ESIE13-01

Service Manual

VRVIV

- Outdoor unit

- RXYQ8~54T7Y1B

- RYYQ8~54T7Y1B

- R-410A Heat Pump 50Hz

VRV IV R-410A Heat Pump 50Hz, 60Hz

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 shook. If it is necessary to supply power to the equipment to conduct the repair or inspecting the circuits, do not touch any electrically charged sections of the equipment.	
If the refrigerant gas discharges during the repair work, do not touch the discharging refrigerant gas. The refrigerant gas can cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, release the refrigerant gas completely at a well-ventilated place first. If there is a gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it can cause injury.	
If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas can generate toxic gases when it contacts flames.	
The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Be sure to discharge the capacitor completely before conducting repair work. A charged capacitor can cause an electrical shock.	
Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug. Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or fire.	

Caution	
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. 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.	

Warning	
Be sure to install the product correctly by using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury.	For integral units only 
Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury.	For integral units only 
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	
Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections can cause excessive heat generation or fire.	
When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	
Do not mix air or gas other than the specified refrigerant (R-410A) in the refrigerant system. If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	
When replacing the coin battery in the remote controller, be sure to disposed of the old battery to prevent children from swallowing it. If a child swallows the coin battery, see a doctor immediately.	

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

1.1.3 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.	

Caution	
Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 Mohm or higher. Faulty insulation can cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair. Faulty drainage can cause the water to enter the room and wet the furniture and floor.	

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.

1.2 PREFACE

Thank you for your continued patronage of Daikin products.

This is the new service manual for Daikin's Year 2012 VRVIV series Heat Pump System. Daikin offers a wide range of models to respond to building and office air conditioning needs. We are confident that customers will be able to find the models that best suit their needs.

This service manual contains information regarding the servicing of VRVIV series R-410A Heat Pump System.

March, 2013

After Sales Service Division

Part 1
General Information

1. Model Names of Indoor/Outdoor Units

VRV Indoor Units

Type		Model Name													Power Supply
Round flow cassette autocleaning function[1] Presence & floor sensor[1]	FXFQ-A		20	25	32	40	50	63		80	100	125				VE
4-way blow ceiling mounted cassette Presence & floor sensor[1]	FXZQ-A	15	20	25	32	40	50								
2-way blow ceiling mounted cassette	FXCQ-A		20	25	32	40	50	63		80		125			
Ceiling mounted corner cassette	FXKQ-MA			25	32	40		63							
Small concealed ceiling unit	FXDQ-M9		20	25											
Slim concealed ceiling unit	FXDQ-A	15	20	25	32	40	50	63							
Conceiled ceiling unit with inverter driven fan	FXSQ-P		20	25	32	40	50	63		80	100	125	140		
Conceiled ceiling unit with inverter driven fan	FXMQ-P7		20	25	32	40	50	63		80	100	125			
Large conceiled ceiling unit	FXMQ-MA[2]													200	250
Wall mounted unit	FXAQ-P	15	20	25	32	40	50	63							
Ceiling suspended unit	FXHQ-A				32			63			100				
4-way blow ceiling suspended unit	FXUQ-A								71		100	125			
Floor standing unit	FXLQ-P		20	25	32	40	50	63							
Conceiled floor standing unit	FXNQ-P		20	25	32	40	50	63							
AHU	EKEQMCBV, EKEQFCBV						50	63		80	100	125	140	200	250

Note:

[1] Optional.

[2] Not connectable to VRV III-S.

Ventilation indoor units

Type		Model Name								Power Supply
Heat reclaim ventilation	VKM-G	50		80	100					V1
	VKM-GM	50		80	100					
Outdoor air	FXMQ-MF					125		200	250	
AHU	EKEXV-unit[1]	50	63	80	100	125	140	200	250	
Biddle free hanging	CYV S/M/L-DK-F	Door height: S≤2,3m; M≤2,5m; L≤3,0m								
Biddle air curtain cassette	CYV S/M/L-DK-C									
Biddle air curtain recessed	CYV S/M/L-DK-R									

Note:

[1] In combination with EKEQ-M/F.

RA-indoor units

Type		Model Name								RYYQ-T RXYQ-T	RXYSQ-P8V1 RXYSQ-P8Y1
Daikin Emura wall mounted kit	FTXG-JA/JW			25	32		50			✓	✓
Wall mounted unit	CTXS-K FTXS-K	15	20	25	35	42	50			✓	✓
Wall mounted unit	FTXS-G							60	71	✓	✓
Nexura floor standing unit	FVXG-K			25	35		50			✓	✓
Floor standing unit	FVXS-F			25	35		50			✓	✓
Flexi type unit	FLXS-B			25	35		50	60		✓	✓

Note:

In combination with BPMKSB2B or BPMKSB3B.

Hydrobox indoor

Type		Model Name	
Low temperature hydrobox[1]	HXY-A	80	125
High temperature hydrobox[2]	HXHD-A		125

Note:

[1] Only connectable to RYYQ-T.

[2] Only connectable to REYAQ-P.

Outdoor units

Type		Model Name							Power Supply
Heat pump	RXYQ	8T 22T 36T 50T	10T 24T 38T 52T	12T 26T 40T 54T	14T 28T 42T	16T 30T 44T	18T 32T 46T	20T 34T 48T	Y1
	RYYQ	8T 22T 36T 50T	10T 24T 38T 52T	12T 26T 40T 54T	14T 28T 42T	16T 30T 44T	18T 32T 46T	20T 34T 48T	Y1

Combination outdoor and connection ratio indoor

	System model name	Combination size modules							Connection ratio to outdoor[1]			Outdoor refnet
		8	10	12	14	16	18	20	50%	100%	130%	
Single module	RXYQ 8 / RYYQ 8 T	1							100	200	260	
	RXYQ 10 / RYYQ 10 T		1						125	250	325	
	RXYQ 12 / RYYQ 12 T			1					150	300	390	
	RXYQ 14 / RYYQ 14 T				1				175	350	455	
	RXYQ 16 / RYYQ 16 T					1			200	400	520	
	RXYQ 18 / RYYQ 18 T						1		225	450	585	
	RXYQ 20 / RYYQ 20 T							1	250	500	650	
Multi of 2 outdoor[2]	RXYQ 22 / RYYQ 22 T		1	1					275	550	715	BHFQ22P1007
	RXYQ 24 / RYYQ 24 T	1				1			300	600	780	
	RXYQ 26 / RYYQ 26 T			1	1				325	650	845	
	RXYQ 28 / RYYQ 28 T			1		1			350	700	910	
	RXYQ 30 / RYYQ 30 T			1			1		375	750	975	
	RXYQ 32 / RYYQ 32 T					2			400	800	1040	
	RXYQ 34 / RYYQ 34 T					1	1		425	850	1105	
	RXYQ 36 / RYYQ 36 T					1		1	450	900	1170	
Multi of 3 outdoor[3]	RXYQ 38 / RYYQ 38 T	1	1					1	475	950	1235	BHFQ22P1517
	RXYQ 40 / RYYQ 40 T		1	1			1		500	1000	1300	
	RXYQ 42 / RYYQ 42 T		1			2			525	1050	1365	
	RXYQ 44 / RYYQ 44 T			1		2			550	1100	1430	
	RXYQ 46 / RYYQ 46 T				1	2			575	1150	1495	
	RXYQ 48 / RYYQ 48 T					3			600	1200	1560	
	RXYQ 50 / RYYQ 50 T					2	1		625	1250	1625	
	RXYQ 52 / RYYQ 52 T					1	2		650	1300	1690	
	RXYQ 54 / RYYQ 54 T						3		675	1350	1755	

Note:

[1] Maximum number indoor units = 64, but ensure total connection ratio is between 50 and 130%.

[2] RXYQ22~36T7 = 2 x RXYQ-T7, RYYQ22~36T7 = 2 x RYMQ-T7.

[3] RXYQ38~54T7 = 3 x RXYQ-T7, RYYQ38~54T = 3 x RYMQ-T7.

2. External Appearance

2.1 Outdoor Units

Normal Series (Space Saving Series)

RXYQ8-12T (small) RYYQ8-12T (small)	RXYQ14-20T (medium) RYYQ14-20T (medium)	RXYQ22-30T (small, medium) RYYQ22-30T (small, medium)
 8, 10, 12HP	 14, 16, 18, 20HP	 22, 24, 26, 28, 30HP

RXYQ32-36T (medium, medium) RYYQ32-36T (medium, medium)	RXYQ38-40T (small, small, medium) RYYQ38-40T (small, small, medium)
 32, 34, 36HP	 38, 40HP

RXYQ42-44T (small, medium, medium) RYYQ42-44T (small, medium, medium)	RXYQ46-54T (medium, medium, medium) RYYQ46-54T (medium, medium, medium)
 42, 44HP	 46, 48, 50, 52, 54HP

3. Model Selection

VRV IV Heat Pump Series

Connectable Indoor Unit

Type		Model Name														Power Supply
Round flow cassette autocleaning function[1] Presence & floor sensor[1]	FXFQ-A		20	25	32	40	50	63		80	100	125				VE
4-way blow ceiling mounted cassette Presence & floor sensor[1]	FXZQ-A	15	20	25	32	40	50									
2-way blow ceiling mounted cassette	FXCQ-A		20	25	32	40	50	63		80		125				
Ceiling mounted corner cassette	FXKQ-MA			25	32	40		63								
Small concealed ceiling unit	FXDQ-M9		20	25												
Slim concealed ceiling unit	FXDQ-A	15	20	25	32	40	50	63								
Conceiled ceiling unit with inverter driven fan	FXSQ-P		20	25	32	40	50	63		80	100	125	140			
Conceiled ceiling unit with inverter driven fan	FXMQ-P7		20	25	32	40	50	63		80	100	125				
Large conceiled ceiling unit	FXMQ-MA[2]													200	250	
Wall mounted unit	FXAQ-P	15	20	25	32	40	50	63								
Ceiling suspended unit	FXHQ-A				32			63			100					
4-way blow ceiling suspended unit	FXUQ-A								71		100	125				
Floor standing unit	FXLQ-P		20	25	32	40	50	63								
Conceiled floor standing unit	FXNQ-P		20	25	32	40	50	63								
AHU	EKEQMCBV, EKEQFCBV						50	63		80	100	125	140	200	250	

Note:

[1] Optional.

[2] Not connectable to VRV III-S.

Indoor unit capacity

New refrigerant model code	Q20 type	Q25 type	Q32 type	Q40 type	Q50 type	Q63 type	Q80 type	Q100 type	Q125 type	Q140 type	Q200 type	Q250 type
Selecting model capacity	2.2 kW	2.8 kW	3.5 kW	4.5 kW	5.6 kW	7.0 kW	9.0 kW	11.2 kW	14.0 kW	16.0 kW	22.4 kW	28.0 kW
Equivalent output	0.8HP	1HP	1.25HP	1.6HP	2.0HP	2.5HP	3.2HP	4HP	5HP	6HP	8HP	10HP

Use the above tables to determine the capacities of indoor units to be connected. Make sure the total capacity of indoor units connected to each outdoor unit is within the specified value (kW).

- The total capacity of connected indoor units must be within a range of 50 to 130% of the rated capacity of the outdoor unit.
- In some models, it is not possible to connect the maximum number of connectable indoor units. Select models so the total capacity of connected indoor units conforms to the specification.

4. VRV III - VRV IV Components and Features

Size (hp)	Modelname	Compressors		Fan motor	Expansion valves	Service monitor indication	Stop valves	Level > 50 m
		Inverter	Standard					
8	RXYQ-P	1		1 x 750 W	2	7 LED	2	EKLD90P12
	RYYQ-T	1		1 x 750 W	3	888	3	field set outdoor
	RYMQ-T				2		2	
	RXYQ-T							
10, 12	RXYQ-P	1	1	1x 750 W		7 LED		EKLD90P12
	RYYQ-T	1		1 x 750 W	3	888	3	field set outdoor
	RYMQ-T				2		2	
	RXYQ-T							
14, 16	RXYQ-P	1	1	2 x 350 W	2	7 LED	2	EKLD90P18
	RYYQ-T	2		2 x 750 W	3	888	3	field set outdoor
	RYMQ-T				2		2	
	RXYQ-T							
18	RXYQ-P	1	2	2 x 750 W	2	7 LED		EKLD90P18
	RYYQ-T	2		2 x 750 W	3	888	3	field set outdoor
	RYMQ-T				2		2	
	RXYQ-T							
20	RYYQ-T	2		2 x 750 W	3	888	3	field set outdoor
	RYMQ-T				2		2	
	RXYQ-T							

Part 2
Specifications

1. General Specifications

Model Name				RXYQ8T RYYQ8T RYMQ8T	RXYQ10T RYYQ10T RYMQ10T	RXYQ12T RYYQ12T RYMQ12T	RXYQ14T RYYQ14T RYMQ14T	RXYQ16T RYYQ16T RYMQ16T	RXYQ18T RYYQ18T RYMQ18T	RXYQ20T RYYQ20T RYMQ20T
PED	Category			Cat II						
	Most critical part			Accumulator						
		Ps*V	bar*l	325	325	325	415	415	492.5	492.5
Casing	Colour			Daikin white						
	Material			Painted galvanised steel						
Dimensions	Unit	Height	mm	1685						
		Width	mm	930			1240			
		Depth	mm	765						
	Packing	Height	mm	1820						
Weight	Unit	RYYQ	kg	261	268		364		398	
		RYMQ		188	195		309		319	
		RXYQ		187	194		305		314	
Heat exchanger	Specifications	Type		Cross fin						
		Treatment		Anti corrosion						
Fan	Type			Propeller						
	Quantity			1			2			
	Air flow rate (nominal at 230V)		m^3/min	162	175	185	223	260	251	261
	External static pressure		Pa	78Pa in high static mode						
	Discharge direction			Vertical						
	Motor	Quantity		1			2			
		Model		Brushless DC						
		Output/pcs	W	750						
Compressor	Quantity			1			2			
	Motor	Model		Inverter						
		Type		Hermetically sealed scroll compressor						
		Crankcase heater	W	33						
Refrigerant	Type			R410A						
	Charge		kg	5.9	6	6.3	10.3	10.4	11.7	11.8
Refrigerant oil	Type			Synthetic (Ether) Oil						
	Standard oil charge		l	1.7	2.0		1.7 + 1.7		1.7 + 2.0	
	Factory extra oil charge	RYYQ8~20*	l	0.8	0.5	0.7	1.8	1.8	1.7	1.9
		RYMQ* & RXYQ*		1.0	1.2	1.4	2.4	3.3	3.3	3.3
Piping connections	Liquid	Type		Brazing connection						
		Diameter (OD)	mm	9.52		12.7			15.9	
	Gas	Type		Brazing connection						
		Diameter (OD)	mm	19.1	22.2	28.6				
	Equalizing (only for RYMQ)	Type		Brazing connection						
		Diameter (OD)	mm	19.1		22.2			28.6	

2. Electrical Specifications

Model Name				RXYQ8T RYYQ8T RYMQ8T	RXYQ10T RYYQ10T RYMQ10T	RXYQ12T RYYQ12T RYMQ12T	RXYQ14T RYYQ14T RYMQ14T	RXYQ16T RYYQ16T RYMQ16T	RXYQ18T RYYQ18T RYMQ18T	RXYQ20T RYYQ20T RYMQ20T
Power supply	Name			Y1						
	Phase			3N~						
	Frequency		Hz	50						
	Voltage		V	380-415						
Current	Nominal running current (RLA)(1)		A	7.2	10.2	12.7	15.4	18.0	20.8	26.9
	Starting current (MSC)(2)		A	always ≤ MCA						
	Minimum circuit amps (MCA)(3)		A	16.1	22.0	24.0	27.0	31.0	35.0	39.0
	Maximum fuse amps (MFA)(4)		A	20	25	32	32	40	40	50
	Total overcurrent amps (TOCA)(5)		A	17.3	24.6	24.6	35.4	35.4	42.7	42.7
	Full load amps (FLA)(6)		A	1.2	1.3	1.5	1.8	2.6	2.6	2.6
Voltage range			V	380-415 ±10%						
Wiring connections	For power supply	Quantity		5G						
	For connection with indoor	Quantity		2 (F1/F2)						
Power supply intake				Both indoor and outdoor unit						

Notes:

(1) RLA is based on following conditions: COOLING indoor temperature: 27°CDB / 19°CWB, outdoor temperature: 35°CDB.

(2) MSC means the maximum current during start up of the compressor. VRV4 uses only inverter compressors.

(3) MCA must be used to select the correct field wiring size. The MCA can be regarded as the maximum running current.

(4) MFA is used to select the circuit breaker and the ground fault circuit interrupter (earth leakage circuit breaker).

(5) TOCA means the total value of each OC set.

(6) FLA: nominal running current fan.

- Voltage range: units are suitable for use on electrical systems where voltage supplied to unit terminal is not below or above listed range limits.
- Maximum allowable voltage range variation between phases is 2%.

3. Safety Specifications

RYYQ-T

Name part	Description	Wiring symbol	8	10	12	14	16	18	20
compressor 1	model	M1C	JT1GCVDKYR	JT15J-VDKYR		JT1GCVDKYR			
	overcurrent (A)		16.1	22.5		16.1			
compressor 2	model	M2C				JT1GCVDKYR		JT15J-VDKYR	
	overcurrent (A)					16.1		22.5	
fan motor 1	overcurrent (A)	MF1	7.7						
fan motor 2	overcurrent (A)	MF2				7.7			
expansion valve	main (outdoor coil)	Y1E	fully closed 0 pulses, opening 160~3000 pulses - 4 pole, coil 150 ohm						
	sub-cool	Y2E	fully closed 0 pulses, opening 20~480 pulses, coil 46 ohm						
	PCM vessel	Y3E	fully closed 0 pulses, opening 160~3000 pulses - 4 pole, coil 150 ohm						
high pressure switch	compressor 1	S1PH	off (open) 4,0 Mpa, on (close) below 3,0 Mpa						
	compressor 2	S2PH				off (open) 4,0 Mpa, on (close) below 3,0 Mpa			
discharge temperature (°C)	compressor 1	R21T	off >135°C 2 times in 100 minutes						
	compressor 2	R22T				off >135°C 2 times in 100 minutes			
compressor body temperature	compressor 2	R8T		off >120°C 2 times in 100 minutes				off >120°C 2 times in 100 minutes	
inverter fin temperature (°C)	compressor 1		99	100		99		84	
	compressor 2					99			
fuse control	control board	F1U (A)	15						
		F2U (A)	15						
fuse noise filter		F1U (A)	6.3						
solenoid valve accumulator		Y2S	2,2 kohm						
solenoid valve oil separator	compressor 1	Y3S	2,2 kohm						
	compressor 2	Y4S	2,2 kohm						
4 way valve indoor		Y1S	2,0 kohm						
4 way valve outdoor		Y5S	2,0 kohm						

RYMQ-T

Name part	Description	Wiring symbol	8	10	12	14	16	18	20
compressor 1	model	M1C	JT1GCVDKYR	JT15J-VDKYR		JT1GCVDKYR			
	overcurrent (A)		16.1	22.5		16.1			
compressor 2	model	M2C				JT1GCVDKYR		JT15J-VDKYR	
	overcurrent (A)					16.1		22.5	
fan motor 1	overcurrent (A)	MF1	7.7						
fan motor 2	overcurrent (A)	MF2				7.7			
expansion valve	main (outdoor coil)	Y1E	fully closed 0 pulses, opening 160~3000 pulses - 4 pole, coil 150 ohm						
	sub-cool	Y2E	fully closed 0 pulses, opening 20~480 pulses, coil 46 ohm						
high pressure switch	compressor 1	S1PH	off (open) 4,0 Mpa, on (close) below 3,0 Mpa						
	compressor 2	S2PH				off (open) 4,0 Mpa, on (close) below 3,0 Mpa			
discharge temperature (°C)	compressor 1	R21T	off >135°C 2 times in 100 minutes						
	compressor 2	R22T				off >135°C 2 times in 100 minutes			
compressor body temperature	compressor 2	R8T		off >120°C 2 times in 100 minutes				off >120°C 2 times in 100 minutes	
inverter fin temperature (°C)	compressor 1		99	100		99		84	
	compressor 2					99			
fuse control	control board	F1U (A)	15						
		F2U (A)	15						
fuse noise filter		F1U (A)	6.3						
solenoid valve accumulator		Y2S	2,2 kohm						
solenoid valve oil separator	compressor 1	Y3S	2,2 kohm						
	compressor 2	Y4S	2,2 kohm						
4 way valve indoor		Y1S	2,0 kohm						
4 way valve outdoor		Y5S	2,0 kohm						

RXYQ-T

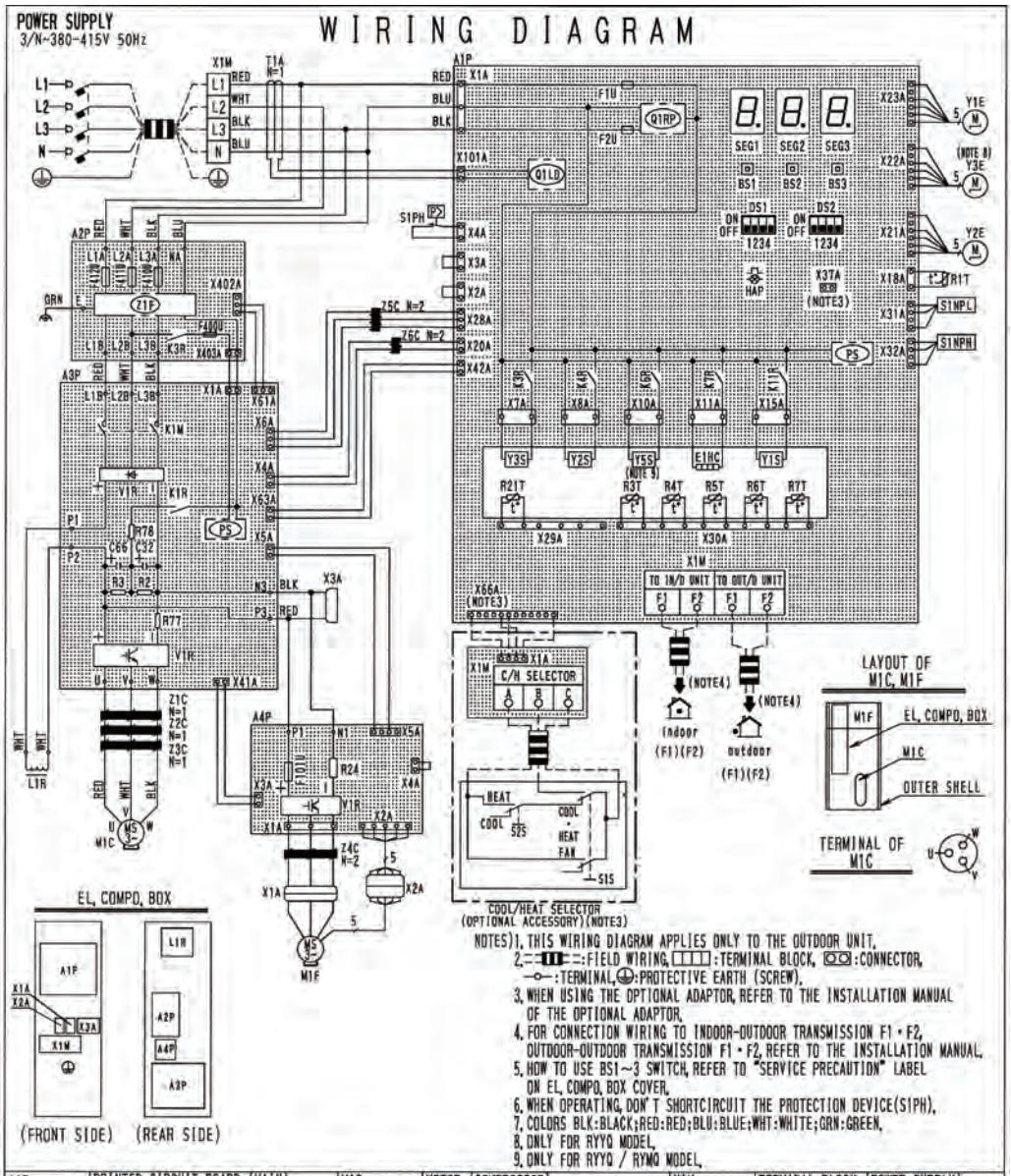
Name part	Description	Wiring symbol	8	10	12	14	16	18	20
compressor 1	model	M1C	JT1GCVDKYR	JT15J-VDKYR		JT1GCVDKYR			
	overcurrent (A)		16.1	22.5		16.1			
compressor 2	model	M2C				JT1GCVDKYR		JT15J-VDKYR	
	overcurrent (A)					16.1		22.5	
fan motor 1	overcurrent (A)	MF1	7.7						
fan motor 2	overcurrent (A)	MF2				7.7			
expansion valve	main (outdoor coil)	Y1E	fully closed 0 pulses, opening 160~3000 pulses - 4 pole, coil 150 ohm						
	sub-cool	Y2E	fully closed 0 pulses, opening 20~480 pulses, coil 46 ohm						
high pressure switch	compressor 1	S1PH	off (open) 4,0 Mpa, on (close) below 3,0 Mpa						
	compressor 2	S2PH				off (open) 4,0 Mpa, on (close) below 3,0 Mpa			
discharge temperature (°C)	compressor 1	R21T	off >135°C 2 times in 100 minutes						
	compressor 2	R22T				off >135°C 2 times in 100 minutes			
compressor body temperature	compressor 2	R8T		off >120°C 2 times in 100 minutes				off >120°C 2 times in 100 minutes	
inverter fin temperature (°C)	compressor 1		99	100		99		84	
	compressor 2					99			
fuse control	control board	F1U (A)	15						
		F2U (A)	15						
fuse noise filter		F1U (A)	6.3						
solenoid valve accumulator		Y2S	2,2 kohm						
solenoid valve oil separator	compressor 1	Y3S	2,2 kohm						
	compressor 2	Y4S	2,2 kohm						
4 way valve indoor		Y1S	2,0 kohm						

Part 3
Wiring Diagrams

1. Wiring Diagrams for Reference

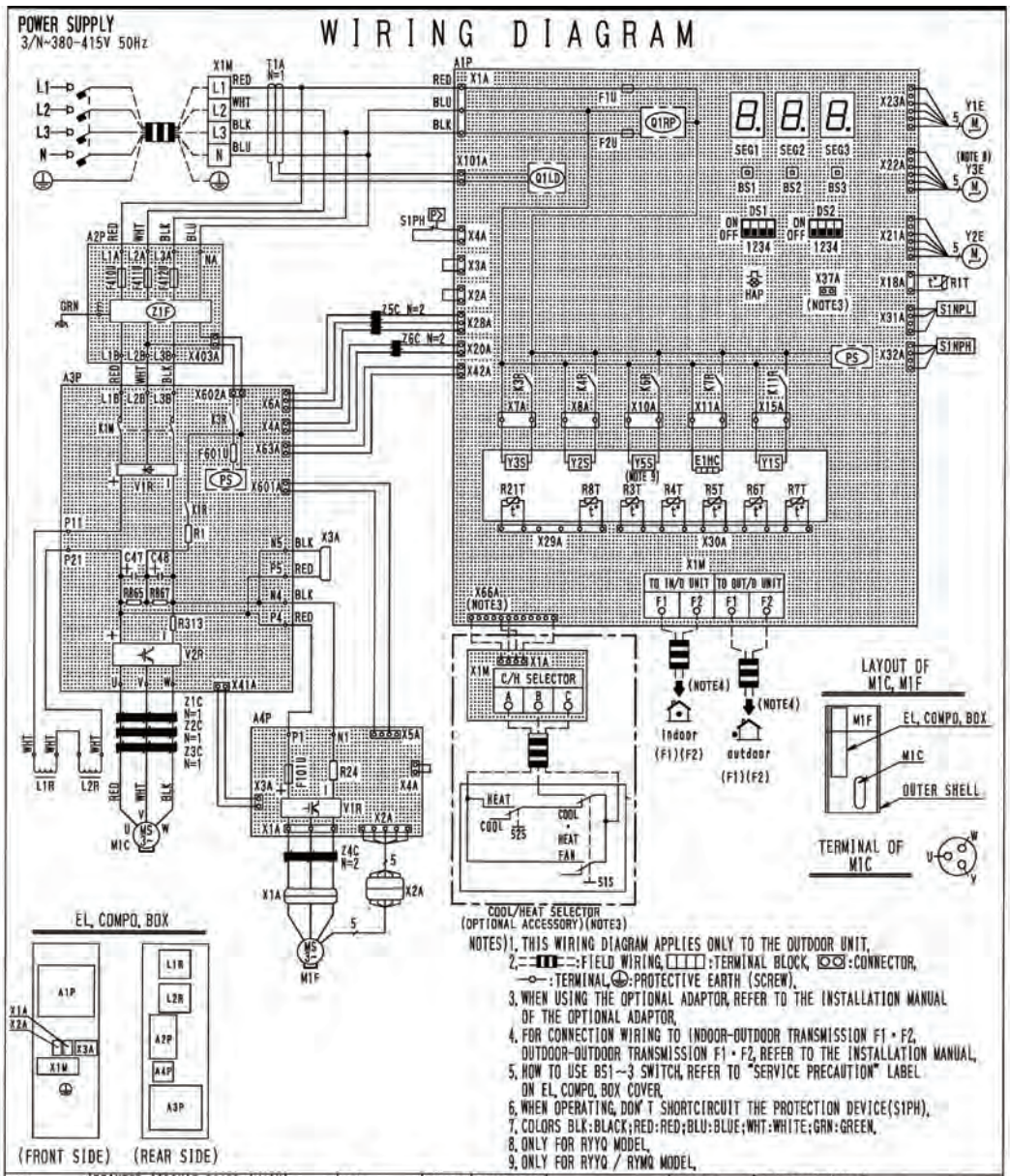
1.1 Outdoor Unit

RYYQ8T7Y1B
RXYQ8T7Y1B
RYMQ8T7Y1B



A1P	PRINTED CIRCUIT BOARD (MAIN)	M1C	MOTOR (COMPRESSOR)	X1M	TERMINAL BLOCK (POWER SUPPLY)
A2P	PRINTED CIRCUIT BOARD (NOISE FILTER)	M1F	MOTOR (FAN)	X1M	TERMINAL BLOCK (CONTROL)(A1P)
A3P	PRINTED CIRCUIT BOARD (INV)	PS	SWITCHING POWER SUPPLY(A1P, A3P)	Y1E	ELECTRONIC EXPANSION VALVE (MAIN)
A4P	PRINTED CIRCUIT BOARD (FAN)	Q1LD	LEAKAGE DETECTION CIRCUIT(A1P)	Y2E	ELECTRONIC EXPANSION VALVE (INJECTION)
BS1~3	PUSH BUTTON SWITCH(A1P) (MODE, SET, RETURN)	Q1RP	PHASE REVERSAL DETECT CIRCUIT(A1P)		
		R1T	THERMISTOR (A1R)(A1P)	Y3E	ELECTRONIC EXPANSION VALVE (STORAGE VESSEL)(NOTE 8)
C32, C66	CAPACITOR(A3P)	R21T	THERMISTOR(M1C DISCHARGE)		
DS1, DS2	DIP SWITCH(A1P)	R3T	THERMISTOR (ACCUMULATOR)	Y1S	SOLENOID VALVE (MAIN)
E1HC	CRANKCASE HEATER	R4T	THERMISTOR (HEAT EXC, LIQ. PIPE)	Y2S	SOLENOID VALVE (ACCUMULATOR OIL RETURN)
F1U, F2U	FUSE(T, 3.15A, 250V)(A1P)	R5T	THERMISTOR (SUBCOOL LIQ. PIPE)		
F101U	FUSE(A4P)	R6T	THERMISTOR (HEAT EXC, GAS PIPE)	Y3S	SOLENOID VALVE(OIL1)
F400U	FUSE(A2P)	R7T	THERMISTOR (HEAT EXC, DEICER)	Y5S	SOLENOID VALVE (SUB)(NOTE 9)
F410U~F412U	FUSE(A2P)	R2, R3	RESISTOR(A3P)	Z1C~Z6C	NOISE FILTER (FERRITE CORE)
HAP	PILOTLAMP(A1P) (SERVICE MONITOR-GREEN)	R24	RESISTOR(CURRENT SENSOR)(A4P)	Z1F	NOISE FILTER(A2P) (WITH SURGE ABSORBER)
		R77	RESISTOR(CURRENT SENSOR)(A3P)		
K1M	MAGNETIC RELAY(A3P)	R78	RESISTOR(CURRENT LIMTING)(A3P)		
K1R	MAGNETIC RELAY(A3P)	S1NPH	PRESSURE SENSOR (HIGH)		
K3R	MAGNETIC RELAY(A2P)	S1NPL	PRESSURE SENSOR (LOW)		
K3R	MAGNETIC RELAY (Y3S)(A1P)	S1PH	PRESSURE SWITCH (HIGH)		
K4R	MAGNETIC RELAY (Y2S)(A1P)	SEG1~SEG3	7-SEGMENT DISPLAY(A1P)		
K5R	MAGNETIC RELAY (Y5S)(A1P)	T1A	CURRENT SENSOR	CONNECTOR FOR OPTIONAL ACCESSORIES	
K7R	MAGNETIC RELAY (E1HC)(A1P)	V1R	POWER MODULE(A3P)(A4P)	X37A	CONNECTOR (POWER ADAPTER)
K11R	MAGNETIC RELAY (Y1S)(A1P)	X1A, X2A	CONNECTOR(M1F)	X66A	CONNECTOR (REMOTE SWITCHING COOL/HEAT SELECTOR)
L1R	REACTOR	X3A	CONNECTOR(CHECK THE RESIDUAL CHARGE)		

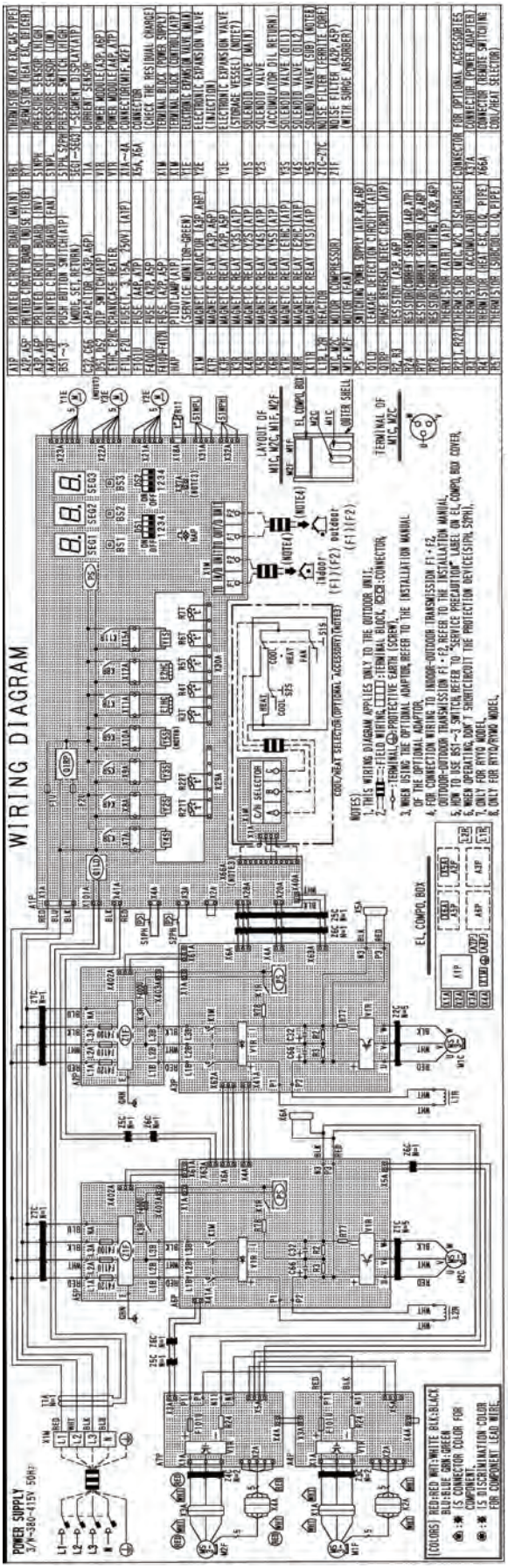
RYYQ10-12T7Y1B
RXYQ10-12Y1B
RYMQ10-12T7Y1B



NOTES) 1. THIS WIRING DIAGRAM APPLIES ONLY TO THE OUTDOOR UNIT.
2. ⊏⊐: FIELD WIRING, ⊏⊐: TERMINAL BLOCK, ⊏⊐: CONNECTOR, —o—: TERMINAL, ⏚: PROTECTIVE EARTH (SCREW).
3. WHEN USING THE OPTIONAL ADAPTOR, REFER TO THE INSTALLATION MANUAL OF THE OPTIONAL ADAPTOR.
4. FOR CONNECTION WIRING TO INDOOR-OUTDOOR TRANSMISSION F1・F2, OUTDOOR-OUTDOOR TRANSMISSION F1・F2, REFER TO THE INSTALLATION MANUAL.
5. HOW TO USE BS1~3 SWITCH, REFER TO "SERVICE PRECAUTION" LABEL ON EL. COMPO. BOX COVER.
6. WHEN OPERATING, DON'T SHORTCIRCUIT THE PROTECTION DEVICE(S1PH).
7. COLORS BLK:BLACK; RED:RED; BLU:BLUE; WHT:WHITE; GRN:GREEN.
8. ONLY FOR RYYQ MODEL.
9. ONLY FOR RYYQ / RYMQ MODEL.

A1P	PRINTED CIRCUIT BOARD (MAIN)	M1C	MOTOR (COMPRESSOR)	X1A, X2A	CONNECTOR(M1F)
A2P	PRINTED CIRCUIT BOARD (NOISE FILTER)	M1F	MOTOR (FAN)	X3A	CONNECTOR(CHECK THE RESIDUAL CHARGE)
A3P	PRINTED CIRCUIT BOARD (INV)	PS	SWITCHING POWER SUPPLY(A1P, A3P)	X1M	TERMINAL BLOCK (POWER SUPPLY)
A4P	PRINTED CIRCUIT BOARD (FAN)	Q1LD	LEAKAGE DETECTION CIRCUIT(A1P)	X1M	TERMINAL BLOCK (CONTROL)(A1P)
BS1~3	PUSH BUTTON SWITCH(A1P) (MODE, SET, RETURN)	Q1RP	PHASE REVERSAL DETECT CIRCUIT(A1P)	Y1E	ELECTRONIC EXPANSION VALVE (MAIN)
		R1T	THERMISTOR (AIR)(A1P)	Y2E	ELECTRONIC EXPANSION VALVE (INJECTION)
C47, C48	CAPACITOR(A3P)	R2T	THERMISTOR(M1C DISCHARGE)		
DS1, DS2	DIP SWITCH(A1P)	R3T	THERMISTOR (ACCUMULATOR)	Y3E	ELECTRONIC EXPANSION VALVE (STORAGE VESSEL)(NOTE 8)
E1HC	CRANKCASE HEATER	R4T	THERMISTOR (HEAT EXC. LIQ. PIPE)		
F1U, F2U	FUSE(T, 3.15A, 250V)(A1P)	R5T	THERMISTOR (SUBCOOL LIQ. PIPE)	Y1S	SOLENOID VALVE (MAIN)
F101U	FUSE(A4P)	R6T	THERMISTOR (HEAT EXC. GAS PIPE)	Y2S	SOLENOID VALVE (ACCUMULATOR OIL RETURN)
F410U~F412U	FUSE(A2P)	R7T	THERMISTOR (HEAT EXC. DEICER)		
F601U	FUSE(A3P)	R8T	THERMISTOR (M1C BODY)	Y3S	SOLENOID VALVE(OIL1)
HAP	PILOTLAMP(A1P) (SERVICE MONITOR-GREEN)	R1	RESISTOR(CURRENT LIMTING)(A3P)	Y5S	SOLENOID VALVE (SUB)(NOTE 9)
		R24	RESISTOR(CURRENT SENSOR)(A4P)	Z1C~Z6C	NOISE FILTER (FERRITE CORE)
K1M	MAGNETIC CONTACTOR(A3P)	R313	RESISTOR(CURRENT SENSOR)(A3P)	Z1F	NOISE FILTER(A2P) (WITH SURGE ABSORBER)
K1R	MAGNETIC RELAY (A3P)	R865, R867	RESISTOR(A3P)		
K3R	MAGNETIC RELAY (A3P)	S1NPH	PRESSURE SENSOR (HIGH)		
K3R	MAGNETIC RELAY (Y3S)(A1P)	S1NPL	PRESSURE SENSOR (LOW)		
K4R	MAGNETIC RELAY (Y2S)(A1P)	S1PH	PRESSURE SWITCH (HIGH)		
K6R	MAGNETIC RELAY (Y5S)(A1P)	SEG1~SEG3	7-SEGMENT DISPLAY(A1P)	CONNECTOR FOR OPTIONAL ACCESSORIES	
K7R	MAGNETIC RELAY (E1HC)(A1P)	T1A	CURRENT SENSOR	X37A	CONNECTOR (POWER ADAPTER)
K11R	MAGNETIC RELAY (Y1S)(A1P)	V1R	POWER MODULE(A3P)(A4P)	X66A	CONNECTOR (REMOTE SWITCHING COOL/HEAT SELECTOR)
L1R, L2R	REACTOR	V2R	POWER MODULE(A3P)		

RYYQ14-16T7Y1B
RXYQ14-16T7Y1B
RYMQ14-16T7Y1B



RYYQ18-20T7Y1B
RXYQ18-20T7Y1B
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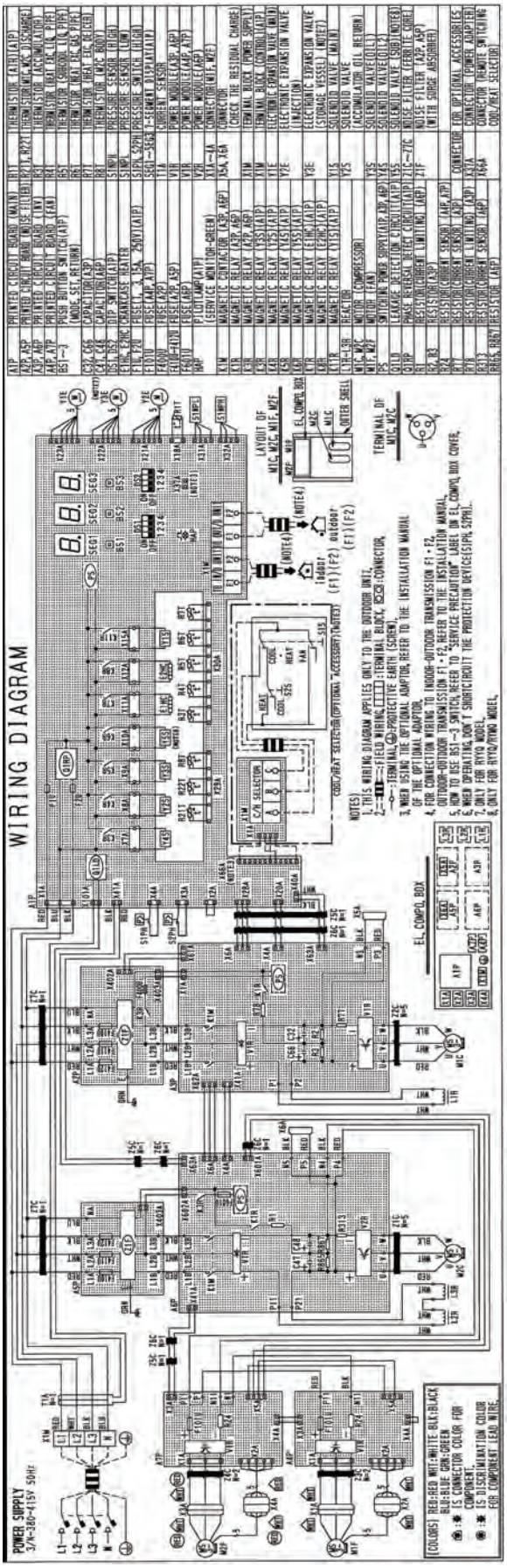

1.2 Field Wiring

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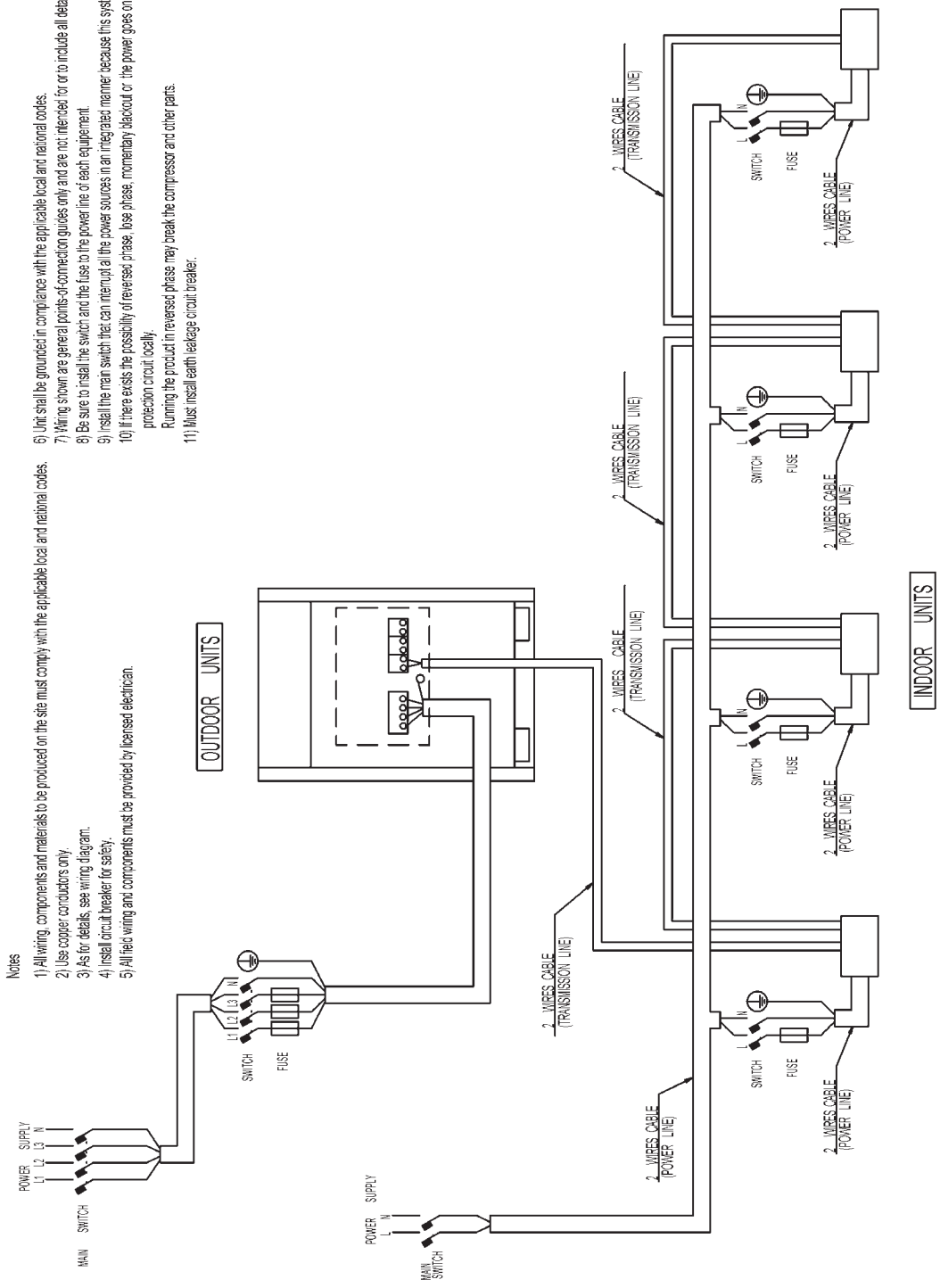
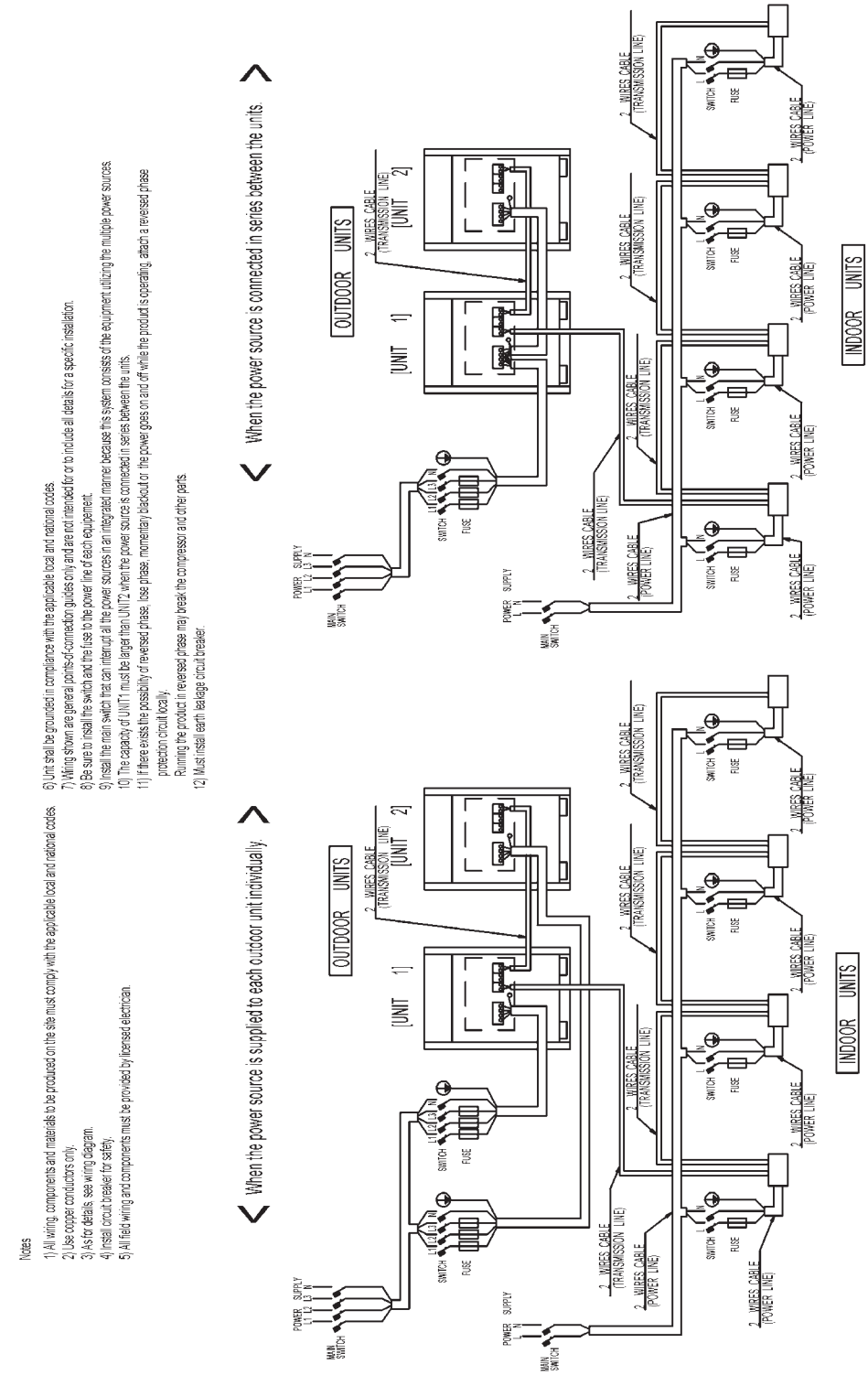
RYYQ8/10/12/14/16/18/20T7Y1B



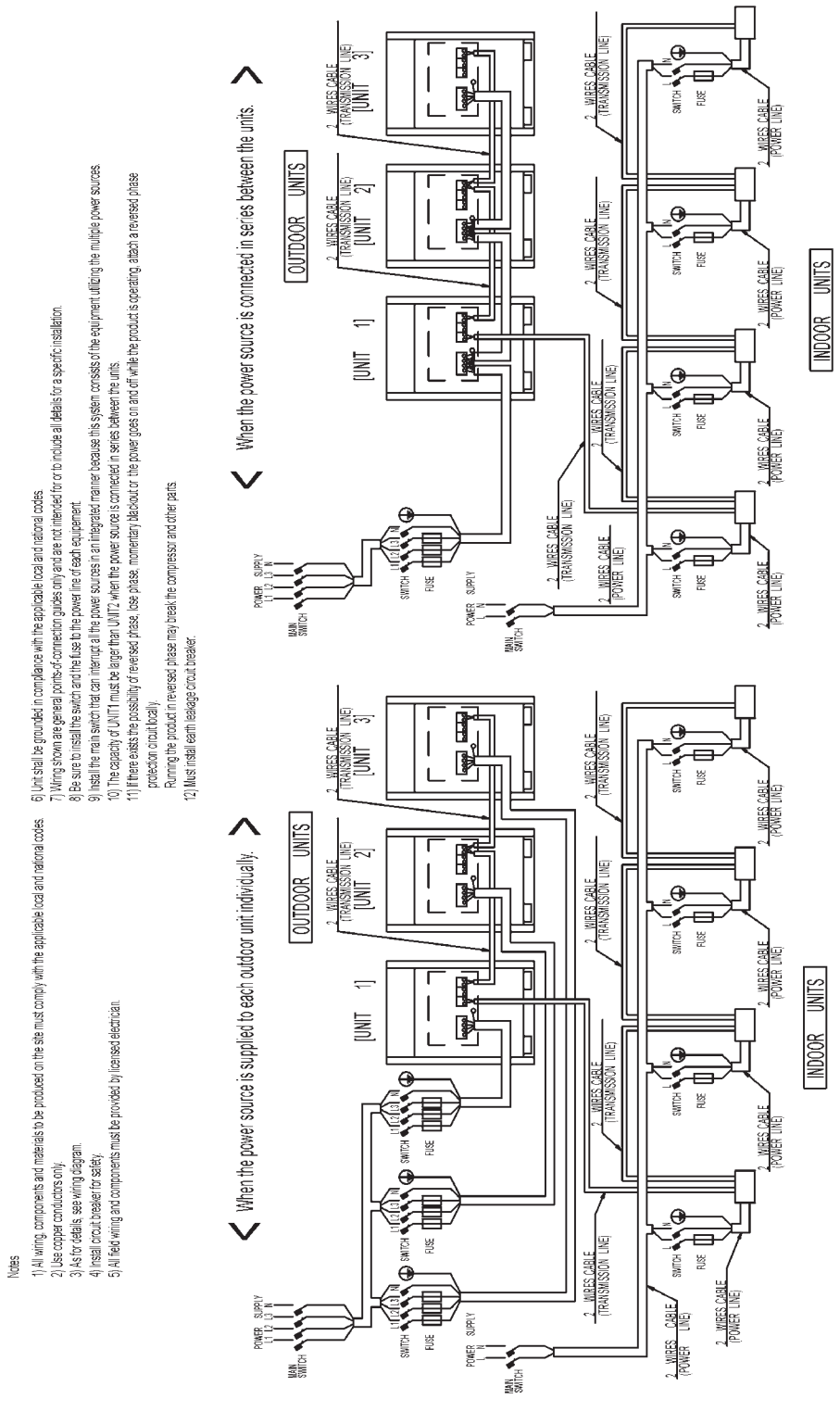
RXYQ22/24/26/28/30/32/34/36T7Y1B
RYYQ22/24/26/28/30/32/34/36T7Y1B



Notes

1) All wiring, components and materials to be produced on the site must comply with the applicable local and national codes.
2) Use copper conductors only.
3) As for details, see wiring diagram.
4) Install circuit breaker for safety.
5) All field wiring and components must be provided by licensed electrician.
6) Unit shall be grounded in compliance with the applicable local and national codes.
7) Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
8) Be sure to install the switch and the fuse to the power line of each equipment.
9) Install the main switch that can interrupt all the power sources in an integrated manner because this system consists of the equipment utilizing the multiple power sources.
10) The capacity of UNIT1 must be larger than UNIT2 when the power source is connected in series between the units.
11) If there exists the possibility of reversed phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reversed phase protection circuit locally.
Running the product in reversed phase may break the compressor and other parts.
12) Must install earth leakage circuit breaker.

RXYQ38/40/42/44/46/48/50/52/54T7Y1B
RYYQ38/40/42/44/46/48/50/52/54T7Y1B



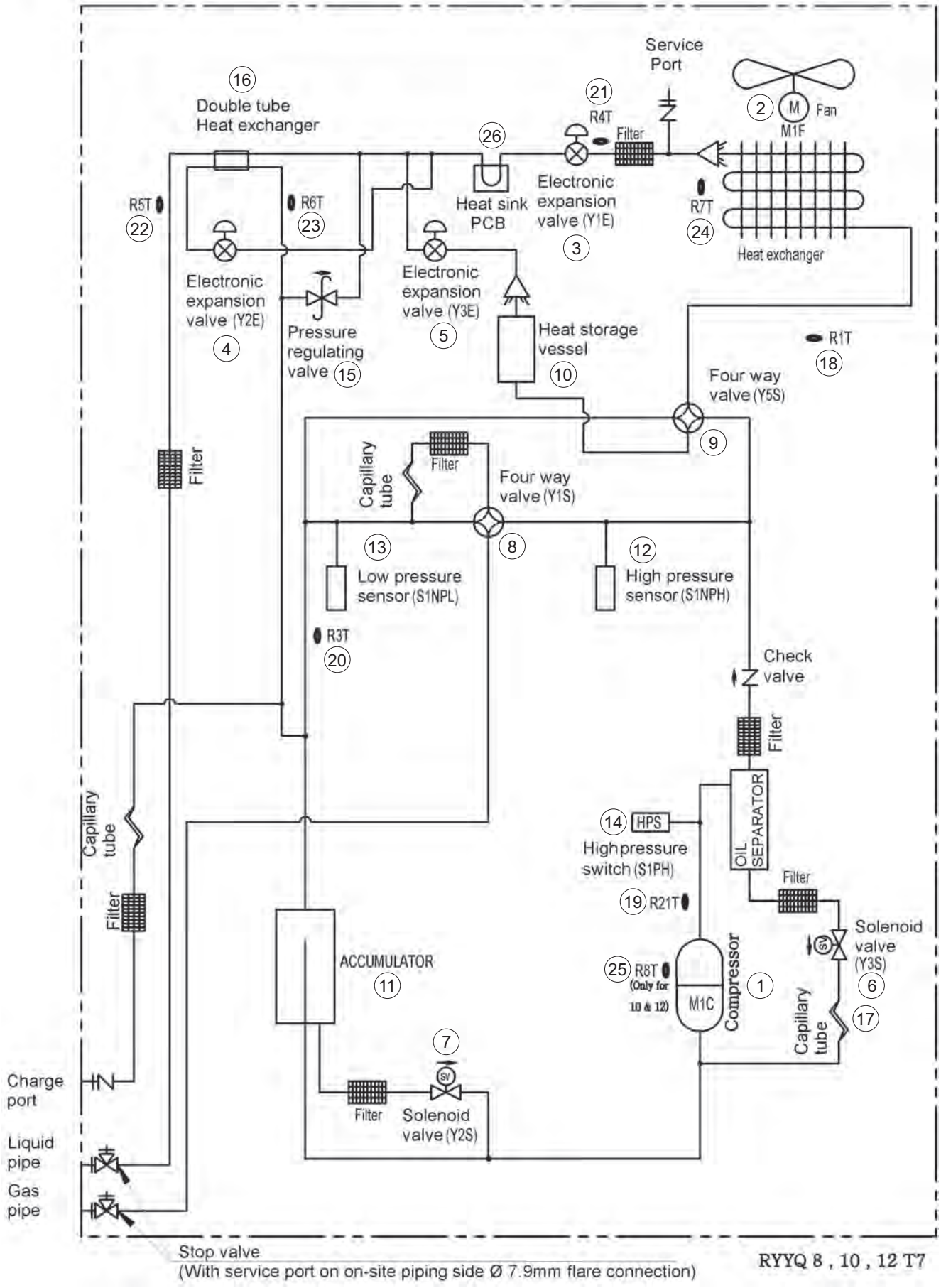
Notes
1) All wiring, components and materials to be produced on the site must comply with the applicable local and national codes.
2) Use copper conductors only.
3) As for details, see wiring diagram.
4) Install circuit breaker for safety.
5) All field wiring and components must be provided by licensed electrician.
6) Unit shall be grounded in compliance with the applicable local and national codes.
7) Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
8) Be sure to install the switch and the fuse to the power line of each equipement.
9) Install the main switch that can interrupt all the power sources in an integrated manner because this system consists of the equipment utilizing the multiple power sources.
10) The capacity of UNIT1 must be larger than UNIT2 when the power source is connected in series between the units.
11) If there exists the possibility of reversed phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reversed phase protection circuit locally.
Running the product in reversed phase may break the compressor and other parts.
12) Must install earth leakage circuit breaker.

Part 4
Refrigerant Circuit

1. Piping Diagram and Functional Parts Layout

1.1 RYYQ8,10,12T7Y1B

No.	Name Part	Wiring Symbol	Major Function
1	Inverter driven compressor	M1C	Inverter driven compressor is operated in multi-steps according to Te for cooling, Tc for heating.
2	INV fan	M1F	When outdoor coil is condensor, the fan is operated in 8 steps to maintain minimum Tc.
3	Expansion valve for outdoor coil	Y1E	In cooling: fully open when compressor operation. In heating operation: PI control to keep the superheat constant.
4	Expansion valve for sub cool heat exchanger	Y2E	Used to control outlet super heat on sub cool heat exchanger.
5	Expansion valve for PCM heat exchanger	Y3E	Used to control flow through the heat exchanger of the PCM vessel during heating (used as subcondensor) and defrost (used as main evaporator). Circuit is not used during cooling mode.
6	Solenoid valve oil return from oil separator	Y3S	Used to control amount of returned oil from the oil separator to the compressor.
7	Solenoid valve oil return from accumulator	Y2S	Used to return oil from the accumulator to the compressor.
8	4 way valve indoor side	Y1S	Used to switch the operation mode between cooling and heating.
9	4 way valve outdoor side	Y5S	Used to switch condition of outdoor heat exchanger versus PCM vessel.
10	PCM vessel	—	Phase change material vessel will store heat during heating cycle. By absorbing heat, PCM becomes liquid. During defrost cycle, the PCM heat exchanger is used as evaporator. By cooling down, the PCM becomes solid.
11	Suction accumulator	—	Used to avoid liquid back to the compressor (upper area) while also storage of refrigerant not required to circulate at current capacity step.
12	HP sensor	S1NPH	Used to detect discharge pressure. In cooling mainly used to control fan speed outdoor. In heating mode mainly used for compressor capacity control.
13	LP sensor	S1NPL	Used to detect suction pressure. In cooling mainly used to control compressor capacity. In heating mode to enable to calculate suction superheat.
14	High pressure switch	S1PH	In order to prevent the increase of high pressure when a malfunction occurs. This pressure switch opens over 4.0MPa or more to stop the compressor operation.
15	Pressure regulating valve	—	This valve opens at a pressure of 4.0MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
16	Subcooling heat exchanger	—	Used to subcool liquid refrigerant.
17	Capillary tube	—	Used to return the refrigerating oil separated through the oil separator to the compressor.
18	Thermistor air	R1T	Detects outdoor ambient temperature. Mainly used to correct discharge pipe temperature, and defrosting condition.
19	Thermistor discharge	R21T	Detects discharge pipe temperature. Mainly used for discharge temperature protection of compressor.
20	Thermistor accumulator inlet	R3T	Detects the gas inlet temperature of the accumulator. Mainly used to keep the suction superheated degree constant in heating operation.
21	Thermistor main liquid pipe to outdoor coil	R4T	Detects liquid pipe temperature of heat exchanger, determine subcool during autocharge, test run and leak test, overcharge during test run.
22	Thermistor main liquid to indoor coil	R5T	Detects liquid pipe temperature. Mainly used to judge effect of liquid subcool circuit during test run and leak test.
23	Thermistor subcooling heat exchanger gas pipe	R6T	Detects gas pipe temperature on the evaporation side of subcooling heat exchanger, keep the superheated degree at the outlet of subcooling heat exchanger constant.
24	Thermistor heat exchanger deicer	R7T	Detects liquid pipe temperature of air heat exchanger, determine start and end defrost operation.
25	Thermistor compressor surface	R8T	Detects compressor surface temperature, this switch is activated at surface temperature of 120 deg. or more to stop the compressor operation (only for RYY10,12T).
26	Cooling plate	—	Used to cool plate of switch box by refrigerant.



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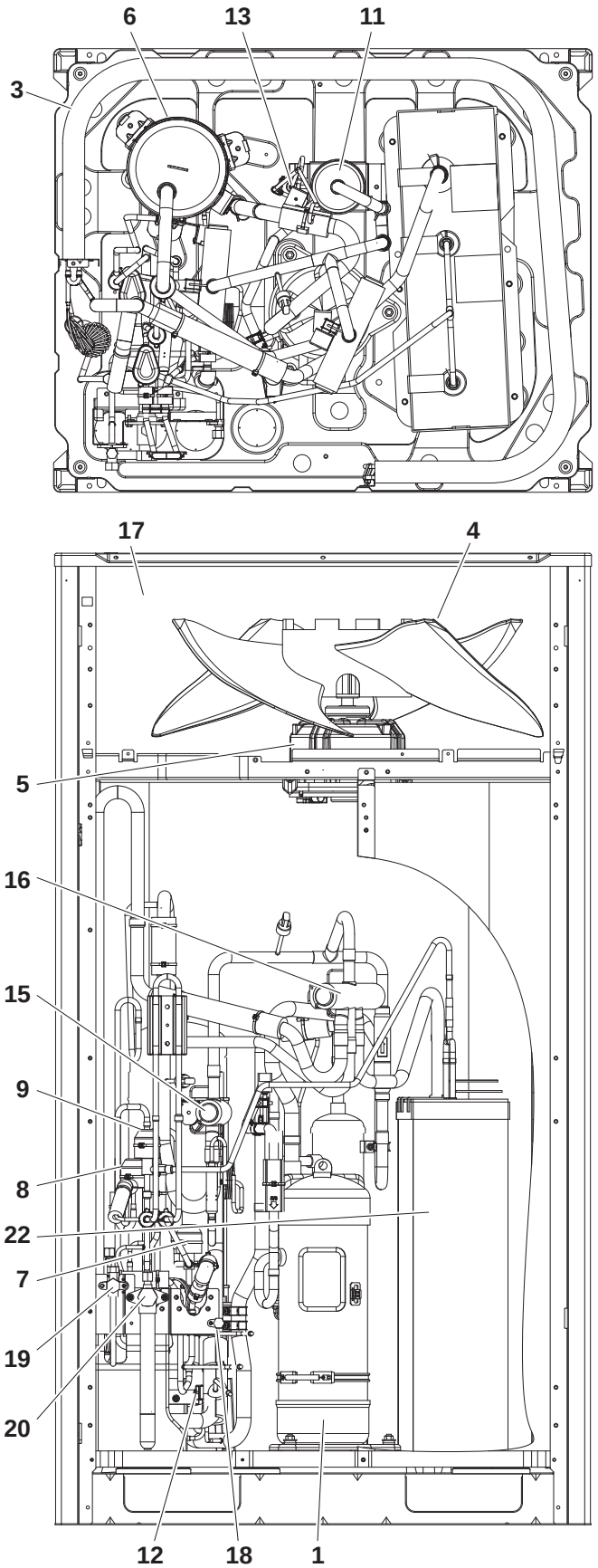
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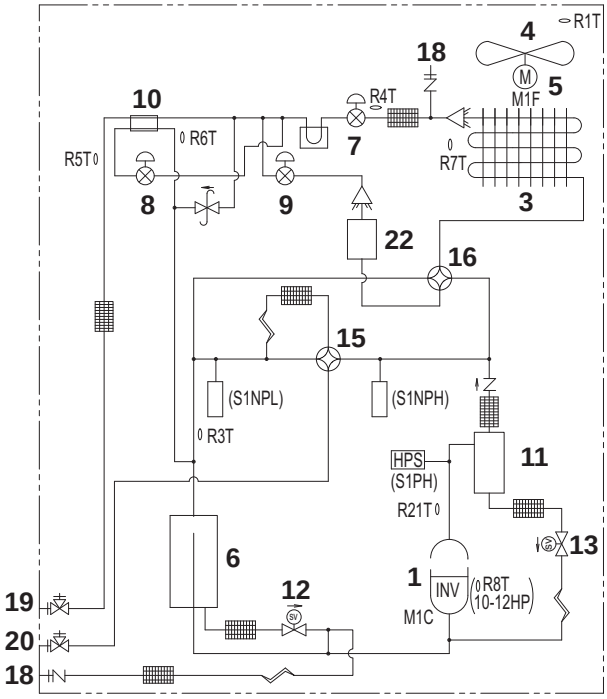
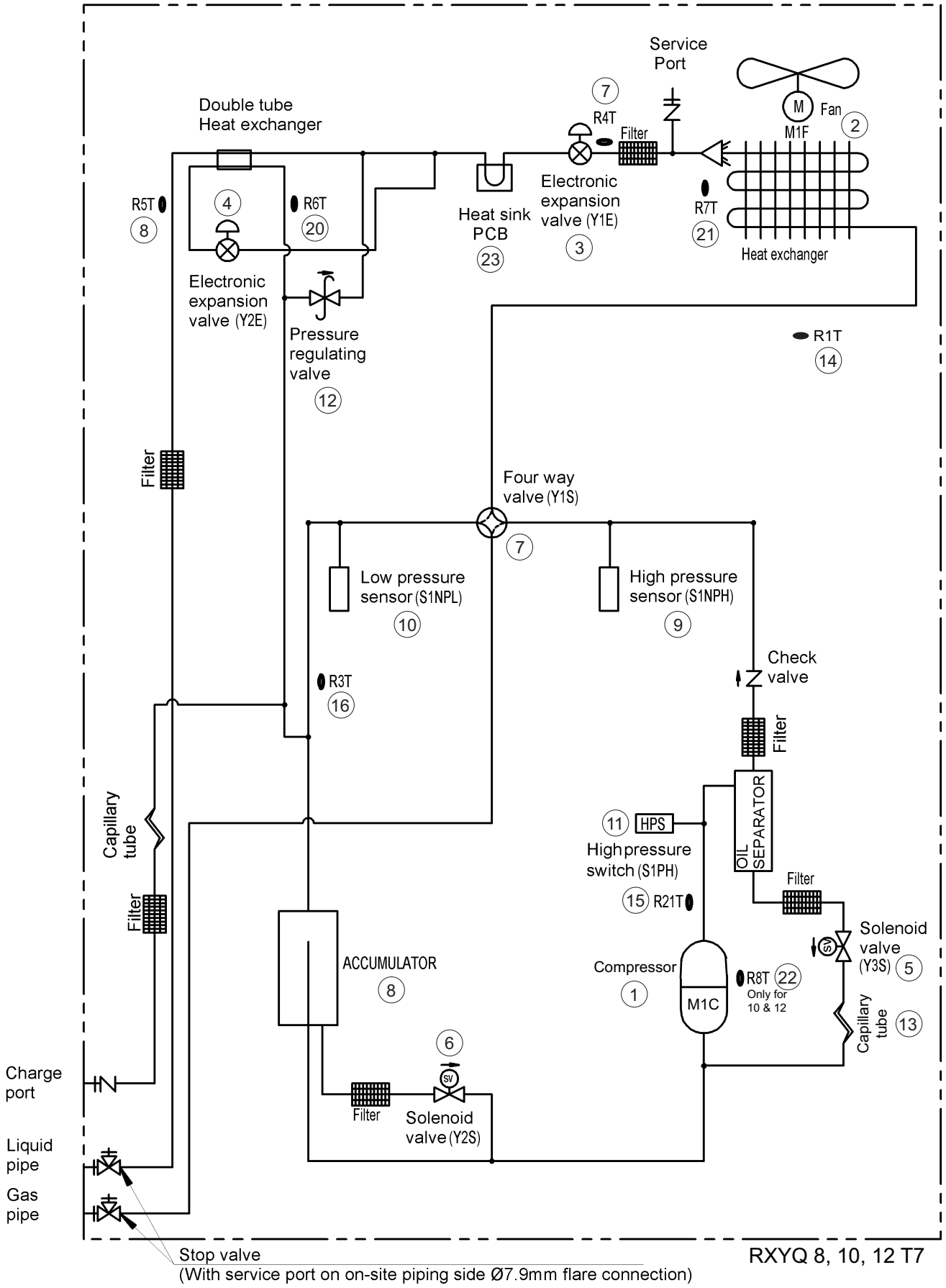


1 Compressor (M1C)
3 Heat exchanger
4 Fan
5 Fan motor (M1F, M2F)
6 Accumulator
7 Expansion valve, main (Y1E)
8 Expansion valve, subcool heat exchanger (Y2E)
9 Expansion valve, storage vessel (Y3E)
10 Subcool heat exchanger
11 Oil separator
12 Solenoid valve, oil accumulator (Y2S)
13 Solenoid valve, oil1 (Y3S)
15 4-way valve, main (Y1S)
16 4-way valve, sub (Y5S)
17 Electrical component box
18 Service port, refrigerant charge
19 Stop valve, liquid
20 Stop valve, gas
21 Stop valve, equalizing gas
22 Heat accumulation element

From manufacturing number 3000000.

1.2 RXYQ8,10,12T7Y1B

No.	Name Part	Wiring Symbol	Major Function
1	Inverter driven compressor	M1C	Inverter driven compressor is operated in multi-steps according to Te for cooling, Tc for heating.
2	INV fan	M1F	When outdoor coil is condensor, the fan is operated in 8 steps to maintain minimum Tc.
3	Expansion valve for outdoor coil	Y1E	In cooling: fully open when compressor operation. In heating operation: PI control to keep the superheat constant.
4	Expansion valve for sub cool heat exchanger	Y2E	Used to control outlet super heat on sub cool heat exchanger.
5	Solenoid valve oil return from oil separator	Y3S	Used to control amount of returned oil from the oil separator to the compressor.
6	Solenoid valve oil return from accumulator	Y2S	Used to return oil from the accumulator to the compressor.
7	4 way valve indoor side	Y1S	Used to switch the operation mode between cooling and heating.
8	Suction accumulator	—	Used to avoid liquid back to the compressor (upper area) while also storage of refrigerant not required to circulate at current capacity step.
9	HP sensor	S1NPH	Used to detect discharge pressure. In cooling mainly used to control fan speed outdoor. In heating mode mainly used for compressor capacity control.
10	LP sensor	S1NPL	Used to detect suction pressure. In cooling mainly used to control compressor capacity. In heating mode to enable to calculate suction superheat.
11	High pressure switch	S1PH	In order to prevent the increase of high pressure when a malfunction occurs. This pressure switch opens over 4.0MPa or more to stop the compressor operation.
12	Pressure regulating valve	—	This valve opens at a pressure of 4.0MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
13	Subcooling heat exchanger	—	Used to subcool liquid refrigerant.
14	Capillary tube	—	Used to return the refrigerating oil separated through the oil separator to the compressor.
15	Thermistor air	R1T	Detects outdoor ambient temperature. Mainly used to correct discharge pipe temperature, and defrosting condition.
16	Thermistor discharge	R21T	Detects discharge pipe temperature. Mainly used for discharge temperature protection of compressor.
17	Thermistor accumulator inlet	R3T	Detects the gas inlet temperature of the accumulator. Mainly used to keep the suction superheated degree constant in heating operation.
18	Thermistor main liquid pipe to outdoor coil	R4T	Detects liquid pipe temperature of heat exchanger, determine subcool during autocharge, test run and leak test, overcharge during test run.
19	Thermistor main liquid to indoor coil	R5T	Detects liquid pipe temperature. Mainly used to judge effect of liquid subcool circuit during test run and leak test.
20	Thermistor subcooling heat exchanger gas pipe	R6T	Detects gas pipe temperature on the evaporation side of subcooling heat exchanger, keep the superheated degree at the outlet of subcooling heat exchanger constant.
21	Thermistor heat exchanger deicer	R7T	Detects liquid pipe temperature of air heat exchanger, determine start and end defrost operation.
22	Thermistor compressor surface	R8T	Detects compressor surface temperature, this switch is activated at surface temperature of 120 deg. or more to stop the compressor operation (only for RXYQ10,12T).
23	Cooling plate	—	Used to cool plate of switch box by refrigerant.



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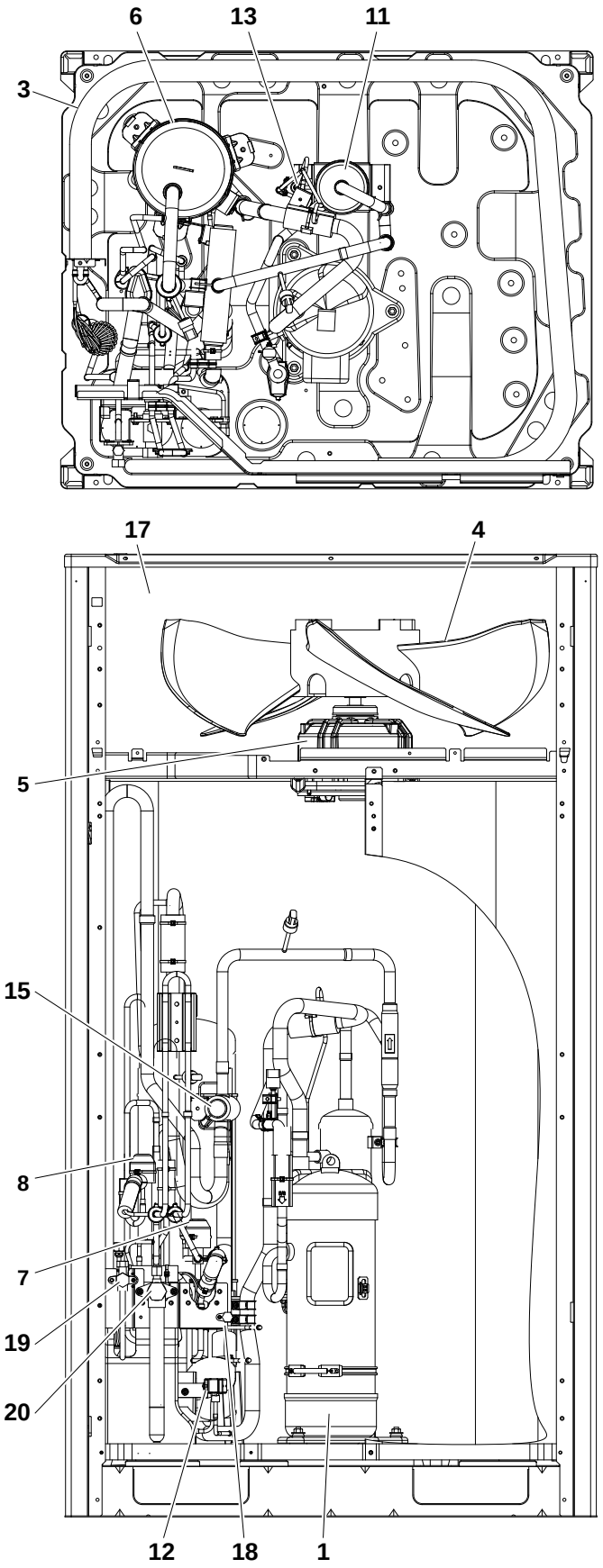
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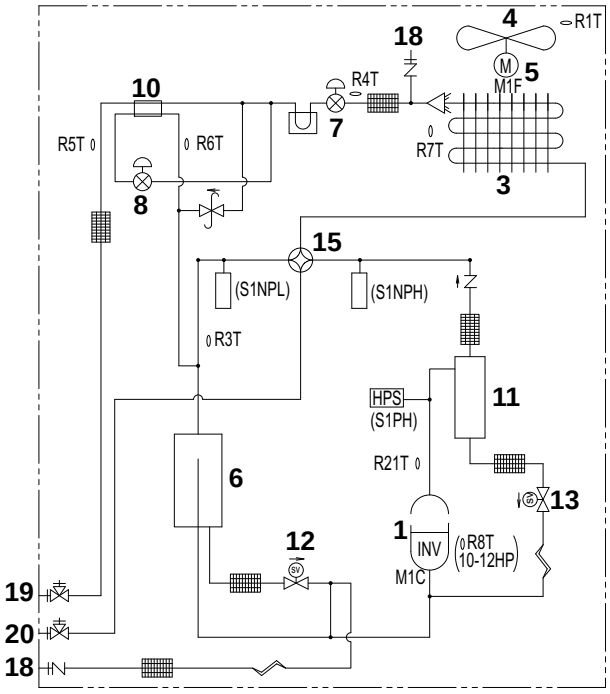
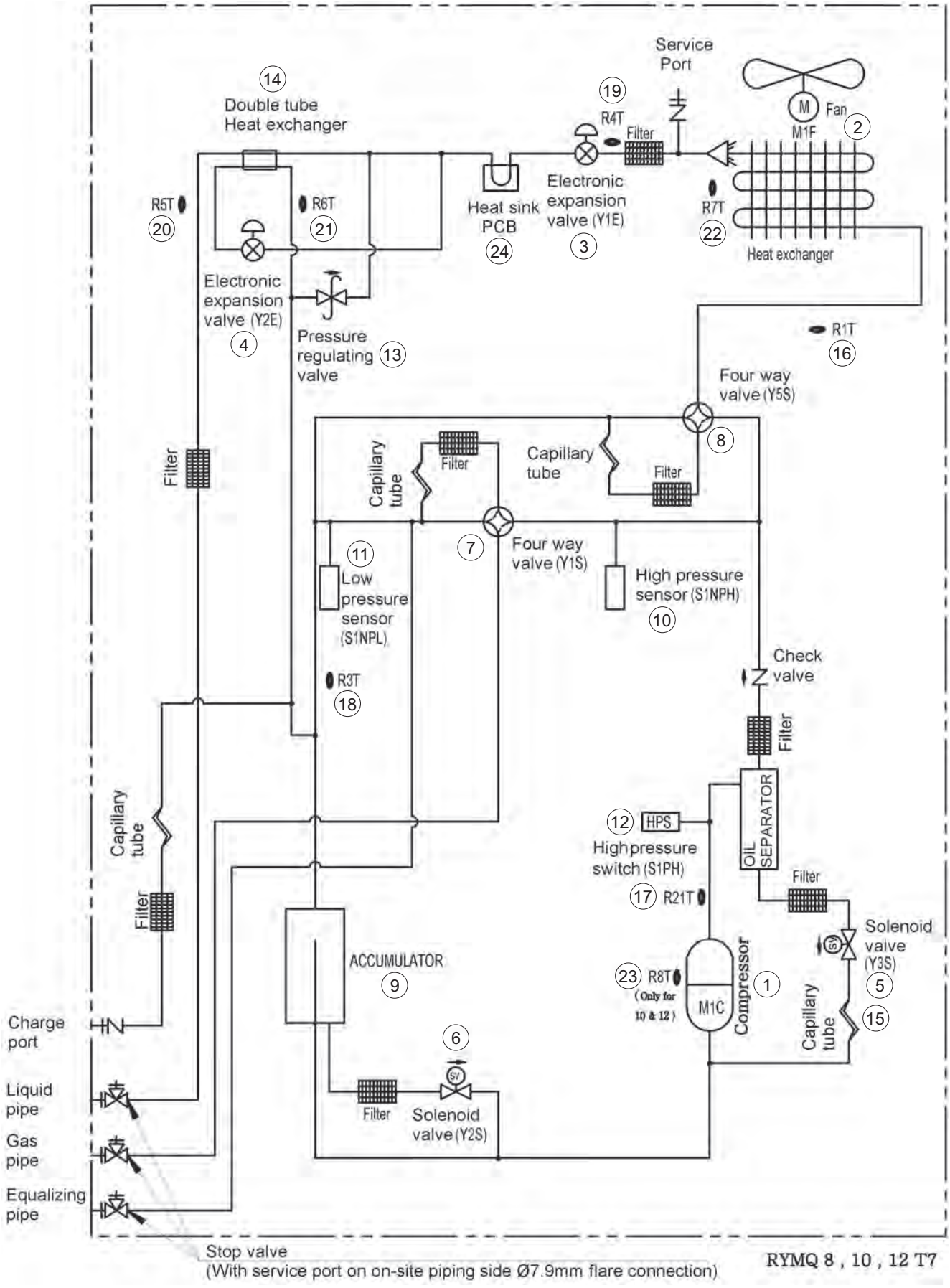


1 Compressor (M1C)
3 Heat exchanger
4 Fan
5 Fan motor (M1F, M2F)
6 Accumulator
7 Expansion valve, main (Y1E)
8 Expansion valve, subcool heat exchanger (Y2E)
10 Subcool heat exchanger
11 Oil separator
12 Solenoid valve, oil accumulator (Y2S)
13 Solenoid valve, oil1 (Y3S)
15 4-way valve, main (Y1S)
17 Electrical component box
18 Service port, refrigerant charge
19 Stop valve, liquid
20 Stop valve, gas

From manufacturing number 3000000.

1.3 RYMQ8,10,12T7Y1B

No.	Name Part	Wiring Symbol	Major Function
1	Inverter driven compressor	M1C	Inverter driven compressor is operated in multi-steps according to Te for cooling, Tc for heating.
2	INV fan	M1F	When outdoor coil is condensor, the fan is operated in 8 steps to maintain minimum Tc.
3	Expansion valve for outdoor coil	Y1E	In cooling: fully open when compressor operation. In heating operation: PI control to keep the superheat constant.
4	Expansion valve for sub cool heat exchanger	Y2E	Used to control outlet super heat on sub cool heat exchanger.
5	Solenoid valve oil return from oil separator	Y3S	Used to control amount of returned oil from the oil separator to the compressor.
6	Solenoid valve oil return from accumulator	Y2S	Used to return oil from the accumulator to the compressor.
7	4 way valve indoor side	Y1S	Used to switch the operation mode between cooling and heating.
8	4 way valve outdoor side	Y5S	Used to switch condition of outdoor heat exchanger as condensor or evaporator.
9	Suction accumulator	—	Used to avoid liquid back to the compressor (upper area) while also storage of refrigerant not required to circulate at current capacity step.
10	HP sensor	S1NPH	Used to detect discharge pressure. In cooling mainly used to control fan speed outdoor. In heating mode mainly used for compressor capacity control.
11	LP sensor	S1NPL	Used to detect suction pressure. In cooling mainly used to control compressor capacity. In heating mode to enable to calculate suction superheat.
12	High pressure switch	S1PH	In order to prevent the increase of high pressure when a malfunction occurs. This pressure switch opens over 4.0MPa or more to stop the compressor operation.
13	Pressure regulating valve	—	This valve opens at a pressure of 4.0MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
14	Subcooling heat exchanger	—	Used to subcool liquid refrigerant.
15	Capillary tube	—	Used to return the refrigerating oil separated through the oil separator to the compressor.
16	Thermistor air	R1T	Detects outdoor ambient temperature. Mainly used to correct discharge pipe temperature, and defrosting condition.
17	Thermistor discharge	R21T	Detects discharge pipe temperature. Mainly used for discharge temperature protection of compressor.
18	Thermistor accumulator inlet	R3T	Detects the gas inlet temperature of the accumulator. Mainly used to keep the suction superheated degree constant in heating operation.
19	Thermistor main liquid pipe to outdoor coil	R4T	Detects liquid pipe temperature of heat exchanger, determine subcool during autocharge, test run and leak test, overcharge during test run.
20	Thermistor main liquid to indoor coil	R5T	Detects liquid pipe temperature. Mainly used to judge effect of liquid subcool circuit during test run and leak test.
21	Thermistor subcooling heat exchanger gas pipe	R6T	Detects gas pipe temperature on the evaporation side of subcooling heat exchanger, keep the superheated degree at the outlet of subcooling heat exchanger constant.
22	Thermistor heat exchanger deicer	R7T	Detects liquid pipe temperature of air heat exchanger, determine start and end defrost operation.
23	Thermistor compressor surface	R8T	Detects compressor surface temperature, this switch is activated at surface temperature of 120 deg. or more to stop the compressor operation (only for RYM10,12T).
24	Cooling plate	—	Used to cool plate of switch box by refrigerant.



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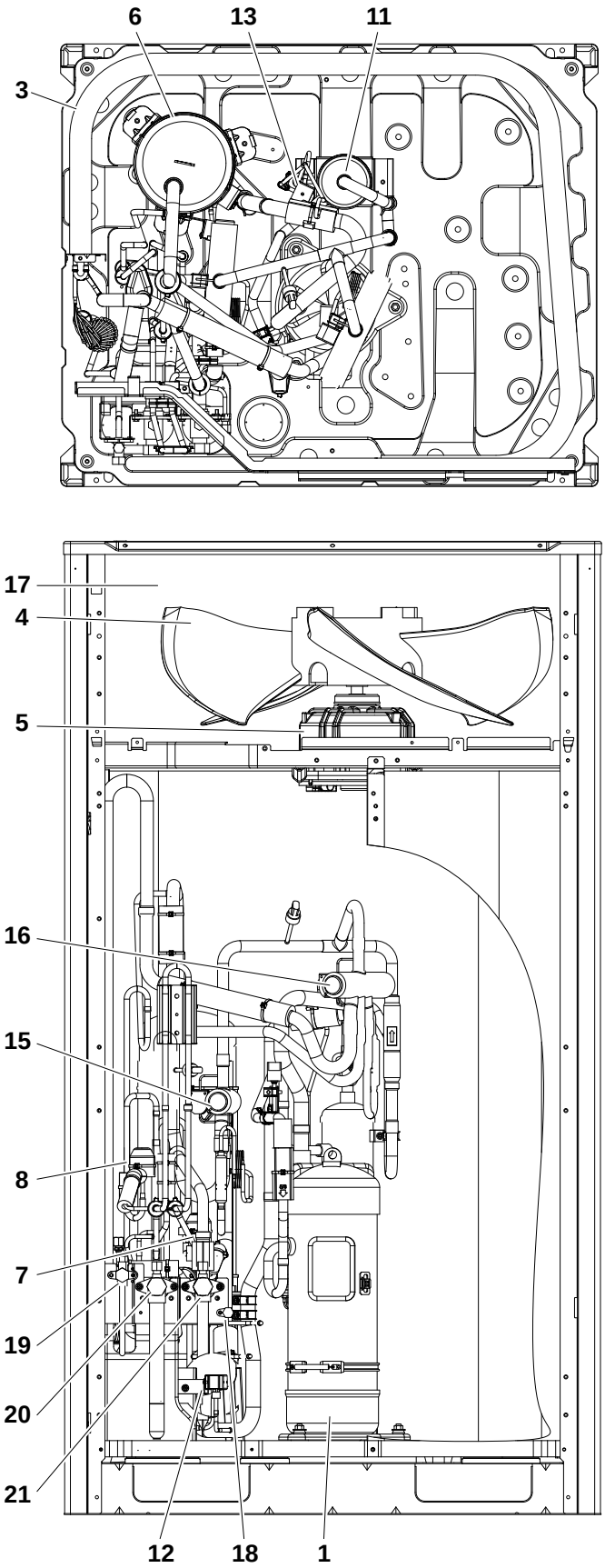
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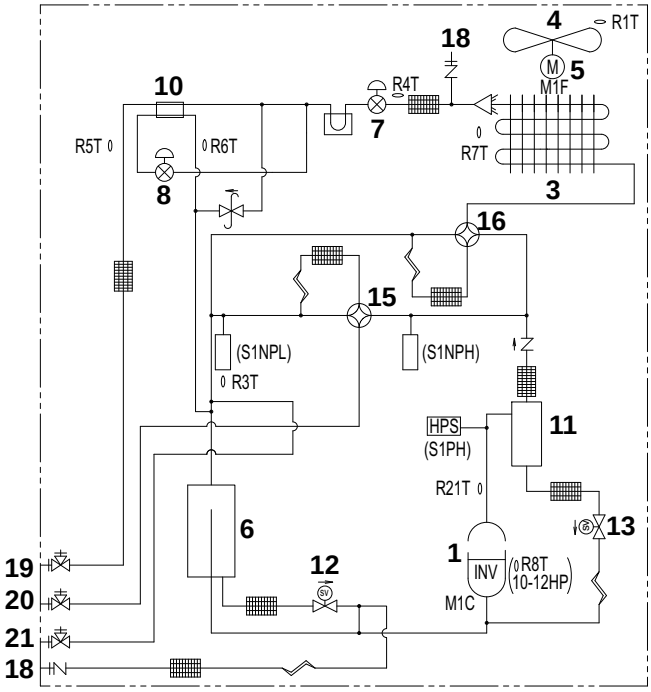
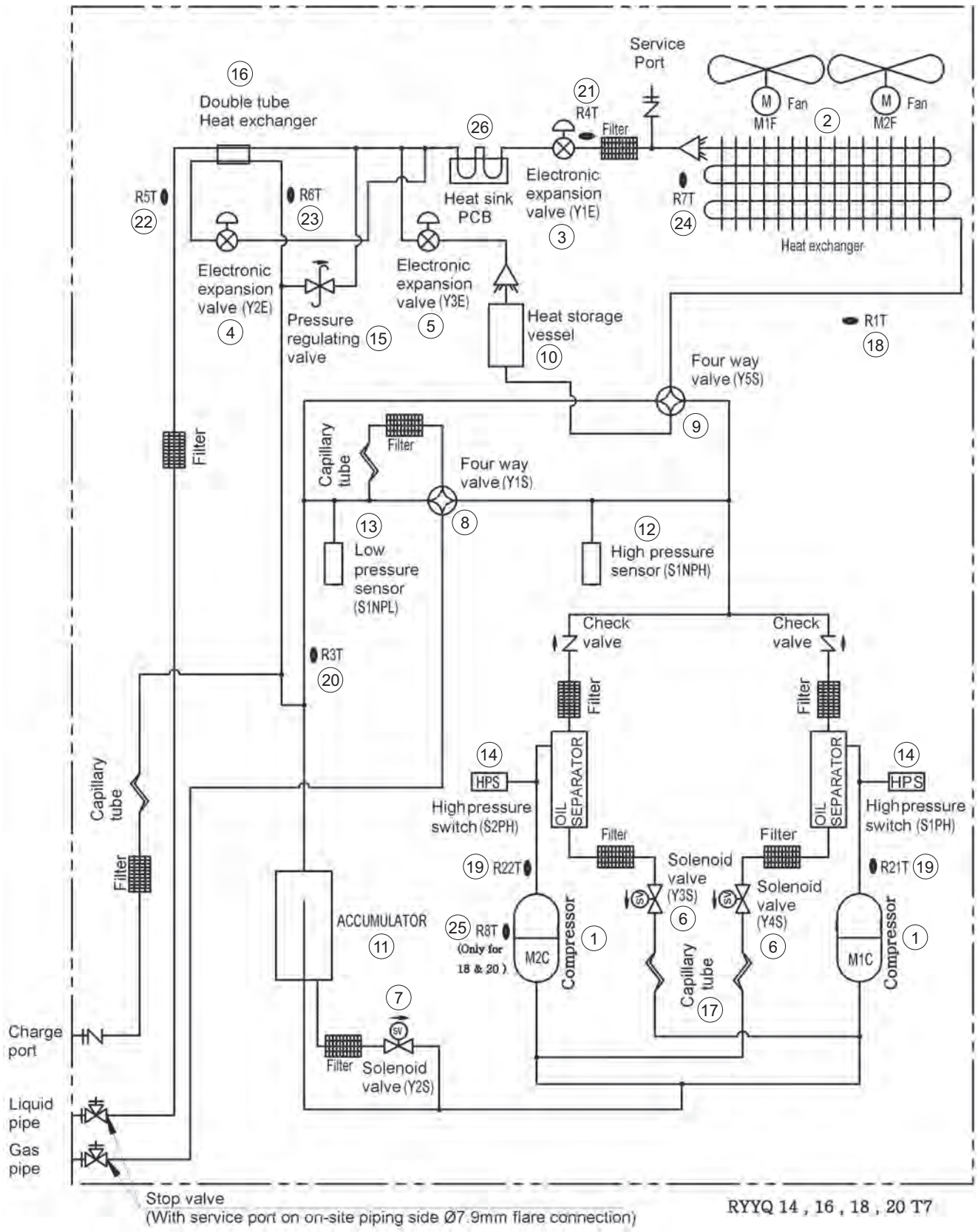


1 Compressor (M1C)
3 Heat exchanger
4 Fan
5 Fan motor (M1F, M2F)
6 Accumulator
7 Expansion valve, main (Y1E)
8 Expansion valve, subcool heat exchanger (Y2E)
10 Subcool heat exchanger
11 Oil separator
12 Solenoid valve, oil accumulator (Y2S)
13 Solenoid valve, oil1 (Y3S)
15 4-way valve, main (Y1S)
16 4-way valve, sub (Y5S)
17 Electrical component box
18 Service port, refrigerant charge
19 Stop valve, liquid
20 Stop valve, gas
21 Stop valve, equalizing gas

From manufacturing number 3000000.

1.4 RYYQ14,16,18,20T7Y1B

No.	Name Part	Wiring Symbol	Major Function
1	Inverter driven compressors	M1,2C	Inverter driven compressors are operated in multi-steps according to Te for cooling, Tc for heating.
2	INV fan	M1,2F	When outdoor coil is condensor, the fan is operated in 8 steps to maintain minimum Tc.
3	Expansion valve for outdoor coil	Y1E	In cooling: fully open when compressor operation. In heating operation: PI control to keep the superheat constant.
4	Expansion valve for sub cool heat exchanger	Y2E	Used to control outlet super heat on sub cool heat exchanger.
5	Expansion valve for PCM heat exchanger	Y3E	Used to control flow through the heat exchanger of the PCM vessel during heating (used as subcondensor) and defrost (used as main evaporator). Circuit is not used during cooling mode.
6	Solenoid valve oil return from oil separator	Y3S, Y4S	Used to control amount of returned oil from the oil separator to the compressor.
7	Solenoid valve oil return from accumulator	Y2S	Used to return oil from the accumulator to the compressor.
8	4 way valve indoor side	Y1S	Used to switch the operation mode between cooling and heating.
9	4 way valve outdoor side	Y5S	Used to switch condition of outdoor heat exchanger versus PCM vessel.
10	PCM vessel	—	Phase change material vessel will store heat during heating cycle. By absorbing heat, PCM becomes liquid. During defrost cycle, the PCM heat exchanger is used as evaporator. By cooling down, the PCM becomes solid.
11	Suction accumulator	—	Used to avoid liquid back to the compressor (upper area) while also storage of refrigerant not required to circulate at current capacity step.
12	HP sensor	S1NPH	Used to detect discharge pressure. In cooling mainly used to control fan speed outdoor. In heating mode mainly used for compressor capacity control.
13	LP sensor	S1NPL	Used to detect suction pressure. In cooling mainly used to control compressor capacity. In heating mode to enable to calculate suction superheat.
14	High pressure switch	S1PH, S2PH	In order to prevent the increase of high pressure when a malfunction occurs. This pressure switch opens over 4.0MPa or more to stop the compressor operation.
15	Pressure regulating valve	—	This valve opens at a pressure of 4.0MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
16	Subcooling heat exchanger	—	Used to subcool liquid refrigerant.
17	Capillary tube	—	Used to return the refrigerating oil separated through the oil separator to the compressor.
18	Thermistor air	R1T	Detects outdoor ambient temperature. Mainly used to correct discharge pipe temperature, and defrosting condition.
19	Thermistor discharge	R21T, R22T	Detects discharge pipe temperature. Mainly used for discharge temperature protection of compressor.
20	Thermistor accumulator inlet	R3T	Detects the gas inlet temperature of the accumulator. Mainly used to keep the suction superheated degree constant in heating operation.
21	Thermistor main liquid pipe to outdoor coil	R4T	Detects liquid pipe temperature of heat exchanger, determine subcool during autocharge, test run and leak test, overcharge during test run.
22	Thermistor main liquid to indoor coil	R5T	Detects liquid pipe temperature. Mainly used to judge effect of liquid subcool circuit during test run and leak test.
23	Thermistor subcooling heat exchanger gas pipe	R6T	Detects gas pipe temperature on the evaporation side of subcooling heat exchanger, keep the superheated degree at the outlet of subcooling heat exchanger constant.
24	Thermistor heat exchanger deicer	R7T	Detects liquid pipe temperature of air heat exchanger, determine start and end defrost operation.
25	Thermistor compressor surface (only for RYYQ10,12T)	R8T	Detects compressor surface temperature, this switch is activated at surface temperature of 120 deg. or more to stop the compressor operation (only for RYYX10,12T).
26	Cooling plate	—	Used to cool plate of switch box by refrigerant.



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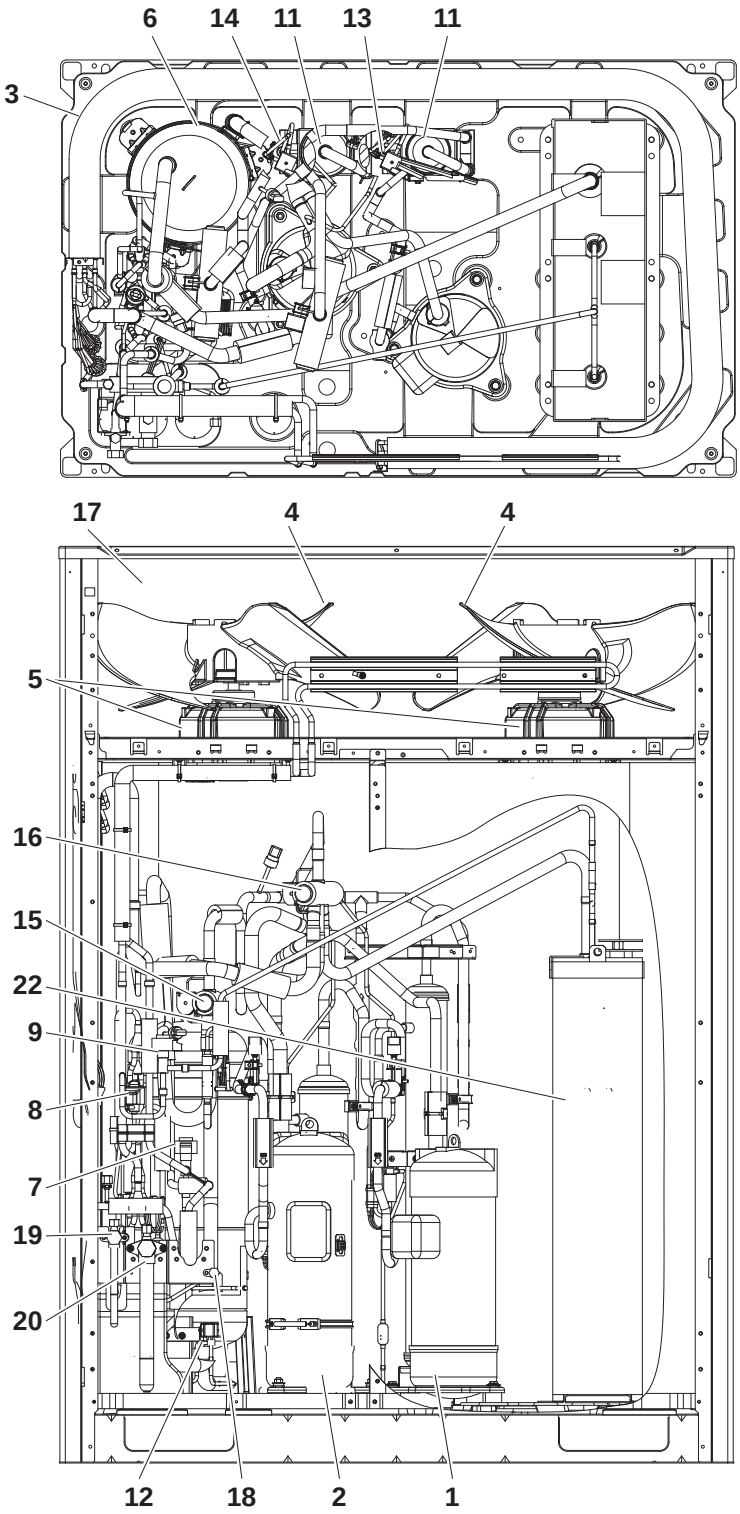
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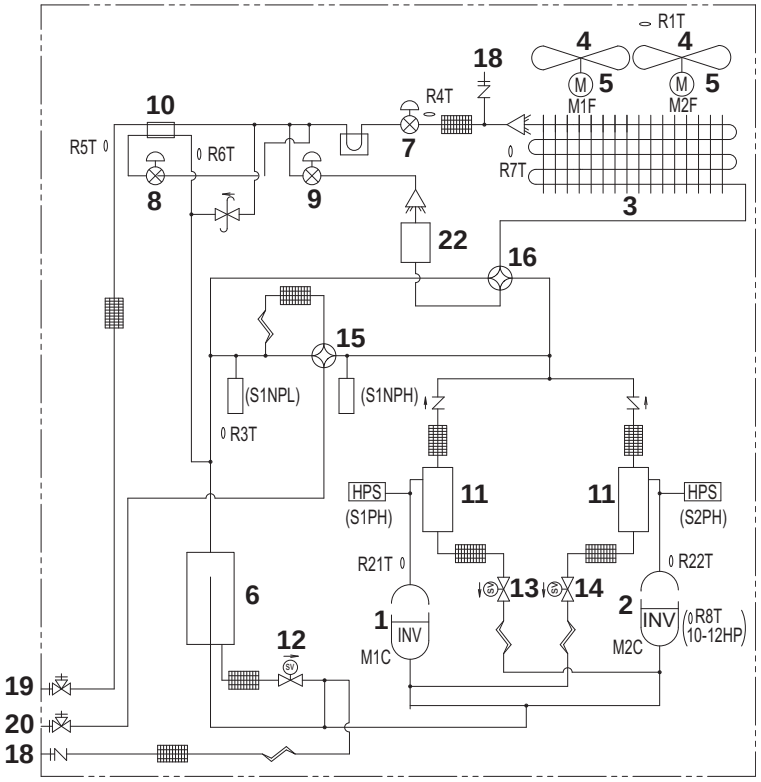
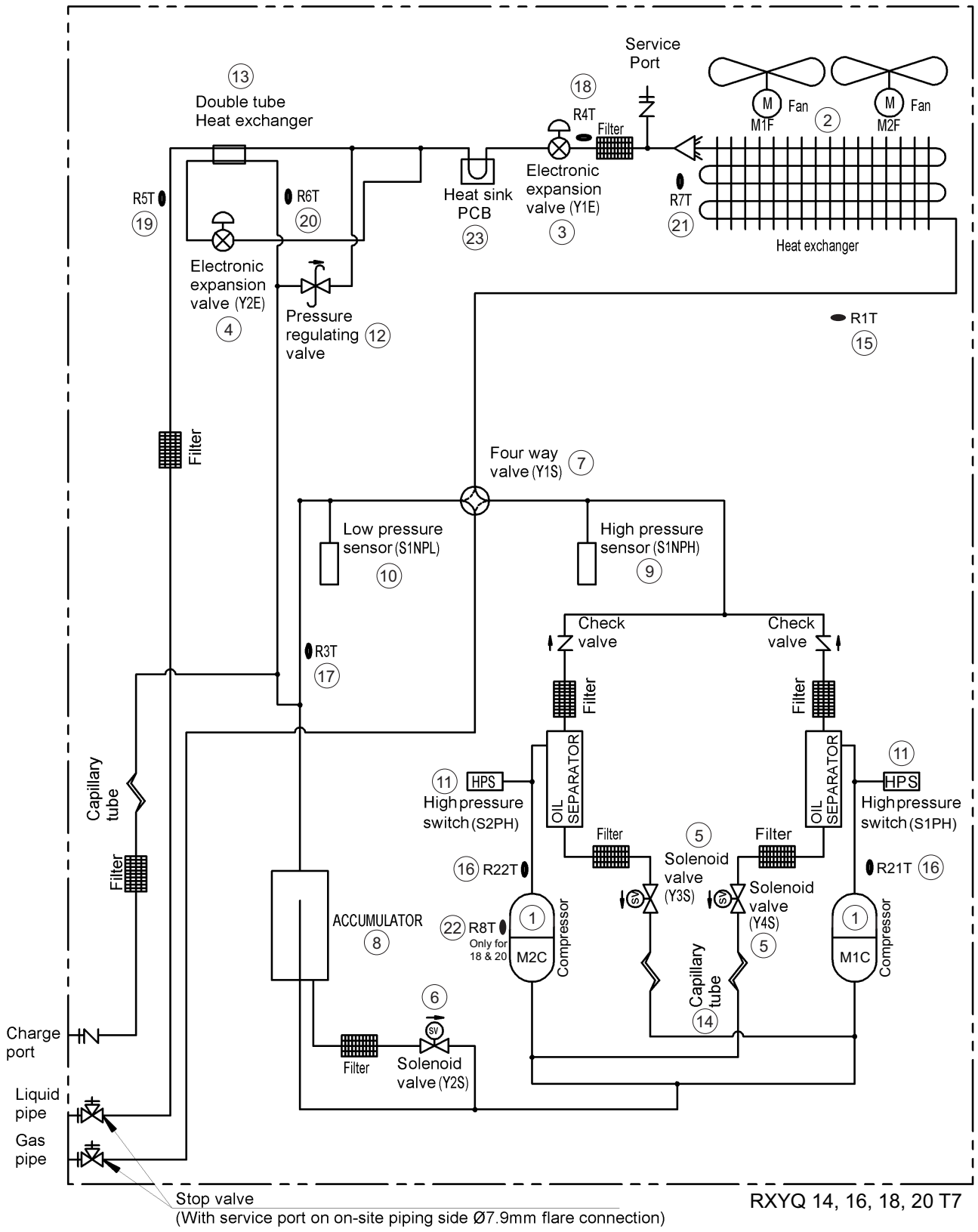


1 Compressor (M1C)
2 Compressor (M2C)
3 Heat exchanger
4 Fan
5 Fan motor (M1F, M2F)
6 Accumulator
7 Expansion valve, main (Y1E)
8 Expansion valve, subcool heat exchanger (Y2E)
9 Expansion valve, storage vessel (Y3E)
10 Subcool heat exchanger
11 Oil separator
12 Solenoid valve, oil accumulator (Y2S)
13 Solenoid valve, oil1 (Y3S)
14 Solenoid valve, oil2 (Y4S)
15 4-way valve, main (Y1S)
16 4-way valve, sub (Y5S)
17 Electrical component box
18 Service port, refrigerant charge
19 Stop valve, liquid
20 Stop valve, gas
21 Stop valve, equalizing gas
22 Heat accumulation element

From manufacturing number 3000000.

1.5 RXYQ14,16,18,20T7Y1B

No.	Name Part	Wiring Symbol	Major Function
1	Inverter driven compressors	M1,2C	Inverter driven compressors are operated in multi-steps according to Te for cooling, Tc for heating.
2	INV fan	M1,2F	When outdoor coil is condensor, the fan is operated in 8 steps to maintain minimum Tc.
3	Expansion valve for outdoor coil	Y1E	In cooling: fully open when compressor operation. In heating operation: PI control to keep the superheat constant.
4	Expansion valve for sub cool heat exchanger	Y2E	Used to control outlet super heat on sub cool heat exchanger.
5	Solenoid valve oil return from oil separator	Y3S, Y4S	Used to control amount of returned oil from the oil separator to the compressor.
6	Solenoid valve oil return from accumulator	Y2S	Used to return oil from the accumulator to the compressor.
7	4 way valve indoor side	Y1S	Used to switch the operation mode between cooling and heating.
8	Suction accumulator	—	Used to avoid liquid back to the compressor (upper area) while also storage of refrigerant not required to circulate at current capacity step.
9	HP sensor	S1NPH	Used to detect discharge pressure. In cooling mainly used to control fan speed outdoor. In heating mode mainly used for compressor capacity control.
10	LP sensor	S1NPL	Used to detect suction pressure. In cooling mainly used to control compressor capacity. In heating mode to enable to calculate suction superheat.
11	High pressure switch	S1PH, S2PH	In order to prevent the increase of high pressure when a malfunction occurs. This pressure switch opens over 4.0MPa or more to stop the compressor operation.
12	Pressure regulating valve	—	This valve opens at a pressure of 4.0MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
13	Subcooling heat exchanger	—	Used to subcool liquid refrigerant.
14	Capillary tube	—	Used to return the refrigerating oil separated through the oil separator to the compressor.
15	Thermistor air	R1T	Detects outdoor ambient temperature. Mainly used to correct discharge pipe temperature, and defrosting condition.
16	Thermistor discharge	R21T, R22T	Detects discharge pipe temperature. Mainly used for discharge temperature protection of compressor.
17	Thermistor accumulator inlet	R3T	Detects the gas inlet temperature of the accumulator. Mainly used to keep the suction superheated degree constant in heating operation.
18	Thermistor main liquid pipe to outdoor coil	R4T	Detects liquid pipe temperature of heat exchanger, determine subcool during autocharge, test run and leak test, overcharge during test run.
19	Thermistor main liquid to indoor coil	R5T	Detects liquid pipe temperature. Mainly used to judge effect of liquid subcool circuit during test run and leak test.
20	Thermistor subcooling heat exchanger gas pipe	R6T	Detects gas pipe temperature on the evaporation side of subcooling heat exchanger, keep the superheated degree at the outlet of subcooling heat exchanger constant.
21	Thermistor heat exchanger deicer	R7T	Detects liquid pipe temperature of air heat exchanger, determine start and end defrost operation.
22	Thermistor compressor surface	R8T	Detects compressor surface temperature, this switch is activated at surface temperature of 120 deg. or more to stop the compressor operation (only for RYYX10,12T).
23	Cooling plate	—	Used to cool plate of switch box by refrigerant.



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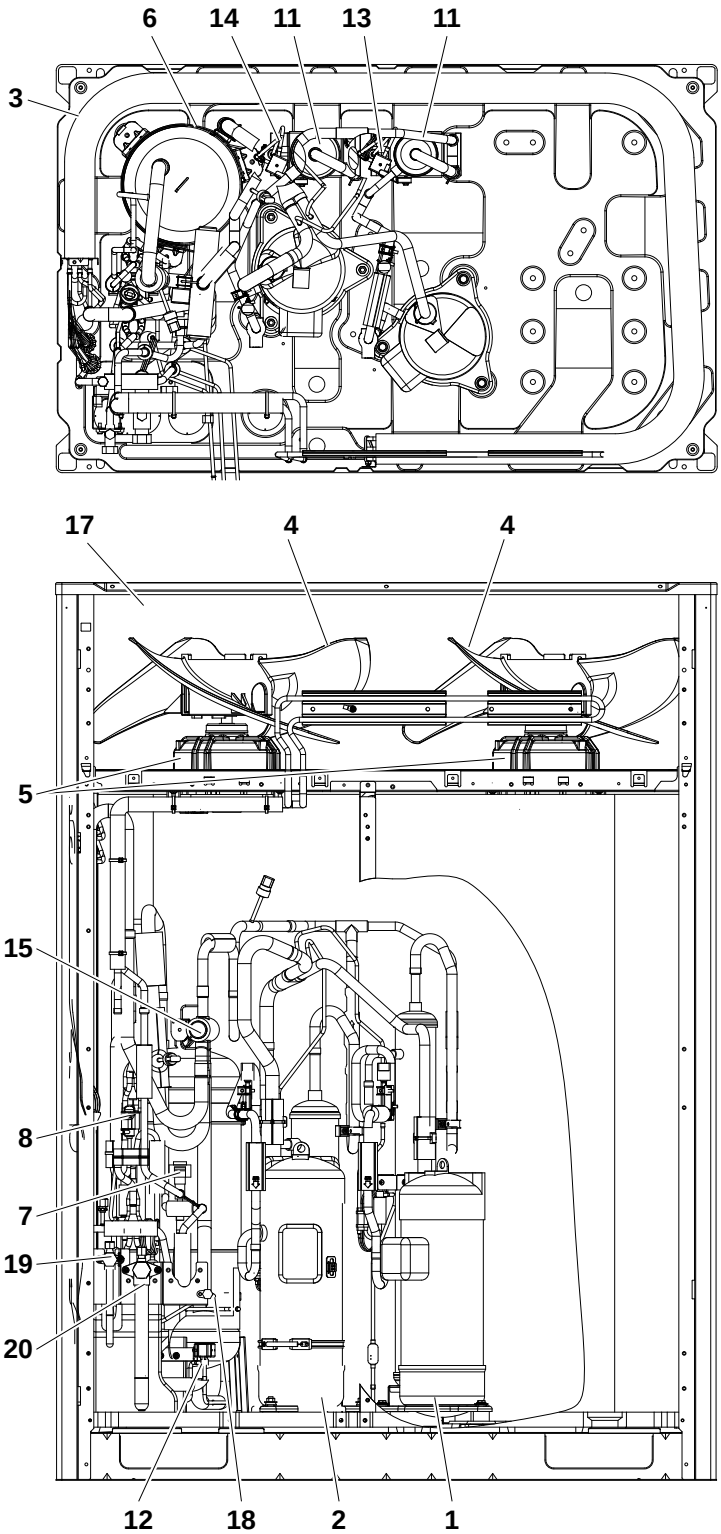
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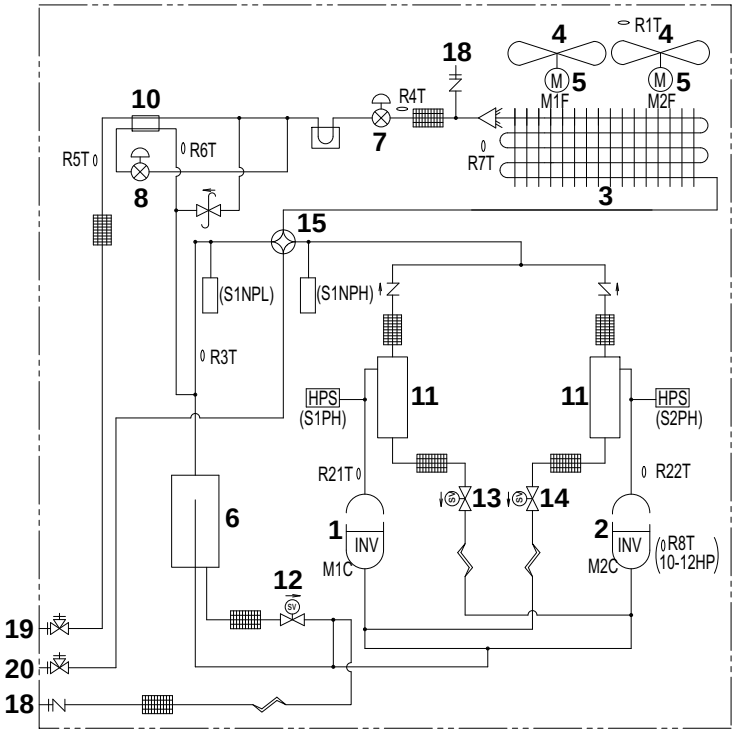
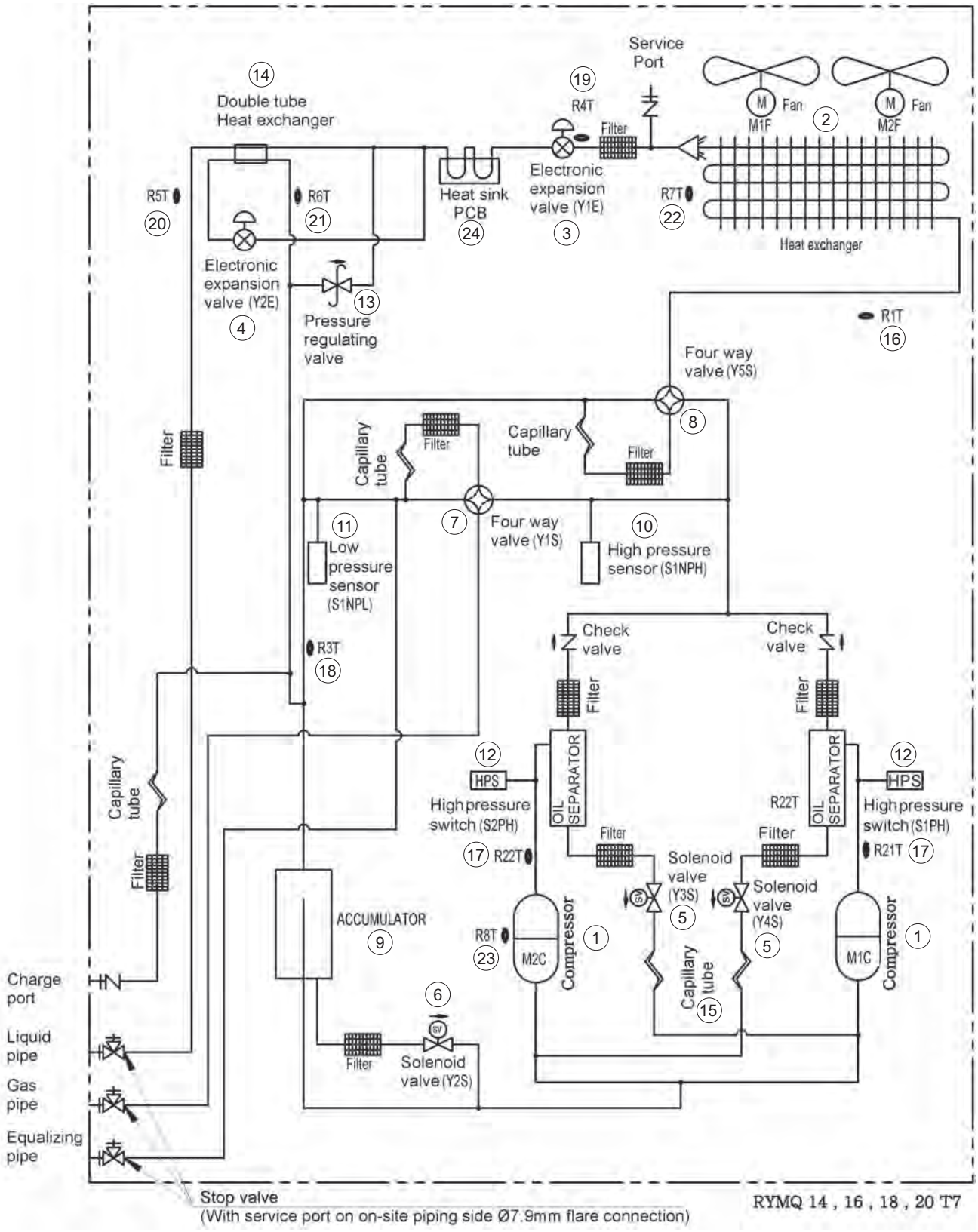


1 Compressor (M1C)
2 Compressor (M2C)
3 Heat exchanger
4 Fan
5 Fan motor (M1F, M2F)
6 Accumulator
7 Expansion valve, main (Y1E)
8 Expansion valve, subcool heat exchanger (Y2E)
10 Subcool heat exchanger
11 Oil separator
12 Solenoid valve, oil accumulator (Y2S)
13 Solenoid valve, oil1 (Y3S)
14 Solenoid valve, oil2 (Y4S)
15 4-way valve, main (Y1S)
17 Electrical component box
18 Service port, refrigerant charge
19 Stop valve, liquid
20 Stop valve, gas

From manufacturing number 3000000.

1.6 RYMQ14,16,18,20T7Y1B

No.	Name Part	Wiring Symbol	Major Function
1	Inverter driven compressors	M1,2C	Inverter driven compressor is operated in multi-steps according to Te for cooling, Tc for heating.
2	INV fan	M1,2F	When outdoor coil is condensor, the fan is operated in 8 steps to maintain minimum Tc.
3	Expansion valve for outdoor coil	Y1E	In cooling: fully open when compressor operation. In heating operation: PI control to keep the superheat constant.
4	Expansion valve for sub cool heat exchanger	Y2E	Used to control outlet super heat on sub cool heat exchanger.
5	Solenoid valve oil return from oil separator	Y3S, Y4S	Used to control amount of returned oil from the oil separator to the compressor.
6	Solenoid valve oil return from accumulator	Y2S	Used to return oil from the accumulator to the compressor.
7	4 way valve indoor side	Y1S	Used to switch the operation mode between cooling and heating.
8	4 way valve outdoor side	Y5S	Used to switch condition of outdoor heat exchanger as condensor or evaporator.
9	Suction accumulator	—	Used to avoid liquid back to the compressor (upper area) while also storage of refrigerant not required to circulate at current capacity step.
10	HP sensor	S1NPH	Used to detect discharge pressure. In cooling mainly used to control fan speed outdoor. In heating mode mainly used for compressor capacity control.
11	LP sensor	S1NPL	Used to detect suction pressure. In cooling mainly used to control compressor capacity. In heating mode to enable to calculate suction superheat.
12	High pressure switch	S1PH, S2PH	In order to prevent the increase of high pressure when a malfunction occurs. This pressure switch opens over 4.0MPa or more to stop the compressor operation.
13	Pressure regulating valve	—	This valve opens at a pressure of 4.0MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
14	Subcooling heat exchanger	—	Used to subcool liquid refrigerant.
15	Capillary tube	—	Used to return the refrigerating oil separated through the oil separator to the compressor.
16	Thermistor air	R1T	Detects outdoor ambient temperature. Mainly used to correct discharge pipe temperature, and defrosting condition.
17	Thermistor discharge	R21T, R22T	Detects discharge pipe temperature. Mainly used for discharge temperature protection of compressor.
18	Thermistor accumulator inlet	R3T	Detects the gas inlet temperature of the accumulator. Mainly used to keep the suction superheated degree constant in heating operation.
19	Thermistor main liquid pipe to outdoor coil	R4T	Detects liquid pipe temperature of heat exchanger, determine subcool during autocharge, test run and leak test, overcharge during test run.
20	Thermistor main liquid to indoor coil	R5T	Detects liquid pipe temperature. Mainly used to judge effect of liquid subcool circuit during test run and leak test.
21	Thermistor subcooling heat exchanger gas pipe	R6T	Detects gas pipe temperature on the evaporation side of subcooling heat exchanger, keep the superheated degree at the outlet of subcooling heat exchanger constant.
22	Thermistor heat exchanger deicer	R7T	Detects liquid pipe temperature of air heat exchanger, determine start and end defrost operation.
23	Thermistor compressor surface	R8T	Detects compressor surface temperature, this switch is activated at surface temperature of 120 deg. or more to stop the compressor operation (only for RYMQ18,20T).
24	Cooling plate	—	Used to cool plate of switch box by refrigerant.



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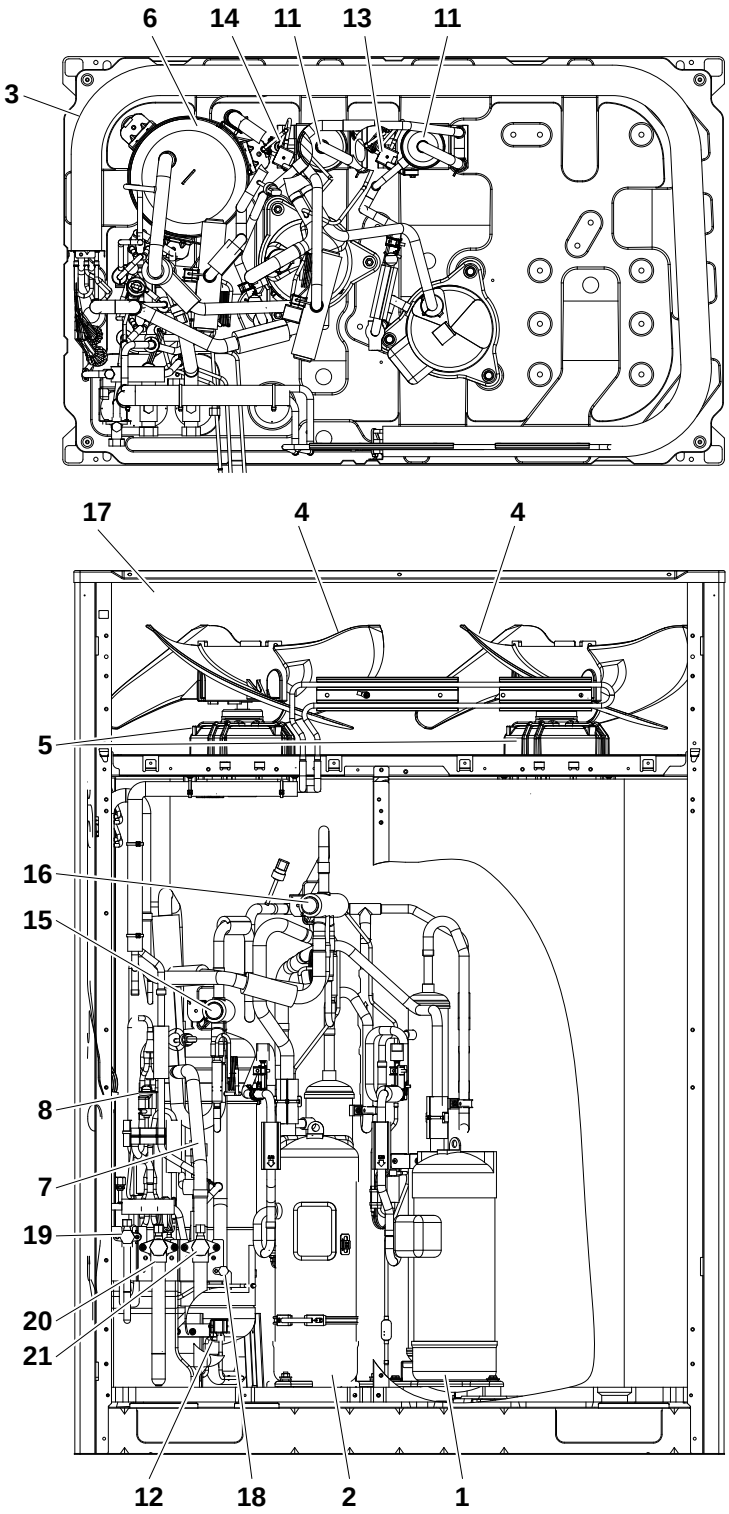
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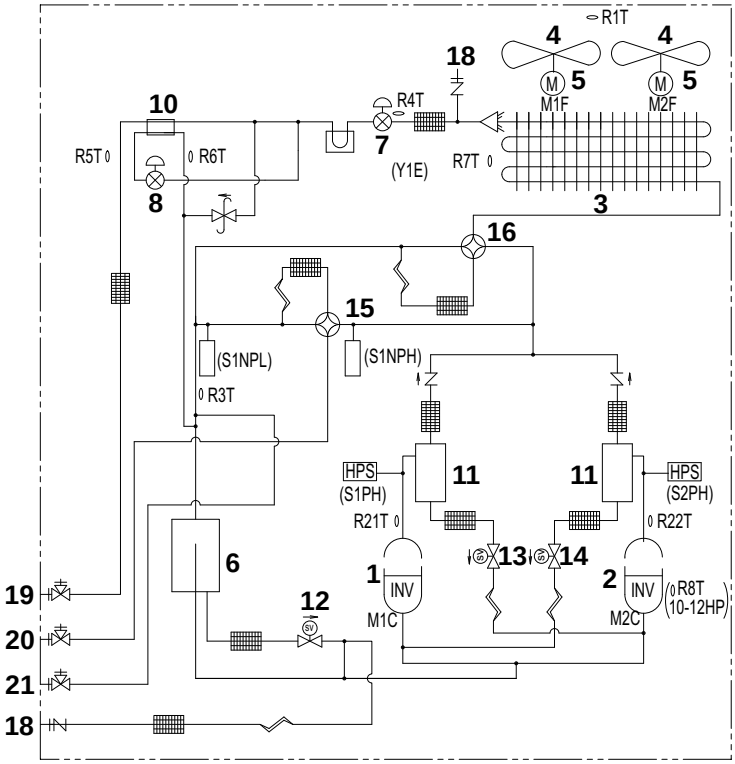
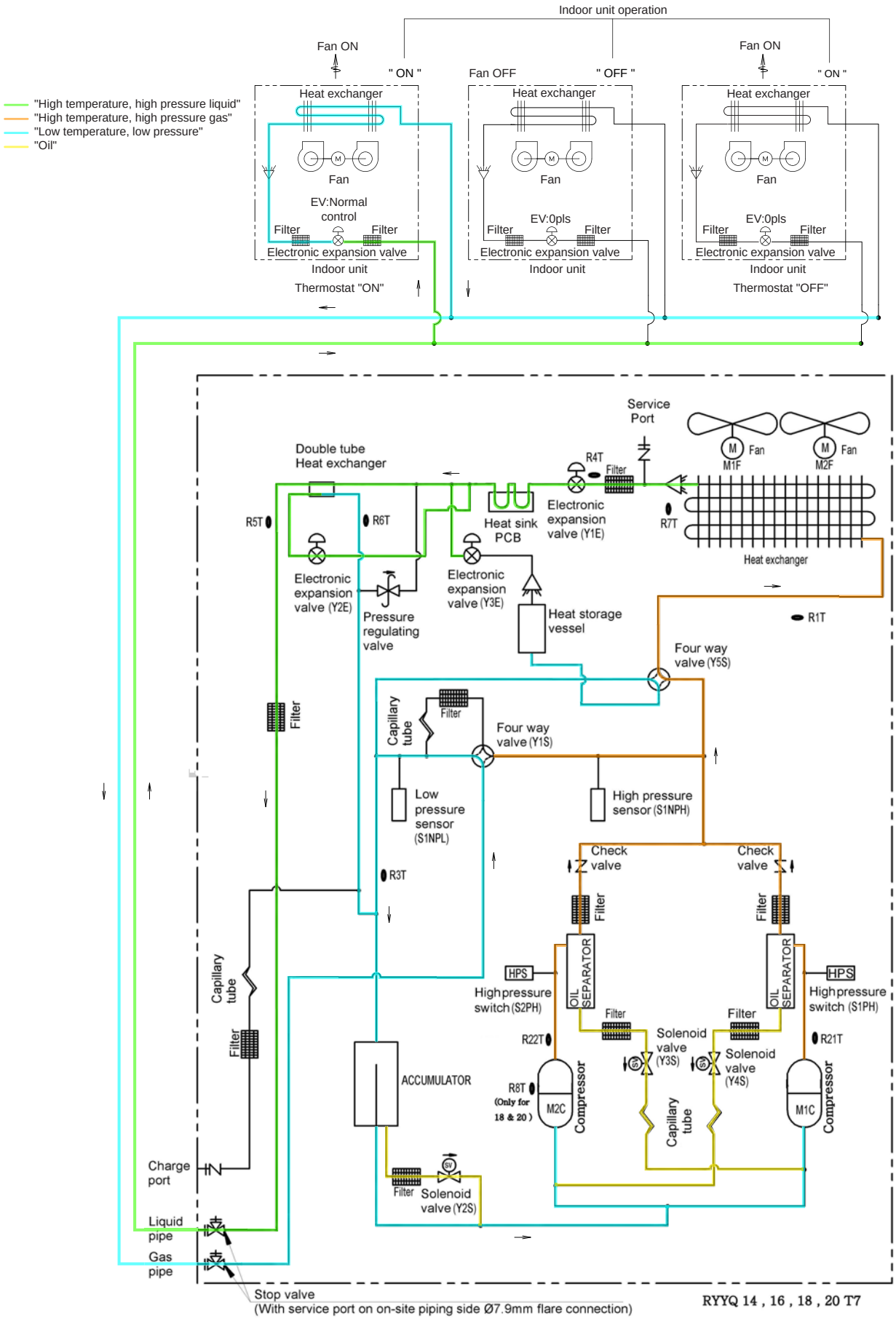


1 Compressor (M1C)
2 Compressor (M2C)
3 Heat exchanger
4 Fan
5 Fan motor (M1F, M2F)
6 Accumulator
7 Expansion valve, main (Y1E)
8 Expansion valve, subcool heat exchanger (Y2E)
10 Subcool heat exchanger
11 Oil separator
12 Solenoid valve, oil accumulator (Y2S)
13 Solenoid valve, oil1 (Y3S)
14 Solenoid valve, oil2 (Y4S)
15 4-way valve, main (Y1S)
16 4-way valve, sub (Y5S)
17 Electrical component box
18 Service port, refrigerant charge
19 Stop valve, liquid
20 Stop valve, gas
21 Stop valve, equalizing gas

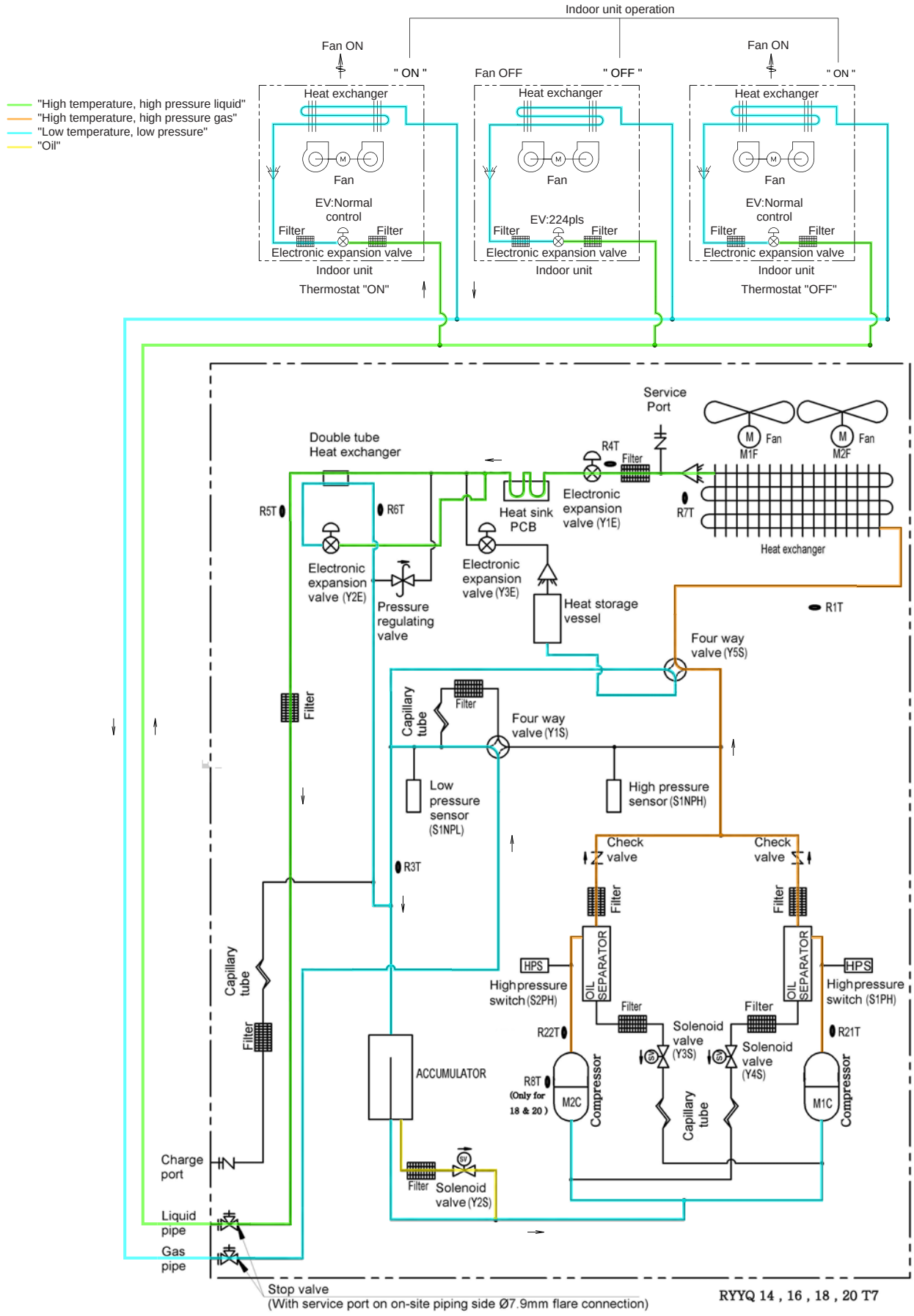
From manufacturing number 3000000.

2. Refrigerant Flow for Each Operation Mode

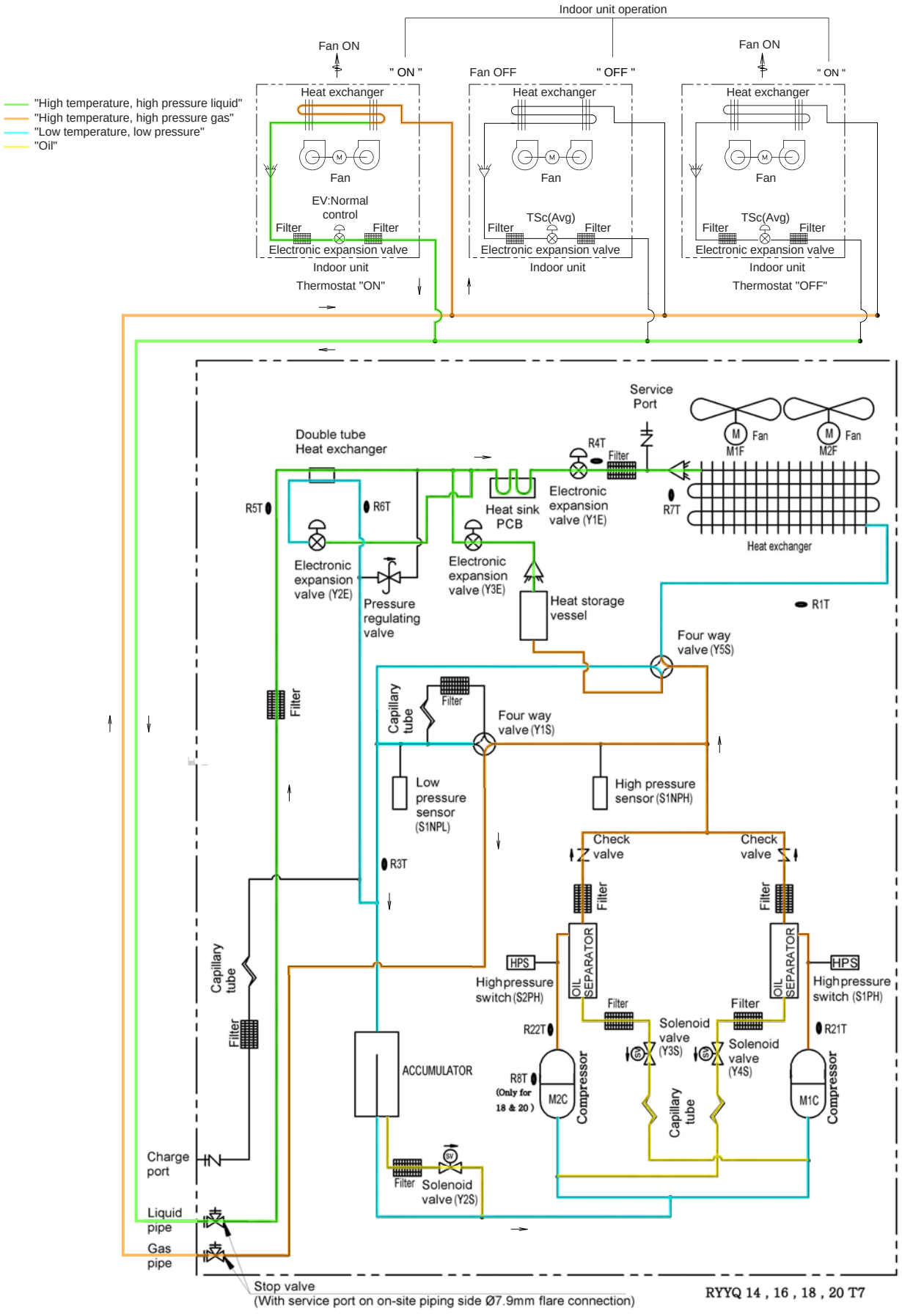
Cooling operation (continuous heating - single)



Cooling oil return operation (continuous heating - single)

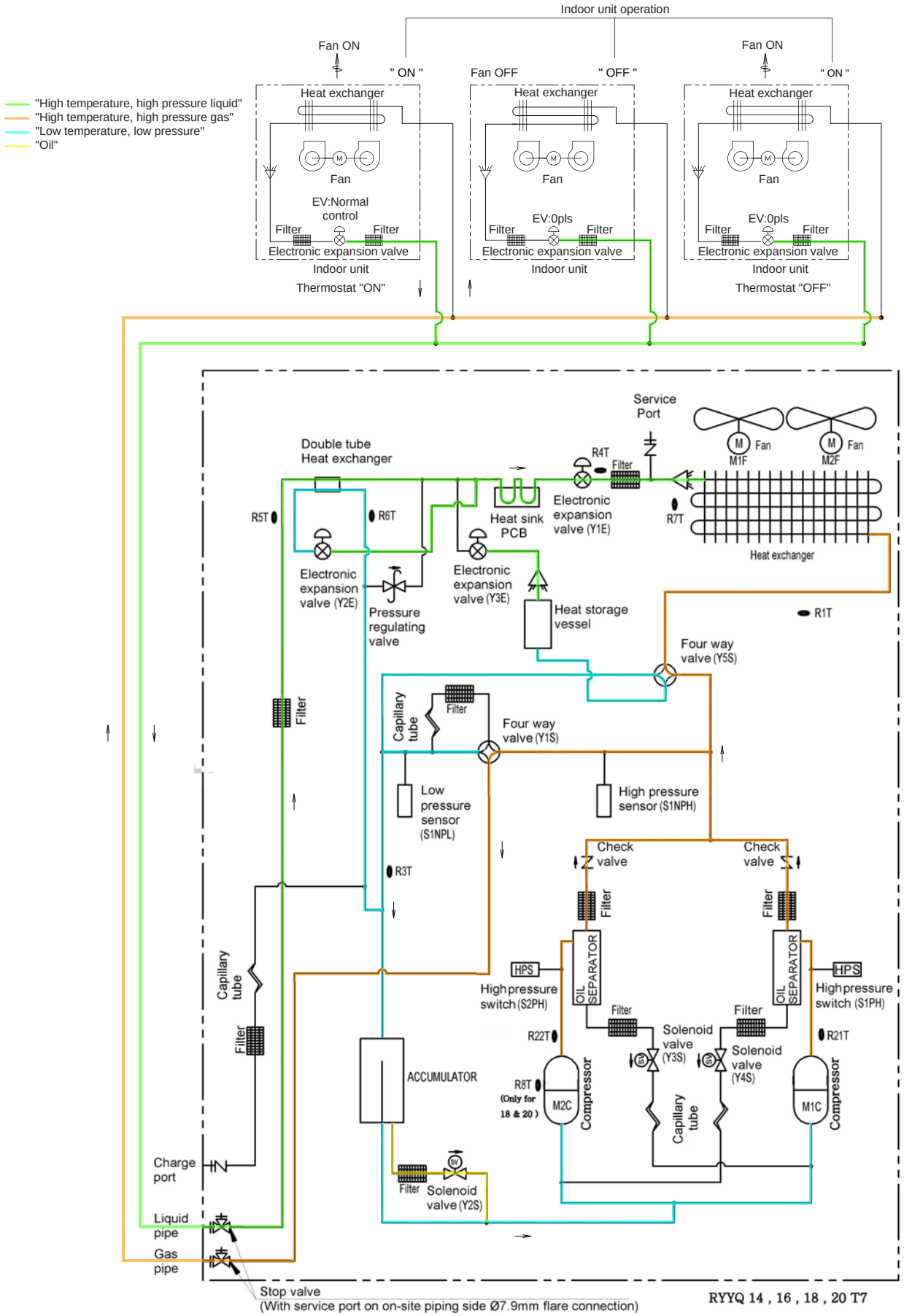


Heating operation and heating oil return (continuous heating - single)

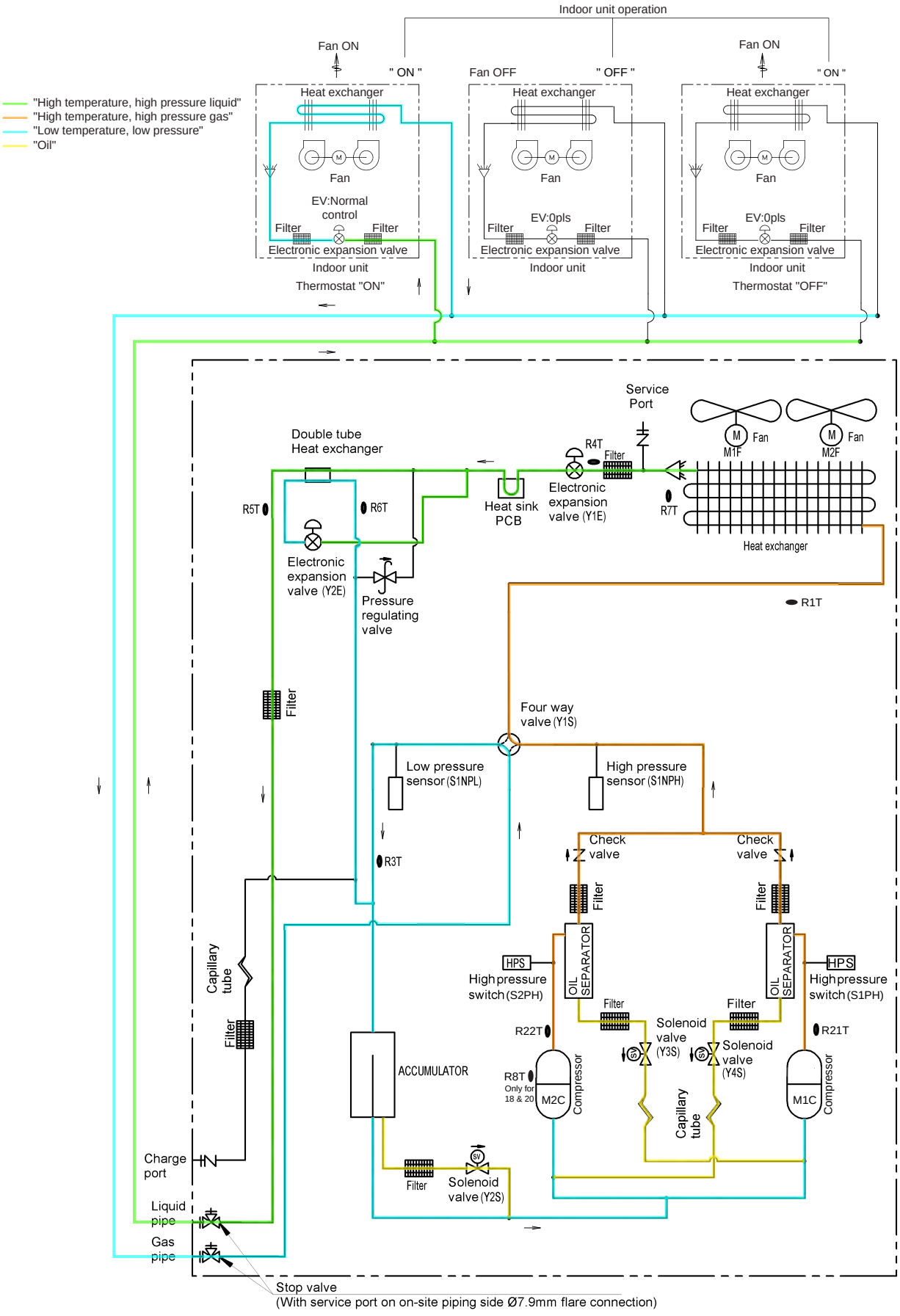


TSc(Avg): the expansion valves of the indoor units are controlled to keep average sub-cool when in state "operation-off" or "thermostat-off".

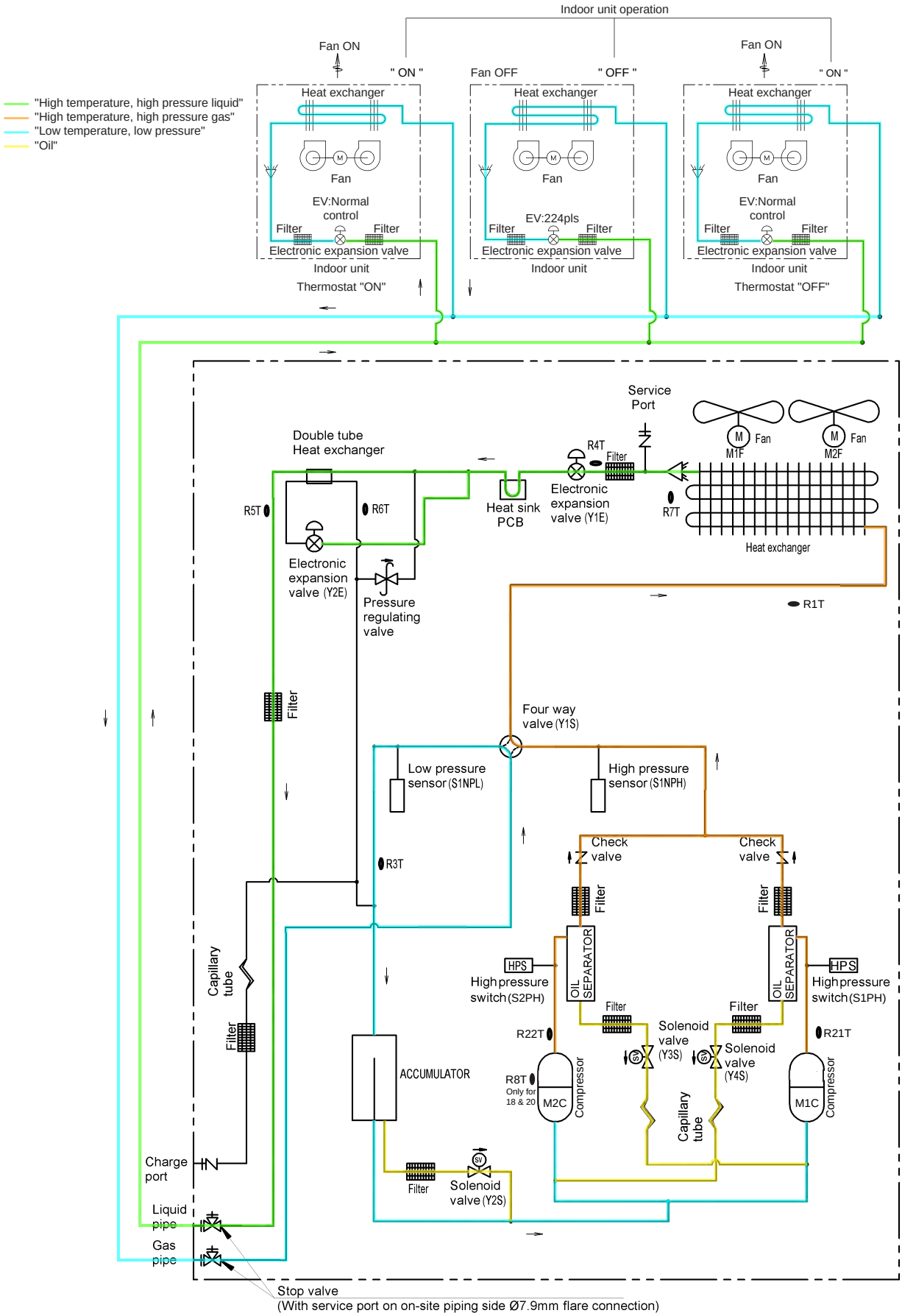
Defrost operation (continuous heating - single)



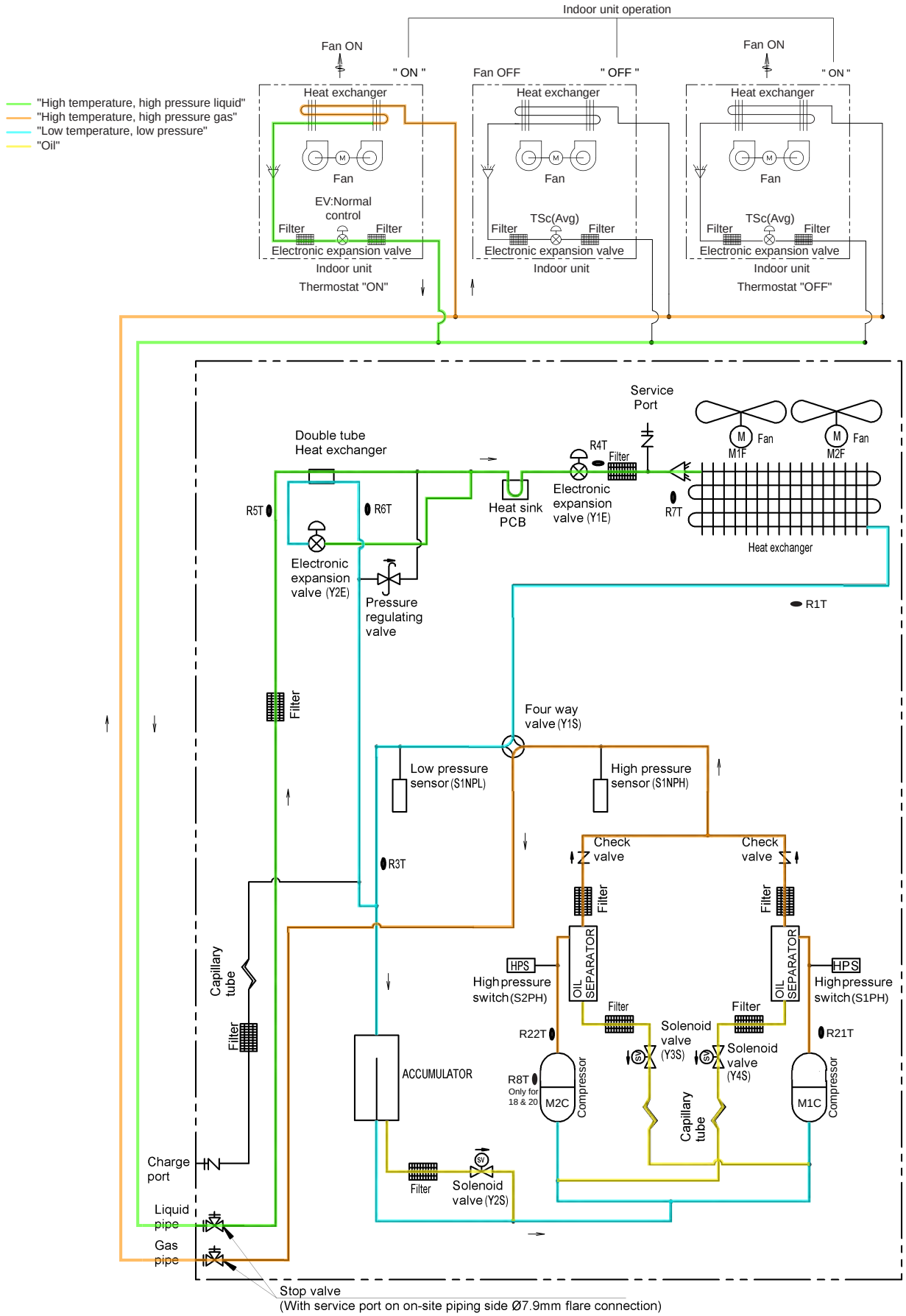
Cooling operation (non-continuous heating)



Cooling oil return operation (non-continuous heating)

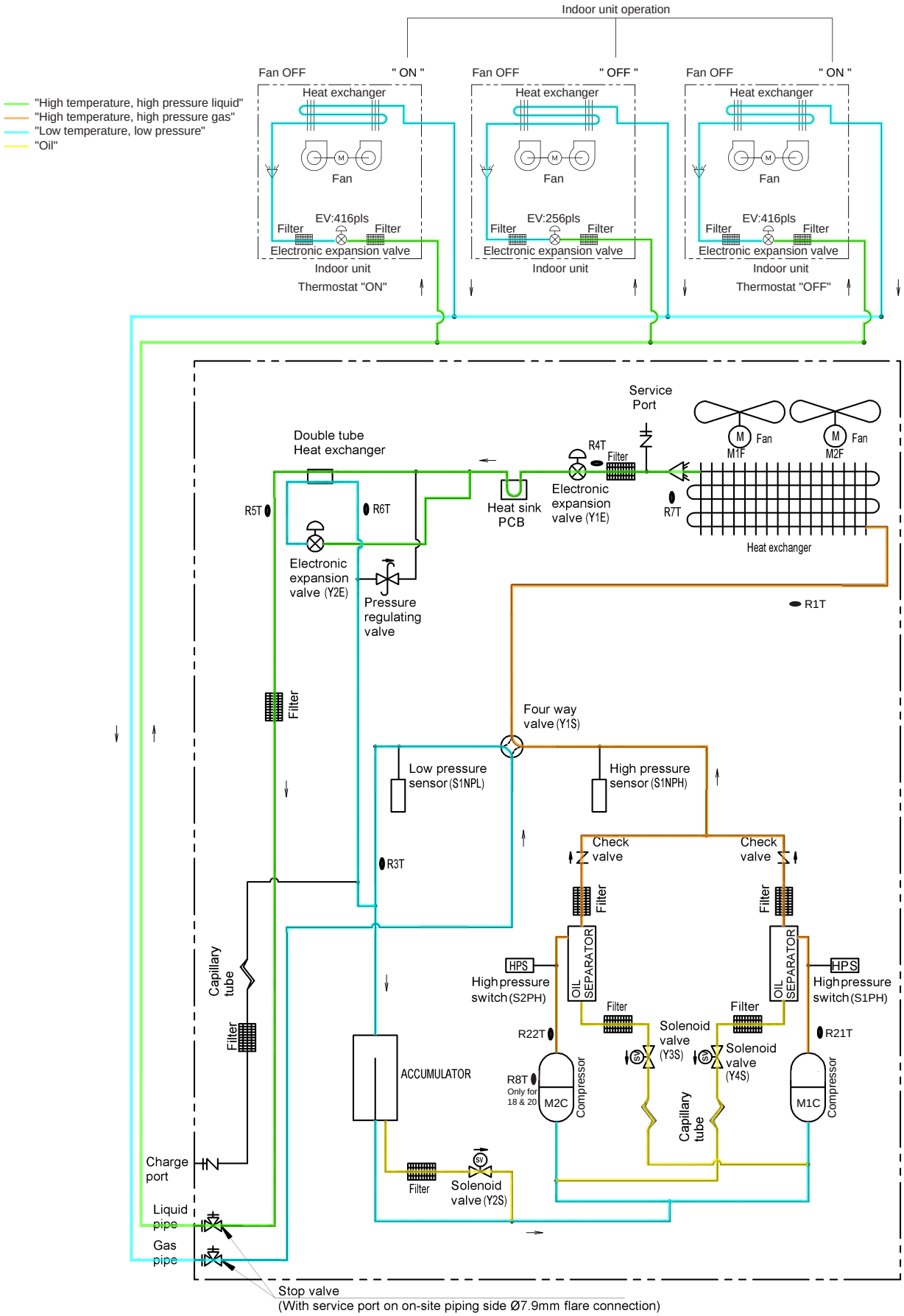


Heating operation (non-continuous heating)

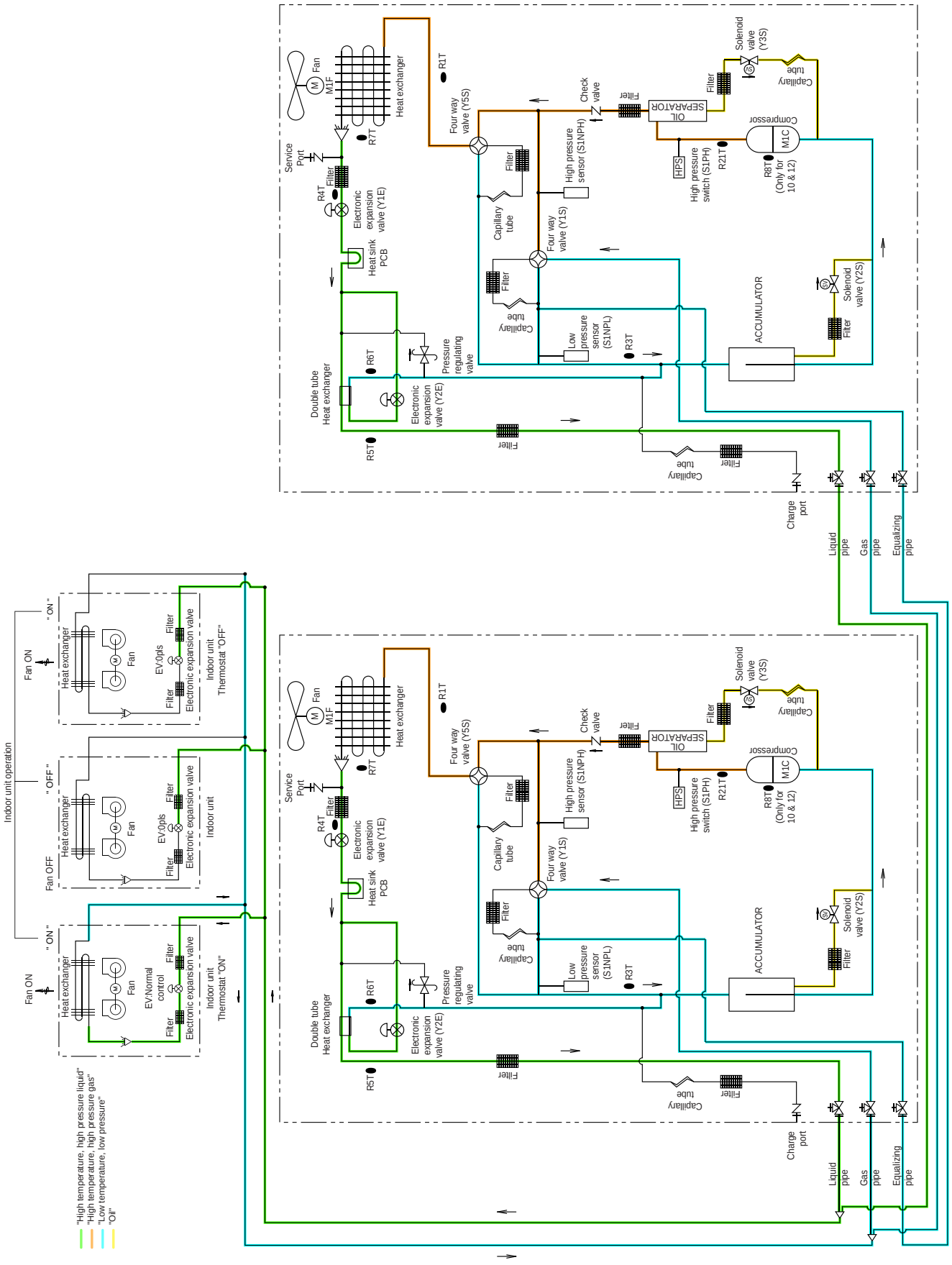


TSc(Avg): the expansion valves of the indoor units are controlled to keep average sub-cool when in state "operation-off" or "thermostat-off".

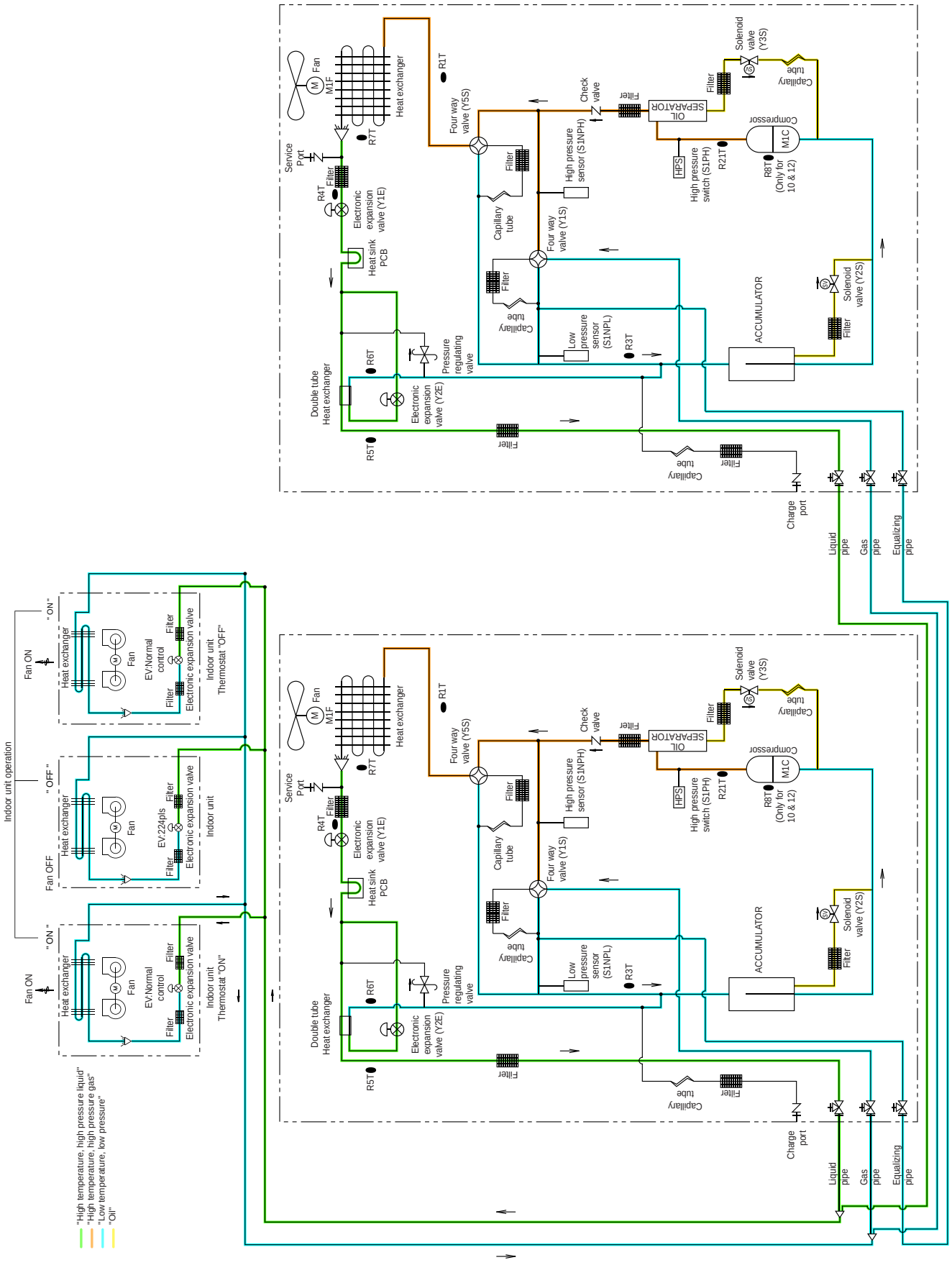
Heating oil return and defrost operation (non-continuous heating)



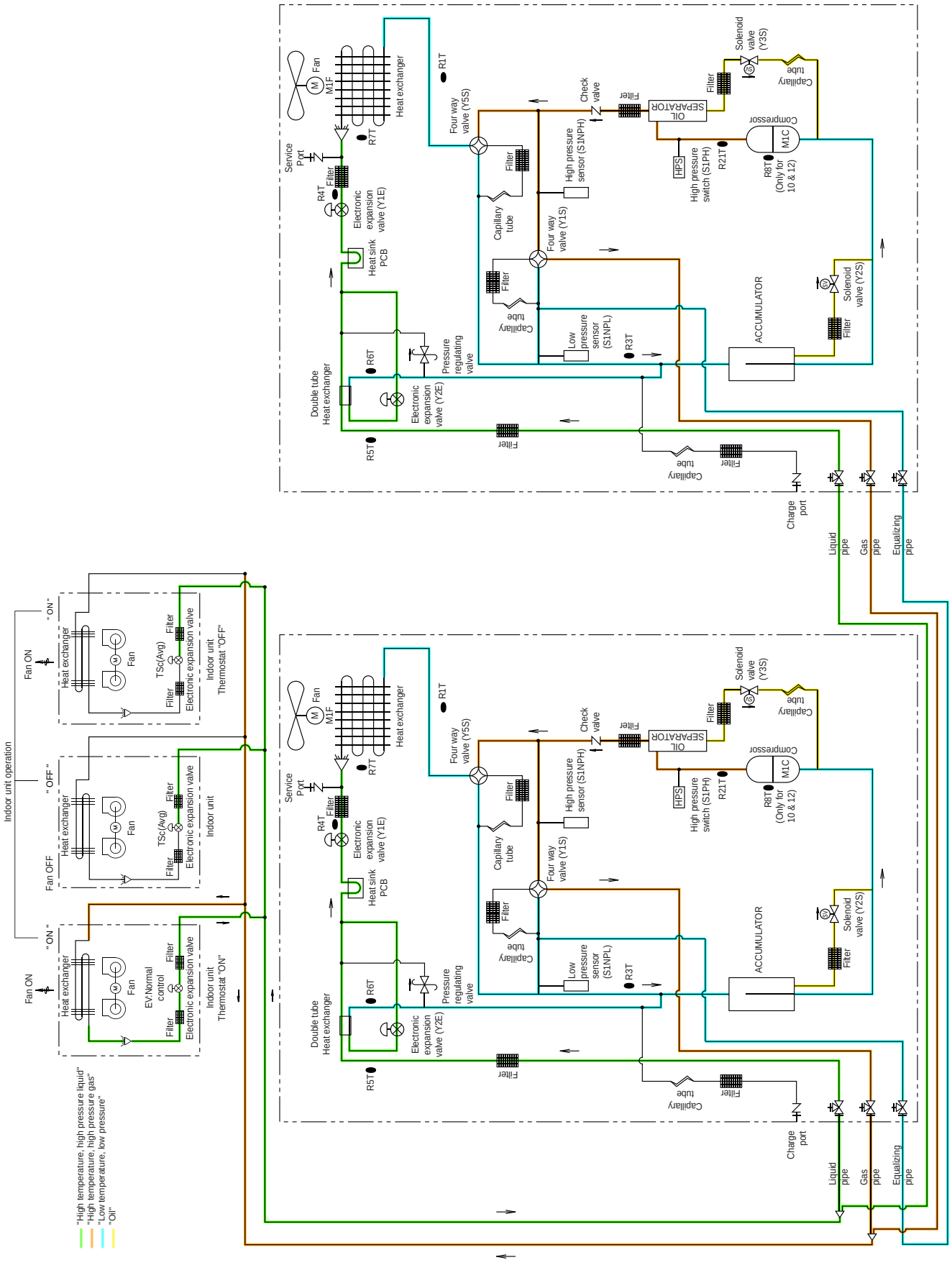
Cooling operation (continuous heating - multi)



Cooling oil return operation (continuous heating - multi)

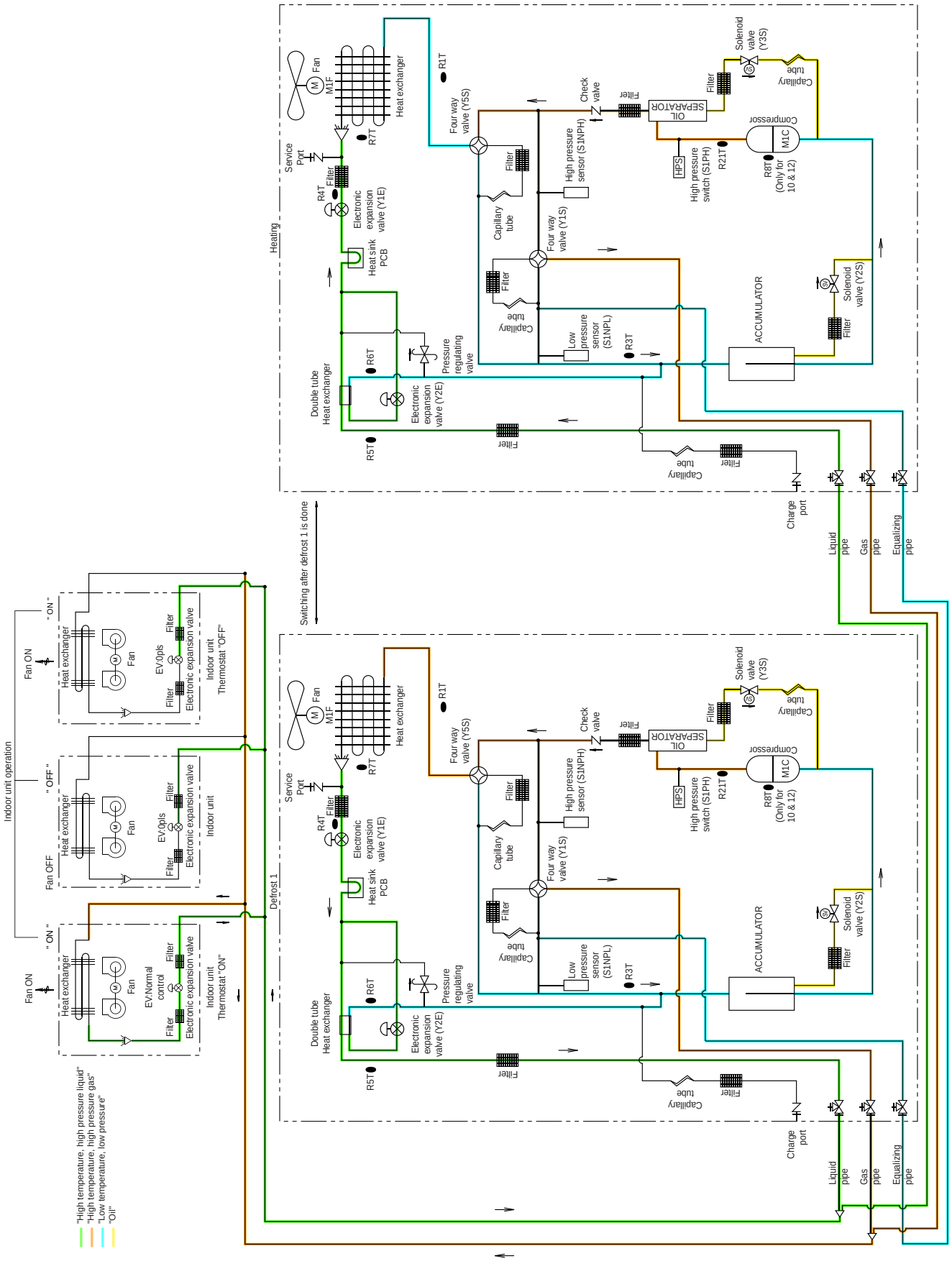


Heating operation and heating oil return (continuous heating - multi)

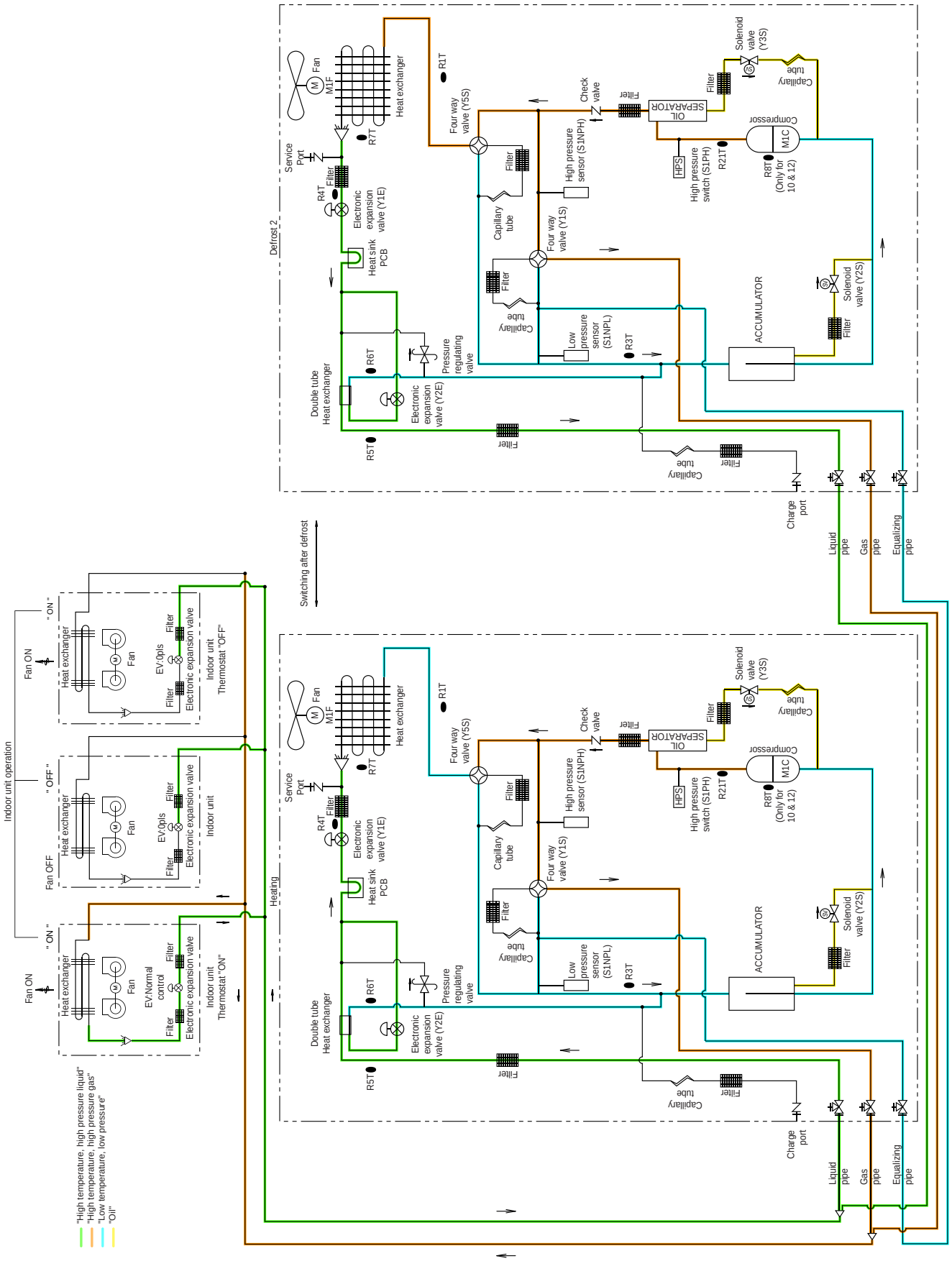


TSc(Avg): the expansion valves of the indoor units are controlled to keep average sub-cool when in state "operation-off" or "thermostat-off".

Defrost 1 operation (continuous heating - multi)



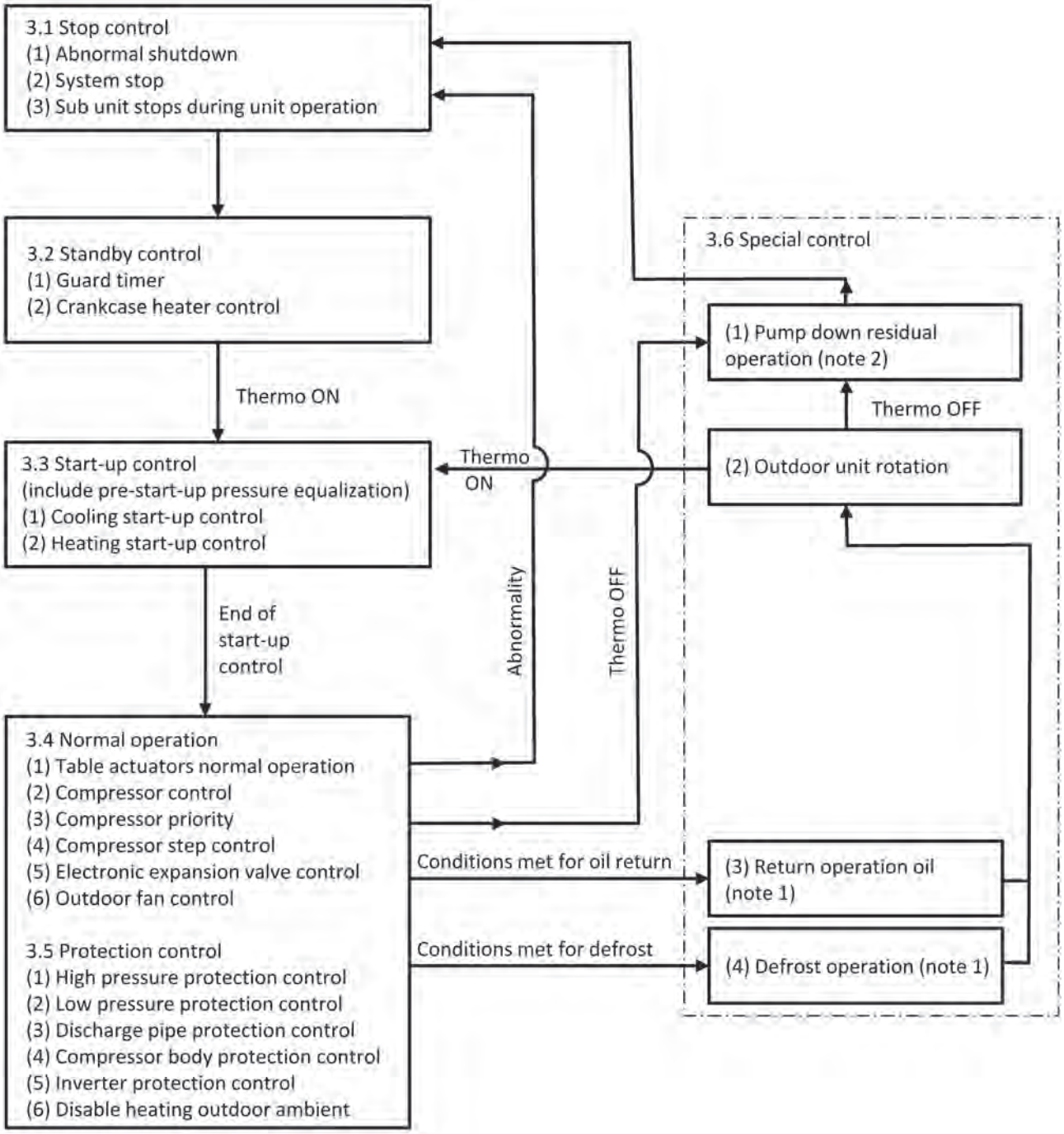
Defrost 2 operation (continuous heating - multi)



3. Functions

Operation flow chart

For detailed description of each function in the above flow, refer to the details on related function on the following pages.



Notes:

- In the event indoor unit stops or the thermostat turns OFF while in oil return operation or defrosting operation, pump down residual operation is performed on completion of the oil return operation or defrosting operation.
- Not performed during cooling mode.

3.1 Stop Control

3.1.1 Abnormal shutdown

- If abnormal situation occurs to protect the compressor, initial thermo-OFF stops the outdoor unit.
- Outdoor control will perform a retry start.
- When the number of retries are reached (see protection control), system will stop and error code is displayed in the remote control.
- If system was restarted from controller, the last 8 error codes are stored:
  - In case of BRC1C,D…. service mode 40 (only 2 digit error code is possible): error codes are stored on indoor board.
  - In case of BRC1E… field setting “Error history” (4 digit error code is possible): error codes are stored on indoor board and BRC1E… .
- Consult the troubleshooting chart on the displayed error code to define cause of abnormal stop.

3.1.2 System stop

When it is stopped in heating mode, the four-way switching valve is kept in same condition (ON).

3.1.3 Sub unit stops during unit operation

When sub module is stopped (because of low demand), conditions for this module are set same as above (2). System stop till this module is required to operate (increase of load).

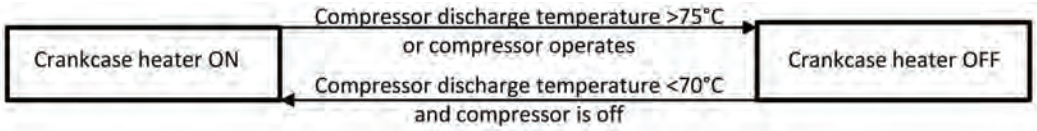
3.2 Standby Control

3.2.1 Guard timer

- When control outdoor judges compressor(s) must stop, control will force a thermo-off for 2 minutes before outdoor control can accept to restart.
- Prior to compressor start, outdoor fan runs for 1 minute (on step 4) to facilitate the pressure equalization. When outdoor heat-exchanger is evaporator (heating), the initial operation of outdoor fan reduces the stagnation of the refrigerant so to avoid refrigerant liquid back to compressor when soft start is launched.

3.2.2 Crankcase heater control

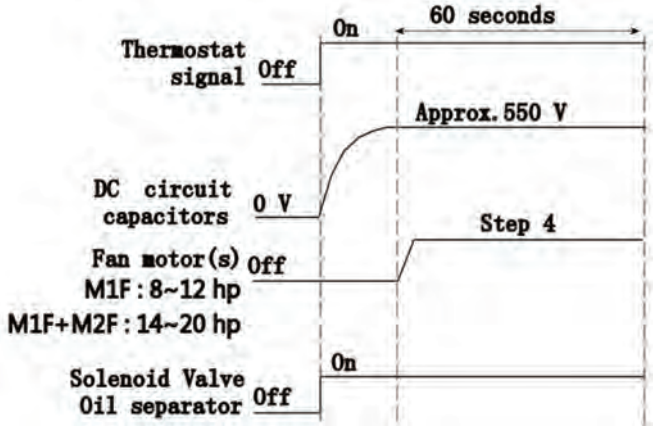
In order to prevent the refrigerant can emigrate to the compressor and to limit refrigerant amount to absorbed in the oil, if compressor is switched for some time, the crankcase heater can be switched on.



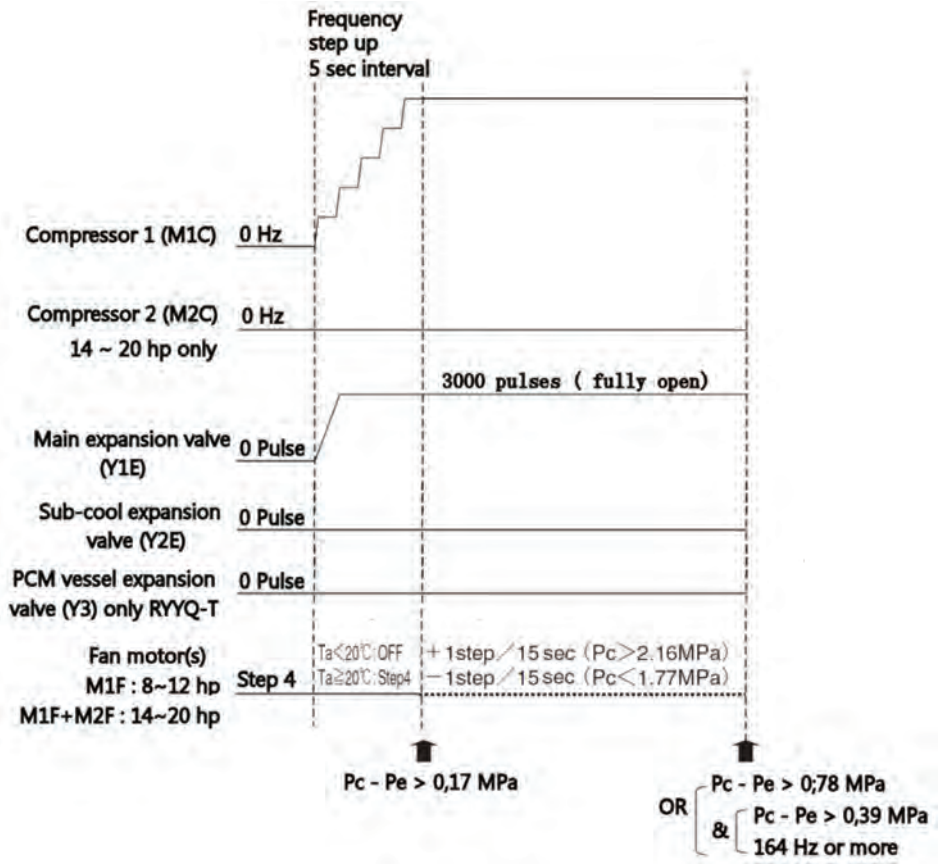
3.3 Start-up Control

Before starting the compressor:

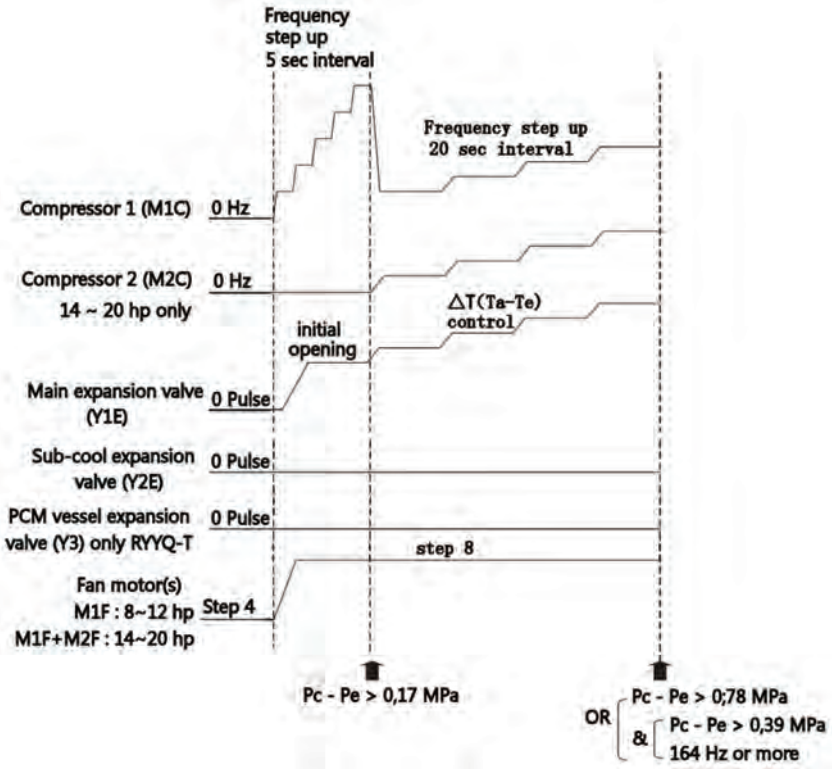
- The capacitor is charged in the DC circuit of the inverter circuit, and
- “Pre-pressure equalization” is performed to reducing the starting current of the compressor.



3.3.1 Cooling start-up control



3.3.2 Heating start-up control



3.4 Normal Operation

3.4.1 Table actuators normal operation

Normal operation cooling

Inverter compressor 1	M1C	PI control by Te target depends on field set 2-8 & 2-83
Inverter compressor 2	M2C	
Fan motor 1	M1F	fan speed 9 steps to keep minimum Tc target 34°C
Fan motor 2	M2F	
Main expansion valve	Y1E	0 pulses = closed (thermo off), 3000 pulses= open (thermo-on)
Sub-cool expansion valve	Y2E	0~480 pulses at compressor on : based on indoor demand
PCM vessel expansion valve	Y3E	0 pulses = closed
solenoid valve oil separator 1	Y3S	only close if HP-LP <0,3MPa (when compressor off)
solenoid valve oil separator 2	Y4S	
solenoid valve accumulator	Y2S	open if DSH >15K
4 Way valve indoor	Y1S	Off : indoor=evaporator
4 way valve outdoor	Y5S	Off : outdoor=condenser

	RYMQ ... T7Y1B				
Part description	8	10~12	14+16	18+20	Status
Inverter compressor 1	M1C				PI control by Te target depends on field set 2-8 & 2-83
Inverter compressor 2				M2C	
Fan motor 1	M1F				Fan speed 9 steps to keep minimum Tc target 34°C
Fan motor 2				M2F	
Main expansion valve	Y1E				0 pulses = closed (thermo off), 3000 pulses = open (thermo-on)
Sub-cool expansion valve	Y2E				0~480 pulses at compressor on: based on indoor demand
Solenoid valve oil separator 1	Y3S				Only close if HP-LP <0,3MPa (when compressor off)
Solenoid valve oil separator 2				Y4S	
Solenoid valve accumulator	Y2S				Open if DSH >15K
4 way valve indoor	Y1S				Off: indoor = evaporator
4 way valve outdoor	Y5S				Off: outdoor = condenser

	RXYQ ... T7Y1B				
Part description	8	10~12	14+16	18+20	Status
Inverter compressor 1	M1C				PI control by Te target depends on field set 2-8 & 2-83
Inverter compressor 2				M2C	
Fan motor 1	M1F				Fan speed 9 steps to keep minimum Tc target 34°C
Fan motor 2				M2F	
Main expansion valve	Y1E				0 pulses = closed (thermo off), 3000 pulses = open (thermo-on)
Sub-cool expansion valve	Y2E				0~480 pulses at compressor on: based on indoor demand
Solenoid valve oil separator 1	Y3S				Only close if HP-LP <0,3MPa (when compressor off)
Solenoid valve oil separator 2				Y4S	
Solenoid valve accumulator	Y2S				Open if DSH >15K
4 way valve indoor/outdoor	Y1S				Off: indoor = evaporator outdoor = condenser

Normal operation heating

Part description	RYYQ ... T7Y1B 8	10~12	14+16	18+20	Status
Inverter compressor 1	M1C				PI control by Tc target depends on field set 2-9 & 2-84
Inverter compressor 2			M2C		
Fan motor 1	M1F				Fan step 7 (normal Tc & Te) or fan step 8 (high load)
Fan motor 2			M2F		
Main expansion valve	Y1E				0 pulses = closed (thermo off), 0~3000 pulses = SH control 5K
Sub-cool expansion valve	Y2E				0~480 pulses at compressor on: based on indoor demand
PCM vessel expansion valve	Y3E				0~3000 pulses = based on Tc
Solenoid valve oil separator 1	Y3S				Only close if HP-LP <0,3MPa (when compressor off)
Solenoid valve oil separator 2			Y4S		
Solenoid valve accumulator	Y2S				Open if DSH >15K
4 way valve indoor	Y1S				On: indoor = condenser
4 way valve outdoor	Y5S				On: outdoor = evaporator

Part description	RYMQ ... T7Y1B 8	10~12	14+16	18+20	Status
Inverter compressor 1	M1C				PI control by Tc target depends on field set 2-9 & 2-84
Inverter compressor 2			M2C		
Fan motor 1	M1F				Fan step 7 (normal Tc & Te) or fan step 8 (high load)
Fan motor 2			M2F		
Main expansion valve	Y1E				0 pulses = closed (thermo off), 0~3000 pulses = SH control 5K
Sub-cool expansion valve	Y2E				0~480 pulses at compressor on: based on indoor demand
Solenoid valve oil separator 1	Y3S				Only close if HP-LP <0,3MPa (when compressor off)
Solenoid valve oil separator 2			Y4S		
Solenoid valve accumulator	Y2S				Open if DSH >15K
4 way valve indoor	Y1S				On: indoor = condenser
4 way valve outdoor	Y5S				On: outdoor = evaporator

Part description	RXYQ ... T7Y1B 8	10~12	14+16	18+20	Status
Inverter compressor 1	M1C				PI control by Tc target depends on field set 2-9 & 2-84
Inverter compressor 2			M2C		
Fan motor 1	M1F				Fan step 7 (normal Tc & Te) or fan step 8 (high load)
Fan motor 2			M2F		
Main expansion valve	Y1E				0 pulses = closed (thermo off), 0~3000 pulses = SH control 5K
Sub-cool expansion valve	Y2E				0~480 pulses at compressor on: based on indoor demand
Solenoid valve oil separator 1	Y3S				Only close if HP-LP <0,3MPa (when compressor off)
Solenoid valve oil separator 2			Y4S		
Solenoid valve accumulator	Y2S				Open if DSH >15K

3.4.2 Compressor capacity control

Capacity steps

The compressor rotation speed is changed according to the control pressure.

- Cooling: suction pressure sensor value is converted into evaporation saturation temperature (relation between pressure and evaporation temperature based on characteristics of refrigerant R410A). For detailed explanation refer to chapter field settings (“Description field settings (mode 2 = m2) on outdoor control board” on page 96 and installation manual outdoor chapter “15.4. Energy saving and optimum operation”).
  - Initial selection is made between “Automatic”, “Fixed” or “High sensible”.
  - During operation, the outdoor target evaporation temperature can be changed based on the selected sub function, taking indoor load into account.
- Heating: discharge pressure sensor value is converted into condensation saturation temperature.
  - Initial selection is made between “Automatic”, “Fixed” or “High sensible”.
  - During operation, the outdoor target condensation temperature can be changed based on the selected sub function, taking indoor load into account.
- Table below shows the rotation speed range for each compressor.

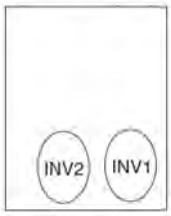
	8 hp	10 hp	12 hp	14 hp	16 hp	18 hp	20 hp
min 1	26 rps (52Hz)	20 rps (60Hz)	20 rps (60Hz)	26 rps (52Hz)	26 rps (52Hz)	26 rps (52Hz)	26 rps (52Hz)
MAX 1	127 rps (254Hz)	127 rps (381Hz)	129 rps (387Hz)	116 rps (232Hz)	128 rps (256Hz)	137 rps (274Hz)	137 rps (274Hz)
min 2				26 rps (52Hz)	26 rps (52Hz)	20 rps (60Hz)	20 rps (60Hz)
MAX 2				116 rps 232Hz)	128 rps (256Hz)	117 rps (351Hz)	133 rps (399Hz)

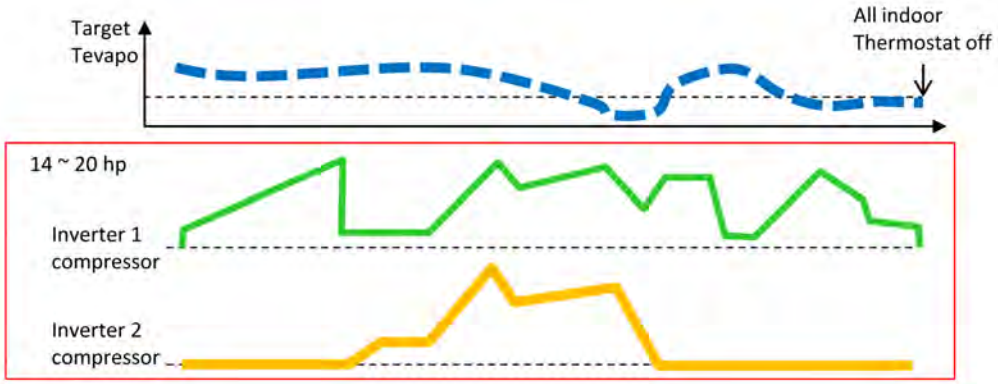
- The initial target saturation temperature can be changed. For details refer to “Description field settings (mode 2 = m2) on outdoor control board” on page 96: for Cooling: “Te set” based on field setting 2-8, for Heating: “Tc set” based on field setting 2-9.
- During operation, outdoor control will take into account the pressure drop so that at indoor units, the pre-set target temperature is reached (average). The estimated pressure drop is calculated based on:
  - Pressure drop characteristics found during test-run outdoor (step 7). At several evaporation temperature, outdoor control stores difference between outdoor evaporation temperature and average of indoor coil temperature (= indoor evaporation temperature).
  - To have judgment of gas speed in main suction pipe, control takes the capacity step of the outdoor unit into account. In function of pressure drop characteristics at the different compressor capacity steps, control concludes the category of system pipe lay out (long, medium, short).
  - Target Te outdoor (cooling) = “Te set” – estimated pressure drop – A.
  - Target Tc outdoor (heating) = “Tc set” + estimated pressure drop + A.
  - Correction factor “A” depends on difference indoor | Air inlet °C – set point °C | after start-up period.

3.4.3 Compressor operation sequence

Single module (RYYQ-T7, RXYQ-T7)

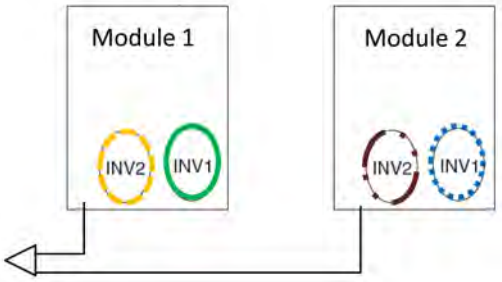
- In case of single module, if dual compressor (14~20hp) inverter compressor 1 always starts first. Depending on load (judged by deviation target to actual saturation temperature) inverter compressor 2 can be added and load up same frequency tendency.

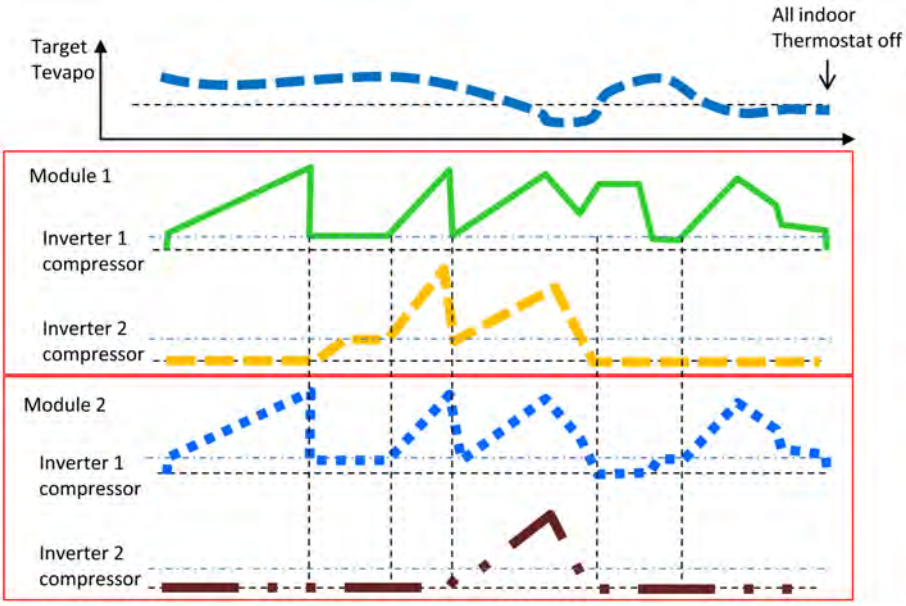




Multi module (RYMQ-T7, RXYQ-T7)

- In case of multi module, at initial start, all modules start inverter compressor 1.
- If load increases, judged by larger deviation target to actual saturation temperature, inverter compressor 2 can be added of one module at the time.
- If load increases, when Te drops below target, or large capacity index indoor switches thermostat-off, some module can be switched off completely till load increases again.





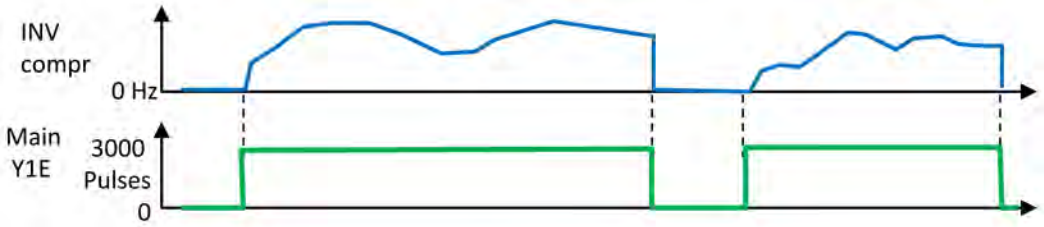
3.4.4 Compressor step control

- The actual rotation speed per second of the compressor (rps) depends on the type of compressor:
  - Compressor (8 hp) and compressor 1 (14~20 hp): rps = frequency / 2.
  - Compressor (10, 12 hp) and compressor 2 (18, 20 hp): rps = frequency / 3.
- The change of compressor capacity step corresponds to 1 rps / step.
- The control can skip an number of steps to reach faster the target saturation temperature.

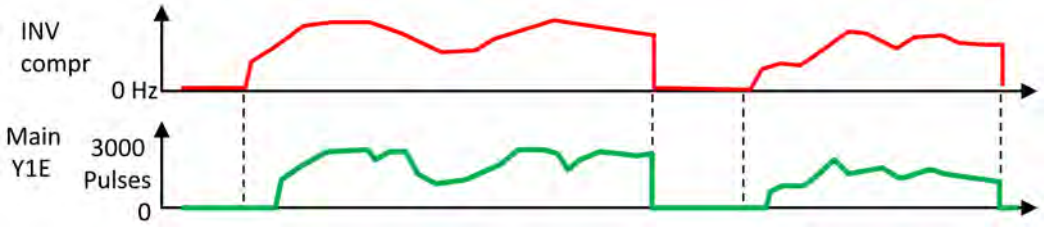
3.4.5 Expansion valve control

Main expansion valve "Y1E"

- Cooling: expansion valve is used only at fully closed or fully open condition:
  - Compressor(s) off: fully closed (0 pulses).
  - Compressor on:
    - Fully open (3000 pulses): if level difference outdoor above indoor units within 50 m (field setting 2-49-0).
    - Limited open: if level difference outdoor maximum 90 m above indoor units (field setting 2-49-1).



- Heating: expansion valve is used in PID control suction superheat:
  - Compressor(s) off: fully closed (0 pulses).
  - Compressor on:
    - At start up: closed = check suction pressure drops.
    - Modulated opening by:
      - Suction superheat = accumulator inlet °C – evaporation temperature.
      - Discharge superheat = discharge compressor °C – condensing temperature.
      - Preventive change when compressor capacity step changes.
      - Limited opening when condensing temperate exceeds target condensing.

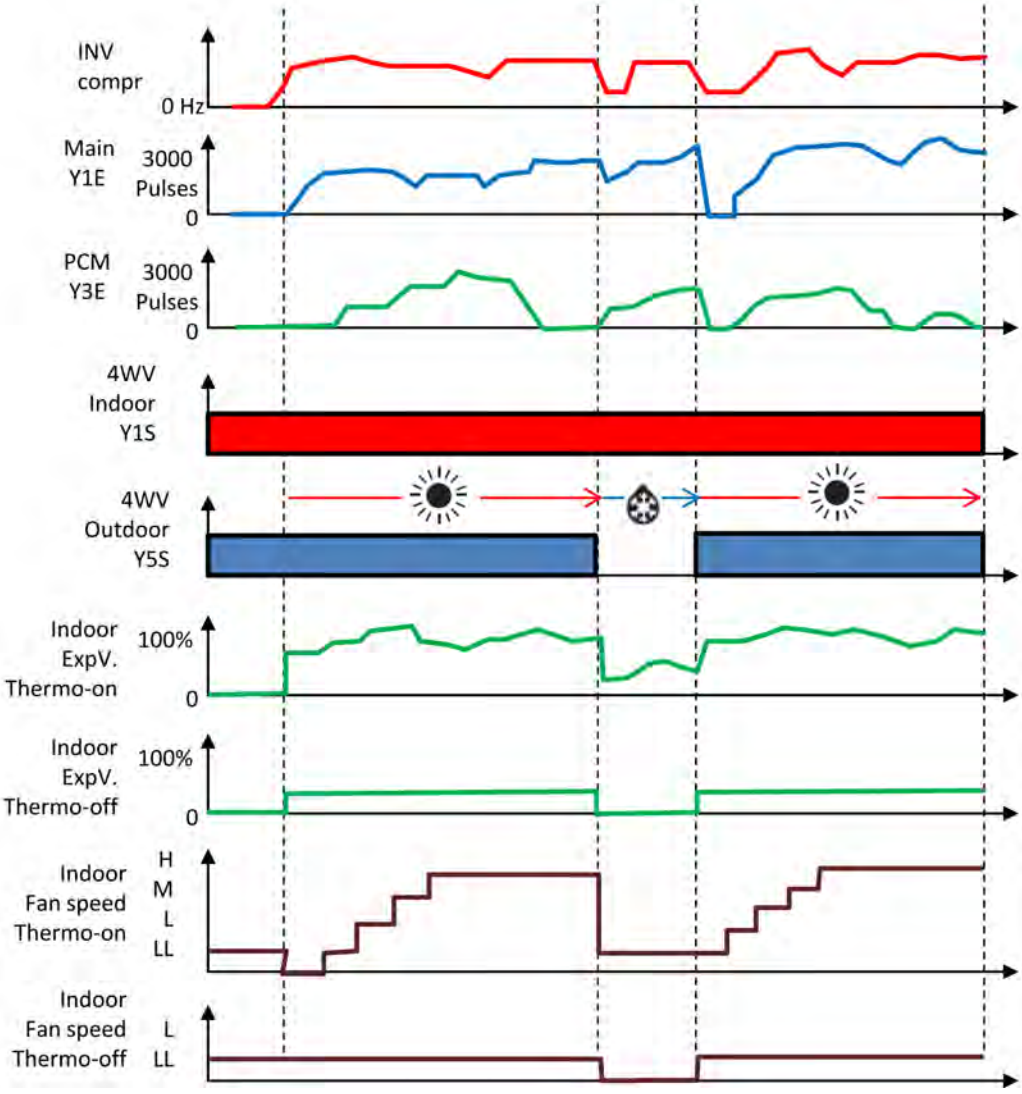


Sub-cool expansion valve "Y2E"

- Increase cooling capacity.
  - Use of liquid sub-cool circuit is initiated when indoor air temperature keeps above set point of remote controller and expansion valve large opening fails to reduce superheat.
  - The refrigerant amount used by the sub-cool liquid heat-exchanger(s) is controlled by superheat = gas outlet sub-cool – evaporation temperature.
  - Default target superheat = 5°.
- Control discharge temperature compressor.
  - Reduce target superheat when discharge superheat risks to reach upper limit (calculated by compression ratio), and actual discharge temperature.

PCM (Phase Change Material) vessel expansion valve “Y3E” (only used in heating mode)

- Compressor off: Y3E closed.
- Compressor on:
  - Start-up: Y3E closed. Priority to indoor unit to reject heat.
  - Normal operation: opening degree (0 ~ 3000 pulses) to store latent heat into the PCM. Depending on tendency of Tc, control judges when required heat is stored (PCM melted).
  - In case more heat is required, the expansion valve of the vessel will open gradually.
  - When the storage operation is completed, the expansion valve closes.
  - When control judges the vessel cools down, some re-heat will start.
  - Defrost: the PCM vessel = unique evaporator in the system.
    - The expansion valve opening based on compressor discharge superheat.
    - Indoor units at thermostat-on: depending on defrost efficiency (outdoor coil temperature and condensing temperature), indoor expansion valve adjust. Indoor fan operates at LL–speed (ultra low).
    - Indoor units at thermostat-off: expansion valve closed and fan off.



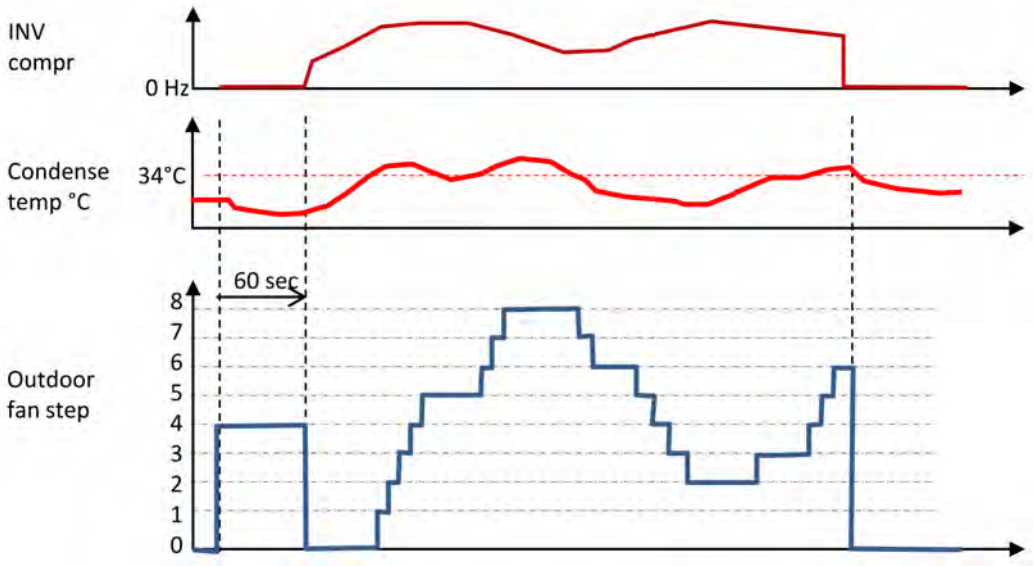
3.4.6 Outdoor fan control

Air flow rate of outdoor unit can be controlled in 9 steps.

	RPM fan step	RYYQ...-T, RYMQ-T, RXYQ...-T						
		8	10	12	14	16	18	20
fan motor nr.1 (right)	0	0						
	1 ~ 8 (C/H)	350 ~ 796/780		821/800	890	360 ~ 1097	1340	1350	1360
fan motor nr.2 (left)	0				0			
	1 ~ 8				360 ~ 1067	1160	1170	1180

Cooling outdoor fan control

- Outdoor fan control adjust air flow rate to keep condensing temperature 34°C or more.
- Compressor off: fan off = step 0
- Compressor on:
  - Pressure-equalisation = 60 seconds. Prior to compressor operation, outdoor control set fan speed at step 4 so that refrigerant saturation temperature in outdoor unit becomes around actual ambient.
  - Normal operation: condensing temperature control can adjust fan speed every 20 seconds between step 0 (off) and step 8.



Heating outdoor fan control

- During compressor operation, outdoor fan control set default nominal air flow rate = step 7.
- Compressor off:
  - Outdoor air temperature below 25°C: fan off = step 0.
  - Outdoor air temperature above 27°C: fan step 1 = heating mode is disabled, low air flow rate to enable to measure correct outdoor air temperature (effect sunshine).
- Compressor on:
  - Pressure-equalisation. Prior to compressor operation, outdoor control set fan speed at step 4.
  - Normal operation:
    - When suction and discharge pressure are in normal range, nominal air flow rate is set: step 7.
    - When suction pressure and discharge drop while main expansion valve opens gradually, high air flow rate is set = step 8.
  - Defrost: outdoor fan stops during defrost cycle of outdoor heat-exchanger.

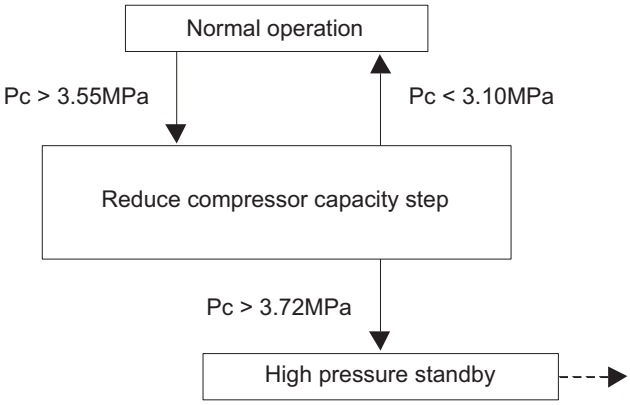
3.5 Protection Control

3.5.1 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.

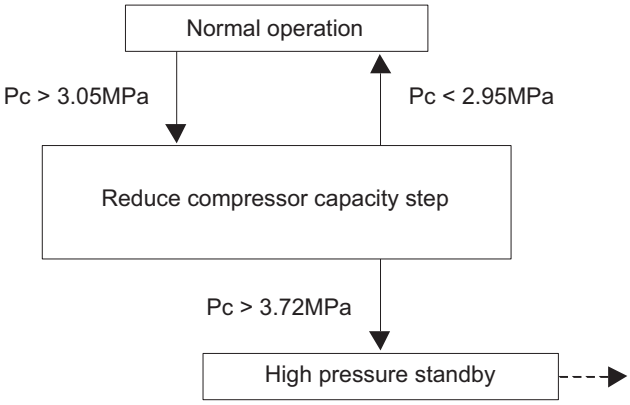
[In cooling operation]

The following control is performed in the entire system. Pc_max indicates the maximum value within the system.



[In heating operation]

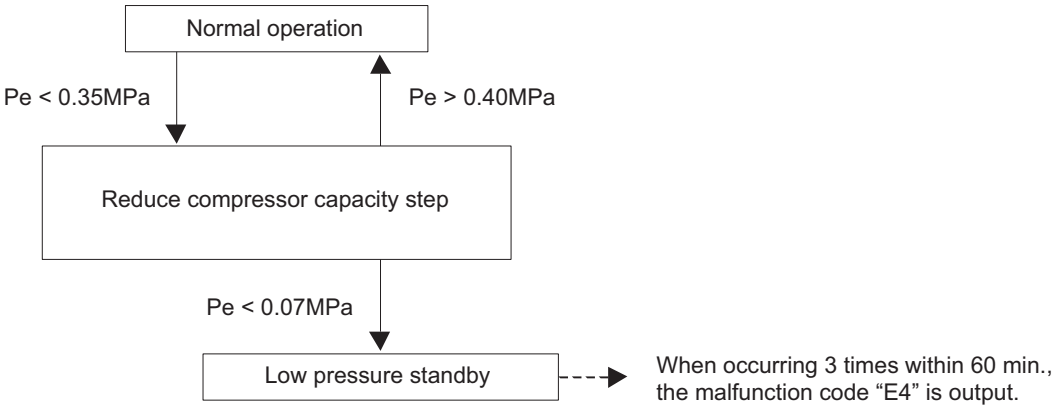
The following control is performed in the entire system. Pc_max indicates the maximum value within the system.



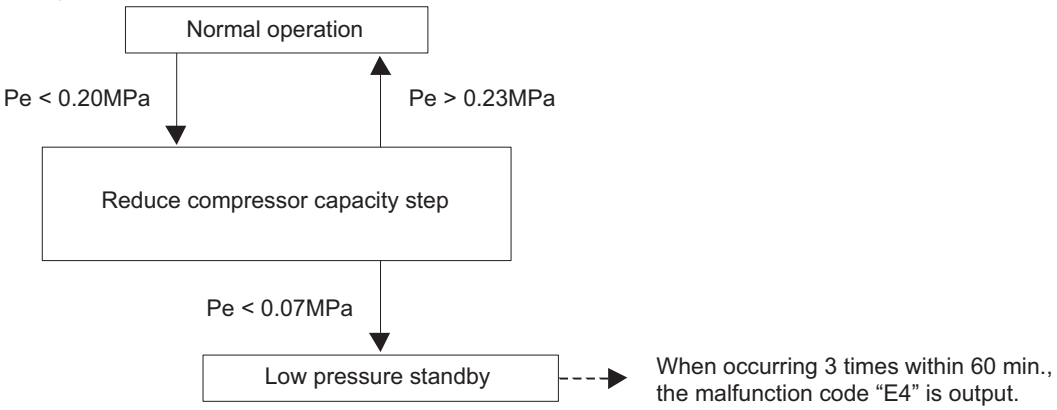
3.5.2 Low pressure protection control

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

[In cooling operation]
Because of common low pressure, the following control is performed in the system. Pe_min indicates the minimum value within the system.



[In heating operation and simultaneous cooling/heating operation]
The following control is performed in the system. Pe_min indicates the minimum value within the system.

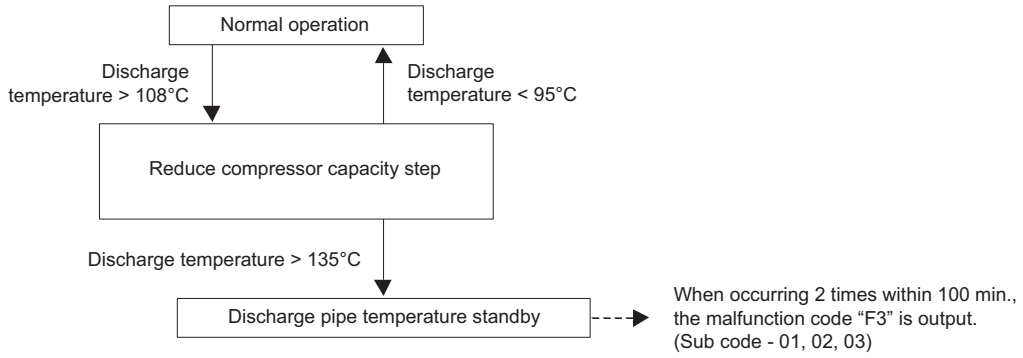


3.5.3 Discharge pipe protection control

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

[Contents]
The following control is performed for each compressor of single unit as well as multi units.

[INV compressor]

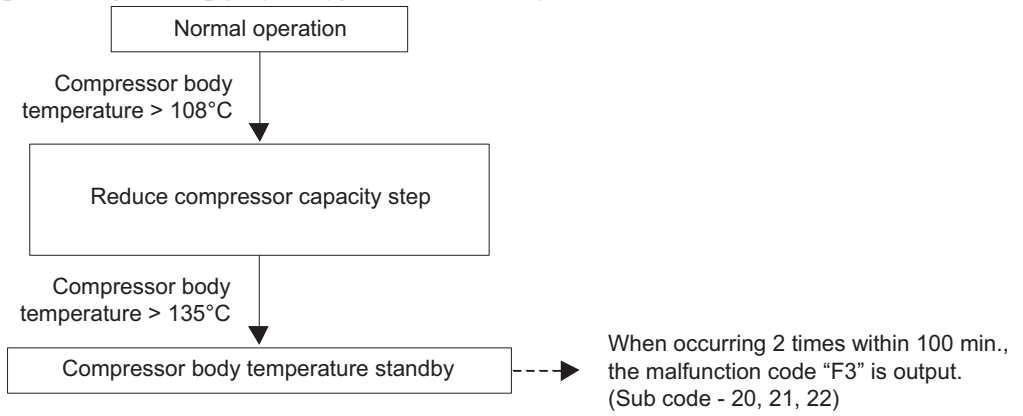


3.5.4 Compressor body protection control

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

[Contents]
The following control is performed for each compressor of single unit as well as multi units.

[INV compressor] (only for type JT15J-VDKYR)

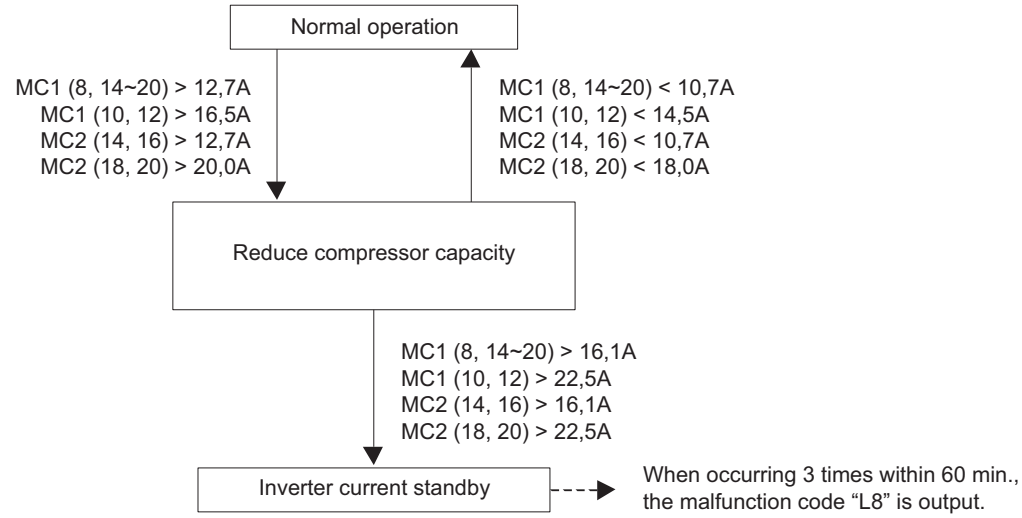


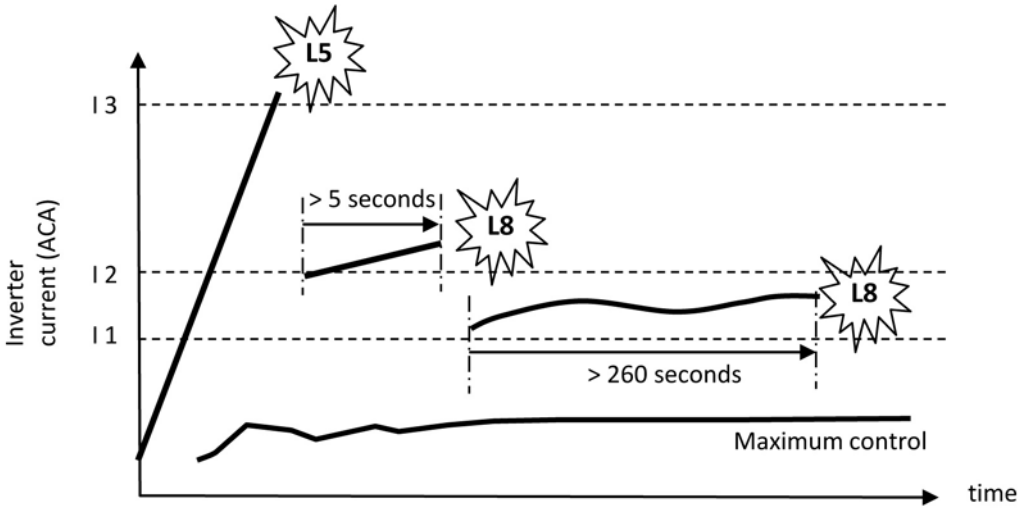
3.5.5 Inverter protection control

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 multi-outdoor-unit system, each INV compressor performs these controls in the following sequence.

[Inverter overcurrent protection control]
Perform the following control of integrated as well as multi units for each INV compressor.

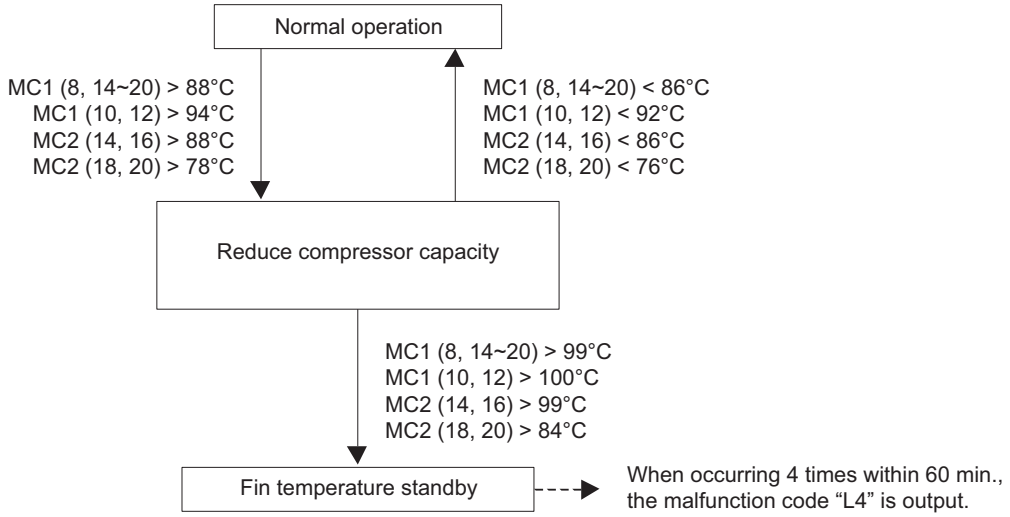




		RYYQ...-T, RYMQ...-T, RXYQ...-T						
Current	MC1	8	10	12	14	16	18	20
I1	1	16.1	22.5		16.1			
I2		19.0	25.0		19.0			
I3		32.0	51.2		32.0			
I1	2				16.1		22.5	
I2					19.0		25.0	
I3					32.0		51.2	

[Inverter fin temperature control]

Perform the following control of integrated as well as multi units for each INV compressor.



3.5.6 Disable heating outdoor ambient

- When outdoor ambient becomes high, outdoor unit can not perform heating because:
  - Low pressure sensor can give pressure value above upper limit of sensor: error “JC”.
  - Mechanical internal load on compressor increases.
  - Low compression ratio can result in insufficient compressor internal oil lubrication.
- Heating is disabled when outdoor air temperature raises above 27°C.
  - Forced thermostat-off indoor units.
  - Outdoor fan operates at “step 1”.
- Heating returns available when outdoor air temperature drops below 25°C.

3.6 Special Control

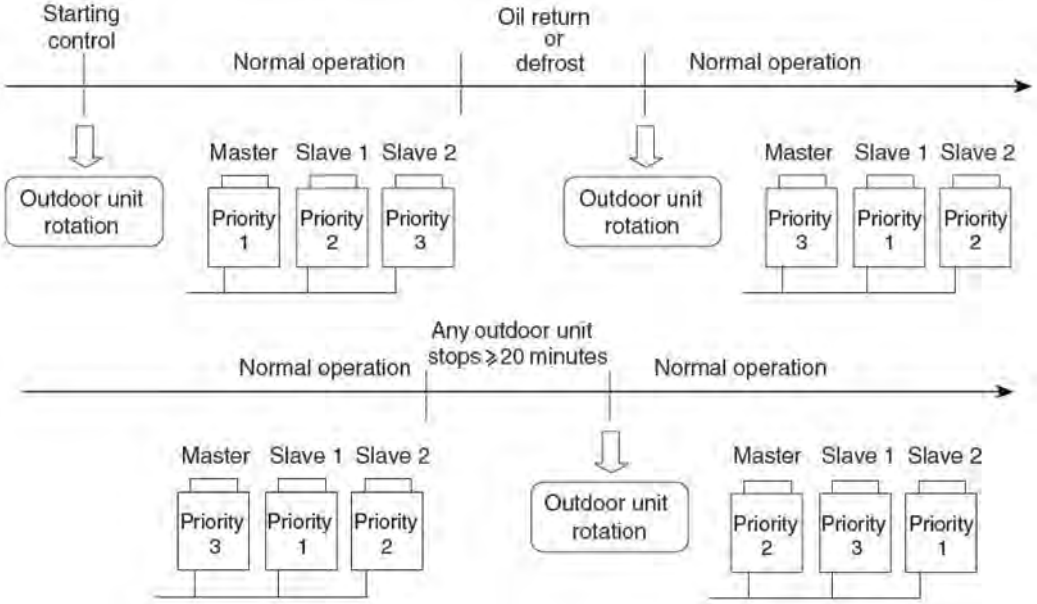
3.6.1 Pump down residual operation

- To avoid refrigerant emigration when outdoor unit stops operation (thermostat or safety), all expansion valves are closed.
- The solenoid valves Y3S and Y4S kept energized till pc-pe drops within 0.3 MPa.

3.6.2 Outdoor unit rotation

- In case of multi-outdoor-unit system, this outdoor unit rotation is used to balance oil level between outdoor units.
- Outdoor unit rotation makes it possible to change the operating priority of outdoor units. The rotation function avoids compressor(s) stopped for an extended period at partial loading, preventing unbalanced oil level.
- Timing of outdoor unit rotation:
  - After oil return operation.
  - After defrosting operation (heating only).
  - At starting control.
  - When any of outdoor unit stops for a period of 20 minutes or more.

Example: the following diagram shows outdoor unit rotation in combination of 3 outdoor units.



3.6.3 Oil return operation

- In order to prevent the compressor from running out of oil, the oil return operation is conducted to recover oil flown out from the compressor to the system side.
- Start conditions. Oil return is started by following conditions:
  - Cumulative oil discharge rate is computed from Tc, Te and compressor loads.
  - Timer setting when the initial cumulative operating time reaches 2 hours after power supply is turned ON.
  - Accumulated operation compressors reaches 8 hours.
- Following tables indicate actuation of actuation parts during oil return.
  - "Continuous heating" range

	Part description		Wiring	Status	
				Cooling	Heating
Outdoor RYYQ-T RYMQ-T	Compressor	Inverter 1	MC1	Capacity step PI-control	
		Inverter 2 (14~20 hp)	MC2		
	Fan motor	Fan motor 1	MF1	TC control	Step 7
		Fan motor 2 (14~20 hp)	MF2		
	Expansion valve (pulses)	Main	Y1E	3000	DSH control
		Sub-cool	Y2E	DSH control	DSH control
		PCM (only RYYQ-T)	Y3E	0	DSH control
	Solenoid valve	Oil separator 1	Y3S	ON	ON
		Oil separator 2 (14~20 hp)	Y4S	ON	ON
		Accumulator	Y2S	ON	ON
		4 way indoor	Y1S	OFF	ON
		4 way outdoor	Y5S	OFF	ON
Indoor	Fan motor speed		M1F	Set	Set
	Expansion valve (pulses)		Y1E	SH control	TC control

  - "Non-continuous heating" range

	Part description		Wiring	Status	
				Cooling	Heating
Outdoor RXYQ-T	Compressor	Inverter 1	MC1	Capacity step PI-control	
		Inverter 2 (14~20 hp)	MC2		
	Fan motor	Fan motor 1	MF1	TC control	OFF
		Fan motor 2 (14~20 hp)	MF2		
	Expansion valve (pulses)	Main	Y1E	3000	3000
		Sub-cool	Y2E	DSH control	DSH control
	Solenoid valve	Oil separator 1	Y3S	ON	ON
		Oil separator 2 (14~20 hp)	Y4S	ON	ON
		Accumulator	Y2S	ON	ON
		4 way indoor	Y1S	OFF	OFF
Indoor	Fan motor speed		M1F	Set	OFF
	Expansion valve (pulses)		Y1E	SH control	SH control

DSH control: compressor discharge °C - Tc

TC control = Target Tc

SH control: gas - coil temperature

3.6.4 Defrost operation (during heating operation)

- To keep the heat-exchange efficiency of outdoor unit optimum, at certain time a defrost can be required. Following checking methods are applied:
  1. Intelligent control:
     - Outdoor air > -5°C, and
     - Compressor operation, and
     - Integrated heating capacity: calculation every 20 seconds in function of Tc, Te, compressor capacity step, and
     - Wait 3 minutes if standard compressor switch on or off, and
     - Minimum 40 minutes accumulated heating operation.
  2. Standard control method:
     - Outdoor coil temperature < Tdef if Ta > -5°C, and
     - Tdef = α * outdoor air °C -14 –B (B +2, or -2 depends on set m2-10: defrost “quick/ slow”).
       - Tdef between -25 and -10°C
       - α = 0.6 if Tamb > 0°C, α = 0.4 if Tamb ≤ 0°C
       - B = 0: field set m2-10-1, B = -2: field set m2-10-0, B = +2: field set m2-10-2
       - Te below 0°C
       - Minimum 40 minutes accumulated heating operation
  3. Regular defrost:
     - Every 2 hours accumulated compressor operation, and
     - Te below 0°C and Tcoil outdoor below -10°C.
- Defrost is not possible if:
  - Outdoor unit performs compressor start-up, or
  - During oil return. In case RYYQ-T and RYMQ-T: outdoor heat-exchanger is kept evaporator. In case of RXYQ-T: outdoor fan may operate by Tc control. This limitation is valid, or
  - Within 20 minutes after end oil return (to avoid frequent interruption of performance). This limitation is only valid for RXYQ-T7.

- Following tables indicate actuation of actuation parts during defrost.
  - “Continuous heating” range

Outdoor RYYQ-T RYMQ-T	Part description		Wiring	Status
	Compressor	Inverter 1	MC1	TC control
		Inverter 2 (14~20 hp)	MC2	
	Fan motor	Fan motor 1	MF1	OFF
		Fan motor 2 (14~20 hp)	MF2	
	Expansion valve (pulses)	Main	Y1E	DSH control
		Sub-cool	Y2E	DSH control
		PCM (only RYYQ-T)	Y3E	DSH control
	Solenoid valve	Oil separator 1	Y3S	ON
		Oil separator 2 (14~20 hp)	Y4S	ON
		Accumulator	Y2S	ON
		4 way indoor	Y1S	ON
		4 way outdoor	Y5S	OFF
Indoor	Fan motor speed			Level 0~3
	Expansion valve (pulses)		Y1E	TC control

DSH control: compressor discharge °C - Tc

TC control = Target Tc

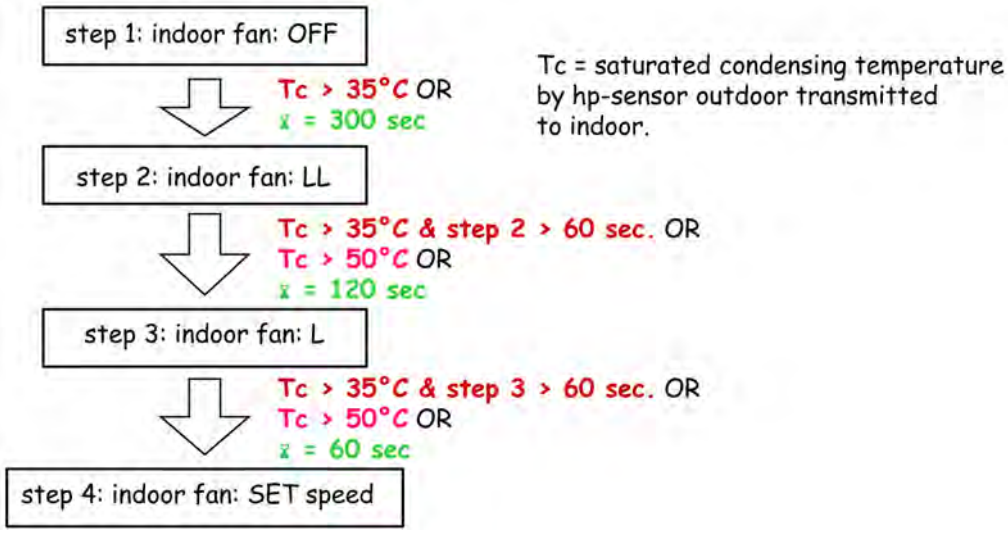
- Level 0~3 indoor fan. Depending on tendency of defrost or period of previous defrost cycle, indoor condition (if thermostat-on) can change:
  - Indoor status condenser:
    - Level 0 (default): fan LL-speed + expansion valve Tc control.
    - Level 1: fan LL-speed + expansion valve fixed minimum position.
    - Level 2: fan off + expansion valve 0 pulses.
  - Indoor status evaporator:
    - Level 3: fan off + expansion valve 0 pulses.

  - "Non-continuous heating" range

Outdoor RXYQ-T	Part description		Wiring	Status
	Compressor	Inverter 1	MC1	TC control
		Inverter 2 (14~20 hp)	MC2	
	Fan motor	Fan motor 1	MF1	OFF
		Fan motor 2 (14~20 hp)	MF2	
	Expansion valve (pulses)	Main	Y1E	0
		Sub-cool	Y2E	0
		PCM (only RYYQ-T)	Y3E	0
	Solenoid	Oil sepator 1	Y3S	ON
		Oil sepator 2 (14~20 hp)	Y4S	ON
		Accumulator	Y2S	ON
		4 way	Y1S	OFF
Indoor	Fan motor speed		M1F	OFF
	Expansion valve (pulses)		Y1E	SH control

SH control: gas - coil temperature

- Defrost termination. One of following conditions stop defrost cycle:
  - Outdoor coil temperature ≥ 11°C continuous ≥ 30 seconds, or
  - Defrost period ≥ 15 minutes.
- Heating restart (hot start). When defrost is terminated, indoor fan speed will gradually increase to avoid cold draft, and smooth built up of discharge pressure.



Part 5
Field Settings

1. List of Field Setting Items

This section shows a list of field setting items possible to set at time of initial start-up. For details of DIP switch setting, setting mode ("mode 2") and monitoring mode ("mode 1"), refer to information on one after the following page onwards.

1.1 Application Settings

Following settings may be required to set to comply to specific application requirements.

No	Setting item	Description	Overview of setting procedure
1	Setting of COOL/HEAT selection control	■ To select cooling or heating mode by one of the following methods: 1. From one indoor unit remote controller (default). 2. From the optional cool/heat switch. Optional board “BRP2A81” required in outdoor unit. 3. Multiple outdoor systems from one indoor unit remote controller. 4. Multiple outdoor systems from the optional cool/heat switch. Optional board “BRP2A81” required in one outdoor unit per zone.	2.1: optional cool/heat switch “KRC19-26B”. 2.2: set dip switch DS1-1 on the outdoor board to “OUT” (upper). 2.3: install option “BRP2A81” in outdoor unit. 3.1: set the system to “MAIN” or “SUB” using mode 2-0. 3.2: set cool/heat zone address mode 2-1. 4: combine 2 and 3.
2	Setting of low noise operation	A. To reduce operation noise level through reduction of the upper limit of the fan using external input (use outdoor fan step 8 for normal operation). 1. Level 1: upper than fan step 7. 2. Level 2: upper fan step 5 + upper limit compressor capacity step mid level. 3. Level 3: upper fan step 3 + upper limit compressor capacity step low level.	■ Use the optional board “DTA104A61”. ■ Set “mode 2” No. 12-1. ■ Choose level by “mode 2” No. 25. ■ If required, set the “Capacity priority setting” to “ON”, by “mode 2” No. 29-1.
		B. To perform automatic night time low noise operation. Start time: selectable from 20:00 to 24:00 hours (step by 2 hours). End time: selectable from 06:00 to 08:00 hours (step by 1 hour). (Note that the set time is estimated according to outdoor temperature tendency.)	■ Select required level by mode 2-22. ■ Select start time with mode 2-26. ■ Select end time with mode 2-27. ■ Select capacity priority setting if required by mode 2-29-1.

For detailed description about each setting, see “Description field settings (mode 2 = m2) on outdoor control board” on page 96.

No	Setting item	Description	Overview of setting procedure
3	Setting of demand operation	■ To limit power consumption: upper limit set on the compressor operating frequency. ■ Demand 1: % current limit 1. ■ Demand 2: % current limit 2. ■ Demand 3: forced thermostat OFF (only indoor fan operation is possible).	■ Use the optional board “DTA104A61”. ■ Wire external signal(s) to the optional adapter “DTA104A61”.
			■ Activate input optional board “DTA104A61” “mode 2” No. 12-1. ■ Select level of demand 1, by mode 2-30. ■ Select level of demand 2, by mode 2-31.
			■ If fixed demand control is required (without adapter “DTA104A61”), set level by mode 2-32.
4	Setting of AirNet address	■ Make “ACNSS” address when it is connected to ANCSS monitoring, or to view detail in the map on Service Checker type III.	■ Set ACNSS address with mode 2-13.
5	High level difference outdoor to indoor	■ Required setting when level difference between outdoor and indoor units of same refrigerant exceeds standard level.	■ Set “mode 2” No. 35 to “1” if outdoor is > 40 m BELOW indoor unit. ■ Set “mode 2” No. 49 to “1” if outdoor is > 50 m ABOVE indoor unit.
6	Setting of high static pressure	■ Set “high static pressure” in order to operate the system with duct to the outdoor unit (used at concealed installation on floors or balconies).	■ Set “mode 2” No. 18 to “ON”.
7	Evaporation temperature setting (cooling performance)	■ Setting to choose the reaction time of outdoor control on change of outdoor and cooling indoor load.	■ Set “mode 2” No. 8 to choose cooling capacity control logic between fixed, automatic or high sensible. ■ Set “mode 2” No. 83 to choose Te adjustment at start up between Powerful, Quick, Mild or Eco.
8	Condense temperature setting (heating performance)	■ Setting to choose the reaction time of outdoor control on change of outdoor and heating indoor load.	■ Set “mode 2” No. 9 to choose heating capacity control logic between fixed, automatic or high sensible. ■ Set “mode 2” No. 84 to choose Tc adjustment at start up between Powerful, Quick, Mild or Eco.

For detailed description about each setting, see “Description field settings (mode 2 = m2) on outdoor control board” on page 96.

1.2 Service Setting by “Configurator”

Mode 2	Field setting	Description	Factory set
[2-0]	Cool/Heat selector setting	Cool/Heat selection setting	0: Individual
[2-1]	Cool/Heat unified address	Cool/Heat selector unified address	0
[2-2]	Low noise / demand address	Low noise demand / address	0
[2-8]	Te target setting	Te target temperature during cooling operation	0: Automatic
[2-9]	Tc target setting	Tc target temperature during heating operation	0: Automatic
[2-12]	Low noise / demand setting	Low noise / demand activation setting (under external control adaptor functionality)	0: OFF
[2-13]	Airnet address	Airnet address	0
[2-14]	Charged refrigerant amount	Input additional refrigerant amount charged (required for automatic leak detection operation)	0: OFF
[2-18]	High ESP setting FAN	Fan high static pressure setting	0: OFF
[2-22]	Low noise setting at night time	Automatic low noise setting and level during night time	0: OFF
[2-25]	Low noise setting (level)	Low noise operation level via the external control	2: Level 2
[2-26]	Start time low noise	Start time low noise operation	2:22:00
[2-27]	End time low noise	Stop time low noise operation	3:08:00
[2-29]	Capacity priority setting (over low noise)	Capacity priority setting over low noise (activation)	0: OFF
[2-30]	Level demand 1	Power consumption limitation level (step1) via the external control adaptor	3: 70%
[2-31]	Level demand 2	Power consumption limitation level (step 2) via the external control adaptor	1: 40%
[2-32]	Force demand set (no external PCB required)	Continous demand operation activation	0: OFF
[2-81]	Cooling comfort setting	Cooling comfort setting	1: Mild
[2-82]	Heating comfort setting	Heating comfort setting	1: Mild
[2-83]	Master user interface setting	Master user interface allocation in case VRV DX indoor units and RA DX indoor units are used at the same time	1: RA DX master
[2-85]	Interval timer for automatic leak detection function	Automatic leak detection interval timer	0: 365 days
[2-86]	Automatic leak detection activation	Automatic leak detection activation	0: OFF
[2-88]	Gathering detailed refrigerant information during test run	Gathering detailed refrigerant information during test run	0: Active

For detailed description about each setting, see “Description field settings (mode 2 = m2) on outdoor control board” on page 96.

2. Settings by DIP Switches

2.1 Factory Settings

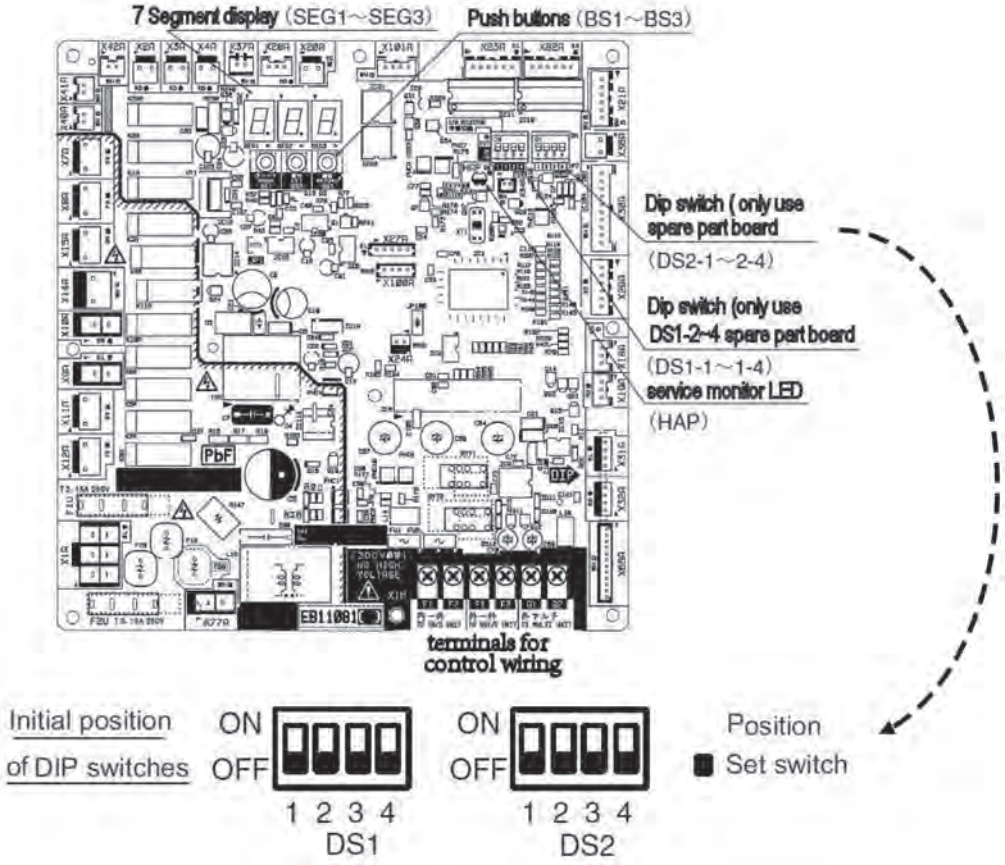
For factory mounted board only use dip switch DS1-1 if required.

DIP switch			
No.	Setting	Setting item	Description
DS1-1	ON	COOL/HEAT selection	Used to choose source to select Cooling/ Heating/fan only. Source can be or indoor remote controller, or optional cool/ heat switch wired to option “BRP2A81”.
	OFF (Factory setting)		
DS1-2 ~DS1-4	ON	N/A	Do not make any change to factory mounted board. Even setting is changed, it will not have effect on operation of unit.
	OFF (Factory setting)		

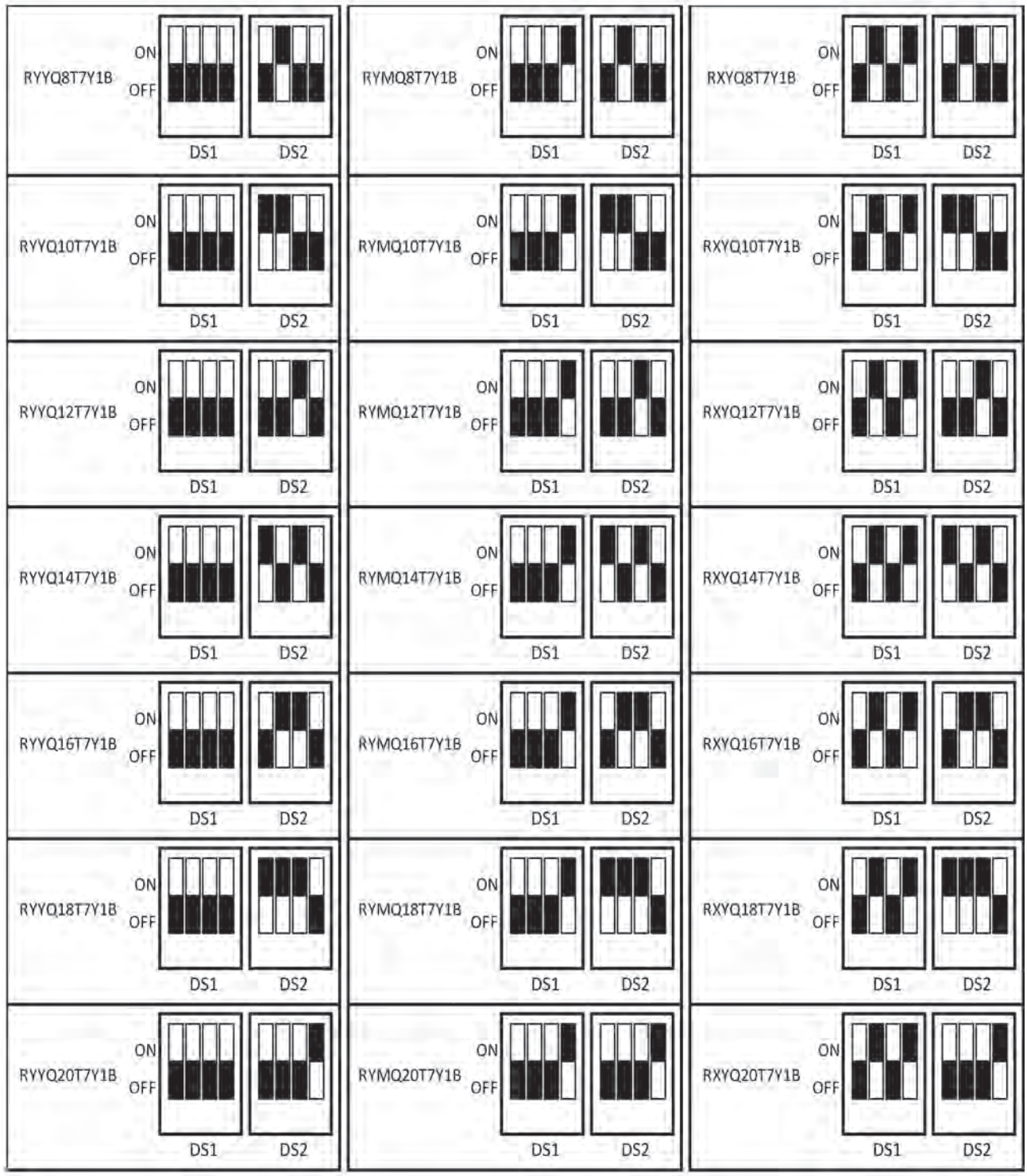
2.2 DIP Switch Setting Mounting a Spare Printed Circuit Board

Caution:

- After replacement with spare PC board, be sure to make settings shown in the table below. The procedure for making settings of spare PC board is different from that used for factory settings described above. Be sure to refer to the table shown below in order to make settings of spare PC board after replacement.
- Enforce a re-initialization of communication: hold push button BS3 “return” for minimum 5 seconds.
- After initialization, a test run is required from outdoor unit (hold BS2 “Set” till indication “t01” appears).



The figure below shows the required position of the dip switches on spare part board for RYYQ, RYMQ or RXYQ-T7Y1B. Change dip switches at time of power disconnected.

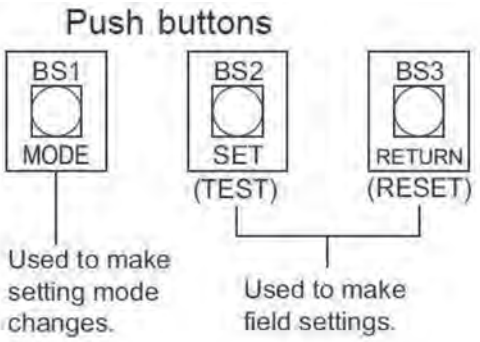


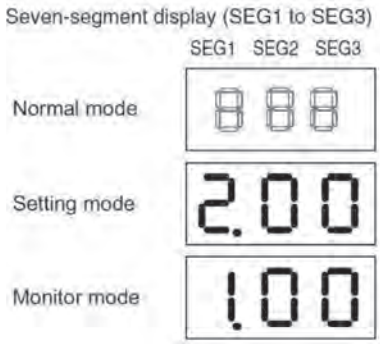
Remark: In case of RYMQ-T7, after reconnect power, also need to set “mode 2”, No. 87 to “0” (factory set “1”).

3. Settings by Push Buttons

The following settings can be made using the push buttons on the PC board.
In case of a multi outdoor system, make these settings with the master outdoor unit (settings made with a slave unit are disabled).

Push buttons

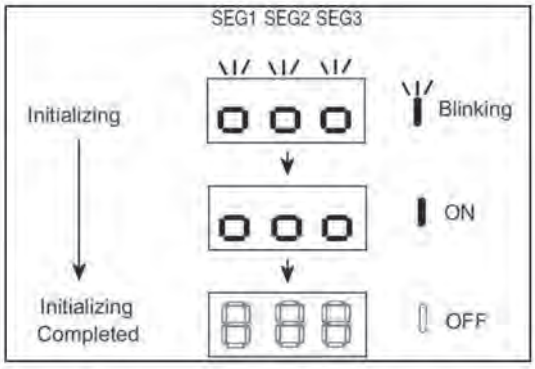




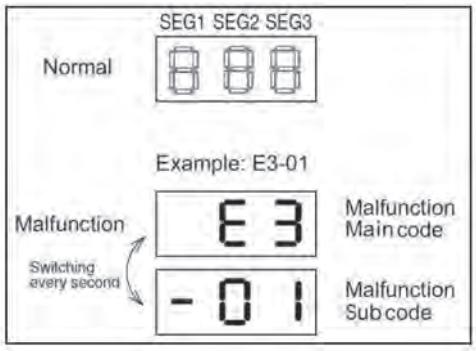
- Normal mode:
  - Blank: if no abnormality is detected and initialization of communication was completed.
  - Flashing combination of letter and number (4 digits): malfunction code detected by outdoor control or trouble by communication.
- Setting mode: used to make changes to operating status, performance settings or address setting.
- Monitor mode: used to verify contents of settings, quantity of units, current value of some parameters during operation of outdoor unit.

3.1 Normal Mode

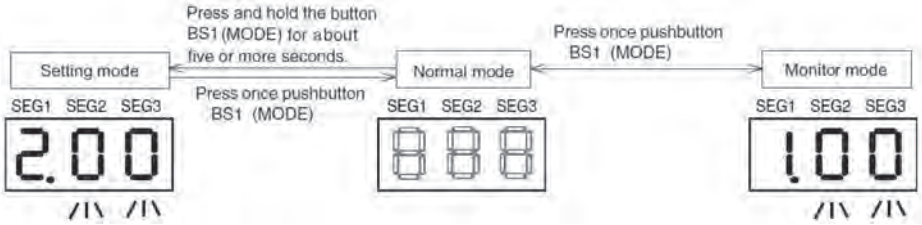
1. Indoor/outdoor transmission status: used to check for the initial status of indoor/outdoor transmission.



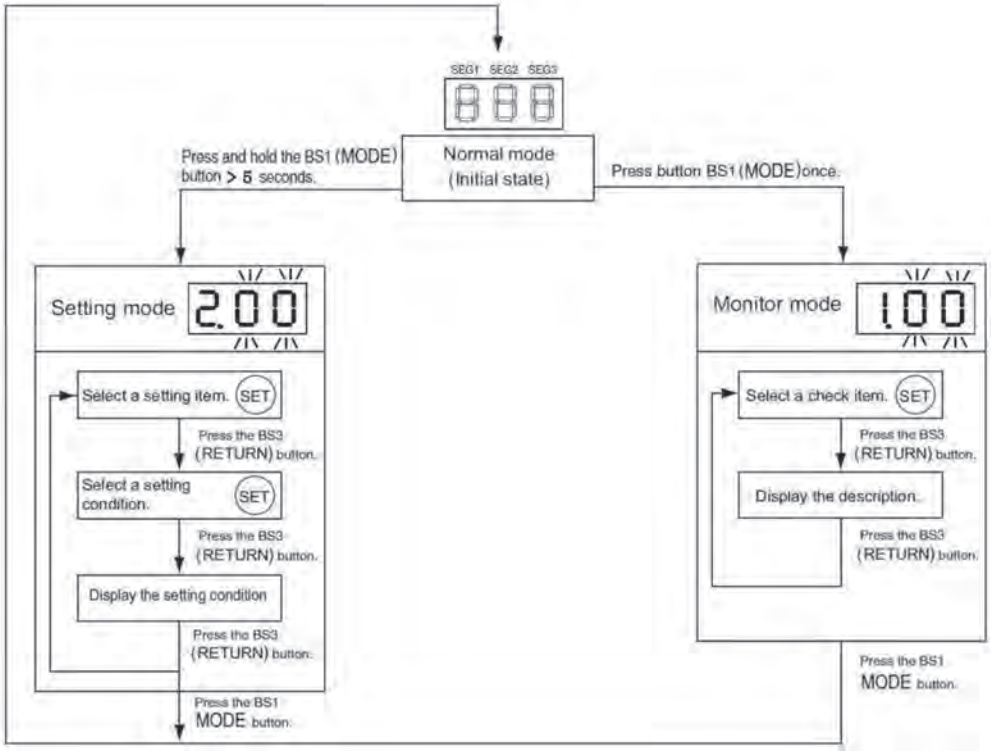
2. Malfunction description: used to display a malfunction description.



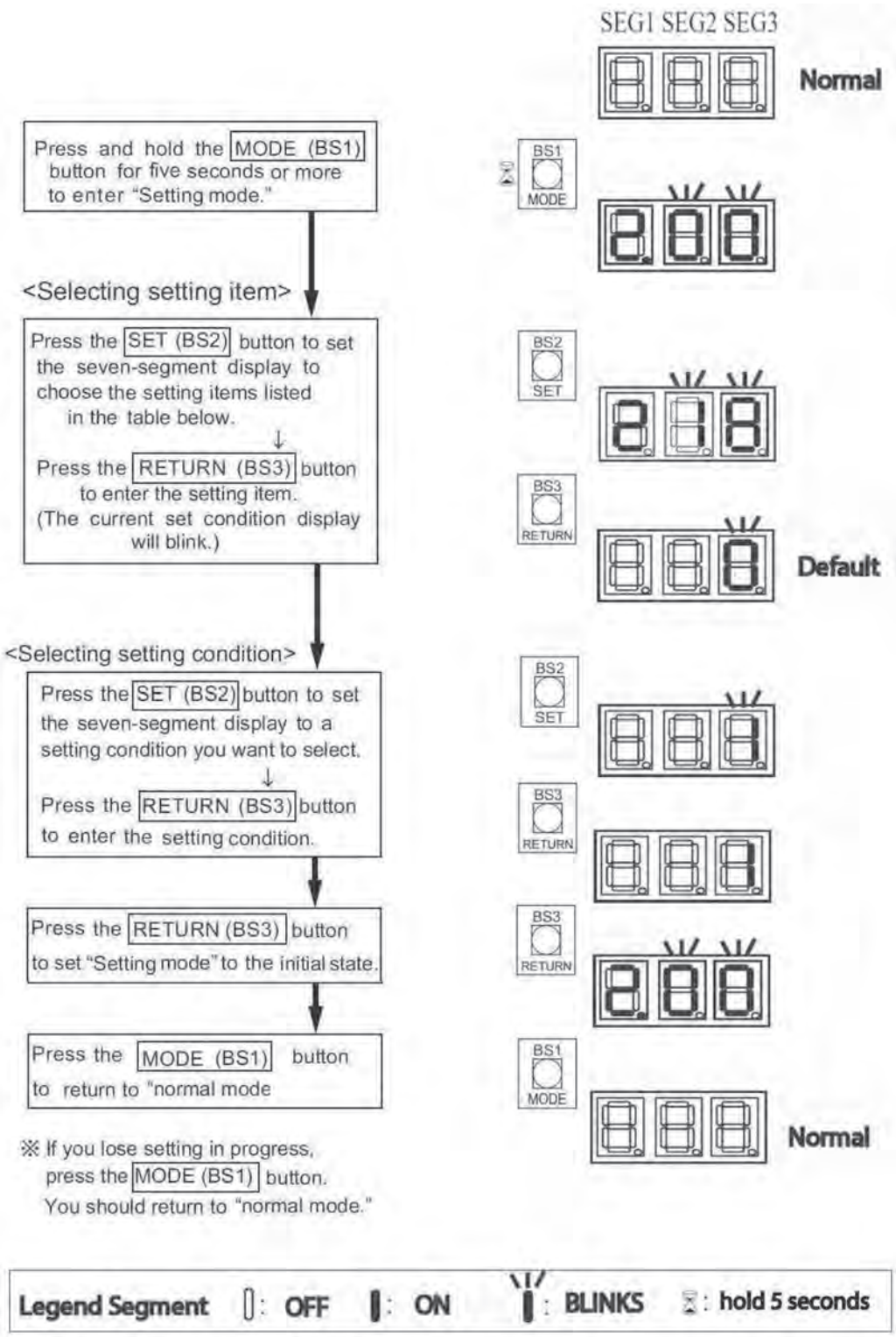
- Mode changing procedure can be selected using the “MODE” push button BS1 as shown below:



- Selection between Normal mode, Mode 1 and Mode 2.



3.2 Setting Mode (= Mode 2)



3.2.1 Overview settings “mode 2”

This overview shows the available settings by using the push buttons on the outdoor unit board.

No. *1	Item	Description	7 segment display			Description	7 segment display Range		
			Dig 1	Dig 2	Dig 3		Dig 1	Dig 2	Dig 3
0	COOL/HEAT selection	Several systems as 1 zone change over COOL/HEAT: ■ INDIVIDUAL: VRV indoor unit or A-B-C input set mode. ■ MASTER: system is the COOL/HEAT master unit. ■ SLAVE: system is not a COOL/HEAT master.	2.	0	0	**Individual** Unified master Unified slave			**0** 1 2
1	COOL/HEAT unified address	Used to make address setting for unified cooling/heating operation.	2.	0	1	**0** Address ~ 31		~ 3	**0** ~ 1
2	Low noise/ demand address	Used to make address setting for low noise/demand operation.	2.	0	2	**0** Address ~ 31		~ 3	**0** ~ 1
5	Indoor unit forced fan H	Used to force the fan of indoor unit to H tap.	2.	0	5	**Normal operation** Indoor fan H			**0** 1
6	Forced thermostat	Used to force all indoor units to operate forced thermo-ON.	2.	0	6	Normal operation Forced thermo-on			0 1
8	Te setting	Used to make setting of targeted evaporating temperature for cooling operation.	2.	0	8	**Auto** (6~11°C) Low level = 3°C Standard = 6°C High Sens. 7°C High Sens. 8°C High Sens. 9°C High Sens.10°C High Sens.11°C			**0** 1 2 3 4 5 6 7
9	Tc setting	Used to make setting of targeted condensing temperature for heating operation.	2.	0	9	**Auto** (38~49°C) Low = 41°C Normal = 43°C High = 46°C			**0** 1 3 6
10	Defrost selection setting	Used to adjust the defrost start temperature of outdoor coil, to initiate defrosting earlier/later.	2.	1	0	Defrost IN -2° **Normal** Defrost IN +2°			0 **1** 2
12	External LNO/ DE	Used to receive external low noise or demand signal.	2.	1	2	Input LNO/DE : **NO** : YES			**0** 1
13	ACNSS address	Used to set address of ACNSS.	2.	1	3	**0** Address ~ 63		~ 3	**0** ~ 1

*1: Numbers in the "No." column represent the number of times to press the pushbutton.
*2: Setting does not return to factory setting when exit mode 2. To cancel the function, change setting manually to factory set.
For detailed description about each setting, see “Description field settings (mode 2 = m2) on outdoor control board” on page 96.
Indication **bold** = factory set.

No. *1	Item	Description	7 segment display			Description	7 segment display		
							Range		
			Dig 1	Dig 2	Dig 3		Dig 1	Dig 2	Dig 3
14	Additional refrigerant charge	Input the additional refrigerant amount during manual + automatic charge: setting is required to offer the refrigerant leak detection operation.	2.	1	4	Additional R410A (/5 kg): **no input** 0~90 kg		~ 1 2	**0** ~ 9 0
20	Additional refrigerant charge	Used to perform additional refrigerant charging operation (compressor operation).	2.	2	0	Refrigerant charging **OFF** ON			**0** 1
21	Refrigerant recovery and vacuuming	Used to set the system to refrigerant collection mode (without compressor run).	2.	2	1	Refrigerant recovery **OFF** ON			**0** 1
22	Nighttime low noise level setting	Automatic nighttime low noise operation. Time for the operation is subject to the start and end time settings.	2.	2	2	**OFF** Level 1 Level 2 Level 3			**0** 1 2 3
25	External low operating noise level setting	Low operating noise level when the external low noise signal is input at option DTA104A61.	2.	2	5	Level 1 **Level 2** Level 3			1 **2** 3
26	Nighttime low noise operation start setting	Time to start automatic “nighttime low noise” operation. (“Nighttime low noise” level setting should also be made.)	2.	2	6	About 20:00 **About 22:00** About 24:00			1 **2** 3
27	Nighttime low noise operation end setting	Time to end automatic “nighttime low noise” operation. (“Nighttime low noise” level setting should also be made.)	2.	2	7	About 06:00 About 07:00 **About 08:00**			1 2 **3**
28	Power transistor check mode	Used to troubleshoot DC compressor. Inverter waveforms are output without wire connections to the compressor. It is useful to determine whether the relevant trouble has resulted from the compressor or inverter board.	2.	2	8	**OFF** ON (10 Hz)			**0** 1
29	Capacity priority setting	Cancel the low noise level control if capacity is required while low noise operation or nighttime low noise operation is in progress.	2.	2	9	**OFF** ON			**0** 1

*1: Numbers in the "No." column represent the number of times to press the pushbutton.
*2: Setting does not return to factory setting when exit mode 2. To cancel the function, change setting manually to factory set.
*3: Once function is activated “t01” appears. To stop current function, press once BS3 “Return” button.
For detailed description about each setting, see “Description field settings (mode 2 = m2) on outdoor control board” on page 96.
Indication **bold** = factory set.

No. *1	Item	Description	7 segment display			Description	7 segment display		
							Range		
			Dig 1	Dig 2	Dig 3		Dig 1	Dig 2	Dig 3
30	Demand 1 level setting	Used to make a change to the targeted power consumption level when the demand 1 control signal is inputted.	2.	3	0	Level 1 (60%) Level 2 (65%) **Level 3 (70%)** Level 4 (75%) Level 5 (80%) Level 6 (85%) Level 7 (90%) Level 8 (95%)			1 2 3 4 5 6 7 8
31	Demand level setting	Used to use a targeted power current level when the demand 2 control signal is inputted.	2.	3	1	**Level 1 (40%)** Level 2 (50%) Level 3 (55%)			1 2 3
32	Constant demand setting	Used to set permanent demand 1 or 2 control without inputting any external signal.	2.	3	2	**OFF** Demand 1 (2-30) Demand 2 (2-31)			0 1 2
34	Indoor fan upper limit	Forced fan speed to low indoor units thermostat on if total indoor thermostat-on > index 130.	2.	3	34	**Cooling and heating** Heating only Never			0 1 2
35	Outdoor > 40 m below indoor	To increase Tc target heating.	2.	3	35	Level > 40 m **Level max. 40 m** Do not use			0 1 ~7
38	Emergency operation (master)	To prohibit a compressor or complete in “Master”. Since module is permanent disabled, immediately replace the broken component(s).	2.	3	8	**OFF** Master INV 1 off Master INV 2 off Master unit off			0 1 2 3
39	Emergency operation (slave 1)	To prohibit a compressor or complete “Slave 1”. Since module is permanent disabled, immediately replace the broken component(s).	2.	3	9	**OFF** Slave 1 INV 1 off Slave 1 INV 2 off Slave 1 unit off			0 1 2 3
40	Emergency operation (slave 2)	To prohibit a compressor or complete “Slave 2”. Since module is permanent disabled, immediately replace the broken component(s).	2.	4	0	**OFF** Slave 2 INV 1 off Slave 2 INV 2 off Slave 2 unit off			0 1 2 3
42	Outdoor fan	Outdoor fan noise countermeasure (limit fan speed).	2.	4	2	**Standard** Made A Mode B			0 1 2
43	Defrost 4-way valve	At time defrost starts/end.	2.	4	3	**Capacity priority** Compressor off			0 1
49	Outdoor > 50 m above indoor	Height difference setting max. 90 m.	2.	4	9	**Off (max. 50 m)** On (max 90 m)			0 1

*1: Numbers in the "No." column represent the number of times to press the pushbutton.
For detailed description about each setting, see “Description field settings (mode 2 = m2) on outdoor control board” on page 96.
Indication **bold** = factory set.

No. *1	Item	Description	7 segment display			Description	7 segment display		
							Range		
			Dig 1	Dig 2	Dig 3		Dig 1	Dig 2	Dig 3
50	Defrost RYMQ	Priority during defrost RYMQ-T.	2.	5	0	**Indoor priority** Defrost priority			0 1
51	Sequence multi outdoor	Sequence addressing between main and sub units (REMQ-RXYQ-T multi).	2	5	1	**Automatic** Forced main Forded sub 1 Forced sub 2			0 1 2 3
52	Drain pan heater (optional)	Output for optional drain pan heater.	2.	5	2	**Off** Setting 1 Setting 2			0 1 2
81	Comfort setting cooling	Selection of sub-mode in case of T-evaporation automatic or high sensible mode (see setting 2-8).	2.	8	1	Eco **Mild** Quick Powerful			0 1 2 3
82	Comfort setting heating	Selection of sub-mode in case of T-condensation automatic (see setting 2-9).	2	8	2	Eco **Mild** Quick Powerful			0 1 2 3
83	Assignment cool/heat	Allocation of cool/heat master logic if VRV + RA indoor units.	2	8	3	VRV logic (fixed) **BP logic (1st ON)**			0 1
84	Initial EV heating opening BP	Instruction indoor EV opening in BP unit at start up.	2	8	4	**400 pulses** 500 pulses 600 pulses 300 pulses			0 1 2 3
85	Interval automatic refrig. check	Interval (days) to perform automatic refrigerant containment check.	2	8	5	**365** 180 90 60 days 30 7 1			0 1 2 3 4 5 6
86	Activation automatic refrig. check	Activation of automatic refrigerant containment check.	2	8	6	**Disable** One time set Continuous set			0 1 2
87	Oil return interval setting	Additional setting for RYMQ-T7 (only spare part board required).	2	8	7	**Off** ON			0 1
88	Test-run refrig. check details	Collect detailed data during test-run, leak test becomes available.	2.	8	8	**Enabled** Disabled			0 1
90	Skip U4 indoor power < 24 h	When indoor unit (max. 30% index) power off for maintenance.	2	9		**Disabled** Enabled			0 1

*1: Numbers in the "No." column represent the number of times to press the pushbutton.
For detailed description about each setting, see “Description field settings (mode 2 = m2) on outdoor control board” on page 96.
Indication **bold** = factory set.

3.2.2 The factory setting for all field settings - mode 2

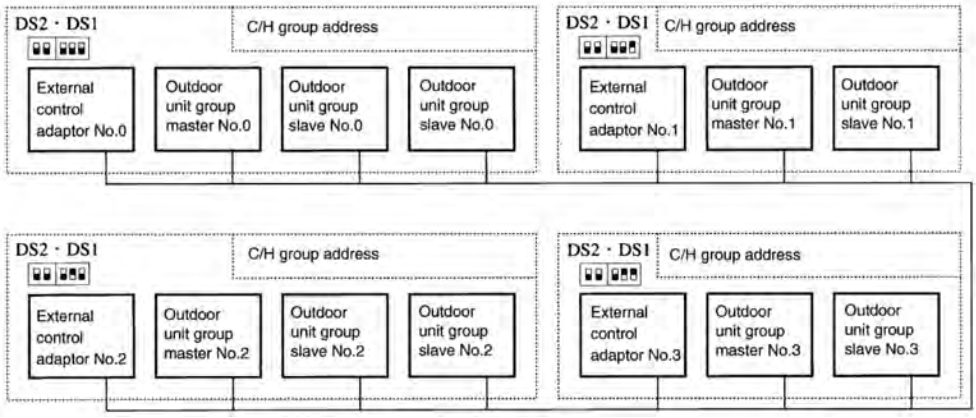
No	Item	Description factory setting	7 seg. display Digit 1	2	3	No.	Item	Description factory setting	7 seg. display Digit 1	2	3
0	CL/H selection	Individual			0	41	Do not change contents				0
1	CL/HT address	Address 0			0	42	Outdoor fan	Standard			0
2	LNO /DE addr.	Address 0			0	43	Sound defrost	Capacity			0
3	Do not change contents				0	44	Do not change contents				0
4					0	45					0
5	Indoor fan H	Normal			0	46					0
6	Indoor therm-on	Normal			0	47					0
7	Do not change contents				0	48					0
8	Te setting	Automatic			0	49	Outdoor > 50 m	Disabled			0
9	Tc setting	Automatic			0	50	Defrost cont heat	Enabled			0
10	Defrost selection	Normal			1	51	Sequence multi	Automatic			0
11	Do not change contents				0	52	Drain pan heater	Disabled			0
12	Extern. LNO/DE	Disabled			0	53	Do not change contents				3
13	ACNSS address	Address 0			0	54					0
14	Kg R410A add	No input			0	55					1
15	Do not change contents				0	56					0
16					0	57					0
17					0	58					0
18	Outd fan ESP	Normal			0	59					0
19	Do not change contents				1	60					0
20	Add refrig. Man.	Disabled			0	61					0
21	Recov'y, vacuuming	Disabled			0	62					0
22	Auto LNO level	Disabled			0	63					1
23	Do not change contents				0	64					0
24	Do not change contents				0	65					0
25	Input LNO	Level 2			2	66					0
26	Auto LNO start	10:00 PM			2	67					0
27	Auto LNO end	8:00 PM			3	68			2	5	5
28	Pow.trans.check	Disabled			0	69					0
29	Capacity priority	Disabled			0	70					0
30	Demand level 1	70%			3	71					0
31	Demand level 2	40%			1	81	Comfort Cooling	Mild			1
32	Forced demand	Disabled			0	82	Comfort Heating	Mild			1
33	Do not change contents				0	83	Assignment cool/heat	RA			1
34	L-tap > 130%	All modes			0	84	Initial EV heating opening BP	500			1
35	Outdoor > 40 m	Disabled			1	85	Interval auto refrig.check	365 days			0
36	Do not change contents				2	86	Auto refrig.check	Disabled			0
37					0	87	Oil return interval	Disabled			0
38	Disable Master	Disabled			0	88	Test-run refrig. check details	Collection enabled			0
39	Disable Slave 1	Disabled			0	89	Do not change contents				0
40	Disable Slave 2	Disabled			0	90	Skip U4 indoor w/o power max. 24 hr	Disabled			0

For detailed description about each setting, see “Description field settings (mode 2 = m2) on outdoor control board” on page 96.

3.2.3 Description field settings (mode 2 = m2) on outdoor control board

- m2-0: **Cool/heat zone** setting. When multiple heat-pump systems need to change over together between cooling and heating (example multiple systems serve to indoor units in landscape area), per zone the optional board DTA104A61/62 needs to be installed.
  - Recommended location is in one of the VRV indoor units belonging to the system that will be set as “Master cool/heat unit” (field set 2-0-1).
  - The source to change over between cooling and heating can be as follows:
    - One of indoor units is chosen: outdoor board dip switch DS1-1 “Off”, or
    - Optional cool/heat selector “KRC19-26A” and optional board “BRP2A81” is used.
  - Default value: 0 = “individual”**.** Each outdoor unit can select cool/heat operation by optional cool/heat selector if installed, or by defining master indoor unit.
  - Set 1: “Master unit”. This system will switch several systems between cooling/heating/ fan-only.
  - Set 2: “Slave unit”. The system will receive the operation from a system set as “Master cool/heat” with same “Cool/heat address” (set 2-1) and dip switch address on the optional board DTA104A61/62.

- m2-1: **Cool/heat unified address**: address for cool/heat unified operation.
  - When multiple heat-pump systems need to change over together between cooling and heating (example multiple systems serve indoor units in landscape area). Per zone the optional board DTA104A61/62 needs to be installed. Recommended location is in one of the VRV indoor units belonging to the system that will be set as “Master cool/heat unit” (field set 2-0-1).
  - The address set to the multiple systems need to operate as a zone, should be same as the address set by the dip switches on the related optional board DTA104A61/62.



  - Default value = 0.
  - Field set: 1~31.
  - The source for cool/heat selection can be:
    - Indoor unit: when outdoor unit dip switch DS1-1 is at the “off” position.
    - Cool/heat switch: set dip switch DS1-1 outdoor board to “on”. Operation mode according to connections A-B-C to optional board “BRP2A81”.

- m2-2: **Low noise/demand address**: address for low noise/demand operation.
  - One or more systems (maximum 10 systems wired by “F1F2 OUT/D”) can operate use the LNO (Low Noise Operation) or/and the DE (Demand Control) by instruction of local supplied input to optional board DTA104A61/62.
  - To link the system to the corresponding DTA104A61/62, set the address same as the dip switches position on the related optional board DTA104A61/62.
  - Ensure that also field set 2-12-1 is set to enable input from optional board DTA104A61/ 62.

- m2-5: **Cross wiring check**.
  - Default value = 0. Not active.
  - Set 1: force all connected indoor units (except VKM) to operate the indoor fan on high speed. This setting can be made to check which units are missing in the communication if the number of indoor units do not correspond to the system lay out. Ensure that after cross wiring check was confirmed, to return setting to default 2-5-0. Once setting 2-5-1 is active, it is not automatically returning to default when exit mode 2.

- m2-6: **Forced thermostat-on** command all connected indoor units.
  - Default value = 0. Not active.
  - Set 1: force all connected indoor units to operate under “Test” = forced thermostat-on command to outdoor. Ensure that when the forced thermostat-on needs to be ended, to return setting to default 2-6-0. Once setting 2-6-1 is active, it is not automatically returning to default when exit mode 2.

- m2-8: **Te target** temperature for cooling operation. Change the setting 2-8 = 0, 2~7 in function of required operation method during cooling.
  - Default value = 0 = **Automatic**. The refrigerant temperature is set depending on the outdoor ambient conditions. As such adjusting the refrigerant temperature to match the required load (which is also related to the outdoor ambient conditions). When system is operating in cooling, less cooling load when low outdoor ambient temperatures (e.g. 25°C) as under higher outdoor ambient temperatures (35°C). The system automatically starts increasing its refrigerant temperature, so reducing the delivered capacity and increasing the system's efficiency.
  - Set 2: **Basic**. The refrigerant temperature is fixed to average indoor evaporation temperature of 6°C, independent from the situation. It corresponds to the standard operation which is known and can be expected from/under previous VRV systems.
  - Set 3~7: **High Sensible**. The refrigerant temperature is set higher/lower in cooling compared to basic operation. The focus under high sensible mode is comfort feeling for the customer. The selection method of indoor units is important and has to be considered as the available capacity is not the same as under basic operation. Activate this setting under cooling operation.

set 2-8-	Te target
3	7°C
4	8°C
5	9°C
6	10°C
7	11°C

- m2-9: **Tc target** for heating operation. Change field setting 2-9 to the appropriate control.
  - Default value = 0 = **Automatic**. The refrigerant temperature is set depending on the outdoor ambient conditions. As such adjusting the refrigerant temperature to match the required load (which is also related to the outdoor ambient conditions). When system is operating in heating, no need as much heating under high outdoor ambient temperatures (e.g. 20°C) as under low outdoor ambient temperatures (–5°C). The system automatically starts decreasing its refrigerant temperature, reducing the delivered capacity and increasing the system's efficiency.
  - Set 1 or 3: **High Sensible**. The refrigerant temperature is set higher/lower in heating compared to basic operation. The focus under high sensible mode is comfort feeling for the customer. The selection method of indoor units is important and has to be considered as the available capacity is not the same as under basic operation.

set 2-9-	Te target
1	41°C
3	43°C

  - Set 6: **Basic**. The refrigerant temperature is fixed to average indoor condensation temperature of 46°C, independent from the situation. It corresponds to the standard operation which is known and can be expected from/under previous VRV systems.

- m2-12: **Enable input "DTA104A61"**: enable the low noise function and/or power consumption limitation. If the system needs to be running under low noise operation or under power consumption limitation conditions when an external signal is sent to the unit, this setting should be changed. This setting will only be effective when the optional external control adaptor (DTA104A61/62) is installed and the address set by dip switches on DTA104A61/62 corresponds to the address set on the outdoor unit(s) – set 2-.
  - Default value = 0.
  - To enable input from DTA104A61/62 change to 2-12-1.

- m2-13: **ACNSS address**.
  - When an ANCSS system will be used, outdoor unit needs an ANCSS address.
  - Also to facilitate the recognition of a system in the map lay out of the service checker type III, set each system an unique address between 1 and 63.
  - When duplicating of ACNSS address, "UC" error code will appear on central control.

- m2-14: **Additional refrigerant charge** amount.
  - Once the manual or/and automatic refrigerant charge is completed, it is required to input to the outdoor unit the total additional refrigerant charge (per 5kg R410A).

set 2-14 -	+kg R410A
0	no input
1	0 ~ 5
2	5 ~ 10
3	10 ~ 15
4	15 ~ 20
5	20 ~ 25

set 2-14 -	+kg R410A
6	25 ~ 30
7	30 ~ 35
8	35 ~ 40
9	40 ~ 45
10	45 ~ 50
11	50 ~ 55
12	55 ~ 60

set 2-14 -	+kg R410A
13	60 ~ 65
14	65 ~ 70
15	70 ~ 75
16	75 ~ 80
17	80 ~ 85
18	85 ~ 90
19	90 ~ 95

  - If default set 0, the refrigerant containment check will not be available.
  - If no input, and field set 2-88-0, at the end of the test-run caution "U3-02" will indicate that the refrigerant leak containment check will not be available.

- m2-18: **Fan high static** pressure setting. In order to increase the static pressure the outdoor unit fan (up to 78 Pa at highest fan step), this setting should be activated.
  - Default value = 0: High ESP not activated.
  - Set 2-18-1: the High ESP function is active.

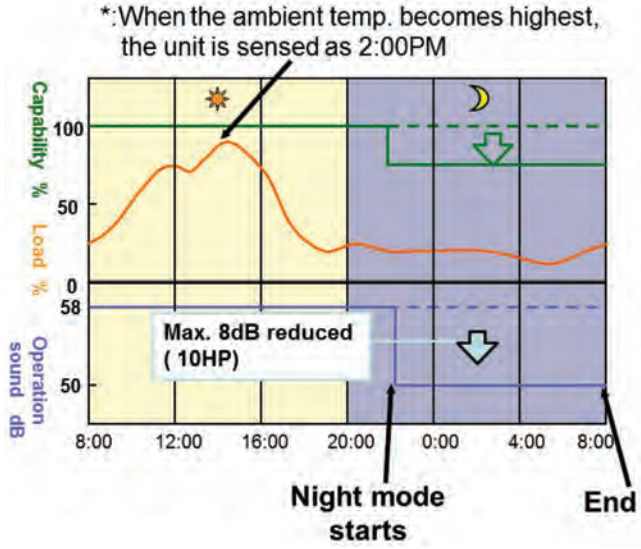
- m2-20: **Manual refrigerant charge**. To add the refrigerant amount in a manual way (without automatic refrigerant charging functionality), following setting should be applied.
  - Default value = 0. Manual refrigerant charge is not performed.
  - Activate manual refrigerant charge: make setting 2-20 = 1. When the manual refrigerant charge is active, indication on outdoor refer to "Start-up".

- m2-21: **Refrigerant recovery / vacuuming**.
  - Default value = 0: recovery mode not active.
  - Set 1: outdoor and indoor expansion valves are opened fully (except EV3 for PCM vessel equipped in RYYQ-T7). Compressor(s) do not operate.
    - All controllers show "Test" + LED operation-on, but indoor and outdoor fan do not operate.
    - Outdoor segment display indicates t01.
    - By opening indoor and outdoor expansion valves there is a free pathway to reclaim remaining refrigerant out by using a refrigerant recovery unit to a refrigerant recovery bottle.
    - Prior to launch the recovery mode, ensure:
      - To vacuum all lines between service hoses – refrigerant recovery unit and recovery bottle.
      - Weight the refrigerant recovery bottle to know recovered amount when refrigerant recovery function is terminated.
  - To end the refrigerant recovery mode: press once button BS3. The 7 segment display returns to normal (= all off).

- m2-22: **Selection automatic night time LNO** level. The outdoor can switch automatically to a pre-set LNO level during night time judgement.
  - Default value = 0: Auto LNO not active.
  - Set 1: use level 1,
  - Set 2: use level 2,
  - Set 3: use level 3.
  - Set period: see set 2-26 for start time and 2-27 for end time.

- m2-25: **LNO level when using external input** to optional board DTA104A61/62.
  - If the system needs to be running under low noise operation conditions when an external signal is sent to the unit, this setting defines the level of low noise that will be applied.
  - This setting will only be effective when the optional external control adaptor DTA104A61/62 is installed and the setting is enabled (mode 2-12-1).
  - When LNO is actually performed, conditions if visible in mode 1 – code 1.
  - The LNO will not be performed in one of following conditions:
    - Start-up of system, or
    - During oil return or defrost operation, or
    - 30 minutes after external input opened, or
    - Capacity precedence setting is active (see mode 2-29-1) and limit condition is met.
  - Default value = 2: level 2.
  - LNO level can be selected to 1, 2 or 3 (field set 2-25 – 1, 2, 3).

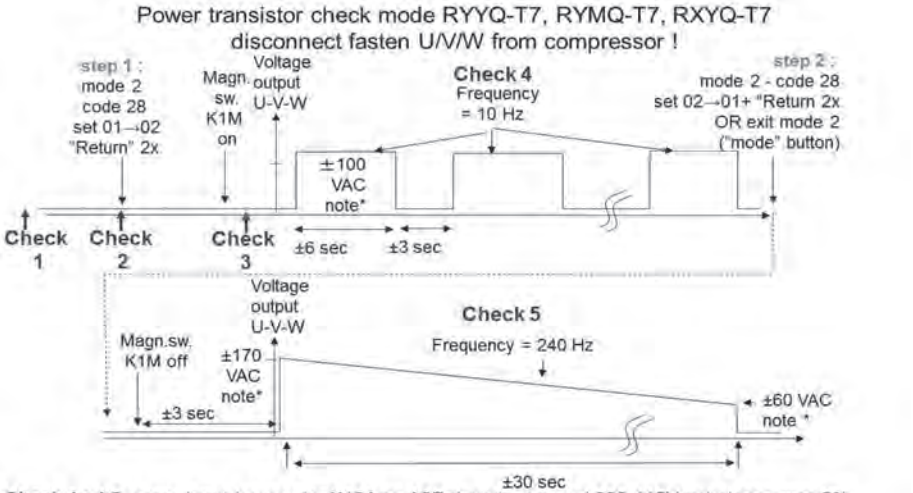
- m2-26: **Start time automatic low noise** operation. When the auto-LNO is active (see field set 2-22) outdoor will start when start time is reached time is reached. The time judgment is taken from outdoor air tendency.



  - Default value = 2: 22h00.
  - Field set 1 = 20h00, 3 = 24h00 (midnight).

- m2-27: **Stop time automatic low noise** operation. When the auto-LNO is active (see field set 2-22) outdoor will stop the LNO level automatically when stop time is reached.
  - Default value = 3: 8h00.
  - Field set 1 = 6h00, 3 = 7h00.

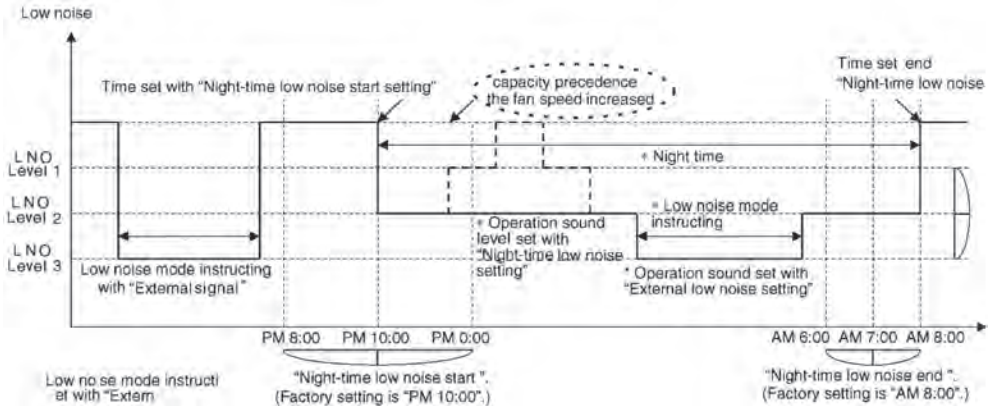
- m2-28: **Power transistor check** mode. To evaluate the output of the power transistors. Use this function in case malfunction code is displayed related to malfunction of inverter board compressor or inverter compressor is locked.
  - Default value = 0: power transistor check mode is not active.
  - Field set 1: power transistor check mode is active.
    - Function:
      - Inverter board gives output of 10 Hertz in sequence by all 6 transistors. Remove the U/V/W terminals of the inverter compressor, and connect to the inverter checker module. If all 6 LEDs blink, the transistors switch correctly.
      - When the power transistor check mode is interrupted, after internal power circuit is disconnected on the inverter board, 2 LEDs will light up to indicate discharge of the DC voltage. Wait till the LEDs are off before returning fasten terminals back to the compressor terminals.
    - Minimum requirements to see the result on the inverter checker module:
      - All 3 phases and neutral are available, and
      - Inverter board control is active. Check if the green LED “HAP” on the inverter boards are blinking normal (approx. 1/ second). If LEDs are off, need to exit the “standby mode” of the inverter:
        - Disconnect and reconnect power supply control board, or
        - Forced thermostat-on condition, or
          - Make shortly set 2-6-1 (forced thermostat-on indoor), or
          - 2-20-1 (manual refrigerant charge).
          - Once the LED is blinking on the inverter board(s), change related setting immediately back to set 0 to deactivate related function.
      - Diode module generates the required 500 VDC.
    - Cautions:
      - In case there is more than 1 compressor in a system (outdoor is 14 hp or larger, or multi outdoor configuration) all compressor inverter boards will perform the power transistor check. In such case, disconnect U/V/W fasten terminals on all compressors. Avoid accidental touch of fasten terminals to short-circuit or earth leak to casing.
      - To stop the power transistor check mode, change setting to default 2-28-0.
      - Output to U/V/W will also stop when control board decides standby mode of inverter circuit.
    - Next time graph shows the different steps during the power transistor check mode.
      - Switching sequence during power transistor check mode:



Check 1 : AC power input (connector X10A on A2P=inverter compr.) 380-415V unbalance max.2%.
Check 2 : relay "K1M" on inverter pcb switches ; check DC voltage on P & N increase to ±500VDC.
Check 3 : DC = 1.42 x VAC power supply L1~L3 ; check at connector X3A (8~12hp), or X5,6A (14~20hp).
Check 4 : AC UVW 10Hz intermediate : check difference within 10V (at fasten U/V/W)
Check 5 : AC UVW 240Hz continuous output while voltage drop (discharge capacitors DC) check difference between UVW within 10 V. 2 LEDs (V phase) brightness reduce till off.

* note : actual voltage value depends on meter characteristics

- m2-29: **Capacity precedence**. When the LNO is in use, performance of system might drop because air flow rate of outdoor unit is reduced.
  - Default value = 0: capacity precedence cannot be used.
  - Field set 1: capacity precedence can temporary cancel the LNO operation. Capacity precedence can be initiated when certain operation parameters approach the safety setting:
    - Raise in HP during cooling.
    - Drop in LP during heating.
    - Raise of discharge pipe temperature.
    - Raise of inverter current.
    - Raise of fin temperature inverter board.
  - When operation parameters return to normal range, the capacity precedence is switched off, enable to reduce air flow rate depending on LNO is still required (end time for LNO is not reached or external input LNO is still closed).



- m2-30: **Power consumption limitation level 1**. If the system needs to be running under power consumption limitation conditions via the external control adaptor DTA104A61/62. This setting defines the level power consumption limitation that will be applied for level 1. The level is according the table.
  - Default = 3: 70%
  - Field set:

set 2-30	current limit set %
1	60
2	65
3	70 (default)
4	75
5	80
6	85
7	90
8	95

- m2-31: **Power consumption limitation level 2**. If the system needs to be running under power consumption limitation conditions via the external control adaptor DTA104A61/62. This setting defines the level power consumption limitation that will be applied for level 2. The level is according the table.
  - Default = 1: 40%
  - Field set:

set 2-31	current limit set %
1	40 (default)
2	50
3	55

- m2-34: **Indoor fan speed limitation** (if indoor thermostat-on 130% or more). To avoid indoor overload (cooling) or cold draft (heating), indoor units thermostat-on will reduce air flow rate to low speed level if thermostat-on index is 130% or more. This function is default applicable for cooling and heating. By following setting, this function can be cancelled for cooling, or heating, or both.
  - Default value = 0: both cooling and heating
  - Field set:

set 2-34	Forced L-speed indoor ≥ 130% thermostat-on
0	Cooling and heating (default)
1	Heating only
2	Never

- m2-35: **Level outdoor below indoor > 40 m**. When outdoor units are located more than 40 m below highest located indoor unit, in heating mode target condensation needs to be increased to raise liquid pressure.
  - Default = 1: standard Tc value,
  - Field set: 0 = adjust Tc value. Do not use set 2~7!

- m2-38: **Emergency operation "Master"**. To disable permanent compressor operation: in case of single module or "Master" unit of a multi outdoor system, this setting allows:
  - Default value = 0: compressor operation enabled.
  - Field set:
    - Set 1: inverter 1 compressor is disabled.
    - Set 2: inverter 2 compressor is disabled. Only to make in case of 14~20 hp. Note that compressor 2 is left side located.
    - Set 3: all compressors in this master module are disabled permanent.

- m2-39: **Emergency operation "Slave 1"**. To disable permanent compressor operation of "Slave 1" unit of a multi outdoor system (RYMQ-T7 or RXYQ-T7):
  - Default value = 0: compressor operation enabled.
  - Field set:
    - Set 1: inverter 1 compressor is disabled.
    - Set 2: inverter 2 compressor is disabled. Only to make in case of 14~20 hp. Note that compressor 2 is left side located.
    - Set 3: all compressors in this master module are disabled permanent.

- m2-40: **Emergency operation "Slave 2"**. To disable permanent compressor operation of "Slave 2" unit of a multi outdoor system (RYMQ-T7 or RXYQ-T7):
  - Default value = 0: compressor operation enabled.
  - Field set:
    - Set 1: inverter 1 compressor is disabled.
    - Set 2: inverter 2 compressor is disabled. Only to make in case of 14~20 hp. Note that compressor 2 is left side located.
    - Set 3: all compressors in this master module are disabled permanent.

Combination table setting 2-38, 2-39 and 2-40:

disable	Master/ individual	Slave 1	Slave 2
compressor 1	2 - 38 - 1	2 - 39 - 1	2 - 40 - 1
compressor 2	2 - 38 - 2	2 - 39 - 2	2 - 40 - 2
module	2 - 38 - 3	2 - 39 - 3	2 - 40 - 3

- m2-42: **RPM adjustment**.
  - Default value = 0: no correction.
  - Field set: 1 = slightly decrease rpm, set 2 = slightly increase rpm.

- m2-43: **Compressor operation defrost start-end condition**.
  - Default value = 0: compressor continues when 4-way valve nr. 2 changes.
  - Field set: 1 = compressor stops when 4-way valve nr. 2 changes.

- m2-49: **Level outdoor above indoor > 50 m**. When outdoor units are located more than 50 m above lowest located indoor unit, in cooling liquid pressure can raise excessively at inlet of indoor expansion valve (liquid pressure at indoor = liquid pressure outdoor + hydrostatic pressure by liquid column). Excessive liquid pressure can cause problem with operation of the expansion valve at indoor unit. So in such installation, liquid pressure at outdoor must be limited.
  - Default = 0: outdoor main expansion valve opens fully during compressor operation.
  - Field set: 1 = outdoor main expansion valve opens limited degree during compressor operation.

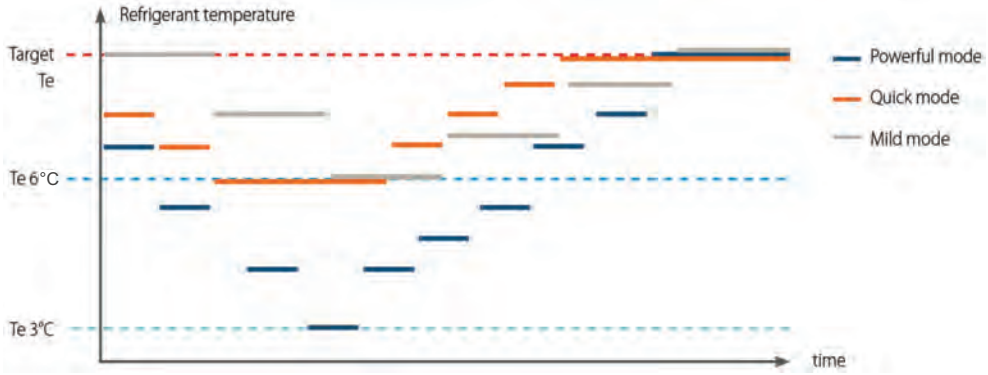
- m2-50: **Indoor fan operation during defrost** (only for RYYQ-T7 or RYMQ-T7).
  - Default value = 0: during defrost, indoor units in thermostat-on will operate fan at LL-speed (ultra low speed) and limited expansion valve opening = limited heating capacity during defrost (= “continuous heating” function).
  - Field set: 1 = during defrost, all indoor units stop fan operation and close expansion valve to stop discharge flow through indoor units. This function will shorten the defrost cycle, but stops heat rejection and possible refrigerant noise.

- m2-51: **Master/Slave setting Multi** (only for RYMQ-T7 and RXYQ-T7). When 2 or 3 modules are installed as a multi-outdoor (by common refrigerant piping and wiring by terminals Q1Q2) configuration is automatically detected. In certain cases, the sequence of the slave units need to be set manually (in case of ACNSS monitoring).
  - Default value = 0: Automatic detection.
  - Field set: ensure that the modules in a multi are set different status. Even some modules in a multi are set manually to same status, U7 error will appear.
    - 1 = forced “Master” (F1F2/Ind terminals should be connected to indoor units).
    - 2 = forced “Slave 1” (only Q1Q2 terminals should be wired to “Master” module).
    - 3 = forced “Slave 2” (only Q1Q2 terminals should be wired to “Master” module).

- m2-52: **Output for optional mounted bottom plate heater**. When the optional kit bottom plate heater “EKBPH012/020T7” + optional board “EKBPHPCBT7”, extra field setting is required:
  - Default value = 0: no optional bottom plate heater is installed.
  - Field set: 2 = optional bottom plate heater is installed and optional board “EKHBPHPCBT7” is connected.
    - Output on during defrost operation AND outdoor air < 3°C.
    - If setting is made without this optional board, LC-33 will appear when power is connected to outdoor unit.

- m2-81: **Cooling comfort** setting. The comfort level is related to the timing and the effort (power consumption) which is put in achieving a certain room temperature by changing temporally the refrigerant temperature to different values in order to achieve requested conditions more quickly.
  - Default value = 1: “Mild”. Undershoot during cooling operation is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast. The undershoot is not allowed from the start-up moment. The start-up occurs under the condition which is defined by the operation mode. In case of cooling operation the evaporating temperature is allowed to go down to 6°C on temporary base depending on the situation. When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation method above. The start-up condition is different from the powerful and quick comfort setting.

- Field set:
  - 0 = “Eco”. The original refrigerant temperature target, which is defined by the Te setting (field set 2-8) in cooling mode, is kept without any correction, unless for protection control.
  - 2 = “Quick”. Undershoot during cooling operation is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast. The overshoot is allowed from the start up moment. In case of cooling operation the evaporating temperature is allowed to go down to 6°C on temporary base depending on the situation. When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation method above.
  - 3 = “Powerful”. Undershoot during cooling operation is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast. The overshoot is allowed from the start up moment. In case of cooling operation the evaporating temperature is allowed to go down to 3°C on temporary base depending on the situation. This setting is used in conjunction with setting [2-8].
- The graph below shows the different patterns of target Te according to setting 2-81 “cooling comfort setting”.



- m2-82: **Heating comfort** setting. The comfort level is related to the timing and the effort (power consumption) which is put in achieving a certain room temperature by changing temporally the refrigerant temperature to different values in order to achieve requested conditions more quickly.
  - Default value = 1: “Mild”. Overshooting during heating operation is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast. The overshoot is not allowed from the start-up moment. The start-up occurs under the condition which is defined by the operation mode. In case of heating operation the condense temperature is allowed to go up to 46°C on temporary base depending on the situation. When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation method above. The start-up condition is different from the powerful and quick comfort setting.
  - Field set:
    - 0 = “Eco”. The original refrigerant temperature target, which is defined by the Tc setting (field set 2-9) in heating mode, is kept without any correction, unless for protection control.
    - 2 = “Quick”. Overshoot during heating operation is allowed compared to the requested refrigerant temperature, in order to achieve the required room temperature very fast. The overshoot is allowed from the start up moment. In case of heating operation the condense temperature is allowed to go up to 46°C on temporary base depending on the situation. When the request from the indoor units becomes more moderate, the system will eventually go to the steady state condition which is defined by the operation method above.
    - 3 = “Powerful”. The overshoot is allowed from the start up moment. In case of heating operation the condense temperature is allowed to go up to 49°C on temporary base depending on the situation. This setting is used in conjunction with setting [2-9].

- m2-83: **Allocation of cool/heat master logic**. When system contains VRV DX indoor and RA indoor (through BP units), it is required to assign the cool/heat change over logic to follow.
  - Default value = 1: RA cool/heat master logic. Any RA indoor unit that is switched first, is assigned as cool/heat master as long this unit is in operation (regardless thermostat status). Only when this indoor unit is switched off operation (by remote controller), other indoor unit can become cool/heat master:
    - Priority is given to indoor unit operating in the same mode as the previous cool/heat master switched off operation.
    - Only no more indoor unit operate in the same mode as the previous cool/heat master, other RA indoor unit can become cool/heat master to switch to the other operation mode.
    - RA indoor unit that is operating, but demanding the other operation mode set by the cool/heat master, enters the “stand-by mode”: operation LED blinks.
    - VRV indoor unit change the operation mode immediately when outdoor unit receives change of operation mode from the current cool/heat master RA indoor unit.
  - Field Set: 0 = VRV cool/heat master logic.
    - At time of first start-up, or when cool/heat master was released, one of connected VRV DX indoor unit can be assigned cool/heat master. The symbol “locked cool/heat selector”  blinks. In case of wireless controller kit is used, the green clock LED blinks on the receiver.
    - Confirm cool/heat master to a VRV DX indoor unit: press once the cool/heat selector button  on the remote controller of the indoor unit to be set as cool/heat master.

- m2-84: **Initial opening expansion valve BP** unit heating thermostat-on:
  - Default value = 0: 400 pulses.
  - Field set: 1 = 500 pulses, 2 = 600 pulses, 3 = 300 pulses.

- m2-85: **Automatic leak detection interval time**. VRV4 outdoor can perform on a preset interval a leak detection. It is required to activate the “automatic leak detection” by field set 2-86.
  - Default value = 0: 365 days.
  - Field set: 1~6.

set 2-85 -	Days between automatic refrig. leak detection
0	365 (default)
1	180
2	90
3	60
4	30
5	7
6	1

- m2-86: **Automatic leak detection activation**: the refrigerant leak detection judgment can be performed once in set days or every period set days. The interval is set by 2-85 (see above). Each time when the automatic leak detection function was executed the system will stay idle until it is restarted by thermo ON request or by next scheduled action.
  - Default value = 0.
  - Field set:
    - 1 = once in set days.
    - 2 = every set days.

- m2-88: **Gathering detailed refrigerant information** during test run. To have the refrigerant leak function available, the VRV4 outdoor needs to run a prolonged test-run to calculate the total refrigerant charge and the related operation conditions at several target evaporation temperatures. The control uses following parameters: condensing temperature, evaporation temperature, discharge temperature, frequency step, opening degree expansion valves, indoor type and size, pipe length estimation during step 7 of test-run.

- Default value = 0: detailed data collection enabled.
- Field set: 1 = test run without detailed data collection.

- m2-90: **Indoor unit without power** U4 error generation. In case an indoor unit needs maintenance or repair on the electric side, it is possible to keep the rest of the VRV DX indoor units operating without power supply to some indoor unit(s).
  - Default value = 0: not active.
  - Field set: 1 = possible for operate system when some indoor units are temporary without power supply. Following conditions need to fulfil:
    - Maximum equivalent piping length of the farthest indoor less than 120 m.
    - Index indoor units power simultaneously less than 30% of the nominal outdoor.
    - Total capacity is less than 30% of the nominal one of the outdoor unit.
    - Operation time is limited to 24 hours period.
    - It is recommended to shut down connected indoor units at the same floor.
    - Not possible to use service mode operation (e.g. recovery mode).
    - Backup operation has priority over this special feature.

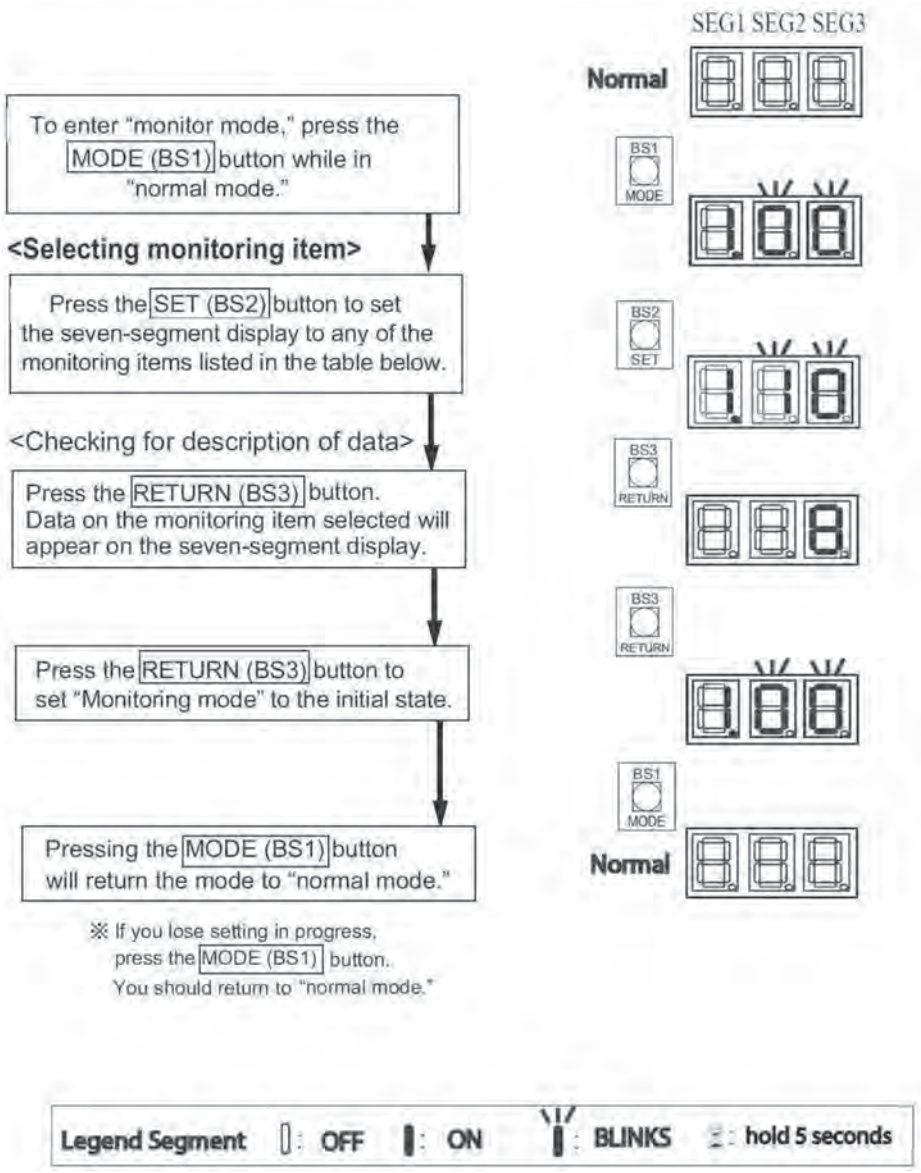
3.3 Monitor Mode

In the monitor mode, info can be retrieved about settings related to performance, addresses, number of units and actual operation data.

3.3.1 Retrievable data by “Configurator”

Mode 1	Setting	Description
[1-0]	Master/slave1/slave2	Shows whether the unit you check is a master
[1-10]	Total connected indoor units	Shows the total number of connected indoor units
[1-13]	Total connected outdoor units	Shows the total number of connected outdoor units
[1-17]	Contents of malfunction (latest)	Shows the latest malfunction code
[1-18]	Contents of malfunction (1 before)	Shows the 2nd last malfunction code
[1-19]	Contents of malfunction (2 before)	Shows the 3rd last malfunction code
[1-20]	Software number (based on Micon ID)	Software number (based on the Micon ID)
[1-21]	HP code	Capacity code of the unit
[1-22]	Software version	Software version
[1-23]	Contents of retry (latest)	Latest system retry
[1-24]	Contents of retry (1 before)	Previous system retry (1)
[1-25]	Contents of retry (2 before)	Previous system retry (2)
[1-29]	The leak detection refrigerant amount history (latest)	Shows the estimated leaked refrigerant amount (kg) based on the latest leak detection operation
[1-30]	The leak detection refrigerant amount history (1 before)	Shows the estimated leaked refrigerant amount (kg) based on the 2nd last leak detection operation
[1-31]	The leak detection refrigerant amount history (2 before)	Shows the estimated leaked refrigerant amount (kg) based on the 3rd last leak detection operation
[1-34]	Days remaining till the next automatic leak detection	Shows the remaining days till the next automatic leak
[1-35]	Result of the last leak detection operation	Shows the result of the latest automatic leak detection
[1-36]	Result of the last leak detection operation (1 before)	Shows the result of the 2nd last automatic leak detection operation
[1-37]	Result of the last leak detection operation (2 before)	Shows the result of the 3rd last automatic leak detection operation
[1-38]	Number of connected RA DX indoor units	Shows the number of RA DX indoor units connected to the system
[1-39]	Number of connected hydrobox indoor units	Shows the number of hydroboxes indoor units connected to the system

3.3.2 Retrieve data by using push button outdoor main control board



No. *1	Monitoring item				Data display			
	Item	7-segment display			Contents	7-segment display		
		Dig 1	Dig 2	Dig 3		Dig 1	Dig 2	Dig 3
0	Master/slave outdoor unit	1.	0	0	Undefined Master unit Slave 1 unit Slave 2 unit			- 0 1 2
1	Low noise operation state	1.	0	1	In normal operation In low noise operation			0 1
2	Demand operation state	1.	0	2	In normal operation In demand operation			0 1
3	Automatic backup operation state	1.	0	3	OFF ON			0 1
4	Defrost selection setting	1.	0	4	Slow defrost Normal Quick defrost			0 1 2
5	Te setting	1.	0	5	Automatic Low 3°C Normal 6°C High sensible 7°C High sensible 8°C High sensible 9°C High sensible 10°C High sensible 11°C			0 1 2 3 4 5 6 7
6	Tc setting	1.	0	6	Automatic (38~49°C) Low = 41°C Normal = 43°C High = 46°C			0 1 3 6
7	COOL/HEAT unified address	1.	0	7	Possible 0~31		- 3	0 1
8	Low noise/demand address	1.	0	8	Possible 0~31		- 3	0 1

*1: Numbers in the "No." column represent the number of times to press the pushbutton.

No. *1	Monitoring item				Data display			
	Item	7-segment display			Contents	7-segment display		
		Dig 1	Dig 2	Dig 3		Dig 1	Dig 2	Dig 3
9	ACNSS address	1.	0	9	Possible 0~63		- 6	0 3
10	Number of indoor unit connected (see *2)	1	1	0	Possible 0~63		- 6	0 3
13	Number of outdoor units (see *3)	1.	1	3	Possible 0~63		- 6	0 3
15	Number of units in zone	1.	1	5	Possible 0~63		- 6	0 3
16	Number of all indoor units of several systems if “F1F2 OUT/D is wired between systems (see *4)	1.	1	6	Possible 0~128	- 1	- 2	0 8
17	Description of malfunction (latest)	1.	1	7	See information on the following page.			
18	Description of malfunction (1 cycle before)	1.	1	8				
19	Description of malfunction (2 cycles before)	1.	1	9				
20	Software ID upper number	1	2	0	Use BS2 “Set” to view upper and lower No.	00 99	-00 -99	
21	Horsepower outdoor	1	2	1	0 = no data 3 = 8 hp 4 = 10 hp 5 = 12 hp 6 = 14 hp 7 = 16 hp 8 = 18 hp 9 = 20 hp			0 3 4 5 6 7 8 9
22	Software ID lower number	1	2	2	Possible 000~999	0 9	0 9	0 9
23	Description of retry (latest)	1.	2	3	See information on the following page.			
24	Description of retry (1 cycle before)	1.	2	4				
25	Description of retry (2 cycles before)	1.	2	5				

*1: Numbers in the "No." column represent the number of times to press the pushbutton.
*2: Number of indoor units connected: represents the number of indoor units connected to a single outdoor system.
*3: Number of outdoor units: represents the number of outdoor units connected to a single DIII-NET that is a communication line.
*4: Number of terminal units: represents the number of indoor units connected to a single DIII-NET that is a communication line.

No. *1	Monitoring item				Data display			
	Item	7-segment display			Contents	7-segment display		
		Dig 1	Dig 2	Dig 3		Dig 1	Dig 2	Dig 3
26	Number of DIII net transmission retry	1	2	6	Possible 0~63			- 6
27	Number of ACNSS transmission retry	1	2	7	Possible 0~63			- 6
28	Number of outdoor units connected to a multi system	1.	2	8	Possible 0~63			- 6
29	Result of last manual refrigerant containment check	1	2	9	Possible 0~9.9		0 9	. .
30	Result of 2nd last manual refrig. containment check	1	3	0	Possible 0~9.9		0 9	. .
31	Result of 3rd last manual refrig. containment check	1	3	1	Possible 0~9.9		0 9	. .
32	Outdoor board status judgment	1	3	2	0 = standard judgment 1 = normal 2 = abnormal			0 1 2
33	Number of abnormal status judgment outdoor board	1	3	3	Possible 0~15		- 1	0 5
34	Remaining days till next automatic refrigerant containment check	1	3	4	Possible 1~366	3	6	1 6
35	Result of last auto refrigerant containment check	1	3	5	Normal Outd. °C out of range Indoor °C out of range			1 2 3
36	Result of 2nd last auto refrigerant containment check	1	3	6	Normal Outd. °C out of range Indoor °C out of range			1 2 3
37	Result of 3rd last auto refrigerant containment check	1	3	7	Normal Outd. °C out of range Indoor °C out of range			1 2 3
38	Number of connected RA indoor (through BP unit)	1	3	8	Possible 0~63		- 6	0 3
39	Number of connected LT unit HXY-A	1	3	9	Possible 0~63		- 6	0 3
40	Cooling comfort setting (see mode 2 No. 8)	1	4	0	Possible 0~7		- 6	0 3
41	Heating comfort setting (see mode 2 No. 9)	1	4	1	Possible 0~6		- 6	0 3

*1: Numbers in the "No." column represent the number of times to press the pushbutton.

No. *1	Monitoring item				Data display			
	Item	7-segment display			Contents	7-segment display		
		Dig 1	Dig 2	Dig 3		Dig 1	Dig 2	Dig 3
42 *2	High pressure (MPa)	1	4	2	Possible 0.1~9.99	0. 9.	1 9	0 9
43 *2	Low pressure (MPa)	1	4	3	Possible 0.1~9.99	0. 9.	1 9	0 9
44 *2	Compressor total frequency (Hz)	1	4	4	0~999	0 9	0 9	0 9
45 *2	Opening pulses EV main “Y1E” (pulses / 10)	1	4	5	0~999	0 9	0 9	0 9
46 *2	Discharge temperature R21T (°C)	1	4	6	-99~999	- 9	9 9	9 9
47 *2	Discharge temperature R22T (°C)	1	4	7	-99~999	- 9	9 9	9 9
48 *2	Compressor body temperature R8T (°C)	1	4	8	-99~999	- 9	9 9	9 9
49 *2	Air temperature R1T (°C)	1	4	9	-99~999	- 9	9 9	9 9
50 *2	Accumulator inlet temperature R3T (°C)	1	5	0	-99~999	- 9	9 9	9 9
51 *2	Gas outlet sub-cool heat-exchanger R6T (°C)	1	5	1	-99~999	- 9	9 9	9 9
52 *2	Coil temperature R7T (°C)	1	5	2	-99~999	- 9	9 9	9 9
53 *2	Compressor operation hours / 100	1	5	3	0~999	0 9	0 9	0 9

*1: Numbers in the "No." column represent the number of times to press the pushbutton.

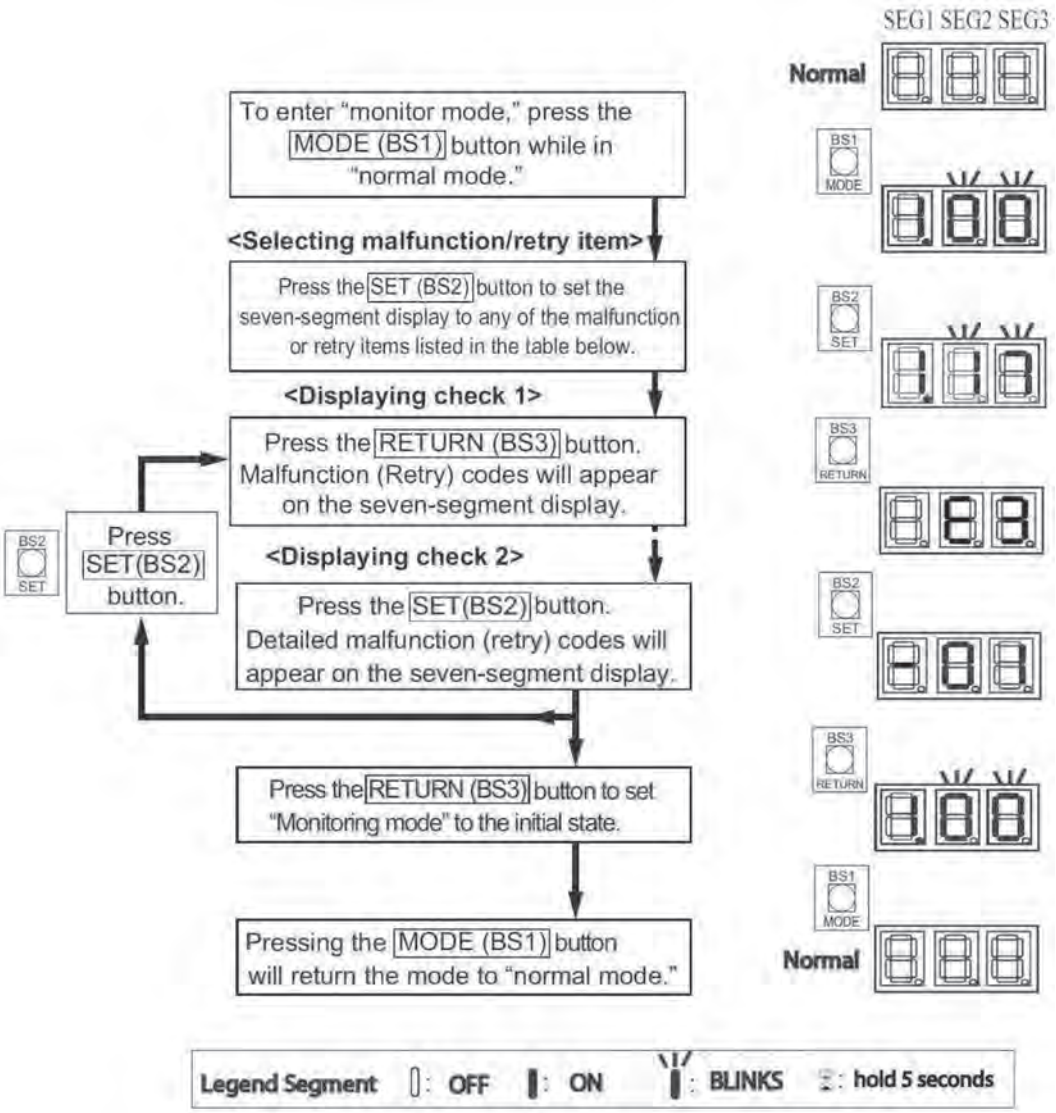
* 2: Available from software ID “30-28” (to check current software version, see monitor mode No. 20).

3.3.3 Check for descriptions of malfunctions/retries

Follow the procedure described below. This procedure is different than indicated in previous “Monitor mode”.

The error codes for forced stop outdoor or retry are item:

- 17, 18, 19: description of malfunction (outdoor system stopped operation).
- 23, 24, 25: description of retry.



- The tables on next pages show a full list of possible malfunction codes displayed on the 3 digit 7 segment display of the outdoor unit. The error code contains an upper and lower digit. To scroll between upper and lower error digit, use the “Set” button BS2 when the select number in the monitoring mode is chosen:
  - No. 17~19 for malfunction = system operated stopped.
  - No. 23~25 for retry = system attempts to keep operation.
- The malfunctions cover problems detected in the outdoor unit or the communication.
- Malfunctions detected on the indoor unit are not shown on the outdoor display. For inspecting error code on indoor unit, please consult:
  - Display of the remote controller connected to the indoor units.
  - If there are no remote controllers, there should be a central control device set up. Prior to start up, make the necessary group number settings on each indoor unit.

Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
E1	-	1	Malfunction of outdoor unit PC board		E	1	-	0	1
	-	2	Faulty outdoor unit PC board				-	0	2
E2	-	1	Ground leakage detection error – Main unit		E	2	-	0	1
	-	2	Ground leakage detection error – Sub unit 1				-	0	2
	-	3	Ground leakage detection error – Sub unit 2				-	0	3
	-	6	Missing of ground leakage detection core – Main unit				-	0	6
	-	7	Missing of ground leakage detection core – Sub unit 1				-	0	7
	-	8	Missing of ground leakage detection core – Sub unit 2				-	0	8
E3	-	1	Actuation of high pressure switch – Main unit		E	3	-	0	1
	-	2	High pressure - refrigerant overcharge or closed stop valve – Main				-	0	2
	-	3	Actuation of high pressure switch – Sub unit 1				-	0	3
	-	4	High pressure - refrigerant overcharge or closed stop valve – Sub 1				-	0	4
	-	5	Actuation of high pressure switch – Sub unit 2				-	0	5
	-	6	High pressure - refrigerant overcharge or closed stop valve – Sub 2				-	0	6
	-	13	Liquid stop valve check error – Main unit				-	1	3
	-	14	Liquid stop valve check error – Sub unit 1				-	1	4
	-	15	Liquid stop valve check error – Sub unit 2				-	1	5
	-	18	Overall retry of high pressure switch				-	1	8
E4	-	1	Malfunction of low pressure sensor – Main unit		E	4	-	0	1
	-	2	Malfunction of low pressure sensor – Sub unit 1				-	0	2
	-	3	Malfunction of low pressure sensor – Sub unit 2				-	0	3
E5	-	1	Inverter compressor 1 lock – Main unit		E	5	-	0	1
	-	2	Inverter compressor 1 lock – Sub unit 1				-	0	2
	-	3	Inverter compressor 1 lock – Sub unit 2				-	0	3
	-	7	Inverter compressor 2 lock – Main unit				-	0	7
	-	8	Inverter compressor 2 lock – Sub unit 1				-	0	8
	-	9	Inverter compressor 2 lock – Sub unit 2				-	0	9

Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
E7	-	1	Fan motor 2 lock – Main unit		E	7	-	0	1
	-	2	Fan motor 1 lock – Main unit				-	0	2
	-	5	Fan motor 2 momentary overcurrent – Main unit				-	0	5
	-	6	Fan motor 1 momentary overcurrent – Main unit				-	0	6
	-	9	Fan motor 2 IPM error – Main unit				-	0	9
	-	10	Fan motor 1 IPM error – Main unit				-	0	9
	-	13	Fan motor 2 lock – Sub unit 1				-	1	3
	-	14	Fan motor 1 lock – Sub unit 1				-	1	4
	-	17	Fan motor 2 momentary overcurrent – Sub unit 1				-	1	7
	-	18	Fan motor 1 momentary overcurrent – Sub unit 1				-	1	8
	-	21	Fan motor 2 IPM error – Sub unit 1				-	2	1
	-	22	Fan motor 1 IPM error – Sub unit 1				-	2	2
	-	25	Fan motor 2 lock – Sub unit 2				-	2	5
	-	26	Fan motor 2 lock – Sub unit 2				-	2	6
	-	29	Fan motor 2 momentary overcurrent – Sub unit 2				-	2	9
	-	30	Fan motor 1 momentary overcurrent – Sub unit 2				-	3	0
	-	33	Fan motor 2 IPM error – Sub unit 2				-	3	3
	-	34	Fan motor 1 IPM error – Sub unit 2				-	3	4
E9	-	1	Malfunction of motorized valve 2 coil (Y2E) – Main unit		E	9	-	0	1
	-	3	Malfunction of motorized valve 3 coil (Y3E) – Main unit				-	0	3
	-	4	Malfunction of motorized valve 1 coil (Y1E) – Main unit				-	0	4
	-	5	Malfunction of motorized valve 2 coil (Y2E) – Sub unit 1				-	0	5
	-	6	Malfunction of motorized valve 3 coil (Y3E) – Sub unit 1				-	0	6
	-	7	Malfunction of motorized valve 1 coil (Y1E) – Sub unit 1				-	0	7
	-	8	Malfunction of motorized valve 2 coil (Y2E) – Sub unit 2				-	0	8
	-	9	Malfunction of motorized valve 3 coil (Y3E) – Sub unit 2					0	9
	-	10	Malfunction of motorized valve 1 coil (Y1E) – Sub unit 2				-	1	0
	-	20	Failure detection - coil expansion valve 1 (Y1E) – Main unit				-	2	0
	-	21	Failure detection - coil expansion valve 1 (Y1E) – Sub unit 1				-	2	1
	-	22	Failure detection - coil expansion valve 1 (Y1E) – Sub unit 2				-	2	2
	-	23	Failure detection - coil expansion valve 2 (Y2E) – Main unit				-	2	3
	-	24	Failure detection - coil expansion valve 2 (Y2E) – Sub unit 1				-	2	4
	-	25	Failure detection - coil expansion valve 2 (Y2E) – Sub unit 2				-	2	5
F3	-	1	Discharge pipe high temperature error – Main unit		F	3	-	1	1
	-	3	Discharge pipe high temperature error – Sub unit 1				-	1	3
	-	5	Discharge pipe high temperature error – Sub unit 2				-	1	5
	-	20	Compressor overheat error – Main unit				-	2	0
	-	21	Compressor overheat error – Sub unit 1				-	2	1
	-	22	Compressor overheat error – Sub unit 2				-	2	2

Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
F4	-	1	Wet alarm		F	4	-	0	1
	-	2	Failure detection - Wet alarm INV1 – Main unit				-	0	2
	-	3	Failure detection - Wet alarm INV2 – Main unit				-	0	3
	-	4	Failure detection - Wet alarm INV1 – Sub unit 1				-	0	4
	-	5	Failure detection - Wet alarm INV2 – Sub unit 1				-	0	5
	-	6	Failure detection - Wet alarm INV1 – Sub unit 2				-	0	6
	-	7	Failure detection - Wet alarm INV2 – Sub unit 2				-	0	7
	-	8	Failure detection - Wet error INV1 – Main unit				-	0	8
	-	9	Failure detection - Wet error INV2 – Main unit				-	0	9
	-	10	Failure detection - Wet error INV1 – Sub unit 1				-	1	0
	-	11	Failure detection - Wet error INV2 – Sub unit 1				-	1	1
	-	12	Failure detection - Wet error INV1 – Sub unit 2				-	1	2
	-	13	Failure detection - Wet error INV2 – Sub unit 2				-	1	3
	-	14	Failure detection - Indoor unit failure alarm				-	1	4
F6	-	2	Refrigerant overcharged		F	6	-	0	2
H3	-	2	Connection malfunction (Control & INV. 1 (A3P)) – Main unit		H	3	-	0	2
	-	3	Connection malfunction (Control & INV. 2 (A6P)) – Main unit				-	0	3
	-	4	Connection malfunction (Control & INV. 1 (A3P)) – Sub unit 1				-	0	4
	-	5	Connection malfunction (Control & INV. 2 (A6P)) – Sub unit 1				-	0	5
	-	6	Connection malfunction (Control & INV. 1 (A3P)) – Sub unit 2				-	0	6
	-	7	Connection malfunction (Control & INV. 2 (A6P)) – Sub unit 2				-	0	7
H7	-	1	Fan motor 2 signal detection error – Main unit		H	7	-	0	1
	-	2	Fan motor 1 signal detection error – Main unit				-	0	2
	-	5	Fan motor 2 signal detection error – Sub unit 1				-	0	5
	-	6	Fan motor 1 signal detection error – Sub unit 1				-	0	6
	-	9	Fan motor 2 signal detection error – Sub unit 2				-	0	9
	-	10	Fan motor 1 signal detection error – Sub unit 2				-	1	0
H9	-	1	Faulty outdoor air thermistor – Main unit		H	9	-	0	1
	-	2	Faulty outdoor air thermistor – Sub unit 1				-	0	2
	-	3	Faulty outdoor air thermistor – Sub unit 2				-	0	3
J3	-	16	Faulty discharge pipe 1 thermistor: Open – Main unit		J	3	-	1	6
	-	17	Faulty discharge pipe 1 thermistor: Short – Main unit				-	1	7
	-	22	Faulty discharge pipe 1 thermistor: Open – Sub unit 1				-	2	2
	-	23	Faulty discharge pipe 1 thermistor: Short – Sub unit 1				-	2	3
	-	28	Faulty discharge pipe 1 thermistor: Open – Sub unit 2				-	2	8
	-	29	Faulty discharge pipe 1 thermistor: Short – Sub unit 2				-	2	9
J3	-	18	Faulty discharge pipe 2 thermistor: Open – Main unit		J	3	-	1	8
	-	19	Faulty discharge pipe 2 thermistor: Short – Main unit				-	1	9
	-	24	Faulty discharge pipe 2 thermistor: Open – Sub unit 1				-	2	4
	-	25	Faulty discharge pipe 2 thermistor: Short – Sub unit 1				-	2	5
	-	30	Faulty discharge pipe 2 thermistor: Open – Sub unit 2				-	3	0
	-	31	Faulty discharge pipe 2 thermistor: Short – Sub unit 2				-	3	1

Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
J3	-	47	Faulty compressor surface thermistor: Open – Main unit		J	3	-	4	7
	-	48	Faulty compressor surface thermistor: Short – Main unit				-	4	8
	-	49	Faulty compressor surface thermistor: Open – Sub unit 1				-	4	9
	-	50	Faulty compressor surface thermistor: Short – Sub unit 1				-	5	0
	-	51	Faulty compressor surface thermistor: Open – Sub unit 2				-	5	1
	-	52	Faulty compressor surface thermistor: Short – Sub unit 2				-	5	2
J3	-	56	Discharge pipe warning – Main unit		J	3	-	5	6
	-	57	Discharge pipe warning – Sub unit 1				-	5	7
	-	58	Discharge pipe warning – Sub unit 2				-	5	8
J5	-	1	Faulty accumulator inlet thermistor – Main unit		J	5	-	0	1
	-	3	Faulty accumulator inlet thermistor – Sub unit 1				-	0	3
	-	5	Faulty accumulator inlet thermistor – Sub unit 2				-	0	5
	-	15	Failure detection of accumulator inlet thermistor – Main unit				-	1	5
	-	16	Failure detection of accumulator inlet thermistor – Sub unit 1				-	1	6
	-	17	Failure detection of accumulator inlet thermistor – Sub unit 2				-	1	7
J6	-	1	Faulty heat exchanger thermistor – Main unit		J	6	-	0	1
	-	2	Faulty heat exchanger thermistor – Sub unit 1				-	0	2
	-	3	Faulty heat exchanger thermistor – Sub unit 2				-	0	3
J7	-	6	Faulty subcool liquid pipe thermistor (R5T) – Main unit		J	7	-	0	6
	-	7	Faulty subcool liquid pipe thermistor (R5T) – Sub unit 1				-	0	7
	-	8	Faulty subcool liquid pipe thermistor (R5T) – Sub unit 2				-	0	8
J8	-	1	Faulty heat exchanger liquid pipe thermistor (R4T) – Main unit		J	8	-	0	1
	-	2	Faulty heat exchanger liquid pipe thermistor (R4T) – Sub unit 1				-	0	2
	-	3	Faulty heat exchanger liquid pipe thermistor (R4T) – Sub unit 2				-	0	3
J9	-	1	Faulty sub-cool heat exchanger outlet thermistor – Main unit		J	9	-	0	1
	-	2	Faulty sub-cool heat exchanger outlet thermistor – Sub unit 1				-	0	2
	-	3	Faulty sub-cool heat exchanger outlet thermistor – Sub unit 2				-	0	3
	-	8	Failure detection - Failure of sub-cool heat exchanger outlet thermistor – Main unit				-	0	8
	-	9	Failure detection - Failure of sub-cool heat exchanger outlet thermistor – Sub unit 1				-	0	9
	-	10	Failure detection - Failure of sub-cool heat exchanger outlet thermistor – Sub unit 2				-	1	0
JA	-	6	Faulty high pressure sensor: Open – Main unit		J	A	-	0	6
	-	7	Faulty high pressure sensor: Short – Main unit				-	0	7
	-	8	Faulty high pressure sensor: Open – Sub unit 1				-	0	8
	-	9	Faulty high pressure sensor: Short – Sub unit 1				-	0	9
	-	10	Faulty high pressure sensor: Open – Sub unit 2				-	1	0
	-	11	Faulty high pressure sensor: Short – Sub unit 2				-	1	1
JC	-	6	Faulty low pressure sensor: Open – Main unit		J	C	-	0	6
	-	7	Faulty low pressure sensor: Short – Main unit				-	0	7
	-	8	Faulty low pressure sensor: Open – Sub unit 1				-	0	8
	-	9	Faulty low pressure sensor: Short – Sub unit 1				-	0	9
	-	10	Faulty low pressure sensor: Open – Sub unit 2				-	1	0
	-	11	Faulty low pressure sensor: Short – Sub unit 2				-	1	1

Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
L1	-	1	Instantaneous overcurrent - Inverter compressor 1 – Main unit		L	1	-	0	1
	-	2	Failure of current sensor - Inverter compressor 1 – Main unit				-	0	2
	-	3	Current offset - Inverter compressor 1 – Main unit				-	0	3
	-	4	Failure power transistors - Inverter compressor 1 – Main unit				-	0	4
	-	5	Jumper settings Inverter - Inverter compressor 1 – Main unit				-	0	5
	-	17	Instantaneous overcurrent - Inverter compressor 2 – Main unit				-	1	7
	-	18	Failure of current sensor - Inverter compressor 2 – Main unit				-	1	8
	-	19	Current offset - Inverter compressor 2 – Main unit				-	1	9
	-	20	Failure power transistors - Inverter compressor 2 – Main unit				-	2	0
	-	21	Jumper settings Inverter - Inverter compressor 2 – Main unit				-	2	1
	-	28	Failure inverter fan motor 1 - Main unit – ROM				-	2	8
	-	29	Failure inverter fan motor 2 - Main unit – ROM				-	2	9
	-	36	Failure inverter compressor 1 - Main unit – ROM				-	3	6
	-	37	Failure inverter compressor 2 - Main unit – ROM				-	3	7
	-	47	Malfunction power supply inverter compressor 1 – Main unit				-	4	7
	-	48	Malfunction power supply inverter compressor 2 – Main unit				-	4	8
L1	-	7	Instantaneous overcurrent - Inverter compressor 1 – Sub unit 1		L	1	-	0	7
	-	8	Failure of current sensor - Inverter compressor 1 – Sub unit 1				-	0	8
	-	9	Current offset - Inverter compressor 1 – Sub unit 1				-	0	9
	-	10	Failure power transistors - Inverter compressor 1 – Sub unit 1				-	1	0
	-	15	Jumper settings inverter - Inverter compressor 1 – Sub unit 1				-	1	5
	-	22	Instantaneous overcurrent - Inverter compressor 2 – Sub unit 1				-	2	2
	-	23	Failure of current sensor - Inverter compressor 2 – Sub unit 1				-	2	3
	-	24	Current offset - Inverter compressor 2 – Sub unit 1				-	2	4
	-	25	Failure power transistors - Inverter compressor 2 – Sub unit 1				-	2	5
	-	26	Jumper settings inverter - Inverter compressor 2 – Sub unit 1				-	2	6
	-	32	Failure inverter fan motor 1 ROM – Sub unit 1				-	3	2
	-	33	Failure inverter fan motor 2 ROM – Sub unit 1				-	3	3
	-	38	Failure inverter compressor 1 ROM – Sub unit 1				-	3	8
	-	39	Failure inverter compressor 2 ROM – Sub unit 1				-	3	9
	-	49	Malfunction power supply inverter compressor 1 – Sub unit 1				-	4	9
	-	50	Malfunction power supply inverter compressor 2 – Sub unit 1				-	5	0

Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
L1	-	11	Instantaneous overcurrent - Inverter compressor 1 – Sub unit 2		L	1	-	1	1
	-	12	Failure of current sensor - Inverter compressor 1 – Sub unit 2				-	1	2
	-	13	Current offset - Inverter compressor 1 – Sub unit 2				-	1	3
	-	14	Failure power transistors - Inverter compressor 1 – Sub unit 2				-	1	4
	-	16	Jumper settings inverter - Inverter compressor 1 – Sub unit 2				-	1	6
	-	34	Failure inverter fan motor 1 ROM – Sub unit 2				-	3	4
	-	35	Failure inverter fan motor 2 ROM – Sub unit 2				-	3	5
	-	40	Failure inverter compressor 1 ROM – Sub unit 2				-	4	0
	-	41	Failure inverter compressor 2 ROM – Sub unit 2				-	4	1
	-	42	Instantaneous overcurrent - Inverter compressor 2 – Sub unit 2				-	4	2
	-	43	Failure of current sensor - Inverter compressor 2 – Sub unit 2				-	4	3
	-	44	Current offset - Inverter compressor 2 – Sub unit 2				-	4	4
	-	45	Failure power transistors - Inverter compressor 2 – Sub unit 2				-	4	5
	-	46	Jumper settings inverter - Inverter compressor 2 – Sub unit 2				-	4	6
	-	51	Malfunction power supply inverter compressor 1 – Sub unit 2				-	5	1
	-	52	Malfunction power supply inverter compressor 2 – Sub unit 2				-	5	2
L2	-	1	Momentary power failure – Main unit		L	2	-	0	1
	-	2	Momentary power failure – Sub unit 1				-	0	2
	-	3	Momentary power failure – Sub unit 2				-	0	3
	-	4	Power ON - Main – Main unit				-	0	4
	-	5	Power ON – Sub unit 1				-	0	5
	-	6	Power ON – Sub unit 2				-	0	6
L4	-	1	Radiator fin temperature rise: INV. PC board 1 – Main		L	4	-	0	1
	-	2	Radiator fin temperature rise: INV. PC board 1 – Sub 1				-	0	2
	-	3	Radiator fin temperature rise: INV. PC board 1 – Sub 2				-	0	3
	-	9	Radiator fin temperature rise: INV. PC board 2 – Main				-	0	9
	-	10	Radiator fin temperature rise: INV. PC board 2 – Sub 1				-	1	0
	-	11	Radiator fin temperature rise: INV. PC board 2 – Sub 2				-	1	1

Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
L5	-	3	Inverter compressor 1 momentary overcurrent (Master)		L	5	-	0	3
	-	5	Inverter compressor 1 momentary overcurrent (Slave 1)				-	0	5
	-	7	Inverter compressor 1 momentary overcurrent (Slave 2)				-	0	7
	-	14	Inverter compressor 2 momentary overcurrent (Master)				-	1	4
	-	15	Inverter compressor 2 momentary overcurrent (Slave 1)				-	1	5
	-	16	Inverter compressor 2 momentary overcurrent (Slave 2)				-	1	6
L8	-	3	Inverter compressor 1 overcurrent (Master)		L	8	-	0	3
	-	6	Inverter compressor 1 overcurrent (Slave 1)				-	0	6
	-	7	Inverter compressor 1 overcurrent (Slave 2)				-	0	7
	-	11	Inverter compressor 2 overcurrent (Master)				-	1	1
	-	12	Inverter compressor 2 overcurrent (Slave 1)				-	1	2
	-	13	Inverter compressor 2 overcurrent (Slave 2)				-	1	3
L9	-	1	Faulty inverter compressor 1 startup (Master)		L	9	-	0	1
	-	5	Faulty inverter compressor 1 startup (Slave 1)				-	0	5
	-	6	Faulty inverter compressor 1 startup (Slave 2)				-	0	6
	-	10	Faulty inverter compressor 2 startup (Master)				-	1	0
	-	11	Faulty inverter compressor 2 startup (Slave 1)				-	1	1
	-	12	Faulty inverter compressor 2 startup (Slave 2)				-	1	2
LC	-	14	Transmission error [Between outdoor units, INV. 1] (Master)		L	C	-	1	4
	-	15	Transmission error [Between outdoor units, INV. 1] (Slave 1)				-	1	5
	-	16	Transmission error [Between outdoor units, INV. 1] (Slave 2)				-	1	6
	-	19	Transmission error [Between outdoor units, Fan 1] (Master)				-	1	9
	-	20	Transmission error [Between outdoor units, Fan 1] (Slave 1)				-	2	0
	-	21	Transmission error [Between outdoor units, Fan 1] (Slave 2)				-	2	1
	-	24	Transmission error [Between outdoor units, Fan 2] (Master)				-	2	4
	-	25	Transmission error [Between outdoor units, Fan 2] (Slave 1)				-	2	5
	-	26	Transmission error [Between outdoor units, Fan 2] (Slave 2)				-	2	6
	-	30	Transmission error [Between outdoor units, INV. 2] (Master)				-	3	0
	-	31	Transmission error [Between outdoor units, INV. 2] (Slave 1)				-	3	1
	-	32	Transmission error [Between outdoor units, INV. 2] (Slave 2)				-	3	2
	-	33	Transmission error [Between outdoor units, sub PC board] “EKBPHPCBT7” (master) or set 2-52-2 without sub board				-	3	3
	-	34	Transmission error [Between outdoor units, sub PC board] “EKBPHPCBT7” (slave 1) or set 2-52-2 without sub board				-	3	4
	-	35	Transmission error [Between outdoor units, sub PC board] “EKBPHPCBT7” (slave 2) or set 2-52-2 without sub board				-	3	5

Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
P1	-	1	Inverter 1 power supply unbalanced voltage (Master)		P	1	-	0	1
	-	2	Inverter 1 power supply unbalanced voltage (Slave 1)				-	0	2
	-	3	Inverter 1 power supply unbalanced voltage (Slave 2)				-	0	3
	-	7	Inverter 2 power supply unbalanced voltage (Master)				-	0	7
	-	8	Inverter 2 power supply unbalanced voltage (Slave 1)				-	0	8
	-	9	Inverter 2 power supply unbalanced voltage (Slave 2)				-	0	9
P3	-	1	Faulty reactor thermistor 1 (Master: INV. PC board 1)		P	3	-	0	1
	-	2	Faulty reactor thermistor 1 (Slave 1: INV. PC board 1)				-	0	2
	-	3	Faulty reactor thermistor 1 (Slave 2: INV. PC board 1)				-	0	3
	-	4	Faulty reactor thermistor 2 (Master: INV. PC board 1)				-	0	4
	-	5	Faulty reactor thermistor 2 (Slave 1: INV. PC board 1)				-	0	5
	-	6	Faulty reactor thermistor 2 (Slave 2: INV. PC board 1)				-	0	6
	-	7	Faulty reactor thermistor 1 (Master: INV. PC board 2)				-	0	7
	-	8	Faulty reactor thermistor 1 (Slave 1: INV. PC board 2)				-	0	8
	-	9	Faulty reactor thermistor 1 (Slave 2: INV. PC board 2)				-	0	9
	-	10	Faulty reactor thermistor 2 (Master: INV. PC board 2)				-	1	0
	-	11	Faulty reactor thermistor 2 (Slave 1: INV. PC board 2)				-	1	1
	-	12	Faulty reactor thermistor 2 (Slave 2: INV. PC board 2)				-	1	2
P4	-	1	Faulty fin thermistor (Master: INV. PC board 1)		P	4	-	0	1
	-	4	Faulty fin thermistor (Slave 1: INV. PC board 1)				-	0	4
	-	5	Faulty fin thermistor (Slave 2: INV. PC board 1)				-	0	5
	-	6	Faulty fin thermistor (Master: INV. PC board 2)				-	0	6
	-	7	Faulty fin thermistor (Slave 1: INV. PC board 2)				-	0	7
	-	8	Faulty fin thermistor (Slave 2: INV. PC board 2)				-	0	8
PJ	-	4	Incorrect type of inverter PC board [INV.1] (Master)		P	J	-	0	4
	-	5	Incorrect type of inverter PC board [INV.1] (Slave 1)				-	0	5
	-	6	Incorrect type of inverter PC board [INV.1] (Slave 2)				-	0	6
	-	9	Incorrect type of inverter PC board [Fan 1] (Master)				-	0	9
	-	10	Incorrect type of inverter PC board [Fan 2] (Master)				-	1	0
	-	12	Incorrect type of inverter PC board [INV.2] (Master)				-	1	2
	-	13	Incorrect type of inverter PC board [INV.2] (Slave 1)				-	1	3
	-	14	Incorrect type of inverter PC board [INV.2] (Slave 2)				-	1	4
	-	15	Incorrect type of inverter PC board [Fan 1] (Slave 1)				-	1	5
	-	16	Incorrect type of inverter PC board [Fan 1] (Slave 2)				-	1	6
	-	17	Incorrect type of inverter PC board [Fan 2] (Slave 1)				-	1	7
	-	18	Incorrect type of inverter PC board [Fan 2] (Slave 2)				-	1	8
U0	-	5	Gas shortage alarm		U	0	-	0	5
	-	6	Gas shortage alarm				-	0	6
	-	8	Gas shortage (Master)				-	0	8
	-	9	Gas shortage (Slave 1)				-	0	9
	-	10	Gas shortage (Slave 2)				-	1	0

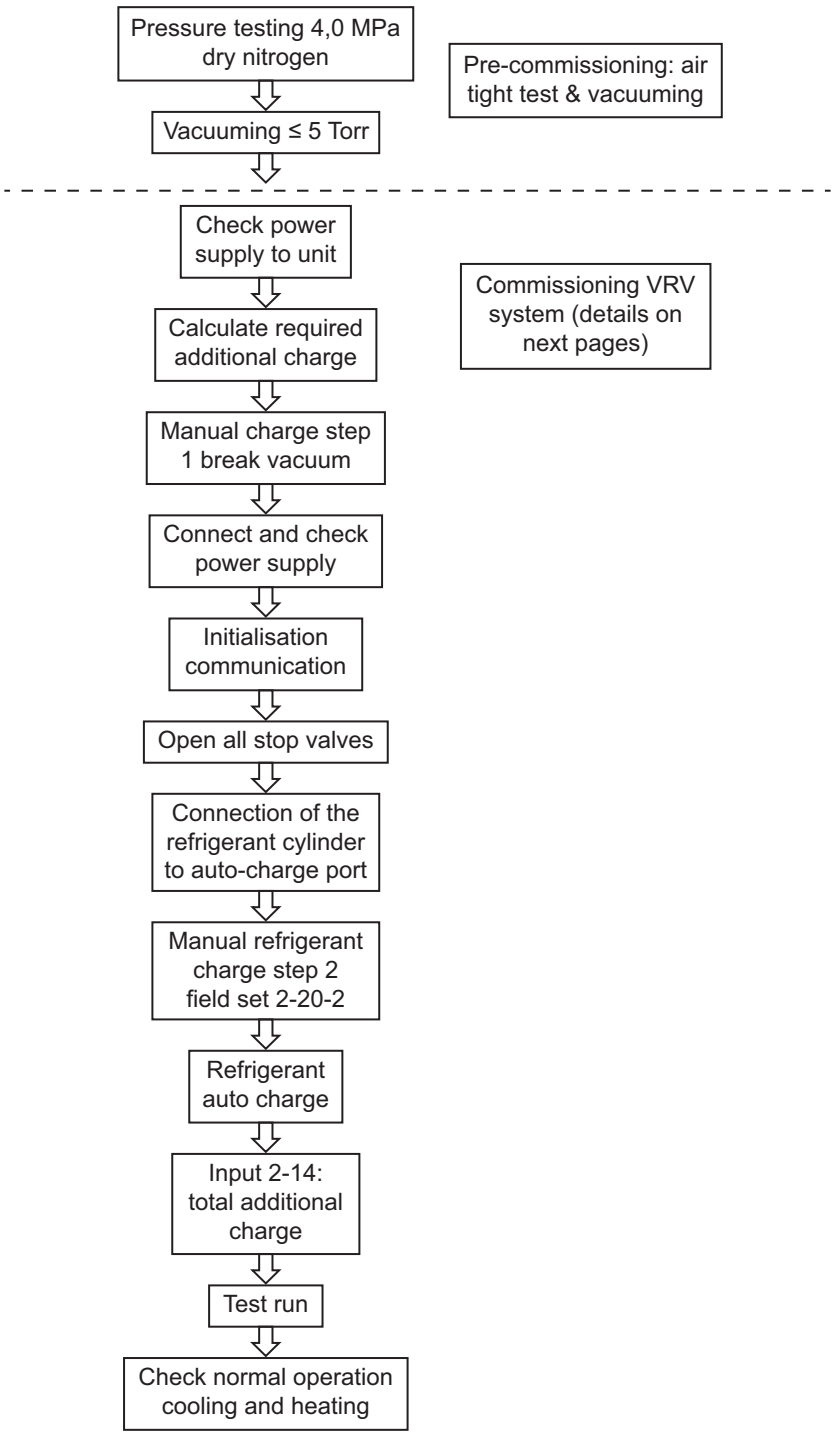
Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
U1	-	1	Negative phase/open phase of power supply (Master)		U	1	-	0	1
	-	4	Negative phase of power supply [when power ON] (Master)				-	0	4
	-	5	Negative phase/open phase of power supply (Slave 1)				-	0	5
	-	6	Negative phase of power supply [when power ON] (Slave 1)				-	0	6
	-	7	Negative phase/open phase of power supply (Slave 2)				-	0	7
	-	8	Negative phase of power supply [when power ON] (Slave 2)				-	0	8
U2	-	1	Shortage of inverter 1 power supply voltage (Master)		U	2	-	0	1
	-	2	Open phase of inverter 1 power supply (Master)				-	0	2
	-	3	Malfunction of capacitor in inverter 1 main circuit (Master)				-	0	3
	-	8	Shortage of inverter 1 power supply voltage (Slave 1)				-	0	8
	-	9	Open phase of inverter 1 power supply (Slave 1)				-	0	9
	-	10	Malfunction of capacitor in inverter 1 main circuit (Slave 1)				-	1	0
	-	11	Shortage of inverter 1 power supply voltage (Slave 2)				-	1	1
	-	12	Open phase of inverter 1 power supply (Slave 2)				-	1	2
	-	13	Malfunction of capacitor in inverter 1 main circuit (Slave 2)				-	1	3
	-	22	Shortage of inverter 2 power supply voltage (Master)				-	2	2
	-	23	Open phase of inverter 2 power supply (Master)				-	2	3
	-	24	Malfunction of capacitor in inverter 2 main circuit (Master)				-	2	4
	-	25	Shortage of inverter 2 power supply voltage (Slave 1)				-	2	5
	-	26	Open phase of inverter 2 power supply (Slave 1)				-	2	6
	-	27	Malfunction of capacitor in inverter 2 main circuit (Slave 1)				-	2	7
	-	28	Shortage of inverter 2 power supply voltage (Slave 2)				-	2	8
	-	29	Open phase of inverter 2 power supply (Slave 2)				-	2	9
	-	30	Malfunction of capacitor in inverter 2 main circuit (Slave 2)				-	3	0
U3	-	2	First installation alarm / Test run failed due to indoor unit error		U	3	-	0	2
	-	3	Test operation not conducted				-	0	3
	-	4	Abnormal end of test operation				-	0	4
	-	5	Premature end of test operation during initial transmission error – check indoor unit error U4 / U9				-	0	5
	-	6	Premature end of test operation during normal transmission error				-	0	6
	-	7	Premature end of test operation due to transmission error				-	0	7
	-	8	Premature end of test operation due to transmission error of all units				-	0	8
U4	-	1	Transmission error between indoor and outdoor units		U	4	-	0	1
	-	3	Transmission error between indoor unit and system: check indoor unit error				-	0	3
	-	15	Outdoor unable to start test-run because some indoor detects malfunction				-	1	5

Malfunction code			Description of malfunction	Upper code			Lower code		
				Dig 1	Dig 2	Dig 3	Dig 1	Dig 2	Dig 3
U7	-	1	Error when external control adapter is installed		U	7	-	0	1
	-	2	Alarm when external control adapter is installed				-	0	2
	-	3	Transmission error between master and slave 1 units				-	0	3
	-	4	Transmission error between master and slave 2 units				-	0	4
	-	5	Multi system malfunction				-	0	5
	-	6	Error in address settings of slave 1 and 2				-	0	6
	-	7	Connection of four or more outdoor units in the same system				-	0	7
	-	11	Error in indoor unit connection capacity for test operation				-	1	1
U9	-	1	Malfunction of other indoor units		U	9	-	0	1
UA	-	17	Connection of excessive indoor units		U	A	-	1	7
	-	18	Connection of wrong models of indoor units				-	1	8
	-	20	Improper combination of outdoor units				-	2	0
	-	21	Connection error				-	2	1
	-	29	Branch selector BSVQ-P connected to heat-pump system				-	2	9
	-	31	Multi-unit combination error				-	3	1
	-	38	Daikin Altherma indoor unit detected				-	3	8
	-	39	Other hydrobox type than HXY-A unit detected				-	3	9
	-	50	RA connected to BP units and HXY-A unit detected				-	5	0
	-	51	Only HXY-a unit(s) connected, minimum 50% DX indoor need				-	5	1
UF	-	1	Wrong wiring check error		U	F	-	0	1
	-	5	Malfunction of shut-off valve for test operation				-	0	5
UH	-	1	Wiring error		U	H	-	0	1
UJ	-	1	Malfunction of active filter (Master)		U	J	-	0	1
	-	2	Malfunction of active filter (Slave 1)				-	0	2
	-	3	Malfunction of active filter (Slave 2)				-	0	3

Caution Code			Description code	Upper code		
				Dig 1	Dig 2	Dig 3
	P	2	Auto charge more than 5 minutes “t03” blinking		P	2
		8	Auto charge abnormal end freeze up indoor		P	8
		E	Auto charge nearly terminated		P	E
		9	Auto charge normal terminated		P	9
E	-	1	Conditions not met to perform leak test	E	-	1
	-	2	Indoor air average below 10°C for leak test	E	-	2
	-	3	Outdoor air below 0°C for leak test	E	-	3
	-	4	Abnormal low pressure during leak test	E	-	4
	-	5	Some indoor not compatible for leak test	E	-	5

4. Start Up

Overview initial start up procedure



4.1 Power Supply

Perform the procedure as described below at the initial start up of the equipment, or at the start up after the power supply has been switched off for a long period.

4.1.1 Check before switching on the power supply outdoor unit

Remark

Following items are also described in the installation manual of the indoor and outdoor unit. Make the following checks:

A

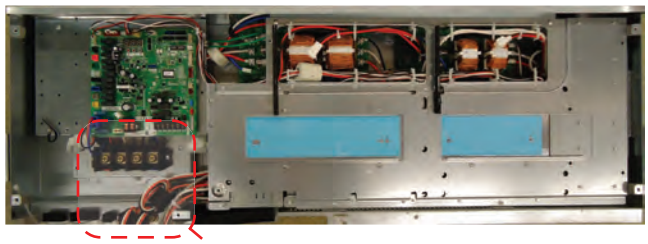
- Power wiring
- Control wiring
- Ground wire
- Circuit breaker
- Earth leakage breaker

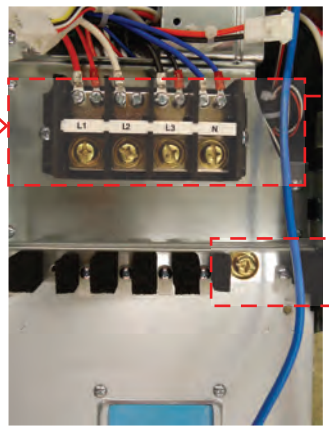
A.

- Wiring is installed in accordance with the instructions.
- The earth leakage circuit breaker and circuit breaker are wired correctly.
- The specified cables and wires are used.
- No loose screws or wires.
- The earth wiring is present and connected.
- Check the insulation of the power supply. Check the insulation at the power supply terminals with a megger. Set the megger to 500 VDC. Only use the megger on the circuit of 400 and 230 VAC. Do not use a megger on control wiring F1/F2, Q1/Q2 (outdoor only), nor indoor P1P2, T1T2 (indoor only).
- For a new installation, do not switch on the power supply till the second step of manual charge.
- If repair work is done on the refrigerant circuit, keep the power supply connected in order to open all expansion valves by the setting "refrigerant recovery mode" (outdoor field set 2-21-2).

Switch box
RYYQ/RYMQ/RXYQ8~12T

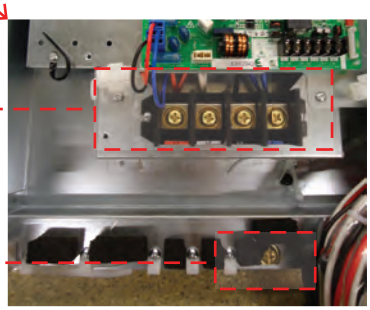
Switch box
RYYQ/RYMQ/RXYQ14~20T



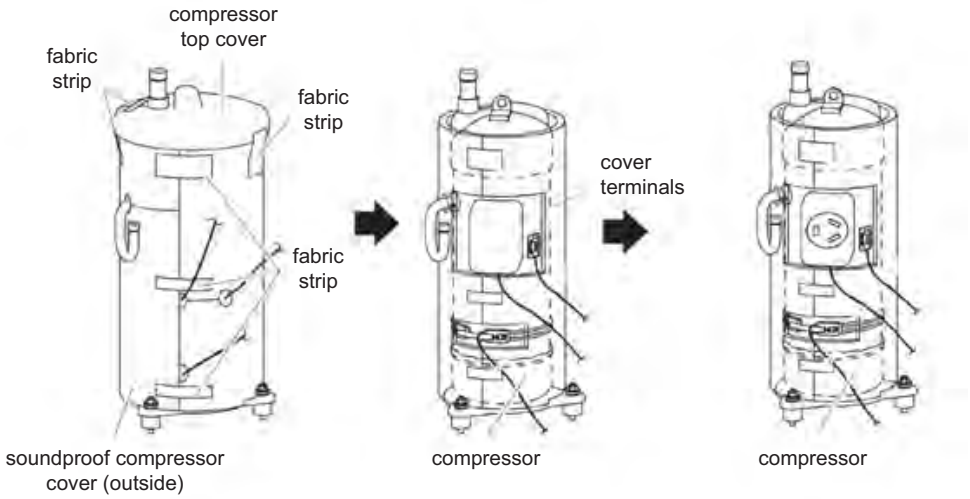


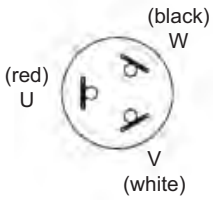
Power supply terminals

Earth connection



- Confirm the current connections at the compressor corresponding to the marking on the sticker on the body of the compressor.
- If the insulation of the main power supply circuit is less than 1 MΩ, it might be caused by accumulated refrigerant in the oil of the compressor.
- Remove the U (red)/V (white)/W (black) wires from the terminals at the compressor(s) and insulate the wire ends.





1. Measure the insulation resistance of the main power supply circuit.
   - If less than 1 MΩ, a possible cause could be failure of the local power supply circuit. Please check the insulation of the local power supply circuit.
   - If more than 1 MΩ, please do the following, see ② and ③.
2. Turn on the power supply outdoor unit without wiring to the compressor. After the power is switched on, crankcase heaters will be energized. Keep this situation for 6 hours. After this period, use a megger at the compressor terminals U/V/W.
3. Measure the insulation resistance to ground again.
   - If more than 1 MΩ, the product is normal. Reconnect the U/V/W wires in the correct sequence. Please continue the installation work.
   - If less than 1 MΩ, the compressor is faulty.

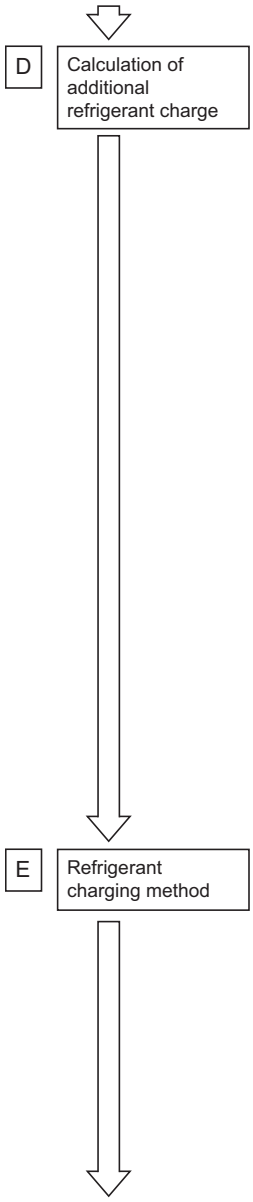
B Check on refrigerant piping/ insulation materials

B. Refrigerant piping

- Are the pipe sizes correct? Design pressure is 4.0 MPa for both liquid and gas piping, pipe thickness should be sufficient (refer to installation manual).
- The insulating material of the pipe is securely installed.
  Insulation material is required for both liquid and gas pipes. If insulation is not present, it may cause condensation.

C Checking the airtight test and vacuum drying

C. Follow the steps in the installation manual, confirm that a leak test and vacuum drying were performed correctly.



D. Calculation of additional refrigerant (unit = 0.1 kg):

R=[(X1 x **Ø22.2**) x 0.37+(X2 x **Ø19.1**) x 0.26+(X3 x **Ø15.9**) x 0.18+(X4 x **Ø12.7**) x 0.12+(X5 x **Ø9.5**) x 0.059+(X6 x **Ø6.4**) x 0.022]+**A**+**B**

X1...6 =Total length (m) of liquid piping size at **Øa**

		HP			
A parameter (kg)	Total indoor unit capacity CR(a)	8	10+12	14+16	18+20
Piping length ≤ 30m	50% ≤ CR ≤ 105%	0			0.5
	105% < CR ≤ 130%	0.5			1
Piping length > 30m	50% ≤ CR ≤ 70%	0			0.5
	70% < CR ≤ 85%	0.3	0.5		1.0
	85% < CR ≤ 105%	0.7	1		1.5
	105% < CR ≤ 130%	1.2	1.5		2.0

(a) CR= Connection ratio

- In case of multi system, add the sum of individual units.
- Piping length is considered the distance from the outdoor unit to the farthest indoor unit.

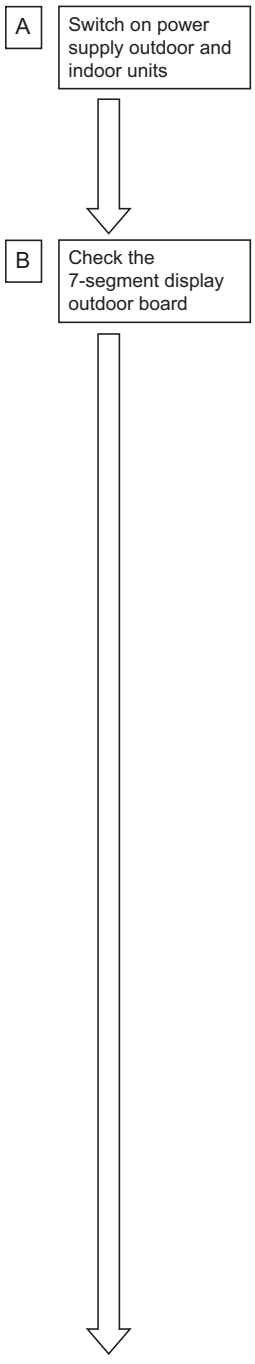
B parameter (kg)(a)	RYYQ8 RYYQ10 RYYQ12	RYYQ14 RYYQ16	RYYQ18 RYYQ20
B (kg)	0.9	1.1	1.3

(a) B paramer is ONLY required for RYYQ8~20 models, not for RXYQ8~54 and RYYQ22~54

E. Procedure for adding refrigerant:

- Manual charge without compressor operation: after vacuum drying, add liquid refrigerant from liquid stop valve service port (liquid and gas shut-off valve remains closed).
  - Caution: do not use the service port of gas shut-off valve(s). This can cause permanent damage.
- After the power supply is switched on, add the remaining amount of refrigerant according to the "additional refrigerant charging operation" (manual or/and automatic). For details refer to “Refrigerant Charging” on page 129.
- Add the amount of factory charge and the additional refrigerant charge on the sticker supplied as accessory and in the field setting of the outdoor unit (see “Refrigerant Charging” on page 129).

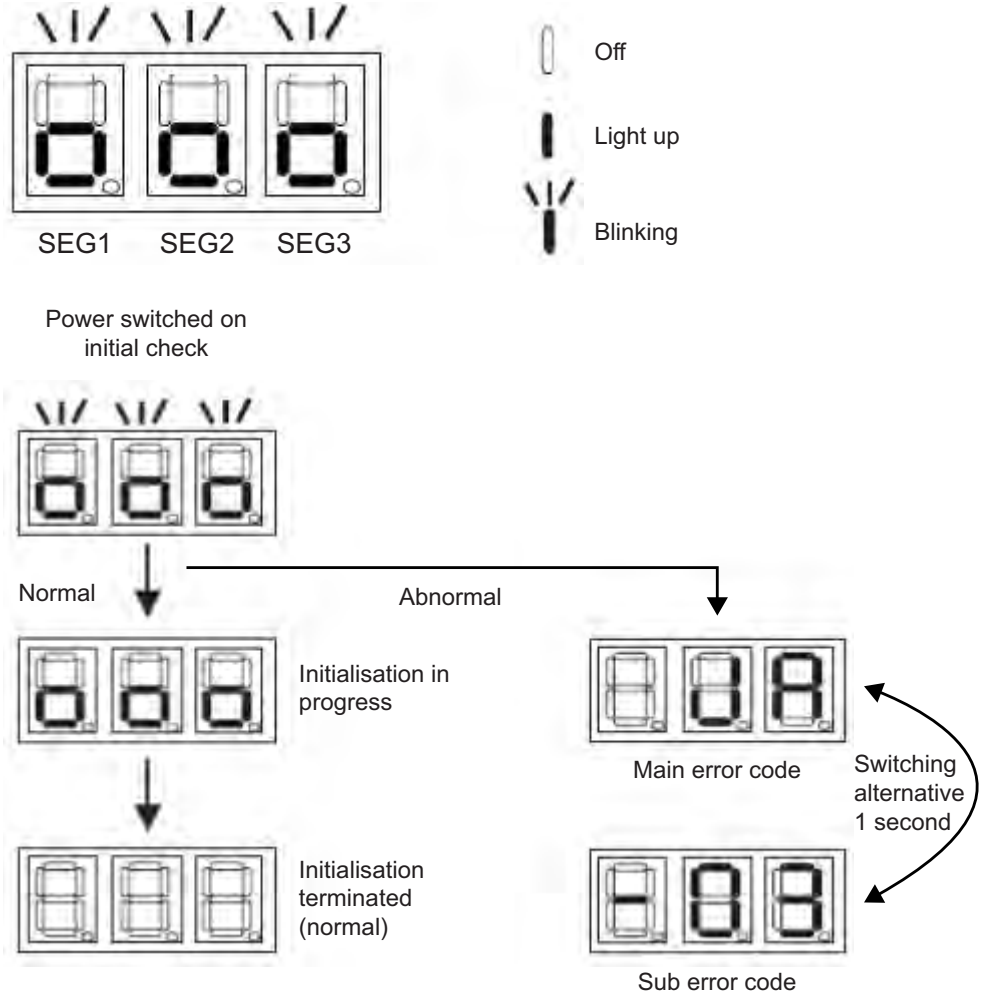
4.1.2 Switch on power supply



A. In order to protect the compressor, please turn on the power 6 hours prior to the start of operation. Check if the power supply is correct:

- For 3 phase: 400 VAC ± 10%, unbalance among phases 2%.
- For single phase (phase-neutral): 230 VAC ± 10%.
- Frequency 50 Hz ± 3%.

B. Please make sure that the transmission is successful. In a normal condition, the 7-segment display is off. Please refer to the following figure for other states.



For further details about error codes, refer to “Part 6 Troubleshooting by Error Code” on page 145 and the installation manual of the outdoor unit.

4.2 Refrigerant Charging

4.2.1 Overview charging methods

The following procedure indicates the 3 different methods of adding refrigerant to the system:

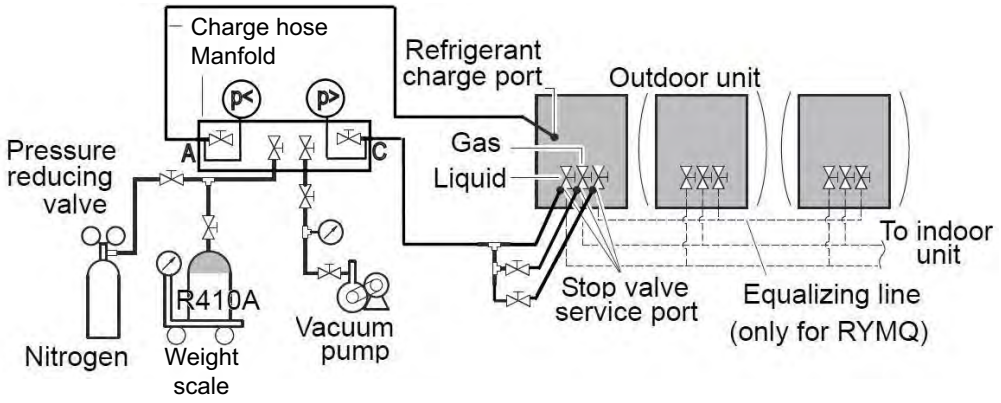
1. Manual charge without compressor operation. Initial charge by breaking the vacuum of field piping, without compressor operation. Stop valves are kept closed at the outdoor unit.
2. Manual charge by compressor operation. Second step by operation of outdoor unit using the "manual refrigerant charge function" (setting 2-20). Ensure to connect the refrigerant cylinder through some manifold to the service port for auto-charge.
3. Automatic judgment of refrigerant charge.
   - After breaking the vacuum, and eventually proceeding by manual charge, the system can operate in the automatic judgment of refrigerant charge to obtain best performance for the given ambient conditions indoor and outdoor. The outdoor unit will judge by some parameters what is the most efficient condition.
   - When the additional refrigerant amount exceeds the calculated amount (based on liquid line diameter and length), the function must be interrupted and proceed to test run.
   - This function is however not possible in case of one of the following conditions:
     - Combination of VRV indoor units with special indoor units as LT VRV4 indoor (HXY80,125A), nor when using BP units with split serie indoor units.
     - Low outdoor ambient below 0°C.
     - Low average indoor air temperature below 10°C.
     - Total connection ratio less than 80%.

- When the refrigerant charging is completed, it is required to indicate the additional refrigerant amount on the outdoor control board (field setting 2-14).

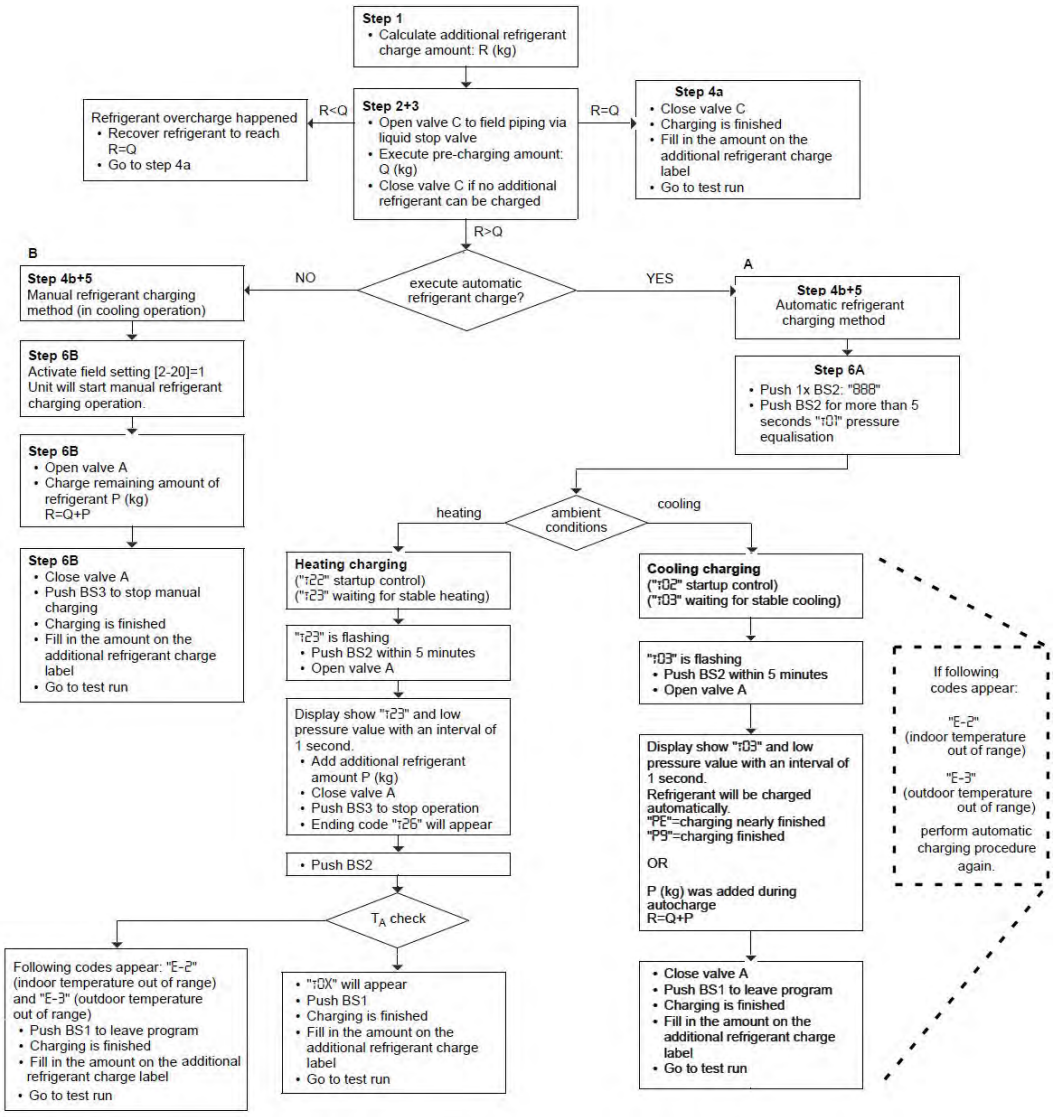
set 2-14	X = additional refrigerant amount (kg)
0	No input (default)
1	0<X<5
2	5<X<10
3	10<X<15
4	15<X<20
5	20<X<25
6	25<X<30
7	30<X<35
8	35<X<40
9	40<X<45
10	45<X<50

set 2-14	X = additional refrigerant amount (kg)
11	50<X<55
12	55<X<60
13	60<X<65
14	65<X<70
15	70<X<75
16	75<X<80
17	80<X<85
18	85<X<90
19	Setting cannot be used. Total refrigerant charge has to be < 100 kg
20	
21	

- Refrigerant charge procedure.

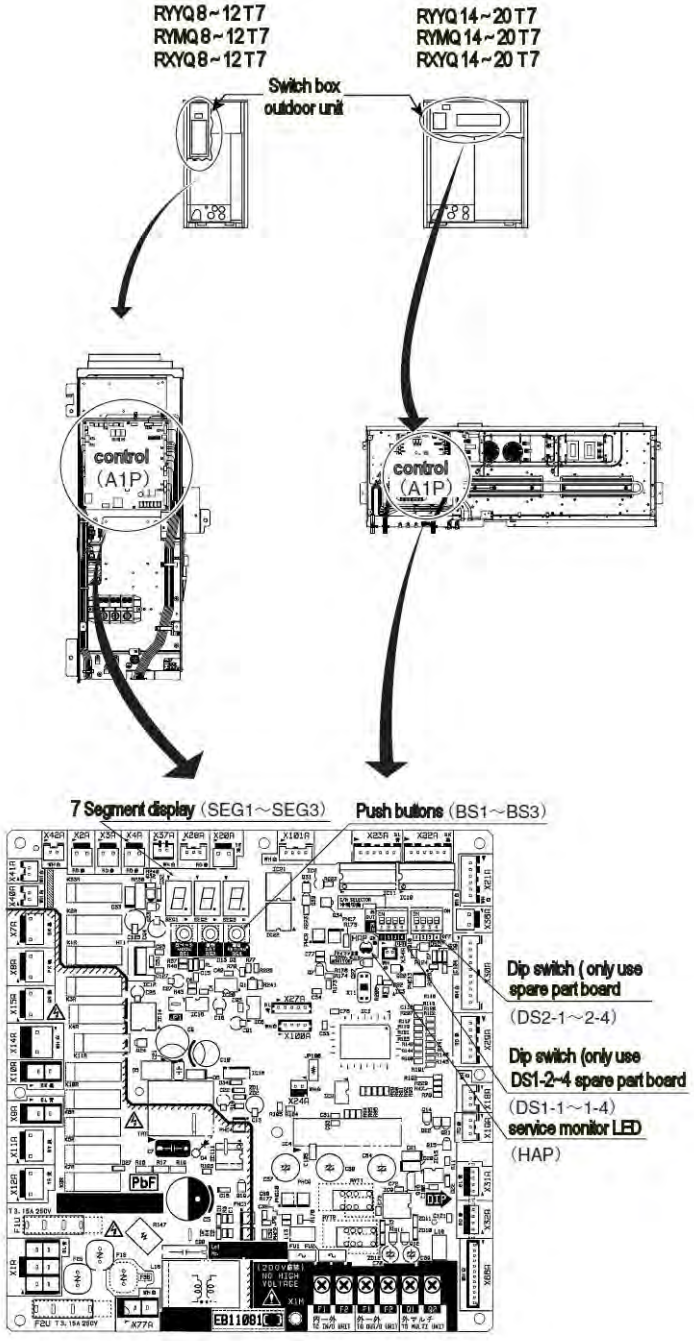


4.2.2 Flowchart refrigerant charge procedure (see also installation manual outdoor unit)



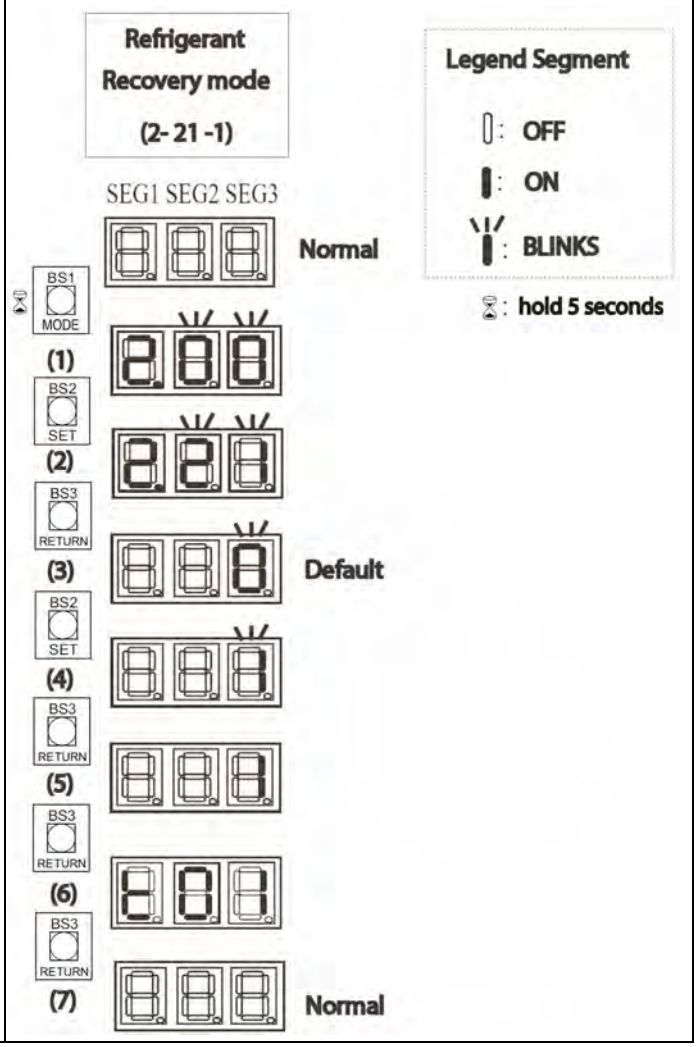
4.2.3 Location 7-segment display and push buttons outdoor control board

- Use the buttons on the outdoor control board to initiate the different steps of the refrigerant charging and the required test run. In case of multi outdoor combination, this actuation needs to be made from the "main" unit (where F1F2 wiring is connected too).
- Location of the buttons on the control board outdoor unit:



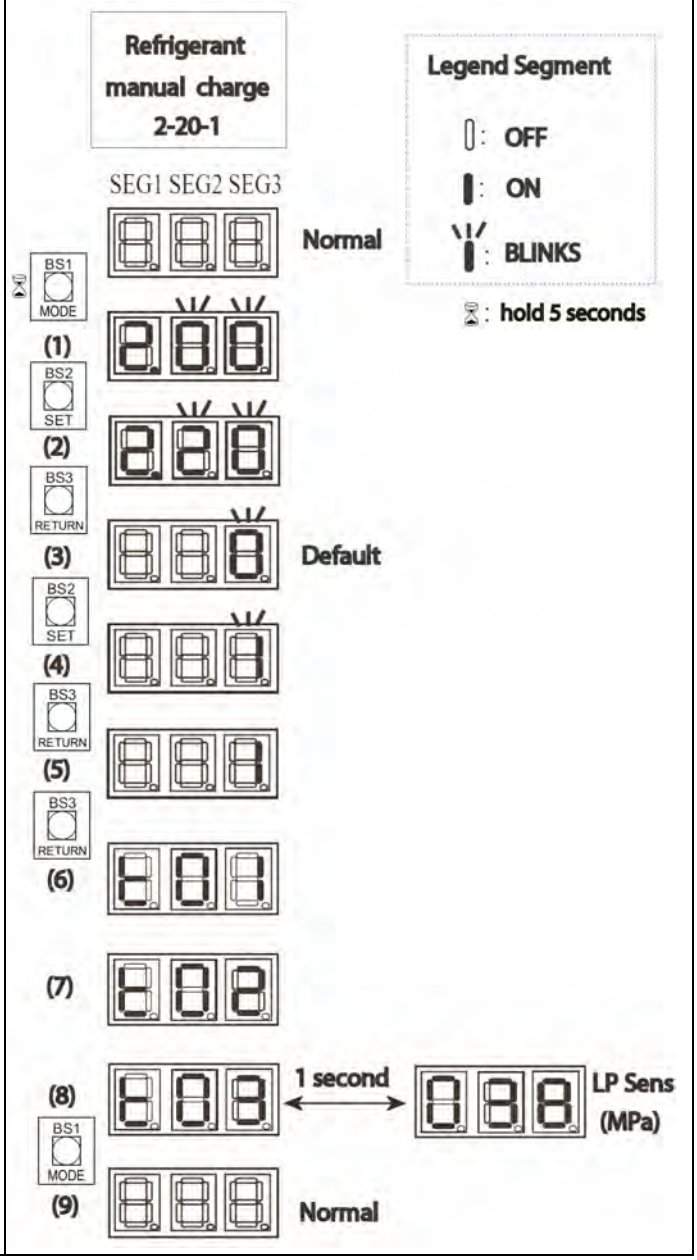
4.2.4 Indication 7-segment display and setting method outdoor control board during refrigerant charge

A: Without compressor operation (break vacuum).

Ensure that the display shows "normal display" = display off. If the current display is monitoring mode (indication "100"), press BS1 "MODE" one time. (1) Press and hold BS1 "MODE" (± 5 seconds) till the display changes to 200. (2) Press BS2 "SET" 21 times till display 221 appears. (3) Press BS3 "RETURN" to enter setting. (4) Press BS2 "SET" one time. (5) Press BS3 "RETURN" to confirm setting. (6) Press BS3 "RETURN" to activate the setting. Display "t01" appears. All expansion valves indoor and outdoor are opened, and on the wired remote controllers the button lock symbol and "TEST" appears. (7) To exit the recovery mode, press once BS3 "RETURN". All indoor and outdoor expansion valves close again.	

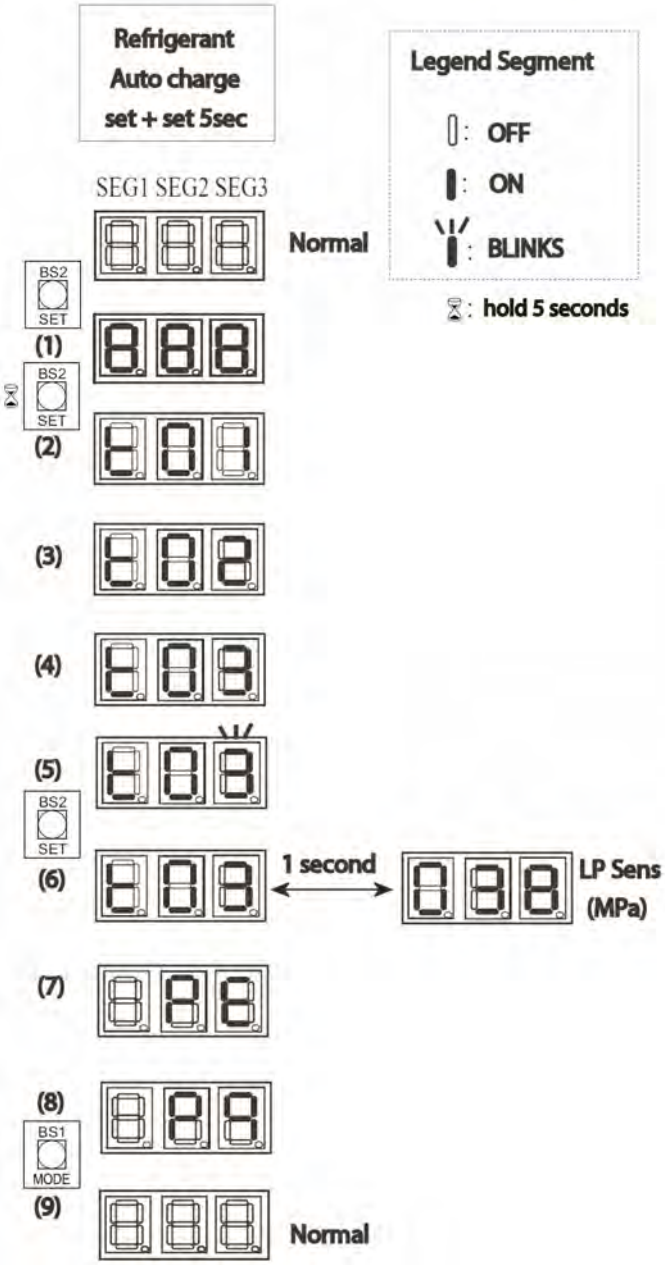
B: Manual refrigerant charge by operating the compressor(s).

Ensure that the display shows "normal display" = display off. If the current display is monitoring mode (indication "100"), press BS1 "MODE" one time.
(1) Press and hold BS1 "MODE" (± 5 seconds) till display changes to 200.
(2) Press BS2 "SET" 20 times till display 220 appears.
(3) Press BS3 "RETURN" to enter setting.
(4) Press BS2 "SET" one time.
(5) Press BS3 "RETURN" to confirm setting.
(6) Press BS3 "RETURN" to activate the setting. Display "t01" appears. On the wired remote controllers the button lock symbol and "TEST" appears. The indoor fan motors start on high speed. The outdoor fan starts step 4. Step "t01" takes 1 to 10 minutes.
(7) At step "t02" compressor starts to build up pressure difference.
(8) At step "t03" display changes alternative to low pressure sensor value.
(9) To stop the manual refrigerant charge, press once BS1 "MODE" button.
Indoor and outdoor units stop operation. The outdoor unit will be able to restart (for test run) after 3 minutes guard timer passed.

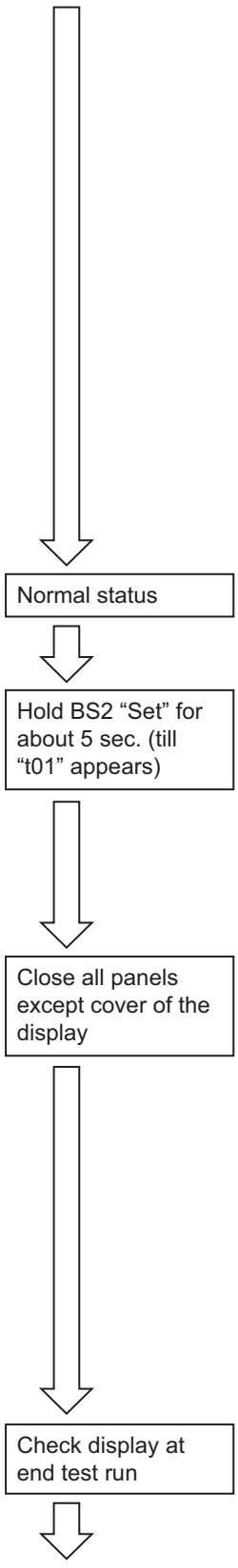


C: Automatic refrigerant charge.

Ensure that the display shows "normal display" = display off. If current display is monitoring mode (indication "100") or mode 2 (indication "200"), press BS1 "MODE" one time.
(1) Press once BS1 "SET". Indication "888" appears.
(2) Press and hold BS1 "SET" for about 5 seconds till "t01" appears. On the wired remote controllers the button lock symbol and "TEST" appears. The indoor fan motors start on high speed. The outdoor fan starts step 4. Step "t01" takes 1 to 10 minutes.
(3) At step "t02" compressor starts to build up pressure difference.
(4) At step "t03", the outdoor unit increases capacity step to reach target evaporation -15°C and judge initial operation performance.
(5) When the system judges that additional refrigerant is required, indication "t03" blinks.
(6) Within 5 minutes, button BS2 "TEST" needs to be pressed once and the valve to charge cylinders needs to be opened.
(7) When automatic refrigerant charge is almost completed, indication "PE" appears.
(8) When the system judges that automatic refrigerant charge is completed, indication "P9" appears. Outdoor change over to heating cycle and performs a pump down before stopping operation. By setting outdoor heat-exchanger to low pressure side, refrigerant overcharge is limited when charge valve is not closed immediately when "P9" appears.
(9) Press button BS1 "MODE" to stop the automatic refrigerant charge. Add the additional refrigerant charge weight in field setting 2-14. Go to test run procedure.



4.3 Test Run

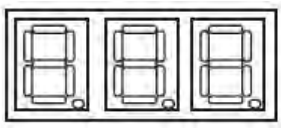
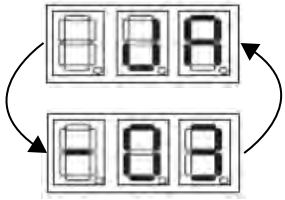


- At the first start up, make sure to perform an outdoor unit test run.
- If no outdoor test run was performed, some error code will be displayed on outdoor 7-segment display of outdoor control board:
  - U3-02: the test run could not be performed due to outdoor or indoor air temperature not in operation range, or the test run was manually interrupted.
  - U3-03: test run was not yet performed.
  - U4-03: one or more indoor units have an error related to a thermistor, float switch, fan motor, or expansion valve malfunction, or no controller is detected (controller = indoor remote control or central control device).
- During the test run, the following items will be checked automatically.
  1. Check cross wiring. At the initial start up, indoor coil temperature must drop when outdoor unit reaches low evaporation temperature (target -15°C).
  2. Check if the shut-off valves are open.
  3. Check if refrigerant overcharge.
  4. Automatic judgment pipe length.
- Method to perform the test run outdoor unit:
  - Indication during initialisation, see “Switch on power supply” on page 128. Wait until initialisation has be completed = normal mode indication.
  - "normal mode": the 7-segment display is off.
  - If there is an error code, use the related flow chart about the indicated error code.
  - During the outdoor test run.
    - The system will run in cooling mode.
    - The 7-segment display shows the current step (the figure below).

First step Last step

    - The indoor unit controller shows the symbol  and "TEST".
    - Prior to compressor start.
      - The system will equalize the refrigerant state.
      - Difference between indoor coil and air temperature within 5°K.
      - This first step (indicated by "t01") may take up to 10 minutes.
    - Once the compressor operates, operation sound increases due to the operation of solenoid valve and raising compressor speed.
    - During the outdoor test run, no check is possible on the remote control.
    - Indoor can not be stopped by remote controller.
    - If you need to abort the test run, please press BS3 "Confirm" button. If you try to start the indoor unit by remote controller, again error U3-03 will appear on the 7-segment display.
    - Close all panels during the test run (except the service cover for the display).
    - Test run will automatically stop.
      - If no data about total refrigerant charge needs to be collected (if field setting 2-88-1): about 30-50 minutes.
      - If data about total refrigerant charge needs to be collected (default setting 2-88-0): it takes maximum 4 hours.

- Judgment at end of test run.

Status	7-segment display	Result
Normal		Display off
Abnormal		Error indication: main code and sub code (alternating with about every second interval)

- If there is no error indication on the outdoor display nor on the indoor controllers, outdoor can start normal operation after about 5 minutes.
- If there is an error code, refer to the chapter troubleshooting to search for the cause of the error code.
- Once the problem is solved, a new test run will be required.
- To clear the current error indication on the outdoor display, press BS3 "Confirm" button once.
- Notes on operation check:
  - About 12 minutes after turning on the power supply to the indoor and outdoor unit, the 7-segment display can show normal status (time of initialisation of communication). During the initialisation, it is not possible to initiate the test run.
  - Before starting a test run, make sure that the 7-segment display is off.
  - It is normal that step 1 of the test run can take up to 10 minutes: it is not a failure. System needs to equalize the refrigerant state and indoor unit heat-exchanger. During this step "t01" indoor units will run the fan on high fan speed, and outdoor will operate fan at step 4. Only when outdoor display shows "t02", compressor starts operation.
  - Be sure to mount the cap to the service valve ports when the additional refrigerant charge is completed. The tightening torque of the lid is 12.7 ± 1.2 N·m.
  - Run the test run only one system at the time. Keep the other systems off to ensure that air discharge of one system does not affect the system performing the test run.
  - If there is a faulty wiring, a test run can not be performed.
  - Actual correct operation of indoor unit is not checked during test run. At the end of the test run check the normal operation.
  - When some special functions are activated, for example refrigerant recovery mode (setting 2-21) or manual refrigerant charge (setting 2-20), a test run can not be started.
  - During the test run following steps are shown:
    - "t01" = control before start up (pressure and temperature equalisation).
    - "t02" = cooling start up control (create pressure difference to position 4-way valves correctly).
    - "t03" = cooling stable conditions.
    - "t04" = check cross piping/wiring: at all indoor units communicating with this system, coil temperature should drop. If one or more indoor units do not detect a low coil temperature, "UF" error will be generated and system will stop. To trace which indoor unit(s) fail this test, verify coil temperature, by remote controller (service mode), or by service checker recording data.
    - "t05" = check if all stop valves are opened.
    - "t06" = check pipe length. Control will set a number of target evaporation temperatures. At each target, when evaporation temperature is stable, control will take difference between average indoor coil temperature and outdoor evaporation temperature, taking into account current compressor capacity step.
    - "t07" = check refrigerant amount.

- "t08" = take reference data at given refrigerant volume input to enable a comparison during the leak test function. This step can only take place if field setting is 2-88-0 (default).
- "t09" = pump down of system.
- "t10" = the unit stops and the guard timer counts down before a normal operation can be started from the indoor controller operation button.

4.4 Check Normal Operation

- At the end of the test run, start the system by the indoor controller and verify system performance.
  - Start indoor unit, check if no error appears on the controller.
  - Stop the system immediately when there is abnormal noise due to liquid compression of the compressor. Confirm that during compressor off-cycle, the crankcase heater is switched on for sufficient time to warm up crankcase of compressor.
  - Operate each indoor unit one by one. Make sure that some indoor units have the cooling thermostat-on at the same time to avoid that the outdoor unit stops when indoor units are switched thermostat-off (to check expansion valve indoor unit closes correctly).
  - Confirm the air outlet temperature on each indoor unit at thermostat-on demand:
    - Cooling mode:
      - Thermostat-on: air outlet is at least 10° below air inlet.
      - Thermostat-off: indoor coil temperature should raise and approach within 10° to air return temperature. Keep indoor unit fan running to observe coil temperature tendency.
    - Heating mode: at least 15° raise compared to air inlet.
  - Consult customer to know the preferred fan speed setting and air flap position.
- Caution when confirming normal operation.
  - Above 24°C outdoor ambient, heating operation is not possible. Only indoor fan will operate if switched on. No error will be shown on controllers.
  - When the compressor stops (due to thermostat-off or fault), the guard timer of 3 minutes avoids that the compressor can restart immediately after stopping. So when the compressor stops, outdoor can not restart within the guard timer period.
  - When all indoor units are stopped operation by remote controller, outdoor can still run up to about 10 minutes, due to completion of defrost or oil return.
  - When a low noise operation is active (by external contact on optional board DTA104A61 or automatic control), the outdoor fan can run on low speed. If the low noise operation was interrupted (input contact opened on optional board DTA104A61), the low noise operation can not resume within the next 30 minutes even if input contact is closed again within this period.

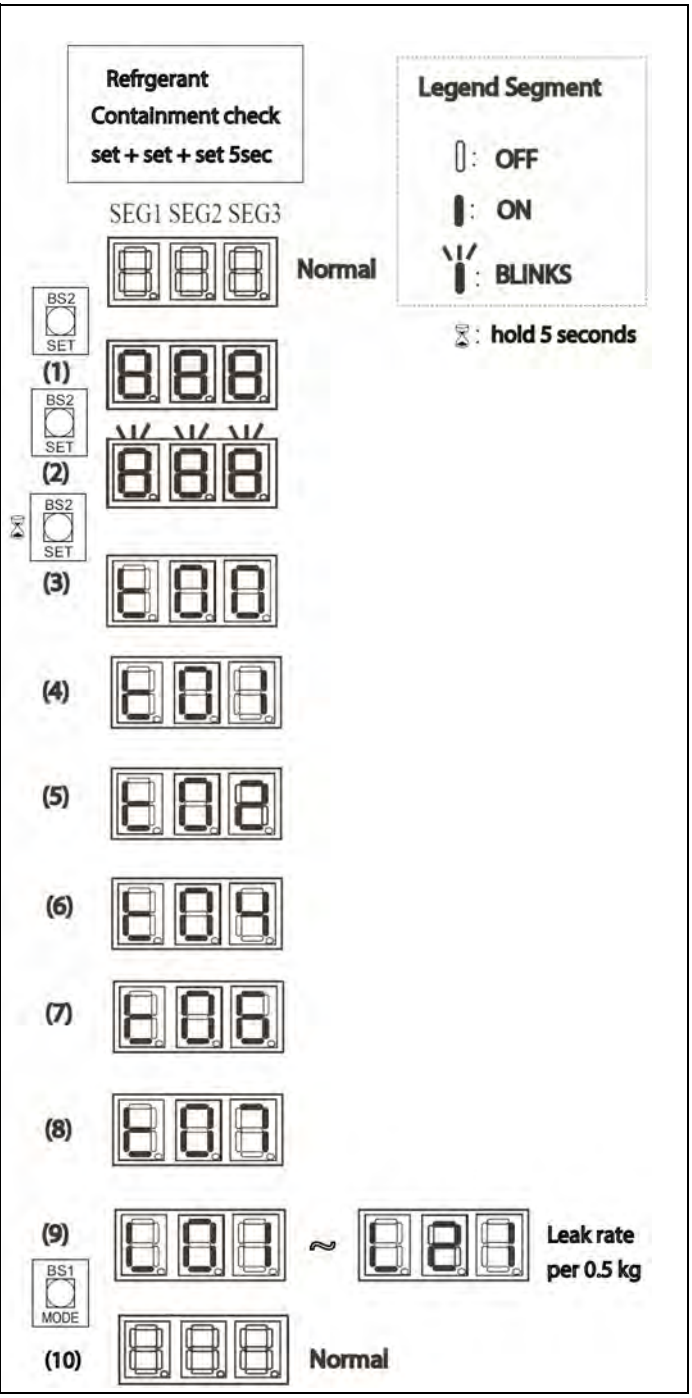
4.5 Refrigerant Containment Check

4.5.1 General info

- To comply to the HFC regulations in the EU market, within a fixed period of operation, an inspection on refrigerant leaks is required.
- During the refrigerant containment check, the outdoor unit will use a number of parameters to enable an estimation of the total refrigerant charge by comparing data during the latest performed test run (if setting 2-88-0 was selected).
- The refrigerant containment check can be initiated:
  - Manual from outdoor control board.
  - Automatic interval from outdoor control board (default not activated).
  - Manual from ITM (ITM = Intelligent Touch Manager, a Daikin building management system).
  - Schedule from ITM.
- To have the refrigerant containment check available, following conditions need to be completed correctly:
  - Only the combination of VRV indoor units (including VKM and FXMQ-MF).
  - The function is not available when there is a combination with RA split indoor unit(s) nor when including Hydrobox HXY80,125A.
  - The function is not available when field setting is made because "high level different between outdoor and indoor":
    - Field setting 2-35-1 if outdoor is > 40m below indoor units, or
    - Field setting 2-49-2 if outdoor is > 50m above indoor units.
  - The function is not available when the connection ratio is less than 80% of the outdoor system total index.
  - Additional refrigerant charge input prior to test run (field set 2-14 - 01~18).
  - The extended test run was performed (if field setting 2-88-0).
  - During the test run, outdoor temperature was not lower than 0°C and average indoor temperature was not below 10°C.
  - During the refrigerant containment check, average indoor air temperature is not lower than 20°C.

4.5.2 Procedure to launch the "Refrigerant containment check"

A: Manually from outdoor control board.

Ensure that the display shows "normal display" = display off. If current display is monitoring mode (indication "100") or mode 2 (indication "200"), press BS1 "MODE" button one time. (1) Press once BS2 "SET" button. Indication "888" appears. (2) Press again BS2 "SET" button. Indication "888" blinks. (3) Press and hold BS2 "SET" button for about 5 seconds till "t00" appears. On the wired remote controllers the button lock symbol and "TEST" appears. The indoor fan motors start on high speed. The outdoor fan starts step 4. (4) Step "t01" = pressure equalisation. It takes 1 to 10 minutes. (5) Step "t02" = compressor starts to build up pressure difference. (6) Step "t04" = refrigerant containment check. (7) Step "t06" = stand by. If indoor < 15°C or outdoor < 20°C: heating. (8) Step "t07" = end. (9) Indication L01 till L21 = indication leak rate per 0.5 kg. (10) To complete, push BS1 "MODE" button once.	

B: Automatic schedule from outdoor board.

- Following field settings are required:
  - 2-86:
    - Set 01 = once in period days set by field setting 2-85.
    - Set 02 = every period days set by field setting 2-85.
  - 2-85:
    - Set 0 = 365 days (default).
    - Set 1 = 180 days.
    - Set 2 = 90 days.
    - Set 3 = 60 days.
    - Set 4 = 30 days.
    - Set 5 = 7 days.
    - Set 6 = 1 day.
  - 2-88-0 = during test run, collection of extended data.
  - The automatic refrigerant containment check will start between 10 pm and 4 am. The time is judged automatically by tendency of outdoor air temperature. Highest ambient is occurring at 2 pm. This judgment is however a "learning" function over several days.

C: Manual from ITM.

- Set an unique "ACNSS" address on the outdoor unit control board (field set 2-13 - 002~031).
- Choose type 5.
- Initiate refrigerant containment check from ITM.
- When the function is activated manually, indoor units will stop about 15 minutes before the outdoor unit will start actual verification.
- When the function ends, the related indoor units stay for 2 hours in maintenance condition.

D: Schedule from ITM.

- Set an unique "ACNSS" address on the outdoor unit control board (field set 2-13 - 002~031).
- Choose type 5.
- Set a schedule in the ITM.
- When the function is activated, indoor units will stop about 15 minutes before the outdoor unit will start actual verification. When the function ends, the related indoor units stay for 2 hours in maintenance condition.

4.6 Check List for Start Up, Refrigerant Charge, Test Run and Normal Operation

Location information

Customer name	
Address	

Outdoor unit general info

Model name	Serial nr.	Fuse (A)	Megger to ground				Power supply voltage				ACNSS (2-13)
			L1	L2	L3	N	L1-L2	L1-L3	L2-L3	L1-N	

Indoor unit general info

Nr.	Model name	Serial nr.	Fuse (A)	Group nr.	ACNSS address	Nr.	Model name	Serial nr.	Fuse (A)	Group nr.	ACNSS address
1				-		2				-	
3				-		4				-	
5				-		6				-	
7				-		8				-	
9				-		10				-	
11				-		12				-	
13				-		14				-	
15				-		16				-	
17				-		18				-	
19				-		20				-	
21				-		22				-	
23				-		24				-	
25				-		26				-	
27				-		28				-	
29				-		30				-	
31				-		32				-	
33				-		34				-	
35				-		36				-	
37				-		38				-	
39				-		40				-	
41				-		42				-	
43				-		44				-	
45				-		46				-	
47				-		48				-	

Calculation additional refrigerant charge

Liquid pipe									
Ø	22.2	19.1	15.9	12.7	9.5	6.4			
Length (m)	.....	.....	.....	.....	.....	.....			
x Kg/m	0.370	0.260	0.180	0.120	0.059	0.022	A	B	Total
Kg for ø	.....	.....	.....	.....	.....	.....	.....	.....	...,... kg

Refrigerant charging method

Manual (break vacuum)		Manual (2-20)		Auto charge (BS2 ⌛ 5 sec)	
Start:	End:	Start:	End:	Start:	End:

Total refrigerant charge

Factory charge (kg)	
Outdoor 1	,
Outdoor 2	,
Outdoor 3	,
Additional	,
Total	,
Set 2-14	

Additional refrigerant charge (per 5 kg) field set outdoor 2-14 - 1~18

Test run

Set 2-88	0 / 1
Start:	End:

Outdoor unit operation data

Model name	Serial nr.	Fuse (A)	Current (A)				Power supply voltage			
			L1	L2	L3	N	L1-L2	L1-L3	L2-L3	L1-N

Indoor unit operation data

Nr.	Model name	Serial nr.	Current (A)	Air in (°C)	Air out (°C)	Nr.	Model name	Serial nr.	Current (A)	Air in (°C)	Air out (°C)
1						2					
3						4					
5						6					
7						8					
9						10					
11						12					
13						14					
15						16					
17						18					
19						20					
21						22					
23						24					
25						26					
27						28					
29						30					
31						32					
33						34					
35						36					
37						38					
39						40					
41						42					
43						44					
45						46					
47						48					

Part 6 Troubleshooting by Error Code

1. "E1" Faulty Outdoor Unit PC Board

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect according to communication conditions between the indoor unit and the outdoor unit in terms of hardware.

3 Conditions for Determining Malfunction

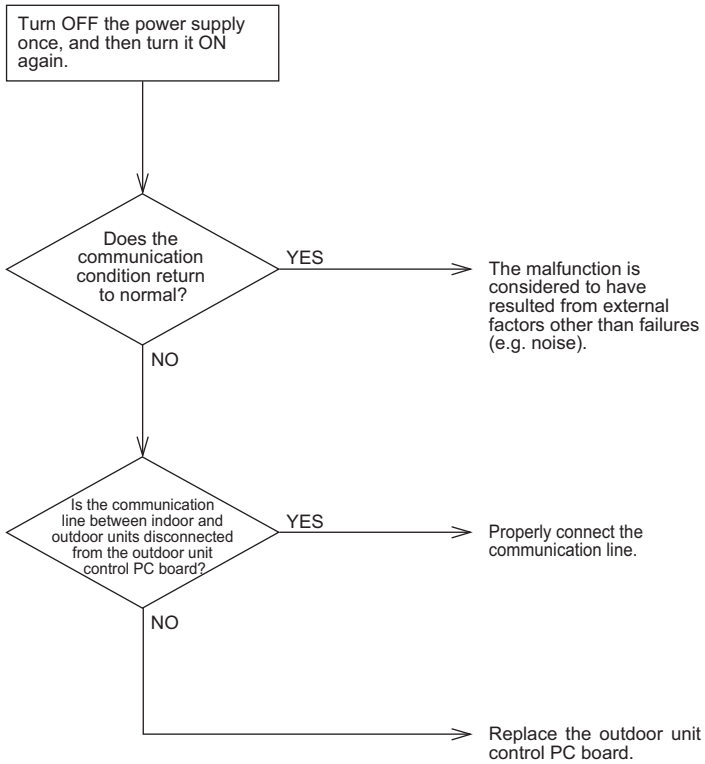
When communication conditions between the indoor unit and the outdoor unit in terms of hardware are not normal.

4 Supposed Causes

- Faulty control PC board (A1P)
- Faulty connection of communication line between indoor and outdoor units

5 Troubleshooting

Diagnosis	Counter-measures



2. "E2" Ground Leakage Detection

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect leakage current in the ground leakage detection circuit and detect malfunction on the control PC board.

3 Conditions for Determining Malfunction

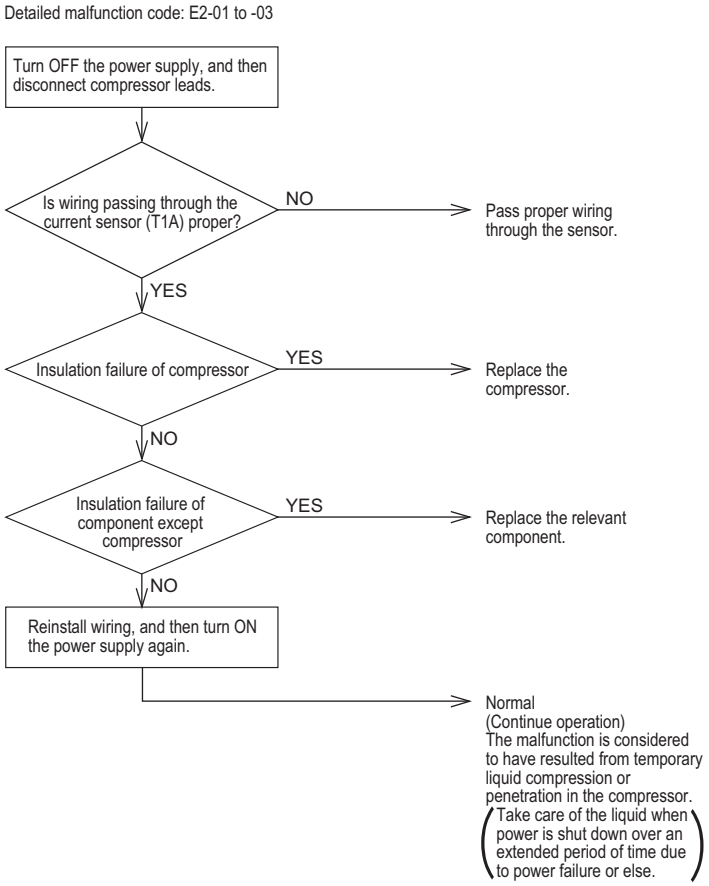
When leakage current is detected.

4 Supposed Causes

- Ground fault
- Improper wiring passing through the current sensor
- Temporary liquid compression or entrance in compressor

5 Troubleshooting

Diagnosis	Counter-measures



3. "E2" Missing of Ground Leakage Detection Core

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect malfunction according to whether or not there is continuity across the junction connector (X4A).

3 Conditions for Determining Malfunction

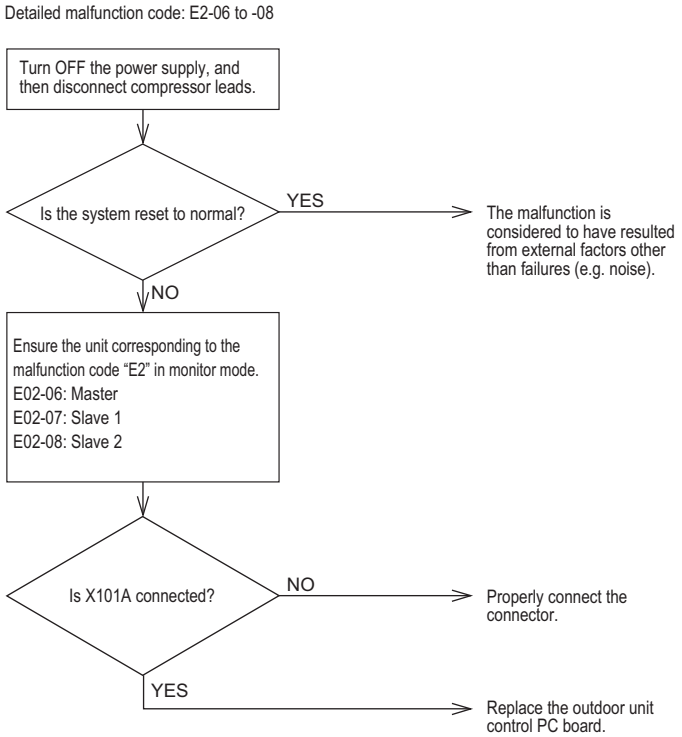
When no current flows at the time of turning ON the power supply.

4 Supposed Causes

- Disconnection of junction connector (X4A)
- Wiring disconnection
- Faulty outdoor unit PC board

5 Troubleshooting

Diagnosis	Counter-measures



4. "E3" Activation of High Pressure Switch

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect continuity across the high pressure switch in the protection device circuit.

3 Conditions for Determining Malfunction

When part of the protection device circuit opens.
(Reference) Operating pressure of the high pressure switch:

- Operating pressure: 4.0MPa
- Resetting pressure: 3.0MPa

4 Supposed Causes

- Activation of high pressure switch
- Faulty high pressure switch
- Faulty control PC board (A1P)
- Momentary power failure
- Faulty high pressure sensor

5 Troubleshooting

Diagnosis	Counter-measures

Check for the following three points:
①Is the stop valve open?
②Is the high pressure switch connector properly connected to the control PC board?
③Is there continuity across the high pressure switch?

Are the above three points OK? — NO → Remedy faulty points.

YES

(1)Mount a pressure gauge on the high pressure service port.
(2)Reset the operation using the remote controller, and then restart the operation.

Does the malfunction "E3" recur? — YES → Is the operating pressure of the high pressure switch normal (4.0MPa)? — NO → Replace the high pressure switch.

Does the malfunction "E3" recur? — NO

Is the operating pressure of the high pressure switch normal (4.0MPa)? — YES

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

YES

Service Checker
Connect the Service Checker, and then make a comparison between "high pressure" checked by the Service Checker and the measurement of the high pressure sensor (See ※1)

Is the "high pressure" checked by the Service Checker same as the measurement of the high pressure gauge? — NO → Replace the control PC board (A1P).

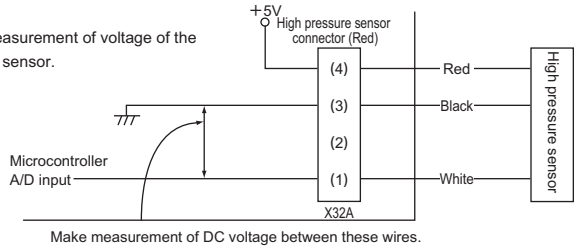
YES

-The high pressure sensor is normal, and pressure detection with the control PC board is also normal.
-The high pressure has really become high.

Check 1 With reference to information on '6 - 43. Check Abnormal Operation', eliminate factors that cause the high pressure to rise.

※1: Make a comparison between voltage measured by the pressure sensor and that read by the pressure gauge. (The pressure sensor makes measurement of voltage at its connector block to convert it to pressure according to information on '6 - 45. Pressure Sensor Characteristics'.)

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



Make measurement of DC voltage between these wires.

5. "E4" Activation of Low Pressure Switch

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Make judgment of pressure detected by the low pressure sensor with the control PC board.

3 Conditions for Determining Malfunction

When low pressure caused a drop while the compressor is in operation:

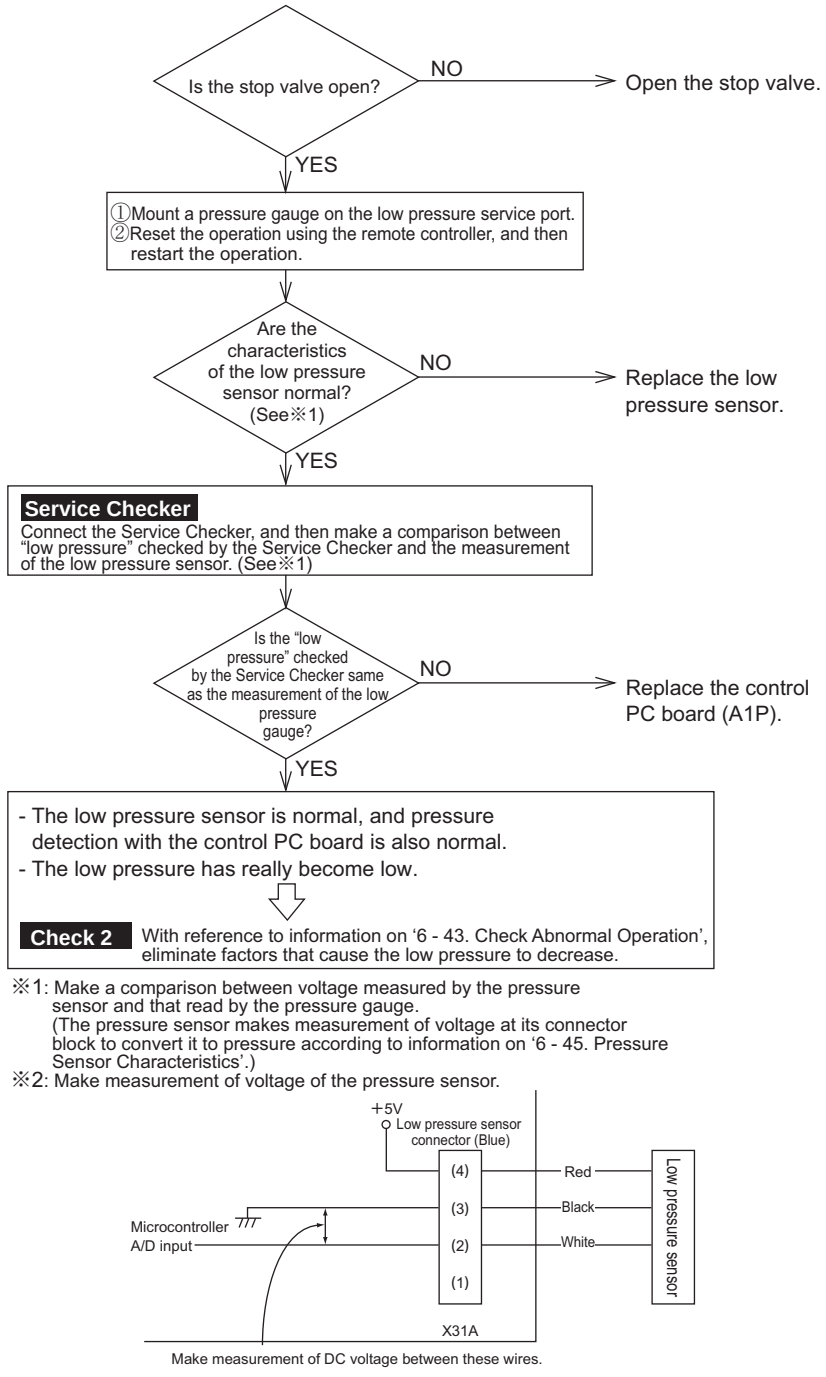
- Operating pressure: 0.07MPa

4 Supposed Causes

- Abnormally drop in low pressure
- Faulty low pressure sensor
- Faulty outdoor unit PC board
- Neglect to open the stop valve

5 Troubleshooting

Diagnosis	Counter-measures



※1: Make a comparison between voltage measured by the pressure sensor and that read by the pressure gauge.
(The pressure sensor makes measurement of voltage at its connector block to convert it to pressure according to information on '6 - 45. Pressure Sensor Characteristics'.)

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

6. "E5" Inverter Compressor Lock

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect malfunction according to abnormality in phase current waveforms observed in the circuit from the UVW line connected between the inverter and the compressor and the inverter PC board.

3 Conditions for Determining Malfunction

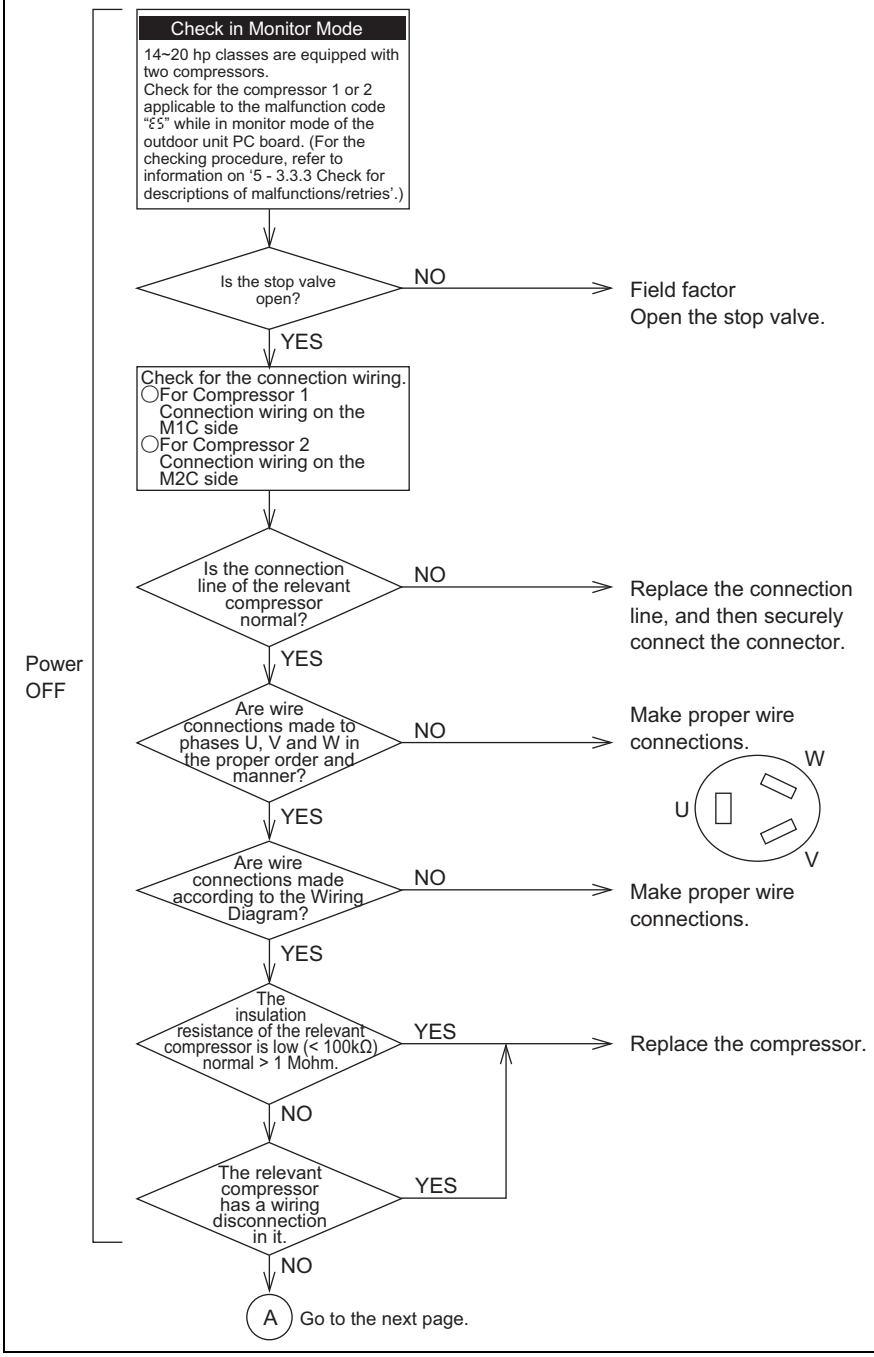
When the inverter compressor motor does not run even by starting it in forced startup mode.

4 Supposed Causes

- Inverter compressor lock
- High differential pressure (0.5MPa or more)
- UVW connection error
- Faulty inverter PC board
- Neglect to open stop valve

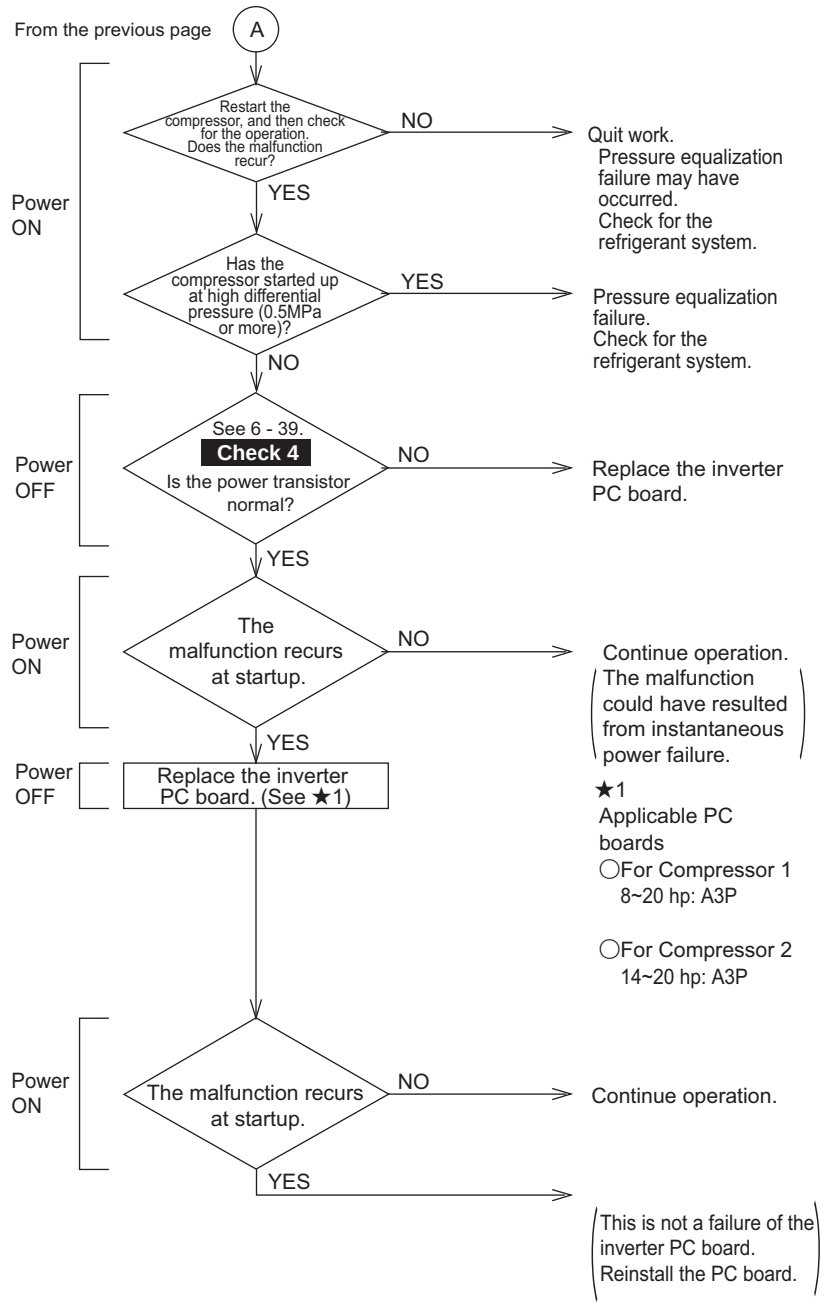
5 Troubleshooting

Diagnosis	Counter-measures



5 Troubleshooting

Diagnosis	Counter-measures



7. "E6" Compressor Damage Alarm

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Determine the symptom to be malfunction by detecting the revolutions of the compressor and pressure values detected by the high and low pressure sensors, and further making a comparison between a theoretical current value of the compressor calculated from parameters detected and an actual current value detected by the power transistor.

3 Conditions for Determining Malfunction

When a state in which the actual current value of the compressor is abnormally high (by 130% or more) compared to the theoretical current value continues for a period of 30 minutes.
※In case of a system with multi outdoor units, the system will return an alarm if there is any operational unit other than that applicable to "E6" or determine to be malfunction if not.

4 Supposed Causes

- Faulty compressor
- Malfunction of high pressure sensor
- Malfunction of low pressure sensor
- Faulty control PC board
- Faulty inverter PC board

5 Troubleshooting

Diagnosis	Counter-measures

①Mount a pressure gauge on the high and low pressure service ports.
②Reset the power supply, and then restart the operation.

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

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

Service Checker
Connect the Service Checker, and then make a comparison between "high pressure" and "low pressure" checked by the Service Checker and the measurements of the high and low pressure gauge. (See※1)

Are the "high pressure" and "low pressure" checked by the Service Checker same as the measurements of the high and low pressure sensors?
NO → Replace the control PC board (A1P).
YES

See 6 - 39. **Check 4** Is the power transistor normal?
NO → Replace the inverter PC board.(See ★1)
Applicable PC boards
○For Compressor 1
8~20 hp: A3P
○For Compressor 2
14~20 hp: A6P
YES

Replace the inverter compressor.

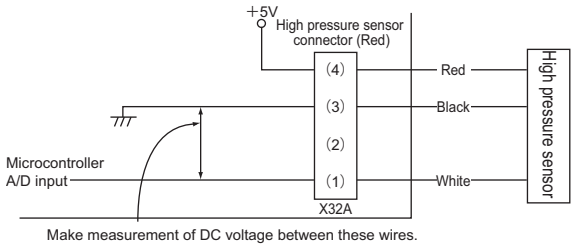
After replacing the inverter compressor, eliminate the causes of faulty compressor according to the results of '6 - 43. Check Abnormal Operation' - **Check 3** and **Check 5**.

5 Troubleshooting

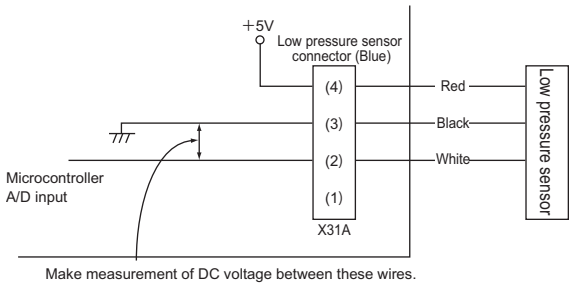
Diagnosis	Counter-measures

※1: Make a comparison between voltage measured by the pressure sensor and that read by the pressure gauge.
(The pressure sensor makes measurement of voltage at its connector block to convert it to pressure according to information on '6 - 45. Pressure Sensor Characteristics'.)
※2: Make measurement of voltage of the pressure sensor.

High pressure sensor:



Low pressure sensor:



8. "E7" Outdoor Unit Fan Motor lock

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

① Detect according to the value of current flowing through the inverter PC board (or fan inverter PC board in case of Fan Motor 2).
② Detect malfunction of the fan motor system according to the fan revolutions detected by the hall IC during the fan motor runs.

3 Conditions for Determining Malfunction

① When overcurrent is detected from the inverter PC board (A3P) or the fan inverter PC board (A4P) (Detecting overcurrent 4 times will shut down the system).
② When the fan revolutions fall below a given level for a period of 6 seconds while in fan motor rotation mode (Detecting shortage of revolutions will shut down the system).

4 Supposed Causes

- Fan motor failure
- Neglect to connect or faulty connection of harness/ connector between the fan motor and the PC board
- Fan does not rotate due to foreign matters caught in it
- Clearing condition: fan motor performs normal operation for a period of 5 minutes

5 Troubleshooting

Diagnosis	Counter-measures

Check in Monitor Mode
14~20 hp classes are equipped with two compressors.
Check for the compressor 1 or 2 applicable to the malfunction code "E7" while in monitor mode of the outdoor unit PC board. (For the checking procedure, refer to information on '5 - 3.3.3 Check for descriptions of malfunctions/retries'.)

↓

Turn OFF the power supply, and then wait for a period of 10 minutes.

↓

There are foreign matters around the applicable fan. — YES → Remove the foreign matters.

NO ↓

Check for Connection of Connector
Check for the connections of all fan motor connectors.
(See "※1: Wirings" shown below)

↓

Some connectors are disconnected. — YES → Insert the connector.

NO ↓

Check for Colors of Junction Connectors
Check for any wire connection errors in two units of fan motors.
○Fan motor 1: Power supply cables and signal cables are all white.
○Fan motor 2: Power supply cables and signal cables are red on the PC board side and white on the motor side.

↓

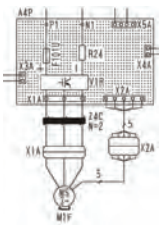
There is a junction relay connection error. — YES → Correct the connection of the junction connector.

NO ↓

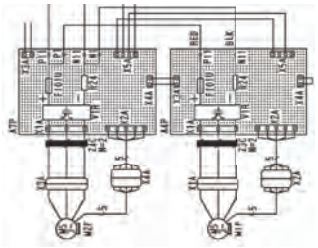
(A) Go to the next page.

※1. Wirings

8~12 hp (A4P)

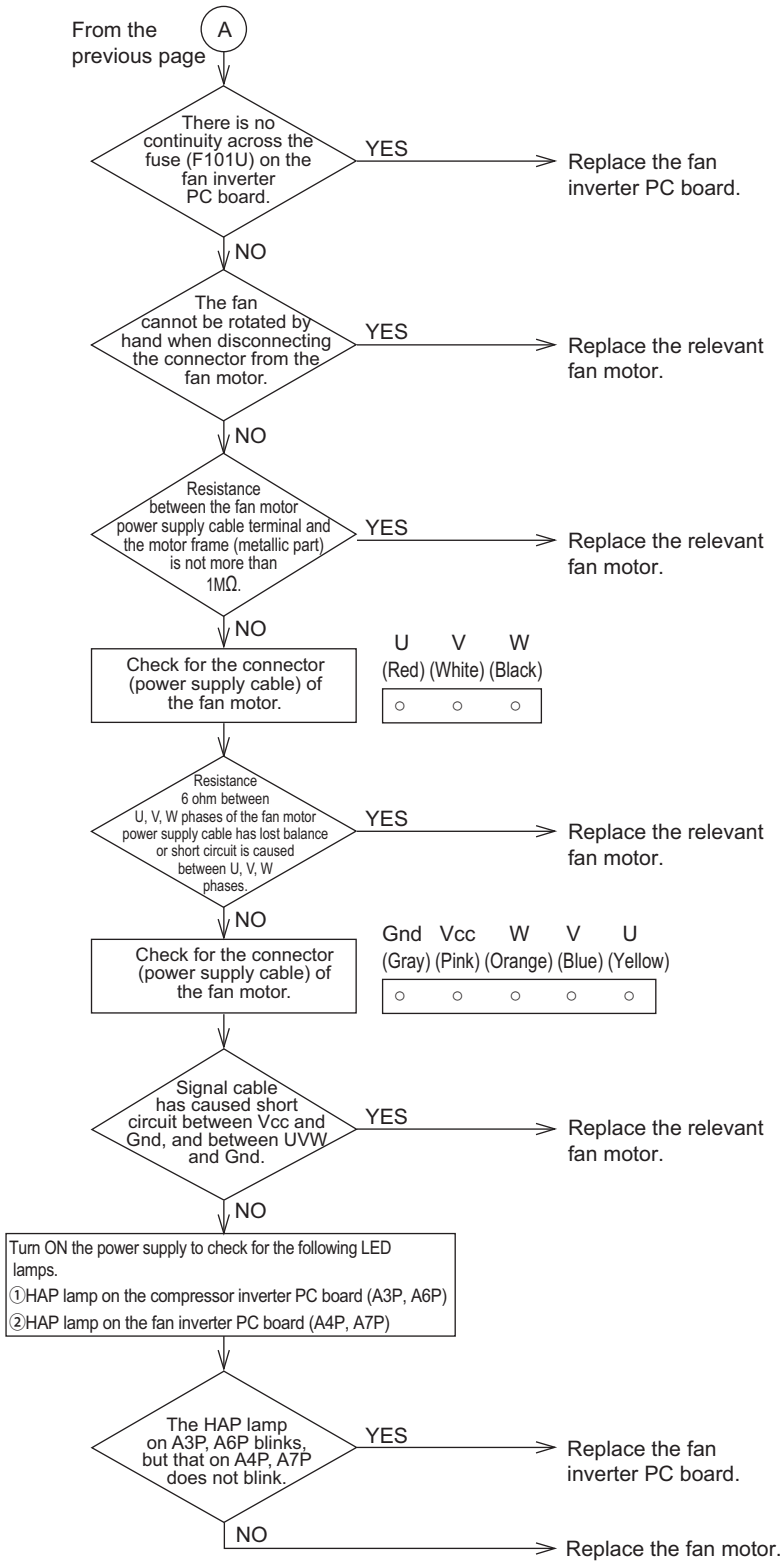


14~20 hp (A7P) (A4P)



5 Troubleshooting

Diagnosis	Counter-measures



9. "E9" Malfunction of Electronic Expansion Valve Coil

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect according to whether or not there is continuity across the electronic expansion valve coils (Y1E, Y2E).

3 Conditions for Determining Malfunction

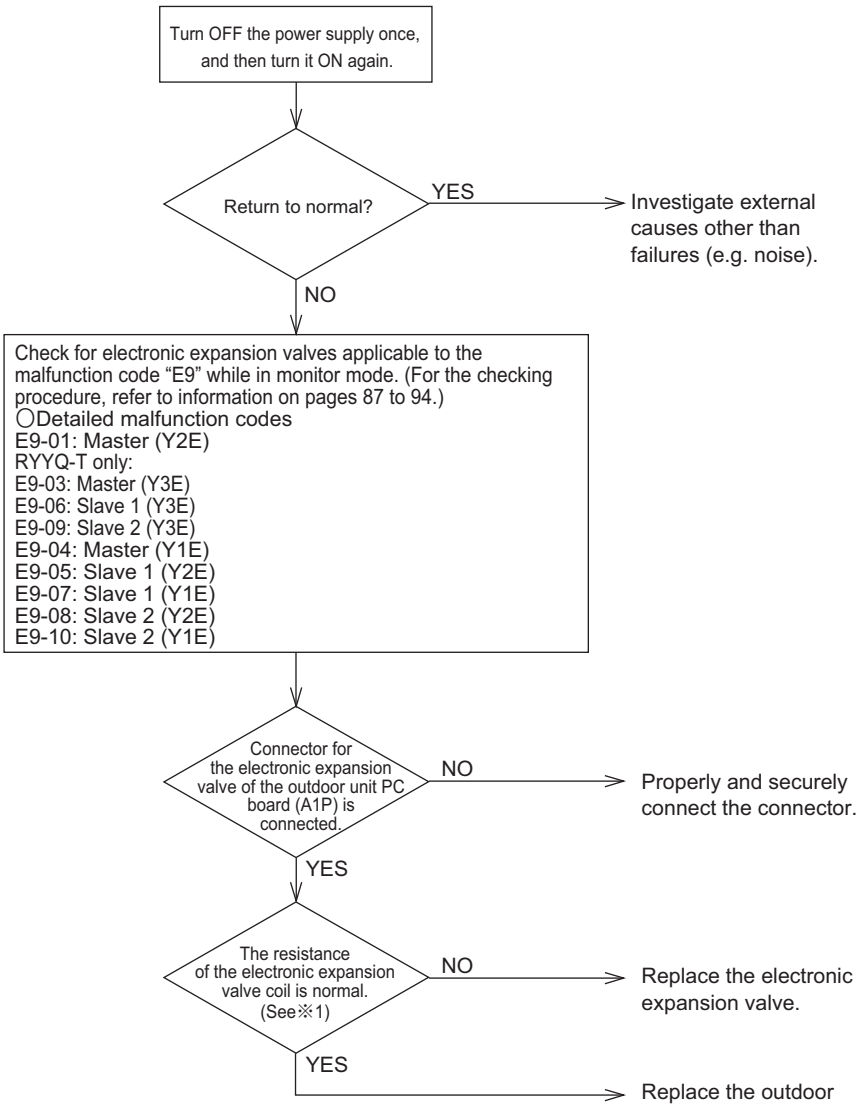
When no current flows through common (COM[+]) at the time of turning ON the power supply.

4 Supposed Causes

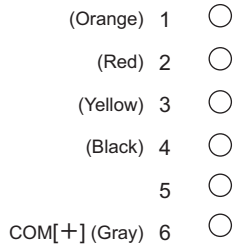
- Disconnection of connectors from electronic expansion valves (Y1E, Y2E)
- Faulty electronic expansion valve coil
- Faulty outdoor unit control PC board

5 Troubleshooting

Diagnosis	Counter-measures



※1: Make measurement of resistance between individual pins to ensure that it falls within the range of 40 to 50Ω.



Measurement Point	Acceptance Criteria
1−6	40〜50Ω
2−6	
3−6	
4−6	

10."F3" Abnormal Discharge Pipe Temperature

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect according to temperature detected with the discharge pipe or compressor surface temperature thermistor.

3 Conditions for Determining Malfunction

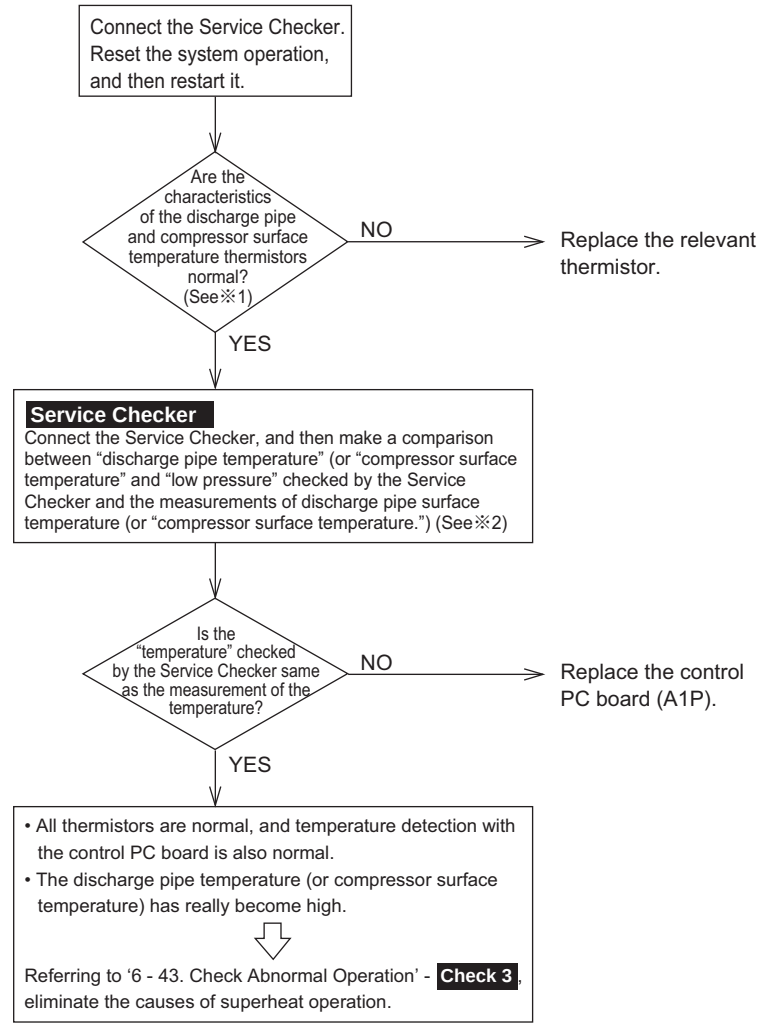
- When discharge pipe temperature becomes abnormally high (i.e., 135°C or more)
- When discharge pipe temperature sharply rises (remains at 120°C or more for a period of consecutive 10 minutes)
- When compressor surface temperature becomes abnormally high (i.e., 120°C or more)
- When compressor surface temperature sharply rises (remains at 110°C or more for a period of consecutive 10 minutes)

4 Supposed Causes

- Abnormal discharge pipe temperature
- Faulty discharge pipe thermistor
- Abnormal compressor surface temperature
- Faulty compressor surface temperature thermistor
- Faulty outdoor unit control PC board

5 Troubleshooting

Diagnosis | **Counter-measures**



※1:Thermistors and connector symbols

Malfunction Code	Applicable Thermistor	8 hp		10, 12 hp		14, 16 hp		18, 20 hp	
		Electrical symbol	Connector	Electrical symbol	Connector	Electrical symbol	Connector	Electrical symbol	Connector
J3	Discharge pipe (M1C) thermistor	R21T	X29A	R21T	X29A (Unified thermistor)	R21T	X29A (Unified thermistor)	R21T	X29A (Unified thermistor)
	Discharge pipe (M2C) thermistor	—	—	—		R22T		R22T	
	Compressor surface temperature thermistor	—	—	R8T		—		R8T	

Make measurement of temperature using a surface pyrometer.
For thermistor temperature and resistance characteristics, refer to information on '6 - 44. Thermistor Resistance / Temperature Characteristics'.

11."F4" Wet Alarm

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

In cooling operation, detect the condition under which liquid refrigerant returns to the compressor, according to the temperature and pressure of each part.

3 Conditions for Determining Malfunction

When the following wet state continues for a period of 30 minutes:

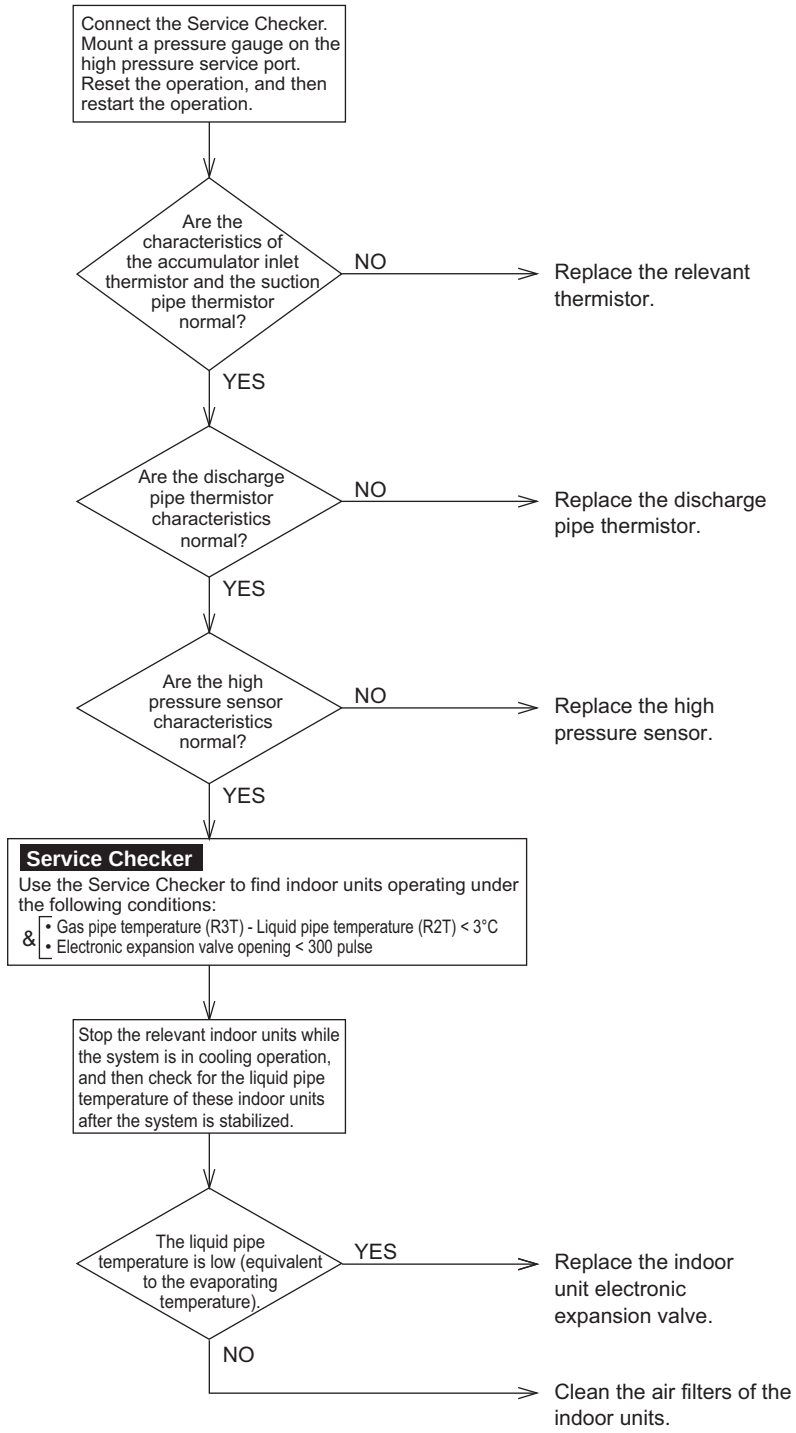
& [
- Wet state in outdoor units
- Wet state in some of indoor units
]

4 Supposed Causes

- Faulty suction pipe thermistor
- Faulty discharge pipe thermistor
- Faulty high pressure sensor
- Faulty indoor unit electronic expansion valve
- Dirty air filter

5 Troubleshooting

Diagnosis	Counter-measures



12."F6" Refrigerant Overcharged

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect overcharged refrigerant according to outdoor air temperature, heat exchanging deicer temperature, and liquid pipe temperature during check run.

3 Conditions for Determining Malfunction

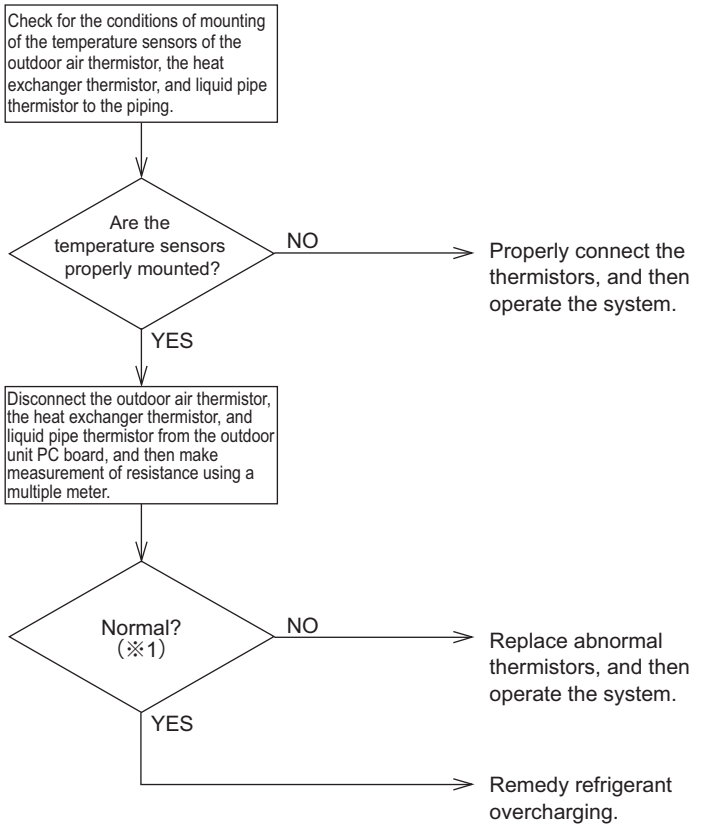
When the amount of refrigerant, which is calculated using outdoor air temperature, heat exchanging deicer temperature, and liquid pipe temperature during check run, exceeds the regular charge amount by 30% or more
(If refrigerant is charged slightly over the regular charge amount, "F6" may be displayed on the remote controller.)

4 Supposed Causes

- Refrigerant overcharged
- Disconnection of outdoor air thermistor
- Disconnection of heat exchanging deicer thermistor
- Disconnection of liquid pipe temperature thermistor

5 Troubleshooting

Diagnosis	Counter-measures



※1: For thermistor temperature and resistance characteristics, refer to information on '6 - 44. Thermistor Resistance / Temperature Characteristics'.

13."H3" Harness Malfunction (between Control PC Board and Inverter PC Board)

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Check for the transmission conditions of the following jumpers between the PC boards using microcontroller:

- 8~20 hp Inverter 1
  Between X28A (A1P) and X6A (A3P)
- 14~20 hp Inverter 2
  Between X62A (A3P) and X6A (A6P)

3 Conditions for Determining Malfunction

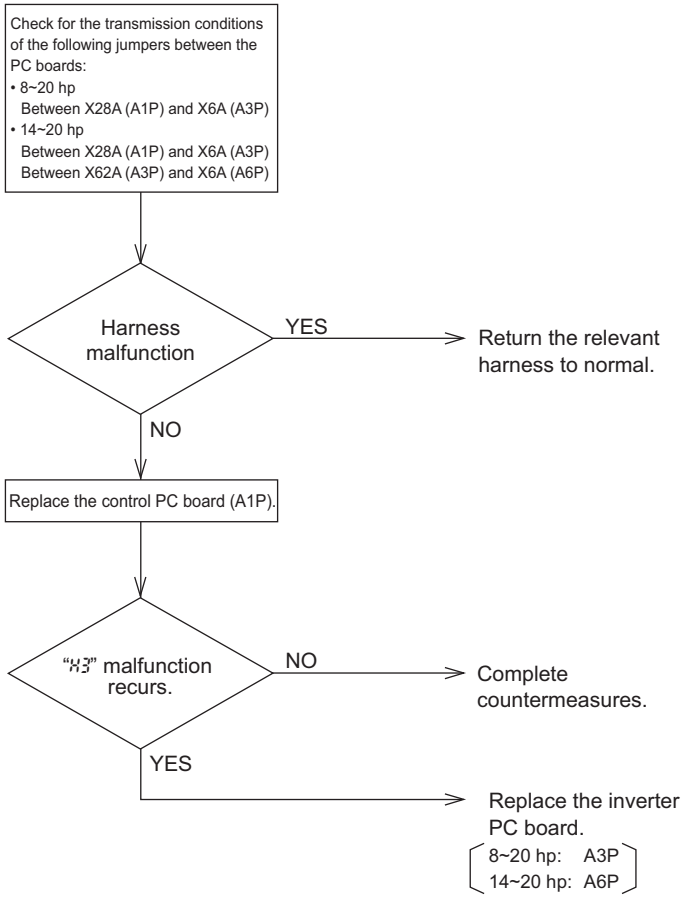
When normal transmission between PC boards is disabled during the compressor stops running.

4 Supposed Causes

- Faulty connection of jumpers between PC boards
- Faulty control PC board (A1P)
- Faulty inverter PC board

5 Troubleshooting

Diagnosis	Counter-measures



14."H7" Fan Motor Signal Detection Error

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect by an abnormal signal from the fan motor.

3 Conditions for Determining Malfunction

When an abnormal signal is detected at startup of the fan motor operation.

4 Supposed Causes

- Abnormal signal from fan motor (Circuit failure)
- Disconnection/Short circuit in fan motor leads or disconnection of connector
- Faulty inverter PC board (A3P, A6P)

5 Troubleshooting

Diagnosis

Check for fan motor applicable to the malfunction code "H7" while in monitor mode. (For the checking procedure, refer to information on pages 87 to 94.)
○Detailed malfunction codes
H7-01/05/09: Fan motor 1 (M1F) Master / Slave 1 / Slave 2
H7-02/06/10: Fan motor 2 (M2F) Master / Slave 1 / Slave 2

Turn OFF the power supply.

Is the connector of signal cable of the relevant fan motor normally connected?

NO → Properly connect the connector.

YES

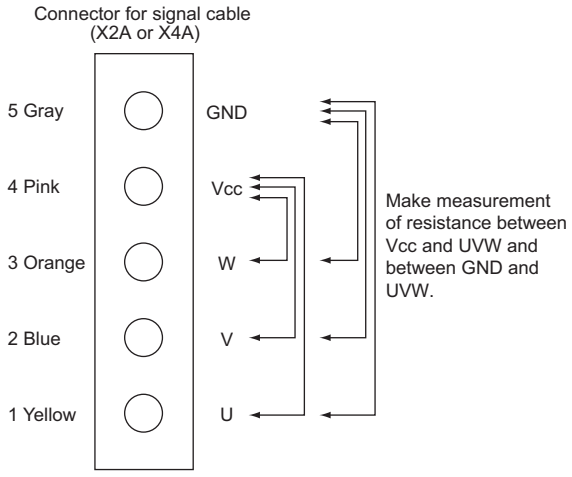
Check for the connector of the fan motor. (See※1)

Is resistance between Vcc and UVW and between GND and UVW of the fan motor lead in balance?

NO → Replace the fan motor.

YES → Replace the inverter PC board.
- For Fan motor 1, replace the inverter PC board A4P.
- For Fan motor 2, replace the fan inverter PC board A7P.

※1: Procedure for checking for the connector of the fan motor.
(1) Turn OFF the power supply.
(2) Disconnect the connector (X2A or X4A) from the PC board, and then make measurement of the following resistance. Acceptance criteria: Resistance between phases falls within the range of ±20%.



Counter-measures

15."H9" Faulty Outdoor Air Thermistor

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect according to temperature detected with the outdoor air thermistor.

3 Conditions for Determining Malfunction

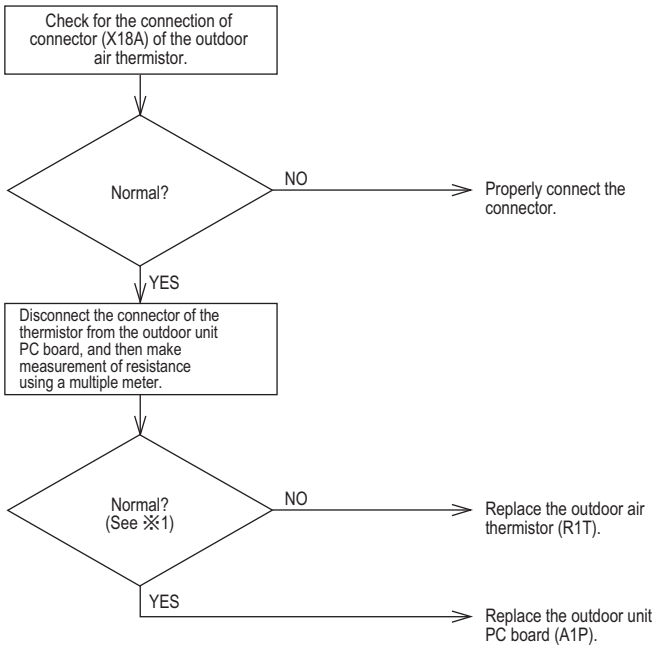
When the system is in operation and the thermistor causes wiring disconnection or short circuit in it.

4 Supposed Causes

- Faulty connection of outdoor air thermistor
- Faulty outdoor air thermistor
- Faulty outdoor unit PC board (A1P)

5 Troubleshooting

Diagnosis	Counter-measures



※1: For thermistor temperature and resistance characteristics, refer to information on '6 - 44. Thermistor Resistance / Temperature Characteristics'.

16."J3, J5, J6, J7, J8, J9" Faulty Outdoor Unit Thermistor

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect according to temperature detected with individual thermistors.

3 Conditions for Determining Malfunction

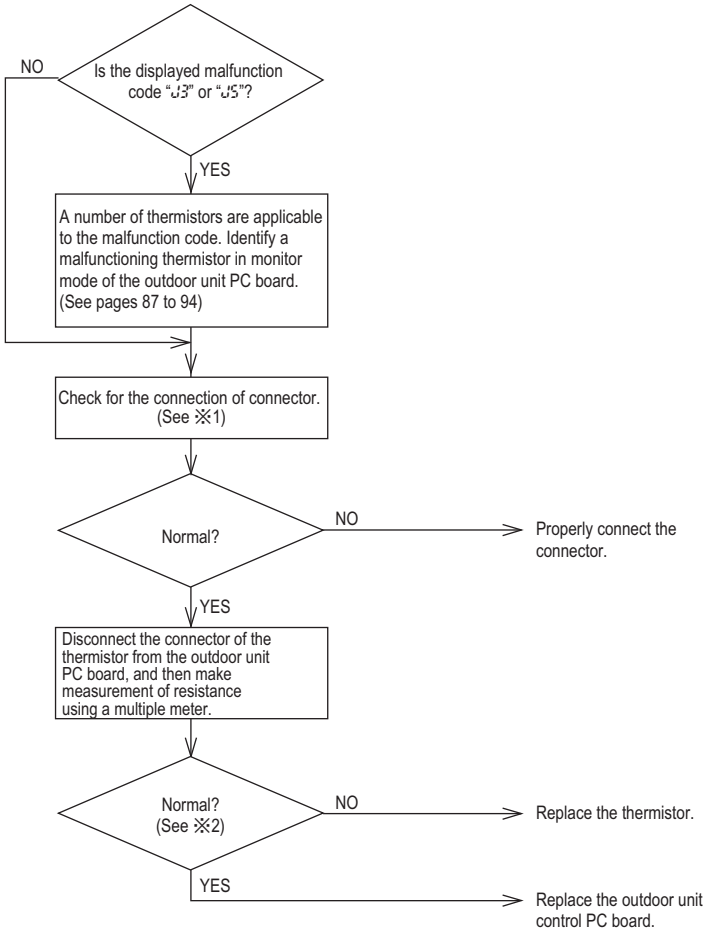
When the system is in operation and the thermistor causes wiring disconnection or short circuit in it.

4 Supposed Causes

- Faulty connection of thermistor
- Faulty thermistor
- Faulty outdoor unit PC board

5 Troubleshooting

Diagnosis	Counter-measures



※1: Malfunction codes, description of malfunction, electrical symbols

Malfunction Code	Applicable Thermistor	8 hp		10, 12 hp		14, 16 hp		18, 20 hp	
		Electrical symbol	Connector	Electrical symbol	Connector	Electrical symbol	Connector	Electrical symbol	Connector
J3	Discharge pipe	R21T	X29A	R21T	X29A (Unified thermistor)	R21T	X29A (Unified thermistor)	R21T	X29A (Unified thermistor)
	Discharge pipe (M2C) thermistor	—	—	—		R22T		R22T	
	Compressor surface temperature thermistor	—	—	R8T		—		R8T	
J5	Accumulator inlet thermistor	R3T	X30A (Unified thermistor)	R3T	X30A (Unified thermistor)	R3T	X30A (Unified thermistor)	R3T	X30A (Unified thermistor)
J6	Heat exchanging deicer thermistor	R7T		R7T		R7T		R7T	
J7	Subcool heat exchanger liquid pipe thermistor	R5T		R5T		R5T		R5T	
J8	Heat exchanger liquid pipe thermistor	R4T		R4T		R4T		R4T	
J9	Heat exchanger liquid pipe thermistor	R6T		R6T		R6T		R6T	

※2: For thermistor temperature and resistance characteristics, refer to information on '6 - 44. Thermistor Resistance / Temperature Characteristics'.

17."JA" Faulty High Pressure Sensor

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RYXQ-T

2 Method for Detecting Malfunction

Detect according to temperature detected with the high pressure sensor.

3 Conditions for Determining Malfunction

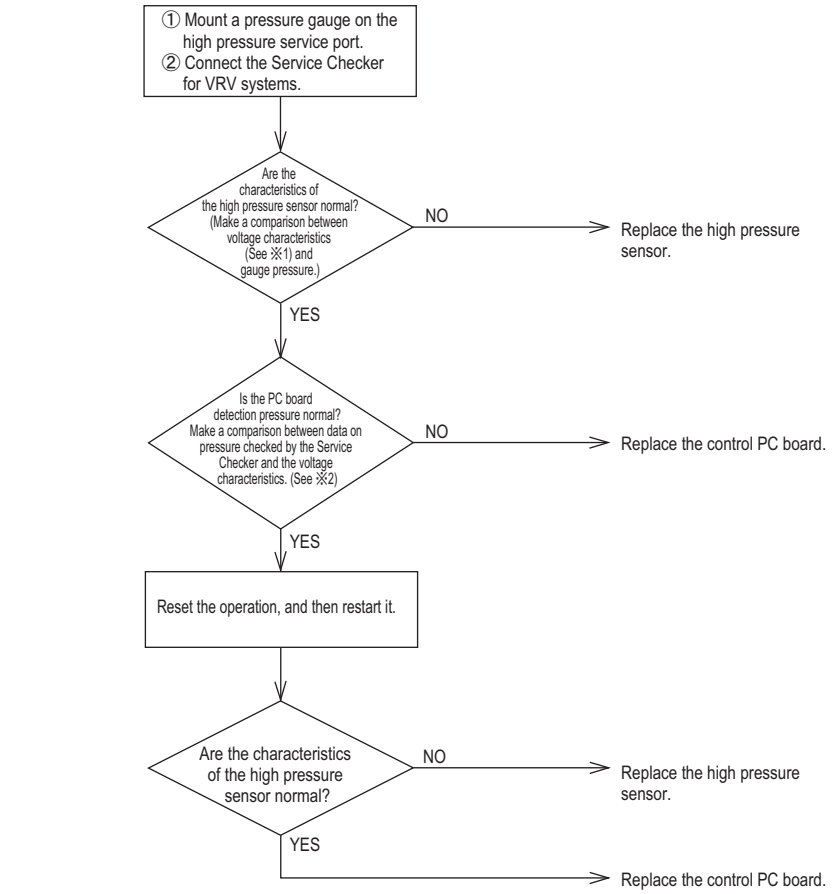
When the high pressure sensor causes wiring disconnection or open circuit (at pressure of not less than 4.22MPa or not more than 0.01MPa).

4 Supposed Causes

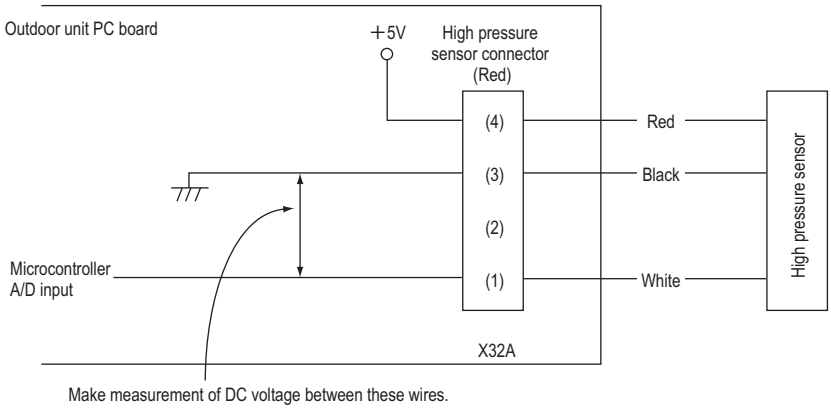
- Faulty high pressure sensor
- Connection of low pressure sensor in mistake for high pressure sensor
- Faulty outdoor unit PC board
- Faulty connection of high pressure sensor

5 Troubleshooting

Diagnosis	Counter-measures



※1 Make measurement of voltage of the pressure sensor.



※2 See "Pressure sensor: Pressure vs. Voltage Characteristics Table" on '6 - 45. Pressure Sensor Characteristics'.

18."JC" Faulty Low Pressure Sensor

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect according to temperature detected with the low pressure sensor.

3 Conditions for Determining Malfunction

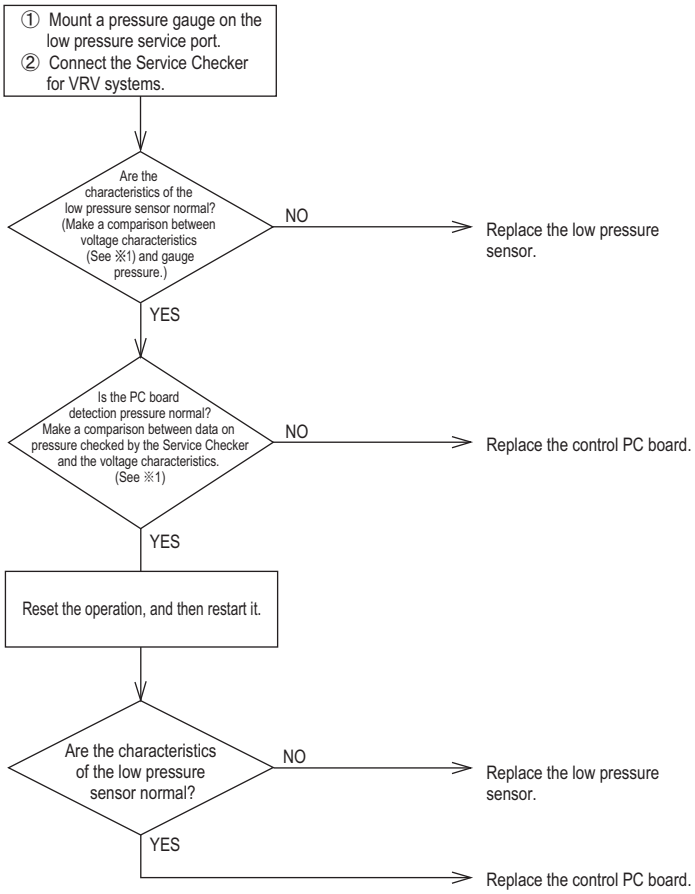
When the low pressure sensor causes wiring disconnection or open circuit (at pressure of not less than 1.77MPa or not more than 0.01MPa).

4 Supposed Causes

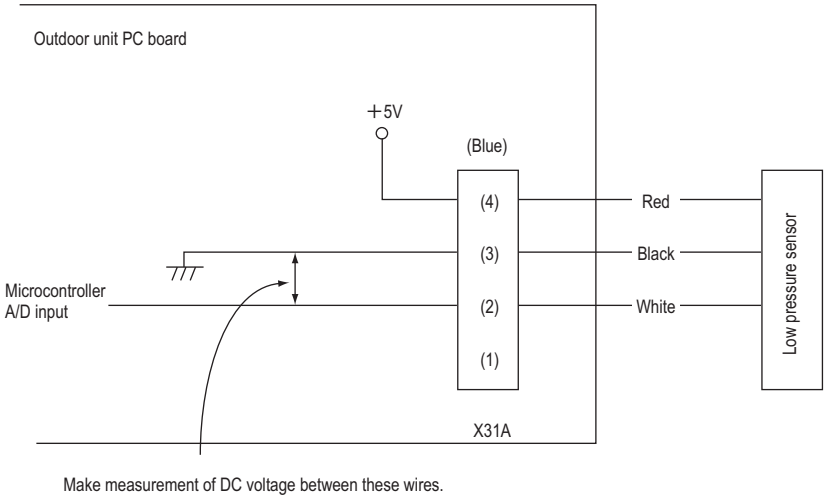
- Faulty low pressure sensor
- Connection of high pressure sensor in mistake for low pressure sensor
- Faulty outdoor unit PC board
- Faulty connection of low pressure sensor

5 Troubleshooting

Diagnosis	Counter-measures



※1 Make measurement of voltage of the pressure sensor.



※2 See "Pressure sensor: Pressure vs. Voltage Characteristics Table" on '6 - 45. Pressure Sensor Characteristics'.

19."L1" Faulty Inverter PC Board

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

- Detect according to current value detected during the output of waveform before compressor startup
- Detect according to current value detected with the current sensor during sync operation for startup

3 Conditions for Determining Malfunction

- When overcurrent (OCP) flows during the output of waveform
- When the current sensor malfunctions during sync operation
- When IPM error occurs

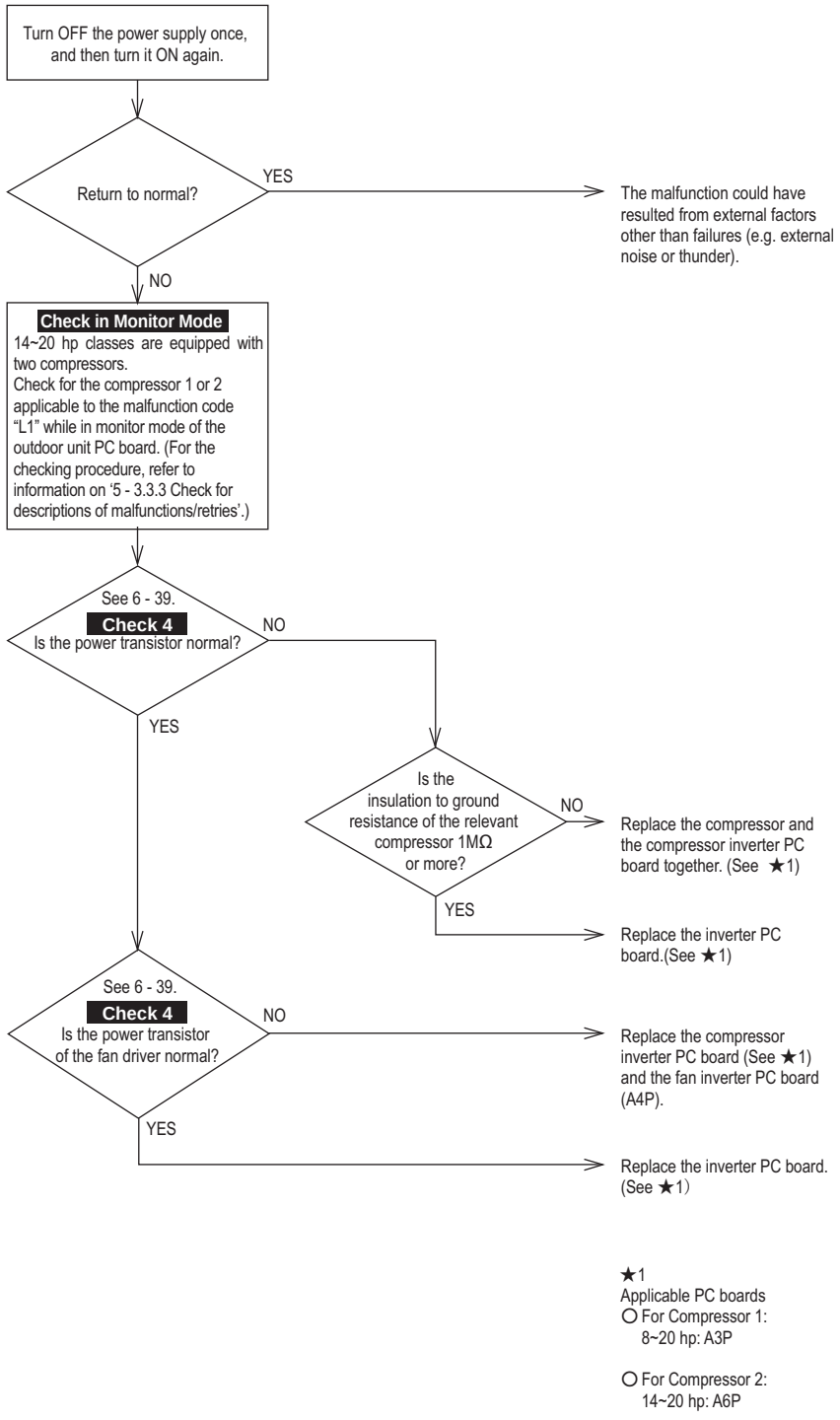
4 Supposed Causes

- Inverter PC board (A3P):
  - IPM failure
  - Current sensor failure
  - Drive circuit failure

5 Troubleshooting

Diagnosis

Counter-measures



20."L4" Radiator Fin Temperature Rise

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect temperature of power module of the compressor inverter PC board.

3 Conditions for Determining Malfunction

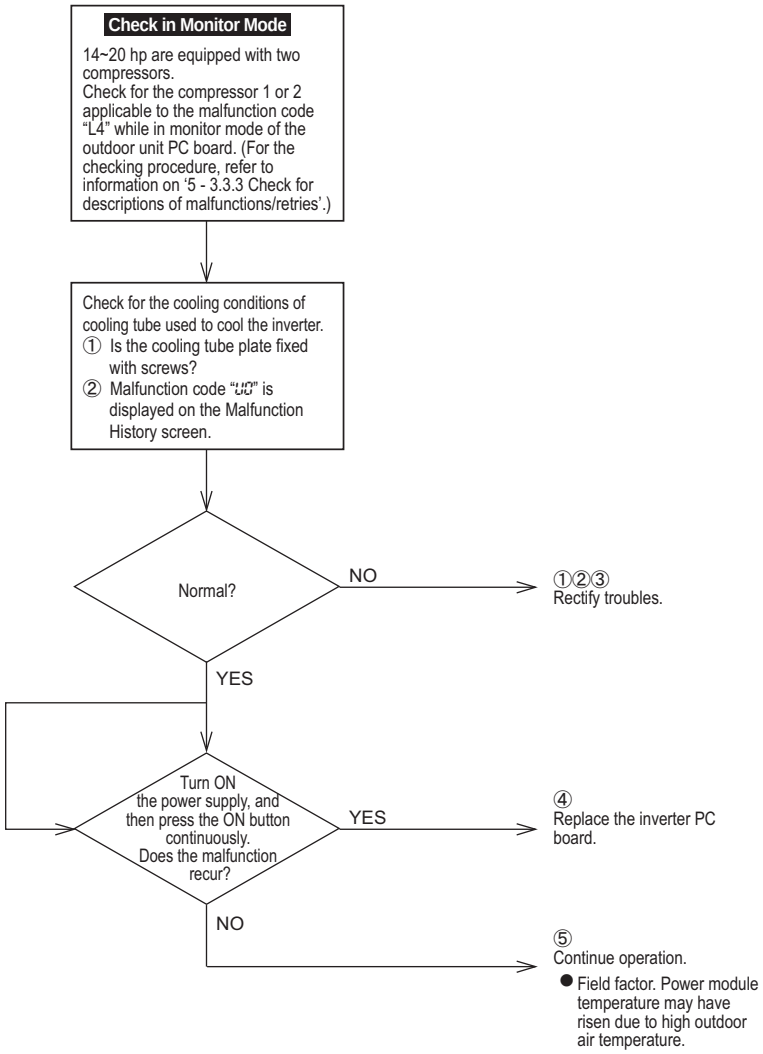
① Thermistor located inside the power module of the inverter board for compressor and fan motor.
② Cooling tube plate poor heat-exchange.

4 Supposed Causes

① Cooling tube plate not fixed with screws.
② "U0" malfunction.
③ Faulty inverter PC board.
④ High outdoor air temperature.

5 Troubleshooting

Diagnosis	Counter-measures



21. "L5" Inverter Compressor Instantaneous Overcurrent

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect current flowing through the power transistor.

3 Conditions for Determining Malfunction

When instantaneously overcurrent flows through the power transistor:

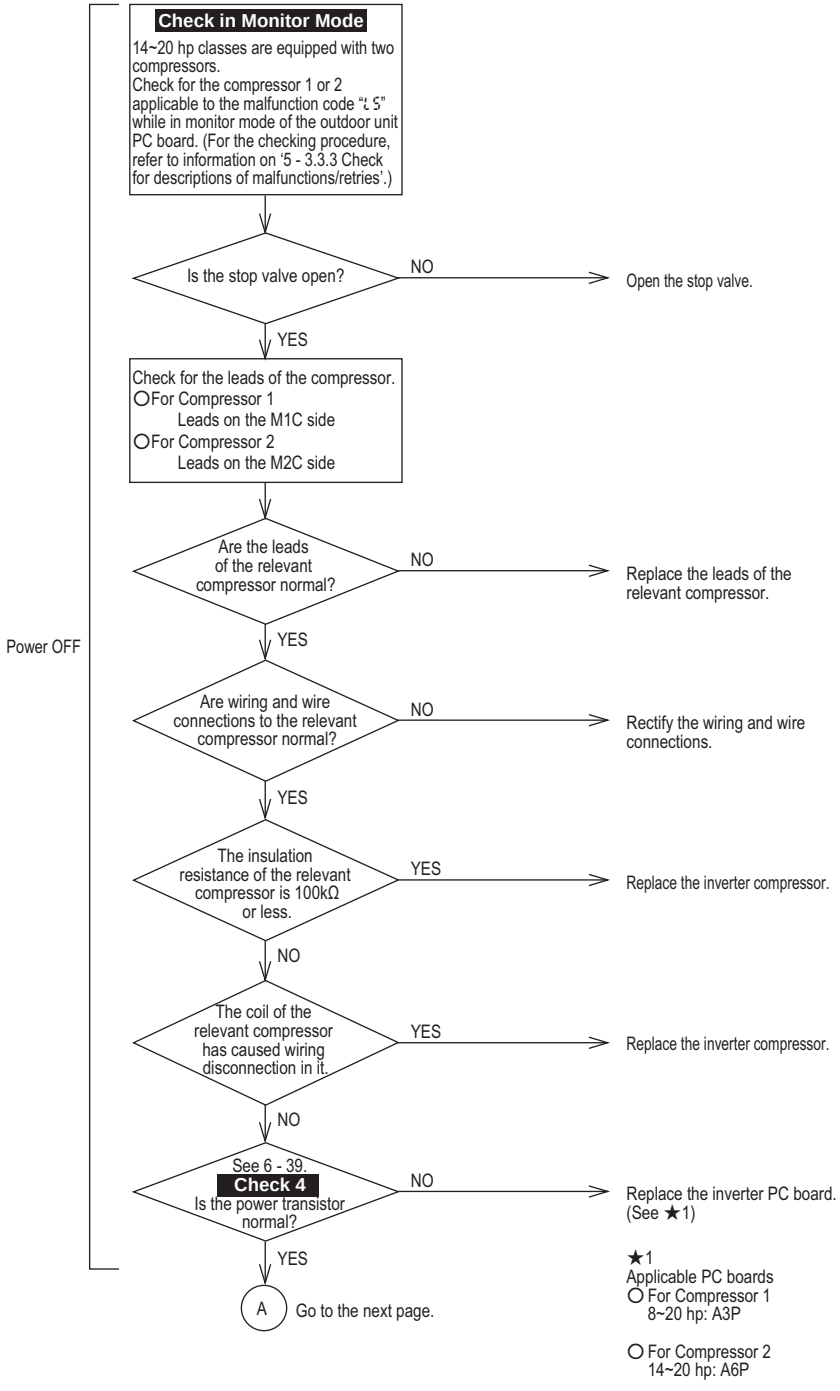
- Compressor type JT1GCVDKYR trigger point = 32 Amp
- Compressor type JT15J-VDKYR trigger point = 51.2 Amp

4 Supposed Causes

- Faulty compressor coil (such as wiring disconnection or insulation failure)
- Compressor startup failure (mechanical lock)
- Faulty inverter PC board

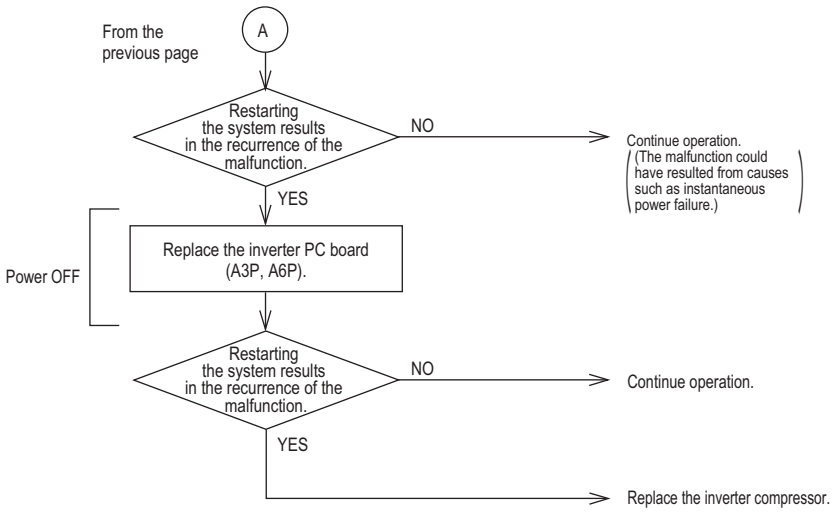
5 Troubleshooting

Diagnosis | **Counter-measures**



5 Troubleshooting

Diagnosis	Counter-measures



22."L8" Inverter Compressor Overcurrent

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect current flowing through the power transistor.

3 Conditions for Determining Malfunction

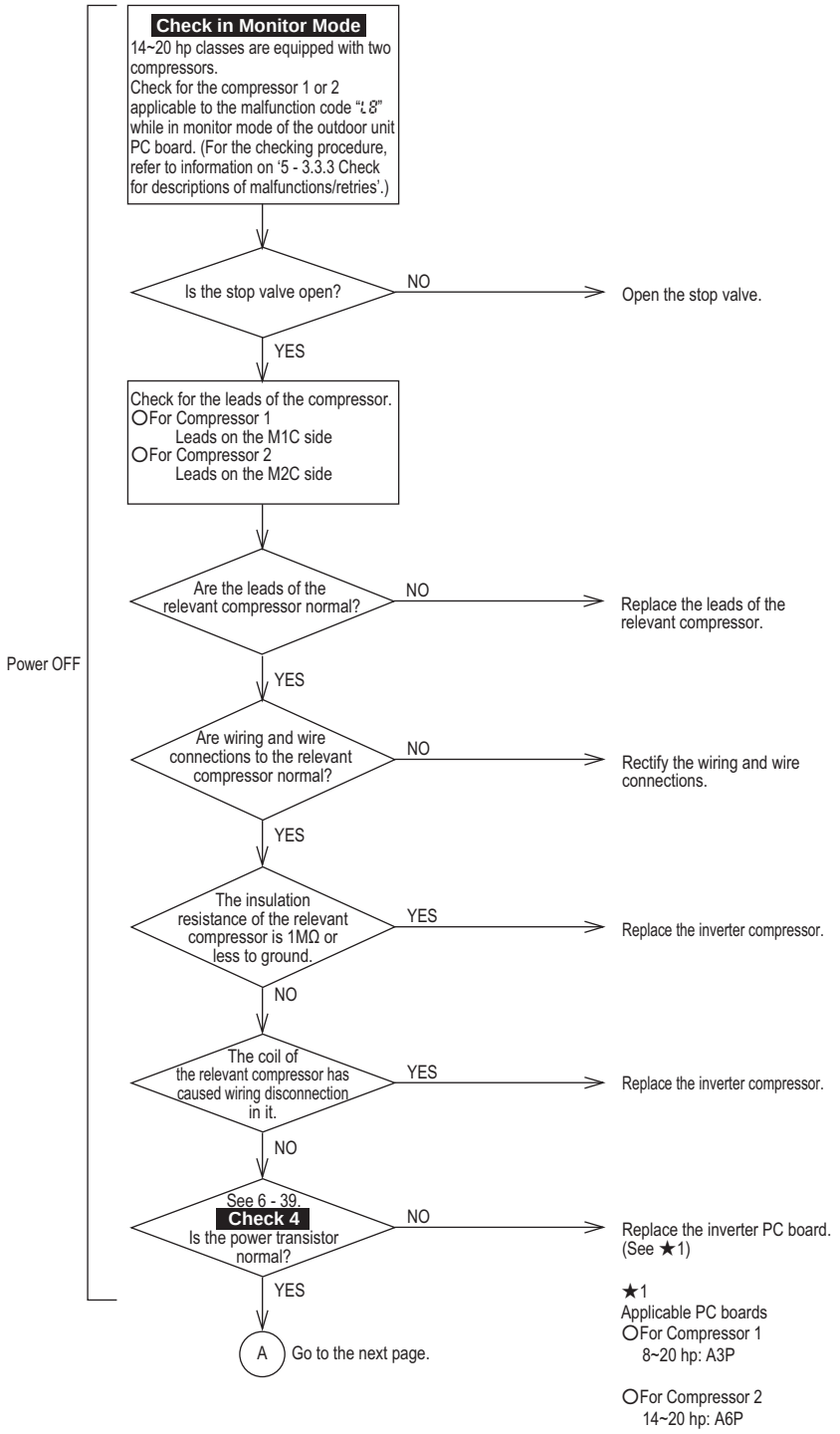
When the secondary-side inverter current exceeds:
(1) for a period of consecutive 5 seconds:
compressor type JT1GCVDKYR trigger point = 19 Ampere
compressor type JT15J-VDKYR trigger point = 25 Ampere.
(2) for a period of consecutive 260 seconds:
compressor type JT1GCVDKYR trigger point = 16 Ampere
compressor type JT15J-VDKYR trigger point = 22.5 Ampere.

4 Supposed Causes

- Compressor overloaded
- Wiring disconnection in compressor coil
- Disconnection of compressor wiring
- Faulty inverter PC board

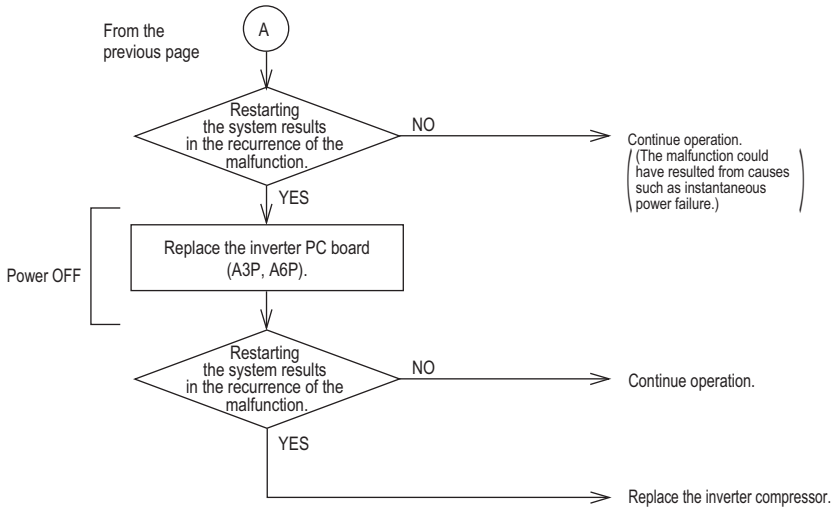
5 Troubleshooting

Diagnosis | **Counter-measures**



5 Troubleshooting

Diagnosis	Counter-measures



23."L9" Inverter Compressor Startup Failure

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect malfunction according to the signal waveform of compressor.

3 Conditions for Determining Malfunction

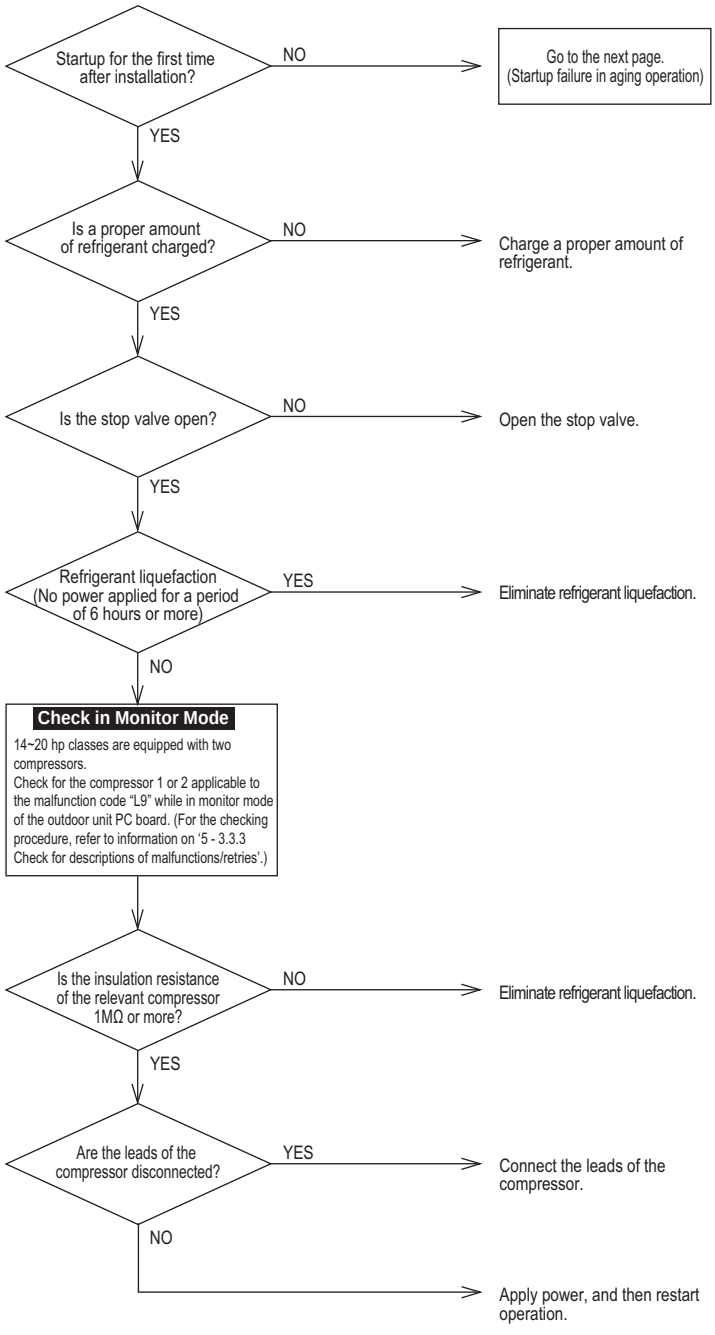
When compressor startup operation has not been completed.

4 Supposed Causes

- Neglect to open the stop valve
- Faulty compressor
- Error in wire connections to compressor
- Large differential pressure before compressor startup
- Faulty inverter PC board

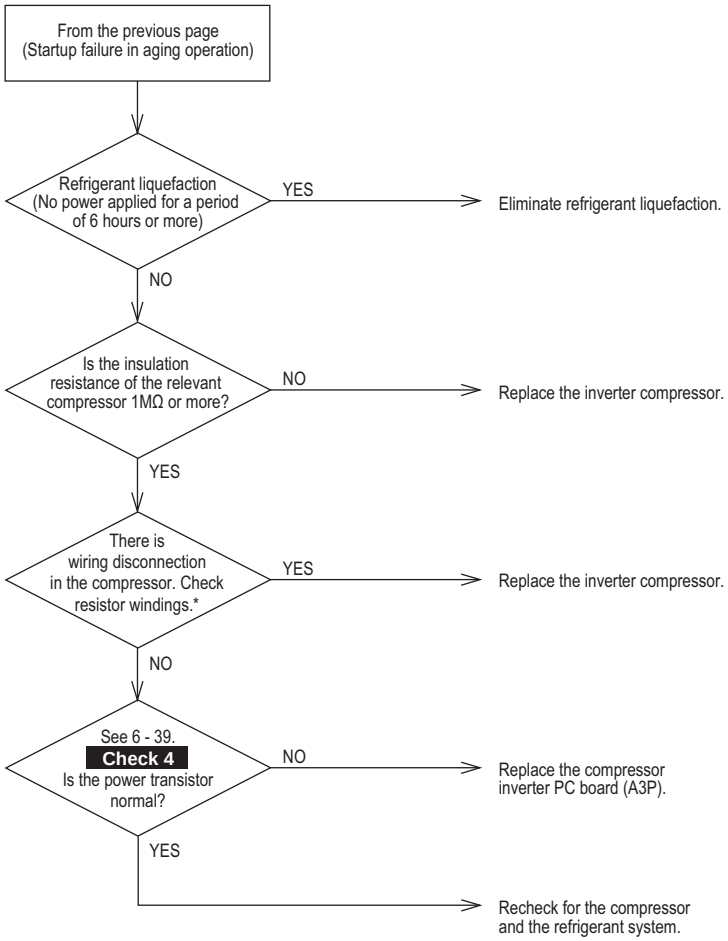
5 Troubleshooting

Diagnosis | **Counter-measures**



5 Troubleshooting

Diagnosis	Counter-measures



* compressor type JT1GCVDKYR: approx. 0.90 ohm
* compressor type JT15J-VDKYR: approx. 0.47 ohm

24."LC" Transmission Error (Between Inverter PC Board and Control PC Board)

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Check for the transmission conditions between the inverter PC board and the control PC board using a microcontroller.

3 Conditions for Determining Malfunction

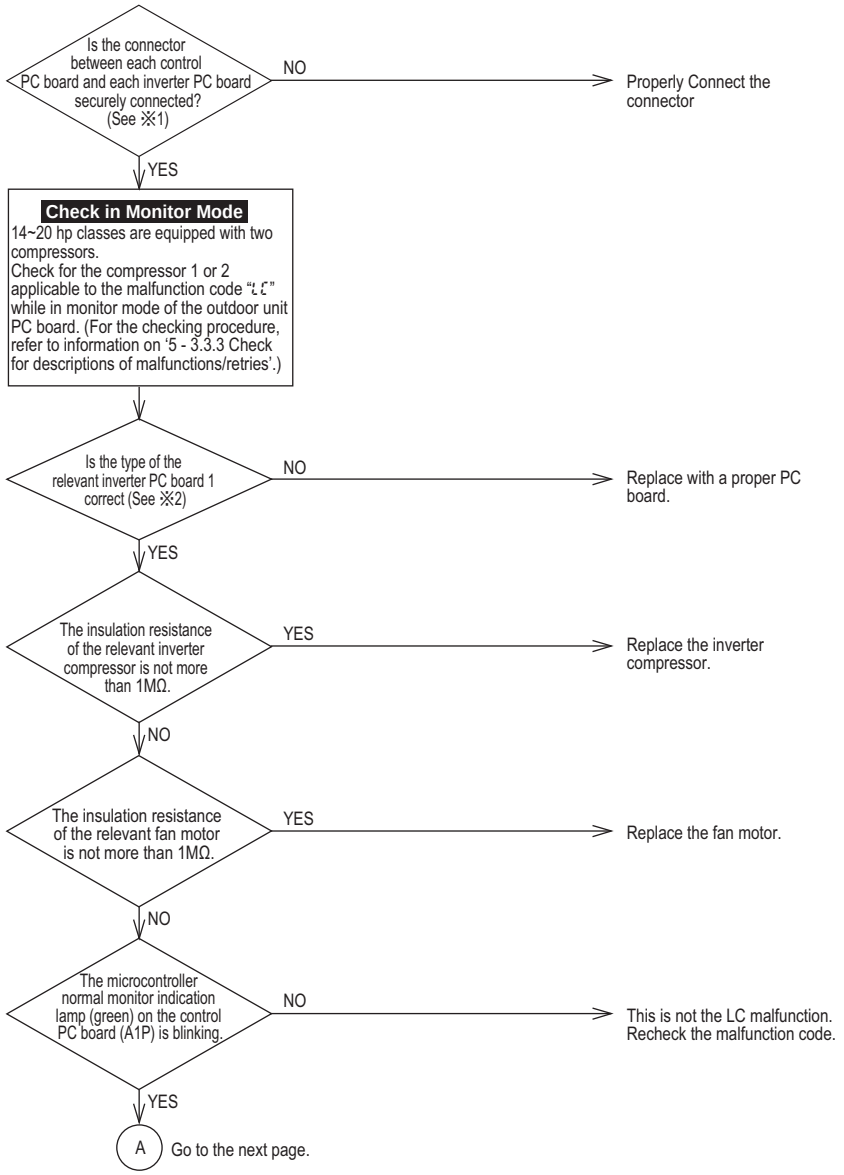
When normal transmission is disabled for a given period of time or more.

4 Supposed Causes

- Faulty connection between the inverter PC board and the control PC board
- Faulty control PC board (transmission block)
- Faulty noise filter
- External factors (e.g. noise)
- Faulty inverter compressor
- Faulty fan motor

5 Troubleshooting

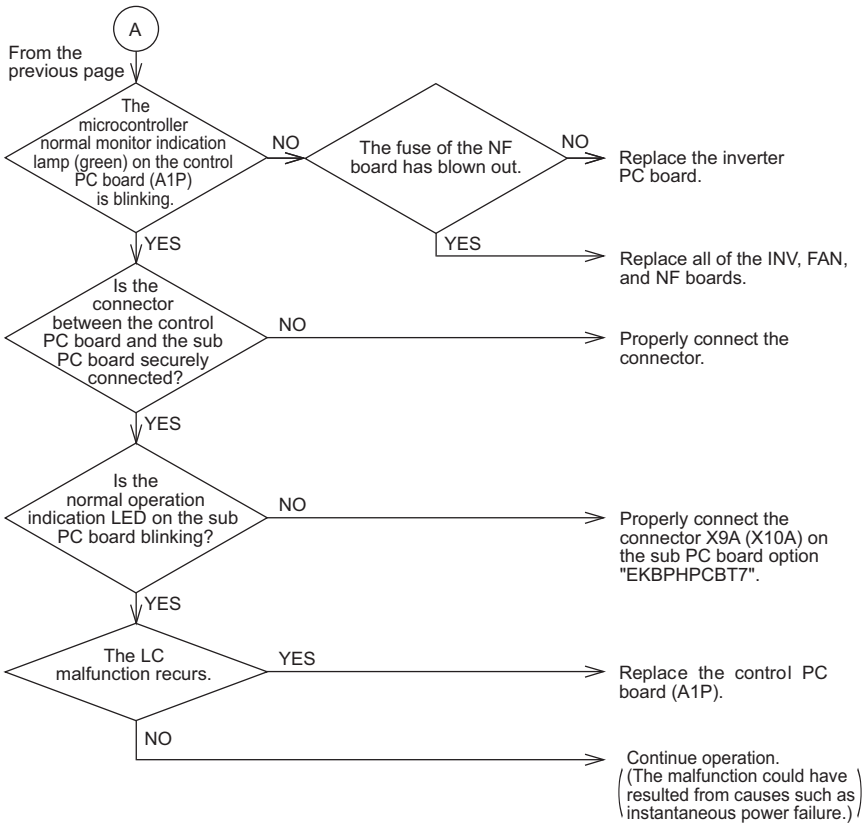
Diagnosis	Counter-measures



5 Troubleshooting

Diagnosis

Counter-measures



∗1. Connect and disconnect the connector once to ensure that it is securely connected.

∗2. List of types of inverter PC board:

Motor symbol	RYYQ / RYMQ / RXYQ …. T7Y1B						
	8	10	12	14	16	18	20
M1C	PC1129-1	PC1116-1		PC1130-1			
M2C				PC1131-1		PC1116-3	
M1F	PC1210-1						
M2F				PC1210-2			

25."P1" Power Supply Voltage Imbalance

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect voltage imbalance through PC board.

3 Conditions for Determining Malfunction

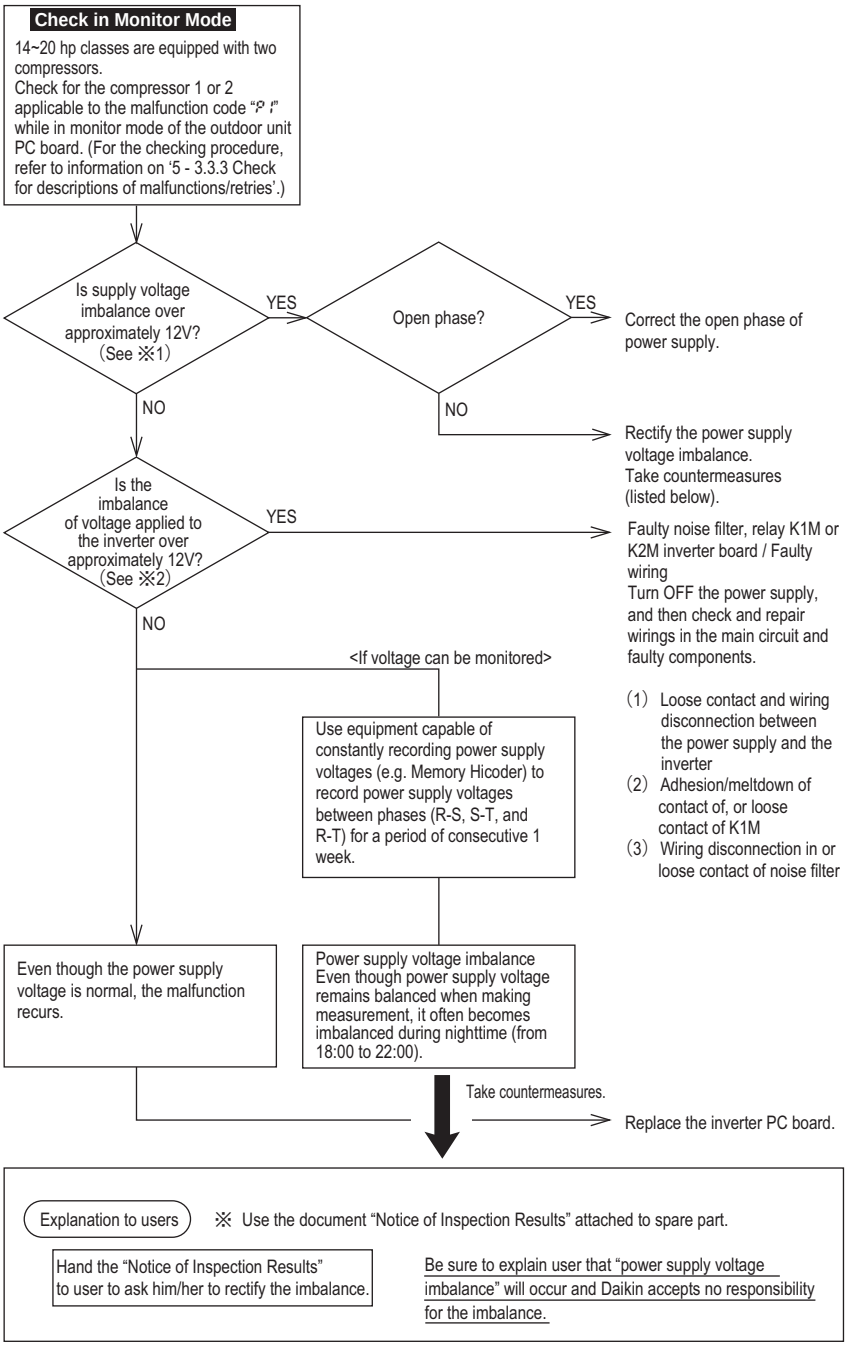
When power supply voltage imbalance exceeds approximately 12V.

4 Supposed Causes

- Open phase
- Interphase voltage imbalance
- Faulty capacitor in the main circuit
- Faulty inverter PC board
- Faulty K1M, K2M (inverter board)
- Faulty wiring in the main circuit

5 Troubleshooting

Diagnosis | **Counter-measures**



※1. Make measurement of voltage at the power supply terminal block (X1M).
※2. Make measurement of voltage at the L1, L2 and L3 terminals of diode module located on the inverter PC board during the compressor is in operation.

26."P4" Faulty Radiator Fin Thermistor

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect the resistance of the following thermistors during the compressor stops running:
① Radiator fin thermistor.
② Thermistor located in PC board circuit.
③ Heatsink thermistor.

3 Conditions for Determining Malfunction

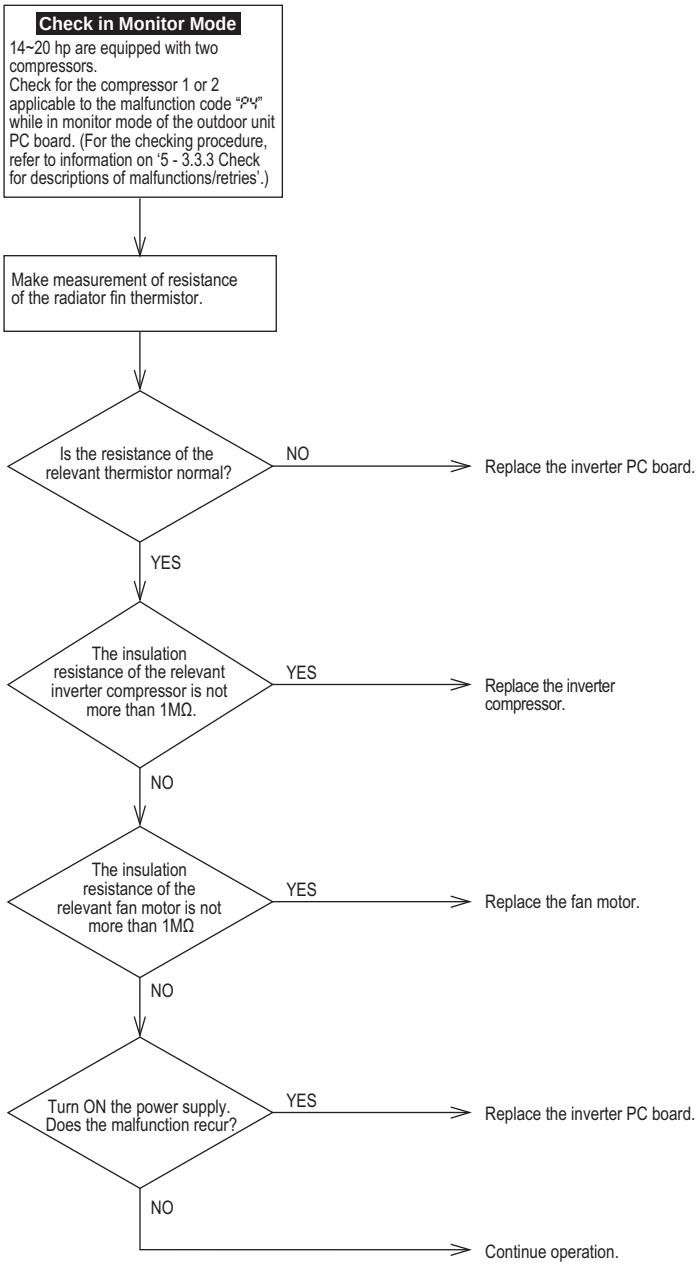
When the resistance of the thermistor comes to a value equivalent to open or short circuit.
* Unit can continue to operate. On the remote controller(s) a caution appears:
  - for BRC1D528: the "inspection icon" blinks,
  - for BRC1E51,52A/B7: at the bottom appears "Error: Push Menu button".
    P4 error will appear when press:
    - inspection button if BRC1D528,
    - Menu button (middle) if BRC1E51/52.

4 Supposed Causes

- Faulty thermistor power module inverter board
- Faulty inverter PC board
- Faulty inverter compressor
- Faulty fan motor

5 Troubleshooting

Diagnosis	Counter-measures



27."PJ" Improper Combination of Inverter and Fan Driver

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect according to communication with the inverter.

3 Conditions for Determining Malfunction

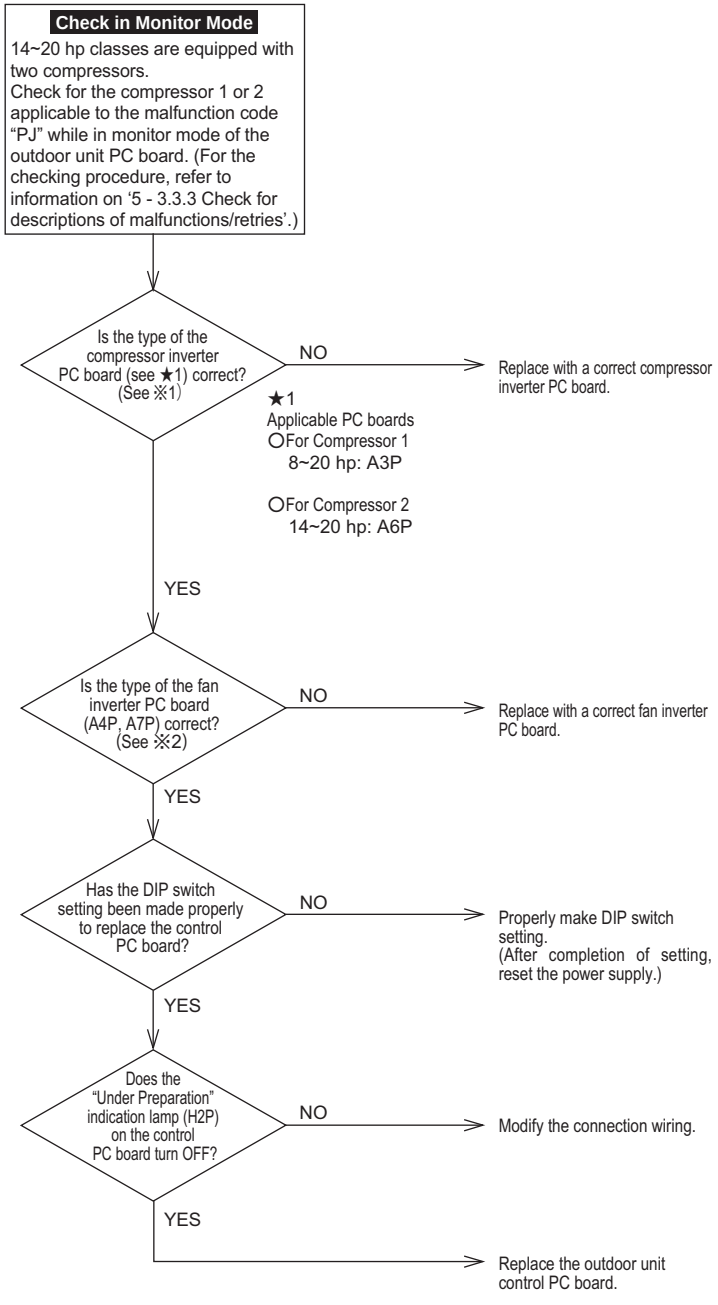
When the type of the inverter PC board is determined to be correct according to communication data.

4 Supposed Causes

- Mismatch of the type of PC board
- Field setting error

5 Troubleshooting

Diagnosis	Counter-measures



5 Troubleshooting

Diagnosis	Counter-measures

*1: Types of compressor inverter PC boards
Compressor inverter PC board 1

Type	Applicable Size
PC1129-1	8 hp
PC1116-1	10 & 12 hp
PC1130-1	14 ~ 20 hp

Compressor inverter PC board 2

Type	Applicable Size
PC1131-1	14 & 16 hp
PC1116-3	18 & 20 hp

*2: Types of fan inverter PC boards
Fan inverter PC board 1

Type	Applicable Size
PC1210-1	8 ~ 20 hp

Fan inverter PC board 2

Type	Applicable Size
PC1201-2	14 ~ 20 hp

28."UO" Gas Shortage Alarm

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect gas shortage according to a low pressure level or a difference in heat exchanging temperature from the suction pipe.

3 Conditions for Determining Malfunction

[In cooling operation]:
- When low pressure falls below 0.1MPa

[In heating operation]:
- When the degree of superheat of suction gas exceeds 20°K
  SH = Ts1 - Te
  where Ts1= Temperature detected by the suction pipe thermistor (R3T)
  Te= Saturation temperature equivalent to low pressure

* The system continues operation without determining the symptom to be malfunction.

4 Supposed Causes

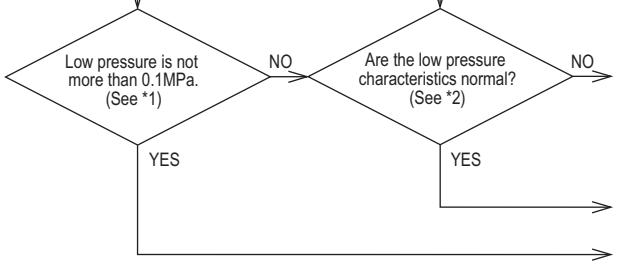
- Gas shortage or clogging of refrigerant (Piping error)
- Faulty thermistor (R3T)
- Faulty low pressure sensor
- Faulty outdoor unit PC board (A1P)

5 Troubleshooting

Diagnosis	Counter-measures

In cooling operation

① Mount a pressure gauge on the low pressure service port.
② Reset the operation using the remote controller, and then restart the operation.



Replace the low pressure sensor.

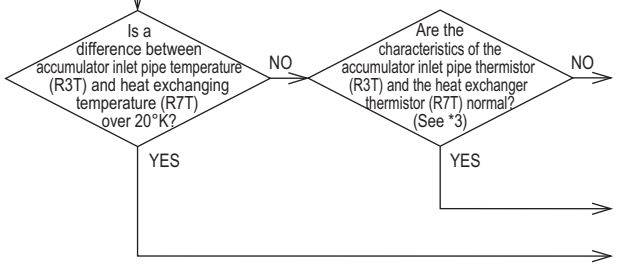
Replace the control PC board (A1P).

Referring to '6 - 43. Check Abnormal Operation' - **Check 2**, eliminate the causes of a drop in low pressure.

*1 Check for low pressure with the pressure gauge while operating.
*2 Make a comparison between the measurement of the pressure sensor and the reading of the pressure gauge.
(To make measurement with the pressure sensor, make voltage measurement at the connector [between (2) and (3)], and then convert it to pressure referring to information on '6 - 45. Pressure Sensor Characteristics'.)

In heating operation

Reset the operation using the remote controller, and then restart the operation.



Replace the thermistor.

Replace the control PC board (A1P).

Referring to '6 - 43. Check Abnormal Operation' - **Check 3**, eliminate the causes of superheat operation.

*3 Make a comparison between the resistance of thermistor and value detected by the surface pyrometer.

29. "U1" Negative Phase / Open Phase

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect the state of each phase in the negative phase detection circuit to determine whether or not it is open or negative.

3 Conditions for Determining Malfunction

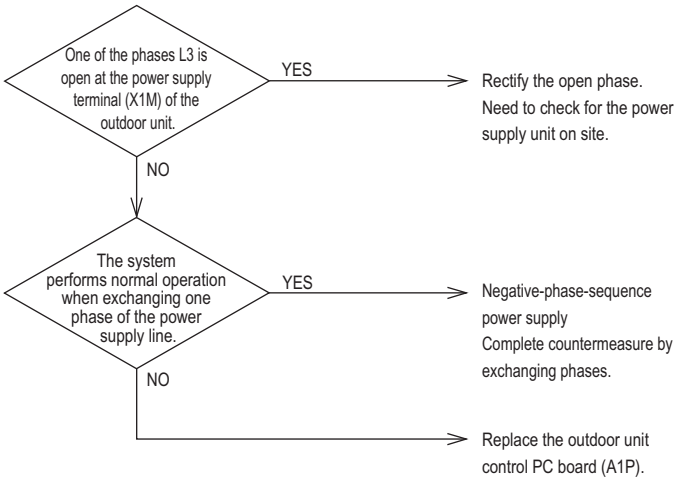
When power supply voltage is a negative-phase-sequence voltage or the phase L3 is open.

4 Supposed Causes

- Negative-phase-sequence power supply
- Open phase-L3
- Faulty outdoor unit PC board

5 Troubleshooting

Diagnosis	Counter-measures



30."U2" Abnormal Power Supply Voltage

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect the voltage of capacitor of the main circuit in the inverter.

3 Conditions for Determining Malfunction

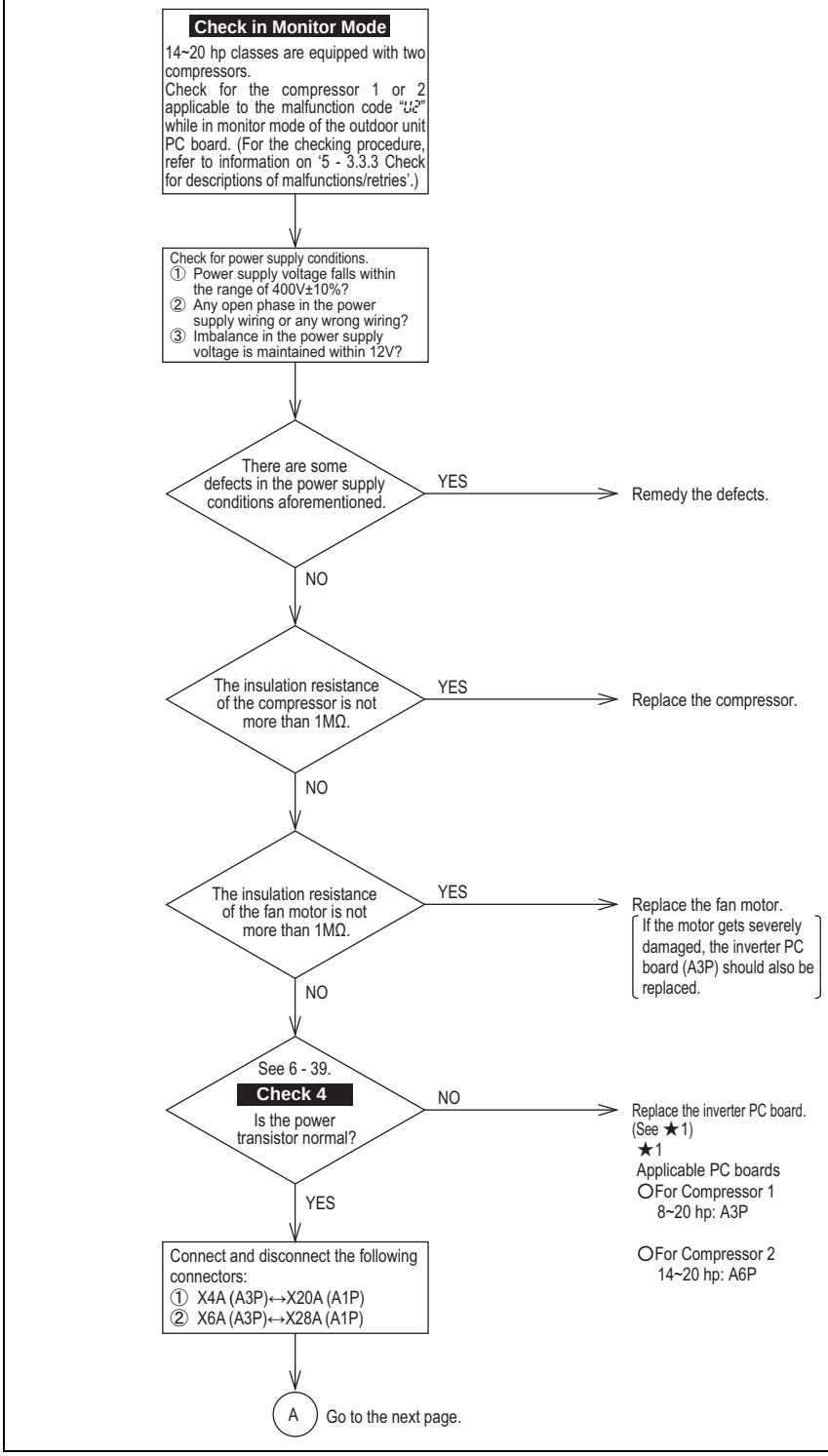
When the voltage in the DC circuit (between diode module and power module) falls below 380VDC.

4 Supposed Causes

- Abnormal power supply voltage
- Instantaneous power failure
- Open phase
- Faulty inverter PC board
- Faulty control PC board
- Faulty compressor
- Faulty main circuit wiring
- Faulty fan motor
- Faulty connection of signal cable

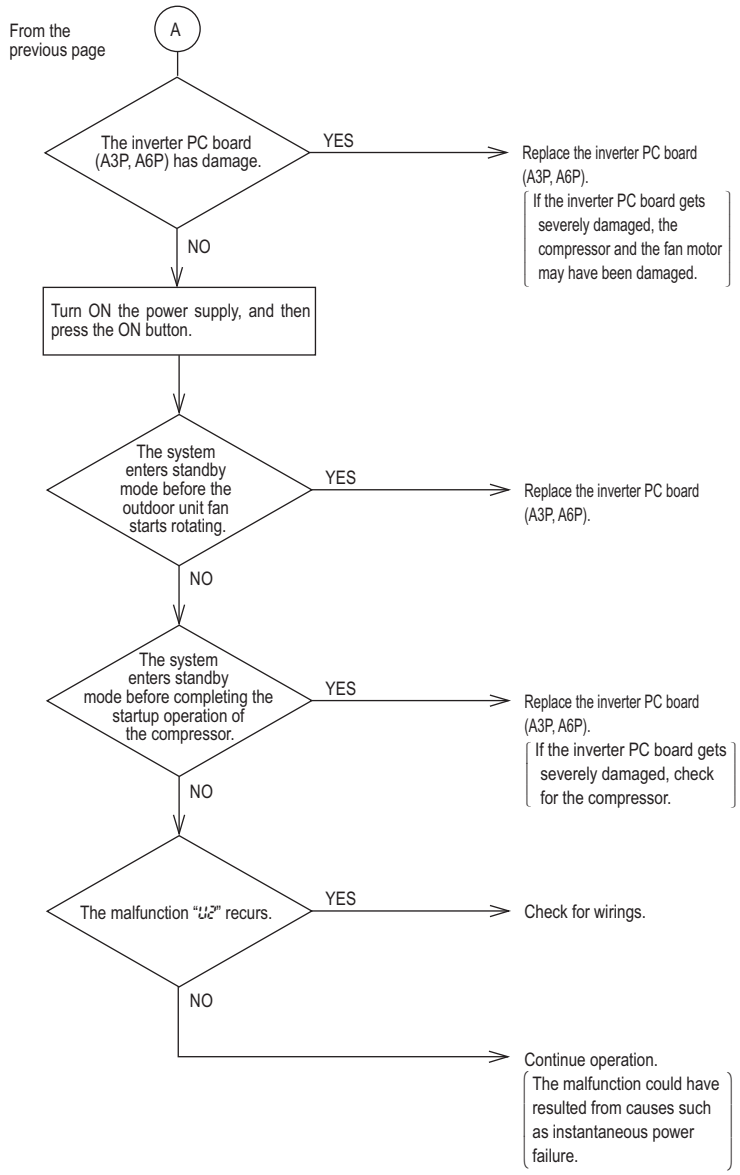
5 Troubleshooting

Diagnosis	Counter-measures



5 Troubleshooting

Diagnosis	Counter-measures



31."U3" Check Operation Not Conducted

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect according to whether or not the test operation has been conducted.

3 Conditions for Determining Malfunction

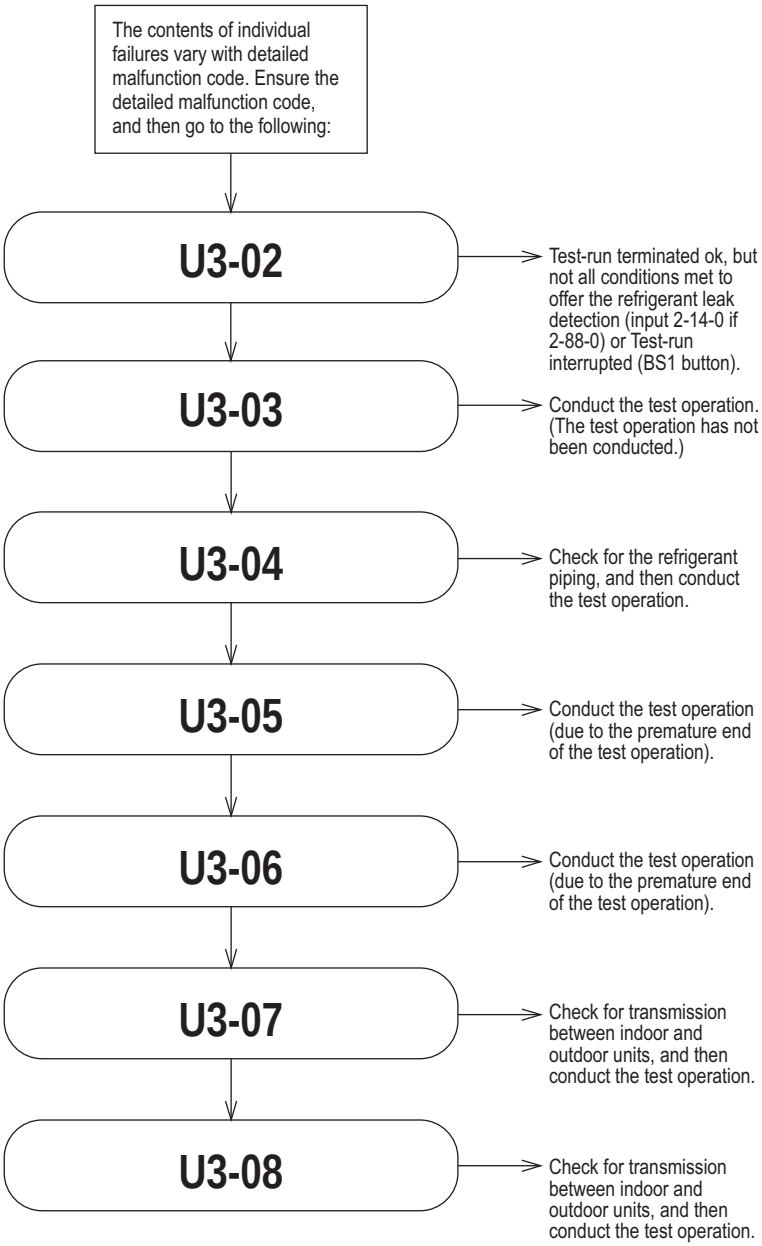
When the system operates before the test operation is conducted.

4 Supposed Causes

- Check operation not conducted

5 Troubleshooting

Diagnosis	Counter-measures



32. "U4" Transmission Error (Between Indoor Unit and Outdoor Unit)

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T
Indoor unit
All models

2 Method for Detecting Malfunction

Check whether or not transmission between indoor and outdoor units is normal, by the use of a microcontroller.

3 Conditions for Determining Malfunction

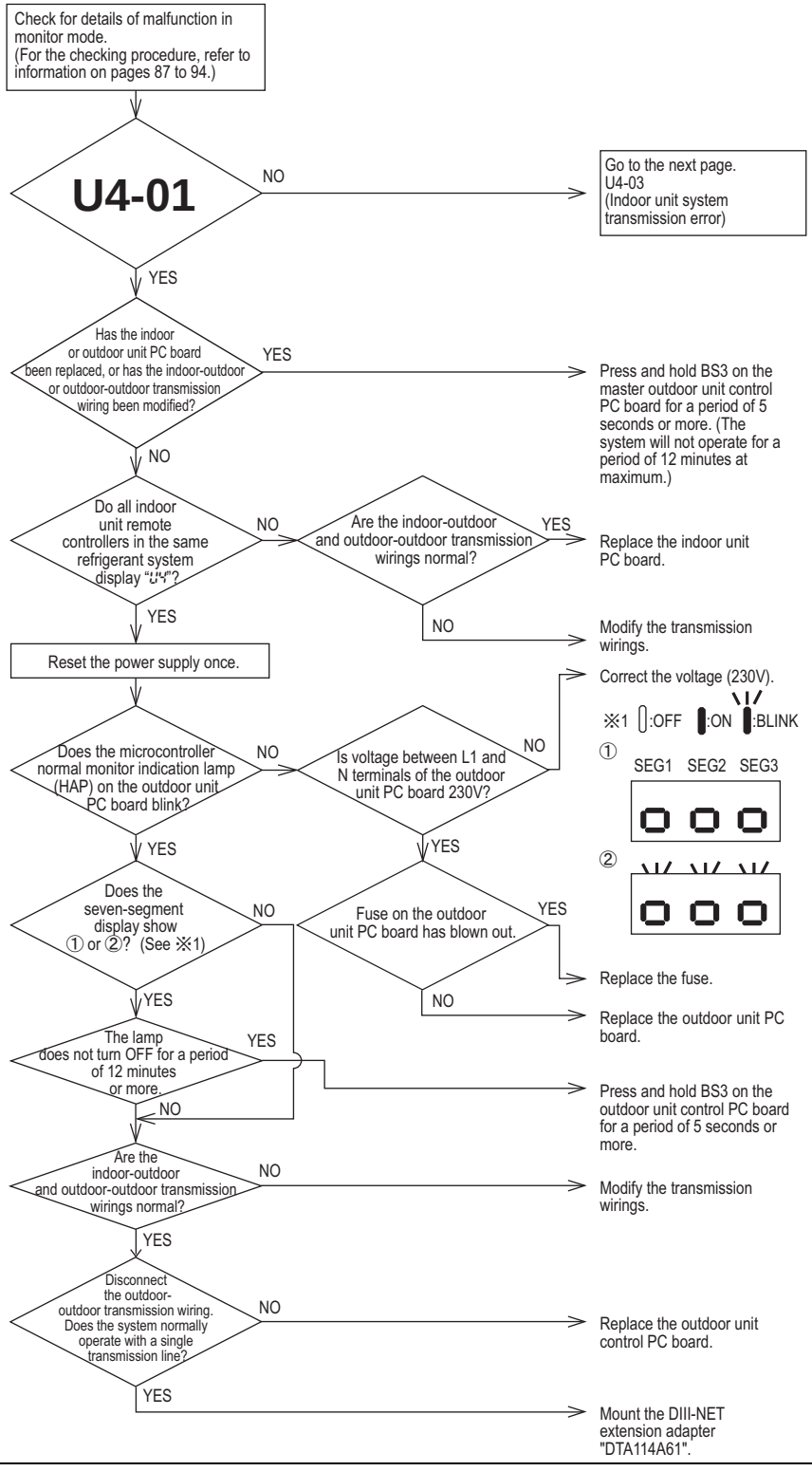
When normal transmission is disabled for a given period of time or more.

4 Supposed Causes

- Short circuit in indoor-outdoor or outdoor-outdoor transmission wiring (F1 / F2), or wrong wiring
- Outdoor unit power OFF
- Mismatch of system address
- Faulty outdoor unit PC board (A1P)
- Faulty indoor unit PC board

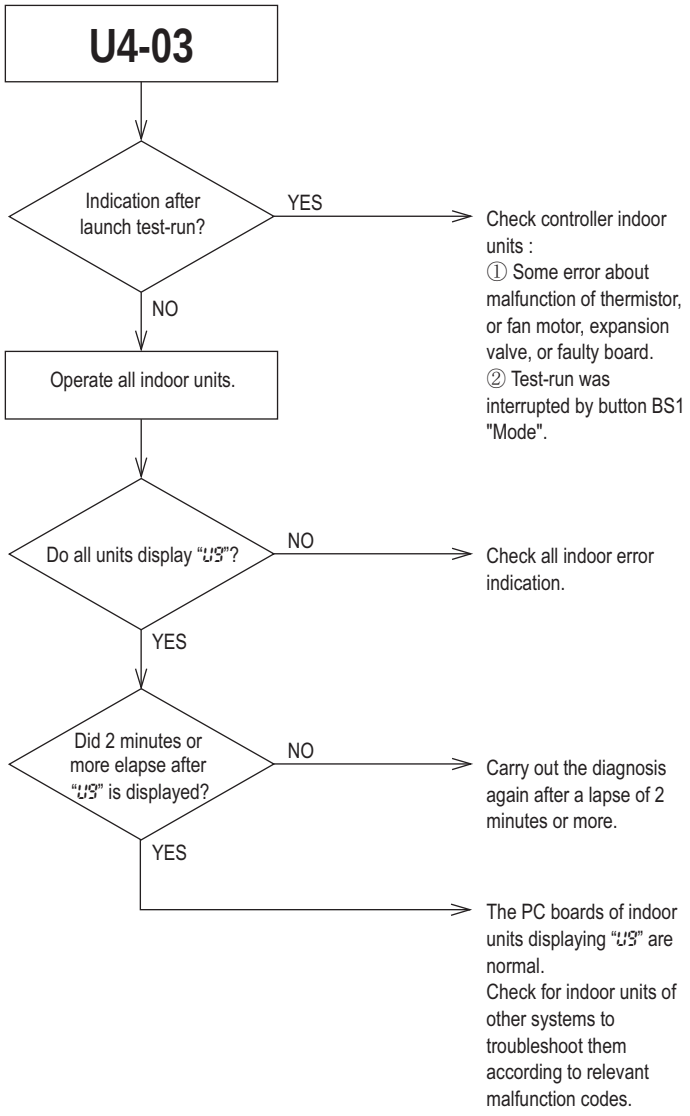
5 Troubleshooting

Diagnosis	Counter-measures



5 Troubleshooting

Diagnosis	Counter-measures



33. "U5" Transmission Error (Between Remote Controller and Indoor Unit)

1 Applicable Models

Indoor unit
All indoor units

2 Method for Detecting Malfunction

Check whether or not transmission between indoor unit and remote controller is normal, by the use of a microcontroller.

3 Conditions for Determining Malfunction

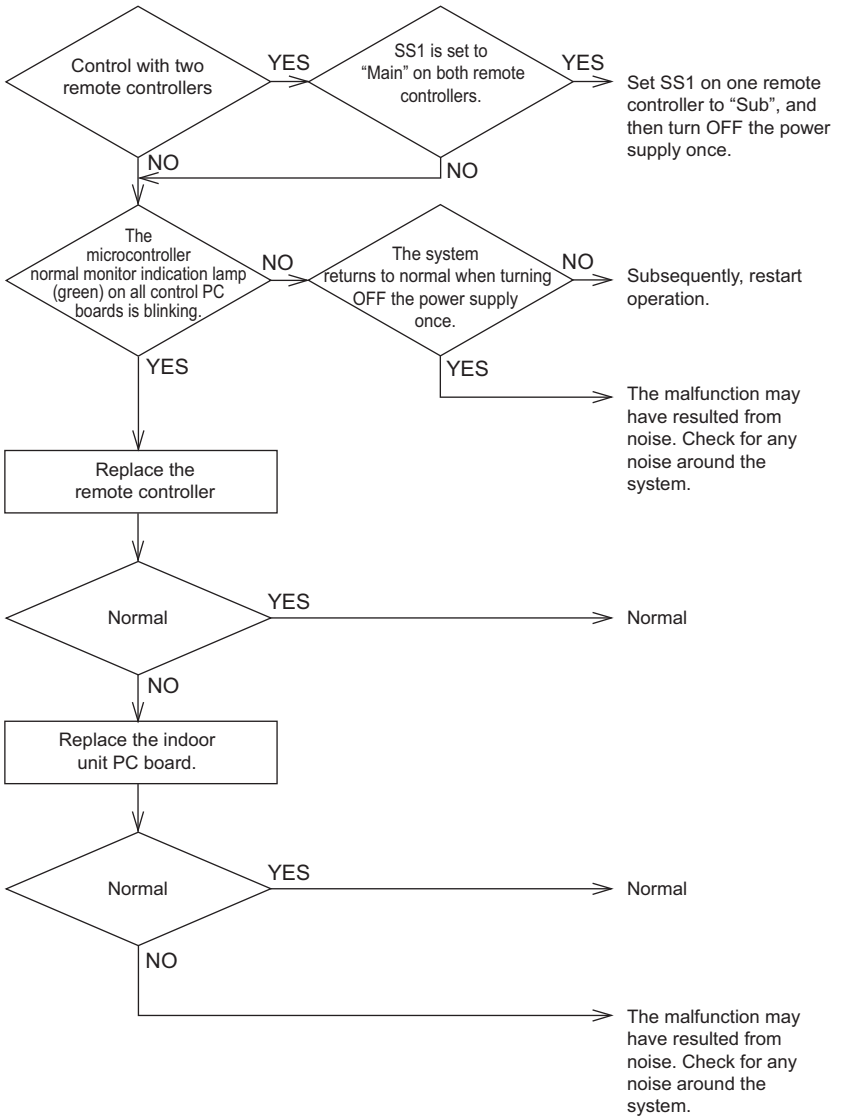
When normal transmission is disabled for a given period of time or more.

4 Supposed Causes

- Transmission error between indoor unit and remote controller
- Connection of main remote controllers (for control with two remote controllers)
- Faulty outdoor unit PC board
- Faulty remote controller PC board
- Transmission error due to noise

5 Troubleshooting

Diagnosis	Counter-measures



34."U7" Transmission Error (Between Remote Controller and Indoor Unit)

1 Applicable Models

Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Check whether or not transmission between outdoor units is normal, by the use of a microcontroller.

3 Conditions for Determining Malfunction

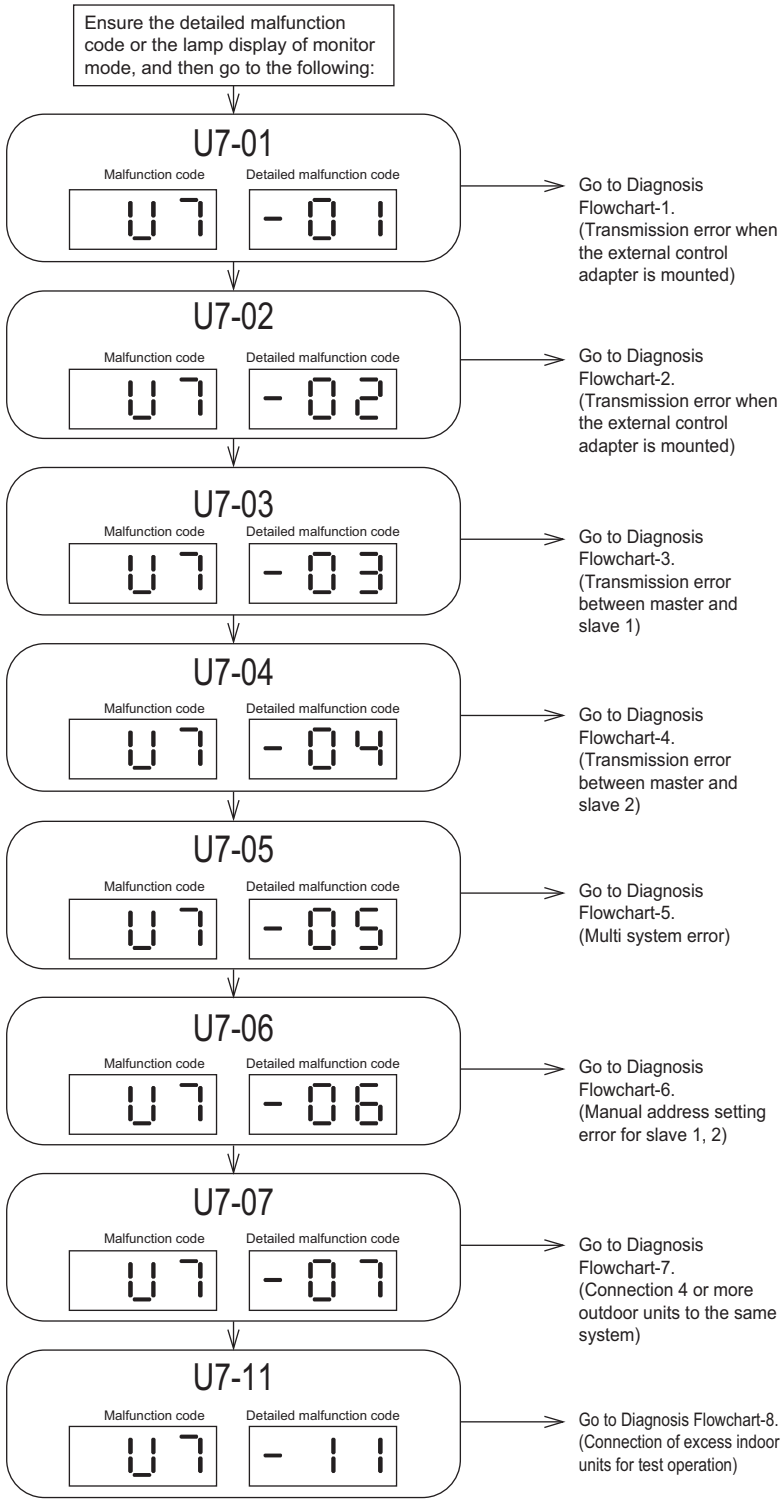
When normal transmission is disabled for a given period of time or more.

4 Supposed Causes

- Connection error of transmission wirings between outdoor unit and external control adapter for outdoor unit
- Connection error of transmission wirings between outdoor units
- Cool/Heat selection setting error
- Cool/Heat unified address setting error (functional unit, external control adapter for outdoor unit)
- Faulty outdoor unit PC board
- Faulty external control adapter for outdoor unit

5 Troubleshooting

Diagnosis	Counter-measures



5 Troubleshooting

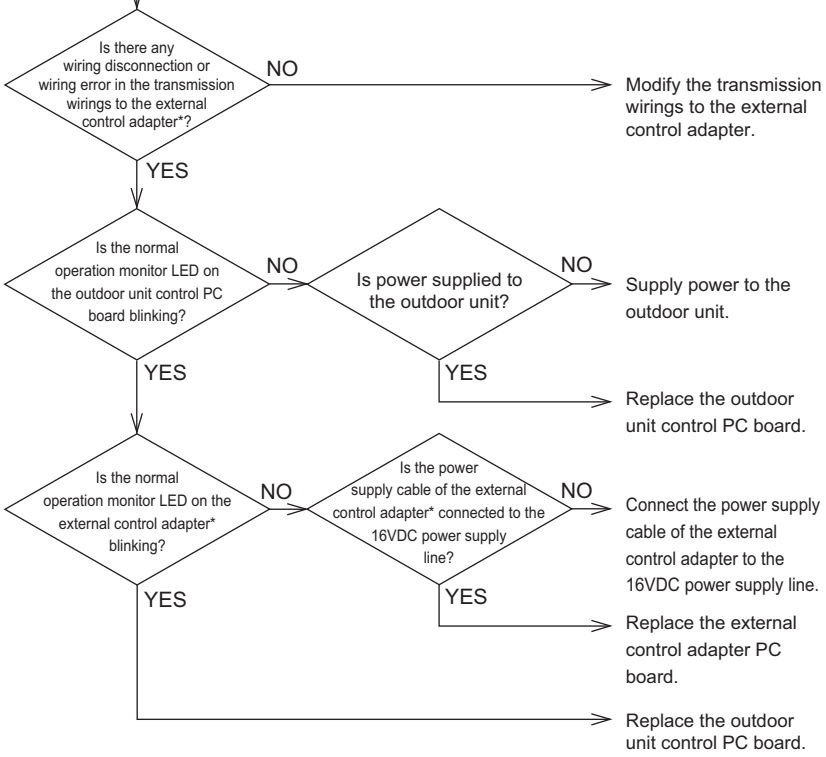
Diagnosis	Counter-measures

Diagnosis Flowchart-1

U7-01

Malfunction code: U7 Detailed malfunction code: -01

(Transmission error when the external control adapter is mounted)



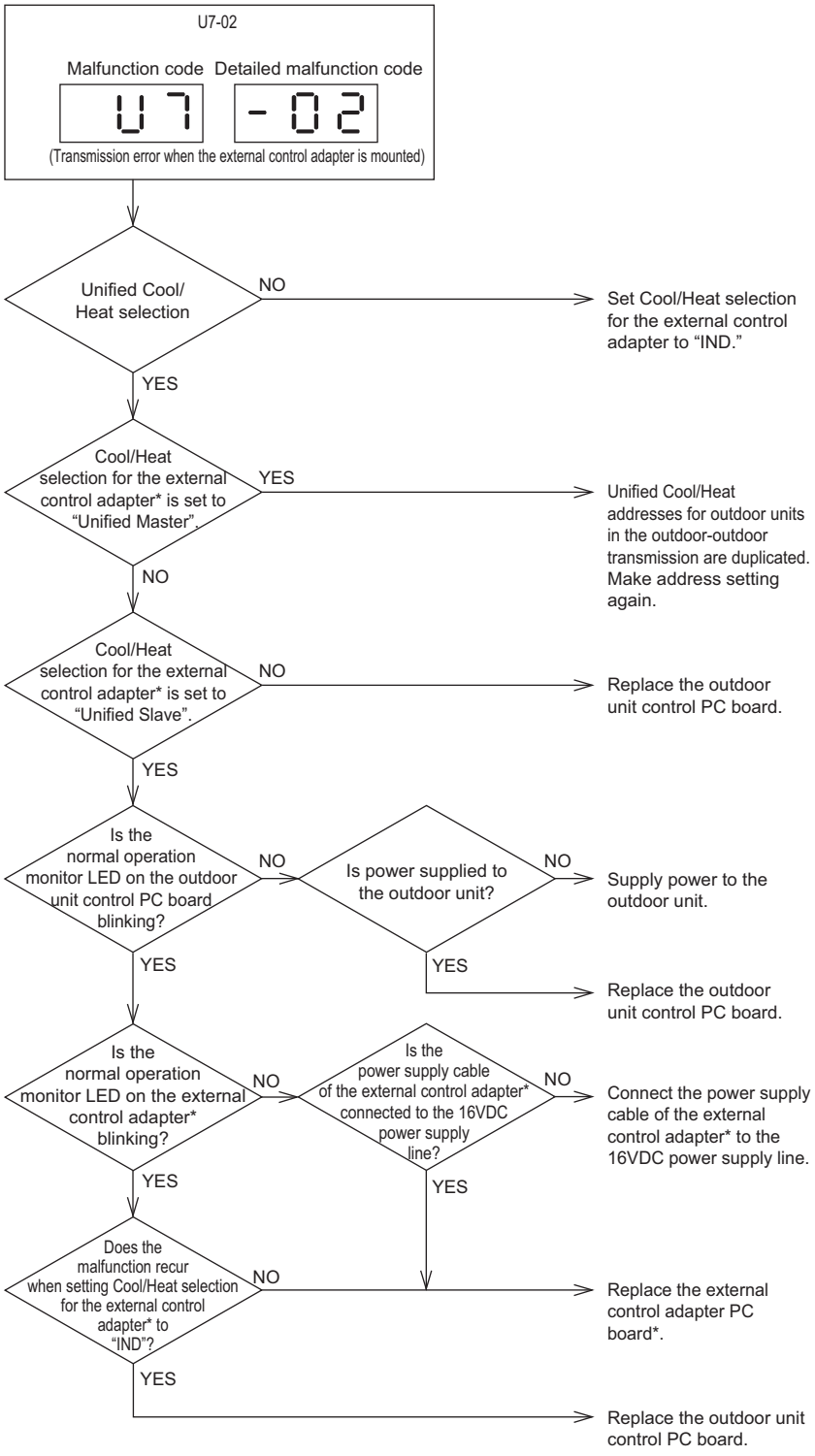
* optional board "DTA104A61, 62"

5 Troubleshooting

Diagnosis

Counter-measures

Diagnosis Flowchart-2

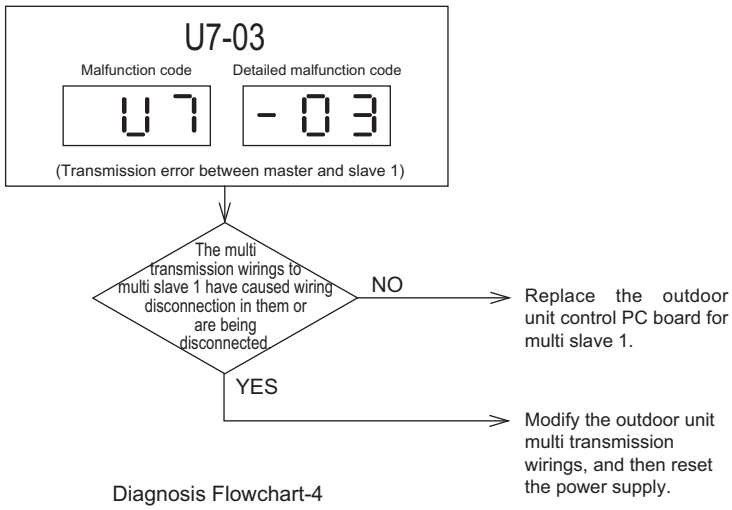


* Option board DTA104A61, 62

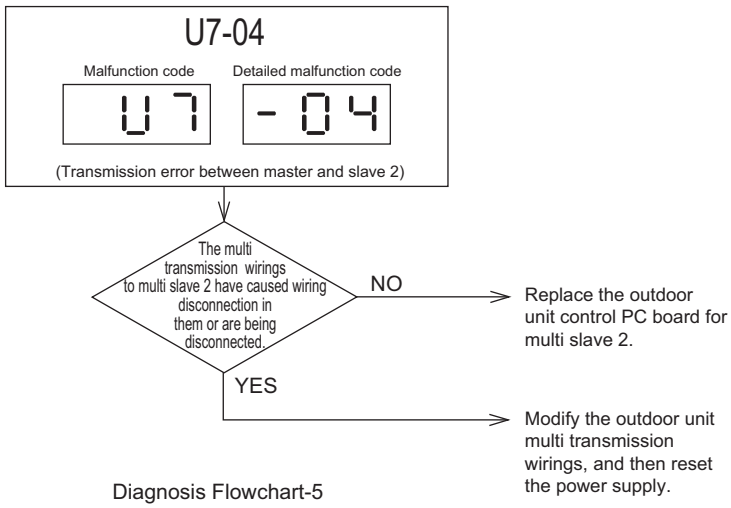
5 Troubleshooting

Diagnosis	Counter-measures

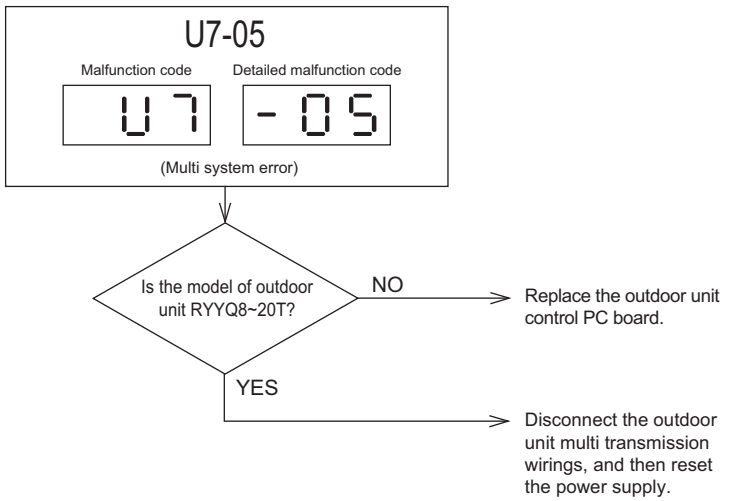
Diagnosis Flowchart-3



Diagnosis Flowchart-4



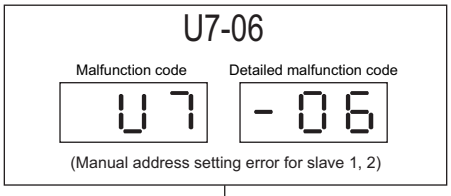
Diagnosis Flowchart-5



5 Troubleshooting

Diagnosis	Counter-measures

Diagnosis Flowchart-6

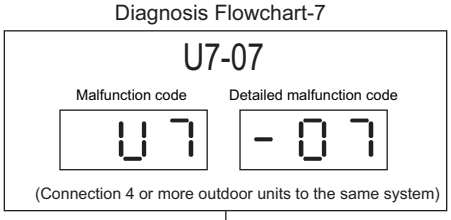


One of outdoor unit multi transmission wirings has caused wiring disconnection in it or been disconnected.

NO → Replace the outdoor unit control PC board.

YES → Modify the outdoor unit multi transmission wirings, and then reset the power supply.

Diagnosis Flowchart-7

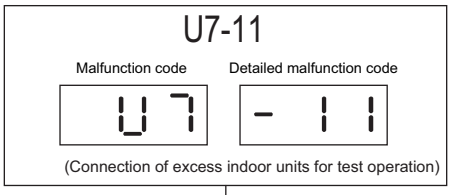


4 or more outdoor units are connected using the outdoor unit multi transmission wirings.

NO → Replace the outdoor unit control PC board.

YES → Modify the outdoor unit multi transmission wirings, and then reset the power supply.

Diagnosis Flowchart-8



There is an error in the connection of indoor-outdoor, indoor-indoor, and outdoor multi transmission wirings.

YES → Rectify the error in the connection of transmission wirings, and then reset the power supply.

NO

The capacity to connect indoor units falls within the specified range.

NO → Review the capacity to connect indoor units.

YES → Replace the outdoor unit PC board (A1P).

35. "U8" Transmission Error (Between Main and Sub Remote Controllers)

1 Applicable Models

Indoor unit
All indoor units

2 Method for Detecting Malfunction

Check whether or not transmission between indoor unit and remote controller (main and sub remote controller) under control with two remote controllers is normal, by the use of a microcontroller.

3 Conditions for Determining Malfunction

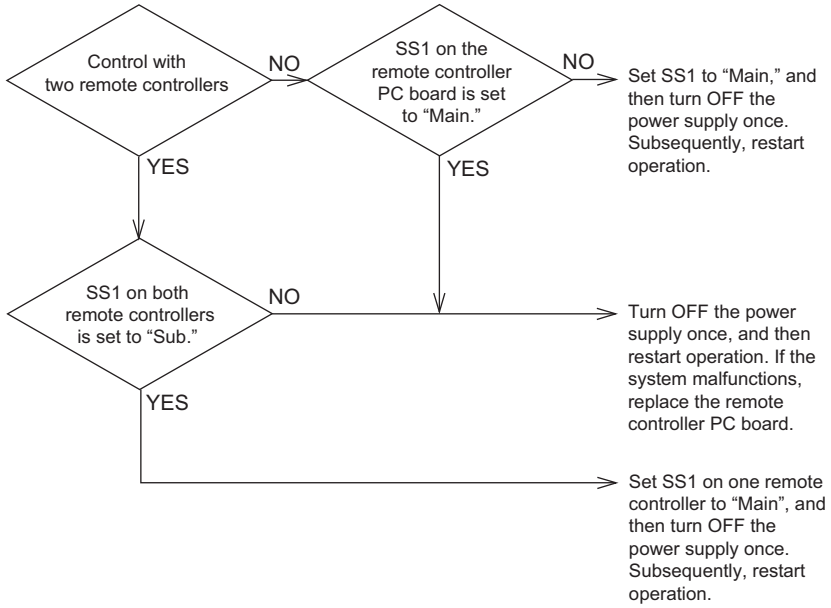
When normal transmission is disabled for a given period of time or more.

4 Supposed Causes

- Transmission error between main and sub remote controllers
- Connection of sub remote controllers
- Faulty remote controller PC board

5 Troubleshooting

Diagnosis	Counter-measures



36. "U9" Transmission Error (Between Other Indoor and Outdoor Units)

1 Applicable Models

Indoor unit
All models
Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

Detect a malfunction signal from other indoor unit in the same system with the outdoor unit PC board.

3 Conditions for Determining Malfunction

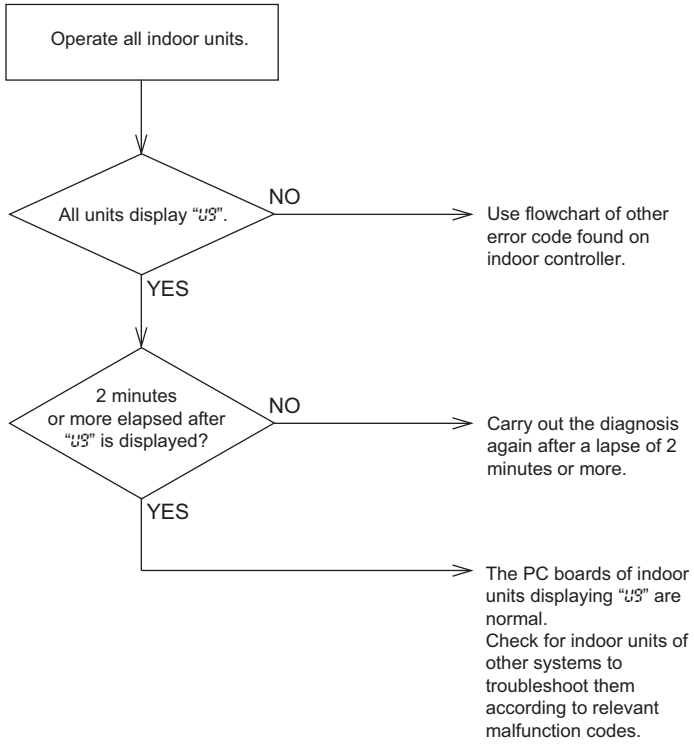
When malfunction is determined on other indoor unit in the same system.

4 Supposed Causes

- Transmission error between other indoor and outdoor units
- Malfunction of electronic expansion valve of other indoor unit
- Faulty indoor unit PC board for other indoor unit
- Faulty connection of indoor-outdoor transmission wirings

5 Troubleshooting

Diagnosis	Counter-measures



37."UA" Improper Combination of Indoor Unit and Remote Controller

1 Applicable Models

Indoor unit
All models
Outdoor unit
RYYQ-T
RYMQ-T
RXYQ-T

2 Method for Detecting Malfunction

- Detect malfunction when data by refrigerant type differ between indoor and outdoor units.
- Detect malfunction when the number of indoor units falls outside of the allowable range.

3 Conditions for Determining Malfunction

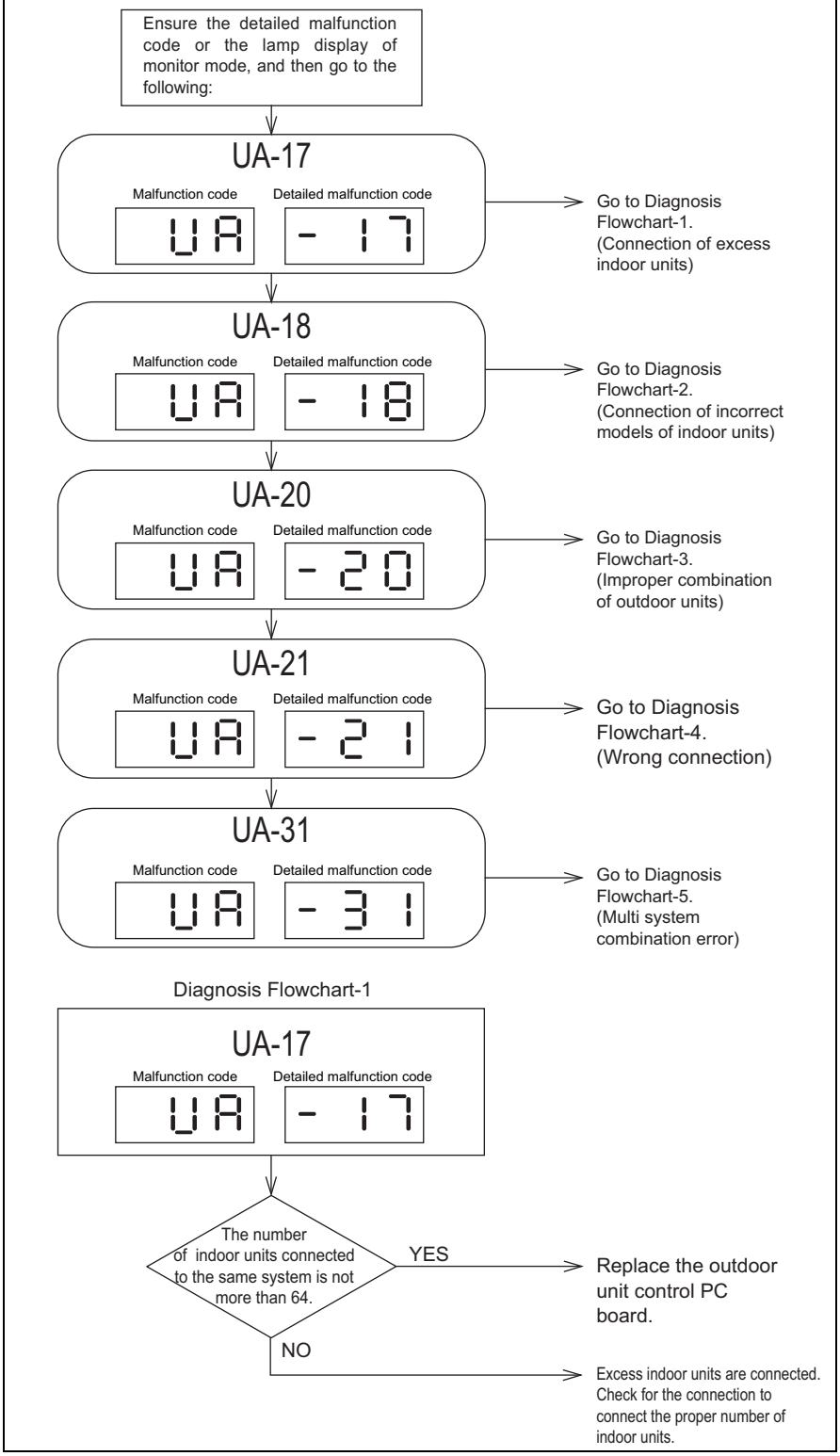
The events listed above are determined to be malfunction as soon as they are detected.

4 Supposed Causes

- Connection of excess indoor units
- Faulty outdoor unit PC board
- Mismatch of refrigerant between indoor and outdoor units
- No setting made when the outdoor unit control PC board (A1P) was replaced with a spare PC board

5 Troubleshooting

Diagnosis	Counter-measures

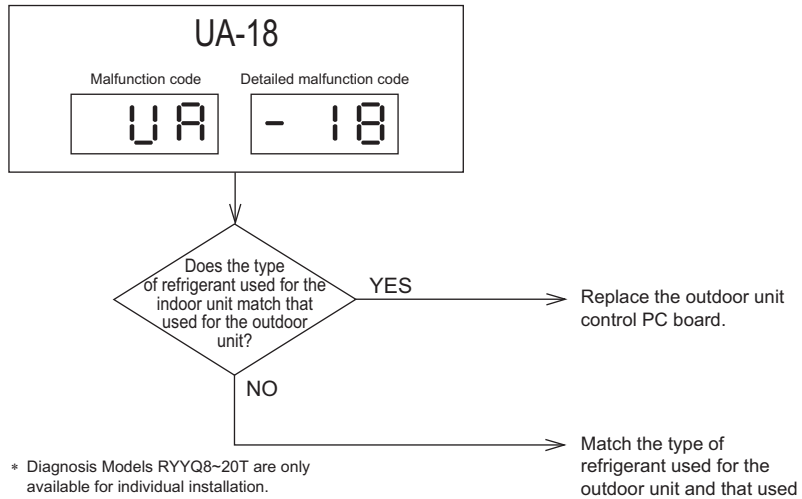


5 Troubleshooting

Diagnosis

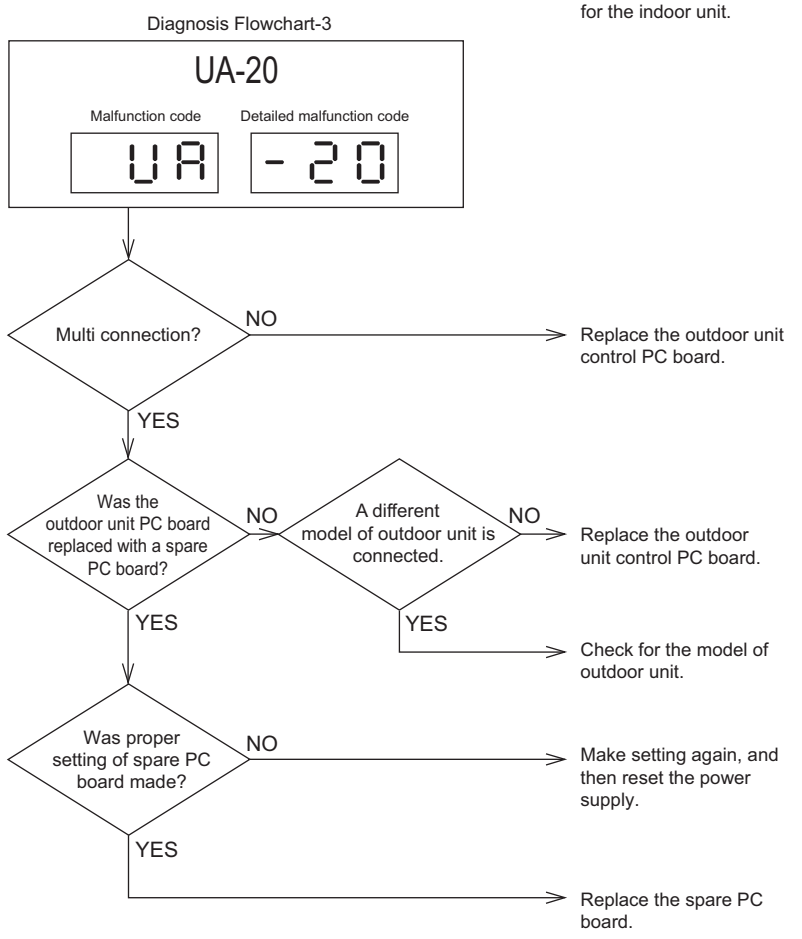
Counter-measures

Diagnosis Flowchart-2



* Diagnosis Models RYYQ8~20T are only available for individual installation.

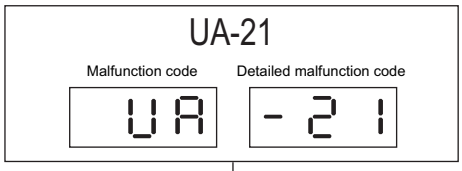
Diagnosis Flowchart-3



5 Troubleshooting

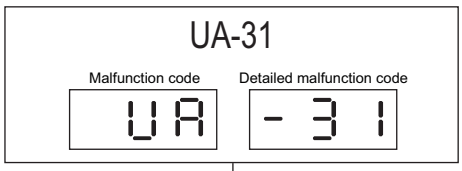
Diagnosis	Counter-measures

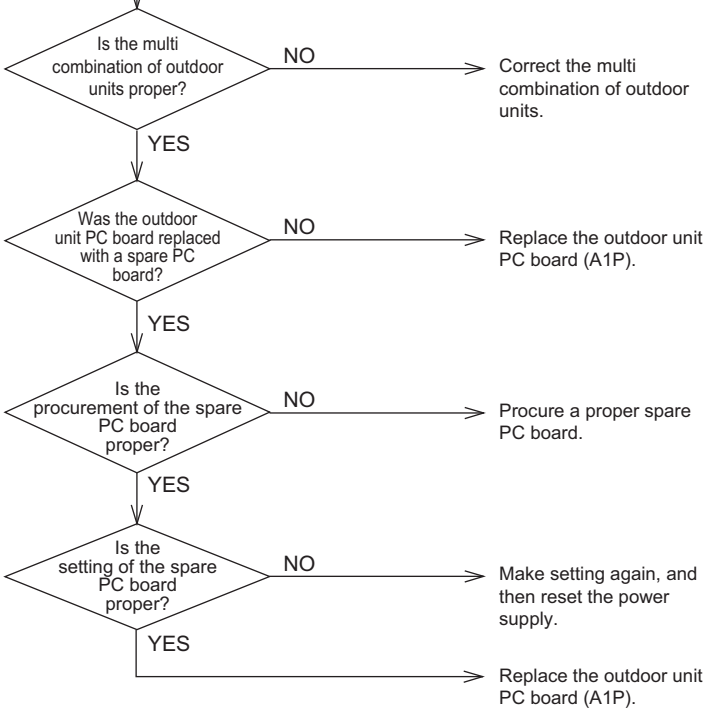
Diagnosis Flowchart-4



Replace the outdoor unit control PC board.

Diagnosis Flowchart-5





38."UA" Lack of Support for Auto Clean Panel

1 Applicable Models

Indoor unit
All models
FXFQ20~125P
[with Self cleaning panel BYCQ140C(7)GW1 installed]
FXFQ20~125A
[with Self cleaning panel BYCQ140D(7)GW1 installed]

2 Method for Detecting Malfunction

Check whether or not the outdoor unit supports the use of auto clean panel. Self cleaning function not compatible to VRVII.

3 Conditions for Determining Malfunction

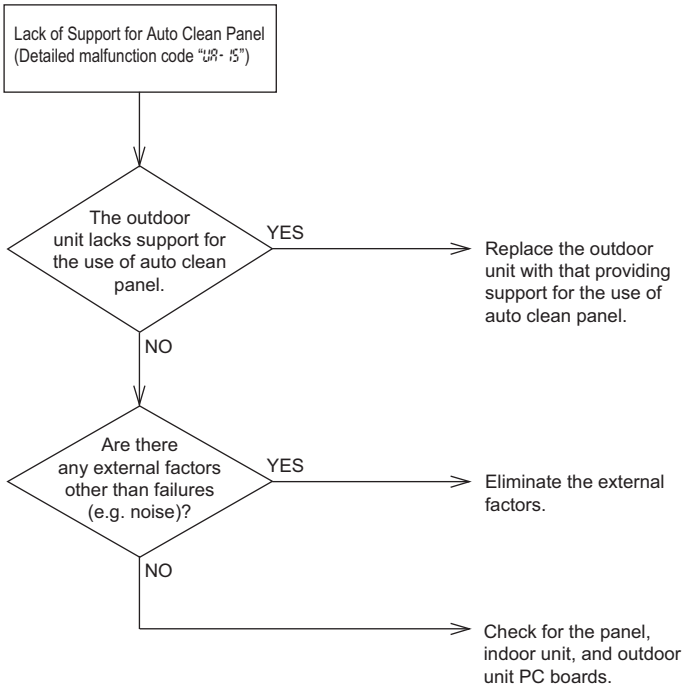
The lack of support is determined to be malfunction as soon as it is detected.

4 Supposed Causes

- Lack of support of outdoor unit for the use of auto clean panel

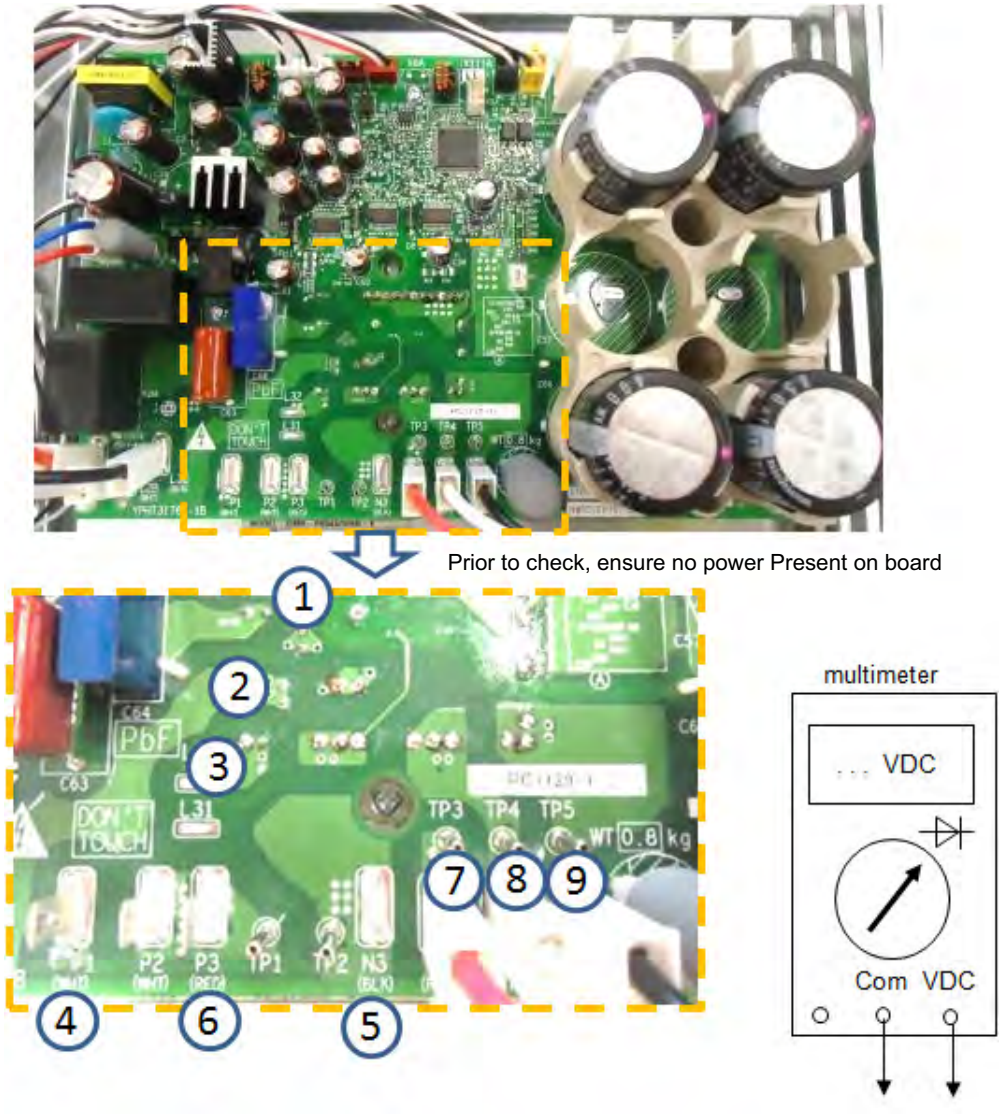
5 Troubleshooting

Diagnosis	Counter-measures



39.Check 4-1

Inverter board for compressor JT1GCVDKYR



Diode check of diode-module VRV-4

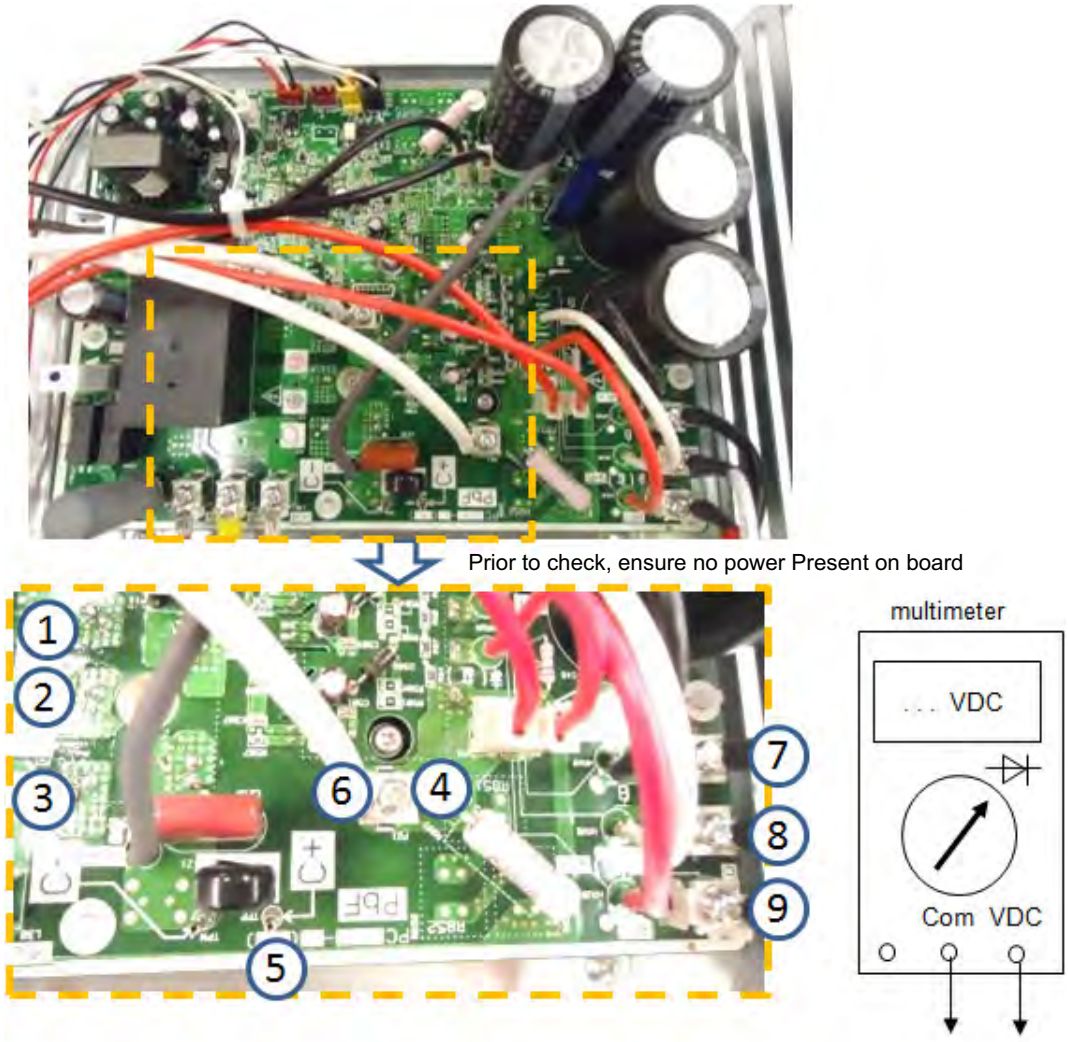
VDC	com	Ref	VDC	com	Ref	VDC	com	Ref
4	1	O.L.	5	1	0,5	5	4	0,9
4	2	O.L.	5	2	0,5			
4	3	O.L.	5	3	0,5			
1	4	0,5	1	5	O.L.	4	5	O.L.
2	4	0,5	2	5	O.L.			
3	4	0,5	3	5	O.L.			

Diode check of power module VRV-4

VDC	com	Ref	VDC	com	Ref	VDC	com	Ref
6	7	O.L.	5	7	0,4	5	6	0,9
6	8	O.L.	5	8	0,4			
6	9	O.L.	5	9	0,4			
7	6	0,4	7	N3	O.L.	6	5	O.L.
8	6	0,4	8	N3	O.L.			
9	6	0,4	9	N3	O.L.			

40.Check 4-2

Inverter board for compressor JT15J-VDKYR



Diode check of diode-module VRV-4

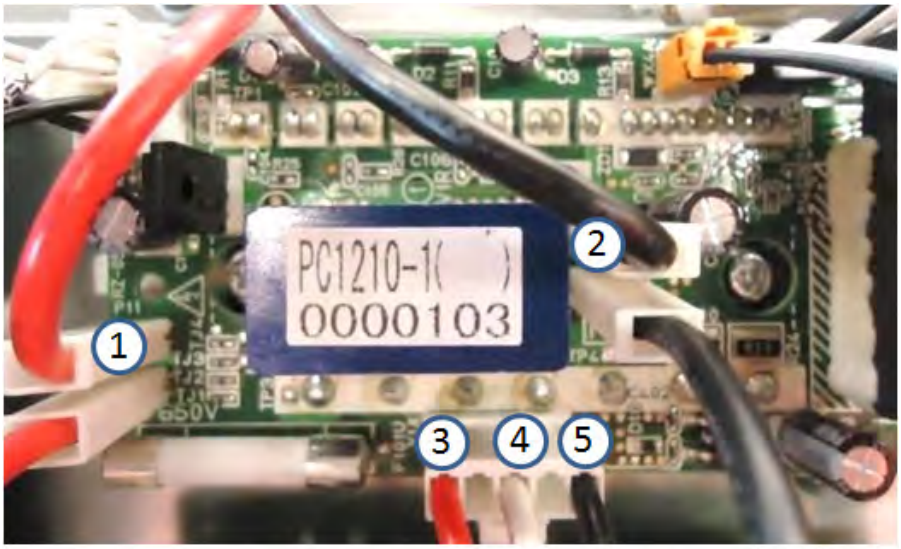
VDC	com	Ref	VDC	com	Ref	VDC	com	Ref
4	1	O.L.	5	1	0,5	5	4	0,9
4	2	O.L.	5	2	0,5			
4	3	O.L.	5	3	0,5			
1	4	0,5	1	5	O.L.	4	5	O.L.
2	4	0,5	2	5	O.L.			
3	4	0,5	3	5	O.L.			

Diode check of power module VRV-4

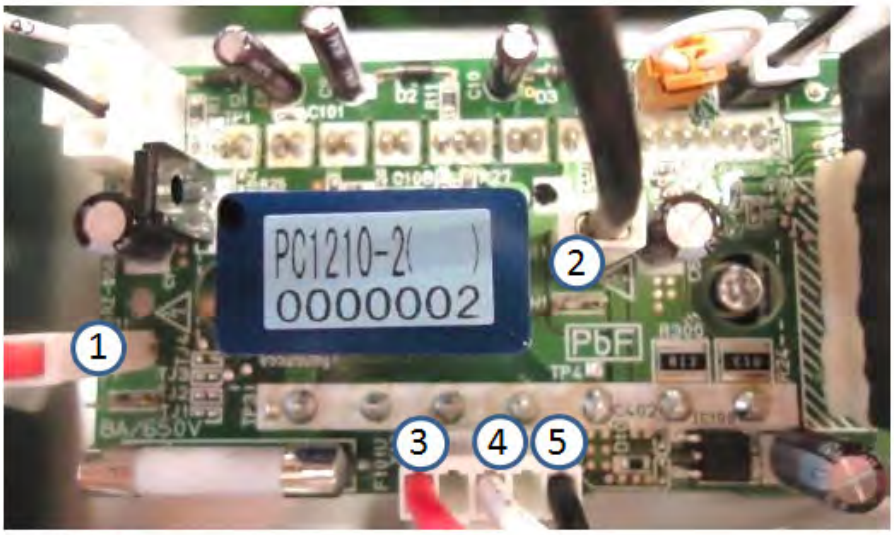
VDC	com	Ref	VDC	com	Ref	VDC	com	Ref
6	7	O.L.	5	7	0,4	5	6	0,9
6	8	O.L.	5	8	0,4			
6	9	O.L.	5	9	0,4			
7	6	0,4	7	N3	O.L.	6	5	O.L.
8	6	0,4	8	N3	O.L.			
9	6	0,4	9	N3	O.L.			

41.Check 4-3

Inverter board for Fan motor

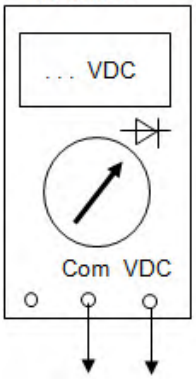


Fan Motor Nr. 1



Fan Motor Nr. 2

multimeter



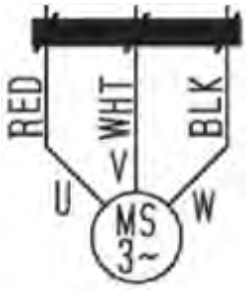
Prior to check, ensure no power Present on board

VDC	com	Ref	VDC	com	Ref	VDC	com	Ref
1	3	O.L.	2	3	0,4	5	6	0,8
1	4	O.L.	2	4	0,4			
1	5	O.L.	2	5	0,4			
3	1	0,4	3	2	O.L.	6	5	O.L.
4	1	0,4	4	2	O.L.			
5	1	0,4	5	2	O.L.			

42.Check 4-4

Compressor motor checking method

Prior to check, ensure no power Present on board

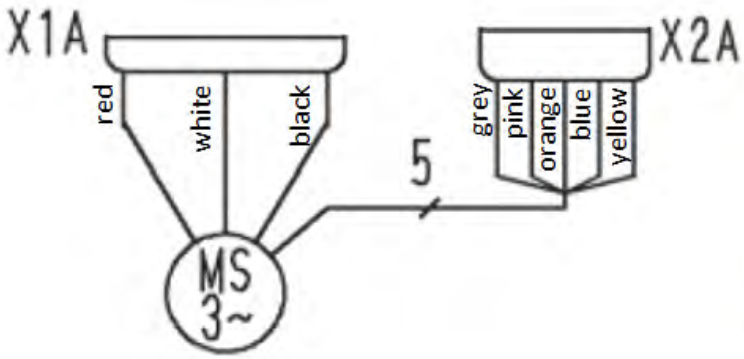


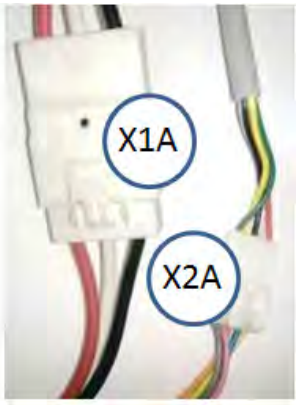
JT1GCVDKYR		U	V	W
Ohm	U		0,90	0,90
	V	0,90		0,90
	W	0,90	0,90	

JT15JVDKYR		U	V	W
Ohm	U		0,47	0,47
	V	0,47		0,47
	W	0,47	0,47	

Fan motor checking method

Prior to check, ensure no power Present on board





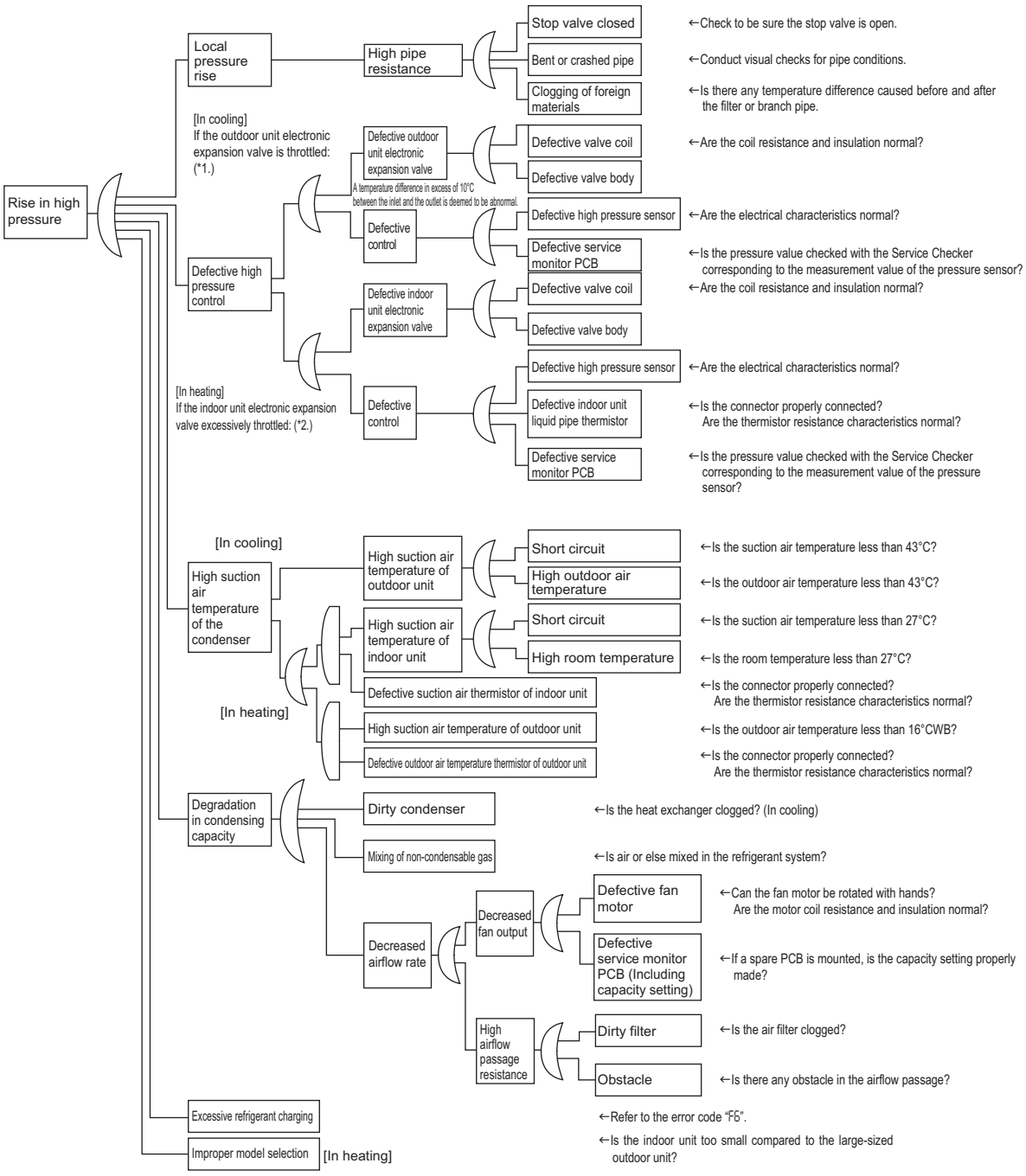
		Com				
	X2A	grey	pink	orange	blue	yellow
VDC	grey		0,56	1,60	1,60	1,60
	pink	1,17		2,36	2,36	2,36
	orange	OL	OL		OL	OL
	blue	OL	OL	OL		OL
	yellow	OL	OL	OL	OL	

	X1A	red	white	black
Ohm	red		4,6	4,6
	white	4,6		4,6
	black	4,6	4,6	

43.Check Abnormal Operation

CHECK 1 **Check for causes of rise in high pressure.**

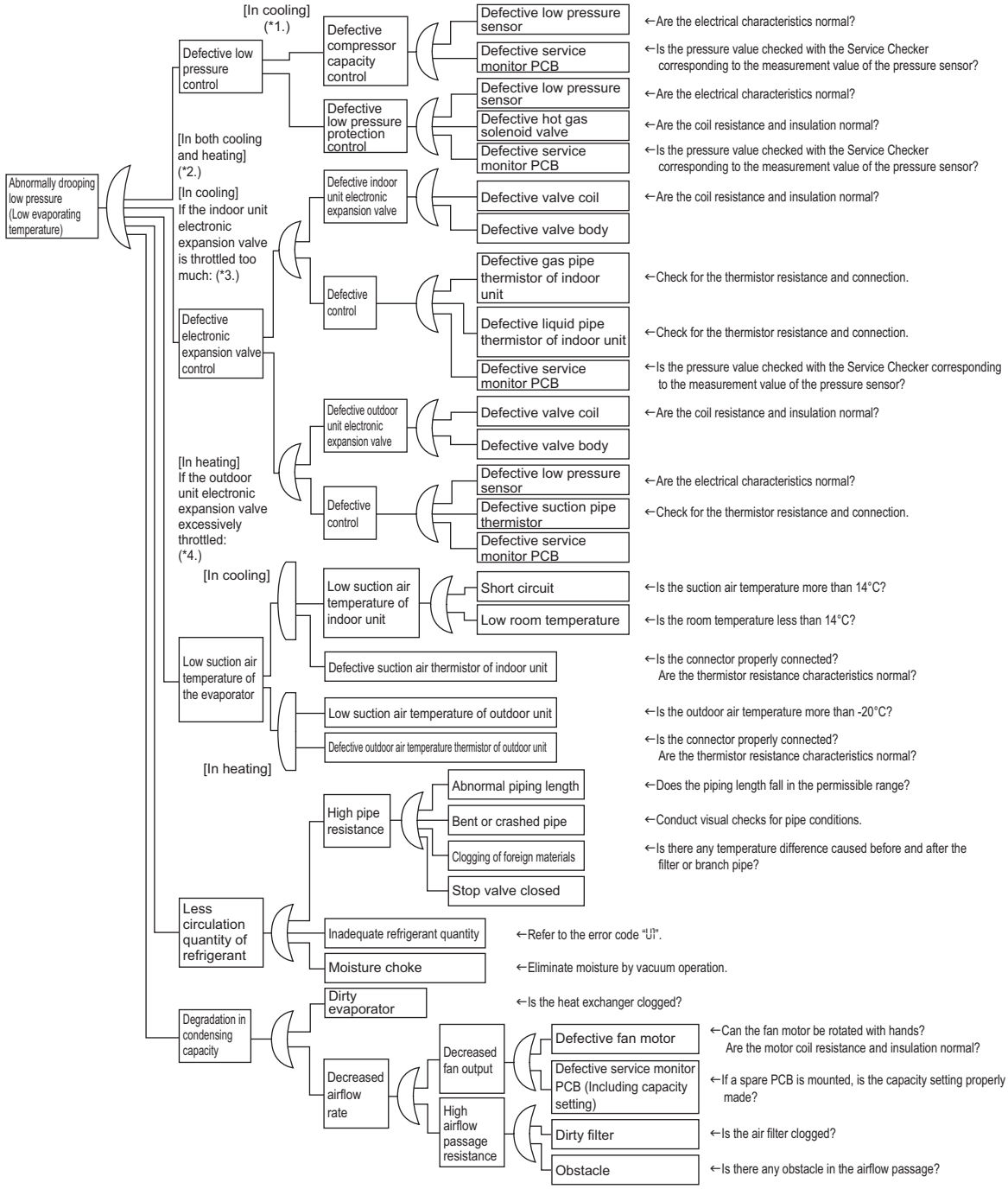
Referring to the Fault Tree Analysis (FTA) shown below, probe the defective points.



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

CHECK 2 **Check for causes of drop in low pressure.**

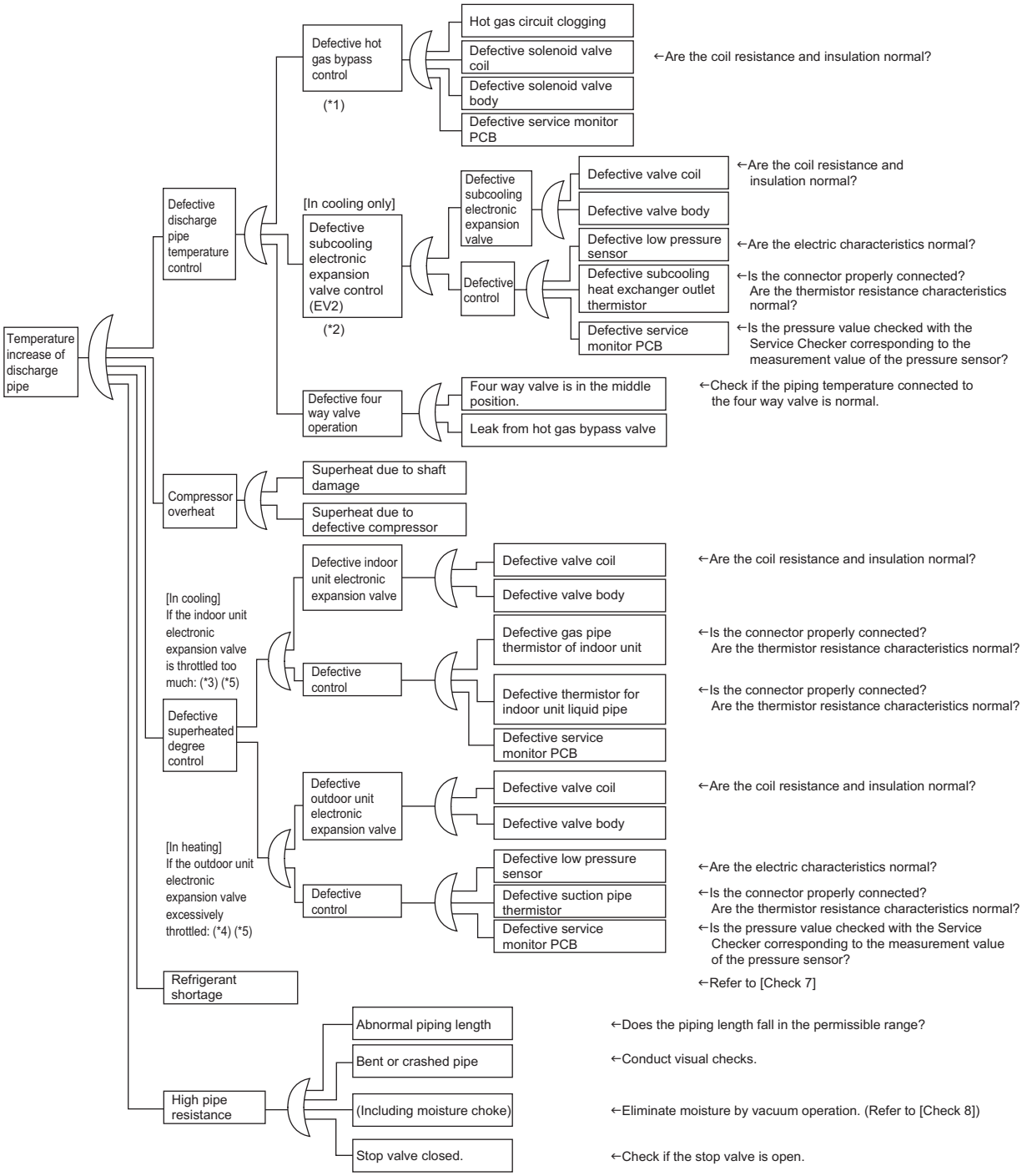
Referring to the Fault Tree Analysis (FTA) shown below, probe the defective points.



Note: *1: For details of 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 indoor unit 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".

CHECK 3 Check the factors of overheat operation.

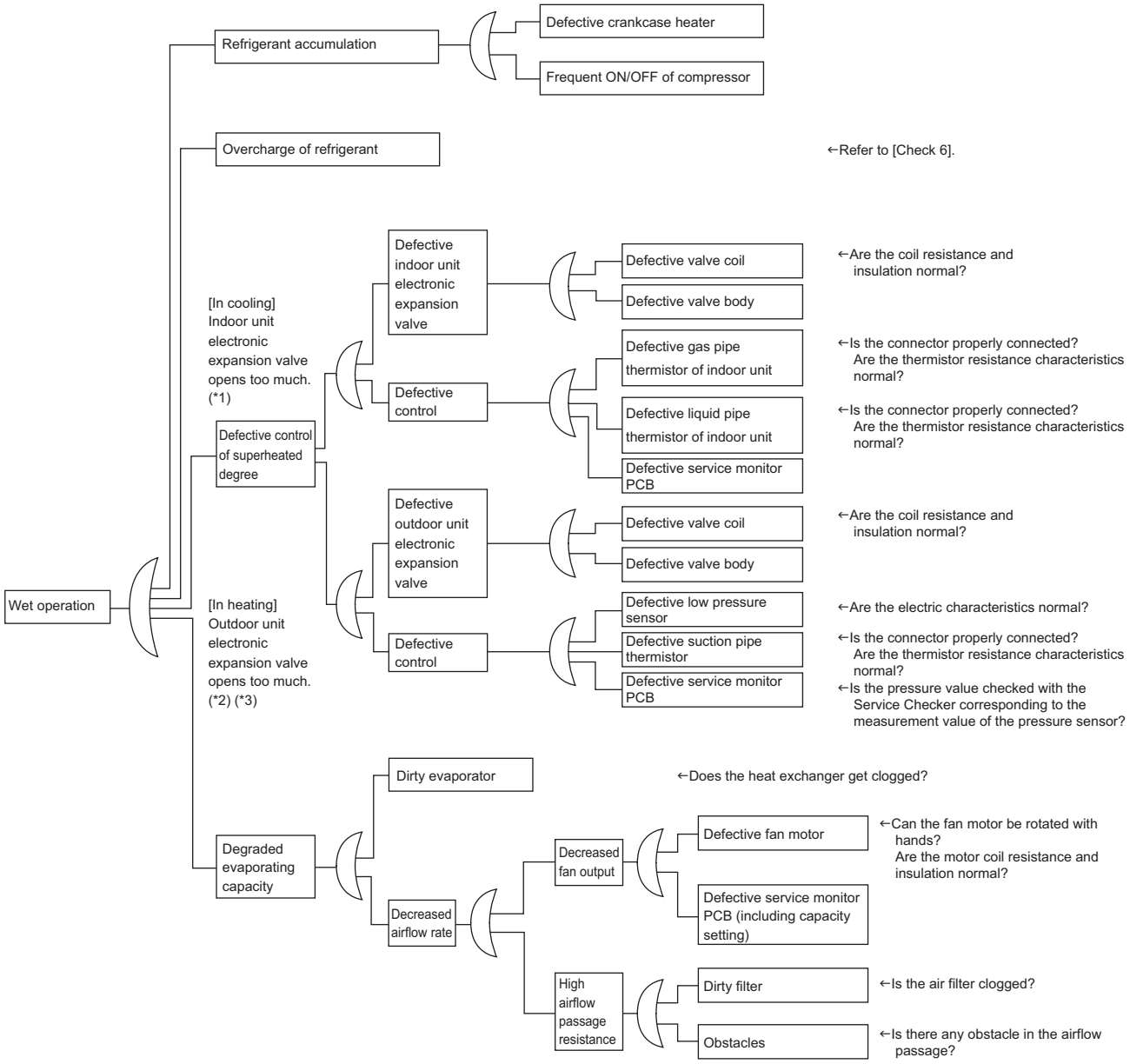
Referring to the Fault Tree Analysis (FTA) shown below, probe the defective points.



Note:
- *1: Refer to “Low pressure protection control” for hot gas bypass control.
- *2: Refer to “Subcooling electronic expansion valve control”.
- *3: “Superheating temperature control” in cooling is conducted by indoor unit electronic expansion valve.
- *4: Superheating temperature control in heating is conducted by outdoor unit electronic expansion valve (EVM).
- *5: Judgement criteria of superheat operation:
  ① Suction gas superheated degree: 10°C and over. ② Discharge gas superheated degree: 45°C and over, except immediately after compressor starts up or is running under drooping control.
  (Use the above values as a guide. Depending on the other conditions, the unit may be normal despite the values within the above range.)

CHECK 5 **Check for causes of wet operation.**

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



Note: *1: “Superheating temperature control” in cooling is conducted by indoor unit electronic expansion valve.

*2: Superheating temperature control in heating is conducted by outdoor unit electronic expansion valve (EVM).

*3: Guideline of superheated degree to judge as wet operation

① Suction gas superheated degree: Not more than 3°C; ② Discharge gas superheated degree: Not more than 15°C, except immediately after compressor starts up or is running under drooping control.

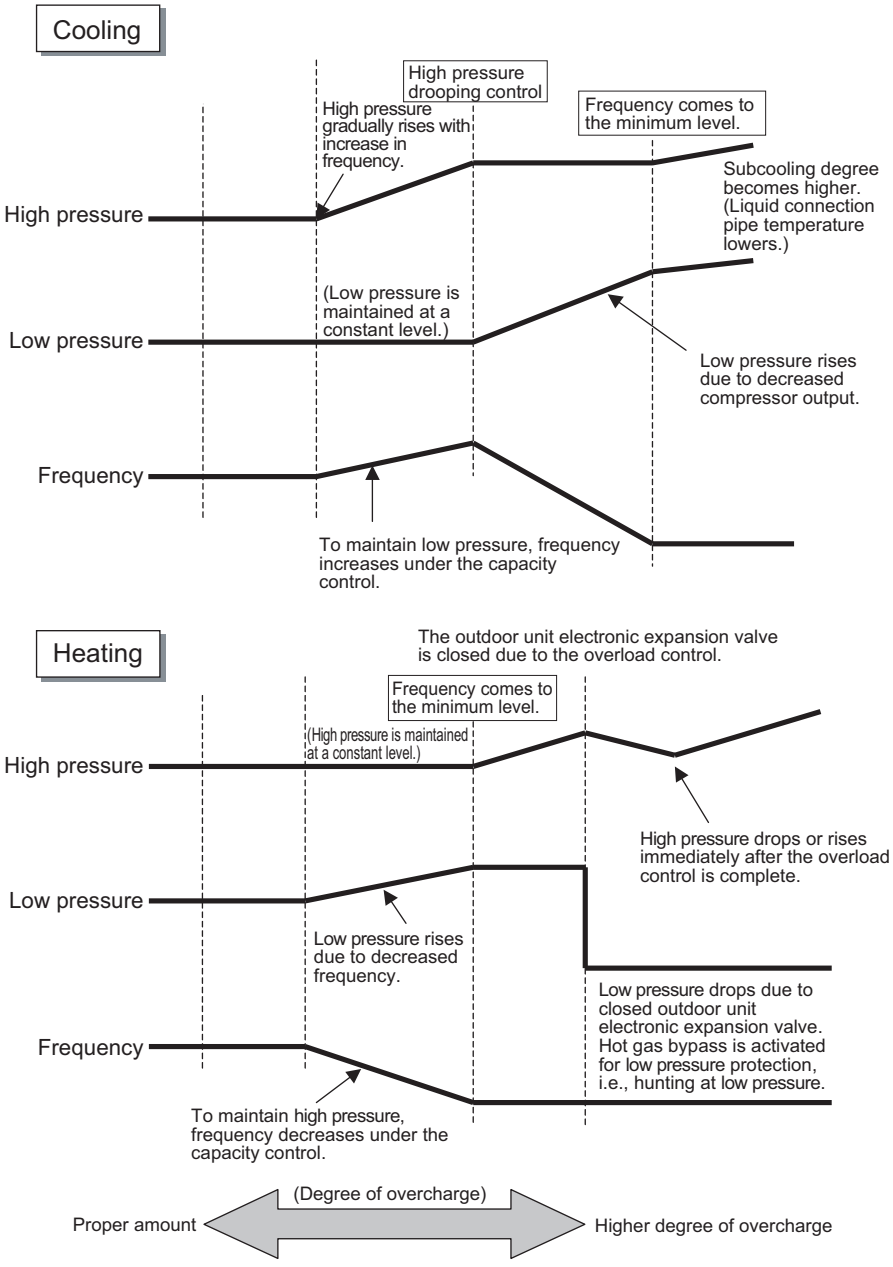
(Use the above values as a guide. Depending on the other conditions, the unit may be normal despite the values within the above range.)

CHECK 6 **Check for overcharge of refrigerant.**

In case of VRV Systems, the only way to judge as the overcharge of refrigerant is with operating conditions due to the relationship to pressure control and electronic expansion valve control. As information for making a judgement, refer to the information below.

Diagnosis of overcharge of refrigerant

1. High pressure rises. Consequently, overload control is conducted to cause insufficient cooling capacity.
2. The superheated degree of suction gas lowers (or the wet operation is performed). Consequently, the compressor becomes lower in discharge pipe temperature despite of pressure loads.
3. The subcooled degree of condensate rises. Consequently, in heating, the temperature of discharge air through the subcooled section becomes lower.

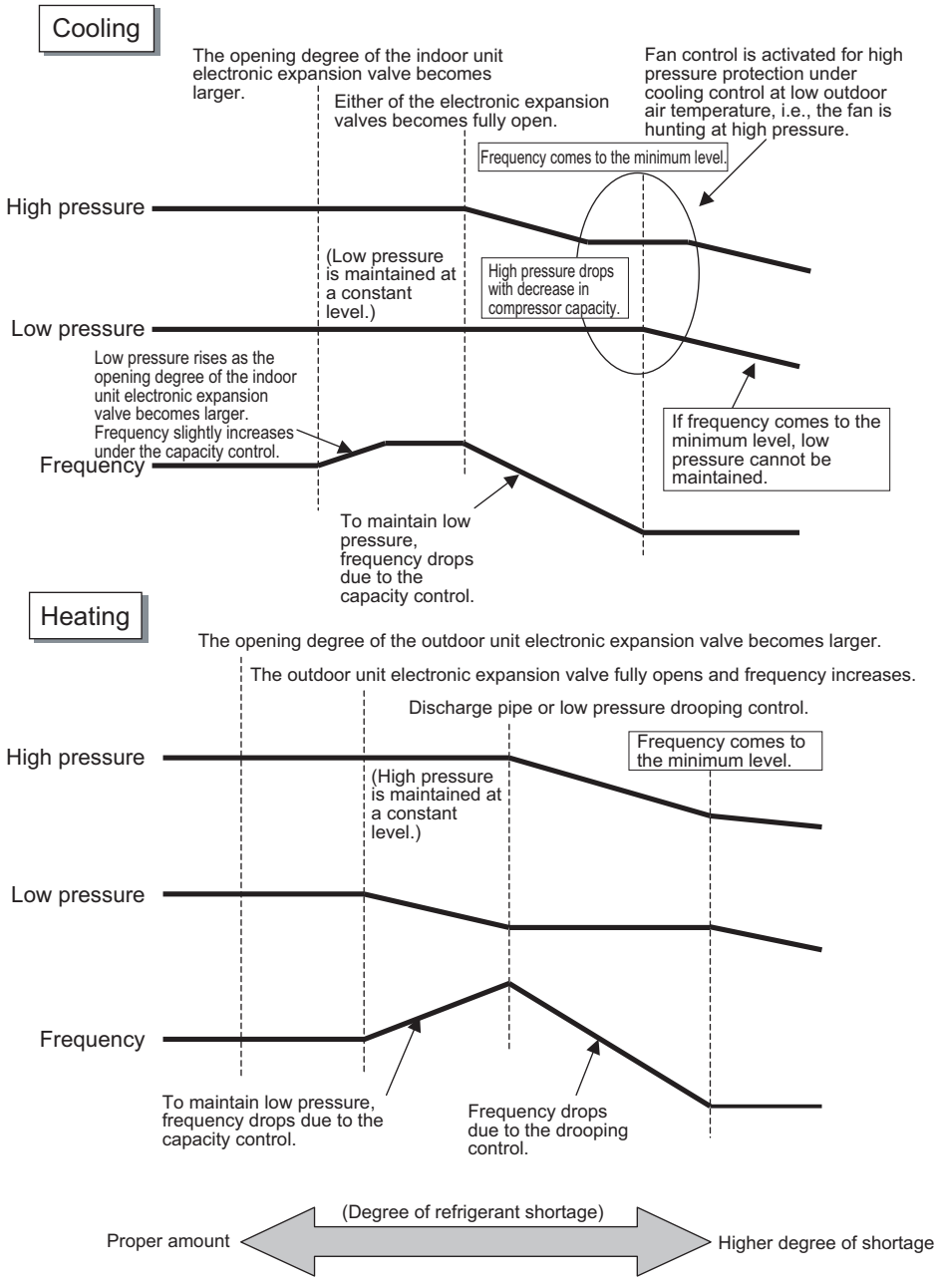


CHECK 7 **Check for shortage of refrigerant.**

In case of VRV Systems, the only way to judge as the shortage of refrigerant is with operating conditions due to the relationship to pressure control and electronic expansion valve control. As information for making a judgement, refer to the information below.

Diagnosis of shortage of refrigerant

1. The superheated degree of suction gas rises. Consequently, the compressor discharge gas temperature becomes higher.
2. The superheated degree of suction gas rises. Consequently, the electronic expansion valve turns open.
3. Low pressure drops to cause the unit not to demonstrate cooling capacity (heating capacity).



CHECK 8 **Vacuuming and dehydration procedure.**

Conduct vacuuming and dehydration in the piping system following the procedure for <Normal vacuuming and dehydration> described below.
Furthermore, if moisture may get mixed in the piping system, follow the procedure for <Special vacuuming and dehydration> described below.

<Normal vacuuming and dehydration>

① Vacuuming and dehydration
- Use a vacuum pump that enables vacuuming up to -100.7kPa (5 torr, -755 mmHg).
- Connect manifold gauges to the service ports of liquid pipe and gas pipe and run the vacuum pump for a period of 2 or more hours to conduct evacuation to -100.7kPa or less.
- If the degree of vacuum does not reach -100.7kPa or less even though evacuation is conducted for a period of 2 hours, moisture will have entered the system or refrigerant leakage will have been caused. In this case, conduct evacuation for a period of another 1 hour.
- If the degree of vacuum does not reach -100.7kPa or less even though evacuation is conducted for a period of 3 hours, conduct the leak tests.

② Leaving in vacuum state
- Leave the compressor at the degree of vacuum of -100.7kPa or less for a period of 1 hour or more, and then check to be sure that the vacuum gauge reading does not rise. (If the reading rises, moisture may have remained in the system or refrigerant leakage may have been caused.)

③ Additional refrigerant charge
- Purge air from the manifold gauge connection hoses, and then charge a necessary amount of refrigerant.

<Special vacuuming and dehydration> - In case of moisture may get mixed in the piping*

① Vacuuming and dehydration
- Follow the same procedure as that for 1) Normal vacuuming and dehydration described above.

② Vacuum break
- Pressurize with nitrogen gas up to 0.05MPa.

③ Vacuuming and dehydration
- Conduct vacuuming and dehydration for a period of 1 hour or more. If the degree of vacuum does not reach -100.7kPa or less even though evacuation is conducted for a period of 2 hours or more, repeat vacuum break - vacuuming and dehydration.

④ Leaving in vacuum state
- Leave the compressor at the degree of vacuum of -100.7kPa or less for a period of 1 hour or more, and then check to be sure that the vacuum gauge reading does not rise.

⑤ Additional refrigerant charge
- Purge air from the manifold gauge connection hoses, and then charge a necessary amount of refrigerant.

Note: * In case of construction during rainy reason, if dew condensation occurs in the piping due to extended construction period, or rainwater or else may enter the piping during construction work.

44.Thermistor Resistance / Temperature Characteristics

Indoor unit
- For suction air — R1T
- For liquid pipe — R2T
- For gas pipe — R3T
- For NTC (only FXSQ and FXMQ-P) — R5T
- For discharge air (only FXMQ-P) — R4T

Outdoor unit
- For radiation fin — R1T

Outdoor unit
- For outdoor air — R1T
- For heat exchanger gas pipe — R6T
- For heat exchanger deicer — R7T
- For subcooling heat exchanger gas pipe — R6T
- For heat exchanger liquid pipe — R4T
- For accumulator inlet — R3T
- For liquid pipe — R5T

Outdoor unit
- For discharge pipe — R21T, R22T, R8T

T°C	kΩ
-30	354.1
-25	259.7
-20	192.6
-15	144.2
-10	109.1
-5	83.25
0	64.10
5	49.70
10	38.85
15	30.61
20	24.29
25	19.41
30	15.61
35	12.64
40	10.30
45	8.439
50	6.954
55	5.761
60	4.797
65	4.014
70	3.375
75	2.851
80	2.418
85	2.060
90	1.762
95	1.513
100	1.304
105	1.128
110	0.9790
115	0.8527
120	0.7450
125	0.6530
130	0.5741

3PA61998L (AD92A057)

T°C	kΩ
-30	361.7719
-25	265.4704
-20	196.9198
-15	147.5687
-10	111.6578
-5	85.2610
0	65.6705
5	50.9947
10	39.9149
15	31.4796
20	25.0060
25	20.0000
30	16.1008
35	13.0426
40	10.6281
45	8.7097
50	7.1764
55	5.9407
60	4.9439
65	4.1352
70	3.4757
75	2.9349
80	2.4894
85	2.1205
90	1.8138
95	1.5575
100	1.3425
105	1.1614

3SA48001 (AD87A001J)

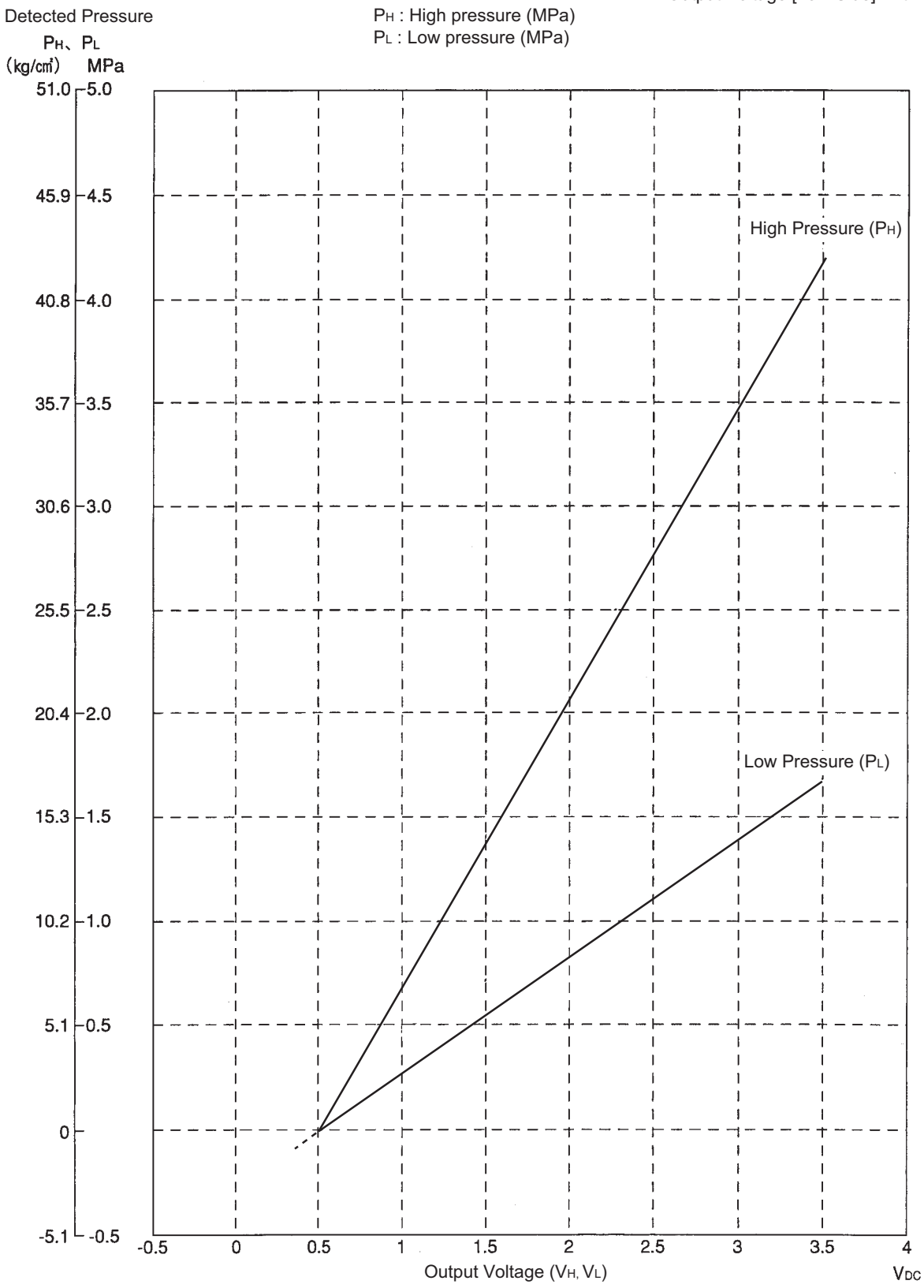
T°C	kΩ
-30	3257.371
-25	2429.222
-20	1827.883
-15	1387.099
-10	1061.098
-5	817.9329
0	635.0831
5	496.5712
10	391.0070
15	309.9511
20	247.2696
25	198.4674
30	160.2244
35	130.0697
40	106.1517
45	87.0725
50	71.7703
55	59.4735
60	49.5180
65	41.4168
70	34.7923
75	29.3499
80	24.8586
85	21.1360
90	18.0377
95	15.4487
100	13.2768
105	11.4395
110	9.8902
115	8.5788
120	7.4650
125	6.5156
130	5.7038
135	5.0073
140	4.4080
145	3.8907
150	3.4429

3SA48006 (AD87A001J)

45.Pressure Sensor Characteristics

$P_H = 1.38V_H-0.69$
$P_L = 0.57V_L-0.28$
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}

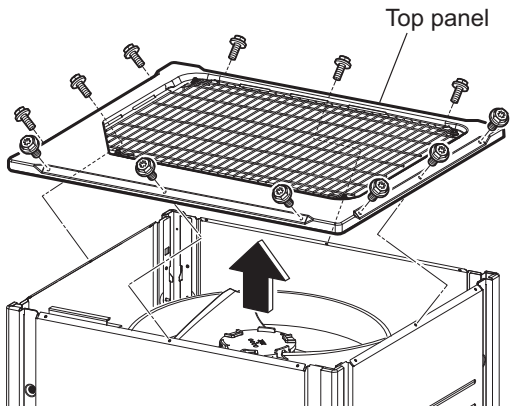
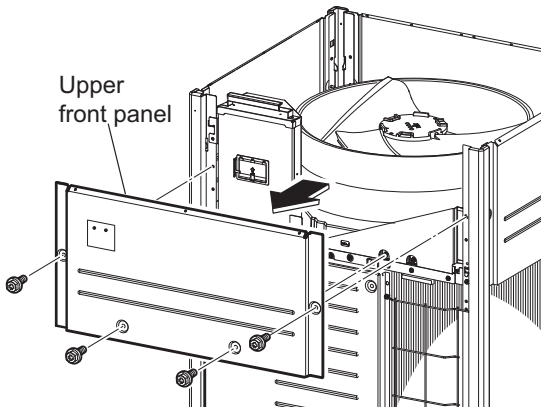
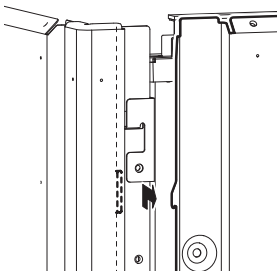
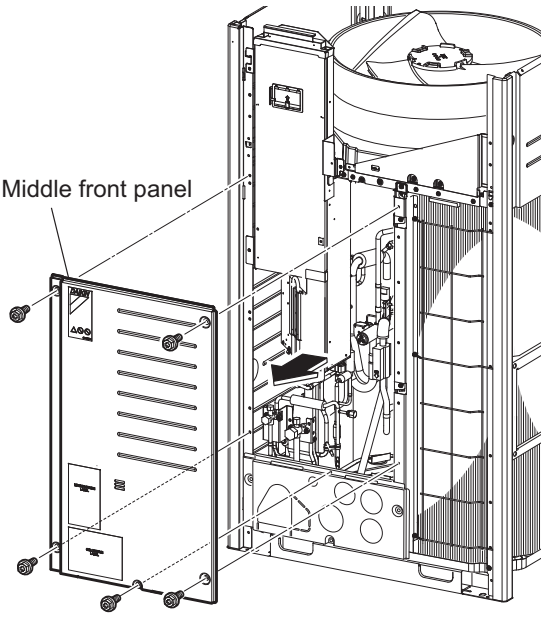
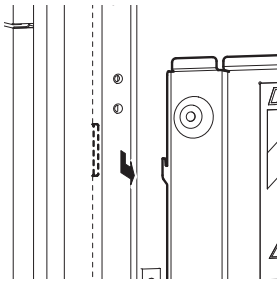


Part 7
Replacement Procedure for Outdoor Parts

1. RXYQ8,10,12T

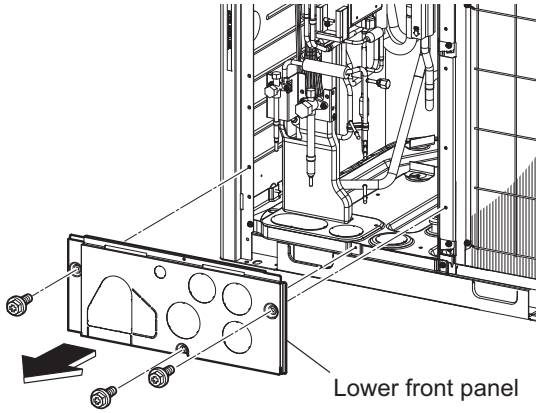
1.1 Removal Instructions for Outside Panels (1/2)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
1. Remove the top panels ① Remove the 12 screws, and pull out the top panel upward.		★ In case of working on a stepladder, secure the stepladder to ensure work safety.
2. Remove the upper front panel ① Remove the 4 screws, unclamp two claws and pull out the upper front panel upward.		★ There is a claw on each side of the upper front panel. 
3. Remove the middle front panel ① Remove the five screws, unclamp the single claw, and take out the middle front panel.		

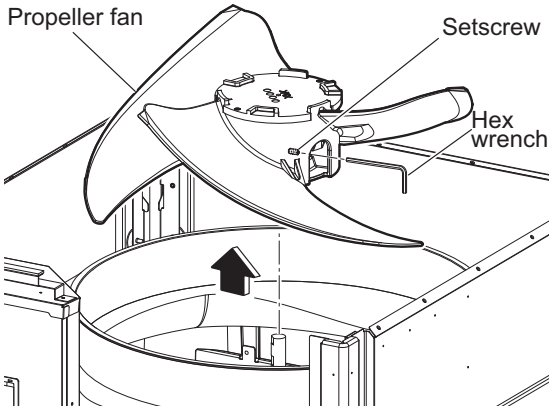
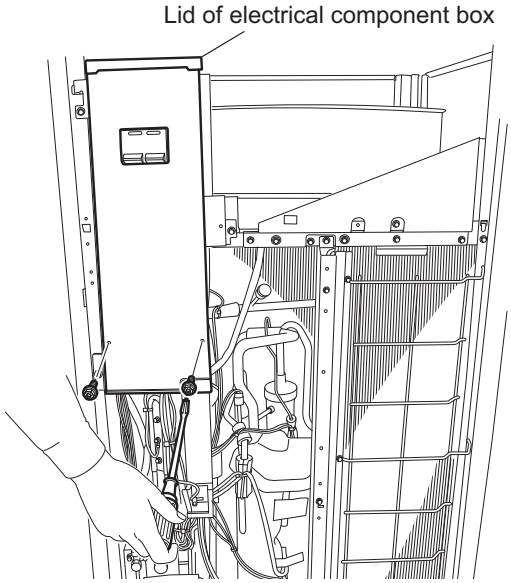
1.2 Removal Instructions for Outside Panels (2/2)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure	Remarks
4. Remove the lower front panel ① Remove the three screws, unclamp the single claw, and take out the lower front panel.	

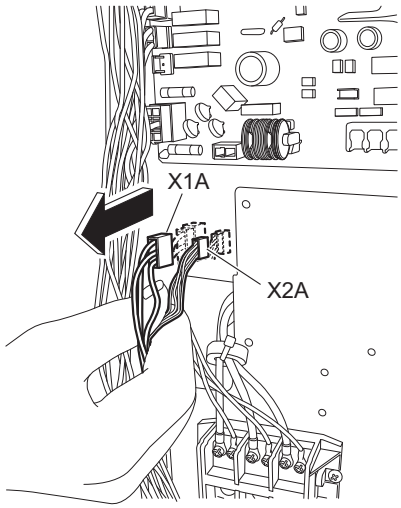
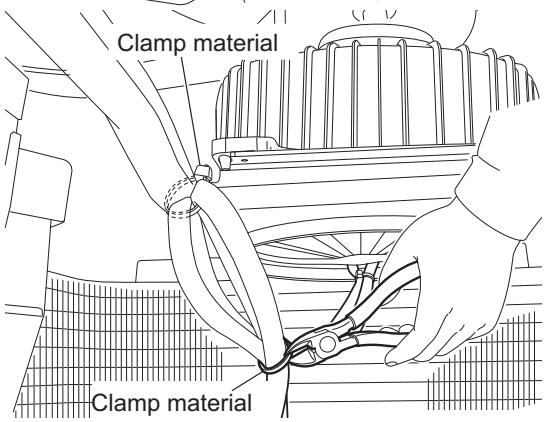
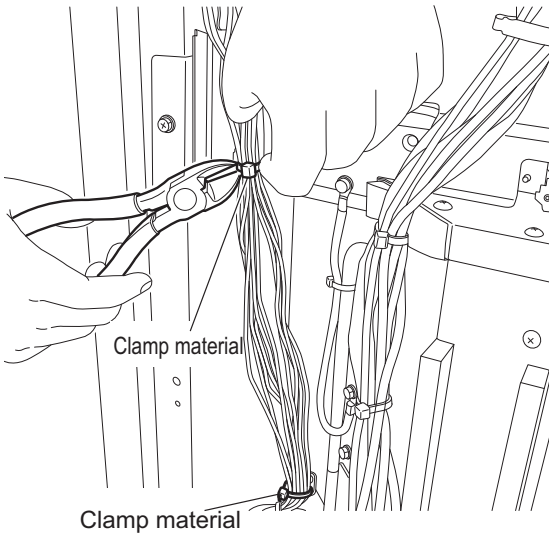
1.3 Removal Instructions for Fan Motor (1/3)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the top panel and upper, middle, and lower front panels. **1. Remove the propeller fan** ① Loosen the setscrew (M10) with a hex wrench. ② Pull out the propeller fan upward.		
2. Remove the fan motor ① Remove the two screws from the lid of the electrical component box. ② Slide down the lid of the electrical component box until the top edge of the lid becomes visible, and remove the lid of the electrical component box.		

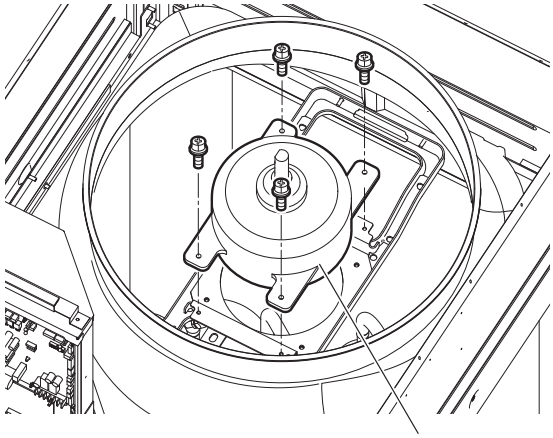
1.4 Removal Instructions for Fan Motor (2/3)

> **⚠ WARNING**
> Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
③ Remove the relay connectors (X1A and X2A) for the fan motor.		
④ Remove the four clamp materials that secure the leads.		
		

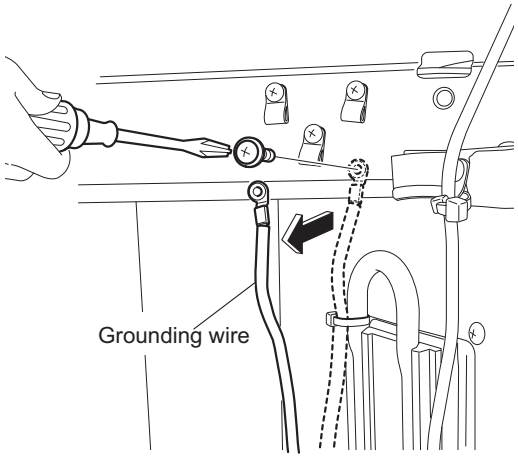
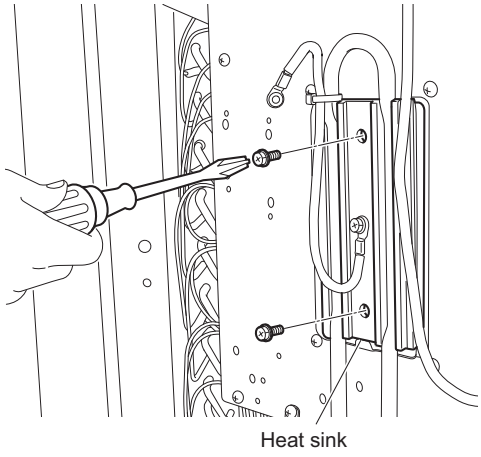
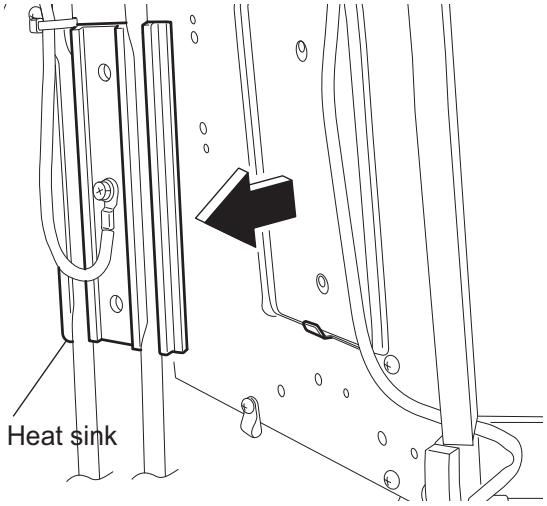
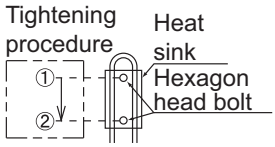
1.5 Removal Instructions for Fan Motor (3/3)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
⑤ Remove the four fixing bolts, and take out the fan motor.		

1.6 Removal Instructions for Electrical Component Assembly (1/4)

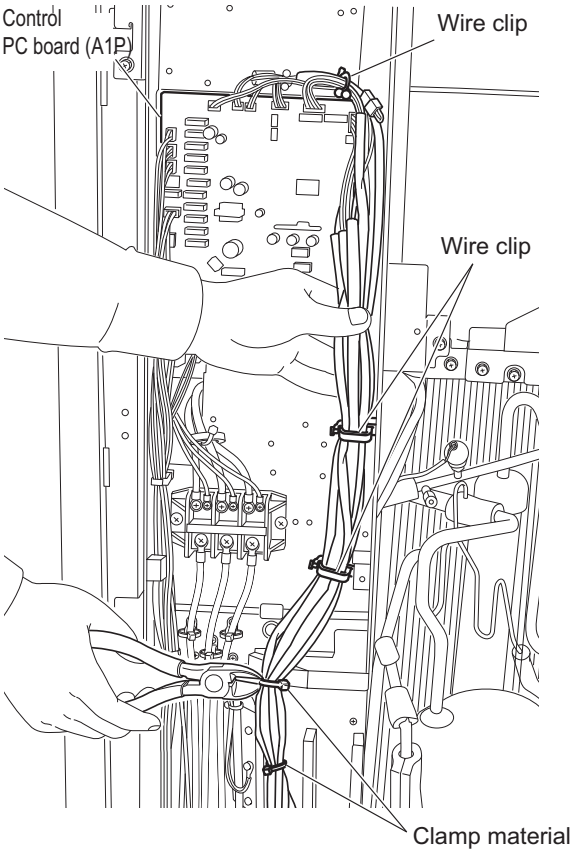
⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the top panel and upper and middle front panels. ● Remove the two screws, and take out the lid of the electrical component box. **1. Remove the heat sink** ① Remove the ground wire from the heat sink. ② Remove the two screws from the heat sink. ③ Unclamp the hook on the mounting part and pull out the heat sink.	  	★ Precautions for the installation of the heat sink. Tighten the screws twice in the order of (1) to (4) as shown in the illustration below.  Tightening torque 1.8±0.2N·m

1.7 Removal Instructions for Electrical Component Assembly (2/4)

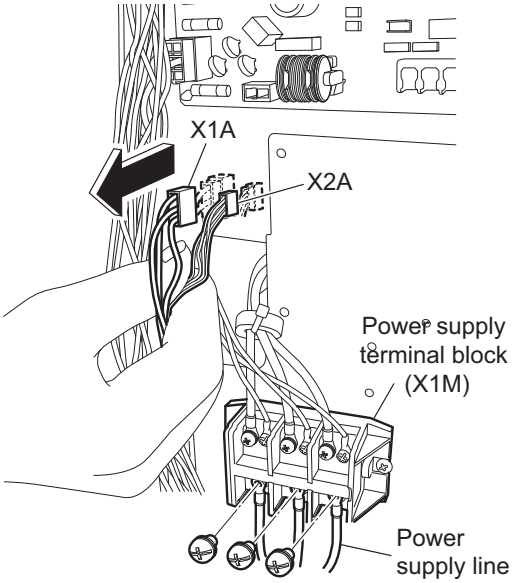
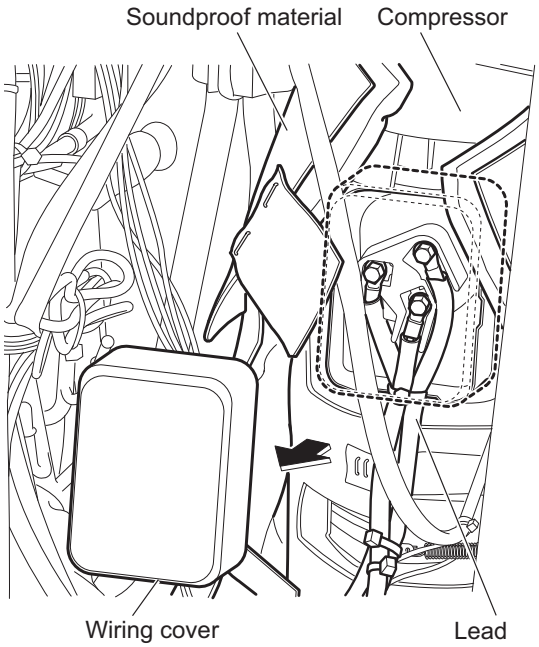
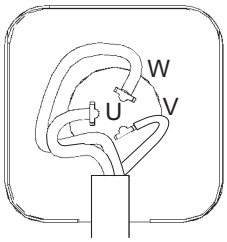
> **WARNING**
> Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure	Remarks
2. Remove the electrical component assembly ① Remove the connectors on the control PC board (A1P). ② Cut two points of the clamp material. ③ Remove the harness from the wire clip.	



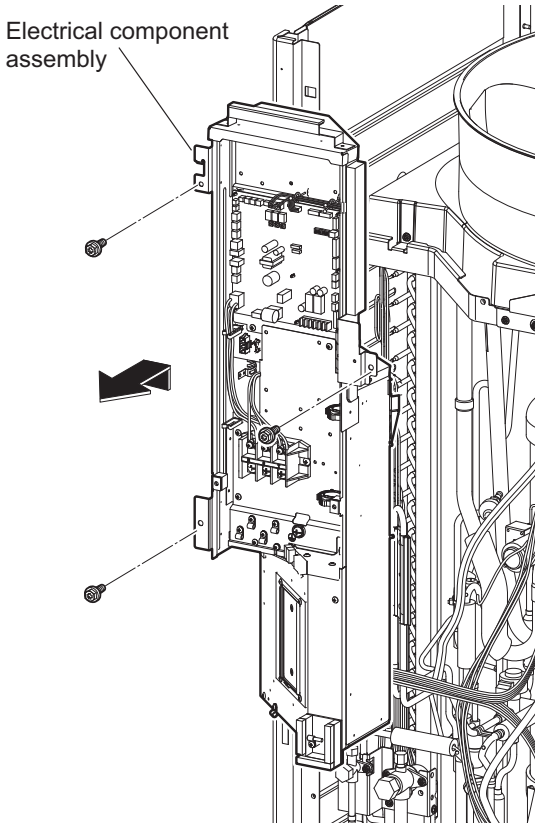
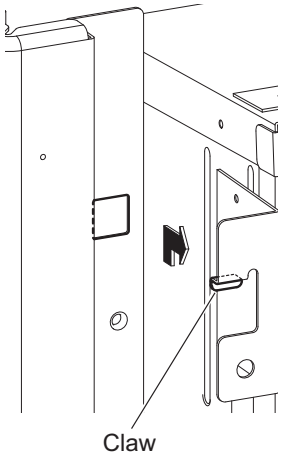
1.8 Removal Instructions for Electrical Component Assembly (3/4)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
④ Remove the relay connectors (X1A and X2A) for the fan motor. ⑤ Remove the three screws from the power supply terminal block (X1M), and disconnect the power supply line.		
⑥ Open the soundproof material of the inverter compressor (M1C), and remove the wiring cover. ⑦ Remove the three leads from the terminals of the compressor (M1C).		★ Compressor 8~20hp terminal symbol 

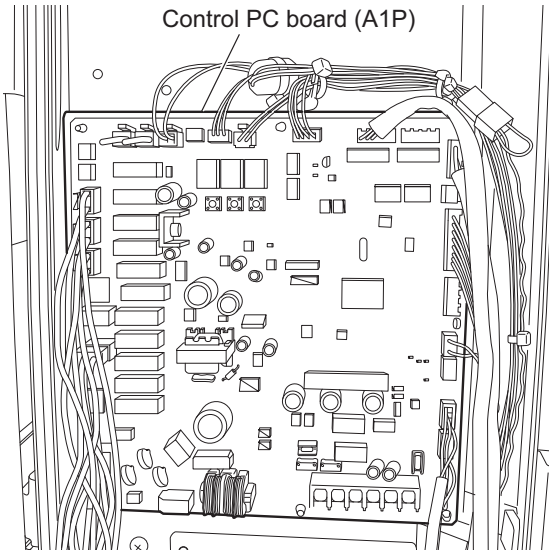
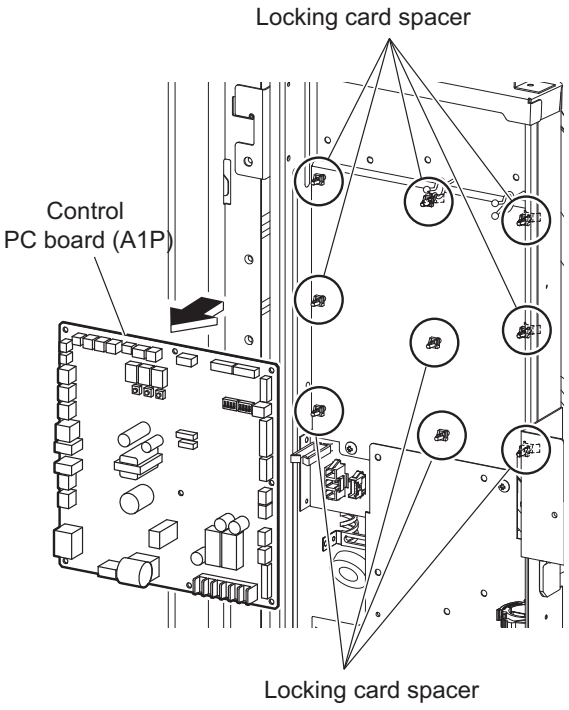
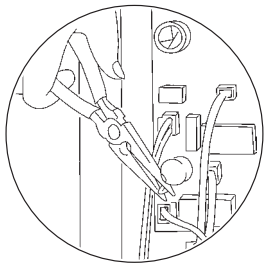
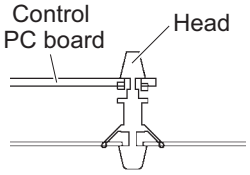
1.9 Removal Instructions for Electrical Component Assembly (4/4)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
⑧ Remove the three screws, lift up the upper part of the electrical component assembly, and take out the electrical component assembly.		★ Unclamp the claw on the back of the electrical component assembly.  ★ Take out the electrical component assembly with careful attention paid to the heat sink.

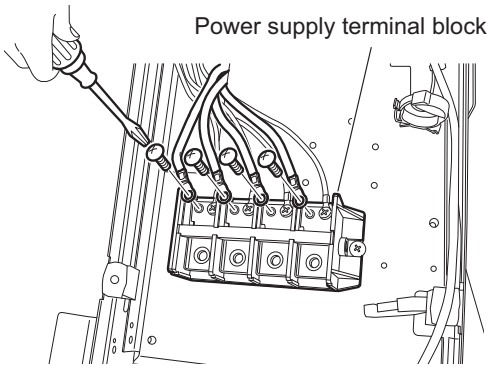
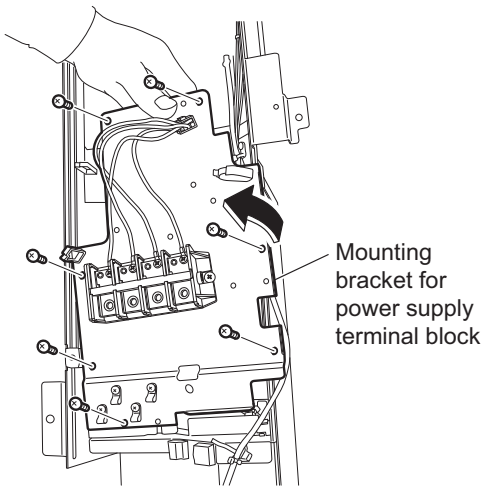
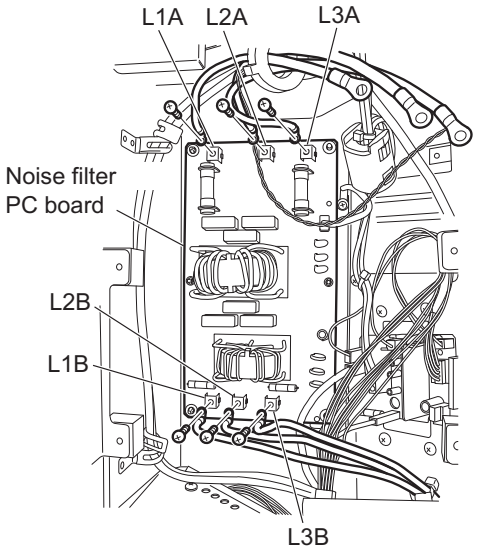
1.10 Removal Instructions for Control PC Board

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the top panel and upper and middle front panels. ● Remove the two screws, and take out the lid of the electrical component box.		
1. Remove the control PC board (A1P)		
① Remove all the connectors on the control PC board.		
② Remove the locking card spacer and take out the control PC board (A1P).		★ Removal from the locking card spacer  ★ Cross-sectional view of locking card spacer 

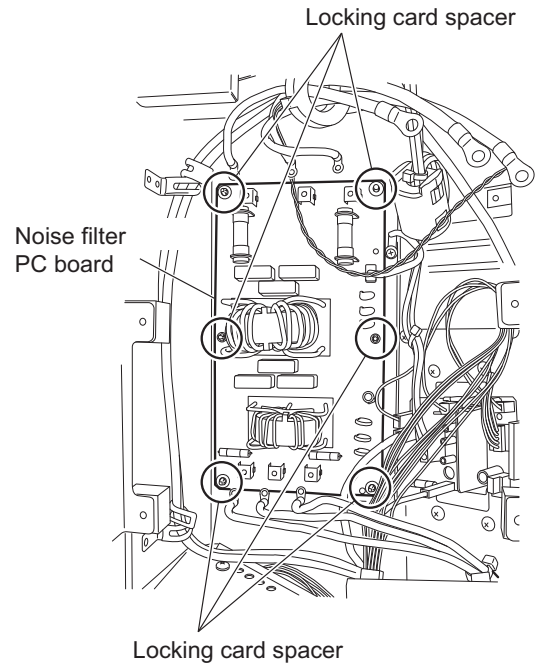
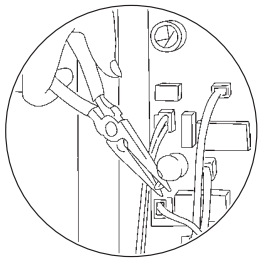
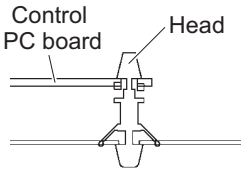
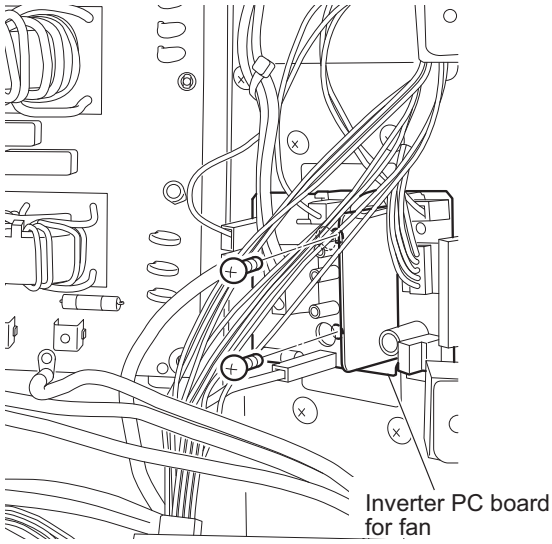
1.11 Removal Instructions for Noise Filter PC Board, Inverter PC Board for Fan and Inverter PC Board for Compressor (1/5)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the upper and middle front panels. ● Follow the removal instructions for the electrical component assembly to remove the electrical component assembly.		
1. Remove the noise filter PC board (A2P) ① Remove the three wires from the power supply terminal block. ② Remove the seven screws from the power supply terminal block mounting bracket to take it out.		
③ Remove the connector on the noise filter PC board. ④ Remove the screws from the L1A, L2A, L3A, L1B, L2B, and L3B terminals.		

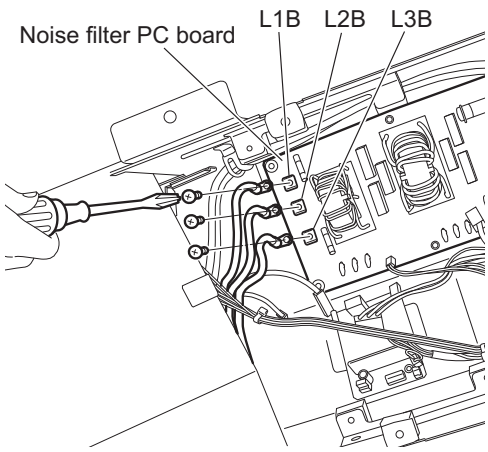
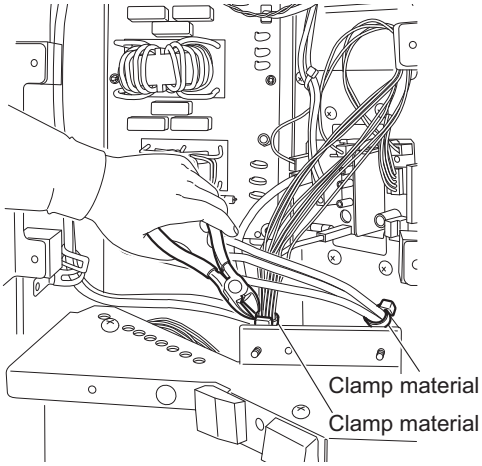
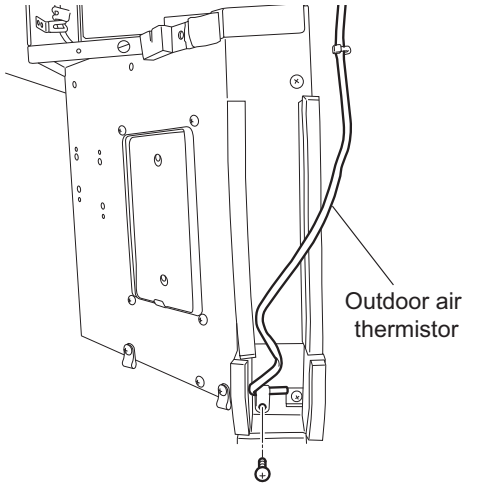
1.12 Removal Instructions for Noise Filter PC Board, Inverter PC Board for Fan and Inverter PC Board for Compressor (2/5)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
⑤ Remove the locking card spacer, and take out the noise filter PC board.		★ Removal from the locking card spacer  ★ Cross-sectional view of locking card spacer 
2. Remove the inverter PC board for the fan ① Remove the connector on the inverter PC board for the fan. ② Remove the two screws, and take out the inverter PC board for the fan.		

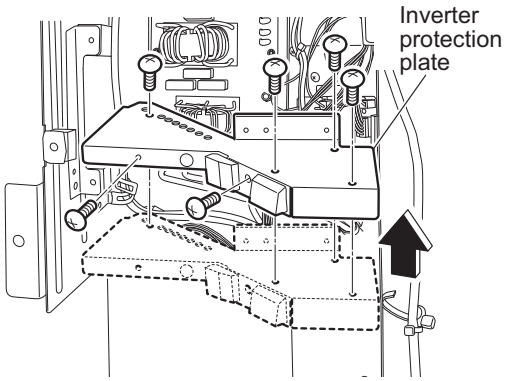
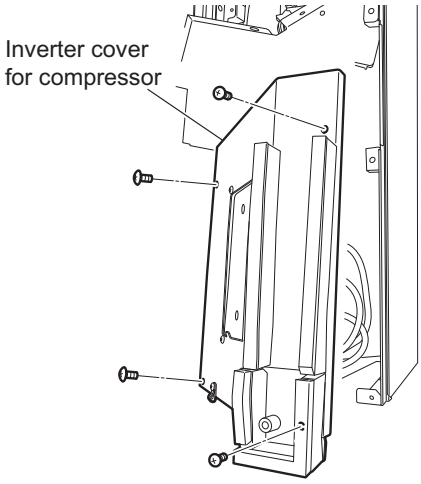
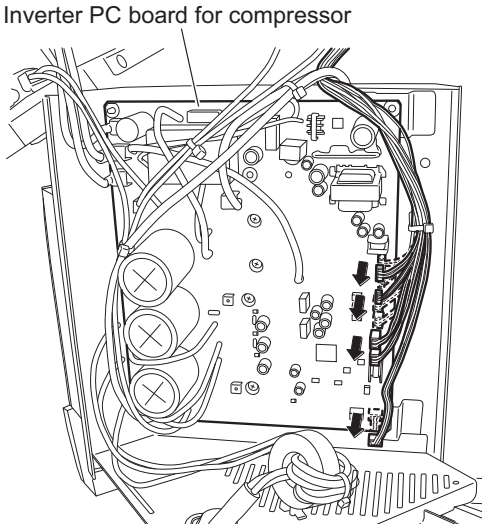
1.13 Removal Instructions for Noise Filter PC Board, Inverter PC Board for Fan and Inverter PC Board for Compressor (3/5)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure	Remarks
3. Remove the inverter PC board (A3P) for the compressor ① Remove the three screws from the L1B, L2B, and L3B terminals on the noise filter PC board. ② Cut two points of the clamp material for the inverter protection plate. ③ Remove the single screw from the outdoor air thermistor.	  

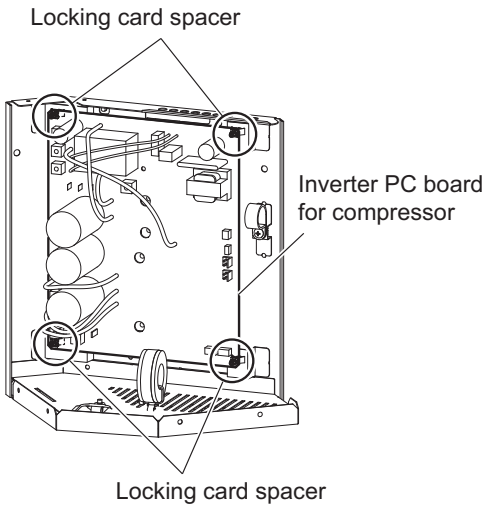
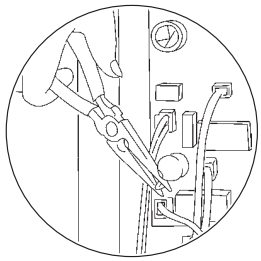
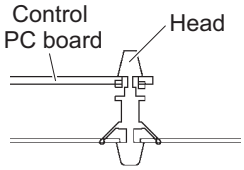
1.14 Removal Instructions for Noise Filter PC Board, Inverter PC Board for Fan and Inverter PC Board for Compressor (4/5)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
④ Remove the six screws, and take out the inverter protection plate.		
⑤ Remove the four screws, and take out the inverter cover for the compressor.		
⑥ Remove all the connectors on the inverter PC board for the compressor.		

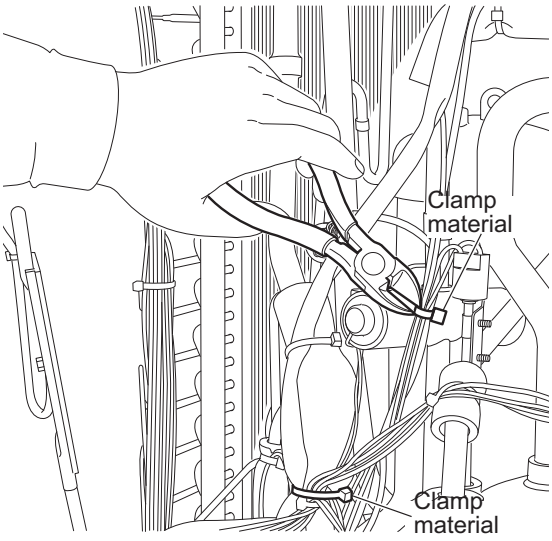
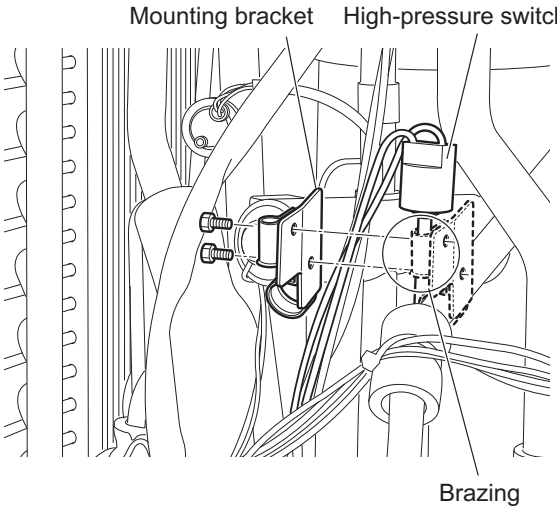
1.15 Removal Instructions for Noise Filter PC Board, Inverter PC Board for Fan and Inverter PC Board for Compressor (5/5)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
⑦ Remove the locking card spacer, and take out the inverter PC board for the compressor.		★ Removal from the locking card spacer  ★ Cross-sectional view of locking card spacer 

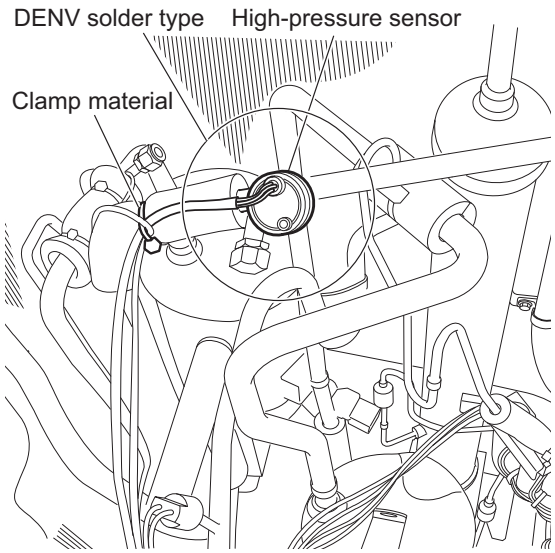
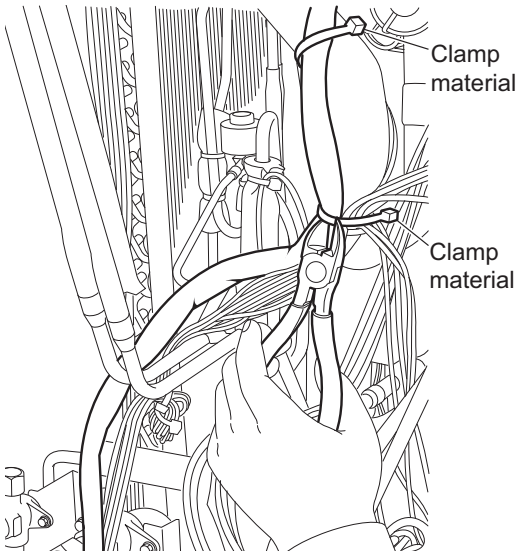
1.16 Removal Instructions for Pressure Switches and Pressure Sensors (1/3)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the upper and middle front panels. ● Follow the removal instructions for the electrical component assembly to remove the electrical component assembly.		
1. Remove the pressure switches ① Remove the connector (X4A) on the high-pressure switch. ② Cut four points of the clamp material.		
③ Remove the two screws, and take out the mounting bracket. ④ Remove the one-point brazing, and take out the high-pressure switch.		★ Perform brazing after checking that the refrigerant has been completely purged. ★ Use an appropriate protector, such as a steel plate, so that the flame of the gas-welding machine does not have an adverse effect on other piping.

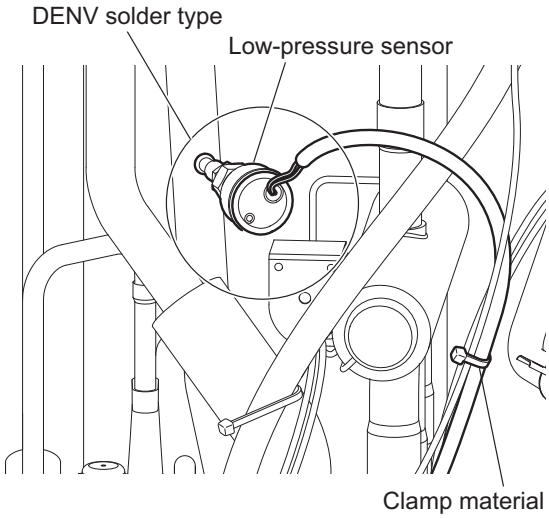
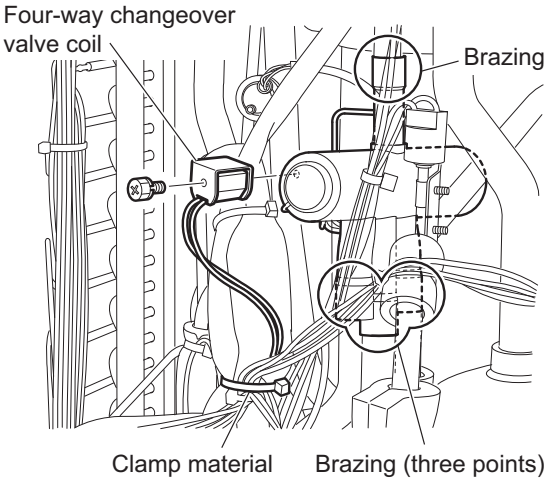
1.17 Removal Instructions for Pressure Switches and Pressure Sensors (2/3)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
2. Remove the pressure sensors ① Remove the connector (X32A) for the high-pressure sensor. ② Remove the leads from the two wire clips, and cut three points of the clamp material. ③ Use two wrenches to remove the high-pressure sensor.		★ You can remove the high-pressure sensor without purging the refrigerant. (A check valve is provided.)
④ Remove the connector (X31A) for the low-pressure sensor. ⑤ Remove the leads from the two wire clips, and cut two points of the clamp material.		

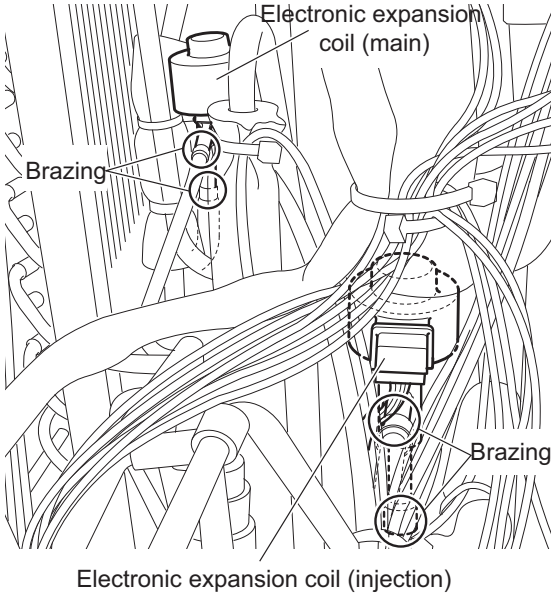
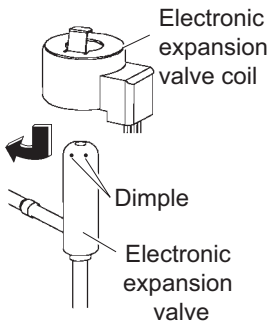
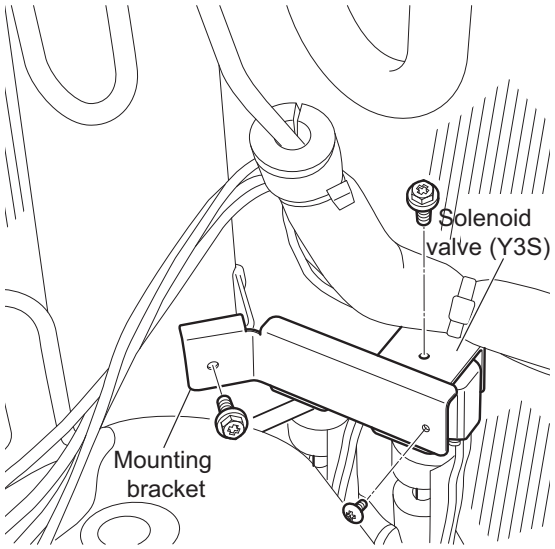
1.18 Removal Instructions for Pressure Switches and Pressure Sensors (3/3)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
⑥ Use two wrenches to remove the low-pressure sensor.		★ Solder type
3. Remove the four-way changeover valve ① Remove the connector (X15A) for the four-way changeover valve coil (Y4S). ② Remove the leads from the two wire clips, and cut two points of the clamp material. ③ Remove the single screw, and take out the four-way changeover valve. ④ Remove the four-point brazing, and take out the four-way changeover valve.		★ Blaze the four-way changeover valve while cooling the valve so that the temperature of the valve does not exceed 120°C. ★ Perform brazing after checking that the refrigerant has been completely purged. ★ Use an appropriate protector, such as a steel plate, so that the flame of the gas-welding machine does not have an adverse effect on other piping.

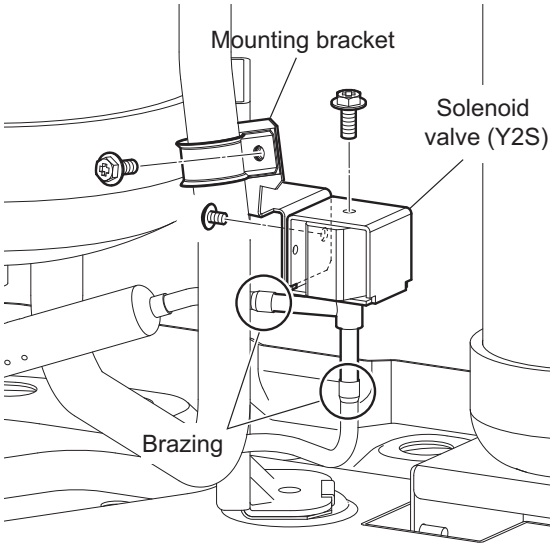
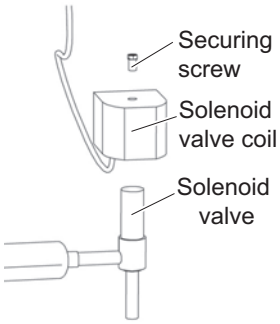
1.19 Removal Instructions for Electronic Expansion Valves and Solenoid Valves (1/2)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the top panel and upper, middle, and lower front panels. ● Follow the removal instructions for the electrical component assembly to remove the electrical component assembly.		
1. Remove the electronic expansion valves ① Rotate the main and injection electronic expansion valves by 20° to 30°, and pull out the valves upward. ② Remove the two-point brazing, and take out the electronic expansion valve.		★ Mounting method of electronic expansion valve 
2. Remove the solenoid valves ① Remove the single screw, and take out the mounting bracket. ② Remove each screw each from the mounting bracket, and take out the solenoid valve (Y3S). ③ Remove each screw each, and take out the solenoid valve coils.		

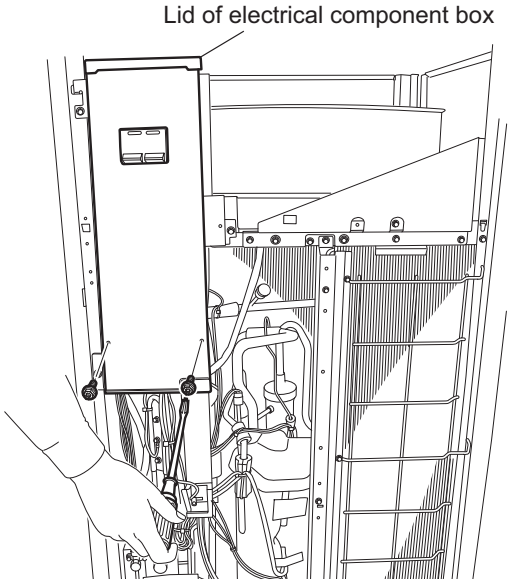
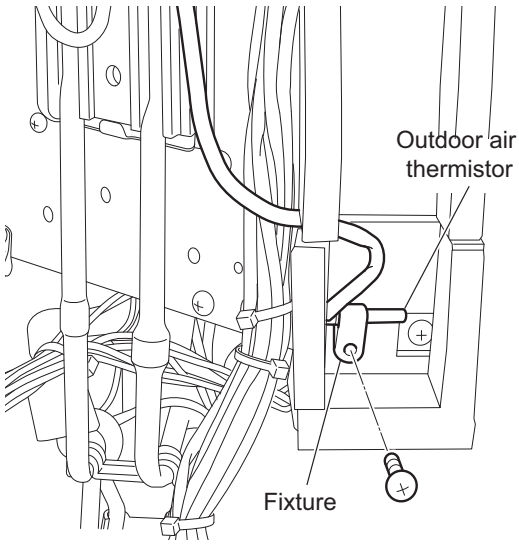
1.20 Removal Instructions for Electronic Expansion Valves and Solenoid Valves (2/2)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
④ Remove the single screw, and take out the mounting bracket for the solenoid valve (Y2S). ⑤ Remove the single screw from the mounting bracket, and take out the solenoid valve (Y2S). ⑥ Remove the two-point brazing, and take out the solenoids.		★ Removal of solenoid valves  ★ Perform brazing after checking that the refrigerant has been completely purged.

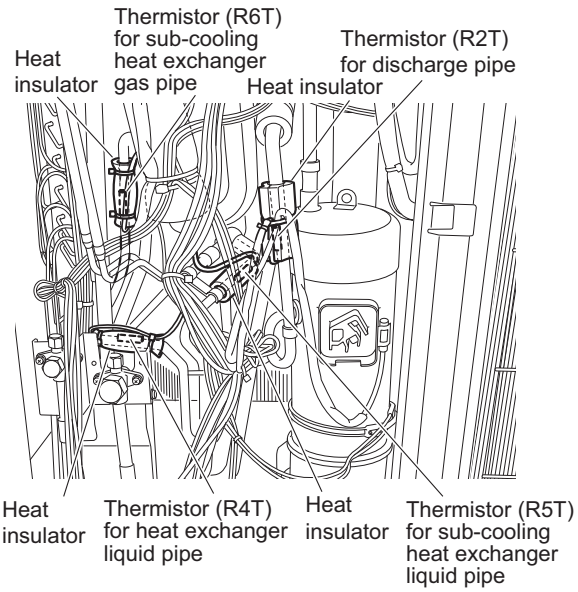
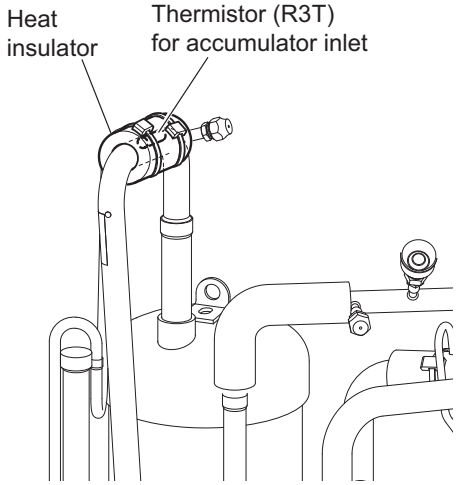
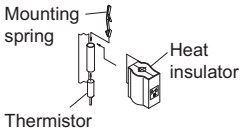
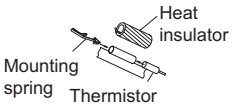
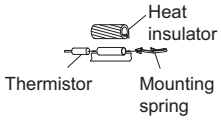
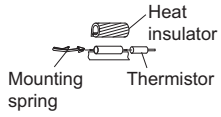
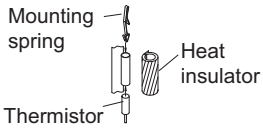
1.21 Removal Instructions for Outdoor Air Thermistor

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the top panel and upper, middle, and lower front panels. **1. Remove the outdoor air thermistor (R1T)** ① Remove the two screws, and take out the lid of the electrical component box. ② Remove the connector (X18A) for the outdoor air thermistor, and disconnect the leads from the two wire clips.		
③ Cut two points of the clamp material. ④ Remove the single screw, dismount the fixture, and take out the outdoor air thermistor.		

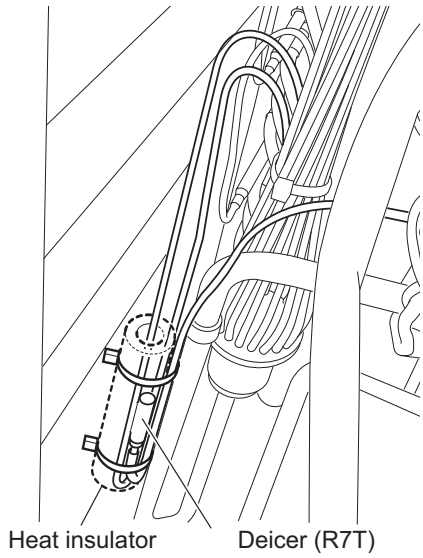
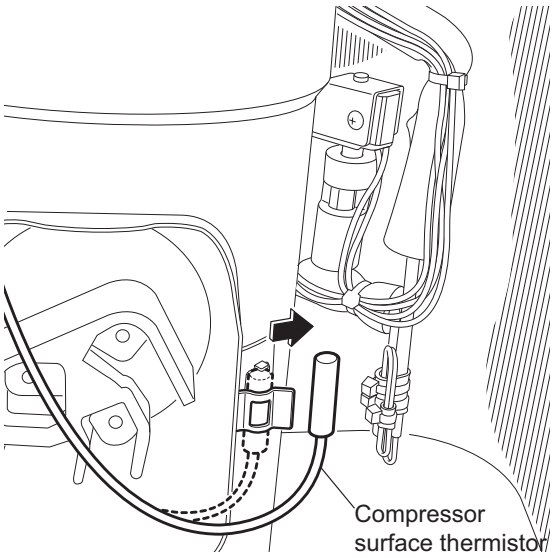
1.22 Removal Instructions for Each Thermistor (1/2)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal Instructions for the outside panels to remove the top panel and upper, middle, and lower front panels. ● Follow the removal Instructions for the electrical component assembly to remove the electrical component assembly. **1. Remove the thermistors (R2T, R3T, R4T, R5T and R6T)** ① Remove the heat insulator. ② Press the lower part of each mounting screw for the thermistors, and take out the thermistors.	 	★ 1 Perform brazing after checking that the refrigerant has been completely purged.  ★ 2 Thermistor (R3T) for accumulator inlet  ★ 3 Thermistor (R4T) for heat exchanger liquid pipe  ★ 4 Thermistor (R5T) for sub-cooling heat exchanger liquid pipe  ★ 5 Thermistor (R6T) for sub-cooling heat exchanger gas pipe 

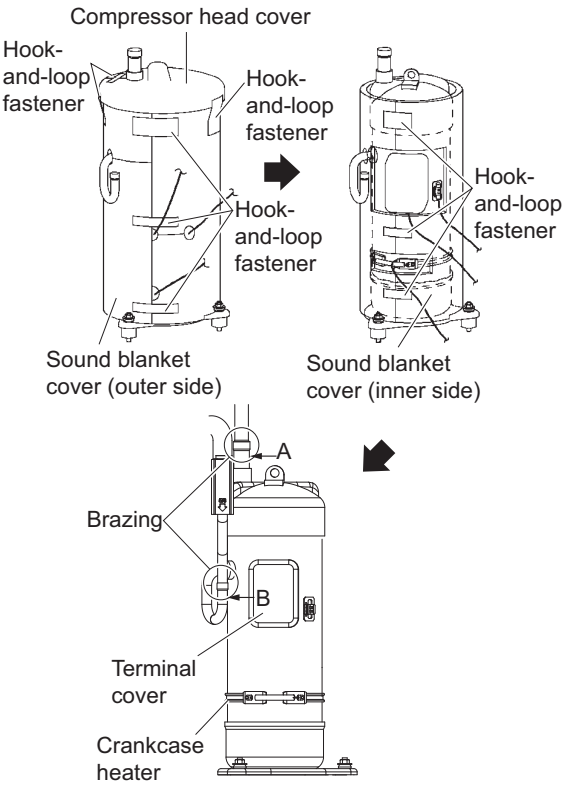
1.23 Removal Instructions for Each Thermistor (2/2)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
2. Remove the deicer (R7T) ① Remove the heat insulator. ② Pull out the deicer together with the mounting bracket.		
3. Remove the compressor surface thermistor (R8T) ① Pull out the compressor surface thermistor from the mounting bracket.		Only: M1C: 10, 12hp M2C: 18, 20hp

1.24 Removal Instructions for Compressor (1/2)

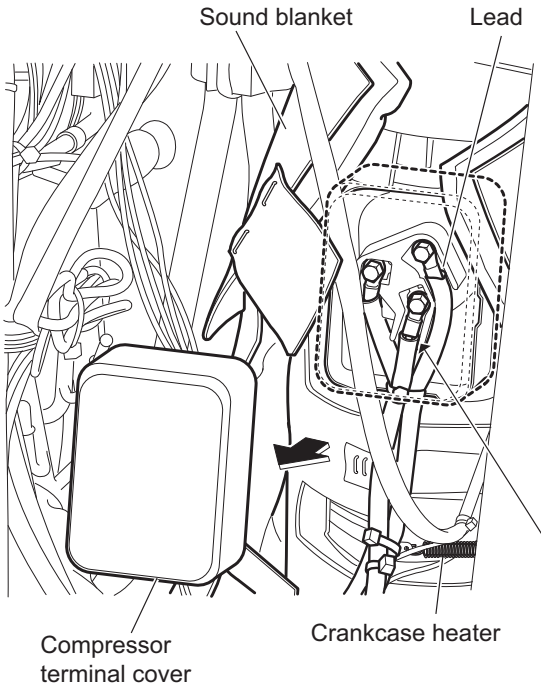
> **⚠ WARNING**
> Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

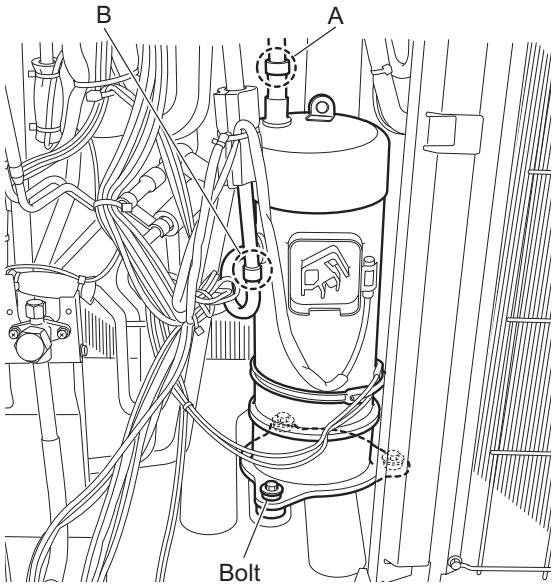
Work procedure	Remarks
● Follow the removal instructions for the outside panels to remove the top panel and upper, middle, and lower front panels. ● Follow the removal instructions for the electrical component assembly to remove the electrical component assembly. **1. Remove the sound blanket cover** ① Remove the three hook-and-loop fasteners, and take out the compressor head cover. ② Remove the three Hook-and-loop fasteners, and pull out the sound blanket cover for the compressor.	

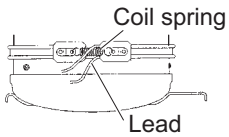
1.25 Removal Instructions for Compressor (2/2)

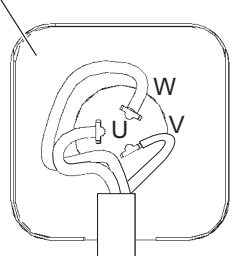
⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure	Remarks
2. Remove the crankcase heater ① Remove the coil spring, and pull out the crankcase heater.	★ Perform brazing after checking that the refrigerant has been completely purged. ★ Precautions for the mounting of the crankcase heater • Make sure that the crankcase heater does not overlap with the weld part of the compressor. • Insert the coil spring of the heater into the lead loop.
3. Take out the compressor ① Remove the compressor terminal cover. ② Remove the leads from the compressor terminal block. ③ Remove the three mounting bolts from the compressor. ④ Cut the discharge pipe (at A and B) with a pipe cutter. ⑤ Lift up and pull the compressor forward. ⑥ Remove the residual brazing on the pipe.	★ Compressor terminal symbols ★ Oil will leak at the time of cutting the pipe. Cut the pipe with the lower part protected with a waste cloth.







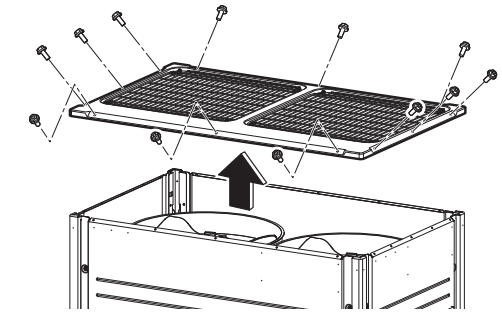


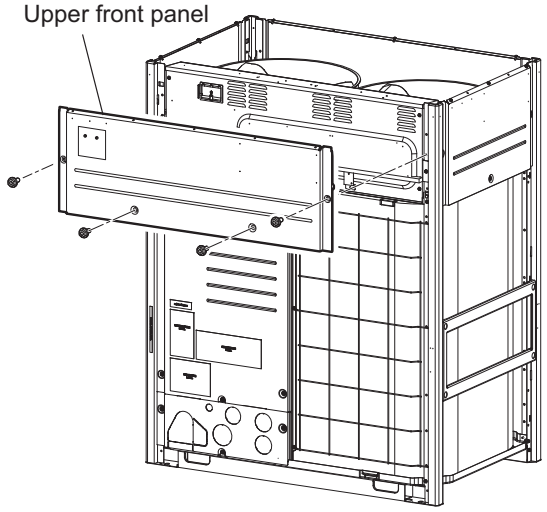
2. RYYQ14,16,18&20T

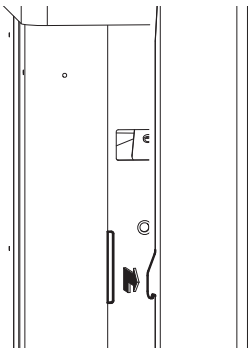
2.1 Removal Instructions for Outside Panels

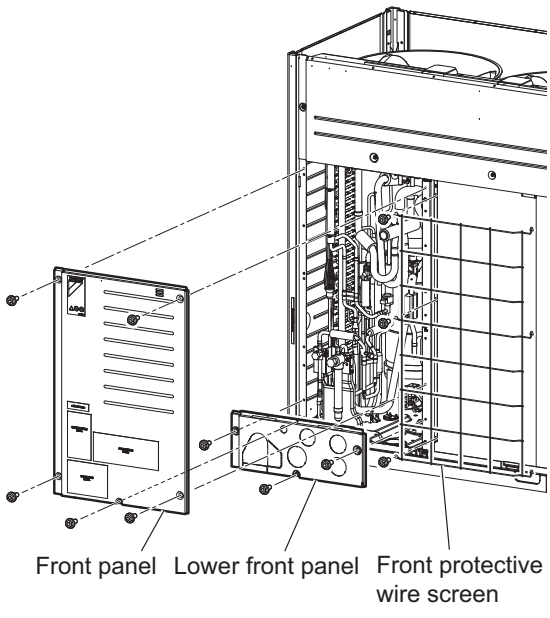
⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

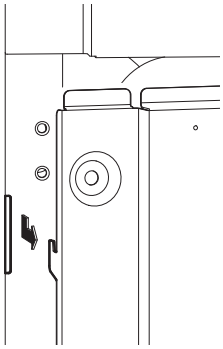
Work procedure	Remarks
1. Remove the top panel ① Remove the 12 screws, and pull out the top panel upward.	
2. Remove the upper front panel ① Remove the three screws, unclamp the two claws, and take out the upper front panel.	There is a claw on each side of the upper front panel.
3. Remove the middle front panel ① Remove the five screws, unclamp the single claw, and take out the middle front panel.	There is a claw on left side of the upper front panel.
4. Remove the protection wire mesh ① Remove the three screws, and take out the front protective wire screen. You can take out the protective wire screen without removing the front panel.	
5. Remove the lower front panel ① Remove the three screws, unclamp the single claw, and take out the lower front panel.	





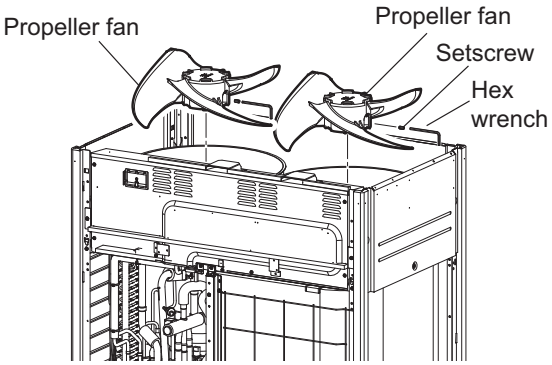
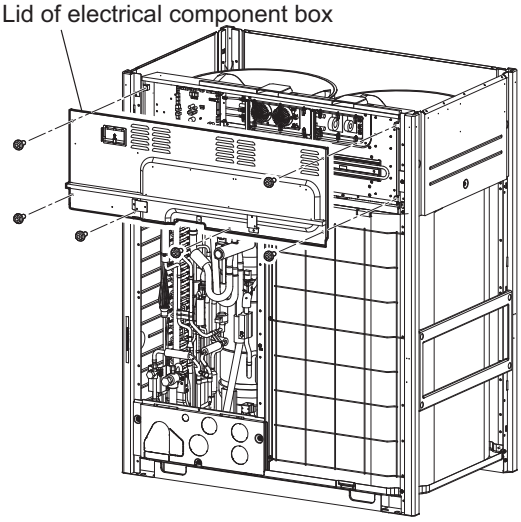
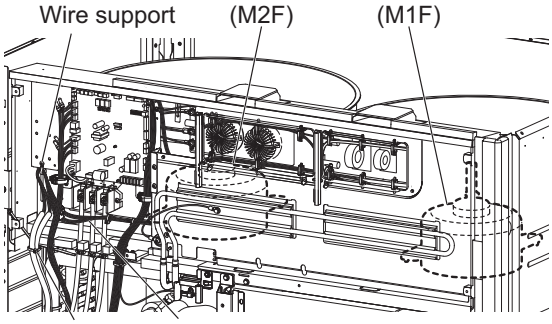
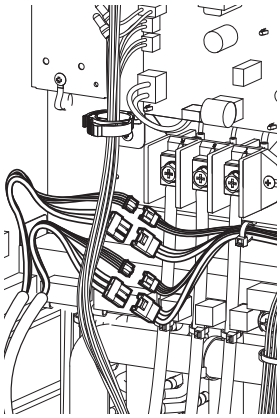






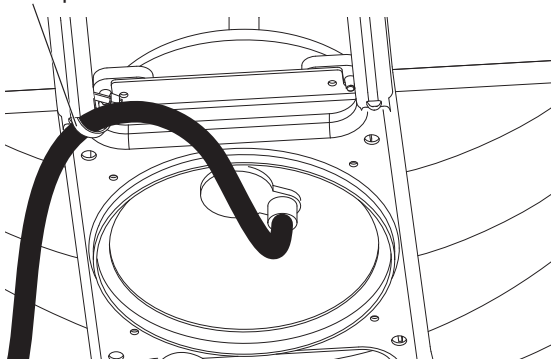
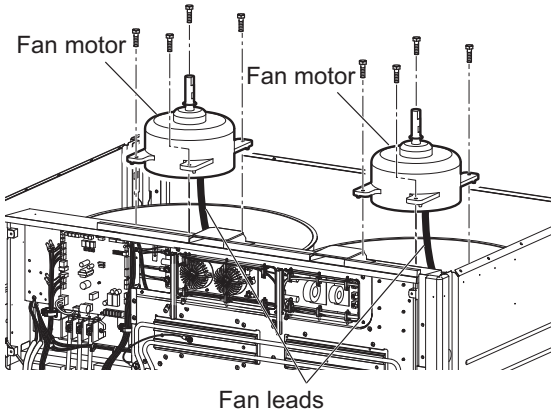
2.2 Removal Instructions for Fan Assembly (1/2)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the top panel, front panel, and upper front panel. **1. Remove the propeller fan** ① Loosen the setscrew (M10) with a hex wrench. ② Pull out the propeller fan upward. **2. Remove the fan motor** ① Remove the six screws from the lid of the electrical component box. ② Remove the fan leads from the wire support. ③ Cut the clamp material. ④ Remove the relay connectors for the fan motor.	   | | Connector on the equipment side | Connector on the PC board side | |---|---|---| | M1F | White | White (X1A and X2A) | | M2F | White with red marking | Red (X3A and X4A) |	★ Relay connectors for fan motor 

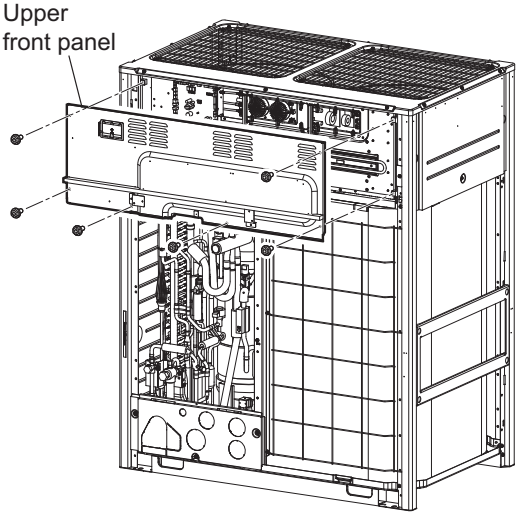
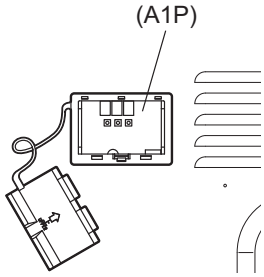
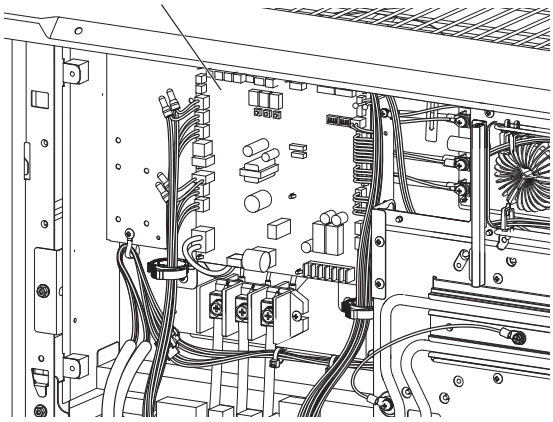
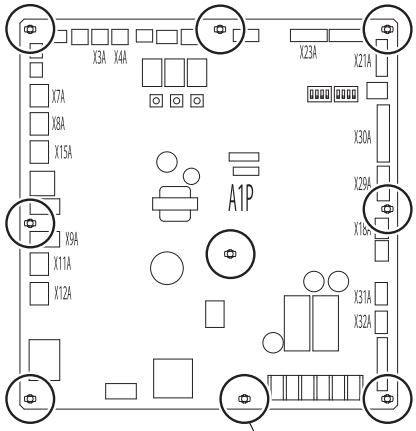
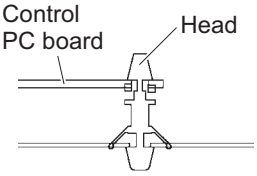
2.3 Removal Instructions for Fan Assembly (2/2)

> **⚠ WARNING**
> Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
⑤ Remove the clamp material that secures the leads.	Clamp material 	
⑥ Remove the four fixing bolts, and take out the fan motor.		

2.4 Removal Instructions for Control PC Board

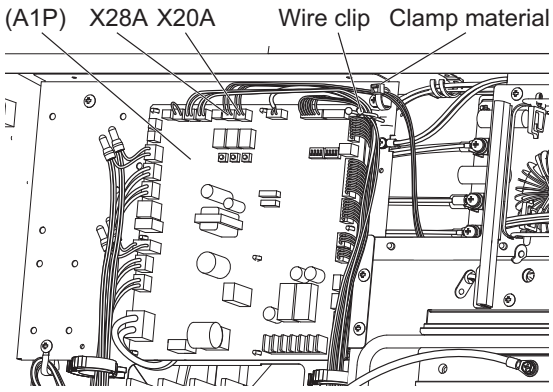
⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

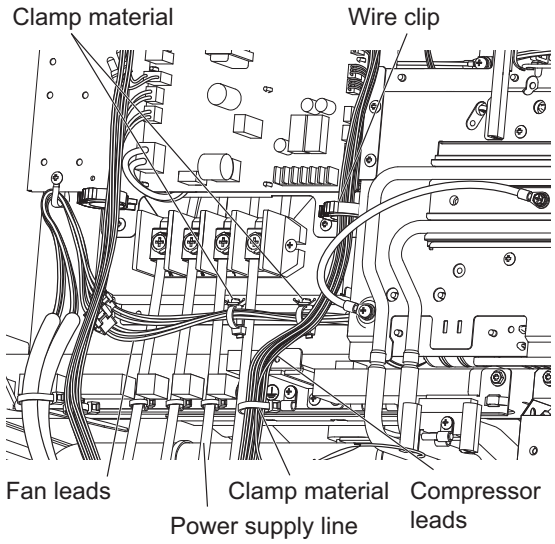
Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the front panel and upper front panel.	Upper front panel 	★ Open the access hole at the time of commissioning. Press the button on the PC board with an insulated rod. 
1. Remove the control PC board (A1P)		
① Remove the six screws, and take out the lid of the electrical component box.		
② Remove all the connectors on the control PC board.	Control PC board (A1P) 	★ You can check the commissioning button with the access hole opened. Refer to the precautions for servicing on the lid of the electrical component box.
③ Remove the locking card spacer, and take out the control PC board (A1P).	 Locking card spacer	★ Removal from locking card spacer  ★ Cross-sectional view of locking card spacer 

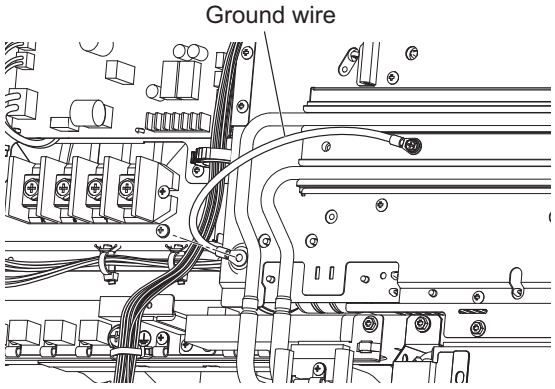
2.5 Removal Instructions for Electrical Component Assembly (1/3)

> **WARNING**
> Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure	Remarks
● Follow the removal instructions for the outside panels to remove the front panel and upper front panel. **1. Remove the electrical component assembly** ① Remove the connectors (X28A and X20A) on the control PC board (A1P). ② Cut the clamp materials. ③ Remove the harness from the wire clip. ④ Cut the clamp material on the fan leads. ⑤ Remove the relay connector for the fan motor. ⑥ Remove the power supply line. ⑦ Remove the harness from the wire clip. ⑧ Cut the two clamp materials on the compressor leads. ⑨ Remove the screw on the left-hand side for the ground wire. Leave the screw on the heat sink side as it is.	

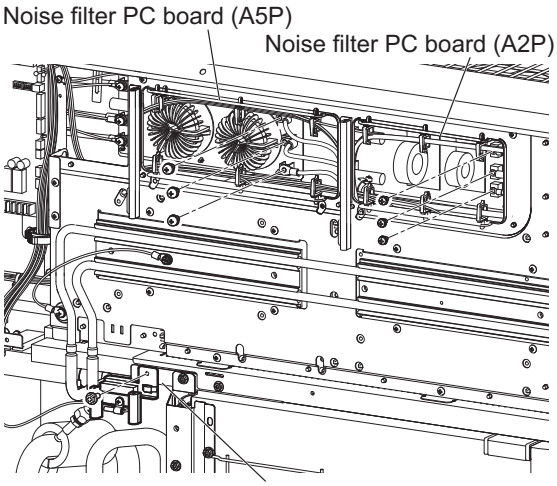
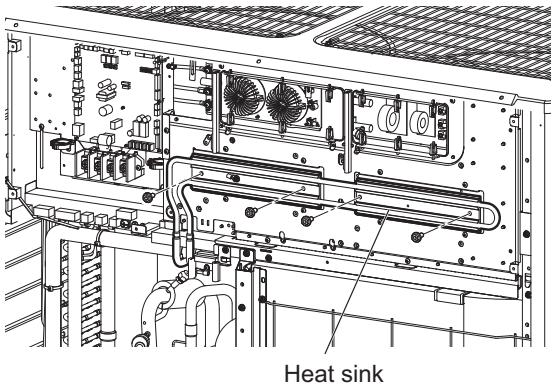
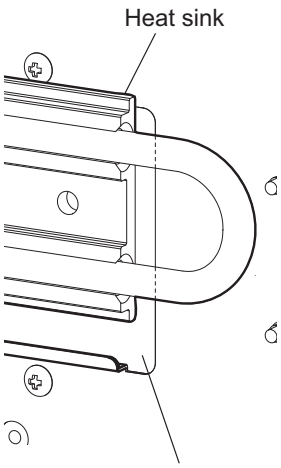






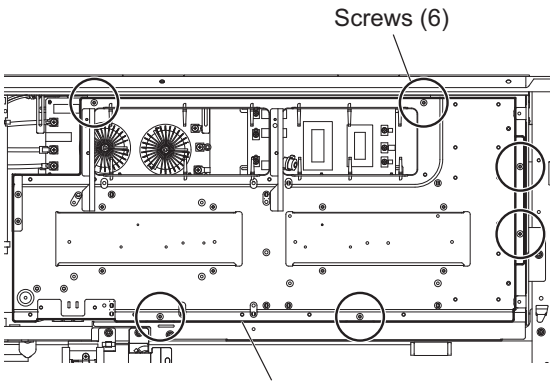
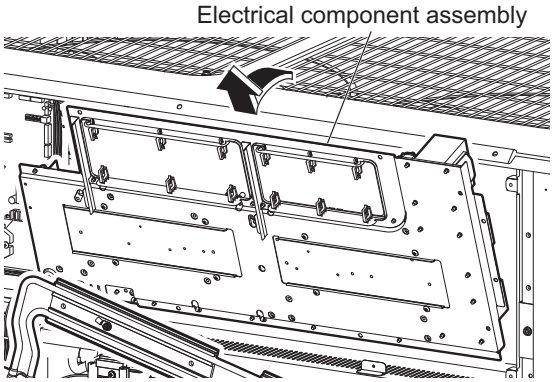
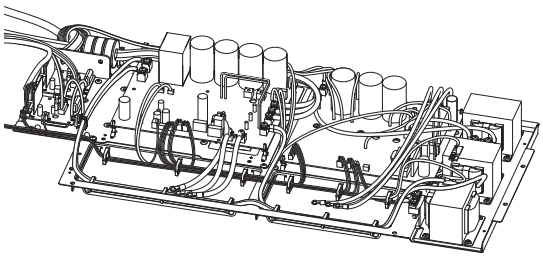
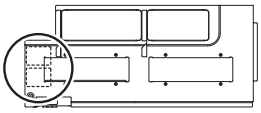
2.6 Removal Instructions for Electrical Component Assembly (2/3)

WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
⑩ Remove the six securing screws (blue, white, and red) on the leads of the noise filter PC board. ⑪ Remove the single screw from the mounting bracket of outdoor air thermistor.		**Precaution:** Be careful not to drop the screws.
⑫ Remove the four securing screws from the heat sink. ⑬ Unclamp the hook on the electrical component assembly, and slid the heat sink upward.		★ Hook on the electrical component assembly 

2.7 Removal Instructions for Electrical Component Assembly (3/3)

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
⑭Remove the six screws, slide the electrical component assembly to the left, and pull and take out the electrical component assembly forward.	  [Backside of electrical component assembly] 	**Precaution**  Do not touch the PC board for the fan on the back.

2.8 Removal Instructions for Inverter PC Board for Compressor

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure	Remarks

- Follow the removal instructions for the electrical component assembly to remove the electrical component assembly.

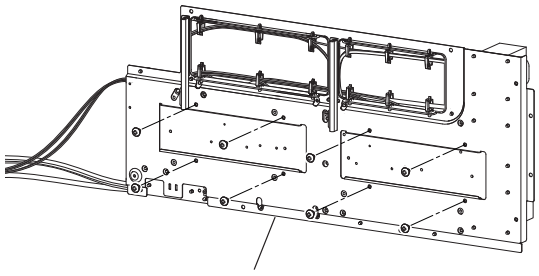
1. Remove the inverter PC boards (A3P and A6P) for the compressor

① Remove the eight screws (four each on both sides) of the heat sink.

② Remove all the connectors on the inverter PC board for the compressor.

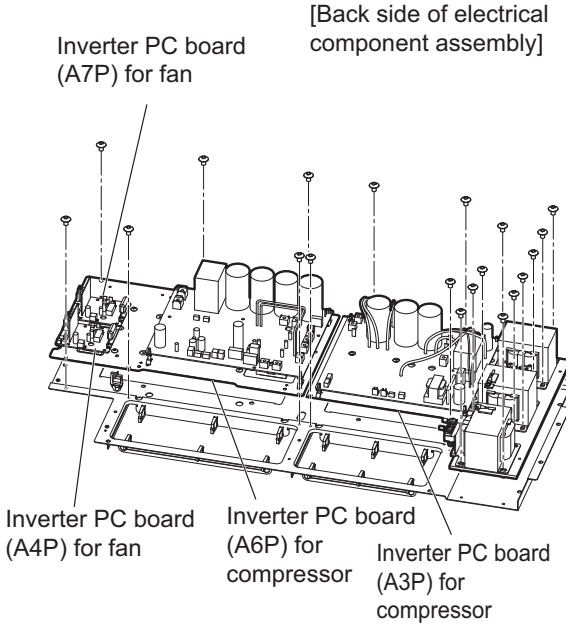
③ Remove the following screws.
Reactors: 9 screws
Ferrite core: 4 screws
(A6P): 6 screws
(A3P): 4 screws

④ (4) Take out the inverter PC board for the compressor. (Replace the PC board connected to the plate.)



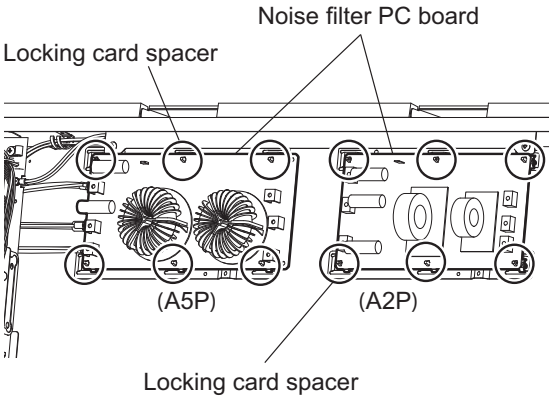
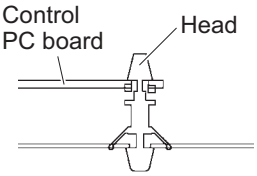
Electrical component assembly

[Back side of electrical component assembly]



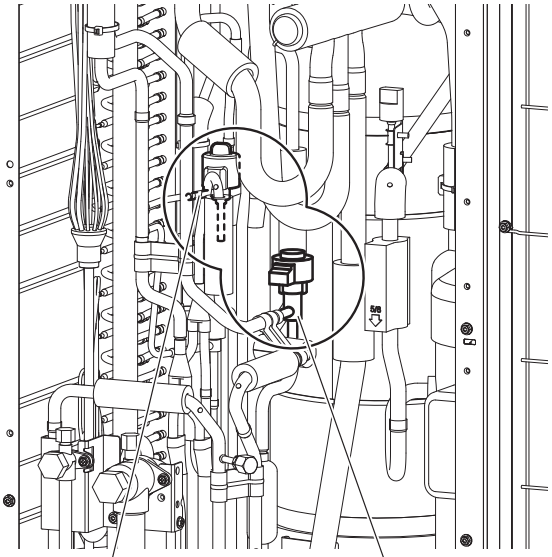
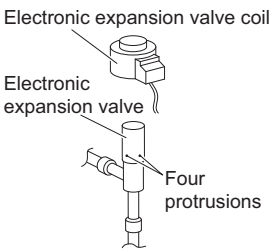
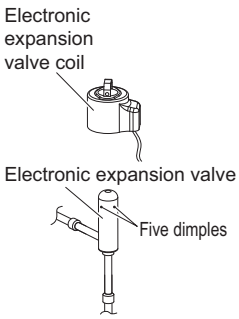
2.9 Removal Instructions for Noise Filter PC Board

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the electrical component assembly to remove the electrical component assembly.		
1. Remove the noise filter PC boards (A2P and A5P)		★ Removal from locking card spacer 
① Remove all the connectors on the filter PC board. ② Remove the locking card spacer, and take out the filter PC board.		★ Cross-sectional view of locking card spacer 

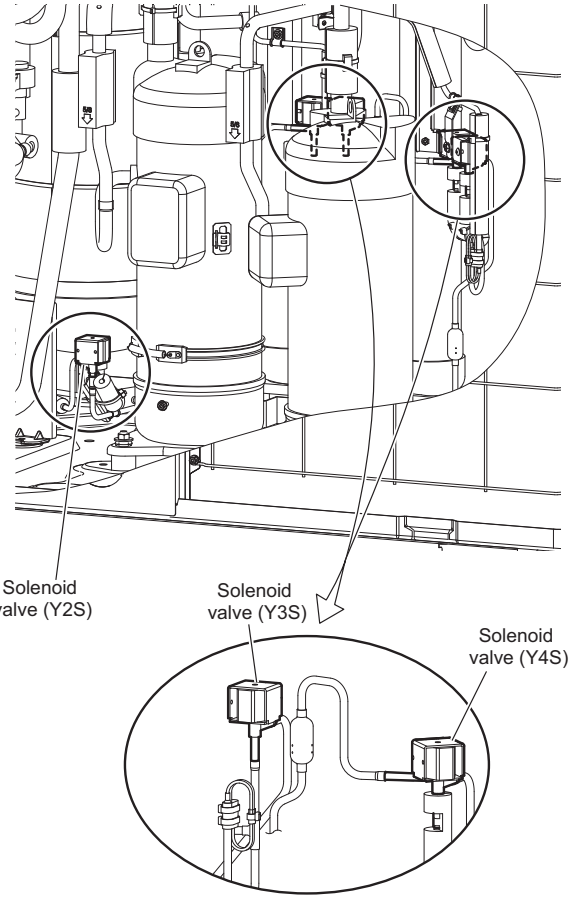
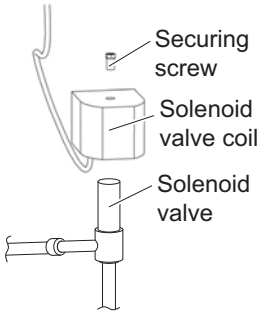
2.10 Removal Instructions for Electronic Expansion Valves

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the front panel. **1. Remove the electronic expansion valves** ① Rotate the electronic expansion valve (Y1E and Y2E) coils by 20° to 30°, and pull out the valves upward. ② Remove the two-point brazing, and take out the solenoid valves (Y1E and Y2E).	 Electronic expansion valve (Y2E) Electronic expansion valve (Y1E)	★ 1 Collect the refrigerant before removing each part, and perform brazing after checking that the refrigerant has been completely purged. ★ 2 Electronic expansion valve (Y1E)  ★ 3 Electronic expansion valve (Y2E)  ★ For RYYQ-T: Electronic expansion valve (Y3E)

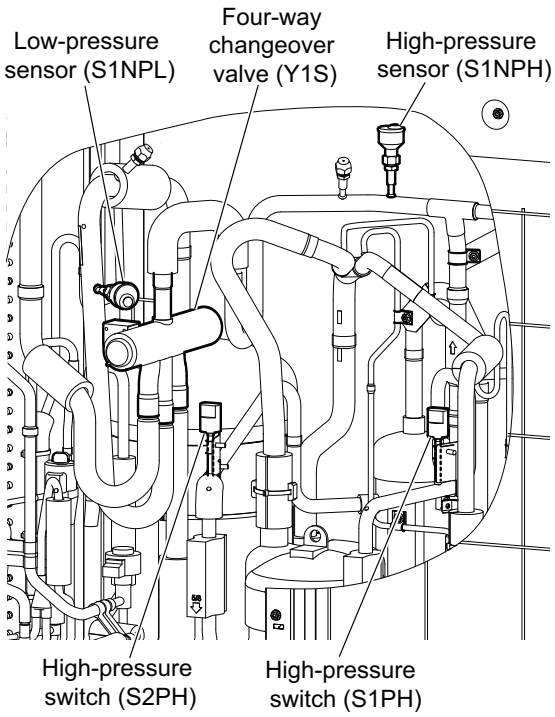
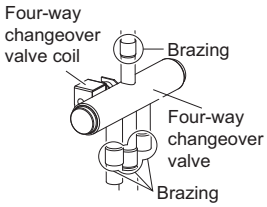
2.11 Removal Instructions for Solenoid Valves

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the front panel.		
1. Remove the solenoid valves		★ 1 Collect the refrigerant before removing each part, and perform brazing after checking that the refrigerant has been completely purged.
① Remove a single screw each, and take out the solenoid valve (Y3S and Y4S) coils.		★ 2 <u>Solenoid valves (Y3S and Y4S)</u> 
② Remove the two-point brazing, and take out the solenoid valve (Y3S and Y4S).		

2.12 Removal Instructions for Pressure Sensor, Four-way Changeover Valve and High-pressure Switch

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the front panel. **1. Remove the pressure sensors** ① Remove the connector (X32A) for the high-pressure sensor. ② Use two wrenches to remove the high-pressure sensor. ③ Remove the connector (X31A) for the low-pressure sensor. ④ Use two wrenches to remove the low-pressure sensor. **2. Remove the four-way changeover valve** ① Remove the connector (X15A) for the four-way changeover valve coil. ② Remove the single screw, and take out the four-way changeover valve coil. ③ Remove the four-point brazing, and take out the four-way changeover valve. **3. Remove the pressure switches.** ① Remove the connectors (X3A and X4A) for the high-pressure switches. ② Remove a single-brazing point per high-pressure switch.		★ 1 Collect the refrigerant before removing the four-way changeover valve and high-pressure switch, and perform brazing after checking that the refrigerant has been completely purged. ★ 2 Four-way changeover valve (Y1S)  (Blaze the four-way changeover valve while cooling the valve with a wet cloth so that the temperature of the valve will not exceed 120°C.)

2.13 Removal Instructions for Solenoid Valves

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure

- Follow the removal instructions for the outside panels to remove the front panel.

1. Remove the outdoor air thermistor (R1T)

① Remove the single screw, and take out the thermistor fixture.

② Pull out the outdoor air thermistor from the fixture.

2. Remove the thermistors (R3T, R5T, R6T, R4T, R21T and R22T)

① Remove the heat insulator.

② Remove the thermistors while pushing the lower part of the mounting spring.

3. Remove the deicer (R7T)

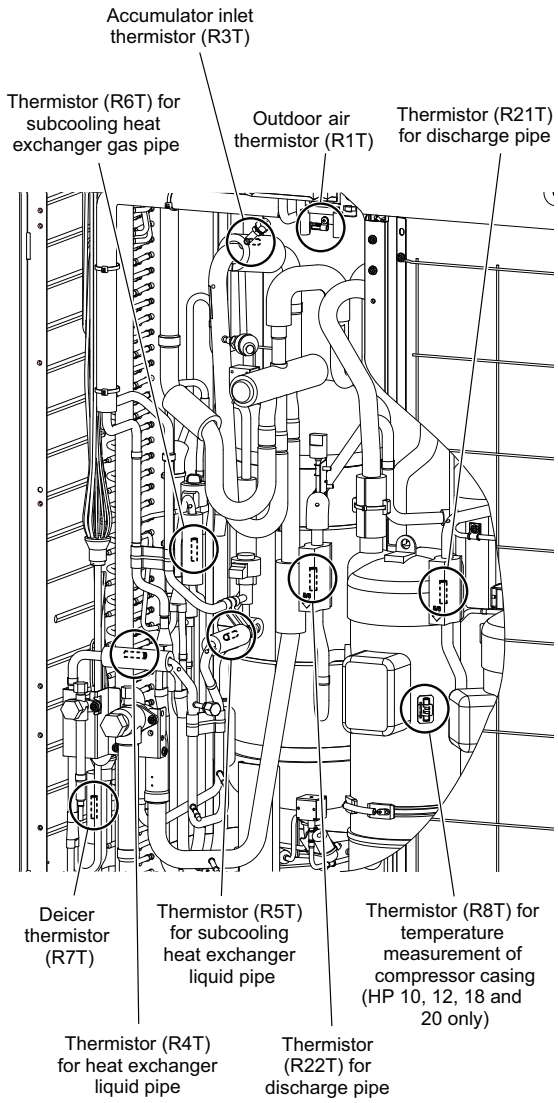
① Remove the heat insulator.

② Pull out the deicer together with the mounting bracket.

4. Remove the compressor surface thermistor (R8T)

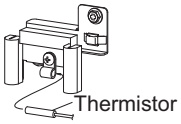
(HP 10, 12, 18 or 20 only)

① Pull out the compressor surface thermistor from the mounting.

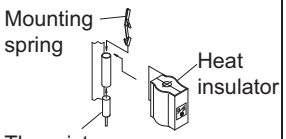


Remarks

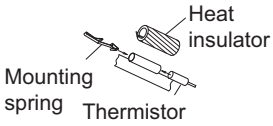
★ 1 outdoor air thermistor (R1T)



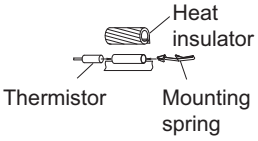
★ 2 Thermistors (R21T and R22T) for discharge pipe



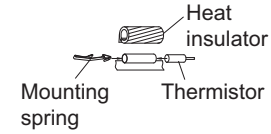
★ 3 Accumulator inlet thermistor (R3T)



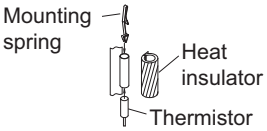
★ 4 Thermistor (R4T) for heat exchanger liquid pipe



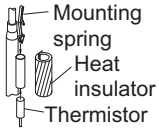
★ 5 Thermistor (R5T) for subcooling heat exchanger liquid pipe



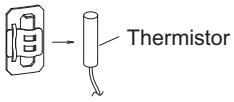
★ 6 Thermistor (R6T) for subcooling heat exchanger gas pipe



★ 7 Deicer thermistor (R7T)

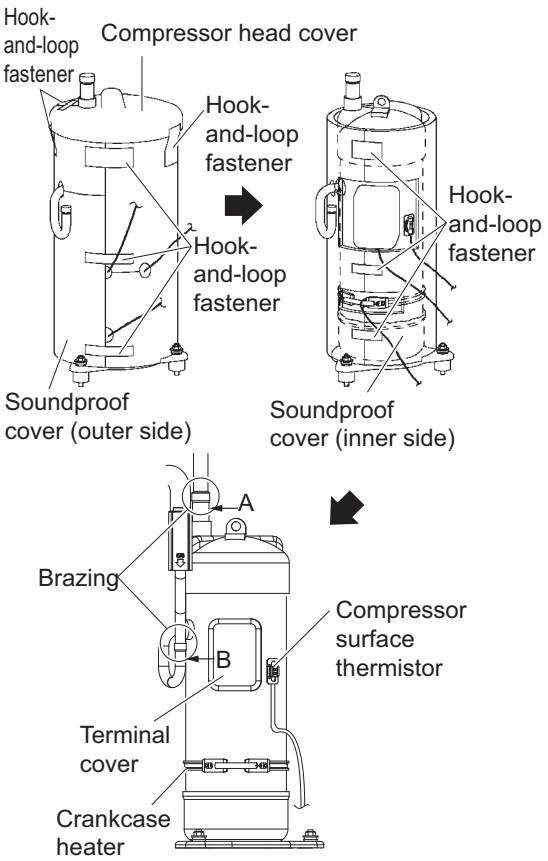
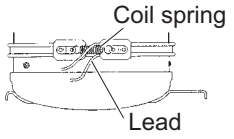
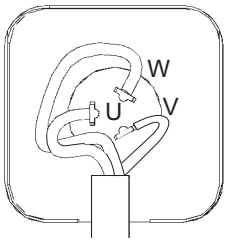


★ 8 Thermistor (R8T) for temperature measurement of compressor casing surface



2.14 Removal Instructions for Compressor

⚠ WARNING
Be sure to disassemble the unit 10 minutes after all the power supply is turned off.

Work procedure		Remarks
● Follow the removal instructions for the outside panels to remove the front panel. **1. Remove the soundproof materials** ① Remove the three hook-and-loop fasteners, and take out the compressor head cover. ② Remove the three hook-and-loop fasteners, and pull out the soundproof cover for the compressor. **2. Remove the compressor** ① Remove the coil spring, and pull out the crankcase heater. ② Remove the compressor terminal cover. ③ Remove the leads from the compressor terminal block. ④ Remove the three mounting bolts from the compressor. ⑤ Cut the discharge pipe (at B) and the suction pipe (at A) with a pipe cutter. ⑥ Lift up and pull out the compressor. ⑦ Remove the residual brazing on the pipe.		★ 1 Collect the refrigerant, and start working after checking that the refrigerant has been completely purged. ★ 2 Precautions for mounting crankcase heater • Make sure that the crankcase heater does not overlap with the weld part of the compressor. • Insert the coil spring of the heater into the lead loop.  ★ 3 Terminal block of compressor <Fast-on terminal>  ★ 4 Oil will leak at the time of cutting the pipe. Cut the pipe with the lower part protected with a waste cloth.

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