ESIE12-04A



Service Manual

Altherma

- Outdoor unit
  - ERLQ004~008CAV3
  - ERLQ011~016CAV3
  - ERLQ011~016CAW1
  - ERHQ011~016BAV3
  - ERHQ011~016BAW1
- Hydro-box
  - EHBH/X004~016CA3/9V/W
  - EHVH/X004~016CA3/9V/W
- Remote Alarm / Operation signal
  - EKRP1HB
- Altherma Room thermostat
  - EKRTW
  - EKRTR
  - EKRTETS
- User interface
  - EKRUCAL1/2
- Domestic hot water tank
  - EKHWS150~300V3/Z2
  - EKHWSU150~300V3/Z2
  - EKHWE150~300V3/Z2
  - EKHTS200~260AC

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Part 6
Appendix - Installer Reference Guide

1 Introduction

1.1 Version log

Version history

Version code	Description	Date
ESIE12-04A	Outdoor error codes added (A5, E6, E8, EA, H0, H6, H8, F6, JA, L3)	19/07/2016

1.2 About This Manual

Target group

This service manual is intended for and should only be used by qualified engineers.

Purpose of this manual

This service manual contains all the information you need to carry out the necessary repair and maintenance tasks for the Daikin ALTHERMA.

Five parts

This service manual consists of an introduction, five parts and an index:

Part	See page
Part 1–System Outline	1–1
Part 2–Functional Description	2–1
Part 3–Troubleshooting	3–1
Part 4–Commissioning and Test Run	4–1
Part 5–Maintenance and Disassembly	5–1

Introduction overview

The introduction contains the following topics:

Topic	See page
1.3–Safety Cautions	iii

Note

This Service Manual is about ER(L/H)Q004~016 / EHB/V H/X 004~016.

Please refer to Service Manual ESIE06-03 for details of ERYQ005~007 / EKHBH(X)007*** / ERHQ006~008 / EKHBH(X)008.

Please refer to Service Manual ESIE08-01 for details of ERHQ011~016AA* / EKHBH(X)016*.

Please refer to Service Manual ESIE08-02 for details of E(B/D)(H/L)Q011~016*.

Please refer to Service Manual ESIE10-02 for details of ER(H/L)Q006~008* / EKHBH(X)008BA*.

Please refer to Service Manual ESIE10-05 for details of EBHQ006~008* / EKCB(H/X)008BA*.

Please refer to Service Manual ESIE11-04 for details of ER(H/L)Q011~016BA* / EKHBH(X)016*.

1.3 Safety Cautions

Cautions and warnings

- Be sure to read the following safety cautions before conducting repair work.
- The caution items are classified into "**Warning**" and "**Caution**". The "**Warning**" items are especially important since they can lead to death or serious injury if they are not followed closely. The "**Caution**" items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.
- About the pictograms

△ This symbol indicates an item for which caution must be exercised.

The pictogram shows the item to which attention must be paid.

◯ This symbol indicates a prohibited action.

The prohibited item or action is shown inside or near the symbol.

● This symbol indicates an action that must be taken, or an instruction.

The instruction is shown inside or near the symbol.

- After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer.

1.3.1 Caution in Repair

Warning

Warning	
Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Working on the equipment that is connected to a power supply can cause an electrical shook. If it is necessary to supply power to the equipment to conduct the repair or inspecting the circuits, do not touch any electrically charged sections of the equipment.	
If the refrigerant gas discharges during the repair work, do not touch the discharging refrigerant gas. The refrigerant gas can cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, release the refrigerant gas completely at a well-ventilated place first. If there is a gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it can cause injury.	
If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas can generate toxic gases when it contacts flames.	

Warning	
The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Be sure to discharge the capacitor completely before conducting repair work. A charged capacitor can cause an electrical shock.	
Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug. Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or fire.	

Caution

Caution	
Do not repair the electrical components with wet hands. Working on the equipment with wet hands can cause an electrical shock.	
Do not clean the air conditioner by splashing water. Washing the unit with water can cause an electrical shock.	
Be sure to provide the grounding when repairing the equipment in a humid or wet place, to avoid electrical shocks.	
Be sure to turn off the power switch and unplug the power cable when cleaning the equipment. The internal fan rotates at a high speed, and cause injury.	
Do not tilt the unit when removing it. The water inside the unit can spill and wet the furniture and floor.	
Be sure to check that the refrigerating cycle section has cooled down sufficiently before conducting repair work. Working on the unit when the refrigerating cycle section is hot can cause burns.	
Use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.	

1.3.2 Cautions Regarding Products after Repair

Warning

Warning	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury.	
Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury.	For integral units only
Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury.	For integral units only
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	
Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections can cause excessive heat generation or fire.	
When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	
Do not mix air or gas other than the specified refrigerant (R-410A) in the refrigerant system. If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	

Warning	
When replacing the coin battery in the remote controller, be sure to disposed of the old battery to prevent children from swallowing it. If a child swallows the coin battery, see a doctor immediately.	

Cautions

Caution	
Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks.	
Do not install the equipment in a place where there is a possibility of combustible gas leaks. If a combustible gas leaks and remains around the unit, it can cause a fire.	
Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water can enter the room and wet the furniture and floor.	For integral units only

1.3.3 Inspection after Repair

Warning

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet all the way. If the plug has dust or loose connection, it can cause an electrical shock or fire.	
If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires can cause an electrical shock, excessive heat generation or fire.	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it can cause an electrical shock, excessive heat generation or fire.	

Caution

Caution	
Check to see if the parts and wires are mounted and connected properly, and if the connections at the soldered or crimped terminals are secure. Improper installation and connections can cause excessive heat generation, fire or an electrical shock.	
If the installation platform or frame has corroded, replace it. Corroded installation platform or frame can cause the unit to fall, resulting in injury.	
Check the grounding, and repair it if the equipment is not properly grounded. Improper grounding can cause an electrical shock.	
Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 Mohm or higher. Faulty insulation can cause an electrical shock.	
Be sure to check the drainage of the hydro-box after the repair. Faulty drainage can cause the water to enter the room and wet the furniture and floor.	

Part 1
System Outline

What is in this part? This part contains the following chapters:

Chapter	See page
1–General Outline: Altherma	1–3
2–Specifications	1–21
3–Functional Diagrams	1–23
4–Piping Diagrams	1–27
5–Switch Box Layout	1–37
6–Wiring Diagrams	1–43
7–PCB Layout	1–61

1 General Outline: Altherma

1.1 What Is in This Chapter?

Introduction

This chapter contains the following information on the Altherma:

- Outlook and dimensions
- Installation and service space
- Components
- Physical limitations and limits of operation
- Drainpan kit necessity

General outline

This chapter contains the following general outlines:

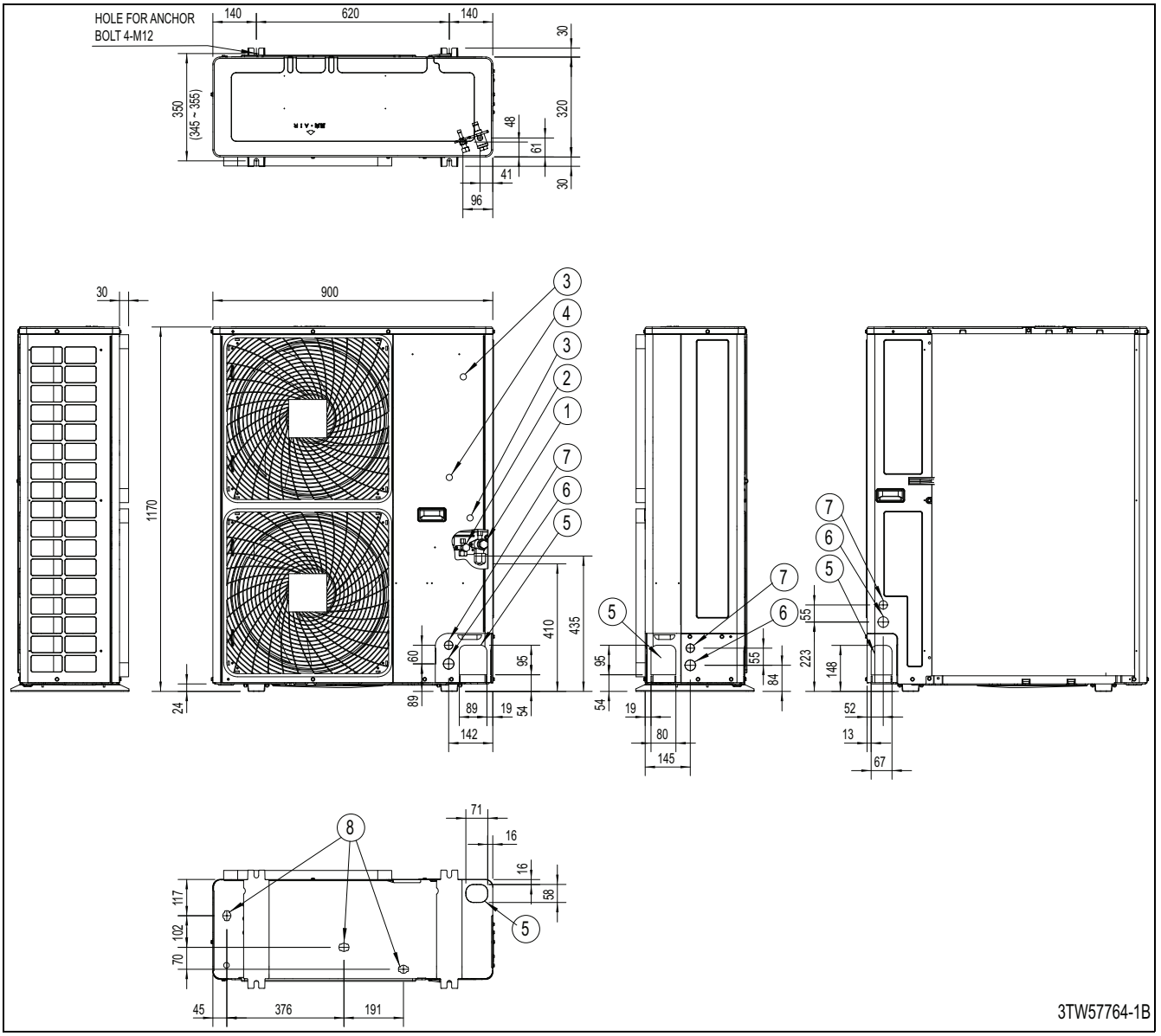
Topic	See page
1.2–ERHQ011~016BAV3: Outlook and Dimensions	1–4
1.3–ERHQ011~016BAW1: Outlook and Dimensions	1–5
1.4–ERLQ011~016CAV3: Outlook and Dimensions	1–6
1.5–ERLQ011~016CAW1: Outlook and Dimensions	1–7
1.6–ERLQ004~008CAV3: Outlook and Dimensions	1–9
1.7–EHBH/X004~016CA**: Outlook and Dimensions	1–10
1.8–EHVH/X004~016CA**: Outlook and Dimensions	1–13
1.9–EKHTS 200/260 AC	1–16
1.10–EKHTSU 200/260 AC	1–18
1.11–EKRTR / EKRTW: Outlook and Dimensions	1–20

1

1.2 ERHQ011~016BAV3: Outlook and Dimensions

Outlook and dimensions

The illustration below shows the outlook and the dimensions of the unit (mm).



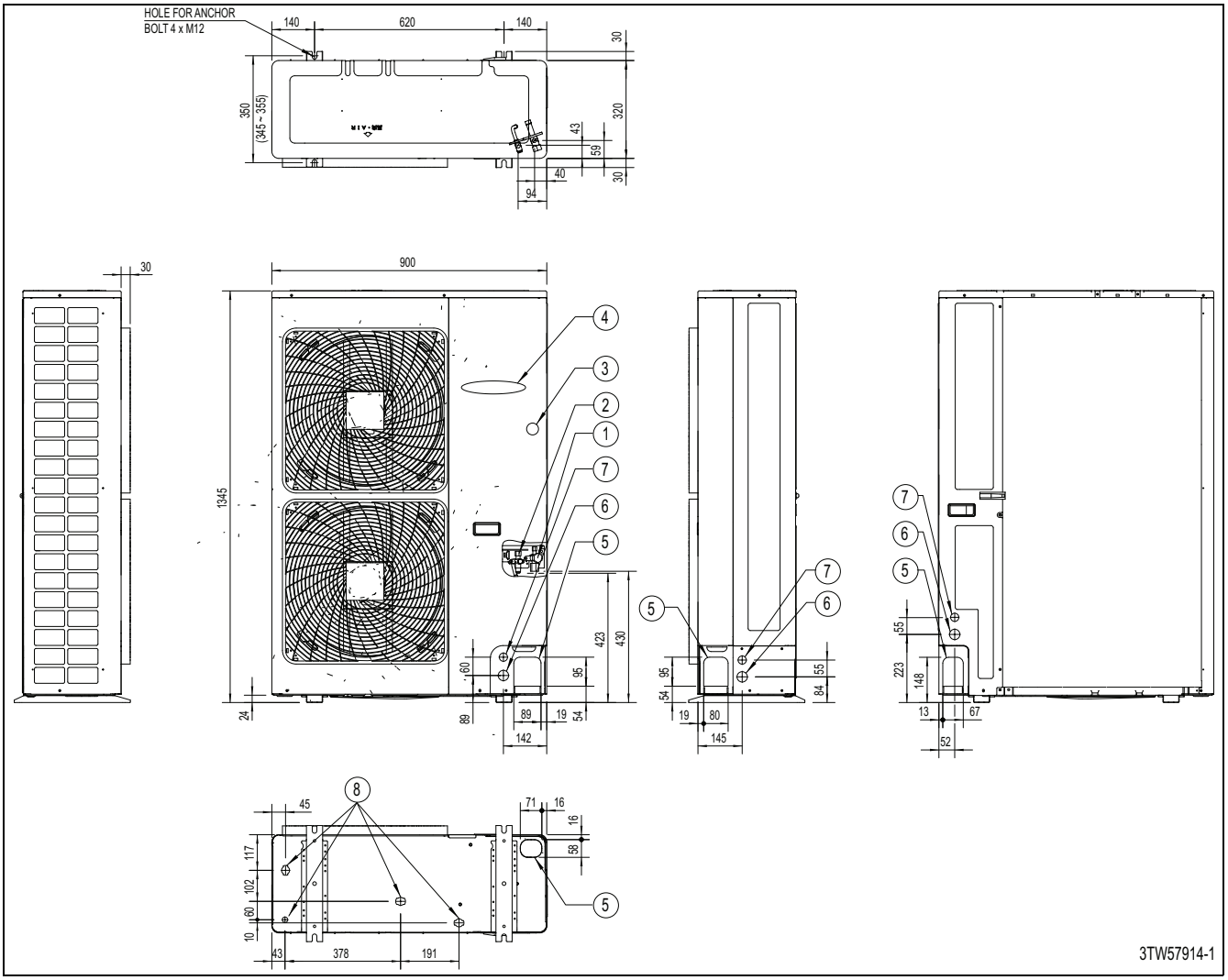
Installation and service space

See installation manual.

1.3 ERHQ011~016BAW1: Outlook and Dimensions

Outlook and dimensions

The illustration below shows the outlook and the dimensions of the unit (mm)



Installation and service space

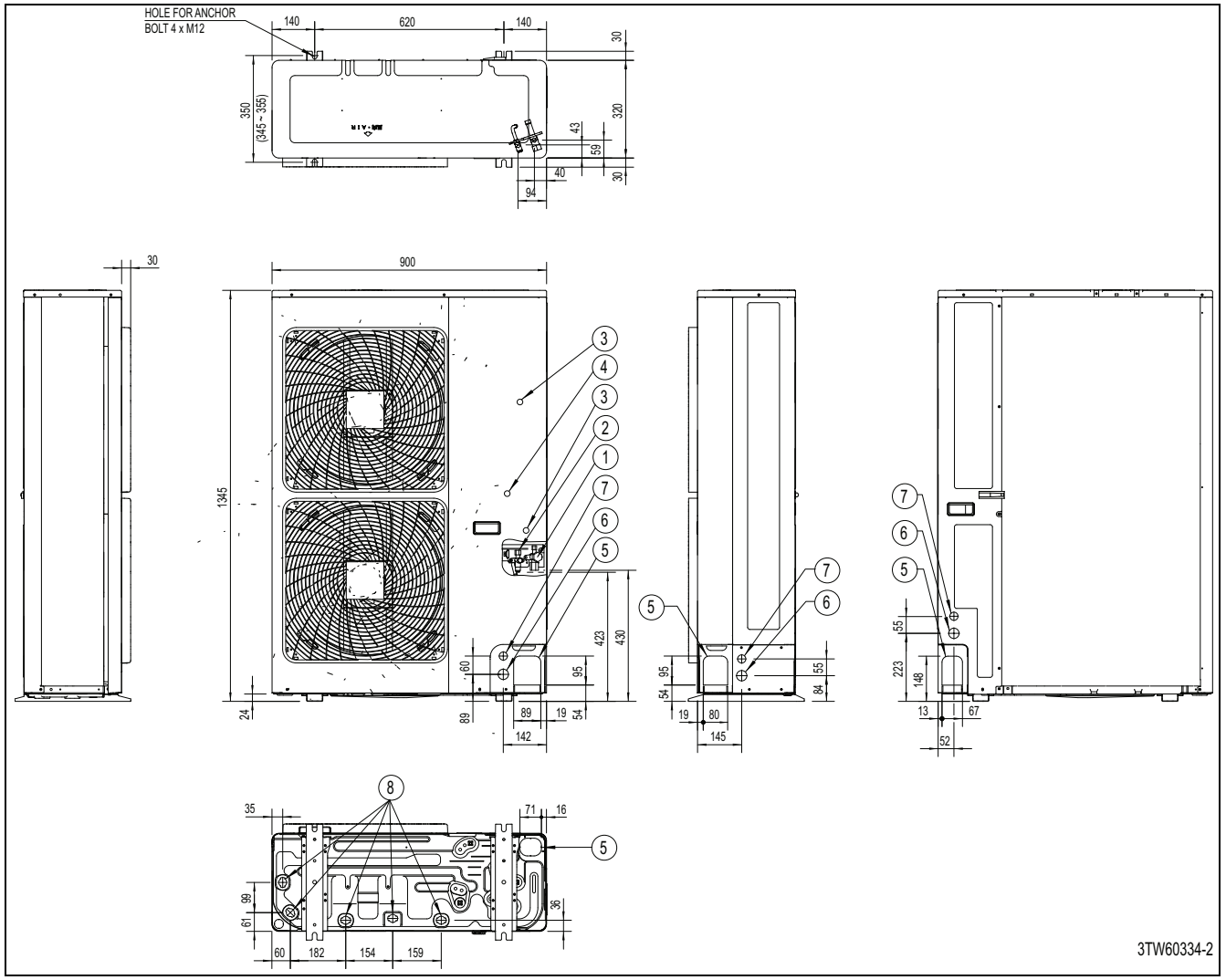
See installation manual.

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1.4 ERLQ011~016CAV3: Outlook and Dimensions

Outlook and dimensions

The illustration below shows the outlook and the dimensions of the unit (mm)



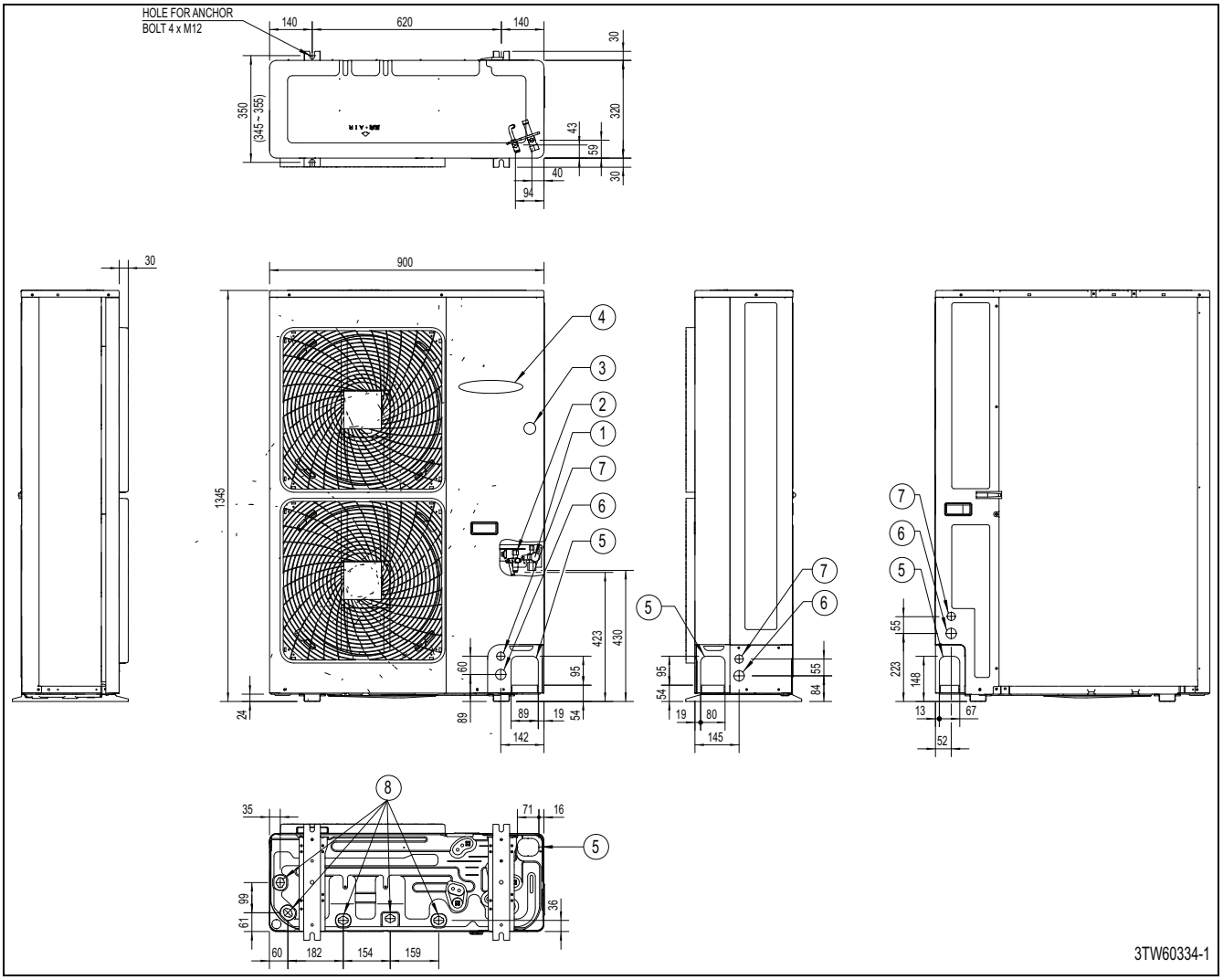
Installation and service space

See installation manual.

1.5 ERLQ011~016CAW1: Outlook and Dimensions

Outlook and dimensions

The illustration below shows the outlook and the dimensions of the unit (mm)



Installation and service space

See installation manual.

1

Components

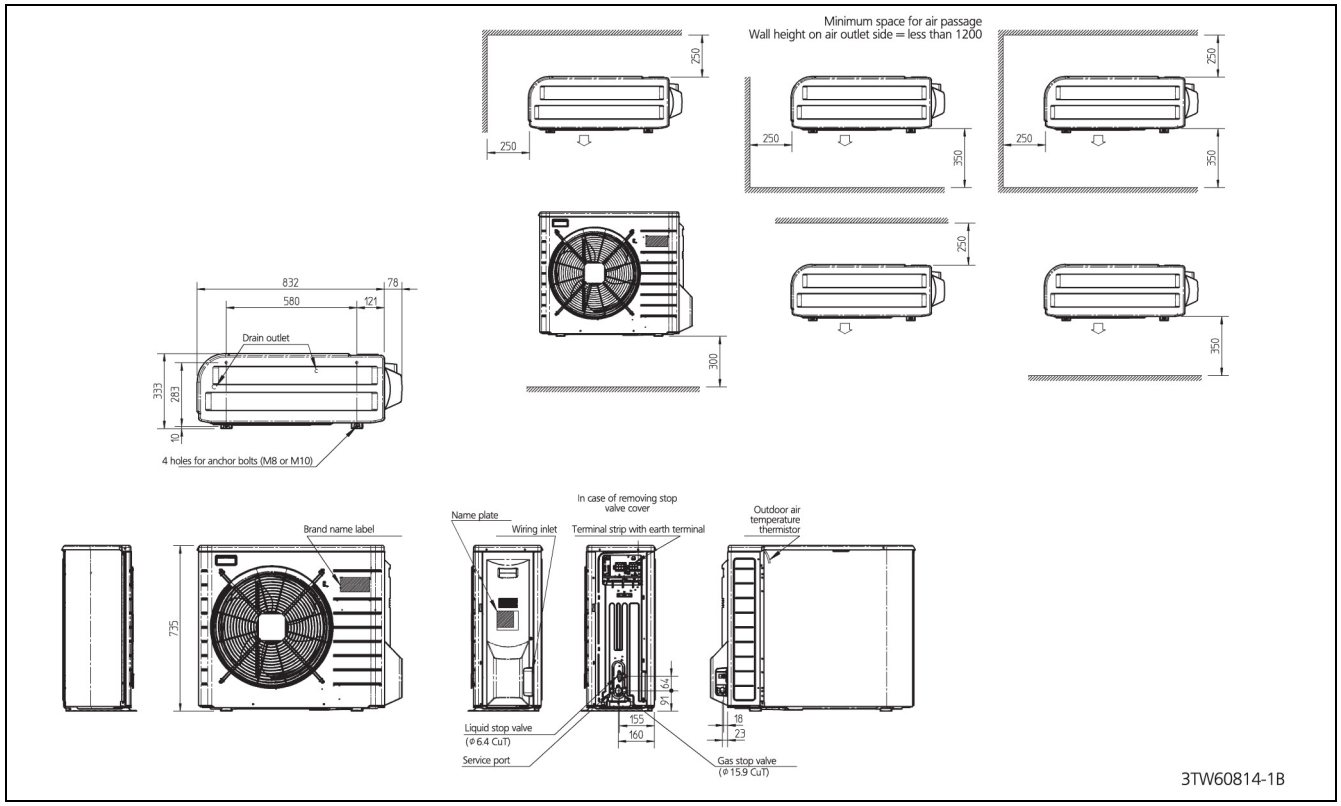
The table below contains the different components of the unit.

No.	Component
1	Gas pipe connection ø15.9 flare
2	Liquid pipe connection ø9.5 flare
3	Service port (in the unit)
4	Electronic and Grounding terminal M5 (in switch box)
5	Refrigerant piping intake
6	Power supply wiring intake (knock out hole ø34)
7	Control wiring intake (knock out hole ø27)
8	Drain outlet

1.6 ERLQ004~008CAV3: Outlook and Dimensions

Outlook and dimensions

The illustration below shows the outlook and the dimensions of the unit (mm).



Installation and service space

See installation manual.

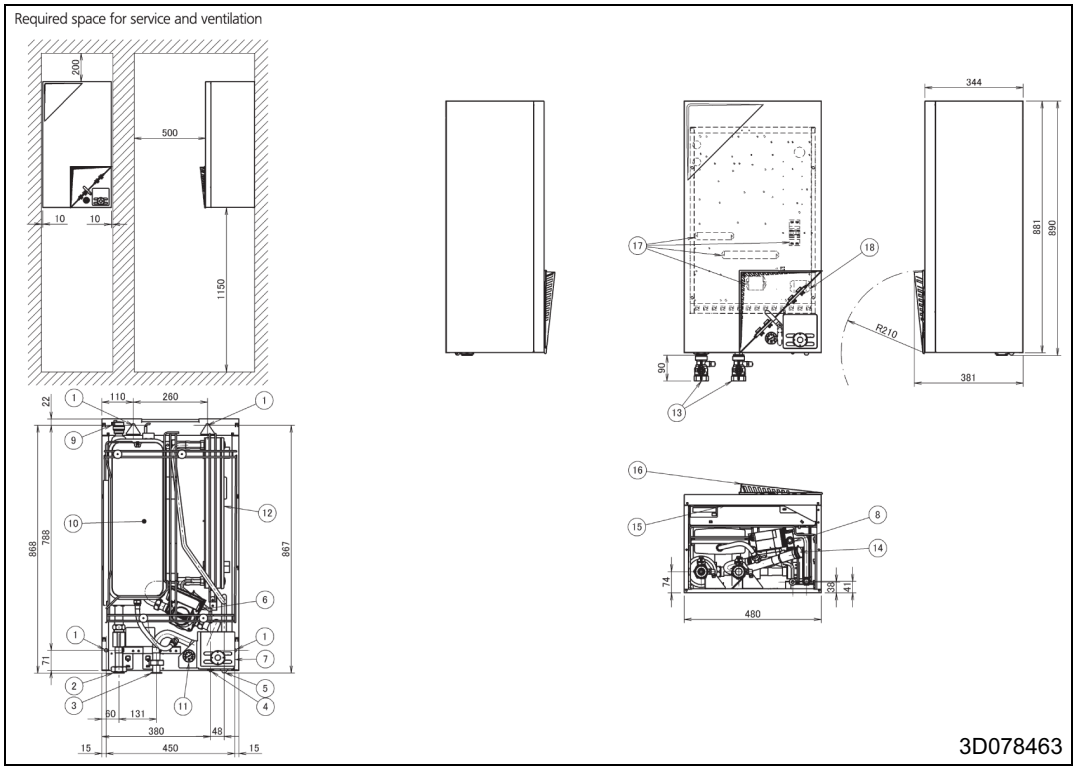
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1.7 EHBH/X004~016CA**: Outlook and Dimensions

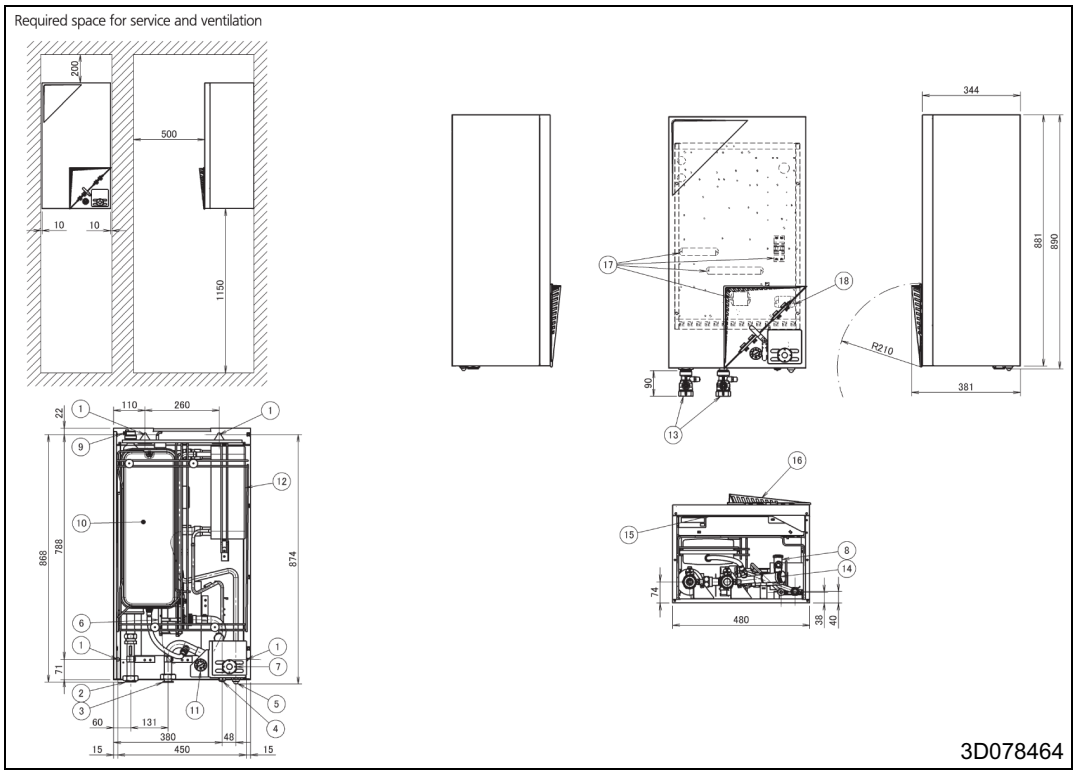
Outlook and dimensions

The illustrations below show the outlook and the dimensions of the unit (mm).

EHBH/X004~008C



EHBH/X016C



Installation and service space

See installation manual.

Components

The tables below contain the different components of the unit.

EHBH/X004~008C

No.	Component
1	Holes (ø12) for fixation to the wall
2	Water out connection (1-1/4" F BSP)
3	Water in connection (1-1/4" F BSP)
4	Refrigerant liquid connection ø6.35 (flare)
5	Refrigerant suction connection ø15.9 (flare)
6	Pump
7	User interface
8	Safety valve (pressure)
9	Air purge
10	Expansion vessel
11	Pressure gauge
12	Heat exchanger (refrigerant / water)
13	Shut off valve with drain / fill valve (1-1/4" F BSP) (included accessory)
14	Water filter
15	Power supply / communication wire entrance
16	Service door
17	Switchbox terminals
18	Switchbox terminals for domestic hot water tank (option)

EHBH/X016C

No.	Component
1	Holes (ø12) for fixation to the wall
2	Water out connection (1-1/4" F BSP)
3	Water in connection (1-1/4" F BSP)
4	Refrigerant liquid connection ø9.52 (flare)
5	Refrigerant suction connection ø15.9 (flare)
6	Pump
7	User interface
8	Safety valve (pressure)
9	Air purge
10	Expansion vessel

1

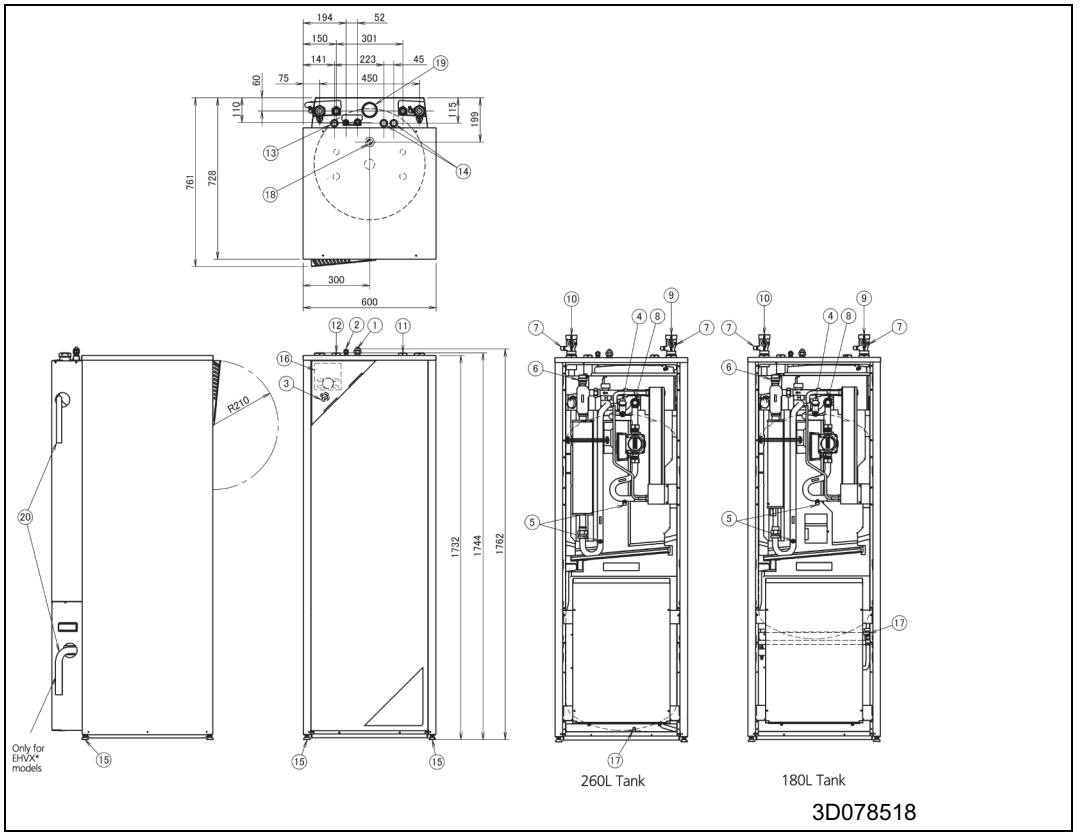
No.	Component
11	Pressure gauge
12	Heat exchanger (refrigerant / water)
13	Shut off valve with drain / fill valve (1-1/4" F BSP) (included accessory)
14	Water filter
15	Power supply / communication wire entrance
16	Service door
17	Switchbox terminals
18	Switchbox terminals for domestic hot water tank (option)

1.8 EHVH/X004~016CA**: Outlook and Dimensions

Outlook and dimensions

The illustrations below show the outlook and the dimensions of the unit (mm).

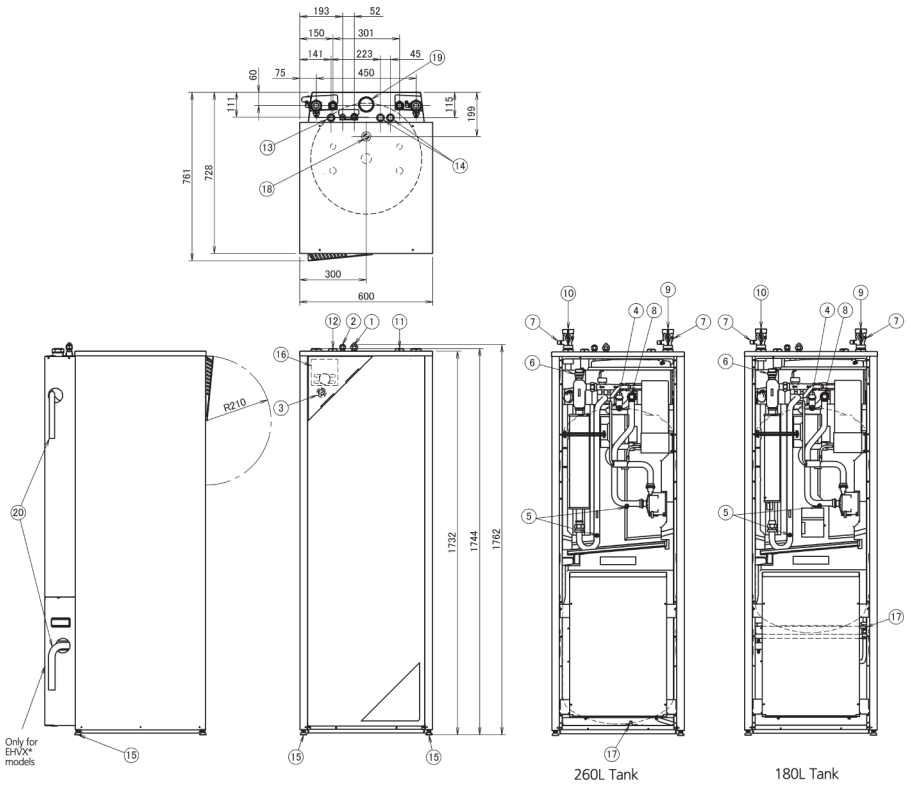
EHVH/X004~008C



Note: Typical field installation is according to local and national regulations. For examples, refer to installer reference guide.

1

EHVH/X016C



Note: Typical field installation is according to local and national regulations. For examples, refer to installer reference guide.

Installation and service space

See installation manual.

Components

The tables below contain the different components of the unit.

EHVH/X004~008C

No.	Component
1	Gas pipe connection ø15.9 flare
2	Liquid pipe connection ø6.35 flare
3	Pressure gauge
4	Safety valve (pressure)
5	Drain valve water circuit
6	Air purge
7	Shut off valve with fill valve (included accessory)
8	Water filter
9	Water in connection (1-1/4" F BSP)
10	Water out connection (1-1/4" F BSP)
11	Tank in connection (1" F BSP)

No.	Component
12	Tank out connection (1" F BSP)
13	Control wiring intake (ø24 mm)
14	Power supply wiring intake (ø24 mm)
15	Levelling feet
16	User interface (included accessory)
17	Drain valve tank circuit
18	Recirculation connection G 1/2” female
19	Knock-out hole for recirculation piping or option wiring (ø62 mm)
20	Drain outlet (unit + safety valve)

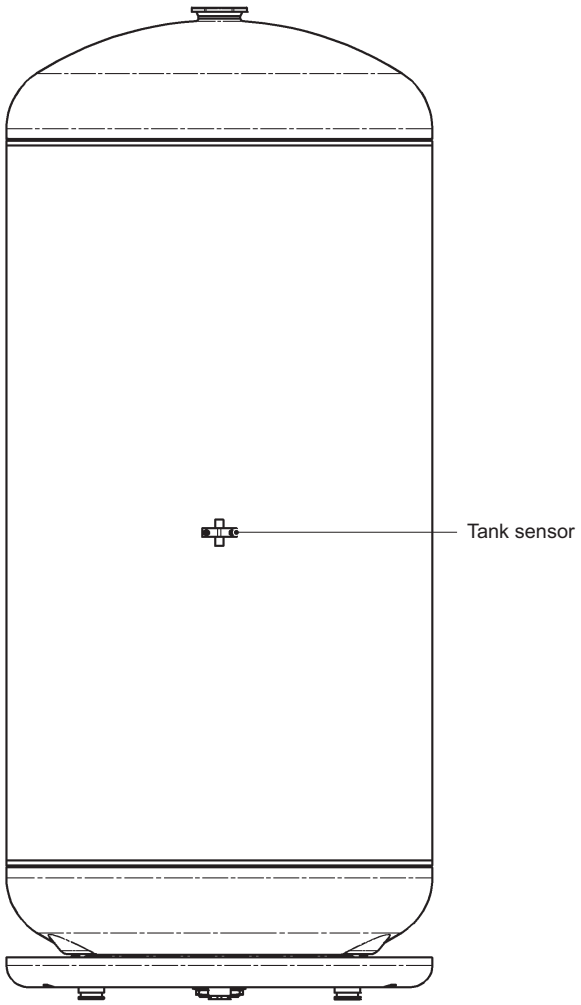
EHVH/X016C

No.	Component
1	Gas pipe connection ø15.9 flare
2	Liquid pipe connection ø9.52 flare
3	Pressure gauge
4	Safety valve (pressure)
5	Drain valve water circuit
6	Air purge
7	Shut off valve with fill valve (included accessory)
8	Water filter
9	Water in connection (1-1/4" F BSP)
10	Water out connection (1-1/4" F BSP)
11	Tank in connection (1" F BSP)
12	Tank out connection (1" F BSP)
13	Control wiring intake (ø24 mm)
14	Power supply wiring intake (ø24 mm)
15	Levelling feet
16	User interface (included accessory)
17	Drain valve tank circuit
18	Recirculation connection G 1/2” female
19	Knock-out hole for recirculation piping or option wiring (ø62 mm)
20	Drain outlet (unit + safety valve)

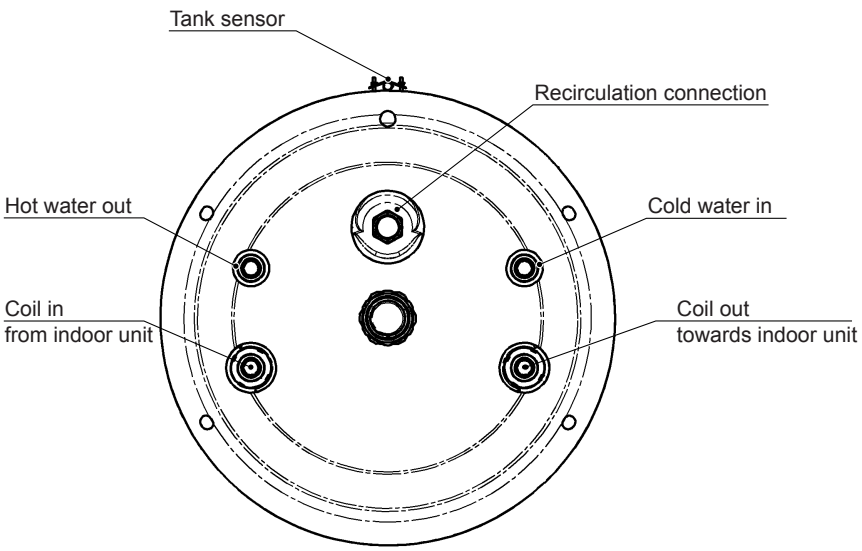
1

1.9 EKHTS 200/260 AC

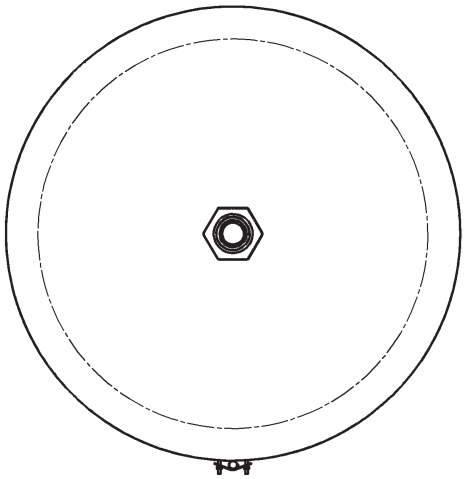
Front view



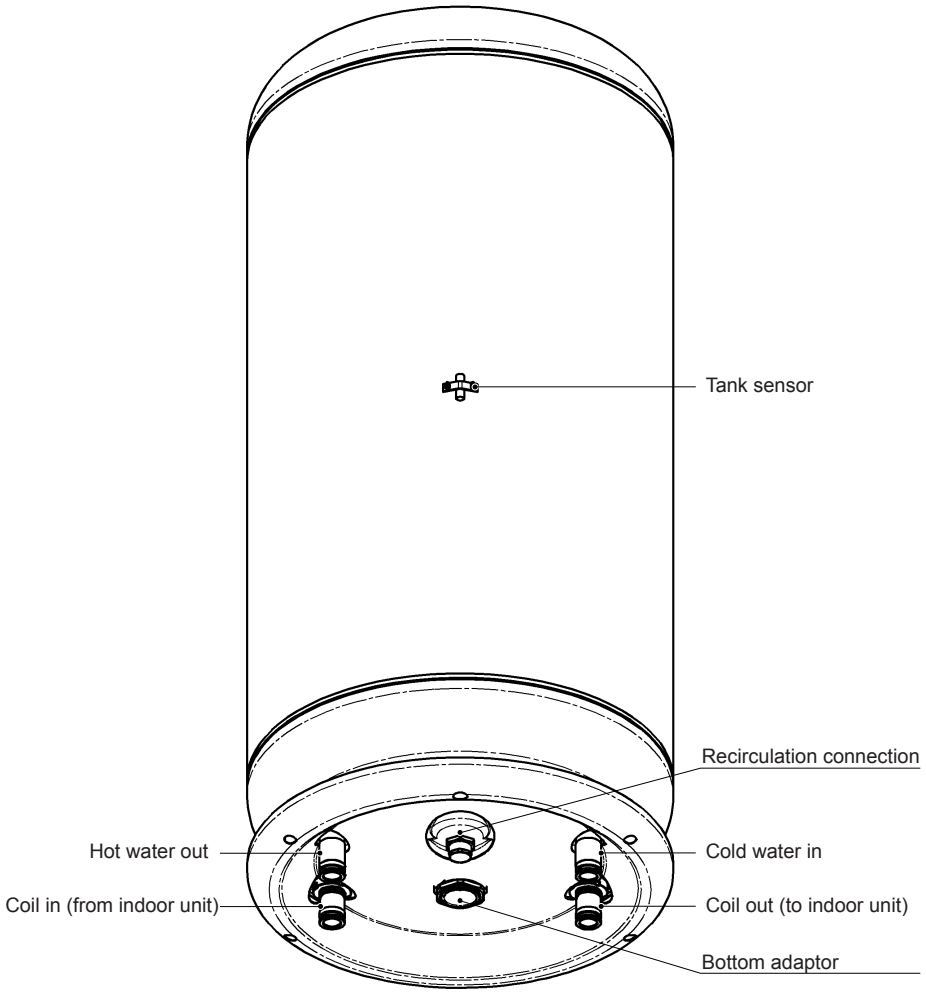
Bottom view



Top view



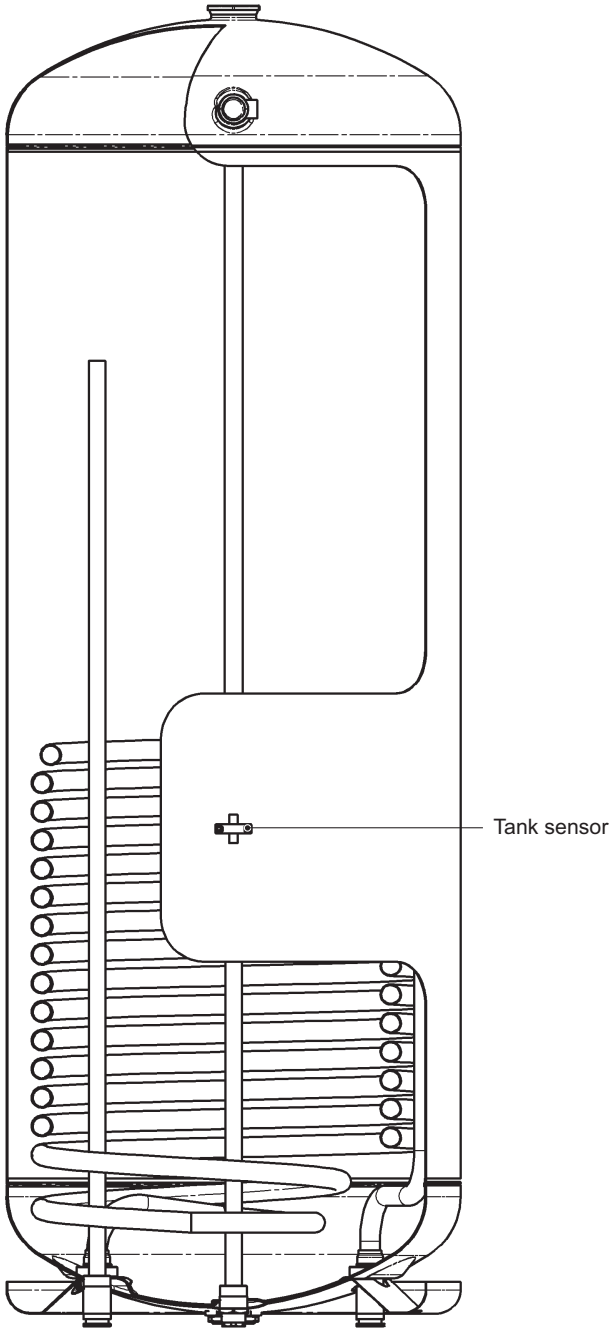
Worm's-eye view



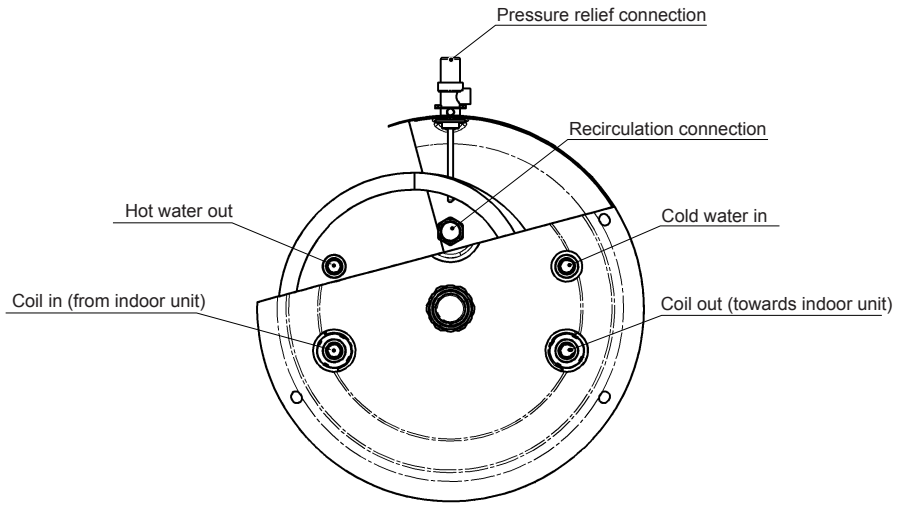
1

1.10 EKHTSU 200/260 AC

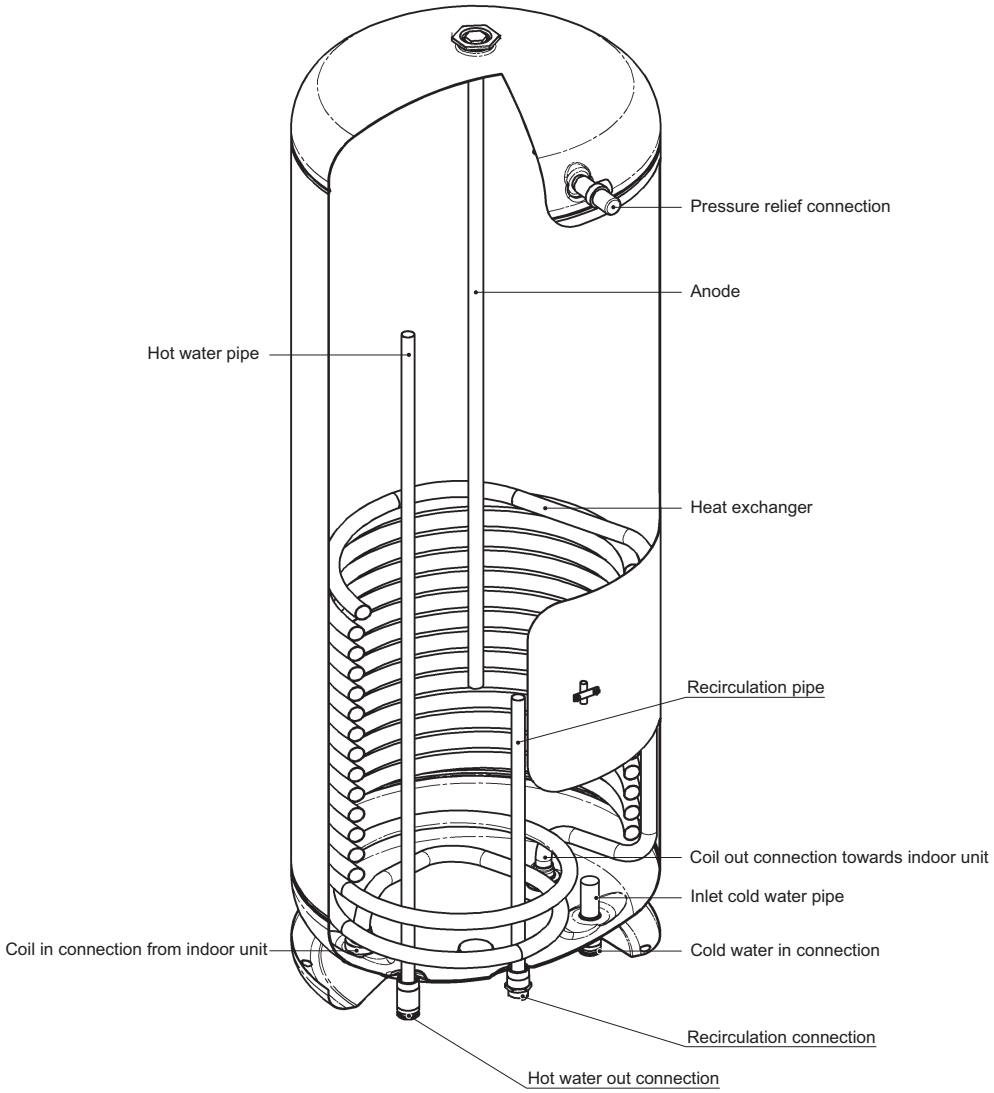
Front view



Bottom view



Bird's-eye view



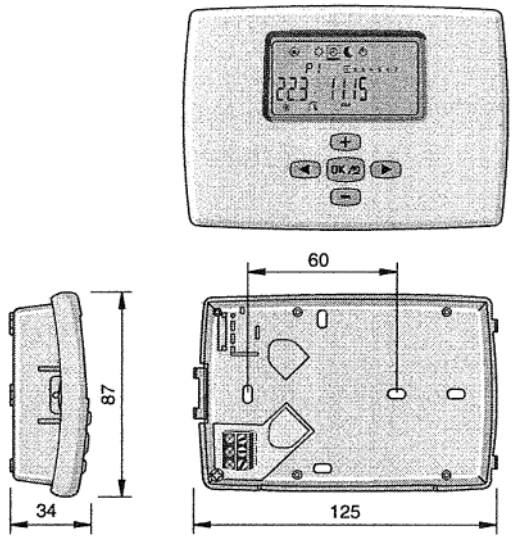
1

1.11 EKRTR / EKRTW: Outlook and Dimensions

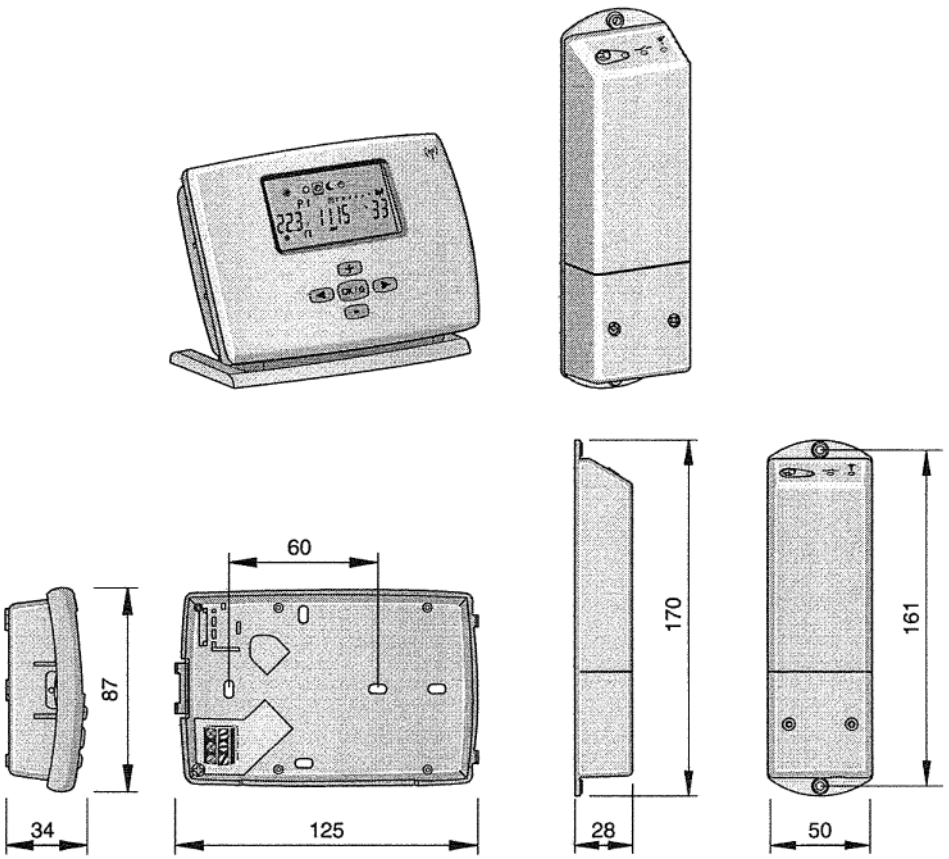
Outlook and dimensions

The illustrations below shows the outlook and the dimensions of the units (mm).

EKRTW



EKRTR



2 Specifications

2.1 What Is in This Chapter?

All technical and electrical specifications can be found back in the corresponding databooks which are available in the document library on extranet.

You can also find this information back on the Installer Reference Guide, which is delivered with the unit on CD and which is added to this Service Manual in Appendix. See page 92-95 of the Appendix for technical and electrical specifications.

1

3 Functional Diagrams

3.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Overview complete system
- Electrical connection diagram
- Pipe connection diameters.

Functional diagrams

This chapter contains the following functional diagrams:

Topic	See page
3.2–Functional Diagrams Outdoor Unit and Indoor Unit	1–24
3.3–Electrical Connection Diagram	1–25

1

3.2 Functional Diagrams Outdoor Unit and Indoor Unit

See Installer Reference Guide (delivered on CD with every unit) in Appendix of this Service Manual on page 80.

3.3 Electrical Connection Diagram

The electrical connection diagram can be found in the Installer Reference Guide (delivered on CD with the unit) which can be found in Appendix of this Service Manual on page 89-91.

1

4 Piping Diagrams

4.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Piping diagrams

Piping diagrams

This chapter contains the following piping diagrams:

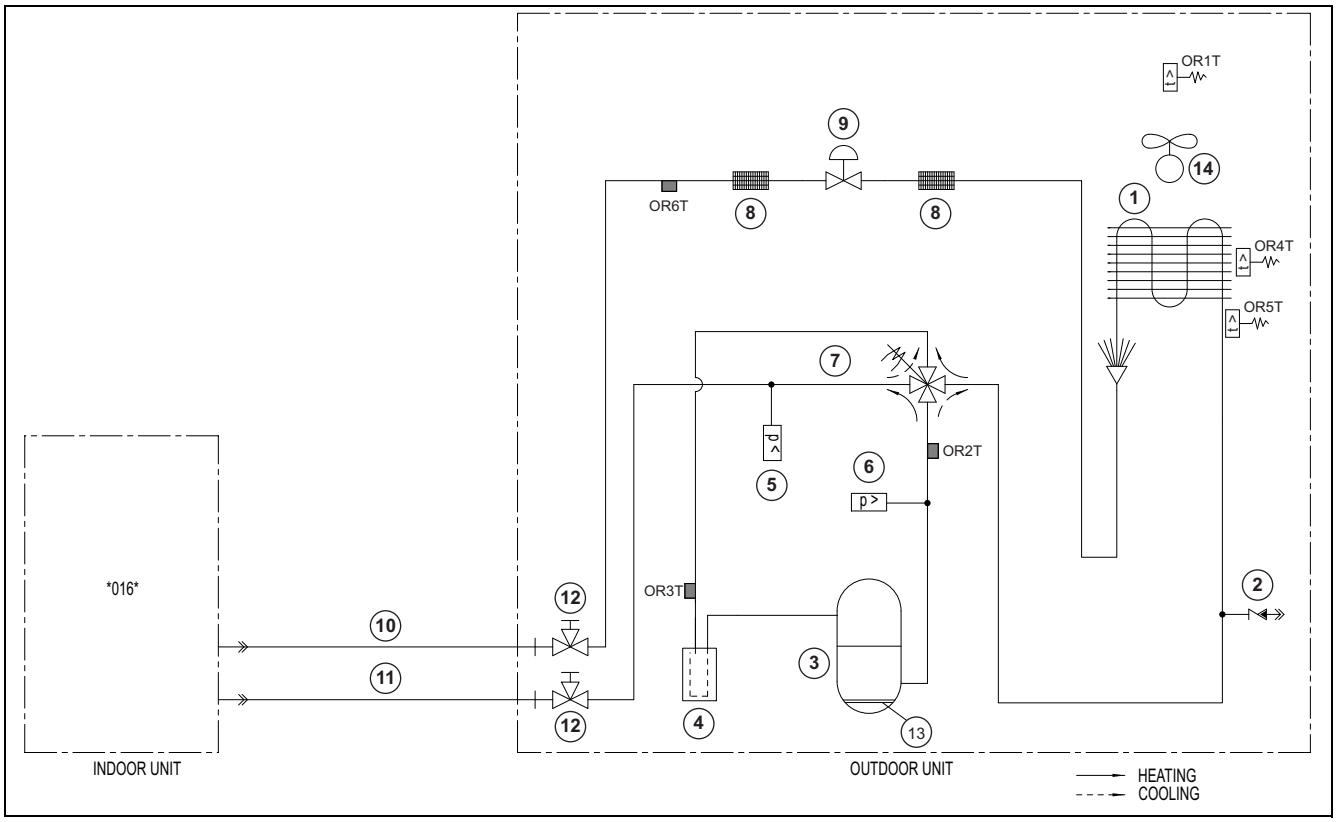
Topic	See page
4.2–Piping Diagram for ERHQ011~016BAV3	1–28
4.3–Piping Diagram for ERHQ011~016BAW1(8)	1–30
4.4–Piping Diagram for ERLQ011~016CA(V3/W1)	1–32
4.5–Piping Diagram for ERLQ004~008CA	1–34
4.6–Piping Diagram for EHBH/X & EHVH/X-CA	1–35

Note

For accurate piping diagrams, we refer to the corresponding databooks which are available in the document library on extranet.

1

4.2 Piping Diagram for ERHQ011~016BAV3



Components

The table below contains the different components of the functional diagrams.

No.	Name	
1	Outdoor heat exchanger	-
2	Service port 5/16”	-
3	Compressor	M1C
4	Accumulator	-
5	Pressure sensor	S1NPH
6	High pressure switch	S1PH
7	4-way valve	Y1S
8	Filter	-
9	Electronic expansion valve	Y1E
10	Field piping Ø9.5 C	-
11	Field piping Ø15.9 C	-
12	Stop valve	-
13	Crank case heater	E1AC
14	Outdoor fan	M1F-M2F
OR1T	Thermistor (AIR)	
OR2T	Thermistor (Discharge)	
OR3T	Thermistor (suction)	
OR4T	Thermistor (heat exchanger)	
OR5T	Thermistor (heat exchanger middle)	
OR6T	Thermistor (liquid)	

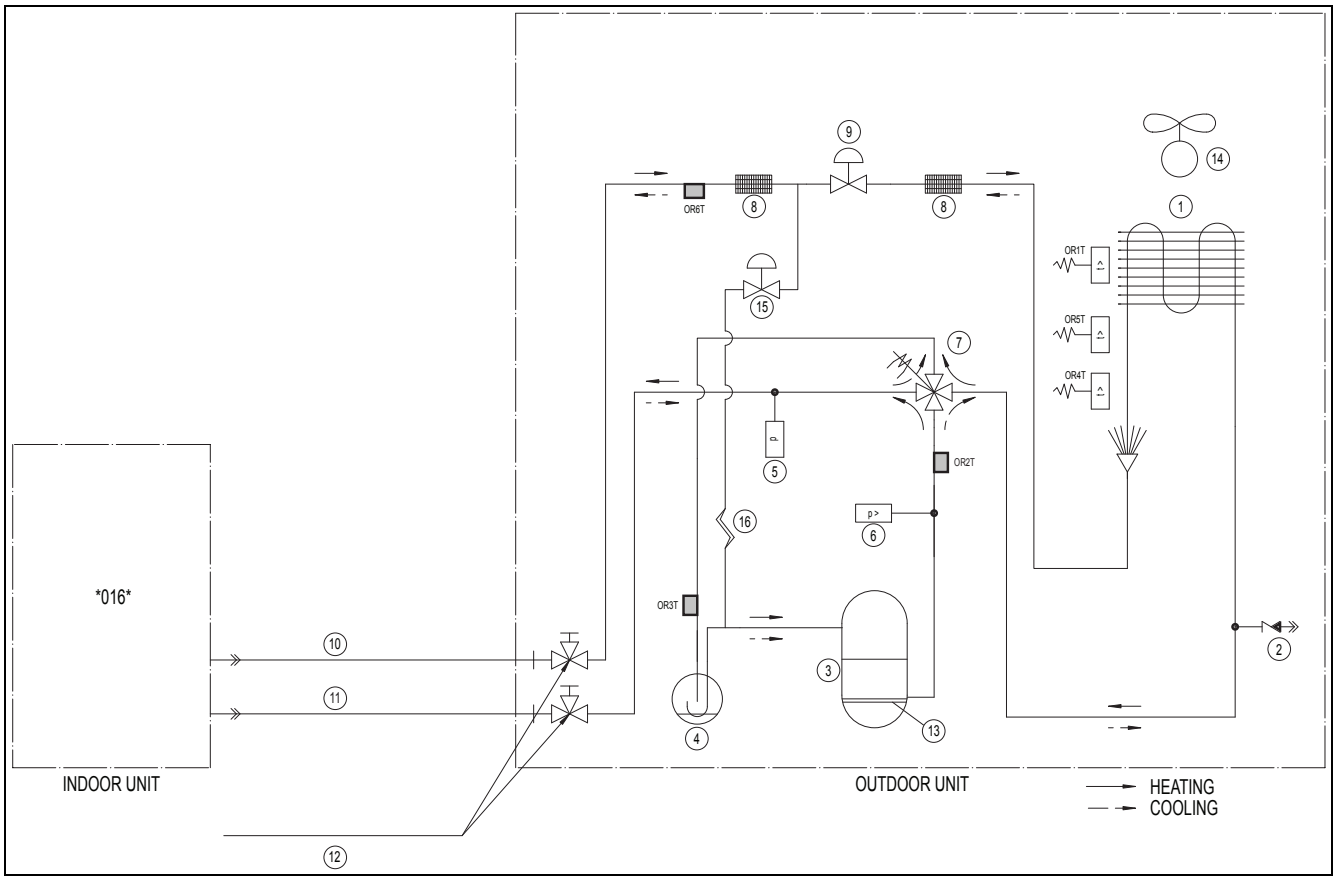
Symbols

The table below contains the different symbols used on the functional diagrams.

Symbol	Name
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

4.3 Piping Diagram for ERHQ011~016BAW1(8)



Components

The table below contains the different components of the functional diagrams.

No.	Name	
1	Heat exchanger	-
2	Service port 5/16”	-
3	Compressor	M1C
4	Accumulator	-
5	Pressure sensor	S1NPH
6	High pressure switch	S1PH
7	4-way valve	Y1S
8	Filter	-
9	Electronic expansion valve	Y1E
10	Field piping Ø9.5 C	-
11	Field piping Ø15.9 C	-
12	Stop valve (with service port 5/16” flare)	-
13	Crank case heater	E1HC
14	Fan motor	M1F-M2F
15	Injection valve	Y3S
16	Capillary tube	-

No.	Name	
OR1T	Thermistor (AIR)	
OR2T	Thermistor (Discharge)	
OR3T	Thermistor (suction)	
OR4T	Thermistor (heat exchanger)	
OR5T	Thermistor (heat exchanger middle)	
OR6T	Thermistor (liquid)	

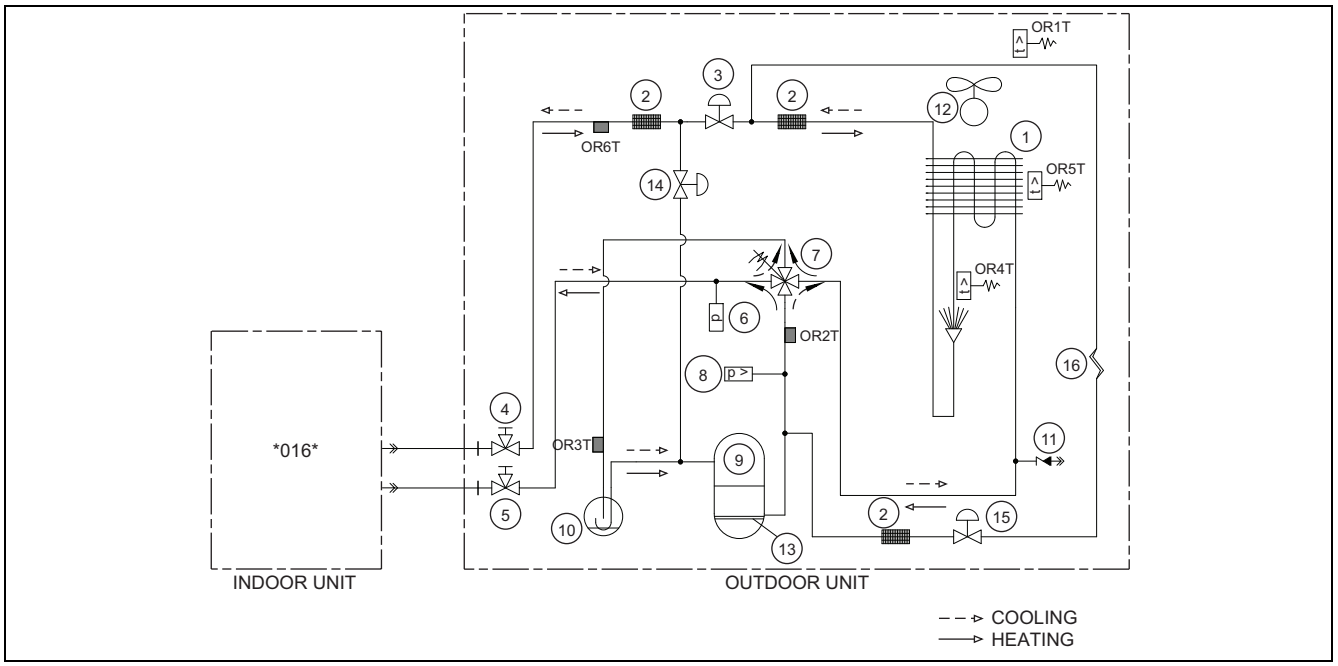
Symbols

The table below contains the different symbols used on the functional diagrams.

Symbol	Name
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

1

4.4 Piping Diagram for ERLQ011~016CA(V3/W1)



Components

The table below contains the different components of the functional diagrams.

No.	Name	
1	Heat exchanger	-
2	Filter	-
3	Electronic expansion valve	Y1E
4	Stop valve (with service port 5/16” flare)	-
5	Stop valve (with service port 5/16” flare)	-
6	Pressure sensor	-
7	4-way valve	Y1S
8	High pressure switch	-
9	Compressor	M1C
10	Accumulator	-
11	Service port 5/16”	-
12	Outdoor fan	M1F-M2F
13	Crank case heater	E1HC
14	Injection electronic expansion valve	Y3E
15	Solenoid valve (hot gas pass)	Y3S
16	Capillary tube	-
OR1T	Thermistor (AIR)	
OR2T	Thermistor (Discharge)	
OR3T	Thermistor (suction)	
OR4T	Thermistor (heat exchanger)	
OR5T	Thermistor (heat exchanger middle)	
OR6T	Thermistor (liquid)	

1

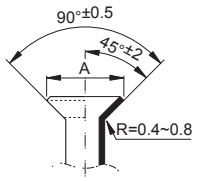
Symbols

The table below contains the different symbols used on the functional diagrams.

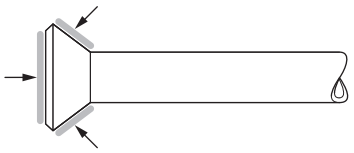
Symbol	Name
	Check valve
	Flare connection
	Screw connection
	Flange connection
	Pinched pipe
	Spinned pipe

Caution for flare connection

- Refer to table below for correct flare dimensions and tightening torques. Too high tightening force may cause refrigerant leak because of flare cracking:

Piping size	Flare nut tightening torque	A dimensions for processing flares (mm)	Flare shape
Ø6.4	14.2~17.2 N•m (144~176 kgf•cm)	8.7~9.1	
Ø9.5	32.7~39.9 N•m (333~407 kgf•cm)	12.8~13.2	
Ø12.7	49.5~60.3 N•m (504~616 kgf•cm)	16.2~16.6	
Ø15.9	61.8~75.4 N•m (630~770 kgf•cm)	19.3~19.7	
Ø19.1	97.2~118.6 N•m (989.8~1208 kgf•cm)	23.6~24.0	

- When connecting the flare nut, apply refrigerating machine oil to the flare (inside and outside) and first screw the nut 3 or 4 turns by hand. Coat the indicated surfaces using ether or ester oil:



- After completing the installation, carry out an inspection of the piping connections by pressure test using nitrogen.

1

4.5 Piping Diagram for ERLQ004~008CA

The piping diagram for ERLQ-CA GBS can be found back in the Installer Reference Guide (delivered with every unit on CD) which can be found in Appendix of this Service Manual on page 81.

4.6 Piping Diagram for EHBH/X & EHVH/X-CA

The piping diagram for EHB & EHV-CA can be found back in the Installer Reference Guide (delivered with every unit on CD) which can be found in Appendix of this Service Manual on page 82.

1

5 Switch Box Layout

5.1 What Is in This Chapter?

Introduction

This chapter shows the switch box components.

Altherma

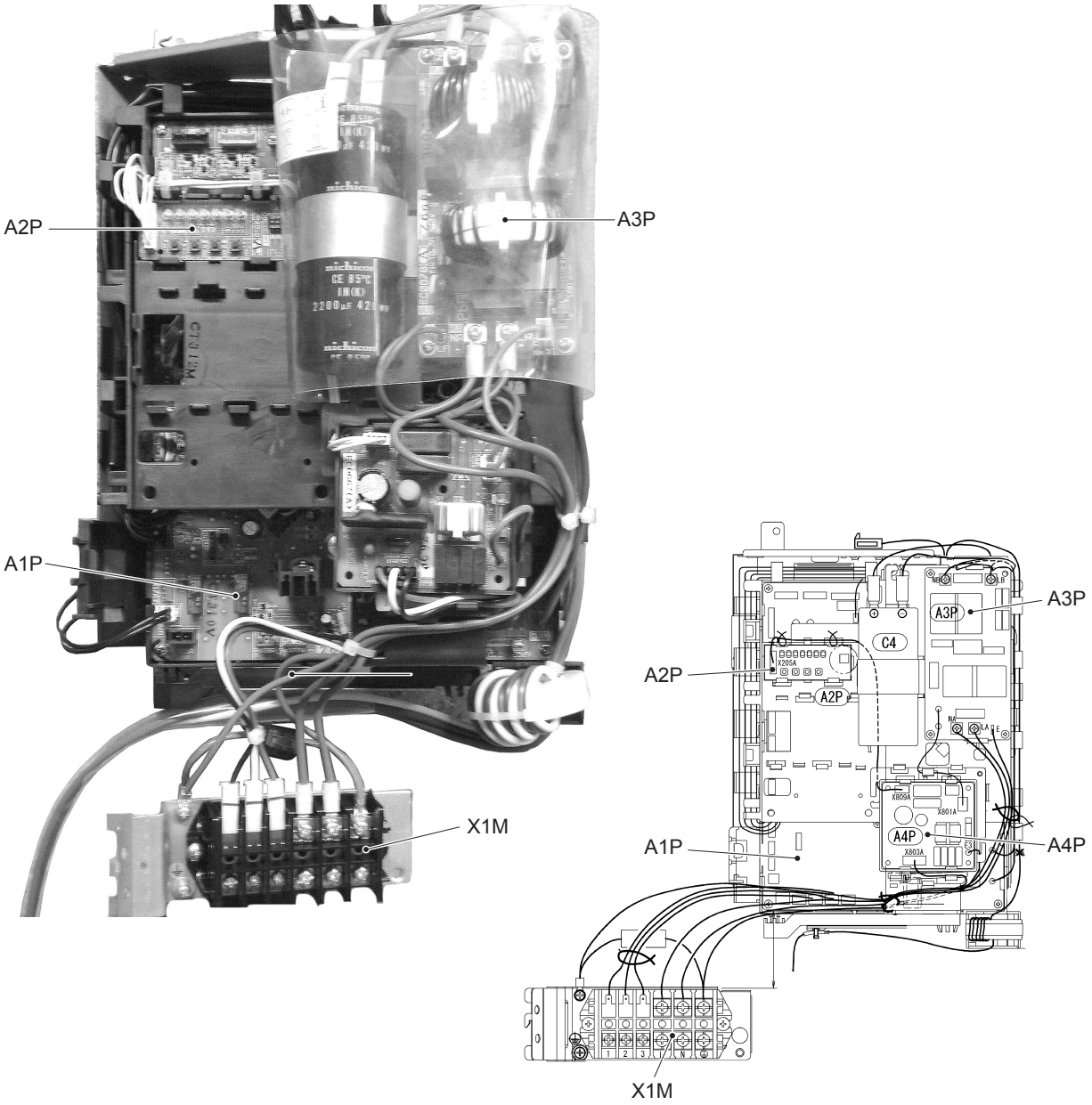
This chapter contains the following switch box layouts:

Topic	See page
5.2–Switch Box Layout for ERHQ011~016BAV3	1–38
5.3–Switch Box Layout for ERHQ011~016BAW1	1–39
5.4–Switch Box Layout for EHVH/X-CA	1–41
5.5–Switch Box Layout for EHBH/X-CA	1–42

1

5.2 Switch Box Layout for ERHQ011~016BAV3

The illustration below shows the outdoor switch box layout:

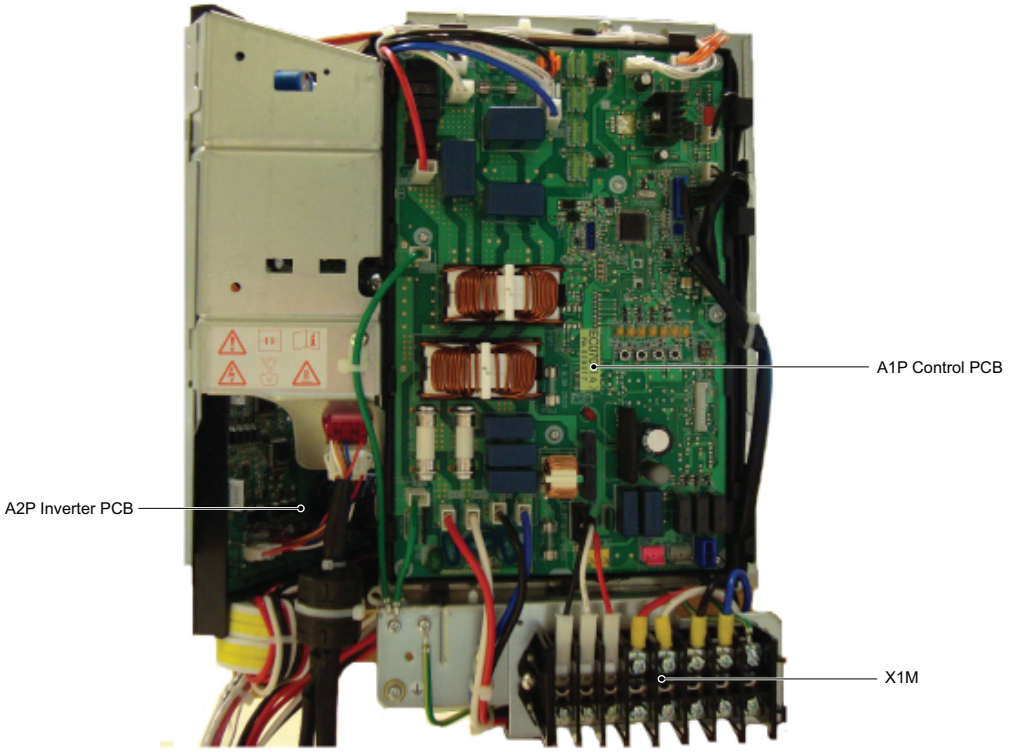


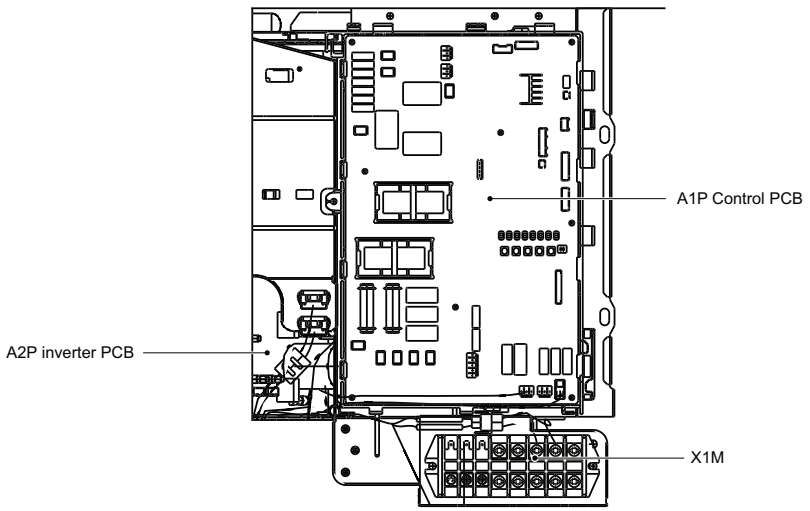
Item	Description
A1P	Printed circuit board (control)
A2P	Printed circuit board (service)
A3P	Printed circuit board (noise filter)
A4P	Printed circuit board (communication)
X1M	Terminal strip

5.3 Switch Box Layout for ERHQ011~016BAW1

FRONT

The illustration below shows the outdoor switch box layout:



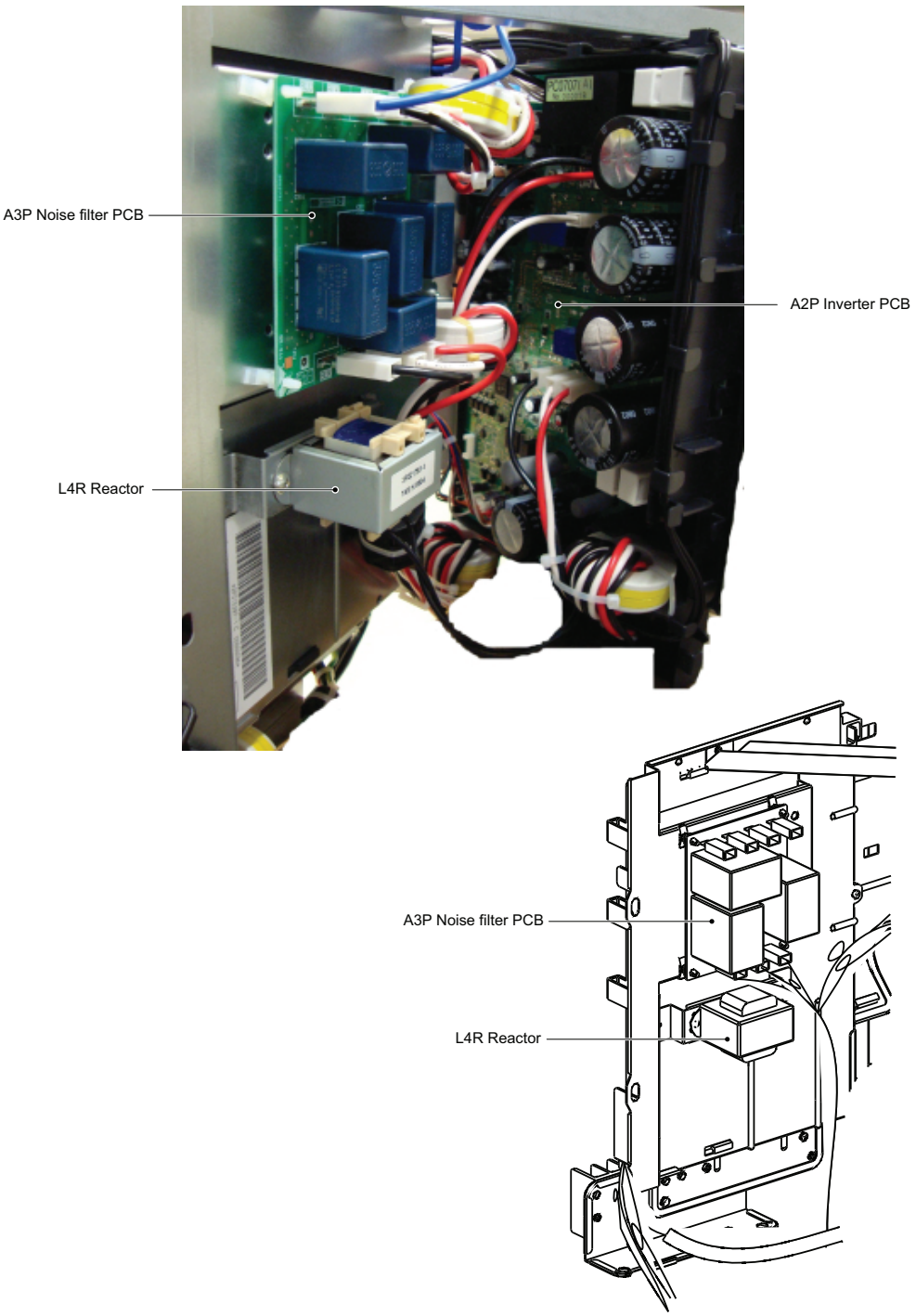


Item	Description
A1P	Printed circuit board (control)
A2P	Printed circuit board (inverter)
X1M	Terminal strip

1

BACK

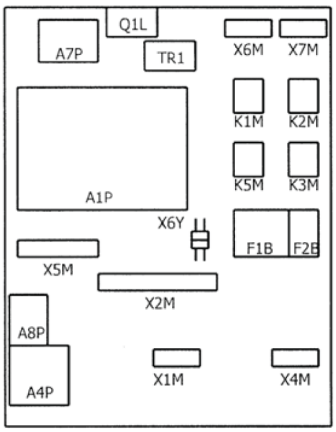
The illustration below shows the outdoor switch box layout:



Item	Description
A2P	Printed circuit board (inverter)
A3P	Printed circuit board (noise filter)
L4R	Reactor

5.4 Switch Box Layout for EHVH/X-CA

The illustration below shows the switch box layout:



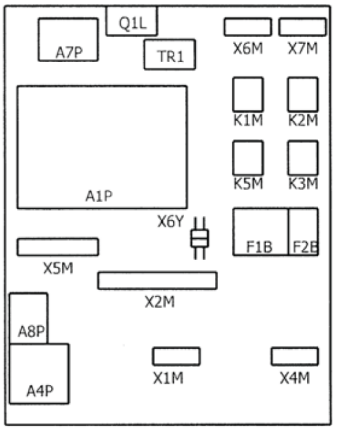
Item	Description
A1P	Main PCB
A4P	Digital I/O PCB (*)
A4P	Receiver PCB (wireless ON/OFF thermostat) (*)
A7P	Pump driver PCB (only for *16*)
A8P	Demand PCB (*)
F1B	Overcurrent fuse backup heater
F2B	Overcurrent fuse booster heater (*)
K1M, K2M	Contactor backup heater
K3M	Contactor booster heater (*)
K5M	Safety contactor BUH (only *9W)
Q1L	Thermal protector backup heater
TR1	Power supply transformer
X*M	Terminal strip
X*Y	Connector

(*): Optional

1

5.5 Switch Box Layout for EHBH/X-CA

The illustration below shows the switch box layout:



Item	Description
A1P	Main PCB
A4P	Digital I/O PCB (*)
A4P	Receiver PCB (wireless ON/OFF thermostat) (*)
A7P	Pump driver PCB (only for *16*)
A8P	Demand PCB (*)
F1B	Overcurrent fuse backup heater
F2B	Overcurrent fuse booster heater (*)
K1M, K2M	Contactor backup heater
K3M	Contactor booster heater (*)
K5M	Safety contactor BUH (only *9W)
Q1L	Thermal protector backup heater
TR1	Power supply transformer
X*M	Terminal strip
X*Y	Connector

(*): Optional

6 Wiring Diagrams

6.1 What Is in This Chapter?

Introduction

This chapter contains the wiring diagrams of the outdoor, hydro-box and domestic hot water tank.

Altherma

This chapter contains the following wiring diagrams:

Topic	See page
6.2–Wiring Diagram for EHBH/X-CA & EHVH/X-CA	1–44
6.3–Wiring Diagram for ERHQ011~016BAV3	1–45
6.4–Wiring Diagram for ERLQ011~016BAV3	1–47
6.5–Wiring Diagram for ERLQ011~016CAV3	1–49
6.6–Wiring Diagram for ERHQ011~016BAW1	1–51
6.7–Wiring Diagram for ERLQ011~016BAW1	1–53
6.8–Wiring Diagram for ERLQ011~016CAW1	1–55
6.9–Wiring Diagram for ERLQ004~008CAV3	1–57
6.10–Wiring Diagram for EKRTR / EKRTW	1–58

Note

All wiring diagrams can be found back in the corresponding databooks which are available in the document library on extranet.

1

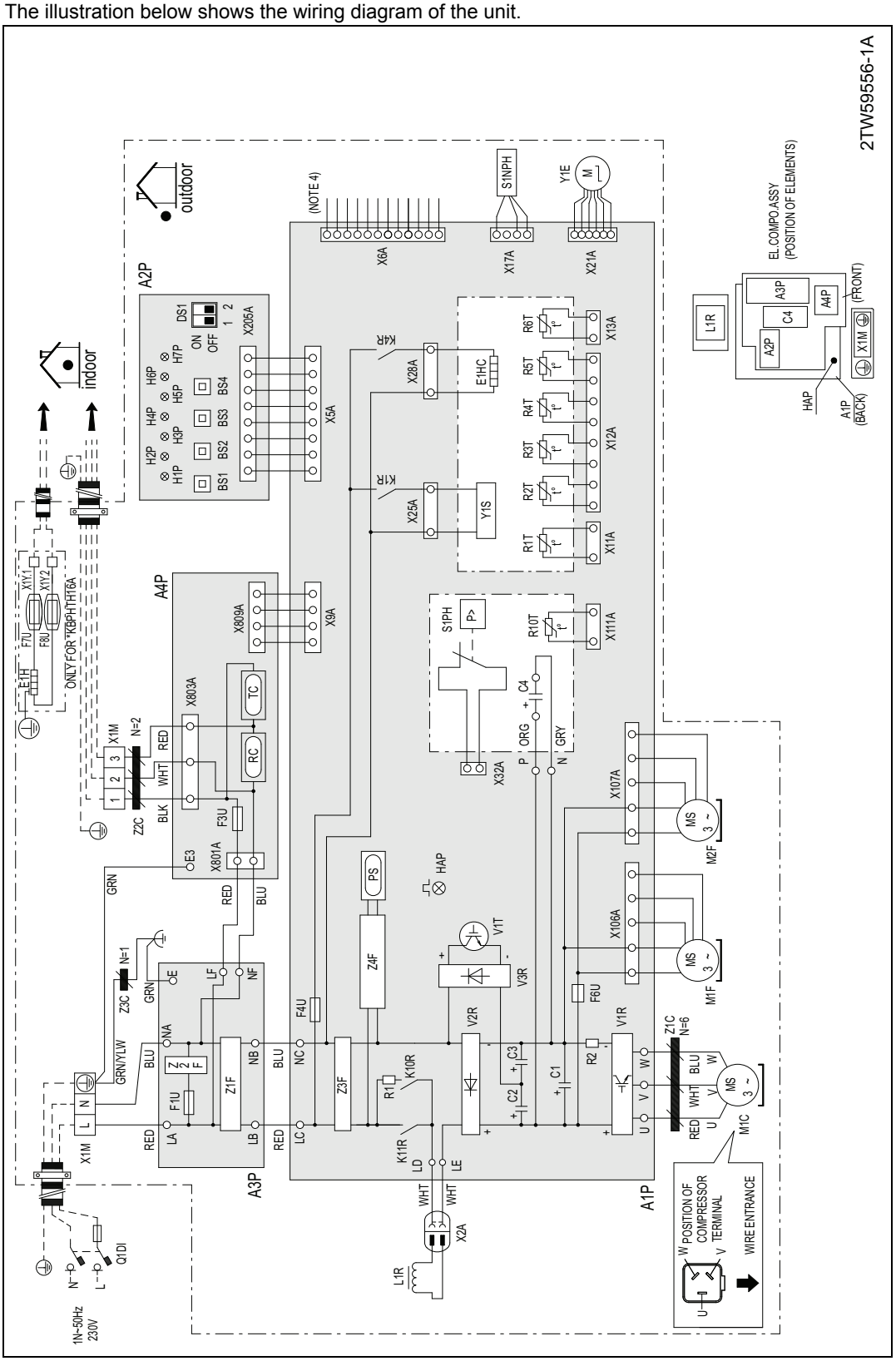
6.2 Wiring Diagram for EHBH/X-CA & EHVH/X-CA

The wiring diagram for EHB & EHV-CA can be found back in the Installer Reference Guide (delivered with the unit on CD) which can be found in Appendix of this Service Manual on page 86-91.

6.3 Wiring Diagram for ERHQ011~016BAV3

Wiring diagram

The illustration below shows the wiring diagram of the unit.



1

Legend

A1P	Printed circuit board (main)	Q1DI	Earth leakage circuit breaker
A2P	Printed circuit board (inverter)	R1	Resistor
A3P	Printed circuit board (noise filter)	R2	Resistor
A4P	Printed circuit board	R1T	Thermistor (air)
BS1~BS4	Push button switch	R2T	Thermistor (discharge)
C1~C4	Capacitor	R3T	Thermistor (suction)
DS1	Dip switch	R4T	Thermistor (heat exchanger)
E1H	Bottomplate heater	R5T	Thermistor (heat exchanger middle)
E1HC	Crankcase heater	R6T	Thermistor (liquid)
F1U, F3U, F4U	Fuse (T 6.3A / 250V)	RC	Signal receiver circuit
F6U	Fuse (T 5.0A / 250V)	R10T	Thermistor (fin)
F7U, F8U	Fuse (F 1.0A / 250V)	S1NPH	Pressure sensor
H1P~7P (A2P)	Light emitting diode (serv. monitor-orange)	S1PH	Pressure switch (high)
	[H2P] prepare test - - - - - - - - - - - -flickering	TC	Signal transmission circuit
	[H2P] malfunction detection- - - - -light up	V1R	Power module
HAP (A1P)	Light emitting diode (service monitor green)	V2R, V3R	Diode module
K1R	Magnetic relay (Y1S)	V1T	IGBT
K4R	Magnetic relay (E1HC)	X1M	Terminal strip (power supply)
K10R	Magnetic relay	Y1E	Electronic expansion valve
K11R	Magnetic relay	Y1S	Solenoid valve (4 way valve)
L1R	Reactor	Z1C~Z3C	Noise filter (ferrity core)
M1C	Motor (compressor)	Z1F~Z4F	Noise filter
M1F	Motor (fan - upper)		
M2F	Motor (fan - lower)	Optional connector	
PS	Switching power supply	X1Y	Connector

Notes

1 This wiring diagram only applies to the outdoor unit.

2 L Live N Neutral

Field wiring

3 Terminal strip Connector

Connection Protective earth (screw)

Connector Noiseless earth

Terminal

4 Refer to the option manual for connecting wiring to X6A.

5 Refer to the “wiring diagram sticker” (on back of front plate) on how to use BS1~BS4 and DS1 switch.

6 Do not operate the unit by short-circuiting protection device S1PH.

7 Colours: BLU = Blue, BRN = Brown, GRN = Green, RED = Red, WHT = White, YLW = Yellow, ORG = Orange, BLK = Black

8 Confirm the method of setting the selector switches (DS1) by service manual. Factory setting of all switches: ‘OFF’.

Symbols

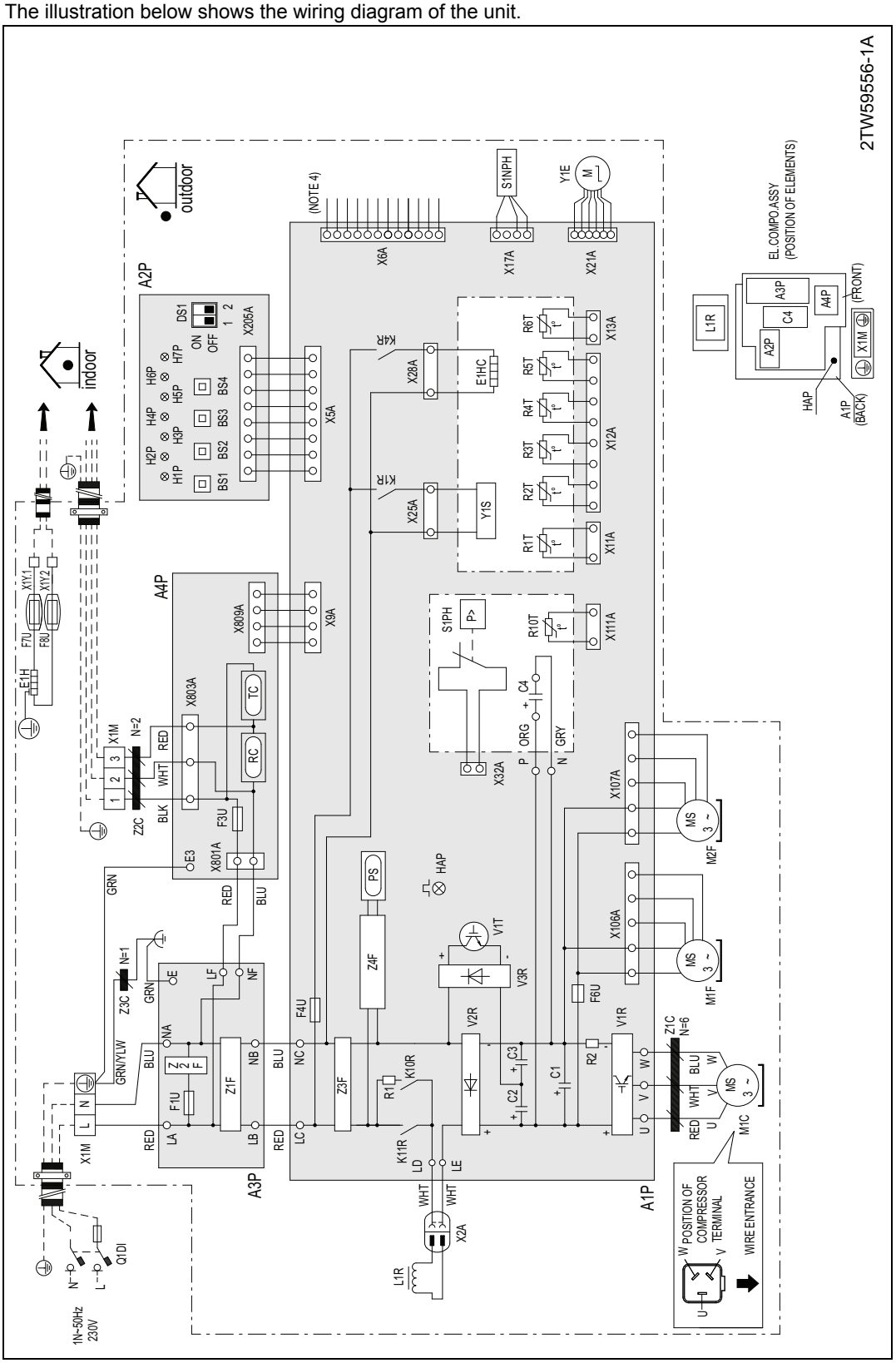
Wiring dependent on model Field wiring Option

Field wiring PCB Wire colour

6.4 Wiring Diagram for ERLQ011~016BAV3

Wiring diagram

The illustration below shows the wiring diagram of the unit.



1

Legend

A1P	Printed circuit board (main)	Q1DI	Earth leakage circuit breaker
A2P	Printed circuit board (inverter)	R1	Resistor
A3P	Printed circuit board (noise filter)	R2	Resistor
A4P	Printed circuit board	R1T	Thermistor (air)
BS1~BS4	Push button switch	R2T	Thermistor (discharge)
C1~C4	Capacitor	R3T	Thermistor (suction)
DS1	Dip switch	R4T	Thermistor (heat exchanger)
E1H	Bottomplate heater	R5T	Thermistor (heat exchanger middle)
E1HC	Crankcase heater	R6T	Thermistor (liquid)
F1U, F3U, F4U	Fuse (T 6.3A / 250V)	RC	Signal receiver circuit
F6U	Fuse (T 5.0A / 250V)	R10T	Thermistor (fin)
F7U, F8U	Fuse (F 1.0A / 250V)	S1NPH	Pressure sensor
H1P~7P (A2P)	Light emitting diode (serv. monitor-orange)	S1PH	Pressure switch (high)
	[H2P] prepare test - - - - - - - - - - - -flickering	TC	Signal transmission circuit
	[H2P] malfunction detection- - - - -light up	V1R	Power module
HAP (A1P)	Light emitting diode (service monitor green)	V2R, V3R	Diode module
K1R	Magnetic relay (Y1S)	V1T	IGBT
K4R	Magnetic relay (E1HC)	X1M	Terminal strip (power supply)
K10R	Magnetic relay	Y1E	Electronic expansion valve
K11R	Magnetic relay	Y1S	Solenoid valve (4 way valve)
L1R	Reactor	Z1C~Z3C	Noise filter (ferrity core)
M1C	Motor (compressor)	Z1F~Z4F	Noise filter
M1F	Motor (fan - upper)		
M2F	Motor (fan - lower)	Optional connector	
PS	Switching power supply	X1Y	Connector

Notes

1 This wiring diagram only applies to the outdoor unit.

2 L Live N Neutral

Field wiring

3 Terminal strip Connector

Connection Protective earth (screw)

Connector Noiseless earth

Terminal

4 Refer to the option manual for connecting wiring to X6A.

5 Refer to the “wiring diagram sticker” (on back of front plate) on how to use BS1~BS4 and DS1 switch.

6 Do not operate the unit by short-circuiting protection device S1PH.

7 Colours: BLU = Blue, BRN = Brown, GRN = Green, RED = Red, WHT = White, YLW = Yellow, ORG = Orange, BLK = Black

8 Confirm the method of setting the selector switches (DS1) by service manual. Factory setting of all switches: ‘OFF’.

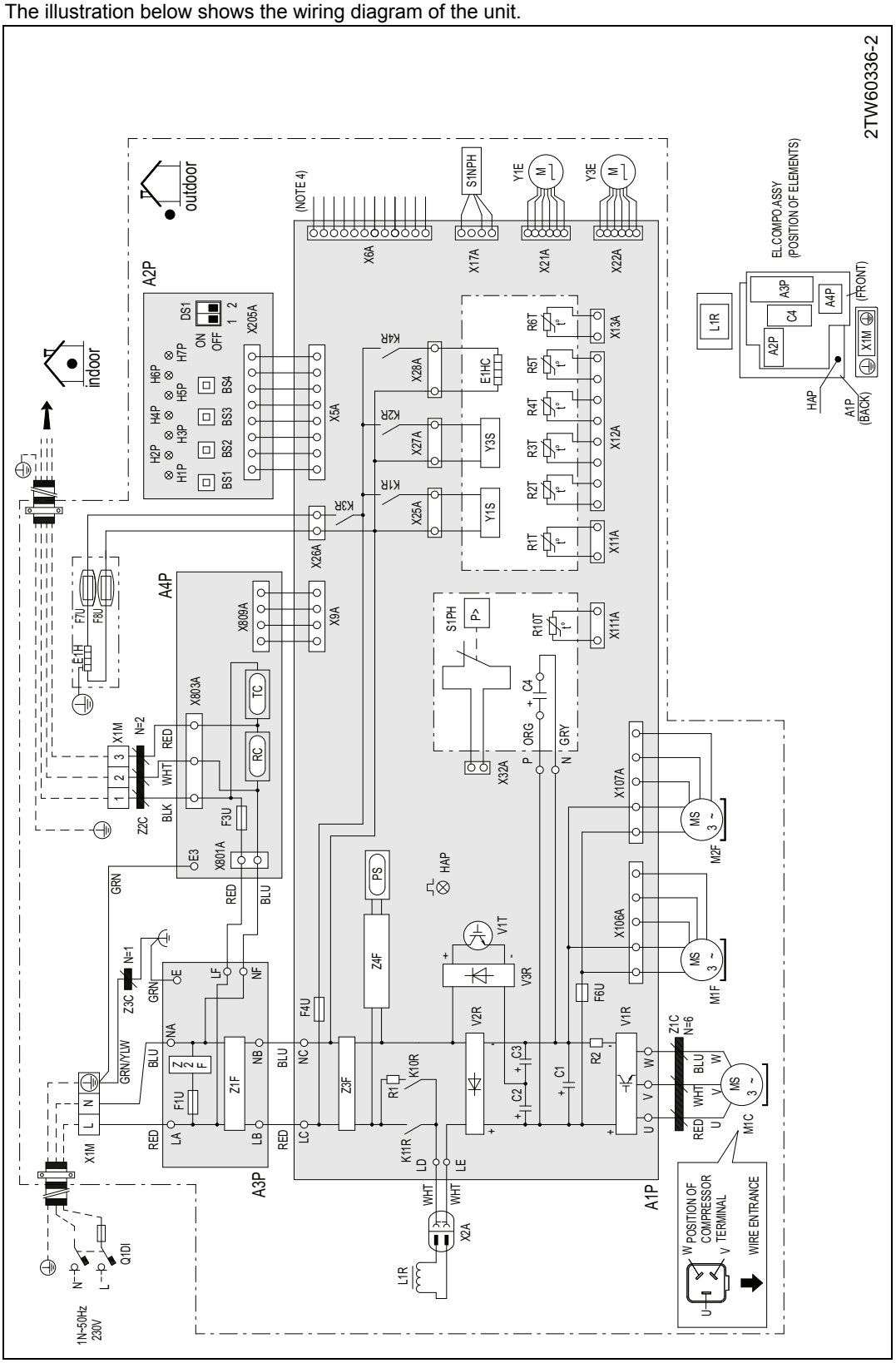
Symbols

Wiring dependent on model Field wiring Option

Field wiring PCB Wire colour

6.5 Wiring Diagram for ERLQ011~016CAV3

Wiring diagram The illustration below shows the wiring diagram of the unit.



1

Legend

A1P	Printed circuit board (main)	PS	Switching power supply
A2P	Printed circuit board (service)	Q1DI	Earth leakage circuit breaker
A3P	Printed circuit board (noise filter)	R1	Resistor
A4P	Printed circuit board (communication)	R2	Resistor
BS1~BS4	Push button switch	R1T	Thermistor (air)
C1~C4	Capacitor	R2T	Thermistor (discharge)
DS1	Dip switch	R3T	Thermistor (suction)
E1H	Bottomplate heater	R4T	Thermistor (heat exchanger)
E1HC	Crankcase heater	R5T	Thermistor (heat exchanger middle)
F1U, F3U, F4U	Fuse (T 6.3A / 250V)	R6T	Thermistor (liquid)
F6U	Fuse (T 5.0A / 250V)	RC	Signal receiver circuit
F7U, F8U	Fuse (F 1.0A / 250V)	R10T	Thermistor (fin)
H1P~7P (A2P)	Light emitting diode (serv. monitor-orange)	S1NPH	Pressure sensor
	[H2P] prepare test - - - - - - - - - - - -flickering	S1PH	Pressure switch (high)
	[H2P] malfunction detection- - - - -light up	TC	Signal transmission circuit
HAP (A1P)	Light emitting diode (service monitor green)	V1R	Power module
K1R	Magnetic relay (Y1S)	V2R, V3R	Diode module
K2R	Magnetic relay (Y3S)	V1T	IGBT
K3R	Magnetic relay (E1H)	X1M	Terminal strip (power supply)
K4R	Magnetic relay (E1HC)	Y1E	Electronic expansion valve (main)
K10R	Magnetic relay (upload)	Y3E	Electronic expansion valve (inj)
K11R	Magnetic relay (main)	Y1S	Solenoid valve (4 way valve)
L1R	Reactor	Y3S	Solenoid valve (hot gas pass)
M1C	Motor (compressor)	Z1C~Z3C	Noise filter (ferrity core)
M1F	Motor (fan - upper)	Z1F~Z4F	Noise filter
M2F	Motor (fan - lower)		

Notes

1 This wiring diagram only applies to the outdoor unit.

2 L Live N Neutral

Field wiring

3 Terminal strip Connector

Connection Protective earth (screw)

Connector Noiseless earth

Terminal

4 Refer to the option manual for connecting wiring to X6A.

5 Refer to the “wiring diagram sticker” (on back of front plate) on how to use BS1~BS4 and DS1 switch.

6 Do not operate the unit by short-circuiting protection device S1PH.

7 Colours: BLU = Blue, BRN = Brown, GRN = Green, RED = Red, WHT = White, YLW = Yellow, ORG = Orange, BLK = Black

8 Confirm the method of setting the selector switches (DS1) by service manual. Factory setting of all switches: ‘OFF’.

Symbols

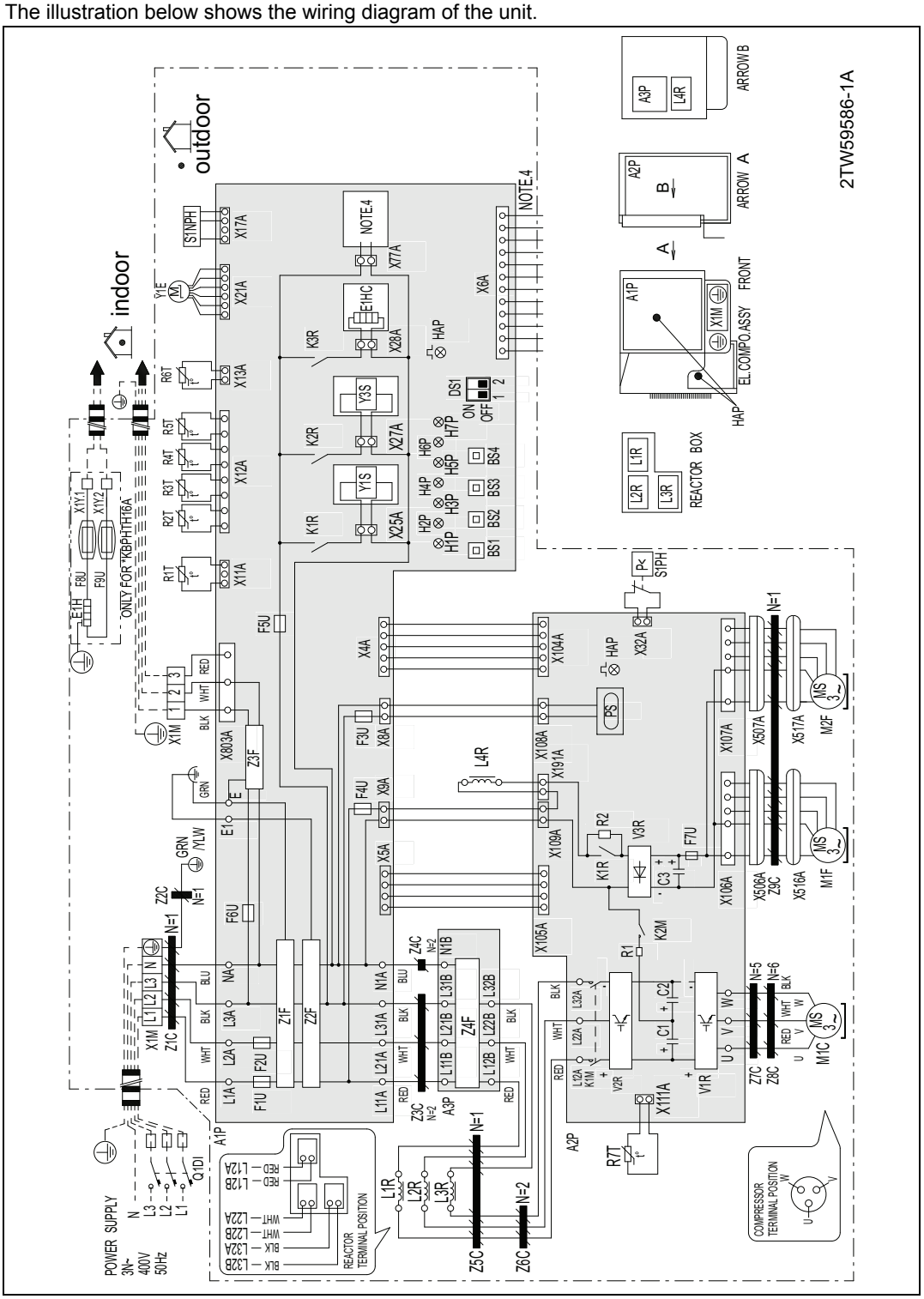
Wiring dependent on model Field wiring Option

Field wiring PCB Wire colour

6.6 Wiring Diagram for ERHQ011~016BAW1

Wiring diagram

The illustration below shows the wiring diagram of the unit.



1

Legend

A1P	Printed circuit board	M1F	Motor (fan - upper)
A2P	Printed circuit board (inv.)	M2F	Motor (fan - lower)
A3P	Printed circuit board (noise filter)	PS	Switching power supply
BS1~BS4	Push button switch	R1~R4	Resistor
C1~C4	Capacitor	R1T	Thermistor (air)
DS1	Dip switch	R2T	Thermistor (discharge)
E1HC	Crankcase heater	R3T	Thermistor (suction)
E1H	Bottomplate heater	R4T	Thermistor (heat exchanger)
F1U	Fuse (31.5A 500V)	R5T	Thermistor (heat exchanger middle)
F2U	Fuse (31.5A 500V)	R6T	Thermistor (liquid)
F3U	Fuse (T 6.3A / 250V)	R7T	Thermistor (fin)
F4U	Fuse (T 6.3A / 250V)	S1NPH	Pressure sensor
F5U	Fuse (T 6.3A / 250V)	S1PH	Pressure switch (high)
F6U	Fuse (T 6.3A / 250V)	V1R, V2R	Power module
F7U	Fuse (T 5.0A / 250V)	V3R	Diode module
F8U, F9U	Fuse (F 1.0A / 250V)	X1M	Terminal strip
HAP (A1P)	Pilot lamp (service monitor-green)	Y1E	Electronic expansion valve
HAP (A2P)	Pilot lamp (service monitor-green)	Y1S	Solenoid valve (4 way valve)
H1P~7P (A1P)	Pilot lamp (service monitor-orange)	Y3S	Solenoid valve
K1M-K2M	Magnetic contactor	Z1C~Z9C	Noise filter
K1R (A1P)	Magnetic relay (Y1S)	Z1F~Z4F	Noise filter
K1R (A2P)	Magnetic relay	Q1DI	Earth leakage circuit breaker
K2R (A1P)	Magnetic relay (Y3S)	Optional connector	
K3R (A1P)	Magnetic relay (E1HC)	X6A	Connector
L1R~L3R	Reactor	X77A	Connector
L4R	Reactor (for outdoor fan motor)	X1Y	Connector
M1C	Motor (compressor)		

Notes

1 This wiring diagram only applies to the outdoor unit.

2 L Live N Neutral

Field wiring

3 Terminal strip Connector

Connection Protective earth (screw)

Connector Noiseless earth

Terminal

4 Refer to the option manual for connecting wiring to X6A and X77A.

5 Refer to the “wiring diagram sticker” (on back of front plate) on how to use BS1~BS4 and DS1 switch.

6 Do not operate the unit by short-circuiting protection device S1PH.

7 Colours: BLU = Blue, BRN = Brown, GRN = Green, RED = Red, WHT = White, YLW = Yellow, ORG = Orange, BLK = Black

8 Confirm the method of setting the selector switches (DS1) by service manual. Factory setting of all switches: ‘OFF’.

Symbols

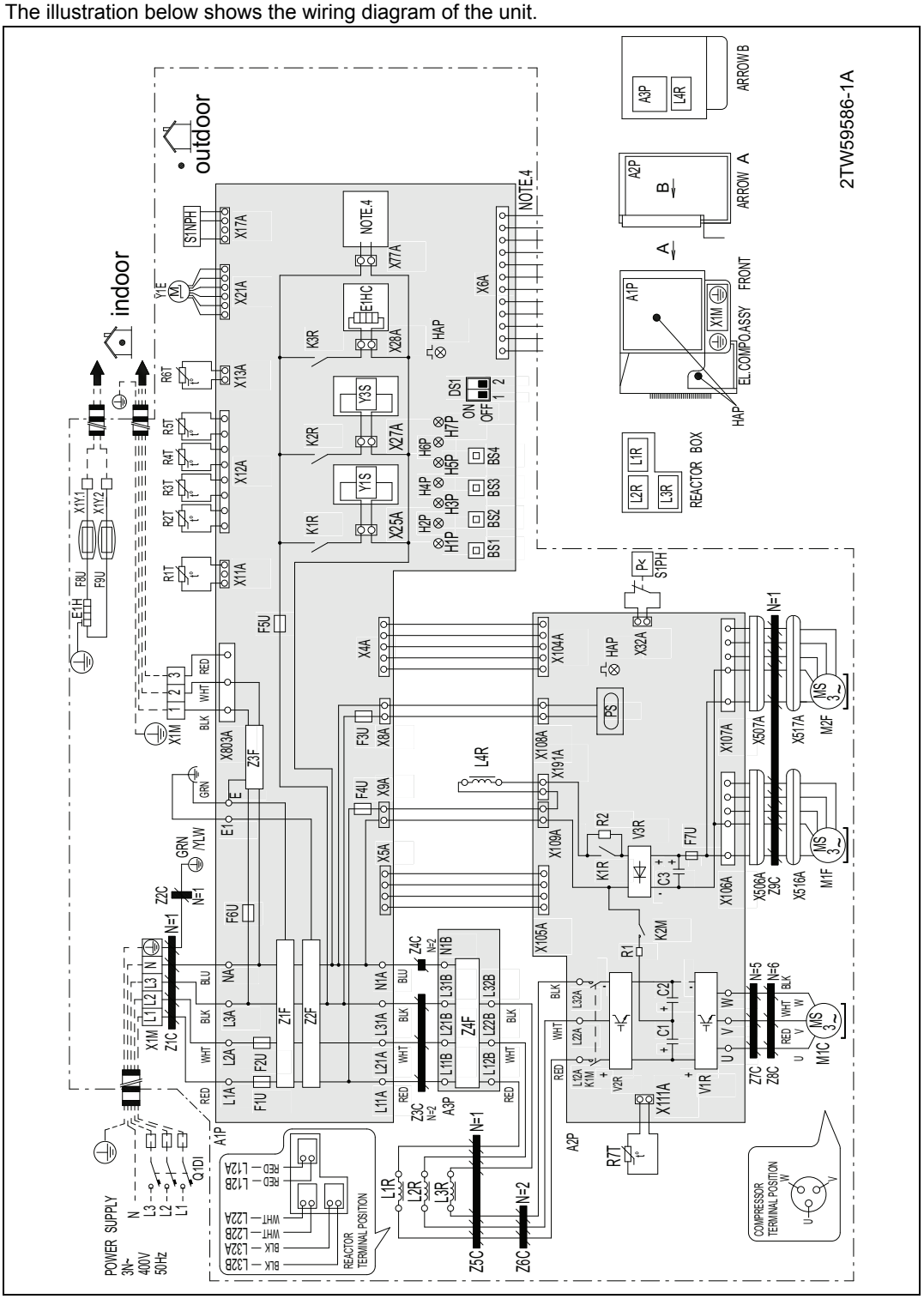
Wiring dependent on model Field wiring Option

Field wiring PCB Wire colour

6.7 Wiring Diagram for ERLQ011~016BAW1

Wiring diagram

The illustration below shows the wiring diagram of the unit.



1

Legend

A1P	Printed circuit board	M1F	Motor (fan - upper)
A2P	Printed circuit board (inv.)	M2F	Motor (fan - lower)
A3P	Printed circuit board (noise filter)	PS	Switching power supply
BS1~BS4	Push button switch	R1~R4	Resistor
C1~C4	Capacitor	R1T	Thermistor (air)
DS1	Dip switch	R2T	Thermistor (discharge)
E1HC	Crankcase heater	R3T	Thermistor (suction)
E1H	Bottomplate heater	R4T	Thermistor (heat exchanger)
F1U	Fuse (31.5A 500V)	R5T	Thermistor (heat exchanger middle)
F2U	Fuse (31.5A 500V)	R6T	Thermistor (liquid)
F3U	Fuse (T 6.3A / 250V)	R7T	Thermistor (fin)
F4U	Fuse (T 6.3A / 250V)	S1NPH	Pressure sensor
F5U	Fuse (T 6.3A / 250V)	S1PH	Pressure switch (high)
F6U	Fuse (T 6.3A / 250V)	V1R, V2R	Power module
F7U	Fuse (T 5.0A / 250V)	V3R	Diode module
F8U, F9U	Fuse (F 1.0A / 250V)	X1M	Terminal strip
HAP (A1P)	Pilot lamp (service monitor-green)	Y1E	Electronic expansion valve
HAP (A2P)	Pilot lamp (service monitor-green)	Y1S	Solenoid valve (4 way valve)
H1P~7P (A1P)	Pilot lamp (service monitor-orange)	Y3S	Solenoid valve
K1M-K2M	Magnetic contactor	Z1C~Z9C	Noise filter
K1R (A1P)	Magnetic relay (Y1S)	Z1F~Z4F	Noise filter
K1R (A2P)	Magnetic relay	Q1DI	Earth leakage circuit breaker
K2R (A1P)	Magnetic relay (Y3S)	Optional connector	
K3R (A1P)	Magnetic relay (E1HC)	X6A	Connector
L1R~L3R	Reactor	X77A	Connector
L4R	Reactor (for outdoor fan motor)	X1Y	Connector
M1C	Motor (compressor)		

Notes

1 This wiring diagram only applies to the outdoor unit.

2 L Live N Neutral

Field wiring

3 Terminal strip Connector

Connection Protective earth (screw)

Connector Noiseless earth

Terminal

4 Refer to the option manual for connecting wiring to X6A and X77A.

5 Refer to the “wiring diagram sticker” (on back of front plate) on how to use BS1~BS4 and DS1 switch.

6 Do not operate the unit by short-circuiting protection device S1PH.

7 Colours: BLU = Blue, BRN = Brown, GRN = Green, RED = Red, WHT = White, YLW = Yellow, ORG = Orange, BLK = Black

8 Confirm the method of setting the selector switches (DS1) by service manual. Factory setting of all switches: ‘OFF’.

Symbols

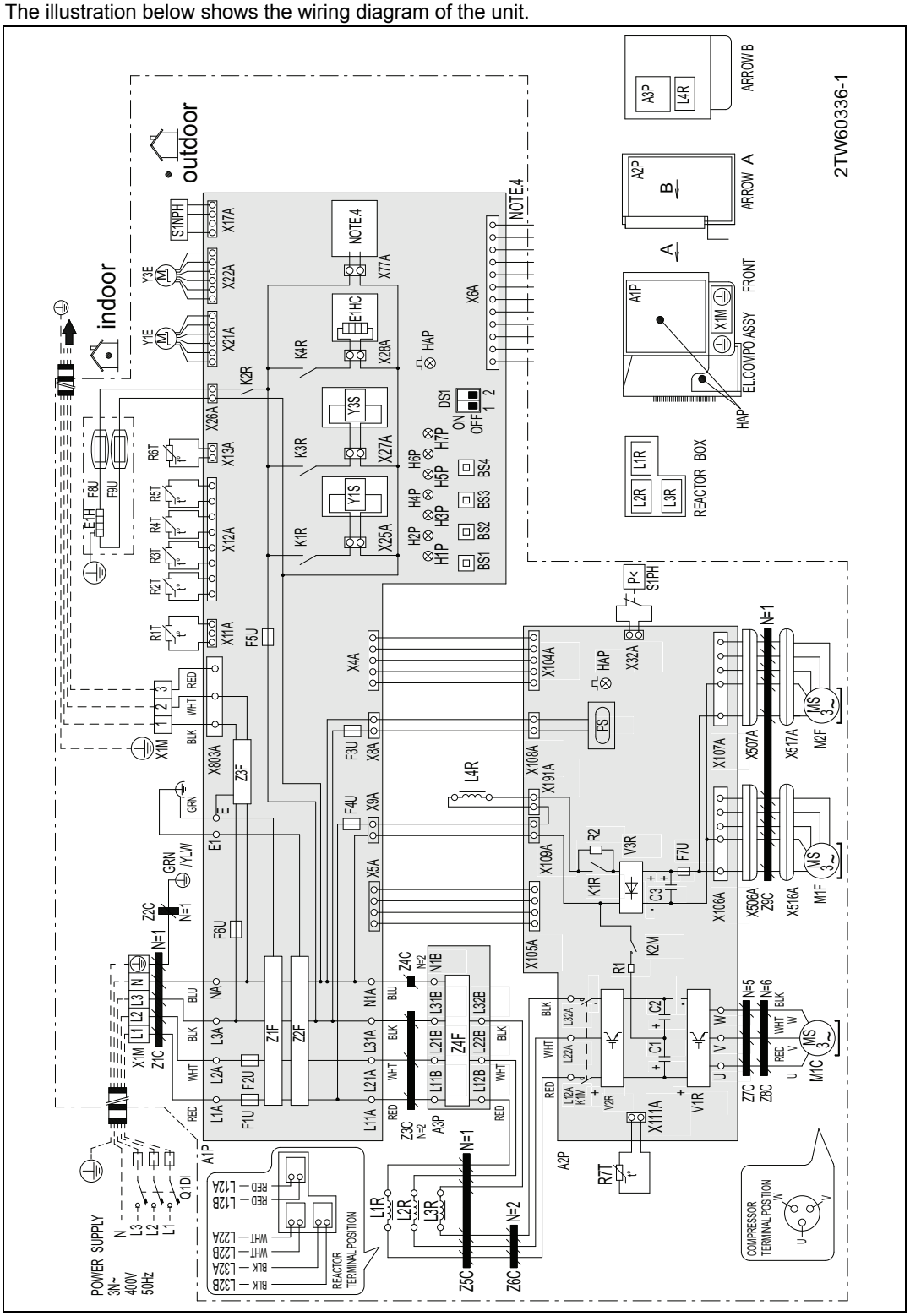
Wiring dependent on model Field wiring Option

Field wiring PCB Wire colour

6.8 Wiring Diagram for ERLQ011~016CAW1

Wiring diagram

The illustration below shows the wiring diagram of the unit.



1

Legend

A1P	Printed circuit board (control)	M1C	Motor (compressor)
A2P	Printed circuit board (inv.)	M1F	Motor (fan - upper)
A3P	Printed circuit board (noise filter)	M2F	Motor (fan - lower)
BS1~BS4	Push button switch	PS	Switching power supply
C1~C4	Capacitor	R1~R4	Resistor
DS1	Dip switch	R1T	Thermistor (air)
E1HC	Crankcase heater	R2T	Thermistor (discharge)
E1H	Bottomplate heater	R3T	Thermistor (suction)
F1U	Fuse (31.5A 500V)	R4T	Thermistor (heat exchanger)
F2U	Fuse (31.5A 500V)	R5T	Thermistor (heat exchanger middle)
F3U	Fuse (T 6.3A / 250V)	R6T	Thermistor (liquid)
F4U	Fuse (T 6.3A / 250V)	R7T	Thermistor (fin)
F5U	Fuse (T 6.3A / 250V)	S1NPH	Pressure sensor
F6U	Fuse (T 6.3A / 250V)	S1PH	Pressure switch (high)
F7U	Fuse (T 5.0A / 250V)	V1R, V2R	Power module
F8U, F9U	Fuse (F 1.0A / 250V)	V3R	Diode module
HAP (A1P)	Pilot lamp (service monitor-green)	X1M	Terminal strip
HAP (A2P)	Pilot lamp (service monitor-green)	Y1E	Electronic expansion valve (main)
H1P~7P (A1P)	Pilot lamp (service monitor-orange)	Y3E	Electronic expansion valve (inj)
K1M-K2M	Magnetic contactor (main - upload)	Y1S	Solenoid valve (4 way valve)
K1R (A1P)	Magnetic relay (Y1S)	Y3S	Solenoid valve (hot gas pass)
K1R (A2P)	Magnetic relay (upload)	Z1C~Z9C	Noise filter
K2R (A1P)	Magnetic relay (E1H)	Z1F~Z4F	Noise filter
K3R (A1P)	Magnetic relay (Y3S)	Q1DI	Earth leakage circuit breaker
K4R (A1P)	Magnetic relay (E1HC)	Optional connector	
L1R~L3R	Reactor	X6A	Connector
L4R	Reactor (for outdoor fan motor)	X77A	Connector

Notes

1 This wiring diagram only applies to the outdoor unit.

2 L Live N Neutral

Field wiring

3 Terminal strip Connector

Connection Protective earth (screw)

Connector Noiseless earth

Terminal

4 Refer to the option manual for connecting wiring to X6A and X77A.

5 Refer to the “wiring diagram sticker” (on back of front plate) on how to use BS1~BS4 and DS1 switch.

6 Do not operate the unit by short-circuiting protection device S1PH.

7 Colours: BLU = Blue, BRN = Brown, GRN = Green, RED = Red, WHT = White, YLW = Yellow, ORG = Orange, BLK = Black

8 Confirm the method of setting the selector switches (DS1) by service manual. Factory setting of all switches: ‘OFF’.

Symbols

Wiring dependent on model

Field wiring

Option

Field wiring

PCB

BRN Wire colour

6.9 Wiring Diagram for ERLQ004~008CAV3

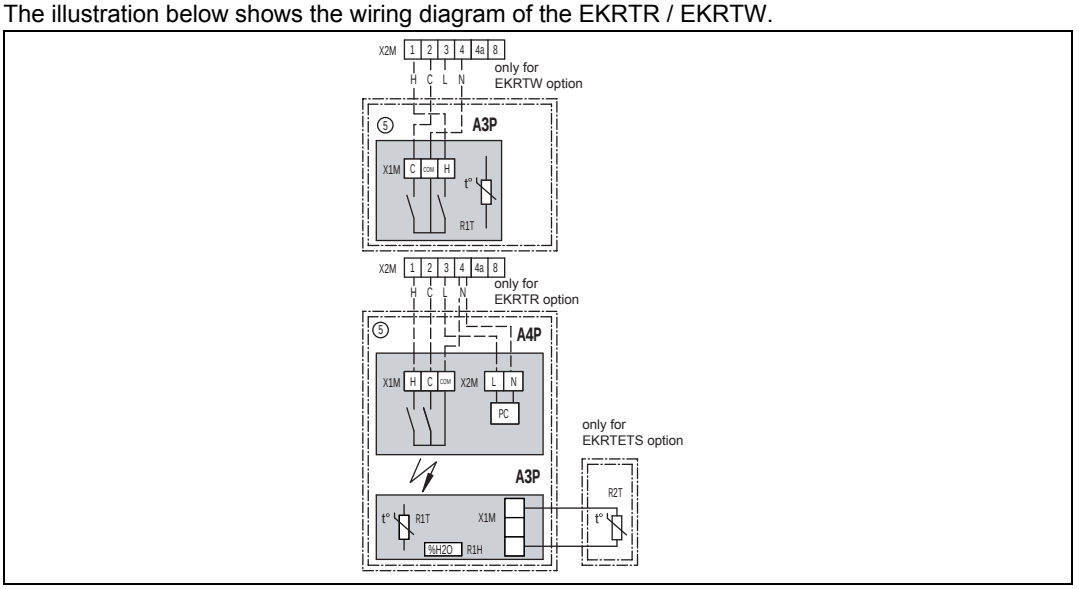
The wiring diagram for ERLQ004~008CAV3 can be found back in the Installer Reference Guide (delivered with every unit on CD) which can be found in Appendix of this Service Manual. For ERLQ004CA on page 83. For ERLQ006~009CA on page 84.

1

6.10 Wiring Diagram for EKRTR / EKRTW

Wiring diagram

The illustration below shows the wiring diagram of the EKRTR / EKRTW.



Legend

A3P	Thermostat (PC= power circuit)
A4P	Receiver PCB
R1H	Humidity sensor
R1T	Ambient sensor
R2T	External sensor (floor or ambient)
X1M-X2M	Terminal strips

Notes

1 This wiring diagram only applies to the indoor unit.

2 Use one and same dedicated power supply for indoor unit, outdoor unit and *KHW* option.

3

	Field wiring	NO/ NC	Normal open / Normal closed
SPST	Single pole single throw		

4

	Terminal strip		Connector
	Terminal		Protective earth

5 Do not operate the unit by short-circuiting any protection device.

6 BLK = Black, RED = Red, BLU = Blue, WHT = White, PNK = Pink, YLW = Yellow, BRN = Brown, GRY = Grey, GRN = Green, ORG = Orange, VIO = Violet

7 For *KHWSU*V3, refer to option manual.

8 Option PCB works with an external 230V AC power supply (L, N).

9 For EKSOLHWAV1, refer to option manual.

1

Symbols


Wiring dependent on model


Option


PCB


Field wiring

Field wiring



Wire colour

1

7 PCB Layout

7.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- It describes which unit uses which PCB types
- It shows the PCB connectors.

Outdoor units

This chapter contains the following PCB layouts:

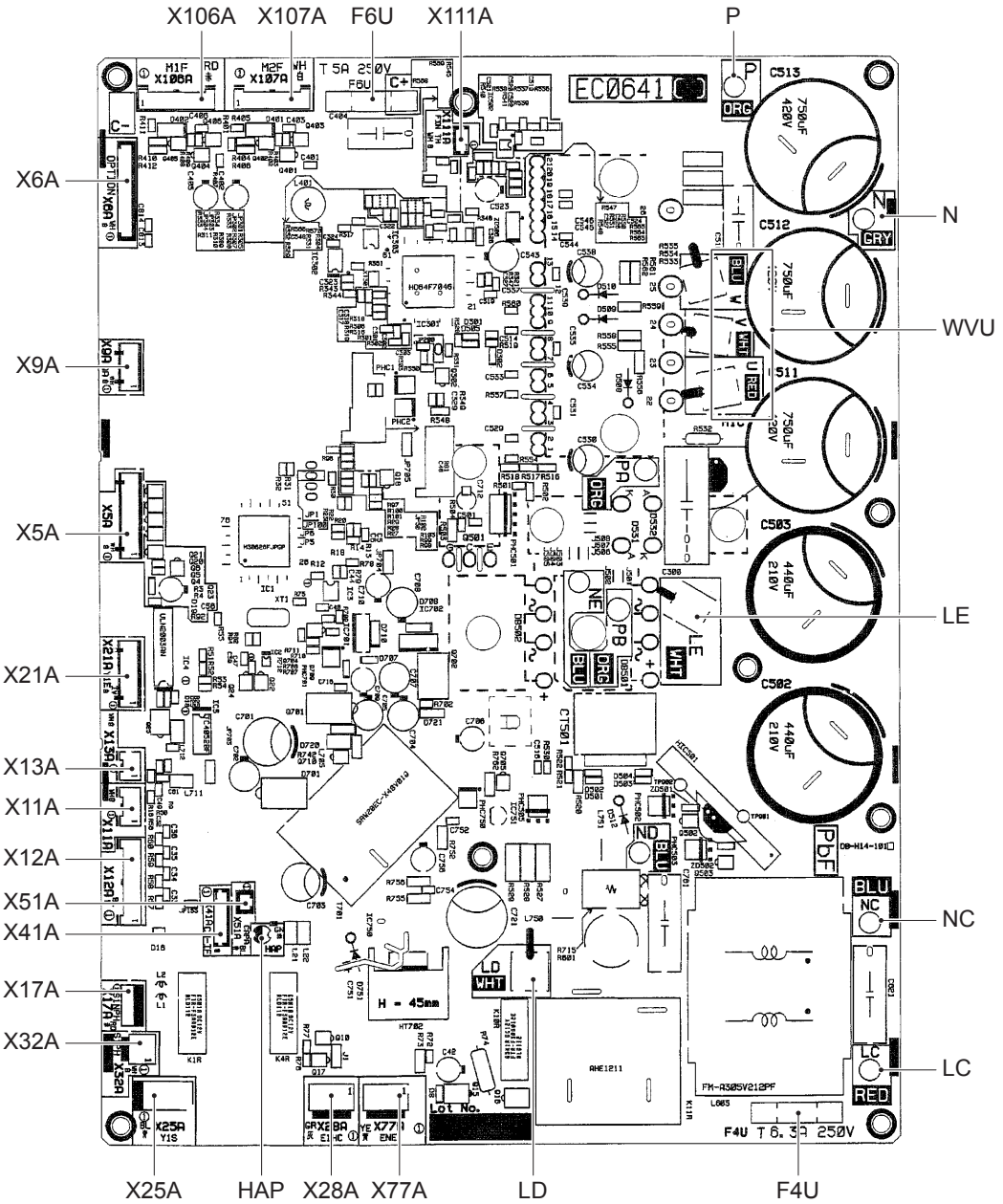
Topic	See page
7.2–PCB Layout for ERHQ011~016BAV3 / ERLQ011~016BAV3	1–62
7.3–PCB Layout for ERLQ011~016CAV3	1–68
7.4–PCB Layout for ERHQ011~016BAW1 / ERLQ011~016BAW1	1–73
7.5–PCB Layout for ERLQ011~016CAW1	1–79
7.6–PCB Layout for ERLQ004CAV3	1–84
7.7–PCB Layout for EHB/V-CA	1–86

1

7.2 PCB Layout for ERHQ011~016BAV3 / ERLQ011~016BAV3

Control & inverter PCB (A1P)

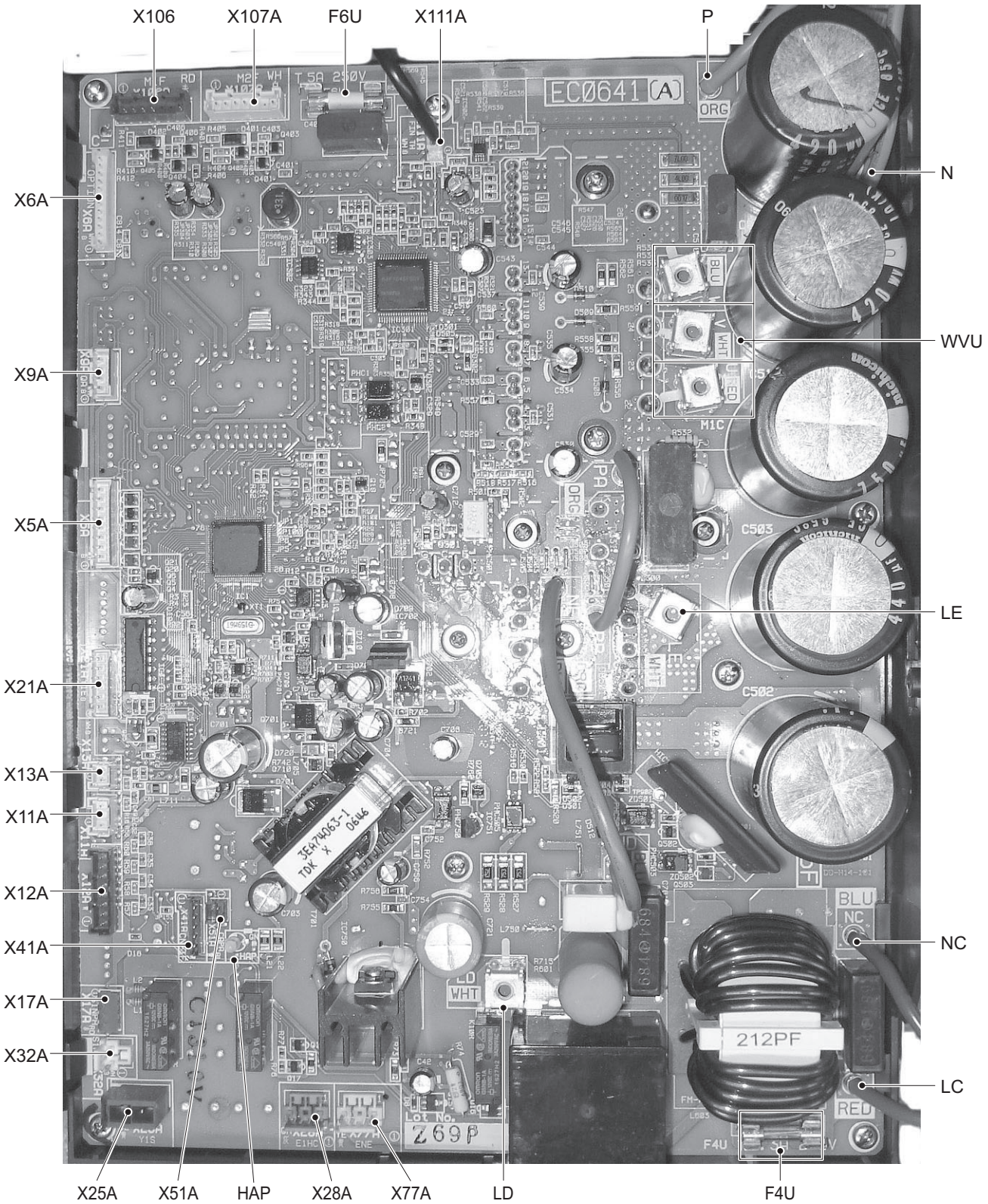
The illustration below shows the PCB connectors.



1

Control & inverter PCB (A1P)

The picture below shows the PCB connectors.



1

Connectors

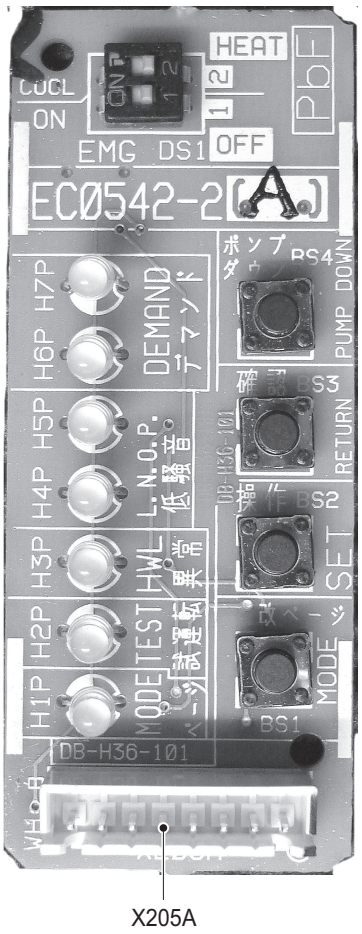
The table below describes the PCB connectors.

Connector	Connected to	Description
X5A	X205A	On service PCB
X6A		For optional PCB KRP58M51
X9A	X809A	On communication PCB
X11A	R1T	Air thermistor
X12A	R2T ~R5T	Coil thermistor
X13A	R6T	Discharge pipe thermistor
X17A	S1NPH	Suction pipe thermistor
X21A	Y1E	Expansion valve
X25A	Y1S	4-way valve
X28A	E1HC	Crankcase heater
X31A	S1PL	Low pressure switch
X32A	S1PH	High pressure switch
X51A		Connector for spare parts adaptor
X77A		For optional PCB KRP58M51
X106A	M1F	Fan motor
X107A	M2F	Fan motor
X111A	R10T	Fin thermistor
HAP	-	Indication CPU / Power supply
MC-ML	MB-LB	On noise filter
N-P	C4	Capacitor
F4U	-	Fuse 6.3A/250V for Y1S, E1HC
F6U	-	Fuse 5.0A/250V for M1F, M2F
U-V-W	M1C	Compressor
LE-LD	L1R	Reactor coil

1

Service PCB (A2P)

The illustration below shows the PCB connectors.



X205A

Connectors

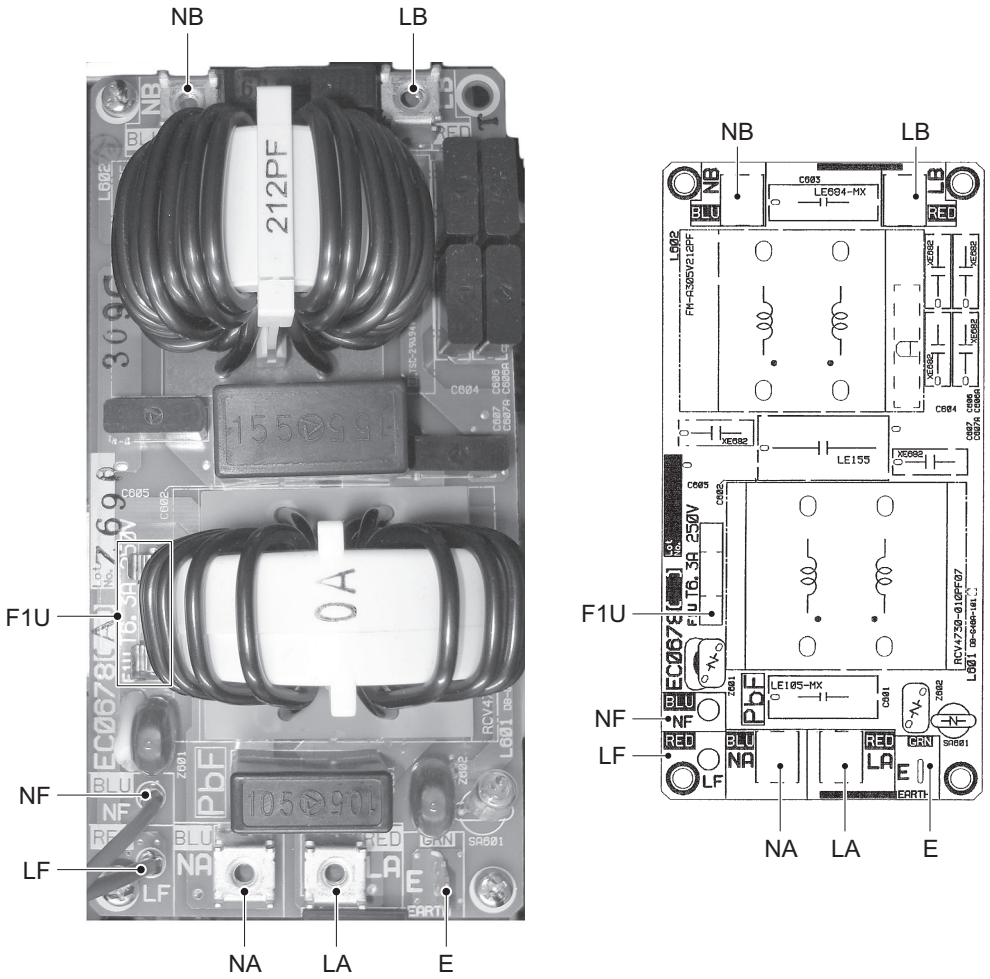
The table below describes the PCB connectors.

Connector	Connected to	Description
X205A	X5A	Inverter & control PCB

1

Noise filter PCB (A3P)

The illustration below shows the PCB connectors.



Connectors

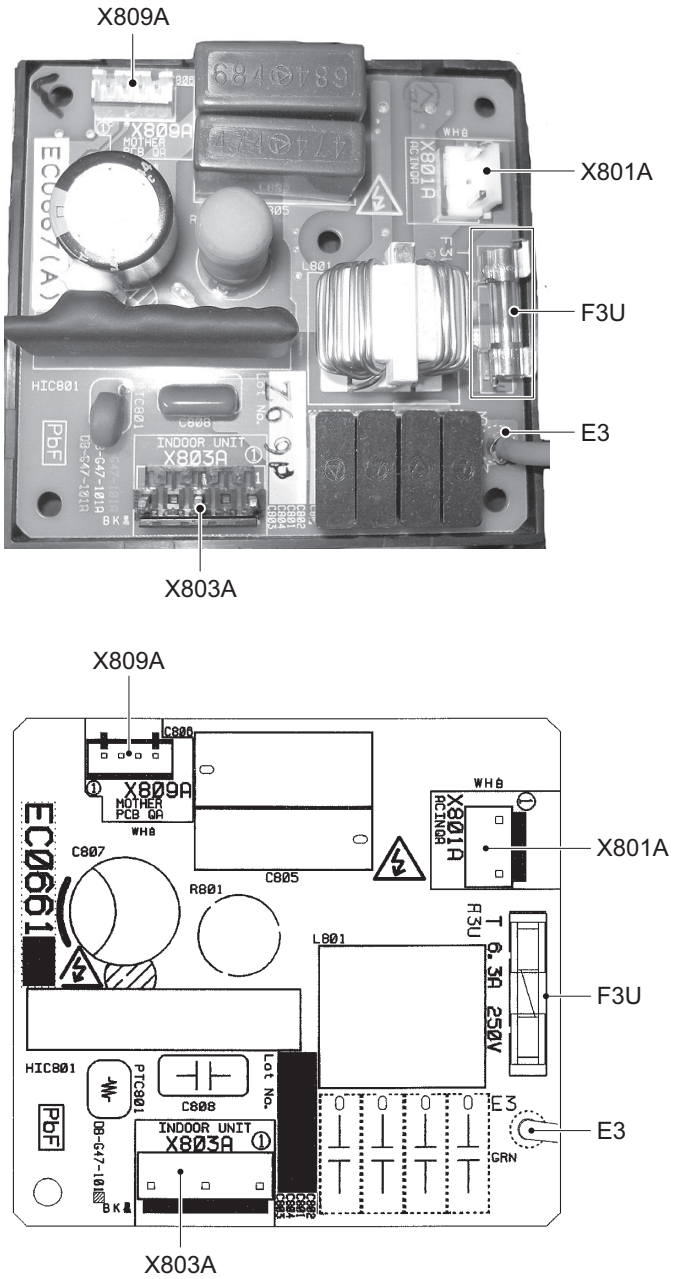
The table below describes the PCB connectors.

Connector	Connected to	Description
E	X1M	Via Z3C to X1M
F1U	-	Fuse 6.3A/250V
LA-NA	X1M	Power supply 1~ 230V
LB-NB	LC-MC	Inverter and control PCB
LF-NF	X801A	Communication PCB

1

Communication PCB (A4P)

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

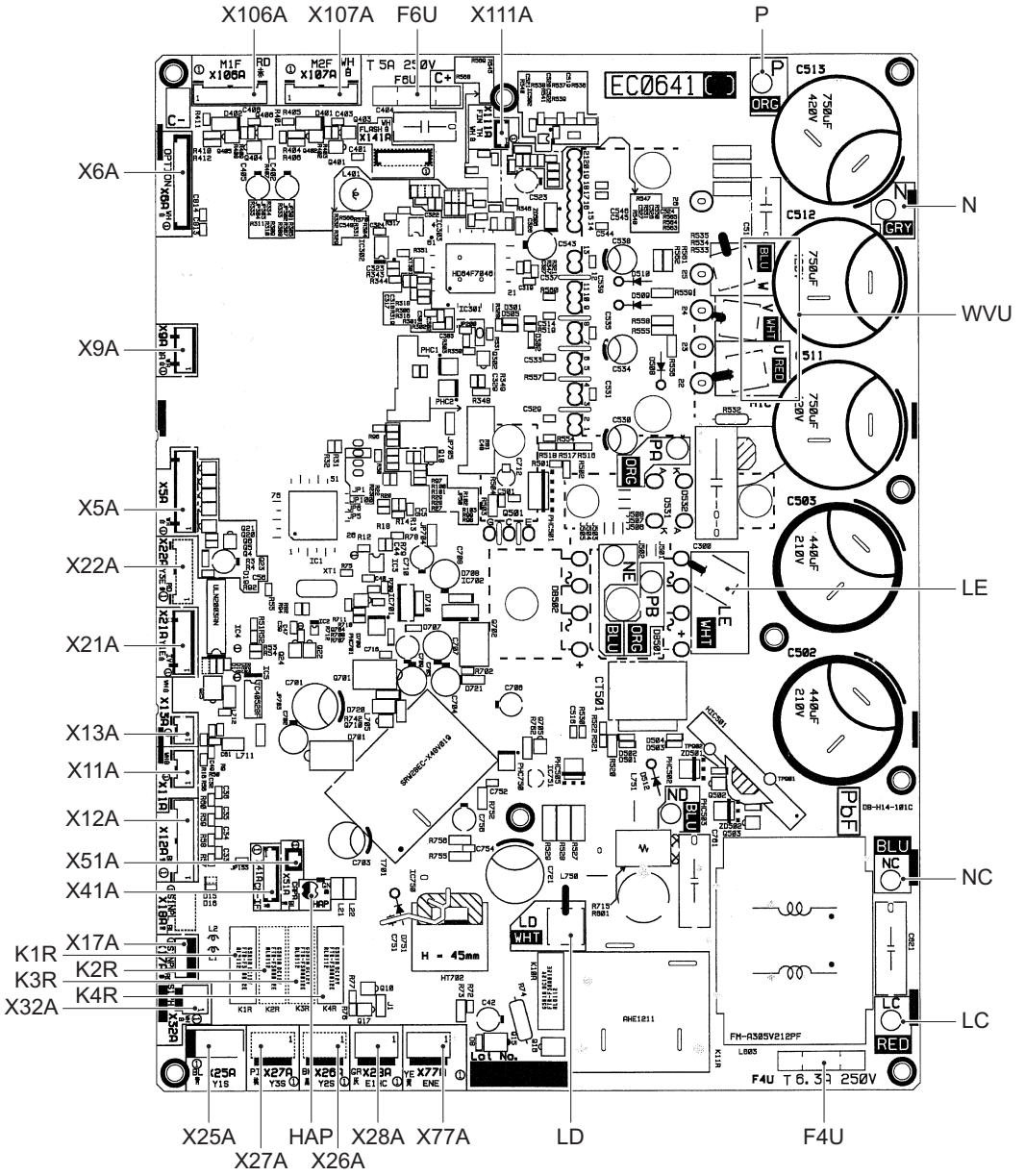
Connector	Connected to	Description
X801A	MF-LF	Noise filter PCB
X803A	W1M (1, 2, 3)	To hydro-box
X809A	A1P main	Inverter and control PCB
E3	X1M	Earth
F3U	-	Fuse 6.3A/250V

1

7.3 PCB Layout for ERLQ011~016CAV3

Control & inverter PCB (A1P)

The illustration below shows the PCB connectors.



Connectors

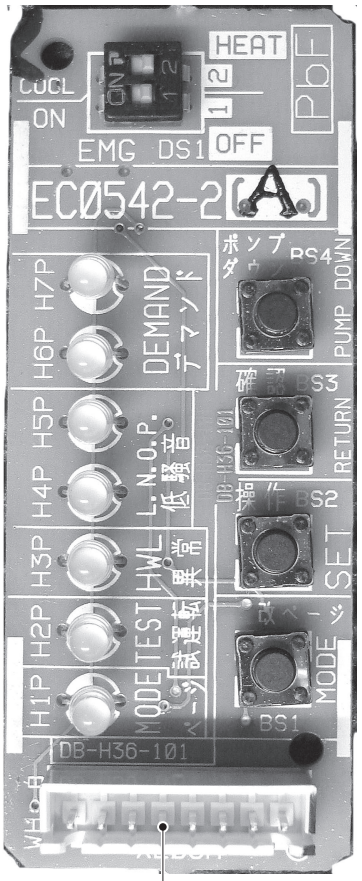
The table below describes the PCB connectors.

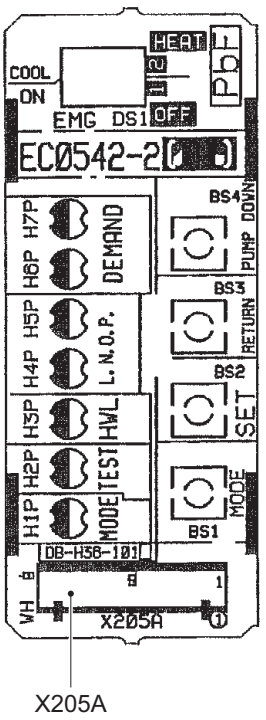
Connector	Connected to	Description
X5A	X205A	On service PCB
X6A		For optional
X9A	X809A	On communication PCB
X11A	R1T	Air thermistor
X12A	R2T ~R5T	Coil thermistor
X13A	R6T	Discharge pipe thermistor
X17A	S1NPH	Suction pipe thermistor
X21A	Y1E	Expansion valve
X22A	Y3E	Electronic expansion valve (inj.)
X25A	Y1S	4-way valve
X26A	E1H	Bottom plate heater
X27A	Y3S	Hot gas pass
X28A	E1HC	Crankcase heater
X32A	S1PH	High pressure switch
X51A		Connector for spare parts adaptor
X77A		For optional PCB
X106A	M1F	Fan motor
X107A	M2F	Fan motor
X111A	R10T	Fin thermistor
HAP	-	Indication CPU / Power supply
MC-ML	MB-LB	On noise filter
N-P	C4	Capacitor
F4U	-	Fuse 6.3A/250V for Y1S, E1HC
F6U	-	Fuse 5.0A/250V for M1F, M2F
U-V-W	M1C	Compressor
LE-LD	L1R	Reactor coil
K1R	Y1S	Magnetic relay for solenoid valve (4 way valve)
K2R	Y3S	Magnetic relay for solenoid valve (hot gas pass)
K3R	E1H	Magnetic relay for bottomplate heater
K4R	E1HC	Magnetic relay for crankcase heater

1

Service PCB (A2P)

The illustration below shows the PCB connectors.





Connectors

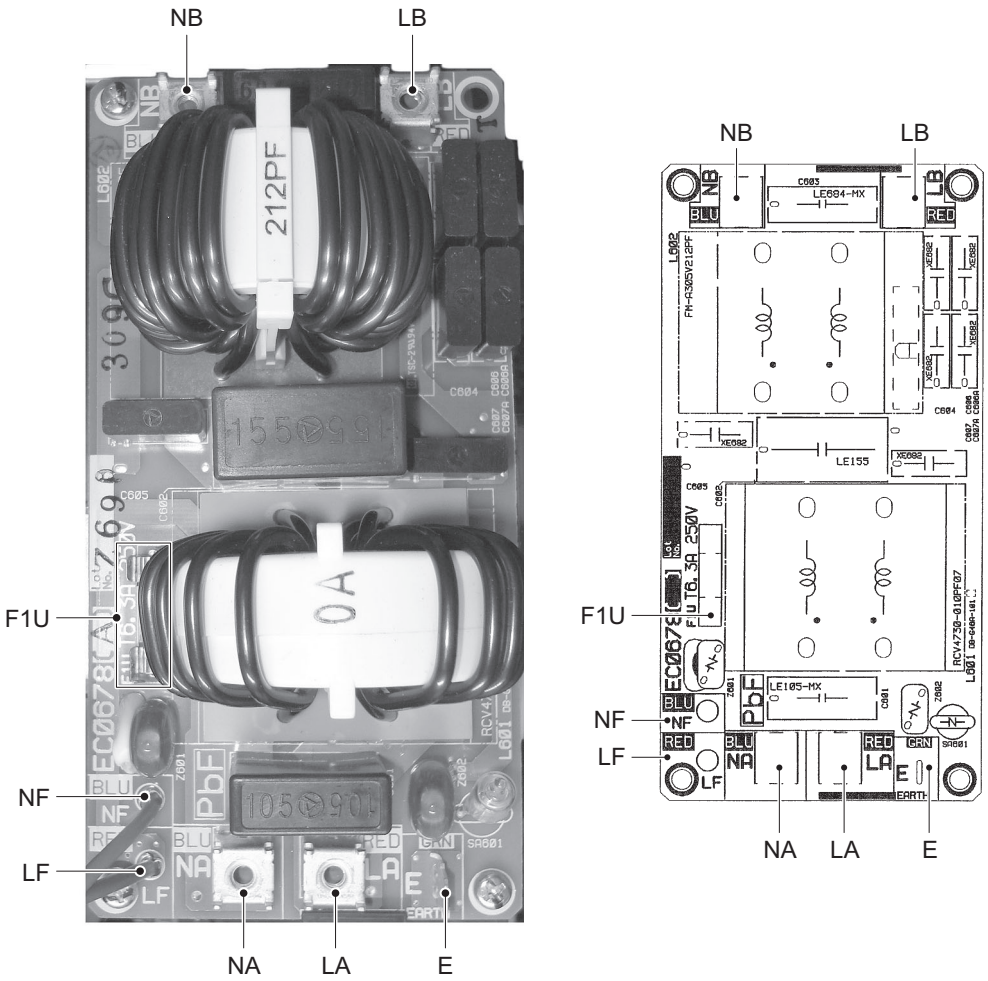
The table below describes the PCB connectors.

Connector	Connected to	Description
X205A	X5A	Inverter & control PCB

1

Noise filter PCB (A3P)

The illustration below shows the PCB connectors.



Connectors

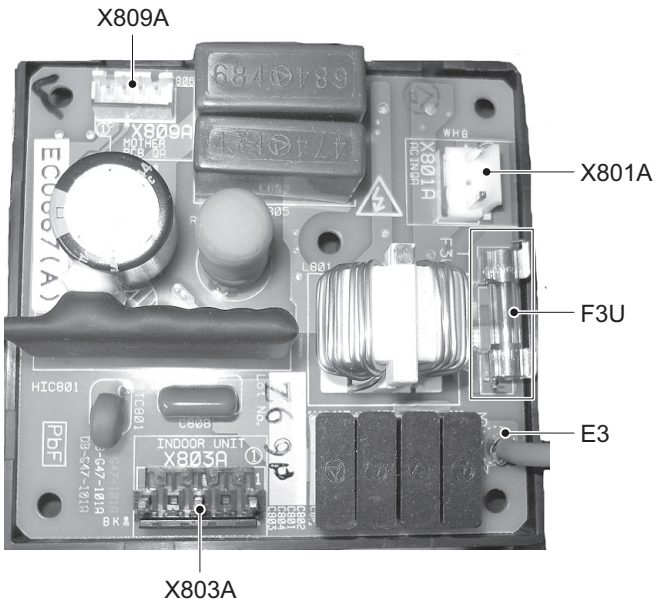
The table below describes the PCB connectors.

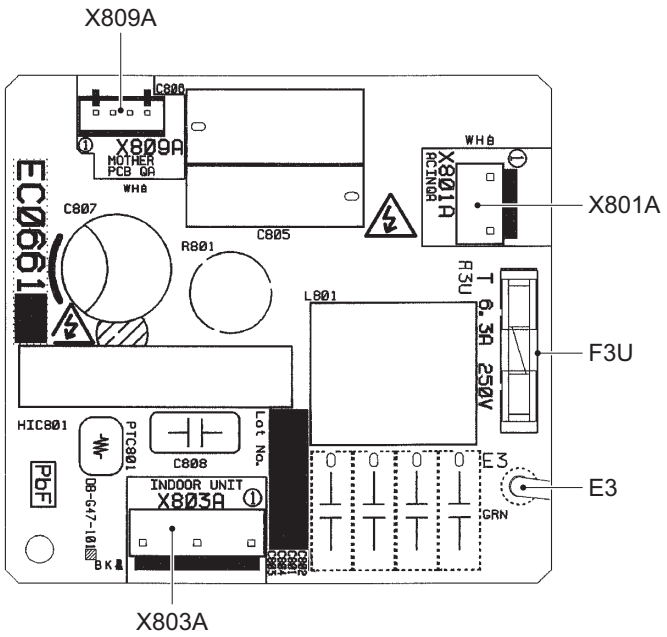
Connector	Connected to	Description
E	X1M	Via Z3C to X1M
F1U	-	Fuse 6.3A/250V
LA-NA	X1M	Power supply 1~ 230V
LB-NB	LC-MC	Inverter and control PCB
LF-NF	X801A	Communication PCB

1

Communication PCB (A4P)

The illustration below shows the PCB connectors.





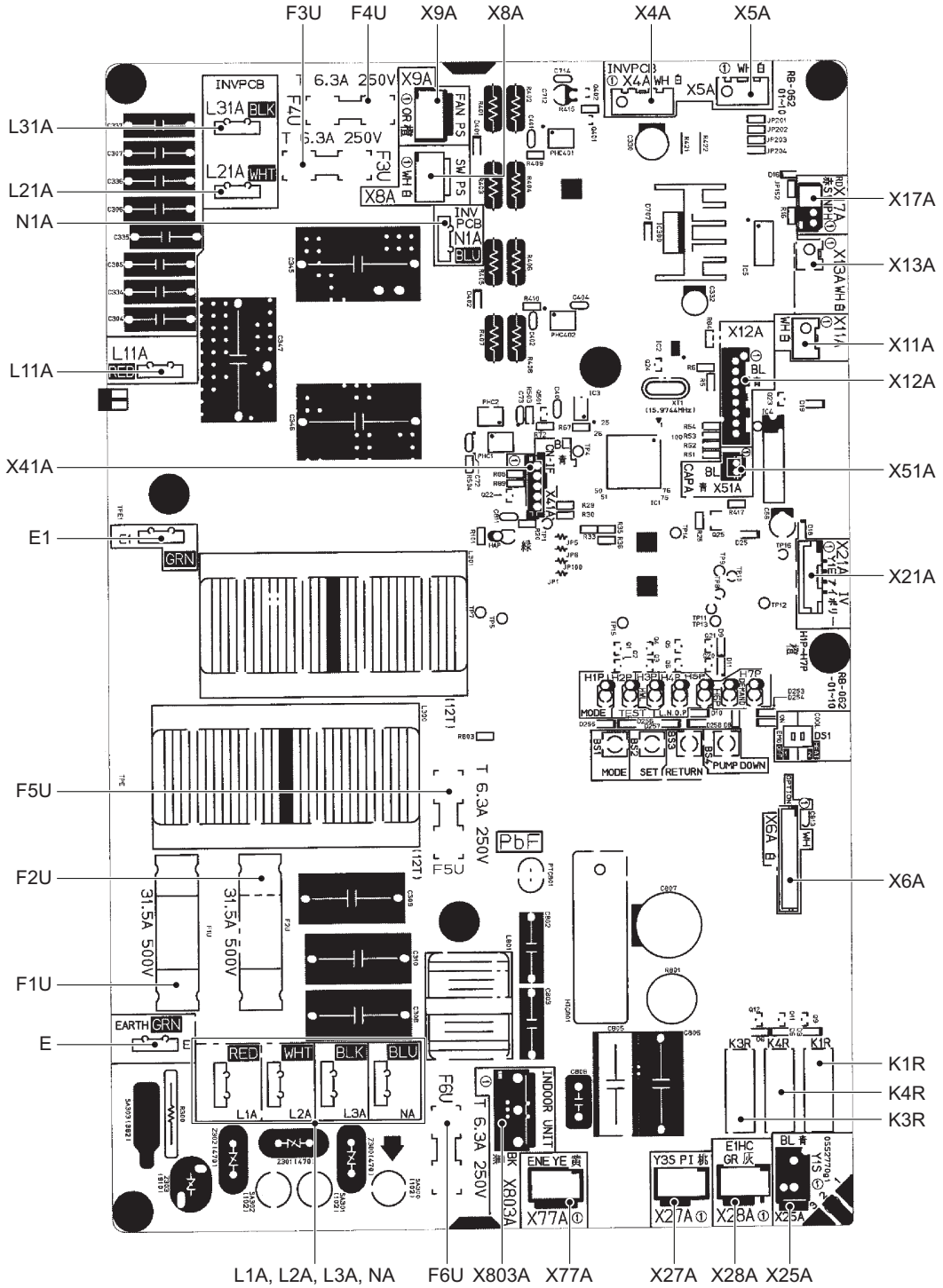
Connectors

The table below describes the PCB connectors.

Connector	Connected to	Description
X801A	MF-LF	Noise filter PCB
X803A	W1M (1, 2, 3)	To hydro-box
X809A	A1P main	Inverter and control PCB
E3	X1M	Earth
F3U	-	Fuse 6.3A/250V

7.4 PCB Layout for ERHQ011~016BAW1 / ERLQ011~016BAW1

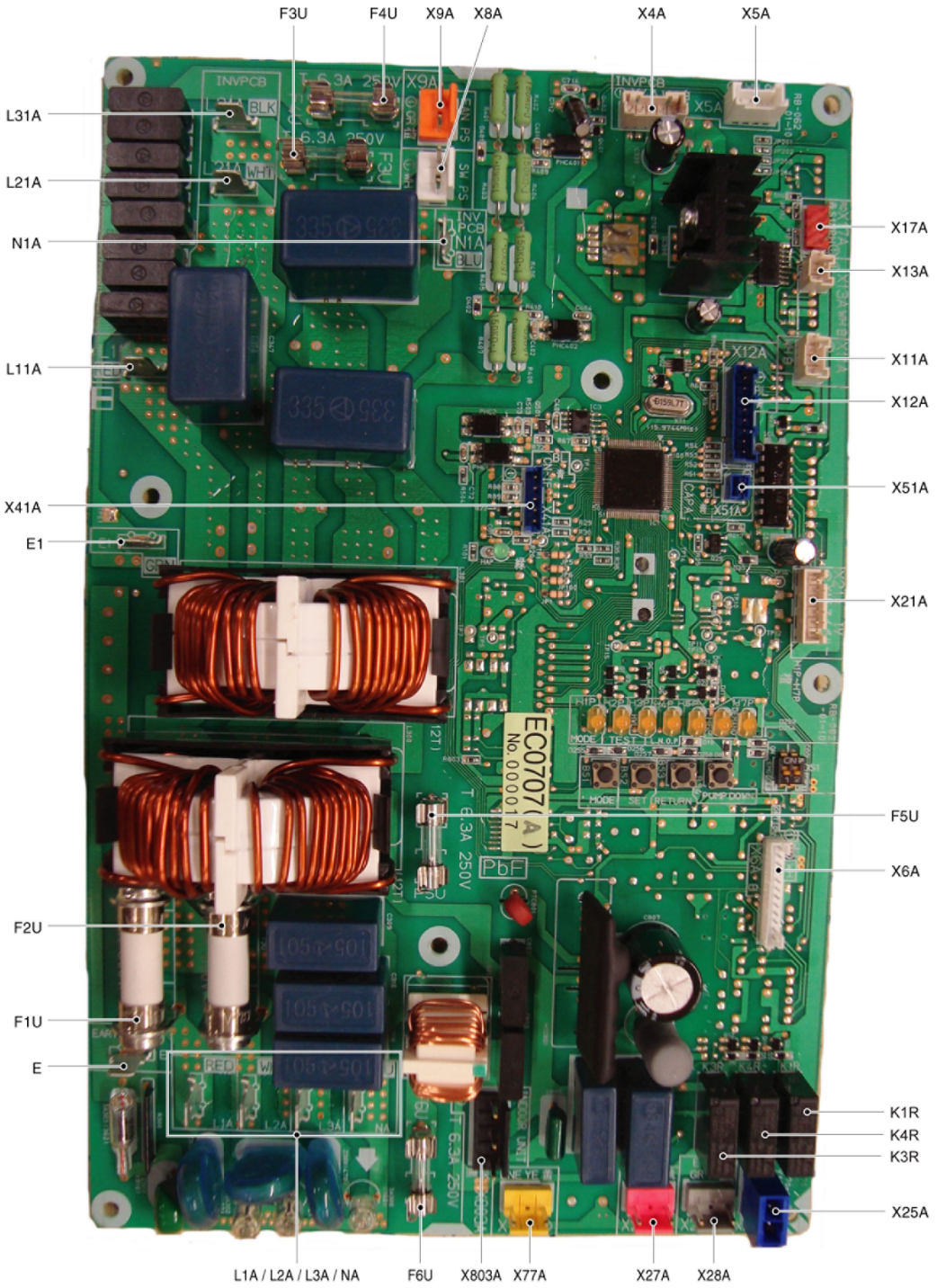
Control PCB (A1P) The illustration below shows the PCB connectors.



1

Control PCB (A1P)

The picture below shows the PCB connectors.



Connectors

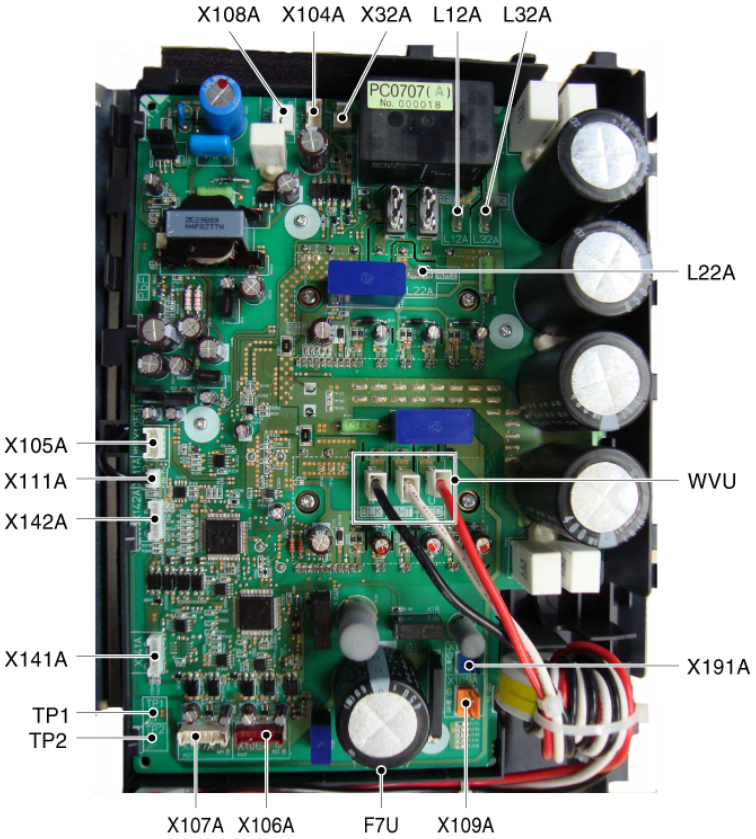
The table below describes the PCB connectors.

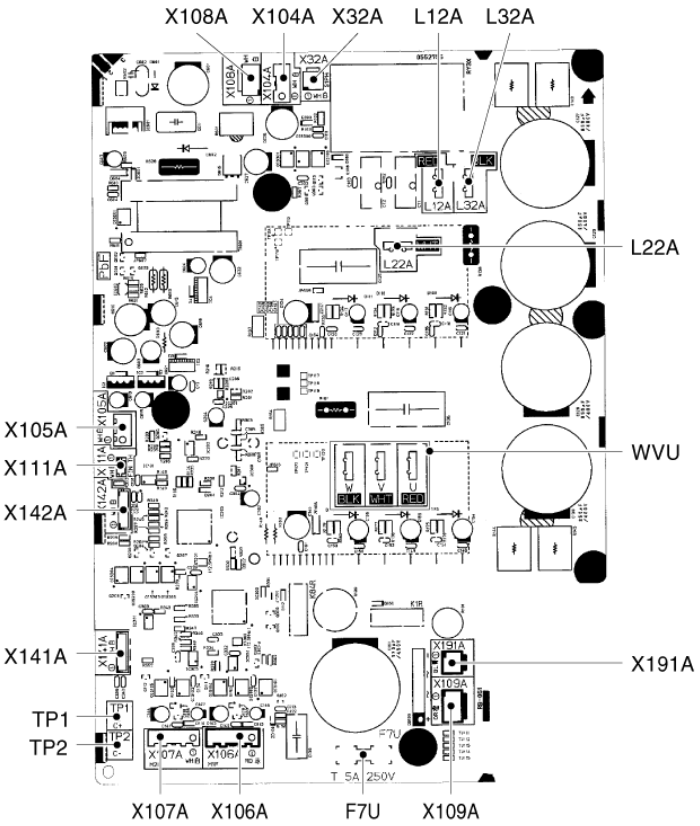
Connector	Connected to	Description
K1R	X25A/Y1S	Magnetic relay 4 way valve
K3R	X27A/Y3S	Magnetic relay liquid injection valve
K4R	X28A/E1HC	Magnetic relay crankcase heater
X4A	X104A	On Inverter PCB
X5A	X105A	On Inverter PCB
X6A	-	For Optional PCB
X8A	X108A	On Inverter PCB (PS Module)
X9A	X109A	On Inverter PCB (Diode module fan motor)
X11A	R1T	Ambient thermistor
X12A	R2T-R5T	Discharge-Suction-HEX-HEX middle- thermistor
X13A	R6T	Liquid thermistor
X17A	S1NPH	Pressure sensor
X21A	Y1E	Expansion valve
X25A	Y1S	4-way valve
X27A	Y3S	Liquid Injection Valve
X28A	E1HC	Crankcase heater
X41A		
X51A		Connector for spare capacity adaptor
X77A	-	For Optional PCB
X803A	X1M (1-2-3)	Towards Hydrobox
N1A	N1B	On Noise filter A3P
L31A	L31B	On Noise filter A3P
L21A	L21B	On Noise filter A3P
L1A~NA	X1M (L1-L2-L3-N)	Towards main power supply
L11A	L11B	On Noise filter A3P
F6U	-	Fuse 6.3A / 250V for Hydrobox
F5U	-	Fuse 6.3A / 250V for Y1S-Y3S-E1HC-
F4U	-	Fuse 6.3A / 250V for M1F-M2F (AC)
F3U	-	Fuse 6.3A / 250V for PS Module A2P
F2U	-	Fuse 31.5A / 250V for Inverter Module L1 A2P
F1U	-	Fuse 31.5A / 250V for Inverter Module L2 A2P
E1	GRN	Protective earth
E	GRN	Protective earth
HAP	-	Indication CPU/power supply

1

Inverter PCB (A2P)

The illustration below shows the PCB connectors.





Connectors

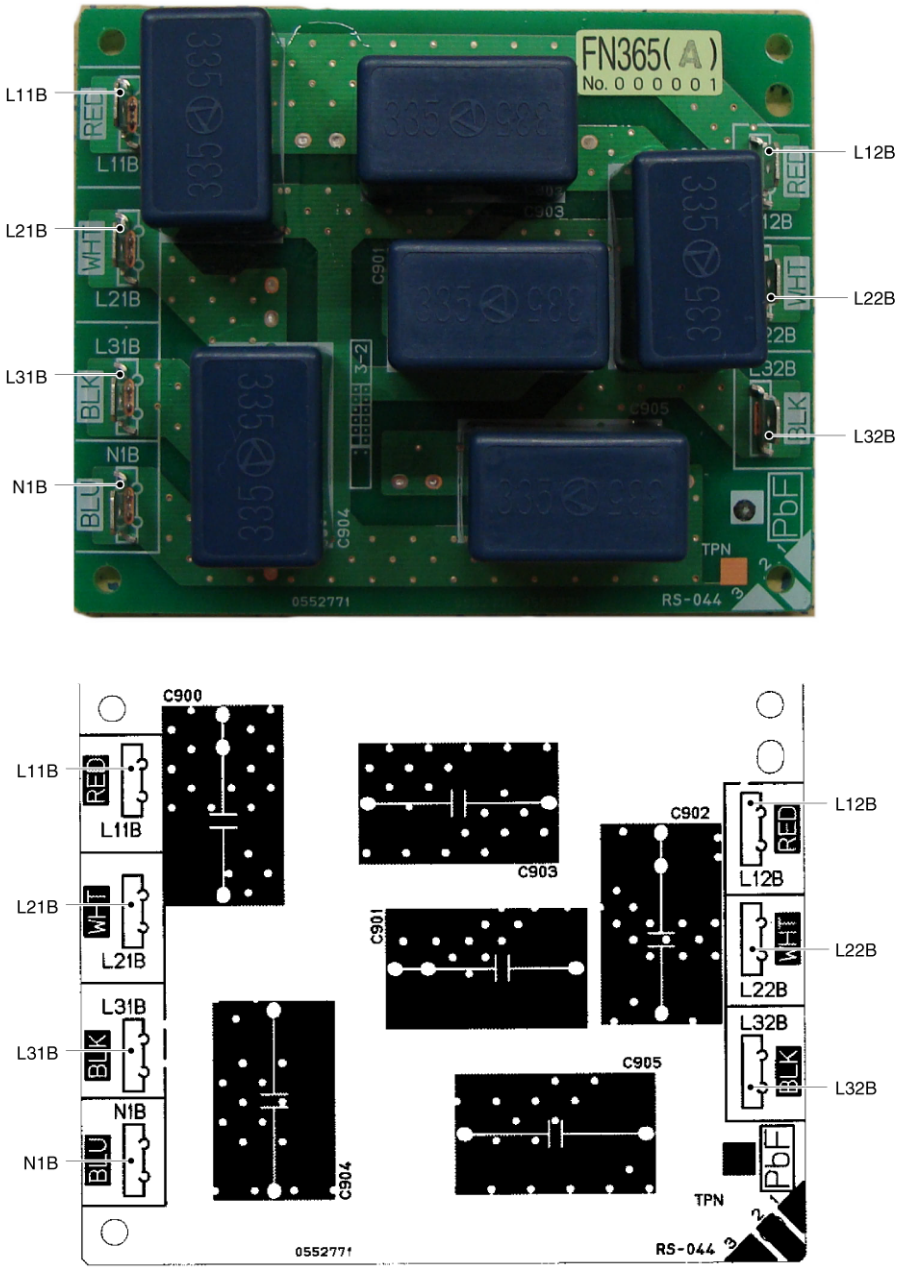
The table below describes the PCB connectors.

Connector	Connected to	Description
X108A	X8A	On Control PCB
X104A	X4A	On Control PCB
X32A	S1PH	High pressure switch
L12A	L1R	Reactor inverter M1C
L32A	L2R	Reactor inverter M1C
L22A	L3R	Reactor inverter M1C
WVU	M1C	Compressor
X191A	L4R	Reactor inverter M1F-M2F
W109A	X9A	On Control PCB
F7U	-	Fuse 1.0A / 250V for M1F-M2F (DC)
X106A	M1F	Fan Motor upper
X107A	M2F	Fan Motor lower
TP1	-	Inverter DC checkpin
TP2	-	Inverter DC checkpin
X141A	-	-
X142A	-	-
X111A	R7T	Inverter Fin thermistor
X105A	X5A	On Control PCB

1

Noise filter PCB (A3P)

The illustration below shows the PCB connectors.



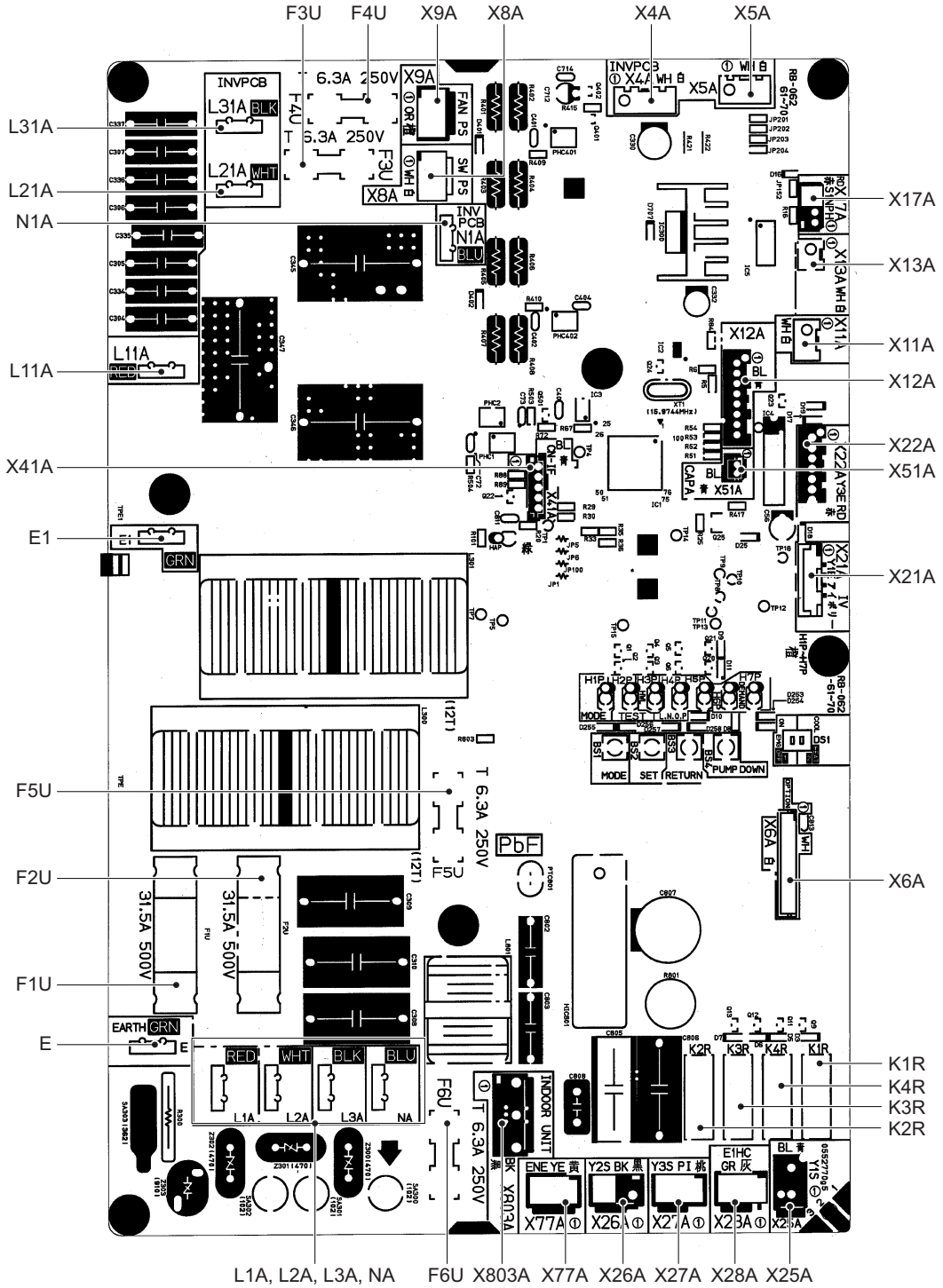
Connectors

The table below describes the PCB connectors.

Connector	Connected to	Description
L11B	L11A	On Control PCB (L1)
L21B	L21A	On Control PCB (L2)
L31B	L31A	On Control PCB (L3)
N1B	N1A	On Control PCB (N)
L12B	L1R	Reactor inverter M1C
L22B	L2R	Reactor inverter M1C
L23B	L3R	Reactor inverter M1C

7.5 PCB Layout for ERLQ011~016CAW1

Control PCB (A1P) The illustration below shows the PCB connectors.



1

Connectors

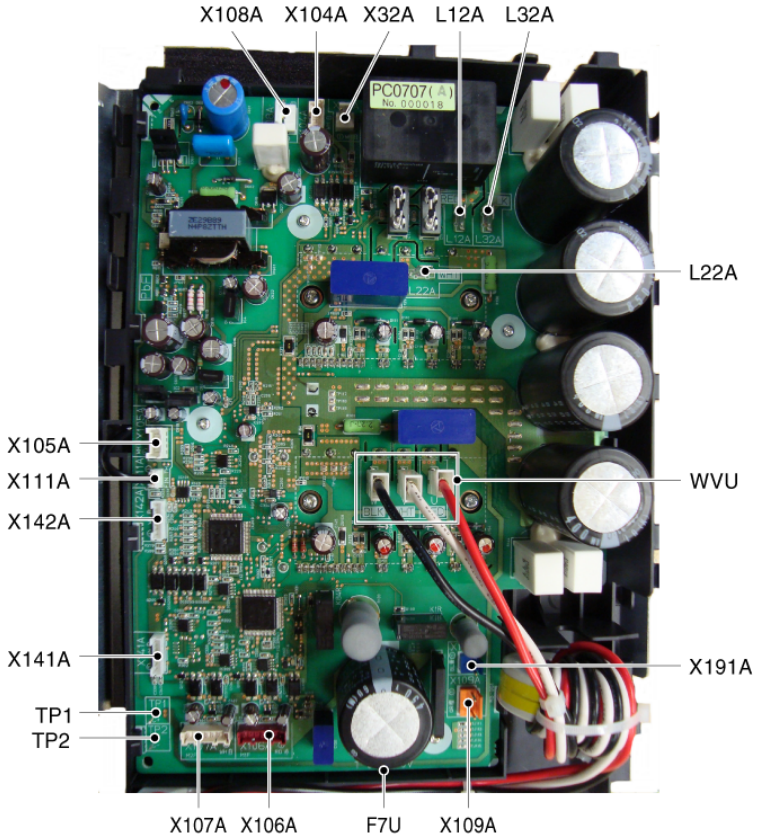
The table below describes the PCB connectors.

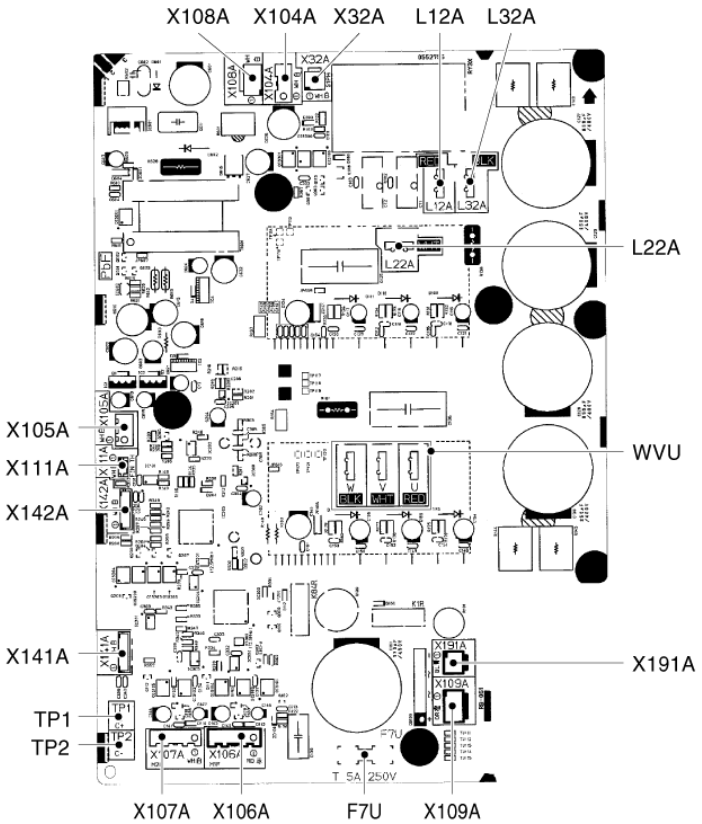
Connector	Connected to	Description
K1R	X25A/Y1S	Magnetic relay 4 way valve
K2R	X26A/E1H	Magnetic relay bottom plate heater
K3R	X27A/Y3S	Magnetic relay liquid injection valve
K4R	X28A/E1HC	Magnetic relay crankcase heater
X4A	X104A	On Inverter PCB
X5A	X105A	On Inverter PCB
X6A	-	For Optional PCB
X8A	X108A	On Inverter PCB (PS Module)
X9A	X109A	On Inverter PCB (Diode module fan motor)
X11A	R1T	Ambient thermistor
X12A	R2T-R5T	Discharge-Suction-HEX-HEX middle- thermistor
X13A	R6T	Liquid thermistor
X17A	S1NPH	Pressure sensor
X21A	Y1E	Electronic main expansion valve
X22A	Y3E	Electronic injection expansion valve
X25A	Y1S	4-way valve
X26A	E1H	Bottom plate heater
X27A	Y3S	Liquid Injection Valve
X28A	E1HC	Crankcase heater
X41A		
X51A		Connector for spare capacity adaptor
X77A	-	For Optional PCB
X803A	X1M (1-2-3)	Towards Hydrobox
N1A	N1B	On Noise filter A3P
L31A	L31B	On Noise filter A3P
L21A	L21B	On Noise filter A3P
L1A~NA	X1M (L1-L2-L3-N)	Towards main power supply
L11A	L11B	On Noise filter A3P
F6U	-	Fuse 6.3A / 250V for Hydrobox
F5U	-	Fuse 6.3A / 250V for Y1S-Y3S-E1HC-
F4U	-	Fuse 6.3A / 250V for M1F-M2F (AC)
F3U	-	Fuse 6.3A / 250V for PS Module A2P
F2U	-	Fuse 31.5A / 250V for Inverter Module L1 A2P
F1U	-	Fuse 31.5A / 250V for Inverter Module L2 A2P
E1	GRN	Protective earth
E	GRN	Protective earth
HAP	-	Indication CPU/power supply

1

Inverter PCB (A2P)

The illustration below shows the PCB connectors.





1

Connectors

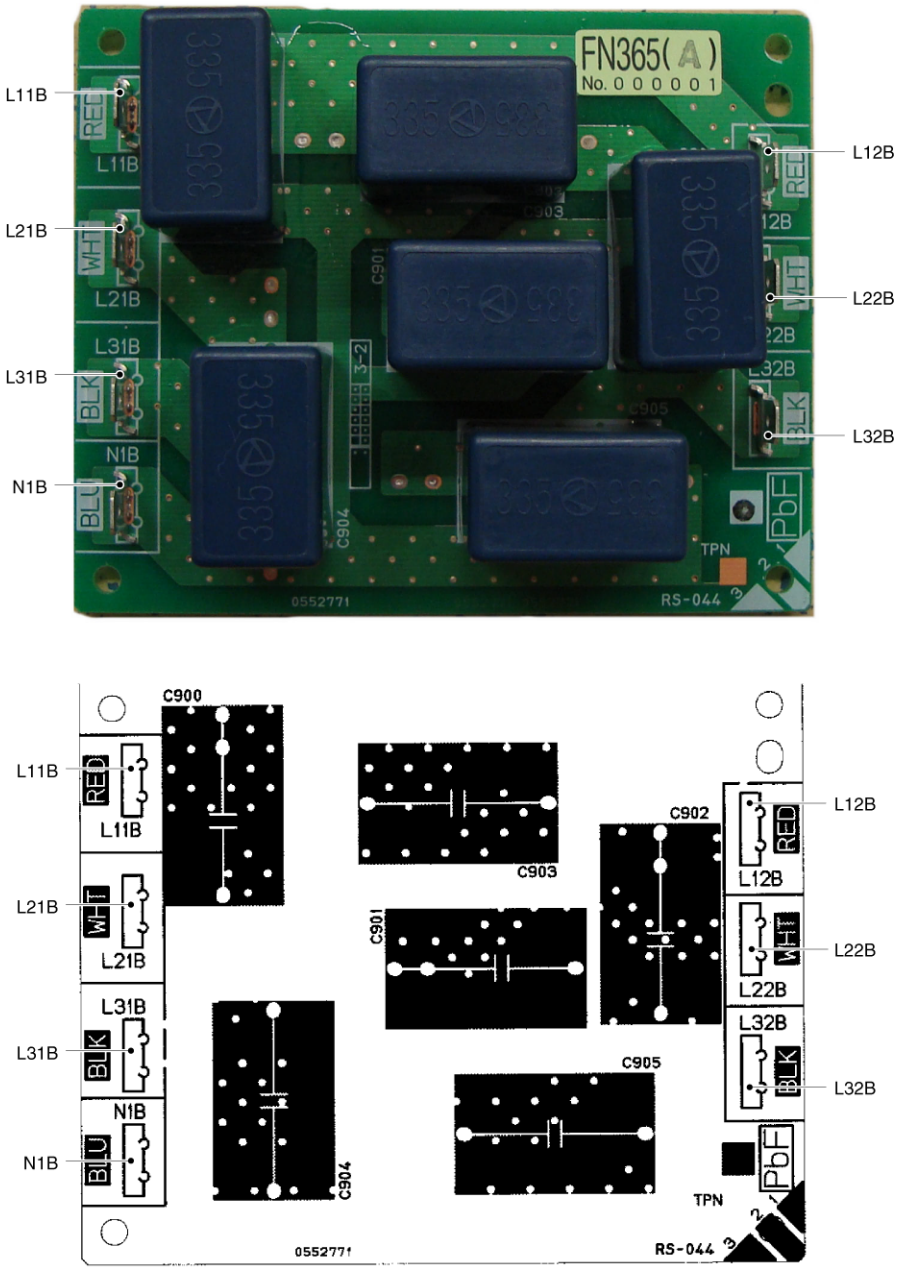
The table below describes the PCB connectors.

Connector	Connected to	Description
X108A	X8A	On Control PCB
X104A	X4A	On Control PCB
X32A	S1PH	High pressure switch
L12A	L1R	Reactor inverter M1C
L32A	L2R	Reactor inverter M1C
L22A	L3R	Reactor inverter M1C
WVU	M1C	Compressor
X191A	L4R	Reactor inverter M1F-M2F
W109A	X9A	On Control PCB
F7U	-	Fuse 1.0A / 250V for M1F-M2F (DC)
X106A	M1F	Fan Motor upper
X107A	M2F	Fan Motor lower
TP1	-	Inverter DC checkpin
TP2	-	Inverter DC checkpin
X141A	-	-
X142A	-	-
X111A	R7T	Inverter Fin thermistor
X105A	X5A	On Control PCB

1

Noise filter PCB (A3P)

The illustration below shows the PCB connectors.



Connectors

The table below describes the PCB connectors.

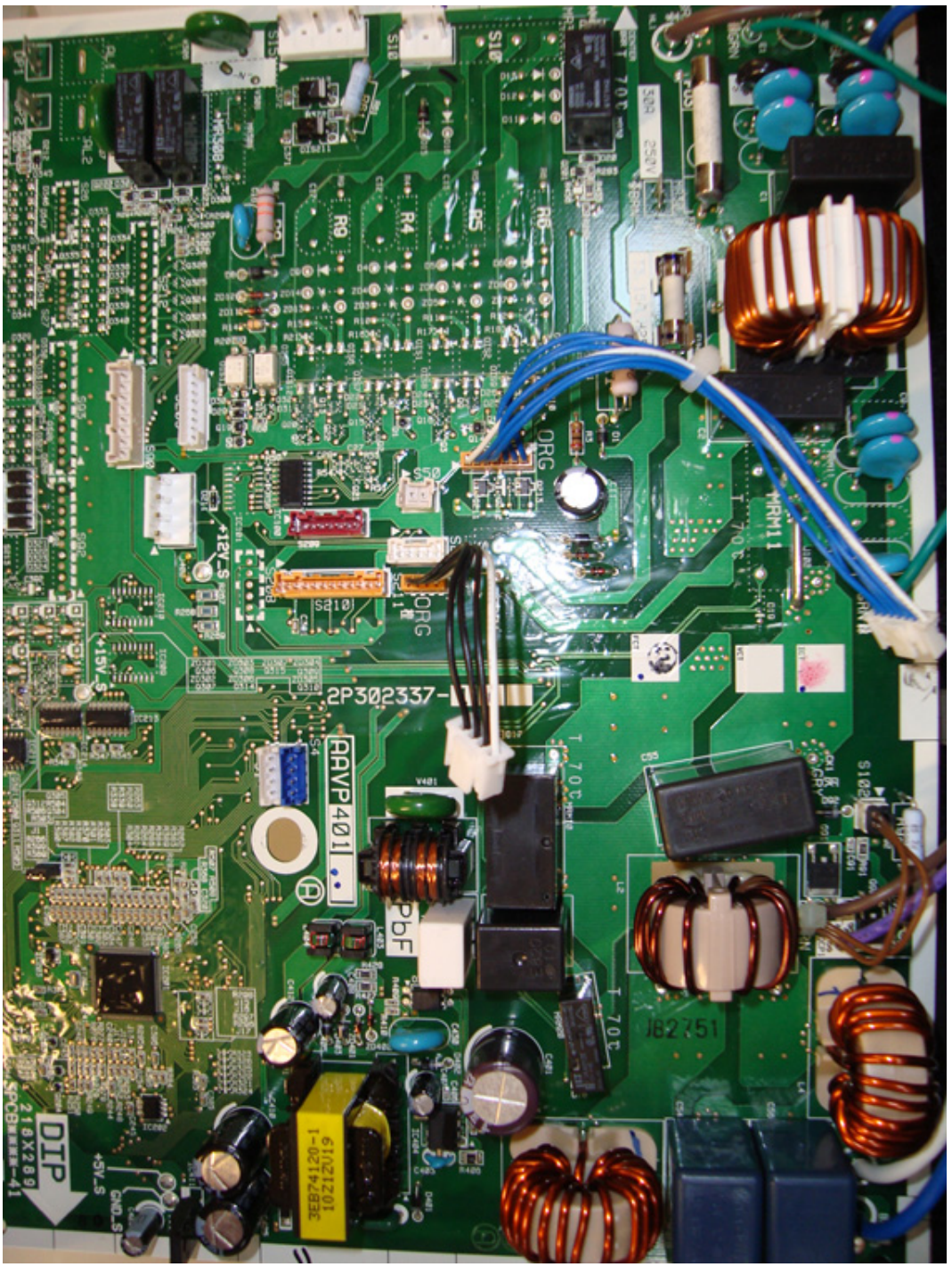
Connector	Connected to	Description
L11B	L11A	On Control PCB (L1)
L21B	L21A	On Control PCB (L2)
L31B	L31A	On Control PCB (L3)
N1B	N1A	On Control PCB (N)
L12B	L1R	Reactor inverter M1C
L22B	L2R	Reactor inverter M1C
L23B	L3R	Reactor inverter M1C

1

7.6 PCB Layout for ERLQ004CAV3

Main PCB

The illustration below shows the PCB connectors.

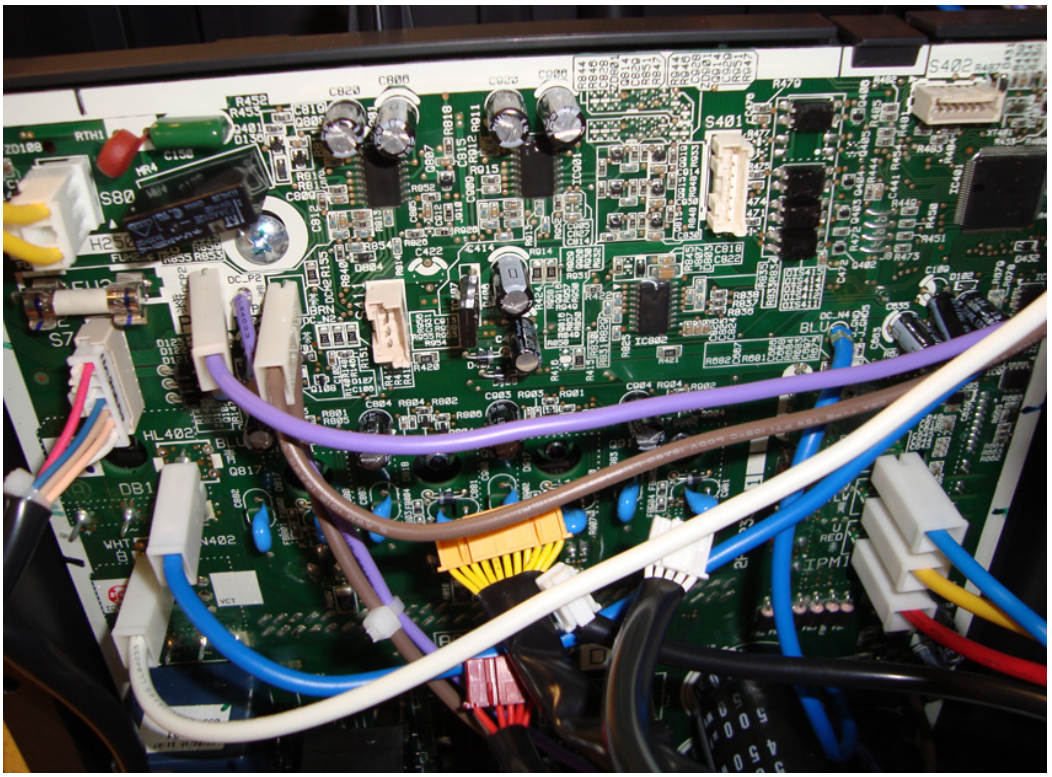


Connectors

To be completed.

Inverter PCB

The illustration below shows the PCB connectors.



Connectors

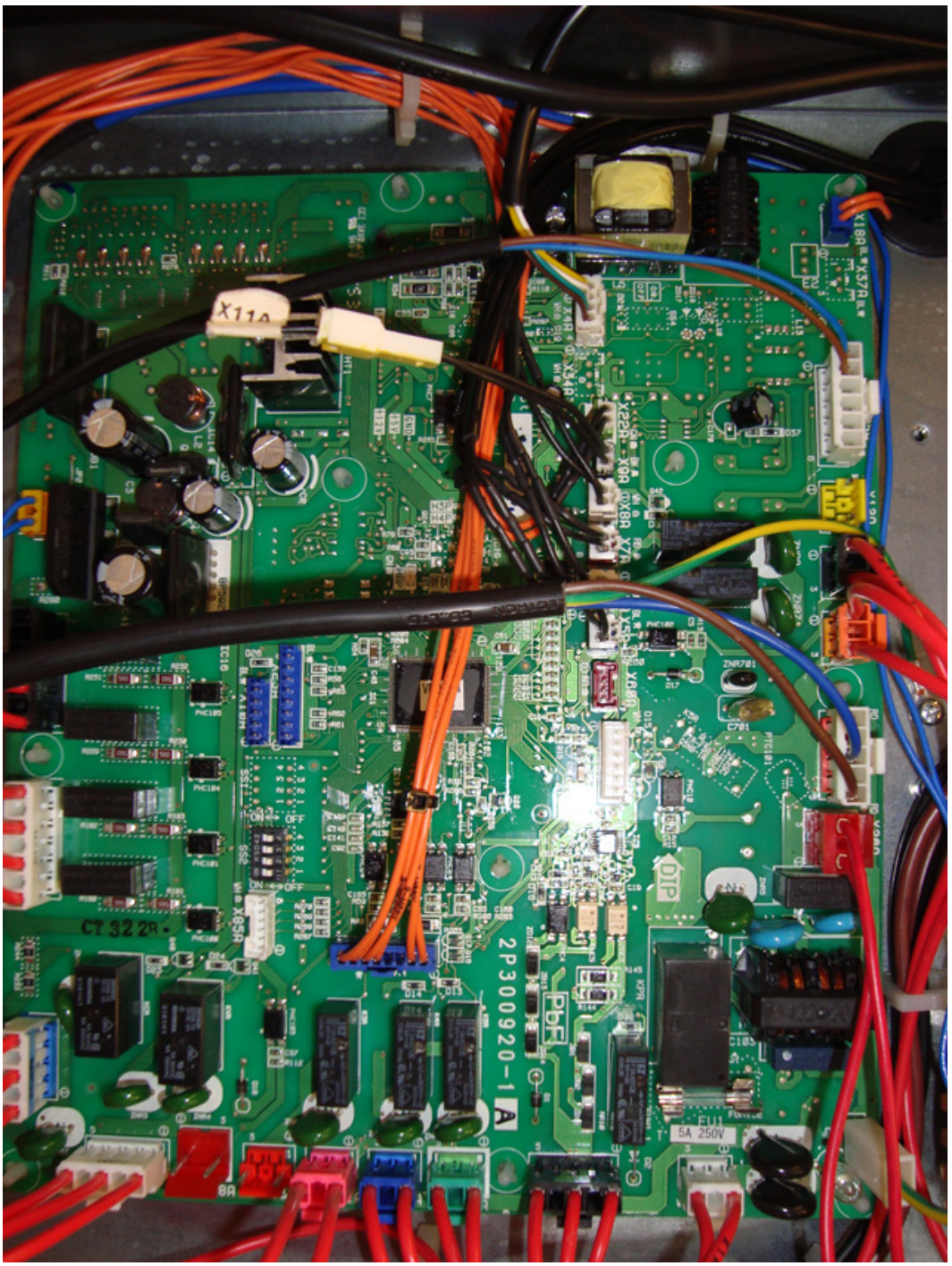
To be completed.

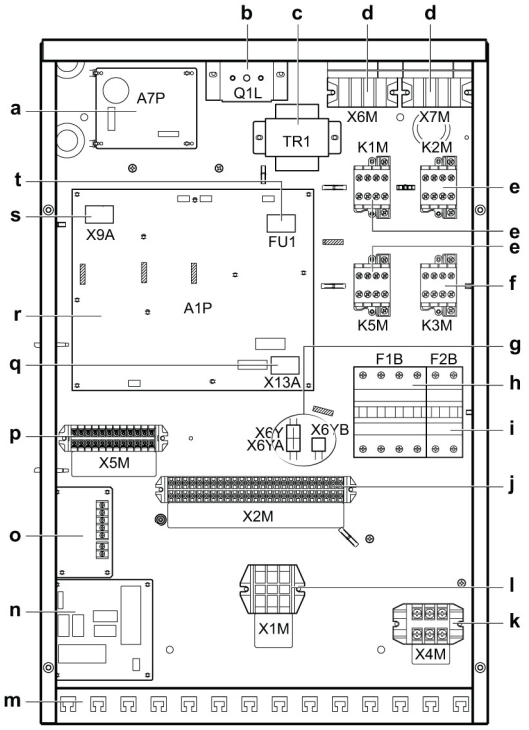
1

7.7 PCB Layout for EHB/V-CA

Main PCB

The illustration below shows the PCB connectors.





Connectors

The table below describes the PCB connectors for EHB/V-CA.

Item	Description
a	Pump PCB A7P (Inverter PCB)
b	Backup heater thermal protector Q1L
c	Transformer TR1
d	Terminals for backup heater X6M/X7M (*9W models only)
e	Backup heater contactors K1M, K2M and K5M
f	Booster heater contactor K3M
g	Connectors X6YA/X6YB/X6Y
h	Backup heater circuit breaker F1B
i	Booster heater circuit breaker F2B. (Only for installations with domestic hot water tank)
j	Terminal block X2M (high voltage)
k	Terminal block X3M. (Only for installations with domestic hot water tank)
l	Terminal block X1M (to outdoor unit)
m	Cable tie mountings
n	Digital I/O PCB A4P (only for installations with solar kit or digital I/O PCB kit)
o	Demand PCB for power limitation
p	Terminal block X5M (low voltage)
q	Socket X13A, receives the K3M connector. (Only for installations with domestic hot water tank)
r	Main PCB A1P
s	Socket X9A, receives the thermistor connector. (Only for installations with domestic hot water tank)
t	PCB fuse FU1

Part 2
Functional Description

What is in this part?

This part contains information on the functions used to control the system. Understanding these functions is vital when diagnosing a malfunction that is related to the functional control.

Overview

This part contains the following chapters:

Chapter	See page
1–General Functionality	2–3
2–Hydro-box Functional Concept	2–23
3–Outdoor Unit Functional Concept	2–37

1 General Functionality

1.1 What Is in This Chapter?

Introduction

This chapter will explain all functions not related to the compressor frequency control, outdoor unit fan control and expansion valve control. These functions have been programmed to ensure the unit's reliability and lifetime, enable the operation in case of malfunction.

Overview

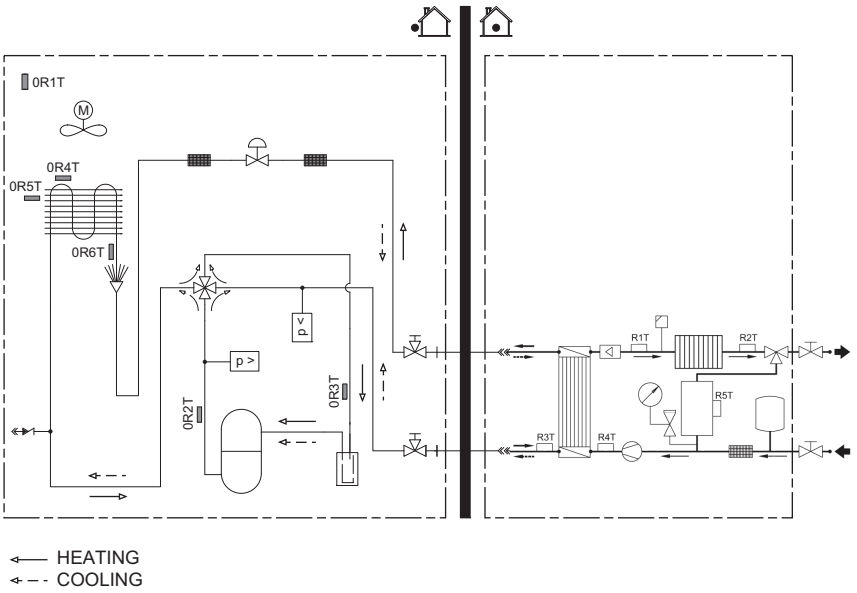
This chapter contains the following topics:

Topic	See page
1.2–Function of Thermistors	2–4
1.3–Forced Operating Mode (Emergency Operation)	2–7
1.4–Simulated Operation Function	2–9
1.5–Restart Standby	2–10
1.6–Automatic Restart	2–11
1.7–Forced Thermostat OFF	2–12
1.8–Test Run Control	2–13
1.9–4-way Valve Control	2–14
1.10–Pump Down and Forced Defrost Operation	2–15
1.11–Defrost Operation	2–16
1.12–Freeze Prevention Function	2–18
1.13–Crankcase Heater Control	2–19
1.14–Benefit kWh Rate Power Supply/Heatpump tariff	2–20

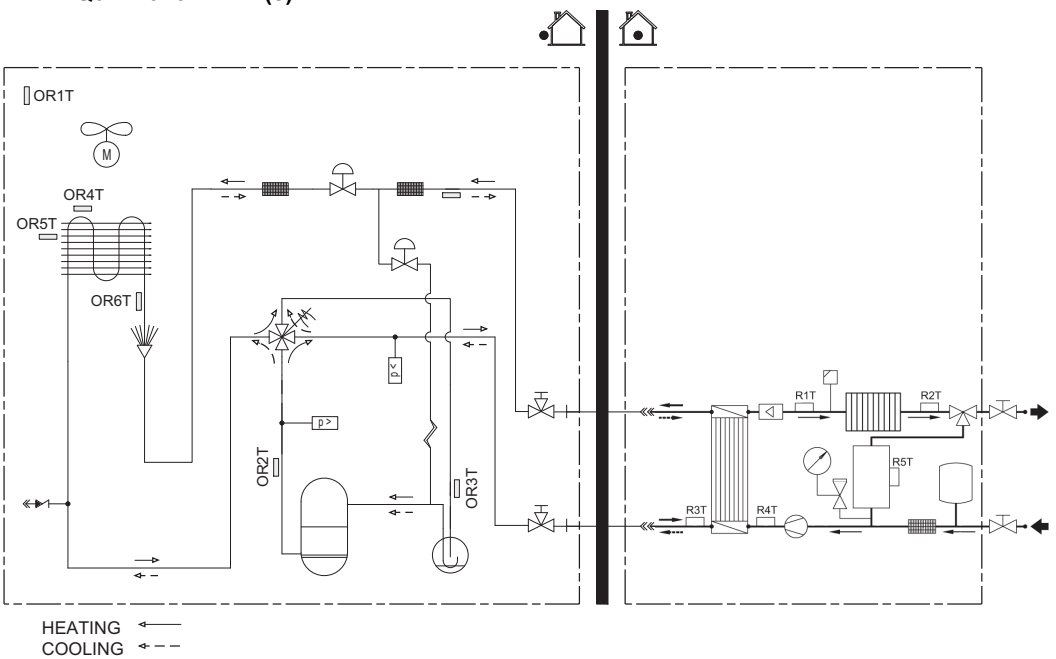
1.2 Function of Thermistors

Location of the thermistors

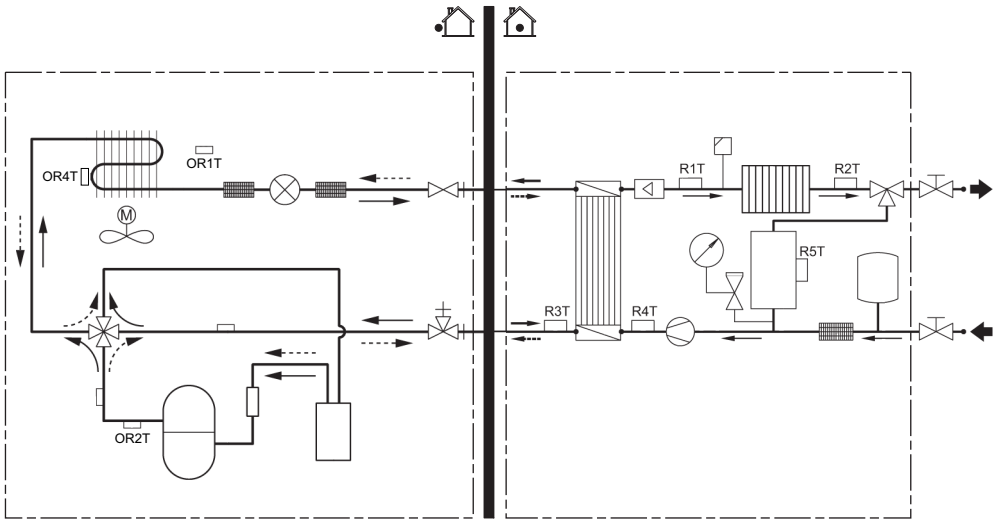
ERL/HQ011~016B/CV3(8)



ERL/HQ011~016B/CW1(8)



ERLQ004~008CAV3



HEATING
COOLING

2

Functions of the thermistors

Location	Thermistor	Mode	Function
Outdoor heat exchanger	OR4T	Cooling	■ Inverter current protection control
		Heating	■ Inverter current protection control ■ Defrost control
Outdoor ambient	OR1T	Cooling	■ Outdoor fan speed control ■ PMV control ■ Pressure difference control ■ Overall current protection control
		Heating	■ Defrost control ■ Forced thermostat OFF ■ Overall current protection control
Discharge pipe	OR2T	Cooling	■ Discharge superheat control ■ Expansion valve control ■ Crankcase heater
		Heating	■ Expansion valve control ■ Crankcase heater
Suction pipe	OR3T	Cooling	■ Expansion valve control (SH control)
		Heating	■ Expansion valve control (SH control) ■ Suction pipe superheat protection control
Inverter power module	OR10T (V3) OR7T (W1)	Cooling	■ Outdoor fan speed control ■ Inverter fin temperature control ■ Pressure difference control
		Heating	■ Inverter fin temperature control
Outdoor heat exchanger middle temperature	OR5T	Cooling	■ Calculate the expected high pressure ■ Outdoor fan speed control
		Heating	■ Calculate the expected low pressure
Liquid refrigerant temperature	OR6T	Heating	■ Calculate the subcool ■ Expansion valve control
Outlet water temperature after PHE	R1T	Cooling Heating	■ Controlling the H/P operation (thermostat ON/OFF, capacity control) ■ Freeze prevention control
Outlet water temperature after BUH	R2T	Heating	■ Controlling the BUH operation (thermostat ON/OFF, capacity control)
Liquid refrigerant temperature	R3T	Cooling	■ Compressor frequency control (target Te) ■ Freeze-up control
		Heating	■ Compressor frequency control (target Tc) ■ Hot start control ■ Peak cut-OFF
Inlet water temperature	R4T	Heating	■ Start up control (BUH), temperature drop prevention (defrost) ■ Freeze prevention control
DHW temperature (on tank)	R5T	DHW	■ Controlling the H/P, BSH or BUH operation (thermostat ON/OFF), DHW priority instruction

1.3 Forced Operating Mode (Emergency Operation)

Purpose

The table below describes the purpose of the forced operating mode.

If...	Then...
■ R/C is defective ■ Indoor PC board is defective ■ Outdoor PC board is defective	Forced operating mode can be used to go to cooling or heating. In forced operating mode, the compressor is forced to operate until the defective indoor or outdoor PC board is back online.

Starting conditions

You can operate the system manually by changing the emergency switch on the outdoor PC board from "normal" to "emergency". When the system is operating in "emergency" it can not control the water temperature. Compressor will operate with fixed capacity request.

The outdoor unit must be set to "emergency" while the power is off.

Ending conditions

You can end the emergency operation by changing the "emergency" switch back to "normal" while the power is OFF.

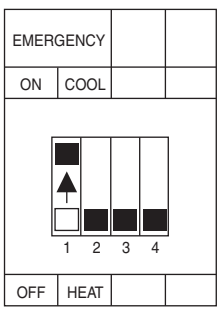
Emergency operation

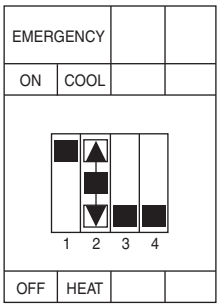
Below table explains what will happen when the switch is set to "emergency":

Changing the switch to "emergency" for the…	Switches ON the…
Hydro-box	■ Pump
Outdoor unit	■ Compressor ■ Outdoor fan(s)

How to set Emergency operation

To set emergency operation, proceed as follows:

Step	Action
1	Turn OFF the power.
2	Switch ON the emergency switch on the outdoor PCB. 

Step	Action
3	Set the emergency switch on the outdoor PCB to the forced mode you prefer (Cooling or Heating). 
4	Turn ON the power supply.

Remark: This is overruling field setting [4-06] which defines if during emergency, the BUH is allowed or not.

Active components

Component	Forced cooling	Forced heating	Forced defrosting
Compressor	ON	ON	ON
4-way valve	OFF	ON	OFF
Outdoor unit fan	H fan speed	H fan speed	OFF
Hydro-box pump	ON	ON	ON

Attention! **Confirm the operation of the hydro-box pump during forced operation.**

Additional info

- During emergency operation, hydro-box should be active and remote controller will show actual error code (reason for emergency mode by outdoor).
- If a safety device is activated during emergency, all actuators are turned OFF
  - Freeze-up prevention (Cooling)
  - High pressure control (Heating)
- In cooling, the unit runs for 20 minutes and then stops for 10min in order to avoid freeze-up of the indoor coil.
- In heating, defrost is activated for 3 minutes once every hour.
- The unit will not regulate the temperature during emergency operation.
- Change the position of the emergency switch only when the power is turned off.
- In case outdoor unit broken/no outdoor unit connected:
  - The hydro-box will go automatically in emergency operation.
    The space heating and/or Hot water operation will be performed by the backup or/and Booster heater only.
- Emergency operation by outdoor unit will only operate in case a malfunction is applicable.

Remark: Emergency operation by indoor unit (automatic function), will only operate BUH and BSH and not the compressor.

1.4 Simulated Operation Function

General description

In case of a thermistor malfunction, simulated operation is performed in two different ways as shown below even while the malfunction is detected.

A. Operation continues while the malfunction code is displayed on the remote controller.

Applicable thermistors:

- Outside air temperature thermistor
- Heat exchanger distribution pipe thermistor (in cooling operation only)
- Intermediate heat exchanger thermistor (in heating operation only)
- Liquid pipe thermistor
- Indoor heat exchanger thermistor

B. Operation continues even when the malfunction is detected. The remote controller displays "ⓘ". Only when the button is pushed, the malfunction code appears.

Applicable thermistors:

- Radiation fin thermistor

Note

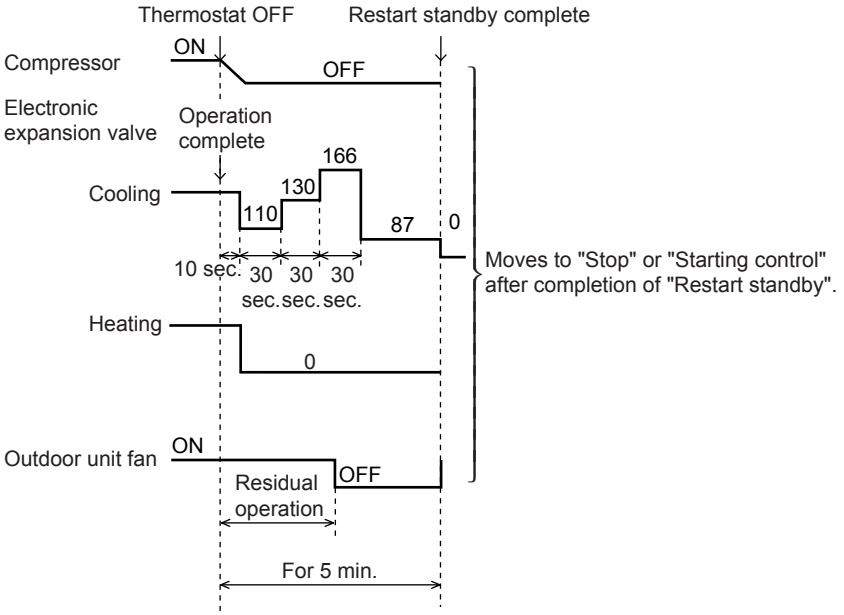
In case of a thermistor malfunction other than A and B above, a malfunction stop is made and no simulated operation is carried out.

Applicable thermistors:

- Suction pipe thermistor
- Discharge pipe thermistor
- Heat exchanger distribution pipe thermistor (in heating operation only)
- Intermediate heat exchanger thermistor (in cooling operation only)

1.5 Restart Standby

To prevent compressor from frequent ON/OFF and equalize pressure in refrigerant line, conducts forced thermostat OFF for 3-5 minutes after compressor stopping. Moreover, outdoor unit fan conducts residual operation for a period of time for pressure equalization and prevent refrigerant from entering in the evaporator.



1.6 Automatic Restart

Purpose

The purpose of the auto-restart function is to automatically resume the same operating mode as when the unit was operating when the power supply is restored after a power failure.

Do not use the "Automatic Restart" function to daily start/stop the unit.

Precautions when turning OFF power

- When you have to turn OFF the power supply in order to carry out maintenance, make sure to turn the remote control's ON/OFF switch OFF firstly.
- If you turn OFF the power supply while the remote control's ON/OFF switch is still ON, the "automatic restart function" automatically starts the hydro-box pump immediately and the outdoor unit fan starts automatically 3 minutes after the power supply is turned back ON.
- Do not start/stop the unit by disconnecting the power supply. Stop the unit by stop commando from the remote controller or optional controller before disconnecting the power supply. Be sure that the compressor and the outdoor fans are stopped before disconnecting the power supply so the "Refrigerant Recovery function" has been finished correctly.
- When restarting the unit after the power was disconnected for a longer period leave the unit OFF with the power supply connected for about half an hour to prevent liquid slug of compressor (See "Crankcase Heater Control").

Notice

Auto-restart can be enabled/disabled through setting A.6.1. or overview setting [3.00].

1.7 Forced Thermostat OFF

Outline

The unit will perform the forced thermostat off function in following conditions:

Condition 1 (Cooling)

- Thermostat off due to freeze-up prevention.
  Based on the judgment to prevent the indoor heat exchanger from freezing, the thermostat is forcedly turned OFF.
- Thermostat off due to low outdoor temperature

  When the outside temperature is <10°C DB in Cooling mode, the unit will conduct a forced thermostat off operation to protect the system.

Condition 2 (Heating)

Thermostat off due to low / high outdoor temperature.

- When the outside temperature is out of the operation range in heating mode, the unit will conduct a forced thermostat off operation to protect the system.

Condition 3 (Hot water operation)

Thermostat off due to low / high outdoor temperature

- When the outside temperature is out of the operation range in Hot water operation mode, the unit will conduct a forced thermostat off operation to protect the system.

Note

- Forced thermostat involves that compressor can not operate anymore, but backup heater and booster heater can still operate.
- See also "1.12–Freeze Prevention Function" on page 2–18.

1.8 Test Run Control

Purpose

When operating the units for the first time after installation, the unit will - depending on the selected operation mode - perform a test run operation first.

Automatic test run

When the unit is put into operation (by pressing the button) for the first time, the system will automatically perform a test run in cooling mode. The test run will take up to 3 minutes, during which no specific indication is given on the user interface.

During the automatic test run, it is important to ensure that the water temperature does not drop below 10°C, which might activate the freeze-up protection and thereby prevent the test run to finish.

Should the water temperature drop below 10°C, press the ☀/❄ button so the ☀ icon is displayed. This will active the backup heater during the automatic test run and raise the water temperature sufficiently.

If the automatic test run has ended successfully, the system will automatically resume normal operation.

If there are misconnections or malfunctions, an error code will be displayed on the user interface. To resolve the error codes, see "Troubleshooting".

Note

- When the outdoor unit is put into pump down operation (see the outdoor unit installation manual), the automatic test run flag will be cleared. The next time the system is put into operation, the automatic test run will be executed again.
- When running in test run mode, the unit will sense on site installation parameters (e.g.: failure to open stop valves,...) and indicate the applicable malfunction code if required.
- If the remote controller shows E3, E4 or L8 as an error code, it is possible that the stop valve is closed.
- Check the inter unit branch wiring connection (1-2-3 wiring) when error code U4 or UF is displayed on the remote controller.
- When error code U2 is displayed on the remote controller, check for voltage imbalance.
- When error code L4 is displayed on the remote controller, it is possible that the air flow passage is closed.
- When there is no error code displayed, cooling operation continues without interruption. (However, this control is once again performed after refrigerant is recovered by means of the pump down switch and at the time of the first operation after the outdoor PC board replacement.)

1.9 4-way Valve Control

Purpose

The purpose of the 4-way valve control is to control how the superheated refrigerant passes through the 4-way valve. The 4-way valve control carries out the changeover switching of the 4-way valve. This changeover switching is only carried out during operation, because a certain pressure difference is required to move the internal cylinder.

When...	Then the 4-way valve connects the outlet of the compressor with...
Cooling	Outdoor heat exchanger
Heating	Indoor heat exchanger

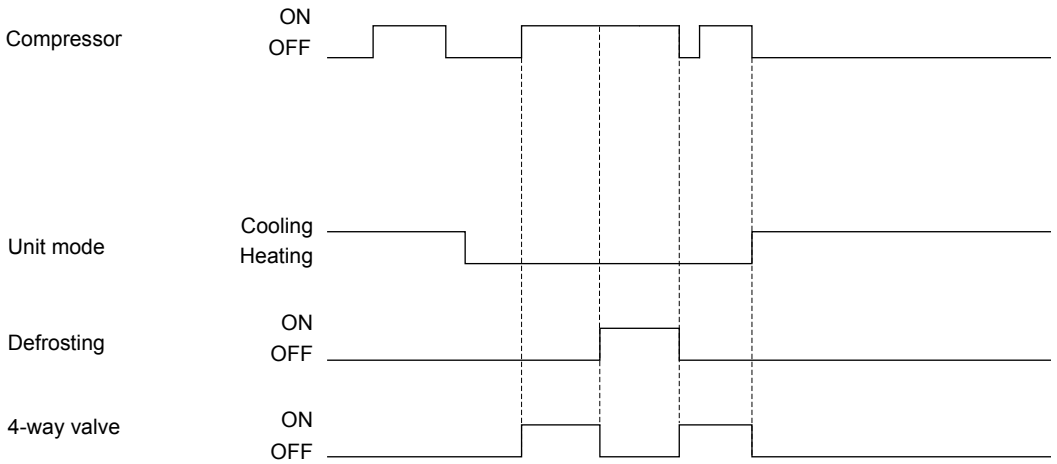
Method

The table below describes the 4-way valve control operation.

In...	The 4-way valve is...
■ Heating, except for defrosting	ON
■ Cooling ■ Defrosting	OFF

Time chart

The time chart below illustrates the 4-way valve control.



1.10 Pump Down and Forced Defrost Operation

Outline

This unit is equipped with an automatic pump down operation which will collect all refrigerant from the field piping and hydro-box in the outdoor unit. To protect the environment, make sure to perform the following pump down operation when relocating or disposing of the unit.

Note

The outdoor unit is equipped with a low pressure sensor to protect the compressor by switching it off. Never short-circuit the low pressure sensor during pump down operation!

Procedure

GBS:

1. Remove the valve lid from liquid stop valve and gas stop valve.
2. Carry out forced cooling operation by pressing SW3 on the service PCB.
3. After 5-10 min (after only 1-2 min in case of very low Ta < -10°C), close the liquid stop valve with a hexagonal wrench.
4. Check on the manifold if vacuum is reached.
5. After 2-3 minutes, close gas stop valve and stop forced cooling operation by pressing forced cooling operation switch SW3 on the service PCB again.

GQI:

1. Stop space and DHW demand (all screens of user interface OFF) and select Max pump speed.
2. Switch-OFF / ON the power supply of the outdoor unit.
3. Activate "pump down/forced defrost" on outdoor PCB via BS4, press for at least 5 seconds.
4. The compressor and outdoor fan will start automatically.
5. Request space heating via remote controller on hydro-box asap, in order to activate the circulation pump (prevent PHE freeze-up) and allow BUH operation if required.
6. **a.** Forced defrost can be stopped by pressing BS4 on outdoor PCB.

   b. Once operation stops (after 3 to 5 minutes), close the liquid and the gas stop valve.
7. Pump down is now finished. U4 may be displayed on the remote controller, this is not a malfunction.
8. After "pump down/forced defrost" is finished or stopped, keep the circulation pump running for at least 5 minutes.
9. Switch-OFF the power supply of the outdoor unit.

Note

- Make sure that the water temperature and volume is sufficient to perform the "pump down/forced defrost" operation.
- Make sure to re-open both stop valves before restart operation of the unit.
- After a finished or stopped pump down, the unit will perform a test run at first operation (same as during commissioning).
- On the ERLQ*CA* models, the circulation pump will run automatically (step 5 not needed).
- During forced cooling, water temperature should remain higher than 5°C.
- Forced defrost can also be enabled through setting A.6.6. on the user interface.

1.11 Defrost Operation

Outline

When the unit is operating in heating mode, a defrost operation will be conducted in order to avoid ice formation on the outdoor unit heat exchanger.

2

Defrost starting conditions

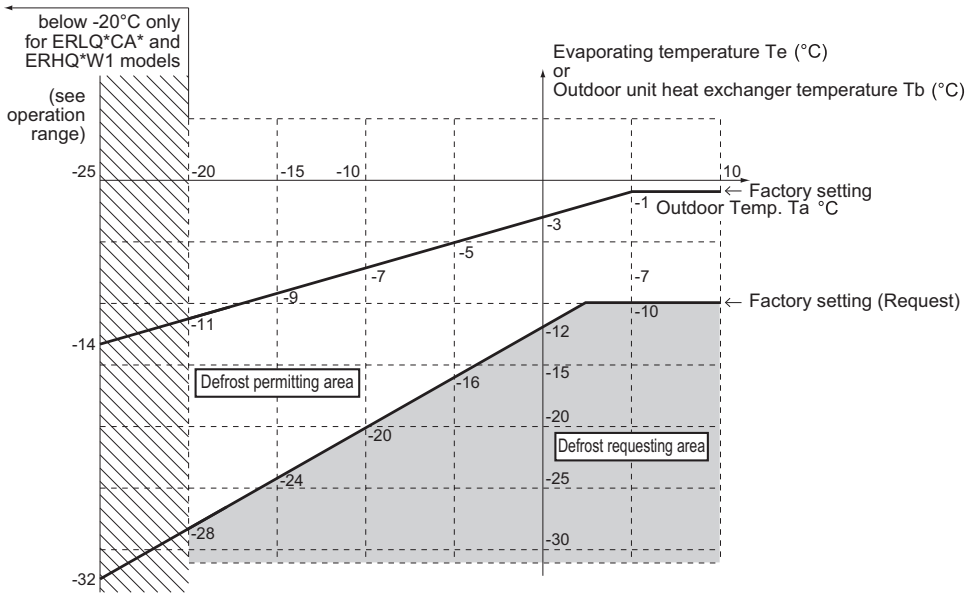
1 Defrost will start when the following conditions have been realized:

- Integrated compressor running time is 25 minutes or more since the completion of the previous defrost operation.

&

OR

- Defrost upper limit time A is met.
- Outdoor unit heat exchanger area temperature (Tb) is within the defrost requesting area.



2 Forced defrost switch “BS4”.

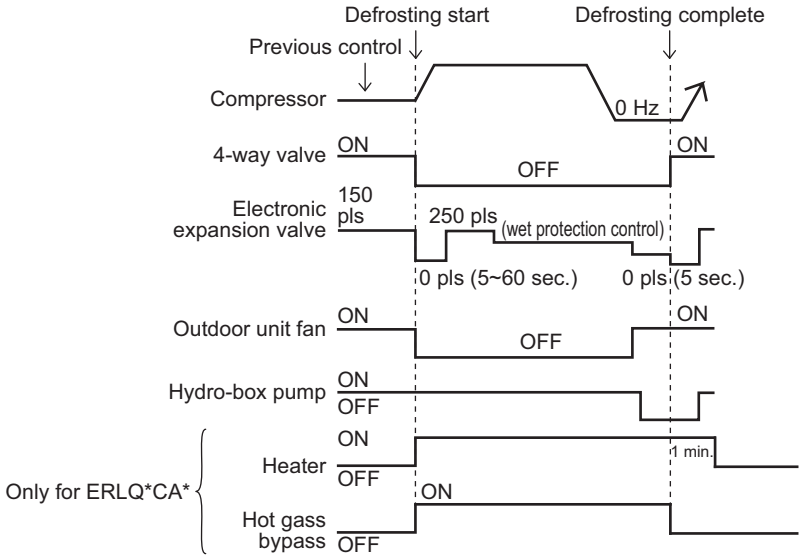
3 After one hour of heating operation in emergency operation.

Areas

Defrost upper limit A

- Outdoor temperature > -5°C : 2 hours
- Outdoor temperature ≤ -5°C : 2 hours

Defrost control



Defrost ending conditions

Defrosting ends when the following conditions have been realized. Note that defrosting can be operated for 10 minutes at longest.

- OR
  - & (
    - Defrost Time>1 min.
    - Tb>12°C
  - & (
    - Defrost Time>1 min.
    - Water outlet temperature < / = 2,5°C
  - & (
    - Defrost Time>10 min.
    - Tb>9°C
  - & (
    - Defrost Time>10 sec.
    - Hp>2.45 MPa

1.12 Freeze Prevention Function

Purpose

In order to avoid formation of ice on the hydro-box heat exchanger in cooling mode, the system automatically starts up a freeze prevention cycle when a number of specific conditions are fulfilled.

2

Freeze Prevention start conditions

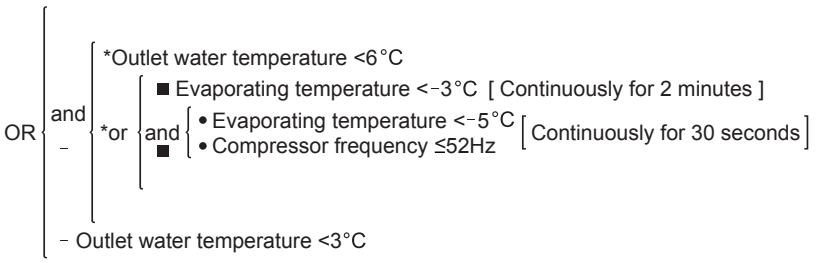
Freeze prevention start decided by the hydro-box.

Action

When start condition is met, the compressor will be forced stopped for a minimum of three minutes.

Freeze prevention - Reset conditions

After three minutes forced stop, the compressor operation permission will be released in case the outlet water temperature > outlet water setpoint + 3°C.

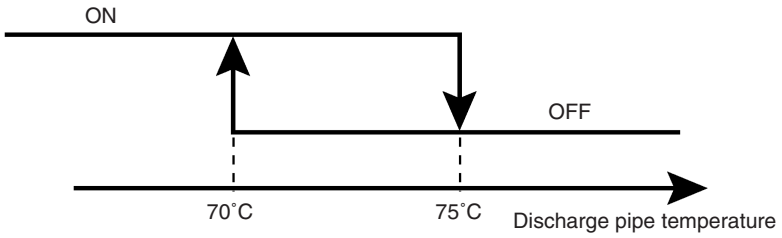


1.13 Crankcase Heater Control

Outline

After the compressor has been turned off, the crankcase heater control will be activated in order to avoid refrigerant from dissolving in the compressor oil.

Trigger conditions



1.14 Benefit kWh Rate Power Supply/Heatpump tariff

Electricity companies throughout the world work hard to provide reliable electric service at competitive prices and are often authorized to bill clients at benefit rates. E.g. time-of-use rates, seasonal rates, Wärmepumpentarif in Germany and Austria, ...

This equipment allows for connection to such benefit rate power supply delivery systems.

Consult with the electricity company acting as provider at the site where this equipment is to be installed to know whether it is appropriate to connect the equipment in one of the benefit kWh rate power supply delivery systems available, if any.

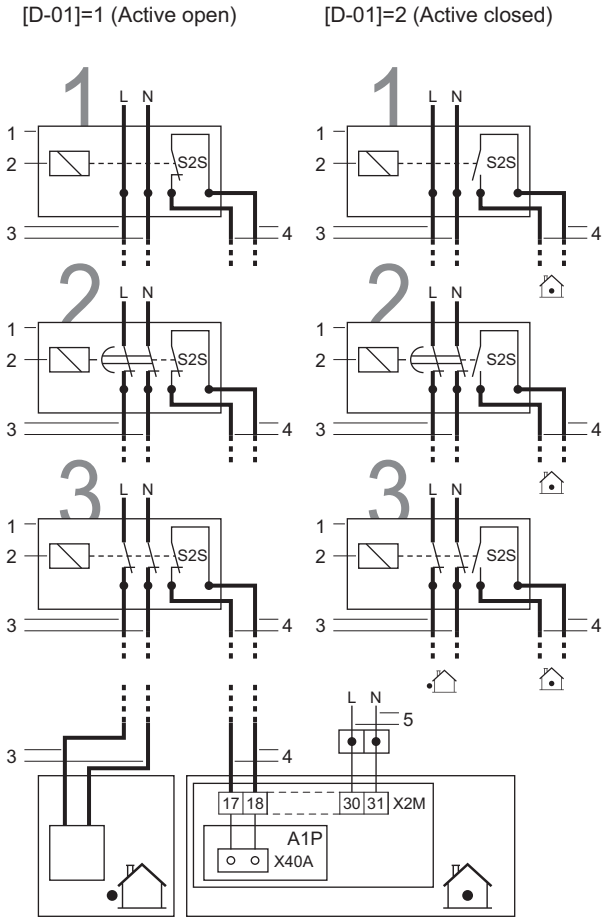
When the equipment is connected to such benefit kWh rate power supply, the electricity company is allowed to:

- interrupt power supply to the equipment for certain periods of time
- demand that the equipment only consumes a limited amount of electricity during certain periods of time.

The indoor unit is designed to receive an input signal by which the unit switches into forced off mode. At that moment, the outdoor unit compressor will not operate.

Possible types of benefit kWh rate power supply

Possible connections and requirements to connect the equipment to such power supply are illustrated in the figure below ([D-01] = Preferential kWh Rate):



1 Benefit kWh rate power supply box
2 Receiver controlling the signal of the electricity company
3 Power supply to outdoor unit (refer to the installation manual delivered with the outdoor unit)
4 Voltage free contact to indoor unit
5 Normal kWh rate power supply

When the outdoor unit is connected to a benefit kWh rate power supply, the voltage free contact of the receiver controlling the benefit kWh rate signal of the electricity company must be connected to clamps 17 and 18 of X2M (as illustrated in the figure above).

When parameter [D-01]=1 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will open and the unit will go in forced off mode. When the signal is released again, the voltage free contact will close and the unit will restart operation. It is therefore important to leave the auto restart function enabled (setting [3.00] or A.6.1.).

When parameter [D-01]=2 at the moment that the benefit kWh rate signal is sent by the electricity company, that contact will close and the unit will go in forced off mode. When the signal is released again, the voltage free contact will open and the unit will restart operation. It is therefore important to leave the auto restart function enabled (setting [3.00] or A.6.1.).

- type 1

  The benefit kWh rate power supply is of the type that power supply is not interrupted.

- type 2

  The benefit kWh rate power supply is of the type that power supply will be interrupted after elapse of time.

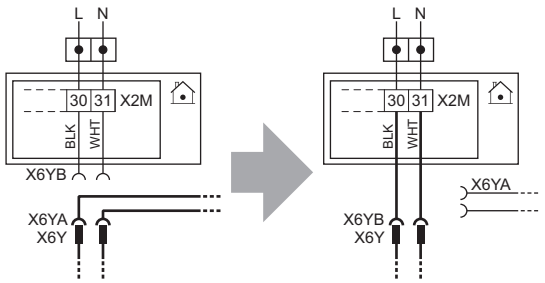
- type 3

  The benefit kWh rate power supply is of the type that power supply will be interrupted immediately.

Connect the indoor unit to a normal kWh rate power supply

If the benefit kWh rate power supply is of type 2 or 3 (power interruption of main power supply to outdoor unit), the indoor unit should be connected to a normal kWh rate power supply to allow continuous indoor control and operation (e.g., pump).

Disconnect terminal X6YA from X6Y and connect X6YB to X6Y.



Warning!

- Benefit kWh rate power supplies that completely shut power supply like illustrated above as types 2 and 3 are not allowed for this application because of the water freeze prevention that would not be powered.

Note

- If the benefit kWh rate power supply is of the type that power supply is not interrupted, the unit will be forced to go off. Controlling the solar pump is still possible.
- Water pipe freeze prevention has higher priority than benefit kWh rate. In case of water piping freeze prevention, the backup heater can function while the unit is in forced off mode by benefit kWh function.

Note (Information)

- When connecting the equipment to a benefit kWh rate power supply, change field setting [D-01]. When benefit kWh rate power supply is of type 1 or indoor unit is connected to a normal kWh rate power supply (via 30-31, X2M) change both field settings [D-01] and [D-00].
- If the benefit kWh rate power supply is of type 1 or indoor unit is connected to a normal kWh rate power supply, the unit will be forced to off. Controlling the solar pump is still possible.
- If the benefit kWh rate power supply is of type 2 or 3 and indoor unit is not connected to a normal kWh rate power supply, then the heaters cannot be controlled. This power supply interruption should not be longer than 2 hours, otherwise the real time clock of the controller will be reset. During power supply interruption, the controller display will be blank.
- Related to heatpump tariff during defrost operation:
  - If forced stop through indoor signal: when power comes back on and defrost conditions are met, defrost operation will start after 6 minutes of compressor operation.
  - If power to outdoor is cut (no signal): when power comes back on and defrost conditions are met, defrost operation will start after 20 minutes of compressor operation.

2 Hydro-box Functional Concept

2.1 What Is in This Chapter?

Introduction

This chapter will explain more details about the various functions that are programmed for the hydro-box.

Overview

This chapter contains the following topics:

Topic	See page
2.2–Hydro-box Pump Blockage Prevention Control	2–24
2.3–General Hydro-box Pump Troubleshooting by Led (GBS Only)	2–25
2.4–Hydro-box Pump Operation Control	2–26
2.5–Defrost control	2–28
2.6–Cooling operation	2–29
2.7–Heating operation	2–30
2.8–H/P hot water heating operation	2–31
2.9–H/P hot water heating priority function	2–32
2.10–Booster heater operation	2–33
2.11–Backup heater operation	2–34
2.12–Emergency operation	2–36

2.2 Hydro-box Pump Blockage Prevention Control

Outline

In order to prevent pump operation failure (blockage) due to no pump operation for long-term, pump will operate at regular intervals.

General

In case the pump was not operating for continuously 24 hours, pump will run for a short period.

2.3 General Hydro-box Pump Troubleshooting by Led (GBS Only)

Yonos Para Pump (for GBS only).

LED	Meaning	Diagnostic	Cause	Remedy
lights green	Pump in operation	Pump runs according its setting	Normal operation	
blinks quick green	RKA model:	Pump runs during 10 min in air venting function. Afterwards the targeted performance must be adjusted.	Normal operation	
	PWM model:	Pump in standby	Normal operation	
blinks red/ green	Pump in function but stopped	Pump restarts by itself after the fault is disappeared	1. Undervoltage U<160 V or Overvoltage U>253 V	1. Check voltage supply 195 V < U < 253 V
			2. Module overheating: temperature inside motor too high	2. Check water and ambient temperature
blinks red	Pump out of function	Pump stopped (blocked)	Pump does not restart by itself due to a permanent failure	Change pump
LED off	No power supply	No voltage on electronics	1. Pump is not connected to power supply	1. Check cable connection
			2. LED is damaged	2. Check if pump is running
			3. Electronics are damaged	3. Change pump

2.4 Hydro-box Pump Operation Control

Outline

When heating / cooling and (or) domestic hot water operation is activated the pump will operate.

Details

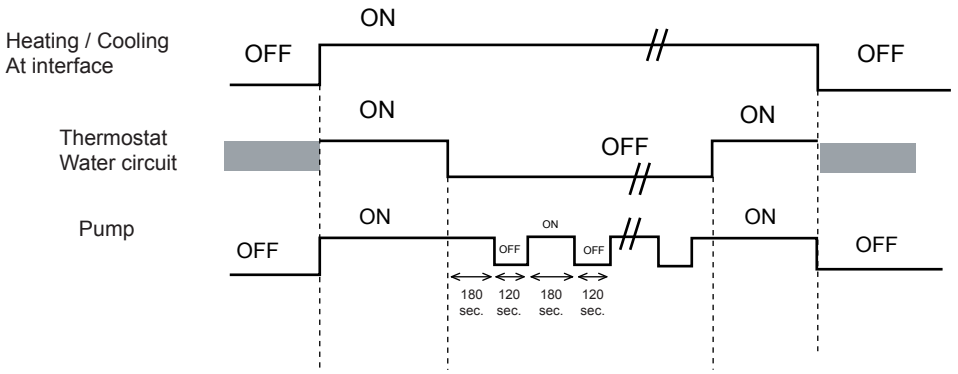
The pump operation pattern is determined by some system parameters and field settings.

2

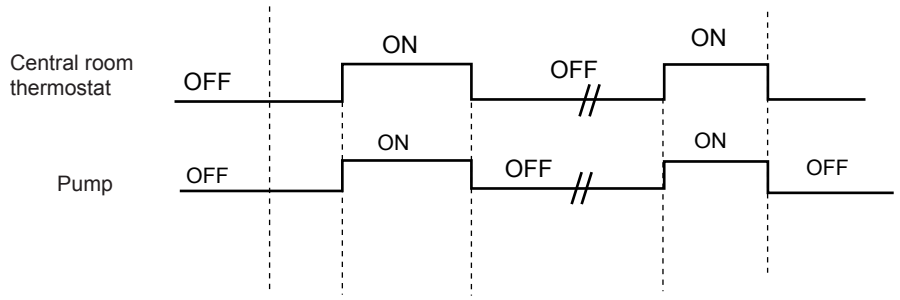
Heating / cooling mode

When the unit is put into heating / cooling operation (by pressing the ON / OFF button, LED lit - or via central room thermostat) the pump will operate according to below pattern.

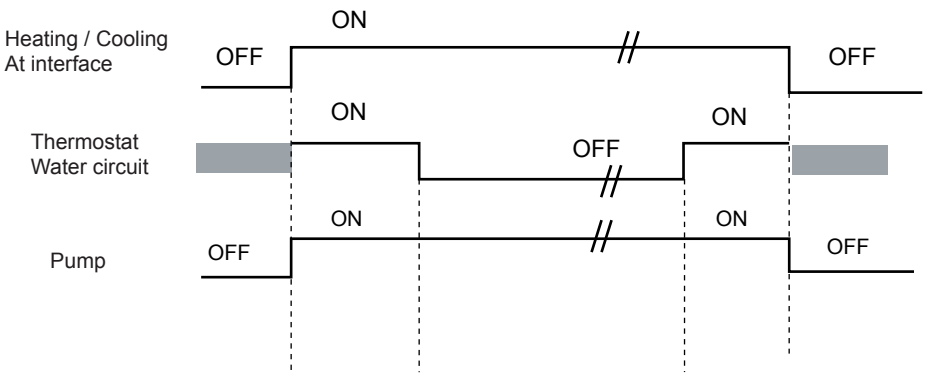
No central room thermostat connected to the hydro-box (default field setting)



Central room thermostat connected to the hydro-box



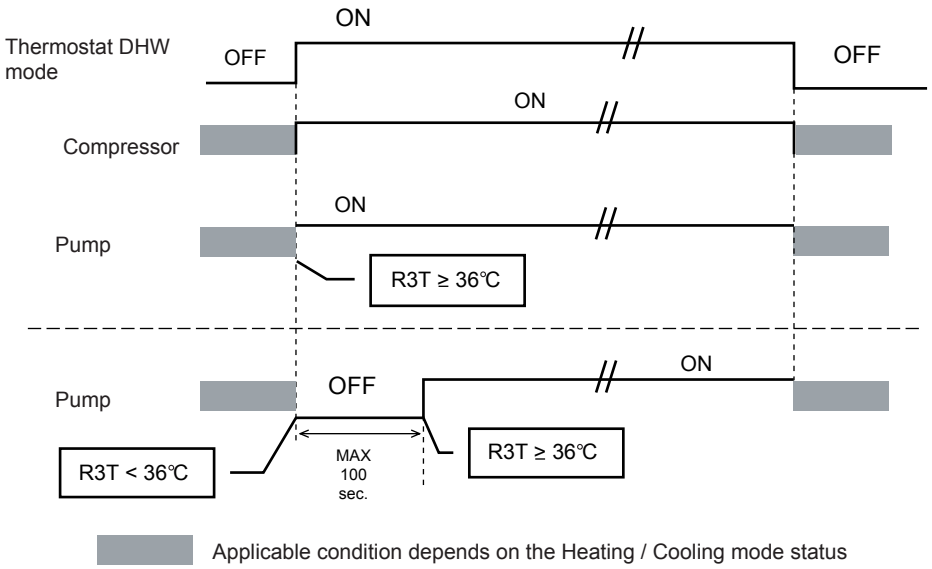
Continuously pump operation (adapted field setting)



Applicable condition is irrelevant for the pump operation status

Domestic hot water mode

When the unit is put into domestic hot water [DHW] operation (tank screen is activated) the pump will operate according to below pattern.



Remark

- In case the outdoor unit is ERHQ011~016, the pump will stop just before compressor start up. This function is applicable at continuously pump operation as well.
- Pump operation at domestic hot water mode is independent on the heating / cooling mode and related setting.
- Pump will continue for 1 minute in case unit is stopped (via ON / OFF button or central room thermostat) and BUH was active.
- Central room thermostat determines operation mode (cooling or heating).

2.5 Defrost control

Defrost operation during space heating operation

Conditions during defrost cycle:

- Outdoor demand operation mode is heating
- Backup heater is based on BUH heating thermostat-ON / OFF state
- Three-way valve is space heating side
- Two-way valve is open
- Pump on and after defrost cycle keeps on for 6 minutes additionally
- Booster heater is based on BSH domestic hot water heating thermostat-ON / OFF state

Remark

During additional pump operation of 6 minutes. Pump operation signal is NOT displayed on the interface.

Defrost operation during domestic hot water heating defrost

Conditions during defrost cycle:

- Outdoor demand operation mode is heating
- Backup heater is OFF
- Three-way valve is sanitary water heating side
- Two-way valve hold last state
- Pump ON and after defrost cycle keeps on for 6 minutes additionally
- Booster heater is BSH sanitary water heating thermostat-ON / OFF state

Remark

During additional pump operation of 6 minutes. Pump operation signal is NOT displayed on the interface.

2.6 Cooling operation

Cooling condition ON

&[When the water temperature zone > zone B (∆T > 0)
No hot water heating priority instruction

Cooling condition OFF

or [&[When the water temperature zone = zone A (∆T = -1)
or[Hot water heating priority instruction
No hot water heating priority instruction
&[When the water temperature zone > zone B (∆T > 0)
Hot water heating priority instruction

∆T = outlet - target

Remark

Condition ON indicate that H/P will operate in cooling mode.

Condition OFF indicate that H/P will not operate in cooling mode.

2.7 Heating operation

Heating condition ON

&[When the water temperature zone > zone B (ΔT > 0)
No hot water heating priority instruction

Heating condition OFF

or [&[When the water temperature zone = zone A (ΔT = -1)
or[Hot water heating priority instruction
No hot water heating priority instruction
&[When the water temperature zone > zone B (ΔT > 0)
Hot water heating priority instruction

ΔT = target - outlet

Remark

Condition ON indicate that H/P will operate in heating mode.

Condition OFF indicate that H/P will not operate in heating mode.

2.8 H/P hot water heating operation

The H/P hot water heating thermostat ON / OFF judging is always carried out when hot water mode is ON (active on interface).

Hot water H/P thermostat ON

When ΔT (T_{HPMAX} - [6.01] - [6.00] - water temperature tank) ≥ 0°C

$T_{HP\ ON}$

([6.01] = ΔT determining HP off)

([6.00] = ΔT determining HP on)

Hot water H/P thermostat OFF

When ΔT (T_{HPMAX} - [6.01] - water temperature tank) ≤ 0°C

$T_{HP\ OFF}$

Remark

- H/P will only OPERATE when hot water H/P thermostat ON and has the permission determined by setting [8] (see setting [8.01] & [8.02] timers).
- For BB indoor series, control logic can be slightly different from above depending of field setting [4-03] and [6].

2.9 H/P hot water heating priority function

The H/P domestic hot water heating priority instruction is determined by the request level between heating / cooling and domestic hot water.

Hot water heating priority instruction active

& {
- Request level hot water heating mode higher than heating (cooling) mode
- Balance between DHW and heating request (default): DSW_No4=OFF
- Domestic water tank installed: DSW_No2=ON
- H/P domestic water heating thermostat-ON
- Anti-recycle timer, setting [8.02] not active

Remark

Hot water heating priority instruction is not applicable.

In case of domestic water heating operation mode is not active (not activated on the interface, schedule timer), setting [5.02] applicable or DSW_No4=ON (*).

(*): In case the DSW_No4 is ON, the DHW production will only become active if the system reach an thermostat OFF for cooling or heating.

2.10 Booster heater operation

Booster heater thermostat ON

When the water temperature in tank drops 2°C below “target DHW + setting [7.00] (DHW overshoot T)”.

Booster heater operates

- $T_{DHW} \leq T_{HP\ ON}$
  - Delay timer of (20 ~ 95) minutes starts (setting [8.03] (BSH delay timer))
    After this delayed time booster heater operates
- $T_{DHW} \geq T_{HP\ ON}$
  - Delay timer of 20 minutes (fixed) starts
    After this delayed time booster heater operates

Booster heater thermostat OFF (stops operation)

When the water temperature in tank reach “target DHW + setting [7.00]”.

Delay timer is reset.

Remark

- Booster heater operation prohibition / permission can be determined by schedule timer.
- For BB indoor series, control logic can be slightly different from above depending of field setting [4-03] and [8-03].

2.11 Backup heater operation

Normal backup heater operation

In order to provide bigger heating capacity by low outdoor temperatures the backup heater can / will provide additional capacity.

Backup heater permission decision

BUH operation permission / prohibition by setting [4.00]

Backup heater priority decision

BUH operation priority by setting [4.01]

BUH operation ON

& {
- BUH permissioned to operate ([4.00]=1)
- Ambient temperature ≤ setting [5.01] equilibrium temperature
- Request to operate BUH (determined by capacity demand)
- Delay timer of 6 minutes is over
- Or { [4.01] = 1 AND booster heater is NOT operating / [4.01] = 0

BUH will stop operation when one of the below conditions are applicable:

BUH operation OFF

or {
- BUH permissioned to operate ([4.00]=0)
- NO request to operate BUH (determined by capacity demand)
- Ambient temperature > setting [5.01] + 3°C
- [4.01] = 1 AND booster heater is operating

Remark

The BUH heater will stop immediately by following safety items:

- NO flow signal
- Outlet water temperature after BUH higher than 55°C
- Return water temperature thermistor abnormality
- Thermal protector of BUH is open

Start up control by space heating operation

In order to start up the heat pump in controlled way when low outside air and low water temperature.

Start up operation

BUH operates when:

& {
- & {
  - Indoor demand operation mode is heating
  - No defrost operation
  - Inlet water temperature lower than 15°C
  - Outside air temperature lower than 22°C
- & {
  - Outlet water temperature after BUH lower than 55°C [overheat protection temperature]
  - No return water temperature thermistor abnormality [error code 80 on interface]

This control overrules the settings [4] & [5].

BUH forced OFF when pump OFF.

Heat exchanger freeze prevention BUH control

In order to prevent breakage by heat exchanger freeze from defrost (start up) operation when low outside air and low water temperature.

Space heating defrost operation

BUH operates when:

- & { Indoor demand operation mode is heating
  - Defrost operation
  - Return water temperature below security level }
- & { Outlet water temperature after BUH lower than 55°C [overheat protection temperature]
  - No return water temperature thermistor abnormality [error code 80 on interface] }

This control overrules the settings [4] & [5].

BUH forced OFF when pump OFF.

BUH protection control

In order to prevent breakage by BUH.

The BUH heater will stop immediately by following safety items:

- NO flow signal
- Outlet water temperature after BUH higher than 55°C [overheat protection temperature]
- No return water temperature thermistor abnormality [error code 80 on interface]
- Thermal protector of BUH is open [error code AA on interface]

Remark (during commissioning)

BUH operates for short periods. Due to remaining air in the piping short ‘no flow’ BUH stops and delay timer restarts.

Indoor EHV units

The BUH can also operate during DHW-mode due to no BSH present on these units.

2.12 Emergency operation

Indoor control by emergency.

In order to provide the customer a minimum heating capacity. The unit will go automatically in emergency operation when malfunction occur at the outdoor or indoor unit. This minimum heating capacity will be provide by BUH.

Space heating operation by emergency

BUH operates when:

- Heat-pump abnormality
- Indoor demand operation mode is heating
- Request to operate BUH (determined by capacity demand)
- Delay timer of 6 minutes is over

&

- [4.01] = 1 AND booster heater is NOT operating

or

- [4.01] = 0

This control overrules the settings [4.00] & [5].

BUH forced OFF when pump OFF or no flow.

3 Outdoor Unit Functional Concept

3.1 What Is in This Chapter?

Introduction

This chapter will explain more details about the various functions that are programmed for the sky-air R410A inverter outdoor units.

Overview

This chapter contains the following topics:

Topic	See page
3.2–Function Outline	2–38
3.3–Frequency Regulating Functions	2–41
3.4–Expansion Valve Regulating Functions	2–57
3.5–Outdoor Unit Fan Speed Control	2–61

3.2 Function Outline

Introduction

This chapter will show an overview of all applicable functions in cooling and heating mode.

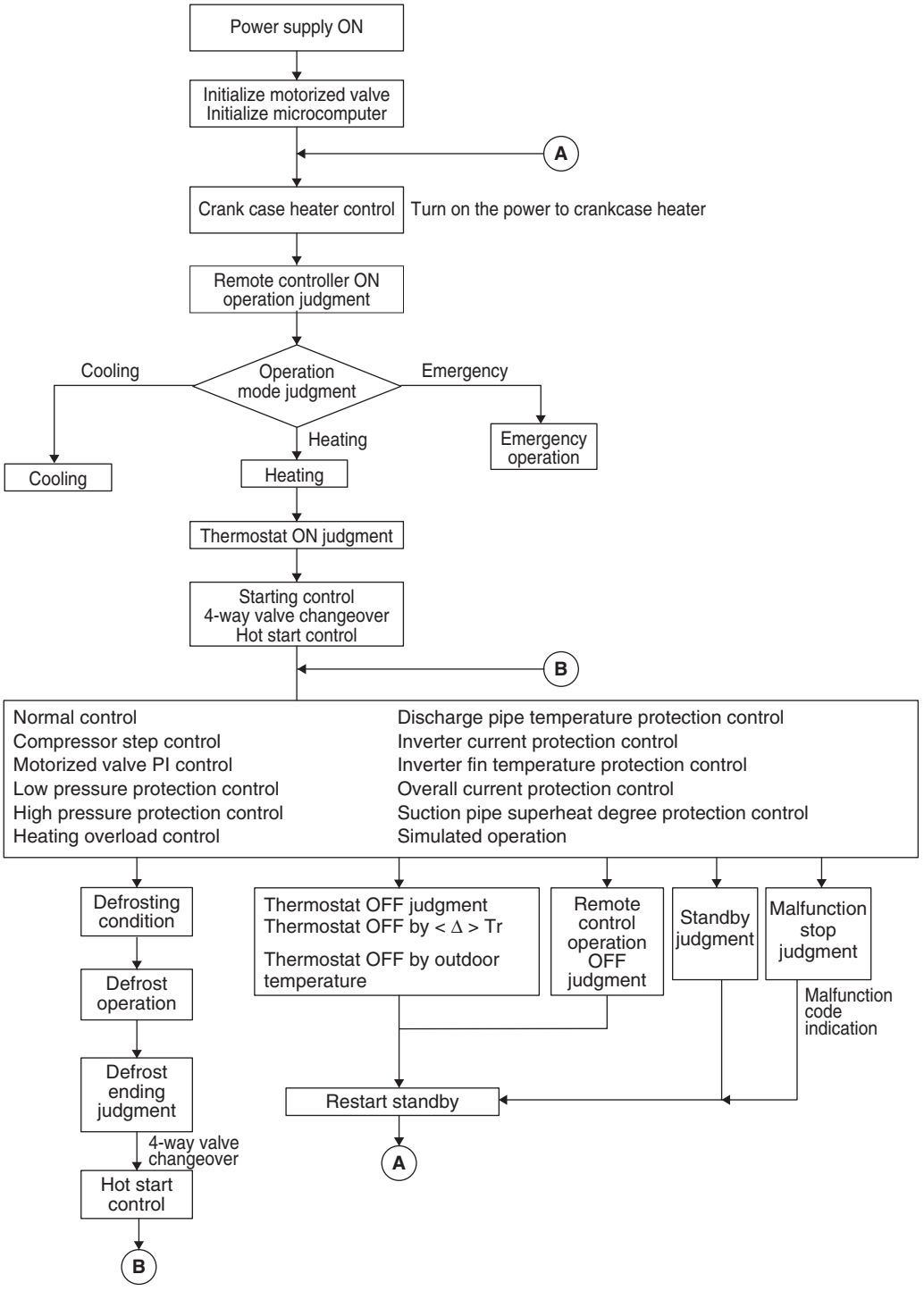
Content

2

Topic	See page
3.2.1–Function Outline in Heating Mode	2–39
3.2.2–Function Outline in Cooling Mode	2–40

3.2.1 Function Outline in Heating Mode

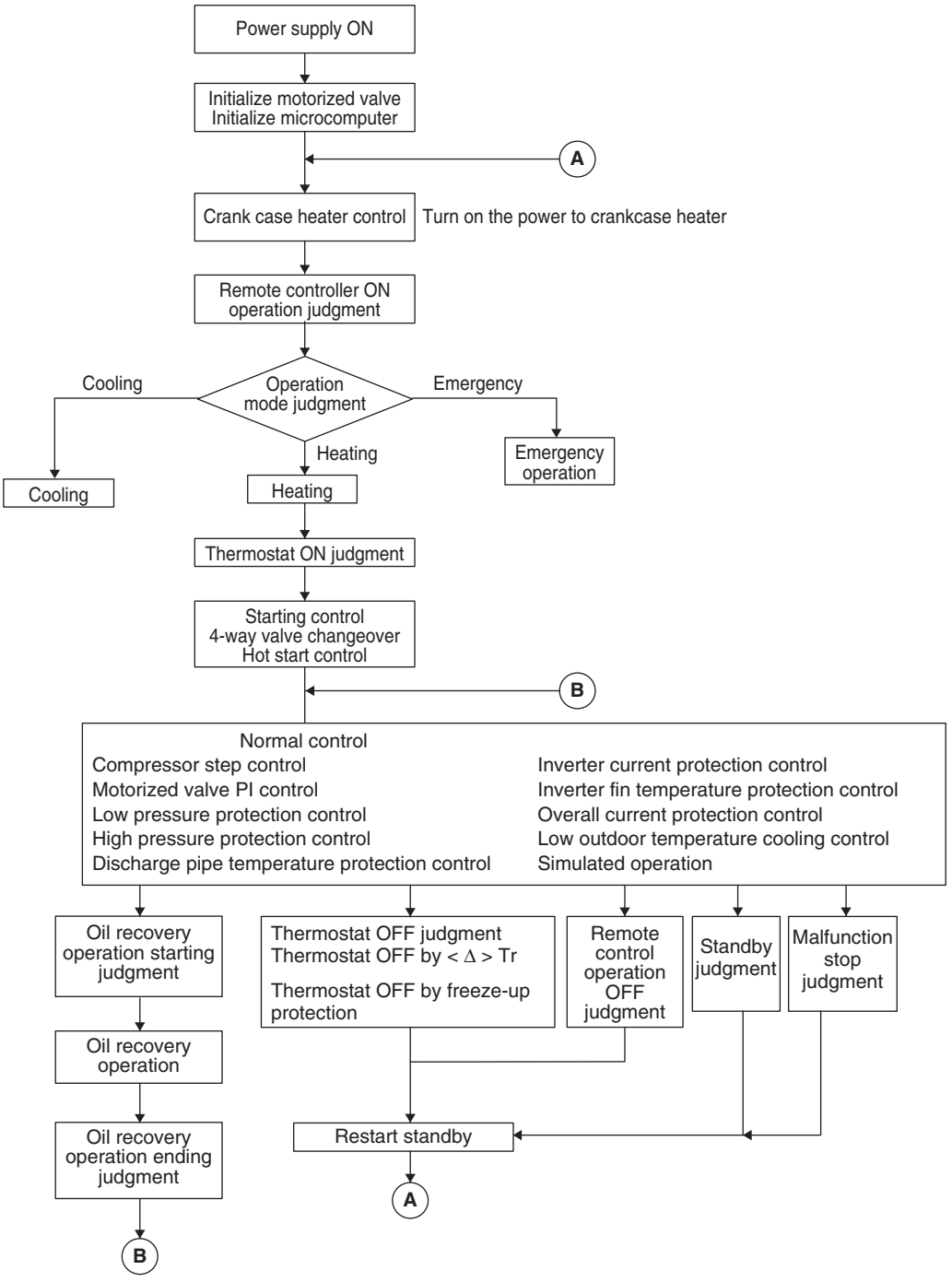
Flow chart Heating operation



3.2.2 Function Outline in Cooling Mode

Flow chart

Cooling



3.3 Frequency Regulating Functions

Introduction

One of the main functions of the μ-controller will be the control of the compressor frequency. The next chapter will explain how the compressor frequency is determined.

Content

Topic	See page
3.3.1–Starting Frequency Control	2–42
3.3.2–Starting Control	2–43
3.3.3–General Frequency Control	2–44
3.3.4–Low Pressure Protection Control	2–47
3.3.5–High Pressure Protection Control	2–48
3.3.6–Discharge Pipe Temperature Control	2–49
3.3.7–Suction Pipe Superheat Protection Control (Heating Mode)	2–50
3.3.8–Inverter Current Protection Control	2–51
3.3.9–Protection Control by Overall Current	2–52
3.3.10–Inverter Cooling Fin Temperature Control	2–53
3.3.11–Pressure Difference Control	2–54
3.3.12–Oil Recovery Operation	2–56

3.3.1 Starting Frequency Control

Outline

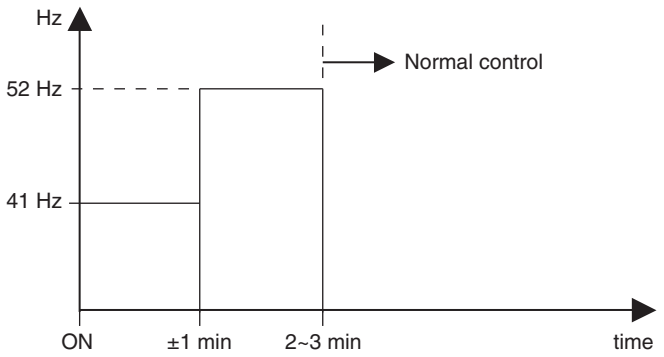
The inverter compressor will start up with a limited fixed frequency value for a specified period of time in order to prevent liquid back to the compressor, and to limit the starting current.

General

The normal starting control time is 2~3 minutes. The maximum starting frequency control time is limited to 10 minutes.

During compressor start-up, a pressure difference will be build up in order to have sufficient pressure difference for the 4-way valve to change over.

Graph



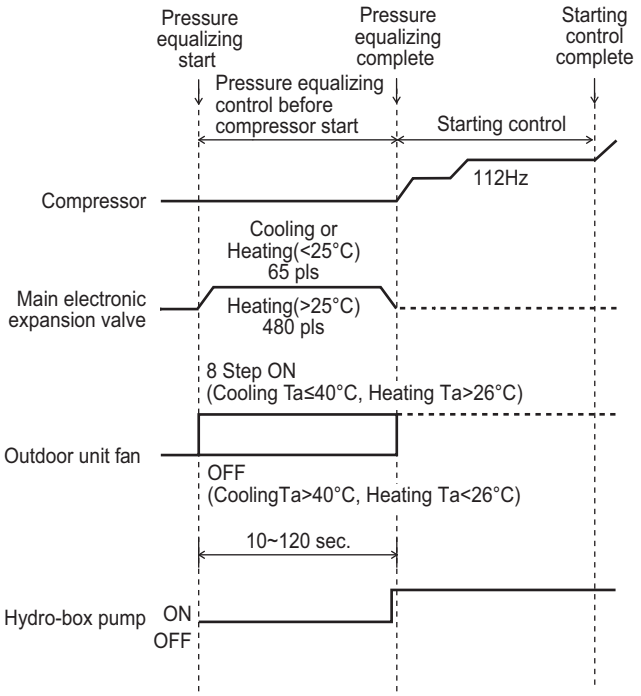
Ending condition

The starting control will be terminated when the low pressure value < 6 bar or when the maximum starting time of 10 minutes has been reached in case the low pressure value stays > 6 bar.

3.3.2 Starting Control

Starting control

When compressor start up, the starting frequency is fixed for specified period of time at low frequency to prevent returning of refrigerant.



3.3.3 General Frequency Control

Outline

After the "Starting frequency control" function has been terminated, the ideal compressor frequency will be determined by the "General frequency control".

2

General

The compressor operation frequency is controlled in order to keep a constant evaporation temperature in cooling and a constant condensing temperature in heating.

The frequency can be changed every 20 seconds.The maximum frequency change = 2 steps/change. (= max 6 steps/min)

During abnormal situations (e.g. inverter current protection) the change per step is also = 2 steps/change, but the 20 seconds interval may be decreased, so a quicker change is possible.

Note

When other control functions are activated (e.g. discharge pipe control), they can change the compressor frequency using other inputs than the ones normally being used by the "General frequency control" function.

Cooling

In cooling, the target operation frequency will be determined by the indoor Δt and the evaporating temperature.

Δt cool = Remote controller set temperature - Outlet water temperature.

Depending on the cooling load, the target evaporating temperature (Te) will be a value between 2°C ≤ Te ≤ 20°C TBC.

Heating

In heating, the target operation frequency will be determined by the indoor Δt and the condensing temperature.

Δt heat = Outlet water temperature - Remote controller set temperature.

Depending on the heating load, the target condensing temperature (Tc) will be a value between 28°C ≤ Tc ≤ 58°C TBC.

Frequency steps

The operating frequency for the inverter units will be a value chosen from a list with fixed frequency settings that is programmed in the unit's memory:

Step No.	Compressor operation frequency
	ERHQ011~016*
1	32 Hz
2	36 Hz
3	41 Hz
4	44 Hz
5	48 Hz
6	52 Hz
7	57 Hz
8	62 Hz
9	67 Hz
10	72 Hz
11	78 Hz
12	84 Hz
13	90 Hz
14	94 Hz
15	98 Hz
16	102 Hz
17	107 Hz
18	112 Hz
19	117 Hz
20	123 Hz
21	131 Hz
22	139 Hz
23	147 Hz
24	155 Hz
25	164 Hz
26	174 Hz
27	184 Hz
28	194 Hz
29	205 Hz
30	216 Hz
31	224 Hz
32	232 Hz
33	240 Hz
34	246 Hz
35	252 Hz
36	256 Hz
37	260 Hz
38	264 Hz

Maximum frequency step

	Cooling	Heating
ERHQ011*	20	17
ERHQ014*	26	22
ERHQ016*	28	24
ERLQ011CA*	20	27
ERLQ014CA*	26	32
ERLQ016CA*	28	38

3.3.4 Low Pressure Protection Control

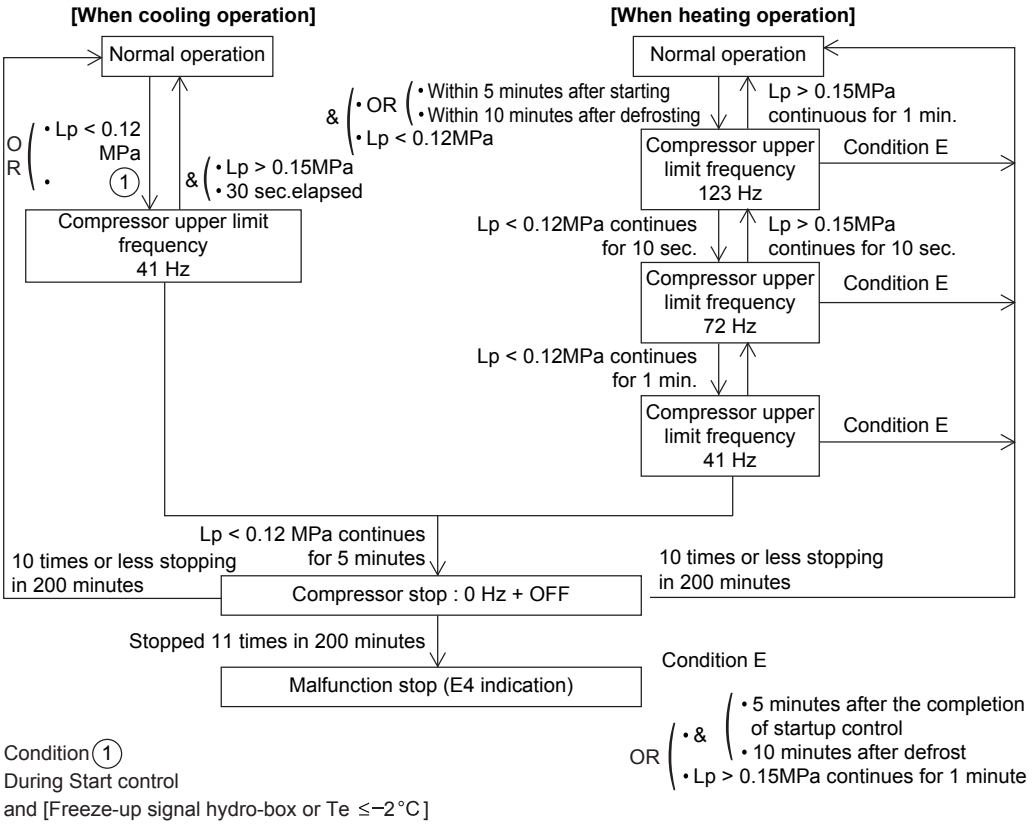
Outline

In order to prevent low pressures in the system, the below control function will be activated.

Details

Low pressure is a calculated value during heating operation. Low pressure is detected by the pressure sensor during cooling operation.

Flow chart



3.3.5 High Pressure Protection Control

Outline

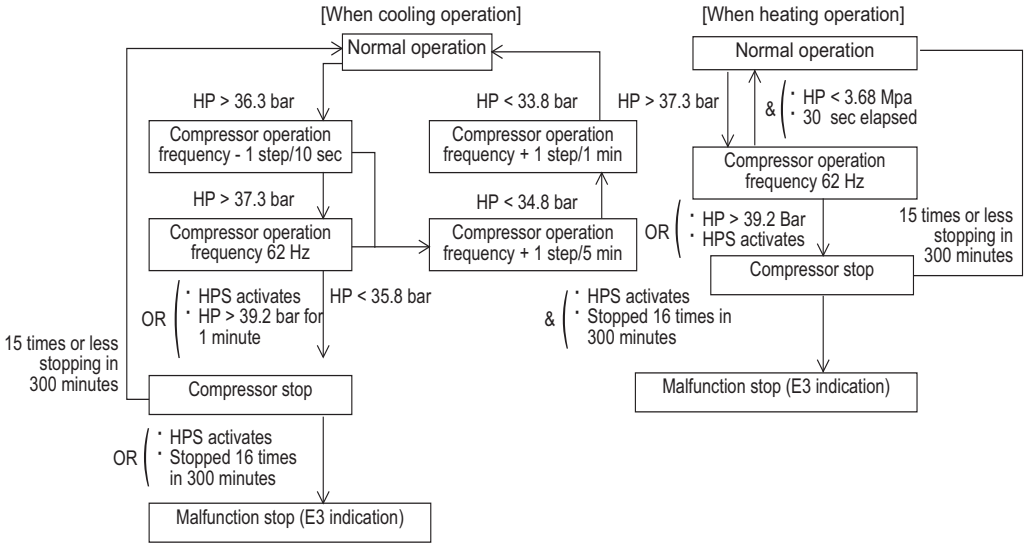
In order to prevent abnormal high pressures in the system and hence avoiding activation of the high pressure safety device the below control function will be activated.

Details

The high pressure value will be calculated from the low pressure, power input and compressor frequency. Low pressure is a calculated value during cooling operation. The high pressure value is detected by the pressure sensor.

- HPS opens at: 40 bar (tolerance: +0 / -0.15)
- HPS closes at: 30 bar (tolerance: +/- 0.15)

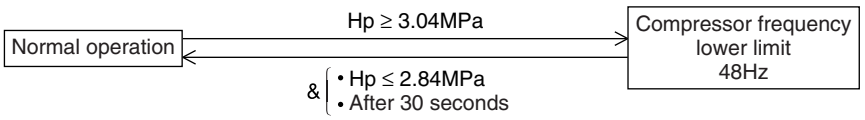
Flow chart



Minimum frequency

As the bearing resistance limit pressure decreases during low frequency of the compressor, the lower limit of frequency is restricted.

[In cooling/heating operation]

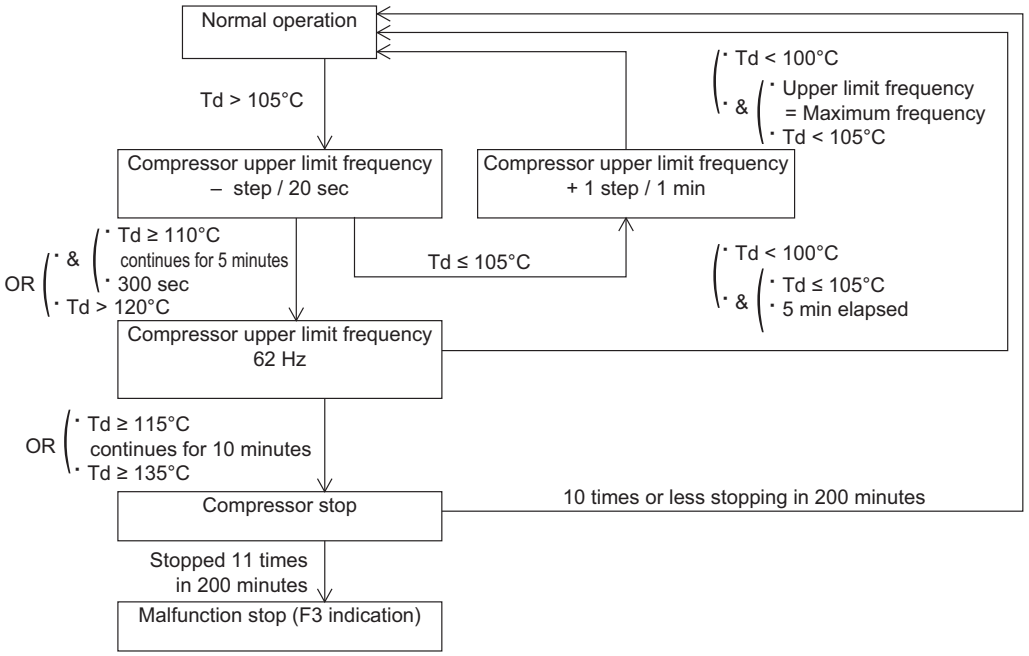


3.3.6 Discharge Pipe Temperature Control

Outline

The compressor operating frequency will be controlled in order to avoid abnormal high compressor temperatures (see also expansion valve control).

Flow chart



Note

For ERLQ*CA* models with a liquid injection valve above control becomes only active when the discharge temperature is still exceeding 105°C when the injection valve is completely open.

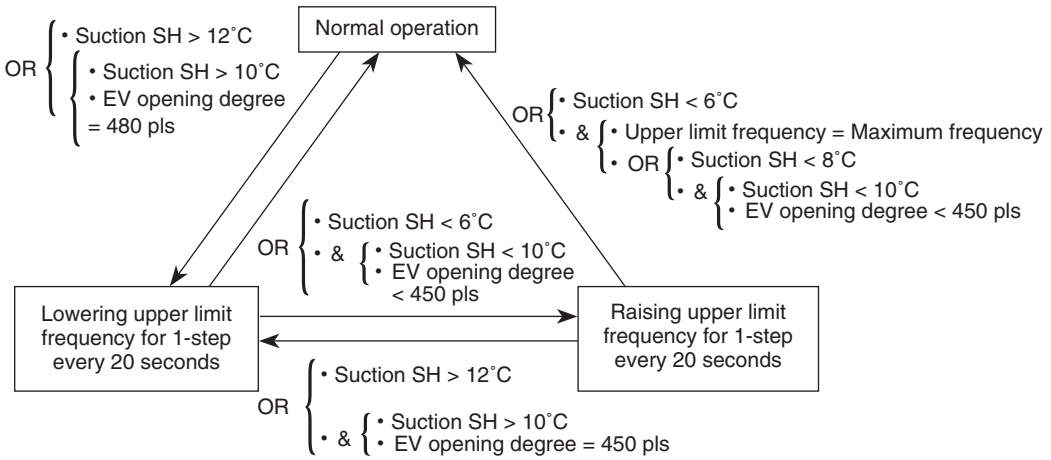
3.3.7 Suction Pipe Superheat Protection Control (Heating Mode)

Outline

In case the suction superheat value in heating mode is too high, the oil return to the compressor will be insufficient. In order to avoid that the compressor oil will be accumulated in the outdoor unit heat exchanger, the upper limit frequency will be decreased.

2

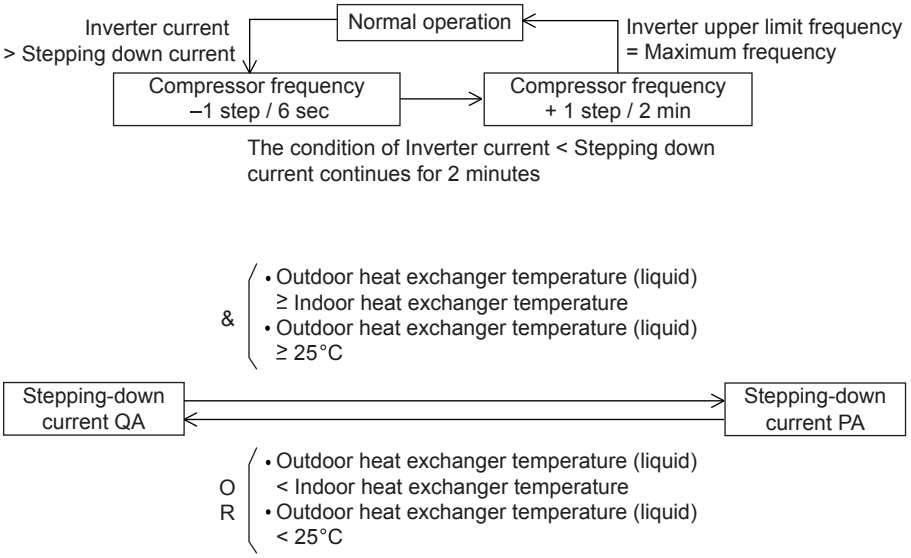
Flow chart



3.3.8 Inverter Current Protection Control

Flow chart

Restricts compressor operation frequency to prevent compressor from tripping due to inverter overcurrent.

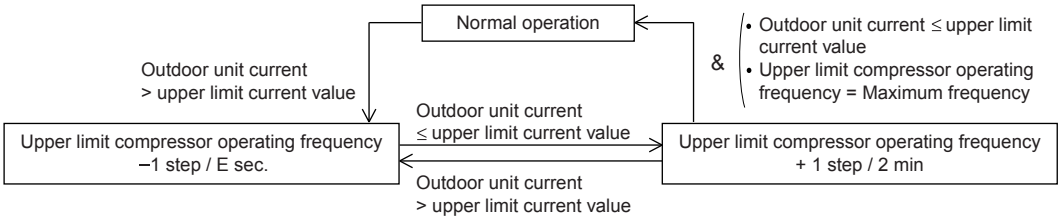


	ERL/HQ011~016V3	ERL/HQ011~016W1
PA	20A	9.5A
QA	20A	11.5A

3.3.9 Protection Control by Overall Current

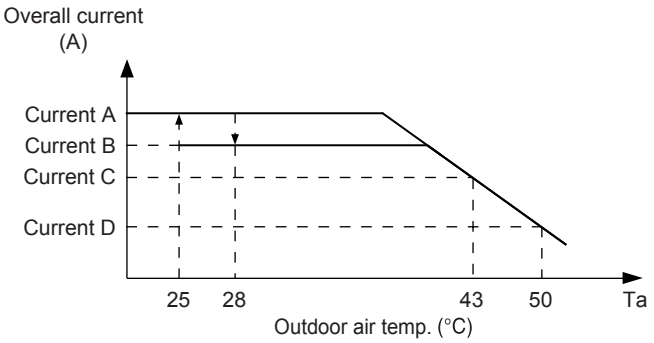
Flow chart

Monitors the overall current and restricts the upper limit compressor operating frequency to prevent circuit breakers from exceeding the rated capacity.



Upper limit current (A)

Takes the following values depending on the outside temperature.
Also varies depending on model.



	ERHQ V3	ERHQ W1
A	24.0A	13.5A
B	24.0A	11.2A
C	23.0A	11.2A
D	16.0A	11.2A
E	10 (sec.)	6 sec.

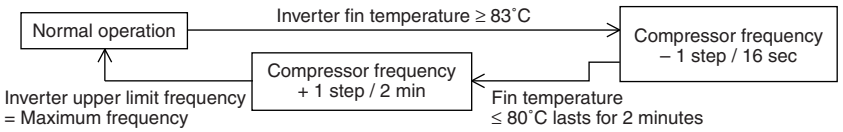
3.3.10 Inverter Cooling Fin Temperature Control

Outline

This control will restrict the compressor upper limit frequency in order to protect the electronic components in the switch box from overheating (L4-error activation).

By lowering the compressor frequency, the current drawn by the compressor will be reduced and as a result the temperature inside the switch box will drop.

Flow chart



3.3.11 Pressure Difference Control

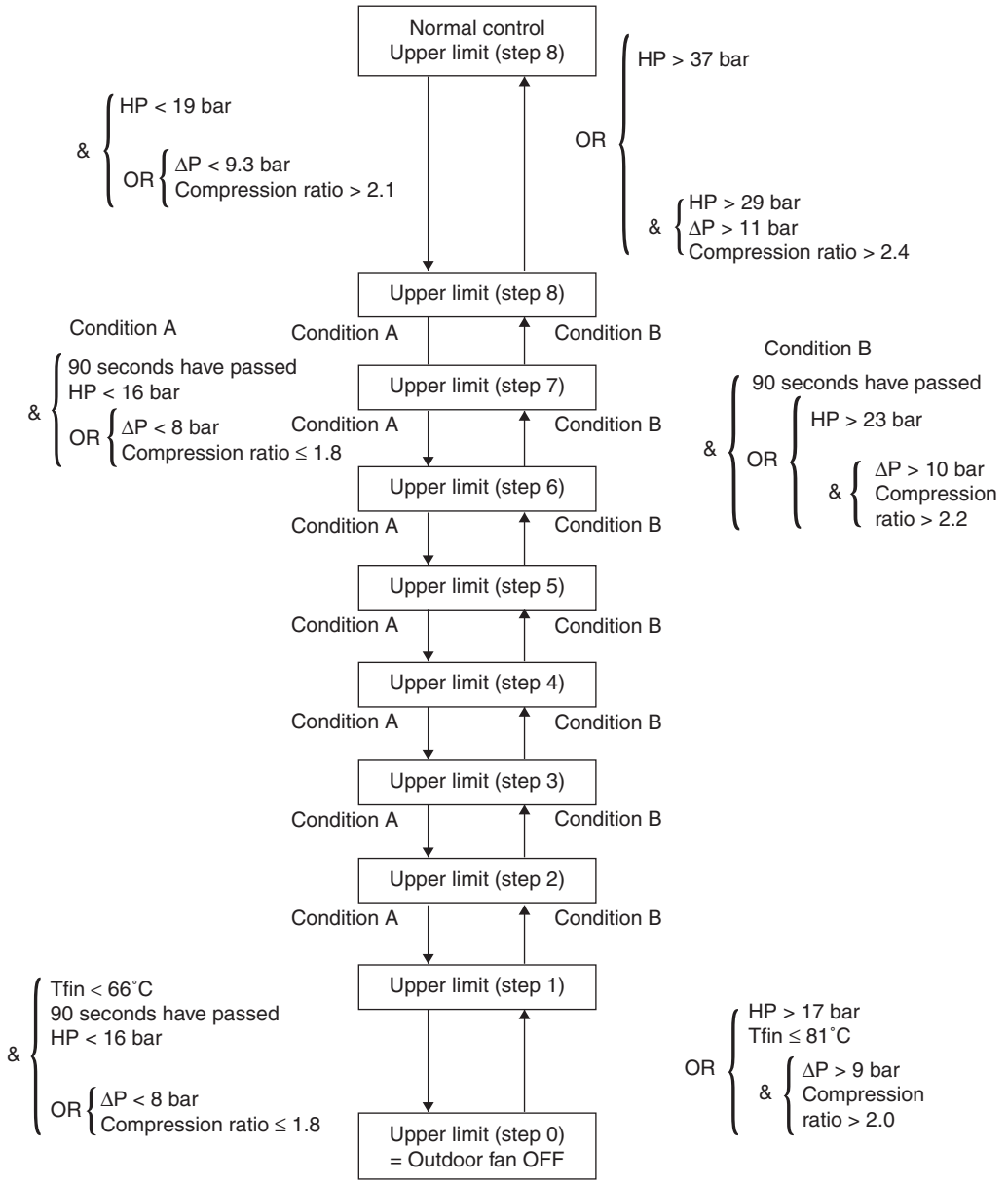
Outline

To ensure the compression ratio (pressure difference between high and low pressure) at low outdoor temperature conditions in cooling mode and high outdoor temperature conditions in heating mode, the outdoor fan and target compressor frequency may be varied.

2

Cooling

In cooling low ambient conditions, the outdoor fan speed and compressor frequency will be adapted to secure the differential pressure between high and low pressure.



Frequency restriction in cooling

	Normal control		
Upper limit frecuency	011	014	016
	123 Hz	174 Hz	174 Hz
Lower limit frecuency	41 Hz		

Ta ≤ 20˚C

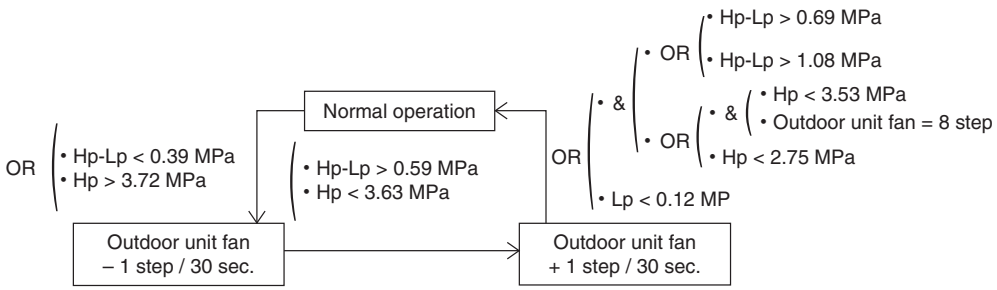
Ta ≥ 21˚C

	011	014 / 016
Upper limit frequency	123 Hz	139 Hz
Lower limit frequency	72 Hz	72 Hz

Heating

High outdoor ambient (overload conditions):

In heating overload conditions, the outdoor fan speed will be adapted to secure the differential pressure between high and low pressure.



Only the fan speed will be adapted in heating overload conditions.

No adjustments to the compressor frequency will be made.

3.3.12 Oil Recovery Operation

Outline

When the compressor operates for a certain period of time at low frequency, the oil level in the compressor may become low due to incomplete oil return. To prevent damage to the compressor and in worst case avoid compressor lock, an oil recovery operation will be conducted.

Details

During the oil recovery operation, the operation frequency of the compressor will be increased for a time period of 5 minutes.Oil recovery operation is only executed in cooling mode.In heating mode, oil return to the compressor is guaranteed by the defrost operation.

3.4 Expansion Valve Regulating Functions

Introduction

This chapter will explain the functions that are used to control the expansion valve opening.

Content

Topic	See page
3.4.1–Expansion Valve Control (main) at Startup	2–58
3.4.2–General Expansion Valve Control	2–59
3.4.3–Discharge Pipe Temperature Protection Control	2–60

3.4.1 Expansion Valve Control (main) at Startup

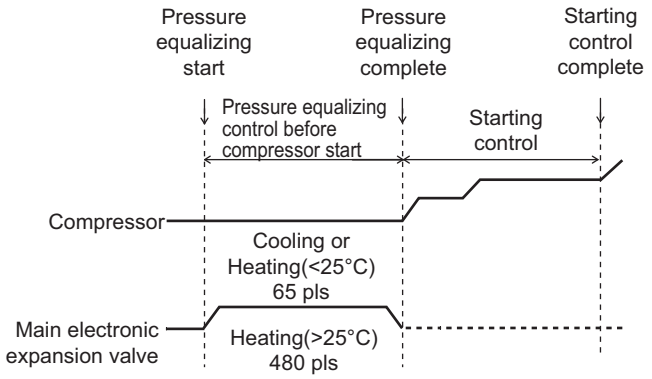
Outline

Before going to the general expansion valve control, the expansion valve opening will be limited in order to avoid the risk of liquid back and allow quick build up of pressure difference.

Details

During startup, the opening degree is determined by both the compressor frequency & the suction superheat. During startup, it is not possible to use only the value of the suction superheat because the operation is not stable yet. As a consequence also the SH value will not be stable.

Graph



Ending condition

The starting control will be terminated when the low pressure value < 6 bar or when the maximum starting time of 10 minutes has been reached in case the low pressure value stays > 6 bar.

3.4.2 General Expansion Valve Control

Outline

After the start up control function has been terminated the general expansion valve control function will regulate the expansion valve opening in function of the target suction SH value.

The discharge SH value will be used to set the target SH value.

The measured suction SH value will be used to control the opening of the expansion to the target SH value.

Details

When the unit is in cooling or heating operation the opening of the expansion valve will be controlled in order to keep the amount of superheat at the evaporator outlet constant. This way the evaporator can be used at maximum efficiency under all conditions. The initial target heat exchanger outlet superheat value = 5°C.

The target heat exchanger outlet superheat value can be increased in case the discharge superheat value decreases.

The target heat exchanger outlet superheat value can be decreased in case the discharge superheat value increases.

Control

During normal control 2 situations can decide on the expansion valve opening degree:

1 Target superheat amount:

- When the target heat exchanger outlet superheat > actual heat exchanger outlet superheat --> the expansion valve will close.
- When the target heat exchanger outlet superheat < actual heat exchanger outlet superheat --> the expansion valve will open.

The superheat amount is checked every 10 seconds.

2 Frequency change: At the time of compressor frequency change, the expansion valve opening will be changed with a fixed value. This value will be in function of the amount of compressor frequency change.

Calculations

The heat exchanger outlet superheat value is calculated from the saturated suction temperature Te (using indoor coil sensor in cooling, outdoor coil sensor in heating) and the suction pipe temperature R4T: SH = R4T-Te

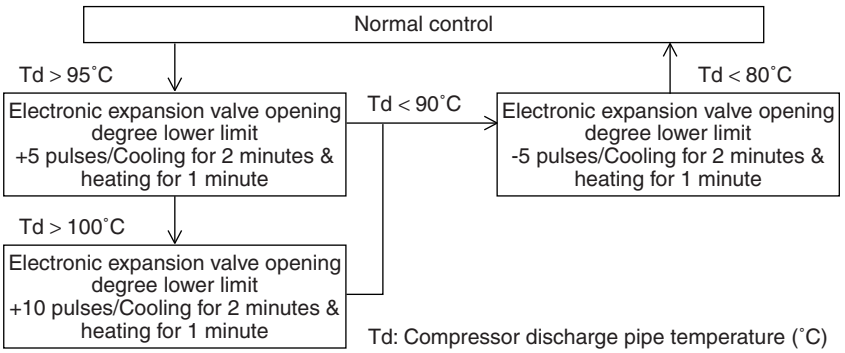
The discharge superheat value is calculated from the saturated discharge temperature Td (HP value calculated out of PI, frequency and Te) or Tc and the discharge pipe temperature R3T: SH = R3T-Td or R3T or SH = R3T-Tc (whichever is the lowest).

3.4.3 Discharge Pipe Temperature Protection Control

Outline

The expansion valve opening will be controlled in order to avoid abnormal high compressor discharge temperatures (see also compressor operating frequency control).

Details



Note

For ERLQ*CA* models with liquid injection valve, will first activate this valve (T_d > 90°C) to try to reduce high compressor discharge temperatures. When needed the main expansion valve will help to control this discharge temperature.

3.5 Outdoor Unit Fan Speed Control

Introduction

This chapter will explain how the outdoor fan speed is determined in cooling and heating operation.

Content

Topic	See page
3.5.1–Outdoor Unit Fan Speed Control	2–62

3.5.1 Outdoor Unit Fan Speed Control

Fan speed control

The outdoor fan speed will be controlled in function of the actual outdoor ambient temperature, the condensation pressure, pressure difference between low and high pressure and compression ratio.

For details please refer to "Pressure Difference Control".

2

Fan step table

	Cooling		Heating	
Step	**M1F**	**M2F**	**M1F**	**M2F**
0	0 rpm	0 rpm	0 rpm	0 rpm
1	250 rpm	0 rpm	250 rpm	0 rpm
2	400 rpm	0 rpm	285 rpm	250 rpm
3	285 rpm	250 rpm	335 rpm	300 rpm
4	360 rpm	325 rpm	395 rpm	360 rpm
5	445 rpm	410 rpm	470 rpm	435 rpm
6	545 rpm	510 rpm	560 rpm	525 rpm
7	660 rpm	625 rpm	660 rpm	625 rpm
8	850 rpm	815 rpm	850 rpm	815 rpm

Part 3
Troubleshooting

What is in this part? This part contains the following chapters:

Chapter	See page
1–Troubleshooting	3–3
2–Error Codes: Hydro-box	3–41
3–Error Codes: Outdoor Units	3–57
4–Error Codes: System Malfunctions	3–107
5–Additional Checks for Troubleshooting	3–119

1 Troubleshooting

1.1 What Is in This Chapter?

Introduction

When a problem occurs, you have to check all possible malfunctions. This chapter gives a general idea of where to look for malfunctions.

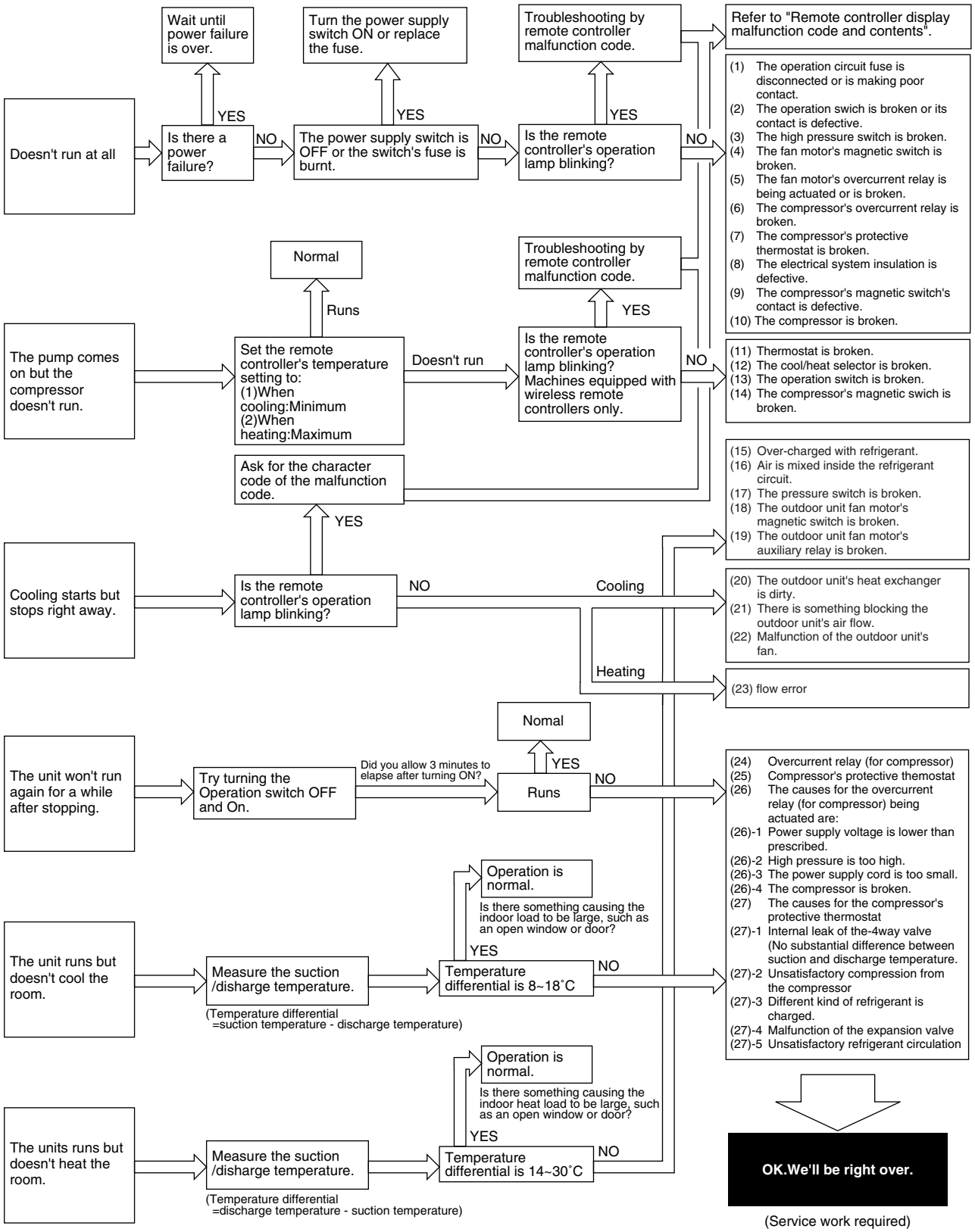
Not all repair procedures are described. Some procedures are considered common practice.

Overview

This chapter contains the following topics:

Topic	See page
1.2–General Troubleshooting Flowchart	3–4
1.3–Overview of General Problems	3–5
1.4–Fault-diagnosis by Remote Controller	3–25
1.5–Fault-diagnosis manual reset in the memory	3–26
1.6–Fault Diagnosis by LED	3–29
1.7–Overview of Error Codes	3–34
1.8–Overview of the Outdoor Safety Devices	3–38
1.9–Overview of the Hydro-box Safety Devices	3–39

1.2 General Troubleshooting Flowchart



1.3 Overview of General Problems

General guidelines

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

Before contacting your local Daikin dealer, read this chapter carefully, it will save you time and money.

Warning! When carrying out an inspection on the switch box of the unit, always make sure that the main switch of the unit is switched off.

When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. Under no circumstances safety devices may be bridged or changed to a value other than the factory setting. If the cause of the problem cannot be found, call your local Daikin dealer.

If the pressure relief valve is not working correctly and is to be replaced, always reconnect the flexible hose attached to the pressure relief valve, to avoid water dripping out of the unit!

General symptoms

	Equipment Condition	Remedy
1.3.1	Equipment does not Operate	See page 3-6
1.3.2	Indoor Pump Operates, but Compressor does not	See page 3-7
1.3.3	Cooling/Heating Operation Starts but Stops Immediately	See page 3-9
1.3.4	After Unit Shuts Down, It cannot be Restarted for a While	See page 3-11
1.3.5	Equipment Produces Loud Noise or Shakes	See page 3-13
1.3.6	User Interface Displays “Busy”	See page 3-15
1.3.7	The Unit is Turned on (d LED is lit) but the Unit is not Heating or Cooling as Expected	See page 3-16
1.3.8	The Unit is Turned on but the Compressor is not Starting (Space Heating or Domestic Heating)	See page 3-17
1.3.9	Pump is Making Noise (Cavitation)	See page 3-18
1.3.10	The Water Pressure Relief Valve Opens	See page 3-19
1.3.11	The Water Pressure Relief Valve Leaks	See page 3-20
1.3.12	The User Interface Does Not Display Certain Screens (RT, LWT, Tank, Ext RT)	See page 3-21
1.3.13	Domestic Hot Water Capacity Shortage at Low Outdoor Temperatures	See page 3-22
1.3.14	Space Heating Capacity Shortage at Low Outdoor Temperatures	See page 3-23
1.3.15	Room Temperature Set Point Isn’t Reached or Increases Too Slow	See page 3-24

Error codes

When a safety device is activated, the user interface will display the ⓘ-icon on the home screen. When pushing the ⓘ-button, the error code and a brief description of the error will be shown.

A short list of all errors and corrective actions can be found in the installer reference guide. More detailed information on how to solve these errors can be found in the next pages.

1.3.1 Equipment does not Operate

Applicable model

ERHQ011~016*
ERLQ004~016*

Error detection method

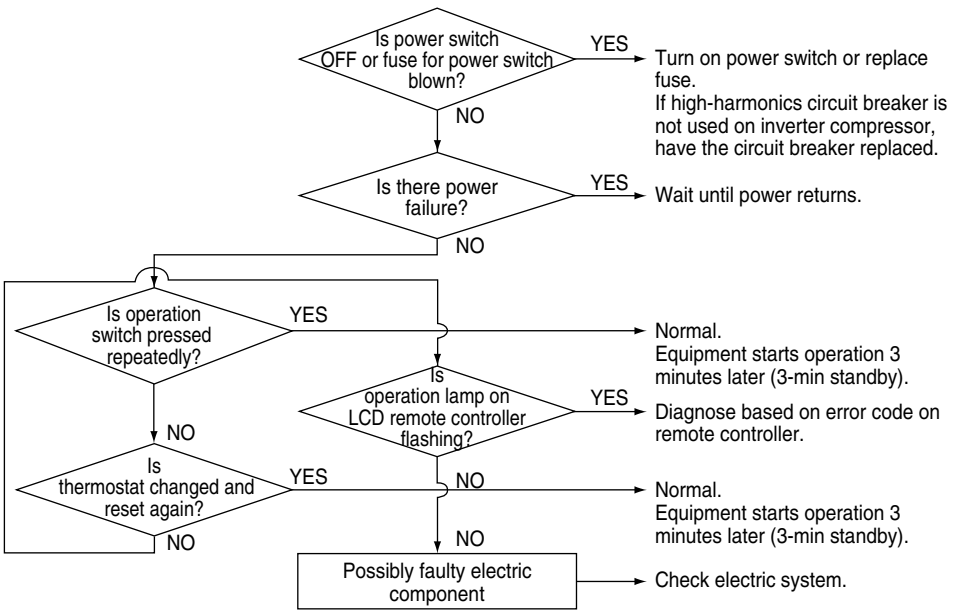
Error generating condition

3

Supposed causes

- Fuse blown or disorder of contact in operation circuit
- Faulty operation switch or contact point
- Faulty high pressure switch
- Faulty magnetic switch for fan motor
- Activation or fault of overcurrent relay for fan motor
- Faulty overcurrent relay for compressor
- Faulty compressor protection thermostat
- Insufficient insulation in electric system
- Faulty contact point of magnetic switch for compressor
- Malfunction of compressor
- Defective remote controller

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

1.3.2 Indoor Pump Operates, but Compressor does not

Applicable model

ERHQ011~016*
ERLQ004~016*

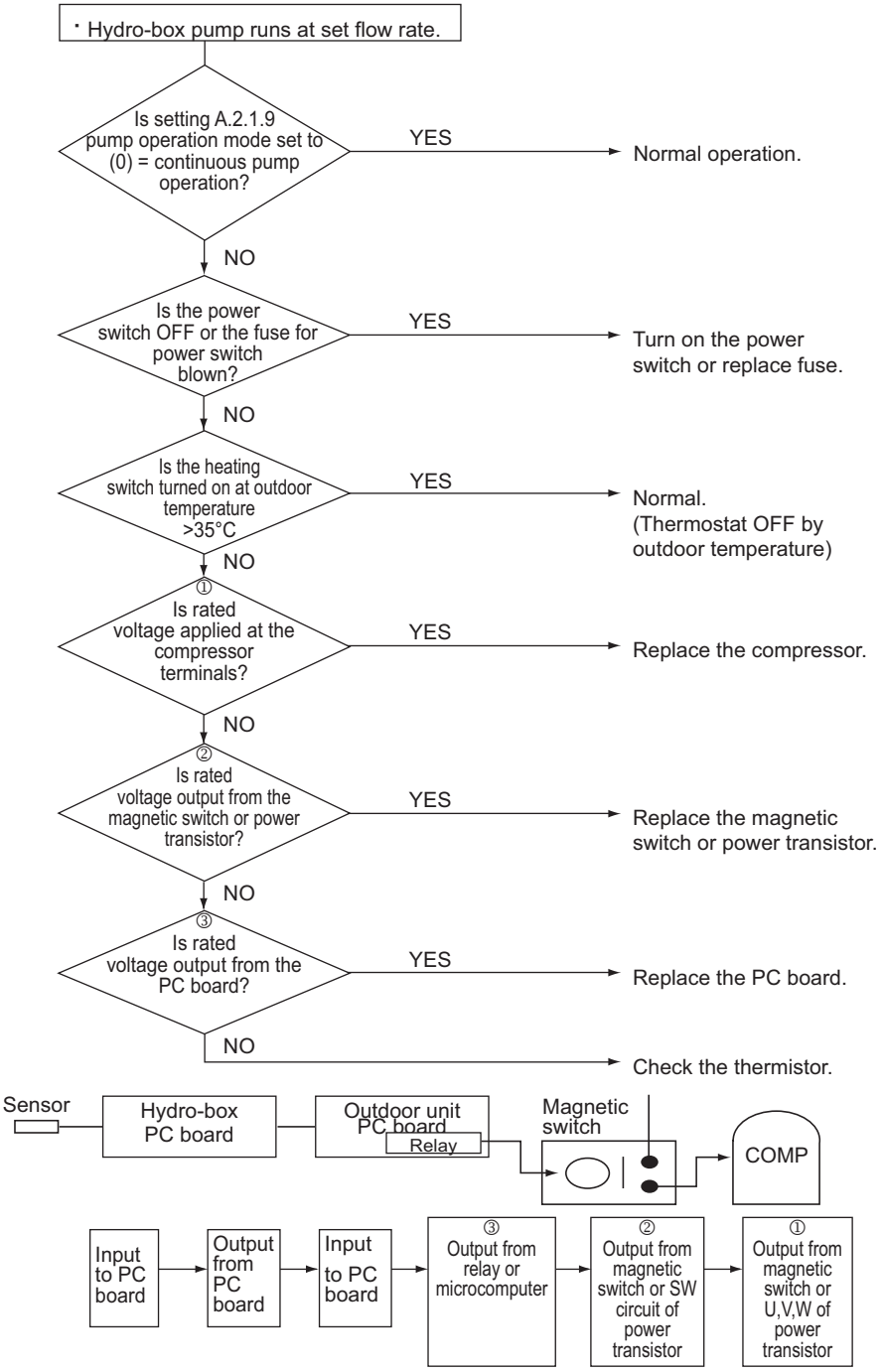
Error detection method

Error generating condition

Supposed causes

- Faulty thermistor
- Faulty indoor/outdoor unit PC board
- Faulty magnetic switch
- Faulty power transistor
- Faulty compressor
- Continuous pump operation enabled by setting

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

1.3.3 Cooling/Heating Operation Starts but Stops Immediately

Applicable model

ERHQ011~016*
ERLQ004~016*

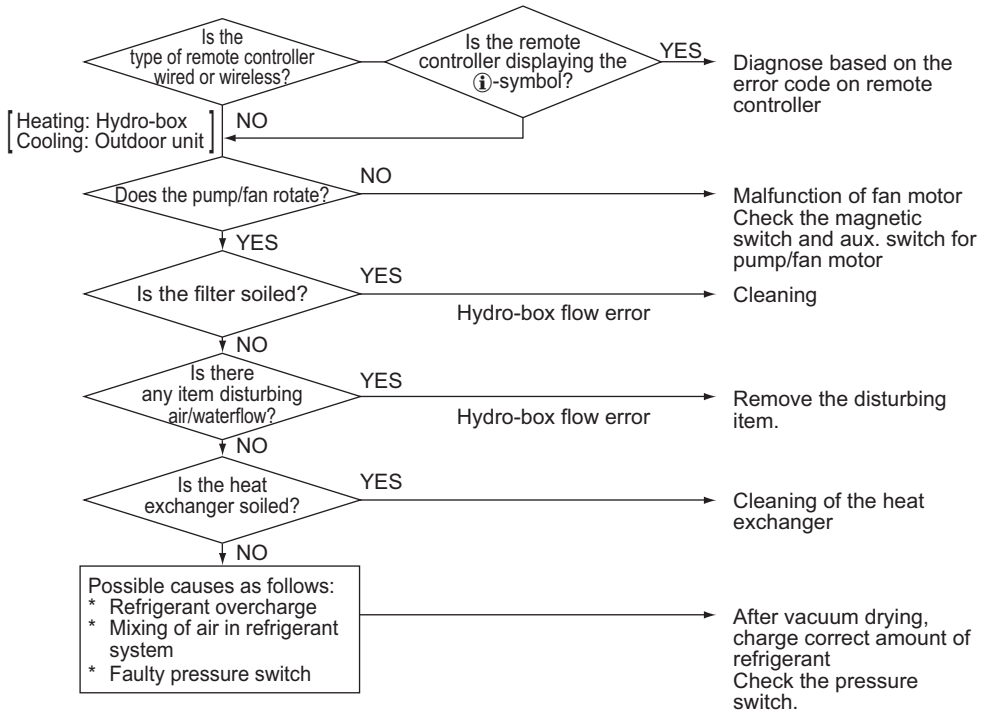
Error detection method

Error generating condition

Supposed causes

- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Faulty pressure switch
- Faulty magnetic switch for outdoor unit fan motor
- Faulty aux. relay for outdoor unit fan motor
- Soiled heat exchanger of outdoor unit
- There is an interfering item in air flow of outdoor unit
- Malfunction of outdoor unit fan
- Soiled air filter of hydro-box
- Malfunction of hydro-box pump (flow error)

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

1.3.4 After Unit Shuts Down, It cannot be Restarted for a While

Applicable model

ERHQ011~016*
ERLQ004~016*

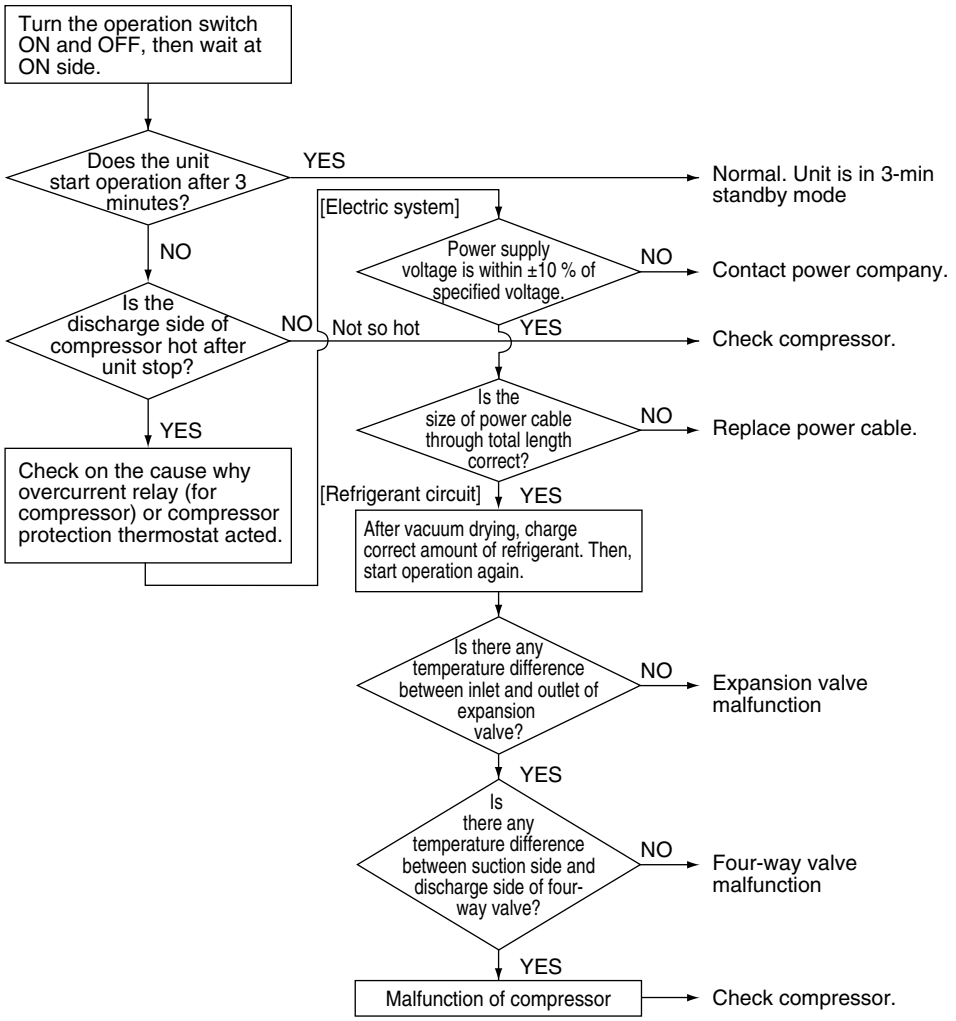
Error detection method

Error generating condition

Supposed causes

- Overcurrent relay (for compressor)
- Compressor protection thermostat
- Overcurrent relay may act due to the following reasons:
  - Lower voltage of power supply
  - Excess level of high pressure
  - Insufficient size of power cable
  - Malfunction of compressor
- Compressor protection thermostat may act due to the following reasons:
  - Internal leakage of four-way valve (There is no difference between suction and discharge temperature)
  - Insufficient compression of compressor
  - Incorrect refrigerant
  - Faulty expansion valve
  - Insufficient circulation of refrigerant

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

1.3.5 Equipment Produces Loud Noise or Shakes

Applicable model

ERHQ011~016*
ERLQ004~016*

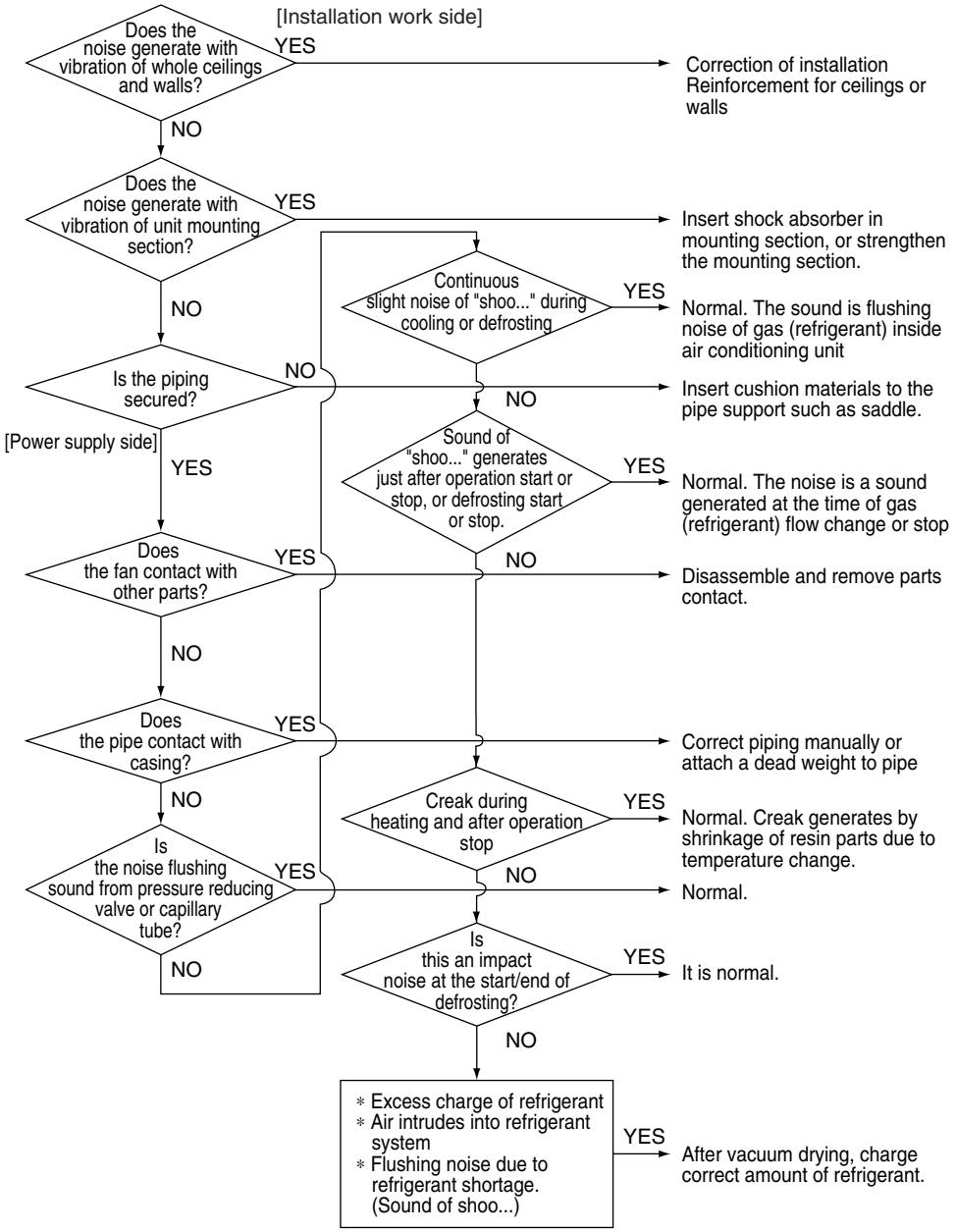
Error detection method

Error generating condition

Supposed causes

- Faulty installation
- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Flushing noise due to refrigerant shortage. (Sound of shoo...)

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

1.3.6 User Interface Displays "Busy"

Applicable model

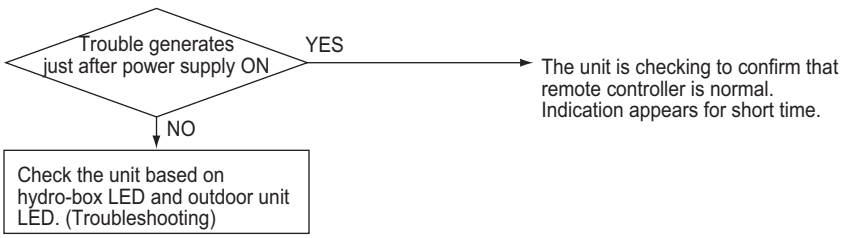
EHB/V*CA

Error detection method

Error generating condition

Supposed causes

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may have occurred.

1.3.7 The Unit is Turned on (⏻ LED is lit) but the Unit is not Heating or Cooling as Expected

Applicable models

EHB*CA, EHV*CA, ERHQ011~016*, ERLQ004~016*

Error detection method

Error generating condition

3

Supposed causes - corrective action

Possible causes	Corrective action
The temperature setting is not correct.	Check the controller set point.
The water flow is too low.	■ Check that all shut off valves of the water circuit are completely open. ■ Check if the water filter needs cleaning. ■ Make sure there is no air in the system (purge air). ■ Check on the manometer that there is sufficient water pressure. The water pressure must be >1.5 bar. ■ Check that the pump speed setting is on the highest speed. ■ Make sure that the expansion vessel is not broken. ■ Check that the resistance in the water circuit is not too high for the pump.
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value (refer to the “Specifications” in databook).

1.3.8 The Unit is Turned on but the Compressor is not Starting (Space Heating or Domestic Heating)

Applicable models

EHB*CA, EHV*CA, ERHQ011~016*, ERLQ004~016*

Error detection method

Error generating condition

Supposed causes - corrective action

Possible causes	Corrective action
The unit must start up out of its operation range (the water temperature is too low).	In case of low water temperature, the system utilizes the backup heater to reach the minimum water temperature first (18°C). ■ Check that the backup heater power supply is correct. ■ Check that faston terminals are connected correctly (instruction can be found in the Installer Reference Guide in Appendix on page 35). ■ Check that the backup heater thermal fuse is closed. ■ Check that the thermal protector backup heater is not activated. ■ Check that the backup heater contactors are not broken.

1.3.9 Pump is Making Noise (Cavitation)

Applicable models

EHB*CA, EHV*CA

Error detection method

Error generating condition

Supposed causes - corrective action

Possible causes	Corrective action
There is air in the system.	Purge air.
Water pressure at pump inlet is too low.	■ Check on the manometer on the unit that there is sufficient water pressure. The water pressure must be >1.5 bar. ■ Check that the manometer is not broken. ■ Check that the expansion vessel is not broken. ■ Check that the setting of the pre-pressure of the expansion vessel is correct (refer to the installer reference guide attached in Appendix to this Service Manual on page 23).

1.3.10 The Water Pressure Relief Valve Opens

Applicable models

EHB*CA, EHV*CA

Error detection method

Error generating condition

Supposed causes - corrective action

Possible causes	Corrective action
The expansion vessel is broken.	Replace the expansion vessel.
The water volume in the installation is too high.	Make sure that the water volume in the installation is under the maximum allowed value (refer to the “Specifications” in databook).

1.3.11 The Water Pressure Relief Valve Leaks

Applicable models

EHB*CA, EHV*CA

Error detection method

Error generating condition

Supposed causes - corrective action

Possible causes	Corrective action
Dirt is blocking the water pressure relief valve outlet.	Check for correct operation of the pressure relief valve by turning the red knob on the valve counter clockwise: ■ If you do not hear a clacking sound, contact your local Daikin dealer. ■ In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local Daikin dealer.

1.3.12 The User Interface Does Not Display Certain Screens (RT, LWT, Tank, Ext RT)

Applicable models

EHB*CA, EHV*CA

Error detection method

Error generating condition

Supposed causes - corrective action

Possible causes	Corrective action
The tank-screen is not visible.	Check if there is a tank connected? Then setting A.2.2.1. should be set to yes.
The RT-screen is not visible.	Check setting A.2.1. to see if unit control method is set to Room Thermostat control.
The ext RT-screen is not visible.	Check setting A.2.1. to see if unit control method is set to ext Room Thermostat control.
The LWT-screen is not visible.	1. Check setting A.2.1. to see if unit control method is set to LWT. 2. Check 7.4.1 (user settings - available homepage if LWT screen is enabled).

1.3.13 Domestic Hot Water Capacity Shortage at Low Outdoor Temperatures

Applicable models

EHB*CA, EHV*CA, ERHQ011~016B/CA, ERLQ004~016CA

Error detection method

Error generating condition

Supposed causes - corrective action

Possible causes	Corrective action
The settings related to domestic hot water operation at low Ta - space heating priority [5-02] and space heating priority temperature [5-03] - are not set or not optimized according to the site application(1).	Optimize the settings related to domestic hot water operation at low Ta - space heating priority [5-02] and space heating priority temperature [5-03] - according to the site application: ■ [5-02] = “1” ■ [5-03] = “[5-01](2) + 3~5°C”

(1) In case the Daikin Altherma LT has no spare capacity compare to the space heating load at low Ta (see equilibrium temperature [5-01]), the priority shall be given towards space heating (see anti-recycling timer [8-02] and maximum running timer for domestic hot water [8-01]) and domestic hot water shall be covered/supported by the electrical heater (To guarantee sufficient domestic hot water and reasonable domestic hot water heat-up times).

(2) The applicable Ta can be determined via the Daikin Altherma simulation software (extranet/software/downloads/altherma/altherma_new_LT).

1.3.14 Space Heating Capacity Shortage at Low Outdoor Temperatures

Applicable models

EHB*CA, EHV*CA, ERHQ011~016*, ERLQ004~016*

Error detection method

Error generating condition

Supposed causes - corrective action

A. General: independent from DHW - setpoint mode

Possible causes	Corrective action
The settings related to space heating operation at low Ta - equilibrium temperature status (backup heater allowance) [5-00] and equilibrium temperature [5-01] - are not set or not optimized according to the site application(1).	Optimize the settings related to space heating operation at low Ta - equilibrium temperature status (backup heater allowance) [5-00] and equilibrium temperature [5-01] - according to the site application: ■ [5-00] = “1” ■ [5-01] = the applicable Ta where the heating load and Daikin Altherma LT available heating capacity are in balance*. Other related settings to optimize: ■ [5-02] = “1” ■ [5-03] = “[5-01](2) + 3~5°C”

(1) In case the Daikin Altherma LT has no spare capacity compare to the space heating load at low Ta (see equilibrium temperature [5-01]), the backup heater shall support the Daikin Altherma LT to supply the required heating capacity according to the heating load. Additionally, at lower Ta space heating operation shall not be interrupted by domestic hot water operation (space heating priority [5-02] and space heating priority temperature [5-03]).

(2) The applicable Ta can be determined via the Daikin Altherma simulation software (extranet/software/downloads/altherma/altherma_new_LT).

B. Specific for integrated models (EHV-CA) (and DHW setpoint is “Reheat only”)

Possible cause:
Frequent domestic hot water operation and/or long domestic hot water operation time happens. In case of a domestic hot water tank without internal booster heater, the space heating is interrupted for the complete domestic hot water range which results in to frequent and/or too long space heating interruption.

Corrective action:
It is advised NOT to select Reheat only as Domestic hot water - Setpoint mode in case of a domestic hot water tank without internal booster heater (domestic hot water production covered/supported by backup heater).

1.3.15 Room Temperature Set Point Isn't Reached or Increases Too Slow

Applicable models

EHB*CA, EHV*CA

Error detection method

Error generating condition

Supposed causes - corrective action

Possible causes	Corrective action
See possible causes of item "2 Possible space heating capacity shortage at low Ta".	See corrective actions of item "2 Possible space heating capacity shortage at low Ta".
The leaving water temperature set point (weather dependent or fixed) is too low in relation with the target room temperature set point.	Select the desired leaving water temperature(1) in balance with the desired room temperature(2) and/or the capacity. Secondly the desired leaving water temperature shall be in relation to the temperature difference between inlet and outlet water temperature of the heat emitters (according to the design and selection of the heat emitters).

(1) The desired leaving water temperature is the result of several settings (preset values, shift values, weather dependent curves, modulation). As a result, too high or too low leaving water temperature could occur which lead to overtemperatures or capacity shortage. By limiting the leaving water temperature range to adequate values (depending on the heat emitter), such situations can be avoided.

(2) The feasible room temperature dependents on the average heat emitter surface temperature. The average heat emitter surface temperature is determined by the temperature difference between the inlet and outlet water temperature of the heat emitter.

1.4 Fault-diagnosis by Remote Controller

Explanation

If operation stops due to malfunction (error or warning), the user interface homescreen will indicate the ⓘ-symbol. The malfunction code plus a short description of the error is displayed when pushing the ⓘ-button on the user interface. In case of a warning, the unit will continue operation. In case of an error, the unit will preventively shut down.



Attention!

Some errors can only be reset when in installer level! The malfunction code enables you to tell what kind of malfunction caused operation to stop. See next pages for malfunction code and malfunction contents.

1.5 Fault-diagnosis manual reset in the memory

Explanation In order to reset the malfunction code in the remote controller memory, follow actions has to be performed.

Remark For some malfunction codes it's required to manually reset the malfunction code in the memory before the unit can be restarted.

1.5.1 Remote Controller Display Malfunction Code and Contents

	Malfunction code	Contents/Processing	Remarks
Hydro-box	80	Inlet water temperature thermistor abnormality	
	81	Outlet water temperature thermistor abnormality	
	89	Water heat exchanger freeze-up abnormality	
	7H	Water flow abnormality	
	8F	Outlet water temperature too high	
	8H	Outlet water temperature too high	
	AA	Booster or back-up heater thermal protector is open	
	AC	Booster heater thermal protector is open	
	AH	Warning tank disinfection function not completed correctly	
	A1	Hydro-box PCB abnormality	
	CJ	Room temperature thermistor error	
	C0	Flow switch abnormality	
	C4	Heat exchanger thermistor abnormality	
	EC	Domestic hot water temperature too high	
	HC	Domestic hot water temperature thermistor abnormality	
	H1	External temperature sensor error	
Outdoor Unit	E1	Outdoor unit PC board malfunction	
	E3	High pressure malfunction (outdoor unit)	
	E4	Abnormality of low pressure (outdoor)	Failure of low pressure sensor system. Check if the stop valve is open.
	E5	Compressor motor lock malfunction	Compressor motor lock, incorrect wiring.
	E7	Outdoor fan motor lock or outdoor fan instantaneous overcurrent malfunction	
	E9	Malfunction of electronic expansion valve (outdoor unit)	
	F3	Discharge pipe temperature malfunction (outdoor unit)	
	H3	Failure of high pressure switch (outdoor unit)	
	H9	Malfunction of outdoor air temperature sensor system (outdoor unit)	
	J1	Malfunction of pressure sensor	
	J3	Malfunction of discharge pipe temperature sensor system (outdoor unit)	
	J3	Malfunction of discharge pipe temperature sensor system (outdoor unit)	
	J5	Suction pipe thermistor malfunction	
	J6	Malfunction of heat exchanger temperature sensor system (outdoor unit)	
	J7	Malfunction of subcooling heat exchanger thermistor (outdoor unit)	
	J8	Malfunction of liquid pipe thermistor (outdoor unit)	
	L1	Outdoor PC board malfunction	
	L4	Radiation fin temperature rise	Malfunction of inverter cooling
	L5	Instantaneous over current	Possibility of compressor motor grounding or shortage of motor winding
	L8	Electronic thermal	Possibility of compressor overload, open circuit in compressor motor
	L9	Stall prevention	Possibility of compressor seizing
	LC	Malfunction of transmission system (between control PCB and inverter PCB)	
	P1	Open phase or voltage unbalance	
	P4	Abnormal radiation fin temperature sensor (outdoor unit)	
	PJ	Failure of capacity setting (outdoor unit)	Either capacity data is set incorrectly, or capacity has not been set for the data IC

	Malfunction code	Contents/Processing	Remarks
System malfunctions	U0	Lack of gas malfunction	
	U0		Abnormal suction pipe temperature
	U0		
	U2	Abnormal power supply voltage	Including malfunction of K10R, K11R
	U3	Underfloor heating screed dry-out error	Can only be reset when in installer level
	U4/UF	Failure of transmission (between hydro-box and outdoor unit)	Transmission between hydro-box and outdoor unit is not being carried out correctly. (1)
	UF	Failure of transmission (between hydro-box and outdoor unit) or Gas shortage	Transmission between hydro-box and outdoor unit is not being carried out correctly. or There is very little or no refrigerant flow within the hydro-box.
	U5	Failure of transmission (between hydro-box and remote controller)	Transmission between hydro-box and remote controller is not being carried out correctly.
	UA	Incorrect hydro-box connected to the system **or** unit type connection not confirmed	In case of spare part PCB.

3

Legend

Colour	Meaning
	Error code displays automatically and system stops. Inspect and repair it.
	In case of shaded error codes, 'inspection' is not displayed. The system operates but be sure to inspect and repair it.
	Error code displayed on user interface. The system operates, but be sure to inspect and repair it.

Note

(1) There is a possibility of open phase power supply, check power supply also.

1.6 Fault Diagnosis by LED

Introduction

Several methods can be used to consult the system malfunction.

Fault diagnosis by LED is applicable on hydro-box (PCB A1P) and outdoor unit (PCB A2P).

Overview

This chapter contains the following topics:

Topic	See page
1.6.1–Troubleshooting by LED on the Hydro-box PCB	3–30
1.6.2–Troubleshooting by LED on the Outdoor PCB (A1P) (only for GQI)	3–31
1.6.3–Troubleshooting by LED on the Outdoor Service PCB (A2P)	3–32

1.6.1 Troubleshooting by LED on the Hydro-box PCB

Overview

Troubleshooting can be carried out by HAP LED (green). (Blinks when normal)

☼: LED on / ● : LED off / ◑ : LED blinks

Microcomputer Normal Monitor HAP (LED-A)	Contents/Processing
☼	Failure of hydro-box PC board ass'y (Note 5)
●	Malfunction of power supply or failure of PC board ass'y or broken transmission wire between indoor and outdoor unit. (Note 5)

3

Notes

1 Operation halts due to malfunction depending on the model or condition.

2 Troubleshoot by turning off the power supply for a minimum of 5 seconds, turning it back on, and then rechecking the LED display.

1.6.2 Troubleshooting by LED on the Outdoor PCB (A1P) (only for GQI)

Overview

The following diagnosis can be conducted by turning on the power switch and checking the LED indication on the printed circuit board of the outdoor unit.

☼ : LED on / ● : LED off / ◑ : LED blinks / — : Not used for diagnosis

LED detection		Description
HAP (Green)	H1P (Red)	
◑	●	Normal
☼	—	Faulty outdoor unit PCB (Note 1)
●	—	Power supply abnormality, or faulty outdoor unit PCB (Note 2)
◑	☼	Activation of protection device (Note 3)

Notes

1 Turn off the power switch, and turn it on again after 5 seconds or more. Check the error condition, and diagnose the problem.

2 Turn off the power switch. After 5 seconds or more, disconnect the connection wire (2). Then turn on the power switch. If the HAP on the outdoor unit PCB flashes after about 10 seconds, the hydro-box PCB is faulty.

3 Also check for open phase.

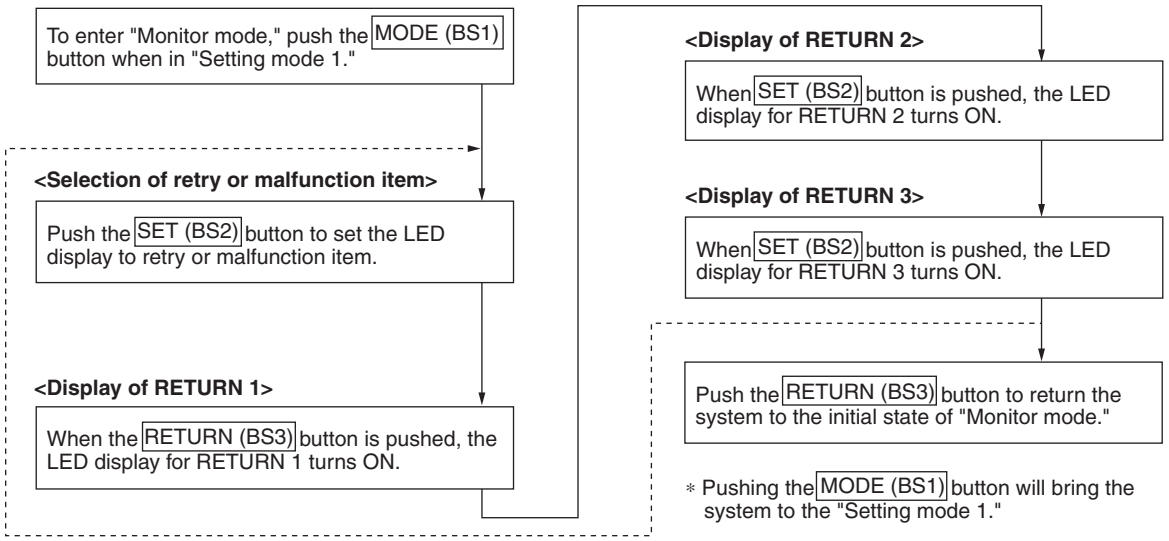
Remark

The error detection monitor continues to indication the previously generated error until the power switch is turned off.

Be sure to turn off the power switch after inspection.

1.6.3 Troubleshooting by LED on the Outdoor Service PCB (A2P)

Take the following steps to check contents of retry and malfunction:



Overview

☼: ON ●: OFF ◑: BLINK

Malfunction code	Contents of retry or malfunction		1								2								3							
			HAP	H1P	H2P	H3P	H4P	H5P	H6P	H7P	HAP	H1P	H2P	H3P	H4P	H5P	H6P	H7P	HAP	H1P	H2P	H3P	H4P	H5P	H6P	H7P
C4	Indoor heat exchanger thermistor		◑	◑	☼	●	●	●	◑	●	◑	◑	☼	●	●	◑	●	●	◑	◑	☼	☼	●	●	●	●
E1	Faulty outdoor PC board		◑	◑	●	☼	●	●	◑	◑	◑	◑	☼	●	●	●	●	◑	◑	◑	☼	☼	●	●	●	●
E3	Abnormal high pressure										◑	◑	☼	●	●	●	◑	◑	◑	◑	☼	☼	●	●	●	●
E4	Abnormal low pressure										◑	◑	☼	●	●	◑	●	●	◑	◑	☼	☼	●	●	●	●
E5	Compressor motor lock										◑	◑	☼	●	●	◑	●	◑	◑	◑	☼	☼	●	●	●	●
E7	Abnormal outdoor fan motor	DC motor 1 lock									◑	◑	☼	●	●	◑	◑	◑	◑	◑	☼	☼	●	●	●	◑
		DC motor 2 lock																	◑	◑	☼	☼	●	●	◑	●
		Abnormal inverter transmission																	◑	☼	☼	☼	●	●	◑	◑
E9	Abnormal electronic expansion valve	Disconnected electronic expansion valve connector									◑	◑	☼	●	◑	●	●	◑	◑	◑	☼	☼	●	●	●	◑
		Malfunction due to wet conditions																	◑	◑	☼	☼	●	●	◑	●
F3	Abnormal discharge pipe temperature	Abnormal discharge pipe temperature	◑	◑	●	☼	●	◑	●	◑	◑	◑	☼	●	●	●	◑	◑	◑	◑	☼	☼	●	●	●	◑
		Disconnected discharge pipe thermistor																	◑	◑	☼	☼	●	●	◑	●
H3	Abnormal high pressure switch		◑	◑	●	☼	●	◑	●	●	◑	◑	☼	●	●	●	◑	◑	◑	◑	☼	☼	●	●	●	●
H9	Abnormal outdoor air thermistor										◑	◑	☼	●	◑	●	●	◑	◑	◑	☼	☼	●	●	●	●
J1	Abnormal pressure sensor		◑	◑	●	☼	●	◑	◑	●	◑	◑	☼	●	●	●	●	◑	◑	◑	☼	☼	●	●	●	●
J3	Abnormal discharge pipe thermistor										◑	◑	☼	●	●	●	◑	◑	◑	◑	☼	☼	●	●	●	●
J5	Abnormal suction pipe thermistor										◑	◑	☼	●	●	◑	●	◑	◑	◑	☼	☼	●	●	●	●
J6	Abnormal heat exchanger distributor pipe thermistor										◑	◑	☼	●	●	◑	◑	●	◑	◑	☼	☼	●	●	●	●
J7	Abnormal intermediate heat exchanger thermistor										◑	◑	☼	●	●	◑	◑	◑	◑	◑	☼	☼	●	●	●	●
J8	Abnormal liquid pipe thermistor										◑	◑	☼	●	◑	●	●	●	◑	◑	☼	☼	●	●	●	●
L1	PC board failure		◑	◑	●	☼	●	◑	◑	◑	◑	◑	☼	●	●	●	●	◑	◑	◑	☼	☼	●	●	●	●
L4	Elevated radiation fin temperature										◑	◑	☼	●	●	◑	●	●	◑	◑	☼	☼	●	●	●	●
L5	Compressor instantaneous overcurrent										◑	◑	☼	●	●	◑	●	◑	◑	◑	☼	☼	●	●	●	●
L8	Compressor overload										◑	◑	☼	●	◑	●	●	●	◑	◑	☼	☼	●	●	●	●
L9	Compressor lock										◑	◑	☼	●	◑	●	●	◑	◑	◑	☼	☼	●	●	●	●
LC	Abnormal transmission (between the control and the inverter)										◑	◑	☼	●	◑	◑	●	●	◑	◑	☼	☼	●	●	●	●
P1	Unbalanced power supply voltage		◑	◑	●	☼	◑	●	●	●	◑	◑	☼	●	●	●	●	◑	◑	◑	☼	☼	●	●	●	●
P4	Abnormal radiation fin thermistor										◑	◑	☼	●	●	◑	●	●	◑	◑	☼	☼	●	●	●	●
PJ	Faulty capacity setting										◑	◑	☼	●	◑	◑	●	◑	◑	◑	☼	☼	●	●	●	●
U0	Abnormal gas shortage	Gas shortage warning	◑	◑	●	☼	◑	●	●	◑	◑	◑	☼	●	●	●	●	●	◑	◑	☼	☼	●	●	●	◑
		Abnormal gas shortage																	◑	◑	☼	☼	●	●	◑	●
U2	Abnormal power supply voltage	Inverter undervoltage and overvoltage									◑	◑	☼	●	●	●	◑	●	◑	◑	☼	☼	●	●	●	◑
		SP-PAM overvoltage																	◑	◑	☼	☼	●	●	◑	●
U4	Abnormal transmission (between indoor and outdoor units)										◑	◑	☼	●	●	◑	●	●	◑	◑	☼	☼	●	●	●	●
UA	Faulty field setting switch										◑	◑	☼	●	◑	●	◑	●	◑	◑	☼	☼	●	●	●	●
UF	Improper piping and improper communication wiring														◑	◑	◑	◑	◑	◑	☼	☼	●	●	●	●

1.7 Overview of Error Codes

Abbreviations

DHW= domestic hot water

SPH= space heating

BUH= back-up heater

BSH= booster heater

PHE= plate heat exchanger

1.7.1 Hydro-box Malfunction

Overview

Remote Controller Display	Contents of Malfunction	Details of Malfunction (Reference Page)
80	Return water temperature thermistor abnormality	3–44
81	Leaving water temperature thermistor abnormality	3–44
89	PHE freeze-up protection control	3–43
7H	Water flow abnormality	3–45
8F	Abnormal increase BUH outlet water temperature (DHW)	3–49
8H	Abnormal increase BUH outlet water temperature	3–48
AA	BUH overheated, power reset required	3–50
AC	BSH overheated, power reset required	3–52
AH	Tank disinfection function not completed correctly	3–55
A1	Zero cross detection problem. Power reset required	3–42
CJ	Room temperature sensor problem	3–44
C0	Flow sensor abnormality	3–53
C4	Heat exchanger thermistor abnormality	3–44
EC	Abnormal increase tank temperature	3–54
H1	External temperature sensor problem	
HC	Tank temperature thermistor problem	3–44

1.7.2 Outdoor Unit Malfunction

Overview

Remote Controller Display	Contents of Malfunction	Details of Malfunction (Reference Page)
E1	Outdoor unit PC board malfunction	3–60
E3	Abnormality of high pressure (HPS)	3–61
E4	Abnormality of low pressure (outdoor)	3–63
E5	Compressor motor lock malfunction	3–66
E7	Malfunction of outdoor unit fan motor	3–70
E9	Malfunction of Electronic expansion valve	3–74
F3	Discharge pipe temperature malfunction	3–78
H3	Faulty high pressure switch (HPS)	3–82
H9	Malfunction of outdoor air temperature sensor system	3–86
J1	Malfunction of pressure sensor	3–87
J3	Malfunction of discharge pipe temperature sensor system	3–86
J5	Suction pipe thermistor malfunction	3–86
J6	Malfunction of heat exchanger temperature sensor system	3–86
J7	Malfunction of subcooling heat exchanger temperature sensor system (outdoor unit)	3–86
J8	Malfunction of liquid pipe thermistor (outdoor unit)	3–86
L1	Outdoor PC board malfunction	3–90
L4	High temperature of radiation fin	3–93
L5	Overcurrent of DC output (instantaneous)	3–95
L8	Electronic thermal switch (time lag)	3–97
L9	Stall prevention (time lag)	3–99
LC	Malfunction of transmission system (between control PCB and inverter PCB)	3–101
P1	Open phase or voltage unbalance	3–103
P4	Malfunction of radiator fin temperature thermistor	3–104
PJ	Error in capacity setting	3–105

1.7.3 System Malfunction

Overview

Remote Controller Display	Contents of Malfunction	Details of Malfunction (Reference Page)
U0	Gas shortage	3–108
U2	Abnormal power supply voltage	3–110
U3	Underfloor heating screed dry-out error	3–112
U4 or UF	Transmission error (between hydro-box and outdoor unit) (1)	3–113
UF	Malfunction of transmission (between hydro-box and outdoor unit) or gas shortage	3–115
U5	Transmission error (between hydro-box and user interface)	3–117
UA	Incorrect hydro-box connected to this system or unit type connection not confirmed	3–118

Note

(1) Possibility of open phase power supply.

1.8 Overview of the Outdoor Safety Devices

	High pressure switch		Fuse
	Open	Close	
ERHQ011~016BA	4.0 MPa +0/-0.15	3.0 +/-0.15	6.3A/250V
ERLQ-CA	4.17 MPa +0/-0.15	3.2 +/-0.15	6.3A/250V

3

1.9 Overview of the Hydro-box Safety Devices

Hydro-box

	Protector	Cut-out condition	Reference
EHB/V-CA	Q1L (Clixon)	85 +0/-6°C	4P312728
	F1T (Thermal fuse)	134°C +3/-2°C	AD120151
	B1L004	Min 5l/min in hp operation. If 3V BUH: min 12l/min	AD120120
	B1L008~016	Min 11l/min in hp operation. If 3V BUH: min 12l/min If 9W BUH: min 15l/min	AD120120

Tank

	Protector (Clixon)	Cut-out condition	Reference
EKSWW	Q2L	85°C ± 3°C	4SW03476-1
EKSWWU	Q2L	85°C ± 3°C	4SW03476-1
	Q3L	85°C ± 3°C	
EKHWS - V3	Q2L	85°C ± 3°C	4SW05637-1
	Q3L	85°C ± 3°C	
EKHWS - Z2	Q2L	91°C ± 3°C	4SW05637-2
	Q3L	85°C ± 3°C	4SW05637-1
EKHWSU - V3	Q2L	85°C ± 3°C	4SW05637-3
	Q3L	85°C ± 3°C	
EKHWE - V3	Q2L	89°C +0 / -8°C	4SW05724-1
EKWE - Z2	Q2L	89°C +0 / -8°C	4SW05724-1
	Q3L	89°C +0 / -8°C	
EHV - CA	No clixon on tank since no BSH in tank. Only relevant clixon is clixon from BUH.		

2 Error Codes: Hydro-box

2.1 What Is in This Chapter?

Introduction

In the first stage of the troubleshooting sequence, it is important to correctly interpret the error code on the user interface display. The error code helps you to find the cause of the problem.

Shutdown

For some errors, the system only shuts down when the error occurs several times. This means that you have to wait until the system shuts down to be able to see the error code on the user interface.

Overview

This chapter contains the following topics:

Topic	See page
2.2–“A1” Malfunctioning Hydro-box PCB	3–42
2.3–“89” Water Heat Exchanger Frozen	3–43
2.4–“CJ, C4, 81, 80, HC, H1” Thermistor or Related Abnormality (Hydro-box)	3–44
2.5–“7H” Hydro-box: Flow Error	3–45
2.6–“8H” Hydro-box: Leaving water temperature too high (> 65°C)	3–48
2.7–“8F” Leaving water temperature too high (> 75°C) during domestic hot water production	3–49
2.8–“AA” Hydro-box: Open thermal protector / fuse of backup heater	3–50
2.9–“AC” Hydro-box: Open thermal protector of booster heater (only for EHB*)	3–52
2.10–“C0” Hydro-box: Flow sensor failure	3–53
2.11–“EC” Hydro-box: Domestic hot water tank temperature too high (> 89°C)	3–54
2.12–Warning “AH” Tank disinfection function not completed correctly	3–55

2.2 "A1" Malfunctioning Hydro-box PCB

User interface display

A1

Error generation

The error is generated when the data from the EEPROM is not received correctly.

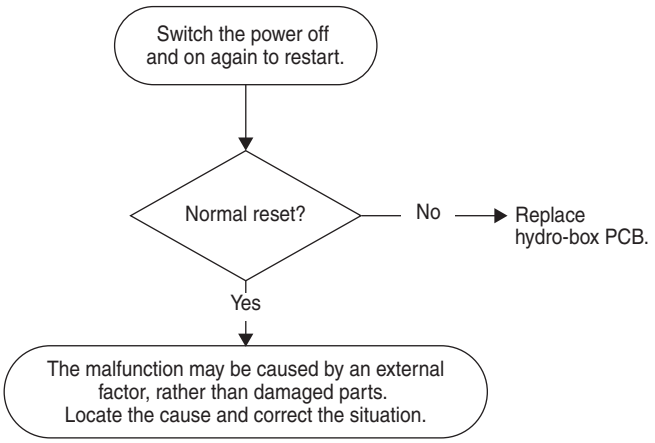
EEPROM (Electrically Erasable Programmable Read Only Memory): A memory chip that holds its content without power. It can be erased, either within the computer or externally and usually requires more voltage for erasure than the common +5 volts used in logic circuits. It functions like non-volatile RAM, but writing to EEPROM is slower than writing to RAM.

3

Supposed causes

The possible cause is a malfunctioning hydro-box PCB.

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

2.3 "89" Water Heat Exchanger Frozen

User interface display

89

Method of malfunction detection

The freeze-up protection control (operation halt) is activated during cooling operation according to the temperature detected by the hydro-box heat exchanger thermistor.

Malfunction decision conditions

Freeze-up protection:
When the hydro-box heat exchanger temperature is below 0°C during cooling operation.

Supposed causes

- Detection error due to faulty hydro-box heat exchanger thermistor.
- Detection error due to faulty hydro-box PCB.

Troubleshooting



See also "Check No.4 - Resistance Conversion Table (Ambient, Coil, Fin)" on page 3-123.

Caution

Be sure to turn off power switch before connecting or disconnecting connector, otherwise parts may be damaged.

2.4 "CJ, C4, 81, 80, HC, H1" Thermistor or Related Abnormality (Hydro-box)

User interface display

CJ, C4, 81, 80, HC, H1

Method of malfunction detection

The temperatures detected by the thermistors are used to determine thermistor errors.

Malfunction decision conditions

When the thermistor input is more than 4.96 V or less than 0.04 V during compressor operation*.
* (reference)

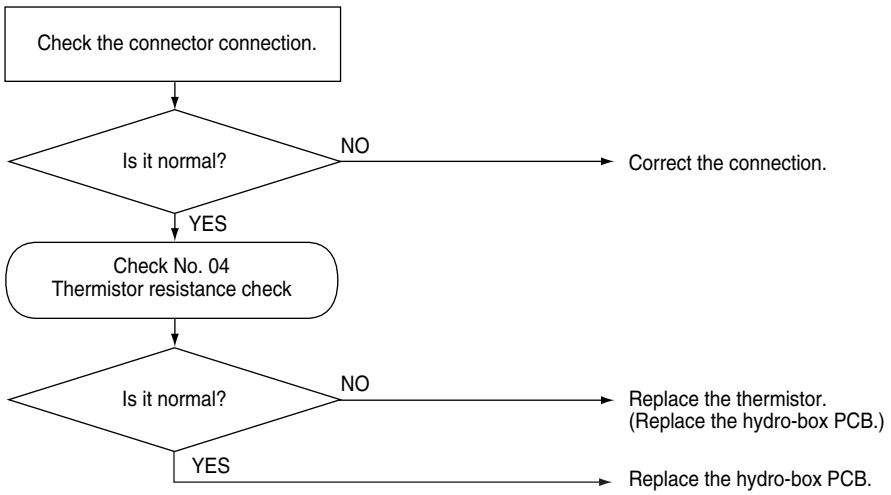
When above about 212°C (less than 120 ohms) or below about –50°C (more than 1,860 kohms).

Note: The values vary slightly in some models.

Supposed causes

- Faulty connector connection
- Faulty thermistor
- Faulty PCB

Troubleshooting



CJ: Room temperature thermistor
HC: Tank temperature thermistor
C4: Hydro-box heat exchanger thermistor
81: Leaving water temperature thermistor
80: Return water temperature thermistor

(*) See also "Check No.4 - Resistance Conversion Table (Ambient, Coil, Fin)" on page 3-123.

2.5 "7H" Hydro-box: Flow Error

User interface display

7H

Method of malfunction detection

The malfunction is detected by the flow sensor.

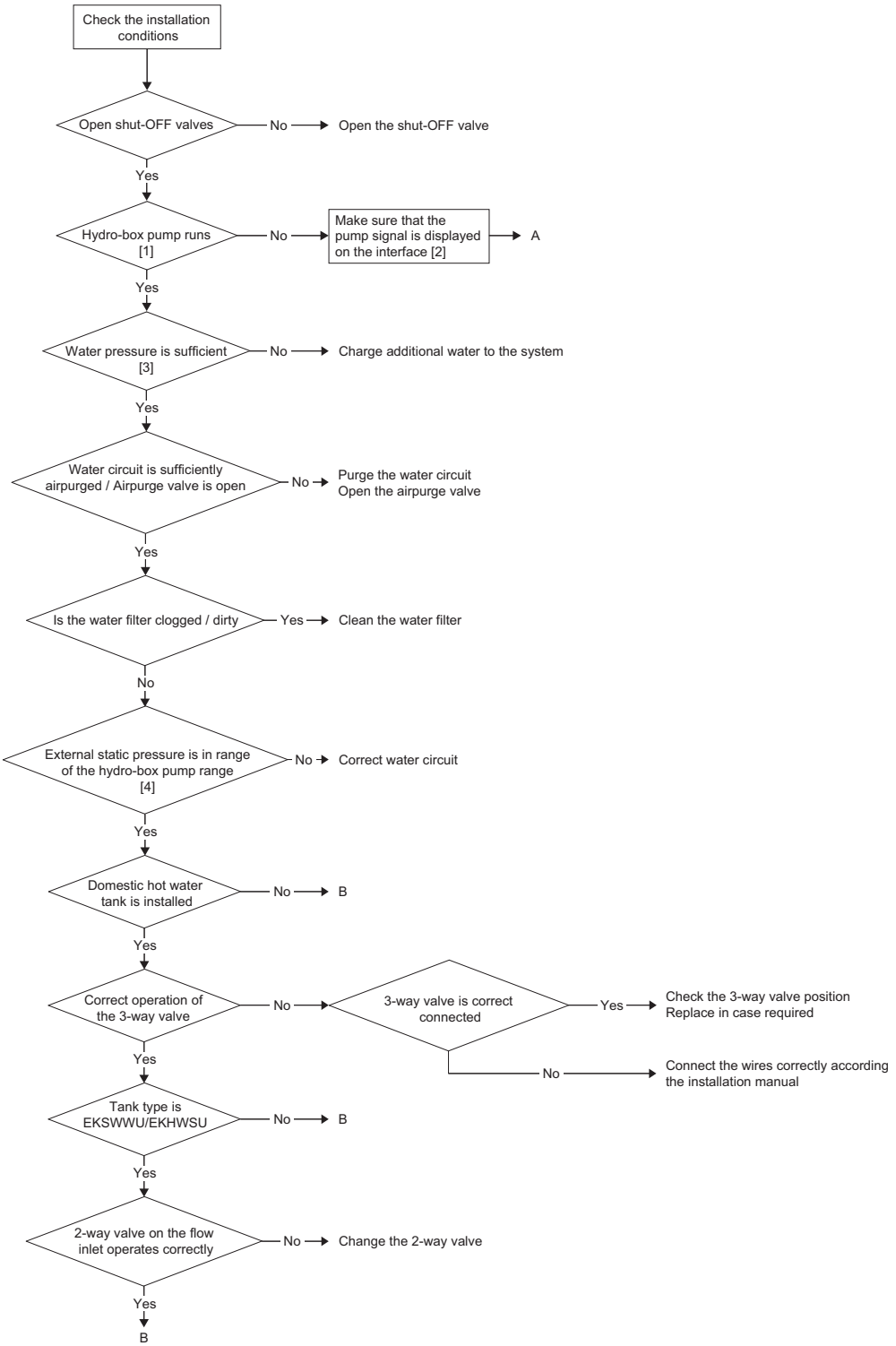
Malfunction decision conditions

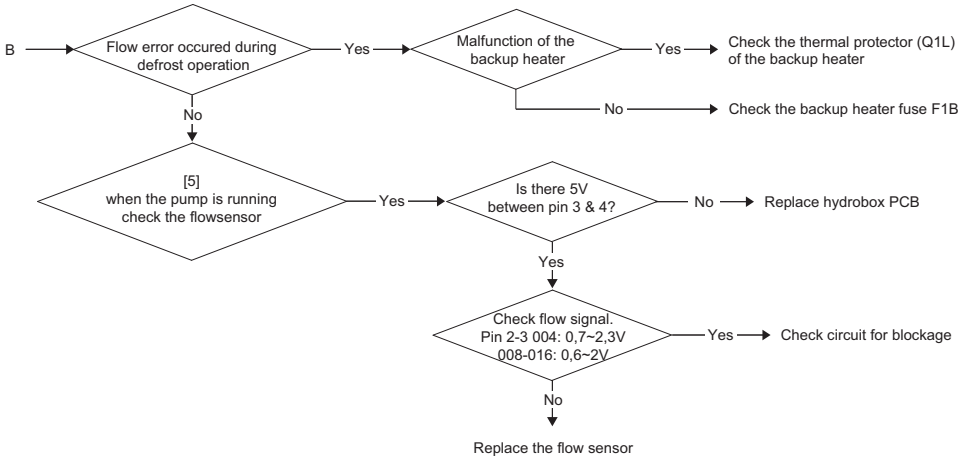
The error is generated in case the water flow is too low or no water flow at all for 15 seconds.

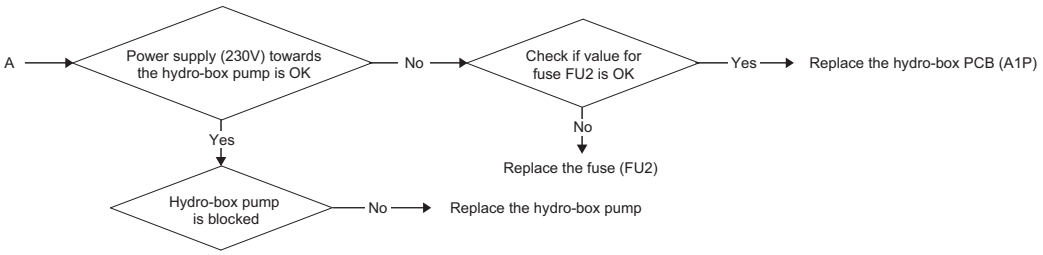
Supposed causes

- Closed shut off valve
- Air in the system
- Clogged water filter
- Insufficient water pressure
- Too high external static pressure (pump speed setting)
- Malfunction of hydro-box pump
- Hydro-box pump fuse open [FU2]
- During defrost
  - Malfunction of the backup heater [Q1L]
  - Backup heater fuse [F1B]
- In case of EKSWW(U) / EKHWS(U) / EKHWE
  - Malfunction of the 3-way valve
- In case of the EKSWWU / EKHWSU
  - Malfunction of the tank thermostat [Q1T, Q3L]
  - Malfunction of 2-way valve
- Malfunction of flow sensor (damaged membrane)
- 7H-01 waterflow problem

Troubleshooting







[1]: When the pump starts (push the ON/OFF button), manometer needle moves, pump vibrations can be detect. In case unclear perform item A.

[2]: When the pump runs, pump signal is displayed on the interface controller. The pump will run for 15 seconds before error code 7H will be displayed.

In order perform item A completely, several pump restarts can be required.

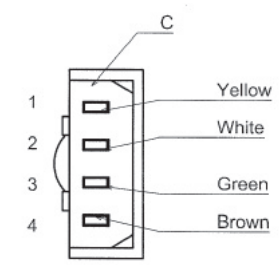
[3]: Check the installation manual for the minimum required water pressure in the system.

[4]: Check the installation manual for the external static pressure values of the different pump speeds.

[5]: Disconnect the connector of the flow sensor on the PCB (X4A) and measure the resistance value on the connector of the flow sensor.

At a restart of the system, the pump will operate for 15 seconds before error code occurs.

Use these 15 seconds to confirm the voltages of the flow sensor before the pump will be stopped due to error 7H.



Yellow = NA
White = Flow
Green = GND
Brown = 5V DC

2.6 "8H" Hydro-box: Leaving water temperature too high (> 65°C)

User interface display

8H

Method of malfunction detection

The malfunction is detected by leaving water thermistor after backup heater [R2T].

Malfunction decision conditions

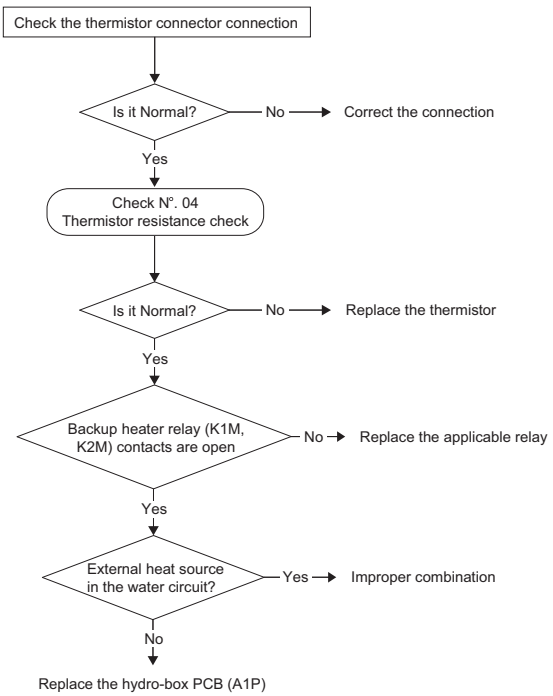
The error is generated in case the leaving water temperature is higher than 65°C.

3

Supposed causes

- Malfunction of the leaving water thermistor [R2T]
- Malfunction of the backup heater relays [K1M, K2M]
- In case of combination of boiler
  - Incorrect cooperation of systems

Troubleshooting



2.7 "8F" Leaving water temperature too high (> 75°C) during domestic hot water production

User interface display

8F

Method of malfunction detection

The malfunction is detected by leaving water thermistor after backup heater.

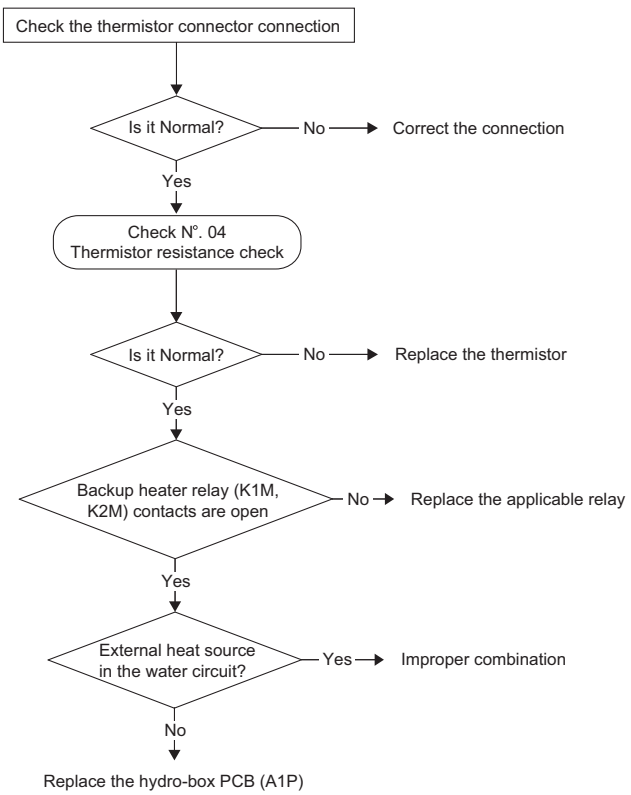
Malfunction decision conditions

The error is generated in case the leaving water temperature is higher than 75°C.

Supposed causes

- Malfunction of the leaving water thermistor [R2T]
- Malfunction of the backup heater relays [K1M, K2M]
- In case of combination with boiler
  - Incorrect cooperation of systems

Troubleshooting



2.8 "AA" Hydro-box: Open thermal protector / fuse of backup heater

User interface display

AA

Method of malfunction detection

The malfunction is detected by activation of thermal protector of the backup heater [Q1L] when the pump is running.

Malfunction decision conditions

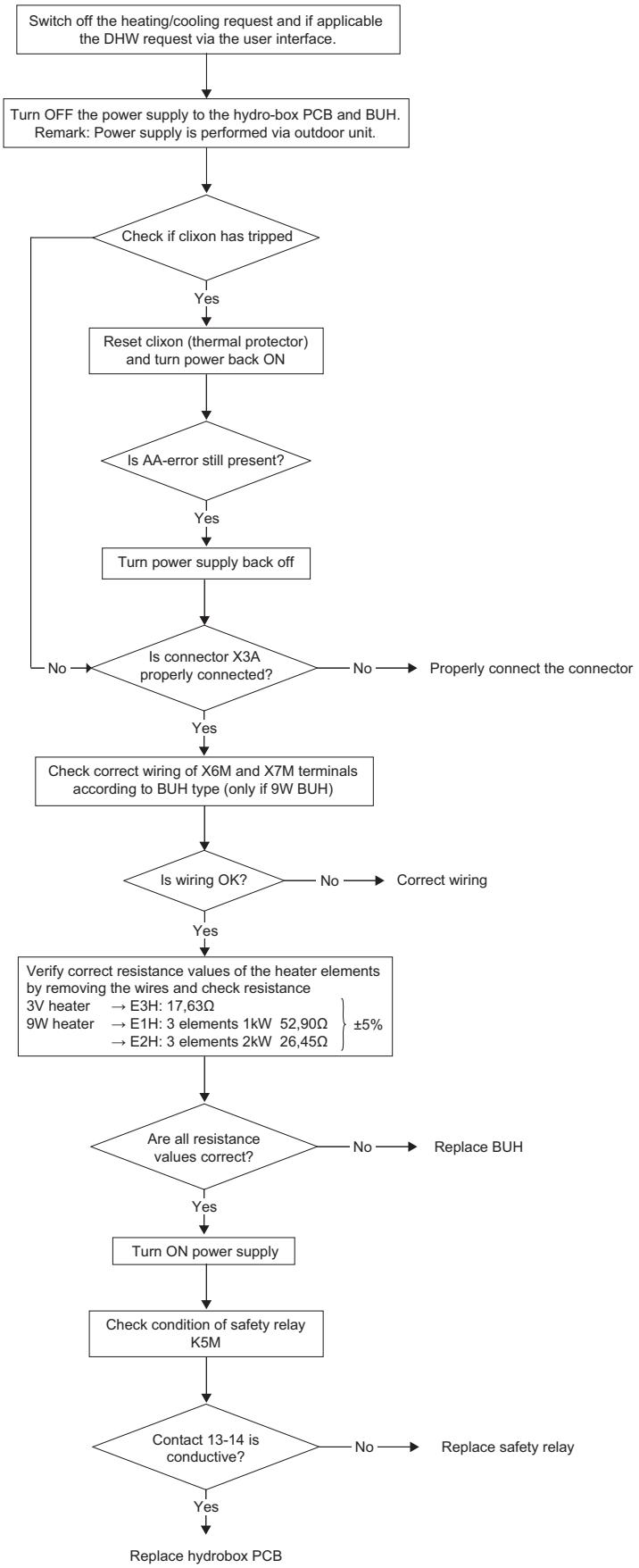
The error is generated in case the temperature of the backup heater rises above 85°C.

3

Supposed causes

- Malfunction of the backup heater relays [K1M, K2M]
- Incorrect parameter of the solar pump station (maximum tank temperature is too high, etc.)
- Fuse FU2 blown
- AA-01 = BUH overheated
- AA-02 = external BUH overheated

Troubleshooting



2.9 "AC" Hydro-box: Open thermal protector of booster heater (only for EHB*)

Remote controller display

AC

Method of malfunction detection

The malfunction is detected by activation of thermal protector of the booster heater:

- Q2L: EKHWE / EKHWS***V3 / EKHWSU
- Q3L: EKHWS**Z2

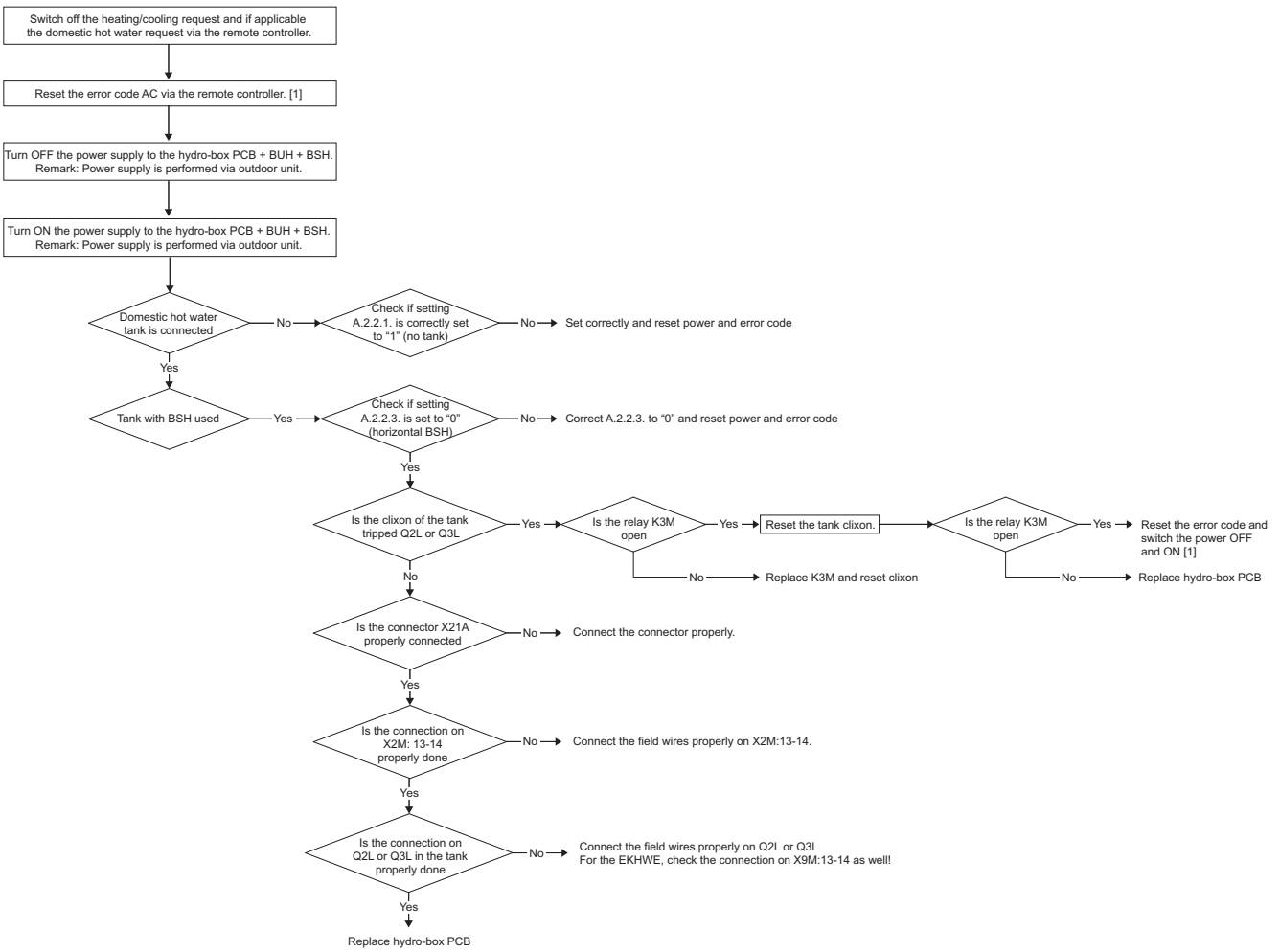
Malfunction decision conditions

The error is generated in case the temperature of the booster heater rises above specific temperature.

Supposed causes

- Malfunction of the booster heater relay [K3M]
- Incorrect parameter of the solar pump station (maximum tank temperature is too high, etc.)

Troubleshooting



2.10 "C0" Hydro-box: Flow sensor failure

Remote controller display

C0

Method of malfunction detection

The protection device circuit checks the flow input signal during pump stop operation.

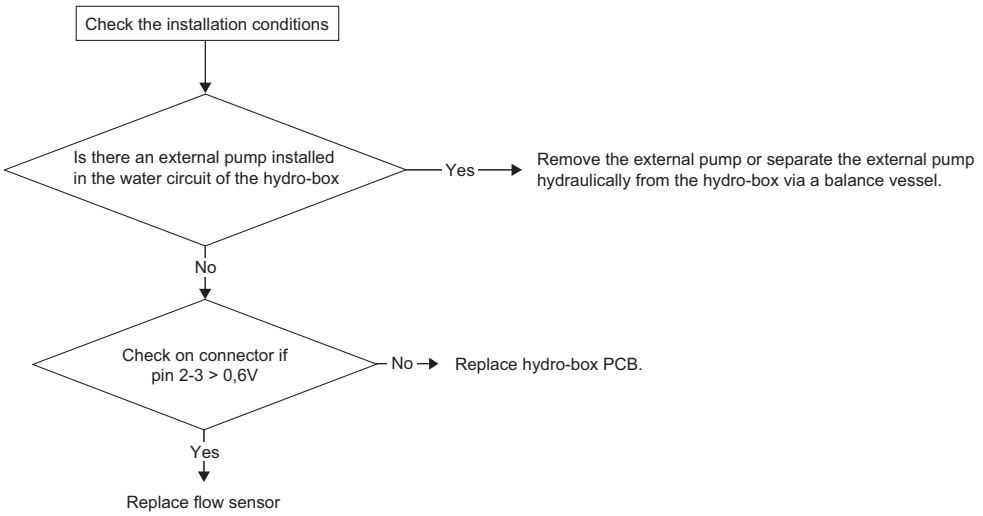
Malfunction decision conditions

The error is generated in case flow input signal during pump stop operation occurs.

Supposed causes

- Malfunction of the flow sensor
- Water flow caused by external source

Troubleshooting



[1]: Do not disconnect the connector of the flow sensor on the PCB (X4A). Measure the voltage value on the connector of the flow sensor between pin 2 and 3.

2.11 "EC" Hydro-box: Domestic hot water tank temperature too high (> 89°C)

Remote controller display

EC

Method of malfunction detection

The malfunction is detected by domestic hot water tank thermistor (R5T).

Malfunction decision conditions

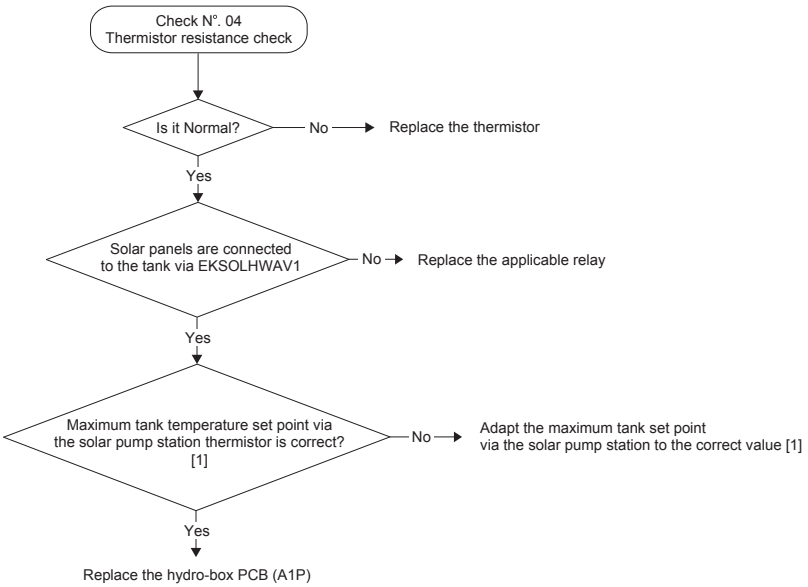
The error is generated in case the domestic hot water temperature rise above 89°C.

3

Supposed causes

- Malfunction of the domestic hot water tank thermistor [R5T]
- Incorrect parameters on the solar pump station

Troubleshooting



[1]: Confirm the maximum allowed tank temperature via solar panels in the installation manual of EKSOLHWAV1.

2.12 Warning "AH" Tank disinfection function not completed correctly

Remote controller display

AH (warning)

Method of malfunction detection

The malfunction is detected by thermistor and timer-check.

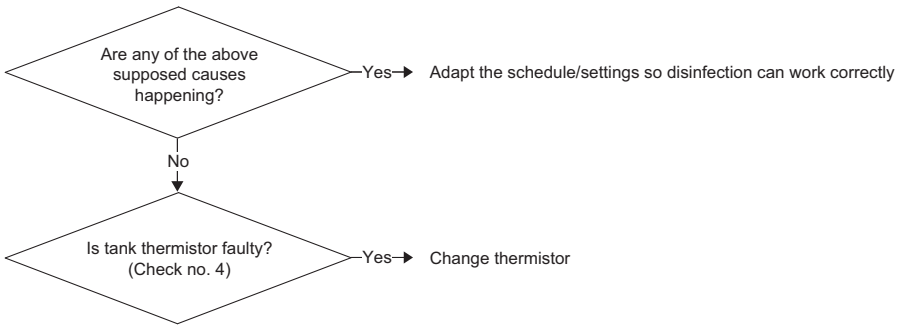
Malfunction decision conditions

The error is generated when disinfection function is not completed correctly. Either tank temperature for disinfection [A.4.4.4.] is not reached or temperature is not kept for required time [A.4.4.5.].

Supposed causes

- Disinfection function was interrupted by DHW tapping
- Large DHW tapping happened recent before the programmed start-up of disinfection
- BSH is restricted during disinfection

Troubleshooting



3 Error Codes: Outdoor Units

3.1 What Is in This Chapter?

Introduction

In the first stage of the troubleshooting sequence, it is important to correctly interpret the error code on the remote controller display. The error code helps you to find the cause of the problem.

Overview

This chapter contains the following topics:

Topic	See page
3.2–“A5” Freeze-up protection heating peak cut control	3–59
3.3–“E1” Outdoor Unit PCB Abnormality	3–60
3.4–“E3”Abnormal High Pressure (Detected by the HPS)	3–61
3.5–“E4” Actuation of Low Pressure Sensor	3–63
3.6–“E5” Compressor Motor Lock	3–66
3.7–“E6” Compressor Motor Lock	3–68
3.8–“E7” Malfunction of Outdoor Unit Fan Motor	3–70
3.9–“E8” Compressor overcurrent detection	3–73
3.10–“E9” Malfunction of Electronic Expansion Valve	3–74
3.11–“EA” Four Way Valve Abnormality	3–77
3.12–“F3” Malfunctioning in Discharge Pipe Temperature	3–78
3.13–“F6” Malfunctioning in Discharge Pipe Temperature	3–80
3.14–“H0” Compressor sensor system abnormality	3–81
3.15–“H3” Malfunctioning HPS System	3–82
3.16–“H6” Position Detection Sensor Abnormality	3–84
3.17–“H8” Compressor input (CT) system abnormality	3–85
3.18–“H9, J3, J5, J6, J7, J8” Thermistor or Related Abnormality (Outdoor Unit)	3–86
3.19–“J1” Malfunction of Pressure Sensor	3–87
3.20–“JA” High pressure sensor abnormality	3–89
3.21–“L1” Faulty Outdoor PC Board	3–90
3.22–“L3” Switch Box Temperature Abnormality	3–92
3.23–“L4” Radiation Fin Temperature Increased	3–93
3.24–“L5” DC Output Overcurrent (Instantaneous)	3–95
3.25–“L8” DC Output Overcurrent (Instantaneous)	3–97

Topic	See page
3.26–“L9” Stall Prevention (Time Lag)	3–99
3.27–“LC” Malfunction of Transmission system (Between Control PCB and Inverter PCB)	3–101
3.28–“P1” Open Phase or Power Supply Voltage Imbalance	3–103
3.29–“P4” Malfunction of Radiator Fin Temperature Thermistor	3–104
3.30–“PJ” Malfunction of Radiator Fin Temperature Thermistor	3–105
3.29–“FR” Abnormal High Pressure, Activation of HPS	

3.2 "A5" Freeze-up protection heating peak cut control

Trigger	Effect	Reset
• during cooling operation, indoor heat exchanger temperature is below 0°C (freeze-up protection control). • during heating operation, indoor heat exchanger is above 65°C (heating peak-cut control).	Unit will stop operating.	Automatic reset when temperature is within range.

Possible cause	Check	Corrective action
Indoor Unit - Electrical components		
Air short-circuit.	Check if the airflow around the unit is OK and there are no obstructions.	Remove obstruction.
Clogged air filter.	Check if the air filter is clogged.	Clean the air filter.
Dust accumulation on indoor heat exchanger.	Check if indoor heat exchanger is dirty/dusty.	Clean the indoor heat exchanger.
Faulty indoor heat exchanger thermistor.	Check indoor heat exchanger thermistor.	Replace indoor heat exchanger thermistor when required.
Faulty indoor PCB.	Check if error still occurs after turning off power and turning it back on again. Check if the indoor PCB receives power. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check the wiring to indoor PCB.	Adjust power to the indoor PCB. Replace indoor PCB when HAP LED is not blinking in regular intervals. Install correct spare part or update indoor PCB. Adjust wiring to indoor PCB when required.

3.3 "E1" Outdoor Unit PCB Abnormality

Remote controller display

E1

Method of malfunction detection

Microcomputer checks whether E^2PROM is normal.

Malfunction decision conditions

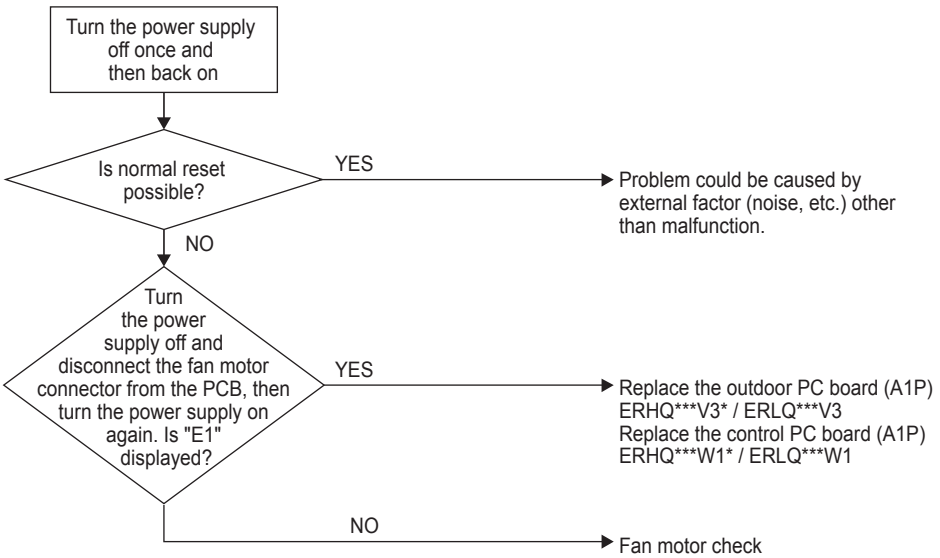
E^2PROM:
When E^2PROM malfunctions when turning the power supply on

3

Supposed causes

Faulty outdoor unit PCB

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.4 "E3" Abnormal High Pressure (Detected by the HPS)

Remote controller display

E3

Method of malfunction detection

The protection device circuit checks continuity in the high pressure switch.

Malfunction decision conditions

When the high pressure switch is actuated
Actuating pressure:

Supposed causes

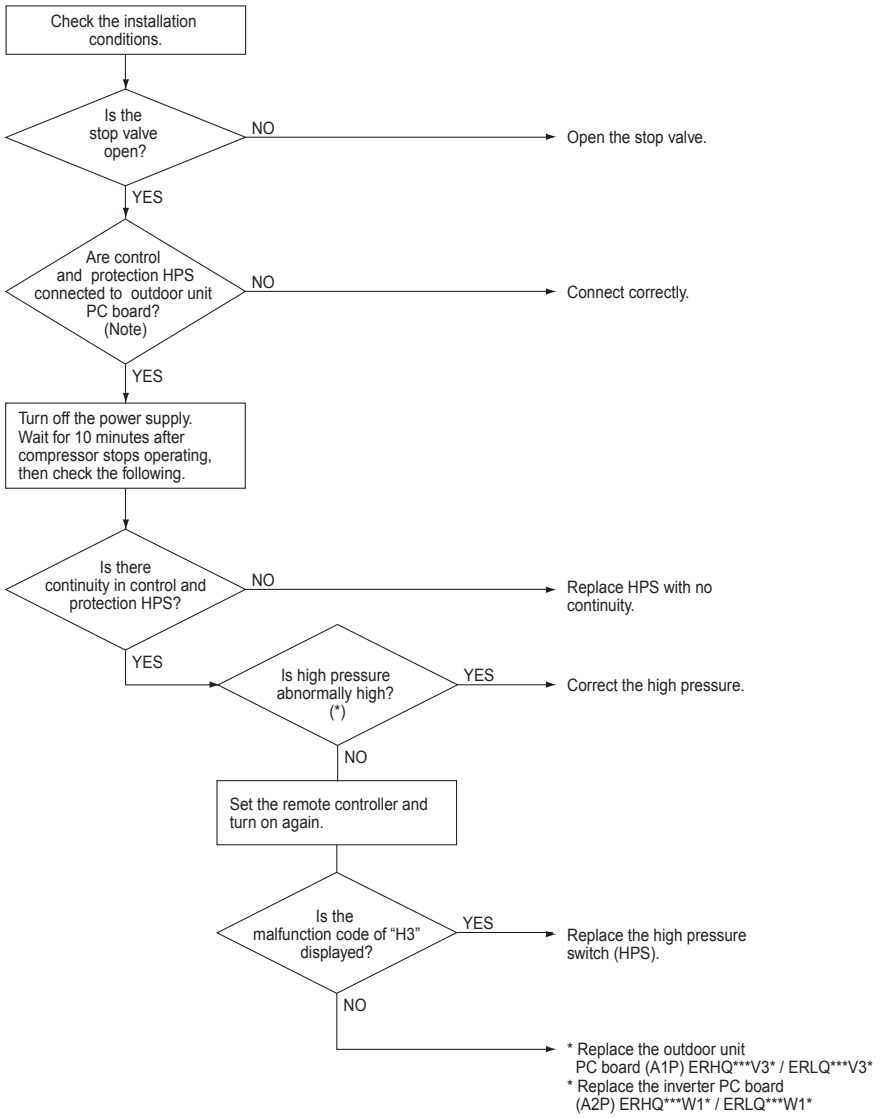
- Faulty high pressure switch
- Disconnection in high pressure switch harness
- Faulty connection of high pressure switch connector
- Clogged hydro-box suction filter (in heating operation)
- Dirty outdoor unit heat exchanger
- Faulty outdoor unit fan
- Refrigerant overcharge
- Stop valve is left in closed

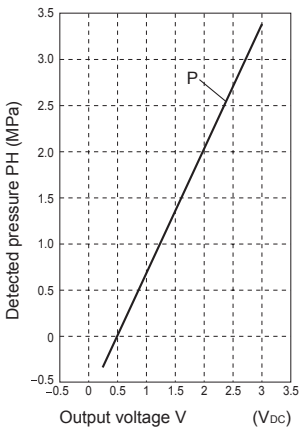
HPS settings

The table below contains the preset HPS values.

	High pressure switch		Fuse
	Open	**Close**	
ERHQ011~016BA*	4.0 MPa +0/-0.15	3.0 +/-0.15	6.3A/250V
ERLQ011~016BA*			
ERLQ011~016CA*			

Troubleshooting





P = 1.38V - 0.69
P : Detected pressure (MPa)
V : Output voltage

(*) See also "Check No.6 - Evaluation of Abnormal High Pressure" on page 3-126.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.5 "E4" Actuation of Low Pressure Sensor

Remote controller display

E4

Method of malfunction detection

[In cooling]

- Detect malfunctions by the pressure sensor (S1NPH).

[In heating]

- Detect malfunctions by the heat exchanger distribution pipe thermistor (R4T).

Malfunction decision conditions

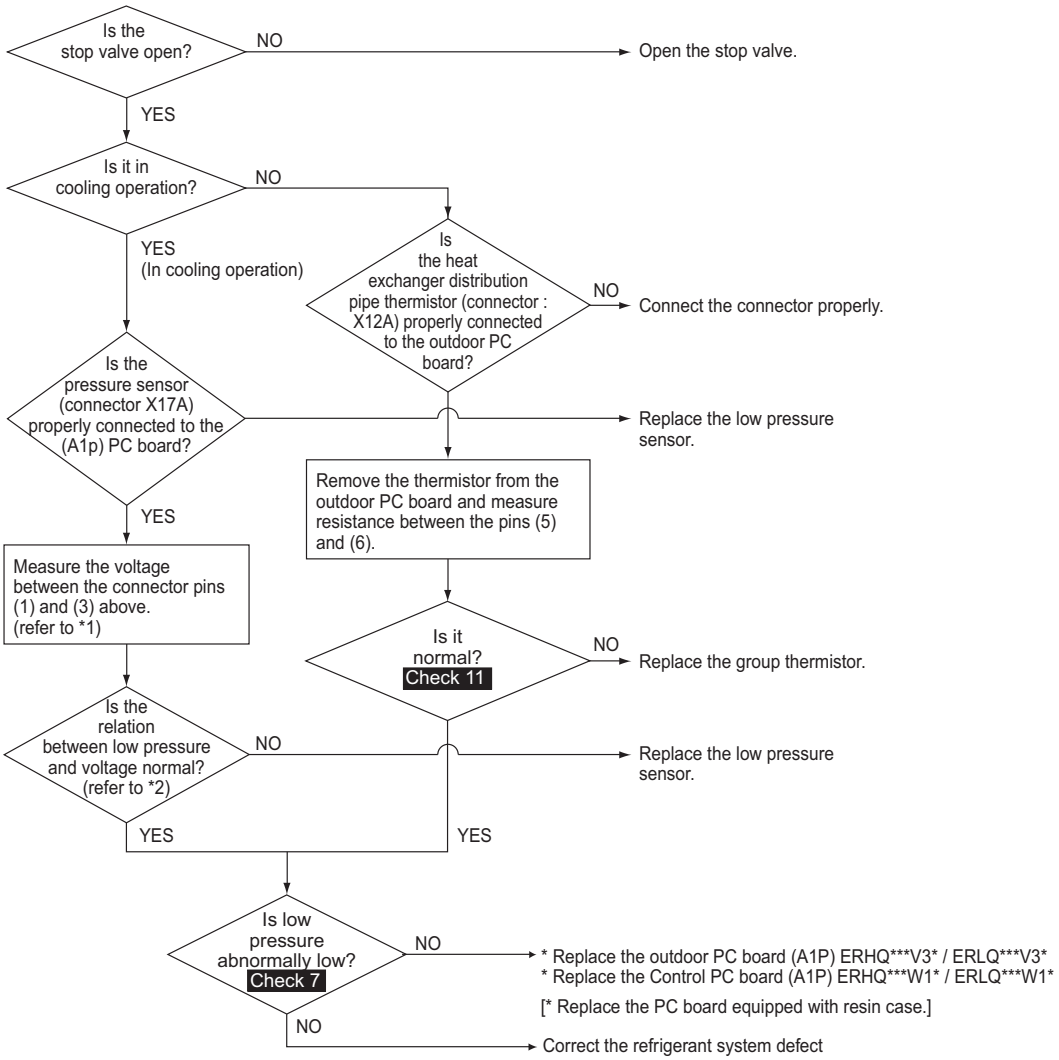
[In cooling]

- When the detection pressure is the following value:
  0.12 MPa or less continues for 5 minutes
- When the saturated pressure equivalent to the detection temperature is the following value:
  0.12 MPa or less continues for 5 minutes

Supposed causes

- The stop valve remains closed
- Faulty pressure sensor and intermittent harness
- Faulty outdoor PC board
- Abnormal drop of low pressure
  (inadequate refrigerant)
  (Abnormal refrigerant piping system (liquid pipe system))
  (Faulty electronic expansion valve)

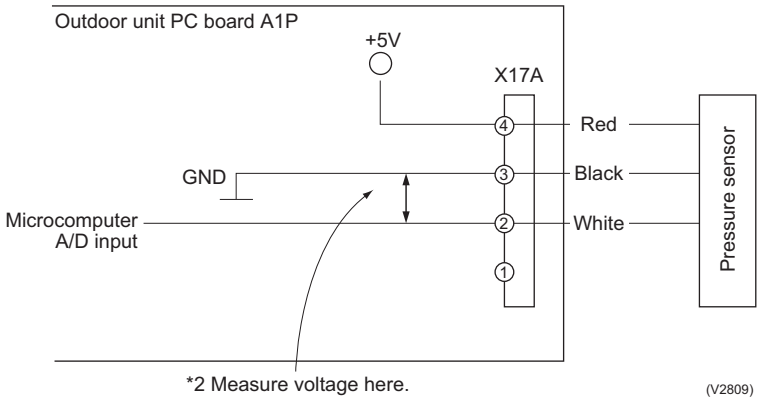
Troubleshooting

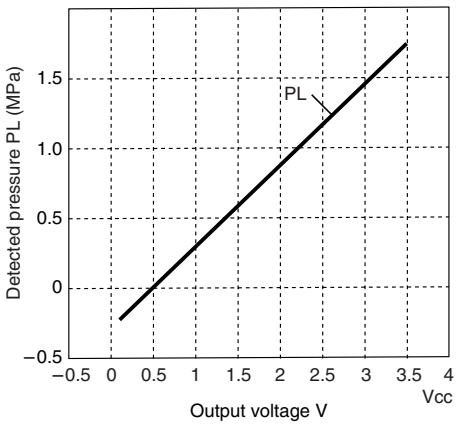


See also

- "Check No.7 - Evaluation of Abnormal Low Pressure" on page 3-127.
- "Check No.11 - Outdoor unit: Check for Power Transistor" on page 3-130.

Graphs





PL=0.57V−0.28
PL: detected pressure (Mpa)
V: output voltage (V)

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.6 "E5" Compressor Motor Lock

Remote controller display

E5

Method of malfunction detection

Inverter PC board takes the position signal from UVW line connected between the inverter and compressor, and detects the position signal pattern.

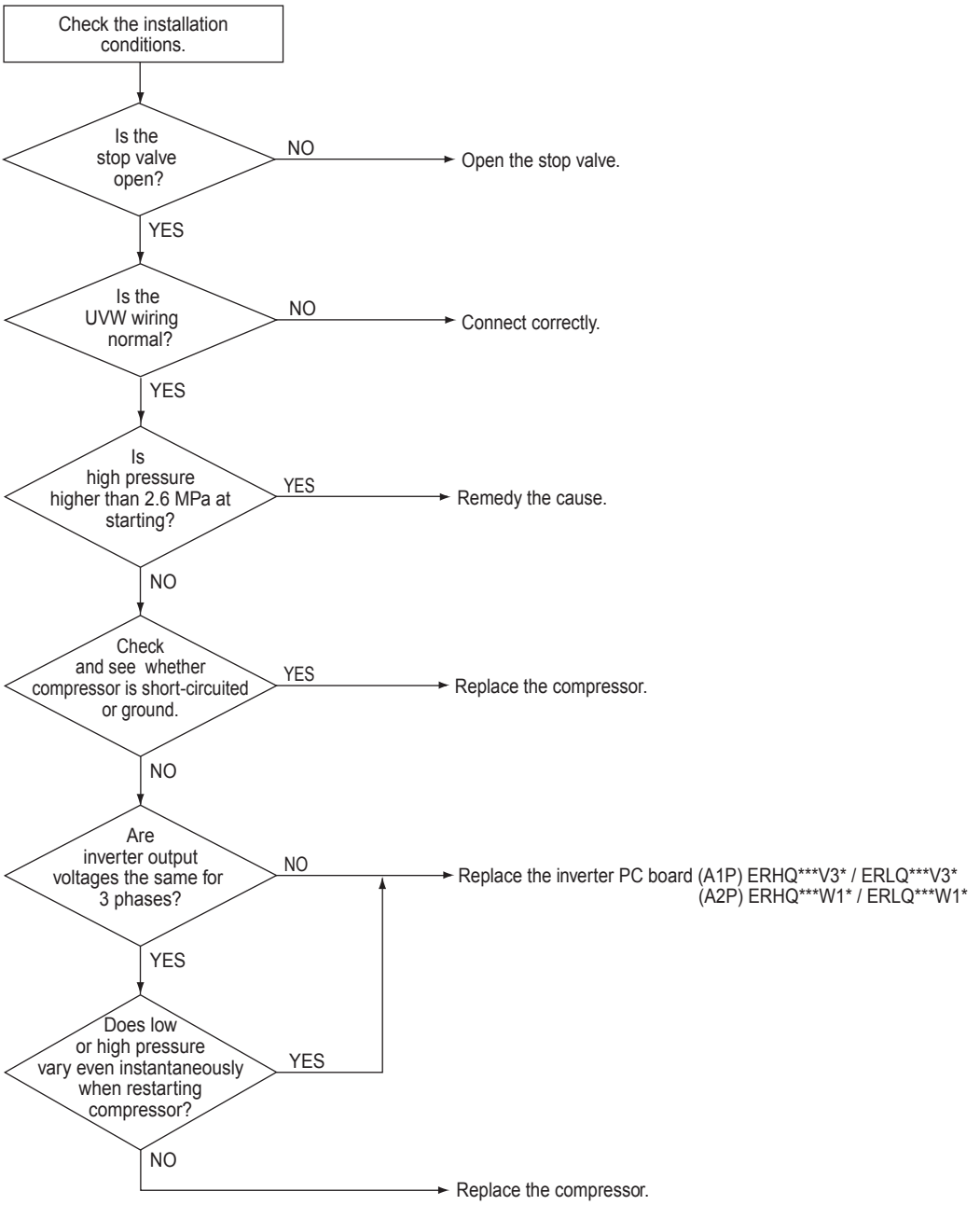
Malfunction decision conditions

The position signal with 3 times cycle as imposed frequency is detected when compressor motor operates normally, but 2 times cycle when compressor motor locks. When the position signal in 2 times cycle is detected

Supposed causes

- Compressor lock
- High differential pressure (2.6MPa or more) starting
- Incorrect UVW wiring
- Faulty inverter PC board
- Stop valve is left in closed.

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.7 "E6" Compressor Motor Lock

Trigger	Effect	Reset
The motor rotor does not rotate when the compressor is energized.	Unit will not stop operating.	Automatic reset after a continuous run for about 10 min.
	Unit will stop operating.	Manual reset via user interface.

Possible cause	Check	Corrective action
Faulty discharge thermistor.	Check the discharge thermistor.	Replace discharge thermistor when required.
Refrigerant shortage.	Check for refrigerant shortage. Refer to the nameplate for the correct charge.	Charge the correct refrigerant amount when required.
Humidity in refrigerant (ice formation in expansion valve).	Check for humidity in the refrigerant.	In case of suspicion of humidity, recover, vacuum and recharge with virgin refrigerant.
Non condensables in refrigerant.	Check for non condensables in refrigerant.	In case of suspicion of non condensables, recover, vacuum and recharge with virgin refrigerant.
Stop valve is closed.	Check stop valve.	Open stop valve when required.
Refrigerant circuit is clogged (HP - LP > 0,26 MPa).	Check for possible blockage (blockages can be checked by measuring the refrigerant/pipe temperature. Sudden drop in temperature could indicate a blockage (remark: this is not valid for the expansion valve)).	Replace the blocked part.
Faulty compressor.	Check compressor. Check connections and wiring of the compressor. Check expansion valve (liquid back issue) (see "Check No.2 - Outdoor Unit: Checking the Expansion Valve" on page page 3-121). Check the refrigerant charge. Refer to the nameplate for correct charge.	Replace compressor when required (see "Removal of Compressor" on page page 5-13). Investigate reason of breakdown. Replace expansion valve when required (see "Removal of Pressure Sensor, Electronic Expansion Valve, and Others" on page page 5-10). Fix possible leak.
Compressor turned off too fast.		Wait for guard timer.
Faulty outdoor unit main PCB.	Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check if the outdoor main PCB receives power.	Restore the power to the outdoor main PCB. Replace outdoor main PCB when HAP LED is not blinking in regular intervals (see "Removal of PC Board" on page page 5-9).
Faulty outdoor inverter PCB.	Check outdoor inverter PCB. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed.	Restore the power to the outdoor inverter PCB. Replace the outdoor inverter PCB when required (see "Removal of PC Board" on page page 5-9).

Possible cause	Check	Corrective action
Faulty 4-way valve.	Check the 4-way valve.	Replace the 4-way valve coil (see "Removal of Four Way Valve" on page page 5-9) or body (see "Removal of Four Way Valve" on page page 5-9) when required.
Faulty expansion valve.	Check the expansion valve (see "Check No.2 - Outdoor Unit: Checking the Expansion Valve" on page page 3-121).	Replace the expansion valve body (see see "Removal of Pressure Sensor, Electronic Expansion Valve, and Others" on page page 5-10) or motor (see "Removal of Pressure Sensor, Electronic Expansion Valve, and Others" on page page 5-10) when required.

3.8 "E7" Malfunction of Outdoor Unit Fan Motor

Remote controller display

E7

Method of malfunction detection

Abnormality of fan motor system is detected according to the fan speed detected by hall IC when the fan motor runs.

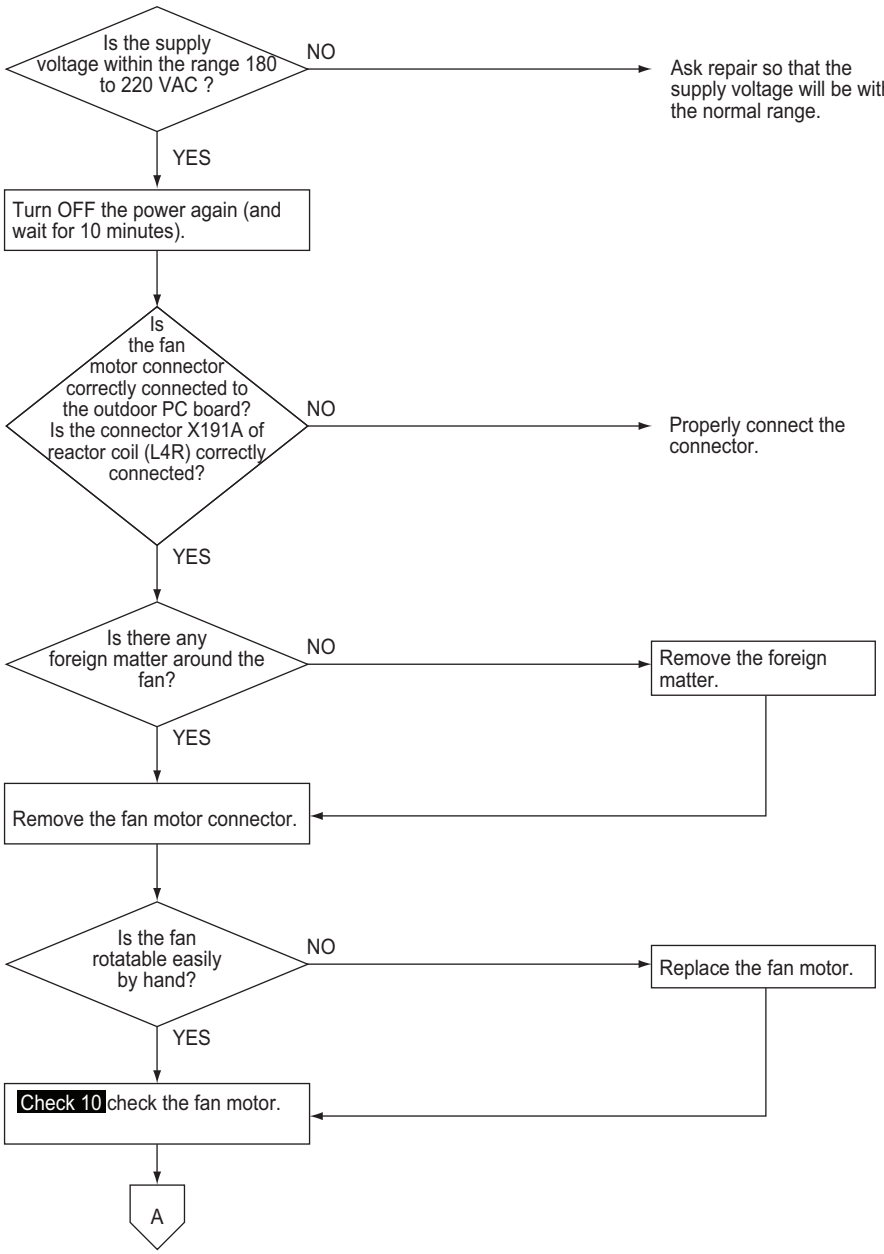
Malfunction decision conditions

- When the fan runs with speed less than a specified one for 15 seconds or more when the fan motor running conditions are met
- When connector detecting fan speed is disconnected
- When malfunction is generated 4 times, the system shuts down.

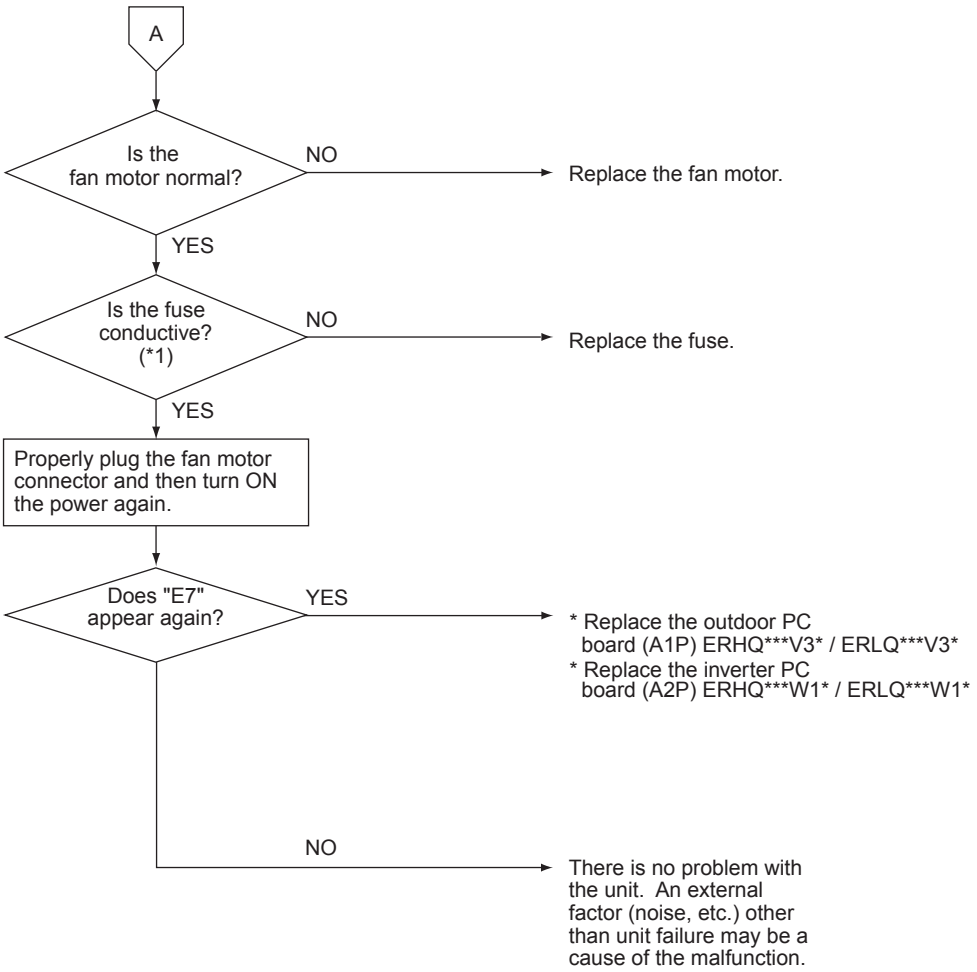
Supposed causes

- Malfunction of fan motor
- The harness connector between fan motor and PC board is left in disconnected, or faulty connector
- ERLQW1* / ERHQW1* only: faulty connector X191A (L4R)
- Fan does not run due to foreign matters tangled
- Malfunction of the outdoor (inverter) PC board
- Blowout of fuse

Troubleshooting



(*) See also "Check No.10 - Outdoor unit: Fan Speed Pulse" on page 3-129.



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

(*1): FUSE CONDUCTIVE

ERHQ011~016*V3 ERLQ011~016*V3	F6U (A1P) [outdoor pc board]
ERHQ011~016*W1 ERLQ011~016*W1	F7U (A2P) [inverter pc board]

3.9 "E8" Compressor overcurrent detection

Trigger	Effect	Reset
When the compressor is running the current exceeds 9.25 A ~ 20 A (depending on the unit) for 2.5 seconds.	Unit will stop operating.	Manual reset via user interface.

Possible cause	Check	Corrective action
Outdoor temperature is out of operation range.	Check the outdoor temperature (see 5.4–Check No.3 - Checking the Thermistors on page 3–122).	Wait until the temperature is within operation range.
Faulty compressor.	Check compressor. Check connections and wiring of the compressor. Check expansion valve (liquid back issue) (see 5.3–Check No.2 - Outdoor Unit: Checking the Expansion Valve on page 3–121). Check the refrigerant charge. Refer to the nameplate for correct charge.	Replace compressor when required (see 2.9–Removal of Compressor on page 5–13). Investigate reason of breakdown. Replace expansion valve when required (see 2.6–Removal of Pressure Sensor, Electronic Expansion Valve, and Others on page 5–10). Fix possible leak.
Faulty power module = faulty inverter PCB.	Check outdoor inverter PCB. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed.	Restore the power to the outdoor inverter PCB. Replace the outdoor inverter PCB when required (see 2.5–Removal of PC Board on page 5–9).
Faulty or disturbance of the power supply (imbalance > 10%). Power drop. Short circuit.	Check if the power supply is conform with regulations. No fluctuations in frequency.	Adjust power supply when required. Power reset via outdoor unit.

3.10 "E9" Malfunction of Electronic Expansion Valve

Remote controller display

E9

Method of malfunction detection

Method is determined according to the suction pipe superheat degree and electronic expansion valve opening degree calculated by values of low pressure sensor and suction pipe temperature thermistor.

Malfunction decision conditions

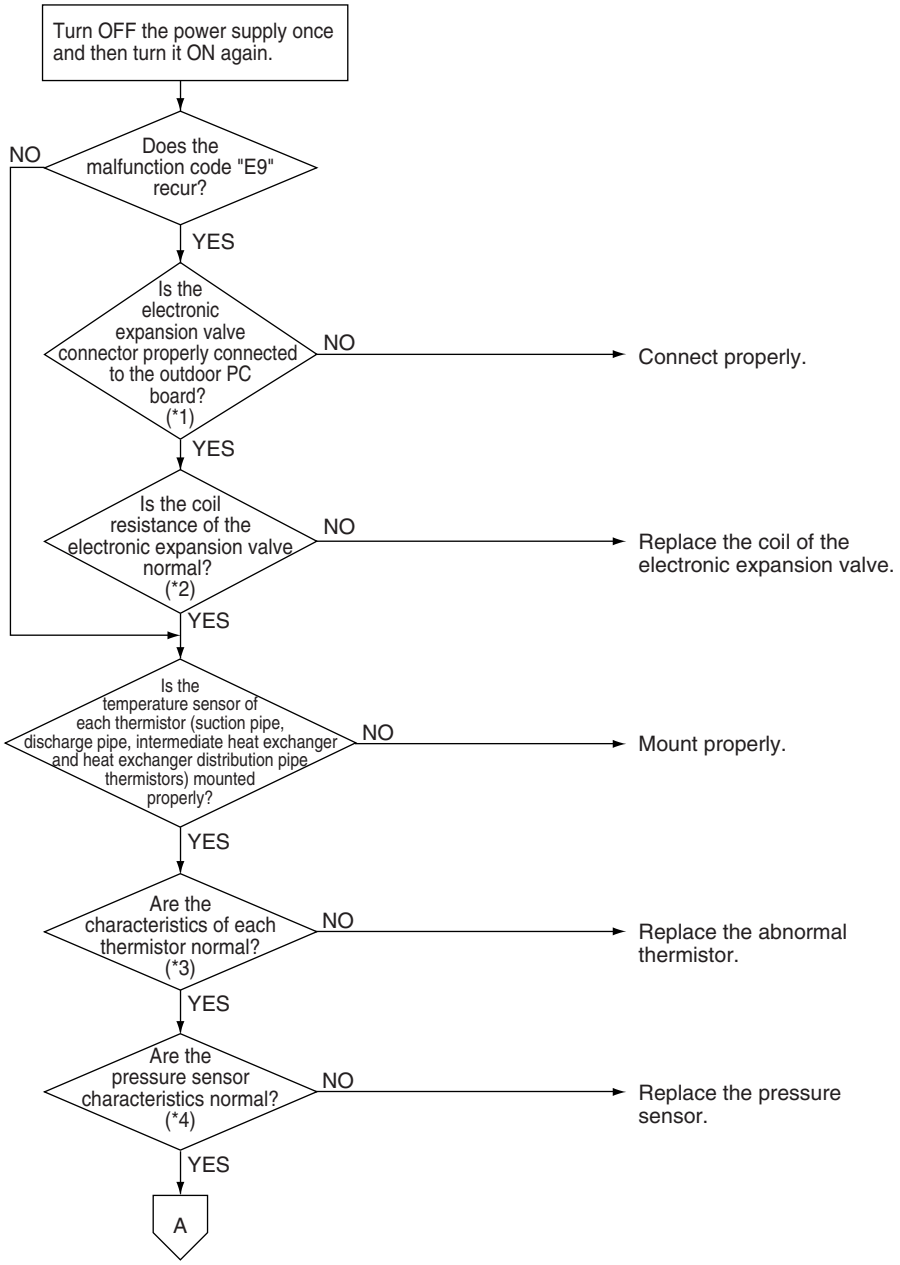
When the following conditions are met for 10 minutes

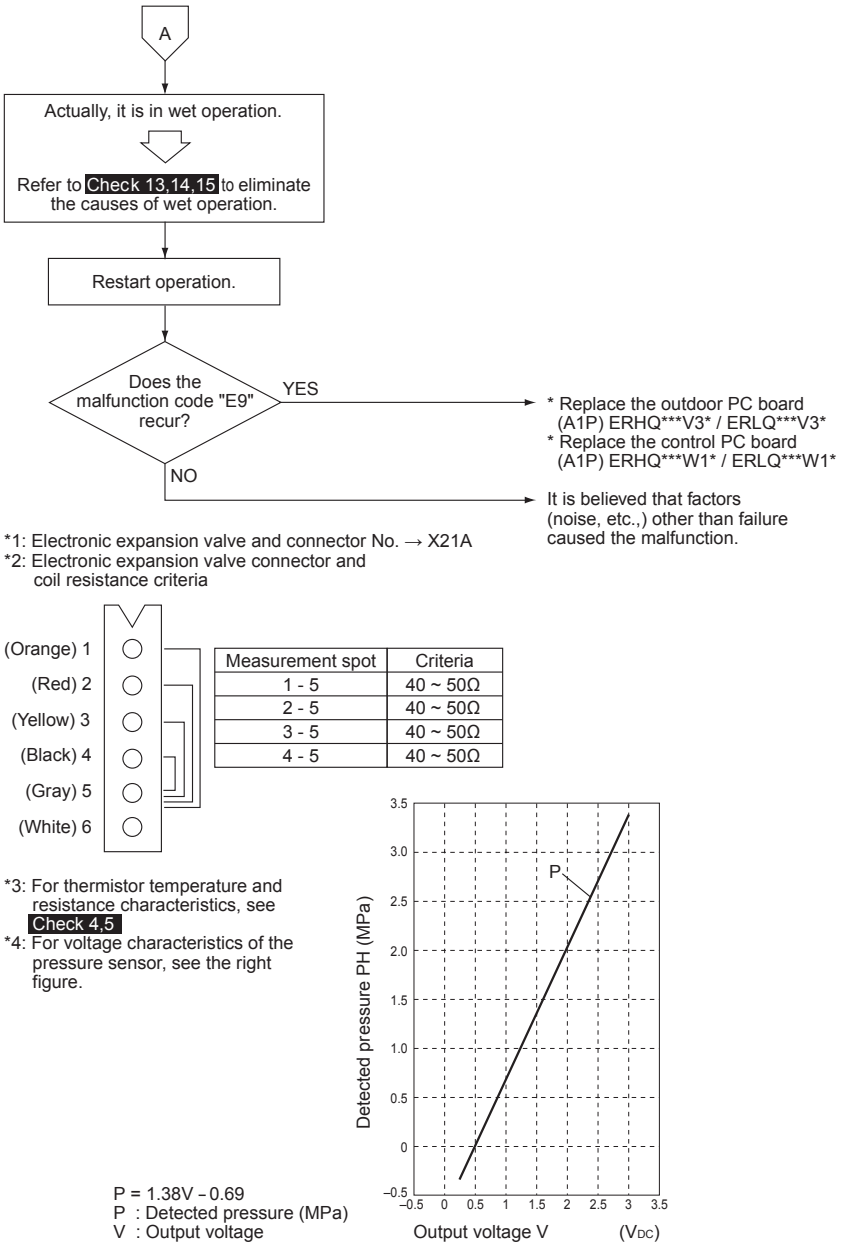
- Suction pipe superheat degree < 4°C
- Minimum electronic expansion valve opening degree
- Connector of electronic expansion valve is missing when the power is on.

Supposed causes

- Faulty electronic expansion valve
- Faulty solenoid valve
- Faulty check valve
- Disconnection of electronic expansion valve harness
- Faulty connection of electronic expansion valve connector
- Faulty each thermistor
- Faulty mounting
- Faulty pressure sensor
- Faulty Outdoor control PC board

Troubleshooting





See also

- "Check No.4 - Resistance Conversion Table (Ambient, Coil, Fin)" on page 3-123.
- "Check No.5 - Resistance Conversion Table (Discharge Pipe Sensor)" on page 3-125.
- "Check No.13 - Check for Inadequate Refrigerant" on page 3-131.
- "Check No.14 - Check for Excessive Refrigerant Charging" on page 3-132.
- "Check No.15 - Check for Factors Causing Wet Operation" on page 3-133.

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.11 "ER" Four Way Valve Abnormality

Trigger	Effect	Reset
Following condition continues over 1~10 minutes (depending on the model) after operating for 5~10 minutes: • In cooling/dry: (room thermistor T - indoor heat exchanger T) < -5°C • In heating: (indoor heat exchanger T - room thermistor T) < -5°C	Unit will stop operating.	Automatic reset when continuous run for 60 minutes without any other error.

Possible cause	Check	Corrective action
Indoor Unit - Electrical components		
Stop valve is closed.	Check if stop valve is open.	Open stop valve when required.
Faulty thermistors.	Check thermistors (see 5.4–Check No.3 - Checking the Thermistors on page 3–122).	Replace thermistors (see 2.7–Removal of Thermistor on page 5–11) when required.
Faulty 4-way valve coil.	Check 4-way valve coil.	Replace 4-way valve coil (see 2.8–Removal of Four Way Valve on page 5–12) when required.
Faulty outdoor unit main PCB.	Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed Check if the outdoor main PCB receives power.	Restore the power to the outdoor main PCB. Replace outdoor main PCB when HAP LED is not blinking in regular intervals. (see 2.5–Removal of PC Board on page 5–9).
Refrigerant shortage.	Check for refrigerant shortage. Refer to the nameplate for the correct charge.	Charge the correct refrigerant amount when required.
Humidity in refrigerant. (ice formation in expansion valve).	Check for humidity in the refrigerant.	In case of suspicion of humidity, recover, vacuum and recharge with virgin refrigerant.
Non condensables in refrigerant.	Check for non condensables in refrigerant.	In case of suspicion of non condensables, recover, vacuum and recharge with virgin refrigerant.
Faulty 4-way valve body, blocked.	Check 4-way valve body.	Replace 4-way valve body when required (see 2.8–Removal of Four Way Valve on page 5–12).

3.12 "F3" Malfunctioning in Discharge Pipe Temperature

Remote controller display

F3

Method of malfunction detection

Abnormality is detected according to the temperature detected by the discharge pipe temperature sensor.

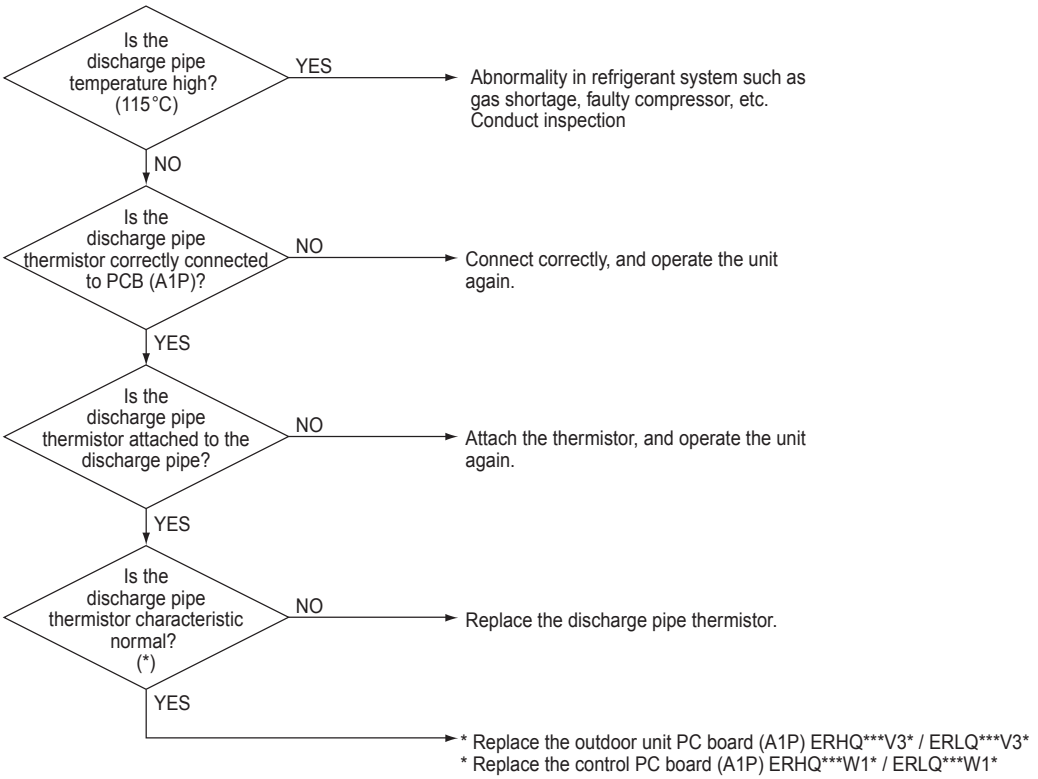
Malfunction decision conditions

- When the discharge pipe temperature rises to an abnormally high level
- When the discharge pipe temperature rises suddenly

Supposed causes

- Faulty discharge pipe thermistor
- Faulty connection of discharge pipe thermistor
- Insufficient refrigerant amount
- Faulty compressor
- Disconnection of discharge pipe thermistor

Troubleshooting



(*) See also "Check No.5 - Resistance Conversion Table (Discharge Pipe Sensor)" on page 3-125.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.13 "F6" Malfunctioning in Discharge Pipe Temperature

Trigger	Effect	Reset
Outdoor heat exchanger thermistor measures temperature > 60°C~65°C (depending on model).	Unit will not stop operating.	Automatic reset when temperature drops below 50°C.

Possible cause	Check	Corrective action
Installation space is too small.	Check if the installation space is in line with regulations.	Adjust installation space.
Dirty outdoor heat exchanger.		Clean the outdoor heat exchanger.
Faulty outdoor fan motor.	Check the fan motor. Check fan motor connections and wiring.	Replace fan motor when required (see 2.3–Removal of Propeller Fan and Fan Motor on page 5–7). Adjust wiring when required.
Faulty stop valve.	Check the stop valve.	Replace the stop valve when required.
Faulty heat exchanger thermistor.	Check heat exchanger thermistor (see 5.4–Check No.3 - Checking the Thermistors on page 3–122).	Replace heat exchanger thermistor when required.
Faulty expansion valve.	Check the expansion valve (see 5.3–Check No.2 - Outdoor Unit: Checking the Expansion Valve on page 3–121).	Replace the expansion valve body (see 2.6–Removal of Pressure Sensor, Electronic Expansion Valve, and Others on page 5–10) or motor (see 2.6–Removal of Pressure Sensor, Electronic Expansion Valve, and Others on page 5–7) when required.
Faulty outdoor unit main PCB.	Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check if the outdoor main PCB receives power.	Restore the power to the outdoor main PCB. Replace outdoor main PCB when HAP LED is not blinking in regular intervals.

3.14 "H0" Compressor sensor system abnormality

Trigger	Effect	Reset
DC voltage before compressor start-up is out of range (0.5~4.5 V).	Unit will stop operating.	Manual reset via user interface.
DC voltage before compressor start up is below 50 V.	Unit will stop operating.	Manual reset via user interface.

Possible cause	Check	Corrective action
Faulty outdoor unit main PCB.	Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check if the outdoor main PCB receives power.	Adjust the power to the outdoor main PCB. Replace outdoor main PCB when HAP LED is not blinking in regular intervals (see 2.5–Removal of PC Board on page 5–9).
Faulty outdoor inverter PCB.	Check outdoor inverter PCB. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed.	Restore the power to the outdoor inverter PCB. Replace the outdoor inverter PCB when required (see "Removal of PC Board" on page 5-9).
Faulty connection or wiring of the PCB's.	Check the connections and the wiring of the PCB's.	Adjust connection or wiring when required.
Faulty or disturbance of the power supply (imbalance > 10%). Power drop. Short circuit.	Check if the power supply is conform with regulations. No fluctuations in frequency.	Restore power supply when required. Power reset via outdoor unit.

3.15 "H3" Malfunctioning HPS System

Remote controller display

H3

Method of malfunction detection

The protection device circuit checks continuity in the high pressure switch.

Malfunction decision conditions

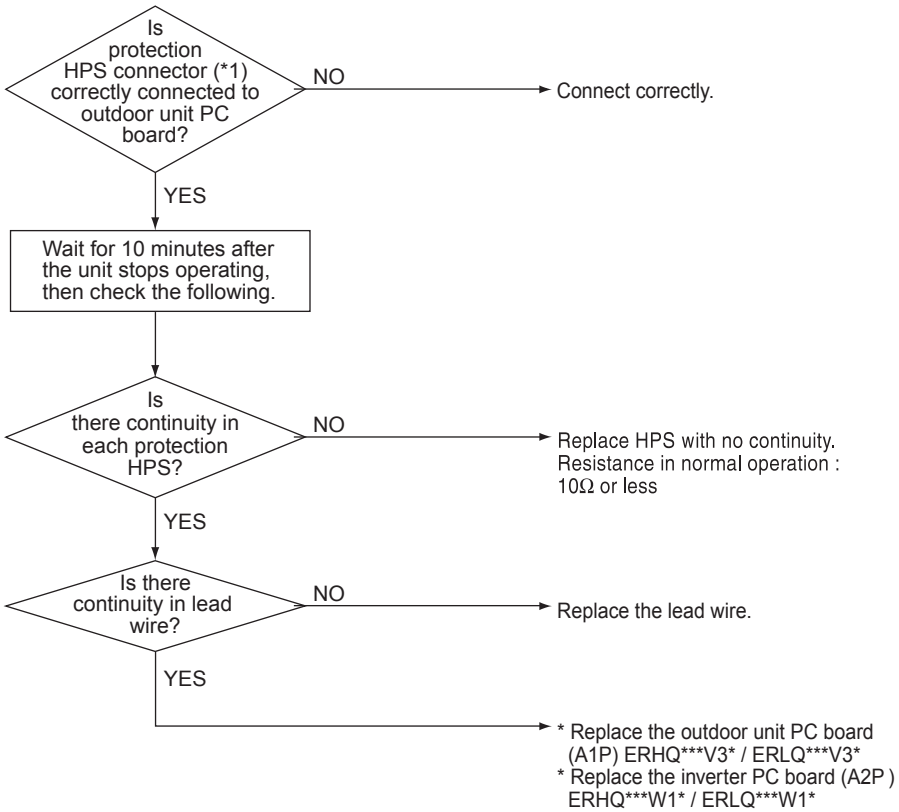
When there is no continuity in the high pressure switch during compressor stops operating.

3

Supposed causes

- Incomplete high pressure switch
- Disconnection in high pressure switch harness
- Faulty connection of high pressure switch connector
- Faulty outdoor unit PC board
- Disconnected lead wire

Troubleshooting



*1 Connector symbol
ERLQ011~016*V3 / ERHQ011~016*V3: X32A (A1P)
ERLQ011~016*W1 / ERHQ011~016*W1: X32A (A2P)

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.16 "H6" Position Detection Sensor Abnormality

Trigger	Effect	Reset
Compressor fails to start within 15 seconds after the compressor run command signal is sent.	Unit will not stop operating.	Automatic reset after a continuous run of 10 minutes.
	Unit will stop operating if the warning occurs 8 times.	Manual reset via remote controller.

Possible cause	Check	Corrective action
Faulty compressor.	Check compressor. Check connections and wiring of the compressor. Check expansion valve (liquid back issue) (see 5.3–Check No.2 - Outdoor Unit: Checking the Expansion Valve on page 3–121). Check the refrigerant charge. Refer to the nameplate for correct charge.	Replace compressor when required (see "Removal of Compressor" on page 5-13). Investigate reason of breakdown. Replace expansion valve when required (see "Removal of Pressure Sensor, Electronic Expansion Valve, and Others" on page 5-10). Fix possible leak.
Faulty outdoor unit main PCB.	Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check if the outdoor main PCB receives power.	Restore the power to the outdoor main PCB. Replace outdoor main PCB when HAP LED is not blinking in regular intervals (see "Removal of PC Board" on page 5-9).
Faulty outdoor inverter PCB.	Check outdoor inverter PCB. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed.	Restore the power to the outdoor inverter PCB. Replace the outdoor inverter PCB when required (see "Removal of PC Board" on page 5-9).
Stop valve is closed.	Check stop valve.	Open stop valve when required.
Faulty or disturbance of the power supply (imbalance > 10%). Power drop. Short circuit.	Check if the power supply is conform with regulations. No fluctuations in frequency.	Restore power supply when required. Power reset via outdoor unit.

3.17 "H8" Compressor input (CT) system abnormality

Trigger	Effect	Reset
DC voltage or DC current sensor abnormality based on the compressor running frequency and the input current.	Unit will not stop operating.	Automatic reset when compressor runs normally for 60 minutes.
	Unit will stop operating if the warning occurs several times.	Manual reset via user interface.

Possible cause	Check	Corrective action
Faulty outdoor unit main PCB.	Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check if the outdoor main PCB receives power.	Restore the power to the outdoor main PCB. Replace outdoor main PCB when HAP LED is not blinking in regular intervals (see "Removal of PC Board" on page 5-9).
Faulty power module. Input current or compressor current too low. Faulty outdoor inverter PCB.	Check outdoor inverter PCB. Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed.	Restore the power to the outdoor inverter PCB. Replace the outdoor inverter PCB when required (see "Removal of PC Board" on page 5-9).
Faulty compressor.	Check compressor. Check connections and wiring of the compressor. Check expansion valve (liquid back issue) (see 5.3–Check No.2 - Outdoor Unit: Checking the Expansion Valve on page 3–121). Check the refrigerant charge. Refer to the nameplate for correct charge.	Replace compressor when required (see "Removal of Compressor" on page 5-13). Investigate reason of breakdown. Replace expansion valve when required (see "Removal of Pressure Sensor, Electronic Expansion Valve, and Others" on page 5-10). Fix possible leak.
Faulty reactor.	Check reactor.	Replace reactor when required.

3.18 "H9, J3, J5, J6, J7, J8" Thermistor or Related Abnormality (Outdoor Unit)

Remote controller display

H9, J3, J5, J6, J7, J8

Method of malfunction detection

Abnormality is detected according to the temperature detected by each individual thermistor.

Malfunction decision conditions

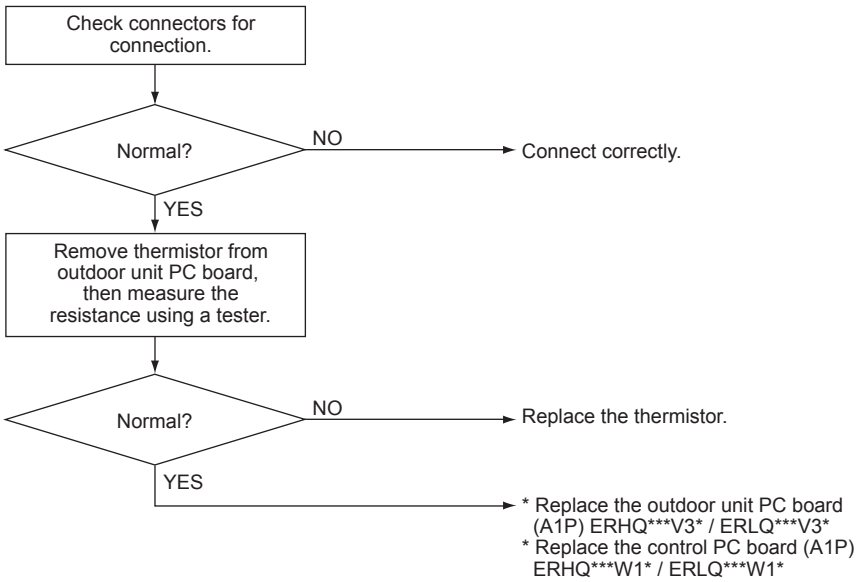
When thermistor is disconnected or short-circuited during operation

3

Supposed causes

- Faulty thermistor
- Faulty connection of connector
- Faulty outdoor unit PC board (control PC board)

Troubleshooting



H9 : Malfunction of outdoor temperature thermistor system
J3 : Malfunction of discharge pipe thermistor system
J5 : Malfunction of suction pipe thermistor system
J6 : Malfunction of heat exchange thermistor
J7: Malfunction of subcooling heat exchanger thermistor
J8: Malfunction of liquid thermistor

(*) See also "Check No.4 - Resistance Conversion Table (Ambient, Coil, Fin)" on page 3-123.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.19 "J1" Malfunction of Pressure Sensor

Remote controller display

J1

Method of malfunction detection

The malfunction is detected by the pressure measured with pressure sensor (S1NPH)

Malfunction decision conditions

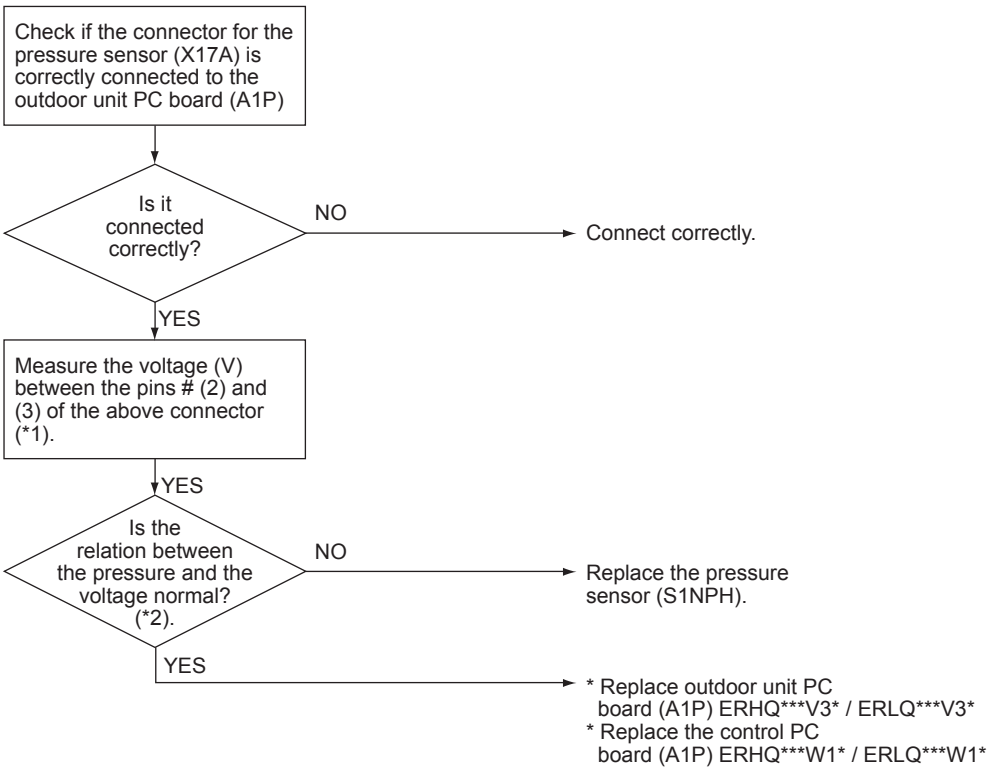
When the defect pressure becomes following:

- Detected pressure ≤ -0.05MPa continues 185 sec.
- Detected pressure ≥ -0.05MPa continues 185 sec.

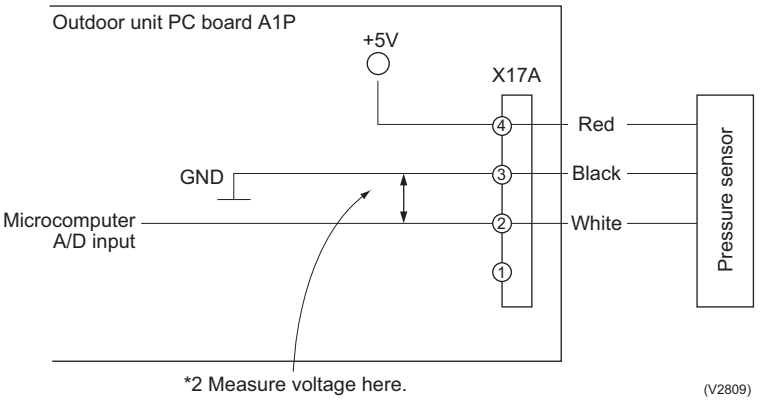
Supposed causes

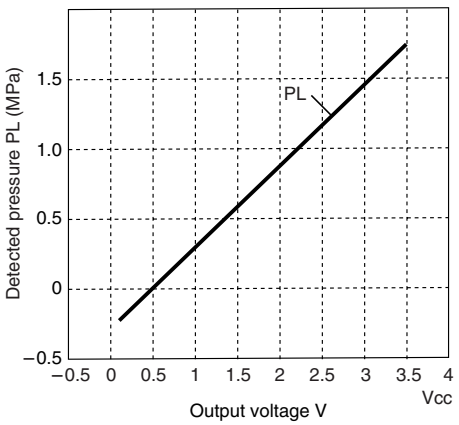
- Faulty pressure sensor
- Faulty outdoor unit PC board
- Incorrect connection of connector

Troubleshooting



Graphs





PL=0.57V−0.28
PL: detected pressure (Mpa)
V: output voltage (V)

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.20 "JR" High pressure sensor abnormality

Trigger	Effect	Reset
High pressure sensor detects an abnormal value for 3 minutes (> 4,5 MPa or < -0,05 MPa).	Unit will stop operating.	Manual reset via user interface.

Possible cause	Check	Corrective action
Faulty outdoor unit main PCB.	Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed. Check if the outdoor main PCB receives power.	Restore the power to the outdoor main PCB. Replace outdoor main PCB when HAP LED is not blinking in regular intervals (see "Removal of PC Board" on page page 5-9).
Faulty high pressure sensor.	Check high pressure sensor.	Replace high pressure sensor when required (see "Removal of Pressure Sensor, Electronic Expansion Valve, and Others" on page page 5-10).
Faulty capacity adapter on outdoor PCB.	Check if the correct adapter is installed. Check if the correct spare part is installed.	Adjust capacity adapter when required.

3.21 "L1" Faulty Outdoor PC Board

Remote controller display

L1

Method of malfunction detection

- Detect malfunctions by current value during waveform output before compressor startup.
- Detect malfunctions by current sensor value during synchronized operation at the time of startup.
- Detect malfunctions using an MP-PAM series capacitor overvoltage sensor.

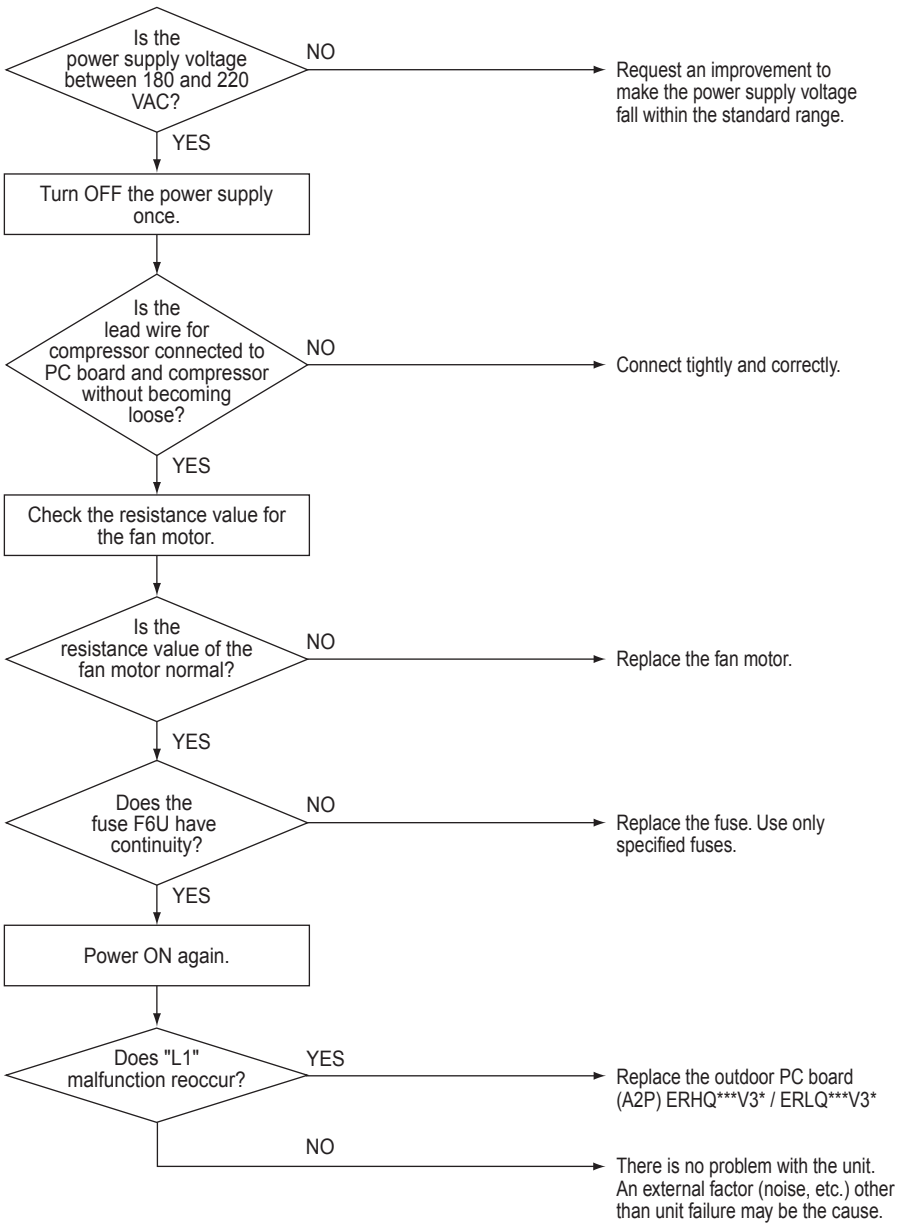
Malfunction decision conditions

- When over-current is detected at the time of waveform output before operating the compressor
- When the current sensor malfunctions during synchronized operation
- When overvoltage occurs in MP-PAM
- In case of IGBT malfunction
- In case of faulty jumper setting

Supposed causes

- Faulty outdoor PC board (A1P)
  - IPM failure
  - Current sensor failure
  - MP-PAM failure
  - Failure of IGBT or drive circuit

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.22 "L3" Switch Box Temperature Abnormality

Trigger	Effect	Reset
Switch box temperature is too high when the compressor is off.	Unit will not stop operating.	Automatic reset when temperature drops.
	Unit will stop operating.	Manual reset via remote controller.

Possible cause	Check	Corrective action
Faulty outdoor inverter PCB.	Check outdoor inverter PCB.	Restore the power to the outdoor inverter PCB.
Faulty radiation fin thermistor.	Check if the HAP LED is blinking in regular intervals. Check if the correct spare part is installed.	Replace the outdoor inverter PCB when required (see "Removal of PC Board" on page 5-9).
Faulty outdoor fan motor.	Check the fan motor. Check fan motor connections and wiring.	Replace fan motor when required (see "Removal of Propeller Fan and Fan Motor" on page 5-7). Adjust wiring when required.
Faulty or disturbance of the power supply (imbalance > 10%). Power drop. Short circuit.	Check if the power supply is conform with regulations. No fluctuations in frequency.	Adjust power supply when required. Power reset via outdoor unit.
Outdoor heat exchanger is dirty.	Check outdoor heat exchanger.	Clean outdoor heat exchanger when required.

3.23 "L4" Radiation Fin Temperature Increased

Remote controller display

L4

Method of malfunction detection

Fin temperature is detected by the thermistor of the radiation fin.

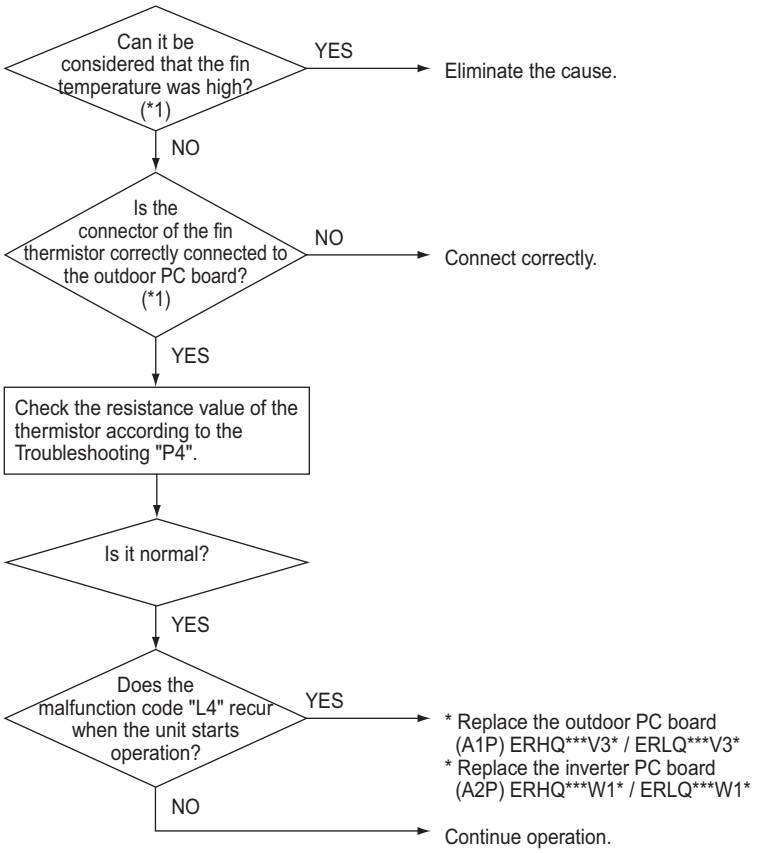
Malfunction decision conditions

When the temperature of the inverter radiation fin increases abnormally due to faulty heat dissipation.

Supposed causes

- Activation of fin thermal switch
- Faulty fin thermistor
- High outside air temperature
- Insufficient cooling of inverter radiation fin
- Blocked suction opening
- Dirty radiation fin
- Faulty outdoor inverter PCB

Troubleshooting



* Fin temperature detection value

	Detection	Reset
ERHQ 011 ~ 016*V3	88°C	78°C
ERHQ 011 ~ 016*W1	88°C	85°C

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.24 "L5" DC Output Overcurrent (Instantaneous)

Remote controller display

L5

Method of malfunction detection

Malfunction is detected by converting the current flowing to power transistor into voltage with CT1 (DC current sensor).

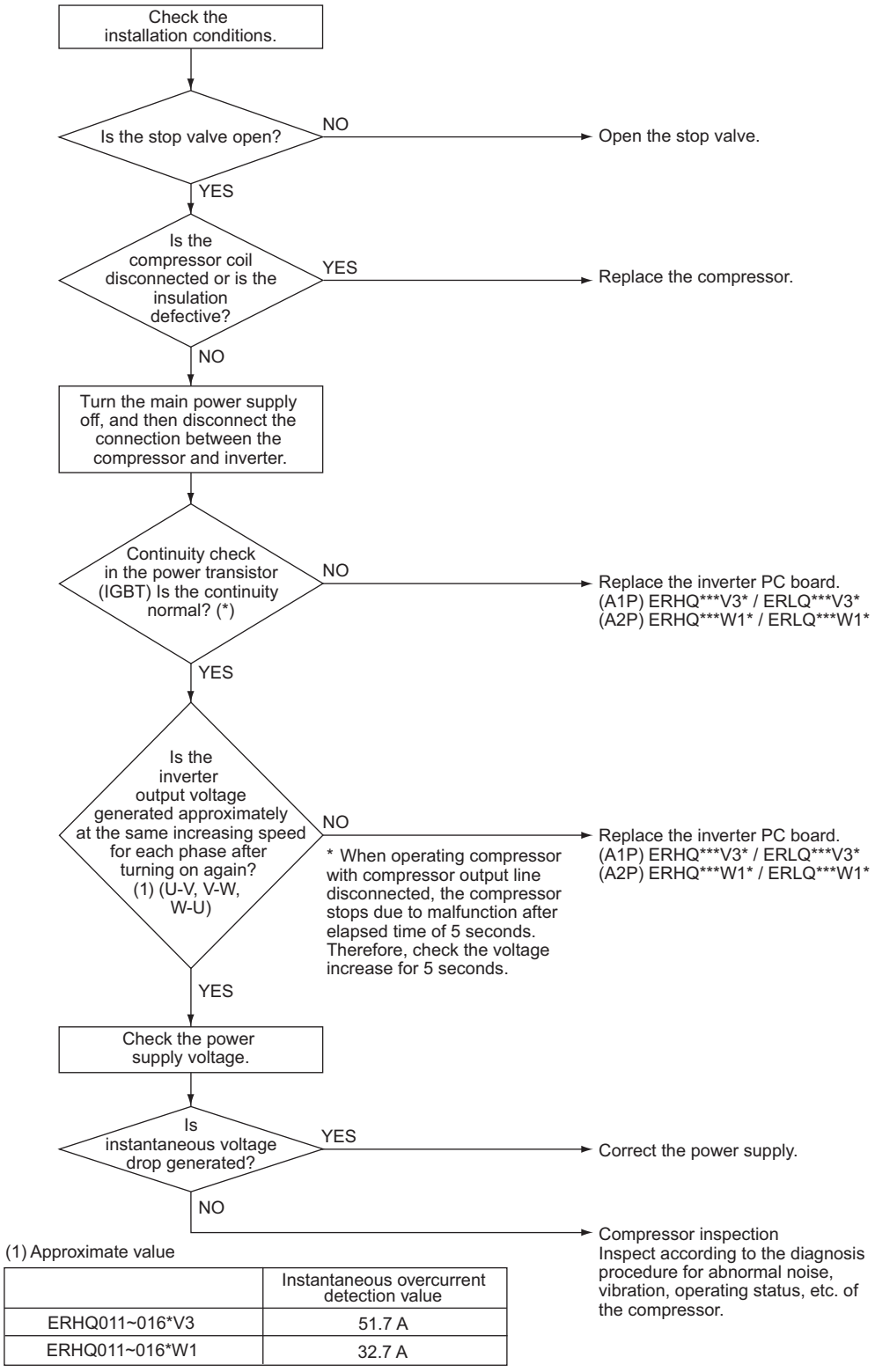
Malfunction decision conditions

When overcurrent has run to power transistor.
(Actuated even by instantaneous overcurrent)

Supposed causes

- Faulty compressor coil (disconnection, poor insulation)
- Compressor startup malfunction (mechanical lock)
- Faulty inverter PC board
- Instantaneous fluctuation of power supply voltage
- Faulty compressor (if bearing is scratched)
- The stop valve is left in closed.

Troubleshooting



(1) Approximate value

	Instantaneous overcurrent detection value
ERHQ011~016*V3	51.7 A
ERHQ011~016*W1	32.7 A

(*) See also "Check No.11 - Outdoor unit: Check for Power Transistor" on page 3-130.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.25 "L8" DC Output Overcurrent (Instantaneous)

Remote controller display

L8

Method of malfunction detection

- Malfunction is detected by converting the current flowing to power transistor into voltage with CT1 (DC current sensor).
- Inverter PC board detects the disorder of position signal.

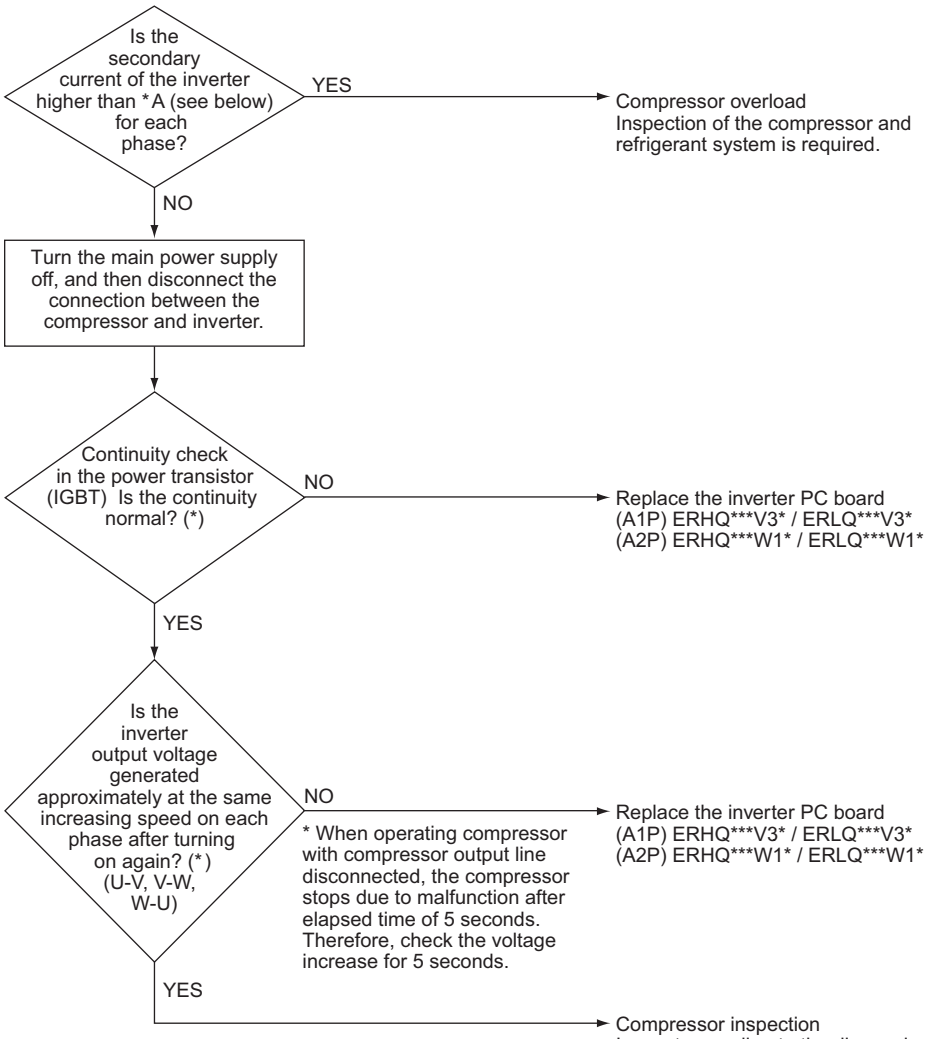
Malfunction decision conditions

When compressor overload (except for when startup) is detected.

Supposed causes

- Compressor overload (during operation)
- Disconnected compressor coil
- Faulty inverter
- Faulty compressor (if bearing is scratched)

Troubleshooting



* Electronic thermal detection value

		Detection value
ERHQ011~016*V3	Cooling	31A × 5 seconds or 20.1A × 260 seconds
	Heating	
ERHQ011~016*W1	Cooling	17A × 5 seconds or 10.6A × 260 seconds
	Heating	17A × 5 seconds or 12.6A × 260 seconds

(*) See also "Check No.11 - Outdoor unit: Check for Power Transistor" on page 3-130.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.26 "L9" Stall Prevention (Time Lag)

Remote controller display

L9

Method of malfunction detection

- Malfunction is detected by converting the current flowing to power transistor into voltage with CT1 (DC current sensor).
- Inverter PC board detects the disorder of position signal.

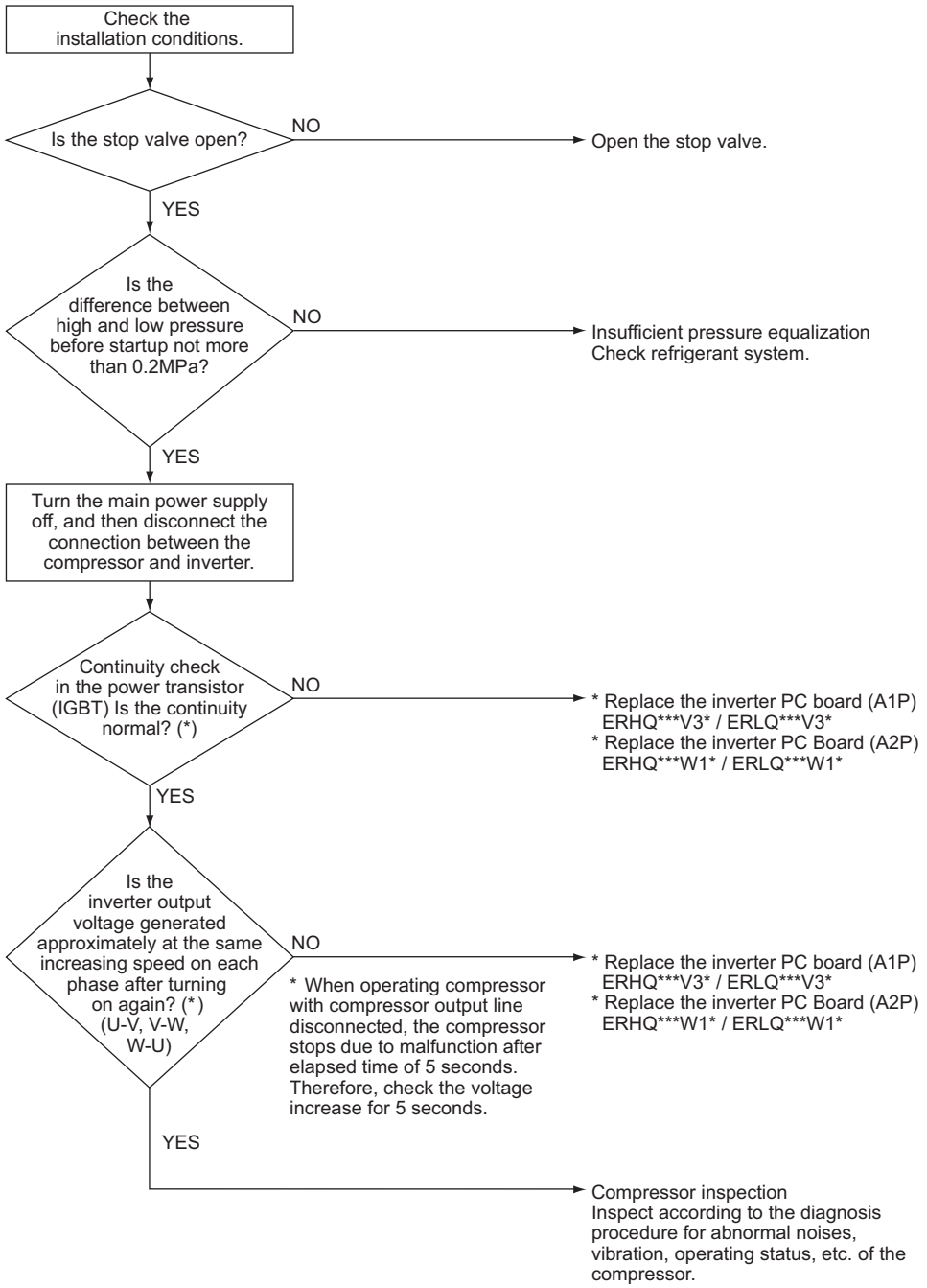
Malfunction decision conditions

- When compressor overload (except for when startup) is detected
- When position signal is disordered

Supposed causes

- Faulty compressor (lock)
- Pressure differential startup
- Faulty inverter
- The stop valve is left in closed.

Troubleshooting



(*) See also "Check No.11 - Outdoor unit: Check for Power Transistor" on page 3-130.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.27 "LC" Malfunction of Transmission system (Between Control PCB and Inverter PCB)

Remote controller display

LC

Method of malfunction detection

Checks and sees whether transmission between control and inverter PC board is carried out normally.

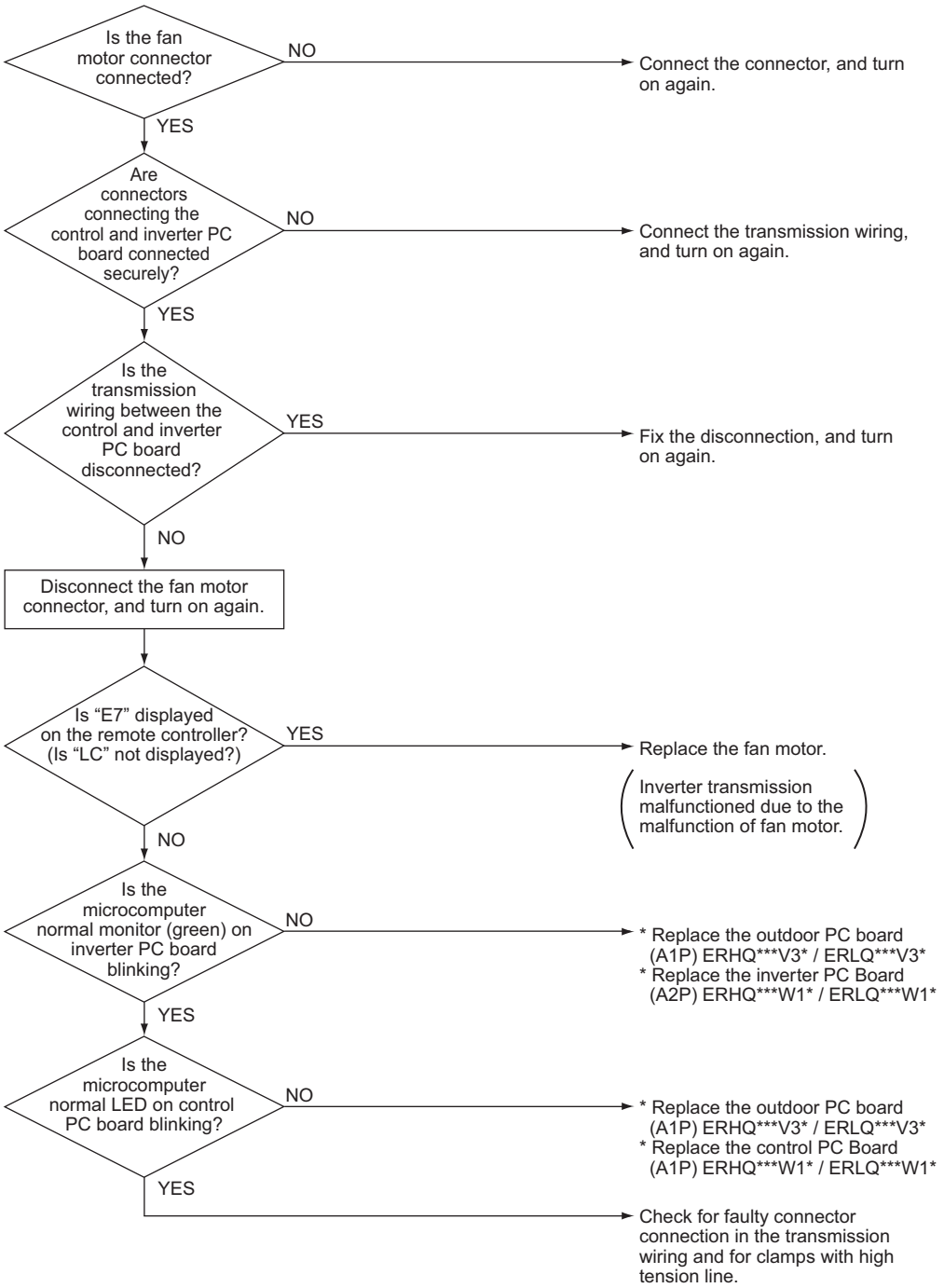
Malfunction decision conditions

When the transmission is not carried out in a specified period of time or longer.

Supposed causes

- Incorrect transmission wiring between control and inverter PC board/insufficient contact in wiring
- Faulty control and inverter PC board
- External factors (noise, etc.)
- Faulty outdoor fan motor
- Faulty of fan motor connector contact

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.28 "P1" Open Phase or Power Supply Voltage Imbalance

Remote controller display

P1

Method of malfunction detection

Malfunction is detected according to the voltage waveform of main circuit capacitor built in inverter.

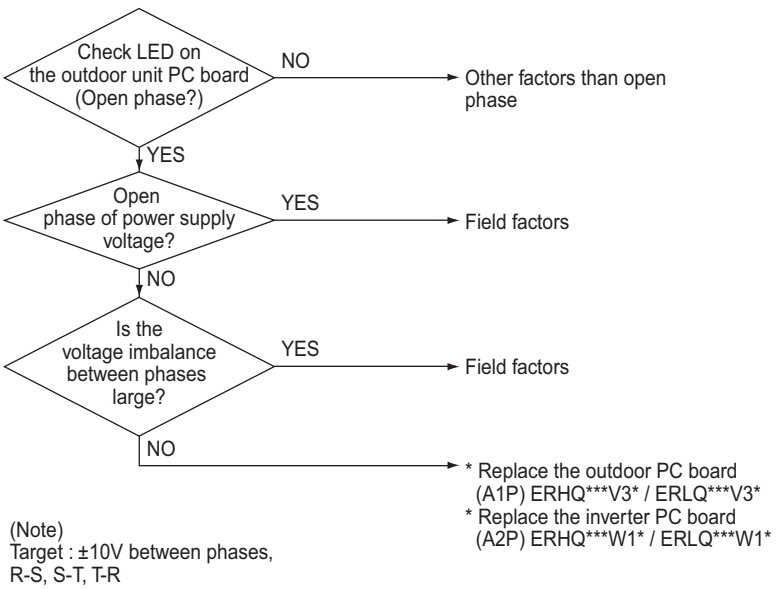
Malfunction decision conditions

When the aforementioned voltage waveform becomes identical with the waveform of the power supply open phase.

Supposed causes

- Open phase
- Voltage imbalance between phases
- Faulty outdoor inverter PC board
  - Faulty main circuit capacitor
  - Power unit (Disconnection in diode module)
  - Faulty magnetic relay (K11R, K12R)
  - Improper main circuit wiring

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.29 "P4" Malfunction of Radiator Fin Temperature Thermistor

Remote controller display

P4

Method of malfunction detection

Detection by open or short circuit of the radiator fin temperature thermistor during the compressor stops operating.

Malfunction decision conditions

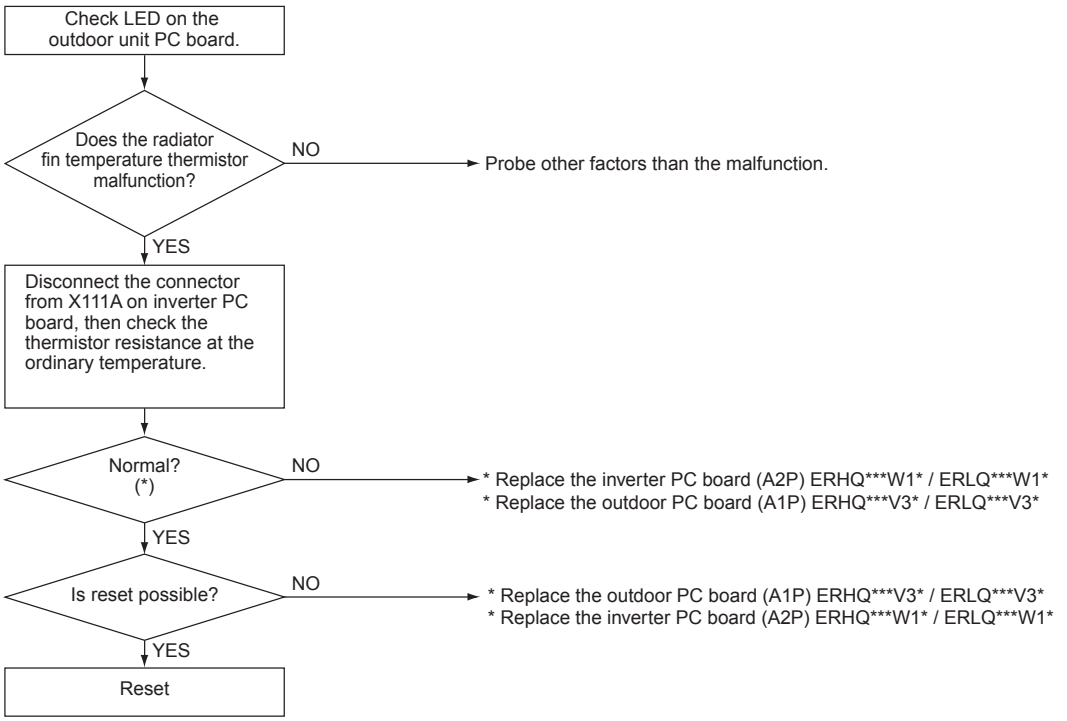
When open or short circuit of the radiator fin temperature thermistor is detected during the compressor stops operating

3

Supposed causes

- Faulty radiator fin temperature thermistor
- Faulty outdoor unit PC board

Troubleshooting



(*) See also "Check No.4 - Resistance Conversion Table (Ambient, Coil, Fin)" on page 3-123.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

3.30 "PJ" Malfunction of Radiator Fin Temperature Thermistor

Remote controller display

PJ

Method of malfunction detection

Check whether set value written in E^2PROM (at factory) or set value of capacity setting adaptor (for replacement) is the same as outdoor unit capacity.

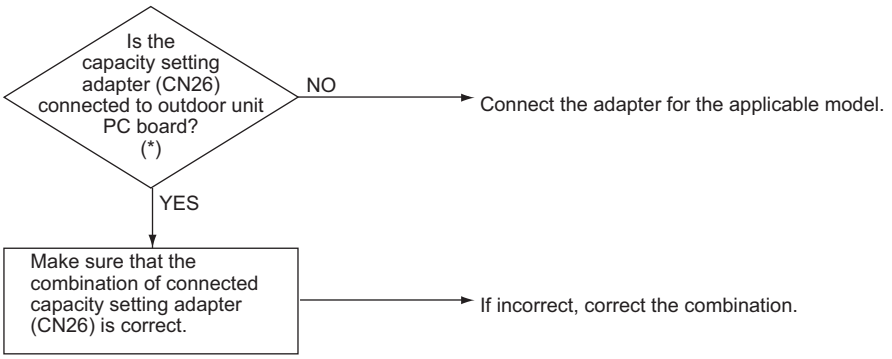
Malfunction decision conditions

When the set value on E^2PROM differs from the outdoor unit capacity or a capacity setting adaptor except for PC board applicable models is installed. (Malfunction decision is made only when turning the power supply on.)

Supposed causes

- Improper set value of E^2PROM
- Improper capacity setting adaptor
- Faulty outdoor unit PC board

Troubleshooting



(*) Capacity setting adapter is not connected at factory. (Capacity is written in E²PROM.) Capacity setting adapter is required only when the PC board was replaced with spare PC board.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4 Error Codes: System Malfunctions

4.1 What Is in This Chapter?

Introduction

In the first stage of the troubleshooting sequence, it is important to correctly interpret the error code on the remote controller display. The error code helps you to find the cause of the problem.

Overview

This chapter contains the following topics:

Topic	See page
4.2–“U0” Gas Shortage (Malfunction)	3–108
4.3–“U2” Abnormal Power Supply Voltage	3–110
4.4–“U3” Underfloor heating screed dry-out failure	3–112
4.5–“U4” Malfunction of Transmission between Hydro-box and Outdoor Unit	3–113
4.6–“UF” Malfunction of Transmission between Hydro-box and Outdoor Unit or Gas Shortage	3–115
4.7–“U5” Malfunction of Transmission between Hydro-box and Remote Controller	3–117
4.8–“UA” Indoor-Outdoor Combination Problem	3–118
4.9–“U7” Transmission Malfunction Between Main CPU and Inverter CPU	

4.2 "U0" Gas Shortage (Malfunction)

Remote controller display

U0

Method of malfunction detection

(In cooling operation)
Detection based on difference in temperature between temperature preset by remote controller and indoor suction air temperature, motorized valve opening degree, compressor frequency and low pressure.

(In heating operation)
Detection based on difference in temperature between temperature preset by remote controller and indoor suction air temperature, motorized valve opening degree during the control of suction air superheating, high pressure, indoor heat exchanger temperature and indoor suction air temperature.

Malfunction decision conditions

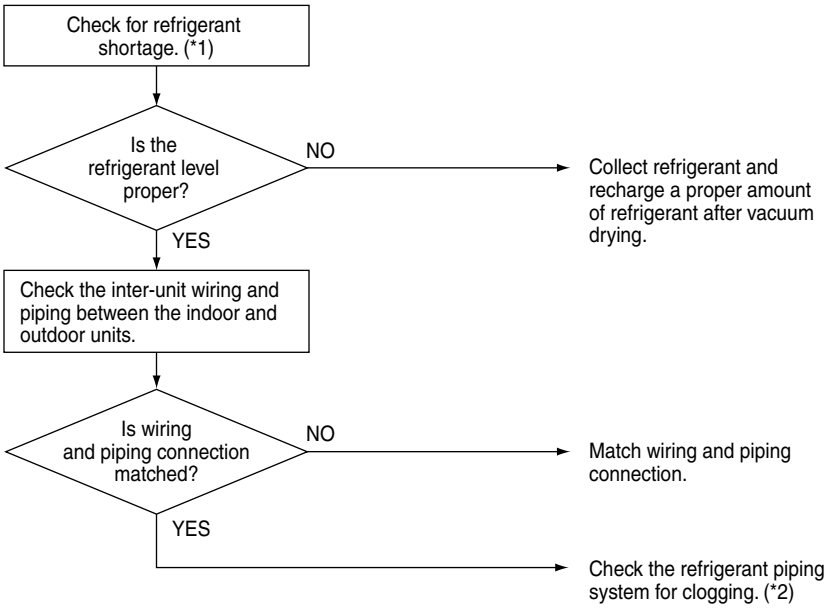
(In cooling operation)
When compressor frequency does not increase even though the load is heavy because the motorized valve is opened to the fullest extent
[If low pressure drops when the compressor is at 41Hz, malfunction is confirmed.]

(In heating operation)
When suction gas superheat degree is large, compressor frequency is low and the motorized valve is opened to the fullest extent even though heating load is heavy
[If high pressure is lower than saturated pressure for indoor heat exchanger temperature (or indoor suction air temperature), malfunction is confirmed.]

Supposed causes

- Refrigerant shortage (out of gas)
- Clogged refrigerant piping system
- Mismatching of wiring and piping

Troubleshooting



See also:

- (*1) "Check No.13 - Check for Inadequate Refrigerant" on page 3-131.
- (*2) "Check No.8 - Clogged Points" on page 3-128.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4.3 "U2" Abnormal Power Supply Voltage

Remote controller display

U2

Method of malfunction detection

Malfunction is detected according to the voltage of main circuit capacitor built in the inverter and power supply voltage.

Malfunction decision conditions

When the voltage of main circuit capacitor built in the inverter and power supply voltage drop:

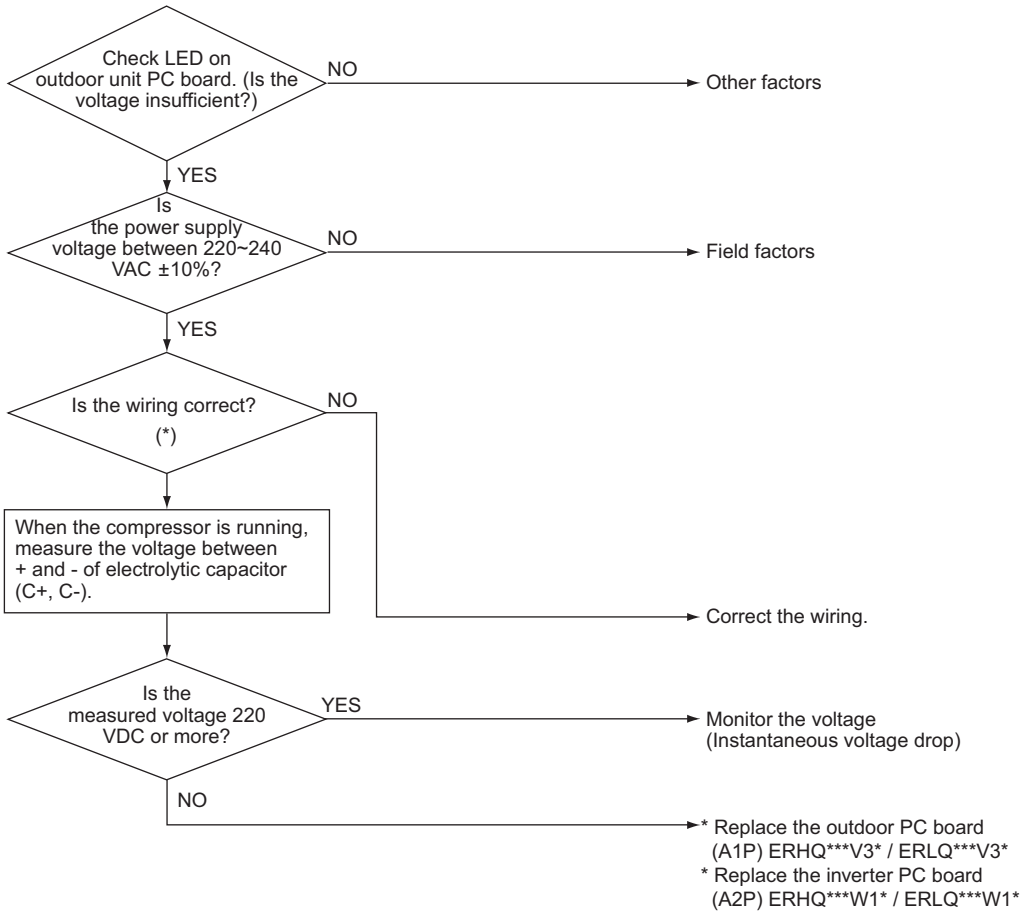
- for V3 only: 150-170 VAC or when the power failure of several tons of ms or longer is generated or DC voltage is not in range of 305~380 VDC.
- for W1 only: 300-320 VAC or when the power failure of several tons of ms or longer is generated or DC voltage is not in scope of 508~620 VDC.

* Remote controller does not decide the abnormality.

Supposed causes

- Drop in power supply voltage (180 V or less)
- Instantaneous power failure
- Inverter open phase (Phase T)
- Faulty main circuit wiring
- Faulty outdoor inverter PC board
- Main circuit parts damaged

Troubleshooting



(*) Check the several connections according to wiring diagram.

- V3/W1: Reactor coil resistance value ±0,2 ~ 1 ohm.
- V3: Capacitor C4 is correctly connected. GREY cable is connected at the side of the grey stroke on the capacitor.
- W1: Confirm the conditions of F1U & F2U.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4.4 "U3" Underfloor heating screed dry-out failure

Remote controller display

U3

Method of malfunction detection

An interruption during the underfloor heating screed dry-out program is detected.

Malfunction decision conditions

Screed dry-out program was interrupted incorrectly (ex. by accident by enduser).

3

Supposed causes

- Another error, U3 only generated when other error is solved.
- Operation OFF button pushed
- Power failure

Troubleshooting



- Check if dry-out schedule was interrupted.
- If schedule was interrupted by mistake reset error and continue dry-out again.
- If schedule was interrupted deliberately, reset U3 error and start operation (dry-out is responsibility of the installer according to instructions of screed manufacturer)

Attention!

U3 error can only be reset in installer level, to avoid that the installer is not informed that the dry-out schedule was interrupted.

4.5 "U4" Malfunction of Transmission between Hydro-box and Outdoor Unit

Remote controller display

U4

Error generation

The error is generated when the microprocessor detects that the transmission between the indoor and the outdoor unit is not normal over a certain amount of time.

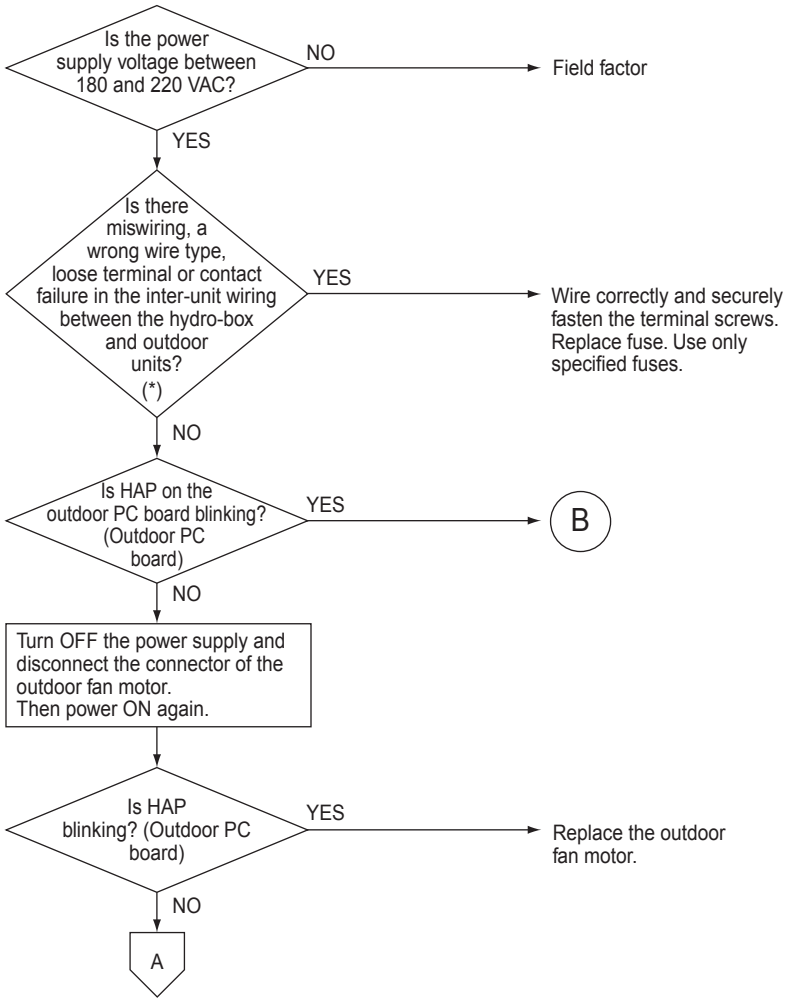
Supposed causes

The possible causes are:

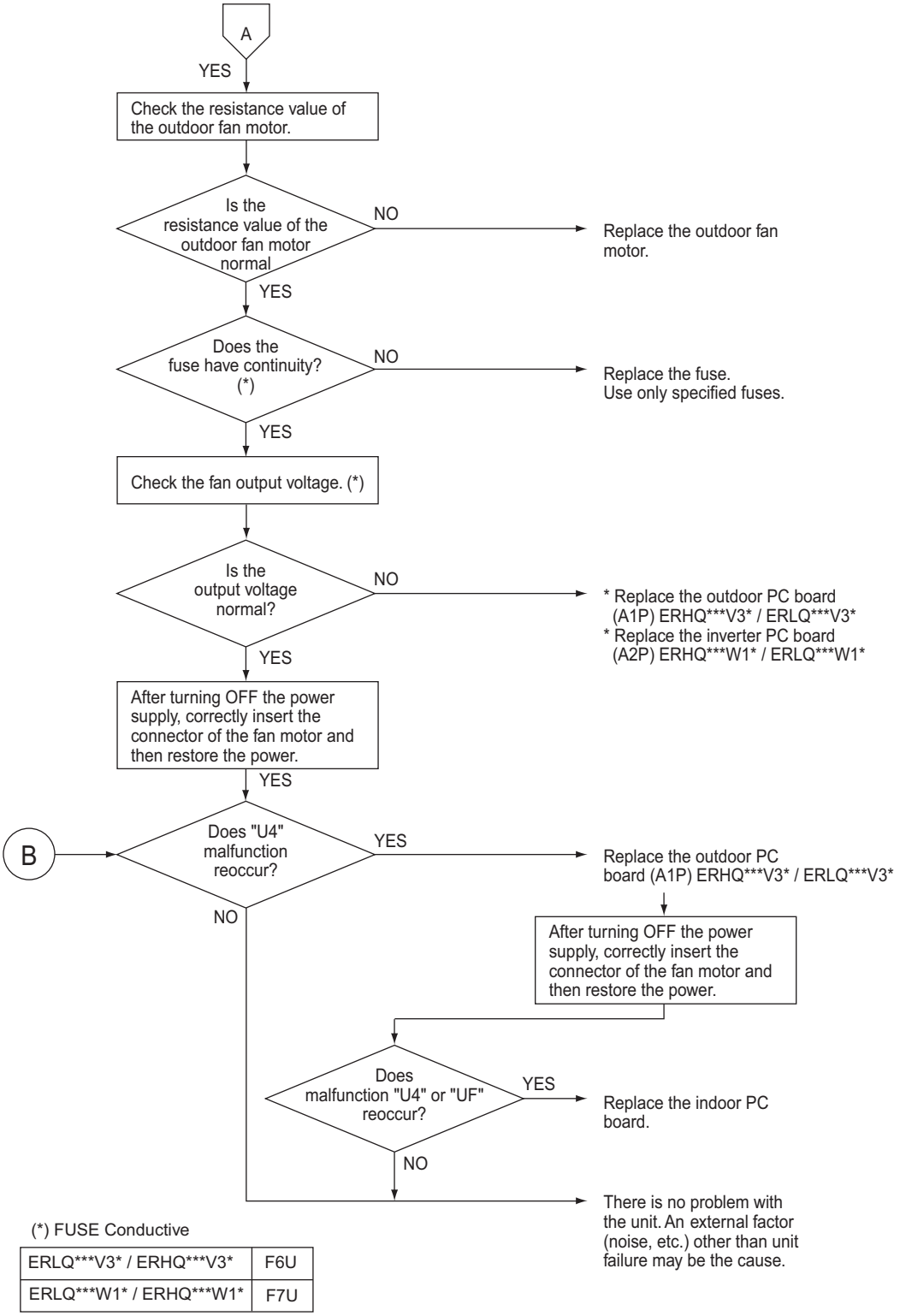
- Wiring indoor-outdoor transmission wire is incorrect
- Malfunctioning hydro-box PCB
- Malfunctioning outdoor unit PCB
- Outside cause (noise...).

Troubleshooting

Diagnosis of incorrect or broken/disconnected wiring. If the LEDs on the hydro-box PC board are off, it indicates that the transmission wiring between indoor and outdoor units may be incorrect or broken/disconnected.



(*) ERHQ***V3* / ERLQ***V3*
Does the fuse F3U on the communicator PC board (A4P) have No continuity?
ERHQ***W1* / ERLQ***W1*
Does the fuse F6U on the control PC board (A1P) have No continuity?



(*) FUSE Conductive

ERLQ***V3* / ERHQ***V3*	F6U
ERLQ***W1* / ERHQ***W1*	F7U

(*) See also "Check No.10 - Outdoor unit: Fan Speed Pulse" on page 3-129.

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4.6 "UF" Malfunction of Transmission between Hydro-box and Outdoor Unit or Gas Shortage

Remote controller display

UF

Method of malfunction detection

Check the transmission between the indoor and outdoor units with a microcomputer when the power turned ON.

Detect by checking the following temperature differences during compressor operation.

A: Difference in temperature detected by the indoor liquid thermistor (R3T) and the indoor suction air thermistor (R1T)

B: Difference in evaporation temperature (Te) (or condensation temperature (Tc) during heating operation) detected by the indoor heat exchanger thermistor (R2T) and the compressor sensor

Malfunction decision conditions

When the inter-unit wiring between the indoor and outdoor units is incorrect

When the following conditions continue for 20 minutes during compressor operation

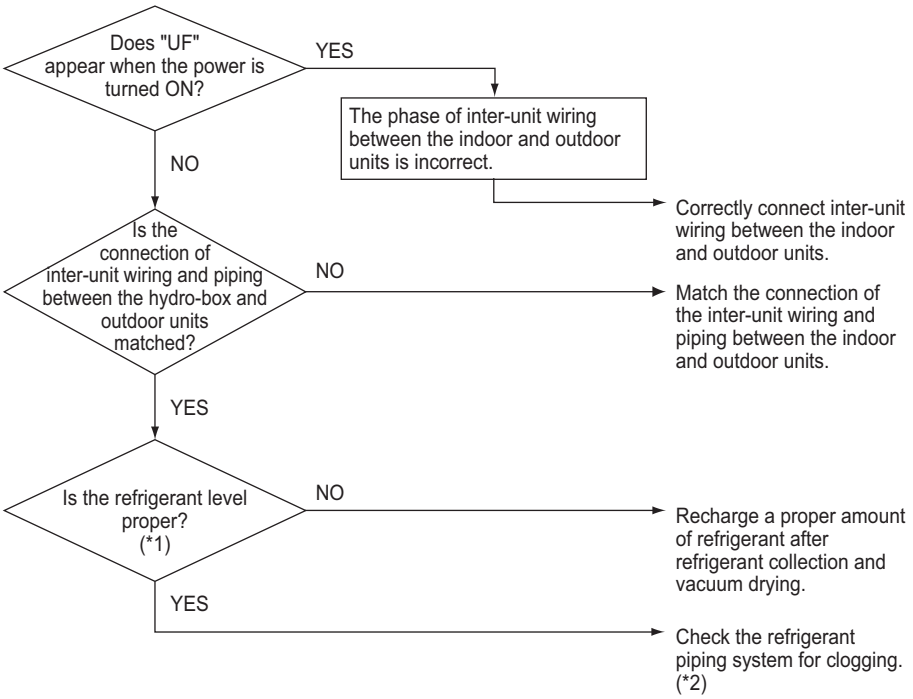
A: R2T – R1T < 4ºC, and

B: R2T – Te (or Tc during heating operation) > 14ºC (24ºC during heating operation)

Supposed causes

- Faulty inter-unit wiring between the indoor and outdoor units
- Refrigerant shortage (out of gas)
- Clogged refrigerant piping system

Troubleshooting



See also:

- (*1) "Check No.13 - Check for Inadequate Refrigerant" on page 3-131.
- (*2) "Check No.8 - Clogged Points" on page 3-128.

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4.7 "U5" Malfunction of Transmission between Hydro-box and Remote Controller

Remote controller display

U5

Error generation

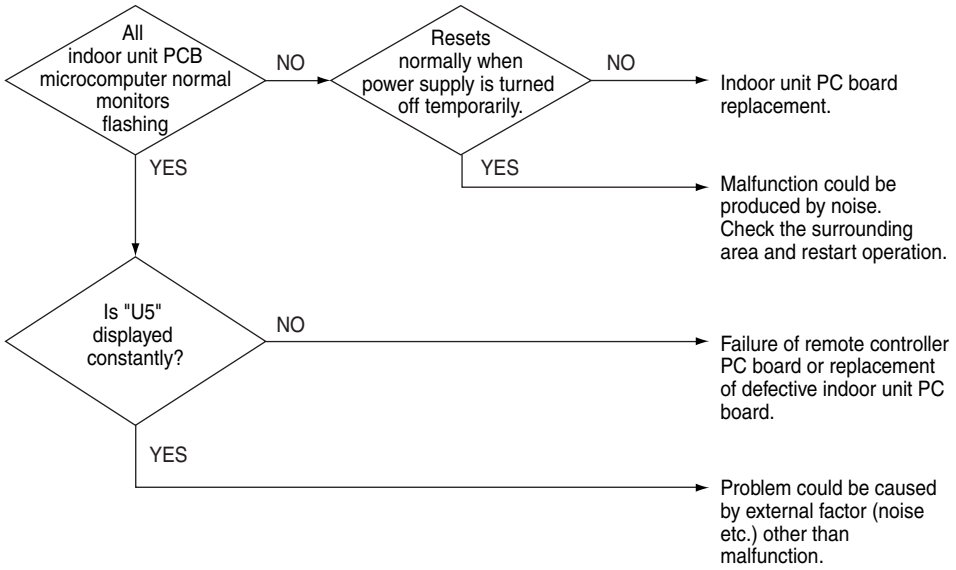
The error is generated when the microprocessor detects that the transmission between the hydro-box and the remote controller is not normal over a certain amount of time.

Supposed causes

The possible causes are:

- Malfunctioning remote controller
- Malfunctioning indoor PCB
- Outside cause (noise...)
- Connection of two master remote controllers (when using two remote controllers).

Troubleshooting



Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4.8 "UA" Indoor-Outdoor Combination Problem

Remote controller display

UA

Error generation

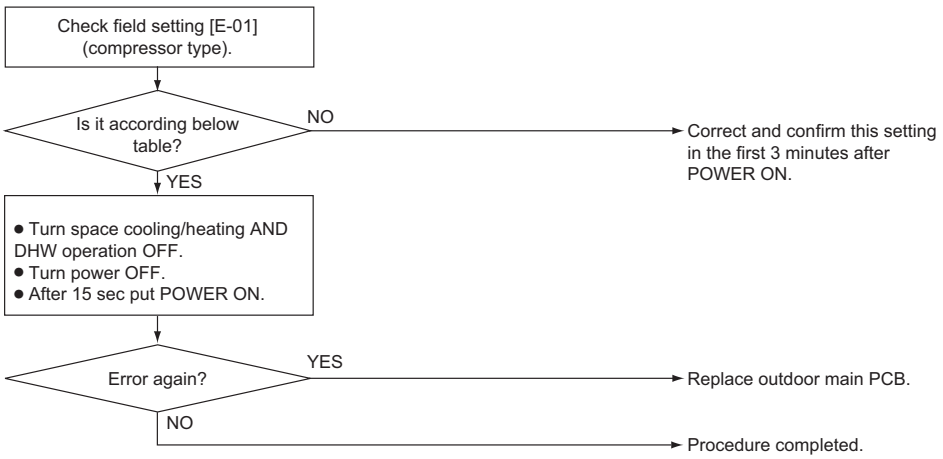
The error is generated when there is a combination mismatch between indoor/outdoor.

Supposed causes

- Incorrect unit model.
- Option [D-04] not confirmed.
- Functionality of X14A for *AB models.

3

Troubleshooting



Model	[E-01] value
EHB/VH/X004CA	0
EHB/VH/X008CA	0
EHB/VH/X016CA	1

Caution

Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

5 Additional Checks for Troubleshooting

5.1 What Is in This Chapter?

Introduction

This chapter explains how you must check the units to carry out troubleshooting correctly.

Overview

This chapter contains the following topics:

Topic	See page
5.2–Check No.1 - Outdoor unit: Checking the Installation Condition	3–120
5.3–Check No.2 - Outdoor Unit: Checking the Expansion Valve	3–121
5.4–Check No.3 - Checking the Thermistors	3–122
5.5–Check No.4 - Resistance Conversion Table (Ambient, Coil, Fin)	3–123
5.6–Check No.5 - Resistance Conversion Table (Discharge Pipe Sensor)	3–125
5.7–Check No.6 - Evaluation of Abnormal High Pressure	3–126
5.8–Check No.7 - Evaluation of Abnormal Low Pressure	3–127
5.9–Check No.8 - Clogged Points	3–128
5.10–Check No.10 - Outdoor unit: Fan Speed Pulse	3–129
5.11–Check No.11 - Outdoor unit: Check for Power Transistor	3–130
5.12–Check No.13 - Check for Inadequate Refrigerant	3–131
5.13–Check No.14 - Check for Excessive Refrigerant Charging	3–132
5.14–Check No.15 - Check for Factors Causing Wet Operation	3–133
5.15–Check No.16 - Troubleshooting Yonos Para Inverter Pump (Only for EH/VB004-008)	3–134

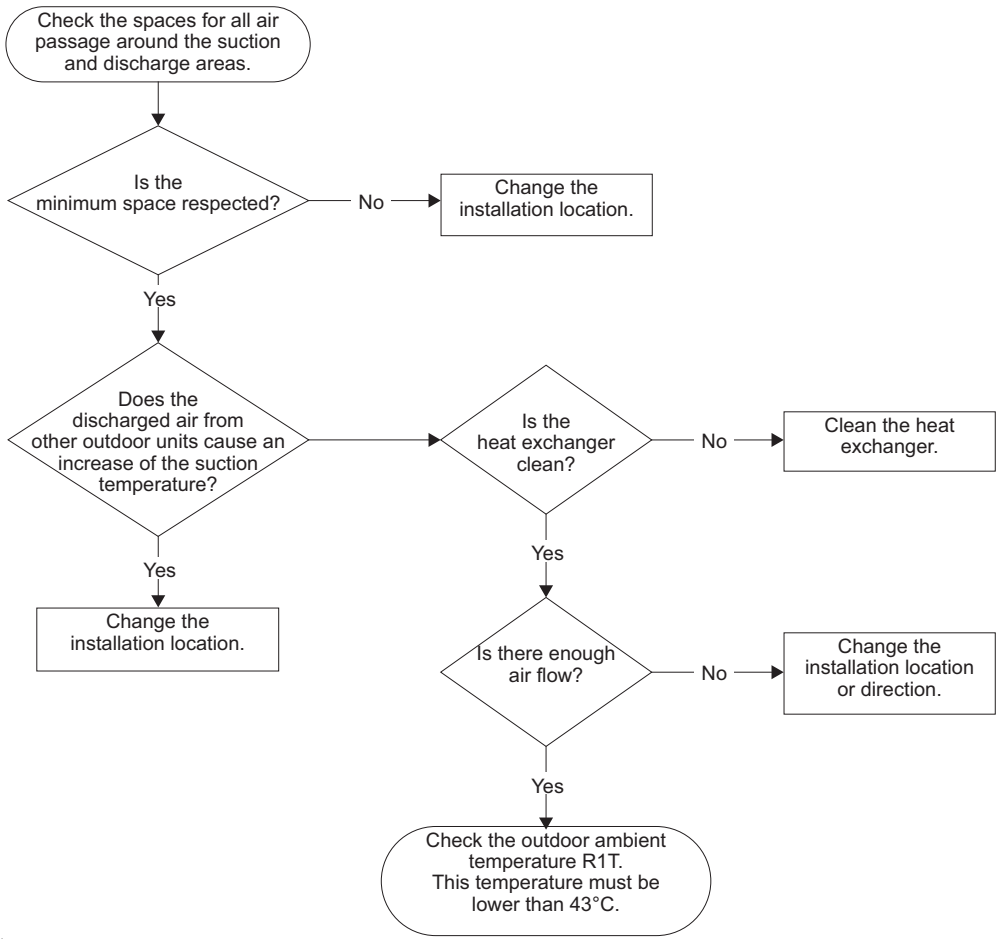
Note

Former check No.9 and check No.12 are not applicable on the models described in this manual.

5.2 Check No.1 - Outdoor unit: Checking the Installation Condition

Check No.01

1 To check the installation condition, proceed as follows:



5.3 Check No.2 - Outdoor Unit: Checking the Expansion Valve

Checking

To check the electronic expansion valve, proceed as follows:

Step	Action
1	Check if the expansion valve connector is correctly inserted in the X12A of A1P.
2	Compare the expansion valve unit with the number of the connector to make sure it is correctly connected.
3	Switch the power OFF.
4	Switch the power ON to check whether the expansion valve is producing a clicking sound. **If...** / **Then...** The expansion valve has no clicking sound → Disconnect the valve connector without the clicking sound and proceed to step 5.
5	Check the coil current: Open circuit < normal < short circuit The table below contains the reference resistance values.
6	Check the clicking sound again. **If...** / **Then...** There is a clicking sound → The expansion valve works properly. There is no clicking sound → Replace the expansion valve unit. There is still no clicking sound → Replace outdoor PCB A1P.

—	White	Grey	Black	Yellow	Red	Orange
White	—	∞	45 Ω	∞	45 Ω	∞
Grey	∞	—	∞	45 Ω	∞	45 Ω
Black	45 Ω	∞	—	∞	90 Ω	∞
Yellow	∞	45 Ω	∞	—	∞	90 Ω
Red	45 Ω	∞	90 Ω	∞	—	∞
Orange	∞	45 Ω	∞	90 Ω	∞	—

5.4 Check No.3 - Checking the Thermistors

Thermistors

If the cause of the problem is related to the thermistors, then the thermistors should be checked prior to changing the PCB.

For more information about these thermistors, see:

- "Wiring Diagrams" (outdoor units)
- "Function of Thermistors" on page 2-4

Overview of thermistors

The table below contains an overview of the thermistors:

Thermistor		Description
Hydro-box	R1T	Outlet water after PHE thermistor
	R1T (A2P)	Ambient sensor user interface
	R1T (A3P)*	Ambient sensor ON/OFF thermistor
	R2T	Outlet water after BUH thermistor
	R2T*	External sensor (floor or ambient)
	R3T	Refrigerant liquid thermistor
	R4T	Inlet water thermistor
	R5T*	Domestic hot water tank thermistor
	R6T*	External indoor or outdoor ambient thermistor
Outdoor	R1T	Ambient air thermistor
	R2T	Discharge pipe thermistor
	R3T	Suction pipe thermistor
	R4T	Heat exchanger thermistor
	R5T	Intermediate heat exchanger thermistor
	R6T	Liquid pipe thermistor
	R10T	Power module fin thermistor ERHQ V3* / ERLQ V3*
	R7T	Power module fin thermistor ERHQ W1* / ERLQ W1*

* = optional

Checking

To check the thermistors, proceed as follows:

Step	Action
1	Disconnect the thermistor from the PCB.
2	Read the temperature and the resistor value.
3	Check if the measured values correspond with the values in the table on the next pages.

5.5 Check No.4 - Resistance Conversion Table (Ambient, Coil, Fin)

Temperature – resistance

The table below is the thermistor (Hydro-box : Suction air, Coil / Outdoor : Ambient, Coil, Pipe without discharge, Fin) temperature – resistance conversion table.

Temp. (°C)	A (kΩ)	B (kΩ)	Temp. (°C)	A (kΩ)	B (kΩ)	Temp. (°C)	A (kΩ)	B (kΩ)
-20	197.81	192.08	20	25.01	24.45	60	4.96	4.87
-19	186.53	181.16	21	23.91	23.37	61	4.79	4.70
-18	175.97	170.94	22	22.85	22.35	62	4.62	4.54
-17	166.07	161.36	23	21.85	21.37	63	4.46	4.38
-16	156.80	152.38	24	20.90	20.45	64	4.30	4.23
-15	148.10	143.96	25	20.00	19.56	65	4.16	4.08
-14	139.94	136.05	26	19.14	18.73	66	4.01	3.94
-13	132.28	128.63	27	18.32	17.93	67	3.88	3.81
-12	125.09	121.66	28	17.54	17.17	68	3.75	3.68
-11	118.34	115.12	29	16.80	16.45	69	3.62	3.56
-10	111.99	108.96	30	16.10	15.76	70	3.50	3.44
-9	106.03	103.18	31	15.43	15.10	71	3.38	3.32
-8	100.41	97.73	32	14.79	14.48	72	3.27	3.21
-7	95.14	92.61	33	14.18	13.88	73	3.16	3.11
-6	90.17	87.79	34	13.59	13.31	74	3.06	3.01
-5	85.49	83.25	35	13.04	12.77	75	2.96	2.91
-4	81.08	78.97	36	12.51	12.25	76	2.86	2.82
-3	76.93	74.94	37	12.01	11.76	77	2.77	2.72
-2	73.01	71.14	38	11.52	11.29	78	2.68	2.64
-1	69.32	67.56	39	11.06	10.84	79	2.60	2.55
0	65.84	64.17	40	10.63	10.41	80	2.51	2.47
1	62.54	60.96	41	10.21	10.00			
2	59.43	57.94	42	9.81	9.61			
3	56.49	55.08	43	9.42	9.24			
4	53.71	52.38	44	9.06	8.88			
5	51.09	49.83	45	8.71	8.54			
6	48.61	47.42	46	8.37	8.21			
7	46.26	45.14	47	8.05	7.90			
8	44.05	42.98	48	7.75	7.60			
9	41.95	40.94	49	7.46	7.31			
10	39.96	39.01	50	7.18	7.04	—		
11	38.08	37.18	51	6.91	6.78			
12	36.30	35.45	52	6.65	6.53			
13	34.62	33.81	53	6.41	6.53			
14	33.02	32.25	54	6.65	6.53			
15	31.50	30.77	55	6.41	6.29			
16	30.06	29.37	56	6.18	6.06			
17	28.70	28.05	57	5.95	5.84			
18	27.41	26.78	58	5.74	5.43			
19	26.18	25.59	59	5.14	5.05			

Applicable sensors

A: Outdoor: Ambient, Coil, Pipe without discharge

B: Outdoor: Fin



Be careful when ordering spare part sensor for tank thermistor.

Thermistor resistance check

Remove the connectors of the thermistors on the PCB, and measure the resistance of each thermistor using tester.

The tank thermistor is for EKHWS-B and EKHWE domestic hot water tanks.

The relationship between normal temperature and resistance is shown in the graph and the table below:

	Hydro-box	Tank thermistor
	3SA48002	**3SA48009**
	R25°C=20kΩ	**R120=7.13Ω**
	B=3990	**B= 4177**
-20	197.8 kΩ	2534 kΩ
-15	148.2 kΩ	1877 kΩ
-10	112.0 kΩ	1404 kΩ
-5	85.52 kΩ	1059 kΩ
0	65.84 kΩ	806.5 kΩ
5	51.05 kΩ	618.9 kΩ
10	39.91 kΩ	478.8 kΩ
15	31.44 kΩ	373.1 kΩ
20	24.95 kΩ	292.9 kΩ
25	19.94 kΩ	231.4 kΩ
30	16.04 kΩ	184.1 kΩ
35	12.99 kΩ	147.4 kΩ
40	10.58 kΩ	118.7 kΩ
45	8.669 kΩ	96.13 kΩ
50	7.143 kΩ	78.29 kΩ

Tank thermistor for EHV*CA* domestic hot water tanks.

NTC-curve

T°C	Resistance value
-20	197.81 kΩ
0	65.84 kΩ
25	20 kΩ

5.6 Check No.5 - Resistance Conversion Table (Discharge Pipe Sensor)

Temperature – resistance

The table below is the discharge pipe thermistor temperature – resistance conversion table.

Temp. (°C)	Resist. (kΩ)	Temp. (°C)	Resist. (kΩ)	Temp. (°C)	Resist. (kΩ)
—	—	60.0	52.8	130.0	5.4
—	—	62.0	48.9	132.0	5.4
-6.0	1120.0	64.0	45.3	134.0	4.8
-4.0	1002.5	66.0	42.0	136.0	4.6
-2.0	898.6	68.0	39.0	138.0	4.3
0.0	806.5	70.0	36.3	140.0	4.1
2.0	724.8	72.0	33.7	142.0	3.9
4.0	652.2	74.0	31.4	144.0	3.7
6.0	587.6	76.0	29.2	146.0	3.5
8.0	530.1	78.0	27.2	148.0	3.3
10.0	478.8	80.0	25.4	150.0	3.2
12.0	432.9	82.0	23.7	152.0	3.0
14.0	392.0	—	—	154.0	2.9
16.0	355.3	—	—	156.0	2.7
18.0	322.4	—	—	158.0	2.6
20.0	292.9	—	—	160.0	2.5
22.0	266.3	92.0	16.9	162.0	2.3
24.0	242.5	94.0	15.8	164.0	2.5
26.0	221.0	96.0	14.8	166.0	2.1
28.0	201.6	98.0	13.9	168.0	2.0
30.0	184.1	100.0	13.1	170.0	1.9
32.0	168.3	102.0	12.3	172.0	1.9
34.0	154.0	104.0	11.5	174.0	1.8
36.0	141.0	106.0	10.8	176.0	1.7
38.0	129.3	108.0	10.2	178.0	1.6
40.0	118.7	110.0	9.6	180.0	1.5
42.0	109.0	112.0	9.0		
44.0	100.2	114.0	8.5		
46.0	92.2	116.0	8.0		
48.0	84.9	118.0	7.6		
50.0	78.3	120.0	7.1	—	
52.0	72.2	122.0	6.7		
54.0	66.7	124.0	6.4		
56.0	61.6	126.0	6.0		
58.0	57.0	128.0	5.7		

5.7 Check No.6 - Evaluation of Abnormal High Pressure

Abnormally high pressure level is mostly caused by the condenser side. The following contents are provided by service engineer based on their field checks. Further, the number is listed in the order of degree of influence.

In cooling operation

Check items (Possible causes)	Judgment
Does the outdoor unit fan run normally?	Visual inspection
Is the outdoor unit heat exchanger clogged?	Visual inspection
Is there clogging before or after the EV (capillary)?	Check if there is a temperature difference before and after EV (capillary). Check if the main valve unit of EV operates (by noise, vibration).
Is the check valve clogged? *Heat pump model only	Check if there is a temperature difference before and after check valve. ■ If YES, the check valve is caught.
Is the HPS normal?	Check continuity by using a tester.
Is the outdoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is the piping length 5 meters or less?	Visual inspection
Does air enter the refrigerant system?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.
Is the refrigerant overcharged?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

In heating operation

Check items (Possible causes)	Judgment
Is the hydro-box heat exchanger clogged?	Visual inspection
Is there clogging before or after the EV (capillary)?	Check if there is a temperature difference before and after EV (capillary). Check if the main valve unit of EV operates (by noise, vibration).
Is the check valve clogged?	Check if there is a temperature difference before and after check valve. ■ If YES, the check valve is caught.
Is the HPS normal?	Check continuity using a tester.
Is the piping length 5 meters or less?	Visual inspection
Does air enter the refrigerant system?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.
Is the refrigerant overcharged?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

5.8 Check No.7 - Evaluation of Abnormal Low Pressure

Abnormally low pressure level is mostly caused by the evaporator side. The following contents are provided based on field checking of service engineer. Further, the number is listed in the order of degree of influence.

In cooling operation

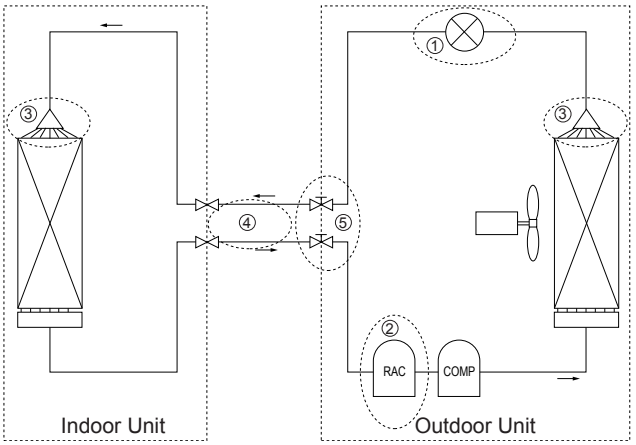
Check items (Possible causes)	Judgment
Does the outdoor unit fan run normally?	Visual inspection
Is the hydro-box filter clogged?	Visual inspection
Is there clogging before or after the EV (capillary)?	Check if there is a temperature difference before and after EV (capillary). Check if the main valve unit of EV operates (by noise, vibration).
Is the check valve clogged? *Heat pump model only	Check if there is a temperature difference before and after check valve. ■ If YES, the check valve is caught.
Is the LPS normal?	Check continuity using a tester.
Is the hydro-box installed under such conditions that short circuit easily occurs?	Visual inspection
Is the refrigerant gas short?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

In heating operation

Check items (Possible causes)	Judgment
Does the outdoor unit fan run normally?	Visual inspection
Is the outdoor unit heat exchanger clogged?	Visual inspection
Is the outdoor unit installed under such conditions that short circuit easily occurs?	Visual inspection
Is there clogging before or after the EV (capillary)?	Check if there is a temperature difference before and after EV (capillary). Check if the main valve unit of EV operates (by noise, vibration).
Is the check valve clogged?	Check if there is a temperature difference before and after check valve. ■ If YES, the check valve is caught.
Is the LPS normal?	Check continuity using a tester.
Is the refrigerant gas short?	Conduct refrigerant collection and vacuum drying, and then add proper amount refrigerant.

5.9 Check No.8 - Clogged Points

Temperature differences must occur before or after the clogged points!



Check points		Check factor	Causes	Remedies
1	Around expansion mechanism	Temperature difference	■ Dust ■ Choked moisture ■ Reduced effective pipe diameter due to adherent contamination, etc.	Replace the expansion valve.
2	Accumulator	Frosting	■ Choked moisture	Blow a nitrogen gas, and then replace the refrigerant.
3	Distributor	Temperature difference	■ Dust ■ Choked moisture ■ Reduced effective pipe diameter due to adherent contamination, etc.	Replace the heat exchanger or distributor.
4	Field piping	Temperature difference	■ Collapsed pipe	Replace the pipe.
5	Stop valve	Temperature difference	■ The stop valve is not fully open.	Open the stop valve fully.

5.10 Check No.10 - Outdoor unit: Fan Speed Pulse

1 Disconnect the connector X106A with the power supply OFF and Operation OFF.

2 Is the voltage between pins 4 and 3 of X106A about 15 VDC after turning the power supply on?

3 Is the voltage between pins 4 and 1 of X106A about 5 VDC?

4 Is the voltage between pins 4 and 7 of X106A about 325 VDC ± 30 VDC?

5 Connect the connector X106A with the power supply OFF and Operation OFF.

6 When making one turn of the upper fan motor by hand after turning the power supply on, is a pulse (0 and 5 V) generated 2 times between pins 4 and 1 of X106A? (Measure at the contact terminal on the harness side with the connector connected.)

7 Disconnect the connector X107A with the power supply OFF and Operation OFF.

8 Is the voltage between pins 4 and 3 of X107A about 15 VDC after turning the power supply on?

9 Is the voltage between pins 4 and 1 of X107A about 5 VDC?

10 Is the voltage between pins 4 and 7 of X107A about 325 VDC ± 30 VDC?

11 Connect the connector X107A with the power supply OFF and Operation OFF.

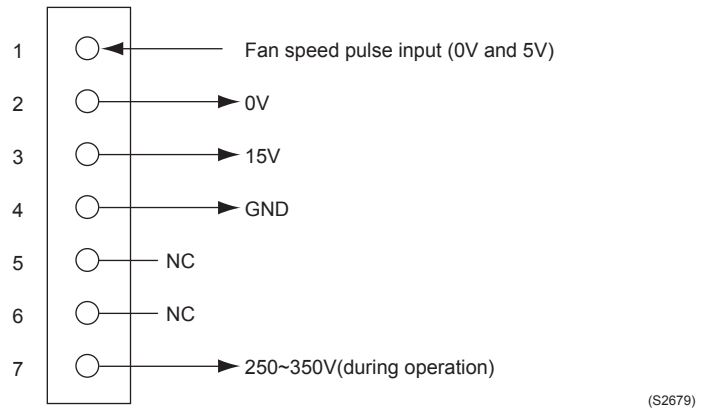
12 When making one turn of the lower fan motor by hand after turning the power supply on, is a pulse (0 and 5 V) generated 2 times between pins 4 and 1 of X107A?

(2) (7): NO → Faulty PC board → Replace the PC board.

(3) (8): NO → Faulty PC board → Replace the PC board.

(5)(10): NO → Faulty hall IC → Replace the DC fan motor.

(2) (3) (5) (7) (8) (10): YES → Replace the PC board.



5.11 Check No.11 - Outdoor unit: Check for Power Transistor

Judgment according to the continuity check by using an analog tester:

1 Do not touch the charged area (high voltage) for 10 minutes after turning the power supply off.

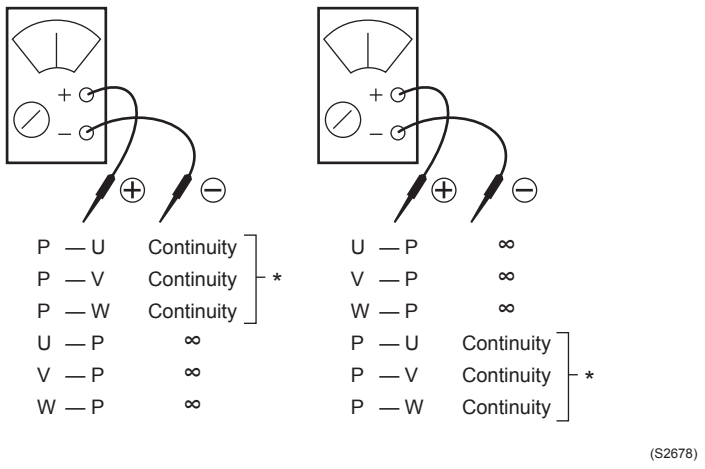
2 If you must touch such an area, make sure that the power supply voltage of power transistor is 50 V or less.

3 Disconnect the connector of the outdoor unit fan motor.
When the outdoor unit fan is rotating against a strong wind, the condenser is charged and electric shock may result. Therefore, disconnect the connector from the outdoor unit fan motor after confirming that the outdoor unit fan has stopped.

4 Before measuring the continuity, disconnect the connection between compressor and power transistor.

5 Measure the continuity in the following procedure.
[Judgment] Normal if the continuity check results in the following.

Power transistor (on inverter PC board)



(S2678)

* If there is continuity, the resistance should be the same as each phase.

* If a digital tester is used for the measurement of continuity, ∞ and continuity may be reversed.

5.12 Check No.13 - Check for Inadequate Refrigerant

As criteria for judging whether refrigerant is inadequate or not, refer to the following operating conditions.

<Diagnosis of inadequate refrigerant>
In cooling operation

1 As suction superheat degree increases due to gas shortage, the electronic expansion valve tends to open (opens fully) in order to avoid overheat operation.

2 In response to decreased evaporator capacity caused by gas shortage, capacity is controlled in the inverter in order to maintain low pressure, which results in a decrease in frequency.

3 Because of (1) and (2) above, the compressor frequency decreases despite a large difference (large load) between temperature set by the remote controller and indoor suction temperature, resulting that cooling capacity becomes unavailable.

4 If gas shortage worsens, the electronic expansion valve remains fully open and suction superheat degree further increases. In addition, because the compressor frequency drops to the level of the lowest frequency (52 Hz) and the refrigerant flow rate decrease, low pressure cannot be maintained.

<Diagnosis of inadequate refrigerant>
In heating operation

1 As suction superheat degree increases due to gas shortage, the electronic expansion valve tends to open (opens fully) to avoid overheat operation.

2 As suction superheat degree increases due to gas shortage, compressor frequency decreases because suction superheat degree is controlled in order to prevent oil to the outdoor heat exchanger from being retained.

3 Because of (1) and (2) above, evaporator capacity and compressor frequency decrease despite a large difference (large load) between temperature set by the remote controller and indoor suction temperature, resulting that high pressure cannot be maintained and heating capacity becomes unavailable. Also a decrease in evaporator capacity frequently puts the system in defrost operation.

4 If gas shortage worsens, high pressure becomes smaller than saturated pressure equivalent to indoor heat exchanger temperature (or indoor suction temperature).

5.13 Check No.14 - Check for Excessive Refrigerant Charging

As criteria for judging whether refrigerant is excessively charged or not, refer to the following operating conditions.

<Diagnosis of excessive refrigerant charging>
In cooling operation

1 Because high pressure rises due to excessive charging, overload control is carried out and capacity tends to run short.

2 Considering pressure load, compressor discharge pipe temperature is low.

3 Subcooled degree of condensate liquid becomes large. Therefore, temperature of blown air passing through subcooled part decreases in heating operation.

3

5.14 Check No.15 - Check for Factors Causing Wet Operation

Note

Reference values for superheat degree to be used in the judgement of wet operation:

1 Suction pipe superheat degree: 4°C or more

2 Discharge pipe superheat degree: 5°C or less

(The values above must be used only for reference purposes. Even it is operated within the range above, operation may be normal in other conditions)

5.15 Check No.16 - Troubleshooting Yonos Para Inverter Pump (Only for EH/VB004-008)

LED	Meaning	Diagnostic	Cause	Remedy
lights green	Pump in operation	Pump runs according its setting	Normal operation	
blinks quick green	RKA model:	Pump runs during 10 min in air venting function. Afterwards the targeted performance must be adjusted.	Normal operation	
	PWM model:	Pump in standby	Normal operation	
blinks red/ green	Pump in function but stopped	Pump restarts by itself after the fault is disappeared	1. Undervoltage U<160 V or Overvoltage U>253 V	1. Check voltage supply 195 V < U < 253 V
			2. Module overheating: temperature inside motor too high	2. Check water and ambient temperature
blinks red	Pump out of function	Pump stopped (blocked)	Pump does not restart by itself due to a permanent failure	Change pump
LED off	No power supply	No voltage on electronics	1. Pump is not connected to power supply	1. Check cable connection
			2. LED is damaged	2. Check if pump is running
			3. Electronics are damaged	3. Change pump

If the fault cannot be remedied, please consult the specialist technician or the Wilo factory after-sales service.

Part 4
Commissioning and Test Run

What is in this part? This part contains the following chapters:

Chapter	See page
1–Pre-Test Run Checks	4–3
2–Field Settings	4–13
3–Test Run and Operation Data	4–41

1 Pre-Test Run Checks

1.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Checks before test run
- Test run checks

Overview

This chapter contains the following topics:

Topic	See page
1.2–Checks before Test Run	4–4
1.3–Air Purge	4–7
1.4–Test Run Operation (Manual)	4–9
1.5–Actuator Test Run	4–10
1.6–UFH Screed Dry-out	4–11

1.2 Checks before Test Run

Introduction

This chapter will show an overview of all checks before test run.

Content

Topic	See page
1.2.1–General procedure	4–4
1.2.2–Checks before Initial start-up	4–5
1.2.3–MINIMUM water volume in the installation	4–6

1.2.1 General procedure

Before carrying out a test run, proceed as follows:

Step	Action
1	Make sure the voltage at the primary side of the safety breaker is: ■ 230 V ± 10% for 1-phase units ■ 400 V ± 10% for 3-phase units
2	Fully open the liquid and the gas stop valve.

1.2.2 Checks before Initial start-up

Warning! Check off the power supply before making any connections.

Procedure After the installation of the unit, check the following before switching on the circuit breaker:

1 Field wiring

Make sure that the field wiring between local supply panel and hydro-box, outdoor unit and hydro-box, hydro-box and valves (when applicable), hydro-box and room thermostat (when applicable), and hydro-box and domestic hot water tank has been carried out according to the instructions described in the chapter ‘‘Field Settings” on page 4-13, according to the wiring diagrams and according to European and national regulations.

2 BUH wiring. Make sure BUH is on a separate fuse and wired correctly. Check wiring in hydrobox, faston terminals in related settings.

3 Fuses or protection devices

Check that the fuses or the locally installed protection devices are of the size and type specified in the chapter "Technical specifications" in databook. Make sure that neither a fuse nor a protection device has been bypassed.

4 Booster heater circuit breaker F2B

Do not forget to turn on the booster heater circuit breaker F2B in the switch box (applies only to units with optional domestic hot water tank installed).

5 Earth wiring

Make sure that the earth wires have been connected properly and that the earth terminals are tightened.

6 Internal wiring

Visually check the switch box on loose connections or damaged electrical components.

7 Fixation

Check that the unit is properly fixed, to avoid abnormal noises and vibrations when starting up the unit.

8 Damaged equipment

Check the inside of the unit on damaged components or squeezed pipes.

9 Refrigerant leak

Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, call your local Daikin dealer.

10 Power supply voltage

Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.

11 Air purge valve

Make sure the air purge valve is open (at least 2 turns).

12 Pressure relief valve

Do not forget to connect a hose to the pressure relief valve outlet to make sure excessive water gets drained.

Check if the backup heater vessel is completely filled with water by operating the pressure relief valve. It should purge water instead of air.

Caution! Operating the system with the backup heater vessel not completely filled with water will damage the backup heater!

13 Shut-off valves

Make sure that the shut-off valves are correctly installed and fully open.

Caution! Operating the system with closed valves will damage the pump!

14 Check the water pressure on the units manifold. It should be between 1,5 and 2 bar.

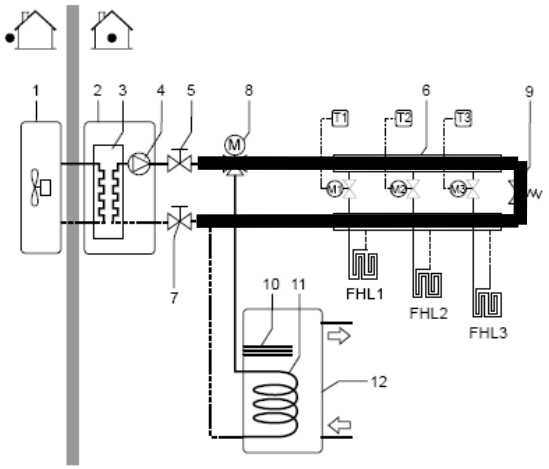
1.2.3 MINIMUM water volume in the installation

In order to secure the correct operation of the heat pump in all conditions, the minimum water volume in the installation should be 20l (°).

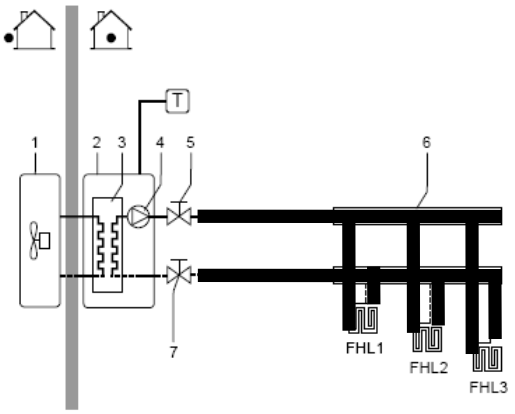
Caution!

The minimum water volume of the system is the available water volume in the most critical situation.

- The most critical situation in this type of installation is in case all valve are closed. Available water volume is only field piping volume.



- In this type of installation, the minimum water volume is equal to the total system water volume.



(°): The minimum water volume of 20l is excluding the internal water volume of hydrobox (and/or tank).

1.3 Air Purge

When commissioning and installing the unit, it is very important to remove all air in the water circuit. When the air purge function is running, the pump operates without actual operation of the unit and the remove of air in the water circuit will start.

There are 2 modes to purge air:

- Manually: the unit will operate with a fixed pump speed and in a fixed or custom position of the 3-way valve. The custom position of the 3-way valve is a helpful feature to remove all air from the water circuit in space heating or domestic hot water heating mode. The operation speed of the pump (slow or quick) can also be set.
- Automatic: the unit change automatically the pump speed and the position of the 3-way valve between space heating or domestic hot water heating mode.

The air purge function stops automatically after 30 minutes.

It is recommended to start the air purge function in manually mode. When almost all air is removed, it is recommended to start the automatic mode. If necessary, repeat the automatic mode until you are sure that all air is removed from the system.

4

1.3.1 To perform a manual air purge

1 Set the user permission level to Installer. See "To set the user permission level to Installer" in the Installer Reference Guide which can be found in Appendix of this Service Manual on page 33.

2 Set the air purge mode: go to [A.7.3.1] > Installer settings > Commissioning > Air purge > Type.

3 Select Manual and press OK.

4 Set the desired pump speed: go to [A.7.3.2] > Installer settings > Commissioning > Speed.

5 Select the desired pump speed and press OK.

Result: Low

Result: High

6 If applicable, select the desired position of the 3-way valve. If not applicable, go to [A.7.3.4].

7 Set the desired position of the 3-way valve: go to [A.7.3.3] > Installer settings > Commissioning > Air purge > Circuit.

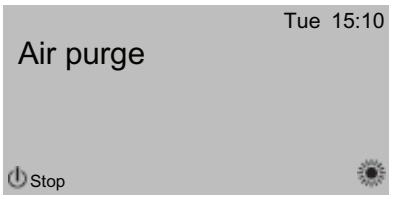
8 Select the desired circuit and press OK.

Result: SHC

Result: Tank

9 Go to [A.7.3.4] > Installer settings > Commissioning > Air purge > Start air purge and press OK to start the air purge function.

Result: Air purging is started and following screen will be shown.



1.3.2 To perform an automatic air purge

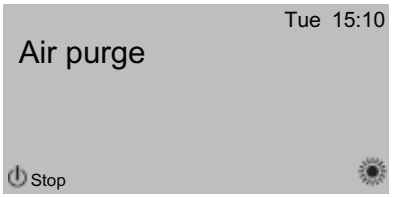
1 Set the user permission level to Installer. See "To set the user permission level to Installer" in the Installer Reference Guide which can be found in Appendix of this Service Manual on page 33.

2 Set the air purge mode: go to [A.7.3.1] > Installer settings > Commissioning > Air purge > Type.

3 Select Automatic and press OK.

4 Go to [A.7.3.4] > Installer settings > Commissioning > Air purge > Start air purge and press OK to start the air purge function.

Result: Air purging will started and following screen will be shown.



4

1.3.3 To interrupt air purge

1 Go to [A.7.3].

2 Press and press OK to confirm the air purge function.

1.4 Test Run Operation (Manual)

Procedure

If required, the installer can perform a manual test run operation at any time to check correct operation of cooling, heating, domestic water heating and start up the underfloor screed dry-out program (from BB-indoor series onwards).

1 Activate the testrun in A.7.1.

Testscreen will be shown and testrun will automatically stop after 30 minutes unless manually ended by pressing ON/OFF button (+ confirm).

2 During test, only menu [6] Information is accessible: sensor information and actuator info.

3 Performing testrun is optional and analysis of correct behaviour is up to the installer by checking sensor and actuator information during test.

1.5 Actuator Test Run

Procedure

A.7 Commissioning
1 Test run
2 UFH screed dryout
3 Air purge
4 Actuator test run

A.7.4 Actuator test run
1 BSH
2 BUH 1
3 BUH 2
6 Pump
7 Solar pump
8 2 way valve
9 3 way valve
A BPH
B Bivalent
C Alarm
D C/H signal
E Quick heatup
F Circulation pump

Select and start actuator run in [A.7.1.4].

- Displays test screen Test run stops:
  - After 30 min
  - Manually by pushing ON/OFF button and confirming
  - When reaching stop condition
- BSH: Start: tank temp < 40°C. Stop: 50°C
- BUH: Start: LWT < 30°C. Stop LWT > 40°C
- Pump: Maximum speed
- Solar pump: Start: tank temp < 40°C. Stop: 50°C
- Bivalent: Bivalent permission: ON and 3-way valve to DHW

Remark

Actuator testrun overrules “issues”. If the unit is in error, then the Actuator Testrun can still be performed to check which item is faulty.

1.6 UFH Screed Dry-out

General

In the Installer commissioning menu, there is a setting possible to perform underfloor and scheduling heating screed dry-out. Setting this function is the responsibility of the installer. It should:

- Contact the screed manufacturer for the initial heating instructions to avoid cracking the screed.
- Program the UFH screed dry-out schedule according to the above instruction of the screed manufacturer.
- Check on regular base the good working of the set-up.
- Select the correct program that complies with the type of used screed for the floor.

Note

Screed dry-out is possible by BUH only (if no outdoor unit installed yet).

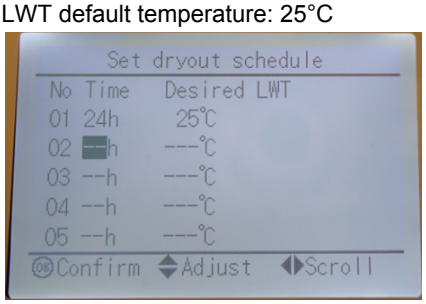
Procedure

A.7 Commissioning
1 Test run
2 UFH screed dryout
3 Air purge
4 Actuator test run

A.7.2 UFH screed dryout
1 Set dryout program
2 Start dryout
3 Dryout status

Set and start dry-out in [A.7.2].

- 20 steps duration 1~72 hours, steps of 1 hour
- LWT default temperature: 25°C



- Preferential kWh rate power supply must be disabled before starting! (A.2.1.6)
- During operation: Status screen shown with: current step, total remaining time and active LWT setpoint.
- If finished: home screen returns to normal and A.7.2.3 Dry-out status is finished.

2 Field Settings

2.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Extract from operation manual on simple settings with the user interface
- Overview list of all settings and factory settings
- Reference to field settings

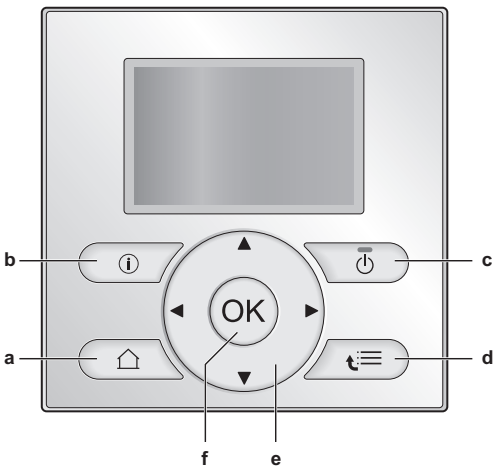
Overview

This chapter contains the following topics:

Topic	See page
2.2–The User Interface at a Glance	4–14
2.3–Space Heating/Cooling Control	4–17
2.4–Domestic Hot Water Control	4–19
2.5–Schedules: Example	4–22
2.6–Overview of the Field and Factory Settings of the Hydro-box	4–24
2.7–Overview of the Field Setting on the Outdoor Unit	4–34

2.2 The User Interface at a Glance

2.2.1 Buttons



a HOME PAGES

- Switches between home pages (when you are on a home page).
- Goes to the default home page (when you are in the menu structure).

b MALFUNCTION INFORMATION

If a malfunction occurs, ⓘ is displayed on the home pages. You can press to display more information about the malfunction.

c ON/OFF

Turns ON or OFF one of the controls (room temperature, leaving water temperature, DHW tank temperature).

d MENU STRUCTURE/BACK

- Opens the menu structure (when you are on a home page).
- Goes a level up in the menu structure (when you are navigating in the menu structure).
- Goes back 1 step (example: when you are programming a schedule in the menu structure).

e NAVIGATING/CHANGING SETTINGS

- Navigates the cursor on the display.
- Navigates in the menu structure.
- Changes settings.
- Selects a mode.

f OK OK

- Goes to the next step when you are programming a schedule in the menu structure.
- Confirms a selection.
- Enters a submenu in the menu structure.
- Switches between displaying actual and desired values, or between displaying actual and offset values (if applicable) on the home pages.
- Enables you to activate or deactivate child lock if pressed for more than 5 seconds on a home page.
- Enables you to activate or deactivate a function lock if pressed for more than 5 seconds in the main menu of the menu structure.

If you press or while changing settings, the changes will NOT be applied.

2.2.2 Status icons

Icon	Description
	Space operation mode = Heating.
	Space operation mode = Cooling.
	Unit is operating.
	Desired room temperature = preset value (Comfort; daytime).
	Desired room temperature = preset value (Eco; nighttime).
	■ On the room temperature home page: Desired room temperature = according to the selected schedule. ■ On the DHW tank temperature home page: DHW tank mode = Scheduled mode.
	DHW tank mode = Reheat mode.
	DHW tank mode = Scheduled + reheat mode.
	At the next scheduled action, the desired temperature will increase.
	At the next scheduled action, the desired temperature will NOT change.
	At the next scheduled action, the desired temperature will decrease.
	The preset value (Comfort or Eco) or scheduled value is temporarily overruled.
	The system will produce domestic hot water for the indicated number of persons.
	The DHW tank booster mode is active or ready to be activated.
	Quiet mode is active.
	Holiday mode is active or ready to be active.
	Child lock mode and/or function lock mode is active.
	An external heat source is active. Example: Gas burner.
	The disinfection mode is active.
	A malfunction occurred. You can press to display more information about the malfunction.
	Weather-dependent mode is active.

Icon	Description
	User permission level = Installer.
	Defrost/oil return mode is active.
	Hot start mode is active.
	Emergency operation is active.

2.3 Space Heating/Cooling Control

2.3.1 Setting the space operation mode

To set the space operation mode

1 Go to [4]: ☰ > Operation mode.

2 Select one of the following and press OK:

If you select...	Then the space operation mode is...
Heating	Always heating mode.
Cooling	Always cooling mode
Automatic	Automatically changed by the software based on the outdoor temperature (and depending on installer settings also the indoor temperature), and takes monthly restrictions into account. Note: Automatic changeover is only possible under certain conditions.

To restrict when automatic changeover is possible

1 Go to [7.5]: ☰ > User settings > Allowed operation mode.

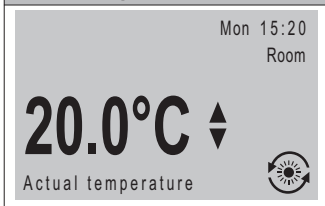
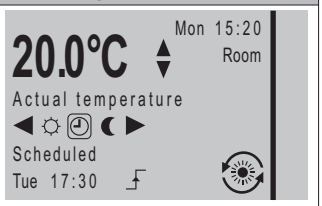
2 Select a month and press OK.

3 Select Heating only, Cooling only or Heating/Cooling, and press OK.

2.3.2 Using the room temperature home page

Typical room temperature home pages

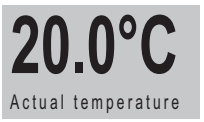
Depending on the user profile, you can do more or less on the home page.

User profile = Basic	User profile = Detailed
	

To read out the actual and desired room temperature

1 Go to the room temperature home page (Room).

Result: You can read out the actual temperature.



2 Press OK.

Result: You can read out the desired temperature.



To temporarily overrule the room temperature schedule

1 Go to the room temperature home page (Room).

2 Use ▲ or ▼ to adjust the temperature.

To change the mode from scheduled to preset value

Prerequisite: User profile = Detailed.

1 Go to the room temperature home page (Room).

2 Press ◀ or ▶ to select a preset value (☼ or ☾).

To set the overrule period

1 Go to [7.2]: ☰ > User settings > Temperature lock.

2 Select a value and press OK:
- Permanent
- Hours (2, 4, 6, 8)

Result: This overrule period (Temperature lock) remains valid until you change it again.

2.3.3 Using the leaving water temperature home pages (main + additional)

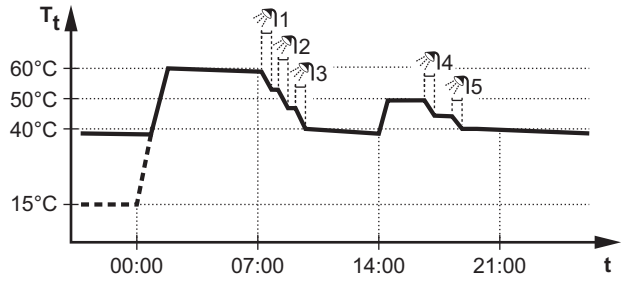
The leaving water is the water that is sent to the heat emitters. The desired leaving water temperature is set by your installer in accordance with the heat emitter type. Example: Under floor heating is designed for lower leaving water temperature than radiators and heat pump convectors and/or fan coil units. You only have to adjust leaving water temperature settings in case of problems.

For more information about the leaving water temperature, see the user reference guide.

2.4 Domestic Hot Water Control

2.4.1 Reheat mode

In reheat mode ( ), the DHW tank continuously heats up to the desired temperature (example: 50°C).



- T_t: DHW tank temperature
- t: Time

It is recommended NOT to use the selection of ([6-0D]=0, [A.4.1] Domestic hot water Setpoint mode=Reheat only) in case of a domestic hot water tank without internal booster heater.

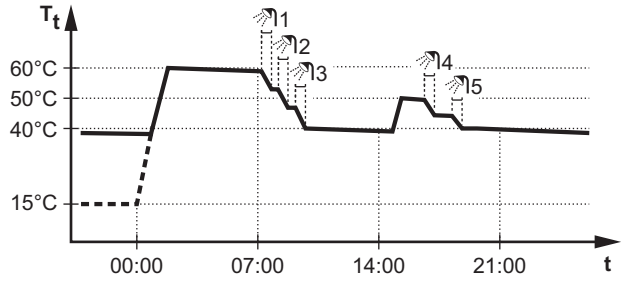
The risk of space heating (cooling) capacity shortage/comfort problems is significant (in case of frequent domestic hot water operation, frequent and long space heating/cooling interruption will happen).

2.4.2 Scheduled mode

In scheduled mode ( ), the DHW tank produces hot water corresponding to a schedule. The best time to produce hot water is during the night, because (possibly):

- Space heating demand is lower
- Electric tariffs are lower

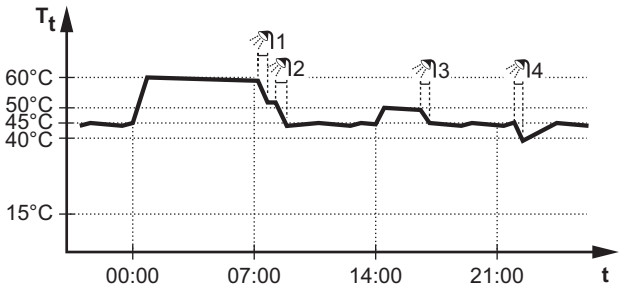
Example:



- T_t: DHW tank temperature
- t: Time

2.4.3 Scheduled + reheat mode

In scheduled + reheat mode ( ), the domestic hot water control is the same as in scheduled mode. However, when the DHW tank temperature drops below a preset value (= Reheat; example: 45°C), the DHW tank heats up until it reaches the preset value. This ensures that a minimum amount of hot water is available at all times.

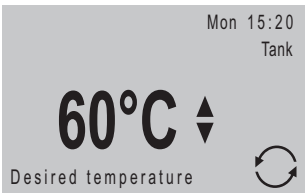
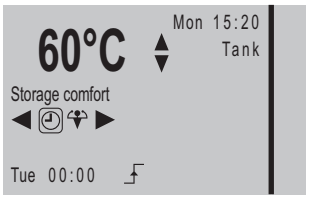


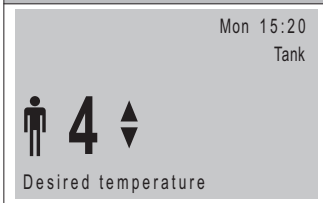
4

2.4.4 Using the DHW tank temperature home page

Typical DHW tank temperature home pages

Depending on the user profile, you can see and do more or less on the home page. The examples in the illustrations below are in DHW tank mode = Scheduled.

User profile = Basic	User profile = Detailed
	

User profile = Basic	User profile = Detailed
	

To read out and adjust the desired reheat temperature (in reheat mode)

1 Go to the DHW tank temperature home page (Tank).

Result: You can read out the desired reheat temperature.



2 Press ▲ or ▼ to adjust.

Note: If the desired temperature is weather dependent, you cannot change it on the home page.

To read out and overrule the active or next scheduled desired temperature (in scheduled mode or scheduled + reheat mode)

1 Go to the DHW tank temperature home page (Tank).

Result: 60°C ▲▼ or 4 ▲▼ is displayed.

2 Press ▲ or ▼ to overrule.

Note: If the desired temperature is weather dependent, you cannot change it on the home page.

2.4.5 Using the DHW tank booster mode

To activate the DHW tank booster mode (method 1)

1 Go to the DHW tank temperature home page (Tank).

2 Press ▶ for more than 2 seconds.

To activate the DHW tank booster mode (method 2)

Prerequisite: User profile = Detailed

1 Go to the DHW tank temperature home page (Tank).

2 Press ▶ to select .

2.5 Schedules: Example

The procedures to program other controls are similar.

In this example:

- Room temperature schedule in heating mode
- Monday = Tuesday = Wednesday = Thursday = Friday
- Saturday = Sunday

2.5.1 To program the schedule

1 Go to [7.3.1.1]: ☰ > User settings > Set schedules > Room temperature > Set heating schedule.
2 Select Empty and press OK.
3 Program the schedule for Monday.
4 Copy from Monday to Tuesday, Wednesday, Thursday and Friday.
5 Program the schedule for Saturday.
6 Copy from Saturday to Sunday.
7 Save the schedule and give it a name.

2.5.2 To program the schedule for Monday

1 Use ▲ and ▼ to select Monday.
2 Press ▶ to enter the schedule for Monday.
3 Program the schedule for Monday:
   - Use ◀ and ▶ to select an entry.
   - Use ▲ and ▼ to change the value of an entry.

2.5.3 To copy from one day to another

1 Select the day from which you want to copy and press OK.
   Example: Monday.
2 Select Copy day and press OK.
3 Set the days you want to copy to Yes and press OK.
   Example: Tuesday = Yes, Wednesday = Yes, Thursday = Yes and Friday = Yes

2.5.4 To save the schedule

1 Press OK, select Save schedule and press OK.

2 Select User defined 1, User defined 2 or User defined 3 and press OK.

3 Change the name and press OK.

Example: MyWeekSchedule

2.5.5 To select which schedule you currently want to use

1 Go to [5]: ☰ > Select schedules.

2 Select for which control you want to use a schedule.

Example: [5.1] Room temperature.

3 Select for which operation mode you want to use a schedule.

Example: [5.1.1] Heating.

4 Select a predefined or user-defined schedule and press OK.

2.6 Overview of the Field and Factory Settings of the Hydro-box

Introduction

This chapter will show an overview of all field and factory settings (in bold) of the Hydro-box and then link to the overview settings.

Content

Topic	See page
2.6.1–Field settings table EH/VB*	4–25

4

2.6.1 Field settings table EH/VB*

Applicable indoor units

*HBH04CA3V	*HVH04S18CA3V
*HBH08CA3V	*HVH08S18CA3V
*HBH16CA3V	*HVH16S18CA3V
*HBX04CA3V	*HVX04S18CA3V
*HBX08CA3V	*HVX08S18CA3V
*HBX16CA3V	*HVX16S18CA3V
*HBH08CA9W	*HVH08S26CA9W
*HBH16CA9W	*HVH16S26CA9W
*HBX08CA9W	*HVX08S26CA9W
*HBX16CA9W	*HVX16S26CA9W

Notes

(*1) *HB*
(*2) *HV*
(*3) *3V
(*4) *9W
(*5) *04/08*
(*6) *16*

Field settings table						Installer setting at variance with default value	
Breadcrumb	Field code	Setting name			Range, step **Default value**	Date	Value
User settings							
└ Preset values							
└ Room temperature							
7.4.1.1		Comfort (heating)		R/W	[3-07]~[3-06], step: A.3.2.4 **21°C**		
7.4.1.2		Eco (heating)		R/W	[3-07]~[3-06], step: A.3.2.4 **19°C**		
7.4.1.3		Comfort (cooling)		R/W	[3-08]~[3-09], step: A.3.2.4 **24°C**		
7.4.1.4		Eco (cooling)		R/W	[3-08]~[3-09], step: A.3.2.4 **26°C**		
└ LWT main							
7.4.2.1	[8-09]	Comfort (heating)		R/W	[9-01]~[9-00], step: 1°C **35°C**		
7.4.2.2	[8-0A]	Eco (heating)		R/W	[9-01]~[9-00], step: 1°C **33°C**		
7.4.2.3	[8-07]	Comfort (cooling)		R/W	[9-03]~[9-02], step: 1°C **18°C**		
7.4.2.4	[8-08]	Eco (cooling)		R/W	[9-03]~[9-02], step: 1°C **20°C**		
7.4.2.5		Comfort (heating)		R/W	-10~10°C, step: 1°C **0°C**		
7.4.2.6		Eco (heating)		R/W	-10~10°C, step: 1°C **-2°C**		
7.4.2.7		Comfort (cooling)		R/W	-10~10°C, step: 1°C **0°C**		
7.4.2.8		Eco (cooling)		R/W	-10~10°C, step: 1°C **2°C**		
└ Tank temperature							
7.4.3.1	[6-0A]	Storage comfort		R/W	30~80°C, step: 1°C **60°C**		
7.4.3.2	[6-0B]	Storage eco		R/W	30~50°C, step: 1°C **45°C**		
7.4.3.3	[6-0C]	Reheat		R/W	30~50°C, step: 1°C **45°C**		
└ Quiet level							
7.4.4				R/W	**0: Level 1** 1: Level 2 2: Level 3		
Installer settings							
└ System layout							
└ Standard							
A.2.1.1	[E-00]	Unit type		R/O	0: LT split 1: Mini chiller 2: Monobloc		
A.2.1.2	[E-01]	Compressor type		R/O	0: 8 1: 16		
A.2.1.3	[E-02]	Indoor software type		R/O	0: Type 1 1: Type 2		
A.2.1.4	[E-03]	Backup heater steps		R/O	0: No BUH 1: 1 step 2: 2 steps		
A.2.1.5	[5-0D]	BUH type		R/W	0: 1P,(1/2) 1: 1P,(1/1+2) 2: 3P,(1/2) **3: 3P,(1/1+2) (*3)** 4: 3PN,(1/2) **5: 3PN,(1/1+2) (*4)**		
A.2.1.6	[D-01]	Preferential kWh rate		R/W	**0: No** 1: Active open 2: Active closed		
A.2.1.7	[C-07]	Unit control method		R/W	**0: LWT control** 1: Ext RT control 2: RT control		
A.2.1.8	[7-02]	Number of LWT zones		R/W	**0: 1 LWT zone** 1: 2 LWT zones		
A.2.1.9	[F-0D]	Pump operation mode		R/W	0: Continuous **1: Sample** 2: Request		
A.2.1.A	[E-04]	Power saving possible		R/O	0: No 1: Yes		
A.2.1.B		User interface location		R/W	0: At unit **1: In room**		
└ Options							
A.2.2.1	[E-05]	DHW operation		R/W	**0: No (*1)** **1: Yes (*2)**		
A.2.2.3	[E-07]	DHW tank heater		R/W	**0: Horizontal BSH (*1)** **1: Backup heater (*2)** 2: - 3: -		
A.2.2.4	[C-05]	Contact type main		R/W	0: - 1: Thermo ON/OFF **2: C/H request**		
A.2.2.5	[C-06]	Contact type add.		R/W	0: - 1: Thermo ON/OFF **2: C/H request**		
A.2.2.6.1	[C-02]	Digital I/O PCB	Ext. backup heat src	R/W	**0: No** 1: Bivalent 2: - 3: -		
A.2.2.6.2	[D-07]	Digital I/O PCB	Solar kit	R/W	**0: No** 1: Yes		
A.2.2.6.3	[C-09]	Digital I/O PCB	Alarm output	R/W	**0: Normally open** 1: Normally closed		
A.2.2.6.4	[F-04]	Digital I/O PCB	Bottom plate heater	R/W	**0: No** 1: Yes		
A.2.2.7	[D-04]	Demand PCB		R/W	**0: No** 1: Yes		
A.2.2.8	[D-08]	External kWh meter 1		R/W	**0: No** 1: 0,1 pulse/kWh 2: 1 pulse/kWh 3: 10 pulse/kWh 4: 100 pulse/kWh 5: 1000 pulse/kWh		

(*1) *HB*_(*2) *HV*_(*3) *3V_(*4) *9W_(*5) *04/08*_(*6) *16*

Field settings table						Installer setting at variance with default value	
Breadcrumb	Field code	Setting name			Range, step **Default value**	Date	Value
A.2.2.9	[D-09]	External kWh meter 2		R/W	**0: No** 1: 0,1 pulse/kWh 2: 1 pulse/kWh 3: 10 pulse/kWh 4: 100 pulse/kWh 5: 1000 pulse/kWh		
A.2.2.A	[D-02]	DHW pump		R/W	**0: No** 1: Secondary rtrn 2: Disinf. shunt		
A.2.2.B	[C-08]	External sensor		R/W	**0: No** 1: Outdoor sensor 2: Room sensor		
		└ Capacities					
A.2.3.1	[6-02]	Booster heater		R/W	0~10kW, step: 0,2kW **0kW**		
A.2.3.2	[6-03]	BUH: step 1		R/W	0~10kW, step: 0,2kW **3kW**		
A.2.3.3	[6-04]	BUH: step 2		R/W	0~10kW, step: 0,2kW **0kW (*3)** **6kW (*4)**		
A.2.3.6	[6-07]	Bottom plate heater		R/W	0~200W, step: 10W **0W**		
	Space operation						
		└ LWT settings					
			└ Main				
A.3.1.1.1		LWT setpoint mode		R/W	**0: Absolute** 1: Weather dep. 2: Abs + scheduled 3: WD + scheduled		
A.3.1.1.2.1	[9-01]	Temperature range	Minimum temp (heating)	R/W	15~37°C, step: 1°C **25°C**		
A.3.1.1.2.2	[9-00]	Temperature range	Maximum temp (heating)	R/W	37~depending on outdoor unit, step: 1°C **55°C**		
A.3.1.1.2.3	[9-03]	Temperature range	Minimum temp (cooling)	R/W	5~18°C, step: 1°C **5°C**		
A.3.1.1.2.4	[9-02]	Temperature range	Maximum temp (cooling)	R/W	18~22°C, step: 1°C **22°C**		
A.3.1.1.3	[1-00]	Set weather-dependent heating	Low ambient temp. for LWT main zone heating WD curve.	R/W	-20~5°C, step: 1°C **-10°C**		
A.3.1.1.3	[1-01]	Set weather-dependent heating	High ambient temp. for LWT main zone heating WD curve.	R/W	10~20°C, step: 1°C **15°C**		
A.3.1.1.3	[1-02]	Set weather-dependent heating	Leaving water value for low ambient temp. for LWT main zone heating WD curve.	R/W	25~depending on outdoor unit, step: 1°C **35°C**		
A.3.1.1.3	[1-03]	Set weather-dependent heating	Leaving water value for high ambient temp. for LWT main zone heating WD curve.	R/W	25~depending on outdoor unit, step: 1°C **25°C**		
A.3.1.1.4	[1-06]	Set weather-dependent cooling	Low ambient temp. for LWT main zone cooling WD curve.	R/W	10~25°C, step: 1°C **20°C**		
A.3.1.1.4	[1-07]	Set weather-dependent cooling	High ambient temp. for LWT main zone cooling WD curve.	R/W	25~43°C, step: 1°C **35°C**		
A.3.1.1.4	[1-08]	Set weather-dependent cooling	Leaving water value for low ambient temp. for LWT main zone cooling WD curve.	R/W	5~22°C, step: 1°C **22°C**		
A.3.1.1.4	[1-09]	Set weather-dependent cooling	Leaving water value for high ambient temp. for LWT main zone cooling WD curve.	R/W	5~22°C, step: 1°C **18°C**		
A.3.1.1.5	[8-05]	Modulated LWT		R/W	**0: No** 1: Yes		
A.3.1.1.6.1	[F-0B]	Shut-off valve	Thermo On/OFF	R/W	**0: No** 1: Yes		
A.3.1.1.6.2	[F-0C]	Shut-off valve	Cooling	R/W	0: No **1: Yes**		
A.3.1.1.7	[9-0B]	Emitter type		R/W	0: Quick **1: Slow**		
			└ Additional				
A.3.1.2.1		LWT setpoint mode		R/W	**0: Absolute** 1: Weather dep. 2: Abs + scheduled 3: WD + scheduled		
A.3.1.2.2.1	[9-05]	Temperature range	Minimum temp (heating)	R/W	15~37°C, step: 1°C **25°C**		
A.3.1.2.2.2	[9-06]	Temperature range	Maximum temp (heating)	R/W	37~depending on outdoor unit, step: 1°C **55°C**		
A.3.1.2.2.3	[9-07]	Temperature range	Minimum temp (cooling)	R/W	5~18°C, step: 1°C **5°C**		
A.3.1.2.2.4	[9-08]	Temperature range	Maximum temp (cooling)	R/W	18~22°C, step: 1°C **22°C**		
A.3.1.2.3	[0-00]	Set weather-dependent heating	Leaving water value for high ambient temp. for LWT add zone heating WD curve.	R/W	25~depending on outdoor unit, step: 1°C **35°C**		
A.3.1.2.3	[0-01]	Set weather-dependent heating	Leaving water value for low ambient temp. for LWT add zone heating WD curve.	R/W	25~depending on outdoor unit, step: 1°C **45°C**		
A.3.1.2.3	[0-02]	Set weather-dependent heating	High ambient temp. for LWT add zone heating WD curve.	R/W	10~20°C, step: 1°C **15°C**		
A.3.1.2.3	[0-03]	Set weather-dependent heating	Low ambient temp. for LWT add zone heating WD curve.	R/W	-20~5°C, step: 1°C **-10°C**		
A.3.1.2.4	[0-04]	Set weather-dependent cooling	Leaving water value for high ambient temp. for LWT add zone cooling WD curve.	R/W	5~22°C, step: 1°C **8°C**		
A.3.1.2.4	[0-05]	Set weather-dependent cooling	Leaving water value for low ambient temp. for LWT add zone cooling WD curve.	R/W	5~22°C, step: 1°C **12°C**		
A.3.1.2.4	[0-06]	Set weather-dependent cooling	High ambient temp. for LWT add zone cooling WD curve.	R/W	25~43°C, step: 1°C **35°C**		
A.3.1.2.4	[0-07]	Set weather-dependent cooling	Low ambient temp. for LWT add zone cooling WD curve.	R/W	10~25°C, step: 1°C **20°C**		
			└ Delta T emitter				
A.3.1.3.1	[9-09]	Delta T emitter	Heating	R/W	3~10°C, step: 1°C **5°C**		
A.3.1.3.2	[9-0A]	Delta T emitter	Cooling	R/W	3~10°C, step: 1°C **5°C**		
		└ Room thermostat					
A.3.2.1.1	[3-07]	Room temp. range	Minimum temp (heating)	R/W	12~18°C, step: A.3.2.4 **12°C**		

(*1) *HB*_(*2) *HV*_(*3) *3V_(*4) *9W_(*5) *04/08*_(*6) *16*

Field settings table						Installer setting at variance with default value	
Breadcrumb	Field code	Setting name			Range, step **Default value**	Date	Value
A.3.2.1.2	[3-06]	Room temp. range	Maximum temp (heating)	R/W	18~30°C, step: A.3.2.4 **30°C**		
A.3.2.1.3	[3-09]	Room temp. range	Minimum temp (cooling)	R/W	15~25°C, step: A.3.2.4 **15°C**		
A.3.2.1.4	[3-08]	Room temp. range	Maximum temp (cooling)	R/W	25~35°C, step: A.3.2.4 **35°C**		
A.3.2.2	[2-0A]	Room temp. offset		R/W	-5~5°C, step: 0,5°C **0°C**		
A.3.2.3	[2-09]	Ext. room sensor offset		R/W	-5~5°C, step: 0,5°C **0°C**		
A.3.2.4		Room temp. step		R/W	0: 0,5 °C **1: 1 °C**		
		└ Operation range					
A.3.3.1	[4-02]	Space heating OFF temp		R/W	14~25°C, step: 1°C **25°C (*5)** 14~35°C, step: 1°C **35°C (*6)**		
A.3.3.2	[F-01]	Space cooling On temp		R/W	10~35°C, step: 1°C **20°C**		
		└ Domestic hot water (DHW)					
		└ Setpoint mode					
A.4.1	[6-0D]			R/W	0: Reheat only 1: Reheat + sched. **2: Scheduled only**		
		└ Scheduled DHW					
A.4.2.1		Schedule temperatures		R/W	**0: Presets** 1: Custom		
A.4.2.2		Storage comfort SP mode		R/W	**0: Absolute** 1: Weather dep.		
A.4.2.3	[0-0B]	Weather-dependent curve	Leaving water value for high ambient temp. for DHW WD curve.	R/W	35~55°C, step: 1°C **55°C**		
A.4.2.3	[0-0C]	Weather-dependent curve	Leaving water value for low ambient temp. for DHW WD curve.	R/W	55~70°C, step: 1°C **70°C**		
A.4.2.3	[0-0D]	Weather-dependent curve	High ambient temp. for DHW WD curve.	R/W	10~20°C, step: 1°C **15°C**		
A.4.2.3	[0-0E]	Weather-dependent curve	Low ambient temp. for DHW WD curve.	R/W	-20~5°C, step: 1°C **-10°C**		
		└ Setpoint readout					
A.4.3.1		Setpoint readout type		R/W	**0: Temperature** 1: Graphical		
A.4.3.2.1		Conversion persons	1 person	R/W	30~80°C, step: 1°C **42°C**		
A.4.3.2.2		Conversion persons	2 persons	R/W	0~20°C, step: 1°C **6°C**		
A.4.3.2.3		Conversion persons	3 persons	R/W	0~20°C, step: 1°C **15°C**		
A.4.3.2.4		Conversion persons	4 persons	R/W	0~20°C, step: 1°C **17°C**		
A.4.3.2.5		Conversion persons	5 persons	R/W	0~20°C, step: 1°C **1°C**		
A.4.3.2.6		Conversion persons	6 persons	R/W	0~20°C, step: 1°C **1°C**		
		└ Disinfection					
A.4.4.1	[2-01]	Disinfection		R/W	0: No **1: Yes**		
A.4.4.2	[2-00]	Operation day		R/W	0: Each day 1: Monday 2: Tuesday 3: Wednesday 4: Thursday **5: Friday** 6: Saturday 7: Sunday		
A.4.4.3	[2-02]	Start time		R/W	0~23 hour, step: 1 hour **23**		
A.4.4.4	[2-03]	Temperature target		R/W	[E-07]≠1 : 55~80°C, step: 5°C **70°C** [E-07]=1 : 60°C **60°C**		
A.4.4.5	[2-04]	Duration		R/W	[E-07]≠1 : 5~60 min, step: 5 min **10 min** [E-07]=1 : 40~60 min, step: 5 min **60 min**		
		└ Maximum setpoint					
A.4.5	[6-0E]			R/W	[E-07]≠1 : 40~80°C, step: 1°C **60°C** [E-07]=1 : 40~60°C, step: 1°C **60°C**		
		└ Heat sources					
		└ Backup heater					
A.5.1.1	[4-00]	Operation mode		R/W	0: Limit **1: Enable** 2: Only DHW		
A.5.1.2	[4-06]	Auto emergency operation		R/W	0: No **1: Yes**		
A.5.1.3	[4-07]	Enable BUH step 2		R/W	0: No **1: Yes**		
A.5.1.4	[5-01]	Equilibrium temp.		R/W	-15~35°C, step: 1°C **0°C**		
		└ System operation					
		└ Auto restart					
A.6.1	[3-00]			R/W	0: No **1: Yes**		
		└ Preferential kWh rate					
A.6.2.1	[D-00]	Allowed heaters		R/W	**0: None** 1: BSH only 2: BUH only 3: All heaters		
A.6.2.2	[D-05]	Forced pump OFF		R/W	0: Forced off **1: As normal**		
		└ Pwr consumpt. Control					
A.6.3.1	[4-08]	Mode		R/W	**0: No limitation** 1: Continuous 2: Digital inputs		

(*1) *HB*_(*2) *HV*_(*3) *3V_(*4) *9W_(*5) *04/08*_(*6) *16*

Field settings table

Breadcrumb	Field code	Setting name			Range, step **Default value**	Installer setting at variance with default value Date	 Value
A.6.3.2	[4-09]	Type		R/W	0: Current **1: Power**		
A.6.3.3	[5-05]	Amp. value		R/W	0~50 A, step: 1 A **50 A**		
A.6.3.4	[5-09]	kW value		R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.6.3.5.1	[5-05]	Amp. limits for DI	Limit DI1	R/W	0~50 A, step: 1 A **50 A**		
A.6.3.5.2	[5-06]	Amp. limits for DI	Limit DI2	R/W	0~50 A, step: 1 A **50 A**		
A.6.3.5.3	[5-07]	Amp. limits for DI	Limit DI3	R/W	0~50 A, step: 1 A **50 A**		
A.6.3.5.4	[5-08]	Amp. limits for DI	Limit DI4	R/W	0~50 A, step: 1 A **50 A**		
A.6.3.6.1	[5-09]	kW limits for DI	Limit DI1	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.6.3.6.2	[5-0A]	kW limits for DI	Limit DI2	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.6.3.6.3	[5-0B]	kW limits for DI	Limit DI3	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.6.3.6.4	[5-0C]	kW limits for DI	Limit DI4	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.6.3.7	[4-01]	Priority		R/W	**0: None** 1: BSH 2: BUH		
		└ Averaging time					
A.6.4	[1-0A]			R/W	**0: No averaging** 1: 12 hours 2: 24 hours 3: 48 hours 4: 72 hours		
		└ Ext amb. sensor offset					
A.6.5	[2-0B]			R/W	-5~5°C, step: 0,5°C **0°C**		
	└ Overview settings						
A.8.1	[0-00]	Leaving water value for high ambient temp. for LWT add zone heating WD curve.		R/W	25~depending on outdoor unit, step: 1°C **35°C**		
A.8.2	[0-01]	Leaving water value for low ambient temp. for LWT add zone heating WD curve.		R/W	25~depending on outdoor unit, step: 1°C **45°C**		
A.8.3	[0-02]	High ambient temp. for LWT add zone heating WD curve.		R/W	10~20°C, step: 1°C **15°C**		
A.8.4	[0-03]	Low ambient temp. for LWT add zone heating WD curve.		R/W	-20~5°C, step: 1°C **-10°C**		
A.8.5	[0-04]	Leaving water value for high ambient temp. for LWT add zone cooling WD curve.		R/W	5~22°C, step: 1°C **8°C**		
A.8.6	[0-05]	Leaving water value for low ambient temp. for LWT add zone cooling WD curve.		R/W	5~22°C, step: 1°C **12°C**		
A.8.7	[0-06]	High ambient temp. for LWT add zone cooling WD curve.		R/W	25~43°C, step: 1°C **35°C**		
A.8.8	[0-07]	Low ambient temp. for LWT add zone cooling WD curve.		R/W	10~25°C, step: 1°C **20°C**		
A.8.9	[0-0B]	Leaving water value for high ambient temp. for DHW WD curve.		R/W	35~55°C, step: 1°C **55°C**		
A.8.10	[0-0C]	Leaving water value for low ambient temp. for DHW WD curve.		R/W	55~70°C, step: 1°C **70°C**		
A.8.11	[0-0D]	High ambient temp. for DHW WD curve.		R/W	10~20°C, step: 1°C **15°C**		
A.8.12	[0-0E]	Low ambient temp. for DHW WD curve.		R/W	-20~5°C, step: 1°C **-10°C**		
A.8.13	[1-00]	Low ambient temp. for LWT main zone heating WD curve.		R/W	-20~5°C, step: 1°C **-10°C**		
A.8.14	[1-01]	High ambient temp. for LWT main zone heating WD curve.		R/W	10~20°C, step: 1°C **15°C**		
A.8.15	[1-02]	Leaving water value for low ambient temp. for LWT main zone heating WD curve.		R/W	25~depending on outdoor unit, step: 1°C **35°C**		
A.8.16	[1-03]	Leaving water value for high ambient temp. for LWT main zone heating WD curve.		R/W	25~depending on outdoor unit, step: 1°C **25°C**		
A.8.17	[1-04]	Weather dependent cooling of the main leaving water temperature zone.		R/W	**0: Disabled** 1: Enabled		
A.8.18	[1-05]	Weather dependent cooling of the additional leaving water temperature zone		R/W	**0: Disabled** 1: Enabled		
A.8.19	[1-06]	Low ambient temp. for LWT main zone cooling WD curve.		R/W	10~25°C, step: 1°C **20°C**		
A.8.20	[1-07]	High ambient temp. for LWT main zone cooling WD curve.		R/W	25~43°C, step: 1°C **35°C**		
A.8.21	[1-08]	Leaving water value for low ambient temp. for LWT main zone cooling WD curve.		R/W	5~22°C, step: 1°C **22°C**		
A.8.22	[1-09]	Leaving water value for high ambient temp. for LWT main zone cooling WD curve.		R/W	5~22°C, step: 1°C **18°C**		
A.8.23	[1-0A]	What is the averaging time for the outdoor temp?		R/W	**0: No averaging** 1: 12 hours 2: 24 hours 3: 48 hours 4: 72 hours		
A.8.24	[2-00]	When should the disinfection function be executed?		R/W	0: Each day 1: Monday 2: Tuesday 3: Wednesday 4: Thursday **5: Friday** 6: Saturday 7: Sunday		
A.8.25	[2-01]	Should the disinfection function be executed?		R/W	0: No **1: Yes**		
A.8.26	[2-02]	When should the disinfection function start?		R/W	0~23 hour, step: 1 hour **23**		
A.8.27	[2-03]	What is the disinfection target temperature?		R/W	[E-07]≠1 : 55~80°C, step: 5°C **70°C** [E-07]=1 : 60°C **60°C**		

(*1) *HB*_(*2) *HV*_(*3) *3V_(*4) *9W_(*5) *04/08*_(*6) *16*

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
A.8.28	[2-04]	How long must the tank temperature be maintained?	R/W	[E-07]≠1 : 5~60 min, step: 5 min **10 min** [E-07]=1 : 40~60 min, step: 5 min **60 min**		
A.8.29	[2-05]	Room antifrost temperature	R/W	4~16°C, step: 1°C **12°C**		
A.8.30	[2-06]	Room frost protection	R/W	0: Disabled **1: Enabled**		
A.8.31	[2-09]	Adjust the offset on the measured room temperature	R/W	-5~5°C, step: 0,5°C **0°C**		
A.8.32	[2-0A]	Adjust the offset on the measured room temperature	R/W	-5~5°C, step: 0,5°C **0°C**		
A.8.33	[2-0B]	What is the required offset on the measured outdoor temp.?	R/W	-5~5°C, step: 0,5°C **0°C**		
A.8.34	[3-00]	Is auto restart of the unit allowed?	R/W	0: No **1: Yes**		
A.8.35	[3-01]	--		**0**		
A.8.36	[3-02]	--		**1**		
A.8.37	[3-03]	--		**4**		
A.8.38	[3-04]	--		**2**		
A.8.39	[3-05]	--		**1**		
A.8.40	[3-06]	What is the maximum desired room temperature in heating?	R/W	18~30°C, step: A.3.2.4 **30°C**		
A.8.41	[3-07]	What is the mimimum desired room temperature in heating?	R/W	12~18°C, step: A.3.2.4 **12°C**		
A.8.42	[3-08]	What is the maximum desired room temperature in cooling?	R/W	25~35°C, step: A.3.2.4 **35°C**		
A.8.43	[3-09]	What is the minimum desired room temperature in cooling?	R/W	15~25°C, step: A.3.2.4 **15°C**		
A.8.44	[4-00]	What is the BUH operation mode?	R/W	0: Limit **1: Enable** 2: Only DHW		
A.8.45	[4-01]	Which electric heater has priority?	R/W	**0: None** 1: BSH 2: BUH		
A.8.46	[4-02]	Below which outdoor temperature is heating allowed?	R/W	14~25°C, step: 1°C **25°C (*5)** 14~35°C, step: 1°C **35°C (*6)**		
A.8.47	[4-03]	Operation permission of the booster heater.	R/W	0: Limited 1: No limit 2: Most optimum **3: Optimum**		
A.8.48	[4-04]	--		**2**		
A.8.49	[4-05]	--		**0**		
A.8.50	[4-06]	Is the backup heater allowed during emergency operation?	R/W	0: No **1: Yes**		
A.8.51	[4-07]	Enable the second step of the backup heater?	R/W	0: No **1: Yes**		
A.8.52	[4-08]	Which power limitation mode is required on the system?	R/W	**0: No limitation** 1: Continuous 2: Digital inputs		
A.8.53	[4-09]	Which power limitation type is required?	R/W	0: Current **1: Power**		
A.8.54	[4-0B]	Automatic cooling/heating changeover hysteresis.	R/W	1~10°C, step: 0,5°C **1°C**		
A.8.55	[4-0D]	Automatic cooling/heating changeover offset.	R/W	1~10°C, step: 0,5°C **3°C**		
A.8.56	[5-00]	Is backup heater operation allowed above equilibrium temperature during space hea	R/W	0: Allowed **1: Not allowed**		
A.8.57	[5-01]	What is the equilibrium temperature for the building?	R/W	-15~35°C, step: 1°C **0°C**		
A.8.58	[5-02]	Space heating priority.	R/W	**0: Disabled [E-07]≠1** **1: Enabled [E-07]=1**		
A.8.59	[5-03]	Space heating priority temperature.	R/W	-15~35°C, step: 1°C **0°C**		
A.8.60	[5-04]	Set point correction for domestic hot water temperature.	R/W	0~20°C, step: 1°C **10°C**		
A.8.61	[5-05]	What is the requested limit for DI1?	R/W	0~50 A, step: 1 A **50 A**		
A.8.62	[5-06]	What is the requested limit for DI2?	R/W	0~50 A, step: 1 A **50 A**		
A.8.63	[5-07]	What is the requested limit for DI3?	R/W	0~50 A, step: 1 A **50 A**		
A.8.64	[5-08]	What is the requested limit for DI4?	R/W	0~50 A, step: 1 A **50 A**		
A.8.65	[5-09]	What is the requested limit for DI1?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.8.66	[5-0A]	What is the requested limit for DI2?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.8.67	[5-0B]	What is the requested limit for DI3?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.8.68	[5-0C]	What is the requested limit for DI4?	R/W	0~20 kW, step: 0,5 kW **20 kW**		
A.8.69	[5-0D]	What type of backup heater installation is used?	R/W	0: 1P,(1/2) 1: 1P,(1/1+2) 2: 3P,(1/2) **3: 3P,(1/1+2) (*3)** 4: 3PN,(1/2) **5: 3PN,(1/1+2) (*4)**		
A.8.70	[6-00]	The temperature difference determining the heat pump ON temperature.	R/W	2~20°C, step: 1°C **2°C**		
A.8.71	[6-01]	The temperature difference determining the heat pump OFF temperature.	R/W	0~10°C, step: 1°C **2°C**		
A.8.72	[6-02]	What is the capacity of the booster heater?	R/W	0~10kW, step: 0,2kW **0kW**		
A.8.73	[6-03]	What is the capacity of the backup heater step 1?	R/W	0~10kW, step: 0,2kW **3kW**		
A.8.74	[6-04]	What is the capacity of the backup heater step 2?	R/W	0~10kW, step: 0,2kW **0kW (*3)** **6kW (*4)**		
A.8.75	[6-05]	--		**0**		
A.8.76	[6-06]	--		**0**		
A.8.77	[6-07]	What is the capacity of the bottom plate heater?	R/W	0~200W, step: 10W **0W**		

(*1) *HB*_(*2) *HV*_(*3) *3V_(*4) *9W_(*5) *04/08*_(*6) *16*

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
A.8.78	[6-08]	--		**10**		
A.8.79	[6-09]	--		**0**		
A.8.80	[6-0A]	What is the desired comfort storage temperature?	R/W	30~80°C, step: 1°C **60°C**		
A.8.81	[6-0B]	What is the desired eco storage temperature?	R/W	30~50°C, step: 1°C **45°C**		
A.8.82	[6-0C]	What is the desired reheat temperature?	R/W	30~50°C, step: 1°C **45°C**		
A.8.83	[6-0D]	What is the desired setpoint mode in DHW?	R/W	0: Reheat only 1: Reheat + sched. **2: Scheduled only**		
A.8.84	[6-0E]	What is the maximum tank temperature setpoint?	R/W	[E-07]≠1 : 40~80°C, step: 1°C **60°C** [E-07]=1 : 40~60°C, step: 1°C **60°C**		
A.8.85	[7-00]	Domestic hot water booster heater overshoot temperature.	R/W	0~4°C, step: 1°C **0°C**		
A.8.86	[7-01]	Domestic hot water booster heater hysteresis.	R/W	2~40°C, step: 1°C **2°C**		
A.8.87	[7-02]	How many leaving water temperature zones are there?	R/W	**0: 1 LWT zone** 1: 2 LWT zones		
A.8.88	[8-00]	Minimum running time for domestic hot water operation.	R/W	0~20 min, step: 1 min **5 min**		
A.8.89	[8-01]	Maximum running time for domestic hot water operation.	R/W	5~95 min, step: 5 min **30 min**		
A.8.90	[8-02]	Anti-recycling time.	R/W	0~10 hour, step: 0,5 hour **0,5 hour [E-07]≠1** **3 hour [E-07]=1**		
A.8.91	[8-03]	Booster heater delay timer.	R/W	20~95 min, step: 5 min **50 min**		
A.8.92	[8-04]	Additional running time for the maximum running time.	R/W	0~95 min, step: 5 min **95 min**		
A.8.93	[8-05]	Allow modulation of the LWT to control the room?	R/W	**0: No** 1: Yes		
A.8.94	[8-06]	Leaving water temperature maximum modulation.	R/W	1~5°C, step: 1°C **3°C**		
A.8.95	[8-07]	What is the desired comfort main LWT in cooling?	R/W	[9-03]~[9-02], step: 1°C **18°C**		
A.8.96	[8-08]	What is the desired eco main LWT in cooling?	R/W	[9-03]~[9-02], step: 1°C **20°C**		
A.8.97	[8-09]	What is the desired comfort main LWT in heating?	R/W	[9-01]~[9-00], step: 1°C **35°C**		
A.8.98	[8-0A]	What is the desired eco main LWT in heating?	R/W	[9-01]~[9-00], step: 1°C **33°C**		
A.8.99	[9-00]	What is the maximum desired LWT for main zone in heating?	R/W	37~depending on outdoor unit, step: 1°C **55°C**		
A.8.100	[9-01]	What is the mimimum desired LWT for main zone in heating?	R/W	15~37°C, step: 1°C **25°C**		
A.8.101	[9-02]	What is the maximum desired LWT for main zone in cooling?	R/W	18~22°C, step: 1°C **22°C**		
A.8.102	[9-03]	What is the mimimum desired LWT for main zone in cooling?	R/W	5~18°C, step: 1°C **5°C**		
A.8.103	[9-04]	Leaving water temperature overshoot temperature.	R/W	1~4°C, step: 1°C **1°C**		
A.8.104	[9-05]	What is the mimimum desired LWT for add. zone in heating?	R/W	15~37°C, step: 1°C **25°C**		
A.8.105	[9-06]	What is the maximum desired LWT for add. zone in heating?	R/W	37~depending on outdoor unit, step: 1°C **55°C**		
A.8.106	[9-07]	What is the mimimum desired LWT for add. zone in cooling?	R/W	5~18°C, step: 1°C **5°C**		
A.8.107	[9-08]	What is the maximum desired LWT for add. zone in cooling?	R/W	18~22°C, step: 1°C **22°C**		
A.8.108	[9-09]	What is the desired delta T in heating?	R/W	3~10°C, step: 1°C **5°C**		
A.8.109	[9-0A]	What is the desired delta T in cooling?	R/W	3~10°C, step: 1°C **5°C**		
A.8.110	[9-0B]	What emitter type is connected to the main LWT zone?	R/W	0: Quick **1: Slow**		
A.8.111	[9-0C]	Room temperature hysteresis.	R/W	1~6°C, step: 0,5°C **1 °C**		
A.8.112	[A-00]	--		**0**		
A.8.113	[A-01]	--		**0 (*5)** **3 (*6)**		
A.8.114	[A-02]	--		**0 (*5)** **1 (*6)**		
A.8.115	[A-03]	--		**0**		
A.8.116	[A-04]	--		**0**		
A.8.117	[B-00]	--		**0**		
A.8.118	[B-01]	--		**0**		
A.8.119	[B-02]	--		**0**		
A.8.120	[B-03]	--		**0**		
A.8.121	[B-04]	--		**0**		
A.8.122	[C-00]	Domestic heating water priority.	R/W	**0: Solar priority** 1: Heat pump priority		
A.8.123	[C-01]	--		**1**		
A.8.124	[C-02]	Is an external backup heat source connected?	R/W	**0: No** 1: Bivalent 2: - 3: -		
A.8.125	[C-03]	Bivalent activation temperature.	R/W	-25~25°C, step: 1°C **0°C**		
A.8.126	[C-04]	Bivalent hysteresis temperature.	R/W	2~10°C, step: 1°C **3°C**		
A.8.127	[C-05]	What is the thermo request contact type for the main zone?	R/W	0: - 1: Thermo ON/OFF **2: C/H request**		
A.8.128	[C-06]	What is the thermo request contact type for the add. zone?	R/W	0: - 1: Thermo ON/OFF **2: C/H request**		
A.8.129	[C-07]	What is the unit control method in space operation?	R/W	**0: LWT control** 1: Ext RT control 2: RT control		

(*1) *HB*_(*2) *HV*_(*3) *3V_(*4) *9W_(*5) *04/08*_(*6) *16*

Field settings table					Installer setting at variance with default value	
Breadcrumb	Field code	Setting name		Range, step **Default value**	Date	Value
A.8.130	[C-08]	Which type of external sensor is installed?	R/W	**0: No** 1: Outdoor sensor 2: Room sensor		
A.8.131	[C-09]	What is the required alarm output contact type?	R/W	**0: Normally open** 1: Normally closed		
A.8.132	[D-00]	Which heaters are permitted if prefer. kWh rate PS is cut?	R/W	**0: None** 1: BSH only 2: BUH only 3: All heaters		
A.8.133	[D-01]	Contact type of preferential kWh rate PS installation?	R/W	**0: No** 1: Active open 2: Active closed		
A.8.134	[D-02]	Which type of DHW pump is installed?	R/W	**0: No** 1: Secondary rtrn 2: Disinf. shunt		
A.8.135	[D-03]	Leaving water temperature compensation around 0°C.	R/W	**0: Disabled** 1: Enabled, shift 2°C (from -2 to 2°C) 2: Enabled, shift 4°C (from -2 to 2°C) 3: Enabled, shift 2°C (from -4 to 4°C) 4: Enabled, shift 4°C (from -4 to 4°C)		
A.8.136	[D-04]	Is a demand PCB connected?	R/W	**0: No** 1: Yes		
A.8.137	[D-05]	Is the pump allowed to run if prefer. kWh rate PS is cut?	R/W	0: Forced off **1: As normal**		
A.8.138	[D-07]	Is a solar kit connected?	R/W	**0: No** 1: Yes		
A.8.139	[D-08]	Is an external kWh meter used for power measurement?	R/W	**0: No** 1: 0,1 pulse/kWh 2: 1 pulse/kWh 3: 10 pulse/kWh 4: 100 pulse/kWh 5: 1000 pulse/kWh		
A.8.140	[D-09]	Is an external kWh meter used for power measurement?	R/W	**0: No** 1: 0,1 pulse/kWh 2: 1 pulse/kWh 3: 10 pulse/kWh 4: 100 pulse/kWh 5: 1000 pulse/kWh		
A.8.141	[E-00]	Which type of unit is installed?	R/O	0: LT split 1: Mini chiller 2: Monobloc		
A.8.142	[E-01]	Which type of compressor is installed?	R/O	0: 8 1: 16		
A.8.143	[E-02]	What is the indoor unit software type?	R/O	0: Type 1 1: Type 2		
A.8.144	[E-03]	What is the number of backup heater steps?	R/O	0: No BUH 1: 1 step 2: 2 steps		
A.8.145	[E-04]	Is the power saving function available on the outdoor unit?	R/O	0: No 1: Yes		
A.8.146	[E-05]	Is a DHW tank installed in the system?	R/W	**0: No (*1)** **1: Yes (*2)**		
A.8.147	[E-06]	Is the domestic hot water tank installed?	R/O	0: No 1: Yes		
A.8.148	[E-07]	Which type of electrical heater for DHW is installed?	R/W	**0: Horizontal BSH (*1)** **1: Backup heater (*2)** 2: - 3: -		
A.8.149	[E-08]	Power saving function for outdoor unit.	R/W	**0: Disabled (*6)** **1: Enabled (*5)**		
A.8.150	[E-09]	--		**0**		
A.8.151	[F-00]	Pump operation allowed outside range.	R/W	**0: Disabled** 1: Enabled		
A.8.152	[F-01]	Above which outdoor temperature is cooling allowed?	R/W	10~35°C, step: 1°C **20°C**		
A.8.153	[F-02]	Bottom plate heater ON temperature.	R/W	3~10°C, step: 1°C **3°C**		
A.8.154	[F-03]	Bottom plate heater hysteresis.	R/W	2~5°C, step: 1°C **5°C**		
A.8.155	[F-04]	Is a bottom plate heater connected?	R/W	**0: No** 1: Yes		
A.8.156	[F-05]	--		**0**		
A.8.157	[F-06]	--		**0**		
A.8.158	[F-09]	Pump operation during flow abnormality.	R/W	**0: Disabled** 1: Enabled		
A.8.159	[F-0A]	--		**0**		
A.8.160	[F-0B]	Close shut-off valve during thermo OFF?	R/W	**0: No** 1: Yes		
A.8.161	[F-0C]	Close shut-off valve during cooling?	R/W	0: No **1: Yes**		
A.8.162	[F-0D]	What is the pump operation mode?	R/W	0: Continuous **1: Sample** 2: Request		

(*1) *HB*_(*2) *HV*_(*3) *3V_(*4) *9W_(*5) *04/08*_(*6) *16*

Outline

The hydro-box should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user demand. Thereto, a number of so called field settings are available. These field settings are accessible and programmable through the user interface on the hydro-box.

Each field setting consists of a ‘bread crumb’-code (ex. A.2.1). This indicates the path you have to follow through the user interface. Each field setting is assigned a 3-digit number or code, for example [5-03], which is indicated on the user interface display. The first digit [5] indicates the 'first code' or field setting group. The second and third digit [03] together indicate the 'second code'.

Approximately every bread crumb corresponds with a 3-digit code (ex. 2-04) which can be found back through the overview settings in the installer menu.

A list of all field settings and default values is given under ‘Field settings table EH/VB*’ on page 4-25. In this same list, we provided for 2 columns to register the date and value of altered field settings at variance with the default value.

A detailed description of each field setting is given in the Installer Reference Guide in Appendix.

To change one or more field settings, push the menu-button to enter the menu. Navigate through the menu with the buttons and confirm by pushing OK. The menu is quite self-explanator and can guide you through with some simple clicks.



User permission level

There are 3 different permission levels which can be activated through the user interface menu “Information” - User permission level [6.4]:

- Enduser (default)
- Advanced enduser (push button for 5 seconds)
- Installer (push button for 5 seconds)

Depending on the user, more or less data is visible. The installer menu [A] is only visible when in installer level. When in installer level, a little wrench key can be seen on the homescreen of the user interface.



2.7 Overview of the Field Setting on the Outdoor Unit

Introduction

This chapter will show an overview of the field settings on the outdoor unit.

Setting overview

The table below contains the settings on the Outdoor Unit PCB.

A
- Pump down setting
- Forced defrost setting

B
- Operation status setting
- Refrigerant recovery setting
- Monitoring mode setting

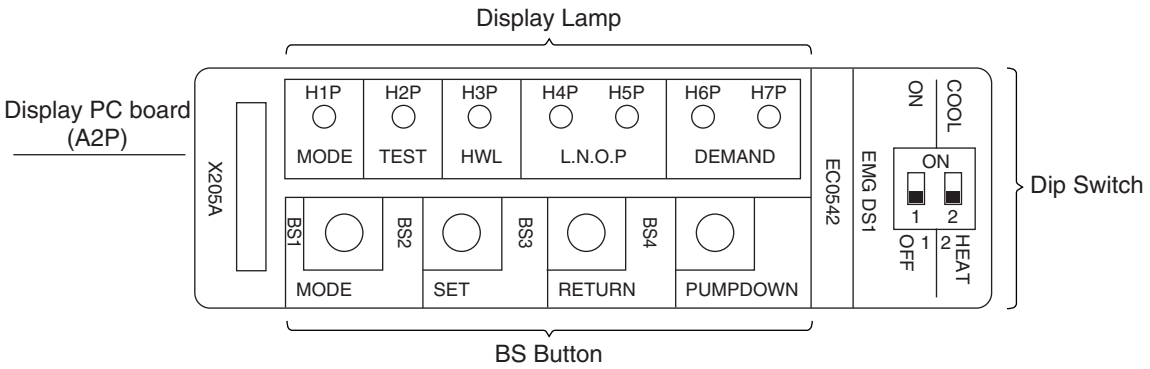
Content

4

Topic	See page
2.7.1–Overview of the Service PCB on the Outdoor Unit (GQI)	4–35
2.7.2–Pump Down / Forced Defrosting (A)	4–36
2.7.3–Setting by BS Buttons (B)	4–37

2.7.1 Overview of the Service PCB on the Outdoor Unit (GQI)

Various settings are available by using the DIP switches and the BS buttons on the Printed-Circuit Board (Display PC board: A2P).



	Display		Function or Operating Procedure	
	Mark	Name		
Display Lamp	H1P	MODE	During "Setting mode 1", the lamp is OFF (●).	During "Monitor mode", the lamp blinks (☼).
	H2P	TEST	During test operation in "Setting mode 1", the lamp is ON (☼).	During "Monitor mode", the lamp is OFF (●).
	H3P	HWL	When a malfunction occurs during "Setting mode 1", the lamp turns ON (☼).	
	H4P	L.N.O.P	During "Setting mode 1", low noise level is displayed.	During "Monitor mode", various combinations of the lamp indicate the following conditions: ■ Indication of oil return operation ■ Indication of outdoor unit class ■ Indication of malfunction code (the latest and up to 2 cycles before) ■ Indication of causes of stepping-down
	H5P			
	H6P	DEMAND	Not applicable	
	H7P			
BS Button	BS1	MODE	Used to change "Setting mode".	
	BS2	SET	Used to change "Setting item" and "Setting condition".	
	BS3	RETURN	Used to decide "Setting item" and "Setting condition".	
	BS4	PUMP DOWN	Used for pump down operation, forced oil return operation and forced defrost operation.	
Dip Switch	DS1-1 ON / OFF(*)	EMERGENCY	Switch from "OFF" to "ON" for emergency operation (forced operation).	
	DS1-2 COOL / HEAT(*)		In case of heating in emergency operation, maintain "HEAT" and in case of cooling in emergency operation, switch to "COOL".	

*Factory settings: "OFF" and "HEAT"

2.7.2 Pump Down / Forced Defrosting (A)

Pressing the BS button forcibly operates the air conditioner in the cooling mode.

1 To conduct a pump-down operation (sending refrigerant to outdoor unit), press the BS button to forcibly operate the equipment in the cooling mode, then operate the unit for about 1 minute to stabilize the system. After stabilizing system, close the liquid pipe stop valve on the outdoor unit, and after the pressure decreases and the low pressure sensor activates, close the gas pipe stop valve.

2 Forced defrost
To activate the defrost operation during the heating operation, press the BS button. This will activate the forced defrost operation (cooling operation).
When the defrost cancel conditions are met, the equipment automatically switches off the defrost operation.

2.7.3 Setting by BS Buttons (B)

Mode overview

With "Setting mode 1", "Setting mode 2" and "Monitor mode", various settings and data can be checked.

1 Setting mode 1

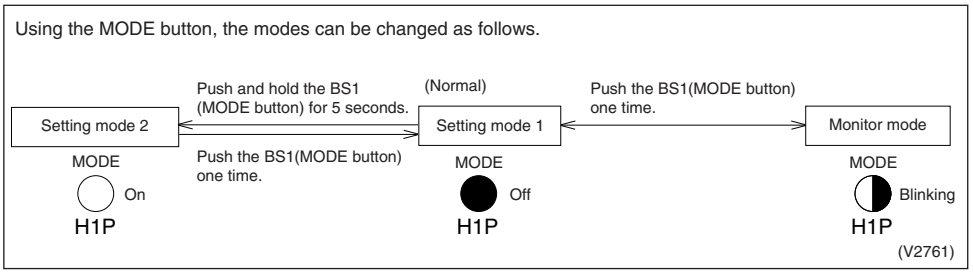
The initial status (normal operation) is "Setting mode 1". This mode indicates operating status - "TEST (test operation)", "HWL (malfunction)".

2 Setting mode 2

To activate “Refrigerant Recovery mode”.

3 Monitor mode

This mode indicates "oil return operation", "outdoor unit class", "contents of retry", "contents of malfunction", "causes of stepping-down operation", etc.



Setting mode 1

Using this mode, the following conditions can be checked:

- Current operating condition (normal/test operation/line inspection and normal/malfunction)
- Low noise operating

These conditions above can be checked by performing the following steps:

Procedure for checking check items

The system is normally set to "Setting mode 1". Should the system be set to any mode other than that, push the MODE (BS1) button to set the system to "Setting mode 1".

Check the system for each condition through LED displays. (Refer to information in table on the right.)

MODE	TEST	HWL	L.N.O.P	
H1P	H2P	H3P	H4P	H5P
●	●	●	●	●

○ : ON ◑ : OFF ● : BLINK

During "Setting mode 1", the lamp is always OFF.

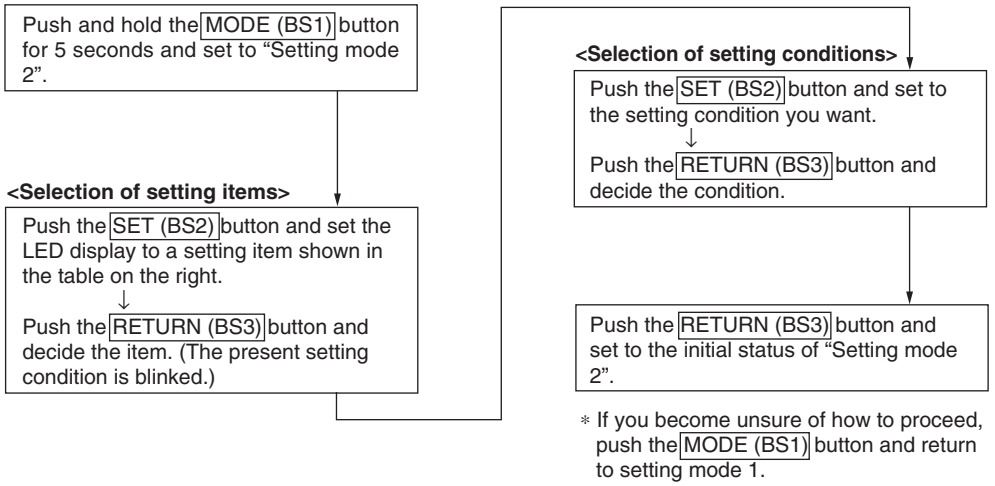
Test operation display
- ● In normal operation ○ In test operation
- ◑ In line inspection operation

Malfunction display
- ● Normal ○ Malfunction

Low noise operation display
- ● ● Normal operation
- ○ ● Low noise Active

Setting mode 2

In this mode, settings for the following items can be made by using BS buttons.



No.	Display of setting items								Display of setting condition							
	Setting item	LED display							Setting condition	LED display						
		H1P	H2P	H3P	H4P	H5P	H6P	H7P		H1P	H2P	H3P	H4P	H5P	H6P	H7P
22	Defrost requesting area (Not for ERLQ*CA* models)	☼	●	☼	●	☼	☼	●	0°C (factory setting)	☼	●	●	●	●	☼	●
									3°C	☼	●	●	●	●	☼	☼
									6°C	☼	●	●	●	☼	●	●
28	Refrigerant recovery mode	☼	●	☼	☼	☼	●	●	OFF (factory setting)	☼	●	●	●	●	●	☼
									ON	☼	●	●	●	●	☼	●
48	Outdoor fan start after defrost	☼	☼	☼	●	●	●	●	60 sec	☼	●	●	●	●	●	☼
									80 sec (factory setting)	☼	●	●	●	●	☼	●
									100 sec	☼	●	●	●	●	☼	☼
51	Compressor start up after defrost	☼	☼	☼	●	●	☼	☼	0Hz (factory setting)	☼	●	●	●	●	●	☼
									52Hz	☼	●	●	●	●	☼	●

●: OFF
☼: ON

The figures in the columns under "No." represent the number of times to push the SET (BS2) button.

Setting of refrigerant recovery mode

When a refrigerant recovery unit is connected on site to recover refrigerant, fully open the expansion valve of the outdoor unit to help the recovery.

Remark for defrost requesting area

With ERLQ*CA* models, setting 22 defrost requesting area should not be adjusted.

[Work procedure] - Example: setting 28

1 Stop operation.

2 Turn ON refrigerant recovery mode by performing the following steps.

●: OFF ◑: BLINK ☼: ON

Operating procedure	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Push and hold the MODE (BS1) button of "Setting mode 1" for 5 seconds or more and set to "Setting mode 2".	☼	●	●	●	●	●	●
Push the SET (BS2) button 28 times to set the LED display as shown in the table on the right. (*1)	☼	●	☼	☼	☼	●	●
Push the RETURN (BS3) button once. (Present settings are displayed.)	☼	●	●	●	●	●	◑
Push the SET (BS2) button once to set the LED display as shown in the table on the right.	☼	●	●	●	●	◑	●
Push the RETURN (BS3) button once to make a decision.	☼	●	●	●	●	☼	●
When the RETURN (BS3) button is pushed once again, the electronic expansion valve opens fully. (For RZQ-KTLT, the solenoid valve also opens.)	☼	●	●	●	●	●	●

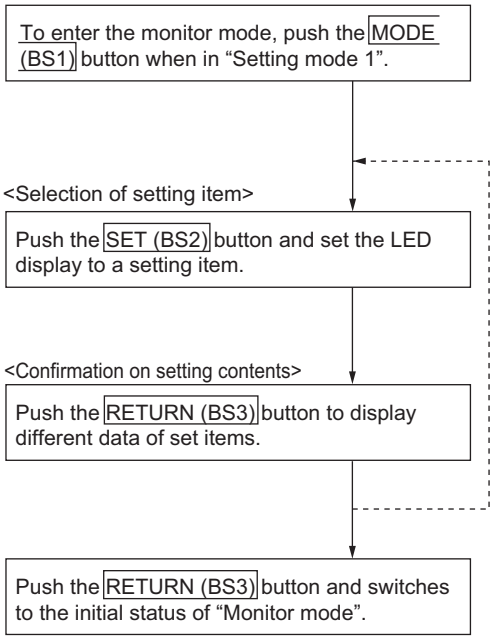
3 Connect a refrigerant recovery unit to perform refrigerant recovery. (For a refrigerant recovery port, refer to the installation manual.)

4 Upon completion of refrigerant recovery, turn OFF refrigerant recovery mode by taking the following steps or turning OFF the power of outdoor unit.

Operating procedure	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Push the SET (BS2) button 28 times to set the LED display as shown in the table on the right. (*1)	☼	●	☼	☼	☼	●	●
Push the RETURN (BS3) button once. (Present settings are displayed.)	☼	●	●	●	●	◑	●
Push the SET (BS2) button once to set the LED display as shown in the table on the right.	☼	●	●	●	●	●	◑
Push the RETURN (BS3) button once to make a decision.	☼	●	●	●	●	●	☼
When the RETURN (BS3) button is pushed once again, the electronic expansion valve fully opens. (For RZQ-KTLT, the solenoid valve also closes.)	☼	●	●	●	●	●	●

*1:If you become unsure how many times you have pushed the button, push the MODE (BS1) button once to return to "Setting mode 1" and start the operating procedure all over again.

Monitor mode In this mode, the following items can be checked by using the BS buttons.



* Push the MODE (BS1) button and returns to “Setting mode 1”.

No.	Setting item	LED display							Data display
		H1P	H2P	H3P	H4P	H5P	H6P	H7P	
0	Indication of oil return operation	◑	●	●	●	●	●	●	See Data display ①.
1	Indication of outdoor unit class	◑	●	●	●	●	●	○	See Data display ②.
2	Contents of retry (the latest)	◑	●	●	●	●	○	●	See "Malfunction code display" on the next page.
3	Contents of retry (1 cycle before)	◑	●	●	●	●	○	○	
4	Contents of retry (2 cycle before)	◑	●	●	●	○	●	●	
5	Contents of malfunction (the latest)	◑	●	●	●	○	●	○	
6	Contents of malfunction (1 cycle before)	◑	●	●	●	○	○	●	
7	Contents of malfunction (2 cycle before)	◑	●	●	●	○	○	○	
10	Indication of causes of stepping-down operation	◑	●	●	○	●	○	●	See Data display ③.

└ The numbers in the "No." column represent the number of times to press the SET (BS2) button .

Data display ①

Display contents	LED display						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
In normal operation	◑	●	●	●	●	●	●
In oil return operation	◑	●	●	●	●	●	◑

Data display ②

Display contents	LED display						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
No setting	◑	●	●	●	●	●	◑
ERHQ011~014*/ERLQ011~014*	◑	●	●	◑	●	●	◑
ERHQ016*/ERLQ016*	◑	●	●	◑	●	◑	●

Data display ③

Display contents	LED display						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Normal (not in stepping-down operation)	◑	●	●	●	●	●	◑
Low pressure stepping-down	◑	●	●	●	●	◑	●
High pressure stepping-down	◑	●	●	●	●	◑	◑
Inverter discharge pipe stepping-down	◑	●	●	●	◑	●	●
Inverter current stepping-down	◑	●	●	●	◑	●	◑
Radiation fin temperature stepping-down	◑	●	●	●	◑	◑	●
Inverter stepping-down	◑	●	●	●	◑	◑	◑
Overall current stepping-down	◑	●	●	◑	●	●	●
Other stepping-down	◑	●	●	◑	●	●	◑

4

3 Test Run and Operation Data

3.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- External static pressure graph
- Operation ranges.

Overview

For correct operation range, we refer to the related databook.

Part 5
Maintenance and Disassembly

What is in this part? This part contains the following chapters:

Chapter	See page
1–Maintenance	5–3
2–Removal procedure: outdoor unit ERHQ011~016BAV3	5–5
3–Removal Procedure: Indoor Unit EHVH/X-CA	5–15

1 Maintenance

1.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Maintenance

Overview

This chapter contains the following topics:

Topic	See page
1.2–Maintenance	5–4

5

1.2 Maintenance

Introduction

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals.

Precaution

- Before carrying out any maintenance or repair activity, always switch off the circuit breaker on the supply panel, remove the fuses or open the protection devices of the unit.
- Make sure that before starting any maintenance or repair activity, also the power supply to the outdoor unit is switched off.

Overview

The described checks must be executed at least **once a year**.

1 Water pressure

Check if the water pressure in the hydrobox is above 1.5 bar. If necessary add water.

2 Water filter

Clean the water filter.

3 Water pressure relief valve

Check for correct operation of the pressure relief valve by turning the red knob on the valve counter-clockwise:

- If you do not hear a clacking sound, contact your local Daikin dealer.
- In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local Daikin dealer.

4 Pressure relief valve hose

Check that the pressure relief valve hose is positioned appropriately to drain the water.

If the (optional) drain pan kit is installed, make sure that the pressure relief valve hose end is positioned in the drain pan.

5 Backup heater vessel insulation cover

Check that the backup heater insulation cover is fastened tightly around the backup heater vessel.

6 Domestic hot water tank pressure relief valve (field supply)

Applies only to installations with a domestic hot water tank.

Check for correct operation of the pressure relief valve on the domestic hot water tank.

7 Domestic hot water tank booster heater

Applies only to installations with a domestic hot water tank.

It is advisable to remove lime buildup on the booster heater to extend its life span, especially in regions with hard water. To do so, drain the domestic hot water tank, remove the booster heater from the domestic hot water tank and immerse in a bucket (or similar) with lime-removing product for 24 hours.

8 Hydro-box switch box

- Carry out a thorough visual inspection of the switch box and look for obvious defects such as loose connections or defective wiring.
- Check for correct operation of contactors K1M, K2M, K3M, K5M (applications with domestic hot water tank only) and K4M by use of an ohmmeter. All contacts of these contactors must be in open position.

2 Removal procedure: outdoor unit ERHQ011~016BAV3

2.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Removal procedure: outdoor unit

Overview

This chapter contains the following topics:

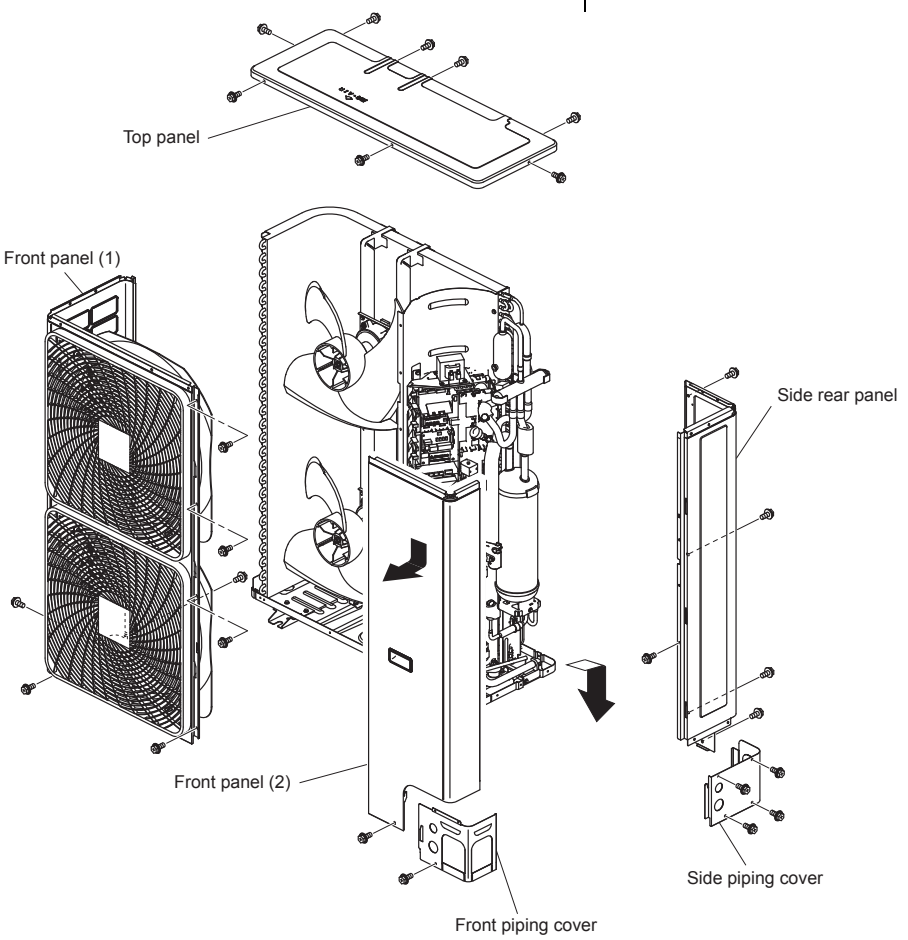
Topic	See page
2.2–Removal of Outside Panels	5–6
2.3–Removal of Propeller Fan and Fan Motor	5–7
2.4–Removal of Switch Box	5–8
2.5–Removal of PC Board	5–9
2.6–Removal of Pressure Sensor, Electronic Expansion Valve, and Others	5–10
2.7–Removal of Thermistor	5–11
2.8–Removal of Four Way Valve	5–12
2.9–Removal of Compressor	5–13
2.10–Removal Procedure: Indoor Unit EHBH/X-CA	5–14

2.2 Removal of Outside Panels

Procedure

Warning! Be sure to commence the disassembling work after 10 minutes or more elapsed from all power supplies have been turned off.

Step	Procedure	Points
1	For the front panel (1), unscrew a single mounting screw and then push this panel downward to remove it.	
2	For the top panel, unscrew the eight mounting screws and then remove this panel.	
3	For the front panel (1), unscrews the seven mounting screws and the remove this panel.	
4	For the front piping cover, unscrew a single mounting screw and then remove this panel.	
5	For the side piping cover, unscrew the four mounting screws and then remove this panel.	
6	For the side rear panel, unscrew the five mounting screws and then remove this panel.	

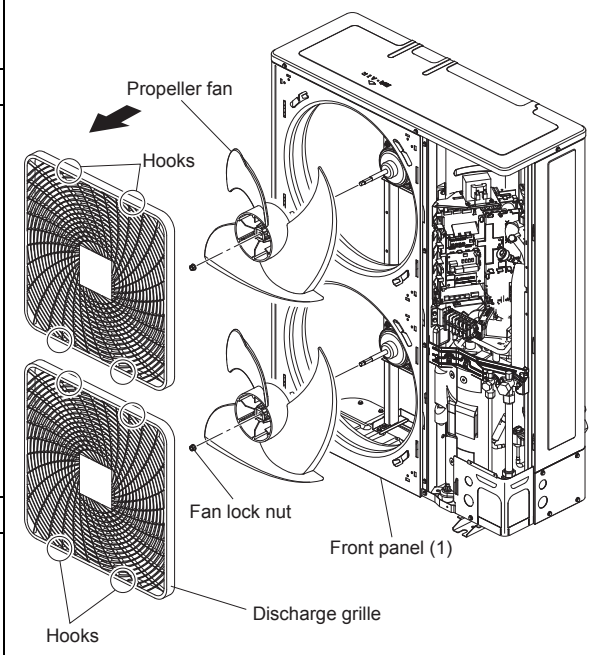
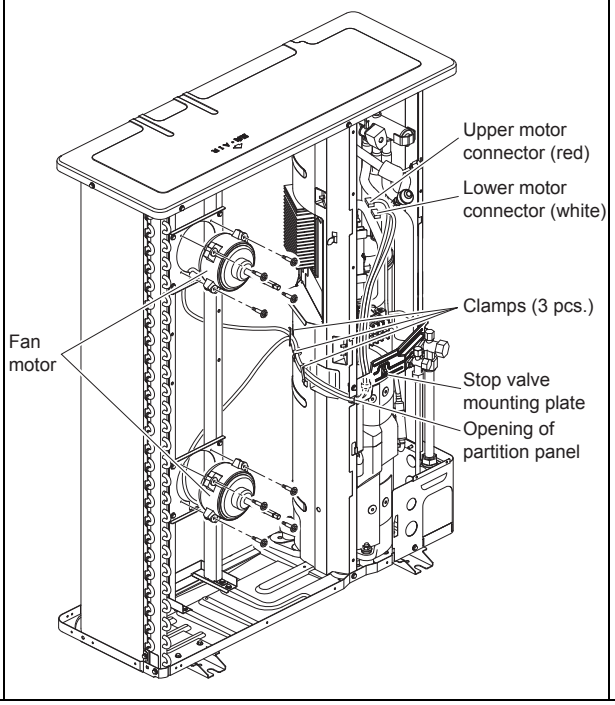
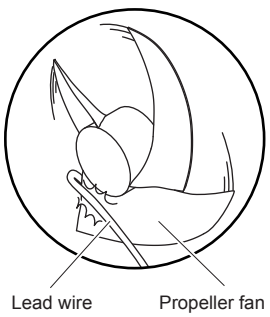


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2.3 Removal of Propeller Fan and Fan Motor

Procedure

Warning! Be sure to commence the disassembling work after 10 minutes or more elapsed from all power supplies have been turned off.

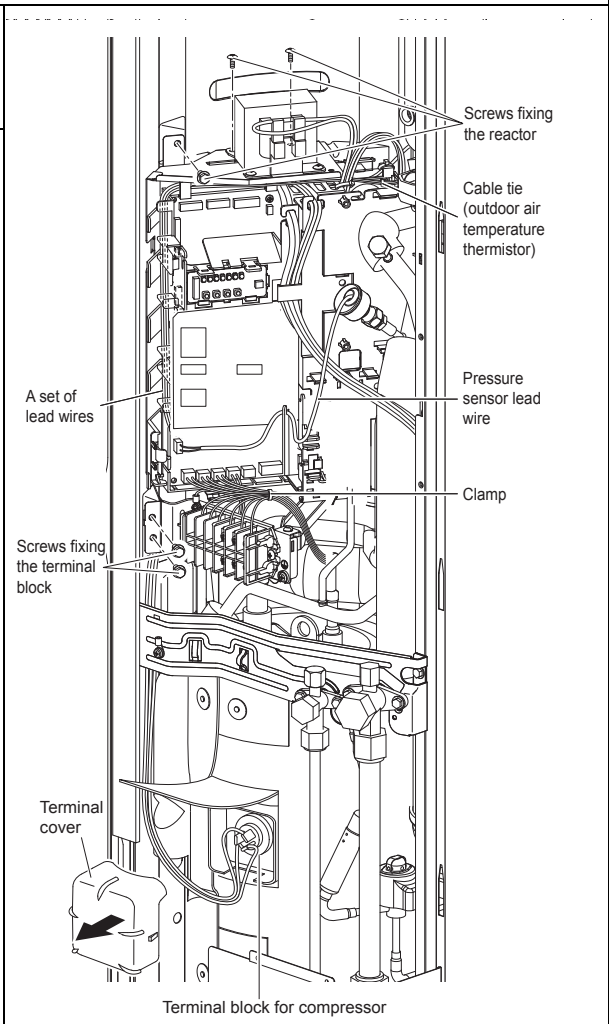
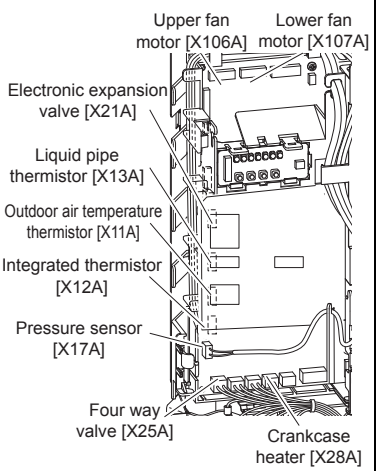
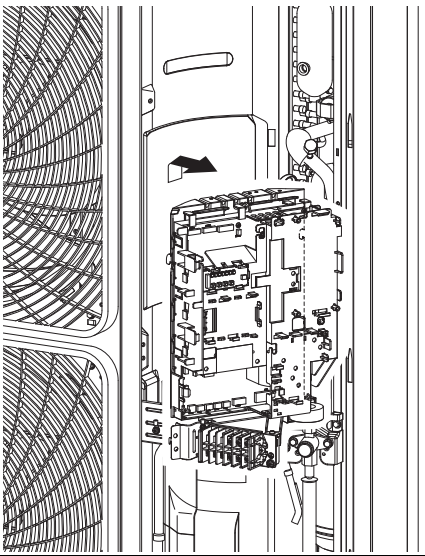
Step	Procedure	Points
■ Remove the front panel (2) accordance with the Removal Procedure for Outside Panels.		
Remove the propeller fan		
1 Unscrew the four screws that fix the air discharge grille and disengage the four hooks at the top and bottom of the grille, and then remove this air discharge grille.		
2 Unfasten the fan lock nut that fixes the propeller fan.		
Remove the fan motor		
■ Remove the front panel (1) accordance with the Removal Procedure for Outside Panels.		
1 Remove the connector (X206A, X207A) for fan motor from the PC board.		■ In order to disconnect the connector, do not pull the lead wire. Hold the connector part and then push the hooks. 
2 Cut the cable tie of lead wires (located on the reverse side of the stop valve mounting plate).		
3 Pull out the lead wires through the opening of the partition panel, and then unclamp the three clamps. (Note that the partition plate has three hooks.)		
4 Unfastening the four lock from the fan motor, enables the removal of this motor.		■ Cautions in mounting the motor Be sure to fix the motor lead wire with a clamp. Not heeding this caution will cause the entanglement of the lead wire around the fan, which will result in damage to the fan.

5

2.4 Removal of Switch Box

Procedure

Warning! Be sure to commence the disassembling work after 10 minutes or more elapsed from all power supplies have been turned off.

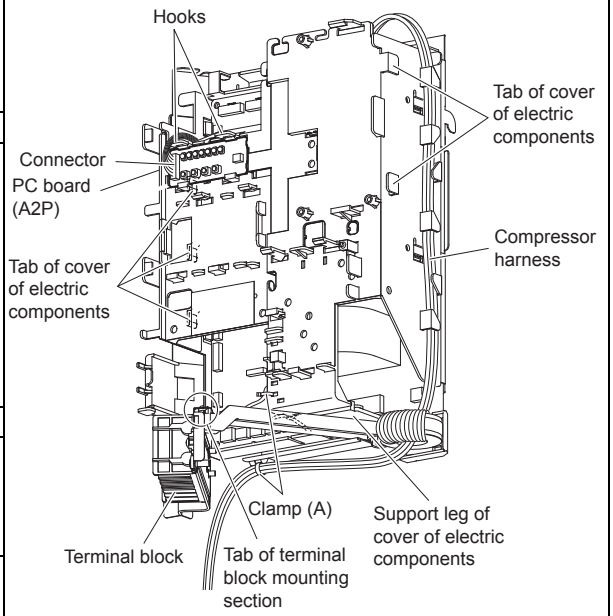
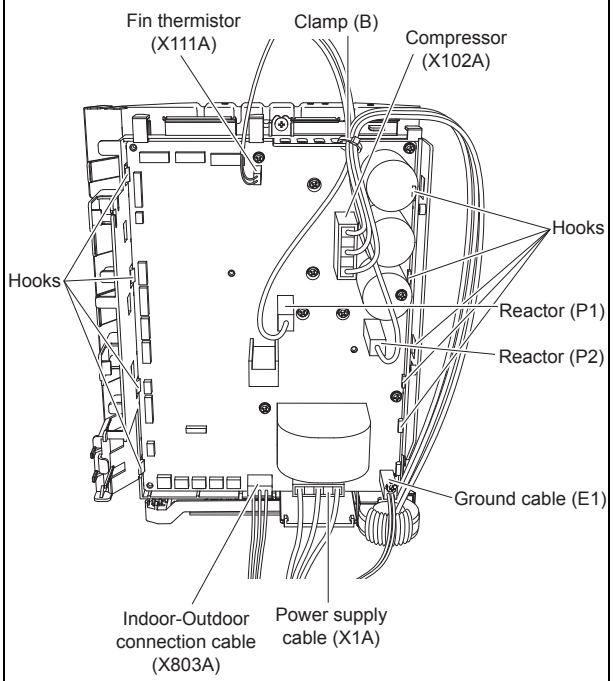
Step	Procedure	Points
■ Remove the front panel (2) accordance with the Removal Procedure for Outside Panels.		■ If the top panel cannot be removed ⬇ Even though workability is degraded, it is possible to pull the switch box to the front without removing the top panel. ■ The figure below shows connectors to be disconnected. 
1 Disconnect each connector on the PC board. (Refer to the Points column.)		
2 Remove the two Faston terminals. After that, unscrew the three screws that fix the reactor, and then remove the reactor.		
3 Cut the clamp.		
4 Remove the clamp of the pressure sensor lead wire.		
5 Cut the clamp of the outdoor air temperature thermistor.		
6 Disconnect a set of lead wires together from the clamp.		
7 Remove the terminal cover, and then disconnect the three lead wires from the terminal block for the compressor.		■ Precaution for mounting the pressure sensor ⬇ To prevent the lead wire from hanging over the PC board, hook the lead wire of 160 to 170 mm in length from the front end of the connector on the clamp.
8 Unscrew the two screws that fix the terminal block.		
9 Disengage the three hooks, and then pull out the switch box upward.		

5

2.5 Removal of PC Board

Procedure

Warning! Be sure to commence the disassembling work after 10 minutes or more elapsed from all power supplies have been turned off.

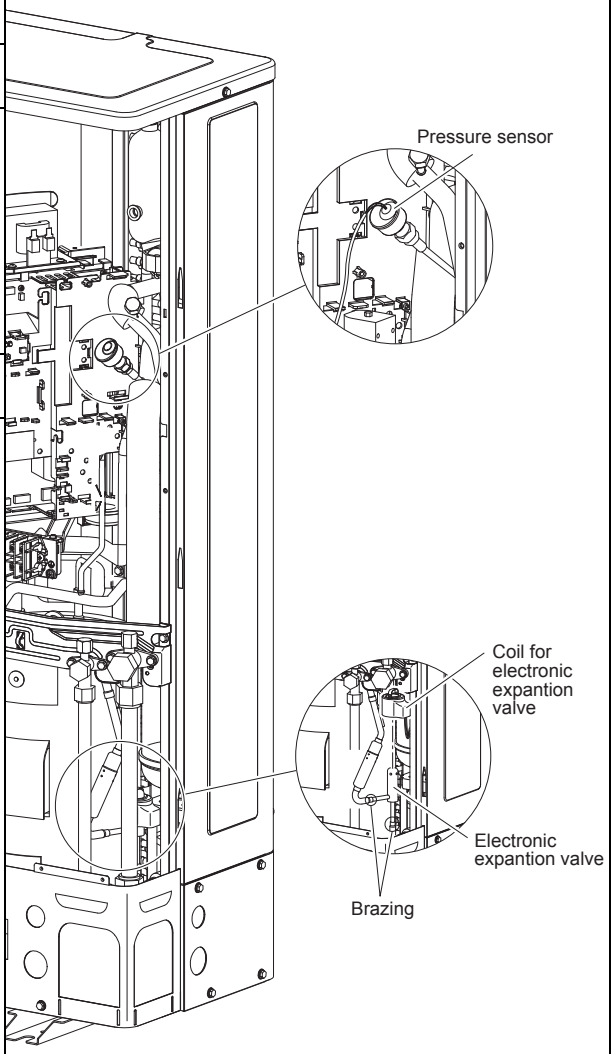
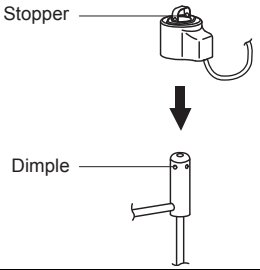
Step	Procedure	Points
■ Remove the top panel and the front panel (2) accordance with the Removal Procedure for Outside Panels.		
Remove the PC board (A2P)		
1 Disconnect the connector (X205A) from the PC board.		
2 While pressing the two hooks, remove the PC board (A2P).		
Remove the PC board (A1P)		
■ Remove the switch box accordance with the Removal procedure for the switch box.		
1 Remove the clamp from the compressor harness.		
2 Press the hooks to remove the terminal block.		
3 Cut the two clamps (A).		
4 Extend the hooks, and then remove the support leg of the cover of electrical components.		
5 Disengage the three hooks on the left side, and then while pushing down the two hooks on the right side, remove the whole cover of the electric components.		
6 Cut the clamps (B).		■ Connectors used on the PC board · Compressor (X102A) · Ground cable (E1) · Reactors (P1 and P2) · Power supply cable (X1A) · Indoor-Outdoor connection cable (X803A)
7 Disconnect the connector listed in point column.		
8 Remove the PC board (A1P) together with the radiating fin.		

5

2.6 Removal of Pressure Sensor, Electronic Expansion Valve, and Others

Procedure

Warning! Be sure to commence the disassembling work after 10 minutes or more elapsed from all power supplies have been turned off.

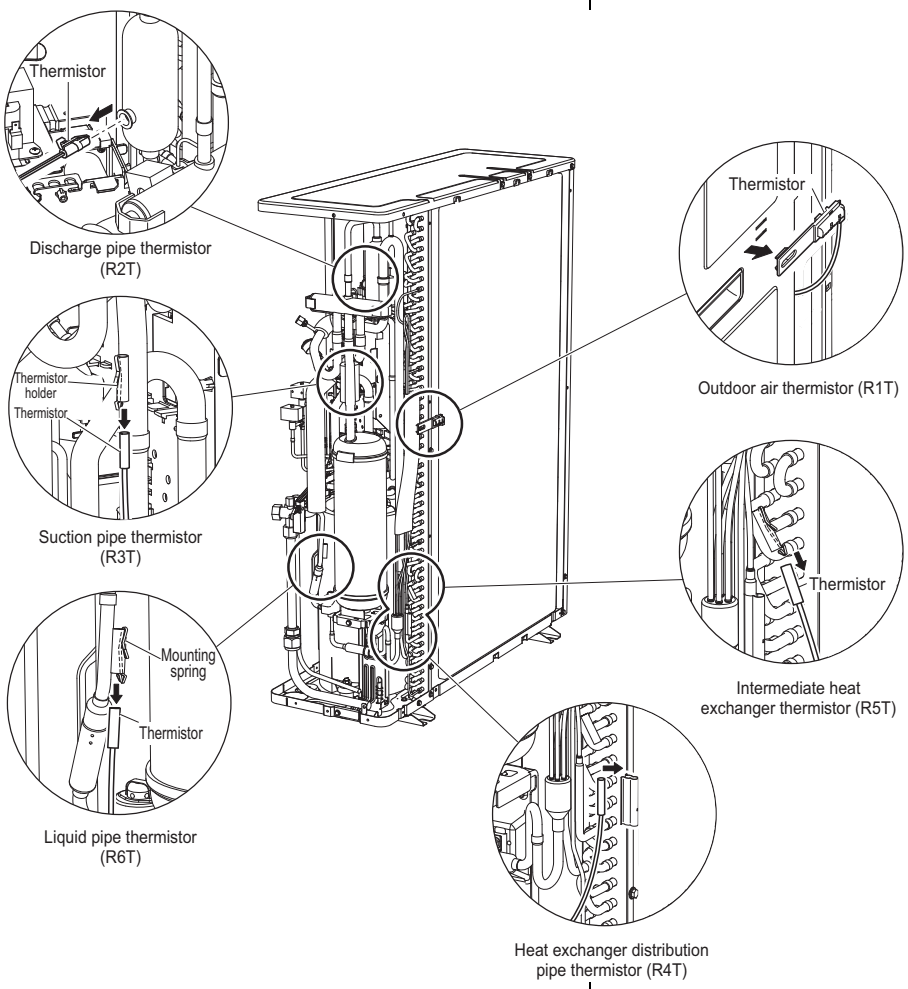
Step	Procedure	Points
■ Remove the top panel and the front panel (2) accordance with the Removal Procedure for Outside Panels.		
1 Remove the pressure sensor		
1 Disconnect the pressure sensor connector (X17A).		
2 Use two spanners to remove the pressure sensor.		
2 Remove the electronic expansion valve.		■ Before removing the electronic expansion valve, be sure to recover the refrigerant.
1 Disconnect the electronic expansion valve connector (X21A).		
2 Pull out the coil for the electronic expansion valve coil upward.		
3 Remove brazing from the two places, and then remove the electronic expansion valve.		Precaution for mounting the coil for the electronic expansion valve ⬇ Align the dimple of the electronic expansion valve and the stopper of the coil for the electronic expansion valve, and then push them in until you hear them click. 

5

2.7 Removal of Thermistor

Procedure

Warning! Be sure to commence the disassembling work after 10 minutes or more elapsed from all power supplies have been turned off.

Step	Procedure	Points
■ Remove the top panel and the front panel (2) and side panel accordance with the Procedure for Outside Panels.		
1 Pull out the outdoor air temperature thermistor to the front, and then slide this thermistor to the right to remove it.		
2 Pinch the mounting spring that fixes the discharge pipe thermistor to pull out this thermistor.		
3 Press the fixing section of the suction pipe thermistor to pull out this thermistor.		
4 Pull the fixing bracket of the heat exchanger's distribution pipe thermistor to the front, and then remove this thermistor.		
5 Press the fixing section of the heat exchanger's intermediate temperature thermistor to pull out this thermistor.		
6 Press the fixing section of the liquid pipe thermistor to pull out this thermistor.	*1 The heat exchanger's distribution pipe thermistor, heat exchanger's intermediate temperature thermistor, and liquid pipe thermistor are jointed together with a single connector. Consequently, these three thermistors should be replaced at the same time.	

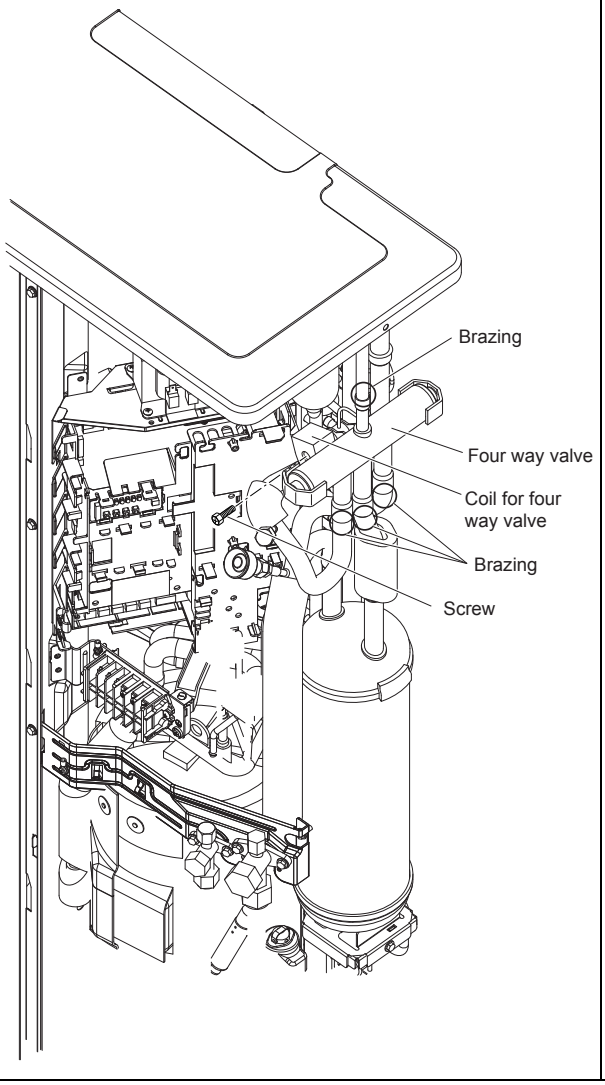
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2.8 Removal of Four Way Valve

Procedure

Warning! Be sure to commence the disassembling work after 10 minutes or more elapsed from all power supplies have been turned off.

Step	Procedure	Points
	■ Recover the refrigerant. ■ According to the procedure for the removal related to the outside panel, remove the front panel (2) and the side panel. ■ According to the procedure for the removal of switch box, remove the switch box.	■ Be sure to remove the four way valve only after the refrigerant is completely recovered.
1	Unscrew the one screw that fixes the coil for the four way valve, and then remove this coil.	
2	Remove brazing from the four places, and then remove the four way valve. (Refer to point column.)	■ To prevent the four way valve from exceeding a temperature of 120°C, conduct brazing work while cooling the valve with wet cloths or else.



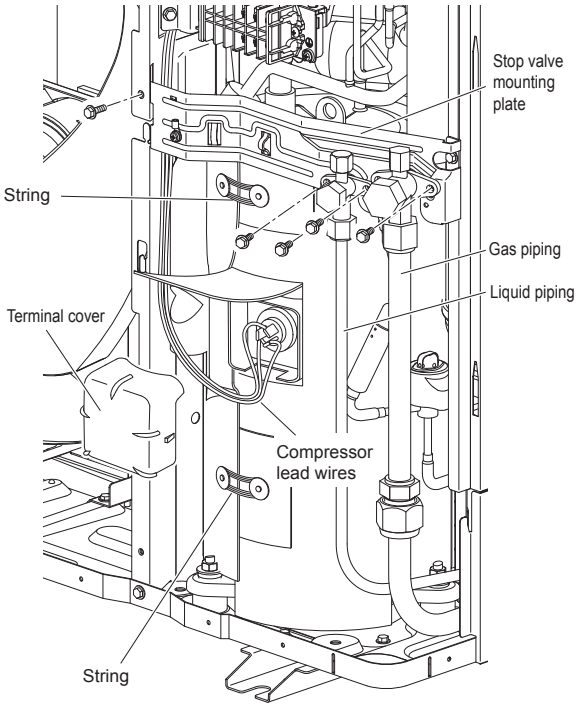
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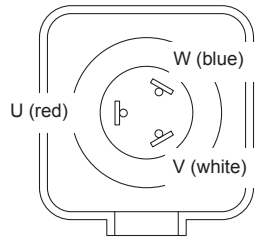
2.9 Removal of Compressor

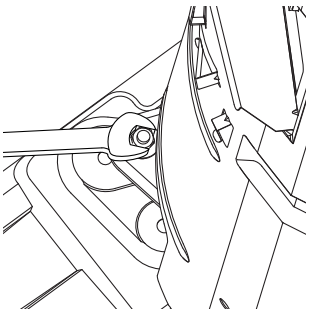
Procedure

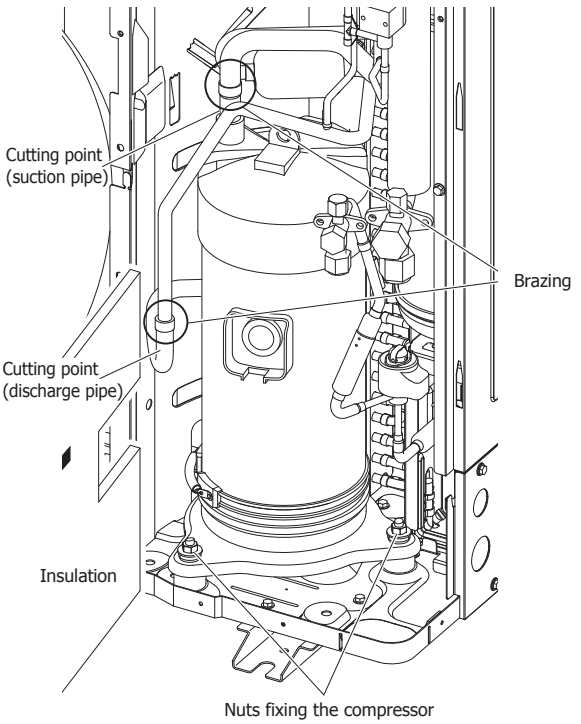
Warning! Be sure to commence the disassembling work after 10 minutes or more elapsed from all power supplies have been turned off.

Step	Procedure	Points
	■ Recover the refrigerant. (Refer to point column.) ■ Remove the front panel (2) and the front piping cover bracket.	■ Be sure to remove the compressor only after the refrigerant is completely recovered.
1	Unscrew the five screws that fix the stop valve mounting plate, and then remove this mounting plate.	■ Terminal block
2	Remove the gas piping and the liquid piping.	
3	Remove the compressor terminal cover.	
4	Disconnect the lead wires from the terminal block.	
5	Loosen the two strings, and then pull out the sound insulation of the compressor.	■ One out of the nuts that fix the compressor is located outside of the partition panel.
6	Unfasten to remove the three nuts that fix the compressor. (Refer to point column.)	
7	Cut the suction pipe and the discharge pipe using a pipe cutter. (Refer to point column.)	
8	Remove brazing from the three places.	■ Be sure to cut thee pipes by using a pipe cutter before disconnecting the brazed sections of pipes. A sudden disconnection of the brazed sections can cause oil to catch fire.
9	Lift to pull out the compressor.	









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2.10 Removal Procedure: Indoor Unit EHBH/X-CA

To be completed.

3 Removal Procedure: Indoor Unit EHVH/X-CA

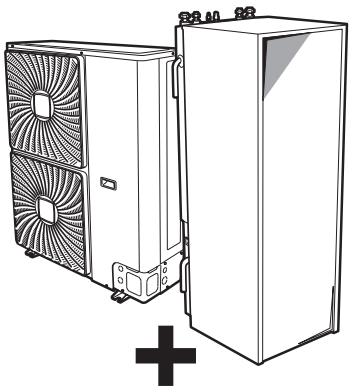
3.1 What Is in This Chapter?

To be completed.

Part 6
Appendix - Installer Reference Guide

Installer reference guide

Daikin Altherma - Low Temperature Split



ERHQ011-014-016BA
ERLQ011-014-016CA
EHVH/X16S18+26CA

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1 About the documentation

1.1 About this document

Target audience

Authorized installers

Documentation set

This document is part of a documentation set. The complete set consists of:

Document	Contains…	Format
General safety precautions	Safety instructions that you must read before installing	Paper (in the box of the indoor unit)
Indoor unit installation manual	Installation instructions	
Outdoor unit installation manual	Installation instructions	Paper (in the box of the outdoor unit)
Installer reference guide	Preparation of the installation, technical specifications, good practices, reference data, …	CD/DVD (in the box of the indoor unit)
Addendum book for optional equipment	Additional info about how to install optional equipment	Paper (in the box of the indoor unit) CD/DVD (in the box of the indoor unit)

Latest revisions of the supplied documentation may be available on the regional Daikin website or via your dealer.

2 General safety precautions

2.1 About the documentation

- The original documentation is written in English. All other languages are translations.
- The precautions described in this document cover very important topics, follow them carefully.
- All activities described in the installation manual must be performed by an authorized installer.

2.1.1 Meaning of warnings and symbols

DANGER

Indicates a situation that results in death or serious injury.

DANGER: RISK OF ELECTROCUTION

Indicates a situation that could result in electrocution.

DANGER: RISK OF BURNING

Indicates a situation that could result in burning because of extreme hot or cold temperatures.

WARNING

Indicates a situation that could result in death or serious injury.

CAUTION

Indicates a situation that could result in minor or moderate injury.

NOTICE

Indicates a situation that could result in equipment or property damage.

INFORMATION

Indicates useful tips or additional information.

2.2 For the installer

2.2.1 General

If you are not sure how to install or operate the unit, contact your dealer.

NOTICE

Improper installation or attachment of equipment or accessories could result in electric shock, short-circuit, leaks, fire or other damage to the equipment. Only use accessories, optional equipment and spare parts made or approved by Daikin.

WARNING

Make sure installation, testing and applied materials comply with applicable legislation (on top of the instructions described in the Daikin documentation).

CAUTION

Wear adequate personal protective equipment (protective gloves, safety glasses,…) when installing, maintaining or servicing the system.

WARNING

Tear apart and throw away plastic packaging bags so that nobody, especially children, can play with them. Possible risk: suffocation.

DANGER: RISK OF BURNING

- Do NOT touch the refrigerant piping, water piping or internal parts during and immediately after operation. It could be too hot or too cold. Give it time to return to normal temperature. If you must touch it, wear protective gloves.
- Do NOT touch any accidental leaking refrigerant.

NOTICE

Provide adequate measures to prevent that the unit can be used as a shelter by small animals. Small animals that make contact with electrical parts can cause malfunctions, smoke or fire.

CAUTION

Do NOT touch the air inlet or aluminum fins of the unit.

NOTICE

- Do NOT place any objects or equipment on top of the unit.
- Do NOT sit, climb or stand on the unit.

In accordance with the applicable legislation, it might be necessary to provide a logbook with the product containing at least: information on maintenance, repair work, results of tests, stand-by periods,…

Also, at least, following information must be provided at an accessible place at the product:

- Instructions for shutting down the system in case of an emergency
- Name and address of fire department, police and hospital
- Name, address and day and night telephone numbers for obtaining service

In Europe, EN378 provides the necessary guidance for this logbook.

2.2.2 Installation site

- Provide sufficient space around the unit for servicing and air circulation.
- Make sure the installation site withstands the unit's weight and vibration.
- Make sure the area is well ventilated.
- Make sure the unit is level.

Do NOT install the unit in the following places:

- In potentially explosive atmospheres.
- In places where there is machinery that emits electromagnetic waves. Electromagnetic waves may disturb the control system, and cause malfunction of the equipment.
- In places where there is a risk of fire due to the leakage of flammable gases (example: thinner or gasoline), carbon fibre, ignitable dust.
- In places where corrosive gas (example: sulphurous acid gas) is produced. Corrosion of copper pipes or soldered parts may cause the refrigerant to leak.

2.2.3 Refrigerant

NOTICE

Make sure refrigerant piping installation complies with applicable legislation. In Europe, EN378 is the applicable standard.

NOTICE

Make sure the field piping and connections are not subjected to stress.

WARNING

During tests, NEVER pressurize the product with a pressure higher than the maximum allowable pressure (as indicated on the nameplate of the unit).

WARNING

Take sufficient precautions in case of refrigerant leakage. If refrigerant gas leaks, ventilate the area immediately. Possible risks:

- Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.
- Toxic gas may be produced if refrigerant gas comes into contact with fire.

WARNING

Always recover the refrigerants. Do NOT release them directly into the environment. Use a vacuum pump to evacuate the installation.

2.2.4 Water

NOTICE

Make sure water quality complies with EU directive 98/83 EC.

2.2.5 Electrical

DANGER: RISK OF ELECTROCUTION

- Turn OFF all power supply before removing the switch box cover, connecting electrical wiring or touching electrical parts.
- Disconnect the power supply for more than 1 minute, and measure the voltage at the terminals of main circuit capacitors or electrical components before servicing. The voltage must be less than 50 V DC before you can touch electrical components. For the location of the terminals, see the wiring diagram.
- Do NOT touch electrical components with wet hands.
- Do NOT leave the unit unattended when the service cover is removed.

WARNING

If not factory installed, a main switch or other means for disconnection, having a contact separation in all poles providing full disconnection under overvoltage category III condition, shall be installed in the fixed wiring.

WARNING

- Only use copper wires.
- All field wiring must be performed in accordance with the wiring diagram supplied with the product.
- NEVER squeeze bundled cables and make sure they do not come in contact with the piping and sharp edges. Make sure no external pressure is applied to the terminal connections.
- Make sure to install earth wiring. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earth may cause electrical shock.
- Make sure to use a dedicated power circuit. NEVER use a power supply shared by another appliance.
- Make sure to install the required fuses or circuit breakers.
- Make sure to install an earth leakage protector. Failure to do so may cause electric shock or fire.
- When installing the earth leakage protector, make sure it is compatible with the inverter (resistant to high frequency electric noise) to avoid unnecessary opening of the earth leakage protector.

Install power cables at least 1 meter away from televisions or radios to prevent interference. Depending on the radio waves, a distance of 1 meter may not be sufficient.

WARNING

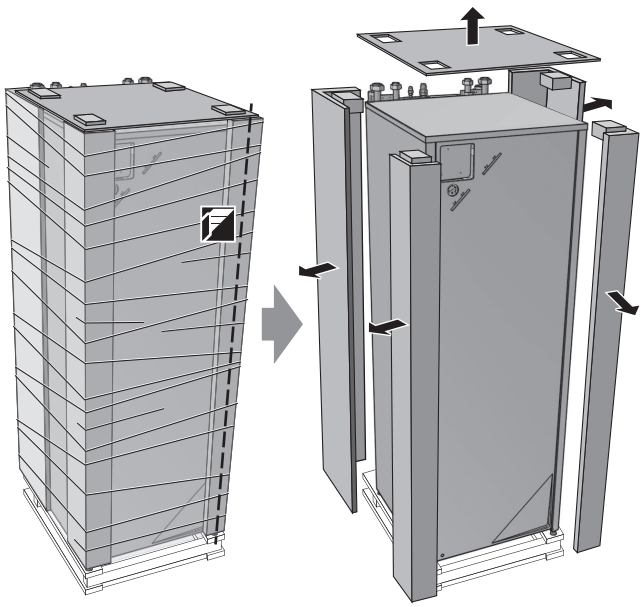
- After finishing the electrical work, confirm that each electrical component and terminal inside the electrical components box is connected securely.
- Make sure all covers are closed before starting up the unit.

3 About the box

- At delivery, the unit must be checked for damage. Any damage must be reported immediately to the carrier's claims agent.
- Bring the packed unit as close as possible to its final installation position to prevent damage during transport.

3.1 Indoor unit

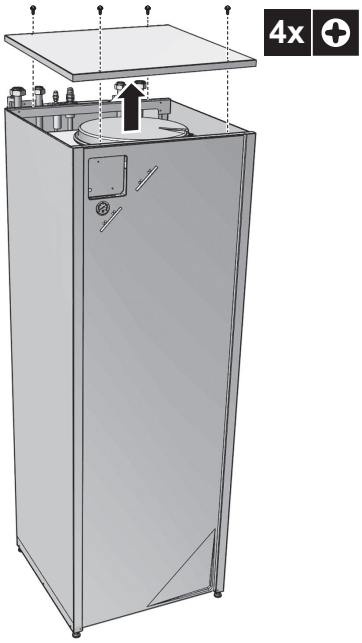
3.1.1 To unpack the indoor unit



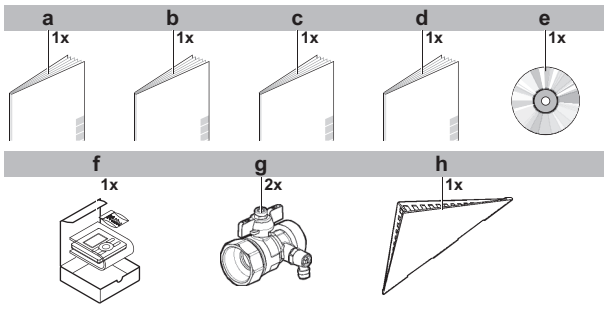
3.1.2 To remove the accessories from the indoor unit

1 Remove the screws at the top of the unit.

2 Remove the top panel.



3 Remove the accessories.



a General safety precautions

b Addendum book for optional equipment
c Indoor unit installation manual
d Operation manual
e CD/DVD
f User interface kit: user interface, 4 fixing screws, 2 plugs
g Shut-off valve
h User interface cover

4 Reinstall the top panel.

4 About the units and options

4.1 Identification

NOTICE

When installing or servicing several units at the same time, make sure NOT to switch the service panels between different models.

4.1.1 Identification label: Indoor unit

Location



Model identification

Example: E HV H 04 S 18 CA 3V

Code	Description
E	European model
HV	HV=Floor-standing indoor unit with integrated tank
H	▪ H=Heating only ▪ X=Heating/cooling
04	Capacity class: ▪ 04=4.5 kW ▪ 08=7.5 kW ▪ 16=16 kW
S	Integrated tank material: S=Stainless steel
18	Integrated tank volume: ▪ 18=180 l ▪ 26=260 l
CA	Series
3V	Backup heater model ▪ 3V ▪ 9W

4.2 Possible combinations of units and options

4.2.1 List of options for indoor unit

User interface (EKRUCAL1, EKRUCAL2)

The user interface is delivered as an accessory with the unit. An additional user interface is optionally available.

The additional user interface can be connected:

- To have both:
  - control close to the indoor unit
  - room thermostat functionality in the principal space to be heated
- To have an interface containing other languages

The additional user interface EKRUCAL1 contains the 6 common languages: English, German, French, Dutch, Italian, Spanish.

The additional user interface EKRUCAL2 contains other languages: English, Swedish, Norwegian, Czech, Turkish, Portuguese.

Languages on the user interface can be uploaded by PC software or copied from an user interface to the other.

For installation instructions, see "7.4.5 To connect the user interface" on page 30.

Room thermostat (EKRTWA, EKRTR1)

You can connect an optional room thermostat to the indoor unit. This thermostat can either be wired (EKRTWA) or wireless (EKRTR1).

For installation instructions, see the installation manual of the room thermostat and addendum book for optional equipment.

Remote sensor for wireless thermostat (EKRTETS)

You can use a wireless indoor temperature sensor (EKRTETS) only in combination with the wireless thermostat (EKRTR1).

For installation intructions, see the installation manual of the room thermostat and addendum book for optional equipment.

Digital I/O PCB (EKRP1HB)

The digital I/O PCB is required to provide following signals:

- Alarm output
- Space heating/cooling On/OFF output
- Changeover to external heat source
- Only for EHVH/X16 models: Control signal for bottom plate heater kit EKBPHTH16A.

For installation instructions, see the installation manual of the digital I/O PCB and addendum book for optional equipment.

Demand PCB (EKRP1AHTA)

To enable the power saving consumption control by digital inputs you must install the demand PCB.

For installation instructions, see the installation manual of the demand PCB and addendum book for optional equipment.

Remote indoor sensor (KRCS01-1)

By default the internal user interface sensor will be used as room temperature sensor.

As an option the remote indoor sensor can be installed to measure the room temperature on another location.

For installation instructions, see the installation manual of the remote indoor sensor and addendum book for optional equipment.

INFORMATION

- The remote indoor sensor can only be used in case the user interface is configured with room thermostat functionality.
- You can only connect either the remote indoor sensor or the remote outdoor sensor.

Remote outdoor sensor (EKRSCA1)

By default the sensor inside the outdoor unit will be used to measure the outdoor temperature.

As an option the remote outdoor sensor can be installed to measure the outdoor temperature on another location (e.g. to avoid direct sunlight) to have an improved system behaviour.

For installation instructions, see the installation manual of the remote outdoor sensor.

INFORMATION

You can only connect either the remote indoor sensor or the remote outdoor sensor.

PC configurator (EKPCCAB*)

The PC cable makes a connection between the switch box of the indoor unit and a PC. It gives the possibility to upload different language files to the user interface and indoor parameters to the indoor unit. For the available language files, contact your local dealer.

The software and corresponding operating instructions are available on Daikin Extranet.

For installation instructions, see the installation manual of the PC cable.

4.2.2 Possible combinations of indoor unit and outdoor unit

Outdoor unit	Indoor unit			
	EHVH16S18CA3V	EHVX16S18CA3V	EHVH16S26CA9W	EHVX16S26CA9W
ERHQ011BAV3	O	O	O	O
ERHQ014BAV3	O	O	O	O
ERHQ016BAV3	O	O	O	O
ERLQ011CAV3	O	O	O	O
ERLQ014CAV3	O	O	O	O
ERLQ016CAV3	O	O	O	O
ERHQ011BAW1	O	O	O	O
ERHQ014BAW1	O	O	O	O
ERHQ016BAW1	O	O	O	O
ERLQ011CAW1	O	O	O	O
ERLQ014CAW1	O	O	O	O
ERLQ016CAW1	O	O	O	O

5 Application guidelines

5.1 Overview: Application guidelines

The purpose of the application guidelines is to give a glance of the possibilities of the Daikin heat pump system.

NOTICE

- The illustrations in the application guidelines are meant for reference only, and are NOT to be used as detailed hydraulic diagrams. The detailed hydraulic dimensioning and balancing are NOT shown, and are the responsibility of the installer.
- For more information about the configuration settings to optimize heat pump operation, see "8 Configuration" on page 33.

This chapter contains applications guidelines for:

- Setting up the space heating/cooling system
- Setting up an auxiliary heat source for space heating
- Setting up the domestic hot water tank
- Setting up the energy metering
- Setting up the power consumption
- Setting up an external temperature sensor

5.2 Setting up the space heating/cooling system

The Daikin heat pump system supplies leaving water to heat emitters in one or more rooms.

Because the system offers a wide flexibility to control the temperature in each room, you need to answer the following questions first:

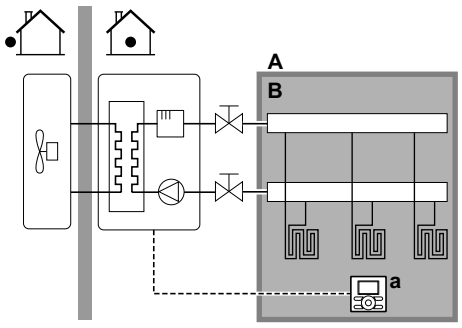
- How many rooms are heated (or cooled) by the Daikin heat pump system?
- Which heat emitter types are used in each room and what is their design leaving water temperature?

Once the space heating/cooling requirements are clear, Daikin recommends to follow the setup guidelines below.

5.2.1 Single room

Under floor heating or radiators – Wired room thermostat

Setup



A Main leaving water temperature zone
B One single room
a User interface used as room thermostat

- The under floor heating or radiators are directly connected to the indoor unit.
- The room temperature is controlled by the user interface, which is used as room thermostat. Possible installations:
  - User interface (standard equipment) installed in the room and used as room thermostat
  - User interface (standard equipment) installed at the indoor unit and used for control close to the indoor unit + user interface (optional equipment EKRUCAL) installed in the room and used as room thermostat

Configuration

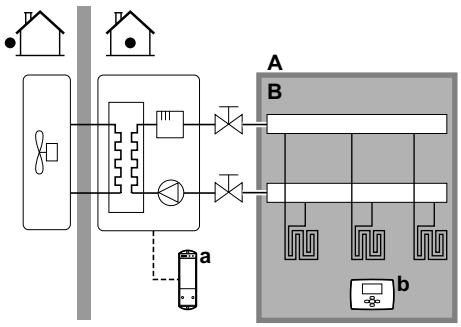
Setting	Value
Unit temperature control: ▪ #: [A.2.1.7] ▪ Code: [C-07]	2 (RT control): Unit operation is decided based on the ambient temperature of the user interface.
Number of water temperature zones: ▪ #: [A.2.1.8] ▪ Code: [7-02]	0 (1 LWT zone): Main

Benefits

- **Cost effective**. You do NOT need an additional external room thermostat.
- **Highest comfort and efficiency**. The smart room thermostat functionality can decrease or increase the desired leaving water temperature based on the actual room temperature (modulation). This results in:
  - Stable room temperature matching the desired temperature (higher comfort)
  - Less ON/OFF cycles (more quiet, higher comfort and higher efficiency)
  - Lowest possible leaving water temperature (higher efficiency)
- **Easy**. You can easily set the desired room temperature via the user interface:
  - For your daily needs, you can use preset values and schedules.
  - To deviate from your daily needs, you can temporarily overrule the preset values and schedules, use the holiday mode…

Under floor heating or radiators – Wireless room thermostat

Setup



A Main leaving water temperature zone
B One single room
a Receiver for wireless external room thermostat
b Wireless external room thermostat

- The under floor heating or radiators are directly connected to the indoor unit.
- The room temperature is controlled by the wireless external room thermostat (optional equipment EKRTR1).

Configuration

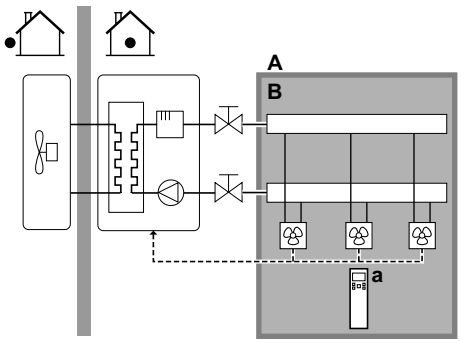
Setting	Value
Unit temperature control: ▪ #: [A.2.1.7] ▪ Code: [C-07]	1 (Ext RT control): Unit operation is decided by the external thermostat.
Number of water temperature zones: ▪ #: [A.2.1.8] ▪ Code: [7-02]	0 (1 LWT zone): Main
External room thermostat for the **main** zone: ▪ #: [A.2.2.4] ▪ Code: [C-05]	Configure according to the setup: ▪ 1 (Thermo ON/OFF): When the used external room thermostat or heat pump convector can only send a thermo ON/OFF condition. No separation between heating or cooling demand. ▪ 2 (C/H request): When the used external room thermostat can send a separate heating/cooling thermo ON/OFF condition.

Benefits

- **Wireless**. The Daikin external room thermostat is available in a wireless version.
- **Efficiency**. Although the external room thermostat only sends ON/OFF signals, it is specifically designed for the heat pump system.
- **Comfort**. In case of under floor heating, the wireless external room thermostat prevents condensation on the floor during cooling operation by measuring the room humidity.

Heat pump convectors

Setup



A Main leaving water temperature zone
B One single room
a Remote controller of the heat pump convectors

- The heat pump convectors are directly connected to the indoor unit.
- The desired room temperature is set via the remote controller of the heat pump convectors.
- The space heating/cooling demand signal is sent to one digital input on the indoor unit (X2M/1 and X2M/4).
- The space operation mode is sent to the heat pump convectors by one digital output on the indoor unit (X2M/33 and X2M/34).

INFORMATION

When using multiple heat pump convectors, make sure each one receives the infrared signal from the remote controller of the heat pump convectors.

Configuration

Setting	Value
Unit temperature control: ▪ #: [A.2.1.7] ▪ Code: [C-07]	1 (Ext RT control): Unit operation is decided by the external thermostat.
Number of water temperature zones: ▪ #: [A.2.1.8] ▪ Code: [7-02]	0 (1 LWT zone): Main
External room thermostat for the **main** zone: ▪ #: [A.2.2.4] ▪ Code: [C-05]	1 (Thermo ON/OFF): When the used external room thermostat or heat pump convector can only send a thermo ON/OFF condition. No separation between heating or cooling demand.

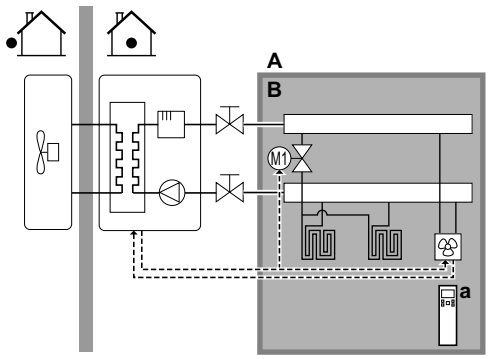
Benefits

- **Cooling**. The heat pump convector offers, besides heating capacity, also excellent cooling capacity.
- **Efficiency**. Optimal energy efficiency because of the interlink function.
- **Stylish**.

Combination: Under floor heating + Heat pump convectors

- Space heating is provided by:
  - The under floor heating
  - The heat pump convectors
- Space cooling is provided by the heat pump convectors only. The under floor heating is shut off by the shut-off valve.

Setup



A Main leaving water temperature zone
B One single room
a Remote controller of the heat pump convectors

- The heat pump convectors are directly connected to the indoor unit.
- A shut-off valve (field supply) is installed before the under floor heating to prevent condensation on the floor during cooling operation.
- The desired room temperature is set via the remote controller of the heat pump convectors.
- The space heating/cooling demand signal is sent to one digital input on the indoor unit (X2M/1 and X2M/4)
- The space operation mode is sent by one digital output (X2M/33 and X2M/34) on the indoor unit to:
  - The heat pump convectors
  - The shut-off valve

Configuration

Setting	Value
Unit temperature control: ▪ #: [A.2.1.7] ▪ Code: [C-07]	1 (Ext RT control): Unit operation is decided by the external thermostat.
Number of water temperature zones: ▪ #: [A.2.1.8] ▪ Code: [7-02]	0 (1 LWT zone): Main
External room thermostat for the **main** zone: ▪ #: [A.2.2.4] ▪ Code: [C-05]	1 (Thermo ON/OFF): When the used external room thermostat or heat pump convector can only send a thermo ON/OFF condition. No separation between heating or cooling demand.

Benefits

- **Cooling**. Heat pump convectors provide, besides heating capacity, also excellent cooling capacity.
- **Efficiency**. Under floor heating has the best performance with Altherma LT.
- **Comfort**. The combination of the two heat emitter types provides:
  - The excellent heating comfort of the under floor heating
  - The excellent cooling comfort of the heat pump convectors

5.2.2 Multiple rooms – One LWT zone

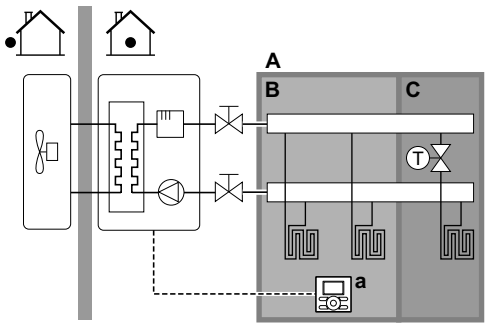
If only one leaving water temperature zone is needed because the design leaving water temperature of all heat emitters is the same, you do NOT need a mixing valve station (cost effective).

Example: If the heat pump system is used to heat up one floor where all the rooms have the same heat emitters.

Under floor heating or radiators – Thermostatic valves

If you are heating up rooms with under floor heating or radiators, a very common way is to control the temperature of the main room by using a thermostat (this can either be the user interface or an external room thermostat), while the other rooms are controlled by so-called thermostatic valves, which open or close depending on the room temperature.

Setup



A Main leaving water temperature zone
B Room 1
C Room 2
a User interface

- The under floor heating of the main room is directly connected to the indoor unit.
- The room temperature of the main room is controlled by the user interface used as thermostat.
- A thermostatic valve is installed before the under floor heating in each of the other rooms.

INFORMATION

Mind situations where the main room can be heated by another heating source. Example: Fireplaces.

Configuration

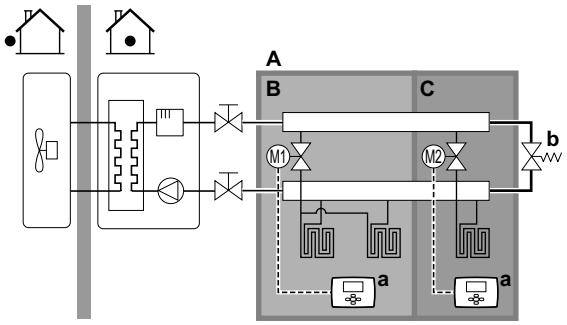
Setting	Value
Unit temperature control: ▪ #: [A.2.1.7] ▪ Code: [C-07]	2 (RT control): Unit operation is decided based on the ambient temperature of the user interface.
Number of water temperature zones: ▪ #: [A.2.1.8] ▪ Code: [7-02]	0 (1 LWT zone): Main

Benefits

- **Cost effective**.
- **Easy**. Same installation as for one room, but with thermostatic valves.

Under floor heating or radiators – Multiple external room thermostats

Setup



A Main leaving water temperature zone
B Room 1
C Room 2
a External room thermostat
b Bypass valve

- For each room, a shut-off valve (field supplied) is installed to avoid leaving water supply when there is no heating or cooling demand.
- A bypass valve must be installed to make water recirculation possible when all shut-off valves are closed.
- The user interface connected to the indoor unit decides the space operation mode. Mind that the operation mode on each room thermostat must be set to match the indoor unit.
- The room thermostats are connected to the shut-off valves, but do NOT have to be connected to the indoor unit. The indoor unit will supply leaving water all the time, with the possibility to program a leaving water schedule.

Configuration

Setting	Value
Unit temperature control: ▪ #: [A.2.1.7] ▪ Code: [C-07]	0 (LWT control): Unit operation is decided based on the leaving water temperature.
Number of water temperature zones: ▪ #: [A.2.1.8] ▪ Code: [7-02]	0 (1 LWT zone): Main

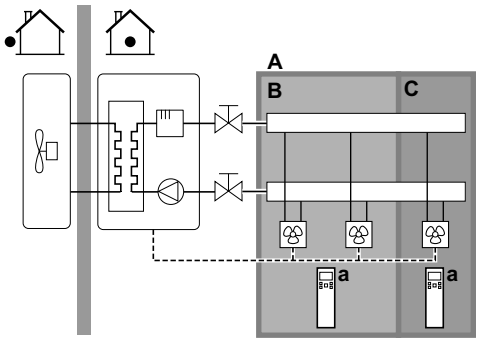
Benefits

Compared with under floor heating or radiators for one room:

- **Comfort**. You can set the desired room temperature, including schedules, for each room via the room thermostats.

Heat pump convectors

Setup



A Main leaving water temperature zone
B Room 1
C Room 2
a Remote controller of the heat pump convectors

- The desired room temperature is set via the remote controller of the heat pump convectors.
- The user interface connected to the indoor unit decides the space operation mode.
- The heating or cooling demand signals of each heat pump convector are connected in parallel to the digital input on the indoor unit (X2M/1 and X2M/4). The indoor unit will only supply leaving water temperature when there is an actual demand.

INFORMATION

To increase comfort and performance, Daikin recommends to install the valve kit option EKVKHPC on each heat pump convector.

Configuration

Setting	Value
Unit temperature control: ▪ #: [A.2.1.7] ▪ Code: [C-07]	1 (Ext RT control): Unit operation is decided by the external thermostat.
Number of water temperature zones: ▪ #: [A.2.1.8] ▪ Code: [7-02]	0 (1 LWT zone): Main

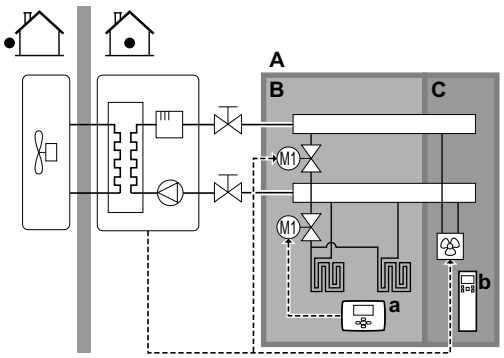
Benefits

Compared with heat pump convectors for one room:

- **Comfort**. You can set the desired room temperature, including schedules, for each room via the remote controller of the heat pump convectors.

Combination: Under floor heating + Heat pump convectors

Setup



A Main leaving water temperature zone
B Room 1
C Room 2
a External room thermostat
b Remote controller of the heat pump convectors

- For each room with heat pump convectors: The heat pump convectors are directly connected to the indoor unit.
- For each room with under floor heating: Two shut-off valves (field supply) are installed before the under floor heating:
  - A shut-off valve to prevent hot water supply when the room has no heating demand
  - A shut-off valve to prevent condensation on the floor during cooling operation of the rooms with heat pump convectors
- For each room with heat pump convectors: The desired room temperature is set via the remote controller of the heat pump convectors.
- For each room with under floor heating: The desired room temperature is set via the external room thermostat (wired or wireless).
- The user interface connected to the indoor unit decides the space operation mode. Mind that the operation mode on each external room thermostat and remote controller of the heat pump convectors must be set to match the indoor unit.

INFORMATION

To increase comfort and performance, Daikin recommends to install the valve kit option EKVKHPC on each heat pump convector.

Configuration

Setting	Value
Unit temperature control: ▪ #: [A.2.1.7] ▪ Code: [C-07]	0 (LWT control): Unit operation is decided based on the leaving water temperature.
Number of water temperature zones: ▪ #: [A.2.1.8] ▪ Code: [7-02]	0 (1 LWT zone): Main

5.2.3 Multiple rooms – Two LWT zones

If the heat emitters selected for each room are designed for different leaving water temperatures, you can use different leaving water temperature zones (maximum 2).

In this document:

- Main zone = Zone with the lowest design temperature in heating, and the highest design temperature in cooling
- Additional zone = The other zone

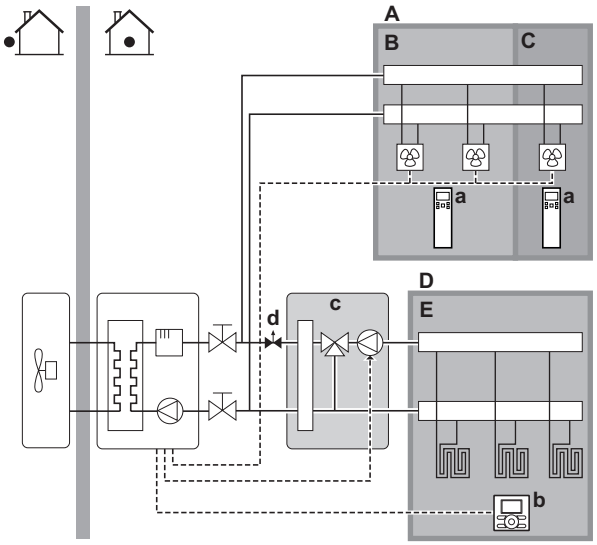
CAUTION

When there is more than one leaving water zone, you must always install a mixing valve station in the main zone to decrease (in heating)/increase (in cooling) the leaving water temperature when the additional zone has demand.

Typical example:

Room (zone)	Heat emitters: Design temperature
Living room (main zone)	Under floor heating: ▪ In heating: 35°C ▪ In cooling: 20°C (only refreshment, no real cooling allowed)
Bed rooms (additional zone)	Heat pump convectors: ▪ In heating: 45°C ▪ In cooling: 12°C

Setup



A Additional leaving water temperature zone
B Room 1
C Room 2
D Main leaving water temperature zone
E Room 3
a Remote controller of the heat pump convectors
b User interface
c Mixing valve station
d Pressure regulating valve

INFORMATION

A pressure regulating valve should be implemented before the mixing valve station. This is to guarantee the correct water flow balance between the main leaving water temperature zone and the additional leaving water temperature zone in relation to the required capacity of both water temperature zones.

- For the main zone:
  - A mixing valve station is installed before the under floor heating.
  - The pump of the mixing valve station is controlled by the ON/OFF signal on the indoor unit (X2M/5 and X2M/7; normal closed shut-off valve output).
  - The room temperature is controlled by the user interface, which is used as room thermostat.

- For the additional zone:
  - The heat pump convectors are directly connected to the indoor unit.
  - The desired room temperature is set via the remote controller of the heat pump convectors for each room.
  - The heating or cooling demand signals of each heat pump convector are connected in parallel to the digital input on the indoor unit (X2M/1 and X2M/4). The indoor unit will only supply the desired additional leaving water temperature when there is an actual demand.
- The user interface connected to the indoor unit decides the space operation mode. Mind that the operation mode on each remote controller of the heat pump convectors must be set to match the indoor unit.

Configuration

Setting	Value
Unit temperature control: ▪ #: [A.2.1.7] ▪ Code: [C-07]	2 (RT control): Unit operation is decided based on the ambient temperature of the user interface. Note: ▪ Main room = user interface used as room thermostat functionality ▪ Other rooms = external room thermostat functionality
Number of water temperature zones: ▪ #: [A.2.1.8] ▪ Code: [7-02]	1 (2 LWT zones): Main + additional
In case of heat pump convectors: External room thermostat for the **additional** zone: ▪ #: [A.2.2.5] ▪ Code: [C-06]	1 (Thermo ON/OFF): When the used external room thermostat or heat pump convector can only send a thermo ON/OFF condition. No separation between heating or cooling demand.
Shut-off valve output	Set to follow the thermo demand of the main zone.
Shut-off valve	If the main zone must be shut off during cooling mode to prevent condensation on the floor, set it accordingly.
At the mixing valve station	Set the desired main leaving water temperature for heating and/or cooling.

Benefits

- **Comfort.**
  - The smart room thermostat functionality can decrease or increase the desired leaving water temperature based on the actual room temperature (modulation).
  - The combination of the two heat emitter systems provides the excellent heating comfort of the under floor heating, and the excellent cooling comfort of the heat pump convectors.
- **Efficiency.**
  - Depending on the demand, the indoor unit supplies different leaving water temperature matching the design temperature of the different heat emitters.
  - Under floor heating has the best performance with Altherma LT.

5.3 Setting up an auxiliary heat source for space heating

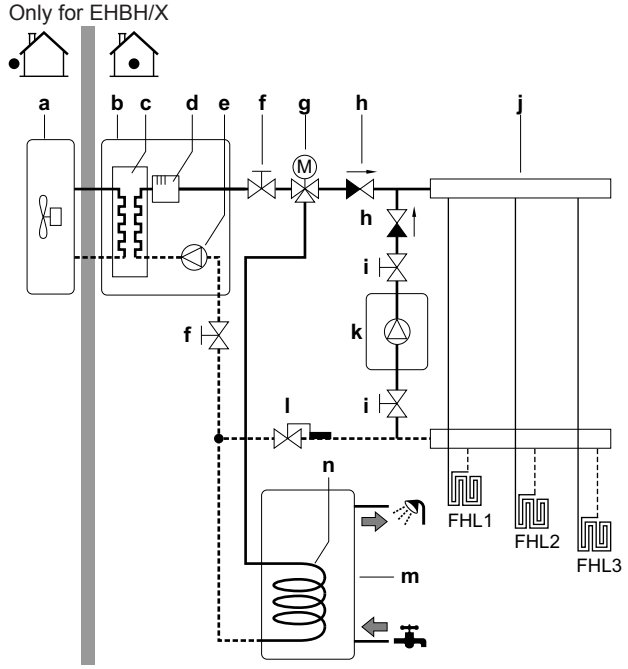
- Space heating can be done by:
  - The indoor unit
  - An auxiliary boiler (field supply) connected to the system
- When the room thermostat requests heating, the indoor unit or the auxiliary boiler starts operating depending on the outdoor temperature (status of the changeover to external heat source). When the permission is given to the auxiliary boiler, the space heating by the indoor unit is turned OFF.
- Bivalent operation is only possible for space heating, NOT for domestic hot water production. Domestic hot water is always produced by the DHW tank connected to the indoor unit.

INFORMATION

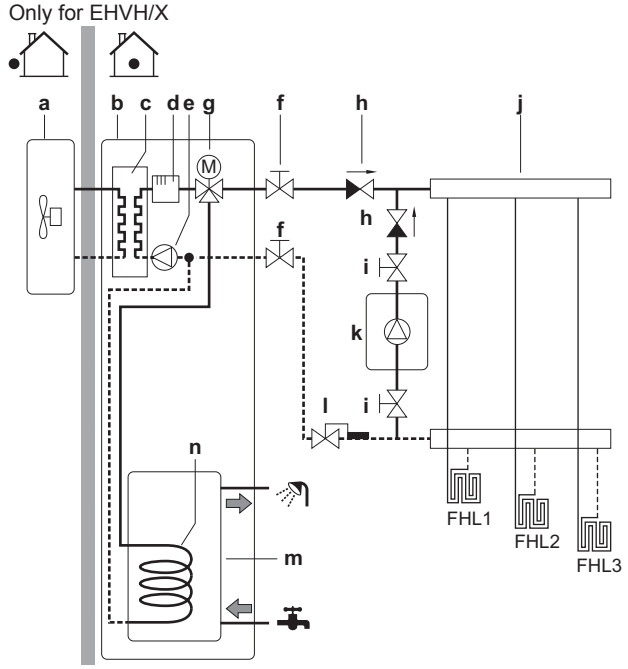
- During heating operation of the heat pump, the heat pump operates to achieve the desired temperature set via the user interface. When weather-dependent operation is active, the water temperature is determined automatically depending on the outdoor temperature.
- During heating operation of the auxiliary boiler, the auxiliary boiler operates to achieve the desired water temperature set via the auxiliary boiler controller.

Setup

- Integrate the auxiliary boiler as follows:
  Only for EHBH/X



Only for EHVH/X



a Outdoor unit
b Indoor unit
c Heat exchanger
d Backup heater
e Pump
f Shut-off valve
g Motorised 3-way valve (delivered with DHW tank)
h Non-return valve (field supply)
i Shut-off valve (field supply)
j Collector (field supply)
k Auxiliary boiler (field supply)
l Aquastat valve (field supply)
m DHW tank (EHBH/X: option)
n Heat exchanger coil
FHL1...3 Under floor heating

NOTICE

- Make sure the auxiliary boiler and its integration in the system complies with applicable legislation.
- Daikin is NOT responsible for incorrect or unsafe situations in the auxiliary boiler system.

- Make sure the return water to the heat pump does NOT exceed 55°C. To do so:
  - Set the desired water temperature via the auxiliary boiler controller to maximum 55°C.
  - Install an aquastat valve in the return water flow of the heat pump.
  - Set the aquastat valve to close above 55°C and to open below 55°C.
- Install non-return valves.
- Make sure to only have one expansion vessel in the water circuit. An expansion vessel is already premounted in the indoor unit.
- Install the digital I/O PCB (option EKRP1HB).
- Connect X1 and X2 (changeover to external heat source) on the PCB to the auxiliary boiler thermostat.
- To setup the heat emitters, see "5.2 Setting up the space heating/cooling system" on page 7.

Configuration

Via the user interface (quick wizard):

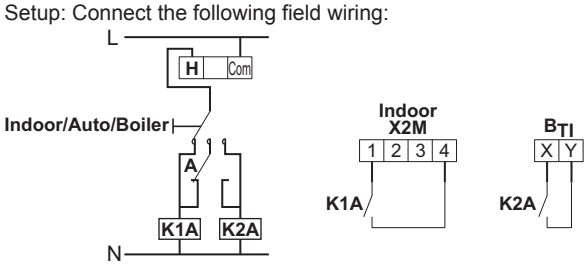
- Set the use of a bivalent system as external heat source.
- Set the bivalent temperature and hysteresis.

NOTICE

- Make sure the bivalent hysteresis has enough differential to prevent frequent changeover between indoor unit and auxiliary boiler.
- Because the outdoor temperature is measured by the outdoor unit air thermistor, install the outdoor unit in the shadow so that it is NOT influenced or turned ON/OFF by direct sunlight.
- Frequent changeover may cause corrosion of the auxiliary boiler. Contact the manufacturer of the auxiliary boiler for more information.

Changeover to external heat source decided by an auxiliary contact

- Only possible in external room thermostat control AND one leaving water temperature zone (see "5.2 Setting up the space heating/cooling system" on page 7).
- The auxiliary contact can be:
  - An outdoor temperature thermostat
  - An electricity tariff contact
  - A manually operated contact
  - …
- Setup: Connect the following field wiring:



B_{TI} Boiler thermostat input
A Auxiliary contact (normal closed)
H Heating demand room thermostat (optional)

K1A Auxiliary relay for activation of indoor unit (field supply)
K2A Auxiliary relay for activation of boiler (field supply)
Indoor Indoor unit
Auto Automatic
Boiler Boiler

NOTICE

- Make sure the auxiliary contact has enough differential or time delay to prevent frequent changeover between indoor unit and auxiliary boiler.
- If the auxiliary contact is an outdoor temperature thermostat, install the thermostat in the shadow so that it is NOT influenced or turned ON/OFF by direct sunlight.
- Frequent changeover may cause corrosion of the auxiliary boiler. Contact the manufacturer of the auxiliary boiler for more information.

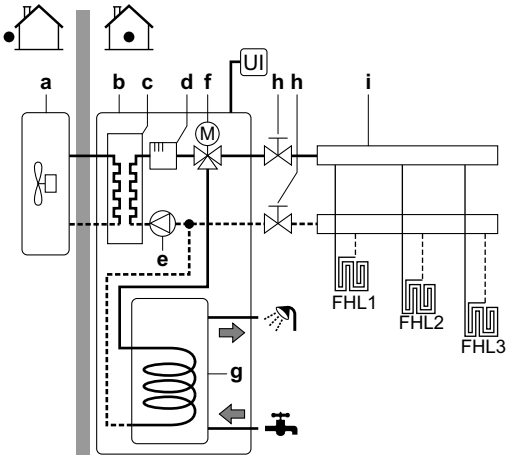
5.4 Setting up the domestic hot water tank

The DHW tank can be:

- Integrated in the indoor unit
- Installed standalone as option

5.4.1 System layout – Integrated DHW tank

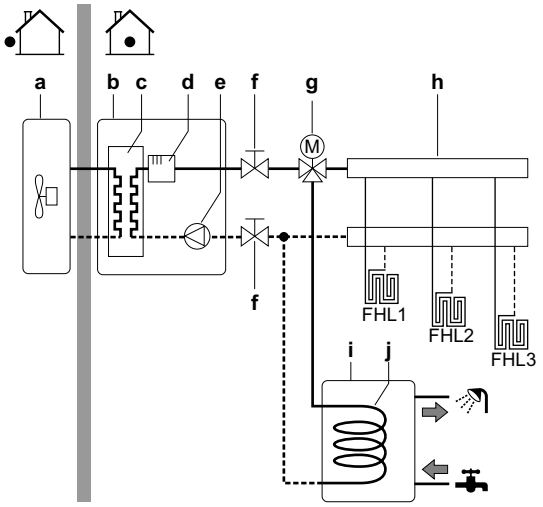
Only for EHVH/X.



a Outdoor unit
b Indoor unit
c Heat exchanger
d Backup heater
e Pump
f Motorised 3-way valve
g DHW tank
h Shut-off valve
i Collector (field supply)
FHL1...3 Under floor heating
UI User interface

5.4.2 System layout – Standalone DHW tank

Only for EHBH/X.



a Outdoor unit
b Indoor unit
c Heat exchanger
d Backup heater
e Pump
f Shut-off valve
g Motorised 3-way valve
h Collector (field supply)
i DHW tank
j Heat exchanger coil
FHL1...3 Under floor heating

5.4.3 Selecting the volume and desired temperature for the DHW tank

People experience water as hot when its temperature is 40°C. Therefore, the DHW consumption is always expressed as equivalent hot water volume at 40°C. However, you can set the DHW tank temperature at a higher temperature (example: 53°C), which is then mixed with cold water (example: 15°C).

Selecting the volume and desired temperature for the DHW tank consists of:

1 Determining the DHW consumption (equivalent hot water volume at 40°C).
2 Determining the volume and desired temperature for the DHW tank.

Possible DHW tank volumes

Type	Possible volumes
Integrated DHW tank	▪ 180 l ▪ 260 l
Standalone DHW tank	▪ 150 l ▪ 200 l ▪ 300 l

Energy saving tips

- If the DHW consumption differs from day to day, you can program a weekly schedule with different desired DHW tank temperatures for each day.
- The lower the desired DHW tank temperature, the more cost effective. By selecting a larger DHW tank, you can lower the desired DHW tank temperature.
- The heat pump itself can produce domestic hot water of maximum 55°C (50°C if outdoor temperature is low). The electrical resistance integrated in the heat pump can higher this temperature. However, this consumes more energy. Daikin recommends to set the desired DHW tank temperature below 55°C to avoid using the electrical resistance.

- The higher the outdoor temperature, the better the performance of the heat pump.
  - If energy prices are the same during the day and the night, Daikin recommends to heat up the DHW tank during the day.
  - If energy prices are lower during the night, Daikin recommends to heat up the DHW tank during the night.
- When the heat pump produces domestic hot water, it cannot heat up a space. When you need domestic hot water and space heating at the same, Daikin recommends to produce the domestic hot water during the night when there is lower space heating demand.

Determining the DHW consumption

Answer the following questions and calculate the DHW consumption (equivalent hot water volume at 40°C) using the typical water volumes:

Question	Typical water volume
How many showers are needed per day?	1 shower = 10 min x 10 l/min = 100 l
How many baths are needed per day?	1 bath = 150 l
How much water is needed at the kitchen sink per day?	1 sink = 2 min x 5 l/min = 10 l
Are there any other domestic hot water needs?	—

Example: If the DHW consumption of a family (4 persons) per day is as follows:

- 3 showers
- 1 bath
- 3 sink volumes

Then the DHW consumption = (3x100 l) + (1x150 l) + (3x10 l) = 480 l

Determining the volume and desired temperature for the DHW tank

Formula	Example
$V_1 = V_2 + V_2 \times (T_2-40) / (40-T_1)$	If: ▪ V_2 = 180 l ▪ T_2 = 54°C ▪ T_1 = 15°C Then V_1 = 280 l
$V_2 = V_1 \times (40-T_1) / (T_2-T_1)$	If: ▪ V_1 = 480 l ▪ T_2 = 54°C ▪ T_1 = 15°C Then V_2 = 307 l

V_1: DHW consumption (equivalent hot water volume at 40°C)
V_2: Required DHW tank volume if only heated once
T_2: DHW tank temperature
T_1: Cold water temperature

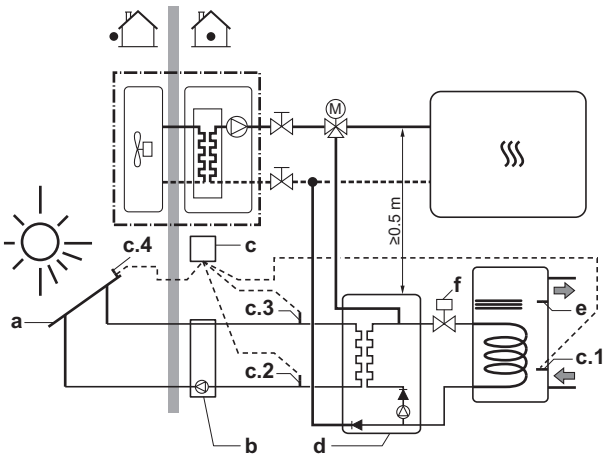
5.4.4 Setup and configuration – DHW tank

- For large DHW consumptions, you can heat up the DHW tank several times during the day.
- To heat up the DHW tank to the desired DHW tank temperature, you can use the following energy sources:
  - Thermodynamic cycle of the heat pump
  - Electrical backup heater (for integrated DHW tank)
  - Electrical booster heater (for standalone DHW tank)
  - Solar panels
- For more information about:
  - Optimizing the energy consumption for producing domestic hot water, see "8 Configuration" on page 33.
  - Connecting the electrical wiring of the standalone DHW tank to the indoor unit, see the installation manual of the DHW tank.
  - Connecting the water piping of the standalone DHW tank to the indoor unit, see the installation manual of the DHW tank.

5.4.5 Combination: Standalone DHW tank + Solar panels

By connecting the DHW tank to solar panels, the DHW tank can be heated by solar energy.

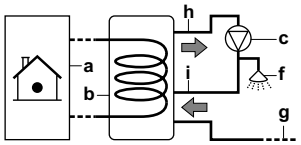
For installation instructions, see the installation manual of the solar kit and addendum book for optional equipment.



a Solar panels
b Solar pump station
c Solar pump station controller with temperature sensors
c1 Tank temperature sensor
c2 Return temperature sensor to solar panels
c3 Supply temperature with flow meter from solar panels
c4 Solar panel temperature sensor
d Solar kit
e DHW temperature sensor of the unit
f Solenoid 2-way valve (only for UK). Obligatory for compliance to UK building regulation G3.
Heating system
Example of unit

5.4.6 DHW pump for instant hot water

Setup



a Indoor unit
b DHW tank
c DHW pump
f Shower
g Cold water
h Domestic hot water OUT
i Recirculation connection

- By connecting a DHW pump, instant hot water can be available at the tap.
- The DHW pump and the installation are field supply and the responsibility of the installer.

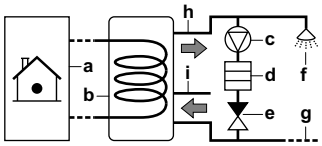
- For more information about connecting the recirculation connection:
  - for integrated DHW tank, see "7 Installation" on page 24,
  - for separate DHW tank, see installation manual of DHW tank.

Configuration

- For more information, see "8 Configuration" on page 33.
- You can program a schedule to control the DHW pump via the user interface. For more information, see the user reference guide.

5.4.7 DHW pump for disinfection

Setup



a Indoor unit
b DHW tank
c DHW pump
d Heater element
e Non-return valve
f Shower
g Cold water
h Domestic hot water OUT
i Recirculation connection

- The DHW pump and the installation are field supply and the responsibility of the installer.
- For the integrated DHW tank, the temperature of the DHW tank can be set to maximum 60°C. If applicable legislation requires higher temperature for disinfection, you can connect a DHW pump and heater element as shown above.
- If applicable legislation requires disinfection of the water piping until the tapping point, you can connect a DHW pump and heater element (if needed) as shown above.

Configuration

The indoor unit can control DHW pump operation. For more information, see "8 Configuration" on page 33.

5.5 Setting up the energy metering

- Via the user interface, you can read out the following energy data:
  - Produced heat
  - Consumed energy
- You can read out the energy data:
  - For space heating
  - For space cooling
  - For domestic hot water production
- You can read out the energy data:
  - Per month
  - Per year

INFORMATION

The calculated produced heat and consumed energy are an estimation, the accuracy cannot be guaranteed.

5.5.1 Produced heat

- Applicable for all models.
- The produced heat is calculated internally based on:
  - The leaving and entering water temperature
  - The flow rate
  - The power consumption of the booster heater (if applicable) in the domestic hot water tank
- Setup and configuration:
  - No additional equipment needed.
  - Only in case a booster heater is present in the system, measure its capacity (resistance measurement) and set the capacity via the user interface. Example: If you measure a booster heater resistance of 17.1 Ω, the capacity of the heater at 230 V is 3100 W.

5.5.2 Consumed energy

You can use the following methods to determine the consumed energy:

- Calculating
- Measuring

INFORMATION

You cannot combine calculating the consumed energy (example: for backup heater) and measuring the consumed energy (example: for outdoor unit). If you do so, the energy data will be invalid.

Calculating the consumed energy

- Only applicable for EHBH/X04+08 and EHVH/X04+08.
- The consumed energy is calculated internally based on:
  - The actual power input of the outdoor unit
  - The set capacity of the backup heater and booster heater
  - The voltage
- Setup and configuration: To get accurate energy data, measure the capacity (resistance measurement) and set the capacity via the user interface for:
  - The backup heater (step 1 and step 2)
  - The booster heater

Measuring the consumed energy

- Applicable for all models.
- Preferred method because of higher accuracy.
- Requires external power meters.
- Setup and configuration:
  - For the specifications of each type of meter, see "14 Technical data" on page 66.
  - When using electrical power meters, set the number of pulses/kWh for each power meter via the user interface. Consumed energy data for EHVH/X16 and EHBH/X16 models will only be available if this setting is configured.

INFORMATION

When measuring the electrical power consumption, make sure ALL power input of the system is covered by the electrical power meters.

5.5.3 Normal kWh rate power supply

General rule

One power meter that covers the entire system is sufficient.

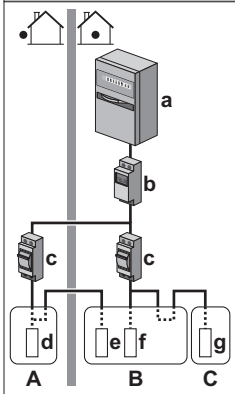
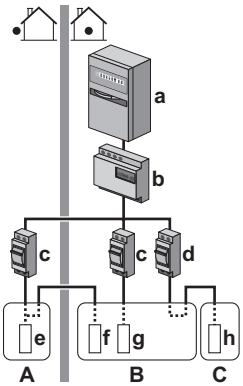
Setup

Connect the power meter to X5M/7 and X5M/8.

Power meter type

In case of…	Use a… power meter
▪ Single-phase outdoor unit ▪ Backup heater supplied from a single-phase grid (i.e. the backup heater model is *3V or *9W connected to a single-phase grid)	Single-phase
In other cases (i.e. a three-phase outdoor unit and/or a *9W backup heater model connected to a three-phase grid)	Three-phase

Example

Single-phase power meter	Three-phase power meter
	
A Outdoor unit	**A** Outdoor unit
B Indoor unit	**B** Indoor unit
C DHW tank	**C** DHW tank
a Electrical cabinet (L_1/N)	**a** Electrical cabinet (L_1/L_2/L_3/N)
b Power meter (L_1/N)	**b** Power meter (L_1/L_2/L_3/N)
c Fuse (L_1/N)	**c** Fuse (L_1/L_2/L_3/N)
d Outdoor unit (L_1/N)	**d** Fuse (L_1/N)
e Indoor unit (L_1/N)	**e** Outdoor unit (L_1/L_2/L_3/N)
f Backup heater (L_1/N)	**f** Indoor unit (L_1/L_2/L_3/N)
g Booster heater (L_1/N)	**g** Backup heater (L_1/L_2/L_3/N)
	h Booster heater (L_1/N)

Exception

- You can use a second power meter if:
  - The power range of one meter is insufficient.
  - The electrical meter cannot easily be installed in the electrical cabinet.
  - 230 V and 400 V three-phase grids are combined (very uncommon), because of technical limitations of power meters.
- Connection and setup:
  - Connect the second power meter to X5M/9 and X5M/10.
  - In the software the power consumption data of both meters is added so you do NOT have to set which meter covers which power consumption. You only need to set the number of pulses of each power meter.
- See "5.5.4 Preferential kWh rate power supply" on page 17 for an example with two power meters.

5.5.4 Preferential kWh rate power supply

General rule

- Power meter 1: Measures the outdoor unit.
- Power meter 2: Measures the rest (i.e. indoor unit, backup heater and optional booster heater).

Setup

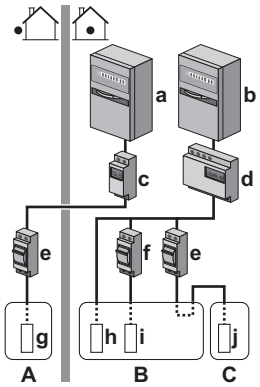
- Connect power meter 1 to X5M/7 and X5M/8.
- Connect power meter 2 to X5M/9 and X5M/10.

Power meter types

- Power meter 1: Single- or three-phase power meter according to the power supply of the outdoor unit.
- Power meter 2:
  - In case of a single-phase backup heater configuration, use a single-phase power meter.
  - In other cases, use a three-phase power meter.

Example

Single-phase outdoor unit with a three-phase backup heater:



A Outdoor unit
B Indoor unit
C DHW tank
a Electrical cabinet (L_1/N): Preferential kWh rate power supply
b Electrical cabinet (L_1/L_2/L_3/N): Normal kWh rate power supply
c Power meter (L_1/N)
d Power meter (L_1/L_2/L_3/N)
e Fuse (L_1/N)
f Fuse (L_1/L_2/L_3/N)
g Outdoor unit (L_1/N)
h Indoor unit (L_1/L_2/L_3/N)
i Backup heater (L_1/L_2/L_3/N)
j Booster heater (L_1/N)

5.6 Setting up the power consumption control

- The power consumption control:
  - Is only applicable for EHBH/X04+08 and EHVH/X04+08.
  - Allows you to limit the power consumption of the entire system (sum of outdoor unit, indoor unit, backup heater and optional booster heater).
  - Configuration: Set the power limitation level and how it has to be achieved via the user interface.
- The power limitation level can be expressed as:
  - Maximum running current (in A)
  - Maximum power input (in kW)
- The power limitation level can be activated:
  - Permanently
  - By digital inputs

INFORMATION

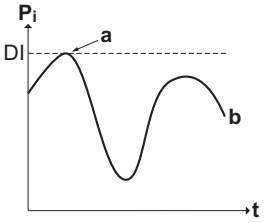
Power consumption control CANNOT be used in applications with booster heater.

5.6.1 Permanent power limitation

Permanent power limitation is useful to assure a maximum power or current input of the system. In some countries, legislation limits the maximum power consumption for space heating and DHW production. Example: The maximum power input depends on the area of the house and an annual fee has to be paid to the electrical company according to the size of the installed field fuse. By permanently limiting the maximum power or current of the system, you can install smaller field fuses.

NOTICE

When the current control is intended to reduce the installed field fuse sizes, the field fuse will trip to protect the field wires in case of overcurrents caused by the unit. Make sure the selection of the field fuse complies with applicable legislation.



P_i Power input
t Time
DI Digital input (power limitation level)
a Power limitation active
b Actual power input

Setup and configuration

- No additional equipment needed.
- Set the power consumption control settings in [A.6.3.1] via the user interface (for the description of all settings, see "8 Configuration" on page 33):
  - Select full time limitation mode
  - Select the type of limitation (power in kW or current in A)
  - Set the desired power limitation level

NOTICE

Mind the following guidelines when selecting the desired power limitation level:

- Set a minimum power consumption of ±3.6 kW to guarantee defrost operation. Otherwise, if defrosting is interrupted several times, the heat exchanger will freeze up.
- Set a minimum power consumption of ±3 kW to guarantee space heating and DHW production by allowing at least one electrical heater (backup heater step 1 or booster heater).

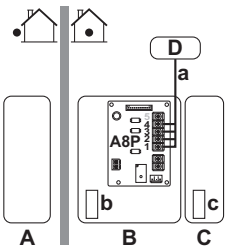
5.6.2 Power limitation activated by digital inputs

Power limitation is also useful in combination with an energy management system.

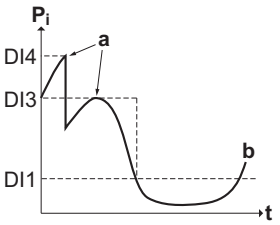
The power or current of the entire Daikin system is limited dynamically by digital inputs (maximum four steps). Each power limitation level is set via the user interface by limiting one of the following:

- Current (in A)
- Power input (in kW)

The energy management system (field supply) decides the activation of a certain power limitation level. Example: To limit the maximum power of the entire house (lighting, domestic appliances, space heating…).



A Outdoor unit
B Indoor unit
C DHW tank
D Energy management system
a Power limitation activation (4 digital inputs)
b Backup heater
c Booster heater



P_i Power input
t Time
DI Digital inputs (power limitation levels)
a Power limitation active
b Actual power input

Setup

- Demand PCB (option EKRP1AHTA) needed.
- Maximum four digital inputs are used to activate the corresponding power limitation level:
  - DI1 = weakest limitation (highest energy consumption)
  - DI4 = strongest limitation (lowest energy consumption)
- For the specification and the connection of the digital inputs, see "14.5 Wiring diagram – components: Indoor unit" on page 72.

Configuration

Set the power consumption control settings in [A.6.3.1] via the user interface (for the description of all settings, see "8 Configuration" on page 33):

- Select activation by digital inputs.
- Select the type of limitation (power in kW or current in A).
- Set the desired power limitation level corresponding to each digital input.

INFORMATION

In case more than 1 digital input is closed (at the same time), the digital input priority is fixed: DI4 priority>…>DI1.

5.6.3 Power limitation process

The outdoor unit has better efficiency than the electrical heaters. Therefore, the electrical heaters are limited and turned OFF first. The system limits power consumption in the following order:

1 Limits certain electrical heaters.

If… has priority	Then set the heater priority via the user interface to…
Domestic hot water production	Booster heater. Result: The backup heater will be turned OFF first.
Space heating	Backup heater. Result: The booster heater will be turned OFF first.

2 Turns OFF all electrical heaters.

3 Limits the outdoor unit.

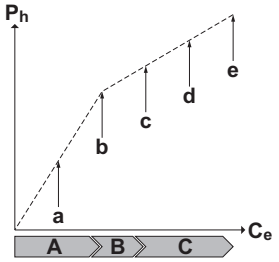
4 Turns OFF the outdoor unit.

Example

If the configuration is as follows:

- Power limitation level does NOT allow operation of both booster heater and backup heater (step 1 and step 2).
- Heater priority = Booster heater.

Then power consumption is limited as follows:



P_h Produced heat
C_e Consumed energy
A Outdoor unit
B Booster heater
C Backup heater
a Limited outdoor unit operation
b Full outdoor unit operation
c Booster heater turned ON
d Backup heater step 1 turned ON
e Backup heater step 2 turned ON

5.7 Setting up an external temperature sensor

You can connect one external temperature sensor. It can measure the indoor or outdoor ambient temperature. Daikin recommends to use an external temperature sensor in the following cases:

Indoor ambient temperature

- In room thermostat control, the user interface is used as room thermostat and it measures the indoor ambient temperature. Therefore, the user interface must be installed on a location:
  - Where the average temperature in the room can be detected
  - That is NOT exposed to direct sunlight
  - That is NOT near a heat source
  - That is NOT affected by outside air or air draught because of, for example, door opening/closing
- If this is NOT possible, Daikin recommends to connect a remote indoor sensor (option KRCS01-1).
- Setup: For installation instructions, see the installation manual of the remote indoor sensor.
- Configuration: Select room sensor [A.2.2.B].

Outdoor ambient temperature

- In the outdoor unit, the outdoor ambient temperature is measured. Therefore, the outdoor unit must be installed on a location:
  - At the north side of the house or at the side of the house where the most heat emitters are located
  - That is NOT exposed to direct sunlight
- If this is NOT possible, Daikin recommends to connect a remote outdoor sensor (option EKRSCA1).
- Setup: For installation instructions, see the installation manual of the remote indoor sensor.
- Configuration: Select outdoor sensor [A.2.2.B].
- During suspend (see "8 Configuration" on page 33), the outdoor unit is turned down to reduce the standby energy losses. As a result, the outdoor ambient temperature is NOT read out.
- If the desired leaving water temperature is weather dependent, the full time outdoor temperature measurement is important. This is another reason to install the optional outdoor ambient temperature sensor.

INFORMATION

The external outdoor ambient sensor data (either averaged or instantaneous) is used in the weather-dependent control curves and in the automatic heating/cooling changeover logic. To protect the outdoor unit, the internal sensor of the outdoor unit is always used.

6 Preparation

6.1 Preparing installation site

Do NOT install the unit in places often used as work place. In case of construction works (e.g. grinding works) where a lot of dust is created, the unit must be covered.

Choose the installation location with sufficient place for carrying the unit in and out of the site.

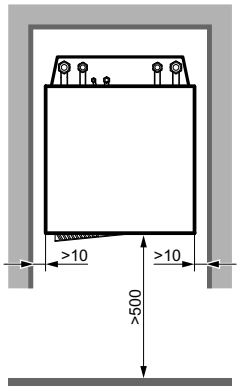
6.1.1 Installation site requirements of the indoor unit

- Mind the measurement guidelines:

Maximum refrigerant piping length between indoor unit and outdoor unit	75 m[(a)]
Minimum refrigerant piping length between indoor unit and outdoor unit	3 m[(b)]
Maximum height difference between indoor unit and outdoor unit	30 m

(a) Check the outdoor unit installation manual.
(b) When <5 m, you need to recharge the outdoor unit (check the outdoor unit installation manual).

- Mind the following spacing installation guidelines:



(mm)

Do NOT install the unit in places such as:

- Where there is mist of mineral oil, oil spray or vapour.
  Plastic parts may deteriorate, and cause them to fall out or water to leak.
- Do NOT install the unit in sound sensitive areas (e.g. near a bedroom and the like), so that the operation noise will cause no trouble.
  Note: If the sound is measured under actual installation conditions, the measured value will be higher than the sound pressure level mentioned in "14.8 Sound spectrum" on page 83 due to environmental noise and sound reflections.
- The foundation must be strong enough to bear the weight of the unit. Take the weight of the unit with a domestic hot water tank full of water into account.
  Make sure, in the event of a water leak, water cannot cause any damage to the installation space and surroundings.
- In places with high humidity (max. RH=85%), for example a bathroom.
- In places where frost is possible. Ambient temperature around the indoor unit should be >5°C.
- The indoor unit is designed for indoor installation only and for ambient temperatures ranging 5~35°C in cooling mode and 5~30°C in heating mode.

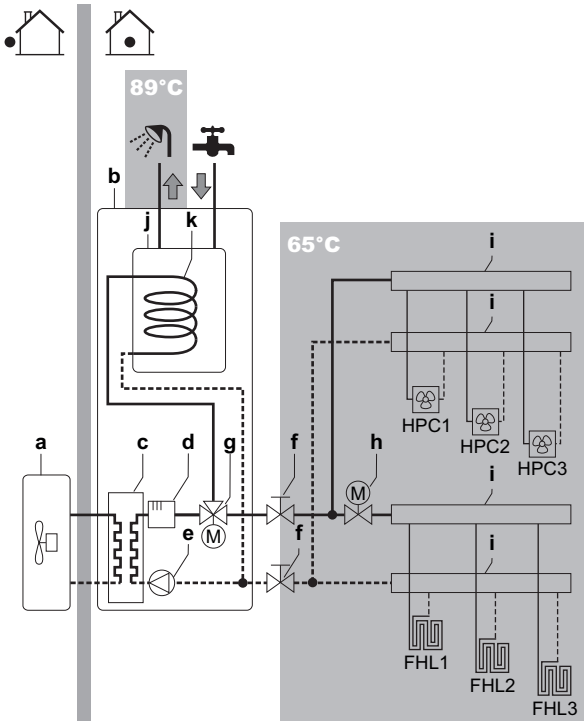
6.2 Preparing water piping

6.2.1 Water circuit requirements

- Use the indoor unit only in a closed water system.
  Using the system in an open water system will lead to excessive corrosion.
- The maximum water pressure is 4 bar.
  Provide adequate safeguards in the water circuit to ensure that the maximum pressure is NOT exceeded.
- All installed piping and piping accessories (valve, connections,…) must withstand the following temperatures:

INFORMATION

The following illustration is an example and may NOT match your system layout.



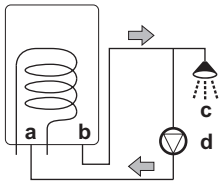
a Outdoor unit
b Indoor unit
c Heat exchanger
d Backup heater
e Pump
f Stop valve
g Motorised 3-way valve
h Motorised 2-way valve (field supply)
i Collector
j Domestic hot water tank
k Heat exchanger coil
HPC1...3 Heat pump convector (optional)
FHL1...3 Floor heating loop

- Make all water piping connections in accordance with the applicable legislation and the outlook diagram that is delivered with the unit, respecting the water inlet and outlet.
- Do NOT use excessive force when connecting the piping. Deformation of the piping can cause malfunctioning of the unit.
- Provide drain taps at all low points of the system in order to allow complete drainage of the water circuit.
- Provide a proper drain for the pressure relief valve to avoid water dripping out of the unit. See "7.3.2 To connect the pressure relief valve to the drain" on page 26.
- Provide air vents at all high points of the system, which must also be easily accessible for servicing. An automatic air purge is provided in the indoor unit. Check that the air purge is NOT tightened too much, so that automatic release of air in the water circuit is possible.
- Only use materials that are compatible with water used in the system and with the materials used in the indoor unit.
- Check that all components in the field piping can withstand the water pressure and water temperature.
- When using non-brass metallic piping, insulate the brass and non-brass properly so that they do NOT make contact with each other. This to prevent galvanic corrosion.
- Never use Zn-coated parts in the water circuit. Because the unit's internal water circuit uses copper piping, excessive corrosion may occur.
- Only use appropriate tooling to handle brass, which is a soft material. If NOT, pipes will get damaged.

- Select the water piping diameter in relation to the required water flow and the available external static pressure of the pump. See "14 Technical data" on page 66 for the external static pressure curves of the indoor unit.
- You can find the minimum required water flow for the indoor unit operation in the following table. When the water flow is lower, flow error 7H will be displayed and the indoor unit will be stopped.

Model	Minimum water flow (l/min)
04	5
08+16	11

- When using a 3-way valve in the water circuit make sure that the domestic hot water circuit and the floor heating circuit is fully separated.
- When using a 2-way valve or a 3-way valve in the water circuit, the maximum change-over time of the valve must be 60 seconds.
- It is strongly recommended to install an additional filter on the heating water circuit. Especially to remove metallic particles from the filed heating piping, it is advised to use a magnetic or cyclone filter, which can remove small particles. Small particles may damage the unit and will NOT be removed by the standard filter of the heat pump system.
- If air, moisture or dust gets into the water circuit, problems may occur. To prevent this:
  - Only use clean pipes
  - Hold the pipe end downwards when removing burrs.
  - Cover the pipe end when inserting it through a wall, to prevent dust and/or particles entering the pipe.
  - Use a decent thread sealant to seal connections.
- For safety reasons, it is NOT allowed to add any kind of glycol to the water circuit.
- To avoid stagnation of water, it is important that the storage capacity of the domestic hot water tank meets the daily consumption of domestic hot water.
  In cases where during longer periods of time there is no consumption of hot water, the equipment must be flushed with fresh water before usage.
  The disinfection function provided on the equipment is specified in the operation manual of the indoor unit.
- It is recommended to avoid long runs of piping between the domestic hot water tank and the hot water end point (shower, bath,…) and to avoid dead ends.
- The installation must be in compliance with the applicable legislation and may require additional hygienic installation measures.
- In accordance with the applicable legislation, it may be necessary to install thermostatic mixing valves.
- Immediately after installation, the domestic hot water tank must be flushed with fresh water. This procedure must be repeated at least once a day the first 5 consecutive days after installation.
- In accordance with the applicable legislation, it may be required to connect a recirculation pump in between the hot water end point and the recirculation connection of the domestic hot water tank.



a Recirculation connection
b Hot water connection
c Shower
d Recirculation pump

6.2.2 Formula to calculate the expansion vessel pre-pressure

The pre-pressure (Pg) of the vessel depends on the installation height difference (H):

Pg=0.3+(H/10) (bar)

6.2.3 To check the water volume

The indoor unit has an expansion vessel of 10 litre with a factory set pre-pressure of 1 bar.

To make sure that the unit operates properly:

- You must check the minimum and maximum water volume.
- You might need to adjust the pre-pressure of the expansion vessel.

Minimum water volume

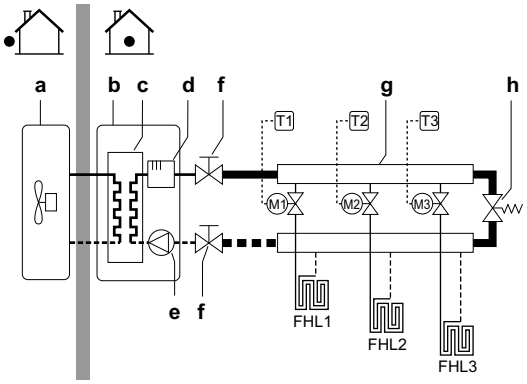
Check that the total water volume in the installation is minimum 20 liter, the internal water volume of the indoor unit NOT included.

INFORMATION

In critical processes, or in rooms with a high heat load, extra water might be required.

NOTICE

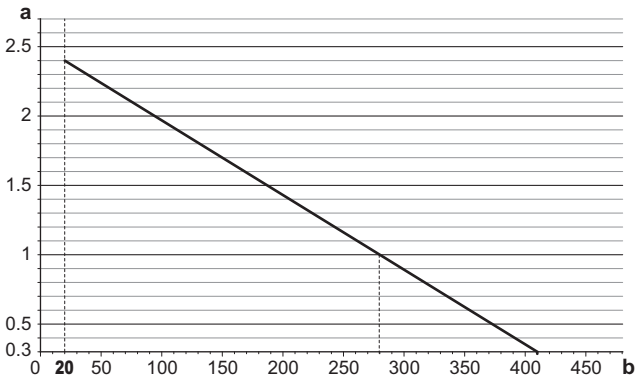
When circulation in each space heating loop is controlled by remotely controlled valves, it is important that the minimum water volume is guaranteed, even if all of the valves are closed.



a Outdoor unit
b Indoor unit
c Heat exchanger
d Backup heater
e Pump
f Shut-off valve
g Collector (field supply)
h By-pass valve (field supply)
FHL1...3 Floor heating loop (field supply)
T1...3 Individual room thermostat (optional)
M1...3 Individual motorised valve to control loop FHL1...3 (field supply)

Maximum water volume

Use the following graph to determine the maximum water volume for the calculated pre-pressure.



a Pre-pressure (bar)
b Maximum water volume (l)

Example: Maximum water volume and expansion vessel pre-pressure

Installation height difference[(a)]	Water volume	
	≤280 l	>280 l
≤7 m	No pre-pressure adjustment is required.	Do the following: ▪ Decrease the pre-pressure. ▪ Check if the water volume does NOT exceed the maximum allowed water volume.
>7 m	Do the following: ▪ Increase the pre-pressure. ▪ Check if the water volume does NOT exceed the maximum allowed water volume.	The expansion vessel of the indoor unit is too small for the installation.

(a) This is the height difference (m) between the highest point of the water circuit and the indoor unit. If the indoor unit is at the highest point of the installation, the installation height is 0 m.

6.2.4 Changing the pre-pressure of the expansion vessel

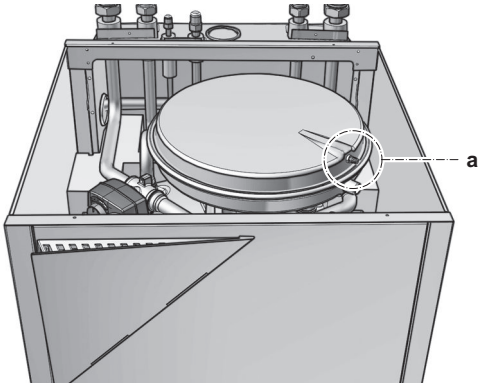
NOTICE

Only a licensed installer may adjust the pre-pressure of the expansion vessel.

When changing the default pre-pressure of the expansion vessel (1 bar) is required, take following guidelines into account:

- Only use dry nitrogen to set the expansion vessel pre-pressure.
- Inappropriate setting of the expansion vessel pre-pressure will lead to malfunction of the system.

Changing the pre-pressure of the expansion vessel should be done by releasing or increasing nitrogen pressure through the schräder valve of the expansion vessel.



a Schräder valve

6.2.5 To check the water volume: Examples

Example 1

The indoor unit is installed 5 m below the highest point in the water circuit. The total water volume in the water circuit is 100 l.

No actions or adjustments are required.

Example 2

The indoor unit is installed at the highest point in the water circuit. The total water volume in the water circuit is 350 l.

Actions:

- Because the total water volume (350 l) is more than the default water volume (280 l), the pre-pressure must be decreased.
- The required pre-pressure is:
  Pg = (0.3+(H/10)) bar = (0.3+(0/10)) bar=0.3 bar.
- The corresponding maximum water volume at 0.3 bar is 410 l. (See the graph in the chapter above).
- Because 350 l is lower than 410 l, the expansion vessel is appropriate for the installation.

6.3 Preparing electrical wiring

6.3.1 About preparing electrical wiring

WARNING

- If the power supply has a missing or wrong N-phase, equipment will break down.
- Establish proper earthing. Do NOT earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earthing may cause electrical shock.
- Install the required fuses or circuit breakers.
- Secure the electrical wiring with cable ties so that the cables do NOT come in contact with the piping or sharp edges, particularly on the high-pressure side
- Do NOT use taped wires, stranded conductor wires, extension cords, or connections from a star system. They can cause overheating, electrical shock or fire.
- Do NOT install a phase advancing capacitor, because this unit is equipped with an inverter. A phase advancing capacitor will reduce performance and may cause accidents.

WARNING

- All wiring must be performed by an authorized electrician and must comply with the applicable legislation.
- Make electrical connections to the fixed wiring.
- All components procured on the site and all electrical construction must comply with the applicable legislation.

WARNING

The backup heater should have a dedicated power supply.

WARNING

Always use multicore cable for power supply cables.

6.3.2 About preferential kWh rate power supply

Electricity companies throughout the world work hard to provide reliable electric service at competitive prices and are often authorized to bill clients at benefit rates. E.g. time-of-use rates, seasonal rates, Wärmepumpentarif in Germany and Austria, ...

This equipment allows for connection to such preferential kWh rate power supply delivery systems.

Consult with the electricity company acting as provider at the site where this equipment is to be installed to know whether it is appropriate to connect the equipment in one of the preferential kWh rate power supply delivery systems available, if any.

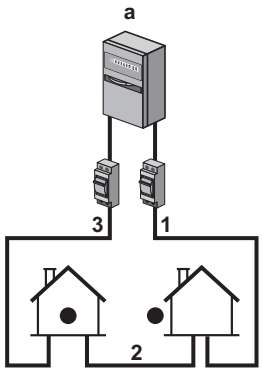
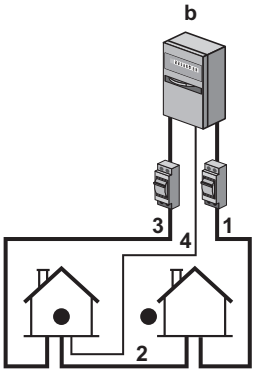
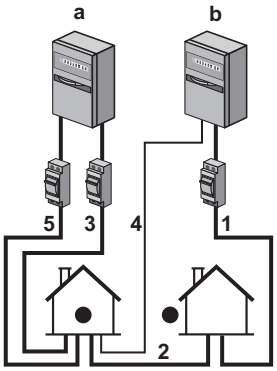
When the equipment is connected to such preferential kWh rate power supply, the electricity company is allowed to:

- interrupt power supply to the equipment for certain periods of time;
- demand that the equipment only consumes a limited amount of electricity during certain periods of time.

The indoor unit is designed to receive an input signal by which the unit switches into forced off mode. At that moment, the outdoor unit compressor will not operate.

Whether the power supply is interrupted or not, the wiring to the unit is different.

6.3.3 Overview of electrical connections except external actuators

Normal power supply	Preferential kWh rate power supply	
	Power supply is NOT interrupted	Power supply is interrupted
		
	During preferential kWh rate power supply activation, power supply is NOT interrupted. The outdoor unit is turned off by the control. **Remark:** The electricity company must always allow the power consumption of the indoor unit.	During preferential kWh rate power supply activation, power supply is interrupted immediately or after some time by the electricity company. In this case, the indoor unit must be powered by a separate normal power supply.

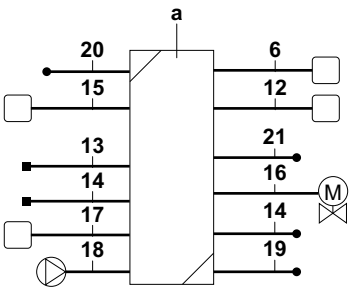
a Normal power supply
b Preferential kWh rate power supply
1 Power supply for outdoor unit
2 Power supply and interconnection cable to indoor unit
3 Power supply for backup heater
4 Preferential kWh rate power supply (voltage free contact)
5 Normal kWh rate power supply (to power the indoor unit PCB in the event of power supply interruption of the preferential kWh rate power supply)

6.3.4 Overview of electrical connections for external and internal actuators

The following illustration shows the required field wiring.

INFORMATION

The following illustration is an example and may NOT match your system layout.



a Indoor unit

Item	Description	Wires	Maximum running current
Outdoor unit and indoor unit power supply			
1	Power supply for outdoor unit	2+GND or 3+GND	(a)
2	Power supply and interconnection cable to indoor unit	3	(c)

Item	Description	Wires	Maximum running current
3	Power supply for backup heater	See table below.	—
4	Preferential kWh rate power supply (voltage free contact)	2	(d)
5	Normal kWh rate power supply	2	6.3 A
User interface			
6	User interface	2	(e)
Optional equipment			
11	Power supply for bottom plate heater	2	(b)
12	Room thermostat	3 or 4	100 mA(b)
13	Outdoor ambient temperature sensor	2	(b)
14	Indoor ambient temperature sensor	2	(b)
15	Heat pump convector	4	100 mA(b)
Field supplied components			
16	Shut-off valve	2	100 mA(b)
17	Electricity meter	2 (per meter)	(b)
18	Domestic hot water pump	2	(b)
19	Alarm output	2	(b)
20	Changeover to external heat source control	2	(b)
21	Space cool/heat operation control	2	(b)
22	Power consumption digital inputs	2 (per input signal)	(b)

(a) Refer to name plate on outdoor unit.
(b) Minimum cable section 0.75 mm².
(c) Cable section 2.5 mm².
(d) Cable section 0.75 mm² till 1.25 mm²; maximum length: 50 m. Voltage-free contact shall ensure the minimum applicable load of 15 V DC, 10 mA.
(e) Cable section 0.75 mm² till 1.25 mm²; maximum length: 500 m. Applicable for both single user interface and dual use interface connection.

NOTICE

More technical specifications of the different connections are indicated on:

- Wiring diagram in the switch box of the unit
- "14.5 Wiring diagram" on page 72

Backup heater type	Power supply	Required number of conductors
*3V	1x 230 V	2+GND
*9W	1x 230 V	2+GND + 2 bridges
	3x 230 V	3+GND + 1 bridge
	3x 400 V	4+GND

7 Installation

7.1 Opening the units

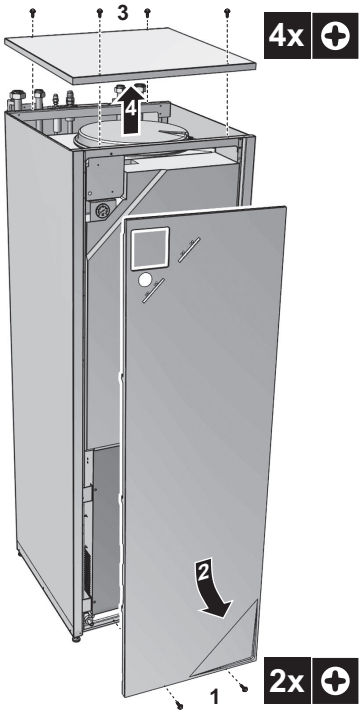
7.1.1 To open the indoor unit

1 Loosen and remove the screws at the bottom of the unit.
2 Slide the front panel of the unit downwards and remove it.

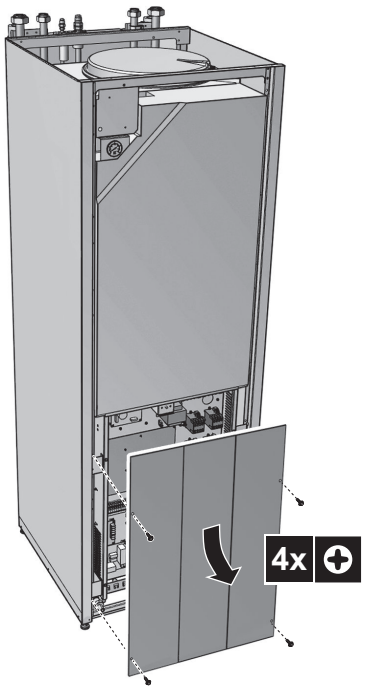
CAUTION

The front panel is heavy. Be careful NOT to jam your fingers when opening or closing the unit.

3 Loosen and remove the 4 screws that fix the top panel.
4 Remove the top panel from the unit.



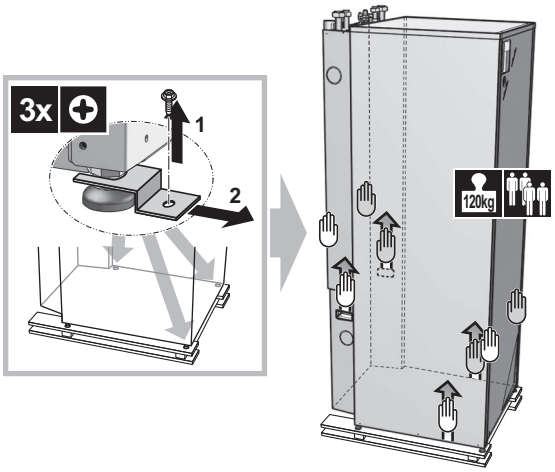
7.1.2 To open the switch box cover of the indoor unit



7.2 Mounting the indoor unit

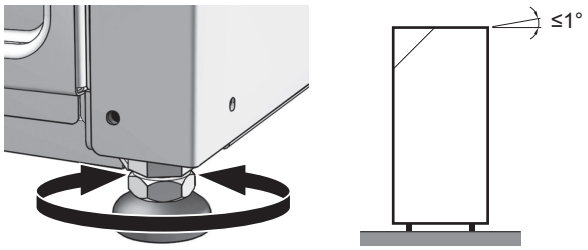
7.2.1 To install the indoor unit

1 Lift the indoor unit from the pallet and place it on the floor.



2 Slide the indoor unit into position.

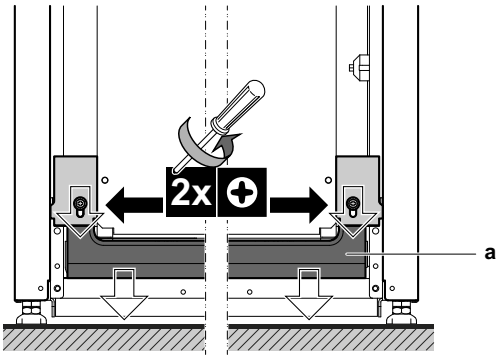
3 Adjust the height of the leveling feet to compensate for floor irregularities. The maximum allowed deviation is 1°.



7.2.2 To lower the sound plate

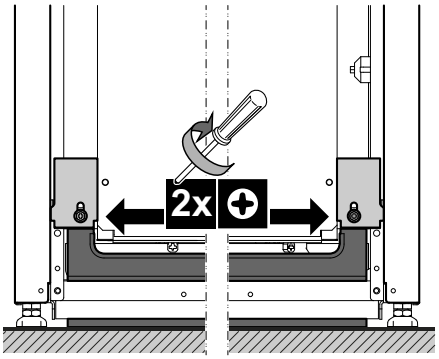
Only applicable for EHVH/X16.

1 Loosen the 2 screws and lower the sound plate as shown in the illustration below.



a Sound plate

2 Tighten the 2 screws.



7.3 Connecting the water piping

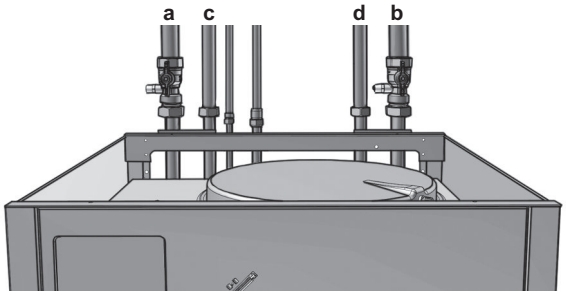
7.3.1 To connect the water piping

NOTICE

Do NOT use excessive force when connecting the piping. Deformation of the piping can cause malfunctioning of the unit.

To facilitate service and maintenance, 2 shut-off valves are provided. Mount the valves on the water inlet and on the water outlet. Mind their the position. Orientation of the integrated drain and fill valves is important for servicing.

1 Install the shut-off valves on the water pipes.



a Space heating/cooling water out
b Space heating/cooling water in
c Domestic hot water out
d Domestic cold water in (cold water supply)

NOTICE

It is recommended to install shut-off valves to domestic cold water in and domestic hot water out connections. Shut-off valves are field supplied.

NOTICE

To avoid damage to the surroundings in case of water leakage, it is recommended to close the cold water inlet stop valves during periods of absence.

2 Screw the indoor unit nuts on the shut-off valves.

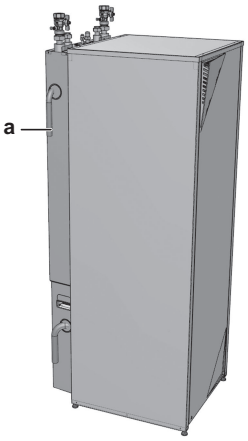
3 Connect the domestic hot water in and out pipes to the indoor unit.

NOTICE

- A drain device and pressure relief device should be installed on the cold water inlet connection of the domestic hot water cylinder.
- To avoid back siphonage, it is recommended to install a non-return valve on the water inlet of the domestic hot water tank in accordance with the applicable legislation.
- It is recommended to install a pressure reducing valve on the cold water inlet in accordance with the applicable legislation.
- An expansion vessel should be installed on the cold water inlet in accordance with the applicable legislation.
- It is recommended to install the pressure relief valve on higher position as top of the domestic hot water tank.
  Heating of the domestic hot water tank causes water to expand and without pressure relief valve the water pressure inside the tank can rise above the tank design pressure. Also the field installation (piping, tapping points, etc.) connected to the tank is subjected to this high pressure. To prevent this, a pressure relieve valve needs to be installed.
  The overpressure prevention depends on the correct operation of the field installed pressure relief valve. If this is NOT working correctly, overpressure will deform the tank and water leakage may occur. To confirm good operation, regular maintenance is required.

7.3.2 To connect the pressure relief valve to the drain

The blow out of the pressure relief valve is coming out of the backside of the unit.

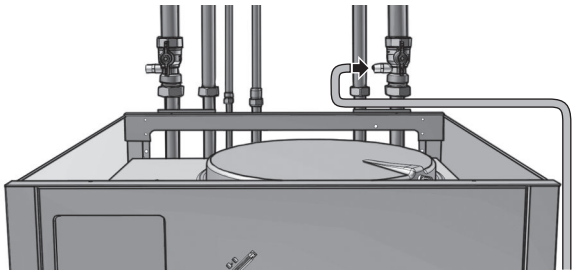


a Pressure relief blow-out

The blow out should be connected to an appropriate drain according to the applicable legislation. It is recommended to use a tundish.

7.3.3 To fill the water circuit

1 Connect the water supply hose to the fill valve.



2 Open the fill valve.

3 Make sure that the automatic air purge valve is open (at least 2 turns).

INFORMATION

For location of the air purge valve, see "14.2.1 Components: Indoor unit" on page 68.

4 Fill the circuit with water until the manometer indicates a pressure of ±2.0 bar.

5 Purge as much air as possible from the water circuit.

NOTICE

- Air in the water circuit can cause malfunctioning of the backup heater. During filling, it may not be possible to remove all the air from the circuit. Remaining air will be removed through the automatic air purge valves during the initial operating hours of the system. Additional filling with water afterwards may be required.
- To purge the system, use the special function as described in the chapter "9 Commissioning" on page 58. This function should be used to purge the heat exchanger coil of the domestic hot water tank.

6 Close the fill valve.

7 Disconnect the water supply hose from the fill valve.

NOTICE

The water pressure indicated on the manometer will vary depending on the water temperature (higher pressure at higher water temperature).

However, at all times water pressure shall remain above 1 bar to avoid air entering the circuit.

7.3.4 To fill the domestic hot water tank

1 Open every hot water tap in turn to purge air from the system pipe work.

2 Open the cold water supply valve.

3 Close all water taps after all air is purged.

4 Check for water leaks.

5 Manually operate the field installed pressure relief valve to ensure that free water flow through the discharge pipe.

7.3.5 To insulate the water piping

The piping in the complete water circuit must be insulated to prevent condensation during cooling operation and reduction of the heating and cooling capacity.

If the temperature is higher than 30°C and the humidity is higher than RH 80%, the thickness of the sealing materials should be at least 20 mm to prevent condensation on the surface of the sealing.

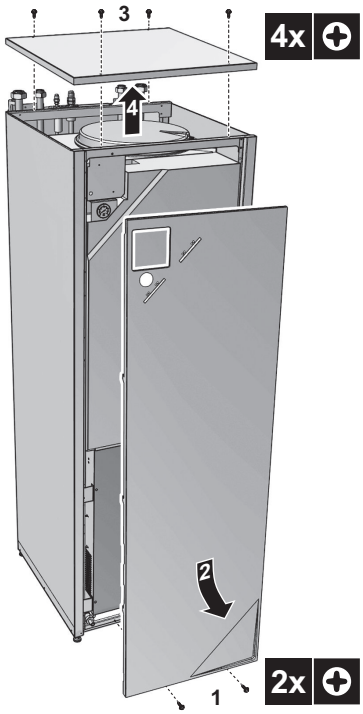
7.3.6 To connect the recirculation piping

1 Loosen and remove the screws at the bottom of the unit.

2 Slide the front panel of the unit downwards and remove it.

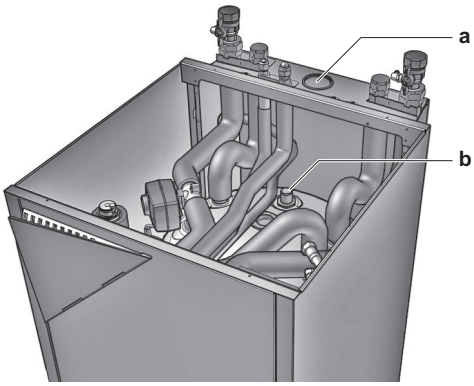
3 Loosen and remove the 4 screws that fix the top panel.

4 Remove the top panel from the unit.



5 Remove the expansion vessel.

6 Remove the upper insulation cover of the unit.

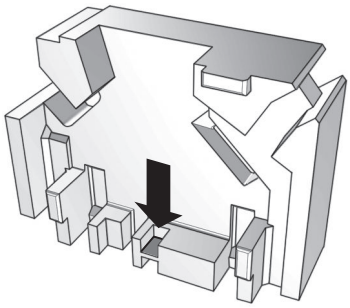


a Knock-out hole
b Connection for recirculation piping

7 Remove the knock-out hole at the backside of the unit.

8 Connect the recirculation piping to the recirculation connection and route the piping through the knock-out hole at the backside of the unit.

9 Remove the indicated part in the figure below.



10 Re-attach the insulation, expansion vessel and casing.

7.4 Connecting the electrical wiring

DANGER: RISK OF ELECTROCUTION

INFORMATION

More information about the legend and the location of the wiring diagram of the unit can be found in "14.5 Wiring diagram" on page 72.

WARNING

Always use multicore cable for power supply cables.

7.4.1 About electrical compliance

Only for ERLQ006CAV3+ERLQ008CAV3

Equipment complying with EN/IEC 61000-3-12 (European/ International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase.).

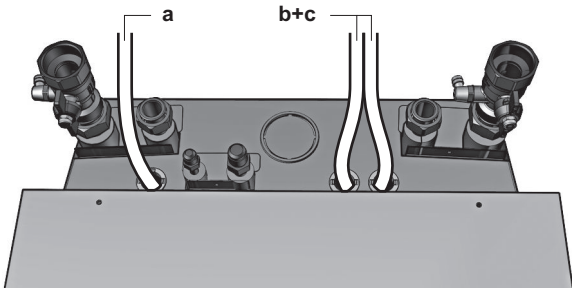
Only for indoor units

See "7.4.4 To connect the backup heater power supply" on page 29.

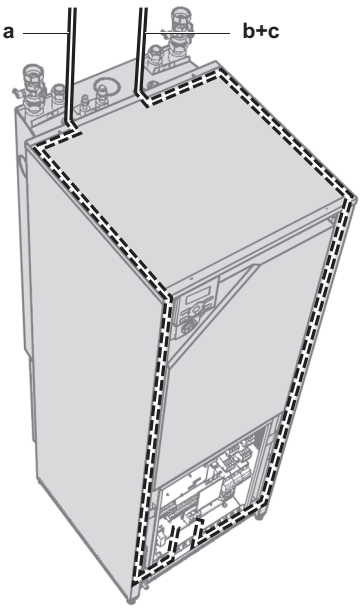
7.4.2 To connect the electrical wiring on the indoor unit

1 To open the indoor unit, see "7.1.1 To open the indoor unit" on page 24 and "7.1.2 To open the switch box cover of the indoor unit" on page 24.

2 Wiring should enter the unit from the top:



3 Routing of the wiring inside the unit should be as follows:



4 Fix the cable with cable ties to the cable tie mountings to ensure strain relief and to make sure that it does NOT come in contact with the piping and sharp edges.

INFORMATION

Only applicable for indoor units with 260 liter tank. To access the domestic hot water temperature sensor, the switch box can be tilt. The switch box should NOT be removed from the unit.

Routing	Possible cables (depending on unit type and installed options)
a Low voltage	▪ User interface ▪ Power consumption digital inputs (field supply) ▪ Outdoor ambient temperature sensor (option) ▪ Indoor ambient temperature sensor (option) ▪ Electrical meters (field supply)
b High voltage power supply	▪ Interconnection cable ▪ Normal kWh rate power supply ▪ Preferential kWh rate power supply ▪ Power supply for backup heater ▪ Power supply for bottom plate heater (option)
c High voltage control signal	▪ Preferential power supply contact ▪ Heat pump convector (option) ▪ Room thermostat (option) ▪ Shut-off valve (field supply) ▪ Domestic hot water pump (field supply) ▪ Alarm output ▪ Changeover to external heat source control ▪ Space cool/heat operation control

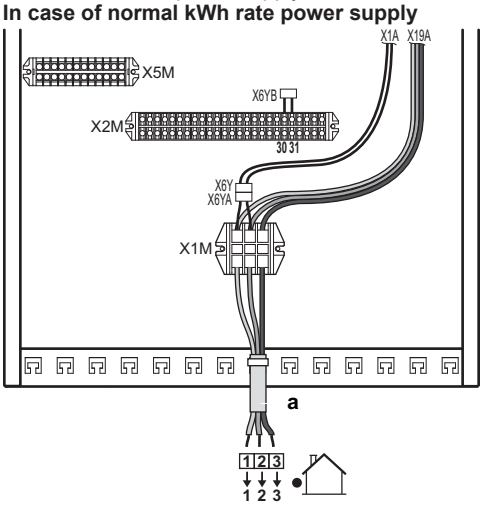
CAUTION

Do NOT push or place redundant cable length in the unit.

7.4.3 To connect the main power supply

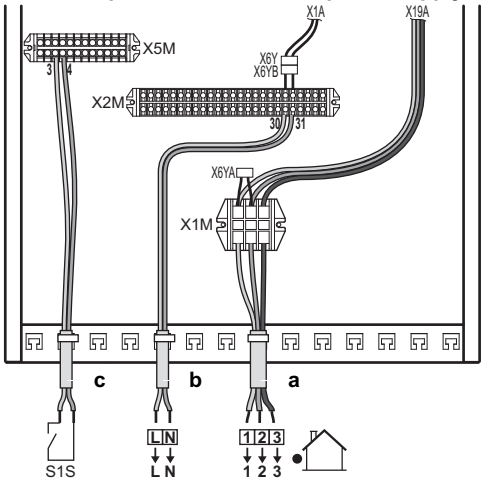
1 Connect the main power supply.

In case of normal kWh rate power supply



Legend: see illustration below.

In case of preferential kWh rate power supply



a Interconnection cable (=main power supply)
b Normal kWh rate power supply
c Preferential power supply contact

2 Fix the cable with cable ties to the cable tie mountings.

INFORMATION

In case of preferential kWh rate power supply, the necessity of separate normal kWh rate power supply to indoor unit (b) X2M30/31 depends on the type of preferential kWh rate power supply.

Separate connection to the indoor unit is required:

- if preferential kWh rate power supply is interrupted when active, OR
- if no power consumption of the indoor unit is allowed at the preferential kWh rate power supply when active.

7.4.4 To connect the backup heater power supply

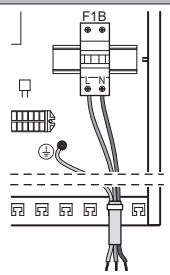
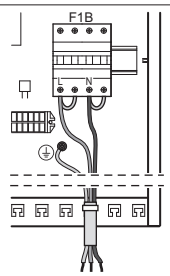
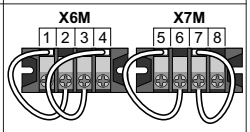
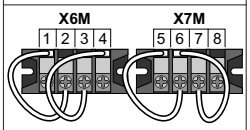
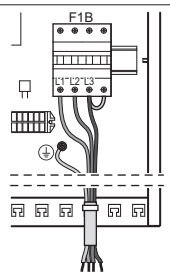
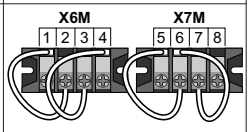
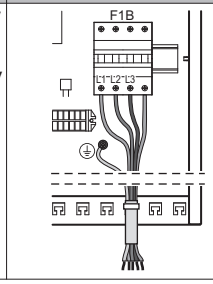
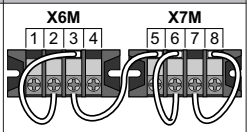
The backup heater capacity can vary, depending on the indoor unit model. Make sure that the power supply is in accordance with the backup heater capacity, as listed in the table below.

Backup heater type	Backup heater capacity	Power supply	Maximum running current	Z_{max}(Ω)
*3V	3 kW	1~ 230 V	13 A	—
*9W	3 kW	1~ 230 V	13 A	—
	6 kW	1~ 230 V	26 A[(a)(b)]	0.29
	6 kW	3~ 230 V	15 A[(b)]	—
	6 kW	3N~ 400 V	8.6 A	—
	9 kW	3N~ 400 V	13 A	—

(a) Equipment complying with EN/IEC 61000-3-12 (European/ International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase.).

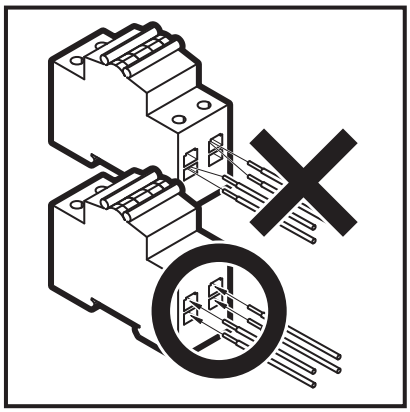
(b) This equipment complies with EN/IEC 61000-3-11 (European/ International Technical Standard setting the limits for voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤75 A) provided that the system impedance Z_{sys} is less than or equal to Z_{max} at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a system impedance Z_{sys} less than or equal to Z_{max}.

1 Connect the backup heater power supply.
For *3V models, use a single pole fuse for F1B. For *9W models, use a double pole fuse for F1B.

Backup heater type[(a)]	Connections to backup heater power supply	Connections to terminals
3 kW 1~ 230 V (*3V)		—
3 kW 1~ 230 V (*9W)		
6 kW 1~ 230 V (*9W)		
6 kW 3~ 230 V (*9W)		
6 kW 3N~ 230 V (*9W) 9 kW 3N~ 400 V (*9W)		

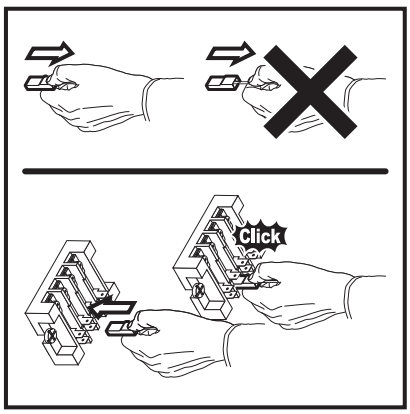
(a) For configuration of the backup heater, see "8.2.2 Quick wizard: Standard" on page 35.

Special remark for fuses:



Special remark for terminals:

As mentioned on the table above, the connections on the terminals X6M and X7M need to be changed to configure a backup heater. Refer to the illustration below as a caution about handling the terminals.



2 Fix the cable with cable ties to the cable tie mountings.

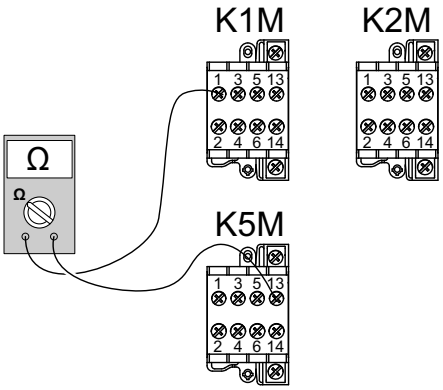
3 Configure the user interface for the respective power supply. See "8.2.2 Quick wizard: Standard" on page 35.

During connection of the backup heater, miswiring is possible. To detect possible miswiring, it is highly recommended to measure the resistance value of the heater elements. Depending on the different backup heater types, following resistance values (see table below) should be measured. ALWAYS measure the resistance on the contactor clamps K1M, K2M, and K5M.

		3 kW 1~ 230 V	6 kW 1~ 230 V	6 kW 3~ 230 V	6 kW 3N~ 400 V	9 kW 3N~ 400 V
K1M/1	K5M/13	52.9Ω	52.9Ω	52.9Ω	∞	∞
	K1M/3	∞	∞	∞	105.8Ω	105.8Ω

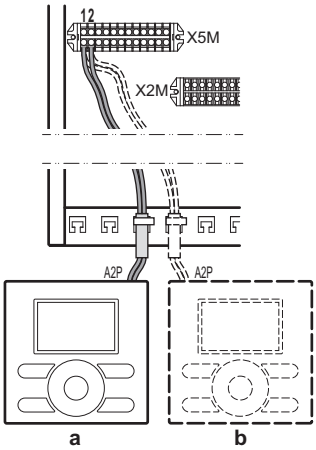
		3 kW 1~ 230 V	6 kW 1~ 230 V	6 kW 3~ 230 V	6 kW 3N~ 400 V	9 kW 3N~ 400 V
	K1M/5	∞	∞	∞	105.8Ω	105.8Ω
K1M/3	K1M/5	26.5Ω	26.5Ω	26.5Ω	105.8Ω	105.8Ω
K2M/1	K5M/13	∞	26.5Ω	26.5Ω	∞	∞
	K2M/3	∞	∞	∞	52.9Ω	52.9Ω
	K2M/5	∞	∞	∞	52.9Ω	52.9Ω
K2M/3	K2M/5	52.9Ω	52.9Ω	52.9Ω	52.9Ω	52.9Ω
K1M/5	K2M/1	∞	∞	∞	∞	∞

Example measure resistance between K1M/1 and K5M/13:



7.4.5 To connect the user interface

1 Connect the user interface cable to the indoor unit.

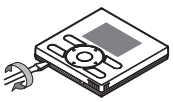


a User interface delivered with the unit
b Optional user interface

2 Fix the cable with cable ties to the cable tie mountings.

To fix the user interface to the unit

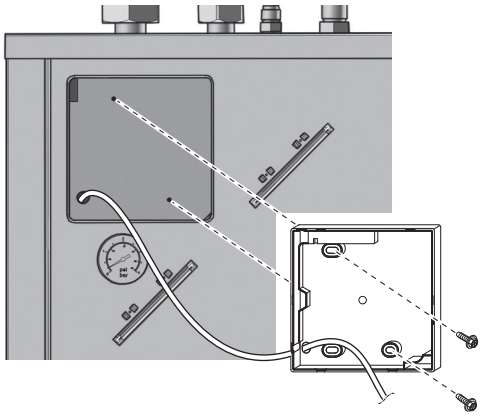
1 Insert a screwdriver into the slots underneath the user interface and carefully separate the faceplate from the wallplate.



NOTICE

The PCB is mounted in the faceplate of the user interface. Be careful NOT to damage it.

2 Fix the wallplate of the user interface to the frontplate of the unit.



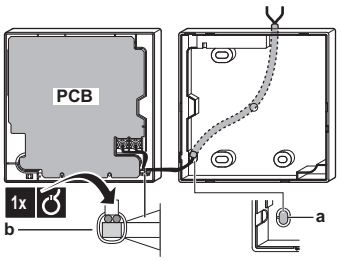
NOTICE

Be careful NOT to distort the shape of the backside of the user interface by overtightening the mounting screws.

3 Cut off a 2 wire conductor.

4 Connect the wires to the user interface as shown below.

From the rear



a Notch this part for the wiring to pass through with nippers etc.
b Secure the wiring to the front part of the casing using the wiring retainer and clamp.

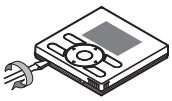
5 Reinstall the faceplate onto the wallplate.

NOTICE

Be careful NOT to pinch the wiring when attaching the frontplate to the unit.

To fix the user interface to the wall in case of installation as room thermostat

1 Insert a screwdriver into the slots underneath the user interface and carefully separate the faceplate from the wallplate.



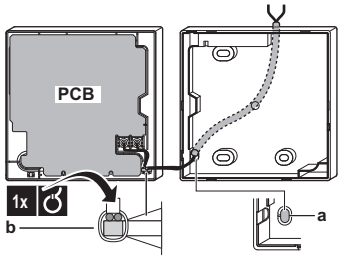
NOTICE

The PCB is mounted in the faceplate of the user interface. Be careful NOT to damage it.

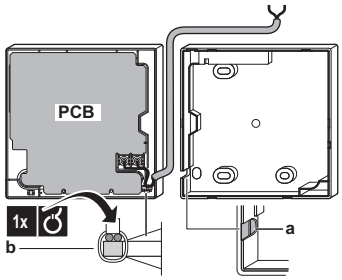
2 Fix the wallplate of the user interface to the wall.

3 Connect the wires to the user interface as shown below

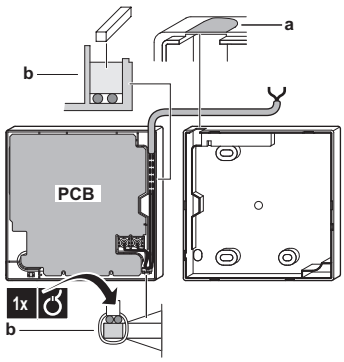
From the rear



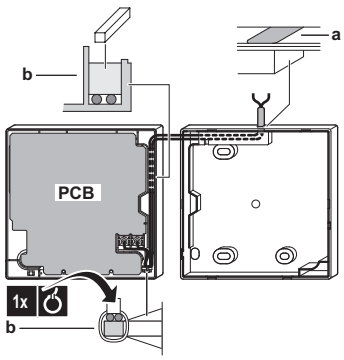
From the left



From the top



From the top center



a Notch this part for the wiring to pass through with nippers etc.

b Secure the wiring to the front part of the casing using the wiring retainer and clamp.

4 Reinstall the faceplate onto the wallplate.

NOTICE

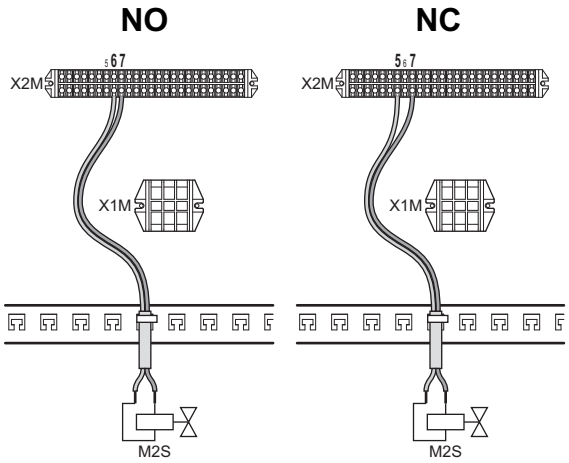
Be careful NOT to pinch the wiring when attaching the frontplate to the unit.

7.4.6 To connect the shut-off valve

1 Connect the valve control cable to the appropriate terminals as shown in the illustration below.

NOTICE

Wiring is different for a NC (normal closed) valve and a NO (normal open) valve.



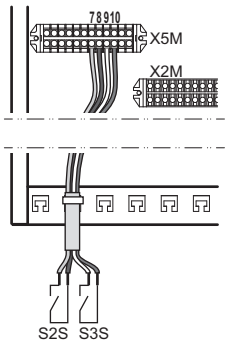
2 Fix the cable with cable ties to the cable tie mountings.

7.4.7 To connect the electrical meters

INFORMATION

In case of an electrical meter with transistor output, check the polarity. The positive polarity MUST be connected to X5M/7 and X5M/9; the negative polarity to X5M/8 and X5M/10.

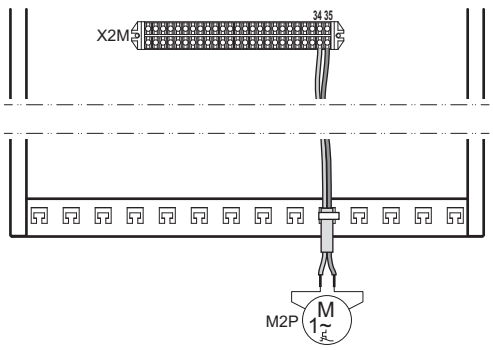
1 Connect the electrical meters cable to the appropriate terminals as shown in the illustration below.



2 Fix the cable with cable ties to the cable tie mountings.

7.4.8 To connect the domestic hot water pump

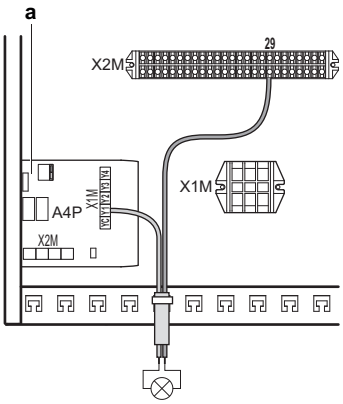
1 Connect the domestic hot water pump cable to the appropriate terminals as shown in the illustration below.



2 Fix the cable with cable ties to the cable tie mountings.

7.4.9 To connect the alarm output

1 Connect the alarm output cable to the appropriate terminals as shown in the illustration below.

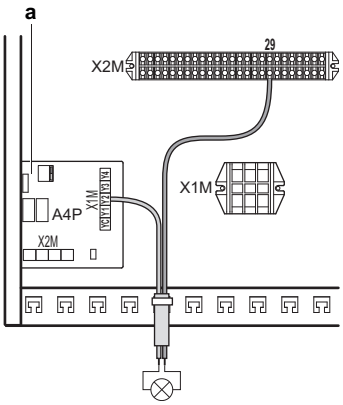


a Installation of EKRP1HB is required.

2 Fix the cable with cable ties to the cable tie mountings.

7.4.10 To connect the space cooling/heating ON/OFF output

1 Connect the space cooling/heating ON/OFF output cable to the appropriate terminals as shown in the illustration below.

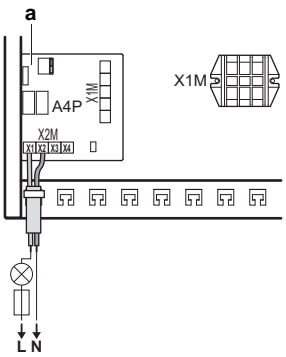


a Installation of EKRP1HB is required.

2 Fix the cable with cable ties to the cable tie mountings.

7.4.11 To connect the changeover to external heat source

1 Connect the changeover to external heat source cable to the appropriate terminals as shown in the illustration below.

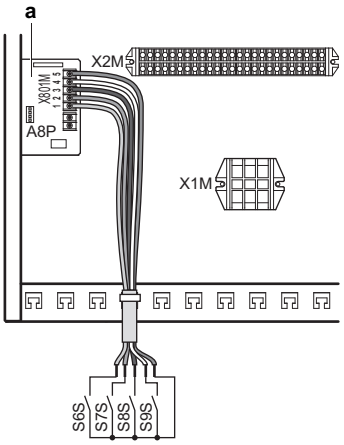


a Installation of EKRP1HB is required.

2 Fix the cable with cable ties to the cable tie mountings.

7.4.12 To connect the power consumption digital inputs

1 Connect the power consumption digital inputs cable to the appropriate terminals as shown in the illustration below.



a Installation of EKRP1AHTA is required.

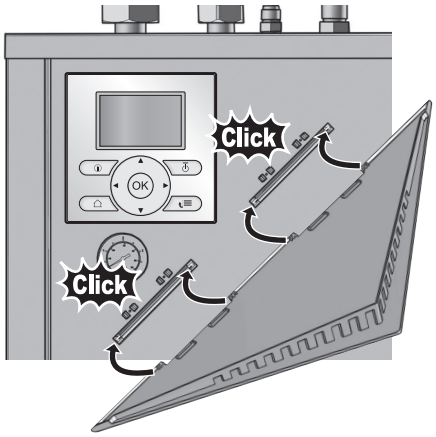
2 Fix the cable with cable ties to the cable tie mountings.

7.5 Finishing the indoor unit installation

7.5.1 To fix the user interface cover to the indoor unit

1 Make sure that the front panel is removed from the indoor unit. See "7.1.1 To open the indoor unit" on page 24.

2 Plug the user interface cover into the hinges.



3 Mount the front panel to the indoor unit.

7.5.2 To close the indoor unit

1 Close the switch box cover.

2 Reinstall the top plate.

3 Reinstall the front panel.

NOTICE

When closing the indoor unit cover, make sure that the tightening torque does NOT exceed 4.1 N•m.

8 Configuration

8.1 Overview: Configuration

If you do NOT configure the system correctly, it might NOT work as expected. You can configure the system with the user interface.

When you turn ON the user interface for the first time (via the indoor unit), a quick wizard starts to help you configure the system. If necessary, you can also make changes to the configuration afterwards.

The installer can prepare the configuration off-site on PC and afterwards upload the configuration to the system with the PC configurator. See "8.1.1 To connect the PC cable to the switch box" on page 33 for more information about the connection.

The configuration influences the following:

- The calculations of the software
- What you can see on and do with the user interface

Legend for the settings tables:

- **#**: Breadcrumb in the menu structure
- **Code**: Code in the overview settings

When the installer settings are changed, the system will request to confirm. When confirmation is complete, the screen will shortly turn OFF and "busy" will be displayed for several seconds.

The most commonly used installation settings are accessible through the menu structure. Their location is mentioned by the breadcrumb indication (#). Additionally, all installer settings can also be found in "8.5 Menu structure: Overview installer settings" on page 57.

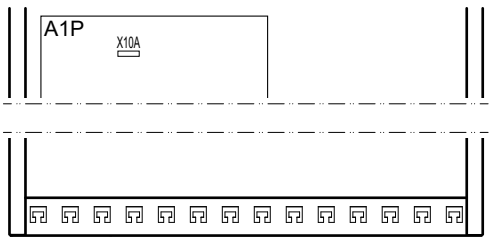
For access to the setting codes, see "To access the installer settings" on page 33.

Not all settings are accessible through the menu structure. Some are only accessible through their code. Then in the table explained below, the bread crumb is set as N/A (not applicable).

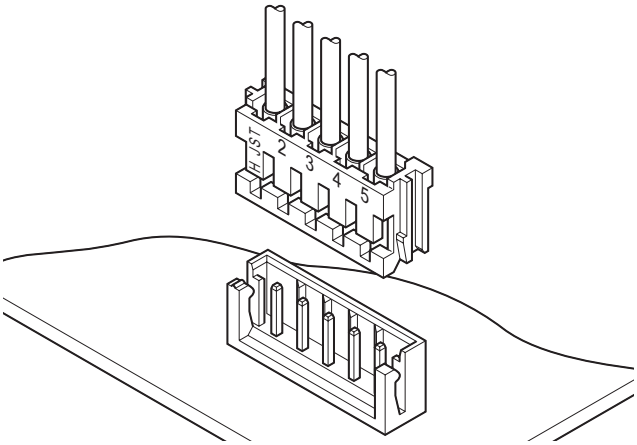
8.1.1 To connect the PC cable to the switch box

1 Connect the cable with USB connection to your PC.

2 Connect the plug of the cable to X10A on A1P of the switch box of the indoor unit.



3 Pay special attention to the position of the plug!



8.1.2 To access the most used commands

To access the installer settings

1 Set the user permission level to Installer.

2 Go to [A]: ☰ > Installer settings.

To access the overview settings

1 Set the user permission level to Installer.

2 Go to [A.8]: ☰ > Installer settings > Overview settings.

To set the user permission level to Installer

1 Go to [6.4]: ☰ > Information > User permission level.

2 Press ☰ for more than 4 seconds.

Result: 🔧 is displayed on the home pages.

3 If you do NOT press any button for more than 1 hour or press ⓘ again for more than 4 seconds, the installer permission level switches back to End user.

To switch between user permission levels (End user and Advanced end user)

1 Go to [6] or any of its submenus: ☰ > Information.

2 Press ⓘ for more than 4 seconds.

Result: The user permission level switches to Adv. end user. Additional information is displayed and "+" is added to the menu title.

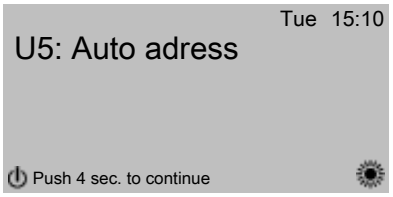
3 If you do NOT press any button for more than 1 hour or press ⓘ again for more than 4 seconds, the user permission level switches back to End user.

8.1.3 To copy the system settings from the first to the second user interface

If an optional user interface is connected, the installer must first proceed below instructions for the proper configuration of the two user interfaces.

This procedure offers you also the possibility to copy the language set from one user interface to the other one: e.g. from EKRUCAL2 to EKRUCAL1.

1 When power is turned on for the first time, both user interfaces display:



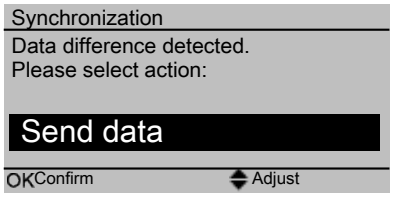
2 Push ⏻ for 4 sec. on the user interface on which you want to proceed to the quick wizard.

INFORMATION

During the quick wizard, the second user interface displays Busy and will not be possible to operate.

3 The quick wizard will guide you.

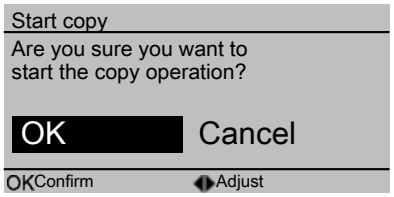
4 For proper operation of the system, the local data on the two user interfaces must be the same. If this is not the case, both user interfaces will display:



5 Select the required action:

- Send data: the user interface you are operating contains the correct data and the data on the other user interface will be overwritten.
- Receive data: the user interface you are operating doesn't contain the correct data and the data on the other user interface will be used to overwrite.

6 The user interface requests confirmation if you are sure to proceed.



7 Confirm the selection on the screen by pushing OK and all data (languages, schedules etc.) will be synchronised from the selected source user interface to the other one.

INFORMATION

- During the copying, both controllers display Busy and will not be possible to operate. Please do not power off or disconnect the user interface.
- The copy operation can take uptil 90 minutes.

8 Your system is now set to be operated by the two user interfaces.

8.1.4 To copy the language set from the first to the second user interface

See "8.1.3 To copy the system settings from the first to the second user interface" on page 33.

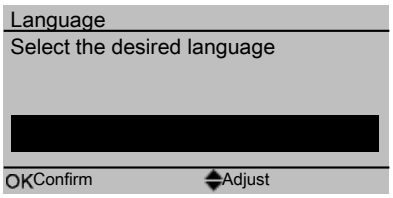
8.1.5 Quick wizard: Set the system layout after first power ON

After first power ON of the system, you are guided on the user interface to do initial settings:

- language,
- date,
- time,
- system layout.

By confirming the system layout, you can proceed with the installation and commissioning of the system.

1 At power ON, the quick wizard starts as long as the system layout was NOT confirmed yet, by setting the language.

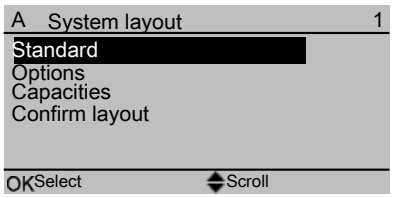


2 Set the current date and time.

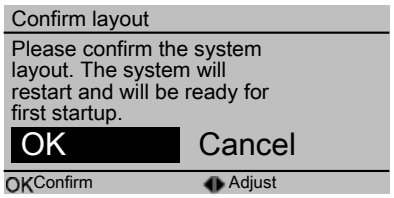




3 Set the system layout settings: Standard, Options, Capacities. For more details, see "8.2 Basic configuration" on page 34.



4 Confirm by pressing OK.



5 The user interface re-initialises and you can proceed the installation by setting the other applicable settings and commissioning of the system.

When the installer settings are changed, the system will request to confirm. When confirmation is complete, the screen will shortly turn OFF and "busy" will be displayed for several seconds.

8.2 Basic configuration

8.2.1 Quick wizard: Language / time and date

#	Code	Description
[A.1]	N/A	Language
[1]	N/A	Time and date

8.2.2 Quick wizard: Standard

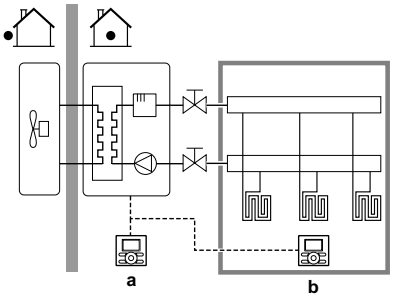
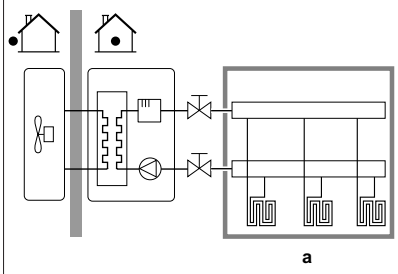
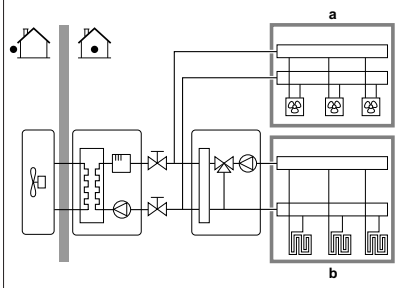
Backup heater configuration (only for *9W model)

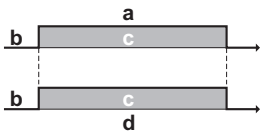
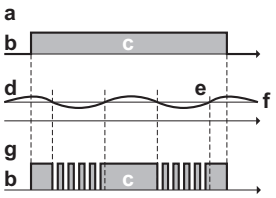
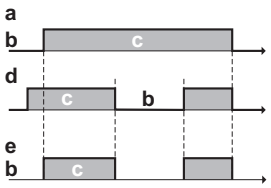
The backup heater in a *9W model is adapted to be connected to most common European electricity grids. Besides hardware configuration, the backup heater type must be set on the user interface.

#	Code	Description
[A.2.1.5]	[5-0D]	BUH type: ▪ 1 (1P,(1/1+2)): 6 kW 1~ 230 V (*9W) ▪ 3 (3P,(1/1+2)): 6 kW 3~ 230 V (*9W) ▪ 4 (3PN,(1/2)): 6 kW 3N~ 400 V (*9W) ▪ 5 (3PN,(1/1+2)): 9 kW 3N~ 400 V (*9W)

Space heating/cooling settings

The system can heat up or cool down a space. Depending on the type of application, the space heating/cooling settings must be made accordingly.

#	Code	Description
[A.2.1.7]	[C-07]	Unit control method: ▪ 0 (LWT control): Unit operation is decided based on the leaving water temperature regardless the actual room temperature and/or heating or cooling demand of the room. ▪ 1 (Ext RT control): Unit operation is decided by the external thermostat or equivalent (e.g. heat pump convector). ▪ 2 (RT control): Unit operation is decided based on the ambient temperature of the user interface.
[A.2.1.B]	N/A	Only if there are 2 user interfaces (1 installed in the room, 1 installed at the indoor unit):  ▪ a: At unit ▪ b: In room as room thermostat User interface location: ▪ At unit: the other user interface is automatically set to In room and if RT control is selected act as room thermostat. ▪ In room (default): the other user interface is automatically set to At unit and if RT control is selected to act as room thermostat.
[A.2.1.8]	[7-02]	The system can supply leaving water to up to 2 water temperature zones. During configuration, the number of water zones must be set. Number of LWT zones: ▪ 0 (1 LWT zone)(default): Only 1 leaving water temperature zone. This zone is called the main leaving water temperature zone.  ▪ a: Main LWT zone ▪ 1 (2 LWT zones): 2 leaving water temperature zones. The zone with the lowest leaving water temperature (in heating) is called the main leaving water temperature zone. The zone with the highest leaving water temperature (in heating) is called the additional leaving water temperature zone. In practice, the main leaving water temperature zone consists of the higher load heat emitters and a mixing station is installed to achieve the desired leaving water temperature.  ▪ a: Add LWT zone ▪ b: Main LWT zone

#	Code	Description
[A.2.1.9]	[F-0D]	When the space heating/cooling control is OFF by the user interface, the pump is always OFF. When the space heating/cooling control is On, you can select the desired pump operation mode (only applicable during space heating/cooling) Pump operation mode: ▪ 0 (Continuous): Continuous pump operation, regardless of thermo ON or OFF condition. Remark: continuous pump operation requires more energy than sample or request pump operation.  ▪ a: Space heating/cooling control (user interface) ▪ b: OFF ▪ c: On ▪ d: Pump operation ▪ 1 (Sample)(default): The pump is ON. When there is heating or cooling demand as the the leaving temperature has not reached the desired temperature yet. When thermo OFF condition occurs, the pump runs every 5 minutes to check the water temperature and demand heating or cooling if necessary. Remark: Sample is NOT available in extended room thermostat control or room thermostat control.  ▪ a: Space heating/cooling control (user interface) ▪ b: OFF ▪ c: On ▪ d: LWT temperature ▪ e: Actual ▪ f: Desired ▪ g: Pump operation ▪ 2 (Request): Pump operation based on request. Example: Using a room thermostat creates thermo ON/OFF condition. When there is no such demand, the pump is OFF. Remark: Request is NOT available in leaving water temperature control.  ▪ a: Space heating/cooling control (user interface) ▪ b: OFF ▪ c: On ▪ d: Heating demand (by ext RT or RT) ▪ e: Pump operation

8.2.3 Quick wizard: Options

Domestic hot water settings

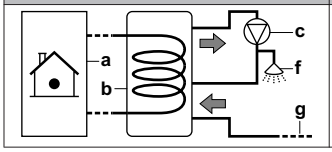
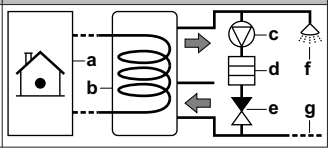
This chapter only applies to systems with a domestic hot water tank installed:

- EHBH/X: an optional domestic hot water tank is available,
- EHVH/X: a domestic hot water tank is standard incorporated into the indoor unit.

Following settings must be made accordingly.

#	Code	Description
[A.2.2.1]	[E-05]	DHW operation: ▪ 0 (No): NOT installed. Default for EHBH/X. ▪ 1 (Yes): Installed. Default for EHVH/X. Remark: For EHVH/X, the domestic hot water tank is by default installed. Do NOT change this setting.
[A.2.2.3]	[E-07]	During domestic hot water preparation, the heat pump can be assisted by an electrical heater to ensure the domestic hot water preparation even for high desired tank temperatures. DHW tank heater: ▪ 0 (Horizontal BSH): Installed at side of the tank. Default for EHBH/X. ▪ 1 (Backup heater): Default for EHVH/X. The backup heater will also be used in domestic hot water heating.

#	Code	Description
[A.2.2.A]	[D-02]	The indoor unit offers the possibility to connect a field supplied domestic hot water pump (On/OFF type). Depending on the installation and configuration on the user interface, we distinguish its functionality. DHW pump: ▪ 0 (No)(default): NOT installed. ▪ 1 (Secondary rtrn): Installed for instant hot water when water is tapped. The end-user sets the operation timing (weekly schedule time) of the domestic hot water pump when it should run. Control of this pump is possible through the indoor unit. ▪ 2 (Disinf. shunt): Installed for disinfection. It runs when the disinfection function of the domestic hot water tank is running. No further settings are needed. See also illustrations below.

Domestic hot water pump installed for…	
Instant hot water	Disinfection
	

a Indoor unit
b Tank
c Domestic hot water pump
d Heater element
e Non-return valve
f Shower
g Cold water

Thermostats and external sensors

See "5 Application guidelines" on page 7.

#	Code	Description
[A.2.2.4]	[C-05]	Contact type main In external room thermostat control, the contact type of the optional room thermostat or heat pump convector for the main leaving water temperature zone must be set. See "5 Application guidelines" on page 7. ▪ 1 (Thermo ON/OFF): The connected external room thermostat or heat pump convector sends the heating or cooling demand by the same signal as it is connected to only 1 digital input (preserved for the main leaving water temperature zone) on the indoor unit (X2M/1). Select this value in case of a connection to the heat pump convector (FWXV). ▪ 2 (C/H request)(default): The connected external room thermostat sends separate heating and cooling demand and is therefore connected to the 2 digital input (preserved for the main leaving water temperature zone) on the indoor unit (X2M/1 and 2). Select this value in case of connection with the wired (EKRTWA) or wireless (EKRTR1) room thermostat.
[A.2.2.5]	[C-06]	Contact type add. In external room thermostat control with 2 leaving water temperature zones, the type of the optional room thermostat for the additional leaving water temperature zone must be set. See "5 Application guidelines" on page 7. ▪ 1 (Thermo ON/OFF): See Contact type main. Connected on the indoor unit (X2M/1a). ▪ 2 (C/H request)(default): See Contact type main. Connected on the indoor unit (X2M/1a and 2a).
[A.2.2.B]	[C-08]	External sensor When an optional external ambient sensor is connected, the type of the sensor must be set. See "5 Application guidelines" on page 7. ▪ 0 (No)(default): NOT installed. The thermistor in the user interface and in the outdoor unit are used for measurement. ▪ 1 (Outdoor sensor): Installed. The outdoor sensor will be used to measure the outdoor ambient temperature. Remark: For some functionality, the temperature sensor in the outdoor unit is still used. ▪ 2 (Room sensor): Installed. The temperature sensor in the user interface is NOT used anymore. Remark: This value has only meaning in room thermostat control.

Digital I/O PCB

Modification of these settings is only needed when the optional digital I/O PCB is installed. The digital I/O PCB has multiple functionality which need to be configured. See "5 Application guidelines" on page 7.

#	Code	Description
[A.2.2.6.1]	[C-02]	Ext. backup heat src Indicates if the space heating is also performed by means of an other heat source that the system. ▪ 0 (No)(default): NOT installed. ▪ 1 (Bivalent): Installed. The auxiliary boiler (gasboiler, oil burner) will operate when the outdoor ambient temperature is low. During the bivalent operation, the heat pump is turned OFF. Set this value in case an auxililary boiler is used. See "5 Application guidelines" on page 7.
[A.2.2.6.2]	[D-07]	Solar kit Only applicable for EHBH/X. Indicates if the domestic hot water tank is also heated by thermal solar panels. ▪ 0 (No)(default): NOT installed. ▪ 1 (Yes): Installed. The domestic hot water tank can –besides by the heat pump- also be heated by thermal solar panels. Set this value if thermal solar panels are installed. See "5 Application guidelines" on page 7.

#	Code	Description
[A.2.2.6.3]	[C-09]	Alarm output Indicates the logic of the alarm output on the digital I/O PCB during malfunctioning. ▪ 0 (Normally open)(default): The alarm output will be powered when an alarm occurs. By setting this value, a distinction is made between malfunctioning and detection of a power failure of the unit. ▪ 1 (Normally closed): The alarm output will NOT be powered when an alarm occurs.
[A.2.2.6.4]	[F-04]	Bottom plate heater Only applicable for EHBH/X16 and EHVH/X16. Indicates if an optional bottom plate heater is installed on the outdoor unit. The power of the bottom plate heater is in this case supplied by the indoor unit. ▪ 0 (No)(default): NOT installed. ▪ 1 (Yes): Installed. Remark: If this value is set, the output on the digital I/O PCB cannot be used for space heating/cooling output. See "5 Application guidelines" on page 7.

Demand PCB

The demand PCB is used to enable the power consumption control by digital inputs. See "5 Application guidelines" on page 7.

#	Code	Description
[A.2.2.7]	[D-04]	Demand PCB Only applicable for EHBH/X04+08 and EHVH/X04+08. Indicates if the optional demand PCB is installed. ▪ 0 (No)(default): NOT installed. ▪ 1 (Yes): Installed. Power consumption control by digital inputs is selectable in [A.6.2.1].

Energy metering

When energy metering is performed by the use of external power meters, configure the settings as described below. Select the pulse frequency output of each power meter in accordance with the power meter specifications. It is possible to connect (up to 2) power meters with different pulse frequencies. When only 1 or no power meter is used, select No to indicate the corresponding pulse input is NOT used.

#	Code	Description
[A.2.2.8]	[D-08]	Optional external kWh meter 1: ▪ 0 (No): NOT installed ▪ 1: Installed (0.1 pulse/kWh) ▪ 2: Installed (1 pulse/kWh) ▪ 3: Installed (10 pulse/kWh) ▪ 4: Installed (100 pulse/kWh) ▪ 5: Installed (1000 pulse/kWh)
[A.2.2.9]	[D-09]	Optional external kWh meter 2: ▪ 0 (No): NOT installed ▪ 1: Installed (0.1 pulse/kWh) ▪ 2: Installed (1 pulse/kWh) ▪ 3: Installed (10 pulse/kWh) ▪ 4: Installed (100 pulse/kWh) ▪ 5: Installed (1000 pulse/kWh)

8.2.4 Quick wizard: Capacities (energy metering)

The capacities of all electrical heaters must be set for the energy metering and/or power consumption control feature to work properly. When measuring the resistance value of each heater, you can set the exact heater capacity and this will lead to more accurate energy data.

#	Code	Description
[A.2.3.1]	[6-02]	Booster heater: Only applies to domestic hot water tanks with an internal booster heater (EKHW*). The capacity of the booster heater at nominal voltage. Nominal value is 3 kW. Default: 0. 0~10 kW (in steps of 0.2 kW)
[A.2.3.2]	[6-03]	BUH: step 1: The capacity of the first step of the backup heater at nominal voltage. Nominal value 3 kW. Default: 3 kW. 0~10 kW (in steps of 0.2 kW)
[A.2.3.3]	[6-04]	BUH: step 2: Only applies to a two-step backup heater (*9W). The capacity difference between the second and first step of the backup heater at nominal voltage. Nominal value depends on the backup heater configuration: ▪ 3 kW, 1N~ 230 V: 0 kW ▪ 6 kW, 1N~ 230 V: 3 kW (6 kW-3 kW) ▪ 6 kW, 3~ 230 V: 3 kW (6 kW-3 kW) ▪ 6 kW, 3N~ 400 V: 3 kW (6 kW-3 kW) ▪ 9 kW, 3N~ 400 V: 6 kW (9 kW-3 kW) 0~10 kW (in steps of 0.2 kW): ▪ *3V: default 0 kW ▪ *9W: default 6 kW
[A.2.3.6]	[6-07]	Bottom plate heater: Only applies to an optional bottom plate heater (EKBPHTH16A). The capacity of the optional bottom plate heater at nominal voltage. Default: 0 W. 0~200 W (in steps of 10 W)

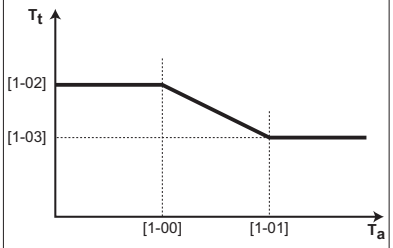
8.2.5 Space heating/cooling control

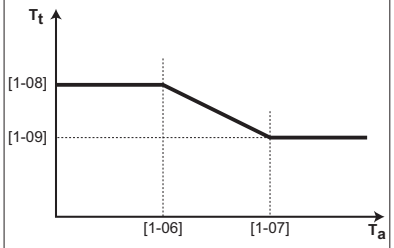
The basic required settings in order to configure the space heating/cooling of your system are described in this chapter. The weather-dependent installer settings define the parameters for the weather-dependent operation of the unit. When weather-dependent operation is active, the water temperature is determined automatically depending on the outdoor temperature. Low outdoor temperatures will result in warmer water and vice versa. During weather-dependent operation, the user has the possibility to shift up or down the target water temperature by a maximum of 5°C.

See the user reference guide and/or operation manual for more details about this function.

Leaving water temperature: Main zone

#	Code	Description
[A.3.1.1.1]	N/A	LWT setpoint mode: ▪ Absolute (default) The desired leaving water temperature is: ▪ NOT weather-dependent (i.e. does not depend on the outdoor ambient temperature) ▪ fixed in time (i.e., not scheduled) ▪ Weather dep.: The desired leaving water temperature is: ▪ weather-dependent (i.e. depends on the outdoor ambient temperature) ▪ fixed in time (i.e., not scheduled) ▪ Abs + scheduled: The desired leaving water temperature is: ▪ NOT weather-dependent (i.e., does NOT depend on the outdoor ambient temperature) ▪ according a schedule. The scheduled actions consists of desired leaving water temperatures either preset or custom Remark: This value can only be set in leaving water temperature control. ▪ WD + scheduled: The desired leaving water temperature is: ▪ weather-dependent (i.e., does depend on the outdoor ambient temperature) ▪ according a schedule. The scheduled actions consists of desired leaving water temperatures either preset or custom Remark: This value can only be set in leaving water temperature control.

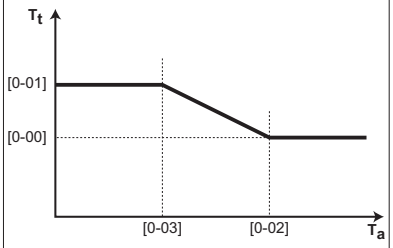
#	Code	Description
[A.3.1.1.3]	[1-00] [1-01] [1-02] [1-03]	Set weather-dependent heating:  ▪ T_t: Target leaving water temperature (main) ▪ T_a: Outdoor temperature ▪ [1-00]: Low outdoor ambient temperature. −20°C~5°C (default: −10°C) ▪ [1-01]: High outdoor ambient temperature. 10°C~20°C (default: 15°C) ▪ [1-02]: Desired leaving water temperature when the outdoor temperature equals or drops below the low ambient temperature. Between minimum and maximum leaving water temperature (default: 35°C). Note: This value should be higher than [1-03] as for low outdoor temperatures warmer water is required. ▪ [1-03]: Desired leaving water temperature when the outdoor temperature equals or rises above the high ambient temperature. Between minimum and maximum leaving water temperature (default: 25°C). Note: This value should be lower than [1-02] as for high outdoor temperatures less warm water is required.

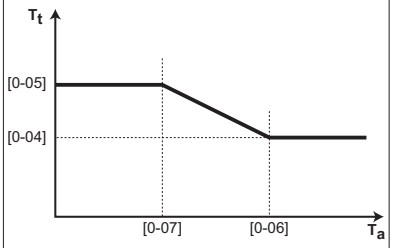
#	Code	Description
[A.3.1.1.4]	[1-06] [1-07] [1-08] [1-09]	Set weather-dependent cooling:  ▪ T_t: Target leaving water temperature (main) ▪ T_a: Outdoor temperature ▪ [1-06]: Low outdoor ambient temperature. 10°C~25°C (default: 20°C) ▪ [1-07]: High outdoor ambient temperature. 25°C~43°C (default: 35°C) ▪ [1-08]: Desired leaving water temperature when the outdoor temperature equals or drops below the low ambient temperature. Between minimum and maximum leaving water temperature 5°C~22°C (default: 22°C). Note: This value should be higher than [1-09] as for low outdoor temperatures less cold water suffices. ▪ [1-09]: Desired leaving water temperature when the outdoor temperature equals or rises above the high ambient temperature. Between minimum and maximum leaving water temperature 5°C~22°C (default: 18°C). Note: This value should be lower than [1-08] as for high outdoor temperatures colder water is required.

Leaving water temperature: Additional zone

Only applicable if 2 leaving water temperature zones are present.

#	Code	Description
[A.3.1.2.1]	N/A	LWT setpoint mode: ▪ Absolute (default) The desired leaving water temperature is: ▪ NOT weather-dependent (i.e. does not depend on the outdoor ambient temperature) ▪ fixed in time (i.e., not scheduled) ▪ Weather dep.: The desired leaving water temperature is: ▪ weather-dependent (i.e. depends on the outdoor ambient temperature) ▪ fixed in time (i.e., not scheduled) ▪ Abs + scheduled: The desired leaving water temperature is: ▪ NOT weather-dependent (i.e., does NOT depend on the outdoor ambient temperature) ▪ according a schedule. The scheduled actions are On or OFF. Remark: This value can only be set in leaving water temperature control. ▪ WD + scheduled: The desired leaving water temperature is: ▪ weather-dependent (i.e., does depend on the outdoor ambient temperature) ▪ according a schedule. The scheduled actions are On or OFF Remark: This value can only be set in leaving water temperature control.

#	Code	Description
[A.3.1.2.3]	[0-00] [0-01] [0-02] [0-03]	Set weather-dependent heating:  ▪ T_t: Target leaving water temperature (main) ▪ T_a: Outdoor temperature ▪ [0-03]: Low outdoor ambient temperature. −20°C~5°C (default: −10°C) ▪ [0-02]: High outdoor ambient temperature. 10°C~20°C (default: 15°C) ▪ [0-01]: Desired leaving water temperature when the outdoor temperature equals or drops below the low ambient temperature. Between minimum and maximum leaving water temperature 25°C~depending on outdoor unit (default: 45°C). Note: This value should be higher than [0-00] as for low outdoor temperatures warmer water is required. ▪ [0-00]: Desired leaving water temperature when the outdoor temperature equals or rises above the high ambient temperature. Between minimum and maximum leaving water temperature 25°C~depending on outdoor unit (default: 35°C). Note: This value should be lower than [0-01] as for high outdoor temperatures less warm water is required.

#	Code	Description
[A.3.1.2.4]	[0-04] [0-05] [0-06] [0-07]	Set weather-dependent cooling:  ▪ T_t: Target leaving water temperature (main) ▪ T_a: Outdoor temperature ▪ [0-07]: Low outdoor ambient temperature. 10°C~25°C (default: 20°C) ▪ [0-06]: High outdoor ambient temperature. 25°C~43°C (default: 35°C) ▪ [0-05]: Desired leaving water temperature when the outdoor temperature equals or drops below the low ambient temperature. Between minimum and maximum leaving water temperature 5°C~22°C (default: 12°C). Note: This value should be higher than [1-09] as for low outdoor temperatures less cold water suffices. ▪ [0-04]: Desired leaving water temperature when the outdoor temperature equals or rises above the high ambient temperature. Between minimum and maximum leaving water temperature 5°C~22°C (default: 8°C). Note: This value should be lower than [1-08] as for high outdoor temperatures colder water is required.

Leaving water temperature: Delta T emitter

Temperature difference for entering and leaving water. The unit is designed to support under floor loops operation. The recommended leaving water temperature (set by the user interface) for under floor loops is 35°C. In such case, the unit will be controlled to realize a temperature difference of 5°C which means that the entering water to the unit is around 30°C. Depending on the installed application (radiators, heat pump convector, under floor loops) or situation, it can be possible to change the difference between entering and leaving water temperature. Note that the pump will regulate its flow to keep the Δt.

#	Code	Description
[A.3.1.3.1]	[9-09]	Heating: required temperature difference between entering and leaving water. Range: 3~10°C (in steps of 1°C; default value: 5°C).
[A.3.1.3.2]	[9-0A]	Cooling: required temperature difference between entering and leaving water. Range: 3~10°C (in steps of 1°C; default value: 5°C).

Leaving water temperature: Modulation

Only applicable in case of room thermostat control. When using the room thermostat functionality, the customer needs to set the desired room temperature. The unit will supply hot water to the heat emitters and the room will be heated. Additionally, also the desired leaving water temperature must be configured: when turning on the modulation, the desired leaving water temperature will be calculated automatically by the unit (based on the preset temperatures, if weather-dependent is selected, modulation will be done based on the desired weather-dependent temperatures); when turning off the modulation, you can set the desired leaving water temperature on the user interface. Moreover, with the modulation turned on, the desired leaving water temperature is lowered or raised in function of the desired room temperature and the difference between the actual and the desired room temperature. This results in:

- stable room temperatures exactly matching the desired temperature (higher comfort level)
- less On/OFF cycles (lower noise level, higher comfort and higher efficiency)
- water temperatures as low as possible to match the desired temperature (higher efficiency)

#	Code	Description
[A.3.1.1.5]	[8-05]	Modulated LWT: ▪ No (default): disabled. Note: The desired leaving water temperature needs to be set on the user interface. ▪ Yes: enabled Note: The desired leaving water temperature can only be read out on the user interface

Leaving water temperature: Emitter type

Only applicable in case of room thermostat control. Depending on the system water volume and the heat emitters type, the heat up or cool down of a space can take longer. This setting can compensate for a slow or a quick heating/cooling system during the heat up/cool down cycle.

Note: The setting of the emitter type will influence the maximum modulation of the desired leaving water temperature and the possibility for usage of the automatic cooling/heating changeover based on the indoor ambient temperature.

Therefore it is important to set this correctly.

#	Code	Description
[A.3.1.1.7]	[9-0B]	Emitter type: Reaction time of the system: ▪ Quick Example: Small water volume and fan coils. ▪ Slow Example: Large water volume, floor heating loops.

8.2.6 Domestic hot water control

Only applicable in case an optional domestic hot water tank is installed.

Configuring the desired tank temperature

The domestic hot water can be prepared in 3 different ways. They differ from each other by the way the desired tank temperature is set and how the unit acts upon it.

#	Code	Description
[A.4.1]	[6-0D]	Domestic hot water Setpoint mode: ▪ 0 (Reheat only): Only reheat operation is allowed. ▪ 1 (Reheat + sched.): The domestic hot water tank is heated according to a schedule and between the scheduled heatup cycles, reheat operation is allowed. ▪ 2 (Scheduled only) The domestic hot water tank can ONLY be heated according to a schedule.

See "8.3.2 Domestic hot water control: advanced for more details" on page 46.

INFORMATION

It is recommended NOT to use the selection of ([6-0D]=0, [A.4.1] Domestic hot water Setpoint mode=Reheat only) in case of a domestic hot water tank without internal booster heater.

The risk of space heating (cooling) capacity shortage/ comfort problems is significant (in case of frequent domestic hot water operation, frequent and long space heating/cooling interruption will happen).

Readout the desired tank temperature

The desired tank temperature is displayed on the user interface. By the following settings, you can configure the way the tank temperature is displayed:

- by its numerical value
- by an equivalent.

Use the numerical value in case the understanding of tank temperature is clear for the customer. On the user interface the customer can set the desired tank temperature by 1°C. For customers with less feeling about tank temperatures, choose display by equivalent number of people. They will set the desired tank temperature by indicating their domestic hot water consumption as a number of people.

As installer, you configure the conversion between the equivalent domestic hot water consumption per person at 1 heat-up cycle and the real desired tank temperature. Please take into account the installed tank size. Additionally, using the graphical display, the customer is made aware about the amount of consumed domestic hot water.

#	Code	Description
[A.4.3.1]	N/A	How has the tank temperature to be displayed on the user interface? ▪ As temperature.  ▪ As graphic: The temperature has to displayed as available hot water for x persons. If you choose this, you also have to configure which number equals which temperature under [A. 4.3.2.1]~[A.4.3.2.6]: 
[A.4.3.2.1]	N/A	1 person The absolute desired tank temperature for 1 person. 30~80°C (default: 42°C)

#	Code	Description
[A.4.3.2.2]	N/A	2 persons The increment of the desired tank temperature for 2 persons compared to 1 person. 0~20°C (default: 6°C)
[A.4.3.2.3]	N/A	3 persons The increment of the desired tank temperature for 3 persons compared to 2 persons. 0~20°C (default: 15°C)
[A.4.3.2.4]	N/A	4 persons The increment of the desired tank temperature for 4 persons compared to 3 persons. 0~20°C (default: 17°C)
[A.4.3.2.5]	N/A	5 persons The increment of the desired tank temperature for 5 persons compared to 4 persons. 0~20°C (default: 1°C)
[A.4.3.2.6]	N/A	6 persons The increment of the desired tank temperature for 6 persons compared to 5 persons. 0~20°C (default: 1°C)

INFORMATION

The real desired tank temperature is defined by selected absolute desired tank temperature and the number of persons + selected increment value(s).

Example: 3 persons (default settings)

Real desired tank temperature=[A.4.3.2.1]+[A.4.3.2.2]+[A.4.3.2.3]

Real desired tank temperature=42+6+15=63°C.

Maximum tank temperature

The maximum temperature that users can select for the domestic hot water. You can use this setting to limit the temperatures at the hot water taps.

INFORMATION

During disinfection of the domestic hot water tank, the tank temperature can exceed this maximum temperature.

INFORMATION

Limit the maximum hot water temperature according to the applicable legislation.

#	Code	Description
[A.4.5]	[6-0E]	Maximum setpoint The maximum temperature that users can select for the domestic hot water. You can use this setting to limit the temperature at the hot water taps. If ▪ [E-07]=0: 40~80°C (default: 60°C) (for EHBH/X in combination with EKHW*) ▪ [E-07]=1: 40~60°C (default: 60°C) (only for EHVH/X) The maximum temperature is NOT applicable during disinfection function. See disinfection function.

8.2.7 Contact/helpdesk number

#	Code	Description
[6.3.2]	N/A	Number that users can call in case of problems.

8.3 Advanced configuration/optimization

8.3.1 Space heating/cooling operation: advanced

Preset leaving water temperature

You can define preset leaving water temperature temperatures:

- economic (denotes the desired leaving water temperature which results in the lowest energy consumption)
- comfort (denotes the desired leaving water temperature which results in the highest energy consumption).

Preset values make it easy to use the same value in the schedule or to adjust the desired leaving water temperature according to the room temperature (see modulation). If you later want to change the value, you only have to do it in one place. Depending on whether the desired leaving water temperature is weather dependent or not, the absolute desired leaving water temperature should be specified or the desired shift values.

NOTICE

The preset leaving water temperature temperatures are only applicable for the main zone, as the schedule for the additional zone consists of On/OFF actions.

NOTICE

Select preset leaving water temperatures in accordance with the design and selected heat emitters to ensure the balance between desired room and leaving water temperatures.

#	Code	Description
Preset leaving water temperature for the main leaving water temperature zone in case of NOT weather dependent		
[7.4.2.1]	[8-09]	Comfort (heating) [9-01]~[9-00] (default: 35°C)
[7.4.2.2]	[8-0A]	Eco (heating) [9-01]~[9-00] (default: 33°C)
[7.4.2.3]	[8-07]	Comfort (cooling) [9-03]~[9-02] (default: 18°C)
[7.4.2.4]	[8-08]	Eco (cooling) [9-03]~[9-02] (default: 20°C)
Preset leaving water temperature (shift value) for the main leaving water temperature zone in case of weather dependent		
[7.4.2.5]	N/A	Comfort (heating) −10~+10°C (default: 0°C)
[7.4.2.6]	N/A	Eco (heating) −10~+10°C (default: −3°C)
[7.4.2.7]	N/A	Comfort (cooling) −10~+10°C (default: 0°C)
[7.4.2.8]	N/A	Eco (cooling) −10~+10°C (default: +3°C)

Temperature ranges (leaving water temperatures)

The purpose of this setting is to prevent selecting a wrong (i.e. too hot or too cold) leaving water temperature. Thereto the available desired heating temperature range and desired cooling temperature range can be configured.

NOTICE

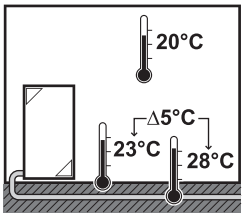
In case of a floor heating application it is important to limit the:

- maximum leaving water temperature at heating operation according to the specifications of the floor heating installation.
- the minimum leaving water temperature at cooling operation to 18~20°C to prevent condensation on the floor.

NOTICE

- When adjusting the leaving water temperature ranges, all desired leaving water temperatures are also adjusted to guarantee they are between the limits.
- Always balance between the desired leaving water temperature with the desired room temperature and/or the capacity (according to the design and selection of the heat emitters). The desired leaving water temperature is the result of several settings (preset values, shift values, weather dependent curves, modulation). As a result, too high or too low leaving water temperatures could occur which lead to overtemperatures or capacity shortage. By limiting the leaving water temperature range to adequate values (depending on the heat emitter), such situations can be avoided.

Example: Set the minimum leaving water temperature to 28°C to avoid NOT to be able to heat up the room: leaving water temperatures must be sufficient higher than the room temperatures (in heating).



#	Code	Description
Leaving water temperature range for the main leaving water temperature zone (= the leaving water temperature zone with the lowest leaving water temperature in heating operation and the highest leaving water temperature in cooling operation)		
[A.3.1.1.2.2]	[9-00]	Maximum temp (heating) 37~depending on outdoor unit (default: 55°C)
[A.3.1.1.2.1]	[9-01]	Minimum temp (heating) 15~37°C (default: 25°C)
[A.3.1.1.2.4]	[9-02]	Maximum temp (cooling) 18~22°C (default: 22°C)
[A.3.1.1.2.3]	[9-03]	Minimum temp (cooling) 5~18°C (default: 5°C)
Leaving water temperature range for the additional leaving water temperature zone (= the leaving water temperature zone with the highest leaving water temperature in heating operation and the lowest leaving water temperature in cooling operation)		
[A.3.1.2.2.2]	[9-06]	Maximum temp (heating) 37~depending on outdoor unit (default: 55°C)
[A.3.1.2.2.1]	[9-05]	Minimum temp (heating) 15~37°C (default: 25°C)
[A.3.1.2.2.4]	[9-08]	Maximum temp (cooling) 18~22°C (default: 22°C)
[A.3.1.2.2.3]	[9-07]	Minimum temp (cooling) 5~18°C (default: 5°C)

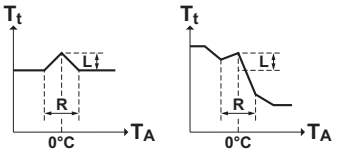
Leaving water temperature overshoot temperature

This function defines how much the water temperature may rise above the desired leaving water temperature before the compressor stops. The compressor will startup again when the leaving water temperature drops below the desired leaving water temperature. This function is only applicable in heating mode.

#	Code	Description
N/A	[9-04]	1~4°C (default: 1°C)

Leaving water temperature compensation around 0°C

In heating operation, the desired leaving water temperature is locally increased around an outdoor temperature of 0°C. This compensation can be selected when using an absolute or a weather dependent desired temperature, this compensation can be selected (see illustration below). Use this setting to compensate for possible heat losses of the building when the outdoor temperature is around 0°C (e.g. in cold region countries).



a Absolute desired LWT
b Weather dependent desired LWT

#	Code	Description
N/A	[D-03]	0 (disabled) (default) 1 (enabled) L=2°C, R=4°C (−2°C<T_A<2°C) 2 (enabled) L=4°C, R=4°C (−2°C<T_A<2°C) 3 (enabled) L=2°C, R=8°C (−4°C<T_A<4°C) 4 (enabled) L=4°C, R=8°C (−4°C<T_A<4°C)

Leaving water temperature maximum modulation

Only applicable in room thermostat control and when modulation is enabled. The maximum modulation (=variance) on the desired leaving water temperature decided on the difference between the actual and desired room temperature, e.g. 3°C modulation means the desired leaving water temperature can be increased or lowered by 3°C. Increasing the modulation results in better performance (less On/OFF, faster heat up), but note that depending on the heat emitter, there must always be a balance (refer to the design and selection of the heat emitters) between the desired leaving water temperature and the desired room temperature.

#	Code	Description
N/A	[8-06]	1~5°C (default: 3°C)

Weather dependent cooling allowance

Only applicable for EHBX and EHVX. It is possible to disable weather dependent cooling, meaning the desired leaving water temperature in cooling operation doesn't depend on the outdoor ambient temperature and this regardless whether weather dependent is selected or NOT. Both for the main leaving water temperature zone as for the additional leaving water temperature zone, this can be set separately.

#	Code	Description
N/A	[1-04]	Weather dependent cooling of the main leaving water temperature zone is… 0 (disabled) (default) 1 (enabled)
N/A	[1-05]	Weather dependent cooling of the additional leaving water temperature zone is… 0 (disabled) (default) 1 (enabled)

Temperature ranges (room temperature)

Only applicable in room thermostat control. In order to save energy by preventing overheating or undercooling the room, you can limit the range of the room temperature, both for heating and/or cooling.

NOTICE

When adjusting the room temperature ranges, all desired room temperatures are also adjusted to guarantee they are between the limits.

#	Code	Description
Room temp. range		
[A.3.2.1.2]	[3-06]	Maximum temp (heating) 18~30°C (default: 30°C)
[A.3.2.1.1]	[3-07]	Minimum temp (heating) 12~18°C (default: 12°C)
[A.3.2.1.4]	[3-08]	Maximum temp (cooling) 25~35°C (default: 35°C)
[A.3.2.1.3]	[3-09]	Minimum temp (cooling) 15~25°C (default: 15°C)

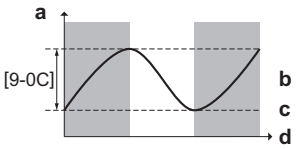
Room temperature step

Only applicable in room thermostat control and when the temperature is displayed in °C.

#	Code	Description
[A.3.2.4]	N/A	Room temp. step ▪ 1°C (default). The desired room temperature on the user interface is settable per 1°C. ▪ 0.5°C The desired room temperature on the user interface is settable per 0.5°C. The actual room temperature is displayed with an accuracy of 0.1°C.

Room temperature hysteresis

Only applicable in case of room thermostat control. The hysteresis band around the desired room temperature is settable. Daikin advises NOT to change the room temperature hysteresis as it is set for an optimal use of the system.



a Room temperature
b Actual room temperature
c Desired room temperature
d Time

#	Code	Description
N/A	[9-0C]	1~6°C (default: 1°C)

Room temperature offset

Only applicable in case of room thermostat control. You can calibrate the (external) room temperature sensor. It is possible to give an offset to the room thermistor value measured by the user interface or by the external room sensor. The settings can be used to compensate for situations where the user interface or external room sensor cannot be installed on the ideal installation location (see installation manual and/or installer reference guide).

#	Code	Description
Room temp. offset: Offset on the actual room temperature measured on the user interface sensor.		
[A.3.2.2]	[2-0A]	−5~5°C, step 0.5°C (default: 0°C)
Ext. room sensor offset: Only applicable if the external room sensor option is installed and configured (see [C-08])		
[A.3.2.3]	[2-09]	−5~5°C, step 0.5°C (default: 0°C)

Room frost protection

Only applicable in case of room thermostat control. When the actual room temperature would drop below the room frost temperature, the unit will supply leaving water (in heating operation mode) to the heat emitters to heat up the room again.

NOTICE

Even if the room thermostat control is OFF on the user interface, room frost protection remains active.

#	Code	Description
N/A	[2-06]	Room frost protection 0: disabled 1: enabled (default)
N/A	[2-05]	Room antifrost temperature 4~16°C (default: 12°C)

Shut-off valve

Only applicable in case of 2 leaving water temperature zones.

The shut-off valve, which is in the main leaving water temperature zone, output is configurable.

INFORMATION

During defrost operation, the shut-off valve is always opened.

Thermo On/OFF: the valve closes, depending on [F-0B] when there is no heating and/or demand of the room in the main zone. Enable this setting to:

- avoid leaving water supply to the heat emitters in the main LWT zone (through the mixing valve station) when there is request from the additional LWT zone.
- activate the On/OFF pump of the mixing valve station only when there is demand. See "5 Application guidelines" on page 7.

#	Code	Description
[A.3.1.1.6.1]	[F-0B]	The shut-off valve: 0 (No)(default): is NOT influenced by heating or cooling demand. 1 (Yes): closes when there is NO heating or cooling demand.

INFORMATION

The setting [F-0B] is only valid when there is a thermostat or external room thermostat request setting (NOT in case of leaving water temperature setting).

Cooling: Only applicable for EHBX and EHVX. The shut-off valve closes, depending on [F-0C] when the unit is running in cooling operation mode. Enable this setting to avoid cold leaving water through the heat emitter and the forming of condensation (e.g. under floor heating loops or radiators).

#	Code	Description
[A.3.1.1.6.2]	[F-0C]	The shut-off valve: 0 (No): is NOT influenced by changing the space operation mode to cooling. 1 (Yes)(default): closes when the space operation mode is cooling.

Operation range

Depending on the average outdoor temperature, the operation of the unit in space heating or space cooling is prohibited.

Space heating OFF temp: When the averaged outdoor temperature raises above this value, space heating is turned OFF to avoid overheating.

#	Code	Description
[A.3.3.1]	[4-02]	▪ EHBH/X04+08 and EHVH/X04+08: 14~25°C (default: 25°C) ▪ EHBH/X16 and EHVH/X16: 14~35°C (default: 35°C) The same setting is also used in automatic heating/cooling changeover.

Space cooling On temp: Only applicable for EHBX and EHVX. When the averaged outdoor temperature drops below this value, space ooling is turned OFF.

#	Code	Description
[A.3.3.2]	[F-01]	10~35°C (default: 20°C) The same setting is also used in automatic heating/cooling changeover.

Automatic heating/cooling changeover

Only applicable for EHBX and EHVX. The end-user sets the

desired operation mode on the user interface: Heating, Cooling or Automatic (see also operation manual/user reference guide). When Automatic is selected, the changing of the operation mode is based on:

- Monthly allowance for heating and/or cooling: the end-user indicates on a monthly base which operation is allowed (# [7:5]): both heating/cooling or heating only or cooling only. If the allowed operation mode changes to cooling only, the operation mode changes to cooling. If the allowed operation mode changes to heating only, the operation mode changes to heating.
- Averaged outdoor temperature: the operation mode will be changed in order to always be within range determined by the space heating OFF temperature for heating and the space cooling On temperature for cooling. If the outdoor temperature drops, the operation mode switches to heating and vice versa. Note that the outdoor temperature will be time-averaged (see "8 Configuration" on page 33).

When the outdoor temperature is between the space cooling On and the space heating OFF temperature, the operation mode remains unchanged unless the system is configured in room thermostat control with one leaving water temperature zone and quick heat emitters. In that case, the operation mode will change based on:

- Measured indoor temperature: besides the heating and the cooling desired room temperature, the installer sets a hysteresis value (e.g. when in heating, this value is related to the desired cooling temperature) and an offset value (e.g. when in heating, this value is related to the desired heating temperature). Example: the desired room temperature in heating is 22°C and in cooling 24°C, with a hysteresis value of 1°C and an offset of 4°C. Changeover from heating to cooling will occur when the room temperature raises above the maximum of the desired cooling temperature added by the hysteresis value (thus 25°C) and the desired heating temperature added by the offset value (thus 26°C). Oppositely, changeover from cooling to heating will occur when the room temperature drops below the minimum of the desired heating temperature subtracted by the hysteresis value (thus 21°C) and the desired cooling temperature subtracted by the offset value (thus 20°C).
- Guard timer to prevent too frequent changing from heating to cooling and vice versa.

Changeover settings related to the outdoor temperature (only when automatic is selected):

#	Code	Description
[A.3.3.1]	[4-02]	Space heating OFF temp. If the outdoor temperature raises above this value, the operation mode will change to cooling: ▪ EHBH/X04+08 and EHVH/X04+08: 14~25°C (default: 25°C) ▪ EHBH/X16 and EHVH/X16: 14~35°C (default: 35°C)
[A.3.3.2]	[F-01]	Space cooling On temp. If the outdoor temperature drops below this value, the operation mode will change to heating: 10~35°C (default: 20°C)
Changeover settings related to the indoor temperature. Only applicable when Automatic is selected and the system is configured in room thermostat control with 1 leaving water temperature zone and quick heat emitters.		
N/A	[4-0B]	Hysteresis: Ensures that changeover is only done when necessary. Example: the space operation mode only changes from cooling to heating when the room temperature drops below the desired heating temperature subtracted by the hysteresis. 1~10°C, step 0.5°C (default: 1°C)
N/A	[4-0D]	Offset: Ensures that the active desired room temperature can be reached. Example: if heating to cooling changeover would occur below the desired room temperature in heating, this desired room temperature could never be reached. 1~10°C, step 0.5°C (default: 1°C)

8.3.2 Domestic hot water control: advanced

Preset tank temperatures

Only applicable when domestic hot water preparation is scheduled or scheduled + reheat.

You can define preset tank temperatures:

- storage economic
- storage comfort

- reheat

Preset values make it easy to use the same value in the schedule. If you later want to change the value, you only have to do it in 1 place (see also operation manual and/or user reference guide).

Storage comfort: Only applicable if the desired tank temperature is NOT weather dependent. The storage comfort temperature denotes the higher desired tank temperature, where the tank heat up cycle is prioritized till the reheat set point. It is the desired temperature when a storage comfort action is scheduled (preferably during night).

#	Code	Description
[7.4.3.1]	[6-0A]	30~80°C (default: 60°C)

Storage eco: The storage economic temperature denotes the lower desired tank temperature. It is the desired temperature when a storage economic action is scheduled (preferably during day).

#	Code	Description
[7.4.3.2]	[6-0B]	30~50°C (default: 45°C)

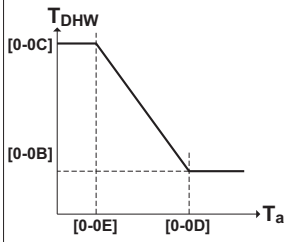
Reheat: The desired reheat tank temperature is used:

- in scheduled + reheat mode, as guaranteed minimum tank temperature: if the tank temperature drops below this value, the tank is heated up.
- during storage comfort, to prioritize the domestic hot water preparation. When the tank temperature raises above this value, domestic hot water preparation and space heating/cooling are executed sequentially.

#	Code	Description
[7.4.3.3]	[6-0C]	30~50°C (default: 45°C)

Weather dependent

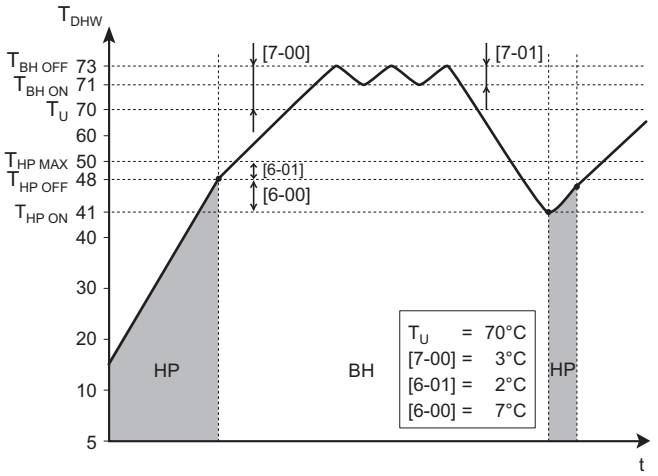
The weather dependent installer settings define the parameters for the weather dependent operation of the unit. When weather dependent operation is active the desired tank temperature is determined automatically depending on the averaged outdoor temperature: low outdoor temperatures will result in higher desired tank temperatures as the cold water tap is colder and vice versa. In case of scheduled or scheduled+reheat domestic hot water preparation, the storage comfort temperature is weather dependent (according to the weather dependent curve), the storage economic and reheat temperature are NOT weather dependent. In case of reheat only domestic hot water preparation, the desired tank temperature is weather dependent (according to the weather dependent curve). During weather dependent operation, the end-user cannot adjust the desired tank temperature on the user interface.

#	Code	Description
[A.4.2.2]	N/A	Weather dependent desired tank temperature is: ▪ Absolute (default): disabled. All desired tank temperature are NOT weather dependent. ▪ Weather dep.: enabled. In scheduled or scheduled+reheat mode, the storage comfort temperature is weather dependent. Storage economic and reheat temperatures are NOT weather dependent. In reheat mode, the desired tank temperature is weather dependent. Note: When the displayed tank temperature is weather dependent, it cannot be adjusted on the user interface.
[A.4.2.3]	[0-0E] [0-0D] [0-0C] [0-0B]	Weather-dependent curve  ▪ T_{DHW}: The desired tank temperature. ▪ T_a: The (averaged) outdoor ambient temperature ▪ [0-0E]: low outdoor ambient temperature. −20~5°C (default: −10°C) ▪ [0-0D]: high outdoor ambient temperature: 10~20°C (default: 15°C) ▪ [0-0C]: desired tank temperature when the outdoor temperature equals or drops below the low ambient temperature: 55~70°C (default: 70°C) ▪ [0-0B]: desired tank temperature when the outdoor temperature equals or rises above the high ambient temperature: 35~55°C (default: 55°C)
[A.4.2.1]	N/A	Schedule temperatures The possible actions of the tank temperature are: ▪ Presets (default): the predefined temperatures storage comfort, storage economic, and storage stop. The predefined temperature are set in the menu structure. ▪ Custom: custom temperatures within the allowable range and storage stop. Note: When selecting this value, it is NOT possible to select weather dependent tank temperatures.

Booster heater and heat pump operation

For systems with separate domestic hot water tank (only for EHBH/X**)**

#	Code	Description
N/A	[4-03]	Defines the operation permission of the booster heater depending on ambient, domestic hot water temperature or operation mode of heat pump. This setting is only applicable in reheat mode for applications with separate domestic hot water tank. ▪ 0: Booster heater operation is NOT allowed except for "Disinfection function" and "Powerful domestic water heating". Only use this in case the capacity of the heat pump can cover the heating requirements of the house and domestic hot water over the complete heating season. If the outdoor temperature is below setting [5-03] and [5-02]=1, the domestic hot water will not be heated. The domestic hot water temperature can be maximum the heat pump OFF temperature. ▪ 1: Booster heater operation is allowed when required. ▪ 2: The booster heater is allowed outside the operation range of the heat pump for domestic hot water operation. Booster heater operation is only allowed if: ▪ Ambient temperature is out of the operating range: T_a<[5-03] or T_a>35°C ▪ Domestic hot water temperature is 2°C lower than the heat pump OFF temperature. The booster heater will be allowed to operate when T_a<[5-03] depends of the status of [5-02]. If bivalent operation is enabled and permission signal for auxiliary boiler is ON, the booster heater will be restricted even when T_a<[5-03]. See [C-02]. ▪ 3 (default): The booster heater is allowed when the heat pump is NOT active in domestic hot water operation. Same as setting 1, but simultaneous heat pump domestic hot water operation and booster heater operation is not allowed. When setting [4-03]=1/2/3, the booster heater operation can still be restricted by the booster heater allowance schedule.
N/A	[7-00]	Overshoot temperature. Temperature difference above the domestic hot water set point temperature before the booster heater is turned OFF. The domestic hot water tank temperature will increase with [7-00] above selected temperature set point. Range: 0~4°C (default: 0)
N/A	[7-01]	Hysteresis. Temperature difference between booster heater ON and booster heater OFF temperature. The minimum hysteresis temperature is 2°C. Range: 2~40°C (default: 2)
N/A	[6-00]	The temperature difference determining the heat pump ON temperature. Range: 2~20°C (default: 2)
N/A	[6-01]	The temperature difference determining the heat pump OFF temperature. Range: 0~10°C (default: 2)



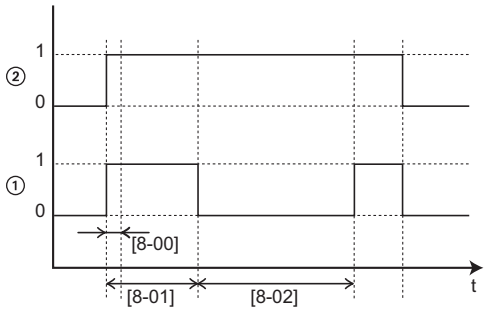
BH Booster heater
HP Heat pump. If heating up time by the heat pump takes too long, auxiliary heating by the booster heater can take place
$T_{BH\ OFF}$ Booster heater OFF temperature (T_U+[7-00])
$T_{BH\ ON}$ Booster heater ON temperature ($T_{BH\ OFF}$−[7-01])
$T_{HP\ MAX}$ Maximum heat pump temperature at sensor in domestic hot water tank
$T_{HP\ OFF}$ Heat pump OFF temperature ($T_{HP\ MAX}$−[6-01])
$T_{HP\ ON}$ Heat pump ON temperature ($T_{HP\ OFF}$−[6-00])
T_{DHW} Domestic hot water temperature
T_U User set point temperature (as set on the user interface)
t Time

Timers

#	Code	Description
N/A	[8-00]	Minimum running time for domestic hot water operation. During this time, space heating/cooling is NOT allowed, even when the target domestic hot water temperature has been reached. Range: 0~20 minutes (default: 5)
N/A	[8-01]	Maximum running time for domestic hot water operation. Domestic hot water heating stops even when the target domestic hot water temperature is NOT reached. The actual maximum running time also depends on setting [8-04]. ▪ When system layout = Room thermostat control: This preset value is only taken into account if there is a request for space heating or cooling. If there is NO request for space heating/cooling, the tank is heated until heat pump OFF temperature. ▪ When system layout ≠ Room thermostat control: This preset value is always taken into account. Range: 5~95 minutes (default: 30)

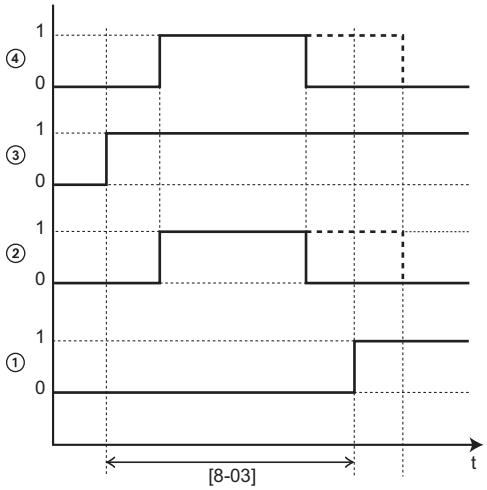
#	Code	Description
N/A	[8-02]	Anti-recycling time. Minimum time between two cycles for domestic hot water. The actual anti-recycling time also depends on setting [8-04]. Range: 0~10 hours (default: 3) (step: 1/2 hour) (only for EHBH/X). Range: 0~10 hours (default: 0.5) (step: 1/2 hour) (only for EHVH/X).
N/A	[8-03]	Booster heater delay timer. Only for EKHW* Start-up delay time for the booster heater when domestic hot water mode is active. ▪ When domestic hot water mode is NOT active, the delay time is 20 minutes. ▪ The delay time starts from booster heater ON temperature. ▪ By adapting the booster heater delay time versus the maximum running time, you can find an optimal balance between the energy efficiency and the heat up time. ▪ If the booster heater delay time is set too high, it might take a long time before the domestic hot water reaches its set temperature. ▪ The setting [8-03] is only meaningful if setting [4-03]=1. Setting [4-03]=0/2/3 limits the booster heater automatically in relation to heat pump operation time in domestic water heating mode. ▪ Make sure that [8-03] is always in relation with the maximum running time [8-01]. Range: 20~95 minutes (default: 50).
N/A	[8-04]	Additional running time for the maximum running time depending on the outdoor temperature [4-02] or [F-01]. Range: 0~95 minutes (default: 95).

[8-02]: Anti-recycling time



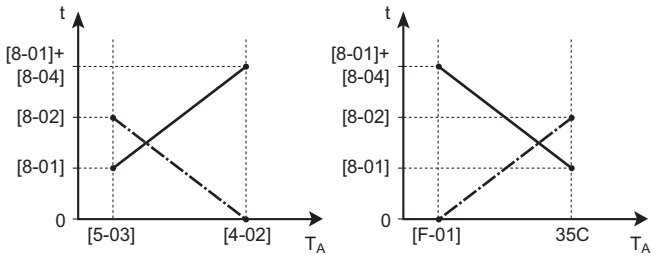
1 Heat pump domestic water heating mode (1=active, 0=not active)
2 Hot water request for heat pump (1=request, 0=no request)
t Time

[8-03]: Booster heater delay timer



1 Booster heater operation (1=active, 0=not active)
2 Heat pump domestic water heating mode (1=active, 0=not active)
3 Hot water request for booster heater (1=request, 0=no request)
4 Hot water request for heat pump (1=request, 0=no request)
t Time

[8-04]: Additional running time at [4-02]/[F-01]



T_A Ambient (outdoor) temperature
t Time
Anti-recycle time
Maximum running current

Disinfection

Applies only to installations with a domestic hot water tank.

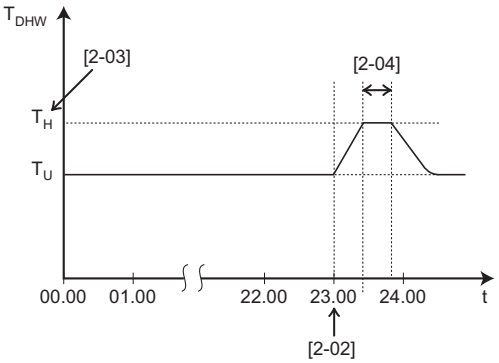
The disinfection function disinfects the domestic hot water tank by periodically heating the domestic hot water to a specific temperature.

CAUTION

The disinfection function settings must be configured by the installer according to the applicable legislation.

#	Code	Description
[A.4.4.2]	[2-00]	Operation day: ▪ Each day ▪ Monday ▪ Tuesday ▪ Wednesday ▪ Thursday ▪ Friday ▪ Saturday ▪ Sunday
[A.4.4.2]	[2-01]	Disinfection ▪ No ▪ Yes

#	Code	Description
[A.4.4.3]	[2-02]	Start time: 00~23:00, step: 1:00.
[A.4.4.4]	[2-03]	Temperature target: ▪ With booster heater: 55~80°C, default: 70°C. ▪ Without booster heater: 60°C (fixed).
[A.4.4.5]	[2-04]	Duration: ▪ With booster heater: 5~60 minutes, default: 10 minutes. ▪ Without booster heater: 40~60 minutes, default: 60 minutes.



T_{DHW} Domestic hot water temperature
T_U User set point temperature
T_H High set point temperature [2-03]
t Time

WARNING

Be aware that the domestic hot water temperature at the hot water tap will be equal to the value selected in field setting [2-03] after a disinfection operation.

When the high domestic hot water temperature can be a potential risk for human injuries, a mixing valve (field supply) shall be installed at the hot water outlet connection of the domestic hot water tank. This mixing valve shall secure that the hot water temperature at the hot water tap never rise above a set maximum value. This maximum allowable hot water temperature shall be selected according to the applicable legislation.

CAUTION

Be sure that the disinfection function start time [A.4.4.3] with defined duration [A.4.4.5] is NOT interrupted by possible domestic hot water demand.

CAUTION

The booster heater permission schedule is used to restrict or allow booster heater operation based on a weekly program. Advice: In order to avoid unsuccessful disinfection function, at least allow the booster heater (by the weekly program) for minimum 4 hours starting from the scheduled start-up of disinfection. If the booster heater is restricted during disinfection, this function will NOT be successful and the applicable warning AH will be generated.

INFORMATION

In case of error code AH and no interruption of the disinfection function occurred due to domestic hot water tapping, following actions are recommended:

- When the Domestic hot water > Setpoint mode > Reheat or Reheat + sched. is selected, it is recommended to program the start-up the disinfection function at least 4 hours later than the last expected large hot water tapping. This start-up can be set by installer settings (disinfection function).
- When the Domestic hot water > Setpoint mode > Scheduled only is selected, it is recommended to program a Storage eco 3 hours before the scheduled start-up of the disinfection function to preheat the tank.

INFORMATION

Disinfection function is restarted in case the domestic hot water temperature drops 5°C below the disinfection target temperature within the duration time.

8.3.3 Heat source settings

Backup heater

For systems without domestic hot water tank or with separate domestic hot water tank (only for EHBH/X**)**

Backup heater operation mode: defines when backup heater operation is enabled or disabled. This setting is only overruled when backup heating is required during defrost operation or malfunctioning of the outdoor unit (when [A.5.1.2] [4-06] is enabled)

For systems with an integrated domestic hot water tank (only for EHVH/X**)**

Backup heater operation mode: defines when backup heater operation is disabled or only allowed during domestic hot water operation. This setting is only overruled when backup heating is required during defrost operation or malfunctioning of the outdoor unit (when [A.5.1.2] [4-06] is enabled)

#	Code	Description
[A.5.1.1]	[4-00]	Backup heater operation: ▪ 0: Disabled ▪ 1: Enabled ▪ 2: Limited, only enabled during domestic hot water operation of for system with integrated domestic hot water tank.
[A.5.1.2]	[4-06]	Defines if during emergency operation the backup heater is: ▪ 1: Allowed ▪ 0: NOT allowed Emergency operation will startup backup heater operation during certain outdoor malfunctions.
[A.5.1.3]	[4-07]	Defines whether backup heater second step is: ▪ 1: Allowed ▪ 0: NOT allowed In this way it is possible to limit the backup heater capacity.
N/A	[5-00]	Is backup heater operation allowed above equilibrium temperature during space heating operation? ▪ 1: NOT allowed ▪ 0: Allowed

#	Code	Description
[A.5.1.4]	[5-01]	Equilibrium temperature. Outdoor temperature below which operation of the backup heater is allowed.

INFORMATION

Only for systems with integrated domestic hot water tank: If the storage temperature set point is higher than 50°C, Daikin recommends NOT to disable the backup heater second step because it will have a big impact on the required time for the unit to heat up the domestic hot water tank.

Bivalent

Applies only to installations with an auxiliary boiler (alternating operation, parallel connected). The purpose of this function is to determine — based on the outdoor temperature — which heating source can/will provide the space heating, either the Daikin indoor unit or an auxiliary boiler.

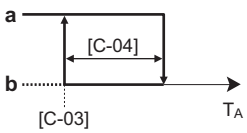
The field setting "bivalent operation" apply only the indoor unit space heating operation and the permission signal for the auxiliary boiler.

When the "bivalent operation" function is enabled, the indoor unit will stop automatically in space heating operation when the outdoor temperature drops below "bivalent ON temperature" and the permission signal for the auxiliary boiler becomes active.

When the bivalent operation function is disabled, the space heating by indoor unit is possible at all outdoor temperatures (see operation ranges) and permission signal for auxiliary boiler is always disactivated.

- [C-03] Bivalent ON temperature: defines the outdoor temperature below which the permission signal for the auxiliary boiler will be active (closed, KCR on EKRP1HB) and space heating by indoor unit will be stopped.
- [C-04] Bivalent hysteresis: defines the temperature difference between bivalent ON temperature and bivalent OFF temperature.

Permission signal X1–X2 (EKRP1HB**)**



T_A Outdoor temperature
a closed
b open

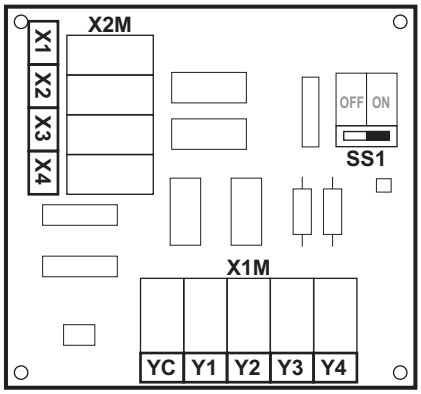
CAUTION

Make sure to observe all rules mentioned in application guideline 5 when bivalent operation function is enabled.

Daikin shall not be held liable for any damage resulting from failure to observe this rule.

INFORMATION

- The combination of setting [4-03]=0/2 with bivalent operation at low outdoor temperature can result in domestic hot water shortage.
- The bivalent operation function has no impact on the domestic water heating mode. The domestic hot water is still and only heated by the indoor unit.
- The permission signal for the auxiliary boiler is located on the EKRP1HB (digital I/O PCB). When it is activated, the contact X1, X2 is closed and open when it is disactivated. See illustration below for the schematic location of this contact.



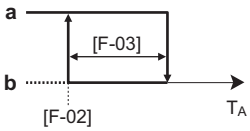
#	Code	Description
N/A	[C-03]	ON temperature. If the outdoor temperature drops below this temperature, the bivalent heat source permission signal will be active.
N/A	[C-04]	Hysteresis. Temperature difference between bivalent heat source ON and OFF to prevent too much switching.

Bottom plate heater

Applies only to installation with an outdoor unit ERHQ and the option bottom plate heater kit is installed.

- [F-02] Bottom plate heater ON temperature: defines the outdoor temperature below which the bottom plate heater will be activated by indoor unit in order to prevent ice build-up in the bottom plate of the outdoor unit at lower outdoor temperatures.
- [F-03] Bottom plate heater hysteresis: defines the temperature difference between bottom plate heater ON temperature and the bottom plate heater OFF temperature.

Bottom plate heater



T_A Outdoor temperature
a On
b OFF

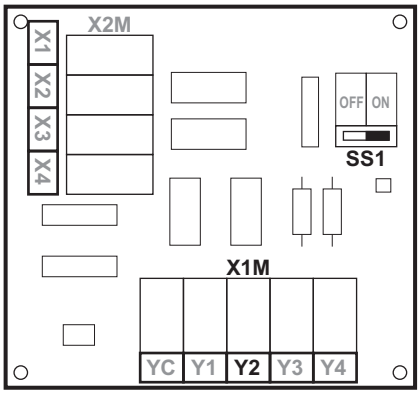
CAUTION

The bottom plate heater is controlled via EKRP1HB.

#	Code	Description
N/A	[F-02]	Bottom plate heater ON temperature: 3~10°C Default: 3°C
N/A	[F-03]	Hysteresis: 2~5°C Default: 5°C

INFORMATION

Dependent from setting [F-04] contact Y2 located on digital I/O PCB (EKRP1HB) controls the option bottom plate heater. See illustration below for the schematic location of this contact. For complete upwiring, see "14.5 Wiring diagram" on page 72.



8.3.4 System settings

Priorities

For systems with separate domestic hot water tank (only for EHBH/X**)**

#	Code	Description
N/A	[5-02]	Space heating priority. Defines whether domestic hot water is made by booster heater only when outdoor temperature is below space heating priority temperature. It is recommended to enable this function to shorten tank heating operation time and guaranteed domestic hot water comfort. ▪ 0: disabled ▪ 1: enabled [5-01] Equilibrium temperature and [5-03] Space heating priority temperature are related to backup heater. So, you must set [5-03] equal or a few degrees higher than [5-01].
	[5-03]	Space heating priority temperature. Defines the outdoor temperature which below the domestic hot water will be heated by booster heater only. Range: 15~35°C (default: 0).
N/A	[5-04]	Set point correction for domestic hot water temperature: set point correction for the desired domestic hot water temperature, to be applied at low outdoor temperature when space heating priority is enabled. The corrected (higher) set point will make sure that the total heat capacity of the water in the tank remains approximately unchanged, by compensating for the colder bottom water layer of the tank (because the heat exchanger coil is not operational) with a warmer top layer. Range: 0~20°C (default: 10).
[A.6.1.2]	[C-00]	If a solar kit is installed, what has priority to heat up the tank? ▪ 0: Solar kit ▪ 1: Heat pump
[A.6.1.1]	[C-01]	If there is a simultaneous demand for space heating/cooling and domestic hot water heating (by heat pump), which operation mode has priority? ▪ 0: The operation mode with the highest request has priority. ▪ 1: Always space heating/cooling has priority.

For systems with an integrated domestic hot water tank (only for EHVH/X**)**

#	Code	Description
N/A	[5-02]	Space heating priority. Defines whether backup heater will assist the heat pump during domestic hot water operation. Consequence: Shorter tank heating operation time and shorter interruption of the space heating cycle. This setting MUST always be 1. [5-01] Equilibrium temperature and [5-03] Space heating priority temperature are related to backup heater. So, you must set [5-03] equal or a few degrees higher than [5-01]. If the backup heater operation is limited ([4-00]=0) and the outdoor temperature is lower than setting [5-03], the domestic hot water will not be heated with the backup heater.
N/A	[5-03]	Space heating priority temperature. Defines the outdoor temperature which below the backup heater will assist during domestic hot water heating.
[A.6.1.2]	[C-00]	If a solar kit is installed, what has priority to heat up the tank? ▪ 0: Solar kit ▪ 1: Heat pump
[A.6.1.1.1]	[C-01]	If there is a simultaneous demand for space heating/cooling and domestic hot water heating (by heat pump), which operation mode has priority? ▪ 0: The operation mode with the highest request has priority. ▪ 1: Always space heating/cooling has priority.

Auto-restart

When power returns after a power supply failure, the auto restart function reapplies the remote controller settings at the time of the power failure. Therefore, Daikin recommends to always enable the function.

If the preferential kWh rate power supply is of the type that power supply is interrupted, always enable the auto restart function. Continuous indoor unit control can be guaranteed independent of the preferential kWh rate power supply status, by connecting the indoor unit to a normal kWh rate power supply.

#	Code	Description
[A.6.1]	[3-00]	Auto restart function: ▪ 0: Enabled ▪ 1: Disabled

Preferential kWh rate power supply

#	Code	Description
A.2.6.1	[d-01]	Connection to a preferential kWh rate power supply: ▪ 0 (default): The outdoor unit is connected to a normal power supply. ▪ 1: The outdoor unit is connected to a preferential kWh rate power supply. When the preferential kWh rate signal is sent by the electricity company, the contact will open and the unit will go in forced off mode. When the signal is released again, the voltage-free contact will close and the unit will restart operation. Therefore, always enable the auto restart function. ▪ 2: The outdoor unit is connected to a preferential kWh rate power supply. When the preferential kWh rate signal is sent by the electricity company, the contact will close and the unit will go in forced off mode. When the signal is released again, the voltage-free contact will close and the unit will restart operation. Therefore, always enable the auto restart function.
[A.6.2.1]	[d-00]	Which heaters are allowed to operate during preferential kWh rate power supply? ▪ 0 (default): None ▪ 1: Booster heater only ▪ 2: Backup heater only ▪ 3: All heaters Only for EHBH/X + EKHW*: See table below. Only for EHVH/X: See table below. Settings 1, 2 and 3 are only meaningful if the preferential kWh rate power supply is of type 1 or indoor unit is connected to a normal kWh rate power supply (via 30-31 X2M) and the backup heater and booster heater are NOT connected to the preferential kWh rate power supply.

Only for EHBH/X + EKHW*:

[d-00]	Booster heater	Backup heater	Compressor
0 (default)	Forced OFF	Forced OFF	Forced OFF
1	Permitted		
2	Forced OFF	Permitted	
3	Permitted		

Only for EHVH/X: Do NOT use 1 or 3.

[d-00]	Backup heater	Compressor
0 (default)	Forced OFF	Forced OFF
2	Allowed	

Power saving function

INFORMATION

Only applicable for ERLQ004~008CAV3.

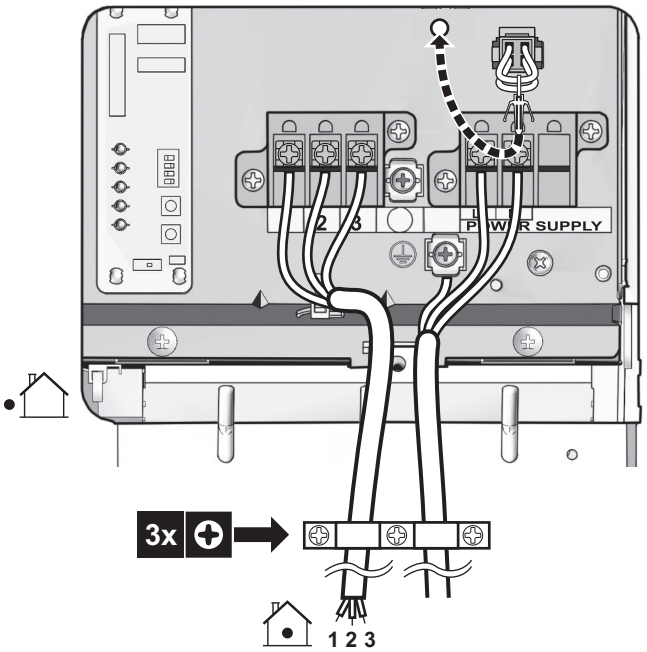
Defines whether the outdoor unit power supply can be interrupted (internally by indoor unit control) during stand-still conditions (no space heating/cooling nor domestic hot water demand). The final decision to allow power interruption of the outdoor unit during standstill depends on the ambient temperature, compressor conditions and minimum internal timers.

To enable the power saving function setting, [E-08] needs to be enable at the user interface in combination with the removal of the power saving connector at the outdoor unit.

NOTICE

The power saving connector at the outdoor unit shall only be removed when the main power supply to the application is switched OFF.

In case of ERLQ004~008CAV3



#	Code	Description
N/A	[E-08]	Power saving function for outdoor unit: ▪ 0: Disabled ▪ 1 (default): Enabled

In case of ERHQ011~016BAV3**,** ERHQ011~016BAW1**,** ERLQ011~016CAV3**, and** ERLQ011~016CAW1

Do NOT change the default setting.

#	Code	Description
N/A	[E-08]	Power saving function for outdoor unit: ▪ 0 (default): Disabled ▪ 1: Enabled

Power consumption control

Only applicable for EHBH/X04+08 + EHVH/X04+08. See "5 Application guidelines" on page 7 for detailed information about this functionality.

Pwr consumpt. control

#	Code	Description
[A.6.3.1]	[4-08]	Mode: ▪ 0 (No limitation)(default): Disabled. ▪ 1 (Continuous): Enabled: You can set one power limitation value (in A or kW) to which the system power consumption will be limited for all the time. ▪ 2 (Digital inputs): Enabled: You can set up to four different power limitation values (in A or kW) to which the system power consumption will be limited when the corresponding digital input asks.
[A.6.3.2]	[4-09]	Type: ▪ 0 (Current): The limitation values are set in A. ▪ 1 (Power)(default): The limitation values are set in kW.
[A.6.3.3]	[5-05]	Value: Only applicable in case of full time power limitation mode. 0~50 A, step 1 A (default: 50 A)
[A.6.3.4]	[5-09]	Value: Only applicable in case of full time power limitation mode. 0~20 kW, step 0.5 kW (default: 20 kW)
Amp. limits for DI: Only applicable in case of power limitation mode based on digital inputs and based on current values.		
[A.6.3.5.1]	[5-05]	Limit DI1 0~50 A, step 1 A (default: 50 A)
[A.6.3.5.2]	[5-06]	Limit DI2 0~50 A, step 1 A (default: 50 A)
[A.6.3.5.3]	[5-07]	Limit DI3 0~50 A, step 1 A (default: 50 A)
[A.6.3.5.4]	[5-08]	Limit DI4 0~50 A, step 1 A (default: 50 A)
kW limits for DI: Only applicable in case of power limitation mode based on digital inputs and based on power values.		
[A.6.3.6.1]	[5-09]	Limit DI1 0~20 kW, step 0.5 kW (default: 20 kW)
[A.6.3.6.2]	[5-0A]	Limit DI2 0~20 kW, step 0.5 kW (default: 20 kW)
[A.6.3.6.3]	[5-0B]	Limit DI3 0~20 kW, step 0.5 kW (default: 20 kW)
[A.6.3.6.4]	[5-0C]	Limit DI4 0~20 kW, step 0.5 kW (default: 20 kW)
Priority: Only applicable in case of an optional EKHW*.		

#	Code	Description
[A.6.3.7]	[4-01]	**Power consumption control DISABLED [4-08]=0** ▪ 0 (None)(default): Backup heater and booster heater can operate simultaneously. ▪ 1 (BSH): The booster heater is prioritized. ▪ 2 (BUH): The backup heater is prioritized. **Power consumption control ENABLED [4-08]=1 or 2** ▪ 0 (None)(default): Depending on the power limitation level, the booster heater will be limited first, before the backup heater is limited. ▪ 1 (BSH): Depending on the power limitation level, the backup heater will be limited first, before the booster heater is limited. ▪ 2 (BUH): Depending on the power limitation level, the booster heater will be limited first, before the backup heater is limited.

Note: In case of power consumption control is DISABLED (for all models) the setting [4-01] defines whether backup heater and booster heater can operate simultaneously, or if the booster heater/backup heater has priority over the backup heater/booster heater.

In case of power consumption control is ENABLED (only for EHBH/X04+08 and EHVH/X04+08), the setting [4-01] defines the priority of the electrical heaters depending on applicable limitation.

#	Code	Description
[A.6.3.7]	[4-01]	▪ 0 (None)(default): No heater is prioritized. If the power consumption control is enabled, the booster heater will be limited first. ▪ 1 (BSH): The booster heater is prioritized. If the power consumption control is enabled, the backup heater (step 1 and/or step 2) will be limited first, before the booster heater is limited. ▪ 2 (BUH): The backup heater is prioritized. If the power consumption control is enabled, the booster heater will be limited first, before the backup heater is limited.

Average timer

The average timer corrects the influence of ambient temperature variations. The weather-dependent set point calculation is done on the average outdoor temperature.

The outdoor temperature is averaged over the selected time period.

#	Code	Description
[A.6.4]	[1-0A]	Outdoor average timer: ▪ No averaging (default) ▪ 12 hours ▪ 24 hours ▪ 48 hours ▪ 72 hours

INFORMATION

If the power saving function is activated (see [E-08]), the average outdoor temperature calculation is only possible in case the external outdoor temperature sensor is used. See "5.7 Setting up an external temperature sensor" on page 19.

Offset temperature external outdoor ambient sensor

Only applicable in case of an external outdoor ambient sensor is installed and configured.

You can calibrate the external outdoor ambient temperature sensor. It is possible to give an offset to the thermistor value. The setting can be used to compensate for situations where the external outdoor ambient sensor cannot be installed on the ideal installation location (see installation).

#	Code	Description
[A.6.5]	[2-0B]	−5~5°C, step 0.5°C (default: 0°C)

Forced defrost

You can manually start a defrost operation.

The decision to execute the manual defrost operation is made by the outdoor unit and depends on ambient and heat exchanger conditions. When the outdoor unit accepted the forced defrost operation, ☃ will be displayed on the user interface. If ☃ is NOT displayed within 6 minutes after forced defrost operation was enabled, the outdoor unit ignored the forced defrost request.

#	Code	Description
[A.6.6]	N/A	Do you want to start a defrost operation? ▪ OK ▪ Cancel

Pump operation

The pump operation field setting apply to the pump operation logic only when [F-0D]=1.

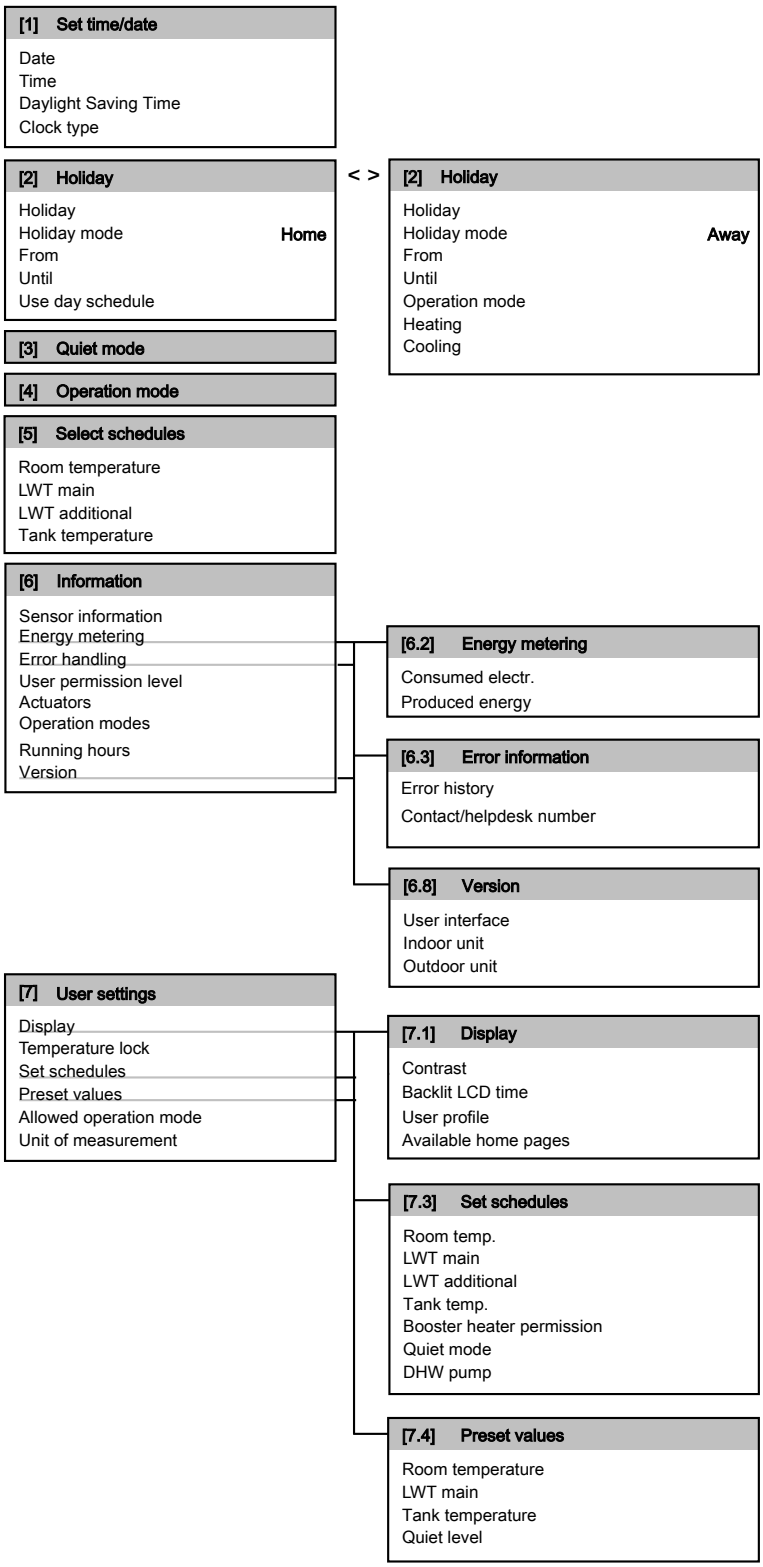
When the pump operation function is disabled the pump will stop if the outdoor temperature is higher than the value set by [4-02] or if the outdoor temperature drops below the value set by [F-01]. When the pump operation is enabled, the pump operation is possible at all outdoor temperatures.

#	Code	Description
N/A	[F-00]	Pump operation: ▪ 0: Disabled if outdoor temperature is higher than [4-02] or lower than [F-01] depending on heating/cooling operation mode. ▪ 1: Possible at all outdoor temperatures.

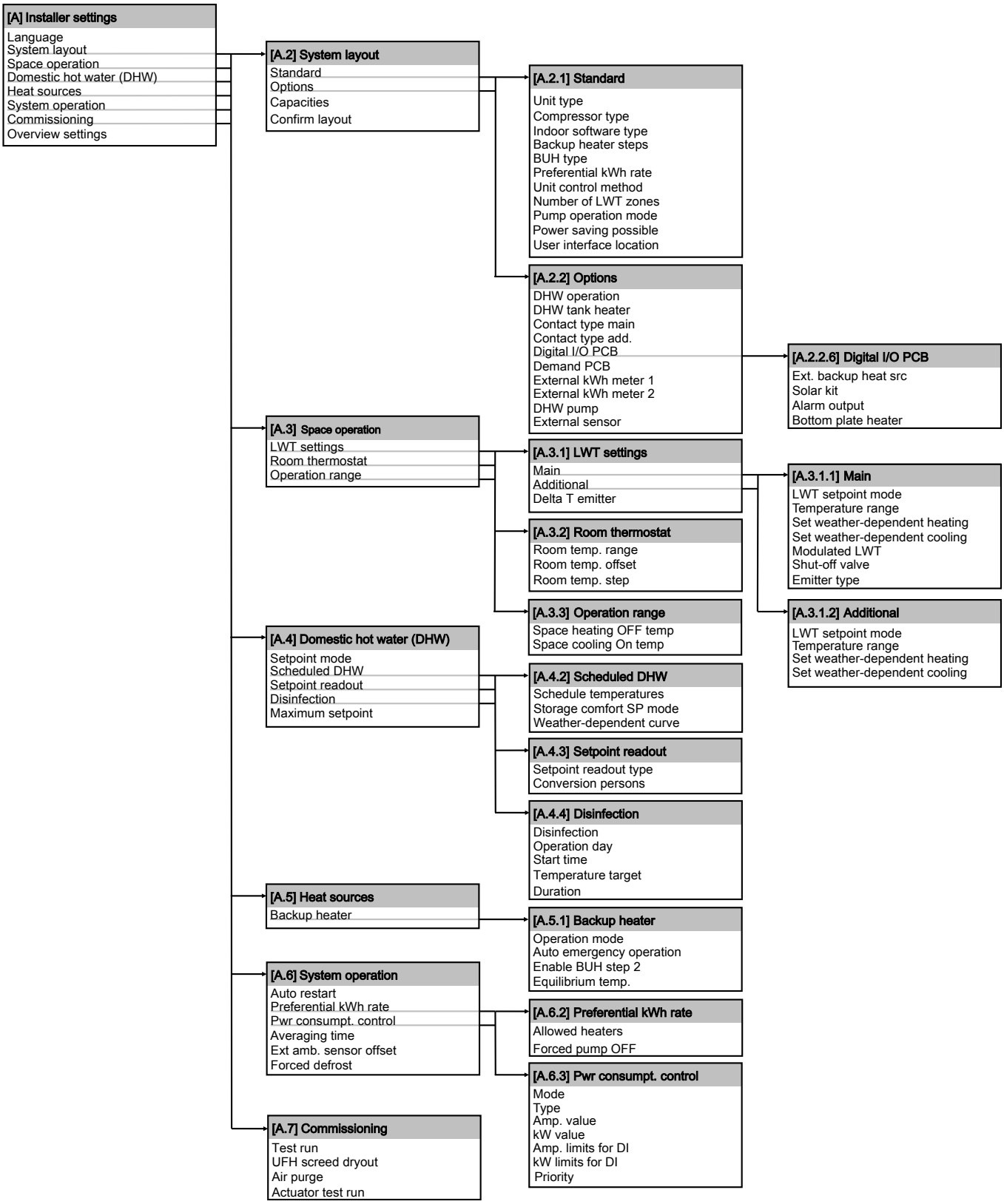
Pump operation during flow abnormality [F-09] defines whether the pump stops at flow abnormality or allow to continue operation when flow abnormality occurs. This functionality is only valid in specific conditions where it is preferable to keep the pump active when T_a<4°C (pump will be activated for 10 minutes and disactivated after 10 minutes). Daikin shall NOT be held liable for any damage resulting this functionality.

#	Code	Description
N/A	[F-09]	Pump continue operation when flow abnormality: ▪ 0: Pump will be desactivated. ▪ 1: Pump will be activated when T_a<4°C (10 minutes ON – 10 minutes OFF)

8.4 Menu structure: Overview



8.5 Menu structure: Overview installer settings



9 Commissioning

INFORMATION

- During the first running period of the unit, the required power may be higher than stated on the nameplate of the unit. This phenomenon originates from the compressor that needs elapse of a 50 hours run in period before reaching smooth operation and stable power consumption.
- Before startup, the installation must be powered for at least 2 hours to allow cranckcase heater to operate.

9.1 Overview: Commissioning

Commissioning typically consists of the following stages:

1 Checking the "Checklist before test run".
2 Performing an air purge.
3 Performing a test run for the system.
4 If necessary, performing a test run for one or more actuators.
5 If necessary, performing an underfloor heating screed dryout.

9.2 Checklist before test run

Do NOT operate the system before the following checks are OK:

☐	The **indoor unit** is properly mounted.
☐	The **outdoor unit** is properly mounted.
☐	The following **field wiring** has been carried out according to this document and the applicable legislation: ▪ Between the local supply panel and the indoor unit ▪ Between the indoor unit and the valves (if applicable) ▪ Between the indoor unit and the room thermostat (if applicable) ▪ Between the indoor unit and the domestic hot water tank (if applicable)
☐	The system is properly **earthed** and the earth terminals are tightened.
☐	The **fuses** or locally installed protection devices are according to this document, and have not been bypassed.
☐	The **power supply voltage** on the local supply panel is according to the voltage on the identification label of the unit.
☐	There are NO **loose connections** or damaged electrical components in the switch box.
☐	There are NO **damaged components** or **squeezed pipes** on the inside of the indoor and outdoor units.
☐	Depending on the backup heater type, the **backup heater circuit breaker** F1B or F3B on the switch box is turned ON.
☐	Only for tanks with built-in booster heater: The **booster heater circuit breaker** F2B on the switch box is turned ON.
☐	There are NO **refrigerant leaks**.
☐	The **refrigerant pipes** (gas and liquid) are thermally insulated.
☐	The correct pipe size is installed and the **pipes** are properly insulated.
☐	There is NO **water leak** inside the indoor unit.
☐	The **shut-off valves** are properly installed and fully open.
☐	The **stop valves** (gas and liquid) on the outdoor unit are fully open.
☐	The **air purge** valve is open (at least 2 turns).
☐	The **pressure relief valve** purges water when opened.

NOTICE

Before starting up the system, the unit must be energized for at least 2 hours. The cranckcase heater needs to heat up the compressor oil to avoid oil shortage and compressor breakdown during startup.

NOTICE

NEVER operate the unit without thermistors, burning of the compressor may result.

NOTICE

Do NOT operate the unit until the refrigerant piping is complete (when operated this way, the compressor will break).

9.3 Air purge function

When commissioning and installing the unit, it is very important to remove all air in the water circuit. When the air purge function is running, the pump operates without actual operation of the unit and the remove of air in the water circuit will start.

There are 2 modes to purge air:

- Manually: the unit will operate with a fixed pump speed and in a fixed or custom position of the 3-way valve. The custom position of the 3-way valve is a helpful feature to remove all air from the water circuit in space heating or domestic hot water heating mode. The operation speed of the pump (slow or quick) can also be set.
- Automatic: the unit change automatically the pump speed and the position of the 3-way valve between space heating or domestic hot water heating mode.

The air purge function stops automatically after 30 minutes.

INFORMATION

It is recommended to start the air purge function in manually mode. When almost all air is removed, it is recommended to start the automatic mode. If necessary, repeat the automatic mode until you are sure that all air is removed from the system.

9.3.1 To perform a manual air purge

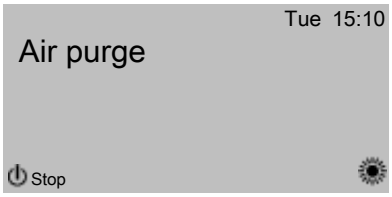
1 Set the user permission level to Installer. See "To set the user permission level to Installer" on page 33.
2 Set the air purge mode: go to [A.7.3.1] > Installer settings > Commissioning > Air purge > Type.
3 Select Manual and press OK.
4 Set the desired pump speed: go to [A.7.3.2] > Installer settings > Commissioning > Speed.
5 Select the desired pump speed and press OK.
Result: Low
Result: High
6 If applicable, select the desired position of the 3-way valve. If not applicable, go to [A.7.3.4].
7 Set the desired position of the 3-way valve: go to [A.7.3.3] > Installer settings > Commissioning > Air purge > Circuit.
8 Select the desired circuit and press OK.

Result: SHC

Result: Tank

9 Go to [A.7.3.4] > Installer settings > Commissioning > Air purge > Start air purge and press OK to start the air purge function.

Result: Air purging is started and following screen will be shown.



9.3.2 To perform an automatic air purge

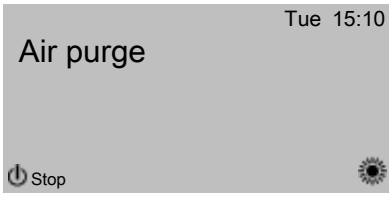
1 Set the user permission level to Installer. See "To set the user permission level to Installer" on page 33.

2 Set the air purge mode: go to [A.7.3.1] > Installer settings > Commissioning > Air purge > Type.

3 Select Automatic and press OK.

4 Go to [A.7.3.4] > Installer settings > Commissioning > Air purge > Start air purge and press OK to start the air purge function.

Result: Air purging will started and following screen will be shown.



9.3.3 To interrupt air purge

1 Go to [A.7.3].

2 Press and press OK to confirm the air purge function.

9.4 To perform a test run

1 Go to [A.7.1]: > Installer settings > Commissioning > Test run.

2 Select a test and press OK.
Example: Heating.

3 Select OK and press OK.

Result: The test run starts. It stops automatically when done (±30 min). To stop it manually, press , select OK and press OK.

INFORMATION

If two user interfaces are present, you can start a test run from both user interfaces.

- The user interface that you used to start the test run displays a status screen.
- The other user interface displays a busy screen. During busy screen, you cannot stop the test run.

If the installation of the unit has been done correctly, the unit will start up during test operation in the selected operation mode. During the test mode, the correct operation of the unit can be checked by monitoring leaving water temperature (heating/cooling mode) and tank temperature (domestic hot water mode).

For monitoring the temperature, go to [A.6] and select the information you want to check.

9.5 To perform an actuator test run

Purpose of the actuator test run is to confirm the operation of the different actuators (e.g., when you select pump operation, a test run of the pump will start).

1 Make sure the room temperature control, the leaving water temperature control and the domestic hot water control are turned OFF via the user interface.

2 Go to [A.7.4]: > Installer settings > Commissioning > Actuator test run.

3 Select an actuator and press OK.
Example: Pump.

4 Select OK and press OK.

Result: The actuator test run starts. It stops automatically when done. To stop it manually, press , select OK and press OK.

9.5.1 Possible actuator test runs

- Booster heater test
- Backup heater (step 1) test
- Backup heater (step 2) test
- Pump test
- Solar pump test
- 2-way valve test
- 3-way valve test
- Bottom plate heater test
- Bivalent signal test
- Alarm output test
- Cooling/heating signal test
- Quick heatup test
- Circulation pump test

9.6 Underfloor heating screed dryout

This function will be used to dry-out the screed of an underfloor heating very slowly during the construction of a house. It allows the installer to program and execute this program.

This function can be executed without finishing the outdoor installation. In this case, the backup heater will perform the screed dryout and supply the leaving water without heat pump operation.

NOTICE

The installer is resposible to:

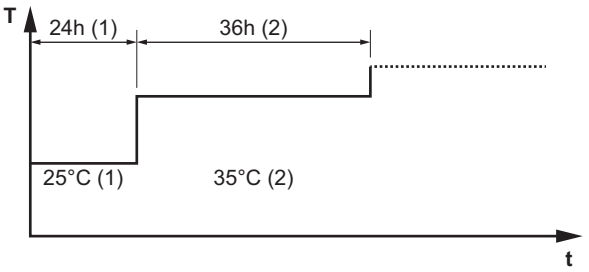
- contact the screed manufacturer for the initial heating instructions to avoid cracking the screed,
- program the underfloor heating screed dryout schedule according to the above instruction of the screed manufacturer,
- check on regular base the good working of the setup,
- select the correct program that complies the type of used screed for the floor.

The installer can program up to 20 steps where for each step he needs to enter:

1 the duration by a number of hours up to 72 hours,

2 the desired leaving water temperature.

Example:



T Desired leaving water temperature (15~55°C)
t Duration (1~72h)
(1) Action step 1
(2) Action step 2

9.6.1 To program an underfloor heating screed dryout schedule

1 Go to [A.7.2]: > Installer settings > Commissioning > UFH screed dryout > Set dryout schedule.
2 Use the , , , and to program the schedule.
- Use and to scroll through the schedule.
- Use and to adjust the selection.

Result: If a time is selected, you can set the duration between 1 and 72 hours.

Result: If a temperature is selected, you can set the desired leaving water temperature between 15°C and 55°C.

3 To add a new step, select "–h" or "–" on an empty line and press .
4 To delete a step, set the duration to "–" by pressing .
5 Press OK to save the schedule.

INFORMATION

It is important that there is no empty step in the program. The schedule will be executed until a blank step is programmed OR after 20 consequetive steps.

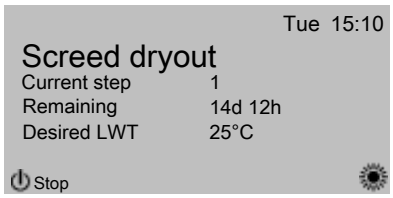
9.6.2 To start an underfloor heating screed dryout

INFORMATION

Preferential kWh rate power supply cannot be used in combination with underfloor heating screed dryout.

1 Go to [A.7.2]: > Installer settings > Commissioning > UFH screed dryout.
2 Set a dryout program.
3 Select Start dryout and press OK.
4 Select OK and press OK.

Result: The underfloor heating screed dryout starts and following screen will be shown. It stops automatically when done. To stop it manually, press , select OK and press OK.



9.6.3 To readout the status of an underfloor heating screed dryout

1 Press .
2 The current step of the program, the total remaining time, and the current desired leaving water temperature will be displayed.

INFORMATION

There is limited access to the menu structure. Only the following menu's can be accessed:
- Information.
- Installer settings > Commissioning > UFH screed dryout

9.6.4 To interrupt an underfloor heating screed dryout

When the program is stopped by an error, an operation switch off, or a power failure, then the U3 error will be displayed on the user interface. To resolve the error codes, see "12.3 Solving problems based on error codes" on page 64. To reset the U3 error, your User permission level needs to be Installer.

1 Go to the underfloor heating screed dryout screen.
2 Press .
3 Press to interrupt the program.
4 Select OK and press OK.

Result: The underfloor heating screed dryout program is stopped.

When the program is stopped due to an error, an operation switch off, or a power failure, you can read out the underfloor heating screed dryout status.

5 Go to [A.7.2]: > Installer settings > Commissioning > UFH screed dryout > Dryout status > Stopped at and followed by the last executed step.
6 Modify and restart the execution of the program.

10 Hand-over to the user

Once the test run is finished and the unit operates properly, please make sure the following is clear for the user:
- Fill in the installer setting table (in the operation manual) with the actual settings.
- Make sure that the user has the CD/DVD and the printed documentation and ask him/her to keep it for future reference.
- Explain the user how to properly operate the system and what he/she has to do in case of problems.
- Show the user what jobs he/she has to do in relation to maintenance of the unit.
- Explain the user about energy saving tips as described in the operation manual.

11 Maintenance and service

NOTICE

Maintenance should preferably be carried out yearly by an installer or service agent.

11.1 Maintenance safety precautions

DANGER: RISK OF ELECTROCUTION

DANGER: RISK OF BURNING

NOTICE: Risk of electrostatic discharge

Before performing any maintenance or service work, touch a metal part of the unit in order to eliminate static electricity and to protect the PCB.

11.1.1 Opening the indoor unit

CAUTION

The front panel is heavy. Be careful NOT to jam your fingers when opening or closing the unit.

You just need to remove the front panel and remove the expanded polystyrene front cover of the unit to gain access to most parts which need maintenance. In rare cases, you may also need to remove the switch box.

11.2 Checklist for yearly maintenance for indoor unit

Check the following at least once a year:

- Water pressure
- Water filter
- Water pressure relief valve
- Relief valve hose
- Pressure relief valve of the domestic hot water tank
- Switch box
- Descaling
- Chemical disinfection
- Anode

Water pressure

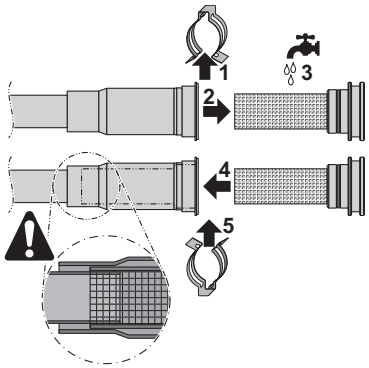
Check whether the water pressure is above 1 bar. If it is lower, add water.

Water filter

Clean the water filter.

NOTICE

Handle the water filter with care. Do NOT use excessive force when you reinsert the water filter so as NOT to damage the water filter mesh.



Water pressure relief valve

Open the valve and check the correct operation. **Water may be very hot!**

Checkpoints are:

- Water flow coming from the relief valve is high enough, no blockage of the valve or in between piping is suspected.
- Water coming out from the relief valve and contains debris or dirt:
  - open the valve untill the discharged water does not contain dirt anymore
  - flush the system and install an additional water filter (a magnectic cyclone filter is preferably).

To make sure this water originates from the tank, check after a tank heat up cycle.

It is recommended to do this maintenance more frequently.

Pressure relief valve hose

Check whether the pressure relief valve hose is positioned appropriately to drain the water. See "7.3.2 To connect the pressure relief valve to the drain" on page 26.

Relief valve of the domestic hot water tank (field supply)

Open the valve and check the correct operation. **Water may be very hot!**

Checkpoints are:

- Water flow coming from the relief valve is high enough, no blockage of the valve or in between piping is suspected.
- Water coming out from the relief valve and contains debris or dirt:
  - open the valve untill the discharged water does not contain dirt anymore
  - flush and clean the complete tank including the piping between the relief valve and cold water inlet.

To make sure this water originates from the tank, check after a tank heat up cycle.

It is recommended to do this maintenance more frequently.

Switch box

- Carry out a thorough visual inspection of the switch box and look for obvious defects such as loose connections or defective wiring.
- Using an ohmmeter, check for correct operation of contactors K1M, K2M, K3M and K5M (depending on your installation). All contacts of these contactors must be in open position when the power is turned OFF.

WARNING

If the internal wiring is damaged, it has to be replaced by the manufacturer, its service agent or similarly qualified persons.

Descaling

Depending on water quality and set temperature, scale can deposit on the heat exchanger inside the domestic hot water tank and can restrict heat transfer. For this reason, descaling of the heat exchanger may be required at certain intervals.

Chemical disinfection

If the applicable legislation requires a chemical disinfection in specific situations, involving the domestic hot water tank, please be aware that the domestic hot water tank is a stainless steel cylinder containing an aluminium anode. We recommend to use a non-chloride based disinfectant approved for use with water intended for human consumption.

NOTICE

When using means for descaling or chemical disinfection, it must be ensured that the water quality remains compliant with EU directive 98/83 EC.

Anode

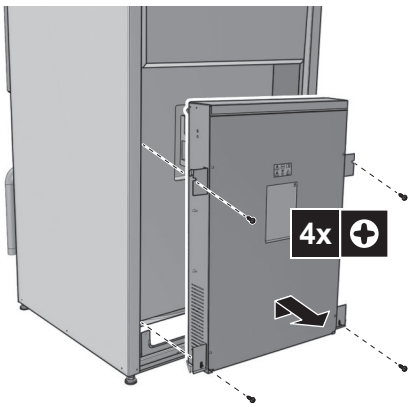
No maintenance or replacement required.

11.2.1 To drain the domestic hot water tank

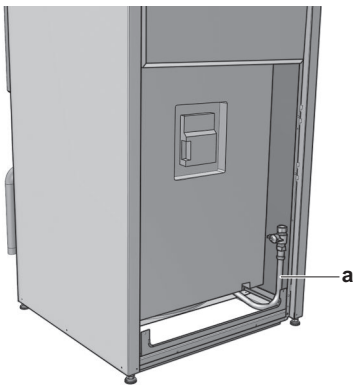
1 Switch OFF the power supply.
2 Turn OFF the cold water supply.
3 Open the hot water taps.
4 Open the drain valve.

11.3 To drain the domestic hot water tank

1 Open the front panel.
2 Remove the 4 screws, unhook and put the switch box aside.



3 The drain hose is located at the right side of the unit. Cut the tie wraps or tape and bring the flexible drain hose forward.



a Drain hose

INFORMATION

To drain the tank, all the hot water tapping points need to be opened to allow air to enter the system.

12 Troubleshooting

12.1 General guidelines

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

WARNING

- When carrying out an inspection on the switch box of the unit, always make sure that the unit is disconnected from the mains. Turn off the respective circuit breaker.
- When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. NEVER bridge safety devices or change their values to a value other than the factory default setting. If you are unable to find the cause of the problem, call your dealer.

DANGER: RISK OF ELECTROCUTION

WARNING

Prevent hazard due to the inadvertent resetting of the thermal cut-out: this appliance must NOT be supplied through an external switching device, such as a timer, or connected to a circuit that is regularly turned ON and OFF by the utility.

DANGER: RISK OF BURNING

12.2 Solving problems based on symptoms

12.2.1 Symptom: The unit is NOT heating or cooling as expected

Possible causes	Corrective action
The temperature setting is NOT correct	Check the temperature setting on the remote controller. Refer to the operation manual.
The water flow is too low	Check and make sure that: ▪ All shut-off valves of the water circuit are completely open. ▪ The water filter is clean. Clean if necessary. ▪ There is no air in the system. Purge air if necessary. You can purge air manually (see "9.3.1 To perform a manual air purge" on page 58) or use the automatic air purge function (see "9.3.2 To perform an automatic air purge" on page 59). ▪ The water pressure is >1 bar. ▪ The expansion vessel is NOT broken. ▪ The resistance in the water circuit is NOT too high for the pump (see "14.9 ESP curve" on page 84). If the problem persists after you have conducted all of the above checks, contact your dealer. In some cases, it is normal that the unit decides to use a low water flow.
The water volume in the installation is too low	Make sure that the water volume in the installation is above the minimum required value (see "6.2.3 To check the water volume" on page 21).

12.2.2 Symptom: The compressor does NOT start (space heating or domestic water heating)

Possible causes	Corrective action
The unit must start up out of its operation range (the water temperature is too low)	If the water temperature is too low, the unit uses the backup heater to reach the minimum water temperature first (15°C). Check and make sure that: ▪ The power supply to the backup heater is correctly wired. ▪ The backup heater thermal protector is NOT activated. ▪ The backup heater contactors are NOT broken. If the problem persists after you have conducted all of the above checks, contact your dealer.
The preferential kWh rate power supply settings and electrical connections do NOT match	This should match with the connections as explained in "6.3.1 About preparing electrical wiring" on page 22 and "7.4.3 To connect the main power supply" on page 28.
The preferential kWh rate signal was sent by the electricity company	Wait for the power to return (2 hours max.).

12.2.3 Symptom: The pump is making noise (cavitation)

Possible causes	Corrective action
There is air in the system	Purge air manually (see "9.3.1 To perform a manual air purge" on page 58) or use the automatic air purge function (see "9.3.2 To perform an automatic air purge" on page 59).
The water pressure at the pump inlet is too low	Check and make sure that: ▪ The water pressure is >1 bar. ▪ The manometer is not broken. ▪ The expansion vessel is not broken. ▪ The pre-pressure setting of the expansion vessel is correct (see "6.2.4 Changing the pre-pressure of the expansion vessel" on page 22).

12.2.4 Symptom: The pressure relief valve opens

Possible causes	Corrective action
The expansion vessel is broken	Replace the expansion vessel.
The water volume in the installation is too high	Make sure that the water volume in the installation is below the maximum allowed value (see "6.2.3 To check the water volume" on page 21 and "6.2.4 Changing the pre-pressure of the expansion vessel" on page 22).
The water circuit head is too high	The water circuit head is the difference in height between the indoor unit and the highest point of the water circuit. If the indoor unit is located at the highest point of the installation, the installation height is considered 0 m. The maximum water circuit head is 10 m. Check the installation requirements.

12.2.5 Symptom: The water pressure relief valve leaks

Possible causes	Corrective action
Dirt is blocking the water pressure relief valve outlet	Check whether the pressure relief valve works correctly by turning the red knob on the valve counterclockwise: ▪ If you do NOT hear a clacking sound, contact your dealer. ▪ If the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your dealer.

12.2.6 Symptom: The space is NOT sufficiently heated at low outdoor temperatures

Possible causes	Corrective action

The backup heater operation is not activated	Check and make sure that:
	▪ The backup heater operation mode is enabled. Go to:
	  ▪ [A.5.1.1] > Installer settings > Heat sources > Backup heater > Operation mode OR
	  ▪ [A.8] > Installer settings > Overview settings [5-01]
	▪ The thermal protector of the backup heater has not been activated. If it has, check:
	  ▪ The water pressure
	  ▪ Whether there is air in the system
	  ▪ The air purge operation
	Press the reset button in the switch box. See "14.2 Components" on page 68 for the location of the reset button.

The backup heater equilibrium temperature has not been configured correctly	Increase the “equilibrium temperature” to activate the backup heater operation at a higher outdoor temperature. Go to: ▪ [A.5.1.4] > Installer settings > Heat sources > Backup heater > Equilibrium temp. OR ▪ [A.8] > Installer settings > Overview settings [4-00]

Possible causes	Corrective action
Too much heat pump capacity is used for heating domestic hot water (applies only to installations with a domestic hot water tank)	Check and make sure that the "space heating priority" settings have been configured appropriately: ▪ Make sure that the "space heating priority status" has been enabled. Go to [A.8] > Installer settings > Overview settings [5-02] ▪ Increase the "space heating priority temperature" to activate backup heater operation at a higher outdoor temperature. Go to [A.8] > Installer settings > Overview settings [5-03]

12.2.7 Symptom: The pressure at the tapping point is temporarily unusual high

Possible causes	Corrective action
Failing or blocked pressure relief valve.	▪ Flush and clean the complete tank including the piping between pressure relief valve and the cold water inlet. ▪ Replace the pressure relief valve.

12.2.8 Symptom: Decoration panels are pushed away due to a swollen tank

Possible causes	Corrective action
Failing or blocked pressure relief valve.	Contact your local dealer.

12.2.9 Symptom: Tank disinfection function is NOT completed correctly (AH-error)

Possible causes	Corrective action
The disinfection function was interrupted by domestic hot water tapping	Program the start-up of the disinfection function when the coming 4 hours NO domestic hot water tapping is expected.
Large domestic hot water tapping happened recently before the programmed start-up of the disinfection function	When the Domestic hot water > Setpoint mode > Reheat or Reheat + sched. is selected, it is recommended to program the start-up the disinfection function at least 4 hours later than the last expected large hot water tapping. This start-up can be set by installer settings (disinfection function). When the Domestic hot water > Setpoint mode > Scheduled only is selected, it is recommended to program a Storage eco 3 hours before the scheduled start-up of the disinfection function to preheat the tank.

12.3 Solving problems based on error codes

When a problem happens, an error code appears on the user interface. It is important to understand the problem and to take countermeasure before resetting the error code. This should be done by a licensed installer or by your local dealer.

This chapter gives you an overview of all error codes and the content of the error code as it appears on the user interface.

For a more detailed troubleshooting guideline for each error, please see the service manual.

12.3.1 Error codes: Overview

Error codes of the indoor unit

Error code	Detailed error code	Description
A1	00	Zero cross detection problem. Power reset required. Please contact your dealer.
AA	01	Backup heater overheated. Power reset required. Please contact your dealer.
UA	00	Indoor unit, outdoor unit matching problem. Power reset required.
7H	01	Water flow problem.
89	01	Heat exchanger frozen.
8H	00	Abnormal increase BUH outlet water temperature.
8F	00	Abnormal increase BUH outlet water temperature (DHW).
C0	00	Flow sensor/switch malfunction. Please contact your dealer.
U3	00	Under floor heating screed dryout function not completed correctly.
81	00	Leaving water temperature sensor problem. Please contact your dealer.
C4	00	Heat exchanger temperature sensor problem. Please contact your dealer.
80	00	Returning water temperature sensor problem. Please contact your dealer.
U5	00	User interface communication problem.
U4	00	Indoor/outdoor unit communication problem.
AC	00	Booster heater overheated. Please contact your dealer.
EC	00	Abnormal increase tank temperature.

Error code	Detailed error code	Description
HC	00	Tank temperature sensor problem. Please contact your dealer.
CJ	02	Room temperature sensor problem. Please contact your dealer.
H1	00	External temperature sensor problem. Please contact your dealer.
AA	02	External backup heater overheated. Please contact your dealer.
HJ	08	Water circuit pressure is too high.
HJ	09	Water circuit pressure is too low.
HJ	10	Water pressure sensor problem. Please contact your dealer.
89	02	Heat exchanger frozen.
A1	00	EEPROM reading error.
AH	00	Tank disinfection function not completed correctly.
89	03	Heat exchanger frozen.

INFORMATION

In case of error code AH and no interruption of the disinfection function occurred due to domestic hot water tapping, following actions are recommended:

- When the Domestic hot water > Setpoint mode > Reheat or Reheat + sched. is selected, it is recommended to program the start-up the disinfection function at least 4 hours later than the last expected large hot water tapping. This start-up can be set by installer settings (disinfection function).
- When the Domestic hot water > Setpoint mode > Scheduled only is selected, it is recommended to program a Storage eco 3 hours before the scheduled start-up of the disinfection function to preheat the tank.

13 Glossary

Dealer
Sales distributor for the product.

Authorized installer
Technical skilled person who is qualified to install the product.

User
Person who is owner of the product and/or operates the product.

Applicable legislation
All international, European, national and local directives, laws, regulations and/or codes that are relevant and applicable for a certain product or domain.

Service company
Qualified company which can perform or coordinate the required service to the product.

Installation manual
Instruction manual specified for a certain product or application, explaining how to install, configure and maintain it.

Operation manual
Instruction manual specified for a certain product or application, explaining how to operate it.

Accessories
Labels, manuals, information sheets and equipment that are delivered with the product and that need to be installed according to the instructions in the accompanying documentation.

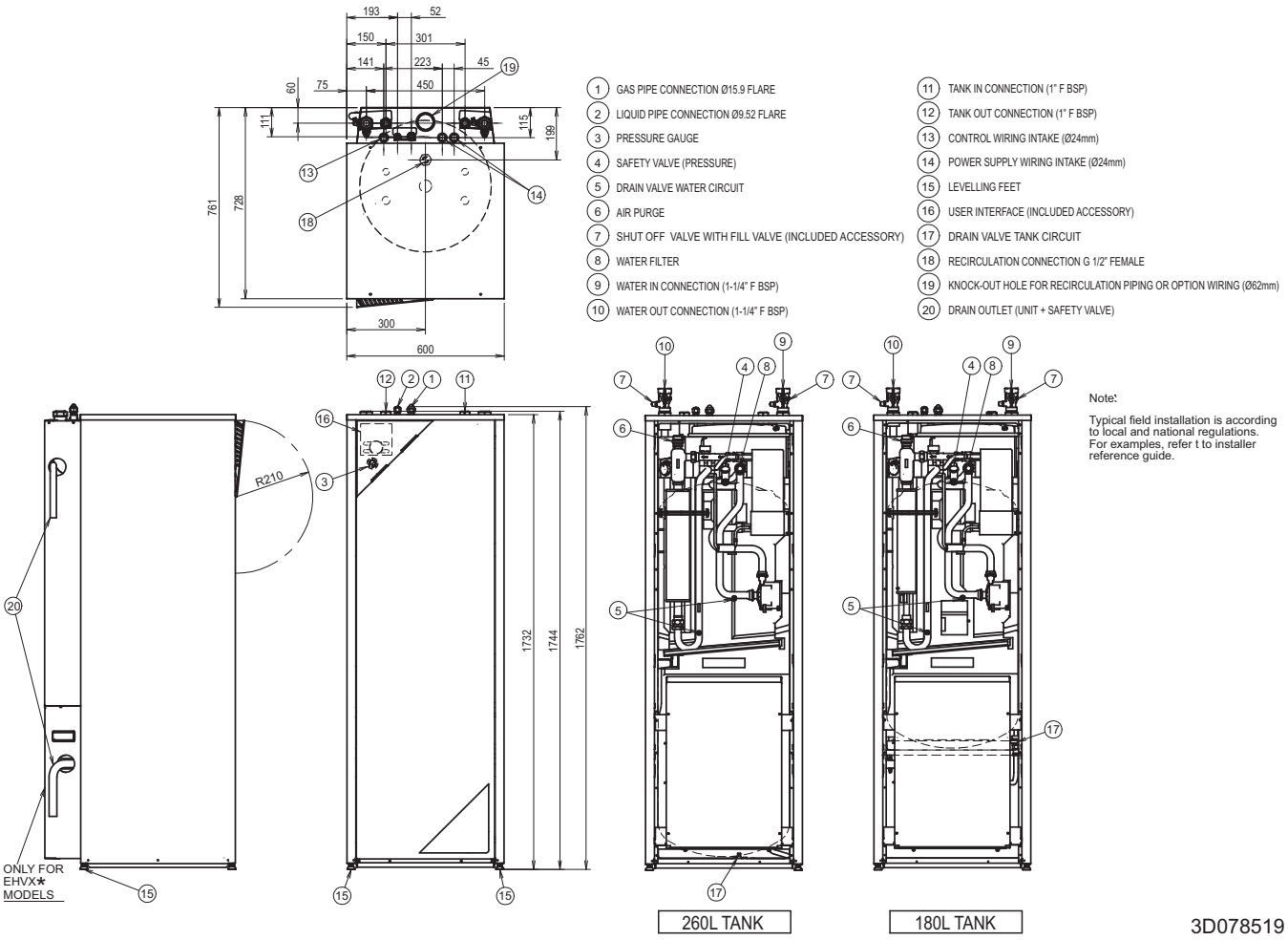
Optional equipment
Equipment made or approved by Daikin that can be combined with the product according to the instructions in the accompanying documentation.

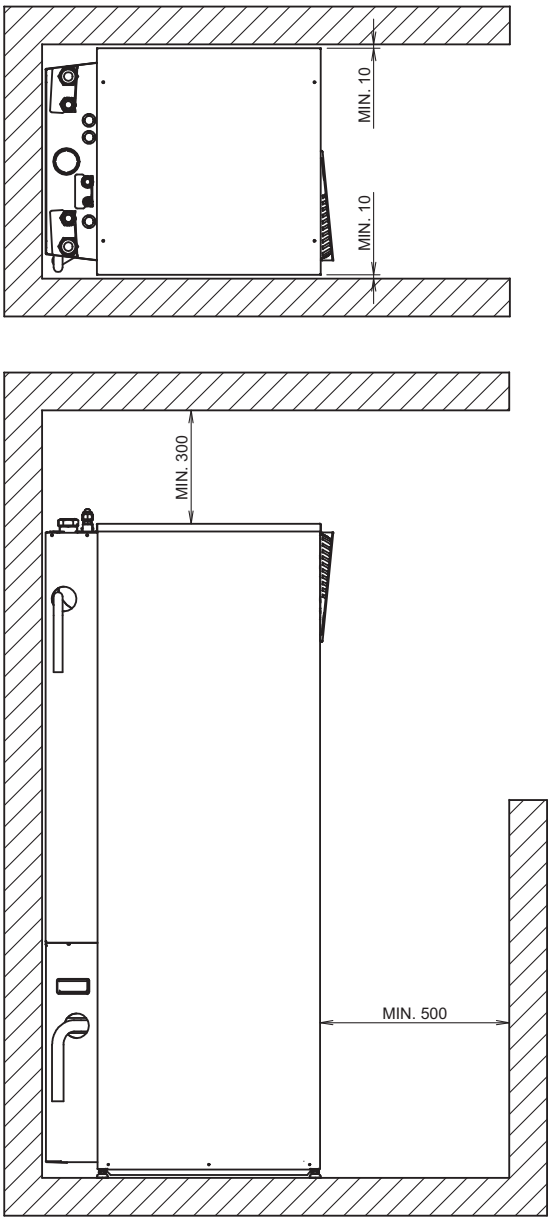
Field supply
Equipment not made by Daikin that can be combined with the product according to the instructions in the accompanying documentation.

14 Technical data

14.1 Dimensions and service space

14.1.1 Dimensions and service space: Indoor unit

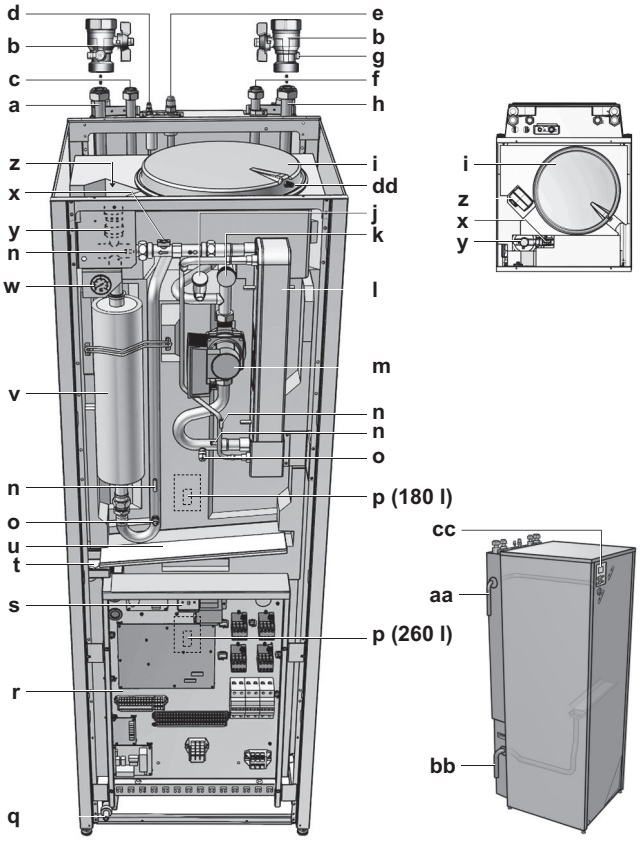




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14.2 Components

14.2.1 Components: Indoor unit

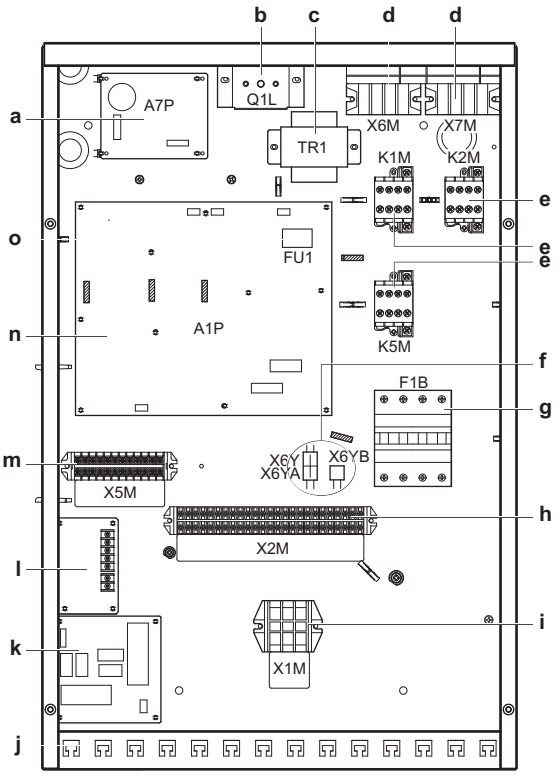


- **a** Space heating cooling out
- **b** Shut-off valves (accessory)
  Allows isolation of the indoor unit water circuit side from the residential water circuit side.
- **c** Domestic hot water out
- **d** Refrigerant liquid connection R410A
- **e** Refrigerant gas connection R410A
- **f** Domestic hot water in
- **g** Fill valve (accessory)
- **h** Space heating cooling in
- **i** Expansion vessel (10 l)
- **j** Pressure relief valve
  Prevents excessive water pressure in the water circuit by opening at 3 bar.
- **k** Water filter
  Removes dirt from the water to prevent damage to the pump or blockage of the heat exchanger.
- **l** Heat exchanger
- **m** Water pump
  Circulates the water in the water circuit.
- **n** Thermistors
  Determines the water and refrigerant temperature at various points in the circuit.
- **o** Drain caps
- **p** Tank thermistors (180 l/260 l)
- **q** Domestic hot water tank drain valve
  Empties the full tank.
- **r** Switch box
  Contains the main electronic and electrical parts of the indoor unit.
- **s** Backup heater thermal protector
  The protector activates when the temperature of the backup heater becomes too high.
- **t** Drain collector (EHVX models only)
- **u** Drain gutter (EHVX models only)
- **v** Backup heater
  Provides additional heating in case of cold outdoor temperatures. Also serves as backup in case of malfunctioning of the outdoor unit.
- **w** Manometer
  Allows readout of the water pressure in the water circuit.
- **x** Flow sensor
  Gives feedback to the interface about the actual flow. Based on this information (and other), the interface adjusts the pump speed.
- **y** Air purge valve
  Remaining air in the water circuit will be automatically removed via the air purge valve.
- **z** 3-way valve
  Controls whether the water is used for space heating, or the domestic hot water tank.
- **aa** User interface (accessory)
- **bb** Drain flexible (EHVX models only)
- **cc** Drain flexible pressure relief valve
- **dd** Air valve

INFORMATION

Some components are not directly accessible when removing the top plate and/or the front plates. It could be necessary to remove the isolation of the tank by sliding it backward of the tank. The components in the switch box are accessible by removing the switch box cover.

14.2.2 Components: Switch box (indoor unit)

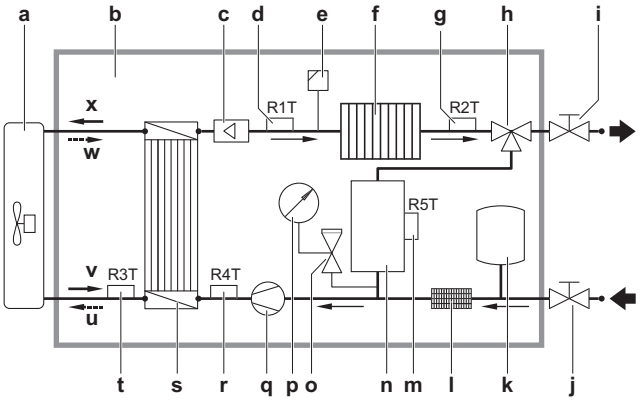


- **a** Pump PCB A7P (Inverter PCB)
- **b** Backup heater thermal protector Q1L
- **c** Transformer TR1
- **d** Terminals for backup heater X6M/X7M (*9W models only)
- **e** Backup heater contactors K1M, K2M and K5M
- **f** Connectors X6YA/X6YB/X6Y
- **g** Backup heater circuit breaker F1B
- **h** Terminal block X2M (high voltage)
- **i** Terminal block X1M (to outdoor unit)
- **j** Cable tie mountings

k Digital I/O PCB A4P (only for installations with solar kit or digital I/O PCB kit)
l Demand PCB for power limitation
m Terminal block X5M (low voltage)
n Main PCB A1P
o PCB fuse FU1

14.3 Functional diagrams

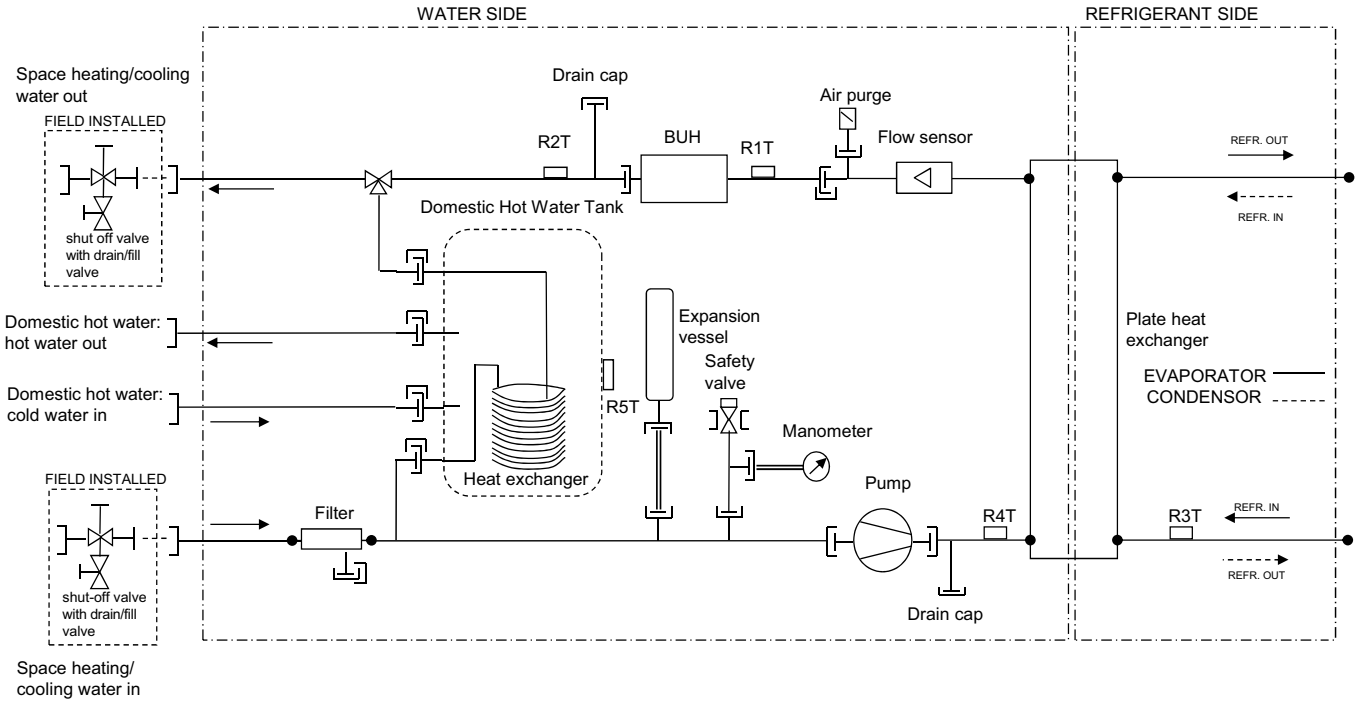
14.3.1 Functional diagram: Indoor unit



a Outdoor unit
b Indoor unit
c Expansion vessel
d Manometer
e Air purge valve
f Pressure relief valve
g Backup heater
h Pump
i Flow sensor
j Shut-off valve water outlet (field installation)
k Shut-off valve water inlet with fill valve (field installation)
l Filter
m Heat exchanger (indoor unit)
n Heat exchanger (domestic hot water tank)
o Domestic hot water tank
p Domestic hot water in
q Domestic hot water out
R1T Outlet water heat exchanger thermistor
R2T Outlet water backup heater thermistor
R3T Refrigerant liquid side thermistor
R4T Inlet water thermistor
R5T Tank temperature thermistor
—► Heating
--► Cooling

14.4 Piping diagram

14.4.1 Piping diagram: Indoor unit



LEGEND:

CHECK VALVE		SCREW CONN.	
FLARE CONN.		QUICK COUPLING	
SPINNED PIPE		FLANGE CONN.	
PINCHED PIPE		BRAZED CONN.	

THERMISTOR	DESCRIPTION
R5T	Tank thermistor
R4T	Inlet water thermistor
R3T	Refrigerant liquid side thermistor
R2T	Outlet water backup heater thermistor
R1T	Outlet water heat exchanger thermistor

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14.5 Wiring diagram

14.5.1 Wiring diagram – components: Indoor unit

See the internal wiring diagram supplied with the unit (on the inside of the indoor unit switch box cover). The abbreviations used are listed below.

NOTES to go through before starting the unit

X1M	: Main terminal	X6M, X7M	: Backup heater terminal
X2M	: Field wiring terminal for AC	X4M	: Booster heater terminal
X5M	: Field wiring terminal for DC		

: Earth wiring
15 : Wire number 15
: Field supply
**/12.2 : Connection ** continues on page 12 column 2
1 : Several wiring possibilities
: Option : Not mounted in switch box
: Wiring depending on model : PCB

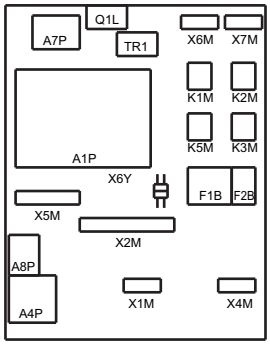
Backup heater configuration (only for *9W)
- ☐ 3V3 (1N~, 230 V, 3 kW)
- ☐ 6V3 (1N~, 230 V, 6 kW)
- ☐ 6WN (3N~, 400 V, 6 kW)
- ☐ 9WN (3N~, 400 V, 9 kW)
- ☐ 6T1 (3~, 230 V, 6 kW)

User installed options:
- ☐ Bottom plate heater
- ☐ Domestic hot water tank
- ☐ Domestic hot water tank with solar connection
- ☐ Remote user interface
- ☐ Ext. indoor thermistor
- ☐ Ext. outdoor thermistor
- ☐ Digital I/O PCB
- ☐ Demand PCB
- ☐ Solar pump and control station

Main LWT:
- ☐ On/OFF thermostat (wired)
- ☐ On/OFF thermostat (wireless)
  - ☐ Ext. thermistor
- ☐ Heat pump convector

Add LWT:
- ☐ On/OFF thermostat (wired)
- ☐ On/OFF thermostat (wireless)
  - ☐ Ext. thermistor
- ☐ Heat pump convector

POSITION IN SWITCH BOX



LEGEND

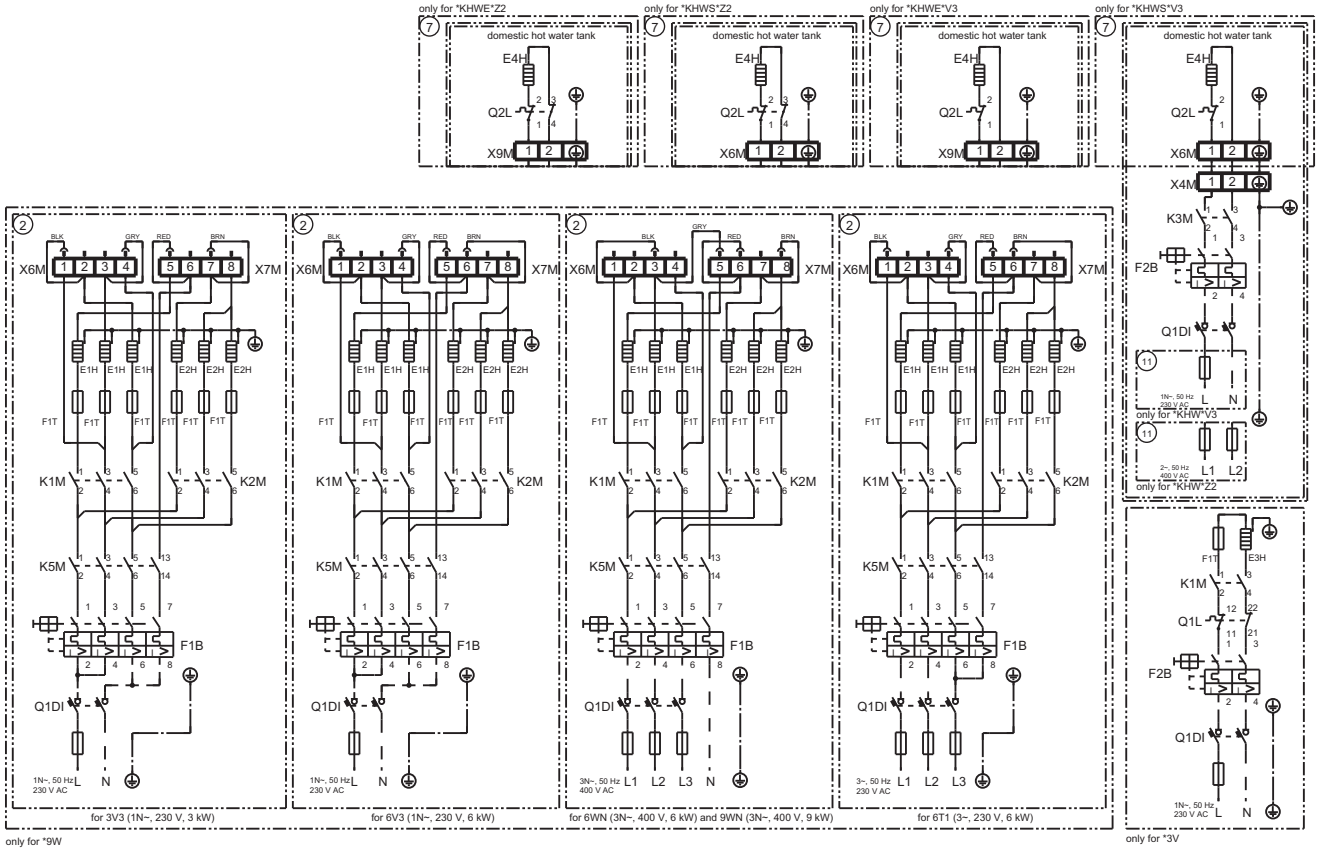
Translation can be found in the installation manual.

Part n°		Description
A1P		main PCB
A2P		user interface PCB
A3P	*	solar pumpstation PCB
A3P	*	On/OFF thermostat (PC=power circuit)
A3P	*	heat pump convector
A4P	*	digital I/O PCB
A4P	*	receiver PCB (wireless On/OFF thermostat)
A7P		pump driver PCB (only for *16*)
A8P	*	demand PCB
B1L		flow sensor
BSK	*	solar pump station relay
DS1 (A8P)	*	dipswitch
E1H		backup heater element (1 kW)
E2H		backup heater element (2 kW)
E3H		backup heater element (3 kW)
E4H	*	booster heater (3 kW)
F1B		overcurrent fuse backup heater
F2B	*	overcurrent fuse booster heater
F1T		thermal fuse backup heater
F1U, F2U	*	fuse 5 A 250 V for digital I/O PCB
FU1		fuse T 6.3 A 250 V for PCB
PHC1	*	optocoupler input circuit
K1M, K2M		contactor backup heater
K3M	*	contactor booster heater
K5M		safety contactor BUH (only *9W)
K*R		relay on PCB
M1P		main supply pump

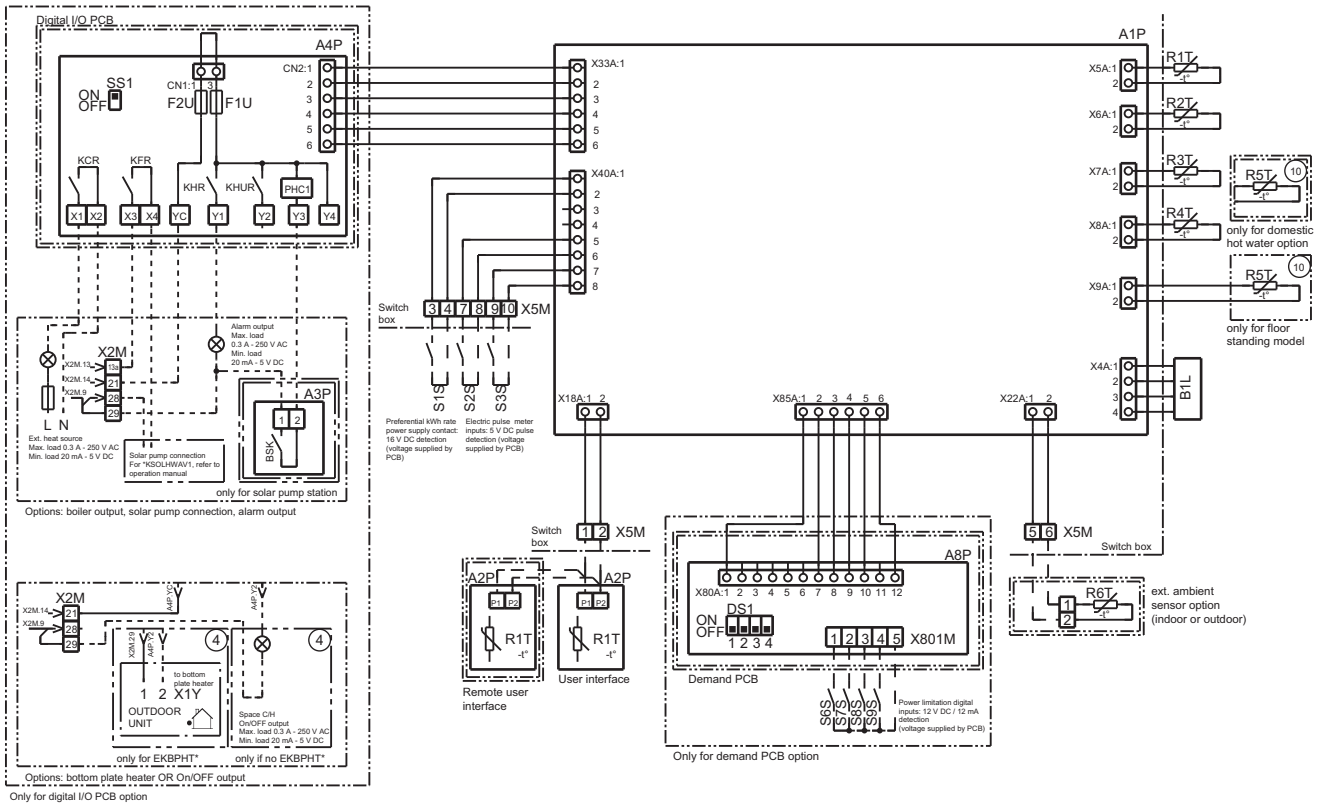
M2P	#	domestic hot water pump
M2S	#	2 way valve for cooling mode
M3S	(*)	3 way valve for floorheating/ domestic hot water
Q1DI, Q2DI	#	earth leakage circuit breaker
Q1L		thermal protector backup heater
Q2L	*	thermal protector booster heater
R1T		outlet water heat exchanger thermistor
R1T (A2P)		ambient sensor user interface
R1T (A3P)	*	ambient sensor On/OFF thermostat
R2T		outlet backup heater thermistor
R2T	*	external sensor (floor or ambient)
R3T		refrigerant liquid side thermistor
R4T		inlet water thermistor
R5T	(*)	domestic hot water thermistor
R6T	*	external indoor or outdoor ambient thermistor
R1H (A3P)	*	humidity sensor
S1S	#	preferential kWh rate PS contact
S2S	#	electrical meter pulse input 1
S3S	#	electrical meter pulse input 2
S6S-S9S	#	digital power limitation inputs
SS1 (A4P)	*	selector switch
T1R (A7P)		rectifier bridge (only for *16*)
TR1		power supply transformer
X*M		terminal strip
X*Y		connector

* : optional
(*) : standard for *HV*, optional for *HB*
\# : field supply

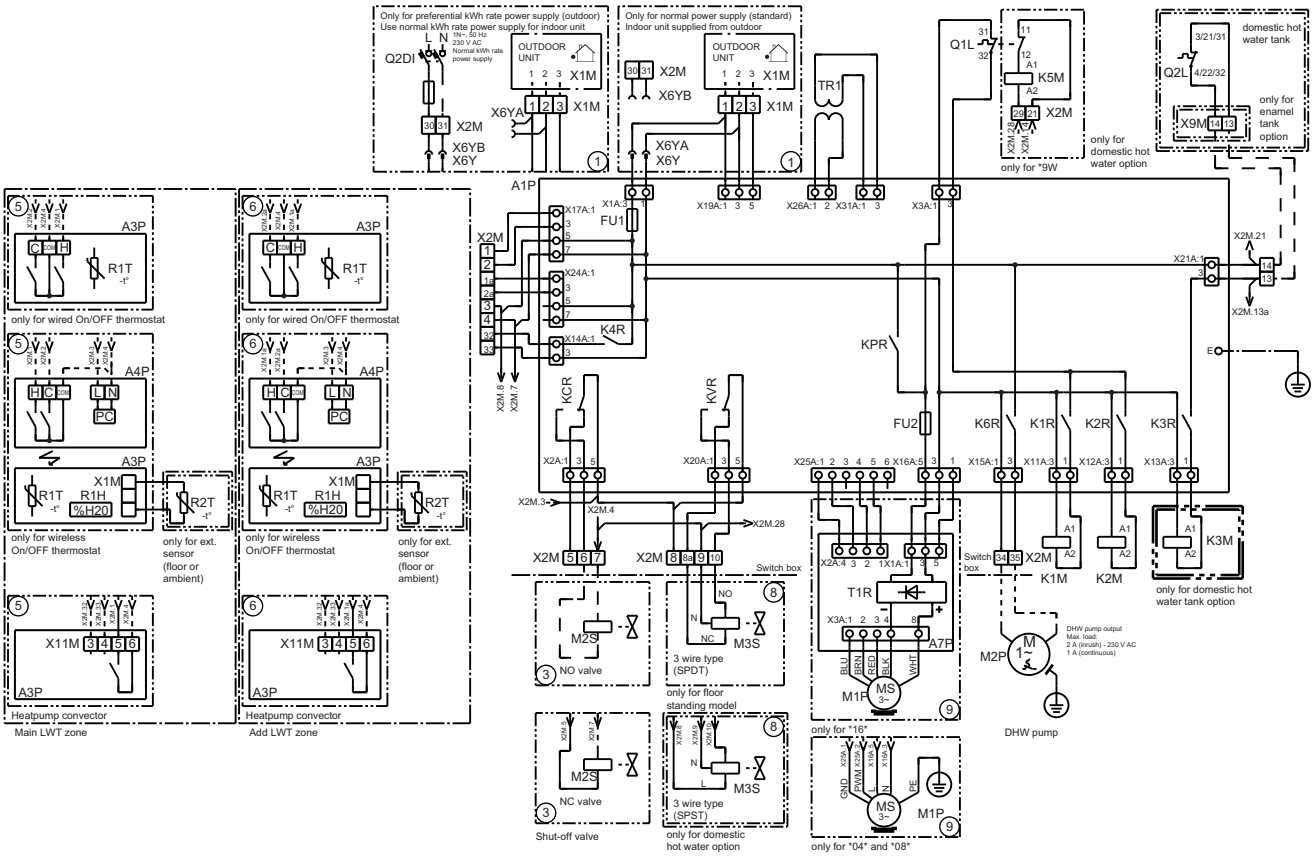
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4D077028 page 3



4D077028 page 4

A1P		Main PCB
A2P		User interface PCB
A3P	*	Solar pump station PCB
A3P	*	On/OFF thermostat (PC=power circuit)
A3P	*	Heat pump convector
A4P	*	Digital I/O PCB
A4P	*	Receiver PCB (Wireless On/OFF thermostat)
A7P		Pump driver PCB (only for EHBH/X04+08 and EHVH/X04+08)
A8P	*	Demand PCB
B1L		Flow sensor
BSK	*	Solar pump station relay
DS1(A8P)	*	DIP switch
E1H		Backup heater element (1 kW)
E2H		Backup heater element (2 kW)
E3H		Backup heater element (3 kW)
E4H	*	Booster heater (3 kW)
F1B		Overcurrent fuse backup heater
F2B	*	Overcurrent fuse booster heater
F1T		Thermal fuse backup heater
F1U, F2U	*	Fuse 5 A 250 V for digital I/O PCB
FU1		Fuse T 6.3 A 250 V for PCB
PHC1	*	Optocoupler input circuit
K1M, K2M		Contactor backup heater
K3M	*	Contactor booster heater
K5M		Safety contactor backup heater (only for *9W)
K*R		Relay on PCB
M1P		Main supply pump
M2P	#	Domestic hot water pump
M2S	#	2-way valve for cooling mode
M3S	(*)	3-way valve for floor heating/domestic hot water
Q1DI, Q2DI	#	Earth leakage circuit breaker
Q1L		Thermal protector backup heater
Q2L	*	Thermal protector booster heater
R1T		Outlet water heat exchanger thermistor
R1T (A2P)		Ambient sensor user interface
R1T (A3P)	*	Ambient sensor On/OFF thermostat
R2T		Outlet backup heater thermistor
R2T	*	External sensor (floor or ambient)
R3T		Refrigerant liquid side thermistor
R4T		Inlet water thermistor
R5T	(*)	Domestic hot water thermistor
R6T	*	External indoor or outdoor ambient thermistor
R1H (A3P)	*	Humidity sensor
S1S	#	Preferential kWh rate power supply contact
S2S	#	Electrical meter pulse input 1
S3S	#	Electrical meter pulse input 2
S6S~S9S	#	Digital power limitation inputs
SS1 (A4P)	*	Selector switch
T1R (A7P)		Rectifier bridge (only for EHBH/X04+08 and EHVH/X04+08)
TR1		Power supply transformer
X*M		Terminal strip
X*Y		Connector
	* =	Optional
	(*) =	Standard for EHVH/X, optional for EHBH/X
	# =	Field supply
BLK		Black

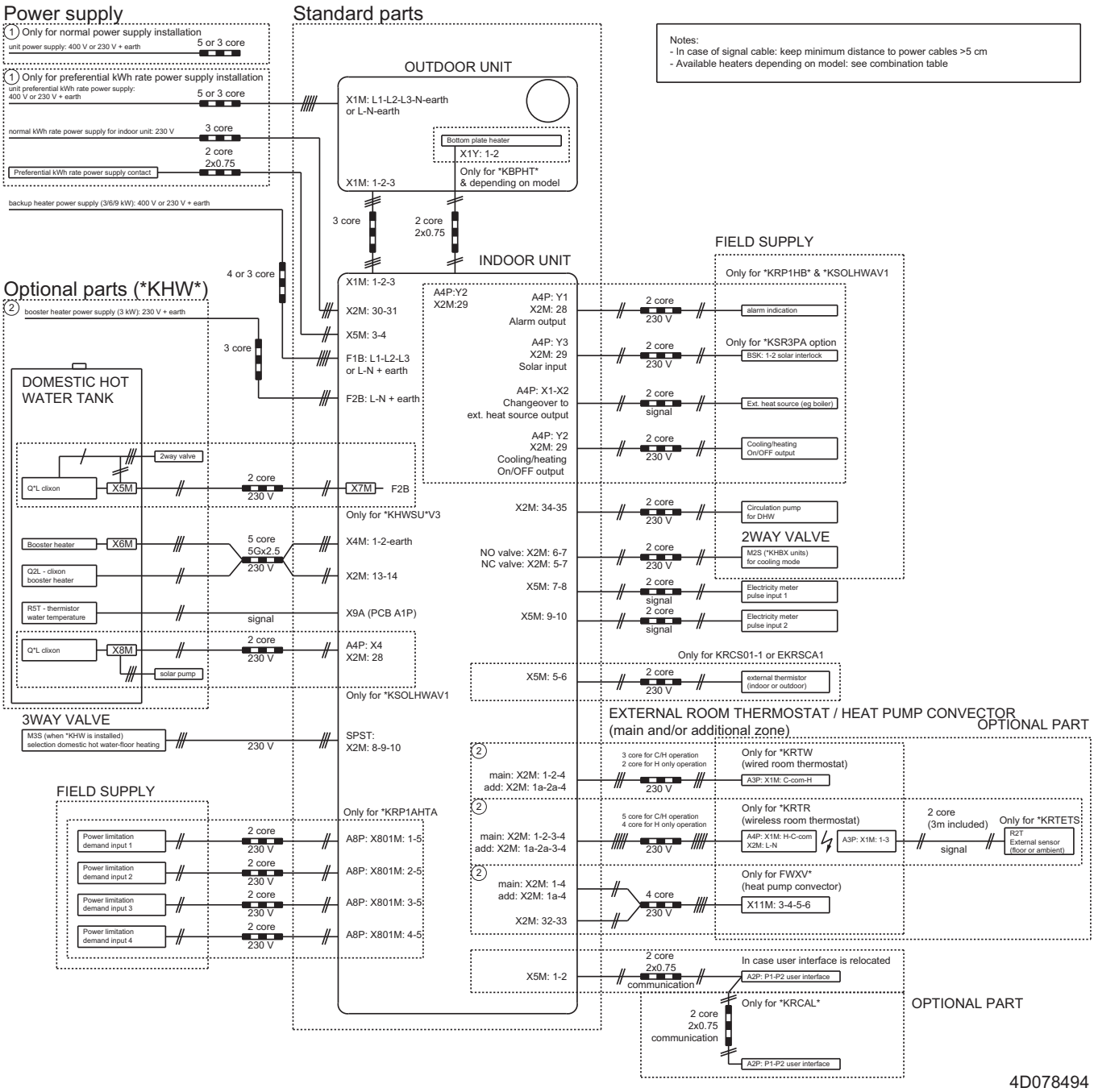
BRN	Brown
GRY	Grey
RED	Red

Notes to go through before starting the unit

English	Translation
X1M	Main terminal
X2M	Field wiring terminal for AC
X5M	Field wiring terminal for DC
X6M, X7M	Backup heater terminal
X4M	Booster heater terminal
—·—·—·—	Earth wiring
15	Wire number 15
– – – – – – –	Field supply
—> **/12.2	Connection ** continues on page 12 column 2
①	Several wiring possibilities
	Option
	Not mounted in switch box
	Wiring depending on model
	PCB
Backup heater configuration (only for *9W)	Backup heater configuration (only for *9W)
User installed options	User installed options
Bottom plate heater	Bottom plate heater
Domestic hot water tank	Domestic hot water tank
Domestic hot water tank with solar connection	Domestic hot water tank with solar connection
Remote user interface	Remote user interface
Ext. indoor thermistor	Extended indoor thermistor
Ext outdoor thermistor	Extended outdoor thermistor
Digital I/O PCB	Digital I/O PCB
Demand PCB	Demand PCB
Solar pump and control station	Solar pump and control station
Main LWT	Main leaving water temperature
On/OFF thermostat (wired)	On/OFF thermostat (wired)
On/OFF thermostat (wireless)	On/OFF thermostat (wireless)
Ext. thermistor	Extended thermistor
Heat pump convector	Heat pump convector
Add LWT	Additional leaving water temperature

Electrical connection diagram Daikin Altherma

For more details please check unit wiring



* electrical meter specification

- pulse meter type/voltage free contact for 5 VDC detection by PCB
- possible number of pulse:
  - 0.1 pulse/kWh
  - 1pulse/kWh
  - 10pulse/kWh
  - 100 pulse/kWh
  - 1000 pulse/kWh
- pulse duration:
  - minimum On time 40ms
  - minimum OFF time 100ms
- measurement type (depending on installation):
  - single phase AC meter
  - three phase AC meter (balanced loads)
  - three phase AC meter (unbalanced loads)

* electrical meter installation guideline

- General: it is the reponsability of the installer to cover the complete power consumption with electrical meters (combination of estimation and metering is not allowed)
- Required number of electrical meters:

Outdoor unit type		*RLQ(04/06/08)*				*R*Q(011/014/016)*V3				*R*Q(011/014/016)*W1				
Indoor unit type		*HB(H/X)(04/08)CA#				*HB(H/X)16CA#				*HB(H/X)16CA#				
	Backup heater type (#)	3V / 9W	9W		9W	3V / 9W	9W		9W	3V / 9W		9W		9W
	Backup heater power supply	1~ 230V	3~ 400V		3~ 230V	1~ 230V	3~ 400V		3~ 230V	1~ 230V		3~ 400V		3~ 230V
	Backup heater configuration	3 / 6 kW	6 / 9 kW		6 kW	3 / 6 kW	6 / 9 kW		6 kW	3 / 6 kW		6 / 9 kW		6 kW
		Regular kWh rate power supply												
Electrical meter type	1~	1	1	-	-	1	1	-	-	1	-	1	-	-
	3~ balanced	-	1	-	-	-	1	-	-	1	-	1	-	-
	3~ unbalanced	-	-	1	1	-	-	1	1	-	1	-	1	1
		Benefit kWh rate power supply												
Electrical meter type	1~	2	1		1	2	1		1	1		-		-
	3~ balanced	-	-		-	-	-		-	1		1		1
	3~ unbalanced	-	1		1	-	1		1	-		1		1

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14 Technical data

14.6 Technical specifications

14.6.1 Technical specifications: Indoor unit

TECHNICAL SPECIFICATIONS

					HEATING ONLY TYPE	REVERSIBLE TYPE	HEATING ONLY TYPE	REVERSIBLE TYPE	HEATING ONLY TYPE	REVERSIBLE TYPE	HEATING ONLY TYPE						REVERSIBLE TYPE					
					*HVH04S18CA3V	*HVX04S18CA3V	*HVH08S18CA3V	*HVX08S18CA3V	*HVH08S26CA9W	*HVX08S26CA9W	*HVH16S18CA3V						*HVX16S18CA3V					
Outdoor units					*RLQ004*V3	*RLQ004*V3	*RLQ006*V3	*RLQ008*V3	*RLQ006*V3	*RLQ008*V3	*RHH(L)Q011*V3	*RHH(L)Q011*W1	*RHH(L)Q014*V3	*RHH(L)Q014*W1	*RHH(L)Q016*V3	*RHH(L)Q016*W1	*RHH(L)Q011*V3	*RHH(L)Q011*W1	*RHH(L)Q014*V3	*RHH(L)Q014*W1	*RHH(L)Q016*V3	*RHH(L)Q016*W1
Nominal input (Indoor only)				W	75						190											
Casing		Colour			White						White											
		Material			Pre-coated sheetmetal						Pre-coated sheetmetal											
Dimensions	Packing	Height		mm	1922						1922											
		Width		mm	690						690											
		Depth		mm	818						818											
	Unit	Height		mm	1732						1732											
		Width		mm	600						600											
		Depth		mm	728						728											
Weight of unit	Machine net weight			kg	115	115	116	117	126	126	120						121				129				129			
Weight of unit	Packed machine weight			kg	128	128	129	130	139	140	133						134				142				142			
Packing materials	Material				Wood - carton - PE wrapping foil						Wood - carton - PE wrapping foil											
	Weight			kg	12						12											
PED	category of unit				Art3§3*		cat. I		cat. I		Art3§3*											
	most critical part =				/		Plate heat exchanger		Plate heat exchanger		/											
			Ps*V	bar*l	/		51,0		51,0		/											
			Ps*DN	bar	/		/		/		/											
	* excluded from scope of PED due to article 1, item 3.6 of 97/23/EC																					
Main components hydrobox	Pump	Type			DC motor						DC motor											
		nr. of speed			Inverter controlled						Inverter controlled											
		nominal ESP unit (*RH/LQ*B*)	Cooling (2)	kPa	-		-		-		-						95	78	69	69	62	62
			Cooling (8)	kPa							-						52	37	3	23	-4	12
			Heating (3)	kPa							84	82	51	44	23	23	84	82	51	44	23	23
			Heating (13)	kPa							93	86	62	56	35	36	93	86	62	56	35	36
		nominal ESP unit (*RLQ*C*)	Cooling (2)	kPa	-	54	-	57	54	-	57	54	-				78,0		68,6		61,9	
			Cooling (8)	kPa	-	45	-	42	41	-	42	41	-				37,0		22,5		12,1	
			Heating (3)	kPa	52		49	37	49	37	49	37	83,6		44,1		23,1		83,6		44,1		23,1	
			Heating (13)	kPa	55		51	41	51	41	51	41	85,8		55,9		34,6		85,8		55,9		34,6	
		Power input		W	46	46	46	46	46	46	46	46	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
	Water side Heat exchanger	Type			Brazed plate						Brazed plate											
		qty			1						1											
		Water volume		l	0,9		1,3		1,3		1,0											
		Water flow rate Min. (11)		l/min	5		11		11		11											
		Water flow rate Nom. (*RH/LQ*B*)	Cooling (2)	l/min	-		-		-		-						28,7	33,6	35,8	36,0	37,6	37,6
			Cooling (8)	l/min							-						39,8	43,1	49,6	46,0	51,0	48,0
			Heating (3)	l/min							32,1	32,5	40,1	41,6	45,9	46,0	32,1	32,5	40,1	41,6	45,9	46,0
			Heating (13)	l/min							29,5	31,5	37,6	38,9	43,6	43,3	29,5	31,5	37,6	38,9	43,6	43,3
		Water flow rate Nom. (*RH/LQ*B*)	Cooling (2)	l/min	-	12,0	-	13,9	15,4	-	13,9	15,4	-				33,6		36,0		37,6	
			Cooling (8)	l/min	-	14,3	-	19,4	19,7	-	19,4	19,7	-				43,1		46,0		48,0	
			Heating (3)	l/min	12,6		17,2	21,2	17,2	21,2	17,2	21,2	32,1		41,6		45,9		32,1		41,6		45,9	
			Heating (13)	l/min	11,6		16,3	19,8	16,3	19,8	16,3	19,8	31,5		39,0		43,6		31,5		39,0		43,6	
		Water flow rate Max.	Cooling	l/min	-	25	-	34		-	34			-			50			-			50	
			Heating	l/min	25		34		34				50											
		Insulation material			EPS						EPS											
	Expansion vessel	Volume		l	10						10											
		Max. water pressure		bar	3						3											
		Pre pressure		bar	1						1											
	Water Filter	Diameter perforations		mm	1						1											
		Material			Copper - brass - stainless steel						Copper - brass - stainless steel											
Main components tank	Tank	Water volume		l	180				260		180								260			
		Material			Stainless steel (EN 1.4521)						Stainless steel (EN 1.4521)											
		Maximum temperature		°C	65						65											
		Maximum pressure		bar	10						10											
		Insulation material		-	EPS						EPS											
		Corrosion protection		-	Anode						Anode											
		Heatlosses (1)		kWh/2	1,4	1,4	1,4	1,4	1,9	1,9	1,4						1,4				1,9				1,9			
	Heat exchanger	Quantity			1						1											
		Material			Stainless steel (EN 1.4521)						Stainless steel (EN 1.4521)											
		Surface		m²	1,9						1,9											
		Internal coil volume		l	8,9						8,9											
	3 way valve	Kvs space heating / tank heating		m³/h	13/8						13/8											
Safety devices	Thermal cut out				1						1											
Water circuit - space heating / cooling side	Piping connections ø (7)			inch	G 1-1/4 (FEMALE)						G 1-1/4 (FEMALE)											
	Safety valve			bar	3						3											
	Manometer				Yes						Yes											
	Drain valve / Fill valve				Yes						Yes											
	Shut off valves				Yes						Yes											
	Air purge valve				Yes						Yes											
	Total Water Volume (6)			l	4,4		4,8		5,8		4,5								5,5			
Water circuit - domestic hot water side	Piping connections - cold water in / hot water out ø			inch	G 1" FEMALE						G 1" FEMALE											
	Piping connections - recirculation connection			inch	G 1/2" FEMALE						G 1/2" FEMALE											
Refrigerant circuit	Gas side ø			mm	15,9		15,9		15,9		15,9								15,9			
	Liquid side ø			mm	6,35		6,35		6,35		9,52								9,52			
Sound level	Sound power (3)	nominal flow	heating	dBA	42		42		42		47								47			
	Sound pressure (4)	nominal flow	heating	dBA	28		28		28		33								33			
Operation range (9)	Ambient	Space cooling		°C	-	10 ~ 43	-	10 ~ 43	-	10 ~ 43	-						10 ~ 46				-				10 ~ 46			
		Space heating		°C	-25 ~ 25		-25 ~ 25		-25 ~ 25		-25 ~ 35 (12)										-25 ~ 35 (12)							
		DHW		°C	-25 ~ 35		-25 ~ 35		-25 ~ 35		-20 ~ 35										-20 ~ 35							
	Waterside	Space cooling		°C	-	5 ~ 22	-	5 ~ 22	-	5 ~ 22	-						5 ~ 22				-				5 ~ 22			
		Space heating (5)		°C	15 ~ 55		15 ~ 55		15 ~ 55		15 ~ 55										15 ~ 55							
		DHW(10)		°C	25 ~ 60		25 ~60		25 ~60		25 ~60										25 ~60							

Notes:

(1) Heatloss according to EN12897
(2) Tamb 35°C - LWE 7°C (DT=5°C)
(3) DB/WB 7°C/6°C - LWC 35°C (DT=5°C)
(4) The sound pressure level is measured via a microphone at 1m from the unit. It is a relative value, depending on the distance and acoustic environment.
The sound pressure level mentioned is valid for pump medium speed - 0 ESP / medium speed - nominal flow / high speed - nominal flow
(5) 15°C ~ 25°C: BUH only, no Heatpump operation = during commissioning
(6) Including piping + PHE + backup heater / excluding expansion vessel
(7) Value mentioned is connection after ball valves. Is same as connection at unit (G1-1/4 FEMALE).
(8) Tamb 35°C, LWE 18°C (DT = 5°C)
(9) details, see operation range drawing
(10) For *RLQ* outdoor units: >55°C BUH only, no heatpump operation
For *RHQ* outdoor units: > 50°C BUH only, no heatpump operation
(11) Minimum flow is mentioned for heat pump operation. To allow backup heater to operate safely, a higher minimum flow is required:
For *3V models: 12 l/min
For *9W models: 15 l/min
(12) Refer to operation range detail for diferences between *RHQ* and *RLQ* models
(13) DB/WB 7°C/6°C - LWC 45°C (DT = 5°C)

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ELECTRICAL SPECIFICATIONS

Electric heater (optional)	Type			3V	9W				
	Capacity setting		kW	3	6	3	6	6	9
	Capacity stages			1	2	1	2	2	2
	Capacity stage 1		kW	3	3	3	3	3	3
	Capacity stage 2		kW	6	-	6	6	6	6
	Minimum time delay between stages			Note (11)	Note (10)	Note (11)	Note (11)	Note (11)	Note (11)
	Power supply (1)	Phase		1~	3~	1~	1~	3~	3~
		Frequency	Hz	50	50				
		Voltage	V	230	230	230		400	400
	Current	Running Current (back-up heater)	A	13	15,1	13	26	8,7	13
		Zmax (back-up heater)	Ω	-	-	-	0,29	-	-
			Complex	-	-	-	0,25 - j0,15	-	-
		Minimum S_{sc} value (8)	kVA	-	-	-	(9)	-	-
		Running Current backup heater	A	13	15,1	13	26	8,7	13
Voltage range (4)	Minimum		V	207	207	207	207	360	360
	Maximum		V	253	253	253	253	440	440
Wiring connections	power supply for back up heater	quantity of wires		3G	4G	3G	3G	4G/5G	4G/5G
		type of wires		Note (3)	Note (3)	Note (3)	Note (3)	Note (3)	Note (3)
	Communication cable	quantity of wires		3					
		type of wires		2,5 mm²					
	User interface	quantity of wires		2					
		type of wires		0,75 mm² till 1,25 mm² (max length 500 m)					
	Preferential kWh rate power supply	quantity of wires		power : 2					
		type of wires		power : 6,3 A note (3)					
	Electricity meter	quantity of wires		2					
		type of wires		Minimum 0,75 mm² (5VDC pulse detection)					
	domestic hot water pump	quantity of wires		2					
		type of wires		Minimum 0,75 mm² (2A inrush, 1A continuous)					
	for connection with R6T	quantity of wires		2					
		type of wires		Minimum 0,75 mm²					
	for connection with A3P	quantity of wires		Note (6)					
		type of wires		Note (3) and (5)					
	for connection with M2S	quantity of wires		3G					
		type of wires		Note (3) and (5)					
	for connection with optional FWXV* (demand input and output signal)	quantity of wires		4					
		type of wires		100 mA, minimum 0,75 mm²					
	bfor connection with bottom plate heater	quantity of wires		2					
		type of wires		Note (3)					

Notes

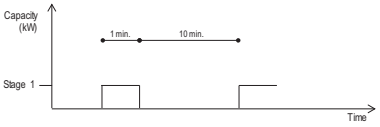
(1) Above mentioned power supply of the hydro box is for the backup heater only. The Switch box & pump of the hydrobox are supplied via the outdoor unit.

(3) Select diameter and type according to national and local regulations
(4) For more details of the voltage range and current refer to installation manual
(5) Voltage: 230V / Maximum current: 100mA / Minimum 0,75mm²
(6) Depends on thermostat type, refer to installation manual

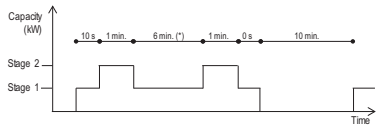
(8) In accordance with EN/IEC 61000-3-11(*), it may be necessary to consult the distribution network operator to ensure that the equipment is connected only to a supply with Zsys(***) ≤ Zmax
(9) Equipment complying with EN/IEC 61000-3-12 (**)

(*) : European/International Technical Standard setting the limits for voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current ≤ 75A.
(**) : European/International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16A and ≤ 75A per phase.
(***) : System impedance

Note (10) - Backup heater (3V) - min. time delay between stages



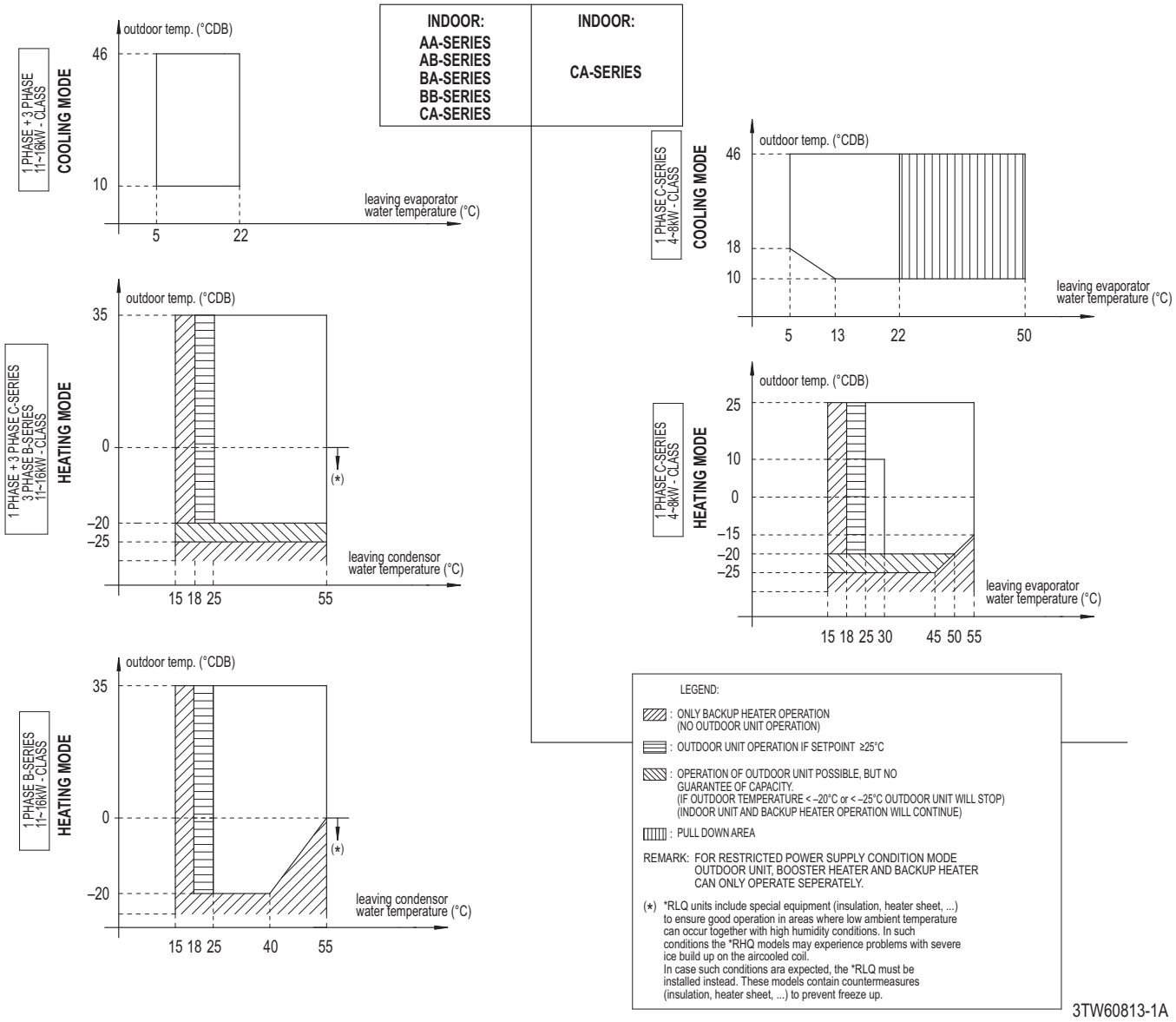
Note (11) - Backup heater (9W) - min. time delay between stages



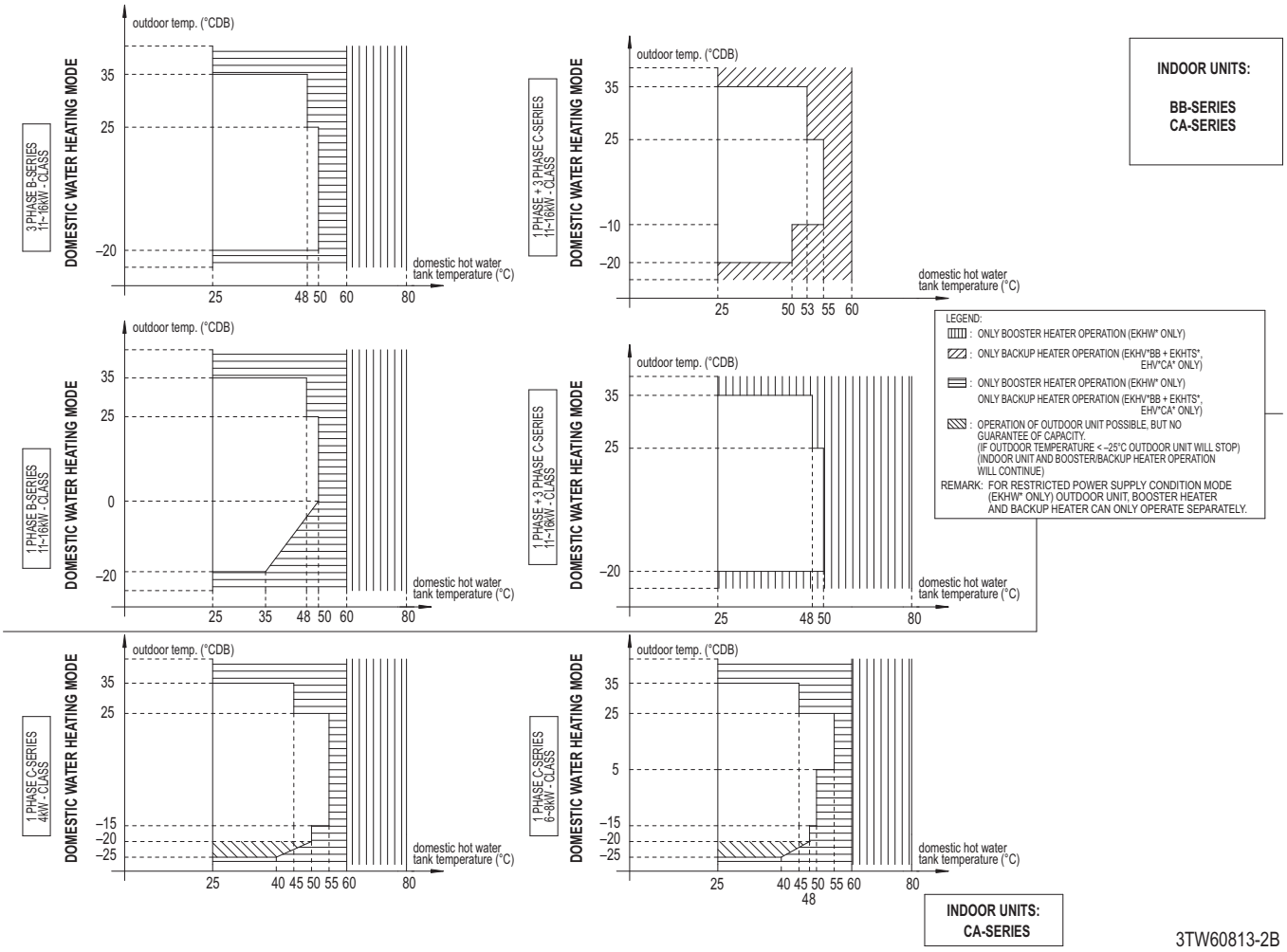
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14.7 Operation range

14.7.1 Operation range: Heating and cooling

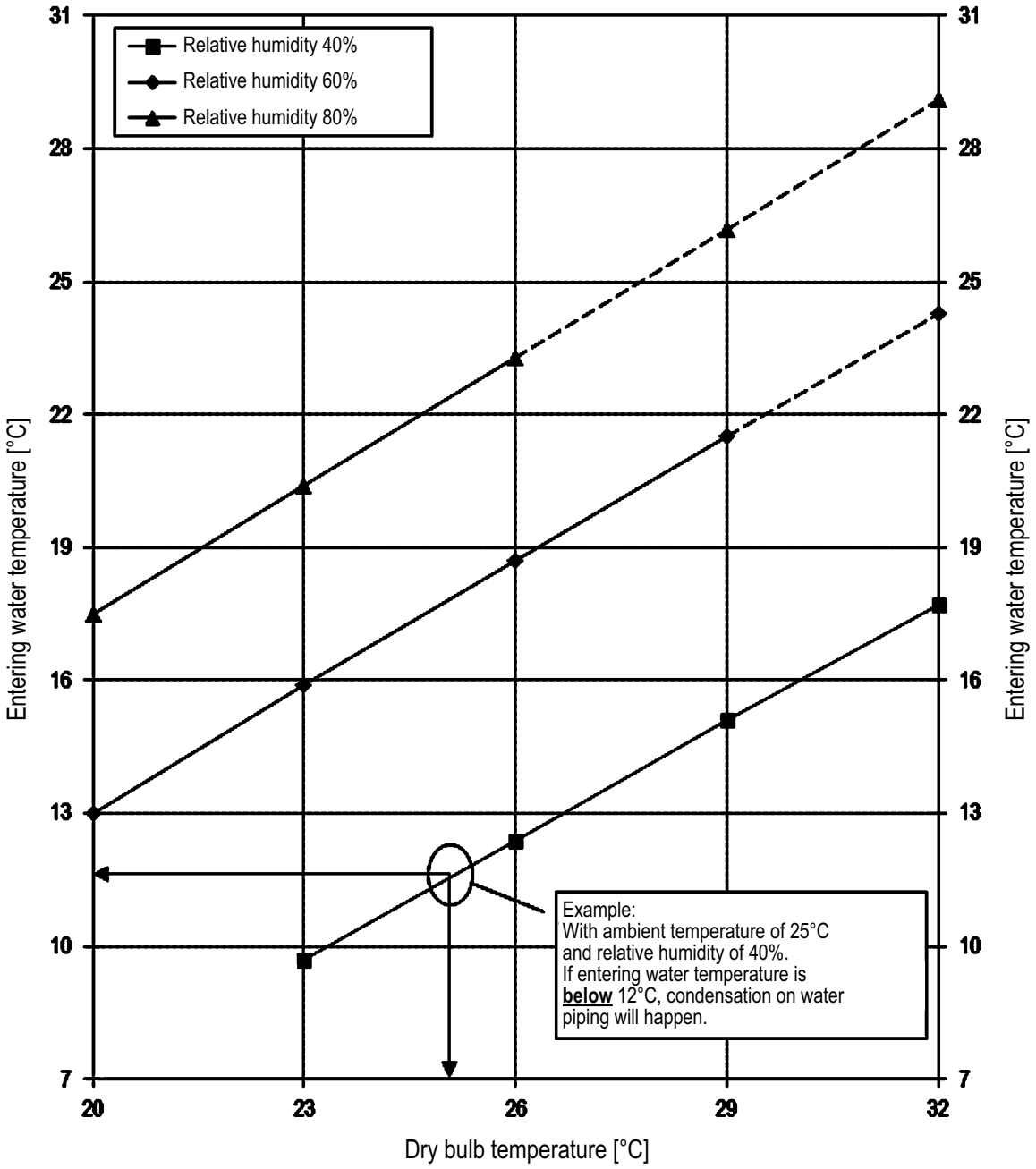


14.7.2 Operation range: Domestic hot water



14.7.3 Drain pan necessity

Entering water temperature limit to prevent condensation



1. Refer to psychometric chart for more information.
2. If condensation is expected, installation of EKHBDPCA2 - drainpan kit must be considered.

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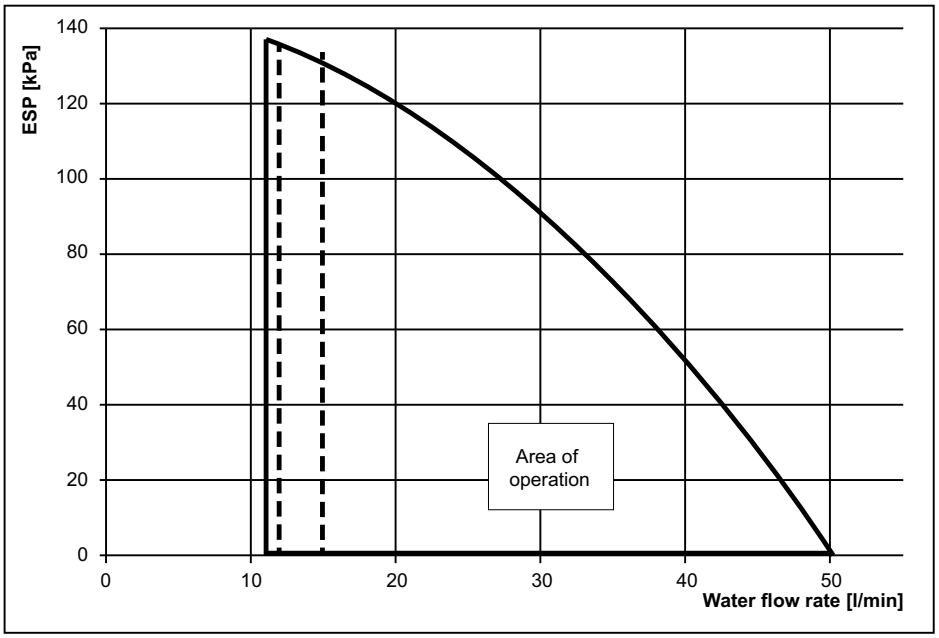
14.8 Sound spectrum

14.8.1 Sound spectrum: Outdoor unit

Not applicable.

14.9 ESP curve

14.9.1 ESP curve: Indoor unit



Minimum flow required during backup heater operation
See dashed lines

Unit	Flow
EHV(H/X)16*CA3V	12
EHV(H/X)16*CA9W	15

ESP: External Static Pressure Available at space heating-cooling circuit

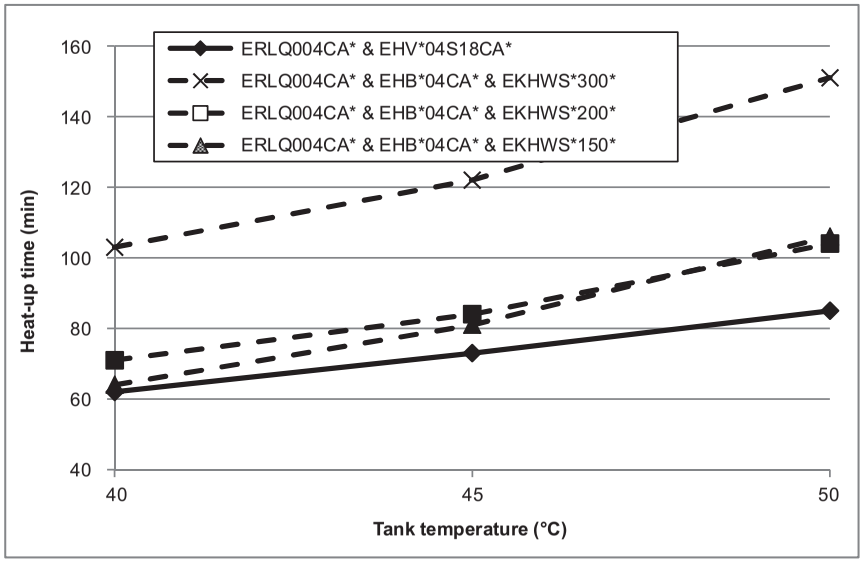
Water flow rate: Waterflow through space heating - cooling circuit

Notes:
1) Selecting a flow outside the area of operation can cause damage or malfunctioning of the unit. See also minimum and maximum allowed waterflow range in the technical specifications.

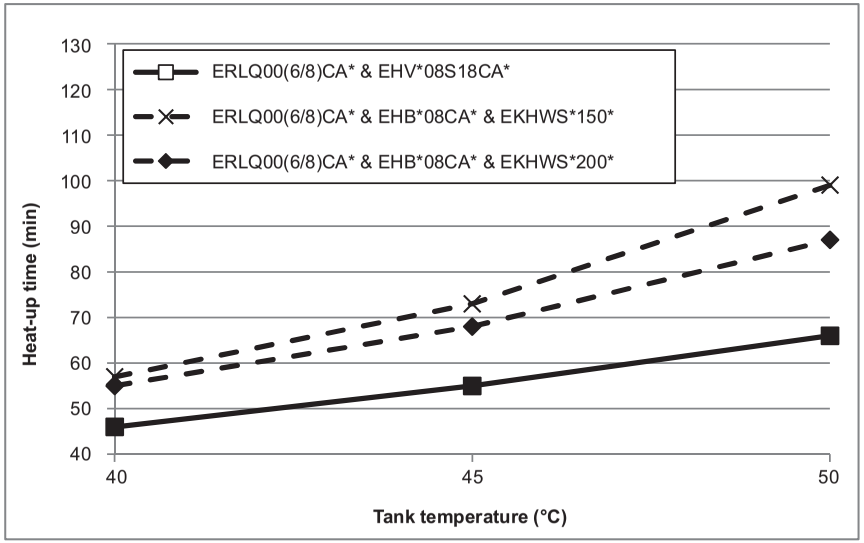
2) Water quality must be according to EN directive EC 98/83 EC.

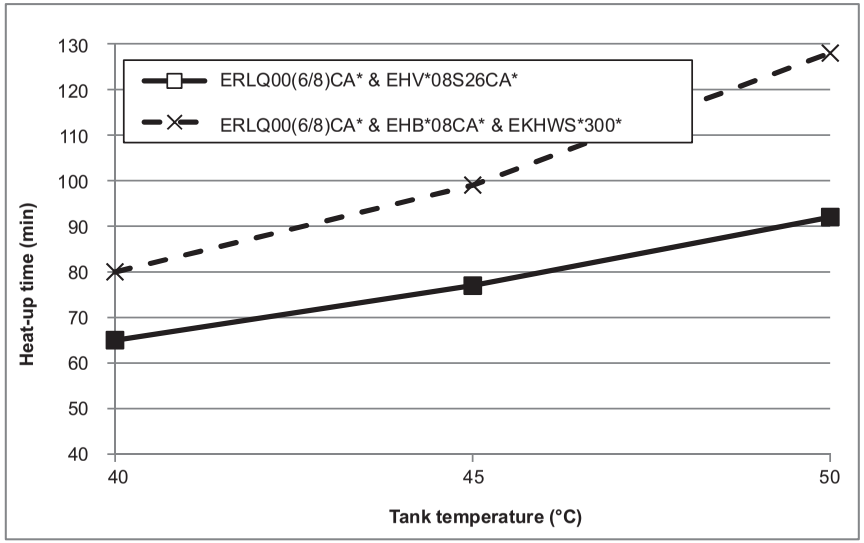
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Heat up times GBS (1) :



	Heat-up time tank until 45°C	
	ERLQ004CA*	ERLQ00(6/8)CA*
EHV*04S18CA	73	N/A
EHV*08S18CA	N/A	55
EHV*08S26CA	N/A	77
	ERLQ004CA* & EHB*04CA*	ERLQ00(6/8)CA* & EHB*08CA*
EKHWS*150*	81	73
EKHWS*200*	84	68
EKHWS*300*	122	99

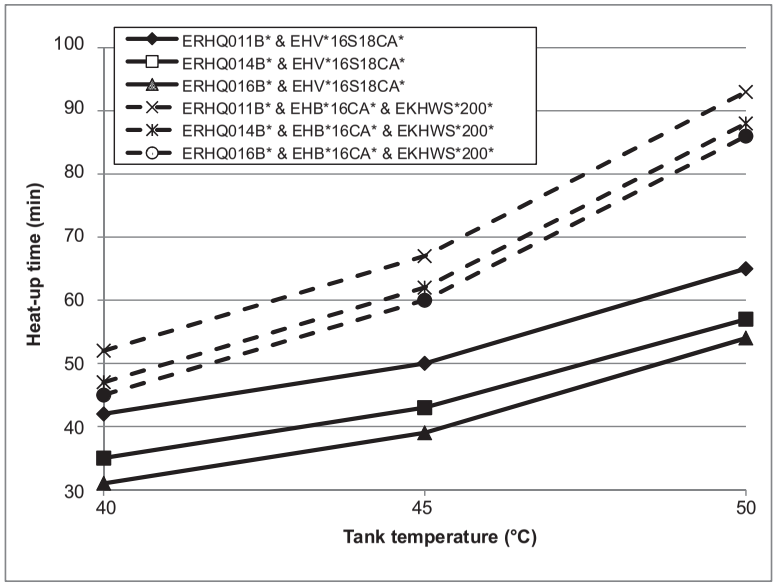


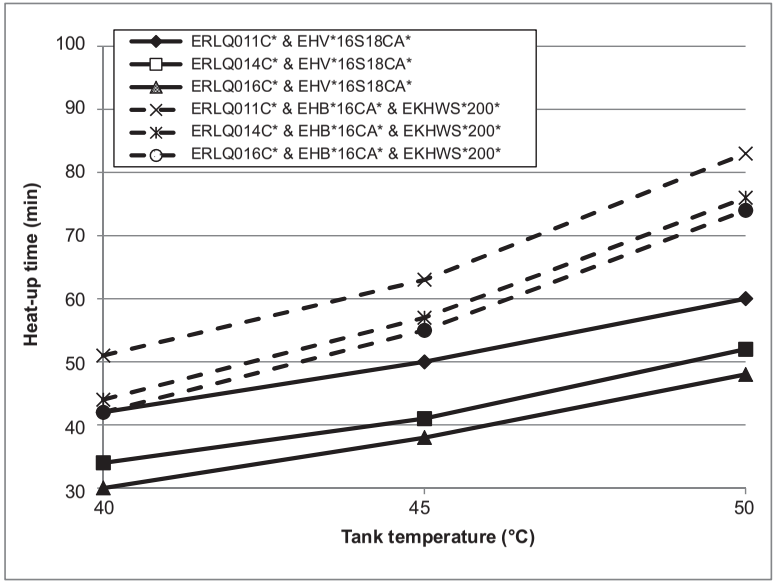


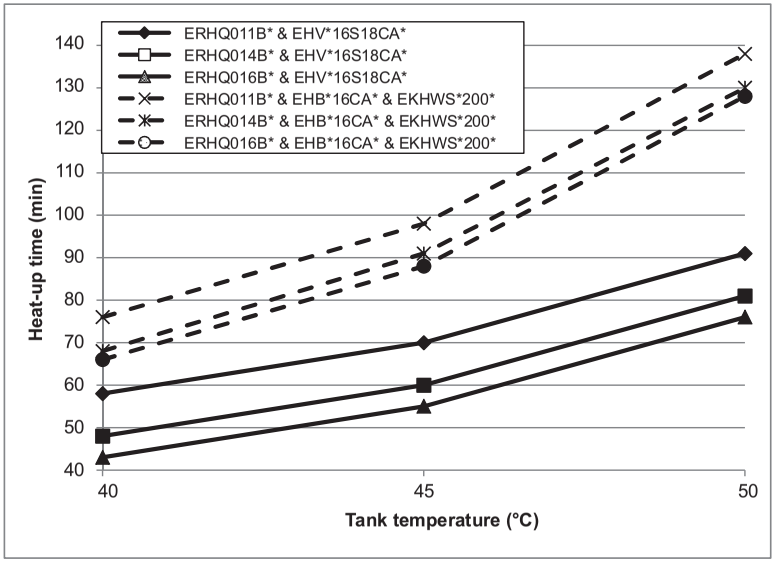
Notes:

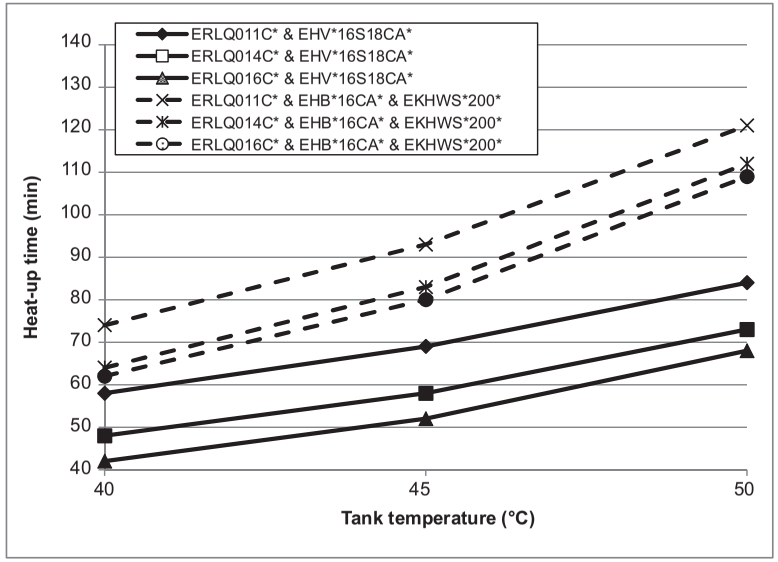
(1) Time required to heat up the tank starting from a temp of 10°C up to the indicated temp with the **heatpump only**.
Refer to operation range for maximum tank temperature with heatpump only.

Heat up times GQI (1) :









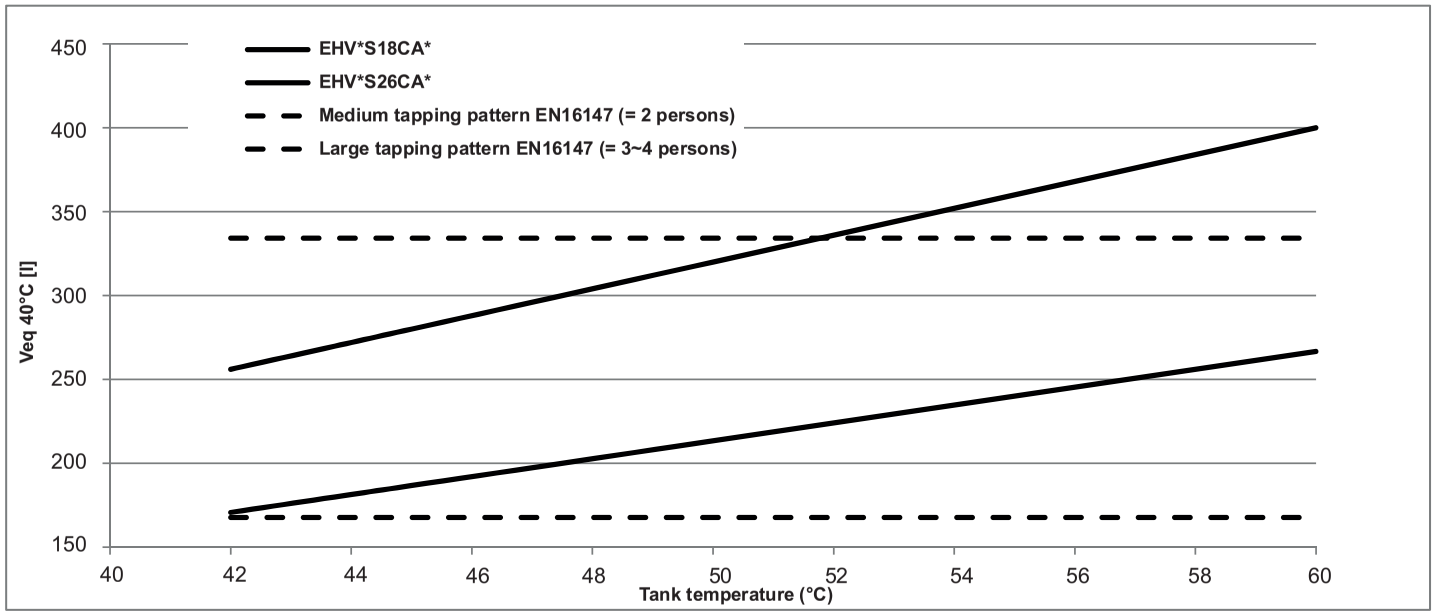
	Heat-up time tank until 45°C
EHV*16S18CA	38
EHV*16S26CA	52
	ERLQ016C* & EHB*16CA*
EKHWS*150*	69
EKHWS*200*	55
EKHWS*300*	80

Notes:

(1) Time required to heat up the tank starting from a temp of 10°C up to the indicated temp with the **heatpump only**.
Refer to operation range for maximum tank temperature with heatpump only.

Selection guidance of domestic hot water tank volume (3)

Veq 40°C = amount of water that can be tapped with a temperature of 40°C when the hot water tank is heated till a certain temperature with a cold water inlet temperature of 10°C. The 40°C is considered as a comfrotable domestic hot water temperature.



If a higher daily Veq 40°C is required then additional heat up cycles are required within 24 hours. Refer to the operation manual for more information.

Heat loss of domestic hot water tank (4)

Tank	Heat loss [kWh/24h]

EHV*	180l	1,38
	260l	1,91

Tank	Heat loss [kWh/24h]	
EKHWS*	150l	1,55
	200l	1,77
	300l	2,19

Notes:

(2) Time required to heat up the tank starting from a temp of 10°C up to the indicated temp with the **heatpump only**.
(3) According to EN16147
(4) According to EN12897

Factory mounted optional equipment for *HV(H/X)04S#CA##

Description	04 # - ##	
Heating only model *HVH*	18 - 3V	
Reversible model *HVX*		18 - 3V
Back up heater 3kW 1N~230 V	o	o
Back up heater 6kW 1N~230 V	-	-
Back up heater 6kW 3N~400 V	-	-
Back up heater 6kW 3~230 V	-	-
Back up heater 9kW 3N~400 V	-	-
Domestic hot water tank 180L	o	o
Domestic hot water tank 260L	-	-

Factory mounted optional equipment for *HV(H/X)08S#CA## and *HV(H/X)16S#CA##

Description	# - ##			
Heating only model *HVH*	18 - 3V		26 - 9W(9)	
Reversible model *HVX*		18 - 3V		26 - 9W(9)
Back up heater 3kW 1N~230 V	o	o	o	o
Back up heater 6kW 1N~230 V	-	-	o	o
Back up heater 6kW 3N~400 V	-	-	o	o
Back up heater 6kW 3~230 V	-	-	o	o
Back up heater 9kW 3N~400 V	-	-	o	o
Domestic hot water tank 180L	o	o	-	-
Domestic hot water tank 260L	-	-	o	o

Outdoor combination table for *HV(H/X)(04/08)S(18/26)CA* and *HB(H/X)16S(18/26)CA*

		*RLQ004CA*V3*	*RLQ006CA*V3*	*RLQ008CA*V3*	*RHQ011B*(V3/W1)	*RHQ014B*(V3/W1)	*RHQ016B*(V3/W1)	*RLQ011C*(V3/W1)	*RLQ014C*(V3/W1)	*RLQ016C*(V3/W1)
HVH04S18CA	Heating only indoor unit	o	---	---	---	---	---	---	---	---
HVX04S18CA	Reversible indoor unit	o	---	---	---	---	---	---	---	---
HVH08S(18/26)CA	Heating only indoor unit	---	o	o	---	---	---	---	---	---
HVX08S(18/26)CA	Reversible indoor unit	---	o	o	---	---	---	---	---	---
HVH16S(18/26)CA	Heating only indoor unit	---	---	---	o	o	o	o	o	o
HVX16S(18/26)CA	Reversible indoor unit	---	---	---	o	o	o	o	o	o

Kit availability for outdoor units

		*RLQ004CA*V3*	*RLQ006CA*V3*	*RLQ008CA*V3*	*RHQ011B*(V3/W1)	*RHQ014B*(V3/W1)	*RHQ016B*(V3/W1)	*RLQ011C*(V3/W1)	*RLQ014C*(V3/W1)	*RLQ016C*(V3/W1)
EKDP008CA	Drain pan kit	o	o	o	---	---	---	---	---	---
*KDK04	Drain plug kit (3)	---	---	---	o	o	o	---	---	---
*KBPHTH16A	Bottom plate heater (1) (3) (10)	---	---	---	o	o	o	--- (8)	--- (8)	--- (8)
*K016SNC	Snow cover	---	---	---	---	---	---	o	o	o

Kit availability

Reference	Description	# - ##			
	Heating only model *HVH*	18 - 3V		26 - 9W	
	Reversible model *HVX*		18 - 3V		26 - 9W
		Availability TBC			
*KRSCA1	Remote sensor for outdoor (11)	o	o	o	o
KRCS01-1	Remote sensor for indoor (11)	o	o	o	o
*KRUCAL1	User interface language group 1	o	o	o	o
*KRUCAL2	User interface language group 2	o	o	o	o
*KRP1HBAA	Digital I/O PCB (2)	o	o	o	o
*KRP1AHTA	Demand PCB (6)	o	o	o	o
*KRTWA	Wired room thermostat option kit	o	o	o	o
*KRTR1	Wireless room thermostat option kit (incl. receiver)	o	o	o	o
*KRTETS	external temperature sensor option kit (4)	o	o	o	o
FWXV15AVEB	Heat pump convector	o	o (5)	o	o (5)
FWXV20AVEB	Heat pump convector	o	o (5)	o	o (5)
*KVKHPC	Valve kit heat pump convector (5)	o	o (5)	o	o (5)
		Availability TBC			
*KPCCAB1	PC cable kit (12)	o	o	o	o

Remark: **Other combinations than mentioned in this combination table are prohibited**

(1) Heater tape that can be fixed on the bottom plate to prevent excessive ice formation.
(2) PCB that provides additional output connections:
  (a) Control external heat source (bivalent operation)
  (b) Output remote ON/OFF signal Space heating/cooling **OR** bottom plate heater *KBPHTH16* control
  (c) Remote alarm output
(3) It is not allowed to combine bottom plate heater and drain plug/stop kit
(4) *KRTETS can only be used in combination with *KRTR1
(5) Valve kit mandatory if heat pump convector is installed on reversible model (not mandatory for heating only model)
(6) PCB to receive up to 4 digital inputs for power limitation, only for *HB(H/X)04/08CA
(8) Bottom plate heater is factory mounted and controlled by outdoor unit.
(9) Unified model, the actual BUH capacity depends on the actual internal upwiring
(10) Requires digital I/O PCB *KRP1HBAA
(11) Only 1 remote sensor can be connected : indoor OR outdoor sensor
(12) Data cable for connection with PC







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