ESIE13-02A

Service Manual

Hybrid

- Gas boiler
  - EHYKOMB33AA / EHYKOMB33AA

- Hydro-box
  - EHYHBH05AAV3 / RHYHBH05AAV3 / CHYHBH05AAV3
  - EHYHBH08AAV3 / RHYHBH08AAV3 / CHYHBH08AAV3
  - EHYHBX08AAV3 / RHYHBX08AAV3

- Outdoor unit
  - EVLQ05CAV3 / RVLQ05CAV3
  - EVLQ08CAV3 / RVLQ08CAV3

1 Introduction

Part 1
System Outline

1 Description

2 Functionality

3 Wiring Diagrams

Part 2
Specifications

1 Gas Condensing Boiler

2 Hydro-box

3 Outdoor Unit

Part 3
Commissioning

Part 4
Troubleshooting

1 Troubleshooting

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1 Introduction

1.1 Version Log

Version code	Description	Date
ESIE13-02A	Manual also applicable for CHYHBH05/08AAV3	04/04/2017

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 Hybrid.

Six parts

This service manual consists of an introduction and six parts:

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Note

Manual	Contents	Gas boiler section	Heat pump section	Outdoor unit
ECPEN13-729_Daikin Altherma hybrid heat pump_tcm135-285966	general system explanations	x	x	x
EEDEN14-729_EHYHBH-AV3_EHYHBX-AV3_EHYKOMB-AA_LR_tcm135-304475	technical data book	x	x	
EEDEN14-729_EVLQ-CV3_LR_tcm135-304456	technical data book			x

Manual	Contents	Gas boiler section	Heat pump section	Outdoor unit
ECPEN13-732_Daikin Altherma hybrid heat pump engineering guide_tcm135-298162	engineering guide	x	x	x
AD130276-1_EHYKOMB33AA_tcm135-290423	CE declaration	x	x	x
4P349694-1_tcm135-290654	addendum book for optional equipment		x	
4PEN349693-1_2013_05_tcm135-290662	general safety precautions	x	x	x
4PEN349695-1_tcm135-290651	installation in a nutshell	x	x	x
4PEN349587-1A_2013_05_tcm135-290364	installation manual		x	
4PEN353067-1_2013_07_tcm135-290386	installation and operation manual	x		
4PEN344906-1_2013_02_tcm135-290349	installation manual			x
4PEN353731_1B_2013_10_tcm135-304271	field setting table		x	
4PEN349588-1_2013_05_tcm135-290399	operation manual		x	

1.3 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.

1.3.1 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.
	**DANGER: RISK OF EXPLOSION** Indicates a situation that could result in explosion.
	**DANGER: RISK OF POISONING** Indicates a situation that could result in poisoning.
	**WARNING: PROTECT AGAINST FROST** Indicates a situation that could result in equipment or property damage.

1.4 For the User

- If you are not sure how to operate the unit, contact your installer.
- The appliance is not intended for use by persons, including children, with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children must be supervised to ensure that they do not play with the product.

	**CAUTION** Do NOT rinse the unit. This may cause electric shocks or fire.

	**NOTICE** ■ Do NOT place any objects or equipment on top of the unit. ■ Do NOT sit, climb or stand on the unit.

- Units are marked with the following symbol:

This means that electrical and electronic products may not be mixed with unsorted household waste. Do NOT try to dismantle the system yourself: the dismantling of the system, treatment of the refrigerant, of oil and of other parts must be done by an authorized installer and must comply with applicable legislation. Units must be treated at a specialized treatment facility for reuse, recycling and recovery. By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and human health. For more information, contact your installer or local authority.

- Batteries are marked with the following symbol:

This means that the batteries may not be mixed with unsorted household waste. If a chemical symbol is printed beneath the symbol, this chemical symbol means that the battery contains a heavy metal above a certain concentration. Possible chemical symbols are: Pb: lead (>0.004%). Waste batteries must be treated at a specialized treatment facility for reuse. By ensuring waste batteries are disposed of correctly, you will help to prevent potential negative consequences for the environment and human health.

1.5 For the Installer

1.5.1 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 aluminium 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.

1.5.2 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.
- Make sure that the floor, where the unit will be installed, is level.
- Make sure walls sensitive to heat (e.g. wood) are protected by suitable insulation.
- ONLY operate the gas boiler if a sufficient supply of combustion air is ensured. In case of a concentric air/flue gas system dimensioned according to the specifications of this manual, this is fulfilled automatically and there are no other conditions for the equipment installation room. This method of operation applies exclusively.
- This gas boiler is NOT designed for room air dependent operation.

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.
- In bathrooms.
- In places where frost is possible. Ambient temperature around the indoor unit should be >5°C.

1.5.3 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.

Only use phosphoric acid deoxidised seamless copper with annealed temper grade.

1.5.4 Brine

If applicable. See the installation manual or installer reference guide of your application for more information.

	**WARNING** The selection of the brine MUST be in accordance with the applicable legislation.
	**WARNING** Take sufficient precautions in case of brine leakage. If brine leaks, ventilate the area immediately and contact your local dealer.

1.5.5 Water

	**NOTICE** Make sure water quality complies with EU directive 98/83 EC.

Avoid damages caused by deposits and corrosion. To prevent corrosion products and deposits, observe the applicable regulations of technology.

Measures for desalination, softening or hardness stabilization are necessary if the filling and top-up water have a high total hardness (>3 mmol/l-sum of the calcium and magnesium concentrations, calculated as calcium carbonate).

Using filling water and top-up water which does NOT meet the stated quality requirements can cause a considerably reduced service life of the equipment. The responsibility for this is entirely that of the user.

1.5.6 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.

1.5.7 Gas

The gas boiler is factory set to:

- The type of gas quoted on the type identification plate or on the setting type identification plate.
- The quitted gas pressure.

Operate the unit ONLY with the gas type and gas pressure indicated on these type identification plates.

Installation and adaptation of the gas system MUST be conducted by:

- Personnel qualified for this work.
- In compliance with valid gas installation related guidelines.
- In accordance with applicable regulations of the gas supply company.
- In accordance with local and national regulations.

Boilers that use natural gas MUST be connected to a governed meter.

Boilers that use liquid petroleum gas (LPG) MUST be connected to a regulator.

The size of the gas supply pipe should under no circumstance be less than 22 mm.

The meter or regulator and pipe work to the meter MUST be checked preferably by the gas supplier. This is to ensure that the equipment works good and meets the gas flow and pressure requirements.

DANGER

If you smell gas:

- Call immediately your local gas supplier and your installer.
- Call the suppliers's number on the side of the LPG tank (if applicable).
- Turn off the emergency control valve at the meter/regulator.
- Do NOT turn electrical switches ON or OFF.
- Do NOT strike matches or smoke.
- Put out naked flames.
- Open doors and windows immediately.
- Keep people away from the affected area.

1.5.8 Gas exhaust

Flue systems must NOT be modified or installed in any way other than as described in the fitting instructions. Any misuses or unauthorized modifications to the appliance, flue or associated components and systems could invalidate the warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

It is NOT allowed to combine flue system parts purchased from different suppliers.

1.5.9 Local legislation

Local regulations for UK

It is law that all gas appliances are installed by a gas safe registered competent engineer and in accordance with the following recommendations:

- Current Gas Safety (Installation and Use) Regulations.
- All current building regulations.
- Building Standards (Scotland) Consolidated.
- This appliance MUST be installed in accordance with the Gas (Safety and Use) Regulations, current Building Regulations, Building Standards (Scotland), I.S.813 Installation of Gas Appliances (Ireland), IEE Wiring Regulations (BS 7671), Health and Safety Document No. 635 (Electricity at Work Regulations) and Local Water Authority Bye Laws.
- UK Water Regulations and Bye Laws.
- Health & Safety.

The installation MUST comply with the following British Standards codes of practice:

- BS 5440: Flues and Ventilation for gas appliances of rated input NOT exceeding 70 kW (Part 1 Flues).
- BS 5440: Flues and Ventilation for gas appliances of rated input NOT exceeding 70 kW (Part 2 Air Supply).
- BS 5546: 2000 Installation of gas hot water supplies for domestic purposes.
- BS 5549: 1990 Forced circulation hot water systems.
- BS 6700: 1997 Design, Installation, testing and maintenance of services supplying hot water.
- BS 6798: 2000 Specification for installation of gas fired hot water boilers of rated input NOT exceeding 70 kW.
- BS 6891: 1998 Installation of low pressure gas pipe-work installation up to 35 mm (RI).
- BS 7593: 1992 Code of practice for treatment of water in heating systems.
- BS 7671: 2001 Requirements for electrical installations, IEE Wiring regulations.
- BS7074:1: Code of practice for domestic and hot water supply.
- EN12828: Central heating for domestic premises.

Potable water: all seals, joints and compounds (including flux and solder) and components used as part of the secondary domestic water system MUST be approved by WRAS.

Part 1
System Outline

1

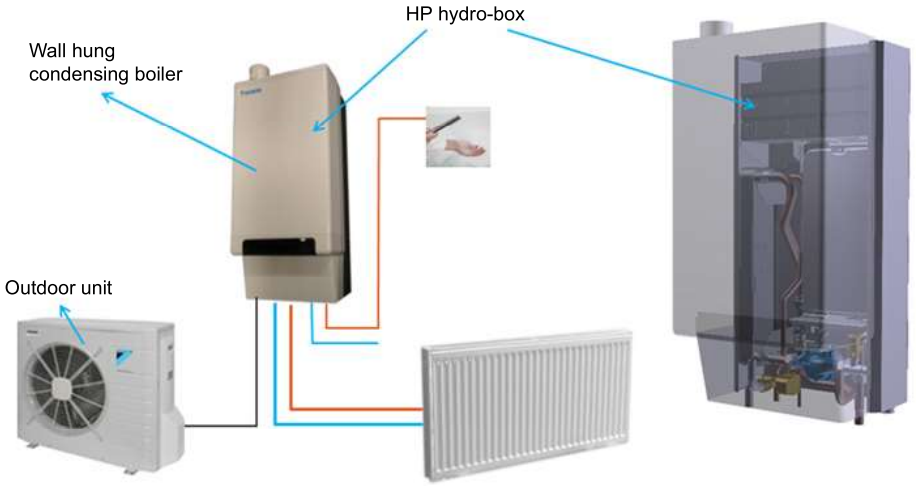
What is in this part? This part contains the following chapters:

1

1 Description

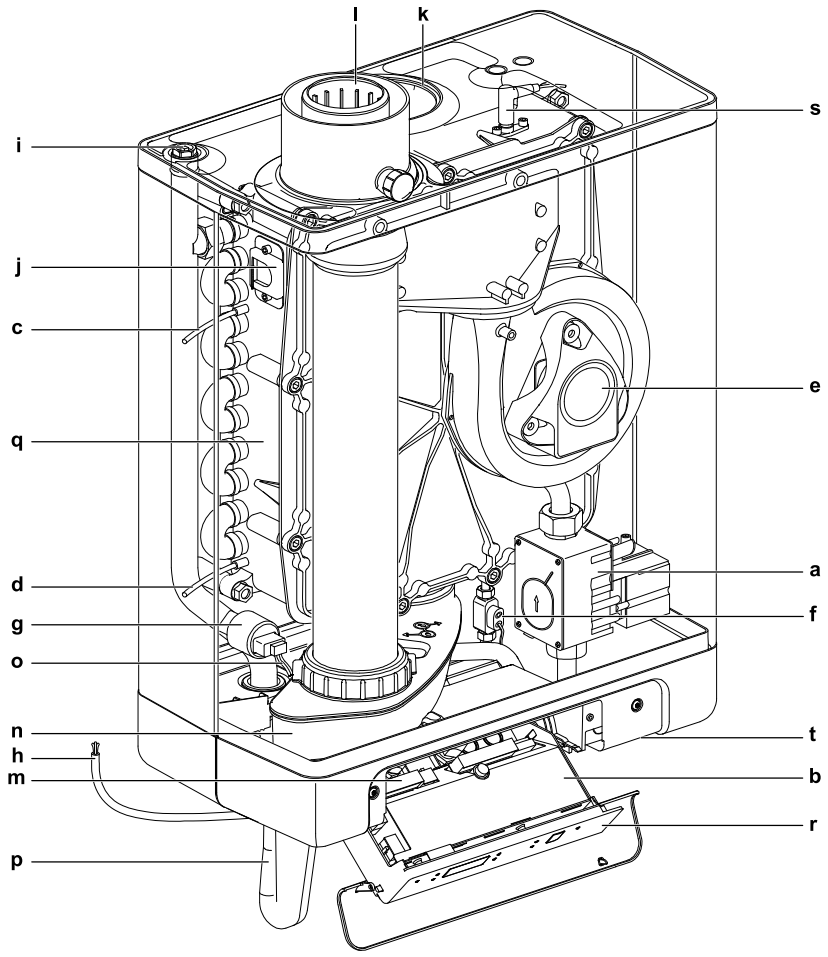
1.1 System Build-up

The system combines a gas condensing boiler and a heat pump (hydro-box) for space heating and domestic hot water. Depending on the position of the 3-way valve, the gas condensing boiler can either be bypassed or not. The heat pump can either operate or not, depending on the active operation mode (heat pump only, gas condensing boiler only or hybrid (= heat pump and gas condensing boiler)).



1.2 Components and Connections

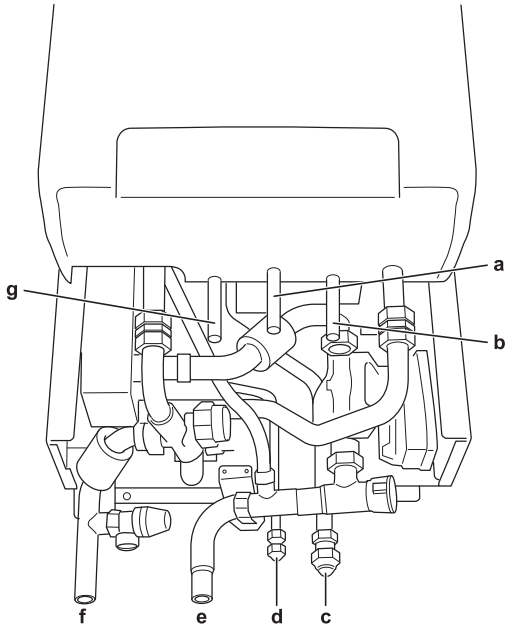
1.2.1 Gas condensing boiler



Item	Description	Item	Description
a	Gas valve	k	Air supply cap
b	Boiler control panel	l	Flue pipe adapter (use ONLY in combination with the accompanying elbow in flue sets)
c	Sensor S1	m	Connection block/terminal strip X4
d	Sensor S2	n	Condensate drain pan
e	Fan	o	Hot water sensor S3
f	Flow sensor	p	Condensate S3
g	Space heating pressure sensor	q	Heat exchanger
h	Mains lead 230 V AC without plug (stripped)	r	Operating panel and read-out
i	Manual air bleed	s	Ionisation/ignition electrode
j	Sight glass	t	Position of data plate

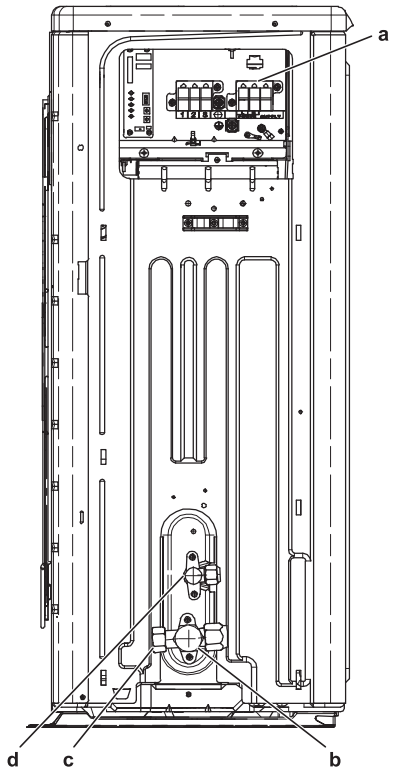
1

1.2.2 Hydro-box



Item	Description
a	Gas in
b	Cold water in
c	Refrigerant gas connection
d	Refrigerant liquid connection
e	Heating return
f	Heating flow
g	Hot water out

1.2.3 Outdoor unit



Item	Description
a	Terminal strip with earth terminal
b	Gas stop valve (ø15.9 CuT)
c	Service port
d	Liquid stop valve (ø6.4 CuT)

1

2 Functionality

2.1 System Operation

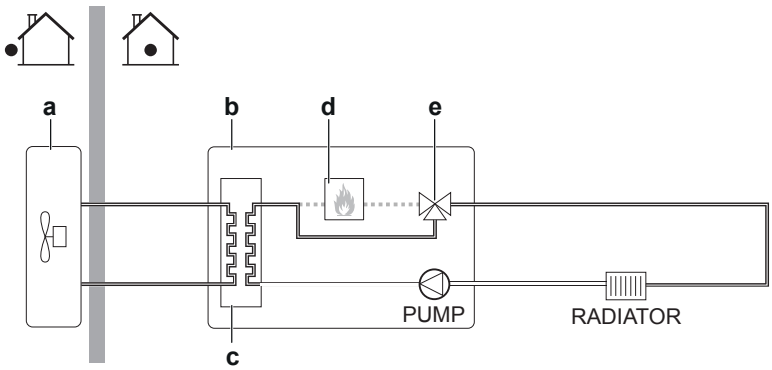
2.1.1 Heating Mode

Heat pump only operation

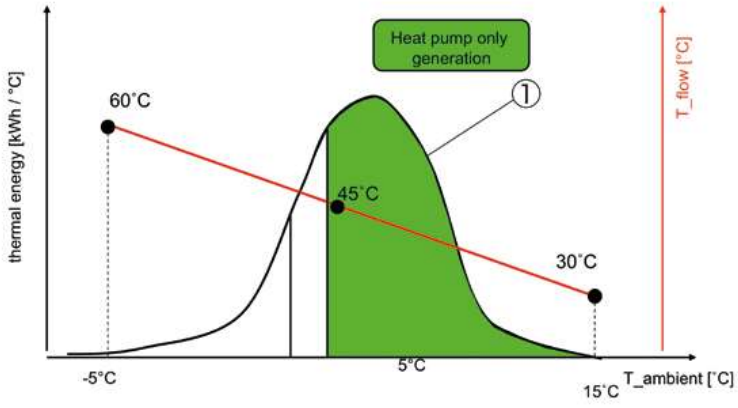
The heat pump and pump are enabled, the gas boiler is bypassed.

Space heating is enabled.

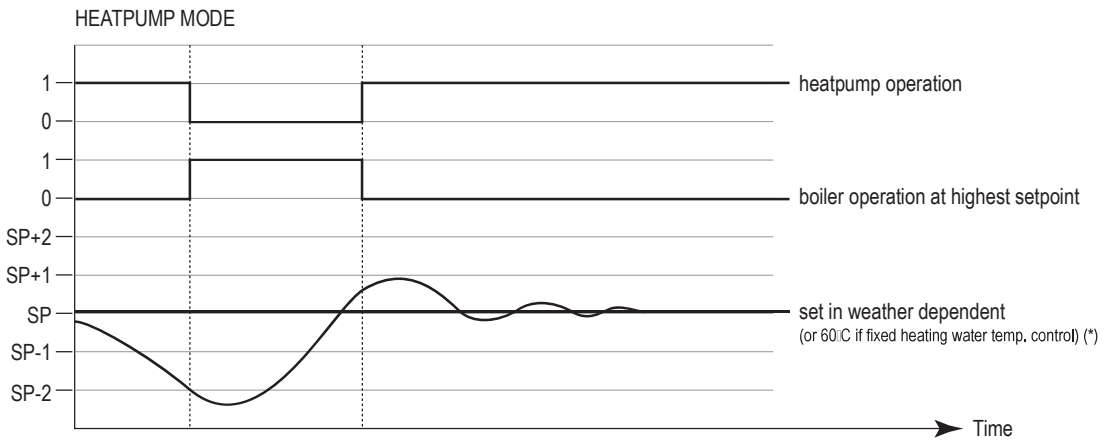
Allowable outdoor temperature range: -25 to 25°C.



a	Outdoor unit
b	Indoor unit
c	Plate heat exchanger
d	Gas boiler
e	3-way valve



Quick heatup



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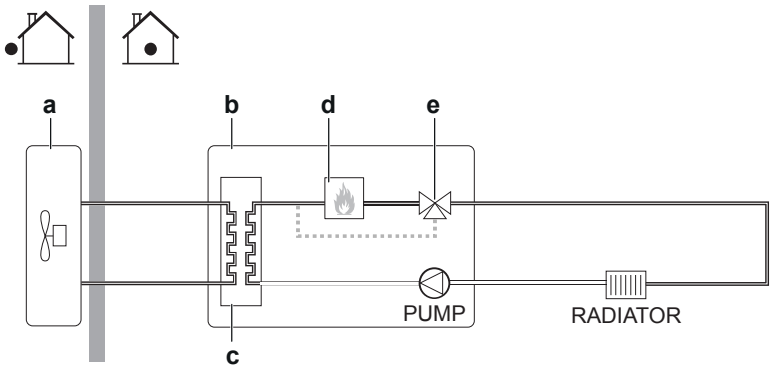
Hybrid operation mode

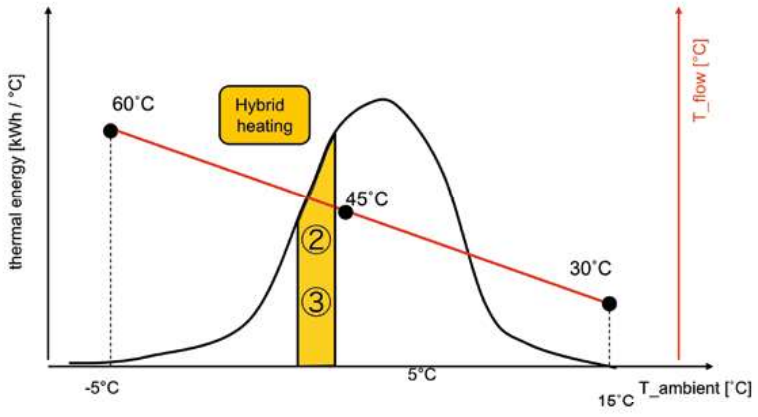
The heat pump, pump and gas boiler are enabled.

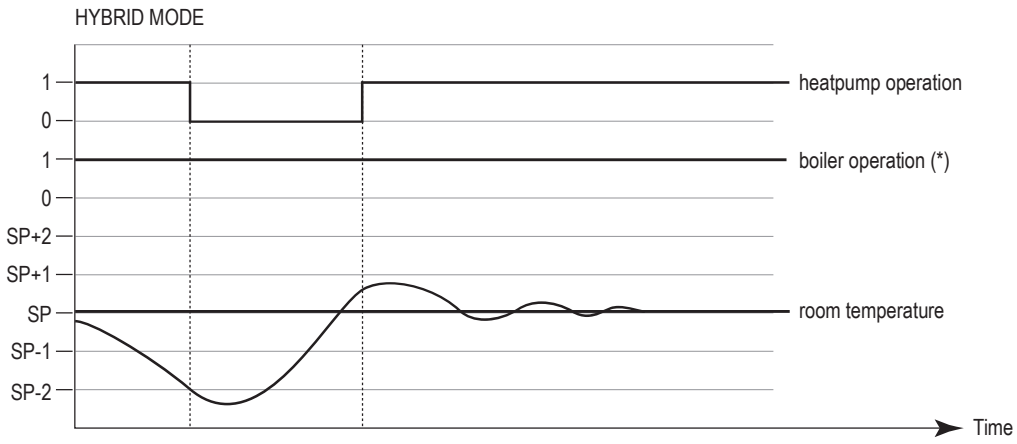
Space heating is enabled.

Allowable outdoor temperature range: -25 to 25°C.



a	Outdoor unit
b	Indoor unit
c	Plate heat exchanger
d	Gas boiler
e	3-way valve




HYBRID MODE
1
0
1
0
SP+2
SP+1
SP
SP-1
SP-2
heatpump operation
boiler operation (*)
room temperature
Time

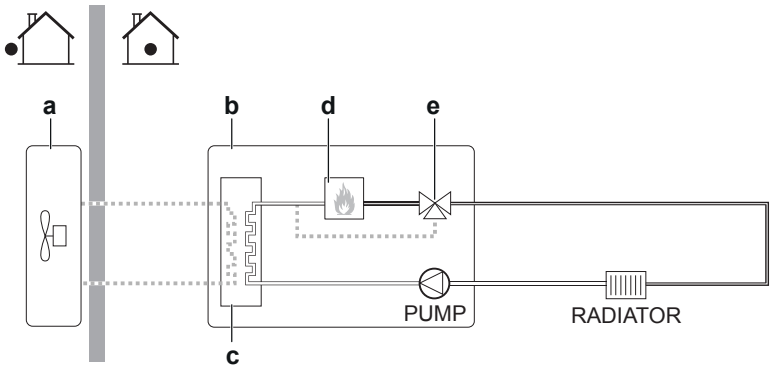
1

Gas boiler only mode

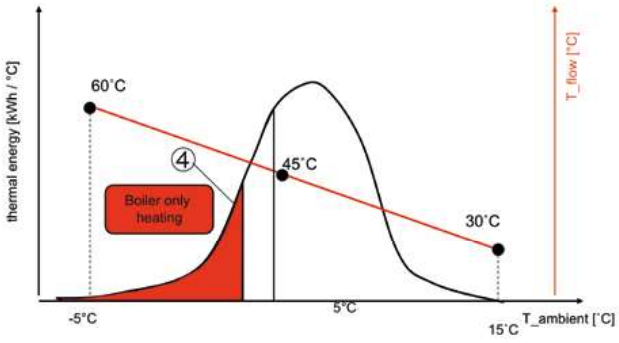
The pump and gas boiler are enabled.

Space heating is enabled. It works alternating depending on the demand of domestic hot water. If there is a domestic hot water demand, the unit stops serving the heating and turns in domestic hot water mode.

Allowable outdoor temperature range: max 25°C.



a	Outdoor unit
b	Indoor unit
c	Plate heat exchanger
d	Gas boiler
e	3-way valve

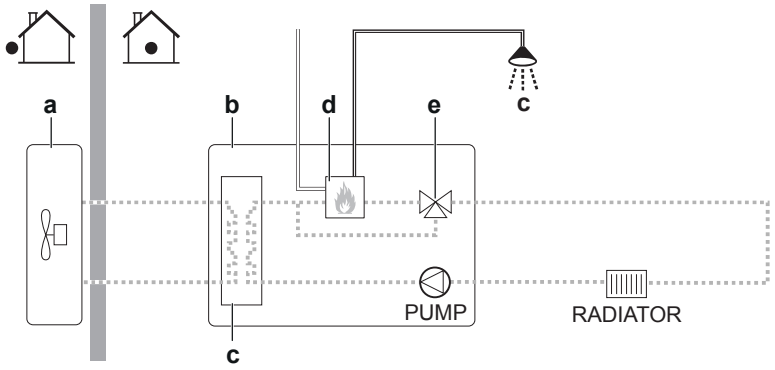


2.1.2 Domestic Hot Water

Domestic hot water only mode

The heat pump and the pump are idle, the gas boiler is enabled.

Space heating is disabled. It works alternating depending on the demand of domestic hot water.



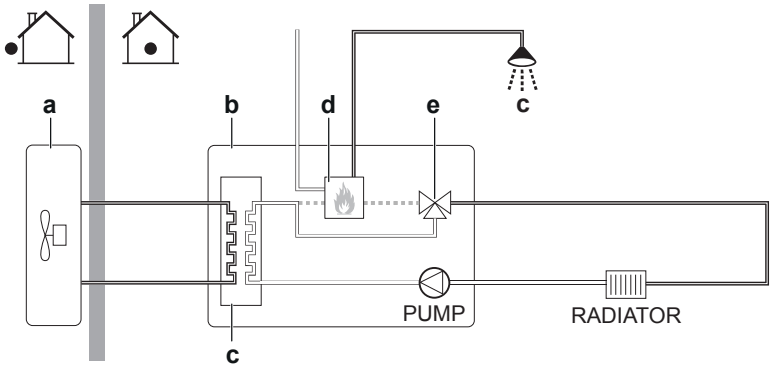
a	Outdoor unit
b	Indoor unit
c	Plate heat exchanger
d	Gas boiler
e	3-way valve

1

Domestic hot water and space heating mode

Depending on the mode (heat pump only / hybrid / gas boiler only) we can generate domestic hot water and heating as follows:

- During heat pump only operation, the heat pump remains operational and the gas boiler is bypassed / domestic hot water will be generated by boiler only on demand. Both can happen parallel.
- During hybrid operation, the system will automatically switch one or both units to ON for heating accordantly to the settings in ecological / economical / domestic hot water will be generated by boiler only on demand. Both can happen parallel.
- During gas boiler only operation, the internal pump is running and the gas boiler will serve heating / domestic hot water will be generated by boiler only on demand. Only one mode can be in time.

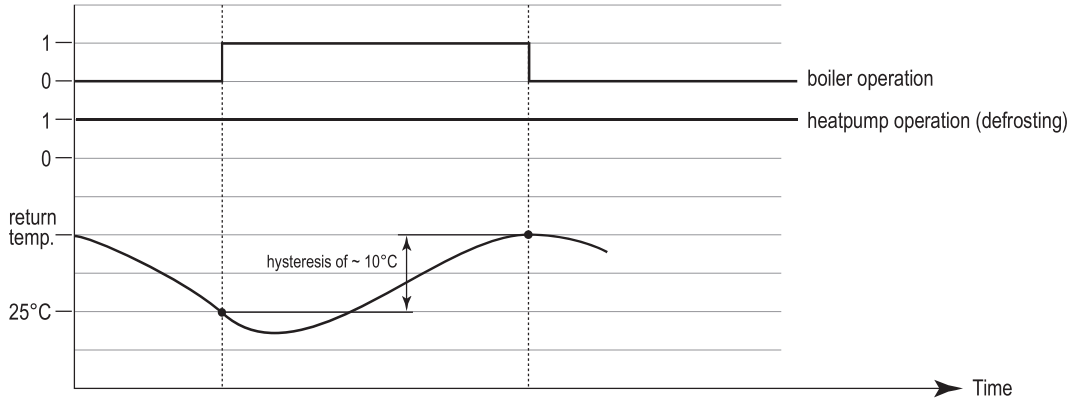


a	Outdoor unit
b	Indoor unit
c	Plate heat exchanger
d	Gas boiler
e	3-way valve

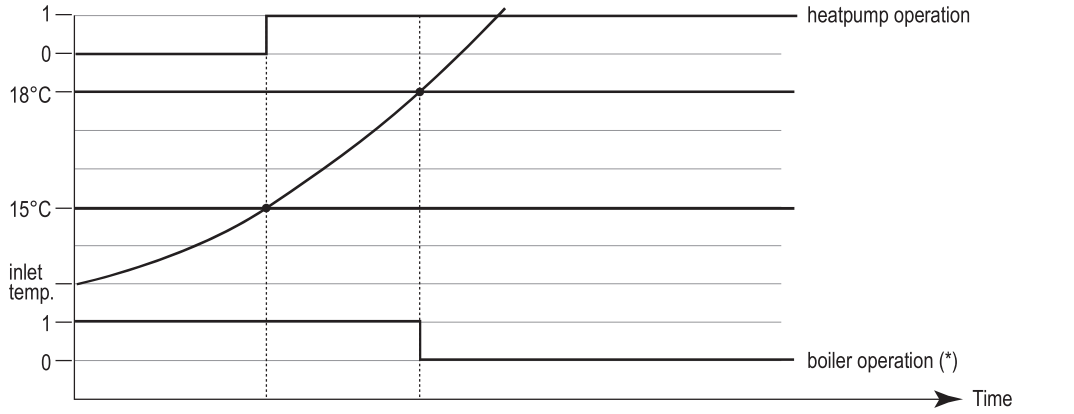
1

Return temperature below 18°C

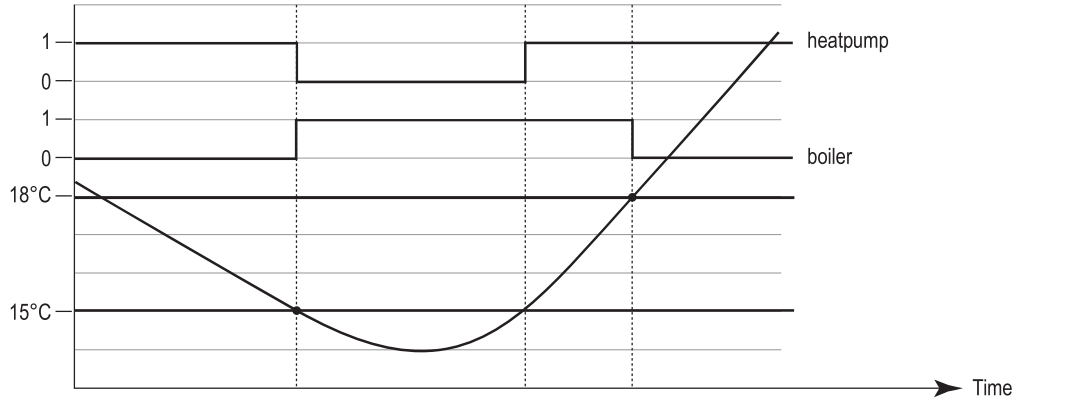
DURING DEFROST



NOT DURING DEFROST : start up of heatpump mode, return <15°C



NOT DURING DEFROST : heatpump mode, return <15°C



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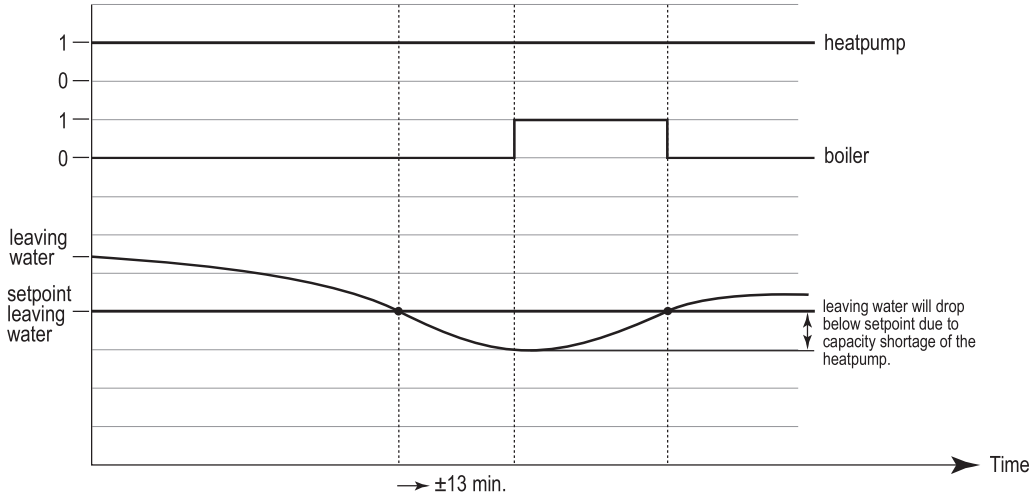
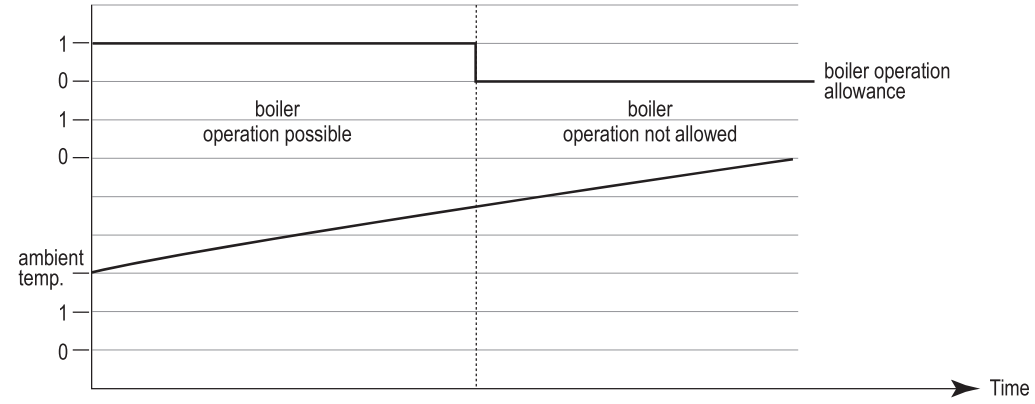
Economical mode, capacity shortage

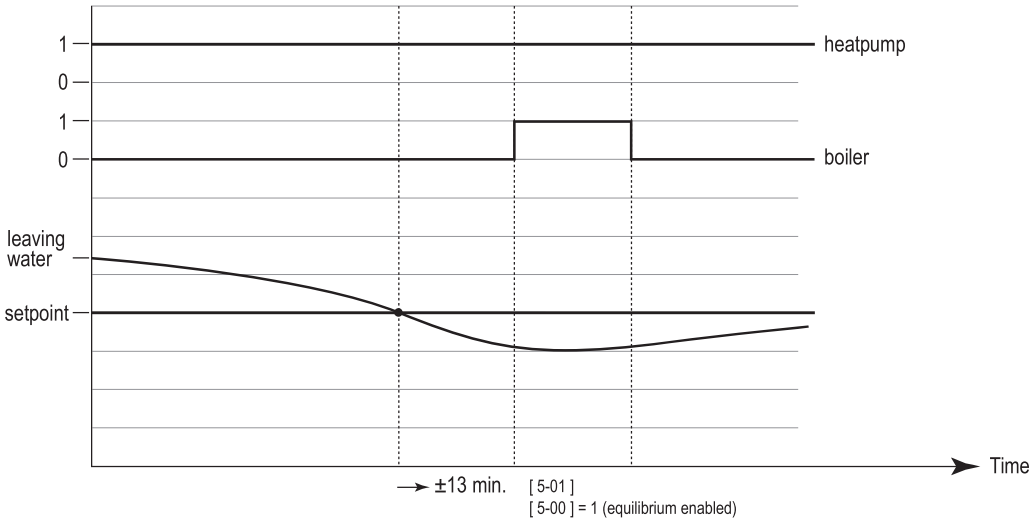


Equilibrium point

(operation of the equilibrium point is **independant** of ecological or economical operation)



Equilibrium point and capacity shortage



Economic

When the heat pump operates at the break-even COP, the cost of 1kWh thermal output produced by the heat pump is equal to the cost of 1kWh thermal output produced by the boiler. The break-even COP is dependent on the electricity price [€/kWh], the gas price [€/kWh] and the boiler's thermal efficiency [%] (considered as a fixed value, independent of flow temperature, return temperature and ambient temperature). The energy prices are set by the user or installer and can be adjusted.

$$COP_{Break\text{-}even,\ ECONO} = \frac{\text{Electricity price} \left[\frac{€}{kWh} \right] \times \eta_{boiler} \left[- \right]}{\text{Gas price} \left[\frac{€}{kWh} \right]}$$

Ecologic

When the heat pump operates at the break-even COP, the primary energy use to produce 1kWh thermal output by the heat pump is equal to the primary energy use to produce 1kWh thermal output by the boiler. The break-even COP is dependent on the Primary Energy coefficient (the amount of primary energy input that is needed to generate a kWh of electricity, here assumed to be 2,5) and the boiler's thermal efficiency.

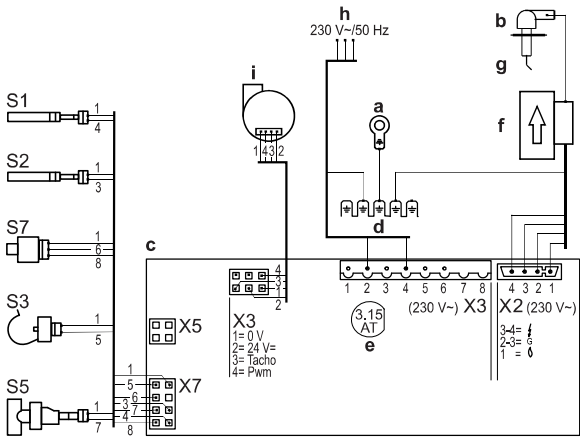
$$COP_{Break\text{-}even,\ ECO} = \text{Primary Energy coefficient} \left[- \right] \times \eta_{boiler} \left[- \right]$$

1

3 Wiring Diagrams

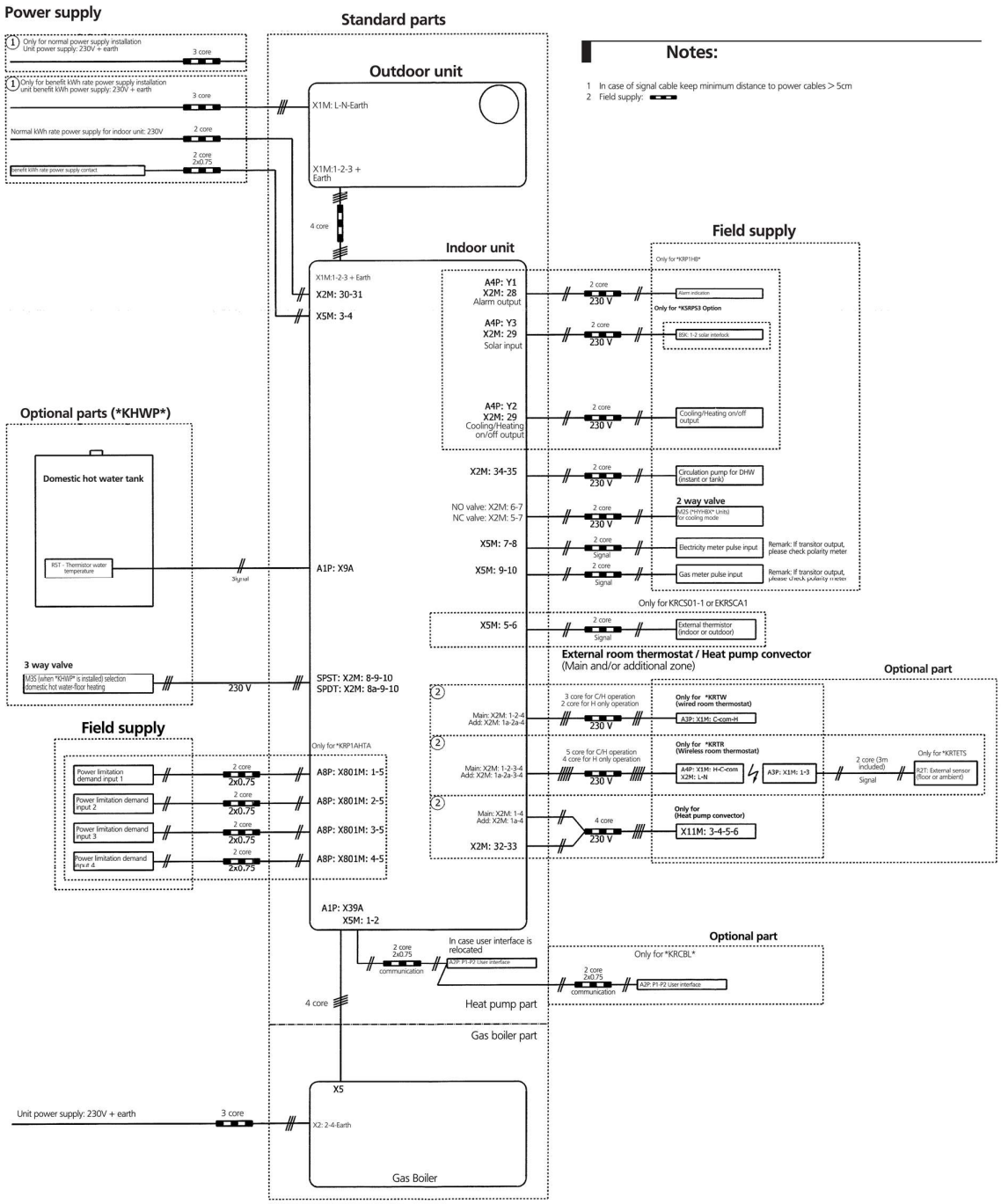
3.1 PCB Description

3.1.1 Gas condensing boiler



Part number	Description
a	Earth connections heat exchanger
b	Spark plug cover
c	Boiler controller
d	Earth connections boiler controller
e	Fuse (3.15 A T)
f	Gas valve and ignition unit
g	Ionisation/ignition probe
h	Main voltage
i	Fan
S1	Flow sensor
S2	Return sensor
S3	Domestic hot water sensor
S5	Flow switch
S7	Space heating water pressure sensor
X2 (1-3)	Room thermostat 230 V AC (1= Switch live, 3= Live (fused)) (not used)
X2 (1-3)	Frost thermostat 230 V AC (1= Switch live, 3= Live (fused)) (not used)
X2 (3-6)	Power supply (230 V) fan
X2 (2-4)	Mains (2= L (BRN), 4= N (BLU))
S5	Boiler communication cable

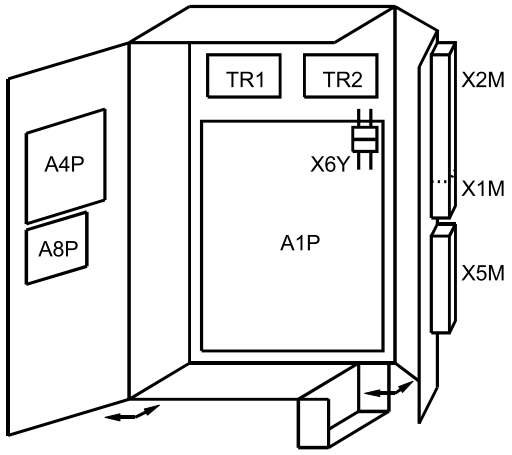
3.1.2 External connection diagram



For more details check unit wiring diagram.

1

3.2 Overview Switch Box

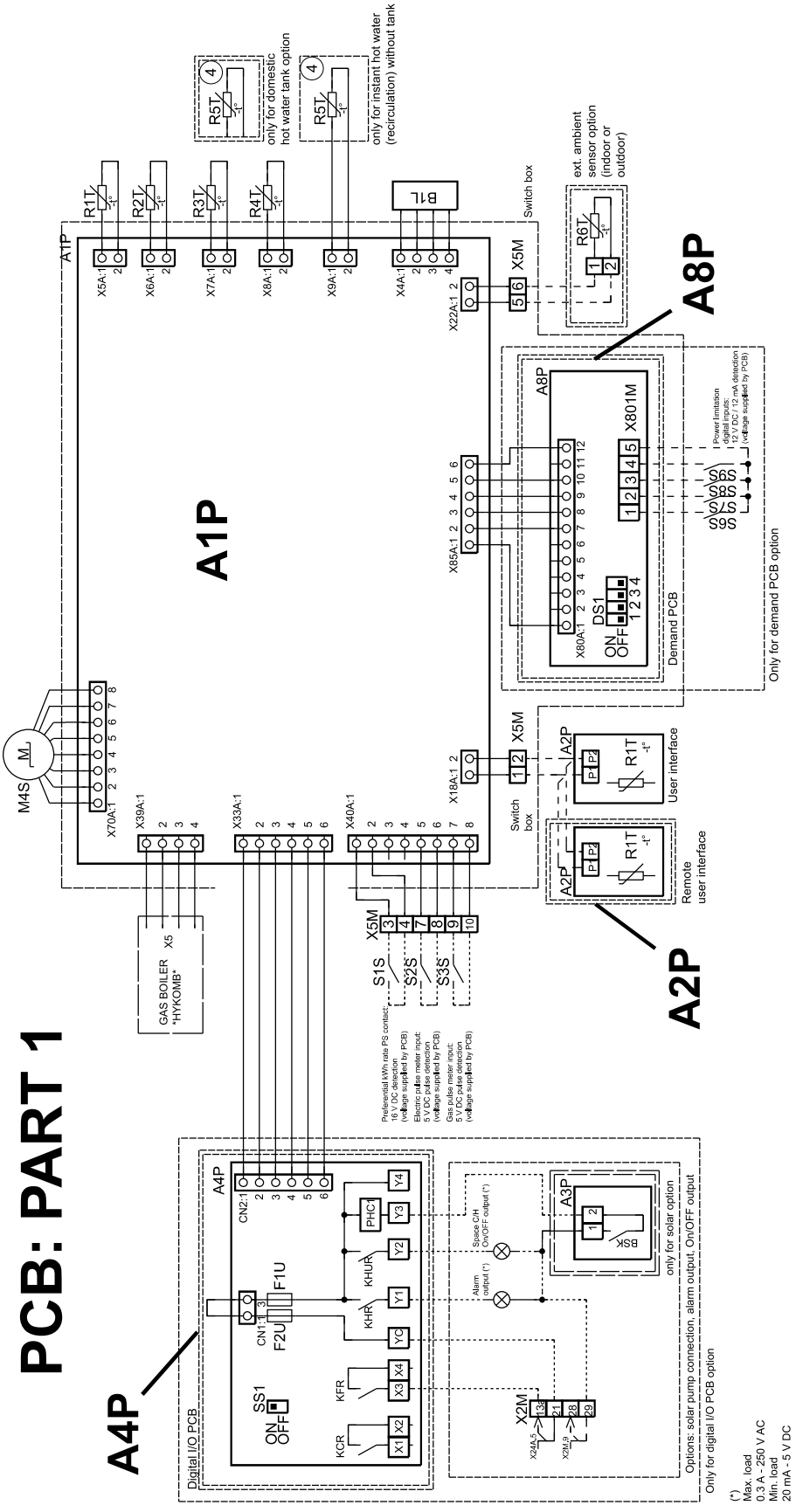


Part number	Description
A4P	Digital I/O PCB, receiver PCB (wireless ON/OFF thermostat, PC= power circuit) (optional)
A8P	Demand PCB (optional)
TR1, TR2	Power supply transformer
A1P	Main PCB (hydro)
X*Y	Connector
X*M	Terminal strip

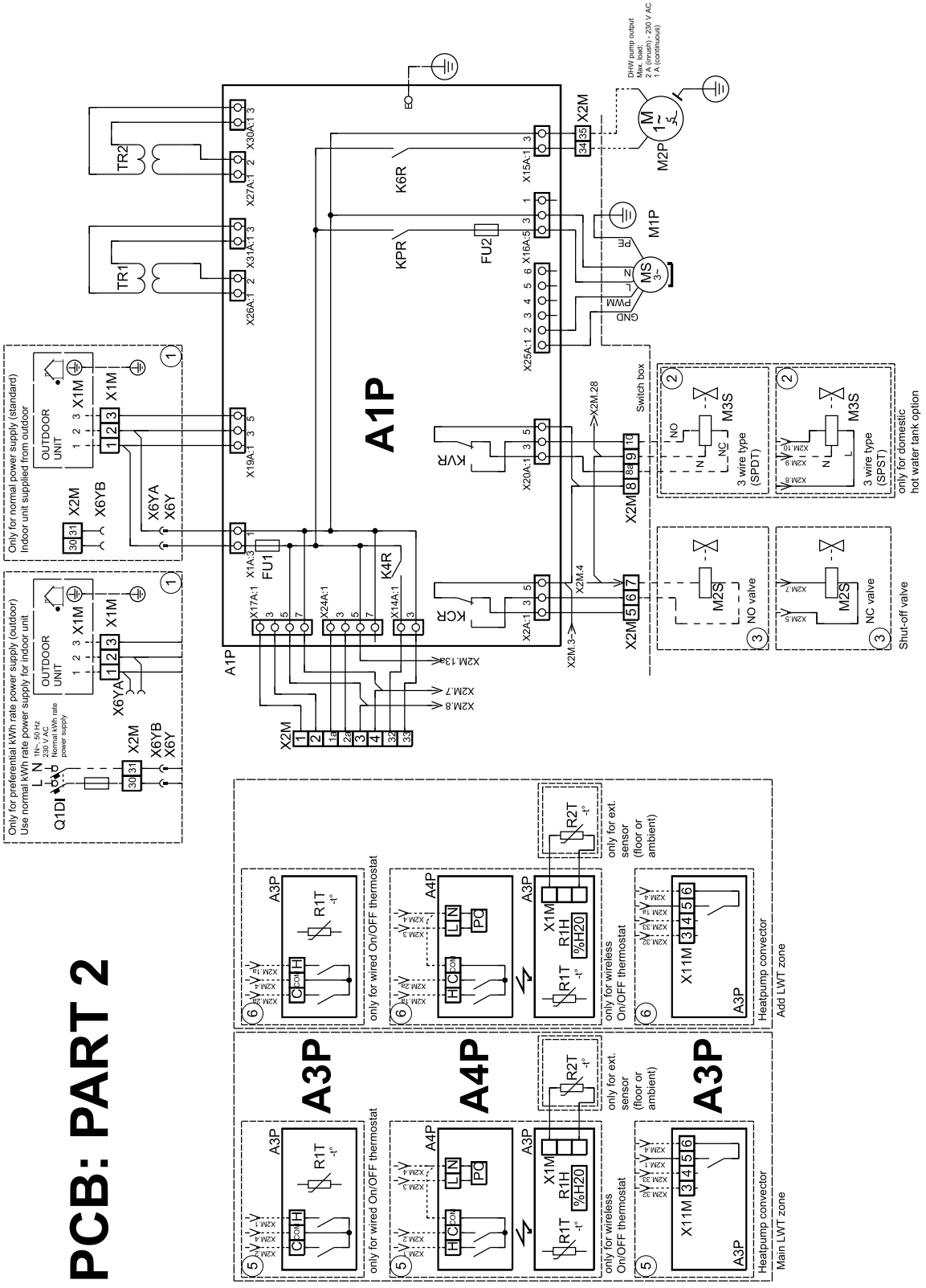
The next two figures ("PCB: part 1" and "PCB: part 2") show the wiring diagram of the hybrid PCB. The different components are mentioned either on "PCB: part 1" or on "PCB: part 2". The legend that is attached mentions the description of each part number and can help to understand these two figures.

Some additional information on the PCB figures:

- The **contacts S1S, S2S and S3S**, shown on PCB PART 1, fulfil the following functions:
  - S1S: Preferential kWh rate: can force the outdoor heat pump to switch off.
  - S2S: Electric power meter pulse input (for the purpose of energy metering).
  - S3S: Gas meter pulse input (for the purpose of energy metering).
- The **user interface** (A2P, see drawing "PCB: PART 1"): is delivered as an accessory within the unit. The connection diagram (see further) shows how to connect it to the PCB.


PCB: PART 1
A4P
A1P
A8P
A2P
A1P
Switch box
R1T
R2T
R3T
R4T
R5T
B1L
only for domestic hot water tank option
only for instant hot water (recirculation) without tank
ext. ambient sensor option (indoor or outdoor)
R6T
X5M
X22A
X9A
X8A
X7A
X6A
X5A
X4A
M4S
X70A
X39A
X33A
X40A
X18A
GAS BOILER "HYKOMB"
X5
S1S
S2S
S3S
Preferential kWh rate PS contact: 16 V DC detection (voltage supplied by PCB)
Electric pulse meter input: 5 V DC pulse detection (voltage supplied by PCB)
Gas pulse meter input: 5 V DC pulse detection (voltage supplied by PCB)
A2P
User interface
Remote user interface
A8P
Demand PCB
X801M
X85A
X80A
DS1
ON
OFF
1 2 3 4
Only for demand PCB option
Power limitation digital inputs: 16 V DC / 7 mA detection (voltage supplied by PCB)
S6P
S7P
S8P
S9P
S10P
S6S
S7S
S8S
S9S
S10S
A4P
Digital I/O PCB
CN2
CN1
F1U
F2U
SS1
ON
OFF
KCR
KFR
KHR
KHUM
PHC
X1
X2
X3
X4
Y1
Y2
Y3
Y4
Y5
Space CH On/OFF output (*)
Alarm output (*)
A3P
BSK
Options: solar pump connection, alarm output, On/OFF output
only for solar option
Only for digital I/O PCB option
X2M
X24A
X25A
(*)
Max. load
0.3 A - 250 V AC
Min. load
20 mA - 5 V DC

1


PCB: PART 2
A1P
A3P
A4P
Only for normal power supply (standard)
Indoor unit supplied from outdoor
Only for preferential kWh rate power supply (outdoor)
Use normal kWh rate power supply for indoor unit
OUTDOOR UNIT
X1M
X2M
X6YA
X6YB
X6Y
Q1DI
TR1
TR2
FU1
FU2
K4R
KCR
KPR
KVR
K6R
M1P
M2P
M3S
M2S
Switch box
3 wire type (SPDT)
3 wire type (SPST)
only for domestic hot water tank option
NO valve
NC valve
Shut-off valve
DHW pump output Max. load: 2 A (inrush), 230 V AC 1 A (continuous)
only for wired On/OFF thermostat
only for wireless On/OFF thermostat
only for ext. sensor (floor or ambient)
Heatpump convector
Main LWT zone
Add LWT zone

For the description of each part number, refer to the table below (note that the options that go together with the hybrid are the same options as those for Altherma LT):

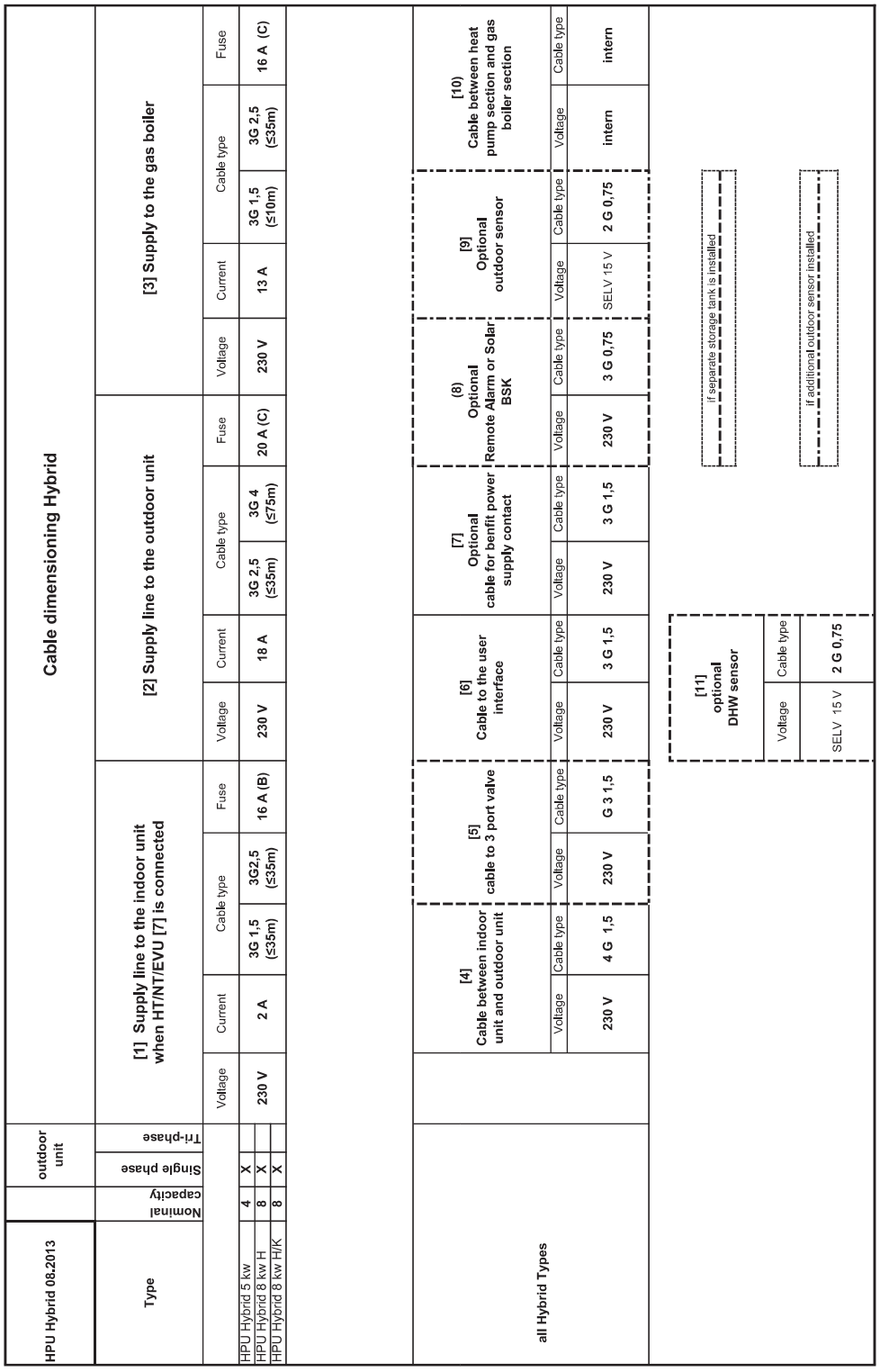
Part number		Description
A1P		Main PCB (hydro)
A2P		User interface PCB
A3P	*	ON/OFF thermostat
A3P	*	Heat pump convector
A3P	*	Solar pumpstation PCB
A4P	*	Digital I/O PCB
A4P	*	Receiver PCB (wireless ON/OFF thermostat, PC= power circuit)
A8P	*	Demand PCB
B1L		Flow sensor
DS1 (A8P)	*	Dipswitch
F1U, F2U	*	Fuse 5 A 250 V for digital I/O PCB (A4P)
FU1		Fuse T 6.3 A 250 V for main PCB (A1P)
K*R		Relay on PCB
M1P		Main water supply pump
M2P	#	Domestic hot water pump
M2S	#	2-way valve for cooling mode
M3S		3-way valve for floor heating / domestic hot water tank
M4S		Bypass valve gas boiler
PHC1	*	Optocoupler input circuit
PS		Switching power supply
Q*DI	#	Earth leakage circuit breaker
R1T (A1P)		Outlet water heat exchanger thermistor
R1T (A2P)		Ambient sensor user interface
R1T (A3P)	*	Ambient sensor ON/OFF thermostat
R2T (A1P)		Outlet gas boiler thermistor
R2T (A4P)	*	External sensor (floor or ambient)
R3T (A1P)		Refrigerant liquid side thermistor
R4T (A1P)		Inlet water thermistor
R5T (A1P)	*	Domestic hot water thermistor
R6T (A1P)	*	External indoor or outdoor ambient thermistor
R1H (A3P)	*	Humidity sensor
S1S	#	Preferential kWh rate PS contact
S2S	#	Electrical meter pulse input
S3S	#	Gas meter pulse input
S6S-S9S	#	Digital power limitation inputs
SS1 (A4P)	*	Selector switch
TR1, TR2		Power supply transformer
X*M		Terminal strip
X*Y		Connector

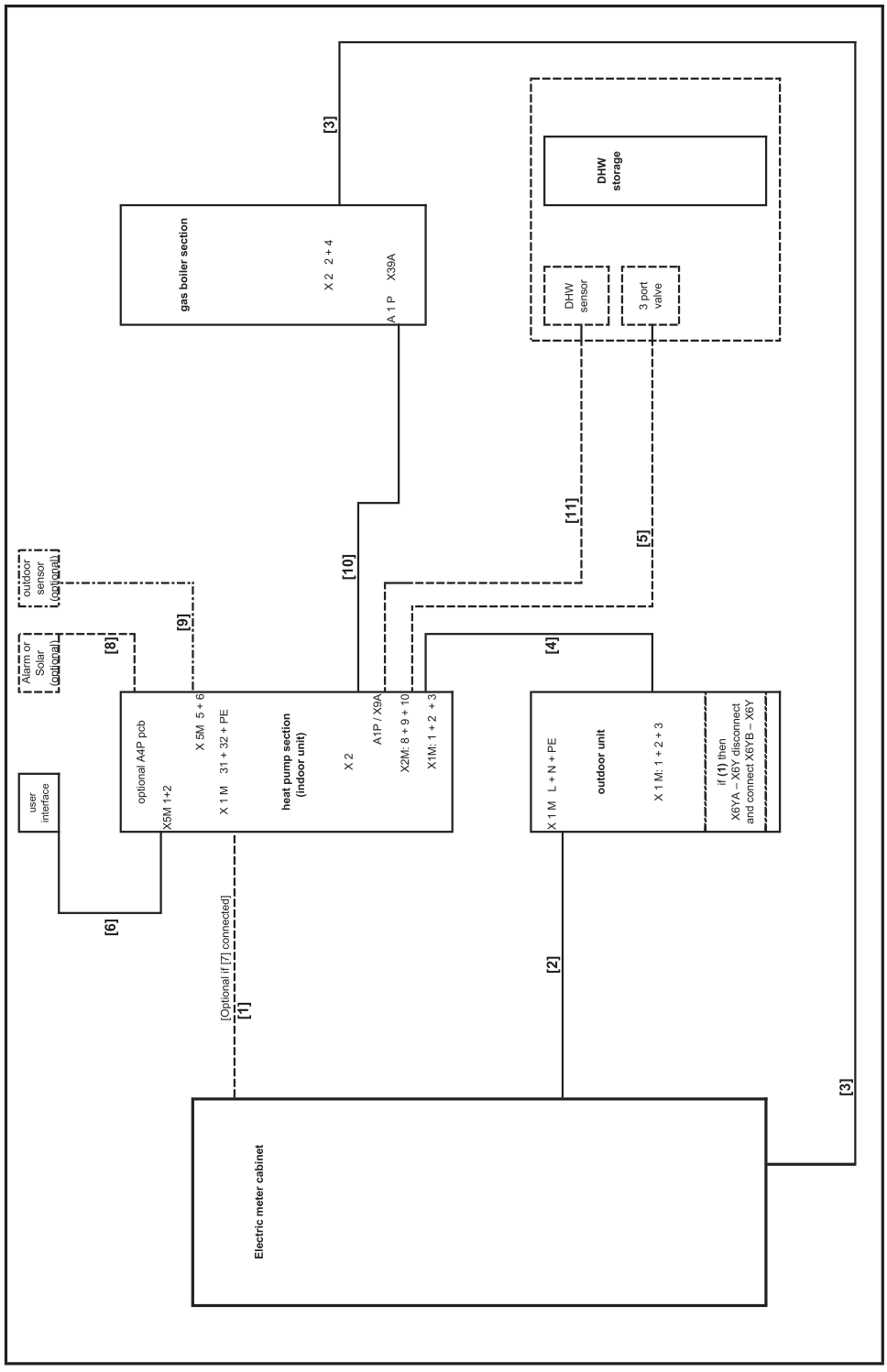
*: optional

#: field supply

1

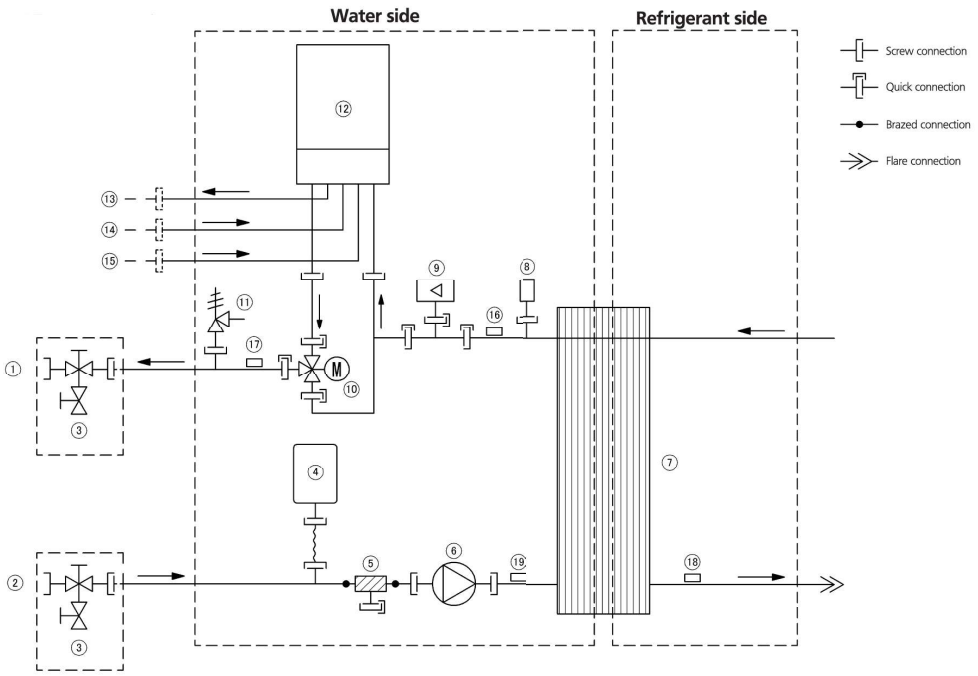
3.3 Cable Dimensions




[3]
gas boiler section
X 2 2 + 4
A 1 P X39A
DHW storage
DHW sensor
3 port valve
[11]
[5]
[10]
outdoor sensor (optional)
Alarm or Solar (optional)
[8]
[9]
[4]
optional A4P pcb
X5M 1+2
X 5M 5 + 6
X 1 M 31 + 32 + PE
heat pump section (indoor unit)
X 2
A1P / X9A
X2M: 8 + 9 + 10
X1M: 1 + 2 + 3
X 1 M L + N + PE
outdoor unit
X 1 M: 1 + 2 + 3
if (1) then
X6YA – X6Y disconnect
and connect X6YB – X6Y
user interface
[6]
[Optional if [7] connected]
[1]
[2]
[3]
Electric meter cabinet

1

3.4 Piping Diagram



Item	Description
1	Space heating / water in
2	Space heating / water out
3	Shut off valve with drain / fill valve (field installation)
4	Expansion vessel
5	Filter
6	Pump
7	Plate heat exchanger
8	Air purge
9	Flow sensor
10	3-way valve
11	Safety valve
12	Boiler
13	Domestic hot water out
14	Gas connection
15	Cold water in
16	R1T - Water OUT PHE
17	R2T - Water OUT
18	R3T - Liquid
19	R4T - Water IN

Part 2
Specifications

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

1 Gas Condensing Boiler

1.1 Technical Specifications

2

				GAS MODULE
INDOOR UNIT				***EHYKOMB33AA**
Function				Heating only
Thermal load (Hi)	Min. - Max.		kW	7,5-32,7
Heating power CH	Min. - Max.	80/60	kW	7,9-31,9
Efficiency CH	NCV	80/60	%	98
Efficiency CH	NCV	40/30 (30%)	%	107
Heating power DHW	Min. - Max.		kW	7,9-31,9
Efficiency DHW	NCV		%	105
Casing	Colour			RAL9010
Dimensions	Unit	Height x width x depth	mm	710x450x240
Weight	Unit		kg	36

Gas categories

			Pressure (mBar)				
Brand	**Country**	**Gas category**	**G20**	**G25**	**G30**	**G31**	**G37**
DAIKIN	UK	II2H3P	20			30-37	
	FR	II2Esi3B/P	20	25		30	
	BE	I2E(S)B	20	25			
		I3P				30	
	SP	II2H3P	20			30-37	
ROTEX	IT	II2H3B/P	20			30	
	DE	II2ELL3P	20	25	50		

Gas type	Natural gas H	Propane P
Gas category	2H G20 20 mBar	3P G31 (propane) 29 mBar
CO_2% at low setting (L) (🔧 and ➖ 2x) (with opened casing)	8.4 - 9.6	9.4 - 10.8
CO_2% at high setting (L) (🔧 and ➕ 2x) (with opened casing)	8.6 - 9.6	9.8 - 10.8
Gas supply pressure (mBar)	20-30	25-35
ø gas metering ring (mm) (HRE36/30)	6.95	5.25
Minimum rpm (% of max) (parameter d)	25	40
Minimum start rpm (% of max) (parameter F)	70	50

Sensor characteristics

NTC 12 kOhm					
T [°C]	**R [ohm]**	**T [°C]**	**R [ohm]**	**T [°C]**	**R [ohm]**
-15	76020	25	12000	65	2752
-10	58880	30	9805	70	2337
-5	45950	35	8055	75	1994
0	36130	40	6653	80	1707
5	28600	45	5522	85	1467
10	22800	50	4609	90	1266
15	18300	55	3863	95	1096
20	14770	60	3253	100	952

2 Hydro-box

2.1 Technical Specifications

2

				EHYHBH05	EHYHBH08	EHYHBX08
Casing		Colour		White		
Dimensions	Unit	Height	mm	900		
		Width	mm	450		
		Depth	mm	165		
Weight	Net weight		kg	28		
Main components	Pump	Type		DC motor		
		Nr. of speed		Inverter controlled		
		Power input	W	45		
	Water side heat exchanger	Type		Brazed plate		
		Qty		1		
		Water volume	l	0,9	1,3	
		Water flow rate min.	l/min	5,0	11,0	
		Insulation material		Green felt	Green felt	Elastomeric foam
	Expansion vessel	Volume	l	10		
		Max. water pressure	bar	3		
		Pre-pressure	bar	1		
	Water filter	Diameter perforations	mm	1		
		Material		Body: copper + brass / filter element: stainless steel		
Heating circuit	Piping connections ø			22 mm CU		
	Safety valve		bar	3		
	Manometer			Yes		
	Drain valve / Fill valve			Yes		
	Shut off valves			Yes		
	Air purge valve			Yes		
Refrigerant circuit	Gas side ø		mm	15,9		
	Liquid side ø		mm	6,35		

Operation range (heat pump operation)	Outdoor temperature	Space cooling	℃	-	-	10 ~ 43
		Space heating (heat pump)	℃	-25 ~ 25		
	Water temperature	Space cooling	℃	-	-	5 ~ 22
		Space heating	℃	15 ~ 55		

3 Outdoor Unit

3.1 Nominal Capacity and Nominal Input

2

For combination indoor units and outdoor units

Outdoor units				EHYRLQ005	EHYRLQ008	EHYRLQ008
Indoor units	Indoor H/P module			EHYHBH05	EHYHBH08	EHYHBX08
Condition 1	Heating capacity	Minimum	kW	1,80	1,80	1,80
		Nominal	kW	4,40	7,40	7,40
		Maximum	kW	5,12	10,02	10,02
	Cooling capacity	Minimum	kW	---	---	2,50
		Nominal	kW	---	---	6,86
	Heating PI	Nominal	kW	0,87	1,66	1,66
	Cooling PI	Nominal	kW	---	---	2,01
	COP	Nominal	-	5,04	4,45	4,45
	EER	Nominal	-	---	---	3,42
Condition 2	Heating capacity	Minimum	kW	1,80	1,80	1,80
		Nominal	kW	4,03	6,89	6,89
		Maximum	kW	4,90	9,53	9,53
	Cooling capacity	Minimum	kW	---	---	2,50
		Nominal	kW	---	---	5,36
	Heating PI	Nominal	kW	1,13	2,01	2,01
	Cooling PI	Nominal	kW	---	---	2,34
	COP	Nominal	-	3,58	3,42	3,42
	EER	Nominal	-	---	---	2,29

Notes

- Condition 1
  - Cooling Ta 35°C - LWE 18°C (DT= 5°C)
  - Heating Ta DB/WB 7°C/6°C - LWC 35°C (DT= 5°C)
- Condition 2
  - Cooling Ta 35°C - LWE 7°C (DT= 5°C)
  - Heating Ta DB/WB 7°C/6°C - LWC 45°C (DT= 5°C)

3.2 Technical Specifications

Casing	Colour			Ivory white		
	Material			<Polyester painted galvanised steel>		
Dimensions	Packing	Height	mm	797		
		Width	mm	990		
		Depth	mm	390		
	Unit	Height	mm	735		
		Width	mm	832		
		Depth	mm	307		
Weight	Machine weight: ERLQ004* / ERLQ006* & ERLQ008*		kg	54 / 56		
	Gross weight: ERLQ004* / ERLQ006* & ERLQ008*		kg	57 / 59		
Packing	Material			EPS, CARTON		
	Weight		kg	3		
Heat exchanger	Specifications	Length	mm	845		
		N° of rows		2		
		Fin pitch	mm	1,8		
		N° of stages		32		
	Tube type			<Hi-Xa(8)>		
	Fin	Type		<WF fin>		
		Treatment		<Anti-corrosion treatment (PE)>		
Fan	Type			<Propeller>		
	Quantity			1		
	Air flow rate (nominal at 230V)	Heating	m³/min	45	47	47
		Cooling	m³/min	52,5	52,5	52,5
	Discharge direction			<Horizontal>		
	Motor	Quantity		1		
		Output	W	53		
Compressor	Quantity			1		
	Motor	Model		2YC36BXD#C	2YC45DXD#C	2YC45DXD#C
		Type		<Hermetically sealed swing compressor>		

2

Operation range(1)	Heating (heat pump)	Min	°CDB	-25
		Max	°CDB	25
	Cooling	Min	°CWB	10
		Max	°CWB	43
Sound level (nominal)	Heating (heat pump)	Sound power (4/6/8)	dBA	61 / 61 / 62
		Sound pressure (4/6/8)(2)	dBA	48 / 48 / 49
	Cooling	Sound power	dBA	63 / 63 / 63
		Sound pressure (4/6/8)(2)	dBA	48 / 49 / 50
Refrigerant	Type			<R-410A>
	Charge EHYRLQ005 / EHYRLQ008		kg	1.45 / 1.60
	Control			<Expansion valve (electronic type)>
	N° of circuits			1
Refrigerant oil	Type			<FVC50K>
	Charged volume		l	0,75
Piping connections	Liquid	Type		<Flare connection>
		Diameter (OD)	mm	<6,35>
	Gas	Type		<Flare connection>
		Diameter (OD)	mm	<15,9>
	Drain	Quantity		2
		Type		Hole
		Diameter (OD)	mm	1xØ15 + 1xØ20
	Piping length	Minimum	m	3
		Maximum	m	30
	Additional refrigerant charge		kg/m	0,02 IF > 10 m
	Height difference between outdoor unit and indoor unit	Maximum	m	20
Defrost method				<Reverse cycle>
Defrost control				<Sensor for outdoor heat exchanger temperature>
Capacity control method				<Inverter controlled>
Standard accessories	Item			<Installation manual>
	Quantity			1

Notes

(1) See operation range drawing. (*) Range increase by support backup heater. (**) Range increase by support booster heater or backup heater.

(2) The sound pressure level is measured via a microphone at a certain distance from the unit. It is a relative value depending on the distance and acoustic environment. Refer to sound spectrum drawing for more information.

2

Part 3
Commissioning

See ‘Note’ on page 6.

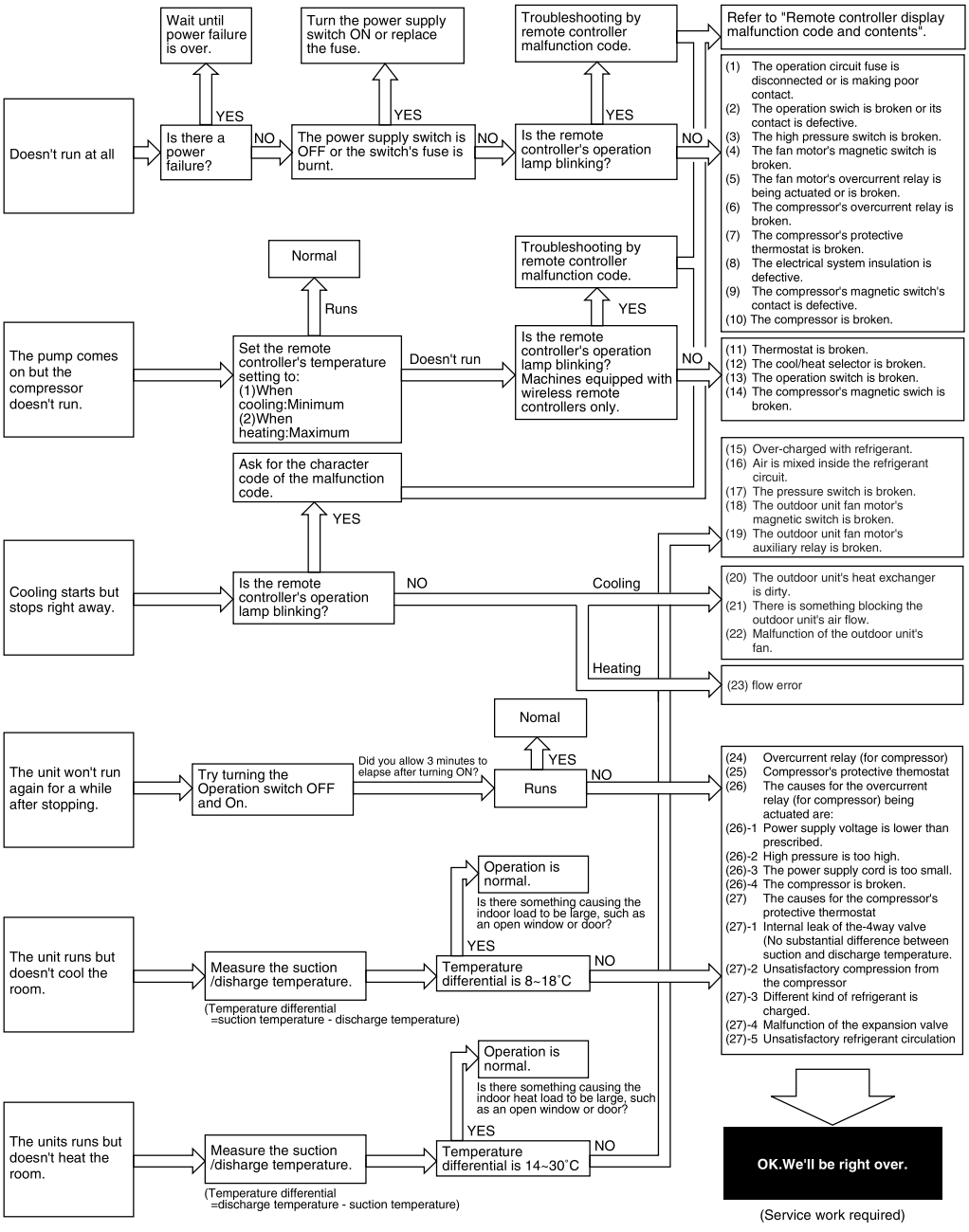
3

Part 4
Troubleshooting

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

1 Troubleshooting

1.1 General Troubleshooting Flowchart



1.2 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
1.2.1	Equipment does not Operate	See page 56
1.2.2	Indoor Pump Operates, but Compressor does not	See page 57
1.2.3	Cooling/Heating Operation Starts but Stops Immediately	See page 59
1.2.4	After Unit Shuts Down, It cannot be Restarted for a While	See page 61
1.2.5	Equipment Produces Loud Noise or Shakes	See page 63
1.2.6	User Interface Displays “Busy”	See page 65
1.2.7	The Unit is Turned on (d LED is lit) but the Unit is not Heating or Cooling as Expected	See page 66
1.2.8	The Unit is Turned on but the Compressor is not Starting (Space Heating or Domestic Heating)	See page 67
1.2.9	Pump is Making Noise (Cavitation)	See page 68
1.2.10	The Water Pressure Relief Valve Opens	See page 69
1.2.11	The Water Pressure Relief Valve Leaks	See page 70
1.2.12	The User Interface Does Not Display Certain Screens (RT, LWT, Tank, Ext RT)	See page 71
1.2.13	Domestic Hot Water Capacity Shortage at Low Outdoor Temperatures	See page 72
1.2.14	Space Heating Capacity Shortage at Low Outdoor Temperatures	See page 73
1.2.15	Room Temperature Set Point Isn’t Reached or Increases Too Slow	See page 74

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.

1.2.1 Equipment does not Operate

Applicable model

ERHQ011~016*
ERLQ004~016*

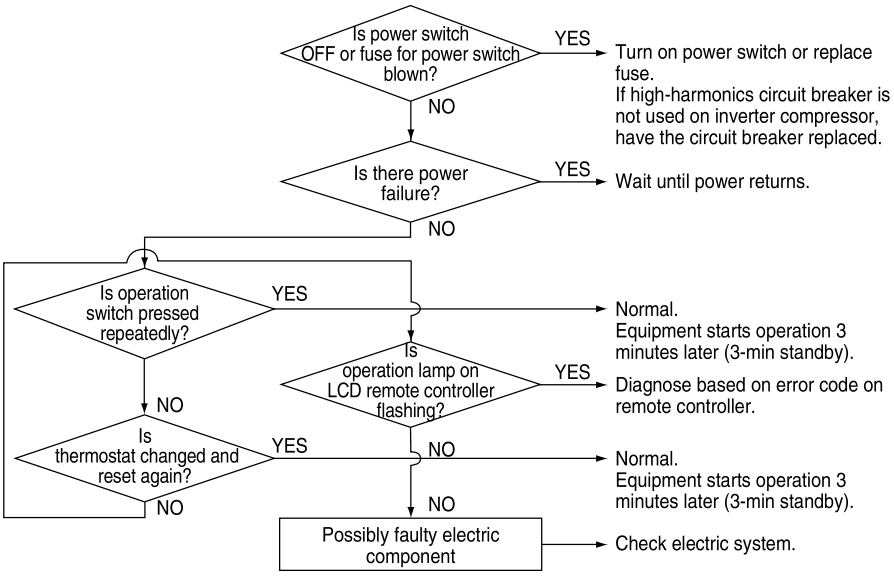
Error detection method

Error generating condition

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.

1.2.2 Indoor Pump Operates, but Compressor does not

Applicable model

ERHQ011~016*
ERLQ004~016*

Error detection method

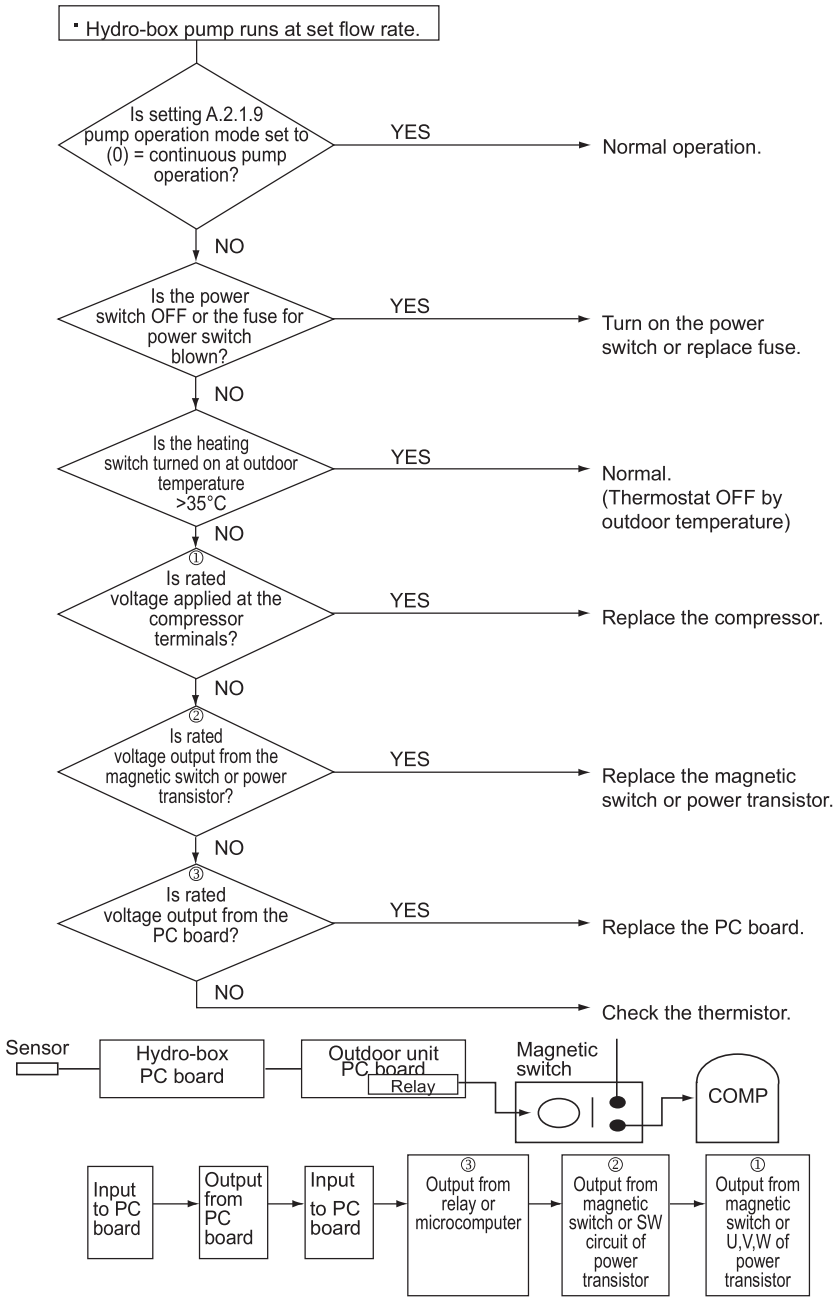
Error generating condition

Supposed causes

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

4

Troubleshooting



Caution

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

1.2.3 Cooling/Heating Operation Starts but Stops Immediately

Applicable model

ERHQ011~016*
ERLQ004~016*

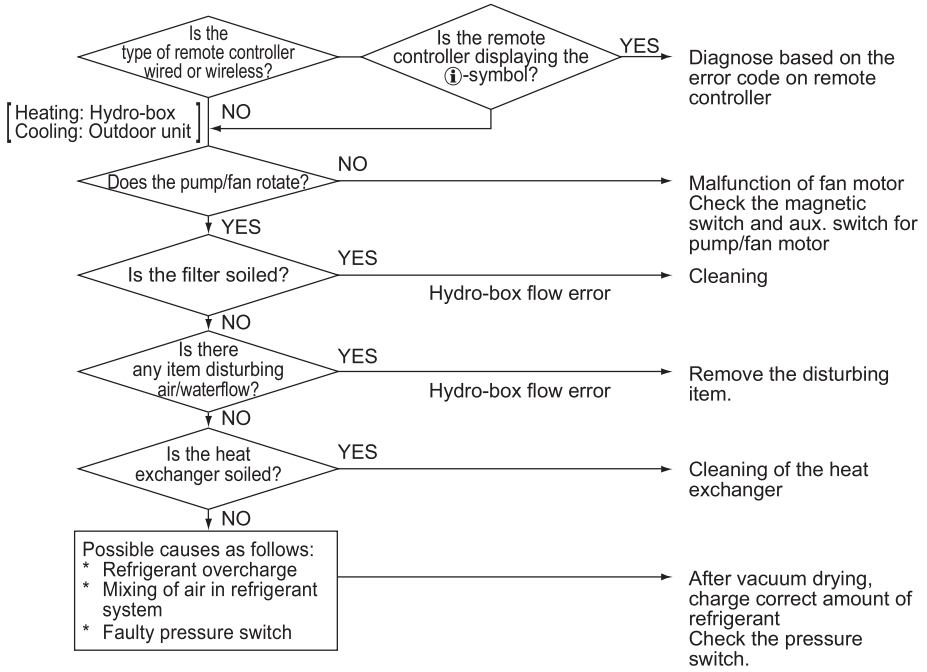
Error detection method

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.

4

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

Applicable model

ERHQ011~016*
ERLQ004~016*

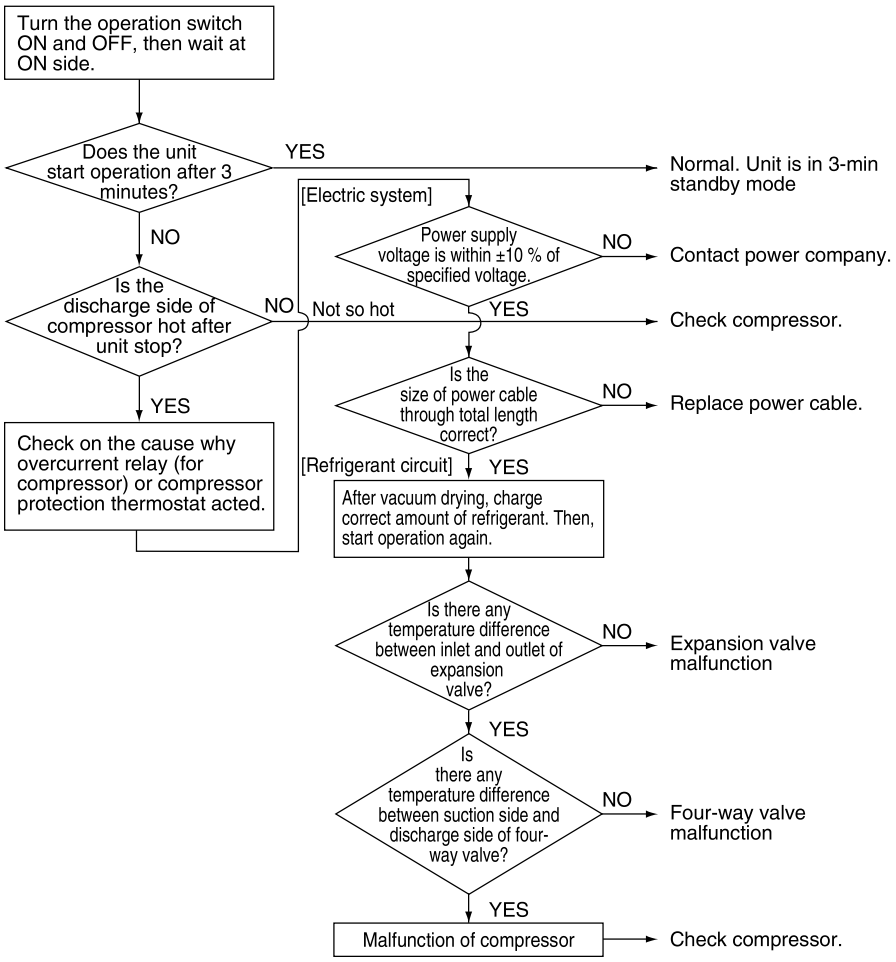
Error detection method

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.

1.2.5 Equipment Produces Loud Noise or Shakes

Applicable model

ERHQ011~016*
ERLQ004~016*

Error detection method

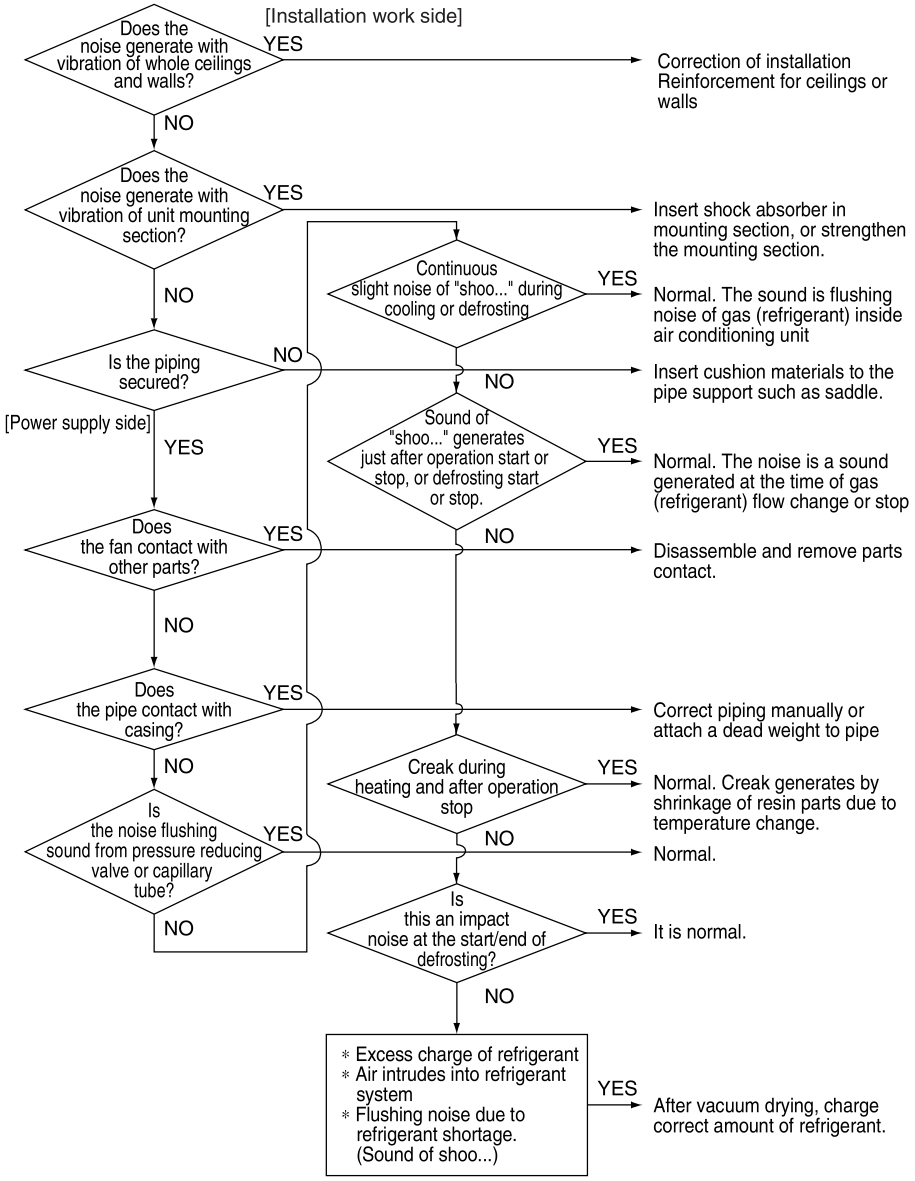
Error generating condition

Supposed causes

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

4

Troubleshooting



Caution

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

1.2.6 User Interface Displays "Busy"

Applicable model

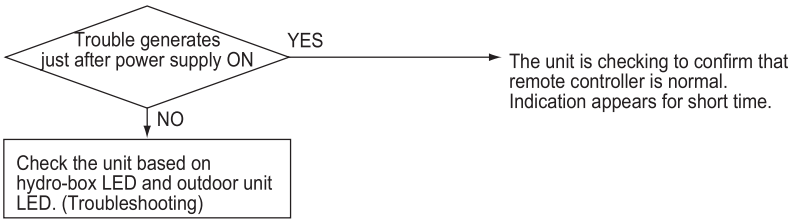
EHB/V*CA

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.

4

1.2.7 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

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).

4

1.2.8 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.

4

1.2.9 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).

4

1.2.10 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).

4

1.2.11 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.

4

1.2.12 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 home page if LWT screen is enabled).

4

1.2.13 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).

1.2.14 Space Heating Capacity Shortage at Low Outdoor Temperatures

Applicable models

EHB*CA, EHV*CA

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 Altherma Hybrid available heating capacity are in balance*. Other related settings to optimize: ■ [5-02] = “1” ■ [5-03] = “[5-01](2) + 3~5°C”

4

1.2.15 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).

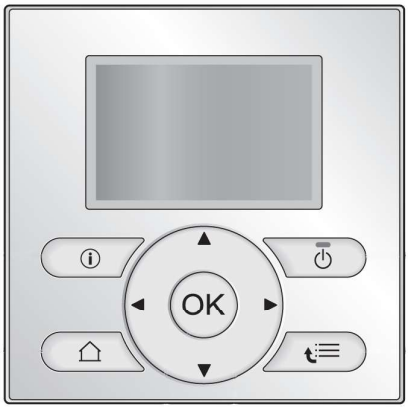
(1) The desired leaving water temperature is the result of several settings (preset values, shift values, weather dependent curves, modulation). As a result, too high or too low leaving water temperature could occur which lead to overtemperatures or capacity shortage. By limiting the leaving water temperature 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.

1.3 Fault-diagnosis by Remote Controller

Explanation

If operation stops due to malfunction (error or warning), the user interface home screen 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.

1.4 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.

1.4.1 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.

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.

1.5 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 assembly (Note 5)
●	Malfunction of power supply or failure of PC board assembly or broken transmission wire between indoor and outdoor unit. (Note 5)

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.

4

1.6 Overview of Error Codes

Abbreviations

DHW= domestic hot water

SPH= space heating

BUH= back-up heater

BSH= booster heater

PHE= plate heat exchanger

1.6.1 Hydro-box Malfunction

Overview

4

Remote Controller Display	Contents of Malfunction	Details of Malfunction (Reference Page)
80	Return water temperature thermistor abnormality	96
81	Leaving water temperature thermistor abnormality	96
89	PHE freeze-up protection control	95
7H	Water flow abnormality	97
AH	Tank disinfection function not completed correctly	102
A1	Zero cross detection problem. Power reset required	94
CJ	Room temperature sensor problem	96
C0	Flow sensor abnormality	100
C4	Heat exchanger thermistor abnormality	96
EC	Abnormal increase tank temperature	101
H1	External temperature sensor problem	96
HC	Tank temperature thermistor problem	96

1.6.2 Outdoor Unit Malfunction

Overview

Remote Controller Display	Contents of Malfunction	Details of Malfunction (Reference Page)
E1	Outdoor unit PC board malfunction	103
E3	Abnormality of high pressure (HPS)	104
E4	Abnormality of low pressure (outdoor)	106
E5	Compressor motor lock malfunction	109
E7	Malfunction of outdoor unit fan motor	111
E9	Malfunction of Electronic expansion valve	114
F3	Discharge pipe temperature malfunction	117
H3	Faulty high pressure switch (HPS)	119
H9	Malfunction of outdoor air temperature sensor system	121
J1	Malfunction of pressure sensor	122
J3	Malfunction of discharge pipe temperature sensor system	121
J5	Suction pipe thermistor malfunction	121
J6	Malfunction of heat exchanger temperature sensor system	121
J7	Malfunction of subcooling heat exchanger temperature sensor system (outdoor unit)	121
J8	Malfunction of liquid pipe thermistor (outdoor unit)	121
L1	Outdoor PC board malfunction	124
L4	High temperature of radiation fin	126
L5	Overcurrent of DC output (instantaneous)	128
L8	Electronic thermal switch (time lag)	130
L9	Stall prevention (time lag)	132
LC	Malfunction of transmission system (between control PCB and inverter PCB)	134
P1	Open phase or voltage unbalance	136
P4	Malfunction of radiator fin temperature thermistor	137
PJ	Error in capacity setting	138

1.6.3 System Malfunction

Overview

Remote Controller Display	Contents of Malfunction	Details of Malfunction (Reference Page)
U0	Gas shortage	139
U2	Abnormal power supply voltage	141
U3	Underfloor heating screed dry-out error	143
U4 or UF	Transmission error (between hydro-box and outdoor unit) (1)	144
UF	Malfunction of transmission (between hydro-box and outdoor unit) or gas shortage	146
U5	Transmission error (between hydro-box and user interface)	148
UA	Incorrect hydro-box connected to this system or unit type connection not confirmed	149

4

Note

(1) Possibility of open phase power supply.

1.7 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

4

1.8 Overview of the Hydro-box Safety Devices

Hydro-box

	Protector	Cut-out condition	Reference
EVLQXXCAV3	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: Gas Condensing Boiler

2.1 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.

4

2.2 Solving Problems Based on Symptoms

Not available at this moment.

2.3 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.

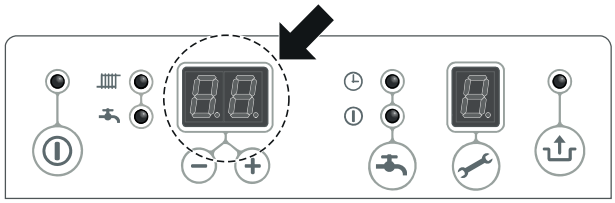
This chapter gives you an overview of all error codes and the content of the error code as it appears on the user interface.

For a more detailed troubleshooting guideline for each error, please see the service manual.

2.3.1 Error codes: Overview

Error codes of the gas boiler

The controller on the gas boiler detects faults and indicates them on the display by error codes.



If the LED is flashing, the controller has detected a problem. Once the problem is rectified, the controller can be restarted by pressing the ⏻ button.

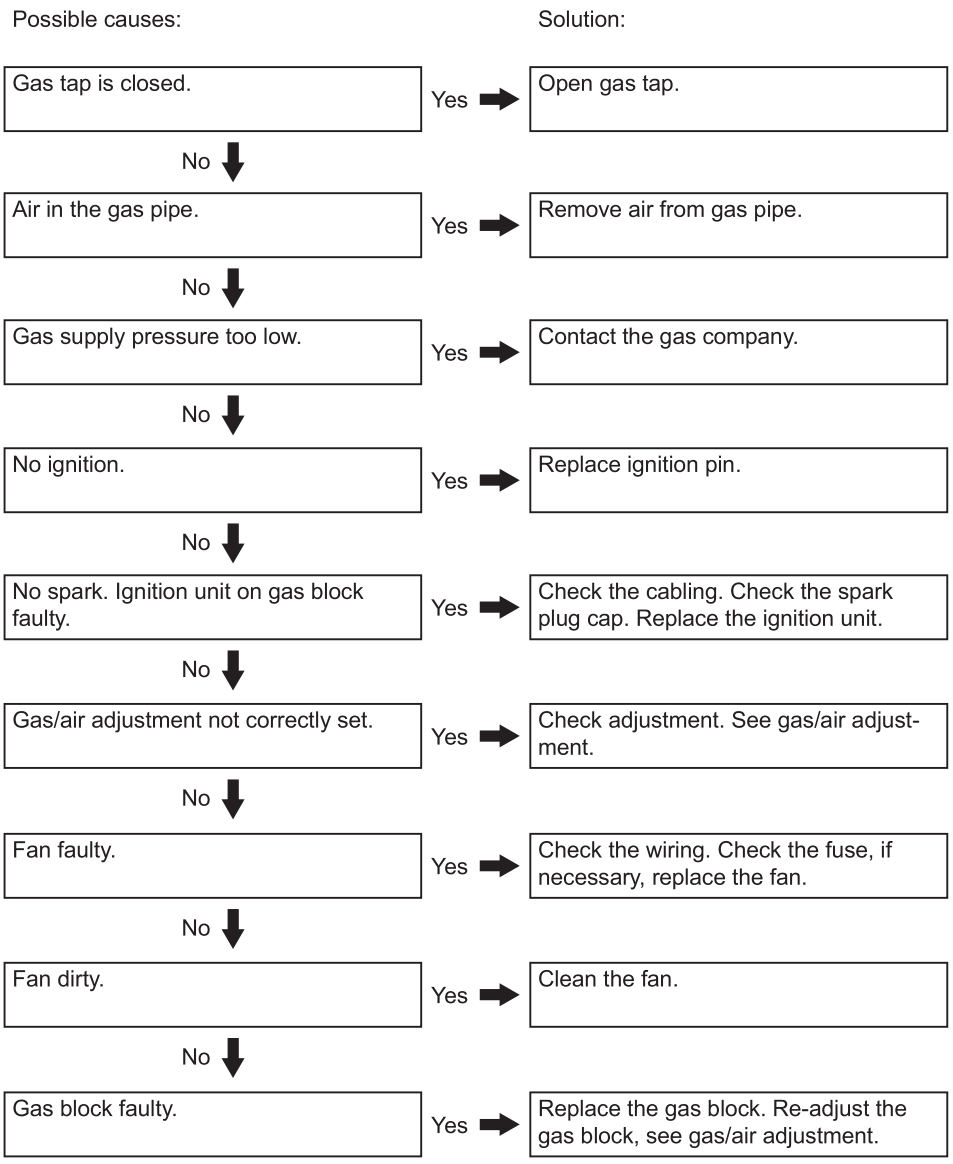
Following table shows a list of error codes and the possible solutions.

Error code	Cause	Possible solution
10, 11, 12, 13, 14	Sensor fault S1.	■ Check wiring. ■ Replace S1.
	Flow sensor cannot close.	Check flow switch.
20, 21, 22, 23, 24	Sensor fault S2.	■ Check wiring. ■ Replace S2.
0	Sensor fault after self-check.	Replace S1 and/or S2.
1	Temperature too high.	■ Air in installation. ■ Pump is NOT running. ■ Insufficient flow in installation. ■ Radiators are closed. ■ Pump setting is too low. ■ Flow switch is sticking.
2	S1 and S2 interchanged.	■ Check cable set. ■ Replace S1 and S2.
4	No flame signal.	■ Gas tap is closed. ■ No or incorrect ignition gap. ■ Gas supply pressure is too low or fails. ■ Gas valve or ignition unit is NOT powered.

Error code	Cause	Possible solution
5	Poor flame signal.	■ Condensate drain blocked. ■ Check adjustment of gas valve.
6	Flame detection fault.	■ Replace ignition cable and spark plug cap. ■ Replace ignition unit. ■ Replace boiler controller.
8	Incorrect fan speed.	■ Fan catching on casing. ■ Wiring between fan and casing. ■ Check wiring for poor wire contact. ■ Replace fan.
29, 30	Gas valve relay fault.	Replace boiler controller.

2.4 Symptoms

2.4.1 Burner does not ignite



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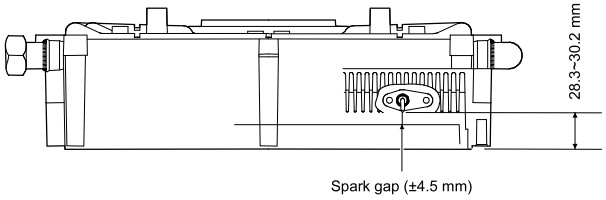
2.4.2 Burner ignites noisily

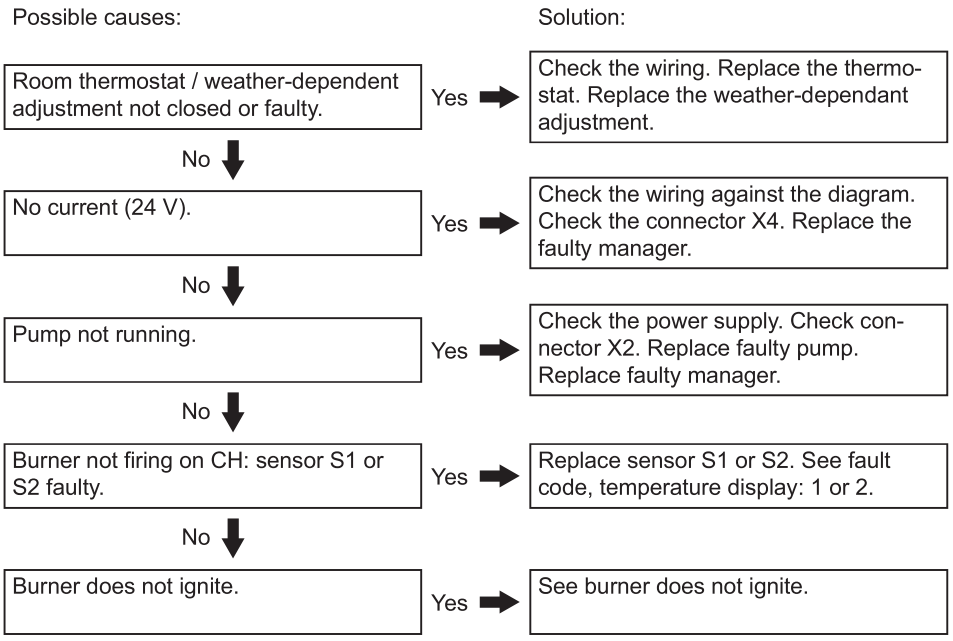
Possible causes:		Solution:
Gas supply pressure too high.	Yes →	The house pressure switch may be faulty. Contact the gas company.
↓ No		
Incorrect ignition gap.	Yes →	Replace the ignition pin. Check the ignition pin gap.
↓ No		
Gas/air adjustment not correctly set.	Yes →	Check the setting. See gas/air adjustment.
↓ No		
Weak spark.	Yes →	Check the ignition gap. Replace the ignition pin. Replace the ignition unit (transformer) on the gas block.



2.4.3 Burner resonating

Possible causes:		Solution:
Gas supply pressure too low.	Yes →	The house pressure switch may be faulty. Contact the gas company.
↓ No		
Recirculation of combustion gasses.	Yes →	Check the gas flue and the air supply.
↓ No		
Gas/air adjustment not correctly set.	Yes →	Check the setting. See gas/air adjustment.

2.4.4 No heating (CH)



2.4.5 Symptom: No space heating

Possible causes	Corrective action
Heat pump error.	Check the user interface.
Communication problem with the heat pump.	Make sure the communication cable is properly installed.
Incorrect heat pump settings.	Check the settings in the heat pump manual.
The service display displays "_", the gas boiler is switched off.	Switch on the gas boiler with ⏻.
No current (24 V).	■ Check the wiring. ■ Check the connector X4. ■ Replace the faulty pump.
The burner does NOT fire on space heating: sensor S1 or S2 faulty.	Replace sensor S1 or S2. See "Error codes of the gas boiler" on page 87.
Burner does NOT ignite.	See "2.4.1-Burner does not ignite" on page 89.

2.4.6 Symptom: The power is reduced

Possible causes	Corrective action
At high rpm, the power has fallen by more than 5%.	■ Check the appliance and flue system for fouling. ■ Clean the appliance and flue system.

2.4.7 Symptom: Space heating does NOT reach the temperature

Possible causes	Corrective action
Weather-dependent setpoint setting is incorrect.	Check the setting on the user interface and adjust if necessary.
Temperature is too low.	Increase the space heating temperature.
No circulation in the installation.	Check whether there is circulation. At least 2 or 3 radiators MUST be open.
The boiler power has NOT been correctly set for the installation.	Adjust the power. See installation and operation manual "HPU hybrid gas boiler module".
No heat transfer as a result of lime scale or fouling in the heat exchanger.	Descale or flush the heat exchanger on the space heating side.

2.4.8 Symptom: No domestic hot water

Possible causes	Corrective action
No current at the flow switch (5 V DC).	Check the wiring according to the diagram.
The burner is NOT firing on domestic hot water: S3 faulty.	Replace S3.
The burner does NOT ignite.	See "2.4.1-Burner does not ignite" on page 89.

2.4.9 Symptom: Hot water does NOT reach the temperature

Possible causes	Corrective action
Domestic hot water flow is too high.	Adjust the inlet assembly.
Temperature setting for water circuit is too low.	Set the hot water circuit on the heat pump user interface, depending on the desired temperature.
No heat transfer as a result of lime scale or fouling in the heat exchanger domestic hot water side.	Descale or flush the exchanger domestic hot water side.
Cold water temperature <10°C.	The water inlet temperature is too low.

3 Error Codes: Hydro-box

3.1 "A1" Malfunctioning Hydro-box PCB

User interface display

A1

Error generation

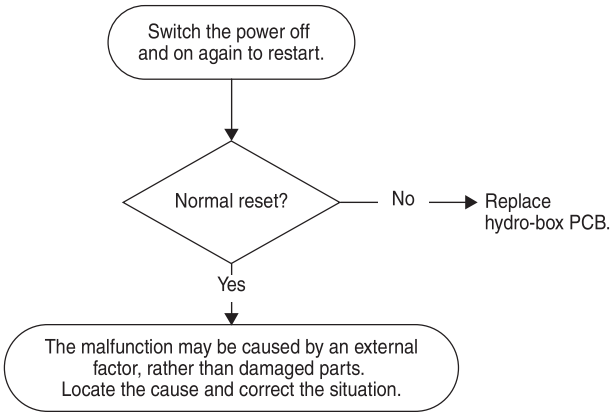
The error is generated when the data from the EEPROM is not received correctly.

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.

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.

3.2 "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 153.

Caution

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

3.3 "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)

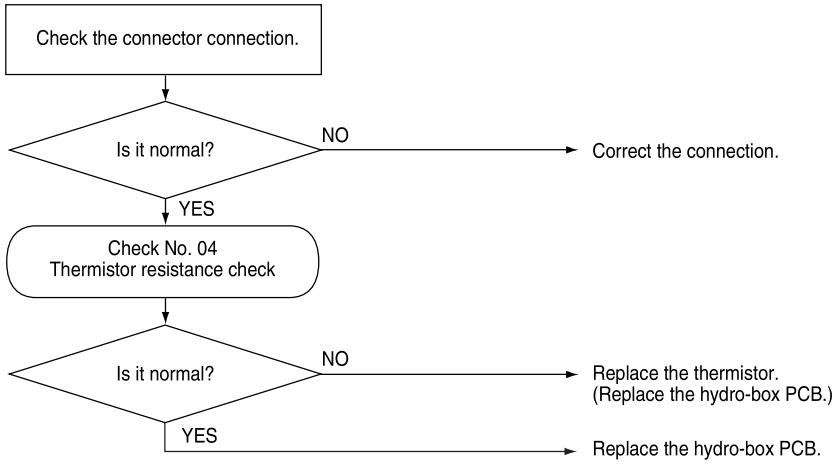
When above about 212°C (less than 120 ohms) or below about –50°C (more than 1,860 kOhms).

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 153.

3.4 "7H" Hydro-box: Flow Error

User interface display

7H

Method of malfunction detection

The malfunction is detected by the flow sensor.

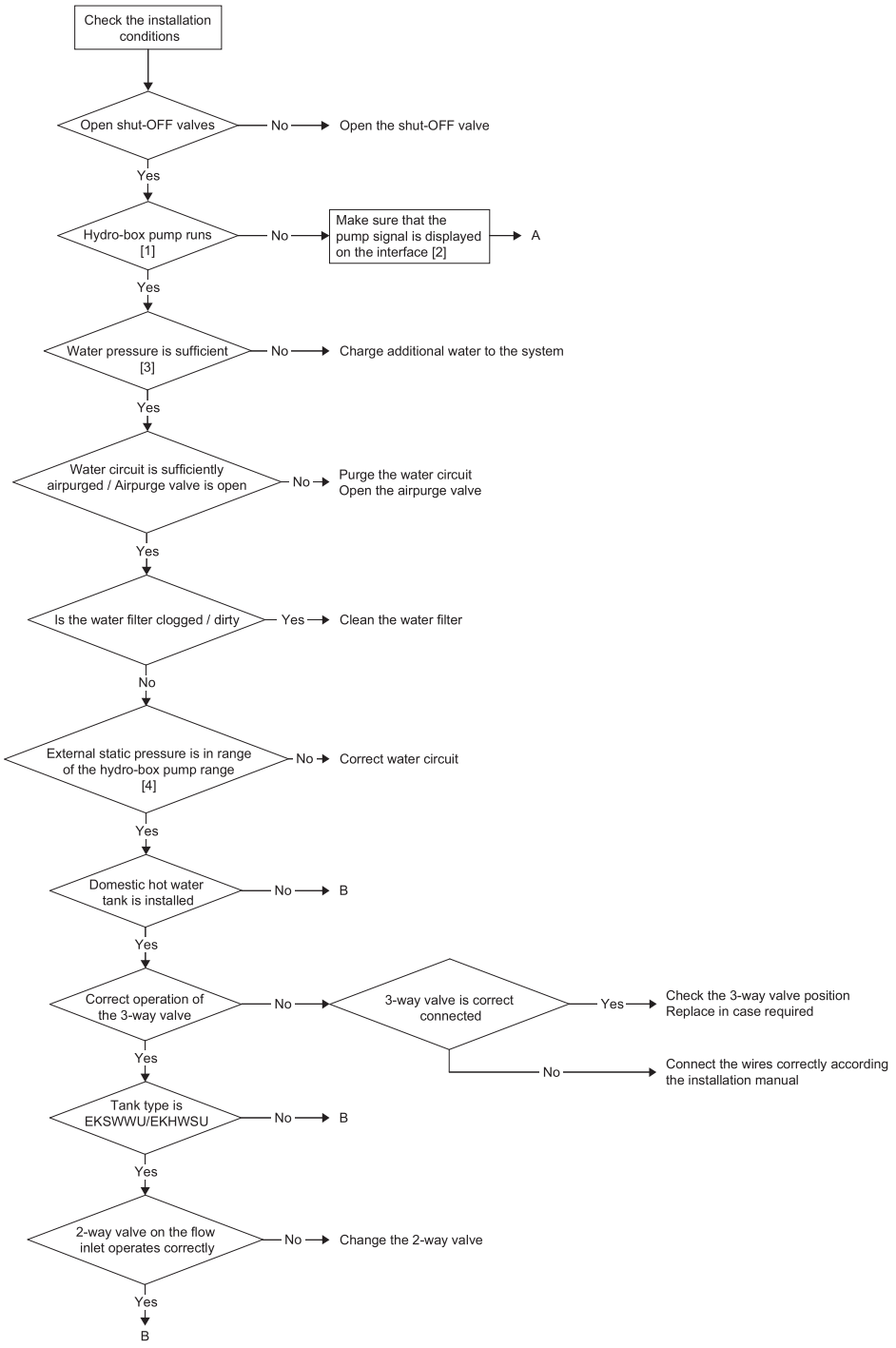
Malfunction decision conditions

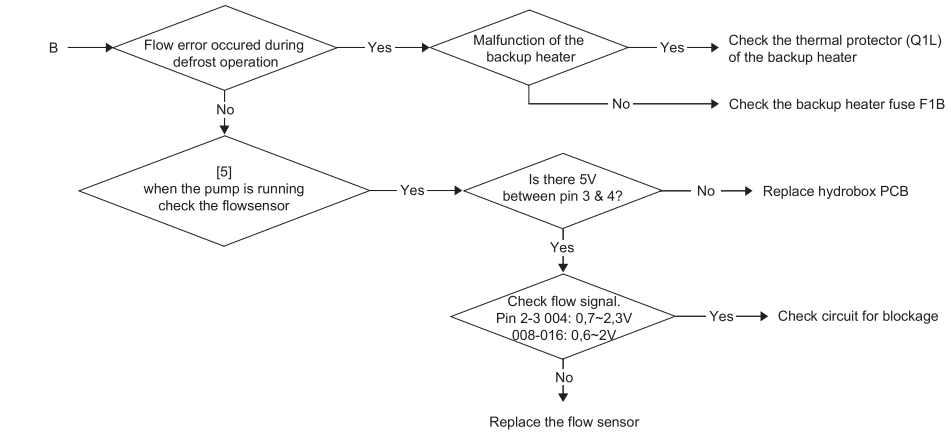
The error is generated in case the water flow is too low or no water flow at all for 15 seconds.

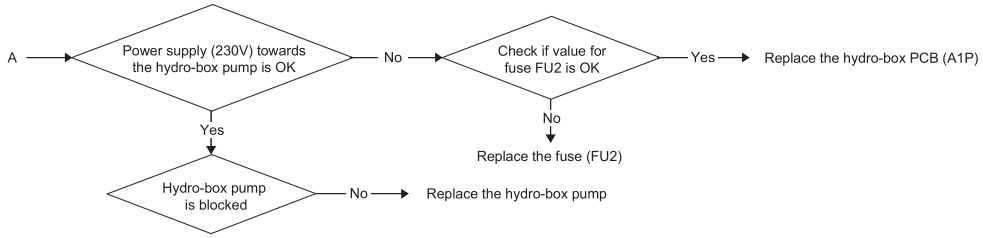
Supposed causes

- 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







4

[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.

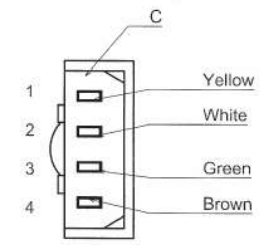
[3]: Check the installation manual for the minimum required water pressure in the system.

[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

3.5 "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.

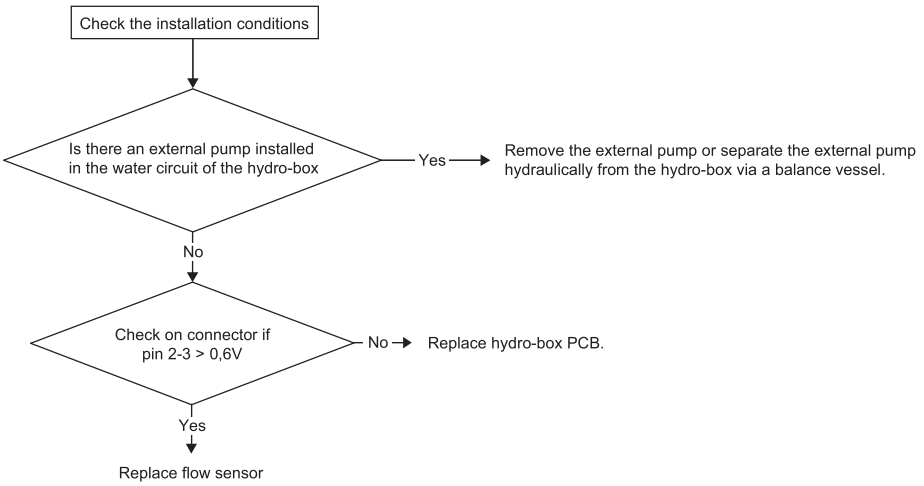
Malfunction decision conditions

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.

3.6 "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).

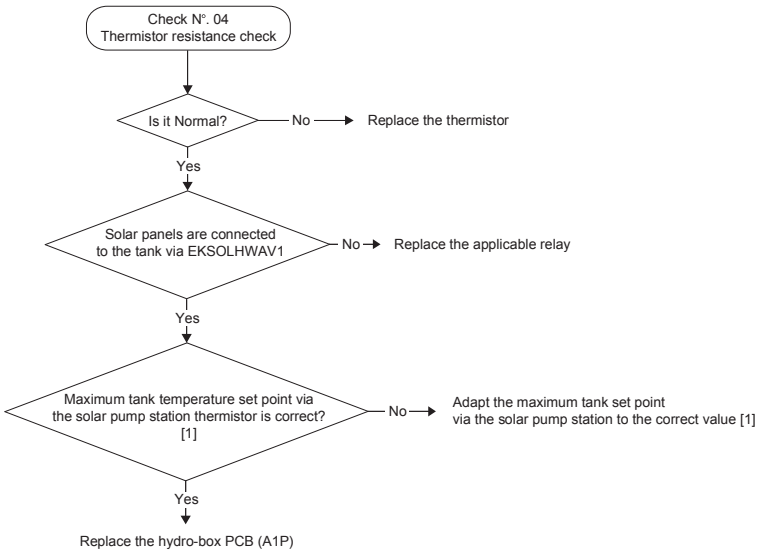
Malfunction decision conditions

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

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.

4

3.7 Warning "RH" Tank Disinfection Function Not Completed Correctly

Remote controller display

RH (warning)

Method of malfunction detection

The malfunction is detected by thermistor and timer-check.

Malfunction decision conditions

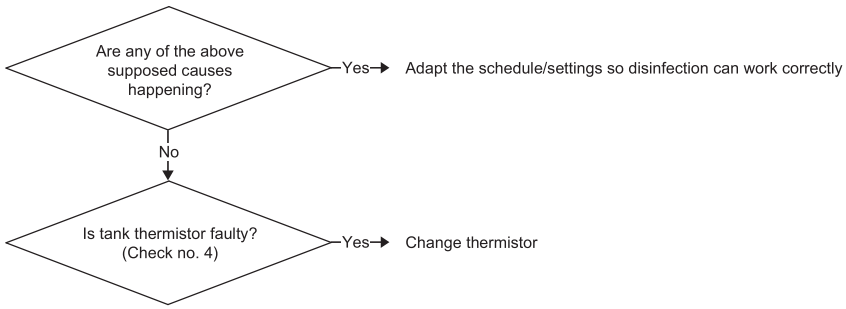
The error is generated when disinfection function is not completed correctly. Either tank temperature for disinfection [A.4.4.4.] is not reached or temperature is not kept for required time [A.4.4.5.].

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

4

Troubleshooting



4 Error Codes: Outdoor Units

4.1 "E1" Outdoor Unit PCB Abnormality

Remote controller display

E1

Method of malfunction detection

Microcomputer checks whether E^2PROM is normal.

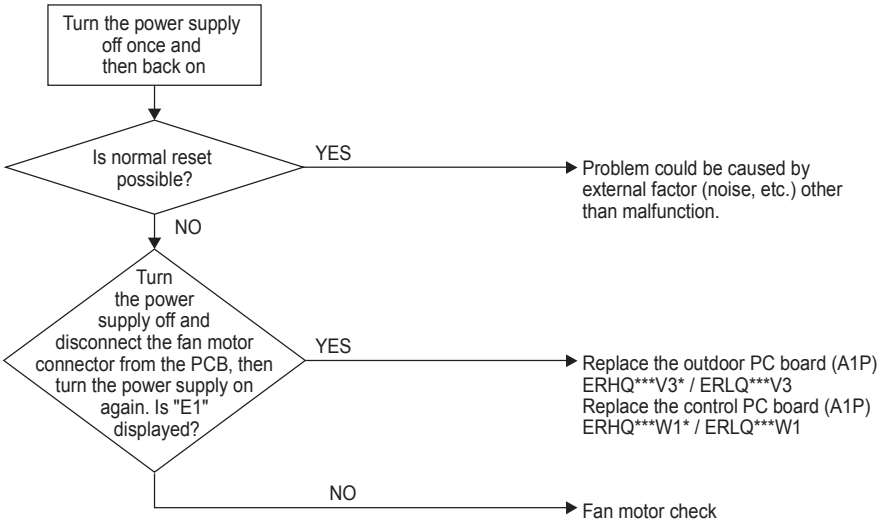
Malfunction decision conditions

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

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.

4.2 "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

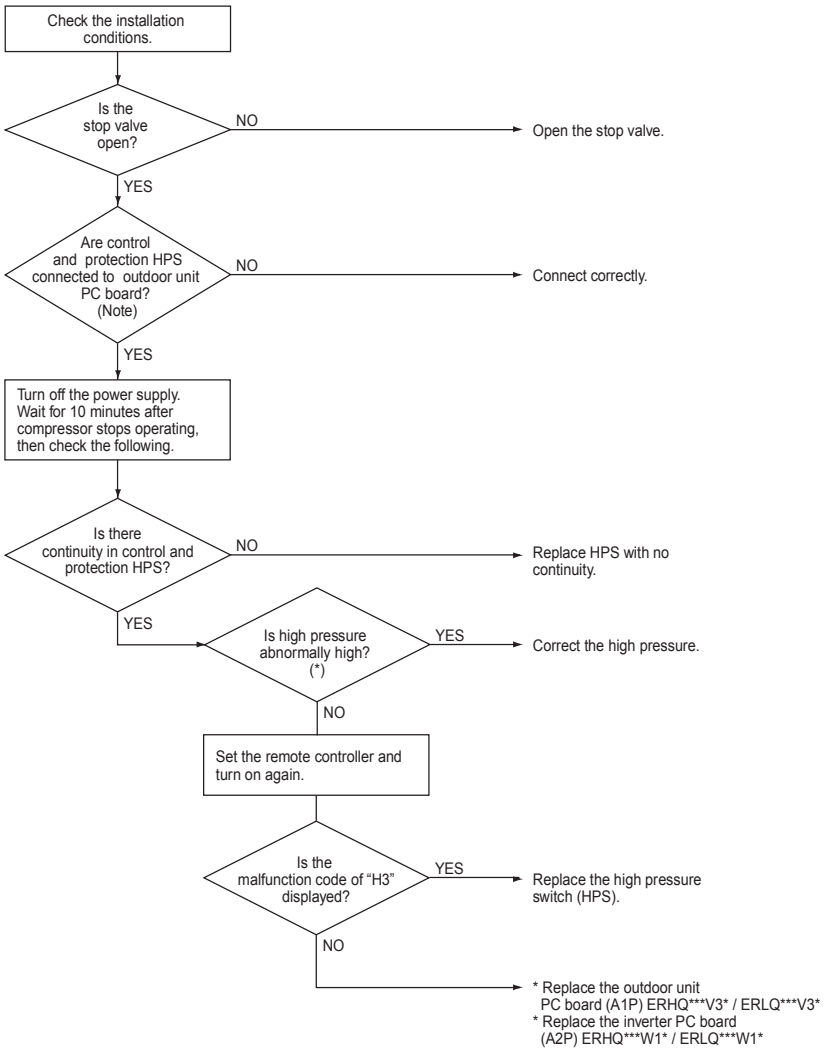
- Faulty high pressure switch
- Disconnection in high pressure switch harness
- Faulty connection of high pressure switch connector
- Clogged hydro-box suction filter (in heating operation)
- Dirty outdoor unit heat exchanger
- Faulty outdoor unit fan
- Refrigerant overcharge
- Stop valve is left in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

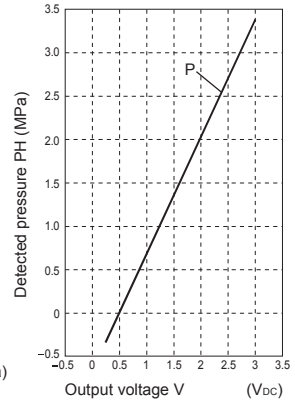
HPS settings

The table below contains the preset HPS values.

	High pressure switch		Fuse
	Open	Close	
	4.0 MPa +0/-0.15	3.0 +/-0.15	6.3A/250V

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 156.

Caution

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

4.3 "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]

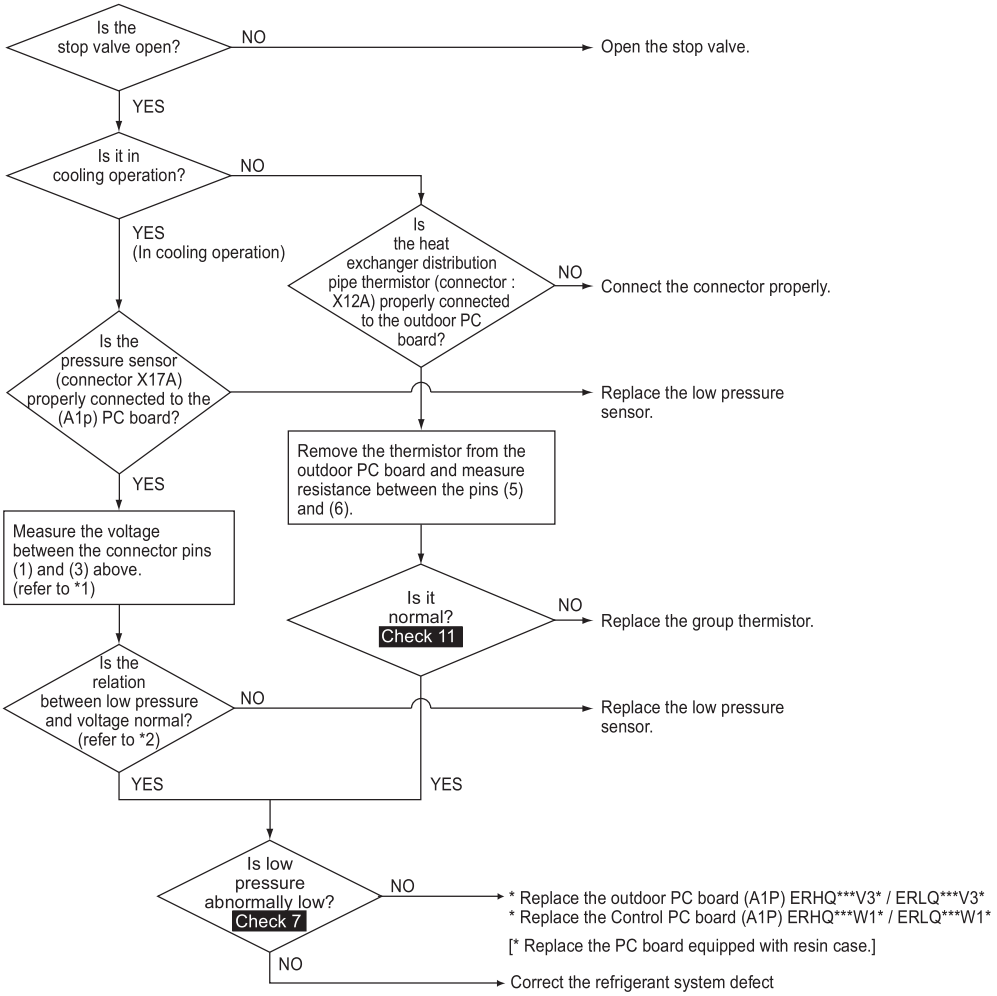
- When the detection pressure is the following value:
  0.12 MPa or less continues for 5 minutes
- When the saturated pressure equivalent to the detection temperature is the following value:
  0.12 MPa or less continues for 5 minutes

4

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)

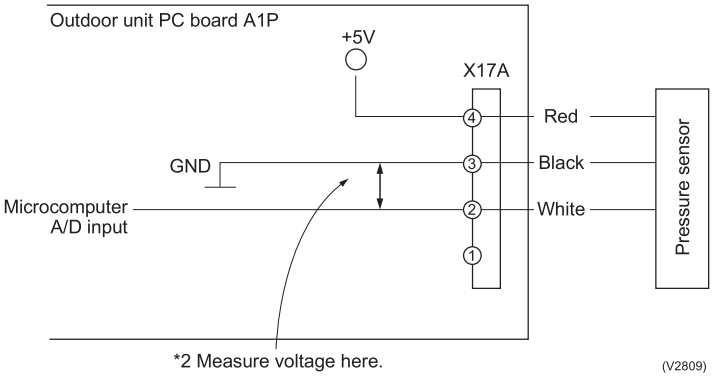
Troubleshooting

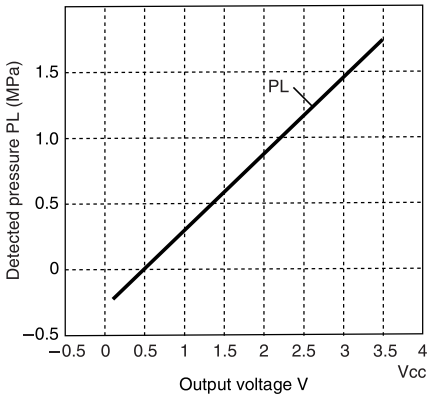


See also

- "Check No.7 - Evaluation of Abnormal Low Pressure" on page 157.
- "Check No.11 - Outdoor Unit: Check for Power Transistor" on page 160.

Graphs





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

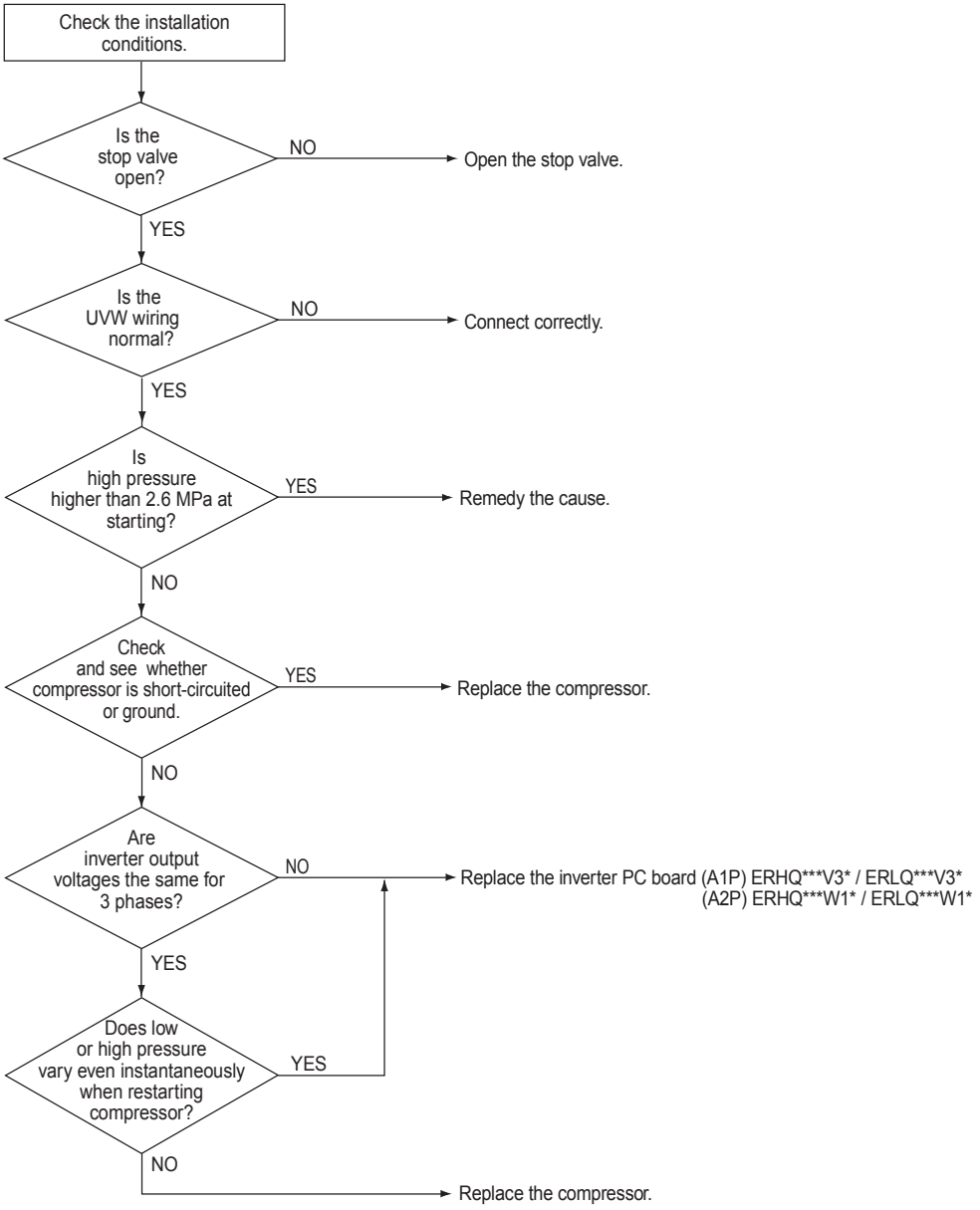
Caution

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

4.4 "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.

4.5 "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.

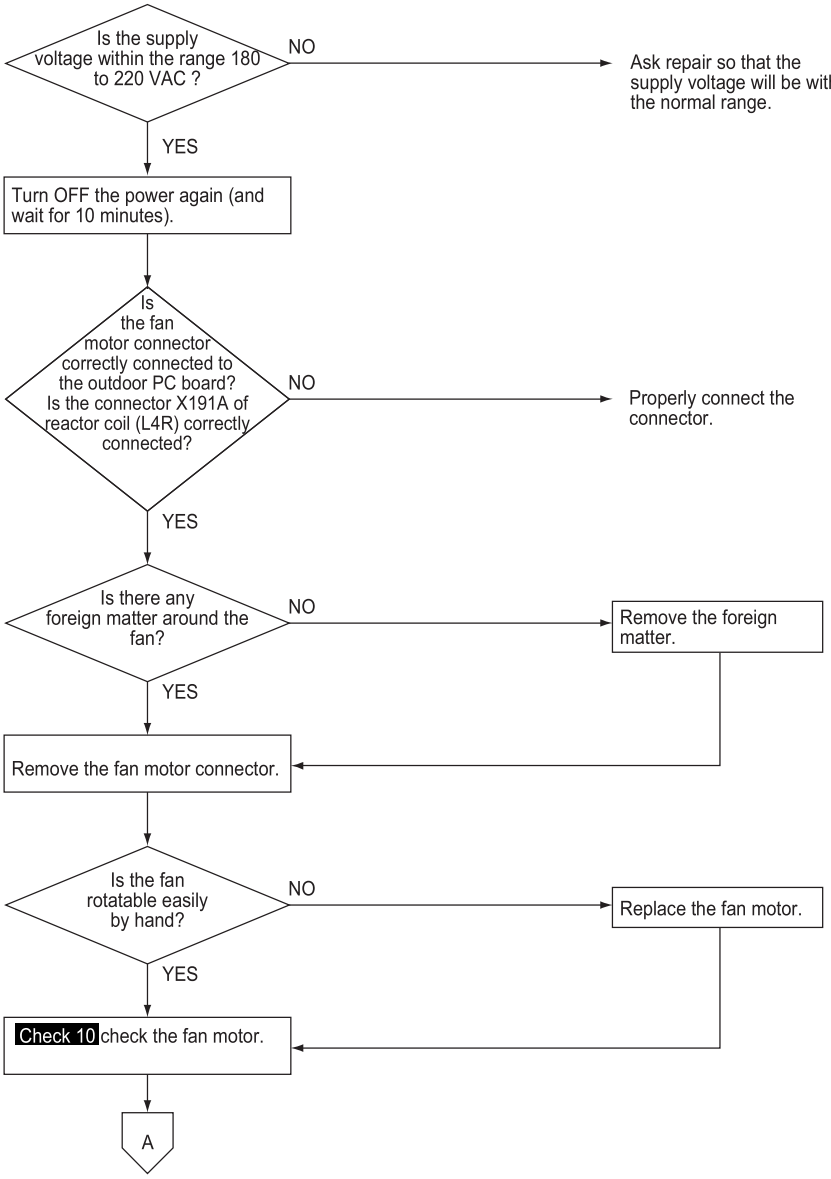
Malfunction decision conditions

- 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.

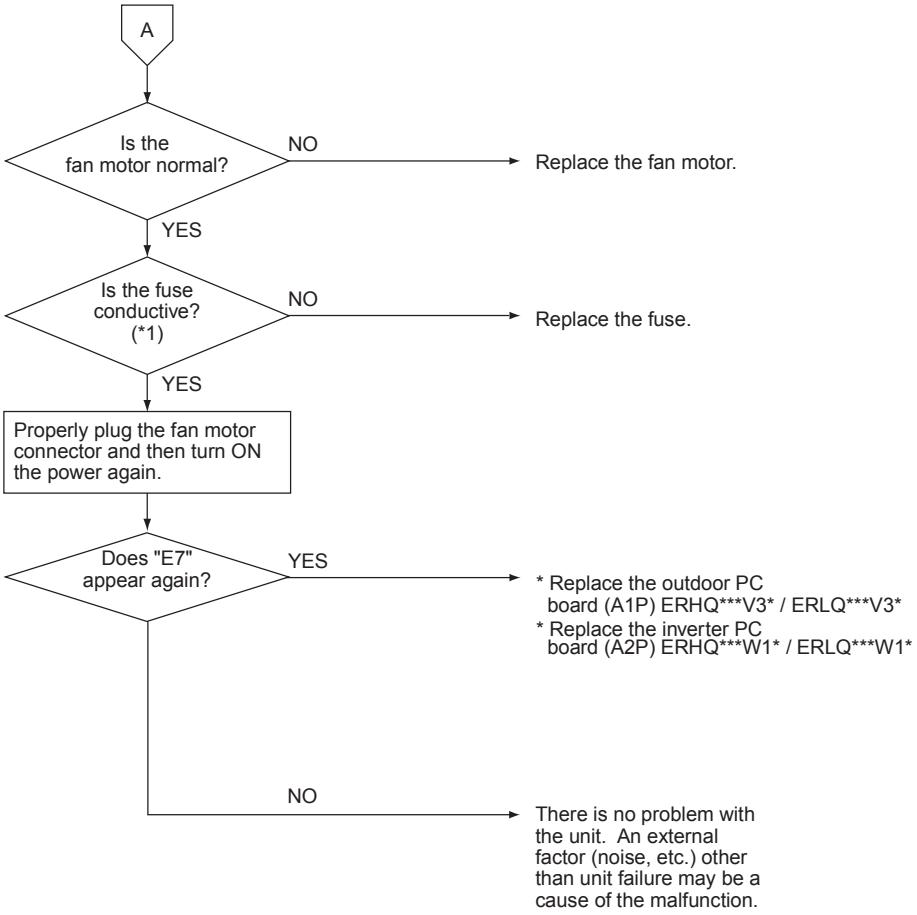
Supposed causes

- Malfunction of fan motor
- The harness connector between fan motor and PC board is left in disconnected, or faulty connector
- 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 159.



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]

4.6 "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

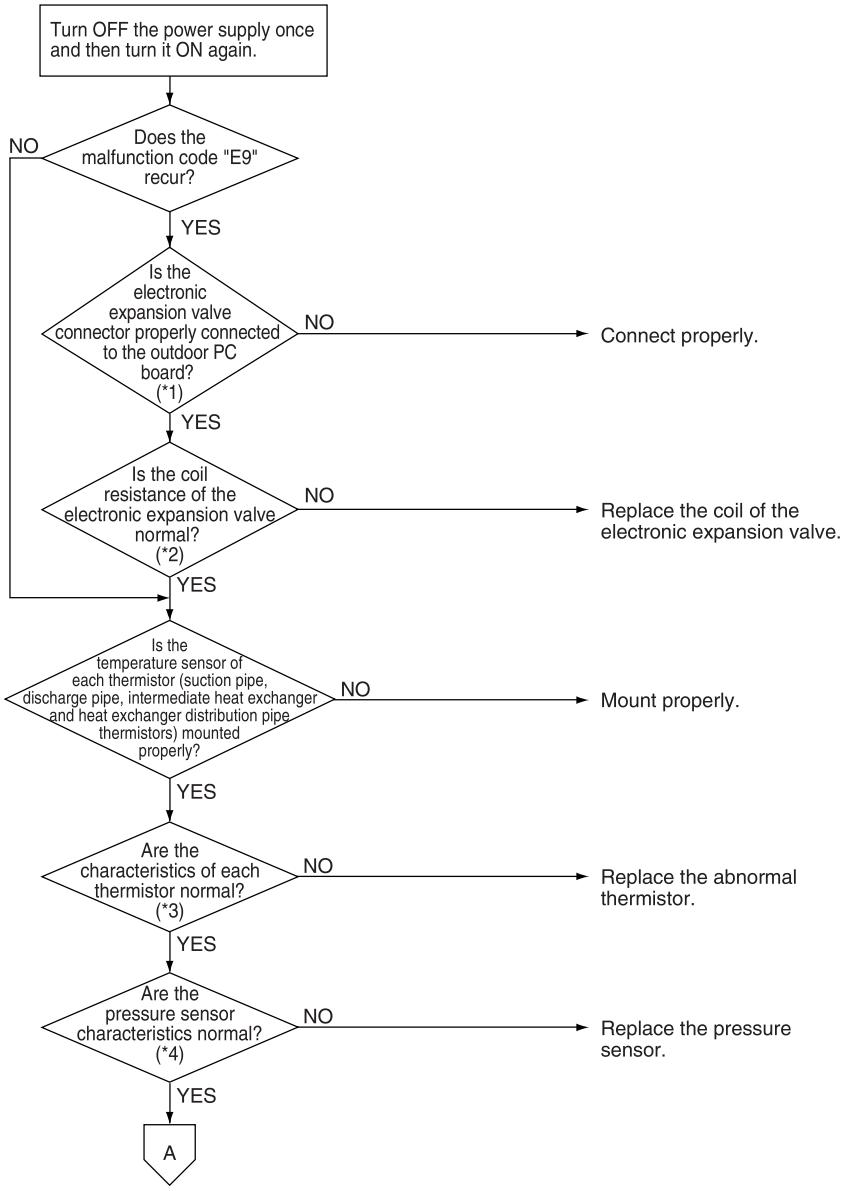
When the following conditions are met for 10 minutes

- 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



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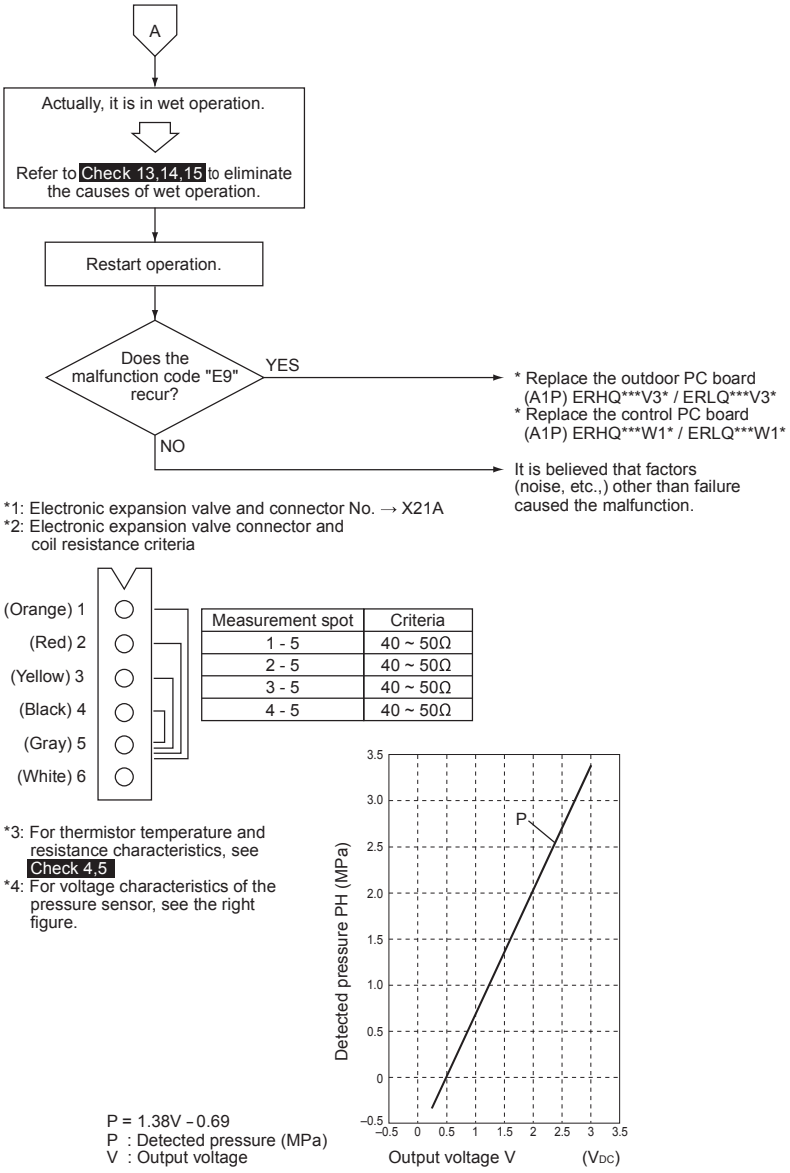


See also

- "Check No.4 - Resistance Conversion Table (Ambient, Coil, Fin)" on page 153.
- "Check No.5 - Resistance Conversion Table (Discharge Pipe Sensor)" on page 155.
- "Check No.13 - Check for Inadequate Refrigerant" on page 161.
- "Check No.14 - Check for Excessive Refrigerant Charging" on page 162.
- "Check No.15 - Check for Factors Causing Wet Operation" on page 163.

Caution

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

4.7 "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.

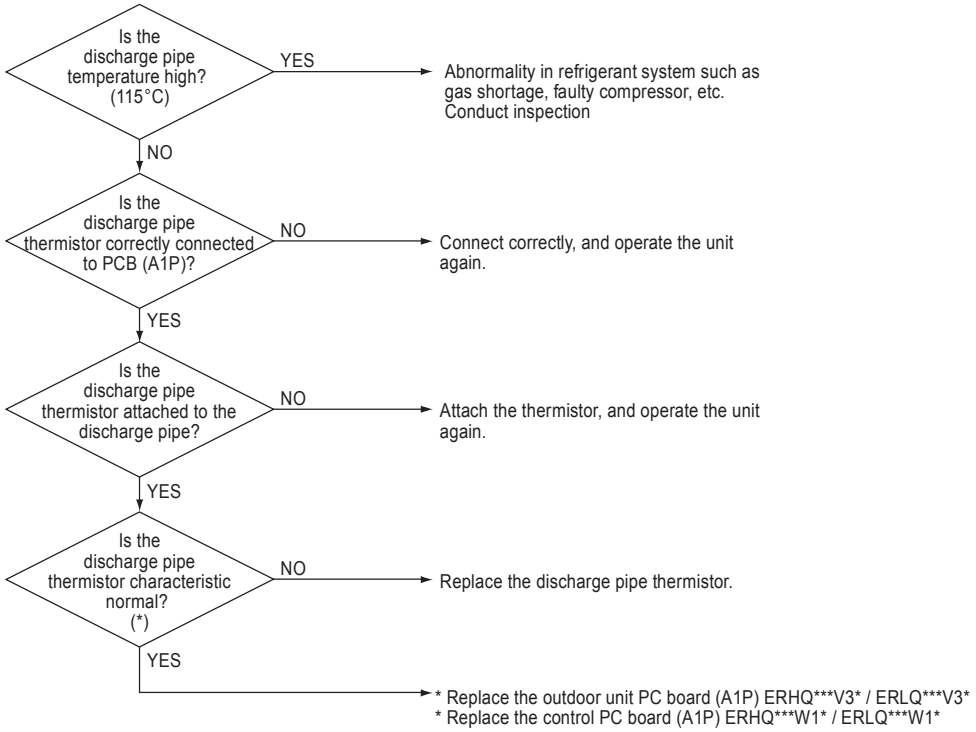
Malfunction decision conditions

- 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 155.

Caution

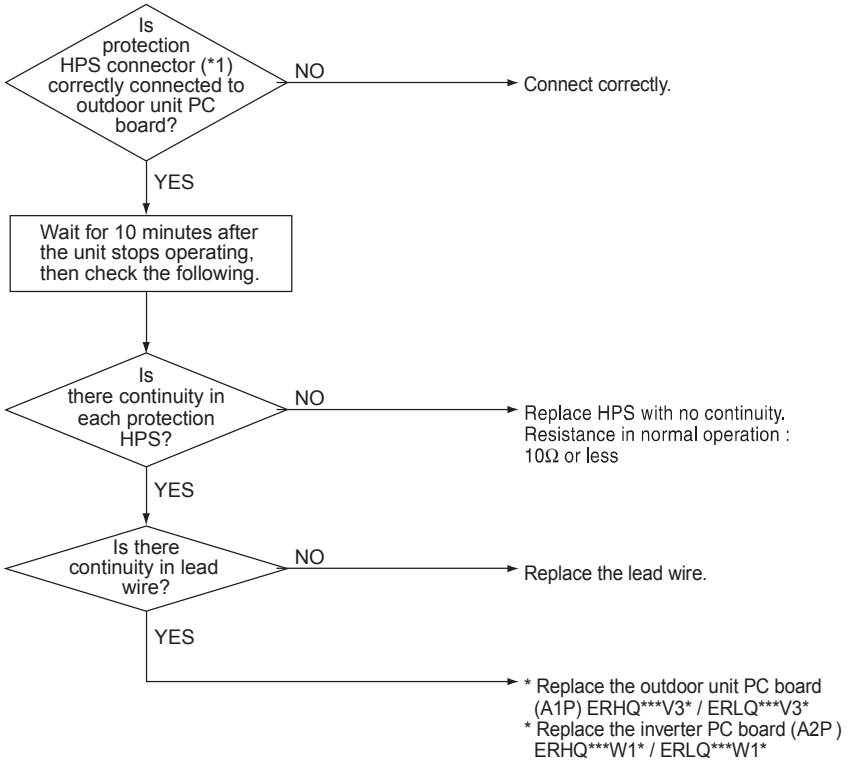
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4

4.8 "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.
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.

4.9 "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.

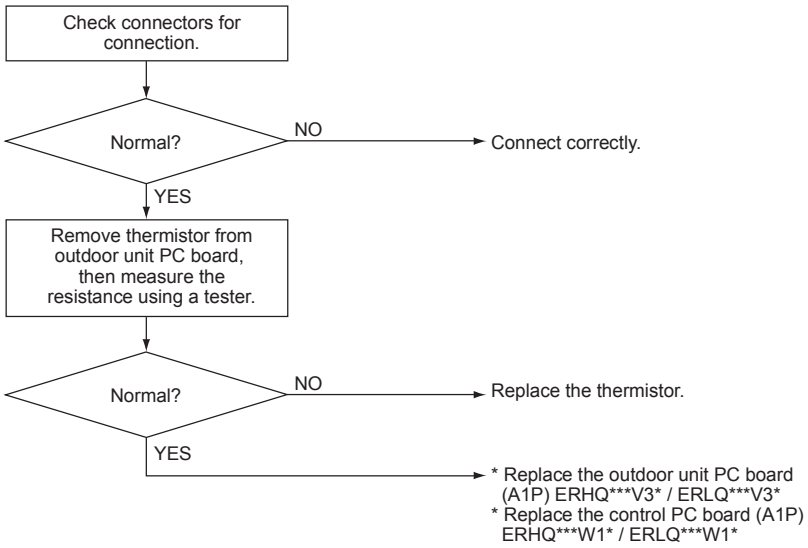
Malfunction decision conditions

When thermistor is disconnected or short-circuited during operation

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 153.

Caution

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

4.10 "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:

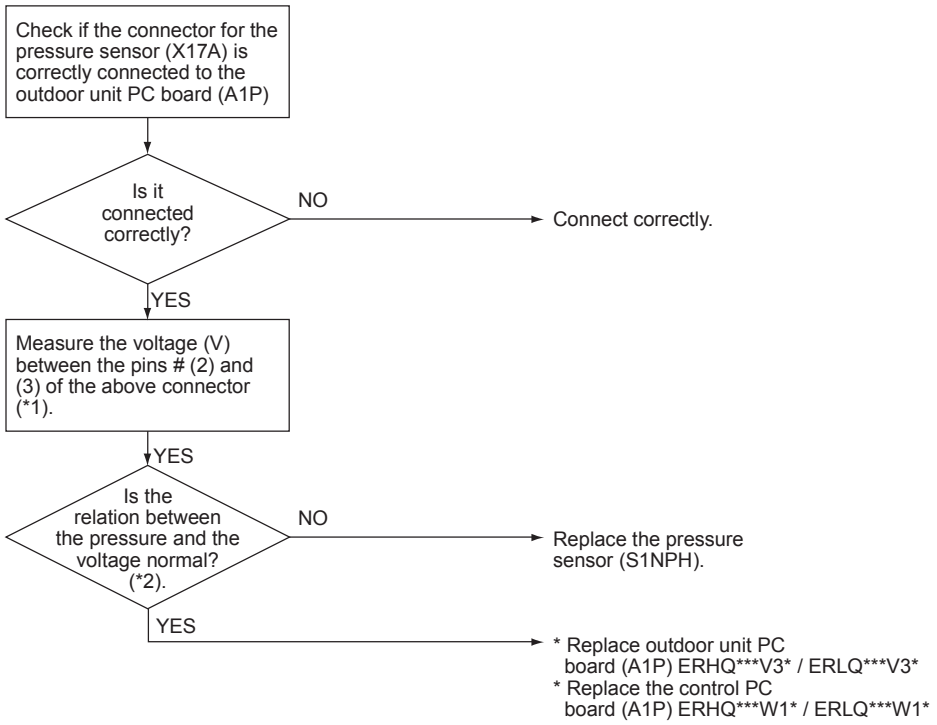
- Detected pressure ≤ -0.05MPa continues 185 s.
- Detected pressure ≥ -0.05MPa continues 185 s.

Supposed causes

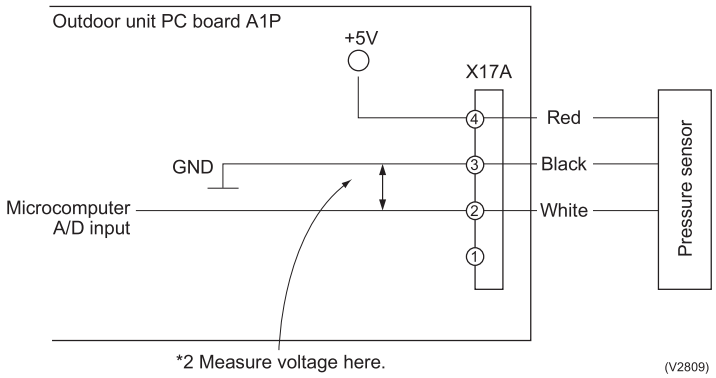
- Faulty pressure sensor
- Faulty outdoor unit PC board
- Incorrect connection of connector

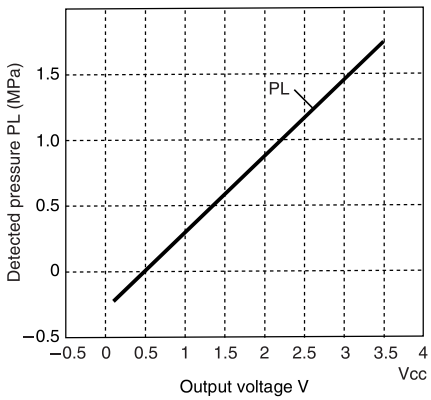
4

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.

4.11 "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.

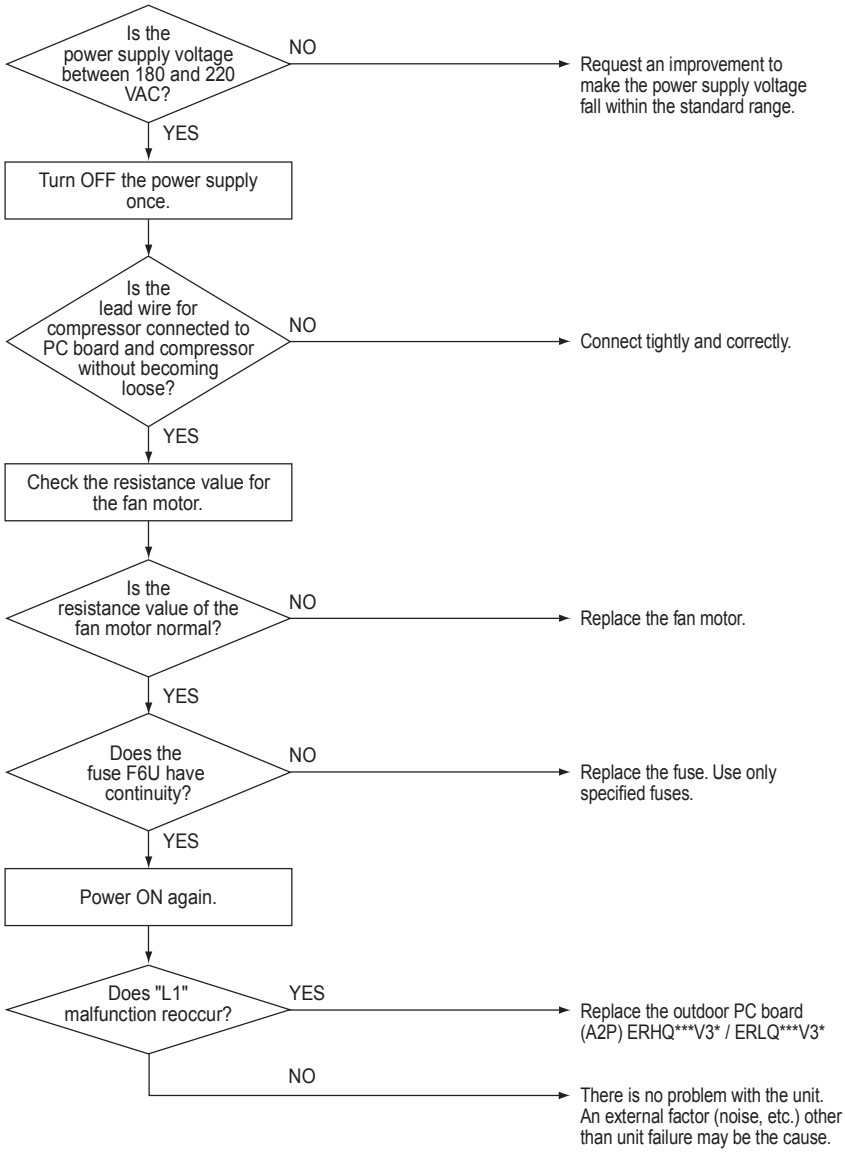
Malfunction decision conditions

- 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.

4.12 "L4" Radiation Fin Temperature Increased

Remote controller display

L4

Method of malfunction detection

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

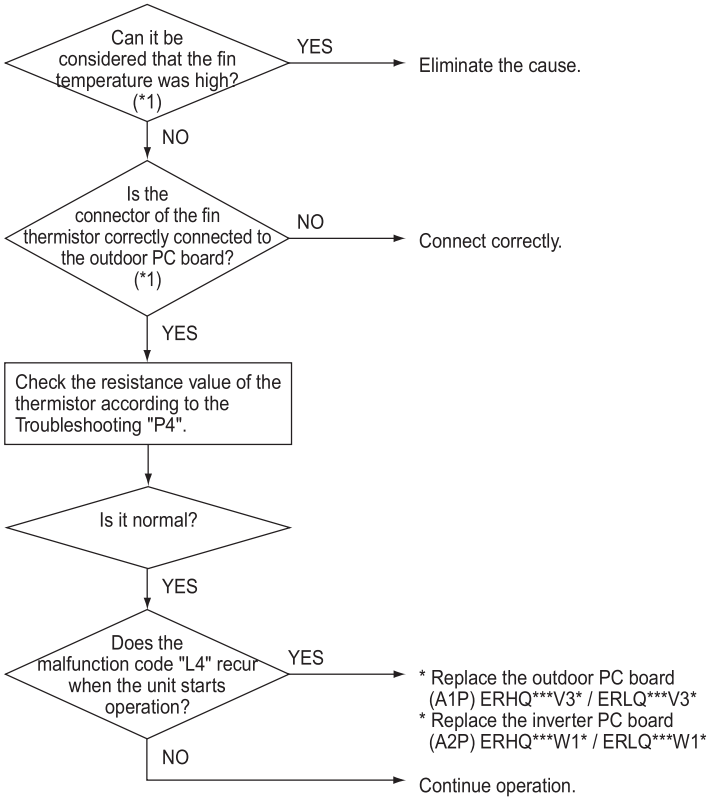
Malfunction decision conditions

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

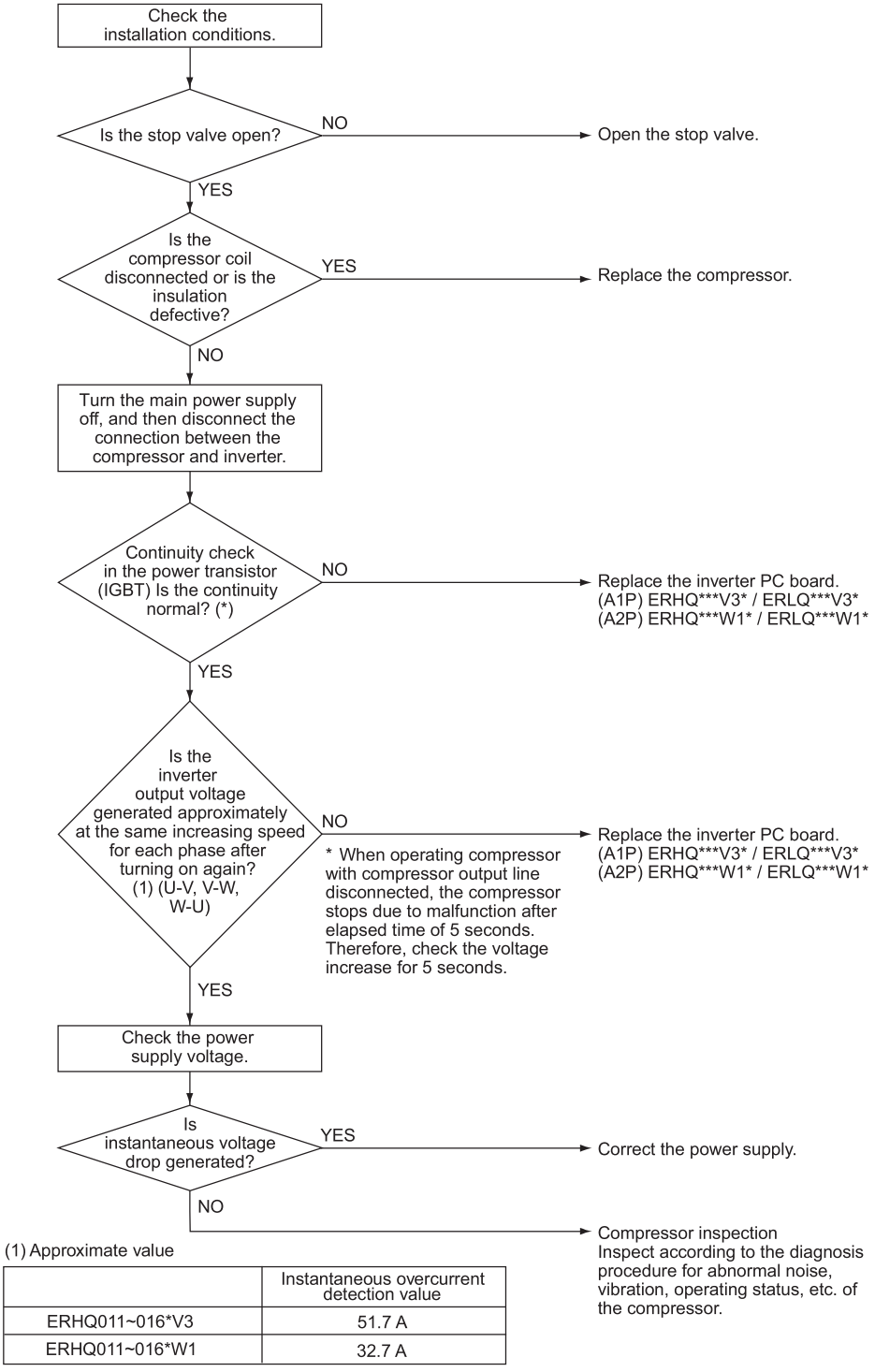
Caution

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

4.13 "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 160.

Caution

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

4.14 "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

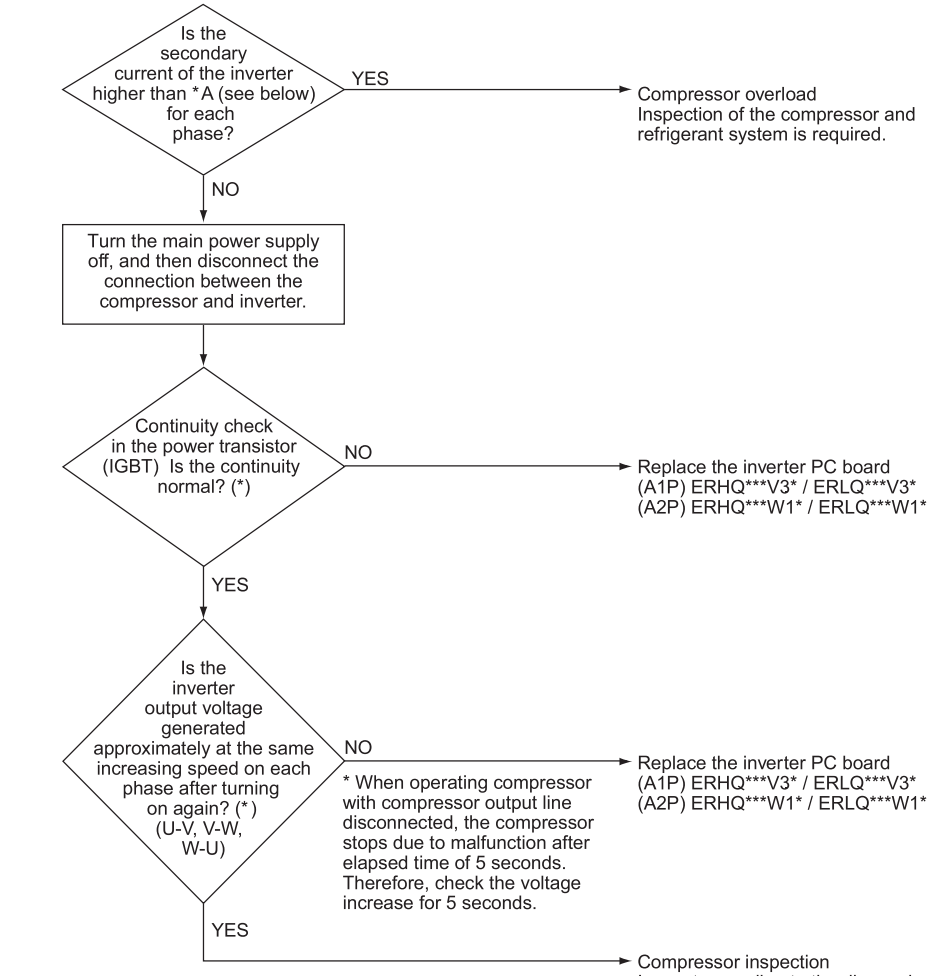
When compressor overload (except for when startup) is detected.

Supposed causes

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

4

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 160.

Caution

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

4.15 "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

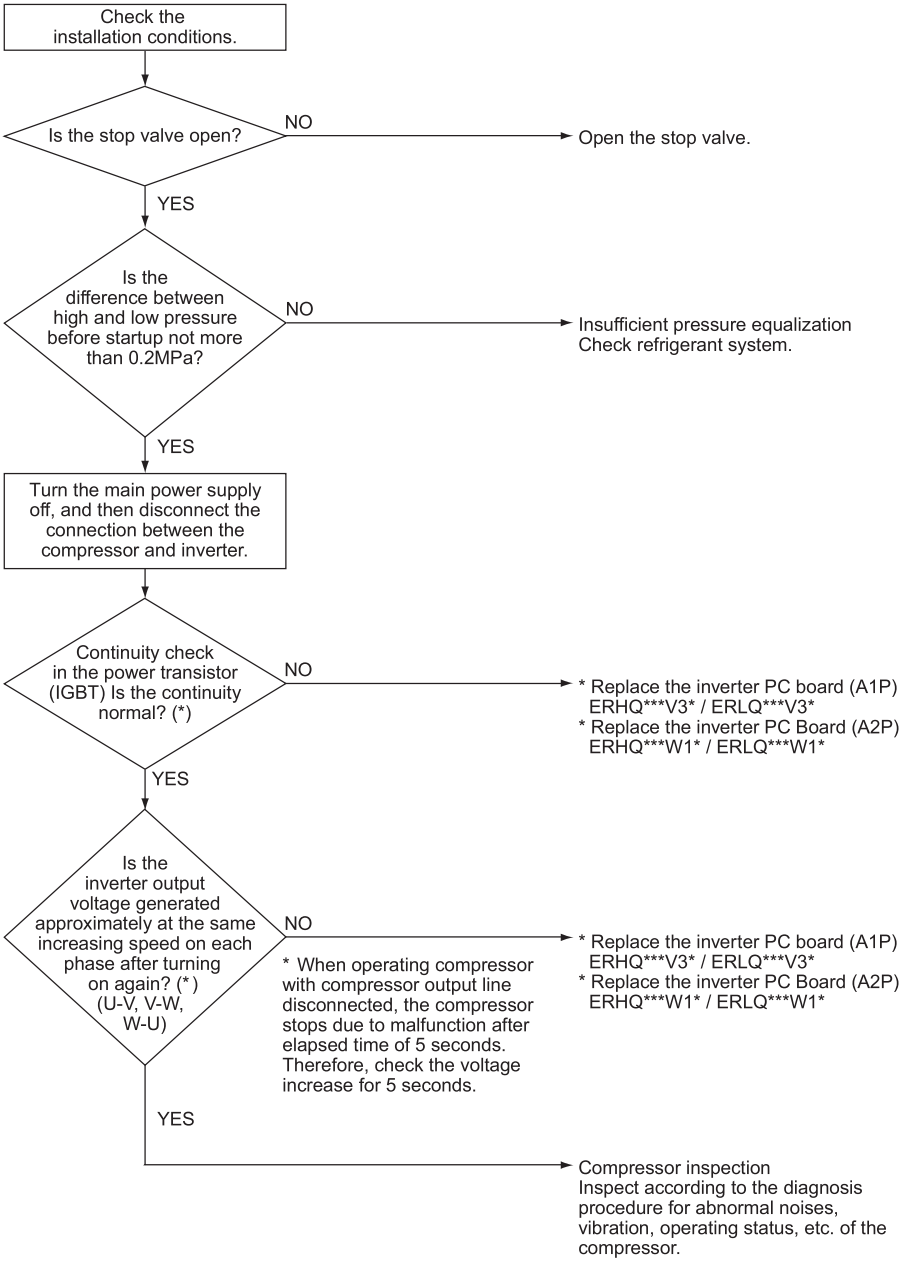
- When compressor overload (except for when startup) is detected
- When position signal is disordered

Supposed causes

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

4

Troubleshooting



(*) See also "Check No.11 - Outdoor Unit: Check for Power Transistor" on page 160.

Caution

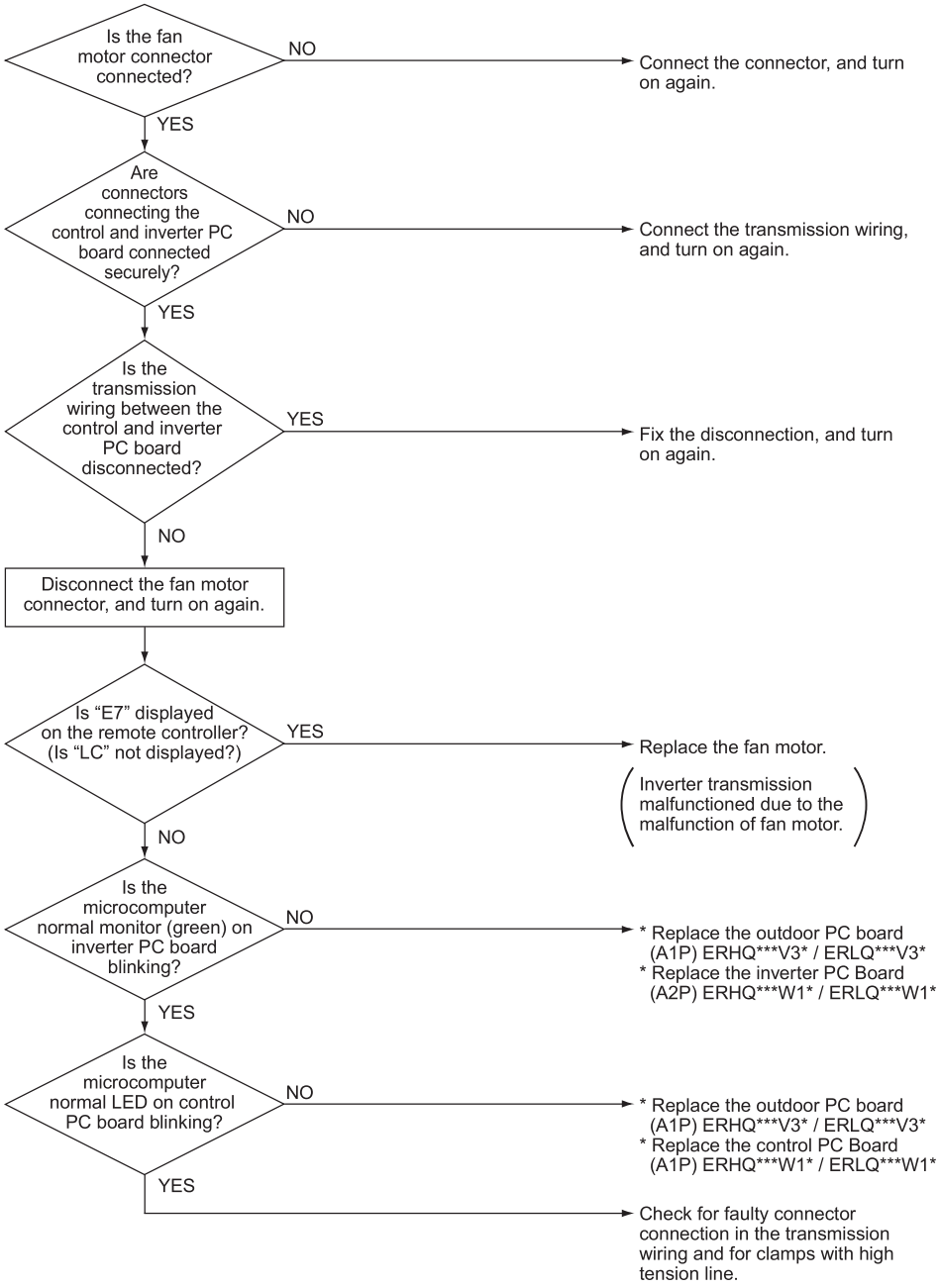
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

4.16 "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

4

Troubleshooting



Caution

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

4.17 "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.

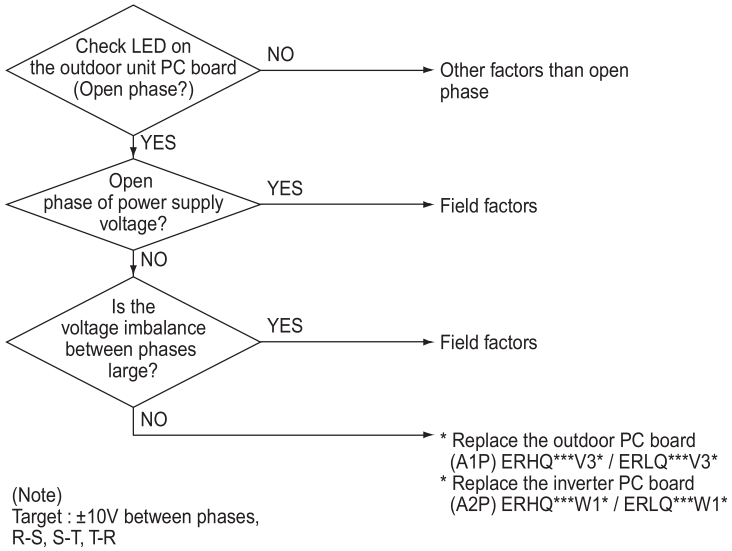
Malfunction decision conditions

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.

4.18 "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.

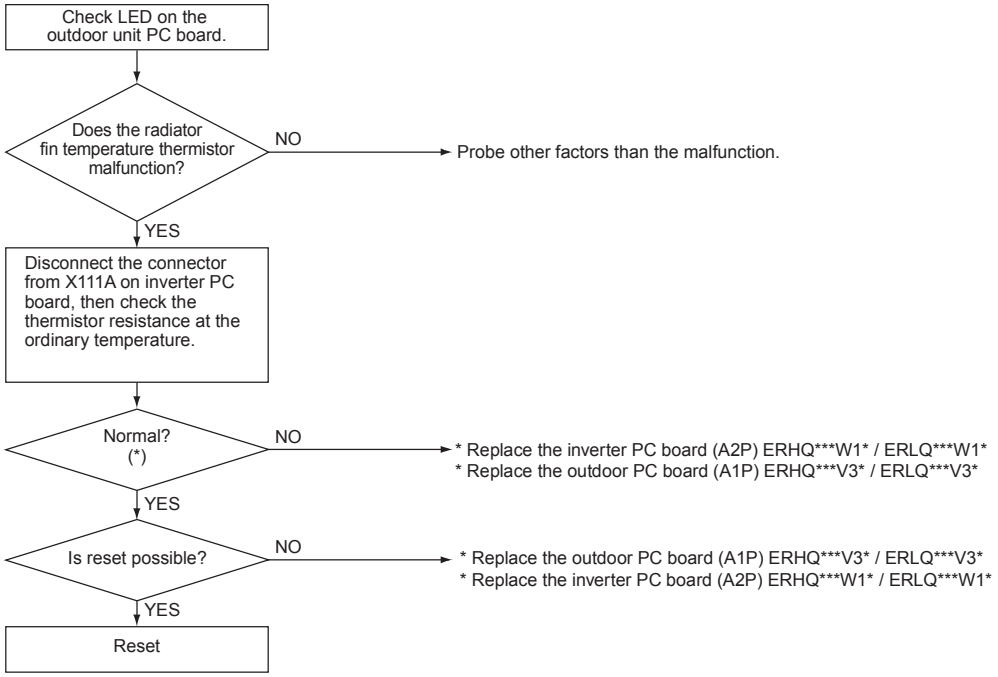
Malfunction decision conditions

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

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 153.

Caution

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

4.19 "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

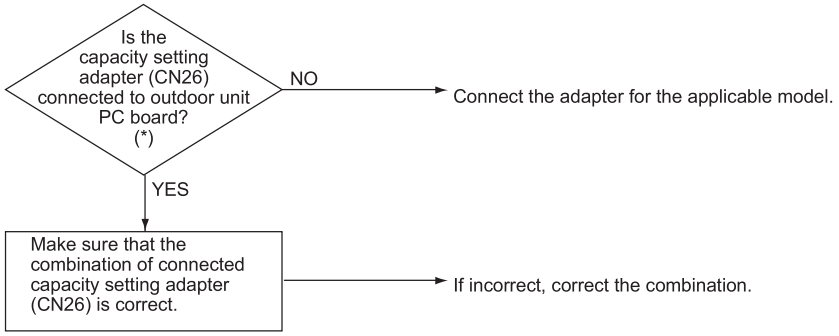
When the set value on E^2PROM differs from the outdoor unit capacity or a capacity setting adaptor except for PC board applicable models is installed. (Malfunction decision is made only when turning the power supply on.)

Supposed causes

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

4

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.

5 Error Codes: System Malfunctions

5.1 "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

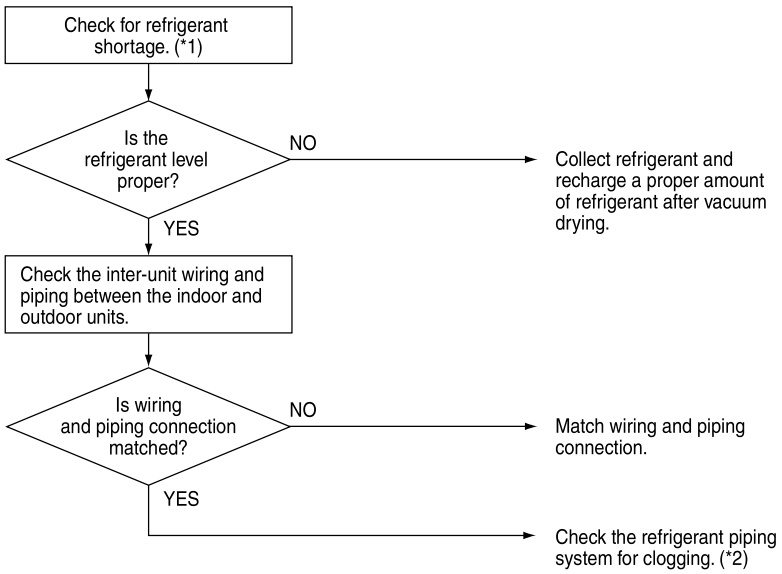
(In cooling operation)
When compressor frequency does not increase even though the load is heavy because the motorized valve is opened to the fullest extent
[If low pressure drops when the compressor is at 41Hz, malfunction is confirmed.]

(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



4

See also:

- (*1) "Check No.13 - Check for Inadequate Refrigerant" on page 161.
- (*2) "Check No.8 - Clogged Points" on page 158.

Caution

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

5.2 "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:

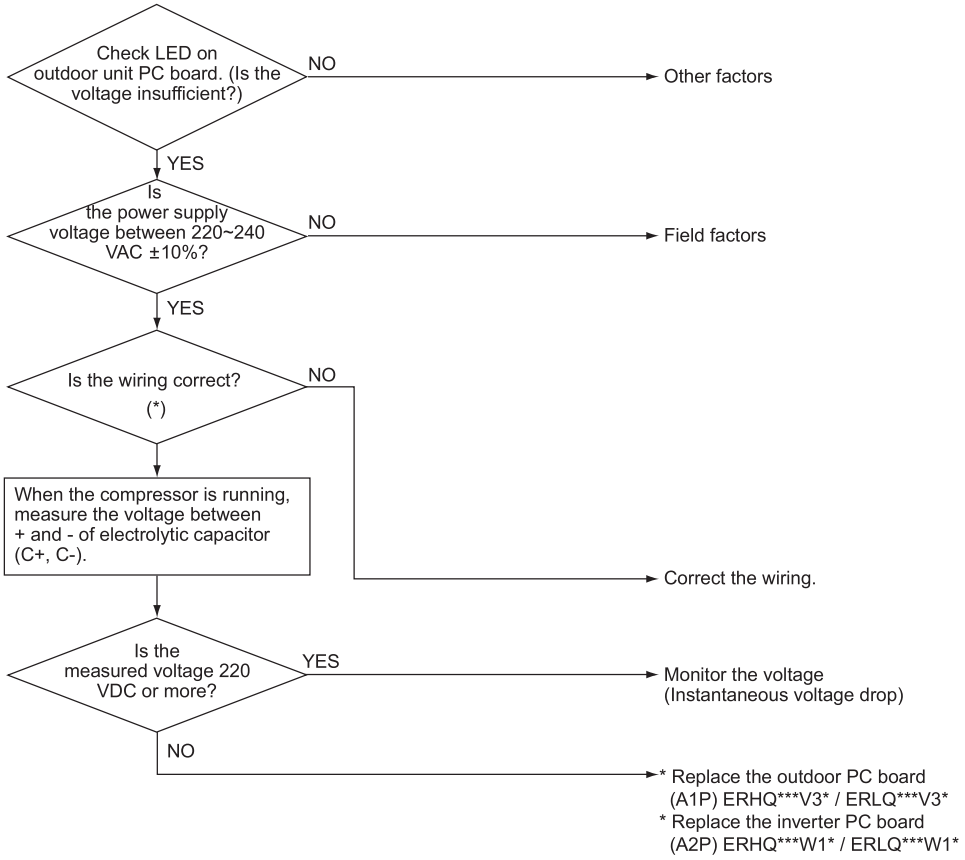
- for V3 only: 150-170 VAC or when the power failure of several tons of ms or longer is generated or DC voltage is not in range of 305~380 VDC.
- for W1 only: 300-320 VAC or when the power failure of several tons of ms or longer is generated or DC voltage is not in scope of 508~620 VDC.

* 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.

5.3 "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.

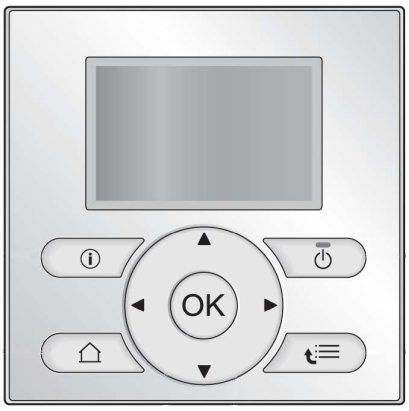
Malfunction decision conditions

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

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

5.4 "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.

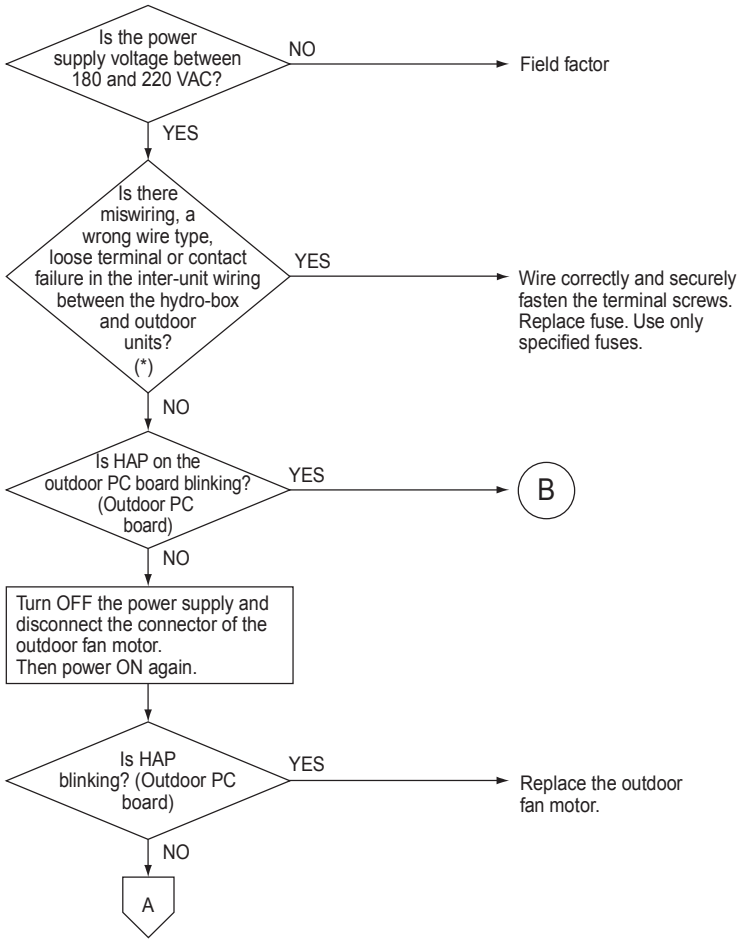
Supposed causes

The possible causes are:

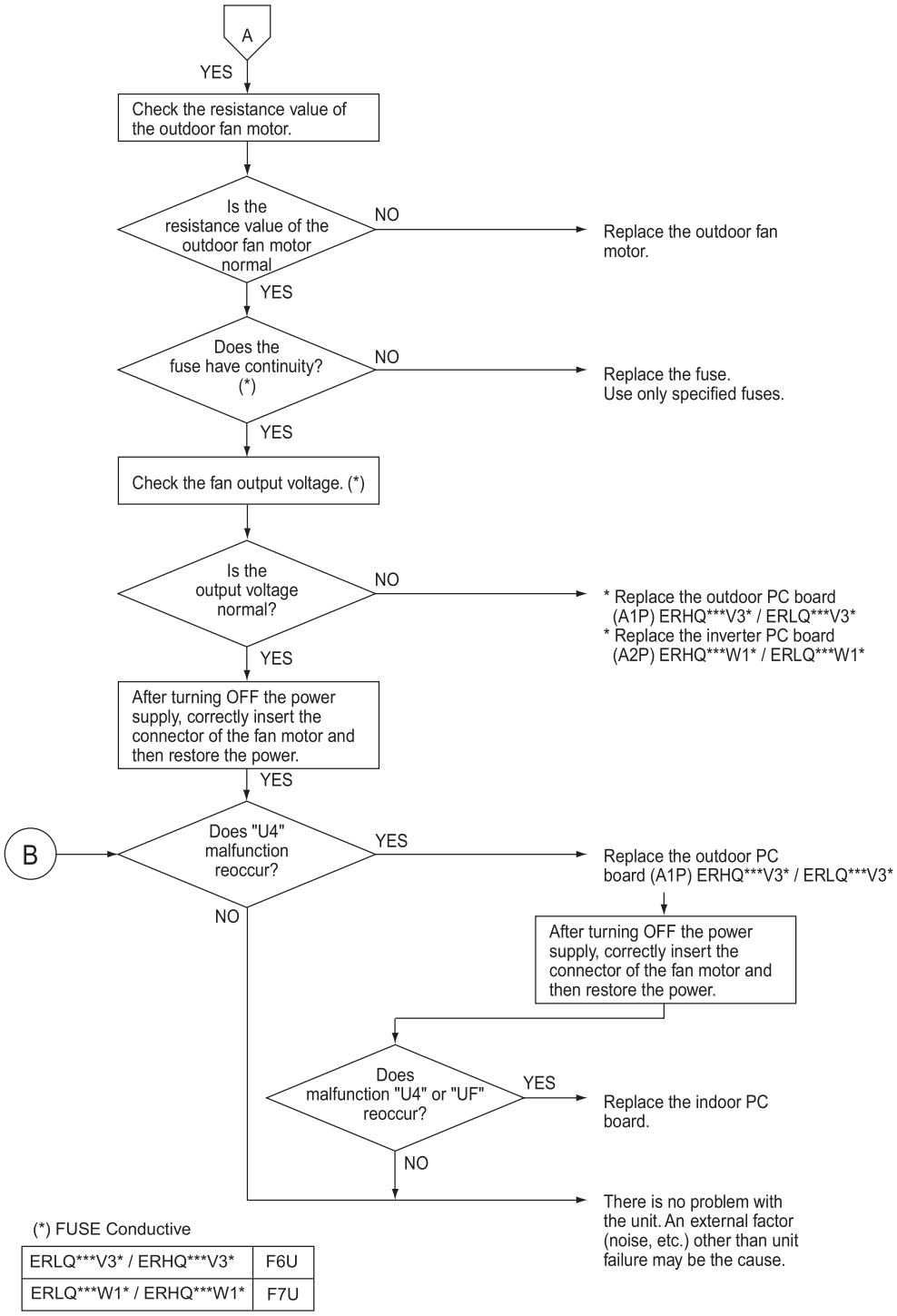
- Wiring indoor-outdoor transmission wire is incorrect
- Malfunctioning hydro-box PCB
- Malfunctioning outdoor unit PCB
- Outside cause (noise...).

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?



(*) See also "Check No.10 - Outdoor Unit: Fan Speed Pulse" on page 159.

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

5.5 "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

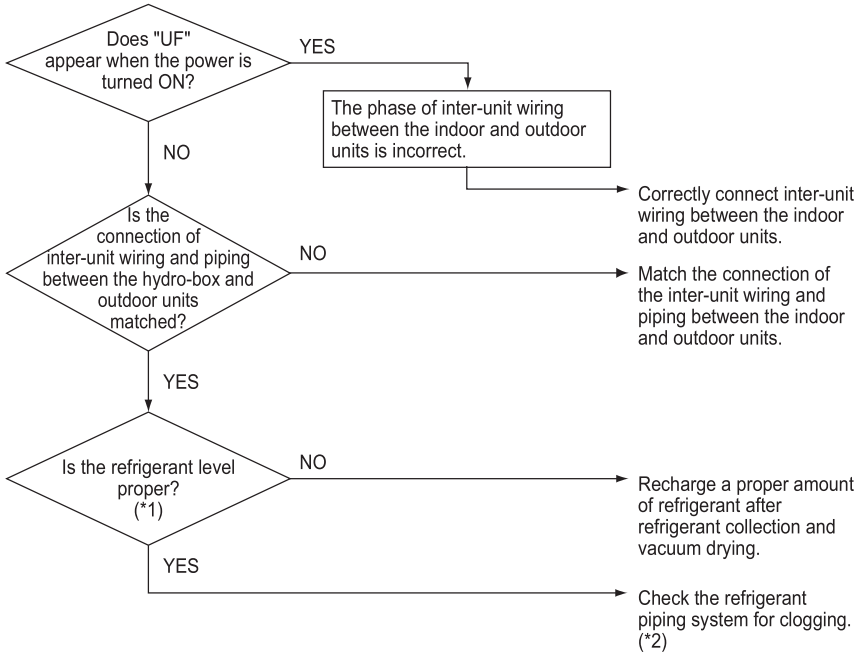
B: R2T – Te (or Tc during heating operation) > 14ºC (24ºC during heating operation)

Supposed causes

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

4

Troubleshooting



See also:

- (*1) "Check No.13 - Check for Inadequate Refrigerant" on page 161.
- (*2) "Check No.8 - Clogged Points" on page 158.

Caution

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

4

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

Remote controller display

U5

Error generation

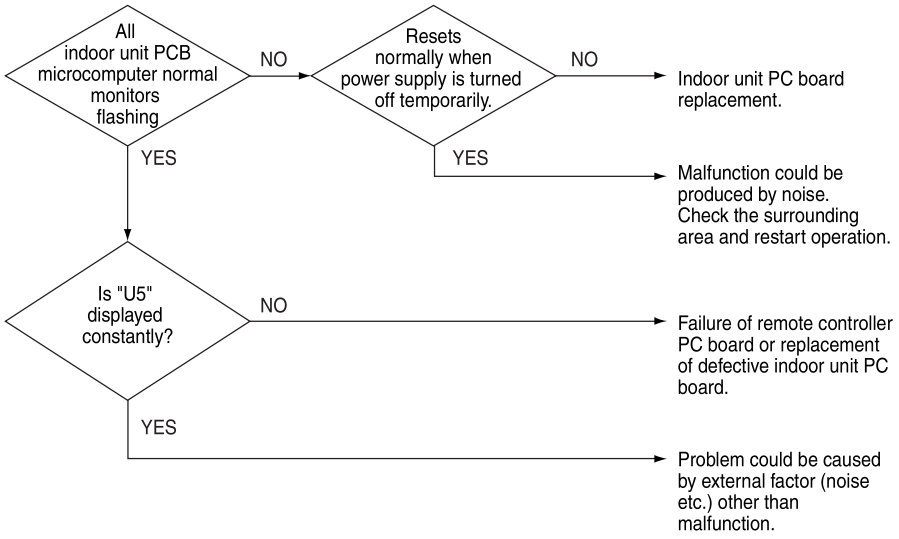
The error is generated when the microprocessor detects that the transmission between the hydro-box and the remote controller is not normal over a certain amount of time.

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.

5.7 "UA" Indoor-Outdoor Combination Problem

Remote controller display

UA

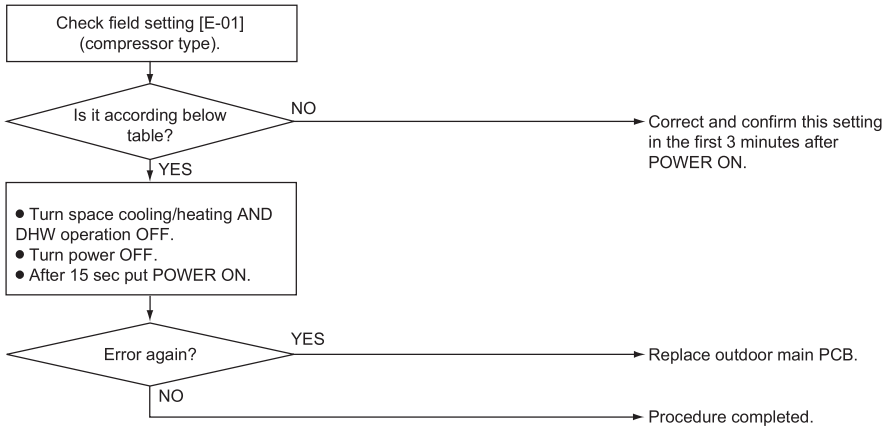
Error generation

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.

Troubleshooting



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

Caution

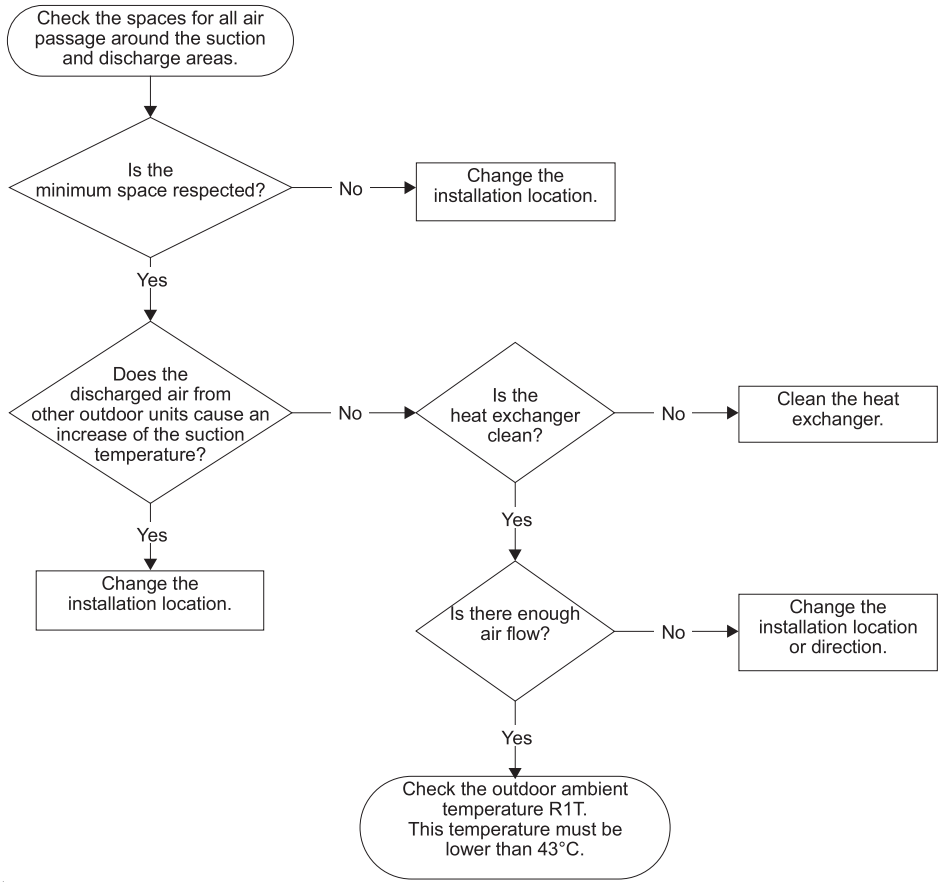
Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

6 Additional Checks for Troubleshooting

6.1 Check No.1 - Outdoor Unit: Checking the Installation Condition

Check No.01

1 To check the installation condition, proceed as follows:



4

6.2 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	∞	—

4

6.3 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:

- "External connection diagram" (outdoor unit)
- "System Operation" on page 22

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.

6.4 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
	3SA48002
	R25°C=20kΩ
	B=3990
-20	197.8 kΩ
-15	148.2 kΩ
-10	112.0 kΩ
-5	85.52 kΩ
0	65.84 kΩ
5	51.05 kΩ
10	39.91 kΩ
15	31.44 kΩ
20	24.95 kΩ
25	19.94 kΩ
30	16.04 kΩ
35	12.99 kΩ
40	10.58 kΩ
45	8.669 kΩ
50	7.143 kΩ

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

NTC-curve tank thermistor

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

6.5 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)
—	—
—	—
-6.0	1120.0
-4.0	1002.5
-2.0	898.6
0.0	806.5
2.0	724.8
4.0	652.2
6.0	587.6
8.0	530.1
10.0	478.8
12.0	432.9
14.0	392.0
16.0	355.3
18.0	322.4
20.0	292.9
22.0	266.3
24.0	242.5
26.0	221.0
28.0	201.6
30.0	184.1
32.0	168.3
34.0	154.0
36.0	141.0
38.0	129.3
40.0	118.7
42.0	109.0
44.0	100.2
46.0	92.2
48.0	84.9
50.0	78.3
52.0	72.2
54.0	66.7
56.0	61.6
58.0	57.0
60.0	52.8
62.0	48.9
64.0	45.3
66.0	42.0
68.0	39.0
70.0	36.3
72.0	33.7
74.0	31.4
76.0	29.2
78.0	27.2
80.0	25.4
82.0	23.7
—	—
—	—
—	—
—	—
92.0	16.9
94.0	15.8
96.0	14.8
98.0	13.9
100.0	13.1
102.0	12.3
104.0	11.5
106.0	10.8
108.0	10.2
110.0	9.6
112.0	9.0
114.0	8.5
116.0	8.0
118.0	7.6
120.0	7.1
122.0	6.7
124.0	6.4
126.0	6.0
128.0	5.7
130.0	5.4
132.0	5.4
134.0	4.8
136.0	4.6
138.0	4.3
140.0	4.1
142.0	3.9
144.0	3.7
146.0	3.5
148.0	3.3
150.0	3.2
152.0	3.0
154.0	2.9
156.0	2.7
158.0	2.6
160.0	2.5
162.0	2.3
164.0	2.5
166.0	2.1
168.0	2.0
170.0	1.9
172.0	1.9
174.0	1.8
176.0	1.7
178.0	1.6
180.0	1.5
—	

6.6 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.

6.7 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

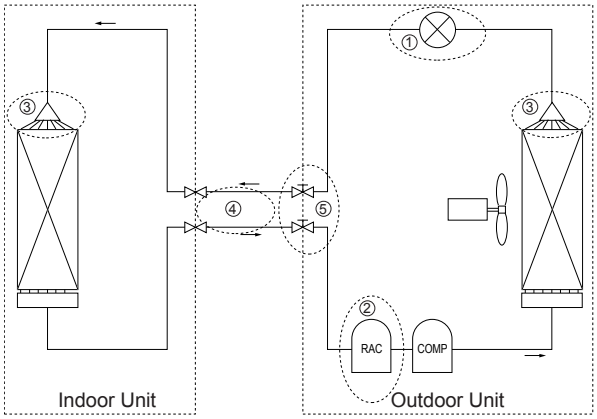
Check items (Possible causes)	Judgment
Does the outdoor unit fan run normally?	Visual inspection
Is the hydro-box filter clogged?	Visual inspection
Is there clogging before or after the EV (capillary)?	Check if there is a temperature difference before and after EV (capillary). Check if the main valve 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.

6.8 Check No.8 - Clogged Points

Temperature differences must occur before or after the clogged points!



4

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.

6.9 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.

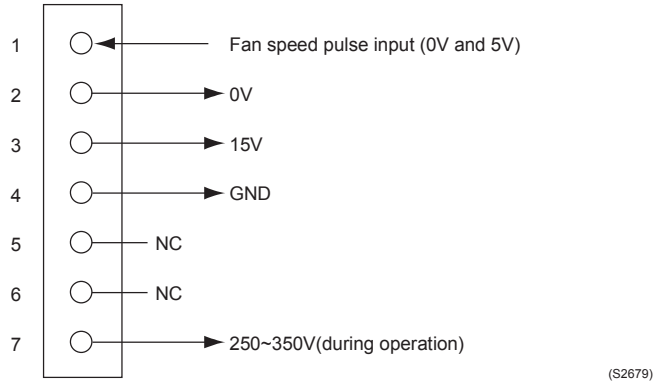
12 When making one turn of the lower fan motor by hand after turning the power supply on, is a pulse (0 and 5 V) generated 2 times between pins 4 and 1 of X107A?

(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.



6.10 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.

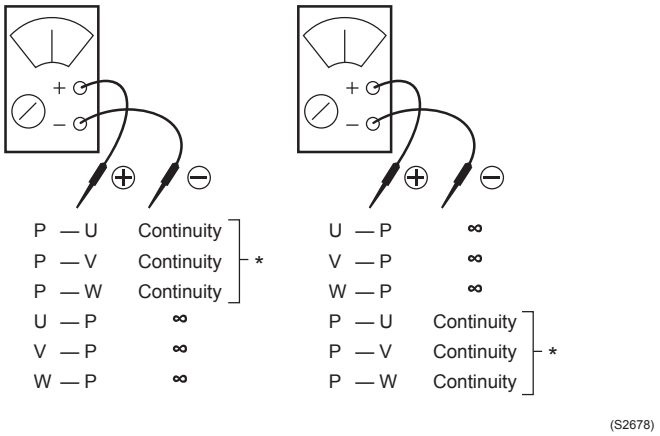
2 If you must touch such an area, make sure that the power supply voltage of power transistor is 50 V or less.

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)



* 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.

6.11 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).

6.12 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.

4

6.13 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)

6.14 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 5
Repair

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

5

1 Tips and Tricks

Not available at this moment

Part 6
Maintenance

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

6

1 Maintenance Schedule

1.1 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 hydro-box 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.

GAS BOILER SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission according to the manufacturer's instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect the customer's statutory rights.

Customer Name _____ Telephone Number _____

Adress _____

Boiler Make and Model _____

Commissioned by *(print name)* _____ Gas Safe Register Number _____

Company Name _____ Telephone Number _____

Company Adress _____

_____ Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certificate*:

Buiding Regulations Notification Number *(if applicable)*

CONTROLS Tick the appropriate boxes

Time and Temperature Control to Heating	Room Thermostat and Programmer/Timer ☐	Programmable Room Thermostat ☐	Load/Weather Compensation ☐	Optimum Start Control ☐
Time and Temperature Control to Hot Water		Cylinder Thermostat and Programmer/Timer ☐		Combination Boiler ☐
Heating Zone Valves			Fitted ☐	Not Required ☐
Hot Water Zone Valves			Fitted ☐	Not Required ☐
Thermostatic Radiator Valves			Fitted ☐	Not Required ☐
Automatic Bypass to System			Fitted ☐	Not Required ☐
Boiler Interlock				Provided ☐

ALL SYSTEMS

The system has been flushed and cleaned in accordance with BS7593 and boiler manufacturer's instructions Yes ☐

What system cleaner was used?

What inhibitor was used? Quantity ☐ litres

CENTRAL HEATING MODE Measure and record:

Gas Rate	☐ m^3/hr	OR		☐	ft^3/hr
Burner Operating Pressure (if applicable)	☐ mbar	OR	Gas Inlet Pressure	☐	mbar
Central Heating Flow Temperature				☐	□C
Central Heating Return Temperature				☐	□C

COMBINATION BOILERS ONLY

Is the installation in a hard water area (above 200ppm)? Yes ☐ No ☐

If yes, and if required by the manufacturer, has a water scale reducer been fitted? Yes ☐ No ☐

What type of scale reducer has been fitted?

DOMESTIC HOT WATER MODE Measure and Record:

Gas Rate	☐ m^3/hr	OR		☐	ft^3/hr
Burner Operating Pressure (at maximum rate)	☐ mbar	OR	Gas inlet Pressure (at maximum rate)	☐	mbar
Cold Water Inlet Temperature				☐	□C
Hot water has been checked at all outlets			Yes ☐ Temperature	☐	□C
Water Flow Rate				☐	l/min

Condensing Boilers Only

The Condensate drain has been installed in accordance with the manufacturer's instructions and/or BS5546/BS6798 Yes ☐

If the condensate pipe terminates externally has the pipe diameter been increased and waterproof insulation fitted? Yes ☐

ALL INSTALLATIONS

If required by the manufacturer, record the following CO_2 ☐ % OR CO ☐ *ppm* OR co/co_2 ratio ☐

The heating and hot water system complies with the appropriate Building Regulations Yes ☐

The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions Yes ☐

The operation of the boiler and system controls have been demonstrated to and understood by the customer Yes ☐

The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the the customer Yes ☐

Commissioning Engineer's Signature

Customer's Signature

(To confirm satisfactory demonstration and receipt of manufacturer s literature)

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme.
A Building Regulations Compliance Certificate will then be issued to the customer.

benchmark COLLECTIVE WORK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

'Heating and Hotwater Industry Council (HHIC)

www.centralheating.co.uk

6

Service Record

It is recommended that your heating system is serviced regularly and that the appropriate Service Interval Record is completed.

Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

Service 1 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature:

Service 2 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature:

Service 3 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature:

Service 4 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature:

Service 5 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature:

Service 6 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature:

Service 7 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature:

Service 8 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature:

Service 9 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature:

Service 10 Date:
Engineer Name:
Company Name:
Telephone No.
Gas Safe Register No.
Comments:

Signature: