ESiEN09-06 A

Service Manual

ERQ Condensing Unit Three Phase

ERQ 125/200/250 A7W1B
EKEQD/F/MCB(A)V3 (control box)
EKEXV 50/63/80/100/125/140/200/250/400/500

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1. Introduction

1.1 Safety Cautions

Cautions and Warnings

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

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

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

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

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

1.1.1 Caution in Repair

⚠ **Warning**	
Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Working on the equipment that is connected to a power supply can cause an electrical 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.	
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.	

Warning	
Be sure to use the specified cable to connect between the AHU 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 AHU 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.	
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 AHU 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.

Part 1
General Information

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1. Model Names of Outdoor Unit, Control Box and Expansion Valve Kit

1.1 Outdoor Units

Outlook

Model name

Series	Model Name				Power Supply
Inverter Heat Pump	ERQ	125A	200A	250A	W1B

W1: 3 phase 380~415V, 50Hz

1.2 Control Box

Outlook

Model name

We distinguish 3 types of control boxes:

- EKEQD: Z-control
- EKEQF: W-, X-,Y-control
- EKEQM: Z-control (only with VRV outdoor unit, no ERQ)

Control type W
Control of capacity by means of external device (DDC controller).
Control type X
Control of refrigerant temperature by means of external device (DDC controller).
Control type Y
Control of evaporation and condensing temperature (T_e, T_c) by Daikin control (no DDC needed).
Control type Z
Control of air temperature (T_s or T_r) by Daikin control (no DDC needed).

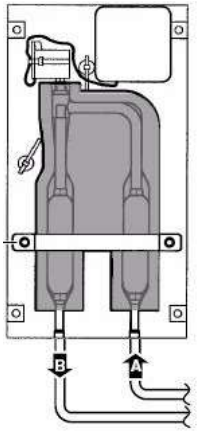
Legend:

T_d	Discharge air control
T_s	Suction air control
T_r	Room air control
T_e	Evaporating temperature control
T_c	Condensing temperature control
AHU	Air handling unit
DDC	Digital controller

1.3 Expansion Valve Kit

Outlook

Expansion valve kit installation drawing:



Model name

Limits for outdoor unit (expansion valve kit).

Outdoor unit (class)	EKEXV kit
125	EKEXV63~140
200	EKEXV100~250
250	EKEXV125~250

Depending on the heat exchanger, a connectable EKEXV (expansion valve kit) must be selected to these limitations.

	Allowed heat exchanger volume (dm^3)		Allowed heat exchanger capacity (kW)	
EKEXV class	Minimum	Maximum	Minimum	Maximum
63	1.66	2.08	6.3	7.8
80	2.09	2.64	7.9	9.9
100	2.65	3.30	10.0	12.3
125	3.31	4.12	12.4	15.4
140	4.13	4.62	15.5	17.6
200	4.63	6.60	17.7	24.6
250	6.61	8.25	24.7	30.8

Saturated suction temperature (SST) = 6°C, SH (superheat) = 5 K, air temperature = 27°C DB / 19°C WB.

2. Combination Table

		Control box		Expansion valve kit						
Outdoor unit		EKEQDCBV3	EKEQFCBV3	EKEXV63	EKEXV80	EKEXV100	EKEXV125	EKEXV140	EKEXV200	EKEXV250
three phase	ERQ125	P	P	P	P	P	P	P	-	-
	ERQ200	P	P	-	-	P	P	P	P	P
	ERQ250	P	P	-	-	-	P	P	P	P

Heat pump

P: Pair: Combination depending on AHU heat exchanger volume and capacity.

		Allowed heat exchanger capacity - COOLING(kW)		Allowed heat exchanger capacity - HEATING(kW)	
		Minimum	Maximum	Minimum	Maximum
Cap class EXV	EKEXV50	5,0	6,2	5,6	7,0
	EKEXV63	6,3	7,8	7,1	8,8
	EKEXV80	7,9	9,9	8,9	11,1
	EKEXV100	10,0	12,3	11,2	13,8
	EKEXV125	12,4	15,4	13,9	17,3
	EKEXV140	15,5	17,6	17,4	19,8
	EKEXV200	17,7	24,6	19,9	27,7
	EKEXV250	24,7	30,8	27,8	34,7
	EKEXV400	**35,4**	**49,5**	**39,8**	**55,0**
	EKEXV500	**49,6**	**61,6**	**55,1**	**69,3**

Cooling saturated suction temp. (SST) = 6°C
Air temperature = 27°C DB / 19°C WB
Superheat (SH) = 5 K

Heating saturated suction temp. (SST) = 46°C
Air temperature = 20°C DB
Subcool (SC) = 3 K

Part 2
Specifications

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1.1 Outdoor Units 8

1. Specifications

1.1 Outdoor Units

Heat Pump 50Hz Standard Series ERQ 125/200/250 A7W1B

TECHNICAL SPECIFICATIONS				ERQ125A7W1B	ERQ200A7W1B	ERQ250A7W1B
Nominal capacity	Cooling		kW	14,0	22,4	28,0
	Heating		kW	16,0	25,0	31,5
COP	Cooling			3,98	4,29	3,77
	Heating			4,00	4,50	4,09
Capacity range			HP	5	8	10
Nominal input	Cooling		kW	3,52	5,22	7,42
	Heating		kW	4,00	5,56	7,70
PED category				2		
Casing	Colour			Daikin white		
	Material			Painted galvanised steel		
Dimensions	Unit	Height	mm	1680		
		Width	mm	635	930	
		Depth	mm	765		
	Packing	Height	mm	1855		
		Width	mm	796	1055	
		Depth	mm	860		
Weight	Unit		kg	159	187	240
	Packed unit		kg	182	217	273
Packing information	Carton		kg	3,8	4,02	
	Wood		kg	19,15	20,85	
	Plastic		kg	0,215	0,265	
Heat exchanger	Specifications	Length	mm	1483	1778	
		Nr of rows		54		
		Fin pitch		2		
		Nr of passes		8	18	
		Face area	m²	1,762	2,112	
		Nr of stages		2		
		Empty tubeplate hole		0		
	Tube type			HI-XSS (8)		
	Fin	Type		Non-symmetric waffle louvre		
		Treatment		Hydrophylic and anti corrosion resistant		
Fan	Type			Propeller		
	Quantity			1		
	Air flow rate (nominal at 230V)	Cooling	m³/min	95	171	185
		Heating	m³/min	95	171	185
	External static pressure		Pa	78 Pa in high static pressure		
	Discharge direction			Vertical		
	Motor	Quantity		1		
		Model		Brushless DC		
		Speed	rpm			
		Output	W	350	750	
		Speed (nominal) Cooling	rpm			
		Speed (nominal) Heating	rpm			
Compressor	Quantity			1		2
	Motor	Quantity		1		
		Model		Inverter		
		Speed	rpm	6300	7980	6300
		Motor output	kW	2,8	3,8	1,2
		Type		Hermetically sealed scroll compressor		
		Crankcase heater	W	33		
		Quantity		0		1
		Model				ON - OFF
		Speed	rpm			2900
		Motor output	kW			4,5
		Type				Hermetically sealed scroll compressor
		Crankcase heater	W			33

TECHNICAL SPECIFICATIONS				ERQ125A7W1B	ERQ200A7W1B	ERQ250A7W1B
Operation range	Cooling	Min	°CDB	-5		
		Max	°CDB	43		
	Heating	Min	°CWB	-20		
		Max	°CWB	15		
Sound level (nominal)	Sound power		dBA	72	78	
	Sound pressure		dBA	54	57	58
Refrigerant	Type			R-410A		
	Charge		kg	6,2	7,7	8,4
	Control			Electronic expansion valve		
	Nr of circuits			1		
Refrigerant oil	Type			Synthetic (ether) oil		
	Charged volume		l	1,7	2,1	4,3
Piping connections	Liquid	Type		Brazing connection		
		Diameter (OD)	mm	9,52		
	Gas	Type		Brazing connection		
		Diameter (OD)	mm	15,9	19,1	22,2
	Discharge gas	Type				
		Diameter (OD)	mm			
	Drain	Quantity				
		Diameter (OD)	mm			
	Heat insulation			Both liquid and gas		
	Max total length		m	55		
Defrost method				Reversed cycle		
Defrost control				Sensor for outdoor heat exchanger temperature		
Capacity control method				Inverter controlled		
Capacity control [%]				~ 100		
Safety devices				High pressure switch		
				Fan driver overload protector		
				Overcurrent relay		
				Inverter overload protector		
				PC board fuse		
Standard accessories	Item			Installation manual		
	Quantity			1		
Standard accessories	Item			Operation manual		
	Quantity			1		
Standard accessories	Item			Connection pipes		
	Quantity			4		
Notes				Nominal cooling capacities are based on: indoor temperature: 27°CDB/19°CWB, outdoor temperature: 35°CDB, equivalent refrigerant piping: 7,5m, level difference: 0m.		
				Nominal heating capacities are based on: indoor temperature: 20°CDB, outdoor temperature: 7°CDB/6°CWB, equivalent refrigerant piping: 7,5m, level difference: 0m.		
				Sound power level is an absolute value that a sound generates.		
				Sound pressure level is a relative value, depending on the distance and acoustic environment. For more details, please refer to sound level drawings.		
				Sound values are measured in a semi-anechoic room.		

ELECTRICAL SPECIFICATIONS				ERQ125A7W1B	ERQ200A7W1B	ERQ250A7W1B
Power supply	Name			W1		
	Phase			3N~		
	Frequency		Hz	50		
	Voltage		V	400		
Current	Nominal running current (RLA)	Cooling	A	5,1	7,5	11,3
		Heating	A	5,8	8,2	11,1
	Starting current (MSC)		A			74
	Zmax		Ω	-	0,27	
	Minimum Ssc value		kVA	-	889	842
	Min circuit amps (MCA)		A	11,9	18,5	21,6
	Max fuse amps (MFA)		A	16	25	
	Total overcurrent amps (TOCA)		A	15,6	16,5	31,5
	Full load amps (FLA)		A	0,4	0,7	0,9
Voltage range			V	400 ±10%		
Wiring connections	For power supply	Quantity		5		
		Remark		Earth wire included		
	For connection with indoor	Quantity		2		
		Remark		F1 - F2		
Power supply intake				Both AHU and outdoor unit		

ELECTRICAL SPECIFICATIONS	ERQ125A7W1B	ERQ200A7W1B	ERQ250A7W1B
Notes	(1) European/international technical standard setting the limits for voltage changers, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated ≤ 75A. (2) European/international technical standard setting the limits for harmonic currents produced by equipment connected to public low-voltage system with input current > 16A and ≤ 75A per phase. (3) Short-circuit power. (4) System impedance.		

Notes:

- MFA is used to select the circuit breaker and the ground fault circuit interrupter (earth leakage circuit breaker).
- MSC means the maximum current during start up of the compressor.
- Maximum allowable voltage range variation between phases is 2%.
- RLA is based on following conditions: indoor temperature: 27°CDB/19°CWB, outdoor temperature: 35°CDB.
- Select wire size based on the value of MCA or TOCA.
- TOCA means the total value of each OC set.
- Voltage range: units are suitable for use on electrical systems where voltage supplied to unit terminal is not below or above listed range limits.
- FLA means the full load amps of the fan motor.
- In accordance with EN/IEC 61000-3-11 (1), respectively EN/IEC 61000-3-12 (2), it may be necessary to consult the distribution network operator to ensure that the equipment is connected only to a supply with Zsys (4) ≤ Zmax, respectively Ssc (3) ≥ minimum Ssc value.

Part 3
Refrigerant Circuit

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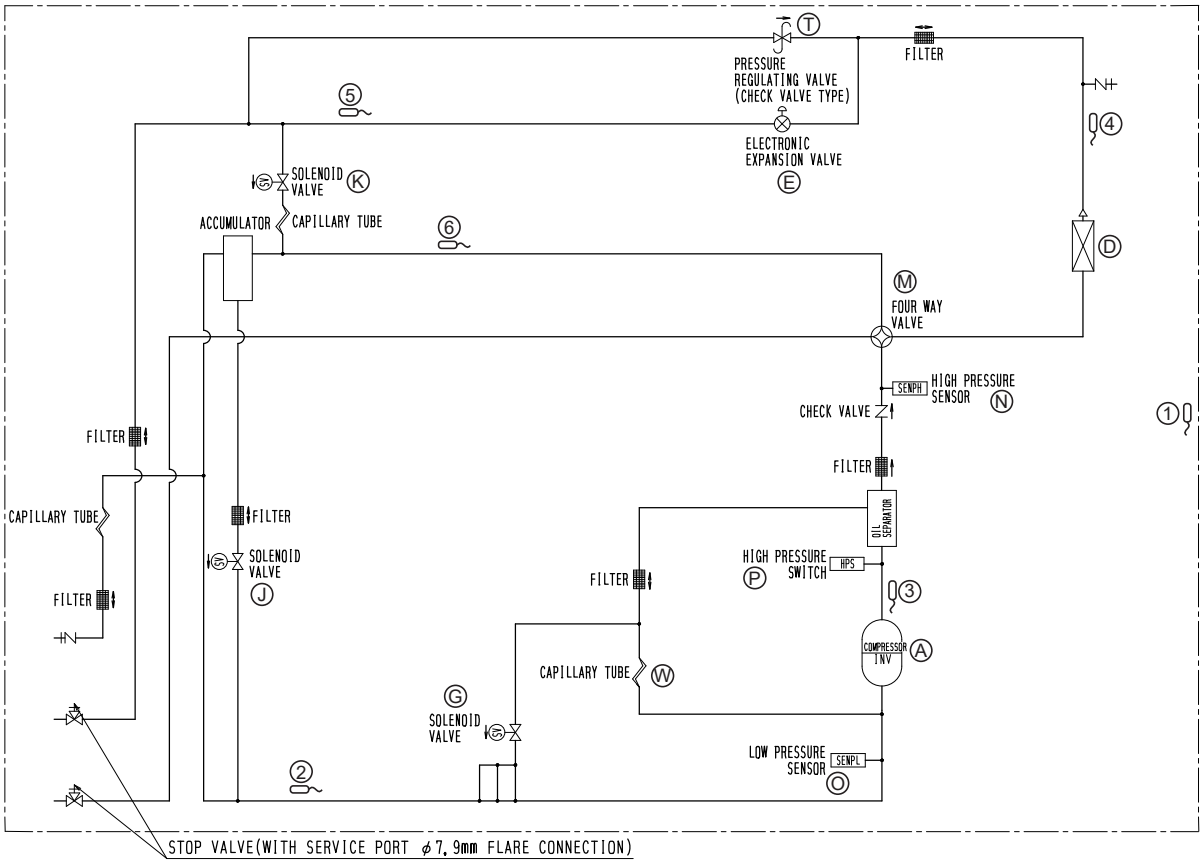
1. Refrigerant Circuit

1.1 ERQ 125 A7W1B

No. in refrigerant system diagram	Symbol	Name	Major Function
A	M1C	Inverter compressor (INV)	Inverter compressor is operated on frequencies between 52Hz and 188Hz by using the inverter. The number of operating steps is as follows when Inverter compressor is operated. RXYQ5P: 18 steps
D	M1F	Inverter fan	Since the system is of air heat exchanging type, the fan is operated at 9-step rotation speed by using the inverter.
E	Y1E	Electronic expansion valve (Main: EV1)	While in heating operation, PI control is applied to keep the outlet superheated degree of air heat exchanger constant.
G	Y1S	Solenoid valve (Hot gas: SVP)	Used to prevent the low pressure from transient falling.
J	Y2S	Solenoid valve (Oil return: SVO)	Used to return oil from the accumulator to the compressor.
K	Y4S	Solenoid valve (Injection) SVT	Used to cool the compressor by injecting refrigerant when the compressor discharge temperature is high.
M	Y3S	4-way valve	Used to switch the operation mode between cooling and heating.
N	S1NPH	High pressure sensor	Used to detect high pressure.
O	S1NPL	Low pressure sensor	Used to detect low pressure.
P	S1PH	HP pressure switch (For INV compressor)	In order to prevent the increase of high pressure when a malfunction occurs, this switch is activated at high pressure of 4.0 MPa or more to stop the compressor operation.
T	—	Pressure regulating valve 1	This valve opens at a pressure of 4.0 MPa for prevention of pressure increase, thus resulting in no damage of functional parts due to the increase of pressure in transportation or storage.
W	—	Capillary tube	Used to return the refrigerating oil separated through the oil separator to the compressor.
1	R1T	Thermistor (Outdoor air: Ta)	Used to detect outdoor temperature, correct discharge pipe temperature, and others.
2	R2T	Thermistor (Suction pipe: Ts)	Used to detect suction pipe temperature.
3	R3T	Thermistor (INV discharge pipe: Tdi)	Used to detect discharge pipe temperature, make the temperature protection control of compressor, and others.
4	R4T	Thermistor (Heat exchanger deicer: Tb)	Used to detect liquid pipe temperature of air heat exchanger, determine defrosting operation, and others.
5	R6T	Thermistor (Liquid pipe Tl)	Used to detect liquid pipe temperature.
6	R7T	Thermistor (Accumulator inlet Ts1)	Used to detect gas pipe temperature at the accumulator inlet. Keep the suction superheated degree constant in heating operation, and others.

ERQ 125 A7W1B



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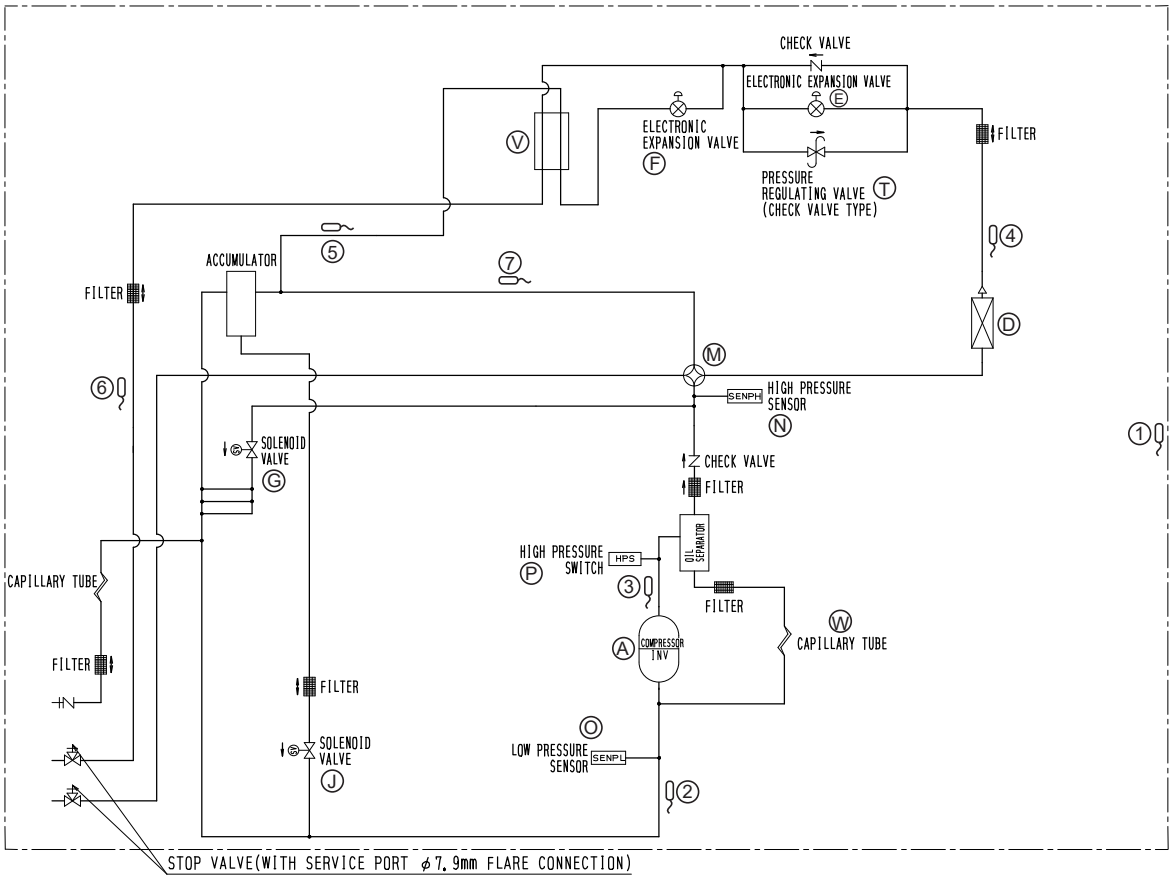
1.2 ERQ 200 A7W1B

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

ERQ 200 A7W1B



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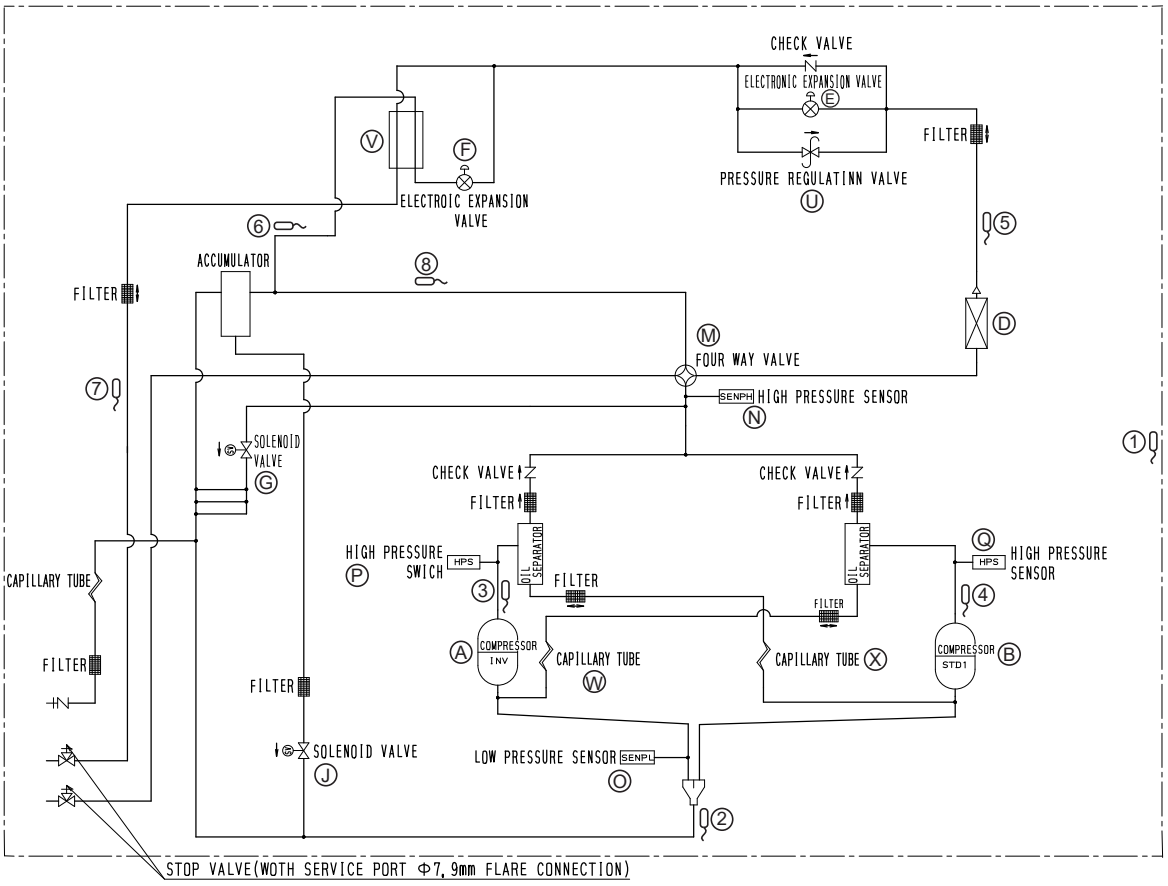
1.3 ERQ 250 A7W1B

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

ERQ 250 A7W1B



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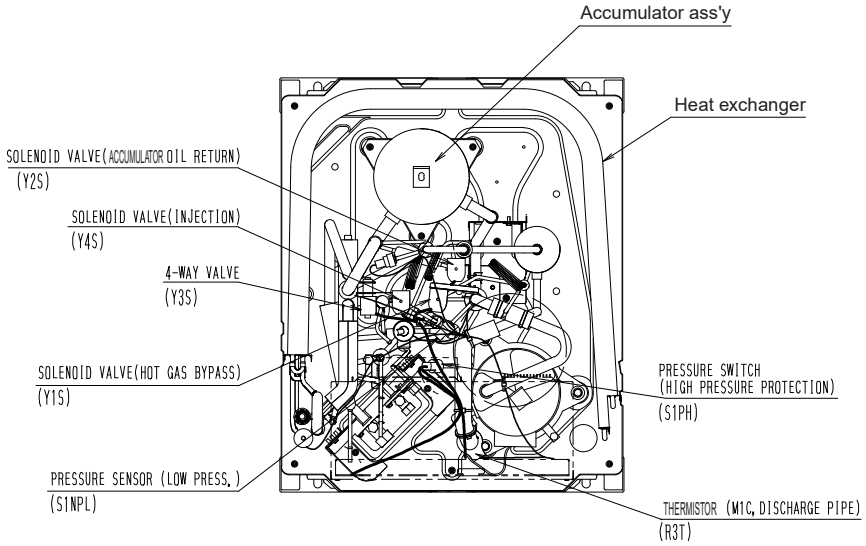
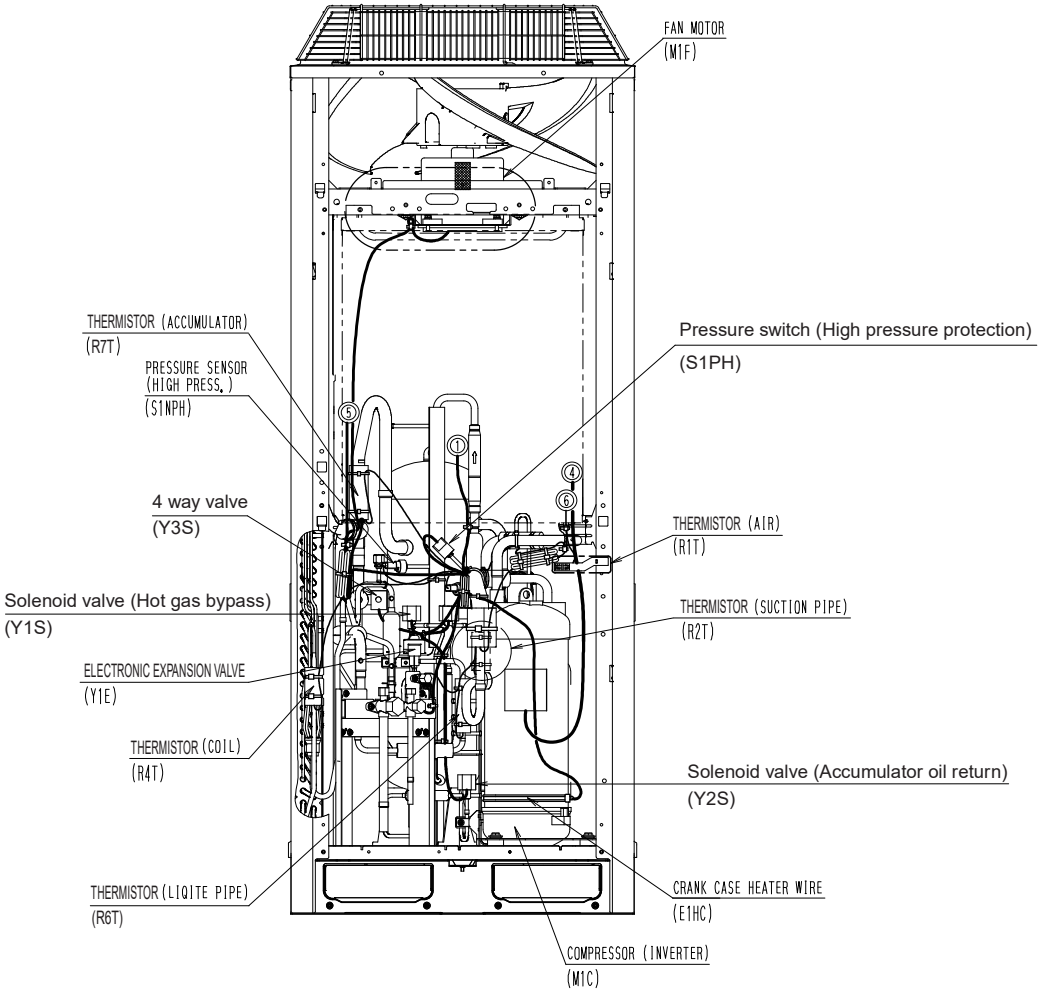
2. Functional Parts Layout

2.1 ERQ 125 A7W1B

Plan

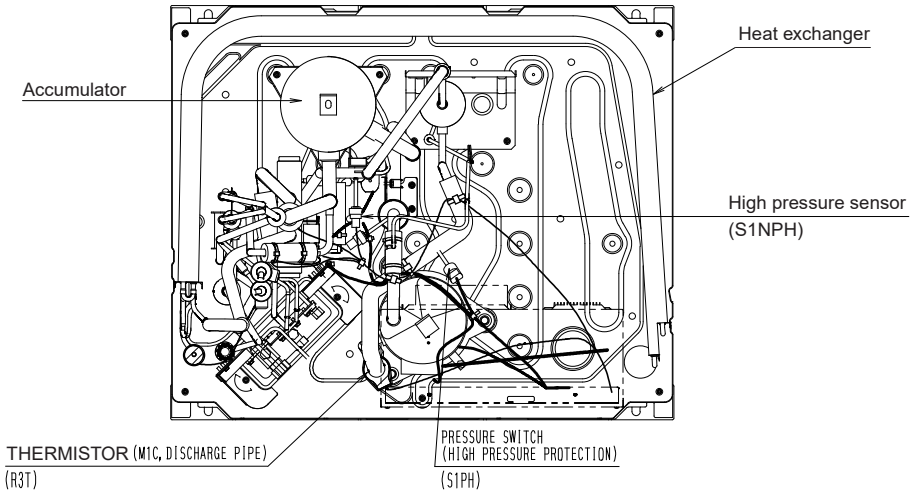


Front View

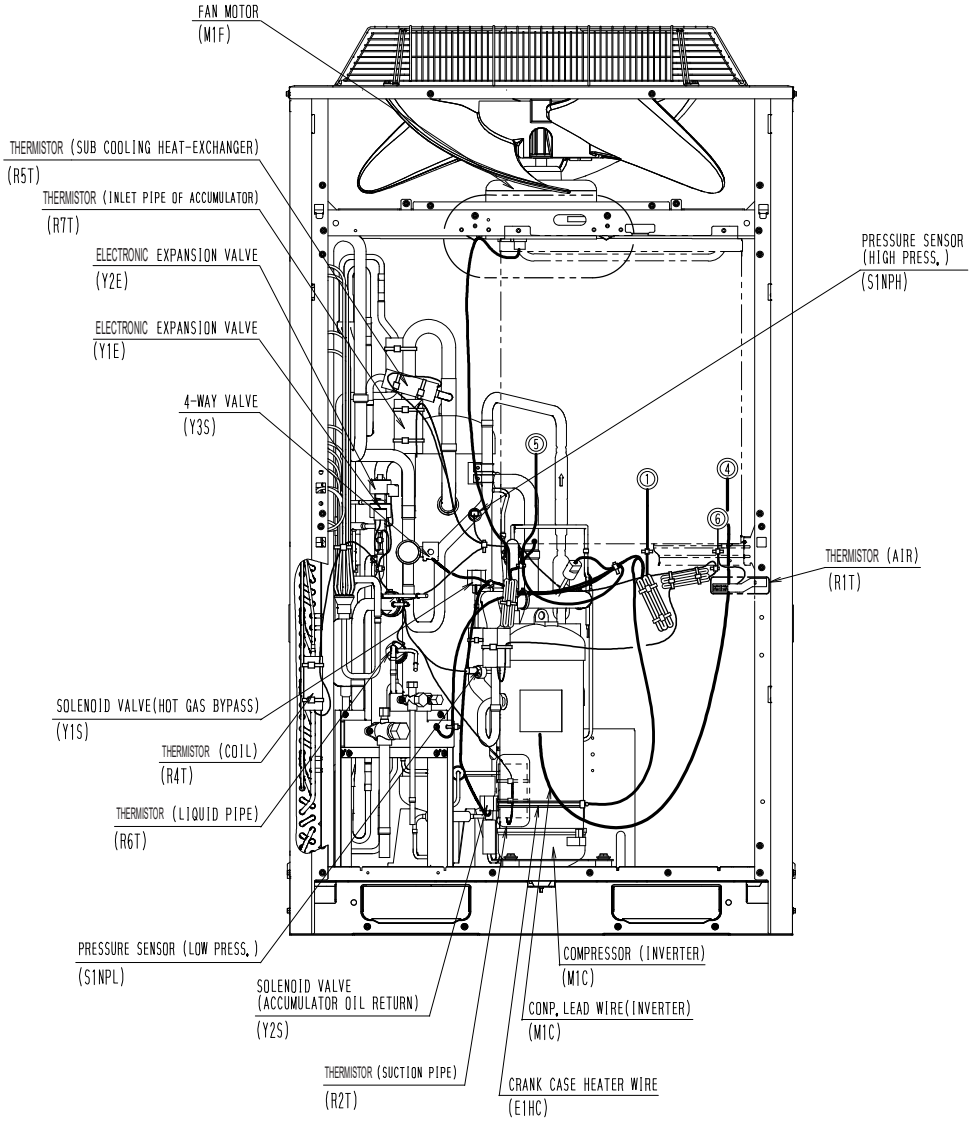


2.2 ERQ 200 A7W1B

Plan

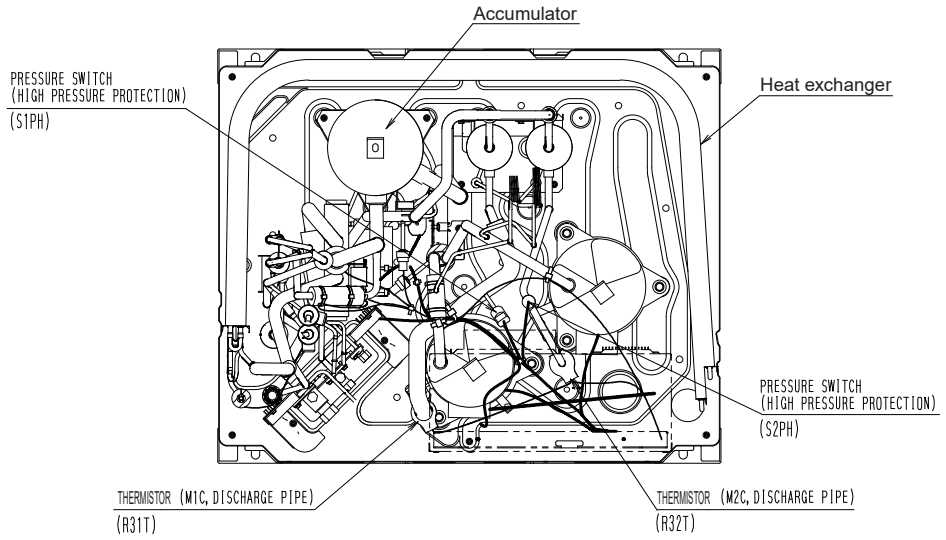


Front View

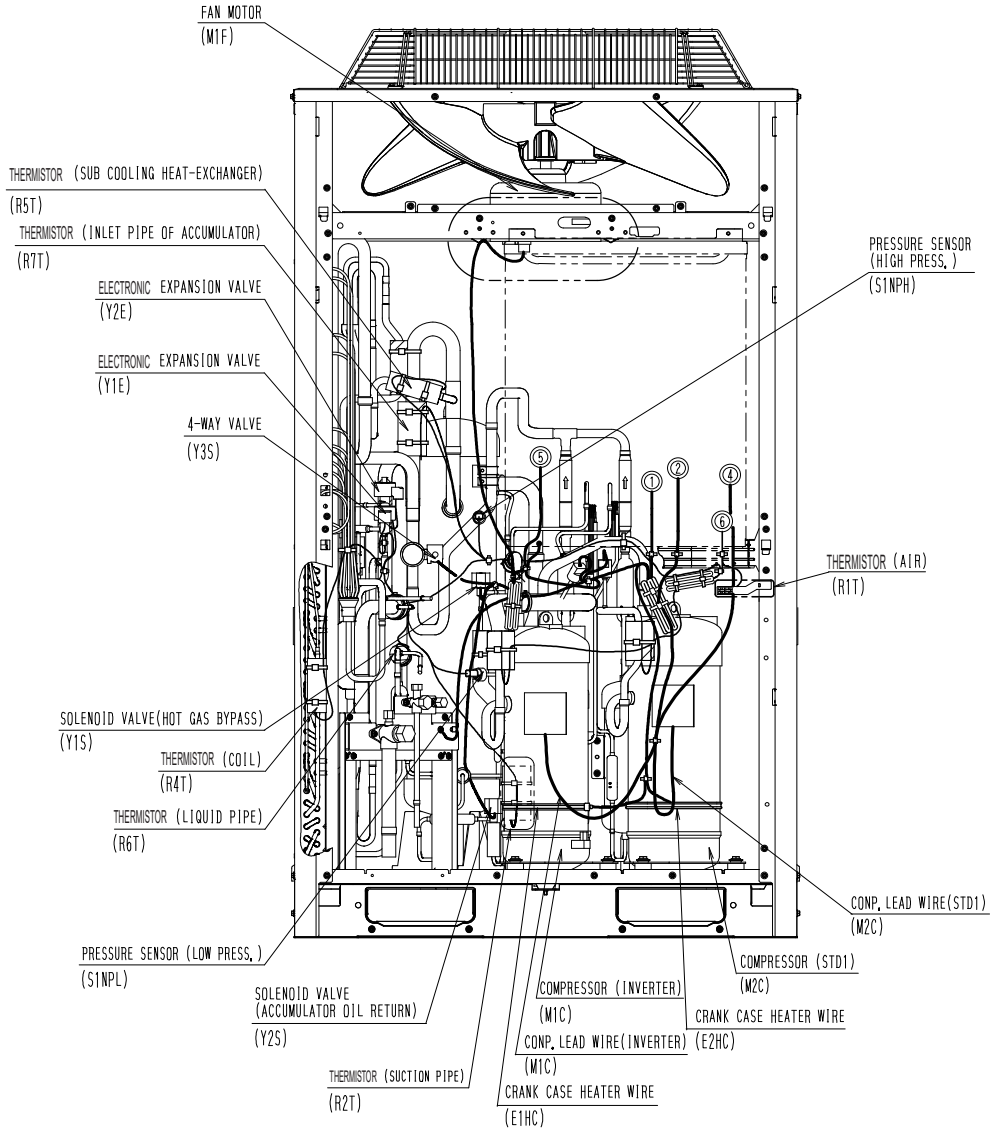


2.3 ERQ 250 A7W1B

Plan



Front View



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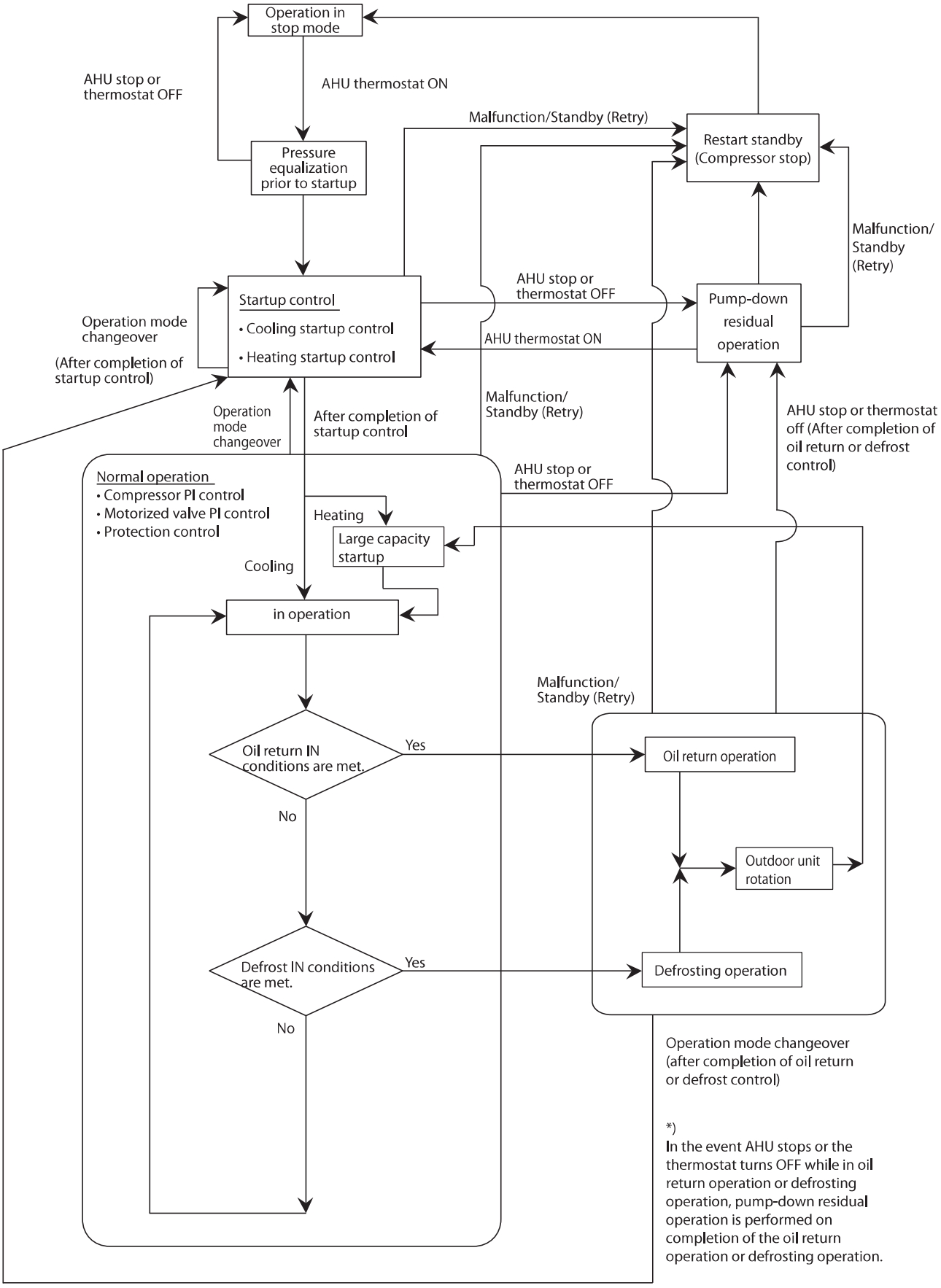
1. Function general

1.1 Symbol

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

1.2 Operation Mode



2. Basic Control

2.1 Normal Operation

2.1.1 List of Functions in Normal Operation

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

AHU actuator		Normal cooling	Normal heating
Fan	Thermostat ON unit	ON	ON
	Stopping unit	OFF	OFF

2.2 Compressor PI Control

2.2.1 For Z-Control

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

[Cooling operation]

Controls compressor capacity to adjust Te to achieve target value (TeS).

Te set value (Make this setting while in Setting mode 2.)

Te : Low pressure equivalent saturation temperature (°C)

TeS : Target Te value (Varies depending on Te setting, operating frequency, etc.)

Te setting

L	M (Normal) (factory setting)	H
3	6	9

[Heating operation]

Controls compressor capacity to adjust Tc to achieve target value (TcS).

Te set value (Make this setting while in Setting mode 2.)

Tc : High pressure equivalent saturation temperature (°C)

TcS : Target Tc value (Varies depending on Tc setting, operating frequency, etc.)

Tc setting

L	M (Normal) (factory setting)	H
43	46	49

2.2.2 For W-, X-, Y-Control

See chapter “Field Setting”.

■ Compressor Step Control
Compressor operations vary with the following steps.

Stand-alone installation

ERQ 125

STEP No.	INV
1	52 Hz
2	56 Hz
3	62 Hz
4	68 Hz
5	74 Hz
6	80 Hz
7	88 Hz
8	96 Hz
9	104 Hz
10	110 Hz
11	116 Hz
12	124 Hz
13	132 Hz
14	144 Hz
15	158 Hz
16	166 Hz
17	176 Hz
18	188 Hz

ERQ 200

STEP No.	INV
1	52 Hz
2	56 Hz
3	62 Hz
4	68 Hz
5	74 Hz
6	80 Hz
7	88 Hz
8	96 Hz
9	104 Hz
10	110 Hz
11	116 Hz
12	124 Hz
13	132 Hz
14	144 Hz
15	158 Hz
16	166 Hz
17	176 Hz
18	188 Hz
19	202 Hz
20	210 Hz
21	218 Hz
22	232 Hz
23	248 Hz
24	266 Hz

ERQ 250

STEP No.	INV	STD1
1	52 Hz	OFF
2	56 Hz	OFF
3	62 Hz	OFF
4	68 Hz	OFF
5	74 Hz	OFF
6	80 Hz	OFF
7	88 Hz	OFF
8	96 Hz	OFF
9	104 Hz	OFF
10	110 Hz	OFF
11	116 Hz	OFF
12	124 Hz	OFF
13	132 Hz	OFF
14	144 Hz	OFF
15	158 Hz	OFF
16	166 Hz	OFF
17	176 Hz	OFF
18	188 Hz	OFF
19	202 Hz	OFF
20	210 Hz	OFF
21	52 Hz	ON
22	62 Hz	ON
23	68 Hz	ON
24	74 Hz	ON
25	80 Hz	ON
26	88 Hz	ON
27	96 Hz	ON
28	104 Hz	ON
29	116 Hz	ON
30	124 Hz	ON
31	132 Hz	ON
32	144 Hz	ON
33	158 Hz	ON
34	176 Hz	ON
35	188 Hz	ON
36	202 Hz	ON
37	210 Hz	ON

Notes:
1. INV : Inverter compressor
   STD1 : Standard compressor 1
2. Depending on the operating conditions of compressors, the compressors may run in patterns other than those aforementioned.

2.3 Step Control of Outdoor Unit Fans

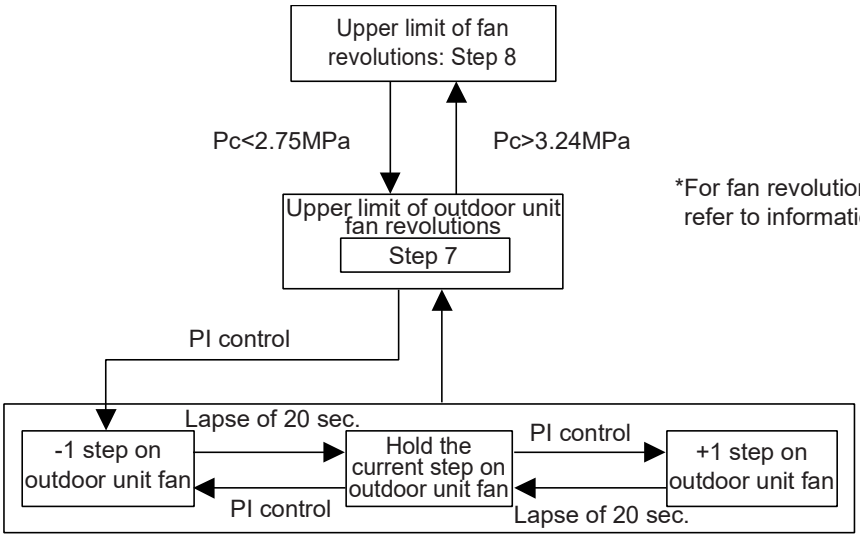
Used to control the revolutions of outdoor unit fans in the steps listed in table below, according to condition changes.

STEP No.	Fan revolutions (rpm)		
	ERQ 125	ERQ 200	ERQ 250
0	0	0	0
1	285	350	350
2	315	370	370
3	360	400	400
4	450	450	460
5	570	540	560
6	710	670	680
7	Cooling: 951 Heating: 941	760	Cooling: 821 Heating: 800
8	Cooling: 951 Heating: 941	Cooling: 796 Heating: 780	Cooling: 821 Heating: 800

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

2.4 Outdoor Unit Fan Control in Cooling Operation

While in cooling operation, if the outdoor temperature is low, this mode provides high-pressure control using the outdoor unit fan to retain appropriate liquid pressure, thus ensuring refrigerant circulation rate to be supplied to AHU.



*For fan revolutions in each step, refer to information on page 107.

3. Special Control

3.1 Startup Control

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

3.1.1 Startup Control in Cooling Operation

Thermostat ON

	Pressure equalization control prior to startup	Startup control	
		STEP1	STEP2
Compressor	0 Hz	52 Hz + OFF + OFF	124 Hz + OFF + OFF +2 steps/20 sec. (until Pc - Pe>0.39MPa is achieved)
Outdoor unit fan	STEP4	Ta<20°C: OFF Ta≥20°C: STEP4	+1 step/15 sec. (when Pc>2.16MPa) -1 step/15 sec. (when Pc<1.77MPa)
Four way valve (20S1)	Holds	OFF	OFF
Main motorized valve (EV1)	0 pls	480 pls	480 pls
Subcooling motorized valve (EV2) (RXYQ8~)	0 pls	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	OFF	OFF
Accumulator oil return valve (SVO)	OFF	OFF	OFF
Injection (SVT) (RXYQ5P model)	OFF	OFF	OFF
Ending conditions	A lapse of one minute	A lapse of 10 sec.	OR • A lapse of 130 sec. • Pc - Pe>0.39MPa

3.1.2 Startup Control in Heating Operation

Thermostat ON

	Pressure equalization control prior to startup	Startup control	
		STEP1	STEP2
Compressor	0 Hz	52 Hz + OFF + OFF	124 Hz + OFF + OFF +2 steps/20 sec. (until Pc - Pe>0.39MPa is achieved)
Outdoor unit fan	STEP4	STEP8	STEP8
Four way valve	Holds	ON	ON
Main motorized valve (EV1)	0 pls	0 pls	0 pls
Subcooling motorized valve (EV2) (RXYQ8~)	0 pls	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	OFF	OFF
Accumulator oil return valve (SVO)	OFF	OFF	OFF
Injection (SVT) (RXYQ5P model)	OFF	OFF	OFF
Ending conditions	A lapse of one minute	A lapse of 10 sec.	OR • A lapse of 130 sec. • Pc>2.70MPa • Pc-Pe>0.39MPa

3.2 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.

3.2.1 Oil Return Operation in Cooling Operation

[Start conditions]

Referring to the set conditions for the following items, start the oil return operation in cooling.

- Cumulative oil feed rate
- Timer setting (Make this setting so as to start the oil return operation when the initial cumulative operating time reaches two hours after power supply is turned ON and then every eight hours.)

Furthermore, the cumulative oil feed rate is computed from Tc, Te, and compressor loads.

Outdoor unit actuator	Oil return preparation operation	Oil return operation	Post-oil-return operation
Compressor	Take the current step as the upper limit.	5 HP: 52 Hz (→ Low pressure constant control) Other model: 52 Hz + ON + ON (→ Low pressure constant control) ↓ Maintain number of compressors in oil return preparation operation ON	Same as the “oil return operation” mode.
Outdoor unit fan	Fan control (Normal cooling)	Fan control (Normal cooling)	Fan control (Normal cooling)
Four way valve	OFF	OFF	OFF
Main motorized valve (EV1)	480 pls	480 pls	480 pls
Subcooling motorized valve (EV2)	SH control	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	OFF	OFF
Accumulator oil return valve (SVO)	ON	ON	ON
Ending conditions	20 sec.	or • 3 min. • Ts - Te<5°C	or • 3 min. • Pe<0.6MPa • HTdi>110°C

AHU actuator		Cooling oil return operation
Fan	Thermostat ON unit	ON
	Stopping unit	OFF

3.2.2 Oil Return Operation in Heating Operation

Outdoor Unit Actuator	Oil return preparation operation	Oil return operation	Post-oil-return operation
Compressor	Upper limit control	176 Hz + ON + ON	124 Hz + OFF + OFF 2-steps increase/20sec. till Pc - Pe>0.4 MPa
Outdoor unit fan	STEP7 or STEP8	OFF	STEP8
Four way valve	ON	OFF	ON
Main motorized valve (EV1)	SH control → 480 pls	480 pls	55 pls
Subcooling motorized valve (EV2)	SH control	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	OFF	OFF
Accumulator oil return valve (SVO)	ON	ON	ON
Injection (SVT) (RXYQ5P model only)	OFF	OFF	OFF
Ending conditions	170 sec.	or • 4 min. • Ts - Te<5°C	or • 10 sec. • Pc - Pe>0.4MPa

AHU actuator		Heating oil return operation
Fan	Thermostat ON unit	Field setting
	Stopping unit	OFF

3.3 Defrosting Operation

To defrost the outdoor unit heat exchanger while in Evaporator, the defrost operation is conducted to recover the heating capacity.

[Start conditions]

Referring to the set conditions for the following items, start the defrosting operation.

• Heat transfer coefficient of the outdoor unit heat exchanger
• Heat exchange temperature (Tb)
• Timer (Set to two hours at minimum.)

Furthermore, the heat transfer coefficient of the outdoor unit Evaporator is computed from Tc, Te, and compressor loads.

Outdoor unit actuator	Defrost preparation operation	Defrost operation	Post Defrost operation
Compressor	Upper limit control	176 Hz + ON + ON	124 Hz + OFF + OFF 2-steps increase/20sec. till Pc - Pe>0.4 MPa
Outdoor unit fan	STEP7 or STEP8	OFF	STEP8
Four way valve	ON	OFF	ON
Main motorized valve (EV1)	SH control → 480 pls	480 pls	55 pls
Subcooling motorized valve (EV2)	0 pls	0 pls	0 pls
Hot gas bypass valve (SVP)	OFF	OFF	OFF
Accumulator oil return valve (SVO)	ON	ON	ON
Injection (SVT) (RXYQ5P model only)	OFF	OFF	OFF
Ending conditions	170 sec.	or [• 10 min. • Tb>11°C]	or [• 10 sec. • Pc - Pe>0.4MPa]

* In the case of multi-outdoor-unit system,
  Master unit: Performs the operations listed in the table above.
  Slave units: Operating units perform the operations listed in the table above.
  Non-operating units perform the operations listed in the table above from the Defrost operation.
  (Non-operating unit stops during “Defrost preparation operation”.)
* Actuators are based on RXYQ14~18P.

AHU actuator		During defrost
Fan	Thermostat ON unit	Field setting
	Stopping unit	OFF

3.4 Pump-down Residual Operation

3.4.1 Pump-down Residual Operation in Cooling Operation

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

Actuator	Master unit operation
Compressor	124 Hz + OFF + OFF
Outdoor unit fan	Fan control
Four way valve	OFF
Main motorized valve (EV1)	480 pls
Subcooling motorized valve (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Accumulator oil return valve (SVO)	ON
Ending conditions	5 min.

3.4.2 Pump-down Residual Operation in Heating Operation

Actuator	Master unit operation
Compressor	124 Hz + OFF + OFF
Outdoor unit fan	STEP7
Four way valve	ON
Main motorized valve (EV1)	0 pls
Subcooling motorized valve (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Accumulator oil return valve (SVO)	ON
Ending conditions	3 min.

3.5 Standby

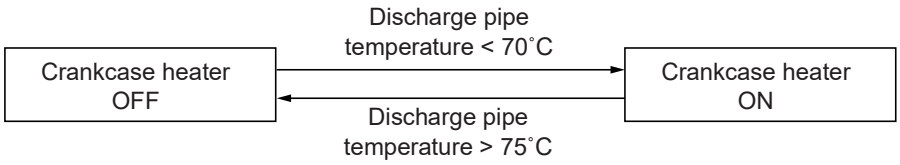
3.5.1 Restart Standby

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

Actuator	Operation
Compressor	OFF
Outdoor unit fan	Ta>30°C: STEP4 Ta≤ 30°C: OFF
Four way valve	Holds
Main motorized valve (EV1)	0 pls
Subcooling motorized (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Accumulator oil return valve (SVO)	OFF
Injection (SVT) (ERQ 125 A7W1B model)	OFF
Ending conditions	3 min.

3.5.2 Crankcase Heater Control

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



3.6 Stopping Operation

3.6.1 When System is in Stop Mode (Normal operation stop)

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

Actuator	Operation
Compressor	OFF
Outdoor unit fan	OFF
Four way valve	Holds
Main motorized valve (EV1)	0 pls
Subcooling motorized valve (EV2)	0 pls
Hot gas bypass valve (SVP)	OFF
Accumulator oil return valve (SVO)	OFF
Injection (SVT) (ERQ 125 model only)	OFF
Ending conditions	AHU thermostat is turned ON.

3.6.2 Stop due to Malfunction

In order to protect compressors, if any of the following items has an abnormal value, the system will make "stop with thermostat OFF" and the malfunction will be determined according to the number of retry times.

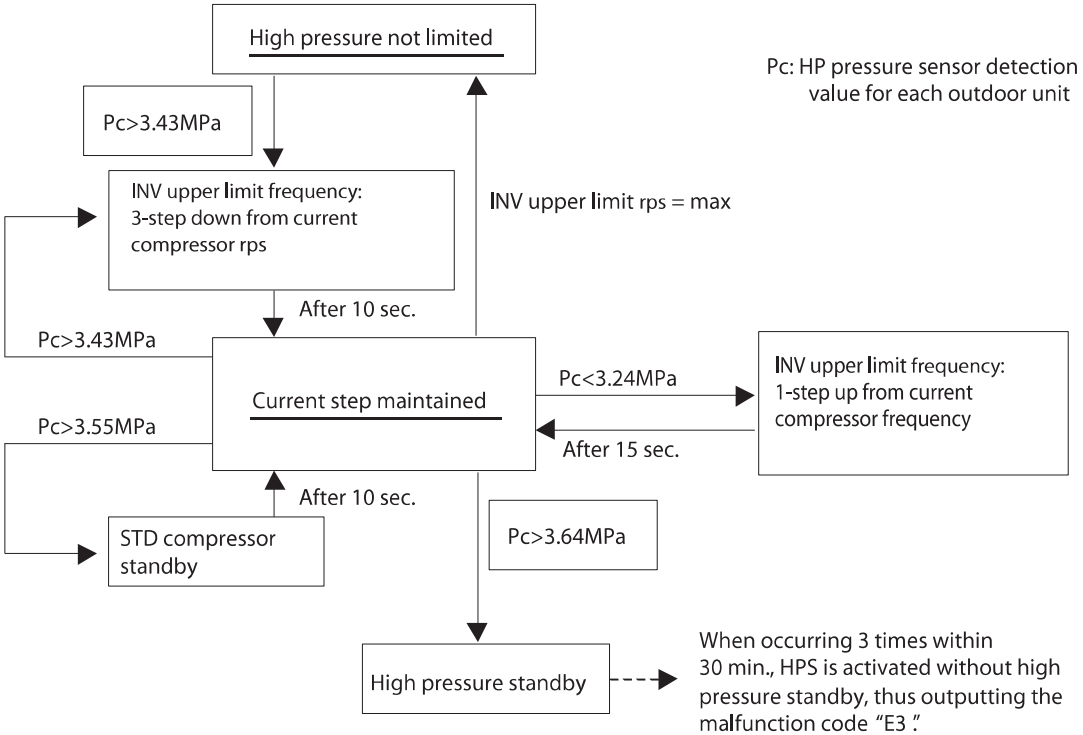
Item	Judgment Criteria	Malfunction Code
1. Abnormal low pressure level	0.07MPa	E4
2. Abnormal high pressure level	4.0MPa	E3
3. Abnormal discharge pipe temperature level	135°C	F3
4. Abnormal power supply voltage	Reverse-phase power supply	U1
5. Abnormal inverter current level	16.1A: 260 sec.	L8
6. Abnormal radiator fin temperature level	93°C	L4

4. Protection Control

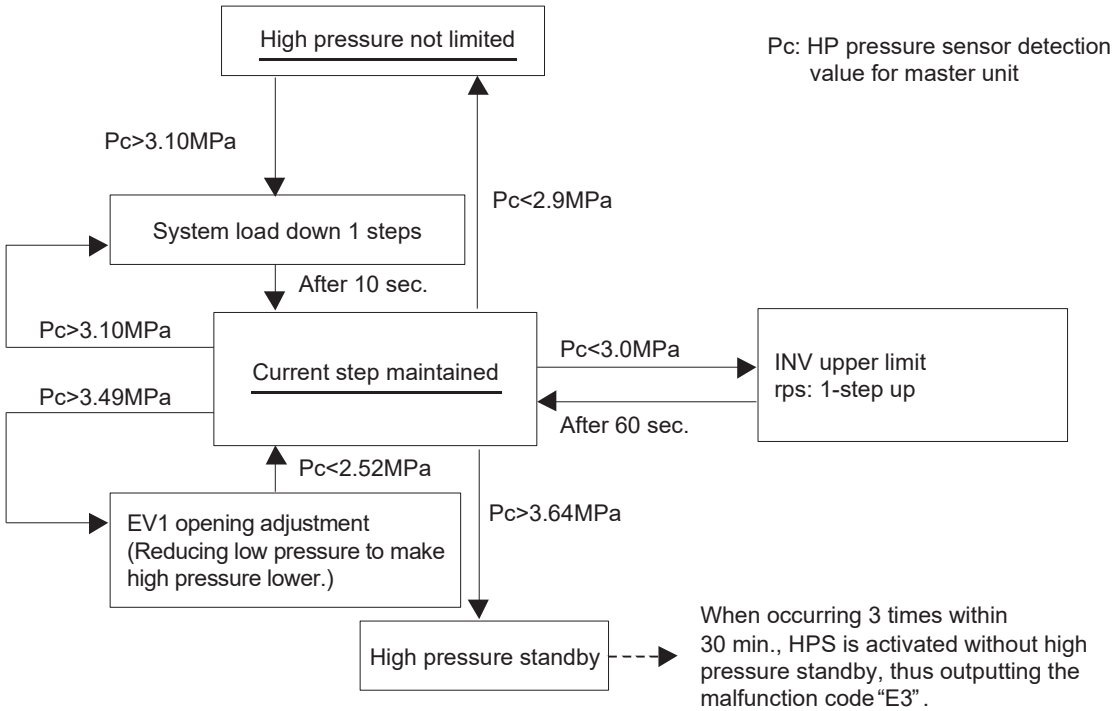
4.1 High Pressure Protection Control

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

[In cooling operation]



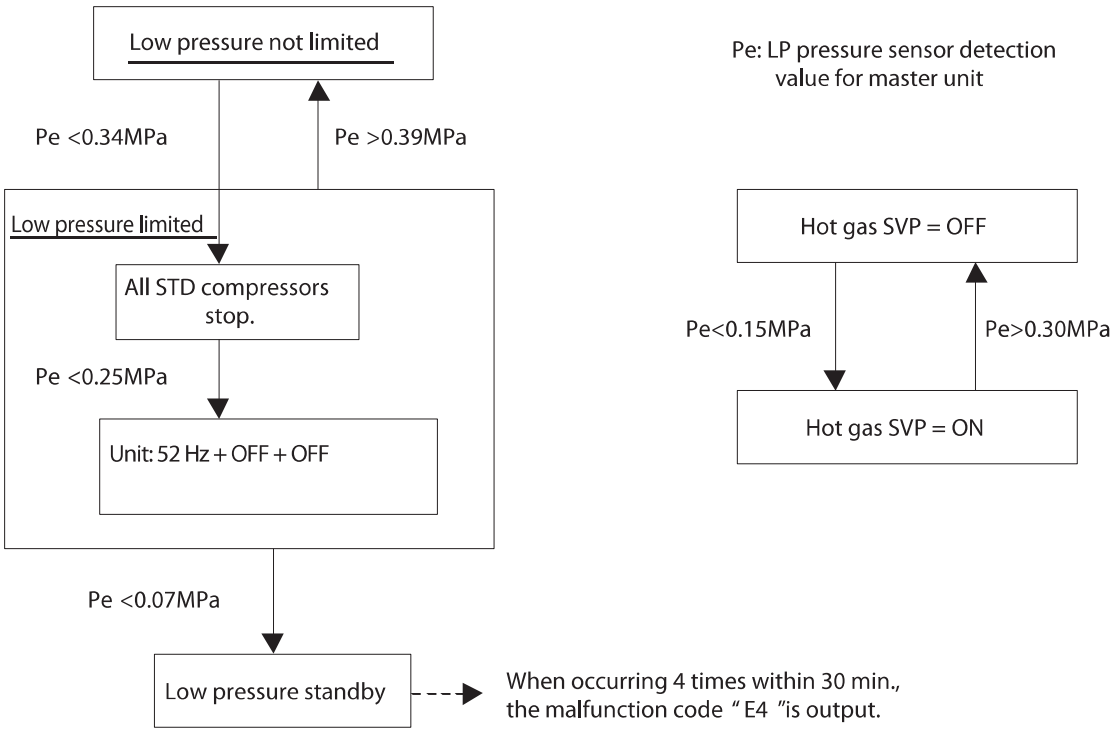
[In heating operation]



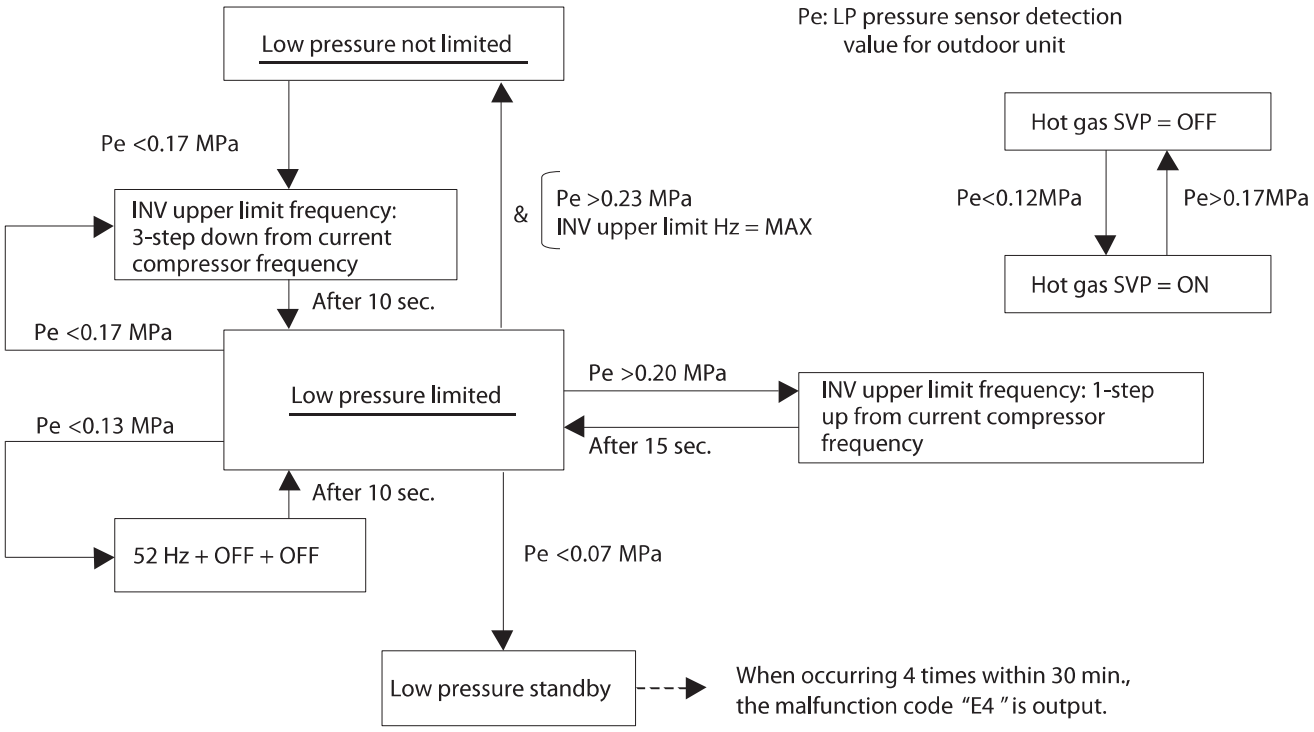
4.2 Low Pressure Protection Control

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

[In cooling operation]



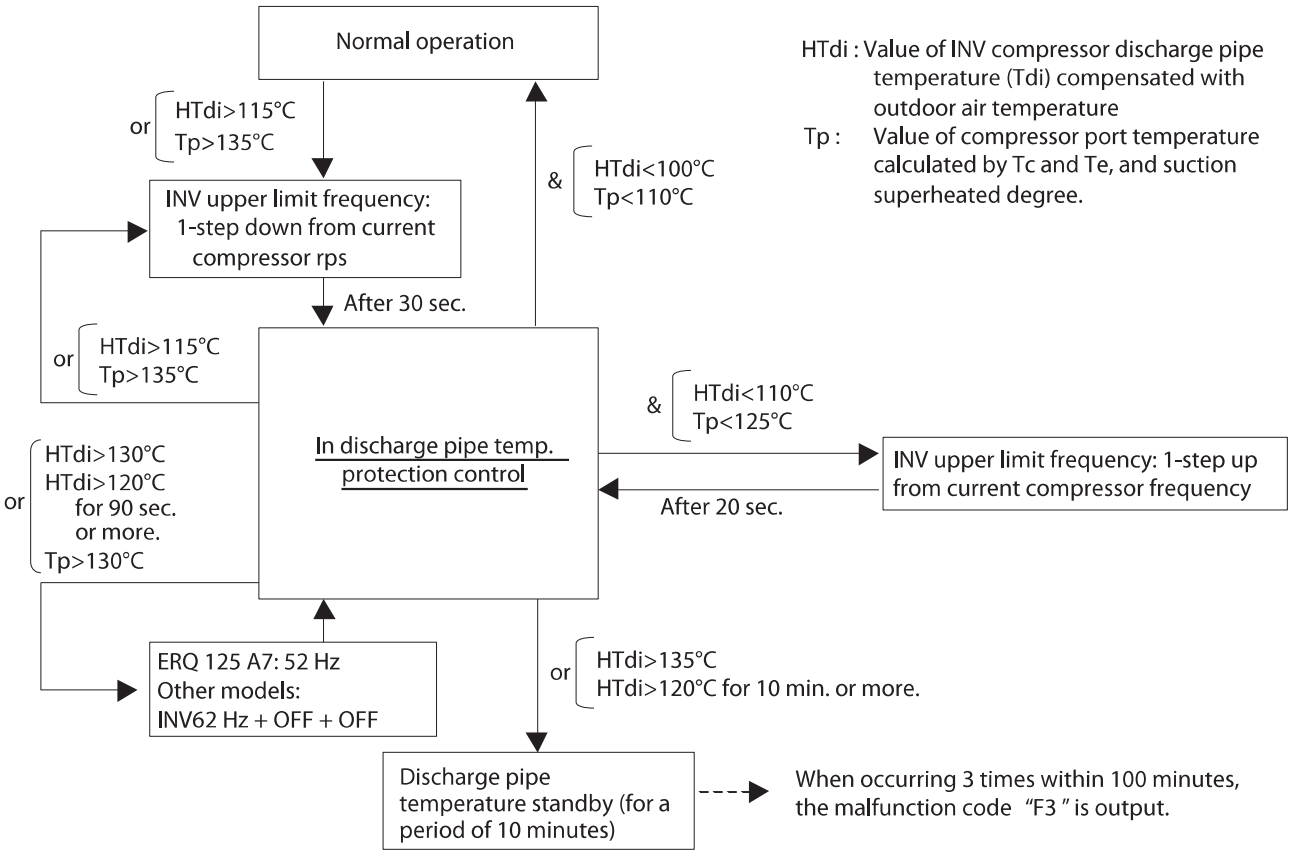
[In heating operation]



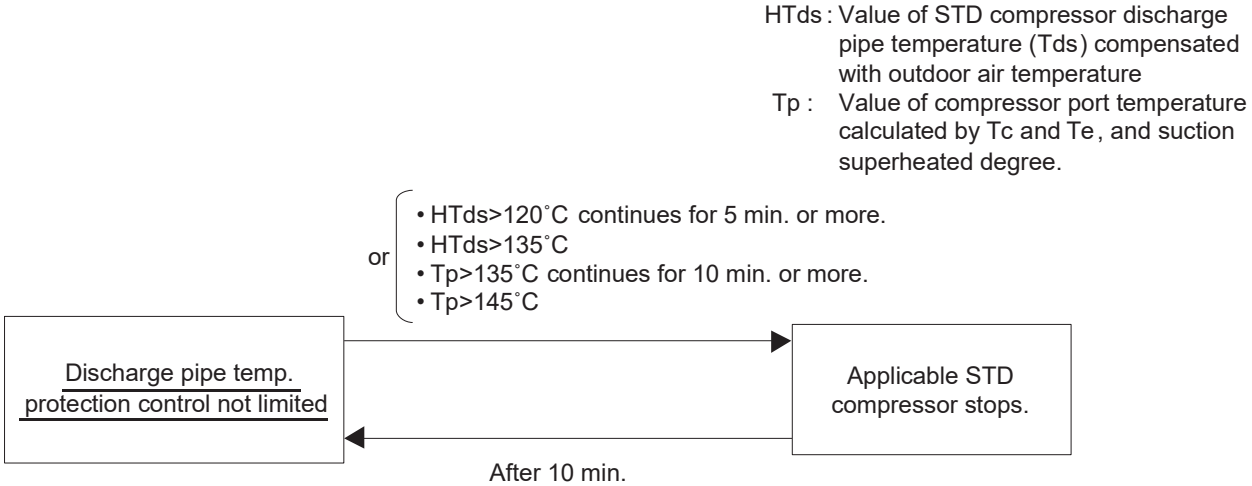
4.3 Discharge Pipe Protection Control

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

[INV compressor]



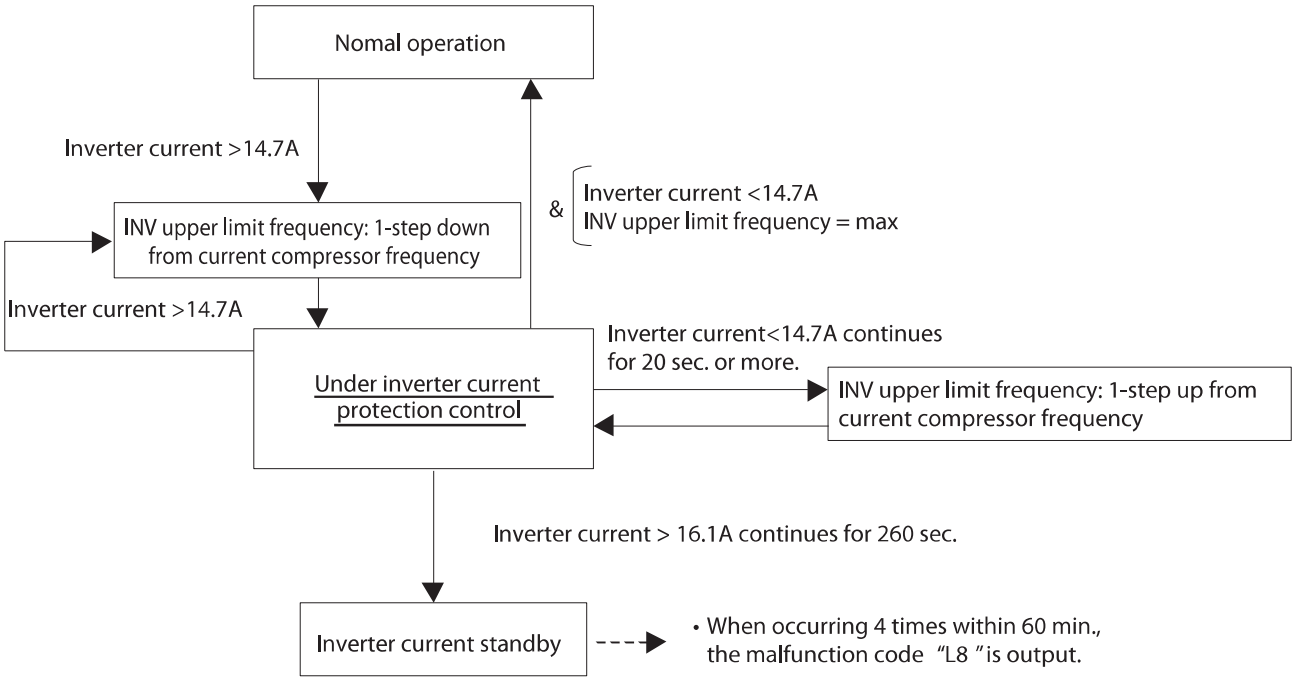
[STD compressor]



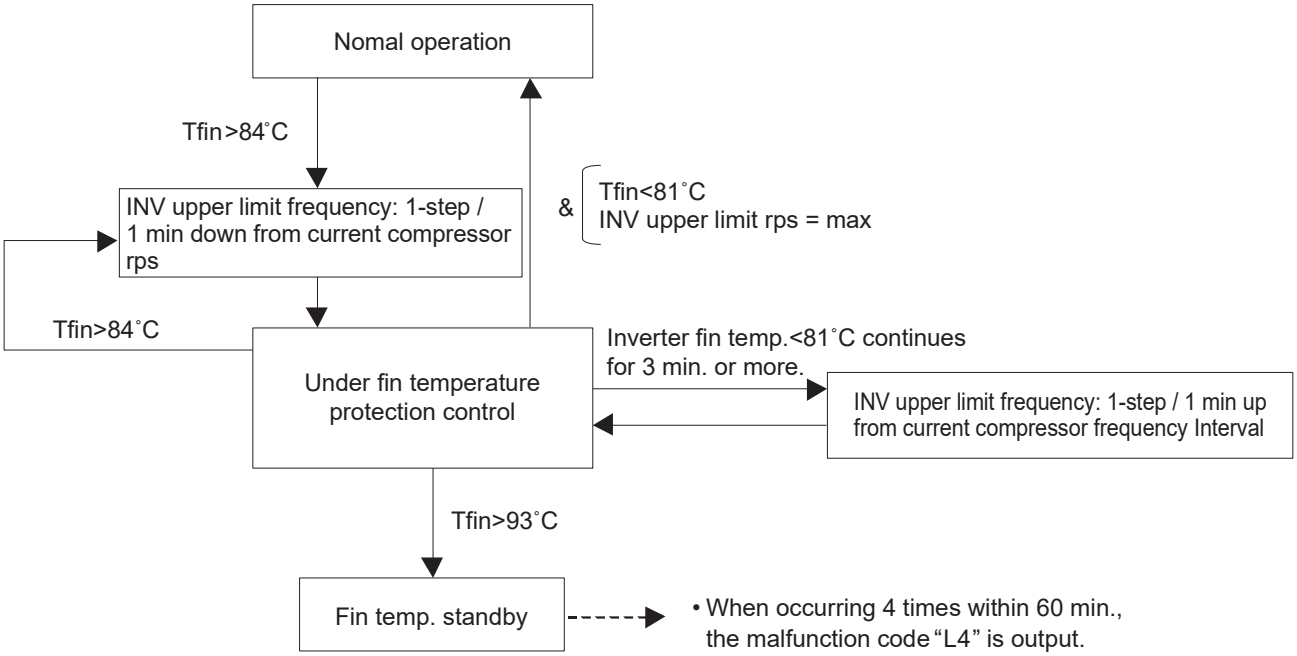
4.4 Inverter Protection Control

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

[Inverter overcurrent protection control]

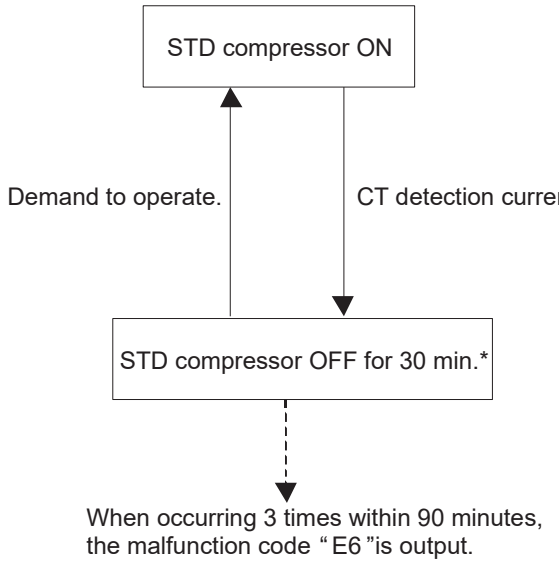


[Inverter fin temperature control]



4.5 STD Compressor Overload Protection

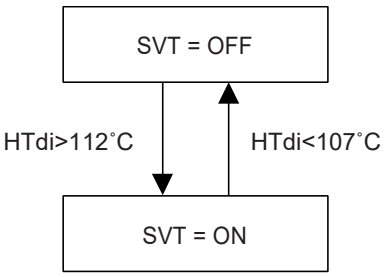
This control is used to prevent abnormal heating due to overcurrent to the compressor resulting from failures of STD compressor such as locking.



*If the power supply is reset while in operation prohibition mode, the prohibition timer will continue counting when the power supply is turned ON.

4.6 Injection Control (only for ERQ 125 A7W1B)

For transitional rise in discharge pipe temperature, have the liquid refrigerant flow into the suction side to reduce the discharge pipe temperature for the compressor protection.



HTdi: Correction value of the discharge pipe temperature on the INV compressor.

5. Other Control

5.1 Emergency Operation (only for ERQ 250 A7W1B)

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

Caution

In order to disable the compressor operation due to a failure or else, be sure to do so in emergency operation mode.

NEVER attempt to disconnect power supply wires from magnetic contactors or else. (Doing so will operate compressors in combination that disables oil equalization between the compressors, thus resulting in malfunctions of other normal compressors.)

5.1.1 Restrictions for Emergency Operation

- In the case of system with 1 outdoor unit installed, only when thermostats of AHUs having a capacity of 50% or more of the outdoor unit capacity turn ON, the emergency operation is functional. (If the total capacity of units with thermostat ON is small, the outdoor unit cannot operate.)
- If the emergency operation is set while the outdoor unit is in operation, the outdoor unit stops once after pump-down residual operation (a maximum of 5 minutes elapsed).

5.1.2 Principle

[Set the system to operation prohibition mode by compressor]

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

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

(Procedure)

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

• In order to set STD1 compressor to operation prohibition mode, set No. 19 of Setting mode 2 to "STD1 OPERATION PROHIBITION". (ERQ 250 A7W1B)

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

(Procedure)

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

5.2 Demand Operation

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

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

5.3 Heating Operation Prohibition

Heating operation is prohibited above 24°C ambient temperature.

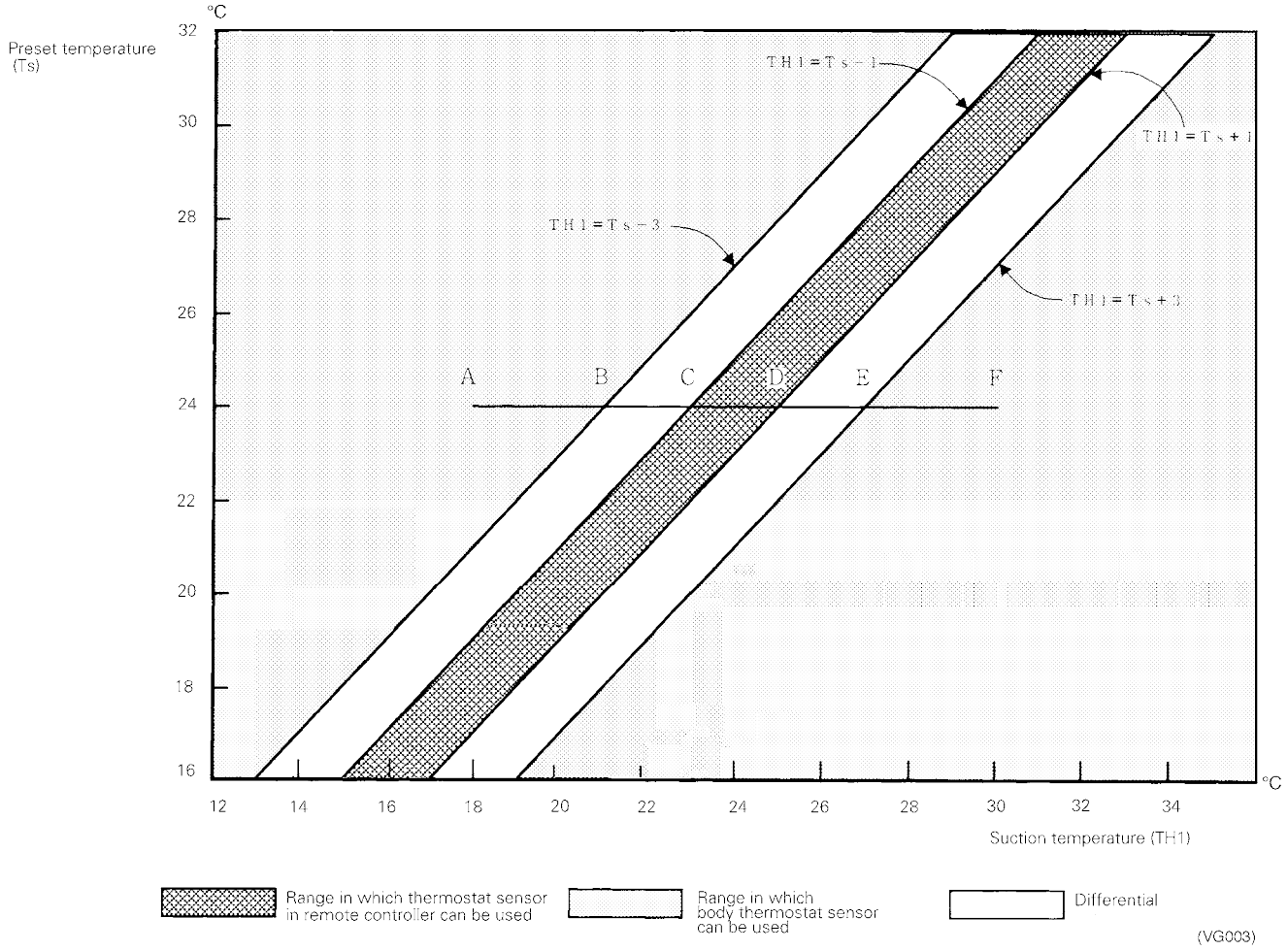
6. Outline of Control

6.1 Thermostat Sensor in Remote Control (only for Z-control)

Temperature is controlled by both the thermostat sensor in remote controller and air suction thermostat in the AHU. (This is however limited to when the field setting for the thermostat sensor in remote controller is set to “Use.”)

Cooling

If there is a significant difference in the preset temperature and the suction temperature, fine adjustment control is carried out using a body thermostat sensor, or using the sensor in the remote controller near the position of the user when the suction temperature is near the preset temperature.



■ **Ex: When cooling**

Assuming the preset temperature in the figure above is 24°C, and the suction temperature has changed from 18°C to 30°C (A → F):

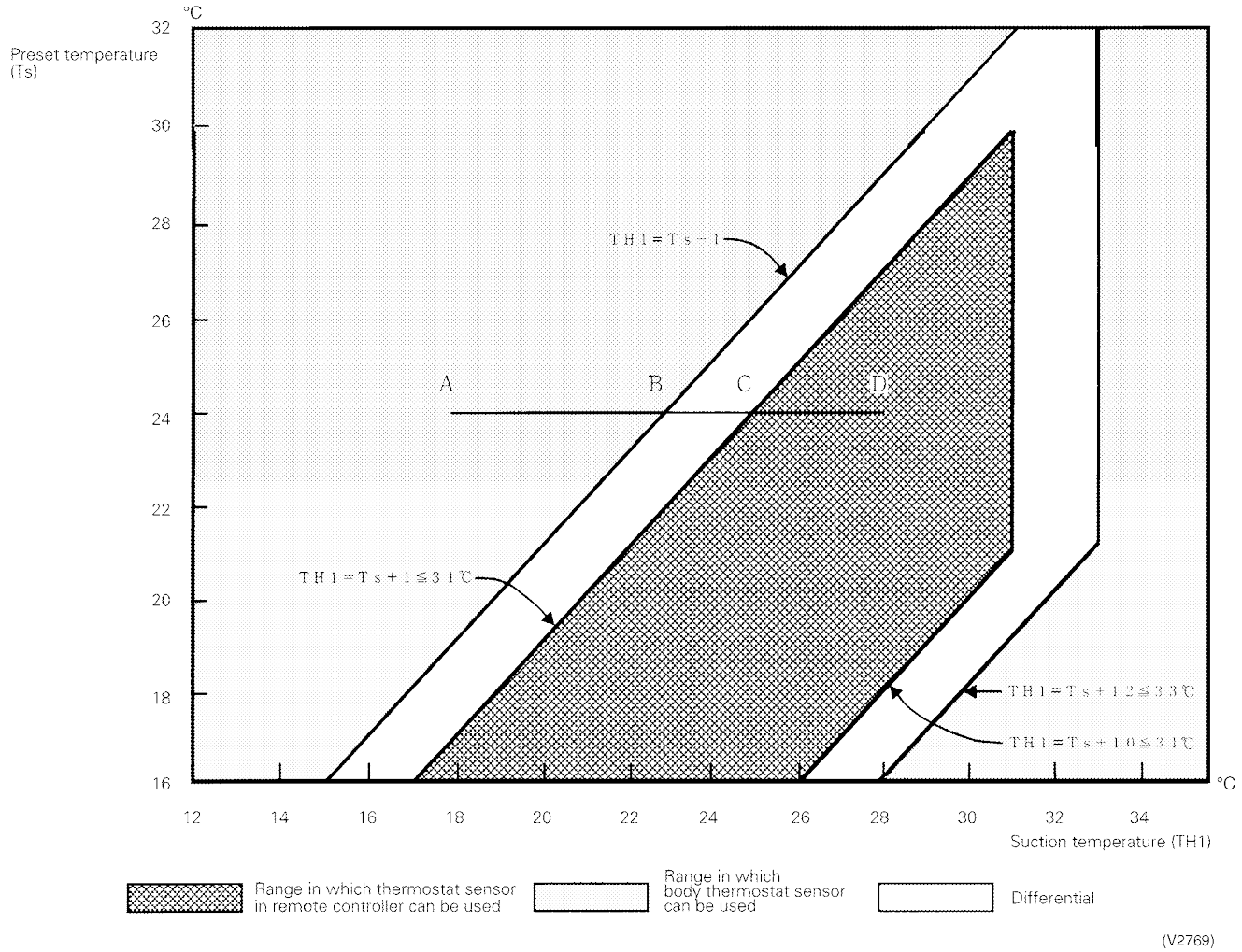
Body thermostat sensor is used for temperatures from 18°C to 23°C (A → C).
Remote controller thermostat sensor is used for temperatures from 23°C to 27°C (C → E).
Body thermostat sensor is used for temperatures from 27°C to 30°C (E → F).

And, assuming suction temperature has changed from 30°C to 18°C (F → A):

Body thermostat sensor is used for temperatures from 30°C to 25°C (F → D).
Remote controller thermostat sensor is used for temperatures from 25°C to 21°C (D → B).
Body thermostat sensor is used for temperatures from 21°C to 18°C (B → A).

Heating

When heating, the hot air rises to the top of the room, resulting in the temperature being lower near the floor where the occupants are. When controlling by body thermostat sensor only, the unit may therefore be turned off by the thermostat before the lower part of the room reaches the preset temperature. The temperature can be controlled so the lower part of the room where the occupants are doesn't become cold by widening the range in which thermostat sensor in remote controller can be used so that suction temperature is higher than the preset temperature.



(V2769)

■ **Ex: When heating Assuming the preset temperature in the figure above is 24°C, and the suction temperature has changed from 18°C to 28°C (A → D):**

Body thermostat sensor is used for temperatures from 18°C to 25°C (A → C).
Remote controller thermostat sensor is used for temperatures from 25°C to 28°C (C → D).

And, assuming suction temperature has changed from 28°C to 18°C (D → A):

Remote controller thermostat sensor is used for temperatures from 28°C to 23°C (D → B).
Body thermostat sensor is used for temperatures from 23°C to 18°C (B → A).

6.2 Hot Start Control (In Heating Operation Only)

At startup with thermostat ON or after the completion of defrosting in heating operation, the AHU fan is controlled to prevent cold air from blasting out and ensure startup capacity.

[Detail of operation]

For more information refer to the chapter "Field Setting".

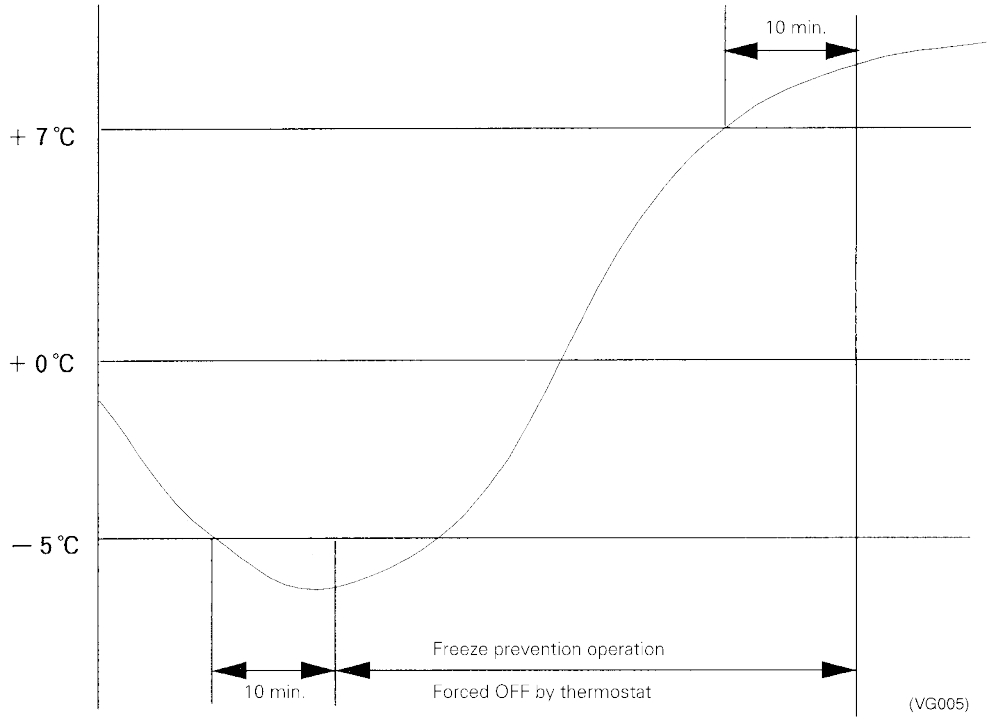
6.3 Freeze Prevention

Freeze Prevention by Off Cycle (AHU)

When the temperature detected by liquid pipe temperature thermistor (R2T) of the AHU heat exchanger drops too low, the unit enters freeze prevention operation in accordance with the following conditions, and is also set in accordance with the conditions given below.

Conditions for starting freeze prevention: Temperature is -1°C or less for total of 40 min., or temperature is -5°C or less for total of 10 min.
Conditions for stopping freeze prevention: Temperature is +7°C or more for 10 min. continuously

Ex: Case where temperature is -5°C or less for total of 10 min.



6.4 Low Outdoor Air Temperature Protection Control

Objective

In cooling (or fan operation) or heating, if outdoor air is low in temperature, stop the fan forcibly.

Details

[Cooling and fan operation]
Turn OFF the fan for a period of 60 minutes at a suction temperature of 5°C or lower.
In order to monitor the outdoor air temperature, however, turn ON the fan for a period of one minute and turn OFF the fan again at a temperature of 5°C or lower after the said timer completes the operative period.
Reset the 60-minute timer when the fan stops running.

[Heating]
Turn OFF the fan for a period of 60 minutes at a suction temperature of –5°C or lower.
In order to monitor the outdoor air temperature, however, turn ON the fan for a period of one minute and turn OFF the fan again at a temperature of –5°C or lower after the said timer completes the operative period.
Reset the 60-minute timer when the fan stops running.
* The thermostat will not turn ON in one minute due to the temperature while the fan stops.

- This control shall be disabled at test run both in cooling and heating. (The test run shall be conducted first.)

Part 5
Control Box EKEQ - CB(A)V3

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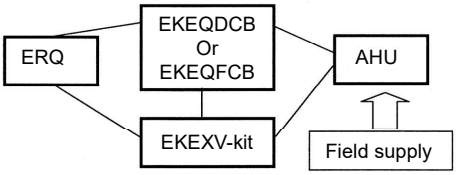
1. Different Systems with their Control Boxes

For steering a field supply AHU by an outdoor inverter heat pump, 2 systems can be used:

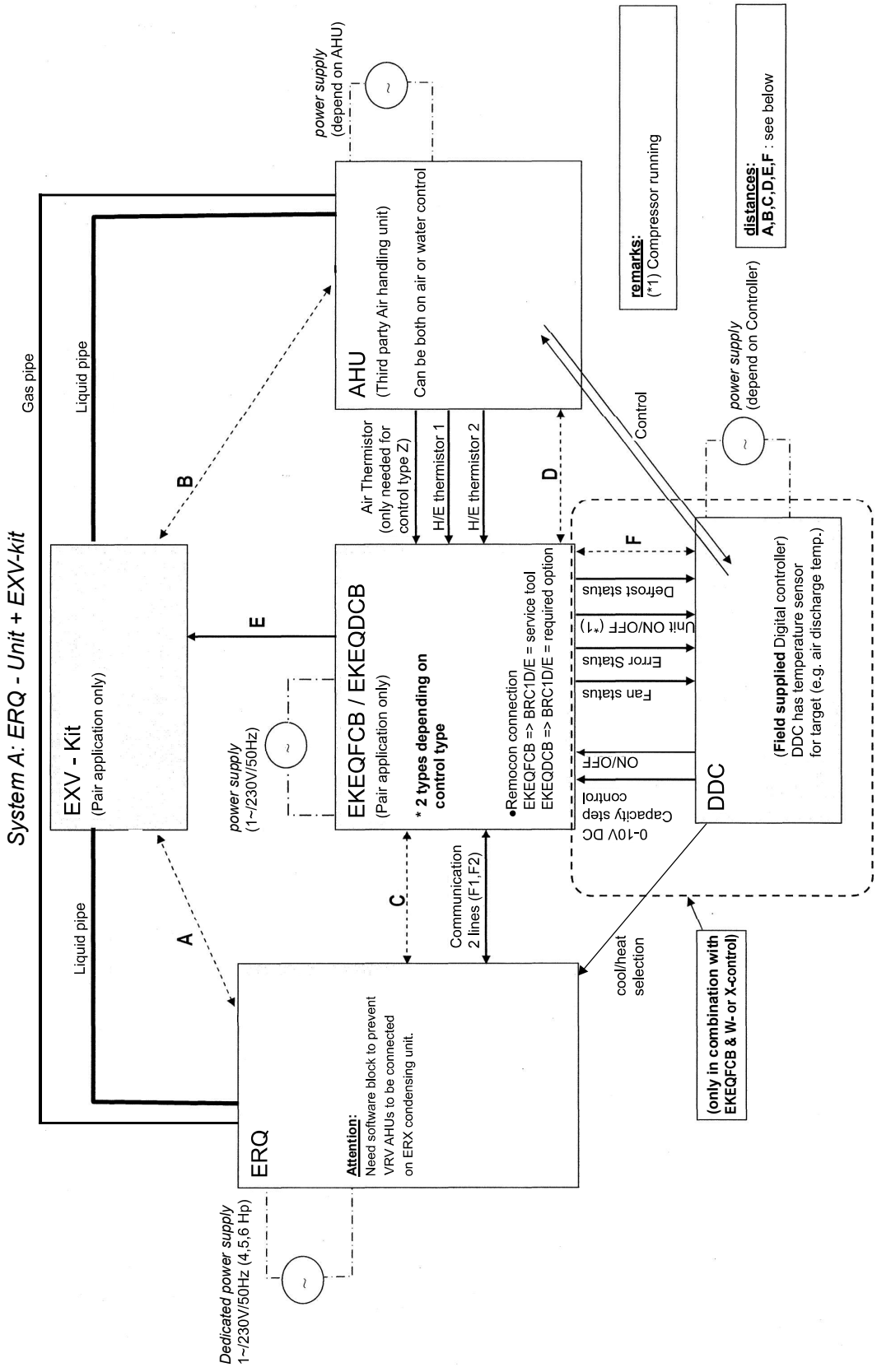
- System A: PAIR application (ERQ-outdoor)
- System B: MULTI application (VRV-outdoor)

1.1 System A: PAIR

System A = PAIR : ERQ + EXV-Kit

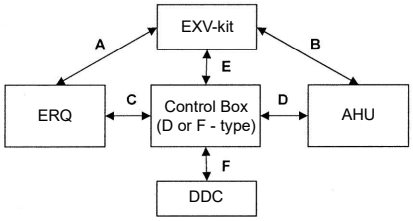


Pair application here means 1 outdoor unit + 1 AHU.
In pair application, there's the choice between 2 control boxes: EKEQD or EKEQF.

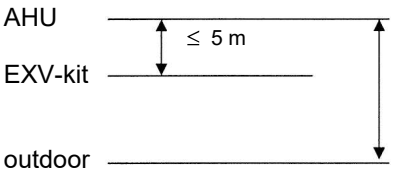

System A: ERQ - Unit + EXV-kit
Gas pipe
Liquid pipe
Liquid pipe
power supply
(depend on AHU)
AHU
(Third party Air handling unit)
Can be both on air or water control
EXV - Kit
(Pair application only)
EKEQFCB / EKEQDCB
(Pair application only)
* 2 types depending on control type
•Remocon connection
EKEQFCB => BRC1D/E = service tool
EKEQDCB => BRC1D/E = required option
Air Thermistor
(only needed for control type Z)
H/E thermistor 1
H/E thermistor 2
power supply
(1~/230V/50Hz)
Dedicated power supply
1~/230V/50Hz (4,5,6 Hp)
ERQ
Attention:
Need software block to prevent VRV AHUs to be connected on ERX condensing unit.
A
B
C
D
E
F
Communication
2 lines (F1,F2)
Control
0-10V DC
Capacity step
control
ON/OFF
Fan status
Error Status
Unit ON/OFF (*1)
Defrost status
DDC
(Field supplied Digital controller)
DDC has temperature sensor
for target (e.g. air discharge temp.)
power supply
(depend on Controller)
cool/heat
selection
(only in combination with
EKEQFCB & W- or X-control)
remarks:
(*1) Compressor running
distances:
A,B,C,D,E,F : see below

Allowable lengths and heights

System A:



Allowable height:



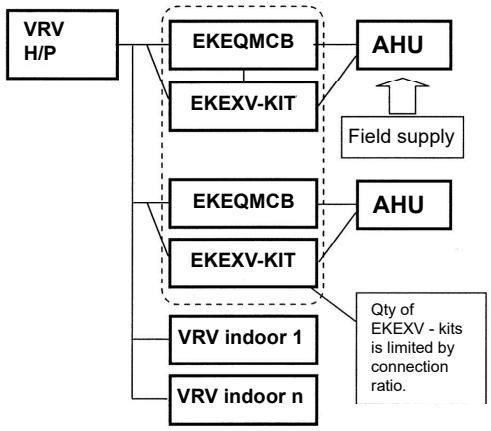
Total system: ≤ 30 m
(outdoor unit can be above
or below the AHU)

		Piping		Communication			
		A	B	C	D	E	F
ERQ 3 phase	125	length: 5 < A ≤ 50 m	length: ≤ 5 m	≤ 100 m	≤ 20 m	≤ 20 m	depend on DDC
	200						
	250						

1.2 System B: MULTI

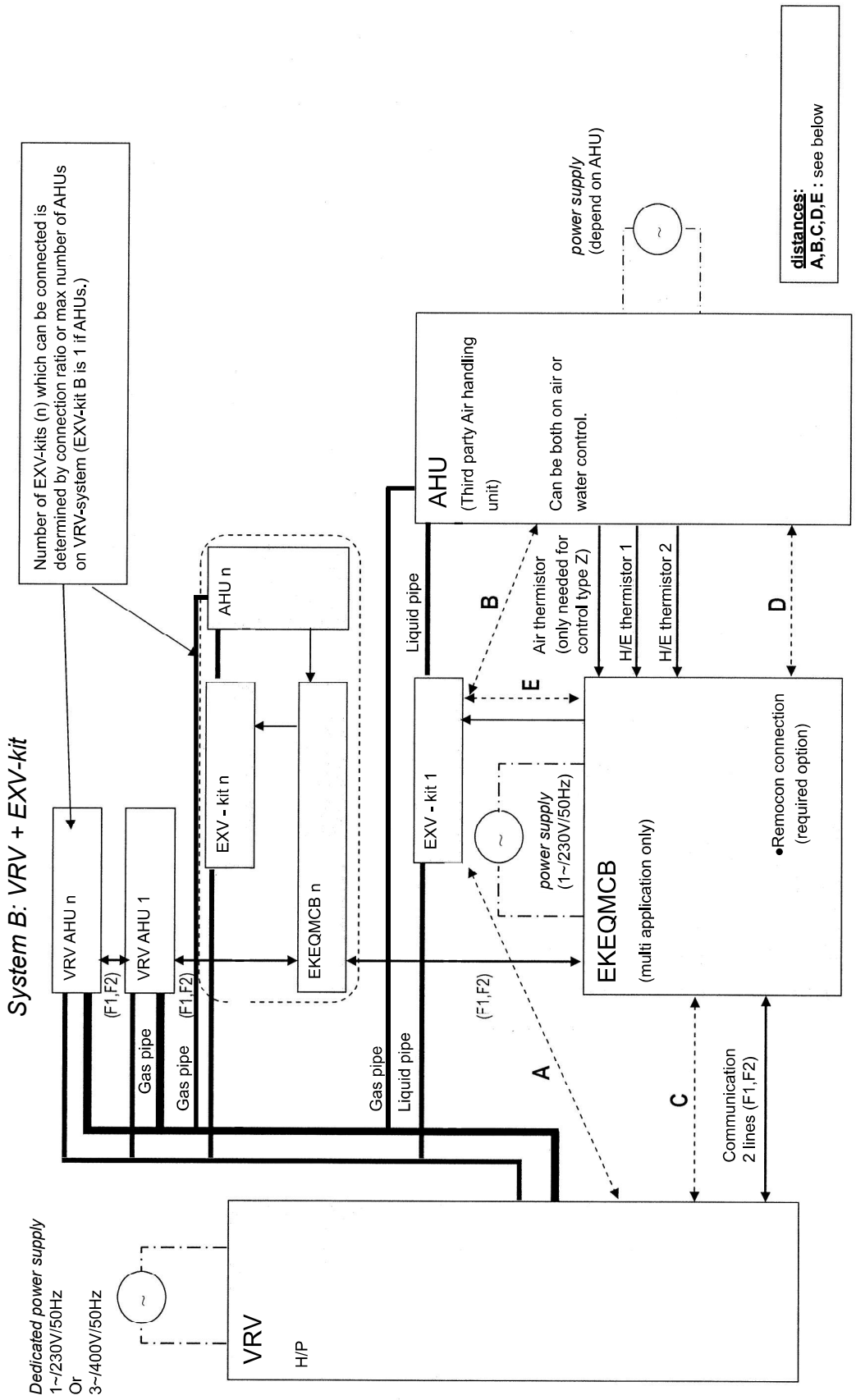
Only for combining VRV + AHU + indoors. No ERQ!

System B = MULTI (suction control) : VRV + EXV-Kit



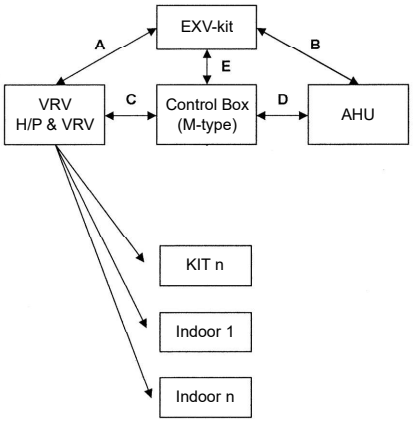
Multi application with VRV means the ability to combine 1 outdoor unit + several AHU, as well as VRV indoors (minimum 1 is required). The required control box for this application is EKEQM.

Also EKEQFCBA can be combined with VRV but in that case, maximum 3 AHU's can be combined with the VRV, and no indoors.

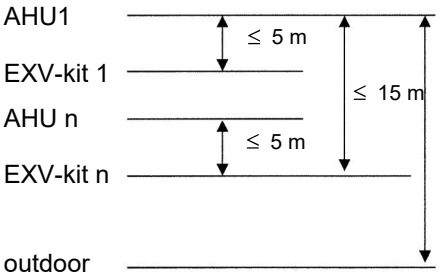

System B: VRV + EXV-kit
Number of EXV-kits (n) which can be connected is determined by connection ratio or max number of AHUs on VRV-system (EXV-kit B is 1 if AHUs.)
VRV AHU n
VRV AHU 1
EXV - kit n
AHU n
EKEQMCB n
EXV - kit 1
AHU
(Third party Air handling unit)
Can be both on air or water control.
power supply
(depend on AHU)
distances:
A,B,C,D,E : see below
Liquid pipe
Gas pipe
Gas pipe
Gas pipe
Liquid pipe
(F1,F2)
(F1,F2)
(F1,F2)
B
E
D
A
C
Air thermistor
(only needed for control type Z)
H/E thermistor 1
H/E thermistor 2
power supply
(1~/230V/50Hz)
EKEQMCB
(multi application only)
•Remocon connection
(required option)
Communication
2 lines (F1,F2)
Dedicated power supply
1~/230V/50Hz
Or
3~/400V/50Hz
VRV
H/P

Allowable lengths and heights

System B:



Allowable height:



Total system: ≤ 40 m
(outdoor unit can be above or below the AHU)

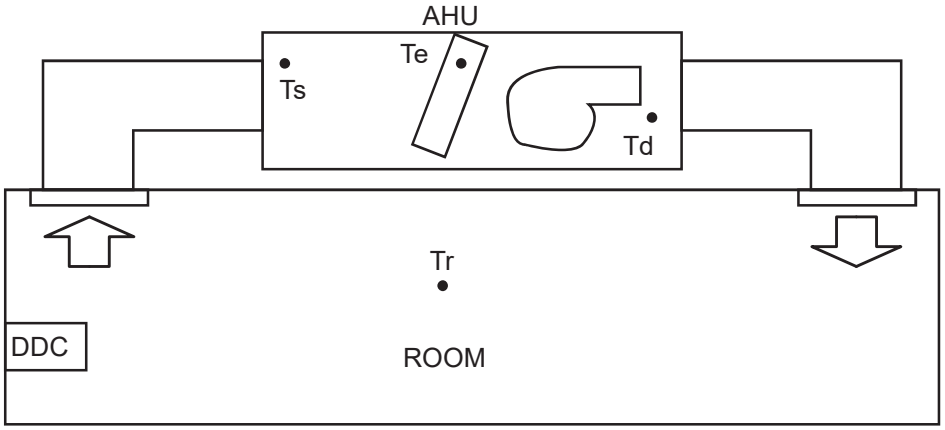
	Piping		Communication		
	A + B	B	C	D	E
VRV	consider same as 1 indoor unit	length: ≤ 5 m	follow std. VRV wiring length policy	≤ 50 m	≤ 50 m

Connection ratio: 50-110%

2. W-, X-, Y-, Z-Control

The D, F, M boxes have different types of control, giving the ability to control different temperatures (T_d, T_s, T_r, T_e or T_c).

Schematic:



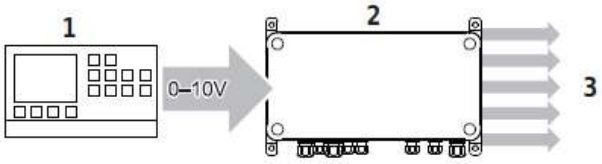
Legend:

T_d	Discharge air control
T_s	Suction air control
T_r	Room air control
T_e	Evaporating temperature control
T_c	Condensing temperature control
AHU	Air handling unit
DDC	Digital controller

EKEQD: Z-control
EKEQF: W-, X-, Y-control
EKEQM: Z-control

2.1 W-Control

Control of capacity by means of an external device (DDC-controller, 0-10 V control).



Legend:

1	Field-supplied controller
2	Control box EKEQF
3	Level 1 ~ 5 for capacity control

Components for control:

- DDC-controller (field supply)
- Air thermistor (field supply)
- BRC1D/E (only for service)

++ Possibility for T_d, T_s or T_r control
Flexibility in applications
-- Higher cost (DDC controller required)

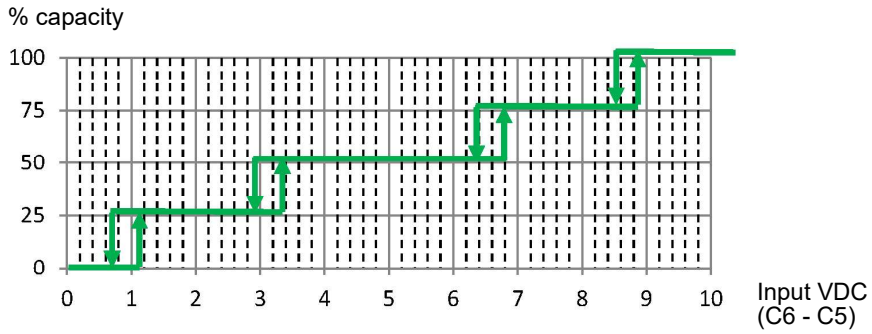
In case of W-control, a DDC-controller is required to operate the unit. This DDC-controller is field supply but in order to connect it to our ERQ-system, it is required that it emits a 0-10 VDC signal towards the control box.

2.1.1 Different steps

The EKEQF control box will interpret the 0-10 V signal according to 5 steps. The correlation between the voltage output and the system capacity is shown in the table below.

Step	Voltage field controller (*)	System capacity (†)	T_e during cooling operation	T_c during heating operation
1	0,8 V	0% (OFF)	-	-
2	2,5 V	40%	13,5°C	31°C
3	5 V	60%	11°C	36°C
4	7,5 V	80%	8,5°C	41°C
5	9,2 V	100%	6°C	46°C

(*) Voltages shown are the center points of each step range.
(†) The capacities mentioned in the table above are not exact. The compressor frequency can vary and will have an impact on the system capacity.



2.1.2 System capacity

The system response to the 0-10 V output from the field-supplied controller is the same in cooling and heating operation.
The field-supplied controller will output a 0-10 V signal based on ΔT.
0 V is interpreted as no capacity.
10 V is interpreted as high capacity both in cooling AND heating operation.

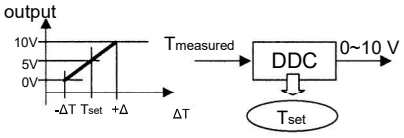
Example:
A ΔT of 4°C in cooling means that the field-supplied controller needs to output 10 V, so that the cooling capacity will be 100%.
The same ΔT of 4°C in heating operation means that the field-supplied controller needs to output 0 V, so that the heating capacity will be 0%.

	Target temperature	Actual measured temperture	ΔT	Required system response
Cooling operation	24°C	28°C	+4°C	High capacity (10 V)
Heating operation	24°C	28°C	+4°C	No capacity (0 V)

The response of the field-supplied controller must therefore be inverted for cooling or heating operation.

2.2 X-Control

Control of refrigerant temperature by means of an external device (DDC controller, 0-10 V control).



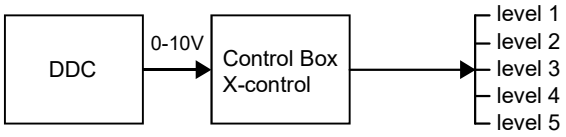
ΔT = T_{set} - $T_{measured}$
$T_{measured}$ = T_d, T_s or T_r

Components for control:
- DDC (field supply)
- Air thermistor (field supply)
- BRC1D (only for servicing)

++ Possibility for T_d, T_s or T_r control
Flexibility in applications
-- Higher cost (DDC needed)

In case of X-control, a DDC-controller is needed to operate the unit. This DDC-controller is field supply but in order to connect it to our ERQ-system, it is required that it emits a 0-10 VDC signal towards the control box.

2.2.1 Different levels



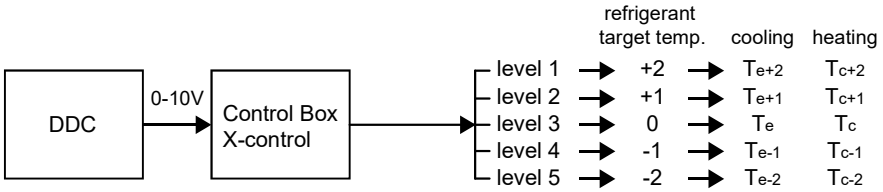
Inside the control box, this 0-10 VDC signal is converted into a voltage level.

The output voltage increase gives the voltage at which the level increases.
The output voltage decrease gives the voltage at which the level decreases.

	Output level	Level 1	Level 2	Level 3	Level 4	Level 5
DDC	Output voltage increasing	1.8 -->	3.8 -->	6.8 -->	8.8 -->	
	Output voltage decreasing	1.2 <--	3.2 <--	6.2 <--	8.2 <--	

Example:
Room temperature = 20°C, set temperature = 25°C. Heating operation: DDC controller, calculates the difference and sends a 3 VDC signal (fictive value) to the control box. This is between 1,8 and 3,8 so in level 2. When the room temperature rises to 23°C, the DDC controller detects a smaller temperature difference and will send out a higher signal, ex. 5 VDC. The output voltage has increased so you have to use the highest line, indicating that you are now in level 3. When the window is opened, the room temperature drops and the difference with the set temperature is higher. The DDC sends a 1 V signal. According to the “output voltage decreasing” line, we are now in level 1.

2.2.2 Target refrigerant temperature



Example, continued:
3 VDC = level 2, thus meaning an increase of the refrigerant target temperature. In heating mode, this means T_c + 1°C. Logically, the room temperature will rise so at the next signal, we are in level 3, where T_c is kept even.

		Cooling	Heating
ΔT < 0	level 1 + level 2	DDC asks less capacity	DDC asks more capacity
ΔT = 0	level 3	no change	no change
ΔT > 0	level 4 + level 5	DDC asks more capacity	DDC asks less capacity

ΔT = room temp. - set temp.

2.3 Y-Control

Control of evaporating and condensing temperature (Te and Tc) by Daikin control (no DDC needed).

Fixed T_e or T_c
T_e = user setting: -3 ~ 10°C
T_c = user setting: 43 ~ 49°C

Components for control:
- BRC1D (only for servicing)

++ Low cost
No BRC needed
-- No air temperature control

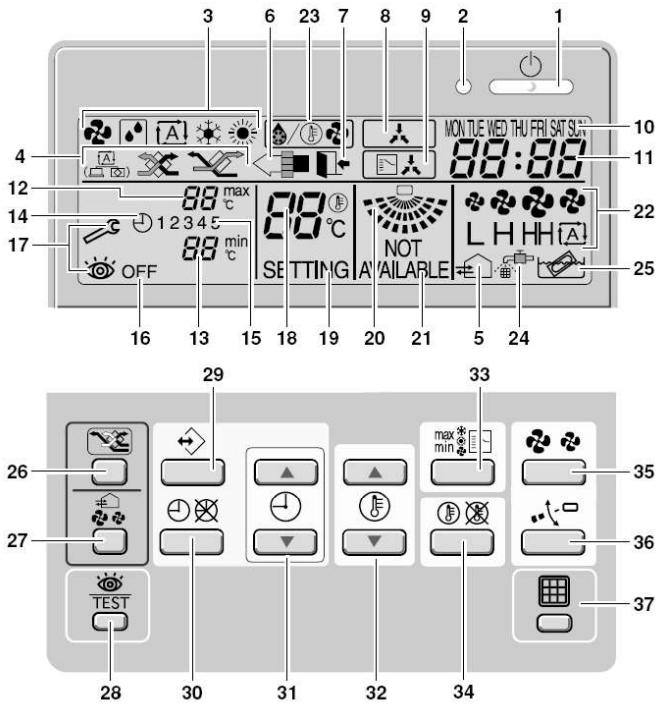
With Y-control, there is no external input to change T_e/T_c value. Their values can only be changed by local setup with a Daikin remote controller (during installation). We refer to the chapter “Field Setting” for further information.

2.4 Z-Control

Control of air temperature (T_s or T_r) by Daikin control (no DDC needed).

Components for control:
- Air thermistor (Daikin)
- BRC1D (Daikin)
- KRP4A (Daikin option, remote on/off)

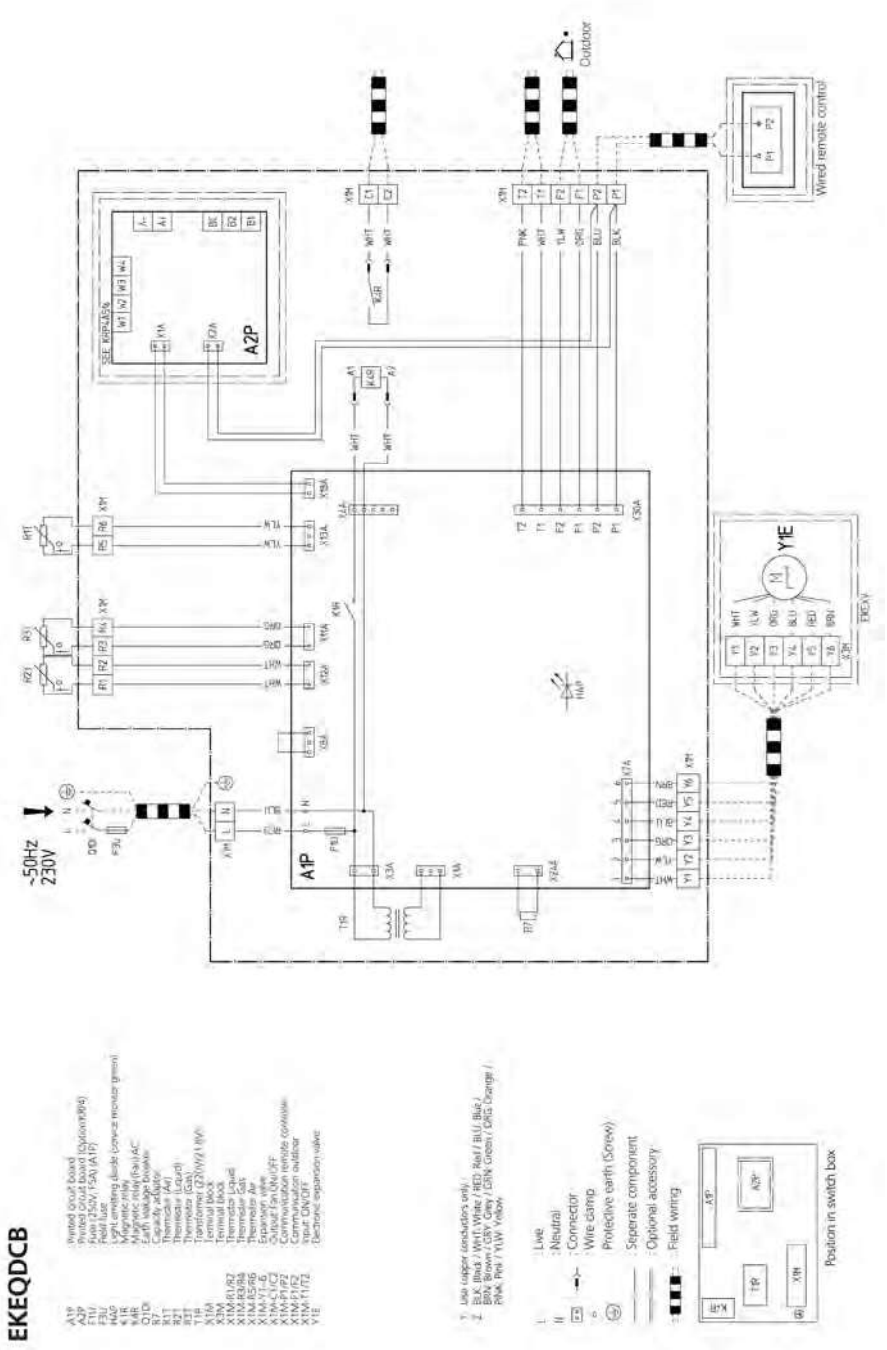
++ Low cost
-- BRC needed
No possibility for T_d control



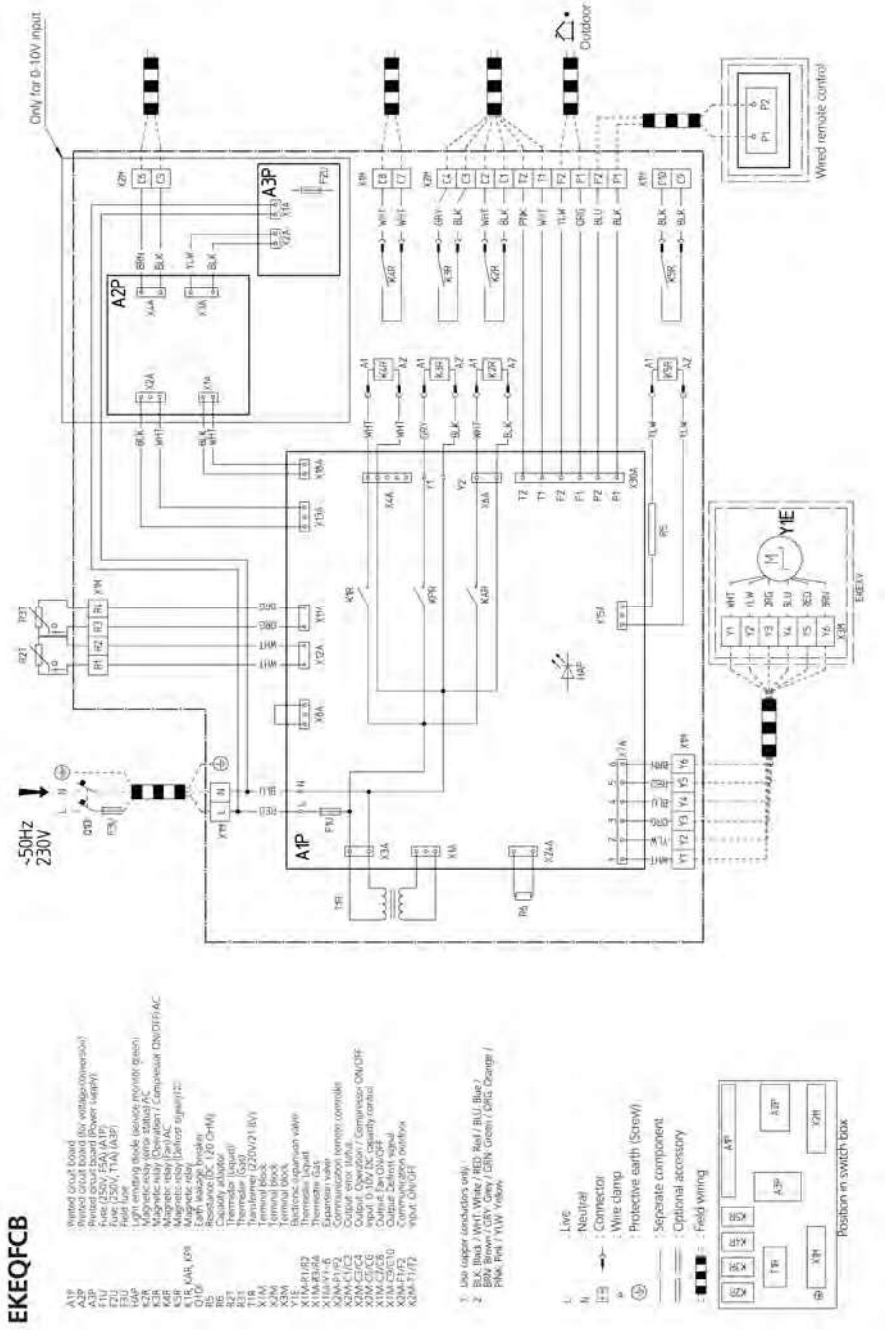
Item	Name	User	Z	BP	M	BM
1	On/off button	Customer	0	0	0	0
28	Inspection/test operation button	Installer	0	0	0	0
29	Programming button	Installer	0	0	0	0
30	Schedule timer button	Customer	0	0	0	0
31	Time adjust buttons	Customer	0	0	0	0
32	Temperature adjust buttons	Customer	0	0	0	0
33	Operation change/min-max button	Customer	0	0	0	0
34	Setpoint/limit button	Customer	0	0	0	0
35	Fan speed button	Customer	x	0	x	x
36	Air flow direction adjust button	Customer	x	x	x	x
37	Air filter cleaning time icon reset button	Customer	x	0	x	x

3. Wiring Diagram of Control Box

3.1 D-box



3.2 F-box


EKEQFCB
Only for 0-10V input
Outdoor
Wired remote control
A3P
A2P
A1P
Y1E
EKEXV
~50Hz
230V
Position in switch box

4. Attention Points

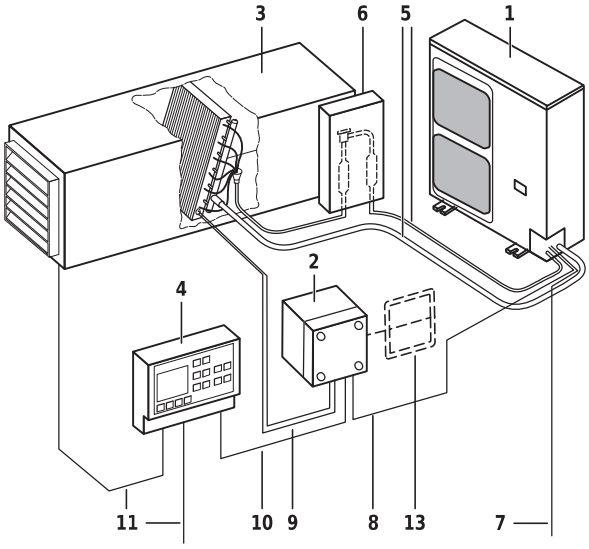
- Do not forget to place the capacity setting adaptor. Otherwise, you'll get UA or PJ error. All capacity setting adaptors are delivered with the control box.
- Polarity of the C5/C6-contact (F-box, W- & X-control) C5 = "-", C6 = "+"

5. System A: EKEQF & EKEQD-box: Installation and Operation Manual

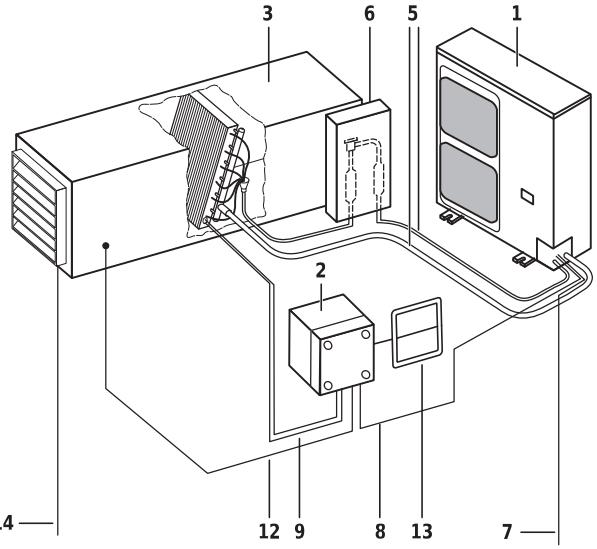
INSTALLATION AND OPERATION MANUAL

Option kit for combination of Daikin condensing units with field-supplied air handling units

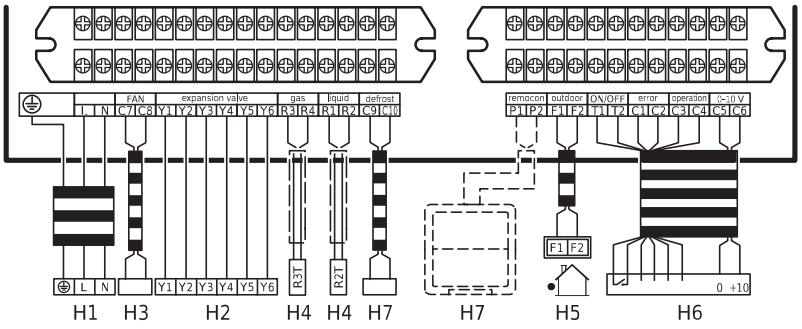
EKEQFCBAV3
EKEQDCBV3



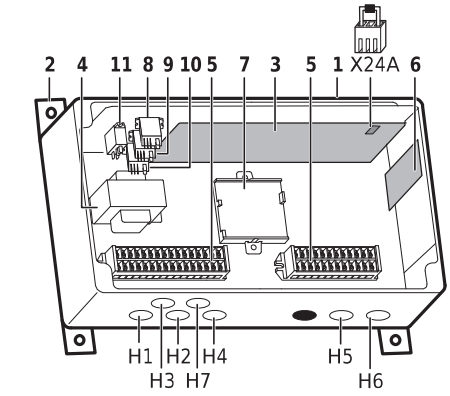
1 EKEQFCBAV3



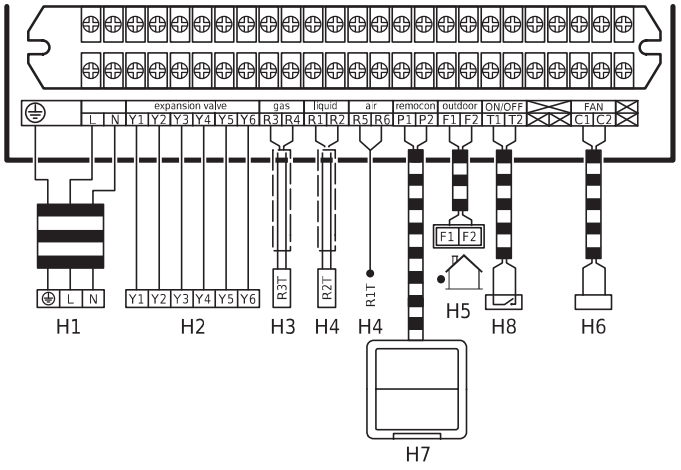
2 EKEQDCBV3



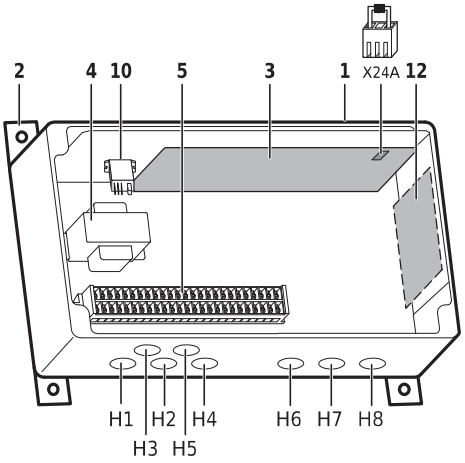
3 EKEQFCBAV3



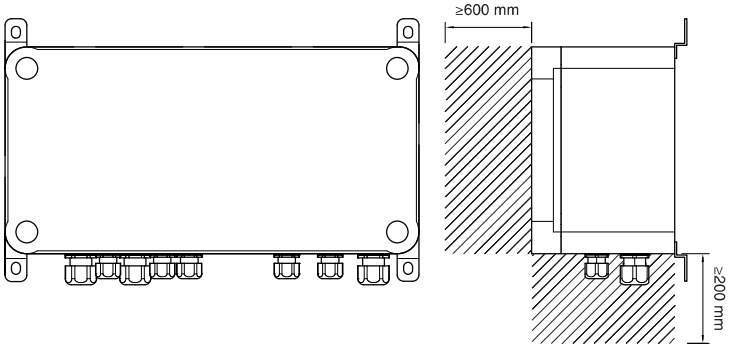
4 EKEQFCBAV3



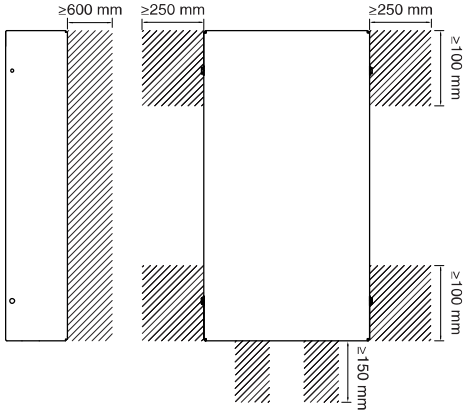
5 EKEQDCBV3



6 EKEQDCBV3



7 EKEQ(F/D)



8 EKEXV

CE - DECLARATION-OF-CONFORMITY | **CE - DECLARACION-DE-CONFORMIDAD** | **CE - DECLARAÇÃO-DE-CONFORMIDADE** | **CE - ERKLÆRING OM-SAMSVAR** | **CE - IZJAVA-O-USKLAĐENOSTI** | **CE - IZJAVA O SKLADNOSTI** | **CE - ATITIKTIES-DEKLARACIJA**
CE - KONFORMITÄTSERKLÄRUNG | **CE - DICHIARAZIONE-DI-CONFORMITA** | **CE - ЗАЯВЛЕНИЕ-О-СООТВЕТСТВИИ** | **CE - ILMOITUS-YHDENMUKAISUUDESTA** | **CE - MEGFELELŐSÉGI-NYILATKOZAT** | **CE - VASTAVUSDEKLARATSIOON** | **CE - ATBILSTĪBAS-DEKLARĀCIJA**
CE - DECLARATION-DE-CONFORMITE | **CE - ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ** | **CE - OPFYLDELSESERKLÆRING** | **CE - PROHLÁŠENÍ-O-SHODĚ** | **CE - DEKLARACJA-ZGODNOŚCI** | **CE - ДЕКЛАРАЦИЯ-ЗА-СЪОТВЕТСТВИЕ** | **CE - VYHLÁSENIE-ZHODY**
CE - CONFORMITEITSVERKLARING | **CE - FÖRSÄKRAN-OM-ÖVERENSTÄMMELSE** | **CE - DECLARAŢIE-DE-CONFORMITATE** | **CE - UYUMLULUK-BEYANI**

Daikin Europe N.V.

01 (GB) declares under its sole responsibility that the air conditioning equipment to which this declaration relates:
02 (D) erklärt auf seine alleinige Verantwortung dass die Ausrüstung der Klimageräte für die diese Erklärung bestimmt ist:
03 (F) déclare sous sa seule responsabilité que l'équipement d'air conditionné visés par la présente déclaration:
04 (NL) verklaart hierbij op eigen exclusieve verantwoordelijkheid dat de airconditioningapparatuur waarop deze verklaring betrekking heeft:
05 (E) declara bajo su única responsabilidad que el equipo de aire acondicionado al que hace referencia la declaración:
06 (I) dichiara sotto la propria responsabilità che gli apparecchi di condizionamento a cui è riferita questa dichiarazione:
07 (GR) δηλώνει με αποκλειστική της ευθύνη ότι ο εξοπλισμός των κλιματιστικών συσκευών στα οποία αναφέρεται η παρούσα δήλωση:
08 (P) declara sob sua exclusiva responsabilidade que os equipamentos de ar condicionado a que esta declaração se refere:
09 (RUS) заявляет, исключительно под свою ответственность, что оборудование для кондиционирования воздуха, к которому относится настоящее заявление:
10 (DK) erklærer under eneansvar, at udstyret til klimaregulering, som denne deklaration vedrører:
11 (S) deklarerer i egenskap av huvudansvarig, att luftkonditioneringsutrustningen som berörs av denna deklaration innebär att:
12 (N) erklærer et fullstendig ansvar for at det luftkondisjoneringsutstyr som berøres av denne deklarasjon, innebærer at:
13 (FIN) ilmoittaa yksinomaan omalla vastuullaan, että tämän ilmoituksen tarkoittamat ilmastointilaitteet:
14 (CZ) prohlašuje ve své plné odpovědnosti, že klimatizační zařízení, k nimž se toto prohlášení vztahuje:
15 (HR) izjavljuje pod isključivo vlastitom odgovornošću da oprema za klimatizaciju na koju se ova izjava odnosi:
16 (H) teljes felelősségé tudatában kijelenti, hogy a klímaberendezések, melyekre e nyilatkozat vonatkozik:
17 (PL) deklaruje na własną i wyłączną odpowiedzialność, że klimatyzatory, których dotyczy niniejsza deklaracja:
18 (RO) declară pe proprie răspundere că echipamentele de aer condiţionat la care se referă această declaraţie:
19 (SLO) z vso odgovornostjo izjavlja, da je oprema klimatskih naprav, na katero se izjava nanaša:
20 (EST) kinnitab oma täielikul vastutusel, et käesoleva deklaratsiooni alla kuuluv klimaseadmete varustus:
21 (BG) декларира на своя отговорност, че оборудването за климатична инсталация, за което се отнася тази декларация:
22 (LT) visiška savo atsakomybe skelbia, kad oro kondicionavimo įranga, kuriai taikoma ši deklaracija:
23 (LV) ar pilnu atbildību apliecina, ka tālāk uzskaitītās gaisa kondicionēšanas iekārtas, uz kuriem attiecas šī deklarācija:
24 (SK) vyhlasuje na vlastnú zodpovednosť, že klimatizačné zariadenie, na ktoré sa vzťahuje toto vyhlásenie:
25 (TR) tamamen kendi sorumluluğunda olmak üzere bu bildirinin ilgili olduğu klima donanımının aşağıdaki gibi olduğunu beyan eder:

EKEQFCBAV3*, EKEQDCBV3*,
* = , , 1, 2, 3, ..., 9

01 are in conformity with the following standard(s) or other normative document(s), provided that these are used in accordance with our instructions:
02 der/den folgenden Norm(en) oder einem anderen Normdokument oder -dokumenten entspricht/entsprechen, unter der Voraussetzung, daß sie gemäß unseren Anweisungen eingesetzt werden:
03 sont conformes à la/aux norme(s) ou autre(s) document(s) normatif(s), pour autant qu'ils soient utilisés conformément à nos instructions:
04 conform de volgende norm(en) of één of meer andere bindende documenten zijn, op voorwaarde dat ze worden gebruikt overeenkomstig onze instructies:
05 están en conformidad con la(s) siguiente(s) norma(s) u otro(s) documento(s) normativo(s), siempre que sean utilizados de acuerdo con nuestras instrucciones:
06 sono conformi al(i) seguente(i) standard(s) o altro(i) documento(i) a carattere normativo, a patto che vengano usati in conformità alle nostre istruzioni:
07 είναι σύμφωνα με το(α) ακόλουθο(α) πρότυπο(α) ή άλλο έγγραφο(α) κανονισμών, υπό την προϋπόθεση ότι χρησιμοποιούνται σύμφωνα με τις οδηγίες μας:
08 estão em conformidade com a(s) seguinte(s) norma(s) ou outro(s) documento(s) normativo(s), desde que estes sejam utilizados de acordo com as nossas instruções:
09 соответствуют следующим стандартам или другим нормативным документам, при условии их использования согласно нашим инструкциям:
10 overholder følgende standard(er) eller andet/andre retningsgivende dokument(er), forudsat at disse anvendes i henhold til vore instrukser:
11 respektive utrustning är utförd i överensstämmelse med och följer följande standard(er) eller andra normgivande dokument, under förutsättning att användning sker i överensstämmelse med våra instruktioner:
12 respektive utstyr er i overensstemmelse med følgende standard(er) eller andre normgivende dokument(er), under forutssetning av at disse brukes i henhold til våre instrukser:
13 vastaavat seuraavien standardien ja muiden ohjeellisten dokumenttien vaatimuksia edellyttäen, että niitä käytetään ohjeidemme mukaisesti:
14 za předpokladu, že jsou využívány v souladu s našimi pokyny, odpovídají následujícím normám nebo normativním dokumentům:
15 u skladu sa slijedećim standardom(ima) ili drugim normativnim dokumentom(ima), uz uvjet da se oni koriste u skladu s našim uputama:
16 megfelelnek az alábbi szabvány(ok)nak vagy egyéb irányadó dokumentum(ok)nak, ha azokat előírás szerint használják:
17 spełniają wymogi następujących norm i innych dokumentów normalizacyjnych, pod warunkiem że używane są zgodnie z naszymi instrukcjami:
18 sunt în conformitate cu următorul (următoarele) standard(e) sau alt(e) document(e) normativ(e), cu condiţia ca acestea să fie utilizate în conformitate cu instrucţiunile noastre
19 skladni z naslednjimi standardi in drugimi normativi, pod pogojem, da se uporabljajo v skladu z našimi navodili:
20 on vastavuses järgmis(t)e standardi(te)ga või teiste normatiivsete dokumentidega, kui neid kasutatakse vastavalt meie juhenditele:
21 съответстват на следните стандарти или други нормативни документи, при условие, че се използват съгласно нашите инструкции:
22 atitinka žemiau nurodytus standartus ir (arba) kitus norminius dokumentus su sąlyga, kad yra naudojami pagal mūsų nurodymus:
23 tad, ja lietoti atbilstoši ražotāja norādījumiem, atbilst sekojošiem standartiem un citiem normatīviem dokumentiem:
24 sú v zhode s nasledovnou(ými) normou(ami) alebo iným(i) normatívnym(i) dokumentom(ami), za predpokladu, že sa používajú v súlade s našim návodom:
25 ürünün, talimatlarımıza göre kullanılması koşuluyla aşağıdaki standartlar ve norm belirten belgelerle uyumludur:

EN60335-2-40,

01 following the provisions of:
02 gemäß den Vorschriften der:
03 conformément aux stipulations des:
04 overeenkomstig de bepalingen van:
05 siguiendo las disposiciones de:
06 secondo le prescrizioni per:
07 με τήρηση των διατάξεων των:
08 de acordo com o previsto em:
09 в соответствии с положениями:
10 under iagttagelse af bestemmelserne i:
11 enligt villkoren i:
12 gitt i henhold til bestemmelsene i:
13 noudattaen määräyksiä:
14 za dodržení ustanovení předpisu:
15 prema odredbama:
16 követi a(z):
17 zgodnie z postanowieniami Dyrektyw:
18 în urma prevederilor:
19 ob upoštevanju določb:
20 vastavalt nõuetele:
21 следвайки клаузите на:
22 laikantis nuostatų, pateikiamų:
23 ievērojot prasības, kas noteiktas:
24 održiavajúc ustanovenia:
25 bunun koşullarına uygun olarak:

Low Voltage 2006/95/EC
Electromagnetic Compatibility 2004/108/EC *

01 Directives, as amended.
02 Direktiven, gemäß Änderung.
03 Directives, telles que modifiées.
04 Richtlijnen, zoals geamendeerd.
05 Directivas, según lo enmendado.
06 Direttive, come da modifica.
07 Οδηγιών, όπως έχουν τροποποιηθεί.
08 Directivas, conforme alteração em.
09 Директив со всеми поправками.
10 Direktiver, med senere ændringer.
11 Direktiv, med företagna ändringar.
12 Direktiver, med foretatte endringer.
13 Direktiivejä, sellaisina kuin ne ovat muutettuina.
14 v platném znění.
15 Smjernice, kako je izmijenjeno.
16 irányelv(ek) és módosításaik rendelkezéseit.
17 z późniejszymi poprawkami.
18 Directivelor, cu amendamentele respective.
19 Direktive z vsemi spremembami.
20 Direktiivid koos muudatustega.
21 Директиви, с техните изменения.
22 Direktyvose su papildymais.
23 Direktīvās un to papildinājumos.
24 Smernice, v platnom znení.
25 Değiştirilmiş halleriyle Yönetmelikler.

01 **Note *** as set out in **<A>** and judged positively by **<B>** according to the **Certificate <C>**,
02 **Hinweis *** wie in der **<A>** aufgeführt und von **<B>** positiv beurteilt gemäß **Zertifikat <C>**,
03 **Remarque *** tel que défini dans **<A>** et évalué positivement par **<B>** conformément au **Certificat <C>**.
04 **Bemerk *** zoals vermeld in **<A>** en positief beoordeeld door **<B>** overeenkomstig **Certificaat <C>**,
05 **Nota *** como se establece en **<A>** y es valorado positivamente por **<B>** de acuerdo con el **Certificado <C>**,
06 **Nota *** definito nel **<A>** e giudicato positivamente da **<B>** secondo il **Certificato <C>**,
07 **Σημείωση *** όπως καθορίζεται στο **<A>** και κρίνεται θετικά από το **<B>** σύμφωνα με το **Πιστοποιητικό <C>.**
08 **Nota *** tal como estabelecido em **<A>** e com o parecer positivo de **<B>** de acordo com o **Certificado <C>**,
09 **Примечание *** как указано в **<A>** и в соответствии с положительным решением **<B>** согласно **Свидетельству <C>.**
10 **Bemærk *** som anført i **<A>** og positivt vurderet af **<B>** i henhold til **Certifikat <C>**,
11 **Information *** enligt **<A>** och godkänts av **<B>** enligt **Certifikatet <C>**,
12 **Merk *** som det fremkommer i **<A>** og gjennom positiv bedømmelse av **<B>** ifølge **Sertifikat <C>**,
13 **Huom *** jotka on esitetty asiakirjassa **<A>** ja jotka **<B>** on hyväksynyt **Sertifikaatin <C>** mukaisesti.
14 **Poznámka *** jak bylo uvedeno v **<A>** a pozitivně zjištěno **<B>** v souladu s **osvědčením <C>**.
15 **Napomena *** kako je izloženo u **<A>** i pozitivno ocijenjeno od strane **<B>** prema **Certifikatu <C>**.
16 **Megjegyzés *** a(z) **<A>** alapján, a(z) **<B>** igazolta a megfelelést, a(z) **<C>** **tanúsítvány** szerint.
17 **Uwaga *** zgodnie z dokumentacją **<A>**, pozytywną opinią **<B>** i **Świadectwem <C>**.
18 **Notă *** aşa cum este stabilit în **<A>** şi apreciat pozitiv de **<B>** în conformitate cu **Certificatul <C>**.
19 **Opomba *** kot je določeno v **<A>** in odobreno s strani **<B>** v skladu s **certifikatom <C>**.
20 **Märkus *** nagu on näidatud dokumendis **<A>** ja heaks kiidetud **<B>** järgi vastavalt **sertifikaadile <C>**.
21 **Забележка *** както е изложено в **<A>** и оценено положително от **<B>** съгласно **Сертификата <C>.**
22 **Pastaba *** kaip nustatyta **<A>** ir kaip teigiamai nuspręsta **<B>** pagal **Sertifikatą <C>.**
23 **Piezīmes *** kā norādīts **<A>** un atbilstoši **<B>** pozitīvajam vērtējumam saskaņā ar **sertifikātu <C>.**
24 **Poznámka *** ako bolo uvedené v **<A>** a pozitívne zistené **<B>** v súlade s **osvedčením <C>.**
25 **Not *** **<A>**'da belirtildiği gibi ve **<C>** **Sertifikasına** göre **<B>** tarafından olumlu olarak değerlendirildiği gibi.

<A>	**DAIKIN.TCF.024G1/08-2014**
<B>	**TÜV (NB1856)**
<C>	**0510260101**

3P383344-1

Jean-Pierre Beuselinck
Director
Ostend, 3rd of November 2014

DAIKIN EUROPE N.V.
Zandvoordestraat 300, B-8400 Oostende, Belgium

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READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION AND OPERATION.

IMPROPER INSTALLATION OR ATTACHMENT OF EQUIPMENT OR ACCESSORIES COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT. BE SURE ONLY TO USE ACCESSORIES MADE BY DAIKIN WHICH ARE SPECIFICALLY DESIGNED FOR USE WITH THE EQUIPMENT AND HAVE THEM INSTALLED BY A PROFESSIONAL.

IF UNSURE OF INSTALLATION PROCEDURES OR USE, ALWAYS CONTACT YOUR DAIKIN DEALER FOR ADVICE AND INFORMATION.

The English text is the original instruction. Other languages are translations of the original instructions.

INTRODUCTION

- Do only use this system in combination with a field supplied air handling unit. Do not connect this system to other indoor units.
- Only optional controls as listed in the optional accessories list can be used.

Field-supplied air handling units can be connected with a Daikincondensing unit via a control box and expansion valve kit. Each airhandling unit can be connected with 1 control box and 1 expansionvalve kit. This manual describes the installation of the expansionvalve kit and the installation and operation of 2 types of control boxes.

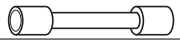
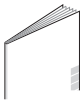
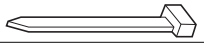
We distinguish 2 different control boxes, each with its own application and installation requirements.

- EKEQFCBA control box (3 possible operation modes)
  - Operation with 0–10 V input to control the capacity
    An external controller is needed to control the capacity. For details of the necessary functions of the external controller refer to paragraph "Operation with 0–10 V capacity control: X-control" on page 79. There are 2 different 0-10 V operation modes that can be used to control the room temperature or air discharge temperature.
  - Operation with fixed T_e/T_c temperature control
    - In cooling this system operates on a fixed evaporating temperature.
    - In heating this system operates on a fixed condensing temperature.
- EKEQDCB control box
  The system will operate as a standard indoor unit to control the room temperature. This system does not require a specific external controller.
- Connectivity to DIII-net devices only allowed with:
  - ITouch Manager II
  - Modbus interface DIII
- This equipment is not designed for year-round cooling applications with low indoor humidity conditions, such as Electronic Data Processing rooms.
- This appliance is not intended for use by persons, including children, with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
  Children should be supervised to ensure that they do not play with the appliance.

INSTALLATION

- For installation of the air handling unit, refer to the air handling unit installation manual.
- Never operate the air conditioner with the discharge pipe thermistor (R3T), suction pipe thermistor (R2T) and pressure sensors (S1NPH, S1NPL) removed. Such operation may burn out the compressor.
- The equipment is not intended for use in a potentially explosive atmosphere.

ACCESSORIES

		EKEQFCB	EKEQDCB
Thermistor (R1T)		—	1
Thermistor (R3T/R2T) (2.5 m cable)		2	
Insulation sheet		2	
Rubber sheet		2	
Wire to wire splice		4	6
Installation and operation manual		1	
Screw nut		7	8
Tie wrap		6	
Capacity setting adaptor		9	7
Stopper (closing cup)		2	—

Obligatory accessory

	EKEQFCBA	EKEQDCB
Expansion valve kit	EKEXV	

Refer to chapter "Valve kit installation" on page 72 for installation instructions.

Optional accessories

		EKEQFCB	EKEQDCB
Remote controller: • BRC1D528 • BRC1E52 • BRC2E52 • BRC3E52		1(*)	1

(*) For EKEQFA, the remote controller is not used for operating the unit, but for service and during installation. Therefore a cool/heat selector KRC19-26A6 is required for the selection of heating, cooling or fan only operation. Refer to the installation manual of the outdoor unit for details.

NAME AND FUNCTION OF PARTS (See figure 1 and figure 2)

Parts and components

1 Outdoor unit

2 Control box (EKEQFCBA / EKEQDCB)

3 Air handling unit (field supply)

4 Controller (field supply)

5 Field piping (field supply)

6 Expansion valve kit

Wiring connections

7 Outdoor unit power supply

8 Control box wiring
(Power supply and communication between control box and outdoor unit)

9 Air handling unit thermistors

10 Communication between controller and control box

11 Power supply and control wiring for air handling unit and controller (power supply is separate from the outdoor unit)

12 Air thermistor control for air handling unit

13 Remote controller (--------- = for service only)

BEFORE INSTALLATION

- Refer to the installation manual of the outdoor unit for details onrefrigerant piping, additional refrigerant charging, and inter-unitwiring.

Since design pressure is 4 MPa or 40 bar, pipes of largerwall thickness may be required. Refer to "Selection of piping material" on page 71

- Precautions for R410A
  - The refrigerant requires strict cautions for keeping thesystem clean, dry and tight.
    - Clean and dry
      Foreign materials (including mineral oils or moisture)should be prevented from getting mixed into the system.
    - Tight
      Read "Piping installation" on page 71 carefully and followthese procedures correctly.
  - Since R410A is a mixed refrigerant, the required additional refrigerant must be charged in its liquid state. (If the refrigerant is in state of gas, its composition changes and the system will not work properly).
  - The connected air handling units must have heat exchangers designed exclusively for R410A.

Cautions for selection of the air handling unit

Select the air handling unit (field supply) according to the technical data and limitations mentioned in Table 1.

Lifetime of the outdoor unit, operation range or operation reliability may be influenced if you neglect these limitations.

NOTE

- If the total capacity of the connected indoor units exceeds the capacity of the outdoor unit, cooling and heating performance may drop when running the indoor units.
  Refer to the section on performance characteristics in the Engineering Data Book for details.
- The capacity class of the air handling unit is determined by the selection of the expansion valve kit according to Table 1.

ERQ outdoor unit

The EKEQ(D/FA) control boxes can only be connected to an ERQ outdoor unit in pair application. Only 1 expansion valve kit EKEXV63~250 can be used per control box and per handling unit.

Outdoor unit (class)	EKEXV kit
100	EKEXV63~125
125	EKEXV63~140
140	EKEXV80~140

Outdoor unit (class)	EKEXV kit
200	EKEXV100~250
250	EKEXV125~250

Depending on the heat exchanger, a connectable EKEXV (expansion valve kit) must be selected to these limitations.

EKEXV class	Allowed heat exchanger cooling capacity (kW)		Allowed heat exchanger heating capacity (kW)	
	Minimum	Maximum	Minimum	Maximum
63	6.3	7.8	7.1	8.8
80	7.9	9.9	8.9	11.1
100	10.0	12.3	11.2	13.8
125	12.4	15.4	13.9	17.3
140	15.5	17.6	17.4	19.8
200	17.7	24.6	19.9	27.7
250	24.7	30.8	27.8	34.7

Cooling saturated suction temp. (SST) = 6°C
Air temp. = 27°C DB/19°C WB
Superheat (SH) = 5 K

Heating saturated suction temp. (SST) = 46°C
Air temp. = 20°C DB
Subcool (SC) = 3 K

1 Selecting the condensing unit

Depending on necessary capacity of the combination an outdoor unit needs to be selected (see "Engineering databook" for capacity).

- Each outdoor unit can be connected to a range of air handling units.
- The range is determined by the allowed expansion valve kits.

2 Selecting the expansion valve

The corresponding expansion valve needs to be selected for your air handling unit. Select the expansion valve according to the above limitations.

NOTE

- The expansion valve is an electronic type, it is controlled by the thermistors that are added in the circuit. Each expansion valve can control a range of air handling units sizes.
- The selected air handling unit must be designed for R410A.
- Extraneous substances (including mineral oils or moisture) must be prevented from getting mixed into the system.
- SST: saturated suction temperature at exit of air handling unit.

3 Selecting the capacity setting adaptor (see accessories)

- The corresponding capacity setting adaptor needs to be selected depending on the expansion valve.
- Connect the correct selected capacity setting adaptor to X24A (A1P). (See figure 4 and figure 6).

EKEXV kit	Capacity setting adaptor label (indication)
63	J71
80	J90
100	J112
125	J140
140	J160
200	J224
250	J280

VRV IV range outdoor units

The EKEQFA control box can be connected to some types of VRV IV outdoor unit (refer to the Engineering Data Book for outdoor units that are in scope) with a maximum number of 3 connectable control boxes to 1 system. 1 control box can be combined with 1 EKEXV kit. In this configuation it is only allowed to connect air handling units. The combination with VRV DX indoor units or other types of indoor units is not allowed.

Depending on the air handling unit heat exchanger, a connectable EKEXV (expansion valve kit) must be selected to following limitations.

EKEXV class	Allowed heat exchanger cooling capacity (kW)		Allowed heat exchanger heating capacity (kW)	
	Minimum	Maximum	Minimum	Maximum
63	6.3	7.8	7.1	8.8
80	7.9	9.9	8.9	11.1
100	10.0	12.3	11.2	13.8
125	12.4	15.4	13.9	17.3
140	15.5	17.6	17.4	19.8
200	17.7	24.6	19.9	27.7
250	24.7	30.8	27.8	34.7
400	35.4	49.5	39.8	55.0
500	49.6	61.6	55.1	69.3

Cooling saturated suction temp. (SST) = 6°C
Air temp. = 27°C DB/19°C WB
Superheat (SH) = 5 K

Heating saturated suction temp. (SST) = 46°C
Air temp. = 20°C DB
Subcool (SC) = 3 K

1 The air handling unit can be considered as a standard VRV indoor unit. The combinations of EKEXV kits (maximum 3) are restricted by the connection ratio limitations: 90~110%.

Additional limits exist when connecting the EKEQFCBA control box. These can be found in the Engineering Data Book of the EKEQFCBA and in this manual.

2 Selecting the expansion valve

A corresponding expansion valve needs to be selected for your air handling unit. Select the expansion valve according to the above limitations.

NOTE

- The expansion valve (electronic type) is controlled by the thermistors that are added in the circuit. Each expansion valve can control a range of air handling units sizes.
- The selected air handling unit must be designed for R410A.
- Extraneous substances (including mineral oils or moisture) must be prevented from getting mixed into the system.
- SST: saturated suction temperature at exit of air handling unit.

3 Selecting the capacity setting adaptor (see accessories)

- The corresponding capacity setting adaptor needs to be selected depending on the expansion valve.
- Connect the correct selected capacity setting adaptor to X24A (A1P). (See figure 4).

EKEXV kit	Capacity setting adaptor label (indication)
63	J71
80	J90
100	J112
125	J140
140	J160

EKEXV kit	Capacity setting adaptor label (indication)
200	J224
250	J280
400	J22
500	J28

For the following items, take special care during construction and check after installation is finished

Tick ☐ when checked	
☐	Are the thermistors fixed firmly? Thermistor may come loose.
☐	Is the freeze-up setting done correctly? The air handling unit may freeze up.
☐	Is the control box fixed firmly? The unit may drop, vibrate or make noise.
☐	Do electrical connections comply with specifications? The unit may malfunction or components may burn out.
☐	Are wiring and piping correct? The unit may malfunction or components may burn out.
☐	Is the unit safely grounded? Dangerous at electric leakage.

SELECTING THE INSTALLATION SITE

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Select an installation site where the following conditions are fulfilled and that meets your customer's approval.

- The option boxes (expansion valve and electrical control box) can be installed inside and outside).
- Do not install the option boxes in or on the outdoor unit.
- Do not put the option boxes in direct sunlight. Direct sunlight will increase the temperature inside the option boxes and may reduce its lifetime and influence its operation.
- Choose a flat and strong mounting surface.
- Operating temperature of the control box is between –10°C and 40°C.
- Keep the space in front of the boxes free for future maintenance.
- Keep air handling unit, power supply wiring and transmission wiring at least 1 m away from televisions and radios. This is to prevent image interference and noise in those electrical appliances. (Noise may be generated depending on the conditions under which the electric wave is generated, even if 1 m is kept.)
- Make sure the control box is installed horizontally. Screw nuts position must be downwards.

Precautions

Do not install or operate the unit in rooms mentioned below.

- Where mineral oil, like cutting oil is present.
- Where the air contains high levels of salt such as air near the ocean.
- Where sulphurous gas is present such as that in areas of hot spring.
- In vehicles or vessels.
- Where voltage fluctuates a lot such as that in factories.
- Where high concentration of vapor or spray are present.
- Where machines generating electromagnetic waves are present.
- Where acidic or alkaline vapor is present.
- The option boxes must be installed with entrances downward.

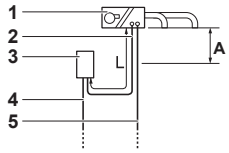
REFRIGERANT PIPING WORK

All field piping must be provided by a licensed refrigeration technician and must comply with the relevant local and national codes.

- For refrigerant piping of outdoor unit, refer to the installation manual supplied with the outdoor unit.
- Follow the outdoor unit specifications for additional charging, piping diameter and installation.
- The maximum allowed piping length depends on the connected outdoor model.

PIPING INSTALLATION

Piping limits



1 Air handling unit

2 Connecton pipe from expansion valve kit to air handling unit

3 Valve kit

4 Liquid pipe

5 Gas pipe

	Max (m)
A	-5/+5(*)
L	5

(*) Below or above the valve kit.

L is to be considered as a part of the total maximum piping length. See installation manual of the outdoor unit for piping installation.

Piping connections

Make sure to install gas and liquid pipe diameters in function of the air handling unit capacity class.

	Connection pipe	
Air handling unit capacity class	Gas pipe	Liquid pipe
50	Ø12.7	Ø6.4
63	Ø15.9	Ø9.52
80		
100		
125		
140		
200	Ø19.1	
250	Ø22.2	
400	Ø28.6	Ø12.7
500	Ø28.6	Ø15.9

Selection of piping material

1 Foreign materials inside pipes (including oils for fabrication) must be 30 mg/10 m or less.

2 Use the following material specification for refrigerant piping:

- Construction material: phosphoric acid deoxidized seamless copper for refrigerant.
- Temper grade: use piping with temper grade in function of the pipe diameter as listed in the table below.

Pipe Ø	Temper grade of piping material
≤15.9	O
≥19.1	1/2H

O = Annealed
1/2H = Half hard

- The pipe thickness of the refrigerant piping should comply with relevant local and national regulations. The minimal pipe thickness for R410A piping must be in accordance with the table below.

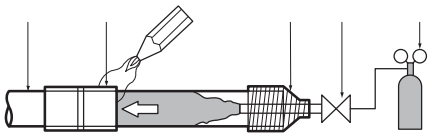
Pipe Ø	Minimal thickness (mm)
6.4	0.80
9.5	0.80
12.7	0.80
15.9	0.99
19.1	0.80
22.2	0.80
28.6	0.99

3 In case the required pipe sizes (inch sizes) are not available, it is also allowed to use other diameters (mm sizes), taken the following into account:

- select the pipe size nearest to the required size.
- use the suitable adapters for the change-over from inch to mm pipes (field supply.

Cautions for brazing

- Be sure to carry out a nitrogen blow when brazing.
  Brazing without carrying out nitrogen replacement or releasing nitrogen into the piping will create large quantities of oxidized film on the inside of the pipes, adversely affecting valves and compressors in the refrigerating system and preventing normal operation.
- When brazing while inserting nitrogen into the piping, nitrogen must be set to 0.02 MPa with a pressure-reducing valve (=just enough so that it can be felt on the skin).



1 Refrigerant piping
2 Part to be brazed
3 Taping
4 Hands valve
5 Pressure-reducing valve
6 Nitrogen

- For details, see manual of the outdoor unit.

VALVE KIT INSTALLATION

Mechanical installation

1 Remove the valve kit box cover by unscrewing 4x M5.

2 Drill 4 holes on correct position (measurements as indicated in figure below) and fix the valve kit box securely with 4 screws through the provided holes Ø9 mm.

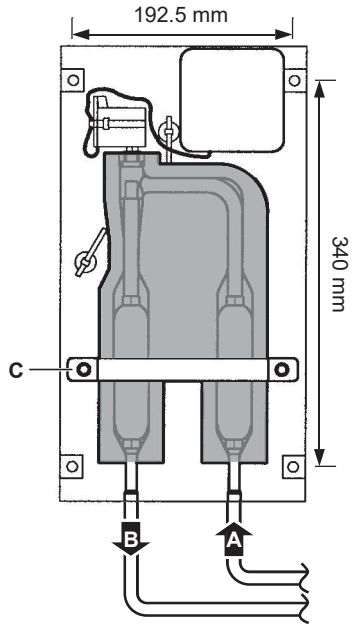
NOTE

- Make sure that the expansion valve is installed vertically.
- Refer to figure 8 for the required service space.

Brazing work

For details, see manual of the outdoor unit.

3 Prepare the inlet/outlet field piping just in front of the connection (do **not** braze yet).



A Inlet coming from the outdoor unit
B Outlet to air handling unit
C Pipe fixing clamp

4 Remove the pipe fixing clamp (C) by unscrewing 2x M5.

5 Remove the upper and lower pipe insulations.

6 Braze the field piping.

- Make sure to cool the filters and valve body with a wet cloth and make sure the body temperature does not exceed 120°C during brazing.
- Make sure that the other parts such as electrical box, tie wraps and wires are protected from direct brazing flames during brazing.

7 After brazing, put the lower pipe insulation back in place and close it with the upper insulation cover (after pealing off the liner).

8 Secure the pipe fixing clamp (C) in place again (2x M5).

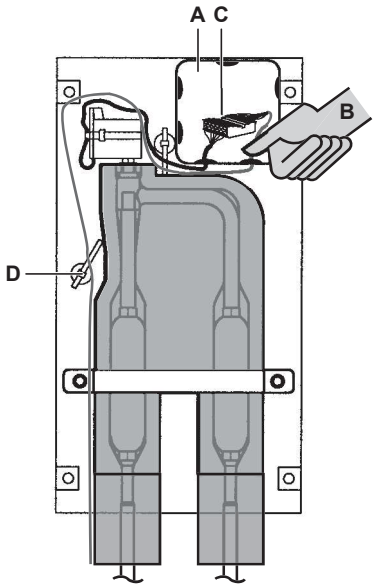
9 Make sure that field pipes are fully insulated.

Field pipe insulation must reach up to the insulation you have put back in place as per procedure step 7. Make sure that there is no gap between both ends in order to avoid condensation dripping (finish the connection with tape eventually).

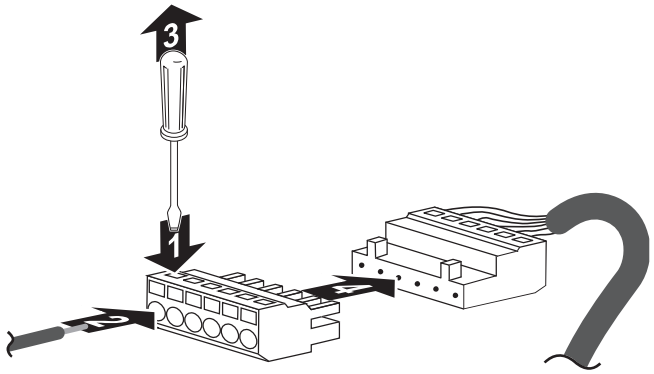
1 Open the electrical box cover (A).

2 Push out **ONLY** the second lower wire intake hole (B) from inside to outside. Do not damage the membrane.

3 Pass valve cable (with wires Y1 ... Y6) from the control box through that membrane wire intake hole and connect the cable wires into the terminal connector (C) following instructions as described in step 4. Route the cable out of the valve kit box according to figure below and fix with the tie wrap (D). See "Electric wiring work" on page 74 for more details.



4 Use a small screwdriver and follow indicated instructions for connecting cable wires into the terminal connector according to the wiring diagram.



5 Make sure that field wiring and insulation is not squeezed when closing the valve kit box cover.

6 Close the valve kit box cover (4x M5).

INSTALLATION OF THE ELECTRICAL CONTROL BOX (See figure 4 and figure 6)

1 Control box
2 Hanger brackets
3 Main PCB
4 Transformer
5 Terminal
6 PCB (for voltage conversion)
7 PCB (power supply)
8 Magnetic relay (operation / compressor ON/OFF)
9 Magnetic relay (error status)
10 Magnetic relay (fan)
11 Magnetic relay (defrost)
12 Optional PCB (KRP4)

Mechanical installation

1 Fix the control box with its hanger brackets to the mounting surface.
Use 4 screws (for holes of Ø6 mm).

2 Open the lid of the control box.

3 For electrical wiring: refer to paragraph "Electric wiring work" on page 74.

4 Install the screw nuts.

5 Close the unnecessary openings with stoppers (closing cups).

6 Close the lid securely after installation to ensure that the control box is watertight.

NOTE Refer to figure 7 for the required service space.

ELECTRIC WIRING WORK

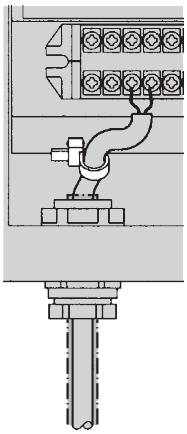
- All field wiring and components must be installed by a licensed electrician and must comply with all international, European, national and local directives, laws, regulations and/or codes that are relevant and applicable.
- Use copper wire only.
- A main switch or other means for disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local and national legislation.
- Refer to the installation manual attached to the outdoor unit for the size of power supply electric wire connected to the outdoor unit, the capacity of the circuit breaker and switch, wiring and wiring instructions.
- Attach the earth leakage circuit breaker and fuse to the power supply line.

Connection of the wires inside the control box

1 For connection to outdoor unit and to controller (field supply):

Pull the wires inside through the screw nut and close the nut firmly in order to ensure a good pull relieve and water protection.

2 The cables require an additional pull-relief. Strap the cable with the installed tie wrap.



Precautions

- Thermistor cable and remote controller wire should be located at least 50 mm away from power supply wires and from wires to the controller. Not following this guideline may result in malfunction due to electrical noise.
- Use only specified wires, and tightly connect wires to the terminals. Keep wiring in neat order so that it does not obstruct other equipment. Incomplete connections could result in overheating, and in worse case electric shock or fire.

Connecting the wiring: EKEQFCBAV3

- Connect the wires to the terminal board according to the wiring diagram in figure 3. See figure 4 for wiring intake in the control box. The wiring intake hole indication H1 refers to the H1 cable of the corresponding wiring diagram.
- Connect cables according to specifications of the next table.

- Take special precaution for connection to the controller (field supply). Do not miswire the output signals nor the input signal (ON/OFF). This mistake could damage the entire system.
- The polarity of the capacity step connection is: C_5=minus pole, C_6=plus pole.

Table connection and application

	Description	Connect to	Type of cable	Cross section (mm^2)(*)	Maximum length (m)	Specifications
L, N, earth	Power supply	Power supply	H05VV-F3G2.5	2.5	—	Power supply 230 V 1~ 50 Hz
Y1~Y6(†)	Expansion valve connection	Expansion valve kit	LIYCY3 x 2 x 0.75	0.75	20	Digital output 12 V DC
R1,R2	Thermistor R2T (liquid pipe)	—	H05VV-F2 x 0.75		Standard 2.5 Maximum 20	Analog input 16 V DC
R3,R4	Thermistor R3T (gas pipe)					
P1,P2	Remote controller (optional)				100	Communication line 16 V DC
F1,F2	Communication to outdoor unit	Outdoor unit				
T1,T2	ON/OFF	Controller field supply	LIYCY4 x 2 x 0.75		(‡)	Digital input 16 V DC
C1,C2	Error signal					Digital output: voltage free. Maximum 230 V, maximum 0,5 A
C3,C4	Operation signal(#)					
C5,C6	Capacity step(**)					Analog input: 0–10 V
C7,C8	Fan signal	Air handling unit fan field supply	H05VV-F3G2.5	2.5	—	Digital output: voltage free. Maximum 230 V, maximum 2 A
C9,C10	Defrost signal	Controller field supply	LIYCY4 x 2 x 0.75	0.75	(‡)	Digital output: voltage free. Maximum 230 V, maximum 0,5 A

(*) Recommended size (all wiring must comply with local codes).
(†) For EKEXV400 and 500, Y5 does not need to be connected.
(‡) The maximum length depends on the external device that is connected (controller/relay,....)
(#) Operation signal: indicates compressor operation.
(**) Only necessary for capacity controlled system.

Wiring diagram

A1P.....Printed circuit board
A2P.....Printed circuit board (for voltage conversion)
A3P.....Printed circuit board (power supply)
F1U.....Fuse (250 V, F5A)(A1P)
F2U.....Fuse (250 V, T1A)(A3P)
F3U.....Field fuse
HAP .....Light emitting diode (service monitor-green)
K2R.....Magnetic relay (error status)
K3R.....Magnetic relay (operation / compressor ON/OFF)
K4R.....Magnetic relay (fan)
K5R.....Magnetic relay (defrost signal)
K1R,KAR,KPR....Magnetic relay
Q1DI .....Earth leakage breaker
R2T.....Thermistor (liquid)
R3T.....Thermistor (gas)
R5 .....Resistance (120 Ω)
R6 .....Capacity adaptor
T1R.....Transformer (220 V/21.8 V)
X1M,X2M,X3M ...Terminal block
Y1E.....Electronic expansion valve
X1M-C7/C8.....Output: fan ON/OFF
X1M-C9/C10.....Output: defrost signal
X1M-R1/R2.....Thermistor liquid
X1M-R3/R4.....Thermistor gas
X1M-Y1~6 .....Expansion valve

X2M-C1/C2..... Output: error status
X2M-C3/C4..... Output: operation / compressor ON/OFF
X2M-C5/C6..... Input: 0-10 V DC capacity control
X2M-F1/F2..... Communication outdoor unit
X2M-P1/P2 ..... Communication remote controller
X2M-T1/T2..... Input: ON/OFF
..... Field wiring
L..... Live
N ..... Neutral
, ... Connector
..... Wire clamp
..... Protective earth (screw)
..... Separate component
..... Optional accessory
BLK..... Black
BLU..... Blue
BRN ..... Brown
GRN..... Green
GRY ..... Gray
ORG ..... Orange
PNK ..... Pink
RED ..... Red
WHT ..... White
YLW ..... Yellow

Connecting the wiring: EKEQDCBV3

- Connect the wires to the terminal board according to the wiring diagram in figure 5. See figure 6 for wiring intake in the control box. The wiring intake hole indication H1 refers to the H1 cable of the corresponding wiring diagram.
- Connect cables according to specifications of the next table.

Table connection and application

	Description	Connect to	Type of cable	Cross section (mm^2)(*)	Maximum length (m)	Specifications
L, N, earth	Power supply	Power supply	H05VV-F3G2.5	2.5	—	Power supply 230 V 1~ 50 Hz
Y1~Y6	Expansion valve connection	Expansion valve kit	LIYCY3 x 2 x 0.75	0.75	20	Digital output 12 V DC
R1,R2	Thermistor R2T (liquid pipe)	—	H05VV-F2 x 0.75		Standard: 2.5 Max.: 20	Analog input 16 V DC
R3,R4	Thermistor R3T (gas pipe)					
R5,R6	Thermistor R1T (air)					
P1,P2	Remote controller				100	Communication line 16 V DC
F1,F2	Communication to outdoor unit	Outdoor unit				
T1,T2	ON/OFF	Controller field supply			—	Digital input 16 V DC
—	Capacity step		LIYCY4 x 2 x 0.75	Optional connection: when the function of the switch box needs to be extended: see KRP4A51 for details of settings and instructions.		
—	Error signal					
—	Operation signal					
C1,C2	Fan signal	Air handling unit fan field supply	H05VV-F3G2.5	2.5	—	Digital output: voltage free. Maximum 230 V, maximum 2 A

(*) Recommended size (all wiring must comply with local codes).

Wiring diagram

A1P .....Printed circuit board
A2P .....Printed circuit board (option KRP4)
F1U .....Fuse (250 V, F5A)(A1P)
F3U .....Field fuse
HAP.....Light emitting diode (service monitor-green)
K1R .....Magnetic relay
K4R .....Magnetic relay (fan)
Q1DI.....Earth leakage breaker
R1T .....Thermistor (air)
R2T .....Thermistor (liquid)
R3T .....Thermistor (gas)
R7.....Capacity adaptor
T1R .....Transformer (220 V/21.8 V)
X1M,X3M .....Terminal block
Y1E .....Electronic expansion valve
X1M-C1/C2 .....Output: fan ON/OFF
X1M-F1/F2 .....Communication outdoor unit
X1M-P1/P2.....Communication remote controller
X1M-R1/R2 .....Thermistor liquid
X1M-R3/R4 .....Thermistor gas
X1M-R5/R6 .....Thermistor air
X1M-T1/T2 .....Input: ON/OFF
X1M-Y1~6 .....Expansion valve

.....Field wiring
L .....Live
N.....Neutral
, ...Connector
.....Wire clamp
.....Protective earth (screw)
.....Separate component
.....Optional accessory
BLK.....Black
BLU .....Blue
BRN.....Brown
GRN .....Green
GRY.....Gray
ORG .....Orange
PNK .....Pink
RED.....Red
WHT .....White
YLW.....Yellow

INSTALLATION OF THERMISTORS

Refrigerant thermistors

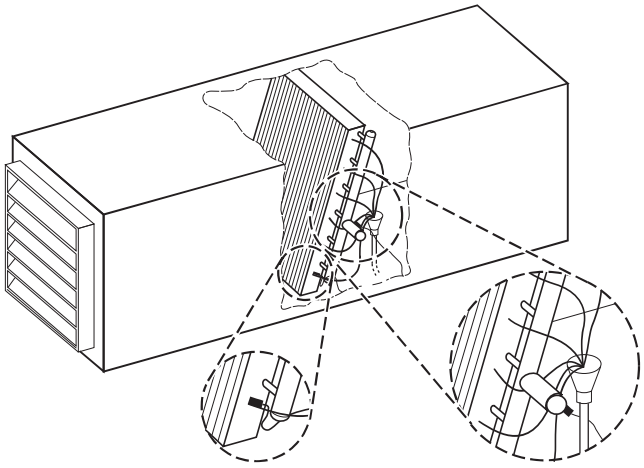
Location of the thermistor

A correct installation of the thermistors is required to ensure a good operation:

1. Liquid (R2T)
   Install the thermistor behind the distributor on the coldest pass of the heat exchanger (contact your heat exchanger dealer).
2. Gas (R3T)
   Install the thermistor at the outlet of the heat exchanger as close as possible to the heat exchanger.

Evaluation must be done to check if the air handling unit is protected against freeze-up. This must be done during test operation.

The thermistor needs to be installed in an enclosed area. Install it inside the air handling unit, or shield it to prevent it from getting touched.



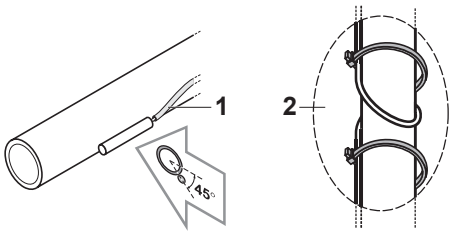
1 Liquid R2T

2 Gas R3T

Installation of the thermistor cable

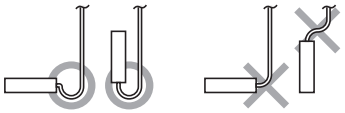
1 Put the thermistor cable in a separate protective tube.

2 Always add a pull-relief to the thermistor cable to avoid strain on the thermistor cable and loosening of the thermistor. Strain on the thermistor cable or loosening of the thermistor may result in bad contact and incorrect temperature measurement.

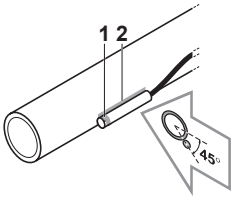


Fixation of the thermistor

- Put the thermistor wire slightly down to avoid water accumulation on top of the thermistor.



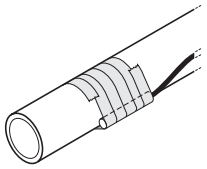
- Make good contact between thermistor and air handling unit. Put the top of the thermistors on the air handling unit, this is the most sensitive point of the thermistor.



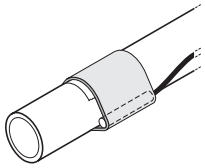
1 Most sensitive point of the thermistor

2 Maximize the contact

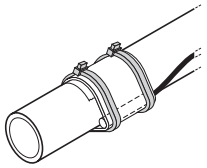
1 Fix the thermistor with insulating aluminum tape (field supply) in order to ensure a good heat transference.



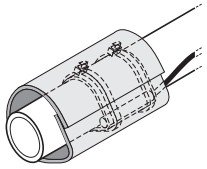
2 Put the supplied piece of rubber around the thermistor (R2T/R3T) in order to avoid loosening of the thermistor after some years.



3 Fasten the thermistor with 2 tie wraps.



4 Insulate the thermistor with the supplied insulation sheet.



Installation of longer thermistor cable (R1T/R2T/R3T)

The thermistor is supplied with a standard cable of 2.5 m. This cable can be made longer to up to 20 m.

Install the longer thermistor cable with the delivered wire to wire splices

1 Cut the wire or bundle the remainder of the thermistor cable.
Keep at least 1 m of the original thermistor cable.
Do not bundle the cable inside the control box.

2 Strip the wire ±7 mm at both ends and insert these ends into the wire to wire splice.

3 Pinch the splice with the correct crimp tool (pliers).

4 After connection, heat up the shrink-insulation of the wire to wire splice with a shrink-heater to make a water tight connection.

5 Wrap electrical insulation tape around the connection.

6 Put a pull-relief in front of and behind the connection.

- The connection must be made on an accessible location.
- To make the connection waterproof, the connection can also be made in a switch box or connector box.
- The thermistor cable should be located at least 50 mm away from power supply wire. Not following this guideline may result in malfunction due to electrical noise.

TEST OPERATION

After installation and once the field settings are defined, the installer is obliged to verify correct operation by performing a test run. Refer to the installation manual of the outdoor unit. Before executing "test run" as well as before operating the unit, you must check the following:

- Refer to the section of "VRV IV range outdoor units" on page 70.
- After finishing the construction of refrigerant piping, drain piping and electric wiring, conduct test operation accordingly to protect the unit.
- Open the gas side stop valve.
- Open the liquid side stop valve.

Additional the test operation

When the test run was succesful, an additional check needs to be carried out during normal operation

1 Close the contact T1/T2 (ON/OFF).

2 Confirm function of the unit according to the manual and check if the air handling unit has collected ice (freeze-up).
If the unit collects ice: see "Troubleshooting" on page 81.

3 Confirm that the fan of the air handling unit is ON.

- In case of poor distribution in the air handling unit, 1 or more passes of the air handling unit may freeze-up (collect ice) → put the thermistor (R2T) on this position.
- Depending on operation conditions (e.g.: outdoor ambient temperature) it is possible that the settings must be changed after commissioning.

OPERATION AND MAINTENANCE

If T1/T2 is used to control the operation of the air handling unit, the following convention is used:

- Closing the T1/T2 signal starts operation of the air handling unit.
- Opening the T1/T2 signal stops operation of the air handling unit.

WHAT TO DO BEFORE OPERATION

- Before initiating operation, contact your dealer to get the operation manual that corresponds to your system.
- Refer to the dedicated manual of the controller (field supply) and air handling unit (field supply).
- Make sure that the air handling unit fan is ON when the outdoor unit is in normal operation.

Field settings for EKEQDCB

Refer to the installation and service manuals of both the outdoor unit and the remote controller.

Field settings for EKEQFCBA

When changing the settings:

1 Make the required settings with the remote controller.

2 Turn power OFF after all required settings have been made.

3 Remove the remote controller after servicing and test run. Operating the remote controller may disturb the normal operation of the system.

4 Do not change T1/T2 during power failure.

5 Put power of indoor and outdoor unit ON.

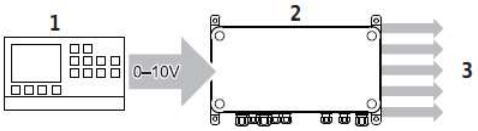
Setting the temperature control system

Mode No.	Code No.	Description of setting	
23(13)–0	01	Operation with 0–10 V capacity control (= factory setting)	X-control
	02	Operation with fixed T_e/T_c temperature control	Y-control
	03	Operation with 0–10 V capacity control	W-control

T_e or SST = evaporating temperature or saturated suction temperature.
T_c = condensing temperature.

Operation with 0–10 V capacity control: X-control

For X-control, a field-supplied controller needs to be connected to the EKEQF control box. The field-supplied controller will geneate a 0–10 V signal that will be used by the EKEQF control box for the capacity control of the system.



1 Field-supplied controller

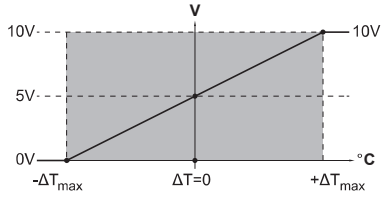
2 Control box EKEQF

3 Level 1 ~ 5 for capacity control

The system needs a field-supplied controller with a tempeature sensor. The temperature sensor can be used to control the following temperatures:

- Suction air temperature of the air handling unit
- Room air temperature
- Discharge air temperature of the air handling unit

Program the field-supplied controller so that it outputs a 0–10 V signal based on the temperature difference between the actual measured temperature and the target temperature.



V Controller voltage output to EKEQF

ΔT [actual measured temperature] – [target temperature]
When ΔT=0, the target temperature is reached.

ΔT_{max} Maximum temperature variation as defined by installation
Recommended value for ΔT_{max}=[2°C~5°C].

The voltage output of the field-supplied controller is a linear function with ΔT:

$$V = \frac{5}{+\Delta T_{max}} \Delta T + 5$$

It is possible that the ΔT value can become higher than the chosen ΔT_{max} value. The output of the field-supplied controller needs to be 10 V or 0 V depending on the ΔT value (see graph for detail).

Below an example for cooling and heating operation is given.

- Cooling operation

ΔT_{max} is selected at 3°C.
The target room temperature is 24°C

Actual measured temperature	ΔT value	Voltage output field controller	Cooling capacity
20°C	-4°C	0 V	Cooling capacity will strongly decrease
21°C	-3°C	0 V	Cooling capacity will strongly decrease
22.5°C	-1.5°C	2.5 V	Cooling capacity will decrease
24°C	0°C	5 V	Unit will keep operating at same capacity level
25.5°C	1.5°C	7.5 V	Cooling capacity will increase
27°C	3°C	10 V	Cooling capacity will strongly increase
28°C	4°C	10 V	Cooling capacity will strongly increase

- Heating operation

ΔT_{max} is selected at 3°C.
The target room temperature is 24°C

Actual measured temperature	ΔT value	Voltage output field controller	Heating capacity
20°C	-4°C	0 V	Heating capacity will strongly increase
21°C	-3°C	0 V	Heating capacity will strongly increase
22.5°C	-1.5°C	2.5 V	Heating capacity will increase
24°C	0°C	5 V	Unit will keep operating at same capacity level
25.5°C	1.5°C	7.5 V	Heating capacity will decrease
27°C	3°C	10 V	Heating capacity will strongly decrease
28°C	4°C	10 V	Heating capacity will strongly decrease

Operation with fixed T_e/T_c temperature control

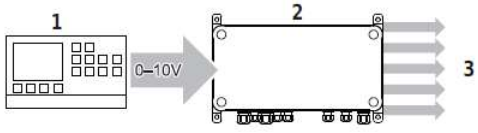
The evaporating temperature (T_e)/condensing temperature (T_c) at which the application has to operate can be set by code numbers as listed below.

Mode No.	Code No.	Description of setting(*)
23(13)–1	01	T_e = 3°C
	02	T_e = 4°C
	03	T_e = 5°C
	04	T_e = 6°C (factory setting)
	05	T_e = 7°C
	06	T_e = 8°C
	07	T_e = 9°C
	08	T_e = 10°C
23(13)–2	01	T_c = 43°C
	02	T_c = 44°C
	03	T_c = 45°C
	04	T_c = 46°C (factory setting)
	05	T_c = 47°C
	06	T_c = 48°C
	07	T_c = 49°C

(*) Depending on the operating temperature condition or on selection of the air handling unit, operation or safety activation of the outdoor unit may take priority and actual T_e/T_c will be different from the set T_e/T_c .

Operation with 0–10 V capacity control: W-control

For W-control, a field-supplied controller needs to be connected to the EKEQF control box. The field-supplied controller will geneate a 0–10 V signal that will be used by the EKEQF control box for the capacity control of the system.



1 Field-supplied controller

2 Control box EKEQF

3 Level 1 ~ 5 for capacity control

The system needs a field-supplied controller with a tempeature sensor. The temperature sensor can be used to control the following temperatures:

- Suction air temperature of the air handling unit
- Room air temperature

■ Discharge air temperature of the air handling unit

The EKEQF control box will interpret the 0–10 V signal according to 5 steps. The correlation between the voltage output and the system capacity is shown in the table below.

Step	Voltage field controller (*)	System capacity(†)	T_e during cooling operation	T_c during heating operation
1	0.8 V	0% (OFF)	—	—
2	2.5 V	40%	13.5°C	31°C
3	5 V	60%	11°C	36°C
4	7.5 V	80%	8.5°C	41°C
5	9.2 V	100%	6°C	46°C

(*) Voltages shown are the center points of each step range.
(†) The capacities mentioned in the table above are not exact. The compressor frequency can vary and will have an impact on the system capacity.

The system response to the 0–10 V output from the field-supplied controller is the same in cooling and heating operation. 10 V means 100% system capacity in cooling and heating operation. The field-supplied controller wil output a 0–10 V signal based on ΔT (see "Operation with 0–10 V capacity control: X-control" on page 79 for the definition of ΔT).

In the table below an example is given. A ΔT of 4°C in cooling operation means that the field-supplied controller needs to output 10 V, so that the cooling capacity will be 100%. A ΔT of 4°C in heating operation means that the field-supplied controller needs to output 0 V, so that the heating capacity will be 0% (OFF).

	Target temp.	Actual measured temp.	ΔT	Required system response
Cooling operation	24°C	28°C	+4°C	High capacity (10 V)
Heating operation	24°C	28°C	+4°C	No capacity (0 V)

The response of the field-supplied controller usttherefore be inverted for cooling or heating operation.

Setting the indoor fan control

NOTE This setting applies to both EKEQDCB and EKEQFCBA control boxes.

In fan only and cooling mode, the indoor fan is ON when the unit is operating.

For heating operation, different settings can be made:

Mode No.	Code No.	Description of setting
22(12)–3	01	Fan ON at thermo OFF
	02	Fan ON at thermo OFF
	03(*)	Fan OFF at thermo OFF

(*) Factory setting

Mode No.	Code No.	Description of setting
23(13)–8	01(*)	Fan OFF at defrost and oil return
	02	Fan ON at defrost and oil return
	03	Fan ON at defrost and oil return

(*) Factory setting

NOTE The combination of "Fan OFF during thermo OFF" and "Fan ON during defrost/oil return" will result in fan ON during thermo OFF.

Operation setting in case of power failure

NOTE This setting applies to both EKEQDCB and EKEQFCBA control boxes.

Measures must be taken to ensure that after power failure, T1/T2 is according to the setting of your preference. Neglecting this caution will result in improper operation.

Mode No.	Code No.	Description of setting
22(12)–5	01	T1/T2 must be open at power restore.(*)
	02(†)	After power failure, the status of T1/T2 must remain identical to the initial T1/T2 status prior to the power failure.

(*) After power failure, T1/T2 must be changed to open (no cooling/heating requested).
(†) Field setting

OPERATION AND DISPLAY SIGNALS

For EKEQFA only			
Output	C1/C2 error signal	Error: open	Abnormal operation on condenser or control system
			Power failure
		No error: Open	Normal operation
			T1/T2 is open: no error detection anymore
	C3/C4 operation signal	Closed	Compressor not operating
		Open	Compressor operating
	C7/C8 fan output	Open	Fan off
		Closed	Fan on
	C9/C10 defrost output	Open	No defrost operation
		Closed	Defrost operation
Input	C5/C6: capacity step	0–10 V	Only necessary for field setting 23(13)–0 = 01 or 03 0–10 V capacity control(*)
	T1/T2(†)	Open	No cooling/heating requested
		Closed	Cooling/heating requested

(*) Refer to paragraph "Operation with 0–10 V capacity control: X-control" on page 79 and "Operation with 0–10 V capacity control: W-control" on page 79.
(†) See field setting 22(12)–5.

For EKEQD only			
Output	C1/C2 fan output	Open	Fan off
		Closed	Fan on
Input	T1/T2(*)	Open	No cooling/heating requested
		Closed	Cooling/heating requested

(*) See field setting 22(12)–5.

- The fan of the air handling unit must operate before cooling operation is required to the outdoor unit.
- When the operation signal is activated, the air handling unit and fan must operate. Failure to this will cause a safety to operate or freezing up of the air handling unit.

TROUBLESHOOTING

To set up the system and make trouble shooting possible, it is required to connect the remote controller to the option kit.

Not a malfunction of the air conditioner

The system does not operate

- The system does not restart immediately after the cooling/heating is requested.
  If the operation lamp lights, the system is in normal operating condition.
  It does not restart immediately because one of its safety devices actuates to prevent the system from being overloaded. The system will turn on again automatically after 3 minutes.
- The system does not restart immediately after the power supply is turned on.
  Wait 1 minute until the micro computer is prepared for operation.

Trouble shooting

If one of the following malfunctions occurs, take the measures shown below and contact your dealer.

The system must be repaired by a qualified service person.

- If a safety device such as a fuse, a breaker, or an earth leakage breaker frequently actuates, or ON/OFF switch does not properly work.
  Turn off the main power switch.
- If the display TEST, the unit number and the operation lamp flash and the malfunction code appears;
  Notify your dealer and report the malfunction code.

If the system does not operate properly, and none of the above mentioned malfunctions is evident, investigate the system according to the following procedures.

If the system does not operate at all

- Check if there is a power failure.
  Wait until power is restored. If power failure occurs during operation, the system automatically restarts immediately after the power supply recovers.
- Check if the fuse has blown or breaker has been tripped.
  Change the fuse or set the breaker.

If the system stops operating after operation is complete

- Check if the air inlet or outlet of outdoor or air handling unit is blocked by obstacles.
  Remove the obstacle and make it well-ventilated.
- Check if the air filter is clogged.
  Ask a qualified service person to clean the air filter.
- The error signal is given and the system stops.
  If the error resets after 5-10 minutes, the unit safety device was activated but the unit restarted after evaluation time.
  If the error persists, contact your dealer.

If the system operates but it does not sufficiently cool/heat

- Check if the air inlet or outlet of the air handling unit or the outdoor unit is blocked with obstacles.
  Remove the obstacle and make it well-ventilated.
- Check if the air filter is clogged.
  Ask a qualified service person to clean the air filter.
- Check if the doors or the windows are open.
  Shut doors or windows to prevent wind from coming in.
- Check if direct sunlight enters the room.
  Use curtains or blinds.
- Check if there are too many inhabitants in the room.
  Cooling effect decreases if heat gain of the room is too large.
- Check if the heat source of the room is excessive.
  Cooling effect decreases if heat gain of the room is too large.

The air handling unit is freezing up

- The liquid thermistor (R2T) is not put on the coldest position and part of the air handling unit is freezing up.
  Thermistor must be put on the coldest position.
- The thermistor has come loose.
  The thermistor must be fixed.
- The air handling unit fan is not operating continuously.
  When the outdoor unit stops operating, the air handling unit fan must continue operation to melt the ice that was accumulated during outdoor unit operation.
  Ensure that the air handling unit fan keeps operating.

In these cases, contact your dealer.

MAINTENANCE

- Only a qualified service person is allowed to perform maintenance.
- Before obtaining access to terminal devices, all power supply circuits must be interrupted.
- Water or detergent may deteriorate the insulation of electronic components and result in burn-out of these components.

DISPOSAL REQUIREMENTS

Dismantling of the unit, treatment of the refrigerant, of oil and of other parts must be done in accordance with relevant local and national legislation.

NOTES

6. System B: EKEQM-box: Installation and Operation Manual

INSTALLATION AND OPERATION MANUAL

Option kit for combination of Daikin condensing units with field supplied air handling units

Installation and operation manual
Option kit for combination of Daikin condensing units with field supplied air handling units — English

Installations- und Bedienungsanleitung
Erweiterungsbausatz für die Verbindung von Daikin-Verflüssigern mit bauseitigen Luftbehandlungsgeräten — Deutsch

Manuel d'installation et d'utilisation
Kit d'options pour combinaison de groupes condenseur Daikin et unités de traitement de l'air non fournies — Français

Montagehandleiding en gebruiksaanwijzing
Optiekit voor combinatie van condensorunits van Daikin met lokaal geleverde luchtbehandelingsunits — Nederlands

Manual de instalación y operación
Kit de opciones para la combinación de unidades de condensación Daikin con unidades de tratamiento de aire suministradas — Español

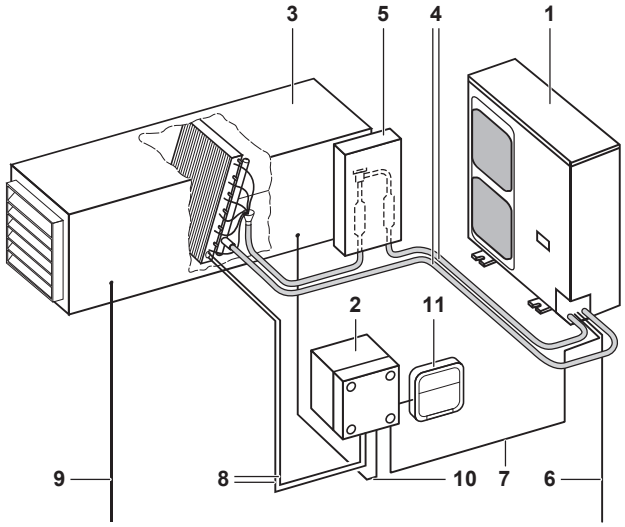
Manuale di installazione e d'uso
Kit opzioni per la combinazione di unità di condensazione Daikin con unità per il trattamento dell'aria non in dotazione — Italiano

Manual de instalação e de funcionamento
Kit de opções para combinação de unidades de condensação Daikin com unidades de tratamento de ar existentes no local — Portugues

Инструкция по монтажу и эксплуатации
Комплект дополнительного оборудования для подключения конденсаторных агрегатов Daikin к приобретаемым на внутреннем рынке — русский

Instrukcja montażu i instrukcja obsługi
Zestawy opcji dla agregatów skraplających Daikin w konfiguracji z centralami klimatyzacyjnymi dostarczanymi osobno — polski

EKEQMCBV3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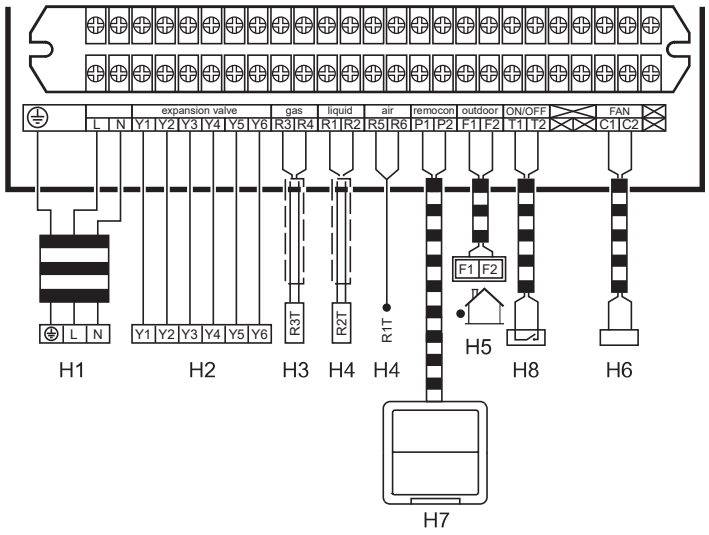
expansion valve
gas
liquid
air
remocon
outdoor
ON/OFF
FAN
L N Y1 Y2 Y3 Y4 Y5 Y6 R3 R4 R1 R2 R5 R6 P1 P2 F1 F2 T1 T2 C1 C2
R3T
R2T
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H1
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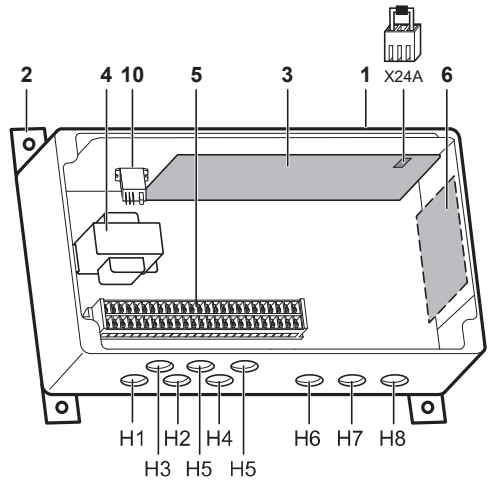
H7

2


2
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X24A
6
H1
H3
H2
H5
H4
H5
H6
H7
H8

3

NOTES

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READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLATION AND OPERATION.

IMPROPER INSTALLATION OR ATTACHMENT OF EQUIPMENT OR ACCESSORIES COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT. BE SURE ONLY TO USE ACCESSORIES MADE BY DAIKIN WHICH ARE SPECIFICALLY DESIGNED FOR USE WITH THE EQUIPMENT AND HAVE THEM INSTALLED BY A PROFESSIONAL.

IF UNSURE OF INSTALLATION PROCEDURES OR USE, ALWAYS CONTACT YOUR DAIKIN DEALER FOR ADVICE AND INFORMATION.

The English text is the original instruction. Other languages are translations of the original instructions.

INTRODUCTION

- Do only use this system in combination with a field supplied air handling unit. Do not connect this system to other appliances.
- Only optional controls as listed in the optional accessories list can be used.

BEFORE INSTALLATION

The system will operate as a standard indoor unit to control the room temperature. This system does not require a specific external controller but take below cautions into account.

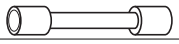
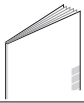
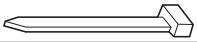
- Multiple outdoor unit connections are not allowed in 1 refrigerant system.
- The automatic refrigerant charging and leak detection function are not possible when the EKEQMCB is used.
- The manufacturer of this outdoor unit has limited responsibility for total performance of the system because performance is determined by the total system. The discharge air may fluctuate depending on selected air handling unit and depending on the installation configuration.
- Do NOT connect the system to DIII-net devices:
  - intelligent touch Controller
  - intelligent Manager
  - DMS-IF
  - BACnet Gateway
  - ...

  This could result in malfunction or breakdown of the total system.
- This equipment is not designed for year-round cooling applications with low indoor humidity conditions, such as Electronic Data Processing rooms.
- This appliance is not intended for use by persons, including children, with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
  Children should be supervised to ensure that they do not play with the appliance.

INSTALLATION

- For installation of the air handling unit, refer to the air handling unit installation manual.
- Never operate the air conditioner with the discharge pipe thermistor (R3T), suction pipe thermistor (R2T) and pressure sensors (S1NPH, S1NPL) removed. Such operation may burn out the compressor.
- The equipment is not intended for use in a potentially explosive atmosphere.

ACCESSORIES

		Quantity
Thermistor (R1T)		1
Thermistor (R3T/R2T) (2.5 m cable)		2
Insulation sheet		2
Rubber sheet		2
Wire to wire splice		6
Installation and operation manual		1
Screw nut		9
Tie wrap		6
Capacity setting adaptor		8
Stopper (closing cup)		1

Obligatory accessory

	EKEQMCB
Expansion valve kit	EKEXV

Refer to chapter "Valve kit installation" for installation instructions.

Optional accessories

		EKEQMCB
Remote controller		1

NAME AND FUNCTION OF PARTS (See figure 1)

Parts and components

1 Outdoor unit

2 Control box

3 Air handling unit (field supply)

4 Field piping (field supply)

5 Expansion valve kit

Wiring connections

6 Outdoor unit power supply

7 Control box wiring
(Power supply and communication between control box and outdoor unit)

8 Air handling unit thermistors

9 Power supply and control wiring for air handling unit and controller (power supply is separate from the outdoor unit)

10 Air thermistor control for air handling unit

11 Remote controller

BEFORE INSTALLATION

- Refer to the installation manual of the outdoor unit for details on refrigerant piping, additional refrigerant charging, and inter-unit wiring.

Since design pressure is 4 MPa or 40 bar, pipes of larger wall thickness may be required. Refer to paragraph "Selection of piping material" on page 90.

- Precautions for R410A
  - The refrigerant requires strict cautions for keeping the system clean, dry and tight.
    - Clean and dry
      Foreign materials (including mineral oils or moisture) should be prevented from getting mixed into the system.
    - Tight
      Read "Piping installation" on page 89 carefully and follow these procedures correctly.
  - Since R410A is a mixed refrigerant, the required additional refrigerant must be charged in its liquid state. (If the refrigerant is in state of gas, its composition changes and the system will not work properly).
  - The connected air handling units must have heat exchangers designed exclusively for R410A.

Cautions for selection of the air handling unit

Select the air handling unit (field supply) according to the technical data and limitations mentioned in Table 1.

Lifetime of the outdoor unit, operation range or operation reliability may be influenced if you neglect these limitations.

This control box can only be used in heat pump applications.

NOTE

- For maximum number of indoor units, see the outdoor unit specifications.
- If the total capacity of the connected indoor units exceeds the capacity of the outdoor unit, cooling and heating performance may drop when running the indoor units.
  Refer to the section on performance characteristics in the Engineering Data Book for details.
- The capacity class of the air handling unit is determined by the selection of the expansion valve kit according to Table 1.

Depending on the heat exchanger, a connectable EKEXV (expansion valve kit) must be selected to these limitations.

Table 1

EKEXV class	Allowed heat exchanger volume (dm^3)		Allowed heat exchanger capacity (kW)	
	Minimum	Maximum	Minimum	Maximum
50	0.76	1.65	5.0	6.2
63	1.66	2.08	6.3	7.8
80	2.09	2.64	7.9	9.9
100	2.65	3.30	10.0	12.3
125	3.31	4.12	12.4	15.4
140	4.13	4.62	15.5	17.6
200	4.63	6.60	17.7	24.6
250	6.61	8.25	24.7	30.8

Saturated suction temperature (SST) = 6°C, SH (superheat) = 5 K, air temperature = 27°C DB / 19°C WB.

1 The air handling unit can be connected as a standard indoor unit to the outdoor unit. The limitations of connection are determined by the outdoor unit.

Additional limits exist when connecting the EKEQMCB control box. These can be found in the technical data book of the EKEQMCB and in this manual.

2 Selecting the expansion valve

The corresponding expansion valve needs to be selected for your air handling unit. Select the expansion valve according to the above limitations.

NOTE

- If conflicting result, capacity selection has priority over volume.
- The expansion valve is an electronic type, it is controlled by the thermistors that are added in the circuit. Each expansion valve can control a range of air handling units sizes.
- The selected air handling unit must be designed for R410A.
- Extraneous substances (including mineral oils or moisture) must be prevented from getting mixed into the system.
- SST: saturated suction temperature at exit of air handling unit.

3 Selecting the capacity setting adaptor (see accessories)

- The corresponding capacity setting adaptor needs to be selected depending on the expansion valve.
- Connect the correct selected capacity setting adaptor to X24A (A1P). (See figure 3)

EKEXV kit	Capacity setting adaptor label (indication)
50	J56
63	J71
80	J90
100	J112

EKEXV kit	Capacity setting adaptor label (indication)
125	J140
140	J160
200	J224
250	J280

For the following items, take special care during construction and check after installation is finished

Tick ☐ when checked	
☐	Are the thermistors fixed firmly? Thermistor may come loose.
☐	Is the freeze-up setting done correctly? The air handling unit may freeze up.
☐	Is the control box fixed firmly? The unit may drop, vibrate or make noise.
☐	Do electrical connections comply with specifications? The unit may malfunction or components may burn out.
☐	Are wiring and piping correct? The unit may malfunction or components may burn out.
☐	Is the unit safely grounded? Dangerous at electric leakage.

SELECTING THE INSTALLATION SITE

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Select an installation site where the following conditions are fulfilled and that meets your customer's approval.

- The option boxes (expansion valve and electrical control box) can be installed inside and outside.
- Do not install the option boxes in or on the outdoor unit.
- Do not put the option boxes in direct sunlight. Direct sunlight will increase the temperature inside the option boxes and may reduce its lifetime and influence its operation.
- Choose a flat and strong mounting surface.
- Operating temperature of the control box is between –10°C and 40°C.
- Keep the space in front of the boxes free for future maintenance.
- Keep air handling unit, power supply wiring and transmission wiring at least 1 m away from televisions and radios. This is to prevent image interference and noise in those electrical appliances. (Noise may be generated depending on the conditions under which the electric wave is generated, even if 1 m is kept.)
- Make sure the control box is installed horizontally. Screw nuts position must be downwards.

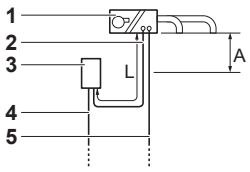
Precautions

Do not install or operate the unit in rooms mentioned below.

- Where mineral oil, like cutting oil is present.
- Where the air contains high levels of salt such as air near the ocean.
- Where sulphurous gas is present such as that in areas of hot spring.
- In vehicles or vessels.
- Where voltage fluctuates a lot such as that in factories.
- Where high concentration of vapor or spray are present.
- Where machines generating electromagnetic waves are present.
- Where acidic or alkaline vapor is present.
- The option boxes must be installed with entrances downward.

PIPING INSTALLATION

Piping limits



1 Air handling unit
2 Connection pipe from expansion valve kit to air handling unit
3 Valve kit
4 Liquid pipe
5 Gas pipe

	Max (m)
A	–5/+5(*)
L	5

(*) Below or above the valve kit.

L is to be considered as a part of the total maximum piping length. See installation manual of the outdoor unit for piping installation.

Piping connections

Make sure to install gas and liquid pipe diameters in function of the air handling unit capacity class.

Air handling unit capacity class	Gas pipe	Connection pipe Liquid pipe
50	Ø12.7	Ø6.4
63	Ø15.9	Ø9.52
80		
100		
125		
140		
200	Ø19.1	
250	Ø22.2	

Selection of piping material

1. Foreign materials inside pipes (including oils for fabrication) must be 30 mg/10 m or less.
2. Use the following material specification for refrigerant piping:
   - Construction material: phosphoric acid deoxidized seamless copper for refrigerant.
   - Temper grade: use piping with temper grade in function of the pipe diameter as listed in the table below.

Pipe Ø	Temper grade of piping material
≤ 15.9	O
≥ 19.1	1/2H

O = Annealed
1/2H = Half hard

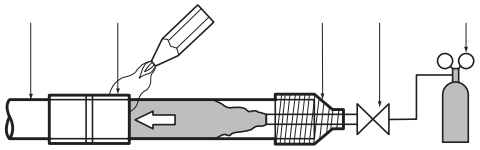
   - The pipe thickness of the refrigerant piping should comply with relevant local and national regulations. The minimal pipe thickness for R410A piping must be in accordance with the table below.

Pipe Ø	Minimal thickness t (mm)
6.4	0.80
9.5	0.80
12.7	0.80
15.9	0.99
19.1	0.80
22.2	0.80

3. In case the required pipe sizes (inch sizes) are not available, it is also allowed to use other diameters (mm sizes), taken the following into account:
   - select the pipe size nearest to the required size.
   - use the suitable adapters for the change-over from inch to mm pipes (field supply).

Cautions for brazing

- Be sure to carry out a nitrogen blow when brazing.
  Brazing without carrying out nitrogen replacement or releasing nitrogen into the piping will create large quantities of oxidized film on the inside of the pipes, adversely affecting valves and compressors in the refrigerating system and preventing normal operation.
- When brazing while inserting nitrogen into the piping, nitrogen must be set to 0.02 MPa with a pressure-reducing valve (=just enough so that it can be felt on the skin).



1 Refrigerant piping
2 Part to be brazed
3 Taping
4 Hands valve
5 Pressure-reducing valve
6 Nitrogen

- For details, see manual of the outdoor unit.

VALVE KIT INSTALLATION

Mechanical installation

1 Remove the valve kit box cover by unscrewing 4x M5.

2 Drill 4 holes on correct position (measurements as indicated in figure below) and fix the valve kit box securely with 4 screws through the provided holes Ø9 mm.

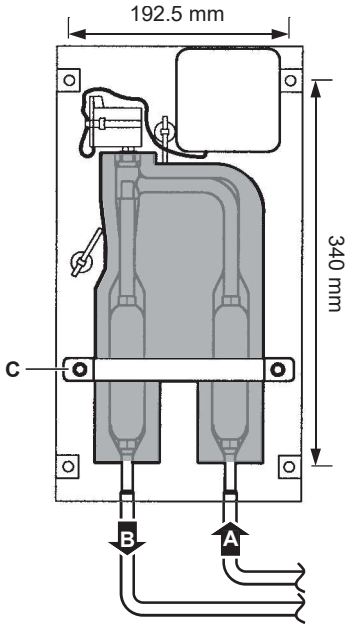
NOTE

- Make sure that the expansion valve is installed vertically.
- Make sure there is enough free space for future maintenance.

Brazing work

For details, see manual of the outdoor unit.

3 Prepare the inlet/outlet field piping just in front of the connection (do **not** braze yet).



A Inlet coming from the outdoor unit

B Outlet to air handling unit

C Pipe fixing clamp

4 Remove the pipe fixing clamp (C) by unscrewing 2x M5.

5 Remove the upper and lower pipe insulations.

6 Braze the field piping.

- Make sure to cool the filters and valve body with a wet cloth and make sure the body temperature does not exceed 120°C during brazing.
- Make sure that the other parts such as electrical box, tie wraps and wires are protected from direct brazing flames during brazing.

7 After brazing, put the lower pipe insulation back in place and close it with the upper insulation cover (after pealing off the liner).

8 Secure the pipe fixing clamp (C) in place again (2x M5).

9 Make sure that field pipes are fully insulated.

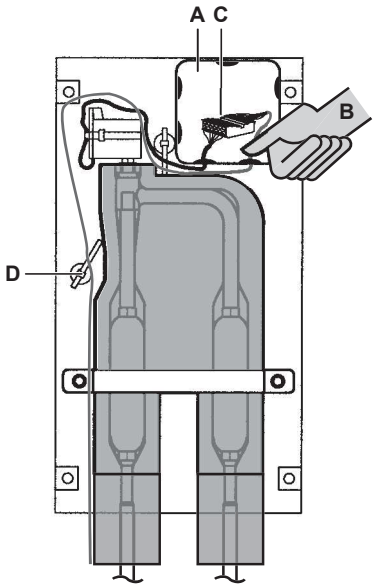
Field pipe insulation must reach up to the insulation you have put back in place as per procedure step 7. Make sure that there is no gap between both ends in order to avoid condensation dripping (finish the connection with tape eventually).

Electrical work

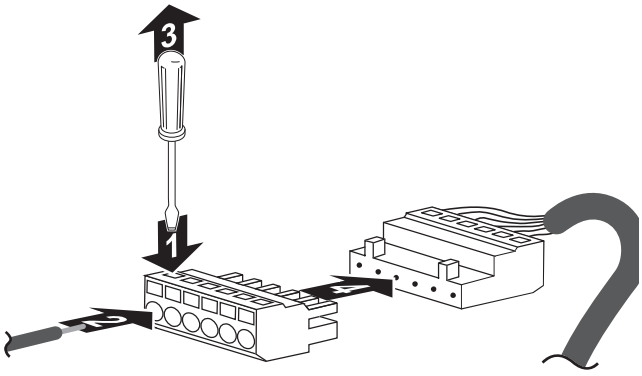
1 Open the electrical box cover (A).

2 Push out **ONLY** the second lower wire intake hole (B) from inside to outside. Do not damage the membrane.

3 Pass valve cable (with wires Y1 ... Y6) from the control box through that membrane wire intake hole and connect the cable wires into the terminal connector (C) following instructions as described in step 4. Route the cable out of the valve kit box according to figure below and fix with the tie wrap (D). See "Electric wiring work" on page 92 for more details.



4 Use a small screwdriver and follow indicated instructions for connecting cable wires into the terminal connector according to the wiring diagram.



5 Make sure that field wiring and insulation is not squeezed when closing the valve kit box cover.

6 Close the valve kit box cover (4x M5).

INSTALLATION OF THE ELECTRICAL CONTROL BOX (See figure 3)

1 Control box
2 Hanger brackets
3 Main PCB
4 Transformer
5 Terminal
6 Optional PCB (KRP4)

Mechanical installation

1 Fix the control box with its hanger brackets to the mounting surface.
Use 4 screws (for holes of Ø6 mm).

2 Open the lid of the control box.

3 For electrical wiring: refer to paragraph "Electric wiring work" on page 92.

4 Install the screw nuts.

5 Close the unnecessary openings with stoppers (closing cups).

6 Close the lid securely after installation to ensure that the control box is watertight.

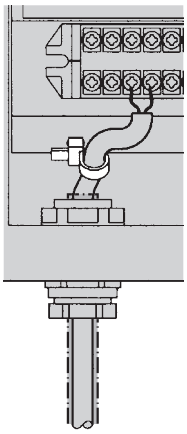
ELECTRIC WIRING WORK

- All field supplied parts and materials and electric works must be conform to local codes.
- Use copper wire only.
- All wiring must be performed by an authorized electrician.
- A main switch or other means for disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local and national legislation.
- Refer to the installation manual attached to the outdoor unit for the size of power supply electric wire connected to the outdoor unit, the capacity of the circuit breaker and switch, wiring and wiring instructions.
- Attach the earth leakage circuit breaker and fuse to the power supply line.

Connection of the wires inside the control box

1 For connection to outdoor unit and to controller (field supply):
Pull the wires inside through the screw nut and close the nut firmly in order to ensure a good pull relieve and water protection.

2 The cables require an additional pull-relief. Strap the cable with the installed tie wrap.



Precautions

- Thermistor cable and remote controller wire should be located at least 50 mm away from power supply wires and from wires to the controller. Not following this guideline may result in malfunction due to electrical noise.
- Use only specified wires, and tightly connect wires to the terminals. Keep wiring in neat order so that it does not obstruct other equipment. Incomplete connections could result in overheating, and in worse case electric shock or fire.

Connecting the wiring: EKEQMCBV3

- Connect the wires to the terminal board according to the wiring diagram in figure 2. See figure 3 for wiring intake in the control box. The wiring intake hole indication H1 refers to the H1 cable of the corresponding wiring diagram. There are 2 wiring intake holes to allow for branching of the communication wire.
- Connect cables according to specifications of the next table.

Table connection and application

	Description	Connect to	Type of cable	Cross section (mm^2)(*)	Maximum length (m)	Specifications
L, N, earth	Power supply	Power supply	H05VV-F3G2.5	2.5	—	Power supply 230 V 1~ 50 Hz
Y1~Y6	Expansion valve connection	Expansion valve kit	LIYCY3 x 2 x 0.75	0.75	20	Digital output 12 V DC
R1,R2	Thermistor R2T (liquid pipe)	—	H05VV-F2 x 0.75		Standard: 2.5 Max.: 20	Analog input 16 V DC
R3,R4	Thermistor R3T (gas pipe)					
R5,R6	Thermistor R1T (air)					
P1,P2	Remote controller				100	Communication line 16 V DC
F1,F2	Communication to outdoor unit	Outdoor unit				
T1,T2	ON/OFF	Controller field supply			—	Digital input 16 V DC
—	Capacity step		LIYCY4 x 2 x 0.75	Optional connection: when the function of the switch box needs to be extended: see KRP4A51 for details of settings and instructions.		
—	Error signal					
—	Operation signal					
C1,C2	Fan signal	Air handling unit fan field supply	H05VV-F3G2.5	2.5	—	Digital output: voltage free. Maximum 230 V, maximum 2 A

(*) Recommended size (all wiring must comply with local codes).

Wiring diagram

A1P.....Printed circuit board
A2P.....Printed circuit board (option KRP4)
F1U.....Fuse (250 V, F5A)(A1P)
F3U.....Field fuse
HAP .....Light emitting diode (service monitor-green)
K1R.....Magnetic relay
K4R.....Magnetic relay (fan)
Q1DI .....Earth leakage breaker
R1T.....Thermistor (air)
R2T.....Thermistor (liquid)
R3T.....Thermistor (gas)
R7 .....Capacity adaptor
T1R.....Transformer (220 V/21.8 V)
X1M,X3M.....Terminal block
Y1E.....Electronic expansion valve
X1M-C1/C2.....Output: fan ON/OFF
X1M-F1/F2.....Communication outdoor unit
X1M-P1/P2 .....Communication remote controller
X1M-R1/R2.....Thermistor liquid
X1M-R3/R4.....Thermistor gas
X1M-R5/R6.....Thermistor air
X1M-T1/T2.....Input: ON/OFF
X1M-Y1~6 .....Expansion valve

..... Field wiring
L..... Live
N ..... Neutral
, ... Connector
..... Wire clamp
..... Protective earth (screw)
..... Separate component
..... Optional accessory
BLK..... Black
BLU..... Blue
BRN ..... Brown
GRN..... Green
GRY ..... Gray
ORG ..... Orange
PNK ..... Pink
RED ..... Red
WHT ..... White
YLW ..... Yellow

INSTALLATION OF THERMISTORS

Refrigerant thermistors

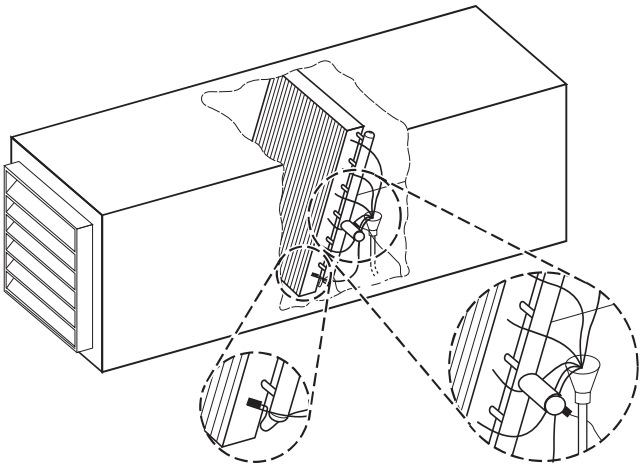
Location of the thermistor

A correct installation of the thermistors is required to ensure a good operation:

1. Liquid (R2T)
   Install the thermistor behind the distributor on the coldest pass of the heat exchanger (contact your heat exchanger dealer).
2. Gas (R3T)
   Install the thermistor at the outlet of the heat exchanger as close as possible to the heat exchanger.

Evaluation must be done to check if the air handling unit is protected against freeze-up.

Execute test operation and check for freeze-up.



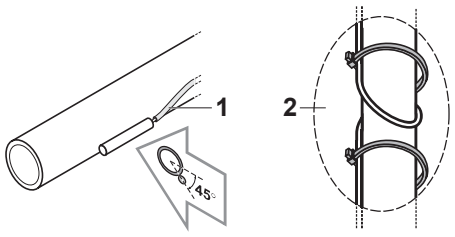
1 Liquid R2T

2 Gas R3T

Installation of the thermistor cable

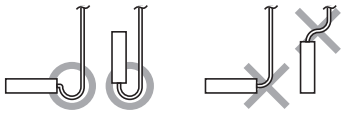
1 Put the thermistor cable in a separate protective tube.

2 Always add a pull-relief to the thermistor cable to avoid strain on the thermistor cable and loosening of the thermistor. Strain on the thermistor cable or loosening of the thermistor may result in bad contact and incorrect temperature measurement.

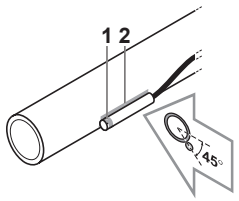


Fixation of the thermistor

- Put the thermistor wire slightly down to avoid water accumulation on top of the thermistor.



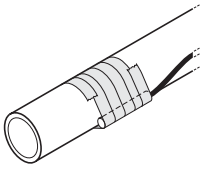
- Make good contact between thermistor and air handling unit. Put the top of the thermistors on the air handling unit, this is the most sensitive point of the thermistor.



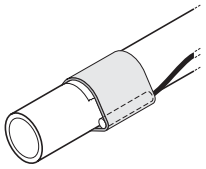
1 Most sensitive point of the thermistor

2 Maximize the contact

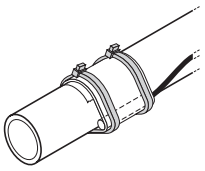
1 Fix the thermistor with insulating aluminum tape (field supply) in order to ensure a good heat transference.



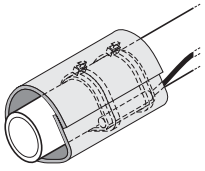
2 Put the supplied piece of rubber around the thermistor (R2T/R3T) in order to avoid loosening of the thermistor after some years.



3 Fasten the thermistor with 2 tie wraps.



4 Insulate the thermistor with the supplied insulation sheet.



Air thermistor

The air thermistor (R1T) can be installed either in the room that needs temperature control or in the suction area of the air handling unit.

NOTE For room temperature control the delivered thermistor (R1T) can be replaced by an optional remote sensor kit KRCS01-1(A) (to be ordered separately).

Installation of longer thermistor cable (R1T/R2T/R3T)

The thermistor is supplied with a standard cable of 2.5 m. This cable can be made longer to up to 20 m.

Install the longer thermistor cable with the delivered wire to wire splices

1 Cut the wire or bundle the remainder of the thermistor cable.
Keep at least 1 m of the original thermistor cable.
Do not bundle the cable inside the control box.

2 Strip the wire ±7 mm at both ends and insert these ends into the wire to wire splice.

3 Pinch the splice with the correct crimp tool (pliers).

4 After connection, heat up the shrink-insulation of the wire to wire splice with a shrink-heater to make a water tight connection.

5 Wrap electrical insulation tape around the connection.

6 Put a pull-relief in front of and behind the connection.

- The connection must be made on an accessible location.
- To make the connection waterproof, the connection can also be made in a switch box or connector box.
- The thermistor cable should be located at least 50 mm away from power supply wire. Not following this guideline may result in malfunction due to electrical noise.

REFRIGERANT PIPING WORK

All field piping must be provided by a licensed refrigeration technician and must comply with the relevant local and national codes.

- For refrigerant piping of outdoor unit, refer to the installation manual supplied with the outdoor unit.
- Follow the outdoor unit specifications for additional charging, piping diameter and installation.
- The maximum allowed piping length depends on the connected outdoor model.

TEST OPERATION

Before executing "test operation" as well as before operating the unit, you must check the following:

- Refer to the section of "For the following items, take special care during construction and check after installation is finished" on page 89.
- After finishing the construction of refrigerant piping, drain piping and electric wiring, conduct test operation accordingly to protect the unit.
- Open the gas side stop valve.
- Open the liquid side stop valve.

Executing the test operation

1 Close the contact T1/T2 (ON/OFF).

2 Confirm function of the unit according to the manual and check if the air handling unit has collected ice (freeze-up).
If the unit collects ice: see "Troubleshooting" on page 96.

3 Confirm that the fan of the air handling unit is ON.

- In case of poor distribution in the air handling unit, 1 or more passes of the air handling unit may freeze-up (collect ice) → put the thermistor (R2T) on this position.
- Depending on operation conditions (e.g.: outdoor ambient temperature) it is possible that the settings must be changed after commissioning.

OPERATION AND MAINTENANCE

If T1/T2 is applicable:

- Closing the T1/T2 signal starts operation of the air handling unit.
- Opening the T1/T2 signal stops operation of the air handling unit.

WHAT TO DO BEFORE OPERATION

- Before initiating operation, contact your dealer to get the operation manual that corresponds to your system.
- Refer to the dedicated manual of the controller (field supply) and air handling unit (field supply).
- Make sure that the air handling unit fan is ON when the outdoor unit is in normal operation.

Field settings for EKEQMCB

Refer to the installation manuals of both the outdoor unit and the remote controller.

Operation setting in case of power failure

Measures must be taken to ensure that after power failure, T1/T2 is according to the setting of your preference. Neglecting this caution will result in improper operation.

Mode No.	Code No.	Description of setting
22(12)–5	01	T1/T2 must be open at power restore.(*)
	02	After power failure, the status of T1/T2 must remain identical to the initial T1/T2 status prior to the power failure.

(*) After power failure, T1/T2 must be changed to open (no cooling/heating requested).

OPERATION AND DISPLAY SIGNALS

Input	T1/T2(*)	Open	No cooling/heating requested
		Closed	Cooling/heating requested

(*) See field setting 22(12)–5.

NOTE

- See the remote controller display for output.
- See optional kit KRP4A51 for additional possible signals.

When the operation signal is activated, the air handling unit and fan must operate. Failure to this will cause a safety to operate or freezing up of the air handling unit.

TROUBLESHOOTING

To set up the system and make trouble shooting possible, it is required to connect the remote controller to the option kit.

Not a malfunction of the air conditioner

The system does not operate

- The system does not restart immediately after the cooling/heating is requested.
  If the operation lamp lights, the system is in normal operating condition.
  It does not restart immediately because one of its safety devices actuates to prevent the system from being overloaded. The system will turn on again automatically after 3 minutes.
- The system does not restart immediately after the power supply is turned on.
  Wait 1 minute until the micro computer is prepared for operation.

Trouble shooting

If one of the following malfunctions occurs, take the measures shown below and contact your dealer.

The system must be repaired by a qualified service person.

- If a safety device such as a fuse, a breaker, or an earth leakage breaker frequently actuates, or ON/OFF switch does not properly work.
  Turn off the main power switch.
- If the display TEST, the unit number and the operation lamp flash and the malfunction code appears;
  Notify your dealer and report the malfunction code.

If the system does not operate properly, and none of the above mentioned malfunctions is evident, investigate the system according to the following procedures.

If the system does not operate at all

- Check if there is a power failure.
  Wait until power is restored. If power failure occurs during operation, the system automatically restarts immediately after the power supply recovers.
- Check if the fuse has blown or breaker has been tripped.
  Change the fuse or set the breaker.

If the system stops operating after operation is complete

- Check if the air inlet or outlet of outdoor or air handling unit is blocked by obstacles.
  Remove the obstacle and make it well-ventilated.
- Check if the air filter is clogged.
  Ask a qualified service person to clean the air filter.
- The error signal is given and the system stops.
  If the error resets after 5-10 minutes, the unit safety device was activated but the unit restarted after evaluation time.
  If the error persists, contact your dealer.

If the system operates but it does not sufficiently cool/heat

- Check if the air inlet or outlet of the air handling unit or the outdoor unit is blocked with obstacles.
  Remove the obstacle and make it well-ventilated.
- Check if the air filter is clogged.
  Ask a qualified service person to clean the air filter.
- Check if the doors or the windows are open.
  Shut doors or windows to prevent wind from coming in.
- Check if direct sunlight enters the room.
  Use curtains or blinds.
- Check if there are too many inhabitants in the room.
  Cooling effect decreases if heat gain of the room is too large.
- Check if the heat source of the room is excessive.
  Cooling effect decreases if heat gain of the room is too large.

The air handling unit is freezing up

- The liquid thermistor (R2T) is not put on the coldest position and part of the air handling unit is freezing up.
  Thermistor must be put on the coldest position.
- The thermistor has come loose.
  The thermistor must be fixed.
- The air handling unit fan is not operating continuously.
  When the outdoor unit stops operating, the air handling unit fan must continue operation to melt the ice that was accumulated during outdoor unit operation.
  Ensure that the air handling unit fan keeps operating.

In these cases, contact your dealer.

MAINTENANCE

- Only a qualified service person is allowed to perform maintenance.
- Before obtaining access to terminal devices, all power supply circuits must be interrupted.
- Water or detergent may deteriorate the insulation of electronic components and result in burn-out of these components.

DISPOSAL REQUIREMENTS

Dismantling of the unit, treatment of the refrigerant, of oil and of other parts must be done in accordance with relevant local and national legislation.

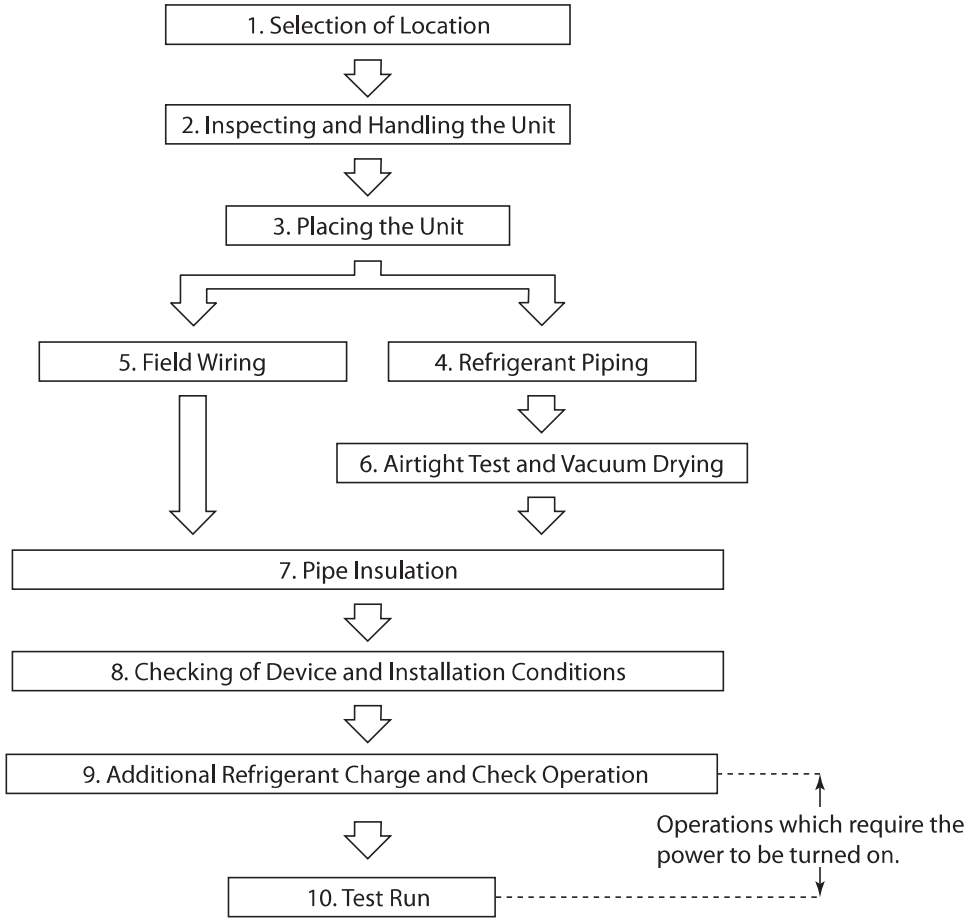
Part 6
Test Operation

1. Test Operation 98
   1.1 Installation Process 98
   1.2 Procedure and Outline 99
   1.3 Operation When Power is Turned On 112
2. Outdoor Unit PC Board Layout 113
3. Field Setting 114
   3.1 Field Setting from Remote Controller 114
   3.2 Field Setting from Outdoor Unit 123

1. Test Operation

1.1 Installation Process

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



1.2 Procedure and Outline

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

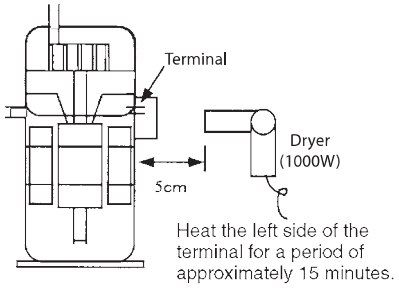
1.2.1 Check work prior to turn power supply on

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

⇩

○ Is the wiring performed as specified?
○ Is the designated wire used?
○ Is the wiring screw of wiring not loose?
○ Is the grounding work completed?
○ Is the insulation of the main power supply circuit deteriorated?
Use a 500V megger tester to measure the insulation. (*1)
- Do not use a megger tester for other circuits than 380V (or 415V) circuit.

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



Check on refrigerant piping / insulation materials

⇩

○ Is the pipe size proper?
○ Is the pipe insulation material installed securely?
Liquid and gas pipes need to be insulated. (Otherwise causes water leak.)

Check airtight test and vacuum drying.

⇩

○ Have the airtight test and the vacuum drying been conducted according to the procedure in the Installation Manual?

Check on amount of refrigerant charge

⇩

○ Is a proper quantity of refrigerant refilled?
The following two methods are available for refilling of the refrigerant.
(1) Use the automatic refrigerant refilling function.
(2) Calculate a refrigerant refilling quantity.

Check the stop valves for conditions.

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

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

1.2.2 Turn power on

Turn outdoor unit and AHU power on.

⇩

Check the LED display of the outdoor unit PC board.

⇩

Make field settings with outdoor unit PC board.

⇩

Conduct check operations.

⇩

Check for normal operation.

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

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

LED display ○ON ●OFF ◑Blinking

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

The check operations shown below will be automatically initiated.

- Check for erroneous wirings
- Check for failure to open stop valves
- Check for excessive refrigerant refilling
- Automatic judgment of piping length

○ Before starting the normal operation after the completion of check operations, make sure AHU and outdoor unit normally operate.

1.2.3 Air Tight Test and Vacuum Drying

Note:

- Always use nitrogen gas for the airtightness test.
- Absolutely do not open the shutoff valve until the main power circuit insulation measurement has been completed. (measuring after the shutoff valve is opened will cause the insulation value to drop.)

1.2.3.1 Preparations

<Needed tools>

Gauge manifold Charge hose valve	• To prevent entry of any impurities and insure sufficient pressure resistance, always use the special tools dedicated for R-410A. • Use charge hose that have pushing stick for connecting to service port of shutoff valves or refrigerant charge port.
Vacuum pump	• The vacuum pump for vacuum drying should be able to lower the pressure to –100.7kPa (5 Torr –755mm Hg). • Take care the pump oil never flow backward into the refrigerant pipe during the pump stops.

<The system for air tight test and vacuum drying>

- Referring to figure 28, connect an nitrogen tank, refrigerant tank, and a vacuum pump to the outdoor unit.
- The shutoff valve and valve A~C in figure 28 should be open or closed as shown in the table below.

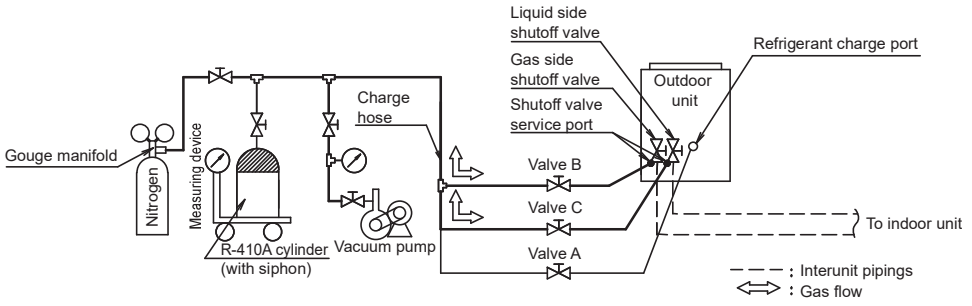


fig. 28

of valve A, B and C and shutoff valves	Valve			shutoff valve	
	A	B	C	Liquid side	Gas side
Air tight test, Vacuum drying (Close valve A and shutoff valves certainly. Otherwise the refrigerant in the unit are released.)	Close	Open	Open	Close	Close

Note:

- The airtightness test and vacuum drying should be done using the liquid side and gas side shutoff valve service ports.
  See the [R-410A] Label attached to the front plate of the outdoor unit for details on the location of the service port (see figure at right).
- See **[Shutoff valve operation procedure]** for details on handling the shutoff valve.
- The refrigerant charge port is connected to unit pipe.
  When shipped, the unit contains refrigerant, so use caution when attaching the charge hose.

1.2.3.2 Air Tight Test and Vacuum Drying Method

After finished piping work, carry out air tight test and vacuum drying.

<Air tight test>

Pressurize the liquid and gas pipes to 4.0MPa (40bar) (do not pressurize more than 4.0MPa (40bar)). If the pressure does not drop within 24 hours, the system passes the test.
If there is a pressure drop, check for leaks, make repairs, and perform the airtight test again.

<Vacuum drying>

Evacuate the system from the liquid and gas pipes by using a vacuum pump for more than 2 hours and bring the system to –100.7kPa or less. After keeping the system under that condition for more than 1 hour, check if the vacuum gauge rises or not. If it rises, the system may either contain moisture inside or have leaks.

Note:

- **If moisture might enter the piping, follow belows.**
  (I.e., if doing work during the rainy season, if the actual work takes long enough that condensation may form on the inside of the pipes, if rain might enter the pipes during work, etc.)

1. After performing the vacuum drying for two hours, pressurize to 0.05 MPa (i.e., vacuum breakdown) with nitrogen gas, then depressurize down to –100.7 kPa for an hour using the vacuum pump (vacuum drying).
2. If the pressure does not reach –100.7 kPa even after depressurizing for at least two hours, repeat the vacuum breakdown - vacuum drying process.

After vacuum drying, maintain the vacuum for an hour and make sure the pressure does not rise by monitoring with a vacuum gauge.

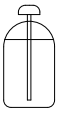
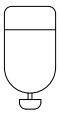
1.2.4 Additional Refrigerant Charge and Check Operation

Maximum piping length is 55 m. For calculation of additional refrigerant charge, we refer to the installation manual.

1.2.4.1 Before Working

[About the refrigerant cylinder]

Check whether the cylinder has a siphon pipe before charging and place the cylinder so that the refrigerant is charged in liquid form. (See the figure below.)

With siphon pipe
 Stand the cylinder upright and charge. (The siphon pipe goes all the way inside, so the cylinder does not need be put upside-down charge in liquid form.)
Other tanks
 Stand the cylinder upside-down and charge.

Caution

- Always use the proper refrigerant (R-410A). If charged with the refrigerant containing an improper material, it may cause an explosion or accident.
- R-410A is a mixed refrigerant, so charging it as a gas will cause the refrigerant composition to change, which may prevent normal operation.

[Shutoff Valve Operation Procedure]

When operating the shutoff valve, follow the procedure instructed below.

Note:

- Do not open the shutoff valve until “1.2.1 Check work prior to turn power supply on” in page 99 are completed. If the shutoff valve is left open without turning on the power, it may cause refrigerant to buildup in the compressor, leading insulation degradation.
- Be sure to use the correct tools.
- The shutoff valve is not a back-seat type. If forced it to open, it might break the valve body.
- When using a service port, use the charge hose.
- After tightening the cap, make sure no refrigerant gas is leaking.

[Tightening torque]

The sizes of the shutoff valves on each model and the tightening torque for each size are listed in the table below.

<Size of Shutoff Valve>

	5HP type	8HP type	10HP type	12HP type	14HP type	16HP type	18HP type
Liquid side shutoff valve	ϕ 9.5 The 12HP type corresponds to the 12.7-diameter onsite piping using the included piping.				ϕ 12.7 The 18HP type corresponds to the 15.9-diameter onsite piping using the accessory pipe.		
Gas side shutoff valve	ϕ 15.9	ϕ 19.1	ϕ 25.4 The 10HP type corresponds to the 22.2-diameter onsite piping using the accessory pipe. The 12 ~ 18HP type corresponds to the 28.6-diameter onsite piping using the accessory pipe.				

<Tightening torque>

Shutoff valve size	Tightening torque N·m (Turn clockwise to close)			
	Shaft (valve body)		Cap (valve lid)	Service port
ϕ 9.5	5.4 - 6.6	Hexagonal wrench 4 mm	13.5 - 16.5	11.5 - 13.9
ϕ 12.7	8.1 - 9.9		18.0 - 22.0	
ϕ 15.9	13.5 - 16.5	Hexagonal wrench 6 mm	22.5 - 27.5	
ϕ 19.1	27.0 - 33.0	Hexagonal wrench 8 mm		
ϕ 25.4				

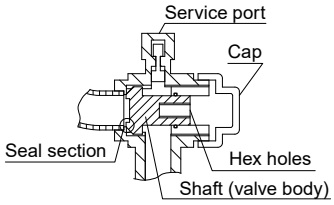


fig 34

[To open]

1. Remove the cap and turn the shaft counterclockwise with the hexagon wrench (JISB4648).
2. Turn it until the shaft stops.
3. Make sure to tighten the cap securely.
   (For the tightening torque, refer to the item <Tightening Torque>.)

[To close]

1. Remove the cap and turn the shaft clockwise with the hexagon wrench (JISB4648).
2. Securely tighten the valve until the shaft contacts the main body seal.
3. Make sure to tighten the cap securely.
   (For the tightening torque, refer to the item <Tightening Torque>.)

1.2.4.2 Procedure of Adding Refrigerant Charging and Check Operation

Warning **Electric Shock Warning**

- Make sure to close the EL. COMPO. BOX lid before turning on the power when performing the refrigerant charging operation.
- Perform the setting on the PC-board (A1P) of the outdoor unit and check the LED display after the power is on via the inspection door which is in the EL. COMPO. BOX lid.
- Use an insulated rod to operate the push buttons via the EL. COMPO. BOX's inspection door.
  There is a risk of electric shock if you touch any live parts, since this operation must be performed with the power on.

Caution

- Make sure to use the protect tool (protective groves and goggles) when charging the refrigerant.
- Due to a danger of liquid hammer, the refrigerant must not be charged over the allowable maximum amount when charging the refrigerant.
- Do not perform the refrigerant charging operation under working for the AHU.
- When opening the front panel, make sure to take caution to the fan rotation during the working.
  After the outdoor unit stops operating, the fan may keep rotation for a while.

Note:

- If operation is performed within 12 minutes after the AHU and outdoor units are turned on, H2P will be lit on and the compressor will not operate.
- In order to ensure uniform refrigerant distribution, it may take up to around 10 minutes for the compressor to start up after the unit starting operating. This is not a malfunction.

<About refrigerant charging>

- The refrigerant charge port is connected to the piping inside the unit.
  When the unit is shipped from the factory, the unit's internal piping is already charged with refrigerant, so be careful when connecting the charge hose.
- After adding the refrigerant, make sure to close the lid of the refrigerant charging port.
  The tightening torque for the lid is 11.5 to 13.9 Nm.
- See [Shutoff valve operation procedure] in 1.2.4.1 for details on how to handle shutoff valves.
- When done or when pausing the refrigerant charging operation, close the valve of the refrigerant tank immediately. If the tank is left with the valve open, the amount of refrigerant which is properly charged may be off the point. More refrigerant may be charged by any remaining pressure after the machine is stopped.

<About check operation>

- Make sure to perform the check operation after installation. Otherwise, the malfunction code "U3" will be displayed and normal operation cannot be performed.
  And the failure of "Check of miswiring" may also cause abnormal operation. Performance may drop due to the failure of "Judgment of piping length".
- The check operation cannot be performed in recovery or other service modes.

1. Make sure the following works are complete in accordance with the installation manual.
   ■Piping work
   ■Wiring work
   ■Air tight test
   ■Vacuum drying
   ■Installation work for AHU
2. Calculate the "additional charging amount" using the installation manual.

3. Open the valve C (See the figure 31. The valve A, B and the liquid and gas side shutout valve must be left closed), and charge the refrigerant of the “additional charging amount” from the liquid side shutout valve service port.
   If the “additional charging amount” was charged fully, close the valve C and go to step 5.
   If the “additional charging amount” was not charged fully, go to step 4.

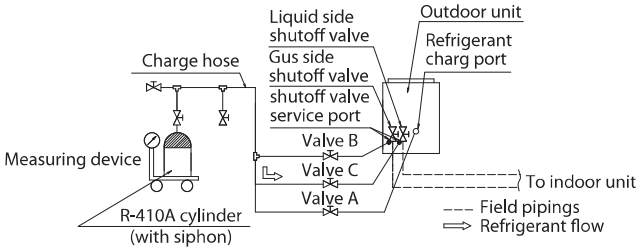


fig 31

4. Perform the refrigerant charging operation following [Refrigerant charging operation procedure], and charge the remaining refrigerant of the “additional charging amount”. For performing the refrigerant charging operation the push button on the PC-board (A1P) of outdoor unit are use. (See the figure 32) In addition, the refrigerant are charged from the refrigerant charge port via the valve A.
   For operating the push button and opening and closing the valve, follow the work procedure.

Note:
The refrigerant will be charged about 22kg in one hour at outdoor temp. 30°C DB (6kg at 0°C DB).

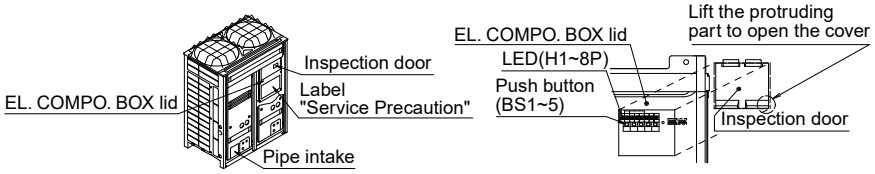


fig 32

[Refrigerant Charging Operation Procedure]

STEP1 Open the liquid and gas side shutoff valves (The valve A~C must be closed. The valve A~C means the valves in the figure 33.)

[Display of normal system]

LED display (Default status of shipped)	SERV. MONI-TOR	MODE	TEST/ HWL	C/H SELECTOR			L.N.O.P	DEMA-ND	MULTI
				IND	MASTER	SLAVE			
	HAP	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H8P
Single system	☀	●	●	☼	●	●	●	●	●

LED display: ●...OFF, ☼...ON, ☀...Blinking

STEP2 If necessary, set the field setting by using the dip switch on the outdoor unit PC-board(A1P).

STEP3 • Close the EL. COMPO. BOX lid and all front panel except on the side of the EL. COMPO. BOX (*1) and turn the power to the outdoor unit and all connected AHU. (*2)

• After H2P stop blinking (about 12 minutes after turning on the power), check LED displays as shown in the table [Display of normal system] and the system is normal state.

If H2P is blinking, check the malfunction code in the remote controller, and correct the malfunction in accordance with [Remote controller display malfunction code] in page 108.

(*1) Lead the refrigerant charge hose etc from the pipe intake. All front panels must be closed at the procedure (9).

(*2) • If you perform the refrigerant charging operation within the refrigerant system that have

the power off unit, the operation cannot finish properly.

For confirming the number of the outdoor and AHUs with the power on, see [How to check how many units are connected] in chapter 1.2.4.1. In case of a multi system,

turn on the power to all outdoor units in the refrigerant system.

• To energize the crankcase heater, make sure to turn on for 6 hours before starting operation.

STEP4 Start the additional refrigerant charge operation.

(About the system settings for additional refrigerant charge operation, refer to the [Service Precaution] label attached on the EL. COMPO. BOX lid in the outdoor unit.)

Open valve A immediately after starting the compressor.

STEP5 Close the valve A if the “additional charging amount” of refrigerant was charged, and push the RETURN button (BS3) once.

STEP6 Record the charging amount on the accessory “REQUEST FOR THE INDICATION” label and attach it to the back side of the front panel.

5. After completing the additional refrigerant charging perform the check operation following below

NOTE:
- For check operation, the following work will be performed.
  - Check of shutoff valve opening
  - Check of miswiring
  - Judgment of piping length
  - Check of refrigerant overcharge
- It takes about 40 minutes to complete the check operation.

[Check Operation Procedure]

STEP1 Make the onsite setting as needed using the dip switches on the outdoor unit PC-board (A1P) with the power off

STEP2 Close the EL. COMPO. BOX lid and all front panels except as the side of the EL. COMPO. BOX and turn on the power to the outdoor unit and all connected AHUs. (Be sure to turn the power on at least 6 hours before operation in order to have power running to the crank case heater.)

STEP3 Check the LED display on the outdoor unit PC-board (A1P) is as shown in the table below and transmission is normal.

LED display (Default status of shipped)	SERV. MONI-TOR	MODE	TEST/ HWL	C/H SELECTOR			L.N.O.P	DEMA-ND	MULTI
				IND	MASTER	SLAVE			
	HAP	H1P	H2P	H3P	H4P	H5P	H6P	H7P	H8P
Single system	☼	●	●	☼	●	●	●	●	●

LED display: ●...OFF, ☼...ON, ☼...Blinking

STEP4 Make the onsite settings as needed using the push button (BS1-BS5) on the outdoor unit PC-board (A1P) with the power on.

STEP5 Perform the check operation following the Check Operation Method of the [Service Precautions] label on the EL. COMPO. BOX lid. The system operation for about 40 minutes and automatically stops the check operation.
If the malfunction code is not displayed in the remote controller after the system stop, check operation is completed. Normal operation will be possible after 5 minutes. If the malfunction code is displayed in the remote controller, correct the malfunction following [Remote controller displays malfunction code] and perform the check operation again.

[Remote controller displays malfunction code]

Malfunction code	Installation error	Remedial action
E3, E4 F3, F6 UF	The shutoff valve of the outdoor unit is left closed.	Open the shutoff valve.
U1	The phases of the power to the outdoor unit is reversed.	Exchange two of the three phases (L1, L2, L3) to make a proper connection.
U1 U4 LC	No power is supplied to an outdoor or AHU (including phase interruption).	Make sure the power source wire is properly connected to the outdoor unit and revise if necessary.
UF	There is conflict on the connection of transmission wiring in the system.	Check if the refrigerant piping line and the transmission wiring are consistent with each other.
E3 F6 UF	Refrigerant overcharge.	Recalculate the additional amount refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
E4 F3	Insufficient refrigerant.	• Check if the additional refrigerant charge has been finished correctly. • Recalculate the additional amount refrigerant from the piping length and add the adequate amount.
U7, U4 UF, UH	If the outdoor unit terminal is connected when there is one outdoor unit installed.	Remove the line from the outdoor multi terminals (Q1 and Q2).

If any malfunction codes other than the above are displayed, check the service manual for how to respond.

1.2.5 Onsite Settings

1.2.5.1 Onsite Settings with the Power Off

If the COOL/HEAT selector was connected to the outdoor unit, set the dip switch (DS1) on the outdoor unit PC-board (A1P) to “ON” (it is set to “OFF” when shipped from the factory).
For the position of the dip switch (DS1), see the “Service Precautions” label (see at right) which is attached to the EL. COMPO. BOX lid.

 **Warning**  **Electric Shock Warning**

Never perform with the power on.
There is a serious risk of electric shock if any live part is touched.

1.2.5.2 Onsite Settings with the Power On

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

 **Warning**  **Electric Shock Warning**

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

1.2.6 Test Run

1.2.6.1 Before Test Run

- Make sure the following works are completed in accordance with the installation manual.
  ■Piping work
  ■Wiring work
  ■Air tight test
  ■Vacuum drying
  ■Additional refrigerant charge
- Check that all work for the AHU is finished and there is no danger to operate.

1.2.6.2 Test Run

After check operation is completed, operate the unit normally and check the following.
(1) Make sure the AHU and outdoor units are operating normally.
(2) Operate the AHU and make sure the corresponding outdoor unit is also operating.
(3) Check to see if cold (or hot) air is coming out from the AHU.

NOTE:

- Heating is not possible if the outdoor temperature is 24°C or higher. Refer to the Operation manual.
- If a knocking sound can be heard in the liquid compression of the compressor, stop the unit immediately and then energize the crank case heater for a sufficient length of time before restarting the operation.
- Once stopping, the compressor will not restart in about 5 minutes even if the On/Off button of the remote controller is pushed.
- When the system operation is stopped by the remote controller, the outdoor units may continue operating for further 5 minutes at maximum.
- The outdoor unit fan may rotate at low speeds if the Night-time low noise setting or the External low noise level setting is made, but this is not a malfunction.

1.2.6.3 Checks after Test Run

Perform the following checks after the test run is complete.

- Record the contents of field setting.
  → Record them on the accessory “REQUEST FOR THE INDICATION” label.
  And attach the label on the back side of the front panel.
- Record the installation date.
  → Record the installation date on the accessory “REQUEST FOR THE INDICATION” label in accordance with the IEC60335-2-40.
  And attach the label on the back side of the front panel.

NOTE:
After the test run, when handing the unit over to the customer, make sure the EL.COMPO.BOX lid, the inspection door, and the unit casing are all attached.

1.3 Operation When Power is Turned On

1.3.1 When Turning On Power First Time

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

Status

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

1.3.2 When Turning On Power The Second Time and Subsequent

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

Status

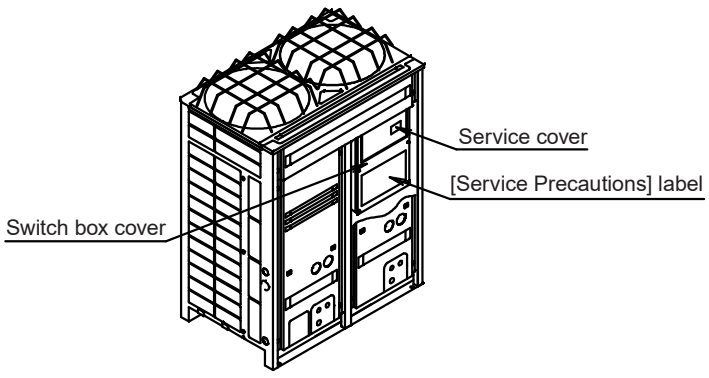
Outdoor unit	Test lamp H2P .... Blinks Can also be set during operation described above.
AHU	If ON button is pushed during operation described above, the operation lamp lights but the compressor does not operate. (Returns to normal when automatic setting is complete.)

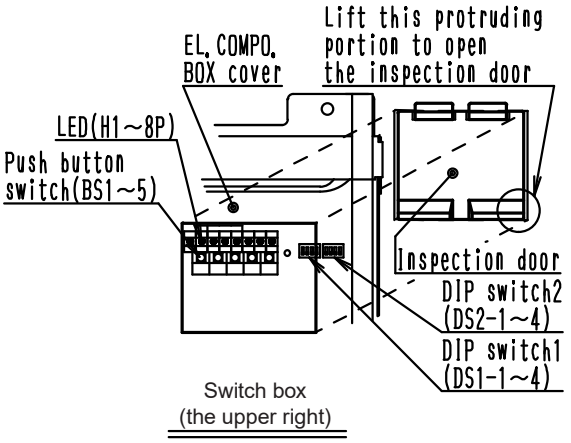
1.3.3 When an AHU or Outdoor unit Has Been Added, or AHU or Outdoor Unit PC Board Has Been Changed

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

Status

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



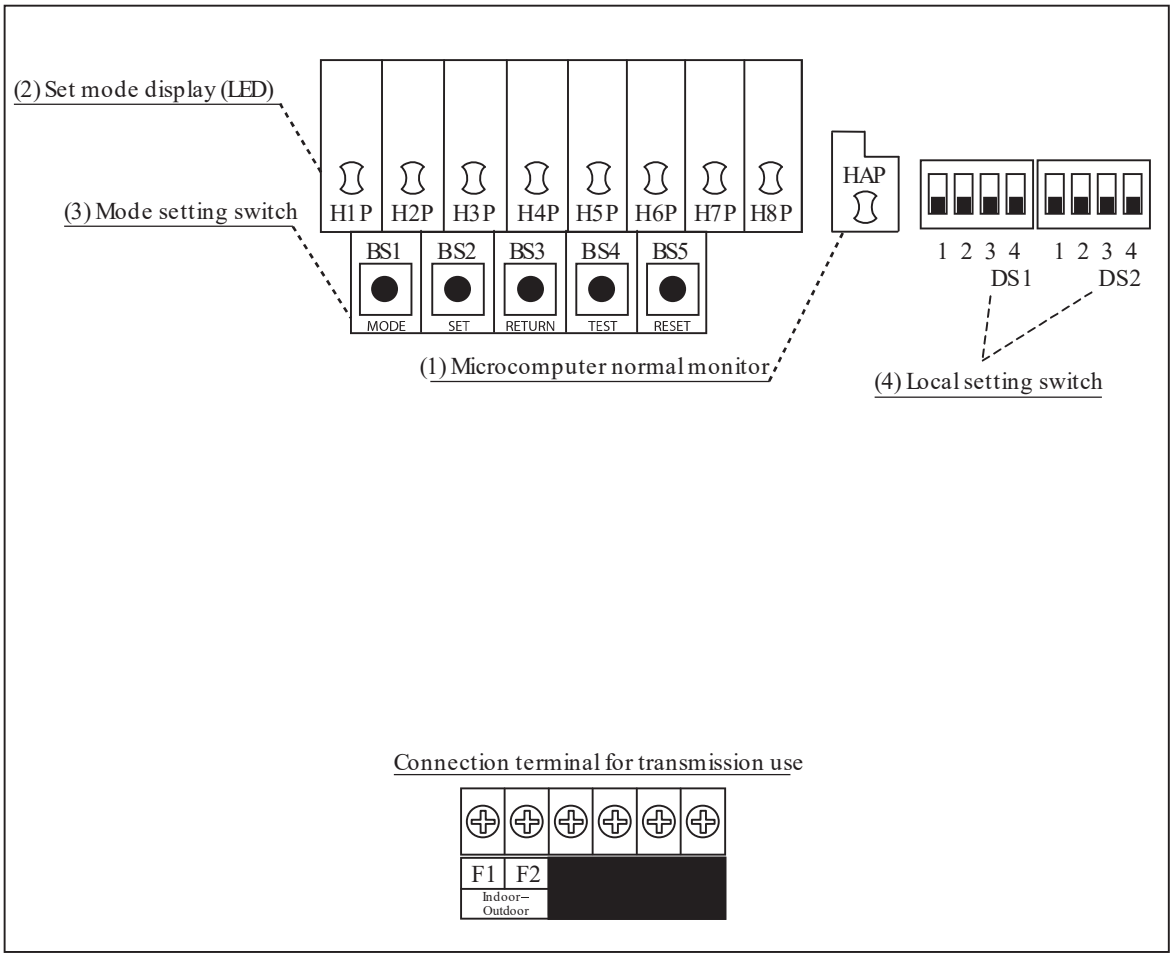


Caution When the 400 volt power supply is applyed to "N" phase by mistake, replace Inverter P.C.B (A2P) and control transformer (T1R, T2R) in switch box together.

(V0847)

2. Outdoor Unit PC Board Layout

Outdoor unit PC board



(V3054)

(1) Microcomputer normal monitor
This monitor blinks while in normal operation, and turns on or off when a malfunction occurs.

(2) Set mode display (LED)
LEDs display mode according to the setting.

(3) Mode setting switch
Used to change mode.

(4) Local setting switch
Used to make field settings.

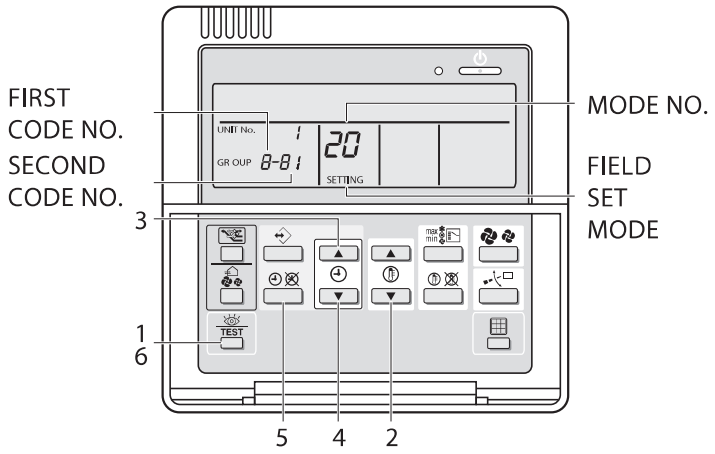
3. Field Setting

3.1 Field Setting from Remote Controller

Individual function of AHU can be changed from the remote controller. At the time of installation or after service inspection / repair, make the local setting in accordance with the following description.
Wrong setting may cause malfunction.

3.1.1 Wired Remote Controller

BRC1D528

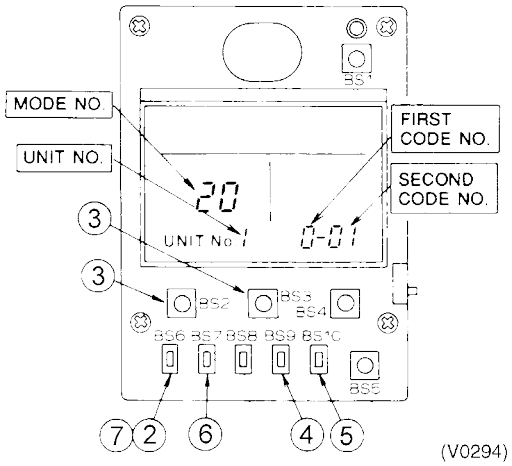


1. When in the normal mode, press the " TEST " button for a minimum of four seconds, and the FIELD SET MODE is entered.
2. Select the desired MODE NO. with the " " button.
3. Push the " " upper button and select FIRST CODE NO.
4. Push the " " lower button and select the SECOND CODE NO.
5. Push the " " button once and the present settings are SET.
6. Push the " TEST " button to return to the NORMAL MODE.

Notes :
1. Do not make any settings not given in the table.
2. Not displayed if the AHU is not equipped with that function.
3. When returning to the normal mode, "88" may be displayed in the LCD in order for the remote controller to initialize itself.

3.1.2 Simplified Remote Controller

BRC2A51
BRC2C51



1. Remove the upper part of remote controller.
2. When in the normal mode, press the [BS6] BUTTON (2) (field set), and the FIELD SET MODE is entered.
3. Select the desired MODE No. with the [BS2] BUTTON (3) (temperature setting ▲) and the [BS3] BUTTON (3) (temperature setting ▼).
4. Push the [BS9] BUTTON (4) (set A) and select FIRST CODE NO.
5. Push the [BS10] BUTTON (5) (set B) and select SECOND CODE NO.
6. Push the [BS7] BUTTON (6) (set/cancel) once and the present settings are SET.
7. Push the [BS6] BUTTON (7) (field set) to return to the NORMAL MODE.

3.1.3 Field Settings - Overview

Note : In the table below, the factory settings are indicated in bold.

Mode n°	Setting	Contents	Second Code n°				Remark
			00	01	02	03	
20 (10)	4	Renewal of target refrigerant control (X-control) (s)		**60**	120	180	1)
	5	Number fanspeed BRC1D/E		**H**	H+L		
	6	Target superheat (cooling) (°C)		**5**	10	15	
	7	Target subcool (heating) (°C)		**3**	5	10	
	8	System setting		**hp**	c/o	h/o	
21	0	Renewal of target T_e control (W-control) (min)	1	**3**	5		
	1	T_e target correction factor (W-control, cooling)	**0**	-1	-2	+1	
	2	T_c target correction factor (W-control, heating)	**0**	+1	+2	-1	
			close = forced	**open/ close**	NC, open		
22 (12)	1	Input T_1T_2	off	**= on/off**	error A0		
	3	Fan at thermo off (heating)		ON	ON	**OFF**	
	5	T_1T_2 at power restore		T_1T_2 must be open at power restore	**T_1T_2 must be identical to prior to power failure**		
	6	Fan at thermo off (cooling)	ON	**ON**	OFF		
23 (13)	0	Control setting EKEQF-box		**X-control**	Y-control	W-control	
	1	Target refrigerant temperature setting T_e (Y-control, cooling)		5	6	7	**1)**
	2	Target refrigerant temperature setting T_c (Y-control, heating)		43	44	45	**1)**
	6	Hot start B (min)		0	1	**3**	1)
	7	Hot start A (°C)		34	37	40	**1)**
	8	Fan at defrost & oil return (heating)		**OFF**	ON	ON	
51	0	ΔT_c control (X-control)	30-55	35-55	40-55	43-55	**1)**
	1	ΔT_e control (X-control)	-7-20	-3-20	0-20	3-20	**1)**
	2	Thermo off (Y-control, heating) B (min), C (min)	2-3	4-3	6-3	8-3	**1)**
	5	Thermo on (X-control) E (min)	**3**	5	10		
	6	Thermo off (X-control) B (min), C (min)	3-3	**5-3**	7-3	--	1)
	7	Thermo on (X-control, cooling) D (level)	1	--	2	--	**1)**
	8	Thermo off (X-control, cooling) A (level)	**1**	1 or 2			
	9	Thermo off (X-control, heating) A (level)	**5**				1)
	b	Thermo on (X-control, cooling) D (level)	1	**2**	3	4	1)

Remark 1) more settings possible, see “Field Settings - Details”.

3.1.4 Field Settings - Details

(1) System Setting

The ERQ is a heat pump but can be limited to “cooling only” or “heating only” by a setting.

Mode n°	Setting switch n°	Setting position n°	Setting
20 (10)	8	**01**	Heat pump
		02	Cooling only
		03	Heating only

(2) Control Setting for EKEQF-Box

With the EKEQF-box, 3 types of control are possible:

- W- & X-control: with DDC-controller
- Y-control: no DDC-controller.

For more information about W-, X-, Y-control, refer to “Part 6 Control Box EKEQ - CBV3”.

Mode n°	Setting switch n°	Setting position n°	Setting
23 (13)	0	**01**	X-control
		02	Y-control
		03	W-control

(3) Indoor Fan Control

In cooling and fan only mode, the indoor fan is in ON-mode when the unit is working.
In heating, different situations are possible.

Mode n°	Setting switch n°	Setting position n°	Setting
22 (12)	3	01	Fan ON at thermo off
		02	Fan ON at thermo off
		03	Fan OFF at thermo off
23 (13)	8	**01**	Fan OFF at defrost and oil return
		02	Fan ON at defrost and oil return
		03	Fan ON at defrost and oil return

Fan off during thermo off and fan on during defrost/oil return will result in fan on during thermo off.

(4) Hot Start

During hot start, fan on is carried out when T_c is A°C or after B minutes.

Mode n°	Setting switch n°	Setting position n°	Setting
23 (13)	7	01	A = 34°C
		02	A = 37°C
		03	A = 40°C
		04	A = 43°C
	6	01	B = 0 min
		02	B = 1 min
		03	B = 3 min
		04	B = 5 min

(5) Thermostat Control

(5.1) X-control

■ **Thermo off/on:**

When the DDC controller sends a voltage that is lower than 1,5 V, the unit stays thermostat off. When the voltage is bigger than 1,5 V, the unit goes thermostat on.

(5.2) X-control

■ **Thermo off**

When the DDC controller maintains level A for more than B minutes, and the thermostat is on, thermo off is carried out for at least C minutes. After C minutes, thermostat on-conditions are checked.

Mode n° setting	Setting switch n°	Setting position n°	Setting
51	8	**00**	level A = 1 (cooling)
		01	level A = 1 or 2 (cooling)
	6	00	B = 3 min, C = 3 min
		01	B = 5 min, C = 3 min
		02	B = 7 min, C = 3 min
		03	--
		04	B = 3 min, C = 5 min
		05	B = 5 min, C = 5 min
		06	B = 7 min, C = 5 min
		07	--
		08	B = 3 min, C = 10 min
		09	B = 5 min, C = 10 min
		10	B = 7 min, C = 10 min
	9	**00**	level A = 5 (heating)
		04	level A = 4 or 5 (heating)

■ **Thermo on**

When the DDC controller reaches level D or higher (lower for heating) and the thermostat is off for at least C minutes (refer to thermo off conditions), thermostat on is carried out for at least E minutes.

Mode n° setting	Setting switch n°	Setting position n°	Setting
51	7	00	D = level 1 (cooling)
		02	D = level 2 (cooling)
		04	D = level 3 (cooling)
		06	D = level 4 (cooling)
		08	D = level 5 (cooling)
	5	**00**	E = 3 min
		01	E = 5 min
		02	E = 10 min
	b	00	D = level 1 (heating)
		01	D = level 2 (heating)
		02	D = level 3 (heating)
		03	D = level 4 (heating)
		04	D = level 5 (heating)

(5.3) Y-control

Cooling: $T_{e\ set} - T_{e\ real} = A$
If A > B for C minutes, thermo off is applied for C minutes.
Heating: $T_{c\ real} - T_{c\ set} = A$
If A > B for C minutes, thermo off is applied for C minutes.

After C minutes, the units starts to operate.

Mode n° setting	Setting switch n°	Setting position n°	Setting	
			B (°C)	C (min)
51	2	00	2	3
		01	4	3
		02	6	3
		03	8	3
		04	2	5
		05	4	5
		06	6	5
		07	8	5
		08	2	7
		09	4	7
		10	6	7
		11	8	7
		12	2	10
		13	4	10
		14	6	10
		15	8	10

(5.4) Z-control

Standard Daikin thermostat on/off control.

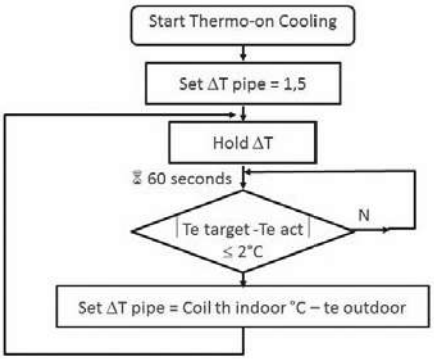
(6) Target Refrigerant Temperature Setting

(6.1) W-control

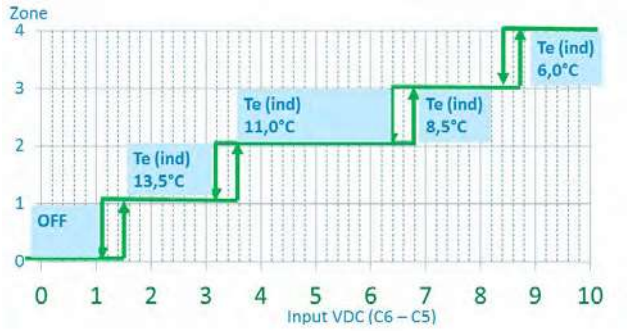
Cooling

T_e target: T_e zone - ΔT pipe - ΔT correction

- INITIAL VALUE BASE ON ZONE
- Adjustable by:
  - ΔT pipe = |Tevapo - T coil AHU| = at start 1,5°, ΔT pipe = 0,5 ~ 11°C
  - ΔT correction: field setting 21-1 (+1 ~ -2°C)



W-control		Setting			
Description	Operation mode	01	02	03	04
Correction target T_e	21-1	**0**	2		3

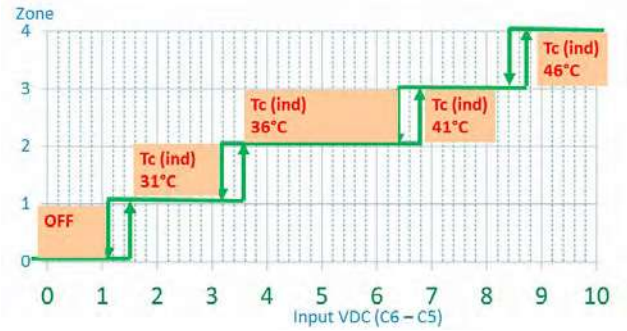


Heating

T_c target:

- INITIAL VALUE BASE ON ZONE
- Adjustable by:
  - Correction field setting 21-2 (-1 ~ +2°C)

W-control		Setting			
Description	Operation mode	01	02	03	04
Correction target T_c	21-2	**0**	+1	+2	-1



(6.2) X-control

- **Cooling: Upper & lower limit of T_e can be chosen**

Mode n° setting	Setting switch n°	Setting position n°	Setting	
			Lower limit T_e (°C)	Upper limit T_e (°C)
51	1	00	-7	20
		01	-3	20
		02	0	20
		03	3	20
		04	-7	15
		05	-3	15
		06	0	15
		07	3	15
		08	-7	10
		09	-3	10
		10	0	10
		11	3	10
		12	-7	8
		13	-3	8
		14	0	8
		15	3	8

■ **Heating: Upper & lower limit of T_c can be chosen**

Mode n° setting	Setting switch n°	Setting position n°	Setting	
			Lower limit T_c (°C)	Upper limit T_c (°C)
51	0	00	30	55
		01	35	55
		02	40	55
		03	43	55
		04	30	50
		05	35	50
		06	40	50
		07	43	50
		08	30	49
		09	35	49
		10	40	49
		11	43	49
		12	30	45
		13	35	45
		14	40	45
		15	43	45

(6.3) Y-control

Since there is no external input to change the T_e/T_c value, their values can only be changed by local setup by means of the Daikin remote controller (during installation).
Cooling: T_e setting
Heating: T_c setting

Mode n° setting	Setting switch n°	Setting position n°	Setting
23 (13)	1	01	T_e = 5°C
		02	T_e = 6°C
		03	T_e = 7°C
		04	T_e = 8°C
		05	T_e = 9°C
		06	T_e = 10°C
		07	T_e = 11°C
		08	T_e = 12°C
	2	01	T_c = 43°C
		02	T_c = 44°C
		03	T_c = 45°C
		04	T_c = 46°C
		05	T_c = 47°C
		06	T_c = 48°C
		07	T_c = 49°C

(7) Renewal of Target Refrigerant Temperature (W- & X-control)

When a level of the main pcb is updated, the T_e/T_c value of the outdoor is updated simultaneously, otherwise the T_e/T_c value remains constant.
When the DDC level remains constant for A seconds, a level update is executed in the main pcb.
For X-control:

Mode n° setting	Setting switch n°	Setting position n°	Setting
20 (10)	4	**01**	A = 60 sec
		02	A = 120 sec
		03	A = 180 sec
		04	A = 240 sec

For W-control:

Mode n° setting	Setting switch n°	Setting position n°	Setting
21 (11)	0	00	A = 1 minute
		01	A = 3 minute
		02	A = 5 minute

3.1.5 Setting of Operation Control Mode from Remote Controller (Local Setting)

The operation control mode is compatible with a variety of controls and operations by limiting the functions of the operation remote controller. Furthermore, operations such as remote controller ON/OFF can be limited in accordance with the combination conditions.

3.2 Field Setting from Outdoor Unit

3.2.1 Field Setting from Outdoor Unit

■ **List of Field Setting Items**

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

For setting items of (*1), refer to detailed information provided on page 114 onward.

Setting item			Content and objective of setting	Overview of setting procedure
Function setting	1	Setting of COOL/ HEAT selection (*1)	■ COOL/HEAT selection methods are possible to select from the following (1) Control by each outdoor unit using the Daikin remote controller (2) Control by each outdoor unit using the COOL/HEAT selection remote controller	■ In order to use the COOL/HEAT selection remote controller, set the DS1-1 on the outdoor unit PC board to OUT.
	2	Setting of low noise operation (*1)	A. Use external input to step down the upper limit of the fan (factory set to Step 8), providing low noise level. (1) Mode 1: Step 6 or lower (2) Mode 2: Step 5 or lower (3) Mode 3: Step 4 or lower	■ Use the "External control adaptor for outdoor unit". KRP 58 Set to "External control adaptor for outdoor unit" with No. 12 of "Setting mode 2" and select the mode with No. 25. If necessary, set the "Capacity priority setting" to ON with No. 29.
			B. The low noise operation aforementioned is enabled in nighttime automatic low noise operation mode. Start time: Possible to select in the range of 20:00 to 24:00 hours. End time: Possible to select in the range of 06:00 to 08:00 hours. (Use the said time as a guide since the start time and the end time are estimated according to outdoor temperatures.)	■ Make this setting while in "Setting mode 2". Select a mode with No. 22 of "Setting mode 2". Select the start time with No. 26 and the end time with No. 27. If necessary, set the "Capacity priority setting" to ON with No. 29.
	3	Setting of demand operation (*1)	■ Used to place limits on the compressor operating frequency to control the upper limit of power consumption. (1) Mode 1 of Demand 1: 60% or less of rating (2) Mode 2 of Demand 1: 70% or less of rating (3) Mode 3 of Demand 1: 80% or less of rating (4) Demand 2: 40% or less of rating	■ For setting with the use of "external control adapter": Set the system to "External control adaptor for outdoor unit" with No. 12 of Setting mode 2" and select the mode with No. 30. ■ For setting only in "Setting mode 2": Set the system to Normal demand mode with No. 32 of "Setting mode 2" and select the mode with No. 30.
	6	Setting of high static pressure	■ Make this setting to operate a system with diffuser duct while in high static pressure mode. (Use this setting mode when shields are installed on upper floors or balconies.) * In order to mount the diffuser duct, remove the cover from the outdoor unit fan.	■ Set No. 18 of "Setting mode 2" to ON.

Setting item			Content and objective of setting	Overview of setting procedure
Service setting	1	AHU fan forced operation	■ Used to operate the AHU in the stopped state in forced operation mode.	■ Set No. 5 of "Setting mode 2" to AHU forced fan.
	2	AHU forced operation	■ Used to operate the AHU in forced operation mode.	■ Set No. 6 of "Setting mode 2" to AHU forced operation mode.
	3	Change of targeted evaporating temperature (in cooling) Z-control	■ In cooling operation, used to change the targeted evaporating temperature for compressor capacity control.	■ Select high side or low side with No. 8 of "Setting mode 2".
	4	Change of targeted condensing temperature (in heating) Z-control	■ In heating operation, used to change the targeted condensing temperature for compressor capacity control.	■ Select high side or low side with No. 9 of "Setting mode 2".
	5	Setting of defrost selection	■ Used to change a temperature at which the defrost operation is initiated, thus making the initiation easy or hard.	■ Select fast side or slow side with No. 10 of "Setting mode 2".
	6	Setting of sequential startup	■ Used to start units not in sequence but simultaneously.	■ Set No. 11 of "Setting mode 2" to NONE.
	7	Emergency operation (*1)	■ If the compressor has a failure, used to prohibit the operation of compressor(s) concerned or outdoor unit(s) concerned and to conduct emergency operation of the system only with operable compressor(s) or outdoor unit(s).	■ Make this setting while in "Setting mode 2". For system with a single outdoor unit: Set with No. 19 or 42.
	8	Additional refrigerant charging (*1)	■ If a necessary amount of refrigerant cannot be charged due to the stop of outdoor unit, operate the outdoor unit and then refill refrigerant.	■ Set No. 20 of "Setting mode 2" to ON and then charge refrigerant.
	9	Refrigerant recovery mode (*1)	■ Used to recover refrigerant on site. With operations of AHU and outdoor units prohibited, fully open the expansion valve of the AHU and outdoor units.	■ Set No. 21 of "Setting mode 2" to ON.
	10	Vacuuming mode (*1)	■ Used to conduct vacuuming on site. Fully open the expansion valves of the AHU and outdoor units, and energize part of solenoid valves. Use a vacuum pump to conduct vacuuming.	■ Set No. 21 of "Setting mode 2" to ON.
	12	Power transistor check mode	■ Used for the troubleshooting of DC compressors. Inverter waveform output makes it possible to judge whether a malfunction results from the compressor or the PC board.	■ Set No. 28 of "Setting mode 2" to ON.
	13	Setting of model with spare PC board	■ In order to replace the PC board by a spare one, be sure to make model setting.	■ For this setting, set the DS2-2, -3, and-4 switches on the PC board to the model concerned.

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

■ **Setting by dip switches**

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

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

Setting at replacement by spare PC board

Caution

DIP switch Setting after changing the main P.C.Board(A1P) to spare parts P.C.B.

After the replacement by the spare PC board, be sure to make settings shown below.
When you change the main P.C.Board(A1P) to spare parts P.C.B., please carry out the following setting.

Initial conditions of dip switches

DIP Switch Detail

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

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

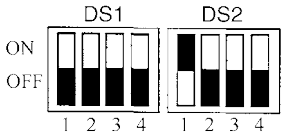
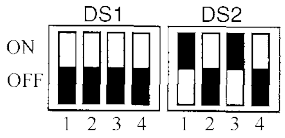
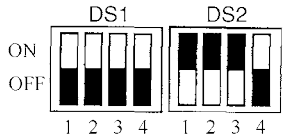
DS No.	Item	Contents
DS2-2	Model setting	Make the following settings according to models of outdoor units. (All models are set to OFF at factory.)
DS2-3		
DS2-4		

	ERQ 125	ERQ 200	ERQ 250
DS2-2	OFF	OFF	ON
DS2-3	OFF	ON	ON
DS2-4	OFF	OFF	OFF

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

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

"Detail of DS1-1~4, DS2-1~4 setting" (for Overseas general)

Unit	Setting method (■ represents the position of switches)	
HEAT PUMP(5HP) ERQ 125		Set DS2-1 to ON.
HEAT PUMP(8HP) ERQ 200		Set DS2-1 and DS2-3 to ON.
HEAT PUMP(10HP) ERQ 250		Set DS2-1, DS2-2 and DS2-3 to ON.

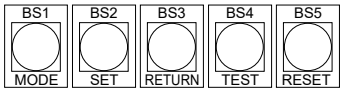
■ **Setting by pushbutton switches**

The following settings are made by pushbutton switches on PC board.

LED display

	MODE H1P	TEST H2P	COOL/HEAT select			Low noise H6P	Demand H7P	Multi H8P
			IND H3P	MASTER H4P	SLAVE H5P			
Single-outdoor-unit system	●	●	☼	●	●	●	●	●

(Factory setting)



(V2760)

There are the following three setting modes.

① **Setting mode 1 (H1P off)**

Initial status (when normal): Used to select the cool/heat setting. Also indicates during “abnormal”, “low noise control” and “demand control”.

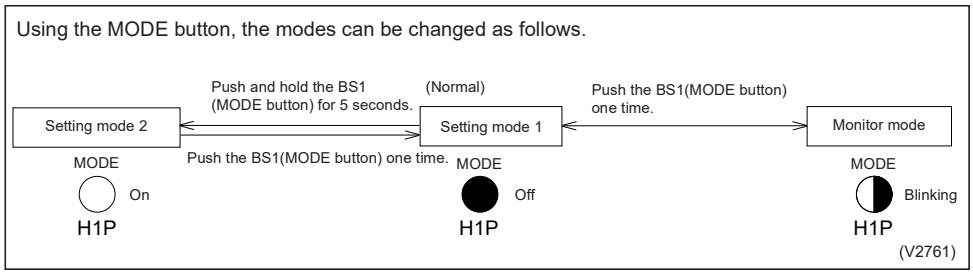
② **Setting mode 2 (H1P on)**

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

③ **Monitor mode (H1P blinks)**

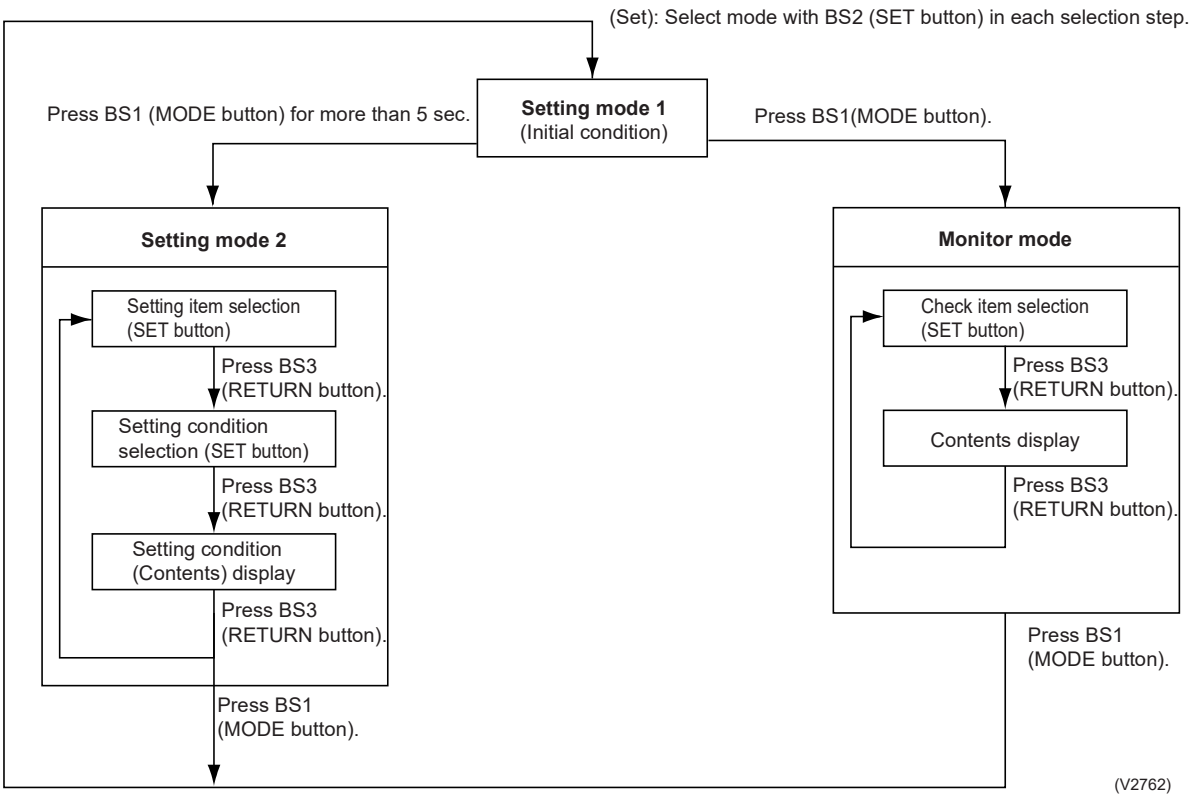
Used to check the program made in Setting mode 2.

■ **Mode changing procedure 1**



(V2761)

■ **Mode changing procedure 2**



(V2762)

a. “Setting mode 1”

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

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

Procedure for changing COOL/HEAT selection setting

Normally, “Setting mode 1” is set. In case of other status, push MODE (BS1) button one time and set to “Setting mode 1”.

Push the SET (BS2) button to set the blinking of LED to any of conditions shown on the right.

☼ ON
● OFF
☼ Blink

Setting (displaying) item	MODE H1P	TEST H2P	COOL/HEAT select			Low noise H6P	Demand H7P
			IND H3P	MASTER H4P	SLAVE H5P		
For selection by individual outdoor unit (factory set)	●	●	☼	●	●	●	●

Push the RETURN (BS3) button to determine the setting.

Pushing the RETURN (BS3) button will return the system to the initial condition of "Setting mode 1".

Procedure for checking check items

The system is normally set to "Setting mode 1".
Should the system be set to any mode other than that, push the MODE (BS1) button to set the system to "Setting mode 1".

MODE H1P	TEST H2P	COOL/HEAT select			Low noise H6P	Demand H7P
		IND H3P	MASTER H4P	SLAVE H5P		
●	●	☼	●	●	●	●

Check the system for each condition through LED displays. (Refer to information in table on the right.)

Pushing the RETURN (BS3) button will bring the system to the initial state of "Setting mode 1".

(V2763)

- Current operating conditions
  - ●Normal ☼Abnormal
  - ☼In preparation or in check operation
- Setting of COO/HEAT selection
  - ☼●●By individual outdoor unit
  - ●☼●In a batch of outdoor unit group with master unit
  - ●●☼In a batch of outdoor unit group with slave unit
- Low noise operating conditions
  - ●In normal operation
  - ☼In low noise operation
- Demand operating conditions
  - ●In normal operation
  - ☼In demand operation

b. “Setting mode 2”

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

<Selection of setting items>

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

<Selection of setting conditions>

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

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

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

(V2764)

No.	Setting item	Description
0	Digital pressure gauge kit display	Used to make setting of contents to display on the digital pressure gauges (e.g. pressure sensors and temperature sensors)
1	Cool/heat unified address	Sets address for cool/heat unified operation.
2	Low noise/demand address	Address for low noise/demand operation
3	Test operation settings	Used to conduct test operation without making changes to the PCB and replacing the refrigerant, after the completion of maintenance.
5	AHU forced fan	Allows forced operation of AHU fan while unit is stopped.
6	AHU forced operation	Allows forced operation of AHU.
10	Defrost changeover setting	Changes the temperature condition for defrost and sets to quick defrost or slow defrost.
12	External low noise setting / Demand setting	Reception of external low noise or demand signal
18	High static pressure setting	Make this setting in the case of operating in high static pressure mode with diffuser duct mounted. (In order to mount the diffuser duct, remove the cover from the outdoor unit fan.)
19	Emergency operation (STD compressor operation prohibited) ! only for ERQ 250	Used to operate system only with inverter compressor when STD compressor malfunctions. This is a temporary operation extremely impairing comfortable environment. Therefore, prompt replacement of the compressor is required. (This operation, however, is not set with ERQ 125, 200.)
20	Additional refrigerant charge operation setting	Carries out additional refrigerant charge operation.
21	Refrigerant recovery/ vacuuming mode setting	Sets to refrigerant recovery or vacuuming mode.
22	Night-time low noise setting	Sets automatic nighttime low noise operation in a simple way. The operating time is based on “Starting set” and “Ending set”.
25	Setting of external low noise level	Sets low noise level when the low noise signal is input from outside.
26	Night-time low noise operation start setting	Sets starting time of nighttime low noise operation. (Night-time low noise setting is also required.)
27	Night-time low noise operation end setting	Sets ending time of nighttime low noise operation. (Night-time low noise setting is also required.)
28	Power transistor check mode ∗Check after disconnection of compressor wires	Used for trouble diagnosis of DC compressor. Since the waveform of inverter is output without wiring to the compressor, it is convenient to probe whether the trouble comes from the compressor or PC board.
29	Capacity precedence setting	If the capacity control is required, the low noise control is automatically released by this setting during carrying out low noise operation and nighttime low noise operation.
30	Demand setting 1	Changes target value of power consumption when demand control 1 is input.
32	Normal demand setting	Normally enables demand control 1 without external input. (Effective to prevent a problem that circuit breaker of small capacity is shut down due to large load.)

No.	Setting item	Description
35	Setting of difference in elevation for the outdoor unit	Make the setting when the outdoor unit is installed 40 m or more below the AHU.
38	Emergency operation	Used to temporarily prohibit the applicable outdoor unit from operating should there be any faulty part. Since the comfortable environment is extremely impaired, prompt replacement of the part is required.
42	Emergency operation (prohibition of INV compressor operation)	If the INV compressor has a failure, used to run the system only with STD compressor. This is a temporary running of the system until the compressor is replaced, thus making comfort extremely worse. Therefore, it is recommended to replace the compressor as soon as possible. (Be noted this setting is not available on model ERQ 125.)

No.	Setting item display								Setting condition display		
	Setting item	MODE H1P	TEST H2P	C/H selection			Low noise H6P	Demand H7P			∗ Factory set
				IND H3P	Master H4P	Slave H5P					
0	Digital pressure gauge kit display	☼	●	●	●	●	●	●	Address Binary number (4 digits)	0 1 ~ 15	☼●●●●●● ☼●●●●●☼ ☼●●☼☼☼☼
1	Cool / Heat Unified address	☼	●	●	●	●	●	☼	Address Binary number (6 digits)	0 1 ~ 31	☼●●●●●● ∗ ☼●●●●●☼ ☼●☼☼☼☼☼
2	Low noise/demand address	☼	●	●	●	●	☼	●	Address Binary number (6 digits)	0 1 ~ 31	☼●●●●●● ∗ ☼●●●●●☼ ☼●☼☼☼☼☼
3	Test operation (Refer to the description on page 180)	☼	●	●	●	●	☼	☼	Test operation: ON Test operation: OFF		☼●●●●●☼ ☼●●●●☼● ∗
5	AHU forced fan	☼	●	●	●	☼	●	☼	Normal operation Indoor forced fan H		☼●●●●●☼ ∗ ☼●●●●☼●
6	AHU forced operation	☼	●	●	●	☼	☼	●	Normal operation Indoor forced operation		☼●●●●●☼ ∗ ☼●●●●☼●
10	Defrost changeover setting	☼	●	●	☼	●	☼	●	Quick defrost Normal (factory setting) Slow defrost		☼●●●☼●● ☼●●●●☼● ∗ ☼●●●●●☼
12	External low noise/ demand setting	☼	●	●	☼	☼	●	●	External low noise/demand: NO External low noise/demand: YES		☼●●●●●☼ ∗ ☼●●●●☼●
18	High static pressure setting	☼	●	☼	●	●	☼	●	High static pressure setting: OFF High static pressure setting: ON		☼●●●●●☼ ∗ ☼●●●●☼●
19	Emergency operation (STD compressor is inhibited to operate.)	☼	●	☼	●	●	☼	☼	OFF STD 1, 2 operation: Inhibited STD 2 operation: Inhibited		☼●●●●●● ∗ ☼●●●●●☼ ☼●●●●☼●
20	Additional refrigerant charging operation setting	☼	●	☼	●	☼	●	●	Refrigerant charging: OFF Refrigerant charging: ON		☼●●●●●☼ ∗ ☼●●●●☼●
21	Refrigerant recovery/vacuuming mode setting	☼	●	☼	●	☼	●	☼	Refrigerant recovery / vacuuming: OFF Refrigerant recovery / vacuuming: ON		☼●●●●●☼ ∗ ☼●●●●☼●
22	Night-time low noise setting	☼	●	☼	●	☼	☼	●	OFF Level 1 (outdoor fan with 6 step or lower) Level 2 (outdoor fan with 5 step or lower) Level 3 (outdoor fan with 4 step or lower)		☼●●●●●● ∗ ☼●●●●●☼ ☼●●●●☼● ☼●●●●☼☼

No.	Setting item display								Setting condition display
	Setting item	MODE H1P	TEST H2P	C/H selection			Low noise H6P	Demand H7P	✻ Factory set
				IND H3P	Master H4P	Slave H5P			
25	Low noise setting	☼	●	☼	☼	●	●	☼	Level 1 (outdoor fan with 6 step or lower) ☼●●●●☼ Level 2 (outdoor fan with 5 step or lower) ☼●●●●☼● ✻ Level 3 (outdoor fan with 4 step or lower) ☼●●●☼●●
26	Night-time low noise operation start setting	☼	●	☼	☼	●	☼	●	About 20:00 ☼●●●●●☼ About 22:00 (factory setting) ☼●●●●☼●✻ About 24:00 ☼●●●☼●●
27	Night-time low noise operation end setting	☼	●	☼	☼	●	☼	☼	About 6:00 ☼●●●●●☼ About 7:00 ☼●●●●☼● About 8:00 (factory setting) ☼●●●☼●● ✻
28	Power transistor check mode	☼	●	☼	☼	☼	●	●	OFF ☼●●●●●☼ ✻ ON ☼●●●●☼●
29	Capacity precedence setting	☼	●	☼	☼	☼	●	☼	OFF ☼●●●●●☼ ✻ ON ☼●●●●☼●
30	Demand setting 1	☼	●	☼	☼	☼	☼	●	60 % demand ☼●●●●●☼ 70 % demand ☼●●●●☼● ✻ 80 % demand ☼●●●☼●●
32	Normal demand setting	☼	☼	●	●	●	●	●	OFF ☼●●●●●☼ ✻ ON ☼●●●●☼●
35	Setting of difference in elevation for the outdoor unit	☼	☼	●	●	●	☼	☼	Normal ☼●●●●●● 65 m or less ☼●●●☼☼● 90 m or less ☼●●●☼☼☼
38	Emergency operation	☼	☼	●	●	☼	☼	●	OFF ☼●●●●●☼ ✻ Master unit operation: Inhibited ☼●●●●☼●
42	Emergency operation (prohibition of INV compressor operation)	☼	☼	●	☼	●	☼	●	Normal operation ☼●●●●●☼ ✻ Emergency operation (prohibition of INV compressor operation) ☼●●●●☼●

c. Monitor mode

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

<Selection of setting item>

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

<Confirmation on setting contents>

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

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

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

(V2765)

No.	Setting item	LED display							Data display
		H1P	H2P	H3P	H4P	H5P	H6P	H7P	
0	Various settings	◑	●	●	●	●	●	●	Lower 4 digits
1	C/H unified address	◑	●	●	●	●	●	☼	Lower 6 digits
2	Low noise/demand address	◑	●	●	●	●	☼	●	
3	Not used	◑	●	●	●	●	☼	☼	
4	Airnet address	◑	●	●	●	☼	●	●	
5	Number of connected AHUs	◑	●	●	●	☼	●	☼	
6	Number of connected BS units	◑	●	●	●	☼	☼	●	
7	Number of connected zone units (excluding outdoor and BS unit)	◑	●	●	●	☼	☼	☼	
8	Number of outdoor units	◑	●	●	☼	●	●	●	
9	Number of connected BS units	◑	●	●	☼	●	●	☼	Lower 4 digits: upper
10	Number of connected BS units	◑	●	●	☼	●	☼	●	Lower 4 digits: lower
11	Number of zone units (excluding outdoor and BS unit)	◑	●	●	☼	●	☼	☼	Lower 6 digits
12	Number of terminal blocks	◑	●	●	☼	☼	●	●	Lower 4 digits: upper
13	Number of terminal blocks	◑	●	●	☼	☼	●	☼	Lower 4 digits: lower
14	Contents of malfunction (the latest)	◑	●	●	☼	☼	☼	●	Malfunction code table
15	Contents of malfunction (1 cycle before)	◑	●	●	☼	☼	☼	☼	Refer page 189.
16	Contents of malfunction (2 cycle before)	◑	●	☼	●	●	●	●	
20	Contents of retry (the latest)	◑	●	☼	●	☼	●	●	
21	Contents of retry (1 cycle before)	◑	●	☼	●	☼	●	☼	
22	Contents of retry (2 cycle before)	◑	●	☼	●	☼	☼	●	
25	Number of multi connection outdoor units	◑	●	☼	☼	●	●	☼	Lower 6 digits

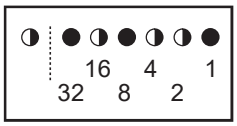
The numbers in the "No." column represent the number of times to press the SET (BS2) button.

Setting item 0 Display contents of "Number of units for various settings"

EMG operation / backup operation setting	ON	◑	●	●	☼	●	●	●
	OFF	◑	●	●	●	●	●	●
Defrost select setting	Short	◑	●	●	●	☼	●	●
	Medium	◑	●	●	●	◑	●	●
	Long	◑	●	●	●	●	●	●
Te setting	H	◑	●	●	●	●	☼	●
	M	◑	●	●	●	●	◑	●
	L	◑	●	●	●	●	●	●
Tc setting	H	◑	●	●	●	●	●	☼
	M	◑	●	●	●	●	●	◑
	L	◑	●	●	●	●	●	●

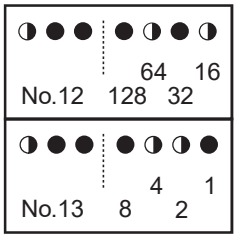
Push the SET button and match with the LEDs No. 1 - 15, push the RETURN button, and confirm the data for each setting.

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



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

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



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

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

3.2.2 Cool / Heat Mode Switching

There are the following 2 cool/heat switching modes.

① Set cool/heat separately for each outdoor unit system by AHU remote controller (only for Z-control).

② Set cool/heat separately for each outdoor unit system by cool/heat selector (X, Y and Z-control).

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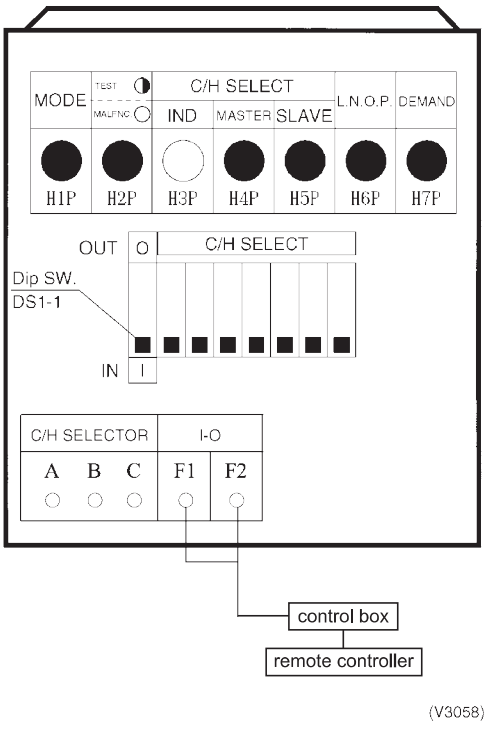
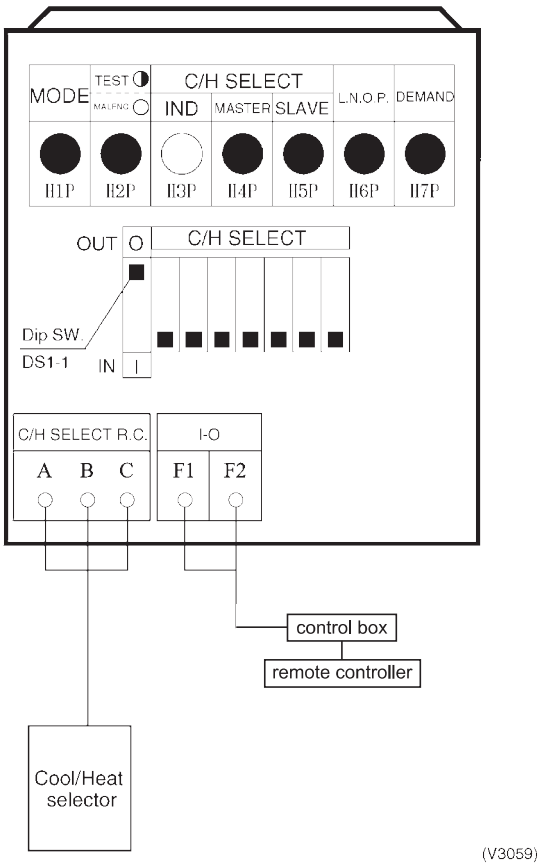
① Set Cool / Heat for Outdoor Unit System by AHU Remote Controller

- ◆ Set outdoor unit PC board DS1-1 to IN (factory set).
- ◆ Set cool/heat switching to IND (individual) for “Setting mode 1” (factory set).



② **Set Cool / Heat for Outdoor Unit System by Cool / Heat Selector**

- ◆ Set outdoor unit PC board DS1-1 to OUT (factory set).
- ◆ Set cool/heat switching to IND (individual) for “Setting mode 1” (factory set).



3.2.3 Setting of Low Noise Operation and Demand Operation

Setting of Low Noise Operation

By connecting the external contact input to the low noise input of the outdoor unit external control adapter (optional), you can lower operating noise.
Be aware that this setting may cause a slight capacity drop.

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

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

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

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

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

Image of operation in the case of A

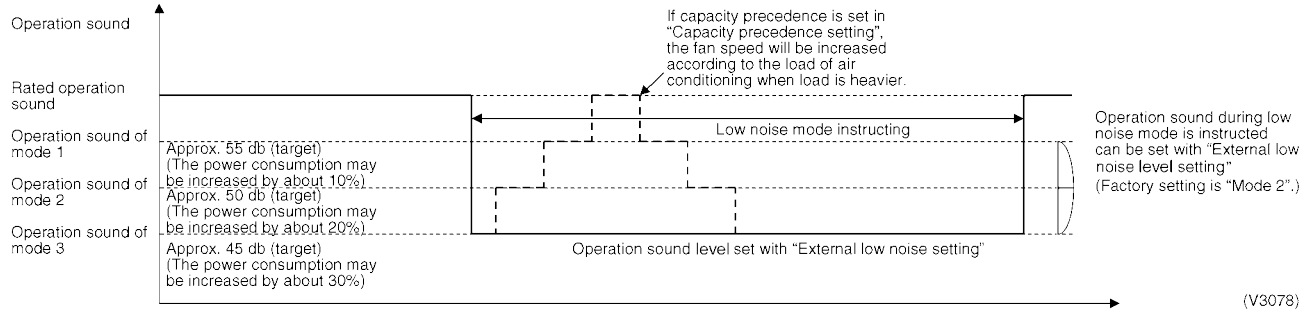


Image of operation in the case of B

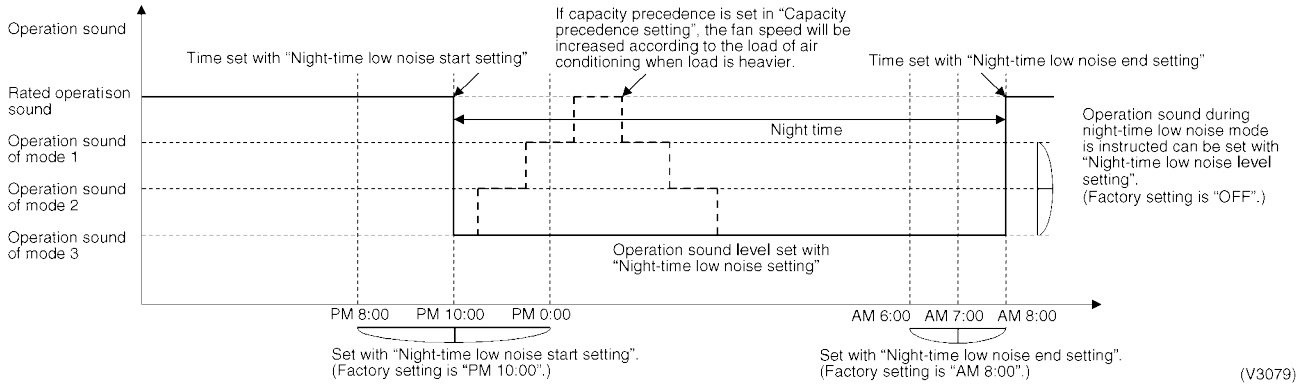
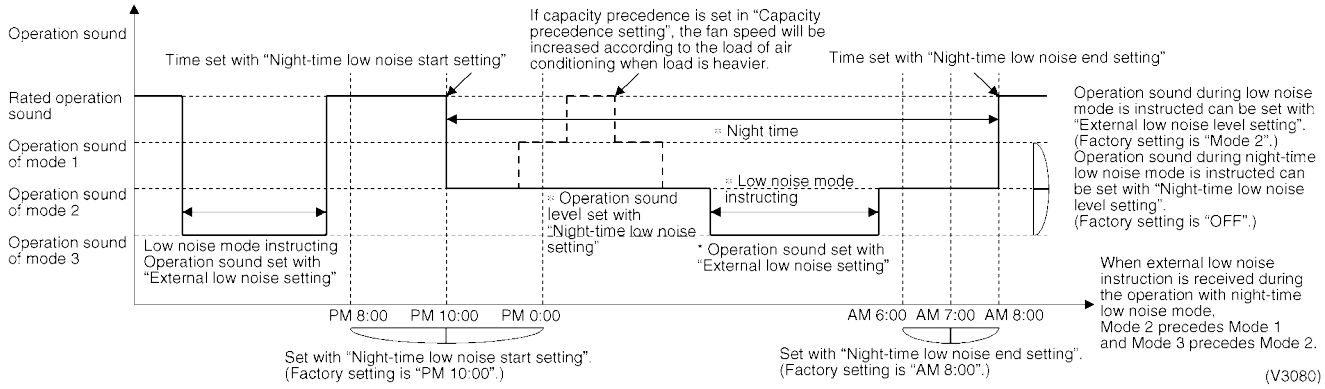


Image of operation in the case of A and B



Setting of Demand Operation

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

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

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

1. While in "Setting mode 2", set the setting condition for set item No. 12 (Setting of external low noise/demand operation) to "YES".
2. If necessary, while in "Setting mode 2", select the set item No. 30 (Setting of Demand 1 level) and then set the setting condition to targeted mode.

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

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

Image of operation in the case of A

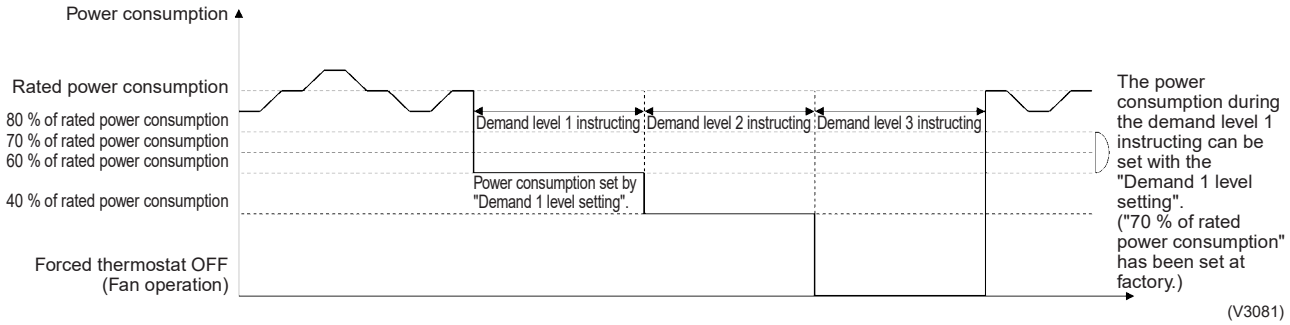


Image of operation in the case of B

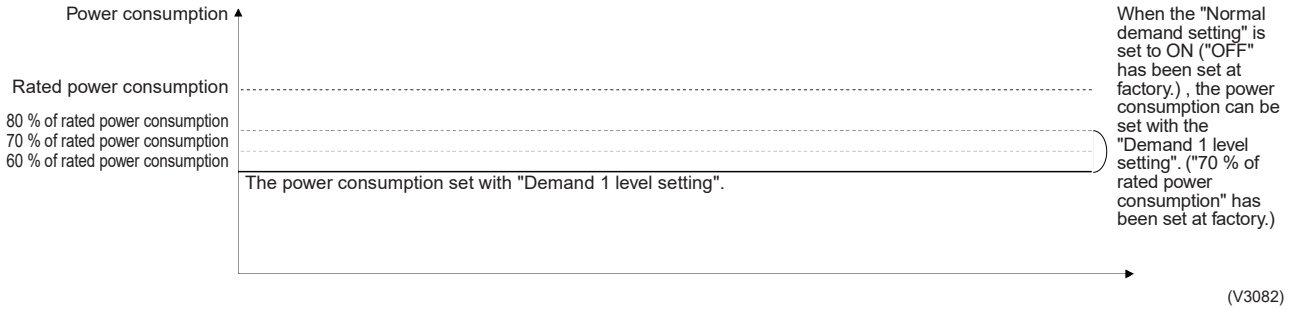
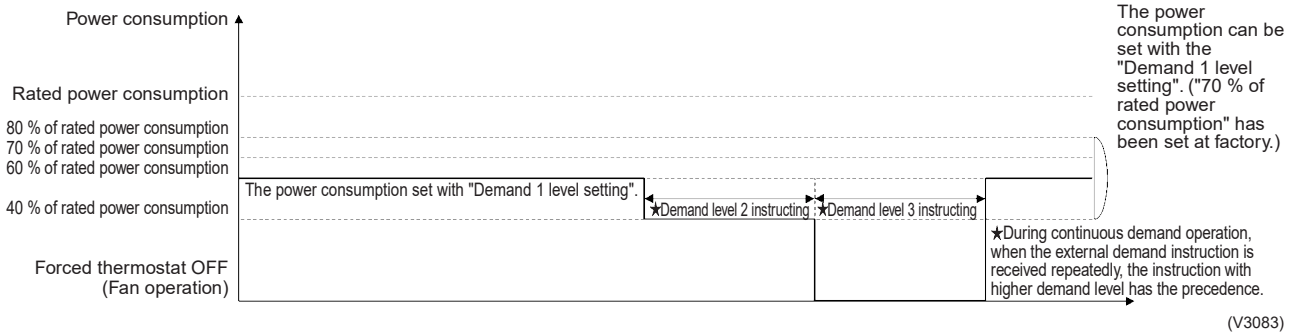


Image of operation in the case of A and B



Detailed Setting Procedure of Low Noise Operation and Demand Control

1. Setting mode 1 (H1P off)

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

2. Setting mode 2 (H1P on)

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

○: ON ●: OFF ☼: Blink

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

Setting mode indication section

Setting No. indication section

Set contents indication section

3.2.4 Setting of Refrigerant Recovery Mode

When carrying out the refrigerant collection on site, fully open the respective expansion valve. All unit operation is prohibited.

[Operation procedure]

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

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

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

3.2.5 Setting of Vacuuming Mode

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

[Operating procedure]

① With **Setting Mode 2** while the unit stops, set “Refrigerant recovery / Vacuuming mode” to ON. The expansion valves of the units fully open and some of solenoid valves open. (H2P blinks to indicate the test operation, and the remote controller displays "Test Operation", thus prohibiting operation.)
After setting, do not cancel “Setting Mode 2” until completion of Vacuuming operation.
② Use the vacuum pump to perform vacuuming operation.
③ Press Mode button “BS1” once and reset “Setting Mode 2”.

3.2.6 Check Operation Detail

CHECK OPERATION FUNCTION

(Press the MODE button BS1 once and set to SETTING MODE 1 (H1P: OFF))