ESIE11-05



Service Manual

Small inverter chillers

EWAQ016BAW
EWAQ021BAW
EWAQ025BAW
EWAQ032BAW
EWAQ040BAW
EWAQ050BAW
EWAQ064BAW

EWYQ016BAW
EWYQ021BAW
EWYQ025BAW
EWYQ032BAW
EWYQ040BAW
EWYQ050BAW
EWYQ064BAW

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1. Introduction

1.1 Safety Cautions

Cautions and warnings

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

△ This symbol indicates an item for which caution must be exercised.
The pictogram shows the item to which attention must be paid.

◯ This symbol indicates a prohibited action.
The prohibited item or action is shown inside or near the symbol.

● This symbol indicates an action that must be taken, or an instruction.
The instruction is shown inside or near the symbol.

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

1.1.1 Caution in Repair

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

Warning	
Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug. Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or fire.	

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

1.1.2 Cautions Regarding Products after Repair

Warning	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. (See Installation Operation Manual) If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury.	
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	
Do not mix air or gas other than the specified refrigerant (R-410A) in the refrigerant system. If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	

Caution	
Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks.	
Do not install the equipment in a place where there is a possibility of combustible gas leaks. If a combustible gas leaks and remains around the unit, it can cause a fire.	

1.1.3 Inspection after Repair

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

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

1.1.4 Using Icons

Icons are used to attract the attention of the reader to specific information. The meaning of each icon is described in the table below.

1.1.5 Using Icons List

Icon	Type of Information	Description
 Note:	Note	A “note” provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks.
 Caution	Caution	A “caution” is used when there is danger that the reader, through incorrect manipulation, may damage equipment, loose data, get an unexpected result or has to restart (part of) a procedure.
 Warning	Warning	A “warning” is used when there is danger of personal injury.
	Reference	A “reference” guides the reader to other places in this binder or in this manual, where he/she will find additional information on a specific topic.

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General Outline

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1. Specifications

1.1 Option Specifications

See databook

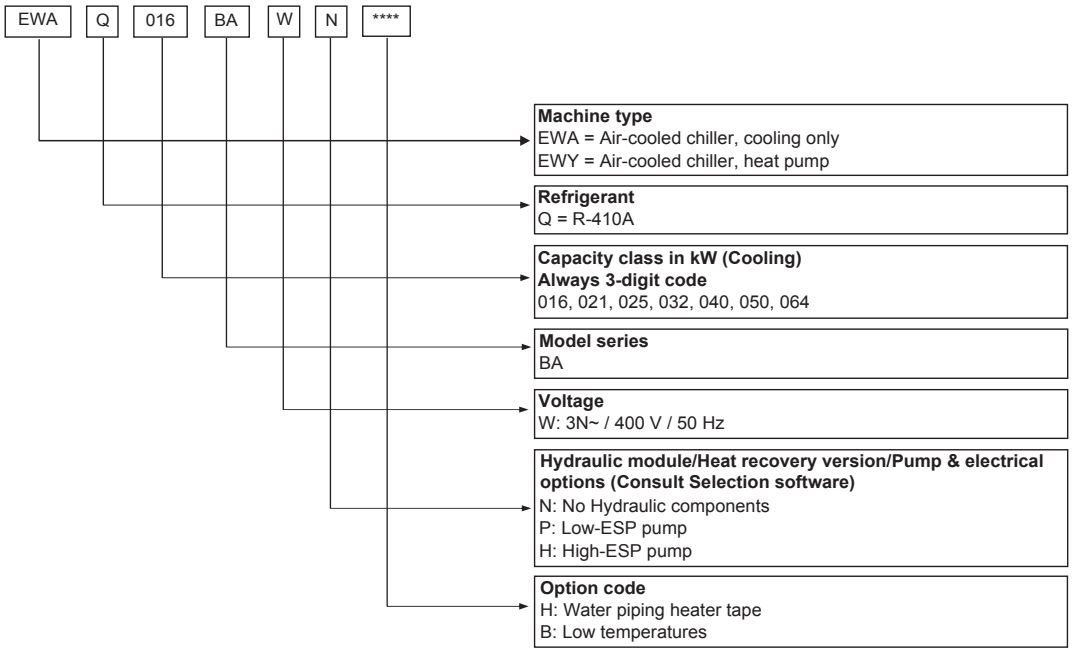
1.2 Technical Specifications

See databook

1.3 Electrical Specifications

See databook

1.4 Nomenclature



1.5 Operation Range

See databook

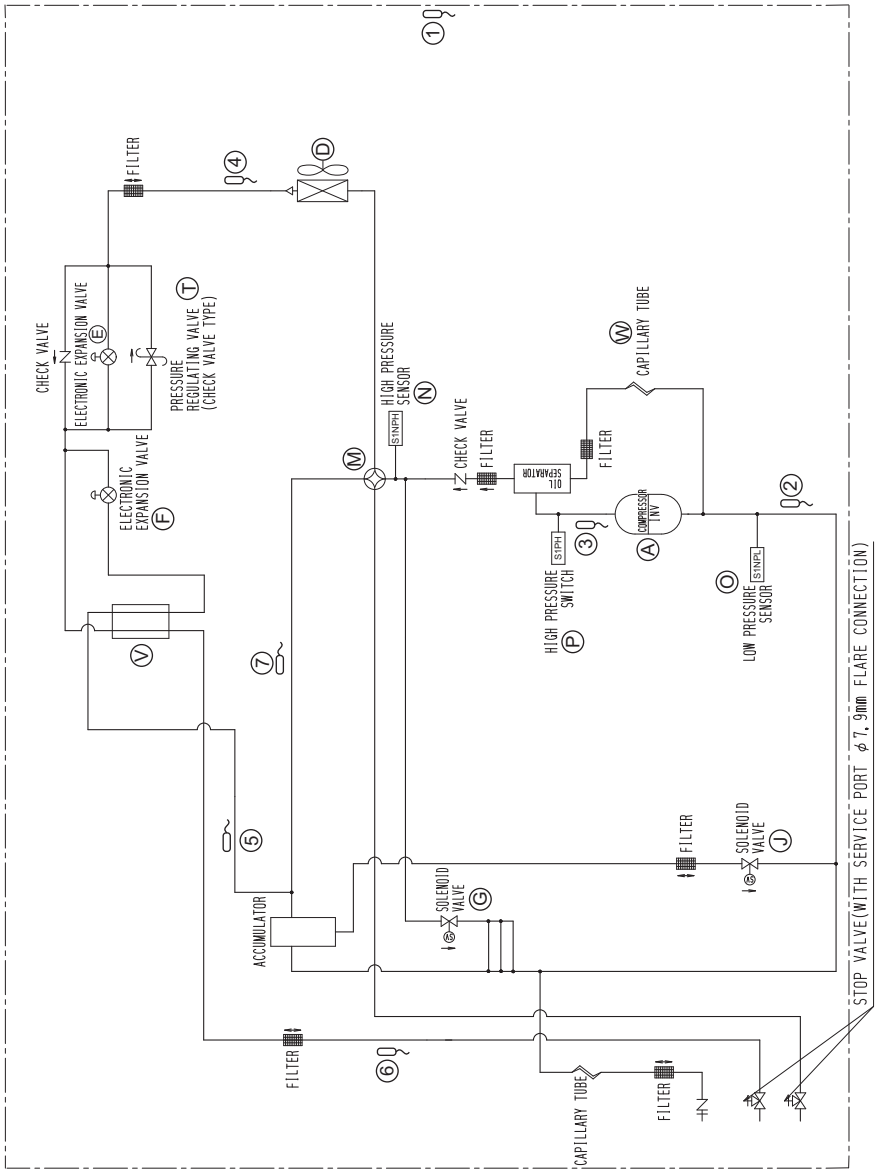
2. Refrigerant Circuit

2.1 Refrigerant Circuit

2.1.1 EWYQ016BA

No. in refrigerant system diagram	Symbol	Name	Major Function
A	M1C	Inverter compressor (INV)	Inverter compressor is operated on frequencies between 52Hz and 266Hz by using the inverter, while Standard compressor is operated with commercial power supply only. The number of operating steps is as follows when Inverter compressor is operated in combination with Standard compressor. RXYQ8P(A): 24 steps
D	M1F	Inverter fan	Because the system is an air heat exchange type, the fan is operated at 9-step rotation speed by using the inverter.
E	Y1E	Electronic expansion valve (Main: EV1)	While in heating operation, PI control is applied to keep the outlet superheated degree of air heat exchanger constant.
F	Y2E	Electronic expansion valve (Subcool: EV2)	PI control is applied to keep the outlet superheated degree of subcooling heat exchanger constant.
G	Y1S	Solenoid valve (Hot gas: SVP)	Used to prevent the low pressure from transient falling.
J	Y2S	Solenoid valve (Oil return: SVO)	Used to return oil from the accumulator to the compressor.
M	Y3S	Four way valve	Used to switch the operation mode between cooling and heating.
N	S1NPH	High pressure sensor	Used to detect high pressure.
O	S1NPL	Low pressure sensor	Used to detect low pressure.
P	S1PH	High pressure switch (For INV compressor)	In order to prevent the increase of high pressure when a malfunction occurs, this switch is activated at high pressure of 4.0 MPa or more to stop the compressor operation.
T	—	Pressure regulating valve (Liquid pipe)	This valve opens at a pressure of 4.0 MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
V	—	Subcooling heat exchanger	Used to subcool liquid refrigerant from the electronic expansion valve (cooling) or indoor units (heating).
W	—	Capillary tube	Used to return the refrigerating oil separated through the oil separator to the INV compressor.
1	R1T	Thermistor (Outdoor air: Ta)	Used to detect outdoor temperature, correct discharge pipe temperature, and others.
2	R2T	Thermistor (Suction pipe: Ts)	Used to detect suction pipe temperature.
3	R3T	Thermistor (INV discharge pipe: Tdi)	Used to detect discharge pipe temperature, make the temperature protection control of compressor, and others.
4	R4T	Thermistor (Heat exchanger deicer: Tb)	Used to detect liquid pipe temperature of air heat exchanger, determine defrosting operation, and others.
5	R5T	Thermistor (Subcooling heat exchanger gas pipe: Tsh)	Used to detect gas pipe temperature of gas pipe on the evaporation side of subcooling heat exchanger, keep the superheated degree at the outlet of subcooling heat exchanger constant, and others.
6	R6T	Thermistor (Receiver outlet liquid pipe: Tl)	Used to detect receiver outlet liquid pipe temperature.
7	R7T	Thermistor (Accumulator inlet: Ts1)	Used to detect gas pipe temperature at the accumulator inlet. Keep the suction superheated degree constant in heating operation, and others.

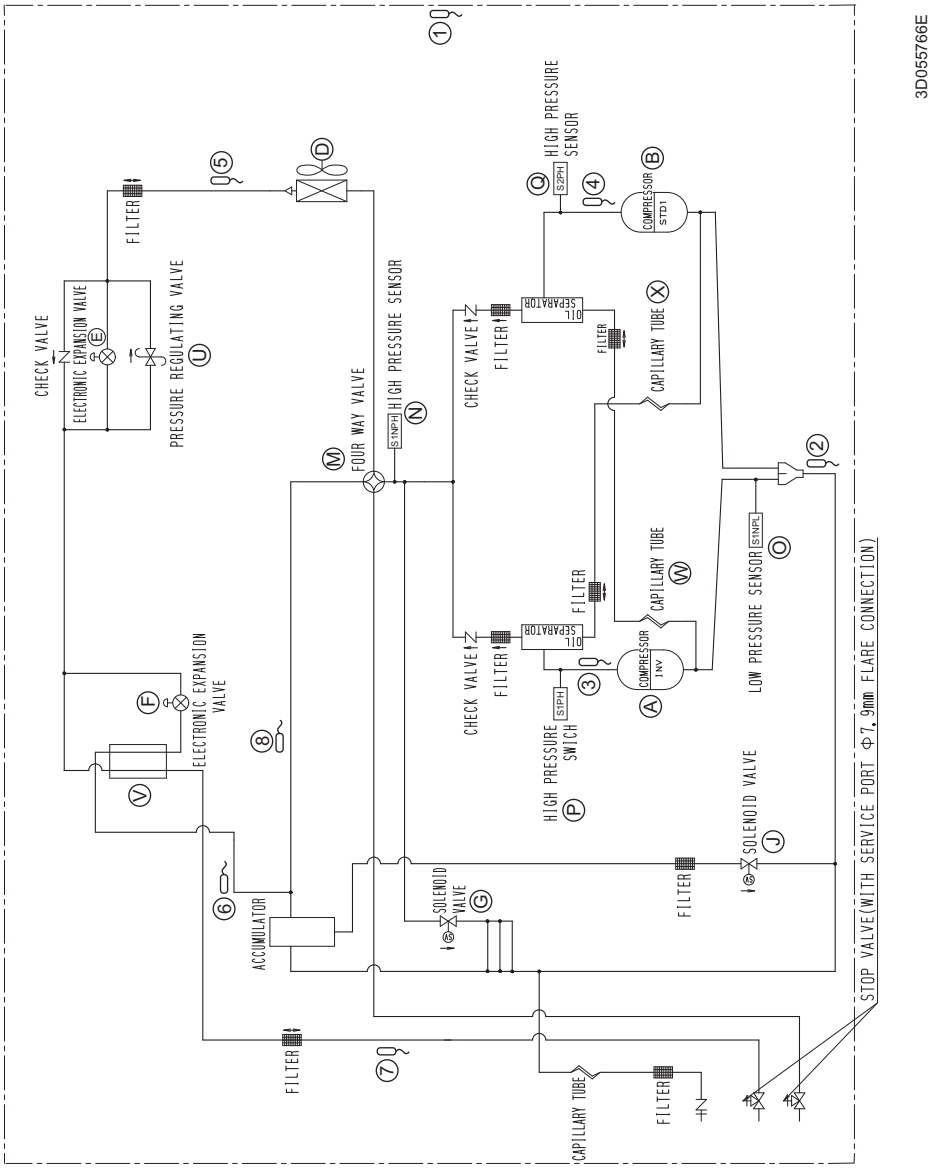
EWYQ016BA


3D055765D
FILTER
CHECK VALVE
ELECTRONIC EXPANSION VALVE
PRESSURE REGULATING VALVE (CHECK VALVE TYPE)
ELECTRONIC EXPANSION VALVE
HIGH PRESSURE SENSOR
CHECK VALVE
FILTER
OIL SEPARATOR
FILTER
CAPILLARY TUBE
COMPRESSOR INV
HIGH PRESSURE SWITCH
LOW PRESSURE SENSOR
FILTER
SOLENOID VALVE
ACCUMULATOR
SOLENOID VALVE
FILTER
FILTER
CAPILLARY TUBE
FILTER
STOP VALVE(WITH SERVICE PORT φ7.9mm FLARE CONNECTION)

2.1.2 EWYQ021BA, 025BA, 040BA, 050BA

No. in refrigerant system diagram	Symbol	Name	Major Function
A	M1C	Inverter compressor (INV)	Inverter compressor is operated on frequencies between 52Hz and 210Hz by using the inverter, while Standard compressor is operated with commercial power supply only. The number of operating steps is as follows when Inverter compressor is operated in combination with Standard compressor. RXYQ10, 12P(A): 37 steps
B	M2C	Standard compressor 1 (STD1)	
D	M1F	Inverter fan	Because the system is an air heat exchange type, the fan is operated at 9-step rotation speed by using the inverter.
E	Y1E	Electronic expansion valve (Main: EV1)	While in heating operation, PI control is applied to keep the outlet superheated degree of air heat exchanger constant.
F	Y2E	Electronic expansion valve (Subcool: EV3)	PI control is applied to keep the outlet superheated degree of subcooling heat exchanger constant.
G	Y1S	Solenoid valve (Hot gas: SVP)	Used to prevent the low pressure from transient falling.
J	Y2S	Solenoid valve (Oil return: SVO)	Used to return oil from the accumulator to the compressor.
M	Y3S	Four way valve	Used to switch the operation mode between cooling and heating.
N	S1NPH	High pressure sensor	Used to detect high pressure.
O	S1NPL	Low pressure sensor	Used to detect low pressure.
P	S1PH	High pressure switch (For INV compressor)	In order to prevent the increase of high pressure when a malfunction occurs, this switch is activated at high pressure of 4.0 MPa or more to stop the compressor operation.
Q	S2PH	High pressure switch (For STD compressor 1)	
U	—	Pressure regulating valve (Liquid pipe)	This valve opens at a pressure of 4.0 MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
V	—	Subcooling heat exchanger	Used to subcool liquid refrigerant from the electronic expansion valve (cooling) or indoor units (heating).
W	—	Capillary tube	Used to return the refrigerating oil separated through the oil separator to the INV compressor.
X	—	Capillary tube	Used to return the refrigerating oil separated through the oil separator to the STD1 compressor.
1	R1T	Thermistor (Outdoor air: Ta)	Used to detect outdoor temperature, correct discharge pipe temperature, and others.
2	R2T	Thermistor (Suction pipe: Ts)	Used to detect suction pipe temperature.
3	R31T	Thermistor (INV discharge pipe: Tdi)	Used to detect discharge pipe temperature, make the temperature protection control of compressor, and others.
4	R32T	Thermistor (STD1 discharge pipe: Tds1)	
5	R4T	Thermistor (Heat exchanger deicer: Tb)	Used to detect liquid pipe temperature of air heat exchanger, determine defrosting operation, and others.
6	R5T	Thermistor (Subcooling heat exchanger gas pipe: Tsh)	Used to detect gas pipe temperature on the evaporation side of subcooling heat exchanger, keep the superheated degree at the outlet of subcooling heat exchanger constant, and others.
7	R6T	Thermistor (Liquid pipe: Tl)	Used to detect liquid pipe temperature.
8	R7T	Thermistor (Accumulator inlet: Ts1)	Used to detect gas pipe temperature at the accumulator inlet. Keep the suction superheated degree constant in heating operation, and others.

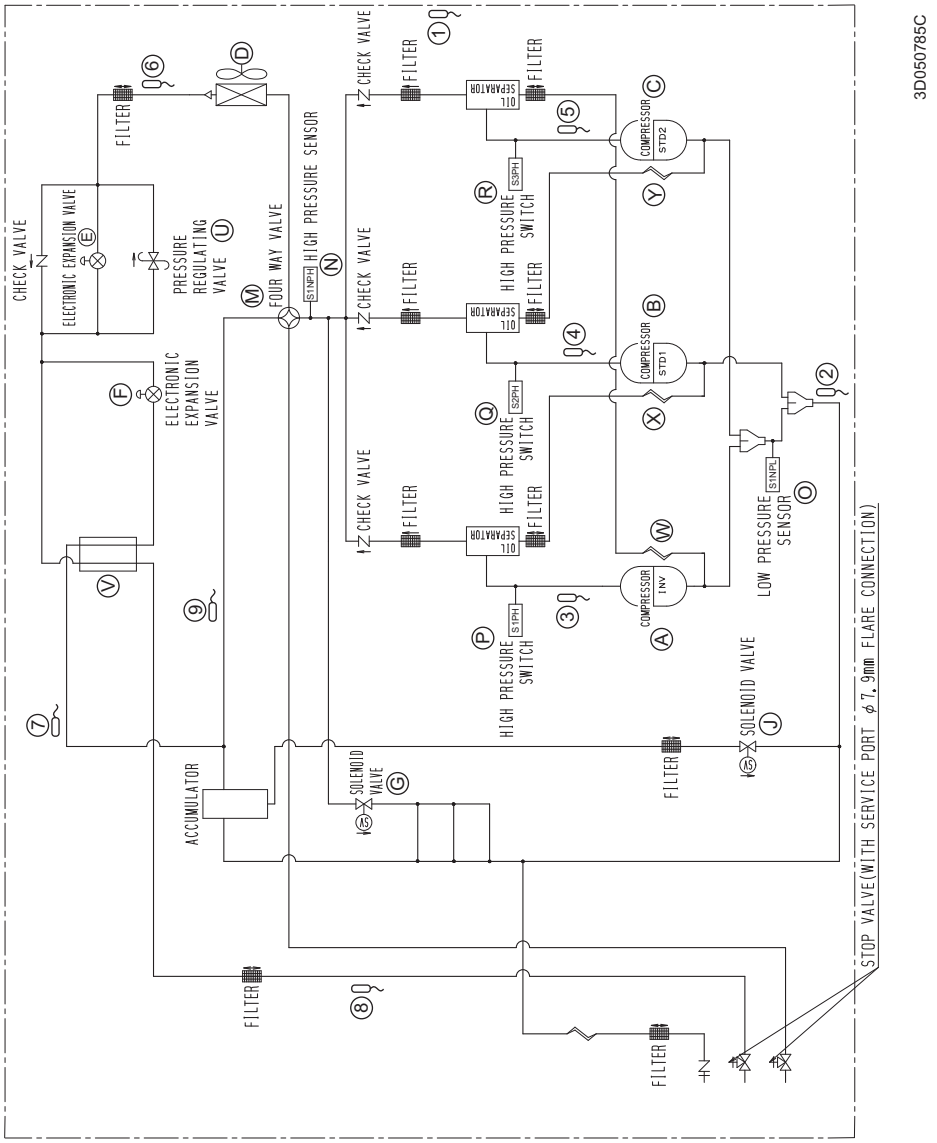
EWYQ021BA, 025BA, 040BA, 050BA



2.1.3 EWYQ032BA, 064BA

No. in refrigerant system diagram	Symbol	Name	Major Function
A	M1C	Inverter compressor (INV)	Inverter compressor is operated on frequencies between 52Hz and 266Hz by using the inverter, while Standard compressor is operated with commercial power supply only. The number of operating steps is as follows when Inverter compressor is operated in combination with Standard compressor. RXYQ14P(A) or 16P(A): 51 steps, RXYQ18P(A): 55 steps
B	M2C	Standard compressor 1 (STD1)	
C	M3C	Standard compressor 1 (STD2)	
D	M1F	Inverter fan	Because the system is an air heat exchange type, the fan is operated at 8-step rotation speed by using the inverter.
E	Y1E	Electronic expansion valve (Main: EV1)	While in heating operation, PI control is applied to keep the outlet superheated degree of air heat exchanger constant.
F	Y2E	Electronic expansion valve (Subcool: EV3)	PI control is applied to keep the outlet superheated degree of subcooling heat exchanger constant.
G	Y1S	Solenoid valve (Hot gas: SVP)	Used to prevent the low pressure from transient falling.
J	Y2S	Solenoid valve (Oil return: SVO)	Used to return oil from the accumulator to the compressor.
M	Y3S	Four way valve	Used to switch the operation mode between cooling and heating.
N	S1NPH	High pressure sensor	Used to detect high pressure.
O	S1NPL	Low pressure sensor	Used to detect low pressure.
P	S1PH	High pressure switch (For INV compressor)	In order to prevent the increase of high pressure when a malfunction occurs, this switch is activated at high pressure of 4.0 MPa or more to stop the compressor operation.
Q	S2PH	High pressure switch (For STD compressor 1)	
R	S3PH	High pressure switch (For STD compressor 2)	
U	—	Pressure regulating valve (Liquid pipe)	This valve opens at a pressure of 4.0 MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
V	—	Subcooling heat exchanger	Used to subcool liquid refrigerant from the electronic expansion valve (cooling) or indoor units (heating).
W	—	Capillary tube	Used to return the refrigerating oil separated through the oil separator to the INV compressor.
X	—	Capillary tube	Used to return the refrigerating oil separated through the oil separator to the STD1 compressor.
Y	—	Capillary tube	Used to return the refrigerating oil separated through the oil separator to the STD2 compressor.
1	R1T	Thermistor (Outdoor air: Ta)	Used to detect outdoor temperature, correct discharge pipe temperature, and others.
2	R2T	Thermistor (Suction pipe: Ts)	Used to detect suction pipe temperature.
3	R31T	Thermistor (INV discharge pipe: Tdi)	Used to detect discharge pipe temperature, make the temperature protection control of compressor, and others.
4	R32T	Thermistor (STD1 discharge pipe: Tds1)	
5	R33T	Thermistor (STD2 discharge pipe: Tds2)	
6	R4T	Thermistor (Heat exchanger deicer: Tb)	Used to detect liquid pipe temperature of air heat exchanger, determine defrosting operation, and others.
7	R5T	Thermistor (Subcooling heat exchanger gas pipe: Tsh)	Used to detect gas pipe temperature on the evaporation side of subcooling heat exchanger, keep the superheated degree at the outlet of subcooling heat exchanger constant, and others.
8	R6T	Thermistor (Liquid pipe: Tl)	Used to detect liquid pipe temperature.
9	R7T	Thermistor (Accumulator inlet: Ts1)	Used to detect gas pipe temperature at the accumulator inlet. Keep the suction superheated degree constant in heating operation, and others.

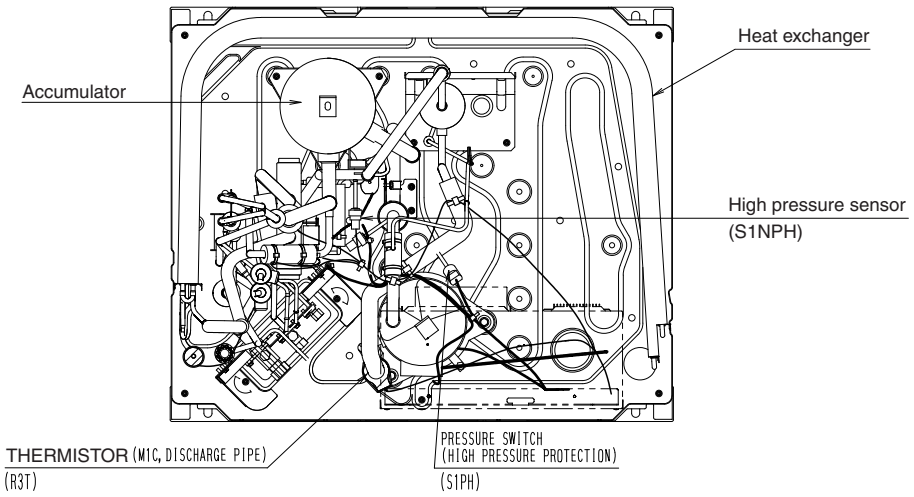
EWYQ032BA, 064BA



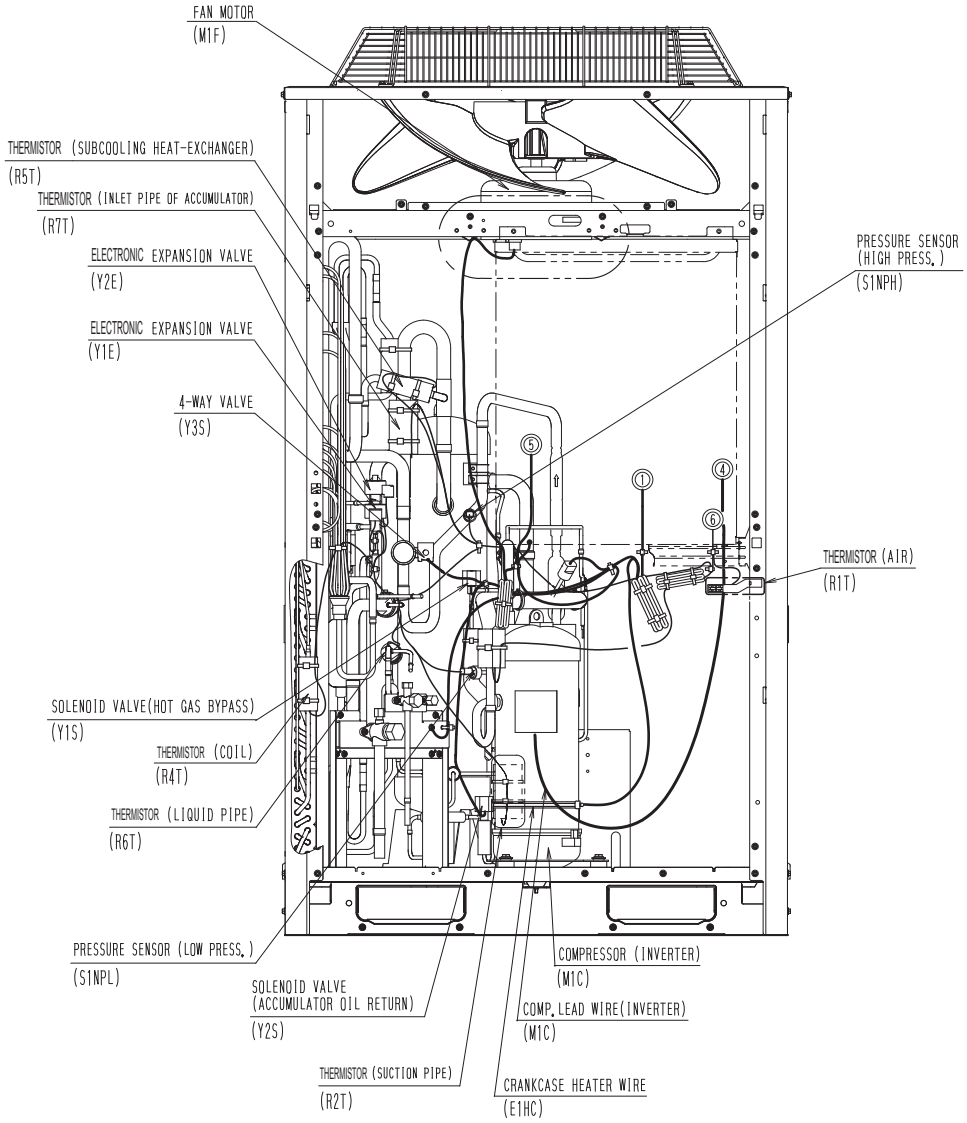
2.2 Functional Parts Layout Outdoor Unit

2.2.1 EWYQ016BA

Top view

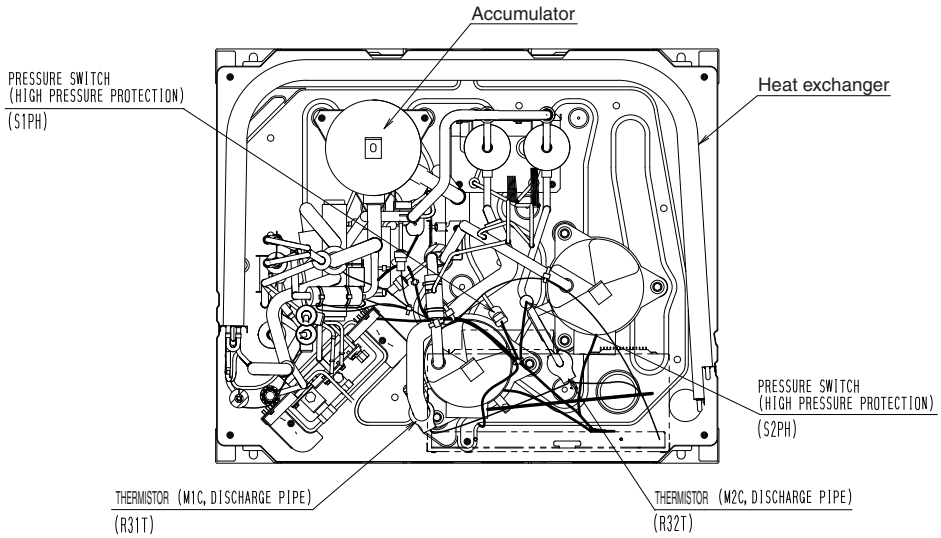


Front view

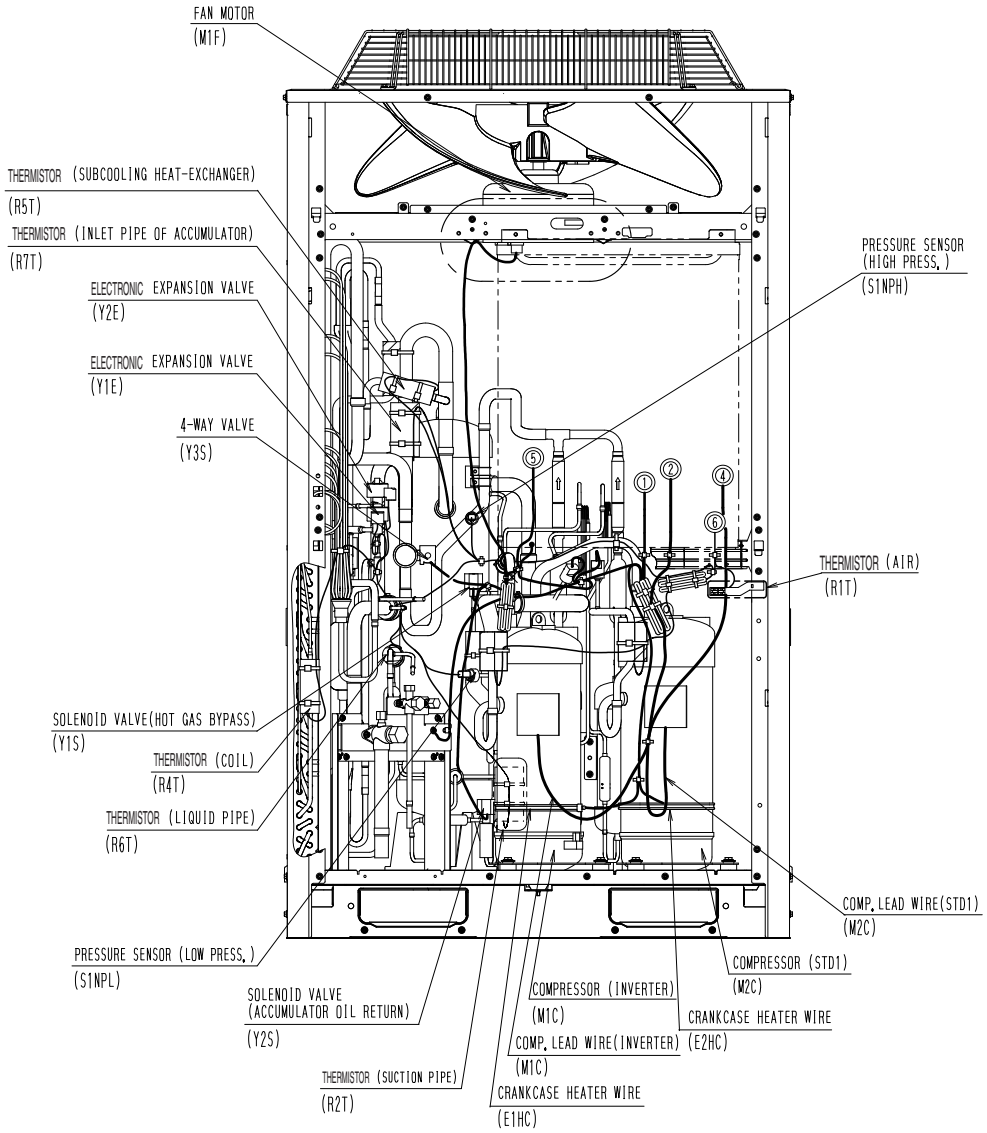


2.2.2 EWYQ021BA, 025BA, 040BA, 050BA

Top view

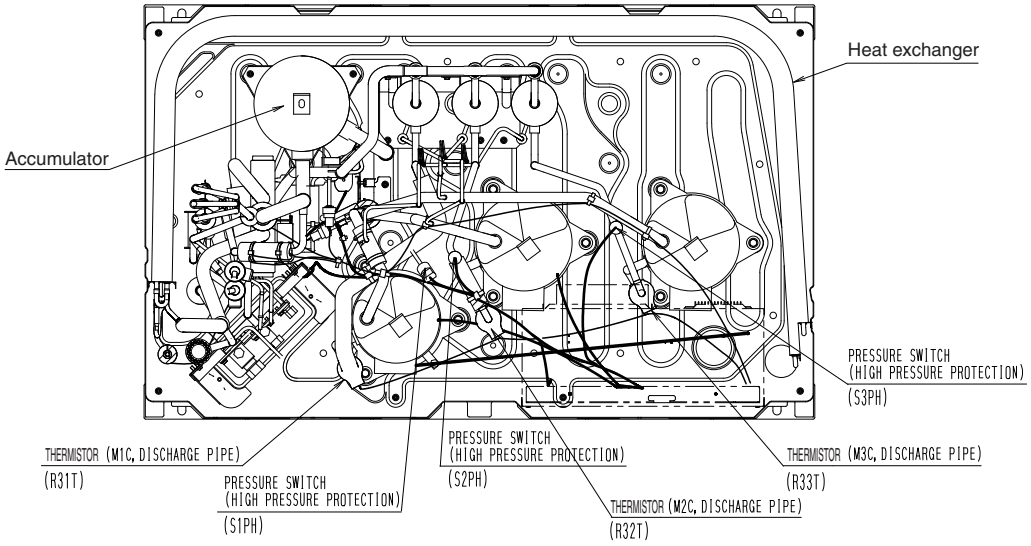


Front view

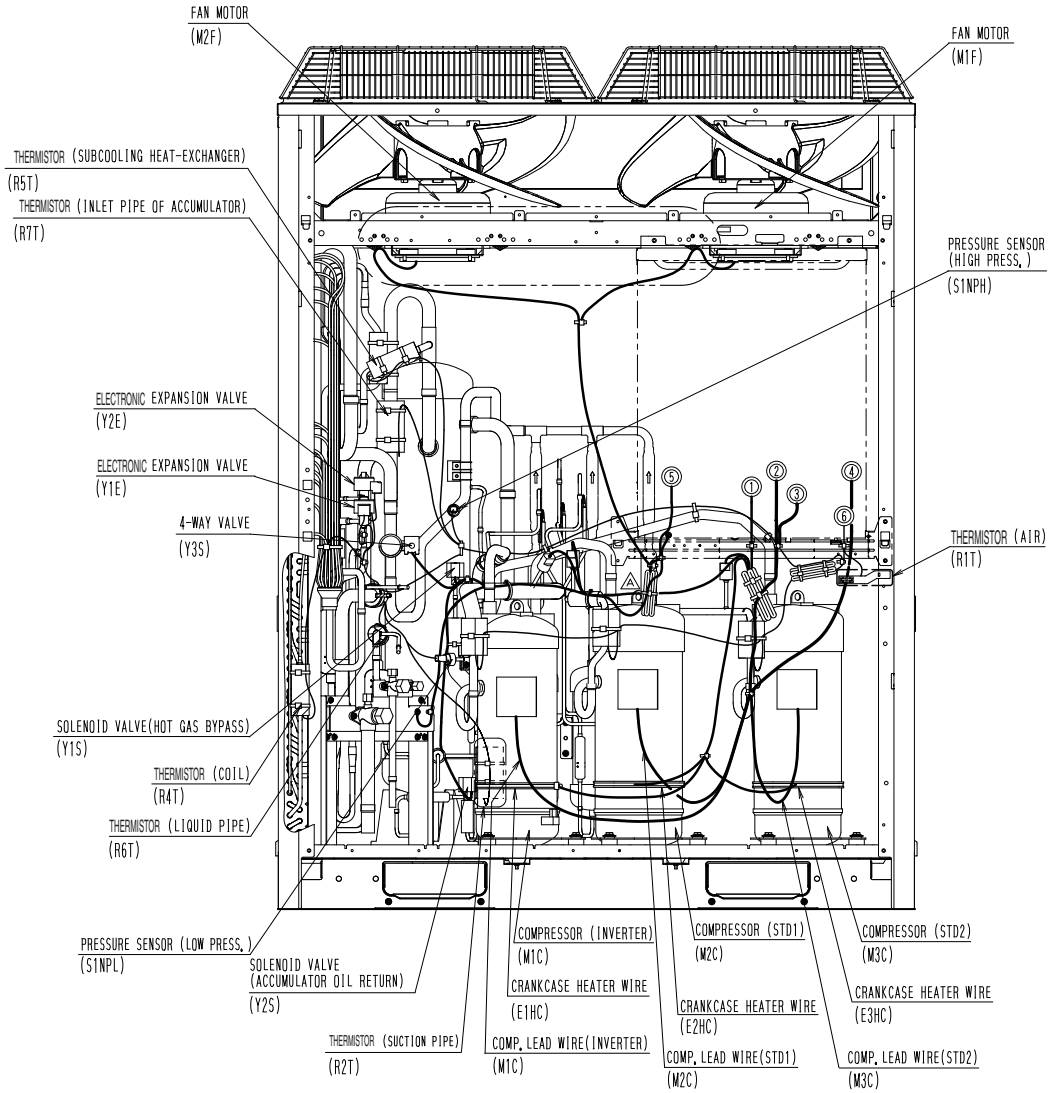


2.2.3 EWYQ032BA, 064BA

Top view

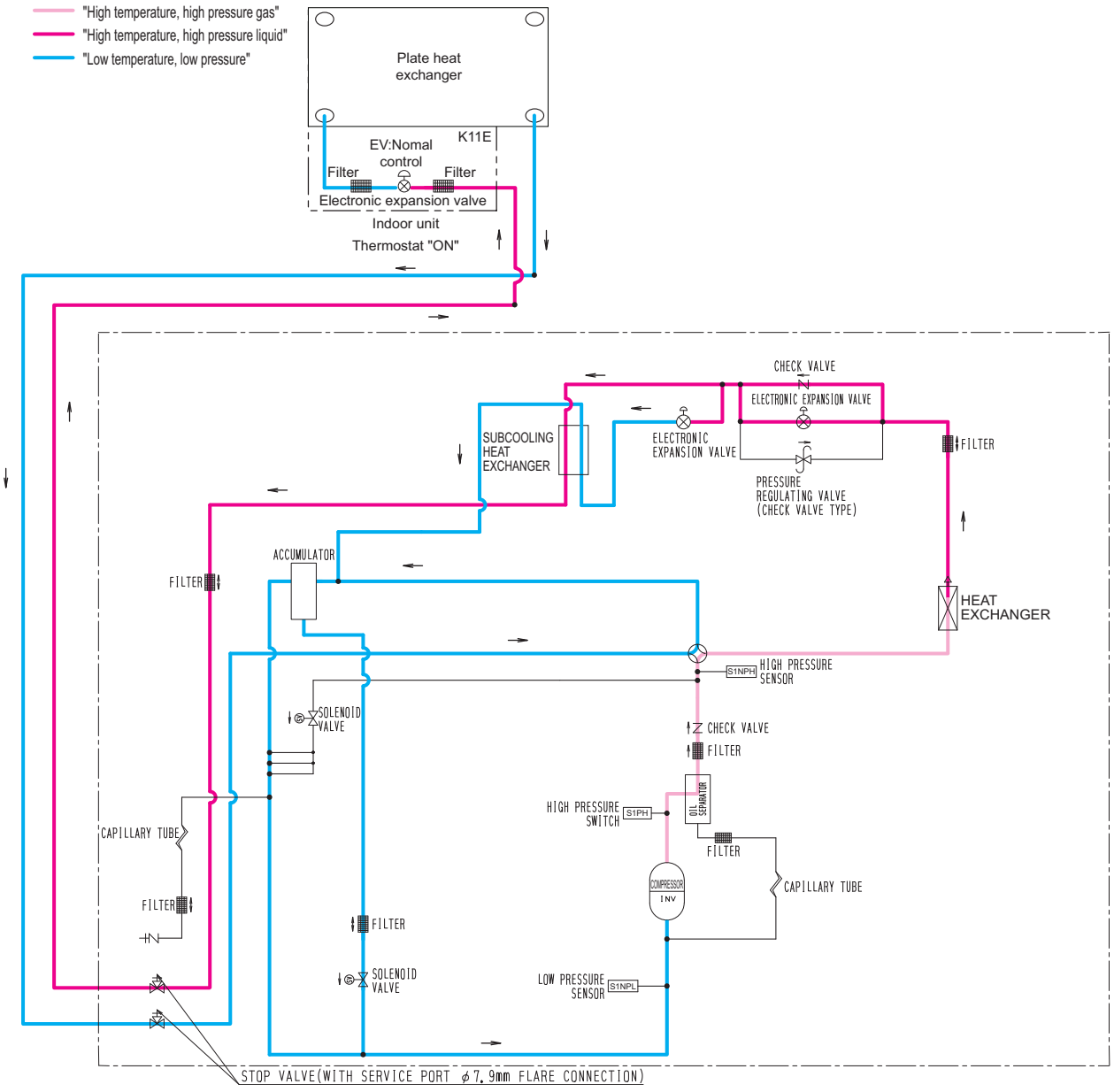


Front view

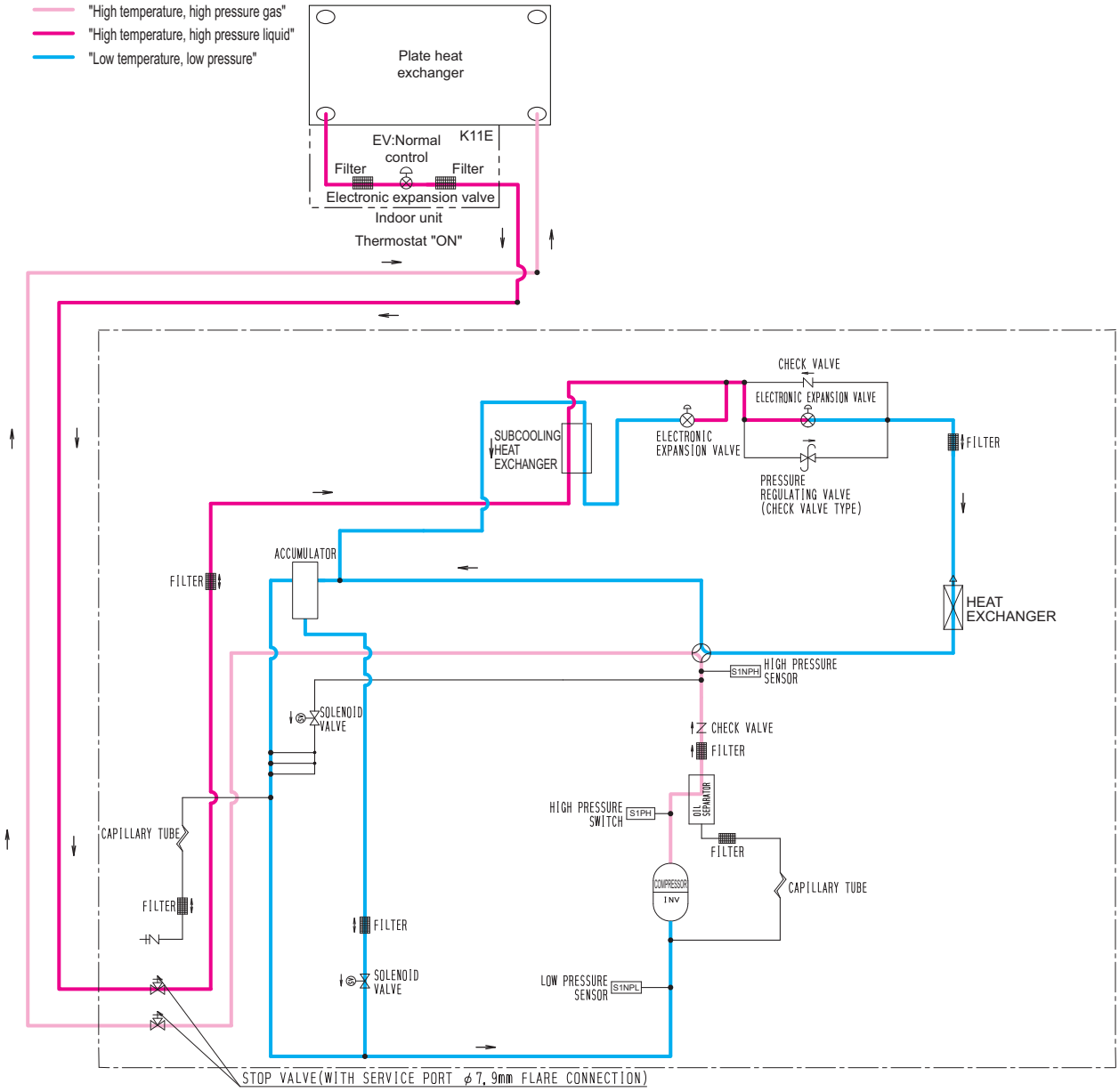


2.3 Refrigerant Flow for Each Operation Mode

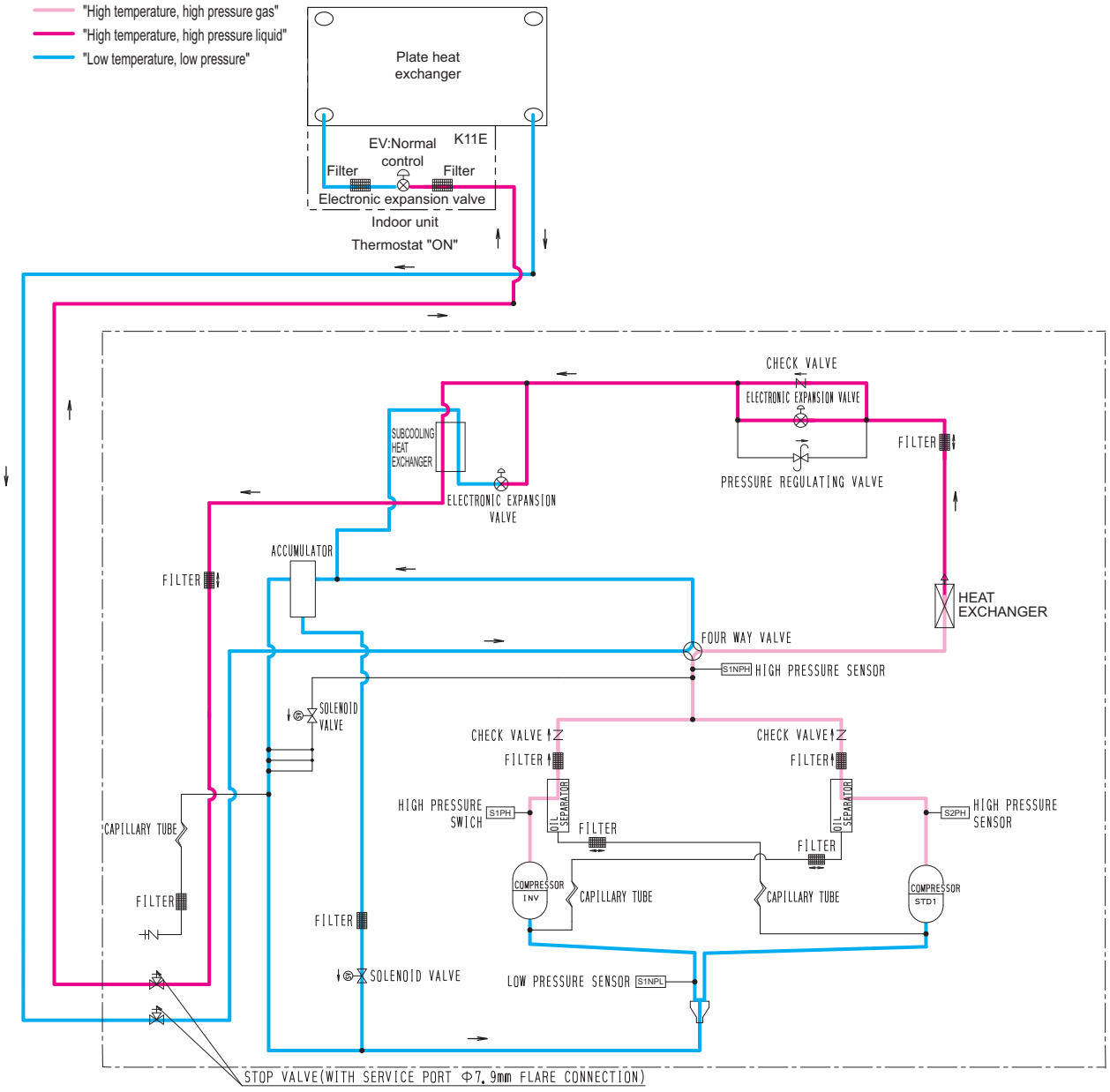
EWYQ016BA
cooling operation



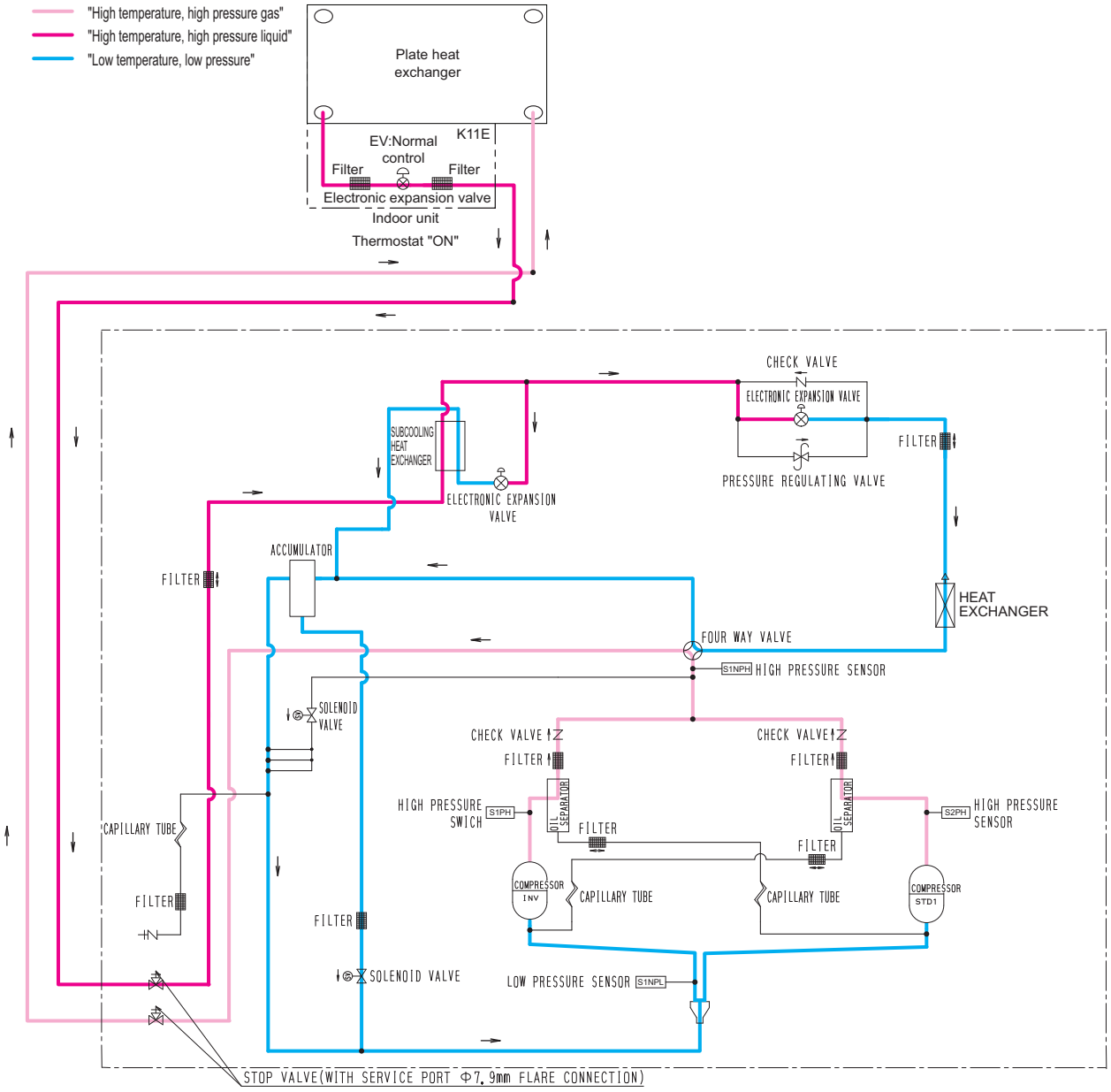
Heating operation



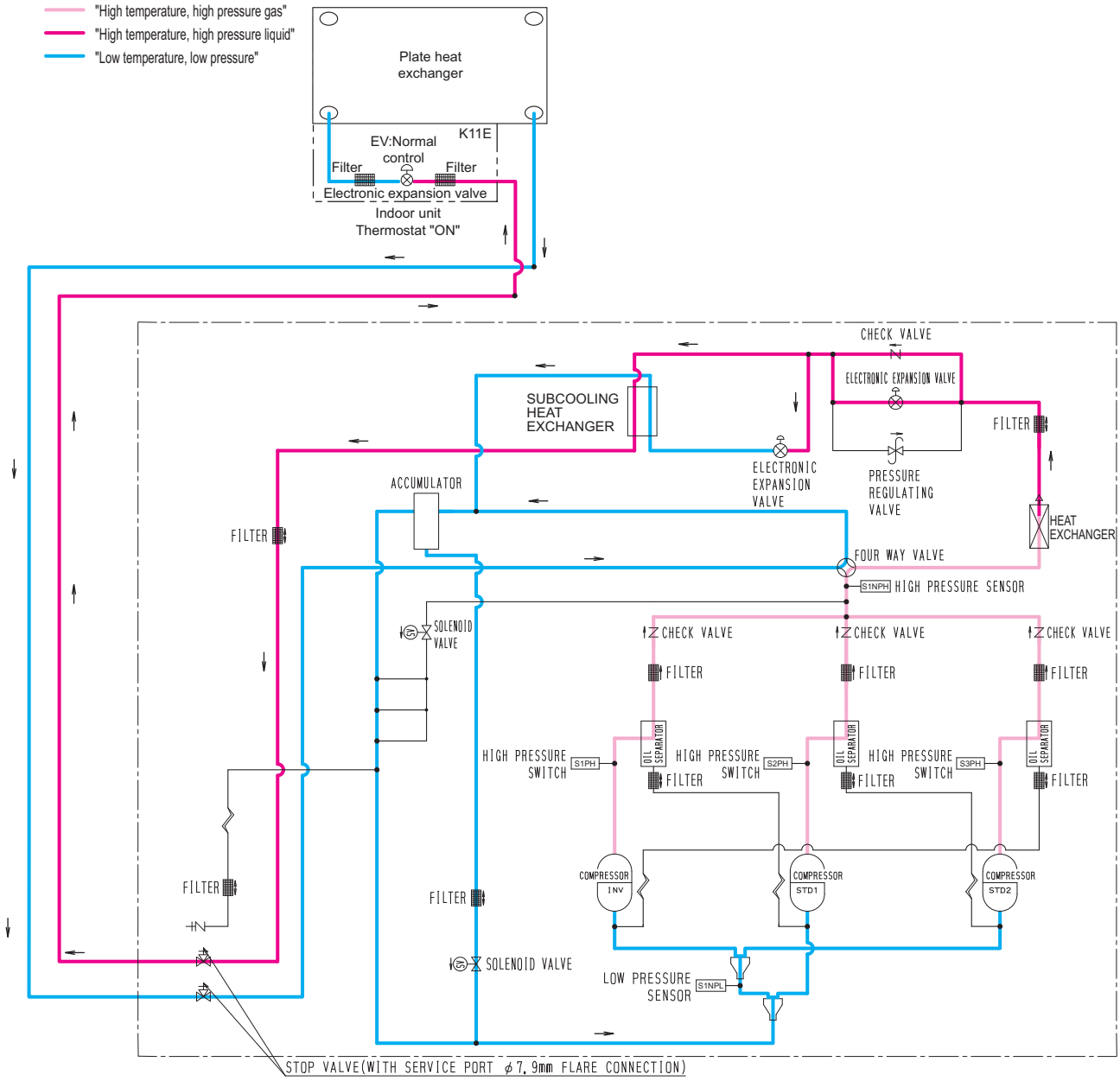
EWYQ021BA, 025BA
cooling operation



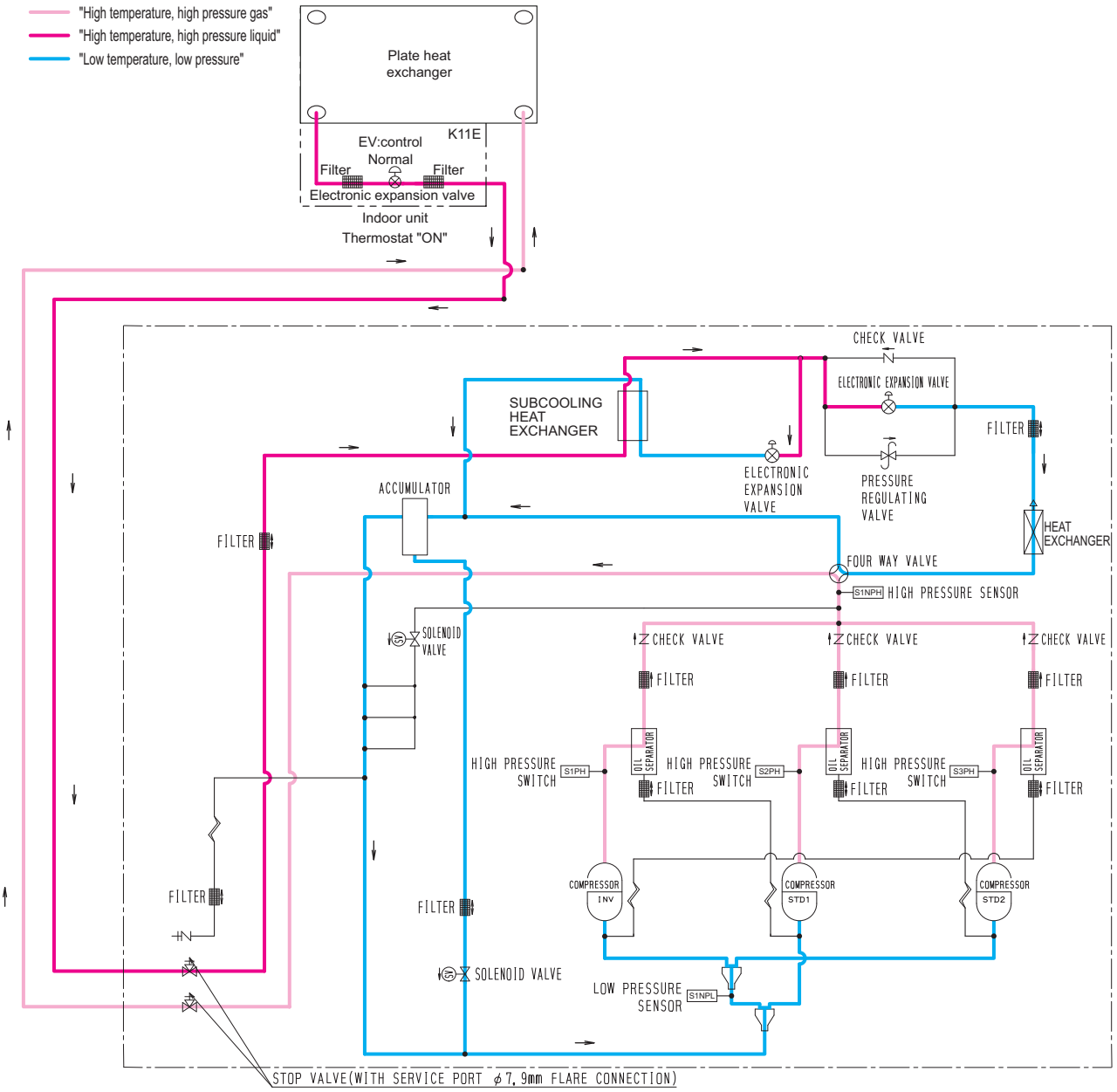
Heating operation



EWYQ032BA
cooling operation

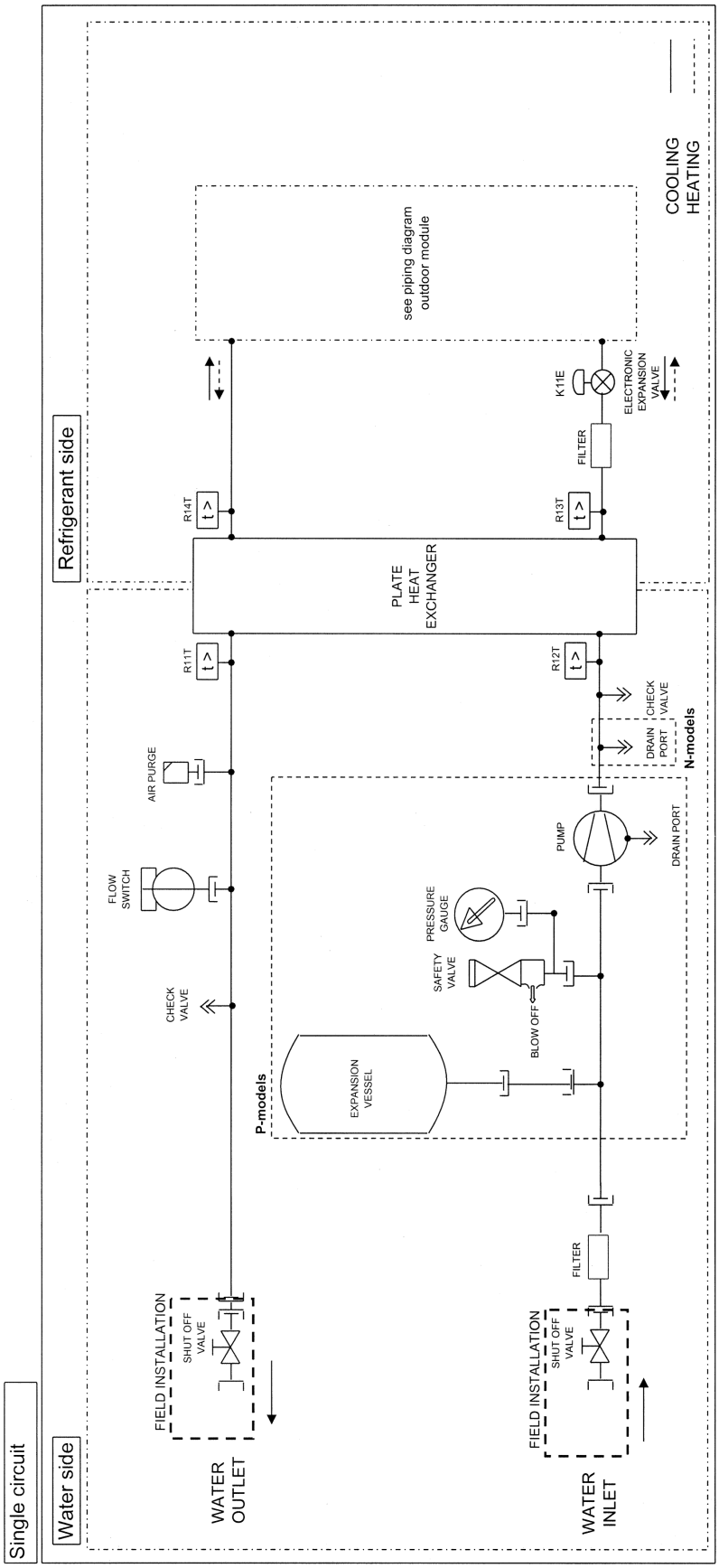


Heating operation



3. Water Circuit

3.1 EWA/YQ016BA, 021BA, 025BA, 032BA



Legend

Part Number	Description
R11T	Outlet water temperature sensor
R12T	Inlet water temperature sensor
R13T	Refrigerant liquid temperature sensor
R14T	Refrigerant gas temperature sensor

Notes


Check valve

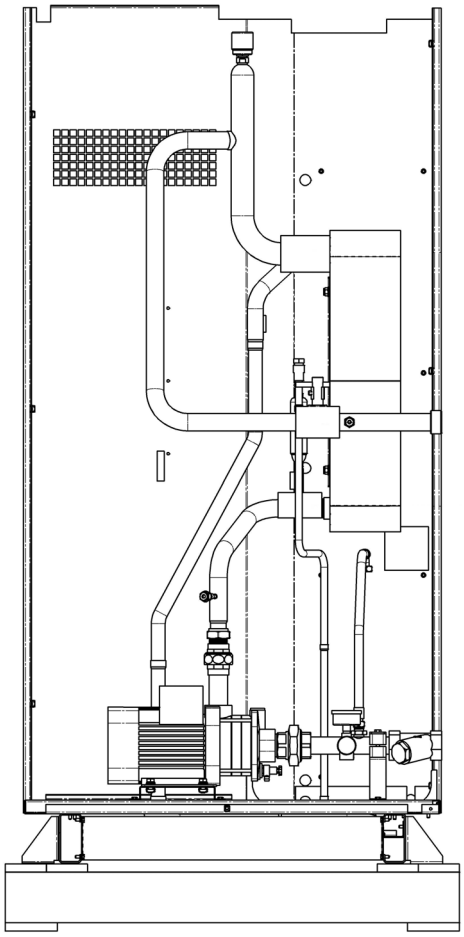

Flare connection


Screw connection

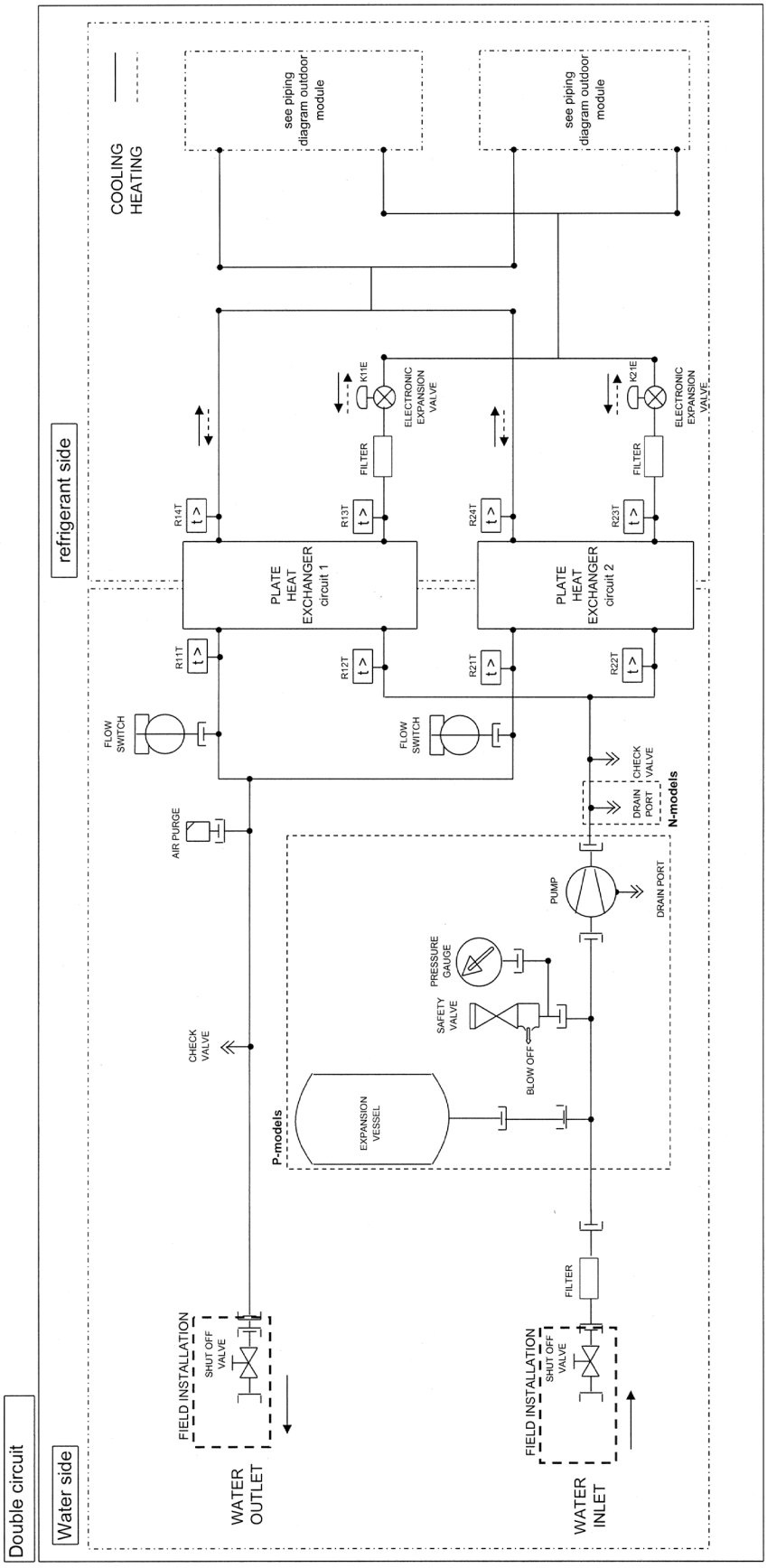

Flange connection


Pinched pipe


Spinned pipe



3.2 EWA/YQ040BA, 050BA, 064BA



Legend

Part Number	Description
R11T	Outlet water temperature sensor
R12T	Inlet water temperature sensor
R13T	Refrigerant liquid temperature sensor
R14T	Refrigerant gas temperature sensor
K11E	Electronic expansion valve (circuit 1)
R21T	Outlet water temperature sensor
R22T	Inlet water temperature sensor
R23T	Refrigerant liquid temperature sensor
R24T	Refrigerant gas temperature sensor
K21E	Electronic expansion valve (circuit 2)

Notes


Check valve

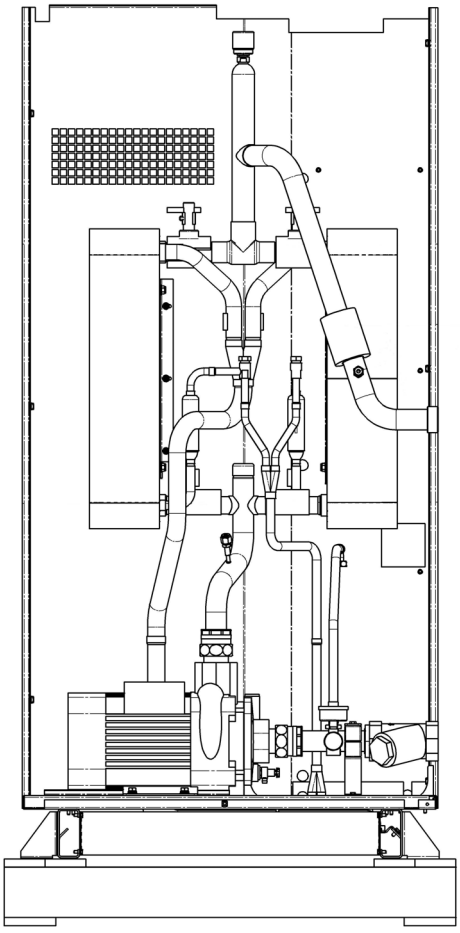

Flare connection


Screw connection


Flange connection

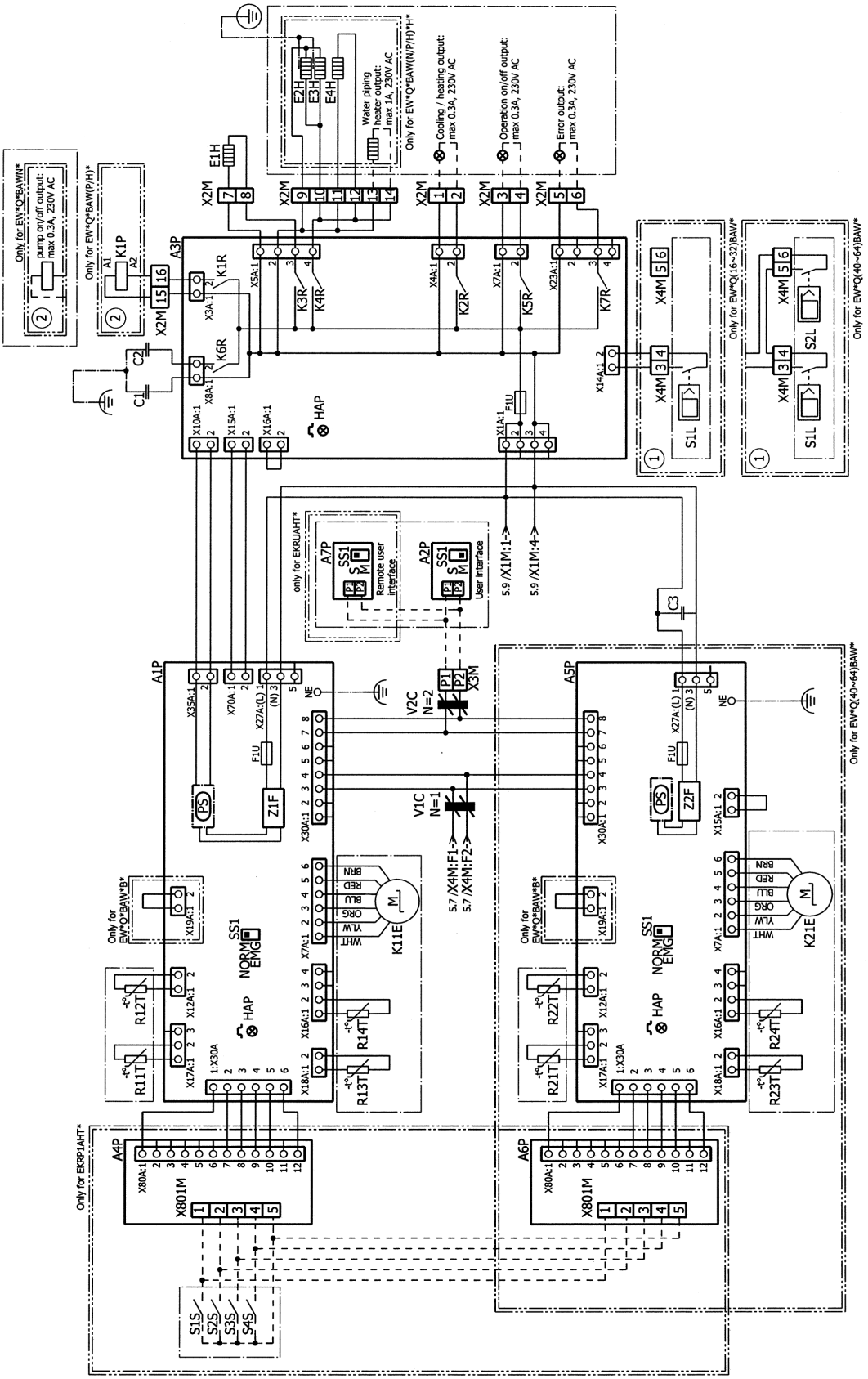
Pinched pipe


Spinned pipe



4. Wiring Diagram

4.1 Hydrobox Wiring



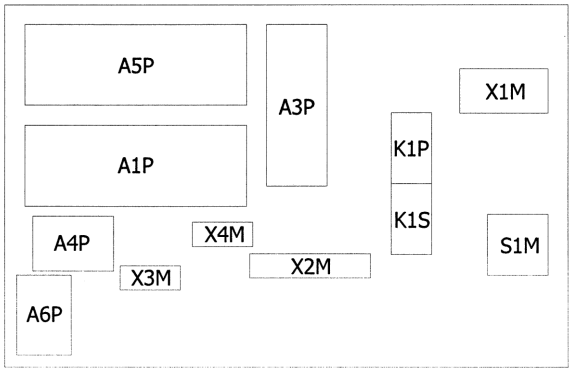
Legend

Part Number		Description
A1P		Main PCB (master)
A2P		User interface PCB
A3P		Control PCB
A4P	*	Demand PCB
A5P		Main PCB (slave)
A6P	*	Demand PCB
A7P	*	Remote user interface PCB
C1 - C3		Filter capacitor
E1H		Switch box heater
E2H		Plate heat exchanger heater (circuit 1)
E3H		Plate heat exchanger heater (circuit 2)
E4H		Water piping heater
E5H		Expansion vessel heater
F1 - F2		Fuse (F, 1A, 250V)
F1U (A*P)		Fuse (T, 3.15A, 250V)
HAP (A*P)		PCB LED
K11E		Electronic expansion valve (circuit 1)
K21E		Electronic expansion valve (circuit 2)
K1P		Pump contactor
K1S		Pump overcurrent relay
K*R (A3P)		PCB relay
M1P		Pump
PS (A*P)		Switching power supply
Q1DI	#	Earth leakage circuit breaker
Q1T		Thermostat for expansion vessel heater
R11T		Leaving water thermistor (circuit 1)
R12T		Returning water thermistor (circuit 1)
R13T		Refrigerant liquid thermistor (circuit 1)
R14T		Refrigerant gas thermistor (circuit 1)
R21T		Leaving water thermistor (circuit 2)
R22T		Returning water thermistor (circuit 2)
R23T		Refrigerant liquid thermistor (circuit 2)
R24T		Refrigerant gas thermistor (circuit 2)
S1L		Flow switch (circuit 1)
S2L		Flow switch (circuit 2)
S1M		Main switch
S1S	#	Thermostat input 1
S2S	#	Thermostat input 2
S3S	#	Operation ON input
S4S	#	Operation OFF input
SS1 (A1P, A5P)		Selector switch (emergency)
SS1 (A2P)		Selector switch (main / sub)
SS1 (A7P)	*	Selector switch (main / sub)
V1C - V2C		Ferrite core noise filter
X1M - X4M		Terminal strip
X801M (A*P)	*	PCB terminal strip
Z1F - Z2F (A*P)		Noise filter

*: field installed option

#: field supplied

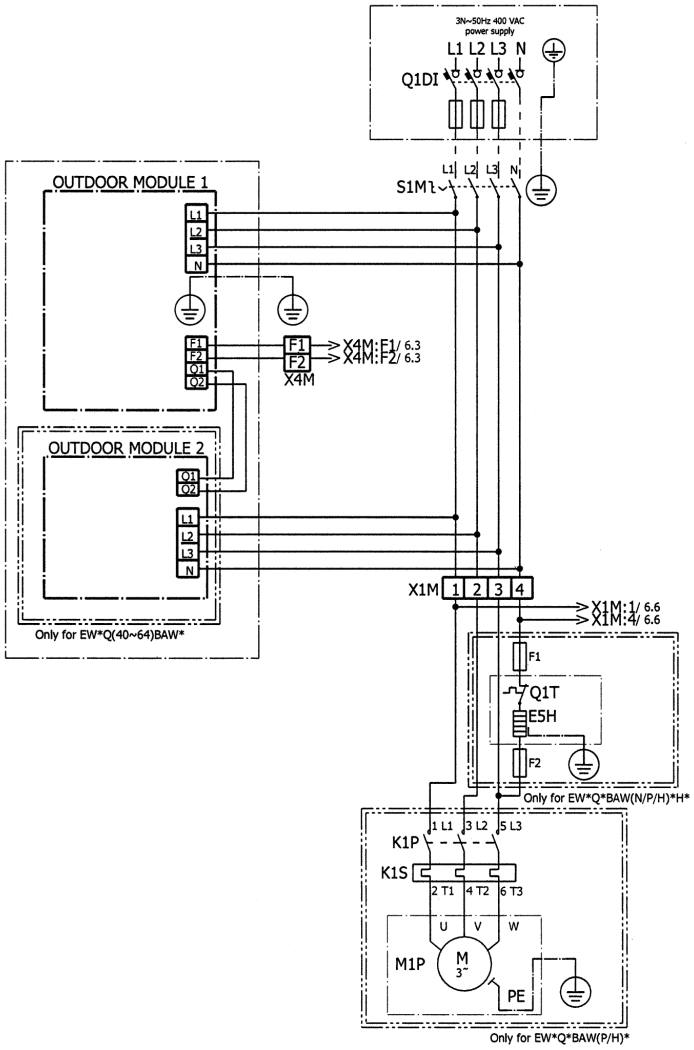
Switch box layout



Notes

1. X1M Terminal
   X2M Field wiring terminal for high voltage
   X3M Field wiring terminal for low voltage
   X4M Factory wiring terminal for low voltage
2. Earth wiring
   Field supply
   Option
   Wiring depending on model
   Not mounted in switch box
   PCB
   1 Several wiring possibilities
3. User installed options:
   EKRUAHT* = Remote user interface
   1x EKRP1AHT* = Demand PCB (only for EW*Q(16~32)BAW*)
   2x EKRP1AHT* = Demand PCB's (only for EW*Q(40~64)BAW*)

4.2 Wiring Diagram - Three Phase

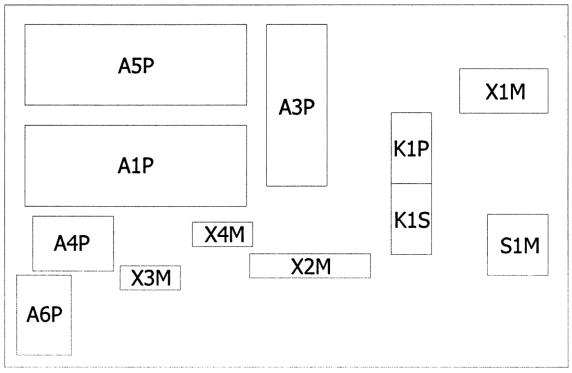


Legend

Part Number		Description
E5H		Expansion vessel heater
F1 - F2		Fuse (F, 1A, 250V)
K1P		Pump contactor
K1S		Pump overcurrent relay
M1P		Pump
PS (A*P)		Switching power supply
Q1DI	#	Earth leakage circuit breaker
Q1T		Thermostat for expansion vessel heater
S1M		Main switch
X1M - X4M		Terminal strip

#: field supplied

Switch box layout

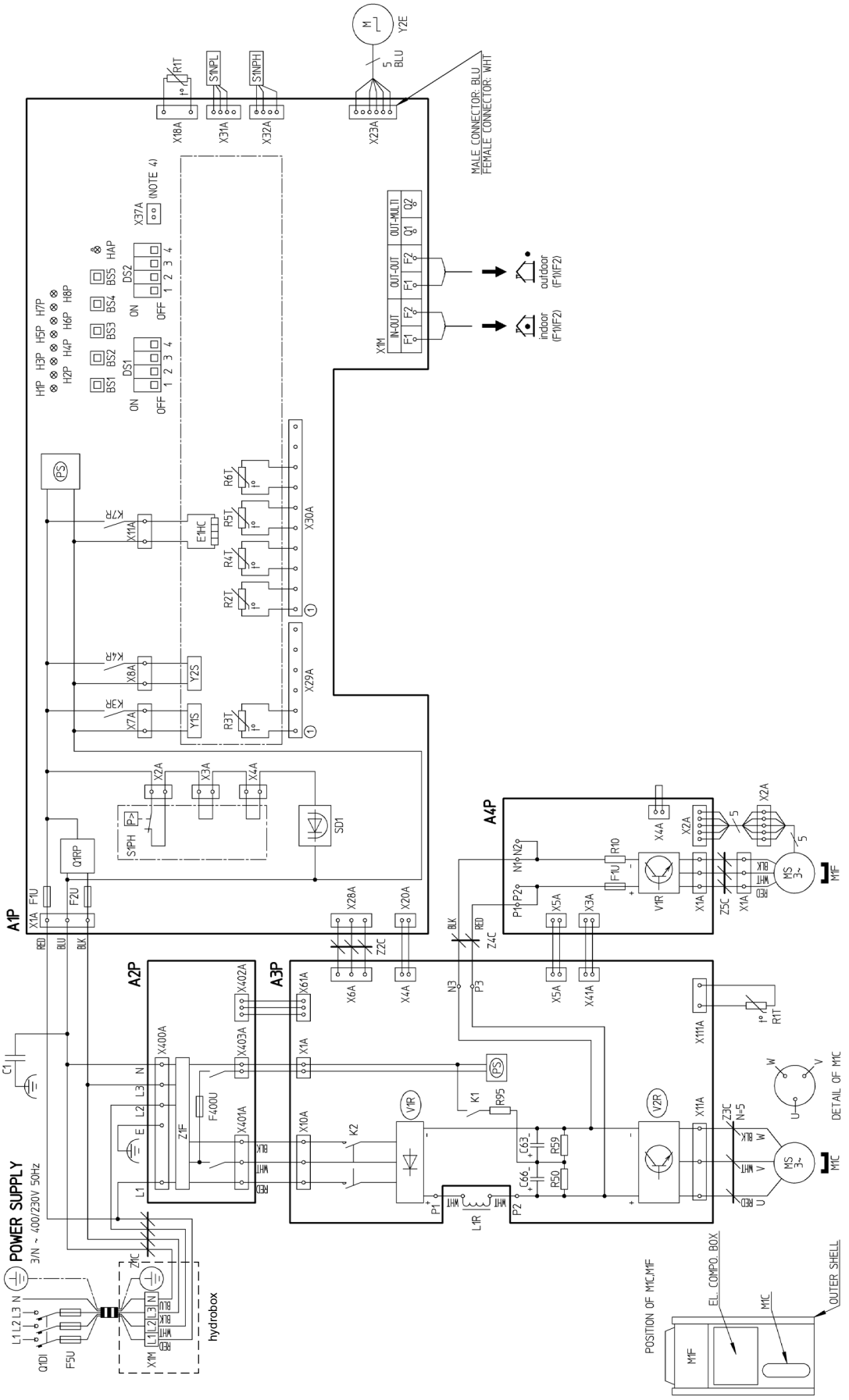


Notes

1. X1M Terminal
   X2M Field wiring terminal for high voltage
   X3M Field wiring terminal for low voltage
   X4M Factory wiring terminal for low voltage
2. Earth wiring
   Field supply
   Option
   Wiring depending on model
   Not mounted in switch box
   PCB
   1 Several wiring possibilities
3. User installed options:
   EKRUAHT* = Remote user interface
   1x EKRP1AHT* = Demand PCB (only for EW*Q(16~32)BAW*)
   2x EKRP1AHT* = Demand PCB's (only for EW*Q(40~64)BAW*)

4.3 Wiring Outdoor

4.3.1 EW*Q016BA

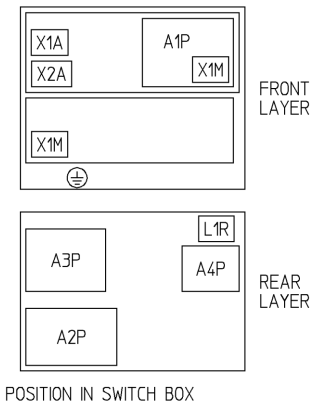


Legend

Part Number	Description	
A1P-A4P	Printed circuit board	
	A1P: Main	A4P: Fan
	A2P: Noise filter	A5P: *1
	A3P: Inverter	
BS1~BS5	Push button switch (Mode, set, return, test, reset)	
C1	Capacitor	
C63, C66	Capacitor	
DS1, DS2	Dip switch	
E1HC	Crankcase heater	
F1U	Fuse (250V, 8A Ⓑ) (A4P)	
F1U, F2U	Fuse (250V, 3.15A Ⓣ) (A1P)	
F5U	Field fuse	
F400U	Fuse (250V, 6.3A Ⓣ) (A2P)	
H1P~H8P	Pilotlamp (service monitor - orange) [H2P] Prepare, Test -------- Flickering Malfunction detection --- Light up	
HAP	Pilotlamp (service monitor - green)	
K1	Magnetic relay	
K2	Magnetic contactor (M1C)	
K3R~K7R	K3R: Y1S	K7R: E1HC
	K4R: Y2S	
L1R	Reactor	
M1C	Motor (Compressor)	
M1F	Motor (Fan)	
PS	Switching power supply (A1P, A3P)	
Q1RP	Phase reversal detect circuit	
Q1DI	Earth leakage breaker	
R1T~R6T	Thermistor	
	R1T: AIR (A1P)	R4T: Heat exch. deicer
	R1T: FIN (A3P)	R5T: Heat exch. outlet
	R2T: Suction	R6T: Liquid pipe
	R3T: M1C discharge	
R10	Resistor (current sensor) (A4P)	
R50, R59	Resistor	
R95	Resistor (current limiting)	
S1NPH	Pressure sensor (high)	
S1NPL	Pressure sensor (low)	
S1PH	Pressure switch (high)	
SD1	Safety devices input	
V1R	Power module (A4P)	
V1R, V2R	Power module (A3P)	
X1A, X2A	Connector (M1F)	
X1M	Terminal strip (power supply)	
X1M	Terminal strip (Control) (A1P)	
Y2E	Electronic expansion valve (subcool)	
Y1S~Y2S	Solenoid valve	
	Y1S: Hot gas	
	Y2S: Oil return	
Z1C~5C	Noise filter (ferrite core)	
Z1F	Noise filter (with surge absorber)	

*1: ABC terminals

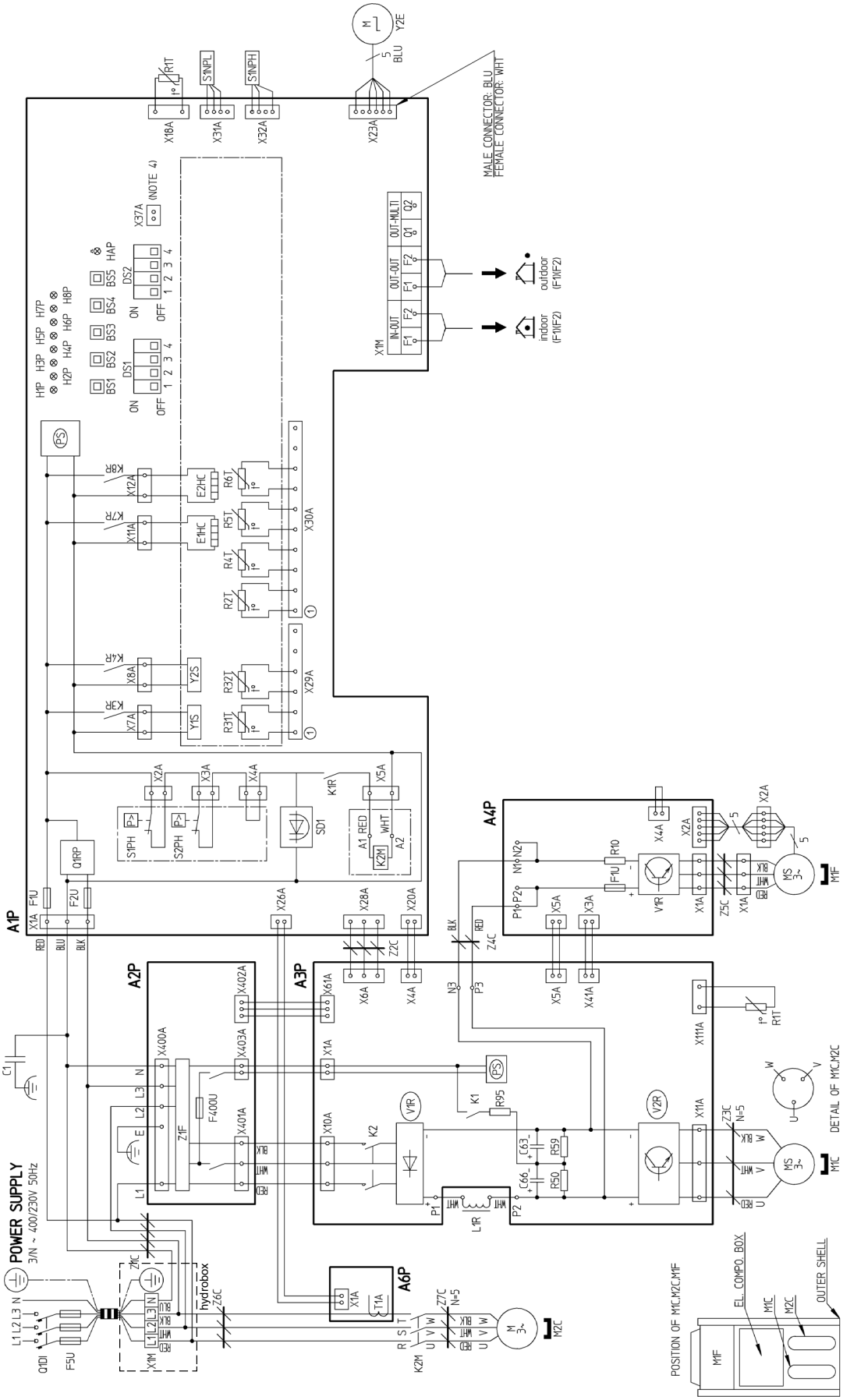
Switch box layout



Notes

1. This wiring diagram only applies to the outdoor unit
2. : field wiring : indication of parts outside switch box
3. : terminal strip : connector : terminal : protective earth (screw)
4. When using the option adapter, refer to the installation manual
5. Refer to the installation manual, for connection wiring to indoor-outdoor transmission F1-F2, outdoor-outdoor transmission F1-F2 and on how to use BS1~BS5 and DS1, DS2 switch.
6. Do not operate the unit by short-circuiting protection device S1PH
7. BLK = Black, RED = Red, BLU = Blue, WHT = White, PNK = Pink, YLW = Yellow, BRN = Brown, GRY = Grey, GRN = Green, ORG = Orange

4.3.2 EW*Q021BA, 025BA, 040BA, 050BA

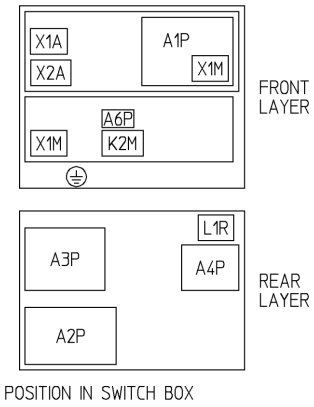


Legend

Part Number	Description	
A1P-A6P	Printed circuit board	
	A1P: Main	A4P: Fan
	A2P: Noise filter	A5P: *1
	A3P: Inverter	A6P: Current sensor
BS1~BS5	Push button switch (Mode, set, return, test, reset)	
C1	Capacitor	
C63, C66	Capacitor	
DS1, DS2	Dip switch	
E1HC, E2HC	Crankcase heater	
F1U	Fuse (250V, 8A Ⓑ) (A4P)	
F1U, F2U	Fuse (250V, 3.15A Ⓣ) (A1P)	
F5U	Field fuse	
F400U	Fuse (250V, 6.3A Ⓣ) (A2P)	
H1P~H8P	Pilotlamp (service monitor - orange) [H2P] Prepare, Test -------- Flickering Malfunction detection --- Light up	
HAP	Pilotlamp (service monitor - green)	
K1	Magnetic relay	
K2	Magnetic contactor (M1C)	
K2M	Magnetic contactor (M2C)	
K1R	Magnetic relais (K2M)	
K3R~K8R	K3R: Y1S	K7R: E1HC
	K4R: Y2S	K8R: E2HC
L1R	Reactor	
M1C, M2C	Motor (Compressor)	
M1F	Motor (Fan)	
PS	Switching power supply (A1P, A3P)	
Q1RP	Phase reversal detect circuit	
Q1DI	Earth leakage breaker	
R10	Resistor (current sensor) (A4P)	
R50, R59	Resistor	
R95	Resistor (current limiting)	
R1T~R6T R31T, R32T	Thermistor	
	R1T: AIR (A1P)	R4T: Heat exch. deicer
	R1T: FIN (A3P)	R5T: Heat exch. outlet
	R2T: Suction	R6T: Liquid pipe
	R31T: M1C discharge	R32T: M2C discharge
S1NPH	Pressure sensor (high)	
S1NPL	Pressure sensor (low)	
S1PH, S2PH	Pressure switch (high)	
T1A	Current sensor (A6P)	
SD1	Safety devices input	
V1R	Power module (A4P)	
V1R, V2R	Power module (A3P)	
X1A, X2A	Connector (M1F)	
X1M	Terminal strip (power supply)	
X1M	Terminal strip (Control) (A1P)	
Y2E	Electronic expansion valve (subcool)	
Y1S~Y2S	Solenoid valve	
	Y1S: Hot gas	
	Y2S: Oil return	
Z1C~Z7C	Noise filter (ferrite core)	
Z1F	Noise filter (with surge absorber)	

*1: ABC terminals

Switch box layout

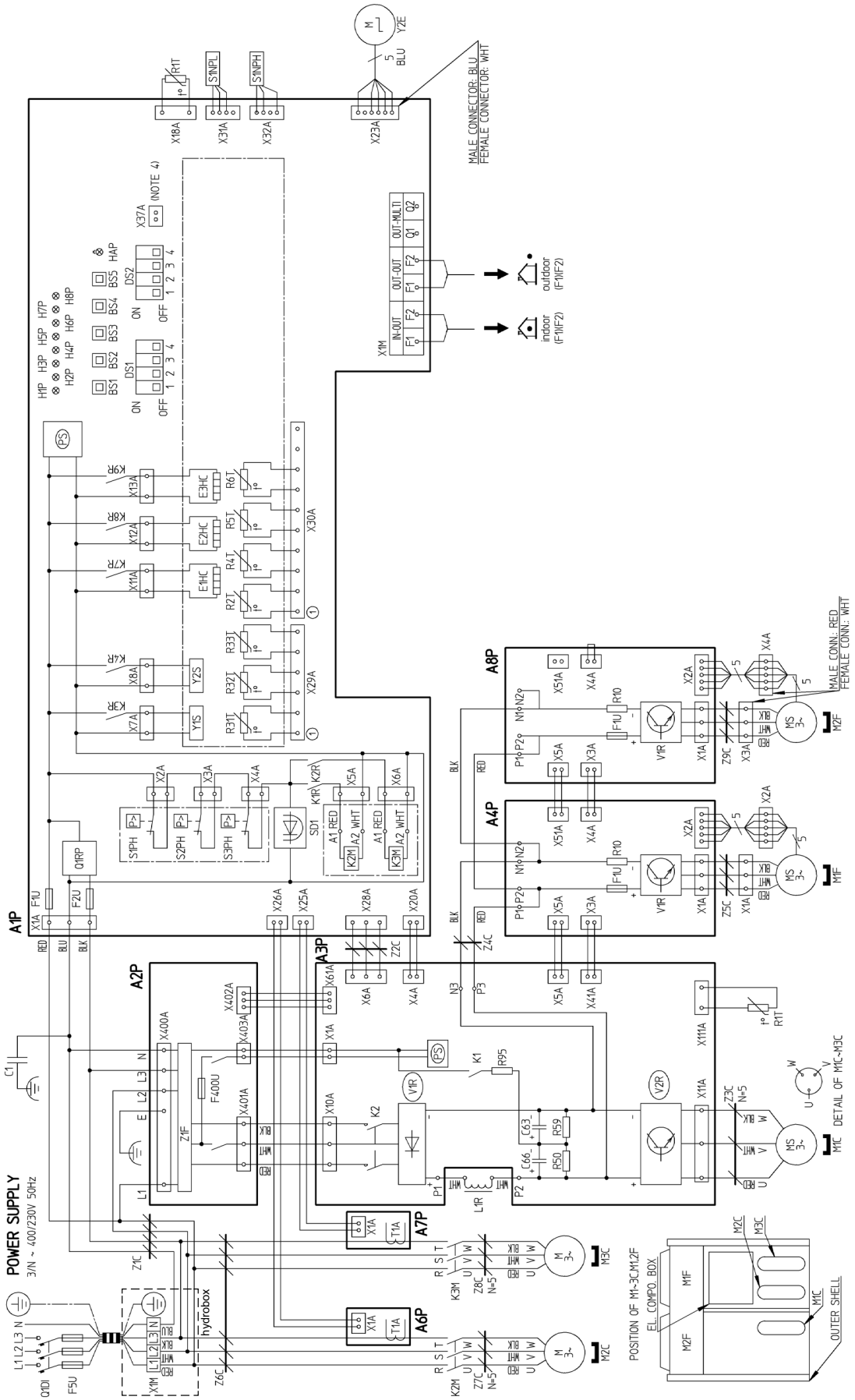


POSITION IN SWITCH BOX

Notes

1. This wiring diagram only applies to the outdoor unit
2. : field wiring : indication of parts outside switch box
3. : terminal strip : connector : terminal : protective earth (screw)
4. When using the option adapter, refer to the installation manual
5. Refer to the installation manual, for connection wiring to indoor-outdoor transmission F1-F2, outdoor-outdoor transmission F1-F2 and on how to use BS1~BS5 and DS1, DS2 switch.
6. Do not operate the unit by short-circuiting protection device S1PH
7. BLK = Black, RED = Red, BLU = Blue, WHT = White, PNK = Pink, YLW = Yellow, BRN = Brown, GRY = Grey, GRN = Green, ORG = Orange

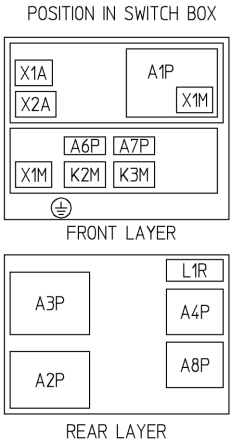
4.3.3 EW*Q032BA, 064BA



Legend

Part Number	Description	
A1P-A7P	Printed circuit board	
	A1P: Main	A4P, A8P: Fan
	A2P: Noise filter	A6P, A7P: Current sensor
	A3P: Inverter	
BS1~BS5	Push button switch (Mode, set, return, test, reset)	
C1	Capacitor	
C63, C66	Capacitor	
DS1, DS2	Dip switch	
E1HC~E3HC	Crankcase heater	
F1U	Fuse (250V, 8A Ⓑ) (A4P, A8P)	
F1U, F2U	Fuse (250V, 3.15A Ⓣ) (A1P)	
F5U	Field fuse	
F400U	Fuse (250V, 6.3A Ⓣ) (A2P)	
H1P~H8P	Pilotlamp (service monitor - orange) [H2P] Prepare, Test -------- Flickering Malfunction detection --- Light up	
HAP	Pilotlamp (service monitor - green)	
K1	Magnetic relay	
K2	Magnetic contactor (M1C)	
K2H, K3H	Magnetic contactor (M2C, M3C)	
K1R, K2R	Magnetic relais (K2M, K3M)	
K3R~K9R	K3R: Y1S	K8R: E2HC
	K4R: Y2S	K9R: E3HC
	K7R: E1HC	
L1R	Reactor	
M1C~M3C	Motor (Compressor)	
M1F, M2F	Motor (Fan)	
PS	Switching power supply (A1P, A3P)	
Q1RP	Phase reversal detect circuit	
Q1DI	Earth leakage breaker	
R10	Resistor (current sensor) (A4P, A8P)	
R1T~R6T R31T~R33T	Thermistor	
	R1T: AIR (A1P)	R33T: M3C discharge
	R1T: FIN (A3P)	R4T: Heat exch. deicer
	R2T: Suction	R5T: Heat exch. outlet
	R31T: M1C discharge	R6T: Liquid pipe
	R32T: M2C discharge	
R50, R59	Resistor	
R95	Resistor (current limiting)	
S1NPH	Pressure sensor (high)	
S1NPL	Pressure sensor (low)	
S1PH, S2PH	Pressure switch (high)	
T1A	Current sensor (A6P, A7P)	
SD1	Safety devices input	
V1R	Power module (A4P, A8P)	
V1R, V2R	Power module (A3P)	
X1A, X4A	Connector (M1F, M2F)	
X1M	Terminal strip (power supply)	
X1M	Terminal strip (Control) (A1P)	
Y2E	Electronic expansion valve (subcool)	
Y1S~Y2S	Solenoid valve	
	Y1S: Hot gas	
	Y2S: Oil return	
Z1C~Z5C	Noise filter (ferrite core)	
Z1F	Noise filter (with surge absorber)	

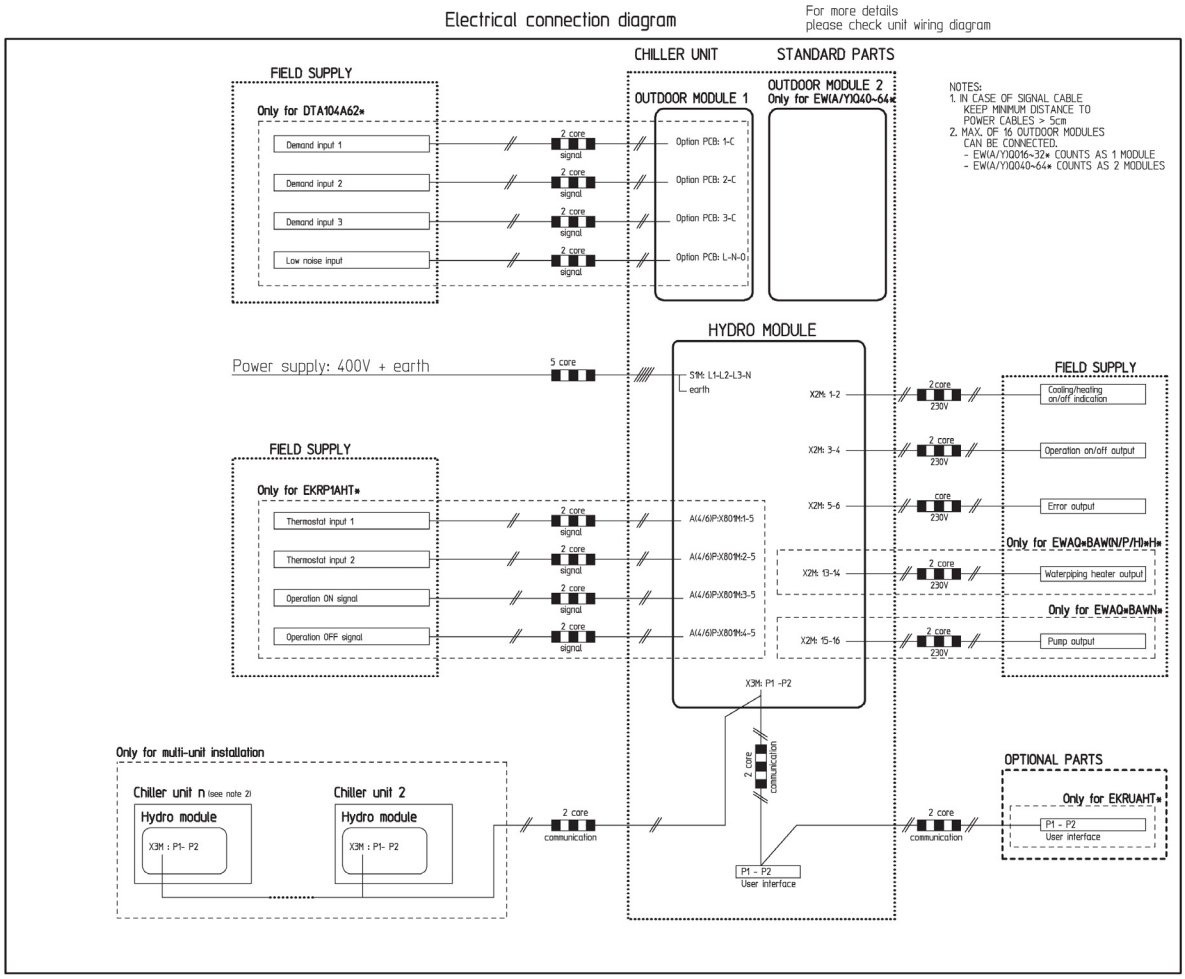
Switch box layout



Notes

1. This wiring diagram only applies to the outdoor unit
2. : field wiring : indication of parts outside switch box
3. : terminal strip : connector : terminal : protective earth (screw)
4. When using the option adapter, refer to the installation manual
5. Refer to the installation manual, for connection wiring to indoor-outdoor transmission F1-F2, outdoor-outdoor transmission F1-F2 and on how to use BS1~BS5 and DS1, DS2 switch.
6. Do not operate the unit by short-circuiting protection device S1PH
7. BLK = Black, RED = Red, BLU = Blue, WHT = White, PNK = Pink, YLW = Yellow, BRN = Brown, GRY = Grey, GRN = Green, ORG = Orange

4.4 Field Wiring



3TW60726-2

Part 2
Functional Description

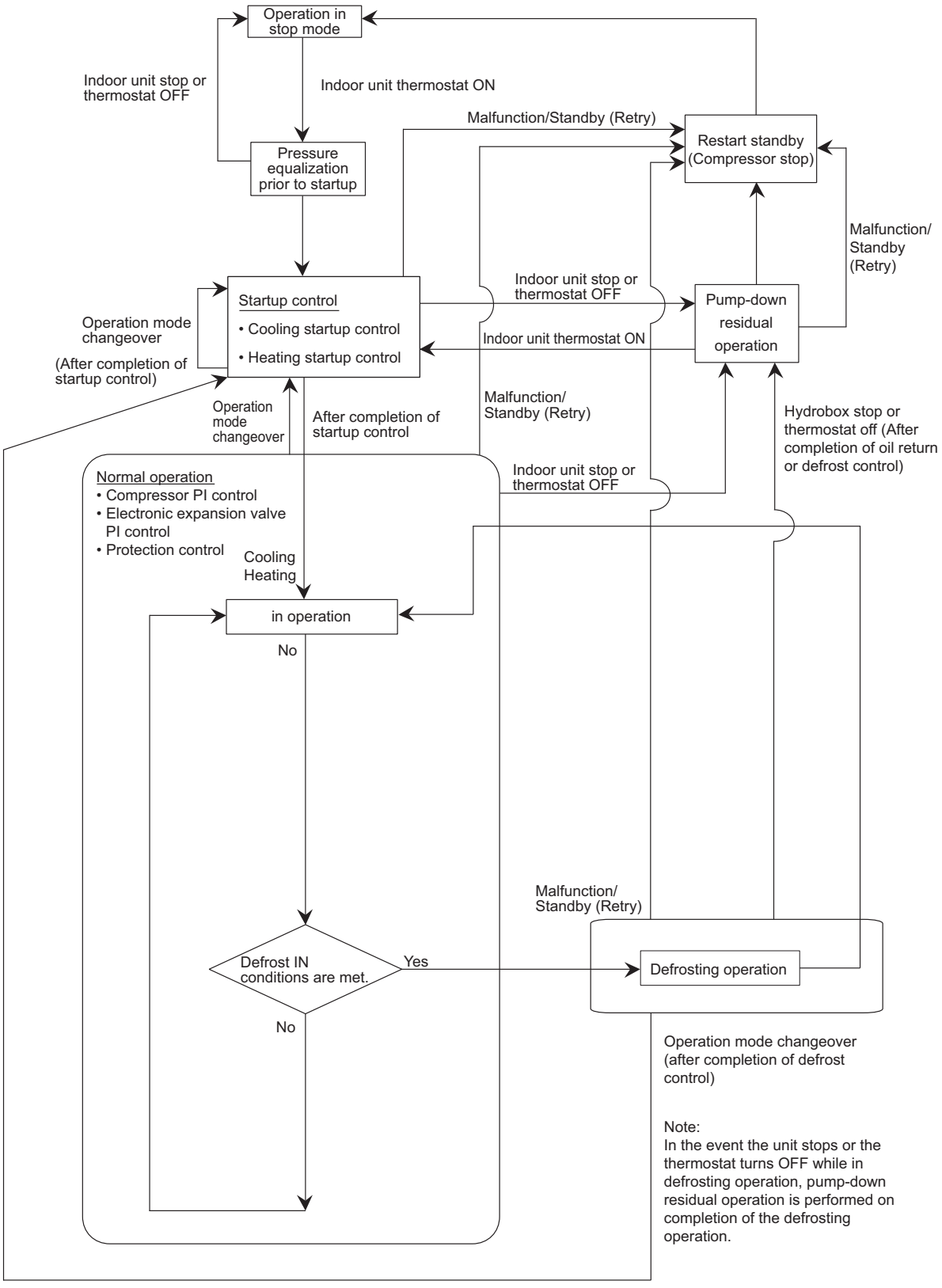
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   4.1 High Pressure Protection Control....51
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   5.1 Emergency Operation....56
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1. Function General

1.1 Symbol

Symbol	Electric symbol	Description or function
20S1	Y3S	Four way valve (Energize during heating)
DSH	–	Discharge pipe superheated degree
DSHi	–	Discharge pipe superheat of inverter compressor
DSHs	–	Discharge pipe superheat of standard compressor
EV	–	Opening of electronic expansion valve
EV1	Y1E	Electronic expansion valve for main heat exchanger
EV2	Y2E	Electronic expansion valve for subcooling heat exchanger
HTdi	–	Value of INV compressor discharge pipe temperature (R31T) compensated with outdoor air temperature
HTds	–	Value of STD compressor discharge pipe temperature (R32T, R33T) compensated with outdoor air temperature
Pc	S1NPH	Value detected by high pressure sensor
Pe	S1NPL	Value detected by low pressure sensor
SH	–	Evaporator outlet superheat
SHS	–	Target evaporator outlet superheat
SVO	Y2S	Solenoid valve for oil return
SVP	Y1S	Solenoid valve for hot gas bypass
SVT	Y4S	Solenoid valve for injection
Ta	R1T (A1P)	Outdoor air temperature
Tb	R4T	Heat exchanger outlet temperature at cooling
Ts2	R2T	Suction pipe temperature detected with the suction pipe thermistor (R2T)
Tsh	R5T (–)	Temperature detected with the subcooling heat exchanger outlet thermistor (R5T)
Tc	–	High pressure equivalent saturation temperature
TcS	–	Target temperature of Tc
Te	–	Low pressure equivalent saturation temperature
TeS	–	Target temperature of Te
Tfin	R1T	Inverter fin temperature
Tl	R6T	Liquid pipe temperature detected with the liquid pipe thermistor (R6T)
Tp	–	Calculated value of compressor port temperature
Ts1	R7T	Suction pipe temperature detected with the accumulator inlet thermistor

1.2 Operation Mode



2. Basic Control

2.1 Normal Operation

2.1.1 List of Functions in Normal Operation

Part Name	Symbol	(Electric Symbol)	Function of Functional Part	
			Normal Cooling	Normal Heating
Compressor	—	(M1C, M2C)	PI control, High pressure protection, Low pressure protection, Td protection, INV protection	PI control, High pressure protection, Low pressure protection, Td protection, INV protection
Outdoor unit fan		(M1F)	Cooling fan control	Step 7 or 8
Four way valve	20S1	(Y1R)	OFF	ON
Main electronic expansion valve	EV1	(Y1E)	480 pls	PI control
Subcool heat exchanger electronic expansion valve	EV2	(Y2E)	PI control	PI control
Hot gas bypass valve	SVP	(Y1S)	OFF	Energized when the system is set to low pressure control mode
Accumulator oil return valve	SV0	(Y2S)	ON	ON
Hydrobox electronic expansion valve Y3E	EV3		PI control	480 puls
Hydrobox electronic expansion valve Y4E (*1)	EV4		PI control	480 puls

*1 Only for EW*Q040BA, 050BA, 064BA.

2.2 Compressor PI Control

Compressor PI control

Carries out the compressor capacity PI control to maintain Te at constant during cooling operation and Tc at constant during heating operation to ensure stable unit performance.

[Cooling operation]

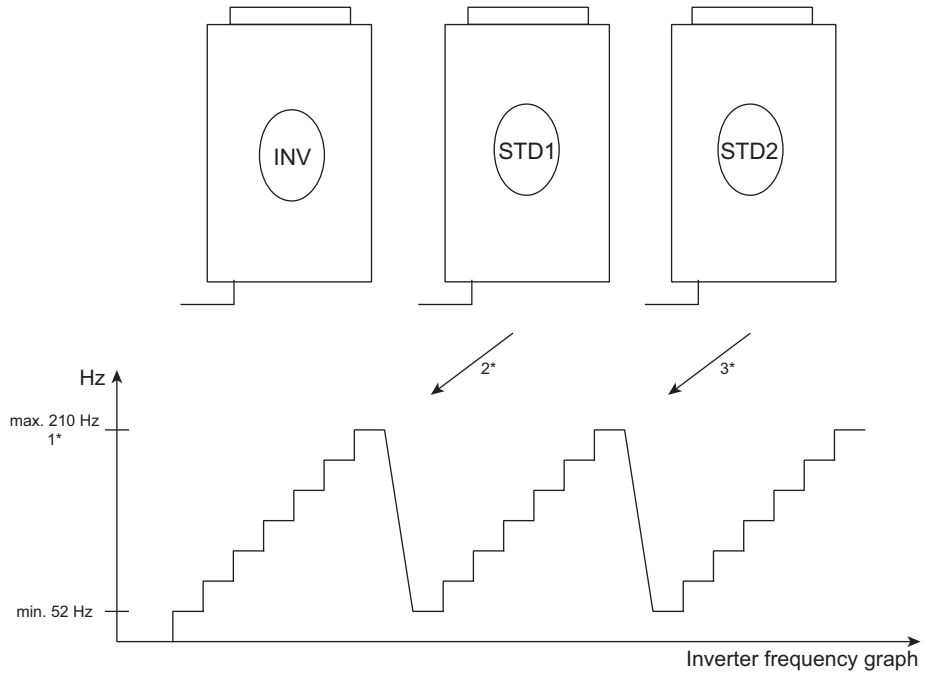
Controls compressor capacity to adjust Te to achieve target value (TeS).	Te:	Low pressure equivalent saturation temperature (°C)
Te set value (Make this setting while in Setting mode 2.)	TeS:	Target Te value (Varies depending on Te setting, operating frequency, etc.)

[Heating operation]

Controls compressor capacity to adjust Tc to achieve target value (TcS).	Tc:	High pressure equivalent saturation temperature (°C)
Te set value (Make this setting while in Setting mode 2.)	TcS:	Target Tc value (Varies depending on Tc setting, operating frequency, etc.)

Compressor step control

Compressor operations may vary with the following logic to information in “Compressor PI Control” on page 41.



1* For EW*Q016BAW* max is 266 Hz.

2* First STD compressor starts. Only possible for EW*Q021-064BAW*.

3* Second STD compressor starts. Only possible for EW*Q032BAW* and EW*Q064BAW*.

Notes

1. Depending on operation of compressors, the compressors may run in different patterns as shown here.
2. Double units EW*Q040-064BAW* both circuits run, same pattern at the same time. With a small exception of safeties and a small delay in bringing in STD compressor.

2.3 Electronic Expansion Valve PI Control

Main electronic expansion valve EV1 control

Carries out the electronic expansion (Y1E) PI control to maintain the subcool at a constant value during heating operation

SB = Tc - Tl

SB: Subcool (°C)
Tc: Saturated condenser temperature
Tl: Liquid temperature R6T (°C)

The optimum initial value of the subcool is ±5°C.

Subcooling electronic expansion valve EV2 control

Makes PI control of the electronic expansion valve (Y2E) to keep the superheated degree of the outlet gas pipe on the evaporator side for the full use of the subcooling heat exchanger.

SH = Tsh - Te

SH: Evaporator outlet superheated degree (°C)
Tsh: Suction pipe temperature detected by thermistor R5T (°C)
Te: Low pressure equivalent saturation temperature (°C)

Hydrobox electronic expansion valve control (K11E & K21E)

Carries out the electronic expansion PI control to maintain the evaporator outlet superheated degree (SH) at constant during cooling operation.

SH = Ts1 - Te

SH: Evaporator outlet superheated degree (°C)
Ts1: Suction pipe temperature detected by thermistor R6T (R7T) (°C)
Te: Low pressure equivalent saturation temperature (°C)

The optimum initial value of the superheat is ±2°C.

2.4 Step Control of Outdoor Unit Fans

Used to control the revolutions of outdoor unit fans in the steps listed in table below, according to condition changes.

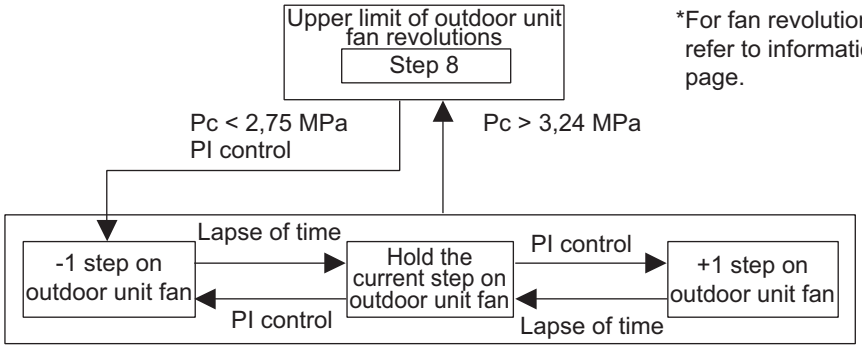
STEP No.	Fan revolutions (rpm)			
	EW*Q016BA	EW*Q021BA, 025BA, 040BA, 050BA	EW*Q032BA, 064BA	
			FAN1	FAN2
0	0	0	0	0
1*	0/350	0/350	0/230	0
1	350	350	230	0
2	370	370	380	0
3	400	400	290	260
4	450	460	375	345
5	540	560	570	540
6	670	680	720	690
7	760	Cooling: 821 Heating: 800	1091	1061
8	Cooling: 796 Heating: 780	Cooling: 821 Heating: 800	1136	1106

* Figures listed above are all those controlled while in standard mode, which vary when the system is set to high static pressure or capacity priority mode.

1* Periodic between 0 speed and 350 speed.

2.5 Outdoor Unit Fan Control in Cooling Operation

While in cooling operation, if the outdoor temperature is low, this mode provides high pressure control using the outdoor unit fan.



*For fan revolutions in each step, refer to information on previous page.

3. Special Control

3.1 Startup Control

This control is used to equalize the pressure in the front and back of the compressor prior to the startup of the compressor, thus reducing startup loads. Furthermore, the inverter is turned ON to charge the capacitor.
In addition, to avoid stresses to the compressor due to oil return or else after the startup, the following control is made and the position of the four way valve is also determined. To position the four way valve, the master and slave units simultaneously start up.

3.1.1 Startup Control in Cooling Operation

Thermostat ON

	Pressure equalization control prior to startup	Startup control	
		STEP1	STEP2
Compressor	0 Hz	52 Hz + OFF + OFF	124 Hz + OFF + OFF +2 steps/20 sec. (until Pc - Pe>0.39MPa is achieved)
Outdoor unit fan	STEP4	Ta<20°C: OFF Ta≥20°C: STEP4	+1 step/15 sec. (when Pc>2.16MPa) -1 step/15 sec. (when Pc<1.77MPa)
Four way valve (20S1)	Holds	OFF	OFF
Main electronic expansion valve (EV1)	0 pls	480 pls	480 pls
Subcooling electronic expansion valve (EV2) (EW*Q016BAW*)	0 pls	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	OFF	OFF
Accumulator oil return valve (SVO)	OFF	OFF	OFF
Ending conditions	A lapse of one minute	A lapse of 10 sec.	OR • A lapse of 130 sec. • Pc - Pe>0.39MPa
Hydrobox expansion valve K11E & K12E	0 pls	0 pls	0 pls

3.1.2 Startup Control in Heating Operation

Thermostat ON

	Pressure equalization control prior to startup	Startup control	
		STEP1	STEP2
Compressor	0 Hz	52 Hz + OFF + OFF	124 Hz + OFF + OFF +2 steps/20 sec. (until Pc - Pe>0.39MPa is achieved)
Outdoor unit fan	STEP4	STEP8	STEP8
Four way valve	Holds	ON	ON
Main electronic expansion valve (EV1)	0 pls	0 pls	0 pls
Subcooling electronic expansion valve (EV2) (EW*Q016BAW*)	0 pls	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	OFF	OFF
Accumulator oil return valve (SVO)	OFF	OFF	OFF
Ending conditions	A lapse of one minute	A lapse of 10 sec.	OR • A lapse of 130 sec. • Pc>2.70MPa • Pc-Pe>0.39MPa
Hydrobox expansion valve K11E & K12E	0 pls	480 pls	480 pls

3.2 Defrosting Operation

To defrost the outdoor unit heat exchanger while in Evaporator, the defrost operation is conducted to recover the heating capacity and runs a reverse cycle.
[Start conditions]
Heat exchange temperature Tb < Tdef (calculated by logic depending on Tamb) and the unit has been at least 25 min in heating
or Te < 0°C the unit will be forced to take a defrost every 2 hours.
Furthermore, the heat transfer coefficient of the outdoor unit Evaporator is computed from Tc, Te and compressor loads.

Outdoor unit actuator	Defrost preparation operation	Defrost operation	Post Defrost operation
Compressor	Upper limit control	176 Hz + ON + ON	124 Hz + OFF + OFF 2-steps increase/20sec. till Pc - Pe>0.4 MPa
Outdoor unit fan	STEP7 or STEP8	OFF	STEP8
Four way valve	ON	OFF	ON
Main electronic expansion valve (EV1)	SH control → 480 pls	480 pls	55 pls
Subcooling electronic expansion valve (EV2)	0 pls	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	OFF	OFF
Accumulator oil return valve (SVO)	ON	ON	ON
Ending conditions	170 sec.	or • 12 min. • Tb>11°C	or • 10 sec. • Pc - Pe>0.4MPa
Hydrobox expansion valve K11E	*1	PI control	*2
Hydrobox expansion valve K21E	*1	PI control	*2

*1 Before switching over to defrost mode the unit closes the EXV for switch over.
*2 Before switching over to normal heating operations the unit closes the EXV for switch over.
* Actuators are based on EWYQ032BA.

3.3 Pump-down Residual Operation

3.3.1 Pump-down Residual Operation in Cooling Operation

If the liquid refrigerant stays in the Evaporator at the startup of a compressor, this liquid refrigerant enters the compressor, thus resulting in diluted oil in the compressor and then degraded lubrication performance.
Consequently, in order to recover the refrigerant in the Evaporator while the compressor stops, the pump-down residual operation is conducted.

Actuator	Operation
Compressor	124 Hz + OFF + OFF
Outdoor unit fan	Fan control
Four way valve	OFF
Main electronic expansion valve (EV1)	480 pls
Subcooling electronic expansion valve (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Accumulator oil return valve (SVO)	ON
Hydrobox electronic expansion valve (K11E)	0 pls
Hydrobox electronic expansion valve (K21E)	0 pls
Ending conditions	or • 5 min. • Master Unit Pe<0.49 MPa • Master Unit Td>110°C • Master Unit Pc>2.94 MPa

* Actuators are based on EWYQ032BA.

3.3.2 Pump-down Residual Operation in Heating Operation

Actuator	Operation
Compressor	124 Hz + OFF + OFF
Outdoor unit fan	STEP 7
Four way valve	ON
Main electronic expansion valve (EV1)	0 pls
Subcooling electronic expansion valve (EV2)	0 pls
Hydrobox electronic expansion valve (K11E)	480 pls
Hydrobox electronic expansion valve (K21E)	480 pls
Hot gas bypass valve (SVP)	OFF
Accumulator oil return valve (SVO)	ON
Ending conditions	or • 3 min. • Master Unit Pe<0.25 MPa • Master Unit Td>110°C • Master Unit Pc>2.94 MPa

* Actuators are based on EWYQ032BA.

3.4 Standby

3.4.1 Restart Standby

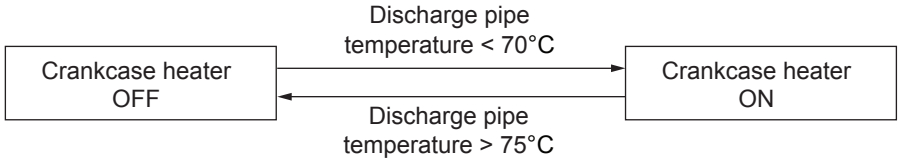
Used to forcedly stop the compressor for a period of 3 minutes, in order to prevent the frequent ON/OFF of the compressor and equalize the pressure within the refrigerant system.

Actuator	Operation
Compressor	OFF
Outdoor unit fan	Ta>30°C: STEP4 Ta≤30°C: OFF
Four way valve	Holds
Main electronic expansion valve (EV1)	0 pls
Subcooling electronic expansion valve (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Hydrobox electronic expansion valve (K11E)	0 pls
Hydrobox electronic expansion valve (K21E)	0 pls
Accumulator oil return valve (SVO)	OFF
Ending conditions	3 min.

* Actuators are based on EWYQ032BA.

3.4.2 Crankcase Heater Control

In order to prevent the refrigerant from melting in the compressor oil in the stopped mode, this mode is used to control the crankcase heater.



3.5 Stopping Operation

3.5.1 When System is in Stop Mode (Normal Operation Stop)

This mode is used to define actuator operations when the system stops.

Actuator	Operation
Compressor	OFF
Outdoor unit fan	OFF
Four way valve	Holds
Main electronic expansion valve (EV1)	0 pls
Subcooling electronic expansion valve (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Accumulator oil return valve (SVO)	OFF
Hydrobox electronic expansion valve (K11E)	0 pls
Hydrobox electronic expansion valve (K21E)	0 pls
Ending conditions	Hydrobox thermostat is turned ON.

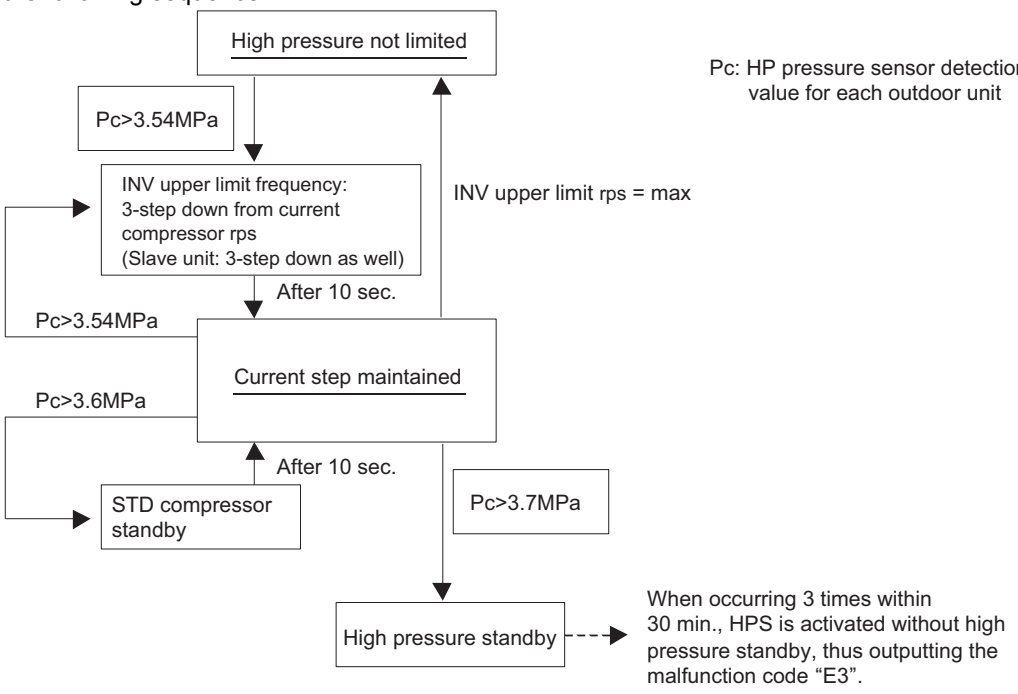
* Actuators are based on EWYQ032BA.

4. Protection Control

4.1 High Pressure Protection Control

This high pressure protection control is used to prevent the activation of protection devices due to abnormal increase of high pressure and to protect compressors against the transient increase of high pressure.

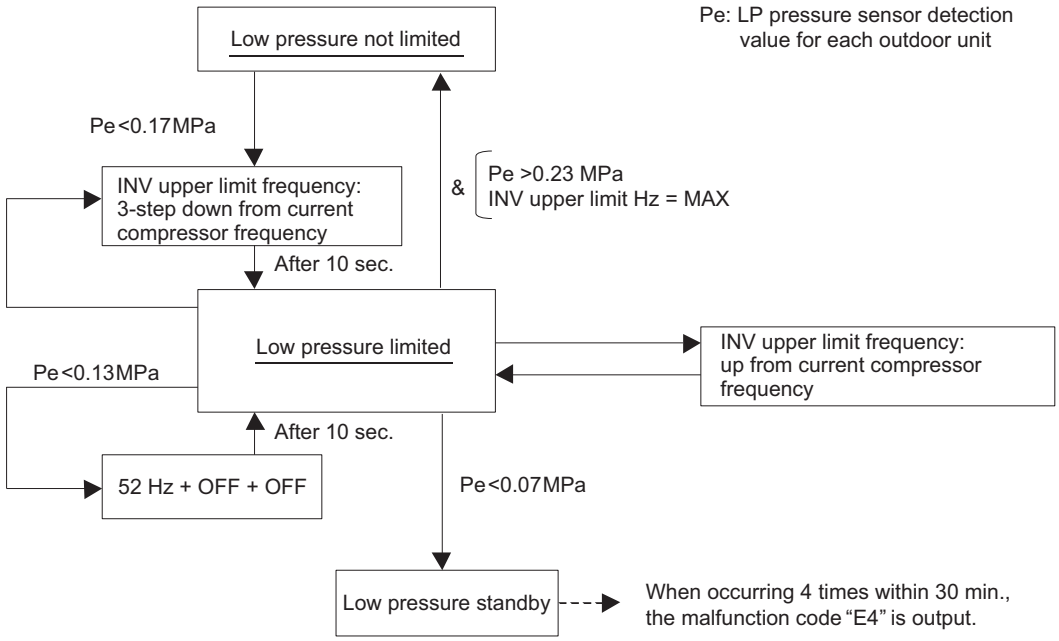
In case of EW*Q040BA, 050BA, 064BA, each outdoor unit performs this control individually in the following sequence.



4.2 Low Pressure Protection Control

This low pressure protection control is used to protect compressors against the transient decrease of low pressure.

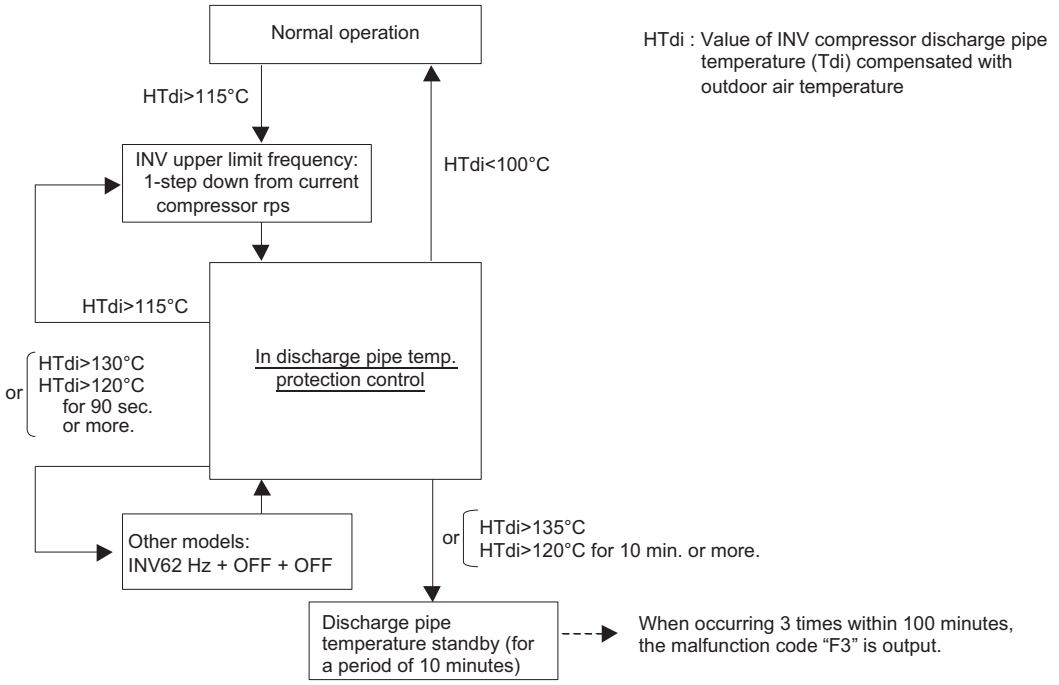
In the case of multi-outdoor-unit system, each outdoor unit performs this control individually in the following sequence.



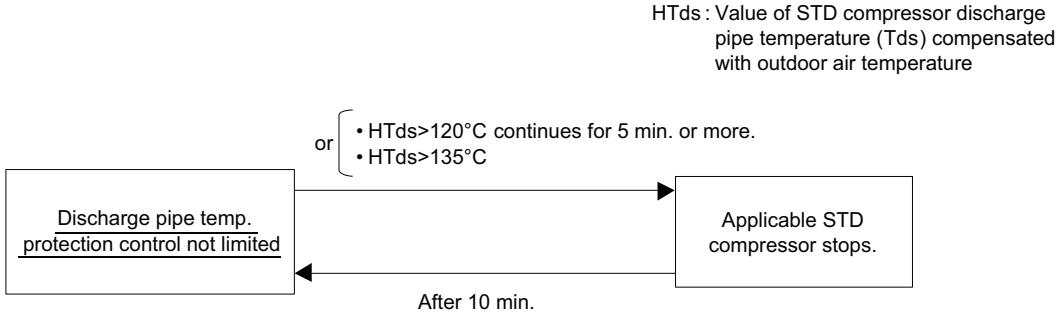
4.3 Discharge Pipe Protection Control

This discharge pipe protection control is used to protect the compressor internal temperature against a malfunction or transient increase of discharge pipe temperature.

[INV compressor]



[STD compressor]

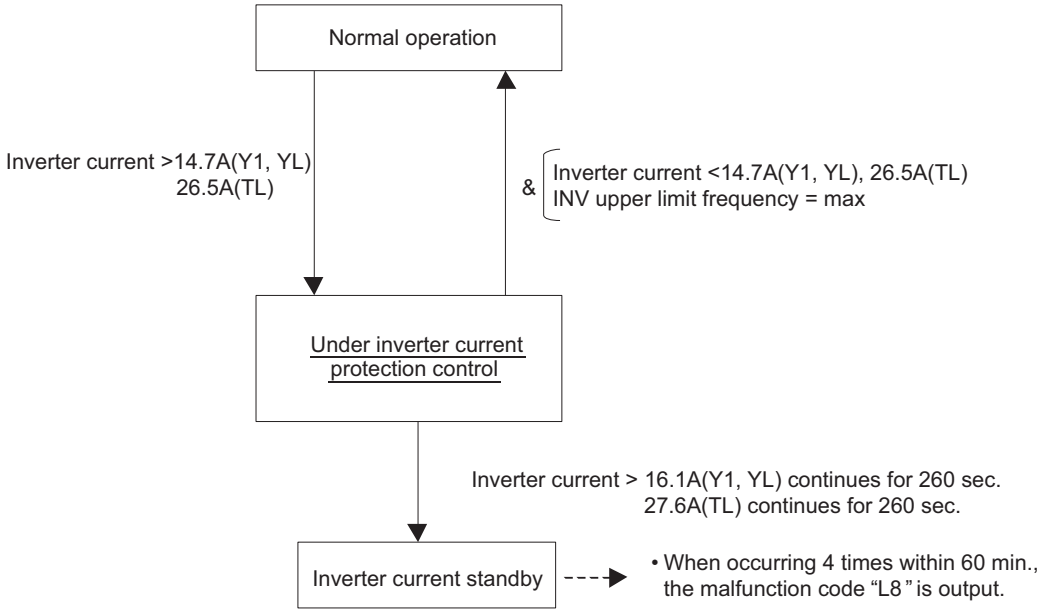


4.4 Inverter Protection Control

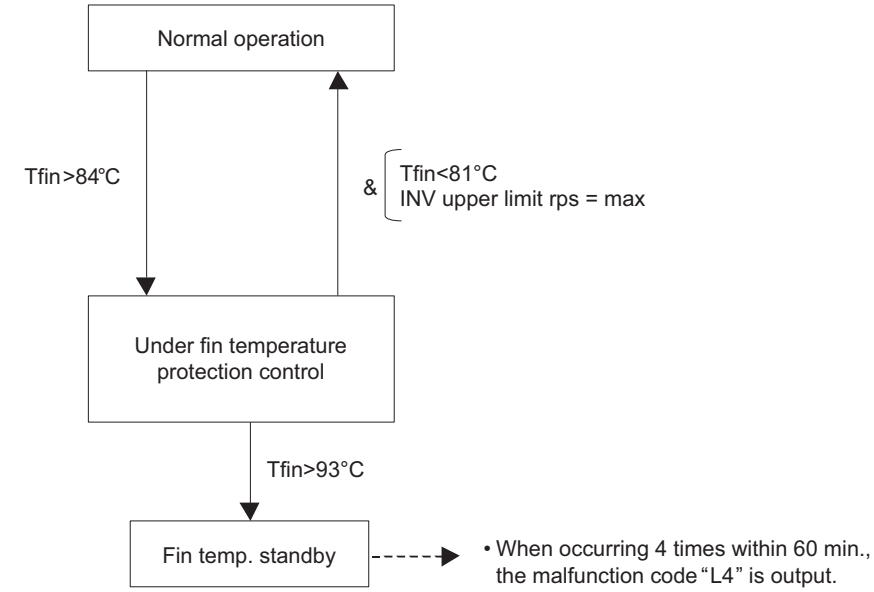
Inverter current protection control and inverter fin temperature control are performed to prevent tripping due to a malfunction, or transient inverter overcurrent, and fin temperature increase.

In the case of EW*Q040BA, 050BA, 064BA, each INV compressor performs these controls in the following sequence.

[Inverter overcurrent protection control]

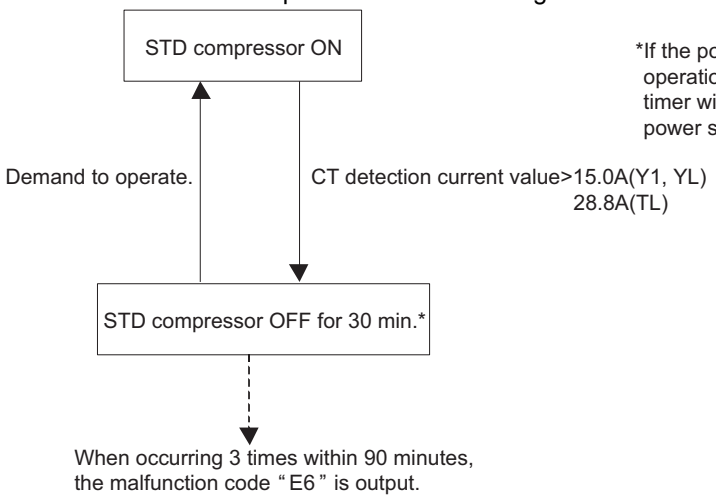


[Inverter fin temperature control]



4.5 STD Compressor Overload Protection

This control is used to prevent abnormal heating due to overcurrent to the compressor resulting from failures of STD compressor such as locking.



5. Other Control

5.1 Emergency Operation

If the compressor cannot operate, this control inhibits any applicable compressor or outdoor unit from operating to perform emergency operation only with the operative compressor or outdoor unit.

Caution

In order to disable the compressor operation due to a failure or else, be sure to do so in emergency operation mode.
NEVER attempt to disconnect power supply wires from magnetic contactors or else. (Doing so will operate compressors in combination that disables oil equalization between the compressors, thus resulting in malfunctions of other normal compressors.)

5.1.1 Restrictions for Emergency Operation

- When the thermostat of the hydrobox has a capacity of 50% or more of the outdoor unit capacity turns ON, the emergency operation is functional. (If the total capacity of hydrobox with thermostat ON is small, the outdoor unit cannot operate.)
- If the emergency operation is set while the outdoor unit is in operation, the outdoor unit stops once after pump-down residual operation (a maximum of 5 minutes elapsed).

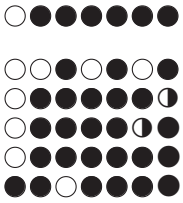
5.1.2 In the Case of 1-Outdoor-Unit System (EW*Q021-064BA)

Set the system to operation prohibition mode by compressor

■ In order to set an INV compressor to operation prohibition mode, set No. 42 of Setting mode 2 to "EMERGENCY OPERATION".

(Procedure)
(1) Press and hold the MODE button (BS1) for a period of 5 seconds or more.
(2) Press the SET button (BS2) 42 times.
(3) Press the RETURN button (BS3) once.
(4) Press the SET button (BS2) once.
(5) Press the RETURN button (BS3) twice.
(6) Press the MODE button (BS1) once.

LED display (○:ON ●:OFF ◑:Blink)
H1P——————H7P



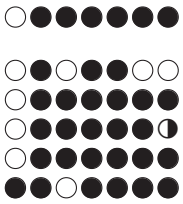
(Factory setting)

⚠ Running only on a STD compressor gives no regulation and has chance on freeze up.

■ In order to set STD1 and STD2 compressors to operation prohibition mode, set No. 19 of Setting mode 2 to "STD1, 2 OPERATION PROHIBITION". EW*Q021BA - EW*Q064BA

(Procedure)
(1) Press and hold the MODE button (BS1) for a period of 5 seconds or more.
(2) Press the SET button (BS2) 19 times.
(3) Press the RETURN button (BS3) once.
(4) Press the SET button (BS2) once.
(5) Press the RETURN button (BS3) twice.
(6) Press the MODE button (BS1) once.

LED display (○:ON ●:OFF ◑:Blink)
H1P——————H7P

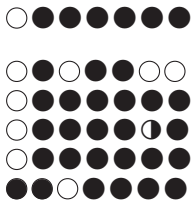


(Factory setting)

■ In order to set the STD 2 compressor to operation prohibition mode, set No. 19 of Setting mode 2 to "STD2 OPERATION PROHIBITION". EW*Q032BA, 064BA

(Procedure)
(1) Press and hold the MODE button (BS1) for a period of 5 seconds or more.
(2) Press the SET button (BS2) 19 times.
(3) Press the RETURN button (BS3) once.
(4) Press the SET button (BS2) twice.
(5) Press the RETURN button (BS3) twice.
(6) Press the MODE button (BS1) once.

LED display (○:ON ●:OFF ◑:Blink)
H1P——————H7P



(Factory setting)

■ For EW*Q032BA, 064BA, if the INV compressor is set to operation prohibition mode, only a single STD compressor will operate for the convenience of oil equalization.
■ For EW*Q032BA, 064BA, only the STD1 compressor cannot be put into operation prohibition mode for the convenience of oil equalization.
■ The automatic backup operation is not functional.

5.2 Demand Operation

In order to save the power consumption, the capacity of outdoor unit is saved with control forcibly by using “Demand 1 Setting” or “Demand 2 Setting”.
To operate the unit with this mode, additional setting of “Continuous Demand Setting” or external input by external control adaptor is required.

Set item	Condition	Content
Demand 1	Mode 1	The compressor operates at approx. 60% or less of rating.
	Mode 2	The compressor operates at approx. 70% or less of rating.
	Mode 3	The compressor operates at approx. 80% or less of rating.
Demand 2	—	The compressor operates at approx. 40% or less of rating.
Demand 3	—	Forced thermostat OFF.

6. Outline of Control (Hydrobox)

6.1 Freeze Prevention

Freeze-up prevention by thermo off condition

The freeze-up prevention is only active when the unit is in thermo OFF condition and field setting [8-04] has been set to 1 or 2.

[Start condition]
AND/OR*:
- Outdoor ambient temperature < 4°C
- Leaving or return water temperature < 7°C

* AND/OR depending of setting [8 - 04] for further details see chapter of setting.

[Operation]
Pump will operate and if leaving OR return water < 5°C for 5 minutes, the unit will start up the freeze-up prevention function to prevent too low temperatures.

6.2 Thermostat Control

Thermo ON/OFF conditions depend on LWT or room temperature regulation.

For LWT control (factory set):

Cooling

Thermo OFF condition:

- LWT < LWT set -2 (for 5 min)
- LWT < LWT set -b (immediately; b= field setting A-03)

Thermo ON condition:

- LWT > LWT set +3,5

Heating

Thermo OFF condition:

- LWT > LWT set +2 (for 5 min)
- LWT > LWT set +b (immediately; b= field setting A-03)

Thermo ON condition:

- LWT < LWT set -3,5

6.3 Flow Control

6.3.1 Unit State OPERATION LED ON

- Pump starts.
- If no flow detected for 2 min unit stops and gives A6 error.

6.3.2 Unit State RUN COOLING/HEATING

- Pump ON.
- If no flow, unit will decrease capacity to keep the unit in safe situation sensor R13T and R14T.
- No flow, for 40 sec unit off, pump still on.
- No flow for 2 min pump off, unit gives A6 error.

6.3.3 Unit State DEFROST

- Pump ON.
- If no flow, unit will decrease capacity to keep the unit in safe situation sensor R13T and R14T.

7. Field Setting from Outdoor Unit

7.1 Field Setting from Outdoor Unit

List of field setting items

This following section indicates the list of field setting items. For the lists of dip switch contents, Setting mode 1, and Setting mode 2, refer to information in tables shown on the following page onward.

For setting items of (*1), refer to detailed information provided on page 73 onward.

Setting item			Content and objective of setting	Overview of setting procedure
Function setting	1	Setting of low noise operation (*1)	A. Use external input to step down the upper limit of the fan (factory set to Step 8), providing low noise level. (1) Mode 1: Step 6 or lower (2) Mode 2: Step 5 or lower (3) Mode 3: Step 4 or lower	■ Use the "External control adaptor for outdoor unit". Set to "External control adaptor for outdoor unit" with No. 12 of "Setting mode 2" and select the mode with No. 25. If necessary, set the "Capacity priority setting" to ON with No. 29.
			B. The low noise operation aforementioned is enabled in nighttime automatic low noise operation mode. Start time: Possible to select in the range of 20:00 to 24:00 hours. End time: Possible to select in the range of 06:00 to 08:00 hours. (Use the said time as a guide since the start time and the end time are estimated according to outdoor temperatures.)	■ Make this setting while in "Setting mode 2". Select a mode with No. 22 of "Setting mode 2". Select the start time with No. 26 and the end time with No. 27. If necessary, set the "Capacity priority setting" to ON with No. 29.
	2	Setting of demand operation (*1)	■ Used to place limits on the compressor operating frequency to control the upper limit of power consumption. (1) Mode 1 of Demand 1: 60% or less of rating (2) Mode 2 of Demand 1: 70% or less of rating (3) Mode 3 of Demand 1: 80% or less of rating (4) Demand 2: 40% or less of rating	■ For setting with the use of "external control adapter": Set the system to "External control adaptor for outdoor unit" with No. 12 of Setting mode 2" and select the mode with No. 30. ■ For setting only in "Setting mode 2": Set the system to Normal demand mode with No. 32 of "Setting mode 2" and select the mode with No. 30.
	3	Setting of high static pressure	■ Make this setting to operate a system with diffuser duct while in high static pressure mode. (Use this setting mode when shields are installed on upper floors or balconies.) * In order to mount the diffuser duct, remove the cover from the outdoor unit fan.	■ Set No. 18 of "Setting mode 2" to ON.

Setting item			Content and objective of setting	Overview of setting procedure
Service setting	4	Emergency operation (*1)	■ If the compressor has a failure, used to prohibit the operation of compressor(s) concerned or outdoor unit(s) concerned and to conduct emergency operation of the system only with operable compressor(s) or outdoor unit(s).	■ Make this setting while in "Setting mode 2". For system with a single outdoor unit: Set with No. 19 or 42. For system with multiple outdoor units: Set with No. 38, 39, or 40.
	5	Refrigerant recovery mode (*1)	■ Used to recover refrigerant on site. With operations of indoor and outdoor units prohibited, fully open the expansion valve of the indoor and outdoor units.	■ Set No. 21 of "Setting mode 2" to ON.
	6	Vacuuming mode (*1)	■ Used to conduct vacuuming on site. Fully open the expansion valves of the indoor and outdoor units, and energize part of solenoid valves. Use a vacuum pump to conduct vacuuming.	■ Set No. 21 of "Setting mode 2" to ON.
	7	Power transistor check mode	■ Used for the troubleshooting of DC compressors. Inverter waveform output makes it possible to judge whether a malfunction results from the compressor or the PCB.	■ Set No. 28 of "Setting mode 2" to ON.
	8	Setting of model with spare PCB	■ In order to replace the PCB by a spare one, be sure to make model setting.	■ For this setting, set the DS2-2, -3, and -4 switches on the PCB to the model concerned.

For setting items of (*1), refer to detailed information provided on page 78 and 79.

Setting by dip switches

Using dip switches on the PCB enables field setting shown below. However, make no changes of factory settings except for DS1-1.

Dipswitch		Setting item	Description
No.	Setting		
DS1-1	ON	Cool / Heat select	Used to set cool / heat select by Cool/Heat selector equipped with outdoor unit.
	OFF (Factory setting)		
DS1-2 ~DS1-4	ON	Not used	Do not change the factory settings.
	OFF (Factory setting)		
DS2-1 ~4	ON	Not used	Do not change the factory settings.
	OFF (Factory setting)		

Setting at replacement by spare PCB

Caution

DIP switch Setting after changing the main PCB (A1P) to spare PCB

After the replacement by the spare PCB, be sure to make settings shown below.
When you change the main PCB (A1P) to spare PCB, please carry out the following setting.

Initial conditions of dip switches



DIP Switch Detail

DS No.	Item	Contents	
DS1-1	Cool/Heat change over setting	ON	COOL/HEAT setting is made with the use of a Cool/Heat selector mounted to the outdoor unit.
		OFF (Factory setting of spare PCB)	COOL/HEAT setting is not made with the use of a Cool/Heat selector mounted to the outdoor unit.
DS1-2	Power supply specification	ON	200V class (220V)
		OFF (Factory setting of spare PCB)	400V class (380V)
DS1-3	Cooling only/Heat pump setting	ON	Cooling only setting
		OFF (Factory setting of spare PCB)	Heat pump setting
DS1-4	Unit allocation setting	ON	Make the following settings according to allocation of unit. (All models are set to OFF at factory.)
DS2-1		OFF (Factory setting of spare PCB)	

	Domestic Japan	Overseas General	Europe
DS1-4	OFF	OFF	ON
DS2-1	OFF	ON	OFF

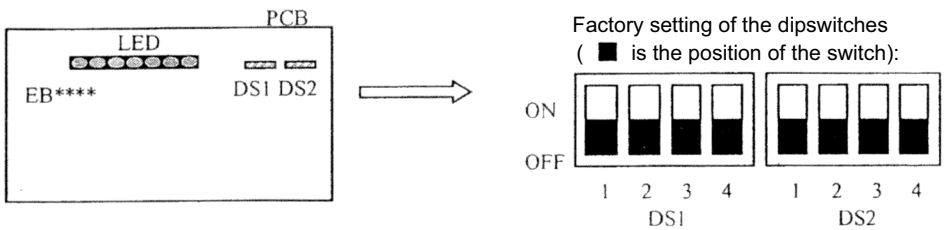
DS No.	Item	Contents
DS2-2	Model setting	Make the following settings according to models of outdoor units. (All models are set to OFF at factory.)
DS2-3		
DS2-4		

	EW*Q016BA	EW*Q021BA, 040BA	EW*Q025BA, 050BA	EW*Q032BA, 064BA
DS2-2	OFF	ON	OFF	OFF
DS2-3	ON	ON	OFF	ON
DS2-4	OFF	OFF	ON	ON

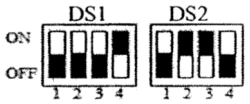
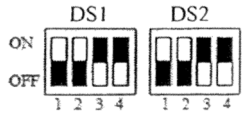
∗ If the DS1-1~1-4, DS2-2~2-4 setting has not been carried out, error code “UA” are displayed and unit can not be operated.

Refer “DS1-1~4, DS2-1~4 setting detail” on next page.

Location of the dipswitches



Dipswitch settings for the applicable models

Applicable model	Settings	
	Positions	Switches ON
EWYQ016BAWP (H/P) EWYQ016BAWN (H/P)		DS1-4, DS2-3
EWYQ021BAWP (H/P) EWYQ021BAWN (H/P) EWYQ040BAWP (H/P) EWYQ040BAWN (H/P)		DS1-4, DS2-2, DS2-3
EWYQ025BAWP (H/P) EWYQ025BAWN (H/P) EWYQ050BAWP (H/P) EWYQ050BAWN (H/P)		DS1-4, DS2-4
EWYQ032BAWP (H/P) EWYQ032BAWN (H/P) EWYQ064BAWP (H/P) EWYQ064BAWN (H/P)		DS1-4, DS2-3, DS2-4
EWAQ016BAWP (C/O) EWAQ016BAWN (C/O)		DS1-3, DS1-4, DS2-3
EWAQ021BAWP (C/O) EWAQ021BAWN (C/O) EWAQ040BAWP (C/O) EWAQ040BAWN (C/O)		DS1-3, DS1-4, DS2-2, DS2-3
EWAQ025BAWP (C/O) EWAQ025BAWN (C/O) EWAQ050BAWP (C/O) EWAQ050BAWN (C/O)		DS1-3, DS1-4, DS2-4
EWAQ032BAWP (C/O) EWAQ032BAWN (C/O) EWAQ064BAWP (C/O) EWAQ064BAWN (C/O)		DS1-3, DS1-4, DS2-3, DS2-4

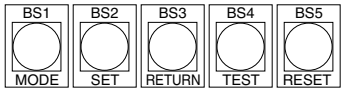
Setting by BS button switches

The following settings are made by BS button switches on PCB.
In case of EW*Q040BA, 050BA, 064BA, various items should be set with the master unit. (Setting with the slave unit is disabled.)
The master unit and slave unit can be discriminated with the LED display as shown below.

LED display

		MODE H1P	TEST H2P	COOL/HEAT select			Low noise H6P	Demand H7P	Multi H8P
				IND H3P	MASTER H4P	SLAVE H5P			
Single-outdoor-unit system		●	●	○	●	●	●	●	●
EW*Q040BA, 050BA, 064BA	Master	●	●	○	●	●	●	●	○
	Slave 1	●	●	●	●	●	●	●	◑

(Factory setting)



(V2760)

There are the following three setting modes.

① **Setting mode 1 (H1P off)**
Initial status (when normal): Used to select IND/BATCH. Also indicates during “abnormal”, “low noise control” and “demand control”.

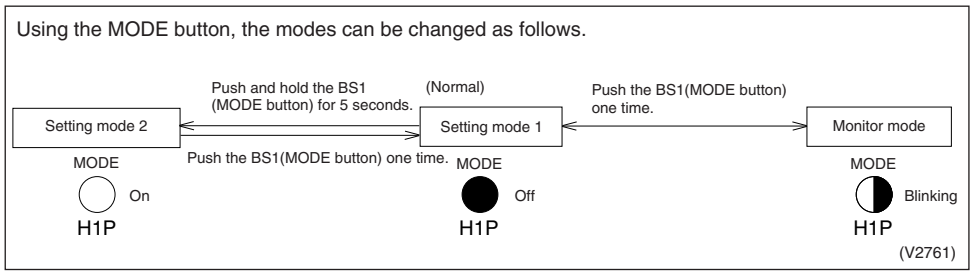
② **Setting mode 2 (H1P on)**

Used to modify the operating status and to set program addresses, etc. Usually used in servicing the system.

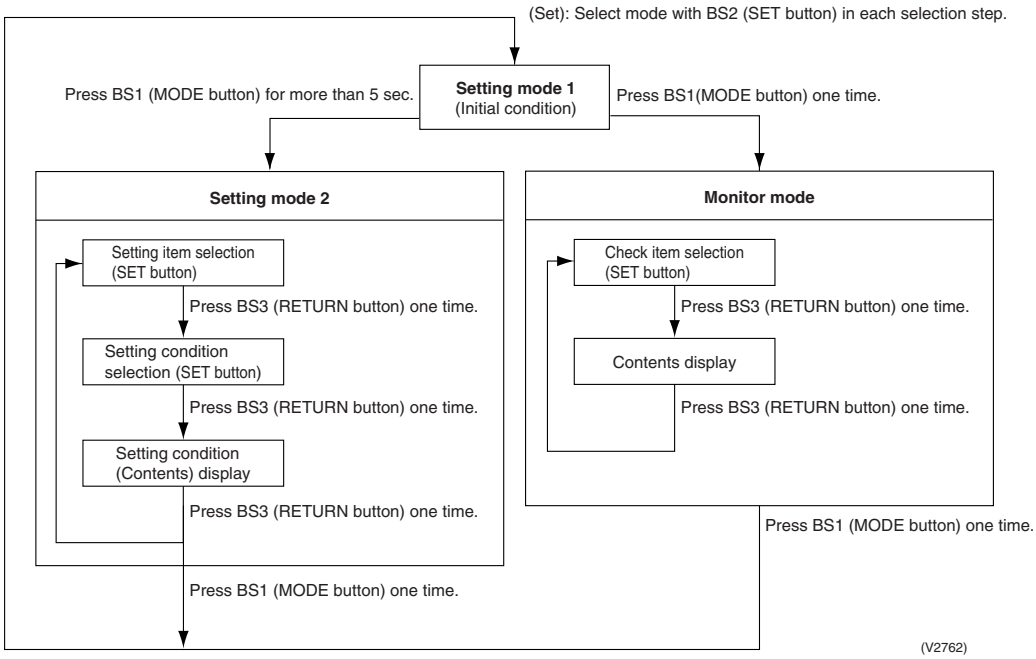
③ **Monitor mode (H1P blinks)**

Used to check the program made in Setting mode 2.

Mode changing procedure 1



Mode changing procedure 2

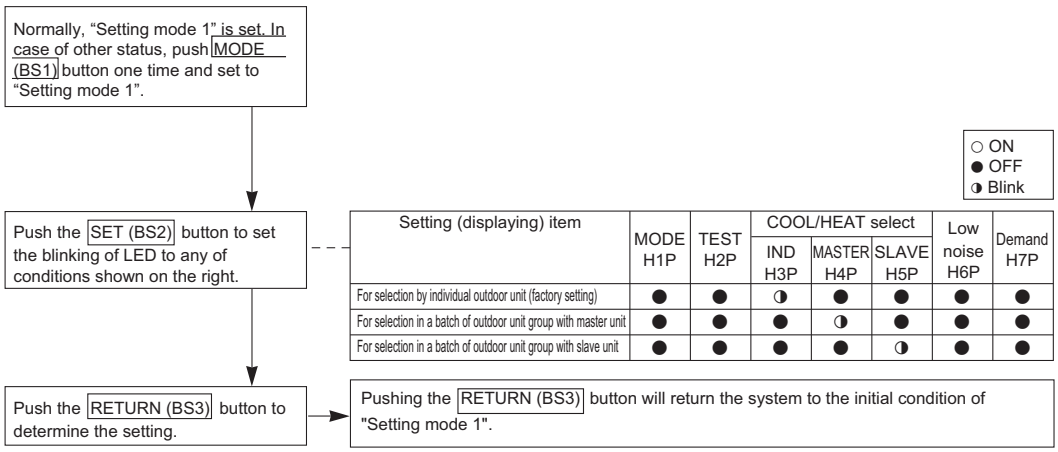


7.2 “Setting Mode 1”

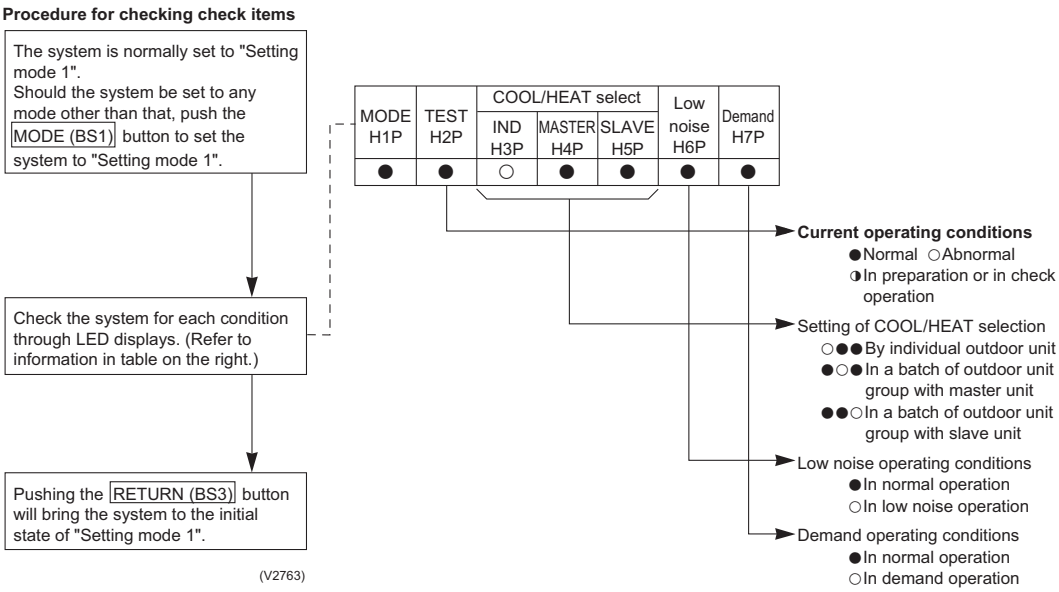
This mode is used to set and check the following items.

1. Set items - - - -In order to make selection in a batch of outdoor unit group, change the setting.
   - ■ Selection (IND) - - - - -Used to select by individual outdoor unit (factory setting).
   - ■ Selection (MASTER) -Used to select the master unit.
   - ■ Selection (SLAVE) - - -Used to select the slave unit.
2. Check items- -The following items can be checked.
   (1) Current operating conditions (Normal / Abnormal / In check operation)
   (2) Setting conditions of selection (Individual / Batch master / Batch slave)
   (3) Low noise operating conditions (In normal operation / In low noise operation)
   (4) Demand operating conditions (In normal operation / In demand operation)

Procedure for changing COOL/ HEAT selection setting



Procedure for checking check items



7.3 “Setting Mode 2”

Push and hold the MODE (BS1) button for 5 seconds and set to “Setting mode 2”.

<Selection of setting items>

Push the SET (BS2) button and set the LED display to a setting item shown in the table on the right.
↓
Push the RETURN (BS3) button and decide the item. (The present setting condition is blinked.)

<Selection of setting conditions>

Push the SET (BS2) button and set to the setting condition you want.
↓
Push the RETURN (BS3) button and decide the condition.

Push the RETURN (BS3) button and set to the initial status of “Setting mode 2”.

* If you become unsure of how to proceed, push the MODE (BS1) button and return to setting mode 1.

No.	Setting item	Description
0	Digital pressure gauge kit display	Used to make setting of contents to display on the digital pressure gauges (e.g. pressure sensors and temperature sensors)
2	Low noise/demand address	Address for low noise/demand operation
12	External low noise setting / Demand setting	Reception of external low noise or demand signal
18	High static pressure setting	Make this setting in the case of operating in high static pressure mode with diffuser duct mounted. (In order to mount the diffuser duct, remove the cover from the outdoor unit fan delivers 78 Pa.)
19	Emergency operation (STD compressor operation prohibited)	Used to operate system only with inverter compressor when STD compressor malfunctions. This is a temporary operation extremely impairing comfortable environment. Therefore, prompt replacement of the compressor is required. (This operation, however, is not set with EW*Q016BA.)
21	Refrigerant recovery/ vacuuming mode setting	Sets to refrigerant recovery or vacuuming mode.
22	Night-time low noise setting	Sets automatic nighttime low noise operation in a simple way. The operating time is based on “Starting set” and “Ending set”.
25	Setting of external low noise level	Sets low noise level when the low noise signal is input from outside.
26	Night-time low noise operation start setting	Sets starting time of nighttime low noise operation. (Night-time low noise setting is also required.)
27	Night-time low noise operation end setting	Sets ending time of nighttime low noise operation. (Night-time low noise setting is also required.)
28	Power transistor check mode ∗Check after disconnection of compressor wires	Used for trouble diagnosis of DC compressor. Since the waveform of inverter is output without wiring to the compressor, it is convenient to probe whether the trouble comes from the compressor or PCB.
29	Capacity priority setting	If the capacity control is required, the low noise control is automatically released by this setting during carrying out low noise operation and nighttime low noise operation.
30	Demand setting 1	Changes target value of power consumption when demand control 1 is input.
32	Normal demand setting	Normally enables demand control 1 without external input. (Effective to prevent a problem that circuit breaker of small capacity is shut down due to large load.)

No.	Setting item	Description
38	Emergency operation (Setting for the master unit operation prohibition in EW*Q040BA, 050BA, 064BA system)	Used to temporarily prohibit the applicable outdoor unit from operating should there be any faulty part in EW*Q040BA, 050BA, 064BA system. Since the comfortable environment is extremely impaired, prompt replacement of the part is required.
39	Emergency operation (Setting for the slave operation prohibition in EW*Q040BA, 050BA, 064BA system)	
42	Emergency operation (prohibition of INV compressor operation)	If the INV compressor has a failure, used to run the system only with STD compressor(s). This is a temporary running of the system until the compressor is replaced, thus making comfort extremely worse. Therefore, it is recommended to replace the compressor as soon as possible. (Be noted this setting is not available on model EW*Q016BA.)



* Running only on a STD compressor gives no regulation and has chance on freeze up.

No.	Setting item display								Setting condition display			
	Setting item	MODE H1P	TEST H2P	C/H selection			Low noise H6P	Demand H7P				✻ Factory setting
				IND H3P	Master H4P	Slave H5P						
0	Digital pressure gauge kit display	○	●	●	●	●	●	●	Address (Binary number (4 digits))	0 1 ~ 15	○●●●●●● ○●●●●●○ ○●●○○○○	✻
2	Low noise/demand address	○	●	●	●	●	○	●	Address (Binary number (6 digits))	0 1 ~ 31	○●●●●●● ○●●●●●○ ○●○○○○○	✻
12	External low noise/ demand setting	○	●	●	○	○	●	●	External low noise/demand: NO External low noise/demand: YES		○●●●●●○ ○●●●●○●	✻
18	High static pressure setting	○	●	○	●	●	○	●	High static pressure setting: OFF High static pressure setting: ON		○●●●●●○ ○●●●●○●	✻
19	Emergency operation (STD compressor is inhibited to operate.)	○	●	○	●	●	○	○	OFF STD 1, 2 operation: Inhibited STD 2 operation: Inhibited		○●●●●●● ○●●●●●○ ○●●●●○●	✻
20	Additional refrigerant charging operation setting	○	●	○	●	○	●	●	Refrigerant charging: OFF Refrigerant charging: ON		○●●●●●○ ○●●●●○●	✻
21	Refrigerant recovery/vacuuming mode setting	○	●	○	●	○	●	○	Refrigerant recovery / vacuuming: OFF Refrigerant recovery / vacuuming: ON		○●●●●●○ ○●●●●○●	✻
22	Night-time low noise setting	○	●	○	●	○	○	●	OFF Level 1 (outdoor fan with 6 step or lower) Level 2 (outdoor fan with 5 step or lower) Level 3 (outdoor fan with 4 step or lower)		○●●●●●● ○●●●●●○ ○●●●●○● ○●●●●○○	✻
25	Low noise setting	○	●	○	○	●	●	○	Level 1 (outdoor fan with 6 step or lower) Level 2 (outdoor fan with 5 step or lower) Level 3 (outdoor fan with 4 step or lower)		○●●●●●○ ○●●●●○● ○●●●○●●	✻
26	Night-time low noise operation start setting	○	●	○	○	●	○	●	About 20:00 About 22:00 (factory setting) About 24:00		○●●●●●○ ○●●●●○● ○●●●○●●	✻
27	Night-time low noise operation end setting	○	●	○	○	●	○	○	About 6:00 About 7:00 About 8:00 (factory setting)		○●●●●●○ ○●●●●○● ○●●●○●●	✻
28	Power transistor check mode	○	●	○	○	○	●	●	OFF ON		○●●●●●○ ○●●●●○●	✻
29	Capacity priority setting	○	●	○	○	○	●	○	OFF ON		○●●●●●○ ○●●●●○●	✻
30	Demand setting 1	○	●	○	○	○	○	●	60% demand 70% demand 80% demand		○●●●●●○ ○●●●●○● ○●●●○●●	✻
32	Normal demand setting	○	○	●	●	●	●	●	OFF ON		○●●●●●○ ○●●●●○●	✻
38	Emergency operation	○	○	●	●	○	○	●	OFF Master unit operation: Inhibited		○●●●●●○ ○●●●●○●	✻

No.	Setting item display								Setting condition display
	Setting item	MODE H1P	TEST H2P	C/H selection			Low noise H6P	Demand H7P	✻ Factory set
				IND H3P	Master H4P	Slave H5P			
39	Emergency operation	○	○	●	●	○	○	○	OFF ○●●●●●○ ✻ Slave unit 1 operation: Inhibited ○●●●●○●
42	Emergency operation (prohibition of INV compressor operation)	○	○	●	○	●	○	●	Normal operation ○●●●●●○ ✻ Emergency operation (prohibition of INV compressor operation) ○●●●●○●

7.4 Monitor Mode

To enter the monitor mode, push the MODE (BS1) button when in "Setting mode 1".

<Selection of setting item>

Push the SET (BS2) button and set the LED display to a setting item.

<Confirmation on setting contents>

Push the RETURN (BS3) button to display different data of set items.

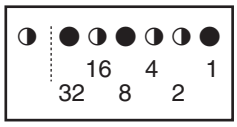
Push the RETURN (BS3) button and switches to the initial status of "Monitor mode".

* Push the MODE (BS1) button and returns to "Setting mode 1".

No.	Setting item	LED display							Data display
		H1P	H2P	H3P	H4P	H5P	H6P	H7P	
0	Various settings	◑	●	●	●	●	●	●	
1	C/H unified address	◑	●	●	●	●	●	○	
2	Low noise/demand address	◑	●	●	●	●	○	●	
3	Not used	◑	●	●	●	●	○	○	
4	Not used	◑	●	●	●	○	●	●	
5	Number of connected hydrobox PCB's	◑	●	●	●	○	●	○	
6	Not used	◑	●	●	●	○	○	●	
7	Not used	◑	●	●	●	○	○	○	
8	Number of outdoor units	◑	●	●	○	●	●	●	
9	Not used	◑	●	●	○	●	●	○	
10	Not used	◑	●	●	○	●	○	●	
11	Not used	◑	●	●	○	●	○	○	
12	Not used	◑	●	●	○	○	●	●	
13	Not used	◑	●	●	○	○	●	○	
14	Contents of malfunction (the latest)	◑	●	●	○	○	○	●	Malfunction code table Refer to page 102.
15	Contents of malfunction (1 cycle before)	◑	●	●	○	○	○	○	
16	Contents of malfunction (2 cycle before)	◑	●	○	●	●	●	●	
20	Contents of retry (the latest)	◑	●	○	●	○	●	●	
21	Contents of retry (1 cycle before)	◑	●	○	●	○	●	○	
22	Contents of retry (2 cycle before)	◑	●	○	●	○	○	●	
25	Not used	◑	●	○	○	●	●	○	

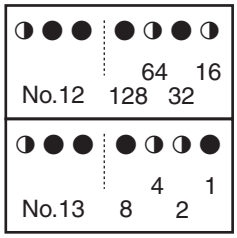
The numbers in the "No." column represent the number of times to press the SET (BS2) button.

- Data such as addresses and number of units is expressed as binary numbers; the two ways of expressing are as follows:



The No. 1 cool/heat unified address is expressed as a binary number consisting of the lower 6 digits. (0 - 63)

In ① the address is 010110 (binary number), which translates to 16 + 4 + 2 = 22 (base 10 number). In other words, the address is 22.



The number of terminal blocks for No. 12 and 13 is expressed as an 8-digit binary number, which is the combination of four upper, and four lower digits for No. 12 and 13 respectively. (0 - 128)
In ② the address for No. 12 is 0101, the address for No. 13 is 0110, and the combination of the two is 01010110 (binary number), which translates to 64 + 16 + 4 + 2 = 86 (base 10 number). In other words, the number of terminal block is 86.

- See the preceding page for a list of data, etc. for No. 0 - 25.

7.5 Setting of Low Noise Operation and Demand Operation

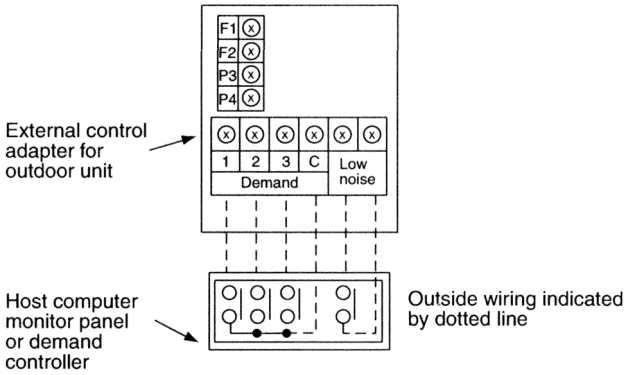
Setting of low noise operation

By connecting the external contact input to the low noise input of the outdoor unit external control adaptor (optional), you can lower operating noise by 2-3 dB.

Setting	Content
Mode 1	Set the outdoor unit fan to Step 6 or lower.
Mode 2	Set the outdoor unit fan to Step 5 or lower.
Mode 3	Set the outdoor unit fan to Step 4 or lower.

A. When the low noise operation is carried out by external contact (with the use of the external control adaptor for outdoor unit)

1. Connect external control adaptor for outdoor unit and short-circuit terminal of low noise (refer below figure).
   If carrying out demand or low-noise input, connect the adaptor's terminals as shown below.



2. While in "Setting mode 2", set the setting condition for set item No. 12 (Setting of external low noise/demand operation) to "YES".
3. If necessary, while in "Setting mode 2", select the setting condition (i.e., "Mode 1", "Mode 2", or "Mode 3") for set item No. 25 (Setting of external low noise level).
4. If necessary, while in "Setting mode 2", set the setting condition for the set item No. 29 (Setting of capacity precedence) to "ON".
   (If the condition is set to "ON", when the air-conditioning load reaches a high level, the low noise operation command will be ignored to put the system into normal operation mode.)

B. When the low noise operation is carried out automatically at night (The external control adaptor for outdoor unit is not required)

1. While in "Setting mode 2", select the setting condition (i.e., "Mode 1", "Mode 2", or "Mode 3") for set item No. 22 (Setting of nighttime low noise level).
2. If necessary, while in "Setting mode 2", select the setting condition (i.e., "20:00", "22:00", or "24:00") for set item No. 26 (Setting of start time of nighttime low noise operation).
   (Use the start time as a guide since it is estimated according to outdoor temperatures.)
3. If necessary, while in "Setting mode 2", select the setting condition (i.e., "06:00", "07:00", or "08:00") for set item No. 27 (Setting of end time of nighttime low noise operation).
   (Use the end time as a guide since it is estimated according to outdoor temperatures.)
4. If necessary, while in "Setting mode 2", set the setting condition for set item No. 29 (Setting of capacity precedence) to "ON".
   (If the condition is set to "ON", when the air-conditioning load reaches a high level, the system will be put into normal operation mode even during nighttime.)

Image of operation in the case of A

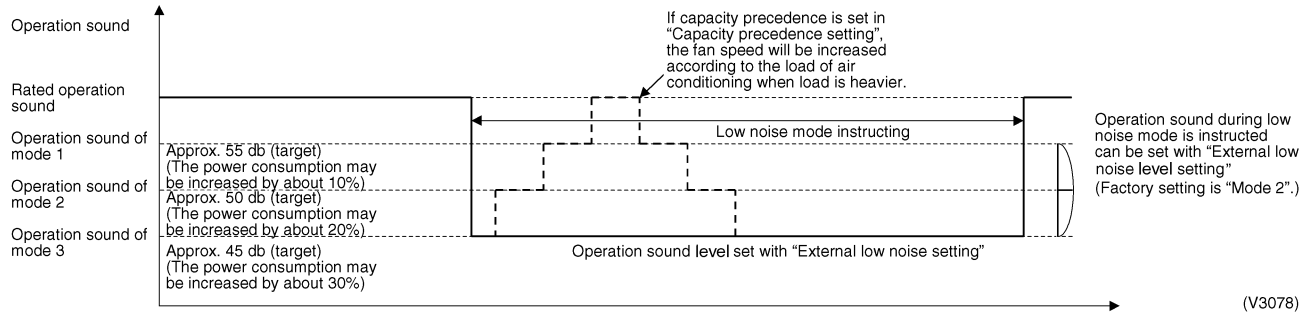


Image of operation in the case of B

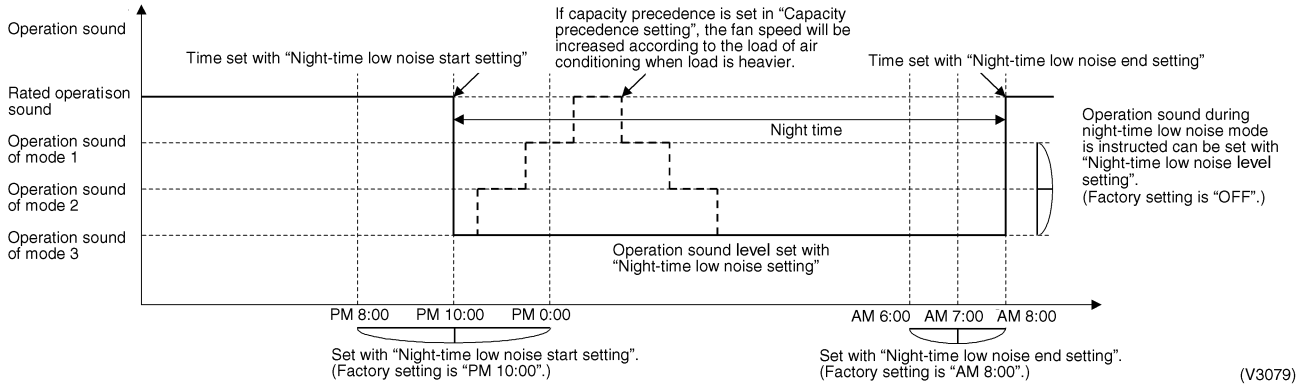
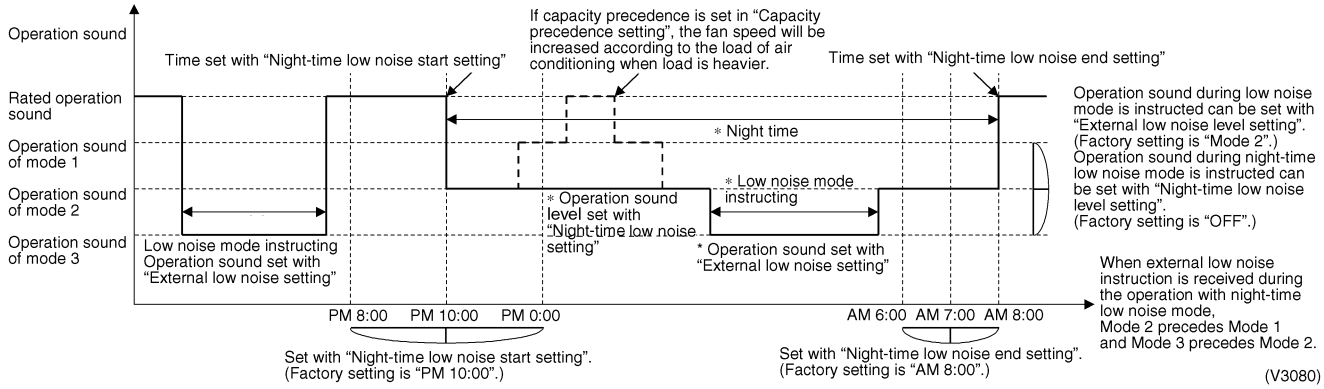


Image of operation in the case of A and B



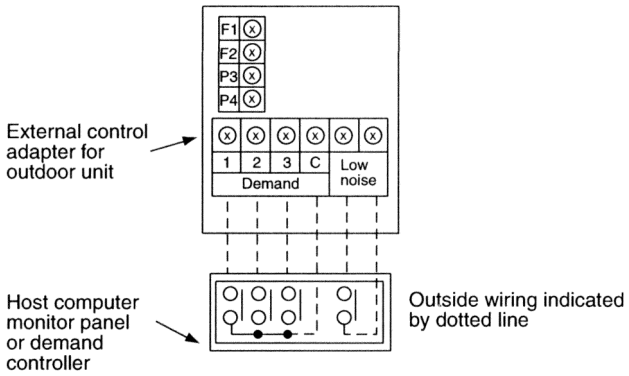
Setting of demand operation

By connecting the external contact input to the demand input of the outdoor unit external control adaptor (optional), the power consumption of unit operation can be saved suppressing the compressor operating condition.

Setting content			Setting method	
Set item	Condition	Content	External control adaptor	Outdoor unit PCB
Demand 1	Mode 1	The compressor operates at approx. 60% or less of rating.	Short circuit “1” and “C” on the terminal strip (TeS1).	Set item No. 32 to “Demand 1”, and item No. 30 to “Level 1”.
	Mode 2	The compressor operates at approx. 70% or less of rating.		Set item No. 32 to “Demand 1”, and item No. 30 to “Level 2”.
	Mode 3	The compressor operates at approx. 80% or less of rating.		Set item No. 32 to “Demand 1”, and item No. 30 to “Level 3”.
Demand 2	—	The compressor operates at approx. 40% or less of rating.	Short circuit “2” and “C”.	Set item No. 32 to “Demand 2”.
Demand 3	—	Forced thermostat OFF.	Short circuit “3” and “C”.	—

*: However the demand operation does not occur in the following operation modes.
① Startup control
② Defrosting operation
③ Pump-down residual operation

If carrying out demand or low-noise input, connect the adaptor’s terminals as shown below.



A. When the demand operation is carried out by external contact (with the use of the external control adaptor for outdoor unit).

1. Connect external control adaptor for outdoor unit and short-circuit terminals as required (refer above figure).
2. While in "Setting mode 2", set the setting condition for set item No. 12 (Setting of external low noise/demand operation) to "YES".
3. If necessary, while in "Setting mode 2", select the set item No. 30 (Setting of Demand 1 level) and then set the setting condition to targeted mode.

B. When the normal demand operation is carried out. (Use of the external control adaptor for outdoor unit is not required.)

1. While in "Setting mode 2", make setting of the set item No. 32 (Setting of alternate demand) to "ON".
2. While in "Setting mode 2", select the set item No. 30 (Setting of Demand 1 level) and then set the setting condition to targeted mode.

Image of operation in the case of A

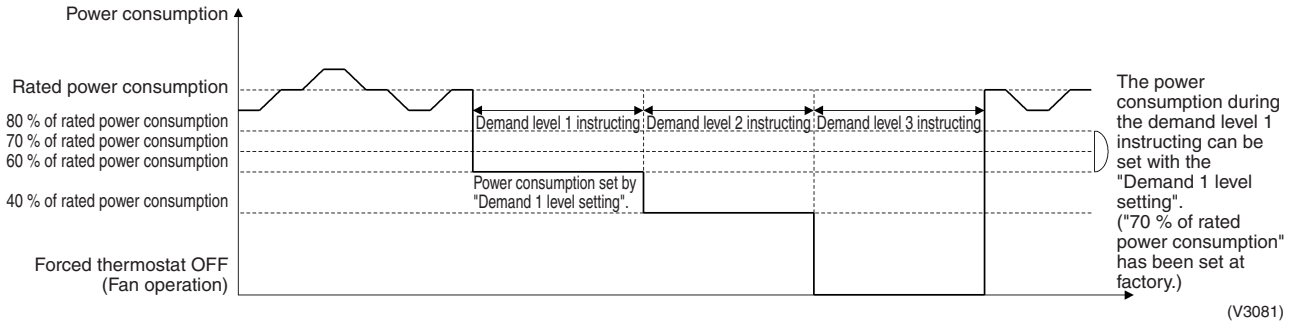


Image of operation in the case of B

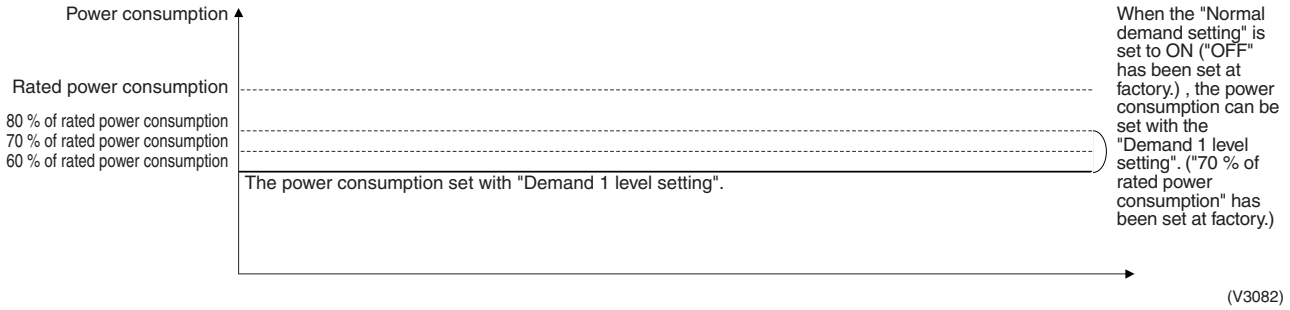
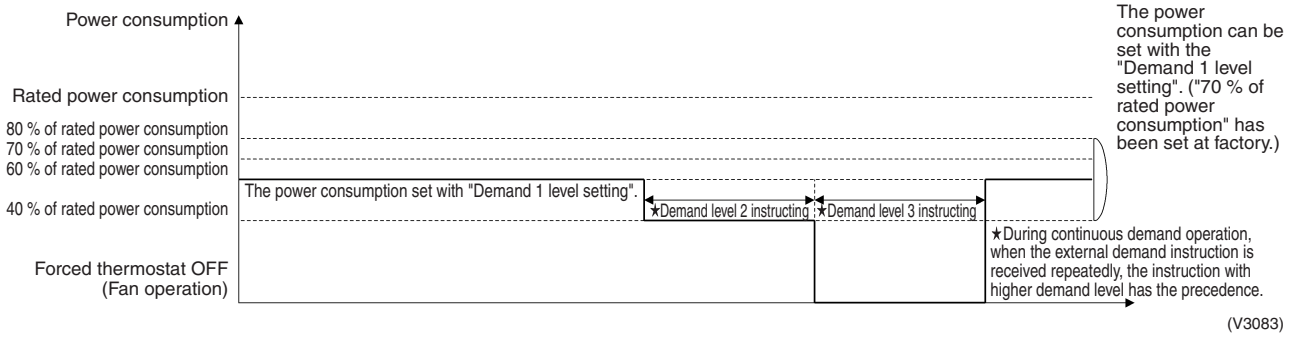


Image of operation in the case of A and B



Detailed setting procedure of low noise operation and demand control

1. Setting mode 1 (H1P off)

① In setting mode 2, push the BS1 (MODE button) one time. → Setting mode 1 is entered and H1P lights off.
During the setting mode 1 is displayed, “In low noise operation” and “In demand control” are displayed.

2. Setting mode 2 (H1P on)

① In setting 1, push and hold the BS1 (MODE button) for more than 5 seconds. → Setting mode 2 is entered and H1P lights.
② Push the BS2 (SET button) several times and match the LED display with the Setting No. you want.
③ Push the BS3 (RETURN button) one time, and the present setting content is displayed.
→ Push the BS2 (SET button) several times and match the LED display with the setting content (as shown below) you want.
④ Push the BS3 (RETURN button) two times. → Returns to ①.
⑤ Push the BS1 (MODE button) one time. → Returns to the setting mode 1 and turns H1P off.

○: ON ●: OFF ◑: Blink

		①							②							③							
Setting No.	Setting contents	Setting No. indication							Setting No. indication							Setting contents	Setting contents indication (Initial setting)						
		H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P		H1P	H2P	H3P	H4P	H5P	H6P	H7P
12	External low noise / Demand setting	○	●	●	●	●	●	●	○	●	●	○	○	●	●	NO (Factory setting)	○	●	●	●	●	●	◑
																YES	○	●	●	●	●	◑	●
22	Night-time low noise setting								○	●	○	●	○	○	●	OFF (Factory setting)	○	●	●	●	●	●	●
																Mode 1	○	●	●	●	●	●	◑
																Mode 2	○	●	●	●	●	◑	●
																Mode 3	○	●	●	●	●	◑	◑
25	External low noise setting								○	●	○	○	●	●	○	Mode 1	○	●	●	●	●	●	◑
																Mode 2 (Factory setting)	○	●	●	●	●	◑	●
																Mode 3	○	●	●	●	◑	●	●
26	Night-time low noise operation start setting								○	●	○	○	●	○	●	PM 8:00	○	●	●	●	●	●	◑
																PM 10:00 (Factory setting)	○	●	●	●	●	◑	●
																PM 0:00	○	●	●	●	◑	●	●
27	Night-time low noise operation end setting								○	●	○	○	●	○	○	AM 6:00	○	●	●	●	●	●	◑
																AM 7:00	○	●	●	●	●	◑	●
																AM 8:00 (Factory setting)	○	●	●	●	◑	●	●
29	Capacity priority setting								○	●	○	○	○	●	○	Low noise priority (Factory setting)	○	●	●	●	●	●	◑
																Capacity priority	○	●	●	●	●	◑	●
30	Demand setting 1								○	●	○	○	○	○	●	60% of rated power consumption	○	●	●	●	●	●	◑
																70% of rated power consumption (Factory setting)	○	●	●	●	●	◑	●
																80% of rated power consumption	○	●	●	●	◑	●	●
32	Normal demand setting								○	●	●	●	●	●	●	OFF (Factory setting)	○	●	●	●	●	●	◑
																ON	○	●	●	●	●	◑	●

Setting mode indication section

Setting No. indication section

Set contents indication section

7.6 Setting of Refrigerant Recovery Mode

When carrying out the refrigerant collection on site, fully open the respective expansion valve of the unit.
All operations are prohibited.

[Operation procedure]

① In **setting mode 2** with units in stop mode, set “Refrigerant Recovery / Vacuuming mode” in mode 2 number 21 to ON. The respective expansion valve of hydrobox and outdoor units are fully opened. (H2P turns to display “TEST OPERATION” (blinks), “TEST OPERATION” and “UNDER CENTRALIZED CONTROL” are displayed on the remote controller, and the all indoor / outdoor unit operation is prohibited.)
After setting, do not cancel “Setting Mode 2” until completion of refrigerant recovery operation.

② Collect the refrigerant using a refrigerant recovery unit. (See the instruction attached to the refrigerant recovery unit for more detail.)

③ Press Mode button “BS1” once and reset “Setting Mode 2”.

7.7 Setting of Vacuuming Mode

In order to perform vacuuming operation at site, fully open the expansion valve of the unit and turn on some solenoid valves.

[Operating procedure]

① With **Setting Mode 2** while the unit stops, set “Refrigerant recovery / Vacuuming mode” in mode 2 number 21 to ON. The expansion valve of the unit fully opens and some of solenoid valves open.
(H2P blinks to indicate the test operation, and the remote controller displays "Test Operation" and "Under centralized control", thus prohibiting operation.)
After setting, do not cancel “Setting Mode 2” until completion of Vacuuming operation.

② Use the vacuum pump to perform vacuuming operation.

③ Press Mode button “BS1” once and reset “Setting Mode 2”.

8. Remote Controller

8.1 Temperature Read Out for Remote Control

Wired remote control EKRUAHTB (BRC21A52)



On the remote controller, the actual temperatures can be displayed.

1. Push and hold the button for 5 seconds.
   The leaving water temperature is displayed (icons and and are blinking).
2. Use the and buttons to display:
   - The entering water temperature (icons and and are blinking and the icon is flashing slowly).
   - The indoor temperature (icons and and are blinking only when room temperature control is selected).
   - The outdoor temperature (icons and and are blinking).
3. Push the button again to leave this mode. If no button is pressed, the remote controller leaves the display mode after 10 seconds.

Schedule timer

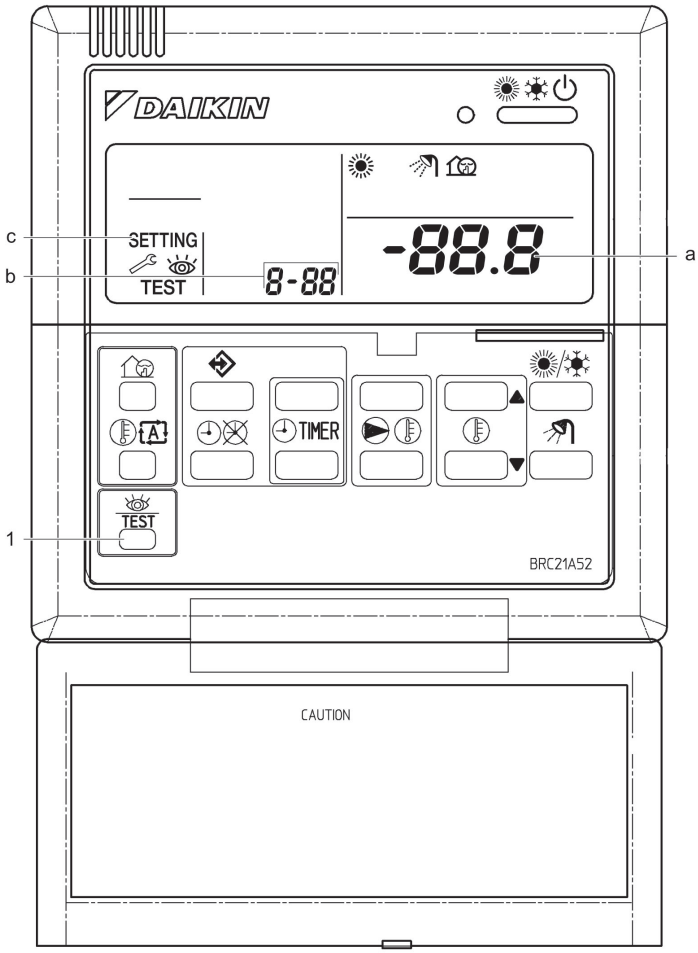
See Installation Operation Manual.

8.2 Field Setting

Field setting from remote control

Individual function of hydrobox can be changed from the remote control. At the time of installation or after service inspection / repair, make the local setting in accordance with the following description.
Wrong setting may cause malfunction.
(When optional accessory is mounted on the hydrobox, setting for the hydrobox may be required to change. Refer to information in the option handbook.)

Wired remote control EKRUAHTB (BRC21A52)



To change one or more field settings, proceed as follows.

1. Press the TEST button for a minimum of 5 seconds to enter FIELD SET MODE.
   The SETTING icon (c) will be displayed. The current selected field setting code is indicated 8-88 (b), with the set value displayed to the right -88.8 (a).
2. Press the ▲ button to select the appropriate field setting first code (8-).
3. Press the ▼ button to select the appropriate field setting second code (-88).
4. Press the TIMER ▲ button and TIMER ▼ button to change the set value of the select field setting.
5. Save the new value by pressing the ⊗ button.
6. Repeat step 2 through 4 to change other field settings as required.
7. When finished, press the TEST button to exit FIELD SET MODE.

Notes

1. Changes made to a field setting are only stored when the ⏲⊗ button is pressed. Pressing the TEST button, without pressing the ⏲⊗ button before, will discard the change made.
2. When you save a field setting by pressing the ⏲⊗ button, the complete field setting group will be saved. For example, when you save field setting 8-00, the other field settings of group 8 (8-01, 8-02, 8-03, 8-04) will be saved as well.
3. Before shipping, the set values have been set as shown in the field settings table.
4. When exiting FIELD SET MODE, "88" may be displayed on the remote controller LCD while the unit initializes itself.
5. When running through the field settings you may notice that there are some more field settings as mentioned in the field settings table. **THESE SETTINGS ARE NOT APPLICABLE AND MAY NOT BE CHANGED!**
6. If you want to leave the setting mode without saving, press the test button.

Field settings table

First code	Second code	Setting name	Installer setting at variance with default value				Default value	Range	Step	Unit
			Date	Value	Date	Value				
0	**Remote control setup**									
	00	User permission level					2	2~3	1	—
	01	Room temperature compensation value					0	–5~5	0.5	°C
	02	Not applicable. Do not change the default value.					1	—	—	—
	03	Status: space heating schedule timer mode Method 1=1 / Method 2=0					1 (ON)	0/1	—	—
	04	Status: space cooling schedule timer mode Method 1=1 / Method 2=0					1 (ON)	0/1	—	—
1	**Settings are not applicable**									
	00	Not applicable. Do not change the default value.					1	—	—	—
	01	Not applicable. Do not change the default value.					1:00	—	—	—
	02	Not applicable. Do not change the default value.					0	—	—	—
	03	Not applicable. Do not change the default value.					15:00	—	—	—
2	**Automatic setback function**									
	00	Status: setback operation					1 (ON)	0/1	—	—
	01	Setback operation start time					23:00	0:00~23:00	1:00	hour
	02	Setback operation stop time					5:00	0:00~23:00	1:00	hour
3	**Weather dependent set point**									
	00	Low ambient temperature (Lo_A)					–10	–20~5	1	°C
	01	High ambient temperature (Hi_A)					15	10~20	1	°C
	02	Set point at low ambient temperature (Lo_Ti)					40	25~80	1	°C
	03	Set point at high ambient temperature (Hi_Ti)					25	25~80	1	°C
4	**Settings are not applicable**									
	00	Not applicable. Do not change the default value.					1	—	—	—
	01	Not applicable. Do not change the default value.					Fri	—	—	—
	02	Not applicable. Do not change the default value.					23:00	—	—	—
5	**Automatic setback and disinfection set point**									
	00	Not applicable. Do not change the default value.					70	—	—	—
	01	Not applicable. Do not change the default value.					10	—	—	—
	02	Leaving water setback temperature					5	0~10	1	°C
	03	Room setback temperature					18	17~23	1	°C
	04	Not applicable. Do not change the default value.					0	—	—	—
6	**Option setup**									
	01	Optional room thermostat installed					0 (OFF)	0/2	—	—
	03	Negative leaving water temperature setting					0	0~–10	–1	°C
7	**Option setup**									
	00	Forced pump operation					1 (ON)	0/1	—	—
8	**Option setup**									
	00	Remote controller temperature control					1 (ON)	0/1	—	—
	01	Not applicable. Do not change the default value.					1	—	—	—
	03	Status: low noise level					1	1~3	1	—
	04	Status: freeze-up prevention					0	0~2	1	—

First code	Second code	Setting name	Installer setting at variance with default value				Default value	Range	Step	Unit
			Date	Value	Date	Value				
9	**Automatic temperature compensation**									
	00	Leaving water temperature compensation value (heating)					0	–2~2	0.2	°C
	01	Leaving water thermistor auto corrective function					1 (ON)	0/1	1	—
	02	Not applicable. Do not change the default value.					0	—	—	—
	03	Leaving water temperature compensation value (cooling)					0	–2~2	0.2	°C
	04	Not applicable. Do not change the default value.					0	—	—	—
A	**Option setup**									
	00	Not applicable. Do not change the default value.					0	—	—	—
	01	Not applicable. Do not change the default value.					0	—	—	—
	02	Not applicable. Do not change the default value.					5	—	—	—
	03	Allowable overshoot on leaving water					3	1~5	0.5	°C
	04	Ethylene glycol concentration					0	0~1	1	—
b	**Settings are not applicable**									
	00	Not applicable. Do not change the default value.					35	—	—	—
	01	Not applicable. Do not change the default value.					45	—	—	—
	02	Not applicable. Do not change the default value.					1	—	—	—
	03	Not applicable. Do not change the default value.					70	—	—	—
	04	Not applicable. Do not change the default value.					70	—	—	—
C	**Leaving water temperature limits**									
	00	Set point: heating leaving water maximum temperature					50	37~50	1	°C
	01	Set point: heating leaving water minimum temperature					25	25~37	1	°C
	02	Set point: cooling leaving water maximum temperature					20	18~22	1	°C
	03	Set point: cooling leaving water minimum temperature					5	Q[(a)]~18	1	°C
	04	Not applicable. Do not change the default value.					0	—	—	—
d	**Settings are not applicable**									
	00	Not applicable. Do not change the default value.					10	—	—	—
	01	Not applicable. Do not change the default value.					30	—	—	—
	02	Not applicable. Do not change the default value.					15	—	—	—
	03	Not applicable. Do not change the default value.					15	—	—	—
	04	Not applicable. Do not change the default value.					40	—	—	—
E	**Service mode**									
	00	Not applicable. Do not change the default value.					0	—	—	—
	01	Not applicable. Do not change the default value.					0	—	—	—
	02	Not applicable. Do not change the default value.					0	—	—	—
	03	Not applicable. Do not change the default value.					1	—	—	—
	04	Pump only operation					0	0~25	1	—
F	**Settings are not applicable**									
	00	Not applicable. Do not change the default value.					5	—	—	—
	01	Not applicable. Do not change the default value.					0	—	—	—
	02	Not applicable. Do not change the default value.					1	—	—	—
	03	Not applicable. Do not change the default value.					10	—	—	—
	04	Not applicable. Do not change the default value.					50	—	—	—

[(a)] Refer to page 92 where [C-03] is explained.

8.2.1 [0] Remote Control Setup

- **[0-00]** User permission level
  The remote controller can be programmed to make certain buttons and functions unavailable for the user. There are 2 permission levels defined. Both levels (level 2 and level 3) are basically the same, the only difference is that for level 3 no water temperature settings are possible (see table below).

	Permission	
	level 2	level 3
Operation ON/OFF	Operable	Operable
Setting the leaving water temperature	Operable	—
Setting the room temperature	Operable	Operable
Quiet mode ON/OFF	—	—
Weather dependent set point operation ON/OFF	Operable	—
Setting the clock	—	—
Programming the schedule timer	—	—
Schedule timer operation ON/OFF	Operable	Operable
Field settings	—	—
Error code display	Operable	Operable
Test operation	—	—

  By default no level is defined so all buttons and functions are operable.
  The actual permission level is determined by field setting. For permission level 2, set field setting [0-00] to 2, for permission level 3, set field setting [0-00] to 3.
  Once the field setting is set, the chosen permission level is not yet active. Enabling the selected permission level is done by simultaneously pressing buttons ⏲▲ and ⏲▼ immediately followed by simultaneously pressing buttons 🏠 and 🌡A, and keeping all 4 buttons pressed for at least 5 seconds. Note that no indication on the remote controller is given. After the procedure the blocked buttons will not be available anymore.
  Deactivating the selected permission level is done in the same way.
- **[0-01]** Room temperature compensation value
  If needed, it is possible to adjust some thermistor value of the unit by a correction value. This can be used as countermeasure for thermistor tolerances or capacity shortage.
  The compensated temperature (= measured temperature plus compensation value) is then used for controlling the system and will be displayed in the temperature read-out mode. See also “[9] Automatic Temperature Compensation” on page 91 for compensation values for leaving water temperature.
- **[0-02]** Setting not applicable.
- **[0-03]** Status: defines whether the ON/OFF instruction can be used in the schedule timer for space heating.
  Refer to the operation manual for details how to program the schedule timer.
  The schedule timer for space heating can be programmed in 2 different ways: based on the temperature set point (both leaving water temperature and room temperature) and based on the ON/OFF instruction.

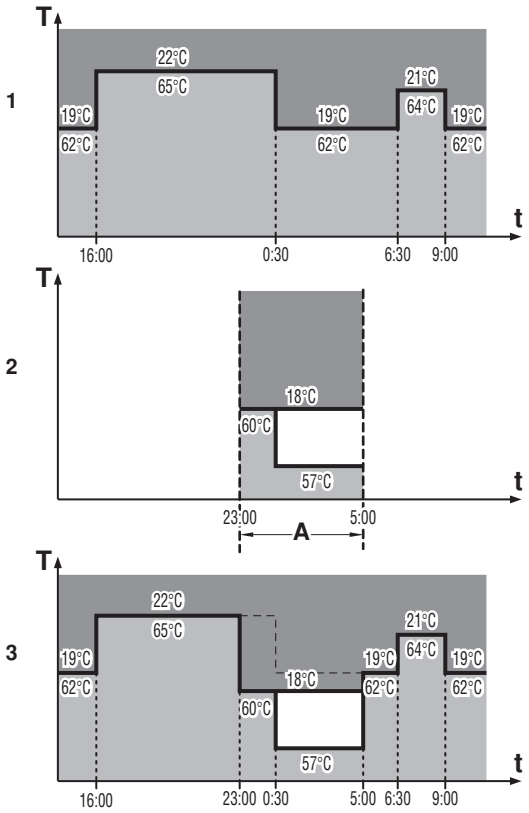
NOTE By default space heating based on temperature set point (method 1) is enabled, so only temperature shifts are possible (no ON/OFF instruction).

In the following tables both methods on how to interpret the schedule timer are shown.

Method 1	Space heating based on temperature set point[a]
During operation	During schedule timer operation the operation LED is lit continuously.
When pushing the ❀❀⏻ button	The schedule timer for space heating will stop and will not start again. The controller will be switched off (operation LED will stop working). However, the schedule timer icon will stay displayed which means that the domestic water heating stays enabled.
When pushing the ⊗/⏲ button	The schedule timer for space heating **and** space cooling along with the quiet mode will be stopped and will not start again. The schedule timer icon will not be displayed anymore.

a. For leaving water temperature and/or room temperature

Operation example: Schedule timer based on temperature set points.
When setback function is enabled, the setback operation will have priority over the scheduled action in the schedule timer.



1 Schedule timer

2 Setback function

3 When both setback function and schedule timer are enabled

A Setback function

t Time

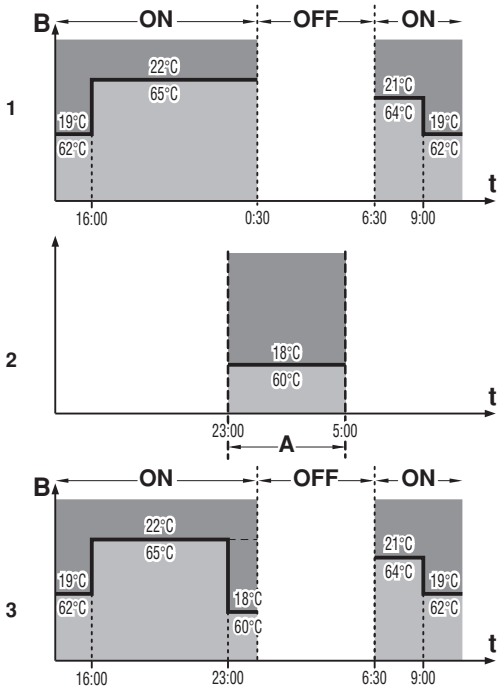
T Temperature set point

Room temperature

Leaving water temperature

Method 2	Space heating based on ON/OFF instruction
During operation	When the schedule timer switches space heating OFF, the controller will be switched off (operation LED will stop working).
When pushing the button	The schedule timer for space heating will stop (when active at that moment) and will start again at the next scheduled ON function. The "last" programmed command overrules the "preceding" programmed command and will remain active until the "next" programmed command occurs. Example: imagine the actual time is 17:30 and actions are programmed at 13:00, 16:00 and 19:00. The "last" programmed command (16:00) overruled the "previous" programmed command (13:00) and will remain active until the "next" programmed command (19:00) occurs. So in order to know the actual setting, one should consult the last programmed command. It is clear that the "last" programmed command may date from the day before. Refer to the operation manual. The controller will be switched off (operation LED will stop working). However the schedule timer icon will stay displayed which means that the domestic heating stays enabled.
When pushing the ⊗/◴ button	The schedule timer for space heating **and** space cooling along with the quiet mode will be stopped and will not start again. The schedule timer icon will not be displayed anymore.

Operation example: Schedule timer based on ON/OFF instruction.
When setback function is enabled, the setback operation will have priority over the scheduled action in the schedule timer if ON instruction is active. If OFF instruction is active this will have priority over the setback function. At any time the OFF instruction will have the highest priority.



1 Schedule timer
2 Setback function
3 When both setback function and schedule timer are enabled
A Setback function
B ON/OFF instruction
t Time
T Temperature set point
Room temperature
Leaving water temperature

- **[0-04]** Status: defines whether the ON/OFF instruction can be used in the schedule timer for cooling.
  Same as for [0-03] but for cooling schedule timer.

For cooling, no setback function is available.

8.2.2 [1] Automatic Storage Timing for Domestic Water Heating

Not applicable.

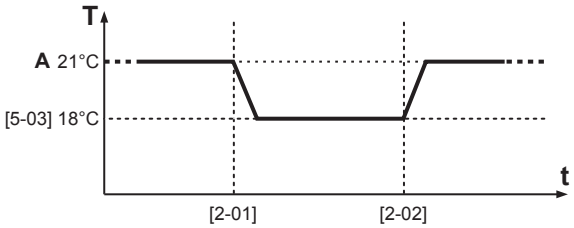
8.2.3 [2] Automatic Setback Function

Setback function provides the possibility to lower the room temperature. The setback function can for instance be activated during the night because the temperature demands during night and day are not the same.

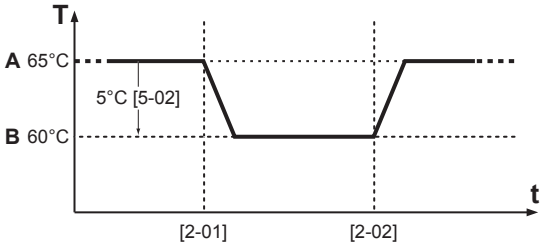
NOTE
- By default the setback function is enabled.
- The setback function can be combined with the automatic weather dependent set point operation.
- Setback function is an automatic daily scheduled function.

- **[2-00]** Status: defines whether the setback function is turned ON (1) or OFF (0)
- **[2-01]** Start time: time at which setback is started
- **[2-02]** Stop time: time at which setback is stopped

Setback can be configured for both room temperature control and leaving water temperature control.



A Normal room temperature set point
t Time
T Temperature



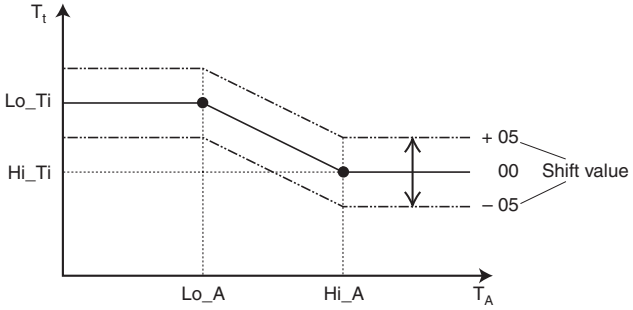
A Normal leaving water temperature set point
B Leaving water setback temperature
t Time
T Temperature

Refer to “[5] Automatic Setback and Disinfection Set Point” on page 89 for temperature set points.

NOTE Setback function for cooling does not exist.

8.2.4 [3] Weather Dependent Set Point

When weather dependent operation is active, the leaving water temperature is determined automatically depending on the outdoor temperature: colder outdoor temperatures will result in warmer water and vice versa. The unit has a floating set point. Activating this operation will result in a lower power consumption than use with a manually fixed leaving water set point. During weather dependent operation, the user has the possibility to shift up or down the target water temperature by a maximum of 5°C. This "Shift value" is the temperature difference between the temperature set point calculated by the controller and the real set point. E.g. a positive shift value means that the real temperature set point will be higher than the calculated set point.
It is advised to use the weather dependent set point because it adjusts the water temperature to the actual needs for space heating. It will prevent the unit from switching too much between thermo ON operation and thermo OFF operation when using the remote controller room thermostat.



T_t	Target water temperature
T_A	Ambient (outdoor) temperature
Shift value	= Shift value

- **[3-00]** Low ambient temperature (Lo_A): low outdoor temperature.
- **[3-01]** High ambient temperature (Hi_A): high outdoor temperature.
- **[3-02]** Set point at low ambient temperature (Lo_Ti): the target outgoing water temperature when the outdoor temperature equals or drops below the low ambient temperature (Lo_A). Note that the Lo_Ti value should be higher than Hi_Ti, as for colder outdoor temperatures (i.e. Lo_A) warmer water is required.
- **[3-03]** Set point at high ambient temperature (Hi_Ti): the target outgoing water temperature when the outdoor temperature equals or rises above the high ambient temperature (Hi_A). Note that the Hi_Ti value should be lower than Lo_Ti, as for warmer outdoor temperatures (i.e. Hi_A) less warm water suffices.

NOTE If by mistake the value of [3-03] is set higher than the value of [3-02], the value of [3-03] will always be used.

8.2.5 [4] Disinfection Function

Not applicable.

8.2.6 [5] Automatic Setback and Disinfection Set Point

- **[5-00]** Not applicable.
- **[5-01]** Not applicable.
- **[5-02]** Leaving water setback temperature.
  See also “[2] Automatic Setback Function” on page 88 for more information.
- **[5-03]** Room setback temperature.
- **[5-04]** Setting not available.

8.2.7 [6] Option Setup

- **[6-01]** External room thermostat option
  If the optional external room thermostat is installed (option EKRP1AHT*), its operation must be enabled by field setting. Default [6-01]=0, which means no external room thermostat is installed. Set [6-01] to 1 or 2 if the optional external room thermostat is installed.
  The two possibilities as field settings are:
  - **[6-01]**=1
    Room thermostat input 1 = heating operation ON/OFF (*1)
    Room thermostat input 2 = cooling operation ON/OFF (*2)
  - **[6-01]**=2
    Room thermostat input 1 = operation ON/OFF (*1)
    Room thermostat input 2 = cooling (0)/heating (1) selection (*2)

  The external room thermostat only gives an ON/OFF signal to the unit. So it can not be controlled for example with a signal from 4-20 mA. To have a good control of the system and avoid frequent ON/OFF, it is advised to use the automatic weather dependent set point operation.
  (*1) this is the connection 1-5 on option EKRP1AHT see wiring for more information.
  (*2) this is the connection 2-5 on option EKRP1AHT see wiring for more information.
  For the control of the system and avoiding frequent ON/OFF it is advised to use the automatic weather dependent set point operation.
- **[6-03]** This setting is only applicable for units that need a setpoint below 0°C. A negative setpoint can not directly be set on the remote controller. This is done threw field settings:
  - [A-04] must be set to 1 “glycol concentration setting” (see page 92 for more information)
  - [6-03] negative setpoint: here you must fill in your desired negative setpoint.

  Furthermore this negative setpoint will only be accepted, when the LWT setpoint on the remote controller is set to 0°C.
  To be able to put LWT setpoint on 0°C you need to change [C-03] to 0 (only possible for EW*Q*BAW*B* units).
  Example: for setpoint of -5°C set [A-04]=1, [C-03]=0, [6-03]=-5 and remote controller LWT setpoint 0°C.

8.2.8 [7] Option Setup

- **[7-00]** Forced pump operation.
  - **[7-00]**=0 the pump performs intermittent sampling during thermo off conditions. This setting is often used when the unit is controlled by a room thermostat.
  - **[7-00]**=1 the pump continues operation during thermo off conditions (default).

8.2.9 [8] Option Setup

- **[8-00]** Remote controller temperature control
  - **[8-00]**=0 the unit operates in leaving water temperature control. This the default setting.
  - **[8-00]**=1 the unit operates in room temperature control. This means that the remote controller is used as room thermostat, so the remote controller can be placed in the living room to control the room temperature.
- **[8-01]** Setting not available
- **[8-03]** Quiet mode

  The unit has a quiet mode functionality for which 3 levels can be selected:

  [8-03]=1 low noise level 1 (default)
  [8-03]=2 low noise level 2
  [8-03]=3 low noise level 3

  Activating this quiet mode is done by pushing the QUIET MODE button on the remote controller or through the schedule timer.
- **[8-04]** Freeze-up prevention

  The unit has a freeze-up prevention functionality for which 3 levels can be selected:

  [8-04]=0 prevention level 0 (default: no prevention)
  [8-04]=1 prevention level 1
  [8-04]=2 prevention level 2

  - Prevention level 0 (0)
    - no prevention (default)
  - Prevention level 1 (1)
    - If Tamb <4°C & EWT or LWT <7°C → pump starts
    - If EWT or LWT <5°C for 5 minutes → unit starts
  - Prevention level 2 (2)
    - If Tamb <4°C → pump starts
    - If EWT or LWT <5°C for 5 minutes → unit starts

  It is advised to enable freeze-up prevention if the indoor unit is located in a colder ambient room (e.g. garage, ...) to prevent water freeze-up.

8.2.10 [9] Automatic Temperature Compensation

If needed, it is possible to adjust some thermistor value of the unit by a correction value. This can be used as countermeasure for thermistor tolerances or capacity shortage.
The compensated temperature (= measured temperature plus compensation value) is then used for controlling the system and will be displayed in the temperature read-out mode.

- **[9-00]** Leaving water temperature compensation value for heating operation.
- **[9-01]** Leaving water thermistor auto corrective function. When enabled, this function will take into account the outdoor ambient conditions and correct the measured value which will be used for the logic.

  E.g. when the ambient temperature is high during cooling mode, the logic will correct the measured value of the leaving water thermistor to a lower value to take into account influence of high ambient temperatures in the measurement.
- **[9-02]** Setting is not applicable.
- **[9-03]** Leaving water temperature compensation value for cooling operation. Not available for heating only model.
- **[9-04]** Setting is not applicable.

8.2.11 [A] Option Setup

- **[A-00]** Setting is not applicable.
- **[A-01]** Setting is not applicable.
- **[A-02]** Setting is not applicable.
- **[A-03]** Leaving water temperature overshoot/undershoot value
  This setting makes it possible to set the allowable overshoot (heating)/undershoot (cooling) when operating the unit during leaving water control. See “Thermostat Control” on page 60.
- **[A-04]** Glycol concentration setting
  This setting is only applicable for units with a low temperature cooling option.
  When changing this setting, the freeze prevention parameters will be changed in relation with the glycol concentration.
  - **[A-04]**=0=10% glycol, minimum leaving water = 0°C.
  - **[A-04]**=1=20% glycol, minimum leaving water = -10°C.

Caution Glycol concentrations lower than the set parameter will cause freezing of the liquid.

8.2.12 [b] Domestic Hot Water Set Points

Not applicable.

8.2.13 [C] Leaving Water Temperature Limits

To prevent misuse concerning leaving water temperatures, it is possible to limit the set points.

- **[C-00]** Maximum leaving water setpoint in heating operation.
- **[C-01]** Minimum leaving water setpoint in heating operation.
- **[C-02]** Maximum leaving water setpoint in cooling operation.
- **[C-03]** Minimum leaving water setpoint in cooling operation.
  Depends on field setting [A-04]
  when [A-04]=0, the minimum value is set to 5
  when [A-04]=1, the minimum value is set to 0 (*1)
  (*1) only for EW*Q*BAW*B* units
- **[C-04]** Field setting not applicable.

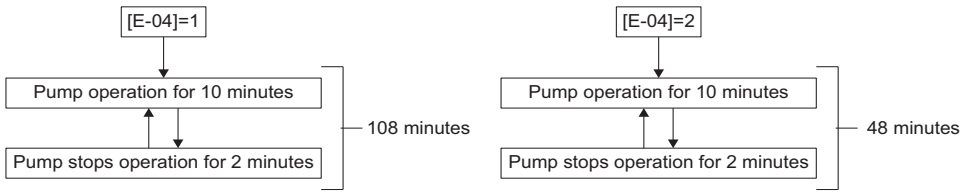
8.2.14 [d] Domestic Water Heating Retention Times

Not applicable.

8.2.15 [E] Service Mode

- **[E-01]** Setting not available.
- **[E-02]** Setting not available.
- **[E-03]** Setting not available.
- **[E-04]** Pump only operation
  When commissioning and installing the unit it is very important to get all air out of the water circuit.
  Through this field setting the pump can be operated without actual operation of the unit. By doing so this will enhance the air removal from the circuit. The pump can operate at different speed:
  - **[E-04]**=0 normal operation of the unit (default)
  - **[E-04]**=1 low pump speed operation
  - **[E-04]**=2 high pump speed operation

  - **[E-04]**=1 program 1 the unit will perform the automatic air purge operation for 108 minutes.
  - **[E-04]**=2 program 2 the unit will perform the automatic air purge operation for 48 minutes.



8.2.16 [F] Option Setup

Not applicable.

8.3 Weekly Schedual

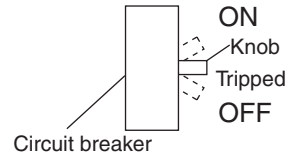
See Installation Operation Manual.

Part 3
Troubleshooting

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1. Symptom-based Troubleshooting

	Symptom		Supposed Cause	Countermeasure
1	The system does not start operation at all.		Blowout of fuse(s)	Turn Off the power supply and then replace the fuse(s).
			Cutout of breaker(s)	• If the knob of any breaker is in its OFF position, turn ON the power supply. • If the knob of any circuit breaker is in its tripped position, do not turn ON the power supply. 
			Power failure	After the power failure is reset, restart the system.
			Open phase in power supply cable	Check power supply. After that, properly connect the power supply cable, and then turn ON the power supply.
2	The system starts operation but makes an immediate stop.		Blocked air inlet or outlet of indoor or outdoor unit	Remove obstacle(s).
3	The unit is turned on but is not heating/cooling as expected.		The temperature setting is not correct.	Check the controller set point.
			Capacity shortage.	Check if the cooling fan at the rear of the switch box is working properly. Check if the unit is not installed in a too hot location (> 30°C).
			The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value.
			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). ■ Make sure that the expansion vessel is not broken. ■ Check on the manometer that there is sufficient water pressure. The water pressure must be > 0,3 bar (water is cold); >> 0,3 bar (water is hot).
			Blocked air inlet or outlet of indoor or outdoor unit	Remove obstacle(s).
			Enclosed outdoor unit(s)	Remove the enclosure.
4	The system does not operate.	The system stops and immediately restarts operation.	If the OPERATION lamp on the remote control turns ON, the system will be normal. These symptoms indicate that the system is controlled so as not to put unreasonable loads on the system.	Normal operation. The system will automatically starts operation after a lapse of five minutes.
		Pressing the TEMP ADJUST button immediately resets the system.		

	Symptom		Supposed Cause	Countermeasure
5	The system produces sounds.	<Indoor and outdoor units> “Hissing” sounds are continuously produced while in cooling or defrosting operation.	These sounds are produced from gas (refrigerant) flowing respectively through the indoor and outdoor units.	Normal operation.
		<Indoor and outdoor units> “Hissing” sounds are produced immediately after the startup or stop of the system, or the startup or stop of defrosting operation.	These sounds are produced when the gas (refrigerant) stops or changes flowing.	Normal operation.
		<Indoor unit> Faint sounds are continuously produced while in cooling operation or after stopping the operation.	These sounds are produced from the drain discharge device in operation.	Normal operation.
		<Indoor unit> “Creaking” sounds are produced while in heating operation or after stopping the operation.	These sounds are produced from resin parts expanding and contracting with temperature changes.	Normal operation.
		<Outdoor unit> Pitch of operating sounds changes.	The reason is that the compressor changes the operating frequency.	Normal operation.
		The pump is making noise (cavitation).	There is air in the system.	Purge air.
			Water pressure at pump inlet is too low.	Check on the manometer that there is sufficient water pressure. The water pressure must be > 0,3 bar (water is cold); >> 0,3 bar (water is hot).
6	Outdoor unit fan does not rotate.	In operation.	The reason is that fan revolutions are controlled to put the operation to the optimum state.	Normal operation.
7	LCD display “88” appears on the remote control.	Immediately after turning ON the power supply.	The reason is that the system is checking to be sure the remote control is normal.	Normal operation. This code is displayed for a period of approximately one minute at maximum.
8	The outdoor gets hot.	While stopping operation.	The reason is that the compressor is warmed up to provide smooth startup of the system.	Normal operation.
9	The water pressure relief valve opens.		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.
10	The water pressure relief valve leaks.		Dirt is blocking the water pressure relief valve.	Check for correct operation of the pressure relief valve by turning the red knob on the valve counter clockwise: ■ You should hear a clocking sound. ■ In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then replace the relief valve.
11	Malfunction of the schedule timer.		The schedule timer does not work but the programmed actions are executed at the wrong time.	Check if the clock and the day of the week are set correctly, correct if necessary.
12	The system produces sounds.	<Outdoor unit> “Hissing” sounds are continuously produced while in cooling or defrosting operation.	These sounds are produced from gas (refrigerant) flowing respectively through the indoor and outdoor units.	Normal operation.
		<Outdoor unit> “Hissing” sounds are produced immediately after the startup or stop of the system, or the startup or stop of defrosting operation.	These sounds are produced when the gas (refrigerant) stops or changes flowing.	Normal operation.
		<Outdoor unit> Pitch of operating sounds changes.	The reason is that the compressor changes the operating frequency.	Normal operation.

	Symptom		Supposed Cause	Countermeasure
13	The outdoor unit compressor or the outdoor unit fan does not stop.	After stopping operation	It stops in order to prevent oil or refrigerant from dwelling.	Normal operation. It stops after a lapse of approximately 5 to 10 minutes.
14	Hot air comes out from the system even though it stops.	Hot air is felt while the system stops.	On VRV systems, small quantity of refrigerant is fed to indoor units in the stopped state when other indoor units are in operation.	Normal operation.

2. Malfunction Codes and Description

○: ON ●: OFF ◑: Blink

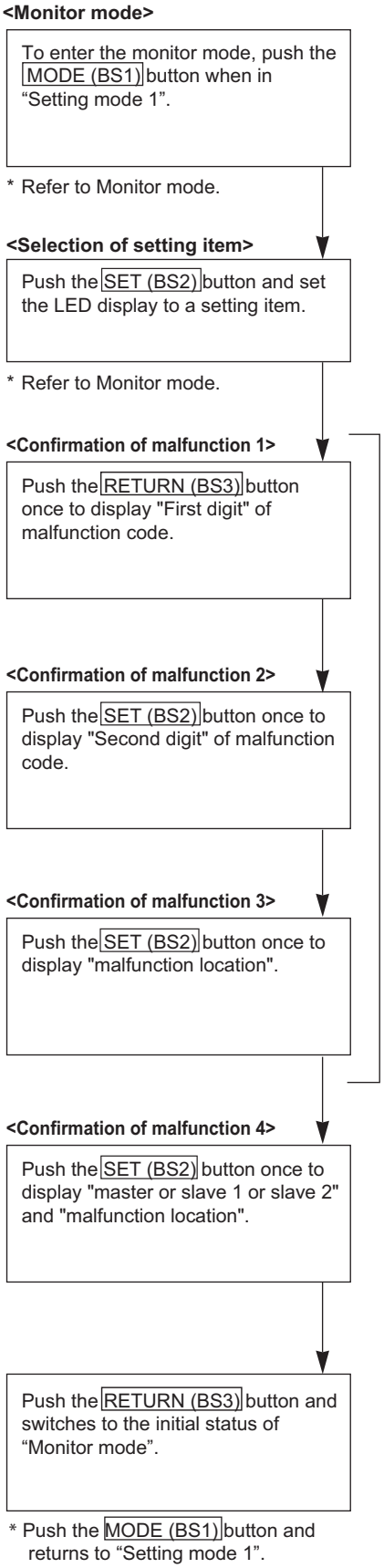
	Malfunction code	Operation lamp	Malfunction contents	Page Referred
Hydrobox	A1	◑	Hydrobox PC board defect	106
	A6	◑	Hydrobox water system error	107
	A9	◑	Hydrobox malfunction of moving part of electronic expansion valve (K11E or K12E) R-410A circuit	108
	AE	○	Hydrobox water circuit error	110
	AJ	◑	Capacity error	111
	C1	◑	Hydrobox failure of transmission (between hydrobox unit pc board and control pc board)	112
	C4	◑	Hydrobox malfunction of thermistor (R13T, R23T) liquid thermistor R-410A	113
	C5	◑	Malfunction of thermistor (R3T) for gas pipe (loose connection, disconnection, short circuit, failure)	—
	C9	◑	Hydrobox return water thermistor (R12T, R22T)	114
	CA	○	Hydrobox leaving water thermistor (R21T or R22T)	115
	CJ	○	Hydrobox malfunction of thermostat sensor in remote controller	116
Outdoor Unit	E1	◑	Outdoor unit PCB defect	117
	E3	◑	Actuation of high pressure switch	118
	E4	◑	Actuation of low pressure sensor	120
	E5	◑	Outdoor unit inverter compressor motor lock	122
	E6	◑	Outdoor unit STD compressor motor overcurrent/lock	124
	E7	◑	Outdoor unit malfunction of outdoor unit fan motor	125
	E9	◑	Outdoor unit malfunction of electronic expansion valve coil (Y1E, Y2E)	128
	F3	◑	Outdoor unit abnormal discharge pipe temperature	130
	F6	◑	Unit refrigerant overcharged	131
	H7	◑	Detection of abnormal signal from fan motor	132
	H9	◑	Outdoor unit malfunction of thermistor (R1T) for outdoor air	133
	J2	◑	Outdoor unit current malfunction	134
	J3	◑	Outdoor unit malfunction of discharge pipe thermistor (R3T, R31T~R33T)	135
	J5	◑	Outdoor unit malfunction of thermistor (R2T, R7T) for suction pipe	136
	J6	◑	Outdoor unit malfunction of thermistor (R4T) for outdoor unit heat exchanger	137
	J7	◑	Suction thermistor error (R14T or R24T)	138
	J9	◑	Outdoor unit malfunction of subcooling heat exchanger gas pipe thermistor	139
	JA	◑	Outdoor unit malfunction of high pressure sensors	140
	JC	◑	Outdoor malfunction of low pressure sensor	141
	L0	◑	Inverter system error	—
	L4	◑	Outdoor unit malfunction of inverter radiating fin temperature rise	142
	L5	◑	Outdoor unit inverter compressor abnormal	144
	L8	◑	Outdoor unit inverter current abnormal	146
	L9	◑	Outdoor unit inverter start up error	148
	LA	◑	Malfunction of power unit	—
	LC	◑	Outdoor unit malfunction of transmission between inverter and control PCB	150
	P1	◑	Outdoor unit inverter over ripple protection	153
	P4	◑	Outdoor unit malfunction of inverter radiating fin temperature rise sensor	154
	PJ	◑	Outdoor unit faulty field setting after replacing main PCB or faulty combination of PCB	156

○: ON ●: OFF ◑: Blink

	Malfunction code	Operation lamp	Malfunction contents	Page Referred
System	U0	○	Outdoor unit low pressure drop due to refrigerant shortage or electronic expansion valve failure	157
	U1	◑	Reverse phase, open phase	158
	U2	◑	Outdoor unit power supply insufficient or instantaneous failure	159
	U3	◑	Outdoor unit check operation is not executed	162
	U4	◑	Malfunction of transmission between hydrobox units and outdoor units	163
	U5	◑	Hydrobox malfunction of transmission between remote controller and hydrobox	164
	U5	●	Failure of remote controller PCB or setting during control by remote controller	—
	U7	◑	Malfunction of transmission between outdoor units	—
	U8	◑	Hydrobox malfunction of transmission between main remote controller and sub remote controllers	165
	U9	◑	Malfunction of transmission between indoor and outdoor units in the same system	—
	UA	◑	Improper combination of hydrobox and outdoor unit and remote controller	166
	UC	○	Address duplication of centralized controller	—
	UE	◑	Malfunction of transmission between centralized controller and indoor unit	—
	UF	◑	System is not set yet	167
	UH	◑	Malfunction of system, refrigerant system address undefined	168

The system operates for malfunction codes indicated in black squares, however, be sure to check and repair.

3. Malfunction Code Indication by Outdoor Unit PCB



Contents of malfunction		Malfunction code
PCB malfunction	PCB malfunction	E1
	Faulty PCB	
Abnormal discharge pressure	HPS activated	E3
Abnormal suction pressure	Abnormal Pe	E4
Compressor lock	Detection of INV compressor lock	E5
Activation of OC	Detection of STD1 compressor lock	E6
	Detection of STD2 compressor lock	
Over load, overcurrent, abnormal lock of outdoor unit fan motor	Instantaneous overcurrent of DC fan 1 motor	E7
	Detection of DC fan 1 motor lock	
	Instantaneous overcurrent of DC fan 2 motor	
	Detection of DC fan 2 motor lock	
Malfunction of electronic expansion valve	EV1	E9
	EV2	
	EV3	
Abnormal position signal of outdoor unit fan motor	Abnormal position signal of DC fan 1 motor	H7
	Abnormal position signal of DC fan 2 motor	
Faulty sensor of outdoor air temperature	Faulty Ta sensor (short)	H9
	Faulty Ta sensor (open)	
Abnormal discharge pipe temperature	Abnormal Td	F3
Abnormal heat exchanger temperature	Refrigerant overcharge	F6
Faulty current sensor	Faulty CT1 sensor	J2
	Faulty CT2 sensor	
Faulty sensor of discharge pipe temperature	Faulty Tdi sensor (short)	J3
	Faulty Tds1 sensor (short)	
	Faulty Tds2 sensor (short)	
	Faulty Tdi sensor (open)	
	Faulty Tds1 sensor (open)	
	Faulty Tds2 sensor (open)	
Faulty sensor of suction pipe temperature	Faulty Ts1 sensor (short)	J5
	Faulty Ts1 sensor (open)	
	Faulty Ts2 sensor (short)	
	Faulty Ts2 sensor (open)	
Faulty sensor of heat exchanger temperature	Faulty Tb sensor (short)	J6
	Faulty Tb sensor (open)	
Malfunction of the liquid pipe temperature sensor	Faulty Tl sensor (short)	J7
	Faulty Tl sensor (open)	
Faulty sensor of subcool heat exchanger temperature	Faulty Tsh sensor (short)	J9
	Faulty Tsh sensor (open)	
Faulty sensor of discharge pressure	Faulty Pc sensor (short)	JA
	Faulty Pc sensor (open)	
Faulty sensor of suction pressure	Faulty Pe sensor (short)	JC
	Faulty Pe sensor (open)	
Instantaneous power failure	∗NO display on remote controller (Judge during compressor operation)	(L2)
Inverter radiation fin temperature rising	Over heating of inverter radiation fin temperature	L4
DC output overcurrent	Inverter instantaneous overcurrent	L5
	IGBT malfunction	L5
Electronic thermal	Electronic thermal switch 1	L8
	Electronic thermal switch 2	
	Out-of-step	
	Speed down after startup	
	Lightening detection	
Stall prevention (Limit time)	Stall prevention (Current increasing)	L9
	Stall prevention (Faulty start up)	
	Abnormal wave form in startup	
	Out-of-step	
Transmission error between inverter and outdoor unit	Inverter transmission error	LC

○: ON ●: OFF ◑:Blink

Malfunction code	Confirmation of malfunction 1							Confirmation of malfunction 2							Confirmation of malfunction 3							Confirmation of malfunction 4						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P
E1	◑			●	●	◑	◑	◑			●	●	●	◑	◑			●	●	●	●	◑			●	●	◑	◑
								◑			●	●	●	◑	◑			●	●	●	●	◑			●	◑	◑	◑
E3								◑			●	●	◑	◑	◑			●	●	●	●	◑			●	●		
E4								◑			●	◑	●	●	◑			●	●	●	●	◑			●	●		
E5								◑			●	◑	●	◑	◑			●	●	●	●	◑			●	●		
E6								◑			●	◑	◑	●	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
E7								◑			●	◑	◑	◑	◑			●	●	●	●	◑			●	●	*1	
															◑			●	●	●	●	◑			●	◑		
															◑			●	●	●	◑	◑			●	●		
															◑			●	●	●	◑	◑			●	◑		
E9								◑			◑	●	●	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
															◑			●	●	●	●	◑			◑	●		
H7	◑			●	◑	●	●	◑			●	◑	◑	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	◑	◑			●	●		
H9								◑			◑	●	●	◑	◑			●	●	●	●	◑			●	●	*1	
															◑			●	●	●	◑	◑			●	●		
F3	◑			●	◑	●	◑	◑			●	●	◑	◑	◑			●	●	●	●	◑			●	●	*1	
F6								◑			●	◑	◑	●	◑			●	●	●	●	◑			●	●	◑	◑
J2	◑			●	◑	◑	●	◑			●	●	◑	●	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
J3								◑			●	●	◑	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
															◑			●	●	●	●	◑			◑	●		
															◑			●	●	●	◑	◑			●	●		
															◑			●	●	●	◑	◑			●	◑		
															◑			●	●	●	◑	◑			◑	●		
J5								◑			●	◑	●	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	◑	◑			●	●		
															◑			●	●	●	●	◑			●	◑	*1	
															◑			●	●	●	◑	◑			●	◑		
J6								◑			●	◑	◑	●	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	◑	◑			●	●		
J7								◑			●	◑	◑	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	◑	◑			●	●		
J9								◑			◑	●	●	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	◑	◑			●	●		
JA								◑			◑	●	◑	●	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	◑	◑			●	●		
JC								◑			◑	◑	●	●	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	◑	◑			●	●		
(L2)	◑			●	◑	◑	◑	◑			●	●	◑	●	◑			●	●	●	●	◑			●	●		
L4								◑			●	◑	●	●	◑			●	●	●	●	◑			●	●		
L5								◑			●	◑	●	◑	◑			●	●	●	●	◑			●	●		
L5															◑			●	●	●	●	◑			●	◑		
L8								◑			◑	●	●	●	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
															◑			●	●	●	●	◑			◑	●	*1	
															◑			●	●	●	◑	◑			●	●		
L9								◑			◑	●	●	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
															◑			●	●	●	●	◑			◑	●		
LC								◑			◑	◑	●	●	◑			●	●	●	●	◑			●	◑		

Display of contents of malfunction (first digit)

Display of contents of malfunction (second digit)

Display 1 of malfunction in detail

Display 2 of malfunction in detail

*1		
	●	● Master
	●	◑ Slave1
	◑	● Slave2
	◑	◑ System

<Monitor mode>

To enter the monitor mode, push the MODE (BS1) button when in "Setting mode 1".

* Refer to Monitor mode.

<Selection of setting item>

Push the SET (BS2) button and set the LED display to a setting item.

* Refer to Monitor mode.

<Confirmation of malfunction 1>

Push the RETURN (BS3) button once to display "First digit" of malfunction code.

<Confirmation of malfunction 2>

Push the SET (BS2) button once to display "Second digit" of malfunction code.

Detail description on next page.

<Confirmation of malfunction 3>

Push the SET (BS2) button once to display "malfunction location".

<Confirmation of malfunction 4>

Push the SET (BS2) button once to display "master or slave 1 or slave 2" and "malfunction location".

Push the RETURN (BS3) button and switches to the initial status of "Monitor mode".

* Push the MODE (BS1) button and returns to "Setting mode 1".

Contents of malfunction		Malfunction code
Open phase/Power supply imbalance	Imbalance of inverter power supply voltage	P1
Faulty temperature sensor inside switch box	Faulty thermistor of inverter box	P3
Faulty temperature sensor of inverter radiation fin	Faulty thermistor of inverter fin	P4
Incorrect combination of Inverter and fan driver	Incorrect combination of inverter	PJ
	Incorrect combination of fan driver 1	
	Incorrect combination of fan driver 2	
Gas shortage	Gas shortage alarm	U0
Reverse phase	Reverse phase error	U1
Abnormal power supply voltage	Insufficient Inverter voltage	U2
	Inverter open phase (phase T)	
	Charging error of capacitor in inverter main circuit	
No implementation of test-run		U3
Transmission error between indoor and outdoor unit	I/O transmission error	U4
	I/O transmission error	
Transmission error between outdoor units, transmission error between thermal storage units, duplication of IC address	Sequential startup ADP alarm	U7
	Sequential startup ADP malfunction	U7
	Malfunction of transmission between multi units (Multi 1)	
	Malfunction of transmission between multi units (Multi 2)	
	Abnormal multi horsepower setting	
	Abnormal multi address setting	
	Excessive multi connections	
	Multi system malfunction	
Transmission error of other system	Indoor unit system abnormal in other system or other indoor unit system abnormal in own system	U9
Erroneous field setting	System transmission malfunction	UA
	Overconnection malfunction of indoor units	
	Malfunction of field setting	
	Refrigerant abnormal	
	Multi-ID abnormal	
	Alarm of TSS field setting	UA
	Alarm of CT address setting	
Faulty system malfunction	Wiring error (Auto-address error)	UH
Transmission error in accessory devices	Malfunction of multi-level connection	UJ
	Alarm of multi-level connection	UJ
Conflict in wiring and piping, no setting for system	Conflict in wiring and piping	UF

○: ON ●: OFF ◑:Blink

Malfunction code	Confirmation of malfunction 1							Confirmation of malfunction 2							Confirmation of malfunction 3							Confirmation of malfunction 4						
	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P
P1	◑			◑	●	●	●	◑			●	●	●	◑	◑			●	●	●	●	◑			●	●		
P3								◑			●	●	◑	◑	◑			●	●	●	●	◑			●	●		
P4								◑			●	◑	●	●	◑			●	●	●	●	◑			●	●	*1	
PJ								◑			◑	◑	●	◑	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
															◑			●	●	●	●	◑			◑	●		
U0	◑			◑	●	●	◑	◑			●	●	●	●	◑			●	●	●	●	◑			●	●	◑	◑
U1								◑			●	●	●	◑	◑			●	●	●	●	◑			●	●		
U2								◑			●	●	◑	●	◑			●	●	●	●	◑			●	●		
															◑			●	●	●	●	◑			●	◑		
U3								◑			●	●	◑	◑	◑			●	●	●	●	◑			●	●	◑	◑
															◑			●	●	●	●	◑			●	◑	◑	◑
U4								◑			●	◑	●	●	◑			●	●	●	●	◑			●	●	◑	◑
															◑			●	●	●	●	◑			●	◑	◑	◑
U7								◑			●	◑	◑	◑	◑			●	●	●	●	◑			●	◑	◑	◑
U7															◑			●	●	●	●	◑			●	●	◑	◑
															◑			●	●	●	●	◑			◑	●	◑	◑
															◑			●	●	●	●	◑			◑	◑	◑	◑
															◑			●	●	●	◑	◑			●	●	◑	◑
															◑			●	●	●	◑	◑			●	◑	◑	◑
															◑			●	●	●	◑	◑			◑	●	◑	◑
															◑			●	●	●	◑	◑			◑	◑	◑	◑
U9								◑			◑	●	●	◑	◑			●	●	●	●	◑			●	●	◑	◑
UA								◑			◑	●	◑	●	◑			●	●	●	●	◑			●	●	◑	◑
															◑			●	●	●	●	◑			●	◑	◑	◑
															◑			●	●	●	●	◑			◑	●	◑	◑
															◑			●	●	●	◑	◑			●	●	◑	◑
															◑			●	●	●	◑	◑			●	◑	◑	◑
UA															◑			●	●	●	◑	◑			◑	●	◑	◑
															◑			●	●	●	◑	◑			◑	◑	◑	◑
UH								◑			◑	●	◑	◑	◑			●	●	●	●	◑			●	●	◑	◑
UJ								◑			◑	◑	●	◑	◑			●	●	●	●	◑			●	●	*1	
UJ															◑			●	●	●	●	◑			●	◑		
UF								◑			◑	◑	◑	◑	◑			●	●	●	●	◑			●	●	◑	◑

Display of contents of malfunction (first digit)

Display of contents of malfunction (second digit)

Display 1 of malfunction in detail

Display 2 of malfunction in detail

*1

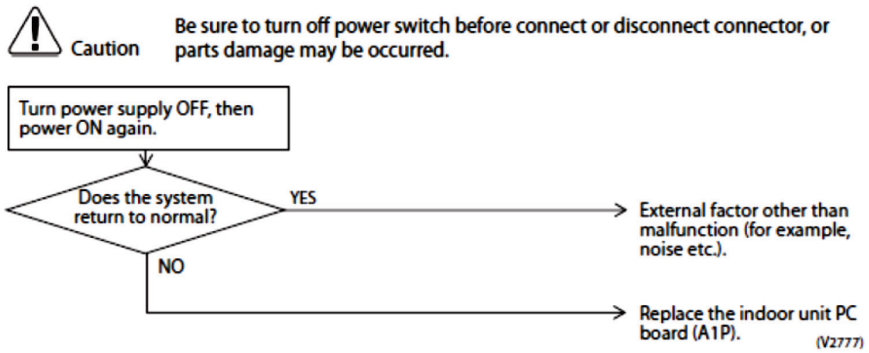
●	●	Master
●	◑	Slave1
◑	●	Slave2
◑	◑	System

4. Error Codes

4.1 “A1”

Error code:	A1: Hydrobox PC board defect Subcode 0	
Purpose:	▪ Detect malfunctioning PCB	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Check data from EPROM	
Error condition:	▪ When data could not be correctly received from EPROM. EPROM type of non-volatile memory. Maintains memory contents even when the power supply is turned off.	
Possible causes	Corrective action	Consequence
Defect of hydrobox pc board	See flow chart	
Reset:	Recycle the power	

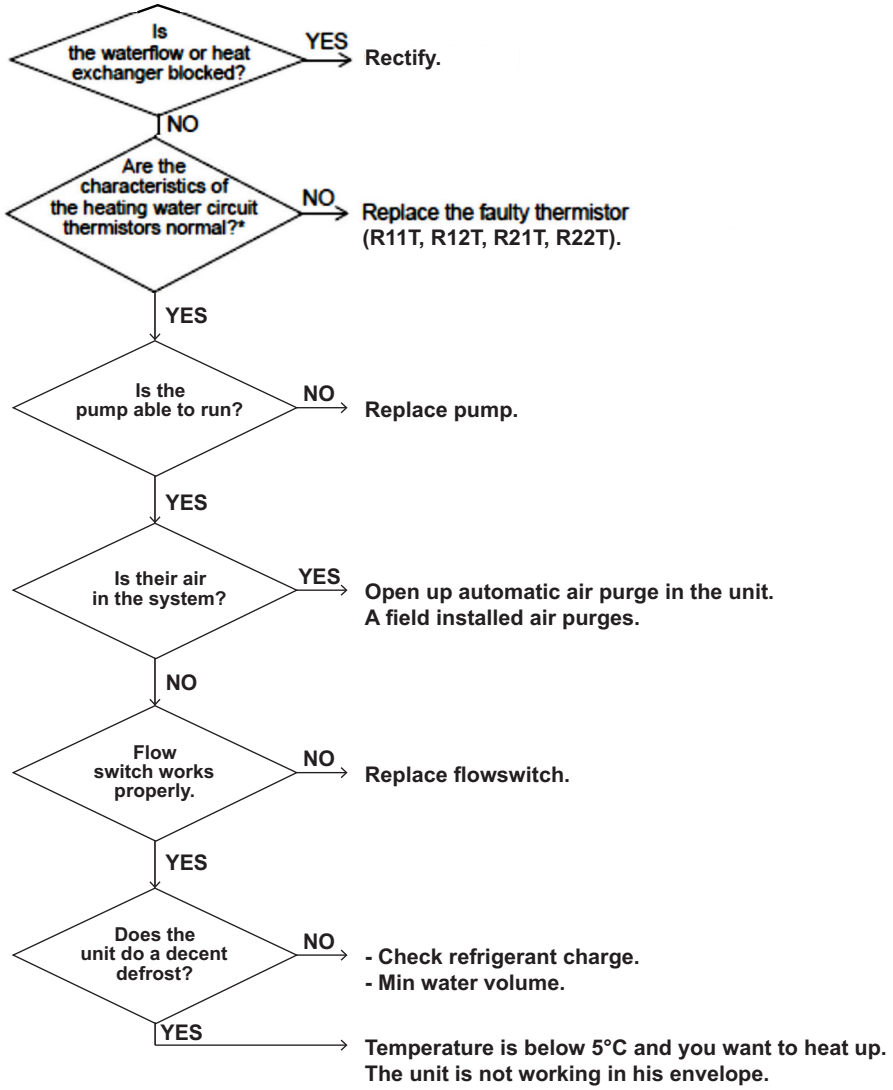
Troubleshooting



4.2 "A6"

Error code:	A6 hydrobox water system error Subcode 0	
Purpose:	▪ Protect the unit from freeze up	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Detection by failure ref. sensors	
Error condition:	▪ When water sensors are not within expected range	
Possible causes	Corrective action	Consequence
Defect of compressor coil (disconnected, defective insulation) Compressor Start-up malfunction (mechanical lock) Defect of inverter PCB	See flow chart	
Reset:	Recycle the power	

Troubleshooting

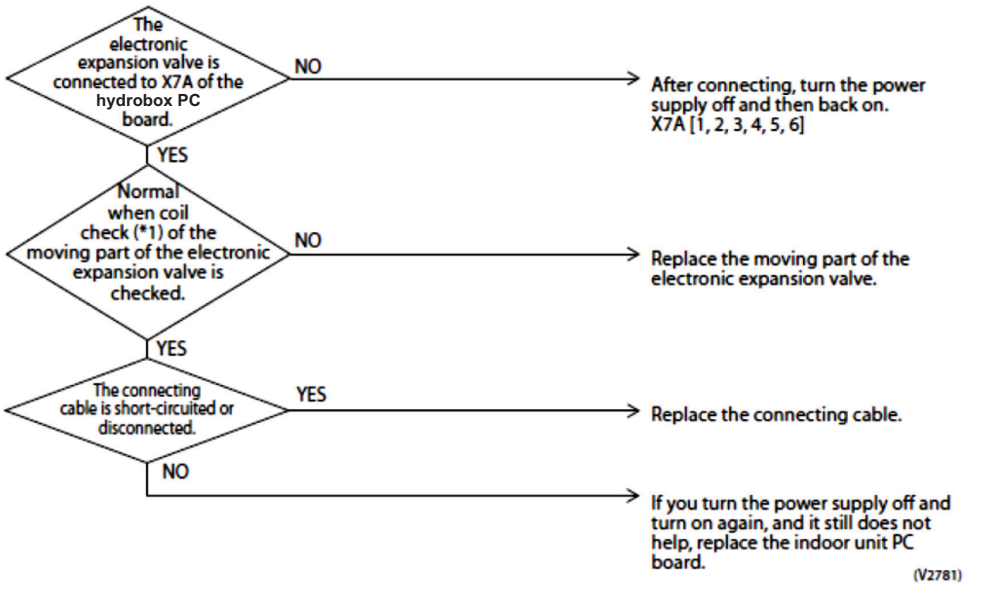


4.3 "A9"

Error code:	A9 Hydrobox malfunction of moving part of electronic expansion valve (K11E or K12E) R-410A circuit Subcode 0	
Purpose:	▪ Detect malfunctioning of expansion valve	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪	
Error condition:	▪	
Possible causes	Corrective action	Consequence
Malfunction of moving part of electronic expansion valve Defect of hydrobox PC board Defect of connecting cable, bad wire	See flow chart	
Reset:	Recycle the power	

Troubleshooting

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



*1: Coil check method for the moving part of the electronic expansion valve
Discount the electronic expansion valve from the PC board and check the continuity between the connector pins.

(Normal)

Pin No.	1. White	2. Yellow	3. Orange	4. Blue	5. Red	6. Brown
1. White		×	○ Approx. 300Ω	×	○ Approx. 150Ω	×
2. Yellow			×	○ Approx. 300Ω	×	○ Approx. 150Ω
3. Orange				×	○ Approx. 150Ω	×
4. Blue					×	○ Approx. 150Ω
5. Red						×
6. Brown						

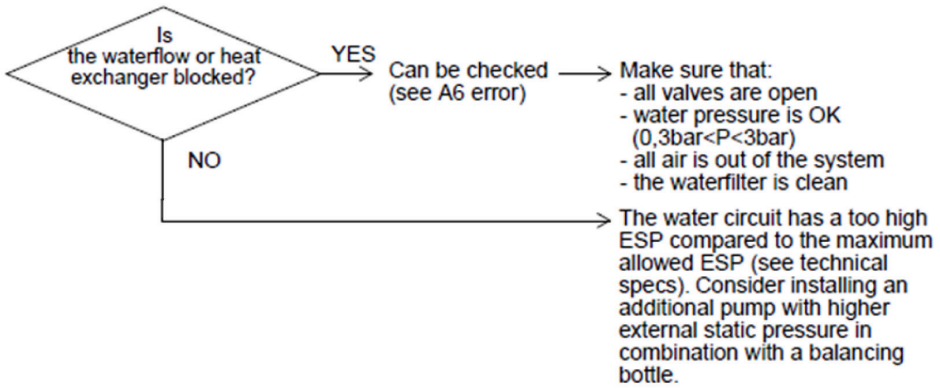
○: Continuity
×: No continuity

4.4 "AE"

Error code:	AE hydrobox water circuit error Subcode 0	
Purpose:	▪ Protect the unit from freeze up	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪	
Error condition:	▪ 5 consecutive PHE freeze up preventions occurred	
Possible causes	Corrective action	Consequence
Blocked water flow or heat exchanger (water side) The water circuit has a too high ESP (external static pressure)	See flow chart	
Reset:	Recycle power	

Troubleshooting

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

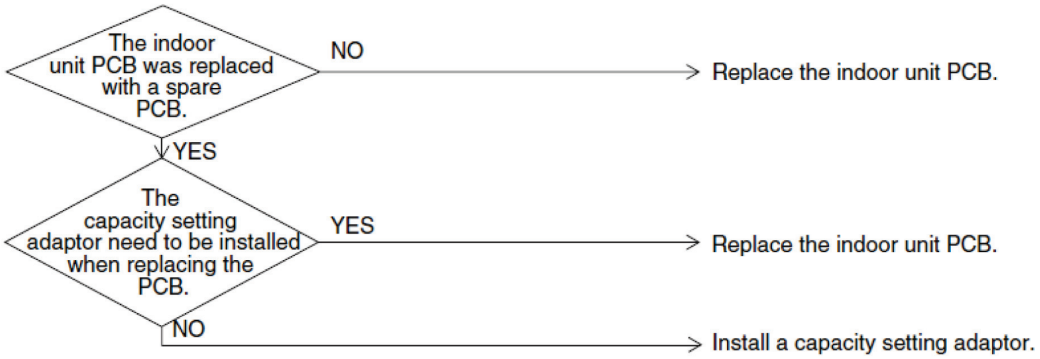


4.5 "AJ"

Error code:	AJ Capacity error	
Purpose:	▪ Detect wrong settings on main outdoor PCB	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Capacity is determined according to resistance of the capacity setting adaptor and the memory inside the IC memory on the indoor unit PCB, and whether the value is normal or abnormal is determined	
Error condition:	▪ Setting has not been set correctly or PCB is defect	
Possible causes	Corrective action	Consequence
Malfunction of moving part of electronic expansion valve Defect of hydrobox PC board Defect of connecting cable, bad wire	See flow chart	
Reset:	Recycle the power	

Troubleshooting

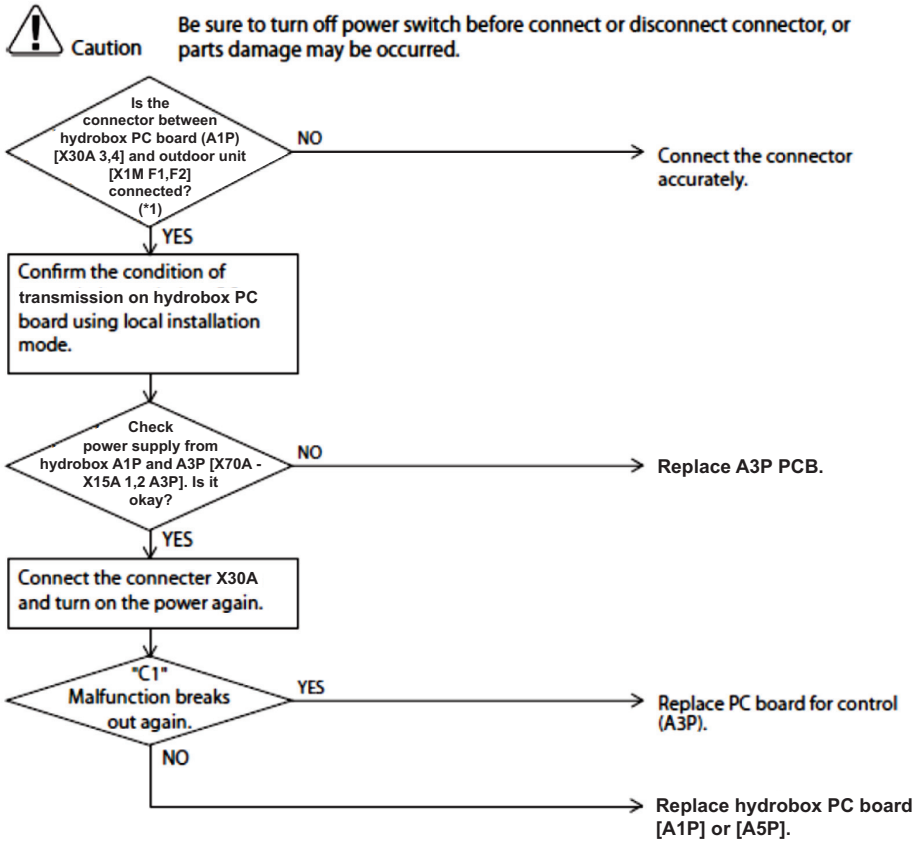
Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



4.6 “C ”

Error code:	C1 hydrobox failure of transmission (between hydrobox unit pc board and control pc board) Subcode 0	
Purpose:	▪ Detect communication failure	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Check the condition of transmission between Hydrobox PC board (A1P) and PC board for control (A3P)	
Error condition:	▪ When normal transmission is not conducted for certain duration	
Possible causes	Corrective action	Consequence
Connection defect of the connecter between hydrobox PC board (A1P) and PC board for control (A3P) (communication problem)	See flow chart	
Malfunction of hydrobox PC board (A1P)		
Malfunction of PC board for control (A3P)		
External factor, such as instantaneous blackout		
Reset:	Recycle power	

Troubleshooting



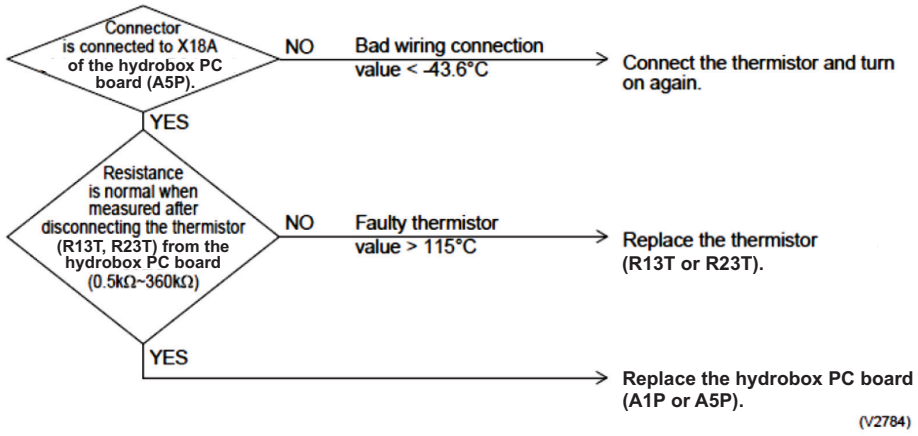
***1. Pull out and insert the connector once and check it is absolutely connected.**

4.7 "C4"

Error code:	C4 hydrobox malfunction of thermistor (R13T, R23T) Liquid Thermistor R410A	
Purpose:	▪ Detect malfunctioning sensor	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Malfunction detection is carried out by temperature detected by liquid thermistor.	
Error condition:	▪ When the liquid thermistor becomes disconnected or shorted while the unit is running.	
Possible causes	Corrective action	Consequence
Defect of thermistor (R3T) for liquid pipe Defect of hydrobox PC board (A1P)	See flow chart	
Reset:	Recycle power	

Troubleshooting

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

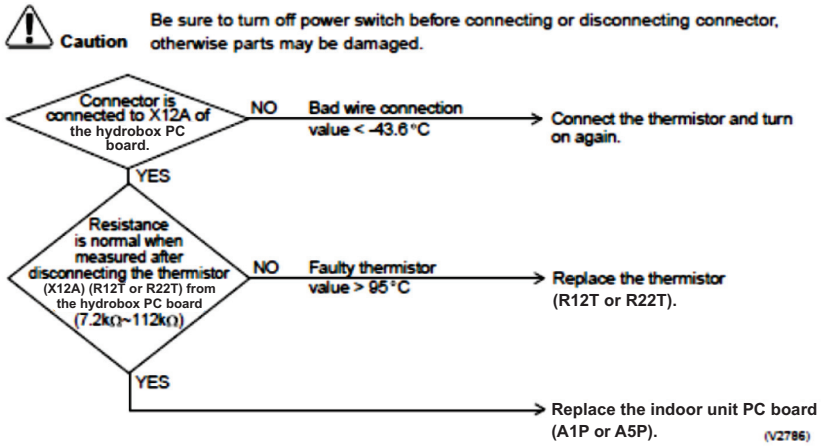


* Refer to thermistor resistance / temperature characteristics table.

4.8 "C9"

Error code:	C9 hydrobox return water Thermistor (R12T, R22T) Subcode 0	
Purpose:	▪ Detect malfunctioning sensor	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Malfunction detection is carried out by temperature detected by return water temperature thermistor.	
Error condition:	▪ When the return water temperature thermistor becomes disconnected or shorted while the unit is running.	
Possible causes	Corrective action	Consequence
Defect of hydrobox thermistor (R4T) for water return Defect of hydrobox PC board (A1P)	See flow chart	
Reset:	Recycle power	

Troubleshooting



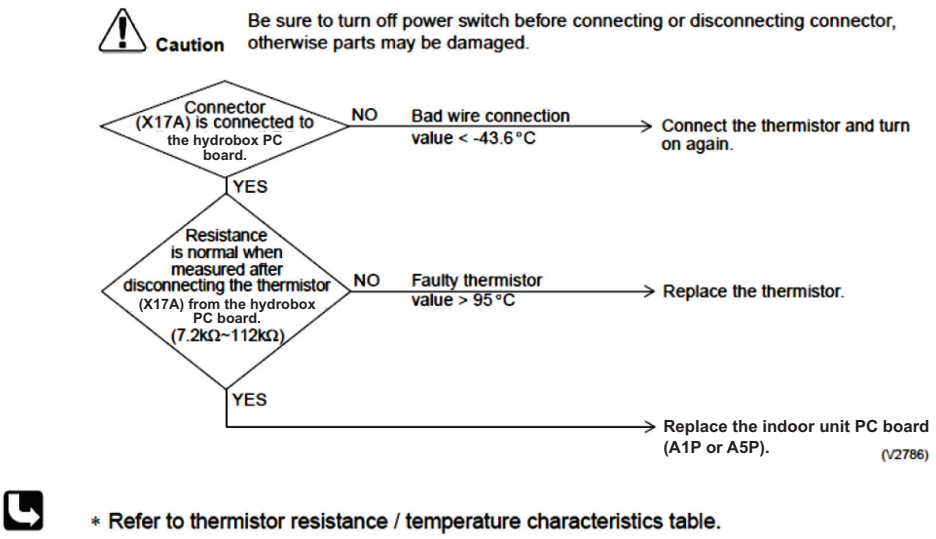
* Refer to thermistor resistance / temperature characteristics table.

4.9 "CA"

Error code:	CA hydrobox leaving water Thermistor (R21T or R22T) Subcode 0
Purpose:	▪ Detect malfunctioning Sensor
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ Malfunction detection is carried out by temperature detected by heating leaving water thermistor.
Error condition:	▪ When the heating leaving water thermistor becomes disconnected or shorted while the unit is running.

Possible causes	Corrective action	Consequence
Defect of hydrobox unit heating thermistor for leaving water (R5T) Defect of hydrobox PC board	See flow chart	
Reset:	Recycle power	

Troubleshooting



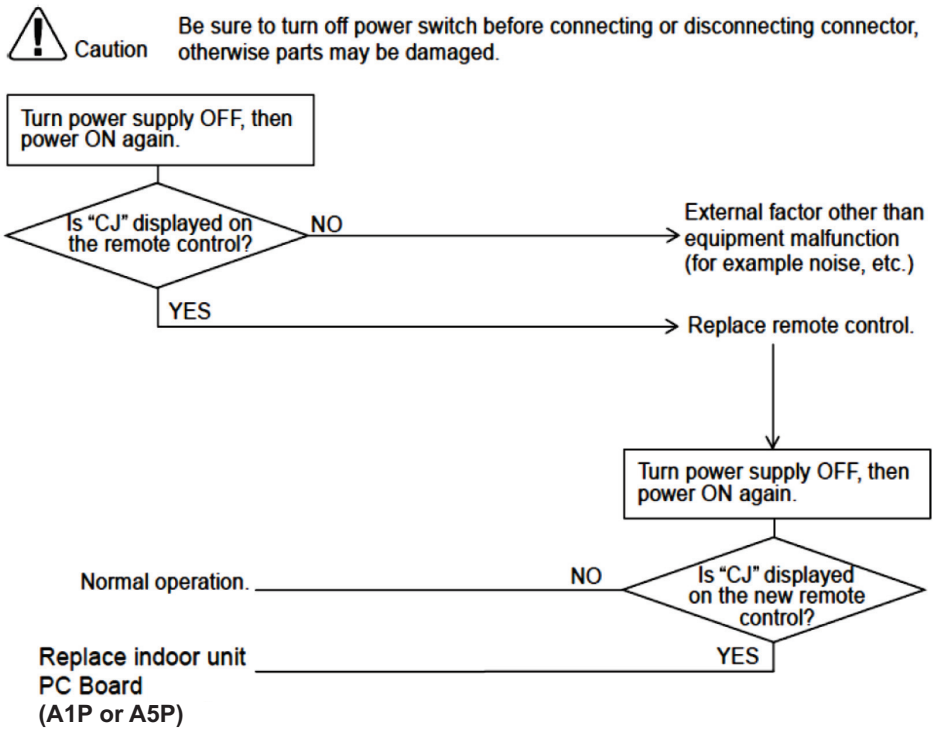
* Refer to thermistor resistance / temperature characteristics table.

4.10 "CJ"

Error code:	CJ hydrobox Malfunction of thermostat sensor in remote controller Subcode 0
Purpose:	▪ Detect malfunctioning sensor
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ Malfunction detection is carried out by temperature detected by remote control air temperature thermistor.
Error condition:	▪ When the remote control air temperature thermistor becomes disconnected or shorted while the unit is running

Possible causes	Corrective action	Consequence
Defect of remote control thermistor Defect of remote control PC board Defect of hydrobox PC board (A1P)	See flow chart	
Reset:	Recycle power	

Troubleshooting

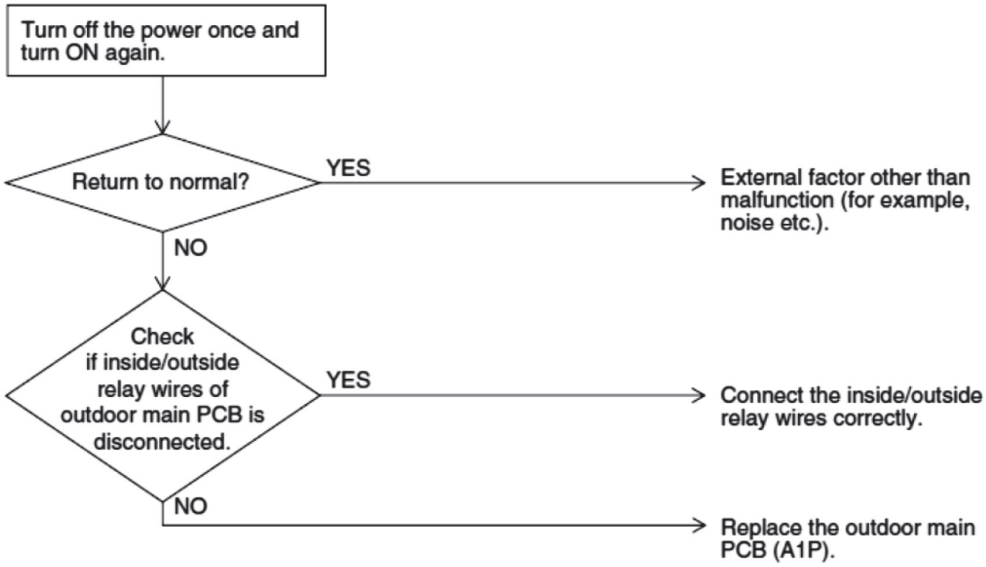


4.11 "E 1"

Error code:	E1: Outdoor Unit PCB defect		
Purpose:	▪ Detect broken outdoor PC board		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Check data from EPROM		
Error condition:	▪ When data could not be correctly received from the EPROM EPROM: Type of non-volatile memory. Maintains memory contents even when the power supply is turned OFF		
Possible causes		Corrective action	Consequence
Defect of outdoor unit PCB (A1P)		See flow chart	Unit shuts off
Reset:	Recycle the power		

Troubleshooting

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



4.12 "E3"

Error code:	E3: Actuation of high pressure switch E3 - 01 High pressure switch activated (master) - 02 High pressure switch activated (master) - 03 High pressure switch activated (slave) - 04 High pressure switch activated (slave)
Purpose:	▪ To prevent too high pressures inside the unit
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ Abnormality is detected when the contact of the high pressure protection switch opens
Error condition:	▪ Error is generated when the HPS activation count reaches the number specific to the operation mode. (reference) Operating pressure of high pressure switch. Operating pressure: 4.0Mpa Reset pressure: 2.85Mpa

Possible causes	Corrective action	Consequence
Actuation of high pressure switch		Unit shuts off (see protection)
Defect of High pressure switch	Replace high pressure switch	
Defect of outdoor unit PC board (A1P)	Replace PC board	
Instantaneous power failure	Check wiring and power supply	
Faulty high pressure sensor	Replace pressure sensor	

Reset:	When pressure is below 4.0Mpa fault is reset and do a power restore

Troubleshooting

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

Check for the points shown below.
① Is the stop valve open?
② Is the high pressure switch connector properly connected to the main PCB?
③ Does the high pressure switch have continuity?

Are the three points above OK?
NO → Rectify the defective points, if any.
YES

· Mount a pressure gauge on the high pressure service port.
· Reset the operation using the remote controller, and then restart the operation.

Does the stop due to malfunction (E3) recur?
YES → Is the high pressure switch operating value normal (i.e., 4.0MPa)?
NO → Replace the high pressure switch.
YES
NO

Are the characteristics of the high pressure sensor normal? (See *1.)
NO → Replace the high pressure sensor.
YES

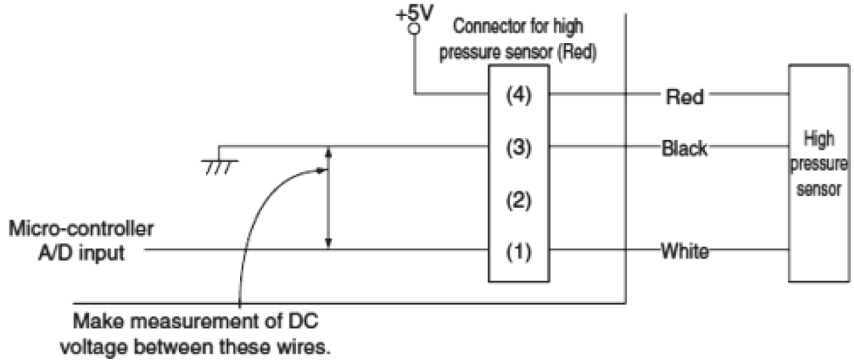
Is the pressure detected with the PCB normal?
NO → Replace the main PCB.
YES

· The high pressure sensor is normal, and the pressure detected with the PCB is also normal.
· The high pressure has really become high.

CHECK 3 remove the causes by which the high pressure has become high.

*1: Make a comparison between the voltage of the pressure sensor and that read by the pressure gauge.
(As to the voltage of the pressure sensor, make measurement of voltage at the connector, and then convert it to pressure according to information on Pressure sensor graph)

*2: Make measurement of voltage of the pressure sensor.

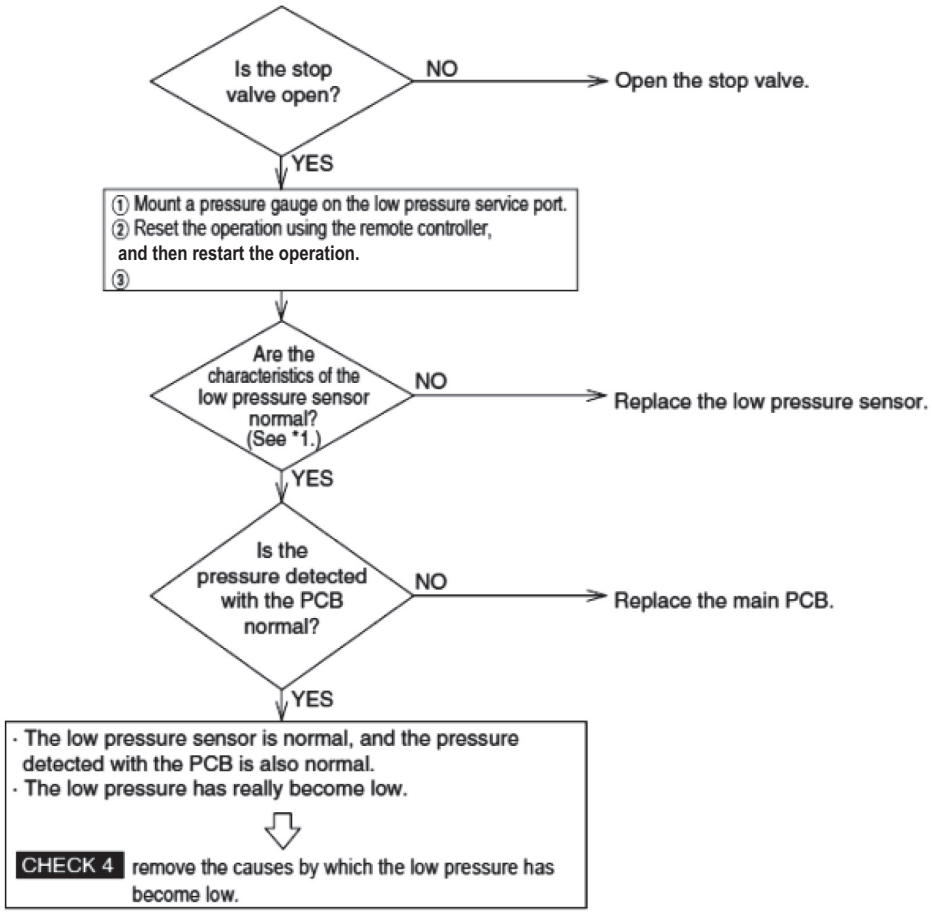


4.13 "E4"

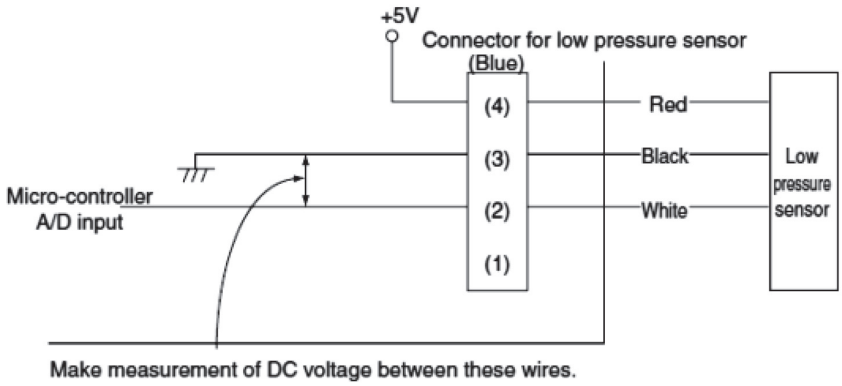
Error code:	E4: Actuation of Low Pressure Sensor E4 - 01 Low pressure error (Master) - 02 Low pressure error (Slave)	
Purpose:	▪ To prevent too low pressures	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Abnormality is detected by the pressure value with the low pressure sensor.	
Error condition:	▪ Error is generated when the low pressure is dropped under specific pressure. Operating pressure: 0,07MPa	
Possible causes	Corrective action	Consequence
Abnormal drop of low pressure (Lower than 0,07MPa)		Unit shuts off (see protections)
Defect of low pressure sensor	Replace low pressure sensor	
Defect of PCB	Replace PCB	
Stop valve is not opened	Repair stop valve	
Clogged Filter	Replace filter	
Reset:	Restore Pressure above 0.07MPa and do a power restore	

Troubleshooting

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



*1: Make a comparison between the voltage of the pressure sensor and that read by the pressure gauge.
(As to the voltage of the pressure sensor, make measurement of voltage at the connector, and then convert it to pressure.)
*2: Make measurement of voltage of the pressure sensor.

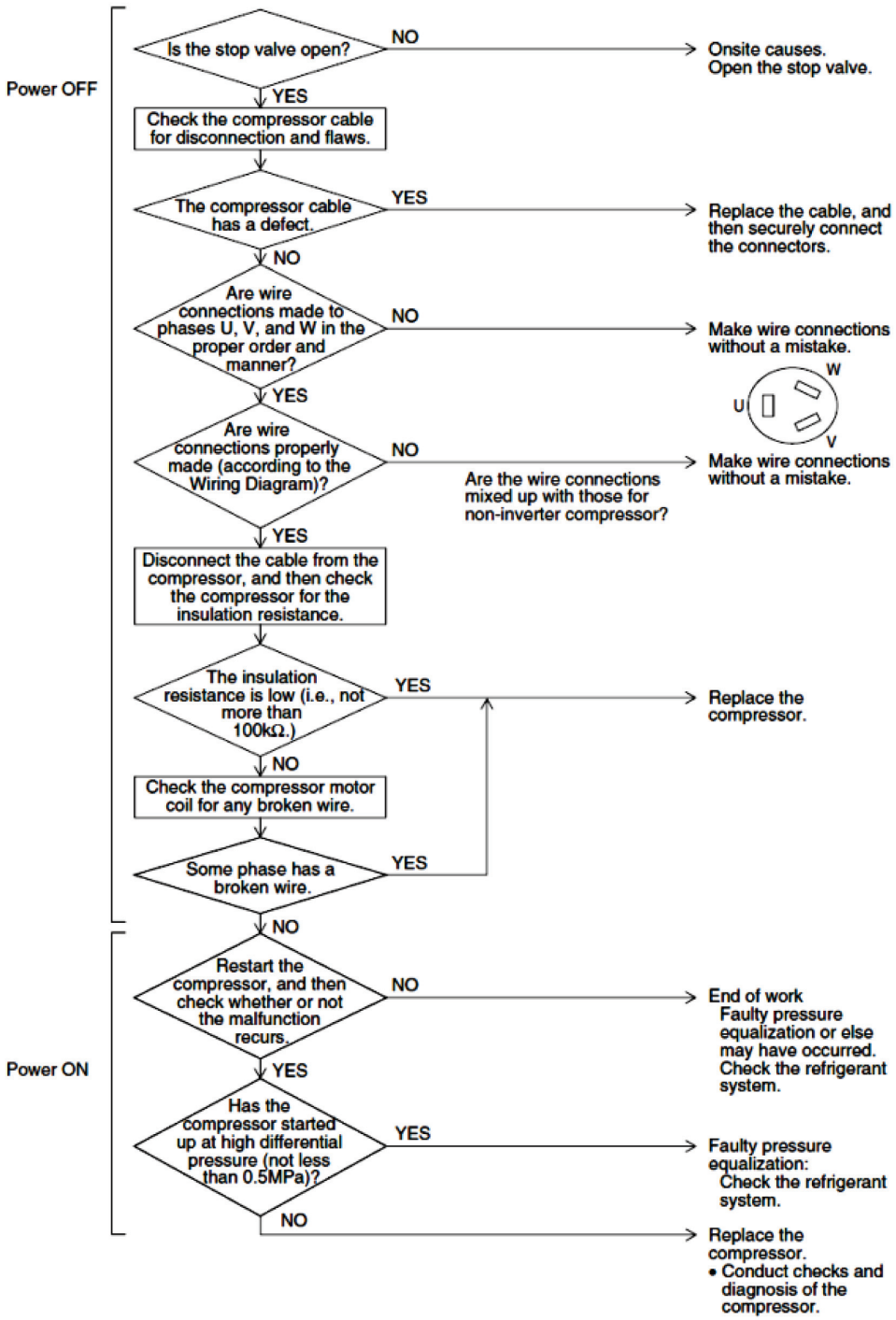


4.14 "E5"

Error code:	E5: Outdoor Unit Inverter compressor Motor Lock E5 - 01 Inverter lock (Master) - 02 Inverter lock (Slave)	
Purpose:	▪ Protect the inverter compressor from incorrect currents	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Inverter PCB takes the position signal from UVW line connected between the inverter and compressor, and the malfunction is detected when any abnormality is observed in the phase current waveform	
Error condition:	▪ This malfunction will be output when the inverter compressor motor does not start up even in forced startup mode.	
Possible causes	Corrective action	Consequence
Inverter compressor lock High differential pressure (0,5Mpa or more) Incorrect UVW wiring Faulty inverter PCB Stop valve is left in closed	See flow chart	The unit will shut down
Reset:	There is the possibility of putting the unit in emergency operation. Or after rectifying the problem restoring the power	

Troubleshooting

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



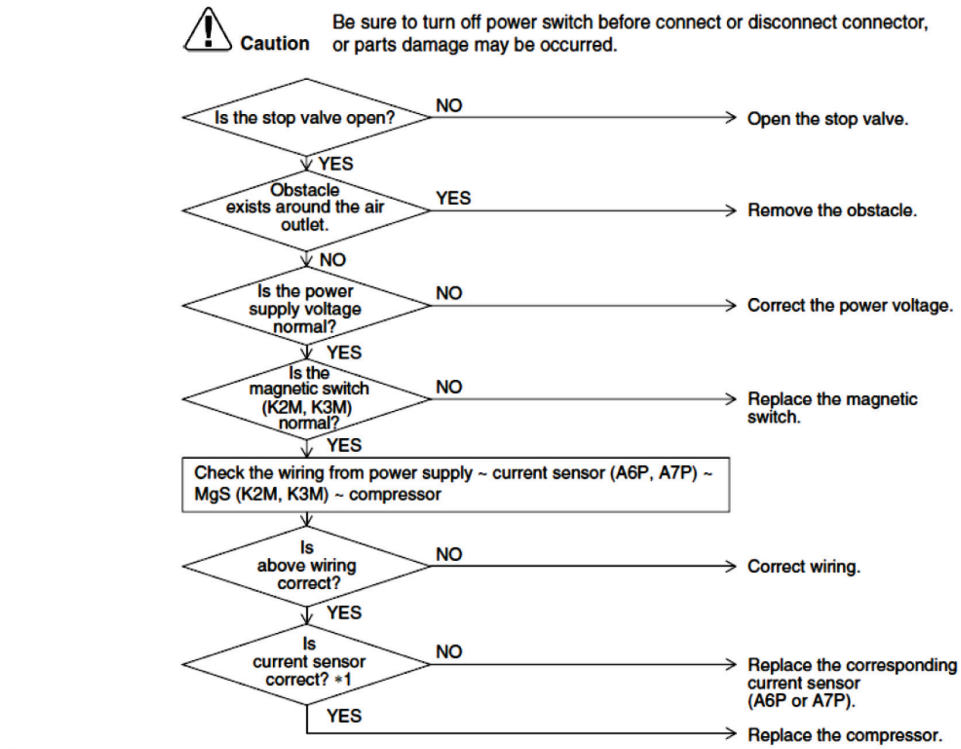
4.15 "E6"

Error code:	E6: Outdoor Unit: STD Compressor Motor Overcurrent/Lock E6 - 01 STD Compressor 1 OC activated (Master) - 02 STD Compressor 2 OC activated (Master) - 03 STD Compressor 1 OC activated (Slave) - 04 STD Compressor 2 OC activated (Slave)
Purpose:	▪ Protect the STD compressors of overcurrent
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ Detects the overcurrent with current sensor (CT).
Error condition:	▪ Malfunction is decided when the detected current value exceeds the below mentioned value for 2 seconds

Possible causes	Corrective action	Consequence
Closed stop valve Obstacles at the air outlet Improper power voltage Faulty magnetic switch Faulty compressor Faulty correct sensor (A6P, A7P)	See flow chart	Unit will shut off

Reset:	There is the possibility of putting the unit in emergency operation. Or after rectifying the problem restoring the power

Troubleshooting

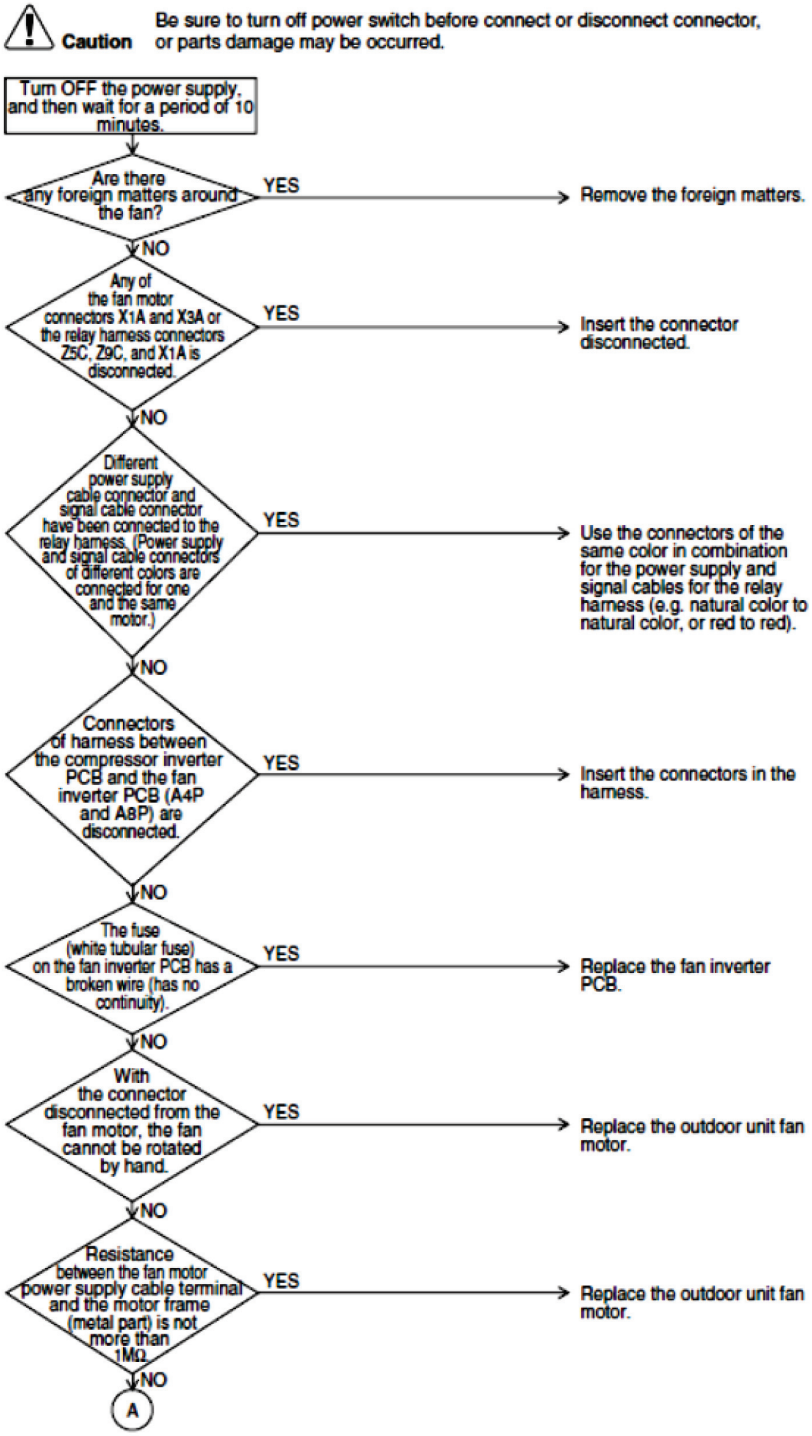


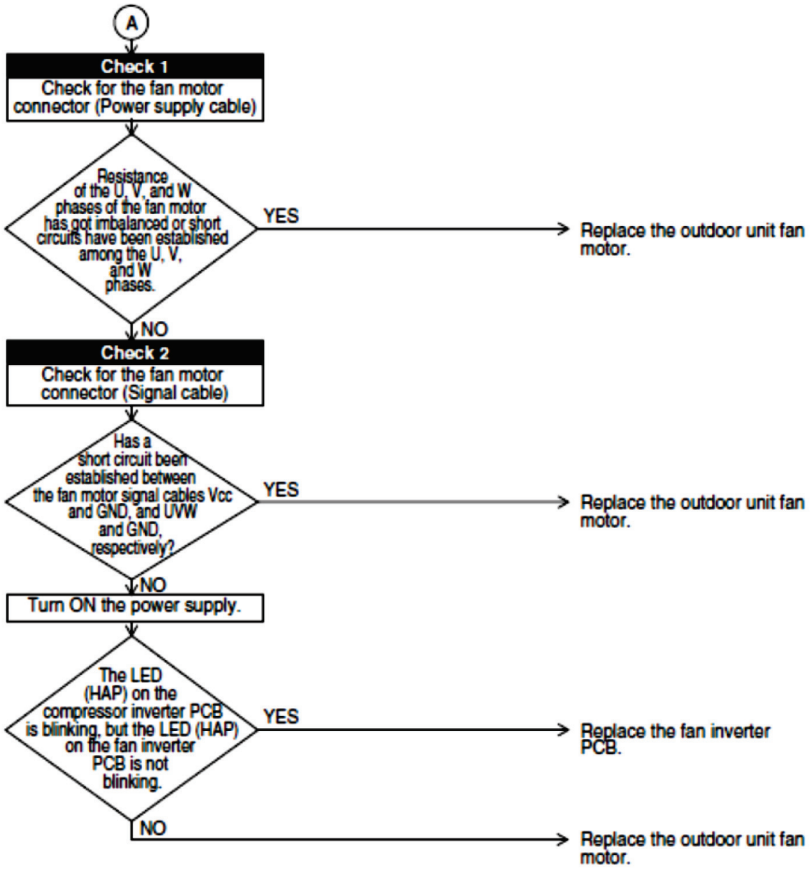
Note: *1 Abnormal case
- The current sensor value is 0 during STD compressor operation.
- The current sensor value is more than 15.0A during STD compressor stop.

4.16 "E7"

Error code:	E7: Outdoor Unit Malfunction of outdoor Unit Fan motor E7 - 01 Fan motor 1 lock (Master) - 02 Fan motor 2 lock (Master) - 05 Fan motor 1 instantaneous overcurrent (Master) - 06 Fan motor 2 instantaneous overcurrent (Master) - 09 Fan motor 1 IPM error (Master) - 10 Fan motor 2 IPM (Master) - 13 Fan motor 1 lock (Slave) - 14 Fan motor 2 lock (Slave) - 17 Fan motor 1 instantaneous overcurrent (Slave) - 18 Fan motor 2 instantaneous overcurrent (Slave)		
Purpose:	▪ Protect the Fans of overcurrent/Overheating		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Malfunction of fan motor system is detected according to the fan speed detected by hall IC when the fan motor runs.		
Error condition:	▪ When the fan runs with speed less than a specified one for 6 seconds or more when the fan motor is running conditions are met.		
Possible causes		Corrective action	Consequence
Malfunction of fan motor The harness connector between fan motor and PCB is left in disconnected, or faulty connector Fan does not run due to foreign matters tangled Clearing conditions: Operate for 5 minutes (normal)		See flow chart	
Reset:	Recycle the power		

Troubleshooting



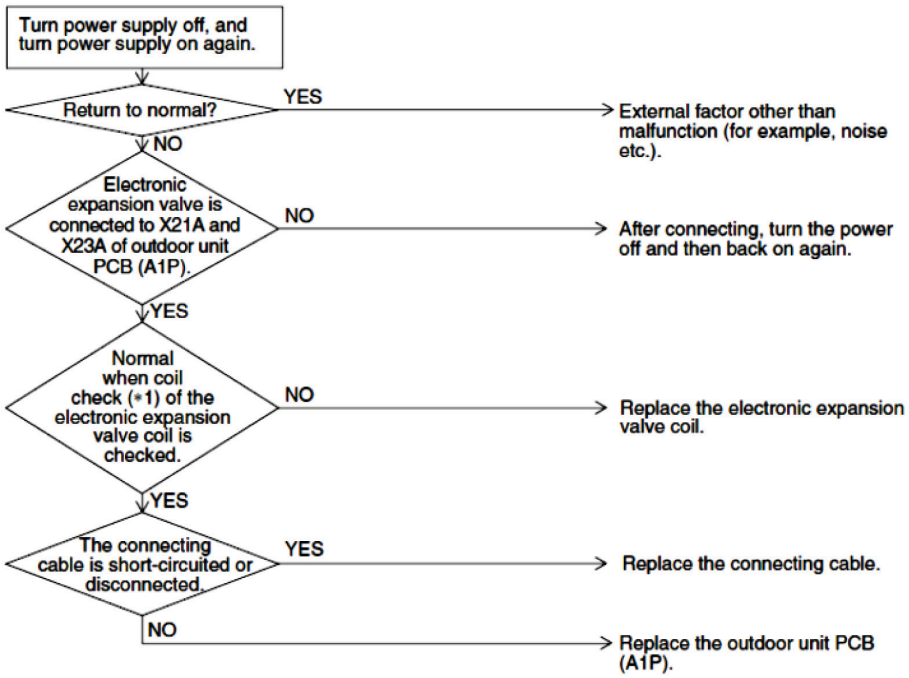

A
Check 1
Check for the fan motor connector (Power supply cable)
Resistance of the U, V, and W phases of the fan motor has got imbalanced or short circuits have been established among the U, V, and W phases.
YES
Replace the outdoor unit fan motor.
NO
Check 2
Check for the fan motor connector (Signal cable)
Has a short circuit been established between the fan motor signal cables Vcc and GND, and UVW and GND, respectively?
YES
Replace the outdoor unit fan motor.
NO
Turn ON the power supply.
The LED (HAP) on the compressor inverter PCB is blinking, but the LED (HAP) on the fan inverter PCB is not blinking.
YES
Replace the fan inverter PCB.
NO
Replace the outdoor unit fan motor.

4.17 "E9"

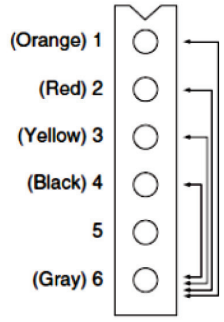
Error code:	E9: Outdoor Unit Malfunction of electronic expansion valve coil (Y1E,Y2E) E9 - 01 Motorized valve 1 coil error (Master) - 04 Motorized valve 2 coil error (Master) - 05 Motorized valve 1 coil error (Slave) - 07 Motorized valve 2 coil error (Slave)	
Purpose:	▪ Protect the unit from malfunctioning electronic expansion valve	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Check disconnection of connector ▪ Check continuity of electronic expansion valve coil	
Error condition:	▪ Error is generated under no common power supply when the power is on.	
Possible causes	Corrective action	Consequence
Defect of electronic expansion valve coil Defect of outdoor unit PCB (A1P) Defect of connecting cable	See flow chart	Units switches off
Reset:	Recycle the power	

Troubleshooting

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



*Make measurement of resistance between the connector pins, and then make sure the resistance falls in the range of 40 to 50Ω.



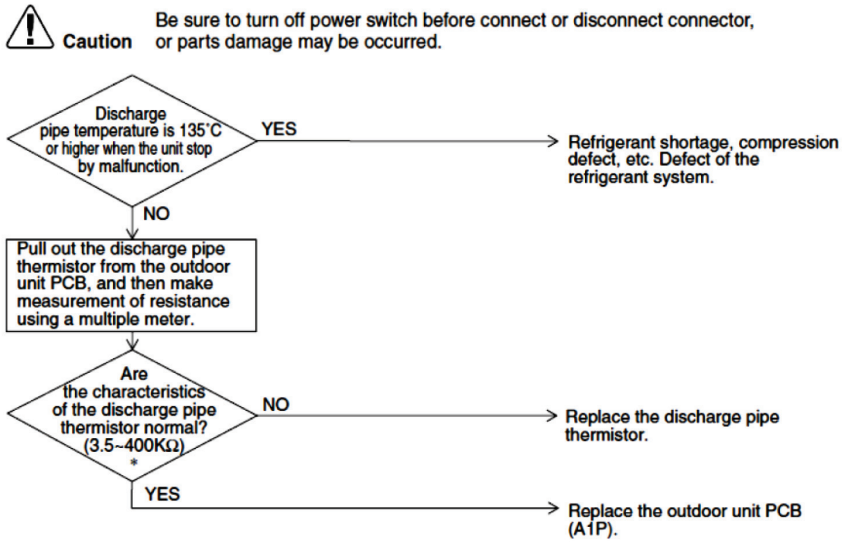
Measuring points
1 - 6
2 - 6
3 - 6
4 - 6

4.18 "F3"

Error code:	F3: Outdoor Unit: Abnormal Discharge pipe temperature F3 - 01 Discharge pipe temperature error (Master) - 02 Discharge pipe temperature error (Slave)
Purpose:	▪ To protect the unit of too high discharge temperatures
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ Abnormality is detected according to the temperature detected by the discharge pipe temperature sensor.
Error condition:	▪ When the discharge pipe temperature rises to abnormally high level ▪ When the discharge pipe temperature rises suddenly

Possible causes	Corrective action	Consequence
Faulty discharge pipe temperature sensor	See flow chart	Unit switches off
Faulty connection of discharge pipe temperature sensor		
Faulty outdoor unit PCB		
Reset:	Recycle the power	

Troubleshooting

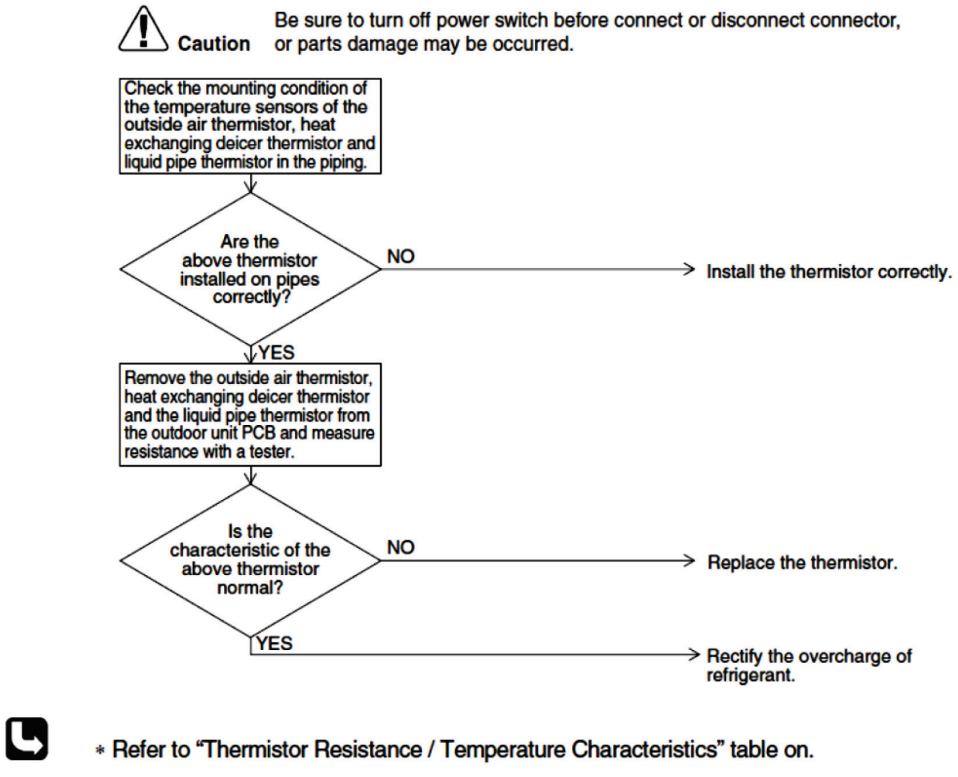


* Refer to "Thermistor Resistance / Temperature Characteristics" table.

4.19 "F6"

Error code:	F6: Unit Refrigerant Overcharged F6 - 02 Excess refrigerant change error*1 - 03 Excess refrigerant charge warning*2		
Purpose:	▪ Check if the unit has right amount of refrigerant		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Excessive charging of refrigerant is detected by using the outdoor air temperature, heat exchanging deicer temperature and liquid pipe temperature during check operation.		
Error condition:	▪ When the amount of refrigerant, which is calculated by using the outdoor air temperature, heat exchanging deicer temperature and liquid pipe temperature during check operation, exceeds the criteria.		
Possible causes		Corrective action	Consequence
Refrigerant overcharge Disconnection of outdoor air thermistor Disconnection of the heat exchanging deicer thermistor Disconnection of the liquid pipe thermistor		See flow chart	
Reset:	Recycle the power		

Troubleshooting

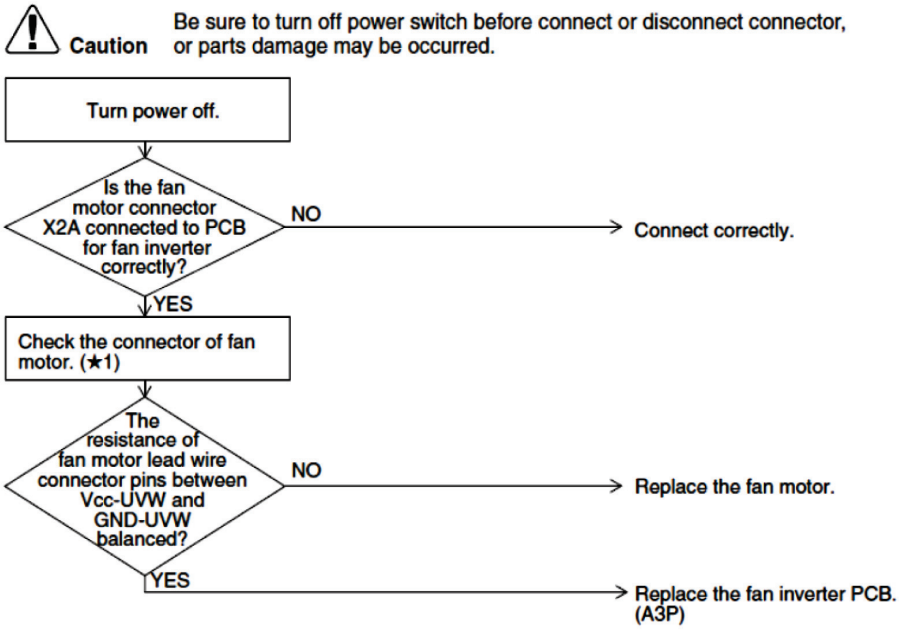


* Refer to "Thermistor Resistance / Temperature Characteristics" table on.

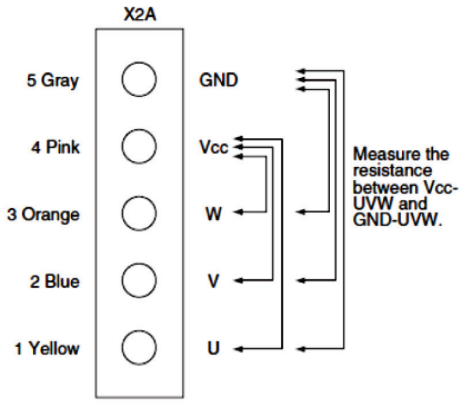
4.20 "H7"

Error code:	H7: Detection of abnormal signal from fan motor		
Purpose:	▪ Detect malfunctioning fan		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Detection of abnormal signal from fan motor		
Error condition:	▪ In case of detection of abnormal signal at starting fan motor.		
Possible causes		Corrective action	Consequence
Abnormal fan motor signal (circuit malfunction) Broken, short-circuited or disconnection connector of fan motor connection cable Fan inverter PCB malfunction		See flow chart	Turn the unit off
Reset:	Recycle the power		

Troubleshooting



★1: Disconnect connector (X2A) and measure the following resistance.

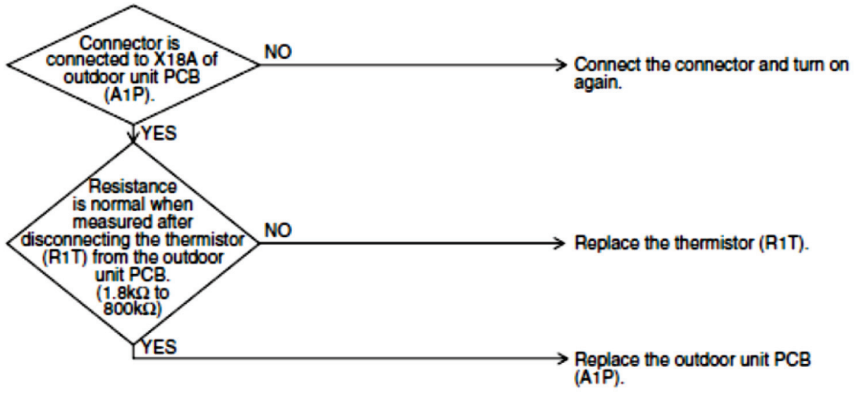


4.21 "H9"

Error code:	H9: Outdoor Unit Malfunction of Thermistor (R1T) for outdoor air H9 - 01 Faulty outdoor air thermistor (Master) - 02 Faulty outdoor air thermistor (Slave)		
Purpose:	▪ Detect faulty sensors		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Malfunction is detected from the temperature detected by the outdoor air thermistor.		
Error condition:	▪ When the outside air temperature thermistor has short circuit or open circuit		
Possible causes		Corrective action	Consequence
Defect of outdoor unit PCB (A1P) Defect of outdoor unit PCB (A1P)		See flow chart	
Reset:	Recycle the power		

Troubleshooting

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



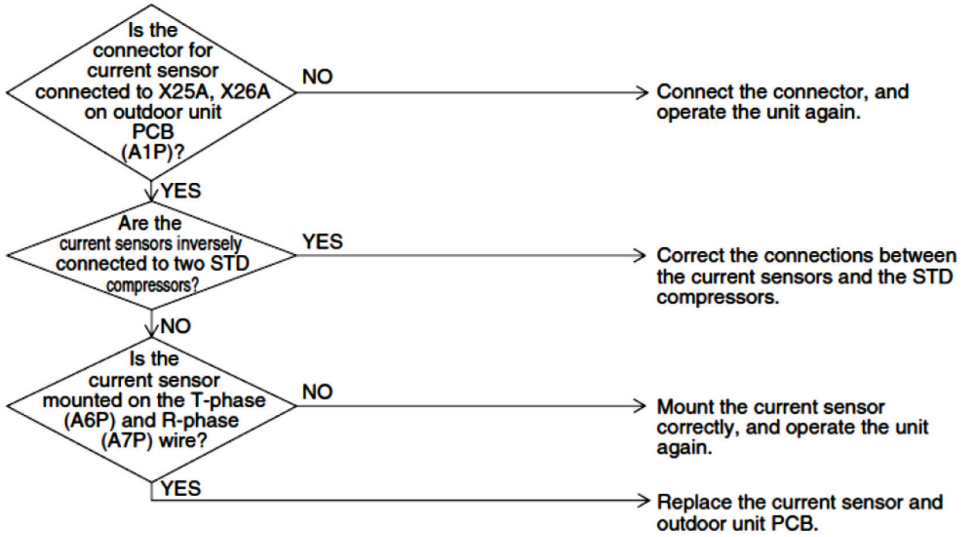
* Refer to "Thermistor Resistance / Temperature Characteristics" table.

4.22 "J2"

Error code:	J2: Outdoor Unit Current Malfunction J2 - 01 Faulty current sensor (Master STD compressor 1) - 02 Faulty current sensor (Master STD compressor 2) - 03 Faulty current sensor (Slave STD Compressor 1) - 04 Faulty current sensor (Slave STD Compressor 2) - 07 Current sensor error (System)	
Purpose:	▪ Detect malfunctioning current sensor	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Malfunction is detected according to the current value detected by current sensor.	
Error condition:	▪ When the current detected by current sensor becomes 5A or lower, or 40A or more during standard compressor operation.	
Possible causes	Corrective action	Consequence
Faulty current sensor (A6P, A7P) Faulty outdoor unit PCB	See flow chart	Turns unit off
Reset:	Recycle the power	

Troubleshooting

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

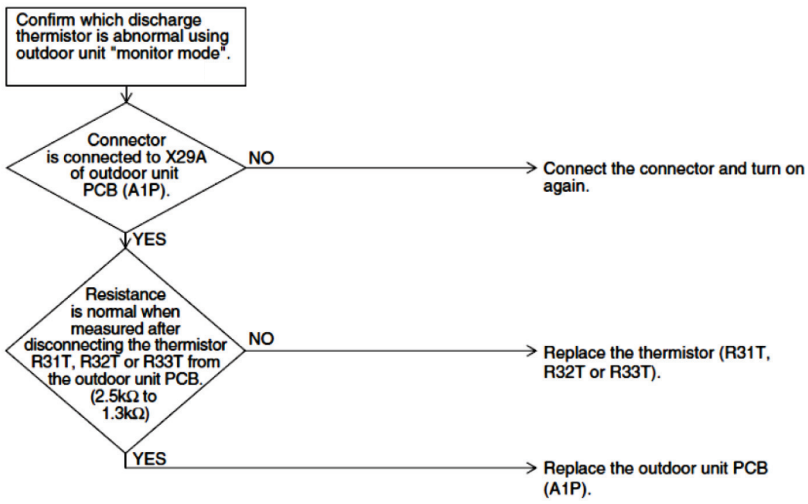


4.23 "J3"

Error code:	J3: Outdoor Unit Malfunction of discharge pipe thermistor (R3T, R31T~R33T) J3 - 01 Faulty discharge pipe thermistor 1 (Master: INV compressor) - 02 Faulty discharge pipe thermistor 2 (Master: STD compressor) - 03 Faulty discharge pipe thermistor 3 (Master: STD compressor) - 04 Faulty discharge pipe thermistor 1 (Slave: INV compressor) - 05 Faulty discharge pipe thermistor 2 (Slave: STD compressor) - 06 Faulty discharge pipe thermistor 3 (Slave: STD compressor)		
Purpose:	▪ Detecting a malfunctioning sensor		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Malfunction is detected from the temperature detected by discharge pipe temperature thermistor.		
Error condition:	▪ When a short circuit or an open circuit in the discharge pipe temperature thermistor is detected.		
Possible causes		Corrective action	Consequence
Defect of thermistor (R31T, R32T, R33T) for outdoor unit discharge pipe Defect of outdoor unit PCB (A1P) Defect of thermistor connection		See flow chart	Turn the unit off
Reset:	Recycle the power		

Troubleshooting

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



The alarm indicator is displayed when the fan is being used also.

Note:

EW*Q016-25BA & EW*Q040-50BA··· R31T, R32T
EW*Q032BA & EW*Q064BA ··· R31T, R32T and R33T

* Refer to "Thermistor Resistance / Temperature Characteristics" table.

4.24 “J5”

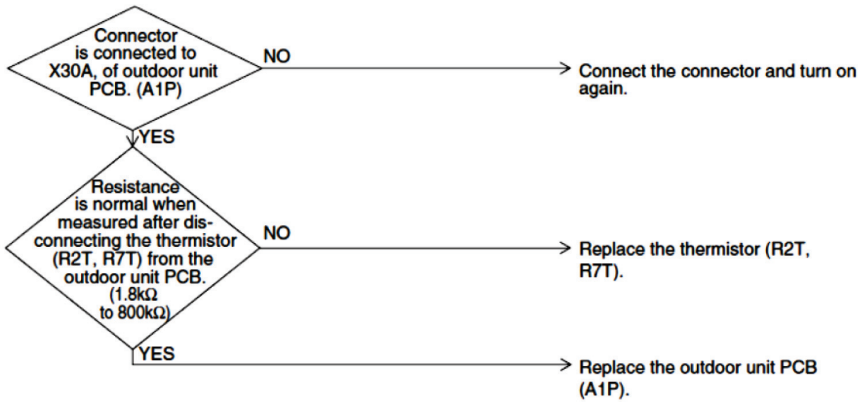
Error code:	J5: Outdoor Unit Malfunction of Thermistor (R2T, R7T) for suction pipe J5 - 01 Faulty suction pipe thermistor (Master) - 02 Faulty accumulator inlet thermistor (Master) - 03 Faulty suction pipe thermistor (Slave) - 04 Faulty accumulator inlet thermistor (Master)
Purpose:	▪ Detect malfunctioning sensor
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ Malfunction is detected from the temperature detected by the suction pipe temperature thermistor.
Error condition:	▪ When a short circuit or an open circuit in the suction pipe temperature thermistor is detected.

Possible causes	Corrective action	Consequence
Defect of Thermistor (R2T), (R7T) for outdoor unit suction pipe Defect of outdoor unit PCB (A1P) Defect of thermistor connection	See flow chart	Turn the unit off

Reset:	Recycle the power

Troubleshooting

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



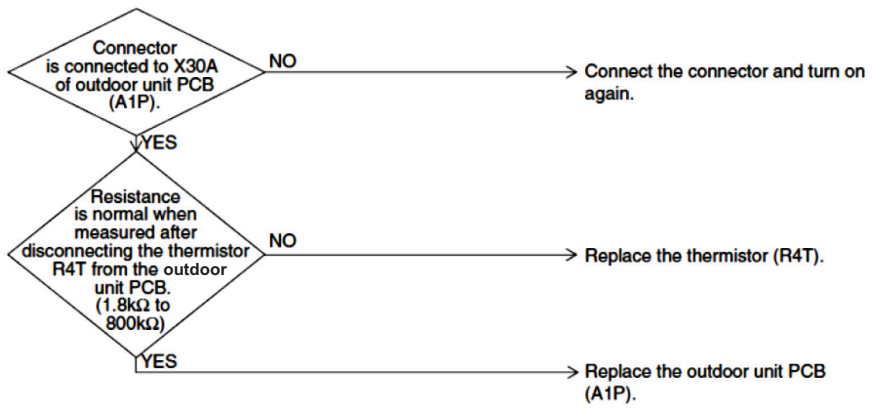
* Refer to “Thermistor Resistance / Temperature Characteristics” table.

4.25 "J6"

Error code:	J6: Outdoor Unit Malfunction of thermistor (R4T) for outdoor unit heat exchanger. J6 - 01 Faulty heat exchanger thermistor (Master) - 02 Faulty heat exchanger thermistor (Slave)		
Purpose:	▪ Detect malfunctioning sensor		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Malfunction is detected from the temperature detected by the heat exchanger thermistor.		
Error condition:	▪ When a short circuit or an open circuit in the heat exchanger thermistor is detected.		
Possible causes		Corrective action	Consequence
Defect of thermistor (R4T) for outdoor unit coil Defect of outdoor unit PCB (A1P) Defect of thermistor connection		See flow chart	
Reset:	Recycle the power		

Troubleshooting

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



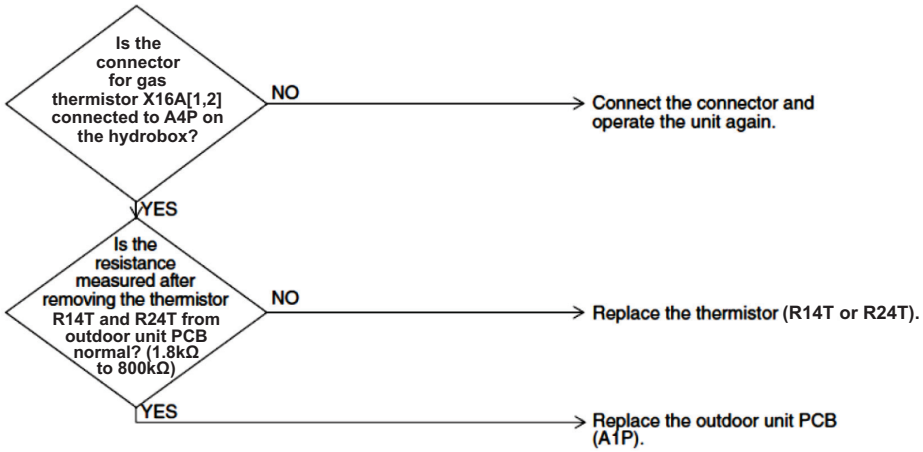
* Refer to "Thermistor Resistance / Temperature Characteristics" table.

4.26 “J7”

Error code:	J7: Suction Thermistor error (R14T or R24T)	
Purpose:	▪ Detect malfunctioning sensor	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Malfunction is detected according to the temperature detected by suction thermistor	
Error condition:	▪ When the suction thermistor is short circuited or opened circuit.	
Possible causes	Corrective action	Consequence
Faulty suction thermistor (R14T, R24T) Faulty outdoor unit PCB Defect of thermistor connection	See flow chart	
Reset:	Recycle the power	

Troubleshooting

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

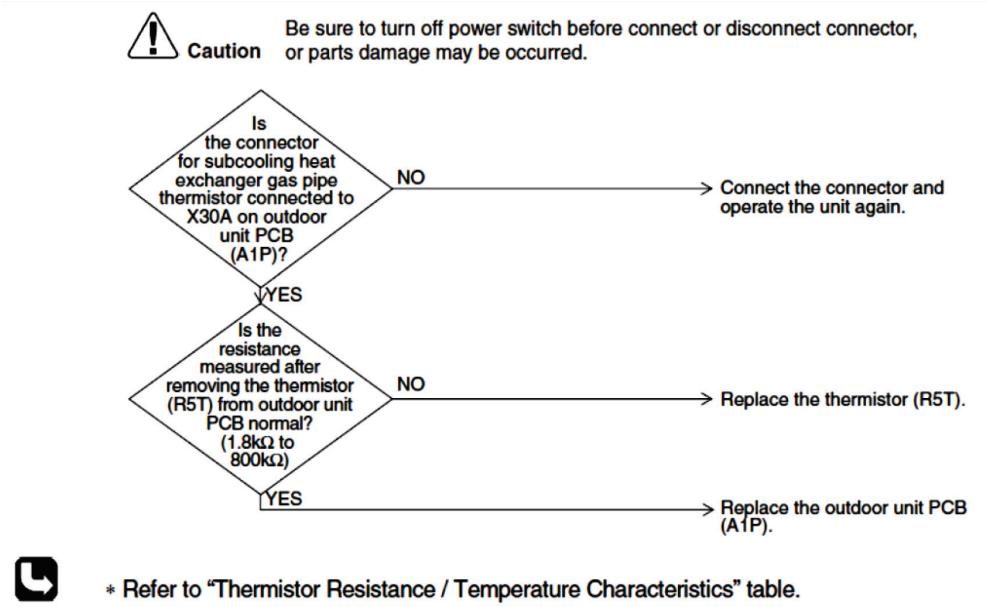


* Refer to “Thermistor Resistance / Temperature Characteristics” table.

4.27 "J9"

Error code:	J9: Outdoor Unit malfunction of subcooling heat exchanger gas pipe thermistor. J9 - 01 Faulty subcooling heat exchanger outlet thermistor (Master) - 02 Faulty subcooling heat exchanger outlet thermistor (Slave)		
Purpose:	▪ Detect malfunctioning sensor		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Malfunction is detected according to the temperature detected by subcooling heat exchanger gas pipe thermistor.		
Error condition:	▪ When the subcooling heat exchanger gas pipe thermistor is short circuited or open circuited.		
Possible causes		Corrective action	Consequence
Faulty subcooling heat exchanger gas pipe thermistor (R5T) Faulty outdoor unit PCB		See flow chart	
Reset:	Recycle the power		

Troubleshooting

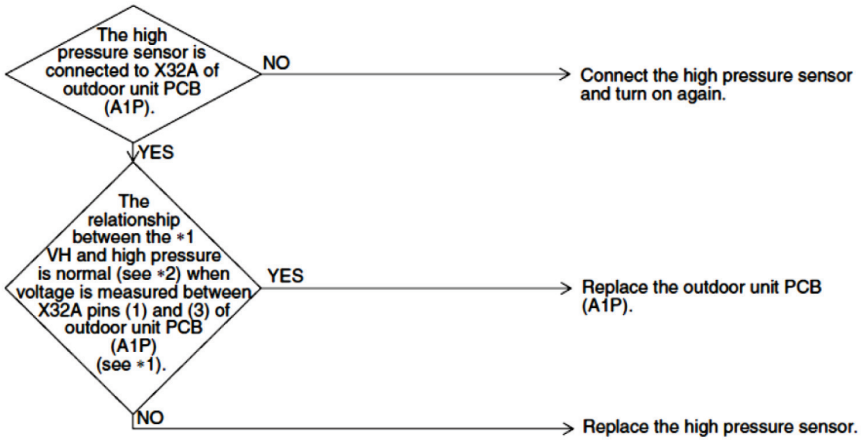


4.28 "JA"

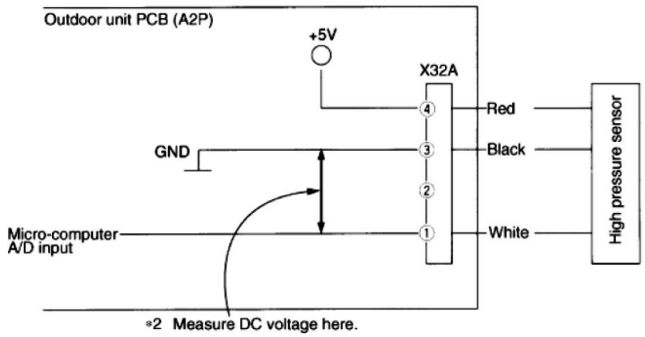
Error code:	JA: Outdoor Unit Malfunction of high pressure sensors JA - 01 Faulty high pressure sensor (Master) - 02 Faulty high pressure sensor (Slave)	
Purpose:	▪ Detect malfunctioning sensor	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Malfunction is detected from the pressure detected by the high pressure sensor.	
Error condition:	▪ When the high pressure sensor is short-circuit or open circuit	
Possible causes	Corrective action	Consequence
Defect of high pressure sensor system Connection of low pressure sensor with wrong connection Defect of outdoor unit PCB	See flow chart	
Reset:	Recycle the power	

Troubleshooting

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



*1: Voltage measurement point



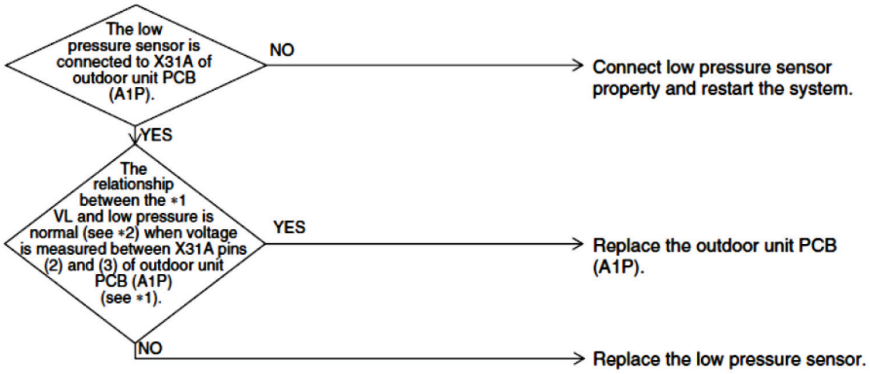
*2: Refer to "Pressure Sensor, Pressure / Voltage Characteristics" table.

4.29 "JC"

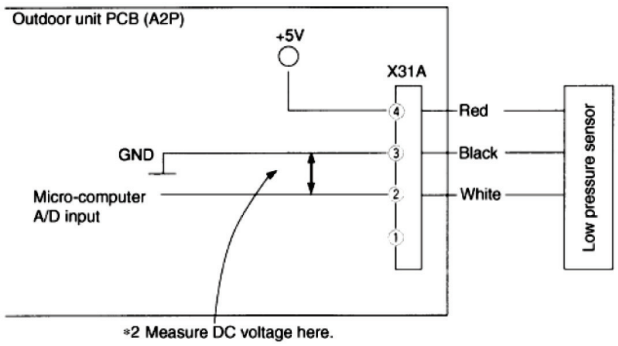
Error code:	JC: Outdoor Malfunction of low pressure sensor JC - 01 Faulty low pressure sensor (Master) - 02 Faulty low pressure sensor (Slave)		
Purpose:	▪ Detect malfunctioning sensor		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Malfunction is detected from pressure detected by low pressure sensor.		
Error condition:	▪ When the low pressure sensor is short circuit or open circuit		
Possible causes		Corrective action	Consequence
Defect of low pressure sensor system Connection of high pressure sensor with wrong connections Defect of outdoor unit PCB		See flow chart	
Reset:	Recycle the power		

Troubleshooting

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



*1: Voltage measurement point



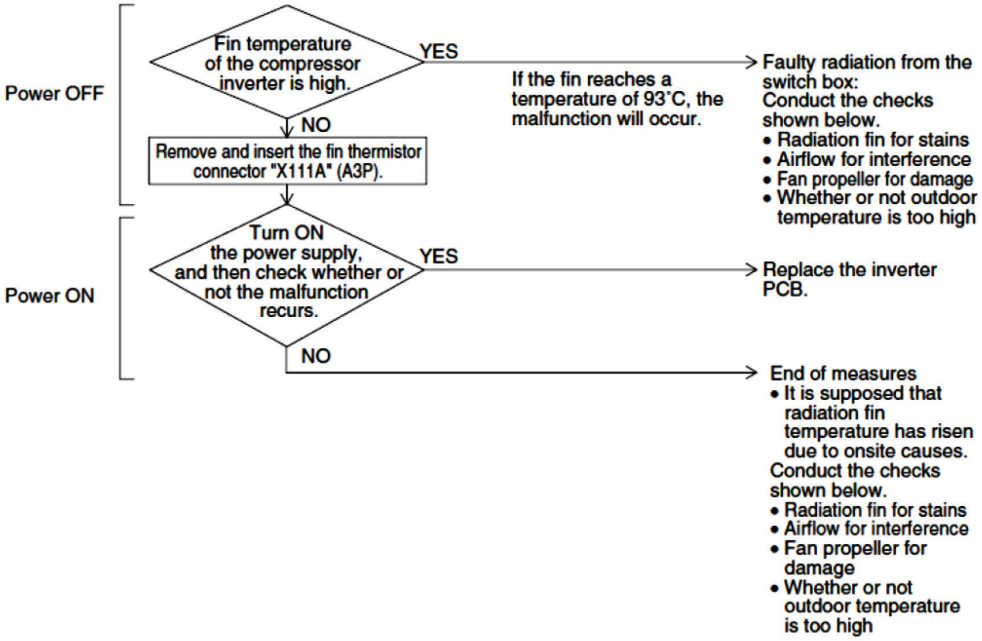
*2: Refer to "Pressure Sensor, Pressure / Voltage Characteristics" table.

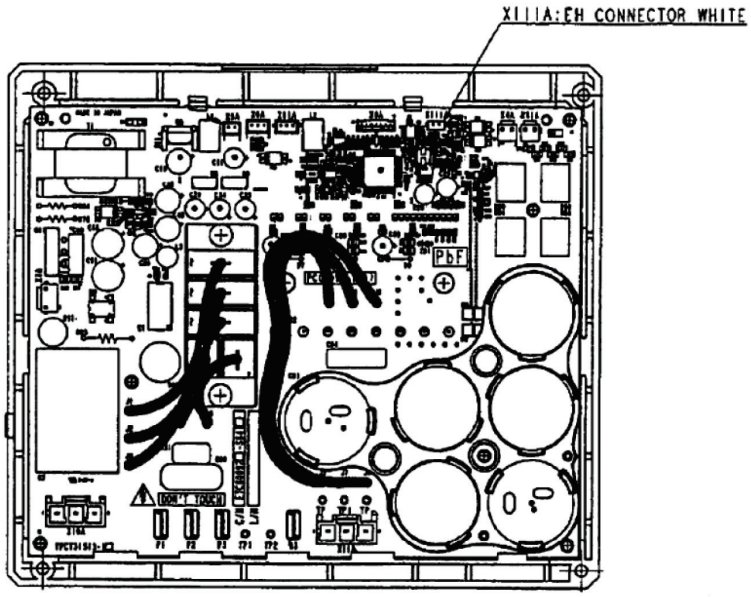
4.30 “L4”

Error code:	L4: Outdoor unit Malfunction of inverter radiating Fin Temperature Rise L4 - 01 Radiation fin temperature rise (Master inverter PC board) - 02 Radiation fin temperature rise (Slave inverter PC board)		
Purpose:	▪ Protect Inverter PC board		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Fin temperature is detected by the thermistor of the radiation fin.		
Error condition:	▪ When the temperature of the inverter radiation fin above 93°C		
Possible causes		Corrective action	Consequence
Actuation of fin thermal (Actuates above 93°C) Defect of inverter PCB Defect of fin thermistor		See flow chart	
Reset:	Recycle the power		

Troubleshooting

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





Inverter PCB for compressor

* Refer to "Thermistor Resistance / Temperature Characteristics" table.

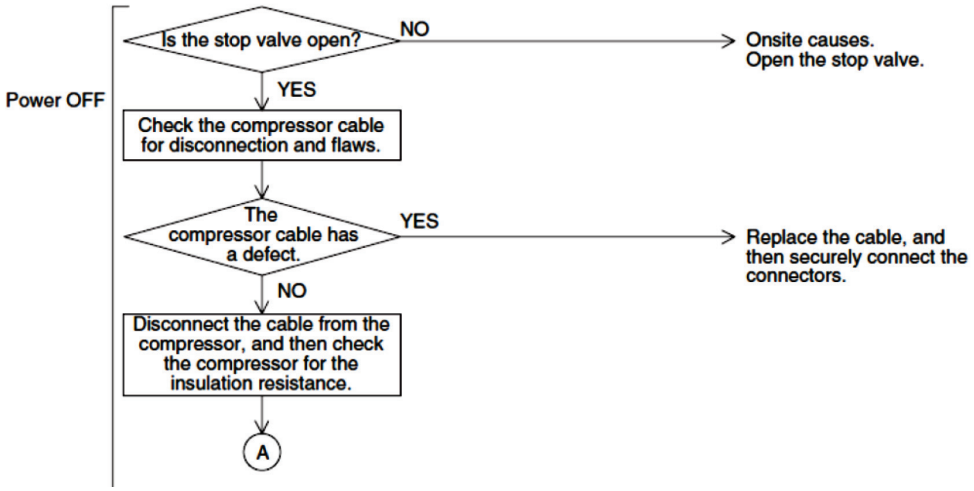
4.31 “L5”

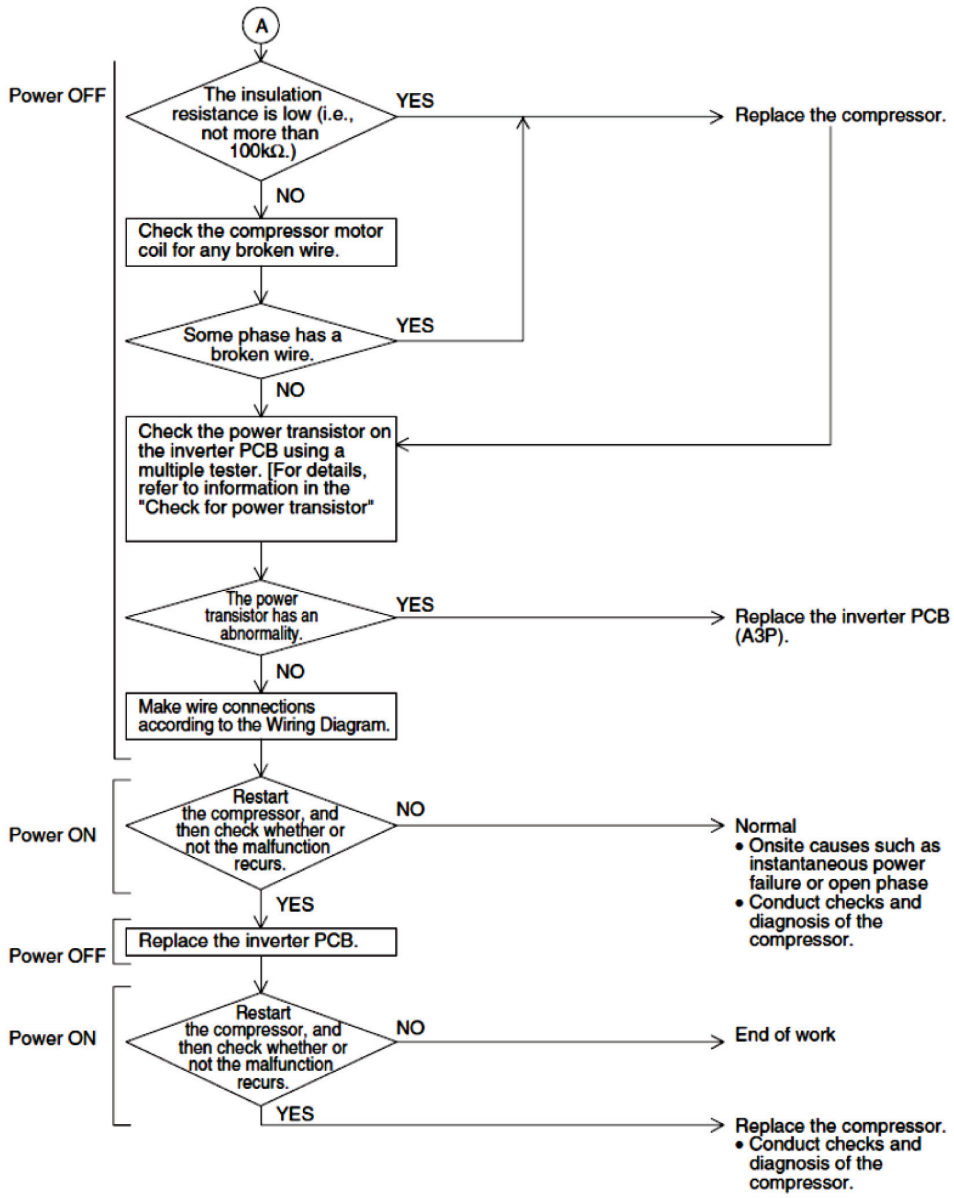
Error code:	L5: Outdoor Unit Inverter Compressor Abnormal L5 - 01 current offset error (Master) - 02 current offset error (Slave)	
Purpose:	▪ Protect the inverter compressor from abnormal currents	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Malfunction is detected from current flowing in the power transistor.	
Error condition:	▪ When an excessive current flows in the power transistor. (Instantaneous overcurrent also causes activation.)	
Possible causes	Corrective action	Consequence
Defect of compressor coil (disconnected, defective insulation) Compressor Start-up malfunction (mechanical lock) Defect of inverter PCB	See flow chart	
Reset:	Recycle the power	

Troubleshooting

Compressor inspection

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

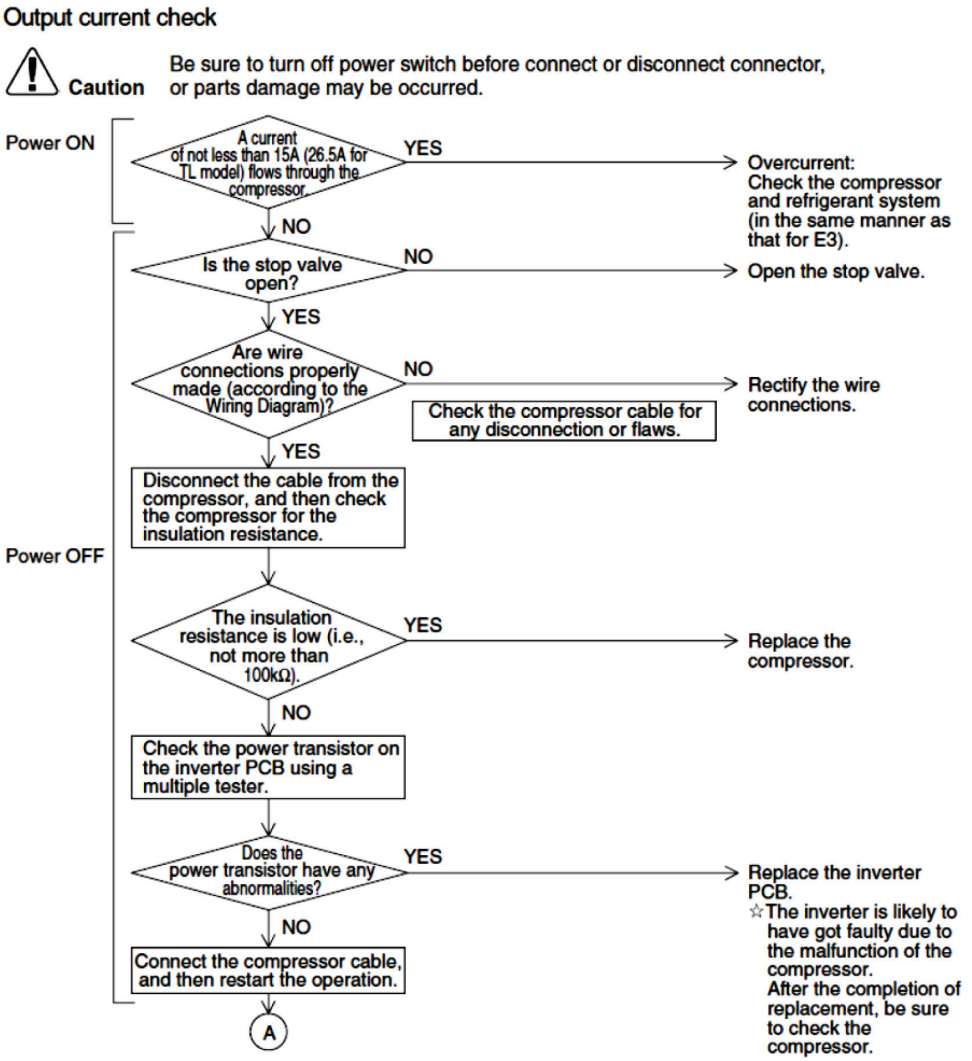


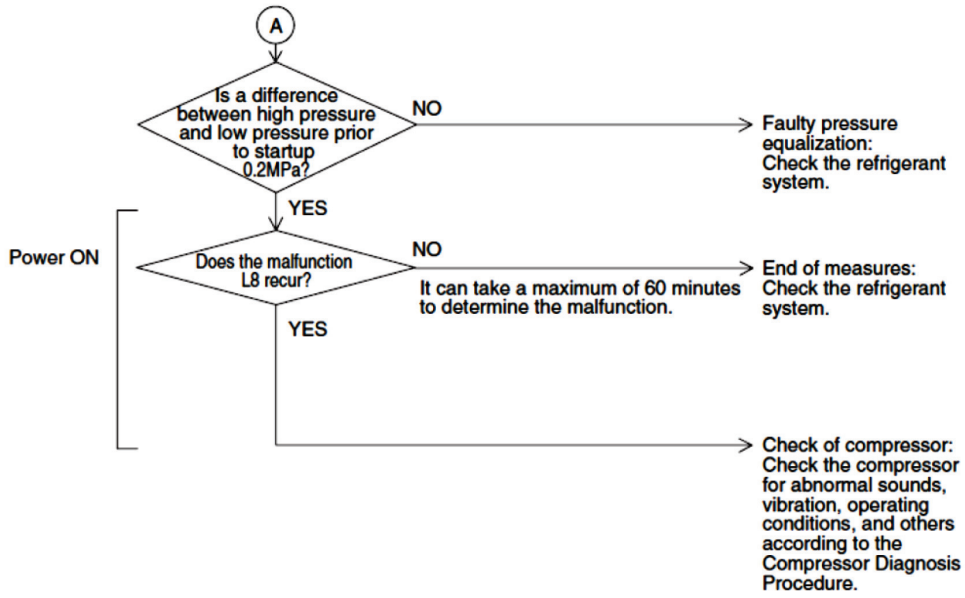

A
Power OFF
The insulation resistance is low (i.e., not more than 100kΩ.)
YES
Replace the compressor.
NO
Check the compressor motor coil for any broken wire.
Some phase has a broken wire.
YES
NO
Check the power transistor on the inverter PCB using a multiple tester. [For details, refer to information in the "Check for power transistor"
The power transistor has an abnormality.
YES
Replace the inverter PCB (A3P).
NO
Make wire connections according to the Wiring Diagram.
Power ON
Restart the compressor, and then check whether or not the malfunction recurs.
NO
Normal
• Onsite causes such as instantaneous power failure or open phase
• Conduct checks and diagnosis of the compressor.
YES
Power OFF
Replace the inverter PCB.
Power ON
Restart the compressor, and then check whether or not the malfunction recurs.
NO
End of work
YES
Replace the compressor.
• Conduct checks and diagnosis of the compressor.

4.32 "L8"

Error code:	L8: Outdoor Unit Inverter current Abnormal L8 - 03 INV compressor instantaneous overcurrent error (Master) - 06 INV compressor instantaneous overcurrent error (Slave)		
Purpose:	▪ Protect the INV compressor from overcurrent		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Malfunction is detected by current flowing in the power transistor		
Error condition:	▪ When overload in the compressor is detected. (Inverter secondary current 16.1A (Y1,YL) and 27.6A (TL))		
Possible causes		Corrective action	Consequence
Compressor overload Compressor Coil disconnected Defect of inverter PCB Faulty compressor		See flow chart	
Reset:	Recycle the power		

Troubleshooting



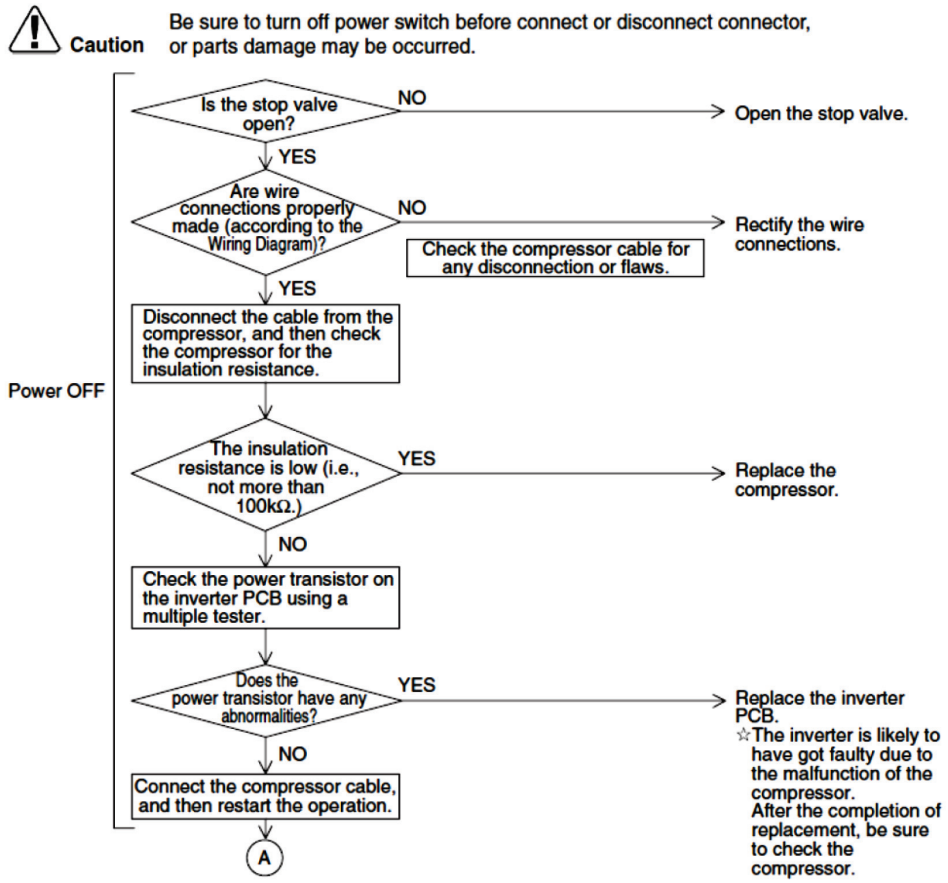

A
Is a difference between high pressure and low pressure prior to startup 0.2MPa?
NO
Faulty pressure equalization: Check the refrigerant system.
YES
Power ON
Does the malfunction L8 recur?
NO
It can take a maximum of 60 minutes to determine the malfunction.
End of measures: Check the refrigerant system.
YES
Check of compressor: Check the compressor for abnormal sounds, vibration, operating conditions, and others according to the Compressor Diagnosis Procedure.

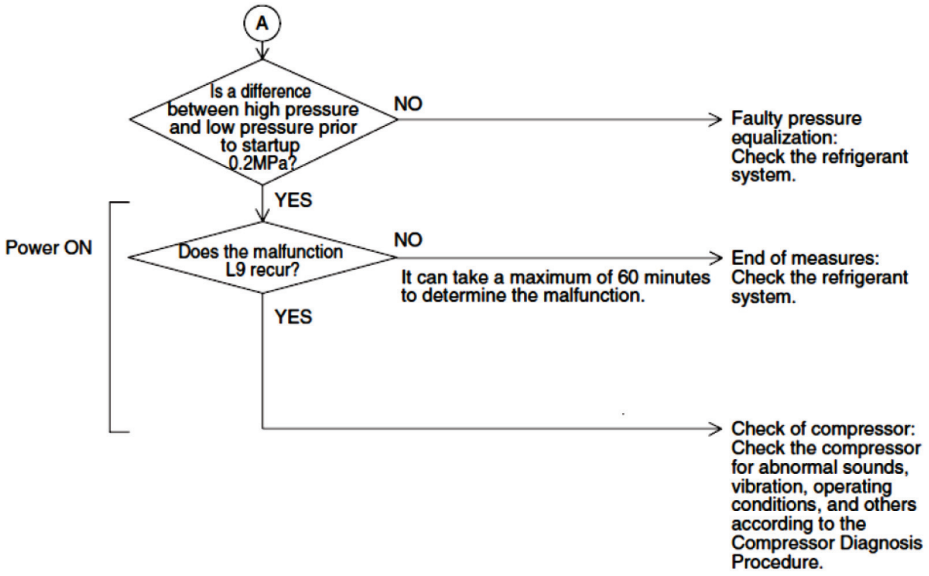
4.33 “L9”

Error code:	L9: Outdoor Unit Inverter Start up Error L9 - 01 INV compressor startup failure (Master) - 05 INV compressor startup failure (Slave)
Purpose:	▪ Detect failure to start the Inverter compressor
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ This malfunction code will be output if overcurrent occurs at the time of startup.
Error condition:	▪ When startup control is failed. ▪ When an overcurrent is passed to the inverter due to the malfunction of a compressor or electrical system.

Possible causes	Corrective action	Consequence
Defect of compressor Pressure differential start Defect of inverter PCB Failure to open the stop valve Faulty compressor connection	See flow chart	
Reset:	Recycle the power	

Troubleshooting

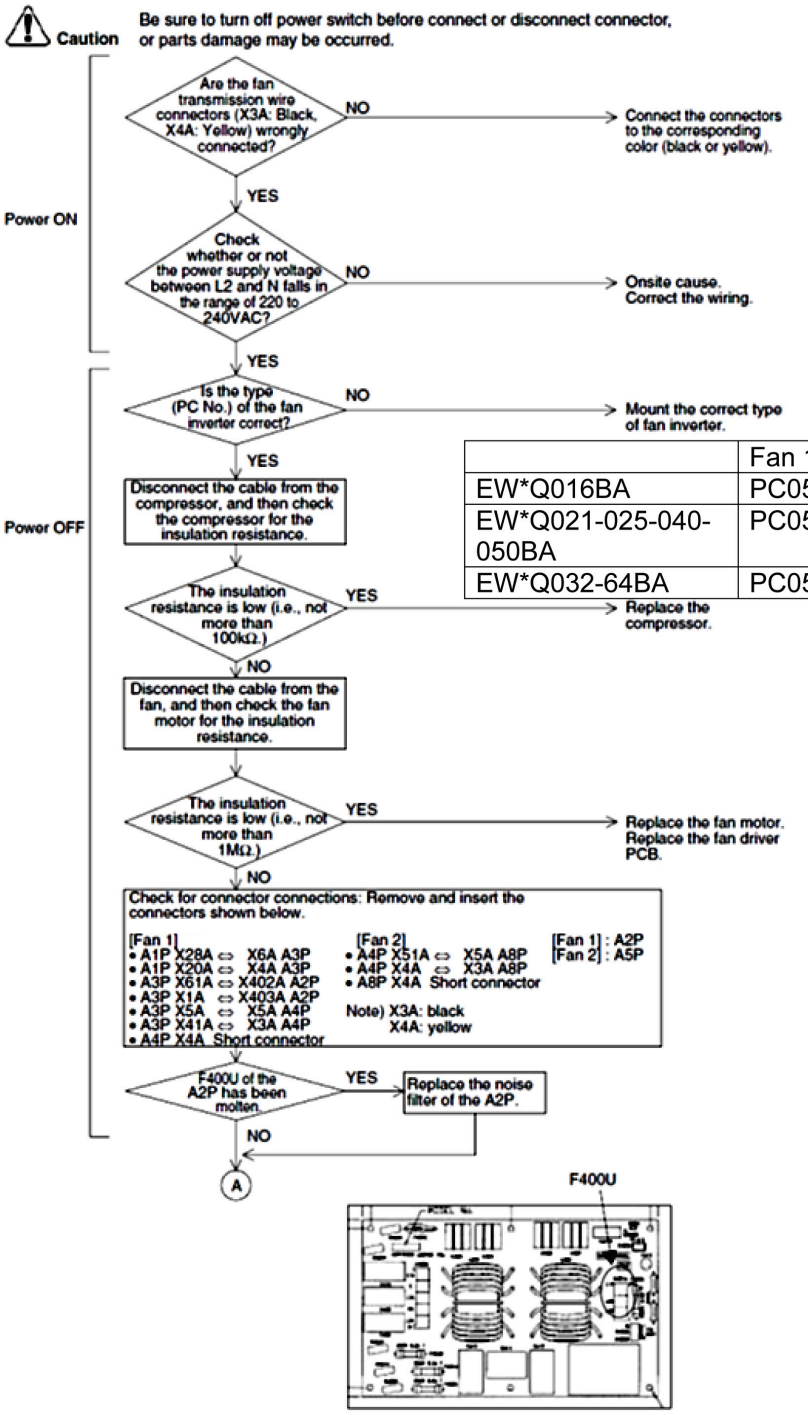



A
Is a difference between high pressure and low pressure prior to startup 0.2MPa?
NO
Faulty pressure equalization: Check the refrigerant system.
YES
Power ON
Does the malfunction L9 recur?
NO
It can take a maximum of 60 minutes to determine the malfunction.
End of measures: Check the refrigerant system.
YES
Check of compressor: Check the compressor for abnormal sounds, vibration, operating conditions, and others according to the Compressor Diagnosis Procedure.

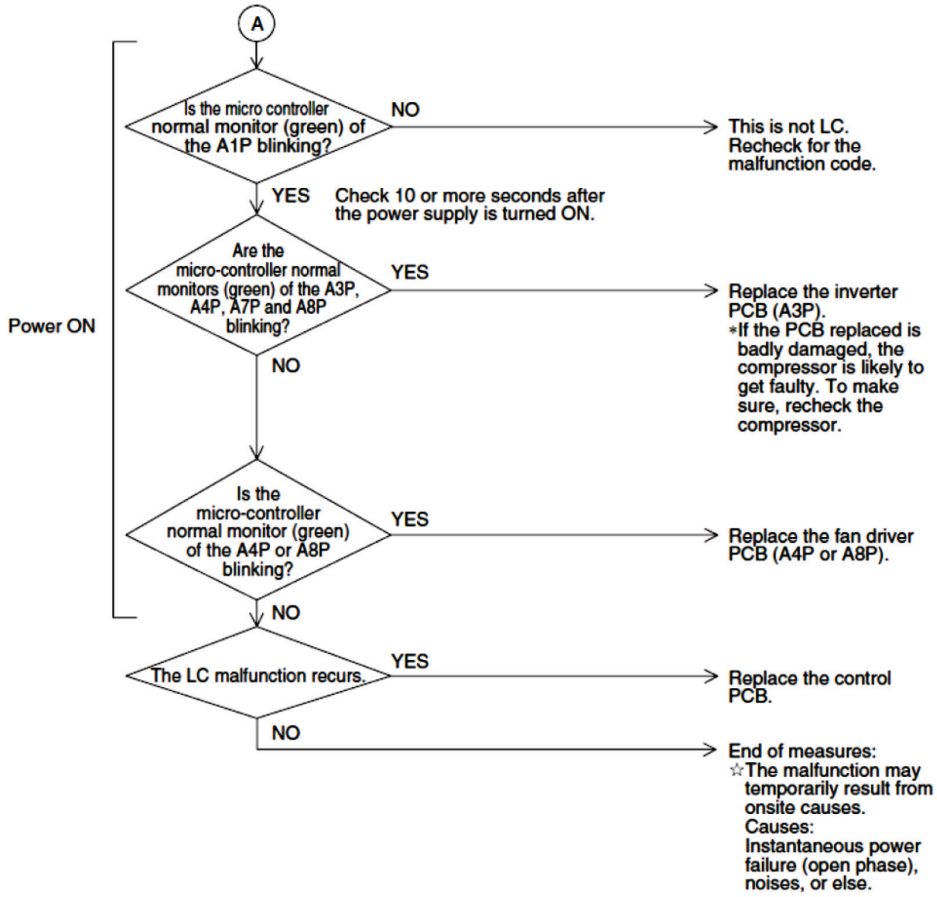
4.34 “LC”

Error code:	LC: Outdoor Unit Malfunction of transmission between inverter and control PCB LC - 01 Transmission error [between INV PCB and main PCB (Master)] - 02 Transmission error [between INV PCB and main PCB (Slave)]	
Purpose:	▪ Detect failure of communication between outdoor PCB’s	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Check the communication state between inverter PCB and control PCB by micro-computer	
Error condition:	▪ When the correct communication is not conducted in a certain period.	
Possible causes	Corrective action	Consequence
Malfunction of connection between the inverter PCB and outdoor control PCB Defect of outdoor control PCB (transmission section) Defect of inverter PCB Defect of noise filter Faulty fan inverter Incorrect type of fan inverter Faulty compressor Faulty fan motor	See flow chart	
Reset:	Recycle the power	

Troubleshooting



	Fan 1	Fan2
EW*Q016BA	PC0511-1	
EW*Q021-025-040-050BA	PC0511-1	
EW*Q032-64BA	PC0511-3	PC0511-4


A
Is the micro controller normal monitor (green) of the A1P blinking?
NO
This is not LC. Recheck for the malfunction code.
YES
Check 10 or more seconds after the power supply is turned ON.
Are the micro-controller normal monitors (green) of the A3P, A4P, A7P and A8P blinking?
YES
Replace the inverter PCB (A3P).
*If the PCB replaced is badly damaged, the compressor is likely to get faulty. To make sure, recheck the compressor.
Power ON
NO
Is the micro-controller normal monitor (green) of the A4P or A8P blinking?
YES
Replace the fan driver PCB (A4P or A8P).
NO
The LC malfunction recurs.
YES
Replace the control PCB.
NO
End of measures:
☆The malfunction may temporarily result from onsite causes.
Causes:
Instantaneous power failure (open phase), noises, or else.

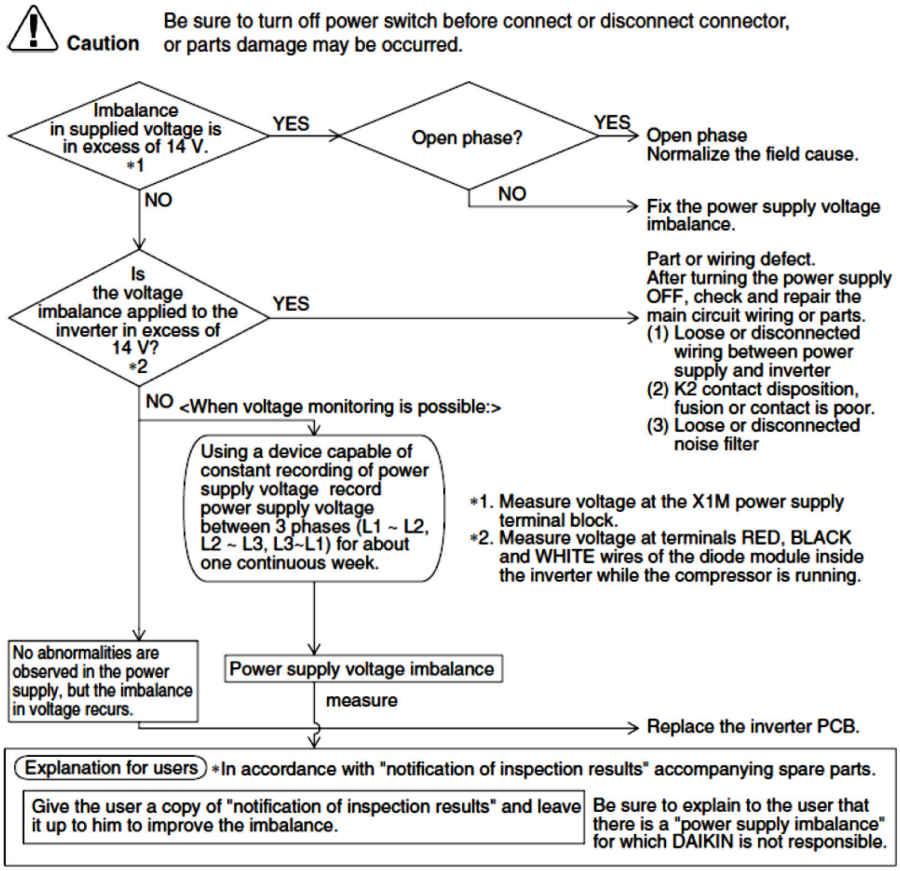
4.35 “P1”

Error code:	P1: Outdoor Unit Inverter Over ripple protection P1 - 01 Unbalanced power supply voltage (Master) - 02 Unbalanced power supply voltage (Slave)
Purpose:	▪ Protection against bad power supply
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ Imbalance in supply voltage is detected in PCB. ▪ Imbalance in the power supply voltage causes increased ripple of voltage of the main circuit capacitor in the inverter. Consequently. The increased ripple is detected.
Error condition:	▪ When the resistance value of thermistor becomes a value equivalent to open or short circuited status. ▪ * Malfunction is not decided while the unit operation is continued. “PA” will be displayed by pressing the inspection button. When the amplitude of the ripple exceeding a certain value is detected for consecutive 4 minutes.

Possible causes	Corrective action	Consequence
Open phase Voltage imbalance between phases Defect of main circuit capacitor Defect of inverter PCB Defect of K2 relay in inverter PCB Improper main circuit wiring	See flow chart	

Reset:	Recycle the power

Troubleshooting

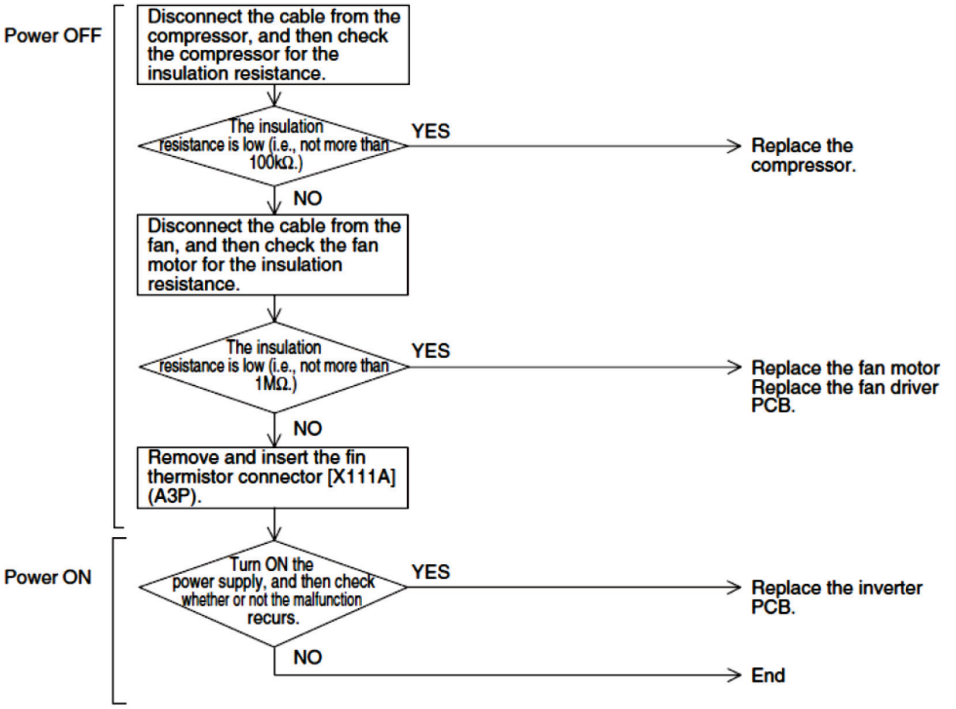


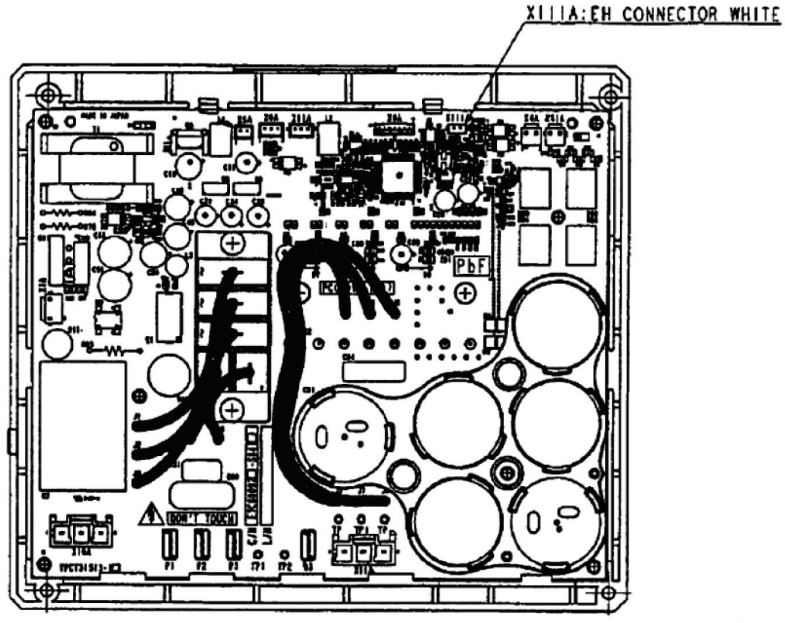
4.36 "P4"

Error code:	P4: Outdoor Unit Malfunction of inverter radiating Fin temperature Rise sensor	
Purpose:	▪ Detect of malfunctioning sensor	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Resistance of radiation fin thermistor is detected when the compressor is not operating.	
Error condition:	▪ When the resistance value of thermistor becomes a value equivalent to open or short circuited status. ▪ Malfunction is not decided while the unit operation is continued. "P4" will be displayed by pressing the inspection button.	
Possible causes	Corrective action	Consequence
Defect of radiator fin temperature sensor Defect of inverter PCB	See flow chart	
Reset:	Recycle the power	

Troubleshooting

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





Inverter PCB for compressor

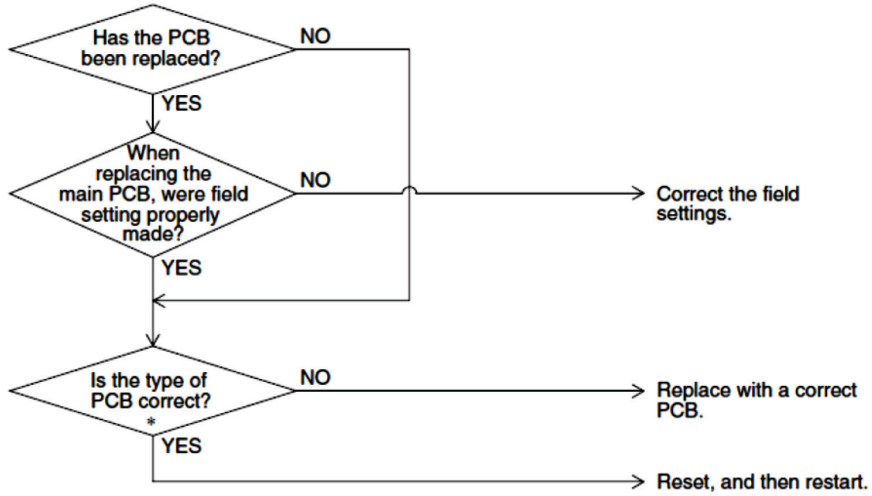
* Refer to "Thermistor Resistance / Temperature Characteristics" table.

4.37 "PJ"

Error code:	PJ Outdoor Unit Faulty field setting after replacing main PCB or faulty combination of PCB PJ - 01 Faulty combination of INV PC board (Master) - 02 Faulty combination of INV PC board (Slave)	
Purpose:	▪ Detecting wrong settings on main PCB	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ The faulty (or no) field setting after replacing PCB or faulty PCB combination is detected through communications with the inverter.	
Error condition:	▪ Whether or not the field setting or the type of the PCB is correct through the communication date is judged.	
Possible causes	Corrective action	Consequence
Faulty (or no field setting after replacing main PCB) Mismatching of type of PCB	See flow chart	
Reset:	Recycle the power	

Troubleshooting

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



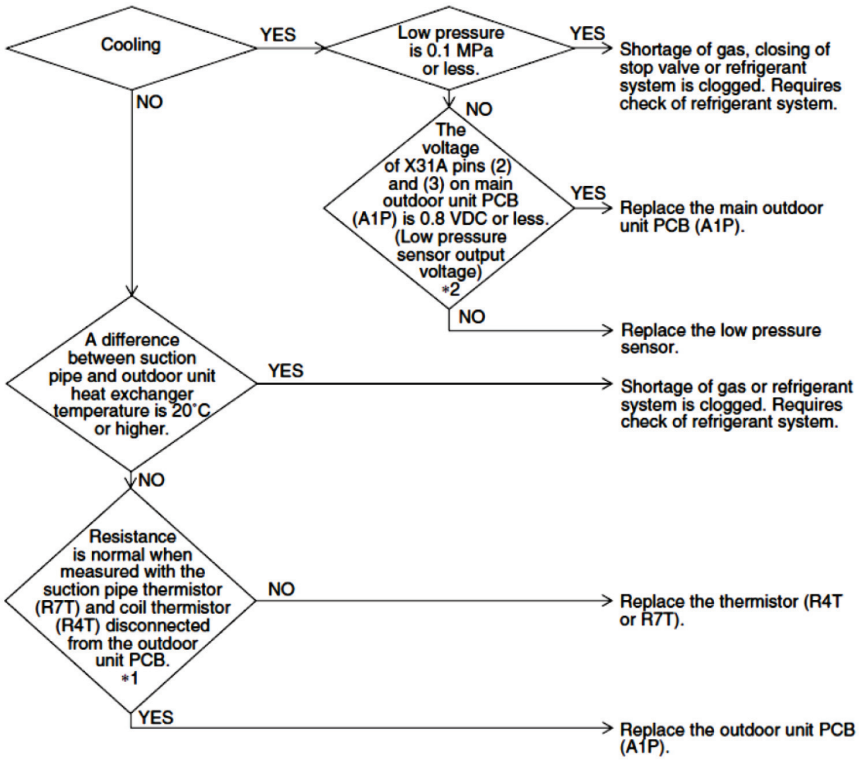
*Note) Type of PCB mismatching includes;
Main PCB
Inverter PCB (for compressor)
Fan driver PCB

4.38 "U0"

Error code:	U0 outdoor unit: low pressure drop due to refrigerant shortage or electronic expansion valve failure U0 - 01 Gas shortage alarm		
Purpose:	▪ To prevent too low pressures		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Shortage of gas malfunction is detected by discharge pipe temperature thermistor.		
Error condition:	▪ Micro-computer judge and detect if the system is short of refrigerant ▪ Malfunction is not decided while the unit operation is continued.		
Possible causes		Corrective action	Consequence
Shortage of gas or refrigerant system clogging. Defect of low pressure sensor Defect of outdoor unit PCB (A1P) Defect of thermistor R7T to R4T		See flow chart	
Reset:	Recycle the power		

Troubleshooting

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



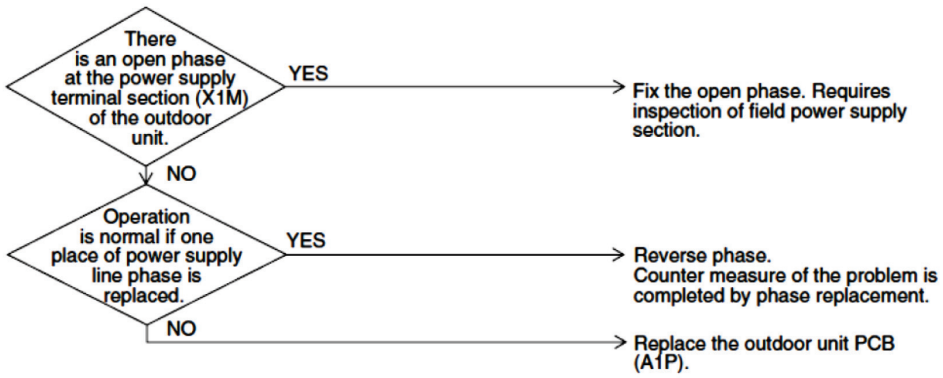
*1: Refer to "Thermistor Resistance / Temperature Characteristics" table.
*2: Refer to "Pressure Sensor, Pressure / Voltage Characteristics" table.

4.39 “U1”

Error code:	U1 Reverse Phase, Open Phase U1 - 01 Reverse phase/open phase for power supply (Master) - 04 Reverse phase for power supply [with power supply turned ON] (Master) - 05 Reverse phase/open phase for power supply (slave) - 06 Reverse phase for power supply [with power supply turned ON] (Slave)		
Purpose:	▪ Protect the unit from incorrect power supply		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ The phase of each phase are detected by reverse phase detection circuit and right phase or reverse phase are judged		
Error condition:	▪ When a significant phase difference is made between phases		
Possible causes		Corrective action	Consequence
Power supply reverse phase Power supply open phase Defect of outdoor unit PCB (A1P)		See flow chart	
Reset:	Recycle the power		

Troubleshooting

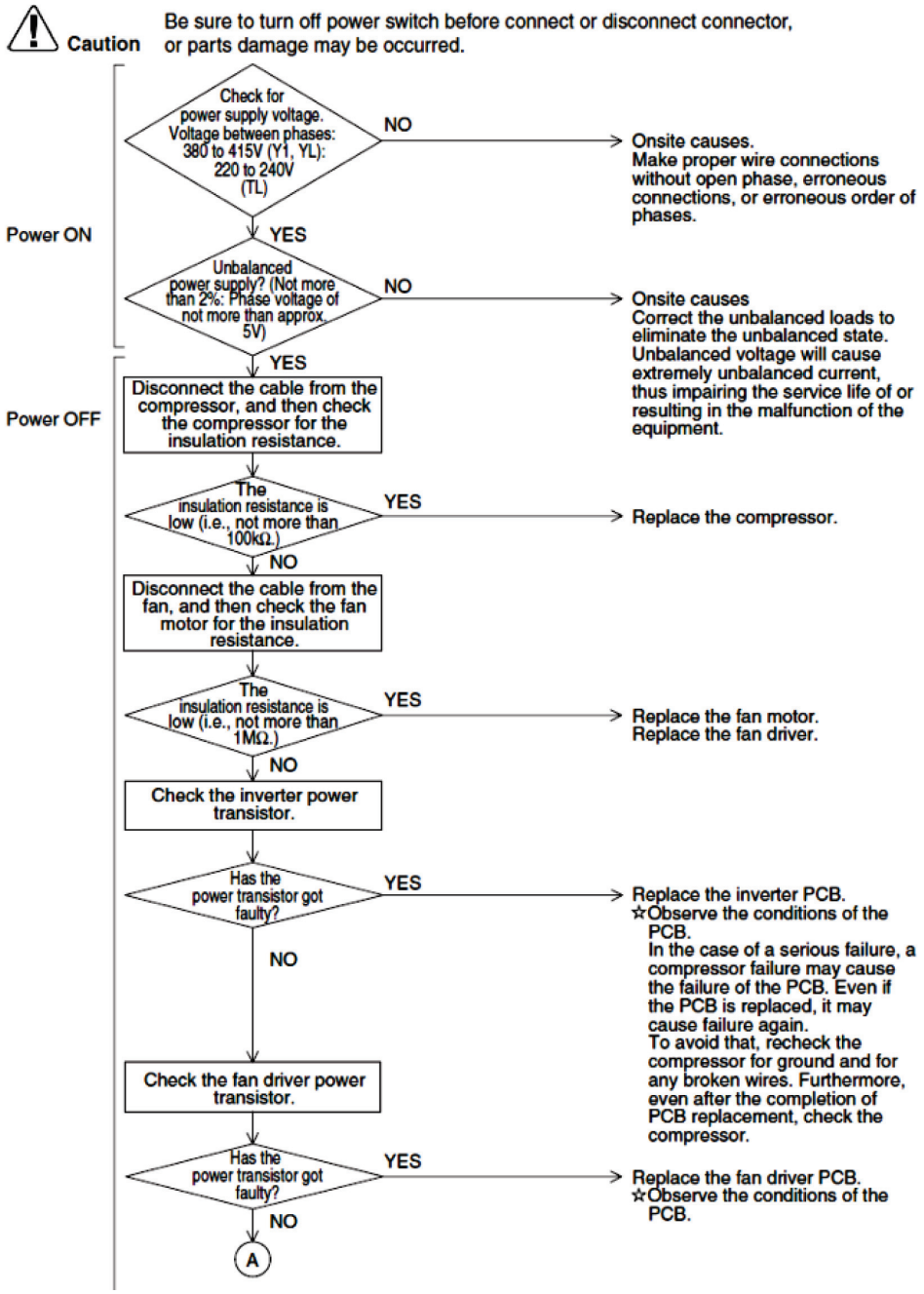
Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

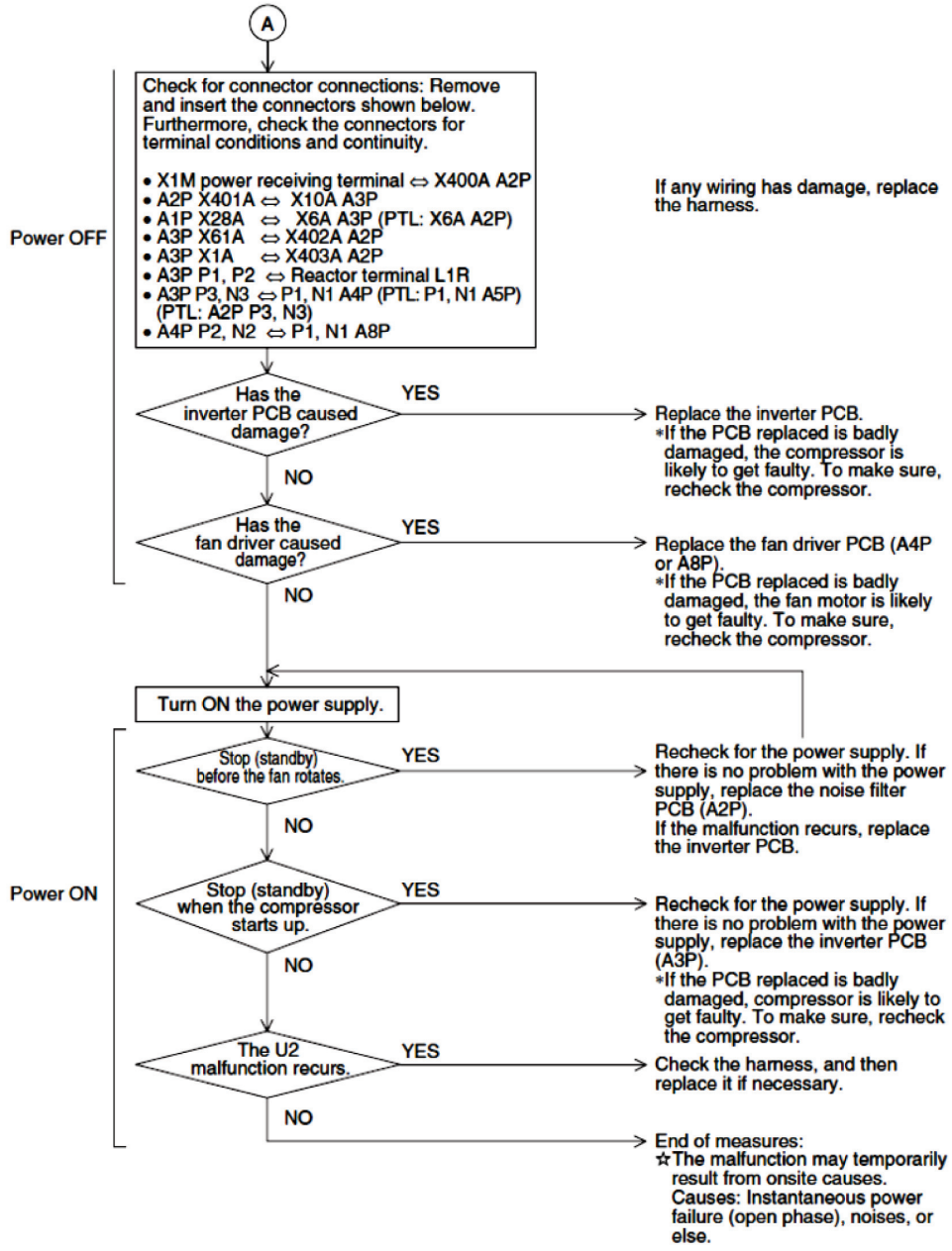


4.40 "U2"

Error code:	U2 outdoor unit power supply insufficient or instantaneous failure U2 - 01 Power supply voltage error - 02 Open phase of power supply - 03 Main circuit capacitor charge error - 04 SP/MP - PAM overvoltage error	
Purpose:	▪ Protect the unit from incorrect power supply	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Detection of voltage of main circuit capacitor built in the inverter and power supply voltage.	
Error condition:	▪ When the voltage aforementioned is not less than 780V or not more than 320V, or when the current-limiting voltage does not reach 200V or more or exceeds 740V	
Possible causes	Corrective action	Consequence
Power supply insufficient Instantaneous power failure Open phase Defect of inverter PCB Defect of outdoor control PCB Main circuit wiring defect Faulty compressor Faulty fan motor Faulty connection of signal cable	See flow chart	
Reset:	Recycle the power	

Troubleshooting



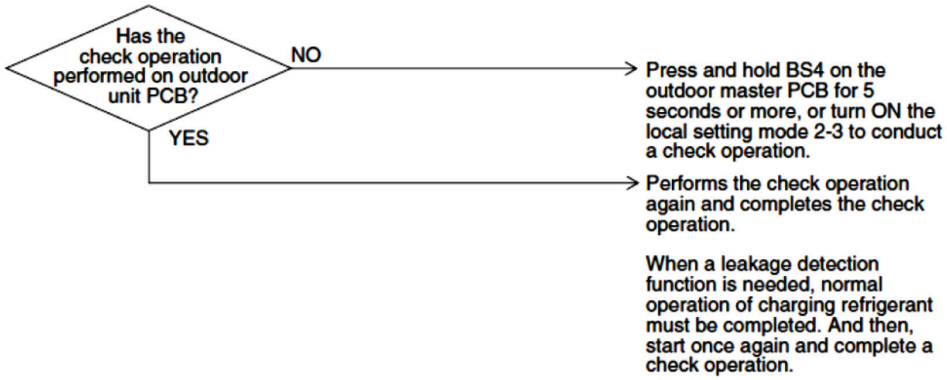

A
Power OFF
Check for connector connections: Remove and insert the connectors shown below. Furthermore, check the connectors for terminal conditions and continuity.
• X1M power receiving terminal ⇔ X400A A2P
• A2P X401A ⇔ X10A A3P
• A1P X28A ⇔ X6A A3P (PTL: X6A A2P)
• A3P X61A ⇔ X402A A2P
• A3P X1A ⇔ X403A A2P
• A3P P1, P2 ⇔ Reactor terminal L1R
• A3P P3, N3 ⇔ P1, N1 A4P (PTL: P1, N1 A5P) (PTL: A2P P3, N3)
• A4P P2, N2 ⇔ P1, N1 A8P
If any wiring has damage, replace the harness.
Has the inverter PCB caused damage?
YES
Replace the inverter PCB.
*If the PCB replaced is badly damaged, the compressor is likely to get faulty. To make sure, recheck the compressor.
NO
Has the fan driver caused damage?
YES
Replace the fan driver PCB (A4P or A8P).
*If the PCB replaced is badly damaged, the fan motor is likely to get faulty. To make sure, recheck the compressor.
NO
Turn ON the power supply.
Power ON
Stop (standby) before the fan rotates.
YES
Recheck for the power supply. If there is no problem with the power supply, replace the noise filter PCB (A2P).
If the malfunction recurs, replace the inverter PCB.
NO
Stop (standby) when the compressor starts up.
YES
Recheck for the power supply. If there is no problem with the power supply, replace the inverter PCB (A3P).
*If the PCB replaced is badly damaged, compressor is likely to get faulty. To make sure, recheck the compressor.
NO
The U2 malfunction recurs.
YES
Check the harness, and then replace it if necessary.
NO
End of measures:
☆The malfunction may temporarily result from onsite causes. Causes: Instantaneous power failure (open phase), noises, or else.

4.41 "U3"

Error code:	U3 outdoor unit: check operation is not executed	
Purpose:	▪ To detect malfunctions at start up	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ Check operation is executed or not	
Error condition:	▪ Malfunction is decided when the unit starts operation without check operation	
Possible causes	Corrective action	Consequence
Check operation is not executed	See flow chart	
Reset:	Recycle the power	

Troubleshooting

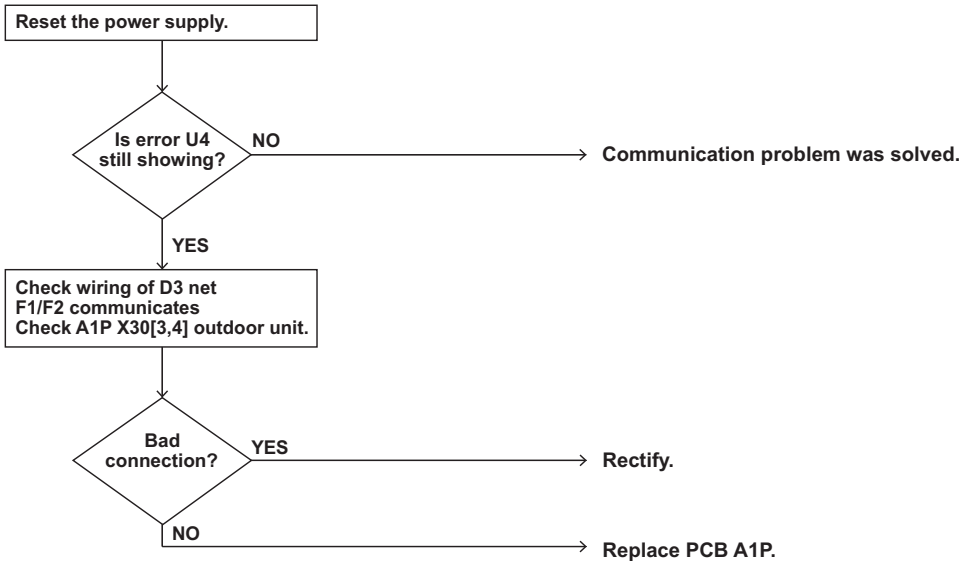
Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



4.42 "U4"

Error code:	U4 malfunction of transmission between hydrobox units and outdoor units U4 - 0		
Purpose:	▪ Detect no communication		
Applicable models:	▪ EWAQ~BA & EWYQ~BA		
Detection method:	▪ Check if the transmission between Hydrobox and outdoor unit is correctly executed using microcomputer		
Error condition:	▪ When transmission is not carried out normally for a certain amount of time		
Possible causes		Corrective action	Consequence
Power cables between Hydrobox and outdoor unit have been disconnected System address doesn't match Defect of hydrobox unit PC board Defect of outdoor unit PC board		See flow chart	
Reset:	Recycle the power		

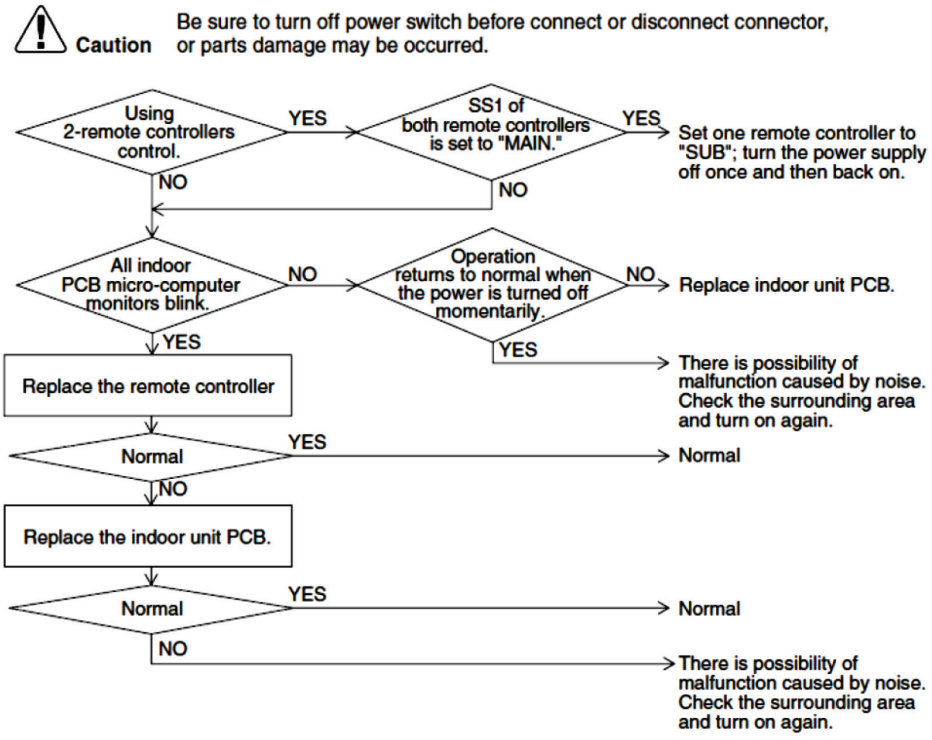
Troubleshooting



4.43 "U5"

Error code:	U5 hydrobox malfunction of transmission between remote controller and hydrobox	
Purpose:	▪ Detect no communication from remote controller	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ In case of controlling 2 remote controller, check the system using micro-computer if signal transmission between hydrobox and remote controller (main and sub) is normal.	
Error condition:	▪ Normal transmission does not continue for specified period.	
Possible causes	Corrective action	Consequence
Malfunction of hydrobox remote controller transmission	See flow chart	
Connection of two main remote controllers (when using 2 remote controllers)		
Defect of remote controller PCB		
Malfunction of transmission caused by noise		
Reset:	Recycle the power	

Troubleshooting



4.44 "U8"

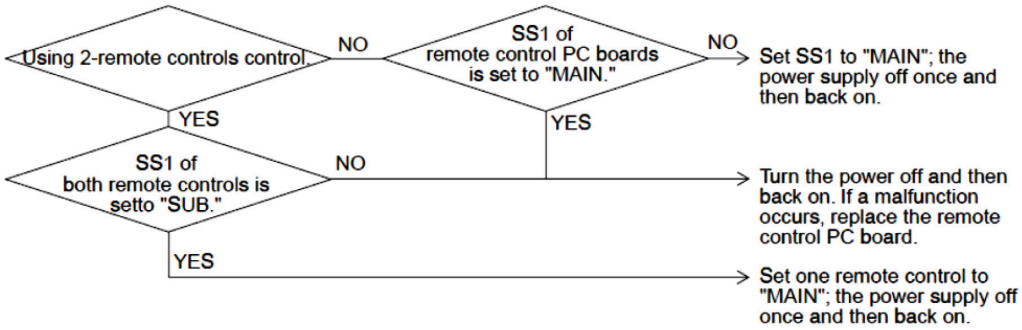
Error code:	U8 hydrobox malfunction of transmission between main remote controller and sub remote controllers
Purpose:	▪ Detect 2 controllers set as slave
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ In case of using 2 remote controller, check the dipswitch setting of master and slave
Error condition:	▪ Normal transmission does not continue for specified period.

Possible causes	Corrective action	Consequence
Malfunction of hydrobox remote controller transmission	See flow chart	
Connection of two main remote controllers (when using 2 remote controllers)		
Defect of remote controller PCB		
Malfunction of transmission caused by noise		

Reset:	Recycle the power

Troubleshooting

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



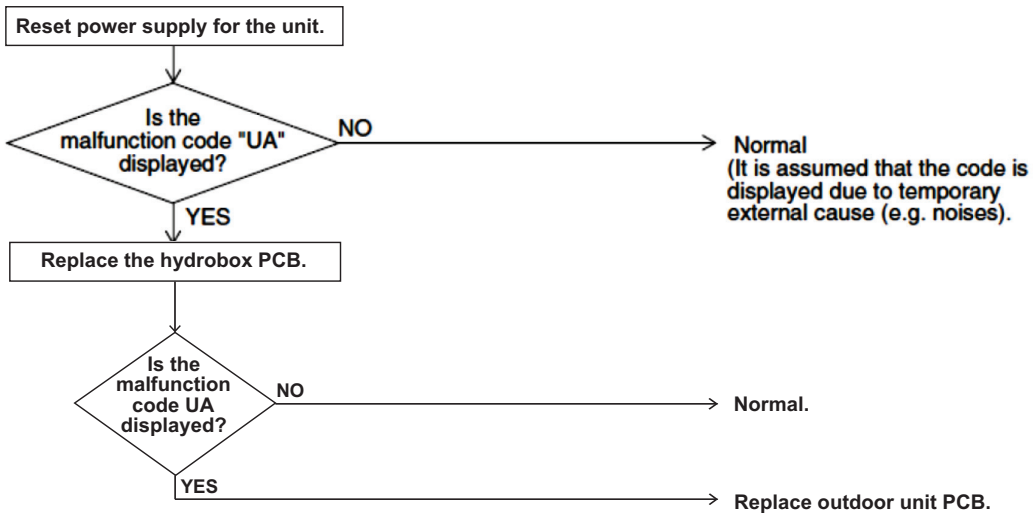
4.45 "UA"

Error code:	UA improper combination of hydrobox and outdoor unit and remote controller. UA - 13 UA - 39
Purpose:	▪ Detect malfunctioning PCB
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ Incorrect signals are transmitted among the hydrobox and outdoor unit
Error condition:	▪ The malfunction decision is made as soon as either of the abnormalities aforementioned is detected.

Possible causes	Corrective action	Consequence
Defect of outdoor unit PCB (A1P) Setting of outdoor PCB was not conducted after replacing to spare parts PCB	See flow chart	

Reset:	Recycle the power

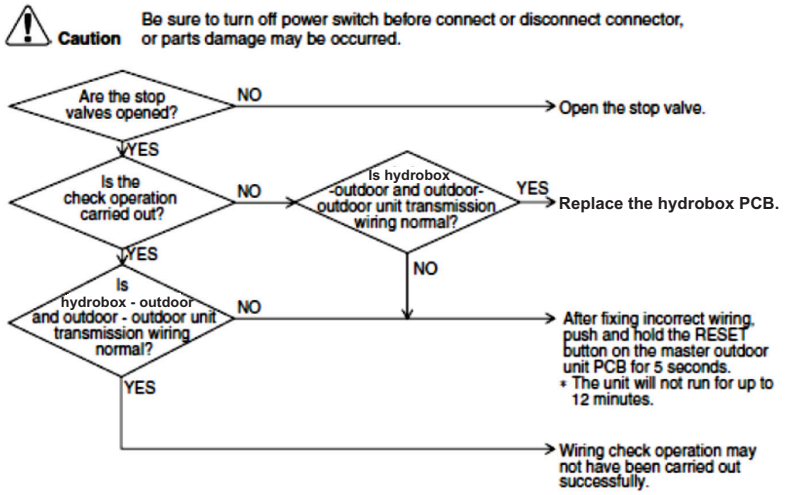
Troubleshooting



4.46 "UF"

Error code:	UF system is not Set yet UF subcode 6 QA wiring problem UF subcode 10 Transmission problem with outdoor unit	
Purpose:	▪ Detect communication error	
Applicable models:	▪ EWAQ~BA & EWYQ~BA	
Detection method:	▪ On check operation, the number of hydrobox in terms of transmission is not corresponding to that of hydrobox that have made changes in temperature.	
Error condition:	▪ The malfunction is determined as soon as the abnormality aforementioned is detected through checking the system for any erroneous connection of units on the check operation.	
Possible causes	Corrective action	Consequence
Improper connection of transmission wiring between hydrobox and outdoor unit Failure to execute check operation Defect of hydrobox unit PCB Stop Valve is closed	See flow chart	
Reset:	Recycle the power	

Troubleshooting



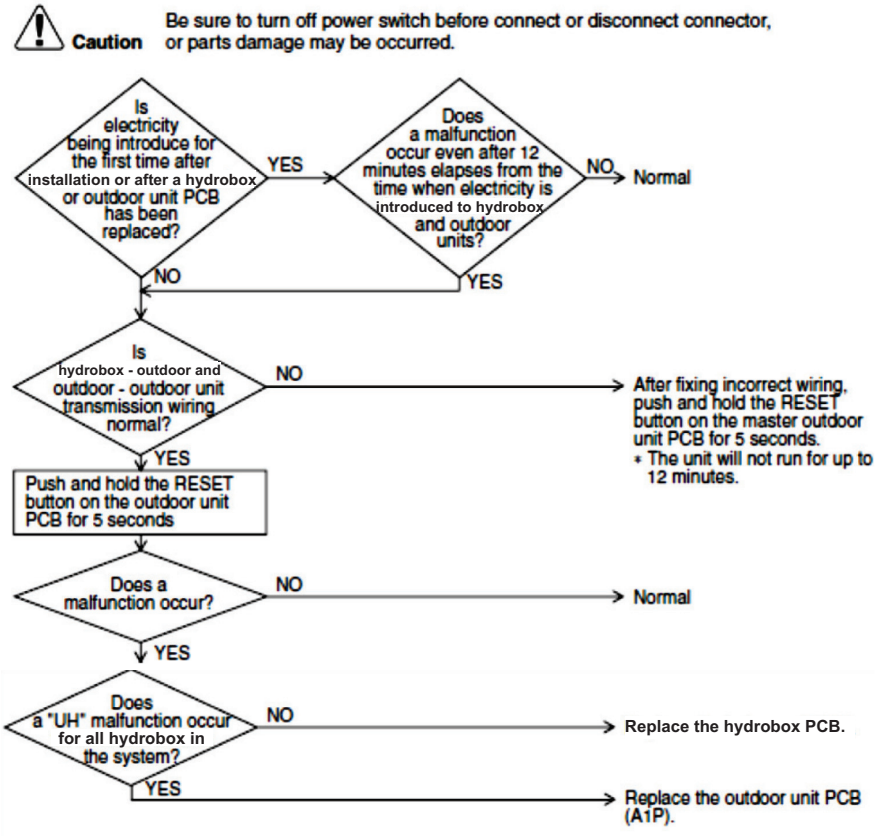
Note: Wiring check operation may not be successful if carried out after the outdoor unit has been off for more than 12 hours, or if it is not carried out after running all connected indoor units in the fan mode for at least an hour.

4.47 "UH"

Error code:	UH Malfunction of system, refrigerant system address undefined UH subcode 0
Purpose:	▪ Detect malfunctioning PCB
Applicable models:	▪ EWAQ~BA & EWYQ~BA
Detection method:	▪ Detect an hydrobox with no address setting
Error condition:	▪ The malfunction decision is made as soon as the abnormality aforementioned is detected.

Possible causes	Corrective action	Consequence
Improper connection of transmission wiring between hydrobox unit and outdoor unit	See flow chart	
Defect of hydrobox PCB		
Detect of outdoor unit main PCB		
Reset:	Recycle the power	

Troubleshooting

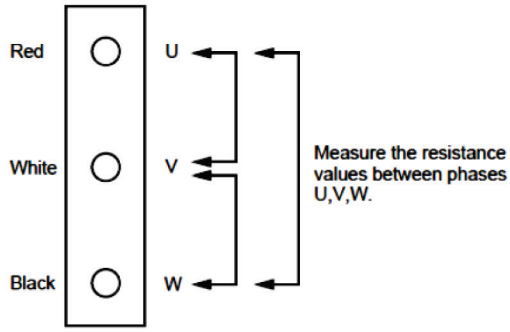


4.48 [CHECK 1]

Check on connector of fan motor (Power supply cable)

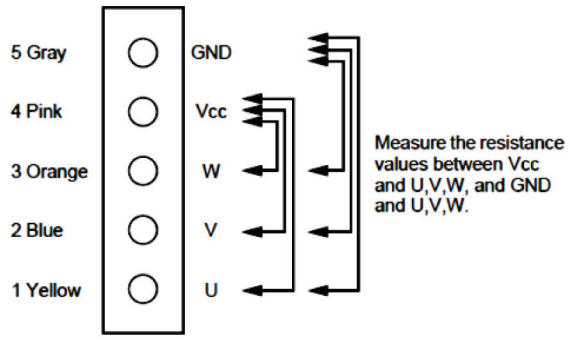
(1) Turn off the power supply.

Measure the resistance between phases of U,V,W at the motor side connectors (three-core wire) to check that the values are balanced and there is no short circuiting, while connector or relay connector is disconnected.



4.49 [CHECK 2]

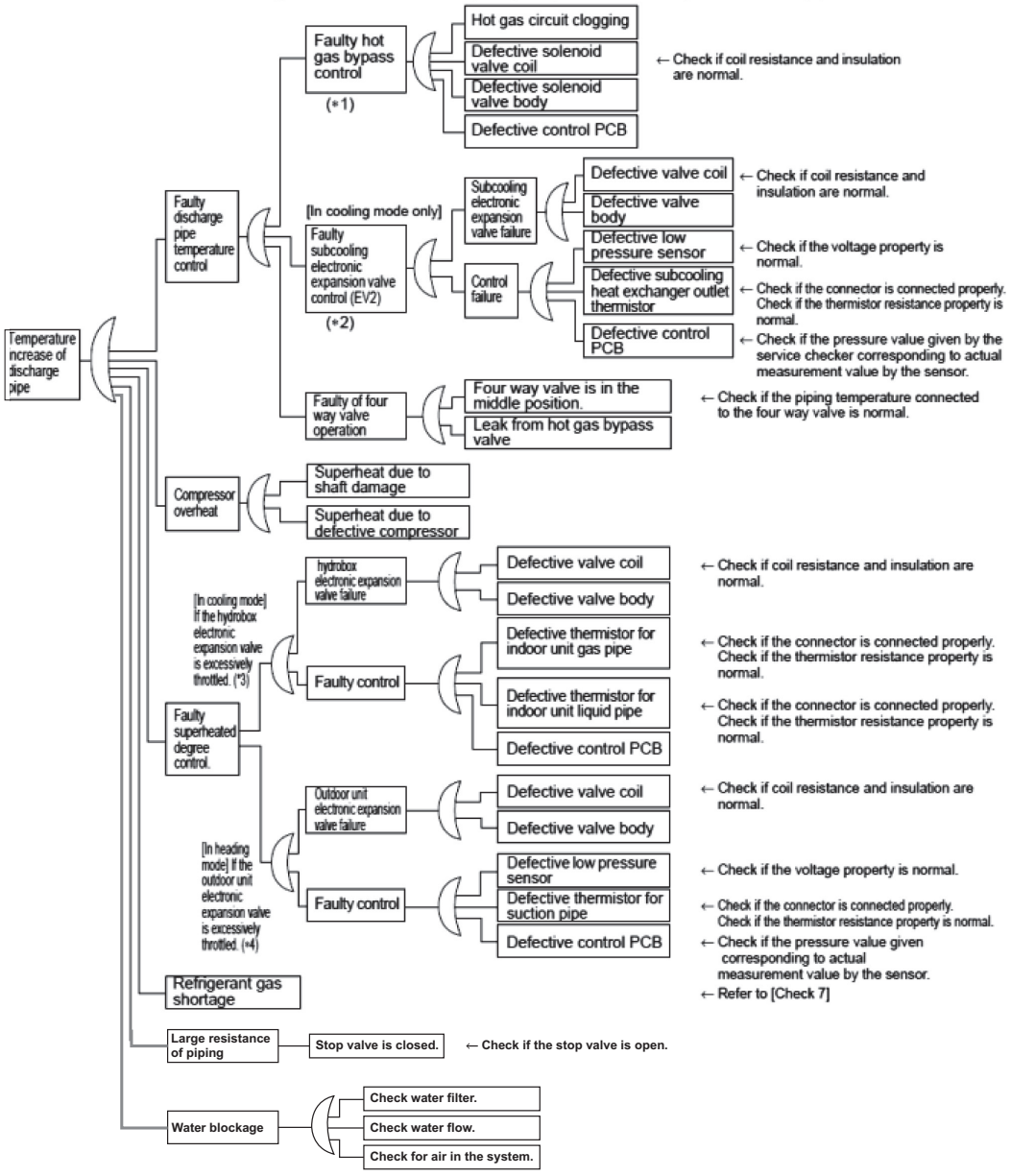
(1) Turn off the power supply.
(2) Measure the resistance between Vcc and each phase of U,V,W, and GND and each phase at the motor side connectors (five-core wire) to check that the values are balanced within the range of ± 20 %, while connector or relay connector is disconnected.
Furthermore, to use a multiple meter for measurement, connect the probe of negative pole to Vcc and that of positive pole to GND.



4.50 [CHECK 3]

Check the Factors of Overheat Operation

Referring to the Fault Tree Analysis (FTA) shown below, probe the faulty points.



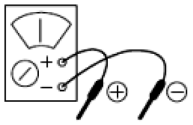
*1: Refer to "Low pressure protection control" for hot gas bypass control.
*2: Refer for subcooling electronic expansion valve control.
*3: "Superheating temperature control" in cooling mode is conducted by indoor unit electronic expansion valve.
*4: Superheating temperature control in heating mode is conducted by outdoor unit electronic expansion valve (EVM).
*5: Judgement criteria of superheat operation:
(1) Suction gas superheating temperature: 10 degrees and over. (2) Discharge gas superheating temperature: 45 degrees and over, except for immediately after starting and drooping control, etc..
(Use the above stated values as a guide. Depending on the other conditions, the unit may be normal despite the values within the above scope.)

4.51 [CHECK 4]

Power Transistor Check

Perform the following procedures prior to check.
(1) Power Off.
(2) Remove all the wiring connected to the PCB where power transistors are mounted on.

[Preparation]
· Tester



* Preparing a tester in the analog system is recommended. A tester in the digital system with diode check function will be usable.

[Point of Measurement and Judgement Criteria]
· Measure the resistance value using a tester at each point of measurement below, 10 minutes later after power OFF.

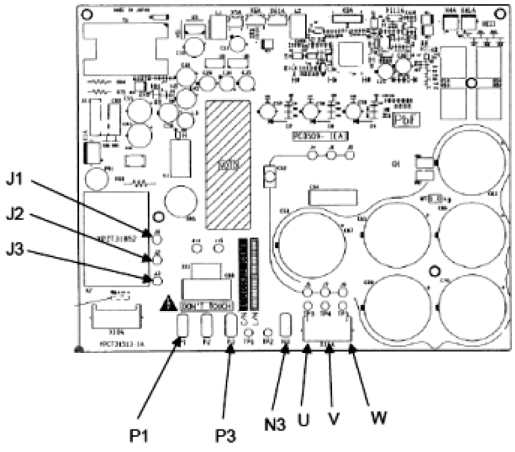
To use analog tester:
Measurement in the resistance value mode in the range of multiplying 1kΩ.

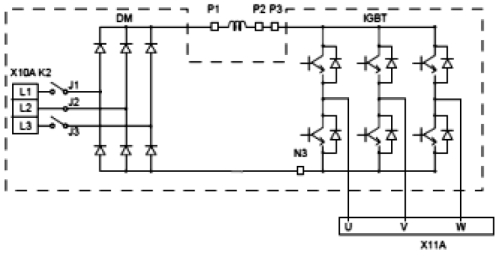
No.	Point of Measurement +	Point of Measurement –	Judgement Criteria	Remarks
1	P2	U	2 ~ 15kΩ	
2	P2	V		
3	P2	W		
4	U	P2	15kΩ and above (including ∞)	Due to condenser charge and so on, resistance measurement may require some time.
5	V	P2		
6	W	P2		
7	N3	U		
8	N3	V		
9	N3	W		
10	U	N3	2 ~ 15kΩ	
11	V	N3		
12	W	N3		

To use digital tester:
Measurement is executed in the diode check mode. (→|←)

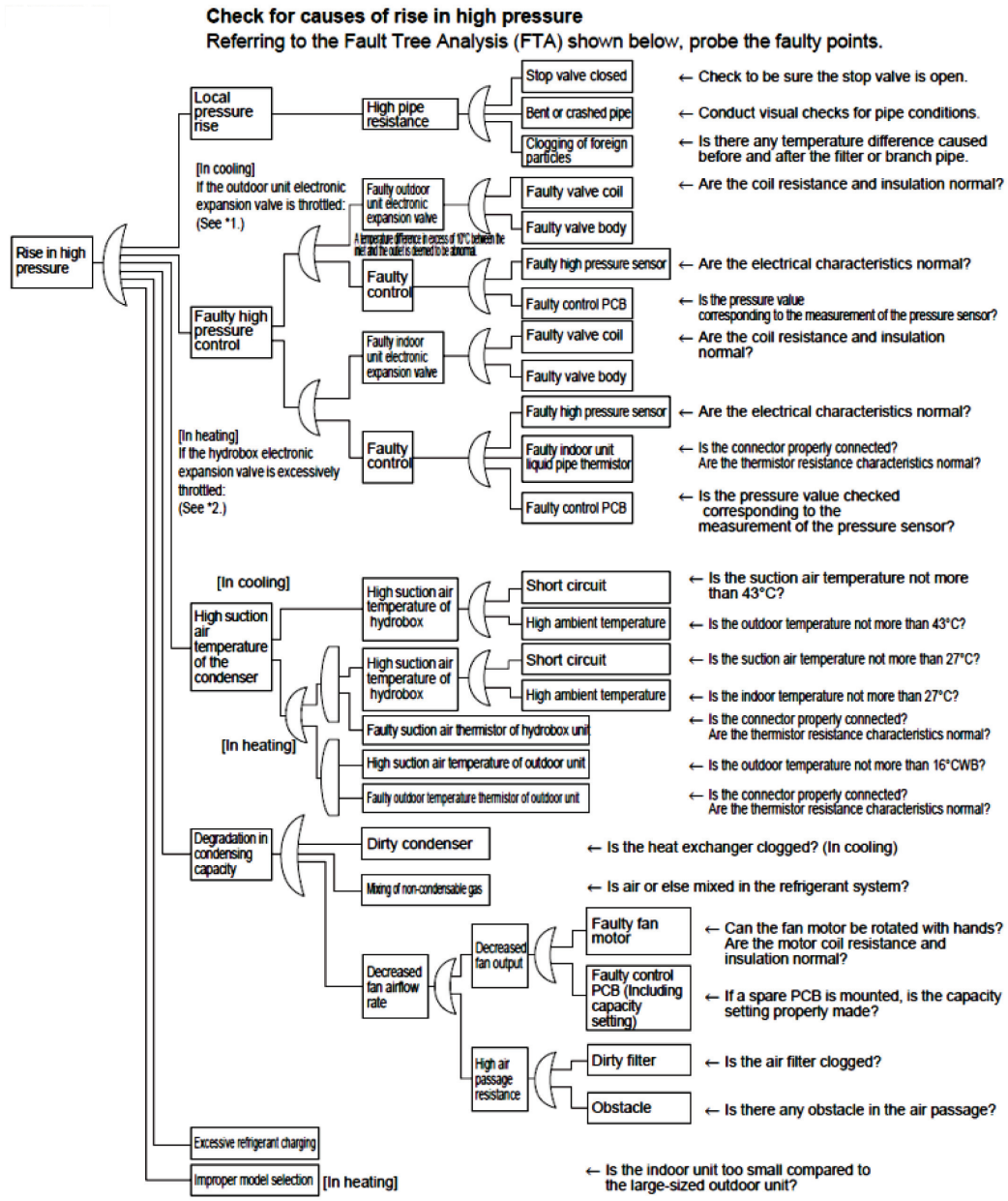
No.	Point of Measurement +	Point of Measurement –	Judgement Criteria	Remarks
1	P2	U	1.2V and over	Due to condenser charge and so on, resistance measurement may require some time.
2	P2	V		
3	P2	W		
4	U	P2	0.3 ~ 0.7V	
5	V	P2		
6	W	P2		
7	N3	U		
8	N3	V		
9	N3	W		
10	U	N3	1.2V and over	Due to condenser charge and so on, resistance measurement may require some time.
11	V	N3		
12	W	N3		

[PCB and Circuit Diagram]



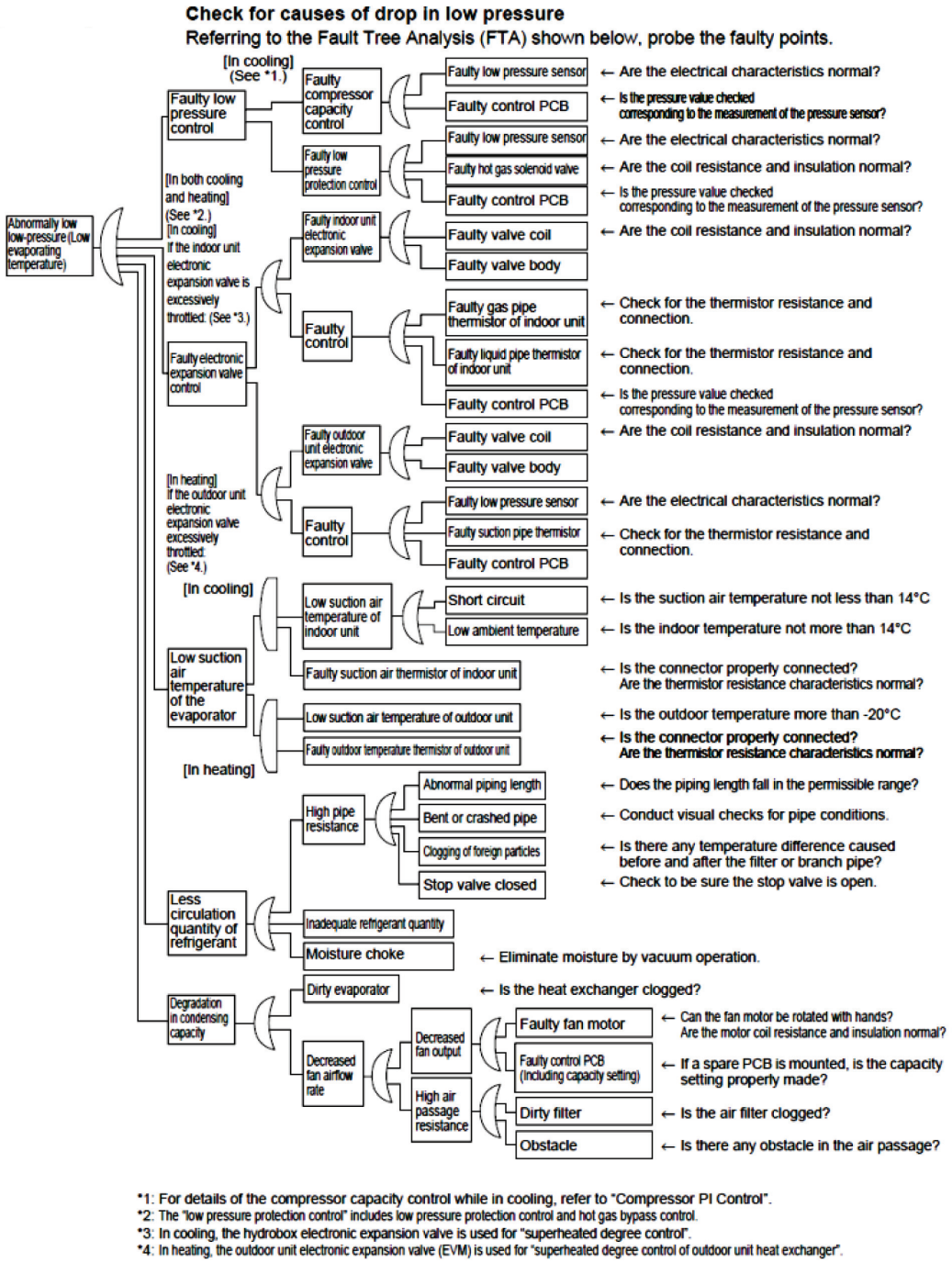


4.52 [CHECK 5]



*1: In cooling, it is normal if the outdoor unit electronic expansion valve (EVM) is fully open.
*2: In heating, the hydrobox electronic expansion valve is used for "subcooled degree control".

4.53 [CHECK 6]



*1: For details of the compressor capacity control while in cooling, refer to "Compressor PI Control".
*2: The "low pressure protection control" includes low pressure protection control and hot gas bypass control.
*3: In cooling, the hydrobox electronic expansion valve is used for "superheated degree control".
*4: In heating, the outdoor unit electronic expansion valve (EVM) is used for "superheated degree control of outdoor unit heat exchanger".

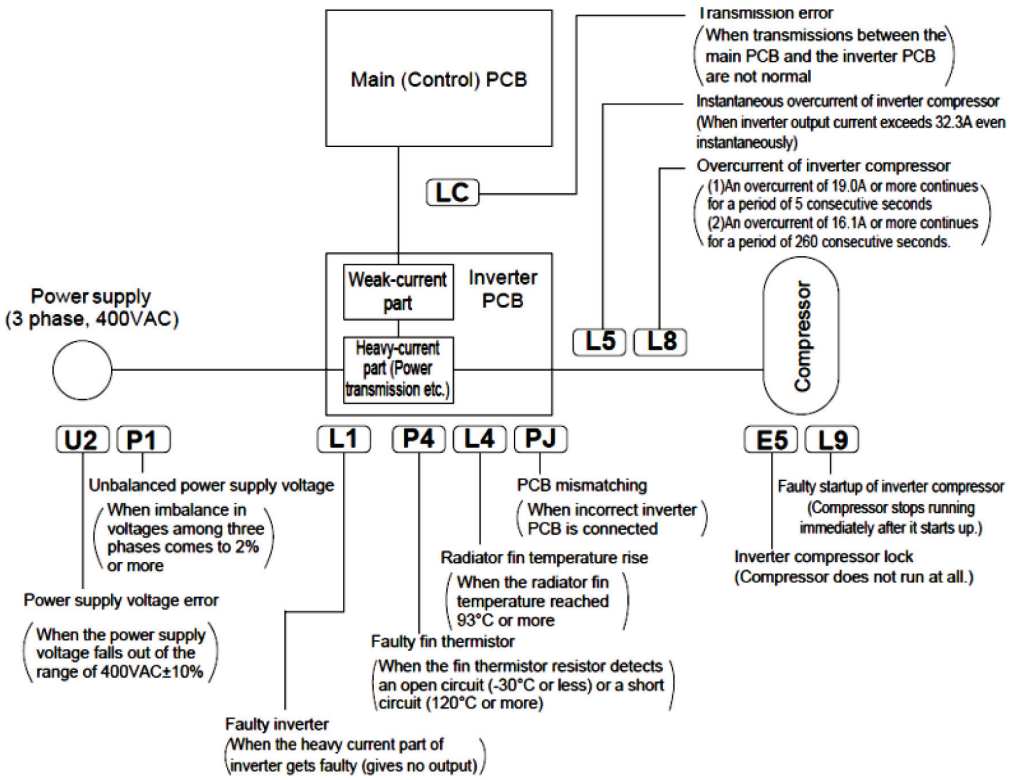
4.54 [CHECK 14]

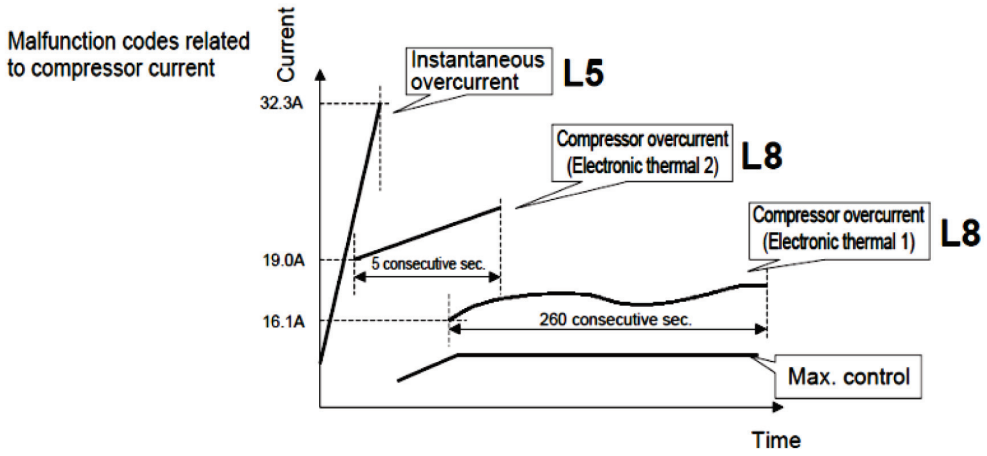
List of inverter-related malfunction codes

	Code	Name	Condition for determining malfunction	Major cause
Compressor current	L5	Instantaneous overcurrent of inverter compressor	• Inverter output current exceeds 32.3A even instantaneously.	• Liquid sealing • Faulty compressor • Faulty inverter PCB
	L8	Overcurrent of inverter compressor (Electronic thermal)	• Compressor overload running An overcurrent of 19.0A or more continues for a period of 5 consecutive seconds or that of 16.1A or more continues for a period of 260 consecutive seconds. • The inverter loses synchronization.	• Backflow of compressor liquid • Sudden changes in loads • Disconnected compressor wiring • Faulty inverter PCB
Protection device and others	L1	Faulty inverter PCB	• No output is given.	• Faulty heavy current part of compressor
	L9	Faulty startup of inverter compressor	• The compressor motor fails to start up.	• Liquid sealing or faulty compressor • Excessive oil or refrigerant • Faulty inverter PCB
	E5	Inverter compressor lock	• The compressor is in the locked status (does not rotate).	• Faulty compressor
	L4	Radiator fin temperature rise	• The radiator fin temperature reaches 87°C or more (while in operation).	• Malfunction of fan • Running in overload for an extended period of time • Faulty inverter PCB
	U2	Power supply voltage error	• The inverter power supply voltage is high or low.	• Power supply error • Faulty inverter PCB
	P1	Imbalanced power supply	• Power supply voltages get significantly imbalanced among three phases.	• Power supply error (imbalanced voltages of 2% or more) • Faulty inverter PCB • Dead inverter PCB
	LC	Transmission error (between inverter PCB and control PCB)	• With the outdoor unit PCB, no communications are carried out across control PCB - inverter PCB - fan PCB.	• Broken wire in communication line • Faulty control PCB • Faulty inverter PCB • Faulty fan PCB
	PJ	PCB mismatching	• Any PCB of specification different from that of the product is connected.	• PCB of different specification mounted
	P4	Faulty fin thermistor	• The fin thermistor gets short-circuited or open.	• Faulty fin thermistor

4.55 [CHECK 15]

Concept of inverter-related malfunction codes





Part 4
Service Procedure

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1. List of Electrical and Functional Parts

1.1 EW*Q016BA

Item	Name		Symbol		
Compressor	Inverter	Type	M1C	JT1GCVDKYR@SB	
		OC protection device		14.7A	
	STD 1	Type	M2C	—	
		OC protection device			
	STD 2	Type	M3C	—	
		OC protection device			
Fan motor		OC protection device	M1F	1.15A	3A
Electronic expansion valve coil (Main)			Y1E	Fully closed: 0pls	Fully open: 480pls
Electronic expansion valve coil (Subcooling)			Y2E	—	Fully closed: 0pls Fully open: 480pls
Pressure protection	High pressure switch	For M1C	S1PH	OFF: 4.0 $^{+0}_{-0.12}$ MPa	ON: 3.0±0.15MPa
		For M2C	S2PH	—	
		For M3C	S3PH	—	
	Low pressure sensor		S1NPL	OFF: 0.07MPa	
Temperature protection	Discharge gas temperature protection (Discharge pipe thermistor)		R3T	OFF: 135°C	
	Inverter fin temperature protection (Radiator fin thermistor)		R1T	OFF: 93°C	
Others	Fuse	For main PCB	A1P	250V, 15A	
			A2P	250V, 3A	
		For Noise filter PCB	F1U	250V AC 5A Class B	

1.2 EW*Q021BA, 025BA, 040BA, 050BA

Item	Name		Symbol		
Compressor	Inverter	Type	M1C	JT1GCVDKYR@SB	
		OC protection device		14.7A	
	STD 1	Type	M2C	JT170G-KYE@T	
		OC protection device		15.0A	
	STD 2	Type	M3C	—	
		OC protection device			
Fan motor		OC protection device	M1F	3A	1.15A
Electronic expansion valve coil (Main)			Y1E	Fully closed: 0pls Fully open: 480pls	
Electronic expansion valve coil (Subcool)			Y2E	Fully closed: 0pls Fully open: 480pls	
Pressure protection	High pressure switch	For M1C	S1PH	OFF: $4.0^{+0}_{-0.12}$ MPa ON: 3.0±0.15MPa	
		For M2C	S2PH	OFF: $4.0^{+0}_{-0.12}$ MPa ON: 3.0±0.15MPa	
		For M3C	S3PH	—	
	Low pressure sensor		S1NPL	OFF: 0.07MPa	
Temperature protection	Discharge gas temperature protection (Discharge pipe thermistor)		R3T	OFF: 135°C	
	Inverter fin temperature protection (Radiator fin thermistor)		R1T	OFF: 93°C	
Others	Fuse	For main PCB	A1P	250V, 15A	
			A2P	250V, 3A	
		For Noise filter PCB	F1U	250V AC 5A Class B	

1.3 EW*Q032BA, 064BA

Item	Name		Symbol		
Compressor	Inverter	Type	M1C	JT1GCVDKYR@SB	
		OC protection device		14.7A	
	STD 1	Type	M2C	JT170G-KYE@T	
		OC protection device		15.0A	
	STD 2	Type	M3C	JT170G-KYE@T	
		OC protection device		15.0A	
Fan motor		OC protection device	M1F	1.15A	3A
Electronic expansion valve coil (Main)			Y1E	Fully closed: 0pls Fully open: 480pls	
Electronic expansion valve coil (Subcool)			Y2E	Fully closed: 0pls Fully open: 480pls	
Pressure protection	High pressure switch	For M1C	S1PH	OFF: $4.0^{+0}_{-0.12}$ MPa ON: 3.0±0.15MPa	
		For M2C	S2PH	OFF: $4.0^{+0}_{-0.12}$ MPa ON: 3.0±0.15MPa	
		For M3C	S3PH	OFF: $4.0^{+0}_{-0.12}$ MPa ON: 3.0±0.15MPa	
	Low pressure sensor		S1NPL	OFF: 0.07MPa	
Temperature protection	Discharge gas temperature protection (Discharge pipe thermistor)		R3T	OFF: 135°C	
	Inverter fin temperature protection (Radiator fin thermistor)		R1T	OFF: 93°C	
Others	Fuse	For main PCB	A1P	250V, 15A	
			A2P	250V, 3A	
		For Noise filter PCB	F1U	250V AC 5A Class B	

2. Thermistor Resistance / Temperature Characteristics

Indoor unit	For suction air	R1T
	For liquid pipe	R2T
	For gas pipe	R3T
Outdoor unit	For outdoor air	R1T
	For coil	R2T
	For suction pipe	R4T
	For Receiver gas pipe	R5T
	For Receiver outlet liquid pipe	R6T

Outdoor unit for fin thermistor R1T

(kΩ)

T°C	0.0
-10	-
-8	-
-6	88.0
-4	79.1
-2	71.1
0	64.1
2	57.8
4	52.3
6	47.3
8	42.9
10	38.9
12	35.3
14	32.1
16	29.2
18	26.6
20	24.3
22	22.2
24	20.3
26	18.5
28	17.0
30	15.6
32	14.2
34	13.1
36	12.0
38	11.1
40	10.3
42	9.5
44	8.8
46	8.2
48	7.6
50	7.0
52	6.7
54	6.0
56	5.5
58	5.2
60	4.79
62	4.46
64	4.15
66	3.87
68	3.61
70	3.37
72	3.15
74	2.94
76	2.75
78	2.51
80	2.41
82	2.26
84	2.12
86	1.99
88	1.87
90	1.76
92	1.65
94	1.55
96	1.46
98	1.38

T°C	0.0	0.5
-20	197.81	192.08
-19	186.53	181.16
-18	175.97	170.94
-17	166.07	161.36
-16	156.80	152.38
-15	148.10	143.96
-14	139.94	136.05
-13	132.28	128.63
-12	125.09	121.66
-11	118.34	115.12
-10	111.99	108.96
-9	106.03	103.18
-8	100.41	97.73
-7	95.14	92.61
-6	90.17	87.79
-5	85.49	83.25
-4	81.08	78.97
-3	76.93	74.94
-2	73.01	71.14
-1	69.32	67.56
0	65.84	64.17
1	62.54	60.96
2	59.43	57.94
3	56.49	55.08
4	53.71	52.38
5	51.09	49.83
6	48.61	47.42
7	46.26	45.14
8	44.05	42.98
9	41.95	40.94
10	39.96	39.01
11	38.08	37.18
12	36.30	35.45
13	34.62	33.81
14	33.02	32.25
15	31.50	30.77
16	30.06	29.37
17	28.70	28.05
18	27.41	26.78
19	26.18	25.59
20	25.01	24.45
21	23.91	23.37
22	22.85	22.35
23	21.85	21.37
24	20.90	20.45
25	20.00	19.56
26	19.14	18.73
27	18.32	17.93
28	17.54	17.17
29	16.80	16.45
30	16.10	15.76

T°C	0.0	0.5
30	16.10	15.76
31	15.43	15.10
32	14.79	14.48
33	14.18	13.88
34	13.59	13.31
35	13.04	12.77
36	12.51	12.25
37	12.01	11.76
38	11.52	11.29
39	11.06	10.84
40	10.63	10.41
41	10.21	10.00
42	9.81	9.61
43	9.42	9.24
44	9.06	8.88
45	8.71	8.54
46	8.37	8.21
47	8.05	7.90
48	7.75	7.60
49	7.46	7.31
50	7.18	7.04
51	6.91	6.78
52	6.65	6.53
53	6.41	6.53
54	6.65	6.53
55	6.41	6.53
56	6.18	6.06
57	5.95	5.84
58	5.74	5.43
59	5.14	5.05
60	4.96	4.87
61	4.79	4.70
62	4.62	4.54
63	4.46	4.38
64	4.30	4.23
65	4.16	4.08
66	4.01	3.94
67	3.88	3.81
68	3.75	3.68
69	3.62	3.56
70	3.50	3.44
71	3.38	3.32
72	3.27	3.21
73	3.16	3.11
74	3.06	3.01
75	2.96	2.91
76	2.86	2.82
77	2.77	2.72
78	2.68	2.64
79	2.60	2.55
80	2.51	2.47

Outdoor unit thermistors for discharge pipe (R3T, R31T~R33T)

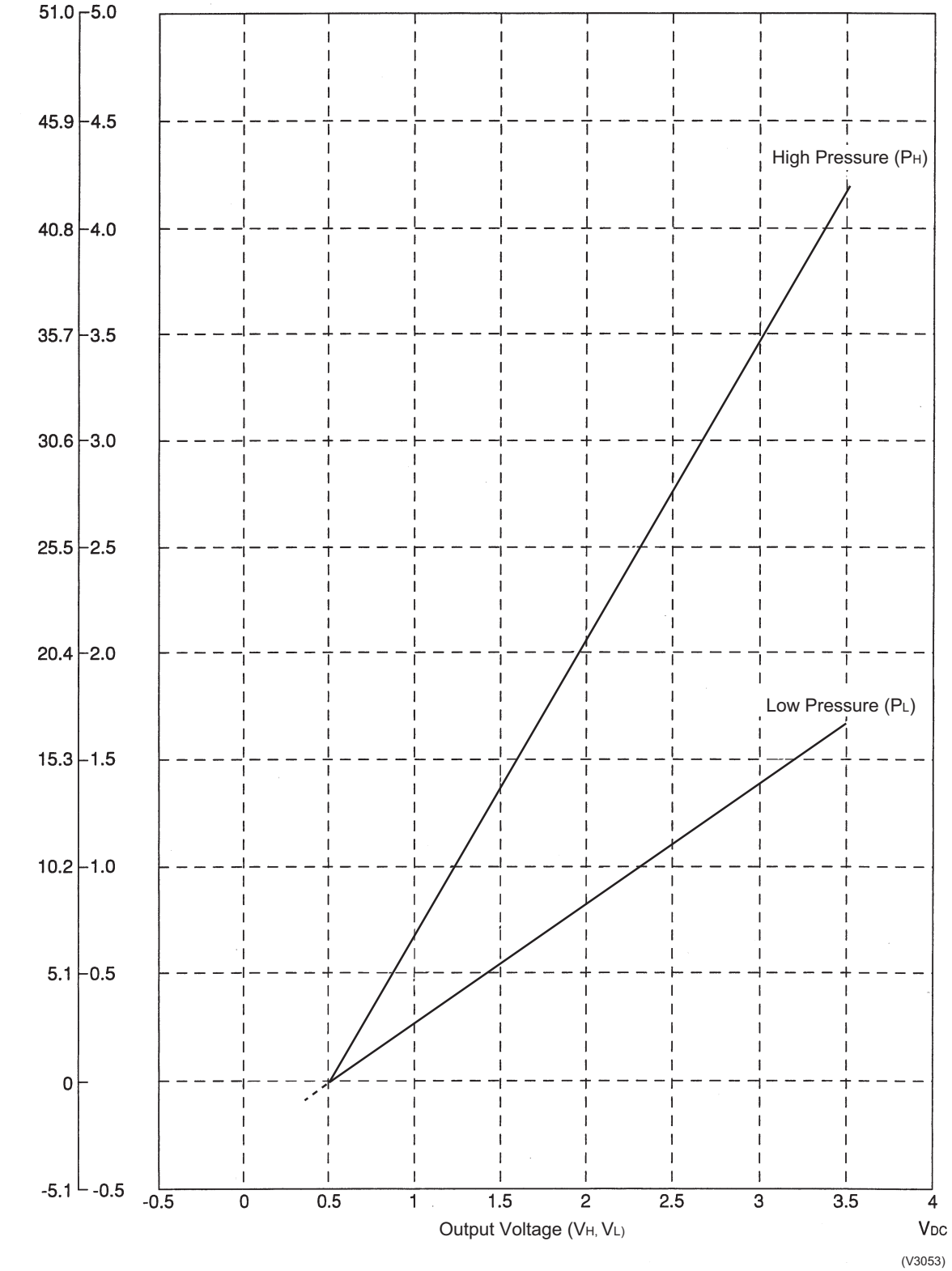
(kΩ)

T°C	0.0	0.5	T°C	0.0	0.5	T°C	0.0	0.5
0	640.44	624.65	50	72.32	70.96	100	13.35	13.15
1	609.31	594.43	51	69.64	68.34	101	12.95	12.76
2	579.96	565.78	52	67.06	65.82	102	12.57	12.38
3	552.00	538.63	53	64.60	63.41	103	12.20	12.01
4	525.63	512.97	54	62.24	61.09	104	11.84	11.66
5	500.66	488.67	55	59.97	58.87	105	11.49	11.32
6	477.01	465.65	56	57.80	56.75	106	11.15	10.99
7	454.60	443.84	57	55.72	54.70	107	10.83	10.67
8	433.37	423.17	58	53.72	52.84	108	10.52	10.36
9	413.24	403.57	59	51.98	50.96	109	10.21	10.06
10	394.16	384.98	60	49.96	49.06	110	9.92	9.78
11	376.05	367.35	61	48.19	47.33	111	9.64	9.50
12	358.88	350.62	62	46.49	45.67	112	9.36	9.23
13	342.58	334.74	63	44.86	44.07	113	9.10	8.97
14	327.10	319.66	64	43.30	42.54	114	8.84	8.71
15	312.41	305.33	65	41.79	41.06	115	8.59	8.47
16	298.45	291.73	66	40.35	39.65	116	8.35	8.23
17	285.18	278.80	67	38.96	38.29	117	8.12	8.01
18	272.58	266.51	68	37.63	36.98	118	7.89	7.78
19	260.60	254.72	69	36.34	35.72	119	7.68	7.57
20	249.00	243.61	70	35.11	34.51	120	7.47	7.36
21	238.36	233.14	71	33.92	33.35	121	7.26	7.16
22	228.05	223.08	72	32.78	32.23	122	7.06	6.97
23	218.24	213.51	73	31.69	31.15	123	6.87	6.78
24	208.90	204.39	74	30.63	30.12	124	6.69	6.59
25	200.00	195.71	75	29.61	29.12	125	6.51	6.42
26	191.53	187.44	76	28.64	28.16	126	6.33	6.25
27	183.46	179.57	77	27.69	27.24	127	6.16	6.08
28	175.77	172.06	78	26.79	26.35	128	6.00	5.92
29	168.44	164.90	79	25.91	25.49	129	5.84	5.76
30	161.45	158.08	80	25.07	24.66	130	5.69	5.61
31	154.79	151.57	81	24.26	23.87	131	5.54	5.46
32	148.43	145.37	82	23.48	23.10	132	5.39	5.32
33	142.37	139.44	83	22.73	22.36	133	5.25	5.18
34	136.59	133.79	84	22.01	21.65	134	5.12	5.05
35	131.06	128.39	85	21.31	20.97	135	4.98	4.92
36	125.79	123.24	86	20.63	20.31	136	4.86	4.79
37	120.76	118.32	87	19.98	19.67	137	4.73	4.67
38	115.95	113.62	88	19.36	19.05	138	4.61	4.55
39	111.35	109.13	89	18.75	18.46	139	4.49	4.44
40	106.96	104.84	90	18.17	17.89	140	4.38	4.32
41	102.76	100.73	91	17.61	17.34	141	4.27	4.22
42	98.75	96.81	92	17.07	16.80	142	4.16	4.11
43	94.92	93.06	93	16.54	16.29	143	4.06	4.01
44	91.25	89.47	94	16.04	15.79	144	3.96	3.91
45	87.74	86.04	95	15.55	15.31	145	3.86	3.81
46	84.38	82.75	96	15.08	14.85	146	3.76	3.72
47	81.16	79.61	97	14.62	14.40	147	3.67	3.62
48	78.09	76.60	98	14.18	13.97	148	3.58	3.54
49	75.14	73.71	99	13.76	13.55	149	3.49	3.45
50	72.32	70.96	100	13.35	13.15	150	3.41	3.37

3. Pressure Sensor

$P_H = 1.38V_H-0.69$
$P_L = 0.57V_L-0.28$
P_H : High pressure (MPa)
P_L : Low pressure (MPa)

V_H : Output Voltage [High Side] V_{DC}
V_L : Output Voltage [Low Side] V_{DC}



(V3053)

4. Method of Checking the Inverter's Power Transistors and Diode Modules

Checking failures in power semiconductors mounted on inverter PCB

Check the power semiconductors mounted on the inverter PCB by the use of a multiple tester.

<Items to be prepared>

- Multiple tester: Prepare the analog type of multiple tester.
  For the digital type of multiple tester, those with diode check function are available for the checking.

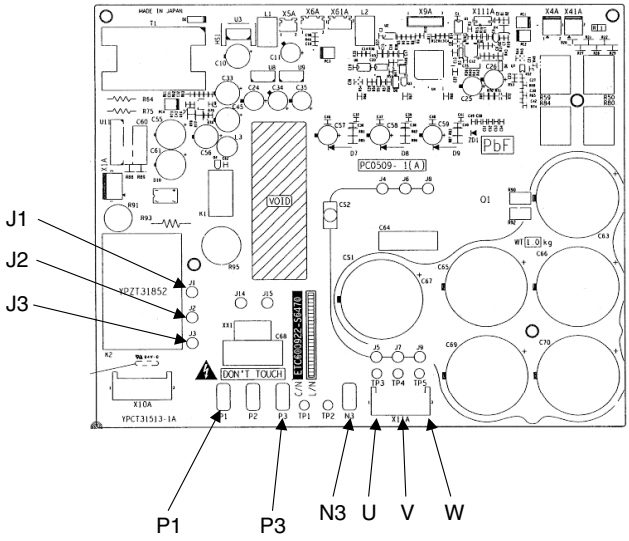
<Test points>

- Turn OFF the power supply. Then, after a lapse of 10 minutes or more, make measurement of resistance.

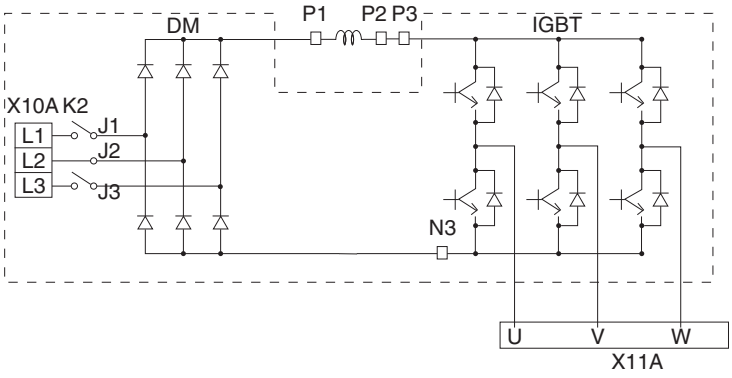
<Preparation>

- To make measurement, disconnect all connectors and terminals.

Inverter PCB



Electronic circuit



- According to the checking aforementioned, it is probed that the malfunction results from the faulty inverter. The following section describes supposed causes of the faulty inverter.
- Faulty compressor (ground leakage)
- Faulty fan motor (ground leakage)
- Entry of conductive foreign particles
- Abnormal voltage (e.g. overvoltage, surge (thunder), or unbalanced voltage)

In order to replace the faulty inverter, be sure to check for the points aforementioned.

1. Power module checking

When using the analog type of multiple tester, make measurement in resistance measurement mode in the x1kΩ range.

No.	Measuring point		Criterion	Remark
	+	-		
1	P3	U	2 to 15kΩ	
2	P3	V		
3	P3	W		
4	U	P3	Not less than 15kΩ (including)	It may take time to determine the resistance due to capacitor charge or else.
5	V	P3		
6	W	P3		
7	N3	U		
8	N3	V		
9	N3	W		
10	U	N3	2 to 15kΩ	
11	V	N3		
12	W	N3		

When using the digital type of multiple tester, make measurement in diode check mode (→⊢).

No.	Measuring point		Criterion	Remark
	+	-		
1	P3	U	Not less than 1.2V (including)	It may take time to determine the voltage due to capacitor charge or else.
2	P3	V		
3	P3	W		
4	U	P3	0.3 to 0.7V	
5	V	P3		
6	W	P3		
7	N3	U		
8	N3	V		
9	N3	W		
10	U	N3	Not less than 1.2V (including)	It may take time to determine the voltage due to capacitor charge or else.
11	V	N3		
12	W	N3		

2. Diode module checking

When using the analog type of multiple tester, make measurement in resistance measurement mode in the x1kΩ range.

No.	Measuring point		Criterion	Remark
	+	-		
1	P1	J1	2 to 15kΩ	
2	P1	J2		
3	P1	J3		
4	J1	P1	Not less than 15kΩ (including)	It may take time to determine the resistance due to capacitor charge or else.
5	J2	P1		
6	J3	P1		
7	N3	J1		
8	N3	J2		
9	N3	J3		
10	J1	N3	2 to 15kΩ	
11	J2	N3		
12	J3	N3		

When using the digital type of multiple tester, make measurement in diode check mode (→⊢).

No.	Measuring point		Criterion	Remark
	+	-		
1	P1	J1	Not less than 1.2V (including)	It may take time to determine the voltage due to capacitor charge or else.
2	P1	J2		
3	P1	J3		
4	J1	P1	0.3 to 0.7V	
5	J2	P1		
6	J3	P1		
7	N3	J1		
8	N3	J2		
9	N3	J3		
10	J1	N3	Not less than 1.2V (including)	It may take time to determine the voltage due to capacitor charge or else.
11	J2	N3		
12	J3	N3		

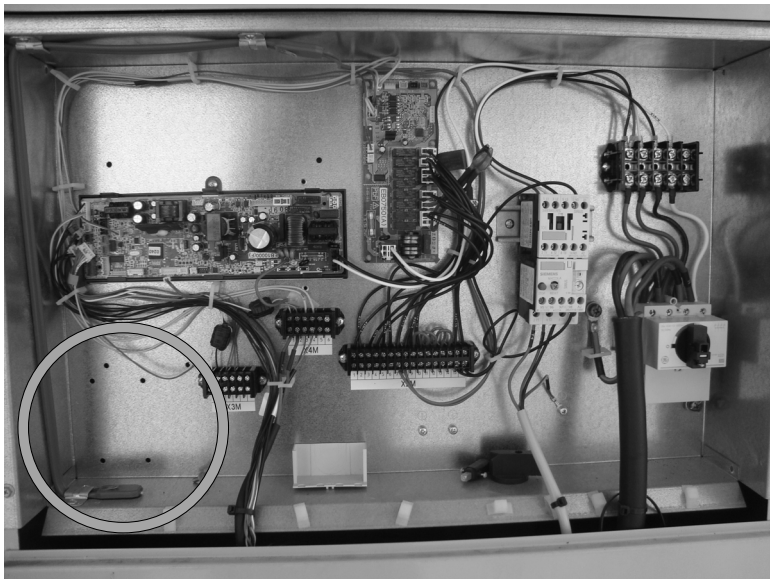
5. Options

5.1 EKRP1AHT

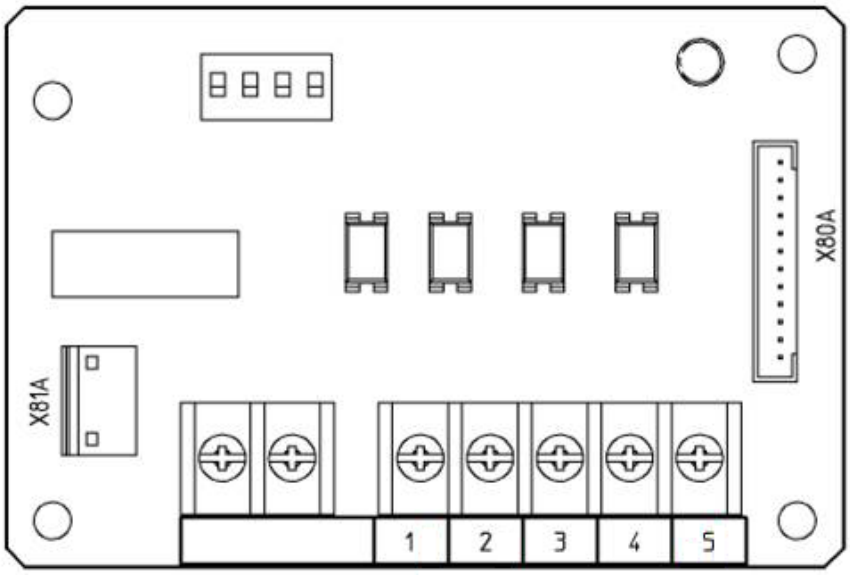
5.1.1 General

This option is for:
- Remote ON/OFF
- Switching between cooling/heating (field settings needed)
- Thermostat ON/OFF (field settings needed)

The PCB is placed in the hydrobox. The switch box connects X80A (A4P or A6P) with X85A (A1P or A5P).



Quantity:
- 1 PCB is needed for EW*Q016BA-032BA
- 2 PCBs are needed for EW*Q040BA-064BA



Connection:
- 1-5: depending on field setting
- 2-5: depending on field setting
- 3-5: operation ON
- 4-5: operation OFF

5.1.2 Field Settings

[6-01] External room thermostat option:

- Setting [6-01]=1
  Room thermostat input 1= heating thermo ON(1)/OFF(0)
  Room thermostat input 2= cooling thermo ON(1)/OFF(0)
- Setting [6-01]=2
  Room thermostat input 1= thermo ON(1)/OFF(0)
  Room thermostat input 2= cooling(1)/heating(0)

5.1.3 Explanation

Thermostat ON/ OFF	The unit still cycles water but can not start to cool/heat. Example: The unit is running and a thermo OFF command is given. The unit stops with a pump down. It will not restart the compressors until a thermo ON command is given and there is load. Also the output signal of the unit shows the unit active.
Cooling/heating	The unit will switch between cooling and heating and vice versa.
Operation ON/ OFF	The unit will stop completely and the output ON/OFF is 0.

5.1.4 Summary

Inputs EKRP1AHT				Outputs X2M		
Terminal status	**Setting on remote controller**	**Action**	**Description**	**1-2 Cooling/heating**	**3-4 Operation ON/OFF**	**5-6 error**
5-1 closed	6-01-1	Heating thermo – ON	Allows unit to start heating when: -operation is ON -and load is present	OFF	Depending on unit operation *	OFF
5-1 open	6-01-1	Heating thermo - OFF	Unit can not start heating mode	OFF	Depending on unit operation *	OFF
5-2 closed	6-01-1	Cooling thermo – ON	Allows unit to start cooling when: -operation is ON -and load is present	ON	Depending on unit operation *	OFF
5-2 open	6-01-1	Cooling thermo – OFF	Unit can not start cooling mode	ON	Depending on unit operation *	OFF
5-1 closed	6-01-2	Thermo ON	Unit can start in cooling or heating mode when: -operation is ON - and load is present	ON/OFF (depends on 5-2)	Depending on unit operation *	OFF
5-1 open	6-01-2	Thermo OFF	Unit can not start in heating or cooling	ON/OFF (depends on 5-2)	Depending on unit operation *	OFF
5-2 closed	6-01-2	Cooling	Unit can work in cooling	ON	Depending on unit operation *	OFF
5-2 open	6-01-2	Heating	Unit can work in heating	OFF	Depending on unit operation *	OFF
5-3 closed	/	Start operation	LED on remote controller indicate ON	n/a	ON if 5-4 is not closed	OFF
5-4 closed	/	Stop operation	LED on remote controller indicate OFF	n/a	OFF	OFF
/	/	Error on unit		n/a	n/a	ON

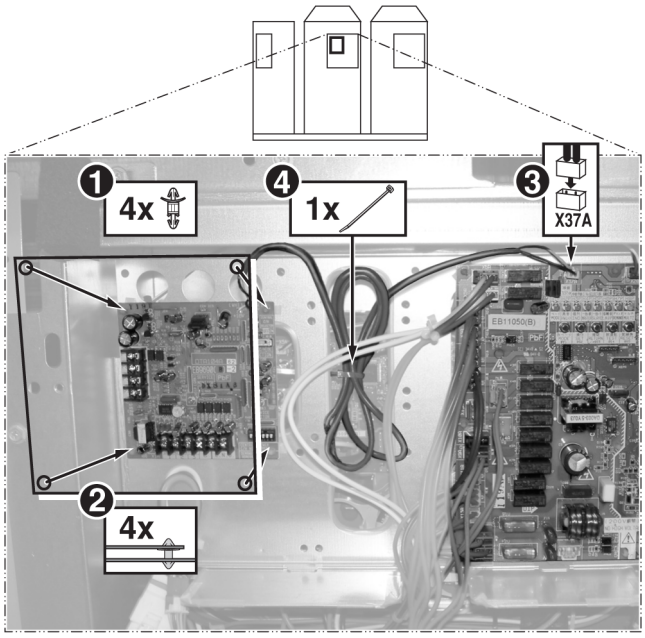
5.2 DTA104A62

5.2.1 General

This option is for:
- Demand operation
- Low noise demand

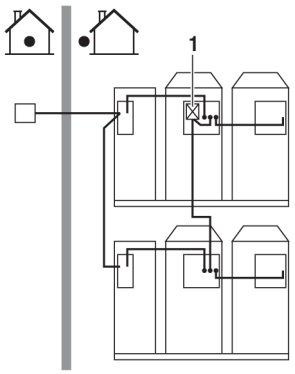
5.2.2 Installation

1. Turn OFF the power to the unit.
2. Remove the front panel of the outdoor module(s). (If the module has two front panels (ie. one each on the left-hand side and right-hand site), remove the panel on the right-hand side only.)
3. Remove the switch box service panel.
4. Install the external control adaptor inside the switch box of the unit according to the figure below and following steps.



1. Mount the 4 PCB supports into the switch box.
2. Mount the external control adaptor on top of the PCB supports.
3. Connect the power supply connector to X37A on the PCB outdoor module.
4. Bundle the redundant length portion of the wire with a clamp.

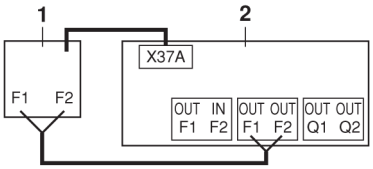
When installed as shown in the figure below, the external control adaptor can execute demand control and low noise control simultaneously and execute both functions for more than one unit as well.



1 External control adaptor

Field wiring

1. Connect the power supply wiring from the adaptor to the adaptor power supply connector on the PCB of the outdoor module (as described in step 3 above).
2. Connect the transmission wiring to the F1 and F2 (OUT - OUT) terminal on the PCB. Use double-core wiring with no polarity.



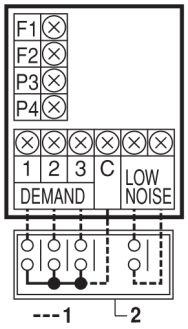
1 External control adaptor
2 PCB outdoor module

3. Using the delivered clamps, clamp the transmission wiring to the low voltage field wiring, etc.

Information

- Transmission wiring specifications
  Sheathed wire (2 wires), 0.75~1.25 mm^2
- Transmission wiring length
  A transmission malfunction may occur if the following limits are exceeded.
  - Total wiring length: Maximum 1000 m
  - Number of branches: Maximum 16

4. If carrying out demand or low noise input, connect the adaptor terminals as shown in the figure below.

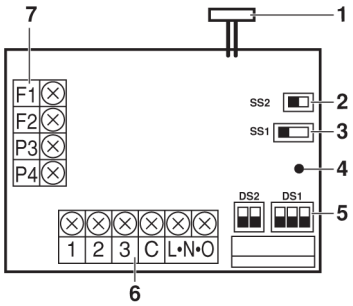


1 Outside wiring
2 Host computer monitor panel or demand controller
DEMAND = Demand
LOW NOISE = Low noise

- Demand input terminal
  Short circuit between DEMAND 1 and C: As a guideline, demand should be about 70%.
  Short circuit between DEMAND 2 and C: As a guideline, demand should be about 40%.
  Short circuit between DEMAND 3 and C: Forced thermo off.
- Low noise input terminal
  When terminals are short-circuited during cooling, capacity save (unit fan turning at low speed, compressor frequency control) is carried out. When terminals are short-circuited during heating, capacity save (compressor frequency control) is carried out.
  Use only at night when load is minimal.

5.2.3 PCB

Names of parts and functions



1 Power supply connector D1, D2
Connect to adaptor power supply connector on indoor unit or BS-unit.
2 Switch SS2. Do not change this setting (OFF).
3 Switch SS1. Do not change this setting (BOTH).
4 Microcomputer normal monitor (HAP: GRN)
This lamp is blinking when the microcomputer is operating normally.
5 Address setting DIP switches (DS1, DS2)
Setting the demand address.
6 Demand, low noise input terminal block (X1M)
Connects control input from electrical appendices (host computer monitor panel, demand controller, timer, etc.).
7 Terminal block for transmission (F1, F2)
Refer to the wiring diagram.

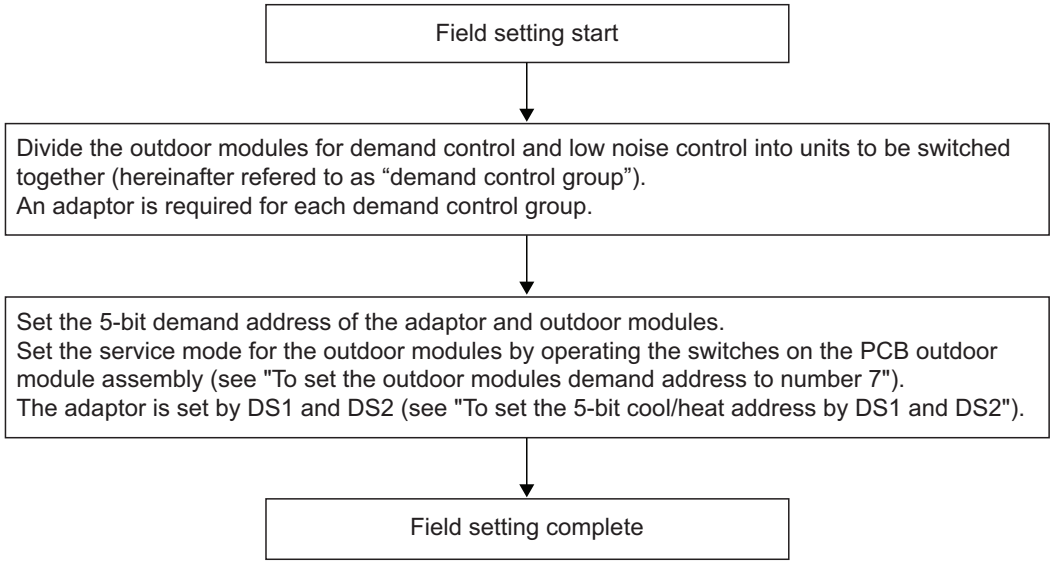
For details, refer to the wiring diagram located on the rear of the unit service panel.

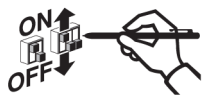
5.2.4 Field Setting

How to set demand control in the field

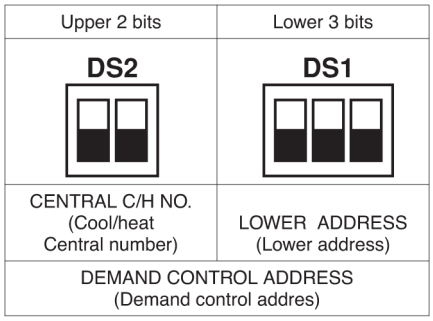
1. Unit field setting
   - Setting mode 1
     Turn on low noise control like explained in the manual of the unit.
   - Setting mode 2
     Match low noise and demand addresses to the external control address.
2. External control adaptor settings
   Match address setting DIP switches DS1 and DS2 to the low noise and demand addresses of the unit.

The contents of the various settings for unified switching of demand and low noise operation are as follows:



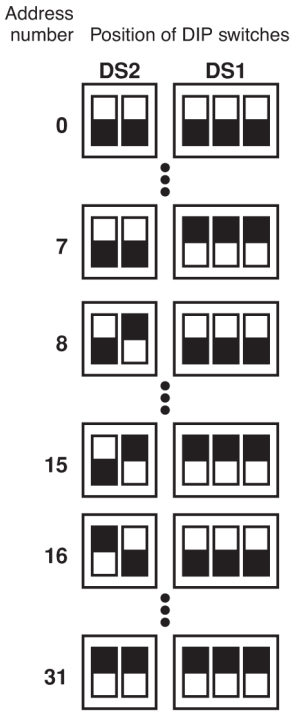


OFF=off, **ON**=on



To set the 5-bit cool/heat address by DS1 and DS2

Designate and set cool/heat addresses 0 to 31 for each mode switch unit.



(example) (see “To set the outdoor modules demand address to number 7”)

To set the outdoor modules demand address to number 7

		5-bit							
		Cool/heat select							
		LEDs on PCB outdoor module[a]							
		H1P	H2P	H3P	H4P	H5P	H6P	H7P	H8P
Procedure[b]	**Setting contents**	MODE	HWL	IND	MASTER	SLAVE	L.N.O.P.	DEMAND	MULTI
When power is turned on	Setting mode (factory set)	●	●	☼	●	●	●	☼	–
Hold down the **BS1 MODE** button for 5 seconds	Enters address setting	☼	●	●	●	●	●	●	–
Push the **BS2 SET** button 2 times	Enters demand address setting	☼	●	●	●	●	☼	●	–
Push the **BS3 RETURN** button 1 time	Make sure demand address has been entered	☼	●	●	●	●	●	●	–
Push the **BS2 SET** button 7 times **(example)** (address number X = push the **BS2 SET** button X times)	Sets demand address	☼	●	●	●	☼	☼	☼	–
Push the **BS3 RETURN** button 2 times	Check demand address	●	☼	●	●	●	●	●	–
Push the **BS1 MODE** button 1 time	Returns to set mode	●	●	☼	●	●	●	☼	–

(a) ●=off, ☼=on, ☼=blinking, –=not relevant
(b) The BS1~BS5 push buttons are located under the LEDs on the PCB

6. Procedure for Software Upload Hydrobox

6.1 What Do You Need?

- This instruction
- Altherma programming cable with “write” extension (part nr: 999480P or 999482P)



- Blue extension cable (part nr: 999485P; drawing nr: 4PW50601-1)



- Following files: flashsta.exe (programming software) and e.g. YP0045V003.mot (software file)
- Laptop (field supply)

6.2 Software Upload Procedure

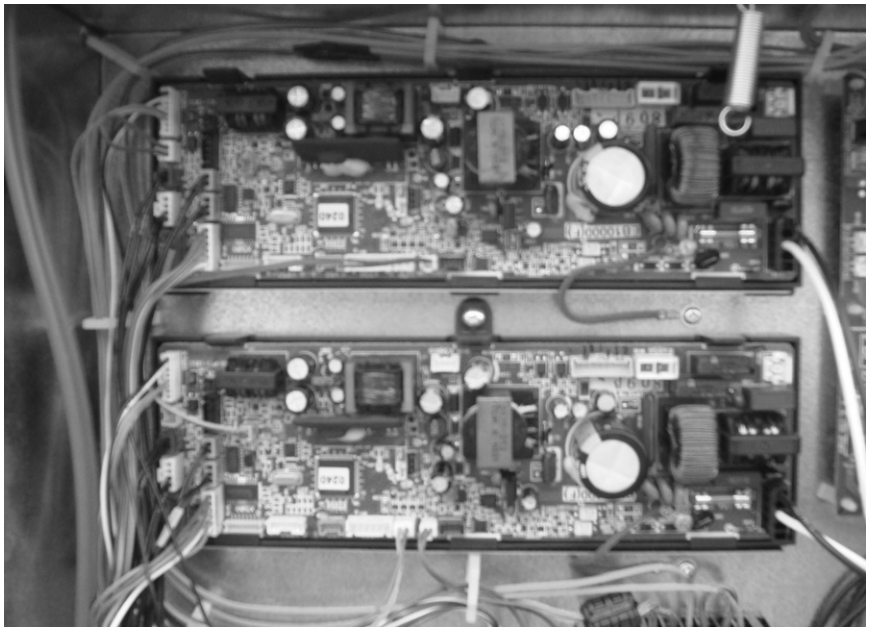
READ THIS INSTRUCTION CAREFULLY. FOLLOW THE INSTRUCTION STEP BY STEP.
NOT FOLLOWING THIS INSTRUCTION MAY RESULT IN INCORRECT PROGRAMMING OF SOFTWARE. UNIT WILL NOT BE ABLE TO RUN IF SOFTWARE IS NOT INSTALLED CORRECTLY.
WITH THIS PROCEDURE, THE EXISTING SOFTWARE IN THE UNIT IS FIRST COMPLETELY ERASED, BEFORE REPROGRAMMING OF THE NEW SOFTWARE.
IF DURING THE PROGRAMMING OF THE SOFTWARE SOME PROBLEM WOULD OCCUR, PLEASE RESTART THE PROCEDURE FROM STEP 1.

Step 1

Shut down the main circuit breaker of the unit. It is very important that there is no power supplied to the indoor unit.

Step 2

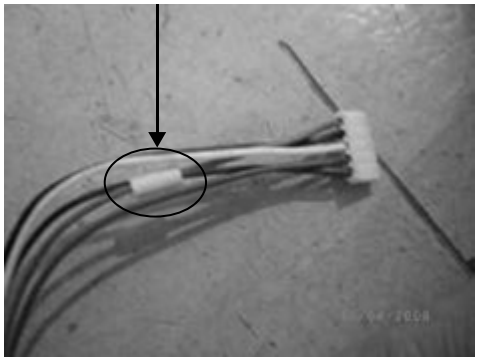
Open the front plate of the unit to have access to the switch box:



Step 3

Install the first end of the programming cable (blue extension) to X50A connector on the main PCB of the indoor unit.

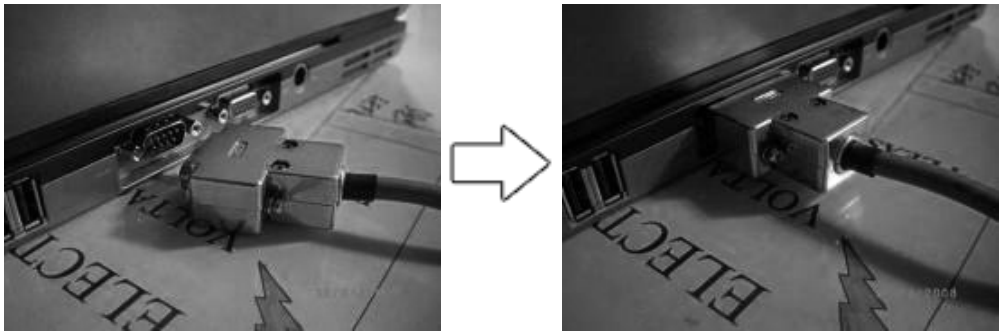
Use programming cable with indication “W” from “Write” (part n°: 999480P or 999482P) + blue connector (part n°: 999485P)





Step 4

Connect serial port end of the cable to the laptop.



Step 5

Close the front plate of the indoor unit.

Step 6

Put power supply to the indoor unit by switching ON the main circuit breaker.

Step 7

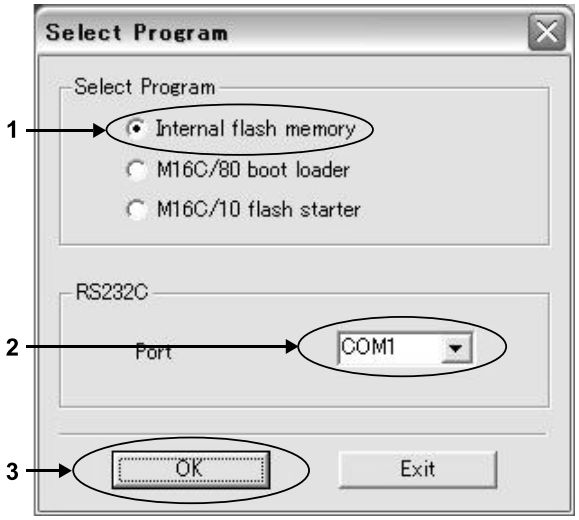
(Programming of software can now start.)
Browse to the executable FlashSta.exe and double-click on the file “FlashSta.exe”:



Step 8

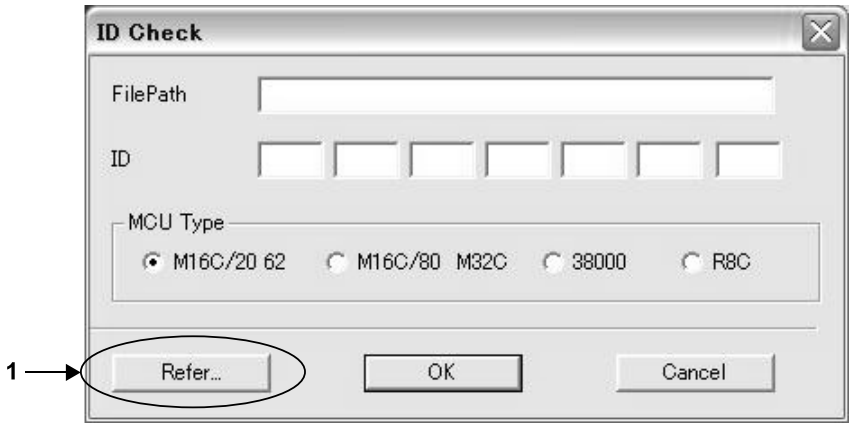
Programming of software

1. Internal flash memory.
2. Select COM1.
3. Click on “OK”.

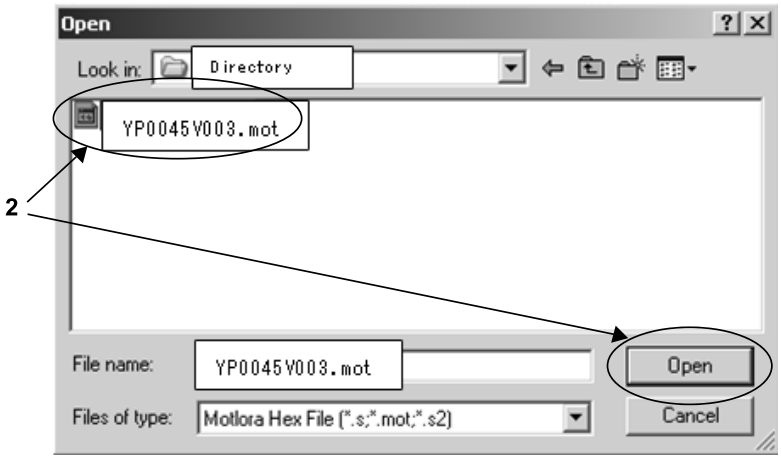


After clicking on “OK”, following window appears: “ID Check”.
This is the window that refers to the software file.

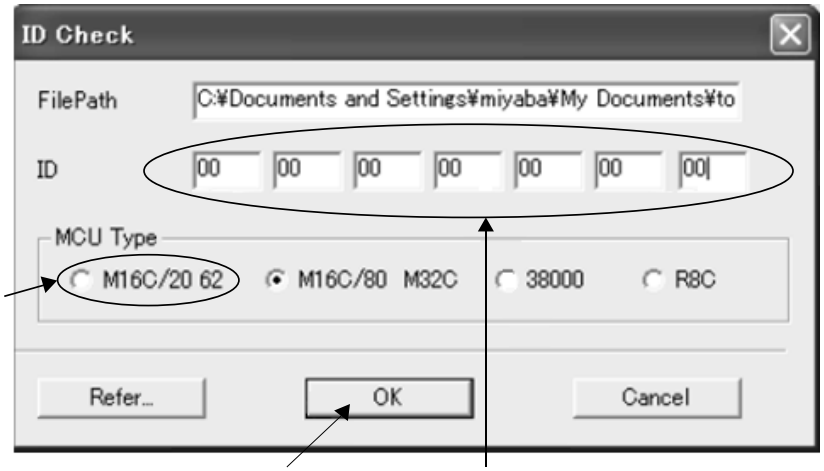
1. Refer to the needed file: click on “Refer”.



2. Browser menu is opened. Browse to the file YP0045V003.mot and click on “Open”.

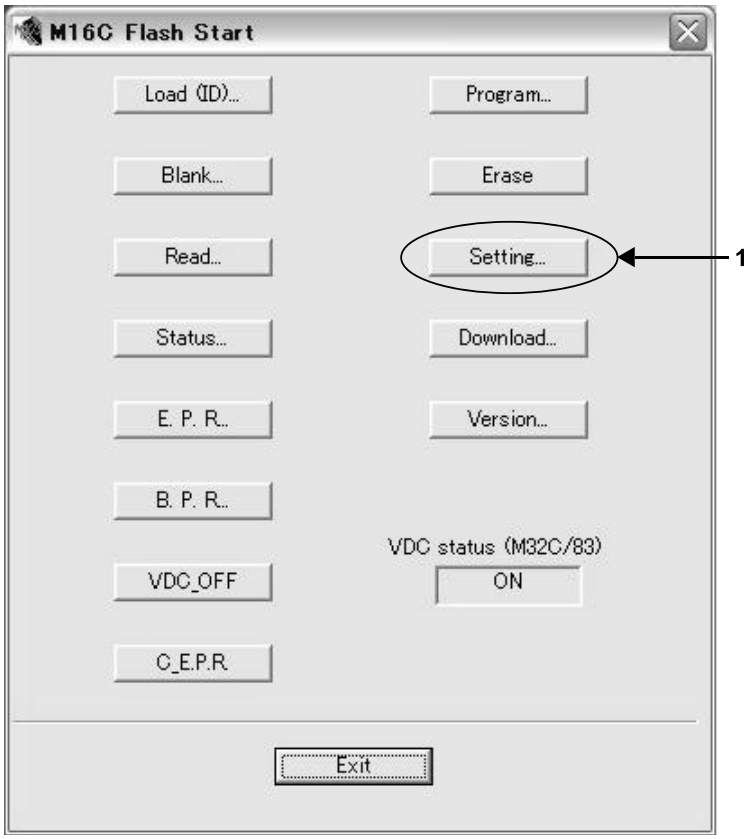


3. The window “ID check” will be opened. In each field, please control 2 zero’s are filled in.
4. Control that the “MCU-Type” is set to “M16C/20 62”.
5. Click on “OK”.



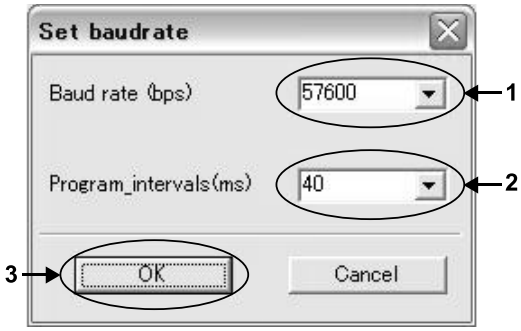
The window “M16C Flash Start” will be opened.

1. Click on “Setting”.



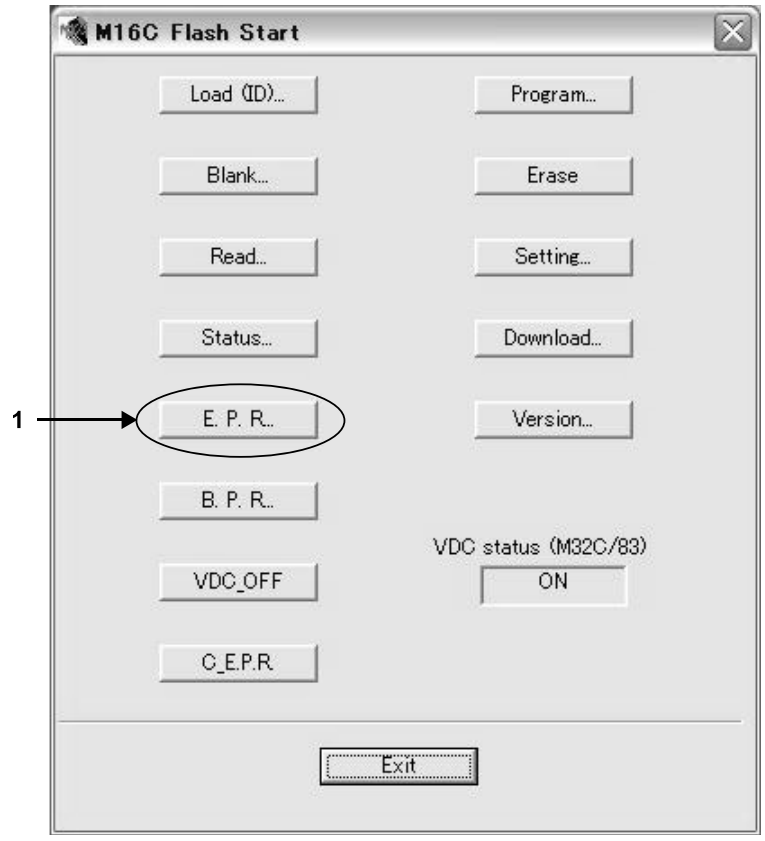
The window “Set baudrate” will be opened.

1. Baud rate (bps) => Select 57600
2. Program_intervals (ms) => Select 40
3. Click on “OK”.

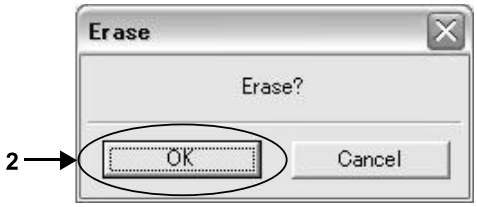


After clicking on “OK”, the window “M16C Flash Start” will be opened again.
Now software needs to be uploaded.

1. Click on “E.P.R.” (= Erase – Program – Read check)

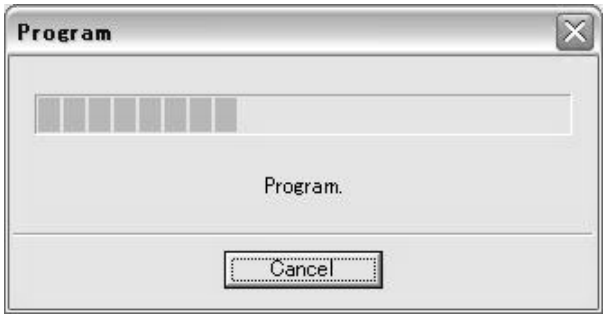


2. The program will request if previous software may be erased: “ERASE?”
   Click on “OK”.

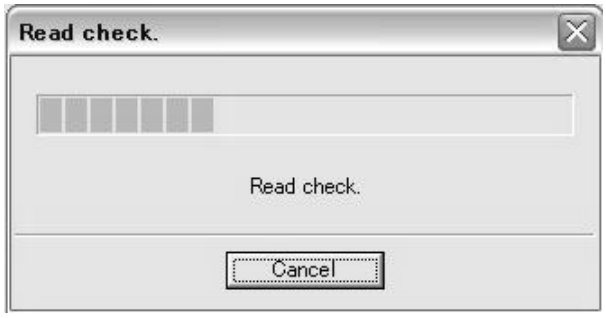


Following steps will happen automatically.

Please wait till the program has ended to erase the old software and reprogramming the new one.
This can take up till 20 min!
Please be patient.
You will be able to check the progress on the windows as shown below:



After erasing and reprogramming the software, the program will check if the software has been written correctly (window “Read check”).
The progress can also be checked.



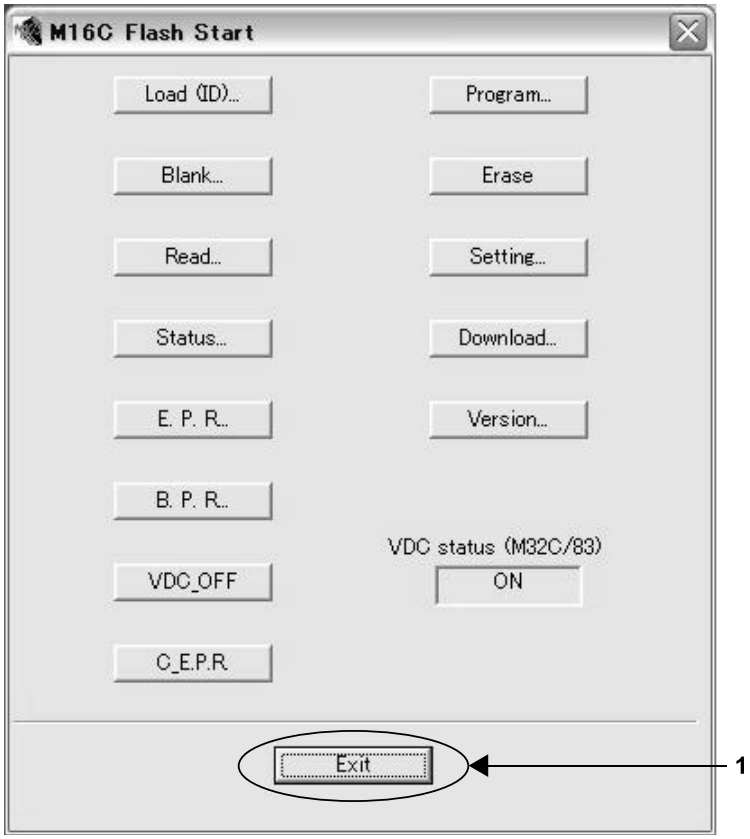
If the check is finished, a window “M16C Flash Start” will appear.

1. Click on OK.



After clicking on “OK”, the window “M16C Flash start” appears again.

1. Click on “Exit” to finish the programming.
   The unit has now been reprogrammed.



Step 9 Shut down the power supply again with the main circuit breaker of the unit, to avoid error on hydrobox.

Step 10 Open the front plate of the indoor unit.

Step 11 Disconnect the programming cable on the indoor units’ PCB.

Step 12

Add sticker (local supply) with new software version on the indoor PCB as indicated below:
OLD SOFTWARE: EB08014(B) --> NEW SOFTWARE: EB08014(C)



Step 13

Close the indoor unit.

Step 14

Reconnect the power supply and start up the unit again.

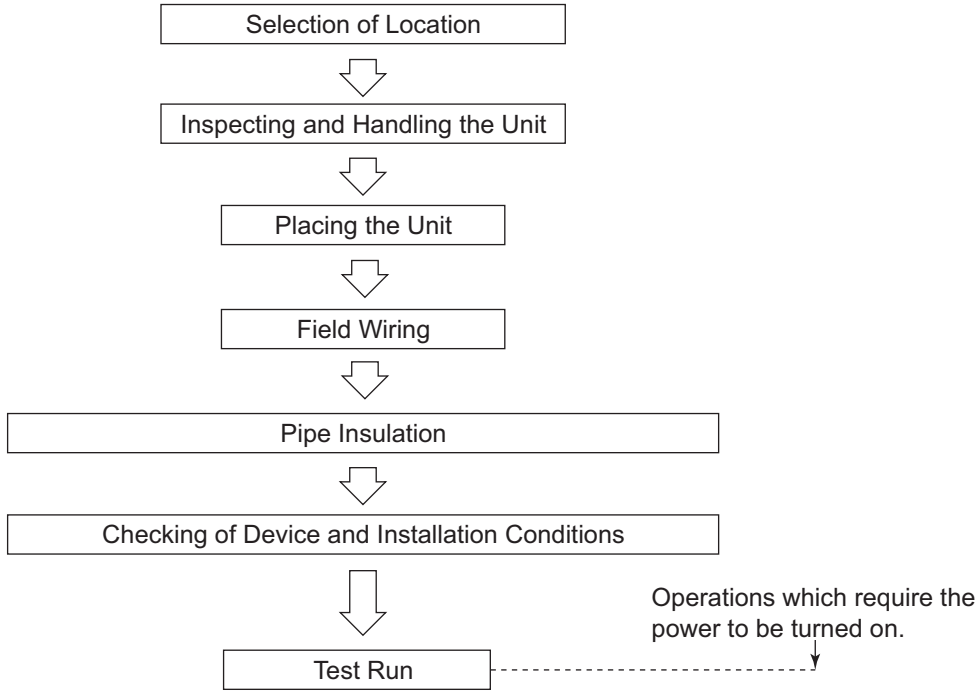
Part 5
Commissioning and Test Run

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1. Test Run

1.1 Installation Process

Below figure shows the installation process. Install in the order of the steps shown.



1.2 Procedure and Outline

Follow the following procedure to conduct the initial test operation after installation.

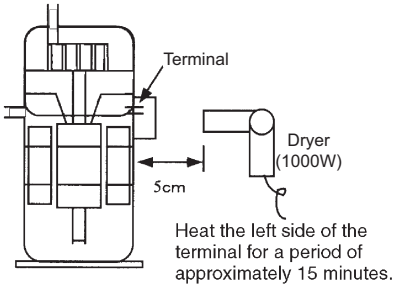
1.2.1 Check Work Prior to Turn Power Supply On

Check the below items.
- Power wiring
- Control transmission wiring between units
- Earth wire

⇩

○ Is the wiring performed as specified?
○ Is the designated wire used?
○ Is the wiring screw of wiring not loose?
○ Is the grounding work completed?
○ Is the insulation of the main power supply circuit deteriorated?
Use a 500V megger tester to measure the insulation. (*1)
- Do not use a megger tester for other circuits than 200V (or 240V) circuit.

*1:Measure to be taken against decreased insulation resistance in the compressor.
If the compressor is left to stand for an extended period of time after the refrigerant charge with the stop valve open and the power supply OFF, the refrigerant may be mixed in the compressor, thus decreasing the insulation resistance.
Heat the compressor as shown on the right and then recheck the insulation.



Check on piping / insulation materials

○ Is the pipe size proper?
○ Is the pipe insulation material installed securely?

⇩

Check the stop valves for conditions.

○ Check to be sure the stop valves are under the following conditions.

Liquid-side stop valve	Gas-side stop valve
Open	Open

1.2.2 Turn Power On

Turn outdoor unit and indoor unit power on.

⇩

Check the LED display of the outdoor unit PCB.

⇩

Make field settings with outdoor unit PCB.

⇩

Conduct check operations.

⇩

Check for normal operation.

○ Be sure to turn the power on 6 hours before starting operation to protect compressors. (to power on crankcase heater)

○ Check to be sure the transmission is normal.
The transmission is normal if the LEDs display conditions as shown in table below.

LED display ○ ON ● OFF ◑ Blinking

LED display (Default status before delivery)		Micro-computer operation monitor	MODE	TEST	COOL / HEAT select			Low noise	Demand	Multi
					IND	MASTER	SLAVE			
		HAP	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H8P
One outdoor unit installed		◑	●	●	○	●	●	●	●	●
EW*Q040BA EW*Q050BA EW*Q064BA(*)	Master	◑	●	●	○	●	●	●	●	○
	Slave 1	◑	●	●	●	●	●	●	●	◑

(*) The master unit is the outdoor unit next to the hydrobox.
The other outdoor unit is the slave.

○ Make field settings if needed.
(For the setting procedure, refer to information in "Field Setting from Outdoor Unit".)
For EW*Q040BA, EW*Q050BA and EW*Q064BA, make field settings with the master unit.
(Field settings made with the slave unit will be all invalid.)

The check operations shown below will be automatically initiated.
- Check for erroneous wirings
- Check for failure to open stop valves

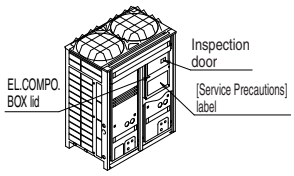
1.2.3 Onsite Settings

Notes

In the case of a EW*Q040BA, EW*Q050BA, EW*Q064BA, all onsite settings should be made on the master unit. Settings made on sub units are invalid.
The outdoor unit to which is next to the hydrobox is the master unit, and the other unit is the slave.

Onsite settings with the power on

Use the BS button switches (BS1 through BS5) on the outdoor unit PCB (A1P) to make the necessary onsite settings.
See the “Service Precautions” label on the EL. COMPO. BOX lid for details on the positions and operating method of the BS button switches and on the onsite setting.
Make sure to record the setting on the accessory “REQUEST FOR THE INDICATION” label.



Warning

Electric Shock Warning

Use an insulated rod to operate the BS buttons via the inspection door of EL. COMPO. BOX lid. There is a risk of electric shock if you touch any live parts, since this operation must be performed with the power on.

1.2.4 Test Run

Before test run

Make sure the following works are completed in accordance with the installation manual.
- Piping work
- Wiring work

Test run

After check operation is completed, operate the unit normally and check the following.
1. Make sure the unit is operating normally.
2. Check to see if cold (or hot) water is coming out from the hydrobox.
3. Close unit with all service panels, the service panels of the switch box should only be opened by a licensed electrician for maintenance purposes.

Notes

- If a knocking sound can be heard in the liquid compression of the compressor, stop the unit immediately and then energize the crank case heater for a sufficient length of time before restarting the operation.
- Once stopping, the compressor will not restart in about 3 minutes even if the On/Off button of the remote controller is pushed.
- The outdoor unit fan may rotate at low speeds if the Night-time low noise setting or the External low noise level setting is made, but this is not a malfunction.

1.3 Operation when Power is Turned On

1.3.1 When Turning On Power First Time

The unit cannot be run for up to 12 minutes to automatically set the master power and address.

Status

Outdoor unit	Test lamp H2P .... Blinks Can also be set during operation described above.
Hydrobox	If ON button is pushed during operation described above, the "UH" malfunction indicator blinks. (Returns to normal when automatic setting is complete.)

1.3.2 When Turning On Power the Second Time and Subsequent

Tap the RESET button on the outdoor unit PCB. Operation becomes possible for about 2 minutes. If you do not push the RESET button, the unit cannot be run for up to 10 minutes to automatically set master power.

Status

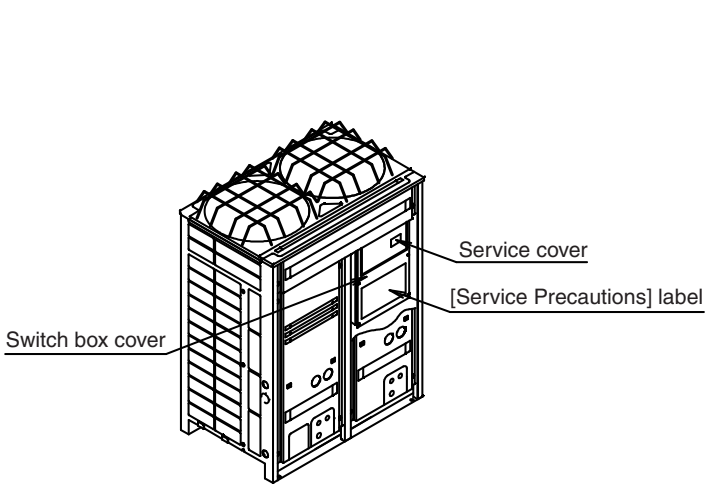
Outdoor unit	Test lamp H2P .... Blinks Can also be set during operation described above.
Hydrobox	If ON button is pushed during operation described above, the operation lamp lights but the compressor does not operate. (Returns to normal when automatic setting is complete.)

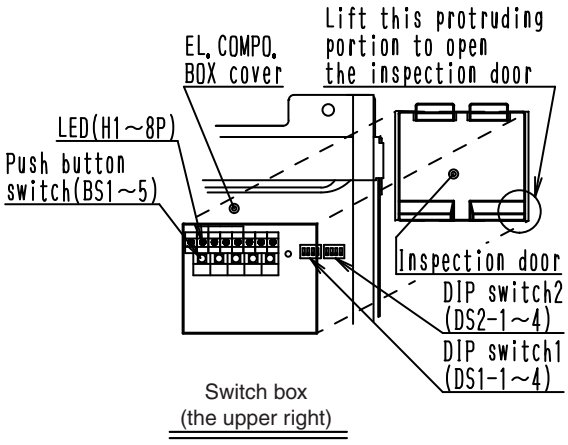
1.3.3 Hydrobox or Outdoor Unit PCB Has Been Changed

Be sure to push and hold the RESET button for 5 seconds. If not, the addition cannot be recognized. In this case, the unit cannot be run for up to 12 minutes to automatically set the address.

Status

Outdoor unit	Test lamp H2P .... ON Can also be set during operation described above.
Hydrobox	If ON button is pushed during operation described above, the "UH" or "U4" malfunction indicator blinks. (Returns to normal when automatic setting is complete.)





Caution When the 400 volt power supply is applied to “N” phase by mistake, replace Inverter PCB (A2P) and control transformer (T1R, T2R) in switch box together.

Part 6
Maintenance

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Precautions

Correct choices and decisions have to be made before any maintenance is done. Opening the refrigerant circuit may cause a loss of refrigerant or lead to system contamination.

- Avoid high gas concentrations.
  While the heavy concentration of the refrigerant gas will remain on the floor level, good ventilation is a must.
- Avoid all contact with open fires or hot surfaces.
  By high temperatures, the refrigerant gas R410A may decompose into irritating and poisonous gas. Avoid skin and hand contact with the liquid refrigerant and protect your eyes against liquid splashes.

1. Maintenance of the Main Parts

Preventive maintenance

A program of scheduled maintenance should be set up and followed. The items mentioned are to be used as a guide and must be used in combination with sound electrical and refrigeration workmanship to ensure trouble free operation and performance.

Unit casing

Follow the below instructions to check the unit casing.

Check if...	If not, then...
The paint of the unit casing is intact.	Touch-up with paint.
All plate work is screwed down in position.	Screw the plate work down in position.

Compressor

Follow the instructions below to check the compressor:

- Check crankcase heater operation. Switch of the compressor and carefully touch the crankcase heater area by hand.

No operation can cause compressor damage when the ambient temperature reaches a low temperature.

Evaporator and condenser

Follow the instructions below to check the evaporator and condenser:

- Inspect the water and condenser after the first operating season. This condition indicates the required frequency of cleaning and also whether water treatment is needed in the chilled water circuit.
- Check the air plugs and drain plugs to prevent or detect water leakage.
- Check pressure-drop and water flow.
- Record temperature difference between water in/out temperature.
- Inspect evaporator insulation. If damaged, repair.
- Inspect water and refrigerant connections.
- If the evaporator heater-tape is installed, check operation by direct power connection and hand-touch.
- Brush cleaning. Abnormal high condensing-pressures are an indication for periodic cleaning.

Unit switch box

Follow the instructions below to check the unit switch box:

- Check all power connections for tightness.
- Check compressor motor terminals.
- Inspect wiring for any signs of overheating (discolouring).
- Remove all dust and debris from the switch box. Replaced coils and components should not be left in the unit control panel.
- Check all field-wired terminals.

Flow switch and pump interlock

Follow the instructions below to check the flow switch and the pump interlock.

- Check operation by ohmmeter after disconnecting the wires to the field terminals and simulating flow and no-flow conditions.
- Inspect the flow-switch for possible corrosion (glycol applications). Check electrical connections for shunts or bridges.

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