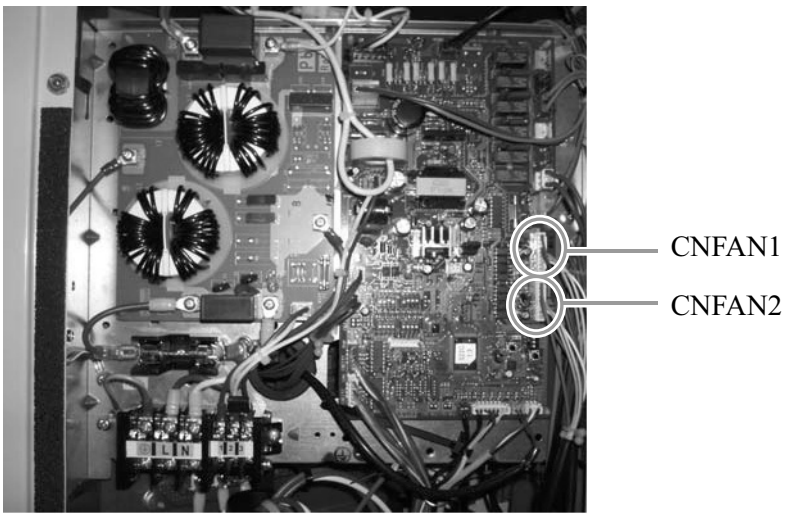
Note: Be sure to do this work after elapsing 3 minutes from power OFF.



3. Pinch the head of locking supports and remove the noise filter PCB.

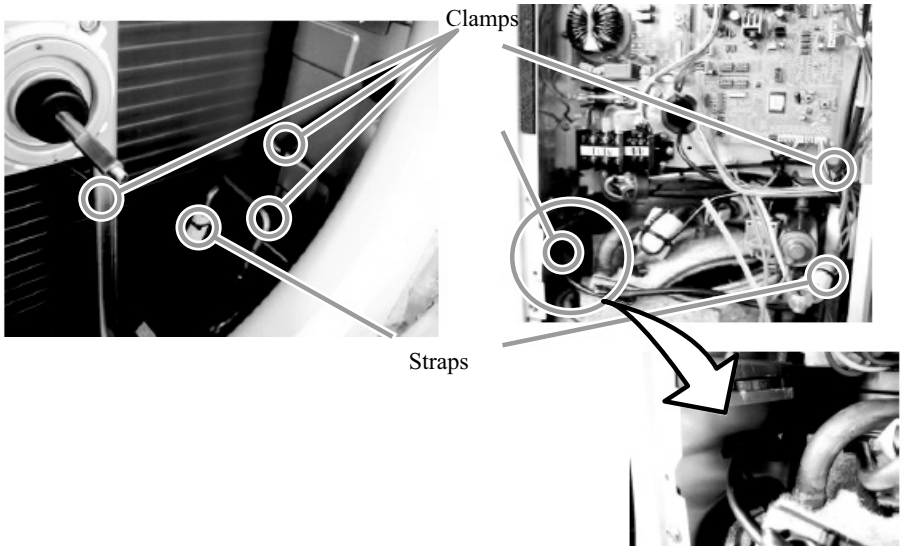


FDCW140VNX

Fan and fan motor (FMo1& FMo2)	
1. Loosen the screws and remove the fan grille for upper fan (FMo1) and/or lower fan (FMo2).	
2. Loosen the nut and remove the fan propeller for upper fan (FMo1) and/or lower fan (FMo2).	
3. Disconnect the connector of CNFAN1 (for FMo1) and/or CNFAN2 (for FMo2).	

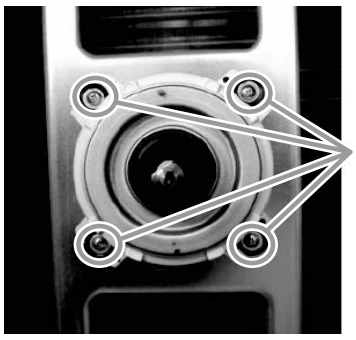
Fan and fan motor (FMo1& FMo2)

4. Detach the clamps and cut off the straps.



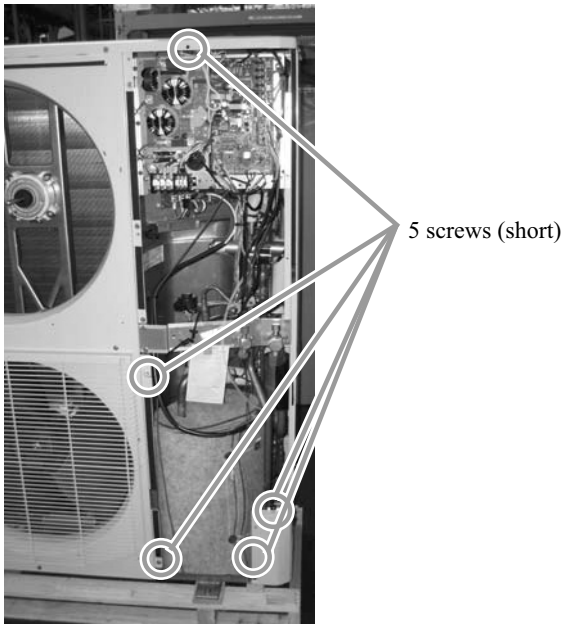
5. Loosen 4 screws.

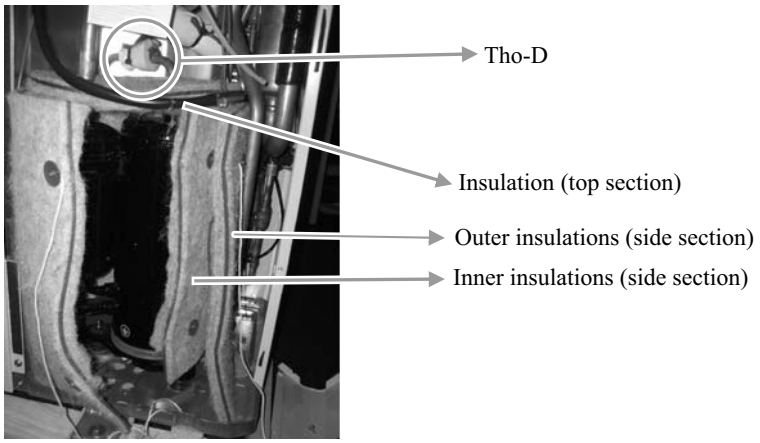
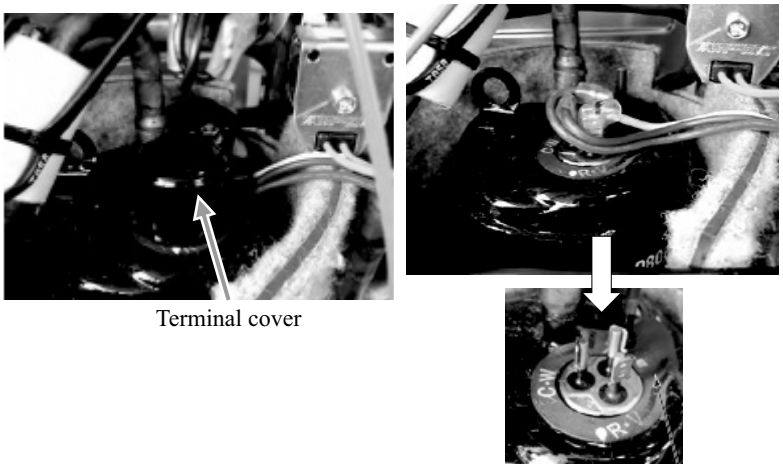
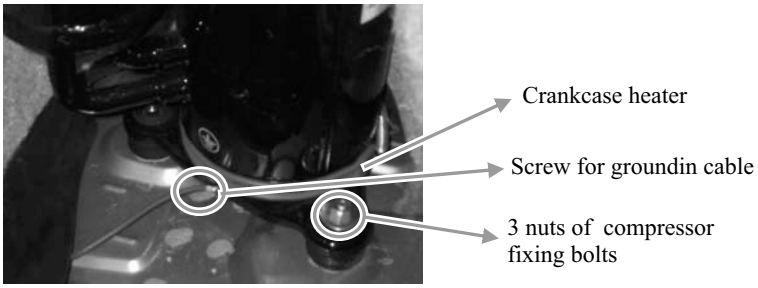
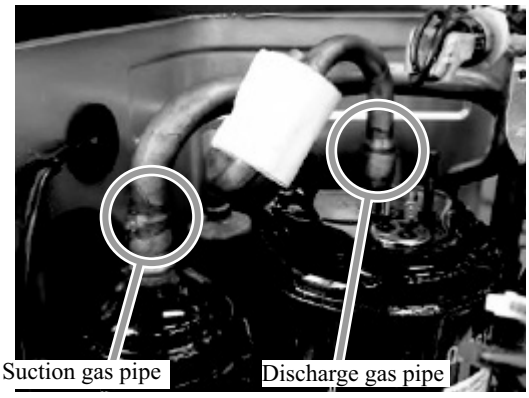
6. Remove the fan motor (FMo1 and/or FMo2).



Compressor (CM)

1. Loosen 5 screws and remove the service panel.



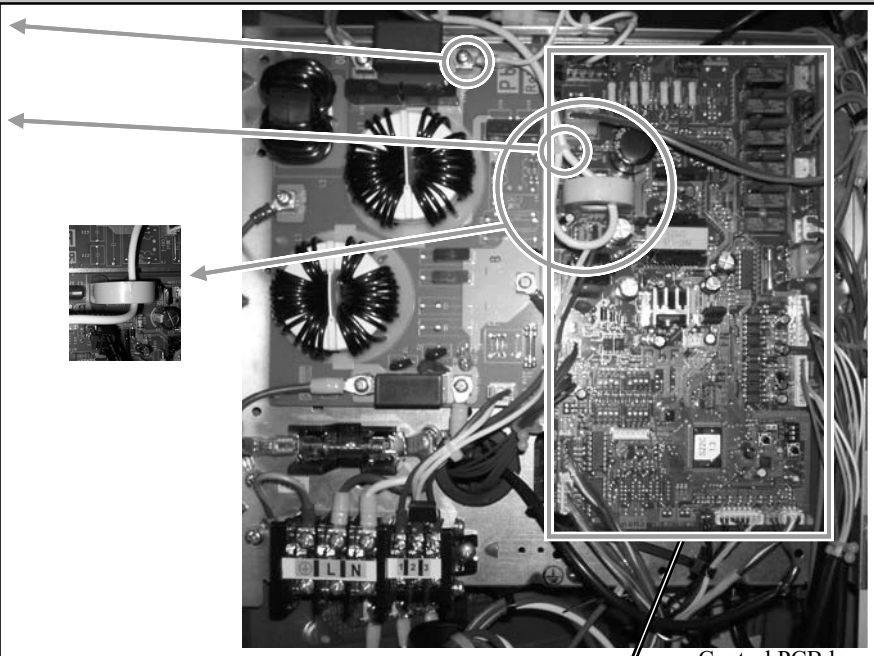
Compressor (CM)	
2. Untie the strings and remove the top and side insulations. **3** Cut off the strap and pull out the sensor (Tho-D).	
4. Remove the terminal cover **5.** Disconnect the fasten connectors from compressor. U: Red cable V: White cable W: Blue cable	
6. Remove the crankcase heater. **7.** Unscrew and disconnect the grounding cable. **8.** Loosen 3 nuts of compressor fixing bolts.	
9. Disconnect the pipes for suction and discharge gas. **10.** Remove the compressor.	

Control PCB (PWB1)

1. Unscrew and disconnect the cable.

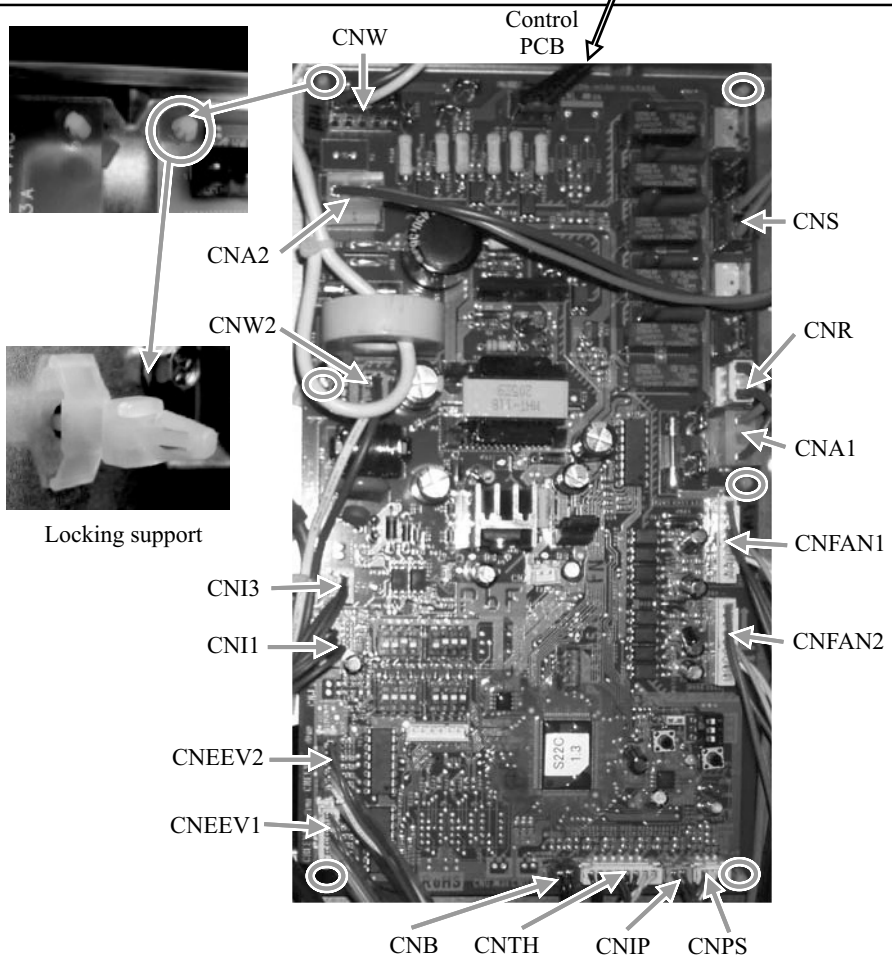
2. Cut the strap and take the cable out from CT hole as shown in the photo.

Note: Be sure to do this work after elapsing 3 minutes from power OFF.



3. Disconnect all connectors.

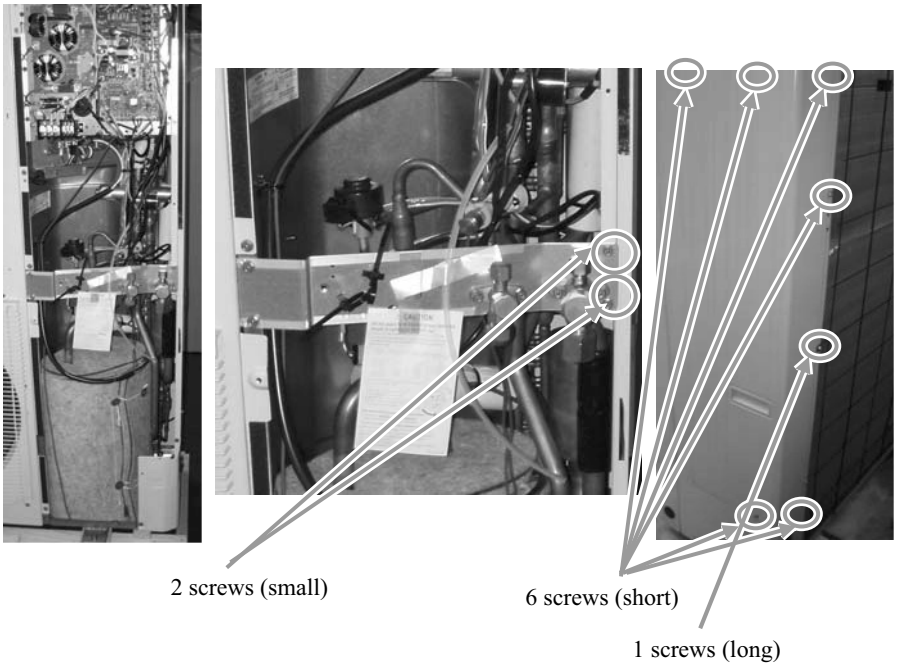
4. Pinch the head of locking supports and remove the control PCB.



Inverter PCB (PWB2)

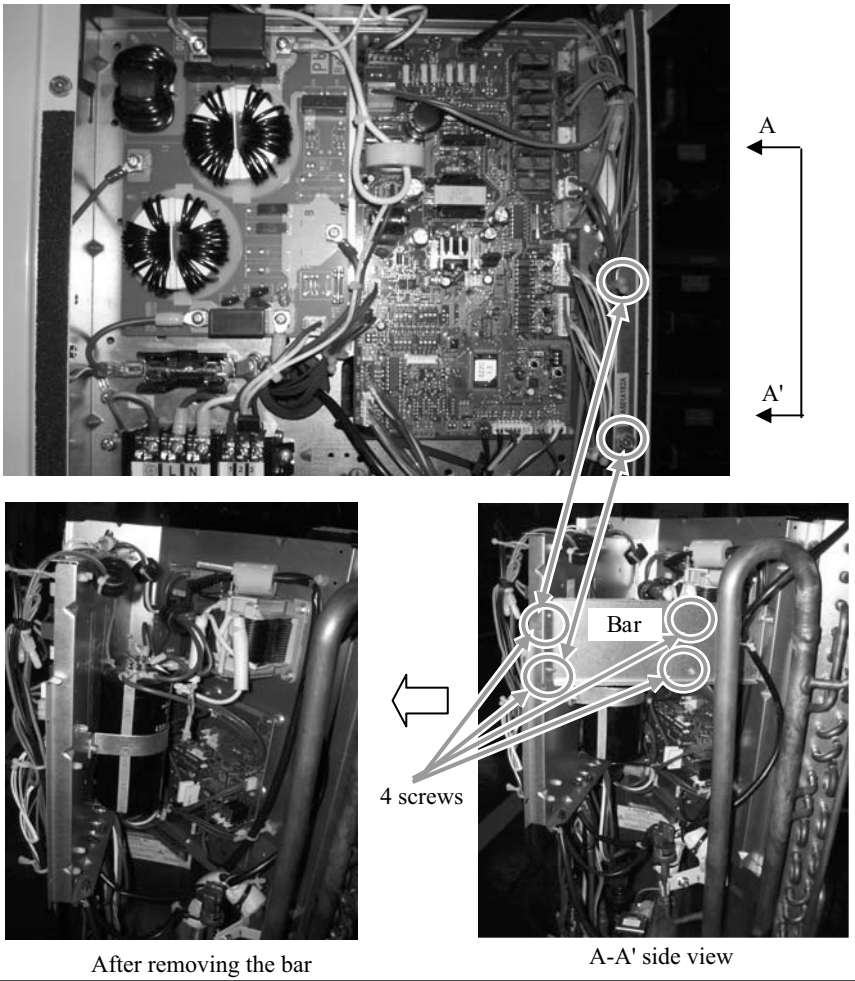
1. Loosen 2 screws on the bar.

2. Loosen 7 screws and remove side pannel.



3. Loosen 4 screws and remove the bar for easy access to the inverter PCB layer.

Note: Be sure to do this work after elapsing 3 minutes from power OFF.



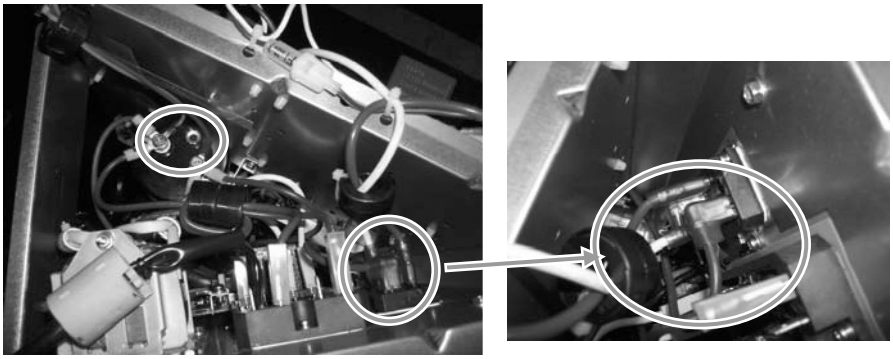
After removing the bar

A-A' side view

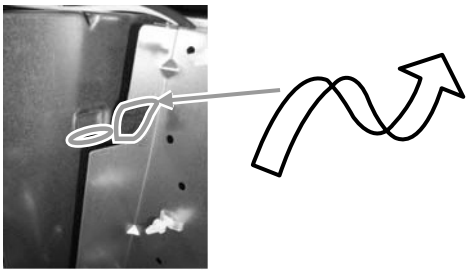
Inverter PCB (PWB2)

4. Loosen a screw on the capacitor and disconnect the red and blue cables which are connected to the control PCB.

5. Disconnect the fasten terminals of red and white cables which are connected to the control PCB.

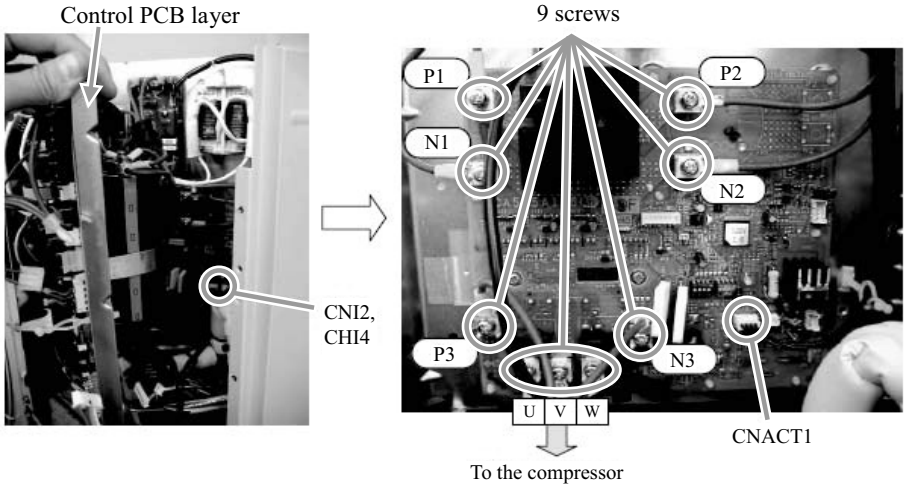


6. Remove the control PCB layer by lifting it up.

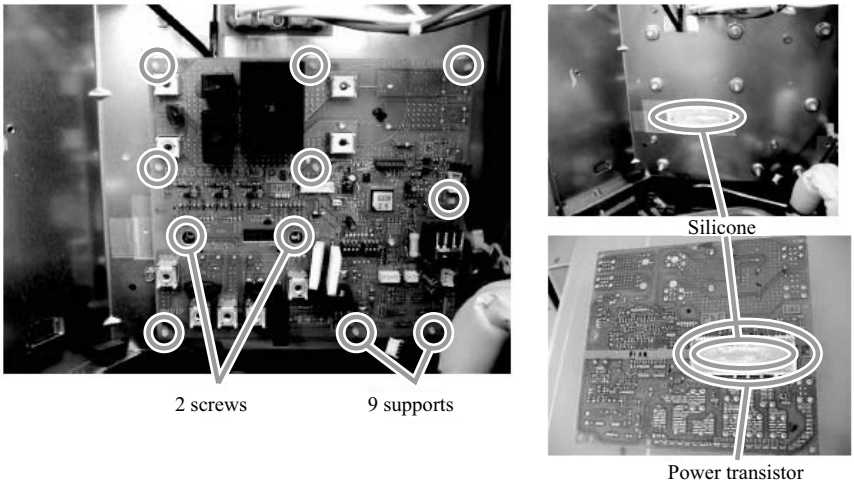


7. Disconnect the connectors of CNI2, CNI4 and CNACT1.

8. Loosen 9 screws and disconnect the cables.



9. Loosen 2 screws and pinch the heads of 9 locking supports and then remove the inverter PCB.

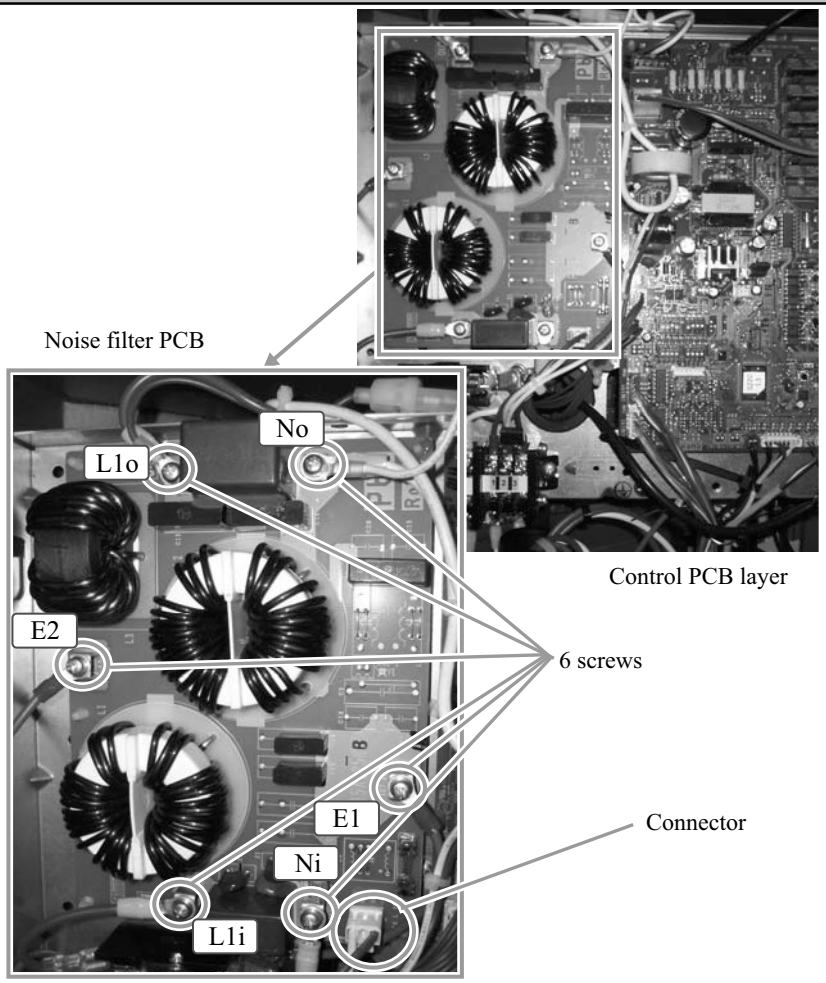


Noise filter PCB (PWB3)

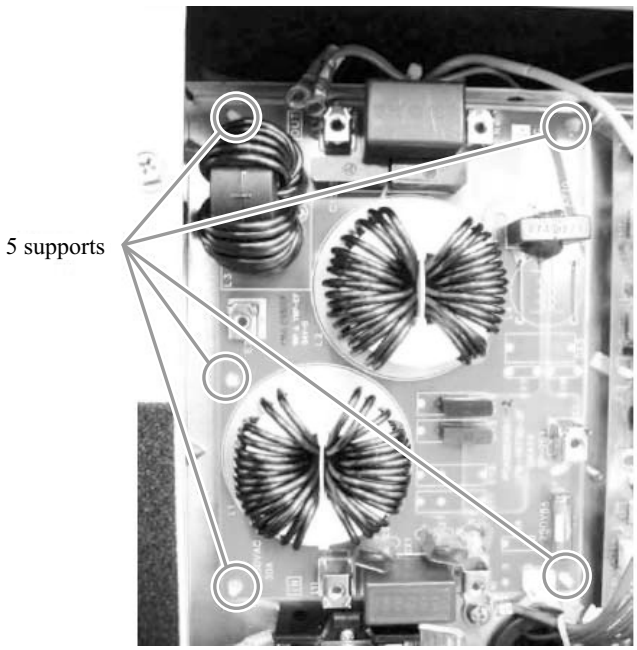
1. Loosen 6 screws and disconnect the cables.

2. Disconnect the connector.

Note: Be sure to do this work after elapsing 3 minutes from power OFF.



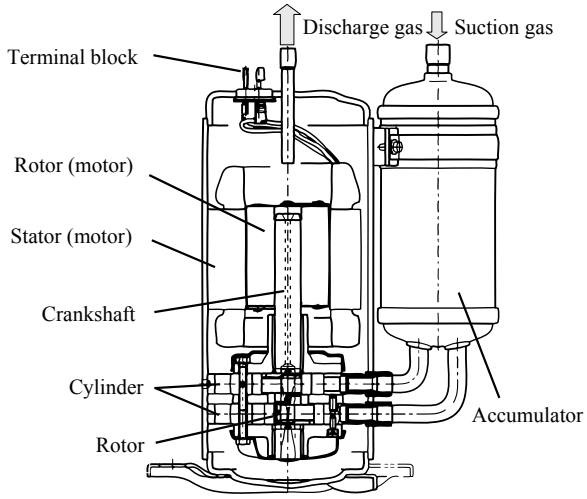
3. Pinch the head of locking supports and remove the noise filter PCB.



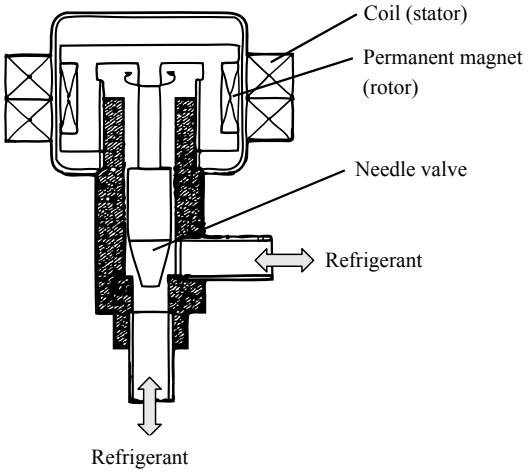
Components

Outdoor unit

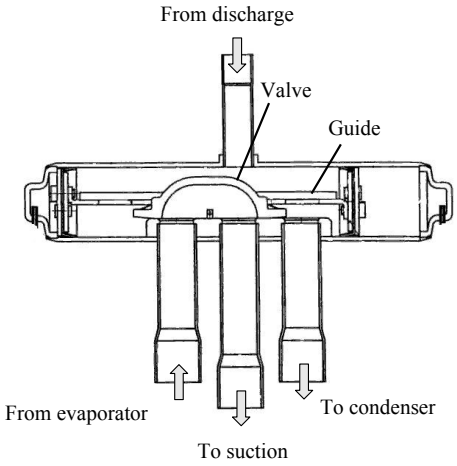
Compressor

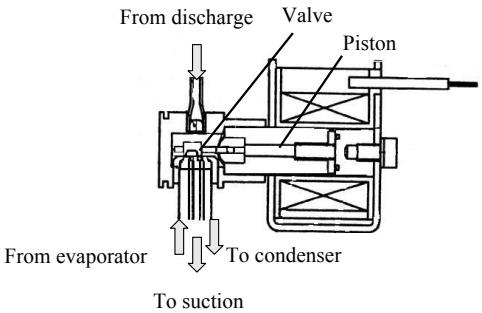


Expansion valve

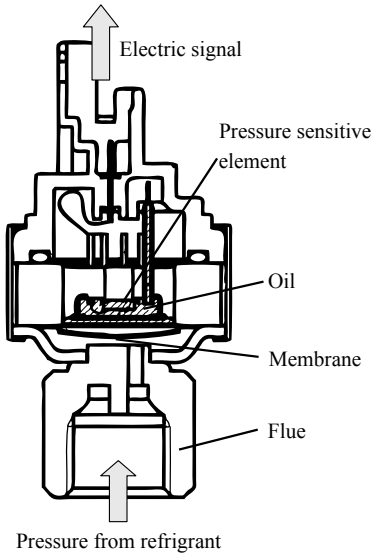


4-way valve



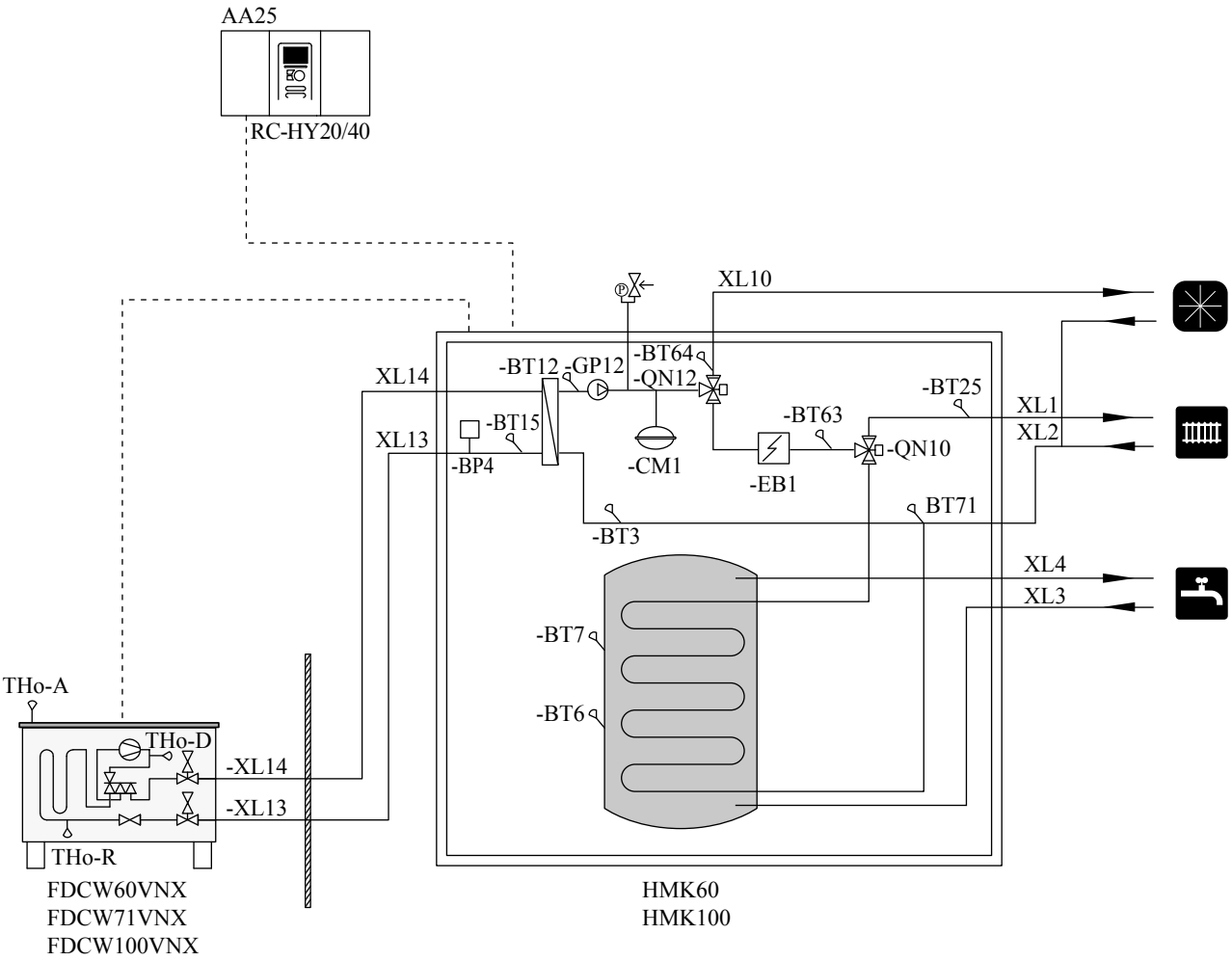


Low pressure sensor



HMK60/HMK100

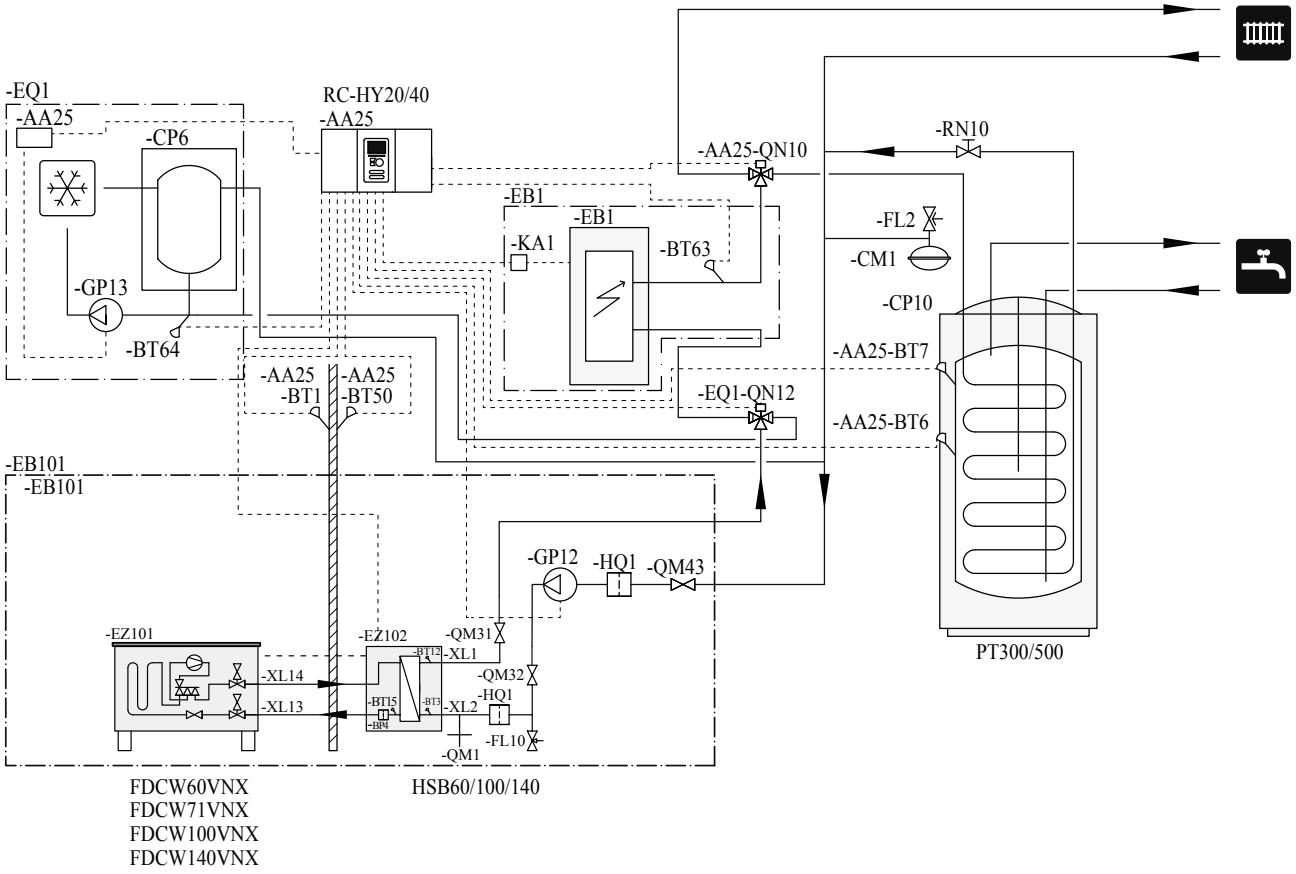
Installation with indoor unit HMK60/HMK100 for hot water and cooling function (4-pipe system)



Please refer to "List of components" (page 303) about meaning of the symbols.

HSB60/HSB100/HSB140

Installation with indoor unit HSB60/HSB100/HSB140, tank PT300/PT500, controller RC-HY20/40 with step controlled additional heat before reversing valve for hot water and cooling function (4-pipe system)



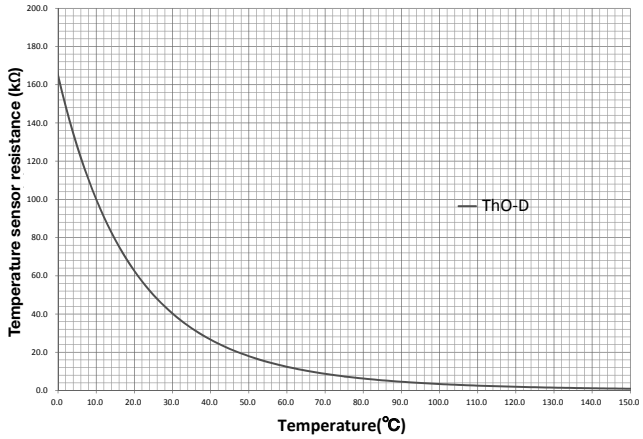
Explanation

AA25	Controller
BT1	Outdoor sensor[1)]
BT6	Temperature sensor, hotwater charging[1)]
BT7	Temperature sensor, hot water top[1)]
BT25	Temperature sensor, external supply line[1)]
BT63	Temperature sensor, external supply line after electric heater
BT71	Temperature sensor, external return line[1)]
Tho-A	Temperature sensor, Outdoor air
Tho-D	Temperature sensor, hot gas
Tho-R	Temperature sensor, heat exchanger out

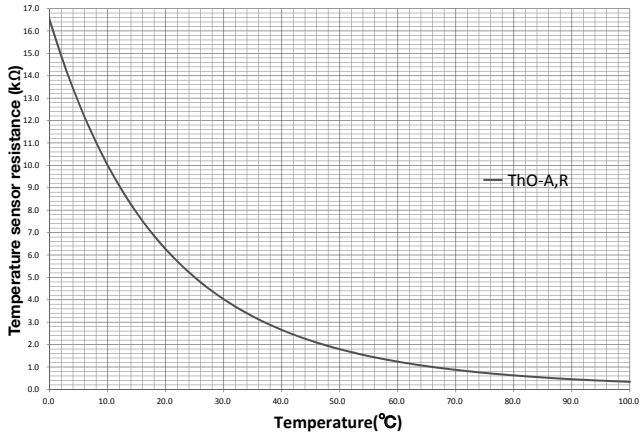
Temperature sensor

Data for sensor in outdoor unit

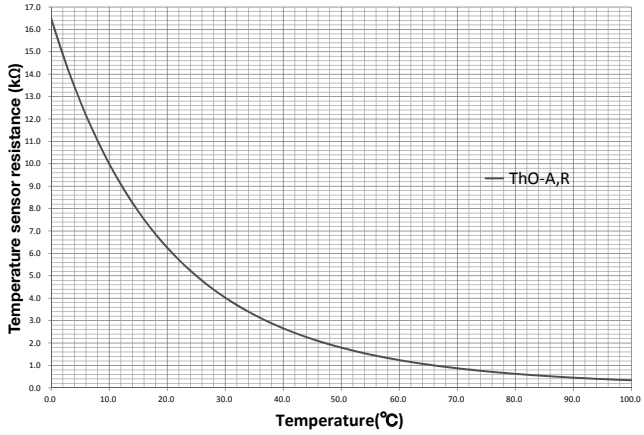
Tho-D



Tho-R



Tho-A

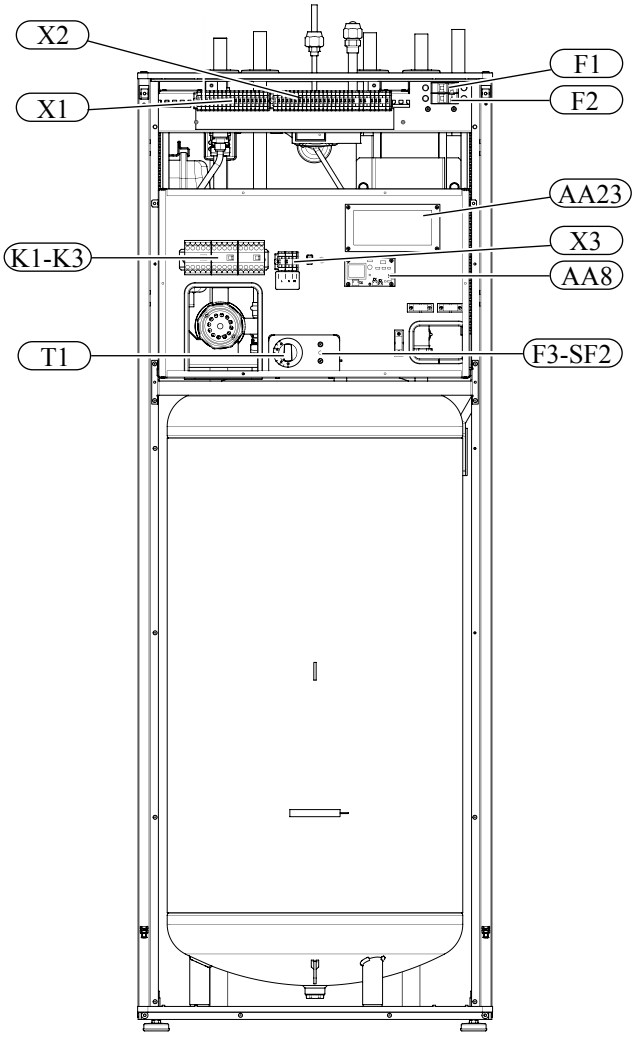


Temperature (°C)	Resistance (kΩ)	Voltage (VDC)
-40	351.0	3.256
-35	251.6	3.240
-30	182.5	3.218
-25	133.8	3.189
-20	99.22	3.150
-15	74.32	3.105
-10	56.20	3.047
-5	42.89	2.976
0	33.02	2.889
5	25.61	2.789
10	20.02	2.673
15	15.77	2.541
20	12.51	2.399
25	10.00	2.245
30	8.045	2.083
35	6.514	1.916
40	5.306	1.752
45	4.348	1.587
50	3.583	1.426
55	2.968	1.278
60	2.467	1.136
65	2.068	1.007
70	1.739	0.891
75	1.469	0.785
80	1.246	0.691
85	1.061	0.607
90	0.908	0.533
95	0.779	0.469
100	0.672	0.414

Component positions

Indoor unit

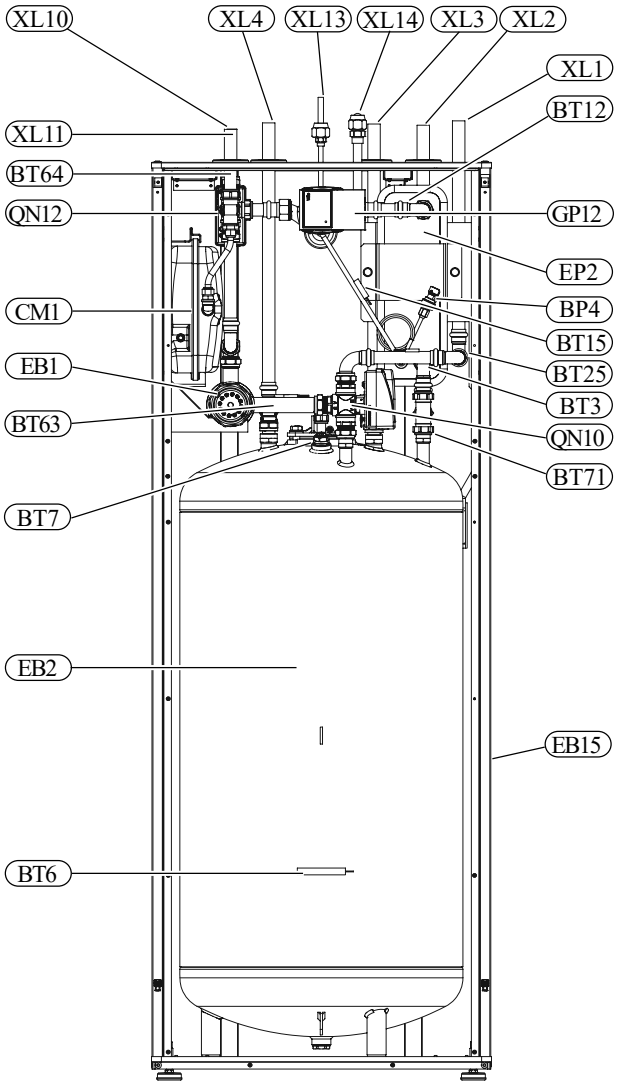
HMK60/HMK100



Explanation

X1	Terminal block, sensors
X2	Terminal block, power source
X3	Terminal block
SF1	Controller switch
K1-K3	Submersible heater contact
T1	Thermostat, standby mode
F3	Temperature limiter
AA8	Titanium anode board
AA23	Communication board
F1	Circuit breaker, outdoor unit
F2	Circuit breaker, controller
UB1	Cable grommet
UB2	Cable grommet
F3-SF2	Reset botton, temperature limiter

HMK60/HMK100



Pipe connections

XL1 ( )	Connection, heating medium, supply
XL2 ( )	Connection, heating medium, return
XL3	Connection, cold water
XL4	Connection, hot water
XL10	Connection, cooling
XL11	Connection, safety group, manometer
XL13	Connection, liquid cooling medium
XL14	Connection, gas cooling medium

HVAC elements

CM1	Diaphragm expansion vessel, closed
QN10	Isolation valve, domestic hot water/central heating
QN12	Isolation valve, cooling/heating
GP12	Circulation pump
EP2	Heat exchanger

Sensors

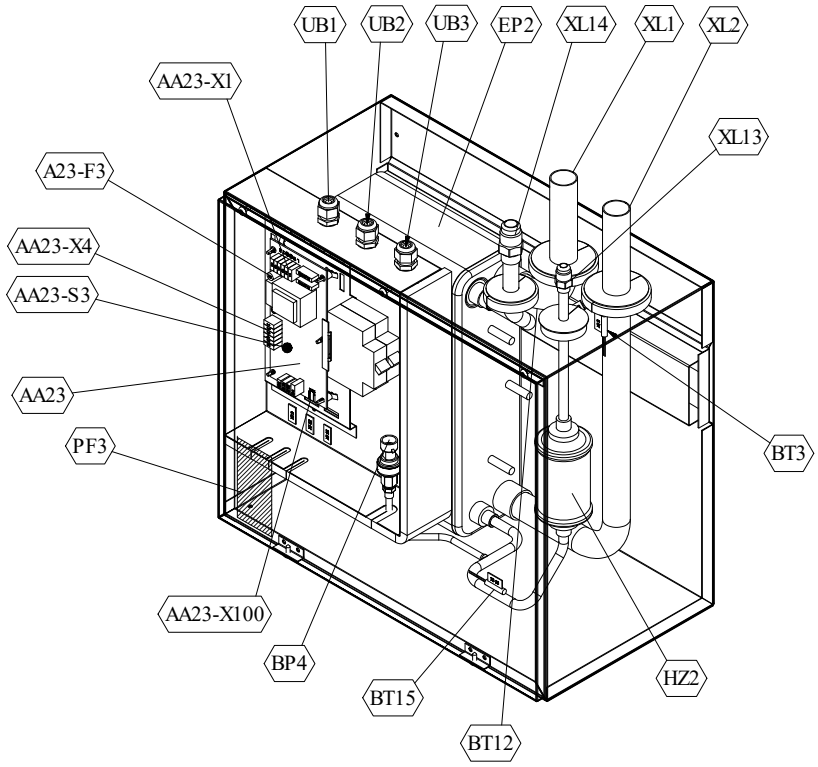
BP4	Pressure sensor, high pressure
BT3	Temperature sensor, heating medium return
BT6	Temperature sensor, hot water loading
BT7	Temperature sensor, top of the hot water heater
BT12	Temperature sensor, condenser outlet
BT15	Temperature sensor, liquid
BT25	Temperature sensor, heating medium supply
BT63	Temperature sensor, heating medium supply downstream the submersible heater
BT64	Temperature sensor, cooling medium supply
BT71	Temperature sensor, heating medium re- turn

Others

EB15	HMK 60
PF3	Serial number
EB2	Domestic hot water tank

Over view and design

HSB60/HSB100/HSB140



Symbol	Pipe connection
XL1 (Red mark)	Climate system supply ø22 mm
XL2 (Blue mark)	Climate system return ø22 mm
XL14	Refrigerant connection, gas line, 1/4 ″ (60), 3/8 ″ (100, 140)
XL13	Refrigerant connection, liquid line, 1/2 ″ (60), 5/8 ″ (100, 140)

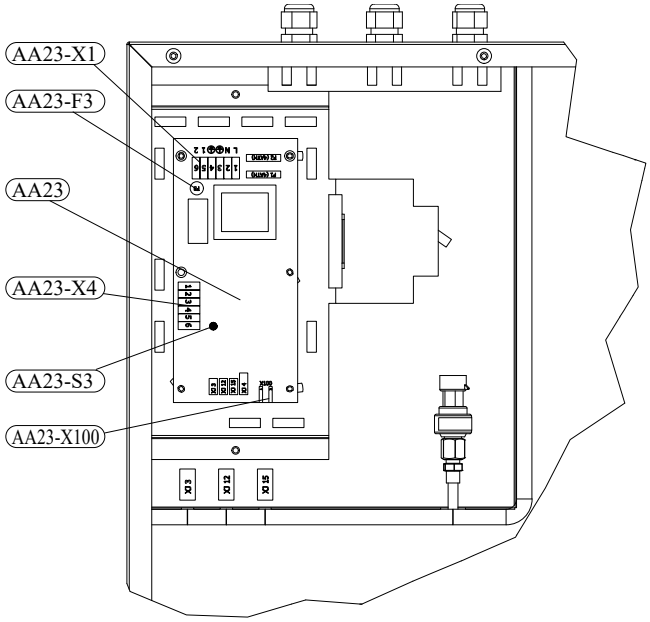
Symbol	Sensor, thermostats
BP4	Pressure sensor, high pressure
BT3	Temperature sensor, heating medium, return
BT12	Temperature sensor, condenser, supply
BT15	Temperature sensor, fl uid pipe

Symbol	Valves etc.
EP2	Heat exchanger
HQ1	Particle filter (supplied)
HZ2	Drying filter

Symbol	Miscellaneous
UB1	Cable gland
UB2	Cable gland
UB3	Cable gland

Symbol	Electrical components
AA23	Communication board
AA23-F3	Fuse for external heating cable
AA23-S3	DIP switch, addressing of outdoor unit
AA23-X1	Terminal block, incoming supply, connection of KVR
AA23-X4	Terminal block, communication with indoor module / control module
AA23-X100	Terminal block, communication outdoor module
X1	Terminal block, incoming component

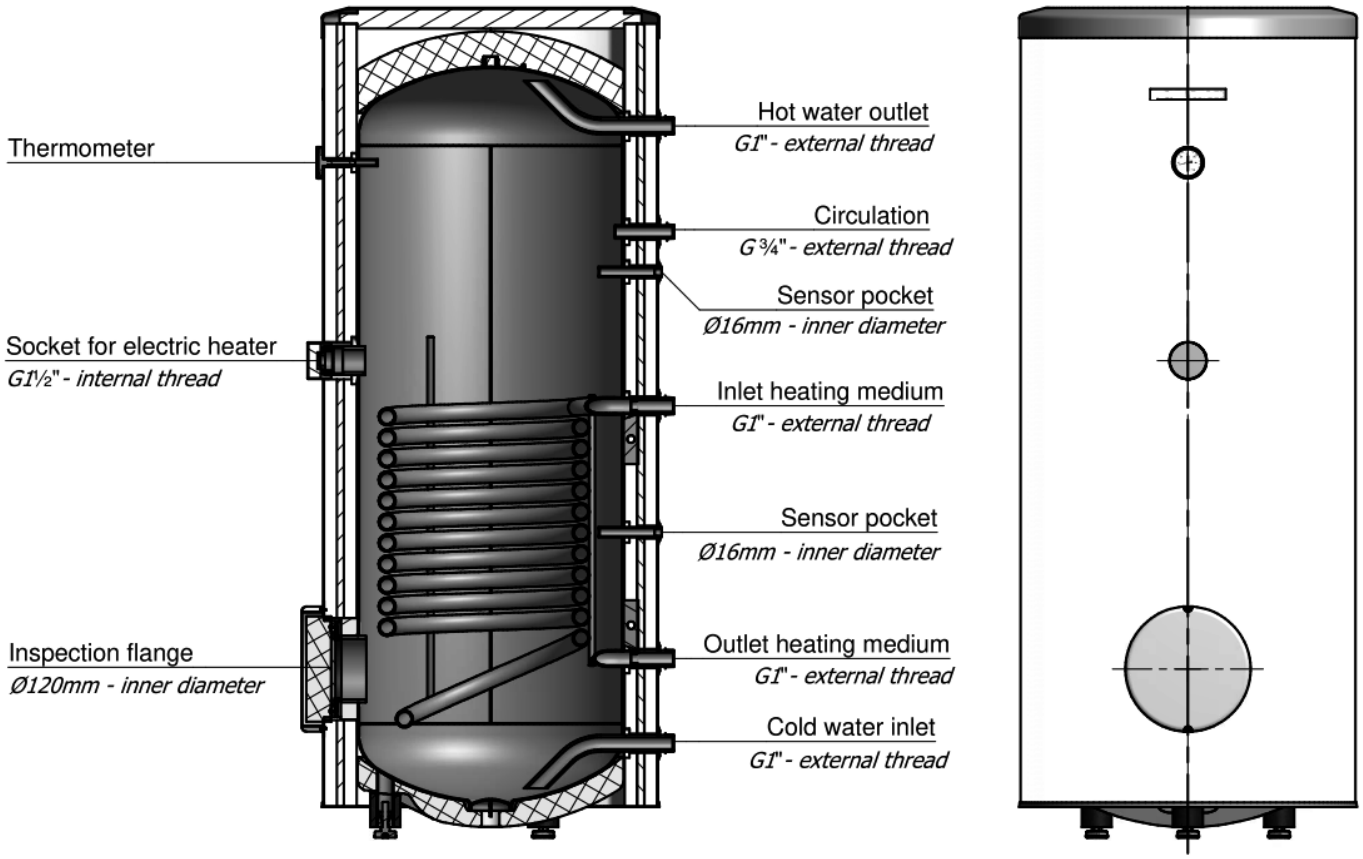
HSB60



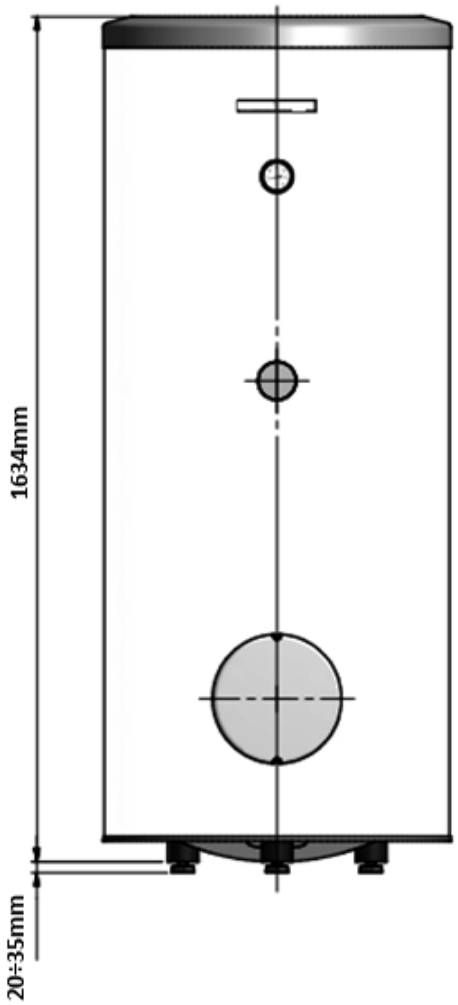
Explanation

AA23	Communication board
AA23-F3	Fuse for external heating cable
AA23-S3	DIP switch, addressing of outdoor unit
AA23-X1	Terminal block, incoming supply
AA23-X4	Terminal block, communication with indoor module / control module
AA23-X100	Terminal block, communication outdoor module FDCW

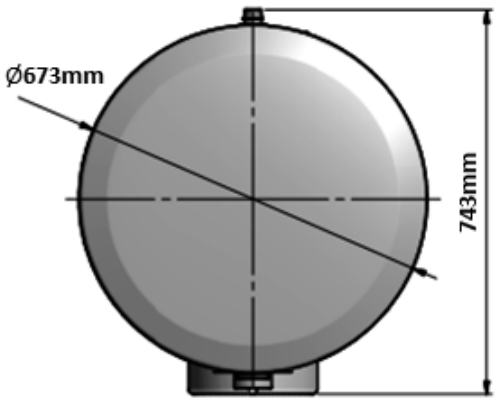
PT300


Thermometer
Socket for electric heater
G1½" - internal thread
Inspection flange
Ø120mm - inner diameter
Hot water outlet
G1" - external thread
Circulation
G ¾" - external thread
Sensor pocket
Ø16mm - inner diameter
Inlet heating medium
G1" - external thread
Sensor pocket
Ø16mm - inner diameter
Outlet heating medium
G1" - external thread
Cold water inlet
G1" - external thread

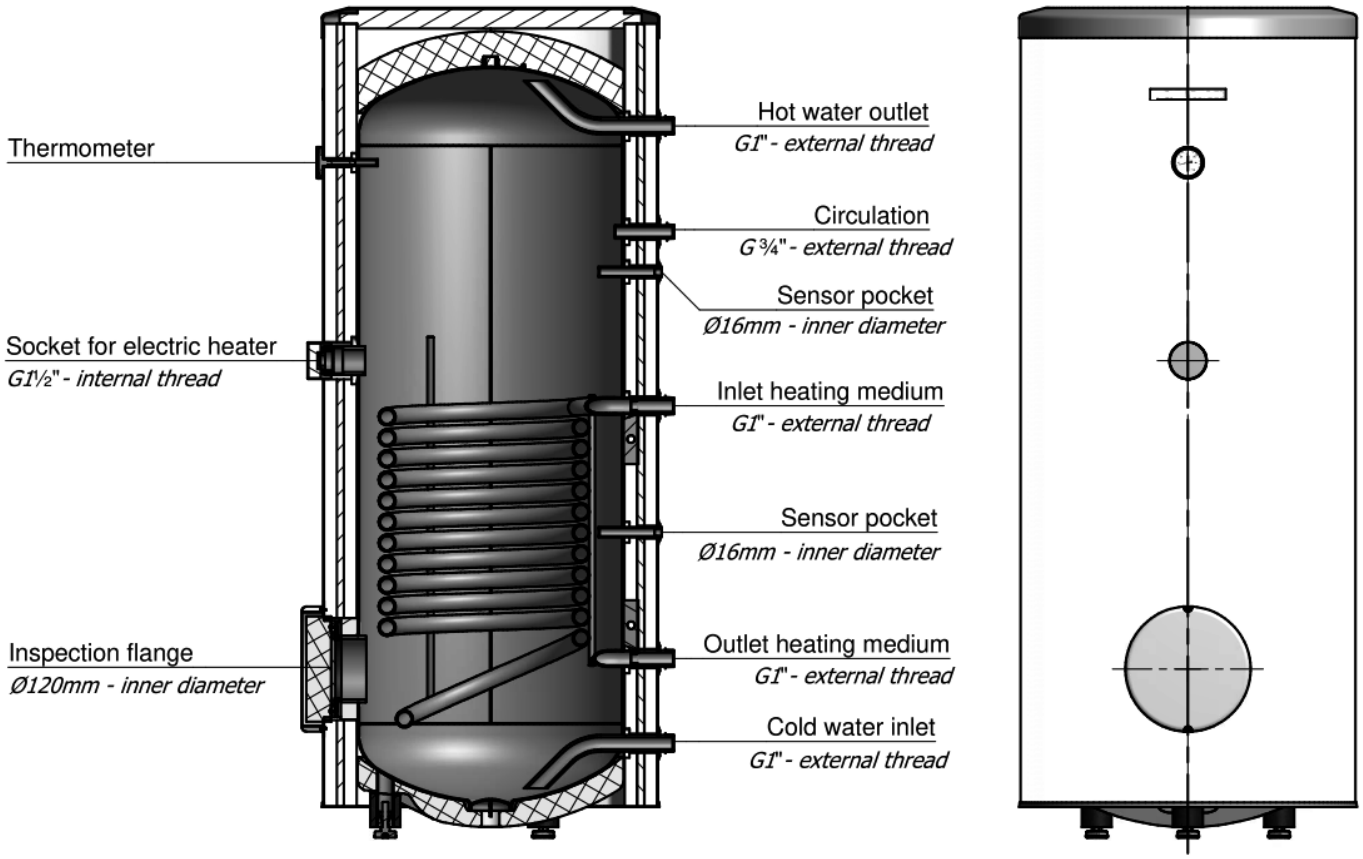
PT300



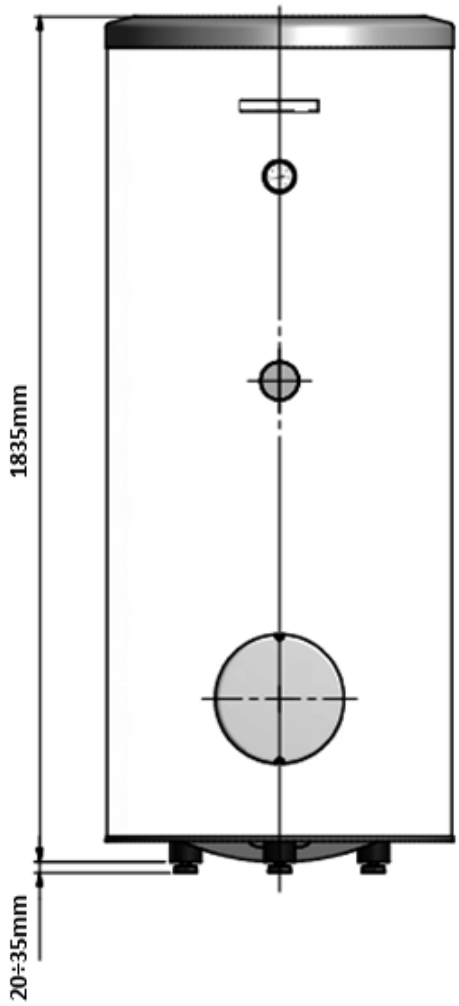
	PT300
A(mm)	1634
B(mm)	743
ØC(mm)	673



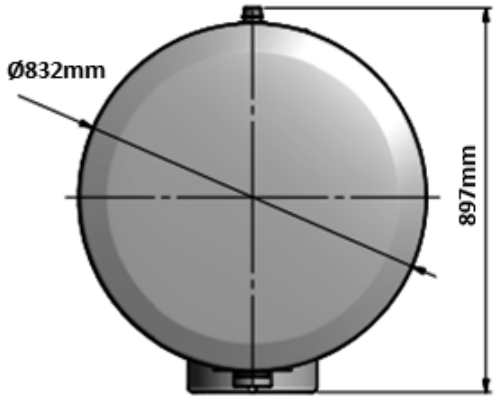
PT500


Thermometer
Socket for electric heater
G1½" - internal thread
Inspection flange
Ø120mm - inner diameter
Hot water outlet
G1" - external thread
Circulation
G ¾" - external thread
Sensor pocket
Ø16mm - inner diameter
Inlet heating medium
G1" - external thread
Sensor pocket
Ø16mm - inner diameter
Outlet heating medium
G1" - external thread
Cold water inlet
G1" - external thread

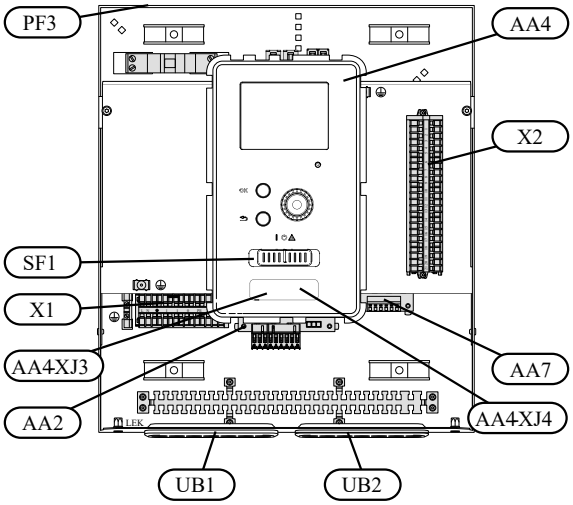
PT500

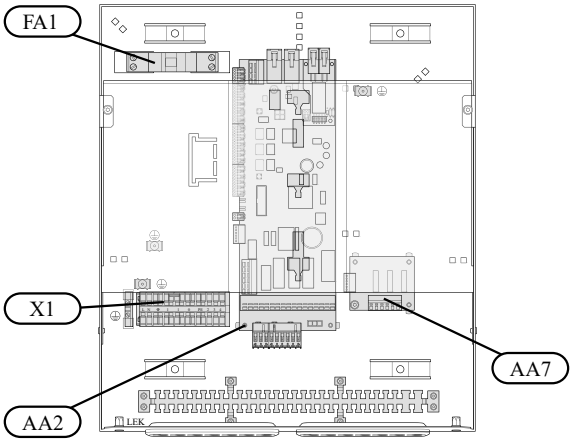


	PT500
A(mm)	1835
B(mm)	897
ØC(mm)	832



RC-HY20

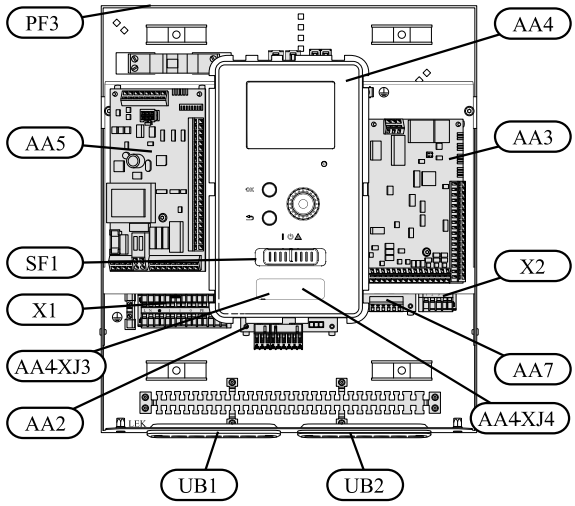


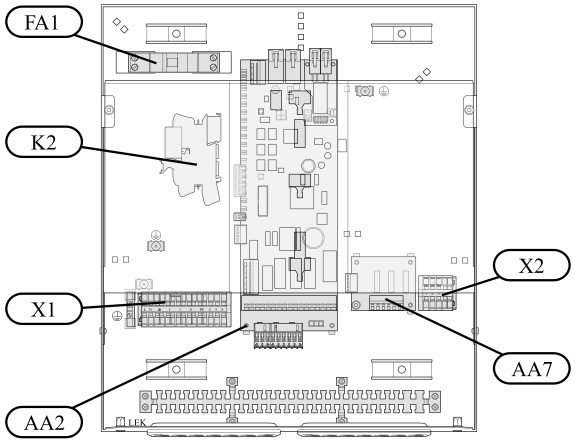


Explanation

AA2	Base card
AA4	Display unit
	AA4-XJ3 USB socket
AA4-XJ4	Service outlet (No function)
AA7	Extra relay circuit board
FA1	Miniature circuit-breaker
X1	Terminal block, incoming electrical supply
X2	Terminal block, control signal circulation pump, sensors AUX inputs and heat pump
SF1	Switch
PF3	Serial number plate
UB1	Cable grommet, incoming supply electricity, power for accessories
UB2	Cable grommet, signal

RC-HY40

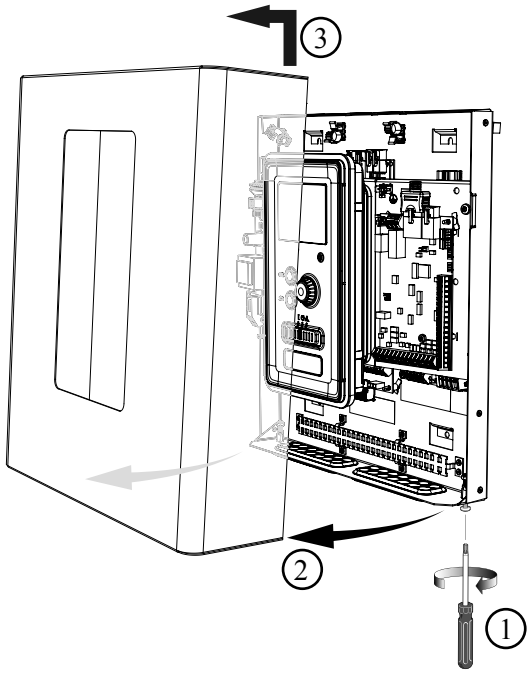


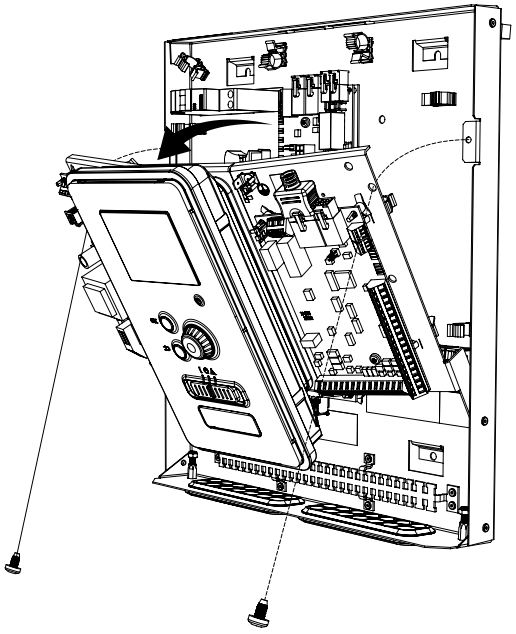


Explanation

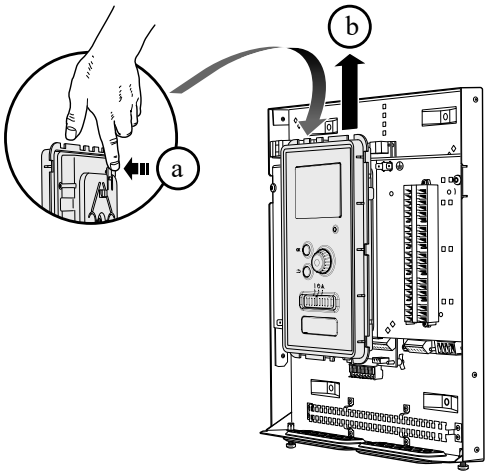
AA2	Base card
AA3	Input circuit board
AA4	Display unit
AA4-XJ3	USB socket
AA4-XJ4	Service outlet (No function)
AA5	Accessory card
AA7	Extra relay circuit board
FA1	Miniature circuit-breaker
K2	Emergency mode relay
X1	Terminal block, incoming electrical supply
X2	Terminal block, AUX4 - AUX6
SF1	Switch
PF3	Serial number plate
UB1	Cable grommet, incoming supply electricity, power for accessories
UB2	Cable grommet, signal

The cover of the control module is opened using a Torx 25 screwdriver. Assembly takes place in the reverse order.

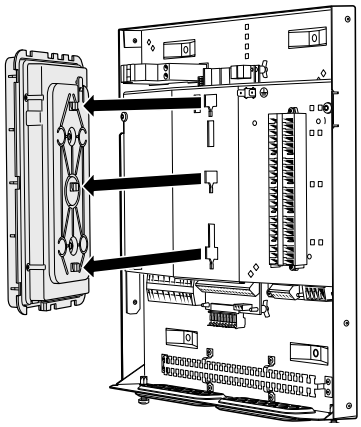




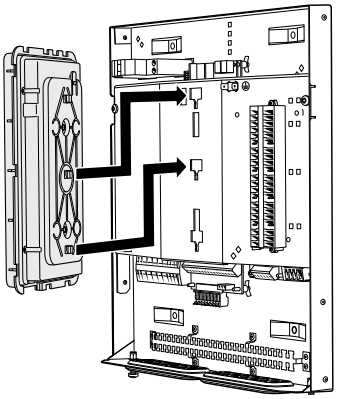
The display may need to be moved for easier access when connecting electrics. This is easily done by following these steps.



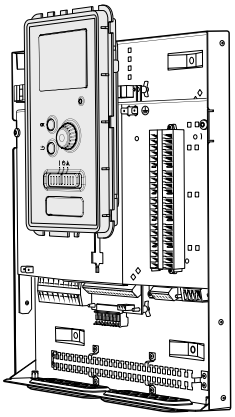
1. Press in the catch on the upper rear side of the display unit towards you (a) and move the display unit upwards (b) so that the mountings unhook from the panel.



2. Lift the display unit from its mountings.



3. Align the two lower mountings on the reverse of the display unit with the two upper holes in the panel as illustrated.



4. Secure the display on the panel.

5. When the electrical connection is ready the display must be reinstalled with three mounting points again, otherwise the front cover cannot be installed.

List of components

Electrical components

X1	Terminal block, sensors
X2	Terminal block, power source
X3	Terminal block
SF1	Controller switch
K1-K3	Submersible heater contact
T1	Thermostat, standby mode
F3	Temperature limiter
AA8	Titanium anode board
AA23	Communication board
F1	Circuit breaker, outdoor unit
F2	Circuit breaker, controller
UB1	Cable grommet
UB2	Cable grommet
F3-SF2	Reset botton, temperature limiter

Pipe connections

XL1	Connection, heating medium, supply
XL2	Connection, heating medium, return
XL3	Connection, cold water
XL4	Connection, hot water
XL10	Connection, cooling
XL11	Connection, safety group, manometer
XL13	Connection, liquid cooling medium
XL14	Connection, gas cooling medium

HVAC elements

CM1	Diaphragm expansion vessel, closed
QN10	Isolation valve, domestic hot water/central heating
QN12	Isolation valve, cooling/heating
GP12	Circulation pump
EP2	Heat exchanger

Sensors

BP4	Pressure sensor, high pressure
BT3	Temperature sensor, heating medium return
BT6	Temperature sensor, hot water loading
BT7	Temperature sensor, top of the hot water heater
BT12	Temperature sensor, condenser outlet
BT15	Temperature sensor, liquid
BT25	Temperature sensor, heating medium supply
BT63	Temperature sensor, heating medium supply downstream the submersible heater
BT64	Temperature sensor, cooling medium supply
BT71	Temperature sensor, heating medium re- turn

Others

EB15	HMK 60
PF3	Serial number
EB2	Domestic hot water tank

Pipe connections

XL1(Red mark)	Climate system supply
XL2 (Blue mark)	Climate system return
XL14	Connection, gas line
XL13	Connection, liquid line

Valves etc.

EP2	Heat exchanger
HQ1	Particle filter (supplied)
HZ2	Drying filter

Electrical components

AA23	Communication board
AA23-F3	Fuse for external heating cable
AA23-S3	DIP switch, addressing of outdoor unit
AA23-X1	Terminal block, incoming supply, connection of KVR
AA23-X4	Terminal block, communication with indoor module / control module
AA23-X100	Terminal block, communication outdoor module

Sensor, thermostats

BP4	Pressure sensor, high pressure
BT3	Temperature sensor, heating medium, return
BT12	Temperature sensor, condenser, supply
BT15	Temperature sensor, fluid pipe

Miscellaneous

UB1	Cable gland
UB2	Cable gland
UB3	Cable gland

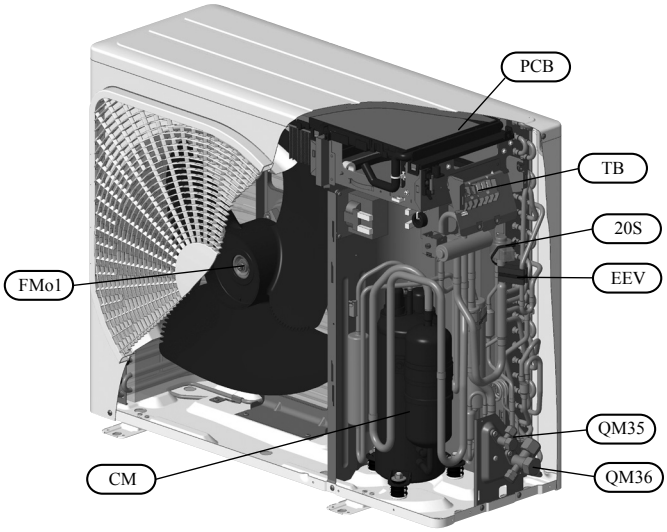
Electrical components

AA23	Communication board
AA23-F3	Fuse for external heating cable
AA23-S3	DIP switch, addressing of outdoor unit
AA23-X1	Terminal block, incoming supply, connection of KVR
AA23-X4	Terminal block, communication with indoor module / control module
AA23-X100	Terminal block, communication outdoor module FDCW

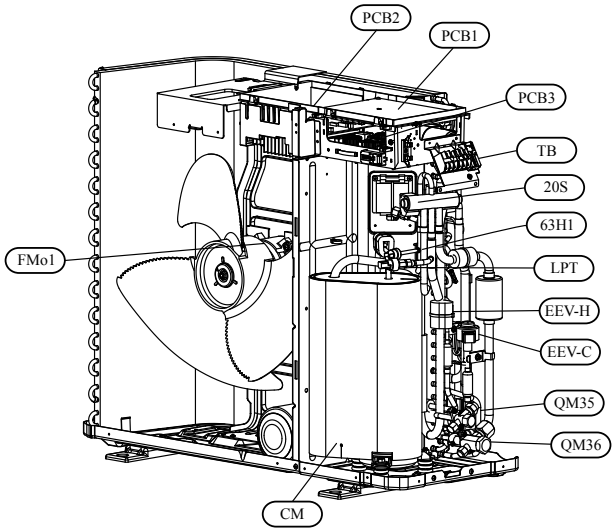
Outdoor unit

Component image

FDCW60VNX-A



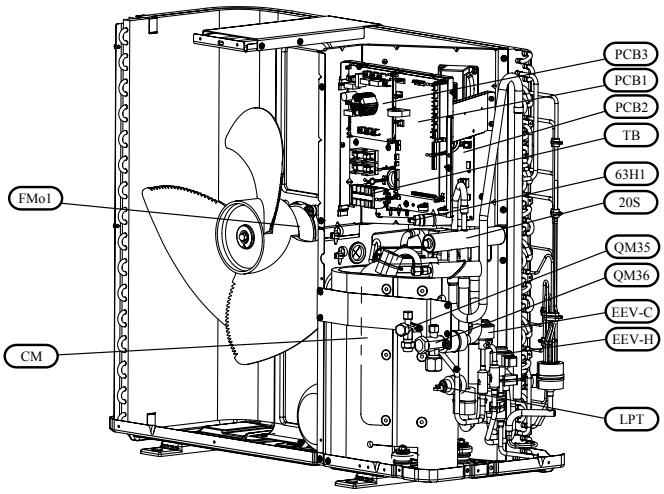
FDCW71VNX-A



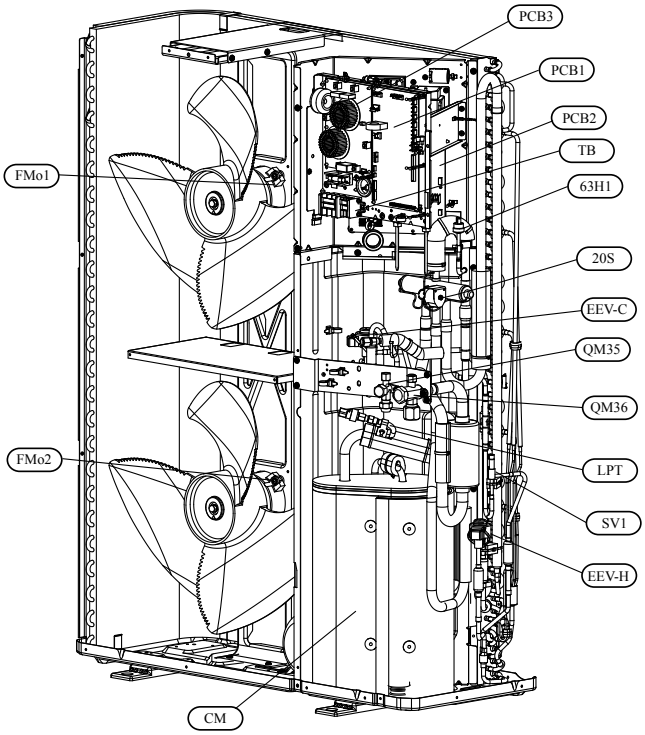
List of components

20S	Solenoid for 4-way valve
CM	Compressor
EEV	Expansion valve
FMo1	Fan motor
PCB	Inverter & control PCB
QM35	Service valve, liquid side
QM36	Service valve, gas side
TB	Terminal block

FDCW100VNX-A



FDCW140VNX-A

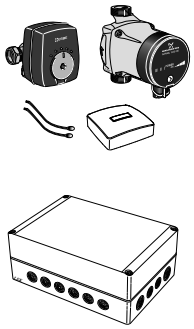
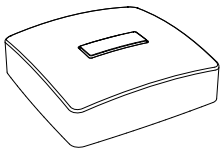
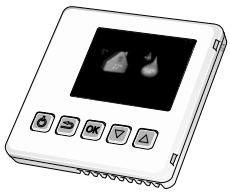
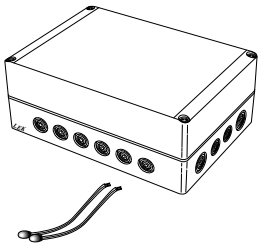
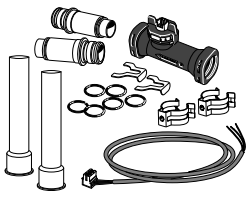


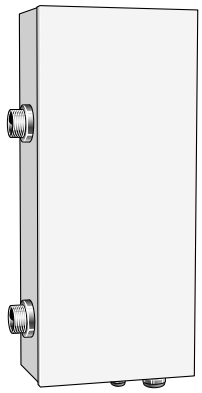
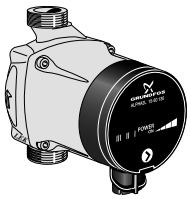
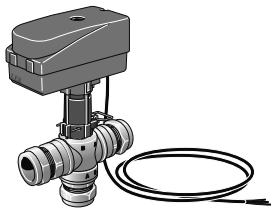
List of components

20S	Solenoid for 4-way valve
63H1	High pressure switch
CM	Compressor motor
EEV-C	Expansion valve, cooling
EEV-H	Expansion valve, heating
FMo1	Fan motor
FMo2	Fan motor
LPT	Low pressure sensor
PCB1	Control PCB
PCB2	Inverter PCB
PCB3	Noise filter PCB
QM35	Service valve, liquid side
QM36	Service valve, gas side
SV1	Valve, solenoid
TB	Terminal block

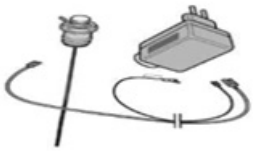
Accessories

Accessory parts

Model name	Designation		RC-HY20 Connection	RC-HY40 Connection	Part No.
ECS-40M ECS-41M		Extra climate system		✔	MCD291A008/ MCD291A009
RTS40M		Room sensor	✔	✔ (Included)	MCD291A010
RMU40M		Room unit		✔	MCD291A011
AXC30M		Accessories		✔	MCD291A012
EMK300M		Energy meter kit	-	✔	MCD291A013
EMK500M			-	✔	MCD291A014

Model name	Designation		RC-HY20 Connection	RC-HY40 Connection	Part No.
ELK9M		Immersion heater 9kW	✔	✔	MCD291A015
CPD11-25M/65		Charging pump	✔	✔	MCD291A016
CPD11-25M/75			✔	✔	MCD291A017
VST05M		Hot water control	✔	✔	MCD291A018
VST11M			✔	✔	MCD291A019
VST20M			✔	✔	MCD291A020
VCC05M		Shuttle valve	✔	Not Necessary	MCD291A021
VCC11M			✔	Not Necessary	MCD291A022

Optional parts

Model name	Designation		Part No.
MEL1030M		Electrical module	MCD291A023
AnodeT300		Titanium anode	MCD291A024
AnodeT500			MCD291A025

Wind protection (prepared on site)

At the site where the following conditions meet, wind protection for outdoor unit is required to avoid capactity drop or abnormal stop for protection.

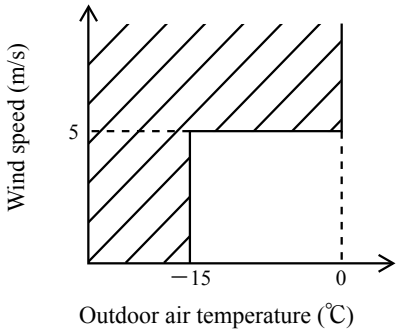
- Natural wind directly blows into outdoor unit.
- Relation between wind speed and outdoor air temperature is in the hatched area at the coldest day.

< FDCW60VNX >

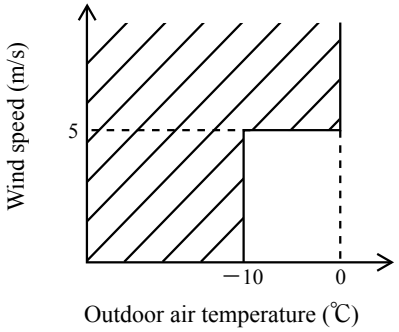
• Use wind guard in case outdoor unit is installed where ambient temperature drops below -10˚C and natural wind blows into outdoor unit directly.

< FDCW71, 100, 140VNX >

FDCW71VNX-A



FDCW100, 140VNX-A



According the wind direction, install appropriate wind guard.

Front wind guard for wind from front.

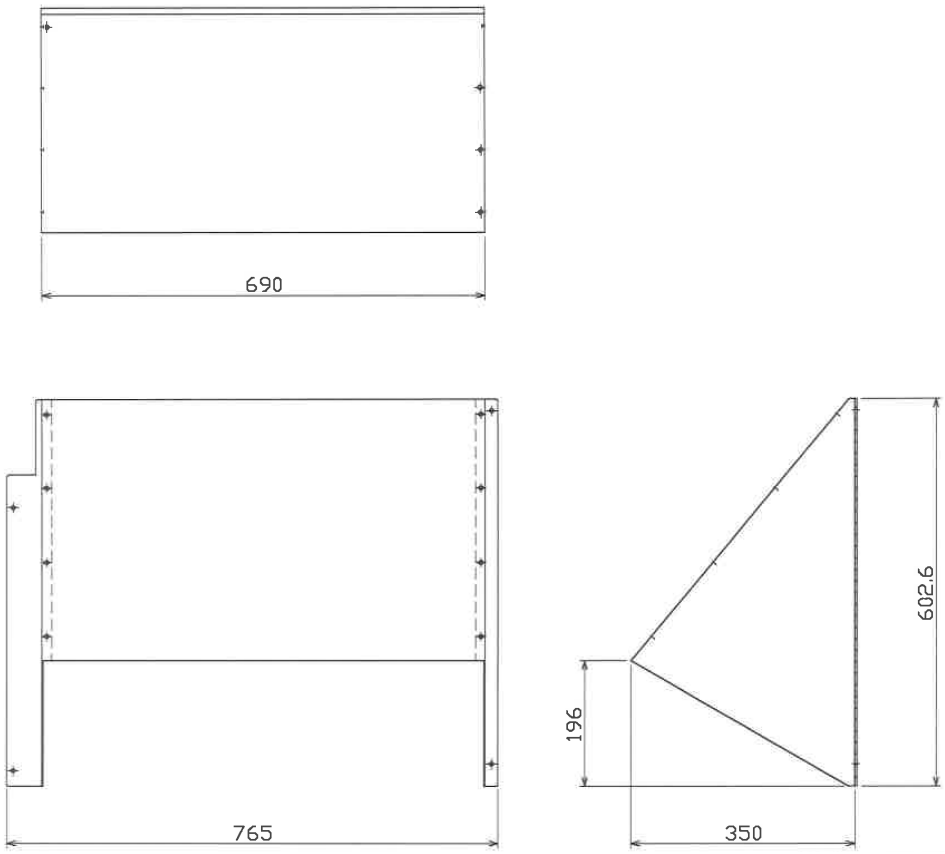
Side wind guard for wind from left side.

Rear wind guard for wind from rear.

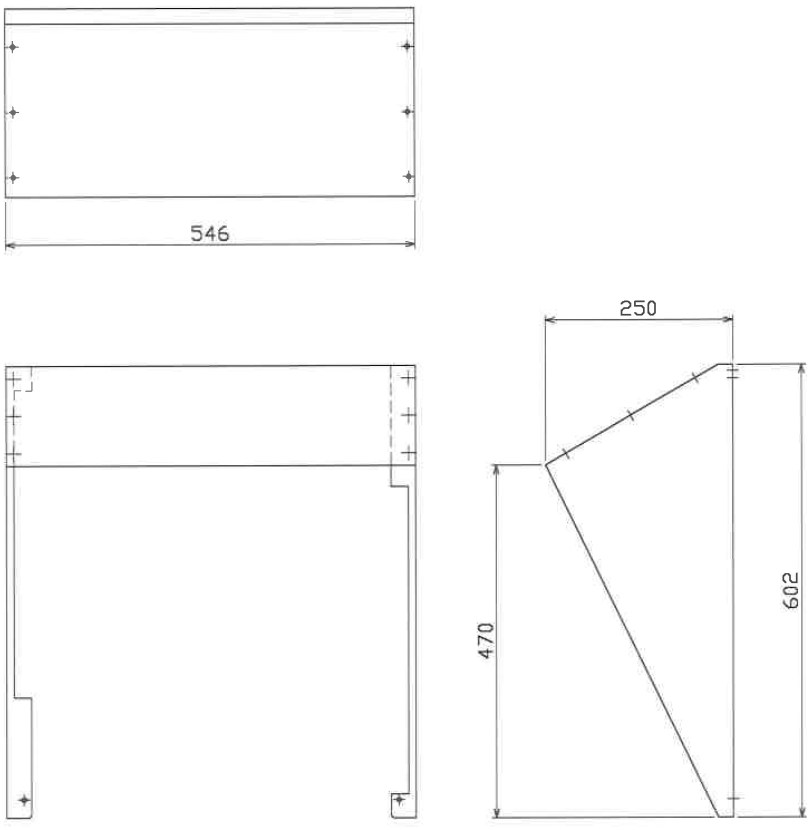
Fasten the components with screws used in the outdoor unit where applicable.

<For FDCW60VNX-A>

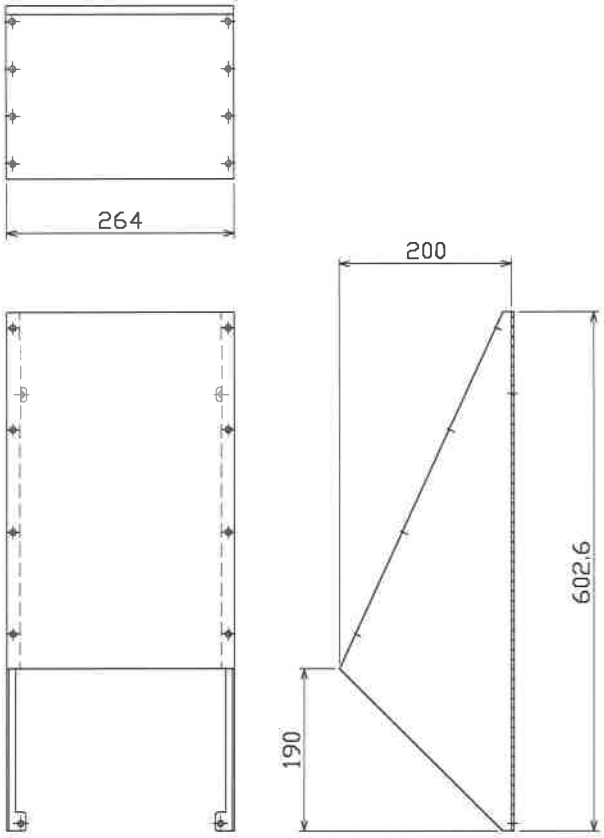
Front wind guard



Rear wind guard

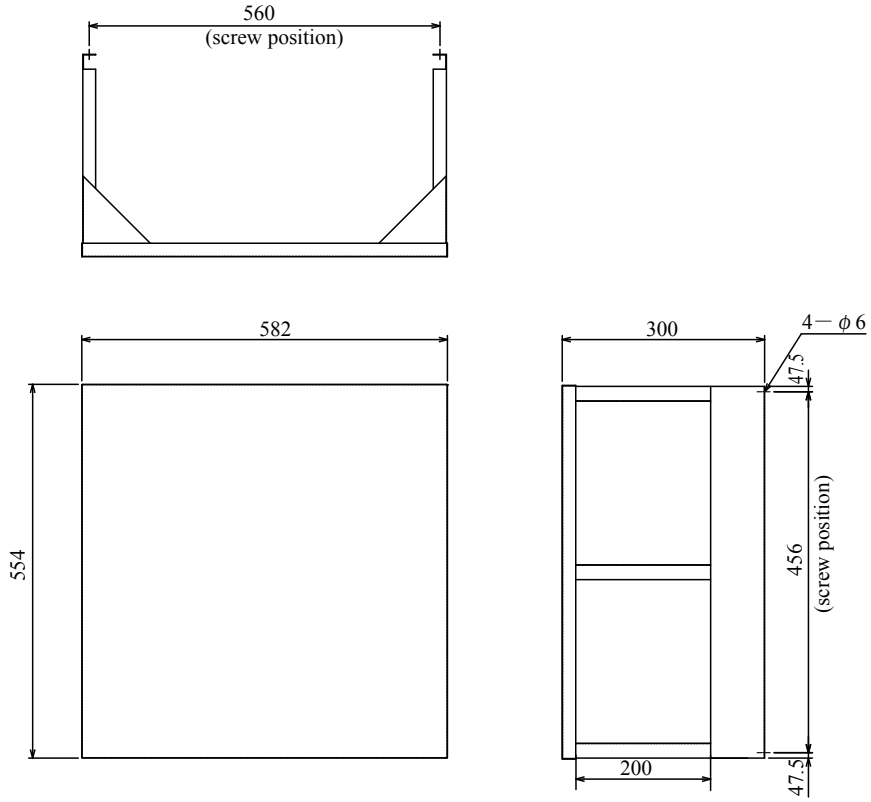


Side wind guard



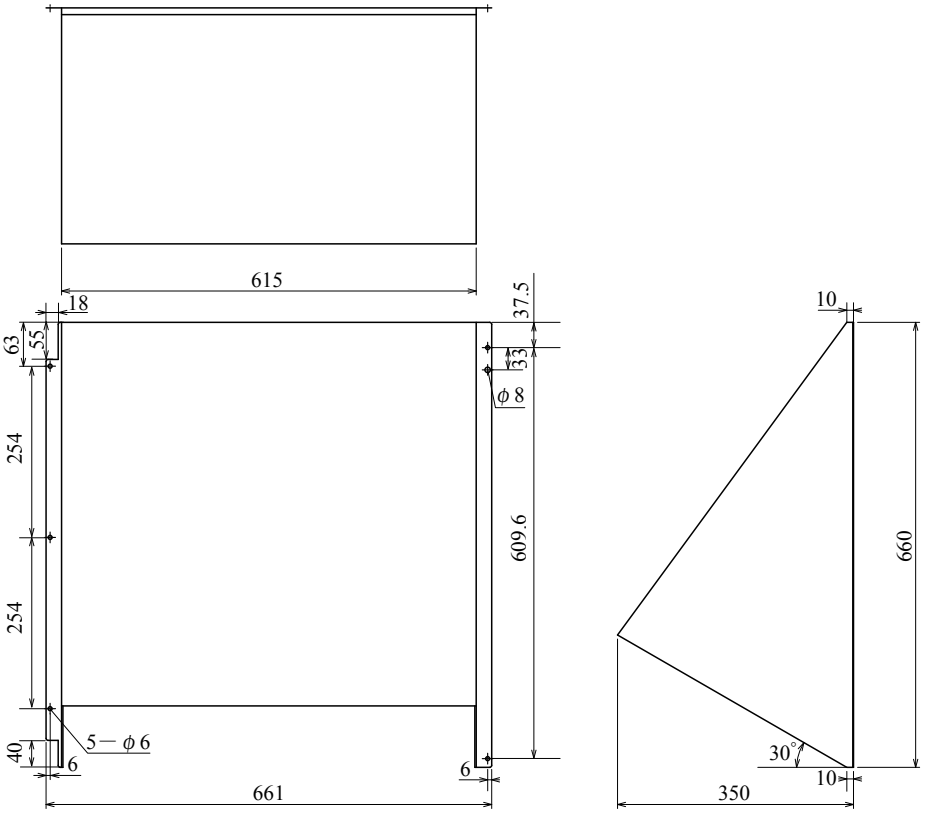
<For FDCW71VNX-A>

Front wind guard

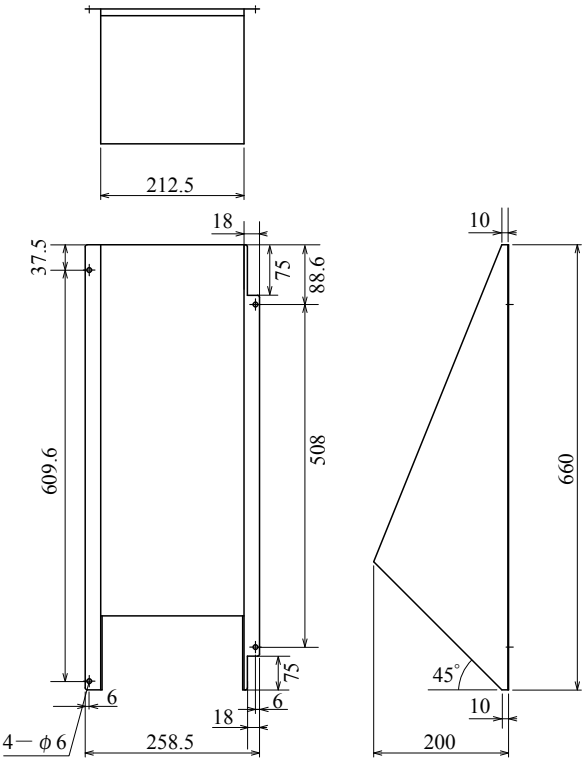


Use M4×10 self-drilling screw to attach it where screw hole is not available.

Rear wind guard

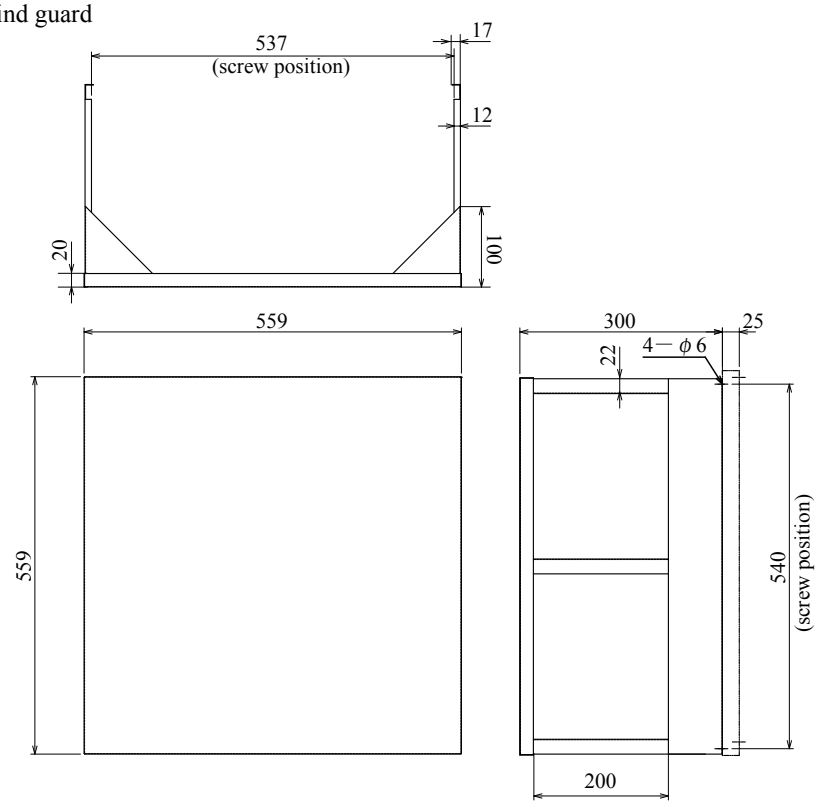


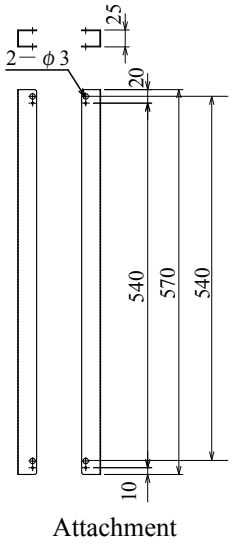
Side wind guard



<For FDCW100VNX-A>

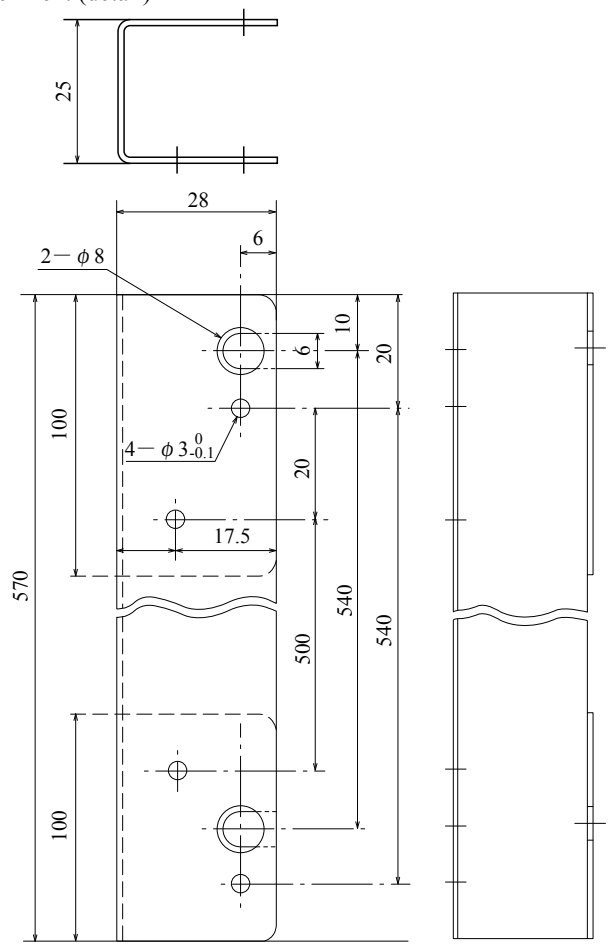
Front wind guard





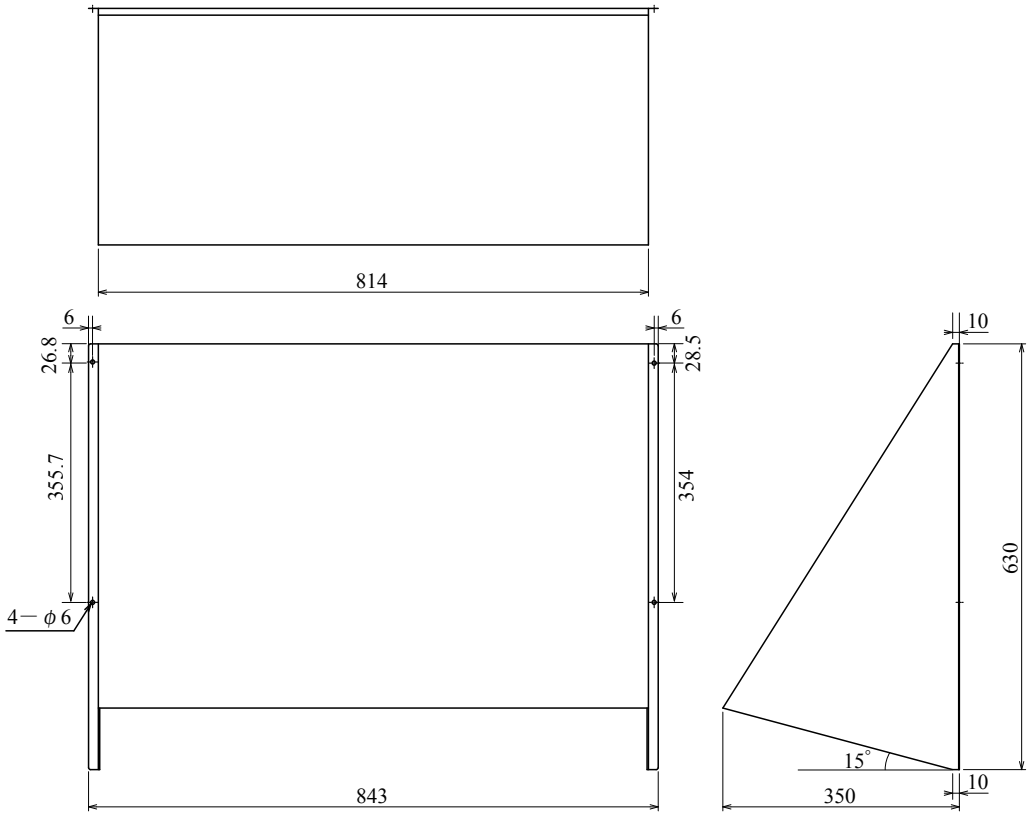
Attachment

Attachment (detail)



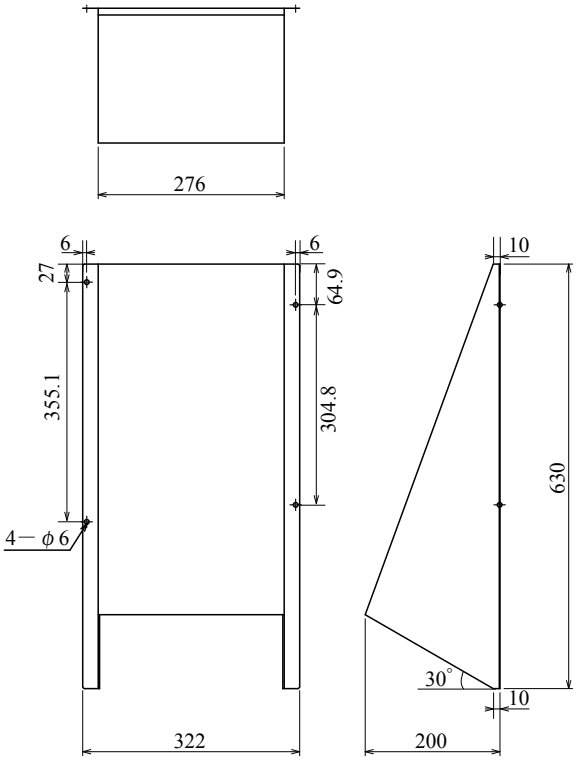
Prepare a pair of symmetrical attachment.

Rear wind guard



Use M5×13 self-drilling screw to attach it where screw hole is not available.

Side wind guard



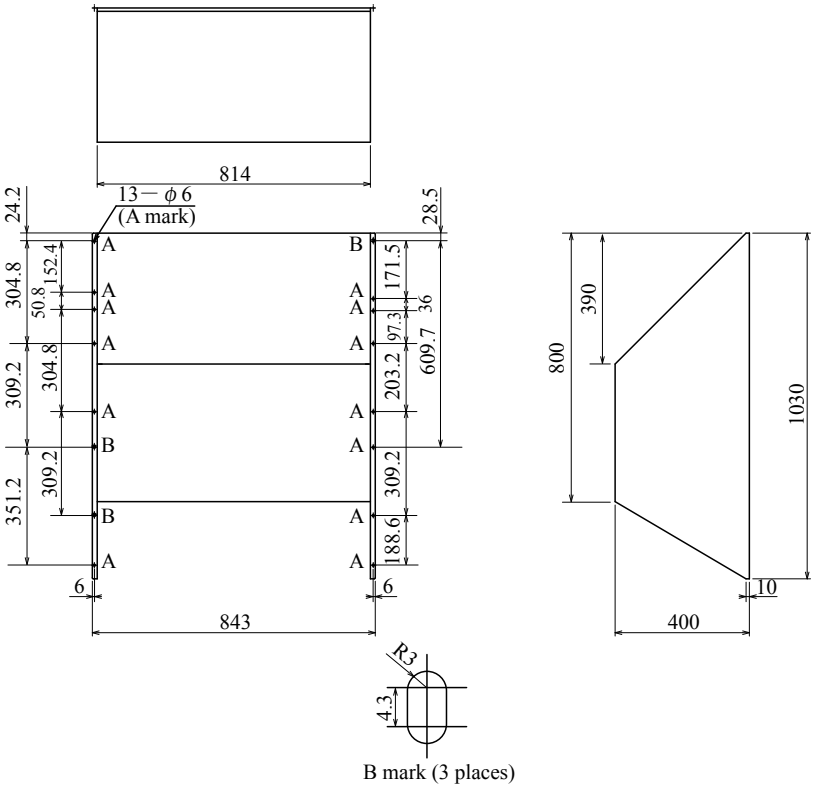
Use M5×13 self-drilling screw to attach it where screw hole is not available.

<For FDCW140VNX-A>

Front wind guard

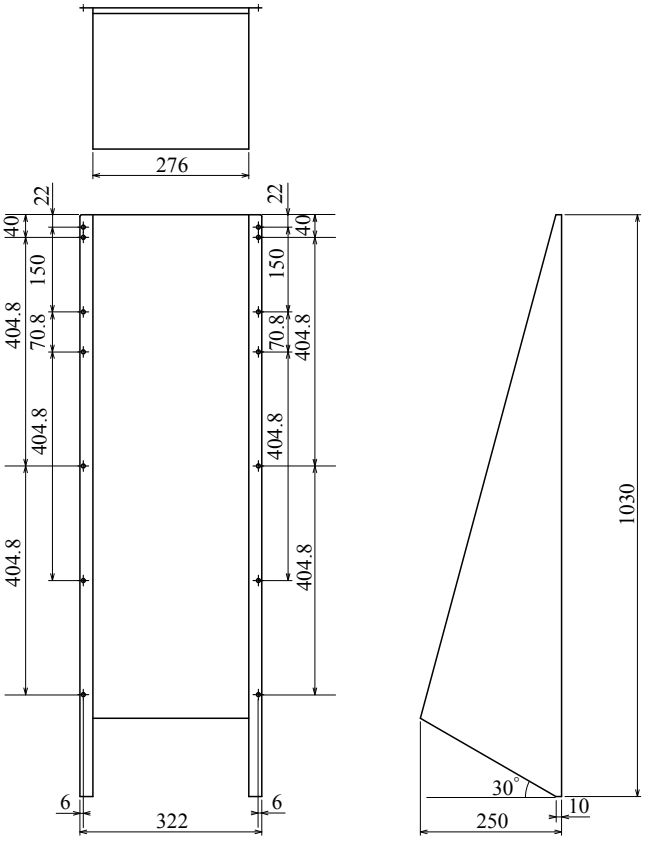
Appearance is as same as FDCW100VNX-A but two pieces are required.

Rear wind guard



Use M5×13 self-drilling screw to attach it where screw hole is not available.

Side wind guard

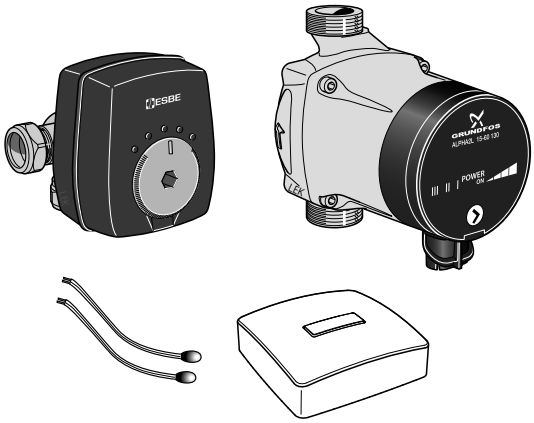


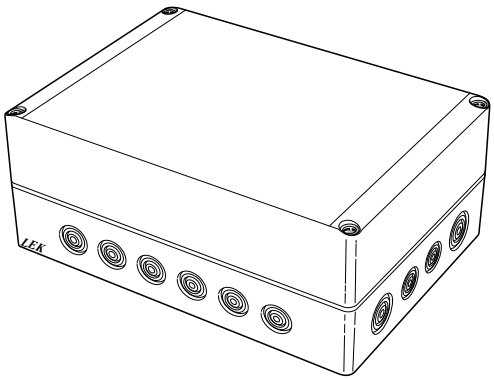
Use M5×13 self-drilling screw to attach it where screw hole is not available.

Installation manual

ECS40M/ECS41M

Extra climate system





Important information

NOTE

This symbol indicates danger to person or machine.

CAUTION

This symbol indicates important information about what you should observe when maintaining your installation.

General

This accessory is used when your climate unit is installed in buildings with several climate systems that require different supply temperatures, for example in cases where the building has both a radiator system and an underfloor heating system. See “Compatible products” below to see which climate units ECS 40M/ECS 41M can be connected to.

The total water flow in the climate systems should not exceed 1700 l/h.

CAUTION

In the case of underfloor heating systems, max flow line temperature should normally be set to between 35 and 45°C. Check the max temperature for your floor with your floor supplier.

CAUTION

If the room sensor is used in a room with under floor heating it should only have an indicatory function, not control of the room temperature.

Compatible products

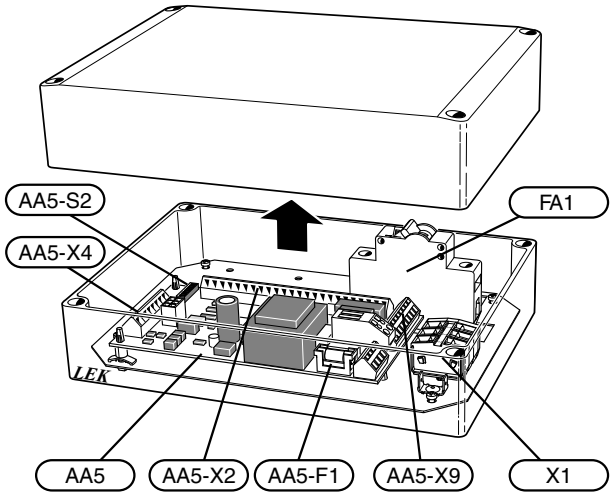
• RC-HY 40

1. The number of climate systems that can be installed varies depending on the product and software version.

Contents

4 x Cable ties
1 x Circulation pump
1 x Shunt motor
1 x 3-way valve
1 x Kit for accessory card
2 x Heating pipe paste
2 x Aluminium tape
1 x Insulation tape
2 x Replacement gasket
2 x Temperature sensor
1 x Room sensor

Component location unit box (AA25)



Electrical components

FA1	Miniature circuit breaker, 10 A
X1	Terminal block, power source
AA5	Accessory card
AA5-X2	Terminal block, sensors and external blocking
AA5-X4	Terminal block, communication
AA5-X9	Terminal block, circulation pump, mixing valve and auxiliary relay
AA5-S2	DIP switch
AA5-F1	Fine wire fuse, T4AH250V

Designations in component locations according to standard IEC 81346.

Electrical connection

Connection of extra climate system

When connecting extra climate systems, they must be connected so that they have a lower temperature than the normal climate system.

Circulation pump and mixing valve

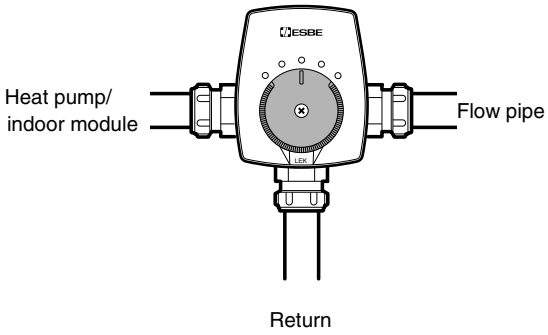
The extra circulation pump (GP20) is positioned in the extra climate system according to the outline diagram.

The shunt valve (QN25) is located on the supply line after the heat pump/indoor module, before the first radiator in the climate system 1. The return line from the extra climate system is connected to the shunt valve and to the return line from the climate system 1, see image and outline diagram.

NOTE

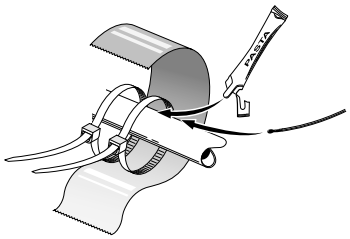
Incorrect installation can affect the function.

Shunt valve, (QN25)
Connection DN32 1 1/4" (22mm)



Temperature sensor

- The supply line sensor (BT2) is installed on the pipe between the circulation pump (GP20) and shunt valve (QN25).
- The return line sensor (BT3) is installed on the pipe from the extra climate system.



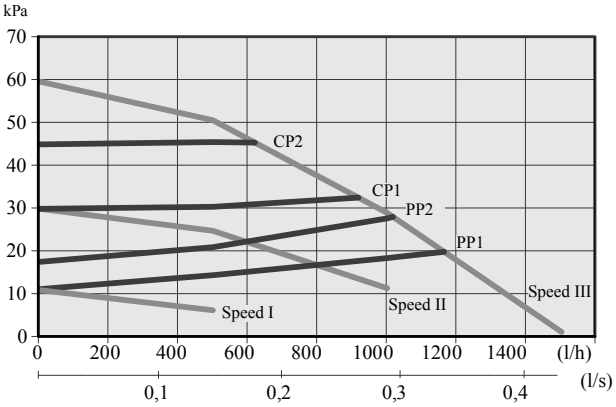
Install the temperature sensors with cable ties with the heat conducting paste and aluminium tape. Then insulate with supplied insulation tape.

NOTE

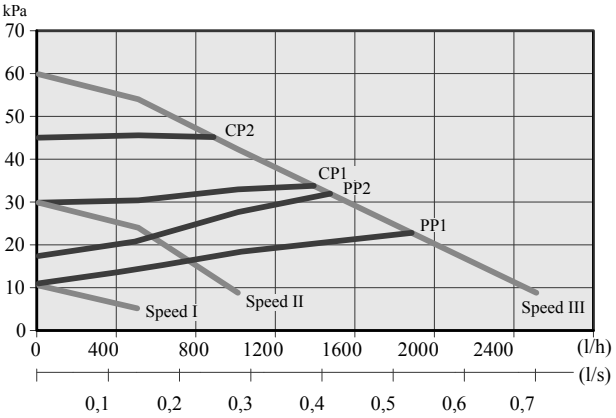
Sensor and communication cables must not be placed near power cables.

Pump and pressure drop diagrams

ECS 40M



ECS 41M



Choose between seven settings on the pump. You can choose between three different constant speeds (I, II or III) or two different curve types, one proportional pressure (PP) and one constant pressure (CP), where 1 is lowest and 2 highest.

Outline diagrams

CAUTION

These are outline diagrams.
Real installations must be planned according to applicable standards.

Explanation

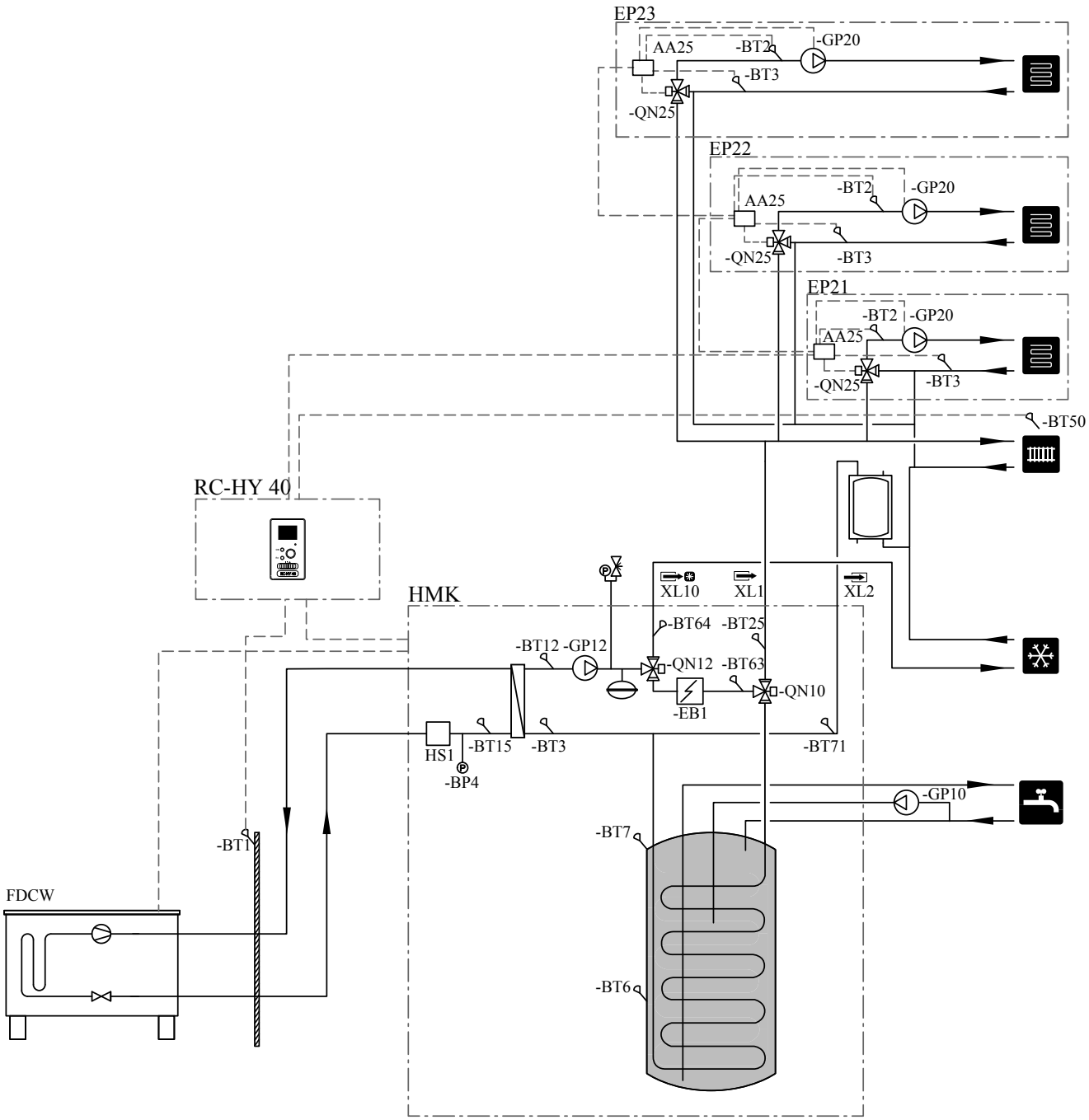
EB1	**External additional heat**
EB1	External electrical additional heat
BT1	Temperature sensor, outdoor
BT6	Temperature sensor, hot water
BT25	Temperature sensor, external flow line
BT71	Temperature sensor, external return line
QN10	Reversing valve, heating/hot water
FDCW	**Heat pump system (slave)**
FDCW	Heat pump
BT3	Temperature sensors, heating medium return
XL1	Connection, heating medium flow
XL2	Connection, heating medium return
EP21	**Climate system 2 (ECS 40M/ECS 41M)**
EP22	**Climate system 3 (ECS 40M/ECS 41M)**
EP23	**Climate system 4 (ECS 40M/ECS 41M)**
AA25	Unit box
BT2	Flow temperature sensor, extra climate system
BT3	Return line sensor, extra climate system
GP20	Circulation pump, extra climate system
QN25	Shunt valve

Miscellaneous

AA25	RC-HY 40
GP10	Circulation pump
QM12	Filler valve, brine
XL10	Connection, cooling medium flow

Designations in component locations according to standard IEC 81346-1 and 81346-2.

Outline diagram RC-HY 40 with ECS 40M/ECS 41M (extra climate system)



Electrical connection

NOTE

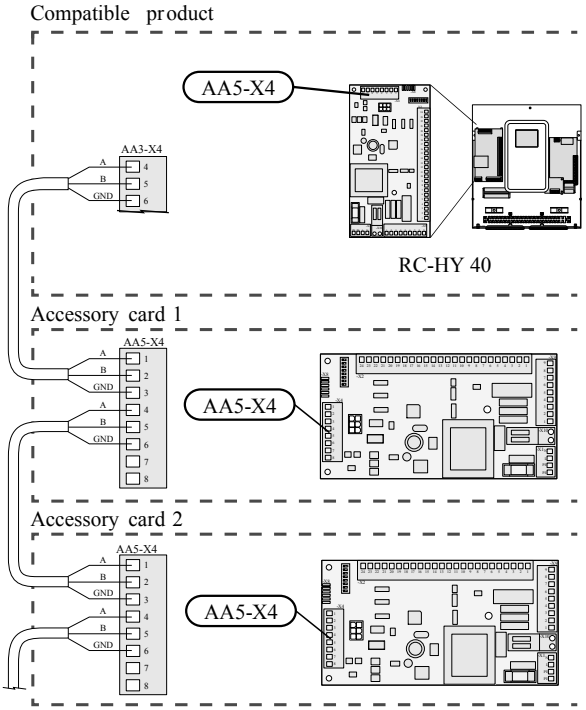
All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
The climate unit must not be powered when installing ECS 40M / ECS 41M.

Connecting communication

If several accessories are to be connected, or are already connected, the following cards must be connected in series with the previous card.

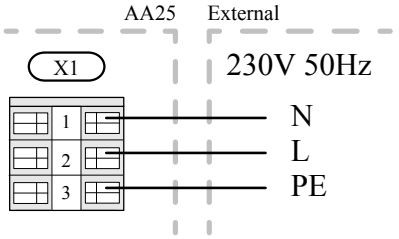
Use cable type LiYY, EKKX or similar.

This accessory contains an accessory board (AA5) that must be connected directly to the compatible product on the input board (terminal block AA3-X4).

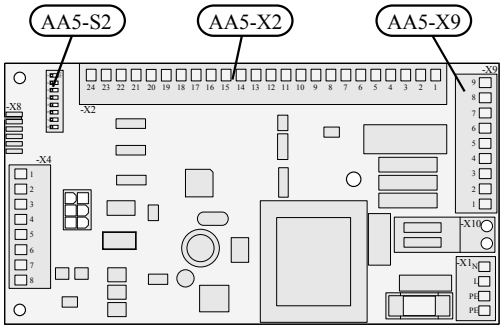


Connecting the supply

Connect the power source to terminal block X1 as illstrated.



Overview accessory board (AA5)



Connection of sensors and external adjustment

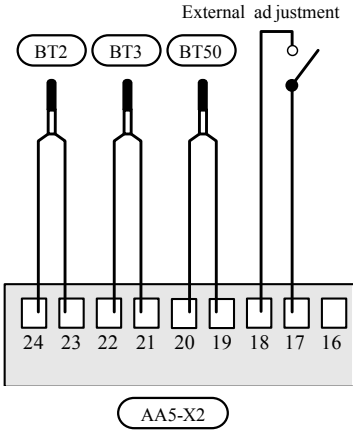
Use cable type LiYY, EKKX or similar. For location of terminal blocks, see Component location unit box (AA25) page 317.

Supply temperature sensor, extra climate system (BT2)
Connect the supply temperature sensor to AA5-X2:23-24.

Return line sensor, extra climate system (BT3)
Connect the return line sensor to AA5-X2:21-22.

Room sensor, extra climate system (BT50) (optional)
Connect the hot water sensor to AA5-X2:19-20.

External adjustment (optional)
A potential-free switch can be connected to AA5-X2:17-18 for external adjustment of the climate system.

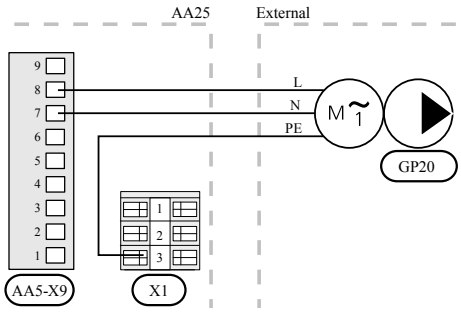


CAUTION

The relay outputs on the accessory board can have a max load of 2 A (230 V) in total.

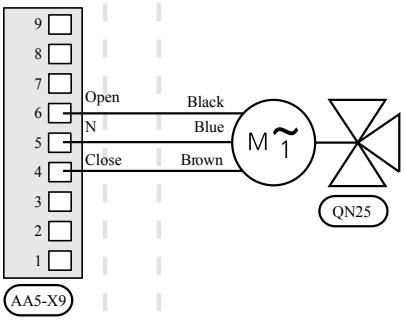
Connection of the circulation pump (GP20)

Connect the circulation pump (GP20) to AA5-X9:8 (230V), AA5-X9:7 (N) and X1:3 (PE).



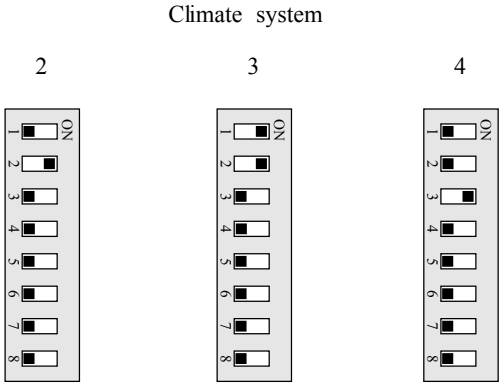
Connection of the shunt valve motor (QN25)

Connect the shunt motor (QN25) to AA5-X9:6 (230 V, open), AA5-X9:5 (N) and AA5-X9:4 (230 V, close).



DIP switch

The DIP switch (S2) on the accessory card (AA5) must be set as follows.



Program settings

Program setting of ECS 40M/ECS 41M can be performed via the start guide or directly in the menu system.

Start guide

The start guide appears when starting for the first time after heat pump/indoor module installation, but is also found in menu 5.7.

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 5.2.4 - accessories[1)]

Activating/deactivating of accessories.
Select: "climate system 2" for climate system 2, "climate system 3" for climate system 3 and "climate system 4" for climate system 4, up to eight climate systems.

1) Applies to RC-HY40.

Menu 5.1.2 - max flow line temperature

Setting the maximum flow temperature for each climate system.

Menu 5.3.3 -extra climate system

Mixing valve settings for extra installed climate system.

Menu 1.1 -temperature

Setting the indoor temperature.

Menu 1.9.1 -heating curve

Setting the heat curve.

Menu 1.9.2 -external adjustment

Setting external adjustment.

Menu 1.9.3 -min. flow line temp.

Setting the minimum flow temperature for each climate system.

Menu 1.9.4 -room sensor settings

Activating and setting the room temperature sensor.

Menu 5.6 -forced control

Forced control of the various components in the heat pump/ indoor module as well as in the various accessories that may be connected. EP21 is climate system 2, EP22 is climate system 3, EP23 is climate system 4.
EP2#-AA5-K1: No function.
EP2#-AA5-K2: : Signal (close) to shunt (QN25).
EP2#-AA5-K3: : Signal (open) to shunt (QN25).
EP2#-AA5-K4: Activating the circulation pump (GP20)

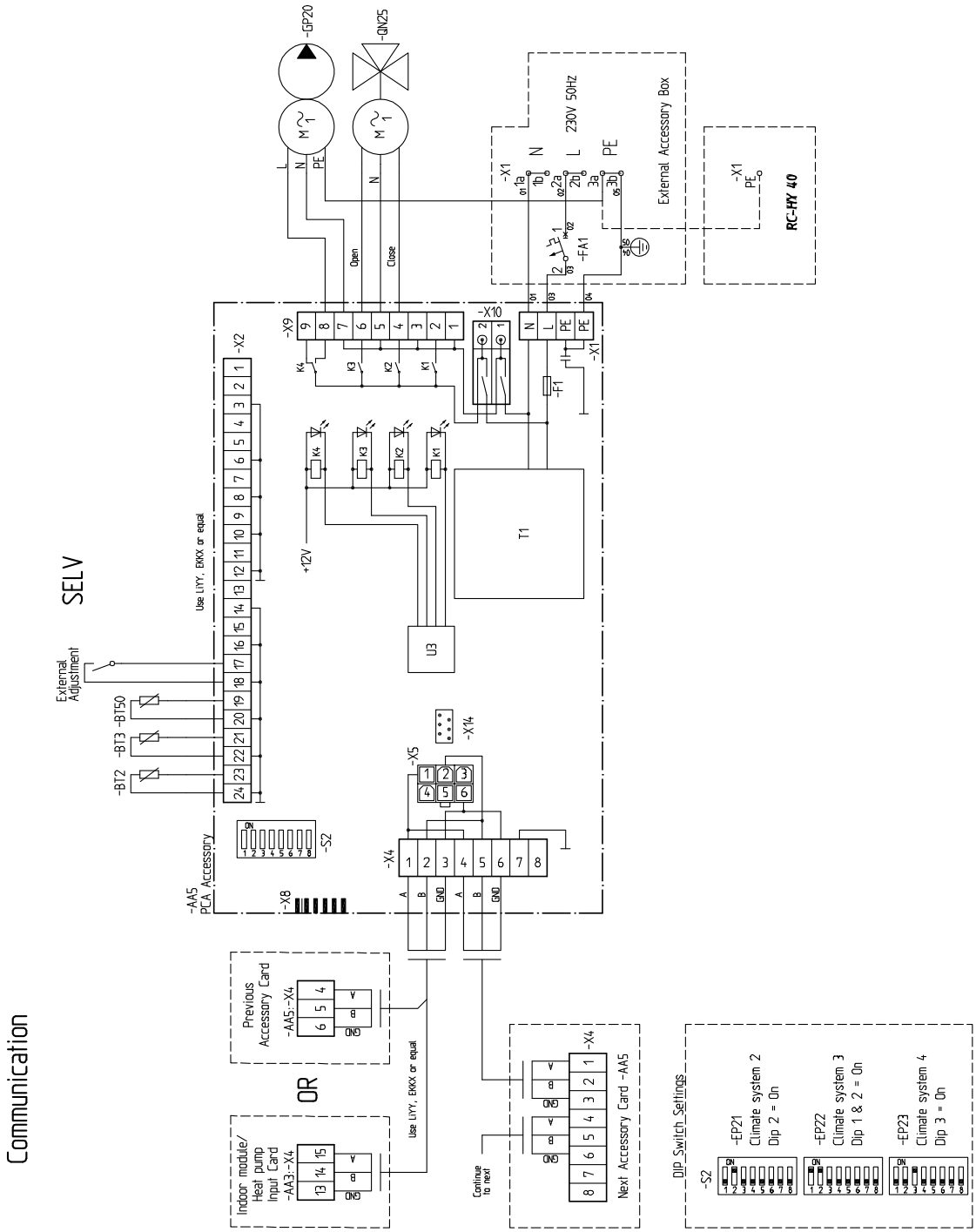
CAUTION

Also see the Installer Manual for the relevant heat pump.

Technical specifications

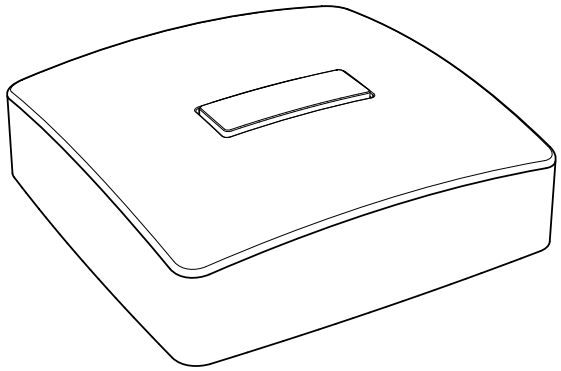
	ECS	
	40M	**41M**
Control voltage	230 V	
cw_s value	4,0	6,3
Connection valve (Ø mm)	22	

Wiring diagram



RTS 40M

Room sensor



General

This accessory is used to obtain a more even indoor temperature. RTS 40M has up to three functions:
1. Show current room temperature in the heat pump's display.
2. Option of changing the room temperature in °C.
3. Makes it possible to change/stabilise the room temperature.

Install the sensor in a neutral position where the set temperature is required. A suitable location is on a free inner wall in a hall approx. 1.5 m above the floor. It is important that the sensor is not obstructed from measuring the correct room temperature by being located, for example, in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.
Changes of temperature in the accommodation take time. For example, short time periods in combination with underfloor heating will not give a noticeable difference in room temperature. If the room sensor is used in a room with underfloor heating, it should only have an indicatory function, not control of the room temperature.

Contents

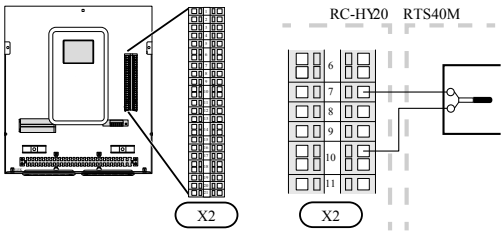
1 x Room sensor

Connecting communication

Use cable type LiYY, EKKX or similar with a cable area of at least 0.5 mm².

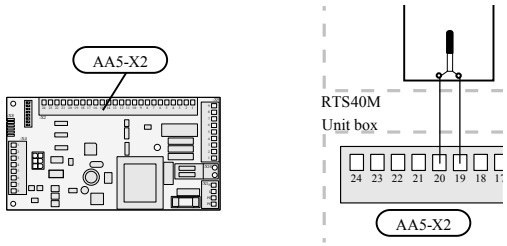
RC-HY 20

In those cases RTS 40M is to be used for climate system 1, it is connected electrically to terminal block X2:7 and X2:10 in RC-HY 20.



Accessory card

Where RTS 40M is to be used for multiple climate systems, connect it electrically to the accessory board (AA5-X2:19-20).



Program settings

Program setting of RTS 40M can be performed via the start guide or directly in the menu system.

Start guide

The start guide appears upon first start-up after heat pump installation, but is also found in menu 5.7.

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 1.1 - temperature

Setting the indoor temperature.

Menu 1.9.1 - heating curve

Setting the heat curve.

Menu 1.9.2 - external adjustment

Inställning av extern justering.

Menu 1.9.4 - room sensor settings

Activating and setting the room temperature sensor.

CAUTION

Also see the Installer manual for the heat pump/indoor module.

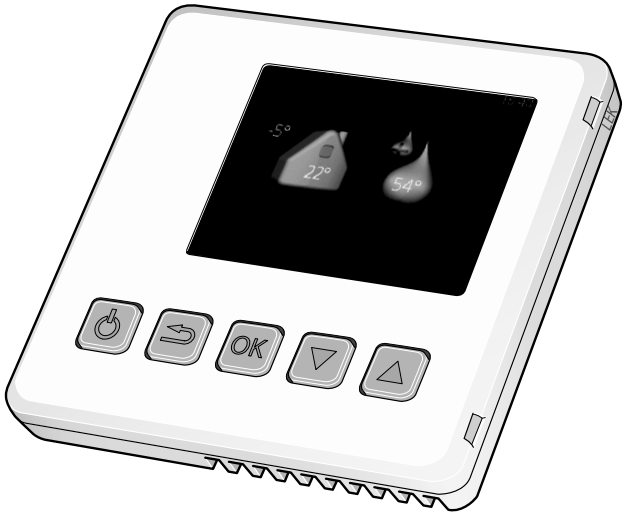
Technical data

Technical specifications

RTS 40M	
DimensionsWxHxD (mm)	80x80x30
Part no	MCD291A010

RMU 40M

Room unit



Important information

NOTE

This symbol indicates danger to person or machine.

CAUTION

This symbol indicates important information about what you should observe when maintaining your installation.

TIP

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

General

With RMU 40M you can control and monitor your heat pump/ indoor module from another room in the house.

Compatible products

- RC-HY 40

Contents

1 x RMU 40M
1 x Plastic spacer
2 x Screws

Installation possibilities

RMU 40M can be installed in several different ways, some of which are shown below.

Room sensor

RMU 40M contains a room sensor with the same function as that supplied with the heat pump/indoor module (BT50). This makes it possible to select which room sensor the heat pump/indoor module will use for display and control of the room temperature.

CAUTION

If both a room sensor (RTS 40M) and a room unit are installed in the same climate system only the temperature from RTS 40M is used for display, control and logging.

The room temperature sensor has up to three functions:
1. Show current room temperature in the heat pump/indoor module display.
2. Option of changing the room temperature in °C.
3. Makes it possible to change/stabilise the room temperature.

Install the sensor in a neutral position where the set temperature is required. A suitable location is on a free inner wall in a hall approx. 1.5 m above the floor.
It is important that the sensor is not obstructed from measuring the correct room temperature by being located, for example, in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.
If the sensor is to be used to change the room temperature in °C and/or to refine/stabilise the room temperature, the sensor must be activated in the heat pump/indoor module menu 1.9.4.

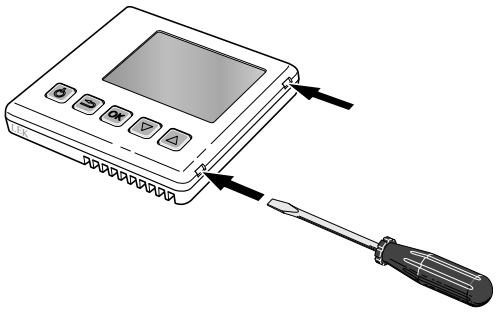
CAUTION

If the room sensor is used in a room with underfloor heating, it should only have an indicatory function, not control of the room temperature.

Installing

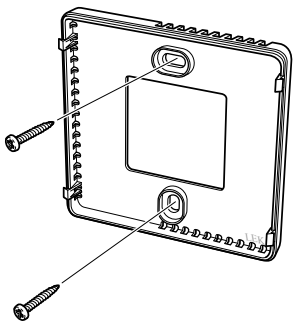
RMU 40M cannot be installed directly against a wall because the connection terminal protrudes from the reverse.
Install RMU 40M either in a spare apparatus box or on the plastic spacer supplied.
If you want to use the room temperature sensor in RMU 40M the position of the room unit is important. See section “Room sensor”.

1.



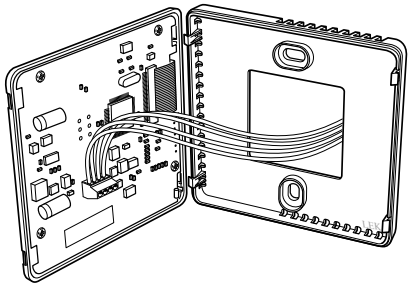
Open RMU 40M by inserting a screwdriver in one of the 4mm wide gaps in the edge. Press the screwdriver straight in to open the clip. Repeat for the other three clips.

2.



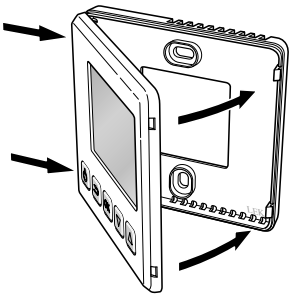
Without plastic spacer: Place the rear panel in front of the apparatus box and screw to the wall.
With plastic spacer: Screw the plastic spacer into the wall. Then screw the the rear panel into the plastic spacer with the two screws supplied.

3.



Connect according to section “Electrical connection”.

4.



Angle the front panel approx. 30° and secure the two clips on one side. Then close the unit and secure the two clips on the other side.

Electrical connection

NOTE

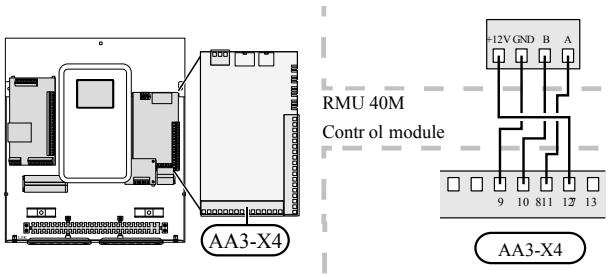
All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
The climate unit must not be powered when installing RMU 40M .

Connecting communication

Use cable type LiYY, EKKX or similar for the following connections.

RC-HY 40

The terminal block in RMU 40M is connected to terminal block X4:9–12 on the input board (AA3) on RC-HY 40.



Program settings

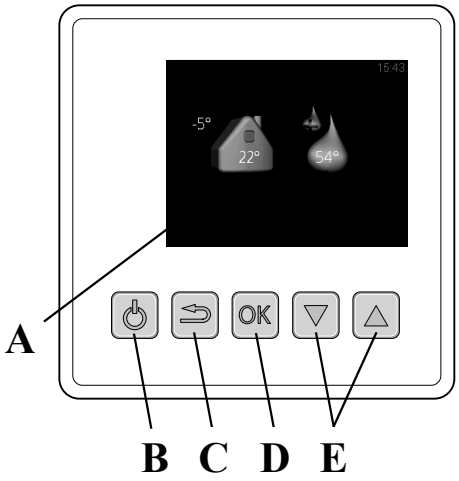
1. Hold the back button in RMU 40M for 7 seconds to access the menu “service settings”.
2. Enter the menu and select which climate system RMU 40M should be connected to.
3. Start the heat pump/indoor module, go to menu “system settings” (4.2) and activate RMU 40M for the climate system you want to control with the room unit.
4. If you want the heat pump/indoor module to use the room sensor to control the temperature, set it in menu “room sensor settings” (1.9.4). If an external room sensor (BT50) is installed, this will be used. Otherwise the room sensor in RMU 40M is used.

NOTE

The software in the heat pump/indoor module must be version 1199 or higher to work with RMU 40M.

Control - Introduction

Room unit



A. Display

Instructions, settings and operational information are shown on the display.

B. Stand-by button

RMU 40M can be switched to stand-by mode using the standby button. The heat pump/indoor module operation is not affected by pressing the button.

C. Back button

The back button is used to:

- go back to the previous menu.
- change a setting that has not been confirmed.

D. OK button

The OK button is used to:

- confirm selections of sub menus/options/ set values.

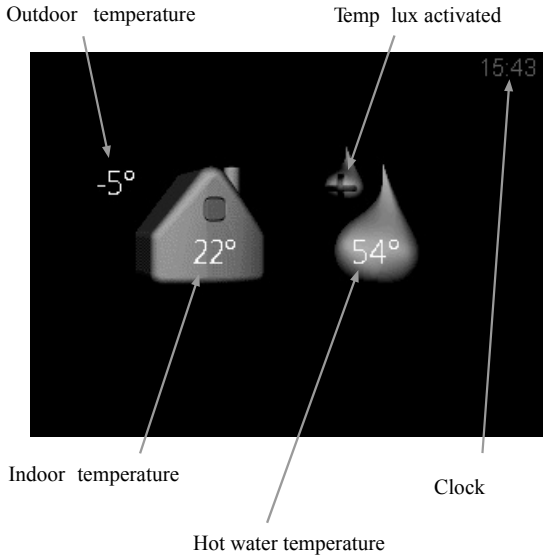
E. Up and down buttons

With the up and down buttons you can:

- scroll in menus and between options.
- increase and decrease the values.

Menu system

When RMU 40M is started you come to the information menu. Basic information about the heat pump/indoor module status is shown here. The indoor temperature is displayed in relation to the selected climate system.



Press any button to go to the main menu.
The information menu shows:
- on starting.
- when the back button in the main menu is pressed.
- after 15 minutes of inactivity.

In the event of an alarm a symbol is shown at the top edge of the display together with the alarm's number. Go to the your heat pump/indoor module to get more information.

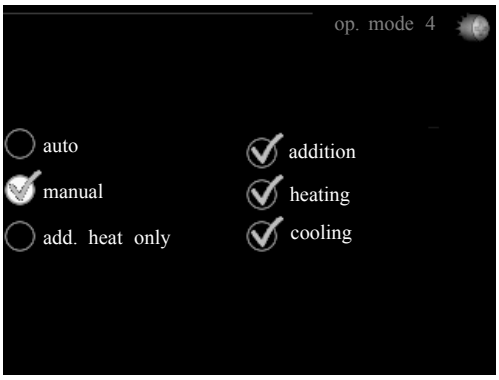
Operation

To move the cursor, press the up or down button. The marked position is brighter and/or has a turned up tab.

Selecting menu

To advance in the menu system select a sub-menu by marking it by using the up and down buttons and then pressing the OK button.

Selecting options



In an options menu the current selected option is indicated by a green tick.
To select another option:

1. Mark the applicable option using the up or down button. One of the options is pre-selected (white).
2. Press the OK button to confirm the selected option. The selected option has a green tick.

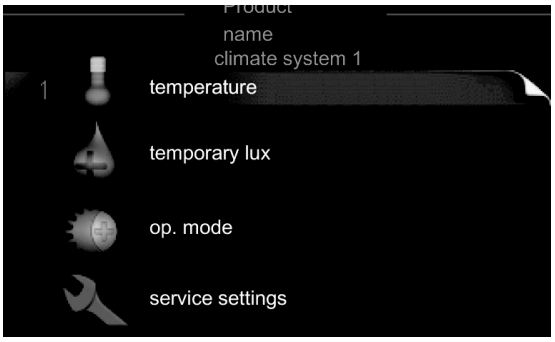
Setting a value

To set a value:

1. Mark the value you want to set using the up or down button.
2. Press the OK button. The background of the value becomes green, which means that you have accessed the setting mode.
3. Press the up button to increase the value or the down button to reduce the value.
4. Press the OK button to confirm the value you have set. To undo and return to the original value, press the back button.

Control - Menus

Main menu



Sub-menus

Status information for the relevant menu can be found on the display to the right of the sub-menus.

temperature

Setting the temperature for the climate system. The status information shows the set value for the climate system.

temporary lux

Activation of temporary increase in the hot water temperature. Status information displays "off" orwhat length of time of the temporary temperature increase remains.

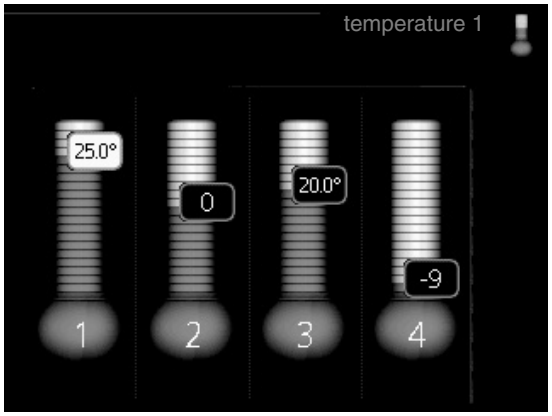
op. mode

Activation of manual or automatic operating mode. The status information shows the selected operating mode.

service settings

Setting which climate system is to be controlled by the room unit. Hold the back button in for 7 seconds to access the Service menu.

Main 1 - temperature



If the house has several climate systems, this is indicated on the display by a thermometer for each system.

Setting the temperature (without room sensors activated):

Setting range: -10 to +10

The display shows the set values for heating (curve offset). To increase or reduce the indoor temperature, increase or reduce the value on the display.

Use the arrow buttons to set a new value. Confirm the new setting by pressing the OK button.

The number of steps the value has to be changed to achieve a degree change of the indoor temperature depends on the heating unit. One step for under floor heating whilst radiators may require three.

Setting the desired value. The new value is shown on the right-hand side of the symbol in the display.

Setting the temperature (with room sensors installed and activated):

Setting range: 5 – 30 °C

The value in the display appears as a temperature in °C if the heating system is controlled by a room sensor.

To change the room temperature, use the arrow buttons to set the desired temperature in the display. Confirm the new setting by pressing the OK button. The new temperature is shown on the right-hand side of the symbol in the display.

CAUTION

An increase in the room temperature can be slowed by the thermostats for the radiators or under floor heating. Therefore, open the thermostat valves fully, except in those rooms where a cooler temperature is required, e.g. bedrooms.

TIP

Wait 24 hours before making a new setting, so that the room temperature has time to stabilise.

Menu 2 - temporary lux

Setting range: 3, 6 and 12 hours, as well as mode “off”

When hot water requirement has temporarily increased this menu can be used to select an increase in the hot water temperature to lux mode for a selectable time.

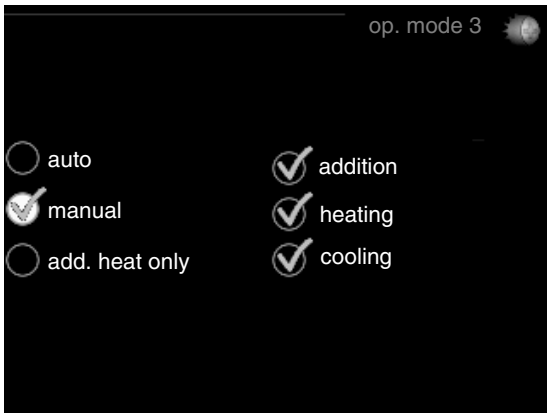
CAUTION

If comfort mode “luxury” is selected in the heat pump/ indoor module menu 2.2, no further increase can be carried out.

The function is activated immediately when a time period is selected and confirmed using the OK button. The time to the right displays the remaining time at the selected setting.

When the time has run out the menu returns to “from” mode. Select “off” to switch off *temporary lux*.

Menu 3 - op. mode



op. mode

Setting range: auto, manual, add. heat only

functions

Setting range: addition, heating, cooling

The heat pump/indoor module operating mode is usually set to “auto”. It is also possible to set the heat pump/indoor module to “add. heat only”, when only additional heat is used, or “manual” and then select what functions are to be permitted.

Change the operating mode by marking the desired mode and pressing the OK button. To select selectable functions that are permitted or not, mark the function using the arrow buttons and press the OK button.

Operating mode auto

In this operating mode you cannot select which functions are to be permitted because it is handled automatically by the heat pump/indoor module.

Operating mode manual

In this operating mode you can select what functions are permitted.

Operating mode add. heat only

CAUTION

If you choose mode “add. heat only” the compressor is deselected and there is a higher operating cost.

In this operating mode the compressor in the heat pump is not active and only additional heat is used.

Functions

"addition" is what helps the compressor to heat the accommodation and/or the hot water when it cannot manage the whole requirement alone.

"heating" means that you get heat in the accommodation. You can deselect the function when you do not wish to have heating running.

"cooling" means that you get cooling in the accommodation in hot weather. You can deselect the function when you do not wish to have the cooling running. This alternative requires an accessory for cooling or if the heat pump has a built in function for cooling.

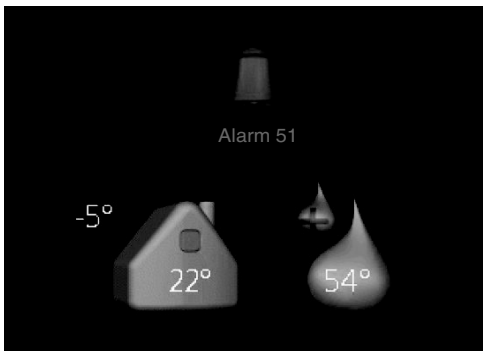
Menu 4 - SERVICE

Here you set which climate system the room unit should be connected to. Confirm the setting using the OK button.
The menu displays which product is connected, and the software version in RMU 40M.

CAUTION

The climate system must also be activated in the heat pump/indoor module menu 4.2. Activate all climate systems you want to control from RMU 40M .

Manage alarm



In the event of an alarm a symbol is shown at the top edge of the display together with the alarm's number.

Go to the your heat pump/indoor module to get more information.

In the other menus the alarm symbol is shown in the bottom right hand corner.

Troubleshooting

Communication error

- Check that the settings in RMU 40M menu 4 and heat pump/indoor module menu 4.2 agree.
- Check the cable connection between RMU 40M and heat pump/indoor module.

Display extinguished

- Check the cable connection between RMU 40M and heat pump/indoor module.
- Check that the unit is not in stand-by mode.

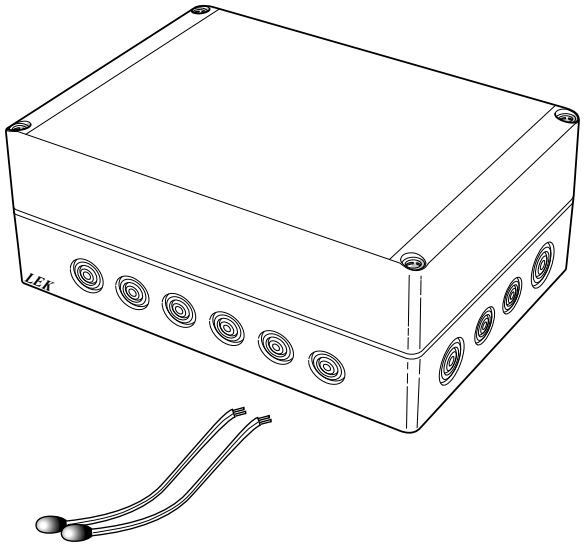
Technical data

Technical specifications

RMU 40M		
Plastic spacerWxHxD	mm	85x85x35
DimensionsWxHxD	mm	85x85x14
Rated voltage		12 VDC 40 mA (supplied from the heat pump/indoor module)
Part No.		MCD291A011

AXC 30M

Accessories



1. General

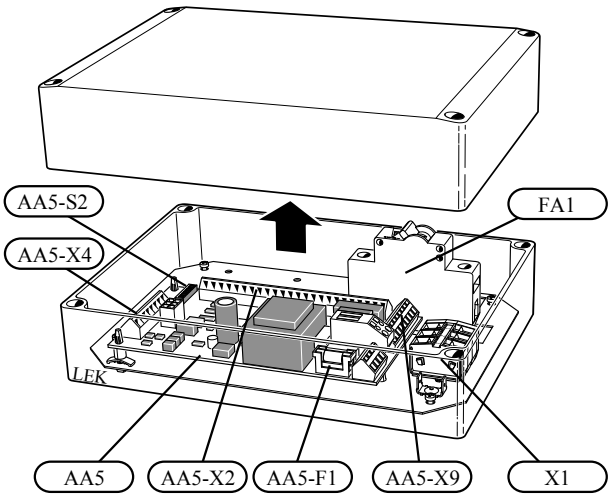
This accessory is used to enable connection and control of (a AXC 30M is required for each of the following accessory functions that is used):

- Shunt controlled additional heat
- Step controlled additional heat
- Extra climate system
- Hot water comfort
- Active cooling (4-pipe)
- Connection of several heat pumps

Contents

4 x	Cable ties
2 x	Heating pipe paste
1 x	Insulation tape
1 x	Unit box with accessory card
2 x	Aluminium tape
2 x	Temperature sensor

Component positions



Electrical components

FA1	Miniature circuit-breaker. 10A
X1	Terminal block, power source
AA5	Accessory card
AA5-X2	Terminal block, sensors and external blocking
AA5-X4	Terminal block, communication
AA5-X9	Terminal block, circulation pump, mixing valve and auxiliary relay
AA5-S2	DIP switch
AA5-F1	Fine wire fuse, T4AH250V

Designations in component locations according to standard IEC 81346-1 and 81346-2.

2. Common electrical connection

NOTE

All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
The heat pump must not be powered when installing AXC 30M.

Electrical circuit diagrams are at the end of the chapter for each connection option.

Connecting communication

Control module

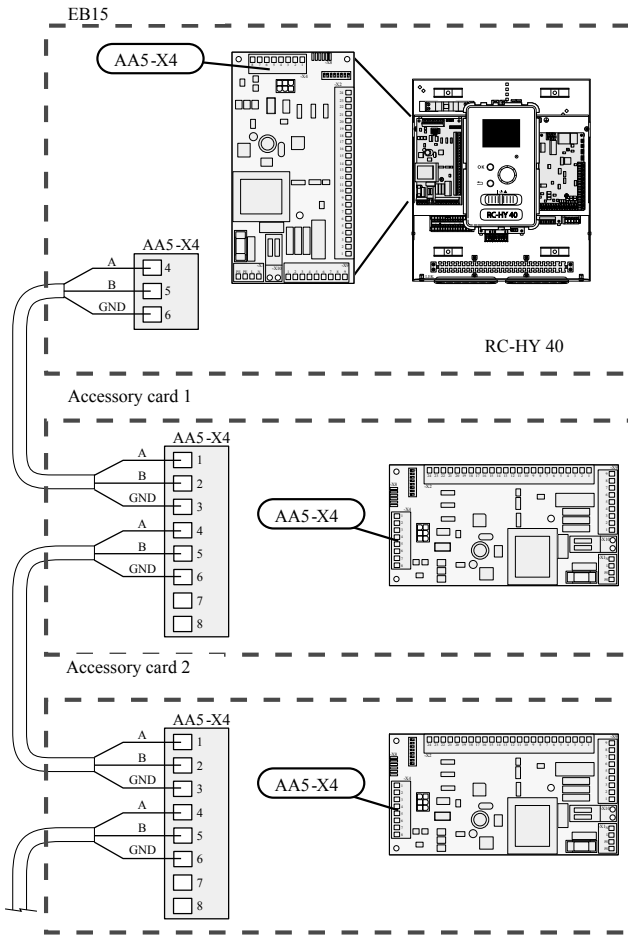
RC-HY 40 contains an accessory card (AA5) which is connected for communication.

If several accessories are to be connected or are already installed, the following instructions must be followed.

The first external accessory card must be connected directly to terminal block AA5-X4 in the control module.

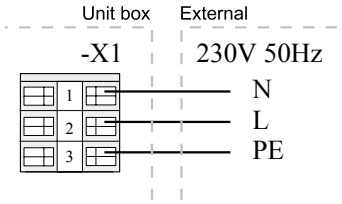
The following cards must be connected in series with the previous card.

Use cable type LiYY, EKKX or similar.



Connecting the supply

Connect the power source to terminal block X1 as illustrated.



3. Shunt controlled additional heat

General

This function enables an external additional heater, e.g. an oil boiler, gas boiler or district heating exchanger to aid with heating.
The indoor module controls a shunt valve and a circulation pump (GP10) via the accessory card in AXC 30M. If the heat pump does not manage to keep the correct supply temperature (BT25), the addition starts. When the boiler temperature of (BT52) has been increased to about 55 °C, the indoor module transmits a signal to the shunt (QN11) to open from the addition. The shunt (QN11) adjusts so the true supply temperature corresponds with the indoor module's theoretical calculated set point value. When the heating demand drops sufficiently so the additional heat is no longer required the shunt (QN11) closes completely. Factory set minimum run time holding the boiler prepared is 12 hours (can be set in menu 5.3.2).

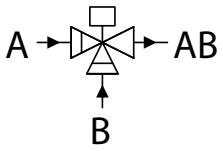
Pipe connections

The external circulation pump (GP10) is positioned according to the outline diagram.

Shunt valve

The shunt valve (QN11) is located on the flow line to the climate system after the heat pump according to the outline diagram.

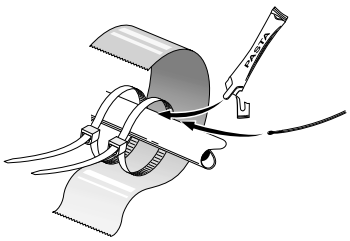
- Connect the flow line from the heat pump to the external heat source via the T-pipe to port B on the shunt valve (closes at reduced signal).



- Connect the flow line to the climate system from the shunt valve to the common port AB (always open).
- Connect the flow line from the external additional heat to the shunt valve to port A (opens at increased signal).

Temperature sensor

- Install the boiler sensor (BT52) in a suitable location in the external addition.
- External supply temperature sensor (BT25, connected in the indoor module's control module) must be installed on the supply line to the radiators, after the shunt valve (QN11).



Install the temperature sensors with cable ties with the heat conducting paste and aluminium tape. Then insulate with supplied insulation tape.

NOTE

Sensor and communication cables must not be placed near power cables.

Outline diagram

Explanation

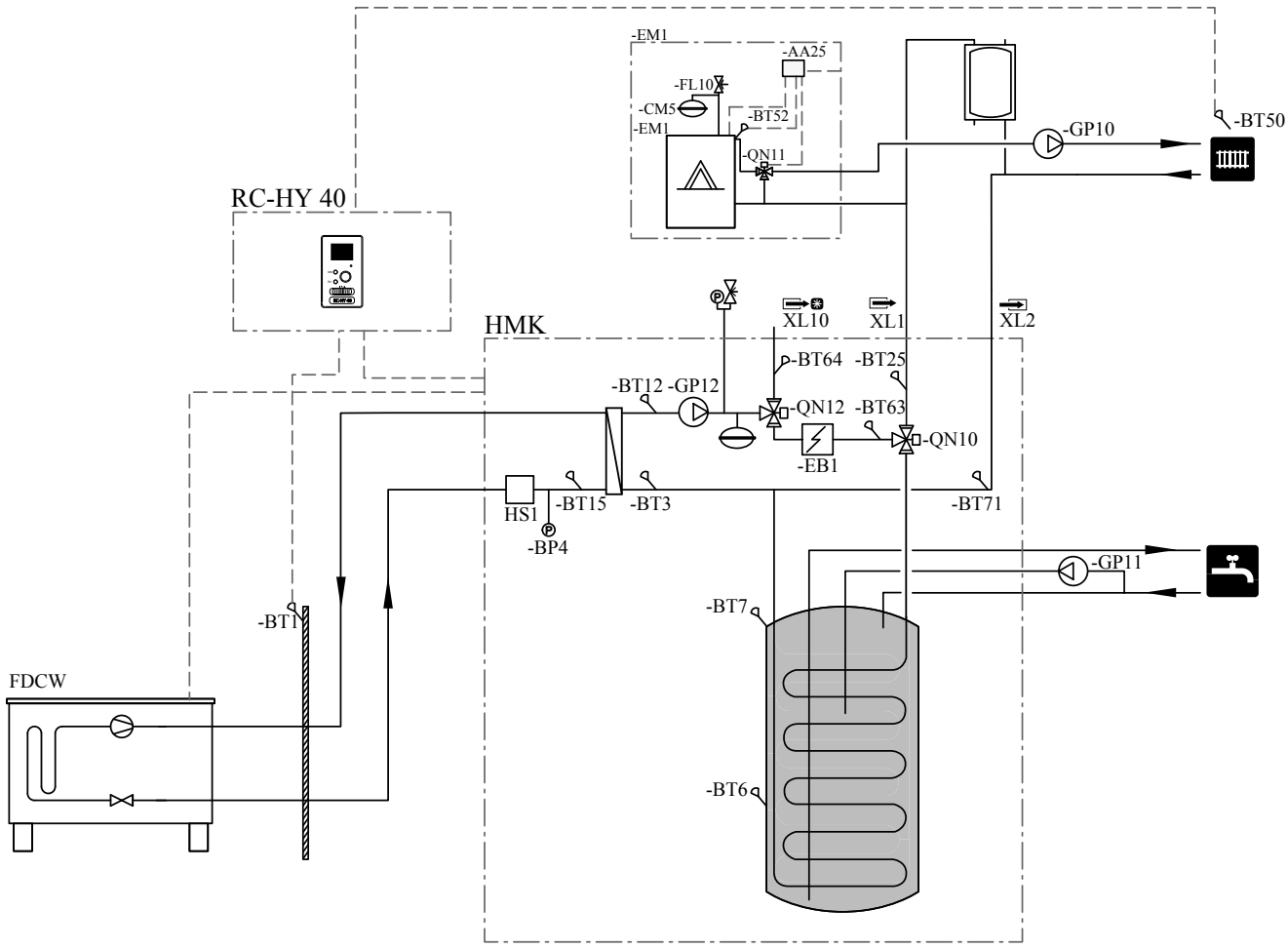
EM1	**Shunt controlled additional heat, boiler**
AA5	Accessory card (AXC 30M)
BT52	Temperature sensor, boiler
CM5	Expansion vessel, closed
EM1	Oil/gas boiler
FL10	Safety valve, heating medium side
QN11	Mixing valve, addition
FDCW	**Heat pump system**
FDCW	Heat pump

Miscellaneous

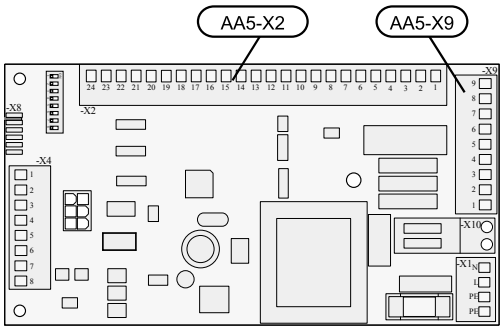
AA25	RC-HY 40
BT1	Outdoor sensor
BT3	Temperature sensor, heating medium return
BT6	Temperature sensor, hot water charging
BT7	Temperature sensor, hot water, top
BT15	Temperature sensor, liquid
BT12	Temperature sensor, condenser outlet
BT25	Temperature sensor, heating medium flow, External
BT50	Room sensor, extra climate system
BT63	Temperature sensor, heating medium supply downstream the submersible heater
BT64	Temperature sensor, cooling medium supply
BT71	Temperature sensor, heating medium return, External
GP10	Circulation pump, heating medium external
GP11	Hot water circulation pump
QN10	Reversing valve, hot water
QN12	Isolation valve, cooling/heating
HS1	Drying filter
BP4	High pressure pressostat

Designations according to standards 81346-1 and 81346-2.

Outline diagram RC-HY 40 with AXC 30M and shunt controlled additional heat



Electrical connection



NOTE

All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
RC-HY 40 must not be powered when installing AXC 30M.

Connection of sensors and external blocking

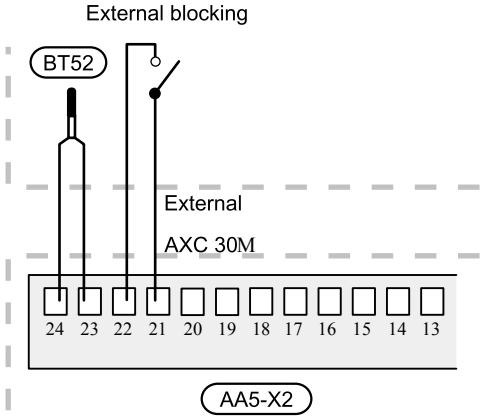
Use cable type LiYY, EKKX or similar.

Boiler sensor (BT52)

Connect the boiler sensor to AA5-X2:23-24.

External blocking (optional)

A contact (NO) can be connected to AA5-X2:21-22 to block the addition. When the contact closes, the addition is blocked.

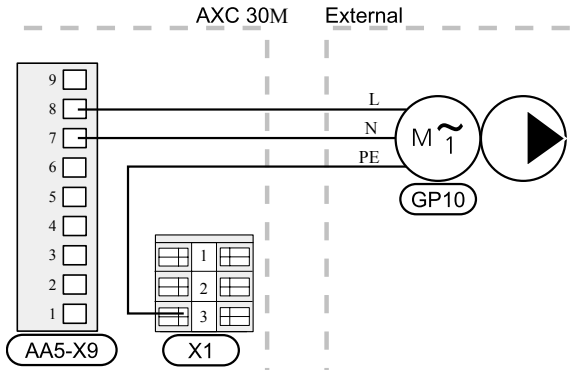


CAUTION

The relay outputs on the accessory card can have a max load of 2 A (230 V) in total.

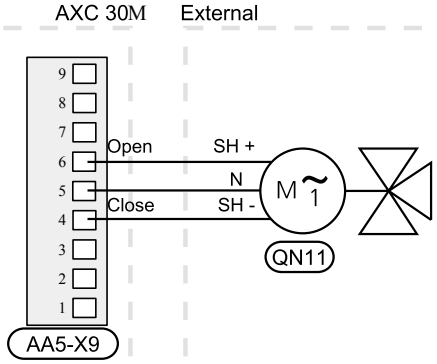
Connection of the circulation pump (GP10)

Connect the circulation pump (GP10) to AA5-X9:8 (230V), AA5-X9:7 (N) and X1:3 (PE)



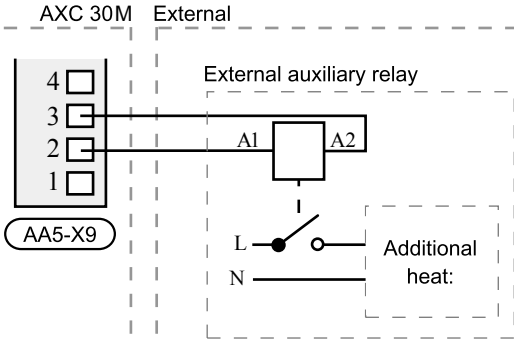
Connection of the mixing valve motor (QN11)

Connect the mixing valve motor (QN11) to AA5-X9:6 (230V, open), AA5-X9:5 (N) and AA5-X9:4 (230V, close).



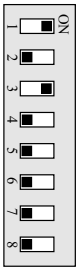
Connection of the auxiliary relay for additional heating

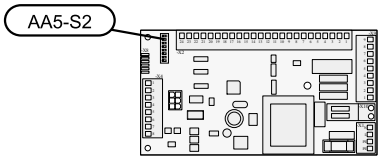
Connect the auxiliary relay for switching the addition on and off to AA5-X9:2 (230V) and AA5-X9:3 (N).



DIP switch

The DIP switch on the accessory card must be set as follows.





Program settings

Program setting of AXC 30M can be performed via the start guide or directly in the menu system.

Start guide

The start guide appears upon first start-up after heat pump installation, but is also found in menu 5.7.

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 5.2 - system settings

Activating/deactivating of accessories.
Select: “shunt controlled add. heat”.

Menu 5.3.2 - shunt controlled add. heat

Here you can perform the following settings:
- Select when the addition is to start.
- Minimum running time.
- Minimum boiler temperature at which the shunt can start control.
- Misc. shunt settings.

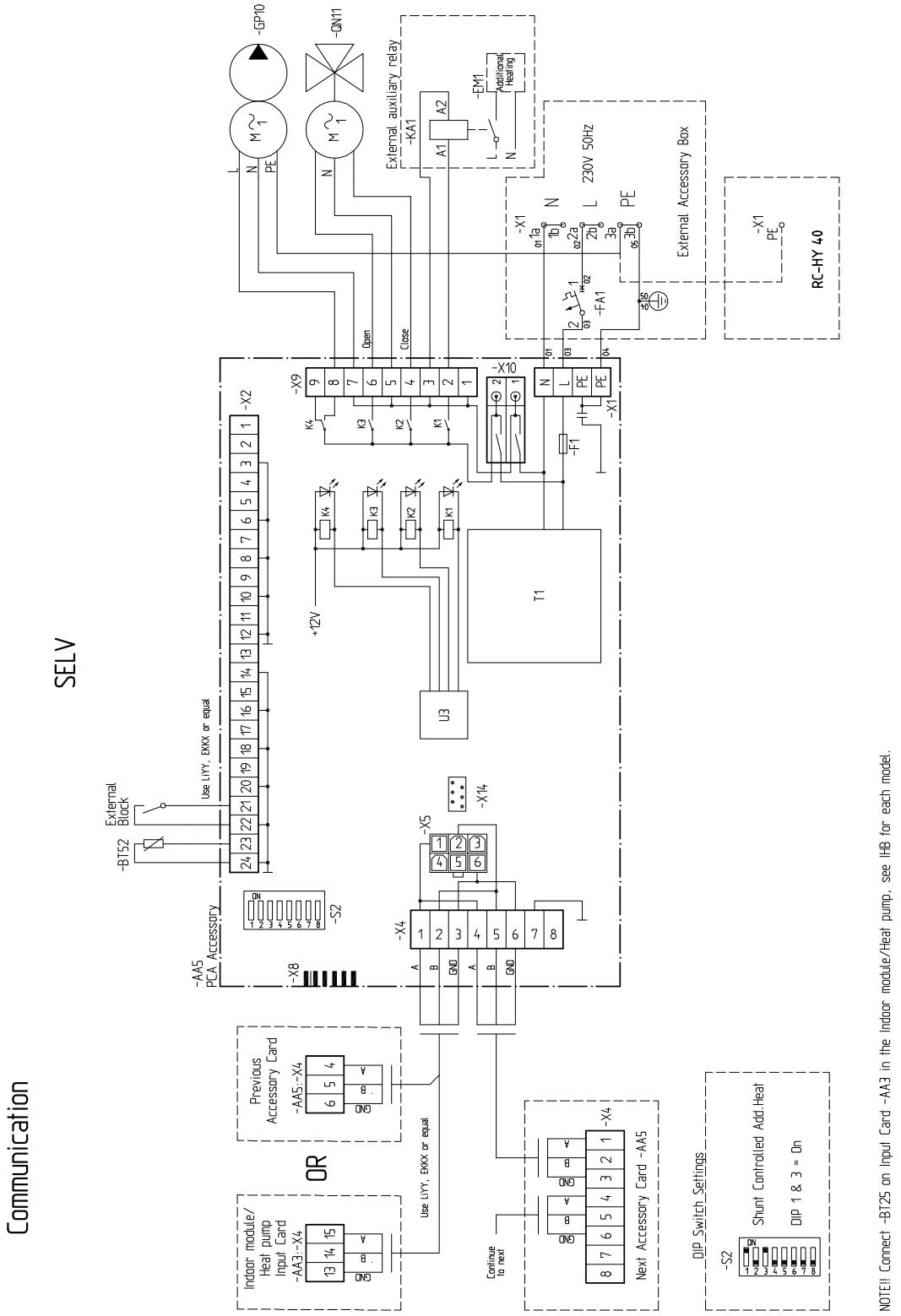
Menu 5.6 - forced control

Forced control of the different components in indoor module as well as in the different accessories that may be connected.
EM1-AA5-K1: Activating the relay for additional heating.
EM1-AA5-K2: Signal (close) to mixing valve (QN11).
EM1-AA5-K3: Signal (open) to mixing valve (QN11).
EM1-AA5-K4: Activating the circulation pump (GP10).

CAUTION

Also see the Installer manual for RC-HY 40.

Electrical circuit diagram



4. Extra climate system

General

This accessory function is used when RC-HY 40 is installed in houses with up to four different climate systems that require different flow line temperatures, for example, in cases where the house has both a radiator system and an under floor heating system.

CAUTION

Underfloor heating systems are normally max flow line temperature set between 35 and 45 °C.
Check the max temperature for your floor with your floor supplier.

CAUTION

If the room sensor is used in a roomwith under floor heating it should only have an indicatory function, not control of the roomtemperature.

Pipe connections

General

When connecting extra climate systems, they must be connected so that they have a lower working temperature than the climate system 1.

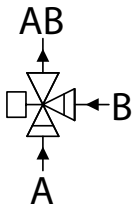
Circulation pump

The extra circulation pump (GP20) is positioned in the extra climate system according to the outline diagram.

Shunt valve

The mixing valve (QN25) is located on the flow line after the heat pump/indoor module, before the first radiator in the climate system 1. The return line from the additional climate system must be connected to the shunt valve and to the return line from the heating system 1, see image and outline diagram.

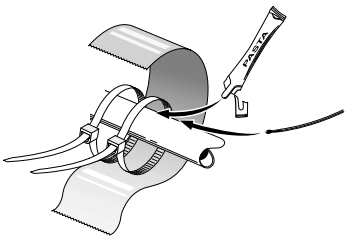
- Connect the flow line to the climate system from the heat pump to port A on the shunt valve (opens at in-creased signal).
- Connect the return line from the climate system to port B on the shunt valve via the T-pipe to (closes at re-duced signal).



- Connect the flow line to the climate system to the common port AB on the shunt valve (always open).

Temperature sensor

- The flow temperature sensor (BT2) is installed on the pipe between the circulation pump (GP20) and mixing valve (QN25).
- The return line sensor (BT3) is installed on the pipe from the extra climate system.



Install the temperature sensors with cable ties with the heat conducting paste and aluminium tape. Then insulate with supplied insulation tape.

NOTE

Sensor and communication cables must not be placed near power cables.

Outline diagram

Explanation

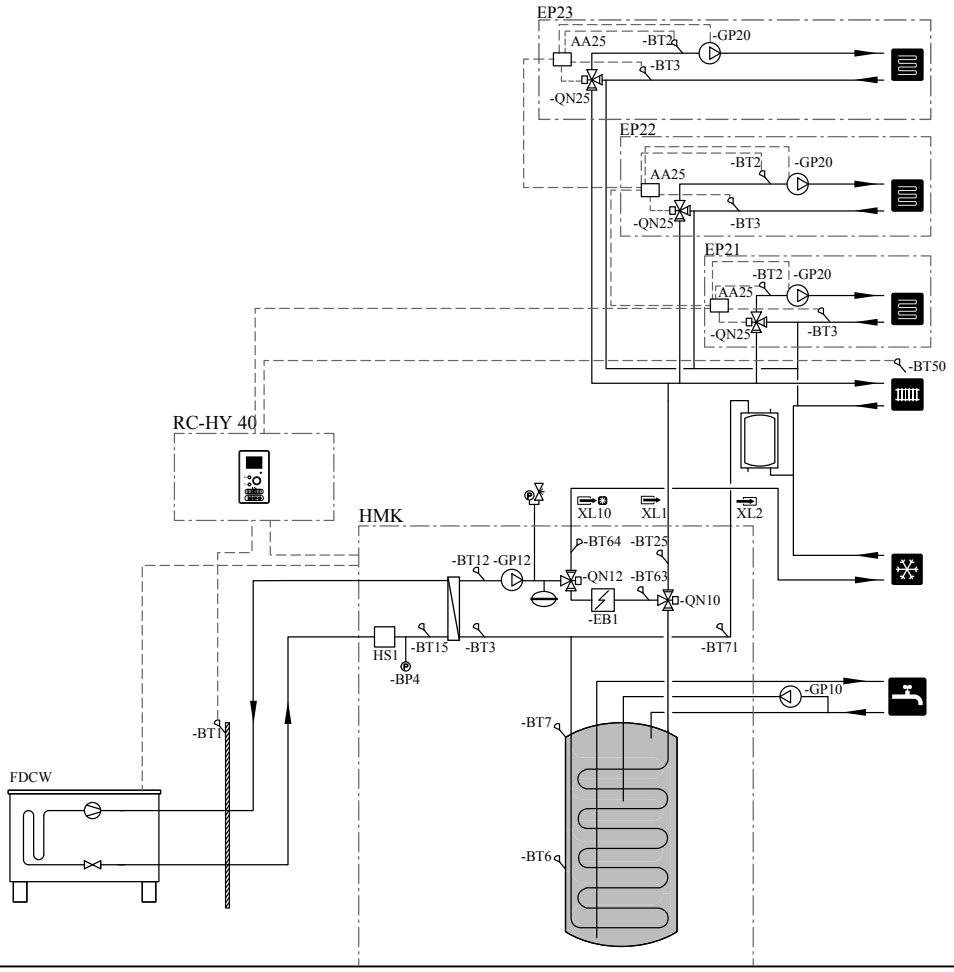
FL10	Safety valve, heating medium side
QN11	Mixing valve, addition
FDCW	**Heat pump system**
FDCW	Heat pump

Miscellaneous

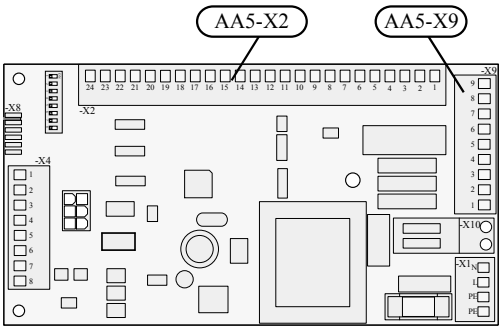
XL1	Connection, heating medium flow
XL2	Connection, heating medium return
EP21	**Climate system 2 (ECS 40M/ECS 41M)**
EP22	**Climate system 3 (ECS 40M/ECS 41M)**
EP23	**Climate system 4 (ECS 40M/ECS 41M)**
AA25	RC-HY 40
BT1	Outdoor sensor
BT3	Temperature sensor, heating medium return
BT6	Temperature sensor, hot water charging
BT7	Temperature sensor, hot water, top
BT15	Temperature sensor, liquid
BT12	Temperature sensor, condenser outlet
BT25	Temperature sensor, heating medium flow, External
BT50	Room sensor, extra climate system
BT63	Temperature sensor, heating medium supply downstream the submersible heater
BT64	Temperature sensor, cooling medium supply
BT71	Temperature sensor, heating medium return, External
GP10	Circulation pump, heating medium external
GP11	Hot water circulation pump
GP20	Circulation pump, extra climate system
QN10	Reversing valve, hot water
QN12	Isolation valve, cooling/heating
QN25	Shunt valve
HS1	Drying filter
BP4	High pressure pressostat
XL10	Connection, cooling medium flow

Designations in component locations according to standard IEC 81346-1 and 81346-2.

Outline diagram RC-HY 40 with AXC 30M and up to three extra climate systems



Electrical connection



NOTE

All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
RC-HY 40 must not be powered when installing AXC 30M.

Connection of sensors and external adjustment

Use cable type LiYY, EKKX or similar.

Flow temperature sensor, extra climate system (BT2)

Connect the boiler sensor to AA5-X2:23-24.

Return line sensor, extra climate system (BT3)

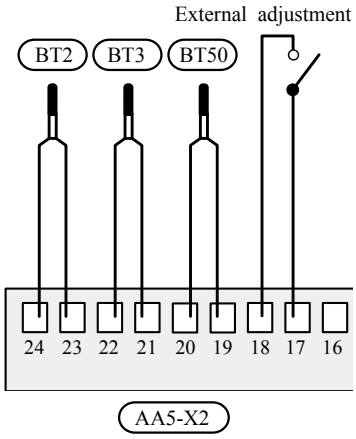
Connect the return line sensor to AA5-X2:21-22.

Room temperature sensor, extra climate system (BT50) (optional)

Connect the room temperature sensor to AA5-X2:19-20.

External adjustment (optional)

A potential free switch can be connected to AA5- X2:17-18 for external adjustment of the climate system.

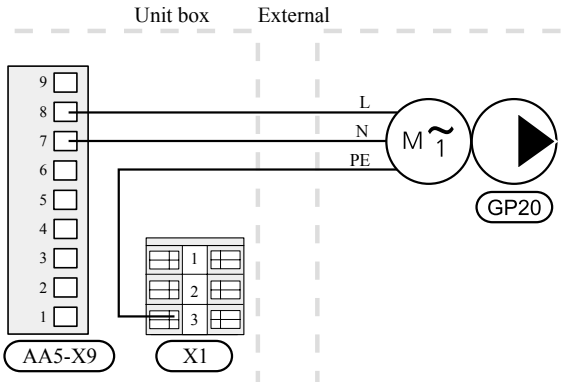


CAUTION

The relay outputs on the accessory card can have a max load of 2 A (230 V) in total.

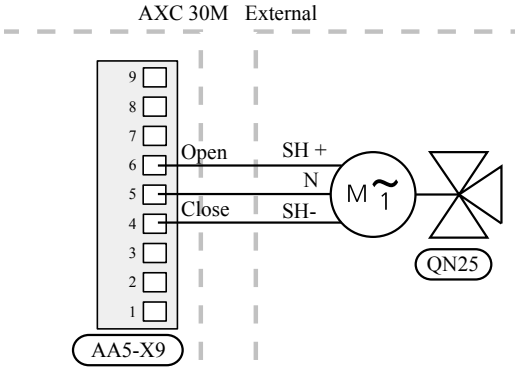
Connection of the circulation pump (GP20)

Connect the circulation pump(GP20) to AA5-X9:8 (230V), AA5-X9:7 (N) and X1:3(PE).



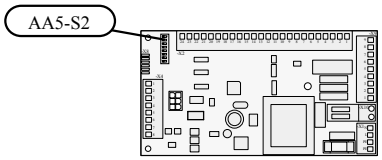
Connection of the mixing valve motor (QN25)

Connect the mixing valve motor (QN25) to AA5-X9:6 (230V, open), AA5-X9:5 (N) and AA5-X9:4 (230V, close).

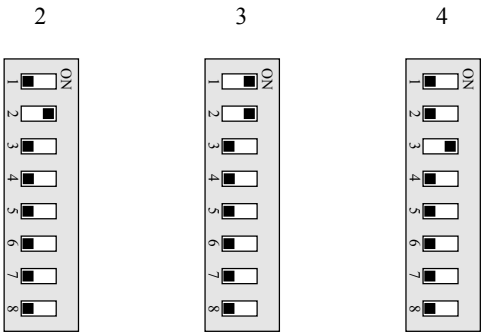


DIP switch

The DIP switch on the accessory card must be set as follows.



Climate system



Program settings

Program setting of AXC 30M can be performed via the start guide or directly in the menu system.

Start guide

The start guide appears upon first start-up after heat pump/ indoor module installation, but is also found in menu 5.7.

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 5.2.4 - accessories

Activating/deactivating of accessories.
Select: “climate system 2”, “climate system 3” and/or “climate system 4” depending on how many climate systems are installed.

Menu 5.1.2 - max flow line temperature

Setting the maximum flow temperature for each climate system.

Menu 5.3.3 - extra climate system

Mixing valve settings for extra installed climate system.

Menu 1.1 - temperature

Setting the indoor temperature.

Menu 1.9.1 - heating curve

Setting the heat curve.

Menu 1.9.2 - external adjustment

Setting external adjustment.

Menu 1.9.3 - min. flow line temp.

Setting theminimumflow temperature for each climate system.

Menu 1.9.4 - room sensor settings

Activating and setting the room temperature sensor.

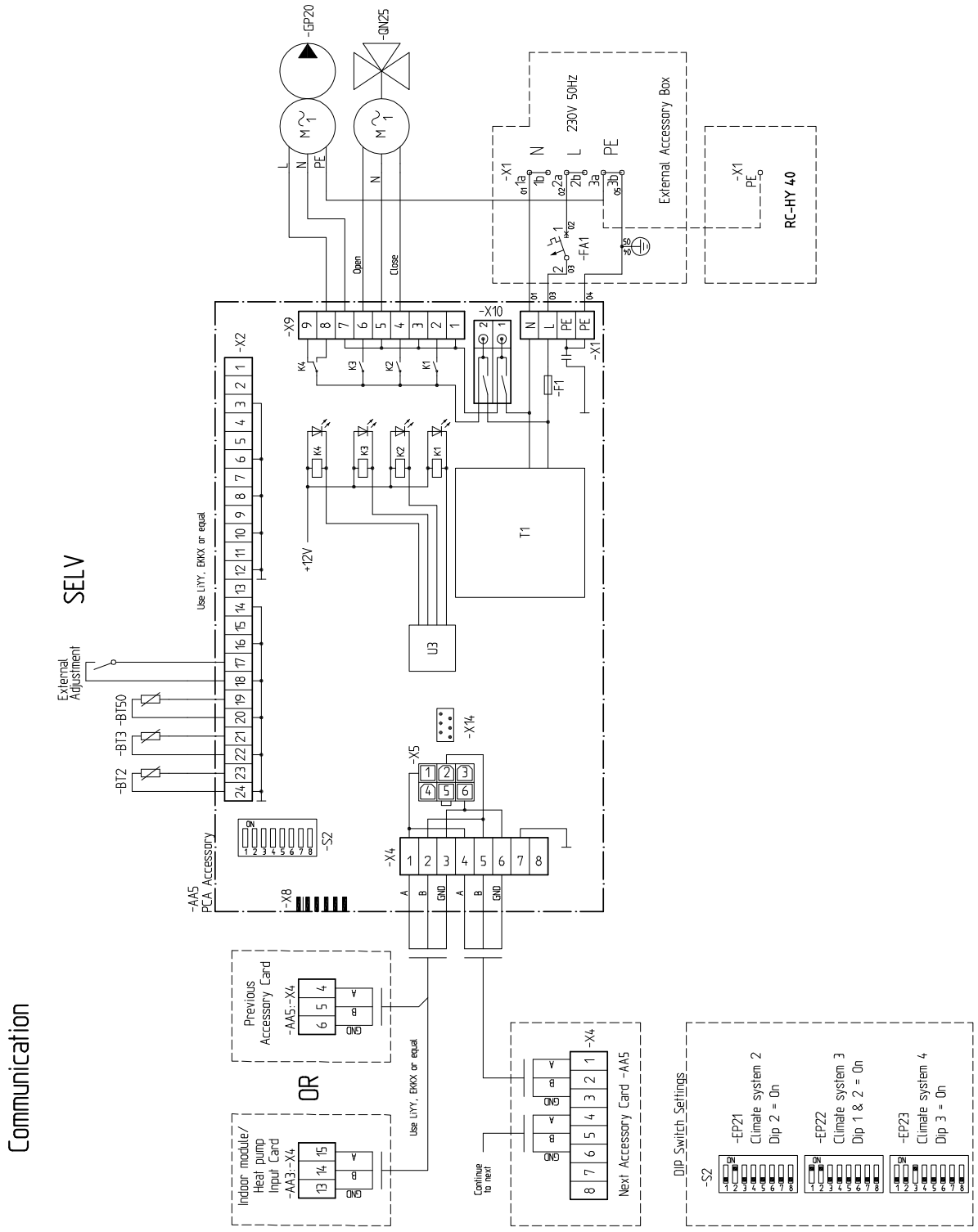
Menu 5.6 - forced control

Forced control of the different components in the heat pump as well as in the different accessories that may be connected. 2 is climate system, EP22, 3 is climate system EP23, 4 is climate system EP21.
EP2#-AA5-K1: No function.
EP2#-AA5-K2: Signal (close) to mixing valve (QN25).
EP2#-AA5-K3: Signal (open) to mixing valve (QN25).
EP2#-AA5-K4: Activating the circulation pump (GP20).

CAUTION

Also see the Installer manual for relevant heat pump/ indoor module.

Electrical circuit diagram



5. Hot water comfort

General

This function allows temporary lux, mixing valve and hot water circulation.

Temporary lux (extra hot water)

If an immersion heater is installed in the tank it can be permitted to produce hot water, at the same time as the heat pump prioritises heating.

Mixing valve

A temperature sensor reads the temperature of the outgoing hot water to the domestic hot water and adjusts the mixing valve from the water heater until the set temperature has been reached.

Hot water circulation (VVC)

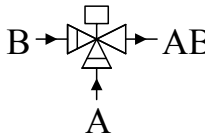
One pump can be controlled for the circulation of the hot water during selectable periods.

Pipe connections

Mixing valve

The mixing valve (FQ1) is located on the outgoing hot water line from the water heater according to the outline diagram.

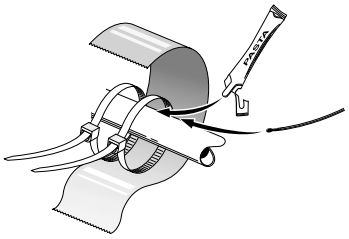
- Connect the incoming cold water via the T-pipe to the port B on the mixing valve (closes at signal).
- Connect the mixed water to the domestic hot water taps from the mixing valve to the common port AB (always open).



- Connect the outgoing hot water from the water heater to the mixing valve to port A(opens on signal).

Temperature sensor

- Temperature sensor, outgoing hot water, (BT70) installed in a suitable place after the mixing valve (FQ1).



Install the temperature sensors with cable ties with the heat conducting paste and aluminium tape. Then insulate with supplied insulation tape.

NOTE

Sensor and communication cables must not be placed near power cables.

Outline diagram

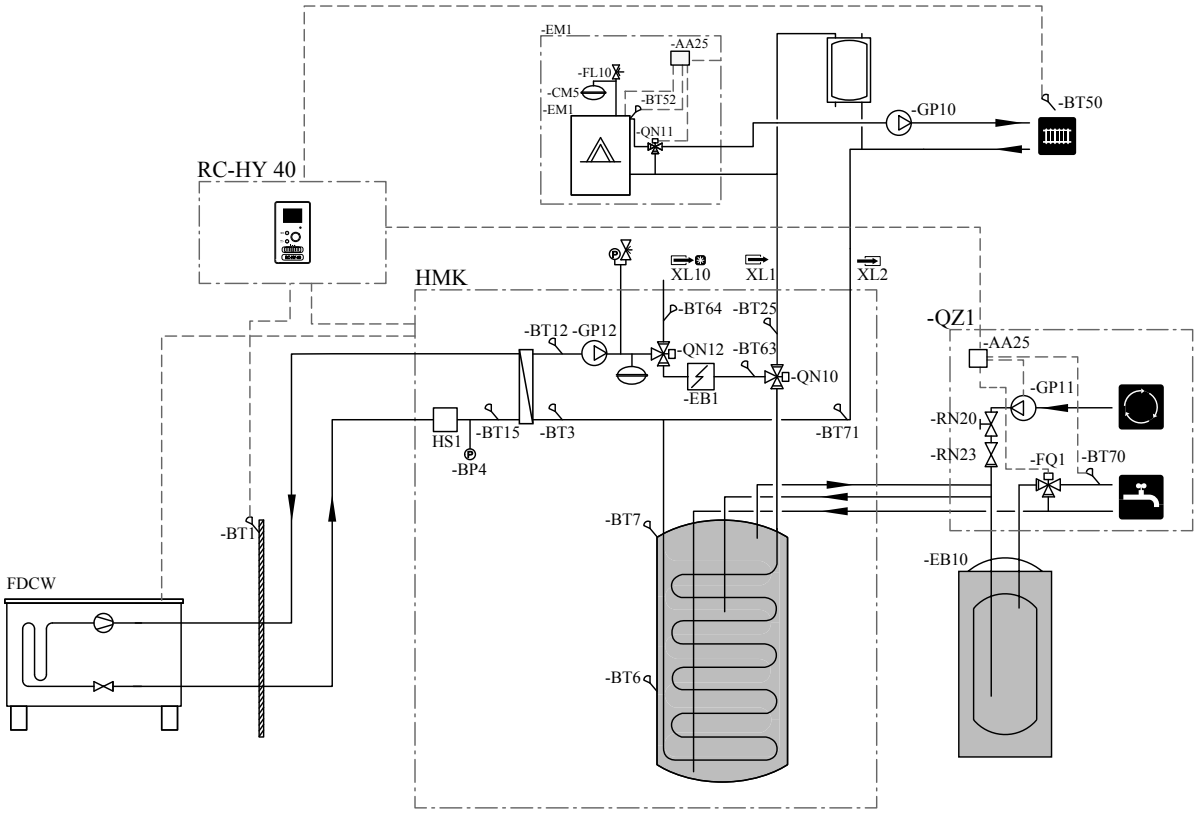
Explanation

EB1	**External additional heat**
CM5	Expansion vessel, closed
EB1	External electrical additional heat
FL10	Safety valve, heating medium side
QN11	Mixing valve, addition
FDCW	**Heat pump system**
FDCW	Heat pump
QZ1	**Hot water comfort**
AA25	Accessory card AXC 30
BT70	Temperature sensor, outgoing hot water
EB10	Additional water heater
RM23	Non-return valve
RN20	Trim valve

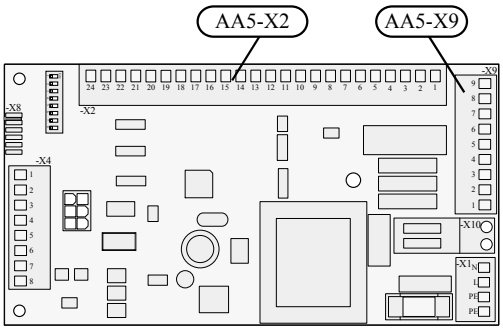
Miscellaneous

XL1	Connection, heating medium flow
XL2	Connection, heating medium return
BT1	Outdoor sensor
BT3	Temperature sensor, heating medium return
BT6	Temperature sensor, hot water charging
BT7	Temperature sensor, hot water, top
BT15	Temperature sensor, liquid
BT12	Temperature sensor, condenser outlet
BT25	Temperature sensor, heating medium flow, External
BT50	Room sensor, extra climate system
BT63	Temperature sensor, heating medium supply downstream the submersible heater
BT64	Temperature sensor, cooling medium supply
BT71	Temperature sensor, heating medium return, External
GP10	Circulation pump, heating medium external
GP11	Hot water circulation pump
GP20	Circulation pump, extra climate system
QN10	Reversing valve, hot water
QN12	Isolation valve, cooling/heating
HS1	Drying filter
BP4	High pressure pressostat
XL10	Connection, cooling medium flow

Outline diagram RC-HY 40 with AXC 30M and hot water comfort



Electrical connection



NOTE

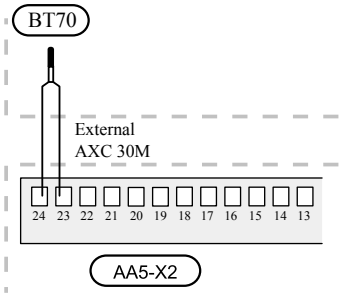
All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
RC-HY 40 must not be powered when installing AXC 30M.

Connecting sensors

Use cable type LiYY, EKKX or similar.

How water sensor, flow line (BT70)

Connect hot water sensor to AA5-X2:23-24.

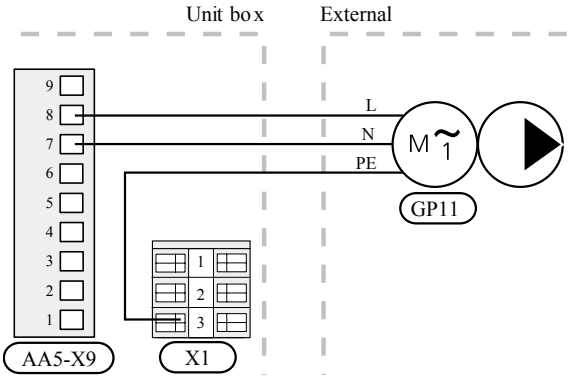


CAUTION

The relay outputs on the accessory card can have a max load of 2 A (230V) in total.

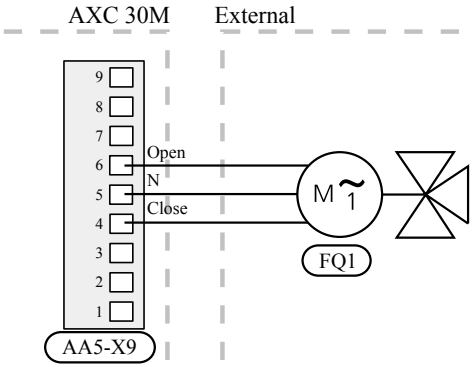
Connection of the hot water circulation pump (GP11)

Connect the circulation pump (GP11) to AA5-X9:8 (230V), AA5-X9:7 (N) and X1:3 (PE).



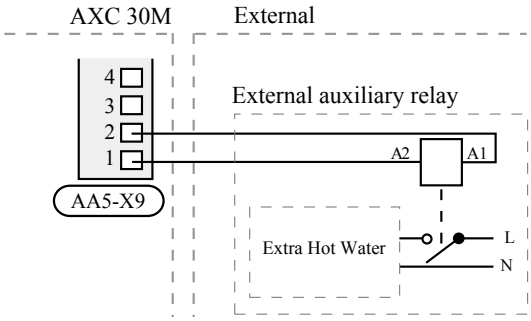
Connection of the mixing valve (FQ1)

Connect the mixing valve motor (FQ1) to AA5-X9:6 (230V, open), AA5-X9:5 (N) and AA5-X9:4 (230V, close).



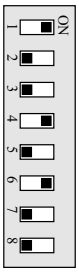
Connecting auxiliary relay for temporary lux (extra hot water)

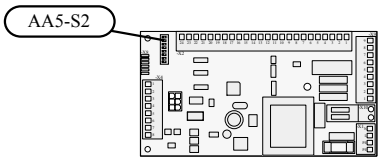
Connect the auxiliary relay for switching the addition on and off to AA5-X9:1 (N) and AA5-X9:2 (230V).



DIP switch

The DIP switch on the accessory card must be set as follows.





Program settings

Program setting of AXC 30M can be performed via the start guide or directly in the menu system.

Start guide

The start guide appears upon first start-up after heat pump installation, but is also found in menu 5.7.

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 5.2.4 - accessories

Activating/deactivating of accessories.
Select: “hot water comfort”.

Menu 2.9.2 - hot water recirc.

Here you can make the following settings for hot water circulation for up to three periods per day:

- How long the hot water circulation pump must run per operating instance.
- How long the hot water circulation pump must be stationary between operating instances.

Menu 5.3.8 - hot water comfort

Here you can perform the following settings:

- If an immersion heater is installed in the tank and whether it can be permitted to charge hot water if the compressors in the heat pump prioritise heating.
- Whether a mixing valve for limiting the temperature of hot water from the water heater is installed.
- Various shunt settings and outgoing hot water temperature from the tank for the mixing valve.

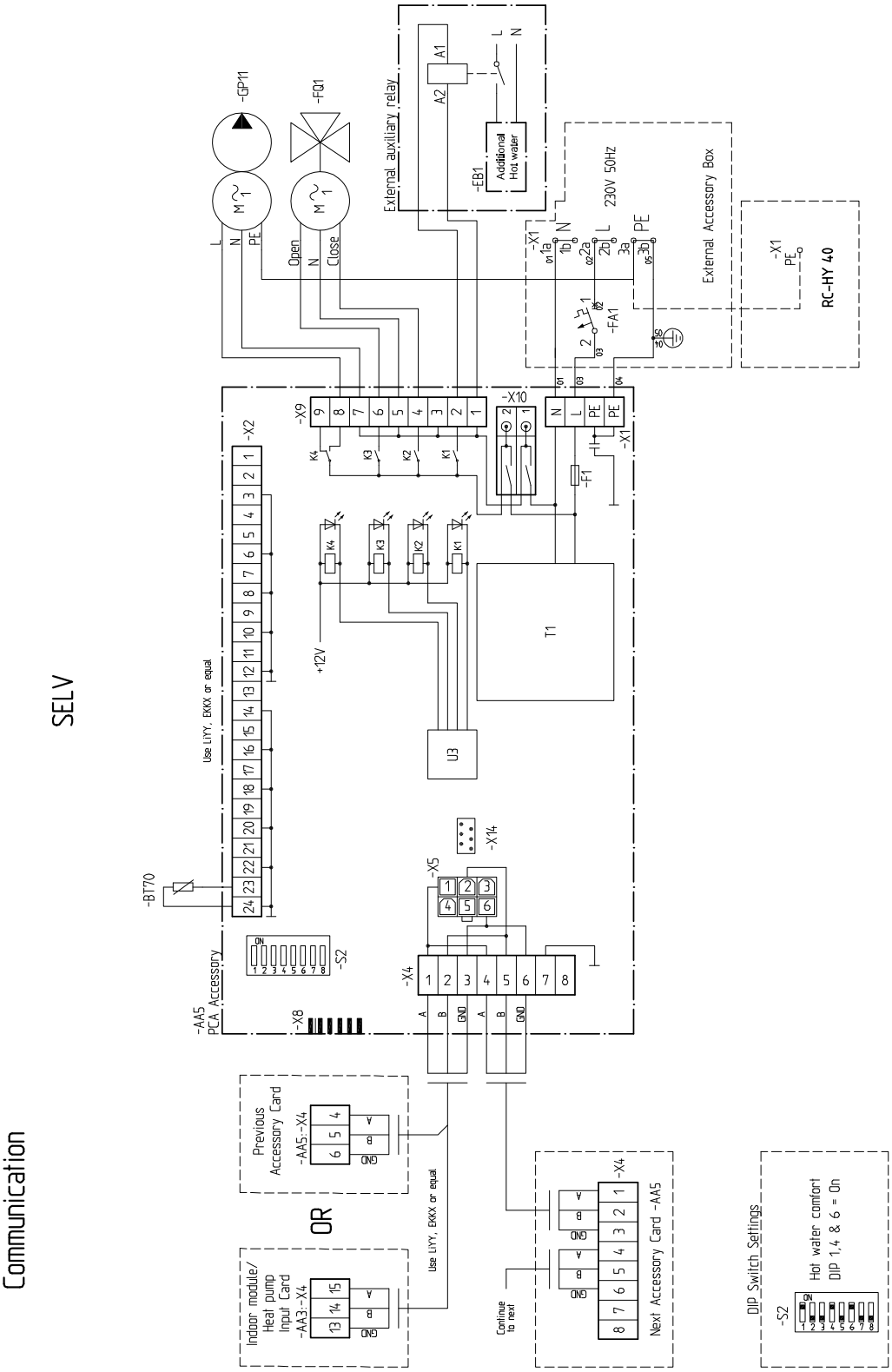
Menu 5.6 - forced control

Forced control of the different components in the heat pump as well as in the different accessories that may be connected.
QZ1-AA5-K1: Activating the relay for extra hot water.
QZ1-AA5-K2: Signal (close) to the mixing valve (FQ1).
QZ1-AA5-K3: Signal (open) to the mixing valve (FQ1).
QZ1-AA5-K4: Activating the circulation pump (GP11).

CAUTION

Also see the Installer manual for RC-HY 40.

Electrical circuit diagram



6. Active cooling (4-pipe)

General

Connecting this accessory makes it possible to control production of cooling.
The cooling system supplies cooling from the heat pump using a circulation pump (GP12) via a reversing valve (QN12).
For the installation to work the cooling system must flow freely permanently, for example using a volume vessel for cooling.
Operating mode cooling is activated by the temperature of the outdoor sensor (BT1) and any room temperature sensors (BT50), room units or separate room sensors for cooling (BT74). (If two different rooms are to be heated respectively cooled at the same time for example.)
When cooling is required, the cooling reversing valve (QN12) and the circulation pump (GP13) are activated.
Cooling production is regulated according to the cooling sensor (BT64) and a cooling set point value that is determined by the selected cooling curve.
Cooling degree minutes are calculated in response to the value on the external temperature sensor (BT64) for cooling out and the cooling set point value.
As an accessory, cooling reversing valve is required.

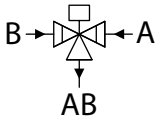
Pipe connections

General

Pipes and other cold surfaces must be insulated with diffusion-proof material to prevent condensation.
Where the cooling demand is high, fan convectors with drip trays and drain connection are needed.

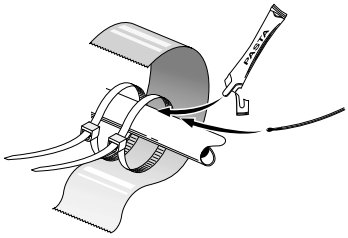
General

The reversing valve (QN12) is located in the system on the supply line from the heat pump.



Temperature sensor

Temperature sensor (BT64) is mounted on the supplyline to the cooling system at the T-pipe connection to the volume vessel (CP21).



Install the temperature sensors with cable ties with the heat conducting paste and aluminium tape. Then insulate with supplied insulation tape.

NOTE

Sensor and communication cables must not be placed near power cables.

Outline diagram

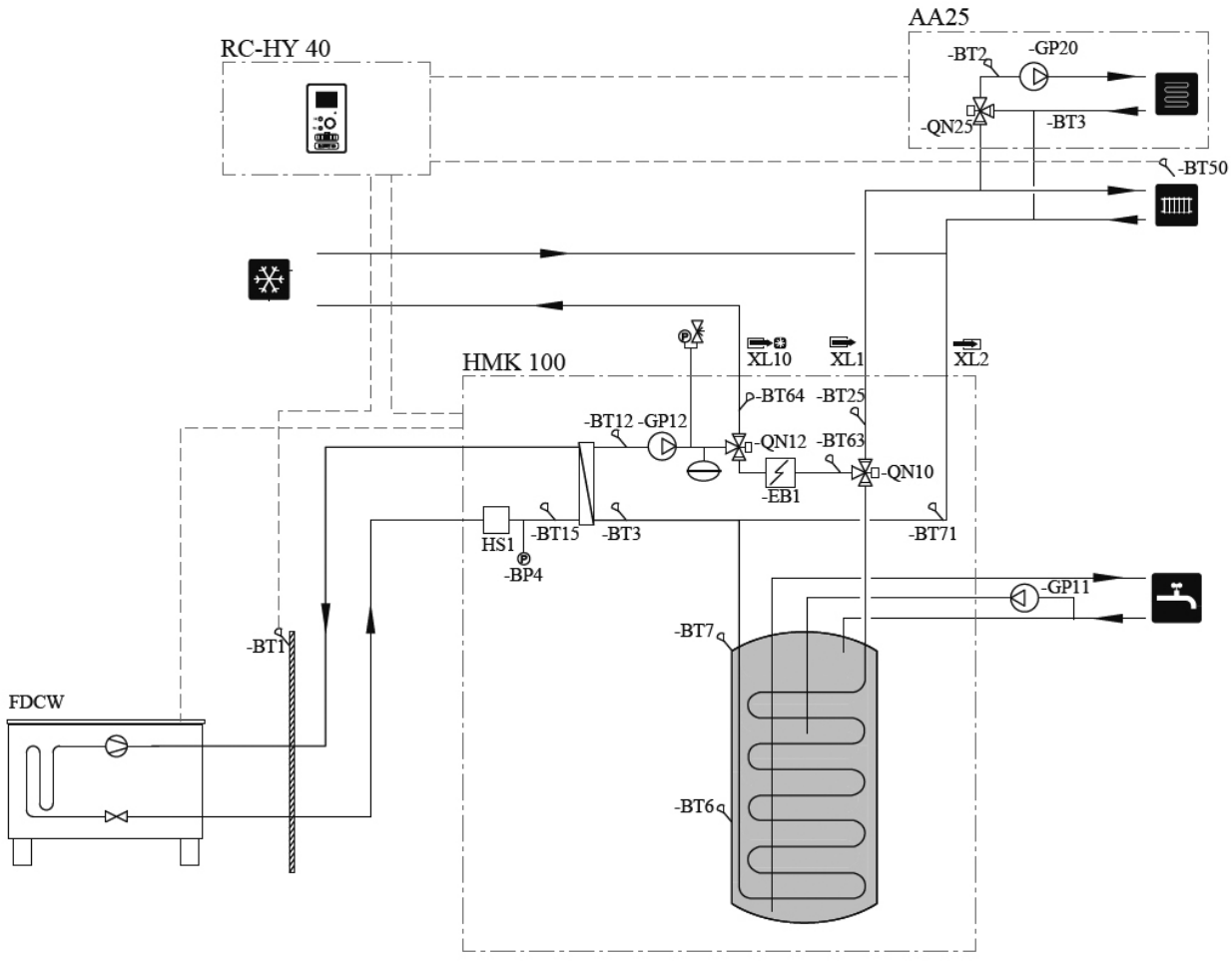
Explanation

FDCW	**Heat pump system**
FDCW	Heat pump

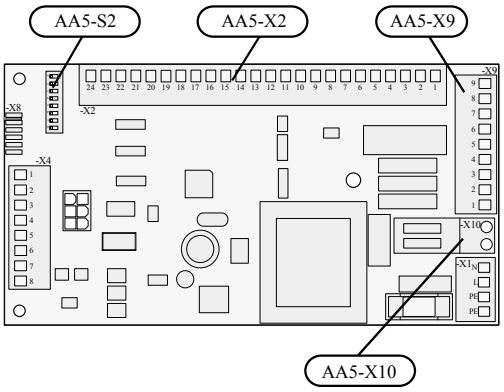
Miscellaneous

AA25	RC-HY 40
BT1	Outdoor sensor
BT3	Temperature sensor, heating medium return
BT6	Temperature sensor, hot water charging
BT7	Temperature sensor, hot water, top
BT15	Temperature sensor, liquid
BT12	Temperature sensor, condenser outlet
BT25	Temperature sensor, heating medium flow, External
BT50	Room sensor, extra climate system
BT63	Temperature sensor, heating medium supply downstream the submersible heater
BT64	Temperature sensor, cooling medium supply
BT71	Temperature sensor, heating medium return, External
GP10	Circulation pump, heating medium external
GP11	Hot water circulation pump
QN10	Reversing valve, hot water
QN12	Isolation valve, cooling/heating
HS1	Drying filter
BP4	High pressure pressostat

Outline diagram RC-HY 40 with AXC 30M and active cooling (4-pipe)



Electrical connection



NOTE

All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
RC-HY 40 must not be powered when installing AXC 30M.

Connection of sensors and external blocking

Use cable type LiYY, EKKX or similar.

Temperature sensor (BT64)

Connect the sensor to AA5-X2:19-20.

Temperature sensor (roomsensor for cooling, BT74)

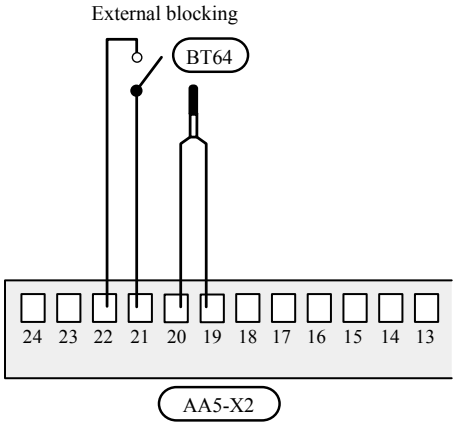
An extra temperature sensor (room sensor for cooling) can be connected to RC-HY 40 in order to better determine when it is time to switch between heating and cooling operation.
Connect the temperature sensor to one of the AUX inputs X6:7-19 on terminal block X6 which are behind the front hatch in RC-HY 40. The actual AUX input is selected in menu 5.4. Connect ground to terminal block X6:GND. Use a 2 core cable of at least 0.5 mm² cable area.
Place the temperature sensor in a neutral position in the room where the set temperature is required. It is important that the sensor is not obstructed from measuring the correct room temperature by being located, for example, in a recess, between shelves, behind a curtain, above or close to a heat source, in a draft from an external door or in direct sunlight. Closed radiator thermostats can also cause problems.

Room sensor (BT50)

To connect the room sensor (BT50), see the Installation manual for RC-HY 40.

External blocking (optional)

A contact can be connected to AA5-X2:21-22 to block cooling operation. When the contact closes, cooling operation is blocked.

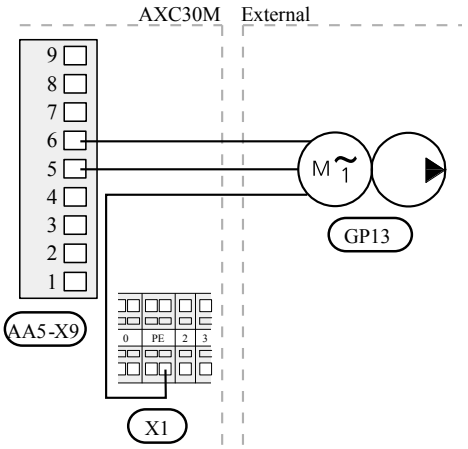


CAUTION

The relay outputs on the accessory card can have a max load of 2 A (230V) in total.

Connection of the cooling circulation pump (GP13)

Connect the circulation pump(GP13) to AA5-X9:6 (230V), AA5-X9:5 (N) and X1:3 (PE)

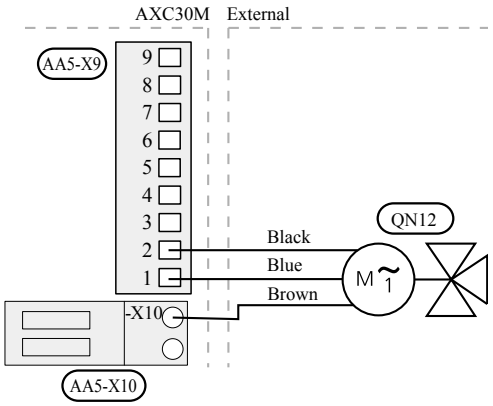


Connecting the charge pump (GP12)

Do not connect charge pump GP12 to the accessory card. See Installation manual to connect charge pump GP12.

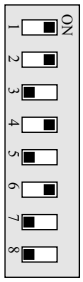
Connection of the reversing valve motor (QN12)

Connect the motor (QN12) to AA5-X9:2 (signal), AA5-X9:1 (N) and AA5-X10:2 (230 V).



DIP switch

The DIP switch on the accessory card must be set as follows.



AA5-S2

Program settings

Program setting of AXC 30M can be performed via the start guide or directly in the menu system.

Start guide

The start guide appears upon first start-up after heat pump installation, but is also found in menu 5.7.

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 5.2.4 - accessories

Activating/deactivating of accessories.
Select: "active cooling 4-pipe".

Menu 1.1 - temperature

Setting indoor temperature (room temperature sensor is required).

Menu 1.9.5 - cooling settings

Here you can perform the following settings:

- Lowest flow line temperature when cooling.
- Desired flow temperature at an outdoor air temperature of +20 and +40 °C.
- Time between cooling and heating operation and vice versa.
- Selection of room sensor can control cooling.
- How much the room temperature may decrease or increase compared to the desired temperature before switching to heating respectively cooling (requires room sensor).
- Degree minute levels for cooling.

Menu 4.9.2 - auto mode setting

When heat pump operating mode is set to "auto" it selects when start and stop of additional heat, heat production and cooling is permitted, dependent on the average outdoor temperature.
Select the average outdoor temperatures in this menu.
You can also set the time over which (filtering time) the average temperature is calculated. If you select 0, the present outdoor temperature is used.

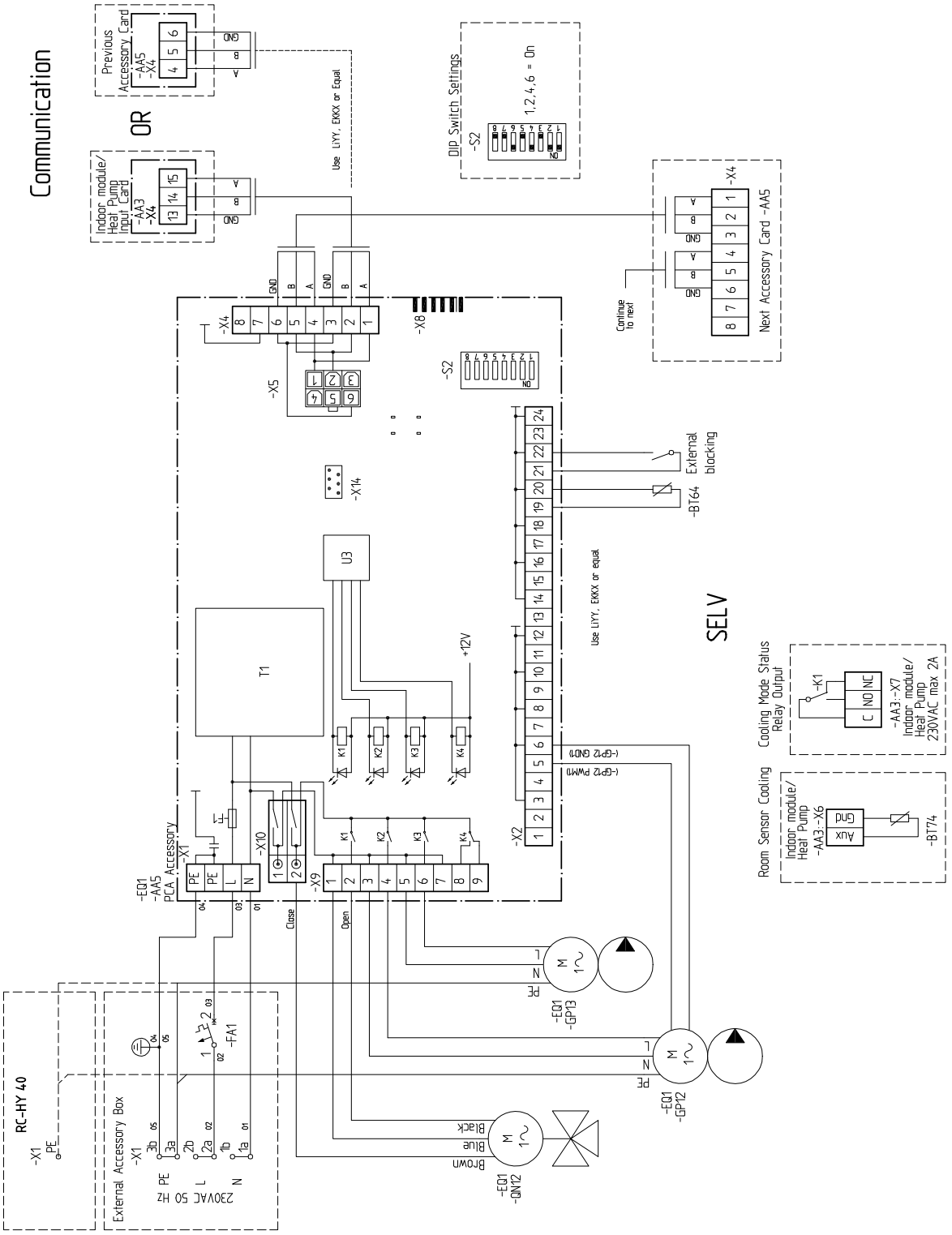
Menu 5.6 - forced control

Forced control of the different components in the heat pump as well as in the different accessories that may be connected.
EQ1-AA5-K1: Signal to 3-way valve (QN12).
EQ1-AA5-K3: Signal cooling circulation pump (GP13).

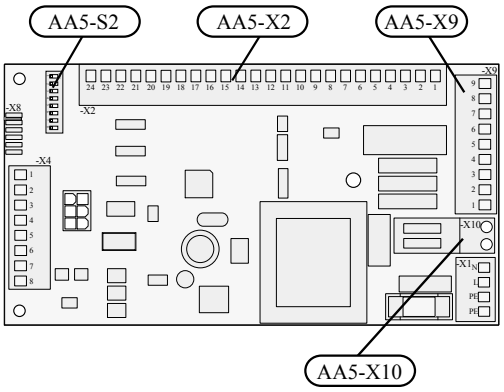
CAUTION

Also see the Operating manual for RC-HY40.

Wiring diagram



Electrical connection



NOTE

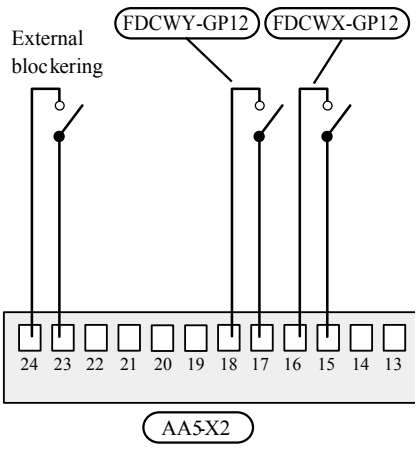
All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
RC-HY 40 must not be powered when installing AXC 30M.

Connection of sensors and external blocking

Use cable type LiYY, EKKX or similar.

External blocking (optional)

A contact can be connected to AA5-X2:23-24 to block cooling the accessory function. When the contact closes, the entire accessory function is blocked.
A further contact can be connected to AA5-X2:17-18 to block the accessory function. When the contact closes, the accessory function FDCWY is blocked.
A further contact can be connected to AA5-X2:15-16 to block the accessory function. When the contact closes, the accessory function FDCWX is blocked.

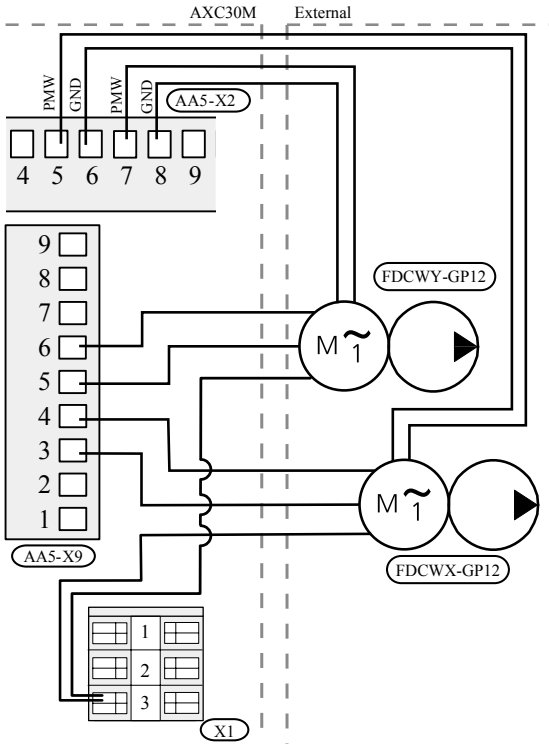


CAUTION

The relay outputs on the accessory card can have a max load of 2 A (230V) in total.

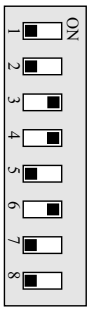
Connection of the circulation pump (GP12)

Connect the circulation pump (FDCWX-GP12) to AA5-X9:4 (230 V), AA5-X9:3 (N) and X1:3 (PE). Connect the circulation pump (FDCWY-GP12) to AA5- X9:6 (230 V), AA5-X9:5 (N) and X1:3 (PE).



DIP switch

The DIP switch on the accessory card must be set as follows.



AA5-S2

Program settings

Program setting of multi installation during operation of several heat pumps can be performed via the start guide or directly in the menu system.

Start guide

The start guide appears upon first start-up after heat pump installation, but is also found in menu 5.7.

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 5.2.2 - installed slaves

Activating/deactivating slaves

Menu 5.2.3 - docking

Enter how your system is docked regarding pipes, for example to pool heating, hot water heating and heating the building.
This menu has a docking memory which means that the control system remembers how a particular reversing valve is docked and automatically enters the correct docking the next time you use the same reversing valve.
Master/slave: Select which heat pump the docking setting is to be made for (if the heat pump is alone in the system only master is displayed).
Compressor: Select if your compressor in the heat pump is blocked (factory setting), externally controlled via soft input or standard (docked for example to hot water charging and heating the building).
Marking frame: Move around the marking frame using the control knob. Use the OK button to select what you want to change and to confirm setting in the options box that appears to the right.
Workspace for docking: The system docking is drawn here.

Symbol	Description
	Compressor (blocked)
	Compressor (externally controlled)
	Compressor (standard)
	Reversing valves for hot water control. The designations above the reversing valve indicate where it is electrically connected (FDCW1 = Slave 1, CL11 = Pool 1 etc.).
	Own hot water charging, only from selected heat pump compressor. Controlled by relevant heat pump.
	Heating (heating the building, includes any extra climate system)

Menu 5.11.1 - EB101-EB108

Make settings for the installed slaves here.

Menu 5.6 - forced control

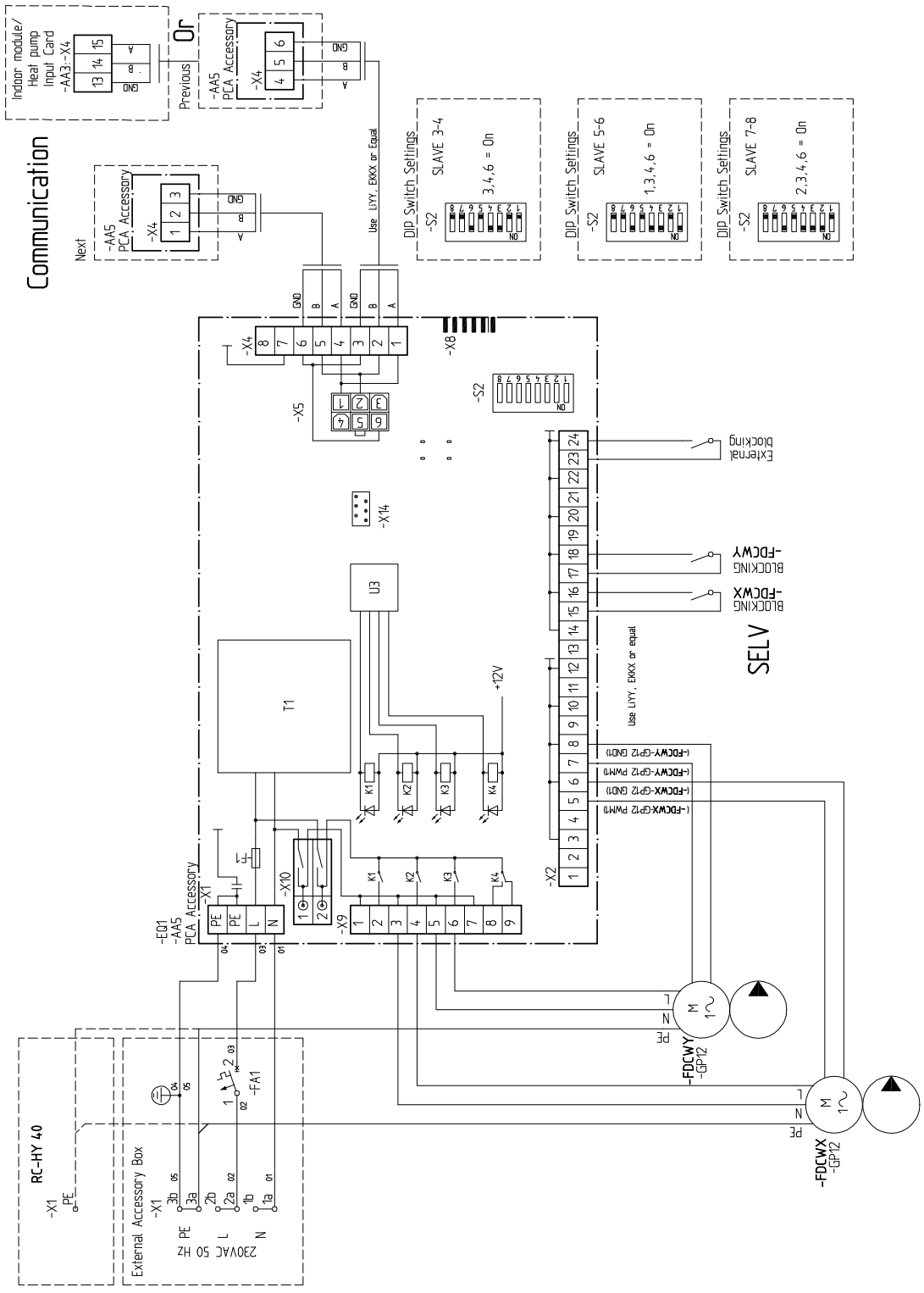
Forced control of the different components in the heat pump as well as in the different accessories that may be connected.

- Compressor speed 3
- FDCW3 - GP12 - AA5-K2
- Charge pump speed 3
- Compressor speed 4
- FDCW4 - GP12 - AA5-K3
- Charge pump speed 4

CAUTION

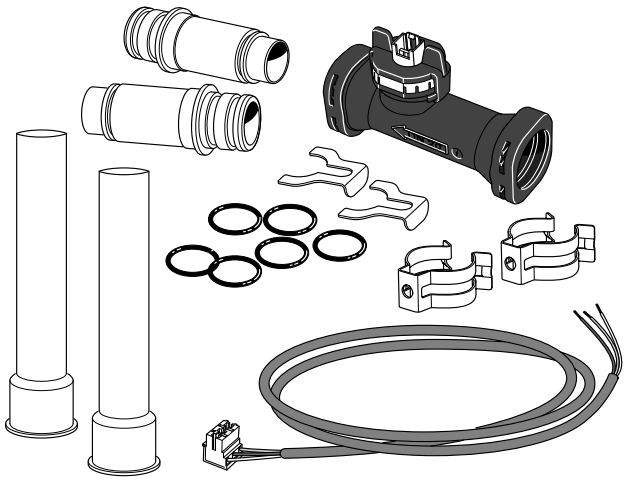
Also see the Installer manual for RC-HY40.

Electrical circuit diagram



EMK 300M

Energy meter kit



Important information

NOTE

This symbol indicates danger to person or machine.

CAUTION

This symbol indicates important information about what you should observe when maintaining your installation.

General

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 differences in the charge circuit. The value is presented in the display on a compatible product.

Compatible products

CAUTION

In order for the accessory to work, a MTH air/water heat pump must be connected to the system.

- RC-HY 40

Contents

1 x Flow meter
1 x Cable to flow meter
1 x Connection kit (Flow meter and O-ring)
2 x Brass pipe connection nipple
4 x O-ring
2 x Copper pipe with insulation (Ø 22)

Pipe connections

Install as follows:

The flow meter is installed in the charge circuit, for example between the heat pump and first reversing valve.
The temperature is measured using the installation's existing sensor.

Electrical connection

NOTE

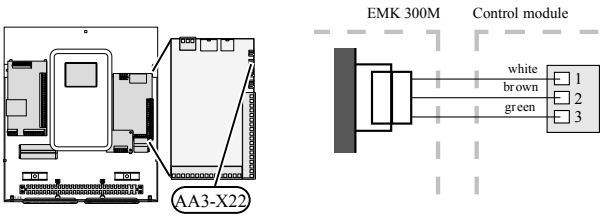
All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
The main unit must not be live when installing EMK 300M.

Connecting communication

Secure the edge connector in the measuring pipe and then connect EMK 300M to the main product according to the instructions below.

RC-HY 40

EMK 300M is connected to terminal block X22 on the input board (AA3) in the control module.

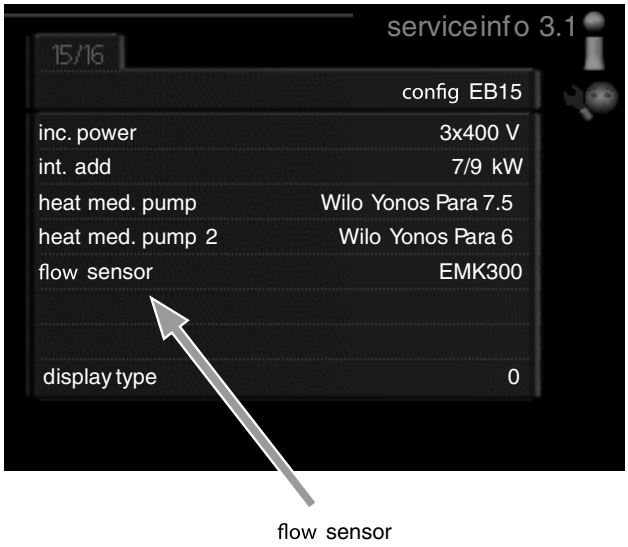


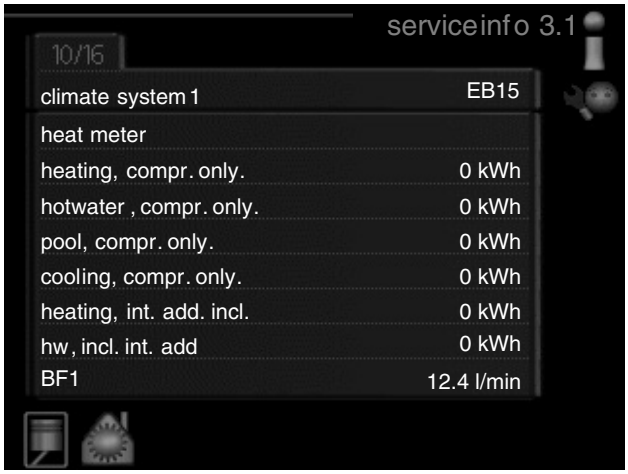
Activating EMK 300M

Activation of EMK 300M occurs the first time that a flow is measured. Energy measurement is displayed in the service information for your main unit.
For main products check that the correct flow sensor is selected by going to the menu 5.3.20 - "flow sensor". Select "EMK 300" if it is not preset.
When EMK 300M is activated, it is shown in menu 3.1 - "service info" and the menu with the registered values is now available.

CAUTION

There may be some differences between example images and actual installation.



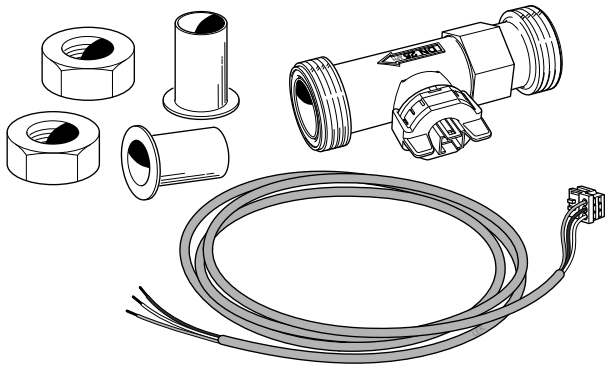


Technical specifications

EMK 300M		
Measurement range	ℓ /min	5,0 – 85
Pressure drop	kPa	0,1 – 18
Ambient temperature	°C	-15 – +85
Medium temperature	°C	<125
Supply	VDC	5 ±5%
Signal	V	0,1 – 4,75
Part No.		MCD291A013

EMK 500M

Energy meter kit



Important information

NOTE

This symbol indicates danger to person or machine.

CAUTION

This symbol indicates important information about what you should observe when maintaining your installation.

General

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. The value is shown on RC-HY 40's display.

Compatible products

The accessory is suitable to following products from MTH:

- RC-HY 40

Contents

1 x Flow meter
1 x Cable to flow meter
2 x Union nut
2 x Copper pipe with pump flange (Ø 28)

Pipe connections

Install as follows:

The temperature is measured using the installation's existing sensor.

RC-HY 40

The flow meter is installed in the charge circuit, for example between the heat pump and first reversing valve.

Electrical connection

NOTE

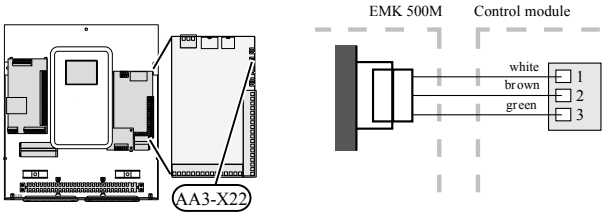
All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
The main unit must not be live when installing EMK 500M.

Connecting communication

Secure the edge connector in the flow meter and then connect EMK 500M to the main product, following the instructions below.

RC-HY 40

EMK 500M is connected to terminal block X22 on the input board (AA3) in the control module.

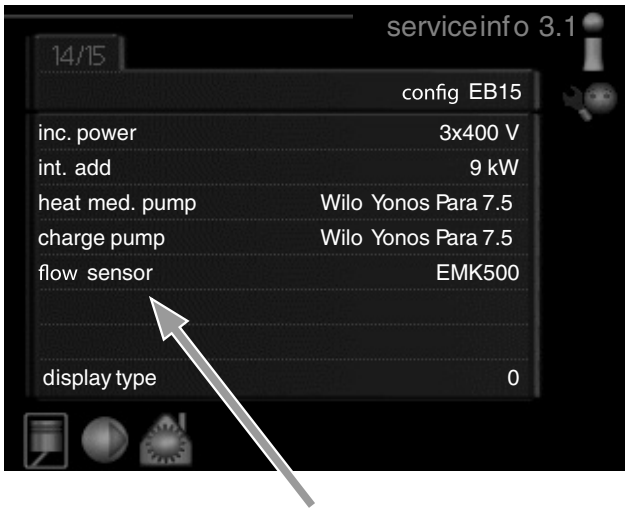


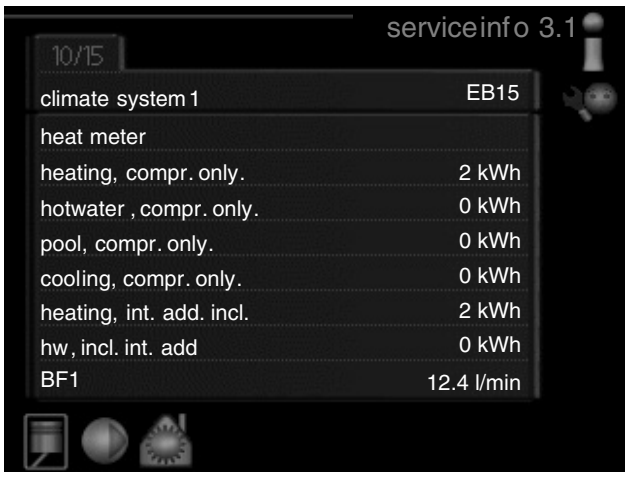
Activating EMK 500M

Activation of EMK 500M occurs the first time that a flow is measured. Energy measurement is displayed in the service information for your main unit.
For main products check that the correct flow sensor is selected by going to the menu 5.3.20 - "flow sensor". Select "EMK 500" if it is not preset.
When EMK 500M is activated, it is shown in menu 3.1 - "service info" and the menu with the registered values is now available.

CAUTION

There may be some differences between example images and actual installation.



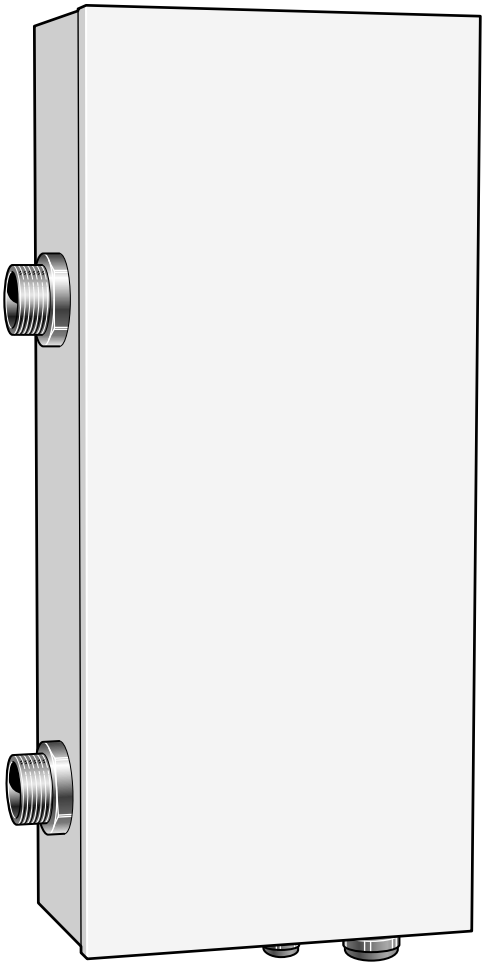


Technical specifications

EMK 500M		
Measurement range	ℓ /min	9,0 – 150
Pressure drop	kPa	0,1 – 27,0
Ambient temperature	°C	-15 – +85
Medium temperature	°C	<125
Pipe connections	(Ø mm)	28
Supply	VDC	5 ±5%
Signal	V	0,1 – 4,75
Part No.		MCD291A014

ELK 9M

Immersion heater



Important information

WARNING

This symbol indicates serious danger to person or machine.

NOTE

This symbol indicates danger to machine or person.

CAUTION

This symbol indicates important information about what you should observe when maintaining your installation.

TIP

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

Recovery

Leave the disposal of the packaging to the installer who installed the product or to special waste stations.
Do not dispose of used products with normal household waste. It must be disposed of at a special waste station or dealer who provides this type of service.
Improper disposal of the product by the user results in administrative penalties in accordance with current legislation.

General

ELK 9M is an electric heater that can be used to supplement the heating capacity of your MTH climate unit. When the heating demand is greater than the climate unit's capacity, the electric heater connects automatically. The electrical equipment is adapted to the climate unit's function.
The electric heater is in principle an immersion heater mounted in a water container or an electric boiler without a water heater. The steel electric coils and electric boiler tube are made of steel which gives a very good service life.
Thanks to a small water volume and a well-insulated electrical heater, ELK 9M has very small heat losses.

Compatible products

Connection is different depending on which product ELK 9M is to be used with.
These products can be connected directly to ELK 9M:

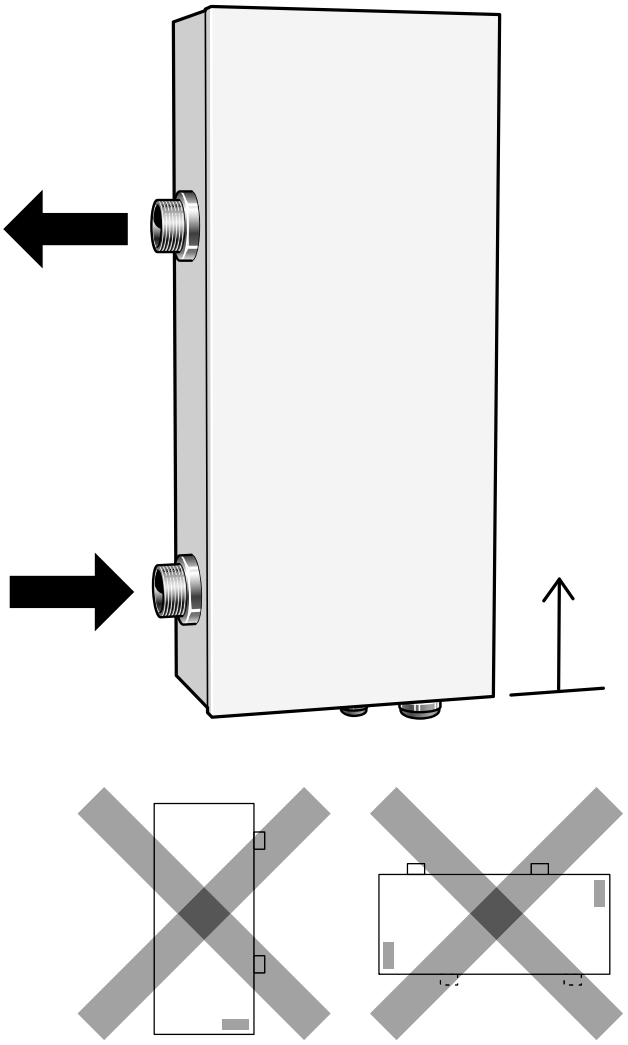
- RC-HY 20
- RC-HY 40

Contents

1 x Immersion heater

Assembly

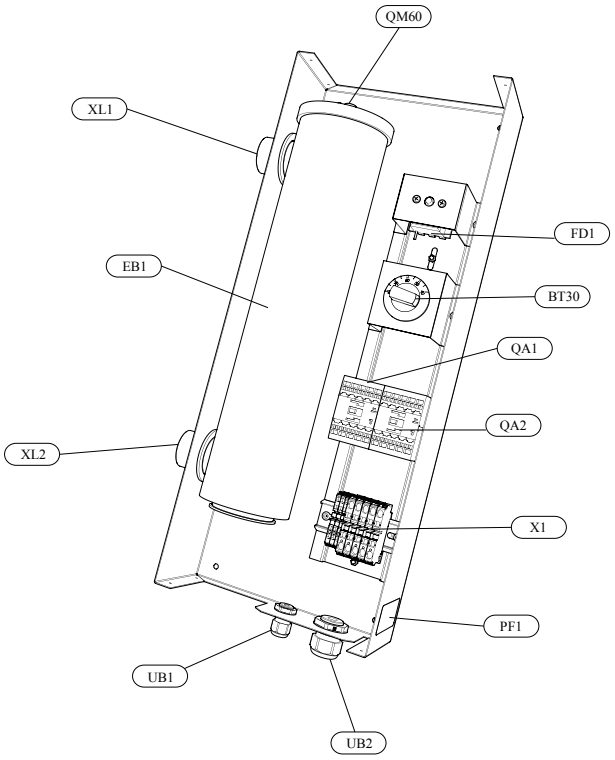
The electric heater must be installed upright (see image below). Free space of 500 mm is required in front of the water heater for service. If this is not possible, detachable connections must be used.



Component positions

Component list

EB1	Immersion heater
FD1	Overheat protection
X1	Terminal block
QA1	Contactor 3,0 kW(-K1)
QA2	Contactor 6,0 kW(-K2)
BT30	Emergency mode thermostat
XL1	Connection supply line, G 32
XL2	Connection return line, G 32
UB1, UB2	Cable gland
QM60	Venting
PF1	Rating plate



Pipe connections

General

The pipe installation must be carried out in accordance with applicable standards.
A circulation pump must be used to ensure the flow over the immersion heater. If the heating system valves can close the circulation completely, the bypass valve must be installed so that the flow through the electric heater does not stop. In closed installations an approved safety valve and pressure expansion vessel must be used.

CAUTION

Also see the installer manual for your heat pump/indoor module.

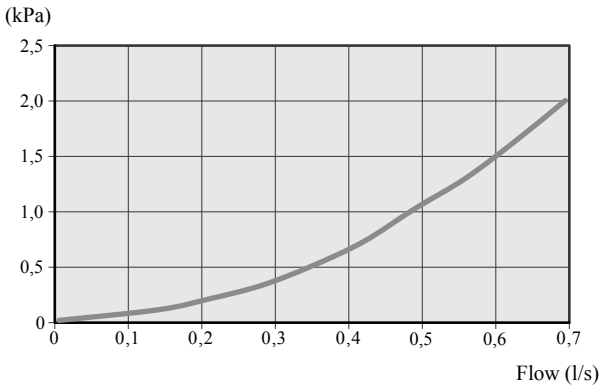
NOTE

The pipe work must be flushed before the electric heater is connected, so that any contaminants do not damage the component parts.

Draining

The system is most easily drained by installing a drainage valve at the lowest point on the pipe installation. The remaining water in ELK 9M is drained through the return line connection (XL2), see “Component location” on page 5. If the return line connection on ELK 9M is normally used for draining the unit, a drain valve can be installed here.

Pressure drop diagram ELK 9M



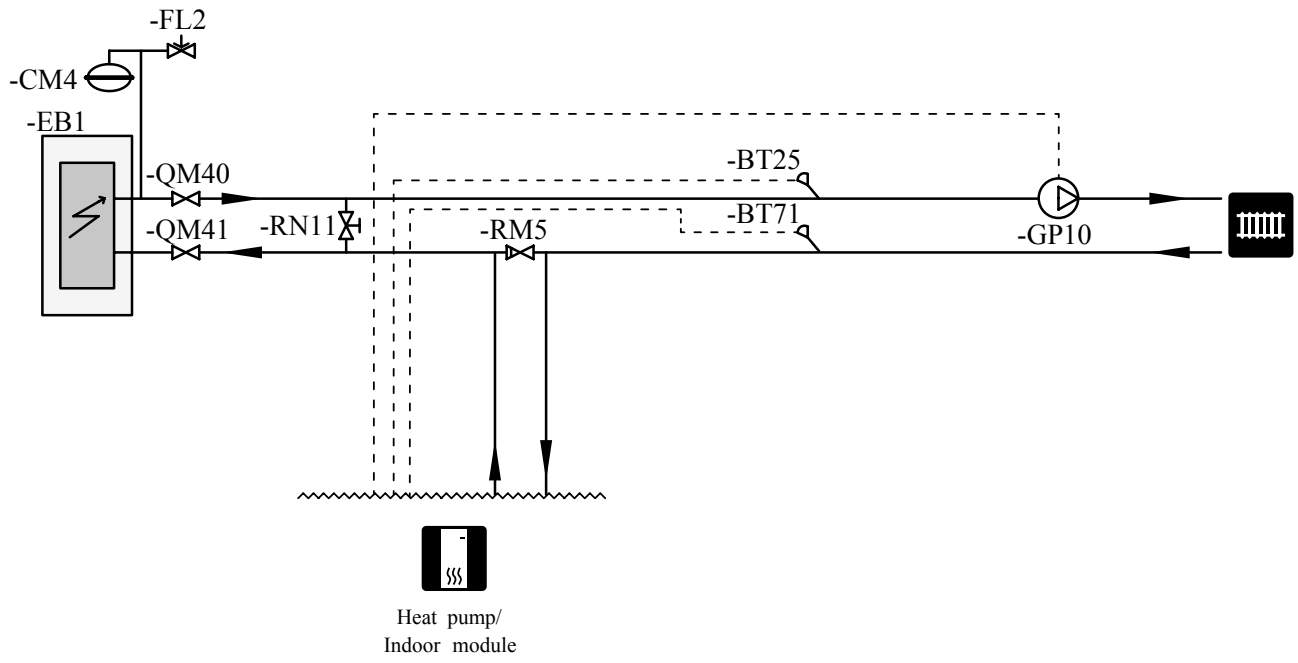
System diagram

Explanation

EB1	**Electric heater ELK 9M**
CM4	Expansion vessel
FL2	Safety valve
QM40 - QM41	Shut off valves
RN11	Control valve
GP10	Circulation pump
RM5	Non-return valve
BT25	Flow line sensor
BT71	Return line sensor

Designations in component locations according to standard IEC 81346-1 and 81346-2.

System diagram



NOTE

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

Electrical connection

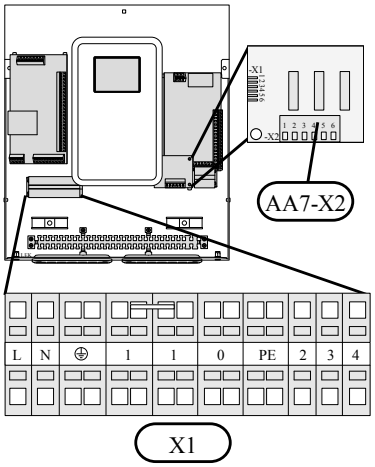
NOTE

All electrical connections must be carried out by an authorised electrician.
Electrical installation and wiring must be carried out in accordance with the stipulations in force.
The climate unit must not be powered when installing ELK 9M.

ELK 9M must be installed via a circuit breaker with a minimum breaking gap of 3mm ELK 9M contains overheat protection and two contactors to control the two power steps 3 kW and 6 kW respectively. For best function the power should be binary controlled, that is to say 3, 6 and 9 kW.

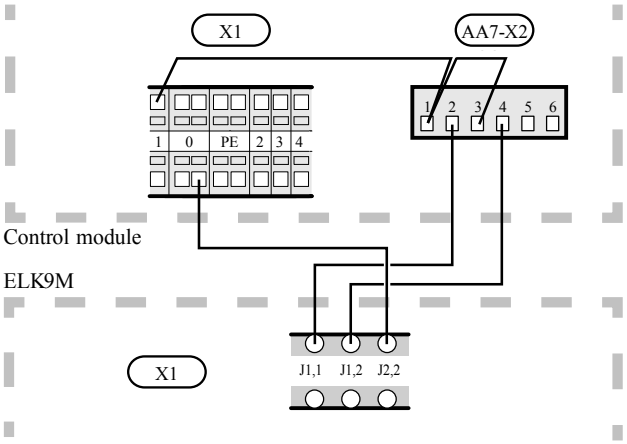
RC-HY 20 and RC-HY 40

Terminal block X1 in ELK 9M connects to the terminal blocks X1 and AA7-X2 in the control module as illustrated.



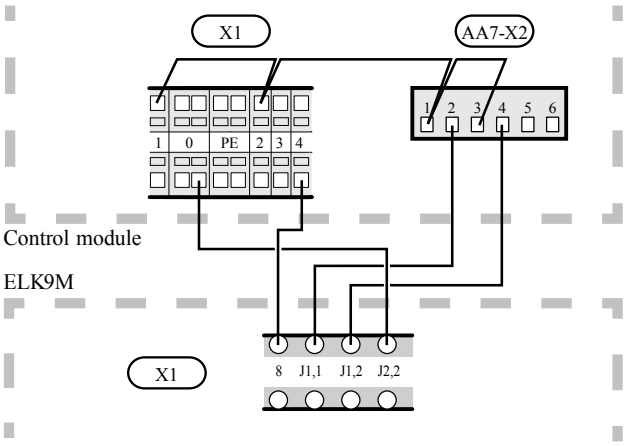
Without thermostat, two active power steps

9 kW electric heater step active.



With thermostat, two active power steps

9 kW electric heater step active.
6 kW electric heater step active in emergency mode.



Activating ELK 9M

The menu setting of ELK 9M can be performed via the start guide or directly in the menu system.

CAUTION

Also see the Installer manual for the product that ELK 9M will be connected to.

Start guide

The start guide appears upon first start-up after heat pump installation, but is also found in menu 5.7.

Menu system

RC-HY 20 and RC-HY40

Menu 4.9.3 - degree minute setting

Here you select when the additional heat is to start and the degree minute intervals.

Menu 5.1.12 - addition

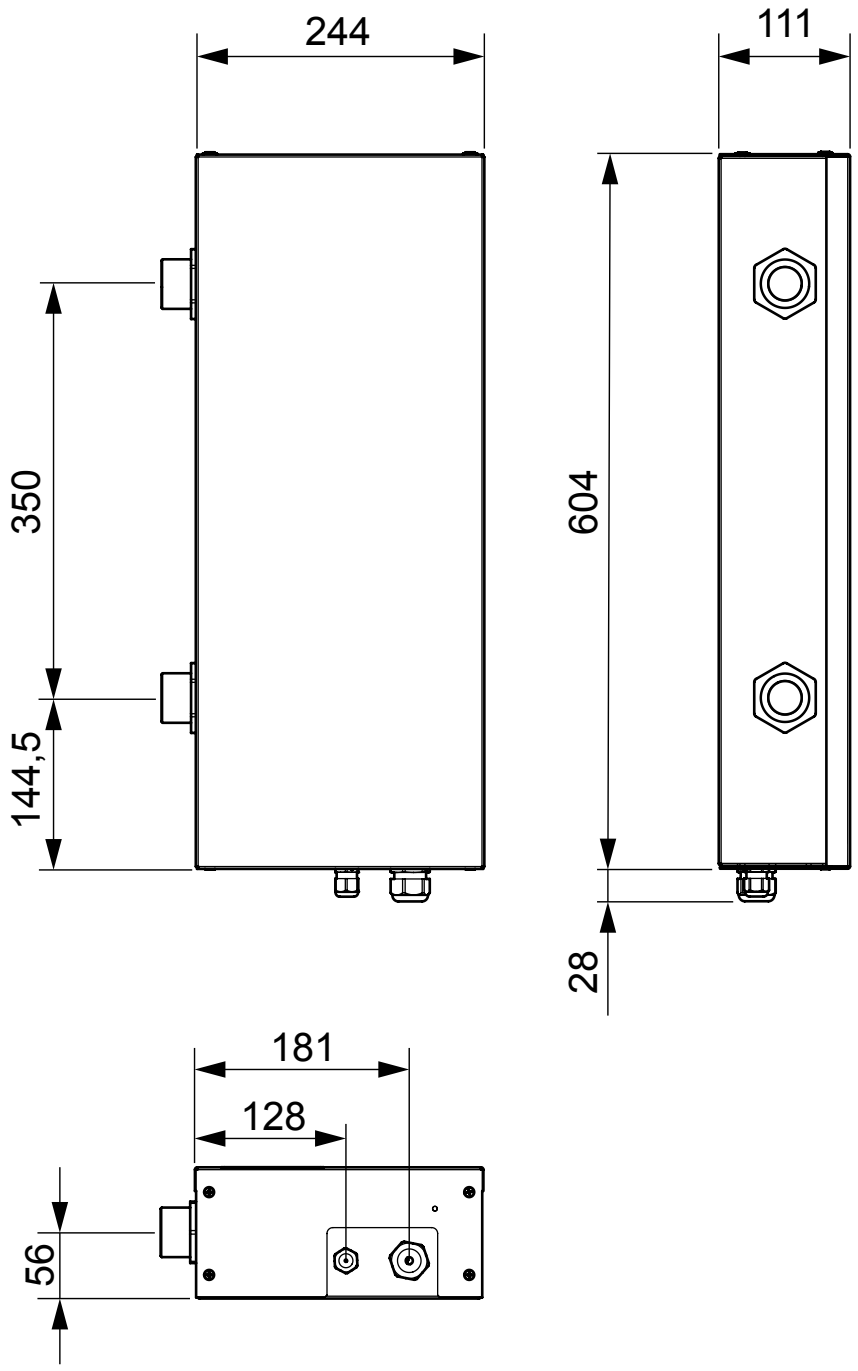
Setting:

- Max. number of permitted additional steps
- If binary stepping is to be used.

Technical data

Dimensions

All dimensions in mm



Technical specifications

IP 44

ELK 9M		
Electrical data		
Rated voltage	V	3 x 400 V ~ 50 Hz
Output immersion heater	kW	9
Immersion heater fuse	A	13
Enclosure class		IP21
Heating medium circuit		
Max permitted pressure in the boiler	MPa/bar	0,7/7
Min flow	ℓ /h	650
Max flow	ℓ /h	2600
Dimensions and weight		
Width	mm	244
Depth	mm	111
Height	mm	604
Weight	kg	10,5
Volume	litre	1,5
Miscellaneous		
Material immersion heater		SIS 2333 EN 1.4301
Material tube		P235GH PN-EN 10216-2
Part No.		MCD291A015

Energy labelling

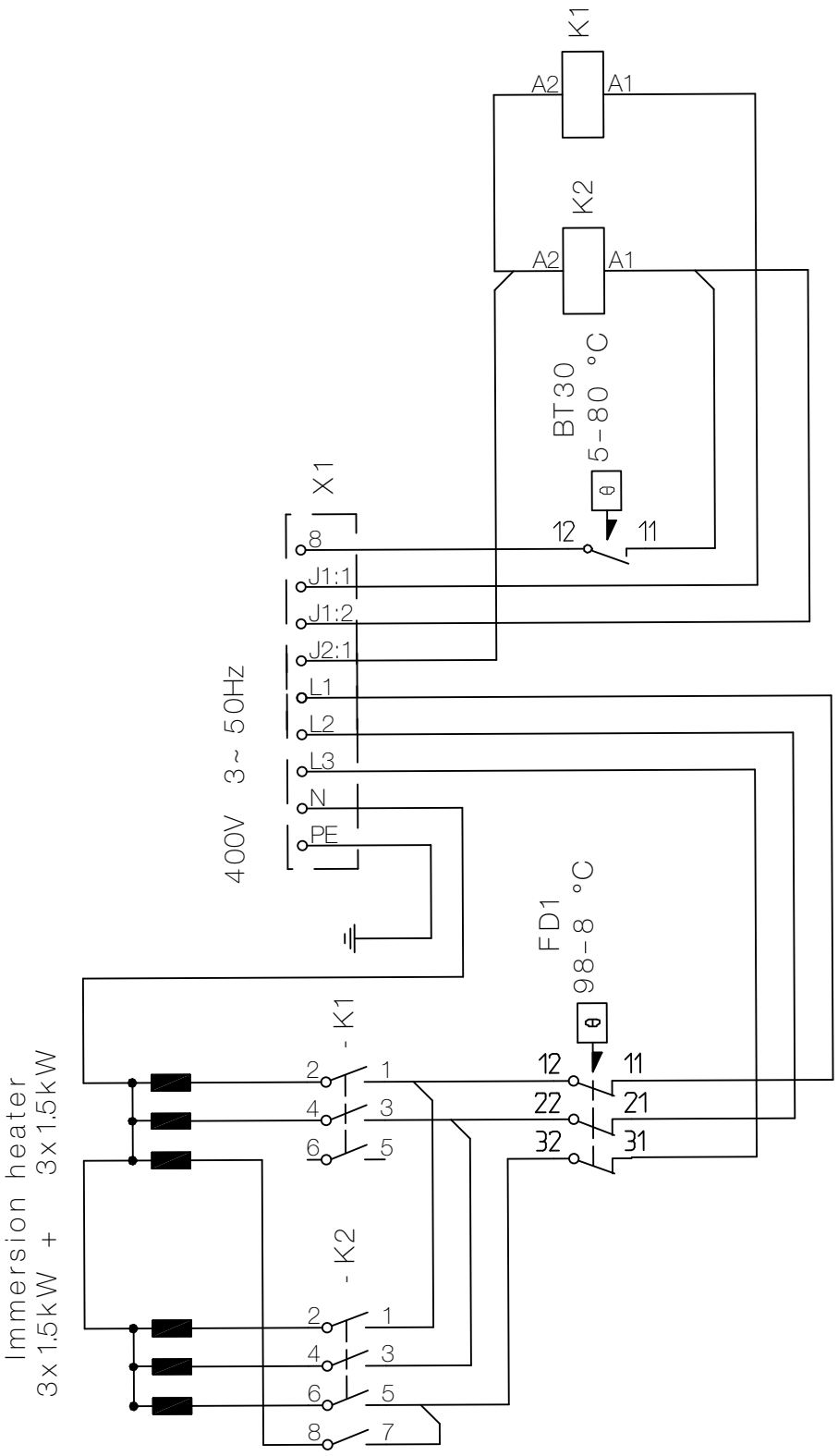
Information sheet

Supplier		**MTH**
Model		**ELK 9M**
Energy efficiency class for space heating		D
Rated heat output (Pdesignh)	kW	9
Annual energy consumption space heating	kWh	33 850
Seasonal space heating energy efficiency	%	36,7
Sound power level L_{WA} indoors	dB	35

Technical documentation

Model		**ELK 9M**						
Condensing boiler		☐ Yes ☒ No						
Low-temperature boiler		☐ Yes ☒ No						
B11 boiler		☐ Yes ☒ No						
Cogeneration space heater		☐ Yes ☒ No						
Combination heater		☐ Yes ☒ No						
Rated heat output	Prated	15	kW		**Seasonal space heating energy efficiency**	η_s	36,7	%
For boiler space heaters and boiler combination heaters: Useful heat output					*For boiler space heaters and boiler combination heaters: Useful efficiency*			
At rated heat output and high-temperature regime	P_4	15	kW		At rated heat output and high-temperature regime	η_4	40	%
At 30%of rated heat output and low-temperature regime	P_1		kW		At 30%of rated heat output and low-temperature regime	η_1		%
Auxiliary electricity consumption					*Other items*			
At full load	elmax		kW		Standby heat loss	P_{stby}	0,2	kW
At part load	elmin		kW		Ignition burner power consumption	P_{ign}		kW
Standby mode	P_{SB}		kW		Annual energy consumption	Q_{HE}	33 850	kWh
					Sound power level, indoors	L_{WA}	35	dB
For combination heaters								
Declared load profile for water heating					**Water heating energy efficiency**	η_{wh}		%
Daily energy consumption	Q_{elec}		kWh		Daily fuel consumption	Q_{fuel}		kWh
Annual energy consumption	AEC		kWh		Annual fuel consumption	AFC		GJ

Electrical circuit diagram



Outline diagram indoor unit with CPD11-25M/65 and CPD11-25M/75, charging pump

CPD11-25M/65

CPD11-25M/75

General

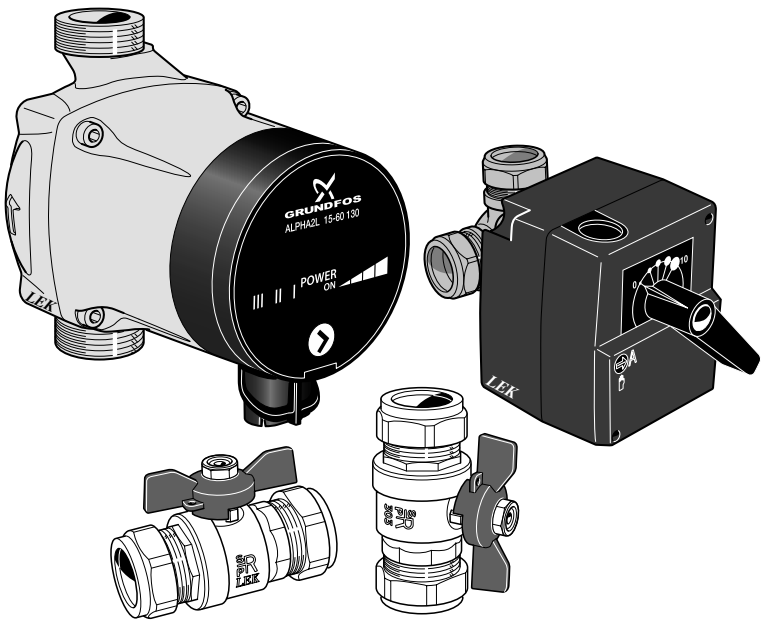
This accessory is used when HMK or HSB is installed in houses with two different heating systems that require different flow line temperatures, for example, in cases where the house has both a radiator system and an under floor heating system. In the following text heating system 1 covers the system that requires the greater temperature and that is connected to the normal supply line respectively return line connection. Heating system 2 covers the heating system that works at the lower temperature.

The water flow in the two heating systems should not exceed the value for the maximum system flow.

Contents

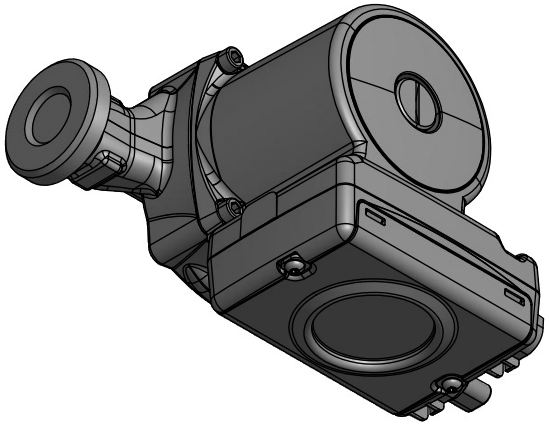
1 x Circulation pump, GP12

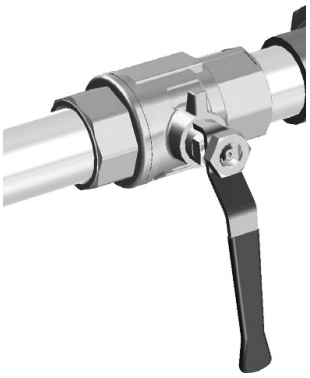
2 x Ball valve M Swivel nut



<**CPD11-25M/65**>

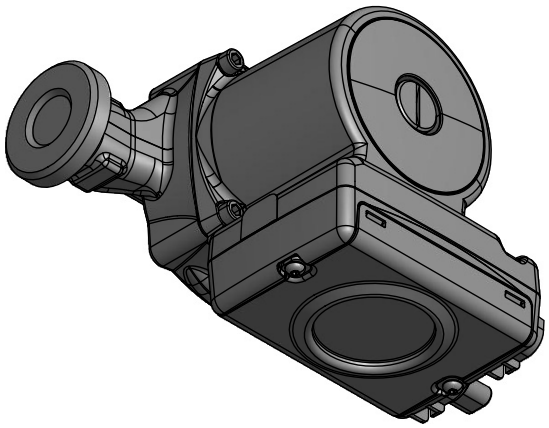
Attribute name	Attribute value
Part name	MCD291A016
Name	CPD 11-25/65
Dimension	L=180
Material	UPM2 K 25-70 180
Net weight	3.53kg
ID	PRT067321
Safety class	4
Manufacturer	Grundfos

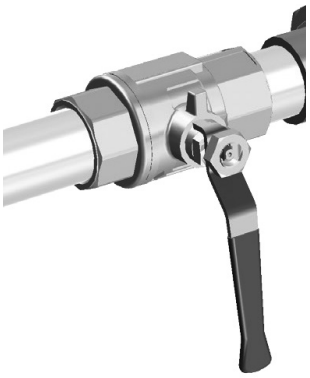




<**CPD11-25M/75**>

Attribute name	Attribute value
Part name	MCD291A017
Name	CPD 11-25/75
Dimension	L=180
Material	UPM2 K 25-75 180
Net weight	3.62kg
ID	PRT067320
Safety class	4
Manufacturer	Grundfos



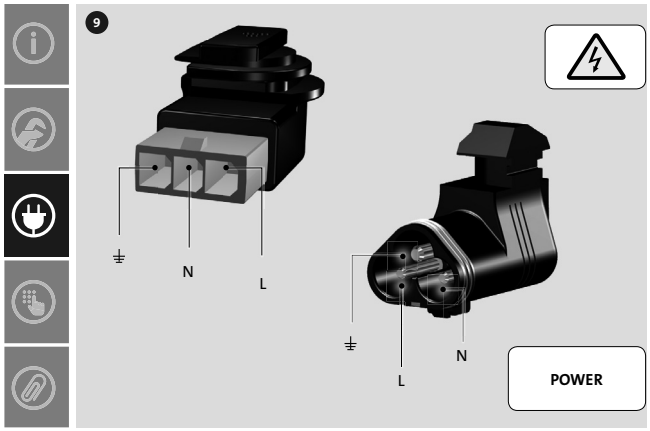


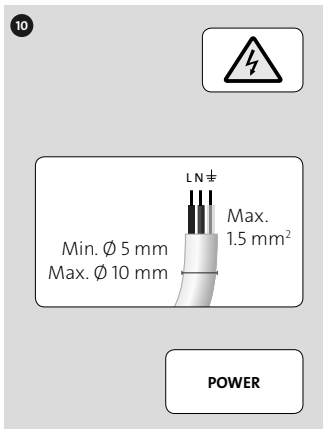
Pipe connections

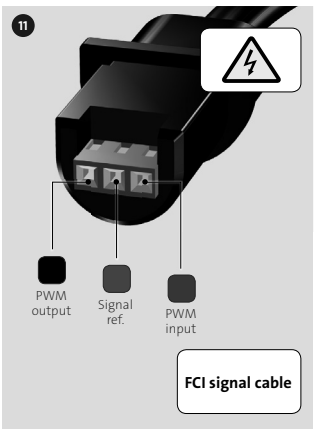
Install as follows:

- First drain the boiler water reservoir/heating system if filled with water.
- The extra heating medium pump (GP12) is placed in a suitable location between the pump (VST) and heating system 2 in the direction of flow.
- The shunt valve (VST11-20M) is located on the supply line after indoor unit, between the inlet of heating system 1 and 2. Connect the shunt valve (VST11-20M) ports 1, 2 and 3 to corresponding pipes.
- The flow sensor (BT12) is installed on the pipe after the heat medium pump (GP12).

Electrical connections

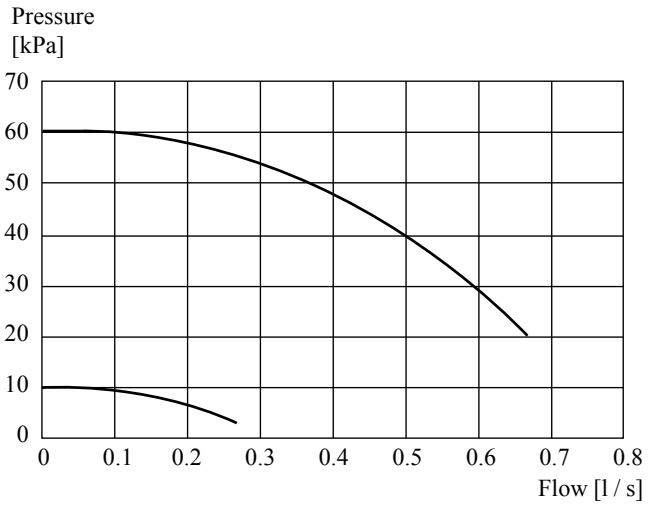




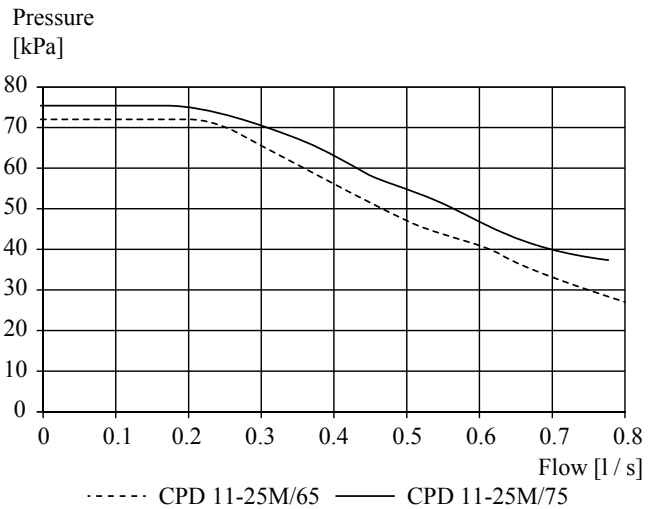


Pump and pressure drop diagrams

<HMK>



<HSB>



VST05M

Hot water control

Description

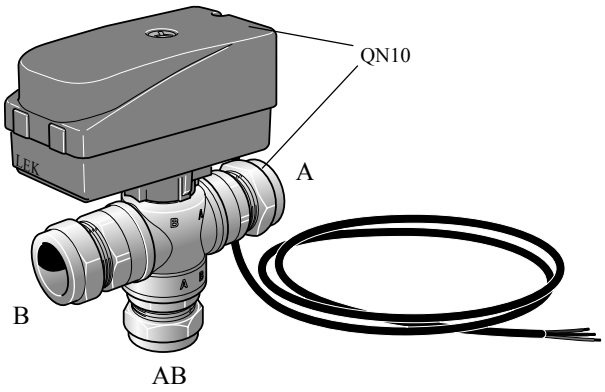
The VST 05M reversing valve enables you to use hot water accessories in different systems with MTH heat pumps.
This also requires a hot water accumulator.

Technical specifications

IP54

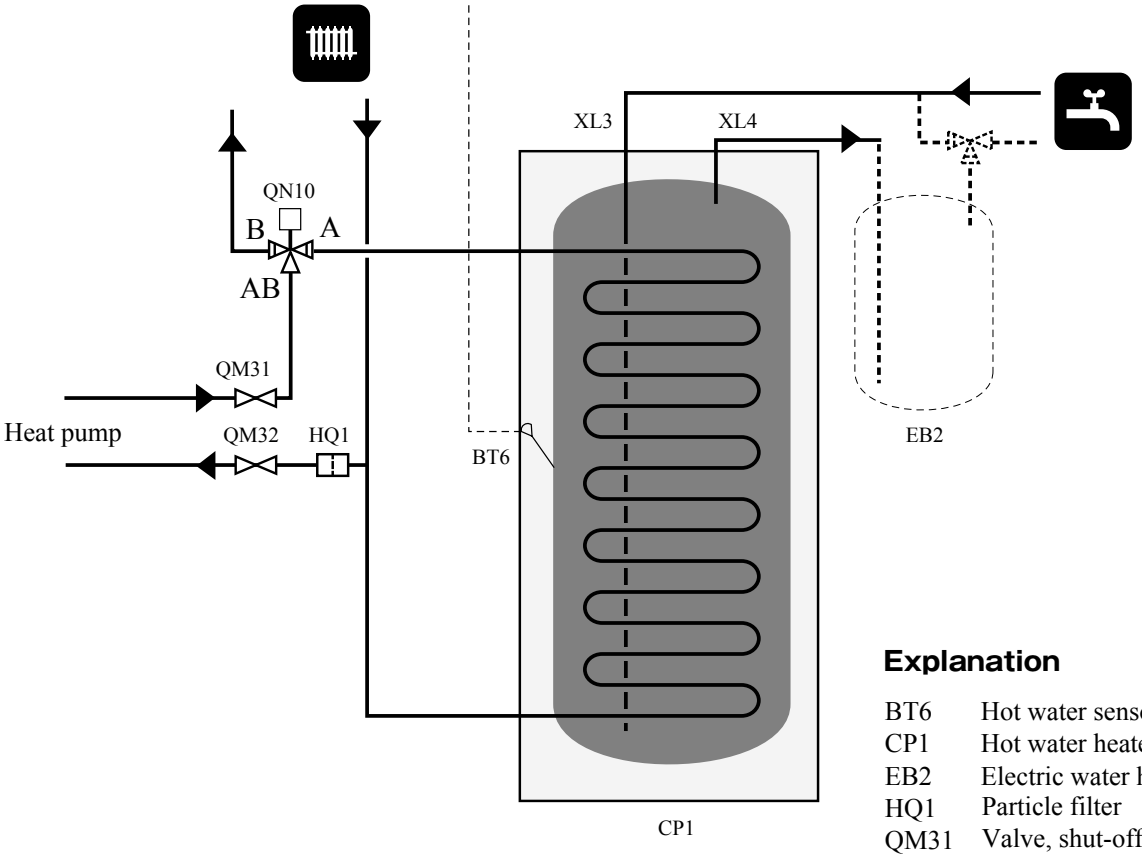
Voltage	230V, -50 Hz
Max. charge output	11 kW
Connections	ϕ 22 mm, Compression ring
Kvs	7.1
Run time	8 secs
Power consumption	7 W (during operation)
Part No.	MCD291A018

Components



QN10 Valve motor + Reversing valve

Outline diagram



Explanation

BT6	Hot water sensor
CP1	Hot water heater/accumulator
EB2	Electric water heater
HQ1	Particle filter
QM31	Valve, shut-off, Heating medium-flow
QM32	Valve, shut-off, Heating medium-return
QN10	Reversing valve
XL3	Connection, cold water
XL4	Connection, hot water

Function

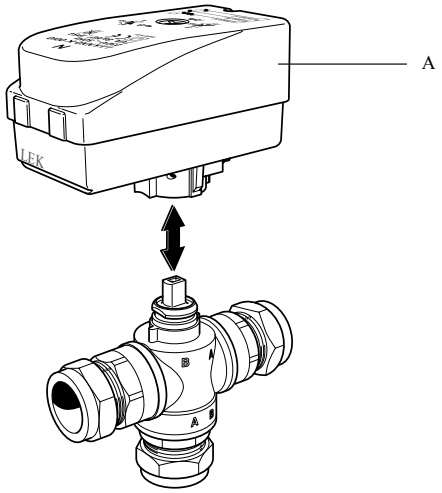
During hot water demand the charge flow is guided to the hot water accumulator using the reversing valve (QN10). In other cases the charge flow is controlled through the remaining parts of the system, for example the heating system.

Mounting

The reversing valve (QN10) is always installed between the heat source and the hot water accumulator/rest of the system. In the starting mode, without control voltage, the reversing valve must be open to the rest of the system. When control voltage is applied the reversing valve opens to the hot water accumulator.

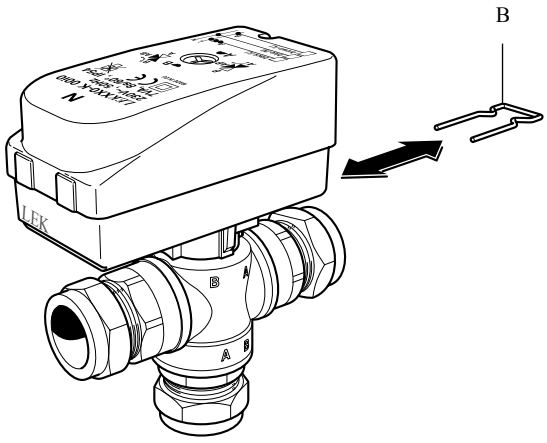
Installing the valve motor

1. Secure the valve motor (A) with a preinstalled spring on the valve. See image below.
2. Press the valve motor down until a click is heard. The motor is then locked to the valve.



Dismantling

• Pull out the spring (B) and remove the components. See image below.

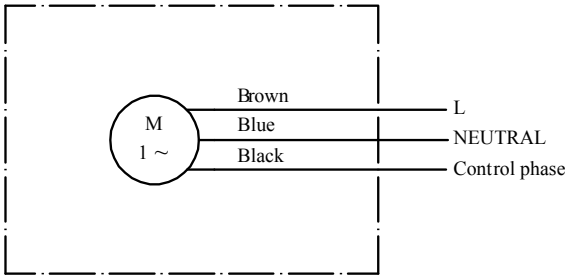


Electrical connection

NOTE

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.

The valve motor is connected according to the following diagram.



For more information about electrical connections, see relevant Installation manual/Assembly and maintenance instructions for the system the reversing valve is to be connected to.

VST11M

Hot water control

Description

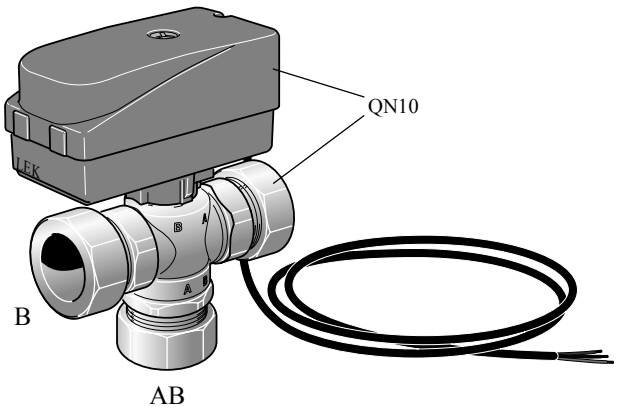
The VST 11M reversing valve enables you to use hot water accessories in different systems with MTH heat pumps.
This also requires a hot water accumulator.

Technical specifications

IP54

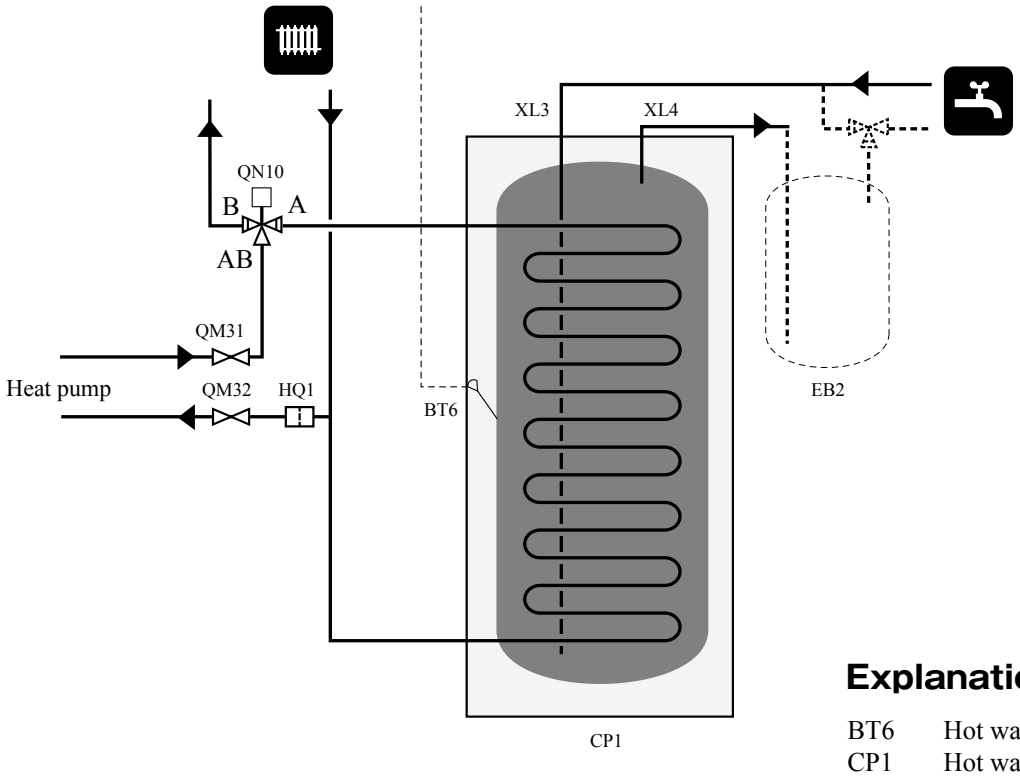
Voltage	230V, -50 Hz
Max. charge output	17 kW
Connections	ϕ 28 mm, Compression ring
Kvs	7.5
Run time	8 secs
Power consumption	7 W (during operation)
Part No.	MCD291A019

Components



QN10 Valve motor + Reversing valve

Outline diagram



Explanation

BT6	Hot water sensor
CP1	Hot water heater/accumulator
EB2	Electric water heater
HQ1	Particle filter
QM31	Valve, shut-off, Heating medium-flow
QM32	Valve, shut-off, Heating medium-return
QN10	Reversing valve
XL3	Connection, cold water
XL4	Connection, hot water

Function

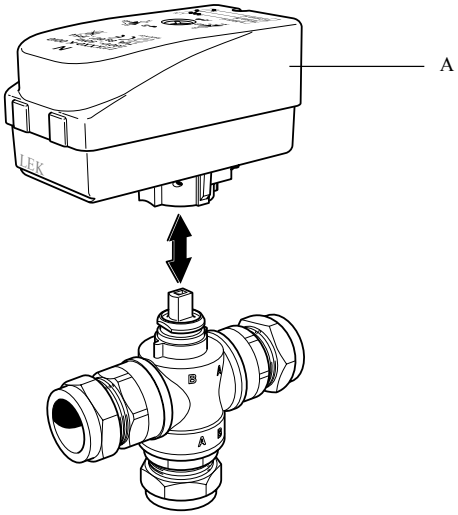
During hot water demand the charge flow is guided to the hot water accumulator using the reversing valve (QN10). In other cases the charge flow is controlled through the remaining parts of the system, for example the heating system.

Installation

The reversing valve (QN10) is always installed between the heat source and the hot water accumulator/rest of the system. In the starting mode, without control voltage, the reversing valve must be open to the rest of the system. When control voltage is applied the reversing valve opens to the hot water accumulator.

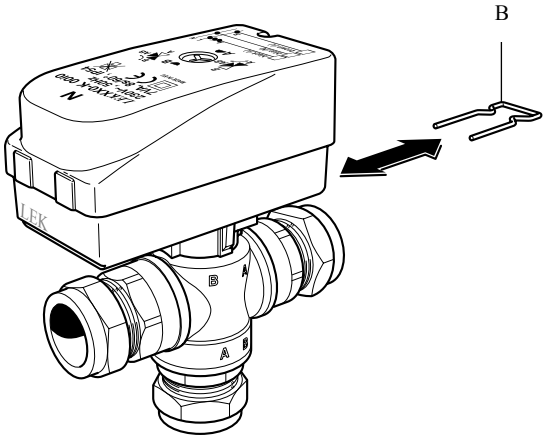
Installing the valve motor

1. Secure the valve motor (A) with a preinstalled spring on the valve. See image below.
2. Press the valve motor down until a click is heard. The motor is then locked to the valve.



Dismantling

• Pull out the spring (B) and remove the components. See image below.

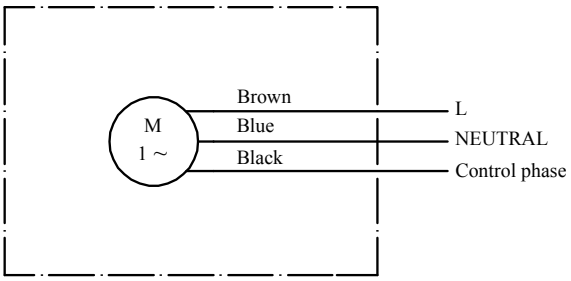


Electrical connection

NOTE

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.

The valve motor is connected according to the following diagram.



For more information about electrical connections, see relevant Installation manual/Assembly and maintenance instructions for the system the reversing valve is to be connected to.

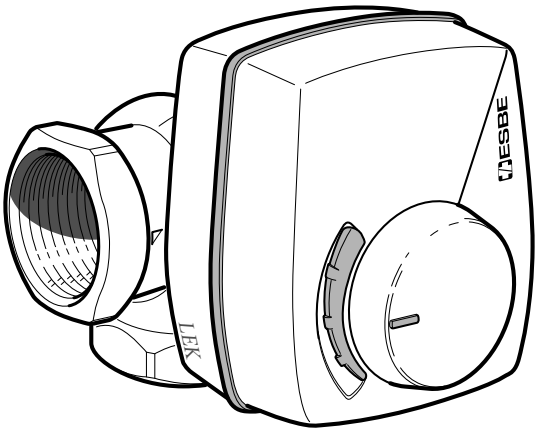
VST20M

Hot water control

General

The VST 20M reversing valve gives you the option to use hot water accessories in different systems together with MTH heat pumps. This also requires a hot water accumulator.
When there is hot water demand the charge flow is guided to the hot water accumulator using the reversing valve (QN10). In other cases the charge flow is controlled through the remaining parts of the system, for example the heating system.

Components

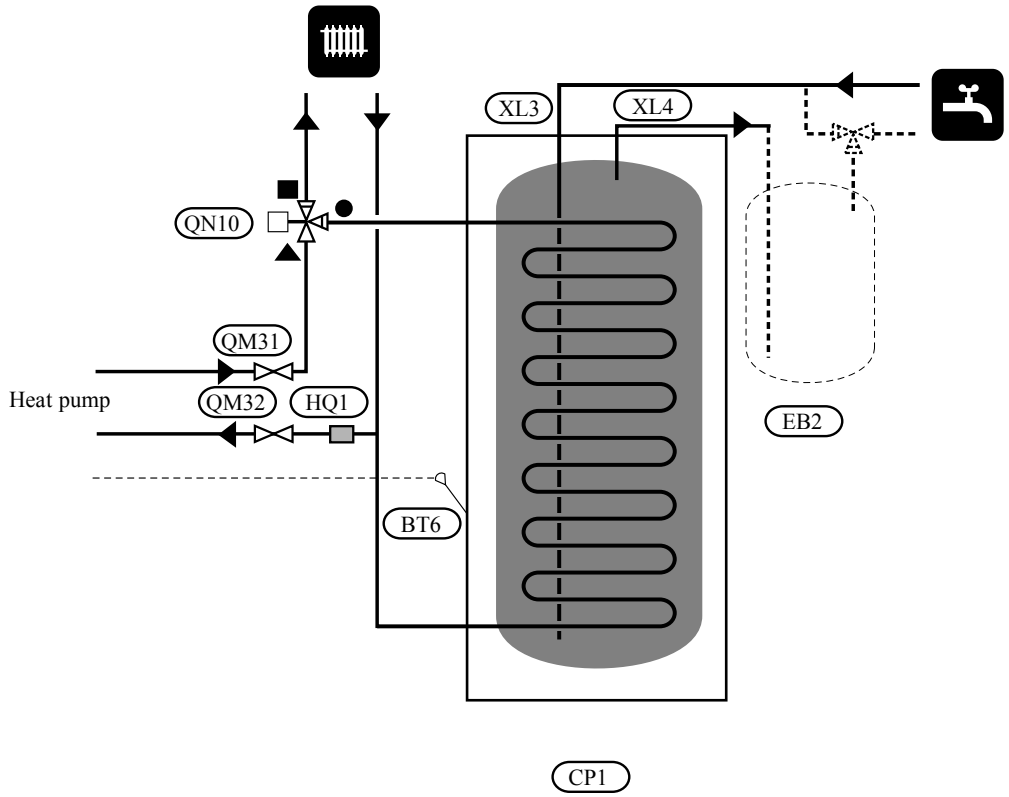


Shunt valve, (QN10)
Connection DN32 (1 1/4”)

Outline diagram

Explanation

BT6	Hot water sensor
CP1	Hot water heater/Accumulator
EB2	Electric water heater
HQ1	Particle filter
QM31	Valve, Shut-off, Heating medium-flow
QM32	Valve, Shut-off, Heating medium-return
QN10	Shuttle valve
XL3	Connection, cold water
XL4	Connection, hot water



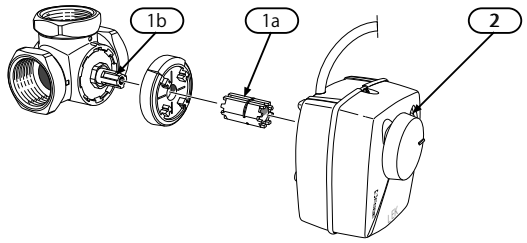
Mounting

The reversing valve (QN10) is always installed between the heat source and the hot water accumulator/rest of the system. In the starting mode, without control voltage, the reversing valve must be open to the rest of the system. When control voltage is applied the reversing valve opens to the hot water accumulator.

Installing the valve motor

Example installation:

1. Ensure that the depression, in the shaft (1a) and the shaft on the valve (1b), are at 12 o'clock with the port up. In this example ▲ and ■ are open while ● to begin with is closed.
2. Ensure that the knob on the motor is turned all the way to the left.
3. Turn the knob to the right to close ■ and open ●.



The symbols are marked on the terminals.

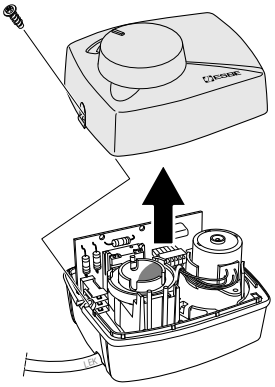
Changing the direction of rotation

NOTE

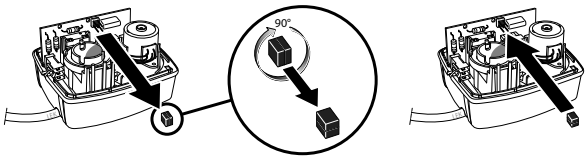
Electrical installation and service must be carried out under the supervision of a qualified electrician.
Cut the current with the circuit breaker before carrying out any servicing. Electrical installation and wiring must be carried out in accordance with the stipulations in force.

Change the direction of rotation on the valve motor as necessary.

1. Slacken off the screws and cap on the valve motor.



2. Pull out the pins, turn them 90 ° and put them back.

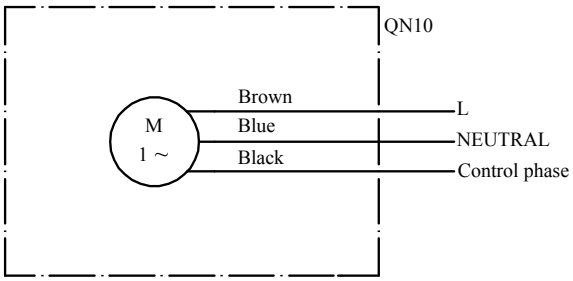


Electrical connection

NOTE

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.

The valve motor is connected according to the following diagram.



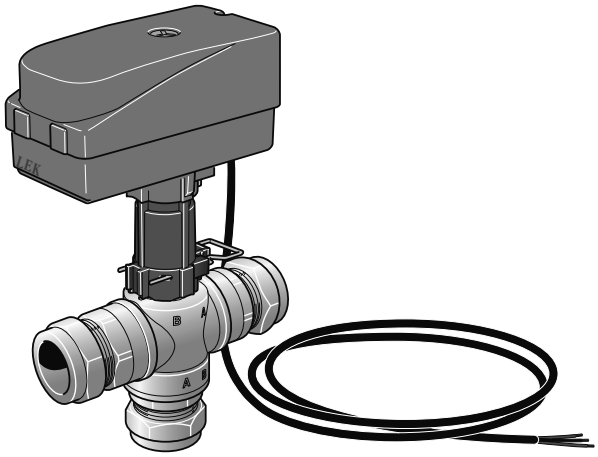
For more information about electrical connections, see relevant Installation manual/Assembly and maintenance instructions for the system the reversing valve is to be connected to.

Technical specifications

Voltage	230V, -50 Hz
Max. charge output	40 kW
Connection	DN32 (11/42")
Kvs	16
Part No.	MCD291A020

VCC 05M

Shuttle valve, cooling



Description

Cooling reversing valve VCC 05M makes it possible to use cooling in a 4-pipe system. Cooling is then distributed in a different system to the heating. This requires the heat pump and the inner module to support the cooling function.

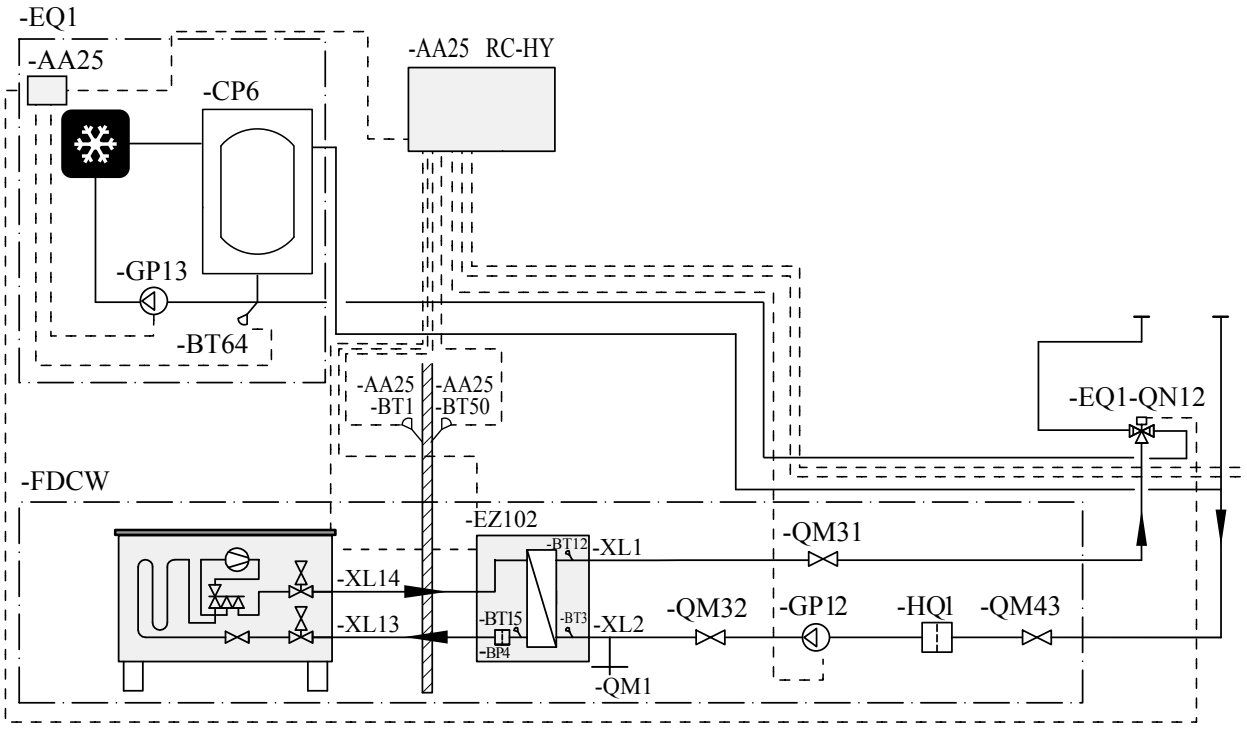
Technical specifications

Voltage	230V, -50 Hz
Max. charge output	11 kW
Connections	ϕ 22 mm
Cw_s	7.1
Run time	8 secs
Power consumption	7 W (during 8 s operation)
Part No.	MCD291A021

Contents

1 x Cooling reversing valve, EQ1-QN12
1 x Adapter kit (Shaft, Adapter and Spring)
1 x 3-way valve, Ø 22 mm compression ring
1 x Valve motor

Outline diagram



Explanation

-AA25	**Indoor module**
-BT1	Temperature sensor, outdoor sensor
-EQ1	**Cooling system (4-pipe)**
-AA25	Accessory card in AXC 30M
-BT64	Flow line, cooling
-CP6	Cooling accumulator (optional)
-GP13	System pump, cooling
-QN12	Reversing valve, cooling
-FDCW	**Heat pump system**
-BT3	Temperature sensor, return
-BT12	Temperature sensor, condenser out
-GP12	Charge pump
-HQ1	Particle filter
-QM1	Tapping valve
-QM31	Shut-off valve
-QM32	Shut-off valve
-QM43	Shut-off valve

Function

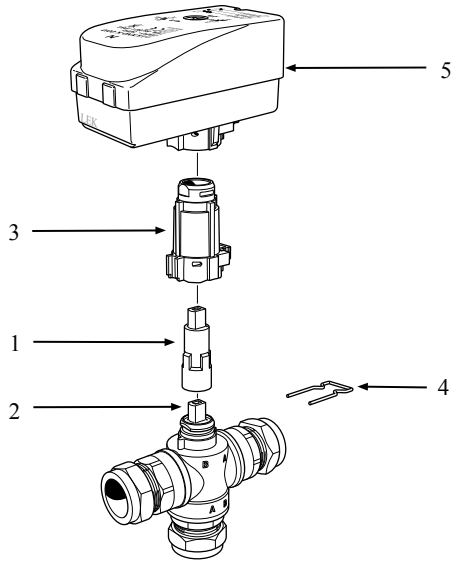
During cooling operation the charge flow is to the cooling system using the cooling reversing valve (QN12). In other cases the charge flow is controlled through the remaining parts of the system, for example the heating system.

Mounting

The cooling reversing valve (QN12) is always installed as the first reversing valve between the heat source and the rest of the system. In the starting mode, without control voltage, the cooling reversing valve must be open to the rest of the system. When control voltage is applied the cooling reversing valve opens to the cooling system.

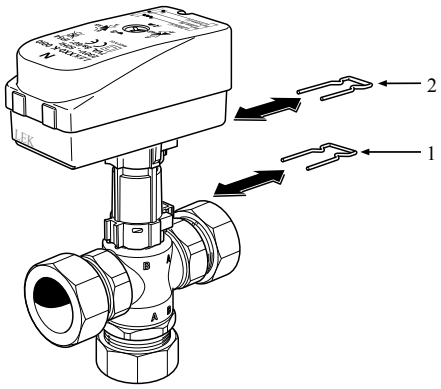
Installing the valve motor

1. Press the adapter shaft (1) on the valve shaft (2). See image below.
2. Press the adapter shaft (3) over the adapter shaft on the valve. Check that the adapter can be twisted.
3. To lock the adapter to the valve, press the spring (4) in the insertion holes of the adapter and press the adapter down until a click is heard.
4. To lock the valve motor to the adapter, secure the valve motor (5) in the preinstalled springs of the adapter and press it down on the adapter until a click is heard.



Dismantling

- Remove the spring (1) (2) from the relevant component and remove the components. See image below.

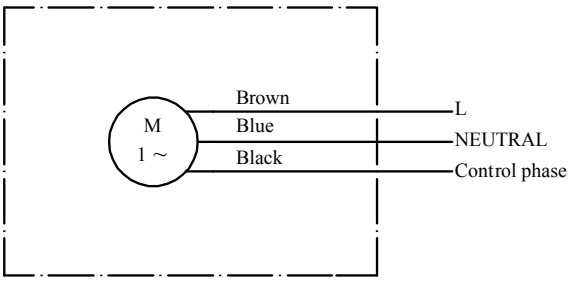


Electrical connection

NOTE

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.

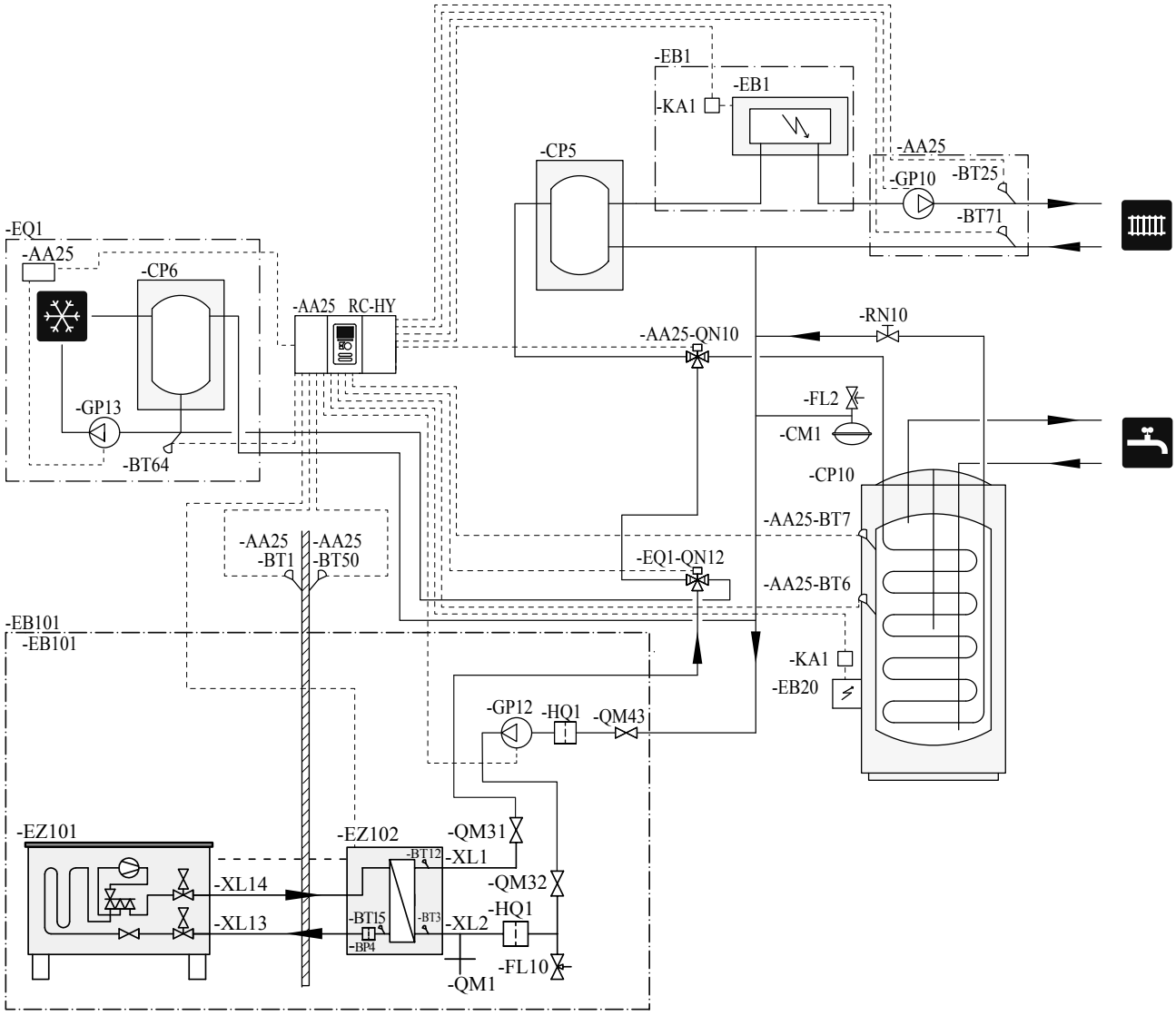
The valve motor is connected according to the following diagram.



For more information about electrical connections, see relevant Installation manual/Assembly and maintenance instructions for the system the reversing valve is to be connected to.

Outline diagram with VCC05M - reversing valve, heating

<HSB>



Explanation

AA25 Controller

BT1	Outdoor sensor[1)]
BT6	Temperature sensor, hotwater charging[1)]
BT7	Temperature sensor, hot water top[1)]
BT25	Temperature sensor, external supply line[1)]
BT50	Room sensor
BT63	Temperature sensor, external supply line after electric heater
BT71	Temperature sensor, external return line[1)]
GP10	Circulation pump, Heating medium
QN10	Reversing valve, Hot water/Heating medium[2)]

EB1 Additional heat

EB1	Immersion heater
KA1	Auxiliary relay/Contactor[2)]

EB101 Heat pump system

BP4	Pressure sensor, condensor[3)]
BT3	Temperature sensor, return line[3)]
BT12	Temperature sensor, condenser supply line[3)]
BT15	Temperature sensor, fluid pipe[3)]
EB101	Heat pump
FL10	Safety valve
GP12	Charge pump[2)]
HQ1	Particle filter[3)]
QM1	Drain valve, Heating medium
QM31	Shut-off valve, Heating medium, Flow
QM32	Shut off valve, Heating medium, Return
QM43	Shut-off valve

EQ1 Cooling system

BT64	Temperature sensor, cooling supply line[2)]
CP6	Single jacket accumulator tank, cooling
GP13	Circulation pump, cooling
QN12	Reversing valve, Cooling/Heating[2)]

Miscellaneous

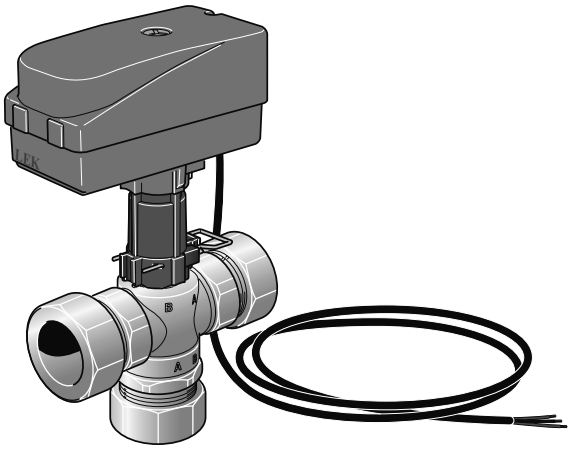
CM1	Expansion vessel closed, Heating medium
CP5	Buffer vessel
CP10	Accumulator tank with hotwater heating
EB20	Immersion heater
FL2	Safety valve, Heating medium
KA1	Auxiliary relay/Contactor
RN10	Trim valve

1) Included in and supplied with controller
2) Included in and supplied with accessory
3) Included in indoor unit

VCC 11M

Installer manual

Shuttle valve, cooling



Description

Cooling reversing valve VCC 11M makes it possible to use cooling in a 4-pipe system. Cooling is then distributed in a different system to the heating. This requires the heat pump and the inner module to support the cooling function.

Technical specification

Voltage	230V, -50 Hz
Max. charge output	17 kW
Connections	ϕ 28 mm
Cw_s	7.1
Run time	8 secs
Power consumption	7 W (during 8 s operation)
Part No.	MCD291A022

Contents

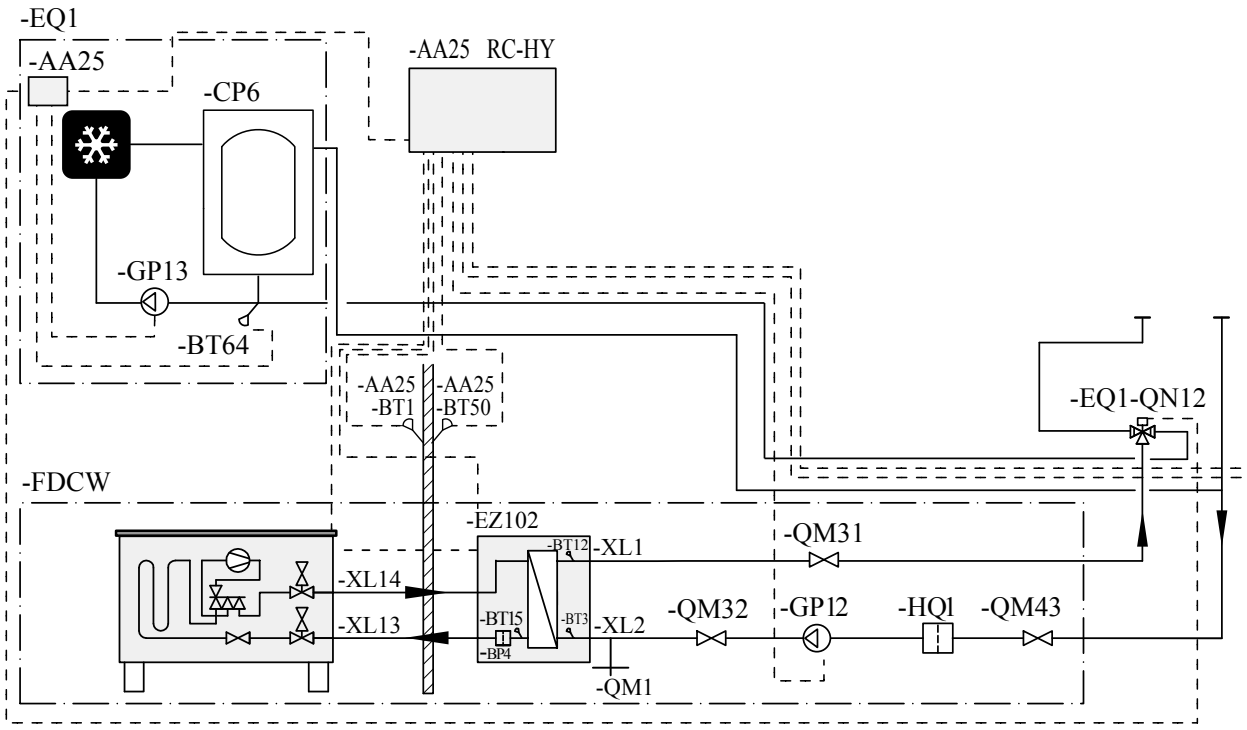
1 x Cooling reversing valve, EQ1-QN12

1 x Adapter kit (Shaft, Adapter and Spring)

1 x 3-way valve, Ø 28 mm compression ring

1 x Valve motor

Outline diagram



Explanation

-AA25	**Indoor module**
-BT1	Temperature sensor, outdoor sensor
-EQ1	**Cooling system (4-pipe)**
-AA25	Accessory card in AXC 30M
-BT64	Flow line, cooling
-CP6	Cooling accumulator (optional)
-GP13	System pump, cooling
-QN12	Reversing valve, cooling
-FDCW	**Heat pump system**
-BT3	Temperature sensor, return
-BT12	Temperature sensor, condenser out
-GP12	Charge pump
-HQ1	Particle filter
-QM1	Tapping valve
-QM31	Shut-off valve
-QM32	Shut-off valve
-QM43	Shut-off valve

Function

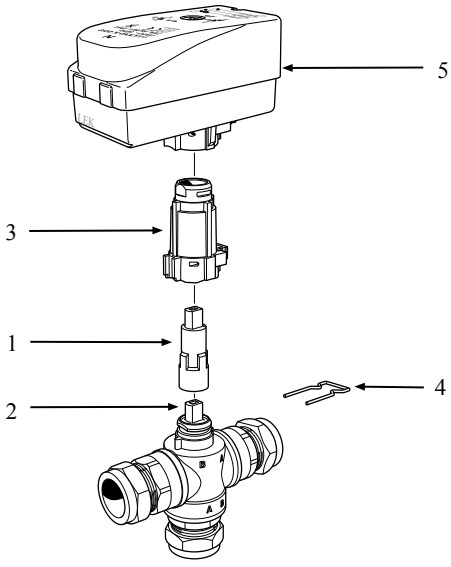
During cooling operation the charge flow is to the cooling system using the cooling reversing valve (QN12). In other cases the charge flow is controlled through the remaining parts of the system, for example the heating system.

Mounting

The cooling reversing valve (QN12) is always installed as the first nreversing valve between the heat source and the rest of the system. In the starting mode, without control voltage, the cooling reversing valve must be open to the rest of the system. When control voltage is applied the cooling reversing valve opens to the cooling system.

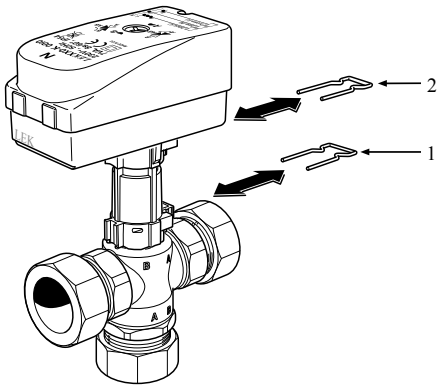
Installing the valve motor

1. Press the adapter shaft (1) on the valve shaft (2). See image below.
2. Press the adapter shaft (3) over the adapter shaft on the valve. Check that the adapter can be twisted.
3. To lock the adapter to the valve, press the spring (4) in the insertion holes of the adapter and press the adapter down until a click is heard.
4. To lock the valve motor to the adapter, secure the valve motor (5) in the preinstalled springs of the adapter and press it down on the adapter until a click is heard.



Dismantling

• Remove the spring (1) (2) from the relevant component and remove the components. See image below.

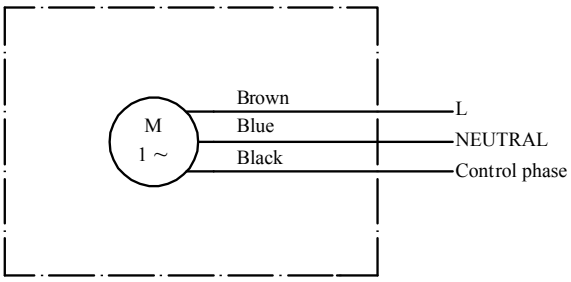


Electrical connection

NOTE

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.

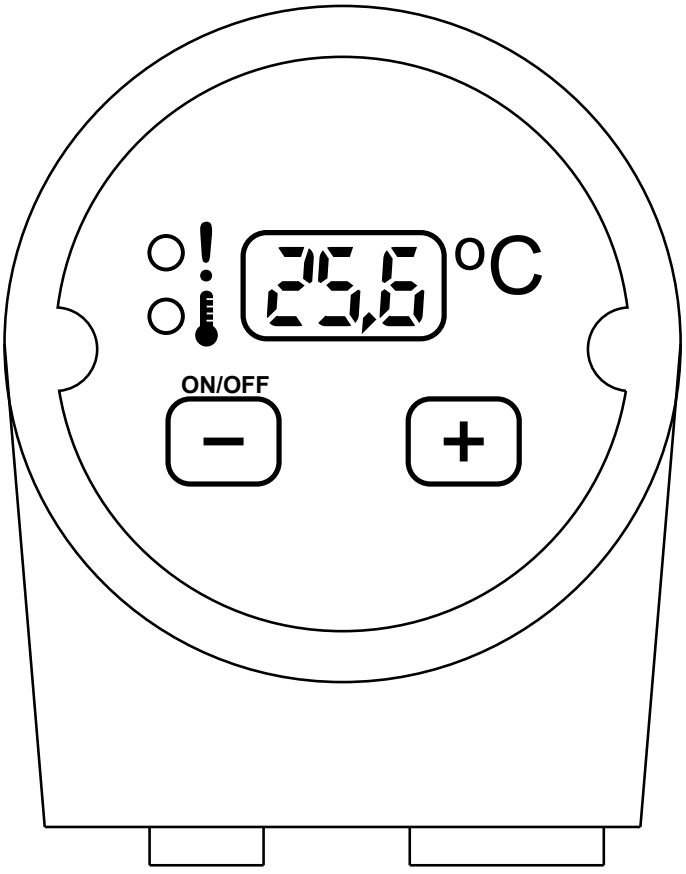
The valve motor is connected according to the following diagram.



For more information about electrical connections, see relevant Installation manual/Assembly and maintenance instructions for the system the reversing valve is to be connected to.

HEATING MODULE WITH MICRO-PROCESSOR TEMPERATURE CONTROL

INSTALLATION AND OPERATION MANUAL

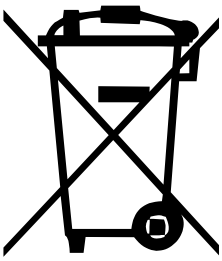


MEL 1030

1. User information on waste electrical and electronic equipment disposal

According to the rules of MTH, this product has been made of the best quality recyclable materials and components. This symbol, placed on the equipment and/or the documentation attached to it, means that waste electrical or electronic equipment must not be disposed of with other waste. The products should be returned to a particular waste disposal centre, where they will be accepted free of charge and recycled.
Correct utilisation of waste equipment helps to protect natural resources and prevents negative impact to human health and the environment, which could increase due to incorrect waste disposal.
Information on waste equipment management points is available from local authorities, seller or distributor.

This equipment is not designed to be used by people (including children) or limited physical, sensory or psychical capability, or by people inexperienced or unfamiliar with this equipment, unless they work under supervision or according to the instructions provided by the parties responsible for their safety. Make sure children do not play with the equipment.



Before installation, read these instructions carefully.

2. Installation requirements

The electrical module you have bought is designed for heating domestic hot water and central heating water. It can be installed in each tank (apart from stainless steel ones) the structure of which (construction and size) makes it possible. Before installation:

- Read this Installation and Operation Manual carefully.
- Entrust installation of the heating module to a qualified person holding appropriate electrical rights.
- The electrical wiring system must be made according to binding regulations.
- Before starting the device, ensure all the connections are correct and tight.
- Provide proper operating conditions, according to the device technical specification.
- To avoid actuation of temperature limit fuse, limit the temperature of heating water supplied to the heat exchanger down to 80°C.
- Check the tank technical specification.
- Check the connector pipe diameter – it should correspond with the heating module thread size.
- Check the connector pipe length: it must be longer than the heating module dead zone.
- Check the material of which the tank is made. The module must not be installed in the stainless-steel tanks.

3. Location and installation

The electrical module can be installed only horizontally, both in horizontal and in vertical tanks whose structure allows for installation of an electrical module of parameters according to the TECHNICAL DATA table, as well as other requirements included in the instructions below.

CAUTION

The module must not be used in the stainless-steel tanks

CAUTION

The heating module must not be installed in the rooms where ambient temperature falls below 5°C or grow up above 50°C.

4. The heating module installation

1. If the module is installed into an already-working device, drain water first.
2. Unscrew the plug protecting the connector pipe. Screw-in the electrical module instead of the plug (Fig. 1 position 1) – seal the thread with oakum or other sealing means available.
3. Screw-in the module so that the supply hose plug is directed down. The module operation in a different position is forbidden.
4. Fill-up the tank, vent the pipe system and then check tightness of the hydraulic connection at the module installation point.
5. If there connection is not tight, drain the tank, seal the connection once again and repeat the operations of sec. 2-4.
6. Unscrew the box front side (Fig. 1 position 2).
7. Connect power supply cables to appropriate terminals located in the upper part of the box (position 2) according to the connection diagram for three-phase or single-phase heaters (see electrical connection diagram).
8. Make the electrical connection according to the electrical diagram.
9. Mount the upper part of the box onto the rest of the heating assembly.
10. Using buttons, set the required water temperature, see: ACTIVATION AND OPERATION page 402.

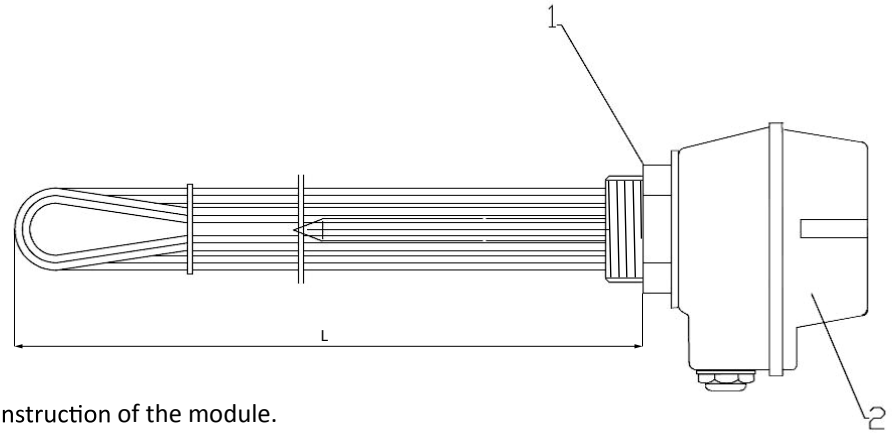


Fig. 1 Construction of the module.

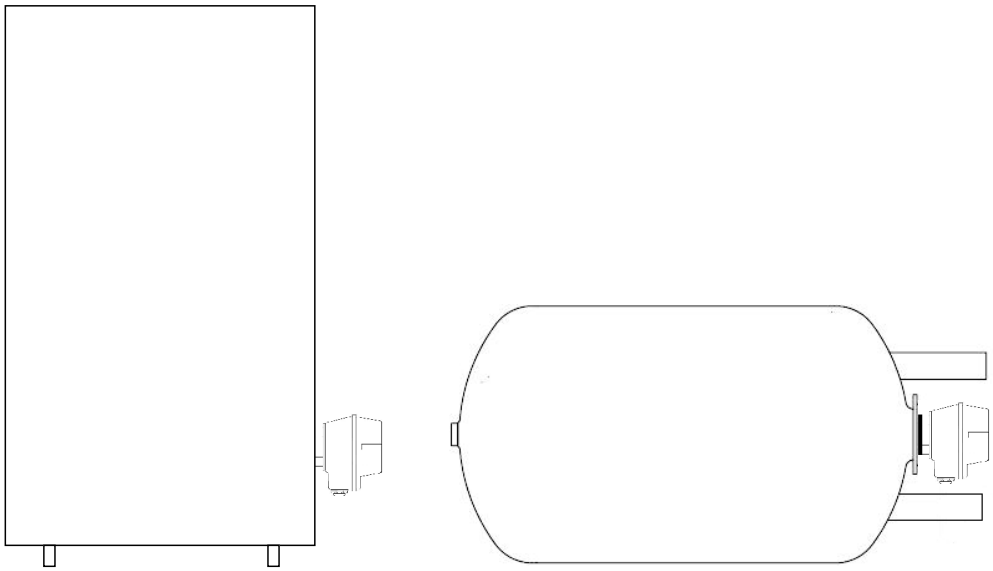


Fig. 2 Installation of heater in the vertical or horizontal heat exchanger.

CAUTION

Lime deposits on the heating part may damage the heating elements. For this reason, it is necessary to do periodic inspections and clean the heating elements of the lime deposits. Frequency of cleaning must be adjusted according to own observations, taking into account hardness of water in the system.

CAUTION

The electrical module must not be connected to mains if the heat exchanger is empty. If it is necessary to drain the heat exchanger (e.g. for the risk of water freezing). first, disconnect the heating module from electrical power supply.

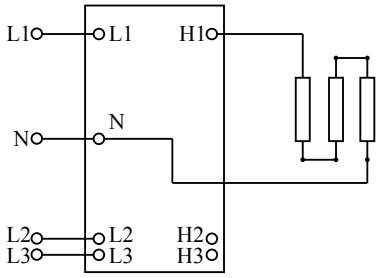
RECOMMENDATIONS

- *Do not feed the device from the same power lines as high-power equipment without appropriate network filters.*
- *Avoid leading signal cable in direct neighbourhood of or parallel to power conductors or feeding cables.*
- *Avoid closeness of remote-controlled devices, high-power loads, equipment of group or phase power adjustment, as well as other equipment which emit high impulse interference.*
- *The manufacturer is no responsible for the damages caused by failure to follow this instructions manual.*

5. Electrical connection

The following figures show the control circuit board with electromechanical relays, as well as connection diagrams. Depending on the number of heaters, 1 phase - 230V AC (1 heater).

5.1 Connecting to 1 phase (4 kW, 3 kW)

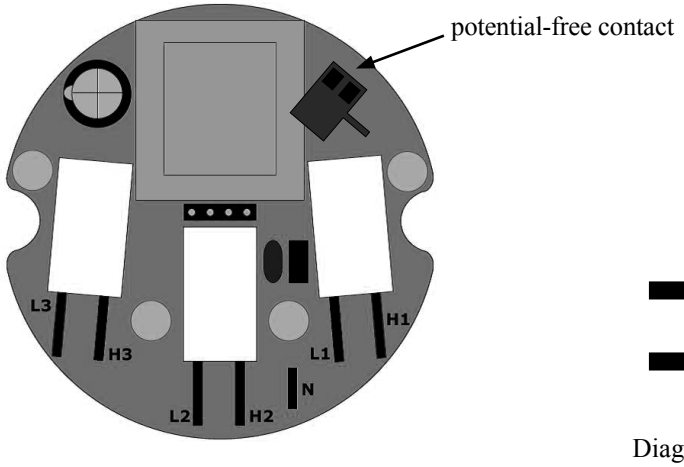


Controller connector

Diagram 1.

5.2 Connecting to external control

The electrical module MEL may be controlled by an external controller, e.g. a heat pump, timer, thermostat with potential-free contact.



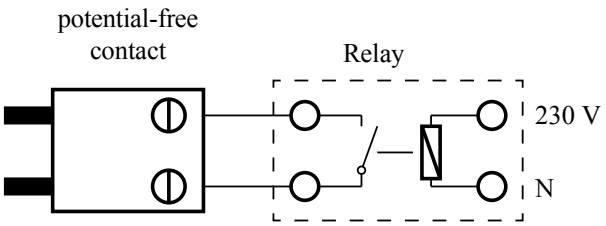


Diagram 2.

The heating module is factory-equipped with a jumper-pin which must be replaced with a relay according to Diagram 3. If the relay circuit is closed, the module display is activated and the heater works according to the pre-set parameters.
At the moment the circuit is broken by the relay, the heater stops its operation. The display is still activated and shows the „EOn" message. This mode allows for changing settings.

CAUTION

To provide correct control of the module by an external device, the temperature set on the heating module must be set to the maximum. This results from the priority of the temperature pre-set on the heating module over the external device at the moment the circuit is closed by an external relay.

CAUTION

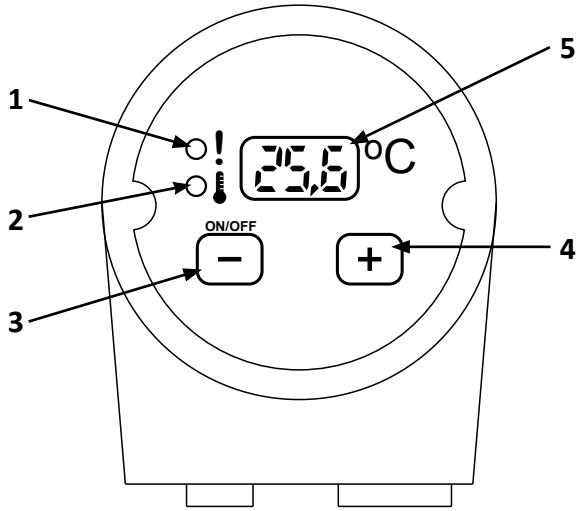
If you give external voltage to the socket in order to connect the potential-free contact, the controller will get damaged. A jumper-pin is factory installed in the socket.

6. Activation and operation

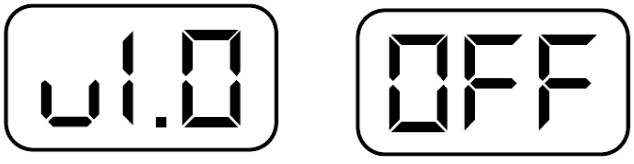
The microprocessor temperature controller is a simple electronic system used to control the heating process. The system controls the heater or set of electrical heaters supplied from the power mains 230V AC (1 phase) or 400V AC (3 phase).

The following figure presents the device with description of control buttons and information LEDs.

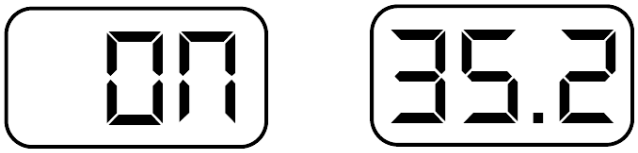
No.	Name	Description
1	Alarm LED	The LED pulses if alarm state is detected.
2	Heating LED	The LED glows if heating is activated. For the 3 phase system, the LED starts pulsing 1°C before the pre-set temperature.
3	Button -	Reduces the pre-set value or, if pressed for approx. 3 seconds, changes the controller state (ON/OFF) (see more: DIAGRAM).
4	Button +	Increases the pre-set value or, if pressed for approx. 3 seconds, enters the hysteresis changing menu (see more: DIAGRAM).
5	LED display	Displays current temperature, settings, alarms and controller state.



If the MEL controller is connected to 230V/400V AC mains (depending on its version), the information screen is started with current software version and then the controller OFF mode is activated.

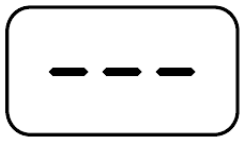
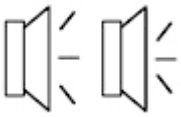
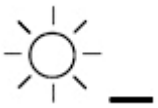
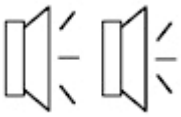
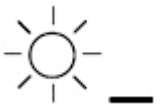
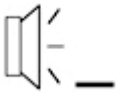
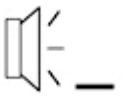
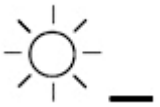


In this mode, the heating process control is off – all heaters are disconnected from the mains. Pressing the „-" button for 3 seconds, changes the controller mode into ON and displays current temperature. From this moment, the heater(s) control process is activated.



Installation and operation manual

The display may also show alarm information. The following table includes all alarm messages with descriptions:

Information displayed	Signal sound	Alarm LED	Description
	Modulated 	Pulsing 	Sensor absent or fail. The alarm will deactivate automatically after the sensor failure is repaired.
	Modulated 	Pulsing 	85 oC exceeded (Protect). The alarm will deactivate after it is cancelled by hand (the OFF mode is entered).
	intermittent 	Pulsing 	Lack of water detected (No Liquid) The alarm will deactivate after it is cancelled by hand (the OFF mode is entered).
	intermittent 	Pulsing 	Lack of heating detected (No Heating) The alarm will deactivate after it is cancelled by hand (the OFF mode is entered).

6.1 Functional menu (controller ON)

Function	Parameter	Range of settings	Factory setting
HEATING TEMPERATURE SET		15 - 75°C	50°C*
TEMPERATURE HYSTERESIS SET		1 - 10°C	2°C

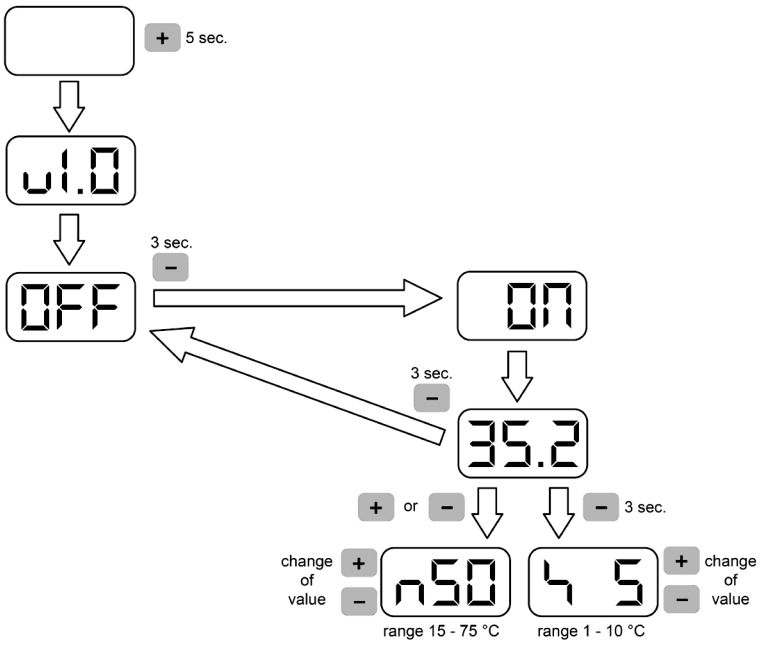
CAUTION

The factory settings are proposals only. All the values depend on the size of heaters, size of the tank, user requirements, etc. Manufacturer reserves itself the right to change the range of settings in next versions of the controller.

CAUTION

The temperature indicated on the heading module display is momentary temperature and it may diverge from the actual temperature in the tank. This is caused by proximity of the heating element to the temperature sensor, as well as with the heating module location in the tank.

6.2 Menu diagram



CAUTION

Return from the setting mode is automatic, 5 sec. after the last button pressing.

6.3 Functional menu

The functional menu is available if the controller is in the ON mode. If you press the „+" or „-" button while the temperature is displayed, you will enter the TEMPERATURE SETTING. If you press the „+" button for 3 seconds while the temperature is displayed, you will enter the HYSTERESIS SETTING. Return from the setting mode to temperature display is automatic, 5 sec. after the last pressing of the button. Description of parameters is presented below.

6.4 Setting temperature

In this menu, you are able to set the temperature to which the tank liquid will be heated. If 3 heaters are installed in the 3 phase system, 0.5°C before achieving the pre-set temperature, one of the heaters will switch off. The LED indicating heating will start pulsing. Such method of heating prevents overheating of the tank excessing the pre-set temperature. It is possible to set the heating temperature from 15°C to 75°C.

6.5 Setting hysteresis

In this menu, you can set temperature hysteresis (how much the tank temperature must fall down to restart heating). It is possible to set the hysteresis from 1°C to 75°C.

7. Cleaning and maintenance

- Clean dirty surfaces with a damp cloth and cleaning agents.
- It is necessary to do periodic inspections and clean the heating elements of the lime deposits.

8. Service

Any irregularities in the heater operation must be reported to the service.
The heating module must be repaired / serviced only by an authorised service as a repair incorrectly made may impair safety of use.

9. Technical details

Table 1.

Model	**MEL 1030**
Power	3 kW
Sensors	NTC 10 kΩ
Temperature control range	5 -75 °C ±3
Measurement resolution	0,1 °C
Time of measurements	0,5 s
Reading data	7-segment LED display
Protection	
Temperature, independent	STB (95 °C)
Temperature, programmable	80 °C
Detecting lack of water	detecting increase of 1°C/3s
Detecting lack of heating	detected after 60 min.
Outputs	
Temperature gauge	NTC 10 kΩ with auto-calibration
Signalling	
LEDs	Signalling heating and alarms
LED display	Messages. measurements. settings
Power source	
Rated voltage	230 V ~
Rated current	13,1 A
Working temperature	5°C – 50°C
Weight	1,3 kg
Degree of protection	IP 54
Length of dead zone	125 mm
Diameter of connector pipe	1 ½”
Length of heating element *	350 mm

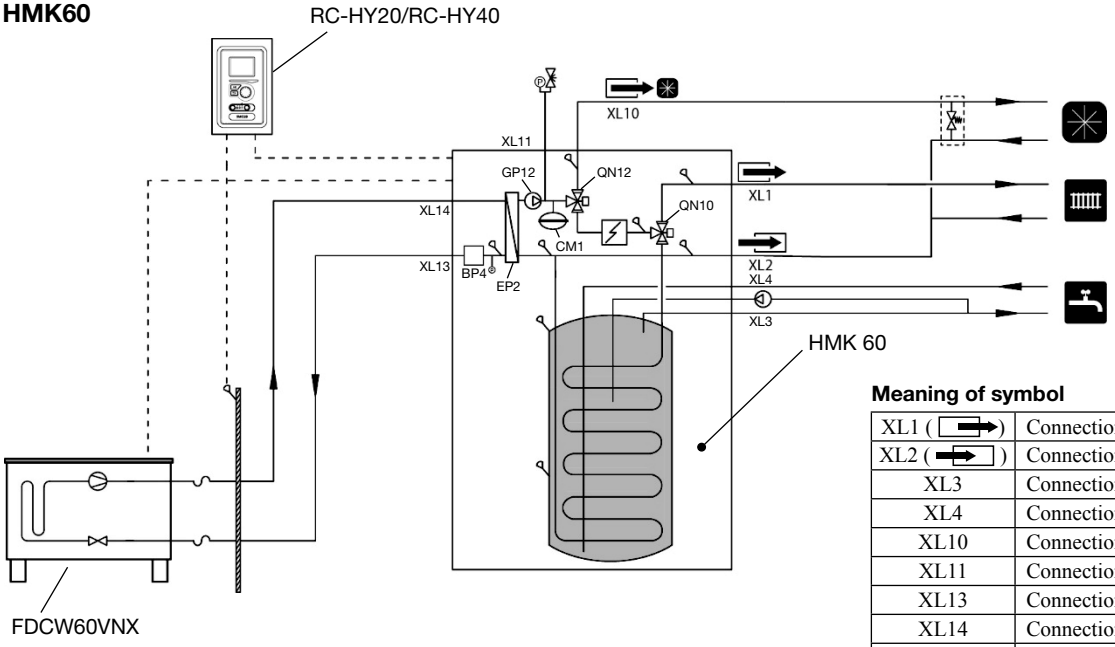
* measured from the heater front (see: Fig. 1, dimension L)

Piping system

Indoor units

All in one type

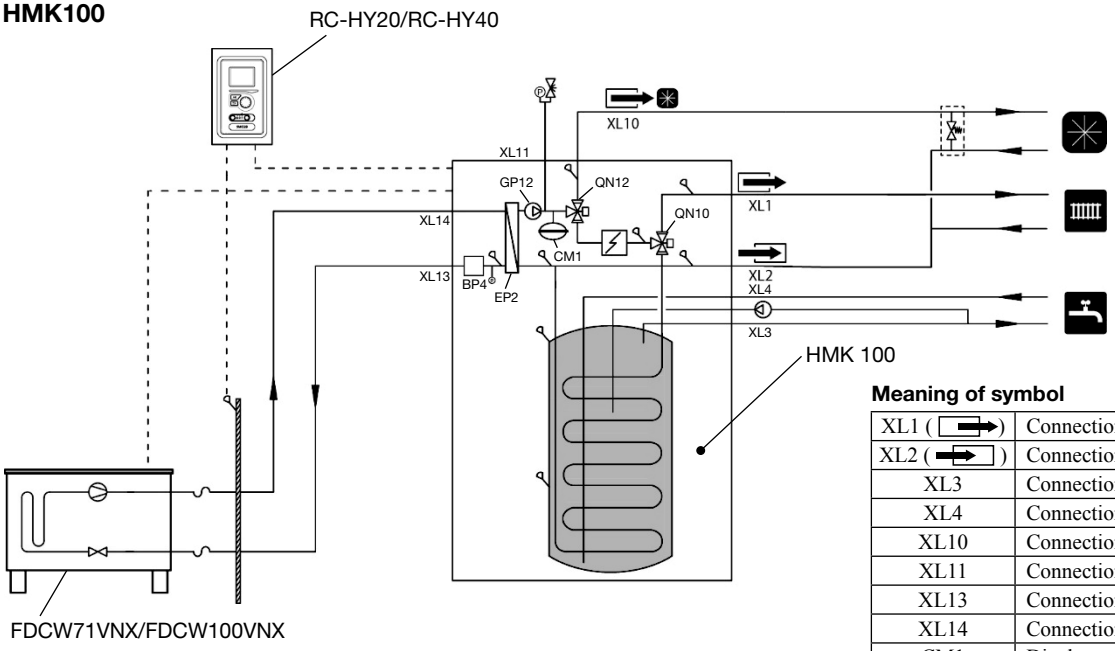
HMK60



Meaning of symbol

XL1 (⇒)	Connection, heating medium, supply
XL2 (⇒)	Connection, heating medium, return
XL3	Connection, cold water
XL4	Connection, hot water
XL10	Connection, cooling
XL11	Connection, safety group, manometer
XL13	Connection, liquid cooling medium
XL14	Connection, gas cooling medium
CM1	Diaphragm expansion vessel, closed
QN10	Isolation valve, domestic hot water/ central heating
QN12	Isolation valve, cooling/heating
GP12	Circulation pump
EP2	Heat exchanger
BP4	Pressure sensor, high pressure

HMK100

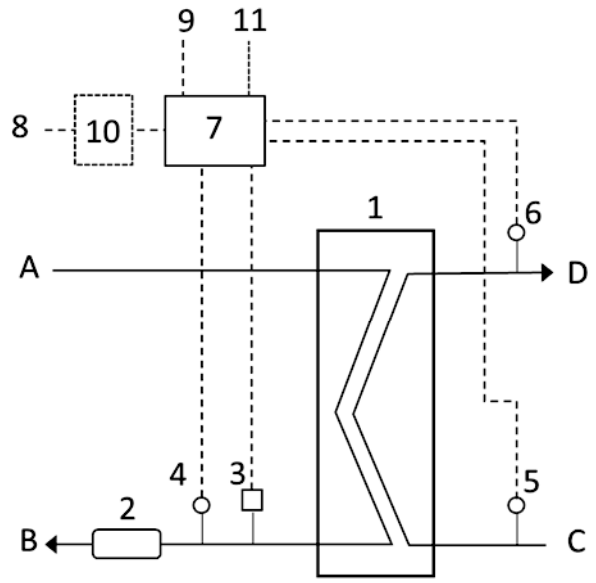


Meaning of symbol

XL1 (⇒)	Connection, heating medium, supply
XL2 (⇒)	Connection, heating medium, return
XL3	Connection, cold water
XL4	Connection, hot water
XL10	Connection, cooling
XL11	Connection, safety group, manometer
XL13	Connection, liquid cooling medium
XL14	Connection, gas cooling medium
CM1	Diaphragm expansion vessel, closed
QN10	Isolation valve, domestic hot water/ central heating
QN12	Isolation valve, cooling/heating
GP12	Circulation pump
EP2	Heat exchanger
BP4	Pressure sensor, high pressure

Split box

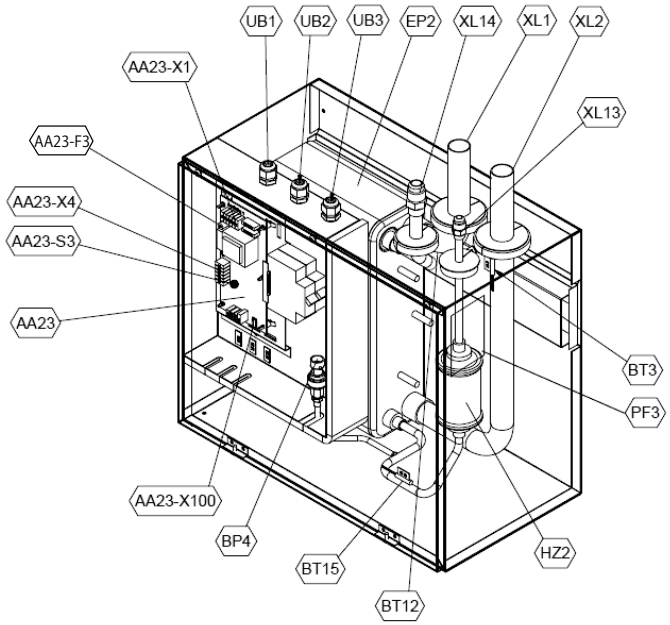
HSB60/HSB100/HSB140



A: Refrigerant flow
B: Refrigerant return
C: Space heating return
D: Space heating flow

1: Condenser
2: Filter
3: Pressure sensor
4: Temp. sensor, refrigerant return
5: Temp. sensor, space heating return
6: Temp. sensor, space heating flow
7: Print control board
8: Power source
9: Signal cable to outdoor heat pump
10: Residual current device (RCD) (option)
11: Cable for heat tracing (option)

(Components location)



(Parts name)

EP2 Heat exchanger

HZ2 Drying filter

Electrical components

AA23	Communication board
AA23-F3	Fuse for external heating cable
AA23-S3	DIP switch, addressing of outdoor unit
AA23-X1	Terminal block, incoming supply
AA23-X4	Terminal block, communication with indoor module / control module
AA23-X100	Terminal block, communication outdoor module

Sensor, thermostats

BP4	Pressure sensor, high pressure
BT3	Temperature sensor, heating medium, return
BT12	Temperature sensor, condenser, supply
BT15	Temperature sensor, fluid pipe

Pipe connections

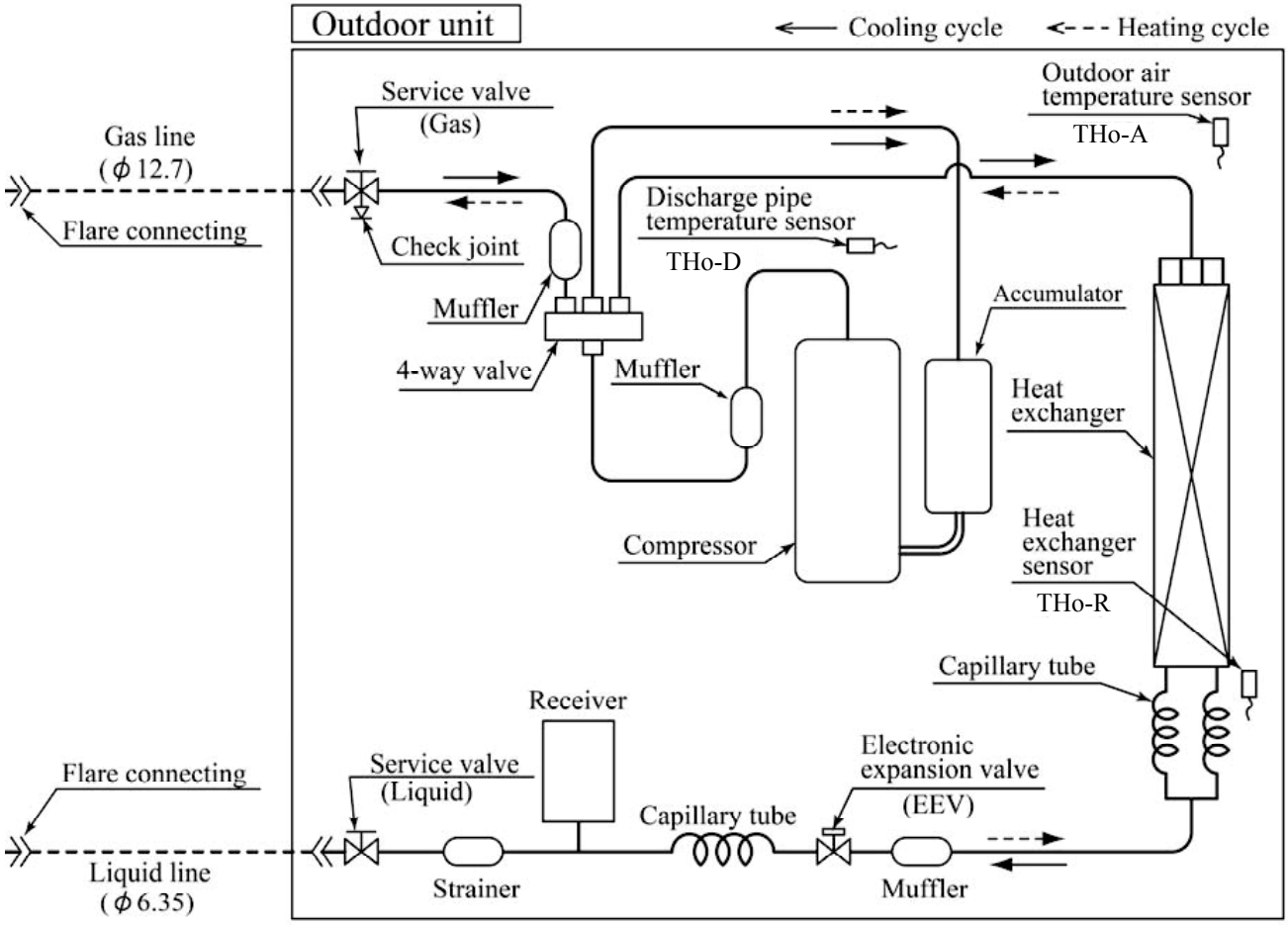
XL1	Connection, heating medium supply
XL2	Connection, heating medium return
XL13	Connection, liquid cooling medium
XL14	Connection, gas cooling medium

Miscellaneous

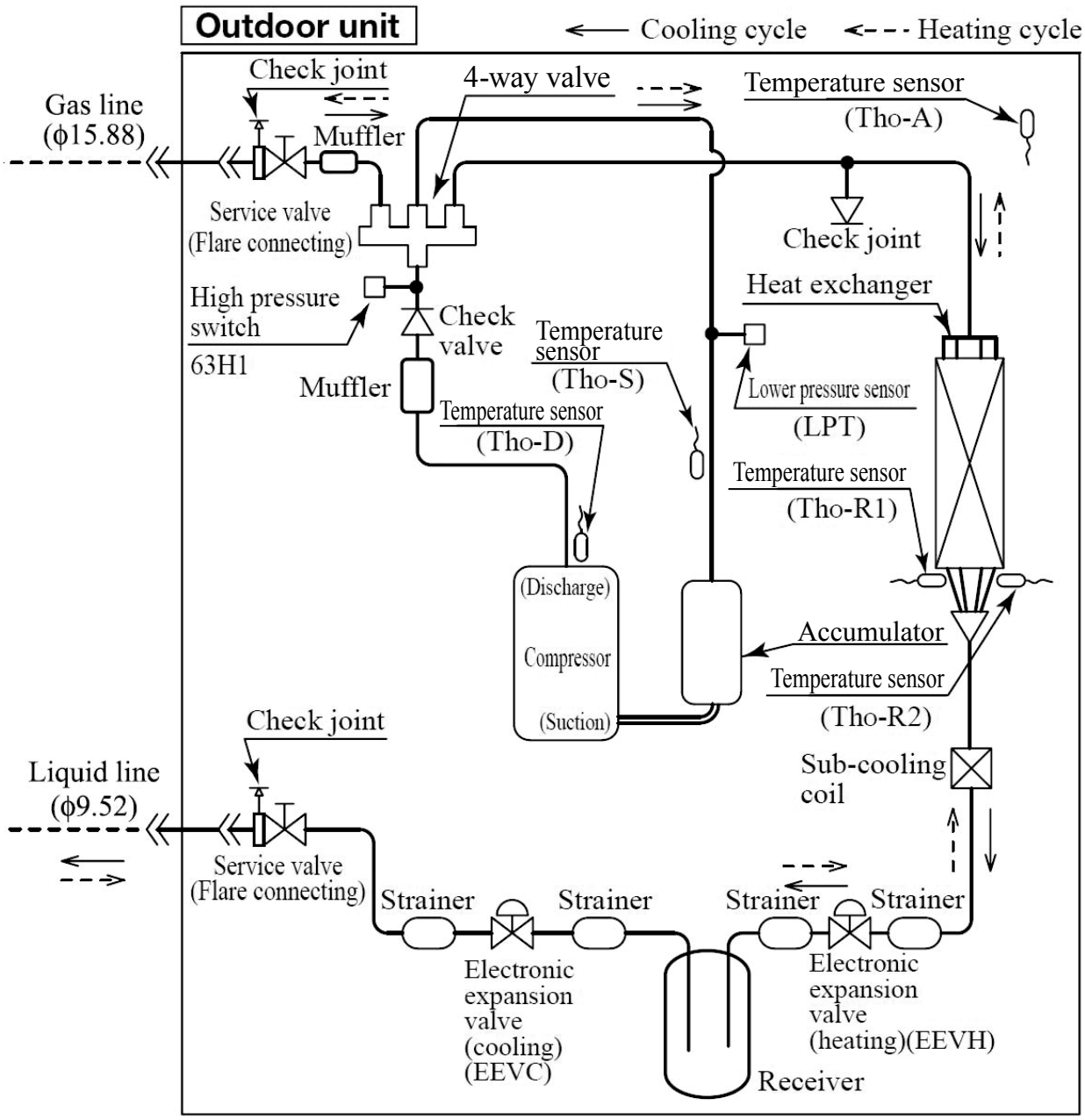
UB1	Cable gland
UB2	Cable gland
UB3	Cable gland
PF3	Nameplate with serial number

Outside units

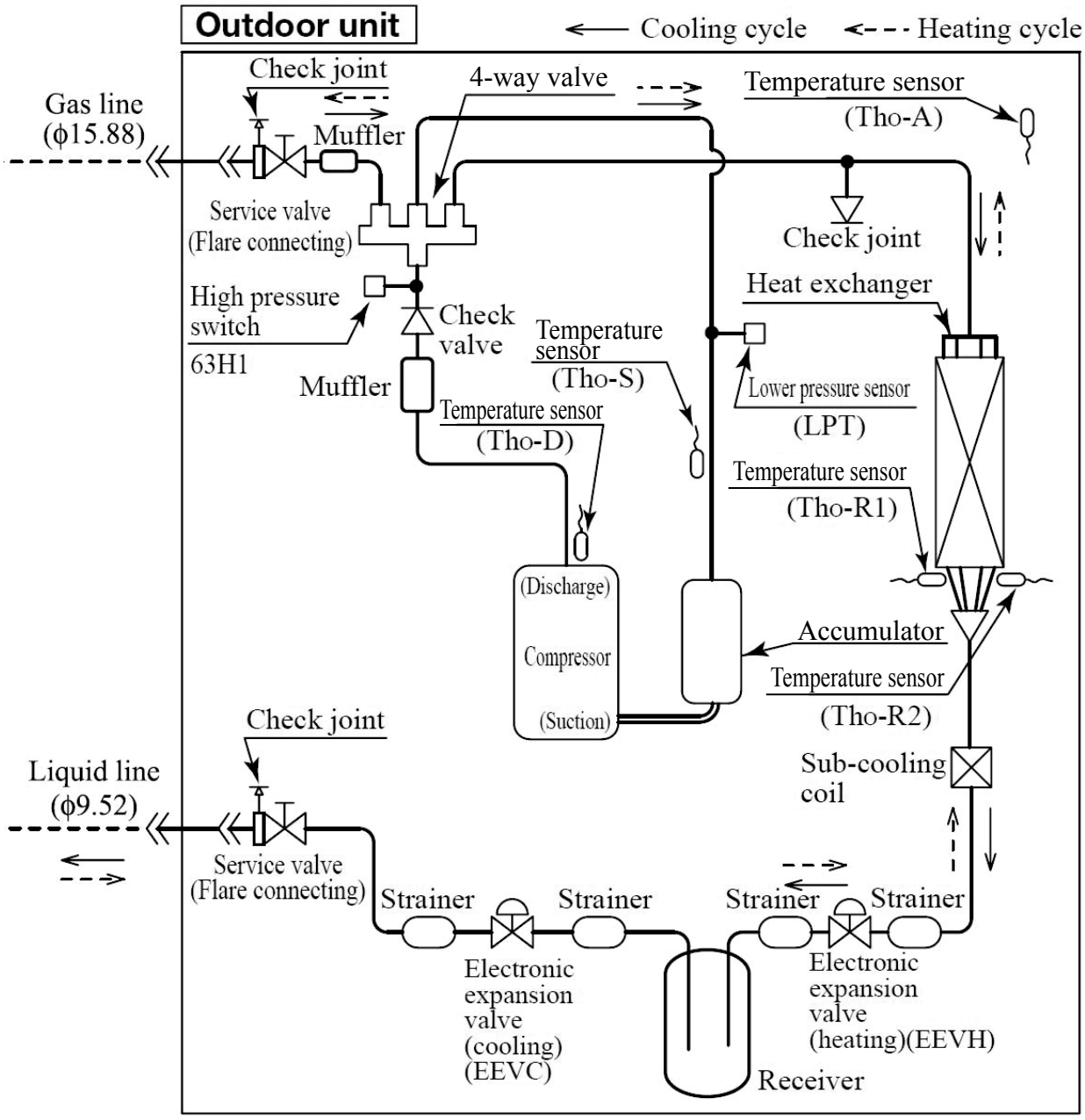
FDCW60VNX



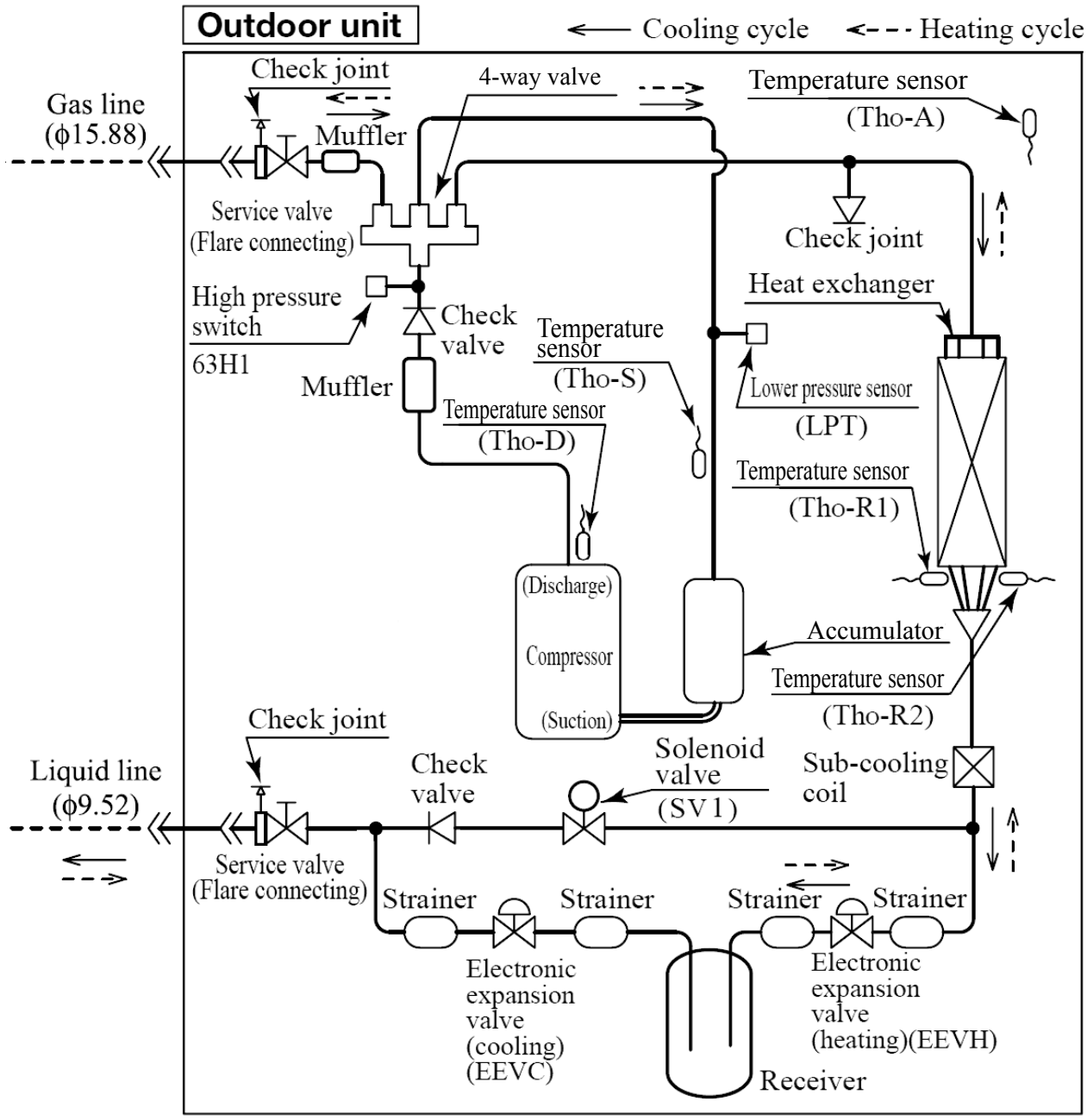
FDCW71VNX


Outdoor unit
Cooling cycle
Heating cycle
Check joint
4-way valve
Temperature sensor
(Tho-A)
Gas line
(ϕ15.88)
Muffler
Service valve
(Flare connecting)
Check joint
Heat exchanger
High pressure
switch
63H1
Check
valve
Temperature
sensor
(Tho-S)
Lower pressure sensor
(LPT)
Muffler
Temperature sensor
(Tho-D)
Temperature sensor
(Tho-R1)
(Discharge)
Compressor
(Suction)
Accumulator
Temperature sensor
(Tho-R2)
Check joint
Liquid line
(ϕ9.52)
Sub-cooling
coil
Service valve
(Flare connecting)
Strainer
Strainer
Strainer
Strainer
Electronic
expansion
valve
(cooling)
(EEVC)
Electronic
expansion
valve
(heating)(EEVH)
Receiver

FDCW100VNX


Outdoor unit
Cooling cycle
Heating cycle
Check joint
4-way valve
Temperature sensor
(Tho-A)
Gas line
(ϕ15.88)
Muffler
Service valve
(Flare connecting)
Check joint
Heat exchanger
High pressure
switch
63H1
Check
valve
Temperature
sensor
(Tho-S)
Lower pressure sensor
(LPT)
Muffler
Temperature sensor
(Tho-D)
Temperature sensor
(Tho-R1)
(Discharge)
Compressor
(Suction)
Accumulator
Temperature sensor
(Tho-R2)
Check joint
Liquid line
(ϕ9.52)
Sub-cooling
coil
Service valve
(Flare connecting)
Strainer
Strainer
Strainer
Strainer
Electronic
expansion
valve
(cooling)
(EEVC)
Electronic
expansion
valve
(heating)(EEVH)
Receiver

FDCW140VNX


Outdoor unit
Cooling cycle
Heating cycle
Check joint
4-way valve
Temperature sensor
(Tho-A)
Gas line
(ϕ15.88)
Muffler
Service valve
(Flare connecting)
Check joint
Heat exchanger
High pressure
switch
63H1
Check
valve
Temperature
sensor
(Tho-S)
Lower pressure sensor
(LPT)
Muffler
Temperature sensor
(Tho-D)
Temperature sensor
(Tho-R1)
(Discharge)
Compressor
(Suction)
Accumulator
Temperature sensor
(Tho-R2)
Check joint
Liquid line
(ϕ9.52)
Check
valve
Solenoid
valve
(SV1)
Sub-cooling
coil
Service valve
(Flare connecting)
Strainer
Strainer
Strainer
Strainer
Electronic
expansion
valve
(cooling)
(EEVC)
Electronic
expansion
valve
(heating)(EEVH)
Receiver

MEMO

AIR TO WATER HEAT PUMP

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