



TECHNICAL MANUAL

VRF INVERTER MULTI-SYSTEM AIR-CONDITIONERS (OUTDOOR UNIT)

KXZ series (Heat pump type)

Standard series

- Single use (Used also for combination)
FDC280KXZE2, 335KXZE2, 400KXZE2, 450KXZE2, 475KXZE2,
500KXZE2, 560KXZE2
- Combination use
FDC615KXZE2, 670KXZE2, 735KXZE2, 800KXZE2, 850KXZE2,
900KXZE2, 950KXZE2, 1000KXZE2, 1060KXZE2, 1120KXZE2,
1200KXZE2, 1250KXZE2, 1300KXZE2, 1350KXZE2, 1425KXZE2,
1450KXZE2, 1500KXZE2, 1560KXZE2, 1620KXZE2, 1680KXZE2
- High-COP combination use
FDC560KXZXE2 (FDC280KXZE2+FDC280KXZE2),
FDC850KXZXE2 (FDC280KXZE2+FDC280KXZE2+FDC280KXZE2),
FDC900KXZXE2 (FDC280KXZE2+FDC280KXZE2+FDC335KXZE2),
FDC950KXZXE2 (FDC280KXZE2+FDC335KXZE2+FDC335KXZE2),
FDC1000KXZXE2 (FDC335KXZE2+FDC335KXZE2+FDC335KXZE2),
FDC1060KXZXE2 (FDC335KXZE2+FDC335KXZE2+FDC400KXZE2),
FDC1120KXZXE2 (FDC335KXZE2+FDC400KXZE2+FDC400KXZE2)

• Notes :

- (1) Regarding the indoor unit series, refer to the TECHNICAL MANUAL No.'19•KX-T-310,
No.'20 • KX-T-347 & No.'20 • KX-T-348.
- (2) Regarding the floor standing-2way type(FDFW), refer to the No.'17 • KX-T-266.

PREFACE

Combination table for KX series

Category	Outdoor unit	Indoor unit									
		Connectable remote control	Same series	Same series	Same series	Mixed series	Mixed series	Mixed series	Same or Mixed series	Mixed series	Same series
		RC-E1	KXE4	KXE4(A)	KXE4A	KXE4A	KXE4A	KXE4A	KXE4R KXE4BR KXE5R	KXE4R KXE4BR KXE5R	KXE4R KXE4BR KXE5R
3-wire type	RC-E1R							KXE4R KXE4BR KXE5R	KXE4R KXE4BR KXE5R	KXE4R KXE4BR KXE5R	KXE4R KXE4BR KXE5R
	2-wire type	RC-E3 RC-E4 RC-E5 RC-EX1A RC-EX3						KXE6 KXE6A KXE6B KXE6D KXE6F KXZE1	KXE6 KXE6A KXE6B KXE6D KXE6F KXZE1	KXE6 KXE6A KXE6B KXE6D KXE6F KXZE1	KXE6 KXE6A KXE6B KXE6D KXE6F KXZE1
Heat pump (2-pipe) systems	FDCA-HKXE4 5HP	YES [C]	YES [C]	YES [C]	NO	NO	NO	NO	NO	NO	NO
	FDCA-HKXE4 8-48HP	NO	YES [C]	YES [C]	NO	NO	NO	NO	NO	NO	NO
	FDCA-HKXE4A 5HP	NO	YES [C]	YES [C]	YES [C] *1	NO	NO	YES [C] *1	NO	NO	NO
	FDCA-HKXE4R 5.6HP										
	FDCA-HKXE4A 8-48HP										
	FDCA-HKXE4R 8-48HP	NO	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]
	FDCA-HKXE4BR 8-48HP										
	FDCA-HKXE4D 8-48HP										
	FDC-KXE6 4.5HP	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES [A] *6
	FDC-KXE6M 4.5HP										
	FDC-KXE6 8-48HP	NO	NO	NO	NO	NO	NO	NO	YES [B]	YES [B]	YES [A]
	FDC-KXE6M 8-48HP										
	FDC-KXZE1 4.5HP	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES [A] *6
	FDC-KXZE1 10-60HP										
	FDC-KXZPE1 8.10HP	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES [A]
FDC-KXZA1 10-60HP											
FDC-KXZE1M 10-60HP											
FDC-KXZME1 8-12HP	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES [A]	
FDC-KXZEN/S1 4HP	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES [A]	
FDC-KXZE2 10-60HP											
FDC-KXZA2 10-60HP	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES [A]	
FDC-KXZE2M 10-60HP											
Heat recovery (3-pipe) systems [Note(3)]	FDCA-HKXRE4 8-48HP	NO	NO	YES [C]	NO	NO	NO	NO	NO	NO	NO
	FDCA-HKXRE4A 8-48HP										
	FDCA-HKXRE4R 8-48HP	NO	NO	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]
	FDCA-HKXRE4BR 8-48HP										
	FDCA-HKXRE4D 8-48HP										
	FDC-KXRE6 8-48HP	NO	NO	NO	NO	NO	NO	NO	YES [B]	YES [B]	YES [A]
	FDC-KXZRE1 8-60HP	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES [A]
FDC-KXZRE2 8-60HP	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES [A]	

Notes (1) YES: Connectable (See following table in detail), NO: Not connectable

*1 except FDKA71KXE5R

	Outdoor unit	Connected Indoor unit		DIP switch setting of outdoor unit KXE6	Superlink protocol	Limitation
		Same series	Mixed series			
YES [A] *2	KXE6 & KXZ	KXE6 & KXZ		II (New)	New (for KXZ/KX6)	New (for KXZ/KX6)
YES [B]		KXE4 series	KXE6 & KXE4 series	I (Previous)	Previous (for KX4)	Previous (for KX4)
YES [C]	KXE4 series	KXE4 series	KXE4 series		Previous (for KX4)	Previous (for KX4)

*2 If outdoor unit system (YES [A]) is connected to other outdoor unit systems (YES [B] and/or YES [C]) in one Superlink network, the DIP switch of outdoor unit KXZ/KX6 of (YES [A]) should be set from II (New) to I (Previous). In this case the Superlink protocol and limitation of outdoor unit system (YES [A]) are switched to Previous (for KX4).

(2) Combination with new central control, PC windows central control and BMS interface unit

	Connectable I/U	Central control, PC windows central control and BMS interface unit					
		SC-SL1N-E	SC-SL2NA-E	SC-SL4N-AE/BE	SC-WGWN-A/B	SC-LGWN-A	SC-BGWN-A/B
YES [A]	Superlink protocol	16	64	128 (128x1)	128 (64x2) *3	128 (48x2)	128 (64x2) *3
	Connectable network	New	New	New	New	New	New
YES [B] & YES [C]	Connectable I/U	1	1	1	2	2	2
	Superlink *5 protocol	16	48	144 (48x3)	96 *4 (48x2)	96 *4 (48x2)	96 *4 (48x2)
	Connectable network	Previous	Previous	Previous	Previous	Previous	Previous
		1	1	3	2	2	2

Note:
KXZ2 and KXZ1 cannot be mixed in the same outdoor unit combination (Twin or triple).

*3 Maximum number of AC cell is limited up to 96.

In case the number of connected indoor units are more than 96, some AC cells should hold 2 or more indoor units.

*4 In case of other central control like SC-SLxN-E is connected in the same network, the connectable indoor unit is limited up to 64 (32x2).

*5 In case of previous Superlink protocol, the Superlink mode of new central control should be set "Previous".

*6 In case of YES[A], previous central control is available to use. But the limitation of connectable indoor unit and so on is complied with the rule of previous Superlink.

<For heat recovery only>

(3) The compatibility of PFD (refrigerant flow branching control) is mentioned in following table.

Connectable PFD control	Outdoor unit	Indoor unit	
		KXE4 & KXE5 series	KXE6 & KXZE1 series
KXRE4 series	PFD-E	PFD-E	PFD-E PFD ***3-E
	PFD-ER	PFD-ER	PFD-ER PFD ***4-E
KXRE6 series	PFD-E	PFD-E	PFD ***3-E
	PFD-ER	PFD-ER	PFD ***4-E
KXZRE1 series KXZRE2 series			PFD ***3-E
			PFD ***4-E

Note:
All indoor unit downstream PFD box must be same series, KXZR, KX6 series or KX4/5 series

(4) Compatibility of the PFD control extension cables is as per the following table.

	PFD-control series	
	PFD ***3-E	PFD ***4-E
PFD-15WR-E	Yes	No
PFD4-15WR-E	No	Yes

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1. GENERAL INFORMATION

1.1 Specific features

Connectable indoor capacity

Capacity from 50% to 200% is possible.

Model \ Item	Number of connectable units	Connectable capacity
FDC280KXZE2	1 to 37	140 — 560
FDC335KXZE2	1 to 44	168 — 670
FDC400KXZE2	1 to 53	200 — 800
FDC450KXZE2	1 to 60	225 — 900
FDC475KXZE2	1 to 50	238 — 760
FDC500KXZE2	1 to 53	250 — 800
FDC560KXZE2	1 to 59	280 — 896
FDC615KXZE2	2 to 65	308 — 984
FDC670KXZE2	2 to 71	335 — 1072
FDC735KXZE2	2 to 78	368 — 1176
FDC800KXZE2	2 to 80	400 — 1280
FDC850KXZE2	2 to 80	425 — 1360
FDC900KXZE2	2 to 80	450 — 1440
FDC950KXZE2	2 to 80	475 — 1520
FDC1000KXZE2	2 to 80	500 — 1300
FDC1060KXZE2	2 to 80	530 — 1378
FDC1120KXZE2	2 to 80	560 — 1456
FDC1200KXZE2	3 to 80	600 — 1560
FDC1250KXZE2	3 to 80	625 — 1625
FDC1300KXZE2	3 to 80	650 — 1690
FDC1350KXZE2	3 to 80	675 — 1755
FDC1425KXZE2	3 to 80	713 — 1852
FDC1450KXZE2	3 to 80	725 — 1885
FDC1500KXZE2	3 to 80	750 — 1950
FDC1560KXZE2	3 to 80	780 — 2028
FDC1620KXZE2	3 to 80	810 — 2106
FDC1680KXZE2	3 to 80	840 — 2184

<High-COP combination>

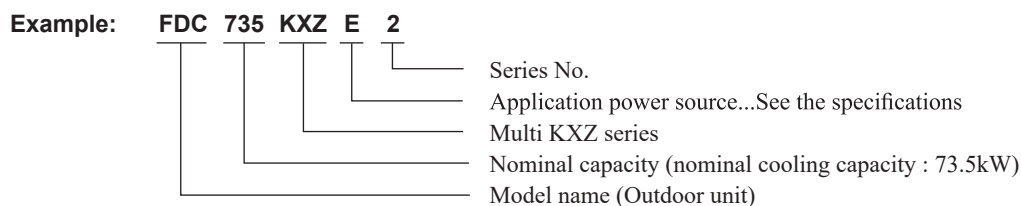
Model \ Item	Number of connectable units	Connectable capacity
FDC560KXZE2	2 to 59	448 — 896
FDC850KXZE2	3 to 80	680 — 1360
FDC900KXZE2	3 to 80	720 — 1440
FDC950KXZE2	3 to 80	760 — 1520
FDC1000KXZE2	3 to 80	800 — 1300
FDC1060KXZE2	3 to 80	848 — 1378
FDC1120KXZE2	3 to 80	896 — 1456

Note

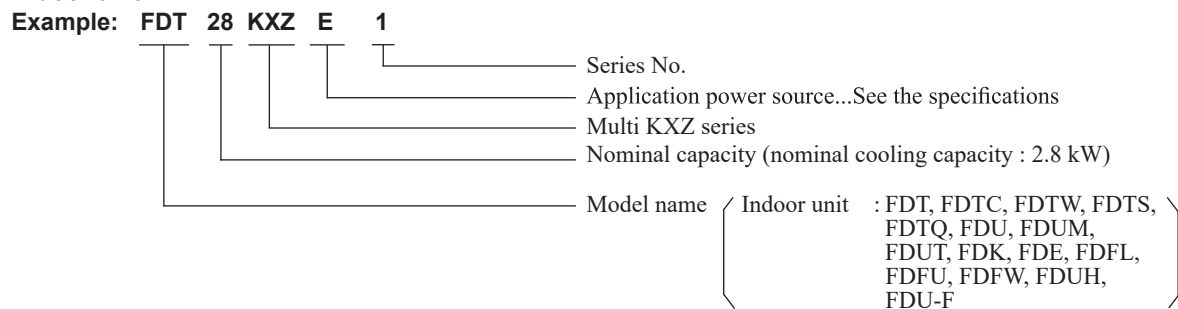
For outdoor unit, EN61000-3-2 and EN61000-3-12 are not applicable as consent by the utility company or notification to the utility company is given before usage.

1.2 How to read the model name

(1) Outdoor unit



(2) Indoor unit



1.3 Table of models

Model	Capacity													
	15	22	28	36	45	56	71	90	112	140	160	224	280	
Ceiling cassette-4 way type (FDT)			○	○	○	○	○	○	○	○	○			
Ceiling cassette-4 way compact type (FDTC)	○	○	○	○	○	○								
Ceiling cassette-2 way type (FDTW)			○		○	○	○	○	○	○				
Ceiling cassette-1 way type (FDTS)					○		○							
Ceiling cassette-1 way compact type (FDTQ)		○	○	○										
Duct connected-High static pressure type (FDU)					○	○	○	○	○	○	○	○	○	
Duct connected-Low/Middle static pressure type (FDUM)		○	○	○	○	○	○	○	○	○	○			
Duct connected (thin)-Low static pressure type (FDUT)	○	○	○	○	○	○	○							
Wall mounted type (FDK)	○	○	○	○	○	○	○	○						
Ceiling suspended type (FDE)				○	○	○	○		○	○				
Floor standing (with casing) type (FDFL)							○							
Floor standing (without casing) type (FDFU)			○		○	○	○							
Floor standing-2 way type (FDFW)			○		○	○								
Duct connected-compact and Flexible type (FDUH)		○	○	○										
Outdoor air processing unit (FDU-F)								○		○		○	○	
Outdoor units to be combined (FDC)	FDC280KXZE2-FDC1680KXZE2													

Note (1) Reference No. of data book : No.'19·KX-T-310, No.'20·KX-T-347, No.'20·KX-T-348

1.4 Outdoor units combination table

Item Models	Combination Outdoor unit models							Indoor unit	
	FDC280 KXZE2	FDC335 KXZE2	FDC400 KXZE2	FDC450 KXZE2	FDC475 KXZE2	FDC500 KXZE2	FDC560 KXZE2	Connectable capacity	Number of connectable units
FDC615KXZE2	1	1	-	-	-	-	-	308 — 984	2 to 65 units
FDC670KXZE2	-	2	-	-	-	-	-	335 — 1072	2 to 71 units
FDC735KXZE2	-	1	1	-	-	-	-	368 — 1176	2 to 78 units
FDC800KXZE2	-	-	2	-	-	-	-	400 — 1280	2 to 80 units
FDC850KXZE2	-	-	1	1	-	-	-	425 — 1360	2 to 80 units
FDC900KXZE2	-	-	-	2	-	-	-	450 — 1440	2 to 80 units
FDC950KXZE2	-	-	-	-	2	-	-	475 — 1520	2 to 80 units
FDC1000KXZE2	-	-	-	-	-	2	-	500 — 1300	2 to 80 units
FDC1060KXZE2	-	-	-	-	-	1	1	530 — 1378	2 to 80 units
FDC1120KXZE2	-	-	-	-	-	-	2	560 — 1456	2 to 80 units
FDC1200KXZE2	-	-	3	-	-	-	-	600 — 1560	3 to 80 units
FDC1250KXZE2	-	-	2	1	-	-	-	625 — 1625	3 to 80 units
FDC1300KXZE2	-	-	1	2	-	-	-	650 — 1690	3 to 80 units
FDC1350KXZE2	-	-	-	3	-	-	-	675 — 1755	3 to 80 units
FDC1425KXZE2	-	-	-	-	3	-	-	713 — 1852	3 to 80 units
FDC1450KXZE2	-	-	-	-	2	1	-	725 — 1885	3 to 80 units
FDC1500KXZE2	-	-	-	-	-	3	-	750 — 1950	3 to 80 units
FDC1560KXZE2	-	-	-	-	-	2	1	780 — 2028	3 to 80 units
FDC1620KXZE2	-	-	-	-	-	1	2	810 — 2106	3 to 80 units
FDC1680KXZE2	-	-	-	-	-	-	3	840 — 2184	3 to 80 units

<High-COP combination>

Item Models	Combination Outdoor unit models							Indoor unit	
	FDC280 KXZE2	FDC335 KXZE2	FDC400 KXZE2	FDC450 KXZE2	FDC475 KXZE2	FDC500 KXZE2	FDC560 KXZE2	Connectable capacity	Number of connectable units
FDC560KXZE2	2	-	-	-	-	-	-	448 — 896	2 to 59 units
FDC850KXZE2	3	-	-	-	-	-	-	680 — 1360	3 to 80 units
FDC900KXZE2	2	1	-	-	-	-	-	720 — 1440	3 to 80 units
FDC950KXZE2	1	2	-	-	-	-	-	760 — 1520	3 to 80 units
FDC1000KXZE2	-	3	-	-	-	-	-	800 — 1300	3 to 80 units
FDC1060KXZE2	-	2	1	-	-	-	-	848 — 1378	3 to 80 units
FDC1120KXZE2	-	1	2	-	-	-	-	896 — 1456	3 to 80 units

(a) Outdoor unit side branch pipe set (Option)

Outdoor unit	Branch pipe set
For two units (for FDC615-1120KXZE2,560KXZE2)	DOS-2A-3
For three units (for FDC1200-1680KXZE2,850-1120KXZE2)	DOS-3A-3

Note (1) Be sure to use this when combining units.

(b) Branch pipe set (Option)

Total capacity downstream	Branching pipe set
Less than 180	DIS-22-1G
180 or more but less than 371	DIS-180-1G
371 or more but less than 540	DIS-371-1G
540 or more	DIS-540-3

(c) Header pipe set (Option)

Total capacity downstream	Header set model type	Number of branches
Less than 180	HEAD4-22-1G	4 branches at the most
180 or more but less than 371	HEAD6-180-1G	6 branches at the most
371 or more but less than 540	HEAD8-371-2	8 branches at the most
540 or more	HEAD8-540-3	8 branches at the most

2. OUTDOOR UNIT

2.1 Specifications

- Single use (Used also for combination)

Models	FDC280KXZE2	FDC335KXZE2	FDC400KXZE2	FDC450KXZE2	FDC475KXZE2	FDC500KXZE2	FDC560KXZE2	
Nominal cooling capacity*1	28.0	33.5	40.0	45.0	47.5	50.0	56.0	
Nominal heating capacity*2	31.5	37.5	45.0	50.0	53.0	56.0	63.0	
Maximum heating capacity	31.5	37.5	45.0	50.0	53.0	56.0	63.0	
Power source	3 Phase 380 / 415V 50Hz / 380V 60Hz							
Power consumption	Cooling	7.25	8.98	10.98	13.98	13.97	14.01	
	Heating	7.41	9.03	10.23	12.50	12.99	13.56	
Running current	Cooling	12.0 / 11.0	14.7 / 13.4	17.6 / 16.3	22.4 / 20.5	22.6 / 20.7	26.9 / 24.6	
	Heating	12.2 / 11.2	14.8 / 13.5	16.7 / 15.5	20.4 / 18.7	21.0 / 19.2	21.9 / 20.1	
Power factor	Cooling	92 / 92	93 / 93	95 / 94	95 / 95	94 / 94	94 / 94	
	Heating	92 / 92	93 / 93	93 / 92	93 / 93	94 / 94	94 / 94	
EER		3.86	3.73	3.64	3.22	3.40	3.57	
COP		4.25	4.15	4.40	4.00	4.08	4.13	
Sound Pressure Level (Cooling / Heating)	dB(A)	56 / 57	63 / 62	60 / 62	61 / 62	61 / 61	63 / 64	
Sound Power Level (Cooling / Heating)	dB(A)	75 / 76	82 / 81	80 / 82	81 / 82	81 / 81	82 / 83	
Starting current	A	20.1	20.1	32.0	32.0	40.2	40.2	
Maximum current		2052 × 1350 × 720						
Exterior dimensions	mm	1697 × 1350 × 720						
Height × Width × Depth		2052 × 1350 × 720						
Exterior appearance (Munsell color)		Stucco White (4.2Y7.5 / 1.1) & Dark Silver (0.5Y4.3 / 0.1) near equivalent						
Net weight	kg	288	332					378
Refrigerant equipment compressor type & Qty		GTC5150NC47BF×1					GTC5150NC47BF×2	
Motor	kW	4.76×1	5.94×1	7.32×1	9.32×1	4.64×2	4.91×2	
Starting method	W	33×1	Direct line starting					33×2
Crankcase heater		M fin & inner grooved tubing						
Refrigerant equipment Heat exchanger		Electronic expansion valve						
Refrigerant control		R410A						
Refrigerant type	kg	11.0	11.5					4.2 (M-MA32R)
Refrigerant amount	L	2.25 (M-MA32R)	2.9 (M-MA32R)					4.2 (M-MA32R)
Refrigerant oil		Microcomputer controlled De-Icer						
Defrost control		Propeller fan × 2						
Air handling equipment fan type & Qty	W	560×2	Direct start					300 / 284
Motor		Max.85						
Starting method	m³/min	225 / 225	294 / 283	304 / 304	300 / 300	300 / 300	300 / 284	
Air flow (Standard)	Pa	Compressor overheat protection / overcurrent protection / power transistor overheating protection / abnormal high pressure protection						
Available external static pressure		φ 25.4 (1") (φ 22.22 (7/8"))						
Shock & vibration absorber		φ 25.4 (1") (φ 22.22 (7/8"))						
Safety equipment		φ 12.7 (1/2")						
Installation data	Liquid Line	φ 9.52 (3/8")	φ 25.4 (1") (φ 22.22 (7/8"))					φ 28.58 (1-1/8")
Refrigerant piping size	Gas line	φ 22.22 (7/8")	φ 25.4 (1") (φ 22.22 (7/8"))					φ 28.58 (1-1/8")
Connecting method		Gas line : Brazing / Liquid line : Flare						
MAX. Pressure	MPa	High 4.15 Low 2.21						
Insulation for piping		Hole for drain (φ 20 × 10 pcs. φ 45 × 3 pcs.)						
IP number		Necessary (both Liquid & Gas line)						
Accessories		IP24						
Exterior dimensions		PCB004Z503	PCB004Z503	PCB004Z503	PCB004Z504	PCB004Z504	PCB004Z504	
Electrical wiring		PCB004Z505	PCB004Z505	PCB004Z505	PCB004Z506	PCB004Z507	PCB004Z507	

- Notes (1) The data are measured at the following conditions.
- | Item | Indoor air temperature | | Outdoor air temperature | | Standards |
|-----------|------------------------|-------|-------------------------|-------|---------------|
| | DB | WB | DB | WB | |
| Operation | 27 °C | 19 °C | 35 °C | 24 °C | ISO5151-T1,H1 |
| Cooling | 20 °C | — | 7 °C | 6 °C | |
| Heating | — | — | — | — | |
- (2) This air-conditioner is manufactured and tested in conformity with the ISO.
- (3) Sound level indicates the value in an anechoic chamber.
- (4) Refrigerant piping size applicable to European installations are shown in parentheses.
- (5) This air-conditioner is adapted RoHS directive.

PCB004Z502

• Combination use

Models	FDC615KXZE2	FDC670KXZE2	FDC735KXZE2	FDC800KXZE2	FDC850KXZE2
Combination unit	FDC280KXZE2	FDC335KXZE2	FDC335KXZE2	FDC400KXZE2	FDC400KXZE2
	FDC335KXZE2	FDC335KXZE2	FDC400KXZE2	FDC400KXZE2	FDC450KXZE2
Power source	3 Phase 380-415V 50Hz/380V 60Hz				
Nominal cooling capacity*1	61.5	67.0	73.5	80.0	85.0
Nominal heating capacity*2	69.0	75.0	82.5	90.0	95.0
Power consumption	16.24	17.96	19.96	21.96	24.96
Running current	26.7/24.4	29.4/26.8	32.3/29.7	35.2/32.6	40.0/36.8
Power factor	93/93	93/93	94/94	95/94	95/95
Net weight	576	576	620	664	664
Refrigerant piping size	φ 15.88 (5/8")				
	φ 12.7 (1/2")				
	φ 28.58 (1.118")				
	φ 31.75 (1.248") (φ 34.92 (1.378"))				
	φ 9.52 (3/8")				
Models	FDC900KXZE2	FDC950KXZE2	FDC1000KXZE2	FDC1060KXZE2	FDC1120KXZE2
Combination unit	FDC450KXZE2	FDC475KXZE2	FDC500KXZE2	FDC500KXZE2	FDC560KXZE2
	FDC450KXZE2	FDC475KXZE2	FDC500KXZE2	FDC560KXZE2	FDC560KXZE2
Power source	3 Phase 380-415V 50Hz/380V 60Hz				
Nominal cooling capacity*1	90.0	95.0	100.0	106.0	112.0
Nominal heating capacity*2	100.0	106.0	112.0	119.0	126.0
Power consumption	27.95	27.94	28.02	31.51	35.00
Running current	44.8/41.0	45.2/41.4	45.2/41.4	49.5/45.3	53.8/49.2
Power factor	95/95	94/94	94/94	94/94	94/94
Net weight	664	756	756	756	756
Refrigerant piping size	φ 15.88 (5/8")				
	φ 31.75 (1.248") (φ 34.92 (1.378"))				
	φ 38.1 (1.500") (φ 38.1 (1.500"))				
	φ 9.52 (3/8")				

PCB004Z502

• Combination use

Models		FDC1200KXZE2	FDC1250KXZE2	FDC1300KXZE2	FDC1350KXZE2	FDC1425KXZE2	
Combination unit		FDC400KXZE2	FDC400KXZE2	FDC400KXZE2	FDC450KXZE2	FDC475KXZE2	
		FDC400KXZE2	FDC400KXZE2	FDC450KXZE2	FDC450KXZE2	FDC475KXZE2	
		FDC400KXZE2	FDC450KXZE2	FDC450KXZE2	FDC450KXZE2	FDC475KXZE2	
		FDC400KXZE2	FDC450KXZE2	FDC450KXZE2	FDC450KXZE2	FDC475KXZE2	
Power source	3 Phase 380-415V 50Hz / 380V 60Hz						
Nominal cooling capacity*1	kW	120.0	125.0	130.0	135.0	142.5	
Nominal heating capacity*2	kW	135.0	140.0	145.0	150.0	159.0	
Power consumption	Cooling	32.94	35.94	38.93	41.93	41.91	
	Heating	30.68	32.95	35.23	37.50	38.97	
Running current	Cooling	52.8/48.9	57.6/53.1	62.4/57.3	67.2/61.5	67.8/62.1	
	Heating	50.1/46.5	53.8/49.7	57.5/52.9	61.2/56.1	63.0/57.6	
Power factor	Cooling	95/94	95/94	95/95	95/95	94/94	
	Heating	93/92	93/92	93/93	93/93	94/94	
Net weight	kg	996	996	996	996	1134	
Refrigerant piping size	Liquid line	φ 19.05 (3/4")					
	Gas line	φ 38.1 (1-1/2") (φ 34.92 (1-3/8"))					
	Oil equalization	φ 9.52 (3/8")					
Models		FDC1450KXZE2	FDC1500KXZE2	FDC1560KXZE2	FDC1620KXZE2	FDC1680KXZE2	
Combination unit		FDC475KXZE2	FDC500KXZE2	FDC500KXZE2	FDC500KXZE2	FDC560KXZE2	
		FDC475KXZE2	FDC500KXZE2	FDC500KXZE2	FDC560KXZE2	FDC560KXZE2	
		FDC500KXZE2	FDC500KXZE2	FDC560KXZE2	FDC560KXZE2	FDC560KXZE2	
		FDC500KXZE2	FDC500KXZE2	FDC560KXZE2	FDC560KXZE2	FDC560KXZE2	
Power source	3 Phase 380-415V 50Hz / 380V 60Hz						
Nominal cooling capacity*1	kW	145.0	150.0	156.0	162.0	168.0	
Nominal heating capacity*2	kW	162.0	168.0	175.0	182.0	189.0	
Power consumption	Cooling	41.95	42.03	45.52	49.01	52.50	
	Heating	39.54	40.68	43.27	45.87	48.46	
Running current	Cooling	67.8/62.1	67.8/62.1	72.1/66.0	76.4/69.9	80.7/73.8	
	Heating	63.9/58.5	65.7/60.3	69.9/64.1	74.1/67.9	78.3/71.7	
Power factor	Cooling	94/94	94/94	94/94	94/94	94/94	
	Heating	94/94	94/94	94/94	94/94	94/94	
Net weight	kg	1134	1134	1134	1134	1134	
Refrigerant piping size	Liquid line	φ 19.05 (3/4")					
	Gas line	φ 38.1 (1-1/2") (φ 34.92 (1-3/8"))					
	Oil equalization	φ 9.52 (3/8")					

PCB004Z502

• High-COP combination use

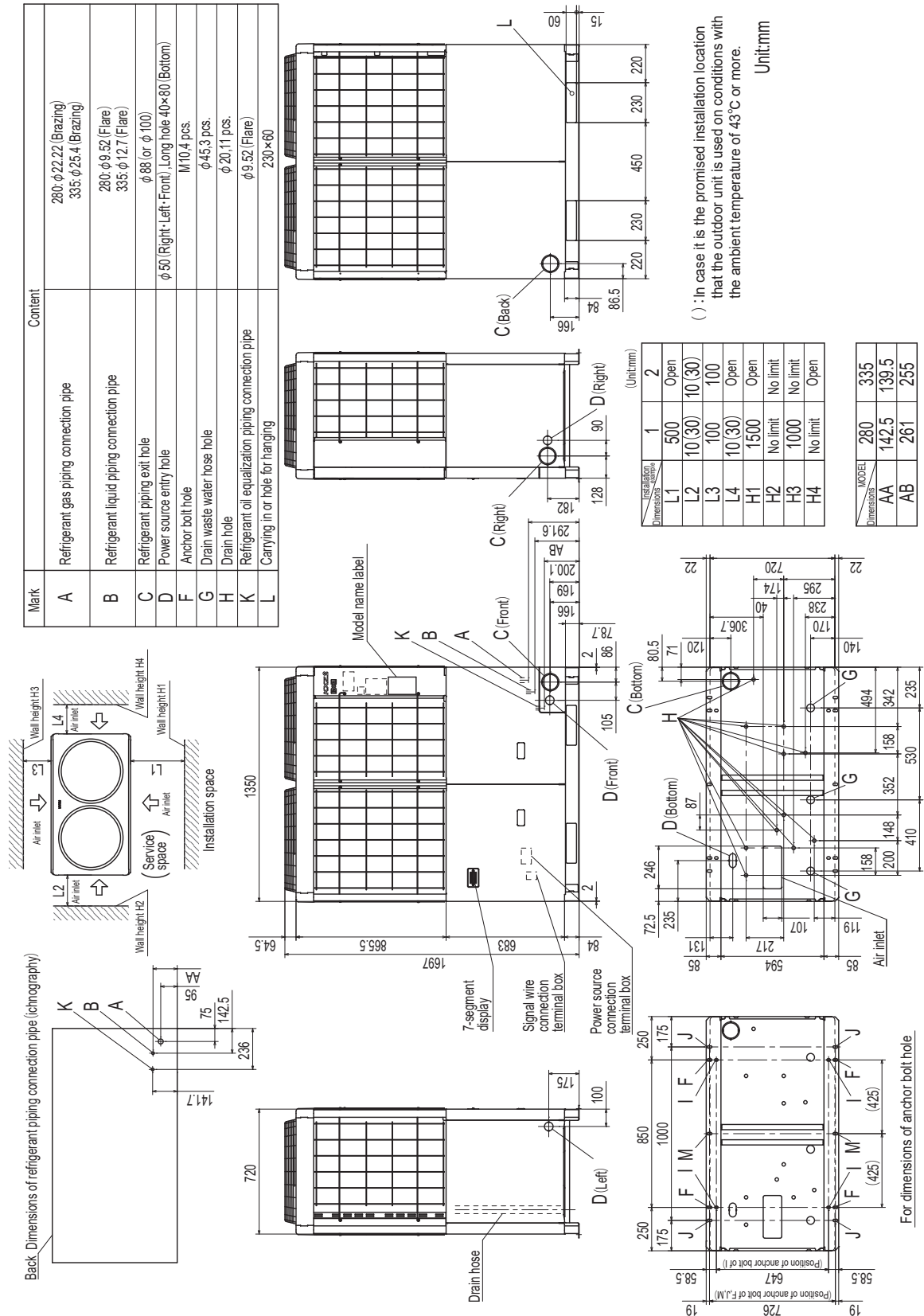
Models	FDC560KXZE2
Combination unit	FDC280KXZE2 FDC280KXZE2
Power source	3 Phase 380-415V 50Hz./380V 60Hz
Nominal cooling capacity*1	56.0
Nominal heating capacity*2	63.0
Power consumption	14.51
Running current	24.0./22.0
Power factor	92./92
Net weight	576
Refrigerant piping size	φ12.7 (1/2")
	φ28.58 (1-1/8")
	φ9.52 (3/8")

Models	FDC850KXZE2	FDC900KXZE2	FDC950KXZE2	FDC1000KXZE2	FDC1060KXZE2	FDC1120KXZE2
Combination unit	FDC280KXZE2 FDC280KXZE2 FDC280KXZE2	FDC280KXZE2 FDC280KXZE2 FDC335KXZE2	FDC280KXZE2 FDC335KXZE2 FDC335KXZE2	FDC335KXZE2 FDC335KXZE2 FDC335KXZE2	FDC335KXZE2 FDC335KXZE2 FDC400KXZE2	FDC335KXZE2 FDC400KXZE2 FDC400KXZE2
Power source	3 Phase 380-415V 50Hz./380V 60Hz					
Nominal cooling capacity*1	84.0	89.5	95.0	100.5	107.0	113.5
Nominal heating capacity*2	94.5	100.5	106.5	112.5	120.0	127.5
Power consumption	21.76	23.49	25.22	26.94	28.94	30.94
Running current	36.0./33.0	38.7./35.4	41.4./37.8	44.1./40.2	47.0./43.1	49.9./46.0
Power factor	92./92	92./92	93./93	93./93	94./93	94./94
Net weight	864	864	864	864	908	952
Refrigerant piping size	φ15.88 (5/8")					
	φ31.75 (1-1/4") (φ34.92 (1-3/8"))					
	φ9.52 (3/8")					

PCB004Z502

2.2 Exterior dimensions

Models FDC280KXZE2, 335KXZE2



Mark	Content
A	Refrigerant gas piping connection pipe 280: φ22.22 (Brazing) 335: φ25.4 (Brazing)
B	Refrigerant liquid piping connection pipe 280: φ9.52 (Flare) 335: φ12.7 (Flare)
C	Refrigerant piping exit hole φ88 (or φ100)
D	Power source entry hole φ50 (Right-Left- Front) , Long hole 40×80 (Bottom)
F	Anchor bolt hole M10, 4 pcs.
G	Drain waste water hose hole φ45.3 pos.
H	Drain hole φ20, 11 pcs.
K	Refrigerant oil equalization piping connection pipe φ9.52 (Flare)
L	Carrying in or hole for hanging 230×60

PCB004Z503

For dimensions of anchor bolt hole
※ Use I, J, M holes for customers for renovation.

2.4 Noise level

Measured based on JIS B 8616

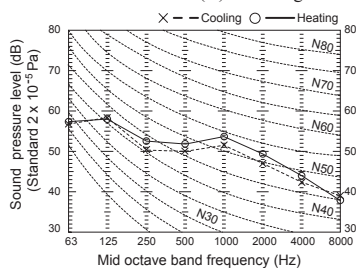
Mike position as highest noise level in position as below

Distance from front side 1m

Height 1m

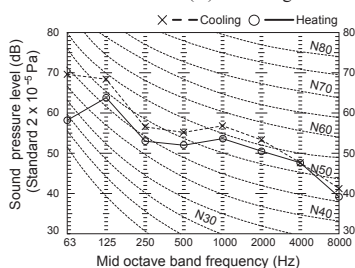
Model FDC280KXZE2

Noise level 56 dB (A) at cooling
57 dB (A) at heating



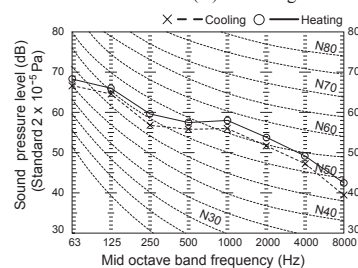
Model FDC335KXZE2

Noise level 63 dB (A) at cooling
62 dB (A) at heating



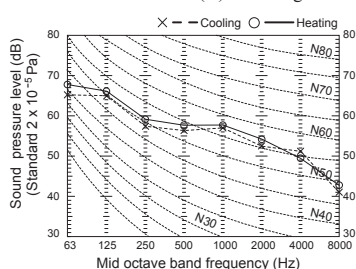
Model FDC400KXZE2

Noise level 60 dB (A) at cooling
62 dB (A) at heating



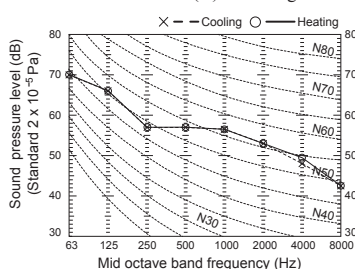
Model FDC450KXZE2

Noise level 61 dB (A) at cooling
62 dB (A) at heating



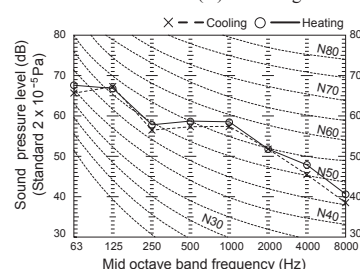
Model FDC475KXZE2

Noise level 61 dB (A) at cooling
61 dB (A) at heating



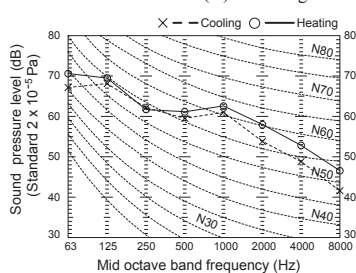
Model FDC500KXZE2

Noise level 61 dB (A) at cooling
62 dB (A) at heating



Model FDC560KXZE2

Noise level 63 dB (A) at cooling
64 dB (A) at heating



3. RANGE OF USAGE & LIMITATIONS

• Single use (also for combined use)

System		FDC280KXZE2	FDC335KXZE2	FDC400KXZE2	
Item					
Indoor air temperature (Upper, lower limits)		Refer to page 19.			
Outdoor air temperature (Upper, lower limits)		Refer to page 19.			
Indoor units that can be used in combination	Number of connected units	1 to 37 units	1 to 44 units	1 to 53 units	
	Connectable capacity ⁽¹⁾	140 - 560	168 - 670	200 - 800	
Total piping length ⁽²⁾		1000m or less			
Main pipe length		130m or less			
Single direction piping length		Actual length : 160m or less, Equivalent length : 185m or less			
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less ⁽⁶⁾)			
Elevation difference between the first branching point and the indoor unit		18m or less			
Difference in height between indoor and outdoor units	Outdoor unit is higher	50m or less (Max. 90m or less) ^{(5),(7)}			
	Outdoor unit is lower	40m or less ⁽³⁾			
Difference in the elevation of indoor units in a system		18m or less (Max. 30m or less) ⁽⁸⁾			
Indoor unit atmosphere (behind ceiling) temperature and humidity (Only models FDT, FDT, FDTW, FDT, FDTQ, FDU, FDUM, FDUT, FDUH, FDU-F)		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU, FDFW : Dew point temperature 23°C or less, relative humidity 80% or less)			
Compressor stop/start frequency	1 cycle time	5 min or more (from stop to stop or from start to start)			
	Stop time	3 min or more			
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage			
	Voltage drop during start	Within -15% of rated voltage			
	Phase unbalance	Within 3%			

System		FDC450KXZE2	FDC475KXZE2	FDC500KXZE2	FDC560KXZE2
Item					
Indoor air temperature (Upper, lower limits)		Refer to page 19.			
Outdoor air temperature (Upper, lower limits)		Refer to page 19.			
Indoor units that can be used in combination	Number of connected units	1 to 60 units	1 to 50 units	1 to 53 units	1 to 59 units
	Connectable capacity ⁽¹⁾	225 - 900	238 - 760	250 - 800	280 - 896
Total piping length ⁽²⁾		1000m or less			
Main pipe length		130m or less			
Single direction piping length		Actual length : 160m or less, Equivalent length : 185m or less			
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less ⁽⁶⁾)			
Elevation difference between the first branching point and the indoor unit		18m or less			
Difference in height between indoor and outdoor units	Outdoor unit is higher	50m or less (Max. 90m or less) ^{(5),(7)}			
	Outdoor unit is lower	40m or less ⁽³⁾			
Difference in the elevation of indoor units in a system		18m or less (Max. 30m or less) ⁽⁸⁾			
Indoor unit atmosphere (behind ceiling) temperature and humidity (Only models FDT, FDT, FDTW, FDT, FDTQ, FDU, FDUM, FDUT, FDUH, FDU-F)		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU, FDFW : Dew point temperature 23°C or less, relative humidity 80% or less)			
Compressor stop/start frequency	1 cycle time	5 min or more (from stop to stop or from start to start)			
	Stop time	3 min or more			
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage			
	Voltage drop during start	Within -15% of rated voltage			
	Phase unbalance	Within 3%			

Notes (1) When connecting the indoor unit type FDK, FDFL, FDFU or FDFW Series, limit the connectable capacity not higher than 130%.

(2) When the pipe extension length exceeds 510m, additional refrigerant oil must be charged (1,000 cc).

(3) It must be less than 30m when conducting the cooling operation with the outdoor air temperature lower than 10°C.

(4) If superlink I (previous superlink) is selected, all the range of usage and limitations, not only the limitations of connectable indoor capacity and connectable number of indoor unit but also of the piping length, operating temperature range and etc., become same as those of KX4 (See technical manual '07-KX-KXR-T-114). In addition to above limitations, all of new functions for KX6 and KXZ such as automatic address setting function for multiple refrigerant systems and etc. will be cancelled.

(5) When it is required to install in a range of 50 to 90m, the limitation of use, etc. are different from those described here. For details, refer to page 20.

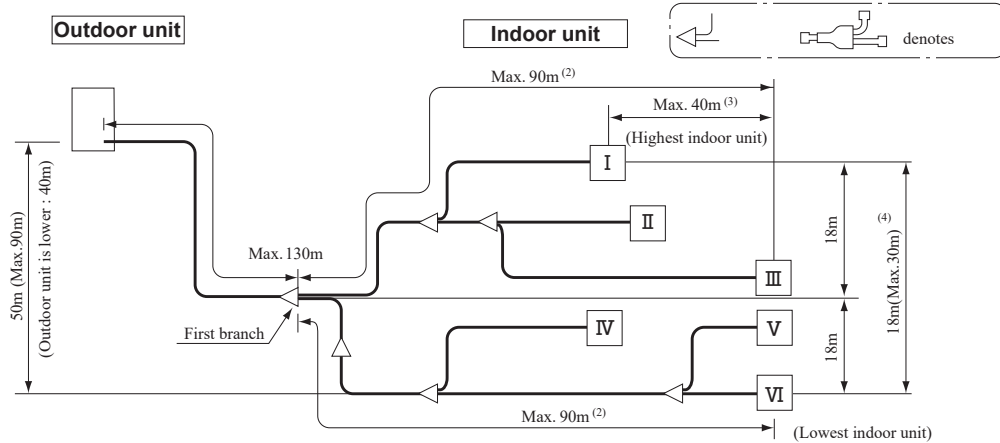
(6) When it is required to install in the difference between the longest and shortest piping more than 40m, refer to page 21.

(7) It must be 40m or less, when it is required to use at the outdoor air temperature higher than 43°C. (See page 21-3.)

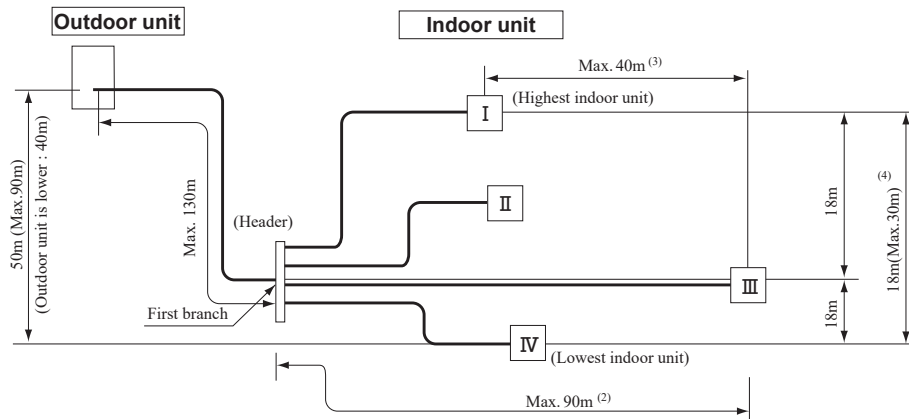
(8) If the difference in the elevation is 18 to 30m, the limitation of use, etc. are different from those described here. For details, refer to page 21-1.

Allowable length of refrigerant piping, height difference between indoor and outdoor unit

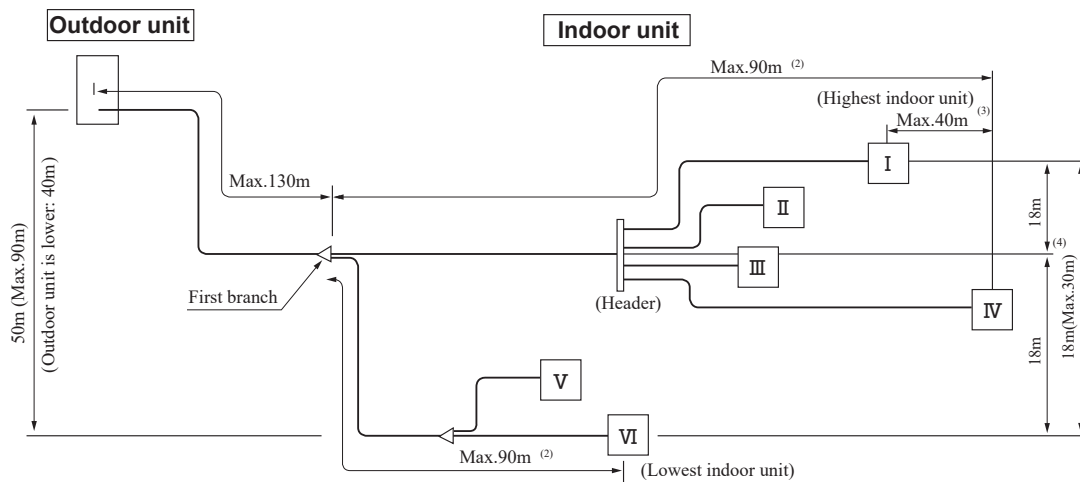
(1) Branch pipe System (Branch piping used)



(2) Header System (Header used)



(3) Mixed System (Branch piping and Header used)



- Note (1) A branch piping system cannot be connected after a header system.
- (2) 90m or less (However, difference between the longest and shortest piping : 40m or less ⁽³⁾)
- (3) When it is required to install the difference between the longest and shortest piping more than 40m, refer to page 21.
- (4) When it is required to install the difference in the elevation 18 to 30m, refer to page 21-1.

Important

When the Additional refrigerant quantity (P+I) is over the following table, please separate the refrigerant line.

Outdoor unit	P + I (kg)
280-670	40
735-950	90
1000-1350	80
1425-1680	100

P: Additional refrigerant quantity for piping (kg)
 I: Additional refrigerant quantity for indoor units (kg)

• Combination use

System		FDC615KXZE2	FDC670KXZE2	FDC735KXZE2	FDC800KXZE2	FDC850KXZE2
		Item				
Indoor air temperature (Upper, lower limits)		Refer to page 19.				
Outdoor air temperature (Upper, lower limits)						
Indoor units that can be used in combination	Number of connected units	2 to 65 units	2 to 71 units	2 to 78 units	2 to 80 units	2 to 80 units
	Connectable capacity ⁽¹⁾	308 – 984	335 – 1072	368 – 1176	400 – 1280	425 – 1360
Total piping length ⁽²⁾		1000m or less				
Single direction piping length		Actual length : 160m or less, Equivalent length : 185m or less				
Main pipe length		130m or less				
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less ⁽⁶⁾)				
Elevation difference between the first branching point and the indoor unit		18m or less				
Difference in height between indoor and outdoor units	Outdoor unit is higher	50m or less (Max.90m or less) ^{(5),(7)}				
	Outdoor unit is lower	40m or less ⁽³⁾				
Difference in the elevation of indoor units in a system		18m or less (Max.30m or less) ⁽⁸⁾				
Difference in height between outdoor units (Same system)		Max. 0.4m				
Difference between an outdoor unit and on outdoor unit side branch pipe		Max. 5m				
Length of oil equalization piping		Max. 10m				
Indoor unit atmosphere (behind ceiling) temperature and humidity Only models FDT, FDTC, FDTW, FDTS, FDTQ, FDU, FDUM, FDUT, FDUH, FDU-F		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU, FDFW : Dew point temperature 23 °C or less, relative humidity 80% or less)				
Compressor stop/start frequency	1 cycle time	5 min or more (from stop to stop or from start to start)				
	Stop time	3 min or more				
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage				
	Voltage drop during start	Within -15% of rated voltage				
	Phase unbalance	Within 3%				

System		FDC900KXZE2	FDC950KXZE2	FDC1000KXZE2	FDC1060KXZE2	FDC1120KXZE2
		Item				
Indoor air temperature (Upper, lower limits)		Refer to page 19.				
Outdoor air temperature (Upper, lower limits)						
Indoor units that can be used in combination	Number of connected units	2 to 80 units	2 to 80 units	2 to 80 units	2 to 80 units	2 to 80 units
	Connectable capacity	450 – 1440	475 – 1520	500 – 1300	530 – 1378	560 – 1456
Total piping length ⁽²⁾		1000m or less				
Single direction piping length		Actual length : 160m or less, Equivalent length : 185m or less				
Main pipe length		130m or less				
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less ⁽⁶⁾)				
Elevation difference between the first branching point and the indoor unit		18m or less				
Difference in height between indoor and outdoor units	Outdoor unit is higher	50m or less (Max.90m or less) ⁽⁵⁾				
	Outdoor unit is lower	40m or less ⁽³⁾				
Difference in the elevation of indoor units in a system		18m or less (Max.30m or less) ⁽⁸⁾				
Difference in height between outdoor units (Same system)		Max. 0.4m				
Difference between an outdoor unit and on outdoor unit side branch pipe		Max. 5m				
Length of oil equalization piping		Max. 10m				
Indoor unit atmosphere (behind ceiling) temperature and humidity Only models FDT, FDTC, FDTW, FDTS, FDTQ, FDU, FDUM, FDUT, FDUH, FDU-F		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU, FDFW : Dew point temperature 23 °C or less, relative humidity 80% or less)				
Compressor stop/start frequency	1 cycle time	5 min or more (from stop to stop or from start to start)				
	Stop time	3 min or more				
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage				
	Voltage drop during start	Within -15% of rated voltage				
	Phase unbalance	Within 3%				

- Notes (1) When connecting the indoor unit type FDK, FDFL, FDFU or FDFW Series, limit the connectable capacity not higher than 130%.
(2) When the pipe extension length exceeds 510m, additional refrigerant oil must be charged (1,000 cc).
(3) It must be less than 30m when conducting the cooling operation with the outdoor air temperature lower than 10°C.
(4) If superlink 1 (previous superlink) is selected, all the range of usage and limitations, not only the limitations of connectable indoor capacity and connectable number of indoor unit but also of the piping length, operating temperature range and etc., become same as those of KX4 (See technical manual '07-KX-KXR-T-114). In addition to above limitations, all of new functions for KX6 and KXZ such as automatic address setting function for multiple refrigerant systems and etc. will be cancelled.
(5) When it is required to install in a range of 50 to 90m, the limitation of use, etc. are different from those described here. For details, refer to page 20.
(6) When it is required to install in the difference between the longest and shortest piping more than 40m, refer to page 21.
(7) It must be 40m or less, when it is required to use at the outdoor air temperature higher than 43°C. (See page 21-3.)
(8) If the difference in the elevation is 18 to 30m, the limitation of use, etc. are different from those described here. For details, refer to page 21-1.

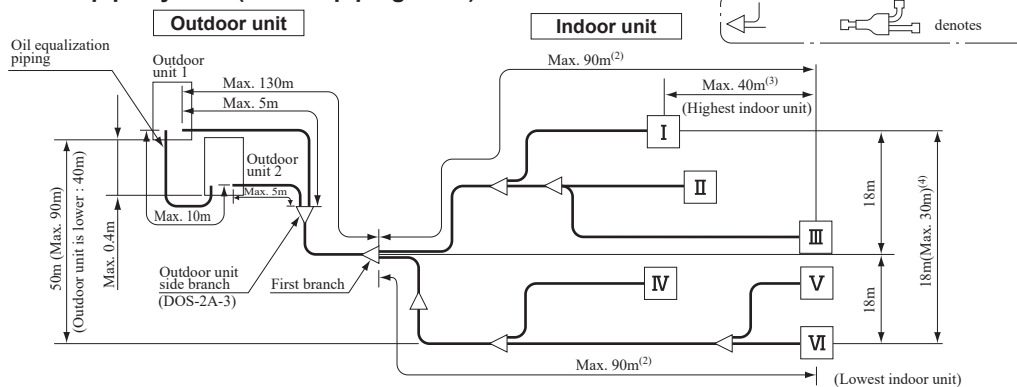
System		System				
		FDC1200KXZE2	FDC1250KXZE2	FDC1300KXZE2	FDC1350KXZE2	FDC1425KXZE2
Item						
Indoor air temperature (Upper, lower limits)		Refer to page 19.				
Outdoor air temperature (Upper, lower limits)						
Indoor units that can be used in combination	Number of connected units	3 to 80 units	3 to 80 units	3 to 80 units	3 to 80 units	3 to 80 units
	Connectable capacity ⁽¹⁾	600 – 1560	625 – 1625	650 – 1690	675 – 1755	713 – 1852
Total piping length ⁽²⁾		1000m or less				
Single direction piping length		Actual length : 160m or less, Equivalent length : 185m or less				
Main pipe length		130m or less				
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less ⁽⁶⁾)				
Elevation difference between the first branching point and the indoor unit		18m or less				
Difference in height between indoor and outdoor units	Outdoor unit is higher	50m or less (Max.90m or less) ^{(5),(7)}				
	Outdoor unit is lower	40m or less ⁽³⁾				
Difference in the elevation of indoor units in a system		18m or less (Max.30m or less) ⁽⁸⁾				
Difference in height between outdoor units (Same system)		Max. 0.4m				
Difference between an outdoor unit and on outdoor unit side branch pipe		Max. 5m				
Length of oil equalization piping		Max. 10m				
Indoor unit atmosphere (behind ceiling) temperature and humidity Only models FDT, FDTC, FDTW, FDTS, FDTQ, FDU, FDUM, FDUT, FDUH, FDU-F		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU, FDFW : Dew point temperature 23 °C or less, relative humidity 80% or less)				
Compressor stop/start frequency	1 cycle time	5 min or more (from stop to stop or from start to start)				
	Stop time	3 min or more				
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage				
	Voltage drop during start	Within –15% of rated voltage				
	Phase unbalance	Within 3%				

System		System				
		FDC1450KXZE2	FDC1500KXZE2	FDC1560KXZE2	FDC1620KXZE2	FDC1680KXZE2
Item						
Indoor air temperature (Upper, lower limits)		Refer to page 19.				
Outdoor air temperature (Upper, lower limits)						
Indoor units that can be used in combination	Number of connected units	3 to 80 units	3 to 80 units	3 to 80 units	3 to 80 units	3 to 80 units
	Connectable capacity	725 – 1885	750 – 1950	780 – 2028	810 – 2106	840 – 2184
Total piping length ⁽²⁾		1000m or less				
Single direction piping length		Actual length : 160m or less, Equivalent length : 185m or less				
Main pipe length		130m or less				
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less ⁽⁶⁾)				
Elevation difference between the first branching point and the indoor unit		18m or less				
Difference in height between indoor and outdoor units	Outdoor unit is higher	50m or less (Max.90m or less) ^{(5),(7)}				
	Outdoor unit is lower	40m or less ⁽³⁾				
Difference in the elevation of indoor units in a system		18m or less (Max.30m or less) ⁽⁸⁾				
Difference in height between outdoor units (Same system)		Max. 0.4m				
Difference between an outdoor unit and on outdoor unit side branch pipe		Max. 5m				
Length of oil equalization piping		Max. 10m				
Indoor unit atmosphere (behind ceiling) temperature and humidity Only models FDT, FDTC, FDTW, FDTS, FDTQ, FDU, FDUM, FDUT, FDUH, FDU-F		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU, FDFW : Dew point temperature 23 °C or less, relative humidity 80% or less)				
Compressor stop/start frequency	1 cycle time	5 min or more (from stop to stop or from start to start)				
	Stop time	3 min or more				
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage				
	Voltage drop during start	Within –15% of rated voltage				
	Phase unbalance	Within 3%				

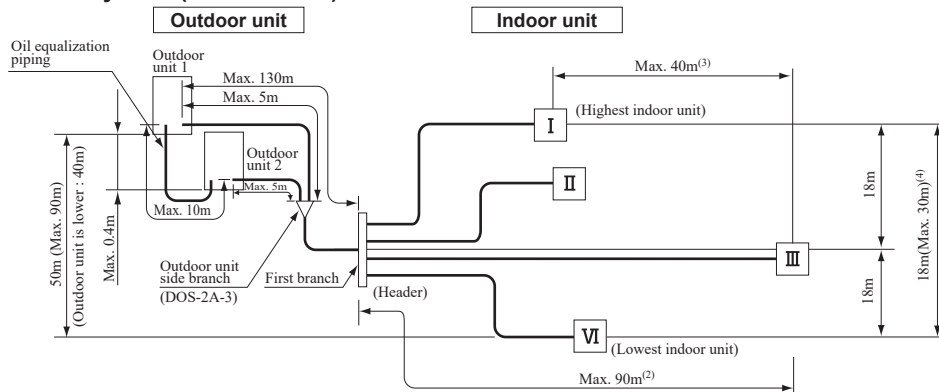
- Notes (1) When connecting the indoor unit type FDK, FDFL, FDFU or FDFW Series, limit the connectable capacity not higher than 130%.
(2) When the pipe extension length exceeds 510m, additional refrigerant oil must be charged (1,000 cc).
(3) It must be less than 30m when conducting the cooling operation with the outdoor air temperature lower than 10°C.
(4) If superlink I (previous superlink) is selected, all the range of usage and limitations, not only the limitations of connectable indoor capacity and connectable number of indoor unit but also of the piping length, operating temperature range and etc., become same as those of KX4 (See technical manual '07-KX-KXR-T-114). In addition to above limitations, all of new functions for KX6 and KXZ such as automatic address setting function for multiple refrigerant systems and etc. will be cancelled.
(5) When it is required to install in a range of 50 to 90m, the limitation of use, etc. are different from those described here. For details, refer to page 20.
(6) When it is required to install in the difference between the longest and shortest piping more than 40m, refer to page 21.
(7) It must be 40m or less, when it is required to use at the outdoor air temperature higher than 43°C. (See page 21-3.)
(8) If the difference in the elevation is 18 to 30m, the limitation of use, etc. are different from those described here. For details, refer to page 21-1.

Allowable length of refrigerant piping, height difference between indoor and outdoor unit

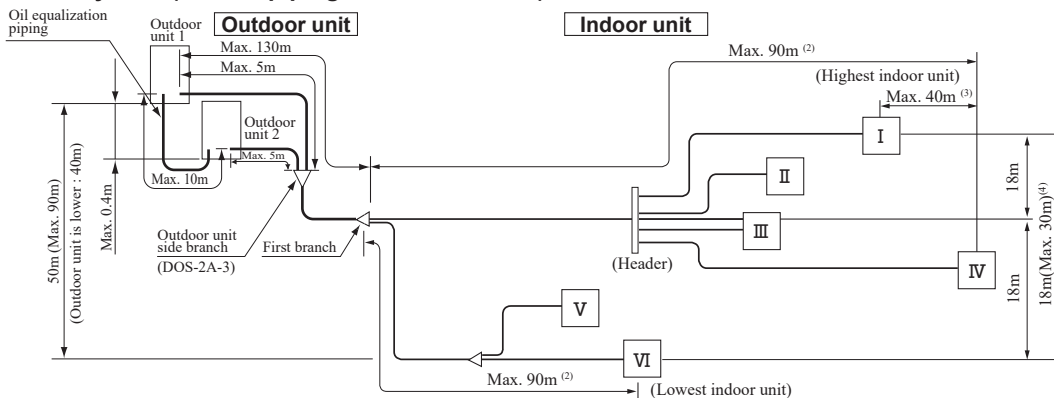
(1) Branch pipe system (Branch piping used)



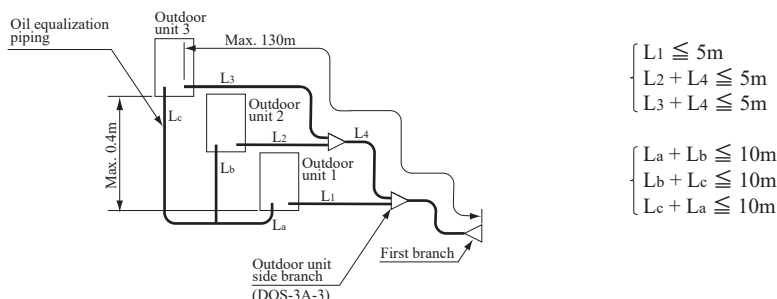
(2) Header system (Header used)



(3) Mixed system (Branch piping and header used)



(4) Pipe system for combination of 3 outdoor units (Displaying only outdoor units)



- Note (1) A branch piping system cannot be connected after a header system.
 (2) 90m or less (However, difference between the longest and shortest piping : 40m or less ⁽³⁾)
 (3) When it is required to install the difference between the longest and shortest piping more than 40m, refer to page 21.
 (4) When it is required to install the difference in the elevation 18 to 30m, refer to page 21-1.

Important

When the additional refrigerant quantity (P+I) is over the following table, please separate the refrigerant line.

Outdoor unit	P + I (kg)
280-670	40
735-950	90
1000-1350	80
1425-1680	100

P: Additional refrigerant quantity for piping (kg)
 I: Additional refrigerant quantity for indoor units (kg)

<Pipe size selection(for normal practice)>

(1) Outdoor unit – Outdoor unit side branching pipe:

Please use a pipe conforming to the pipe size specified for outdoor unit connection.
Indoor unit connecting pipe size table

Outdoor unit	Outdoor unit outlet pipe specifications					
	Gas pipe	Connection method	Liquid pipe	Connection method	Oil equalizing pipe	Connection method
280	φ 22.22 × t 1.0	Blazed	φ 9.52 × t 0.8	Flare	φ 9.52 × t 0.8 ※1	Flare
335	φ 25.4 (φ 22.22) × t 1.0					
400	φ 25.4 (φ 28.58) × t 1.0					
450	φ 28.58 × t 1.0					
475						
500						
560						

Pipe sizes applicable to European installations are shown in parentheses.

Please use C1220T-1/2H for φ 19.05 or larger pipes.

※1: Please connect the master and slave units with an oil equalization pipe, when they are used in a combined installation.

(It is not required, when a unit is used as a standalone installation)

When three outdoor units combination, please connect using a tee joint. (If contains in a branching pipe set for three units.)

(2) Main (Outdoor unit side branching pipe – Indoor unit side first branching pipe):

If the longest distance (measured between the outdoor unit and the farthest indoor unit) is 90m or longer (actual length), please change the main pipe size according to the table below.

Outdoor unit	Main pipe size (normal)		Pipe size for an actual length of 90m or longer	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
280	φ 22.22 × t 1.0	φ 9.52 × t 0.8	φ 25.4 (φ 22.22) × t 1.0	φ 12.7 × t 0.8
335	φ 25.4 (φ 22.22) × t 1.0	φ 12.7 × t 0.8		
400	φ 25.4 (φ 28.58) × t 1.0		φ 28.58 × t 1.0	
450	φ 28.58 × t 1.0		φ 31.8 × t 1.1 (φ 28.58 × t 1.0)	φ 15.88 × t 1.0
475				
500				
560				
615	φ 31.8 × t 1.1 (φ 34.92 × t 1.2)	φ 15.88 × t 1.0	φ 19.05 × t 1.0	
670				
735				
800				
850	φ 38.1 × t 1.35 (φ 34.92 × t 1.2)	φ 19.05 × t 1.0	φ 38.1 × t 1.35 (φ 34.92 × t 1.2)	φ 22.22 × t 1.0
900				
950				
1000				
1060				
1120				
1200				
1250				
1300				
1350				
1425				
1450				
1500				
1560				
1620				
1680				

Please use C1220T-1/2H for φ 19.05 or larger pipes.

Pipe sizes applicable to European installations are shown in parentheses.

(3) Indoor unit side first branching pipe – Indoor unit side branching pipe:

Please choose from the table below an appropriate pipe size as determined by the total capacity of indoor units connected downstream, provided, however, that the pipe size for this section should not exceed the main size (Section B in Figure 1).

Total capacity of indoor units	Gas pipe	Liquid pipe
Less than 70	φ 12.7 × t 0.8	φ 9.52 × t 0.8
70 or more but less than 180	φ 15.88 × t 1.0	
180 or more but less than 371	φ 19.05 × t 1.0 *1	φ 12.7 × t 0.8
371 or more but less than 540	φ 25.4 × t 1.0 (φ 28.58)	φ 15.88 × t 1.0
540 or more but less than 700	φ 28.58 × t 1.0	
700 or more but less than 1100	φ 31.8 × t 1.1 (φ 34.92 × t 1.2)	φ 19.05 × t 1.0
1100 or more	φ 38.1 × t 1.35 (φ 34.92 × t 1.2)	

Please use C1220T-1/2H for φ 19.05 or larger pipes.

Pipe sizes applicable to European installations are shown in parentheses.

*1: When connecting indoor units of 280 at the downstream and the main gas pipe is of φ 22.22 or larger, use the pipe of φ 22.22 × t 1.0.

(4) Indoor unit side branching pipe – Indoor unit:

Indoor unit connection pipe size table

Indoor unit	Capacity	Gas pipe	Liquid pipe
		15, 22, 28	φ 9.52 × t 0.8
36, 45, 56		φ 12.7 × t 0.8	
71, 90, 112, 140, 160		φ 15.88 × t 1.0	φ 9.52 × t 0.8
224		φ 19.05 × t 1.0	
280		φ 22.22 × t 1.0	

Please use C1220T-1/2H for φ 19.05 or larger pipes.

(5) Selection of pipe between outdoor branch pipes for 3-unit combination:

Size of pipe between outdoor branch pipes varies depending on the capacity of outdoor unit which is connected to second branch pipe in the outdoors.

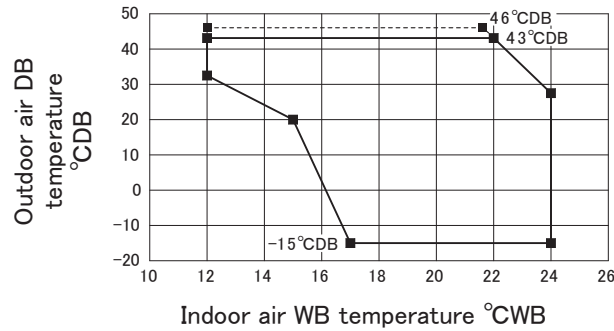
Select it from the following table.

Total capacity of outdoor units connected to second branch pipe in the outdoors	Size of pipe between branch pipes	
	Gas pipe	Liquid pipe
580, 615, 670	φ 28.58 × t 1.0	φ 12.7 × t 0.8
735, 800, 850, 900, 950	φ 31.8 × t 1.1 (φ 34.92 × t 1.2)	φ 15.88 × t 1.0
975, 1000	φ 38.1 × t 1.34	
1060, 1120	(φ 34.92 × t 1.2)	φ 19.05 × t 1.0

Use C1220T-1/2H material for φ 19.05 or larger.

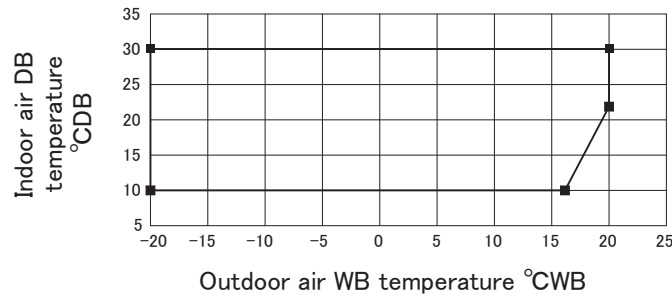
Operating temperature range

Cooling operation



*In case it is the promised installation location that the outdoor unit is used on conditions with the ambient temperature of 43°C or more, refer to pages 8, 9 (2.2 Exterior dimensions) and page 21-3.
 *This model can be installed up to 52°C. Detail limitation of use is in page 21-3.

Heating operation



“CAUTION” Cooling operation under low outdoor air temperature conditions

KXZ models can be operated in cooling mode at low outdoor air temperature condition within above temperature range. However in case of severely low temperature conditions if the following precaution is not observed, it may not be operated in spite of operable temperature range mentioned above and cooling capacity may not be established under certain conditions.

[Precaution]

In case of severely low temperature condition

- 1) Install the outdoor unit at the place where strong wind cannot blow directly into the outdoor unit.
- 2) If there is no installation place where can prevent strong wind from directly blowing into the outdoor unit, prepare a windbreak fence or something like that locally in order to divert the strong wind from the outdoor unit.

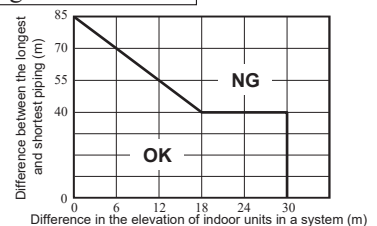
[Reason]

Under the low outdoor air temperature conditions of -5°C or lower, if strong wind directly blow into the outdoor unit, the outdoor heat exchanger temperature will drop, even though the outdoor fan is stopped by outdoor fan control. This makes high and low pressures to drop as well. This low pressure drop makes the indoor heat exchanger temperature to drop and will activate anti-frost control at indoor heat exchanger at frequent intervals, that cooling operation may not be established for any given time.

Specification for installation with the difference between the longest and shortest piping more than 40m

When the difference between the longest and shortest piping is longer than 40m, adjust the difference in the elevation of indoor units in a system such that it will fall in the OK range on the following graph.
 When the difference in the elevation between the indoor and the outdoor units is 50m – 90m or difference in the elevation of indoor units in a system is 18m – 30m, the difference between the longest and shortest piping cannot exceed 40m. Reduce it to less than 40m.

If the refrigerant quantity over occurs when the difference between the longest and shortest piping is longer than 40m, there is a risk that the heating capacity becomes insufficient. Take sufficient care to adjust the additional refrigerant quantity at correct value.



Specification for installation with large head difference (Applicable to: FDC280 - 1680KXZE2)

In case when the outdoor unit is installed at a higher place and **the difference in the elevation between the indoor and the outdoor units is larger than 50m and smaller than 90m**, the limitation on application differs partially from ordinary applications and, instead, the following specification applies. The pipe size, refrigerant amount and way of switch setting become also different.

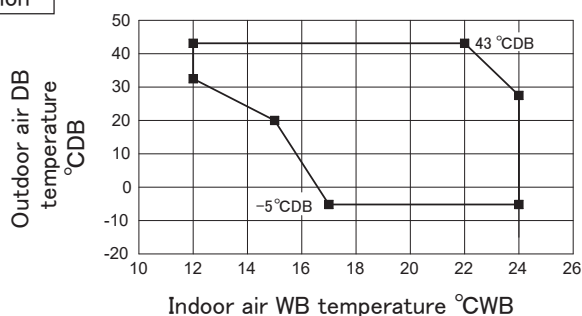
In the range of use, **the outdoor air temperature (lower limit), indoor units allowed to combine, total piping length and difference in the elevation between indoor units in the same system** are different from ordinary applications.

Table 1 Range of use

Item		FDC280-1680KXZE2
Indoor air temperature (Upper, lower limits)		Refer to Table 2.
Outdoor air temperature (Upper, lower limits)		
Indoor units that can be used in combination	Number of connected units	Refer to Table 3.
	Connectable capacity	
Total piping length		510m or less
Main pipe length		130m or less
Single direction piping length		Actual length : 160m or less, Equivalent length : 185m or less
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less)
Allowable difference in the elevation	Elevation difference between the first branching point and the indoor unit	30m or less
	Outdoor unit is higher	50m or more-90m or less
	Outdoor unit is lower	40m or less
	Difference in the elevation of indoor units in a system	15m or less
Limitation on piping from outdoor unit to branching pipe at outdoor unit side	Difference in the elevation	0.4m or less
	Elevation from outdoor unit to branching pipe at outdoor unit side	5m or less
	Oil equalizing pipe length	10m or less
	Length between outdoor branching pipes for a combination of 3 units	5m or less
Indoor unit atmosphere (behind ceiling) temperature and humidity Only models FDT,FDTC,FDTW,FDTQ,FDTS,FDU,FDUM,FDUH,FDUT		Dew point temperature 28°C or less, relative humidity 80% or less (FDT,FDK,FDL,FDU,FDW : Dew point temperature 28°C or less, relative humidity 80% or less)
Compressor stop/start frequency	1 cycle time	5 min or less (from stop to stop or from start to start)
	Stop time	3 min or more
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage
	Voltage drop during start	Within -15% of rated voltage
	Phase unbalance	Within 3%

Table 2 Indoor air temperature/Outdoor air temperature

Cooling operation



Heating operation

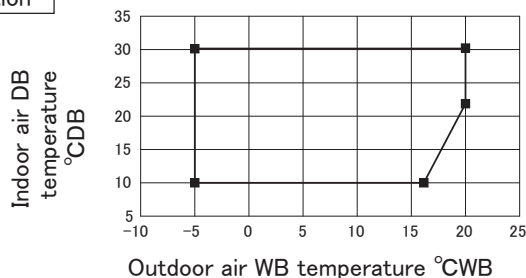


Table 3 Number of connectable indoor units and capacity range

Model/Item	Number of connectable units	Connectable capacity
FDC280KXZE2	1 to 1 8	140 - 280
FDC335KXZE2	1 to 2 2	168 - 335
FDC400KXZE2	1 to 2 6	200 - 400
FDC450KXZE2	1 to 3 0	225 - 450
FDC475KXZE2	1 to 3 1	238 - 475
FDC500KXZE2	1 to 3 3	250 - 500
FDC560KXZE2	1 to 3 7	280 - 560
FDC615KXZE2	2 to 4 1	308 - 615
FDC670KXZE2	2 to 4 4	335 - 670
FDC735KXZE2	2 to 4 9	368 - 735
FDC800KXZE2	2 to 5 3	400 - 800
FDC850KXZE2	2 to 5 6	425 - 850
FDC900KXZE2	2 to 6 0	450 - 900
FDC950KXZE2	2 to 6 3	475 - 950
FDC1000KXZE2	2 to 6 6	500 - 1000
FDC1060KXZE2	2 to 7 0	530 - 1060
FDC1120KXZE2	2 to 7 4	560 - 1120
FDC1200KXZE2	3 to 8 0	600 - 1200
FDC1250KXZE2	3 to 8 0	625 - 1250
FDC1300KXZE2	3 to 8 0	650 - 1300
FDC1350KXZE2	3 to 8 0	675 - 1350
FDC1425KXZE2	3 to 8 0	713 - 1425
FDC1450KXZE2	3 to 8 0	725 - 1450
FDC1500KXZE2	3 to 8 0	750 - 1500
FDC1560KXZE2	3 to 8 0	780 - 1560
FDC1620KXZE2	3 to 8 0	810 - 1620
FDC1680KXZE2	3 to 8 0	840 - 1680

<Pipe size selection>

In the figure for pipe selection, sizes of main pipe and the pipe between the branch at the indoor side and the indoor unit are selected on the basis different from normal practice.

(1) Main pipe (branch of the outdoor unit – first branch at the indoor side)

Size of liquid pipe is different. Change the size of main pipe according to Table 4.

When the maximum length (from the outdoor unit to the furthest indoor unit) is larger than 90m (actual length), change the size of main pipe according to Table 4.

Table 4 Main pipe size

Outdoor unit	Main pipe size (normal)		Pipe size for an actual length of 90m or longer	
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
280	$\phi 22.22 \times t 1.0$	$\phi 12.7 \times t 0.8$	$\phi 25.4 (\phi 22.22) \times t 1.0$	$\phi 15.88 \times t 1.0$
335	$\phi 25.4 (\phi 22.22) \times t 1.0$	$\phi 15.88 \times t 1.0$		
400	$\phi 25.4 (\phi 28.58) \times t 1.0$			
450	$\phi 28.58 \times t 1.0$		$\phi 28.58 \times t 1.0$	
475				
500			$\phi 31.8 \times t 1.1$ ($\phi 28.58 \times t 1.0$)	
560				$\phi 15.88 \times t 1.0$
615				
670				
735	$\phi 31.8 \times t 1.1$ ($\phi 34.92 \times t 1.2$)		$\phi 19.05 \times t 1.0$	
800				
850				
900				
950				
1000		$\phi 38.1 \times t 1.35$ ($\phi 34.92 \times t 1.2$)		$\phi 22.22 \times t 1.0$
1060				
1120				
1200				
1250				
1300				
1350				
1425				
1450				
1500				
1560				
1620				
1680				

(2) Between branch at the indoor side and indoor unit

Size of gas pipe for indoor unit with capacity larger than 112 is different. Change the size of pipe connected to indoor unit according to Table 5.

Table 5 Indoor unit connecting pipe size

Indoor unit	Capacity	Gas pipe	Liquid pipe
		15, 22, 28	$\phi 9.52 \times t 0.8$
36, 45, 56		$\phi 12.7 \times t 0.8$	
71, 90		$\phi 15.88 \times t 1.0$	
112, 140, 160		$\phi 19.05 \times t 1.0$	$\phi 9.52 \times t 0.8$
224		$\phi 22.22 \times t 1.0$	
280		$\phi 25.4 (\phi 28.58) \times t 1.0$	

(3) Refrigerant quantity

In addition to normal charge quantity for refrigerant pipes, charge quantity for the difference in capacity between the indoor and the outdoor units, and standard additional refrigerant quantity, measure and charge the additional refrigerant quantity for the installation with the difference in the elevation being over 50m and less than 90m.

Table 6 Additional refrigerant quantity for the installation with the difference in the elevation being over 50m and less than 90m

Outdoor unit	(kg)	Outdoor unit	(kg)	Outdoor unit	(kg)	Outdoor unit	(kg)	※High-COP combination	
280	0.3	615	0.8	1000	1.6	1425	2.4	Outdoor unit	(kg)
335	0.5	670	1.0	1060	1.7	1450	2.4	560	0.6
400	0.6	735	0.9	1120	1.8	1500	2.4	850	0.9
450	0.7	800	1.2	1200	1.8	1560	2.5	900	1.1
475	0.8	850	1.3	1250	1.9	1600	2.6	950	1.3
500	0.8	900	1.4	1300	2.0	1680	2.7	1000	1.5
560	0.9	950	1.6	1350	2.1			1060	1.6
								1120	1.7

(4) Microcomputer control

Setting of microcomputer control needs to be changed when the outdoor unit is installed upwards and the difference in elevation is larger than 50m and less than 90m. Make sure to set SW6-4 at ON position on both the master and slave units, before turning the power on.

Table 7 Setting of microcomputer control

Elevation difference	Setting	
	SW6-4	7-segment F32
50m - 70m	ON	0
70m - 90m		1

Specification for installation with large head difference between indoor units (Applicable to: FDC280 - 1680KXZE2)

In case of **the difference in the elevation between the indoor unit in a system is larger than 18m and smaller than 30m**, the limitation on application differs partially from ordinary applications and, instead, the following specification applies.

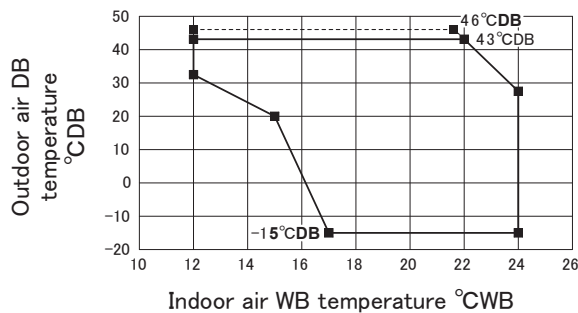
In the range of use, **indoor units allowed to combine, and allowable difference in the elevation between outdoor unit and indoor units in the same system** are different from ordinary applications.

Table 1 Range of use

Item		FDC280-1680KXZE2
Indoor air temperature (Upper, lower limits)		Refer to Table 2
Outdoor air temperature (Upper, lower limits)		
Indoor units that can be used in combination	Number of connected units	Refer to Table 3
	Connectable capacity	
Total piping length		1000m or less
Main pipe length		130m or less
Single direction piping length		Actual length : 160m or less, Equivalent length : 185m or less
Allowable pipe length from the first branching		90m or less (However, difference between the longest and shortest piping : 40m or less)
Allowable difference in the elevation	Elevation difference between the first branching point and the indoor unit	18m to 30m
	Outdoor unit is higher	50m or less (Up to 43°C) (See page 21-3 at higher temperature (43 to 46°C))
	Outdoor unit is lower	40m or less
	Difference in the elevation of indoor units in a system	18m to 30m
Limitation on piping from outdoor unit to branching pipe at outdoor unit side	Difference in the elevation	0.4m or less
	Elevation from outdoor unit to branching pipe at outdoor unit side	5m or less
	Oil equalizing pipe length	10m or less
	Length between outdoor branching pipes for a combination of 3 units	5m or less
Indoor unit atmosphere (behind ceiling) temperature and humidity Only models FDT,FDTC,FDTW,FDTQ,FDTs,FDU,FDUm,FDUH,FDUT		Dew point temperature 28°C or less, relative humidity 80% or less (FDT,FDK,FDL,FDU,FDW : Dew point temperature 28°C or less, relative humidity 80% or less)
Compressor stop/start frequency	1 cycle time	5 min or less (from stop to stop or from start to start)
	Stop time	3 min or more
Power source voltage	Voltage fluctuation	Within ±10% of rated voltage
	Voltage drop during start	Within -15% of rated voltage
	Phase unbalance	Within 3%

Table 2 Indoor air temperature/Outdoor air temperature

Cooling operation



Heating operation

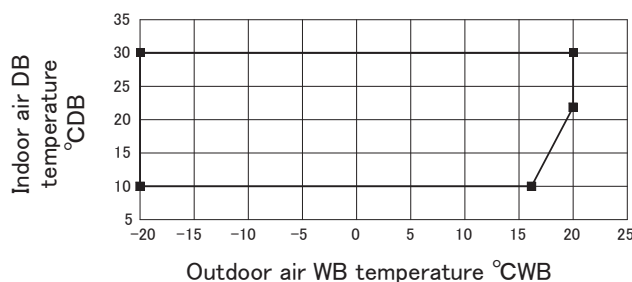


Table 3 Number of connectable indoor units and capacity range

Model/Item	Number of connectable units	Connectable capacity
FDC280KXZE2	1 to 1 8	140 - 280
FDC335KXZE2	1 to 2 2	168 - 335
FDC400KXZE2	1 to 2 6	200 - 400
FDC450KXZE2	1 to 3 0	225 - 450
FDC475KXZE2	1 to 3 1	238 - 475
FDC500KXZE2	1 to 3 3	250 - 500
FDC560KXZE2	1 to 3 7	280 - 560
FDC615KXZE2	2 to 4 1	308 - 615
FDC670KXZE2	2 to 4 4	335 - 670
FDC735KXZE2	2 to 4 9	368 - 735
FDC800KXZE2	2 to 5 3	400 - 800
FDC850KXZE2	2 to 5 6	425 - 850
FDC900KXZE2	2 to 6 0	450 - 900
FDC950KXZE2	2 to 6 3	475 - 950
FDC1000KXZE2	2 to 6 6	500 - 1000
FDC1060KXZE2	2 to 7 0	530 - 1060
FDC1120KXZE2	2 to 7 4	560 - 1120
FDC1200KXZE2	3 to 8 0	600 - 1200
FDC1250KXZE2	3 to 8 0	625 - 1250
FDC1300KXZE2	3 to 8 0	650 - 1300
FDC1350KXZE2	3 to 8 0	675 - 1350
FDC1425KXZE2	3 to 8 0	713 - 1425
FDC1450KXZE2	3 to 8 0	725 - 1450
FDC1500KXZE2	3 to 8 0	750 - 1500
FDC1560KXZE2	3 to 8 0	780 - 1560
FDC1620KXZE2	3 to 8 0	810 - 1620
FDC1680KXZE2	3 to 8 0	840 - 1680

<Pipe size selection>

In the figure for pipe selection, sizes of the pipe between the first branch and the branch at the indoor side, and the pipe between the branch at the indoor side and the indoor unit are selected on the basis different from normal practice.

(1) The pipe between the first branch and the branch at the indoor side

Size of gas pipe is different that includes the lower indoor unit more than 18m downstream.
Change the size of pipe according to Table 4.

Table 4 Middle branch pipe size

Total capacity of indoor units	Gas pipe	Liquid pipe
less than 70	$\phi 9.52 \times t0.8$	$\phi 9.52 \times t0.8$
more than 70 - less than 180	$\phi 12.7 \times t0.8$	
more than 180 - less than 371	$\phi 19.05 \times t1.0$	$\phi 12.7 \times t0.8$
more than 371 - less than 540	$\phi 25.4(\phi 28.58) \times t1.0$	$\phi 15.88 \times t1.0$
more than 540 - less than 700	$\phi 28.58 \times t1.0$	
more than 700 - less than 1100	$\phi 31.8 \times t1.1(\phi 34.92 \times t1.2)$	
more than 1100	$\phi 38.1 \times t1.35(\phi 34.92 \times t1.2)$	$\phi 19.05 \times t1.0$

(2) The pipe between the branch at the indoor side and the indoor unit

Size of gas pipe is different that includes the lower indoor unit more than 18m downstream.
Change the size of pipe according to Table 5.

Table 5 Indoor unit pipe size

Capacity		Gas pipe	Liquid pipe
Indoor unit	22	$\phi 6.35 \times t0.8$	$\phi 6.35 \times t0.8$
	28	$\phi 9.52 \times t0.8$	
	36, 45	$\phi 9.52 \times t0.8$	
	56	$\phi 12.7 \times t0.8$	
	71	$\phi 12.7 \times t0.8$	$\phi 9.52 \times t0.8$
	80, 90, 112, 140, 160	$\phi 15.88 \times t1.0$	
	224	$\phi 19.05 \times t1.0$	
	280	$\phi 22.22 \times t1.0$	

(3) Microcomputer control

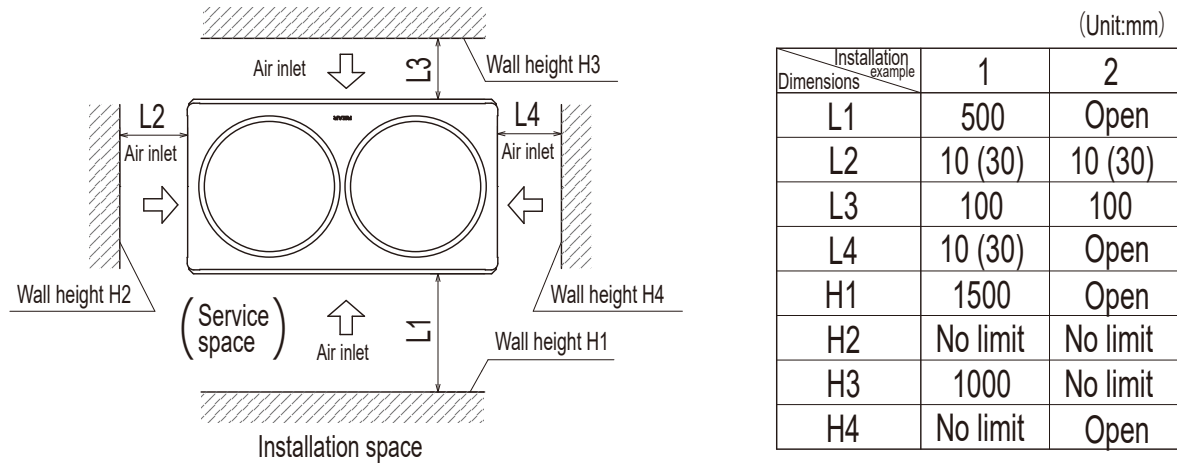
Setting of microcomputer control needs to be changed when the indoor unit is installed and the difference in elevation is larger than 18m and less than 30m.

Elevation difference	Setting
	7-segment F33
0m - 18m	0
18m - 30m	1

Specification for installation at high temperature (more than 43°C)

This model can be installed over than 46°C, up to 52°C of installing temperature.

- (1) If the unit is installed at high temperature (more than 43°C), installation limitation is different in the condition. Follow as in () below.



- (2) In case of installing at high temperature (more than 43°C) in cooling operation, allowable difference in height between indoor and outdoor units is different.

<Outdoor unit is higher>

Outdoor air DB temperature	Allowable difference in height between indoor and outdoor units		
	FDC280, 335	FDC400, 450	FDC475, 500, 560
≤ 43°C (Standard range)	90m	90m	90m
43°C < , ≤ 50°C	※	※	※
50°C < , ≤ 52°C	20m	20m	20m

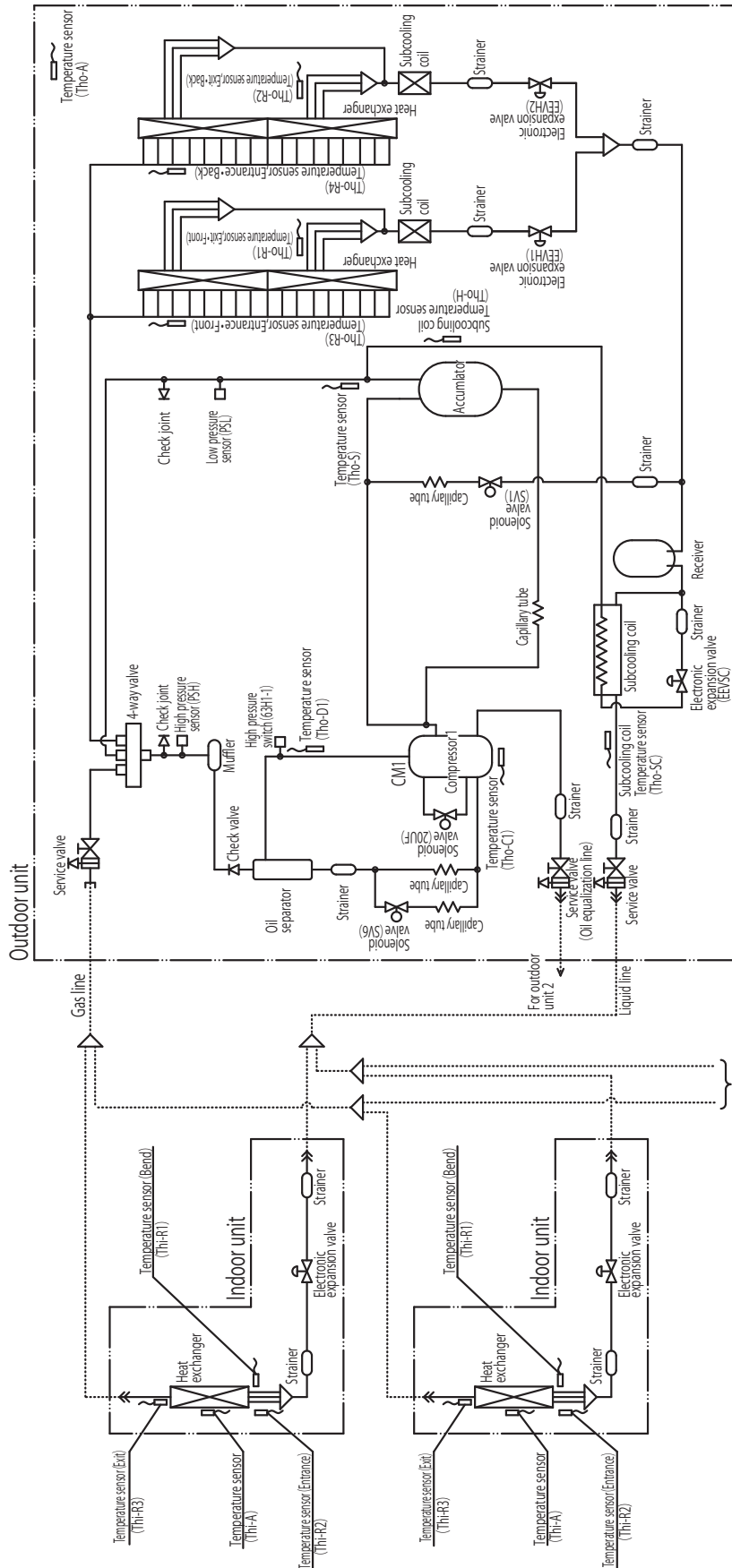
※If main pipe max length ≤ less or 90m : 40m or less
 If main pipe max length > 90m : 30m or less

<Outdoor unit is lower>

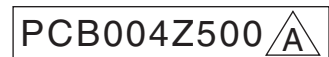
Outdoor air DB temperature	Allowable difference in height between indoor and outdoor units		
	FDC280, 335	FDC400, 450	FDC475, 500, 560
< 10°C	30m	30m	30m
10°C ≤ , ≤ 52°C	40m	40m	40m

- (3) In case of installing at high temperature (more than 46°C) in cooling operation, allowable difference in height between indoor units is limited 18m or less.

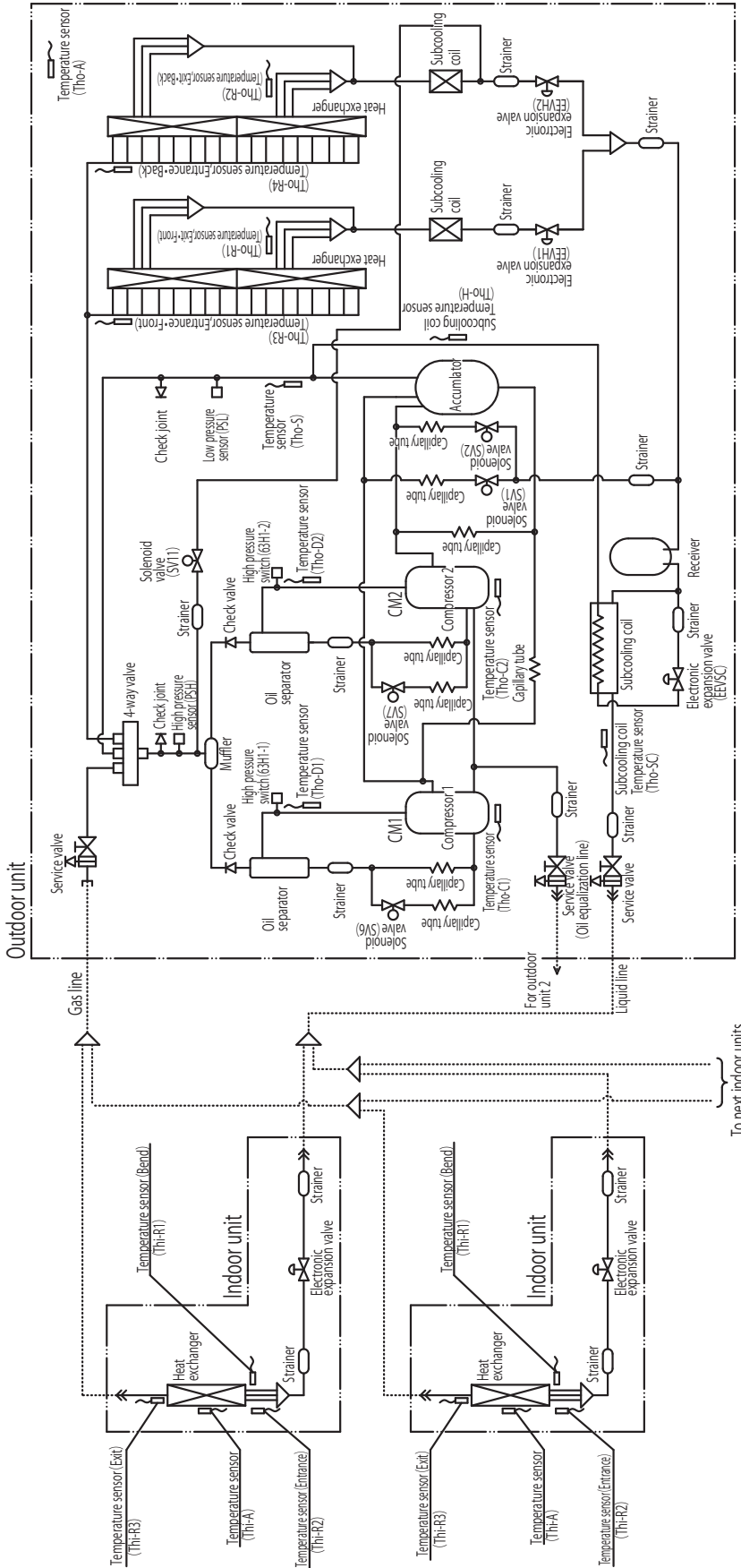
Models FDC400KXZE2, 450KXZE2



- Notes (1) Preset point of protective devices
 63HI-1 : Open 4.15MPa, Close 3.15MPa
 (For protection)
- (2) Function of temperature sensor
 PSH : For compressor control
 3.70 ON (MPa)
 PSL : ON 0.18MPa, OFF 0.20MPa
 (For compressor control)
 ON 0.134MPa, OFF 0.18MPa
 (For protection)
- Tho-R1, R2 : Heating operation : Indoor fan control
 Cooling operation : Frost prevention control
 Super heat control
- Tho-R3 : For super heat control of cooling operation
 Tho-D : For control of discharge pipe temperature
 Tho-C : For control of under-dome temperature
 Tho-S : For control of suction pipe temperature
 Tho-R1, R2 : For control of defrost operation
 Tho-A : For control of defrost operation
 Tho-R3, R4 : Electronic expansion valve (EEVH1, 2) control of heating operation
 Tho-SC : Electronic expansion valve (EEVSC) control of cooling operation
 Tho-H : For super heat control of subcooling coil



Models FDC475KXZE2, 500KXZE2, 560KXZE2

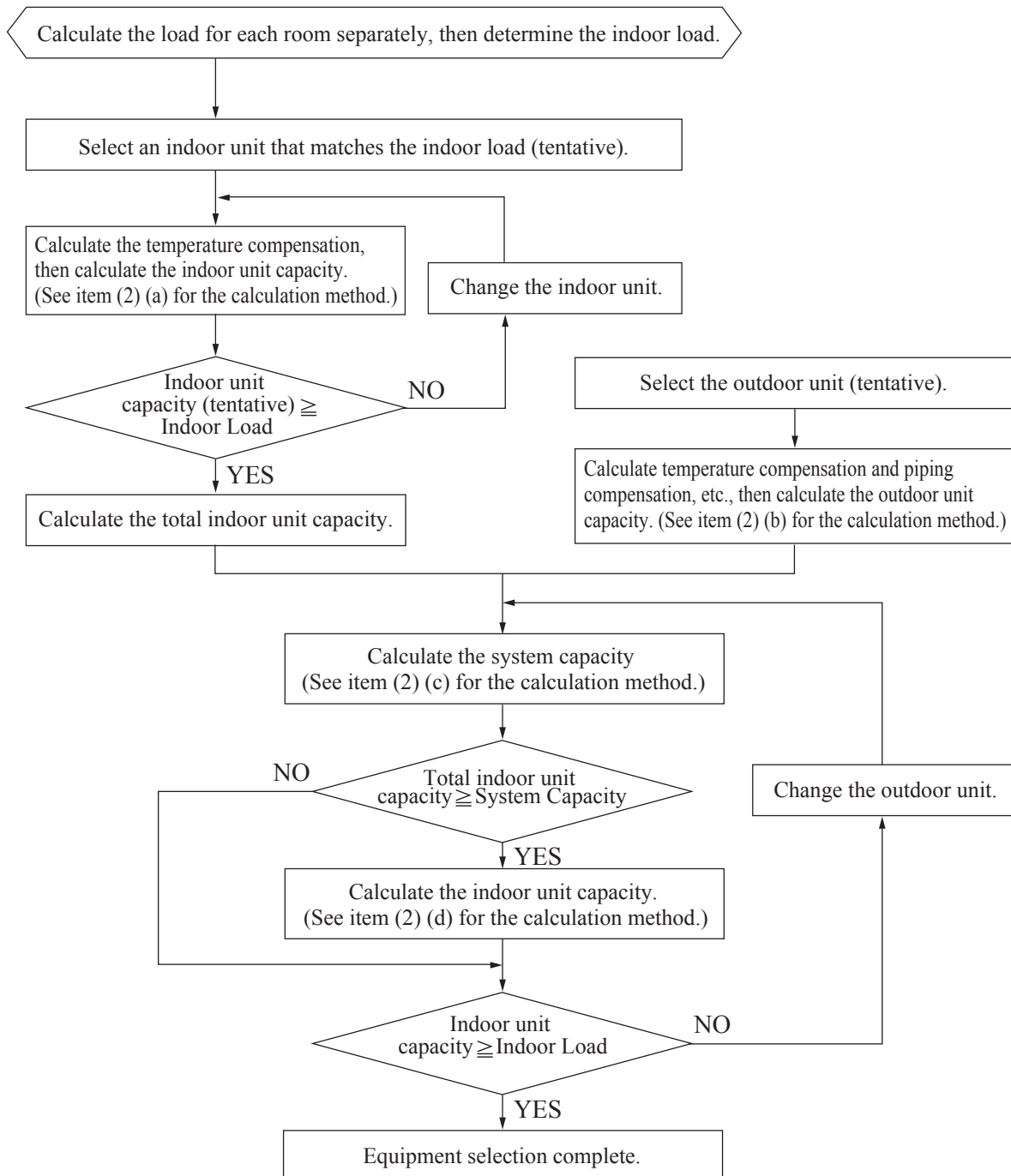


- Notes (1) Preset point of protective devices
 63HI-1, 2 : Open 4.15MPa, Close 3.15MPa
 (For protection)
- (2) Function of temperature sensor
 PSH : For compressor control
 3.70 ON (MPa)
 PSL : ON 0.18MPa, OFF 0.20MPa
 (For compressor control)
 ON 0.134MPa, OFF 0.18MPa
 (For protection)
- Tho-R1, R2 : Heating operation : Indoor fan control
 Cooling operation : Frost prevention control
 Super heat control
- Tho-R3 : For super heat control of cooling operation
 Tho-D1, D2 : For control of discharge pipe temperature
 Tho-C1, C2 : For control of under-dome temperature
 Tho-S : For control of suction pipe temperature
 Tho-R1, R2 : For control defrost operation
 Tho-A : For control defrost operation
 Tho-R3, R4 : Electronic expansion valve (EEVH1, 2) control of heating operation
 Tho-SC : Electronic expansion valve (EEVSC) control of cooling operation
 Tho-H : For super heat control of subcooling coil



5. SELECTION CHART

(1) Equipment selection flow



(2) Capacity calculation method

(a) Calculating the indoor unit capacity compensation

Indoor unit capacity (cooling, heating) = Indoor unit total rated capacity
 \times Capacity compensation coefficient according to temperature conditions
 See item (3) (a) concerning the capacity compensation coefficient according to temperature conditions.

(b) Calculating the outdoor unit capacity compensation

Outdoor unit capacity (Cooling, Heating) = Outdoor unit rated capacity (rated capacity when 100% connected)
 \times Capacity compensation coefficient according to temperature conditions
 \times Capacity compensation coefficient according to piping length
 \times Capacity compensation coefficient according to height difference

- × Correction of heating capacity in relation to the frost on the outdoor unit heat exchanger
- × Capacity compensation coefficient according to indoor unit connection capacity
- × Correction of cooling capacity in relation to the anti-frost on the indoor unit heat exchanger

- ① See item (3) (a) concerning the capacity compensation coefficient according to temperature conditions.
- ② See item (3) (b) concerning the capacity compensation coefficient according to piping length.
- ③ See item (3) (c) concerning the capacity compensation coefficient according to height difference. This compensation should be carried out only in cases where the outdoor unit is lower during cooling and higher during heating.
- ④ See item (3) (d) correction of heating capacity in relation to the frost on the outdoor unit heat exchanger. This compensation should be carried out only when calculating the heating capacity.
- ⑤ See item (3) (e) concerning the capacity compensation coefficient according to indoor unit connected capacity. This compensation should be carried out only in cases where the indoor unit total capacity is 100% or higher.
- ⑥ See item (3) (f) correction of cooling capacity in relation to the anti-frost on the indoor unit heat exchanger. This compensation should be carried out only when calculating the cooling capacity.

(c) Calculating system capacity

Compare the capacities determined in items (a) and (b) above and let the smaller value be the system capacity (cooling, heating).

- ① In cases where indoor unit total capacity (cooling, heating) > outdoor unit capacity (cooling, heating)
System capacity (cooling, heating) = Outdoor unit capacity (cooling, heating)
- ② In cases where indoor unit total capacity (cooling, heating) < outdoor unit capacity (cooling, heating)
System capacity (cooling, heating) = Indoor unit capacity (cooling, heating)

(d) Calculating indoor unit capacity [item (c) ① only]

Indoor unit capacity (cooling, heating) = System capacity (cooling, heating)
× [(Indoor unit capacity) / (Indoor unit total capacity)]

Capacity calculation examples

Example 1

Cooling (when the indoor unit connected total capacity is less than 100%)

- Outdoor unit FDC450KXZE2..... 1 unit
- Indoor unit FDT56KXZE1..... 7 units, All fan tap: P-Hi
- Piping length 60m (Equivalent length)
- Indoor, outdoor unit height difference 15m (Outdoor unit is lower.)
- Temperature conditions Outdoor temperature: 33°C DB
- Temperature conditions Indoor temperature: 19°C WB

<Indoor unit total cooling capacity>: Item (2) (a) calculation

- Indoor unit rated cooling capacity: 5.6 kW
- Capacity compensation coefficient according to temperature conditions:
1.02 (Calculated according to Indoor 19°C WB / Outdoor 33°C DB); (See page 28.)
Indoor unit cooling capacity: 5.6 kW × 1.02 ≈ 5.7 kW
- Indoor unit total cooling capacity calculation;
indoor unit total cooling capacity: 5.7 kW × 7 units = 39.9 kW

<Outdoor unit maximum cooling capacity> : Item (2) (b) calculation

- Outdoor unit rated cooling capacity: 45.0 kW
- Capacity compensation coefficient according to temperature conditions:
1.02 (Calculated according to Indoor 19°C WB / Outdoor 33°C DB); (See page 28.)
Outdoor unit cooling capacity: 45.0 kW × 1.02 ≈ 45.9 kW
- Capacity compensation coefficient according to piping length: 0.94 (calculated according to 60m length); (See page 30.)
45.9 kW × 0.94 ≈ 43.1 kW
- Correction of cooling capacity in relation to the anti-frost: 1.0 (calculated according to outdoor 33°C DB, Total capacity of concurrently operating indoor unit: $(56 \times 7) / 450 \approx 87\%$); (See page 48.)
Outdoor unit cooling capacity: 43.1 kW × 1.0 ≈ 43.1 kW
- Capacity compensation coefficient according to height difference: 0.97 (calculated according to 15 m difference); (See page 34.)
43.1 kW × 0.97 ≈ 41.8 kW
- Capacity compensation coefficient according to indoor unit connected total capacity: 1.0 ← $(56 \times 7) / 450 < 100\%$
No compensation

<System cooling capacity>: Item (2) (c) calculation

Compare the indoor unit total cooling capacity and the outdoor unit maximum cooling capacity. The smaller value is the actual system cooling capacity.

- Indoor unit total cooling capacity: 39.9 kW
 - Outdoor unit maximum cooling capacity: 41.8 kW
- ⇒ System cooling capacity: 39.9 kW

<Indoor unit capacity compensation> No compensation (5.7 kW)**Example 2****Cooling (when the indoor unit connected total capacity is 100% or higher)**

- Outdoor unit FDC450KXZE2..... 1 unit
- Indoor unit FDT56KXZE1..... 10 units, All fan tap: P-Hi
- Piping length 60m (Equivalent length)
- Indoor, outdoor unit height difference 15m (Outdoor unit is higher.)
- Temperature conditions Outdoor temperature: 35°C DB
- Temperature conditions Indoor temperature: 18°C WB

<Indoor unit total cooling capacity>: Item (2) (a) calculation.

- Indoor unit rated cooling capacity: 5.6 kW
- Capacity compensation coefficient according to temperature conditions:
0.95 (Calculated according to Indoor 18°C WB / Outdoor 35°C DB); (See page 28.)
Indoor unit cooling capacity: 5.6 kW × 0.95 = 5.3 kW
- Indoor unit total cooling capacity calculation;
indoor unit total cooling capacity: 5.3 kW × 10 units = 53.0 kW

<Outdoor unit maximum cooling capacity> : Item (2) (b) calculation

- Outdoor unit rated cooling capacity: 45.0 kW
- Capacity compensation coefficient according to temperature conditions:
0.95 (Calculated according to Indoor 18°C WB / Outdoor 35°C DB); (See page 28.)
Outdoor unit cooling capacity: 45.0 kW × 0.95 = 42.8 kW
- Capacity compensation coefficient according to piping length: 0.94 (calculated according to 60m length); (See page 30.)
42.8 kW × 0.94 = 40.2 kW
- Collection of cooling capacity in relation to the anti-frost: 1.0 (calculated according to outdoor 35°C DB, Total capacity of concurrently operating indoor unit: (56 × 10) / 450 = 124%)
40.2 kW × 1.0 = 40.2 kW
- Capacity compensation coefficient according to height difference: 1.0 (the outdoor unit is higher during cooling)
No compensation
- Capacity compensation coefficient according to indoor unit connected total capacity: 1.04 ← (56 × 10) / 450 = 124% (See page 36.)
40.2 kW × 1.04 = 41.8 kW

<System cooling capacity>: Item (2) (c) calculation

Compare the indoor unit total cooling capacity and the outdoor unit maximum cooling capacity. The smaller value is the actual system cooling capacity.

- Indoor unit total cooling capacity : 53.0 kW
 - Outdoor unit maximum cooling capacity : 41.8 kW
- ⇒ System cooling capacity: 41.8 kW

<Indoor unit cooling capacity Compensation>: Item (2) (d) calculation

$$\frac{41.8 \text{ kW} \times 5.3 \text{ kW}}{53.0 \text{ kW}} = \underline{4.2 \text{ kW}}$$

Example 3**Heating (when the indoor unit connected total capacity is 100% or higher)**

- Outdoor unit FDC450KXZE2..... 1 unit
- Indoor unit FDT56KXZE1..... 10 units
- Piping length 60m (Equivalent length)
- Indoor, outdoor unit height difference 20m (Outdoor unit is higher)
- Temperature conditions Outdoor temperature: 6°C WB
- Temperature conditions Indoor temperature: 19°C DB

<Indoor unit total heating capacity>: Item (2) (a) calculation

- Indoor unit rated heating capacity: 6.3 kW
- Capacity compensation coefficient according to temperature conditions:
1.04 (Calculated according to Outdoor 6°C WB / Indoor 19°C DB); (See page 29.)
Indoor unit heating capacity: 6.3 kW × 1.04 = 6.6 kW
- Indoor unit total heating capacity calculation;
indoor unit total heating capacity: 6.6 kW × 10 units = 66.0 kW

<Outdoor unit maximum heating capacity> : Item (2) (b) calculation

- Outdoor unit rated heating capacity: 50.0 kW
- Capacity compensation coefficient according to temperature conditions:
1.04 (Calculated according to Outdoor 6°C WB / Indoor 19°C DB); (See page 29.)
Outdoor unit heating capacity: 50.0 kW × 1.04 = 52.0 kW
- Capacity compensation coefficient according to piping length: 0.982 (calculated according to 60m length); (See page 33.)
52.0 kW × 0.982 = 51.0 kW
- Capacity compensation coefficient according to height difference: 0.96 (calculated according to 20m difference); (See page 34.)
51.0 kW × 0.96 = 49.0 kW
- Correction of heating capacity in relation to the frost on the outdoor unit heat exchanger:
1.0 (calculated according to 6°C WB); (See page 34.)
49.0 kW × 1.0 = 49.0 kW.
- Capacity compensation coefficient according to indoor unit connected total capacity: 1.0 ← (56 × 10) / 450 = 124% (See page 36.)
49.0 kW × 1.0 = 49.0 kW.

<System heating capacity> : Item (2) (c) calculation

Compare the indoor unit total heating capacity and the outdoor unit maximum heating capacity. The smaller value is the actual system heating capacity.

- Indoor unit total heating capacity : 66.0 kW ⇒ System heating capacity: 49.0 kW
- Outdoor unit maximum heating capacity : 49.0 kW

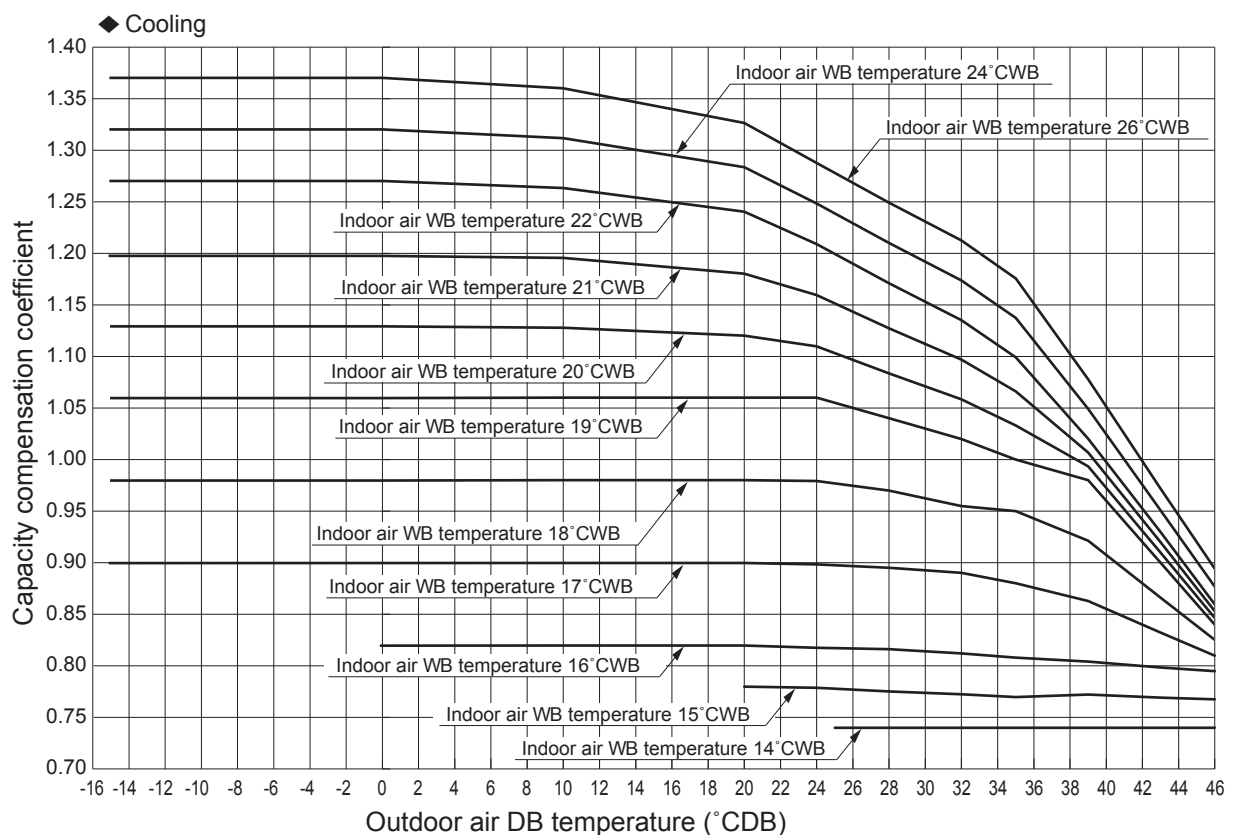
<Indoor unit heating capacity compensation> : Item (2) (d) calculation

$$\frac{49.0 \text{ kW} \times 6.6 \text{ kW}}{66.0 \text{ kW}} = 4.9 \text{ kW}$$

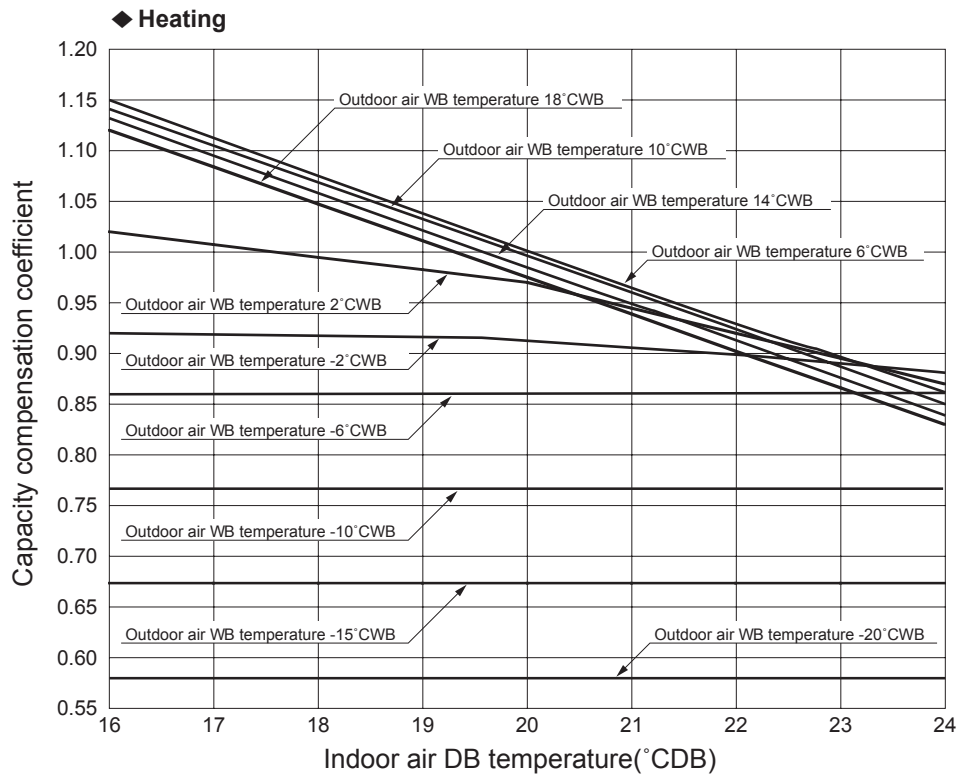
(3) Capacity compensation coefficient

(a) Capacity compensation coefficient and power consumption compensation coefficient according to indoor and outdoor temperature conditions.

1) Capacity compensation coefficient

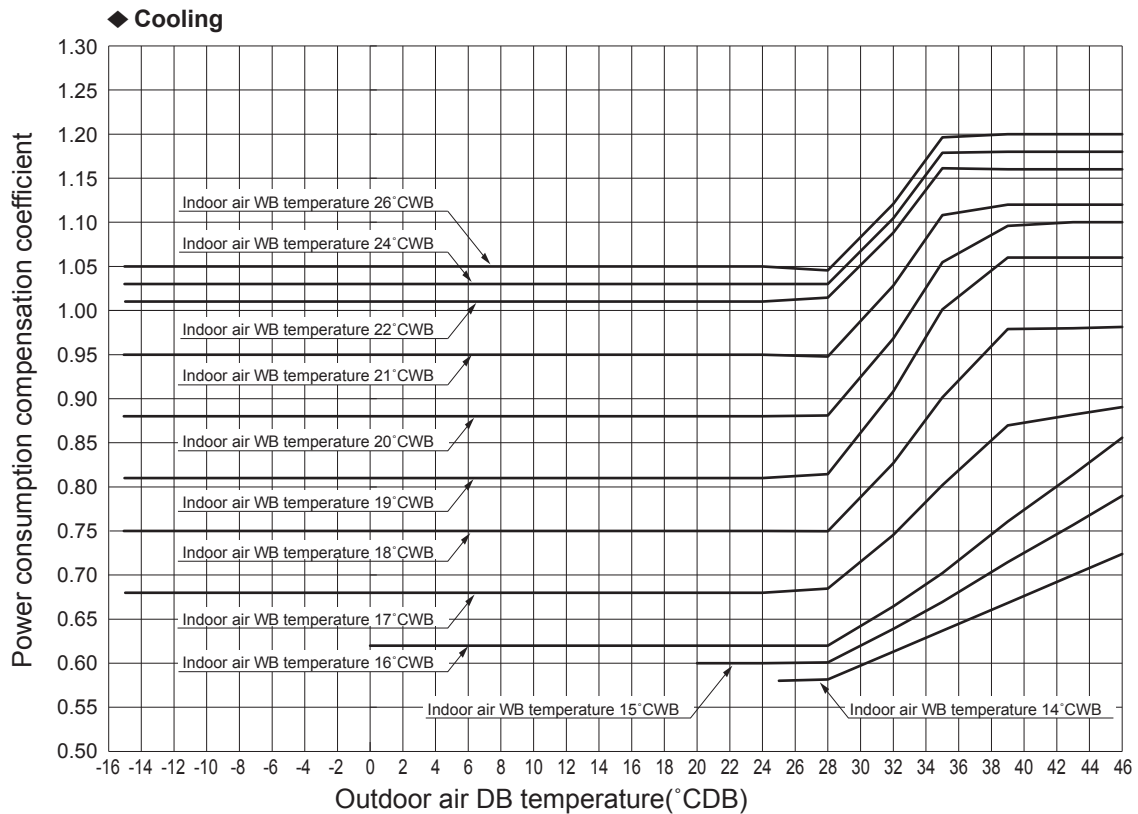


- Notes (1) The above-mentioned table shows a typical condition among conditions to occur via controlling an air-conditioning equipment.
 (2) When performing the cooling operation with the outdoor air temperature being -5°C or under, a windbreak fence must be installed.
 (3) The cooling capacity may decrease by frequent actuation of anti-frost control in low outdoor temperature. Please avoid using the air-conditioners for computer rooms or industrial uses which require annual cooling operation.

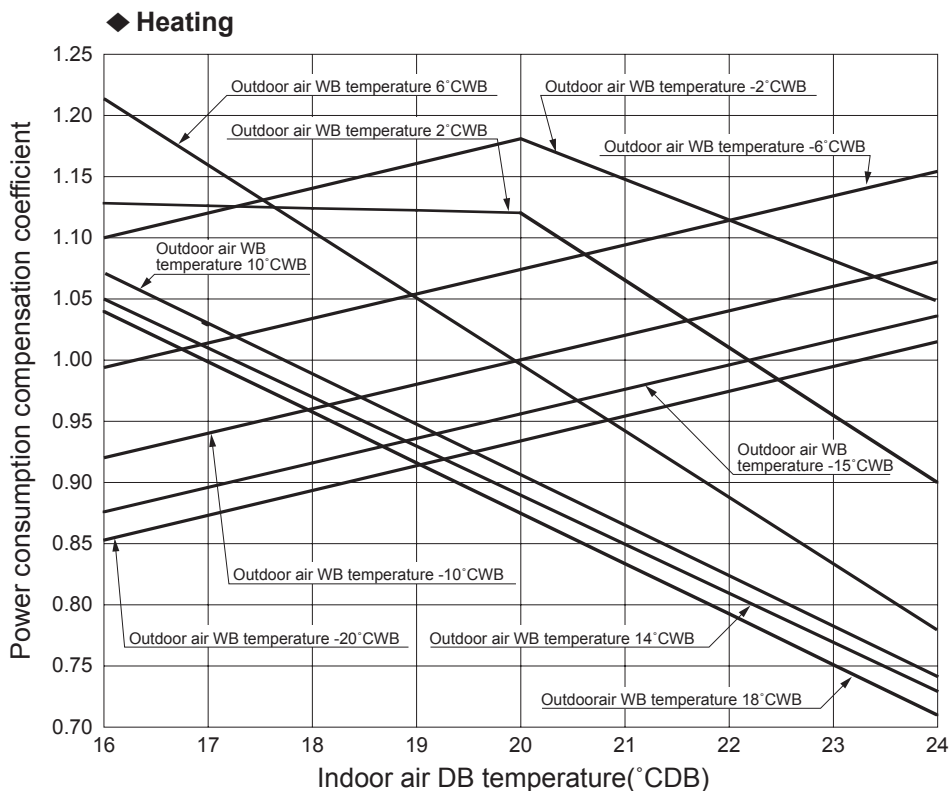


Note (1) The above-mentioned table shows a typical condition among conditions to occur via controlling an air-conditioning equipment.

2) Power consumption correction factor



Note (1) The above-mentioned table shows a typical condition among conditions to occur via controlling an air-conditioning equipment.

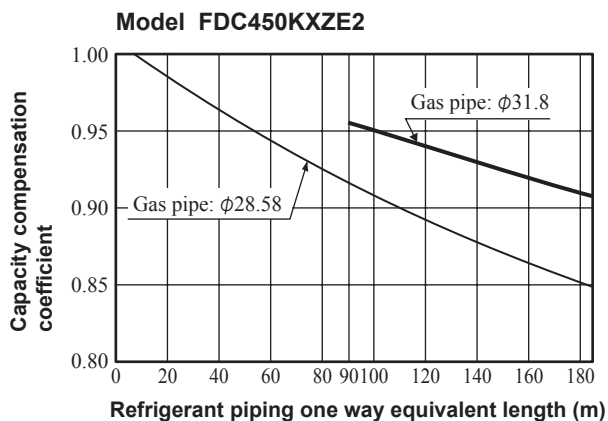
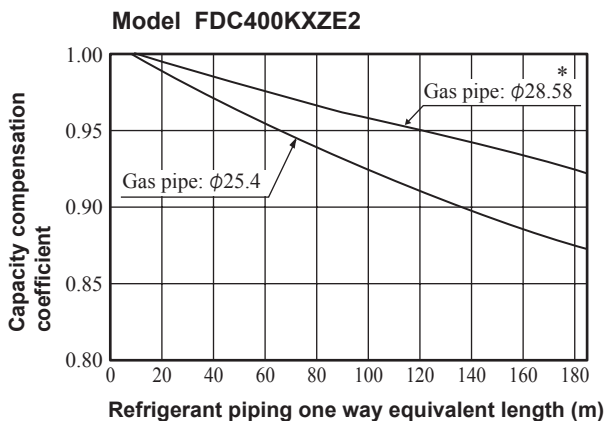
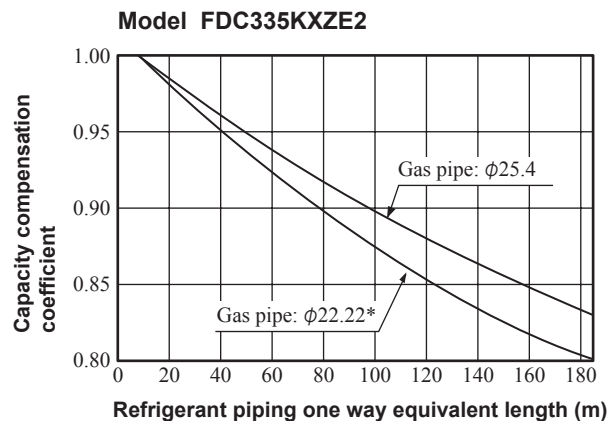
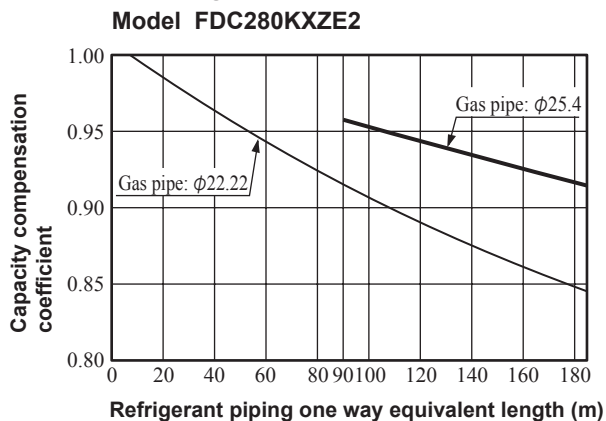


Note (1) The above-mentioned table shows a typical condition among conditions to occur via controlling an air-conditioning equipment.

(b) Correction of cooling and heating capacity in relation to one way length of refrigerant piping

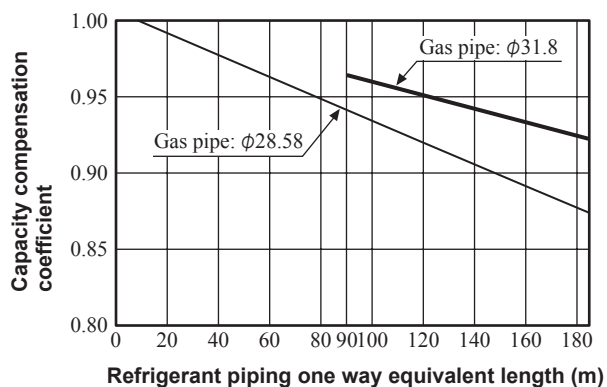
(Note) This table is for reference only. If the refrigerant piping one way equivalent after the first branch is extended longer than 40m, it could drop further by about 10% in the worst case.

1) Cooling

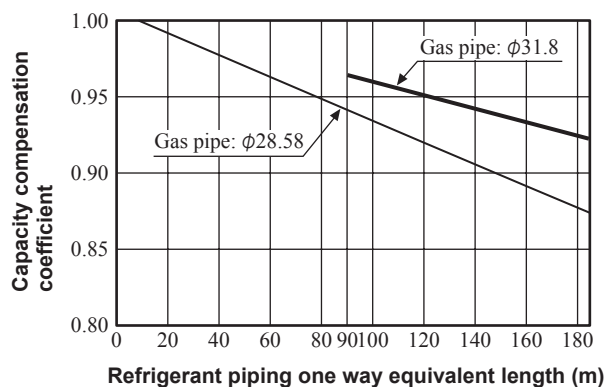


Note (1) Parts with the * mark show the piping size in case used in Europe.

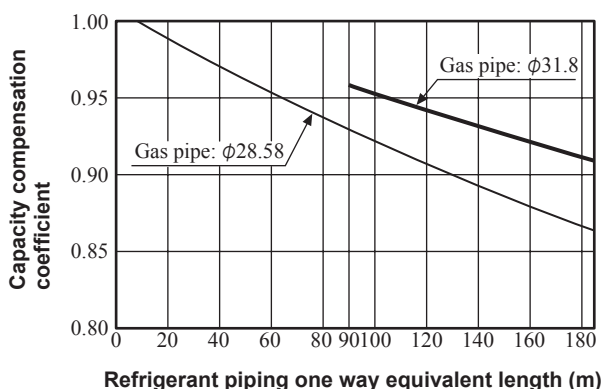
Model FDC475KXZE2



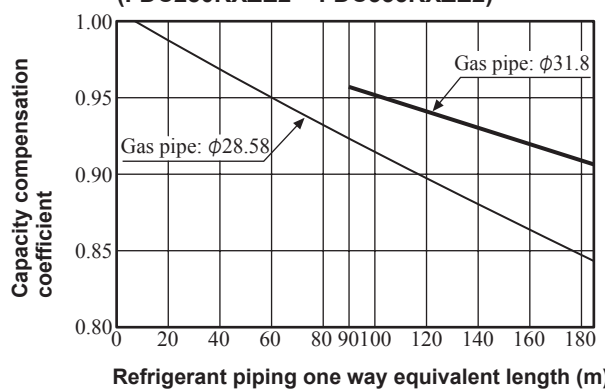
Model FDC500KXZE2



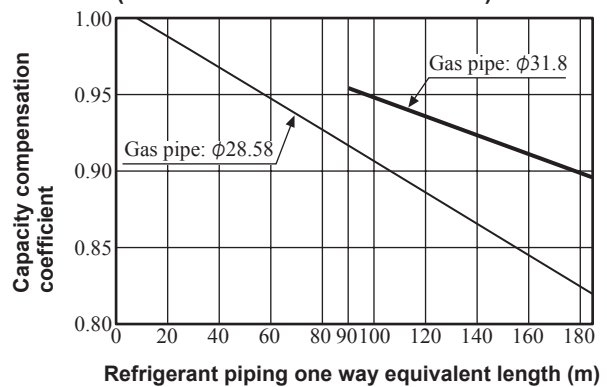
Model FDC560KXZE2



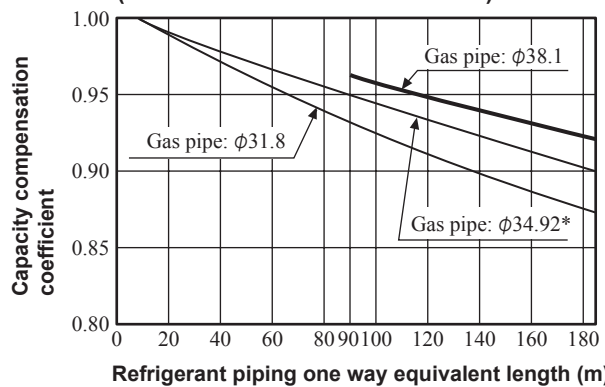
**Model FDC615KXZE2
(FDC280KXZE2 + FDC335KXZE2)**



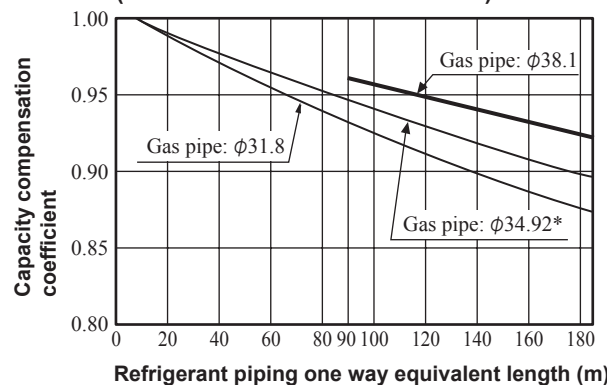
**Model FDC670KXZE2
(FDC335KXZE2 + FDC335KXZE2)**



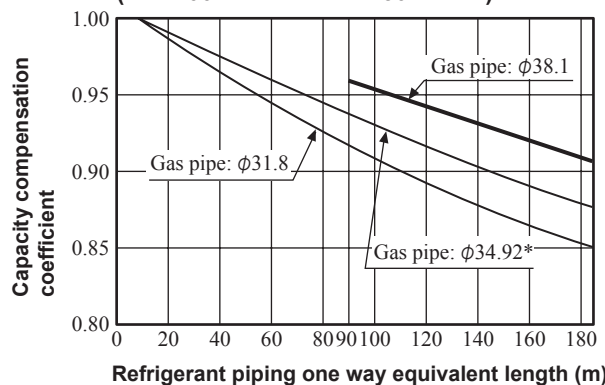
**Model FDC735KXZE2
(FDC335KXZE2 + FDC400KXZE2)**



**Model FDC800KXZE2
(FDC400KXZE2 + FDC400KXZE2)**

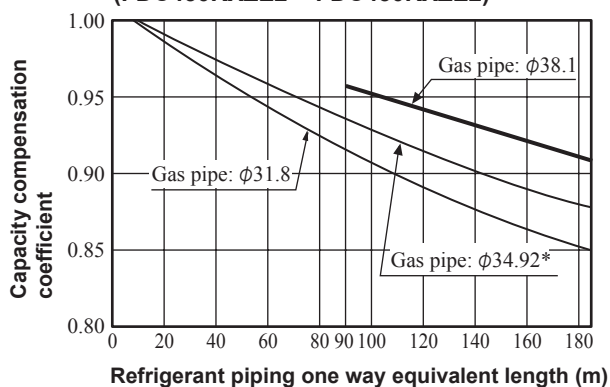


**Model FDC850KXZE2
(FDC400KXZE2 + FDC450KXZE2)**

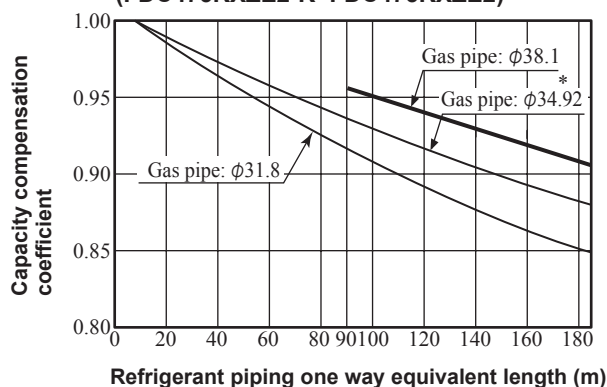


Note (1) Parts with the * mark show the piping size in case used in Europe.

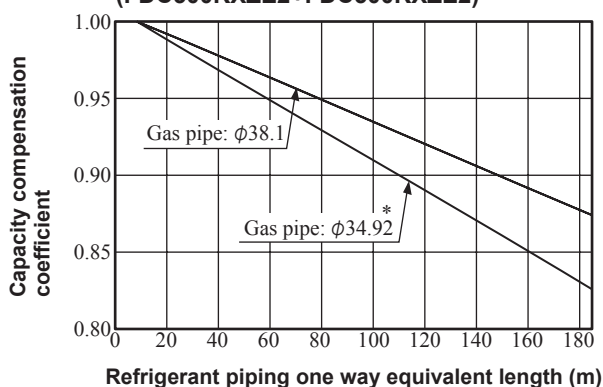
Model FDC900KXZE2
(FDC450KXZE2 + FDC450KXZE2)



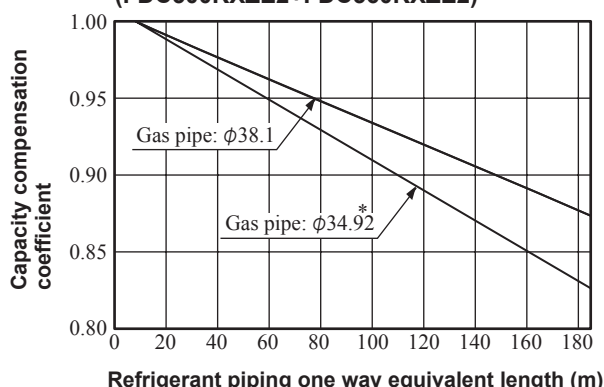
Model FDC950KXZE2
(FDC475KXZE2-K+FDC475KXZE2)



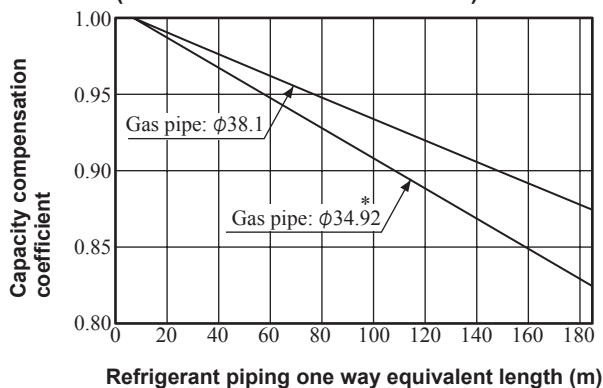
Model FDC1000KXZE2
(FDC500KXZE2+FDC500KXZE2)



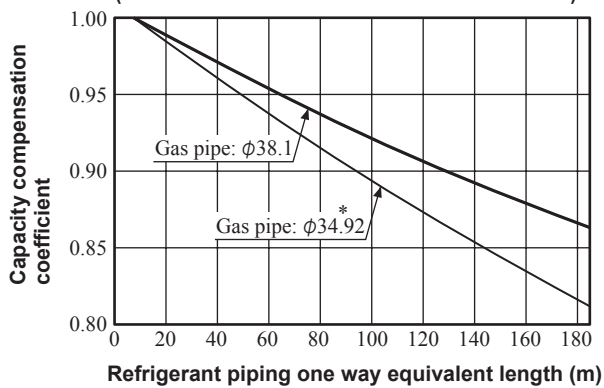
Model FDC1060KXZE2
(FDC500KXZE2+FDC560KXZE2)



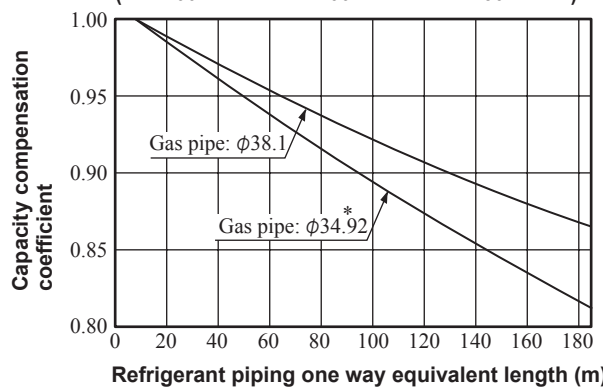
Model FDC1120KXZE2
(FDC560KXZE2+FDC560KXZE2)



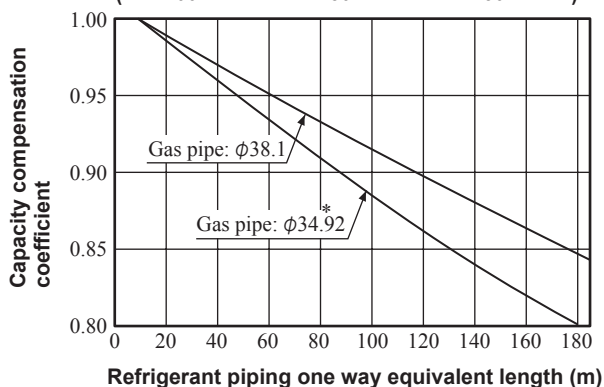
Model FDC1200KXZE2
(FDC400KXZE2+FDC400KXZE2+FDC400KXZE2)



Model FDC1250KXZE2
(FDC400KXZE2+FDC400KXZE2+FDC450KXZE2)

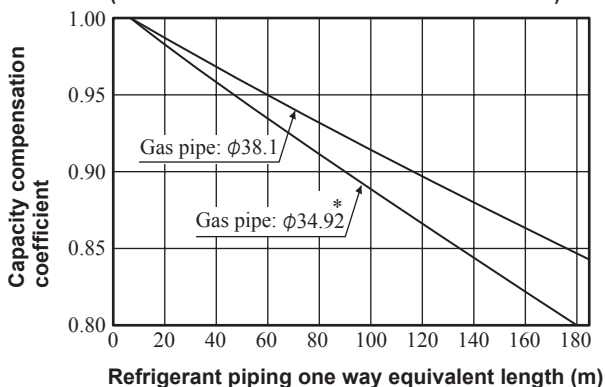


Model FDC1300KXZE2
(FDC400KXZE2+FDC450KXZE2+FDC450KXZE2)

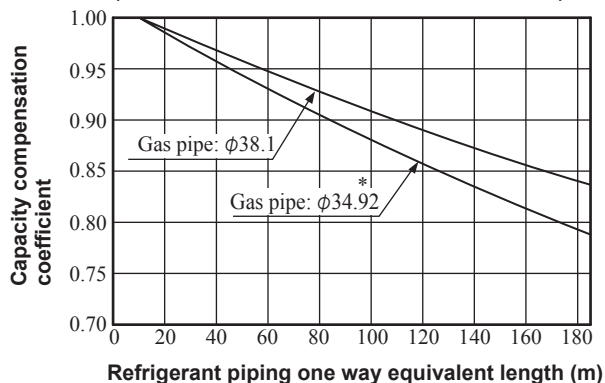


Note (1) Parts with the * mark show the piping size in case used in Europe.

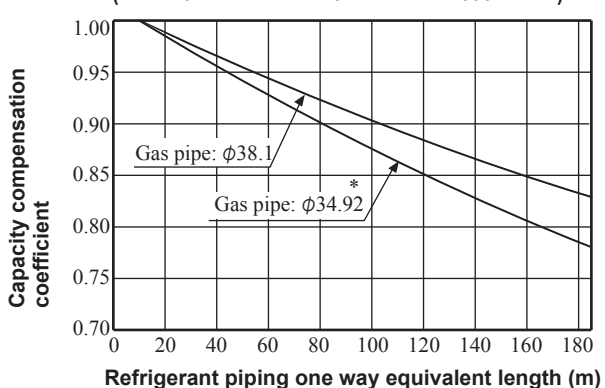
Model FDC1350KXZE2
(FDC450KXZE2+FDC450KXZE2+FDC450KXZE2)



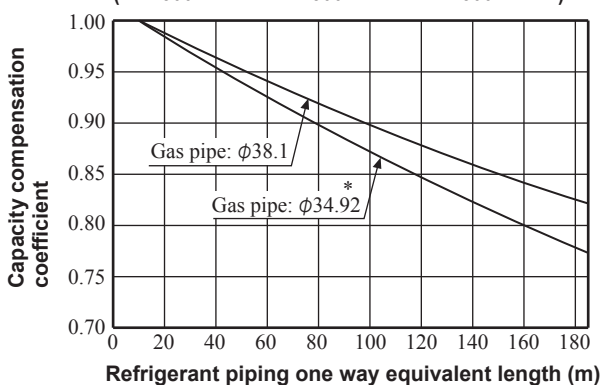
Model FDC1425KXZE2
(FDC475KXZE2+FDC475KXZE2+FDC475KXZE2)



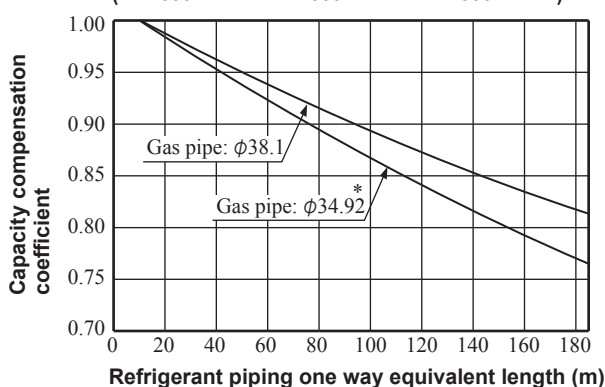
Model FDC1450KXZE2
(FDC475KXZE2+FDC475KXZE2+FDC500KXZE2)



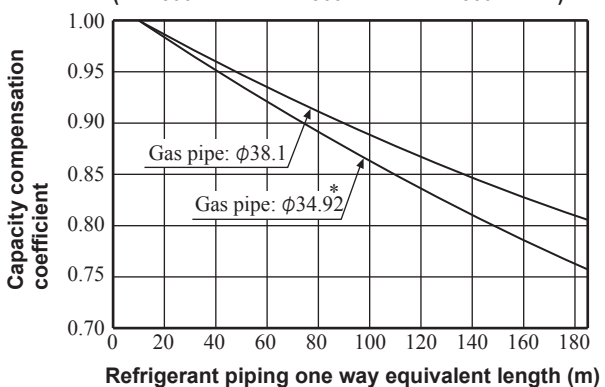
Model FDC1500KXZE2
(FDC500KXZE2+FDC500KXZE2+FDC500KXZE2)



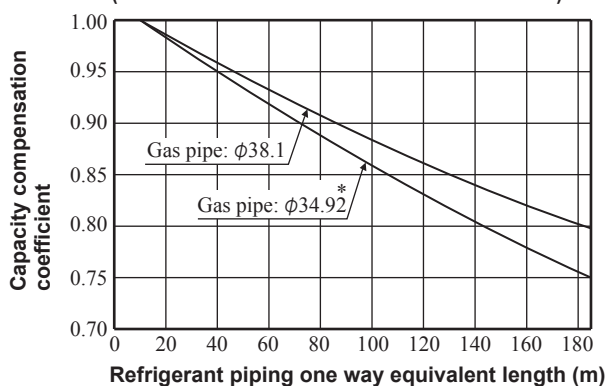
Model FDC1560KXZE2
(FDC500KXZE2+FDC500KXZE2+FDC560KXZE2)



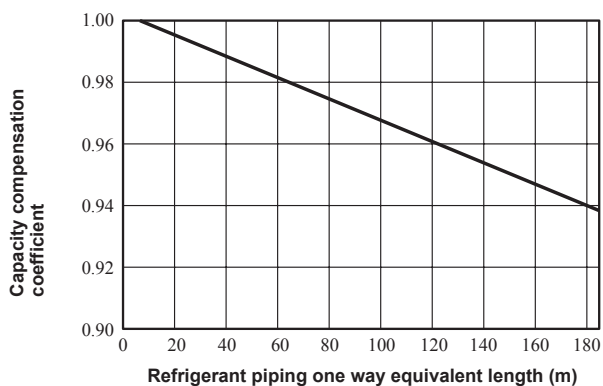
Model FDC1620KXZE2
(FDC500KXZE2+FDC560KXZE2+FDC560KXZE2)



Model FDC1680KXZE2
(FDC560KXZE2+FDC560KXZE2+FDC560KXZE2)



2) Heating



Note (1) Parts with the * mark show the piping size in case used in Europe.

Note (1) Equivalent piping length can be obtained by calculating as follows.

$$\text{Equivalent piping length} = \text{Real gas piping length} + \text{Number of bends in gas piping} \times \text{Equivalent piping length of bends}$$

Equivalent length of each joint

Unit : m/one part

Gas piping size	φ 15.88	φ 19.05	φ 22.22	φ 25.4	φ 28.58	φ 31.8	φ 34.92	φ 38.1
Joint (90° elbow)	0.25	0.30	0.35	0.40	0.45	0.55	0.60	0.65

- (c) When the outdoor unit is located at a lower height than the indoor unit in cooling operation and when the outdoor unit is located at a higher height than the indoor unit in heating operation, the following values should be subtracted from the values in the above table.

Height difference between the indoor unit and outdoor unit in the vertical height difference	5 m	10 m	15 m	20 m	25 m	30 m	35 m
Adjustment coefficient	0.99	0.98	0.97	0.96	0.95	0.94	0.93

Height difference between the indoor unit and outdoor unit in the vertical height difference	40 m	45 m	50 m	55 m	60 m	65 m	70 m
Adjustment coefficient	0.92	0.91	0.90	0.89	0.88	0.87	0.86

Height difference between the indoor unit and outdoor unit in the vertical height difference	75 m	80 m	85 m	90 m
Adjustment coefficient	0.85	0.84	0.83	0.82

- (d) Correction of heating capacity in relation to the frost on the outdoor unit heat exchanger

Air inlet temperature of outdoor unit in °C WB	-20	-15	-13	-11	-9	-7	-5	-3	-1	1	3	5 or more
Adjustment coefficient	0.96	0.96	0.96	0.95	0.94	0.93	0.91	0.88	0.86	0.87	0.92	1

The correction factors will change drastically according to weather conditions. So necessary adjustment should be made empirically according to the weather data of the particular area.

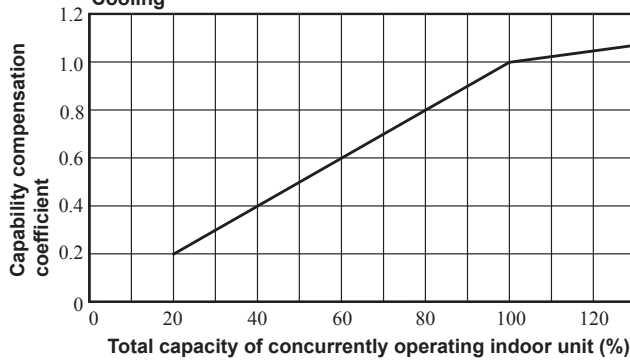
- (e) The capacity compensation coefficient and power consumption compensation coefficient vary according to the total capacity of concurrently operating indoor units, as shown below.

(Note) This table shows typical values.

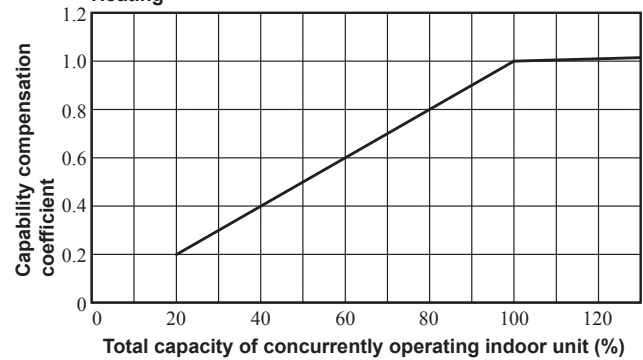
Model FDC280KXZE2

◆ **Capability compensation coefficient**

Cooling

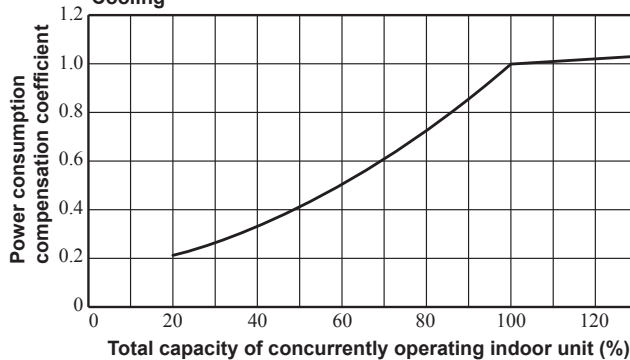


Heating

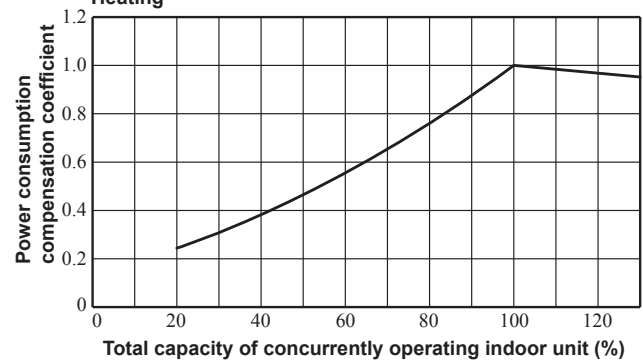


◆ **Power consumption compensation coefficient**

Cooling



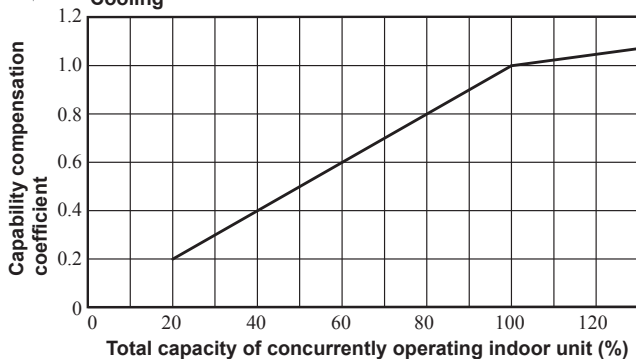
Heating



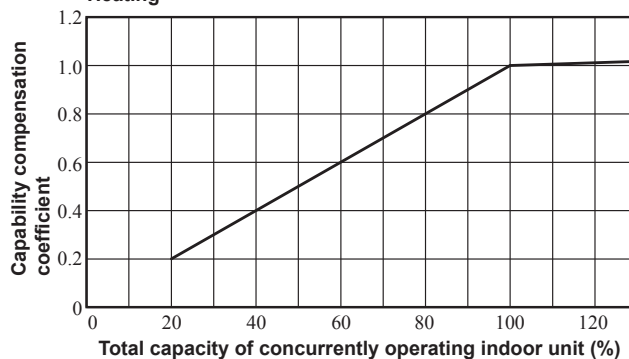
Model FDC335KXZE2

◆ **Capability compensation coefficient**

Cooling

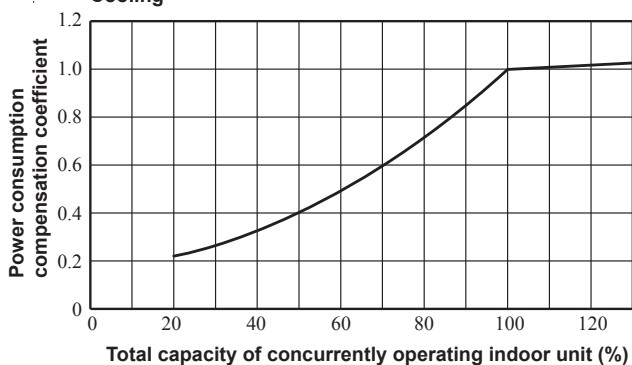


Heating

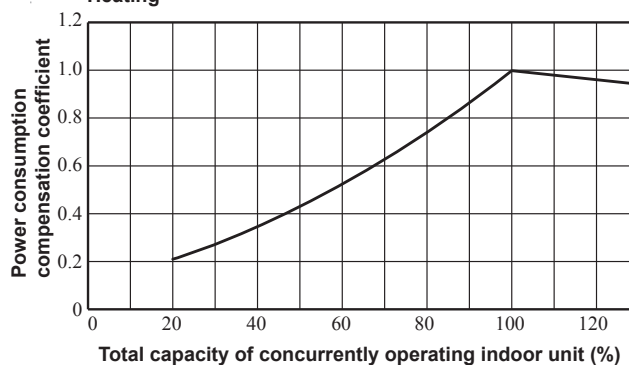


◆ **Power consumption compensation coefficient**

Cooling



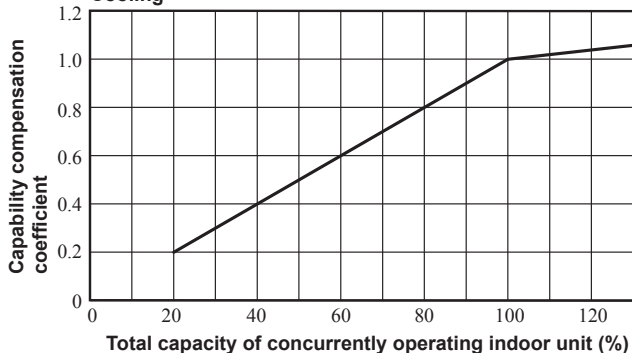
Heating



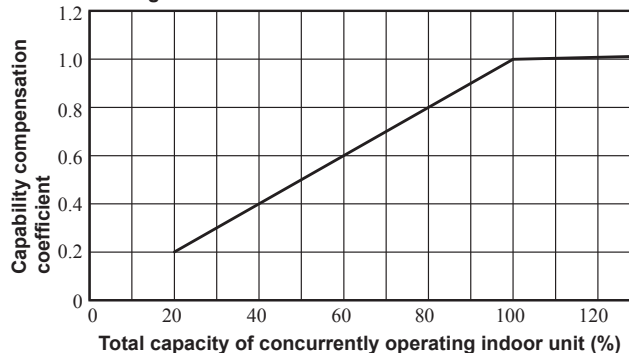
Model FDC400KXZE2

◆ **Capability compensation coefficient**

Cooling

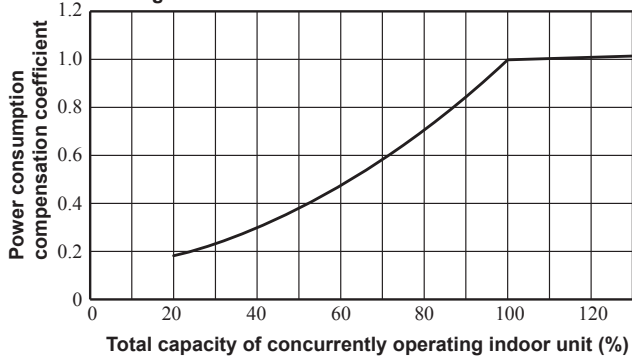


Heating

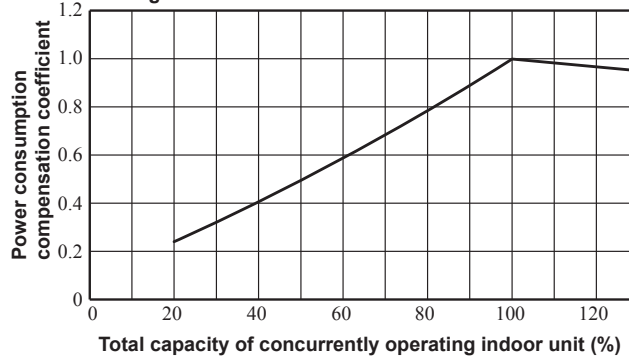


◆ **Power consumption compensation coefficient**

Cooling

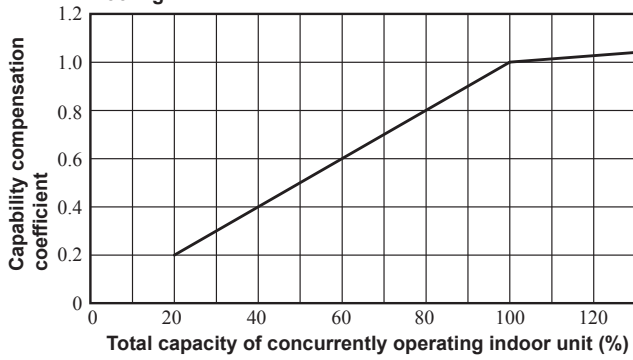


Heating

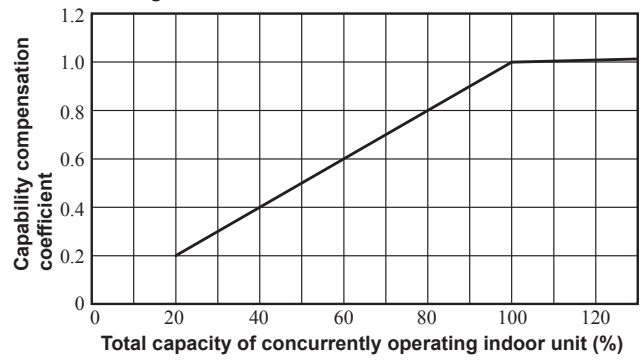


Model FDC450KXZE2

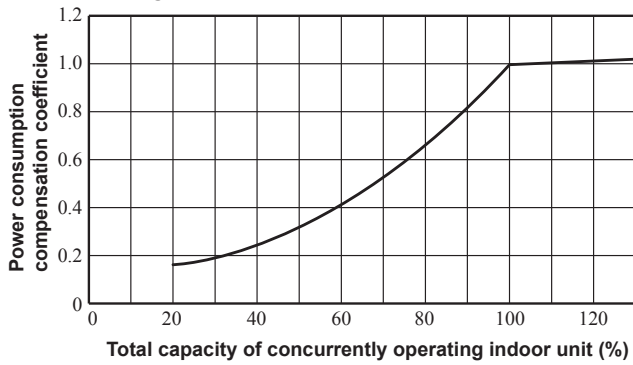
◆ **Capability compensation coefficient**
Cooling



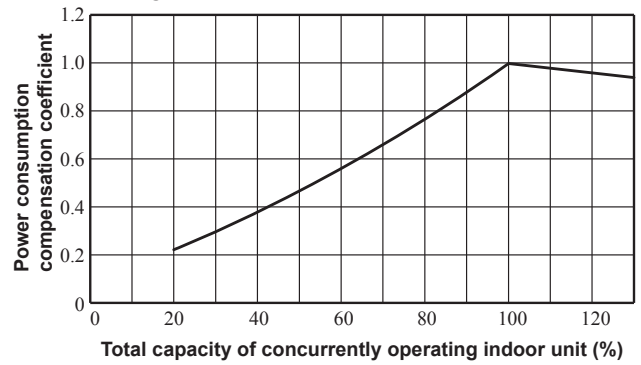
Heating



◆ **Power consumption compensation coefficient**
Cooling

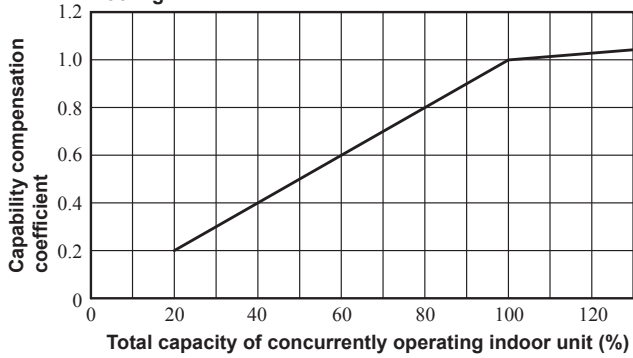


Heating

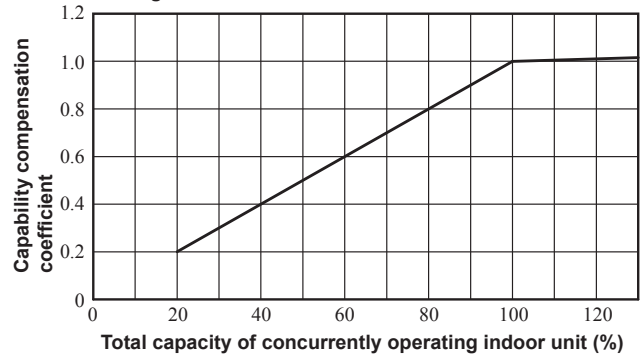


Model FDC475KXZE2

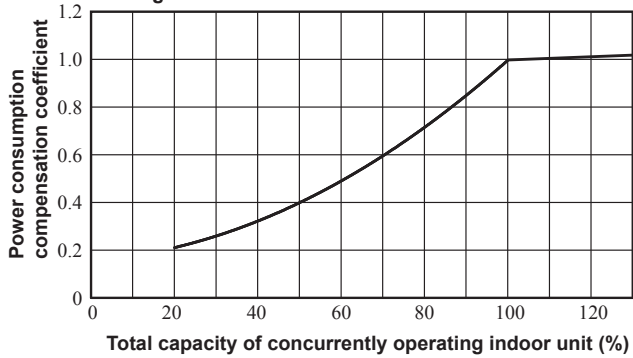
◆ **Capability compensation coefficient**
Cooling



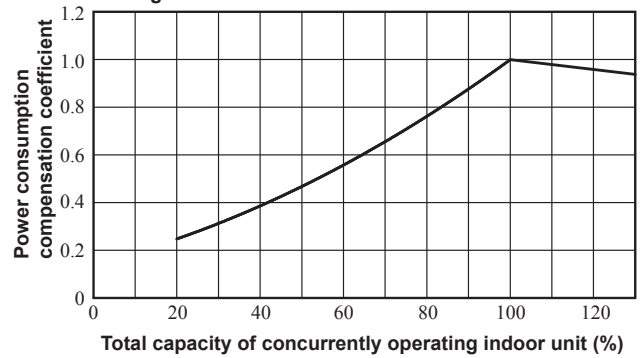
Heating



◆ **Power consumption compensation coefficient**
Cooling



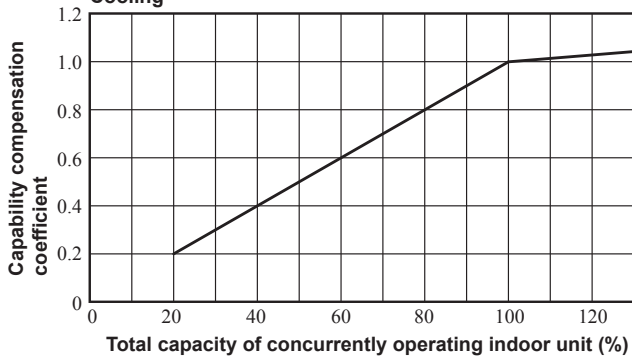
Heating



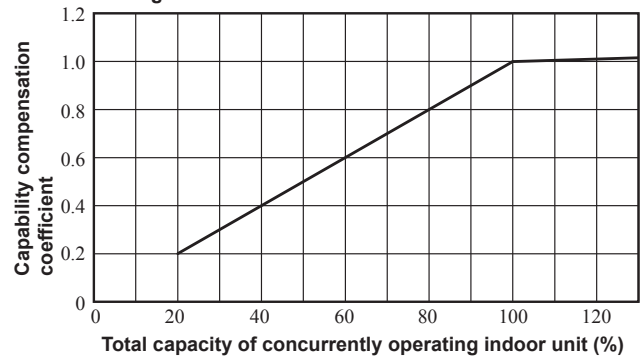
Model FDC500KXZE2

◆ **Capability compensation coefficient**

Cooling

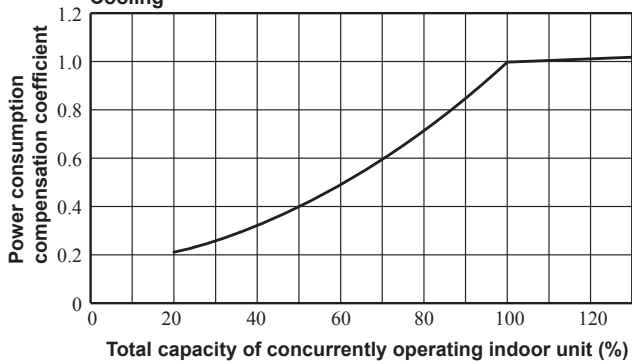


Heating

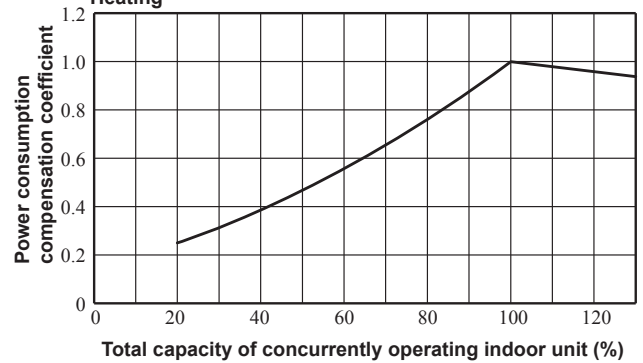


◆ **Power consumption compensation coefficient**

Cooling



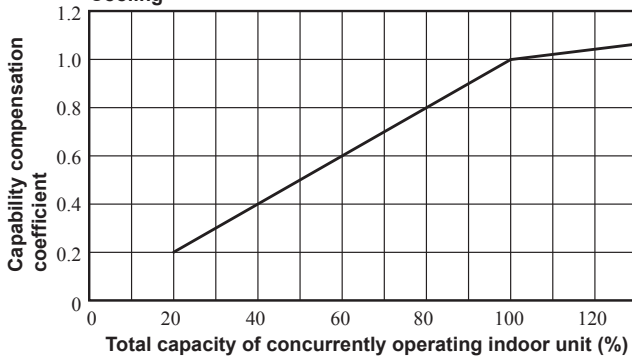
Heating



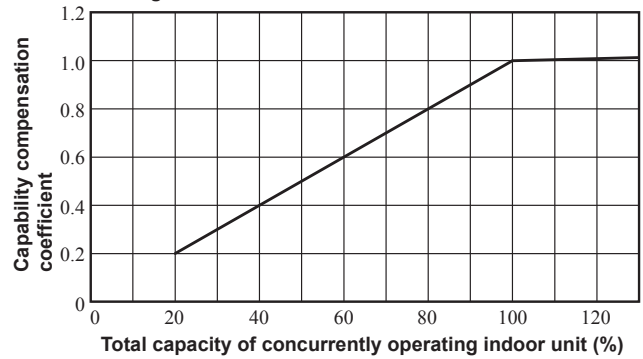
Model FDC560KXZE2

◆ **Capability compensation coefficient**

Cooling

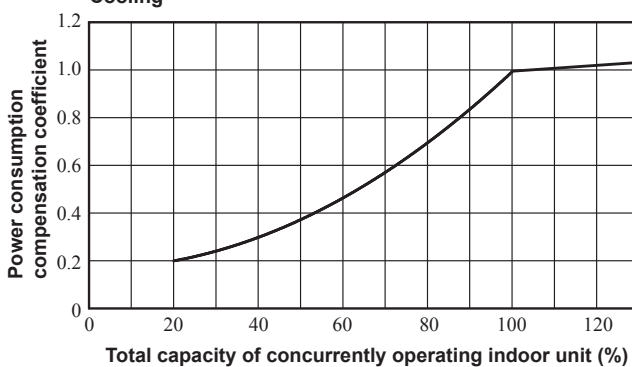


Heating

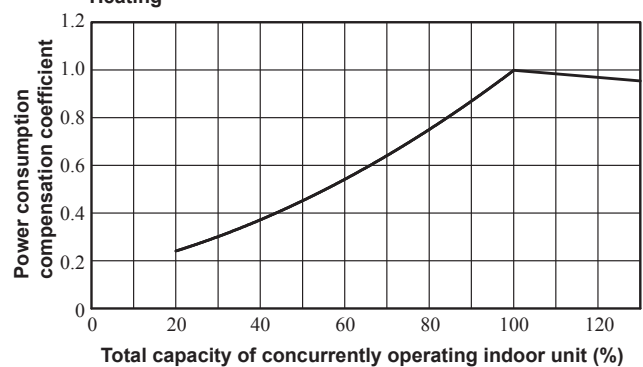


◆ **Power consumption compensation coefficient**

Cooling



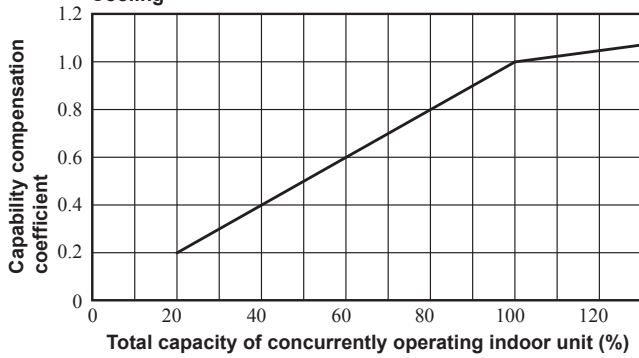
Heating



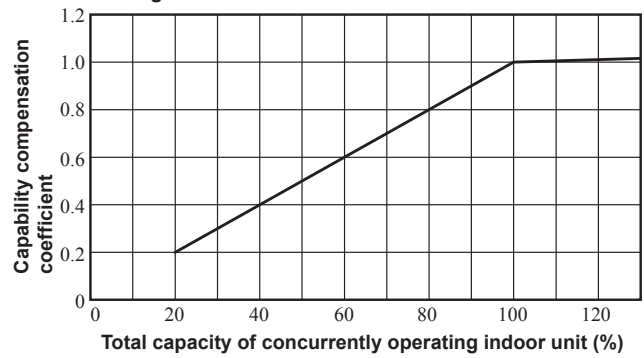
Model FDC615KXZE2

◆ Capability compensation coefficient

Cooling

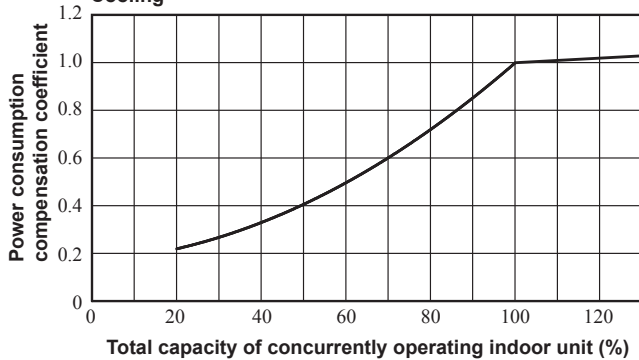


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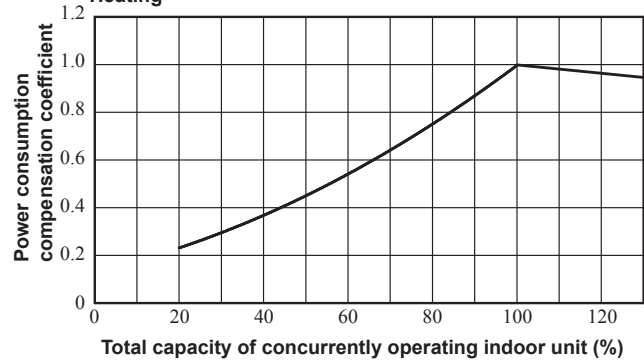


◆ Power consumption compensation coefficient

Cooling



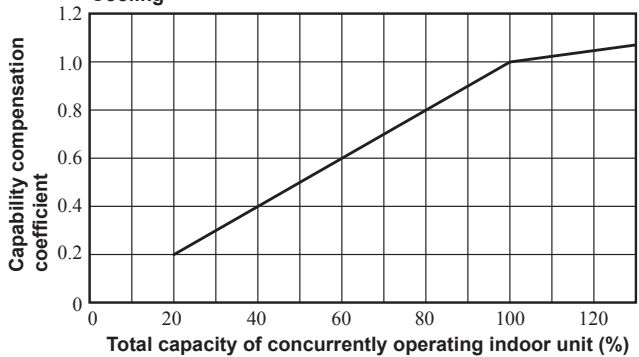
Heating



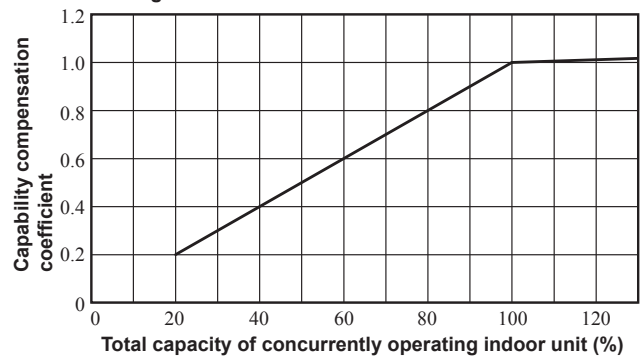
Model FDC670KXZE2

◆ Capability compensation coefficient

Cooling

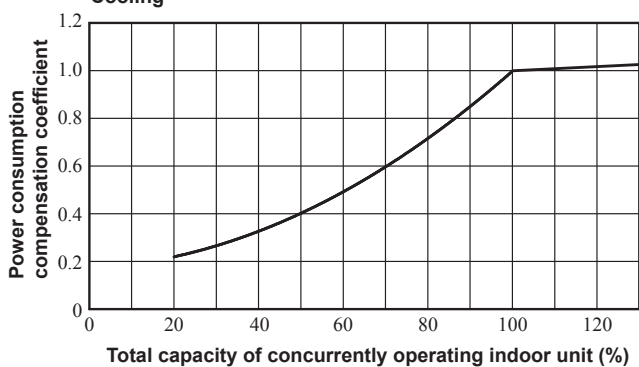


Heating

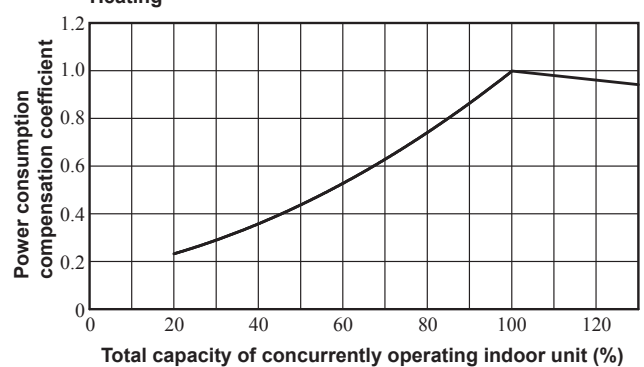


◆ Power consumption compensation coefficient

Cooling

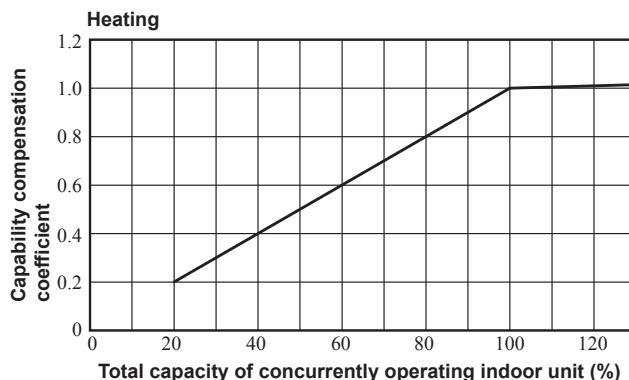
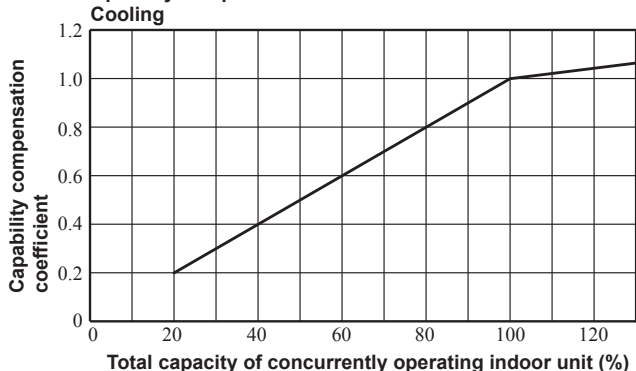


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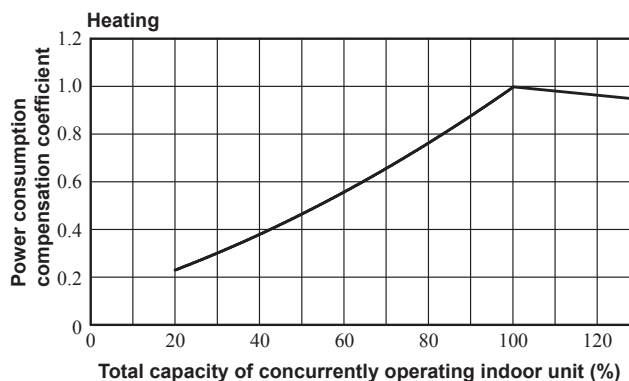
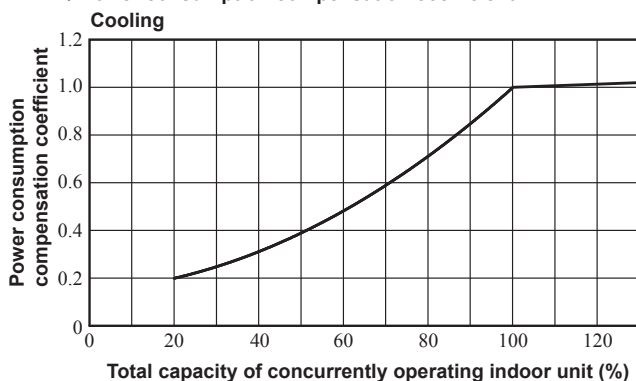


Model FDC735KXZE2

◆ Capability compensation coefficient

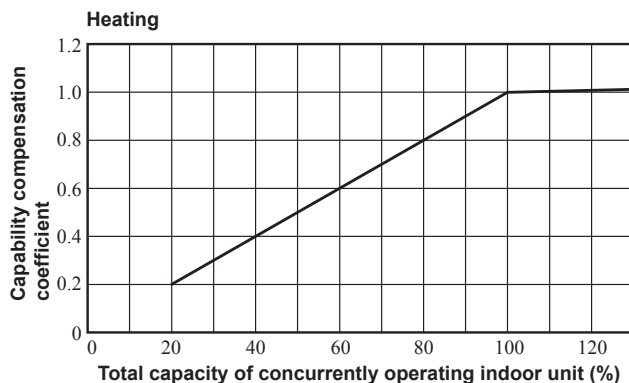
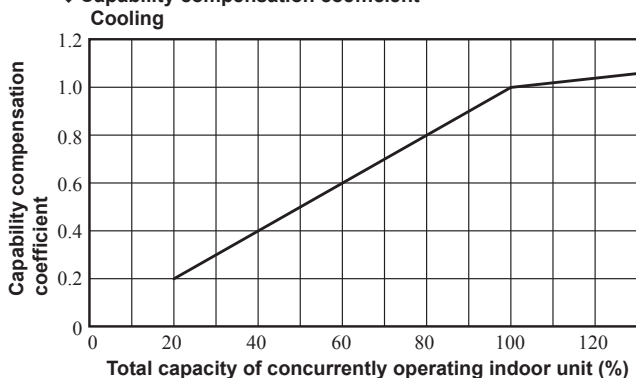


◆ Power consumption compensation coefficient

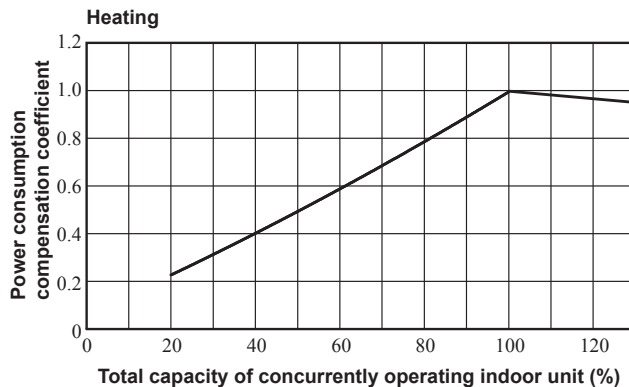
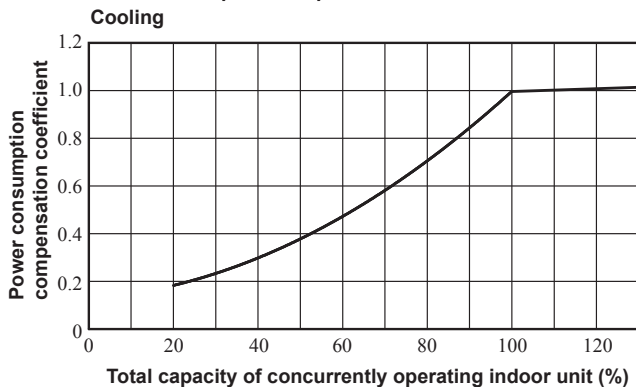


Model FDC800KXZE2

◆ Capability compensation coefficient



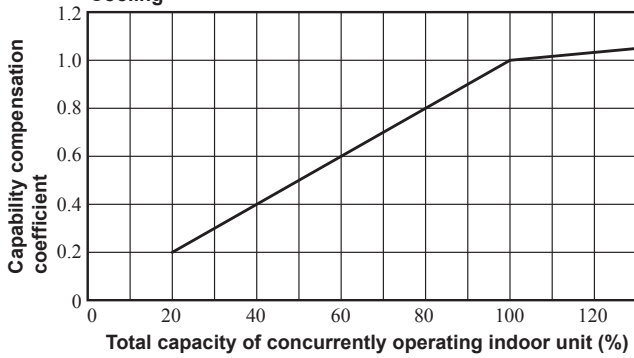
◆ Power consumption compensation coefficient



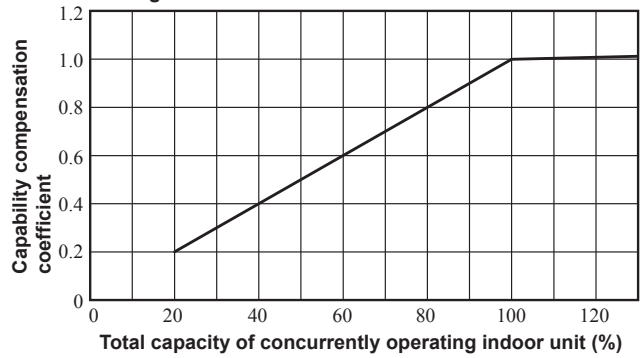
Model FDC850KXZE2

◆ **Capability compensation coefficient**

Cooling

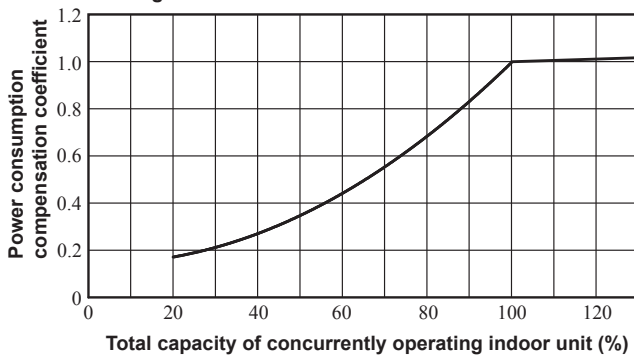


Heating

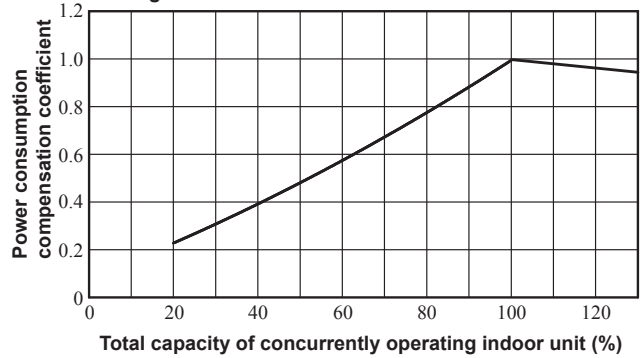


◆ **Power consumption compensation coefficient**

Cooling



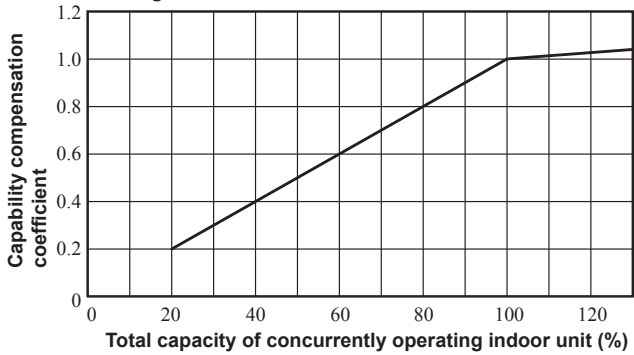
Heating



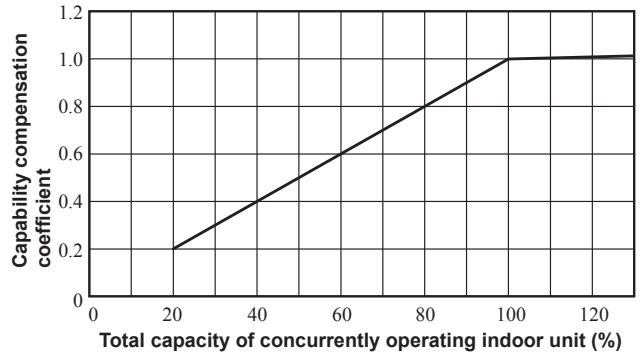
Model FDC900KXZE2

◆ **Capability compensation coefficient**

Cooling

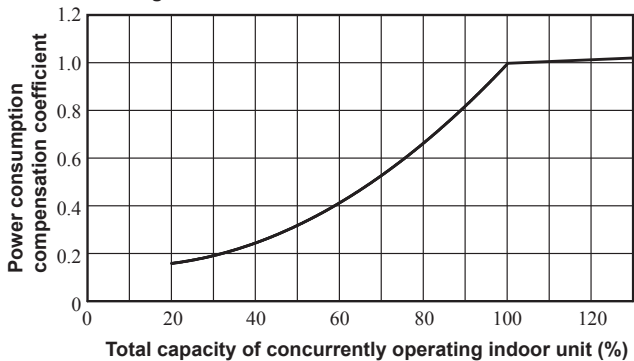


Heating

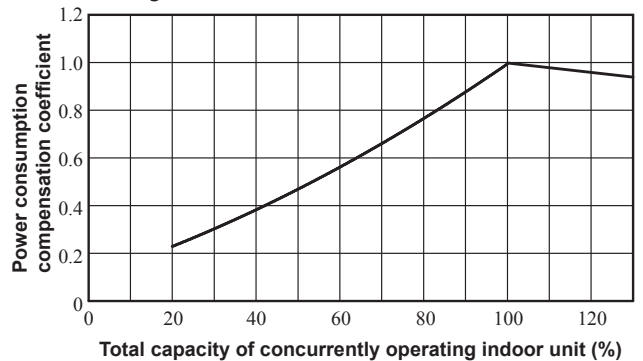


◆ **Power consumption compensation coefficient**

Cooling

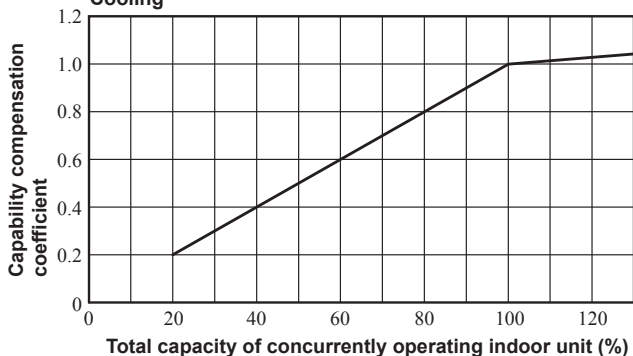


Heating

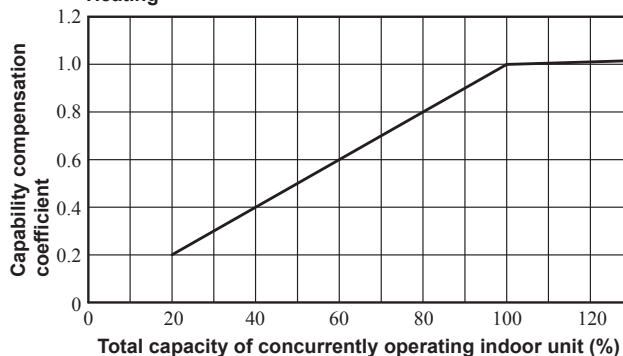


Model FDC950KXZE2

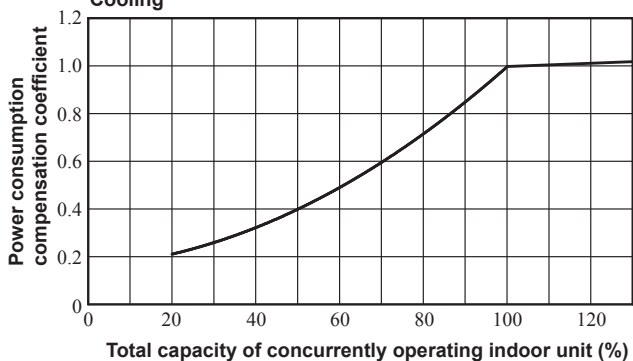
◆ Capability compensation coefficient
Cooling



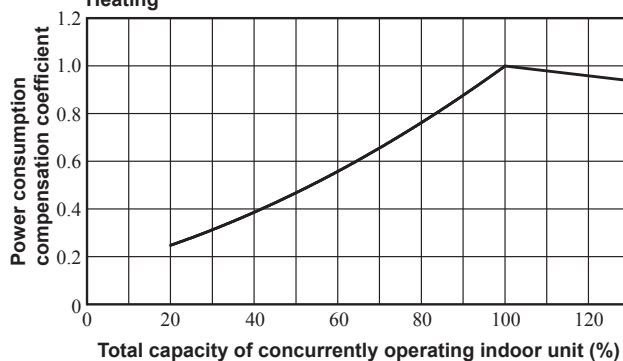
Heating



◆ Power consumption compensation coefficient
Cooling

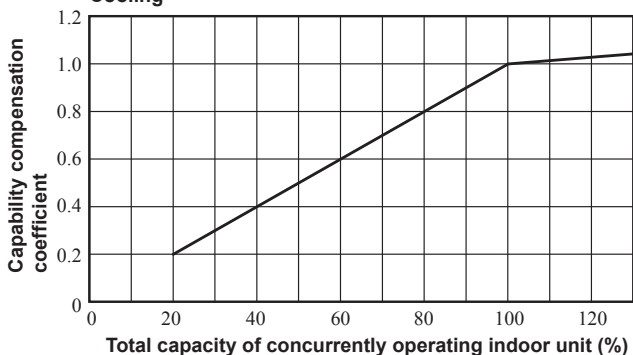


Heating

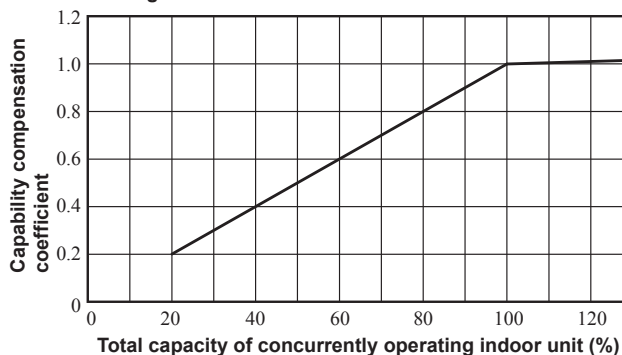


Model FDC1000KXZE2

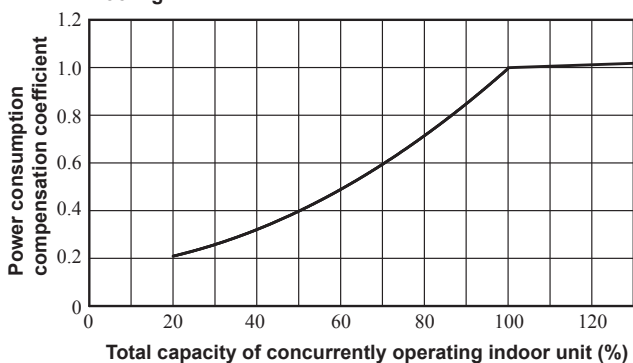
◆ Capability compensation coefficient
Cooling



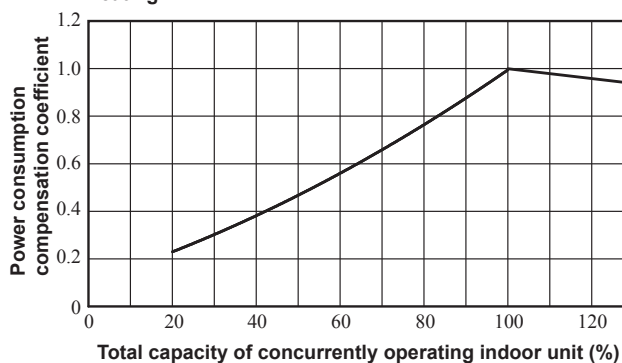
Heating



◆ Power consumption compensation coefficient
Cooling

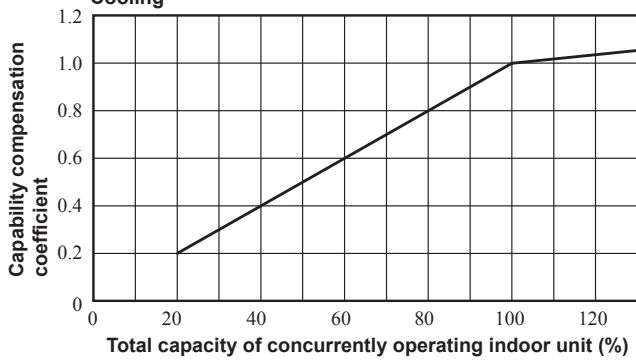


Heating

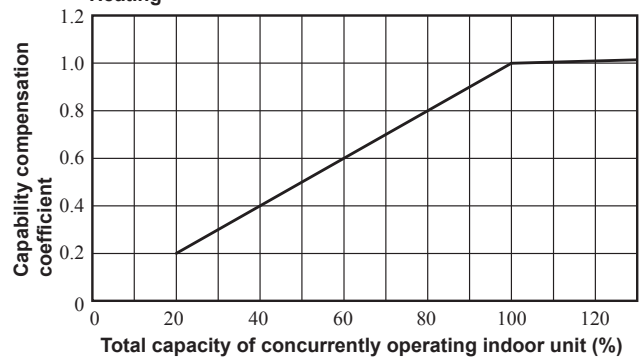


Model FDC1060KXZE2

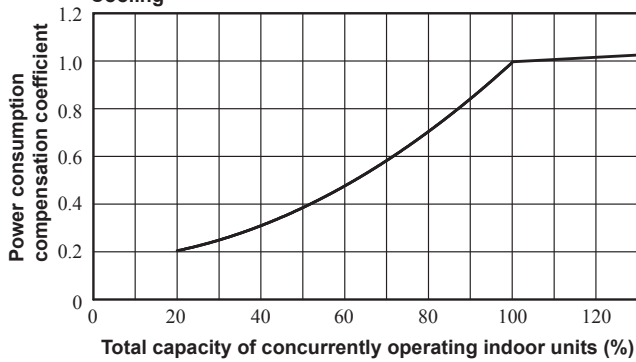
◆ Capability compensation coefficient
Cooling



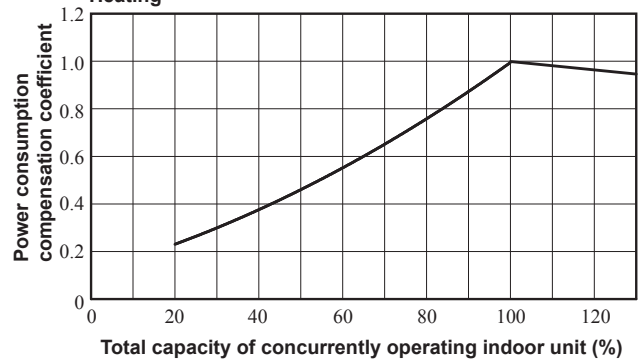
Heating



◆ Power consumption compensation coefficient
Cooling

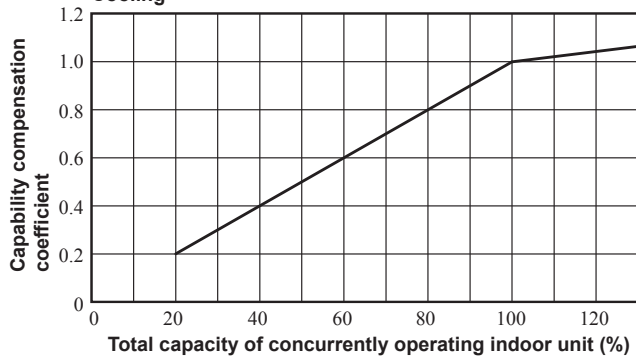


Heating

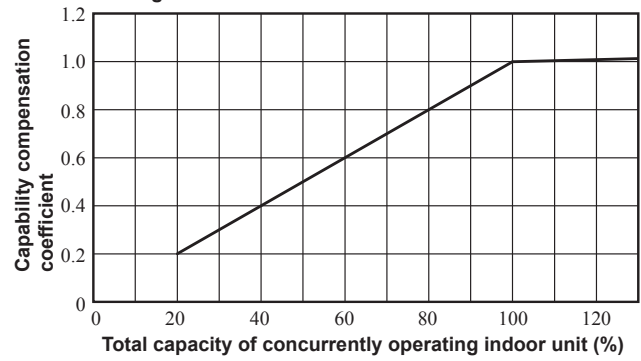


Model FDC1120KXZE2

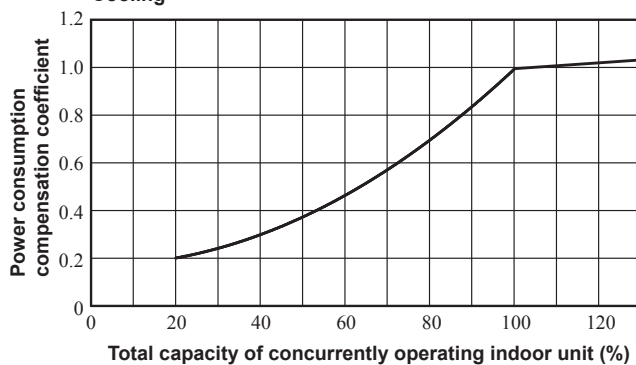
◆ Capability compensation coefficient
Cooling



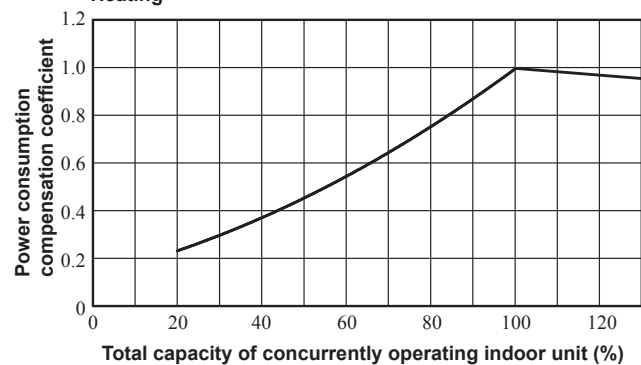
Heating



◆ Power consumption compensation coefficient
Cooling



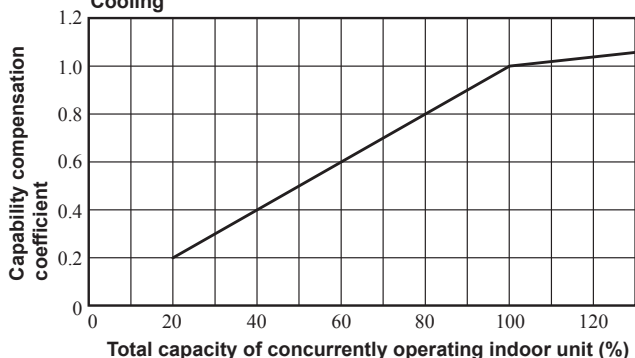
Heating



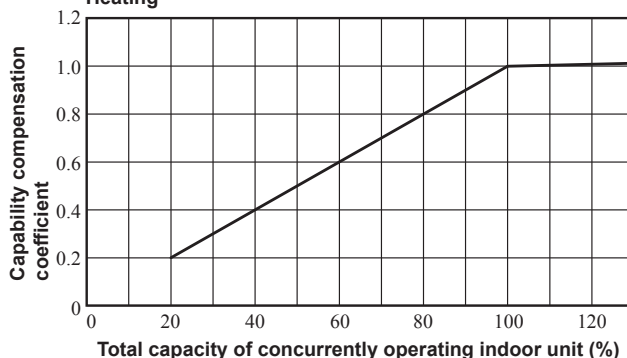
Model FDC1200KXZE2

◆ Capability compensation coefficient

Cooling

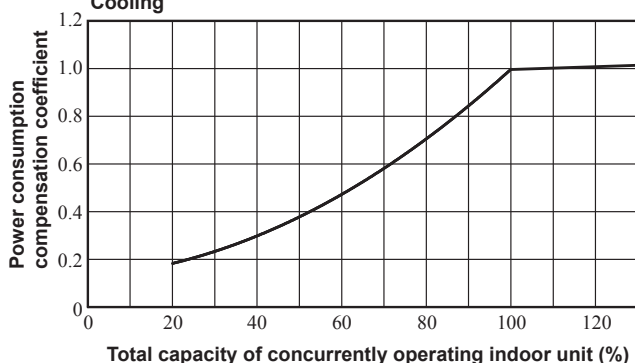


Heating

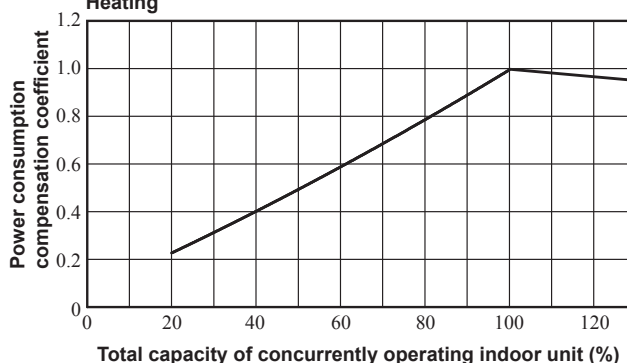


◆ Power consumption compensation coefficient

Cooling



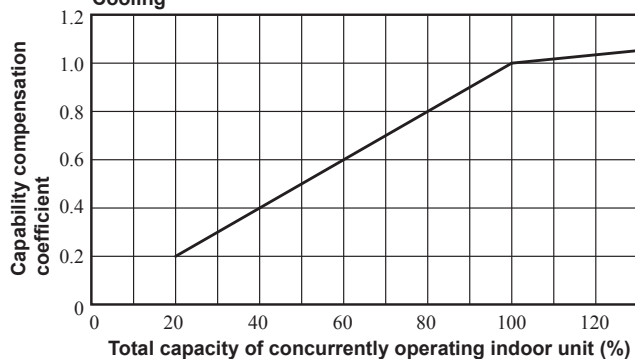
Heating



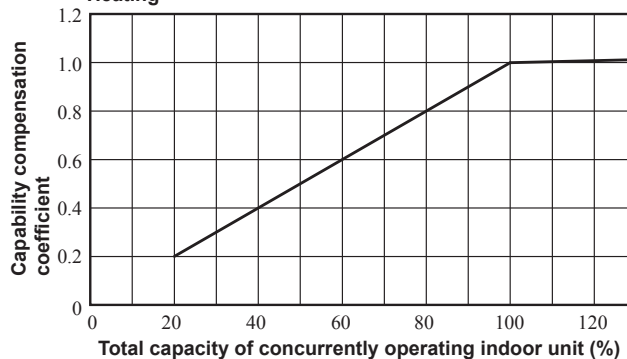
Model FDC1250KXZE2

◆ Capability compensation coefficient

Cooling

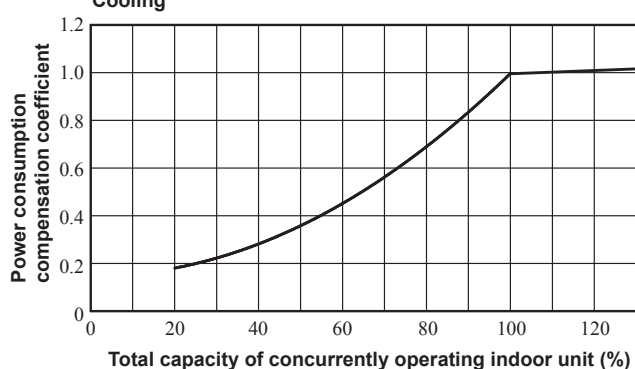


Heating

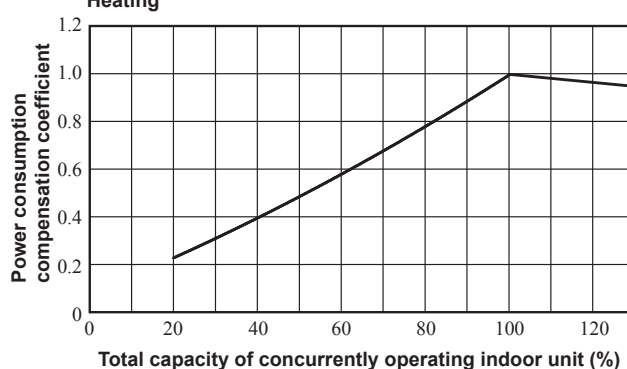


◆ Power consumption compensation coefficient

Cooling

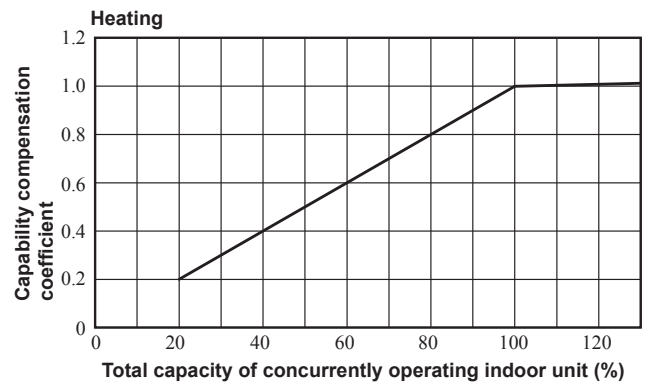
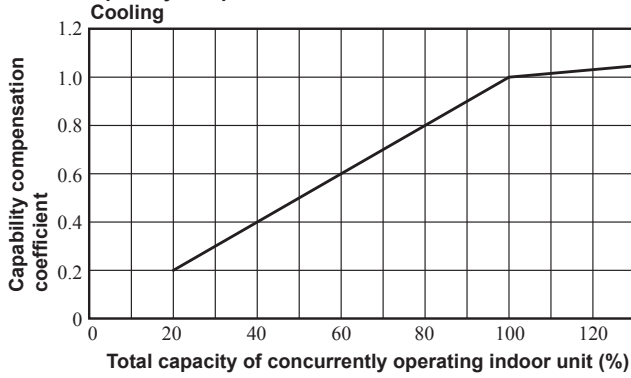


Heating

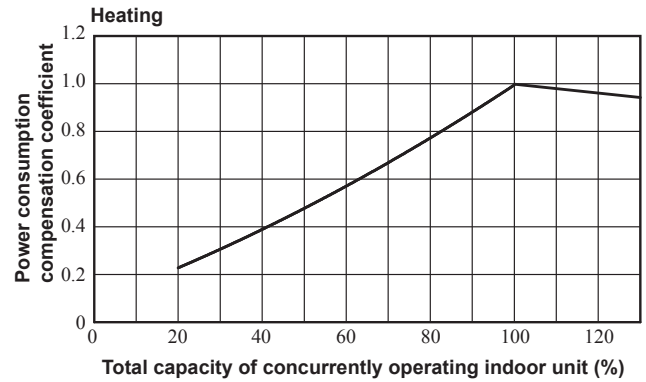
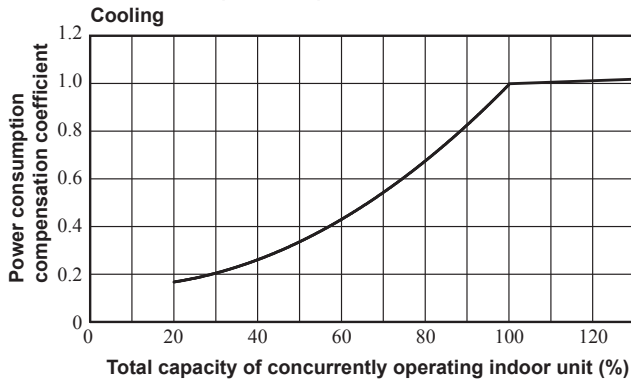


Model FDC1300KXZE2

◆ Capability compensation coefficient

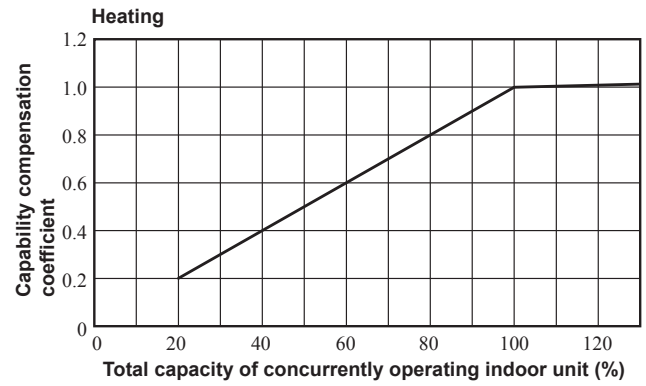
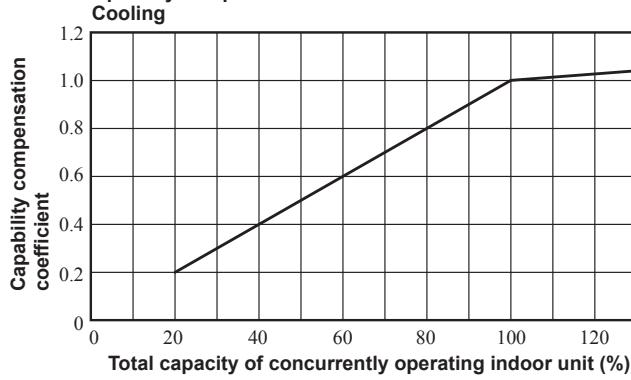


◆ Power consumption compensation coefficient

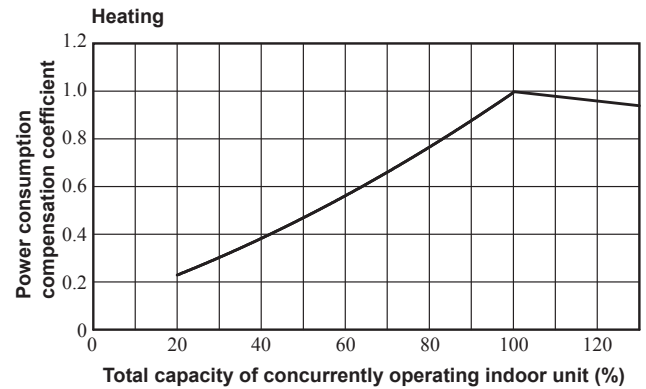
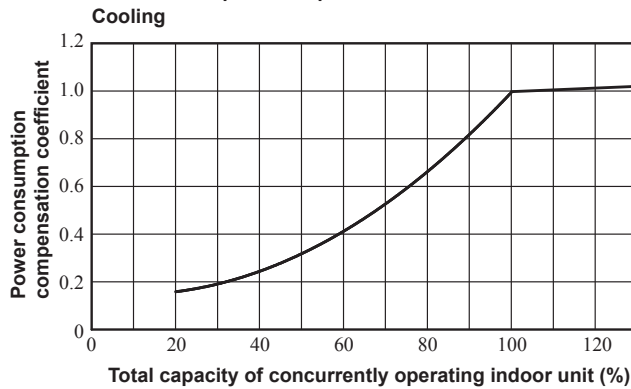


Model FDC1350KXZE2

◆ Capability compensation coefficient

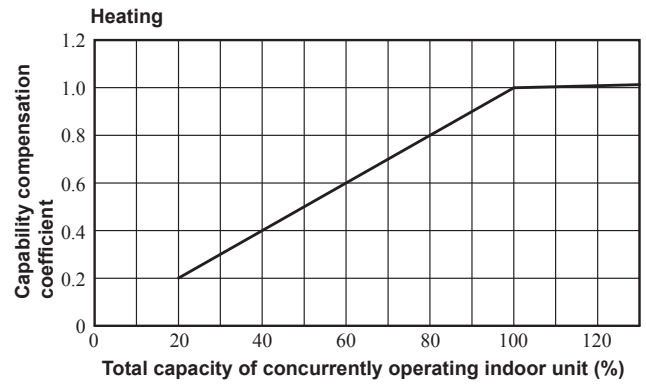
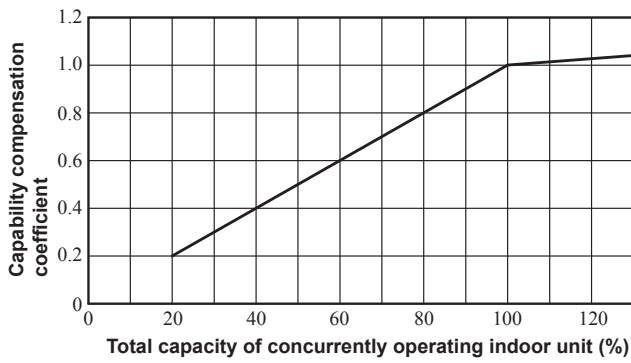


◆ Power consumption compensation coefficient

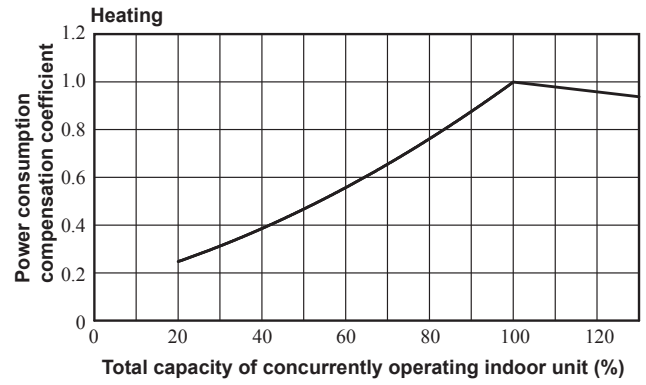
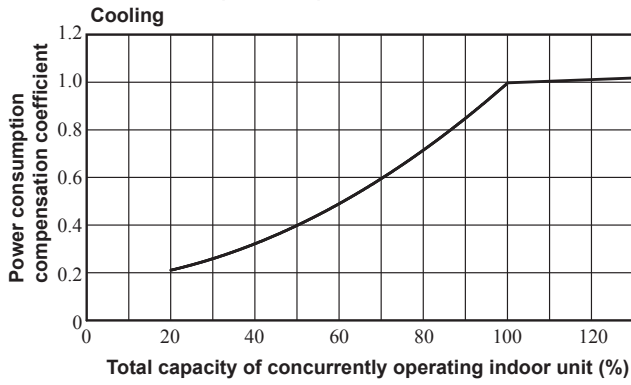


Model FDC1425KXZE2

◆ **Capability compensation coefficient**

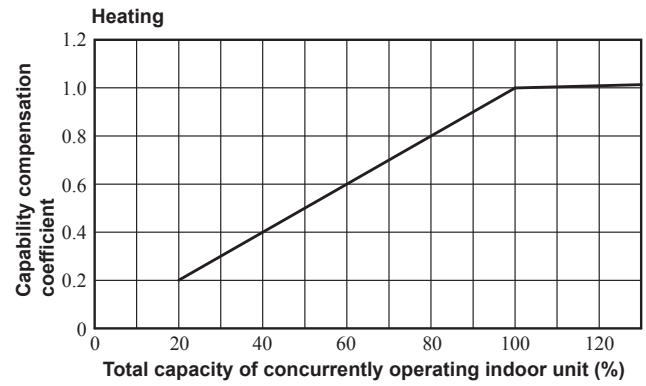
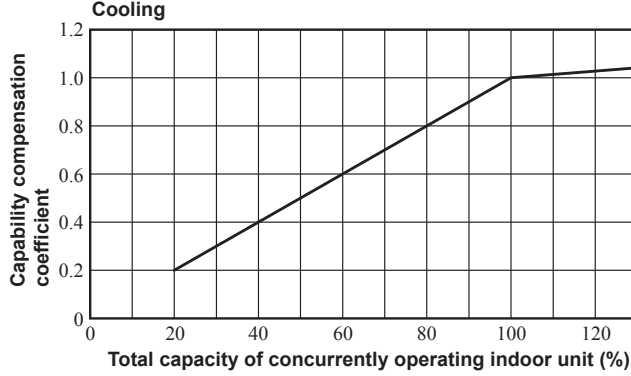


◆ **Power consumption compensation coefficient**

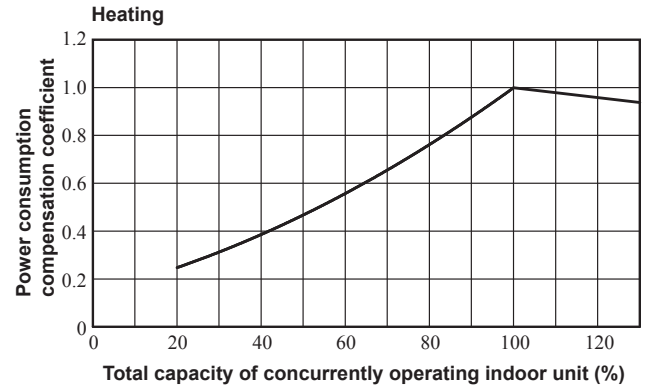
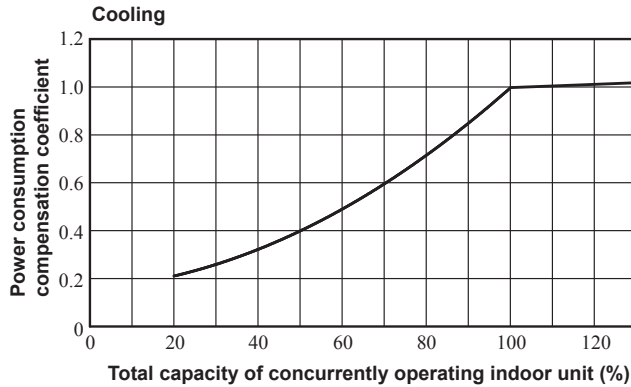


Model FDC1450KXZE2

◆ **Capability compensation coefficient**

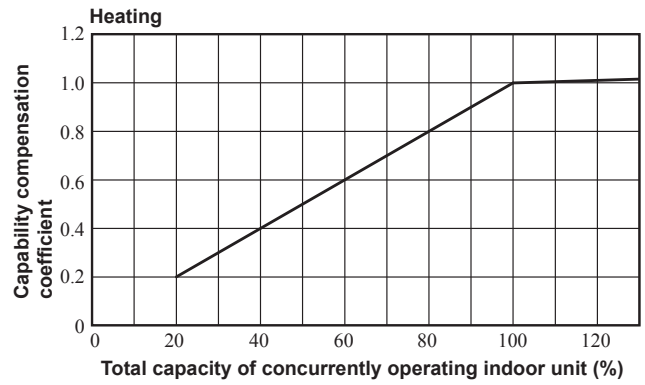
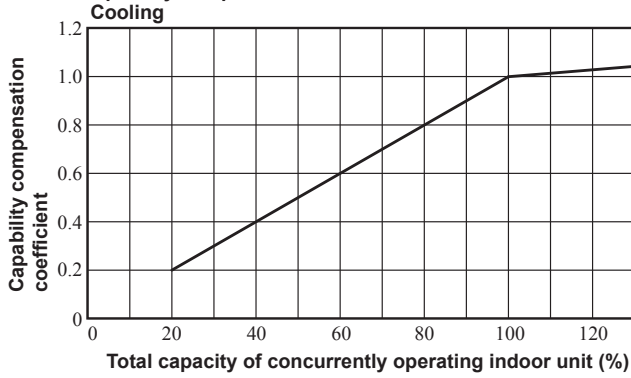


◆ **Power consumption compensation coefficient**

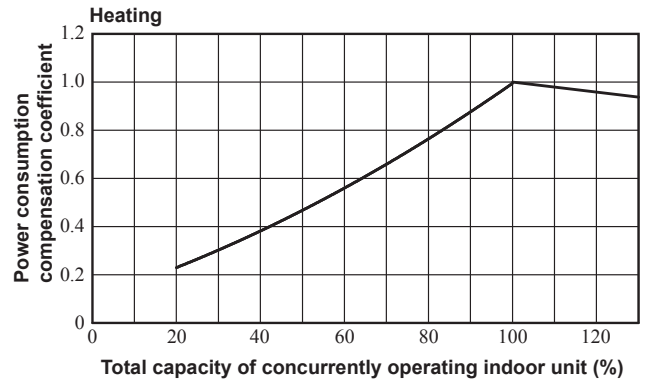
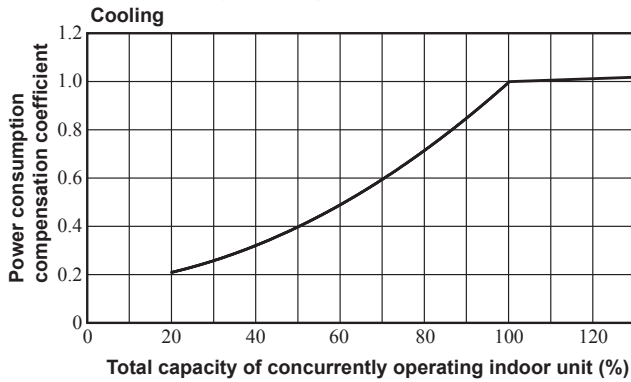


Model FDC1500KXZE2

◆ Capability compensation coefficient

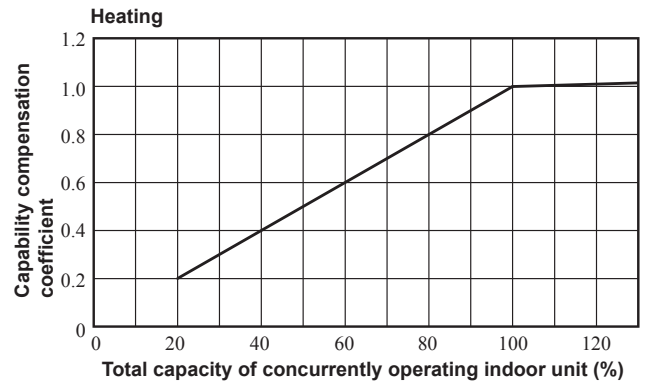
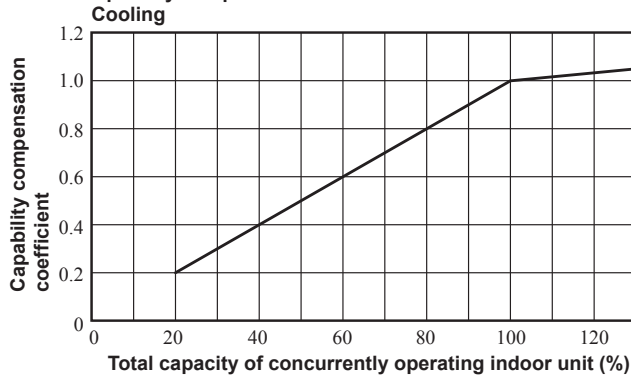


◆ Power consumption compensation coefficient

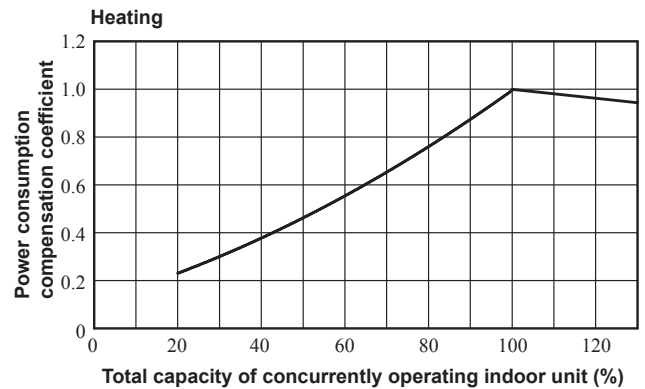
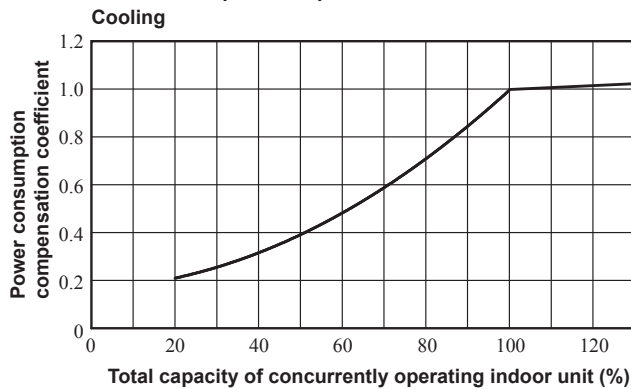


Model FDC1560KXZE2

◆ Capability compensation coefficient



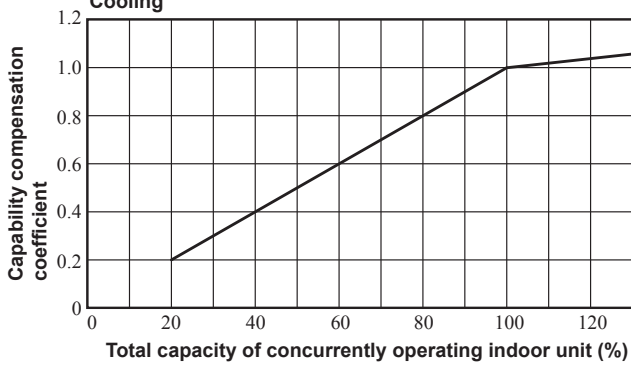
◆ Power consumption compensation coefficient



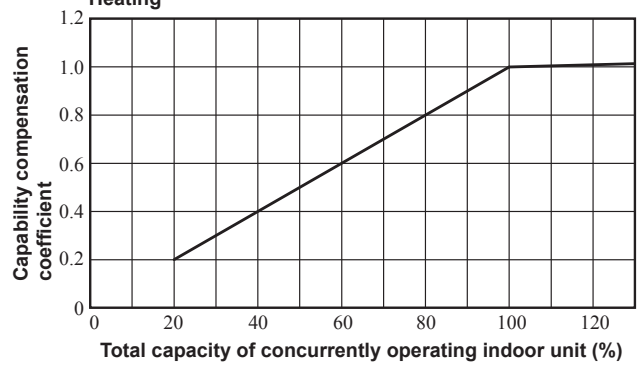
Model FDC1620KXZE2

◆ Capability compensation coefficient

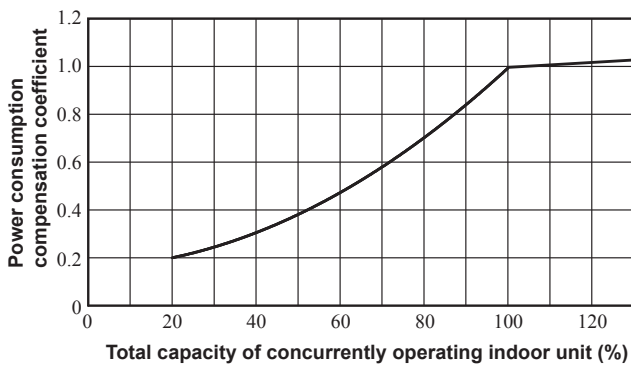
Cooling



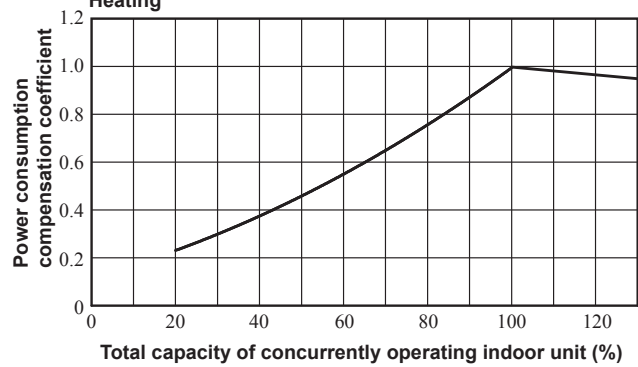
Heating



◆ Power consumption compensation coefficient



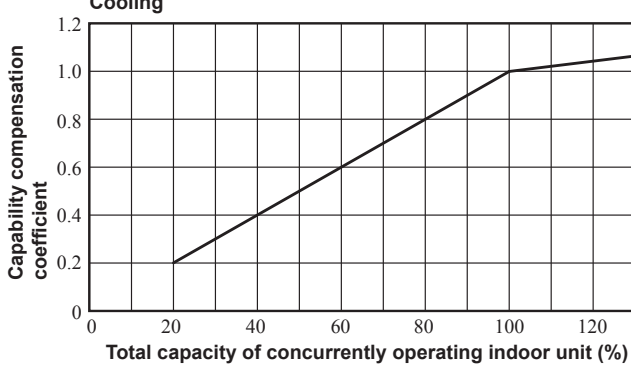
Heating



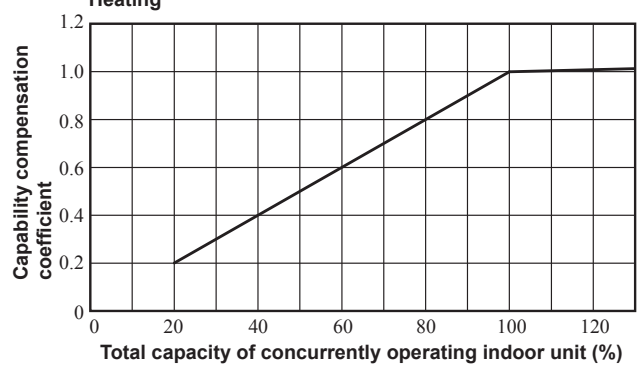
Model FDC1680KXZE2

◆ Capability compensation coefficient

Cooling

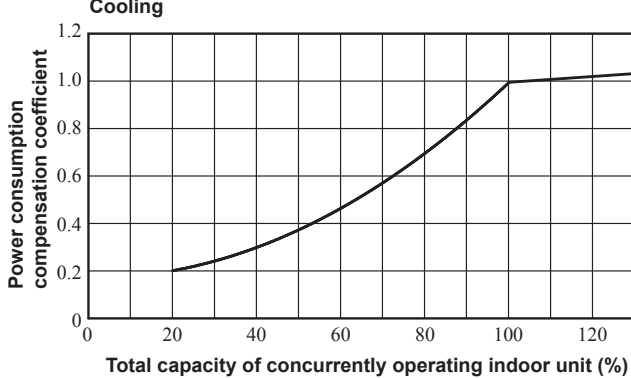


Heating

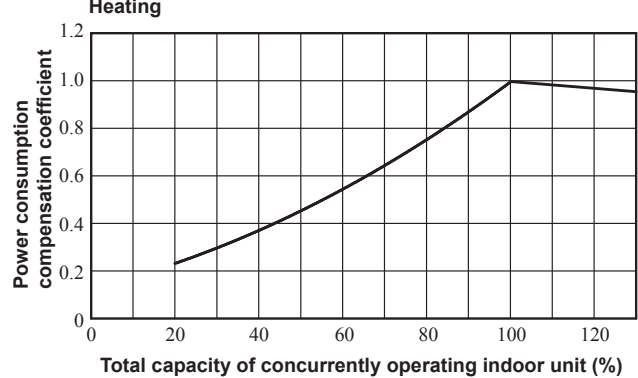


◆ Power consumption compensation coefficient

Cooling

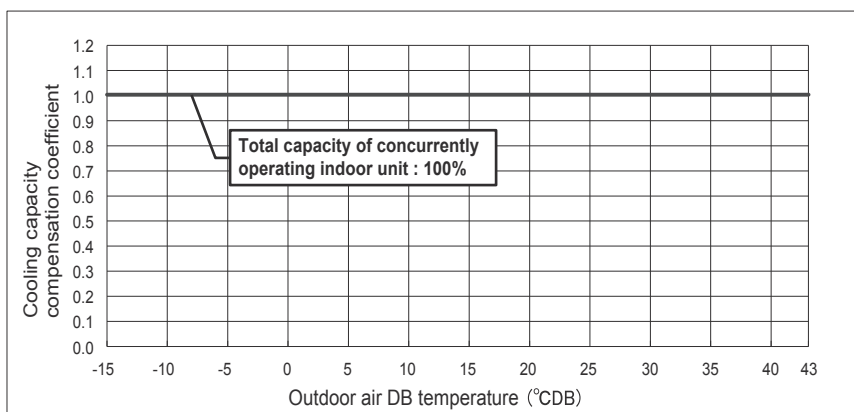
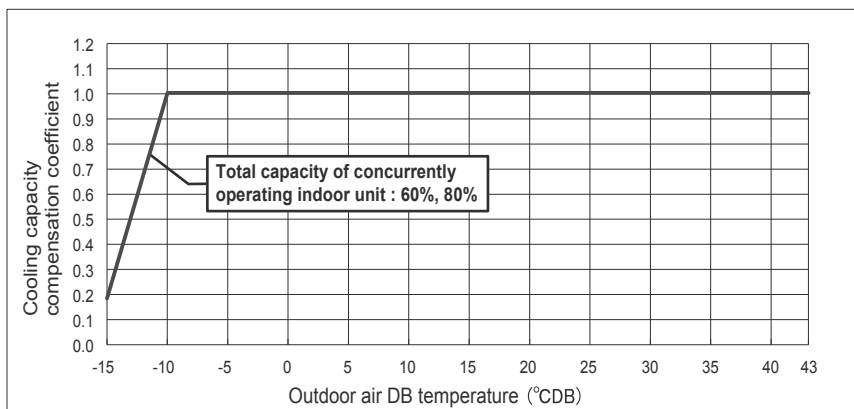
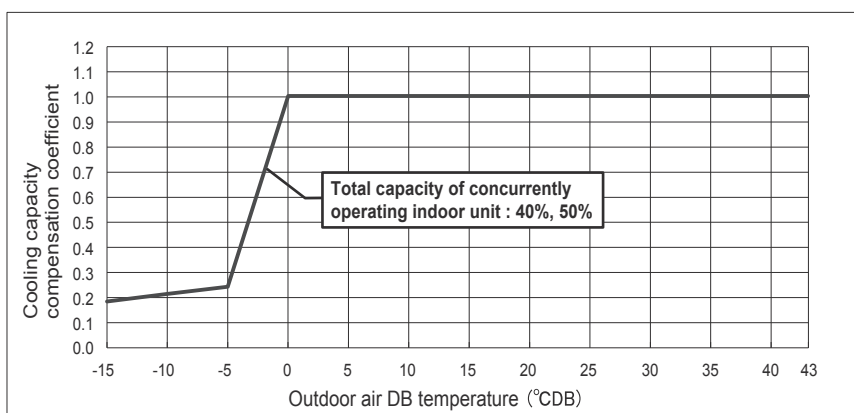
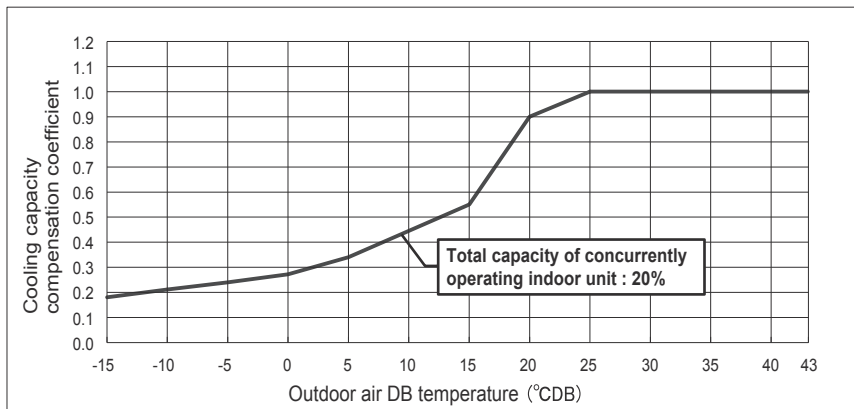


Heating



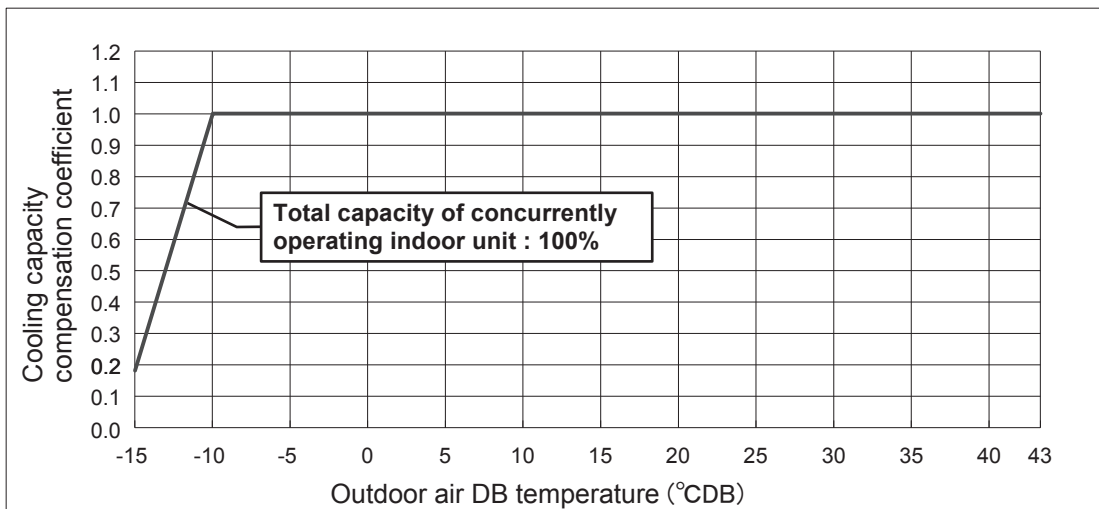
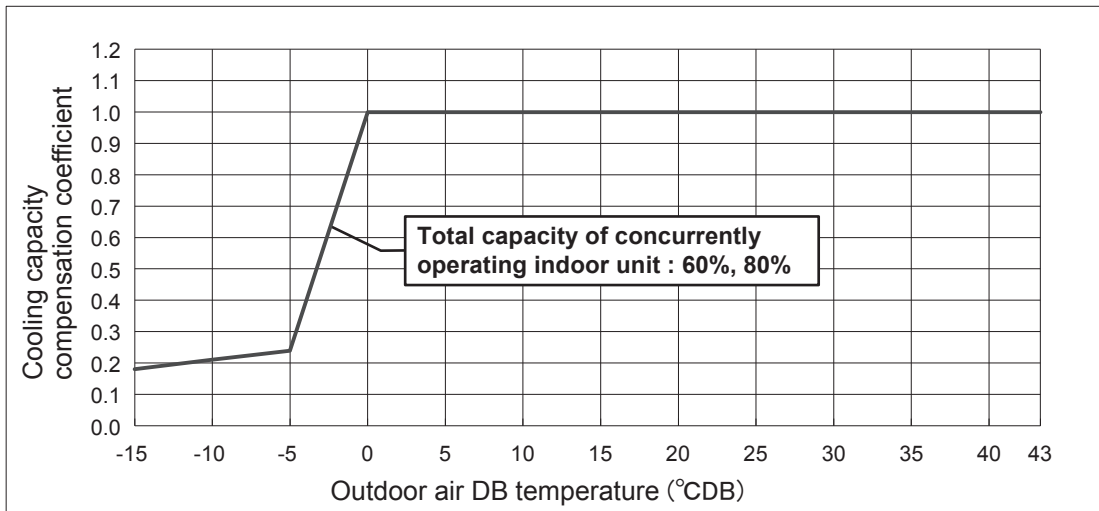
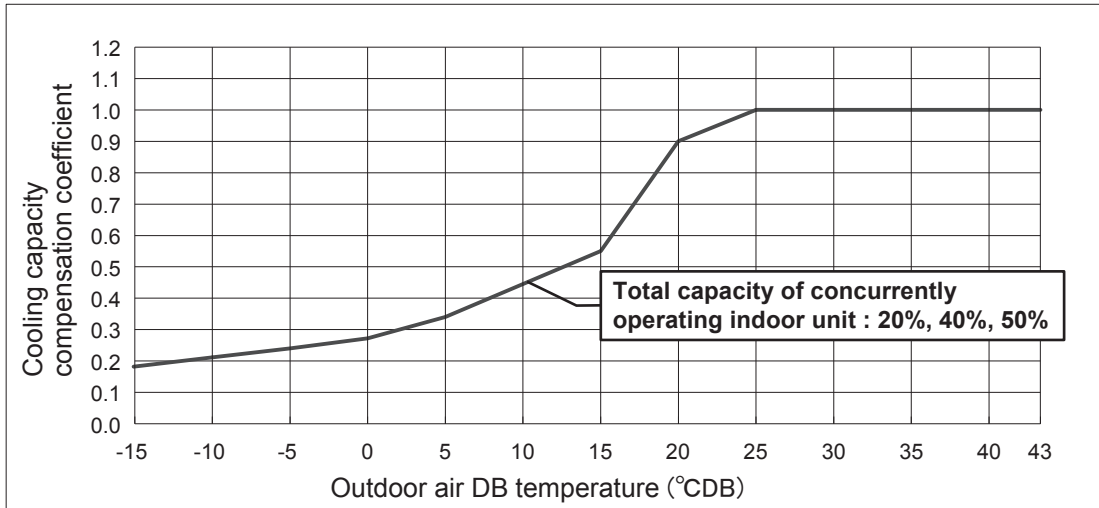
(f) The capacity compensation coefficient:
Cooling capacity in low temperature under operation of Anti-frost control.

(i) Indoor fan tap: P-Hi



Capacity compensation coefficient is that of cooling capacity at each fan-tap.
 (Condition) Room temperature: 27°CDB/19°CWB
 (*) If room temperature is lower than 27°CDB/19°CWB, cooling capacity ratio tends to be smaller than values shown in graph. The lowest fan tap in the operating indoor units should be selected on above graph.

(ii) Indoor fan tap: Lo



Capacity compensation coefficient is that of cooling capacity at each fan-tap.
 (Condition) Room temperature: 27°CDB/19°CWB
 (*) If room temperature is lower than 27°CDB/19°CWB, cooling capacity ratio tends to be smaller than values shown in graph. The lowest fan tap in the operating indoor units should be selected on above graph.

6. WARNINGS ON REFRIGERANT LEAKAGE

Check of concentration limit

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its concentration will not exceed a set limit.

The refrigerant R410A which is used in the air conditioner is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws to be imposed which protect the ozone layer. However, since it contains more than air, it poses the risk of suffocation if its concentration should rise excessively.

Suffocation from leakage of R410A is almost nonexistent. With the recent increase in the number of high concentration buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power etc.

Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared with conventional individual air conditioners. If a single unit of the multi conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its concentration does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).

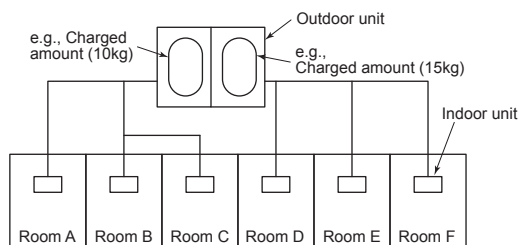
In a room where the concentration may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device.

The concentration is as given below.

$$\frac{\text{Total amount of refrigerant (kg)}}{\text{Min. volume of the indoor unit installed room (m}^3\text{)}} \leq \text{Concentration limit (kg/m}^3\text{)}$$

The concentration limit of R410A which is used in multi air conditioners is 0.42kg/m³. (ISO5149)

Note(1) If there are 2 or more refrigerating systems in a single refrigerating device, the amounts of refrigerant should be as charged in each independent device.

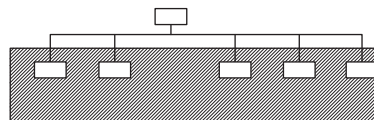


For the amount of charge in this example:
 The possible amount of leaked refrigerant gas in rooms A, B and C is 10kg.
 The possible amount of leaked refrigerant gas in rooms D, E and F is 15kg.

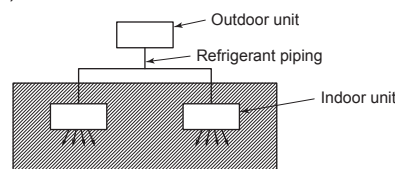
Important

Note(2) The standards for minimum room volume are as follows.

① No partition (shaded portion)

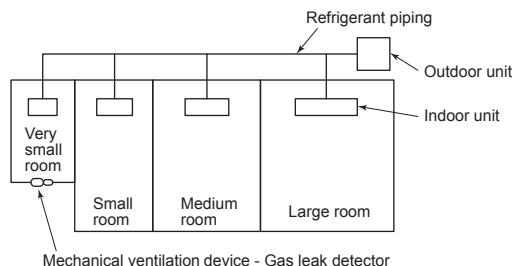


② When there is an effective opening with the adjacent room for ventilation of leaking refrigerant gas (opening without a door, or an opening 0.15% or larger than the respective floor spaces at the top or bottom of the door).

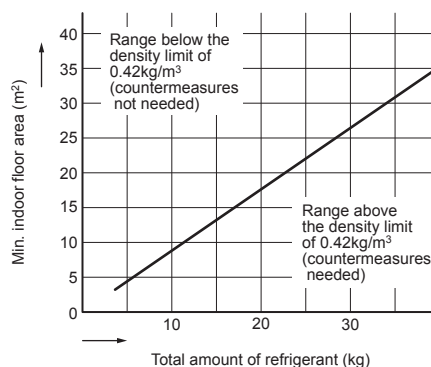


③ If an indoor unit is installed in each partitioned room and the refrigerant tubing is interconnected, the smallest of course becomes the object.

But when a mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the volume of the next smallest room becomes the object.



Note(3) The minimum indoor floor area compared with the amount of refrigerant is roughly as follows: (When the ceiling is 2.7m high)

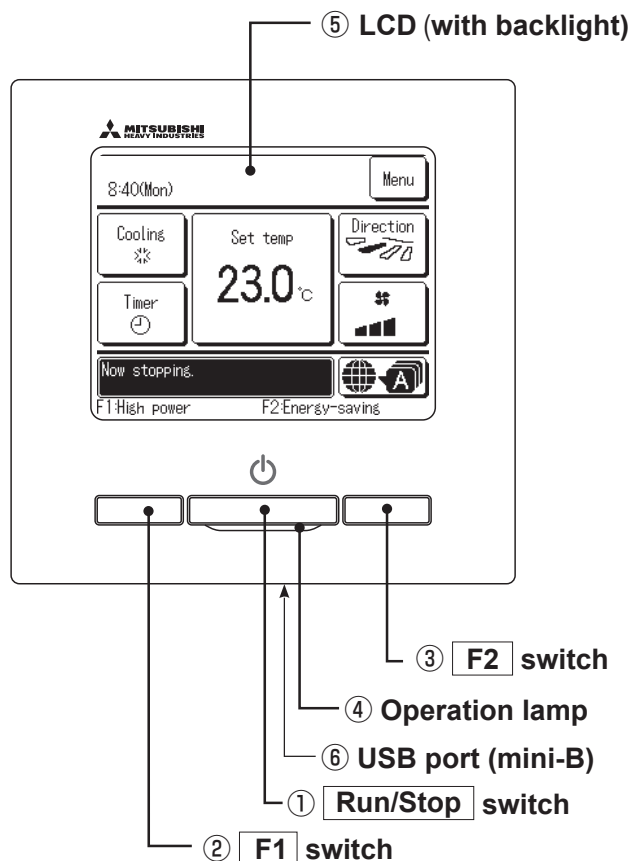


7. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

7.1 Remote control (Option parts)

(1) Wired remote control

(a) Model RC-EX3A



Touch panel system, which is operated by tapping the LCD screen with a finger, is employed for any operations other than the ①Run/Stop, ②F1 and ③F2 switches.

① Run/Stop switch

One push on the button starts operation and another push stops operation.

If the backlight is ON setting, when the screen is tapped while the backlight is turned off, the backlight only is turned on. (Operations with switches ①, ② and ③ are excluded.)

② F1 switch ③ F2 switch

This switch starts operation that is set in F1/F2 function setting.

⑥ USB port

USB connector (mini-B) allows connecting to a personal computer.

④ Operation lamp

This lamp lights in green (yellow-green) during operation. It changes to red (orange) if any error occurs.

For operating methods, refer to the instruction manual attached to the software for personal computer (remote control utility software).

Operation lamp luminance can be changed.

Note(1) When connecting to a personal computer, do not connect simultaneously with other USB devices. Please be sure to connect to the computer directly, without going through a hub, etc.

⑤ LCD (with backlight)

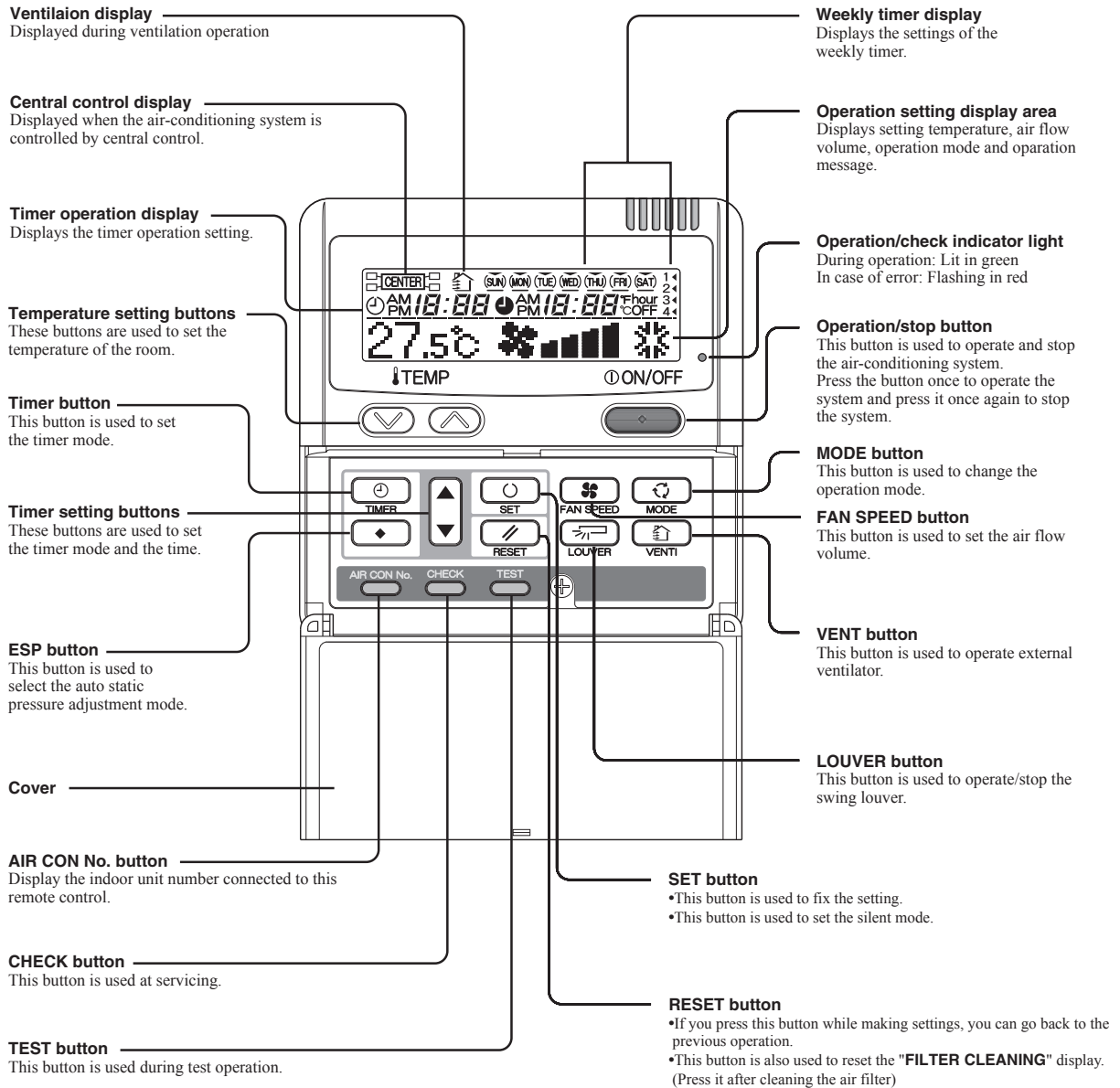
A tap on the LCD lights the backlight.

The backlight turns off automatically if there is no operation for certain period of time. Lighting period of the backlight lighting can be changed.

(b) Model RC-E5

The figure below shows the remote control with the cover opened. Note that all the items that may be displayed in the liquid crystal display area are shown in the figure for the sake of explanation. Characters displayed with dots in the liquid crystal display area are abbreviated.

The figure below shows the remote control with the cover opened.

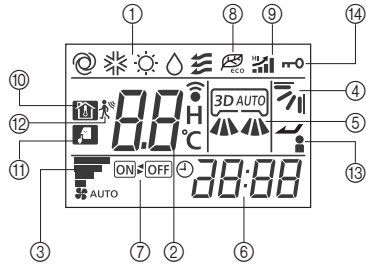


* All displays are described in the liquid crystal display for explanation.

(2) Wireless remote control

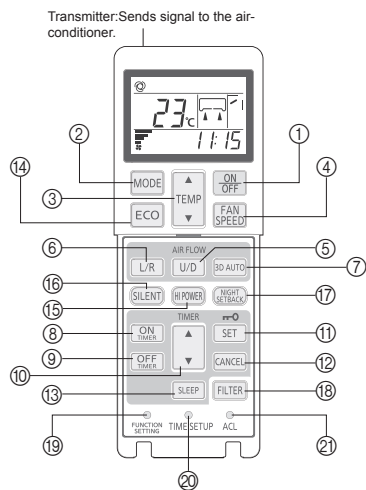
Model RCN-E2

Indication section



①	OPERATION MODE display SET TEMP display	Indicates selected operation mode. Indicates set temperature.
②	SLEEP TIMER time display Indoor function setting number display	Indicates the amount of time remaining on the sleep timer. Indicates the setting number of the indoor function setting.
③	FAN SPEED display	Indicates the selected air flow volume.
④	UP/DOWN AIR FLOW display	Indicates the up/down louver position.
⑤	LEFT/RIGHT AIR FLOW display	Indicates the left/right louver position.
⑥	Clock display	Indicates the current time. If the timer is set, the ON TIMER and OFF TIMER setting times are indicated.
⑦	ON/OFF TIMER display	Displayed when the timer is set.
⑧	ECO mode display	Displayed when the energy-saving operation is active.
⑨	HI POWER display	Displayed when the high power operation is active.
⑩	NIGHT SETBACK display	Displayed when the home leave mode is active.
⑪	SILENT display	Displayed when the silent mode control is active.
⑫	Motion sensor display	Displayed when the infrared sensor control(motion sensor control) is enabled.
⑬	Anti draft setting display	Displayed when anti draft setting is enabled.
⑭	Child lock display	Displayed when child lock is enabled.

Operation section



①	ON/OFF button	When this is pressed once, the air-conditioner starts to operate and when this is pressed once again, it stops operating.
②	MODE button	Every time this button is pressed, displays switch as below
③	TEMP button	Change the set temperature by pressing ▲ or ▼ button.
④	FAN SPEED button	The fan speed is switched in the following order: 1-speed → 2-speed → 3-speed → 4-speed → AUTO → 1-speed.
⑤	U/D button	Used to determine the up/down louver position.
⑥	L/R button	Used to determine the left/right louver position.
⑦	3D AUTO button	Used to switch whether or not to enable or disable 3D AUTO mode.
⑧	ON TIMER button	Used to set the ON TIMER.
⑨	OFF TIMER button	Used to set the OFF TIMER.
⑩	SELECT button	Used to switch the time when setting the timer or adjusting the time. Used to switch the settings of the indoor function.
⑪	SET button	Used to determine the setting when setting the timer or adjusting the time. Used to determine the settings of the indoor function. When press and hold SET button ,Child Lock is enabled.
⑫	CANCEL button	Used to cancel the timer setting.
⑬	SLEEP button	Used to set the sleep timer.
⑭	ECO button	Pressing this button starts the energy-saving operation. Pressing this button again cancels it.
⑮	HI POWER button	Pressing this button starts the high power operation. Pressing this button again cancels it.
⑯	SILENT button	Pressing this button starts the silent mode control. Pressing this button again cancels it.
⑰	NIGHT SETBACK button	Pressing this button starts the home leave mode. Pressing this button again cancels it.
⑱	FILTER button	Pressing this button resets FILTER SIGN.
⑲	FUNCTION SETTING switch	Used to set the indoor function.
⑳	TIME SETUP switch	Used to set the current time.
㉑	ACL switch	Used to reset the microcomputer.

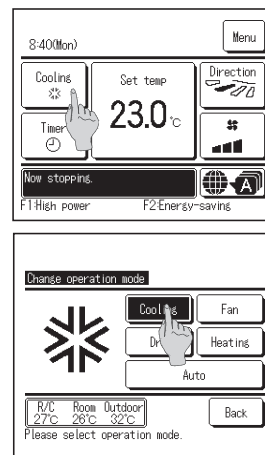
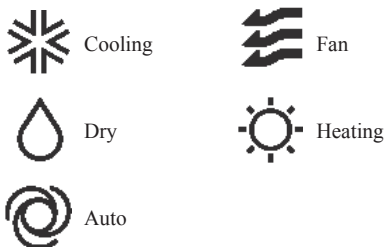
7.2 Operation control function by the wired remote control

(1) Model RC-EX3A

(a) Switching sequence of the operation mode switches of remote control

- (i) Tap the change operation mode button on the TOP screen.
- (ii) When the change operation mode screen is displayed, tap the button of desired mode.
- (iii) When the operation mode is selected, the display returns to the TOP screen.

Icons displayed have the following meanings.



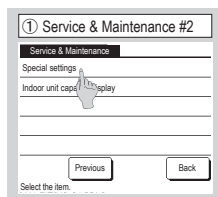
Notes(1) Operation modes which cannot be selected depending on combinations of indoor unit and outdoor unit are not displayed.

- (2) When the Auto is selected, the cooling and heating switching operation is performed automatically according to indoor and outdoor temperatures.

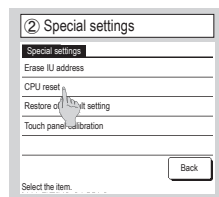
(b) CPU reset

Reset CPU from the remote control as follows.

TOP screen ⇒ ⇒ ⇒



The selected screen is displayed.



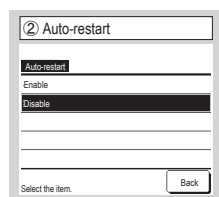
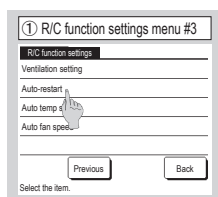
The selected screen is displayed.

Microcomputers of indoor unit and outdoor unit connected are reset (State of restoration after power failure).

(c) Power failure compensation function (Electric power source failure)

Enable the Auto-restart function from the remote control as follows.

TOP screen ⇒ ⇒ ⇒



If the unit stops during operation,

It returns to the state before the power failure as soon as the power source is restored (After the end of the primary control at the power on).

It stops after the restoration of power source.

- Since the status of remote control is retained in memory always, it restarts operations according to the contents of memory as soon as the power source is restored. Although the timer mode is cancelled, the weekly timer, peak cut timer and silent mode timer operate according to the following contents:

- When the clock setting is valid : These timer settings are also valid.
- When the clock setting is invalid : These timer settings become “Invalid” since the clock setting is invalid. These timer settings have to be changed to “Valid” after the timer setting.

- Content memorized with the power failure compensation are as follows.

Note(1) Items f) and g) are memorized regardless whether the power failure compensation is effective or not while the setting of silent mode is cancelled regardless whether the power failure compensation is effective or not.

- At power failure – Operating/stopped
If it had been operating under the off timer mode, sleep timer mode, the state of stop is memorized.
- Operation mode
- Air flow volume mode
- Room temperature setting
- Louver auto swing/stop
However, the stop position (4-position) is cancelled so that it returns to Position (1).
- “Remote control function items” which have been set with the administrator or installation function settings
 (“Indoor function items” are saved in the memory of indoor unit.)
- Weekly timer, peak-cut timer or silent mode timer settings
- Remote control function setting

(d) Alert displays

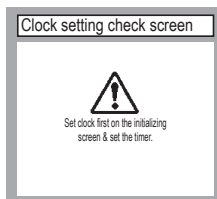
If the following a) to c) appear, check and repair as follows.

- Communication check between indoor unit and remote control



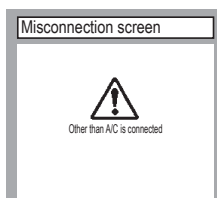
- This appears if communications cannot be established between the remote control and the indoor unit.
Check whether the system is correctly connected (indoor unit, outdoor unit, remote control) and whether the power source for the outdoor unit is connected.

- Clock setting check



- This appears when the timer settings are done without clock setting.
Set the clock setting before the timer settings.

- Misconnection



- This appears when something other than the air-conditioner has been connected to the remote control.
Check the location to which the remote control is connected.

(2) Model RC-E5

(a) Switching sequence of the operation mode switches of remote control



(b) CPU reset

This functions when “CHECK” and “ESP” buttons on the remote control are pressed simultaneously. Operation is same as that of the power source reset.

(c) Power failure compensation function (Electric power source failure)

- This becomes effective if “Power failure compensation effective” is selected with the setting of remote control function.
- Since it memorizes always the condition of remote control, it starts operation according to the contents of memory no sooner than normal state is recovered after the power failure. Although the auto swing stop position and the timer mode are cancelled, the weekly timer setting is restored with the holiday setting for all weekdays. After recovering from the power failure, it readjusts the clock and resets the holiday setting for each weekday so that the setting of weekly timer becomes effective.
- Content memorized with the power failure compensation are as follows.

Note (1) Items f, g) and h) are memorized regardless whether the power failure compensation is effective or not while the setting of silent mode is cancelled regardless whether the power failure compensation is effective or not.

a) At power failure – Operating/stopped

If it had been operating under the off timer mode, sleep timer mode, the state of stop is memorized.

(Although the timer mode is cancelled at the recovery from power failure, the setting of weekly timer is changed to the holiday setting for all weekdays.)

b) Operation mode

c) Air flow volume mode

d) Room temperature setting

e) Louver auto swing/stop

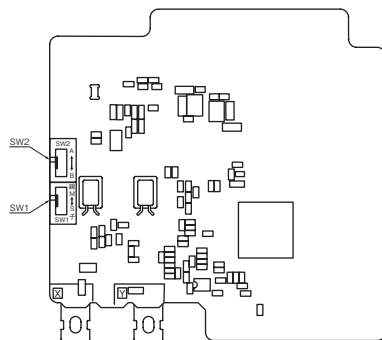
However, the stop position (4-position) is cancelled so that it returns to Position (1).

f) “Remote control function items” which have been set with the remote control function setting (“Indoor function items” are saved in the memory of indoor unit.)

g) Upper limit value and lower limit value which have been set with the temperature setting control

h) Sleep timer and weekly timer settings (Other timer settings are not memorized.)

[Parts layout on remote control PCB]

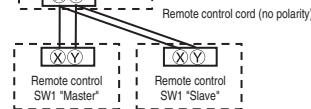


Master/ slave setting when more than one remote controls are used

A maximum of two remote controls can be connected to one indoor unit (or one group of indoor units.)

Switch	Setting	Content
SW1	M	Master remote control
	S	Slave remote control

Note (1) Don't change SW2 because it is not used normally.



Caution

When using multiple remote controls, the following displays or settings cannot be done with the slave remote control. It is available only with the master remote control.

- ① Louver position setting (set upper or lower limit of swinging range)
- ② Setting indoor unit functions
- ③ Setting temperature range
- ④ Operation data display
- ⑤ Error data display
- ⑥ Silent mode setting
- ⑦ Test operation of drain pump
- ⑧ Remote control sensor setting

(3) Operation and setting from wired remote control

A : Refer to the instruction manual for RC-EX series
 B : Refer to the installation manual for RC-EX series
 C : Loading a utility software via Internet

○ : Nearly same function setting and operations are possible.
 △ : Similar function setting and operations are possible.

Setting & display item	Description	RC-EK3A	RC-E5	
1.Remote control network				
1 Control plural indoor units by a single remote control	A remote control can control plural indoor units up to 16 (in one group of remote control network). An address is set to each indoor unit.		○	
2 Main/sub setting of remote controls	A pair of remote controls (including optional wireless remote control) can be connected within the remote control network. Set one to "Main" and the other to "Sub".	B	○	
2.TOP screen, Switch manipulation				
1 Menu	"Control", "State", or "Details" can be selected. (3-8)	A		
2 Operation mode	"Cooling", "Heating", "Fan", "Dry" or "Auto" can be set.	A	○	
3 Set temp.	"Set temperature" can be set by 0.5°C interval.	A	○	
4 Air flow direction	"Air flow direction" (Individual flap control) can be set. Select Enable or Disable for the "3D AUTO" (in case of FDK). *1	A	△	
5 Fan speed	"Fan speed" can be set.	A	○	
6 Timer setting	"Timer operation" can be set.	A	○	
7 ON/OFF	"On/Off operation of the system" can be done.	A	○	
8 F1 SW	The system operates and is controlled according to the function specified to the F1 switch.	A		
9 F2 SW	The system operates and is controlled according to the function specified to the F2 switch.	A		
3.Useful functions				
1 Individual flap control	The moving range (the positions of upper limit and lower limit) of the flap for individual flap can be set. Set also the left and right limit positions for FDK.	A	△	
2 Anti draft setting When the panel with the anti-draft function is assembled.	When the panel with the anti draft function is assembled, select to Enable or Disable the anti draft setting for each operation mode and for each blow outlet.	A		
3 Timer settings	Set On timer by hour	The period of time to start operation after stopping can be set. • The period of set time can be set within range of 1hour-12hours (1hr interval). • The operation mode, set temp. and fan speed at starting operation can be set.	A	△
	Set Off timer by hour	The period of time to stop operation after starting can be set. • The period of set time can be set within range of 1hour-12hours (1hr interval).	A	△
	Set On timer by clock	The clock time to start operation can be set. • The set clock time can be set by 5 minutes interval. • [Once (one time only)] or [Everyday] operation can be switched. • The operation mode, set temp. and fan speed at starting operation can be set.	A	△
	Set Off timer by clock	The clock time to stop operation can be set. • The set clock time can be set by 5 minutes interval. • [Once (one time only)] or [Everyday] operation can be switched.	A	△
	Confirmation of timer settings	Status of timer settings can be seen.	A	
4 Favorite setting [Administrator password]	Set the operation mode, setting temperature, air flow capacity and air flow direction for the choice setting operations. Set them for the Favorite set 1 and the Favorite set 2 respectively.	A		
5 Weekly timer	On timer and Off timer on weekly basis can be set. • 8-operation patterns per day can be set at a maximum. • The setting clock time can be set by 5 minutes interval. • Holiday setting is available. • The operation mode, set temp. and fan speed at starting operation can be set.	A	△	
6 Home leave mode [Administrator password]	When leaving home for a long period like a vacation leave, the unit can be operated to maintain the room temperature not to be hotter in summer or not to be colder in winter. • The judgment to switch the operation mode (Cooling ⇄ Heating) is done by the both factors of the set temp. and outdoor air temp. • The set temp. and fan speed can be set.	A		
7 External Ventilation When the ventilator is combined.	On/Off operation of the external ventilator can be done. It is necessary to set from [Menu] ⇒ [Service setting] ⇒ [R/C function settings] ⇒ [Ventilation setting]. • If the "Independent" is selected for the ventilation setting, the ventilator can be operated or stopped.	A	○	
8 Select the language	Select the language to display on the remote control. • Select from English, German, French, Spanish, Italian, Dutch, Turkish, Portuguese, Russian, Polish, Japanese and Chinese.	A		
4.Energy-saving setting				
Administrator password				
1 Sleep timer	To prevent the timer from keeping ON, set hours to stop operation automatically with this timer. • The selectable range of setting time is from 30 to 240 minutes. (10 minutes interval) • When setting is "Enable", this timer will activate whenever the ON timer is set.	A	△	
2 Peak-cut timer	Power consumption can be reduced by restructuring the maximum capacity. Set the [Start time], the [End time] and the capacity limit % (Peak-cut %). • 4-operation patterns per day can be set at maximum. • The setting time can be changed by 5 minutes interval. • The selectable range of capacity limit % (Peak-cut %) is from 0% to 40-80% (20% interval) • Holiday setting is available.	A		
3 Automatic temp. set back	After the elapse of the set time period, the current set temp. will be set back to the [Set back time.] • The setting can be done in cooling and heating mode respectively. • Selectable range of the set time is from 20 min. to 120 min. (10 min. interval). • Set the [Set back temp.] by 1°C interval.	A	△	
4 Infrared sensor control (Motion sensor control) When the panel with the infrared sensor (motion sensor) is assembled.	When the infrared sensor (motion sensor) is used, it is necessary to set Enable or Disable for the "Power control" and the "Auto-off".	A		
5.Filter				
1 Filter sign reset	Filter sign reset	The filter sign can be reset.	A	
	Setting next cleaning date	The next cleaning date can be set.	A	
6.User setting				
1 Internal settings	Clock setting	The current date and time can be set or revised. • If a power failure continues no longer than 80 hours, the clock continues to tick by the built-in power source.	A	△
	Date and time display	[Display] or [Hide] the date and/or time can be set, and [12H] or [24H] display can be set.	A	
	Summer time	When select [Enable], the +1hour adjustment of current time can be set. When select [Disable], the [Summer time] adjustment can be reset.	A	
	Contrast	The contrast of LCD can be adjusted higher or lower.	A	
	Backlight	Switching on/off a light can be set and period of the lighting time can be set within the range of 5sec-90sec (5sec interval).	A	
	Control sound	It can set with or without [Control sound (beep sound)] at touch panel.	A	
	Operation lamp luminance	This is used to adjust the luminance of operation lamp.	A	
2 Administrator settings [Administrator password]	Permission/Prohibition setting	• Permission/Prohibition setting of operation can be set. [On/Off] [Change set temp] [Change operation mode] [Change flap direction] [Change fan speed] [High power operation] [Energy-saving operation] [Timer] Request for administrator can be set. [Individual flap control] [Weekly timer] [Select the language] [Anti draft setting]	A	△
	Outdoor unit silent mode timer	The period of time to operate the outdoor unit by prioritizing the quietness can be set. • The [Start time] and the [End time] for operating outdoor unit in silent mode can be set. • The period of the operation time can be set once a day by 5 minutes interval.	A	△
	Setting temp. range	The upper/lower limit of temp. setting range can be set. • The limitation of indoor temp. setting range can be set for each operation mode in cooling and heating.	A	△
	Temp. increment setting	The temp. increment setting can be changed by 0.5°C or 1.0°C.	A	
	Set temp. display	Ways of displaying setting temperatures can be selected.	A	

Setting & display item		Description	RC-EX3A	RC-E5		
2 Administrator settings [Administrator password]	R/C display setting	Register [Room name] [Name of I/U] Display [Indoor temp. display] or not. Display [Error code display] or not. Display [Heating stand-by display] [Defrost operation display] [Auto cooling/heating display] [Display temp. of R/C, Room, Outdoor] or not.	A	△		
	Change administrator password	The administrator password can be changed. (Default setting is "0000") The administrator password can be reset.	A B			
	F1/F2 function setting	Functions can be set for F1 and F2. Selectable functions: [High power operation], [Energy-saving operation], [Silent mode cont.], [Home leave mode], [Favorite set 1], [Favorite set 2] and [Filter sign reset].	A			
7. Service setting						
1 Installer settings [Service password]	Installation date	The [Installation date] can be registered. • When registering the [Installation date], the [Next service date] is displayed automatically. (For changing the [Next service date], please refer the item of [Service & Maintenance])	B			
	Company information	The [Company information] can be registered and can be displayed on the R/C. • The [Company] can be registered within 26 characters. • The [Phone No.] can be registered within 13 digits.	B			
	Test run	On/Off operation of the test run can be done.				
	Cooling test run	The [Cooling test run] can be done at 5°C of set temp. for 30 minutes.	B	○		
	Drain pump test run	Only drain pump can be operated.				
	Static pressure adjustment	In case of combination with only the ducted indoor unit which has a function of static pressure adjustment, the static pressure is adjustable. • It can be set for each indoor unit individually.	B			
	Change auto-address	The set address of each indoor unit decided by auto-address setting method can be changed to any other address. (For multiple KX units only)	B	△		
	Address setting of main IU	Main indoor unit address can be set. • Only the Main indoor unit can change operation mode and the Sub indoor units dominated by the Main indoor shall follow. • The Main indoor unit can domain 10 indoor units at a maximum.	B	△		
	IU back-up function	When a pair of indoor units (2 groups) is connected to one unit of remote control, it can be set Enable or Disable for the [IU rotation], [IU capacity back-up] and [IU fault back-up]	B			
	Infrared sensor setting (Motion sensor setting) When the panel with the infrared sensor (motion sensor) is assembled.	Set Enable or Disable for the infrared sensor detectors of indoor units connected to the remote control. If Disable is selected, it cannot be control the infrared sensor control for the energy-saving setting.	B			
2 R/C function setting [Service password]	Main/Sub R/C	The R/C setting of [Main/Sub] can be changed.	B	○		
	Return air temp.	When two or more indoor units are connected to one unit of remote control, suction sensors, which are used for the judgement by thermostat, can be selected. • It can be selected from [Individual], [Master IU] and [Average temp.].	B			
	R/C sensor	It can be set the mode to switch to the remote control sensor. It can be selected from cooling and heating.	B	△		
	R/C sensor adjustment	The offset value of [R/C sensor] sensing temp. can be set respectively in heating and cooling.	B	△		
	Operation mode °C / °F	Enable or Disable can be set for each operation mode. Set the unit for setting temperatures. • °C or °F can be selected.	B	△		
	Fan speed	Fan speeds can be selected.	B	○		
	External input	When two or more indoor units are connected to one unit of remote control, the range to apply CnT inputs can be set.	B	○		
	Upper/lower flap control	[Stop at fixed position] or [Stop at any position] can be selected for the upper and lower louvers.	B	○		
	Left/right flap control	[Fixed position stop] or [Stop at any position] can be selected for the right and left louvers.	B	○		
	Ventilation setting	Combination control for ventilator can be set.	B	○		
	Auto-restart	The operation control method after recovery of power failure happened during operation can be set.	B	○		
	Auto temp. setting	[Enable] or [Disable] of [Auto temp. setting] can be selected.	B			
	Auto fan speed	[Enable] or [Disable] of [Auto fan speed] can be selected.	B			
	3 IU settings [Service password]	Fan speed setting	The fan speed for indoor units can be set.	B	○	
		Filter sign	The setting of filter sign display timer can be done following patterns.	B	○	
External input 1		The connect of control by external input 1 can be changed.	B	○		
External input 1 signal		The type of external input 1 signal can be changed.	B	○		
External input 2		The connect of control by external input 2 can be changed.	B			
External input 2 signal		The type of external input 2 signal can be changed.	B			
Heating thermo-OFF temp. adjustment		The judgement temp. of heating thermo-off can be adjusted within the range from 0 to +3°C (1°C interval)	B	△		
Return temperature adjustment		The sensing temp. of return air temp. sensor built in the indoor unit can be adjusted within the range of ±2°C.	B	△		
Fan control in cooling thermo-OFF		Fan control, when the cooling thermostat is turned OFF, can be changed.	B	○		
Fan control in heating thermo-OFF		Fan control, when the heating thermostat is turned OFF, can be changed.	B	○		
Anti-frost temp.		Judgment temperature for the anti-frost control during cooling can be changed.	B	○		
Anti-frost control		When the anti-frost control of indoor unit in cooling is activated, the fan speed can be changed.	B	○		
Drain pump operation		In any operation mode in addition to cooling and dry mode, the setting of drain pump operation can be done.	B	○		
Keep fan operating after cooling is stopped		The time period residual fan operation after stopping or thermo-off in cooling mode can be set.	B	○		
Keep fan operating after heating is stopped		The time period residual fan operation after stopping or thermo-off in heating mode can be set.	B	○		
Intermittent fan operation in heating		The fan operation rule following the residual fan operation after stopping or thermo-off in heating mode can be set.	B	○		
Fan circulator operation		In case that the fan is operated as the circulator, the fan control rule can be set.	B			
Control pressure adjust		When only the OA processing units are operated, control pressure value can be changed.	B			
Auto operation mode		The [Auto rule selection] for switching the operation mode automatically can be selected from 3 patterns.	B			
Thermo. rule setting		When selecting [Outdoor air temp. control], the judgment temp. can be offset by outdoor temp..	B			
Auto fan speed control	Auto switching range for the auto fan speed control can be set.	B				
IU overload alarm	If the difference between the setting temperature and the suction temperature becomes larger than the temperature difference set for the overload alarm, at 30 minutes after the start of operation, the overload alarm signal is transmitted from the external output (CnT-5).	B				
8. Contact company	External output setting	Functions assigned to the external outputs 1 to 4 can be changed.	B			
	4 Service & Maintenance [Service password]	IU address	Max 16 indoor units can be connected to one remote control, and all address No. of the connected indoor units can be displayed. • The indoor unit conforming to the address No. can be identified by selecting the address No. and tapping [Check] to operate the indoor fan.	B	○	
		Next service date	The [Next service date] can be registered. • The [Next service date] and [Company information] is displayed on the message screen.	A B	○	
		Operation data	The [Operation data] for indoor unit and outdoor unit can be displayed.	B	○	
		Error display	Error history	The error history can be displayed.	B	△
			Display anomaly data	The operation data just before the latest error stop can be displayed.		
			Erase anomaly data	Anomaly operation data can be erased.		
			Reset periodical check	The timer for the periodical check can be reset.		
		Saving IU settings	The IU settings memorized in the indoor PCB connected to the remote control can be saved in the memory of the remote control.	B		
		Special settings	[Erase IU address] [CPU reset] [Restore of default setting] [Touch panel calibration]	B	△	
Indoor unit capacity display		Address No. and capacities of indoor units connected to the remote control are displayed.	B			
9. Contact company						
9. Inspection						
Confirmation of Inspection		This is displayed when any error occurs.	A	△		
10. PC connection						
USB connection		Weekly timer setting and etc., can be set from PC.	C			

◆ Listed items may not function depending on the specifications of indoor and outdoor units which are combined.

7.3 Operation control function by the indoor control

(1) Operations of functional items during cooling/heating

Operation Functional item	Cooling		Fan	Heating			Dehumidifying
	Thermostat ON	Thermostat OFF		Thermostat ON	Thermostat OFF	Hot start (Defrost)	
Compressor	○	×	×	○	×	○	○/×
4-way valve	×	×	×	○	○	○(×)	×
Outdoor fan	○	×	×	○	×	○(×)	○/×
Indoor fan	○	○	○	○/×	○/×	○/×	○/×
Drain pump ⁽³⁾	○	× ⁽²⁾	× ⁽²⁾	○/× ⁽²⁾			Thermostat ON: ○ Thermostat OFF: × ⁽³⁾

Notes (1) ○: Operation ×: Stop ○/×: Turned ON/OFF by the control other than the room temperature control.

(2) ON during the drain motor delay control.

(3) Drain pump ON setting may be selected with the indoor unit function setting of the wired remote control.

(2) Dehumidifying (DRY) operation

(a) In case of with humidity sensor

Indoor ambient temperatures and humidity are controlled simultaneously with the relative humidity sensor (HS) and the suction temperature sensor [Thi-A (or the remote control temperature sensor when it is activated)], which are installed at the suction inlet.

- (i) When the operation has been started with cooling, if there is a difference of 2 °C or less between the suction and setting temperatures, the tap of indoor fan is lowered by one tap. This tap is retained for 3 minutes after changing the tap.
- (ii) After the above condition, when a difference between suction and setting temperature is lower than 3°C, and the relative humidity is high, the tap of indoor fan is lowered by one tap.
When the difference between suction and setting temperature is larger than 3°C, the tap of indoor fan is raised by one tap. This tap is retained for 3 minutes after changing the tap.
- (iii) When relative humidity becomes lower, the indoor fan tap is retained.
- (iv) In case of the thermostat OFF, the indoor fan tap at the thermostat ON is retained.

(b) In case of without humidity sensor

Return air temperature sensor [Thi-A (by the remote control when the remote control temperature sensor is enabled)] controls the indoor temperature environment simultaneously.

- (i) Operation is started in the cooling mode. When the difference between the return air temperature and the setting temperature is 2°C or less, the indoor fan tap is brought down by one tap. That tap is retained for 3 minutes after changing the indoor fan tap.
- (ii) If the return air temperature exceeds the setting temperature by 3°C during dehumidifying operation, the indoor fan tap is raised by one tap. That tap is retained for 3 minutes after changing the indoor fan tap.
- (iii) If the thermostat OFF is established during the above control, the indoor fan tap at the thermostat ON is retained so far as the thermostat is turned OFF.

(3) Timer operation

(a) RC-EX3A

(i) Sleep timer

Set the time from the start to stop of operation. The time can be selected in the range from 30 to 240 minutes (in the unit of 10-minute).

Note (1) Enable the "Sleep timer" setting from the remote control. If the setting is enabled, the timer operates at every time.

(ii) Set OFF timer by hour

Set the time to stop the unit after operation, in the range from 1 to 12 hours (in the unit of hour).

(iii) Set ON timer by hour

Set the time to start the unit after the stop of operation, in the range from 1 to 12 hours (in the unit of hour). It is allowed also to set simultaneously the indoor temperature, operation mode, air flow rate and warm-up enabled/disabled.

(iv) Set ON timer by clock

Set the time to start operation. The time can be set in the unit of 5-minute. This setting can be switched only once or daily. It is allowed also to set simultaneously the indoor temperature, operation mode, air flow rate and warm-up enabled/disabled.

Note (1) It is necessary to set the clock to use this timer.

(v) Set OFF timer by clock

Set the time to stop operation. The time can be set in the unit of 5-minute. This setting can be switched only once or daily.

Note (1) It is necessary to set the clock to use this timer.

(vi) Weekly timer

Set the ON or OFF timer for a week. Up to 8 patterns can be set for a day. The day-off setting is provided for holidays and non-business days.

Note (1) It is necessary to set the clock to use the weekly timer.

(vii) **Combination of patterns which can be set for the timer operations**

	Sleep timer	Set OFF timer by hour	Set ON timer by hour	Set OFF timer by clock	Set ON timer by clock	Weekly timer
Sleep timer		×	×	○	○	○
Set OFF timer by hour	×		×	×	×	×
Set ON timer by hour	×	×		×	×	×
Set OFF timer by clock	○	×	×		○	×
Set ON timer by clock	○	×	×	○		×
Weekly timer	○	×	×	×	×	

Note (1) ○: Allowed ×: Not

(b) RC-E5

(i) Sleep timer

Set the duration of time from the present to the time to turn off the air-conditioner.

It can be selected from 10 steps in the range from “OFF 1 hour later” to “OFF 10 hours later”. After the sleep timer setting, the remaining time is displayed with progress of time in the unit of hour.

(ii) OFF timer

Time to turn OFF the air-conditioner can be set in the unit of 10 minutes.

(iii) ON timer

Time to turn ON the air-conditioner can be set in the unit of 10 minutes. Indoor temperature can be set simultaneously.

(iv) Weekly timer

Timer operation (ON timer, OFF timer) can be set up to 4 times a day for each weekday.

(v) **Combination of patterns which can be set for the timer operations**

Item	Sleep timer	OFF timer	ON timer	Weekly timer
Sleep timer		×	○	×
OFF timer	×		○	×
ON timer	○	○		×
Weekly timer	×	×	×	

Notes (1) ○: Allowed ×: Not

(2) Since the ON timer, sleep timer and OFF timer are set in parallel, when the times to turn ON and OFF the air-conditioner are duplicated, the setting of the OFF timer has priority.

(4) Hot start (Cold draft prevention at heating)**(a) Operating conditions**

When either one of following conditions is satisfied, the hot start control is performed.

(i) From stop to heating operation

(ii) From cooling to heating operation

(iii) From heating thermostat OFF to ON

(iv) After completing the defrost operation (only on units with thermostat ON)

(b) Contents of operation

(i) Indoor fan motor control at hot start

1) Within 7 minutes after starting heating operation, the fan mode is determined depending on the condition of thermostat (fan control with heating thermostat OFF).

- a) Thermostat OFF
 - i) Operates according to the fan control setting at heating thermostat OFF.
 - ii) Even if it changes from thermostat OFF to ON, the fan continues to operate with the fan control at thermostat OFF till the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 35°C or higher.
 - iii) When the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 35°C or higher, the fan operates with the set air flow volume.
- b) Thermostat ON
 - i) When the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 25°C or lower, the fan is turned OFF and does not operate.
 - ii) When the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 25°C or higher, the fan operates with the fan control at heating thermostat OFF.
 - iii) When the heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 35°C or higher, the fan operates with the set air flow volume.
- c) If the fan control at heating thermostat OFF is set at the “Set air flow volume” (from the remote control), the fan operates with the set air flow volume regardless of the thermostat ON/OFF.
- 2) Once the fan motor is changed from OFF to ON during the thermostat ON, the indoor fan motor is not turned OFF even if the heat exchanger temperature sensor detects lower than 25°C.

Note (1) When the defrost operation signal is received, it complies with the fan control during defrost operation.

- 3) Once the hot start is completed, it will not restart even if the temperature on the heat exchanger temperature sensor drops.
 - (ii) During the hot start, the louver is kept at the horizontal position.
 - (iii) When the fan motor is turned OFF for 7 minutes continuously after defrost operation, the fan motor is turned ON regardless of the temperatures detected with the indoor heat exchanger temperature sensor (Thi-R1, R2).

(c) Ending condition

- (i) If one of following conditions is satisfied during the hot start control, this control is terminated, and the fan is operated with the set air flow volume.
 - 1) Heat exchanger temperature sensor (Thi-R1 or R2, whichever higher) detects 35°C or higher.
 - 2) It has elapsed 7 minutes after starting the hot start control.

(5) Hot keep

Hot keep control is performed at the start of the defrost operation.

(a) Contents of operation

- (i) When the indoor heat exchanger temperature (detected with Thi-R1 or R2) drops to 35°C or lower, set the indoor fan to the low speed tap of each setting.
- (ii) During the hot keep, the louver is kept at the horizontal position.

(b) Ending condition

When the indoor fan is at the lower tap at each setting, it returns to the set air flow volume as the indoor heat exchanger temperature rises to 45°C or higher.

(6) Auto swing control

Note Even if [Auto Swing] is selected, the louver position with anti draft function is fixed to position 1.

(a) RC-EX3A

- (i) Louver control
 - 1) To operate the swing louver when the air-conditioner is operating, press the “Direction” button on the TOP screen of remote control. The wind direction select screen will be displayed.
 - 2) To swing the louver, touch the “Auto swing” button. The louver will move up and down. To fix the swing louver at a position, touch one of [1] - [4] buttons. The swing louver will stop at the selected position.
 - 3) Louver operation at the power on with a unit having the louver 4-position control function
 - The louver swings one time automatically (without operating the remote control) at the power on.
 - This allows the microcomputer recognizing and inputting the louver motor (LM) position.
- (ii) Automatic louver level setting during heating
 - At the hot start and the heating thermostat OFF, regardless whether the auto swing switch is operated or not (auto swing or louver stop), the louver takes the level position (in order to prevent blowing of cool wind). The louver position display LCD continues to show the display which has been shown before entering this control.

(iii) Louver free stop control

If you touch the “Menu” → “Service setting” → “R/C function settings” → “Service password” buttons one after another on the TOP screen of remote control, the “Upper / lower flap control” screen is displayed. If the free stop is selected on this screen, the louver motor stops upon receipt of the stop signal from the remote control. If the auto swing signal is received from the remote control, the auto swing will start from the position before the stop.

(b) RC-E5

(i) Louver control

- 1) Press the “LOUVER” button to operate the swing louver when the air-conditioner is operating.
 “SWING \Rightarrow ” is displayed for 3 seconds and then the swing louver moves up and down continuously.
- 2) To fix the swing louver at a position, press one time the “LOUVER” button while the swing louver is moving so that four stop positions are displayed one after another per second.
 When a desired stop position is displayed, press the “LOUVER” button again. The display stops, changes to show the “STOP 1 \Rightarrow ” for 5 seconds and then the swing louver stops.
- 3) Louver operation at the power on with a unit having the louver 4-position control function
 The louver swings one time automatically (without operating the remote control) at the power on.
 This allows inputting the louver motor (LM) position, which is necessary for the microcomputer to recognize the louver position.

Note (1) If you press the “LOUVER” button, the swing motion is displayed on the louver position LCD for 10 second. The display changes to the “SWING \Rightarrow ” display 3 seconds later.

(ii) Automatic louver level setting during heating

At the hot start with the heating thermostat OFF, regardless whether the auto swing switch is operated or not (auto swing or louver stop), the louver takes the level position (In order to prevent the cold start). The louver position display LCD continues to show the display which has been shown before entering this control.

(iii) Louver-free stop control

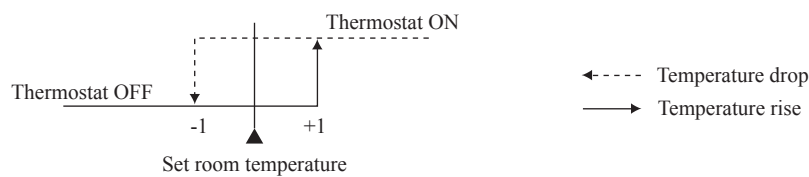
When the louver-free stop has been selected with the indoor function of wired remote control “ \Rightarrow POSITION”, the louver motor stops when it receives the stop signal from the remote control. If the auto swing signal is received from the remote control, the auto swing will start from the position where it was before the stop.

Note (1) When the indoor function of wired remote control “ \Rightarrow POSITION” has been switched, switch also the remote control function “ \Rightarrow POSITION” in the same way.

(7) Thermostat operation

(a) Cooling

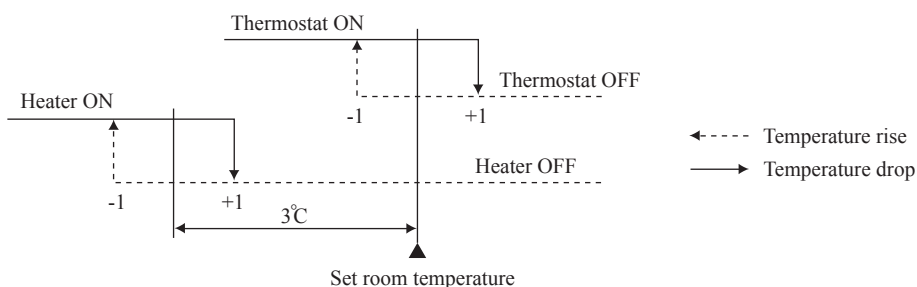
- (i) Thermostat is operated with the room temperature control.
- (ii) Thermostat is turned ON or OFF relative to the set room temperature as shown below.



- (iii) Thermostat is turned ON when the room temperature is in the range of $-1 < \text{Set temperature} < +1$ at the start of cooling operation (including from heating to cooling).

(b) Heating

- (i) Thermostat is operated with the room temperature control.
- (ii) Thermostat is turned ON or OFF relative to the set room temperature as shown below.



- (iii) Thermostat is turned ON when the room temperature is in the range of $-1 < \text{Set room temperature} < +1$ at the start of heating operation (including from cooling to heating).

(c) Fan control during heating thermostat OFF

- (i) Following fan controls during the heating thermostat OFF can be selected with the indoor function setting of the wired remote control.
 - ① Low fan speed (Factory default) ② Set fan speed ③ Intermittence ④ Fan OFF
- (ii) When the “Low fan speed (Factory default)” is selected, the following taps are used for the indoor fans.
 - For DC motor : ULo tap
- (iii) When the “Set fan speed” is selected, it is operated with the set fan speed also in the thermostat OFF condition.
- (iv) If the “Intermittence” is selected, following controls are performed:
 - 1) If the thermostat is turned OFF during the heating operation, the indoor fan stops.
 - 2) Indoor fan OFF is fixed for 5 minutes. After the 5 minutes, the indoor fan is operated at ULo for 2 minutes. In the meantime the louver is controlled at level.
 - 3) After operating at ULo for 2 minutes, the indoor fan moves to the state of 1) above.
 - 4) If the thermostat is turned ON, it moves to the hot start control.
 - 5) When the heating thermostat is turned OFF, the remote control displays the temperature detected at the fan stop and revises the temperature later when the indoor fan changes from ULo to stop.
The remote control uses the operation data display function to display temperatures and updates values of temperature even when the indoor fan is turned OFF.
 - 6) When the defrost operation starts while the heating thermostat is turned OFF or the thermostat is turned OFF during defrost operation, the indoor fan is turned OFF. (Hot keep or hot start control takes priority.) However, the suction temperature is updated at every 7-minute.
 - 7) When the heating thermostat is turned ON or the operation is changed to another mode (including stop), this control is stopped immediately, and the operating condition is restored.
- (v) When the “Fan OFF” is selected, the fan on the indoor unit of which the thermostat has been turned OFF, is turned OFF. The same occurs also when the remote control sensor is effective.

(d) Fan control during cooling thermostat OFF (Except FDTC, FDTQ, FDUT15-56, FDUH, FDK, FDFW, FDFL, FDFU)

- (i) Following fan controls during the cooling thermostat OFF can be selected with the indoor function setting of the wired remote control.
 - ① Low fan speed ② Set fan speed (Factory default) ③ Intermittence ④ Fan OFF
- (ii) When the “Low fan speed” is selected, the following taps are used for the indoor fans.
 - For DC motor : ULo tap
- (iii) When the “Set fan speed” is selected, it is operated with the set fan speed also in the thermostat OFF condition.
- (iv) If the “Intermittence” is selected, following controls are performed:
 - 1) If the thermostat is turned OFF during the cooling operation, the indoor fan stops.
 - 2) Indoor fan OFF is fixed for 5 minutes. After the 5 minutes, the indoor fan is operated at ULo for 2 minutes.
 - 3) After operating at ULo for 2 minutes, the indoor fan moves to the state of 1) above.
 - 4) If the thermostat is turned ON, the fan starts operation at set fan speed.
 - 5) When the cooling thermostat is turned OFF, the remote control displays the temperature detected at the fan stop and revises the temperature later when the indoor fan changes from ULo to stop.
By using operation data display function at wireless remote control, the temperature as displayad and the value is updated including the fan stops.
 - 6) When the cooling thermostat is turned ON or the operation is changed to another mode (including stop), this control is stopped immediately, and the operating condition is restored.
- (v) When the “Fan OFF” is selected, the fan on the indoor unit of which the thermostat has been turned OFF, is turned OFF. The same occurs also when the remote control sensor is effective.

(8) Filter sign

As the operation time (Total ON time of ON/OFF switch) accumulates to 180 hours (1), “FILTER CLEANING” is displayed on the remote control. (This is displayed when the unit is in trouble and under the central control, regardless of ON/OFF)

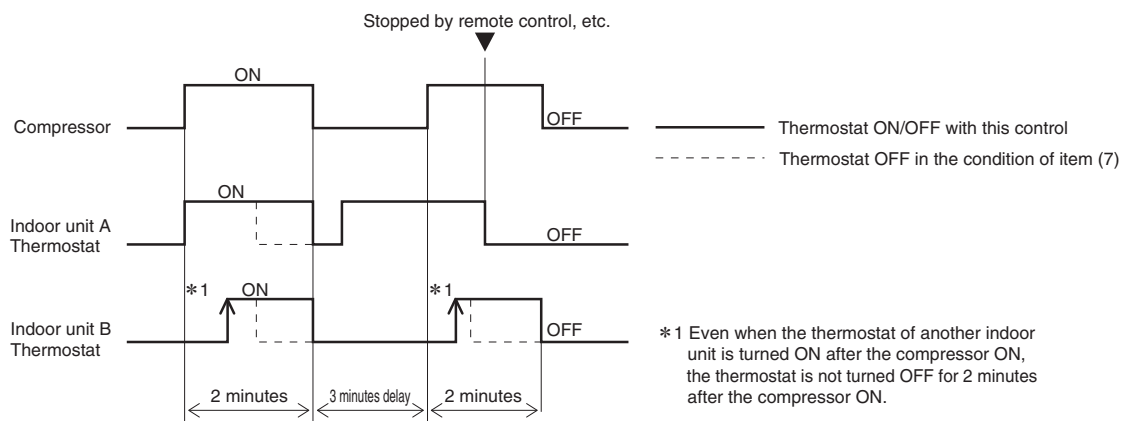
Notes (1) Time setting for the filter sign can be made as shown below using the indoor function of wired remote control “Filter sign”. (It is set at Setting 1 at the shipping from factory.)

Filter sign setting	Function
Setting 1	Setting time: 180 hrs (Factory default)
Setting 2	Setting time: 600 hrs
Setting 3	Setting time: 1,000 hrs
Setting 4	Setting time: 1,000 hrs (Unit stop) ⁽²⁾

(2) After the setting time has elapsed, the “FILTER CLEANING” is displayed and, after operating for 24 hours further (counted also during the stop), the unit stops.

(9) Compressor inching prevention control

(a) Once the indoor unit thermostat has been turned ON, the thermostat is not turned OFF for 2 minutes (*1) after the compressor ON even if the thermostat is turned OFF at the state of item (7).



(b) When the oil return control has started while the thermostat is turned ON, the thermostat is not turned OFF even if the thermostat OFF condition is satisfied during the oil return control.

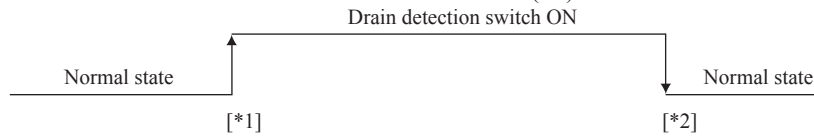
(10) Drain pump control (Except FDK)

- (a) This control is operated when the inverter frequency is other than 0 rps during the cooling operation and automatic cooling and dehumidifying operations.
- (b) Drain pump ON condition continues for 5 minutes even when it enters the OFF range according to (i) above after turning the drain pump ON, and then stops. The 5 minutes delay continues also in the event of anomalous stop.
- (c) The drain pump is operated with the 5 minutes delay operation when the compressor is changed from ON to OFF.
- (d) Even in conditions other than the above (such as heating, fan, stop, cooling thermostat OFF), the drain pump control is performed by the drain detection.
- (e) Following settings can be made using the indoor function setting of the wired remote control.
 - (i) ❶ [Standard (in cooling)] : Drain pump is run during cooling.
 - (ii) ❶❷❸ [Operate in standard & heating] : Drain pump is run during cooling and heating.
 - (iii) ❶❷❸❹ [Operate in heating & fan] : Drain pump is run during cooling, heating and fan.
 - (iv) ❶❷❸ [Operate in standard & fan] : Drain pump is run during cooling and fan.

Note (1) Values in [] are for the RC-EX3A model.

(11) Drain pump abnormalities detection (Except FDK)

- (a) Drain detection switch is turned ON or OFF with the float switch (FS) and the timer.



[* 1] Drain detection switch is turned “ON” when the float switch “Open” is detected for 3 seconds continuously in the drain detectable space.

[* 2] Drain detection switch is turned “OFF” when the float switch “Close” is detected for 10 seconds continuously.

- (i) It detects always from 30 seconds after turning the power ON.
 - 1) There is no detection of anomalous draining for 10 seconds after turning the drain pump OFF.
 - 2) Turning the drain detection switch “ON” causes to turn ON the drain pump forcibly.
 - 3) Turning the drain detection switch “OFF” releases the forced drain pump ON condition.

- (b) Indoor unit performs the control A or B depending on each operating condition.

	Indoor unit operation mode				
	Stop ⁽¹⁾	Cooling	Dry	Fan ⁽²⁾	Heating
Compressor ON	Control A				
Compressor OFF	Control B				

Notes (1) Including the stop from the cooling, dehumidifying, fan and heating, and the anomalous stop
 (2) Including the “Fan” operation according to the mismatch of operation modes

- (i) Control A
 - 1) If the float switch detects any anomalous draining condition, the unit stops with the anomalous stop (displays E9) and the drain pump starts. After detecting the anomalous condition, the drain motor continues to be ON.
 - 2) It keeps operating while the float switch is detecting the anomalous condition.
- (ii) Control B

If the float switch detects any anomalous drain condition, the drain motor is turned ON for 5 minutes, and at 10 seconds after the drain motor OFF it checks the float switch. If it is normal, the unit is stopped under the normal mode or, if there is any anomalous condition, E9 is displayed and the drain motor is turned ON. (The ON condition is maintained during the drain detection.)

(12) Operation check/drain pump test run operation mode

- (a) If the power is turned on by the DIP switch (SW7-1) on the indoor unit control PCB when electric power source is supplied, it enters the mode of operation check/drain pump test run. It is ineffective (prohibited) to change the switch after turning power on.
- (b) When the communication with the remote control has been established within 60 seconds after turning power on by the DIP switch (SW7-1) ON, it enters the operation check mode. Unless the remote control communication is established, it enters the drain pump test run mode.

Note (1) To select the drain pump test run mode, disconnect the remote control connector (CnB) on the indoor unit PCB to shut down the remote control communication.

- (c) Operation check mode

There is no communication with the outdoor unit but it allows performing operation in respective modes by operating the remote control.
- (d) Drain pump test run mode (Except FDK)

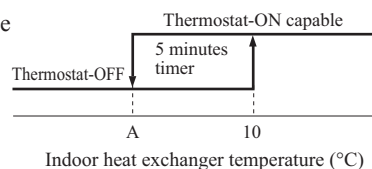
As the drain pump test run is established, the drain pump only operates and during the operation protective functions by the microcomputer of indoor unit become ineffective.

(13) Cooling, dehumidifying frost protection

- (a) To prevent frosting during cooling mode or dehumidifying mode operation, the of thermostat-OFF if the indoor heat exchanger temperature (detected with Thi-R) drops to 1.0 °C or lower at 4 minutes after the thermostat-ON. If the indoor unit heat exchanger temperature is 1.0 °C or lower after 5 minutes, the indoor unit is controlled thermostat-OFF. If it becomes 10°C or higher, the control terminates. When the indoor heat exchanger temperature has become as show, the indoor unit send heat source unit the “Anti-frost” signal.

- Frost prevention temperature setting can be selected with the indoor unit function setting of the wired remote control.

Item	Symbol	A
Temperature - Low (Factory default)		1.0
Temperature - High		2.5



- Compressor forced off temperature (In case of with humidity sensor)

Hs > 50%

Item	Low	High
Symbol		
A	1.0	2.5

Hs ≤ 50%

Item	Low	High
Symbol		
A	-0.5	1.0

(b) Selection of indoor fan speed

If it enters the frost prevention control during cooling operation (including dehumidifying), the indoor fan speed is switched.

- When the indoor return air temperature (Thi-A) is 18°C or higher and the indoor heat exchanger temperature (detected with Thi-R) detects the compressor frequency drop start temperature A°C+1°C, of indoor fan speed is increased by 20min⁻¹.
- If the phenomenon of (i) above is detected again after the acceleration of indoor fan, indoor fan speed is increased further by 20min⁻¹.

Note (1) Indoor fan speed can be increased by up to P-Hi.

(14) Anomalous fan motor

- After starting the fan motor, if the fan motor speed is 200min⁻¹ or less is detected for 30 seconds continuously and 4 times within 60 minutes, then fan motor stops with the anomalous stop (E16).
- If the fan motor fails to reach at -50 min⁻¹ less than the required speed, it stops with the anomalous stop (E20).

(15) Plural unit control – Control of 16 units group by one remote control

(a) Function

One remote control can control a group of multiple number of unit (Max. 16 indoor units). “Operation mode” which is set by the remote control can operate or stop all units in the group one after another in the order of unit. No.⁽¹⁾. Thermostat and protective function of each unit function independently.

Note (1) Unit No. is set by SW1, SW2, and SW5-2 on the indoor control PCB.

(b) Display to the remote control

- Central or each remote control basis, heating preparation: the smallest unit No. among the operating units in the remote mode (or the center mode unless the remote mode is available) is displayed.
- Inspection display, filter sign: Any of unit that starts initially is displayed.

(c) Confirmation of connected units

(i) In case of RC-EX3A remote control

If you touch the buttons in the order of “Menu” → “Service setting” → “Service & Maintenance” → “Service password” → “IU address” on the TOP screen of remote control, the indoor units which are connected are displayed.

(ii) In case of RC-E5 remote control

Pressing “AIR CON No.” button on the remote control displays the indoor unit address. If “▲” “▼” button is pressed at the next, it is displayed orderly starting from the unit of smallest No.

(d) In case of anomaly

If any anomaly occurs on a unit in a group (a protective function operates), that unit stops with the anomalous stop but any other normal units continue to run as they are.

(e) Signal wiring procedure

Signal wiring between indoor and outdoor units should be made on each unit same as the normal wiring. For the group control, connect the remote control wiring to each indoor unit via terminal block for the remote control.

Connect the remote control wiring separately from the power source cable or wires of other electric devices (AC220V or higher).

(16) Fan speed setting control

When sufficient air flow rate cannot be obtained from the indoor unit which is installed at a room with high ceiling, the air flow rate can be increased by changing the fan tap. To change the fan tap, use the indoor unit function “Fan speed setting” on the wired remote control.

Fan tap		Indoor unit air flow rate setting				Series (Wired remote control)
		Hi - Me - Lo	Hi - Me - ULo	Hi - Lo	Hi - Me	
Fanspeed setting	Standard	P-Hi1 - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	Except FDT, FDE (RC-EX3A)
		P-Hi2 - Hi - Me - ULo	Hi - Me - ULo	Hi - ULo	Hi - Me	Only FDT (RC-EX3A)
		P-Hi2 - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	Only FDE (RC-EX3A)
		UH - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	All series (RC-E5)
	Setting 1	P-Hi1 - P-Hi1 - Hi - Me	P-Hi1 - Hi - Me	P-Hi1 - Me	P-Hi1 - Hi	Except FDT, FDE (RC-EX3A)
		P-Hi2 - P-Hi1 - Hi - Me	P-Hi1 - Hi - Me	P-Hi1 - Me	P-Hi1 - Hi	Only FDT (RC-EX3A)
		P-Hi1 - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	Only FDE (RC-EX3A)
	Setting 2	P-Hi2 - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me	Only FDT, FDE (RC-EX3A)
	HIGH SPEED1,2	UH - UH - Hi - Me	UH - Hi - Me	UH - Me	UH - Hi	All series (RC-E5)

Notes (1) Factory default is Standard.

(2) At the hot-start and heating thermostat OFF, or other, the indoor fan is operated at the low speed tap of each setting.

(3) This function is not able to be set with wireless remote control or simple remote control (RCH-E3).

(17) Abnormal temperature sensor (return air/indoor heat exchanger) broken wire/short-circuit detection

(a) Broken wire detection

If the return air temperature sensor detects broken wire for 5 seconds continuously, the compressor stops (E7). If the heat exchanger temperature sensor detects broken wire for 5 seconds continuously, the compressor stops (E6).

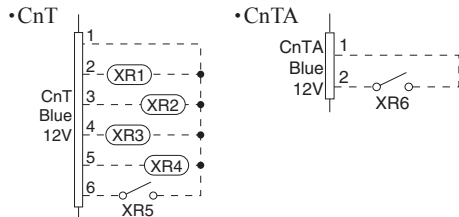
(b) Short-circuit detection

If the return air temperature sensor detects short-circuit for 5 seconds continuously, the compressor stops (E6).

If the heat exchanger temperature sensor detects short-circuit for 5 seconds continuously, the compressor stops (E6).

(18) External input/output control (CnT or CnTA)

External input/output connectors are provided on the indoor unit control PCB, and each input/output is possible to be changed by RC-EX3A. Be sure to connect the wired remote control to the indoor unit. Remote operation with CnT/CnTA only is not possible.



Input/Output	Connector	Factory default setting	RC-EX3A function name
Output	CnT-2 (XR1)	Operation output	External output 1
	CnT-3 (XR2)	Heating output	External output 2
	CnT-4 (XR3)	Thermostat ON output	External output 3
	CnT-5 (XR4)	Inspection (Error) output	External output 4
Input (Volt-free contact)	CnT-6 (XR5)	Remote operation input	External input 1
	CnTA (XR6)	Remote operation input	External input 2

Priority order for combinations of CnT and CnTA input.

		CnTA						
		① Operation stop level	② Operation stop pulse	③ Operation permission/prohibition	④ Operation permission/prohibition pulse	⑤ Cooling/heating selection level	⑥ Cooling/heating selection pulse	⑦ Emergency stop
CnT	① Operation stop level	CnT ①	CnT ①	CnT ① + CnTA ②	CnT ①	CnT ① / CnTA ⑤	CnT ① / CnTA ⑥	CnT ① < CnTA ⑦
	② Operation stop pulse	CnT ②	CnT ②	CnT ② + CnTA ③	CnT ②	CnT ② / CnTA ⑤	CnT ② / CnTA ⑥	CnT ② < CnTA ⑦
	③ Operation permission/prohibition level	CnT ③ > CnTA ①	CnT ③ > CnTA ②	CnT ③ + CnTA ③	CnT ③	CnT ③ / CnTA ⑤	CnT ③ / CnTA ⑥	CnT ③ < CnTA ⑦
	④ Operation permission/prohibition pulse	CnT ④	CnT ④	CnT ④ + CnTA ③※	CnT ④	CnT ④ / CnTA ⑤	CnT ④ / CnTA ⑥	CnT ④ < CnTA ⑦
	⑤ Cooling/heating selection level	CnT ⑤ / CnTA ①	CnT ⑤ / CnTA ②	CnT ⑤ / CnTA ③	CnT ⑤ / CnTA ④	CnT ⑤	CnT ⑤	CnT ⑤ / CnTA ⑦
	⑥ Cooling/heating selection pulse	CnT ⑥ / CnTA ①	CnT ⑥ / CnTA ②	CnT ⑥ / CnTA ③	CnT ⑥ / CnTA ④	CnT ⑥	CnT ⑥	CnT ⑥ / CnTA ⑦
	⑦ Emergency stop	CnT ⑦ > CnTA ①	CnT ⑦ > CnTA ②	CnT ⑦ > CnTA ③	CnT ⑦ > CnTA ④	CnT ⑦ / CnTA ⑤	CnT ⑦ / CnTA ⑥	CnT ⑦ + CnTA ⑦

Note (1) Following operation commands are accepted when the operation prohibition is set with CnTA as indicated with *.

Individual operation command from remote control, test run command from outdoor unit and operation command from option device, CnT input.

Reference: Explanation on the codes and the combinations of codes in the table above

- In case of CnT "Number", the CnT "Number" is adopted and CnTA is invalidated.
- In case of CnTA "Number", the CnTA "Number" is adopted and CnT is invalidated.
- In case of CnT "Number"/CnTA "Number", the CnT "Number" and the CnTA "Number" become independent functions each other.
- In case of CnT "Number" + CnTA "Number", the CnT "Number" and the CnTA "Number" become competing functions each other.
- In case of CnT "Number" > CnTA "Number", the function of CnT "Number" supersedes that of CnTA "Number".
- In case of CnT "Number" < CnTA "Number", the function of CnTA "Number" supersedes that of CnT "Number".
(The "Number" above means ① - ⑦ in the table.)

(a) Output for external control (remote display)

Indoor unit outputs the following signal for operation status monitoring.

	Output name	Condition
1	Operation output	During operation
2	Heating output	During heating operation
3	Thermostat ON output	During compressor operation
4	Inspection (Error) output	When anomalous condition occurs.
5	Cooling output	During cooling operation
6	Fan operation output 1	When indoor unit's fan is operating
7	Fan operation output 2	When indoor unit's fan is operating, and fan speed is higher than Hi speed.
8	Fan operation output 3	When indoor unit's fan is operating, and fan speed is Lower than Me speed.
9	Defrost/oil return output	When indoor unit receive defrost/oil return signal from the outdoor unit.
10	Ventilation output	When "Venti.ON" is selected from remote control
11	Heater output	Refer to " (7) Thermostat operation (b) Heating"
12	Free cooling output	When the ambient temp. is between 10-18 °C in cooling and fan operation
13	Indoor unit overload alarm output	Refer to "IU overload alarm"

(b) Input for external control

The external input for the indoor unit can be selected from the following input by the wired remote control.
 The input connectors (CnT-6 and CnTA) are equipped on the indoor unit control PCB.
 "LEVEL INPUT(Factory default)" or "PULSE INPUT" is selectable from the wired remote control.

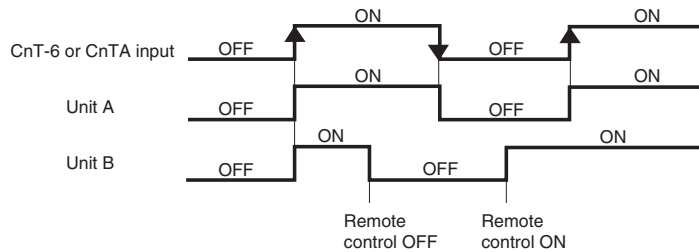
	Input name	Content
1	Run/Stop (Factory default)	Refer to [(18) (c) Remote operation input]
2	Permission/Prohibition	Refer to [(19) Operation permission/prohibition]
3	Cooling/Heating	Refer to [(21) Selection of cooling/heating external input function]
4	Emergency stop	Refer to [(22) Emergency stop input]
5	Setting temperature shift	Set temperature is shifted by +2/-2°C in cooling/heating.
6	Forced thermo-OFF	Unit goes thermo off.
7	Temporary stop	Refer to [(20) Temporary stop input]
8	Silent mode	Outdoor unit silent mode is activated.

(c) Remote operation input

The indoor unit operation can be controlled by external input.
 However it is not effective when "Center mode" is selected by central control.
 Only the "LEVEL INPUT" is recommended for this input, and operation status is changed as follows.

(i) In case of "Level input" setting (Factory default)

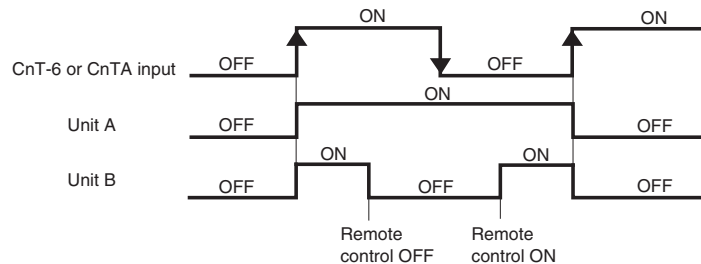
Input signal to CnT-6 or CnTA is OFF→ON unit ON
 Input signal to CnT-6 or CnTA is ON→OFF unit OFF
 Operation is not inverted.



Note: The latest operation has priority.
 It is available to operate/stop by remote control or central control.

(ii) In case of "Pulse input" setting (Local setting)

It is effective only when the input signal to CnT-6 or CnTA is changed OFF→ON, and at that time unit operation [ON/OFF] is inverted.



(iii) In case of multiple units (Max. 16 indoor units group) are connected to one wired remote control

When the R/C function setting of wired remote control for "External control set" is changed from "Individual (Factory default)" to "For all units", all units connected in one wired remote control system can be controlled by external operation input.

(19) Operation permission/prohibition

(In case of adopting card key switches or commercially available timers)

When the external input is selected to "Permission/Prohibition", this control becomes effective.
 However it is not effective when "Center mode" is selected by central control.

Connector	Indoor function	
	RC-EX3A	RC-E5
CnT	External input 1 : Permission/Prohibition	Operation permission/Prohibition : Valid
CnTA	External input 2 : Permission/Prohibition	No function

Only the "LEVEL INPUT" is recommended for this input, and operation status is changed as follows.

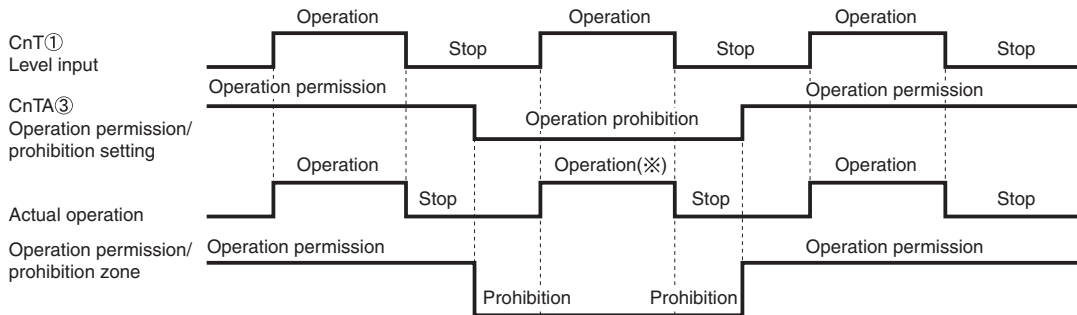
(a) In case of “Level input” setting (Factory default)

- (i) When card key switch is ON (CnT-6 or CnTA ON: Operation permission), start/stop operation of the unit from the wired remote control becomes available.
- (ii) When card key switch is OFF (CnT-6 or CnTA OFF: Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote control becomes not available.

(b) In case of “Pulse input” setting (Local setting)

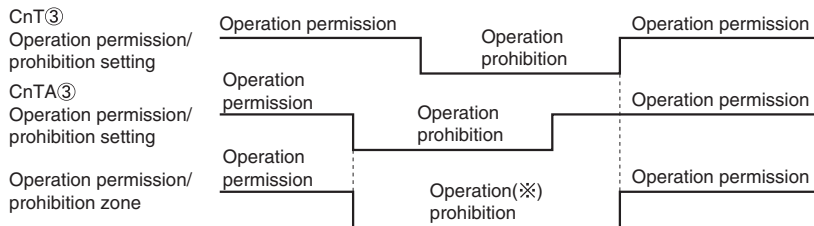
- (i) When card key switch is ON (Operation permission), the unit starts operation in conjunction with ON signal, and also start/stop operation of the unit from the wired remote control becomes available.
- (ii) When card key switch is OFF (Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote control becomes not available.

(c) In case of CnT ① Operation stop level > CnTA ③ Operation permission/prohibition level



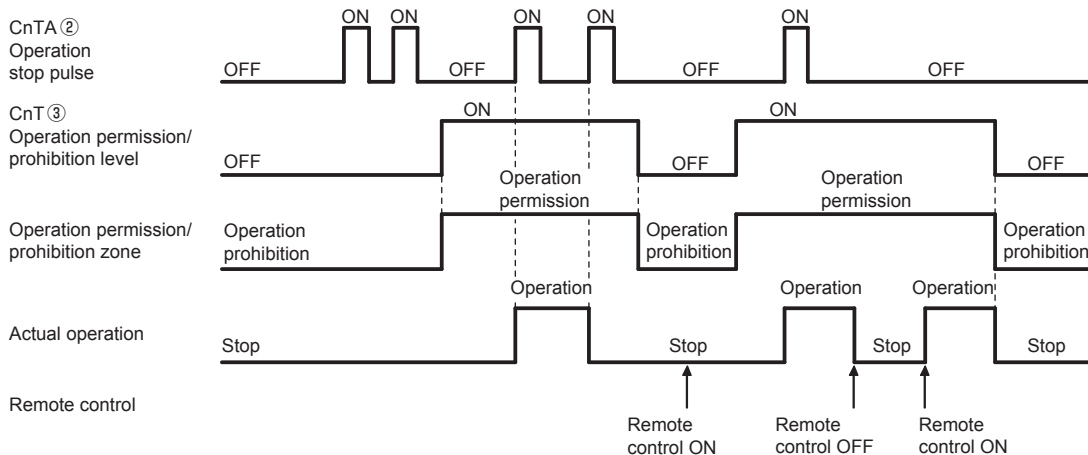
(※) CnT level input supersedes CnTA operation prohibition.

(d) In case of CnT ③ Operation permission/prohibition level + CnTA ③ Operation permission/prohibition level



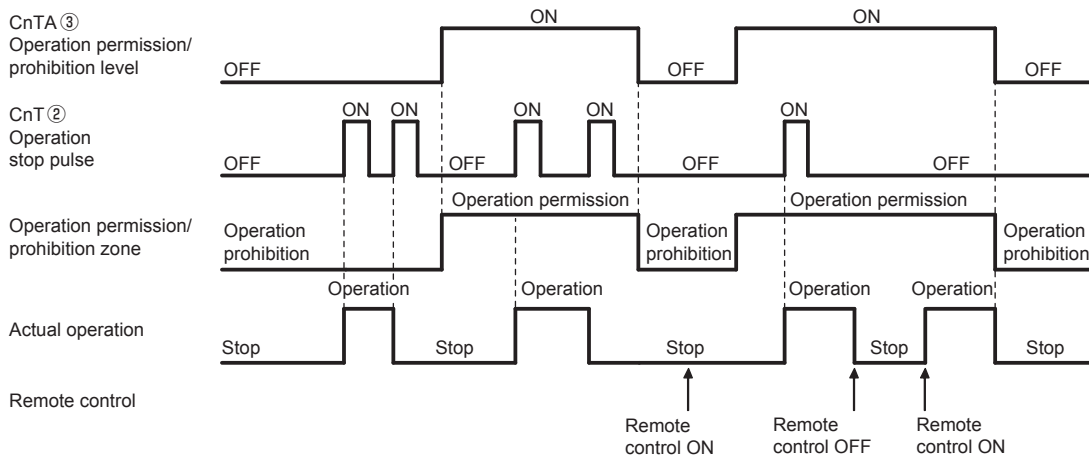
(※) Operation prohibition zone is determined by the OR judgment between CnT operation prohibition zone and CnTA operation prohibition zone.

(e) In case of CnT ③ Operation permission/prohibition level > CnTA ② Operation stop pulse



Note (1) If it is prohibited by CnT, all “Operation” and “Stop” commands are not accepted.

(f) In case of CnT② Operation stop pulse + CnTA ③ Operation permission/prohibition level

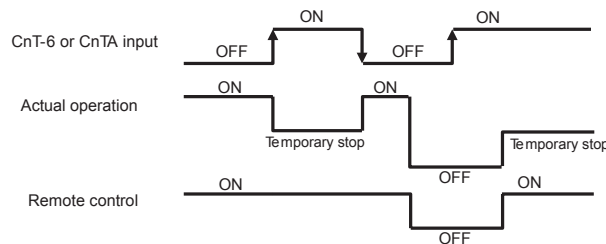


(20) Temporary stop input

In case of temporary stop, operation lamp of remote control lights, but indoor unit stop the operation.

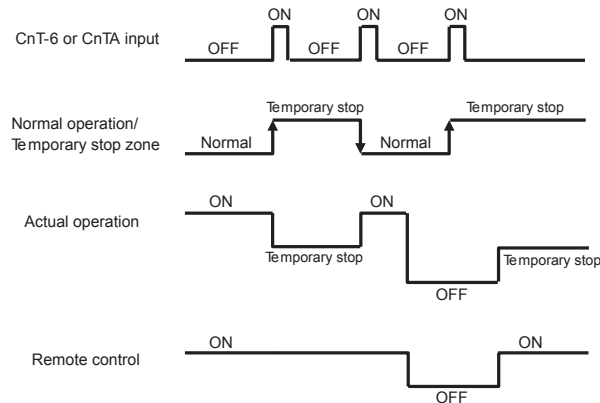
(a) In case of "Level input" setting (Factory default)

Input signal to CnT-6 or CnTA is OFF → ON : Temporary stop
 Input signal to CnT-6 or CnTA is OFF → ON : Normal operation



(b) In case of "Pulse input" setting (Local setting)

It is effective only when the input signal is changed OFF→ON, and "temporary stop/normal operation" is inverted.



(21) Selection of cooling/heating external input function

When "External input 1 or 2 setting: Cooling/heating" is set by the indoor unit function from remote control, the cooling or heating is selected with CnT-6 or CnTA.

(a) In case of "Level input" setting (Factory default)

- CnT-6 or CnTA: OPEN → Cooling operation mode
- CnT-6 or CnTA: CLOSE → Heating operation mode

(b) In case of "Pulse input" setting (Local setting)

If the external input is changed OPEN → CLOSE, operation modes are inverted (Cooling → Heating or Heating → Cooling).

(c) If the cooling/heating selection signal is given by the external input, the operation mode is transmitted to the remote control.

■ Selection of cooling/heating external input function

External input selection	External input method	Operation	
Cooling/heating selection	Level	External input (CnT or CnTA)	
		Cooling/heating	
		Cooling/heating (Competitive)	
	Pulse	External input (CnT or CnTA)	
		Cooling/heating	
		Cooling/heating (Competitive)	

(22) Emergency stop input

When the external input is selected to “Emergency stop”, it is possible to stop the outdoor unit operation by the external input to the indoor unit.

(a) Function setting

Emergency stop input can be selected by the indoor function of wired remote control.

Connector	Indoor function	
	RC-EX3A	RC-E5
CnT	External input 1 : Emergency stop	Emergency stop : Valid
CnTA	External input 2 : Emergency stop	No function

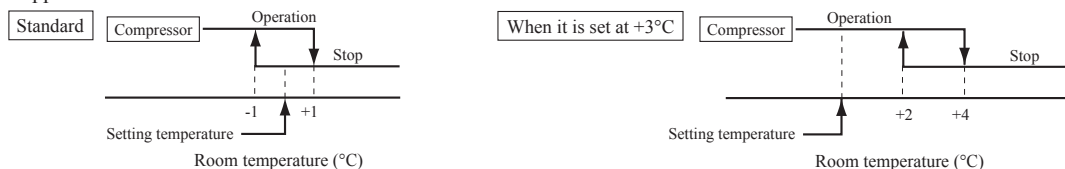
(b) Emergency stop control

When the external input is OFF, the indoor and outdoor units stop.

The indoor unit receive the external input stops the operation, and the outdoor unit which the stopped indoor unit are connected stops with [E-63].

(23) Room temperature detection temperature compensation during heating

With the standard specification, the compressor is turned ON/OFF with the thermostat setting temperature. When the thermostat is likely to turn OFF earlier because the unit is installed at the ceiling where warm air tends to accumulate, the setting can be changed with the wired remote control indoor unit function “*SP OFFSET”. The compressor and the heater are turned ON/OFF at one of the setting temperature +3, +2 or +1°C in order to improve the feeling of heating. The setting temperature, however, has the upper limit of 30°C.



(24) Return air temperature compensation

This is the function to compensate the deviation between the detection temperature by the return air temperature sensor and the measured temperature after installing the unit.

(a) It is adjustable in the unit of 0.5°C with the wired remote control indoor unit function “RETURN AIR TEMP”.

- +1.0°C, +1.5°C, +2.0°C
- -1.0°C, -1.5°C, -2.0°C

(b) Compensated temperature is transmitted to the remote control and the outdoor unit.

Note (1) The detection temperature compensation is effective on the indoor unit thermistor only.

(25) High power operation (RC-EX3A only)

It operates at with the setting temperature fixed at 16°C for cooling, 30°C for heating and maximum indoor fan speed for 15 minutes maximum.

(26) Energy-saving operation (RC-EX3A only)

It operates with the setting temperature fixed at 28°C for cooling, 22°C for heating or 25°C for auto. When fan control in cooling/heating thermo-OFF setting is “Set fan speed”, fan speed during thermo-OFF is changed to “Low”. (Maximum capacity is restricted at 80%.)

(27) Warm-up control (RC-EX3A only)

Operation will be started 5 to 60 minutes before use according to the forecast made by the microcomputer which calculates when the operation should be started in order to warm up the indoor temperature near the setting temperature at the setting time of operation start.

(28) Home leave mode (RC-EX3A only)

When the unit is not used for a long period of time, the room temperature is maintained at a moderate level, avoiding extremely hot or cool temperature.

- (a) Cooling or heating is operated according to the outdoor temperature (factory setting 35°C for cooling, 0°C for heating) and the setting temperature. (factory setting 33°C for cooling, 10°C for heating)
- (b) Setting temperature and indoor fan speed can be set by RC-EX3A.

(29) Auto temperature setting (RC-EX3A only)

Setting temperature is adjusted automatically at the adequate temperature the center setting temperature is 24°C by correcting the outdoor air temperature.

(30) Fan circulator operation (RC-EX3A only)

When the fan is used for circulation, the unit is operated as follows depending on the setting with the remote control.

- (a) If the invalid is selected with the remote control, the fan is operated continuously during the fan operation. (normal fan mode)
- (b) If the valid is selected with the remote control, the fan is operated or stopped when on the difference of the remote control temperature sensor and the return air temperature sensor becomes bigger than 3°C.

(31) The operation judgment is executed every 5 minutes (RC-EX3A only)

Setting temperature T_s is changed according to outdoor temperature.

This control is valid with cooling and heating mode. (Not auto mode)

- (a) Operate 5 minutes forcedly.
- (b) Setting temperature is adjusted every 10 minutes.
 - (i) Cooling mode
 $T_s = \text{outdoor temperature} - \text{offset value}$
 - (ii) Heating mode
 $T_s = \text{outdoor temperature} + \text{offset value}$
- (c) If the return air temperature lower than 18°C in cooling or return air temperature becomes higher than 25°C in heating, unit goes thermostat OFF.

(32) Auto fan speed control (RC-EX3A only)

In order to reach the room temperature to the set temperature as quickly as possible, the air flow rate is increased when the set temperature of thermostat differs largely from the return air temperature. According to temperature difference between set temperature and return air temperature, indoor fan tap are controlled automatically.

- Auto 1: Changes the indoor fan tap within the range of Hi ↔ Me ↔ Lo.
- Auto 2: Changes the indoor fan tap within the range of P-Hi ↔ Hi ↔ Me ↔ Lo.

(33) Indoor unit overload alarm (RC-EX3A only)

If the following condition is satisfied at 30 minutes after starting operation, RC-EX3A shows maintenance code "M07" and the signal is transmitted to the external output (CnT-2-5).

It is necessary to select "Indoor unit overload alarm output" by the external output setting.

- Cooling, Dry, Auto(Cooling) : Indoor air temperature = Set room temperature by remote control + Alarm temperature difference
- Heating, Auto(Heating) : Indoor air temperature = Set room temperature by remote control - Alarm temperature difference

Alarm temperature difference is selectable between 5 to 10°C.

If the following condition is satisfied or unit is stopped, the signal is disappeared.

- Cooling, Dry, Auto(Cooling) : Indoor air temperature = Set room temperature + Alarm temperature difference -2°C
- Heating, Auto(Heating) : Indoor air temperature = Set room temperature - Alarm temperature difference +2°C

(34) Peak-cut timer (RC-EX3A only)

Power consumption can be reduced by restricting the maximum capacity.

Set the [Start time], the [End time] and the capacity limit % (Peak-cut %).

- 4-operation patterns per day can be set at maximum.
- The setting time can be changed by 5-minute interval.
- The selectable range of capacity limit % (Peak-cut %) is from 0% to 40-80% (20% interval).
- Holiday setting is available.

(35) Motion sensor control (RC-EX3A and RCN-E2 only)

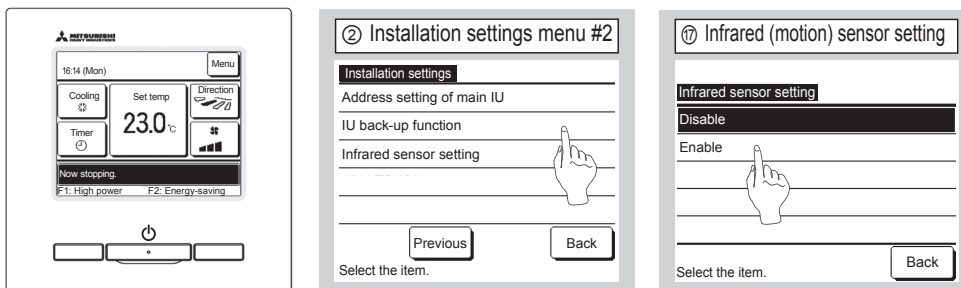
The sensor determines the presence of people and the amount of activity, and the following controls are done by the motion sensor.

Following settings are necessary to activate motion sensor control.

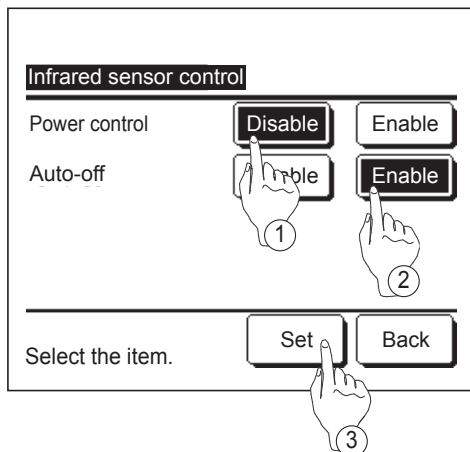
- Infrared (motion) sensor setting: Installation setting of remote control
The indoor unit which is set to "Enable" become valid.
- Infrared (motion) sensor control: Energy-saving setting of remote control
The function which is set to "Enable" become valid.

RC-EX3A

TOP screen **Menu** ⇒ **Service setting** ⇒ **Installation settings** ⇒ **Service password**



TOP screen **Menu** ⇒ **Energy-saving setting** ⇒ **Infrared sensor control** or **Motion sensor control**



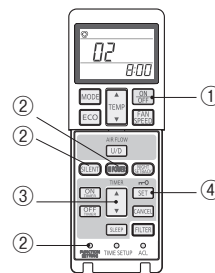
The Infrared sensor control screen and contents of the current settings are displayed.

- ① Enable/disable power control.
- ② Enable/disable auto-off.
- ③ After you set each item, tap the **Set** button.
The display returns to the Energy-saving setting menu screen.

RCN-E2

1. Set indoor functions

- ① Press the ON/OFF button to stop the unit.
 - ② Press the desired one of the buttons shown item 2. while holding down the FUNCTION SETTING switch.
 - ③ Use the selection buttons, ▲ and ▼, to change the setting.
 - ④ Press the SET button.
- The buzzer on the remote control signal receiver beeps twice, and the LED lamp flashes four times at two-second intervals.



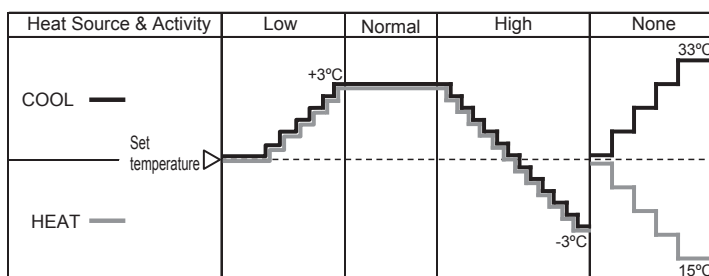
2. Setting details

Button	Number indicator	Function setting
SILENT	00	Infrared sensor setting (Motion sensor setting) : Disable
	01	Infrared sensor setting (Motion sensor setting) : Enable
HI POWER	00	Infrared sensor control (Motion sensor control) : Disable
	01	Infrared sensor control (Motion sensor control) : Power control only
	02	Infrared sensor control (Motion sensor control) : Auto OFF only
	03	Infrared sensor control (Motion sensor control) : Power control and Auto OFF

(i) Power saving / comfort control

The set temperature is adjusted according to the presence of people and their amount of activity detected by the infrared (motion) sensor.

MODE:AUTO/COOL/HEAT mode operation



Low	When the extent of human activity is low
High	When the extent of human activity is high
None	When there is no one in the room

- When the “None” continues for 1 hour, the FAN SPEED is set Lo.

Notes (1) When the following operations are set, power saving control will be canceled.

- ① Energy-saving, Home leave mode, Warm-up control, Cooling operation check.
- ② When the operation mode is changed DRY or FAN.

(2) Not operable while the air-conditioner is OFF.

(ii) Auto-off control

When no activity is detected for 1 hour, unit will go stand-by mode.※ Unit will re-start operation automatically with the original set temperature by activity detection during the stand-by mode. When stand-by mode continues for 12 hours, unit stops.

※ Compressor keeps stopped regardless of the set temperature.

7.4 Operation control function by the outdoor control

(A) Normal control

(1) Operation of major functional components under each operation mode

Functional Components \ Operation mode	Cooling		Fan	Heating			Dehumidify
	Thermostat ON	Thermostat OFF		Thermostat ON	Thermostat OFF	Defrost	
Indoor fan	Remote control command	Remote control command	Remote control command	Remote control command	Intermittent operation	○ → ×	○ / ×
Indoor electronic expansion valve	Superheating control response	Fully closed	Fully closed	Outlet temperature control response	Slight opening control	Model-specific aperture opening angle	Superheating Control Response
Compressor [CM1]	○	×	×	○	×	○	○ / ×
Magnetic contactor CM1 [52X1]	○	○	× / ○	○	○	○	○
Compressor [CM2]	○ / ×	×	×	○ / ×	×	○	○ / ×
Magnetic contactor CM2 [52X2]	○	○	×	○	○	○	○
Outdoor fan [FMo-1]	○ / ×	×	× / ○	○ / ×	×	○ → ×	○ / ×
Outdoor fan [FMo-2]	○	×	× / ○	○	×	○ → ×	○
4-way valve [20S]	×	×	×	○	○	○ → ×	×
Electronic expansion valve for heating [EEVH1, 2]	Fully open ※3	※1	※2	Superheating ※4 control response	※2	Fully closed / Fully open	Fully open ※3
Electronic expansion valve for subcooling [EEVSC]	Opening pulse control	Fully closed	Fully closed	Fully closed	Fully closed	Fully closed	Opening pulse control
Solenoid valve [SV1]	○ / ×	×	×	○ / ×	×	○ / ×	○ / ×
Solenoid valve [SV2]	○ / ×	×	×	○ / ×	×	○ / ×	○ / ×
Solenoid valve [SV6] [SV7]	○ / ×	×	×	○ / ×	×	○ / ×	○ / ×
Solenoid valve [SV11]	×	×	×	○ / ×	×	×	×
Solenoid valve [20UF]	○ / ×	×	×	○ / ×	○ / ×	○ / ×	○ / ×
Crankcase heater [CH1,2]	○ / ×	○ / ×	○ / ×	○ / ×	○ / ×	○ / ×	○ / ×

Notes(1) ○ : ON, × : OFF, ○/×, ×/○: ON or OFF

(2) ※1: The EEVH1, 2 of master unit are fully opened and those of slave unit are fully closed.

(3) ※2: When the unit is stopped from cooling operation, the EEVH1, 2 of master unit are fully opened and those of slave unit are fully closed.

When the unit is stopped from heating operation, the EEVH1, 2 of both master and slave units are fully closed unless the opening degree is specified by the low pressure protective control.

(4) ※3: When the operation mode is changed from heating to cooling/dehumidifying, EEVH1, 2 are maintained at fully closed position and EEV of only one indoor unit keeps 60 pulse until 20S is turned OFF.

(5) ※4: When the operation mode is changed from cooling/dehumidifying to heating, EEVH1, 2 are maintained at fully opened position and EEVs of all indoor units keep 0 pulse until 20S is turned ON.

(6) This shows the state of output when all indoor units are in the same operation mode.

(2) Compressor control (Master unit/slave unit)

(a) Starting compressor

(i) Compressor starting order

After turning the power on, firstly CM1 compressor starts. (In case of the combination use, it is CM01 of master unit) And corresponding to the condition of under-dome temperature and to the required capacity of indoor units thermostat ON, the next compressor will start sequentially, and finally maximum 6 compressors (in case of 3 outdoor units combination use) will start simultaneously.

1) Single use (Model 280, 335)



Range of the compressor operation speed relative to load is as follows.

System load range (Number of operating outdoor units)	0	1
Local load range (Number of compressors operating in outdoor units)	0	1
CM1	0rps	20-140rps*

Note(1) * only model 355 is MAX 140rps, model 280 is MAX 120rps.

2) Single use (Model 400, 450)



Range of the compressor operation frequency relative to load is as follows.

System load range	0	1
Local load range	0	1
CM1	0rps	20-120rps

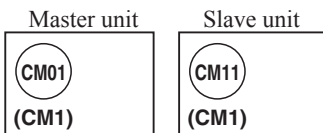
3) Single use (Model 475, 500, 560 : 2 compressors specification)



Range of the compressor operation frequency relative to load is as follows.

System load range	0	1	
Local load range	0	1	2
CM1	0rps	20-112rps	20-120rps
CM2	0rps	0rps	20-120rps

4) 2 outdoor units combination use (Model 560, 615, 670)

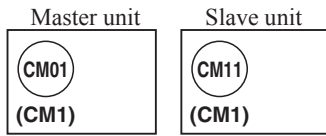


Range of the compressor operation frequency relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range	0	1	1	
Local load range	0	1	1	
Master unit	CM01	0rps	20-112rps	20-120rps
Slave unit	CM11	0rps	0rps	20-120rps

5) 2 outdoor units combination use (Model 735)

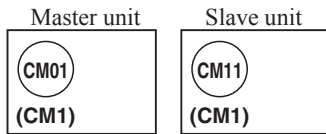
Model 400 (Master) + 335 (Slave)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2
Local load range		0	1	1
Master unit	CM01	0rps	20–65rps	20–82rps
Slave unit	CM11	0rps	0rps	20–120rps

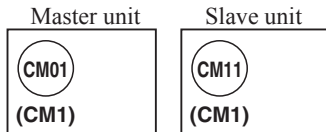
Model 335 (Master) + 400 (Slave)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2
Local load range		0	1	1
Master unit	CM01	0rps	20–112rps	20–120rps
Slave unit	CM11	0rps	0rps	20–82rps

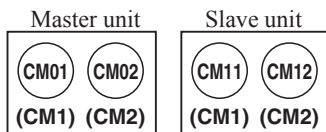
6) 2 outdoor units combination use (Model 800, 850, 900)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2
Local load range		0	1	1
Master unit	CM01	0rps	20–65rps	20–120rps
Slave unit	CM11	0rps	0rps	20–120rps

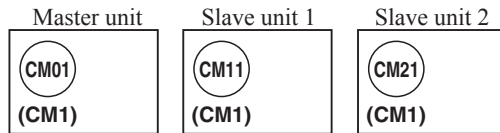
7) 2 outdoor units combination use (Model 950, 1000, 1060, 1120)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	
Local load range		0	1	1	2
Master unit	CM01	0rps	20–112rps	20–112rps	20–120rps
	CM02	0rps	0rps	0rps	20–120rps
Slave unit	CM11	0rps	0rps	20–112rps	20–120rps
	CM12	0rps	0rps	0rps	20–120rps

8) 3 outdoor units combination use (Model 850, 900, 950, 1000)



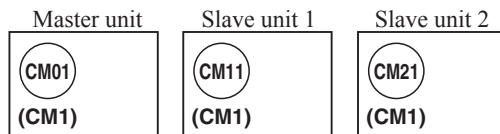
(Model 850, 900, 950, 1000)

Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3
Local load range		0	1	1	1
Master unit	CM01	0rps	20-112rps	20-112rps	20-120rps
Slave unit 1	CM11	0rps	0rps	20-112rps	20-120rps
Slave unit 2	CM21	0rps	0rps	0rps	20-120rps

9) 3 outdoor units combination use (Model 1060)

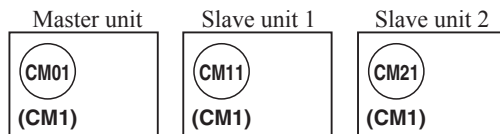
Model 335(Master)+335(Slave1)+400(Slave2)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3
Local load range		0	1	1	1
Master unit	CM01	0rps	20-112rps	20-112rps	20-120rps
Slave unit 1	CM11	0rps	0rps	20-112rps	20-120rps
Slave unit 2	CM21	0rps	0rps	0rps	20-82rps

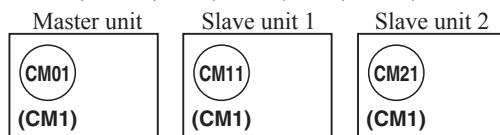
Model 335(Master)+400(Slave1)+335(Slave2)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3
Local load range		0	1	1	1
Master unit	CM01	0rps	20-112rps	20-112rps	20-120rps
Slave unit 1	CM11	0rps	0rps	20-65rps	20-82rps
Slave unit 2	CM21	0rps	0rps	0rps	20-120rps

Model 400(Master)+335(Slave1)+335(Slave2)

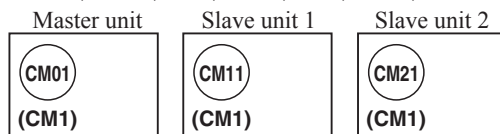


Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3
Local load range		0	1	1	1
Master unit	CM01	0rps	20-65rps	20-65rps	20-82rps
Slave unit 1	CM11	0rps	0rps	20-112rps	20-120rps
Slave unit 2	CM21	0rps	0rps	0rps	20-120rps

10) 3 outdoor units combination use (Model 1120)

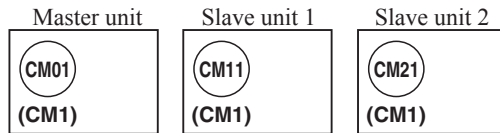
Model 335(Master)+400(Slave1)+400(Slave2)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3
Local load range		0	1	1	1
Master unit	CM01	0rps	20-112rps	20-112rps	20-120rps
Slave unit 1	CM11	0rps	0rps	20-65rps	20-82rps
Slave unit 2	CM21	0rps	0rps	0rps	20-82rps

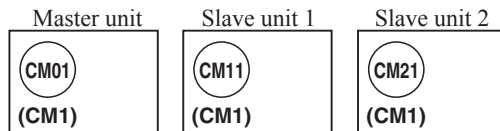
Model 400(Master)+335(Slave1)+400(Slave2)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3
Local load range		0	1	1	1
Master unit	CM01	0rps	20-65rps	20-65rps	20-82rps
Slave unit 1	CM11	0rps	0rps	20-112rps	20-120rps
Slave unit 2	CM21	0rps	0rps	0rps	20-82rps

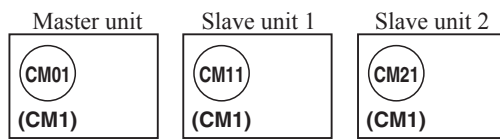
Model 400(Master)+400(Slave1)+335(Slave2)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3
Local load range		0	1	1	1
Master unit	CM01	0rps	20-65rps	20-65rps	20-82rps
Slave unit 1	CM11	0rps	0rps	20-65rps	20-82rps
Slave unit 2	CM21	0rps	0rps	0rps	52-120rps

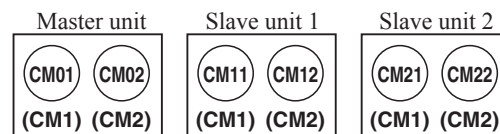
11) 3 outdoor units combination use (Model 1200, 1250, 1300, 1350)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3
Local load range		0	1	1	1
Master unit	CM01	0rps	20-112rps	31-65rps	31-120rps
Slave unit 1	CM11	0rps	0rps	31-65rps	31-120rps
Slave unit 2	CM21	0rps	0rps	0rps	31-120rps

12) 3 outdoor units combination use (Model 1425, 1450, 1500, 1560, 1620, 1680)



Range of the compressor operation speed relative to load is as follows. Following table is applicable when CM01 starts initially.

System load range		0	1	2	3	
Local load range		0	0	1	1	2
Master unit	CM01	0rps	20-112rps	20-112rps	20-112rps	20-120rps
	CM02	0rps	0rps	0rps	0rps	20-120rps
Slave unit 1	CM11	0rps	0rps	20-112rps	20-112rps	20-120rps
	CM12	0rps	0rps	0rps	0rps	20-120rps
Slave unit 2	CM21	0rps	0rps	0rps	20-112rps	20-120rps
	CM22	0rps	0rps	0rps	0rps	20-120rps

(ii) Rotation of compressor start/stop order

- 1) The compressors will be changed over by determining the start/stop order in each heat load zone.
- 2) In case of single use, the starting order of CM1 and CM2 will be changed over on each occasion when the outdoor unit stops.
- 3) In case of combination use, the starting order of CM01(CM11) [CM21] and CM02(CM12) [CM22] will be changed over on each occasion when the master unit or slave unit stops all independently.
- 4) In case of combination use, the starting order of master and slave units will be changed over on each occasion when the master unit or slave unit stops all independently.

Starting order of outdoor units Master→Slave→Master

(3) Outdoor fan control (Master unit/slave unit)**(a) Outdoor fan speed and fan motor rotation speed**Unit : min⁻¹

Fan tap	Cooling		Heating		Remark
	FMo1	FMo2	FMo1	FMo2	
0th speed	0	0	0	0	stop
1st speed	0	160	0	160	Min. speed at 1 FM operation
2nd speed	200	200	0	400	Max. speed at 1 FM operation (During heating)
3rd speed	300	300	160	160	Min. speed at 2 FM operation (During heating)
4th speed	400	400	1140	1140	Max. speed at 2 FM operation (During heating) Rated speed of heating
5th speed	500	500	–	–	
6th speed	600	600	–	–	
7th speed	700	700	–	–	
8th speed	800	800	–	–	
9th speed	900	900	–	–	
10th speed	1000	1000	–	–	
11th speed	1100	1100	–	–	
12th speed	1140	1140	–	–	Rated speed of cooling

(b) Outdoor fan control in cooling mode

Fan speed is controlled based on the high pressure during cooling/dehumidifying (detected with PSH) and the outdoor air temperature (detected with Tho-A).

- (i) Initial fan speed is as follows.

Initial cooling speed of outdoor fan

Outdoor temperature $\leq 10^{\circ}\text{C}$	$10^{\circ}\text{C} \leq$ Outdoor temperature $< 15^{\circ}\text{C}$	$15^{\circ}\text{C} \leq$ Outdoor temperature
2nd speed	4th speed	6th speed

- (ii) Speed changes depending on high pressure values.

(c) Outdoor fan control in heating mode

Fan speed is controlled based on the low pressure (detected with PSL) during heating operation.

- (i) Speed changes depending on low pressure values.
- (ii) Under normal condition, the stepless fan control between 1st speed and 4th speed is performed.

(4) Defrost operation (Master unit/Slave unit)

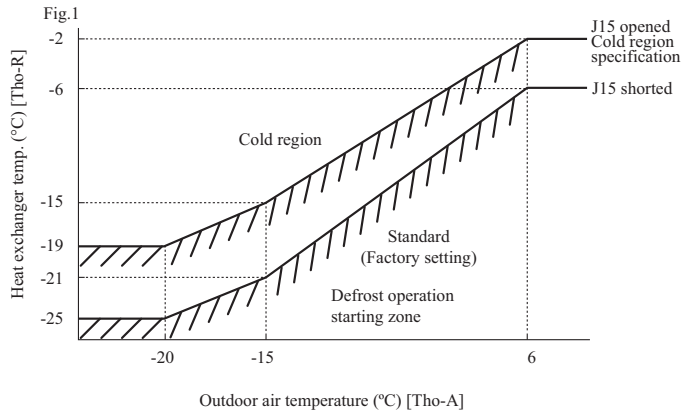
If the defrost operation starting conditions at the outdoor heat exchanger are satisfied, defrost operation starts.

(a) Temperature conditions for defrost operation

(i) Conditions for starting defrost operation

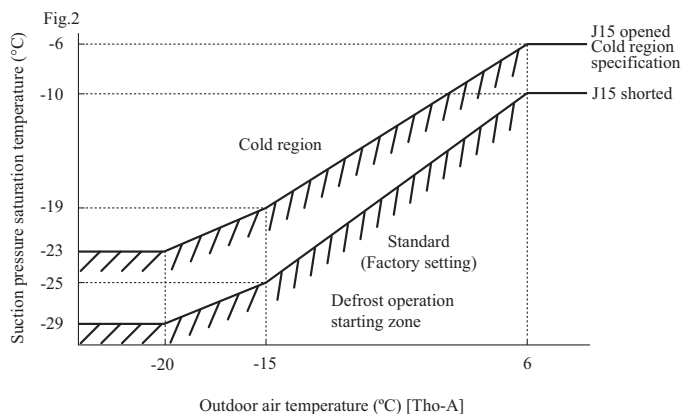
When all of following conditions are satisfied, defrost operation will be started.

- 1) When the cumulative operation time of the compressor becomes 33 minutes after completion of previous defrost operation, or it becomes 33 minutes after heating operation starts.
- 2) When 8 minutes have elapsed after one compressor is turned ON from the state of all compressors OFF.
- 3) When 8 minutes have elapsed after one outdoor fan is turned ON from the state of all outdoor fan OFF.



- 4) When either of following conditions is satisfied after all of the above conditions are satisfied.

- When the temperatures detected with the outdoor heat exchanger temperature sensors (Tho-R1,-R2) and outdoor air temperature sensors (Tho-A) are below the defrost operation starting temperature mentioned in the above graph continuously for 3 minutes.
- When the suction pressure saturation temperature has continued for 3 minutes in the defrost zone which is determined by the outdoor air temperature sensor (Fig. 2)



(ii) Conditions for finishing defrost operation

- Standard (J14 is shorted)
 - 1) When the temperature detected with both outdoor heat exchanger temperature sensors (Tho-R1 and Tho-R2) is higher than 9°C
 - 2) Or when 12 minutes have elapsed since defrost operation started.
- Cold region setting (J14 is open)
 - 1) When $(\text{Tho-R1 and Tho-R2}) \geq 9^\circ\text{C}$ is satisfied, after 2 minutes and 30 seconds have elapsed since defrost operation started, and when either of following conditions is satisfied, the defrost operation end.
 - a) 2 minutes and 30 seconds have elapsed since the temperature of either Tho-R1 or Tho-R2 was 14°C or higher
 - b) The temperature of either Tho-R1 or Tho-R2 is 30°C or higher.
 - c) 14 minutes have elapsed since defrost operation started.
 - 2) When $(\text{Tho-R1 and Tho-R2}) < 9^\circ\text{C}$ is satisfied, after 2 minutes and 30 seconds have elapsed since defrost operation started, and when either of following conditions is satisfied, the defrost operation end.
 - a) 5 minutes have elapsed since the temperature of either Tho-R1 or Tho-R2 was 14°C or higher.
 - b) The temperature of either Tho-R1 or Tho-R2 is 30°C or higher.
 - c) 14 minutes have elapsed since defrost operation started.

(5) Protective control

(a) High pressure protective control/error

If the high pressure exceeds 3.7MPa, the compressor speed is reduced gradually.

It reduces to 20rps at the lowest.

If the high pressure still rises to 4.15MPa, the compressor stops.

(b) Low pressure protective control/error

If the low pressure drops below 0.18MPa, the compressor speed is reduced gradually.

It reduces to 20rps at the lowest.

If the low pressure still drops below 0.134MPa, the compressor stops.

(c) Discharge pipe temperature control/error

If discharge pipe temperatures (detected with Tho-D1, -D2) exceed 120°C, the compressor speed is reduced gradually. (To 20 rps at the lowest) If the temperatures still continue to rise beyond 130°C, the compressor stops.

(d) Compressor compression ratio protective control

If the compressor compression ratio exceeds the setting value, the compressor speed is reduced gradually.

It reduces to 20rps at the lowest.

(e) Current safe control

(i) The current safe control monitors current values at T-phase of inverter. If the value exceeds the setting value, the compressor speed is reduced.

If the value is higher than the setting value even if the speed is reduced, the speed is reduced further.

(ii) This control is reset if the current value at T-phase of inverter becomes lower than the setting value – 1 A for 3 minutes continuously or lower than the setting value for 6 minutes continuously.

(f) Current cut control

(i) Current sensor built in the power transistor monitors current values output from the inverter. If the value exceeds 88 A, the current cut control stops the compressor. The compressor starts automatically 3 minutes after the stop.

(ii) If the above control activates 4 times within 15 minutes, 52C1 or 52C2 is turned off, and the operation is stopped with the error stop.

State of the error continues for 3 minutes after the error stop. The error can be reset by operating the inspection reset from the remote control.

(g) Power transistor temperature (PT) protective control

If temperatures on the power transistor exceed the setting value, the compressor speed is reduced gradually.

It reduces to 20rps at the lowest.

(h) Under-dome temperature protective control

If the under-dome temperature exceeds the setting value, the compressor speed is reduced gradually.

It reduces to 20rps at the lowest.

(i) Protection for combination of outdoor units (Master unit)

The capacity of connectable outdoor units is checked when the communication check is performed after turning the power ON.

If the checked result is other than the allowable combinations mentioned in the following table ① it is prohibited to start operation due to outdoor unit combination error.

When this error occurs, the error code mentioned in the following table ② is displayed on the 7-segment display.

Table① combination list

Capacity	Combination patterns	Capacity	Combination patterns
560	Combination (280+280)	1200	Combination (400+400+400)
615	Combination (280+335)	1250	Combination (400+400+450)
670	Combination (335+335)	1300	Combination (400+450+450)
735	Combination (335+400)	1350	Combination (450+450+450)
800	Combination (400+400)	1425	Combination (475+475+475)
850	Combination (400+450), (280+280+280)	1450	Combination (475+475+500)
900	Combination (450+450), (280+280+335)	1500	Combination (500+500+500)
950	Combination (475+475), (280+335+335)	1560	Combination (500+500+560)
1000	Combination (500+500), (335+335+335)	1620	Combination (500+560+560)
1060	Combination (500+560), (335+335+400)	1680	Combination (560+560+560)
1120	Combination (560+560), (335+400+400)		

Table② Contents displayed on 7-segment display at the combination error

Code display area	Data display area	Contents of invalid operation
oPE	3	Invalid combination of outdoor units

(6) Auto backup operation**(a) Classification of auto backup operations**

When the auto backup operation is enabled, anomaly stops are classified as follows and countermeasures are provided for respective categories.

System stop: All stop including master/slave units

Unit stop: Stop in the unit of outdoor unit

Compressor stop: Stop in the unit of compressor

(b) Control contents of auto backup operation

(i) Condition of auto backup operation is satisfied when the DIP switch SW3-2 on the PCB of master unit is turned ON (selected).

(ii) However, the switching of SW3-2 is effective only at the power on. (It does not become effective unless the power source is reset.)

(iii) Anomaly contents in the following table are invalid and are not detected when the auto backup is effective.

Anomaly detection invalid code	SW3-2ON	Anomaly detection invalid code	SW3-2ON
E32: Open L1,L2,N phase on power source at primary side	○	E45: Communication error between inverter PCB and outdoor control PCB	○
E36: Discharge pipe temperature error	○	E48: Outdoor DC fan motor anomaly	○
E37: Outdoor heat exchanger and subcooling coil temperature sensor anomaly	○	E51: Power transistor overheat (Continuousness)	○
E38: Outdoor air temperature sensor anomaly	○	E53: Suction pipe temperature sensor anomaly	○
E39: Discharge pipe temperature sensor anomaly	○	E55: Under-dome temperature sensor anomaly	○
E40: High pressure anomaly	○	E56: Power transistor temperature sensor anomaly	○
E41: Power transistor overheat	○	E58: Anomalous compressor by loss synchronism	○
E42: Current cut	○	E59: Compressor startup failure	○
E44: Liquid flooding anomaly	○	E60: Rotor position detection failure	○

(iv) If any anomaly occurs when the auto backup is effective, the operation output (CnH), Anomaly output (CnY), 7-segment display and LED show as follows.

1) At the system stop

Operation output on the master unit is turned OFF, the Anomaly output is turned ON, 7-segment display and LED show the anomaly, and the remote control displays E??. (To reset the anomaly, it is necessary to reset the inspection from the remote control.)

2) At the unit stop

On the anomaly occurred unit only, the operation output is turned OFF, the anomaly output is turned ON, 7-segment display and LED show the anomaly and normal units continue their operation ON(or stop).

To reset the state of anomaly on the unit the anomaly occurred, it depends on the condition to reset the state of each anomaly.

3) At the compressor stop

Only the compressor concerned stops, previous states are maintained on the operation output, anomaly output, 7-segment display and LED. To reset the state of anomaly on the compressor, it depends on the condition to reset the state of each anomaly.

Remote control error display	Anomaly contents	Anomalous stop of master outdoor unit			Anomalous stop of slave outdoor unit		
		System stop	Unit stop	Compressor stop	System stop	Unit stop	Compressor stop
E31	Duplicated outdoor unit address No.	○					
E32	Open L1,L2,N Phase on power source at primary side		○			○	
E36	Discharge pipe temperature sensor error			○			○
E37	Outdoor heat exchanger and subcooling coil temperature sensor anomaly		○			○	
E38	Outdoor air temperature sensor anomaly		○			○	
E39	Discharge pipe temperature sensor anomaly			○			○
E40	High pressure anomaly		○			○	
E41	Power transistor overheat			○			○
E42	Current cut			○			○
E43	Excessive number of indoor unit connected, excessive to tal capacity of connection	○			—	—	—
E44	Liquid flooding anomaly			○			○
E45	Communication error between inverter PCB and outdoor control PCB		○			○	
E48	Outdoor DC fan motor anomaly		○			○	
E49	Low pressure error	○			○		
E51	Power transistor overheat (continuousness)			○			○
E53	Suction pipe temperature sensor anomaly		○			○	
E54	High pressure sensor/Low pressure sensor anomaly	○			○		
E55	Under-dome temperature sensor anomaly			○			○
E56	Heat dissipation fins temperature sensor anomaly			○			○
E59	Compressor startup failure			○			○
E60	Rotor position detection failure			○			○
E61	Communications error between the master unit and slave units	○			—	—	—
E63	Emergency stop	○			○		

(c) Prohibiting conditions of auto backup operation

- (i) When the conditions of oil return control are not satisfied
- (ii) When the backup operation time has exceeded the limit value

(d) Control after the conditions to prohibit the auto backup operation have been satisfied

All compressor stop, and the error display [EXX] is shown on the 7-segment display and the remote control.

In this state, the inspection reset of remote control is effective. → [EXX] is displayed continuously on the remote control.

Backup operation function is only for emergency purpose when one of compressors or one of units is damaged. If backup operation is performed continuously for long period, it may cause the damage of good compressors. Accordingly be sure to repair the damaged unit or to replace the damaged compressor and to cancel the backup operation within 48 hours after starting backup operation.

(7) Test run

(a) This control can be performed from the master unit, not from the slave unit.

If this control is done from the slave unit, the following display is shown on the 7-segment display.

The display returns to normal display if the test run control switch is reset.

Code indicator	Data indicator	Contents of invalid operation
OPE	10	Slave setting is invalid.

(b) Test run from master outdoor units with DIP switches SW5-1 and SW5-2.

SW5-1	ON	SW5-2	OFF	Test run for heating
			ON	Test run for cooling
	OFF	Normally operation and after test operation		

Take note that this operation has priority over other option devices such as center console and etc.

This operation status is transmitted to the option devices.

(Note) Test run operation by external input is also available with following method. (Refer next page for detail)

- Select the external input terminal (CnS1) and set 7-segment [P07]-[6] for the function of SW5-1, and select the external input terminal (CnS2) and set 7-segment [P08]-[7] for the function of SW5-2.

CnS1	Shorted	CnS2	Open	Test run for heating
			Shorted	Test run for cooling
	Open	Normal operation and after test operation		

- Other combination of external input terminals (CnS1, CnS2, CnG1, CnG2) and of setting function with 7-segment ([P07], [P08], [P09], [P10] and -[6], -[7]) are available to use.

(c) Starting conditions of test run operation

- (i) DIP switch SW5-1 is turned ON. However the input before the power ON is invalid.
- (ii) The DIP switches SW3 and SW5, other than SW5-1 and SW5-2, should be turned OFF.

However, regarding the DIP switch SW3-2 for automatic backup operation, it is invalid during test run operation regardless whether SW3-2 is turned ON (valid) or OFF (invalid).→In order to check trouble during test run operation.

(d) Control during test run (If indoor units are normal)

- (i) Heating operation is performed with SW5-2 OFF, while cooling operation is performed with SW5-2 ON.
- (ii) Indoor EEV control at the end of test run is depended on the specifications of the indoor unit.
- (iii) Cooling operation: Compressor frequency control is depended on the cooling low pressure control.
- (iv) Heating operation: Compressor frequency control is depended on the heating high pressure control.

(e) Ending conditions of test run operation

Test run operation is terminated if one of following conditions is satisfied.

- (i) Test run operation ends when the DIP switch SW5-1 is turned OFF.
- (ii) When the operation is stopped by the error control during test run, the error is displayed same as the normal operation and the state of error stop is retained even if SW5-1 is turned OFF.

(B) Option controls

• **External input terminal**

- ① 4 external input terminals (CnS1, CnS2, CnG1 and CnG2) are provided. (See Fig-1.)
- ② Each external input terminal can be changed its function by allotting the external input function No. of P07-P10 selected with 7-segment respectively. (External input functions of the code P07-P10 are shown in Fig-2.)

External input terminal			External input function allotment of 7-segment		
Terminal	Specification	Factory setting	Code	Function No.	Factory setting
CnS1	No voltage contact (DC12V)	Shorted	P07	"0"- "9"	"0"
CnS2	No voltage contact (DC12V)	Shorted	P08	"0"- "9"	"1"
CnG1	No voltage contact (DC12V)	Open	P09	"0"- "9"	"2"
CnG2	No voltage contact (DC12V)	Open	P10	"0"- "9"	"3"

Fig-1

- ③ The following function is effective, when the external input function of PXX-"X" is allotted and the signal is input to the external terminal of CnXX.

(Example) If CnS1 terminal is used for demand control (pulse input), allot the "1" of P07 and open J13, and if CnS2 terminal is used for demand control (level input), allot the "1" of P08 and short J13.

By changing the allocation of external input function (P07-10) on the 7-segment, functions of external input terminal may be selected. Inputting signals to external input terminals enable the following functions.

Setting value for external input function assignment	External input terminal shorted	External input terminal open
"0" : External operation input	Permitted	Prohibited
"1" : Demand input	*3	*3
"2" : Cooling / heating force input	Heating	Cooling
"3" : Silent mode 1 *1	Valid	Invalid
"4" : Spare		
"5" : Outdoor fan snow control input	Valid	Invalid
"6" : Test run external input 1 (SW5-1 equivalent)	Test run start	Normal
"7" : Test run external input (SW5-2 equivalent)	Cooling	Heating
"8" : Silent mode 2 *1	Valid	Invalid
"9" : Demand input	*3	*3
"10" : AF periodic inspection display	Valid	Invalid
"11" : AF error display	Valid	Invalid
"12" : Building multi energy save control	Valid	Invalid

*3 Demand setting table

Demand control	Function assignment 1	Function assignment 9
None (Normal)	Shorted	Shorted
1-step	Open	Shorted
2-step	Open	Open
3-step	Shorted	Open

*1 Valid/invalid is changed depending on outdoor air temperatures.
 *2 It is always valid, regardless of outdoor air temperature.
 *3 According to the demand setting table.

Fig-2

- ④ J13: Switching of CnS1,S2 input method (CnS1, S2 only)

J13 shorted: Level input by CnS1, S2
 J13 open : Pulse input by CnS1, S2

*1 "Setting" means;

Master : Set only the master unit. (No necessary to set the slave unit)
 Master/Slave: Set both master/slave unit same.

(1) External input and demand input (Master unit/Slave unit)

(a) Operation permission or prohibition mode

(Note) Following explanation is based on using CnS1 terminal and setting function [P07]-[0] with 7-segment display.

However other terminals can be used with following function setting of 7-segment display.

CnS2: [P08]-[0] CnG1: [P09]-[0] CnG2: [P10]-[0]

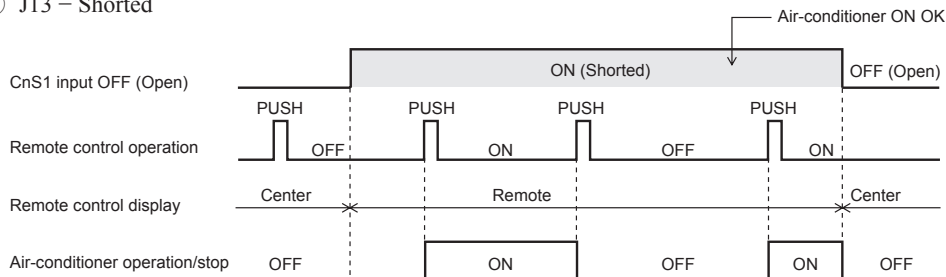
- 1) Operation permission or prohibition mode is switched with the connector (CnS1) and the jumper wire (J13) on the outdoor control PCB after setting function [P07]-[0] (Factory setting) with 7-segment display
- 2) Operation permission/prohibition control by the external input CnS1 to outdoor unit.

Input: CnS1	Switching CnS1 input method:J13	CnS1: Switching operation permission/prohibition mode
	Shorted (Level input)	Operation prohibition mode → Operation permission mode
	Open (Pulse input)	Switching operation permission/ Operation prohibition mode (Reversal)
	Shorted (Level input)	Operation permission mode → Operation prohibition mode
	Open (Pulse input)	(NOP) —

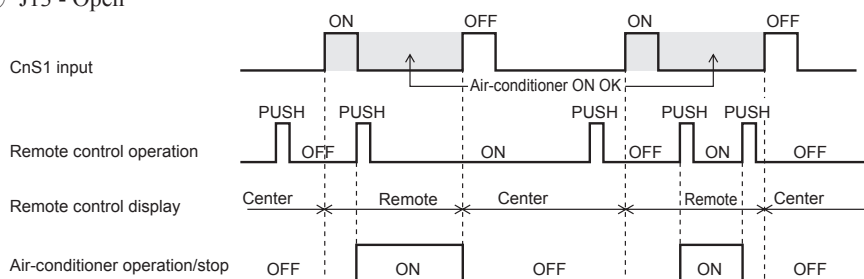
Note (1) Factory setting J13: Shorted, CnS1: Shorted (Short pin is connected)

- 3) The operation condition is displayed on the LCD of remote control and it is transferred to option central control.
- 4) When the operation command from remote control is not accepted by this control, "Center" is displayed on the LCD of remote control. (See item 5 mentioned next page.)
- 5) CnS1 performs the following operation according to switching the jumper wire (J13) shorted or open. In case of pulse input, the pulse width is 500ms or larger.

① J13 – Shorted



② J13 - Open



- 6) After changing mode from operation prohibition mode to permission mode, the indoor units operation status can be select by 7-segment [P17] setting.
 - 7-segment [P17]=0 → Keeping STOP
 - 7-segment [P17]=1 → Automatically RUN

(b) Demand control

(Note) Following explanation is based on using CnS2 terminal and setting function [P08]-[1] with 7-segment display.

However other terminals can be used with following function setting of 7-segment display

CnS1: [P07]-[1] CnG1: [P09]-[1] CnG2: [P10]-[1]

- 1) Demand control or normal control is switched with the connector (CnS2) and the jumper wire (J13) on the outdoor control PCB after setting function [P08]-[1] (Factory setting) with 7-segment display.

J13: Switching of CnS2 input method

J13 shorted: Level input by CnS2

J13 open : Pulse input by CnS2

- 2) Demand control/Normal operation by the external input CnS2 to outdoor unit.

Input: CnS2	Switching CnS2 input method:J13	CnS2: Switching operation permission/prohibition mode
	Shorted (Level input)	Demand control → Normal operation
	Open (Pulse input)	Switching Demand control/ Normal operation (Reversal)
	Shorted (Level input)	Normal control → Demand operation
	Open (Pulse input)	(NOP) —

Note (1) Factory setting J13: Shorted, CnS2: Shorted (Short pin is connected)

- 3) The operation condition is displayed on the LCD of remote control and it is transferred to option central control.

4) Demand control

Demand ratio can be changed with the 7-segment "P04" on the outdoor control PCB.

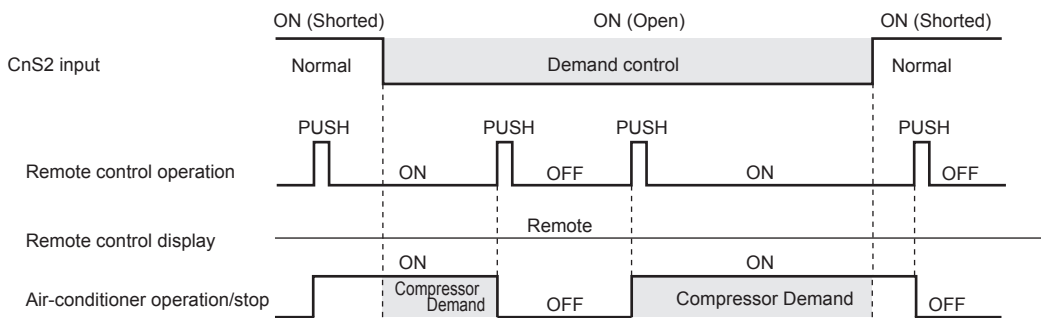
P04 setting	Compressor output (%)
080(Factory default)	80
060	60
040	40
000	0

5) This control has priority over the controls of 4-way valve safeguard, compressor protective start operation, defrost operation, oil equalized operation, oil return operation, pump-down operation for replacement, Start/Stop pump-down operation and check operation.

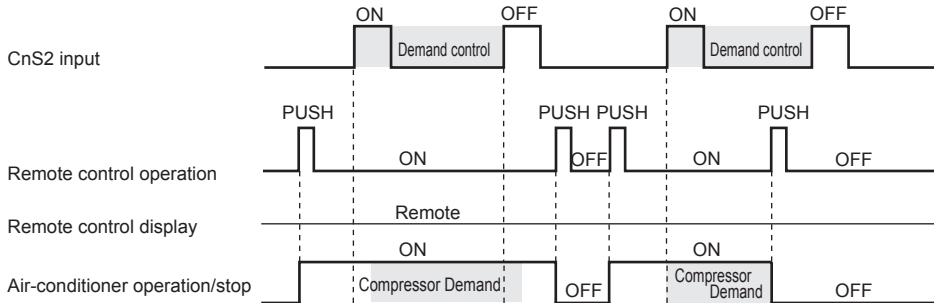
6) CnS2 performs the following operation according to switching the jumper wire (J13) shorted or open.

In case of pulse input, the pulse width is 500ms or larger.

① J13 – Shorted



② J13 - Open



(c) 3 steps demand control

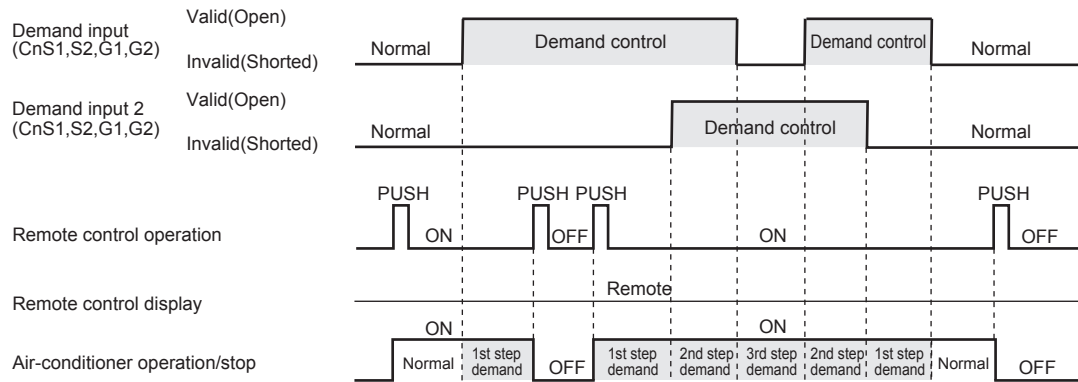
1) Starting condition

When the "Demand input 2" via the external input terminal of outdoor unit (master unit) has become valid.

2) Contents of control

The demand control is performed at the demand rate which has been set with [P14] and [P15] according to the demand input or the demand input 2.

Demand control	Following is assigned to one of P07 - P10.		Demand rate setting
	Demand input (Function assignment: 1)	Demand input 2 (Function assignment: 9)	
None (Normal)	Shorted	Shorted	—
1st step demand	Open	Shorted	P04
2nd step demand	Open	Open	P14
3rd step demand	Shorted	Open	P15



3) Ending condition

When the starting conditions have been lost

(d) Demand control from indoor unit

1) Starting condition

- ① When a demand ratio (“80%”, “60%”, “40%” or “0%”) has been transmitted from an indoor unit of “Peak-cut timer” function.
- ② Normal demand of Item (b) is not activated.
- ③ This control is performed on the RC-EX1A remote control.

2) Contents of control

- ① Compressor’s upper limit speed is restricted according to the demand restriction rate.
- ② The demand ratio controlled by the restriction rate which is transmitted from an indoor unit.
- ③ If the demand control rate signals are received from two or more indoor units, the control takes the lowest rate.
- ④ When the demand rate is other than 0%, this control is superseded by the controls of 4-way valve safeguard, defrost operation, oil return operation, oil equalized operation, pump-down operation for replacement, Start/Stop pump-down operation and check operation.

3) Ending condition

When the starting conditions have been lost

(2) Silent mode control

(Note) With CnG2 terminal and 7-segment display [P10]-[3] for silent mode 1(Factory default) or with CnG2 terminal and 7-segment display [P10]-[8] for silent mode 2 (Setting on site) It is also available to use other terminals as follows.

CnS2: [P08]-[3] or -[8] CnS1: [P07]-[3] or -[8] CnG1: [P09]-[3] or -[8]

- (a) Silent mode is commanded either from the indoor unit (remote control setting) or from the master outdoor unit (CnG2).
- (b) When the "Silent mode start" signals is received from one of indoor units, it enters the silent mode operation.
- (c) When CnG2 of master unit is shorted after setting function [P10]-[3] (Silent mode 1) or [P10]-[8] (Silent mode 2) with 7-segment display, it enters the silent mode operation. (If the signal is input to the slave unit, it is invalid)

(Note) Silent mode 1 and 2 can not be set at same time.

- (d) When the "Silent mode start" signal from indoor unit and the "Silent mode" signal from outdoor unit are received, it enters the silent mode operation under "or" condition.
- (e) When silent mode signals from all indoor units become "Silent mode end" and when silent mode signal input to CnG2 on outdoor unit becomes open, the silent mode operation is reset.

- (f) The operation of silent mode 1 is effective within the following temperature range.

(Note) In case of external input of silent mode 2, following temperature conditions are disregarded.

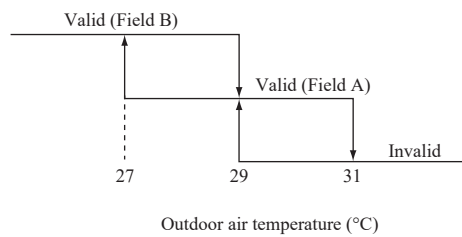
- (i) Silent mode 0,1 : Effect on field A,B
- (ii) Silent mode 2,3 : Effect on field B

- (g) Silent mode setting

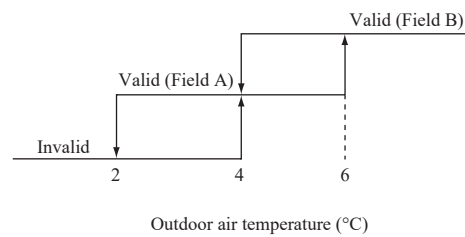
Silent mode setting can be changed with 7-segment "P05" on the outdoor control PCB.

P05 setting	Silent mode setting
000 (Factory default)	Silent mode setting 0
001	Silent mode setting 1
002	Silent mode setting 2
003	Silent mode setting 3

• Cooling



• Heating



- (h) Sound level (Reference data)

Model	SPL Sound pressure level for cooling	SPL Sound pressure level for heating	SPL Silent mode setting 0	SPL Silent mode setting 1	SPL Silent mode setting 2	SPL Silent mode setting 3	PWL Cooling	PWL Heating
	(dB(A))	(dB(A))	(dB(A))	(dB(A))	(dB(A))	(dB(A))	(dB(A))	(dB(A))
FDC280KXZE2	56	57	55	51	47	43	75	76
FDC335KXZE2	63	62	61	57	53	49	82	81
FDC400KXZE2	60	62	60	56	52	48	80	82
FDC450KXZE2	61	62	61	57	53	49	81	82
FDC475KXZE2	61	61	61	57	53	49	81	81
FDC500KXZE2	61	62	61	57	53	49	81	82
FDC560KXZE2	63	64	63	60	56	52	82	83

(3) Outdoor fan snow protection control (Master unit/Slave unit)

(Note) Following explanation is based on setting function with 7-segment display [P02].

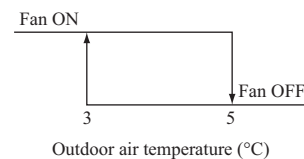
However the following terminals and 7-segment function settings are available to use.

CnS1: [P07]-[5] CnS2: [P08]-[5] CnG1: [P09]-[5] CnG2: [P10]-[5]

- (a) The setting of this control should be done not only on the master unit but also on the slave unit, because the fans of master unit and the slave unit are controlled independently.
- (b) The control is enabled /disabled by selecting [0] or [1] displayed at 7-segment LED of master/slave units.
- (c) Operation method of outdoor fan snow protection control
 - (i) Set the code [P02] on 7-segment display
 - (ii) “0” or “1” is displayed at the data display area of 7-segment LED.
 - “0”: Outdoor fan snow protection control is disabled (Factory setting)
 - “1”: Outdoor fan snow protection control is enabled
 - (iii) Press SW7 (Data write/delete) for 3 seconds continuously
 - (iv) “0” or “1” blinks every 0.5 second at the data display area of 7-segment LED.
 - (v) Press SW8 (one digit) to toggle the display between “0” and “1”.
 - (vi) If SW7 is pressed for 3 seconds continuously while “0” and “1” are blinking, “0” or “1” at the data display area of 7-segment LED stops blinking.

With this operation, the enabled/disabled setting of outdoor fan snow protection control is saved in the memory of EEPROM, and henceforth the outdoor fan is controlled according to the contents of memory.
 - (vii) Contents of outdoor fan snow protection control are retained even if the power is turned off and backed on again.
- (d) Contents of outdoor fan snow protection control
 - (i) At the status of all stop or emergency stop, if the outdoor air temperature drops 3°C or lower, all of outdoor fans are operated at the maximum speed (4th speed) once every 10 minutes.

- (ii) The outdoor fan runs for 30 minutes
- (iii) During this snow protection control, the magnetic contactor 52C1 of the compressor is ON

**(4) Outdoor operation mode**

On the standard models of 2-pipe system, the outdoor operation mode of Stop/Cooling/Heating is selected based on the information of indoor units, and then respective controls are performed.

<Contents of control>

- (a) Determination of outdoor operation mode

Operation mode of outdoor unit is determined based on respective signals of Operation/Stop and Cooling/Heating.
- (b) Type of outdoor operation mode
 - 1) Outdoor operation mode - Stop
 - 2) Outdoor operation mode - Cooling
 - 3) Outdoor operation mode - Heating
- (c) Priority in operation mode selection.
 - 1) First priority is given to the forced cooling/heating operation.
 - 2) Second priority is given as follows

Priority in the operation mode selection can be changed using the 7-segment setting [P01].

P01 setting	Mode
0 (Factory default)	First unit's operation mode
1	Last unit's operation mode
2	Priority of master unit's setting operation mode
3	Priority of required major operation mode

- First unit's operation mode: Operation mode of the indoor unit which is operated first time after stop of the outdoor unit operation mode
- Last unit's operation mode: Operation mode of the indoor unit which is operated at the last time
- Priority of master unit's setting operation mode: Operation mode of indoor unit of which the address No. is smallest (Master indoor unit). When the master indoor unit is turned off, it become valid the first push priority on other indoor units' remote controls.

- Priority of required major operation mode: Operation mode of which the total capacity of operating indoor units is larger. There is no renewed judgment for 10 minutes after a change on the operation mode.

The judgment, however, is renewed in following cases.

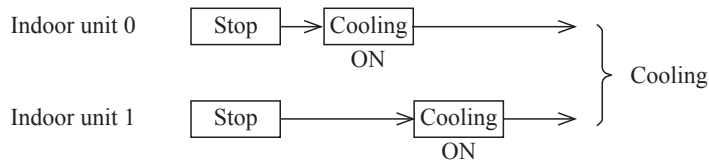
- At the stop
- When the P01 setting is changed.

- 3) In the event that agreement of operation mode is lost between indoor units and outdoor units by selecting the first or second priority after determining the operation mode, it is changed forcibly to the "Fan" mode. The operation mode LCD flickers to warn the "Mode unmatched"

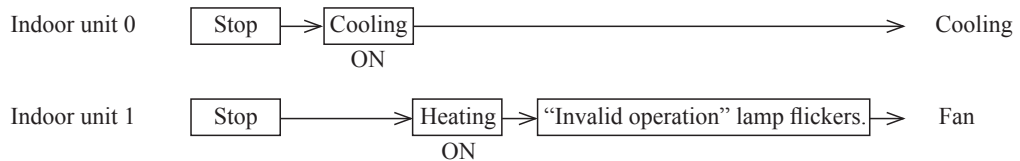
4) Example of operation mode selection

<First unit's operation mode>

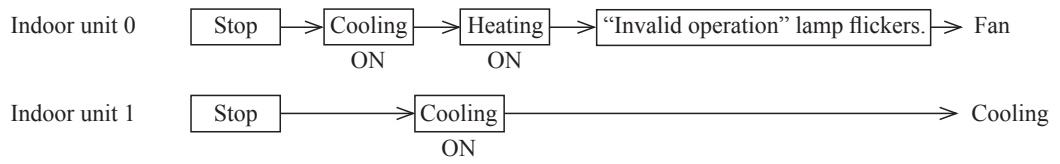
- ① If both of indoor units 0 and 1 have the same operation mode, it operates with the mode.



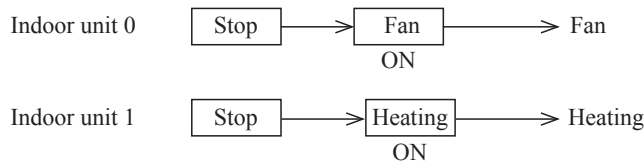
- ② Cooling does not match on indoor units 0 and 1 (Priority is given to previous operation.)



③ When it is changed from same mode to unmatched.

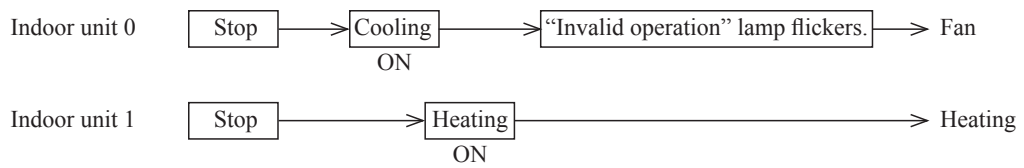


④ Operation mode is prepared for change in the fan mode.

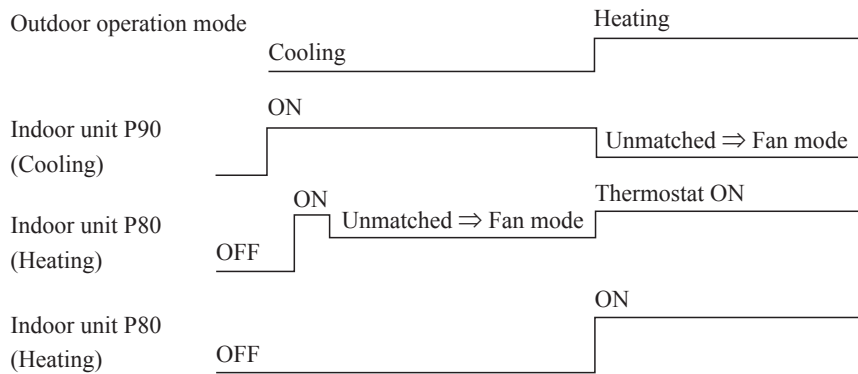


<Last unit's operation mode>

① If the indoor unit 1 of which operation mode is different has joined in when the indoor units 0 is operating.



<Priority of required major operation mode>



5) Reset of unmatched condition (Cooling/heating unmatched)

When unmatched occurs among indoor units, it can be reset by either one of followings.

- ① If the operation mode of outdoor unit is matched with that of indoor unit.
- ② If the operation mode is changed to "Fan" or "Stop" on the indoor units on which Cooling/heating is unmatched.

(d) Forced cooling /heating operation (Master unit)

(Note) Following explanation is based on using CnG1 terminal and setting function [P09]-[2] with 7-segment display.

However other terminals can be used with following function setting of 7-segment display.

CnS1: [P07]-[2]

CnS2: [P08]-[2]

CnG2: [P10]-[2]

- 1) When SW3-7 on the outdoor control PCB is turned ON after setting function [P09]-[2] with 7-segment display, if CnG1 is shorted, forced heating operation is performed, but if CnG1 is open, forced cooling operation is performed.
- 2) If the different mode from the forced operation mode is commanded from indoor unit, the "mode unmatched" message is displayed on the LCD of remote control and the operation is entered in FAN mode.

SW3-7	ON	CnG1	Open	Operation in cooling only
			Shorted	Operation in heating only
	OFF	Normal operation		

- 3) With the forced mode from indoor unit, if a different operation mode is commanded, following operations take place based on the forced cooling/heating operation set with the 7-segment [P18].

P18 = 0: The operation mode unmatched is displayed on the remote control, etc., and it is changed to the fan operation.

P18 = 1: It is operated with the forced cooling/heating operation mode.

Setting temperature for cooling ... 28°C

Setting temperature for heating ... 20°C

(5) Emergency stop control

When one of indoor units receives the emergency stop signal through CnT terminal on the indoor control PCB from the device like as refrigerant leakage detector and that information is transmitted to the outdoor unit, the outdoor unit stops operation and emergency stop error message transmitted to all indoor units running.

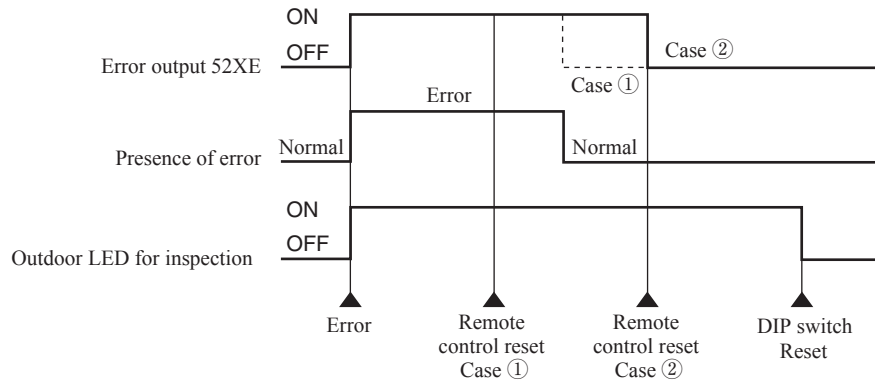
It is able to make the emergency stop function effective by remote control indoor function setting.

- (a) When the outdoor unit receives the "Emergency stop" command from the indoor unit, it makes all stop by error.
- (b) And the "Emergency stop" command is transmitted to all indoor units and error code "E63" is displayed.
- (c) When the outdoor unit receives the "Emergency stop reset" command from the indoor unit, the "Emergency stop reset" command is transmitted to all indoor units.

(6) Operation and error signal output (Master unit/Slave unit)

This is the function to retrieve and display the operation and error information on the outdoor unit as a batch.. Although indoor units also have the function to retrieve the operation and error information, this function is designed to retrieve the whole information of each refrigeration system connected to the outdoor unit.

- (a) The terminals for the operation and error outputs at the outdoor unit side are provided on the outdoor control PCB.
 (b) Diagram of output relay operations



- (c) The error output relay (52XE) is turned ON when the error stop occurs, and is turned OFF when the error reset is done from remote control by pressing "Check" and "Reset" button simultaneously after recovery from the error (Remote control reset case ②).
 Before recovery from the error, if the error reset is done from remote control, 52XE is not turned OFF, but it will be turned OFF automatically after the error is recovered subsequently (Remote control reset case ①).
- (d) If at least one of connected indoor units is operating, the operation output relay (52XR) is turned ON. (Operation means the state that remote control is turned ON, in which the fan operation and the thermostat OFF is included, but the error stop is excluded.)
- (e) Output relay (52XR, 52XE) of DC12V should be prepared in the field. The maximum load of relay is LY2F (Omron).
- (f) The output connectors (CnH, CnY) to be connected to the relays for operation output (52XR) and for error output (52XE) is mounted on the outdoor control PCB.
- (g) If CPU goes out of control, this function becomes disable.
- (h) When the automatic backup operation is effective, there is no error display for any error on the compressor stopping by detecting its anomaly.

(7) External output

This function is used in order to operate the external option devices in conjunction with relay output of the respective operational information from outdoor unit.

However, since these models do not have dedicated output, it makes switchable by using the existing 52R relay in order to comply with various usages.

This control is done for master unit and slave unit independently.

[External output function]

External output function of CnZ1 can be switched by changing of [P06] of 7-segment display from "0" to "5" as mentioned below. However in case of setting [P19]=1 of 7-segment display, Pump-down operation by external input was assigned to CnZ1 function regardless [P06] setting.

0: Operation output [Factory default]

1: Error output

·It is turned on at anomalous stop, and turned OFF when "CHECK" and "RESET" buttons on remote control are pressed simultaneously after recovering from the anomaly. Even if "CHECK" and "RESET" buttons are pressed before recovering from the anomaly, it is not turned OFF. But when recovering from the anomaly later, it is automatically turned OFF.

2: Compressor ON output

·It is turned ON, when the compressor is ON

3: Fan ON output

·It is turned ON, when the outdoor fan No.1 speed command > 0, or the outdoor fan No.2 speed command > 0.

4: Oil return operation output

·It is turned ON at oil return operation in cooling or at oil return operation in heating, or at defrost operation in heating.

5: When HP is relatively high

·Signal is output in order to operate a sprinkler system for cooling down the outdoor heat exchanger.

It is turned ON, when high pressure > 3.3MPa in cooling mode

If once starting operation of sprinkler system, it shall be kept operation for 30sec at least.

(8) Pump down control for replacement (Master unit/slave unit)

This control is for recovering refrigerant to outdoor unit quickly in case of replacement or relocation of the outdoor unit.

(a) This control is performed from the master unit side. It cannot be controlled from the slave unit side. If this control is attempted from the slave unit side, the following codes are displayed on the 7-segment LED of the slave unit.

Code display area	Data display area	Contents of invalid operation
OPE	10	Setting from the slave unit is invalid

Note (1) The display returns to normal if the pump-down control switch is reset.

(b) Pump down operation can be performed with the operation of 3 DIP switches SW5-1 (Test run switch), SW5-2 (Test run operation mode) and SW5-3 (Pump down switch)

(c) Pump down procedure

- 1) Shut the liquid side service valve on the outdoor units
- 2) Turn SW5-2 (test run operation mode) ON (cooling)
- 3) Turn SW5-3 (pump down switch) ON
- 4) Turn SW5-1 (test run switch) ON

(d) Ending condition

If any of the following conditions is satisfied, this control ends.

(i) When the low pressure (LP) is preset value or less, this control ends normally, and indicates followings

- ① Red LED: Keeps lighting
- ② Green LED: Keeps flashing
- ③ 7-segment display: PdE
- ④ Remote control: Stop

(ii) Anomalous all stop by the error detection control

(iii) If the cumulative compressor operation time under pump down control is 15 minutes (End control because time is up), this control ends and indicates followings

- ① Red LED: Stays OFF
- ② Green LED: Keeps flashing
- ③ 7-segment display: No display
- ④ Remote control: Stop

(iv) When any of setting switch (SW5-1, SW5-2, SW5-3) is turned OFF during pump down control.

(Note) Even if only SW5-3 is turned OFF, it is not recognized as the cooling test run mode and it stops.

(9) Pump-down operation by external input

If an error stop is raised by an external input by refrigerant leaking alarm unit, the pump-down operation is performed at the outdoor unit side in order to prevent the refrigerant from leaking.

They are local arrangements.

- ① Refrigerant leaking alarm unit
- ② Valve to shut liquid pipe
- ③ Valve to shut gas pipe

Valves of ② and ③ should be selected what the pressure loss of refrigerant piping doesn't increase.

(a) Status 1: Pump-down operation

(i) Starting condition

- ① When the external input function is assigned to "0: External operation input" and the external input terminal is open (by refrigerant leaking alarm unit).
- ② If the pump-down control is valid when the error stop is raised by the setting on 7-segment. ([P19] = "1")

(ii) Contents of control

- ① ON is output on CnY, and the liquid service valve is shut down if it is connected on CnY.
- ② The pump-down operation for replacement is performed.

(iii) Ending condition

- ① When starting conditions are lost.
- ② When the pump-down operation has ended.

(b) Status 2: Emergency stop operation

(i) Starting condition

- ① When the pump-down operation has ended in the status 1.

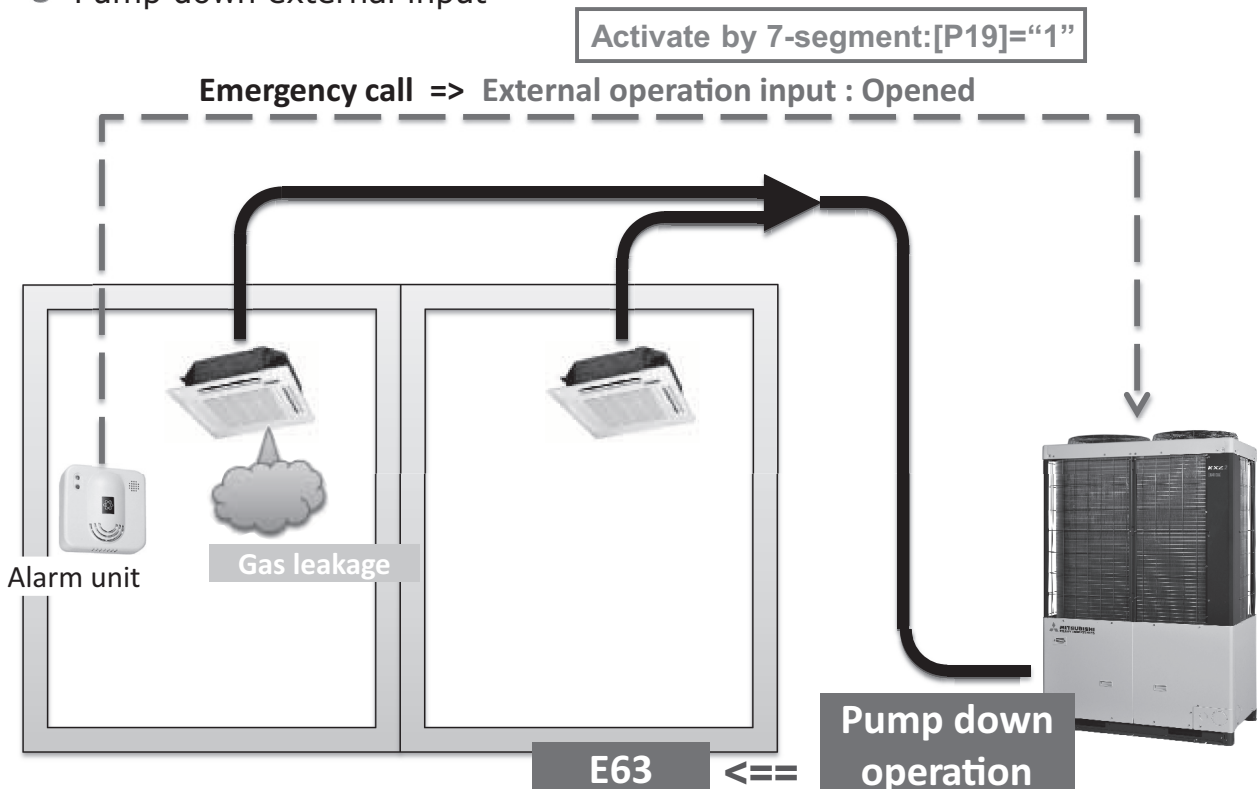
(ii) Contents of control

- ① ON is output to CnZ1, and the gas service valve is shut down if it is connected on CnZ1.
- ② Operation stops with the error full stop. ([E63] is displayed.)

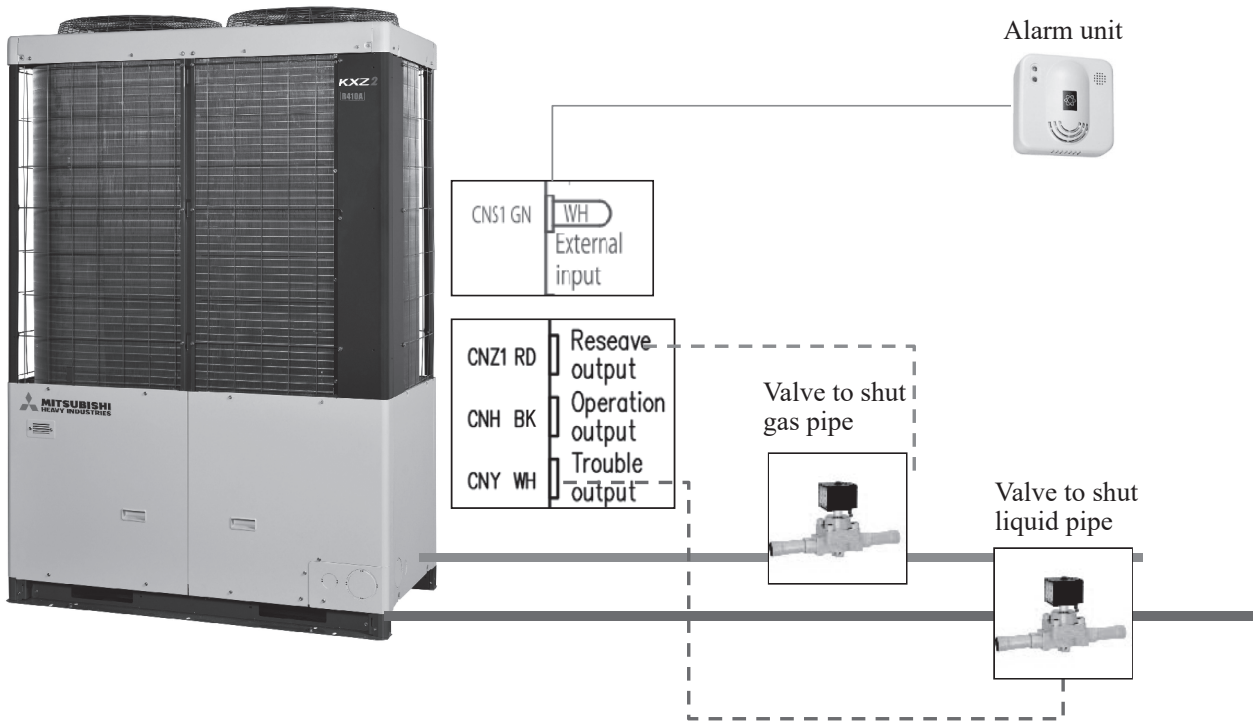
(iii) Ending condition

- ① When starting conditions for the status 1 are lost.
- ② State of error continues for 3 minutes after the error full stop. It cannot be reset in this condition from the remote control. If the starting conditions for status 1 are not yet established later, this can be reset by the remote control inspection reset.

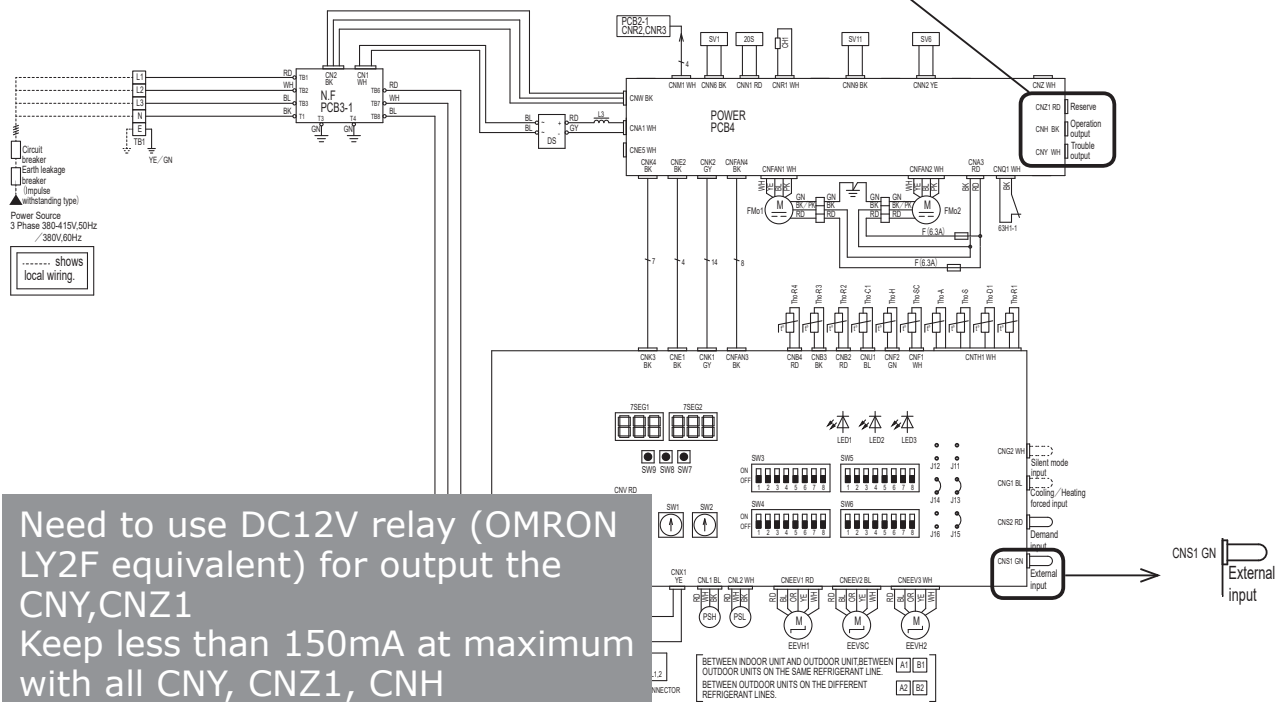
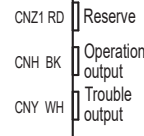
● Pump down external input



● Sample of system configuration



Output for valve to shut gas pipe : CNZ1
 Wiring part No. PCZ006A051AA
 Operation output : CNH
 Wiring part No. PCZ006A051AD
 Output for valve to shut liquid pipe : CNY
 Wiring part No. PCZ006A051AB



(10) Continuous Heating Capacity Control (CHCC)**(a) Starting condition**

- 1) Defrost operation interval extension control (See page 81.)
 - ① When 7-segment [P00] is set at 1.
 - ② When the defrost operation start conditions 1) – 3) are satisfied.
 - ③ When more lower one of two outdoor heat exchanger temperature sensors (Tho-R1, -R2) falls in the defrost operation starting zone (Fig.1) which is determined by the outdoor air temperature sensor (Tho-A) of the defrost control <Starting condition> 4).
- 2) Continuous heating control
 - ① When 7-segment [P00] is set at 2.
 - ② When the defrost operation <Starting conditions> 1) – 3) are satisfied.
 - ③ When more lower one of two outdoor heat exchanger temperature sensors (Tho-R1, -R2) falls in the defrost operation starting zone (temperature of Fig.1 + 1°C) which is determined by the outdoor air temperature sensor (Tho-A) of the defrost operation <Starting condition> 4).

(b) Contents of control

- 1) Lowering of the compressor capacity on each outdoor unit
 - ① Defrost operation interval extension control

It is confirmed at every 30-second that it is in the defrost operation starting zone.

 - If it is in the defrost operation starting zone, the compressor capacity is lowered further.
 - If it is not in the defrost operation starting zone, the PI control is reset.
 - ② Continuous heating control

It is confirmed at every 30-second that it is in the defrost operation starting zone (J15 shorted).

 - If it is in the defrost operation starting zone (J15 shorted), the compressor capacity is lowered further.
 - If it is not in the defrost operation starting zone, the PI control is reset.
- 2) The compressor capacity is lowered by the following value from actual operating condition at that time, on each compressor.

The PI control by the compressor high-low pressure control is implemented still.

All models	Extent of lowered compressor capacity
Normally	5%

- 3) If this control terminates after establishing the <Ending conditions> 4) and 8), it is not activated till the defrost operation terminates normally.
- 4) If this control terminates after establishing the <Ending condition> 5), it is not activated till all compressors on each outdoor unit detect the compressor OFF or the under-dome SH > 18 deg.

(c) Ending condition

- 1) Outdoor unit operation mode stop
- 2) When the outdoor unit operation mode changes to the cooling
- 3) When it continues for 3 minutes the state that it runs out the defrost operation starting zone
- 4) When the following condition is satisfied on all indoor units on which the heating thermostat is turned ON

Remote control setting temperature – Main unit suction temperature ≥ 3 deg
- 5) When either compressor on all outdoor unit has detected for 3 minutes continuously the compressor ON and also the state that the under-dome SH ≤ 15 deg.
- 6) When the defrost operation conditions are not satisfied
- 7) Compressor OFF
- 8) When 7-segment [P00] is set at other than 1 or 2

(11) VTCC : Variable Temperature and capacity control (VRF inverter multi-system energy save control)

On the multi-system, target pressures are set uniformly so that indoor units operate with a constant capacity and repeat the ON/OFF control with which thermostats are turned OFF when temperatures become near the setting temperature.

Owing to the tuning of target high/low pressure near the setting temperature, it becomes possible to perform the high efficiency operation near the setting temperature.

For this reason, duration of time for highly efficient operation is increased by providing the compressor upper limit speed according to the thermostat ON capacity.

• Thermostat ON capacity ... Total capacity of indoor units which are operating with the thermostat ON

(a) Correction of target high/low pressure**(i) Starting condition (either of ① or ②)**

① When the external input function assignment [P07] - [P10]: Multi-system energy save control = Valid

② When 7-segment [P69] (Multi-system energy save control I) = ON, if the external input function assignment [P07] - [P10] is not assigned this control.

(ii) Contents of control**① During the outdoor unit operation mode at cooling**

- Indoor load more than 50% → Corrected to the target cooling low pressure lower.
- Indoor load less than 50% → Corrected to the target cooling low pressure higher.

② During the outdoor unit operation mode at heating

- Indoor load more than 50% → Corrected to the target heating high pressure higher.
- Indoor load less than 50% → Corrected to the target heating high pressure lower.

(Note) Indoor load condition (%) = $\frac{\text{(Total capacity of indoor units of which load is high)}}{\text{Total capacity of indoor units with the thermostat ON}}$

(iii) Ending condition

① When the starting conditions are lost

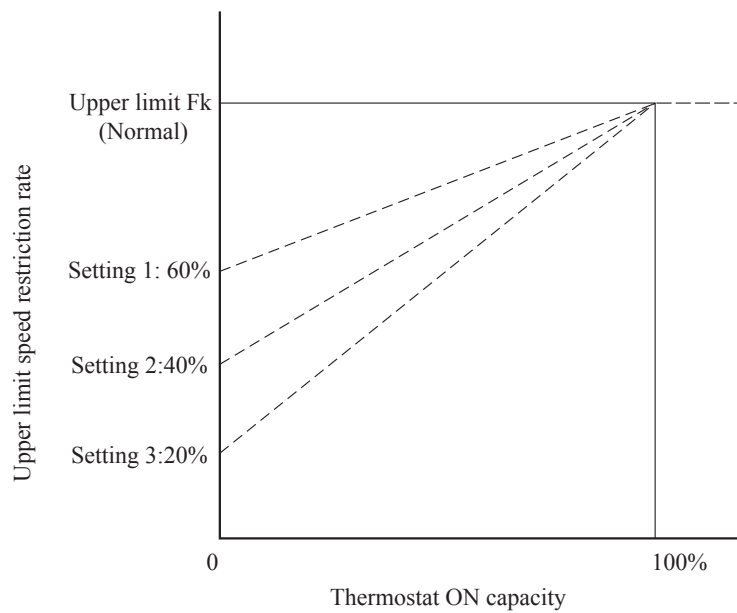
(b) Compressor upper limit speed restriction for each operation capacity

(i) Starting condition (either of ① or ②)

- ① When the external input assignment [P07] – [P10]: Multi-system energy save operation = Valid and 7-segment [P16] (Multi-system energy save control II) = 1 or 2 or 3
 Factory default: 0 (OFF)/1 (Setting 1), 2 (Setting 2), 3 (Setting 3)
- ② 7-segment [P16] = 1 or 2 or 3, if the external input function assignment [P07] – [P10] is not assigned this control.

(ii) Contents of control

- ① Compressor upper limit speed is the value obtained by multiplying with the upper limit speed restriction rate according to the thermostat ON capacity.
- ② The upper limit restriction rate is divided to the following 3 steps according to each setting of [P16] as follows.



③ Following controls supersede this control.

- 4-way valve safeguard
- Oil return operation
- Pump-down operation for replacement
- Defrost operation
- Oil equalized operation
- Start/Stop pump-down operation

(iii) Ending condition

- ① When the starting conditions are lost

(C) Data output**(1) 7-segment display and operation data retention****(a) 7-segment display**

Operation information is displayed for checking various operation data during test run and for helping malfunction diagnosis at servicing. Input data to microcomputer, contents of outdoor unit control, registration information of indoor units and etc. are mainly displayed on the 7-segment LED.

(i) Operation information display

- 1) Each item is displayed at the 7-segment LED with 6-digit on outdoor control PCB
- 2) Left 3 digits are for code display and right 3 digits are for data display
- 3) The code No. of each item is selected by pressing SW8 and SW9. Pressing SW8 increases the NO. by 1, and SW9 decreases by 1.
- 4) If the code No. is set at "C99", the data of the code No. from "C00" to "C29" is displayed cyclically.
Code No. at factory setting is "C99"
- 5) If the code No. is set at other than "C99", the data of selected code No. is kept on displaying.
- 6) The code No. "C77" is for resetting

The contents of retained operation data (the data for a period of 30 minutes prior to error stop) can be erased by setting the code No. at "C77".

The resetting method is to select the code "C77" first. (If any error data is retained, "dEL" is displayed on the data display area.)

And then when press SW7 for 3 seconds, the retained error data can be erased. However the data of the code No. "C54" and "C55" (compressor cumulative operation time) are not erased.

When the data are erased, "---" is displayed on the data display area of 7-segment LED. And this is displayed as well when no error data are retained.

- 7) If SW8 (order of 1) is pressed, it displays in the order of $0 \Rightarrow 1 \Rightarrow 2 \dots\dots 9 \Rightarrow 10$.
- 8) If SW9 (order of 10) is pressed, it displays in the order of $10 \Rightarrow 9 \Rightarrow 8 \dots\dots 1 \Rightarrow 0$.
- 9) The data of code No. "C54" and "C55" can be erased independently

The compressor cumulative operation time corresponding to the code No. selected can be erased (reset). (For resetting of the compressor cumulative operation time after replacement of compressor)

The resetting method is to select the code "C54" or "C55" first. (the compressor cumulative operation time corresponding to the code No. is displayed on the data display area of 7-segment LED.)

And then when press SW7 for 3 seconds, the retained data can be erased. However the data of the retained operation data (the data for 30 minutes before error stop) are not erased.

(ii) Individual definition of display contents

- 1) Code No. "C17": Subcooling degree at cooling mode

[Subcooling degree at cooling mode] =

[High pressure saturated temperature detected with high pressure sensor (PHS)]

-[Subcooling coil temperature detected with subcooling temperature sensor (Tho-SC)]

The calculated result is displayed after rounding to one decimal place. Or if the calculated result is a negative value, "0.0" is displayed.

During heating mode this data might be unreliable as subcooling degree, but the result is displayed as it is.

- 2) Code No. "C18": Suction superheat degree

[Suction superheat degree] =

[Suction pipe temperature detected with suction pipe temperature sensor (Tho-S)]

-[Low pressure saturated temperature detected with low pressure sensor (PLS)]

The calculated result is displayed after rounding to one decimal place. Or if the calculated result is a negative value, "0.0" is displayed.

- 3) Code No. "C19": Superheat degree of subcooling coil

[Superheat degree of subcooling coil] =

[Subcooling coil temperature detected with subcooling coil temperature sensor (Tho-H)]

-[Low pressure saturated temperature detected with low pressure sensor (PLS)]

The calculated result is displayed after rounding to one decimal place. Or if the calculated result is a negative value, "0.0" is displayed.

(b) 7-Segment display

Code No.	Contents of display	Data display range	Minimum unit	Remark
D	Unusual code Pump down Check mode Outdoor unit setup, piping cleaning	—	—	E?? PoE, PoS CH?, PCL? oPE??
C00	CM1 operating frequency	0~130	1rps	
C01	CM2 operating frequency	0~130	1rps	
C02	Tho-A Outdoor air temperature	L,-20~50	1°C	
C03	Tho-R1 Heat exchanger temperature 1 (Exit. Front)	L,-25~73	1°C	
C04	Tho-R2 Heat exchanger temperature 2 (Exit. Rear)	L,-25~73	1°C	
C05	Tho-R3 Heat exchanger temperature 3 (Entrance. Front)	L,-25~73	1°C	
C06	Tho-R4 Heat exchanger temperature 4 (Entrance. Rear)	L,-25~73	1°C	
C07	Tho-D1 Discharge pipe temperature (CM1)	L,31~136	1°C	
C08	Tho-D2 Discharge pipe temperature (CM2)	L,31~136	1°C	
C10	Tho-C1 Under-dome temperature (CM1)	L,5~90	1°C	
C11	Tho-C2 Under-dome temperature (CM2)	L,5~90	1°C	
C12	Heat dissipation fin 1 temperature (CM1)	L,31~136	1°C	
C13	Heat dissipation fin 2 temperature (CM2)	L,31~136	1°C	
C14	Tho-SC Subcooling coil temperature 1	L,18~73	1°C	
C15	Tho-H Subcooling coil temperature 2	L,-25~73	1°C	
C16	Tho-S Suction pipe temperature	L,-25~73	1°C	
C18	CT1 Current (CM1)	0~512	1A	
C19	CT2 Current (CM2)	0~512	1A	
C20	EEVH1 Heating expansion valve opening angle	0~500	1 pulse	
C21	EEVH2 Heating expansion valve opening angle	0~500	1 pulse	
C22	Opening angle of EEVSC subcooling coil expansion valve	0~500	1 pulse	
C23	FM01 Number of rotations	0~999	10 min ⁻¹	
C24	FM02 Number of rotations	0~999	10 min ⁻¹	
C25	PSH High pressure sensor	0~4.15	0.01MPa	
C26	PSL Low pressure sensor	0~1.70	0.01MPa	
C30	63H1-1 63H1-2 (63H1-R)	0,1	—	Order of 100 : 63H1-1, 2 Order of 10 : 63H1-R (0: Open, 1: Close)

Code No.	Contents of display	Data display range	Minimum unit	Remark
C31	CNS1 CNS2 CNG1	0,1	–	Order of 100 : CNS1 Order of 10 : CNS2 Order of 1 : CNG1 (0: Open, 1: Close)
C32	CNG2 SV8 SV10	0,1	–	Order of 100 : CNG1 Order of 10 : SV8 Order of 1 : SV10 (0: Open, 1: Close)
C33	52C1 52C2 CH1	0,1	–	Order of 100 : 52C1 Order of 10 : 52C2 Order of 1 : CH1 (0: Open, 1: Close)
C34	CH2 20S (20SL)	0,1	–	Order of 100 : CH2 Order of 10 : 20S Order of 1 : (20SL) (0: Open, 1: Close)
C35	FMC1,2	0,1	–	Order of 100 : FMC1,2 Order of 10 : Spare Order of 1 : Spare (0: Open, 1: Close)
C36	SV1 SV2(20UF) (SV3)	0,1	–	Order of 100 : SV1 Order of 10 : SV2(20UF) Order of 1 : (SV3) (0: Open, 1: Close)
C37	(SV4) SV6 SV7	0,1	–	Order of 100 : (SV4) Order of 10 : SV6 Order of 1 : SV7 (0: Open, 1: Close)
C38	SV11 SV12 X19	0,1	–	Order of 100 : SV11 Order of 10 : SV12 Order of 1 : X19 (0: Open, 1: Close)
C39	CNZ1 CNH CNY	0,1	–	Order of 100 : CNZ1(External output) Order of 10 : CNH(Operation output) Order of 1 : CNY(Error output) (0: Open, 1: Close)
C40	Number of connected indoor unit	0~80	1	
C41	Capacity of connected indoor unit	0~999		
C42	Number of operation indoor unit	0~80	1	
C43	Required Fk total	0~999	1rps	
C44	Compressor cumulative operating time (CM1)	0~655	100h	
C45	Compressor cumulative operating time (CM2)	0~655	100h	
C46	Discharge pressure saturation temperature	-50~70	0.1°C	Minimum unit 1°C at -10°C or lower
C47	Suction pressure saturation temperature	-50~30	0.1°C	Minimum unit 1°C at -10°C or lower
C48	Tho-SC1 saturated pressure	-0.68~4.15	0.01MPa	
C49	Cooling operation subcooling	0~50	0.1deg	
C50	Suction superheat	0~50	0.1deg	
C51	Superheat of subcooling coil	0~50	0.1deg	SHS
C52	Tho-C1 Superheat	0~50	0.1deg	
C53	Tho-C2 Superheat	0~50	0.1deg	
C54	Target cooling low pressure	0.00~2.00	0.01MPa	
C55	Target heating high pressure	1.60~4.15	0.01MPa	
C56	Target Fk	0~999	1rps	
C57	Inverter 1 operating frequency command	0~140	1rps	
C58	Inverter 2 operating frequency command	0~140	1rps	

Code No.	Contents of display	Data display range	Minimum unit	Remark
C59	FMo1 operating revolution command	0~999	10min ⁻¹	
C60	FMo2 operating revolution command	0~999	10min ⁻¹	
C61	Demand ratio	0~100	1%	Only displaying
C65	Outdoor operating mode pattern	0~127	1	
C66	Control status	0~127	1	
C67	Protection control status	0~127	1	See table on page108.
C68	Compressor stop causes	0~127	1	See table on page109.
C69	Time elapsed after compressor stop cause	0~255	1h	
C70	Protection control causes 1	0~127	1	Displays No. of the protection control of which effect is the strongest among those occurred from the start of operation after the power on.
C71	Protection control causes 2	0~127	1	Displays No. of the protection control of which effect is stronger secondly among those occurred from the start of operation after the power on.
C72	Protection control causes 3	0~127	1	Displays No. of the protection control of which effect is stronger thirdly among those occurred from the start of operation after the power on.
C73	Compressor error causes 1	0~127	1	Displays No. of the error detection of which effect is the strongest among those occurred from the start of operation after the power on.
C74	Compressor error causes 2	0~127	1	Displays No. of the error detection of which effect is stronger secondly among those occurred from the start of operation after the power on.
C75	Compressor error causes 3	0~127	1	Displays No. of the error detection of which effect is stronger thirdly among those occurred from the start of operation after the power on.
C80	Counter · Current cut (CM1)	0~255	1	EEPROM memory. Resettable.
C81	Counter · Current cut (CM2)	0~255	1	EEPROM memory. Resettable.
C82	Counter · Power transistor overheat (CM1)	0~255	1	EEPROM memory. Resettable.
C83	Counter · Power transistor overheat (CM2)	0~255	1	EEPROM memory. Resettable.
C84	Counter · Compressor startup failure (CM1)	0~255	1	EEPROM memory. Resettable.
C85	Counter · Compressor startup failure (CM2)	0~255	1	EEPROM memory. Resettable.
C86	Counter · Anomalous compressor by loss of synchronism (CM1)	0~255	1	EEPROM memory. Resettable.
C87	Counter · Anomalous compressor by loss of synchronism (CM2)	0~255	1	EEPROM memory. Resettable.
C88	Counter · Communication error between inverter PCB and outdoor control (CM1)	0~255	1	EEPROM memory. Resettable.
C89	Counter · Communication error between inverter PCB and outdoor control (CM2)	0~255	1	EEPROM memory. Resettable.
C90	Counter · Anomalous FMo1	0~255	1	EEPROM memory. Resettable.
C91	Counter · Anomalous FMo2	0~255	1	EEPROM memory. Resettable.
C92	Counter · Indoor-outdoor communications error	0~255	—	EEPROM memory. Resettable.
C93	Counter · CPU reset	0~255	—	

Code No.	Contents of display	Data display range	Minimum unit	Remark
C94	Auto back up capable time	0~80	1h	
C97	Program sub-version	0~991	—	
C98	Program POL version	0.00~9.99	0.01	
C99	Auto send display	—	—	
P00	Continuous Heating Capacity Control (CHCC)	0: (Factory default) 0, 1, 2	—	
P01	Switching to operation priority	0: (Factory default) 0, 1, 2, 3	1	
P02	Outdoor fan snow protection control	0: (Factory default) 0, 1, 2	—	0 : Invalid 1 : Valid
P03	Outdoor fan snow protection control ON time setting	30: (Factory default) 10,30~600(sec)	30	Changes to 10, 30, 60, 90 ... 600.
P04	Many steps demand setting (1st step demand)	080: (Factory default) 000,040,060,080	—	
P05	Silent mode setting	0: (Factory default) 0 ~ 9	1	
P06	CNZ1 function assignment	0: (Factory default) 0 ~ 9	1	
P07	CNS1 function assignment	0~12	1	Factory setting: 0 (External operation input)
P08	CNS2 function assignment	0~12	1	Factory setting: 1 (Demand input)
P09	CNG1 function assignment	0~12	1	Factory setting: 2 (Forced cooling/heating input)
P10	CNG2 function assignment	0~12	1	Factory setting: 3 (Silent mode input)
P14	Many steps demand setting (2nd step demand)	080: (Factory default) 000,040,060,080	—	
P15	Many steps demand setting (3rd step demand)	080: (Factory default) 000,040,060,080	—	
P16	Multi-system energy save control II	0: (Factory default) 0, 1, 2, 3	1	
P17	After changing mode from operation prohibition mode	0: (Factory default) 0, 1	1	0 : Keeping STOP 1 : Automatically RUN
P18	Mode unmatched indoor unit setting in forced mode	0: (Factory default) 0, 1	1	
P19	Pump-down operation by external input	0: (Factory default) 0, 1	1	0 : Invalid 1 : Valid
<New Superlink setting>				
P30	Superlink communication status	0, 1	—	0: Previous Superlink 1: New Superlink
P31	Start automatic address setting	0: (Factory default) 0, 1	—	0: Automatic address setting standby 1: Automatic address setting start
P32	Input stating indoor address	0: (Factory default) 1~127	1	Specify the starting indoor address connected in one refrigerant system for automatic address setting.
P33	Input the number of connected indoor units	80: (Factory default) 1~80(*)	1	Specify the number of indoor units connected in one refrigerant system for automatic address setting. (*) Maximum connectable number of indoor units for each outdoor unit
P34	Polarity definition	0: (Factory default) 0, 1	—	0: Network polarity not defined 1: Network polarity defined
P69	Multi-system energy save control I	0: (Factory default) 0, 1	1	0 : Invalid 1 : Valid

Code No.	Contents of display	Data display range	Minimum unit	Remark
AUX	Auto address setting on			
AUE	Indoor unit address No. assignment normal ending			
A01	Indoor unit address No. assignment error 1			
A02	Indoor unit address No. assignment error 2			
A03	Indoor unit address No. assignment error 3			
A04	Superlink setting error			
<7-segment software input>				
F32	Large head difference (50 to 90m) setting	0: (Factory default) 0, 1	—	0:Invalid 1:Valid
F33	Large head difference between indoor units (18 to 30m) setting	0: (Factory default) 0, 1	—	0:Invalid 1:Valid
F48	Mente PC abnormal record sampling	10,20,30,60	—	10(Factory default), 20, 30, 60 seconds

[C67] Protection control status

<Definition of signal>

Shows the status of protection control in operation currently.

If two or more controls among the following protection controls are established simultaneously, No. of the control of which number is larger is displayed.

Protection control status		Number
Ordinary control	No operation of protective control	0
Protection control	During HP protection	1
	Spare	2
	During LP protection	3
	During discharge temperature	4
	During specific pressure protection	5
	During under-dome temperature protection	6
	During current safe protection	7
	During power transistor temperature protection	8
Inverter LC resonance protection		

[C68] Compressor stop causes**<Definition of signal>**

Shows the latest compressor stop cause counted from right now.

(Excluding the ordinary stop, etc.)

Output of the No. is retained till next compressor stop cause occurs.

	Compressor stop causes	Number
	No history	0
Sensor wire breakage	Tho-A	1
	Tho-R1	2
	Tho-R2	3
	Tho-R3	4
	Tho-R4	5
	Tho-D1	6
	Tho-D2	7
	Tho-SC	8
	Tho-H	9
	Tho-S	10
	Tho-C1	11
	Tho-C2	12
	Tho-P1	13
	Tho-P2	14
	High pressure sensor	15
	Low pressure sensor	16
System error	High pressure anomaly	20
	Low pressure anomaly	21
	Discharge temperature sensor error (Tho-D1)	22
	Discharge temperature sensor error (Tho-D2)	23
	Liquid flooding anomaly (CM1)	24
	Liquid flooding anomaly (CM2)	25
	Spare	26
Fan • Compressor Communication error	Outdoor DC fan motor anomaly (FMo1)	30
	Outdoor DC fan motor anomaly (FMo2)	31
	Current cut (CM1)	32
	Current cut (CM2)	33
	Fo short-circuit (CM1)	34
	Fo short-circuit (CM2)	35
	Compressor startup failure (CM1)	36
	Compressor startup failure (CM2)	37
	Communication error between inverter PCB and outdoor control (CM1)	38
	Communication error between inverter PCB and outdoor control (CM2)	39
	Anomalous compressor by loss of synchronism (CM1)	40
	Anomalous compressor by loss of synchronism (CM2)	41
	Communication error between the master unit and slave units	42
	Compressor stop by control	Operation mode change
Differential pressure startup prevention control		51
Protect for heating overload		52
Spare		53

Code	Display unit	Contents of invalid operation
oPE 03	Master	Incorrect combination
oPE 07	Master/Slave	Fault of model selection by SW4 & jumper setting
oPE 08	Master	Prohibition compressor operation due to low ambient temperature
oPE 10	Slave	Unavailable setting from slave

(c) Saving of Operation Data

For the purpose to investigate the cause of trouble in the field, the operation data are always saved in the memory, and if the trouble occurs, the data writing is stopped and the operation data prior to the trouble occurrence are recorded. These data can be retrieved to personal computer through 4-pin connector on the outdoor control PCB and utilized for probing the cause.

- (i) Operation data prior to the present operation are saved and updated sequentially.
- (ii) If an anomalous stop occurs, the data from that point to 180 times before is read and recorded as operation data before the occurrence of on abnormality.
- (iii) Data are written in at 7-segment F48 setting interval and following data will be transmitted to PC upon demand.

Data	Data Range	Example
Software version	Ascii 15 byte	KV1C100##### (#: NULL)
PID (program ID)	Ascii 2 byte	5D
Outdoor unit capacity	Ascii 3 byte	As shown in table at right
Power source frequency	Ascii 2 byte	60
Outdoor address	Ascii 2 byte	00 ~ 3F
Indoor address × 16 units	Ascii 2 byte × 16 units	40 ~ 7F
Indoor capacity × 16 units	Ascii 3 byte × 16 units	022 ~ 280

Outdoor unit capacity data	Outdoor unit capacity data	Remark
Single type	Example: 20HP - [S20]	S: Display with Horse Power of single type or single use of combination type
Master unit of combination type	Example: 40HP - [S40]	S: Display with Horse Power of master unit of combination type
Slave unit of combination type	Example: 20HP - [C20]	C: Display with Horse Power of slave unit of combination type

- (iv) Error retention and monitoring data

< Indoor unit indicate data >

Code No.	Write-in content	Record data				
		Data write-in range	Write-in unit	Number of bytes	Contents	
00	Power-on record code	00~FF	–	1	–	
01	Indoor unit 1 Thi-A	10~52	1°C	1	Air inlet temperature	
		-128~127			Water inlet temperature	
02	Indoor unit 1 Thi-R1	-30~71	1°C	1	Heat exchanger temperature 1	
03	Indoor unit 1 Thi-R2	-30~71	1°C	1	Heat exchanger temperature 2	
04	Indoor unit 1 Thi-R3	-30~71	1°C	1	Heat exchanger temperature 3	
05	Indoor unit 1 EEV	0~470	1 pulse	2		
06	Indoor unit I setting temperature	0~127	0.5°C	1	05H command	
07	Indoor unit I Operation mode/Air capacity	0~500	–	2	0	Not used (Data not received)
					100	Dehumidifying stop 0-speed
					110	Dehumidifying operation 0-speed
					111	Dehumidifying operation 1-speed
					112	Dehumidifying operation 2-speed
					113	Dehumidifying operation 3-speed
					114	Dehumidifying operation 4-speed
					115	Dehumidifying operation 5-speed
					116	Dehumidifying operation 6-speed
					200	Cooling stop 0-speed
					210	Cooling operation 0-speed
					211	Cooling operation 1-speed
					212	Cooling operation 2-speed
					213	Cooling operation 3-speed
					214	Cooling operation 4-speed
					215	Cooling operation 5-speed
					216	Cooling operation 6-speed
					300	Fan stop 0-speed
					310	Fan operation 0-speed
					311	Fan operation 1-speed
					312	Fan operation 2-speed
313	Fan operation 3-speed					
314	Fan operation 4-speed					
315	Fan operation 5-speed					
316	Fan operation 6-speed					
400	Heating stop 0-speed					
410	Heating operation 0-speed					

Code No.	Write-in content	Record data			
		Data write-in range	Write-in unit	Number of bytes	Content
					411 Heating operation 1-speed 412 Heating operation 2-speed 413 Heating operation 3-speed 414 Heating operation 4-speed 415 Heating operation 5-speed 416 Heating operation 6-speed
08	Indoor unit 1 Demand frequency	0~255	1 rps	1	
09	Indoor unit 1 Answer frequency	0~255	1 rps	1	
10	Indoor unit 1 Indoor local	—	—	1	Bit0 Anti-frost Bit1 Opening command ON Bit2※ If indoor unit is HMU, Cooling : Target SH Bit3※ Heating : Target heat exchanger outlet temperature Bit4※ Range : 0~62 (Units of 1 °C, round up. Converse from binary number of Bit2~7.) Bit5※ ※If indoor unit is not HMU : 0 Bit6※ Bit7※
11	Indoor unit 1 Thi spare	-10~52 -128~127	1°C	1	Air outlet temperature Water outlet temperature
12	Indoor unit 1 Model	0~85	—	1	0 FDT 1 FDK 2 other 3 FDE 4 FDTC 5 Outdoor air intake unit 6 Spacious area 7 Outdoor air treatment
13	Indoor unit 1 PID	—	—	1	
Data contents for indoor 2 to 16 are same as above.					

<Outdoor unit indicate data>

Code No.	Write-in content	Record data			
		Data write-in range	Write-in unit	Number of bytes	Content
00	Power-on record code	00~FF	—	1	—
01	Anomalous code	00~99	—	1	00: No anomalous, outdoor unit all anomalous ???
02	Address of unit where trouble occurred	00~FF	—	1	00~3F: Outdoor unit side, 40~6F: Indoor unit side
03	Tho-A Outdoor air temperature	-25~70	A/D value	2	
04	Heat exchanger temperature 1 (Exit, Front)	-40~75	A/D value	2	Cooling liquid side
05	Heat exchanger temperature 2 (Exit, Rear)	-40~75	A/D value	2	Cooling liquid side
06	Heat exchanger temperature 3 (Entrance, Front)	-40~75	A/D value	2	Cooling gas side
07	Heat exchanger temperature 4 (Entrance, Rear)	-40~75	A/D value	2	Cooling gas side
08	Tho-D1 Discharge pipe temperature (CM1)	-20~140	A/D value	2	
09	Tho-D2 Discharge pipe temperature (CM2)	-20~140	A/D value	2	
10	Tho-C1 Under-dome temperature (CM1)	-30~90	A/D value	2	
11	Tho-C2 Under-dome temperature (CM2)	-30~90	A/D value	2	
12	Heat dissipation fin 1	-20~140	A/D value	2	

Code No.	Write-in content	Record data									
		Data write-in range	Write-in unit	Number of bytes	Content						
13	Heat dissipation fin 2	-20~140	A/D value	2							
14	Tho-S Suction pipe temperature	-40~75	A/D value	2							
15	Tho-SC Subcooling coil temperature 1	-40~75	A/D value	2	Liquid pipe side						
16	Tho-H Subcooling coil temperature 2	-40~75	A/D value	2	Suction pipe side						
17	Injection suction pipe temperature 1 (spare)	-40~75	A/D value	2							
18	Receiver liquid surface detection temperature 1 (spare)	-40~75	A/D value	2							
19	CT1 Current	0~511.75	A/D value	2							
20	CT2 Current	0~511.75	A/D value	2							
21	Inverter secondary current 1	0~255.75	A/D value	2							
22	Inverter secondary current 2	0~255.75	A/D value	2							
23	High pressure sensor	0.00~4.15	A/D value	2							
24	Low pressure sensor	0.00~1.70	A/D value	2							
25	Liquid pipe pressure sensor	0.00~4.15	A/D value	2							
26	Indoor unit connection number	0~127	1 unit	1							
27	Indoor unit connection capacity	0~65535	—	2							
28	Indoor unit thermostat ON number	0~255	1 unit	1							
29	Indoor unit cooling thermostat ON capacity	0~65535	—	2							
30	Indoor unit heating thermostat ON capacity	0~65535	—	2							
31	Operation mode	0~2	—	1	<table border="1"> <tr> <td>0</td> <td>Stop</td> </tr> <tr> <td>1</td> <td>Cooling</td> </tr> <tr> <td>2</td> <td>Heating</td> </tr> </table>	0	Stop	1	Cooling	2	Heating
0	Stop										
1	Cooling										
2	Heating										
32	Spare (Outdoor unit operation pattern)	0~255	1	1	Real range is 1~17.						
33	CM1 frequency	0~255	1 rps	1							
34	CM2 frequency	0~255	1 rps	1							
35	FM01 Number of rotations	0~2550	10 min ⁻¹	2							
36	FM02 Number of rotations	0~2550	10 min ⁻¹	2							
37	Required rps total	0~65535	1rps	2							
38	Discharge pressure saturation temperature	-50~70	0.01°C	2							
39	Intake pressure saturation temperature	-50~30	0.01°C	2							
40	Pressure ratio	1.0~10.0	0.1	1							

Code No.	Write-in content	Record data					
		Data write-in range	Write-in unit	Number of bytes	Content		
41	Cooling operation subcooling	0~25.5	A/D value	1			
42	Superheat of suction pipe	0~25.5	A/D value	1			
43	Superheat of subcooling coil	0~25.5	A/D value	1			
44	Under-dome superheat CM1	0~25.5	0.1°C	1			
45	Under-dome superheat CM2	0~25.5	0.1°C	1			
46	Target FK	0~65535	1rps	2			
47	Inverter CM1 operation frequency	0~255	1rps	1			
48	Inverter CM2 operation frequency	0~255	1rps	1			
49	FMo1 rotation command	0~2550	10 min ⁻¹	1			
50	FMo2 rotation command	0~2550	10 min ⁻¹	1			
51	EEVH1 opening angle	-32768 ~32767	1pulse	2			
52	EEVH2 opening angle	-32768 ~32767	1pulse	2			
53	EEVSC opening angle	-32768 ~32767	1pulse	2			
54	EEVD opening angle	-32768 ~32767	1pulse	2	High head unit setting		
	Target temperature of compressor	0~1270	5°C	2	Other 0 : Outlet water temperature of compressor is not controlled. Other 0 : Target outlet water temperature of compressor		
55	Target cooling low pressure of compressor	0.00~2.00	0.01MPa	1			
56	Target heating high pressure of compressor	0.00~4.15	0.01MPa	2			
57	Target differential temperature of heating CSST	0~127	1°C	1	Real range is 5~30 deg		
58	Spare	—	—	1			
59	Target superheat of outdoor unit EEVSC	0~25.5	0.1°C	1			
60	Amount of oil rising (CM1)	0~2550	10cc	1	Real range is 0~1100 cc		
61	Amount of oil rising (CM2)	0~2550	10cc	1	Real range is 0~1100 cc		
62	Oil return count down	0~255	3 minutes	1	Real range is 0~600 minutes		
63	Output of relay	—	—	1	Bit0	52C1	0: OFF, 1: ON
					Bit1	52C2	0: OFF, 1: ON
					Bit2	CH1	0: OFF, 1: ON
					Bit3	CH2	0: OFF, 1: ON
					Bit4	20S	0: OFF, 1: ON
					Bit5	Spare(20S)	0: OFF, 1: ON
					Bit6	FMC1,2	0: OFF, 1: ON
					Bit7	Spare(FMC3)	0: OFF, 1: ON
64	Output of relay	—	—	1	Bit0	SV1	0: OFF, 1: ON
					Bit1	SV2(20UF)	0: OFF, 1: ON
					Bit2	SV4	0: OFF, 1: ON
					Bit3	SV6	0: OFF, 1: ON
					Bit4	SV7	0: OFF, 1: ON

Code No.	Write-in content	Record data										
		Data write-in range	Write-in unit	Number of bytes	Content							
					Bit5	SV8	0: OFF, 1: ON					
					Bit6	SV10	0: OFF, 1: ON					
					Bit7	SV11	0: OFF, 1: ON					
65	Output of relay	—	—	1	Bit0	SV12	0: OFF, 1: ON					
					Bit1	X19	0: OFF, 1: ON					
					Bit2	SV3	0: OFF, 1: ON					
					Bit3	Spare	0: OFF, 1: ON					
					Bit4	Spare	0: OFF, 1: ON					
					Bit5	CNZ1	0: OFF, 1: ON					
					Bit6	CnH	0: OFF, 1: ON					
					Bit7	CnY	0: OFF, 1: ON					
66	Compressor 1 cumulative operating time (estimate)	0~65535	1h	2								
67	Compressor 2 cumulative operating time (estimate)	0~65535	1h	2								
68	Compressor 1 start times	0~65535	20 times	2								
69	Compressor 2 start times	0~65535	20 times	2								
70	Control status CM1 3-minute delay timer	0~180	1 second	1								
71	Control status CM2 3-minute delay timer	0~180	1 second	1								
72	Energizing time count down	0~360	2 minutes	1								
73	Control status CH compressor protective start	0~15	—	1	15	Protective start end						
					0~14	During protective start						
74	Control status Oil equalization	0~127	—	1	0	None						
					1	Oil equalized rotation						
					10	Oil equalized operation 1						
					20	Oil equalized operation 2						
					30	Oil equalized operation 3						
					41	Oil equalized operation 4-1						
					42	Oil equalized operation 4-2						
					51	Oil equalized operation 5-1						
					52	Oil equalized operation 5-2						
					61	Oil equalized operation 6-1						
					62	Oil equalized operation 6-2						
					71	Oil equalized operation 7-1						
					72	Oil equalized operation 7-2						
					81	Oil equalized operation 8-1						
					82	Oil equalized operation 8-2						
75	Control status Oil return	0~2	—	1	0	None						
					1	Oil return (cooling)						
					2	Oil return (gas cycle)						
76	Control status Defrost kinds + defrost status	0~127	—	1	0	None						
					11	Thermal condition defrost status 1						
					12	Thermal condition defrost status 2						
					13	Thermal condition defrost status 3						
					14	Thermal condition defrost status 4						
					21	Strength type thermal condition defrost status 1						
					22	Strength type thermal condition defrost status 2						
					23	Strength type thermal condition defrost status 3						
					24	Strength type thermal condition defrost status 4						
					31	Time condition defrost status 1						
					32	Time condition defrost status 2						
					33	Time condition defrost status 3						
					34	Time condition defrost status 4						
					77	Control status Low pressure error (cooling) return status	0~4	—	1	0	Normal operation	
										1	Compressor OFF	
2	For 70 seconds after compressor ON											
3	After 70 to 180 seconds after compressor ON											
4	After 180 to 195 seconds after compressor ON											
78	Control status 1	—	—	1	Bit0	Superlink communication state	0: SL I (old SL) 1: SL II (new SL)					
					Bit1	In trial operation control	0: Normal 1: Practice					
					Bit2	In demand control	0: Normal 1: Practice					
					Bit3	Silent mode	0: Normal 1: Practice					
					Bit4	Spare	0: Normal 1: Practice					
					Bit5	Spare	0: Normal 1: Practice					
					Bit6	Spare	0: Normal 1: Practice					
					Bit7	In pump-down control at Start/Stop	0: Normal 1: Practice					

Code No.	Write-in content	Record data					
		Data write-in range	Write-in unit	Number of bytes	Content		
79	Control status 2	—	—	1	Bit0	In low outdoor temperature control	0: Normal 1: Practice
					Bit1	In for replacement pump-down control	0: Normal 1: Practice
					Bit2	Compressor dilution protection	0: Normal 1: Practice
					Bit3	Outdoor heat exchanger refrigerant purge	0: Normal 1: Practice
					Bit4	Indoor heat exchanger refrigerant purge	0: Normal 1: Practice
					Bit5	Spare	0: Normal 1: Practice
					Bit6	Spare	0: Normal 1: Practice
					Bit7	Spare	0: Normal 1: Practice
80	Control status 3	—	—	1	Bit0	Auto backup operation	0: Normal 1: Practice
					Bit1	Spare	0: Count 1: Count up
					Bit2	Spare	0: Count 1: Count up
					Bit3	Spare	0: Count 1: Count up
					Bit4	Spare	0: Count 1: Count up
					Bit5	Spare	0: Count 1: Count up
					Bit6	Spare	0: Count 1: Count up
					Bit7	Spare	0: Count 1: Count up
81	Control status of refrigerant filling	—	—	1	Bit0	Spare	
					Bit1	Expulsion control of accumulator	
					Bit2	Target operating point control	
					Bit3	Rough charge	
					Bit4	Liquid level detection control	
					Bit5	Detailed charge	
					Bit6	Successful completion	
					Bit7	Abnormal termination	
82	Backup cumulative time	0~127	1 h	1			
83	Check operation status	0~7	—	1	0	Normal	
					1	Insufficient check operation start condition	
					2	Check operation warm-up	
					3	Check operation ON	
					4	Check operation stop	
					5	Operation valve is closed	
					6	Indoor unit abnormal	
					7	Normal ending of check operation	
84	Status of pipe cleaning operation	0~40	—	1	0	Normal	
					10	Insufficient check operation starting condition	
					21	Check operation warm-up	
					22	Pump-down operation 1	
					23	Preparatory operation	
					24	Liquid back cleaning operation	
					25	Refrigerant eviction operation	
					26	Pump-down operation	
					30	Piping cleaning operation interruption	
					40	Piping cleaning operation completion	
85	Control status Refrigerant quantity check	0~127	—	1			
86	Protection control status 1	—	—	1	Bit0	HP protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit1	HP protection 2 Gas bypass control	0: Normal 1: Practice
					Bit2	HP protection 3 Heating stop indoor unit slight opening control	0: Normal 1: Practice
					Bit3	LP protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit4	LP protection 2 Compressor rising rate control	0: Normal 1: Practice
					Bit5	LP protection 3 Outdoor unit EEV control	0: Normal 1: Practice
					Bit6	LP protection 4 Oil separator SV control	0: Normal 1: Practice
					Bit7	Td protection 1 Compressor capacity control	0: Normal 1: Practice

Code No.	Write-in content	Record data					
		Data write-in range	Write-in unit	Number of bytes	Content		
87	Protection control status 2	—	—	1	Bit0	Td protection 2-1 EEVSC-Td cooling control	0: Normal 1: Practice
					Bit1	Td protection 2-2 EEVH-Td cooling control	0: Normal 1: Practice
					Bit2	Td protection 4 Heating stop indoor unit slight opening control	0: Normal 1: Practice
					Bit3	Td protection 5 Outdoor unit EEV control	0: Normal 1: Practice
					Bit4	CS protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit5	Tc protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit6	Tc protection 2 Gas bypass control	0: Normal 1: Practice
					Bit7	Tc protection 3 CM dilution protection control	0: Normal 1: Practice
88	Protection control status 3	—	—	1	Bit0	CM protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit1	CM protection 2 Outdoor unit EEV control	0: Normal 1: Practice
					Bit2	PT protection 1 Compressor capacity control	0: Normal 1: Practice
					Bit3	PT protection 2 Inverter cooling fan control	0: Normal 1: Practice
					Bit4	Dilution rate protection	0: Normal 1: Practice
89	Protection control causes 1	0~127	—	1			
90	Protection control causes 2	0~127	—	1			
91	Protection control causes 3	0~127	—	1			
92	Compressor stop causes	0~127	—	1			
93	Compressor stop causes lapse of time	0~255	1h	1			
94	Control status High pressure anomaly (63H1) counter	0~5	—	1			
95	Control status Low pressure anomaly (running) counter	0~5	—	1			
96	Control status Low pressure anomaly (starting) counter	0~5	—	1			
97	Control status Low pressure anomaly (stopped) counter	0~5	—	1			
98	Control status Discharge temperature error (Tho-D1) counter	0~5	—	1			
99	Control status Discharge temperature error (Tho-D2) counter	0~5	—	1			
100	Control status Cut off sensor counter	0~3	—	1			
101	Control status Liquid flooding anomaly counter	0~3	—	1			
102	Counter • Current cut (CM1)	0~255	—	1			
103	Counter • Current cut (CM2)	0~255	—	1			
104	Counter • Power transistor overheat (CM1)	0~255	—	1			
105	Counter • Power transistor overheat (CM2)	0~255	—	1			
106	Counter • Compressor startup failure (CM1)	0~255	—	1			
107	Counter • Compressor startup failure (CM2)	0~255	—	1			

Code No.	Write-in content	Record data					
		Data write-in range	Write-in unit	Number of bytes	Content		
108	Counter · Anomalous compressor by loss of synchronism (CM1)	0~255	—	1			
109	Counter · Anomalous compressor by loss of synchronism (CM2)	0~255	—	1			
110	Counter · Communication error between inverter PCB and outdoor control (CM1)	0~255	—	1			
111	Counter · Communication error between inverter PCB and outdoor control (CM2)	0~255	—	1			
112	Counter · Anomalous FMO1	0~255	—	1			
113	Counter · Anomalous FMO2	0~255	—	1			
114	Counter · Indoor-outdoor communications error	0~255	—	1			
115	Counter · CPU reset	0~255	—	1			
116	Compressor error causes 1	0~127	—	1			
117	Compressor error causes 2	0~127	—	1			
118	Compressor error causes 3	0~127	—	1			
119	INV 1 information	—	—	1	Version (Initial value FFh)		
120		—	—	1	DIP switch (Initial value FFh)		
121	INV 2 information	—	—	1	Version (Initial value FFh)		
122		—	—	1	DIP switch (Initial value FFh)		
123	Indoor unit control status 1	Error causes status	—	1	Bit0	Spare	0: Normal 1: Practice
					Bit1	Spare	0: Normal 1: Practice
					Bit2	Spare	0: Normal 1: Practice
					Bit3	Indoor unit cooling startup control 1 (normal)	0: Normal 1: Practice
					Bit4	Indoor unit cooling startup control 2 (prevent liquid back)	0: Normal 1: Practice
					Bit5	Indoor unit heating startup control	0: Normal 1: Practice
					Bit6	Indoor unit outlet temp. of heating control assist	0: Normal 1: Practice
					Bit7	Indoor unit refrigerant withdrawing control	0: Normal 1: Practice
124	Indoor unit control status 2	—	—	1	Bit0	Spare	0: Normal 1: Practice
					Bit1	Spare	0: Normal 1: Practice
125	External input	—	—	1	Bit0	63H1	0: OFF 1: ON
					Bit1	Spare	0: OFF 1: ON
					Bit2	CNS1	0: OFF 1: ON
					Bit3	CNS2	0: OFF 1: ON
					Bit4	CNG1	0: OFF 1: ON
					Bit5	CNG2	0: OFF 1: ON
126	DIP switch [SW 3]	—	—	1	Bit0	SW3-1	0: OFF 1: ON
					Bit1	SW3-2	0: OFF 1: ON
					Bit2	SW3-3	0: OFF 1: ON
					Bit3	SW3-4	0: OFF 1: ON
					Bit4	SW3-5	0: OFF 1: ON
					Bit5	SW3-6	0: OFF 1: ON
					Bit6	SW3-7	0: OFF 1: ON
					Bit7	SW3-8	0: OFF 1: ON
127	DIP switch [SW 4]	—	—	1	Bit0	SW4-1	0: OFF 1: ON
					Bit1	SW4-2	0: OFF 1: ON
					Bit2	SW4-3	0: OFF 1: ON
					Bit3	SW4-4	0: OFF 1: ON

Code No.	Write-in content	Record data				
		Data write-in range	Write-in unit	Number of bytes	Content	
128	DIP switch [SW 5]	—	—	1	Bit4 SW4-5	0: OFF 1: ON
					Bit5 SW4-6	0: OFF 1: ON
					Bit6 SW4-7	0: OFF 1: ON
					Bit7 SW4-8	0: OFF 1: ON
					Bit0 SW5-1	0: OFF 1: ON
					Bit1 SW5-2	0: OFF 1: ON
					Bit2 SW5-3	0: OFF 1: ON
					Bit3 SW5-4	0: OFF 1: ON
129	DIP switch [SW 6]	—	—	1	Bit4 SW5-5	0: OFF 1: ON
					Bit5 SW5-6	0: OFF 1: ON
					Bit6 SW5-7	0: OFF 1: ON
					Bit7 SW5-8	0: OFF 1: ON
					Bit0 SW6-1	0: OFF 1: ON
					Bit1 SW6-2	0: OFF 1: ON
					Bit2 SW6-3	0: OFF 1: ON
					Bit3 SW6-4	0: OFF 1: ON
130	Jumper switch	—	—	1	Bit4 SW6-5	0: OFF 1: ON
					Bit5 SW6-6	0: OFF 1: ON
					Bit6 SW6-7	0: OFF 1: ON
					Bit7 SW6-8	0: OFF 1: ON
					Bit0 J11	0: OFF 1: ON
					Bit1 J12	0: OFF 1: ON
					Bit2 J13	0: OFF 1: ON
					Bit3 J14	0: OFF 1: ON
131	Software switch	—	—	1	Bit4 J15	0: OFF 1: ON
					Bit5 J16	0: OFF 1: ON
					Bit0 Spare	
					Bit1 Spare	
					Bit2 Spare	
					Bit3 Outdoor fan snow protection control	
132	Priority operation switch	0-3	—	1	Bit4 Spare	
					Bit5 Switching to heating wind temperature security priority	
					0 First push priority	
					1 Last push priority	
133	Heating setting 1 (Target exit temperature)	20~50	1°C	1	2 Director mode	
					3 Operating capacity priority	
134	Heating setting 2 (Target of high temperature)	3.65~2.75	0.05MPa	1		
135	Heating setting 3 (Judgment temperature)	20~38	1°C	1		
136	CNS1 function assignment	0~20	—	1		
137	CNS2 function assignment	0~20	—	1		
138	CNG1 function assignment	0~20	—	1		
139	CNG2 function assignment	0~20	—	1		
140	External output function assignment function assignment	0~20	—	1		
141	State in check operation (User's operation, limited to 255 - 1→0 only)	0~255	—	1		
142	Over ride NO.	0~	—	1		

(2) Outdoor PCB setting

Code	Input	Remark
SW1	Outdoor address No. (Order of 10)	Factory setting is 4.(Rotary switch)
SW2	Outdoor address No. (Order of 1)	Factory setting is 9.(Rotary switch)
SW3-1	Inspection LED reset Normal★/Reset	Factory setting is OFF.
SW3-2	Auto backup operation Invalid★/Valid	Factory setting is OFF.
SW3-3	Spare	Factory setting is OFF.Keep OFF.
SW3-4	Refrigerant quantity check Normal★/Check	Factory setting is OFF.
SW3-5	Check operation start Normal★/Check	Factory setting is OFF.
SW3-6	Spare	Factory setting is OFF.Keep OFF.
SW3-7	Forced cooling/heating Normal★/Forced cooling-heating	Factory setting is OFF.
SW3-8	Spare	Factory setting is OFF.Keep OFF.
SW4-1 to 4-4	Model selection	See following table.
SW4-5	KXZE2 model setting	Factory setting is ON.Keep ON.
SW4-6	Spare	Factory setting is OFF.Keep OFF.
SW4-7 to 4-8	Master/slave unit setting address	See following table.
SW5-1	Test run switch Normal★/Test run	Factory setting is OFF.
SW5-2	Test run mode Heating★/Cooling	Factory setting is OFF.
SW5-3	Pump down switch Normal★/Pump down	Factory setting is OFF.
SW5-4	KXZE2 model setting	Factory setting is ON.Keep ON.
SW5-5	SL selector New SL (Auto)★/Old SL	Factory setting is OFF.
SW5-6 to 5-8	Spare	Factory setting is OFF.Keep OFF.
SW6-1 to 6-3	Spare	Factory setting is OFF.Keep OFF.
SW6-4	High head setting Normal★/High head	Factory setting is OFF.
SW6-5 to 6-8	Spare	Factory setting is OFF.Keep OFF.
SW7	Data erase/write	(Button switch)
SW8	7-segment display code No. increasing (order of 1)	(Button switch)
SW9	7-segment display code No. increasing (order of 10)	(Button switch)
SW10-1	Inverter checker1 setting Normal★/Inverter checker mode	Factory setting is OFF.
SW10-2	Inverter checker2 setting Normal★/Inverter checker mode	Factory setting is OFF.
SW10-3 to 10-8	Spare	Factory setting is OFF.Keep OFF.
SW11	Spare	Factory setting is 0.Keep 0.(Rotary switch)
J10	Spare	Factory setting is ON.Keep ON.
J11 to J12	Power source voltage selection	Factory setting is OFF.Keep OFF.
J13	External input Pulse/Level★	Factory setting is ON.
J14	Defrost reset temperature Intensive/Normal★	Factory setting is ON.
J15	Defrost start temperature Cold region/Normal★	Factory setting is ON.
J16	Spare	Factory setting is OFF.Keep OFF.
J17 to J19,J21	Spare	Factory setting is ON.Keep ON.

Notes (1) Jumper wires J10 to J21 indicate OFF(open) and ON(short-circuit).

(2) DIP switch SW's indicate OFF/ON

(3) ★ indicates the factory setting.

■Model selection with SW4-1 SW4-4

0: OFF 1: ON

Model (HP)	280 (10)	335 (12)	400 (14)	450 (16)	475 (17)	500 (18)	560 (20)
SW4-1	1	0	0	1	1	0	1
SW4-2	0	1	0	0	1	1	1
SW4-3	0	0	1	1	0	1	1
SW4-4	0	0	0	0	0	0	0

■Master/slave setting with SW4-7, SW4-8

0: OFF 1: ON

Outdoor unit	SW4-7	SW4-8
Master unit	0 ★	0 ★
Slave unit 1	1	0
Slave unit 2	0	1

(3) Indoor PCB setting

Code	Input	Default setting		Remarks	
SW1	Indoor unit address No.(Order of 10)	0		0-9	
SW2	Indoor unit address No.(Order of 1)	0		0-9	
SW3	Outdoor unit address No.(Order of 10)	4		0-9	
SW4	Outdoor unit address No.(Order of 1)	9		0-9	
SW5-1	Superlink selection	Automatic*/Previous SL	OFF	Automatic	
SW5-2	Indoor unit address No.(Order of 100)		OFF	0	OFF : 0, ON : 1
SW6-1	Model selection		As per model	See table 1.	
SW6-2					
SW6-3					
SW6-4					
SW7-2					
SW7-1	Test run, Drain motor	Normal*/Test run	OFF	Normal	
SW7-3	Spare		OFF		Keep OFF
SW7-4	Reserved		OFF		Keep OFF
SW8-1	Reserved		OFF		Keep OFF
JSL1	Superlink terminal spare	Normal*/switch to spare	With	Normal	

* Default setting

■ Model selection with SW6-1 - SW6-4 and SW7-2

0 : OFF 1 : ON

	P15	P22	P28	P36	P45	P56	P71	P90	P112	P140	P160	P224	P280
SW6-1	0	0	1	0	0	0	0	0	1	0	1	0	1
SW6-2	0	0	0	1	0	1	0	1	1	0	0	1	1
SW6-3	0	0	0	0	1	1	0	0	0	1	1	1	1
SW6-4	0	0	0	0	0	0	1	1	1	1	1	1	1
SW7-2	1	0	0	0	0	0	0	0	0	0	0	0	0

8. SYSTEM TROUBLESHOOTING PROCEDURE

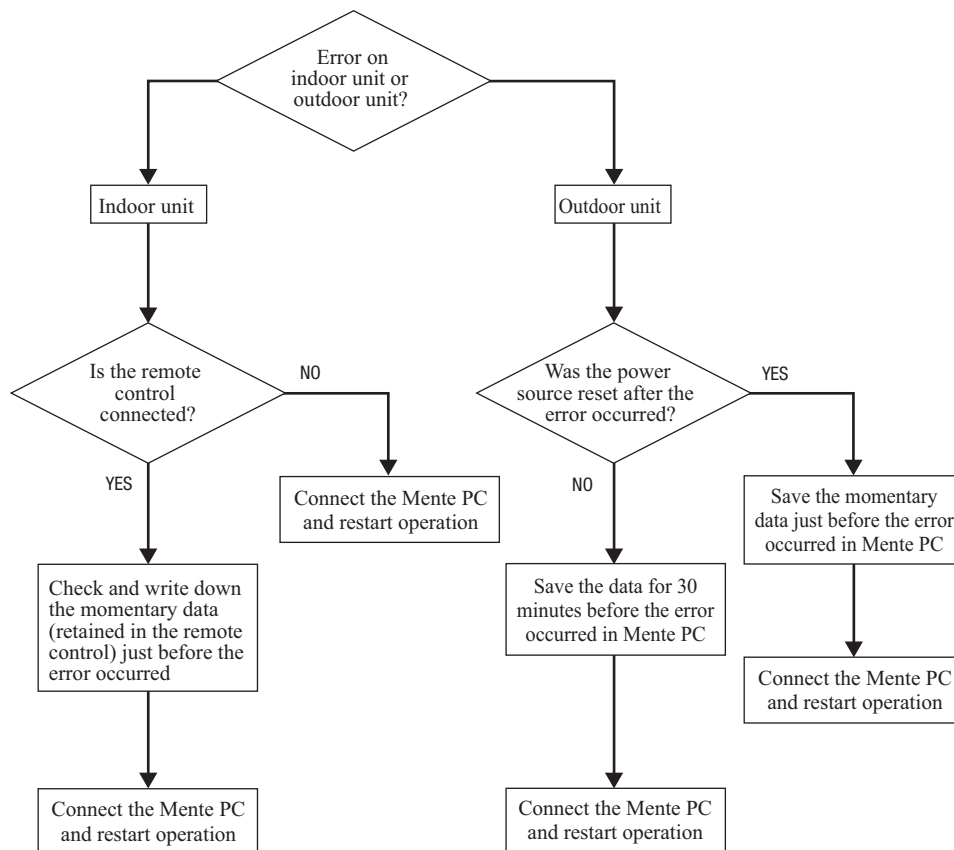
8.1 Basics of troubleshooting

Basic troubleshooting is to check/analyze/save data by connecting the Mente PC.

Whenever arriving at the site, always connect the Mente PC before starting work.

Method of error data analysis (Basic procedure)

- Identify whether particular error occurred during operation or stopping.
- Is it caused by the installation conditions of outdoor/indoor unit? (Refrigerant quantity, pipe length, short-circuit, clogged filter, etc.)
- Isn't there any beginner's mistake at the installation? (Wrong address, mistake in piping or wiring, etc.)
- Is the failure related to any hardware (parts)? (SV main body, coil, capillary, check valve, sensor, etc.)
- Is it a major component?
Compressor, inverter PCB and outdoor DC fan motor
- Is it a failure of electrical component



8.2 Explanation of troubleshooting

(a) Inspection of short-circuit on the power transistor module terminals

Disconnect the wiring of compressor and check for short-circuit with a tester.

Inspect between terminals of: P-U, P-V, P-W, N-U, N-V, N-W and P-N

It will be easier to contact the tester at the following place at each terminal.

P: P terminal of power transistor

N: N terminal of power transistor

U: End of red harness to compressor

V: End of white harness to compressor

W: End of blue harness to compressor

Terminal (+)	Terminal (-)	Normal value (Ω)
P	N	Several 10 M
N	P	Several 1.9 M
P	U	Several 100 M
P	V	
P	W	
N	U	About 1.6 M
N	V	
N	W	
U	P	About 1.6 M
V	P	
W	P	
U	N	Several 100 M
V	N	
W	N	

Note (1) When a measured value is 0 – a few $k\Omega$, the element may be broken.

Replace the power transistor part.

8.2 Inverter checker for diagnosis of inverter output

- Checking method

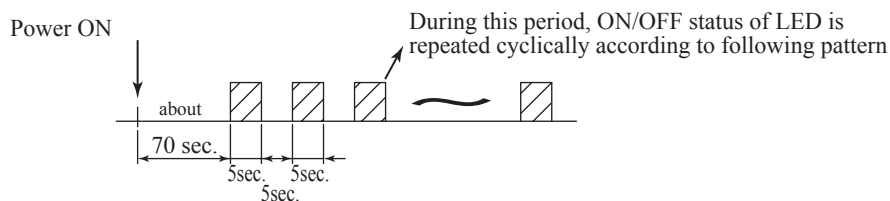
(a) Setup procedure of checker.

- 1) Power OFF (Turn off the breaker).
- 2) Remove the terminal cover of compressor and disconnect the wires (U, V, W) from compressor.
- 3) Connect the wires U (Red), V (White) and W (Black) of checker to the terminal of disconnected wires (U, V, W) from compressor respectively.

(b) Operation for judgment.

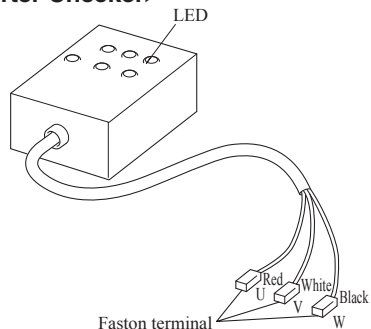
- 1) Power ON after SW10-1or10-2 on outdoor control PCB was turned ON.(INV1:SW10-1, INV2:SW10-2)
- 2) After about 10 seconds since power has turned ON, LED start ON/OFF for 5 seconds cyclically and it keeps repeating.
- 3) Check ON/OFF status of 6 LED's on the checker.
- 4) Judge the PCB by ON/OFF status of 6 LED's on the checker.

ON/OFF status of LED	If all of LED are ON/OFF according to following pattern	If all of LED stay OFF or some of LED are ON/OFF
Inverter PCB	Normal	Anomalous



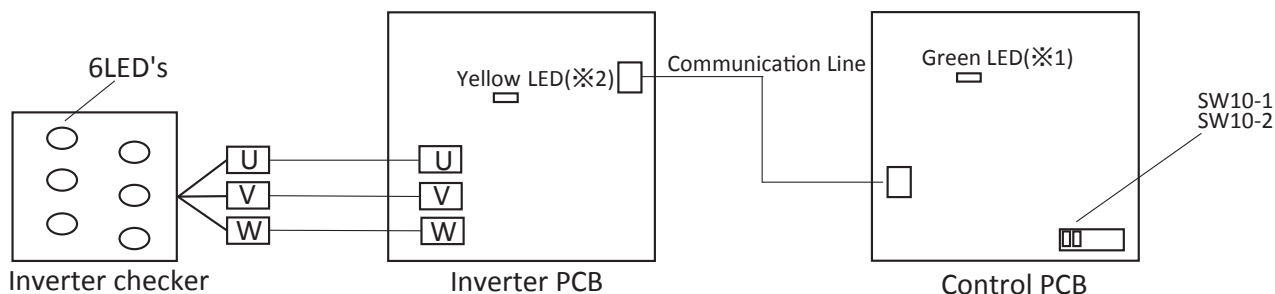
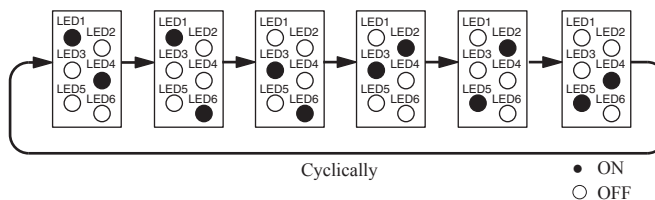
- 5) Be sure to turn off SW10-1or10-2 on outdoor control PCB, after finishing the check operation.

<Inverter Checker>



Connect to the terminal of the wires which are disconnected from compressor.

LED ON/OFF pattern



※ 1. During checking procedure, the Green LED of control PCB is fast flashing

※ 2. During checking procedure, the Yellow LED of inverter PCB is fast flashing

IF LED of control PCB or Inverter PCB stay off, inverter check function doesn't activate.

8.3 Contents of troubleshooting

(a) List of inspection displays

1) Indoor and outdoor units

Remote control error code	7-segment display	Name of inspection	Classification	Page
E1	—	Remote control communication error	Communication error	146
E2	—	Duplicated indoor unit address	Address setting error	147
E3	—	Outdoor unit signal line error	Address pairing setting error	148
E5	—	Communication error during operation	Communication error	149
E6	—	Indoor unit heat exchanger temperature sensor anomaly (Thi-R)	Sensor wire breakage	150
E7	—	Indoor return air temperature sensor anomaly (Thi-A)	Sensor wire breakage	151
E9	—	Drain trouble	System error	152
E10	—	Excessive number of indoor units (more than 17 units) by controlling one remote control	Communication error	153
E11	—	Address setting error of indoor units	Address setting error	154
E12	—	Address setting error by mixed setting method	Address setting error	155
E16	—	Indoor DC fan motor anomaly (FDT, FDTC, FDK series)	DC fan motor error	156
	—	Indoor DC fan motor anomaly		157
	—	Indoor DC fan motor anomaly		158
E18	—	Address setting error of master and slave indoor units	Address setting error	159
E19	—	Indoor unit operation check, drain pump motor check mode anomaly	Setting error	160
E20	—	Indoor DC fan motor rotation speed anomaly (FDT, FDTC, FDK series)	DC fan motor error	161
	—	Indoor DC fan motor rotation speed anomaly		162
	—	Indoor DC fan motor rotation speed anomaly		163
E28	—	Remote control temperature sensor anomaly (The)	Sensor wire breakage	164
E31	E31	Duplicated outdoor unit address No.	Address setting error	165
E32	E32	Open of Phase (L1,L2,N) on power source at primary side	Site setting error	166
E36	E36-1, 2	Discharge pipe temperature error (Tho-D1,D2)	System error	167
E37	E37-1, 2, 3, 4 E37-5, 6	Outdoor unit heat exchanger temperature sensor (Tho-R) and subcooling coil temperature sensor (Tho-SC, -H) anomaly	Sensor wire breakage	168
E38	E38	Outdoor air temperature sensor anomaly (Tho-A)	Sensor wire breakage	169
E39	E39-1, 2	Discharge pipe temperature sensor anomaly (Tho-D1, D2)	Sensor wire breakage	170
E40	E40	High pressure anomaly (63H1-1, 2 activated)	System error	171
E42	E42-1, 2	Current cut (CM1, CM2)	System error	172
E43	E43-1 E43-2	Excessive number of indoor units connected, excessive total capacity of connection	Site setting error	173
E44	E44-1, 2	Liquid flooding anomaly (CM1,2)	System error	174
E45	E45-1, 2	Communication error between inverter PCB and outdoor unit control (PCB)	Communication error	175
E46	E46	Mixed address setting methods coexistent in same network	Address setting error	176
E48	E48-1 E48-2	Outdoor DC fan motor anomaly	DC fan motor error	177-178
E49	E49	Low pressure anomaly	System error	179
E53/E55	E53/ E55-1, 2	Suction pipe temperature sensor anomaly (Tho-S), Under-dome temperature sensor anomaly (Tho-C1, C2)	Sensor wire breakage	180
E54	E54-1 E54-2	High pressure sensor anomaly (PSH)/Low pressure sensor anomaly (PSL)	Sensor wire breakage	181
E56	E56-1, 2	Heat dissipation fins temperature sensor anomaly (Tho-P1, P2)	Sensor wire breakage	182
E58	E58-1, 2	Anomalous compressor by loss of synchronism	System error	183
E59	E59-1, 2	Compressor startup failure (CM1, CM2)	System error	184
E61	E61-1, 2	Communication error between the master unit and slave units	System error	185
E63	E63	Emergency stop	Site setting error	186

2) Option control in-use

SL1N-E SL2NA-E SL4-AE/BE		Indoor unit control PCB		Outdoor unit control PCB		Location of trouble	Description of trouble	Repair method
Error code	Red LED	Red LED	Green LED	Red LED	Green LED			
E75	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Keep flashing	SL1N-E SL2NA-E SL4-AE/BE	• Communication error (Defective communication circuit on the main unit of SL1N-E, SL2NA-E or SL4-AE/BE)	Replacement

(b) Troubleshooting

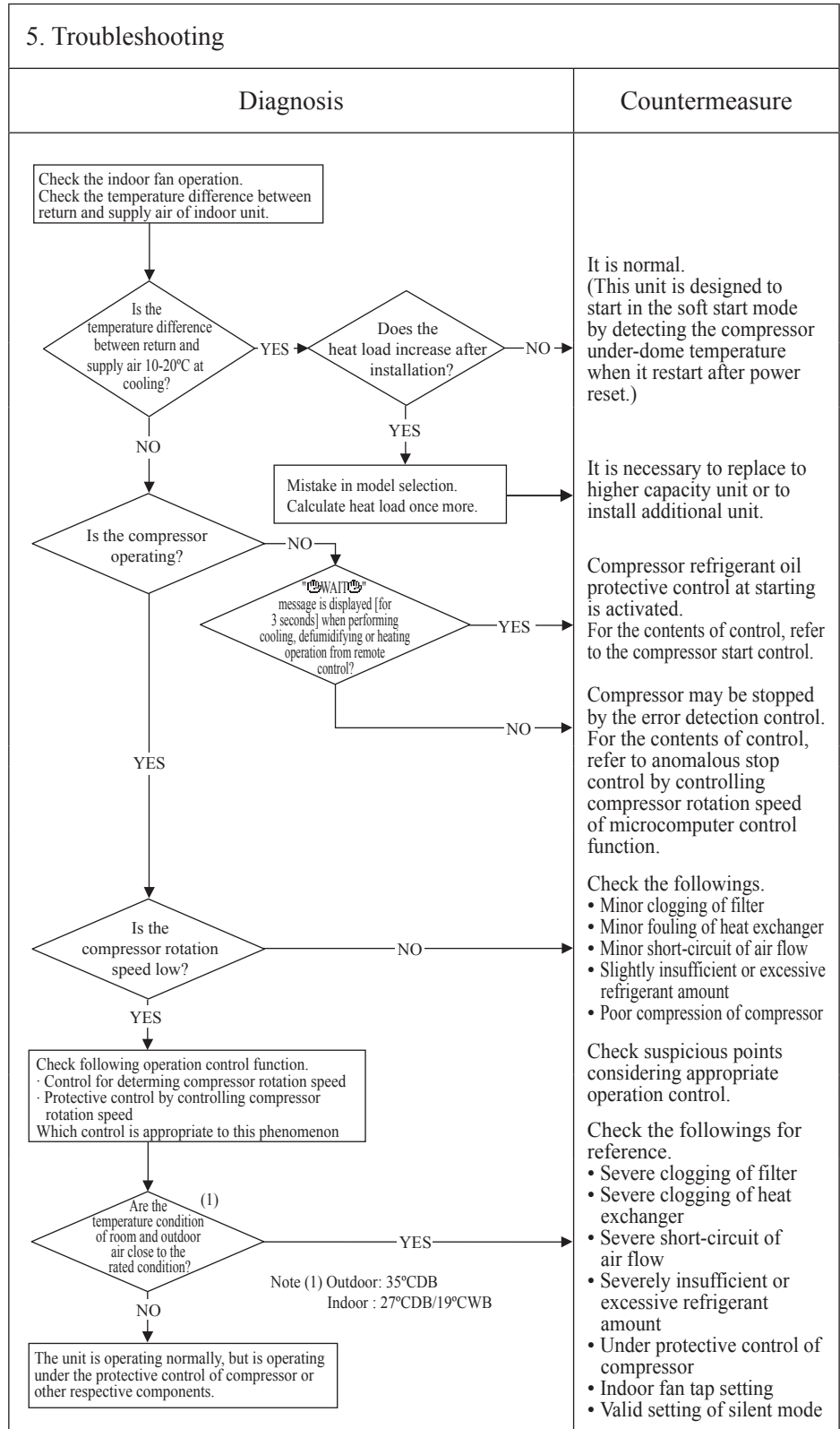
Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Operates but does not cool
	Indoor	Keeps flashing	Stays Off	
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model
All models

2. Error detection method

3. Condition of error displayed

4. Presumable cause
<ul style="list-style-type: none"> • Poor compression of compressor • Expansion valve anomaly



Note:

Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Operates but does not heat
	Indoor	Keeps flashing	Stays Off	
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model
All models
2. Error detection method
3. Condition of error displayed
4. Presumable cause
<ul style="list-style-type: none"> • 4-way valve anomaly • Poor compression of compressor • Expansion valve anomaly

5. Troubleshooting	
Diagnosis	Countermeasure
<p>Check the indoor fan operation Check the temperature difference between return and supply air of indoor unit</p> <pre> graph TD Start[Check indoor fan operation and temperature difference] --> D1{Is the temperature difference between return and supply air 10-30°C at heating?} D1 -- YES --> D2{Does the heat load increase after installation?} D1 -- NO --> D3{Is the compressor operating?} D2 -- YES --> B1[Mistake in model selection. Calculate heat load once more.] D2 -- NO --> D3 B1 --> C1[It is necessary to replace to higher capacity unit or to install additional unit.] D3 -- NO --> D4{Is the compressor rotation speed low?} D3 -- YES --> D5{Are the temperature condition of room and outdoor air close to the rated condition?} D4 --> B2[Compressor refrigerant oil protective control at starting is activated. For the contents of control, refer to the compressor start control.] D4 --> B3[Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputer control function.] D5 -- YES --> B4[Check suspicious points considering appropriate operation control.] D5 -- NO --> B5[The unit is operating normally, but is operating under the protective control of compressor or other respective components] </pre> <p>Check following operation control function. · Control for determining compressor rotation speed · Protective control by controlling compressor rotation speed Which control is appropriate to this phenomenon</p> <p>Are the temperature condition of room and outdoor air close to the rated condition? (1)</p> <p>Note (1) Outdoor: 7°CDB Indoor: 20°CDB</p>	<p>It is normal. (This unit is designed to start in the soft start mode by detecting the compressor under-dome temperature when it restart after power reset.)</p> <p>It is necessary to replace to higher capacity unit or to install additional unit.</p> <p>Compressor refrigerant oil protective control at starting is activated. For the contents of control, refer to the compressor start control.</p> <p>Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputer control function.</p> <p>Check the followings. • Minor clogging of filter • Minor fouling of heat exchanger • Minor short-circuit of air flow • Slightly insufficient or excessive refrigerant amount • Poor compression of compressor</p> <p>Check suspicious points considering appropriate operation control.</p> <p>Check the followings for reference. • Severe clogging of filter • Severe clogging of heat exchanger • Severe short-circuit of air flow • Severely insufficient or excessive refrigerant amount • Under protective control of compressor • Indoor fan tap setting • Valid setting of silent mode</p>

Note:

Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Earth leakage breaker activated
	Indoor	Stays Off	Stays Off	
	Outdoor	Stays Off	Stays Off	

1. Applicable model All models	5. Troubleshooting		
2. Error detection method	Diagnosis	Countermeasure	
3. Condition of error displayed	<pre> graph TD D1{Are the insulation resistance and resistance between terminals (1) of compressor OK?} D2{Is insulation of respective harnesses OK?} D3{Is any harness bitten between panel and casing or etc.?} P1[Check the outdoor unit grounding wire and earth leakage breaker.] P2[Check of the outdoor unit grounding wire and earth leakage breaker] C1[Replace compressor.*] C2[Secure insulation resistance.] C3[Secure insulation resistance.] D1 -- NO --> C1 D1 -- YES --> D2 D2 -- NO --> C2 D2 -- YES --> D3 D3 -- YES --> C3 D3 -- NO --> P1 P1 --> P2 </pre> <p style="font-size: small;"> (1) 0.309Ω or more at 20°C (Models FDC280, 335,475-560KXZE2) 0.264Ω or more at 20°C (Models FDC400, 450KXZE2) </p> <p> * Insulation resistance of compressor • Immediately after installation or when the unit has been left for long period without power source, the insulation resistance may drop to a few MkΩ because of refrigerant migrated in the compressor. When the earth leakage breaker is activated at lower insulation resistance, check the following points. ① 6 hours after power ON, check if the insulation resistance recovers to normal. When power ON, crankcase heater heat up compressor and evaporates the refrigerant migrated in the compressor. ② Check if the earth leakage breaker is conformed to higher harmonic regulation or not. Since the unit has inverter, it is necessary to use components conformed to high harmonic regulation in order to prevent malfunction of earth leakage breaker. </p>		
4. Presumable cause <ul style="list-style-type: none"> • Compressor anomaly • Noise 			

Note:

Error code Remote control: None 7-segment display: -	LED	Green	Red	Content <h2 style="text-align: center;">Excessive noise/vibration (1/3)</h2>
	Indoor	-	-	
	Outdoor	-	-	

<h3>1. Applicable model</h3> <p>All models</p>	<h3>5. Troubleshooting</h3>		
<h3>2. Error detection method</h3>	<h4>Diagnosis</h4>		<h4>Countermeasure</h4>
<h3>3. Condition of error displayed</h3>	<pre> graph TD Q1{Does noise/vibration occur during or soon after stopping operation of air-conditioner?} Q2{[Installation work] Does the noise/vibration occur not only from the air-conditioner but also from entire building?} Q3{Does the installation of indoor/outdoor unit have looseness?} Q4{Are pipes touching the wall and etc.?} Q5{[Units] Does noise/vibration occur when only the fan is operating?} Q6{Is fan or louver touching other components?} End[To 2/3] Q1 -- NO --> CM1[If excessive noise/vibration persists when sufficient time has elapsed after stopping the unit, it is considered that the air-conditioner is not the source.] Q1 -- YES --> Q2 Q2 -- YES --> Q3 Q2 -- NO --> Q4 Q3 -- YES --> CM2[Check the installed condition carefully, and correct the installed position or insert rubber cushions into the gap or take other measure in order to eliminate looseness.] Q3 -- NO --> Q4 Q4 -- YES --> CM3[Prevent the vibration from transmitting to wall and etc by fixing pipes on the wall tightly or wrapping rubber cushion around the pipe which goes through the hole in the wall or applying other appropriate means.] Q4 -- NO --> CM4[Strength of ceiling wall, floor, etc. may be insufficient. Review the installation place or apply reinforcement to increase the strength.] Q5 -- YES --> Q6 Q5 -- NO --> CM5[When the heat exchanger or filter is clogged, clean them.] Q6 -- YES --> CM6[Check for leaning of installed unit or incorrect mounting of fan, louver or motor, and then specify the contacting point and correct it.] Q6 -- NO --> CM5 End --> CM5 </pre>		<p>If excessive noise/vibration persists when sufficient time has elapsed after stopping the unit, it is considered that the air-conditioner is not the source.</p> <p>Check the installed condition carefully, and correct the installed position or insert rubber cushions into the gap or take other measure in order to eliminate looseness.</p> <p>Prevent the vibration from transmitting to wall and etc by fixing pipes on the wall tightly or wrapping rubber cushion around the pipe which goes through the hole in the wall or applying other appropriate means.</p> <p>Strength of ceiling wall, floor, etc. may be insufficient. Review the installation place or apply reinforcement to increase the strength.</p> <p>Check for leaning of installed unit or incorrect mounting of fan, louver or motor, and then specify the contacting point and correct it.</p> <p>When the heat exchanger or filter is clogged, clean them.</p> <p>In case that the unit is installed at the site where background noise is very low, even the low level noise from indoor unit like as refrigerant flow noise can be heard, but it is normal. Before installation, check for background noise. If background noise is very low, convince client prior to installation.</p>
<h3>4. Presumable cause</h3> <ol style="list-style-type: none"> ① Improper installation work <ul style="list-style-type: none"> • Improper vibration-proof work at installation • Insufficient strength of mounting surface ② Anomaly of product <ul style="list-style-type: none"> • Before/after shipment from factory ③ Improper adjustment during commissioning <ul style="list-style-type: none"> • Excessive/insufficient refrigerant. 			

Note:

Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Excessive noise/vibration (2/3)
	Indoor	-	-	
	Outdoor	-	-	

1. Applicable model
All models
2. Error detection method
3. Condition of error displayed
4. Presumable cause

5. Troubleshooting	
Diagnosis	Countermeasure
<pre> graph TD Start([From 1/3]) --> Q1{[Unit] Does noise/vibration occur when the cooling/ heating operation is performing normally?} Q1 -- NO --> End1([To 3/3]) Q1 -- YES --> Q2{Are the pipes contacting with the casing?} Q2 -- YES --> C1[Rearrange the piping to avoid contact with the casing.] Q2 -- NO --> Q3{Is continuous hissing or roaring sound occurred?} Q3 -- YES --> C2[Noise/vibration is generated when the refrigerant gas or liquid flows through inside of piping of air-conditioner. It is likely to occur particularly during cooling or defrost operation in the heating mode. It is normal.] Q3 -- NO --> Q4{Is hissing sounds occurred at the startup or stopping?} Q4 -- YES --> C3[The noise/vibration occurs when the refrigerant starts or stops flowing. It is normal.] Q4 -- NO --> Q5{Is blowing sound occurred at the start/stop of defrost operation during heating mode?} Q5 -- YES --> C4[When the defrost operation starts or stops during heating mode, the refrigerant flow is reversed due to switching 4-way valve. This causes a large change in pressure which produces a blowing sound. It may also accompany the hissing sound as mentioned above. This is normal.] Q5 -- NO --> Q6{Is cracking noise occurred during heating operation?} Q6 -- YES --> C5[After the start or stop of heating operation or during defrost operation, abrupt changes in temperature cause resin parts to shrink or expand. This is normal.] Q6 -- NO --> Q7{Is hissing noise occurred during cooling operation or after operation stopped?} Q7 -- YES --> C6[It is the sound produced by the drain pump that discharges drain from indoor unit. The pump continues to run for 5 (FDU10HP:20)minutes after stopping the cooling operation. This is normal.] Q7 -- NO --> C7[Apply the damper sealant at the place considered to be the sources such as the pressure reducing mechanism. (Expansion valve, capillary tube, etc.)] </pre>	<p>Rearrange the piping to avoid contact with the casing.</p> <p>Noise/vibration is generated when the refrigerant gas or liquid flows through inside of piping of air-conditioner. It is likely to occur particularly during cooling or defrost operation in the heating mode. It is normal.</p> <p>The noise/vibration occurs when the refrigerant starts or stops flowing. It is normal.</p> <p>When the defrost operation starts or stops during heating mode, the refrigerant flow is reversed due to switching 4-way valve. This causes a large change in pressure which produces a blowing sound. It may also accompany the hissing sound as mentioned above. This is normal.</p> <p>After the start or stop of heating operation or during defrost operation, abrupt changes in temperature cause resin parts to shrink or expand. This is normal.</p> <p>It is the sound produced by the drain pump that discharges drain from indoor unit. The pump continues to run for 5 (FDU10HP:20)minutes after stopping the cooling operation. This is normal.</p> <p>Apply the damper sealant at the place considered to be the sources such as the pressure reducing mechanism. (Expansion valve, capillary tube, etc.)</p>

Note:

Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Excessive noise/vibration (3/3)
	Indoor	-	-	
	Outdoor	-	-	

<p>1. Applicable model</p> <p>All models</p>	<p>5. Troubleshooting</p>	
<p>2. Error detection method</p>	<p style="text-align: center;">Diagnosis</p> <div style="text-align: center;"> <p>From 2/3</p> <p>[Adjustment during commissioning]</p> <p>Does noise/vibration occur when the cooling/heating operation is performed under anomalous condition?</p> <p>YES →</p> </div>	<p style="text-align: center;">Countermeasure</p> <p>If insufficient cooling/heating problem happens due to anomalous operating conditions at cooling/heating, followings are suspicious.</p> <ul style="list-style-type: none"> • Excessive charge amount of refrigerant • Insufficient charge amount of refrigerant • Intrusion of air, nitrogen, etc. <p>In such case, it is necessary to recover refrigerant, vacuum-dry and recharge refrigerant.</p> <p>* Since there could be many causes of noise/vibration, the above may not cover all. In such case, check the conditions when, where, how the noise/vibration occurs according to following check points and ask our consultation.</p> <ul style="list-style-type: none"> • Indoor/outdoor unit • Cooling/heating/fan mode • Startup/stop/during operation • Operating condition (Indoor/outdoor air temperatures and pressures) • Time it occurred • Operation data retained by remote control or Mente PC such as compressor rotation speed, heat exchanger temperature, EEV opening degree and etc. • Tone (If available, record the noise) • Any other anomalies
<p>3. Condition of error displayed</p>	<p>4. Presumable cause</p>	

Note:

Error code Remote control: None 7-segment display: -	LED	Green	Red	Content <h2 style="text-align: center;">Louver motor anomaly</h2>
	Indoor	Keeps flashing	Stays Off	
	Outdoor	Keeps flashing	Stays Off	

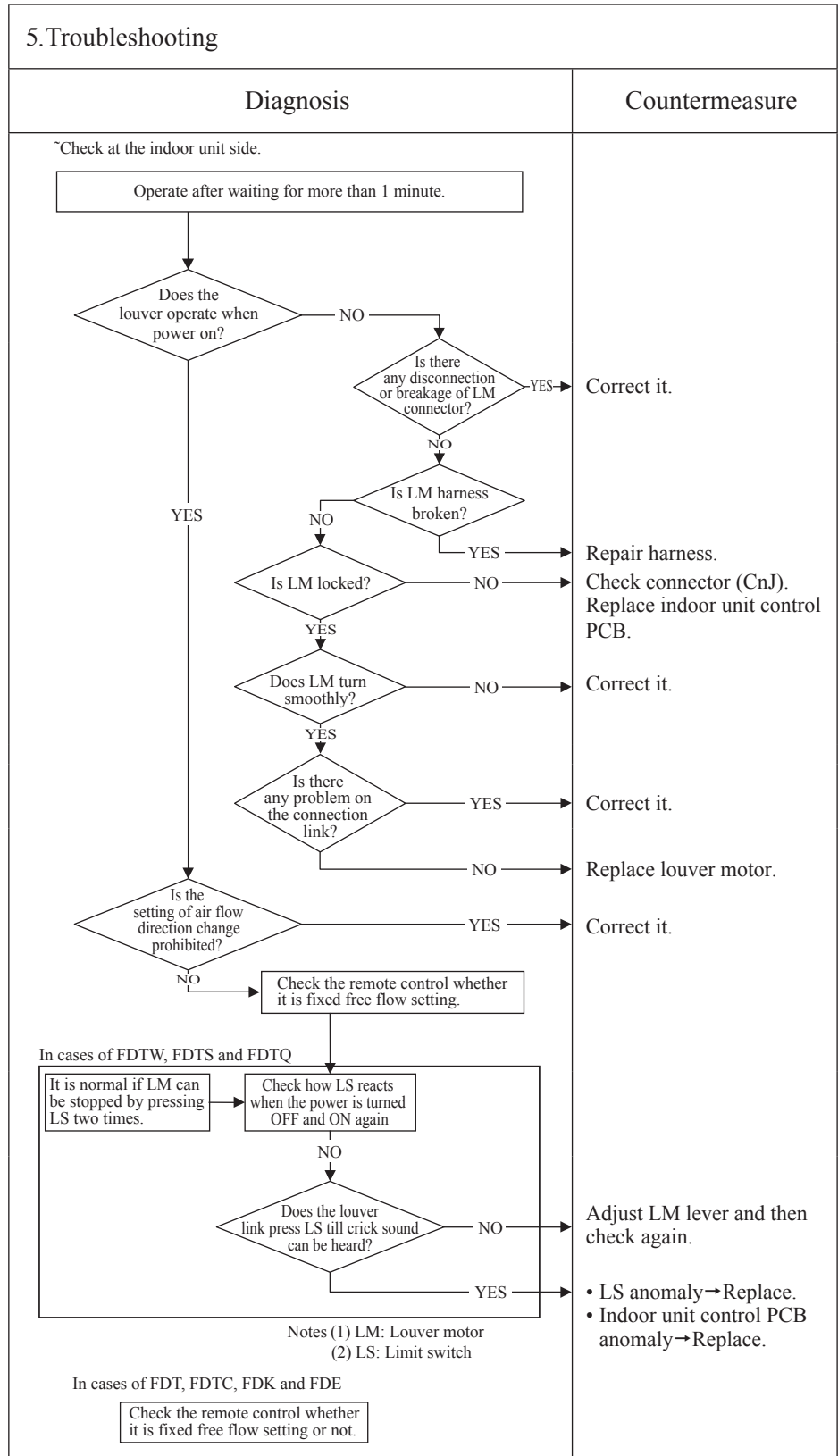
1. Applicable model

FDT, FDTC, FDTW, FDTS, FDTQ, FDK, FDE series

2. Error detection method

3. Condition of error displayed

- 4. Presumable cause**
- Louver motor anomaly
 - Disconnection/breakage of LM harness
 - Limit switch anomaly
 - Indoor unit control PCB anomaly



Note:

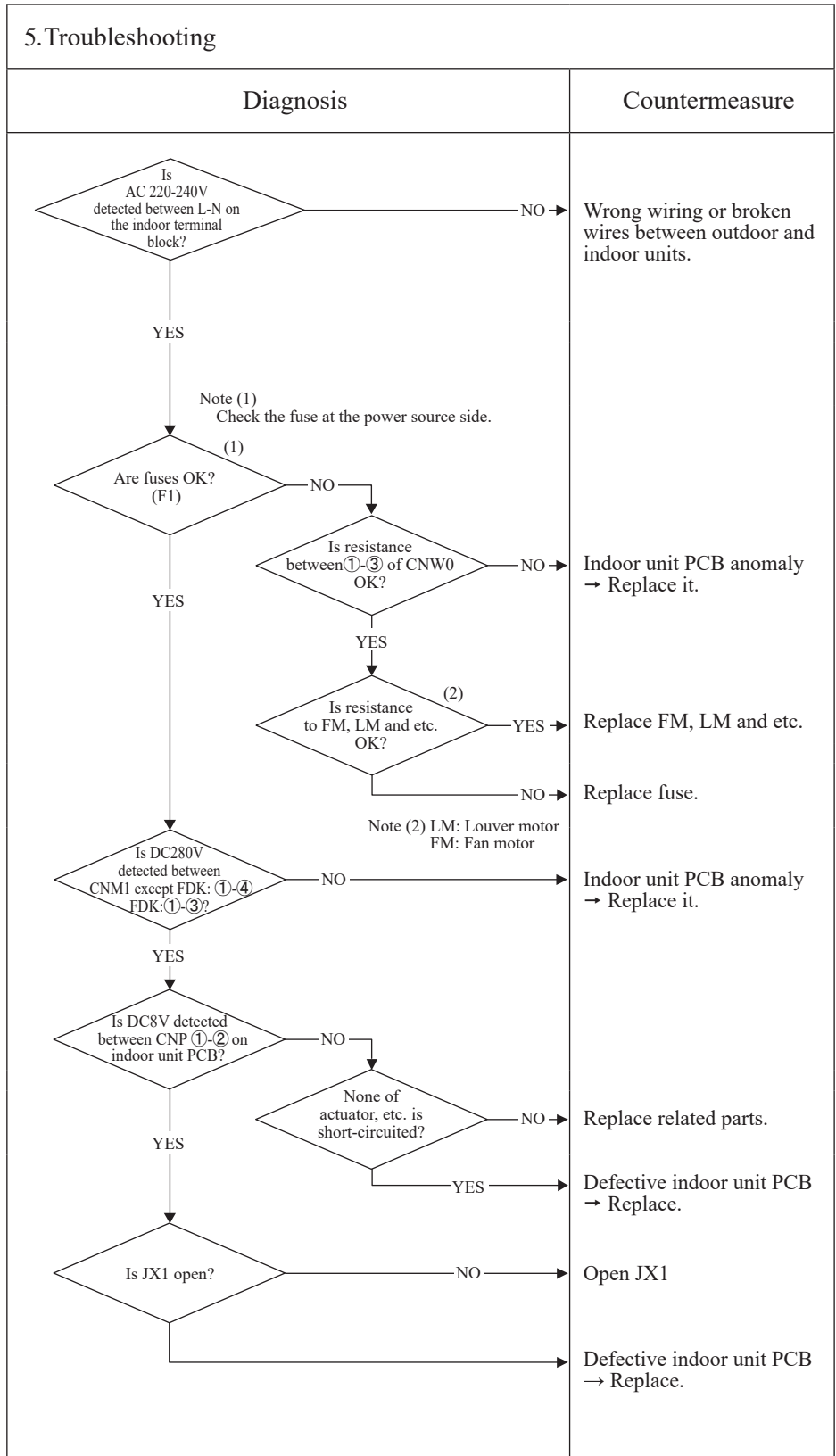
Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Power source system anomaly (Power source to indoor unit PCB)
	Indoor	Stays OFF	Stays OFF	
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model
FDT, FDTC, FDK series only

2. Error detection method

3. Condition of error displayed

4. Presumable cause
<ul style="list-style-type: none"> • Wrong connection or breakage of connecting wires • Blown fuse • Fan motor anomaly • Indoor unit PCB anomaly • Broken harness • Louver motor anomaly



Note:

Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Power source system anomaly (Power source to indoor unit PCB)
	Indoor	Stays Off	Stays Off	
	Outdoor	Stays Off	2 times flash	

1. Applicable model See note.
2. Error detection method
3. Condition of error displayed
4. Presumable cause <ul style="list-style-type: none"> • Wrong connection or breakage of connecting wires • Blown fuse • Transformer anomaly • Indoor unit power PCB anomaly • Broken harness • Indoor unit control PCB anomaly • Fan motor anomaly • Louver motor anomaly

5. Troubleshooting	
Diagnosis	Countermeasure

Note: A group: FDTW, FDTS, FDU45-160, FDUM, FDU71, FDE series
 B group: FDTQ, FDUT15-56, FDUH, FDFL, FDFU series

Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Power source system anomaly (Power source to indoor unit PCB)
	Indoor	Stays OFF	Stays OFF	
	Outdoor	Keeps flashing	2-time flash	

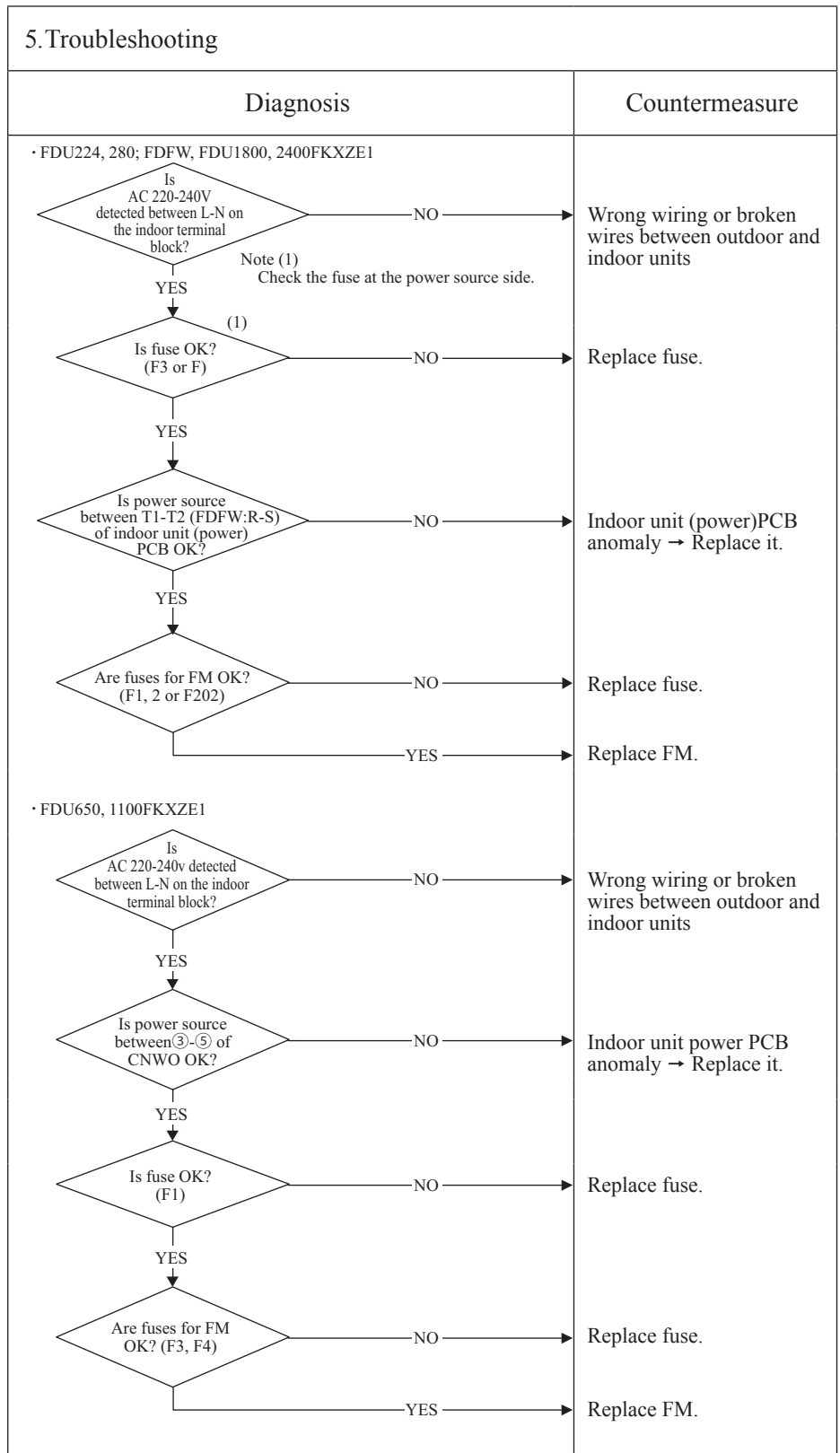
1. Applicable model

FDU224, 280
 FDFW
 FDU650-2400FKXZE1

2. Error detection method

3. Condition of error displayed

- 4. Presumable cause**
- Wrong connection or breakage of connecting wires
 - Blown fuse
 - Fan motor anomaly
 - Indoor unit power PCB anomaly
 - Broken harness
 - Indoor unit control PCB anomaly



Note:

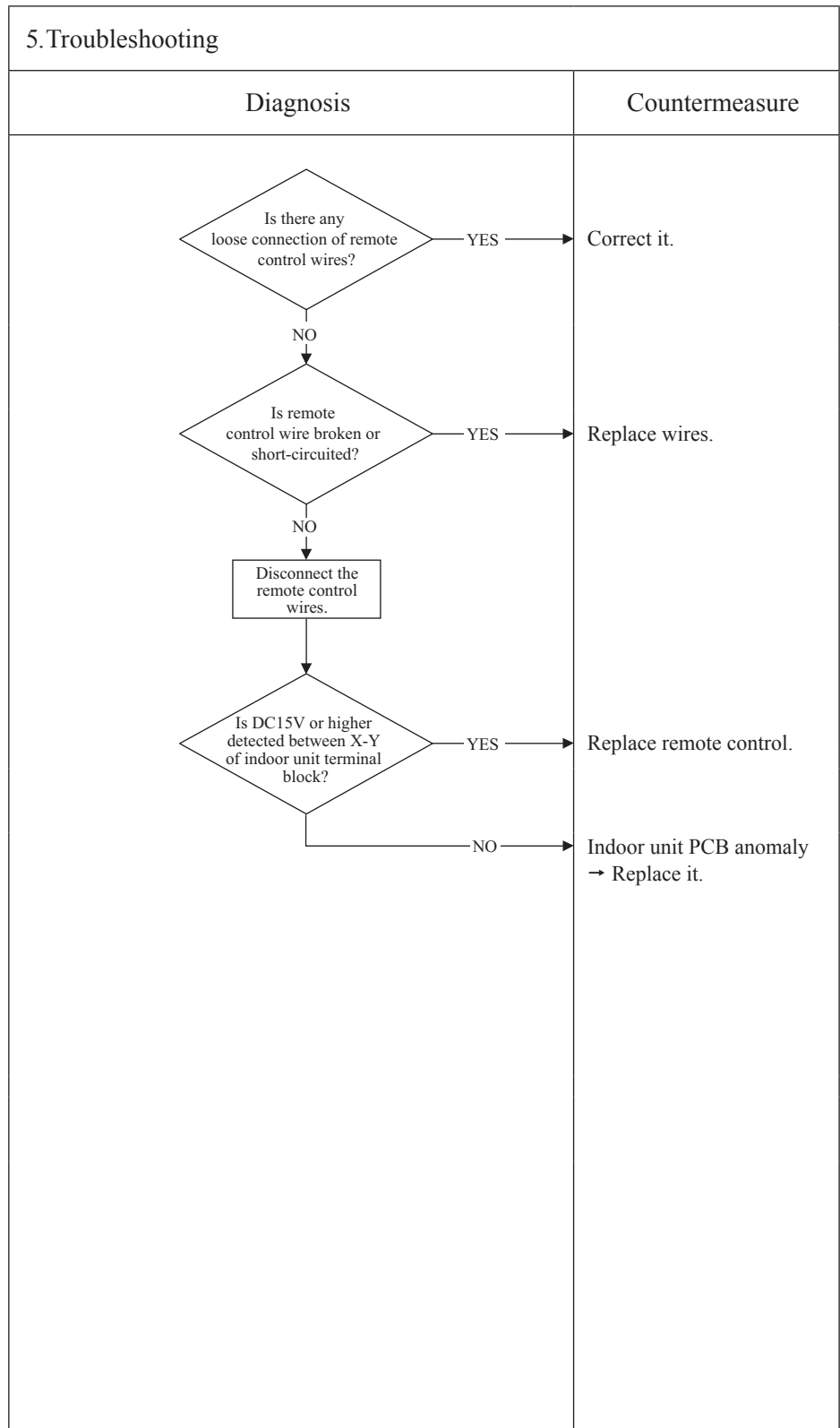
Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Power source system error (Power source to remote control)
	Indoor	Keeps lighting	3-time flash	
	Outdoor	Keeps lighting	2-time flash	

1. Applicable model
 FDT, FDTC series

2. Error detection method

3. Condition of error displayed

- 4. Presumable cause**
- Remote control wire breakage/short-circuit
 - Remote control anomaly
 - Indoor unit PCB anomaly
 - Broken harness



Note:

Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Power source system error (Power source to remote control)
	Indoor	Keeps flashing	3-time flash	
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model See note.
2. Error detection method
3. Condition of error displayed
4. Presumable cause <ul style="list-style-type: none"> • Remote control wire breakage/short-circuit • Remote control anomaly • Indoor unit power PCB anomaly • Broken harness • Indoor unit control PCB anomaly • Transformer anomaly

5. Troubleshooting	
Diagnosis	Countermeasure

Note: A group: FDTW, FDTS, FDU45-160, FDUM, FDU71, FDE series
 B group: FDTQ, FDUT15-56, FDUH, FDFL, FDFU series

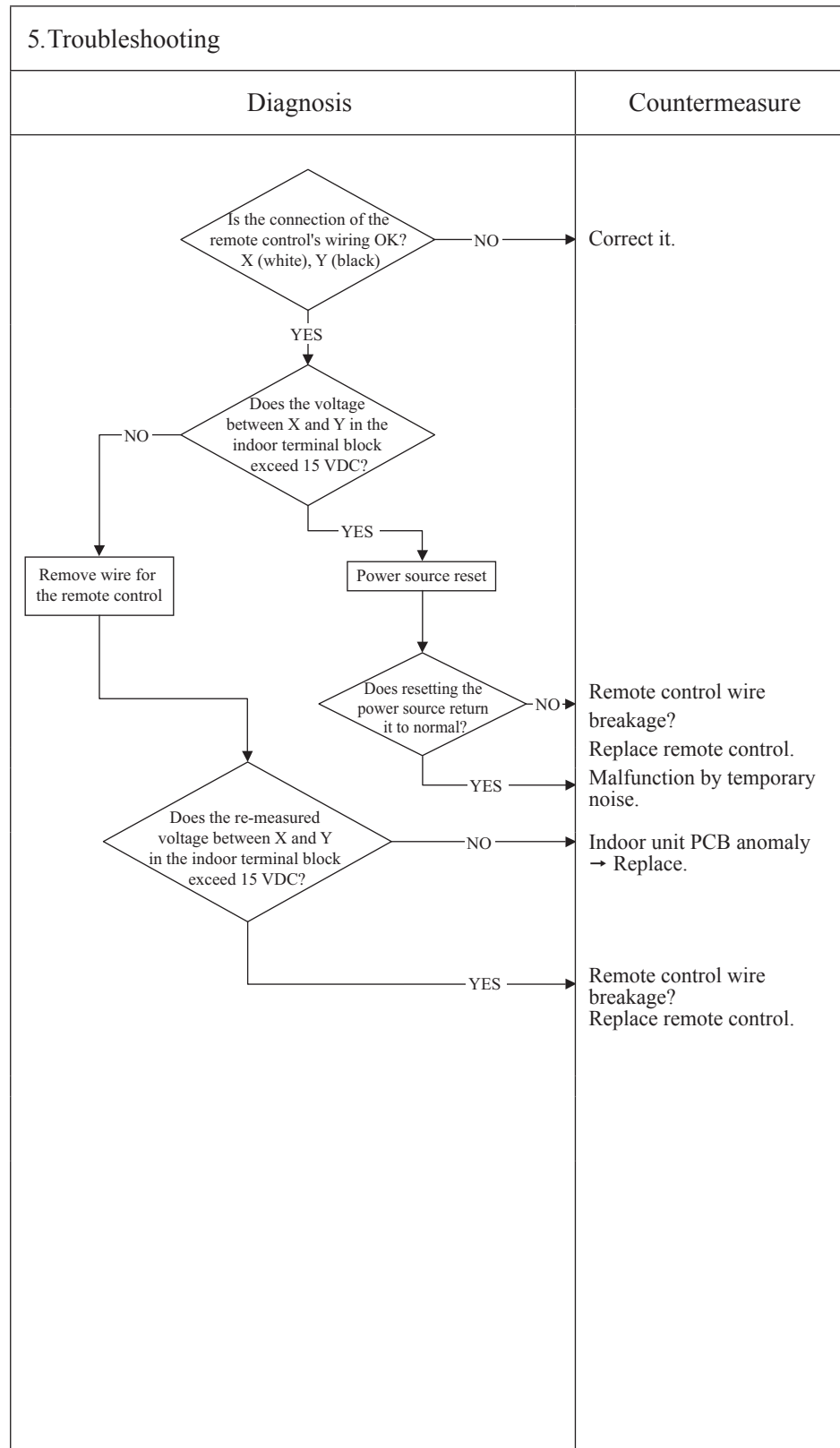
Error code Remote control: None 7-segment display: -	LED	Green	Red	Content Power source system error (Power source to remote control)
	Indoor	Keeps flashing	3-time flash	
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model
FDK series only

2. Error detection method

3. Condition of error displayed

- 4. Presumable cause**
- Remote control wire breakage/short-circuit
 - Defective remote control
 - Malfunction by noise
 - Indoor unit PCB anomaly



Note:

Error code	LED	Green	Red	Content
Remote control: WAIT 7-segment display: -	Indoor	Keeps flashing	Stays Off	WAIT (1)
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model

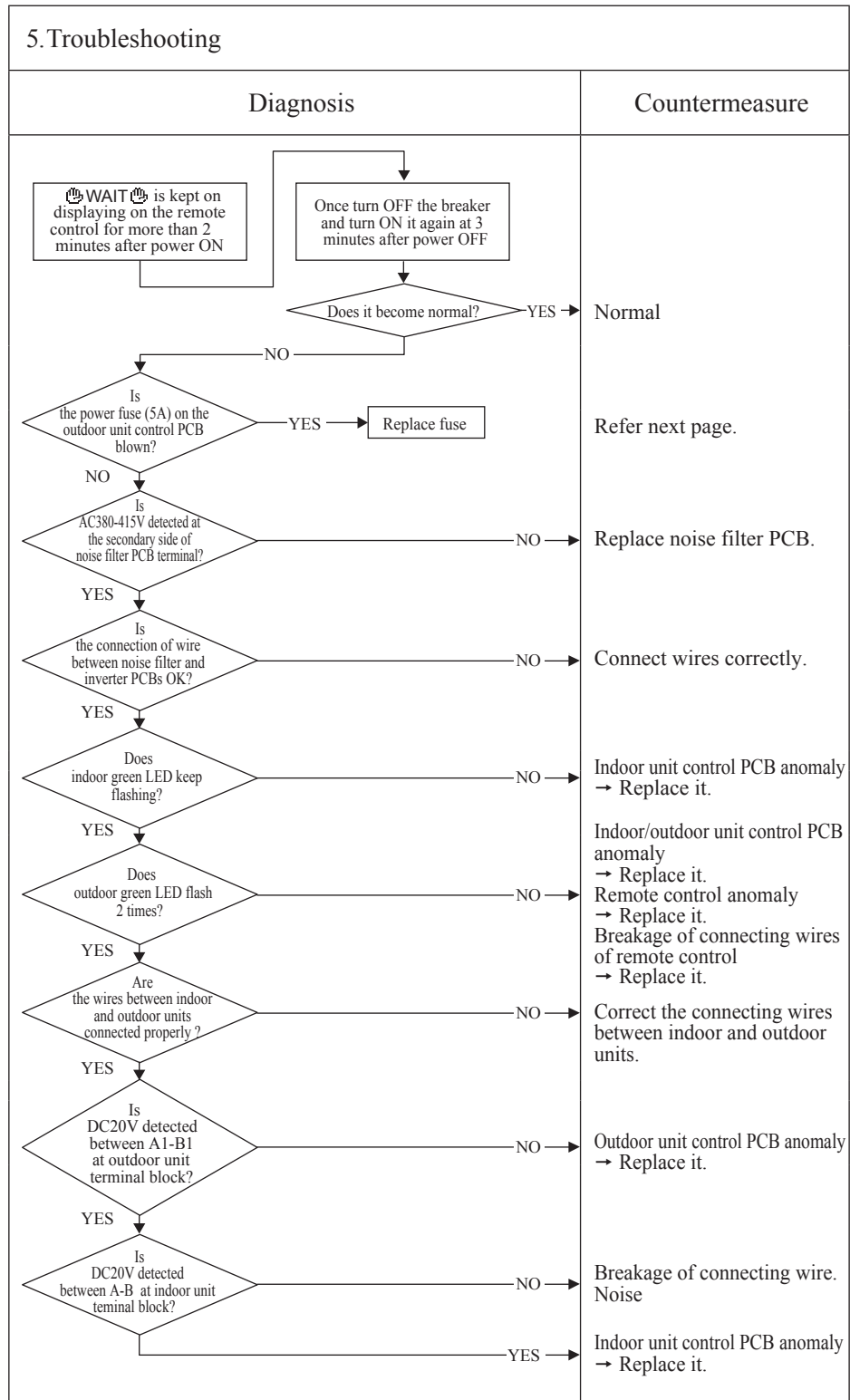
All models

(In case that WAIT is kept on displaying on the remote control for more than 2 minutes after power ON)

2. Error detection method

3. Condition of error displayed

- 4. Presumable cause**
- Fuse blown
 - Noise filter anomaly
 - Anomalous connection of wire between PCBs
 - Indoor unit control PCB anomaly
 - Remote control anomaly
 - Breakage of connecting wires of remote control
 - Outdoor unit control PCB anomaly



Note: (1) When anomaly occurs during establishing communication between indoor and outdoor unit, error code E5 is displayed (outdoor red LED flash 2-time)
In case of E5, the way of troubleshooting is same as above mentioned (except for checking of connecting wire)
When reset the power after E5 occurs, if this anomaly recurs, WAIT is displayed on remote control. If power ON/OFF is repeated in a short period (within 1 minute), WAIT may be displayed. In such case, please wait for 3 minutes after the power breaker OFF.

(2) If any error is detected 30 minutes after displaying "WAIT" on the remote control, the display changes to "INSPECT I/U".

Error code Remote control: 🗄️ WAIT 🗄️ 7-segment display: -	LED	Green	Red	Content 🗄️ WAIT 🗄️ (2)
	Indoor	Keeps flashing	Stays Off	
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model

All models

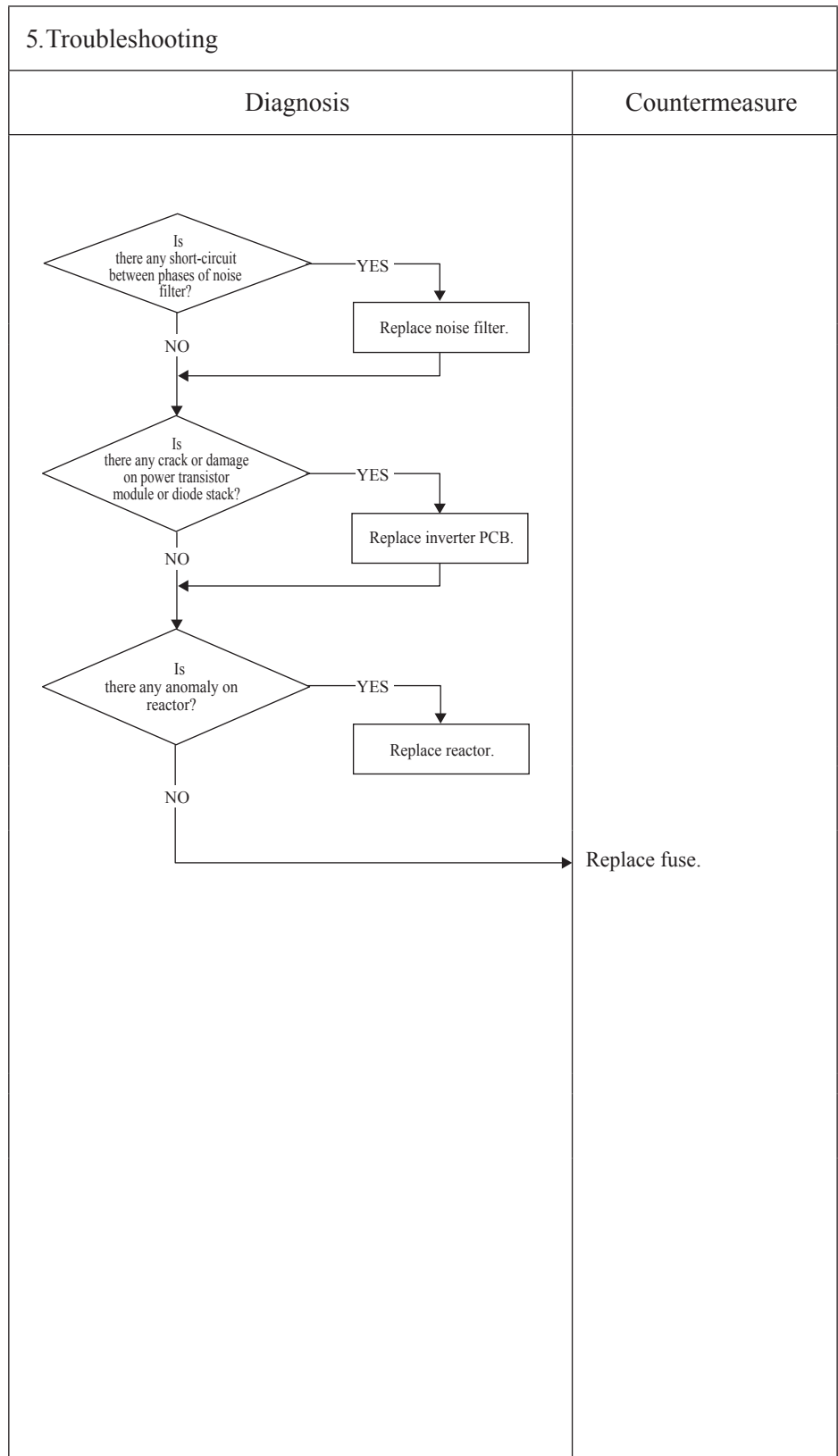
(In case of fuse blown, how to check the inverter before replacement of fuse)

2. Error detection method

3. Condition of error displayed

4. Presumable cause

- Fuse blown
- Noise filter anomaly
- Inverter anomaly
- Reactor anomaly



Note:

Error code Remote control: WAIT 7-segment display: -	LED	Green	Red	Content
	Indoor	Keeps flashing	Stays Off	
	Outdoor	Keeps flashing	2-time flash	

WAIT (3)

1. Applicable model All models (No display on the remote control after power ON)
2. Error detection method
3. Condition of error displayed
4. Presumable cause <ul style="list-style-type: none"> • Fuse blown • Anomalous connection of wire between PCBs • Indoor unit control PCB anomaly • Remote control anomaly • Breakage of connecting wires of remote control • Outdoor unit control PCB anomaly • Transformer anomaly

5. Troubleshooting
Diagnosis
Countermeasure

Note:

Error code Remote control: WAIT 7-segment display: -	LED	Green	Red	Content
	Indoor	Keeps flashing	Stays Off	
	Outdoor	Keeps flashing	2-time flash	

WAIT (4)

1. Applicable model All models (In case that WAIT is kept on displaying on the remote control for more than 2 minutes after power ON)
2. Error detection method
3. Condition of error displayed
4. Presumable cause <ul style="list-style-type: none"> • Anomalous connection of wire between PCBs • Indoor unit control PCB anomaly • Remote control anomaly • Breakage of connecting wires of remote control • Outdoor unit control PCB anomaly

5. Troubleshooting	
Diagnosis	Countermeasure
	Refer next page. Indoor unit control PCB anomaly → Replace it. Indoor unit control PCB anomaly → Replace it. Remote control anomaly → Replace it. Breakage of connecting wires of remote control → Replace it. Correct the connecting wires between indoor and outdoor units. Outdoor unit control PCB anomaly → Replace it. Breakage of connecting wire Noise Indoor unit control PCB anomaly → Replace it.

Note:

Error code Remote control: WAIT 7-segment display: -	LED	Green	Red	Content
	Indoor	Stays OFF	Stays Off	
	Outdoor	Stays OFF	Stays Off	

WAIT (5)

1. Applicable model All models (In case that LED on outdoor unit control PCB stays OFF)
2. Error detection method
3. Condition of error displayed
4. Presumable cause <ul style="list-style-type: none"> Noise filter anomaly Anomalous connection of wire between PCBs Outdoor unit control PCB anomaly Malfunction by noise Reactor anomaly Outdoor fan anomaly

5. Troubleshooting	Diagnosis	Countermeasure
	<p>In case that LED on outdoor unit control PCB stays OFF</p> <pre> graph TD A[A] --> B[Once turn OFF the breaker and turn ON it again at 3 minutes after power OFF] B --> C{Does it become normal?} C -- YES --> D[Normal (Malfunction by temporary noise)] C -- NO --> E{Is power fuse (5A) on the outdoor unit control PCB blown?} E -- YES --> F[Check inverter before replacement of S2C] F --> B E -- NO --> G{Is AC380-415V detected at secondary side of noise filter?} G -- YES --> H{Are connecting wires between noise filter and inverter PCB connected properly?} H -- NO --> I[Connect the connecting wire properly.] H -- YES --> J{Is the connection of connecting wire of reactor OK?} J -- NO --> K[Correct connection. (In case of breakage of wire replace it)] J -- YES --> L{Is there any anomaly on outdoor fan motor?} L -- NO --> M[Outdoor unit control PCB anomaly -> Replace it.] L -- YES --> N[Outdoor fan motor anomaly -> Replace it.] G -- NO --> O[Replace noise filter.] </pre>	Refer next page. Replace noise filter. Connect the connecting wire properly. Correct connection. (In case of breakage of wire replace it) Outdoor unit control PCB anomaly → Replace it. Outdoor fan motor anomaly → Replace it.

Note:

Error code Remote control: 🗸 WAIT 🗸 7-segment display: -	LED	Green	Red	Content
	Indoor	Stays Off	Stays Off	
	Outdoor	Stays Off	Stays Off	

🗸 WAIT 🗸 (6)

1. Applicable model All models (In case of fuse blown, how to check the inverter before replacement of fuse)
2. Error detection method
3. Condition of error displayed
4. Presumable cause <ul style="list-style-type: none"> • Fuse blown • Noise filter anomaly • Inverter anomaly • Reactor anomaly • Electrolytic capacitor anomaly

5. Troubleshooting	
Diagnosis	Countermeasure
<pre> graph TD B[B] --> D1{Is there any short-circuit between phases of noise filter?} D1 -- YES --> C1[Replace noise filter.] D1 -- NO --> D2{Is there any short-circuit between phases at input terminal of inverter PCB?} D2 -- YES --> C2[Replace inverter PCB.] D2 -- NO --> D3{Is there any crack or damage on power transistor module or diode stack?} D3 -- YES --> C2 D3 -- NO --> D4{Is there any anomaly on reactor?} D4 -- YES --> C3[Replace reactor.] D4 -- NO --> D5{Is there any anomaly on electrolytic capacitor?} D5 -- YES --> C4[Replace electrolytic capacitor.] D5 -- NO --> C5[Replace power fuse.] </pre>	

Note:

Error code Remote control: [No display] 7-segment display: -	LED	Green	Red	Content [No display]
	Indoor	Stays OFF	Stays Off	
	Outdoor	Stays OFF	Stays Off	

1.Applicable model	5.Troubleshooting		
All models (No display on the remote control after power ON)	Diagnosis	Countermeasure	
2.Error detection method	<pre> graph TD Start[No display on the remote control after power ON] --> D1{Is DC10V or higher between X-Y detected at remote control terminal?} D1 -- YES --> C1[Remote control anomaly.] D1 -- NO --> D2{Is DC10V or higher between X-Y wires detected when removing remote control?} D2 -- YES --> C2[Remote control anomaly.] D2 -- NO --> D3{Are connecting wires between indoor and outdoor units connected properly?} D3 -- YES --> C3[Indoor unit control PCB anomaly] D3 -- NO --> C4[Correct connecting wire.] </pre>		
3. Condition of error displayed			
4.Presumable cause	<ul style="list-style-type: none"> • Anomalous connection of wire between PCBs • Indoor unit control PCB anomaly • Remote control anomaly • Breakage of connecting wires of remote control 		

Note:

Error code Remote control: E1 7-segment display: -	LED	Green	Red	Content <h2 style="text-align: center;">Remote control communication error</h2>
	Indoor	Keeps flashing	Stays Off	
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model
All models

2. Error detection method
When normal communication between remote control and indoor unit is interrupted for more than 2 minutes (Detectable only with the remote control)

3. Condition of error displayed
Same as above

4. Presumable cause
<ul style="list-style-type: none"> • Anomalous communication circuit between remote control and indoor unit • Noise

5. Troubleshooting	
Diagnosis	Countermeasure
<pre> graph TD Q1{Is it possible to reset normally by the power source reset? (2)} Q1 -- YES --> C1[Malfunction by temporary noise Check peripheral environment.] Q1 -- NO --> P1[Turn SW7-1 OFF → ON. Disconnect the wire between indoor and outdoor units] P1 --> P2[Reset power source.] P2 --> Q2{Does the drain pump start automatically at one minute after power ON?} Q2 -- YES --> C2[Indoor unit control PCB anomaly → Replace it.] Q2 -- NO --> C3[Remote control anomaly → Replace it.] Note2[Note (2) Does the remote control displays "WAIT" even after 3 minutes?] </pre> <p>Note (1) SW7-1: OFF → ON</p> <p>Note (2) Does the remote control displays "WAIT" even after 3 minutes?</p>	

Note: If the indoor unit cannot communicate normally with the remote control for 180 seconds, the indoor unit PCB starts to reset automatically.

Error code Remote control: E2 7-segment display: -	LED	Green	Red	Content <h2 style="text-align: center;">Duplicated indoor unit address</h2>
	Indoor	Keeps flashing	1-time flash	
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model	5. Troubleshooting		
All models	Diagnosis	Countermeasure	
2. Error detection method	<pre> graph TD D1{Is the number of connected indoor units up to 128 units?} D2{Is the different address No. assigned to each indoor unit?} P1[Reset the power source and restart.] C[Caution: Unless the power source is reset, addresses will not be confirmed.] D3{Is E2 displayed?} D1 -- NO --> C1[Review number of connected units.] D1 -- YES --> D2 D2 -- NO --> C2[Correct indoor unit address setting.] D2 -- YES --> P1 P1 --> C C --> D3 D3 -- NO --> C3[Implement test run.] D3 -- YES --> C4[Replace indoor unit control PCB. *] </pre>		
More than 129 indoor units are connected in the same Superlink system. Duplicated indoor unit address			
3. Condition of error displayed	<p style="text-align: right;">* Before replacement, confirm whether the rotary switch for address setting is not damaged. (It was experienced that No. 5 on rotary switch was not recognized.)</p>		
Same as above			
4. Presumable cause	<ul style="list-style-type: none"> • Number of connected indoor units exceeds the limitation. • Duplicated indoor unit address • Indoor unit control PCB anomaly 		

Note:

Error code Remote control: E3/5 7-segment display: -	LED	Green	Red	Content <h2 style="text-align: center;">Outdoor unit signal line error</h2>
	Indoor	Keeps flashing	2-time flash	
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model
All models

2. Error detection method
No outdoor unit exists in the same Superlink system.

3. Condition of error displayed
Same as above

4. Presumable cause
<ul style="list-style-type: none"> • Power is not supplied to the outdoor unit • Unmatch of pairing between indoor and outdoor units • Indoor unit control PCB anomaly • Outdoor unit control PCB anomaly • Missing local wiring

5. Troubleshooting	
Diagnosis	Countermeasure
<p>E3 is a communication error that occurs when communication between indoor and outdoor units is not established at all. Once the communication between indoor and outdoor units is established, it changes to E5. In both cases, check signal wires (between indoor-outdoor units) locally.</p> <pre> graph TD Start[Reset the power source and restart.] --> D1{Does E3/E5 occurs?} D1 -- NO --> C1[Temporary malfunction by noise. Identify the source of noise and correct it.] D1 -- YES --> D2{Is protective fuse for the Superlink circuit blown?} D2 -- YES --> C2[Change to spare circuit.] D2 -- NO --> D3{Is the LED on indoor unit control PCB OK?} D3 -- NO --> C3[Indoor unit control PCB anomaly → Replace it.] D3 -- YES --> D4{Is the power source to outdoor unit OK?} D4 -- NO --> C4[Correct it.] D4 -- YES --> D5{Is the outdoor unit address set on the indoor unit OK?} D5 -- NO --> C5[Correct it.] D5 -- YES --> D6{Is the Superlink communication wire connection OK?} D6 -- NO --> C6[Correct it.] D6 -- YES --> C7[Outdoor unit control PCB anomaly → Replace it.] </pre>	

Note:

Error code Remote control: E5 7-segment display: -	LED	Green	Red	Content <h2 style="text-align: center;">Communication error during operation</h2>
	Indoor	Keeps flashing	*See below	
	Outdoor	Keeps flashing	2-time flash	

1. Applicable model
All models
2. Error detection method
When the communication between indoor and outdoor units is interrupted for more than 2 minutes
3. Condition of error displayed
When this anomaly is detected during operation.
4. Presumable cause
<ul style="list-style-type: none"> • Unit address No. setting error • Remote control wires broken • Poor connection/disconnection of remote control wires • Outdoor unit control PCB anomaly • Malfunction by noise

5. Troubleshooting	
Diagnosis	Countermeasure
<p>* In case that indoor unit red LED flashes 2 times</p> <p style="text-align: center;">Note (1) Check the connection (disconnection, looseness) of signal wires at outdoor unit terminal block</p> <p style="text-align: center;">Is the connection of signal wires at the outdoor unit side OK?</p> <p style="text-align: right;">NO → Repair signal wires.</p> <p style="text-align: center;">YES ↓</p> <p style="text-align: center;">Note (2) Check the connection (disconnection, looseness, brackage) of signal wires (between indoor and outdoor units)</p> <p style="text-align: center;">Is the connection of signal wires (between indoor and outdoor units) OK?</p> <p style="text-align: right;">NO → Repair signal wires.</p> <p style="text-align: center;">YES ↓</p> <p style="text-align: center;">Reset the power source and restart.</p> <p style="text-align: center;">Does the remote control LCD becomes normal?</p> <p style="text-align: right;">NO → Go to the diagnosis of WAIT (1).</p> <p style="text-align: center;">YES → Unit is normal. (Malfunction by temporary noise, etc.)</p> <p>* In case that indoor unit red LED stays OFF</p> <p style="text-align: center;">Reset the power source and restart.</p> <p style="text-align: center;">Does the remote control LCD becomes normal?</p> <p style="text-align: right;">NO → Outdoor unit control PCB anomaly (Network communication circuit anomaly) → Replace it.</p> <p style="text-align: center;">YES → Unit is normal. (Malfunction by temporary noise, etc.)</p>	

Note: When the pump down switch is turned on, communication between indoor and outdoor units is cancelled so that "Communication error E5" will be displayed on the remote control and indoor unit control PCB, but this is normal.

Error code Remote control: E6 7-segment display:-	LED	Green	Red	Content Indoor heat exchanger temperature sensor anomaly (Thi-R)
	Indoor	Keeps flashing	1-time flash	
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature or high temperature (resistance) of Thi-R1, R2, R3

3. Condition of error displayed

- If broken wire is detected for 5 seconds continuously
- Or if in cooling operation short-circuit is detected for 5 seconds continuously

4. Presumable cause

- Anomalous connection of indoor heat exchanger temperature sensor
- Indoor heat exchanger temperature sensor anomaly
- Indoor unit control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure																
<pre> graph TD Q1{Is the connector of temperature sensor connected properly?} -- NO --> C1[Insert the connector securely.] Q1 -- YES --> Q2{Are the characteristics of temperature sensor OK? *1} Q2 -- NO --> C2[Replace temperature sensor. (Thi-R)] Q2 -- YES --> C3[Replace indoor unit control PCB.] </pre> <p>*1 Check several times to prove any poor connection.</p>																	
<p>Temperature-resistance characteristics of indoor heat exchanger temperature sensor (Thi-R1, R2, R3)</p> <table border="1"> <caption>Approximate data points from the graph</caption> <thead> <tr> <th>Temperature (°C)</th> <th>Temperature sensor resistance (kΩ)</th> </tr> </thead> <tbody> <tr><td>0</td><td>15</td></tr> <tr><td>10</td><td>10</td></tr> <tr><td>20</td><td>7</td></tr> <tr><td>25</td><td>5</td></tr> <tr><td>30</td><td>4</td></tr> <tr><td>40</td><td>3</td></tr> <tr><td>50</td><td>2</td></tr> </tbody> </table>	Temperature (°C)	Temperature sensor resistance (kΩ)	0	15	10	10	20	7	25	5	30	4	40	3	50	2	
Temperature (°C)	Temperature sensor resistance (kΩ)																
0	15																
10	10																
20	7																
25	5																
30	4																
40	3																
50	2																

Note:

Error code Remote control: E7 7-segment display: -	LED	Green	Red	Content Indoor return air temperature sensor anomaly (Thi-A)
	Indoor	Keeps flashing	1-time flash	
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model
 All models

2. Error detection method
 Detection of anomalously low temperature or high temperature (resistance) of Thi-A

3. Condition of error displayed
 • If broken wire is detected for 5 seconds continuously

4. Presumable cause
 • Anomalous connection of indoor return air temperature sensor
 • Indoor return air temperature sensor anomaly
 • Indoor unit control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure																
<pre> graph TD Q1{Is the connector of temperature sensor connected properly?} -- NO --> C1[Insert the connector securely.] Q1 -- YES --> Q2{Are the characteristics of temperature sensor OK? *1} Q2 -- NO --> C2[Replace temperature sensor (Thi-A).] Q2 -- YES --> C3[Replace indoor unit control PCB.] </pre> <p>*1 Check several times to prove any poor connection.</p>																	
<p>Temperature-resistance characteristics of indoor return air temperature sensor (Thi-A)</p> <table border="1"> <caption>Temperature-resistance characteristics of indoor return air temperature sensor (Thi-A)</caption> <thead> <tr> <th>Temperature (°C)</th> <th>Temperature sensor resistance (kΩ)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>~15</td> </tr> <tr> <td>10</td> <td>~10</td> </tr> <tr> <td>20</td> <td>~6</td> </tr> <tr> <td>25</td> <td>5</td> </tr> <tr> <td>30</td> <td>~4</td> </tr> <tr> <td>40</td> <td>~3</td> </tr> <tr> <td>50</td> <td>~2</td> </tr> </tbody> </table>	Temperature (°C)	Temperature sensor resistance (kΩ)	0	~15	10	~10	20	~6	25	5	30	~4	40	~3	50	~2	
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0	~15																
10	~10																
20	~6																
25	5																
30	~4																
40	~3																
50	~2																

Note:

Error code Remote control: E10 7-segment display: -	LED	Green	Red	Content Excessive number of indoor units (more than 17 units) by controlling one remote control
	Indoor	Keeps flashing	Stays Off	
	Outdoor	Keeps flashing	Stays Off	

<p>1. Applicable model</p> <p>All models</p>	5. Troubleshooting	
<p>2. Error detection method</p> <p>When it detects more than 17 of indoor units connected to one remote control</p>	<p>Diagnosis</p> <pre> graph TD A{Are more than 17 indoor units connected to one remote control?} -- NO --> B[Remote control anomaly -> Replace it.] A -- YES --> C[Reduce to 16 or less units.] </pre>	<p>Countermeasure</p>
<p>3. Condition of error displayed</p> <p>Same as above</p>		
<p>4. Presumable cause</p> <ul style="list-style-type: none"> • Excessive number of indoor units connected. • Remote control anomaly. 		

Note:

Error code Remote control: E11 7-segment display:-	LED	Green	Red	Content <h2 style="text-align: center;">Address setting error of indoor units</h2>
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model	5. Troubleshooting		
All models	Diagnosis	Countermeasure	
2. Error detection method	<p style="text-align: center;">In case the wiring is below and “Master IU address set” is used, E11 is appeared.</p>		
IU address has been set using the “Master IU address set” function of remote control.	Change of address setting method Set the address by rotary switch SW1, 2 and DIP switch SW5-2 on indoor unit control PCB.		
3. Condition of error displayed	Same as above		
4. Presumable cause	Mistake of address setting method When more than one indoor units are controlled by 1 remote control, address setting from remote control can't be done. Only manual or automatic address setting. (Only when signal wire doesn't straddle the refrigerant system.)		

Note:

Error code Remote control: E12 7-segment display: -	LED	Green	Red	Content <h2 style="text-align: center;">Address setting error by mixed setting method</h2>
	Indoor	Keeps flashing	1-time flash	
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model

All models

2. Error detection method

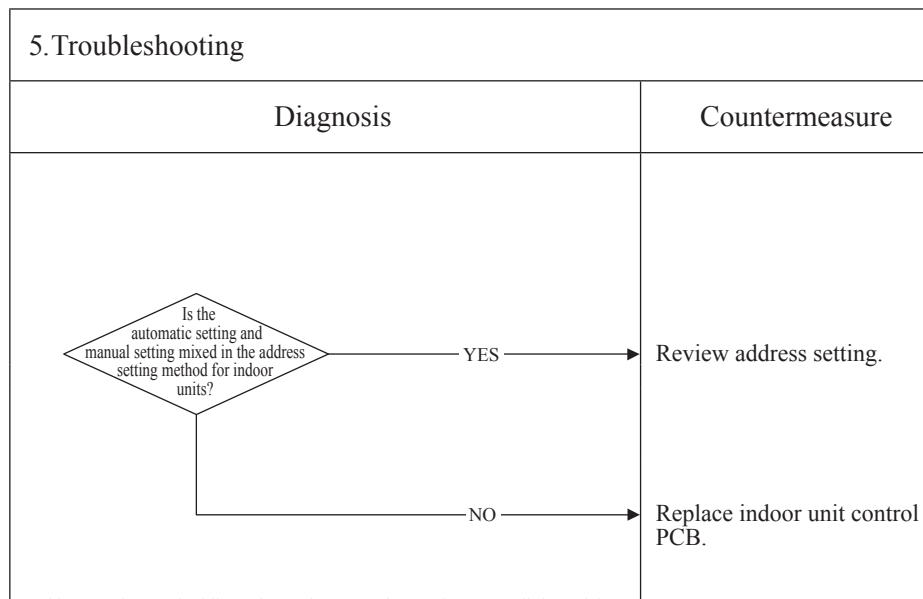
Automatic address setting and manual address setting are mixed when setting address of indoor units

3. Condition of error displayed

Same as above

4. Presumable cause

Mistake in address setting for indoor units



Address setting method list (Figures in [] are for previous Superlink models)

		Models for new Superlink protocol			Models for previous Superlink protocol		
		Indoor unit address setting		Outdoor unit address setting	Indoor unit address setting		Outdoor unit address setting
		Indoor unit No. switch	Outdoor unit No. switch	Outdoor unit No. switch	Indoor unit No. switch	Outdoor unit No. switch	Outdoor unit No. switch
Manual address setting	(New SL)	000-127	00-31	00-31	00-47	00-47	00-47
	(Previous SL)	[00-47]	[00-47]	[00-47]			
Automatic address setting for single refrigerant system	(New SL)	000	49	49	49	49	49
	(Previous SL)						
Automatic address setting for multiple refrigerant systems	(New SL)	000	49	00-31	Not available		
	(Previous SL)	Not available					

Note:

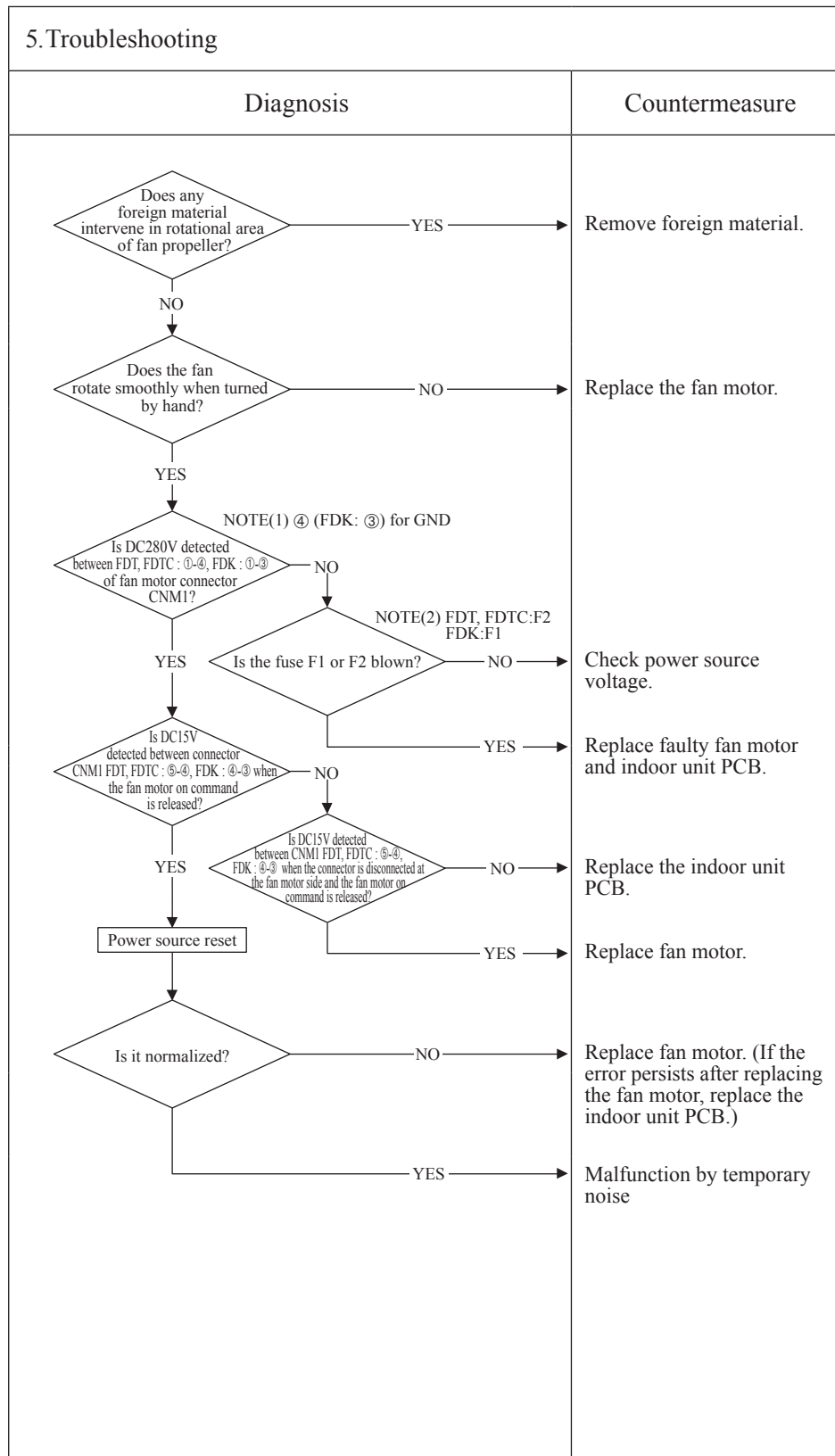
Error code Remote control: E16 7-segment display:-	LED	Green	Red	Content <h2 style="text-align: center;">Indoor DC fan motor anomaly</h2> <p style="text-align: center;">(FDT, FDTC, FDK series)</p>
	Indoor	Keeps flashing	1-time flash	
	Outdoor	Keeps flashing	Stays OFF	

1.Applicable model
FDT, FDTC, FDK series only

2.Error detection method
Detected by rotation speed of indoor fan motor

3. Condition of error displayed
<ul style="list-style-type: none"> When actual rotation speed of indoor fan motor drops to lower than 200min⁻¹ for 30 seconds continuously, the compressor and the indoor fan motor stop. After 2 seconds, it starts again automatically, but if this error occurs 4 times within 60 minutes after the initial detection, the compressor and the indoor fan motor stop abnormally.

4.Presumable cause
<ul style="list-style-type: none"> Indoor unit PCB anomaly Foreign material at rotational area of fan propeller Fan motor anomaly Dust on PCB Blown fuse External noise, surge



Note:

Error code Remote control: E16 7-segment display:-	LED	Green	Red	Content Indoor DC fan motor anomaly
	Indoor	Keeps flashing	1-time flash	
	Outdoor	Keeps flashing	Stays OFF	

1.Applicable model FDTW, FDTS, FDU45-160, FDUM, FDUT71, FDE, FDFW series
2. Error detection method Detected by rotation speed of indoor fan motor
3. Condition of error displayed <ul style="list-style-type: none"> When actual rotation speed of indoor fan motor drops to lower than 200min⁻¹ for 30 seconds continuously, the compressor and the indoor fan motor stop. After 2 seconds, it starts again automatically, but if this error occurs 4 times within 60 minutes after the initial detection, the compressor and the indoor fan motor stop abnormally.
4. Presumable cause <ul style="list-style-type: none"> Indoor unit power PCB anomaly Foreign material at rotational area of fan propeller Fan motor anomaly Dust on PCB Blown fuse External noise, surge Indoor unit control PCB anomaly

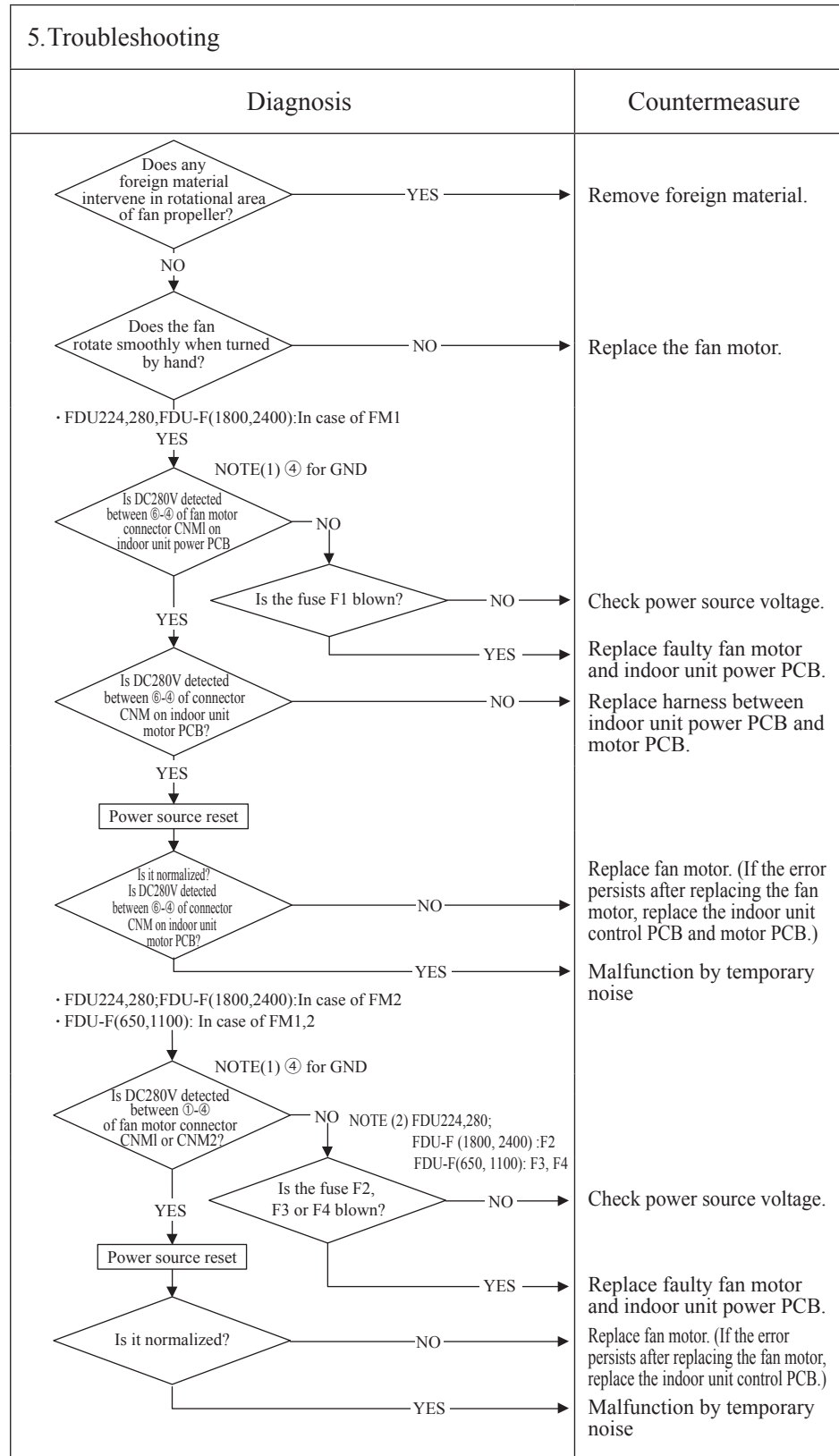
5. Troubleshooting	
Diagnosis	Countermeasure

Note:

Error code Remote control: E16 7-segment display:-	LED	Green	Red	Content <h2 style="text-align: center;">Indoor DC fan motor anomaly</h2>
	Indoor	Keeps flashing	1 (2)-time flash	
	Outdoor	Keeps flashing	Stays OFF	

Note(1) Value in () is for FM2.

1. Applicable model FDU224, 280 FDU650-2400FKXZE1 series
2. Error detection method Detected by rotation speed of indoor fan motor
3. Condition of error displayed <ul style="list-style-type: none"> When actual rotation speed of indoor fan motor drops to lower than 200min⁻¹ for 30 seconds continuously, the compressor and the indoor fan motor stop. After 2 seconds, it starts again automatically, but if this error occurs 4 times within 60 minutes after the initial detection.
4. Presumable cause <ul style="list-style-type: none"> Indoor unit power PCB anomaly Foreign material at rotational area of fan propeller Fan motor anomaly Dust on PCB Blown fuse External noise, surge Indoor unit control PCB Indoor unit motor PCB



Note:

Error code Remote control: E18 7-segment display: -	LED	Green	Red	Content
	Indoor	Keeps flashing	1-ime flash	
	Outdoor	Keeps flashing	Stays OFF	

Address setting error of master and slave indoor units

1. Applicable model	5. Troubleshooting		
Except heat recovery 3-pipe combination system	Diagnosis	Countermeasure	
2. Error detection method	<pre> graph TD D1{Is the address setting for the master indoor unit correct?} -- NO --> C1[Correct the address setting of the master indoor unit.] D1 -- YES --> D2{Is the power source to the master indoor unit turned on?} D2 -- NO --> C2[Turn on power source to the master indoor unit] D2 -- YES --> D3{Are the Superlink signal wires connected between master and slave indoor units?} D3 -- NO --> C3[Connect the Superlink signal wires correctly.] D3 -- YES --> C4["Indoor unit control PCB anomaly -> Replace it. (Firstly replace indoor unit control PCB on the slave indoor unit. If it is not recovered, replace indoor unit control PCB on the master indoor unit as well.)"] </pre>		
3. Condition of error displayed	Same as above		
4. Presumable cause	<ul style="list-style-type: none"> ▪ Address setting error of the master indoor unit ▪ No power source to the master indoor unit ▪ No connection of Superlink signal wires between master and slave indoor unit ▪ Indoor unit control PCB anomaly (Slave or master or both) 		

Note:

Error code Remote control: E19 7-segment display: -	LED	Green	Red	Content Indoor unit operation check, drain pump motor check mode anomaly
	Indoor	Keeps flashing	1-time flash	
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model All models	5. Troubleshooting		
2. Error detection method E19 occurs	Diagnosis	Countermeasure	
3. Condition of error displayed Same as above	<pre> graph TD Start[E19 occurs when the power ON.] --> Decision{Is SW7-1 on the indoor unit control PCB ON?} Decision -- NO --> Countermeasure1[Indoor unit control PCB anomaly (Anomalous SW7) -> Replace.] Decision -- YES --> Countermeasure2[Turn SW7-1 on the indoor unit control PCB OFF and reset the power.] </pre>		
4. Presumable cause <ul style="list-style-type: none"> • Mistake in SW7-1 setting (Due to forgetting to turn OFF SW7-1 after indoor unit operation check) • Indoor unit control PCB anomaly (Anomalous SW7) 			

Note: Indoor unit operation check/drain pump check mode
 If the power is ON after SW7-1ON, indoor unit operation check/drain pump check mode can be established.
 1) When the communication between remote control and indoor unit PCB is established within 60 seconds after power ON, it goes to indoor unit operation check.
 2) When the communication between remote control and indoor unit PCB is not established, it goes to drain pump check (CnB connector should be open before power ON)

Error code Remote control: E20 7-segment display:-	LED	Green	Red	Content Indoor DC fan motor rotation speed anomaly (FDT, FDTC, FDK series)
	Indoor	Keeps flashing	1-time flash	
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

FDT, FDTC, FDK series only

2. Error detection method

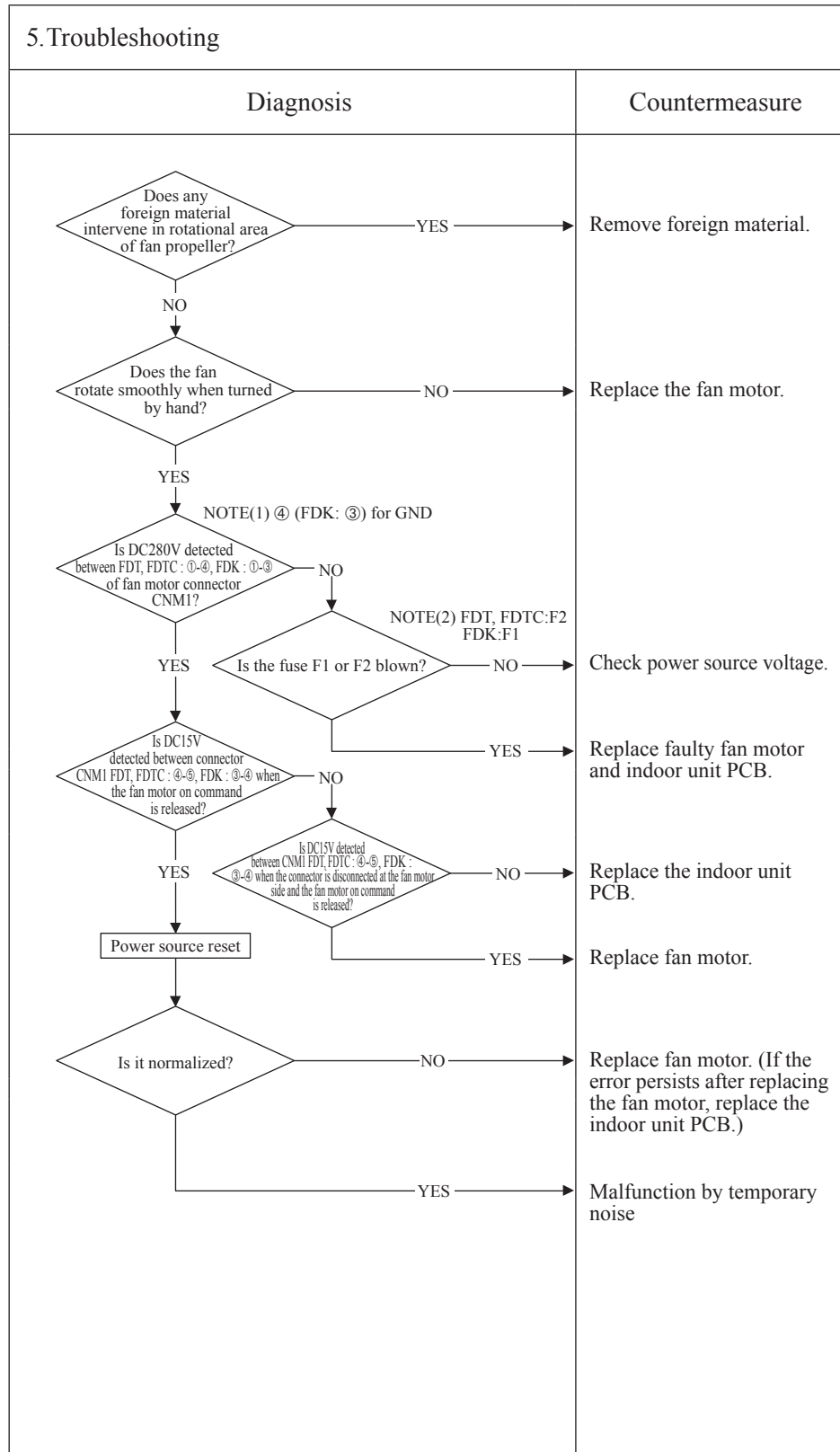
Detected by rotation speed of indoor fan motor

3. Condition of error displayed

When the actual fan rotation speed does not reach to the speed of [required speed -50 min⁻¹] after 2 minutes have been elapsed since the fan motor rotation speed command was output, the unit stops by detecting indoor fan motor anomaly.

4. Presumable cause

- Indoor unit PCB anomaly
- Foreign material at rotational area of fan propeller
- Fan motor anomaly
- Dust on PCB
- Blown fuse
- External noise, surge



Note:

Error code Remote control: E20 7-segment display:-	LED	Green	Red	Content Indoor DC fan motor rotation speed anomaly
	Indoor	Keeps flashing	1-time flash	
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model
FDTW, FDTS, FDU45-160, FDUM, FDUT71, FDE, FDFW series

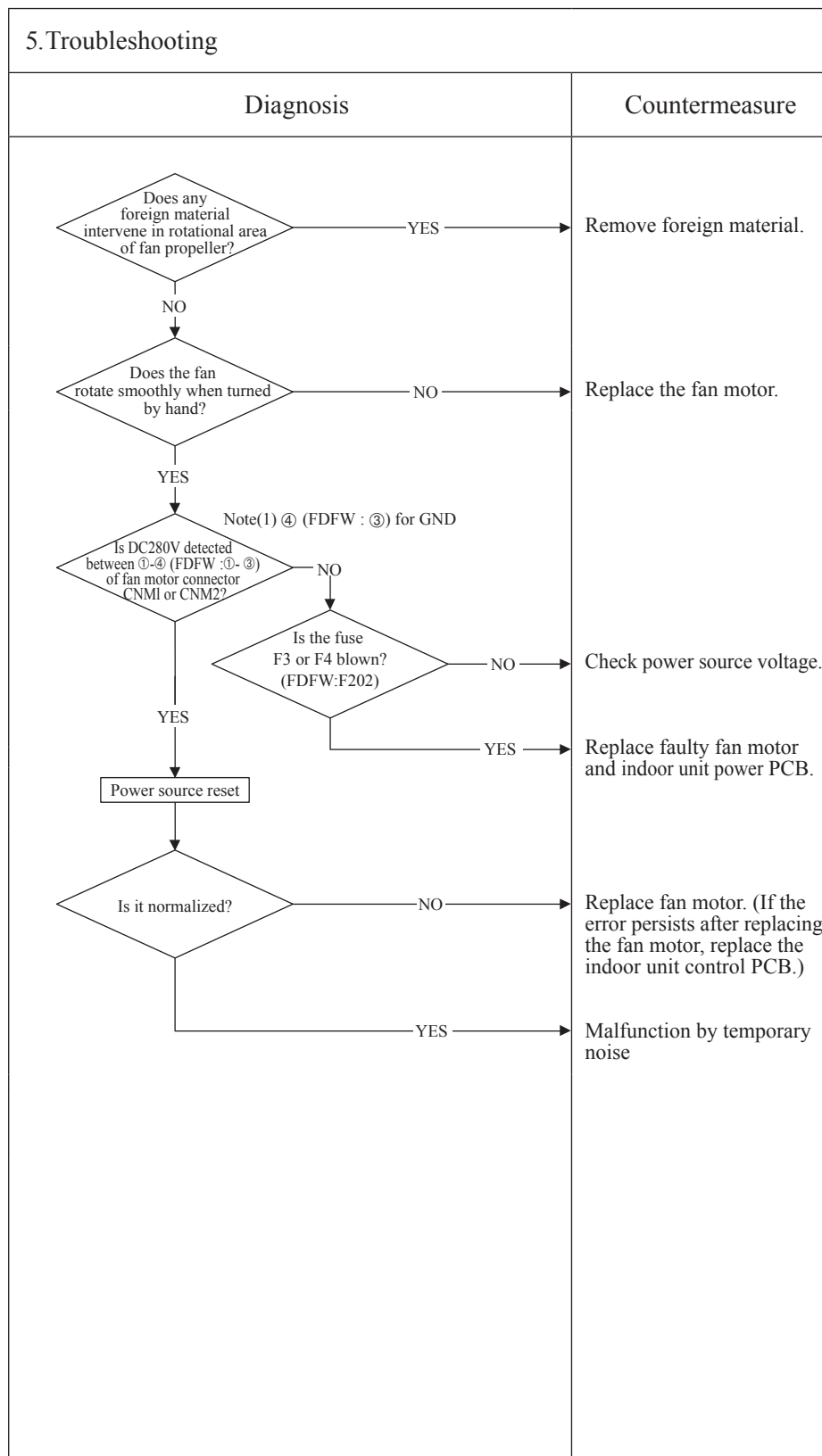
2. Error detection method
Detected by rotation speed of indoor fan motor

3. Condition of error displayed

- When the actual fan rotation speed does not reach to the speed of [required speed -50 (FDU: -500) min⁻¹] after 2 minutes have been elapsed since the fan motor rotation speed command was output, the unit stops by detecting indoor fan motor anomaly.

4. Presumable cause

- Indoor unit power PCB anomaly
- Foreign material at rotational area of fan propeller
- Fan motor anomaly
- Dust on PCB
- Blown fuse
- External noise, surge
- Indoor unit control PCB anomaly



Note:

Error code Remote control: E20 7-segment display:-	LED	Green	Red	Content Indoor DC fan motor rotation speed anomaly
	Indoor	Keeps flashing	1 (2)-time flash	
	Outdoor	Keeps flashing	Stays OFF	

Note(1) Value in () is for FM2.

1.Applicable model FDU224, 280 FDU650-2400FKXZE1 series
2. Error detection method Detected by rotation speed of indoor fan motor
3. Condition of error displayed <ul style="list-style-type: none"> When the actual fan rotation speed does not reach to the speed of [required speed -500 (FDU-F : -50) min⁻¹] after 2 minutes have been elapsed since the fan motor rotation speed command was output, the unit stops by detecting indoor fan motor anomaly.
4. Presumable cause <ul style="list-style-type: none"> Indoor unit power PCB anomaly Foreign material at rotational area of fan propeller Fan motor anomaly Dust on PCB Blown fuse External noise, surge Indoor unit control PCB Indoor unit motor PCB

5. Troubleshooting	Diagnosis	Countermeasure

Note:

Error code Remote control: E28 7-segment display:-	LED	Green	Red	Content <h2 style="text-align: center;">Remote control temperature sensor anomaly (Thc)</h2>
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) of Thc.

3. Condition of error displayed

- If -50°C or lower is detected for 5 seconds continuously, compressor stops. After 3-minute delay, the compressor is restarted automatically, but if this anomaly occurs again within 60 minutes after the initial detection.

4. Presumable cause

- Anomalous connection of remote control temperature sensor
- Remote control temperature sensor anomaly
- Remote control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure																																																																								
<pre> graph TD Q1{Is the connector of temperature sensor connected properly?} -- NO --> C1[Insert the connector securely.] Q1 -- YES --> T1[Regarding the characteristics of the temperature sensor, see the following table.] T1 --> Q2{Are the characteristics of temperature sensor OK? Is the temperature sensor wire OK? *1} Q2 -- NO --> C2[Replace remote control temperature sensor (Thc).] Q2 -- YES --> C3[Replace remote control PCB. (Defective remote control temperature sensor input circuit)] </pre>																																																																									
<p>*1 Check several times to prove any poor connection.</p> <p>Temperature-resistance characteristics of remote control temperature sensor (Thc).</p> <table border="1" style="margin: auto;"> <thead> <tr> <th>Temperature (°C)</th> <th>Resistance (kΩ)</th> <th>Temperature (°C)</th> <th>Resistance (kΩ)</th> <th>Temperature (°C)</th> <th>Resistance (kΩ)</th> <th>Temperature (°C)</th> <th>Resistance (kΩ)</th> </tr> </thead> <tbody> <tr><td>0</td><td>65</td><td>14</td><td>33</td><td>30</td><td>16</td><td>46</td><td>8.5</td></tr> <tr><td>1</td><td>62</td><td>16</td><td>30</td><td>32</td><td>15</td><td>48</td><td>7.8</td></tr> <tr><td>2</td><td>59</td><td>18</td><td>27</td><td>34</td><td>14</td><td>50</td><td>7.3</td></tr> <tr><td>4</td><td>53</td><td>20</td><td>25</td><td>36</td><td>13</td><td>52</td><td>6.7</td></tr> <tr><td>6</td><td>48</td><td>22</td><td>23</td><td>38</td><td>12</td><td>54</td><td>6.3</td></tr> <tr><td>8</td><td>44</td><td>24</td><td>21</td><td>40</td><td>11</td><td>56</td><td>5.8</td></tr> <tr><td>10</td><td>40</td><td>26</td><td>19</td><td>42</td><td>9.9</td><td>58</td><td>5.4</td></tr> <tr><td>12</td><td>36</td><td>28</td><td>18</td><td>44</td><td>9.2</td><td>60</td><td>5.0</td></tr> </tbody> </table>		Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	0	65	14	33	30	16	46	8.5	1	62	16	30	32	15	48	7.8	2	59	18	27	34	14	50	7.3	4	53	20	25	36	13	52	6.7	6	48	22	23	38	12	54	6.3	8	44	24	21	40	11	56	5.8	10	40	26	19	42	9.9	58	5.4	12	36	28	18	44	9.2	60	5.0
Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)	Temperature (°C)	Resistance (kΩ)																																																																		
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2	59	18	27	34	14	50	7.3																																																																		
4	53	20	25	36	13	52	6.7																																																																		
6	48	22	23	38	12	54	6.3																																																																		
8	44	24	21	40	11	56	5.8																																																																		
10	40	26	19	42	9.9	58	5.4																																																																		
12	36	28	18	44	9.2	60	5.0																																																																		

Note: After 10 seconds has elapsed since remote control temperature sensor was switched from invalid to valid, E28 will not be displayed even if the temperature sensor harness is disconnected or broken. However, in such case, the indoor return air temperature sensor (Thi-A) will be valid instantly instead of the remote control temperature sensor (Thc). Please note that even though the remote control temperature sensor (Thc) is valid, the displayed return air temperature on the remote control LCD shows the value detected by the indoor return air temperature sensor (Thi-A), not by the remote control temperature sensor (Thc).

Error code Remote control: E31 7-segment display: E31	LED	Green	Red	Content Duplicated outdoor unit address No.
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model
Outdoor unit
2. Error detection method
When the microcomputer of outdoor control PCB recognizes the duplicated address No. by scanning all addresses of outdoor units in the same Superlink system
3. Condition of error displayed
When duplicated outdoor unit address No. exists in the same Superlink system
4. Presumable cause
<ul style="list-style-type: none"> Mistake in the address setting of outdoor units More than 129 indoor units connected <div style="border: 1px solid black; padding: 2px; display: inline-block;"> Maximum number can be set by address switch is 128 units </div> No setting of Master/Slave setting switch for combination use Outdoor unit control PCB anomaly

5. Troubleshooting	
Diagnosis	Countermeasure
<pre> graph TD A[Save data for 30 minutes before stopping in Mente PC.] --> B[Reset the power supply and restart operation.] B --> C{Does E31 recur?} C -- NO --> D[Test run *No action is taken because it is judged that the power source reset is not done after changing address.] C -- YES --> E[Check outdoor address Nos. in the same Superlink system.] E --> F{Does the same address No. exist?} F -- YES --> G[Correct address.] F -- NO --> H[Replace outdoor control PCB. *] </pre>	
<p>Caution: Unless the power source is reset after changing address, the set address will not be confirmed.</p>	
<p>* Before replacement, please confirm whether the rotary switch for address setting is not damaged. (It was experienced that No. 5 on rotary switch was not recognized.)</p>	

Note: After taken above measure, reset the power source and confirm no error is displayed occurs.
 Unless the power source is reset after changing address, the set address will not be confirmed.
 In case of combination use, set the same address to both master and slave units. Distinction of master or slave unit is done by setting SW4-7 and 4-8. (Refer the instruction manual and technical manual for details)

Error code Remote control: E32 7-segment display: E32	LED	Green	Red	Content Open of Phase (L1, L2, N) on power source at primary side
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

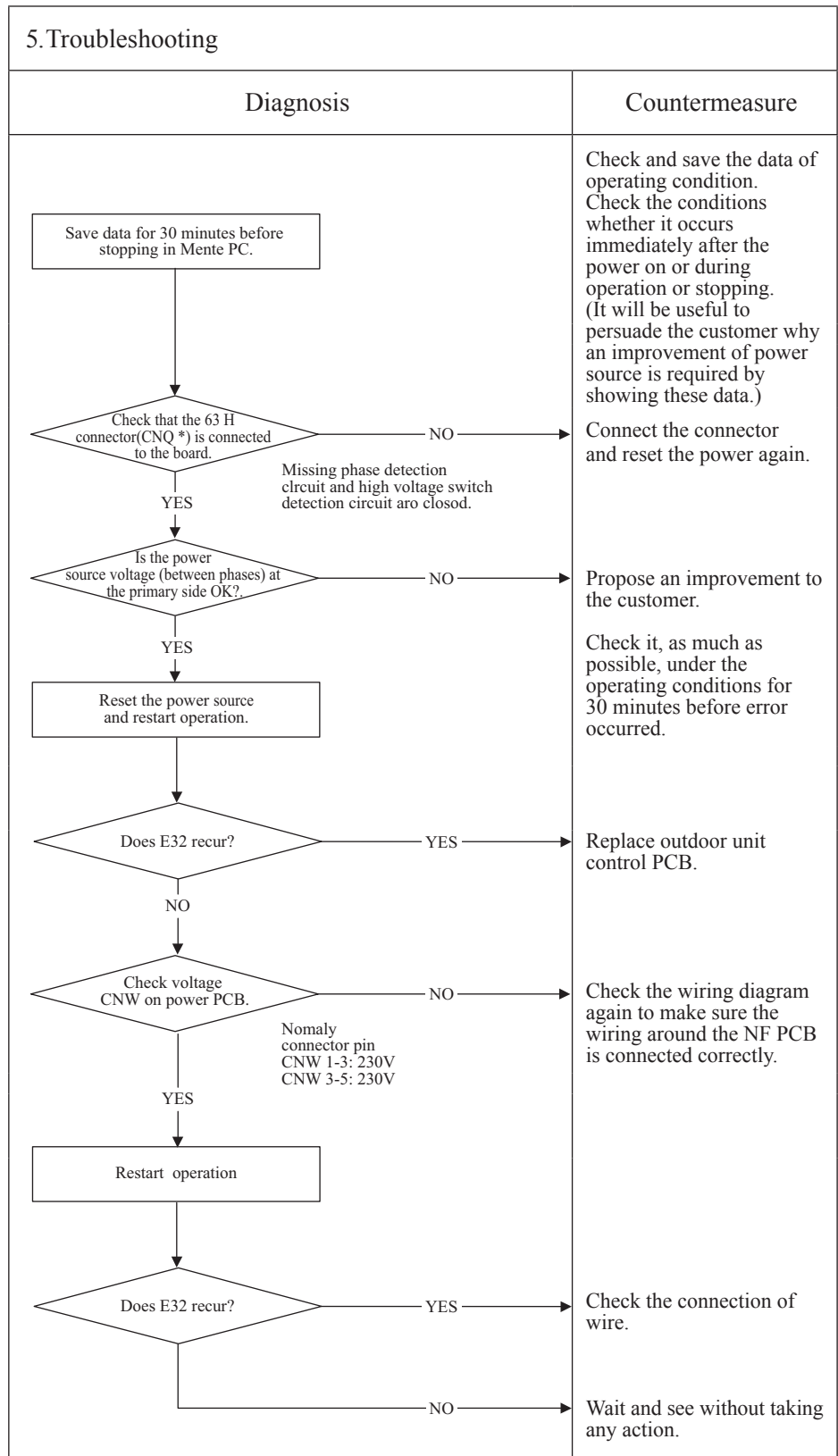
By checking the power source voltage at primary side of the outdoor control PCB.
 (Except of L3 phase)
 Lost of L3 Phase is checked at "E45".

3. Condition of error displayed

When the power supply voltage between L1-N or L2-N

4. Presumable cause

- Anomalous power source at primary side
- Outdoor unit control PCB anomaly.



Note:

Error code Remote control: E36 7-segment display: E36-1, 2 *1	LED	Green	Red	Content Discharge pipe temperature error (Tho-D1, D2)
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*2	

*1 E36-1: Tho-D1, E36-2: Tho-D2 *2 E36-1: 1-time flash, E36-2: 2-time flash

1. Applicable model
Outdoor unit
2. Error detection method
When anomalously high temperature is detected by the discharge pipe temperature sensor (Tho-D1, D2).
3. Condition of error displayed
When 130°C or higher is detected by the discharge temperature sensor, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this anomaly occurs 5 times within 60 minutes after the initial detection.
4. Presumable cause
<ul style="list-style-type: none"> Discharge pipe temperature sensor anomaly SV1, 2 (liquid refrigerant by-pass valve) anomaly <ul style="list-style-type: none"> Breakage of coil Faulty main body Outdoor unit control PCB anomaly Insufficient amount of refrigerant Insufficient air flow volume Short-circuit of air flow

5. Troubleshooting	
Diagnosis	Countermeasure
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Save data for 30 minutes before stopping in Mente PC.</div>	
Is the unit installation environment within the range of limitation?	NO → Propose an improvement to the customer. YES → Are the refrigerant amount and piping length OK?
Are the refrigerant amount and piping length OK?	NO → Adjust the refrigerant amount properly. (Check whether the refrigerant amount is insufficient or not.) (Check the gas leakage.) YES → Is the insertion of the thermistor connector into the connector on outdoor control PCB OK?
Is the insertion of the thermistor connector into the connector on outdoor control PCB OK?	NO → Insert connector securely. YES → Is the discharge pipe temperature sensor OK?
Is the discharge pipe temperature sensor OK?	NO → Check if the characteristics are correct by referring the characteristics chart of E39. And if necessary, replace the discharge pipe temperature sensor. YES → Reset the power source and restart operation.
Does the error recur when restarting?	NO → Wait and see. Continue to obtain data, if possible. (Keep connecting the Mente PC.) YES → Is there AC220-240V of output signal for SV1, 2 from outdoor control PCB?
Is there AC220-240V of output signal for SV1, 2 from outdoor control PCB?	NO → Replace outdoor unit control PCB. YES → Is the coil of SV1, 2 energized?
Is the coil of SV1, 2 energized?	NO → Replace the coil SV1, 2. YES → Does the refrigerant flow through SV1, 2 main body?
Does the refrigerant flow through SV1, 2 main body?	NO → Replace the SV1, 2 main body. (If there is no refrigerant in liquid line, charge refrigerant additional.) YES → Check refrigerant amount again.

Note:

Error code Remote control: E37 7-segment display: E37-1, 2, 3, 4, 5, 6*1	LED	Green	Red	Content Outdoor heat exchanger temperature sensor (Tho-R) and subcooling coil temperature sensor (Tho-SC,-H) anomaly
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	* 1	

*1 E37-1: 1-time flash (Tho-R1), E37-2: 2-time flash (Tho-R2), E37-3: 3-time flash (Tho-R3), E37-4: 4-time flash (Tho-R4), E37-5: 5-time flash (Tho-SC), E37-6: 6-time flash (Tho-H)

<h3>1. Applicable model</h3> <p>Outdoor unit</p>	<h3>5. Troubleshooting</h3> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Diagnosis</th> <th style="width: 50%;">Countermeasure</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <pre> graph TD Q1{Is the connector of temperature sensor connected properly?} -- NO --> C1[Insert the connector securely.] Q1 -- YES --> Q2{Are the characteristics of temperature sensor OK?*2} Q2 -- NO --> C2[Replace temperature sensor. (Tho-SC, Tho-H, Tho-R)] Q2 -- YES --> C3[Replace outdoor unit control PCB.] </pre> </td> <td style="vertical-align: top;"> <p>Check and save the data of operating conditions. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.</p> </td> </tr> </tbody> </table> <p>*2 Check several times to prove any poor connection.</p> <div style="margin-top: 20px;"> <p>Temperature-resistance characteristics of outdoor heat exchanger temperature sensor (Tho-R1-R4) and subcooling coil temperature sensor (Tho-SC, Tho-H)</p> <table border="1" style="margin-top: 10px;"> <caption>Temperature-resistance characteristics</caption> <thead> <tr> <th>Temperature (°C)</th> <th>Temperature sensor resistance (kΩ)</th> </tr> </thead> <tbody> <tr><td>0</td><td>15</td></tr> <tr><td>10</td><td>10</td></tr> <tr><td>20</td><td>6</td></tr> <tr><td>25</td><td>5</td></tr> <tr><td>30</td><td>4</td></tr> <tr><td>40</td><td>3</td></tr> <tr><td>50</td><td>2</td></tr> </tbody> </table> </div>	Diagnosis	Countermeasure	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <pre> graph TD Q1{Is the connector of temperature sensor connected properly?} -- NO --> C1[Insert the connector securely.] Q1 -- YES --> Q2{Are the characteristics of temperature sensor OK?*2} Q2 -- NO --> C2[Replace temperature sensor. (Tho-SC, Tho-H, Tho-R)] Q2 -- YES --> C3[Replace outdoor unit control PCB.] </pre>	<p>Check and save the data of operating conditions. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.</p>	Temperature (°C)	Temperature sensor resistance (kΩ)	0	15	10	10	20	6	25	5	30	4	40	3	50	2
Diagnosis	Countermeasure																				
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0	15																				
10	10																				
20	6																				
25	5																				
30	4																				
40	3																				
50	2																				

<h3>2. Error detection method</h3> <p>Detection of anomalously low temperature (resistance) of Tho-R or Tho-SC or Tho-H.</p>
--

<h3>3. Condition of error displayed</h3> <ul style="list-style-type: none"> If -50°C or lower is detected for 5 seconds continuously within 2-minutes to 2-minutes 20-seconds after the compressor ON, the compressor stops. And after 3-minute delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes after the initial detection If -50°C or lower is detected for 5 seconds continuously within 20 seconds after power ON.
--

<h3>4. Presumable cause</h3> <ul style="list-style-type: none"> Broken temperature sensor harness or the internal wire of sensing section (Check the molded section as well.) Disconnection of temperature sensor harness connection (connector) Outdoor unit control PCB anomaly
--

Note:

Error code Remote control: E38 7-segment display: E38	LED	Green	Red	Content Outdoor air temperature sensor anomaly (Tho-A)
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model

Outdoor unit

2. Error detection method

Detection of anomalously low temperature (resistance) of Tho-A

3. Condition of error displayed

- If -30°C or lower is detected for 5 seconds continuously within 2-minutes to 2-minutes 20-seconds after the compressor ON, the compressor stops. And after 3-minute delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes after the initial detection
- If -30°C or lower is detected for 5 seconds continuously within 20 seconds after power ON

4. Presumable cause

- Broken temperature sensor harness or the internal wire of sensing section (Check the molded section as well.)
- Disconnection of temperature sensor harness connection (connector)
- Outdoor control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure																		
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Save data for 30 minutes before stopping in Mente PC.</div>																			
<pre> graph TD Q1{Is the connector of temperature sensor connected properly?} -- NO --> C1[Insert the connector securely.] Q1 -- YES --> Q2{Are the characteristics of temperature sensor OK?*1} Q2 -- NO --> C2[Replace temperature sensor (Tho-A).] Q2 -- YES --> C3[Replace outdoor unit control PCB.] </pre>	<p>Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.</p>																		
<p>*1 Check several times to prove any poor connection.</p>																			
<p>Temperature-resistance characteristics of outdoor air temperature sensor (Tho-A)</p> <table border="1"> <caption>Approximate data points from the graph</caption> <thead> <tr> <th>Temperature (°C)</th> <th>Temperature sensor resistance (kΩ)</th> </tr> </thead> <tbody> <tr><td>-20</td><td>100</td></tr> <tr><td>-10</td><td>60</td></tr> <tr><td>0</td><td>30</td></tr> <tr><td>10</td><td>15</td></tr> <tr><td>20</td><td>8</td></tr> <tr><td>30</td><td>5</td></tr> <tr><td>40</td><td>4</td></tr> <tr><td>50</td><td>3</td></tr> </tbody> </table>		Temperature (°C)	Temperature sensor resistance (kΩ)	-20	100	-10	60	0	30	10	15	20	8	30	5	40	4	50	3
Temperature (°C)	Temperature sensor resistance (kΩ)																		
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-10	60																		
0	30																		
10	15																		
20	8																		
30	5																		
40	4																		
50	3																		

Note:

Error code Remote control: E39 7-segment display: E39-1, 2*1	LED	Green	Red	Content Discharge pipe temperature sensor anomaly (Tho-D1, D2)
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*2	

*1 E39-1: Tho-D1, E39-2: Tho-D2, *2 E39-1: 1-time flash, E39-2: 2-time flash

<p>1. Applicable model</p> <p>Outdoor unit</p>	5. Troubleshooting																						
<p>2. Error detection method</p> <p>Detection of anomalously low temperature (resistance) of Tho-D1, D2.</p>	Diagnosis		Countermeasure																				
<p>3. Condition of error displayed</p> <ul style="list-style-type: none"> If -30°C or lower is detected for 5 seconds continuously within 10-minutes to 10-minutes 20-seconds after the compressor ON, the compressor stops. And after 3-minute delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes after the initial detection. 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <pre> graph TD Q1{Is the connector of temperature sensor connected properly?} -- NO --> C1[Insert the connector securely.] Q1 -- YES --> Q2{Are the characteristics of temperature sensor OK? *3} Q2 -- NO --> C2[Replace temperature sensor (Tho-D1 or D2).] Q2 -- YES --> C3[Replace outdoor unit control PCB.] </pre>		<p>Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.</p>																				
<p>4. Presumable cause</p> <ul style="list-style-type: none"> Broken temperature sensor harness or the internal wire of sensing section. (Check the molded section as well.) Disconnection of temperature sensor harness connection (connector) Outdoor control PCB anomaly 	<p>*3 Check several times to prove any poor connection.</p> <p>Temperature-resistance characteristics of discharge pipe temperature sensor (Tho-D1, D2)</p> <table border="1"> <caption>Temperature-resistance characteristics of discharge pipe temperature sensor (Tho-D1, D2)</caption> <thead> <tr> <th>Temperature (°C)</th> <th>Temperature sensor resistance (kΩ)</th> </tr> </thead> <tbody> <tr><td>0</td><td>180</td></tr> <tr><td>20</td><td>100</td></tr> <tr><td>40</td><td>60</td></tr> <tr><td>60</td><td>40</td></tr> <tr><td>80</td><td>30</td></tr> <tr><td>100</td><td>25</td></tr> <tr><td>120</td><td>22</td></tr> <tr><td>140</td><td>21</td></tr> <tr><td>160</td><td>20</td></tr> </tbody> </table>			Temperature (°C)	Temperature sensor resistance (kΩ)	0	180	20	100	40	60	60	40	80	30	100	25	120	22	140	21	160	20
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0	180																						
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80	30																						
100	25																						
120	22																						
140	21																						
160	20																						

Note:

Error code Remote control: E40 7-segment display: E40	LED	Green	Red	Content High pressure anomaly (63H1-1, 2 activated)
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model
Outdoor unit

2. Error detection method
When high pressure switch 63H1-1 or 63H1-2 is activated.

3. Condition of error displayed

- If high pressure sensor exceeds 4.14MPa for 10 seconds continuously
- If 63H1-1, 2 is activated 5 times within 60 minutes
- If 63H1-1, 2 is activated for 60 minutes continuously

4. Presumable cause

- Short-circuit of airflow at condenser side of heat exchanger/Disturbance of airflow/Clogging filter/Fan motor anomaly
- Disconnection of high pressure switch connector
- Breakage of high pressure switch harness
- Closed service valves
- High pressure sensor anomaly
- High pressure switch anomaly
- Outdoor unit control PCB anomaly

5. Troubleshooting

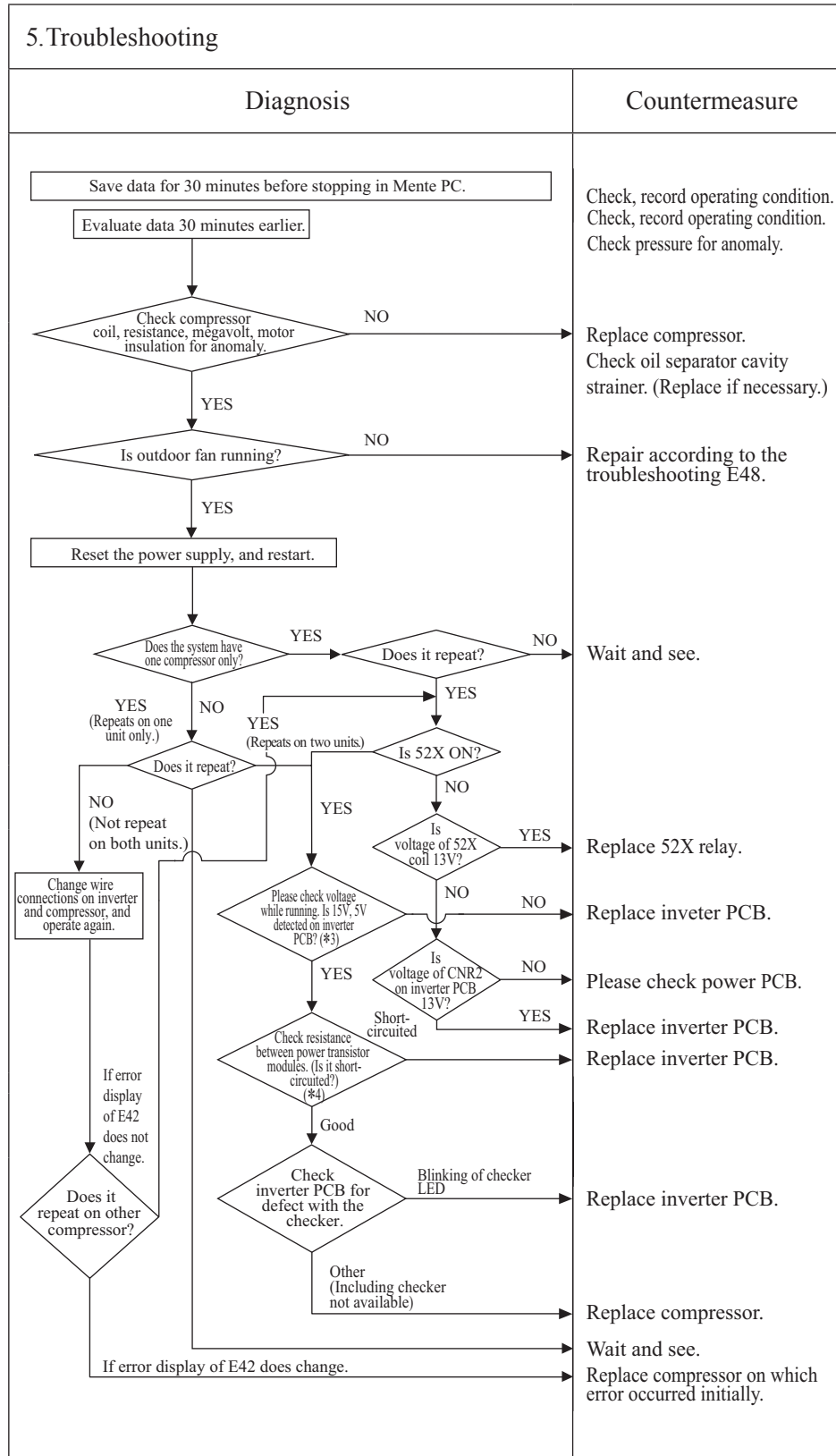
Diagnosis	Countermeasure
<p>Save data for 30 minutes before stopping in Mente PC.</p> <pre> graph TD Q1{Was 63H1 or 63H1-2 activated at 4.15MPa or higher?} Q2{Does the sensed value of the high pressure sensor show 4.15MPa? (Normal?) } Q3{Is the 63H1-1, 2 OK? Are the connector and/or harness OK? } Q4{Are the service valves fully open? } Q5{Is it stop at 4.15MPa of gauge pressure? } Q6{Is there any clogging in the refrigerant circuit? } Q1 -- YES --> Q3 Q1 -- NO --> Q2 Q2 -- YES --> Q3 Q2 -- NO --> CM1 Q3 -- YES --> Q4 Q3 -- NO --> CM2 Q4 -- YES --> Q5 Q4 -- NO --> CM3 Q5 -- YES --> Q6 Q5 -- NO --> CM4 Q6 -- YES --> CM5 Q6 -- NO --> CM6 </pre>	<p>Check and save the data of operating condition. Check the sensed value of high pressure sensor when the 63H1-1, 2 is activated. Check whether the high pressure switch is activated at the sensed value of high pressure sensor.</p> <p>High pressure sensor anomaly is suspicious. Check high pressure sensor itself according to the troubleshooting procedure of E54, after restarting operation. (If the high pressure sensor [PSH] fails, replace it)</p> <p>If the connector is disconnected or the harness is broken, correct it. Also check whether the high pressure switch is properly mounted or not.</p> <p>Open service valve.</p> <p>Check it, as much as possible, under the operating conditions for 30 minutes before error occurred.</p> <p>Replace outdoor unit control PCB.</p> <p>Remove clogs.</p> <p>Check items (condenser side):</p> <ul style="list-style-type: none"> • Filter clogging • Airflow volume (Fan motor) • Short-circuit of airflow

Note: If the error does not recur, connect the Maintenance PC and continue to collect data.

Error code Remote control: E42 7-segment display: E42-1, 2*	LED	Green	Red	Content <h2 style="text-align: center;">Current cut (CM1, CM2)</h2>
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*2	

*1 E42-1: CM1, E42-2: CM2 *2 E42-1: 1-time flash, E42-2: 2-time flash

1. Applicable model
Outdoor unit
2. Error detection method
When anomalously high output current of inverter is detected by the current sensor mounted in the power transistor
3. Condition of error displayed
When inverter output current exceeding the protection value is detected 4 times within 15 minutes [Protection value] FDC280-335, 475-560KXZE2: 37.1APK(min)A FDC400, 450KXZE2: 67.1APK(min) A
4. Presumable cause
<ul style="list-style-type: none"> • Compressor anomaly • Leakage of refrigerant • Power transistor module anomaly • Anomalous power source for inverter PCB • Outdoor fan motor anomaly • Inverter PCB anomaly



Note: *3 Measurement position: Refer to section 9.4 for voltage check of inverter PCB.
 *4 Measurement position: Check resistance between P-U, P-V, P-W, N-U, N-V, N-W, P-N. (TB6-12 on inverter PCB).
 If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code Remote control: E43 7-segment display: E43-1, 2 *1	LED	Green	Red	Content Excessive number of indoor units connected, excessive total capacity of connection
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*1	

*1 E43-1/1-time flash: Excessive number of indoor units connected, E43-2/2-time flash: Excessive capacity of indoor units connection

<p>1. Applicable model</p> <p>Outdoor unit</p>	5. Troubleshooting	
<p>2. Error detection method</p> <p>When the number of connected indoor units exceeds the limitation When the total capacity of connected indoor units exceeds the limitation</p>	Diagnosis	Countermeasure
<p>3. Condition of error displayed</p> <ul style="list-style-type: none"> Excessive number of connected indoor units Excessive total capacity of connected indoor units The total capacity of connected indoor units exceeds the limitation 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">Reset the power.</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Caution: Address will not be confirmed, unless the power source is reset after changing address.</p> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p style="text-align: center;">Is E43 displayed?</p> <p style="text-align: center;">NO →</p> <p style="text-align: center;">YES ↓</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">Does the number of indoor units connected and/or total capacity exceed limitation?</p> <p style="text-align: center;">NO →</p> <p style="text-align: center;">YES →</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Check the connected number of indoor units with 7-segment display code C40 or Mente PC with reference to the utilities drawing. (Check not only one system, but also other systems)</p> </div> <p style="text-align: center;">NO ↓</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;">Are there any indoor units which is not expected to exist in that signal line?</p> <p style="text-align: center;">NO →</p> <p style="text-align: center;">YES →</p> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Check the resistance between A and B of signal line as well.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>General checking of indoor/outdoor unit addresses by means of:</p> <ul style="list-style-type: none"> ◇ Outdoor unit: Mente PC, 7-Segment display and rotary switch (SW1, 2) ◇ Indoor unit: Remote control, rotary switch (SW1, 2, 3, 4) <p>* It is recommended to use means other than the rotary switch which could be defective.</p> </div> </div> <div style="width: 50%; padding-left: 10px;"> <p>Check and save the data of operating condition.</p> <p>Test run No action is taken because it is judged that the power source reset was not done after changing address.</p> <p>Check indoor unit addresses and correct. In case that total capacity of connected indoor units exceeds the limitation, if tentative operation is required turn ON the DIP switch SW5-4 on the outdoor unit control PCB. (However since this tentative solution could cause trouble, be sure to correct it as soon as possible)</p> <p>Signal wire may be connected to other outdoor unit system. Correct the signal wire.</p> <p>Correct addresses. (Either one of addresses is wrong.) If the address corrected with rotary switch is still wrong, replace control PCB. (Defective rotary switch)</p> <p>* Before replacement, please confirm whether the rotary switch for address setting is not damaged. (It was experienced that No. 5 on rotary switch was not recognized.)</p> </div> </div>	
<p>4. Presumable cause</p> <ul style="list-style-type: none"> Mistake in setting of indoor/outdoor unit addresses Mistake in signal wire connection 		

Note: After completing the above procedure, reset the power source and confirm that the error display does not recur. Unless the power source is reset for both indoor unit and outdoor unit, the set addresses will not be confirmed.

Error code Remote control: E44 7-segment display: E44-1, 2 *1	LED	Green	Red	Content Liquid flooding anomaly (CM1, CM2)
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*2	

*1 E44-1: CM1, E44-2 : CM2 *2 E44-1: 1-time flash, E44-2: 2-time flash

1. Applicable model
Outdoor units
2. Error detection method
When 5°C or lower of the under-dome temperature superheat is detected for 15 minutes continuously or for 30 minutes continuously
3. Condition of error displayed
When above anomaly is detected 3 times within 90 minutes
4. Presumable cause
<ul style="list-style-type: none"> • Unmatching of refrigerant piping and/or signal wiring • Overcharging of refrigerant • Anomalous control of superheat • Anomalous circuit of liquid refrigerant by-pass • Anomalous refrigerant circuit of sub-cooling coil • Under-dome temperature sensor (Tho-C1, 2) anomaly

5. Troubleshooting	
Diagnosis	Countermeasure
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">Save data for 30 minutes before stopping in Mente PC.</div>	
Are there any wrong connection of refrigerant piping and/or signal wiring? · Check the numbers of connected indoor units recognized by outdoor unit in comparison with those numbers in utility drawing.	YES → Correct the connection of refrigerant piping and/or signal wiring properly.
NO	
Are there any excessive refrigerant charged at site? · Check the calculation result of additional refrigerant charging amount and the record of additional refrigerant charged amount.	YES → Adjust refrigerant amount properly.
NO	
Are there any leakage of refrigerant through valve sheet of SV1, 2? · Check the temperature difference between before and after SV1, 2.	YES → Replace SV1, 2. Replace the coil of SV1, 2.
NO	
Are there any fault in sub-cooling coil circuit? · Check whether the EEVSC is kept open (at cooling mode) · Check whether the thermistor of Tho-H is inserted in the thermistor holder properly. · Check whether the characteristics of Tho-H and PSL is OK.	YES → <ul style="list-style-type: none"> • Replace EEVSC. • Check the coil of EEVSC → Replace the coil of EEVSC • Replace Tho-H. • Replace PSL.
NO	
Is the superheat control of indoor unit OK at cooling mode? · Check whether the indoor EEV is kept open or not. · Check whether Thi-R1, R2, R3 are installed at proper position or the characteristics of them are OK. · Check whether the air filter is clogged. · Check whether the indoor fan rotates.	NO → <ul style="list-style-type: none"> • Replace indoor EEV. • Check the coil of EEV → Replace the coil of EEV. • Check the installed position of Thi-R1, R2, R3 → Replace Thi-R, if necessary. • Check the air filter. • Check the connection of indoor fan motor connector. Replace indoor fan motor. * By checking Thi-R1, R2, R3 from indoor unit operation data of Mente PC, specify the indoor unit which tends to be liquid flooding (Thi-R3=Thi-R2 shows the probability of liquid flooding)
YES	
Is the superheat control of outdoor unit OK at heating mode? · Check whether EEVH1 is kept open or not. · Check whether Tho-R1, R2, R3, R4 are installed at proper position or the characteristics of them are OK. · Check whether the characteristics of PSL are OK. · Check whether the fin of outdoor heat exchanger is clogged with snow, ice or dust. · Check whether the outdoor fan rotates.	NO → <ul style="list-style-type: none"> • Replace EEVH1, 2. • Check the coil of EEVH1, 2 → Replace the coil of EEVH1, 2. • Check the installed position of Tho-R1, R2, R3, R4 → Replace Tho-R, if necessary. • Clean the fin of outdoor heat exchanger. • Check the connection of outdoor fan motor connector. Replace outdoor fan motor.
YES	
Is the characteristics of Tho-C1, 2 OK?	NO → • Replace Tho-C1, 2. YES → Collect the data with Mente PC and ask our consultation.

Note: If the error does not recur, connect the Mente PC and continue to collect data.

Error code Remote control:E45 7-segment display: E45-1, 2 *1	LED	Green	Red	Content Communication error between inverter PCB and outdoor unit control PCB
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*2	

*1 E45-1: INV1, E45-2: INV2 *2 E45-1: 1-time flash, E45-2: 2-time flash

1.Applicable model Outdoor unit
2.Error detection method E45 is displayed on 7- segment LED.
3. Condition of error displayed When the communication between inverter PCB and control PCB is not established It also occurs when the necessary power is not supplied to the inverter. (Especially when the lost of phase(L3) is occur, it becomes E45.)
4.Presumable cause <ul style="list-style-type: none"> • Signal wire anomaly • Miswire connection • Control PCB anomaly • Power PCB anomaly • Inverter PCB anomaly • Lost of phase(L3)

5.Troubleshooting		
Diagnosis	Countermeasure	
<p style="text-align: center;">Save data for 30minutes before stopping in Mente PC.</p> <p style="text-align: center;">Reset the power source, and resatart.</p> <p style="text-align: center;">Dose it repeat?</p> <p style="text-align: right;">NO →</p> <p style="text-align: center;">YES</p> <p style="text-align: center;">Turn power OFF.Check for proper connection of harnesses and connectors between inverter and control ,power, N.F PCBs. Also check the switch setting of the inverter PCB.</p> <p style="text-align: right;">NO →</p> <p style="text-align: center;">POWER ON</p> <p style="text-align: center;">Is the L3-N phase voltage within the normal range?</p> <p style="text-align: right;">NO →</p> <p style="text-align: center;">YES</p> <p style="text-align: center;">Check if 13V (for relay) on the power PCB is normal. Please refer to section 9.4. ※2</p> <p style="text-align: right;">NO →</p> <p style="text-align: center;">Remote control power ON</p> <p style="text-align: center;">Is yellow LED flashing on Inverter PCB?</p> <p style="text-align: right;">YES →</p> <p style="text-align: center;">NO</p> <p style="text-align: center;">Check if the DC voltage is 400 Vdc or more. ※1</p> <p style="text-align: right;">YES →</p> <p style="text-align: center;">NO</p> <p style="text-align: center;">Is the 52 X relay operating normally?</p> <p style="text-align: right;">YES →</p> <p style="text-align: center;">NO</p> <p style="text-align: center;">Is the coil voltage of the 52X relay around 12V? ※2</p> <p style="text-align: right;">NO →</p> <p style="text-align: center;">YES</p>		<p>Check record operating condition. Check under operating condition 30 minutes earlier than the error,as much as possible.</p> <p>Wait and see.</p> <ul style="list-style-type: none"> •Check for broken wires in harness, disconnected connectors, incorrect connection order of TB3 -1 on inverter PCB and TB6 -8 on N.F PCB. •Switch setting of the inverter PCB SW10-3:OFF INV1 ON INV2 •When the lost of phase (L3), the inverter PCB does not receive power and becomes E45. Check power source voltage. <p>Replace power PCB.</p> <p>Replace control PCB.</p> <p>Replace inverter PCB. The 52C circuit on the inverter PCB may be broken.</p> <p>Replace inverter PCB.</p> <p>Check the wiring between inverter PCB (CNR1) and 52X, and if there is no problem,replace the inverter PCB.</p> <p>Replace 52X.</p>

Note: ※1 For FDC400,450KXZE2 : Between TB12 and TB13 of inverter PCB.
 Other models : Between TB6 and TB7 of inverter PCB.
 ※2 DC voltage for relay is 13V(on power PCB),or around 12V (at connector or terminal part).

Error code Remote control: E46 7-segment display: E46	LED	Green	Red	Content Mixed address setting methods coexistent in same network
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

Outdoor unit

2. Error detection method

If the signal line of a outdoor unit system applied automatic address setting is connected to other outdoor unit system (Detected at indoor unit side)

3. Condition of error displayed

Same as above

4. Presumable cause

- Mistake in the address setting
- Mistake in the connection of signal wire

5. Troubleshooting

Diagnosis	Countermeasure									
<p>Save data for 30 minutes before stopping in Mente PC.</p> <p>Reset power supply and restart.</p> <p>Does E46 recur?</p> <p>NO</p> <p>YES</p> <p>Is the signal line of a outdoor unit system applying automatic address setting connected to other outdoor unit system?</p> <p>YES</p> <p>NO</p> <p>If signal line is connected to more than 2 outdoor unit systems, address setting should be done by manually.</p> <p>Is E46 still displayed?</p> <p>NO</p> <p>YES</p> <p>Turn ON the power source of each outdoor unit one by one and search the outdoor unit that can start up with automatic address setting.</p> <p><Reference> Error display at mixed address setting</p> <table border="1"> <tr> <td></td> <td>Auto</td> <td>Manual</td> </tr> <tr> <td>Auto address setting</td> <td>E31</td> <td>E46</td> </tr> <tr> <td>Manual address setting</td> <td>E46</td> <td>Normal</td> </tr> </table>		Auto	Manual	Auto address setting	E31	E46	Manual address setting	E46	Normal	<p>Check and save the data of operating conditions. Check the address setting method of faulty network whether it is automatic setting or manual setting.</p> <p>Caution: Unless the power source is reset after changing address, the set address will not be confirmed.</p> <p>Test run * No action is taken because it is judged that the power source reset is not done after changing address.</p> <p>Correct signal line. *In case of automatic address setting, signal line cannot be connected to other outdoor unit system.</p> <p>Test run</p> <p>Replace outdoor unit control PCB*. (Rotary switch anomaly)</p> <p>* Before replacement, please confirm whether the rotary switch for address setting is not damaged. (It was experienced that No.5 on rotary switch was not recognized.)</p>
	Auto	Manual								
Auto address setting	E31	E46								
Manual address setting	E46	Normal								

Note: After completing the above procedure, reset the power source and confirm that the error display does not recur. Unless the power source is reset for both indoor unit and outdoor unit, the set addresses will not be confirmed.

Error code Remote control: E48 7-segment display: E48-1, 2 *1	LED	Green	Red	Content <h2 style="text-align: center;">Outdoor DC fan motor anomaly(1/2)</h2>
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*1	

*1 E48-1: 1-time flash (FMO1), E48-2 : 2-time flash (FMO2)

1.Applicable model	Outdoor unit
2.Error detection method	<ul style="list-style-type: none"> If 400 min⁻¹ or lower of the fan rotation command and the state of overcurrent are detected for 10 times continuously (CNFAN terminal: Between 5-2 pins ... Hi output ⇒ Overcurrent Lo output ⇒ Normal) If 100 min⁻¹ of the actual fan rotation speed is detected for 30 seconds
3. Condition of error displayed	Speed of 400 min ⁻¹ or less is commanded, and state of overcurrent is communicated.
4.Presumable cause	<ul style="list-style-type: none"> Broken or disconnected wire Faulty fan motor Defective power PCB Defective control PCB

5.Troubleshooting (Inspect also the fan motor 2 even if it is E48-1.)
(Inspect also the fan motor 1 even if it is E48-2.)

Diagnosis	Countermeasure

Note: ※1 Measurement position: Refer to section 9.4 for voltage check of control and power PCB.
If it fails to repeat, connect the Mente PC, and continue to collect data.

APPENDIX:fan motor resistance

measure point			SSA512T146
			PCB512T006
wire to power	—	red	Vm
	1pin	white	Vcc
	2pin	—	—
control wire	3pin	yellow	Vsp
	4pin	blue	FG
	5pin	—	—
	6pin	pink	GND

※The value is for reference.
It will depends on measuring instruments.

Error code Remote control: E48 7-segment display: E48-1, 2 *1	LED	Green	Red	Content <h2 style="text-align: center;">Outdoor DC fan motor anomaly(2/2)</h2>
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*1	

*1 E48-1: 1-time flash (FMO1), E48-2 : 2-time flash (FMO2)

1. Applicable model	5. Troubleshooting (Inspect also the fan motor 2 even if it is E48-1.) (Inspect also the fan motor 1 even if it is E48-2.)		
Outdoor unit	Diagnosis	Countermeasure	
2. Error detection method	<pre> graph TD Start[From previous page] --> D1{Turn power OFF. Check for proper connection of harnesses and connectors between inverter and control PCB.} D1 -- NO --> C1[• Check for broken wires in harness, disconnected connectors.] D1 -- YES --> D2{Does speed command voltage of power PCB rise gradually and stabilize after a rise of several V?} D2 -- YES --> C2[Replace fan motor.] D2 -- NO --> D3{Replace power PCB. Did the symptoms improve after replacing PCB?} D3 -- YES --> C3[Defective power PCB] D3 -- NO --> D4{Replace control PCB. Did the symptoms improve after replacing PCB?} D4 -- YES --> C4[Defective control PCB] D4 -- NO --> C5[Please also replace fan motor.] </pre>		
3. Condition of error displayed	Speed of 400 min ⁻¹ or less is commanded, and state of overcurrent is communicated.		
4. Presumable cause	<ul style="list-style-type: none"> • Broken or disconnected wire • Faulty fan motor • Defective power PCB • Defective control PCB 		

Note: ※1 Measurement position: Refer to section 9.4 for voltage check of control and power PCB.
If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code Remote control: E49 7-segment display: E49	LED	Green	Red	Content <h2 style="text-align: center;">Low pressure anomaly</h2>
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model
Outdoor unit
2. Error detection method
Detection of anomalously low pressure.
3. Condition of error displayed
During operation <ul style="list-style-type: none"> When the low pressure sensor detects lower than 0.003MPa for 5 seconds continuously When the low pressure sensor detects 0.134MPa or lower for 30 seconds continuously And if this anomaly occurs 5 times within 60 minutes.
4. Presumable cause
<ul style="list-style-type: none"> Low pressure sensor (PSL) anomaly Service valves closed EEV anomaly (EEV closed) Insufficient refrigerant amount Clogging at EEV or strainer

5. Troubleshooting	
Diagnosis	Countermeasure
Save data for 30 minutes before stopping in Mente PC. Reset power supply and restart.	
Does the error occur immediately after the startup? YES NO	Check and save the data of operating conditions Check error status. Is the refrigerant amount OK? Check additional refrigerant amount charged at site according to the piping length instructed on the label pasted on the panel of the unit. Check whether the service valves are open.
Does the low pressure fluctuate after the startup? YES NO	Correct the connection of low pressure sensor connector. Replace low pressure sensor.
Is the opening degree of EEV for evaporator side fluctuating? YES NO	Replace outdoor unit control PCB.
Is the checked result of harness and insulation of EEV coil OK? YES NO	Replace control PCB at evaporator side. Replace EEV coil.
Is the connection of sensor connector OK? YES NO	Correct the connection of temperature sensor connector for heat exchanger. Replace temperature sensor of heat exchanger at evaporator side.
Are the sensor characteristics OK? * YES NO	Replace temperature sensor characteristics OK? at evaporator side.
Are the temperature sensor characteristics OK? YES NO	Replace control PCB at evaporator side.
Does the EEV operate normally by judging from Mente PC data, etc? YES NO	Replace EEV main body or strainer.
Is EEV or strainer clogged? YES NO	Check for short-circuit of air flow of heat exchanger at evaporator side and for fan motor anomaly.

Note: Check whether the indoor unit is connected to other outdoor Superlink network.
 If the error does not recur, connect the Mente PC and continue to collect data.

Error code Remote control: E53/E55*1 7-segment display: E53/E55-1, 2	LED	Green	Red	Content Suction pipe temperature sensor anomaly (Tho-S), Under-dome temperature sensor anomaly (Tho-C1, C2)
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*2	

*1 E53 : Tho-S, E55-1 : Tho-C1, E55-2: Tho-C2 *2 E53, E55-1: 1-time flash, E55-2: 2-time flash

1. Applicable model Outdoor unit
2. Error detection method Detection of anomalously low temperature (resistance) of Tho-S or Tho-C1, C2.
3. Condition of error displayed Tho-S • If -50°C or lower is detected for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after compressor ON, compressor stops. When the compressor is restarted automatically after 3-minute delay, if this anomaly occurs 3 times within 40 minutes Tho-C1, C2: • If -40°C or lower is detected for 5 seconds continuously within 10 minutes to minutes 20 seconds after compressor ON, compressor stops. When the compressor is restarted automatically after 3-minute delay, if this anomaly occurs 3 times within 40 minutes
4. Presumable cause <ul style="list-style-type: none"> • Broken temperature sensor harness or the internal wire of sensing section (Check the molded section as well.) • Disconnection of temperature sensor harness connection (connector) • Outdoor unit control PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <pre> graph TD Q1{Is the connector of temperature sensor connected properly?} -- NO --> C1[Insert the connector securely.] Q1 -- YES --> Q2{Are the characteristics of temperature sensor OK? *1} Q2 -- NO --> C2[Replace temperature sensor. (Tho-S or Tho-C1, C2)] Q2 -- YES --> C3[Replace outdoor unit control PCB.] </pre> <p style="text-align: center;">*1 Check several times to prove any poor connection.</p>	<p>Check and save the data of operating conditions. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature on Mente PC with actual measured value.</p>

Temperature-resistance characteristics of suction pipe temperature sensor (Tho-S)

Temperature-resistance characteristics of under-dome temperature sensor (Tho-C1, C2)

Note:

Error code Remote control: E54 7-segment display: E54-1, 2 *1	LED	Green	Red	Content High pressure sensor anomaly (PSH) Low pressure sensor anomaly (PSL)
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*1	

*1 E54-1: 1-time flash (PSL), E54-2 : 2-time flash (PSH)

1. Applicable model	Outdoor unit
2. Error detection method	Detection of anomalous pressure (voltage) of PSH or PSL. [Operation range High pressure : 0-4.15MPa Low pressure : 0-1.7MPa]
3. Condition of error displayed	If anomalous pressure sensor output voltage (0V or lower or 3.49V or higher) is detected for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON
4. Presumable cause	<ul style="list-style-type: none"> • Broken pressure sensor harness • Disconnection of pressure sensor harness connection (connector) • Pressure sensor (PSH, PSL) anomaly • Outdoor unit control PCB anomaly • Anomalous installation conditions • Insufficient air flow volume • Excessive or insufficient refrigerant amount

5. Troubleshooting

Diagnosis	Countermeasure																
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Check the data for 30 minutes before stopping.</div> <div style="text-align: center;"> Is anomalous pressure detected? <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: left;"> NO ↓ Reset the power source and restart operation. </div> <div style="text-align: right;"> YES ↓ Is the connector of the pressure sensor inserted properly to the connector on the outdoor unit control PCB? <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: left;"> NO → Insert the connector securely and restart operation. </div> <div style="text-align: right;"> YES ↓ Does E54 recur? <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: left;"> NO → Temporary malfunction by noise Correct if the source of noise is specified. </div> <div style="text-align: right;"> YES ↓ Does the pressure converted from the pressure sensor output voltage match the actual pressure measure by pressure gauge? <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: left;"> NO → Replace pressure sensor (PSH, PSL) </div> <div style="text-align: right;"> YES → Replace outdoor unit control PCB. </div> </div> </div> </div> </div> </div> </div> </div></div>																	
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>High pressure sensor output characteristics</p> <table border="1" style="margin: 5px auto;"> <caption>High Pressure Sensor Output Characteristics</caption> <thead> <tr><th>Pressure (MPa)</th><th>Output voltage (V)</th></tr> </thead> <tbody> <tr><td>0</td><td>0.5</td></tr> <tr><td>2.08</td><td>2.0</td></tr> <tr><td>4.15</td><td>3.5</td></tr> </tbody> </table> </div> <div style="text-align: center;"> <p>Low pressure sensor output characteristics</p> <table border="1" style="margin: 5px auto;"> <caption>Low Pressure Sensor Output Characteristics</caption> <thead> <tr><th>Pressure (MPa)</th><th>Output voltage (V)</th></tr> </thead> <tbody> <tr><td>0</td><td>0.5</td></tr> <tr><td>0.85</td><td>2.0</td></tr> <tr><td>1.7</td><td>3.5</td></tr> </tbody> </table> </div> </div> <p style="font-size: small; text-align: center;">Pressure sensor output Black (GND) – White; Output voltage (Black – Red; DC5V)</p>	Pressure (MPa)	Output voltage (V)	0	0.5	2.08	2.0	4.15	3.5	Pressure (MPa)	Output voltage (V)	0	0.5	0.85	2.0	1.7	3.5	
Pressure (MPa)	Output voltage (V)																
0	0.5																
2.08	2.0																
4.15	3.5																
Pressure (MPa)	Output voltage (V)																
0	0.5																
0.85	2.0																
1.7	3.5																

Note:

Error code Remote control: E56 7-segment display: E56-1, 2 *1	LED	Green	Red	Content Power transistor temperature sensor anomaly (Tho-P1, P2)
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*1	

*1 E56-1/1-time flash: Tho-P1 anomaly, E56-2/2-time flash: Tho-P2-anomaly

<p>1. Applicable model</p> <p>Outdoor unit</p>	<p>5. Troubleshooting</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Diagnosis</th> <th style="width: 50%;">Countermeasure</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <p style="text-align: center;">*1 Check several times to prove any poor connection.</p> </td> <td style="vertical-align: top;"> <p>Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature of Mente PC data with actual measured value.</p> <p>Insert the connector securely.</p> <p>Replace power transistor temperature sensor (Tho-P1, P2).</p> <p>Replace outdoor unit inverter PCB.</p> </td> </tr> </tbody> </table>	Diagnosis	Countermeasure	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <p style="text-align: center;">*1 Check several times to prove any poor connection.</p>	<p>Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature of Mente PC data with actual measured value.</p> <p>Insert the connector securely.</p> <p>Replace power transistor temperature sensor (Tho-P1, P2).</p> <p>Replace outdoor unit inverter PCB.</p>
Diagnosis	Countermeasure				
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <p style="text-align: center;">*1 Check several times to prove any poor connection.</p>	<p>Check and save the data of operating condition. Check the conditions whether it occurs immediately after the power on or during operation or stopping. Check the sensed value. Compare the temperature of Mente PC data with actual measured value.</p> <p>Insert the connector securely.</p> <p>Replace power transistor temperature sensor (Tho-P1, P2).</p> <p>Replace outdoor unit inverter PCB.</p>				
<p>2. Error detection method</p> <p>Detection of anomalously low temperature (resistance) of Tho-P1, P2</p>					
<p>3. Condition of error displayed</p> <p>When the outdoor air temperature is above 0°C, if -10°C or lower is detected for 20 seconds continuously within 10 minutes to 10 minutes 30 seconds after compressor ON, compressor stops. When the compressor is restarted automatically after 3-minute delay, if this anomaly occurs 3 times within 40 minutes</p>					
<p>4. Presumable cause</p> <ul style="list-style-type: none"> • Broken temperature sensor harness or the internal wire of sensing section (Check the molded section as well.) • Disconnection of temperature sensor harness connection (connector) • Outdoor unit inverter PCB anomaly 					

Note:

Error code Remote control:E58 7-segment display: E58-1, 2 *1	LED	Green	Red	Content <h2 style="text-align: center;">Anomalous compressor by loss of synchronism</h2>
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*2	

*1 E58-1: CM1, E58-2: CM2 *2 E58-1: 1-time flash, E58-2: 2-time flash

1.Applicable model
Outdoor unit
2.Error detection method
E58 is displayed on 7-segment LED.
3. Condition of error displayed
When this anomaly is established 4 times within 15 minutes
4.Presumable cause
<ul style="list-style-type: none"> Insufficient time elapsed after the power source supplied, before compressor startup. (Startup the compressor without crankcase heater ON) Compressor anomaly Inverter PCB anomaly Check valve broken

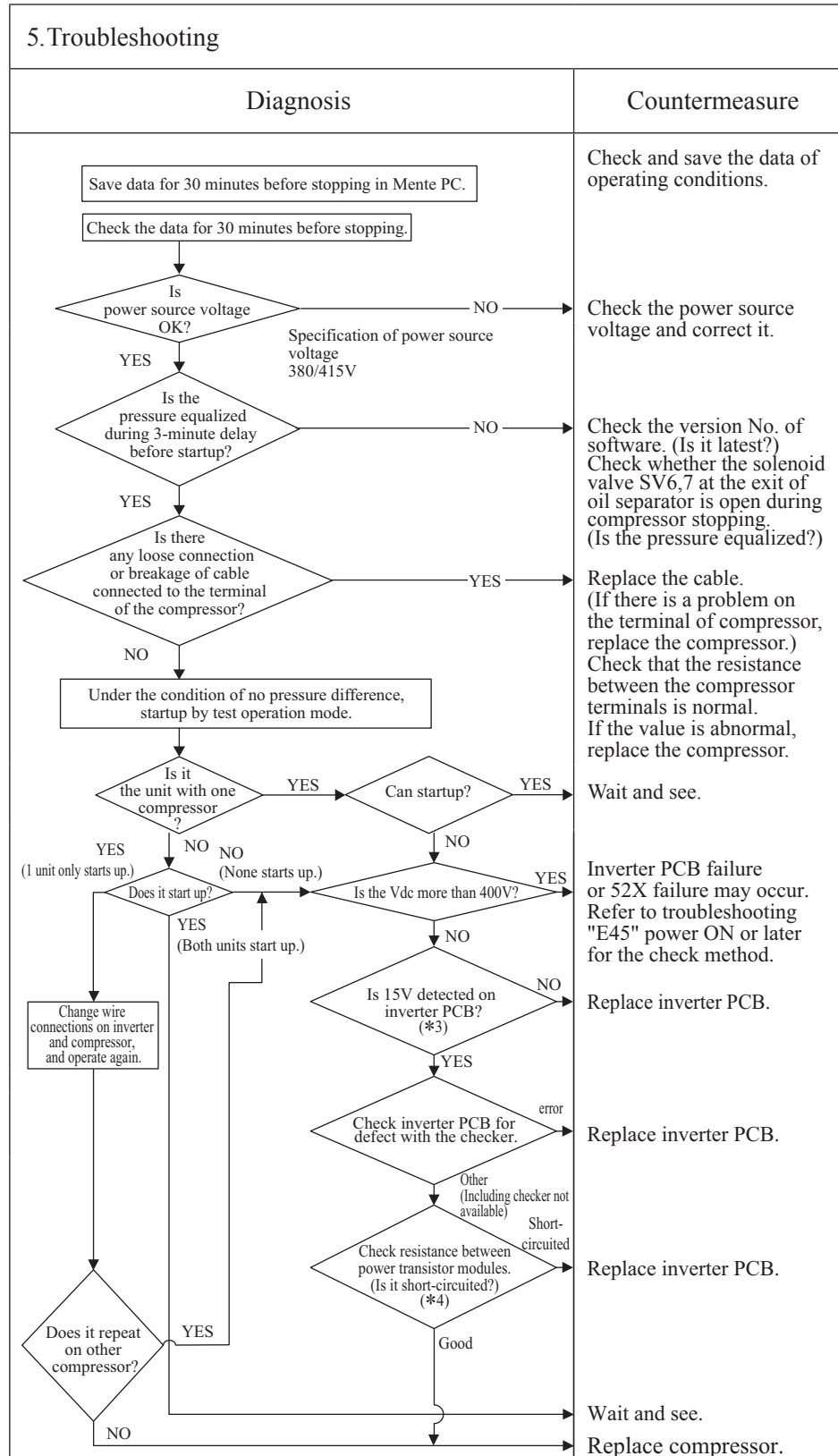
5.Troubleshooting	
Diagnosis	Countermeasure
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Evaluate data 30 minutes earlier.</div>	

Note: *3 Measurement position: Refer to section 9.4 for voltage check of inverter PCB.
 *4 Measurement position: Check resistance between P-U, P-V, P-W, N-U, N-V, N-W, P-N. (Disconnect wires from compressor beforehand.)
 If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code Remote control: E59 7-segment display: E59-1, 2 *1	LED	Green	Red	Content <h2 style="text-align: center;">Compressor startup failure (CM1,CM2)</h2>
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*2	

*1 E59-1: CM1, E59-2: CM2 *2 E59-1: 1-time flash, E59-2: 2-time flash

1. Applicable model
Outdoor unit
2. Error detection method
When it fails to change over to the operation for rotor position detection of compressor motor (If the compressor speed cannot increase 11Hz or higher)
3. Condition of error displayed
If the compressor fails to startup for 20 times (10 patterns x 2 times) continuously
4. Presumable cause
<ul style="list-style-type: none"> • Anomalous voltage of power source • Anomalous components for refrigerant circuit • Inverter PCB anomaly • Loose connection of connector or cable • Compressor anomaly (Motor or bearing)



Note: *3 Measurement position: Refer to section 9.4 for voltage check of inverter PCB.
 *4 Measurement position: Check resistance between P-U, P-V, P-W, N-U, N-V, N-W, P-N. (Disconnect wires from compressor beforehand.)
 If it fails to repeat, connect the Mente PC, and continue to collect data.

Error code Remote control: E61 7-segment display: E61-1, 2 *1	LED	Green	Red	Content Communications error between the master unit and slave units
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	*1	

*1 E61-1/1-time flash: Slave unit 1, E61-2/2-time flash: Slave unit 2

1. Applicable model	5. Troubleshooting		
Outdoor unit	Diagnosis	Countermeasure	
2. Error detection method	<pre> graph TD Q1{Is the address setting of master and slave outdoor units OK?} Q1 -- NO --> C1[Correct it.] Q1 -- YES --> R1[Reset the power supply and restart operation.] R1 --> Q2{Is E61 occur?} Q2 -- YES --> C2[Replace the outdoor unit PCB.] Q2 -- NO --> C3[Anomalous noise, etc.] </pre>		
E61 is displayed on 7-segment LED.			
3. Condition of error displayed			
When the communication between master unit and slave units is not established			
4. Presumable cause	<ul style="list-style-type: none"> • Signal wire anomaly • Outdoor unit control PCB anomaly • Inverter PCB anomaly • Rush current prevention resistor anomaly 		

Note:

Error code Remote control: E63 7-segment display: E63	LED	Green	Red	Content <h2 style="text-align: center;">Emergency stop</h2>
	Indoor	Keeps flashing	Stays OFF	
	Outdoor	Keeps flashing	1-time flash	

1. Applicable model
Indoor unit

2. Error detection method
When ON signal is inputted to the CnT terminal of indoor unit control PCB

3. Condition of error displayed
Same as above

4. Presumable cause
Factors for emergency stop

5. Troubleshooting	
Diagnosis	Countermeasure
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Save data for 30 minutes before stopping in Mente PC.</div> <pre> graph TD A{Is the remote controller setting of Emergency Stop "Valid"?} -- NO --> B[Replace remote control PCB.] A -- YES --> C{Is ON signal inputted to the CnT terminal of indoor unit control PCB?} C -- NO --> D[Replace indoor unit control PCB.] C -- YES --> E[Check the cause of emergency stop. (It is better to have the data for 30 minutes before stopping, when instructing the installer.)] </pre>	
	Check and save the data of operating conditions. Check the conditions whether it occurs immediately after the power on or during operation.



Note: Indoor unit detected emergency stop signal gives command "all stop".

8.4 Outdoor unit control PCB exchange procedure

PCB012D105

Precautions for Safety

- Since the following precaution is the important contents for safety, be sure to observe them. WARNING and CAUTION are described as follows:

-  **WARNING** Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.
-  **CAUTION** Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.

WARNING

- Securely exchange the PCB according to this procedure. If the PCB is incorrectly exchanged, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before exchanging the PCB. The PCB exchange under current-carrying will cause an electric shock or fire.
- After finishing the PCB exchange, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly exchanged, it will cause an electric shock or fire.

CAUTION

- Band the wiring so as not to tense because it will cause an electric shock.

Exchange the Control PCB (Fig.1) according to the following procedure.

1. Exchange the PCB **after elapsing 3 minutes from power OFF. (Even after the breaker Have been turned off, some capacitors still hold high voltage. This condition is very dangerous to touch PCB.) Be sure that the voltage (DC) is under 30 V** before harnesses disconnect from PCBs. (Refer to Fig.2)
2. Remove the connectors from the former Control PCB. Also, reconnect the jumper connectors of CNS1 and CNS2 to same position of the new Control PCB. (Except when jumper connectors are not plug into CNS1 and CNS2.) Outdoor unit cannot restart if the jumper connectors are misconnected.
3. Exchange to the new PCB after match the switches (SW1-6, 10, 11) and jumper wires (J11-18) of the new PCB to the same setting as the former PCB.
4. Reconnect the connectors as before. **(Be sure that there are not half inserted connectors.)**

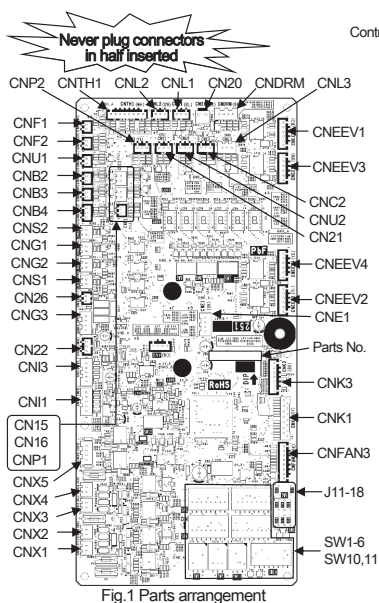


Fig.1 Parts arrangement

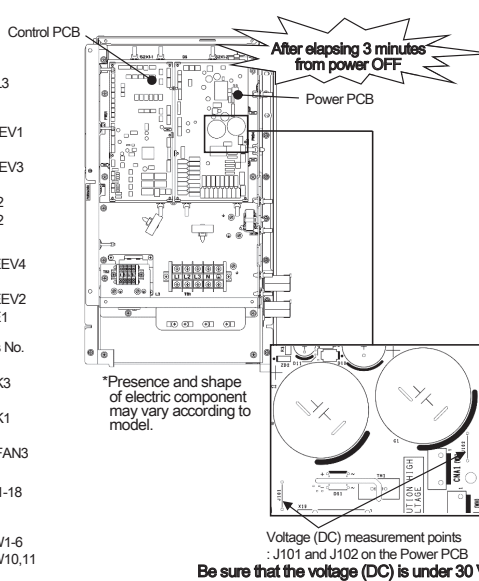




Fig.2 PCB mounting position and voltage measurement points

8.5 Outdoor unit power PCB exchange procedure

PCB012D106

Precautions for Safety

- Since the following precaution is the important contents for safety, be sure to observe them. WARNING and CAUTION are described as follows:

-  **WARNING** Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.
-  **CAUTION** Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.

WARNING

- Securely exchange the PCB according to this procedure. If the PCB is incorrectly exchanged, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before exchanging the PCB. The PCB exchange under current-carrying will cause an electric shock or fire.
- After finishing the PCB exchange, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly exchanged, it will cause an electric shock or fire.

CAUTION

- Band the wiring so as not to tense because it will cause an electric shock.

Exchange the Power PCB (Fig.1) according to the following procedure.

1. Exchange the PCB **after elapsing 3 minutes from power OFF**. (Even after the breaker have been turned off, some capacitors still hold high voltage. This condition is very dangerous to touch PCB.) **Be sure that the voltage (DC) is under 30 V** before harnesses disconnect from PCBs. (Refer to Fig.2)
2. Remove the connectors from the former Power PCB and then exchange to the new PCB.
3. Reconnect the connectors as before. (**Be sure that there are not half inserted connectors.**)

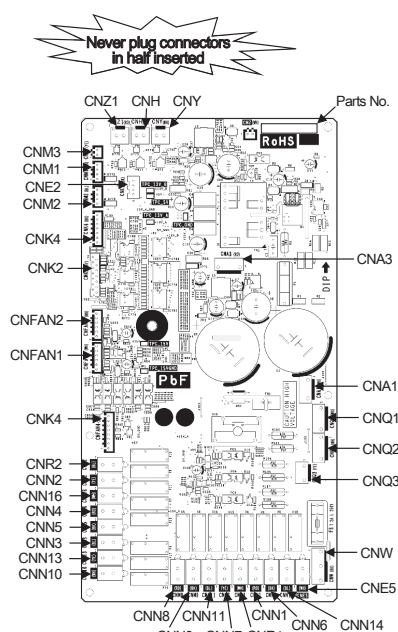
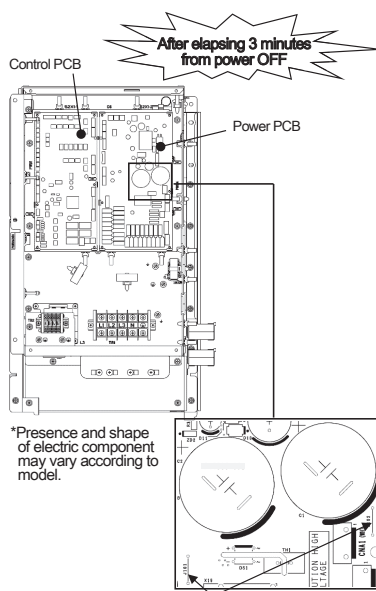


Fig.1 Parts arrangement



Voltage (DC) measurement points : J101 and J102 on the Power PCB
Be sure that the voltage (DC) is under 30 V



Fig.2 PCB mounting position and voltage measurement points

8.6 Outdoor unit noise filter PCB exchange procedure

PCB012D107

Precautions for Safety

- Since the following precaution is the important contents for safety, be sure to observe them. WARNING and CAUTION are described as follows:

-  **WARNING** Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.
-  **CAUTION** Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.

WARNING

- Securely exchange the PCB according to this procedure. If the PCB is incorrectly exchanged, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before exchanging the PCB. The PCB exchange under current-carrying will cause an electric shock or fire.
- After finishing the PCB exchange, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly exchanged, it will cause an electric shock or fire.

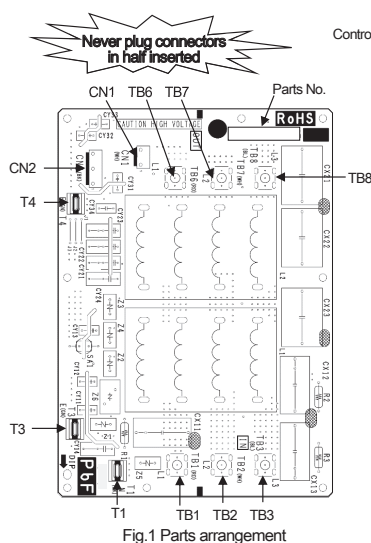
CAUTION

- Band the wiring so as not to tense because it will cause an electric shock

Exchange the Noise Filter PCB (Fig.1) according to the following procedure.

1. Exchange the PCB **after elapsing 3 minutes from power OFF**. (Even after the breaker Have been turned off, some capacitors still hold high voltage. This condition is very dangerous to touch PCB.) **Be sure that the voltage (DC) is under 30 V** before harnesses disconnect from the PCBs. (Refer to Fig.2)
2. Disconnect the connectors and wirings from the former PCB and then exchange to the new PCB.
3. Reconnect the connectors and wirings as before. (Refer to table for recommended tightening torque regarding wirings.)

(Be sure that there are not half inserted connectors.)



Parts	Ref.No.	Tightening torque
Noise Filter PCB	TB1-3 TB6-8	2.5 - 2.7 N·m

Table Recommended tightening torque

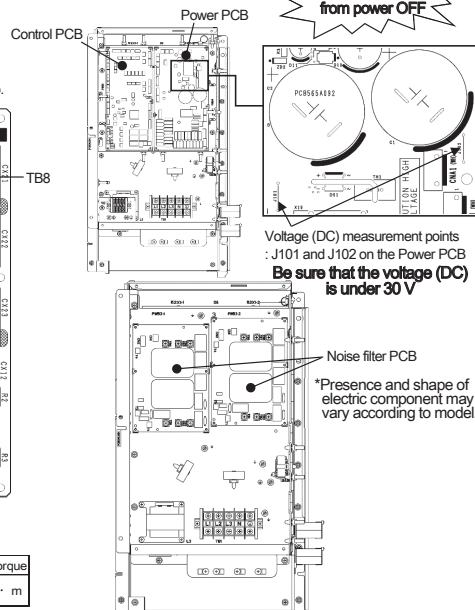


Fig.2 PCB mounting position and voltage measurement points

8.7 Outdoor unit inverter PCB exchange procedure

PCB012D108B

(1) Models FDC280, 335, 475, 500, 560KXZE2

Precautions for Safety	
<ul style="list-style-type: none"> Since the following precaution is the important contents for safety, be sure to observe them. WARNING and CAUTION are described as follows: 	
⚠ WARNING	Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.
⚠ CAUTION	Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.
⚠ WARNING	
<ul style="list-style-type: none"> Securely exchange the PCB according to this procedure. If the PCB is incorrectly exchanged, it will cause an electric shock or fire. Be sure to check that the power source for the outdoor unit is turned OFF before exchanging the substrate. The PCB exchange under current-carrying will cause an electric shock or fire. After finishing the PCB exchange, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly exchanged, it will cause an electric shock or fire. 	
⚠ CAUTION	
<ul style="list-style-type: none"> Band the wiring so as not to tense because it will cause an electric shock. 	

Exchange the Inverter PCB (Fig.1) according to the following procedure.

- Exchange the PCB **after elapsing 3 minutes from power OFF**.
(Even after the breaker have been turned off, some capacitors still hold high voltage. This condition is very dangerous to touch PCB.)
Be sure that the voltage (DC) is under 30 V before harnesses disconnect from PCBs.
(Refer to Fig.2.)
- Remove the connectors and wirings from the former Inverter PCB, and unscrew the screw fixing Power module (IC2) to the radiator.
After removed the former PCB, wipe off the silicon grease neatly from the radiator.
- Match the switch (JSW10) of new PCB to the same setting as the former PCB.
- Attach the cable clamp to new PCB front side and spacer to back side. (Refer to Fig.1.)
- Apply silicone grease evenly to the radiating surface of the Power module (IC2) on the new PCB, otherwise they might be damage. (Consume all of the silicon grease.)
Then install the new PCB in the same position as the former PCB.
- Tighten the screw of Power module (IC2) on the new PCB and reconnect the connectors and wirings as before. (Refer to table for recommended tightening torque regarding wirings and screws.) **(Be sure that there are not half inserted connectors.)**

*Presence and shape of electric component may vary according to model.

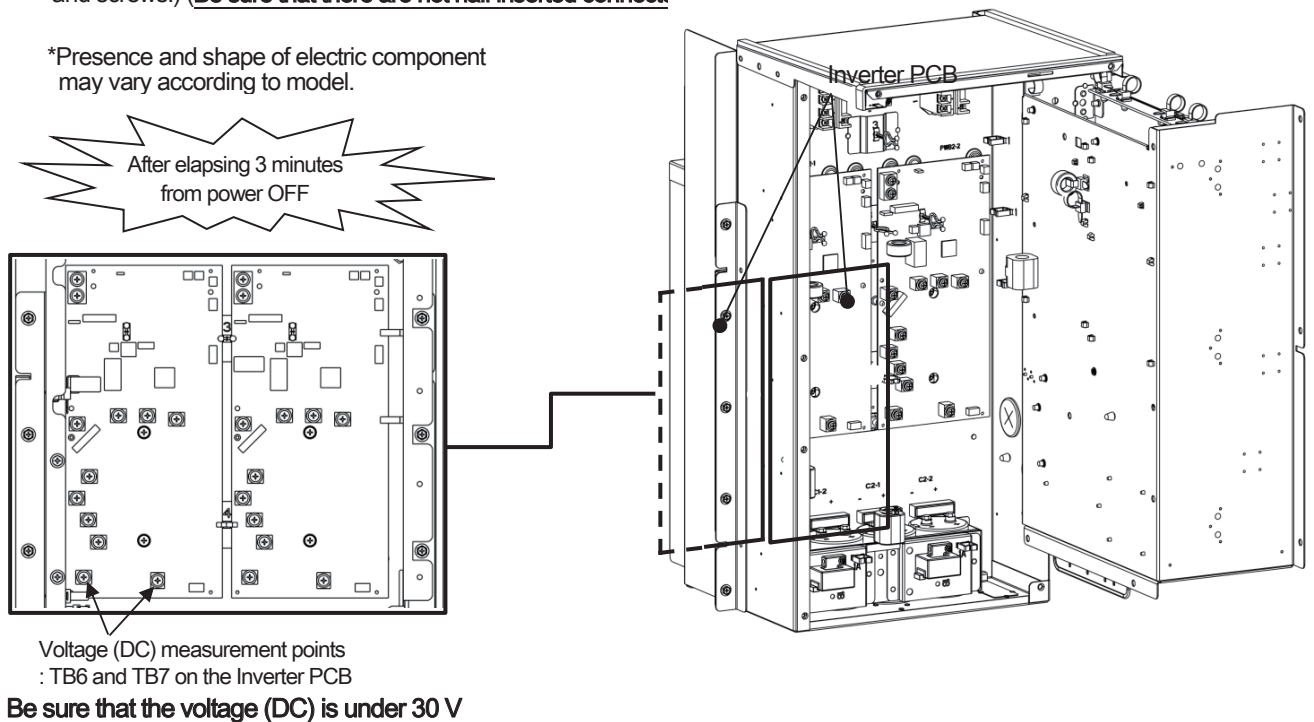


Fig.2 PCB mounting position and voltage measurement points

*Presence and shape of electric component may vary according to model.

Never plug connectors in half inserted

After elapsing 3 minutes from power OFF

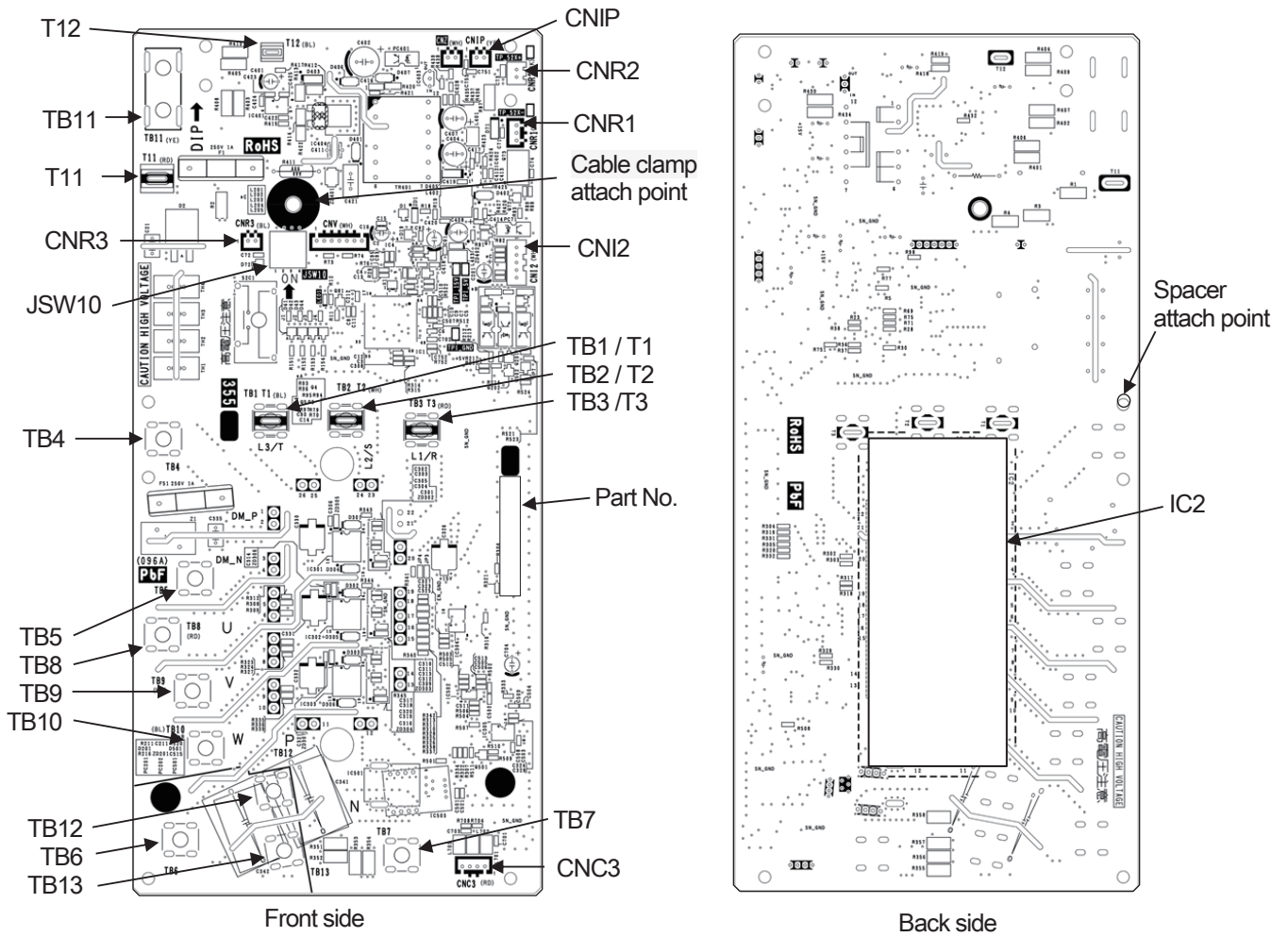




Fig.1 Parts arrangement

Parts	Ref.No	Tightening torque
Power module	IC2	2.5 - 2.7 N· m
Inverter PCB	TB1-13	2.5 - 2.7 N· m

Table Recommended tightening torque

PCB012D108C

(2) Models FDC400, 450KXZE2

Precautions for Safety	
<ul style="list-style-type: none"> Since the following precaution is the important contents for safety, be sure to observe them. 	
WARNING and CAUTION are described as follows:	
 WARNING	Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.
 CAUTION	Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.
⚠ WARNING	
<ul style="list-style-type: none"> Securely exchange the PCB according to this procedure. If the PCB is incorrectly exchanged, it will cause an electric shock or fire. Be sure to check that the power source for the outdoor unit is turned OFF before exchanging the substrate. The PCB exchange under current-carrying will cause an electric shock or fire. After finishing the PCB exchange, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly exchanged, it will cause an electric shock or fire. 	
⚠ CAUTION	
<ul style="list-style-type: none"> Band the wiring so as not to tense because it will cause an electric shock. 	

Exchange the Inverter PCB (Fig.1) according to the following procedure.

- Exchange the PCB **after elapsing 3 minutes from power OFF.**
 (Even after the breaker have been turned off, some capacitors still hold high voltage. This condition is very dangerous to touch PCB.)
Be sure that the voltage (DC) is under 30 V before harnesses disconnect from PCBs.
 (Refer to Fig.2.)
- Remove the connectors, wirings and snubber capacitor from the former Inverter PCB, and unscrew the screws fixing Power module (IC2) to the radiator. After removed former PCB, wipe off the silicon grease neatly from the radiator.
- Match the switch (JSW10) of the new PCB to the same setting as the former PCB.
- Attach the cable clamp to new PCB front side and spacer to back side. (Refer to Fig.1.)
- Apply silicone grease evenly to the radiating surface of the Power module (IC2) on the new PCB, otherwise they might be damaged. (Consume all of the silicon grease.) then install the new PCB in the same position as the former PCB.
- Tighten the screws of Power module (IC2) on new PCB and reconnect the connectors, wirings and snubber capacitor as before. (Refer to table for recommended tightening torque regarding wirings and screws.) **(Be sure that there are not half inserted connectors.)**

*Presence and shape of electric component may vary according to model.

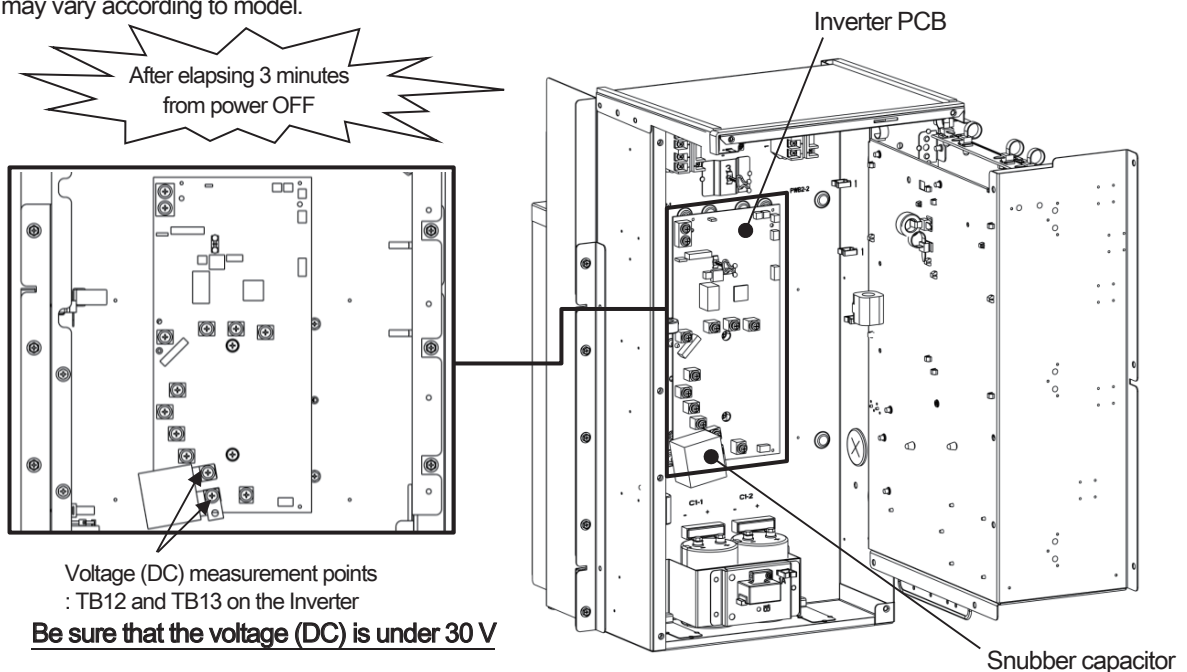


Fig.2 PCB mounting position and voltage measurement points

*Presence and shape of electric component may vary according to model.

Never plug connectors in half inserted

After elapsing 3 minutes from power OFF

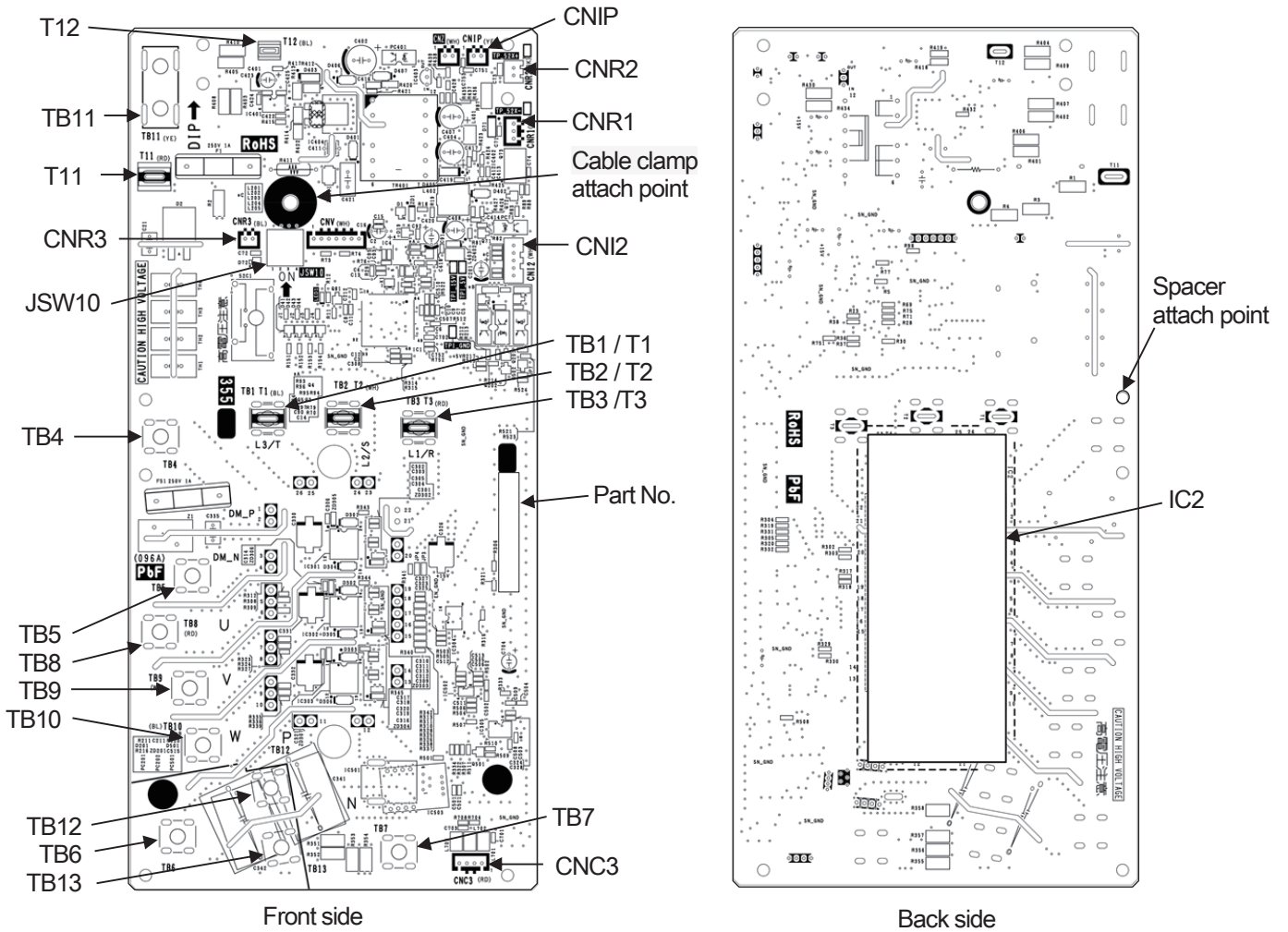


Fig.1 Parts arrangement

Parts	Ref.No	Tightening torque
Power module	IC2	2.5 - 2.7 N· m
Inverter PCB	TB1-13	2.5 - 2.7 N· m

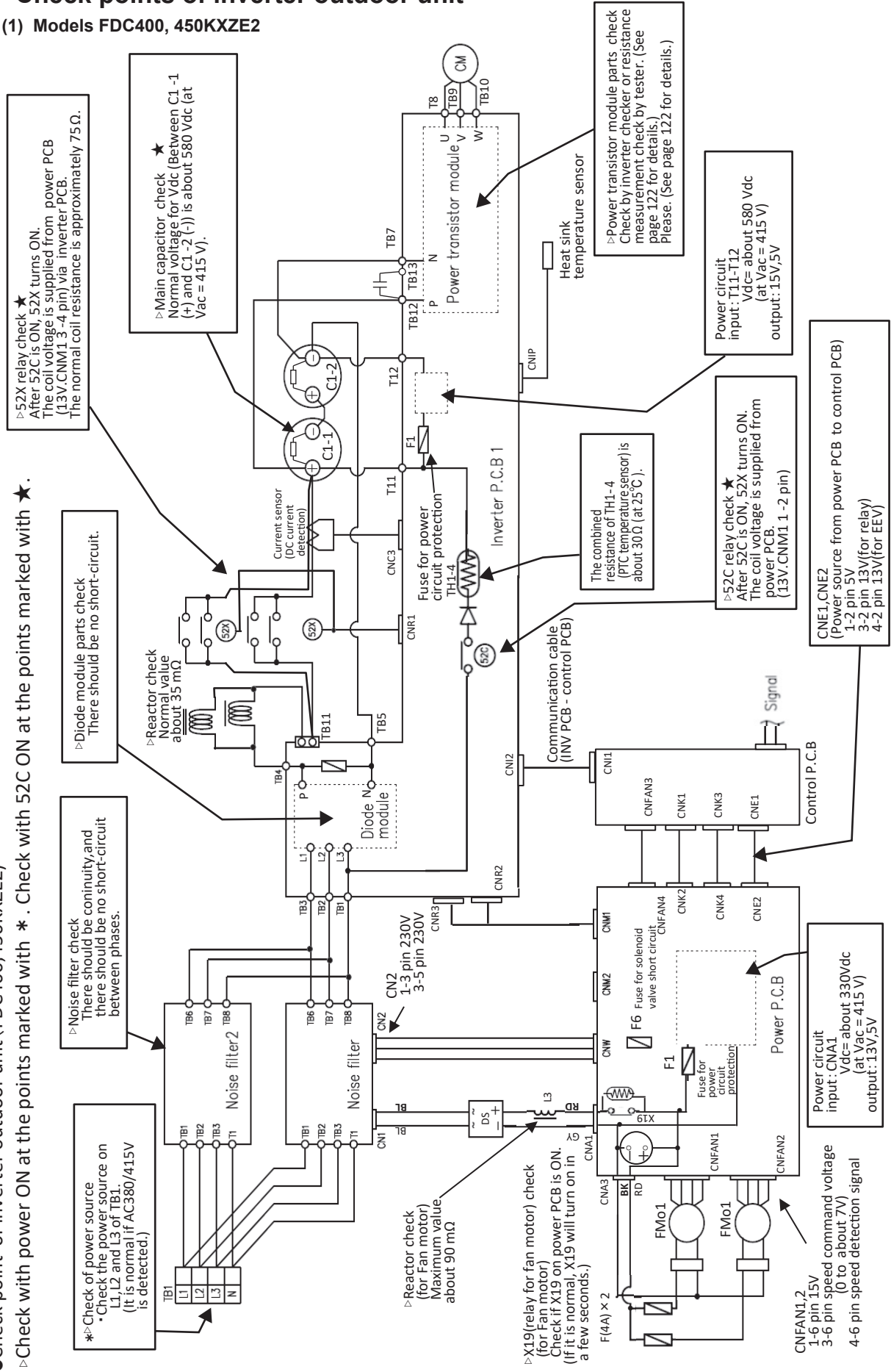
Table Recommended tightening torque

8.8 Check points of inverter outdoor unit

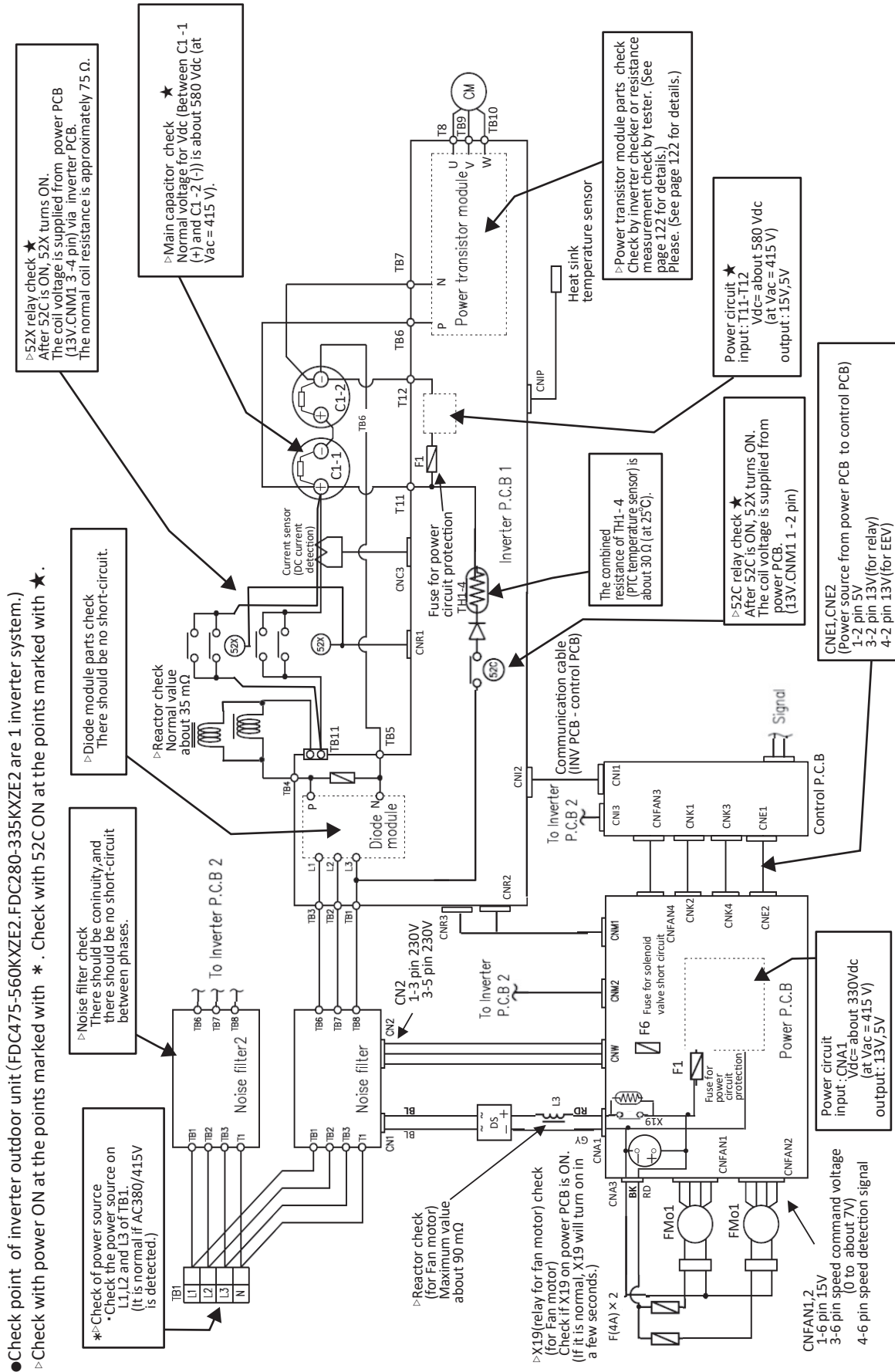
(1) Models FDC400, 450KXZE2

● Check point of inverter outdoor unit (FDC400,450KXZE2)

▷ Check with power ON at the points marked with * . Check with 52C ON at the points marked with ★ .



**(2) Models FDC280-335KXZE2, 475-560KXZE2
(FDC280-335KXZE2 are 1 inverter system.)**



9. APPLICATION DATA

9.1 Installation of outdoor unit

Designed for R410A refrigerant

PSC012D158

KXZ SERIES INSTALLATION MANUAL

Outdoor unit capacity
FDC280-1680

- This installation manual deals with outdoor units and general installation specifications only. For indoor units, please refer to the respective installation manuals supplied with your units.
- Please read this manual carefully before you set to installation work and carry it out according to the instructions contained in this manual.

Precautions for safety

- Read these "Precautions for safety" carefully before starting installation work and do it in the proper way.
- Safety instructions listed here are grouped into [⚠ Warnings] and [⚡ Cautions]. If a non-compliant installation method is likely to result in a serious consequence such as death or major injury, the instruction is grouped into [⚠ Warnings] to emphasize its importance. However, a failure to observe a safety instruction listed under [⚡ Cautions] can also result in a serious consequence depending on the circumstances. Please observe all these instructions, because they include important points concerning safety.
- The meanings of "Marks" used here are as shown on the right: [⚡] **Never do it under any circumstances.** [⚠] **Always do it according to the instruction.**
- When you have completed installation work, perform a test run and make sure that the installation is working properly. Then, explain the customer how to operate and how to take care of the air-conditioner according to the user's manual. Please ask the customer to keep this installation manual together with the user's manual.
- FDC280, 335KXZ comply with EN61000-3-3. The other units comply with EN61000-3-11.
- For outdoor unit, EN61000-3-2 and EN61000-3-12 are not applicable as consent by the utility company or notification to the utility company is given before usage.

⚠ WARNING

!

- Installation must be carried out by the qualified installer.
- If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction.
- Install the system in full accordance with the instruction manual.
- Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- Use the original accessories and the specified components for installation.
- If parts other than those prescribed by us are used, it may cause fall of the unit, water leaks, electric shocks, fire, refrigerant leak, substandard performance, control failure and personal injury.
- When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage accordance with ISO5149.
- Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- Ventilate the working area well in the event of refrigerant leakage during installation.
- If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- After completed installation, check that no refrigerant leaks from the system.
- If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.
- An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit.
- Install the unit in a location with good support.
- Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.
- Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.
- Power source with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire.
- Be sure to shut off the power before starting electrical work.
- Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- Be sure to use the cables conforming to safety standard and cable ampacity for power distribution work.
- Uncomfortable cables can cause electric leak, anomalous heat production or fire.
- Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.
- Loose connections or cable mountings can cause anomalous heat production or fire.
- Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.
- Incorrect installation may result in overheating and fire.
- In connecting the power cable, make sure that no anomalies such as dust deposits, socket clogging or wobble are found and insert the plug securely.
- Accumulation of dust, clogging on the socket, or looseness of plugging can cause electric shocks and fire.
- Be sure not to reuse existing refrigerant pipes
- Conventional refrigerant oil or chlorine contained in the conventional refrigerant which is remaining in the existing refrigerant pipes can cause deterioration of refrigerant oil of new unit. And 1.6 times higher pressure of R410A refrigerant than conventional one can cause burst of existing pipe, personal injury or serious accident.
- Do not perform brazing work in the airtight room
- It can cause lack of oxygen.
- Use the prescribed pipes, flare nuts and tools for R410A.
- Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.
- Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.
- If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked into refrigerant circuit, which can cause burst or personal injury due to anomalously high pressure in the refrigerant.
- Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulphide gas can occur.
- Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety. It can also cause the corrosion of the indoor unit and resultant unit failure or refrigerant leak.
- Only use prescribed option parts. The installation must be carried out by the qualified installer.
- If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- Do not perform any change of protective device itself or its setup condition
- The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- Be sure to switch off the power source in the event of installation, inspection or servicing.
- If the power source is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- Consult the dealer or an expert regarding removal of the unit.
- Incorrect installation can cause water leaks, electric shocks or fire.
- Stop the compressor before closing valve and disconnecting refrigerant pipes in case of pump down operation.
- If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit.

⊘

- Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.
- If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- Do not run the unit with removed panels or protections
- Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- Be sure to fix up the service panels.
- Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.
- If you repair or modify the unit, it can cause water leaks, electric shocks or fire.

⚡ CAUTION

!

- Use the circuit breaker for all pole with correct capacity.
- Using the incorrect circuit breaker, it can cause the unit malfunction and fire.
- Take care when carrying the unit by hand.
- If the earth weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handles when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.
- Dispose of any packing materials correctly.
- Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.
- Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.
- If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.
- Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.
- Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.
- Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.
- If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- Perform installation work properly according to this installation manual.
- Improper installation can cause abnormal vibrations or increased noise generation.

⚡

- Carry out the electrical work for ground lead with care.
- Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks and fire due to short-circuiting. Never connect the grounding wire to a gas pipe because if gas leaks, it could cause explosion or ignition.

⊘

- Earth leakage breaker must be installed
- If the earth leakage breaker is not installed, it can cause fire or electric shocks.
- Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.
- Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- Do not install the unit near the location where leakage of combustible gases can occur.
- If leaked gases accumulate around the unit, it can cause fire.
- Do not install the unit where corrosive gas (such as sulfuric acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.
- Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- Secure a space for installation, inspection and maintenance specified in the manual.
- Insufficient space can result in accident such as personal injury due to falling from the installation place.
- When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.
- Safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.
- Do not use the base frame for outdoor unit which is corroded or damaged due to long periods of operation.
- Using an old and damaged base frame can cause the unit falling down and cause personal injury.
- Do not install the unit in the locations listed below
 - Locations where carbon fiber, metal powder or any powder is floating.
 - Locations where any substances that can affect the unit such as sulphide gas, chlorine gas, acid and alkaline can occur.
 - Vehicles and ships
 - Locations where cosmetic or special sprays are often used.
 - Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
 - Locations where any machines which generate high frequency harmonics are used.
 - Locations with salty atmospheres such as coastlines
 - Locations with heavy snow (if installed, be sure to provide base frame and snow hood mentioned in the manual)
 - Locations where the unit is exposed to chimney smoke
 - Locations at high altitude (more than 1000m high)
 - Locations with ammoniac atmospheres (e.g. organic fertilizer).
 - Locations with calcium chloride (e.g. snow melting agent).
 - Locations where heat radiation from other heat source can affect the unit
 - Locations without good air circulation.
 - Locations with any obstacles which can prevent inlet and outlet air of the unit
 - Locations where short-circuit of air can occur (in case of multiple units installation)
 - Locations where strong air blows against the air outlet of outdoor unit
- It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- Do not install the outdoor unit in the locations listed below.
 - Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
 - Locations where outlet air of the outdoor unit blows directly to an animal or plants. The outlet air can affect adversely to the plant etc.
 - Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
 - Locations where vibration and operation sound generated by the outdoor unit can affect seriously.
 - (on the wall or at the place near bed room)
 - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
 - Locations where drainage cannot run off safely.
 - It can affect surrounding environment and cause a claim
- Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art. It can cause the damage to the items.
- Do not touch any buttons with wet hands
- It can cause electric shocks
- Do not shut off the power source immediately after stopping the operation.
- Wait at least 5 minutes, otherwise there is a risk of water leakage or breakdown.
- Do not control the system with main power switch.
- It can cause fire or water leakage. In addition, the fan can start unexpectedly, which can cause personal injury.
- Do not touch any refrigerant pipes with your hands when the system is in operation.
- During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.
- Do not operate the outdoor unit with any article placed on it.
- You may incur property damage or personal injury from a fall of the article.
- Do not step onto the outdoor unit.
- You may incur injury from a drop or fall.

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Notabilia as a unit designed for R410A

- Do not use any refrigerant other than R410A. R410A will rise to pressure about 1.6 times higher than that of a conventional refrigerant.
- A cylinder containing R410A has a pink indication mark on the top.
- A unit designed for R410A has adopted a different size indoor unit service valve charge port and a different size check joint provided in the unit to prevent the charging of a wrong refrigerant by mistake. The processed dimension of the flared part of a refrigerant pipe and a flare nut's parallel side measurement have also been altered to raise strength against pressure. Accordingly, you are required to arrange dedicated R410A tools listed in the table on the right before installing or servicing this unit.
- Do not use a charge cylinder. The use of a charge cylinder will cause the refrigerant composition to change, which results in performance degradation.
- In charging refrigerant, always take it out from a cylinder in the liquid phase.
- All indoor units must be models designed exclusively for R410A. Please check connectable indoor unit models in a catalog, etc. (A wrong indoor unit, if connected into the system, will impair proper system operation)


Dedicated R410A tools	
a)	Gauge manifold
b)	Charge hose
c)	Electronic scale for refrigerant charging
d)	Torque wrench
e)	Flare tool
f)	Protrusion control copper pipe gauge
g)	Vacuum pump adapter
h)	Gas leak detector

1. BEFORE BEGINNING INSTALLATION (Check that the models, power source specifications, piping, wiring are correct.)

CAUTION

- Please read this manual without fail before you set to installation work and carry it out according to this manual.
- For the installation of an indoor unit, please refer to the installation manual of an indoor unit.
- For piping work, option distribution parts (branching pipe set, header set) are necessary. Please refer to our catalog, etc.
- Never fail to install an earth leakage breaker. (Please use one tolerable to harmonic components)
- Operating the unit with the outlet pipe temperature sensor, the inlet pipe temperature sensor, the pressure sensor, etc. removed can result in a compressor burnout. Avoid operation under such conditions in any circumstances.
- With this air-conditioning system, room temperature may rise, depending on installation conditions, while indoor units are stopped, because small quantity of refrigerant flows into the stopped indoor units if heating operation is conducted on the system.

ACCESSORY

Name	Quantity	Usage location	
Wiring 	2	In operating the unit in the silent mode or the forced cooling/heating mode, insert it to the outdoor unit board's CNG.	It is supplied with the unit. You can find it taped inside the control box.
Instruction manual	1	When the installation work is completed, give instructions to the customer and ask him/her to keep it.	Attached on the side panel below the service valve.

COMBINATION PATTERNS

- The possible outdoor unit combinations and the number and the total capacity of indoor units that can be connected in a system are shown in the table below.
- Please always use indoor units designed exclusively for R410A. For connectable indoor unit model names, please check with our catalog, etc.
- It can be used in combination with the following indoor unit.

Indoor unit	Remote control	Connection OK/NO
FD○△△KXE6, KXE1	RC-E5 (2 cores), RC-EX3A (2 cores)	OK
FD○A△△KXE4R, KXE4BR, KXE5R	RC-E1R(3 cores)	NO
FD○A△△KXE4, KXE4(A), KXE4A	RC-E1(3 cores)	NO

Notabilia

The same outdoor unit is used whether it is used alone or in combination with another unit.

- Please note that an installation involving a combination other than those listed below is not operable. (For example, you cannot operate 280 and 400 in combination)

Outdoor unit		Indoor unit	
Capacity	Combination patterns	Number of connectable units (units)	Range of the total capacity of indoor units connected in a system ^{※1}
280	Single	1 - 37	140 - 560
335	Single	1 - 44	168 - 670
400	Single	1 - 53	200 - 800
450	Single	1 - 60	225 - 900
475	Single	1 - 50	238 - 760
500	Single	1 - 53	250 - 800
560	Single	1 - 59	280 - 896
615	Combination (280+335)	2 - 65	308 - 984
670	Combination (335+335)	2 - 71	335 - 1072
735	Combination (335+400)	2 - 78	368 - 1176
800	Combination (400+400)	2 - 80	400 - 1280
850	Combination (400+450)	2 - 80	425 - 1360
900	Combination (450+450)	2 - 80	450 - 1440
950	Combination (475+475)	2 - 80	475 - 1520
1000	Combination (500+500)	2 - 80	500 - 1300
1060	Combination (500+560)	2 - 80	530 - 1378
1120	Combination (560+560)	2 - 80	560 - 1456
1200	Combination (400+400+400)	3 - 80	600 - 1560
1250	Combination (400+400+450)	3 - 80	625 - 1625
1300	Combination (400+450+450)	3 - 80	650 - 1690
1350	Combination (450+450+450)	3 - 80	675 - 1755
1425	Combination (475+475+475)	3 - 80	713 - 1852
1450	Combination (475+475+500)	3 - 80	725 - 1885
1500	Combination (500+500+500)	3 - 80	750 - 1950
1560	Combination (500+500+560)	3 - 80	780 - 2028
1620	Combination (500+560+560)	3 - 80	810 - 2106
1680	Combination (560+560+560)	3 - 80	840 - 2184
560	High-COP combination (280+280)	2 - 59	448 - 896
850	High-COP combination (280+280+280)	3 - 80	680 - 1360
900	High-COP combination (280+280+335)	3 - 80	720 - 1440
950	High-COP combination (280+335+335)	3 - 80	760 - 1520
1000	High-COP combination (335+335+335)	3 - 80	800 - 1300
1060	High-COP combination (335+335+400)	3 - 80	848 - 1378
1120	High-COP combination (335+400+400)	3 - 80	896 - 1456

※1 When connecting the indoor unit type FDK, FDL, FDFU or FDFW series, limit the connectable capacity not higher than 130%.

[Option parts]

Refrigerant distribution piping components supplied as option parts will become necessary in installing the unit. As refrigerant distribution piping components, branching pipe sets (model type: DOS) for the outdoor unit side piping, branching pipe sets (model type: DIS) and header sets (model type: HEAD) for the outdoor unit side piping are available. Select according to the application. Please refer to "4. REFRIGERANT PIPING WORK" in selecting. If you are uncertain, please do not hesitate to consult with your distributor or the manufacturer. Please use refrigerant branching sets and header sets designed exclusively for R410A without fail.

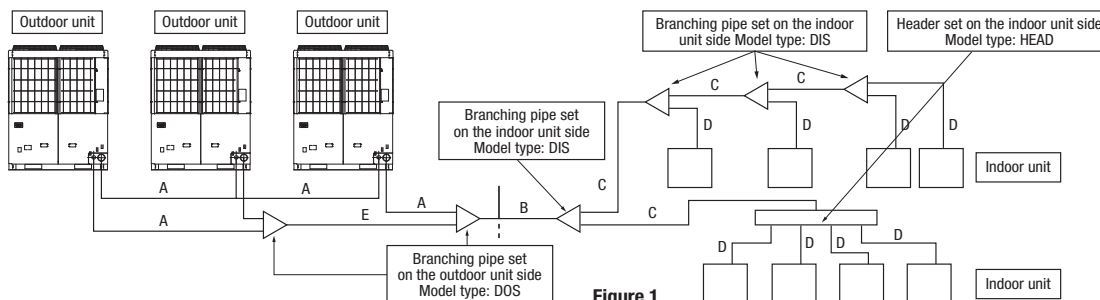


Figure 1

2. INSTALLATION LOCATION (Obtain approval from the customer when selecting the installation area.)

2-1. Selecting the installation location

- Where air is not trapped.
- Where the installation fittings can be firmly installed.
- Where wind does not hinder the intake and outlet pipes.
- Out of the heat range of other heat sources.
- Where strong winds will not blow against the outlet pipe.
- A place where stringent regulation of electric noises is not applicable.
- Where it is safe for the drain water to be discharged.
- Where noise and hot air will not bother neighboring residents.
- Where snow will not accumulate.
- A place where no TV set or radio receiver is placed within 5m. (If electrical interference is caused, seek a place less likely to cause the problem)
- Do not install the unit in places which exposed to sea breeze (e.g. coastal area) or calcium chloride (e.g. snow melting agent), exposed to ammonia substance (e.g. organic fertilizer).

Please note

- a) A four-sided enclosure cannot be used. Leave a space of at least 1m above the unit.
 - b) If there is a danger of a short-circuit, then install a wind direction variable adapter.
 - c) When installing multiple units, provide sufficient intake space so that a short-circuit does not occur.
 - d) In areas where there is snowfall, install the unit in a frame or under a snow hood to prevent snow from accumulating on it. (Inhibition of collective drain discharge in a snowy country)
 - e) Do not install the equipment in areas where there is a danger for potential explosive atmosphere.
- * Please ask your distributor about option parts such as wind vane adapters, snow guard hoods, etc.

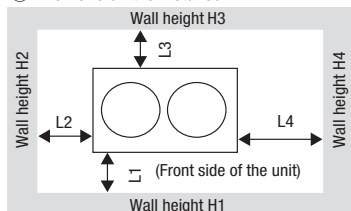
CAUTION

Please leave sufficient clearance around the unit without fail. Otherwise, a risk of compressor and/or electric component failure may arise.

2-2. Installation space (service space) example

Please secure sufficient clearance (room for maintenance work, passage, draft and piping). (If your installation site does not fulfill the installation condition requirements set out on this drawing, please consult with your distributor or the manufacturer)

① When one unit is installed



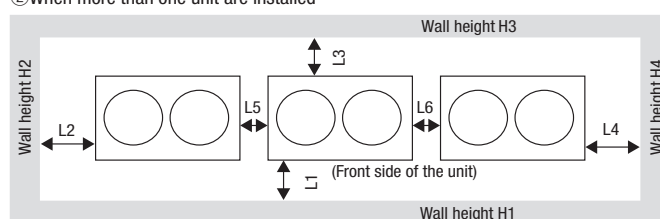
Example installation		I	II	III
Dimensions				
L1		500	500	Open
L2		10 (30)	50	10 (30)
L3		100	50	100
L4		10 (30)	50	Open
H1		1500	1500	Open
H2		No limit	No limit	No limit
H3		1000	1000	No limit
H4		No limit	No limit	Open

(): In case it is the promised installation location that the outdoor unit is used on conditions with the ambient temperature of 43°C or more.

For a normal installation, leave a 10 mm or wider space on both sides of the unit (L5 and L6) as workspace. It is also possible to install at a 0mm interval (continuous installation) with future renewal, etc. in mind.

For your information:
the footprint of an outdoor unit is 1350x720 for all models throughout the series (280-560).

② When more than one unit are installed



Example installation		I	II
Dimensions			
L1		500	Open
L2		10 (30)	200
L3		100	300
L4		10 (30)	Open
L5		10 (30)	400
L6		10 (30)	400
H1		1500	Open
H2		No limit	No limit
H3		1000	No limit
H4		No limit	Open

(): In case it is the promised installation location that the outdoor unit is used on conditions with the ambient temperature of 43°C or more.

3. Unit delivery and installation

CAUTION When a unit is hoisted with slings for haulage, please take into consideration the offset of its gravity center position. If not properly balanced, the unit can be thrown off-balance and fall.

3-1. Delivery

- By defining a cartage path, carry in the entire package containing a unit to its installation point.
- In slinging a unit, use two canvas belts with plates, cloth pads or other protections applied to the unit to prevent damage.

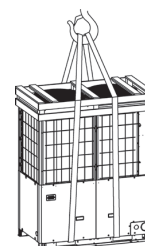
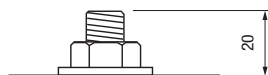
Please note

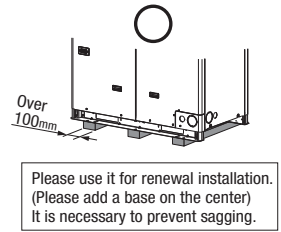
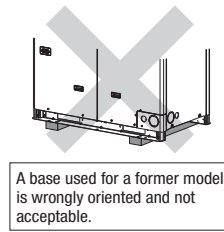
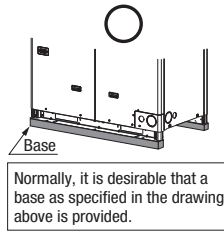
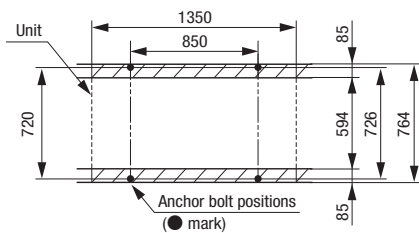
- a) Please do not fail to put belts through the rectangular holes of a unit's anchoring legs.
- b) Apply cloth pads between a canvas belt and a unit to prevent damage.

3-2. Notabilia for installation

(1) Anchor bolt positions

- Use four anchor bolts (M10) to fix an outdoor unit's anchoring legs at all times. Ideally, an anchor bolt should protrude 20mm.





(2) Base

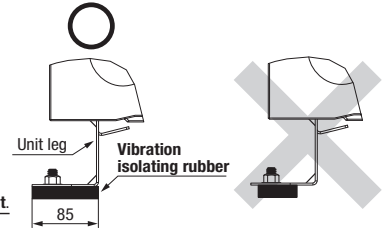
- Please install a unit after ascertaining that the bases have been made to sufficient strength and level to ensure the unit against vibration or noise generation.
- Please construct a base to the size of a shadowed area (the entire bottom area of an outdoor unit's anchoring leg) shown on the above drawing or larger.
- Please orient a base in the traversal direction (direction of W1350mm) of an outdoor unit as illustrated in the drawing above.

(3) Vibration isolating rubber

- A vibration isolating rubber must support an outdoor unit's anchoring leg by its entire bottom area.

Please note

- 1) Install a vibration isolating rubber in such a manner that the entire bottom area of an outdoor unit's anchoring leg will rest on it.
- 2) Do not install an outdoor unit in such a manner that a part of the bottom area of its anchoring leg is off a vibration isolating rubber.



4. REFRIGERANT PIPING WORK

4-1. Restrictions on the use of pipes

(1) Limitation on use of pipes

- In installing pipes, always observe the restrictions on the use of pipes specified in this Section (1) including Maximum length, Total pipe length, Allowable pipe length from the first branching, and Allowable elevation difference (head difference).

- Please avoid forming any trap () or bump () in piping as they can cause fluid stagnation.
- Maximum length (from an outdoor unit to the farthest indoor unit) 160 m or less as actual pipe length (185 m or less as equivalent pipe length)
(When an actual pipe length exceeds 90m, however, it is necessary to change the pipe size. Please determine the main pipe size by consulting with the Main Selection Reference Table set out in Section (3) (b).

- Total pipe length 1000 m or less
- Main pipe length 130 m or less
- Allowable pipe length from the first branching 90 m or less
(However, difference between the longest and shortest piping 40 m or less (Max 85 m or less*1))
*1 When it is required to install in a range of 40 to 85 m, limitation of use, etc. are different from those described here. Refer to technical documents.
- Allowable elevation difference (head difference)

(a) When the outdoor unit is installed above ...

- ① Outdoor dry bulb temp. (at cooling): Lower than 43°C ... 50 m or less (Max. 90 m or less)

→ (When installing at 50 to 90 m, restrictions on use, etc., differ from the description in this installation manual. For details, refer to technical documents.*2)

- ② Outdoor dry bulb temp. (at cooling): Higher than 43°C ... Max. length ≤ 90 m ... 40 m or less
Max. length > 90 m ... 30 m or less

*2 The microcomputer control needs to be adapted to the higher outdoor unit installation and to the installation with the elevation difference at 50 to 90 m. Make sure to set on both the master and slave units. Change the setting of SW6-4 before turning on the power source.

(b) When an outdoor unit is installed below 40 m or less*3

*3 It must be less than 30 m when conducting the cooling operation with the outdoor air temperature lower than 10°C.

(c) Elevation difference between indoor units in the system ... 18 m or less (Max. 30 m or less)

→ (When installing at 18 to 30 m, restrictions on use, etc., differ from the description in this installation manual.

For details, refer to technical documents.*4)

*4 The microcomputer control needs to be adapted to the installation with the elevation difference between indoor units at 18 to 30 m. Make sure to set on both the master and slave units.

Setting conditions (Elevation difference)	Control changing method
More than 18 m but 30 m or less	7 segment F33 setting 1: Valid

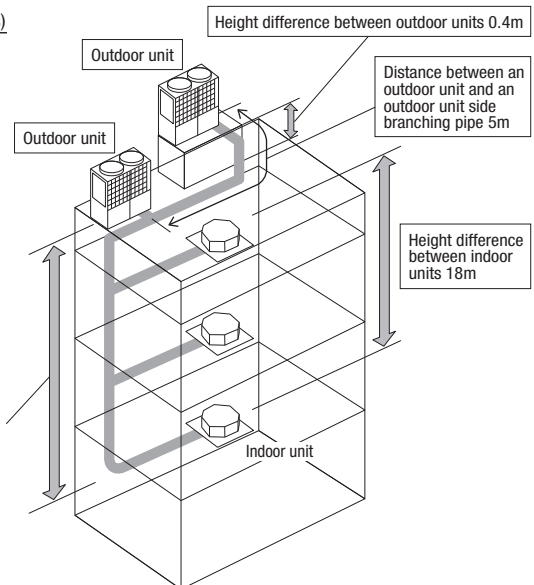
(d) Elevation difference between the first branching point and the indoor unit 18 m or less

- Restrictions on piping applicable to the section between an outdoor unit and an outdoor unit side branching pipe (combination unit)
 - (a) Difference in the elevation 0.4 m or less
 - (b) Distance between an outdoor unit and an outdoor unit side branching pipe 5 m or less
 - (c) Length of oil equalization piping 10 m or less

CAUTION

An installation not conforming to these restrictions can induce a compressor failure, which shall be excluded from the scope of warranty. Always observe the restrictions on the use of pipes in developing a system.

Setting conditions (Elevation difference)	Control changing method	
	SW6-4	7 segment F32
More than 50 m but 70 m or less	ON	0: Invalid (Factory setting)
More than 70 m but 90 m or less	ON	1: Valid



Important

When the Additional refrigerant quantity (S + P + I) is over the following table, please separate the refrigerant line.

Outdoor unit	S + P + I (kg)
280-670	45
735-950	90
1000-1350	80
1425-1680	100

(2) Piping material selection

- Please use pipes clean on both the inside and outside and free from contaminants harmful to operation such as sulfur, oxides, dust, chips, oil, fat and water.
- Use the following material for refrigerant piping.
Material: phosphorus deoxidized seamless copper pipe (C1120T-0, 1/2H, JIS H 3300) Use C1220T-1/2H for φ 19.05 or larger, or C1220T-0 for φ 15.88 or smaller
- Do not use φ 28.58 x t1.0, φ 31.8 x t1.1, φ 34.92 x t1.2 and φ 38.1 x t1.35 as a bent pipe.

- Thickness and size: Please select proper pipes according to the pipe size selection guideline.
(Since this unit uses R410A, always use 1/2H pipes of a specified minimum thickness or thicker for all pipes of $\phi 19.05$ or larger, because the pressure resistance requirement is not satisfied with O-type pipes).
- For branching pipes, use a genuine branching pipe set or header set at all times. (option parts)
- For the handling of service valves, please refer to P.9 4-3(4) Method of operating service valves.
- In installing pipes, observe the restrictions on the use of pipes set out in Section 1 (Maximum length, total pipe length, allowable pipe length from the first branching, allowable elevation difference (head difference)) without fail.
- Install a branching pipe set, paying attention to the direction of attachment, after you have perused through the installation manual supplied with it.

(3) Pipe size selection

(a) Outdoor unit – Outdoor unit side branching pipe: Section A in Figure 1

Please use a pipe conforming to the pipe size specified for outdoor unit connection.

Indoor unit connecting pipe size table

Outdoor unit	Outdoor unit outlet pipe specifications					
	Gas pipe	Connection method	Liquid pipe	Connection method	Oil equalizing pipe	Connection method
280	$\phi 22.22 \times t 1.0$	Blazed	$\phi 9.52 \times t 0.8$	Flare	$\phi 9.52 \times t 0.8$ ※1	Flare
335	$\phi 25.4 (\phi 22.22) \times t 1.0$					
400	$\phi 25.4 (\phi 28.58) \times t 1.0$					
450	$\phi 28.58 \times t 1.0$					
475						
500						
560						

Pipe sizes applicable to European installations are shown in parentheses.

Please use C1220T-1/2H for $\phi 19.05$ or larger pipes.

※1: Please connect the master and slave units with an oil equalization pipe, when they are used in a combined installation.
(It is not required, when a unit is used as a standalone installation)

When three outdoor units combination, please connect using a tee joint. (If contains in a branching pipe set for three units.)

(b) Main (Outdoor unit side branching pipe – Indoor unit side first branching pipe): Section B in Figure 1

If the longest distance (measured between the outdoor unit and the farthest indoor unit) is 90m or longer (actual length), please change the main pipe size according to the table below.

Outdoor unit	Main pipe size (normal)		Pipe size for an actual length of 90m or longer		
	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	
280	$\phi 22.22 \times t 1.0$	$\phi 12.7 \times t 0.8$	$\phi 9.52 \times t 0.8$	$\phi 25.4 (\phi 22.22) \times t 1.0$	
335	$\phi 25.4 (\phi 22.22) \times t 1.0$				
400	$\phi 25.4 (\phi 28.58) \times t 1.0$				
450	$\phi 28.58 \times t 1.0$		$\phi 12.7 \times t 0.8$	$\phi 31.8 \times t 1.1$ ($\phi 28.58 \times t 1.0$)	$\phi 15.88 \times t 1.0$
475					
500					
560					
615	$\phi 31.8 \times t 1.1$ ($\phi 34.92 \times t 1.2$)	$\phi 15.88 \times t 1.0$	$\phi 19.05 \times t 1.0$	$\phi 19.05 \times t 1.0$	
670					
735					
800					
850					
900					
950					
1000	$\phi 38.1 \times t 1.35$ ($\phi 34.92 \times t 1.2$)	$\phi 19.05 \times t 1.0$	$\phi 38.1 \times t 1.35$ ($\phi 34.92 \times t 1.2$)	$\phi 22.22 \times t 1.0$	
1060					
1120					
1200					
1250					
1300					
1350					
1425					
1450					
1500					
1560					
1620					
1680					

Please use C1220T-1/2H for $\phi 19.05$ or larger pipes.

Pipe sizes applicable to European installations are shown in parentheses.

(c) Indoor unit side first branching pipe – Indoor unit side branching pipe: Section C in Figure 1

Please choose from the table below an appropriate pipe size as determined by the total capacity of indoor units connected downstream, provided, however, that the pipe size for this section should not exceed the main size (Section B in Figure 1).

Total capacity of indoor units	Gas pipe	Liquid pipe
Less than 70	$\phi 12.7 \times t 0.8$	$\phi 9.52 \times t 0.8$
70 or more but less than 180	$\phi 15.88 \times t 1.0$	
180 or more but less than 371	$\phi 19.05 \times t 1.0$ *1	
371 or more but less than 540	$\phi 25.4 \times t 1.0$ ($\phi 28.58$)	$\phi 15.88 \times t 1.0$
540 or more but less than 700	$\phi 28.58 \times t 1.0$	
700 or more but less than 1100	$\phi 31.8 \times t 1.1$ ($\phi 34.92 \times t 1.2$)	$\phi 19.05 \times t 1.0$
1100 or more	$\phi 38.1 \times t 1.35$ ($\phi 34.92 \times t 1.2$)	

Please use C1220T-1/2H for $\phi 19.05$ or larger pipes.

Pipe sizes applicable to European installations are shown in parentheses.

*1: When connecting indoor units of 280 at the downstream and the main gas pipe is of $\phi 22.22$ or larger, use the pipe of $\phi 22.22 \times t 1.0$.

(d) Indoor unit side branching pipe – Indoor unit: Section D in Figure 1

Indoor unit connection pipe size table

Indoor unit	Capacity	Gas pipe	Liquid pipe
	15, 22, 28	φ 9.52 × t 0.8	φ 6.35 × t 0.8
36, 45, 56	φ 12.7 × t 0.8		
71, 90, 112, 140, 160	φ 15.88 × t 1.0	φ 9.52 × t 0.8	
224	φ 19.05 × t 1.0		
280	φ 22.22 × t 1.0		

Please use C1220T-1/2H for φ 19.05 or larger pipes.

(e) Selection of pipe between outdoor branch pipes for 3-unit combination: Section E in Figure 1

Size of pipe between outdoor branch pipes varies depending on the capacity of outdoor unit which is connected to second branch pipe in the outdoors.

Select it from the following table.

Total capacity of outdoor units connected to second branch pipe in the outdoors	Size of pipe between branch pipes	
	Gas pipe	Liquid pipe
580,615,670	φ 28.58 × t 1.0	φ 12.7 × t 0.8
735,800,850,900,950	φ 31.8 × t 1.1 (φ 34.92 × t 1.2)	φ 15.88 × t 1.0
975,1000	φ 38.1 × t 1.34	
1060,1120	(φ 34.92 × t 1.2)	φ 19.05 × t 1.0

Use C1220T-1/2H material for φ 19.05 or larger.

(4) Selection of an outdoor unit side branching pipe set

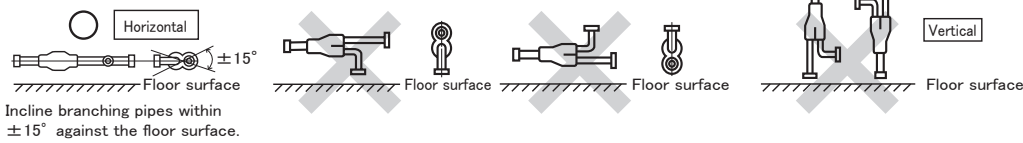
This branching pipe set will always become necessary when units are used in combination.

(When a unit is used as a standalone installation, it is not required)

Please note

- a) In connecting an outdoor unit, please use a pipe conforming to the pipe size specified for outdoor unit connection.
- b) Choose a different-diameter pipe joint matching a main pipe size specified in the above section in installing pipes (= main pipes) on the outdoor unit side.
- c) Always install branching pipe (for both gas and liquid) in such a manner that they form correct horizontal branch.

Outdoor unit	Branching pipe set
For two units	DOS-2A-3
For three units	DOS-3A-3



(5) Selection of an indoor unit side branching pipe set

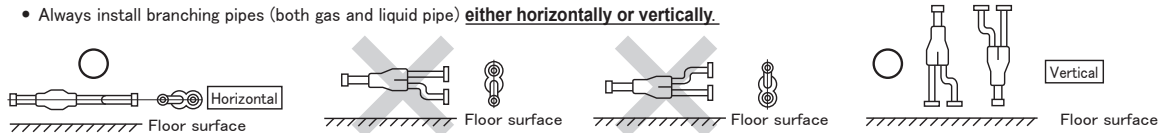
(a) Method of selecting a branching pipe set

- As an appropriate branching pipe size varies with the connected capacity (total capacity connected downstream), determine a size from the following table.

Please note

- In connecting an indoor unit with the indoor unit side branching pipe set, please use a pipe conforming to the pipe size specified for indoor unit connection.
- Always install branching pipes (both gas and liquid pipe) **either horizontally or vertically**.

Total capacity downstream	Branching pipe set
Less than 180	DIS-22-1G
180 or more but less than 371	DIS-180-1G
371 or more but less than 540	DIS-371-1G
540 or more	DIS-540-3



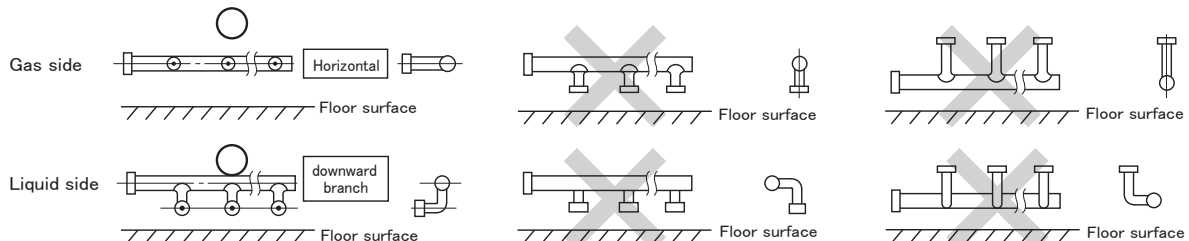
(b) Method of selecting a header set

- Depending on the number of units connected, connect plugged pipes (to be procured on the installer's part) at a branching point (on the indoor unit connection side).
- For the size of a plugged pipe, please refer to the documentation for a header set (option part).

Total capacity downstream	Header set model type	Number of branches
Less than 180	HEAD4-22-1G	4 branches at the most
180 or more but less than 371	HEAD6-180-1G	6 branches at the most
371 or more but less than 540	HEAD8-371-2	8 branches at the most
540 or more	HEAD8-540-3	8 branches at the most

Please note

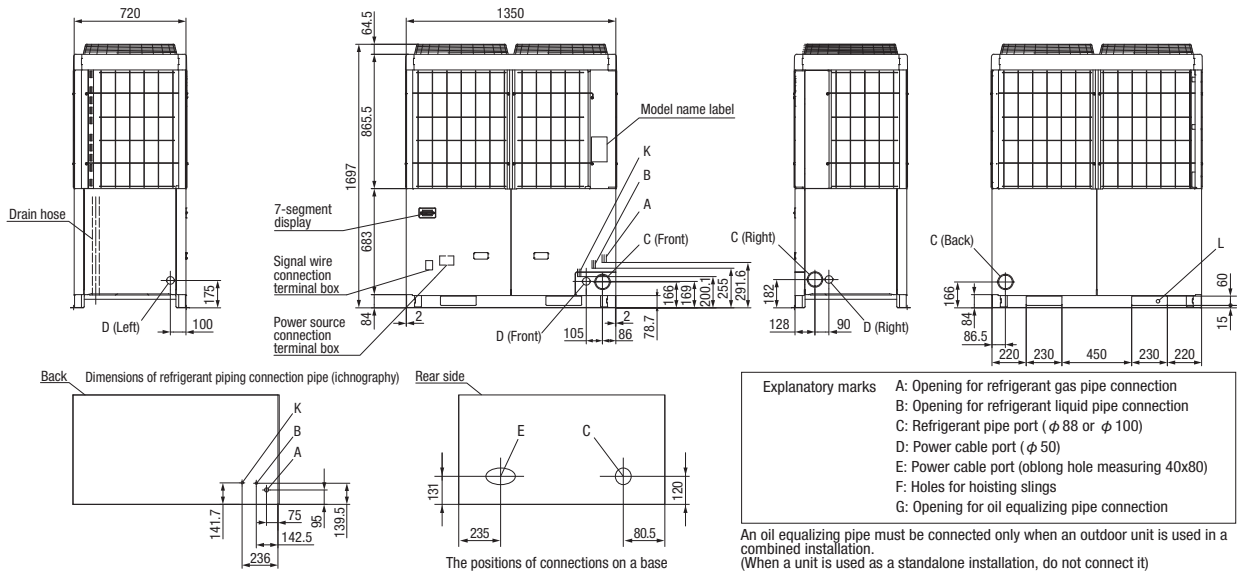
- a) In connecting a header with an indoor unit, please use a pipe conforming to the pipe size specified for indoor unit connection.
- b) **In installing a header, always arrange a gas-side header to branch horizontally and a liquid-side header to branch downward.**
- c) Indoor units 224 and 280 can not be connected to the header.



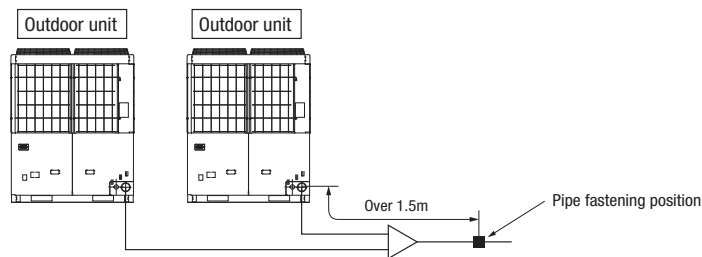
4-2. Pipe connection position and pipe direction

(1) Pipe connecting position and pipe outgoing direction

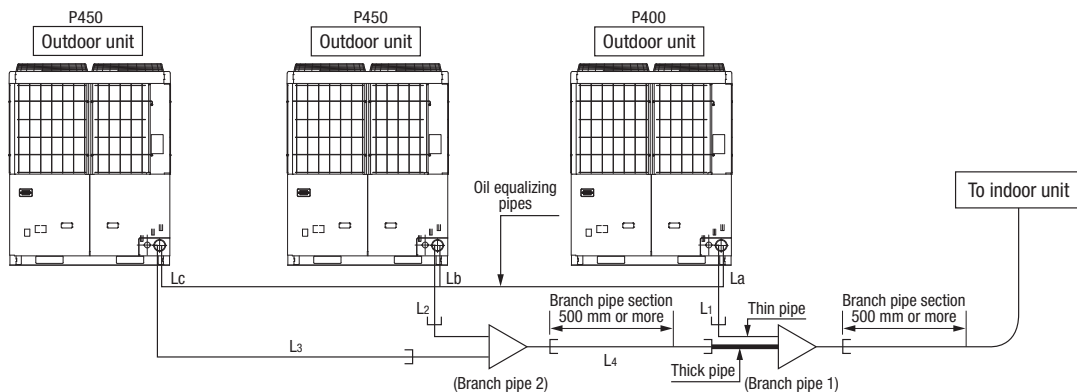
Although this drawing illustrates an installation involving a 335 or smaller capacity unit, an installation involving a 400 or a larger capacity unit should be arranged in the same manner as long as pipe connection points and directions are concerned, except that the height of a unit is different. Measurements in [] indicate those of a 400 or larger capacity unit.



- A pipe can be laid through the front, right, bottom or rear of a unit as illustrated on the above drawings.
- In laying pipes on the installation site, cut off the casing's half blank ($\phi 88$ or $\phi 100$) that covers a hole for pipe penetration with nippers.
- When there is a danger that a small animal enters from the pipe port, cover the port with appropriate blocking materials (to be arranged on the user's part).
- Use an elbow (to be arranged on the user's part) to connect control valves to the piping.
- In anchoring piping on the installation site, give 1.5m or a longer distance between an outdoor unit and an anchoring point where the piping is secured as illustrated below. (A failure to observe this instruction may result in a pipe fracture depending on a method of isolating vibrations employed.)
- The pipe should be anchored every 1.5m or less to isolate the vibration.



- Connect pipes between combined units, with care for the followings.
 - (a) On combination units, it must be secured a straight pipe section of 500 mm or more before a branch pipe (Type DOS) for both gas pipe and liquid pipe as shown below.
 - (b) On the pipe connection system of combination units, place the outdoor unit of which the capacity is the smallest among combined outdoor units, closer to the indoor unit, and place the outdoor unit of which the capacity is the largest among combined outdoor units, far from the indoor unit. (Connecting positions are not specified when the capacities are same.)
(Example) As shown below, in case of P1300 (P400 + P450 + P450), place the outdoor unit P400 closer to the indoor unit and place the outdoor unit P450 far from the indoor unit in the pipe connection system.
 - (c) On the pipe connection system for combination of 3 units, use a branch pipe of which the pipe diameter is different after the pipe branching, for the branch pipe (branch pipe 1) located the closest to the indoor unit. It is necessary also to connect a thin pipe to the outdoor unit and to connect a thick pipe to next branch pipe.
 - (d) It must be no longer than 5m the length of pipe from the branching pipe 1 to the outdoor unit. ($L_1 \leq 5$ m, $L_2 + L_4 \leq 5$ m, $L_3 + L_4 \leq 5$ m) It must be no longer than 10 m the length of oil equalizing pipes between outdoor units. ($L_a + L_b \leq 10$ m, $L_b + L_c \leq 10$ m, $L_a + L_c \leq 10$ m)
In case of P1300 three combination unit:



(2) Piping work

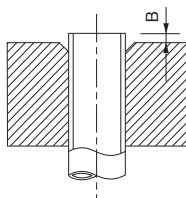
Important

- Please take care so that installed pipes may not touch components within a unit.
- **In laying pipes on the installation site, keep the service valves shut all the time.**
- Give **sufficient protections** (compressed and brazed or by an adhesive tape) **to pipe ends so that any water or foreign matters may not enter the pipes.**
- In bending a pipe, bend it **to the largest possible radius (at least four times the pipe diameter)**. Do not bend a pipe repeatedly to correct its form.
- An outdoor unit's liquid pipe and liquid refrigerant piping are to be flare connected. Flare a pipe after engaging a flare nut onto it. A flare size for R410A is different from that for conventional R407C. Although we recommend the use of flaring tools developed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a protrusion control gauge.
- Tighten a flare joint securely **with two spanners**. Observe flare nut tightening torque specified in the table below.

CAUTION

If you tighten it without using double spanners, you may deform the service valve, which can cause an inflow of nitrogen gas into the outdoor unit.

Flared pipe end: A (mm)	
Copper pipe outer diameter	A
φ 6.35	9.1
φ 9.52	13.2
φ 12.7	16.6
φ 15.88	19.7



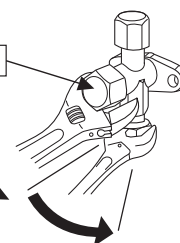
Copper pipe outer diameter	Copper pipe protrusion for flaring: B (mm)	
	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
φ 6.35	0-0.5	0.7-1.3
φ 9.52		
φ 12.7		
φ 15.88		

Tightening torque (N·m)

Service valve size (mm)	Tightening torque (N·m)	Tightening angle (°)	Recommended length of tool handle (mm)
φ 6.35 (1/4")	14-18	45-60	150
φ 9.52 (3/8")	34-42	30-45	200
φ 12.7 (1/2")	49-61	30-45	250
φ 15.88 (5/8")	68-82	15-20	300
φ 19.05 (3/4")	100-120	15-20	450

Do not hold the valve cap area with a spanner.

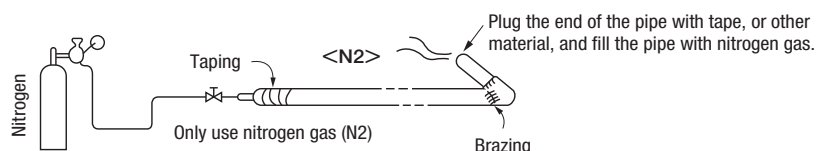
Use a torque wrench. If a torque wrench is not available, fasten the flare nut manually first and then tighten it further, using the left table as a guide.



- Do not apply any oil on a flare joint.
- Pipes are to be blazed to connect an outdoor unit's gas pipe with refrigerant piping or refrigerant piping with a branching pipe set.
- **Blazing must be performed under a nitrogen gas flow.** Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.
- Brazing of the service valve and the pipes should be performed while cooling the valve body with a wet towel.
- Perform flushing. To flush the piping, charge nitrogen gas at about 0.02MPa with a pipe end closed with a hand. When pressure inside builds up to a sufficient level, remove the hand to flush. (in flushing a pipe, close the other end of the pipe with a plug).

Operation procedure

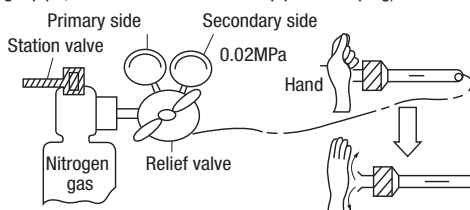
- ① **In laying pipes on the installation site, keep the service valves shut all the time.**
- ② **Blazing must be performed under a nitrogen gas flow.** Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.



- ③ Give **sufficient protections** (compressed and brazed or with an adhesive tape) **so that water or foreign matters may not enter the piping.**



- ④ Perform flushing. To flush the piping, charge nitrogen gas at about 0.02MPa with a pipe end closed with a hand. When pressure inside builds up to a sufficient level, remove the hand to flush. (in flushing a pipe, close the other end of the pipe with a plug).



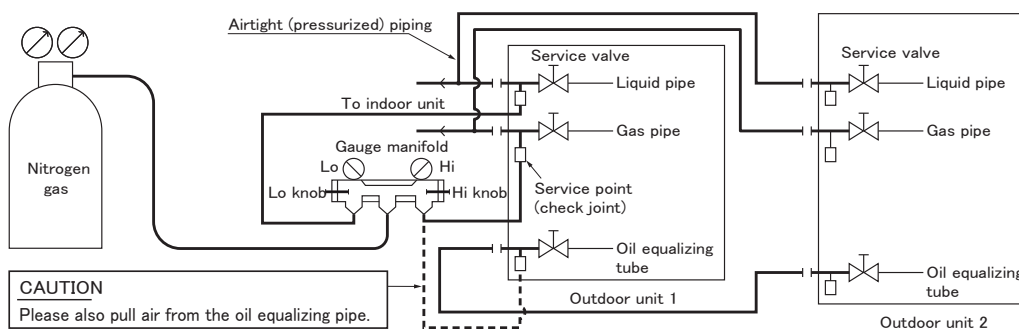
- ⑤ In brazing an service valve and a pipe, **brazing them with the valve main body cooled with a wet towel or the like.**

4-3. Air tightness test and air purge

(1) Air tightness test

- ① Although an outdoor unit itself has been tested for air tightness at the factory, please check the connected pipes and indoor units for air tightness from the check joint of the service valve on the outdoor unit side. While conducting a test, keep the service valve shut all the time
- ② Since refrigerant piping is pressurized to the design pressure of a unit with nitrogen gas for testing air tightness, please connect instruments according to the drawing below. Under no circumstances should chlorine-based refrigerant, oxygen or any other combustible gas be used to pressurize a system. Keep the service valve shut all the time. Do not open it under any circumstances. Be sure to pressurize all of the liquid, gas and oil equalizing pipes
- ③ In pressurizing the piping, do not apply the specified level of pressure all at once, but gradually raise pressure.
 - a) Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes or more to see if the pressure drops.
 - b) Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes to see if the pressure drops.
 - c) Then raise the pressure to the specified level (4.15 MPa), and record the ambient temperature and the pressure.
 - d) If no pressure drop is observed with an installation pressurized to the specified level and left for about one day, it is acceptable. When the ambient temperature changes 1°C, the pressure also changes approximately 0.01 MPa. The pressure, if changed, should be compensated for.
 - e) If a pressure drop is observed (checking a) - d), a leak exists somewhere. Find a leak by applying bubble test liquid to welded parts and flare joints and repair it. After repair, conduct an air-tightness test again.
- ④ Always pull air from the pipes after the airtightness test.

CAUTION
Applying excessive pressure can cause an inflow of nitrogen gas into an outdoor unit.



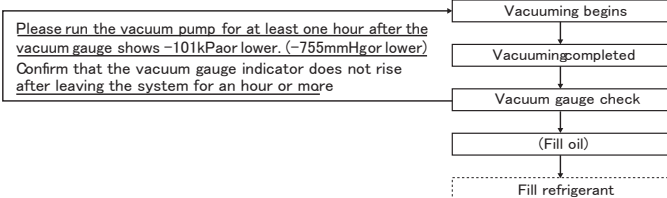
CAUTION
Please also pull air from the oil equalizing pipe.

(2) Vacuuming

Please pull air from the check joints of the service valves on both liquid and gas sides
Please also pull air from the oil equalizing pipe (Please pull air separately from the rest of the piping by using the oil equalizing valve check joint)

<Work flow>

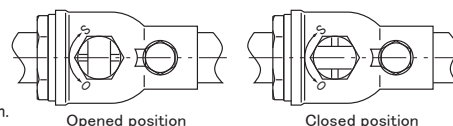
When the system has remaining moisture inside or a leaky point, the vacuum gauge indicator will rise. Check the system for a leaky point and then draw air to create a vacuum again.



CAUTION
Insufficient vacuuming may result in poor performance falling short of the design capacity, pipe clogging due to residue moisture and/or a compressor failure.

Pay attention to the following points in addition to the above for the R410A and compatible machines.

- To prevent a different oil from entering, please assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R407C, etc.).
- Use a counterflow prevention adapter to prevent vacuum pump oil from entering the refrigerant system.



(3) Additional oil charge

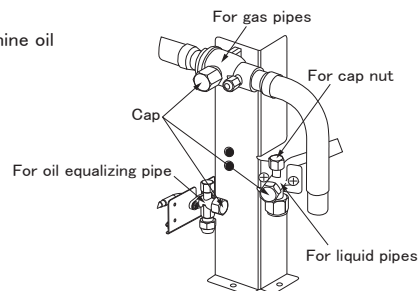
When the total pipe length is longer than 510 m, charge 1,000 cc of M-MA32R refrigeration machine oil from the check joint of gas pipe service valve after the vacuuming.

(4) Method of operating service valves

Method of opening/closing a valve

- Remove the cap, turn the gas pipe side until it comes to the "Open" position as indicated in the drawing on the right.
- For the liquid side pipe and oil equalizing pipe side, turn with a hexagonal wrench until the shaft stops. If excessive force is applied, the valve main body can be damaged. Always use a dedicated special tool.
- Tighten the cap securely.

For tightening torque, refer to the table below.



		Tightening torque • Nm		
		Shaft (valve main body)	Cap (lid)	Cap nut (check joint section)
For gas pipes		7 or less	30 or less	13
For liquid pipes	φ 9.52	6-8	20-30	10-12
	φ 12.7	14-16	25-35	
For oil equalizing pipe		6-8	20-30	10-12

For fastening torque of a flare nut, please refer to Section 4-2 (2) Piping work on site.

4-4. Additional refrigerant charge

Charge additional refrigerant in the liquid state

Be sure to measure the quantity with a scale in adding refrigerant

If you cannot charge all refrigerant with the outdoor unit lying idle, charge it with the unit running in the test run mode. (For the test run method, please refer to Section 8)

If operated for a long time with insufficient refrigerant the compressor will be damaged. (In particular, when adding refrigerant during operation, complete the job within 30min.)

This unit contains <280,335 : 11.0 kg, 400-560 : 11.5kg, 615,670 : 22.0 kg, 735 : 22.5 kg, 800-1120 : 23.0 kg, 1200-1680 : 34.5 kg> of refrigerant

Determine the amount of refrigerant to be charged additionally using the following formula and put down the amount of refrigerant added on the refrigerant charge volume recording plate provided on the back the front panel.

● Adding additional refrigerant

Charge additional refrigerant according to the size and length of the liquid piping and unit capacity .

Determine additional charge volume by rounding to the nearest 0.1 kg.

Additional fill quantity (kg) = S+P+I

S: standard additional refrigerant quantity (kg)

Outdoor unit	S (kg)
280	0
335	0
400	2.1
450	2.1
475	6.2
500	6.2
560	6.2
615	0
670	0
735	2.1

Outdoor unit	S (kg)
800	4.2
850	4.2
900	4.2
950	12.4
1000	12.4
1060	12.4
1120	12.4
1200	6.3
1250	6.3

Outdoor unit	S (kg)
1300	6.3
1350	6.3
1425	18.6
1450	18.6
1500	18.6
1560	18.6
1620	18.6
1680	18.6

※ High-COP combination

Outdoor unit	(kg)
560	0
850	0
900	0
950	0
1000	0
1060	2.1
1120	4.2

P: Additional refrigerant quantity for piping (kg)

$$P = (L1 \times 0.37) + (L2 \times 0.26) + (L3 \times 0.18) + (L4 \times 0.12) + (L5 \times 0.059) + (L6 \times 0.022)$$

L1: φ22.22 total length (m) L2: φ19.05 total length (m) L3: φ15.88 total length (m)

L4: φ12.7 total length (m) L5: φ9.52 total length (m) L6: φ6.35 total length (m)

Refrigerant liquid pipe size	φ22.22	φ19.05	φ15.88	φ12.7	φ9.52	φ6.35
Additional fill quantity (kg/m)	0.37	0.26	0.18	0.12	0.059	0.022

I: Additional refrigerant quantity for indoor units (kg)

If the total indoor units capacity is larger than outdoor unit capacity, then calculate the additional refrigerant quantity for indoor units.

$$D = \{(\text{Total indoor units capacity}) - (\text{outdoor unit capacity})\}$$

$$I = D \times 0.01$$

When D > 0, calculate I using the above equation;

When D ≤ 0, take it as I = 0.

<Example>

When you connect FDC400 to FDT140 x 3 units:

$$D = 140 \times 3 - 400 = 20 (> 0)$$

$$I = 20 \times 0.01 = 0.2 \text{ (kg)}$$

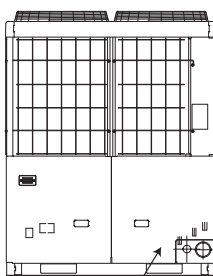
Important	Outdoor unit	S+P+I (kg)
When the Additional refrigerant quantity (S+P+I) is over the following table, please separate the refrigerant line.	280-670	45
	735-950	90
	1000-1350	80
	1425-1680	100

Pay attention to the following points in addition to the above for the R410A and compatible machines.

- To prevent a different oil from entering, please assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R407C, etc.).
- Refrigerant types are indicated by color at the top of the cylinder 5. (Pink for R410A). Always confirm this.
- Do not use a charge cylinder under any circumstances. There is a danger that the composition of the refrigerant will change when R410A is transferred to a cylinder.
- When charging refrigerant, use liquid refrigerant from a cylinder. If refrigerant is charged in a gas form, the composition may change considerably.

Please note

Put down on the refrigerant charge volume recording plate provided on the back of the front panel the amount of refrigerant calculated from the pipe length.



It is located in back of this front panel.

CAUTION

Be sure to record the refrigerant volume, because the information is necessary to perform the installation's maintenance service.

4-5. Heating and condensation prevention

① Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.

Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.

② Use a heat insulating material that can withstand 120°C or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.

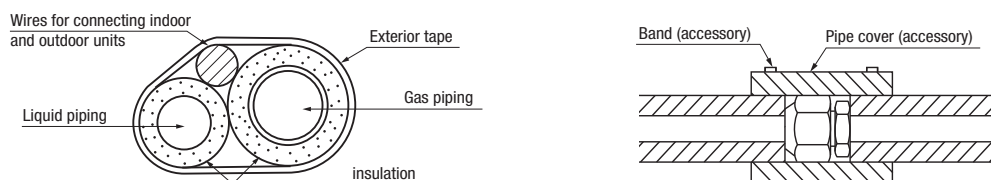
a) The gas pipe can cause during a cooling operation dew condensation which will become drain water causing a possible water-leak accident, or reach during a heating operation as high a temperature as 60°C to 110°C, posing a risk of burns, when touched accidentally. So, do not fail to dress it with a heat insulation material.

b) Wrap indoor units' flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).

c) Give heat insulation to both gas and liquid side pipes. Bundle a heat insulating material and a pipe tightly together so that no gaps may be left between them and wrap them together with a connecting cable by a dressing tape.

d) Although this air-conditioning unit has been tested under the JIS condensation test conditions, the dripping of water may occur when it is operated in a high-humidity atmosphere (23°C or a higher dew point temperature). In such a case, apply an additional heat insulation material of 10 to 20 mm thick to dress an indoor unit body, piping and drain pipes.

When the ambient dew point temperature becomes 28°C or higher, or the relative humidity becomes 80% or higher, add further 10 to 20 mm thick heat insulation material.



5. Drainage

- Where water drained from the outdoor unit may freeze, connect the drain pipe using option drain elbow and drain grommet.

6. ELECTRICAL WIRING WORK

Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country.

Electrical installation work must be executed according to the technical standards and other regulations applicable to electrical installations in the country.

⚠ Please install an earth leakage breaker without fail. The installation of an earth leakage breaker is compulsory in order to prevent electric shocks or fire accidents. (Since this unit employs inverter control, please **use an impulse withstanding type** to prevent an earth leakage breaker's false actuation.)

Please note

a) Use only copper wires.

Do not use any supply cord lighter than one specified in parentheses for each type below.

- braided cord (code designation 60245 IEC 51), if allowed in the relevant part 2;
- ordinary tough rubber sheathed cord (code designation 60245 IEC 53);
- flat twin tinsel cord (code designation 60227 IEC 41)
- ordinary polyvinyl chloride sheathed cord (code designation 60227 IEC 53).

Please do not use anything lighter than polychloroprene sheathed flexible cord (cord designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.

b) **Use separate power sources for the indoor and outdoor units**

c) A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.

d) **The power sources for indoor units in the same system should turn on and off simultaneously**

e) Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire.

If improperly grounded, an electric shock or malfunction may result.

Never connect the grounding wire to a gas pipe because if gas leaks, it could cause explosion or ignition.

f) **The installation of an impulse withstanding type earth leakage breaker is necessary.** A failure to install an earth leakage breaker can result in an accident such as an electric shock or a fire. Do not turn on the power until the electrical work is completed. Be sure to turn off the power when servicing.

g) Please do not use a condensive capacitor for power factor improvement under any circumstances. (It does not improve power factor, while it can cause an abnormal overheat accident)

h) For power source cables, use conduits.

i) Please **do not lay electronic control cables (remote control and signaling wires) and other high current cables together outside the unit.** Laying them together can result in malfunctioning or a failure of the unit due to electric noises.

j) Power cables and signaling wires must always be connected to the power cable terminal block and secured by cable fastening clamps provided in the unit.

k) Fasten cables so that they may not touch the piping, etc.

l) **When cables are connected, please make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection** and then attach the cover securely. (Improper cover attachment can result in malfunctioning or a failure of the unit, if water penetrates into the box.)

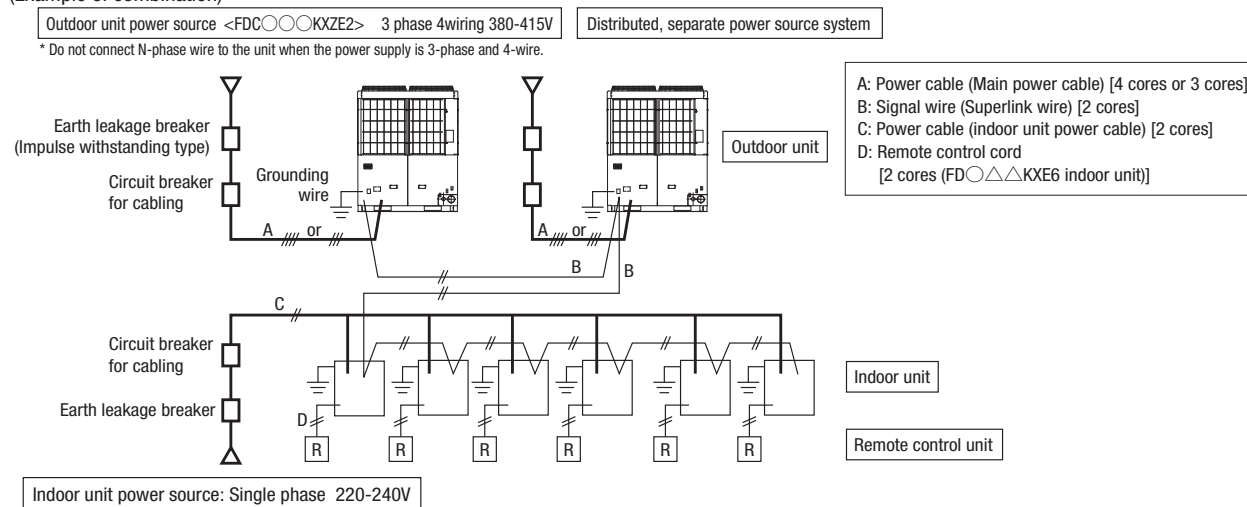
m) Make sure to use circuit breakers (earth leakage breaker and circuit breaker) of proper capacity. Use of breakers of larger capacity could result in trouble on components or fire accident. The circuit breaker should isolate all poles under over current.

n) Install isolator or disconnect switch on the power source wiring in accordance with the local codes and regulations. The isolator should be locked in OFF state in accordance with EN60204-1.

o) After maintenance, all wiring, wiring ties and the like, should be returned to their original state and wiring route, and the necessary clearance from all metal parts should be secured.

6-1. Wiring system diagrams

(Example of combination)



CAUTION

If the earth leakage breaker is exclusively for ground fault protection, then you will need to install a circuit breaker for wiring work.

6-2. Method of connecting power cables

(1) Method of leading out cables

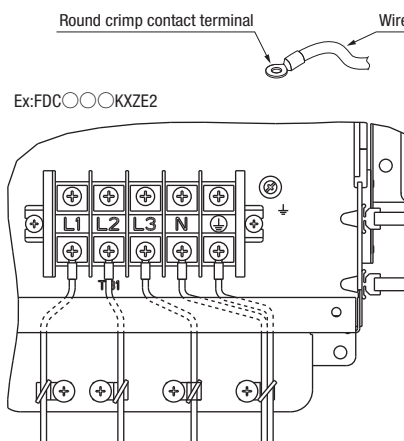
- As shown on the drawing in Section 4-2 (1), cables can be laid through the front, right, left or bottom casing.
- In wiring on the installation site, cut off a half-blank (φ 50 or oblong hole measuring 40x80) covering a penetration of the casing with nippers.

(2) Notabilia in connecting power cables

Power cables must always be connected to the power cable terminal block and clamped outside the electrical component box. In connecting to the power cable terminal block, use round solderless terminals.

- Connect the ground wire before you connect the power cable. When you connect a grounding wire to a terminal block, use a grounding wire longer than the power cable so that it may not be subject to tension.
- Do not turn on power until installation work is completed. Turn off power to the unit before you service the unit.
- Ensure that the unit is properly grounded.
- Always connect power cables to the power terminal block.
- To connect a cable to the power terminal block, use a round crimp contact terminal.
- Use specified wires in wiring, and fasten them securely in such a manner that the terminal blocks are not subject to external force.
- In fastening a screw of a terminal block, use a correct-size driver.
Fastening a screw of a terminal block with excessive force can break the screw.
- For the tightening torque of terminals, refer to the list shown at right.
- When electrical installation work is completed, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection.

FDC○○○KXZE2 : Tightening torque (N · m)		
M3.5	Outdoor signal line terminal block	0.9-1.2
M6	Power cable terminal block, Earth wire	2.5-2.8



Request (FDC○○○KXZE2)

- When connecting to the power source terminal block, use the crimp terminals for M6 as shown at right. 18.5 mm or less
- When connecting to the signal terminal block, use the crimp terminals for M3.5 as shown at right. 7 mm or less

(3) Outdoor unit power source specifications

FDC○○○KXZE2 : 3phase 380-415V

Model	Power source	Cable size for power source (mm ²)	Wire length (m)	Moulded-case circuit breaker (A)		Earth leakage breaker	Earth wire	
				Rated current	Switch capacity		Size (mm ²)	Screw type
280	3 phase 380-415V 50Hz/ 380V60Hz	8	74	30	30	30A30mA less than 0.1 sec	3.5	M6
335		8	74	30	30	30A30mA less than 0.1 sec	3.5	M6
400		14	86	50	50	50A100mA less than 0.1 sec	5.5	M6
450		14	86	50	50	50A100mA less than 0.1 sec	5.5	M6
475		22	102	60	60	60A100mA less than 0.1 sec	5.5	M6
500		22	102	60	60	60A100mA less than 0.1 sec	5.5	M6
560		22	102	60	60	60A100mA less than 0.1 sec	5.5	M6

Please note

- The method of laying cables has been determined pursuant to the Japanese indoor wiring regulations (JEC8001). (Please adapt it to the regulations in effect in each country)
- In the case of distributed, separate power source system, the listed data represent those of an outdoor unit.
- For details, please refer to the installation manual supplied with the indoor unit.

6-3. Method of connecting signaling wires

The communication protocol can be chosen from following two types. One of them is the conventional Superlink (hereinafter previous SL) and the other is the new Superlink II (hereinafter new SL). These two communication protocols have the following advantages and restrictions, so please choose a desirable one meeting your installation conditions such as connected indoor units and centralized control. When signal cables are connected into a network involving outdoor units, indoor units or centralized control equipment that do not support new SL, please select communications in the previous SL mode, even if the refrigerant system is separated from theirs.

Communication protocol	Conventional communication protocol (previous SL)	New communication protocol (new SL)
Outdoor unit setting (SW5-5)	ON	OFF (Factory default)
No. of connectable indoor units	Max. 48	Max. 128
No. of connectable outdoor units in a network	Max. 48	Max. 32
Signal cable (total length)	Up to 1000m	Up to 1,500 m for 0.75 mm ² shielding wire (MWS) Up to 1,000 m for 1.25 mm ² shielding wire (MWS)
Signal cable (furthest length)	Up to 1000m	Up to 1000m
Connectable units to a network	Units not supporting new SL (FD○A△△KXE4-5 series) Units supporting new SL (FD○△△KXE6 series, FD○△△KXZ series) Can be used together.	Units supporting new SL (FD○△△KXE6 series, FD○△△KXZ series)

Note: For FDT224 and 280 models, calculate the number of units taking 1 indoor unit as 2 units for the sake of communication.

● **Signal cables are for DC 5 V. Never connect wires for 220/240 V or 380/415 V.** Protective fuse on the PCB will trip.

- ① Confirm that signal cables are prevented from applying 220/240 V or 380/415 V.
- ② Before turning the power on, check the resistance on the signal cable terminal block. If it is less than 100Ω, power source cables may be connected to the signal cable terminal block.

When units of FD○△△KXE6 Series, FD○△△KXZE1 series and units of FD○A△△KXE4 series are connected:

Standard resistance value=5,100/Number of connected units.

When units of FD○A△△KXE4 and 5 Series only are connected:

Standard resistance value=9,200/Number of connected units.

When units of FD○△△KXE6 Series, FD○△△KXZE1 series and units of FD○A△△KXE4 and 5 Series are connected in a mixture:

Standard resistance value=46,000/[(Number of connected FD○A△△KXE4 and 5 Series units x 5) + (Number of connected FD○△△KXE6 and KXZ Series units x 9)]

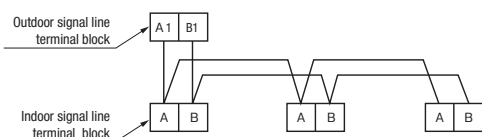
The number of connected units includes those of indoor units, outdoor units and SL devices.

If the resistance value is less than 100Ω, disconnect the signal cables temporarily to divide to more than one network, to reduce the number of indoor units on the same network, and check each network.

Indoor and outdoor units signal cables

- Connect the signal cable between indoor and outdoor units and the signal cable between outdoor units belonging to the same refrigerant line to A1 and B1.
- Connect the signal line between outdoor units on different refrigerant lines to A2 and B2.
- Please use a shielded cable for a signal line and connect a shielding earth at all the indoor units and outdoor units.

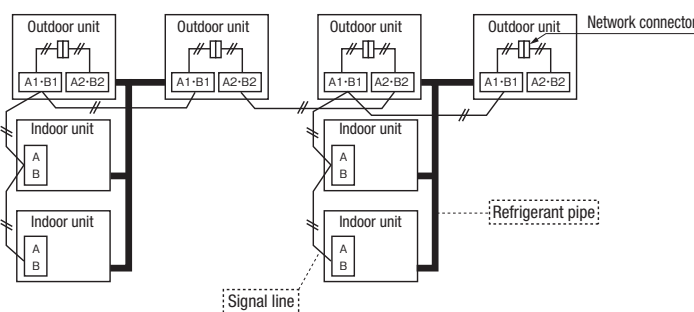
(1) When one outdoor unit is used.



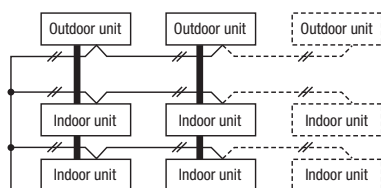
○ Indoor and outdoor signal lines do not have a polarity. Any of the connections in the following illustration can be made.



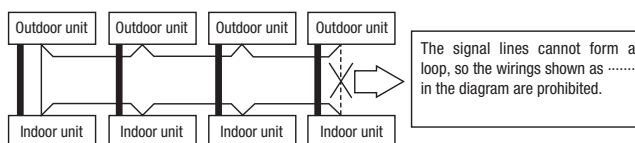
(2) When plural outdoor units are used



(3) The signal lines can also be connected using the method shown below.



Important ○ Loop wiring prohibited.



Remote control wiring specifications

(1) **A standard remote control wire is 0.3mm² x 2 cores (FDC○△△KXE6, KXZE1 indoor unit), 0.3mm² x 3 cores (FD○A△△KXE4-5 indoor unit).** It can be extended up to 600m. For a remote control wire exceeding 100m, please upgrade wire size as specified in the table below.

Length (m)	Wire size
	FD○△△KXE6 indoor unit
100 to 200	0.5mm ² × 2 cores
To 300	0.75mm ² × 2 cores
To 400	1.25mm ² × 2 cores
To 600	2 mm ² × 2 cores

(2) When the remote control wire runs parallel to another power source wire or when it is subject to outside noise, such as from a high-frequency device, use shielded wire. (Be sure to ground only one end of the shielded wire.)

CAUTION In addition to a possible wiring error between indoor and outdoor units, there are other possibilities of erroneous wiring as illustrated below.

① Wrong wiring between signaling wires and remote control wires.

② Connecting power cables to the signaling wire terminal block.

For remote control Terminal block: X, Y, A, B. For signal wires Terminal block: A, B. Remote control wire, Signal wire.

For power cables Terminal block: L, N, A, B. For signal wires Terminal block: A, B. power cable (220-240V), Signal wire.

It will result in a blown signal line fuse (CNK).

7. CONTROL SETTINGS

7-1. Unit address setting

This control system controls the controls of more than one air-conditioner's outdoor unit, indoor unit and remote control unit through communication control, using the microcomputers built in the respective controls. Address setting needs to be done for both outdoor and indoor units. Turn on power in the order of the outdoor units and then the indoor units.

Use 1 minute as the rule of thumb for an interval between them.

The communication protocol can be chosen from following two types. One of them is the conventional communication protocol (previous SL) and the other is the new communication protocol (new SL). These two communication protocols have their own features and restrictions as shown by Table 6-3. Select them according to the indoor units and the centralized control to be connected. When signal cables are connected into a network involving outdoor units, indoor units or central control equipment that do not support new SL, please select communications in the previous SL mode, even if the refrigerant system is separated from theirs.

When communication is established after setting addresses, check the communication protocol with the 7-segment display panel of the outdoor unit.

●Address setting methods

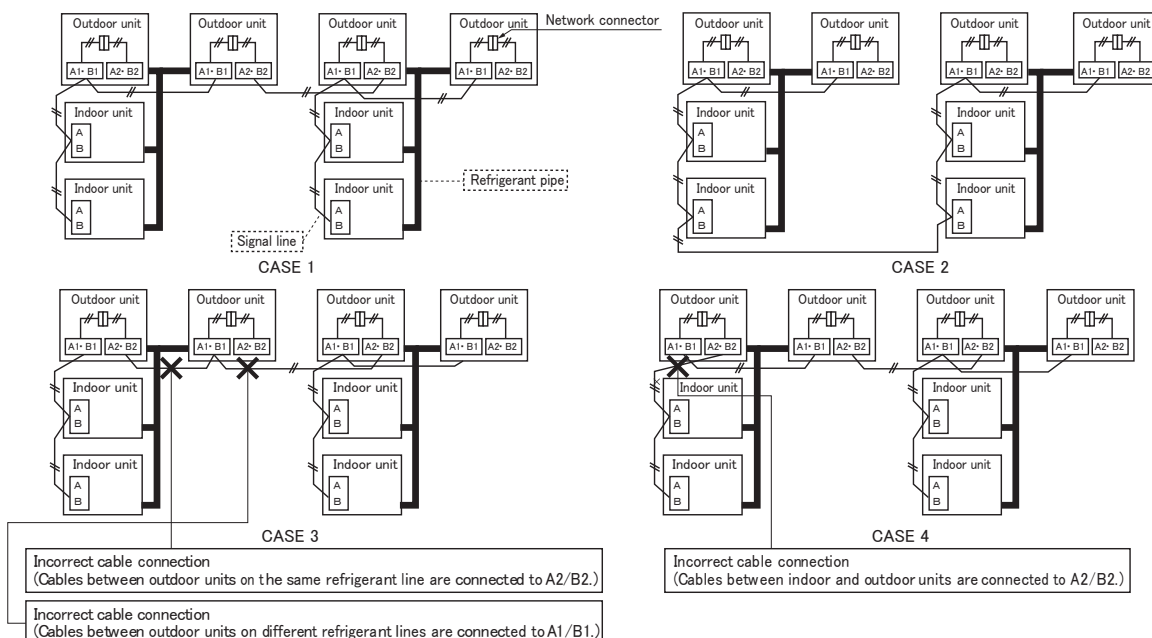
The following address setting methods can be used. The procedure for automatic address setting is different from the conventional one. Please use the automatic address setting function after reading this manual carefully.

Communication protocol Address setting method		new SL		previous SL	
		Automatic	Manual	Automatic	Manual
When plural refrigerant systems are linked with signal lines (e.g., to implement central control)	Case 1 When signal lines linking plural refrigerant systems are provided between outdoor units. (When the network connector is disconnected, refrigerant systems are separated each other)	OK ^{※1}	OK	×	OK
	Case 2 When signal lines linking plural refrigerant systems are provided between indoor units.	×	OK	×	OK
When only one refrigerant system is involved (signal lines do not link plural refrigerant systems)		OK	OK	OK	OK

※1 Do not connect the signal line between outdoor units on the different refrigerant lines to A1 and B1. Do not connect the signal line between outdoor units on the same refrigerant line to A2 and B2. This may interrupt proper address setting. (Case 3)

Do not connect the signal line between indoor unit and outdoor unit to A2 and B2. This may interrupt proper address setting. (Case 4)

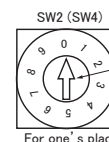
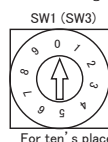
※2 In Case 2, automatic address setting is not available. Set addresses manually.



●Address No. setting

Set SW1 through 4 and SW5-2 provided on the PCB and SW1 & 2 provided on the outdoor unit PCB as shown in the drawings below.

Indoor PCB	SW1, 2 (blue)	For setting indoor No. (The ten's and one's)
	SW3, 4 (green)	For setting outdoor No. (The ten's and one's)
	SW5-2	Indoor No. switch (The hundred's Place) [OFF : 0, ON : 1]
Outdoor PCB	SW1, 2 (red)	For setting outdoor No. (The ten's and one's)



By inserting a flat driver (precision screw driver) into this groove and turn the arrow to point a desired number.

●Summary of address setting methods (figures in [] should be used with previous SL)

	Units supporting new SL			Units NOT supporting new SL		
	Indoor unit address setting		Outdoor unit address setting	Indoor unit address setting		Outdoor unit address setting
	Indoor No. switch	Outdoor No. switch	Outdoor No. switch	Indoor No. switch	Outdoor No. switch	Outdoor No. switch
Manual address setting (previous SL/new SL)	000-127[47]	00-31[47]	00-31[47]	00-47	00-47	00-47
Automatic address setting for single refrigerant system installation (previous SL/new SL)	000	49	49	49	49	49
Automatic address setting for multiple refrigerant systems installation (with new SL only)	000	49	00-31	×	×	×

Do not set numbers other than those shown in the table, or an error may be generated.

Note: When units supporting new SL are added to a network using previous SL such as one involving FD○A△△KXE4-5 series units, choose previous SL for the communication protocol and set addresses manually.

Since the models FDT224 and 280 have 2 PCBs per unit, set different indoor unit No. and SW on each PCB.

- An outdoor unit No., which is used to identify which outdoor unit and indoor units are connected in a refrigerant system, is set on outdoor unit PCB and indoor unit PCB. Give the same outdoor unit No. to all outdoor unit and indoor units connected in same refrigerant system.
- An indoor unit No. is used to identify individual indoor units. Assign a unique number that is not assigned to any other indoor units on the network.

Unless stated otherwise, the following procedures apply, when new SL is chosen for the communication protocol.

When previous SL is chosen, use figures shown in [] in carrying out these procedures.

Manual address setting Generally applicable to new SL/previous SL, use figures in [] with previous SL.

- ① Address setting of outdoor unit Before turning on the power, set as follows. The outdoor address is registered when the power is turned on.

Set **the outdoor No. switches** in a range of **00 - 31 [or 00 - 47 for old SL]**.

Take care not to duplicate with other outdoor unit No. on the network.

In the same way also on the master unit of combination, set the rotary switch for outdoor No. in a range of 00 - 31 [or 00 - 47 for old SL]

For slave units of combination, set the rotary switches for outdoor No. at the same outdoor No. as the master unit of combination.

When 2 units are combined, set the DIP switch SW4-7 of slave unit to ON. When 3 units are combined, set the DIP switch SW4-7 of slave unit 1 to ON and the DIP switch SW4-8 of slave unit 2 to ON. (Use same setting for outdoor No. of master unit and slave unit.)

- ② Address setting of indoor unit Before turning on the power, set as follows. Indoor address is registered when the power is turned on.

Set **the indoor No. switch** in a range of **000 - 127 [or 00 - 47 for old SL]**.

For **the outdoor No switches**, set corresponding outdoor No. in a range of **00 - 31 [or 00 - 47 for old SL]**.

Set with care not to duplicate with other indoor No. on the network.

Refrigerant system	Outdoor unit	SW1	SW2	SW4-7	Address on network
A	Master	2	2	OFF	22
	Slave	2	2	ON	23
B	Master	2	4	OFF	24
	Slave	2	4	ON	25
C	Master	3	1	OFF	31
	Slave	3	1	ON	00

Above list is an example. **The address on the network is master unit +1 for the slave unit.**

If the slave unit address is larger than 31 [or 47 for old SL], the address is assigned sequentially starting from 00.

When setting sequential addresses, take care not to duplicate the master unit address in the refrigerant system B with addresses of slave units in the refrigerant system A.

Refrigerant system	Outdoor unit	SW1	SW2	SW4-7	SW4-8	Address on network
A	Master	2	2	OFF	OFF	22
	Slave 1	2	2	ON	OFF	23
	Slave 2	2	2	OFF	ON	24
B	Master	2	5	OFF	OFF	25
	Slave 1	2	5	ON	OFF	26
	Slave 2	2	5	OFF	ON	27
C	Master	3	1	OFF	OFF	31
	Slave 1	3	1	ON	OFF	00
	Slave 2	3	1	OFF	ON	01

Note:

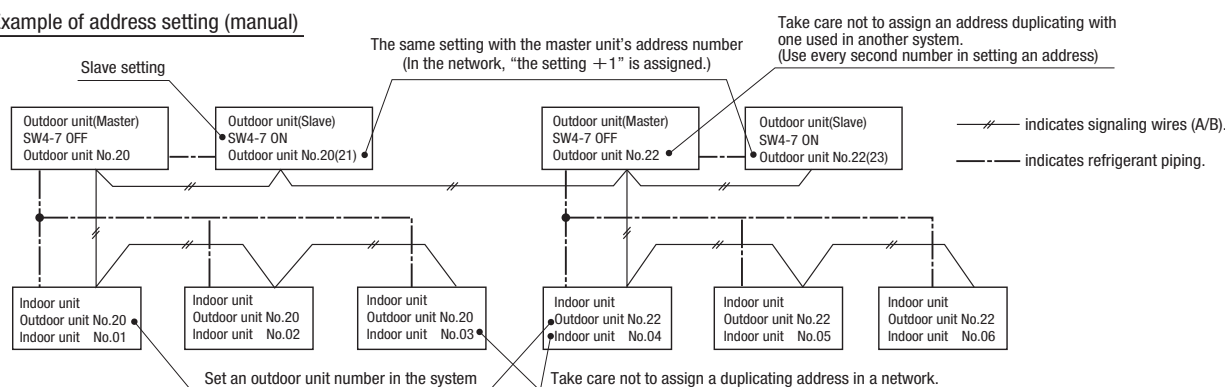
Slave unit address is master unit +1. Address of second slave unit is master unit +2. When setting the address for master unit, take care to avoid duplication with other systems. Otherwise, it cannot operate. (Error: E-31)

- ③ Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them.

* When there are some units not supporting new SL connected in the network, set SW5-5 to ON to choose the previous SL communication mode.

In the case of previous SL, the maximum number of indoor units connectable in a network is 48.

Example of address setting (manual)



Automatic address setting Generally applicable to new SL/previous SL, use figures in [] with previous SL.

With new SL, you can set indoor unit addresses automatically even for an installation involving multiple refrigerant systems connected with same network, in addition to the conventional automatic address setting of a single refrigerant system installation.

However, an installation must satisfy some additional requirements such as for wiring methods, so please read this manual carefully before you carry out automatic address setting.

(1) In the case of a single refrigerant system installation (Generally applicable to new SL/previous SL, use figures in [] with previous SL.)

- ① Address setting of outdoor unit Before turning on the power, set as follows.
 Confirm that the **outdoor No. switch** is set at **49 by the default**.
 • **In the same way also on the master unit of combination**, confirm that the rotary switch for outdoor No. is set **at 49 by the default**.
 • **In the same way also on the slave unit of combination**, confirm that the rotary switch for outdoor No. is set **at 49 by the default**.
When 2 units are combined, set the DIP switch SW4-7 of slave unit to ON. When 3 units are combined, set the DIP switch 4-7 of slave unit 1 to ON and the DIP switch SW4-8 of slave unit 2 to ON.

Outdoor unit	SW1	SW2	SW4-7	Address on network
Master	4	9	OFF	49
Slave	4	9	ON	00

Outdoor unit	SW1	SW2	SW4-7	SW4-8	Address on network
Master	4	9	OFF	OFF	49
Slave 1	4	9	ON	OFF	00
Slave 2	4	9	OFF	ON	01

CAUTION
 If the slave unit is not specified, a compressor failure may result.

- ② Indoor unit address setting
 Set as follows before you turn on power.
 Make sure that the **Indoor Unit No. switch** is set to **000 [in the case of previous SL: 49] (factory setting)**.
 Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting)**.
 ③ Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them. Unlike the procedure set out in (2) below, you need not change settings from the 7-segment display panel.
 ④ Make sure that the number of indoor units indicated on the 7-segment display panel agrees with the number of the indoor units that are actually connected to the refrigerant system.

(2) In the case of a multiple refrigerant systems installation (Applicable to new SL only. In the case of previous SL, set addresses with some other method.)

(This option is available when the interconnection wiring among refrigerant systems is on the outdoor side and new SL is chosen as the communication protocol.)

Address setting procedure (perform these steps for each outdoor unit)

[STEP1] (Items set before turning on power)

- ① Address setting of outdoor unit Before turning on the power, set as follows.
 Set the **outdoor No. switches** in a range of **00 – 31**.
 Take care not to duplicate with other outdoor unit No. on the network.
In the same way also on the master unit of combination, set the rotary switch for outdoor No. **in a range of 00 - 31**
For slave units of combination, set the rotary switches for outdoor No. at **the same outdoor No. as the master unit of combination**.
When 2 units are combined, set the DIP switch SW4-7 of slave unit to ON. When 3 units are combined, set the DIP switch SW4-7 of slave unit 1 to ON and the DIP switch SW4-8 of slave unit 2 to ON. (Use same setting for outdoor No. of master unit and slave unit.)
 ② Address setting of indoor unit Before turning on the power, set as follows.
 Make sure that the **Indoor Unit No. switch** is set to **000 (factory setting)**.
 Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting)**.
 ③ Isolate the present refrigerant system from the network.
 Disengage the **network connectors (white 2P)** of the outdoor units. (Turning on power without isolating each refrigerant system will result in erroneous address setting.)

[STEP2] (Power on and automatic address setting)

- ④ Turn on power to the outdoor unit
 Turn on power in order from the outdoor unit to indoor units. Give a one-minute or longer interval for them.
 ⑤ Select and enter "1" in P31 on the 7-segment display panel of each outdoor unit (master unit in case of combination) to input "Automatic address start."
 ⑥ Input a starting address and the number of connected indoor units.
 Input a starting address in P32 on the 7-segment display panel of each outdoor unit (master unit in case of combination).
 ⑦ When a starting address is entered, the display indication will switch back to the "Number of Connected Indoor Units Input" screen.
 Input the number of connected indoor units from the 7-segment display panel of each outdoor unit (master unit in case of combination). Please input the number of connected indoor units (on the same refrigerant line in case of combination) for each outdoor unit. (You can input it from P33 on the 7-segment display panel.) When the number of connected indoor units is entered, the 7-segment display panel indication will switch to "AUX" and start flickering.

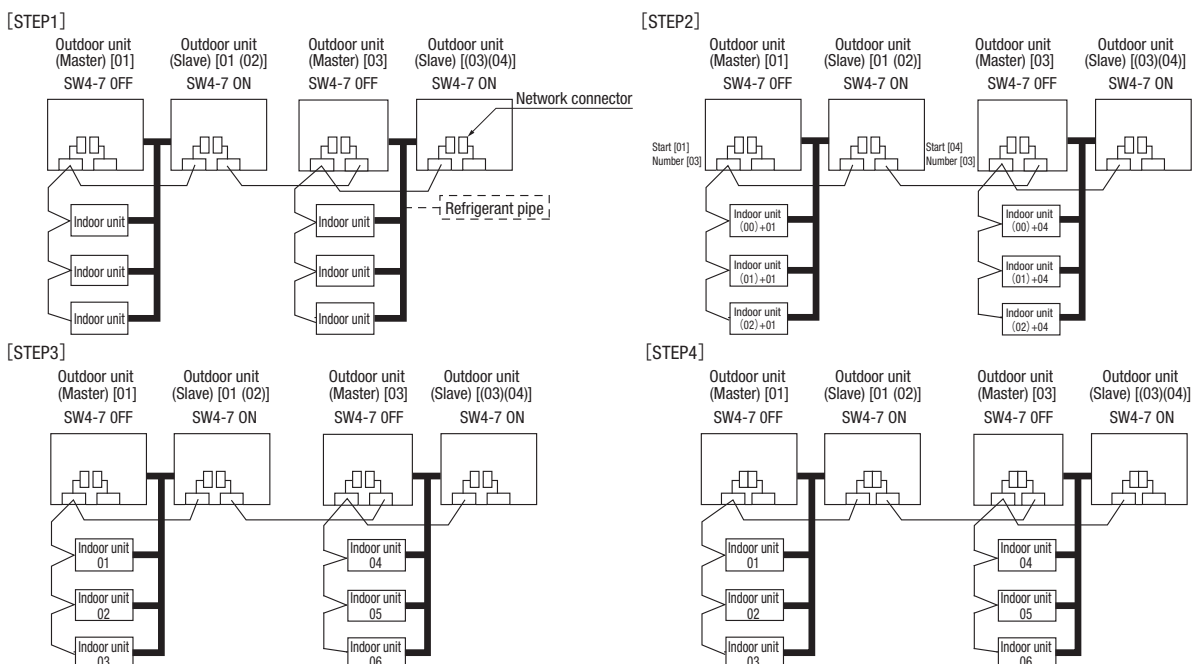
[STEP3] (Automatic address setting completion check)

- ⑧ Indoor unit address determination
 When the indoor unit addresses are all set, the 7-segment display panel indication will switch to "AUE" and start flickering.
 If an error is detected in this process, the display will show "A○○."
 Check the 7-segment display panel of each outdoor unit (master unit in case of combination).
 Depending on the number of connected indoor units, it may take **about 10 minutes** before the indoor unit addresses are all set.

[STEP4] (Network definition setting)

- ⑨ Network connection
 When you have confirmed an "AUE" indication on the display of each outdoor unit, **engage the network connectors** again.
 ⑩ Network polarity setting
After you have made sure that the network connectors are engaged, select and enter "1" in P34 on the 7-segment display panel of **any outdoor unit (on only 1 unit : master unit in case of combination)** to specify network polarity.
 ⑪ Network setting completion check
 When the network is defined, "End" will appear on the 7-segment display panel. An "End" indication will go off, when some operation is made from the 7-segment display panel or 3 minutes after.

	STEP1	STEP2	STEP3	STEP4
Indoor unit power source	② OFF	④ ON	—	—
Outdoor unit power source	① OFF	④ ON	—	—
Indoor unit (indoor/outdoor No.SW)	② Indoor000/outdoor 49 (factory setting)	—	—	—
Outdoor unit (outdoor No.SW)	① 01,03(Ex)	—	—	—
Network connectors	③ Disconnect(each outdoor unit)	—	—	⑨ Connect(each outdoor unit)
Start automatic address setting		⑤ Select "Automatic Address Start" on each outdoor unit.		
Set starting address		⑥ Outdoor 01:[01](Ex) Outdoor 03:[04](Ex)	—	—
Set the number of indoor unit		⑦ Outdoor 01:[03](Ex) Outdoor 03:[03](Ex)	—	—
Polarity setting		—	—	⑩ Set in P34 on the 7-segment display panel of any outdoor unit.
7-segment display		⑦ [AUX] (Blink)	⑧ "AUE"(blink), or "A○○" in error events.	⑪ [End]



- Within a refrigerant system, indoor units are assigned addresses in the order they are recognized by the outdoor unit. Therefore, they are not necessarily assigned addresses in order from the nearest to the outdoor unit first as depicted in drawings above.
- Make sure that power has been turned on to all indoor units.
- When addresses are set, you can have the registered indoor unit address No. and the outdoor unit address No. displayed on the remote control unit by pressing its CHECK button.
- Automatic address setting can be used for an installation in which plural indoor units are controlled from one remote control unit.
- Once they are registered, addresses are stored in microcomputers, even if power is turned off.
- If you want to change an address after automatic address setting, you can change it from the remote control unit with its "Address Change" function or by means of manual setting. Set a unique address by avoiding the address assigned to other indoor unit on the network when the address is changed.
- Do not turn on power to central control equipment until automatic address setting is completed.
- When addresses are set, be sure to perform a test run and ensure that you can operate all indoor and outdoor units normally. Also check the addresses assigned to the indoor units.

Address change (available only with new SL)

"Address Change" is used, when you want to change an indoor unit address assigned with the "Automatic Address Setting" function from a remote control unit. Accordingly, the conditions that permit an address change from a remote control unit are as follows.

	Indoor unit address setting		Outdoor unit address setting
	Indoor No.SW	Outdoor No.SW	Outdoor No.SW
Automatic address setting for single refrigerant system installation	000	49	49
Automatic address setting for multiple refrigerant systems installation	000	49	00-31

If "CHANGE ADD. ▼" is selected with some addresses falling outside these conditions, the following indication will appear for 3 seconds on the remote control "INVALID OPER" .

Operating procedure

When the eco touch remote control is connected, refer to the installation setting in the installation manual which is packed along with the remote control.

(1) When single indoor unit is connected to the remote control.

Item	Operation	Display
1 Address change mode	① Press the AIR CON No. switch for 3 seconds or longer.	[CHANGE ADD. ▼]
	② Each time when you press the ⬆ switch, the display indication will be switched.	[CHANGE ADD. ▼] ⇔ [MASTER I/U ▲]
	③ Press the SET switch when the display shows "CHANGE ADD. ▼" and then start the address change mode, changing the display indication to the "Indoor Unit No. Setting" screen from the currently assigned address.	[I/U 001 O/U 01] (1sec) → [⬆ SET I/U ADD.] (1sec) → [I/U 001 ⬆] (Blink)
2 To set a new indoor unit No.	④ Set a new indoor unit No. with the ⬆ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[I/U 000 ▲] ⇔ [I/U 001 ⬆] ⇔ [I/U 002 ⬆] ⇔ . . . ⇔ [I/U 127 ▼]
	⑤ After selecting an address, press the SET switch, and then the indoor unit address No. is defined.	[I/U 002] (2sec)
3 To set a new outdoor unit No.	⑥ After showing the defined indoor address No. for 2 seconds, the display will change to the "Outdoor Address No. Setting" screen. The currently assigned address is shown as a default value.	[I/U 002] (2sec Lighting) → [⬆ SET O/U ADD.] (1sec) → [O/U 01 ⬆] (Blink)
	⑦ Set a new outdoor unit No. with the ⬆ switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[O/U 00 ▲] ⇔ [O/U 01 ⬆] ⇔ [O/U 02 ⬆] ⇔ . . . ⇔ [O/U 31 ▼]
	⑧ After selecting an address, press the SET switch, and then the outdoor unit No. and the indoor unit No. are defined.	[I/U 002 O/U 02] (2sec Lighting) → [SET COMPLETE] (2sec Lighting) → Returns to normal condition.

(2) When plural indoor units are connected to the remote control.

When plural indoor units are connected, you can change their addresses without altering their cable connection.

Item	Operation	Display
1 Address change mode	① Press the AIR CON Unit No. switch for 3 seconds or longer.	[CHANGE ADD▼]
	② Each time when you press the switch, the display indication will be switched.	[CHANGE ADD▼] ⇔ [MASTER I/U▲]
	③ Press the SET switch when the display shows "CHANGE ADD. ▼" The lowest indoor unit No. among the indoor units connected to the remote control unit will be shown.	[SELECT I/U] (1sec) → [I/U 001 O/U 01▲] (Blink)
2 Selecting an indoor unit to be changed address	④ Pressing the switch will change the display indication cyclically to show the unit No.'s of the indoor units connected to the remote control and the unit No.'s of the outdoor units connected with them.	[I/U 001 O/U 01▲] ⇔ [I/U 002 O/U 01] ⇔ [I/U 003 O/U 01] ⇔ . . . ⇔ [I/U 016 O/U 01▼]
	⑤ Then the address No. of the indoor unit to be changed is determined and the screen switches to the display " SET I/U ADD."	[SET I/U ADD.] (1sec) → [I/U 001] (Blink)
3 Setting a new indoor unit No.	⑥ Set a new indoor unit No. with the switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[I/U 000▲] ⇔ [I/U 001] ⇔ [I/U 002] ⇔ . . . ⇔ [I/U 127▼]
	⑦ After selecting an address, press the SET switch. Then the address No. of the indoor unit is determined.	[I/U 002] (2sec)
4 Setting a new outdoor unit No.	⑧ The display will indicate the determined indoor address No. for 2 seconds and then switch to the " SET O/U ADD." screen. A default value shown on the display is the current address.	[I/U 002] (2sec lighting) ⇔ [SET O/U ADD.] (1sec) ⇔ [O/U 01] (Blink)
	⑨ Set a new outdoor unit No. with the switch. A number indicated on the display will increase or decrease by 1 upon pressing the ▲ or ▼ switch respectively.	[O/U 00▲] ⇔ [O/U 01] ⇔ [O/U 02] ⇔ . . . ⇔ [O/U 31▼]
	⑩ After selecting an address, press the SET switch. Then the address of the indoor unit and outdoor unit are determined.	[I/U 002 O/U 02] (2sec lighting) → [SELECT] (1sec lighting) → [I/U SELECTION▼] (lighting)
	⑪ If you want to continue to change addresses, return to step ④.	[Press the switch] (1sec) → [SET COMPLETE] (2-10sec lighting)
5 Ending the session	⑫ If you want to end the session (and reflect new address settings) In Step ⑩, press the ▼ switch to select "END ▲." If you have finished changing addresses, press the SET switch while "END ▲" is shown. While new settings are being transmitted, "SET COMPLETE" will be indicated. Then the remote control display will change to the normal state.	[END▲] → [SET COMPLETE] (2-10sec lighting) → Normal state
	⑬ If you want to end the session (without reflecting new address settings) Before you complete the present address setting session, press the "ON/OFF" switch. Then the display is change to exit from this mode and switch the display to the normal state. All address settings changed in the session will be aborted and not reflected.	[ON/OFF] → Forced termination

The switch will continuously change the display indication to the next one in every 0.25 seconds when it is pressed for 0.75 seconds or longer.
If the Reset switch is pressed during an operation, the display indication returns to the one that was shown before the last Set switch operation.
Even if an indoor unit No. is changed in this mode, the registered indoor unit No. before address change mode is displayed when [I/U SELECTION▼] is shown.
When "SET COMPLETE" is shown, indoor unit No. is registered.

NOTICE Turn on power to central control equipment after the addresses are determined.
Turning on power in wrong order may result in a failure to recognize addresses.

● 7-segment display indication in automatic address setting

Items that are to be set by the customer

Code	Content of display
P30	Communication protocol 0: Previous SL mode 1: New SL mode (The communication protocol is displayed ; display only)
P31	Automatic address start
P32	Input starting address Specify a starting indoor unit address in automatic address setting.
P33	Input number of connected indoor units Specify the number of indoor units connected in the refrigerant system in automatic address setting.
P34	Polarity definition 0: Network polarity not defined. 1: Network polarity defined.

7-segment display indication in automatic address setting.

Code	Content of display
AUX	During automatic address setting. X: The number of indoor units recognized by the outdoor unit.
AUE	Indoor unit address setting is completed normally.
End	Polarity is defined. (Automatic address) Completed normally.

Address setting failure indication

Code	Content of display	Please check
A01	The number of the indoor units that can be actually communicated with is less than the number specified in P33 on the 7-segment display panel.	Are signal lines connected properly without any loose connections? Input the number of connected indoor units again.
A02	The number of the indoor units that can be actually communicated with is more than the number specified in P33 on the 7-segment display panel.	Are signal lines connected properly without any loose connections? Are the network connectors coupled properly? Input the number of connected indoor units again.
A03	Starting address (P32) + Number of connected indoor units (P33) > 128	Input the starting address again. Input the number of connected indoor units again.
A04	While some units are operating in the previous SL mode on the network, the automatic address setting on multiple refrigerant systems is attempted.	Perform manual address setting. Separate previous SL setting unit from the network Arrange all units to operate in the new SL.

Error indication

Code	Content of display	Cause
E31	Duplicating outdoor unit address	• Plural outdoor units are exist as same address in same network.
E46	Incorrect setting	• Automatic address setting and manual address setting are mixed.

7-2. Change of control

Contents of control for outdoor unit can be changed with dials on PCB and P $\bigcirc\bigcirc$ on 7-segment indicator.

When changing P $\bigcirc\bigcirc$ on 7-segment indicator, it can be set by holding down SW8 (7-segment indicator UP: Ones digit), SW9 (7-segment indicator UP: Tens digit) and SW7 (Data write/Enter)

Method to change control		Contents of control change
SW setting on PCB	P $\bigcirc\bigcirc$ setting on 7-segment	
SW3-7 to ON*1	Set external input function allocation to "2". *1	Forced cooling/heating mode (It can be fixed at cooling with external input terminals open, or at heating with them closed.)
SW5-1 to ON + SW5-2 to ON	—	Cooling test run
SW5-1 to ON + SW5-2 to OFF	—	Heating test run
Close the fluid service valve on outdoor unit and set as follows: (1) SW5-2 of PCB to ON (2) SW5-3 of PCB to ON (3) SW5-1 of PCB to ON	—	Pump-down operation
SW5-5	—	Communication method select ON: Previous SL communication, OFF: New SL communication (SLII)
J13: Shorted (Factory default), J13: Open	—	External input switing (CnS1, CnS2 only) shorted: Level input, open: Pulse input
J15: Shorted (Factory default), J15: Open	—	Defrost start temperature shorted : normal, open: Cold weather district.
—	P01	Operation priority select 0: First push preferred (Factory default) 1: Last push preferred
—	P02	Outdoor fan snow protection control 0: Control invalid (Factory default) 1: Control valid
—	P03	Outdoor fan snow protection ON time setting 30 sec (Factory default) 10, 30 to 600 sec
—	P04	Demand ratio change value OFF: Invalid (Factory default) 000, 040, 060, 080 [%]
—	P05	Silent mode setting 0: at shipping-3: Larger values for larger effect
—	P06	Allocation of external output (CnZ1)
—	P07	Allocation of external input (CnS1)
—	P08	Allocation of external input (CnS2)
—	P09	Allocation of external input (CnG1)
—	P10	Allocation of external input (CnG2)
—	P11-	Spare
—	P14	2-step demand OFF: Invalid (Factory default) 000, 040, 060, 080 [%]
—	P15	3-step demand OFF: Invalid (Factory default) 000, 040, 060, 080 [%]

*1 When both of external input function assignment (P07 – 10) and SW are changed, the control is changed.

(Ex: When CnS1 is used for the input of forced cooling/cooling mode, set P07 at 2 and SW3-7 to ON. When CnS2 is used for the input of forced cooling/cooling mode, set P08 at 2 and SW3-7 to ON)

*2 Under the energy save control, the capacity control becomes valid even if no signal is input to the external input terminal.

By changing the allocation of external input function (P07-10) on the 7-segment, functions of external input terminal may be selected. Inputting signals to external input terminals enable the following functions.

Setting value for external input function assignment	External input terminal shorted	External input terminal open
"0": External operation input	Permitted	Prohibited
"1": Demand input	*3	*3
"2": Cooling / heating forced input	Heating	Cooling
"3": Silent mode 1 *1	Valid	Invalid
"4": Spare		
"5": Outdoor fan snow control input	Valid	Invalid
"6": Test run external input 1 (SW5-1 equivalent)	Test run start	Normal
"7": Test run external input (SW5-2 equivalent)	Cooling	Heating
"8": Silent mode 2 *2	Valid	Invalid
"9": Demand input	*3	*3
"10": AF periodic inspection display	Valid	Invalid
"11": AF error display	Valid	Invalid
"12": Building multi energy save control	Valid	Invalid

*1 Valid/invalid is changed depending on outdoor air temperatures.

*2 It is always Valid, regardless of outdoor air temperature.

*3 According to the demand setting table.

External output function of CnZ1 can be changed by changing P06 on 7-segment indicator.

"0": Operation output
"1": Error output
"2": Compressor ON output
"3": Fan ON output
"4 - 9": Spare

*3 Demand setting table

Demand control	Function assignment 1	Function assignment 9
None (Normal)	Shorted	Shorted
1-step	Open	Shorted
2-step	Open	Open
3-step	Shorted	Open

7-3. External input and output terminals specifications

Name	Purpose (Factory default)	Specification	Operating side connector
External input CnS1	External operation input (Closed at shipping)	Non-voltage contactor (DC12V)	J. S. T (NACHIATSU) B02B-XAMK-1 (LF) (SN)
External input CnS2	Demand input (Short-circuited at shipping)	Non-voltage contactor (DC12V)	J. S. T (NACHIATSU) B02B-XARK-1 (LF) (SN)
External input CnG1	Cooling / Heating forced input (Open at shipping)	Non-voltage contactor (DC12V)	J. S. T (NACHIATSU) B02B-XAEK-1 (LF) (SN)
External input CnG2	Silencing mode input (Open at shipping)	Non-voltage contactor (DC12V)	J. S. T (NACHIATSU) B02B-XASK-1 (LF) (SN)
External output CnH	Operation output	DC12V output	J. S. T (NACHIATSU) BH2P-VH-1-BK (LF) (SN)
External output CnY	Error output	DC12V output	J. S. T (NACHIATSU) BH2P-VH-1 (LF) (SN)
External output CnZ1	Reserve output	DC12V output	J. S. T (NACHIATSU) BH2P-VH-1-R (LF) (SN)

8. TEST OPERATION AND TRANSFER

8-1. Before starting operation

- (1) Make sure that a measurement between the power source terminal block and ground, when measured with a 500V megger, is greater than 1 MΩ.
When the unit is left for a long time with power OFF or just after the installation, there is possibility that the refrigerant is accumulated in the compressor and the insulation resistance between the contact terminals for power source and grounding decreases to 1MΩ or around.
When the insulation resistance is 1MΩ or more, the insulation resistance will rise with crank case heater power ON for 6 hours or more because the refrigerant in the compressor is evaporated.
- (2) Please check the resistance of the signaling wire terminal block before power is turned on. If a resistance measurement is 100Ω or less, it suggests a possibility that power cables are connected to the signaling wire terminal block. (Please refer to 6-3. Standard resistance value.)
- (3) Be sure to turn on the crank case heater 6 hours before operation.
After turning on the crank case heater, there is possibility that the compressor doesn't start operation unless the compressor temperature rises or the time mentioned above is passed. (for protection of compressor)
If the 7-segment display shows the "dLO" and "○○○" (the rest of time 360-001) alternately every 4 seconds, perform the test operation after the compressor temperature rises by the turning on the crank case heater.
- (4) Make sure that the bottom of the compressor casing is warm. (higher than outdoor temperature +5°C)
- (5) Be sure to fully open the service valves (liquid, gas and Equalizer oil piping (for a combined installation only)) for the outdoor unit.
Operating the outdoor unit with the valves closed may damage the compressor.
- (6) Check that the power to all indoor units has been turned on. If not, water leakage may occur.

CAUTION

Please make sure that the service valves (gas, liquid, oil equalizing pipe (for a combined installation only)) are full open before a test run. Conducting a test run with any of them in a closed position can result in a compressor failure.

8-2. Check operation

It is recommended to practice the check operation in precedent to the test run.

[Even if the check operation is not practiced, the test run and normal operations can be performed.]

For further details regarding the check operation refer to the technical data.

Important

- Practice the check operation after completing the address setting for the indoor and outdoor units and also after charging the refrigerant.
 - To assure accurate checking, proper amount of refrigerant must be retained.
 - Check operation cannot be done when the system is stopped by an error.
 - Check operation cannot be done when the total capacity of connected indoor units is less than 80% of the outdoor unit capacity.
 - Check operation cannot be done when the system communication method is previous SL.
 - Don't perform the check operation simultaneously on more than one refrigerant line. Accurate checking cannot be obtained.
 - Practice the check operation within the operation temperature ranges (Outdoor temperature: 0 - 43° C, room temperature: 10 - 32°C). Check operation will not start out of these ranges.
 - Outdoor air processing unit cannot be checked. (It is possible to check indoor units other than the outdoor air processing unit of the same refrigerant line.)
- (1) Check items
Check operation allows proving the following points.
 - Whether or not the service valve is left open (Service valve open/close check). (In case of combination, however, accurate judgement can be made only all service valves of master and slave units are closed.)
 - Whether or not the refrigerant pipes and signal cables are connected properly between indoor and outdoor units. (Mismatch check)
 - Whether or not the indoor expansion valve operates properly. (Expansion valve failure check)

(2) Method of check operation

(a) Starting the check operation

- Confirm that all of the following switches are turned OFF: SW3-2 (Auto backup operation), SW3-6 (Pipe wash mode), SW3-7 (Forced cooling/heating mode), SW5-1 (Test run), SW5-2 (Test run cooling setting), SW5-3 (Pump-down operation) and SW5-6, -7, -8 (Capacity measurement mode). (In case of combination, on both main and slave units)
- At the next, turn the SW3-5 (Check operation) OFF → ON (only on master unit in case of combination) so that the check operation will start.
- It takes 15 - 30 minutes normally (max. 80 min) from the start to the end of check operation.

(b) End the check operation and the result display

- When the check operation is over, the system stops automatically. The 7-segment indicator shows the result (only on master unit in case of combination).

<Normal ending>

- 7-segment indicator shows "CHO End".
- Return the SW3-5 to OFF. The 7-segment indicator returns to normal display.

<Abnormal ending>

- 7-segment indicator shows an error alarm.
- Referring to the section [Inspect here], repair the faulty section and return the SW3-5 to OFF.
- At the next, repeat the check operation from the Step (2) above.

Display on 7-segment indicator during check operation

Code indicator	Data indicator	Display contents
H1	Max. remaining time	Check operation preparation on. Indicates max. remaining time (min). (In case of combination, indicated on master unit only.)
H2	Max. remaining time	Check operation on. Indicates max. remaining time (min). (In case of combination, indicated on master unit only.)
CHO	End	Normal ending of check operation. (In case of combination, indicated on master unit only.)

Error display on 7-segment indicator after ending the check operation

Code indicato	Data indicator	Display contents	Check following points
CHL	---	Operation valve is closed. (Refrigerant circuit is shut off partially.)	<ul style="list-style-type: none"> Isn't the service valve of outdoor unit left open? Is the low pressure sensor normal? (Detected pressure can be seen on the 7-segment indicator.) Is the connector of indoor unit expansion valve coil connected? Isn't the indoor unit expansion valve coil disconnected from the expansion valve body? Is the indoor unit heat exchanger sensor normal? (Check if the sensor is disconnected.)
CHU	Abnormal indoor unit No.	Mismatch between refrigerant pipes and signal cables. Refrigerant is not circulated to the indoor unit of which No. is displayed.	<ul style="list-style-type: none"> Are the refrigerant pipes and signal cables connected properly between the indoor and outdoor units? Is the connector of indoor unit expansion valve coil connected? Isn't the indoor unit expansion valve coil disconnected from the expansion valve body? Is the indoor unit heat exchanger sensor normal? (Check if the sensor is disconnected.)
CHJ	Abnormal indoor unit No.	Expansion valve on the indoor unit of which No. is displayed is not operating properly.	<ul style="list-style-type: none"> Is the connector of indoor unit expansion valve coil connected? Isn't the indoor unit expansion valve coil disconnected from the expansion valve body? Is the indoor unit heat exchanger sensor normal? (Check if the sensor is disconnected.)
CHE	---	Abnormal ending of check operation.	<ul style="list-style-type: none"> Isn't any error displayed (E??) on the indoor unit or outdoor unit? Are signal cables connected without play? Hasn't the switch setting been changed during the check operation?

※ When any error is detected, errors other than those listed above may be displayed. In such occasion, refer to the separate technical data.

8-3. Refrigerant quantity check

Refrigerant quantity check tells you whether the refrigerant quantity is excessive (over) or insufficient (low).

(Even if the check operation is not practiced, the test run and normal operation can be performed.)

For further details regarding the check operation refer to the technical data.

It must be noted that, during the check operation, the outdoor units and the indoor units are operated automatically.

Important

- Practice the refrigerant quantity check operation only after charging the measured quantity of additional refrigerant.
- It is necessary to add or reduce the refrigerant depending on the result of refrigerant quantity check. Even when it has been judged that proper quantity of refrigerant is retained, the result could become inadequate if the operating conditions are changed.
- It should be noted, therefore, that a result under particular conditions cannot cover all operating conditions.

(1) Guideline of accuracy

Guidelines of judgment on the refrigerant quantity are as shown below.

It should be noted that the result of judgment could vary depending on the conditions of judgment.

Refrigerant quantity over	+10 kg (Single machine) +20 kg (Combination machine)
Low refrigerant quantity	20% of the additional refrigerant quantity for piping (P)

(2) Confirmation before implementing the refrigerant quantity check

Confirm on all of the followings before starting the refrigerant quantity check.

- Confirm that it has been completed all works up to "8-1 Before starting operation".
- Check operation cannot be done when the total capacity of connected indoor units is less than 80% of the outdoor unit capacity.
- Check operation cannot be done when the system communication method is that of previous SL.
- Check operation cannot be done when the system is stopped by an error.
- Practice the check operation within applicable operation temperature range (Outdoor temperature: 10 - 43°C, room temperature: 15 - 32°C). Check operation will not start out of these ranges.
- Start the check operation only at 5 minutes after stopping all indoor units.

(3) Method of refrigerant quantity check operation**(a) Starting the refrigerant quantity check operation**

- Confirm that all of the following switches are turned OFF; SW3-2 (Auto backup operation), SW3-6 (Pipe wash mode), SW3-7 (Forced cooling/heating mode), SW5-1 (Test run), SW5-2 (Test run cooling setting), SW5-3 (Pump-down operation) and SW5-6, 7, 8 (Capacity measurement mode). (In case of combination, on both master/slave units)
- At the next, turn the SW3-4 (Refrigerant quantity check operation) OFF → ON (only on master unit in case of combination) so that the check operation will start.
- It takes 60–75 minutes normally from the start to the end of check operation.

(b) End of refrigerant quantity check operation and result display

- When the check operation is over, the system stops automatically, and the result is displayed on the 7-segment indicator. (Only on master unit in case of combination)

< Normal ending >

- 7-segment indicator shows “Co End”.
- Return the SW3-4 to OFF. 7-segment indicator returns to normal display.

< Abnormal ending >

- 7-segment indicator shows an error alarm.
- Repair the faulty section referring to the guidance, and return the SW3-4 to OFF.
- At the next, repeat the check operation from the Step (2) above.

(4) After the refrigerant quantity check operation

Following codes may be displayed at the end of check operation, other than “Co End”.
Check and take action according to the contents of remedy. And then, repeat the check operation.

Display on 7-segment indicator after the check operation (Displayed on master unit only in case of combination.)

Code indicator	Data indicator	Meaning	Remedy
Co	Hi	Refrigerant quantity over	① Too much refrigerant is charged. Reduce the quantity. < Guidelines of reduction > • <u>Single machine:10 kg</u> • <u>Combination machine:20 kg</u> Make sure to recover the refrigerant from the check joint of liquid pipe service valve using the refrigerant recovery device.
Co	Lo	Low refrigerant quantity	① Refrigerant quantity is insufficient. Recharge the refrigerant. < Guideline of recharge > • 20% of the additional refrigerant quantity for piping* (Upper limit: 5 kg) Recharge the refrigerant in the liquid state from the check joint of low pressure line. Make sure to measure the quantity before recharging.
Co	H_L	Couldn't judge.	It cannot judge (a state that it cannot judge properly). State of refrigerant might have been unstable during the check operation due to influence of wind, temperature change, etc. ① Check the expansion valve of indoor unit (disconnected coil, disconnected connector or faulty expansion valve). ② Implement at a later date by changing the conditions.
Co	---	Judgment was interrupted.	Check the following points. ① Haven't you changed the setting of DIP switches after the start? Return them to original setting. ② Is any error code (E??) displayed? If Yes, refer to the troubleshooting section in the technical data.
Co	HE	Starting conditions are not met.	Starting conditions are not met so that it cannot start the check operation. Refer to “(2) Confirmation before implementing the refrigerant quantity check”.

※ “Additional refrigerant quantity for piping” means the value of “Additional refrigerant quantity for piping (P)+(I)” in the Section 4-4 Additional refrigerant charge.

Other errors than above may also be displayed if errors are detected. In such occasion, inspect by referring to the separate technical data.

8-4. Test operation

(1) Test run from an outdoor unit.

Whether external inputs are set to ON or OFF, you can start a test run by using the SW5-1 and SW5-2 switches provided on the outdoor unit board.

Select the test run mode first.

Please set SW5-2 to ON for a cooling test run or OFF for a heating test run. (It is set to OFF at the factory for shipment)

Turning SW5-1 from OFF to ON next will cause all connected indoor units to start.

When a test run is completed, please set SW5-1 to OFF.

Note: During a test run, an indoor unit cannot be operated from the remote control unit (to change settings). ("Under centralized control" is indicated)

(2) Method of starting a test run for a cooling operation from an outdoor unit: please operate a remote control unit according to the following steps.

(a) Start of a cooling test run

Operate the unit by pressing the **START/STOP** button.

Select the "COOLING" mode with the **MODE** button.

Press the **TEST RUN** button for 3 seconds or longer.

The screen display will be switched from "Select with ITEM◆" → "Determine with **SET**" → "Cooling test run▼."

When the **SET** button is pressed while "Cooling test run▼" is displayed, a cooling test run will start. The screen display will be switched to "COOLING TEST RUN."

(b) Termination of a cooling test run

When the **START/STOP** button or the "TEMP SET button is pressed, a cooling test run will be terminated.

Notes : for engineers undertaking piping or electrical installation work

When a test run is completed, please make sure again that the electrical component box cover and the main body panel have been attached before you turn the unit over to the customer.

8-5. TRANSFER

Use the instruction manual that came with the outdoor unit to explain the operation method to the customer.

Please ask the customer to keep this installation manual together with the operation manual of his indoor units.

Instruct the customer that the power should not be turned off even if the unit is not to be used for a long time. This will enable operation of the air-conditioner any time. (Since the compressor bottom is warmed by the crank case heater, seasonal compressor trouble can be prevented.)

9. CAUTIONS FOR SERVICING (for R410A and compatible machines)

(1) To avoid mixing of different types of oil, use separate tools for each type of refrigerant.

(2) To avoid moisture from being absorbed by the refrigerant oil, the time for when the refrigerant circuit is open should be kept as short as possible. (Within 10 min. is ideal.)

(3) For other piping work, airtightness testing, vacuuming, and refrigerant charging, refer to section 4, REFRIGERANT PIPING WORK.

(4) Diagnostic Inspection Procedures

For the meanings of failure diagnosis messages, please refer to the nameplate provided on the unit (on the back of the control lid)

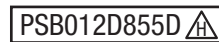
(5) 7-segment LED indication

Data are indicated when so chosen with the indication selector switch. For the details of indication, please refer to the cable name plate attached on the unit. (On the face of the control lid)

(6) Internal wiring

After maintenance, all wiring, wiring ties and the like, should be returned to their original state and wiring route, and the necessary clearance from all metal parts should be secured.

9.2 Instructions for installing the branch pipe set



- ⊙ This manual describes the specifications of branching pipe set and header set installation. For outdoor unit installation and indoor unit installation, please refer to the respective installation manuals supplied with your outdoor unit and indoor unit.
- ⊙ Before you set about installation work, please read this manual carefully so that you can carry out installation work according to the instructions contained herein.
- Please read the safety instructions contained in the installation manual supplied with your outdoor unit carefully and carry out installation work unerringly.
- When installation work is completed, conduct a test run to check the installation for any anomaly. Please also give the customer necessary instructions as to the operation and maintenance of the unit pursuant to the instruction manual (supplied with the indoor unit).
- Please ask the customer to keep the installation manual on the customer's part together with the instruction manual.

PARTS LIST

Branching pipe set type		Gas side	Liquid side	Different diameter pipe joint
Branching pipe set	DIS-22-1G			None
	DIS-180-1G			
	DIS-371-1G			
	DIS-540-3			
Outdoor unit's branching pipe set	DOS-2A-3			
	DOS-3A-3	<p>Branch pipe 1</p> <p>Branch pipe 2</p>	<p>Branch pipe 1</p> <p>Branch pipe 2</p>	

Branching pipe set type	Gas side	Liquid side	Different diameter pipe joint
HEAD4-22-1G			None
HEAD6-180-1G			
HEAD8-371-2			
HEAD8-540-3			

INSTALLATION PROCEDURE

1. Please select an appropriate branching pipe set model and a pipe size by consulting with the installation manual of the indoor unit or other relevant technical documents.

Attention

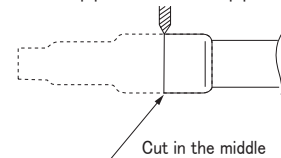
- Use a pipe conforming to a pipe size specified for indoor unit connection for the section between an indoor unit and a branching pipe.
- Use a pipe conforming to a pipe size specified for outdoor unit connection for the section between an outdoor branching pipe and an outdoor unit.

2. Cut a branching pipe set or a different diameter joint with a pipe cutter to make it fit for a selected pipe size before application.

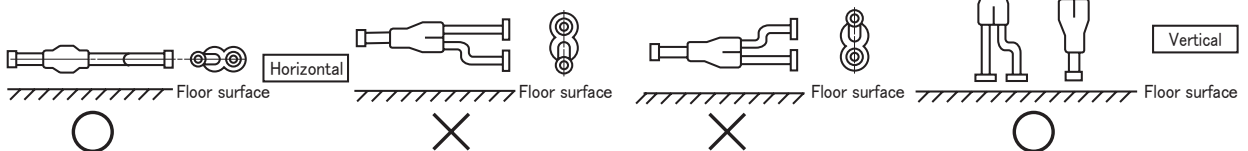
Attention

- In cutting pipes, always use a pipe cutter. Remove burrs from a cut end when you cut a pipe. In doing so, keep a cut end downward so that no chips or burrs may enter the pipe.
- Take utmost care so that no foreign matter such as dust or water may enter piping during installation work.
 - Please cover all the open ends of piping until installation work is completed. Particularly, any openings in the section of piping laid outdoors should be sealed stringently.
 - As long as possible, avoid open ends left facing upward. Make them face either horizontally or downward.
- A branching joint (for both gas and liquid) must always be positioned in such a way that it branches either horizontally or vertically.

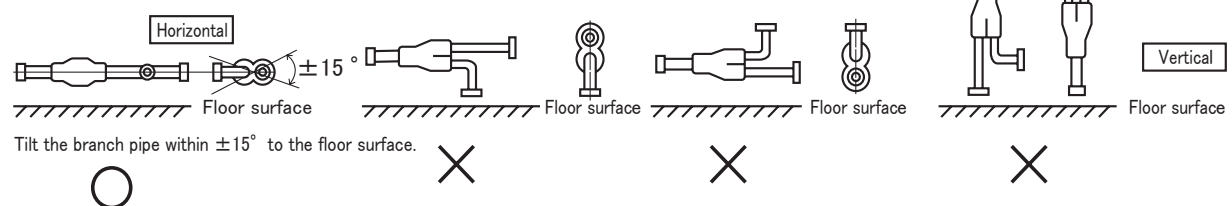
Use pipe cutter to cut pipes.



• In the case of a branching pipe set (model type DIS)

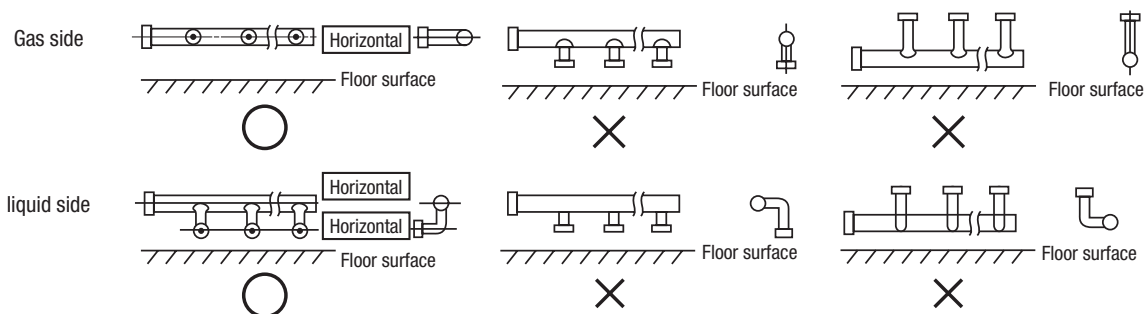


• In the case of a outdoor unit's branching pipe set (model type DOS)

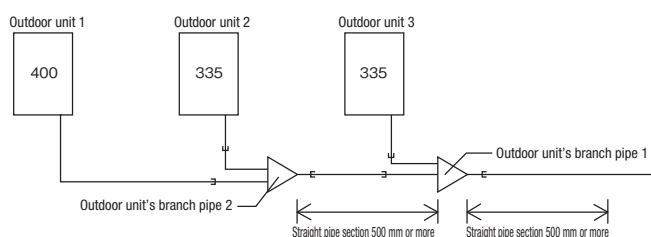


Tilt the branch pipe within $\pm 15^\circ$ to the floor surface.

• In the case of a header set (model type HEAD)



④ When using the outdoor unit's branch pipe set, make sure to secure a straight section of 500 mm or more for both the gas and liquid pipes before branching them.



⑤ Always apply nitrogen gas when soldering joints. If nitrogen gas is not applied, a large amount of film oxide will be formed which could lead to a critical failure in the unit. Use caution to prevent moisture or any foreign matters from entering the pipe when connecting pipe ends.

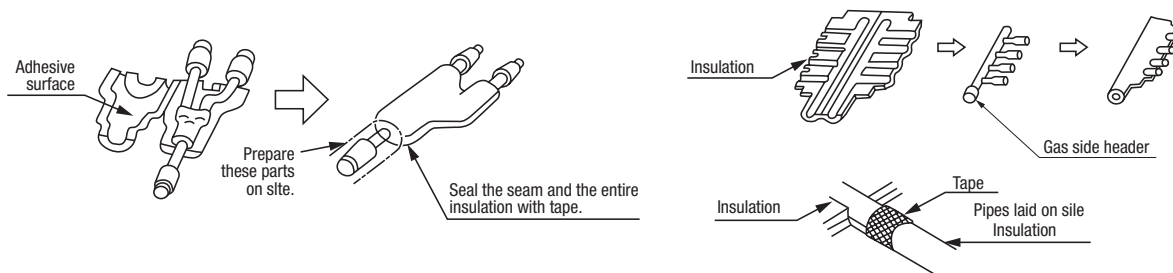
For the method of air tightness testing and pulling air, please refer to the installation manual of the outdoor unit.

⑥ Do not leave piping with any open ends uncovered to prevent water or foreign matters from entering inside.

3. Please dress it with an attached insulation sheet for heat insulation. (Please dress both liquid and gas sides)

Attention

- ① Apply an attached insulation sheet along a pipe, tape the joining line with a joint tape (to be procured on the installer's part) for complete sealing, and wrap the pipe and insulation sheet entirely with a tape.
- ② Dress both liquid and gas pipes with attached insulation sheets for heat insulation.
- ③ Ensure that the liquid pipe is given the heat insulation as good as that of the gas pipe. The absence of heat insulation can cause dripping water from dew condensing on the pipe or performance degradation.



4. How to select a branching pipe

(1) Method to select a branch pipe set (Type DIS)

- An appropriate branching pipe size varies depending on the capacity of connected indoor units (combined total capacity connected downstream), so please choose from the table below.
- In the case of a 140/160 (5/6HP) outdoor unit, however, select DIS-22-1G. (Even if the capacity of connected indoor units reaches 180 or higher, select DIS-22-1G.)

Total capacity downstream	Branching pipe set model type
less than 180	DIS-22-1G
180 or higher – less than 371	DIS-180-1G
371 or higher – less than 540	DIS-371-1G
540 or more	DIS-540-3

Attention

- ① Use a pipe conforming to a pipe size specified for indoor unit connection for the section between an indoor unit and an indoor unit side branching pipe.
- ② A branching joint (for both gas and liquid) must always be positioned in such a way that it branches either horizontally or vertically.

(2) How to select a header set

- Depending on the number of units connected, connect plugged pipes (to be procured on the installer's part) at a branching point (on the indoor unit connection side).
- For the size of a plugged pipe, please refer to the documentation for a header set (optional part).
- In the case of a 140/160 (5/6HP) outdoor unit, however, select HEAD4-22-1G. (Even if the capacity of connected indoor units reaches 180 or higher, select HEAD4-22-1G.)

Total capacity downstream	Header set model type	Number of branches
less than 180	HEAD4-22-1G	Up to 4 branches
180 or higher – less than 371	HEAD6-180-1G	Up to 6 branches
371 or higher – less than 540	HEAD8-371-2	Up to 8 branches
540 or more	HEAD8-540-3	Up to 8 branches

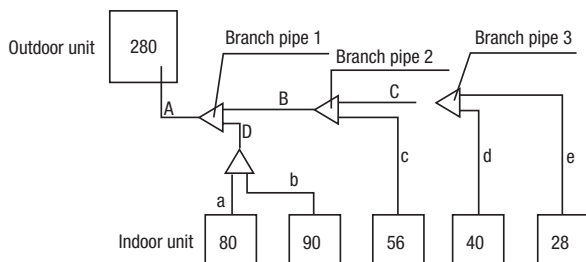
Attention

- ① Use a pipe conforming to a pipe size specified for indoor unit connection for the section between a header and an indoor unit.
- ② Always position a header (both gas and liquid headers) in such a way that it branches horizontally.
- ③ No 224 or 280 indoor unit is connectable to a header.

5. Example of piping

Example 1: Branching type configuration

Connected capacity: 294

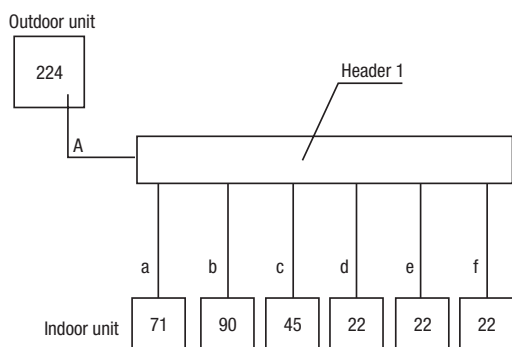


Selection of a branching pipe set

Mark	Selection procedure	Branching pipe set
Branch pipe 1	Combined total capacity of indoor units connected downstream (80+90+56+40+28)=294	DIS-180-1G
Branch pipe 2	Combined total capacity of indoor units connected downstream (56+40+28)=124	DIS-22-1G
Branch pipe 3	Combined total capacity of indoor units connected downstream (40+28)=68	DIS-22-1G

Example 2: Header type configuration

Connected capacity: 272

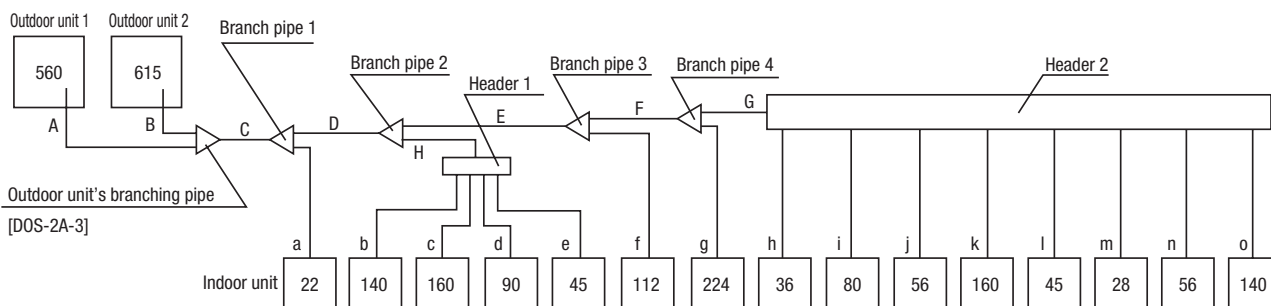


Selection of a header set

Mark	Selection procedure	Header set
Header 1	Combined total capacity of indoor units connected downstream (71+90+45+22+22+22)=272	HEAD6-180-1G

Example 3: Branching + Header mixed type configuration

Connected capacity: 1394



Selection of a branching pipe set

Mark	Selection procedure	Branching pipe set
Branch pipe 1	Combined total capacity of indoor units connected downstream (22+140+160+90+45+112+224+36+80+56+160+45+28+56+140)=1394	DIS-540-3
Branch pipe 2	Combined total capacity of indoor units connected downstream (140+160+90+45+112+224+36+80+56+160+45+28+56+140)=1372	DIS-540-3
Branch pipe 3	Combined total capacity of indoor units connected downstream (112+224+36+80+56+160+45+28+56+140)=937	DIS-540-3
Branch pipe 4	Combined total capacity of indoor units connected downstream (224+36+80+56+160+45+28+56+140)=825	DIS-540-3

Selection of a header set

Mark	Selection procedure	Header set
Header 1	Combined total capacity of indoor units connected downstream (140+160+90+45)=435	HEAD8-371-2
Header 2	Combined total capacity of indoor units connected downstream (36+80+56+160+45+28+56+140)=601	HEAD8-540-3

9.3 Procedure to attach or remove the service panel

(1) Purpose

- To be easier to remove / attach panels
- To improve serviceability

(2) Point of change

- Handles are added on panel to help easier removal / attachment.
- Gap was widened between lower and upper panel so that there is no need to move upper panel when removal / attachment.
- Panel shape is changed with corner radius. It became clear to see claw inserting when removal / attachment.
- Panel structure is changed so that side panel is able to be removed / attached.

(3) Removal and attachment of front panel

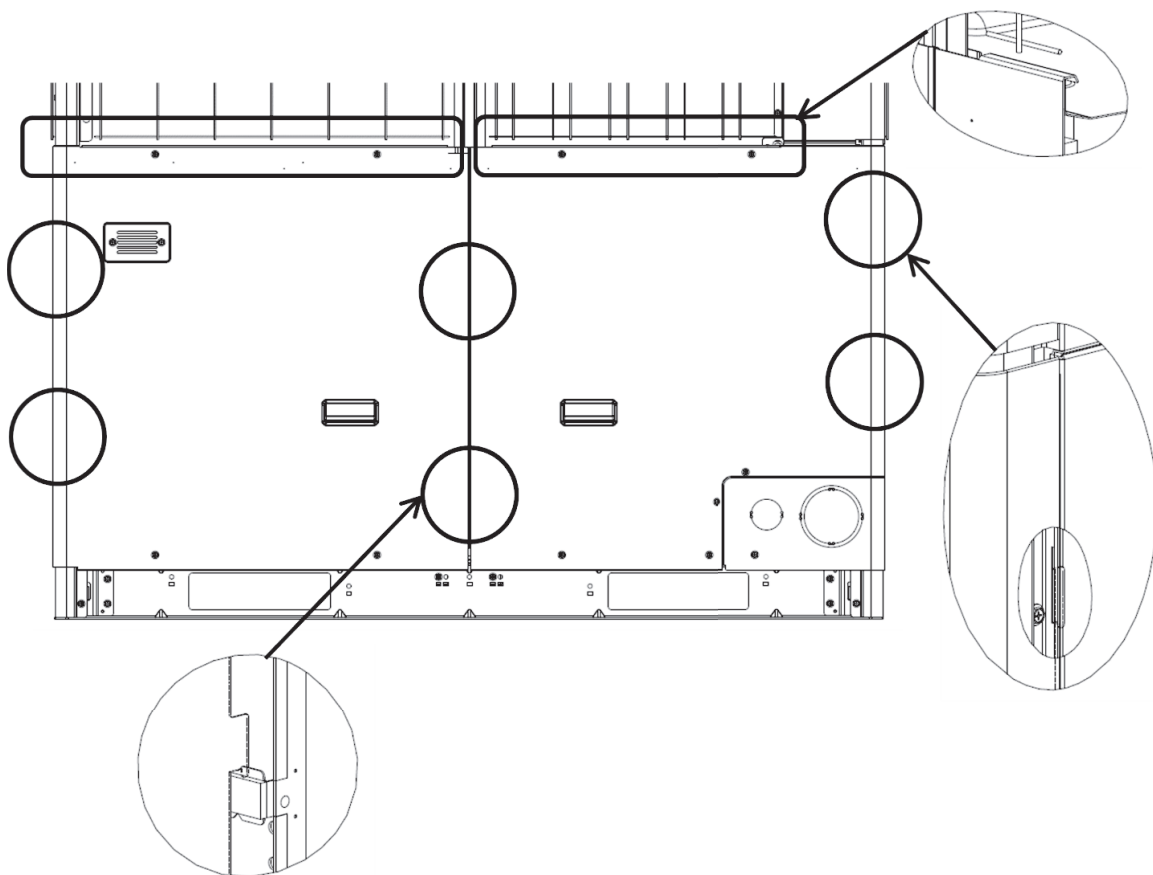
- Removal

- ① Slide-up the front panel about 10mm to release claws. Hold a handle as necessary.
- ② After the claws are released, pull the front panel to this side to remove.

- Attachment

Hook all claws as the reverse order of removal.

(4) Location of claws on front panel



(5) Removal and attachment of rear panel

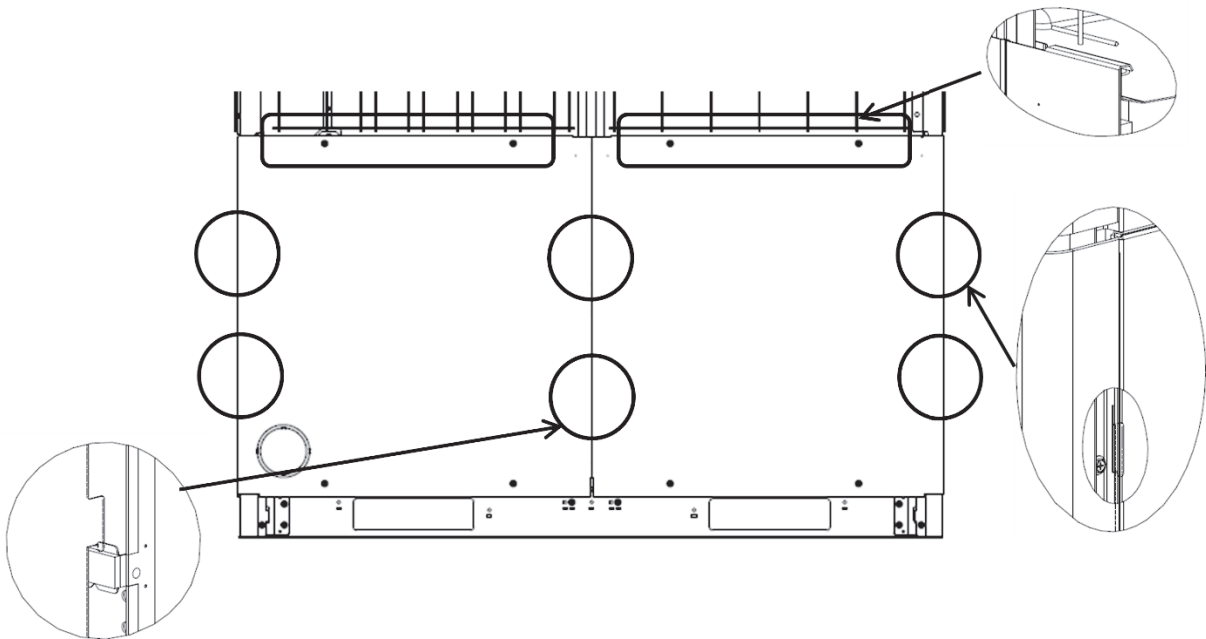
• Removal

- ① Slide-up the front panel about 10mm to release claws.
- ② After the claws are released, pull the front panel to this side to remove.

• Attachment

Hook all claws as the reverse order of removal.

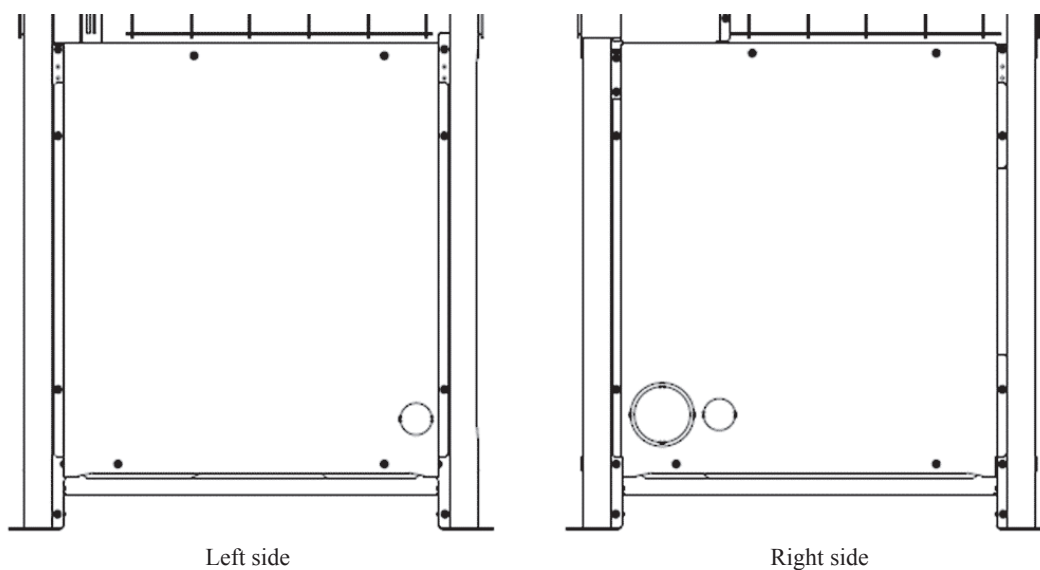
(6) Location of claws on rear panel



(7) Removal and attachment of side panel

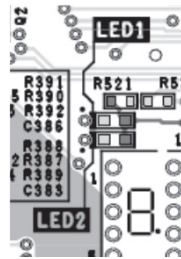
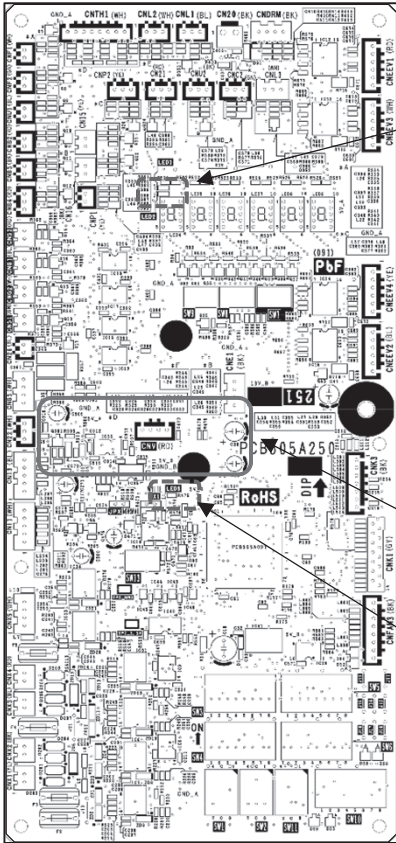
- Before remove / attach side panel, both front and rear panel should be removed.

After removal of front and rear panel, take off all screws below and remove side panel.

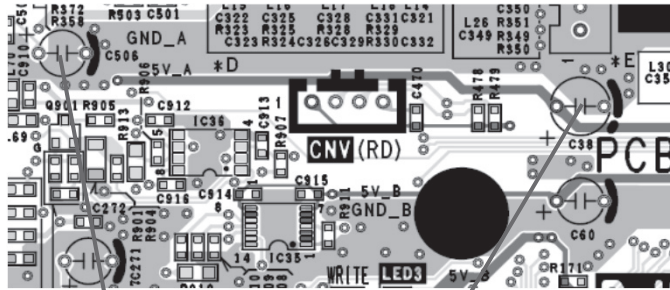


9.4 Voltage check point

(1) Control PCB



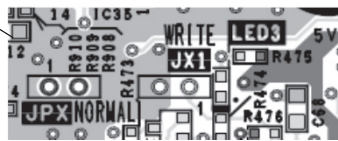
LED1 Red
LED2 Green



Voltage C 11
13 V voltage for EEV

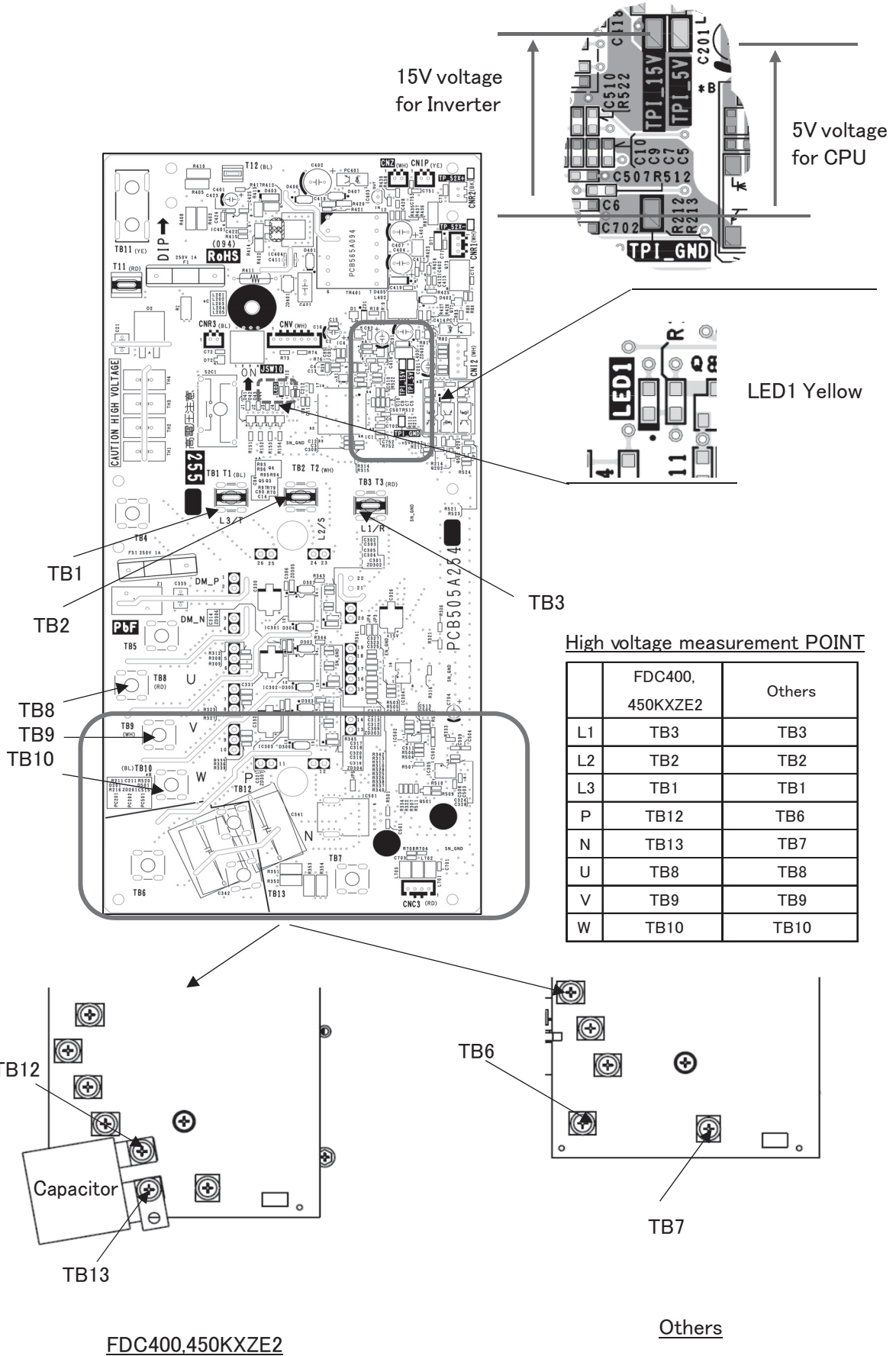
Voltage across C 38
5V voltage for CPU

The above voltages can also be measured on the power source board.




LED3 Green

(3) Inverter PCB



10. OUTDOOR UNIT DISASSEMBLY PROCEDURE

PCB012D104 

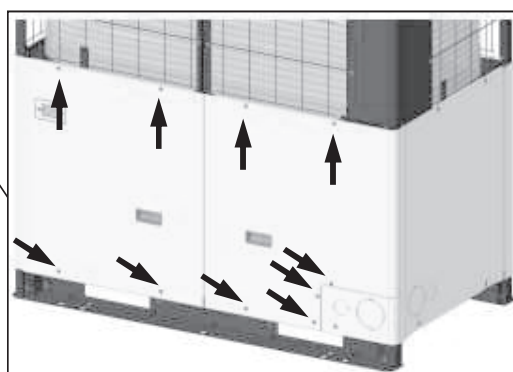
DISASSEMBLY PROCEDURE

WARNING Precautions for safety

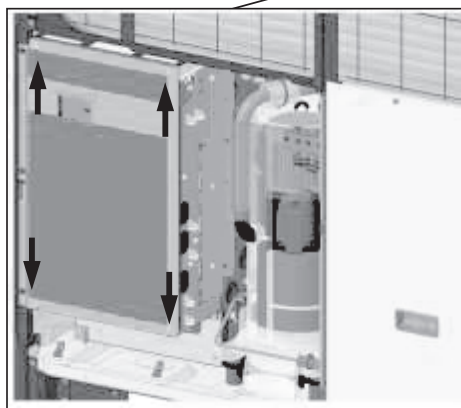
- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES

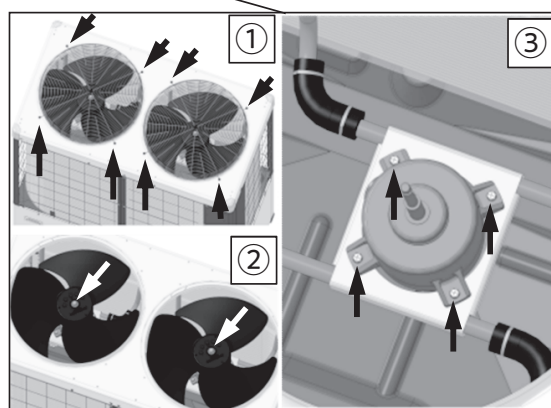
- 1. To remove the service panel**
(1) Remove 10 service panel fixing screws and remove it.



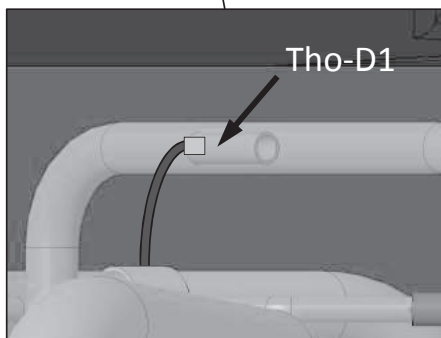
- 2. To remove the lid of control box**
(1) Remove the service panel. (See No.1.)
(2) Remove 4 lid fixing screws and remove it.



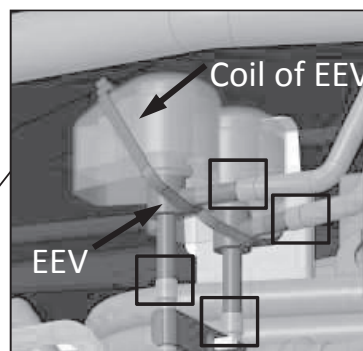
- 3. To remove the fan motor (FM1, FM2)**
(1) Remove the lid of control box. (See No.2.)
(2) Disconnect the motor connectors (CNFANx, CNAX) on PCB in control box.
(3) Remove 8 fan guard fixing screws and remove it. (Pic. ①)
(4) Remove 2 propeller fan fixing nuts and remove it. (Pic. ②)
(5) Remove 4 fan motor fixing nuts and remove it. (Pic. ③)



- 4. To remove the temperature sensors (example "Tho-D1")**
(1) Remove the lid of control box. (See No.2.)
(2) Disconnect the Tho-D1 connector (CNTH or CNxx) on PCB in control box.
(3) Pull out the temperature sensor "Tho-D1" from the sensor holder.



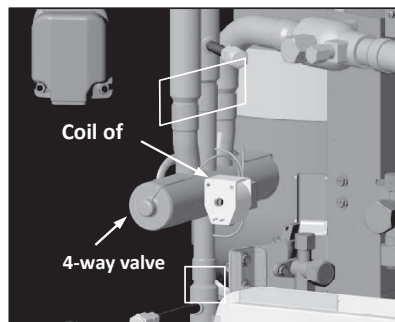
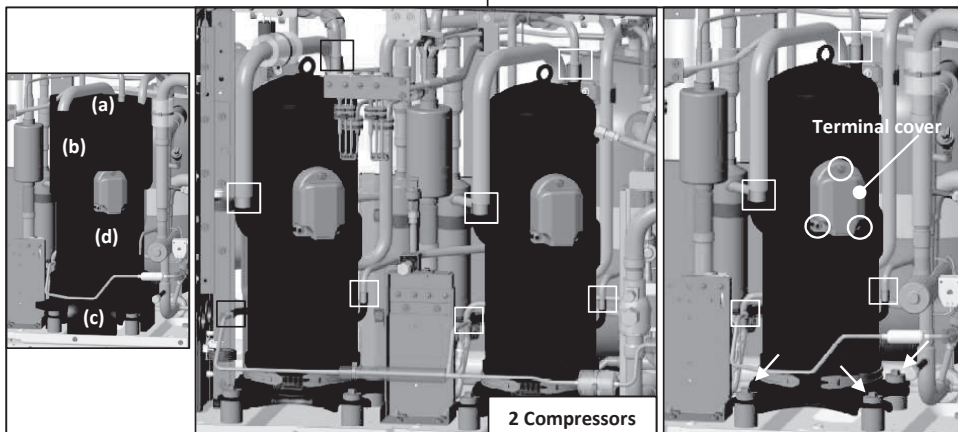
- 5. To remove the electronic expansion valve (EEV)**
(1) Remove the lid of control box. (See No.2.)
(2) Disconnect the EEV connector (CNEEVx) on PCB in control box.
(3) Remove the coil cover and pull out the EEV coil on the top.
(4) Remove welded part of EEV by welding. (□ mark)



PROCEDURE & PICTURES

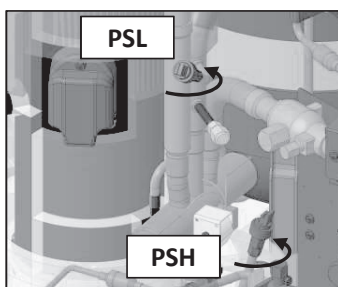
6. To remove the compressor (CM)

- (1) Remove the service panel.(See No.1.)
- (2) Remove the insulation which covers compressors. (Strings (a)~(d) should be loosen.)
- (3) Remove 3 terminal cover fixing bolts(○mark) and remove it, and disconnect the power wiring.
- (4) Remove welded part of compressor by welding. (□mark)
- (5) Remove 4 compressor fixing nuts(← mark) using spaner or adjustable wrench.



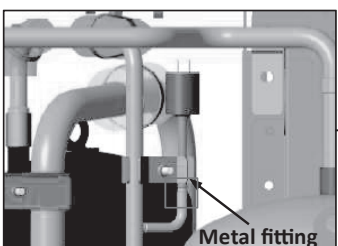
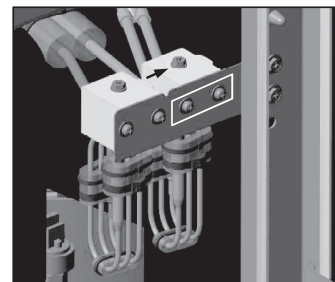
7. To remove the 4-way valve(20S)

- (1) Remove the lid of control box.(See No.2.)
- (2) Disconnect the coil of 4-way valve connector (CNNxx) on PCB in control box.
- (3) Remove coil of 4-way valve fixing screw and remove it.(←mark)
- (4) Remove welded part of 4-way valve by welding. (□mark)



8. To remove the low/high pressure sensor (PSL/PSH)

- (1) Remove the lid of control box.(See No.2.)
- (2) Disconnect the PSL/PSH connector (CNLx) on PCB in control box.
- (3) Turn PSL/PSH to the left and remove it. (Double spanners are needed.)



9. To remove the high pressure switch (63H)

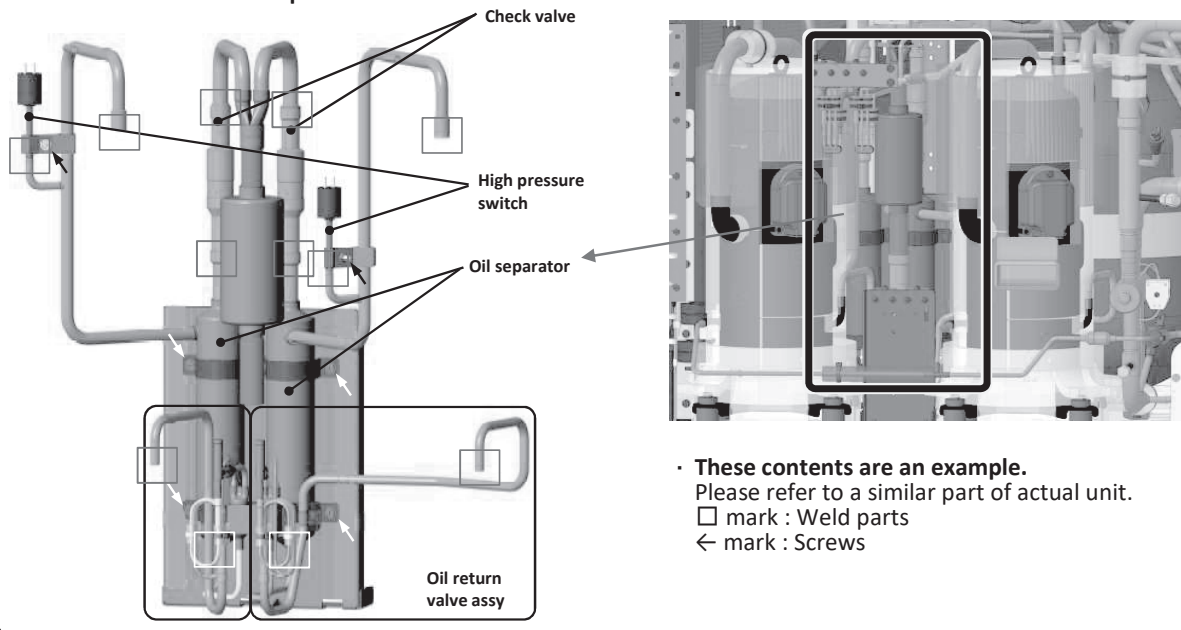
- (1) Remove the lid of control box.(See No.2.)
- (2) Disconnect the 63H connector(CNQx) on PCB in control box.
- (3) Remove the metal fitting fixing screw and remove it.
- (4) Remove welded part of high pressure switch by welding.

10. To remove bypass valve (SV)

- (1) Remove the lid of control box.(See No.2.)
- (2) Disconnect the SV connector(CNNxx) on PCB in control box.
- (3) Remove 2 coil of SV fixing screws and remove it.(□mark)
- (4) Remove SV fixing screws(← mark) and remove it.
- (5) Remove welded part of SV by welding.

PROCEDURE & PICTURES

11. To remove other components



12. To remove the printed circuit board (PCB)

(1) Remove the lid of control box.(See No.2.)

• Control/Power PCB

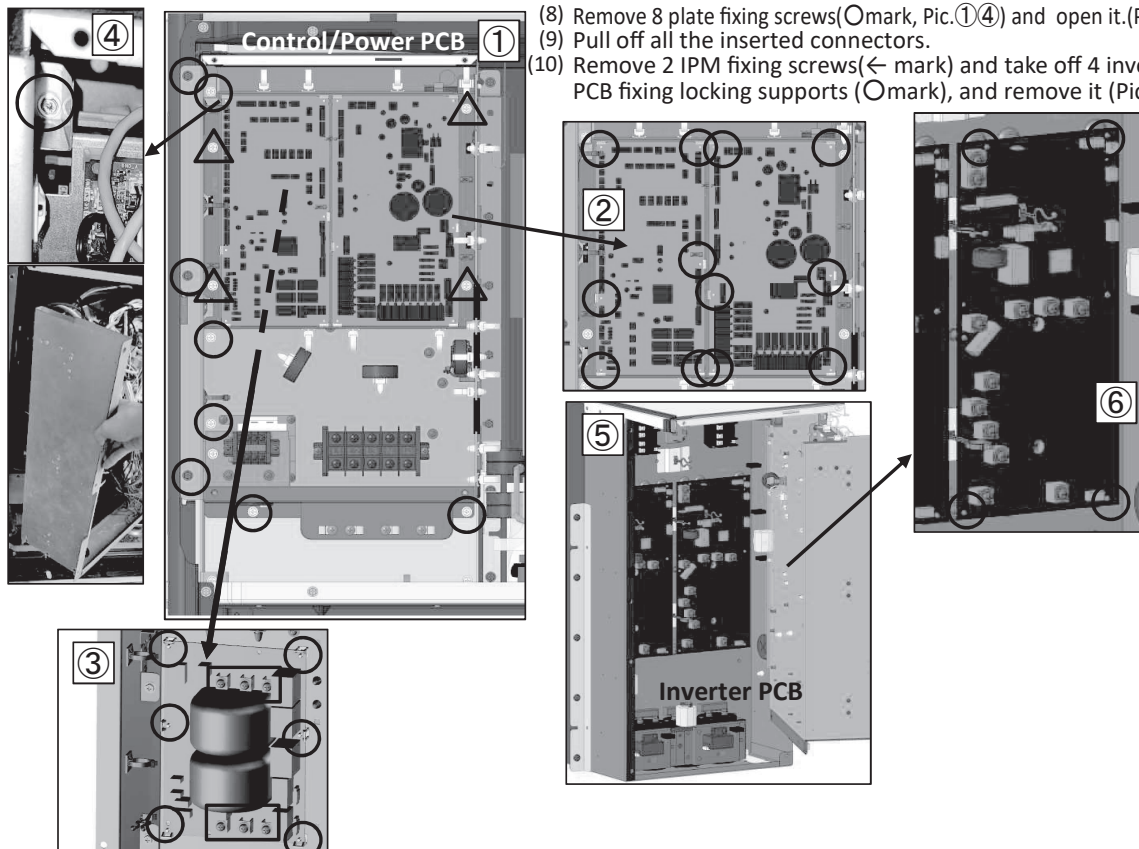
- (2) Pull off all the inserted connectors.
- (3) Take off each all control/power PCB fixing locking supports and remove it.(○ mark, Pic.②)

• Noise Filter PCB

- (4) Remove 4 plate fixing screws(△ mark, Pic.①) and remove plate.
- (5) Pull off all the inserted connectors.
- (6) Remove all screws to disconnect wires (□ mark).
- (7) Take off all noise filter PCB fixing locking and remove (○ mark).

• Inverter PCB

- (8) Remove 8 plate fixing screws(○ mark, Pic.①④) and open it.(Pic.⑤)
- (9) Pull off all the inserted connectors.
- (10) Remove 2 IPM fixing screws(← mark) and take off 4 inverter PCB fixing locking supports (○ mark), and remove it (Pic.⑥).

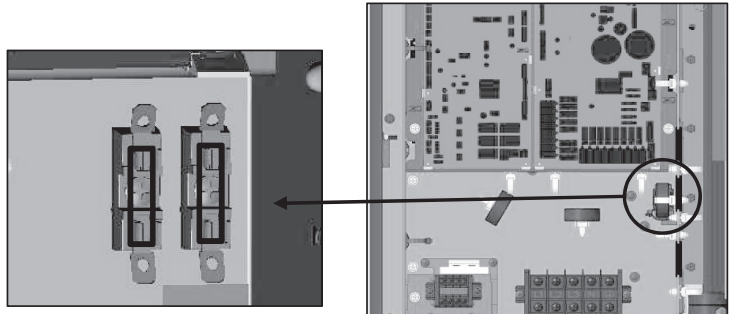


PROCEDURE & PICTURES

13. To remove other electric parts

• **Current Fuse**

- (1) Remove the lid of control box.(See No.2.)
- (2) Pull out fuse.
(See □ mark in right picture.)



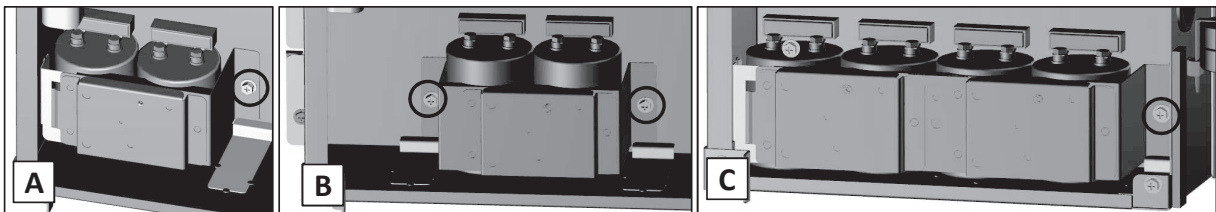
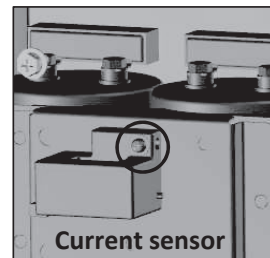
• **Current sensor**

- (1) Open control / power PCB box. (as 12.(4))
- (2) Remove electrolytic capacitor cover. (See right picture.)
- (3) Remove a screw of sensor. (See lower-right picture.)
- (4) Disconnect wire and remove sensor.



• **Electrolytic capacitor**

- (1) Open control / power PCB box. (as 12.(4))
- (2) Remove electrolytic capacitor cover. (See upper-right picture.)
- (3) Remove all screws of bracket. (See below picture.)
- (4) Type-A & C...Pull out the claw of bracket.
- (5) Remove bracket.
- (6) Disconnect wire and remove capacitor.



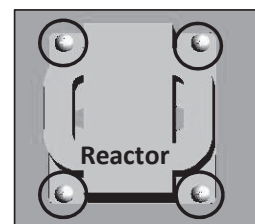
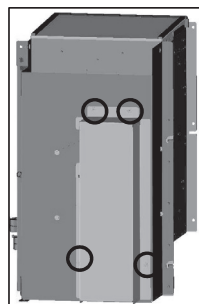
• **Relay (52X)**

- (1) Open control / power PCB box. (as 12.(4))
- (2) Remove each 2 screws of relay. (See right picture.)
- (3) Disconnect wire and remove relay.



• **Reactor**

- (1) Open right rear panel of unit.
- (2) Remove 4 screws of reactor cover.(See right picture.)
- (3) Remove reactor cover.
- (4) Open control / power PCB box.(as 12.(4))
- (5) Disconnect wire.
- (6) Remove each 4 screws of reactor.(See right picture.)
- (7) Remove reactor.



11. OUTDOOR UNIT ELECTRICAL EQUIPMENT EXCHANGE PROCEDURE

(I) Control box

Precautions for Safety

- Since the following precaution is the important contents for safety, be sure to observe them.
WARNING and **CAUTION** are described as follows:
 - ⚠WARNING** Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.
 - ⚠CAUTION** Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.

⚠ WARNING

- Securely replace the electrical equipment according to this procedure.
 If the electrical equipment is incorrectly replaced, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned off before replacing the electrical equipment.
 The electrical equipment replacement under current-carrying will cause an electric shock or fire.
- After finishing replacement, check that wiring is correctly connected with the electrical equipment before power distribution. If the electrical equipment is incorrectly replaced, it will cause an electric shock or fire.

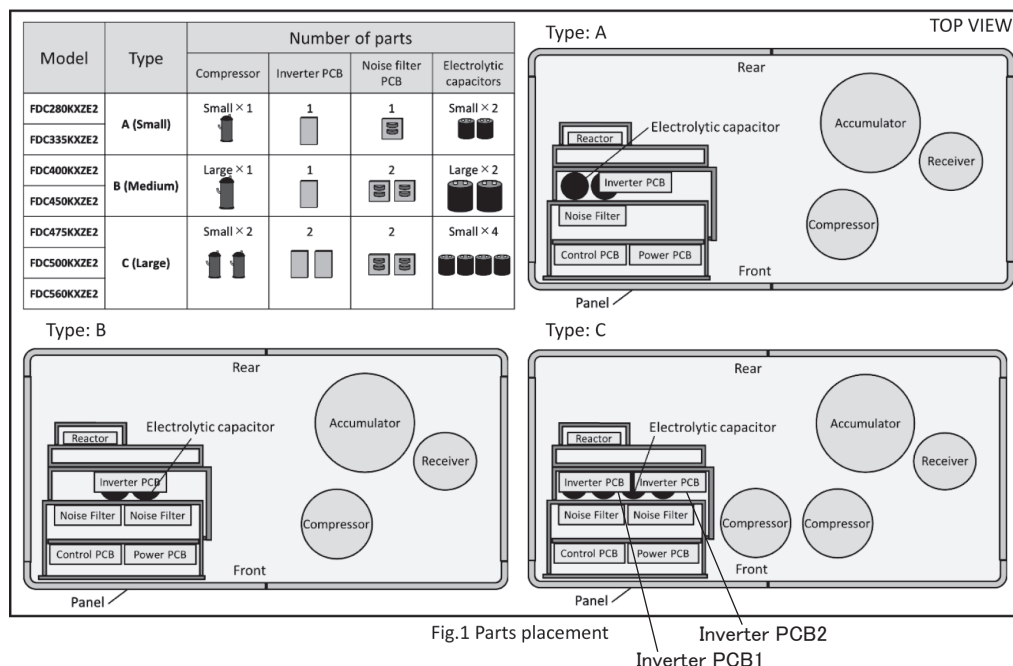
⚠ CAUTION

- To prevent electric shock, bundle the wiring so that it does not become tight.

- ⚠ Replace the electrical equipment after elapsing 3 minutes from power off.
 (Some capacitors maintain high voltage even when the breaker is turned off.
 It's very dangerous to touch electrical equipment in this condition.)

【Parts placement】

Placement and the number of parts vary according to model. (Fig.1)



【Replacement procedure】

Replacement parts

1. Control PCB / Power PCB	2. Noise filter PCB	3. Inverter PCB
4. Electrolytic capacitor	5. Current sensor	6. Reactor

1. Control PCB / Power PCB

- (1) Remove the front panel and the lid of the control box
 - (a) Remove 4 front panel fixing screws. (○mark, Fig.2)
 - (b) Remove the front panel. ※Hold the handle and lift the panel up.

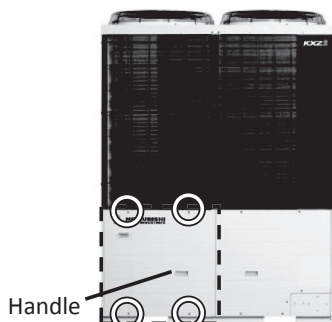
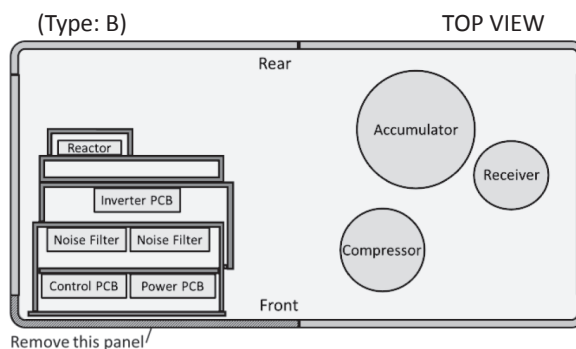


Fig.2 Front panel



- (c) Remove 2 lid fixing screws. (○mark, Fig.3) Loosen 2 lid fixing screws. (□mark, Fig.3)

- (d) Remove the lid of the control box.

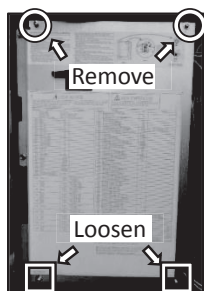
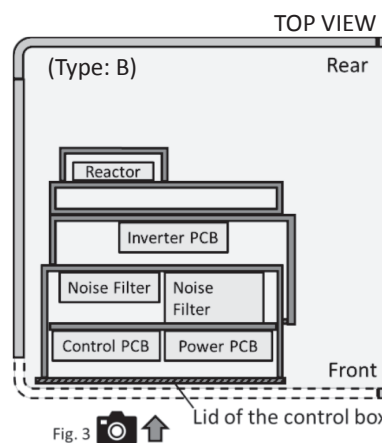


Fig.3 Lid of the control box



- (2) Remove the control PCB / the power PCB

※Control PCB: left side of Fig.4

Power PCB: right side of Fig.4

- (a) Remove all connectors on each PCB.
- (b) Take off the PCB from locking supports.
There're 6 locking supports on each PCB.
(○mark, Fig.4)

- (3) Attach new control PCB / power PCB

- (a) Attach new PCB to locking supports.
- (b) Reconnect all connectors as before.
※Be careful not to make connectors half-inserted.

- (4) Attach the lid of the control box and the front panel

- (a) Attach the lid of the control box as before.
- (b) Attach the front panel as before.

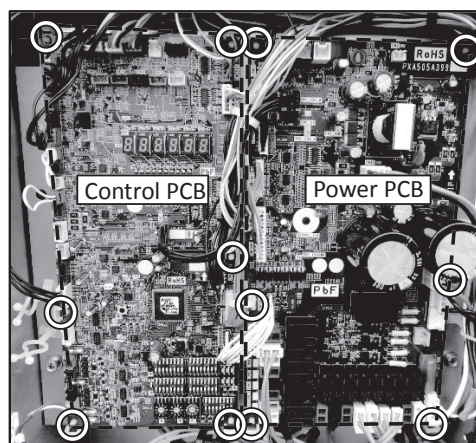


Fig.4 Control PCB / Power PCB

2. Noise filter PCB

(1) Remove the front panel and the lid of the control box. (See 1.)

(2) Remove the PCB bracket

※PCB bracket: holding the control PCB and the power PCB

(a) Remove all connectors on the PCB.

※No need to remove wiring between the control PCB and the power PCB.

(b) Remove bands that hold wiring. (□mark, Fig.5)

(c) Remove 4 PCB bracket fixing screws. (○mark, Fig.6)

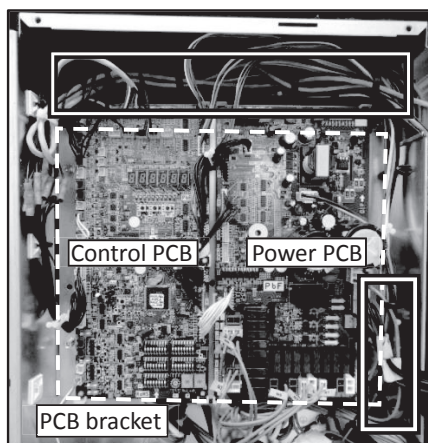


Fig.5 PCB bracket (band)

(d) Remove the PCB bracket.

(3) Remove the noise filter PCB

(a) Remove all connectors on the noise filter PCB.

※CN1 and CN2 are inserted only on the left PCB.

※Type A has only one PCB on the left side.

(b) Remove terminal screws.

There're 6 screws on each PCB. (□mark, Fig.7)

(c) Take off the noise filter PCB from locking supports.

There're 6 locking supports on each. (○mark, Fig.7)

(4) Attach new noise filter PCB

(a) Attach new noise filter PCB to locking supports.

(b) Tighten terminal screws as before. (Torque: 2.5-2.7 Nm)

(c) Reconnect all connectors as before. ※Be careful not to make connectors half-inserted.

(5) Attach the PCB bracket

(a) Fix wiring temporarily with bands. (□mark, Fig.5)

(b) Tighten 4 PCB bracket fixing screws as before.

※Be careful not to bite the wiring between the bracket and the plate.

(c) Fix wiring with bands as before.

(d) Reconnect all connectors as before. ※Be careful not to make connectors half-inserted.

(6) Attach the lid of the control box and the front panel as before

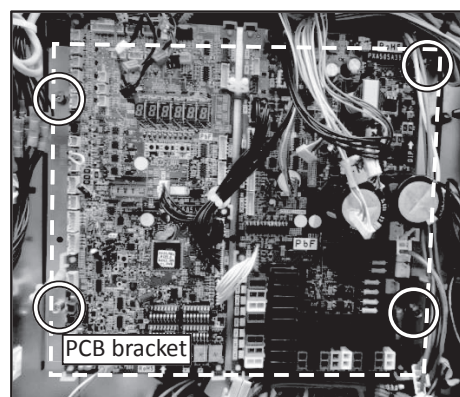
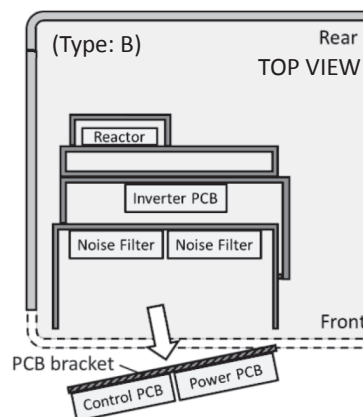


Fig.6 PCB bracket (screw)

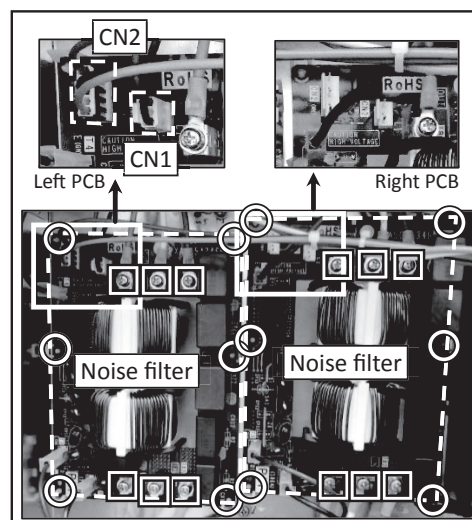


Fig.7 Noise filter PCB (Type: B, C)

3. Inverter PCB

(i) Remove the service panel and the lid of the control box. (See 1.)
 ※Removing the side panel makes it easier to work.

(ii) Open the inverter layer

(1) Remove 8 plate fixing screws. (○mark①-⑧, Fig.8)

(2) Open the inverter layer.

※Be careful not to pull wiring when open the inverter layer.

(○mark, Fig.9)

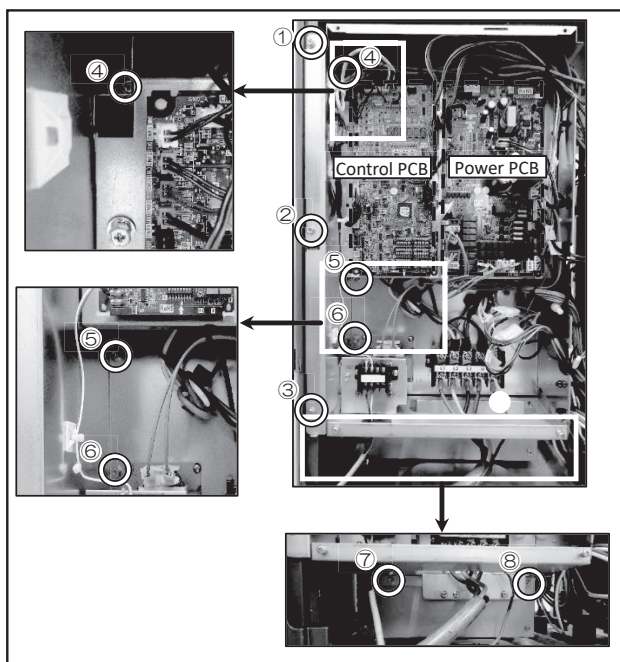


Fig.8 Open the inverter layer

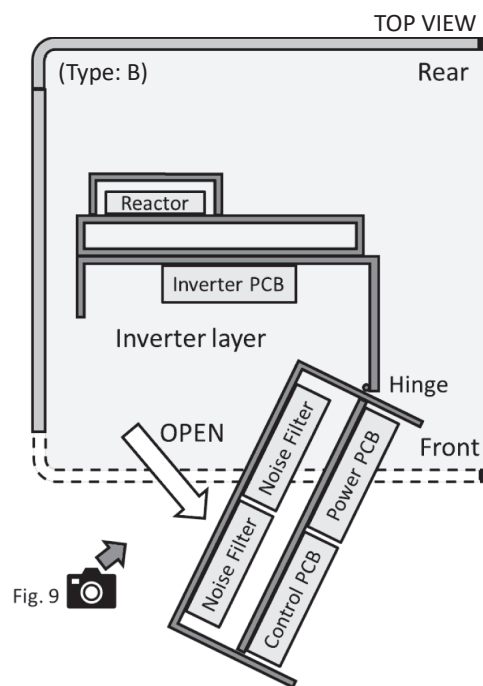
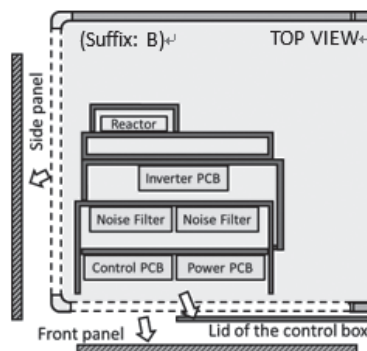


Fig.9

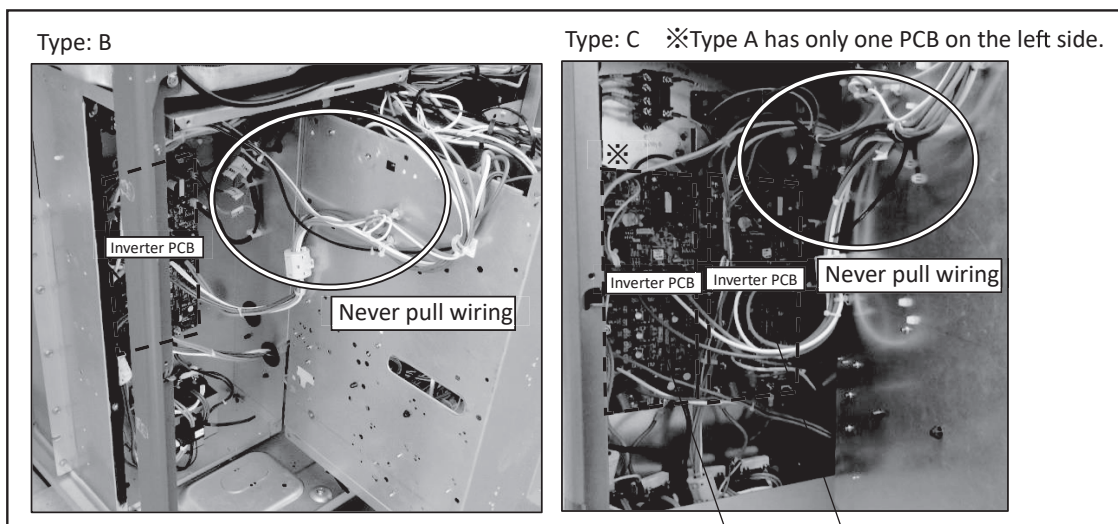


Fig.9 Inverter layer

Inverter PCB2
 Inverter PCB1

(3) Remove the inverter PCB

(a) Remove all connectors on the inverter PCB.

(b) Remove terminal screws. (□mark, Fig.10)

※Type A, C: There're 12 screws on each PCB. (Snubber capacitor: no exist)

Type B : There're 13 screws on each PCB. (Snubber capacitor: exist)

(c) Remove 2 IPM fixing screws. (☆mark, Fig.11)

(d) Take off the inverter PCB from locking supports.

There're 4 locking supports. (○mark, Fig.11)

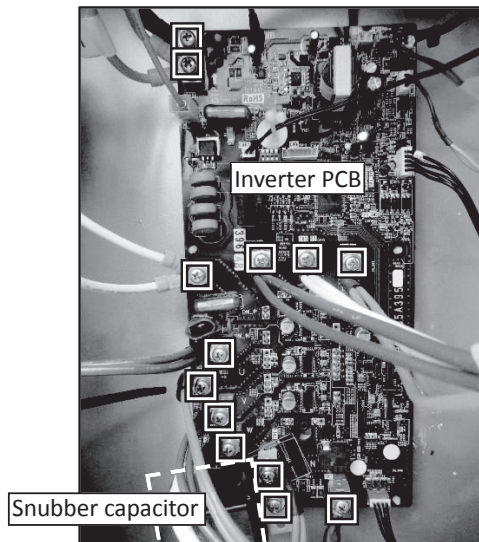


Fig.10 Inverter PCB (Type: B)

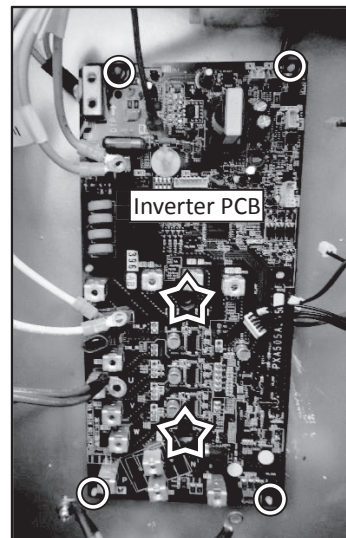


Fig.11 Inverter PCB (Type: B)

(4) Attach new inverter PCB

(a) Attach new Inverter PCB to locking supports. (○mark, Fig.11)

(b) Tighten 2 IPM fixing screws. (☆mark, Fig.11)

(Torque: 2.5-2.7 Nm)

※Be sure to tighten with proper torque.

(c) Tighten terminal screws as before. (□mark, Fig.10)

(Torque: 2.5-2.7 Nm)

(d) Reconnect all connectors as before.

※Be careful not to make connectors half-inserted.

(5) Close the inverter layer

(a) Hang the control box on the hook of the frame.

(□mark, Fig.12) (○mark, Fig.12)

(b) Tighten 8 plate fixing screws. (○mark, Fig.8)

(6) Attach the lid of the control box and the front panel

(a) Attach the lid of the control box as before.

(b) Attach the front panel as before.

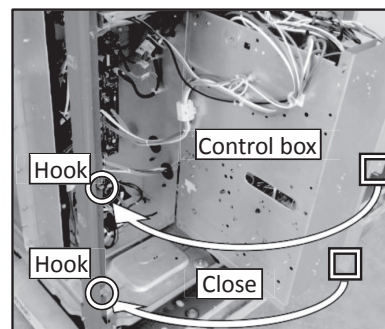


Fig.12 Close the inverter layer

4. Electrolytic capacitor

- (1) Remove the front panel and the lid of the control box. (See 3.)
- (2) Open the inverter layer. (See 3.)
- (3) Remove electrolytic capacitor.
 - (a) Remove 2 capacitor cover fixing screws. (○mark, Fig.13)
Remove the capacitor cover.
 - (b) Remove screws of capacitor bracket. (○mark, Fig.14)
※Capacitor bracket is at the bottom of the inverter layer.
※Type A, C: Pull out the claw of bracket.
 - (c) Remove screws.
 - (i) Remove screws on the PCB side. (○mark, Fig.15)
 - (ii) Take the capacitor out from the control box.
 - (iii) Remove screws on the capacitor. (□mark, Fig.15)
 - (d) Disconnect wiring and remove capacitor.
- (4) Attach new electrolytic capacitor.
- (5) Attach parts as before.

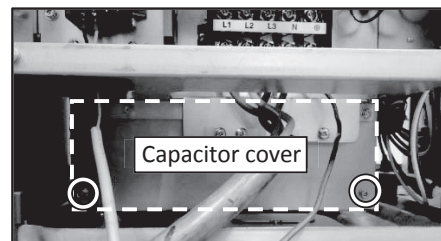
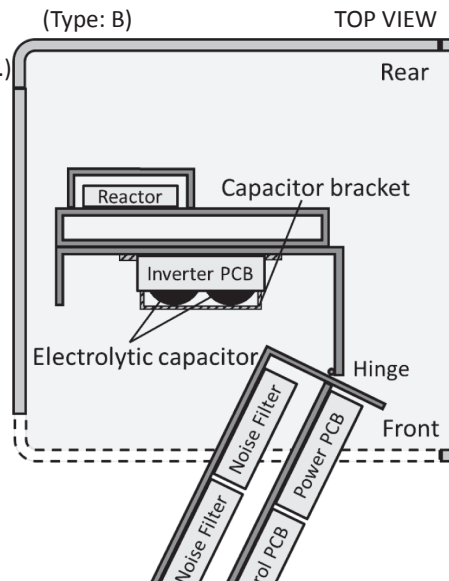


Fig.13 Capacitor cover

※The screw is located at the rear right of the bracket.

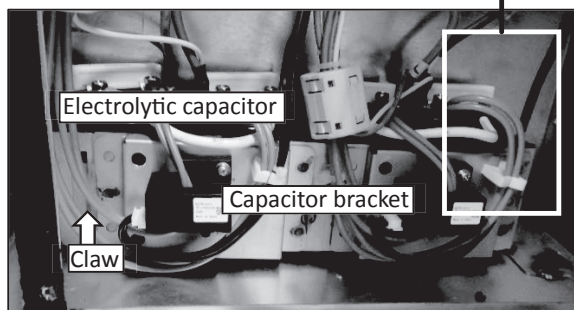
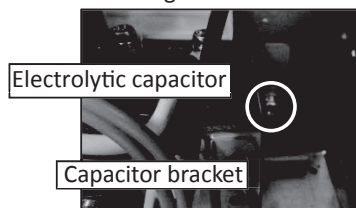


Fig.14 Capacitor bracket (Type: C)

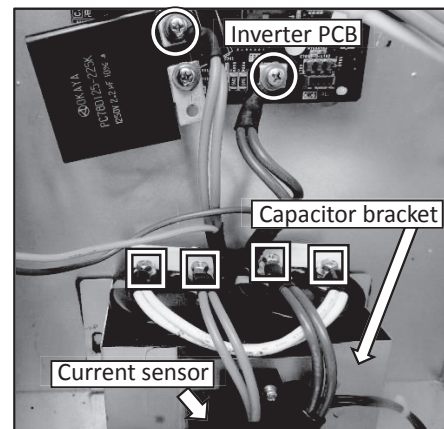
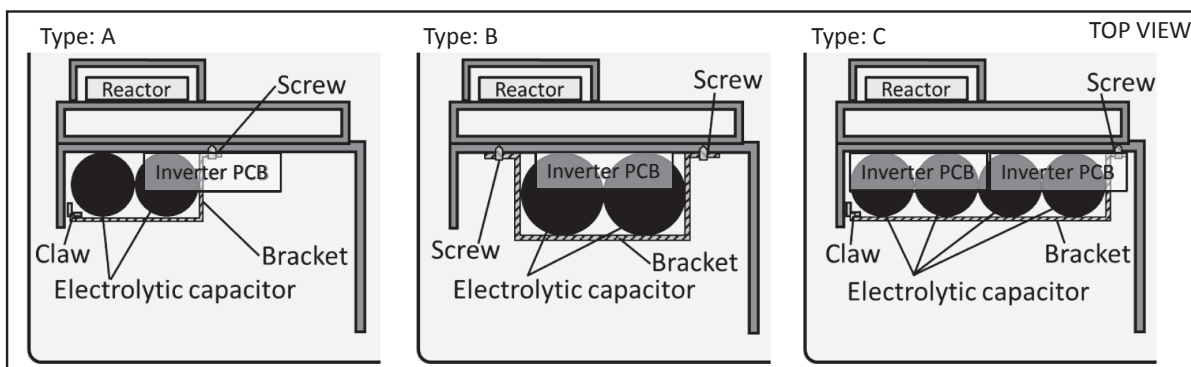


Fig.15 Electrolytic capacitor (Type: B)



5. Current sensor

- (1) Remove the front panel and the lid of the control box. (See 3.)
- (2) Open the inverter layer. (See 3.)
- (3) Remove current sensor.

- (a) Remove 2 capacitor cover fixing screws. (○mark, Fig.16)

Remove the capacitor cover.

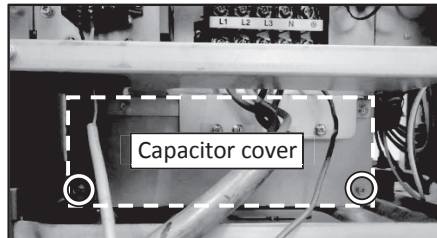
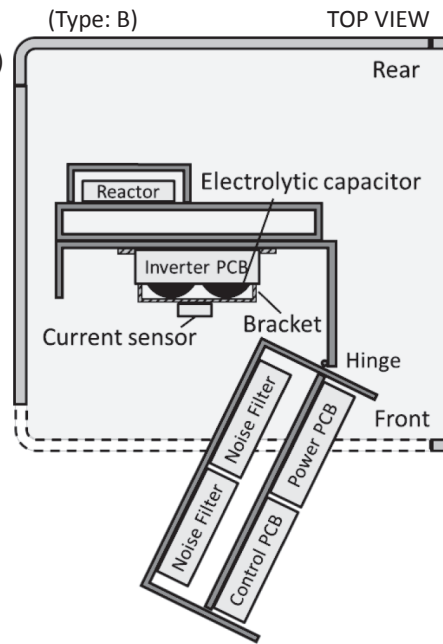


Fig.16 Capacitor cover



- (b) Remove the connector. (□mark, Fig.17)
- (c) Remove screws on the current sensor. (△mark, Fig.17)
- (d) Remove screws on the capacitor. (○mark, Fig.17)

※When it's difficult to remove screws of the capacitor, take the capacitor out from the control box.

(see 4. (3))

- (e) Disconnect wiring and remove the current sensor.

- (4) Attach new current sensor.

- (5) Attach parts as before.

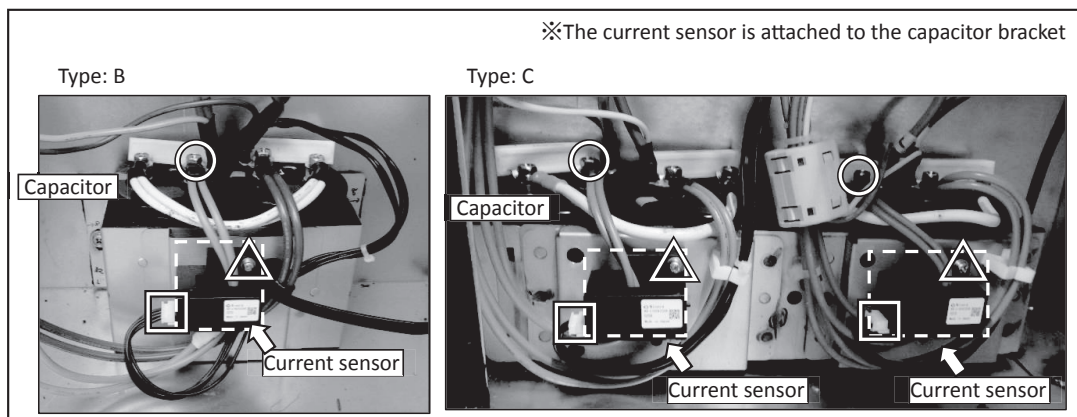
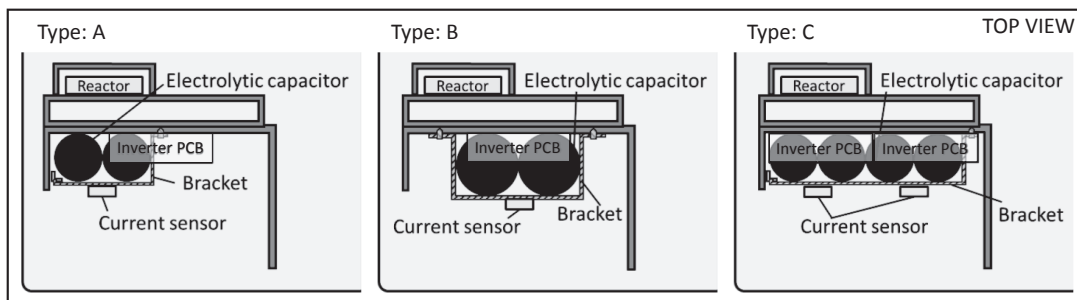


Fig.17 Current sensor



6. Reactor

(1) Remove service panels and the lid of the control box. (See 3.)

※Panels to be removed:

The front panel and the rear panel on the control box side

(2) Open the inverter layer. (See 3.)

(3) Remove wiring of the reactor.

(a) Remove bands that hold wiring. (□mark, Fig.18 & Fig.19)

(b) Remove terminal screws. (○mark, Fig.19)

(4) Remove the reactor.

(a) Twist the drain hose off. (↷mark, Fig.20)

(b) Remove 4 screws of the reactor cover. (○mark, Fig.20)

(c) Remove reactor fixing screws.

There're 4 screws on each reactor. (△mark, Fig.20)

(5) Attach new reactor.

(6) Attach parts as before.

※Attach the drain hose so as not to be easily detached.

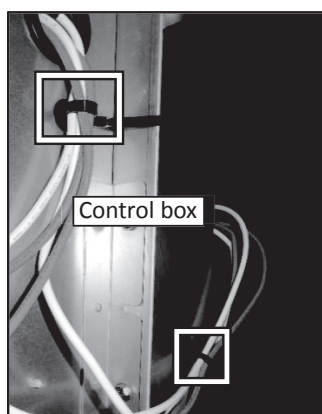
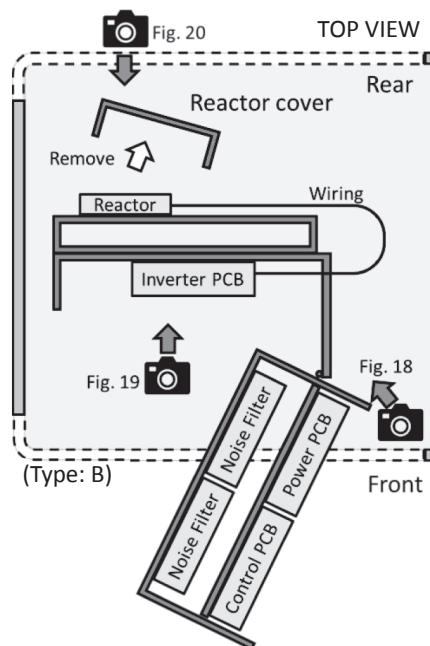


Fig.18 Wiring of the reactor

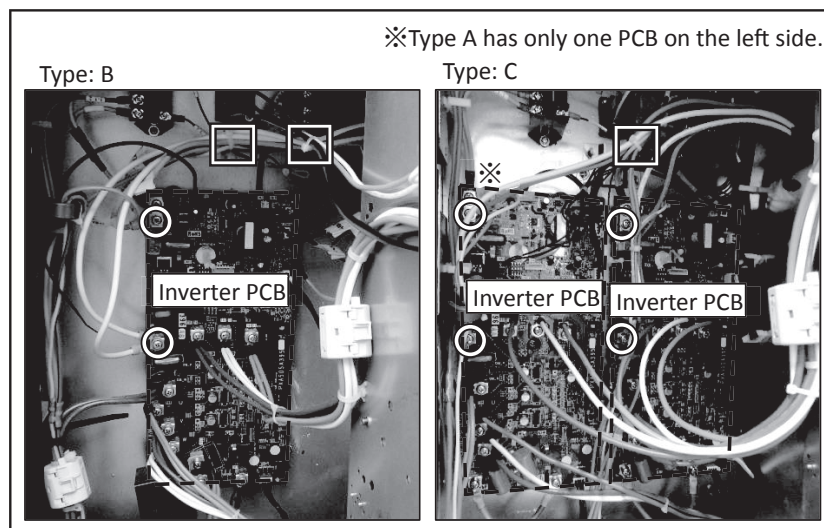


Fig.19 Wiring of the reactor

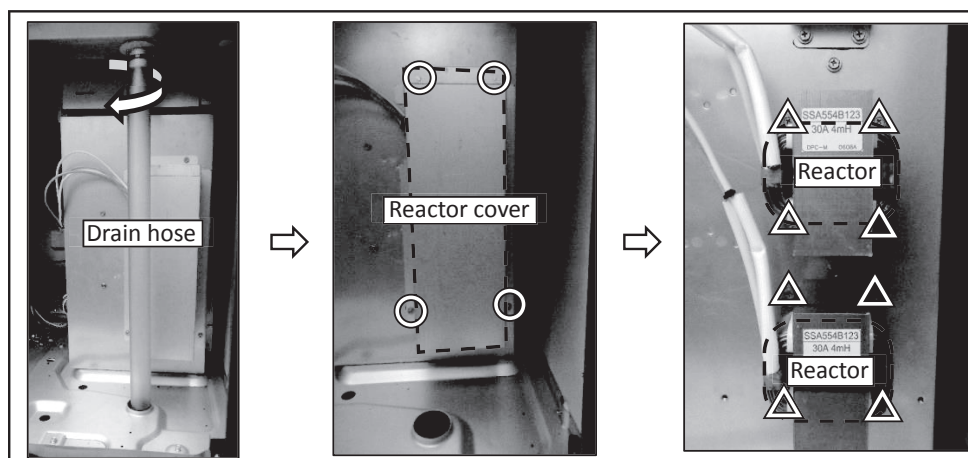


Fig.20 Remove the reactor

(II) Fan motor

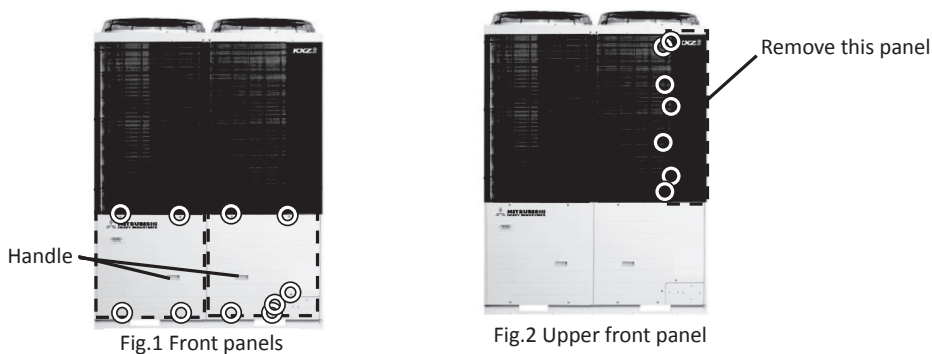
Precautions for Safety	
<ul style="list-style-type: none"> • Since the following precaution is the important contents for safety, be sure to observe them. WARNING and CAUTION are described as follows: 	
<div style="border: 1px solid black; padding: 2px; display: inline-block;">⚠WARNING</div>	Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.
<div style="border: 1px solid black; padding: 2px; display: inline-block;">⚠CAUTION</div>	Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.
⚠ WARNING	
<ul style="list-style-type: none"> • Securely replace the fan motor according to this procedure. If the fan motor is incorrectly replaced, it will cause an electric shock or fire. • Be sure to check that the power source for the outdoor unit is turned off before replacing the fan motor. The fan motor replacement under current-carrying will cause an electric shock or fire. • After finishing replacement, check that wiring is correctly connected with the PCB before power distribution. If the fan motor is incorrectly replaced, it will cause an electric shock or fire. 	
⚠ CAUTION	
<ul style="list-style-type: none"> • To prevent electric shock, bundle the wiring so that it does not become tight. 	

(1) Remove front panels and the lid of the control box.

(a) Remove 10 service panel fixing screws. (○mark, Fig.1) Remove service panels.

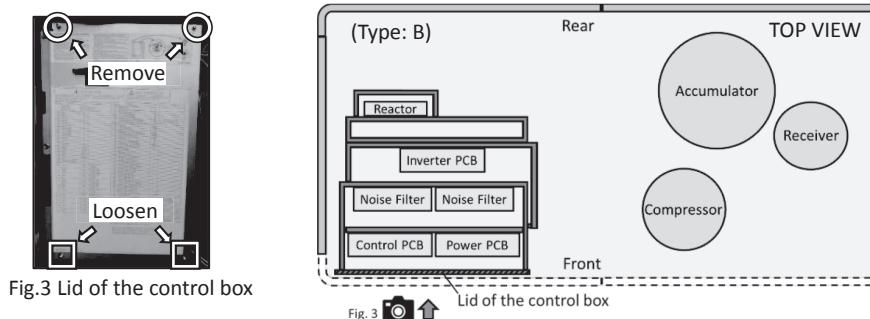
※Hold the handle and lift the panel up.

(b) Remove 7 upper front panel fixing screws. (○mark, Fig.2) Remove the upper front panel.



(c) Remove 2 lid fixing screws. (○mark, Fig.3) Loosen 2 lid fixing screws. (□mark, Fig.3)

(d) Remove the lid of the control box.



(2) Remove wiring of the fan motor.

- (a) Remove bands that hold wiring of the fan motor. (△mark, Fig.4)
- (b) Remove motor wiring connectors. (○mark, Fig.4)

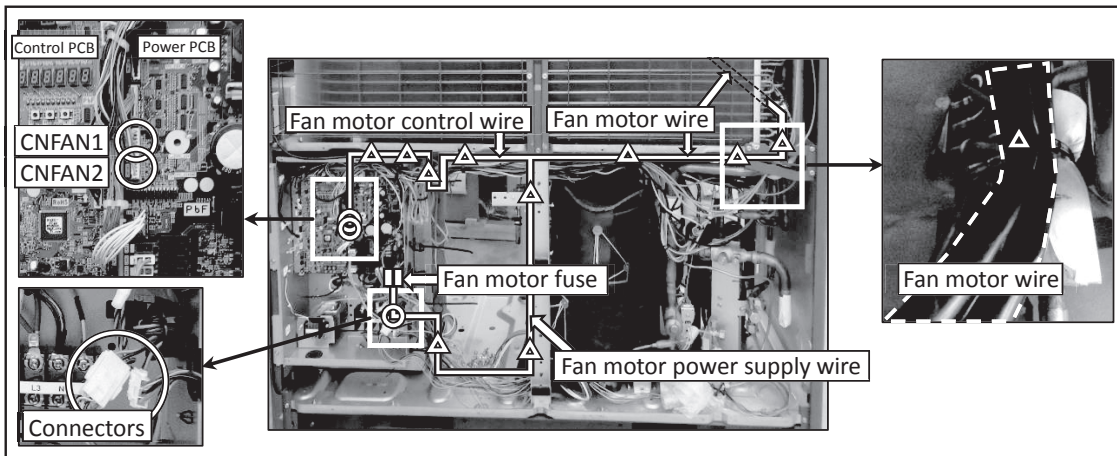


Fig.4 Wiring of the fan motor



(3) Remove the fan motor. ※Work safely with a stepladder.

- (a) Remove 4 fan guard fixing screws and remove the fan guard. (○mark, Fig.5)
- (b) Remove propeller fan fixing nut and remove the propeller. (□mark, Fig.5)
- (c) Remove 4 fan motor fixing screws. (⊙mark, Fig.5)
- (d) Remove bands that hold wiring of the fan motor. (△mark, Fig.5)
- (e) Remove the fan motor.

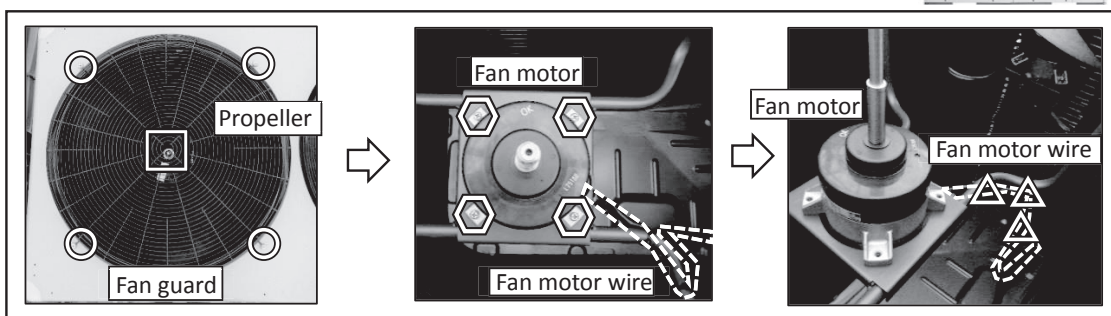


Fig.5 Remove fan motor

(4) Attach new fan motor.

※Do not hold the motor shaft when attaching the fan motor. (Fig.6)

※Fix fan motor wire so as not to contact the fan.

(5) Attach parts as before.

※Torque is shown as below.

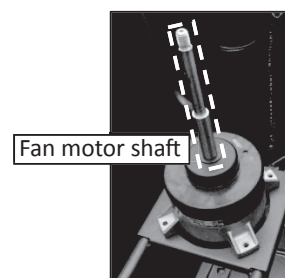
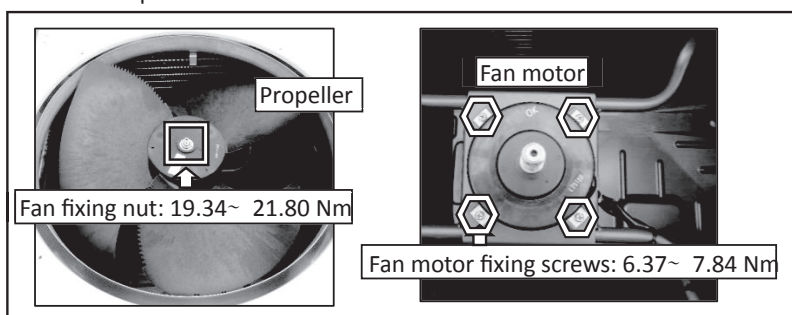


Fig.6 Shaft



12. INDOOR UNIT DISASSEMBLY PROCEDURE

PJF012D045

(1) FDT series

DISASSEMBLY PROCEDURE

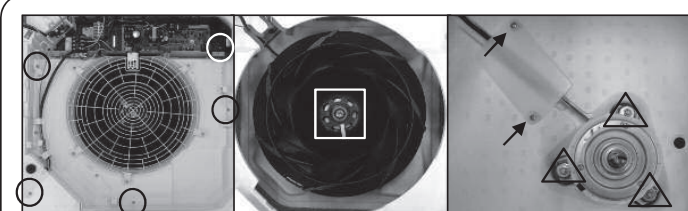
⚠ WARNING Precautions for safety

- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (FDT series)

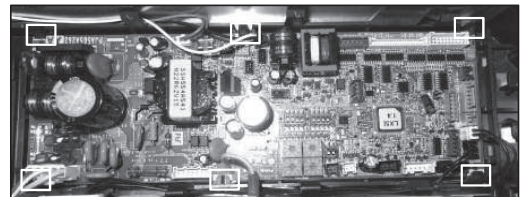


- 1. To remove the lid of control box**
(1) Remove 2 lid fixing screws and remove it.

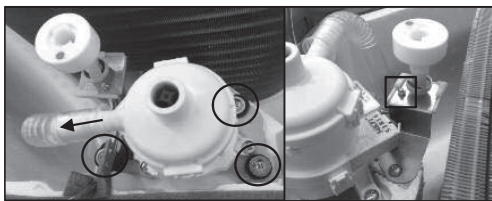


- 3. To remove the impeller and motor (FM)**
(1) Remove the lid of control box.(See No.1.)
(2) Disconnect the motor connector(CNMx.) on PCB in control box.
(3) Remove 5 bellmouth fixing screws and remove it.(○ mark)
(4) Remove the impeller fixing nut and remove it.(□ mark)
(5) Remove 2 plate fixing screws and remove it.(← mark)
(6) Remove 3 motor fixing nuts and remove it.(△ mark)

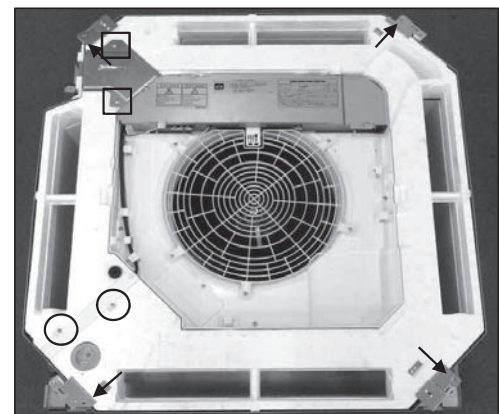
- 2. To remove the printed circuit board (PCB)**
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
(3) Take off 6 fixing hooks and remove it.



- 4. To remove the drain pan**
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
(3) Remove 2 plate fixing screws and remove it.
(○ mark)
(4) Remove 2 lid fixing screws and remove it.
(□ mark)
(5) Remove 4 drain pan fixing screws and remove it.
(← mark)

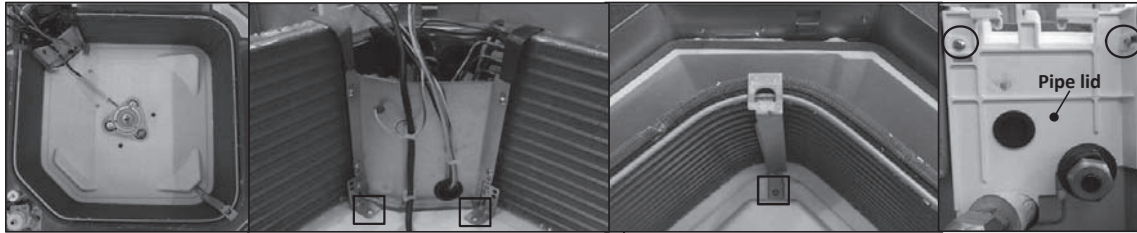


- 5. To remove drain pump (DM) and float switch (FS)**
(1) Remove the drain pan.(See No.4.)
(2) Pull the hose to the arrow direction and remove it.
(3) Remove 3 drain pump fixing screws and remove it.(○ mark)
(4) Remove the float switch fixing screw and remove it.(□ mark)



- 6. To remove the temperature sensors (example "Thi-R1")**
(1) Remove the drain pan.(See No.4.)
(2) Pull out the temperature sensor "Thi-R1" from the sensor holder.

PROCEDURE & PICTURES

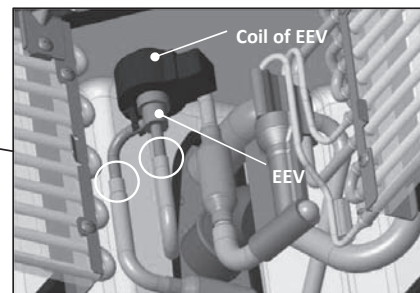


7. To remove the heat exchanger assembly

- (1) Remove the drain pan.(See No.4.)
- (2) Remove 2 pipe lid fixing screws and remove it.(O mark)
- (3) Remove 3 heat exchanger assembly fixing screws and remove it.(□ mark)

8. To remove the Electronic Expansion Valve (EEV)

- (1) Remove the heat exchanger assembly.(See No.7.)
- (2) Remove the coil of EEV by pull out on the top.
- (3) Remove welded part of EEV by welding.(O mark)



General view

(2) FDTC series

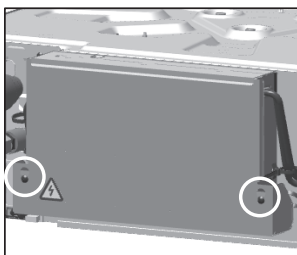
PJA012D792A

DISASSEMBLY PROCEDURE

⚠ WARNING Precautions for safety

- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

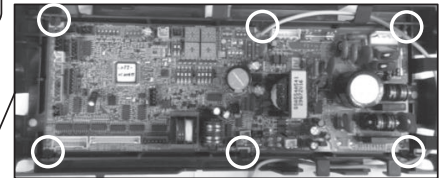
PROCEDURE & PICTURES (FDTC series)

**1. To remove the lid of control box**

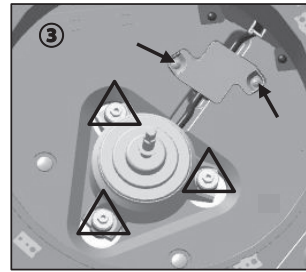
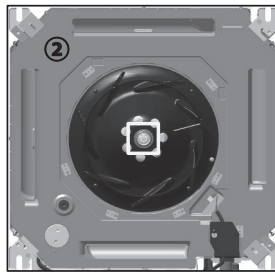
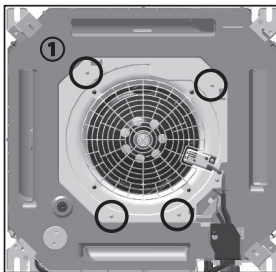
- (1) Remove 2 lid fixing screws then remove the lid.

2. To remove the printed circuit board (PCB)

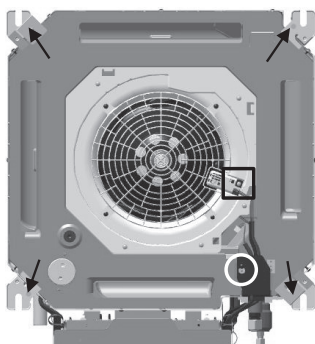
- (1) Remove the lid of control box. (See No.1.)
- (2) Pull off all the inserted connectors.
- (3) Take off 6 fixing hooks then remove the PCB.

**3. To remove the impeller and motor (FM)**

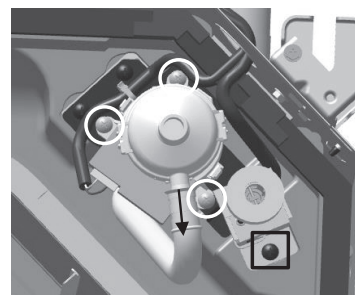
- (1) Remove 4 bellmouth fixing screws then remove the bellmouth. (○ mark)
- (2) Remove the turbo fan fixing nut then remove the turbo fan. (□ mark)
- (3) Remove 2 plate fixing screws then remove the plate. (← mark)
- (4) Disconnect the motor connector (CNMx) in the middle of wiring.
- (5) Remove 3 motor fixing nuts then remove the motor. (△ mark)

**4. To remove the drain pan**

- (1) Remove the lid of control box. (See No.1.)
- (2) Remove the plate fixing screw then remove the plate. (○ mark)
- (3) Remove the sensor holder screw then remove the sensor holder. (□ mark)
- (4) Remove 4 drain pan fixing screws then remove the drain pan. (← mark)

**5. To remove drain pump (DM) and float switch (FS)**

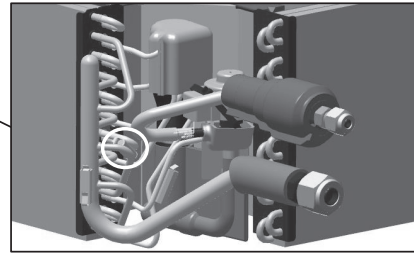
- (1) Remove the lid of control box. (See No.1.)
- (2) Disconnect the drain pump connector (CNRx) and float switch connector (CNix).
- (3) Remove the drain pan. (See No.4.)
- (4) Pull the hose to the arrow direction then remove the hose.
- (5) Remove 3 drain pump fixing screws then remove the drain pump. (○ mark)
- (6) Remove the float switch fixing screw then remove the float switch. (□ mark)



PROCEDURE & PICTURES

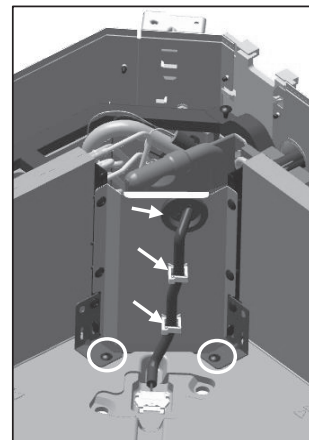
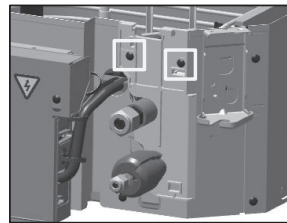
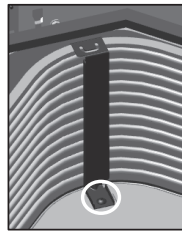
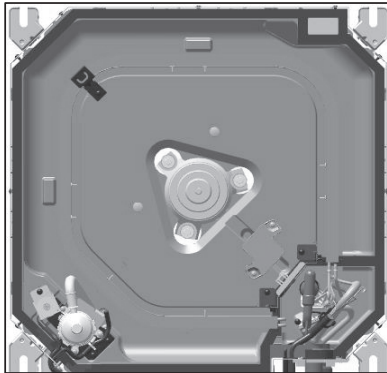
6. To remove the temperature sensors (example "Thi-R1")

- (1) Remove the lid of control box.(See No.1.)
- (2) Disconnect the temperature sensors connector(CNNx).
- (3) Remove the drain pan.(See No.3.)
- (4) Pull out the temperature sensors "Thi-R1" from the sensor holder.



7. To remove the heat exchanger assembly

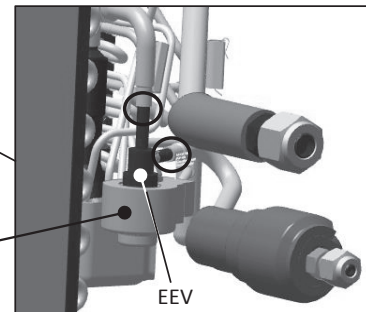
- (1) Remove the drain pan.(See No.4.)
- (2) Remove 2 pipe lid fixing screws then remove the pipe lid.(□ mark)
- (3) Remove the fan motor wiring from clip and grommet.(← mark)
- (4) Remove 3 heat exchanger assembly fixing screws then remove the heat exchanger assembly.(○ mark)



8. To remove the Electronic Expansion Valve (EEV)

- (1) Remove the heat exchanger assembly.(See No.7.)
- (2) Remove the damper sealant from EEV.
- (3) Remove the coil of EEV by pull out on the top.
- (4) Remove welded part of EEV by welding.(○ mark)

coil of EEV



General view

(3) FDTW series

PJB012D309

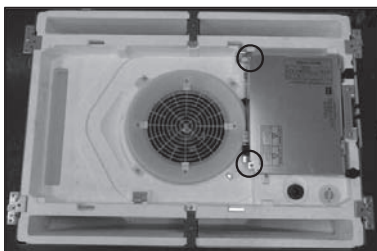
DISASSEMBLY PROCEDURE

⚠ WARNING

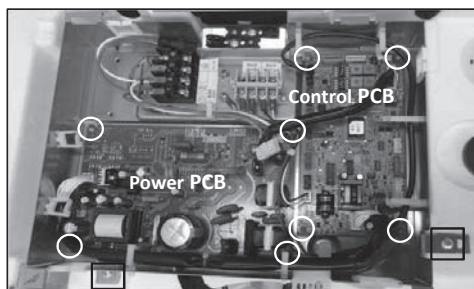
Precautions for safety

- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (FDTW series)

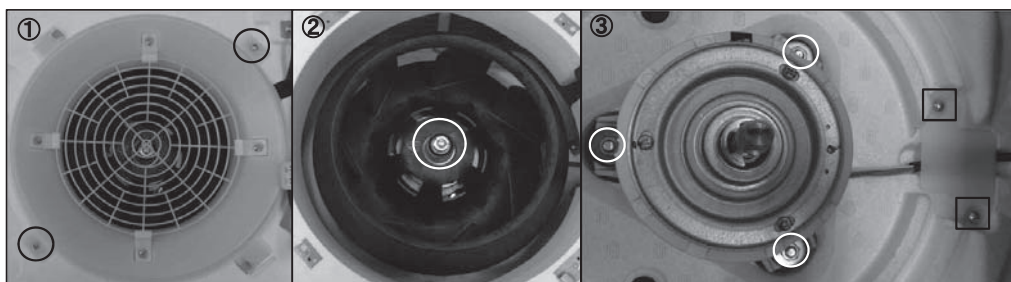


- 1. To remove the lid of control box**
(1) Remove 2 lid fixing screws and remove it.

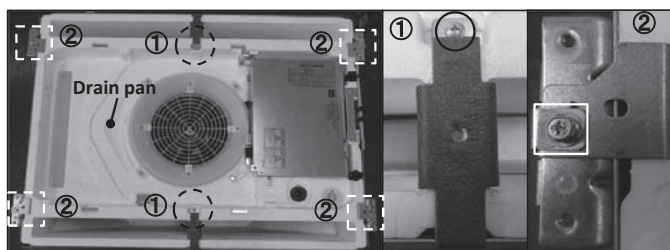


- 2. To remove the printed circuit board (PCB)**
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
- **Control PCB**
(3) Take off 4 control PCB fixing locking supports and remove it.(○ mark)
 - **Power PCB**
(4) Take off 4 power PCB fixing locking supports and remove it.(○ mark)

- 3. To remove the control box**
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
(3) Remove 2 control box fixing screws(□ mark) and remove it.

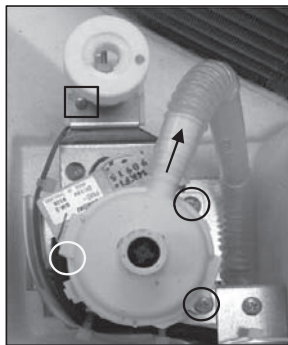


- 4. To remove the impeller and motor (FM)**
(1) Remove the lid of control box.(See No.1.)
(2) Disconnect the motor connector(CNMx) on PCB in control box.
(3) Remove 2 fan guard fixing screws and remove it.(Pic.①)
(4) Remove the impeller fixing nut and remove it.(Pic.②)
(5) Remove 2 plate fixing screws and remove it.(Pic.③, □ mark)
(6) Remove 3 motor fixing nuts and remove it.(Pic.③, ○ mark)

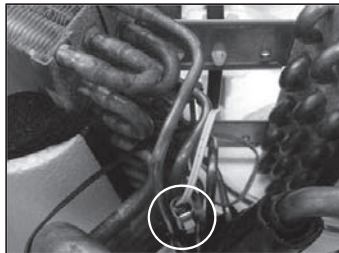


- 5. To remove the drain pan**
(1) Remove the control box.(See No.3.)
(2) Remove the plate fixing screw and remove it.
(Pic.①, ○ mark)
(3) Remove the bracket fixing screw.(Pic.②, □ mark)
(4) Pull drain pan off.

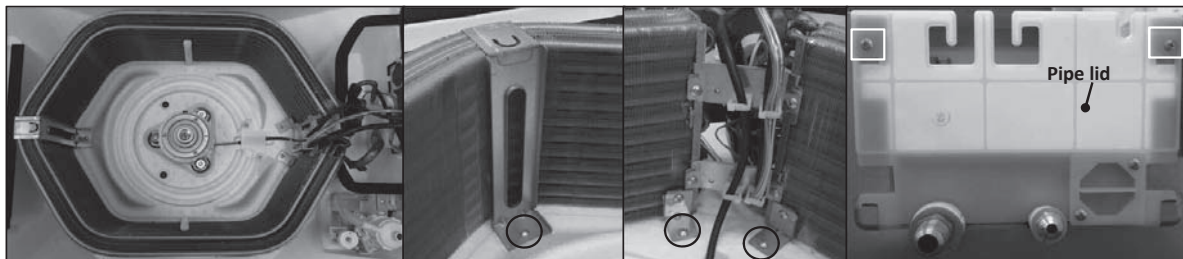
PROCEDURE & PICTURES



- 6. To remove the drain pump(DM) and flot switch(FS)**
- (1) Remove the drain pan.(See No.5.)
 - (2) Pull a hose to the arrow direction and remove it.
 - (3) Remove 3 drain pump fixing screws and remove it.(○ mark)
 - (4) Remove the flot switch fixing screw and remove it.(□ mark)

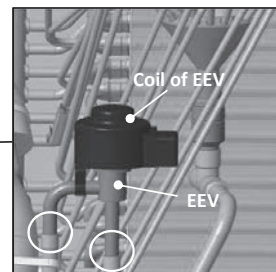


- 7. To remove the temperature sensors(example"Thi-R1")**
- (1) Remove the drain pan.(See No.5.)
 - (2) Pull out the temperature sensor"Thi-R1" from the sensor holder.



- 8. To remove the heat exchanger assembly**
- (1) Remove the drain pan.(See No.5.)
 - (2) Remove 2 pipe lid fixing screws and remove it.(□ mark)
 - (3) Remove 3 heat exchanger assembly fixing screws and remove it.(○ mark)

- 9. To remove the Electronic Expansion Valve (EEV)**
- (1) Remove the heat exchanger assembly.(See No.8.)
 - (2) Remove the coil of EEV by pull out on the top.
 - (3) Remove welded part of EEV by welding.(○ mark)



General view

(4) FDTQ series

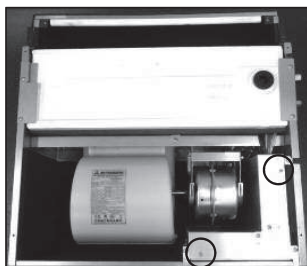
PJC012D211

DISASSEMBLY PROCEDURE

⚠ WARNING**Precautions for safety**

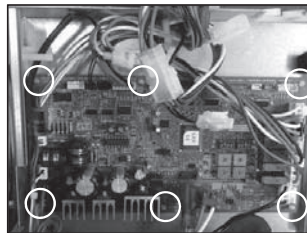
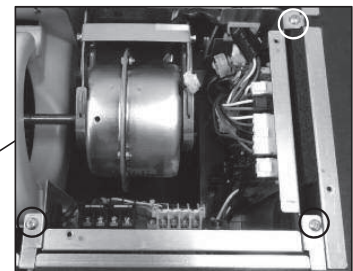
- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (FDTQ series)



- 1. To remove the lid of control box**
(1) Remove 2 lid fixing screws and remove it.

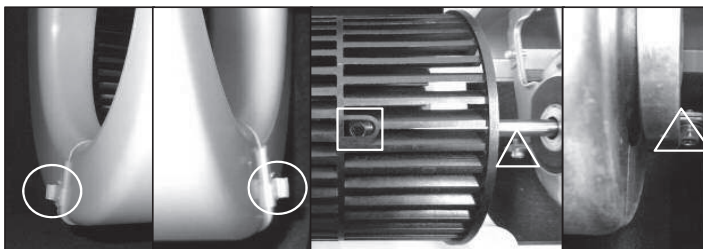
- 2. To remove the control box**
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
(3) Remove 3 control box fixing screws and remove it.
(4) Pull out the control box.



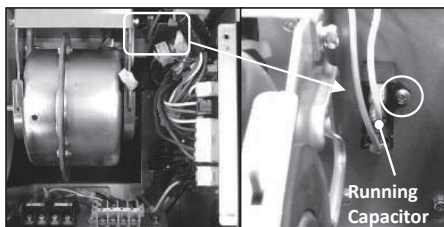
- 3. To remove the printed circuit board (PCB)**
(1) Remove the lid of control box.(See No.1.)
(2) Remove control box.(See No.2.)
(3) Take off 6 PCB fixing locking supports and remove it.



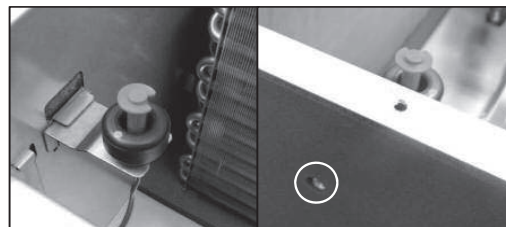
- 4. To remove the drain pan.**
(1) Remove 2 plate fixing screws and remove it.(right and left)
(2) Pull out the control box.



- 5. To remove the impeller and motor (FM)**
(1) Remove the lid of control box.(See No.1.)
(2) Disconnect the float switch connector(CNFx) in the middle of wiring.
(3) Take off 2 impeller casing hooks and remove it.(O mark)
(4) Remove the impeller fixing bolt and remove it.(□ mark)
(5) Remove 2 motor fixing screws and remove it.(△ mark)

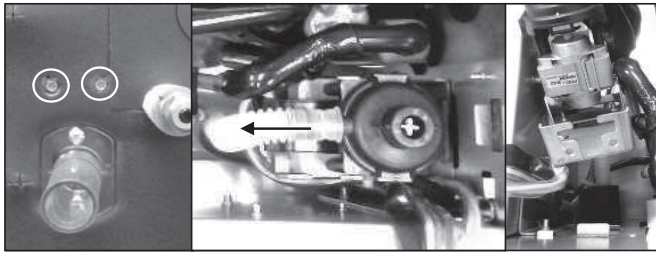


- 6. To remove the running capacitor of fan motor**
(1) Remove the running capacitor fixing screw and remove it.



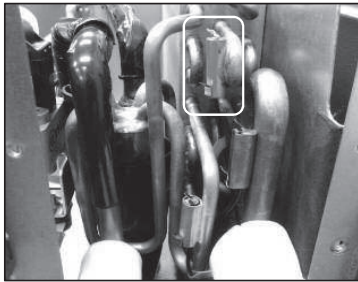
- 7. To remove the float switch (FS)**
(1) Remove the lid of control box.(See No.1.)
(2) Disconnect the float switch connector(CN1x) in the middle of wiring.
(3) Remove the drain pan.(See No.4.)
(4) Remove the float switch fixing screw and remove it.

PROCEDURE & PICTURES



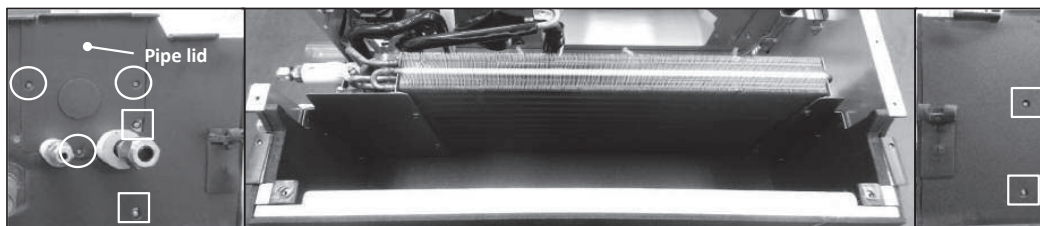
8. To remove drain pump (DM)

- (1) Remove the lid of control box.(See No.1.)
- (2) Remove the drain pan.(See No.4.)
- (3) Disconnect the drain pump connector(CNRx) in the middle of wiring.
- (4) Pull a hose to the arrow direction and remove it.
- (5) Remove 2 drain pump assembly fixing screws and remove it.



9. To remove the temperature sensors(example"Thi-R1")

- (1) Remove the lid of control box.(See No.1.)
- (2) Disconnect the Tho-R1 connector(CNNx) on PCB in control box.
- (3) Remove the drain pan.(See No.4.)
- (4) Pull out the temperature sensor"Thi-R1" from the sensor holder.

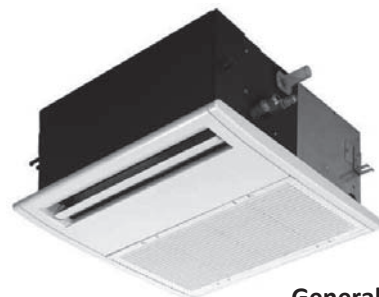
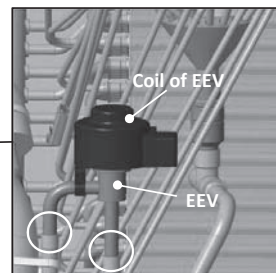


10. To remove the heat exchanger assembly

- (1) Remove the drain pan.(See No.3.)
- (2) Remove 3 pipe lid fixing screws and remove it.(○ mark)
- (3) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)

11. To remove the Electronic Expansion Valve (EEV)

- (1) Remove the heat exchanger assembly.(See No.10.)
- (2) Remove the coil of EEV by pull out on the top.
- (3) Remove welded part of EEV by welding.(○ mark)



General view

(5) FDTS series

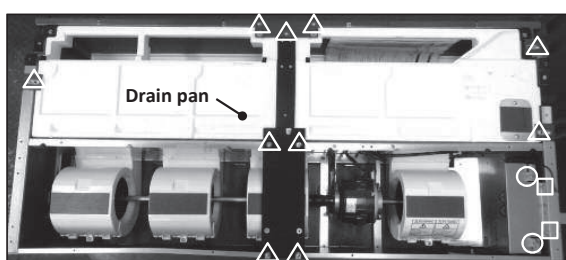
PJC012D311

DISASSEMBLY PROCEDURE

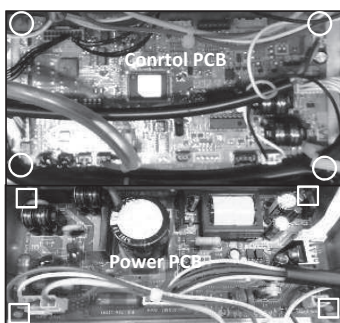
⚠ WARNING Precautions for safety

- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (FDTS series)

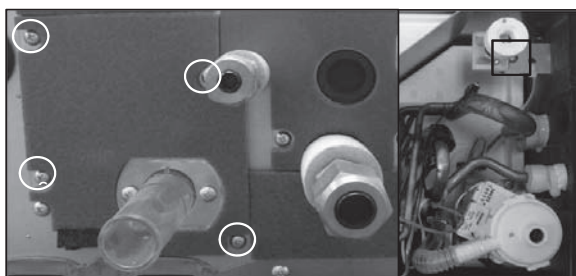
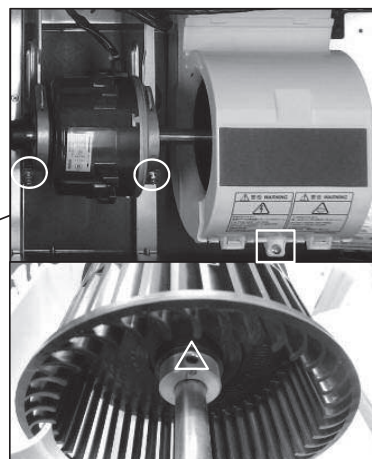


- 1. To remove the lid of control box**
(1) Remove 2 lid fixing screws and remove it.(○ mark)
- 2. To remove the control box**
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
(3) Remove 2 control box fixing screws and remove it.(□ mark)
- 3. To remove the drain pan**
(1) Remove 10 drain pan fixing screws and remove it.
(△ mark)



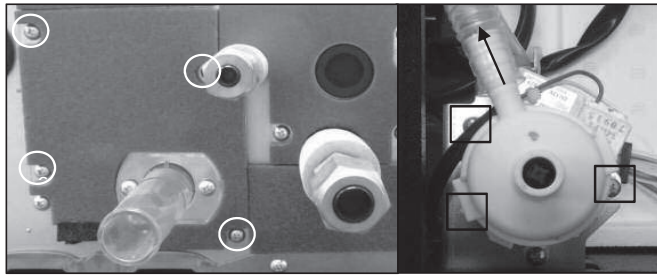
- 4. To remove the printed circuit board (PCB)**
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
 - **Control PCB**
(3) Take off 4 control PCB fixing locking supports and remove it.(○ mark)
 - **Power PCB**
(4) Take off 4 power PCB fixing locking supports and remove it.(□ mark)

- 5. To remove the impeller and motor (FM)**
(1) Remove the lid of control box.(See No.1.)
(2) Disconnect the motor connector(CNMx) on PCB in control box.
(3) Remove 2 motor fixings screw and remove it.(○ mark)
(4) Remove the fan casing fixing screw and remove it.(□ mark)
(5) Remove the impeller fixing bolt and remove it.(△ mark)

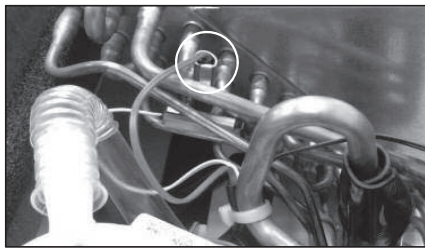


- 6. To remove the float switch (FS)**
(1) Remove the lid of control box.(See No.1.)
(2) Disconnect the float switch connector(CNI) on PCB in control box.
(3) Remove 4 drain pump assembly fixing screws and remove it.(○ mark)
(4) Remove the float switch fixing screw and remove it.(□ mark)

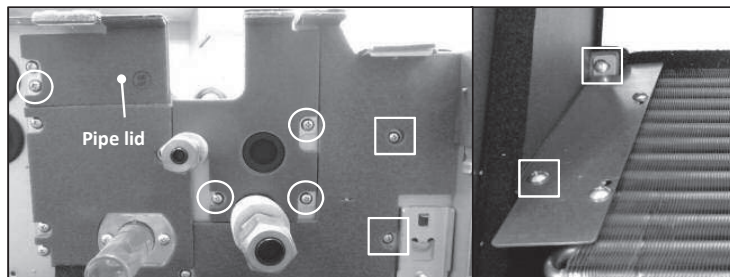
PROCEDURE & PICTURES



- 7. To remove drain pump (DM)**
- (1) Remove the lid of control box.(See No.1.)
 - (2) Disconnect the drain pump connector(CNR) on PCB in control box.
 - (3) Remove 4 drain pump assembly fixing screws and remove it.(O mark)
 - (4) Pull a hose to the arrow direction and remove it.
 - (5) Remove 3 drain pump fixing screws and remove it.(□ mark)

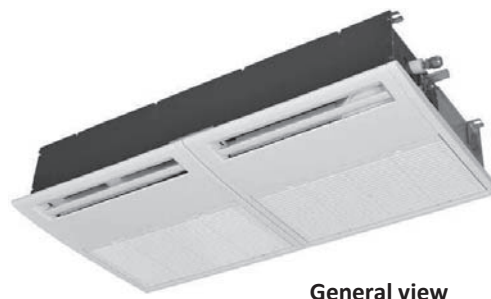
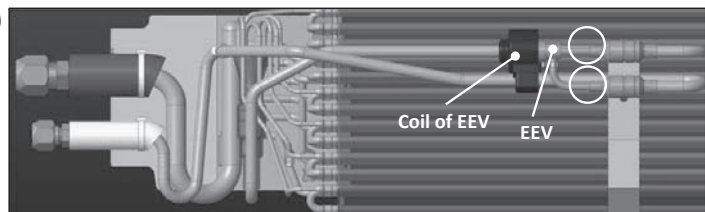


- 8. To remove the temperature sensors(example"Thi-R1")**
- (1) Remove the lid of control box.(See No.1.)
 - (2) Disconnect the Tho-R1 connector(CNNx) on PCB in control box.
 - (3) Remove the drain pan.(See No.3.)
 - (4) Pull out the temperature sensor"Thi-R1" from the sensor holder.



- 9. To remove the heat exchanger assembly**
- (1) Remove the drain pan.(See No.3.)
 - (2) Remove 4 pipe lid fixing screws and remove it.(O mark)
 - (3) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)

- 10. To remove the electronic expansion Valve (EEV)**
- (1) Remove the heat exchanger assembly. (See No.7.)
 - (2) Remove the coil of EEV by pull out on the top.
 - (3) Remove welded part of EEV by welding. (O mark)



General view

(6) FDU • FDUM series

PJG012D019

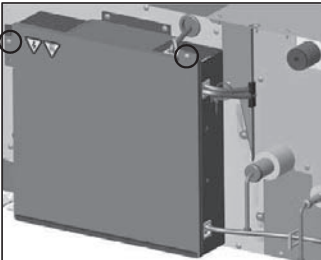
DISASSEMBLY PROCEDURE

⚠ WARNING Precautions for safety

- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (FDU • FDUM series)

(Bottom)

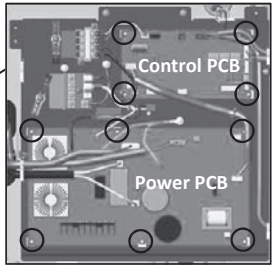
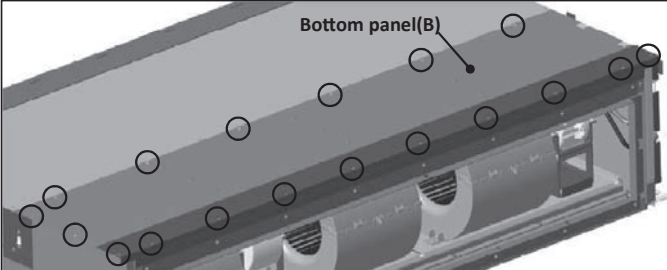


1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

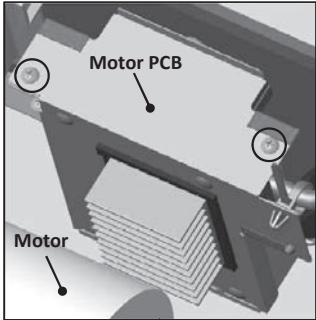
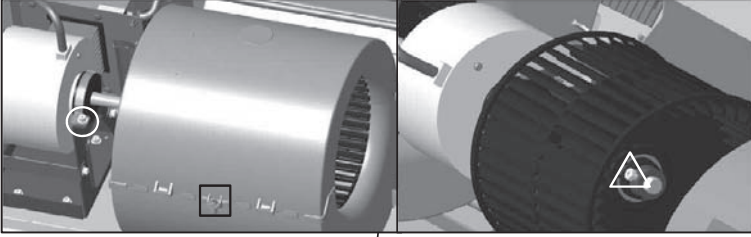
2. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.

- **Control PCB**
(3) Take off 4 control PCB fixing locking supports(○ mark) and remove it.
- **Power PCB**
(4) Take off 6 power PCB fixing locking supports(○ mark) and remove it.

(Top)

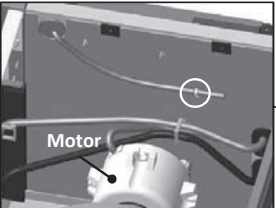



3. To remove the bottom panel(B)
(1) Remove 18 panel fixing screws and remove it.

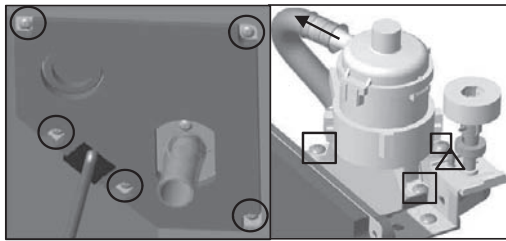
4. To remove the impellers and motors(FM)
(1) Remove the lid of control box.(See No.1.)
(2) Remove the bottom panel(B).(See No.3.)
(3) Disconnect the motor connector(CNFMx or CNMx) on PCB in control box.
(4) Remove the motor fixing screw and remove it.
(○ mark/right and left side)
(5) Remove the fan casing fixing screw and remove it.(□ mark)
(6) Remove the sirocco fan fixing bolt and remove it.(△ mark)

5. To remove the motor PCB
(1) Remove the lid of control box.
(See No.1.)
(2) Remove the bottom panel(B).
(See No.3.)
(3) Disconnect the motor PCB connector
(CNFMx or CNMx)on PCB in control box.
(4) Remove 2 motor PCB fixing screws
and remove it.

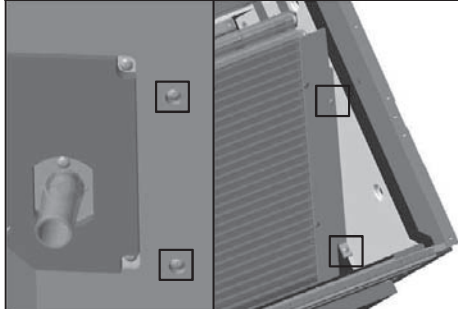
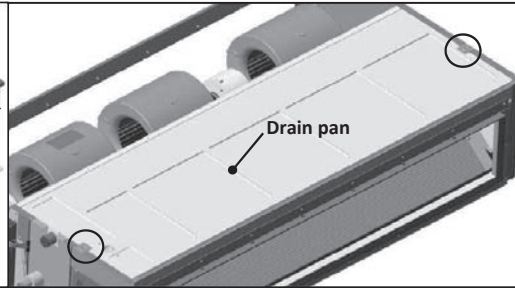
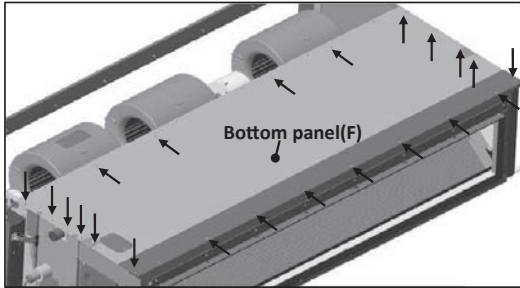


6. To remove the temperature sensors (example "Thi-A")
(1) Remove the lid of control box.(See No.1.)
(2) Remove the bottom panel(B).(See No.3.)
(3) Disconnect the Thi-A connector(CNH) on PCB in control box.
(4) Pull the temperature sensor fixing clip and remove it.(○ mark)

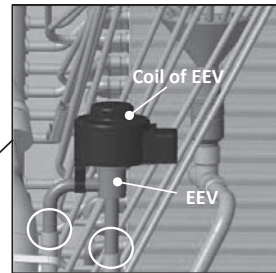
PROCEDURE & PICTURES



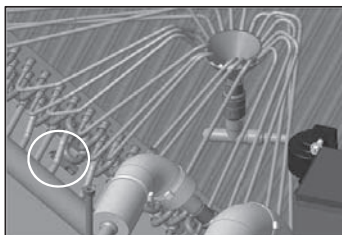
- 7. To remove the drain pump(DM) and flot switch(FS)**
- (1) Remove the lid of control box.(See No.1.)
 - (2) Remove 5 drain pump assembly fixing screws and remove it. (○ mark)
 - (3) Disconnect the drain pump connector(CNR) on PCB in control box.
 - (4) Pull a hose to the arrow direction and remove it.
 - (5) Remove 3 drain pump fixing screws and remove it.(□ mark)
 - (6) Disconnect the flot switch connector(CNI) on PCB in control box.
 - (7) Remove the flot switch fixing screw and remove it.(△ mark)



- 8. To remove the heat exchanger assembly**
- (1) Remove the bottom panel(B).(See No.3.)
 - (2) Remove 22 bottom panel(F) fixing screws and remove it.(← mark)
 - (3) Remove 2 drain pan fixing screws and remove it.(○ mark)
 - (4) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)



- 9. To remove the Electronic Expansion Valve (EEV)**
- (1) Remove the heat exchanger assembly.(See No.8.)
 - (2) Remove the coil of EEV by pull out on the top.
 - (3) Remove welded part of EEV by welding.(○ mark)



- 10. To remove the temperature sensors (example "Thi-R3")**
- (1) Remove the lid of control box.(See No.1.)
 - (2) Disconnect the Thi-R3 connector(CNN) on PWB in control box.
 - (3) Remove the drain pan.(See No.8.)
 - (4) Pull out the temperature sensor"Thi-R3" from the sensor holder.



General view

(7) FDUT series

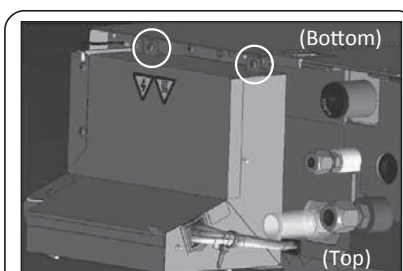
PJH012D004

DISASSEMBLY PROCEDURE

⚠ WARNING Precautions for safety

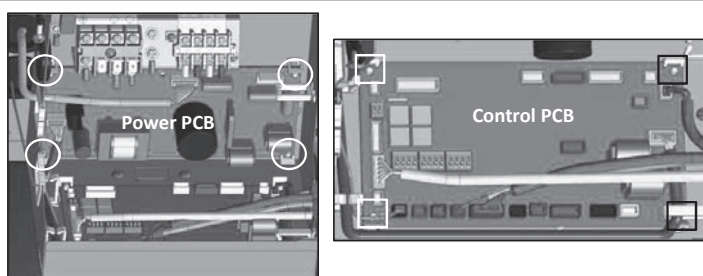
- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (FDUT series)

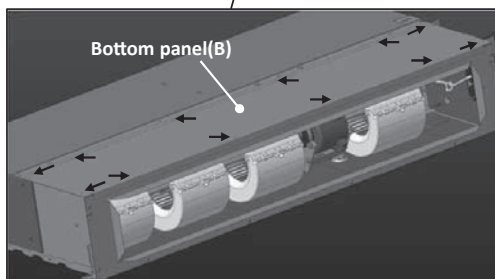


- 1. To remove the lid of control box**
(1) Remove 2 lid fixing screws and remove it.

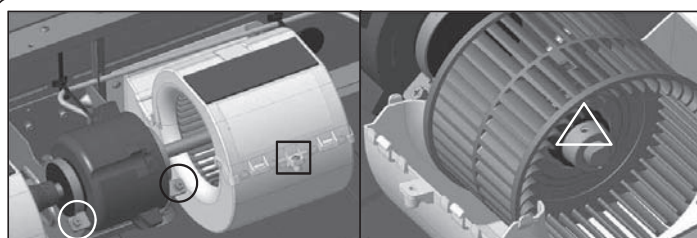
- 3. To remove the bottom panel(B)**
(1) Remove 12 panel fixing screws and remove it.



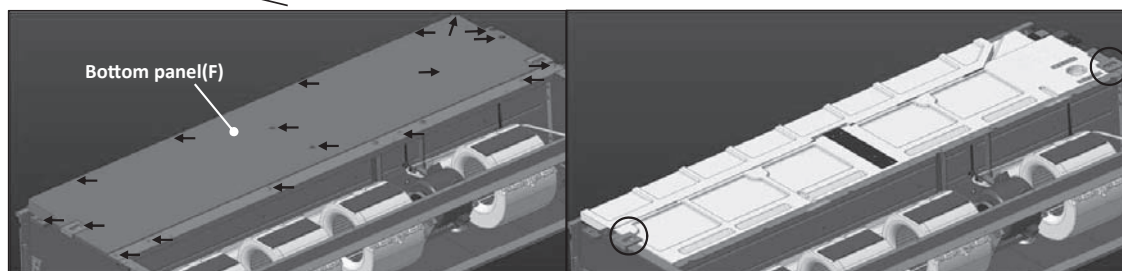
- 2. To remove the printed circuit board (PCB)**
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
- **Control PCB**
(3) Take off 4 control PCB fixing locking supports and remove it. (□ mark)
 - **Power PCB**
(4) Take off 4 power PCB fixing locking supports and remove it. (○ mark)



- 5. To remove the drain pan**
(1) Remove the bottom panel(B).(See No.3.)
(2) Remove 18 bottom panel(F) fixing screws and remove it.(← mark)
(3) Remove 2 drain pan fixing screws and remove it.(○ mark)



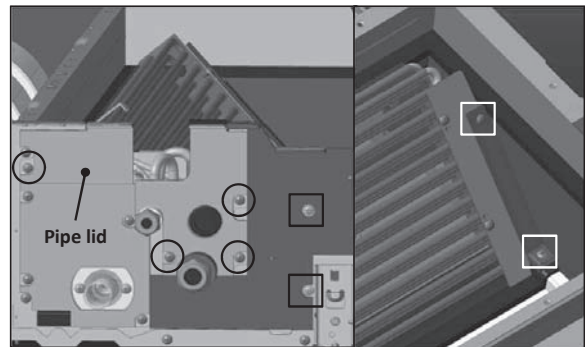
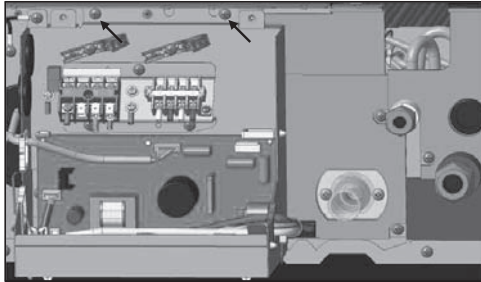
- 4. To remove the impellers and motors(FM)**
(1) Remove the lid of control box.(See No.1.)
(2) Remove the bottom panel(B).(See No.3.)
(3) Disconnect the motor connector(CNM1) on PCB in control box.
(4) Remove 2 motor fixing screws and remove it.(○ mark)
(5) Remove the fan casing fixing screw and remove it.(□ mark)
(6) Remove the sirocco fan fixing bolt and remove it.(△ mark)



PROCEDURE & PICTURES

6. To remove the control box

- (1) Remove the lid of control box.(See No.1.)
- (2) Pull off all the inserted connectors.
- (3) Remove 2 cotrol box fixing screws and remove it.

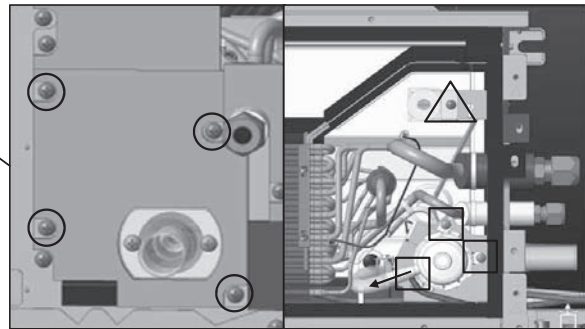


7. To remove the heat exchanger assembly

- (1) Remove the bottom panel(B).(See No.3.)
- (2) Remove the drain pan.(See No.5.)
- (3) Remove the control box.(See No.6.)
- (4) Remove 4 pipe lid fixing screws and remove it.(○ mark)
- (5) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)

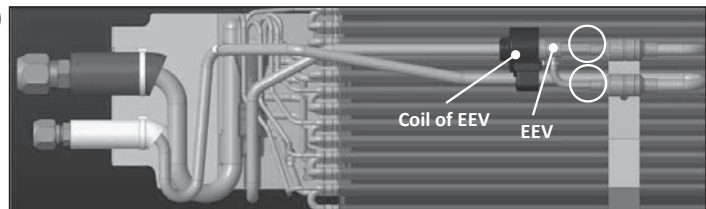
8. To remove the drain pump(DM) and flot switch(FS)

- (1) Remove the control box.(See No.6.)
- (2) Disconnect the drain pump connector(CNR) on PCB in control box.
- (3) Disconnect the flot switch connector(CNI) on PCB in control box.
- (4) Remove 4 drain pump assembly fixing screws and remove it.(○ mark)
- (5) Pull a hose to the arrow direction and remove it.
- (6) Remove 3 drain pump fixing screws and remove it.(□ mark)
- (7) Remove the flot switch fixing screw and remove it.(△ mark)



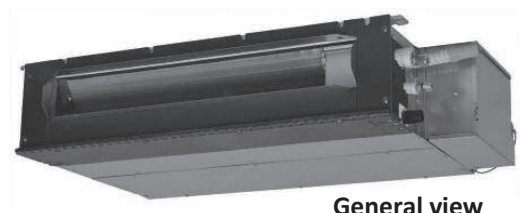
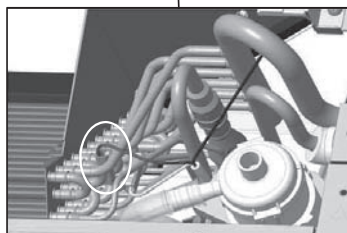
9. To remove the electronic expansion Valve (EEV)

- (1) Remove the heat exchanger assembly.(See No.7.)
- (2) Remove the coil of EEV by pull out on the top.
- (3) Remove welded part of EEV by welding.(○ mark)



10. To remove the temperature sensors (example"Thi-R1")

- (1) Remove the lid of control box.(See No.1.)
- (2) Disconnect the Thi-R1 connector(CNN) on PWB in control box.
- (3) Remove the drain pan.(See No.5.)
- (4) Pull out the temperature sensor"Thi-R3" from the sensor holder.



(8) FDUH series

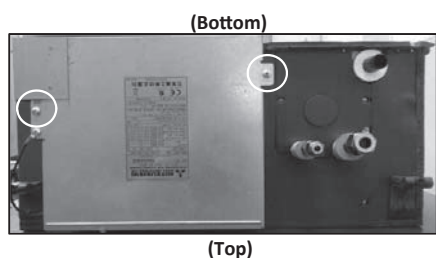
PJC012D123

DISASSEMBLY PROCEDURE

⚠ WARNING Precautions for safety

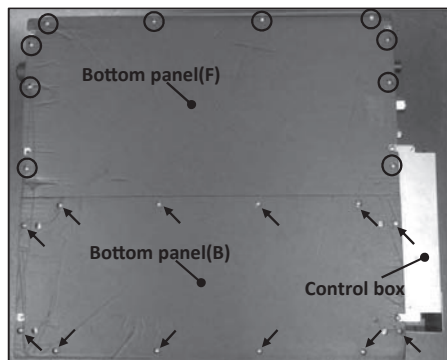
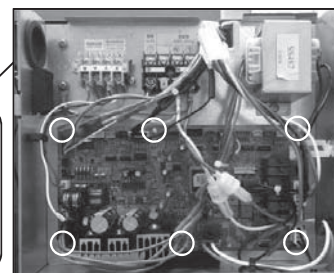
- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (FDUH series)



1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

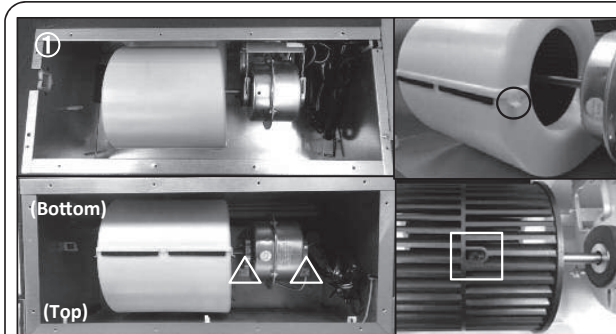
2. To remove the printed circuit board
(1) Remove the lid of control box. (See No.1.)
(2) Pull off all the inserted connectors.
(3) Take off 6 control PCB fixing locking supports and remove it.



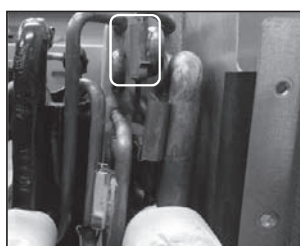
3. To remove the bottom panel(B) and bottom panel(F)
(1) Remove 12 bottom panel panel(B) fixing screws and remove it.(→ mark)
(2) Remove 10 bottom panel panel(F) fixing screws and remove it.(○ mark)



4. To remove the drain pan.
(1) Remove the bottom panel(B) and bottom panel(F).(See.No.3.)
(2) Pull out the control box.

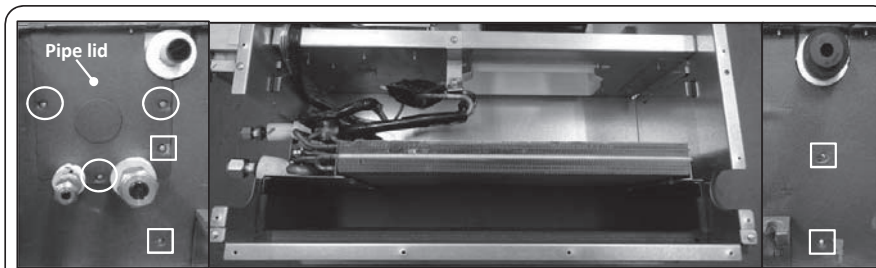


5. To remove the impeller and motor (FM)
(1) Remove the lid of control box.(See No.1.)
(2) Remove the bottom panel(B).(See No.2.)<Pic①>
(3) Disconnect the motor connector(CNFx) in the middle of wiring.
(4) Take off the right and left hooks of the fan casing and remove it.(○ mark)
(5) Remove the impeller fixing bolt and remove it.(□ mark)
(6) Remove 2 motor fixing screws and remove it.(△ mark)



6. To remove the temperature sensors (example"Thi-R1")
(1) Remove the lid of control box.(See No.1.)
(2) Disconnect the Tho-R1 connector(CNNx) on PCB in control box.
(3) Remove the drain pan.(See No.4.)
(4) Pull out the temperature sensor"Thi-R1" from the sensor holder.

PROCEDURE & PICTURES

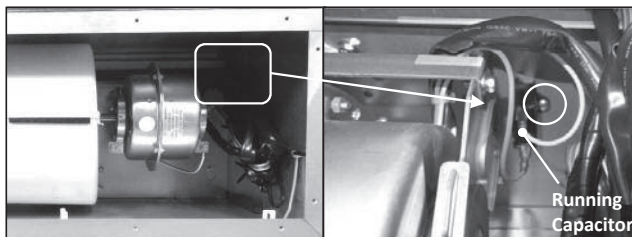
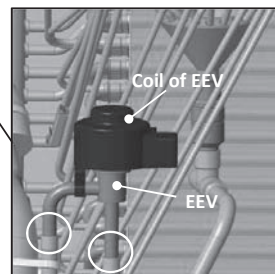


7. To remove the heat exchanger assembly

- (1) Remove the drain pan.(See No.3.)
- (2) Remove 3 pipe lid fixing screws and remove it.(○ mark)
- (3) Remove 4 heat exchanger assy fixing screws and remove it.(□ mark)

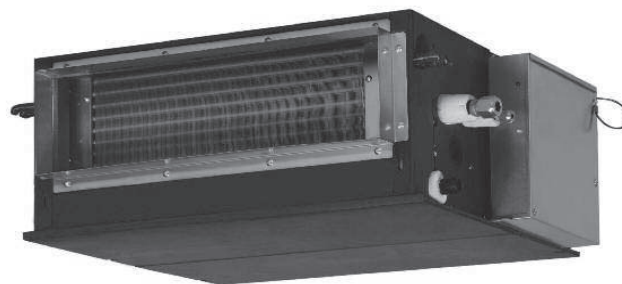
8. To remove the Electronic Expansion Valve (EEV)

- (1) Remove the heat exchanger assembly.(See No.9.)
- (2) Remove the coil of EEV by pull out on the top.
- (3) Remove welded part of EEV by welding.(○ mark)



8. To remove the running capacitor of fan motor

- (1) Remove the running capacitor fixing screw and remove it.




General view

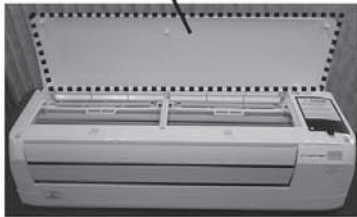


(9) FDK series





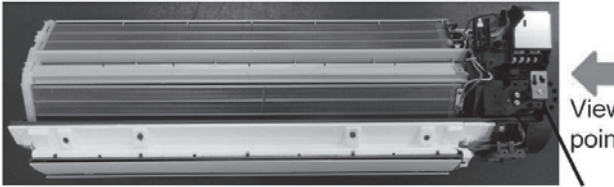




PHA012D402

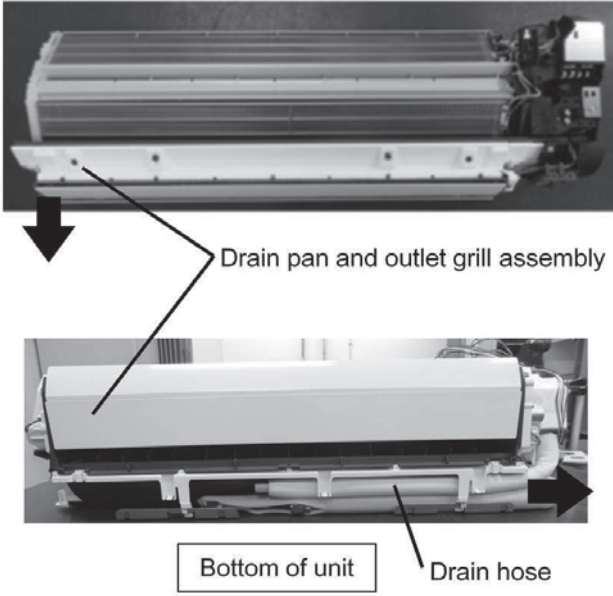
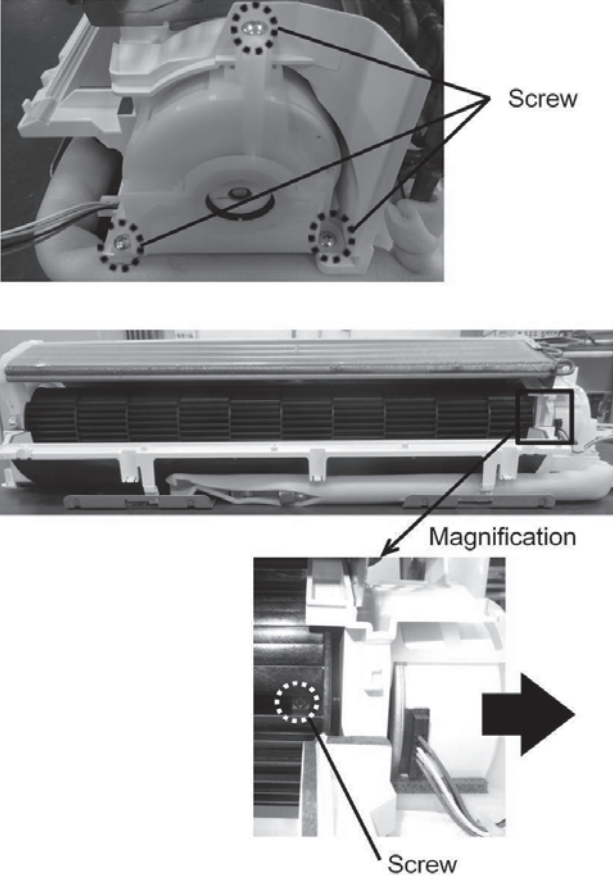
DISASSEMBLY PROCEDURE

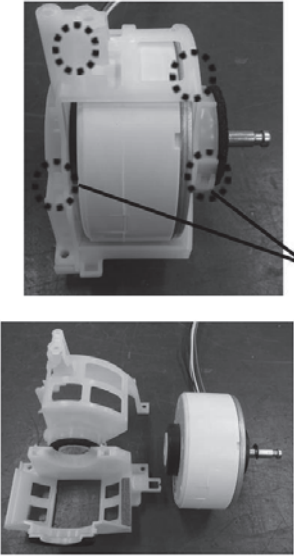
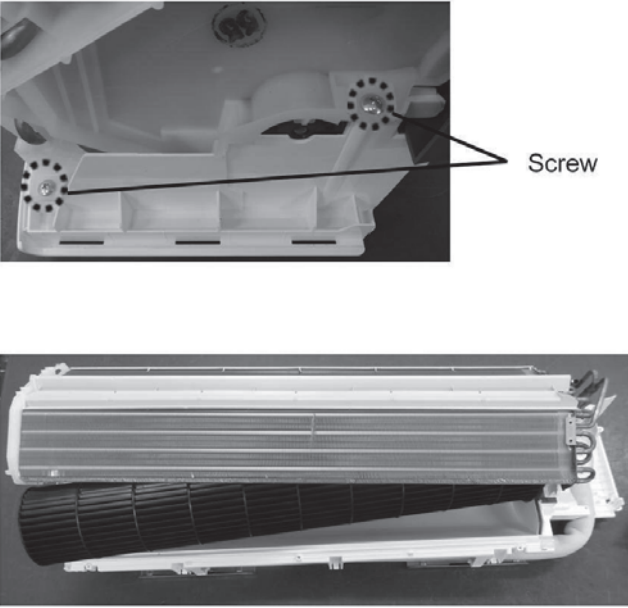
 WARNING	Precautions for safety
<ul style="list-style-type: none"> ● Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way. ● When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram. ● The electrical components are under high voltage by the operation of the booster capacitor. Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock. ● When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode. ● Be sure to collect refrigerant without spreading it in the air. ● These contents are an example. Please refer to a similar part of actual unit. 	

PROCEDURE & PICTURES (SRK-ZS,FDK series)

Item	Illustration	Operating procedure
①	<p>Air inlet panel</p> 	<p>[Removing the air inlet panel]</p> <p>1. Hold lower edge of the air inlet panel, and then open it to about 80°.</p>
②	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Removing the front panel</p> <p>Air filter</p>  <p>Air cleaning filter</p> 	<p>[Removing the filter]</p> <p>1. Remove the air filter ×2.</p> <p>2. Remove the air-cleaning filter ×2</p> <p>3. Holding both sides of the air inlet panel, pull the left and right sides forward at the same time to remove the panel.</p>

Item	Illustration	Operating procedure
<p>③</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Removing the front panel</p>	<p style="text-align: center;">Hook</p>  <p style="text-align: center;">View point</p>  <p style="text-align: center;">View point</p>   <p style="text-align: right;">Cap Screw</p>	<p>1. Open the caps, and then remove the screw ×2 (circled in the illustration below)</p> <p>2. Draw the front panel above after removing 4 hooks</p> <p>Caution</p> <ul style="list-style-type: none"> • Be sure to use a fine-tipped tool (such as a precision screwdriver) to open the cap. • Be careful not to damage the panel surface when opening the caps.
<p>④</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Removing the electrical controller and peripheral parts</p>	 <p style="text-align: right;">View point Screw</p>   <p style="text-align: center;">Magnification</p> <p style="text-align: center;">Screw</p>  <p style="text-align: center;">Magnification</p> <p style="text-align: center;">Screw</p> 	<p>[Removing the Controller]</p> <p>1. Remove screw x1 so as to remove a metal lid.</p> <p>2. Remove a metal lid then unplug the following connector x7 CNU(White) CNG(Black) CNF(White) CNE(Black) CNX(Black) CNY(Red) CNW(Blue)</p> <p>3. Pull the each sensor out from the case into the indicated directions in red arrows.</p> <p>4. Remove screw x3 then draw the controller toward right direction.</p>

Item	Illustration	Operating procedure
<p style="text-align: center;">⑤</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Removing drain pan & outlet grill assembly</p>		<p>[Removing the drain pan]</p> <ol style="list-style-type: none"> 1. Draw the left of the drain pan and outlet grill assembly toward lower side so as to come off it from heat exchanger assembly. 2. Draw the drain pan and outlet grill assembly toward the right with drawing the drain hose.
<p style="text-align: center;">⑥</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Removing fan & motor</p>		<p>[Removing fan & motor]</p> <ol style="list-style-type: none"> 1. Remove screw x3 2. Look into the area surrounded the black rectangle, adjust the screw position with rotating the cross flow fan, then remove a screw. 3. Draw the motor and its bracket toward the right.

Item	Illustration	Operating procedure
<p style="text-align: center;">⑦</p> <p style="text-align: center;">Disassemble the motor</p>	 <p style="text-align: right;">Hook</p>	<p>[Removing the motor case]</p> <p>1. Release the hook ×4 (circled in the illustration), and then remove the motor case (U).</p>
<p style="text-align: center;">⑧</p> <p style="text-align: center;">Removing the fan and heat exchanger</p>	 <p style="text-align: right;">Screw</p>	<p>1. Remove the screw ×2 (circled in the illustration) on the left side of the heat exchanger.</p> <p>2. While lifting up and supporting the left side of the heat exchanger, pull out the fan to the left, keeping it angled down.</p>

(10) FDE series

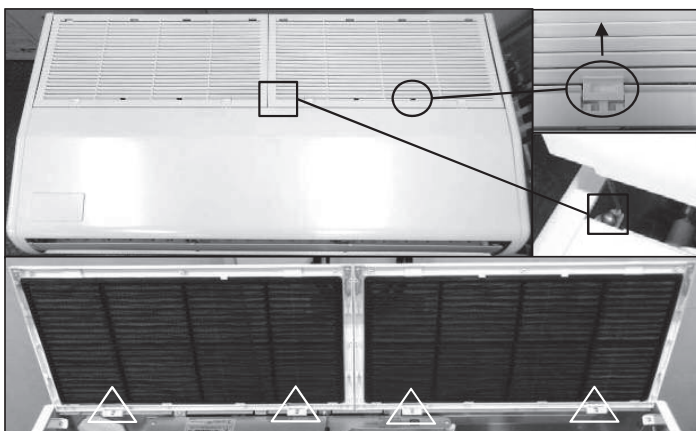
PFA012D631

DISASSEMBLY PROCEDURE

⚠ WARNING Precautions for safety

- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (FDE series)

**1. To remove air inlet grille.**

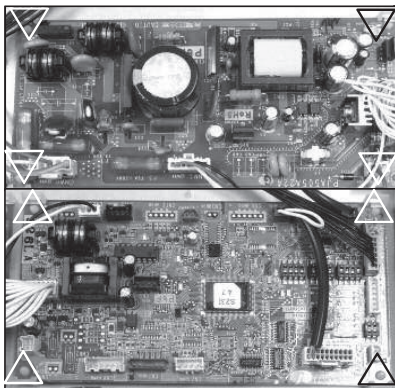
- (1) Slide the hook in the direction of the arrow.(○ mark)
- (2) Remove 4 wire fixing screws.(□ mark)
- (3) Remove 4 air inlet grille fixing screws.(△ mark)

2. To remove the lid of control box

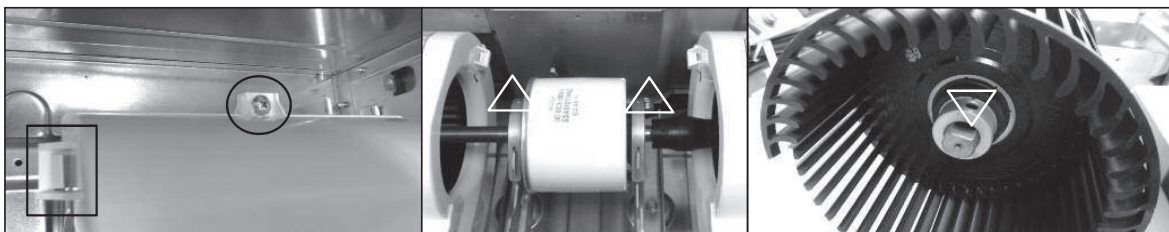
- (1) To remove air inlet grille.(See No.1.)
- (2) Remove 2 wire fixing screws and remove it.(← mark)
- (3) Remove 2 lid fixing screws and remove it.(○ mark)

3. To remove the control box

- (1) Remove the lid of control box.(See No.2)
- (2) Pull off all the inserted connectors.
- (3) Remove 2 control box fixing screws and remove it.(□ mark)
- (4) Pull out the control box.

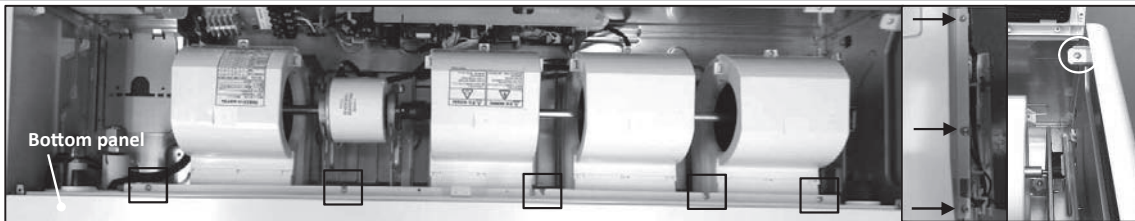
**4. To remove the printed circuit board (PCB)**

- (1) Remove the lid of control box.(See No.2.)
- (2) Pull off all the inserted connectors.
- **Control PCB**
(3) Take off 4 control PCB fixing locking supports and remove it.(△ mark)
- **Power PCB**
(4) Take off 4 power PCB fixing locking supports and remove it.(▽ mark)

**5. To remove the impeller and motor (FM)**

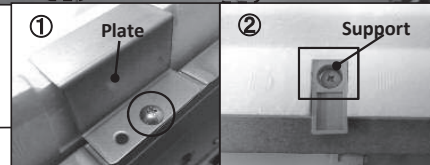
- (1) Remove the lid of control box.(See No.1.)
- (2) Disconnect the motor connector(CNFx) in the middle way of wiring.
- (3) Remove the fan casing fixing screw.(○ mark) Take off the fan casing fixing hook and remove it.(□ mark)
- (4) Remove the impeller fixing screw and remove it.(▽ mark)
- (5) Remove 2 motor fixing screws and remove it.(△ mark)

PROCEDURE & PICTURES



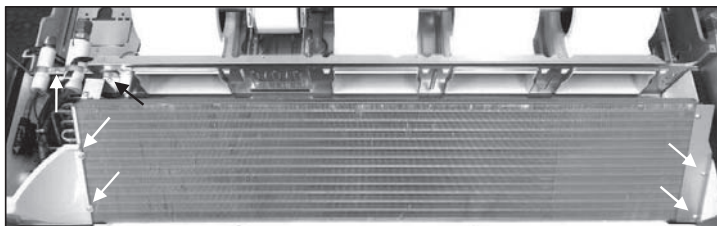
6. To remove side panel and bottom panel

- (1) Remove air inlet grille.(See No.1.)
- (2) Remove the right and left side panel fixing screws and remove it.(○ mark)
- (3) Remove 5 bottom panel fixing screws.(□ mark) Remove 6 bottom panel fixing screws and remove it. (← mark, left and right side)



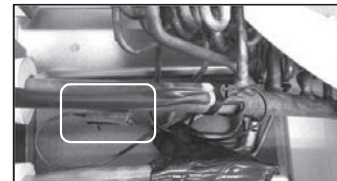
7. To remove drain pan

- (1) Remove side panel and bottom panel.(See No.5.)
- (2) Remove 2 plate fixing screws and remove it.(○ mark, Pic.①)
- (3) Remove 2 support fixing screws and remove it.(□ mark, Pic.②)
- (4) Pull out the drain pan.



8. To remove the heat exchanger assembly

- (1) Remove the drain pan.(See No.6.)
- (2) Remove 6 heat exchanger assy fixing screws and remove it.(← mark)



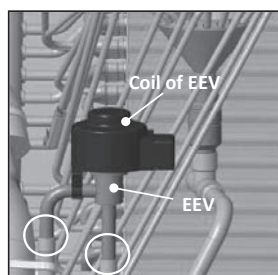
9. To remove the louver motor (LM)

- (1) Remove the lid of control box.(See No.1.)
- (2) Disconnect the louver motor connector (CNJ) on PCB in control box.
- (3) Remove side panel.(See No.5.)
- (4) Remove 2 louver motor fixing screws and remove it.



10. To remove the temperature sensors (example"Thi-R3")

- (1) Remove the lid of control box.(See No.1.)
- (2) Disconnect the Tho-R3 connector(CNNx) on PCB in control box.
- (3) Remove the drain pan.(See No.3.)
- (4) Pull out the temperature sensor"Thi-R1" from the sensor holder.



11. To remove the Electronic Expansion Valve (EEV)

- (1) Remove the heat exchanger assembly.(See No.9.)
- (2) Remove the coil of EEV by pull out on the top.
- (3) Remove welded part of EEV by welding.(○ mark)



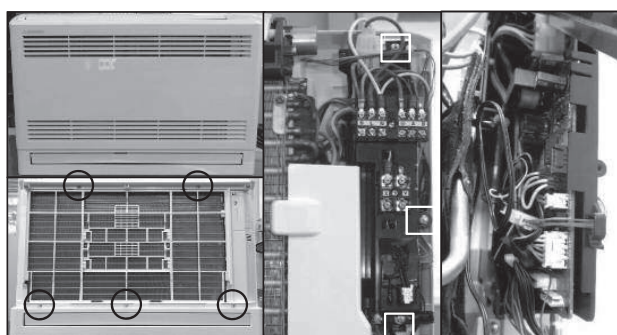
General view

DISASSEMBLY PROCEDURE

⚠ WARNING Precautions for safety

- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

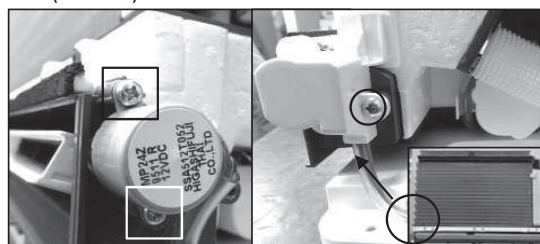
PROCEDURE & PICTURES (FDFW series)

**1. To remove the control box**

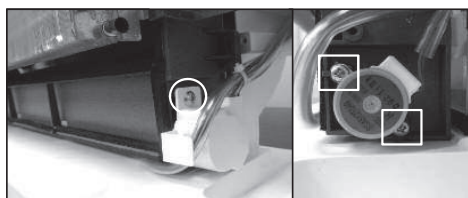
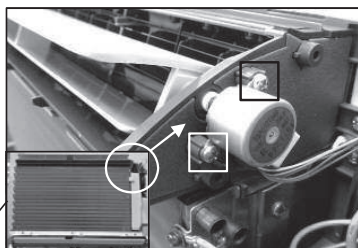
- (1) Remove hooks of the front panel and remove it.
- (2) Remove 5 filter assembly fixing screws and remove it.(○ mark)
- (3) Remove 3 control box and lid fixing screws, and remove it.(□ mark)
- (4) Pull the control box forward.

2. To remove the lower flap motor (LFM)

- (1) Remove the control box.(See No.1.)
- (2) Disconnect the lower flap motor connector(CNJ3) in the way of wiring.
- (3) Remove the cover fixing screw and remove it.(○ mark)
- (4) Remove 2 lower flap motor screws and remove it.(□ mark)

**3. To remove the upper flap motor (UFM)**

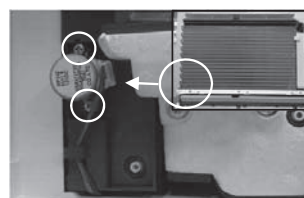
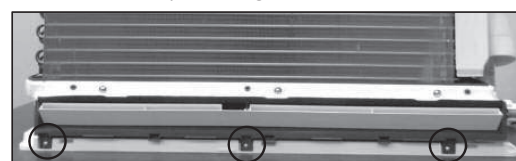
- (1) Remove the control box.(See No.1.)
- (2) Disconnect the upper flap motor connector(CNJ4) in the way of wiring.
- (3) Remove 2 upper flap motor fixing screws and remove it.(□ mark)

**5. To remove the damper arm motor (DAM)**

- (1) Remove the control box.(See No.1.)
- (2) Disconnect the damper arm motor connector(CNJ2) in the way of wiring.
- (3) Remove the cover fixing screw and remove it.(○ mark)
- (4) Remove 2 damper arm motor fixing screws and remove it.(□ mark)

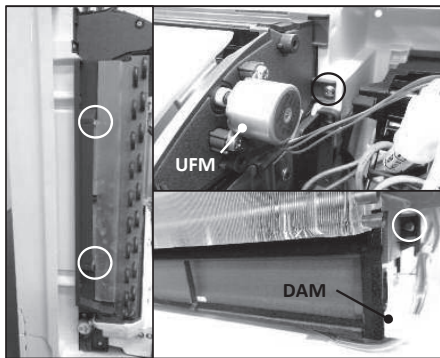
4. To remove drain pan

- (1) Remove the lower flap motor.(See No.3.)
- (2) Remove 3 drain pan fixing screws and remove it.(○ mark)

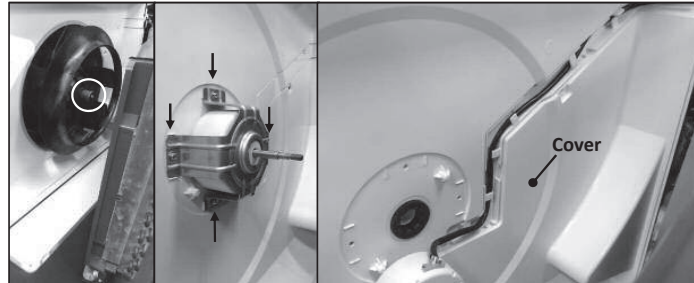
**6. To remove the damper motor (DM)**

- (1) Remove the control box.(See No.1.)
- (2) Disconnect the damper motor connector(CNJ1) in the way of wiring.
- (3) Remove 2 damper arm motor fixing screws and remove it.(○ mark)

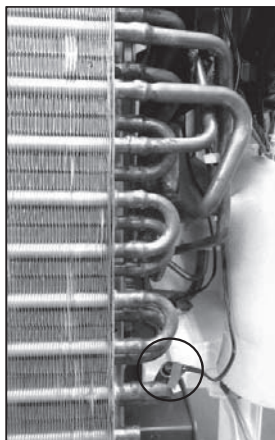
PROCEDURE & PICTURES



- 7. To remove the heat exchanger assembly**
- (1) Remove the drain pan.(See No.4.)
 - (2) Remove 4 heat exchanger assy fixing screws and remove it.(O mark)

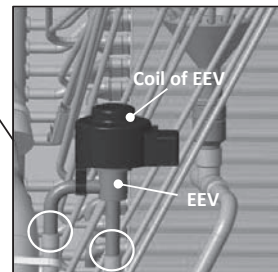


- 8. To remove the impeller and motor (FM)**
- (1) Remove control box.(See No.1.)
 - (2) Disconnect the motor connector(CNM) on PCB in control box.
 - (3) Remove the heat exchanger assembly.(See No.7.)
 - (4) Remove the impeller fixing nut and remove it.(O mark)
 - (5) Remove 4 motor fixing bolts and remove it.(← mark)
 - (6) Take off the hooks of cover and remove it.



- 9. To remove the temperature sensors (example"Thi-R1")**
- (1) Remove control box.(See No.1.)
 - (2) Disconnect the Tho-R1 connector(CNN) on PCB in control box.
 - (3) Pull out the temperature sensor"Thi-R1" from the sensor holder.

- 10. To remove the Electronic Expansion Valve (EEV)**
- (1) Remove the heat exchanger assembly.(See No.7.)
 - (2) Remove the coil of EEV by pull out on the top.
 - (3) Remove welded part of EEV by welding.(O mark)



General view

DISASSEMBLY PROCEDURE

WARNING Precautions for safety

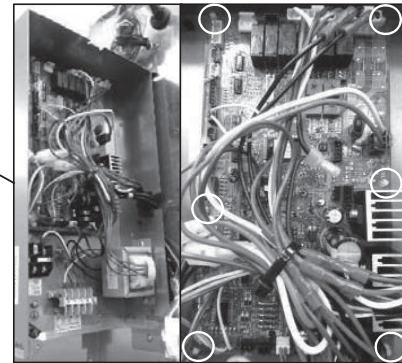
- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (FDFU • FDFL series)

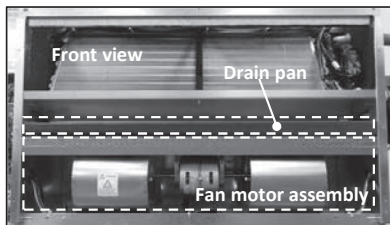
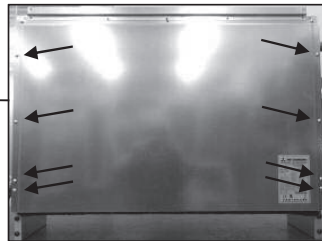


- 1. To remove the lid of control box**
(1) Remove 2 lid fixing screws and remove it.

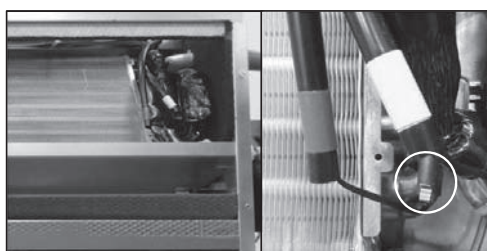
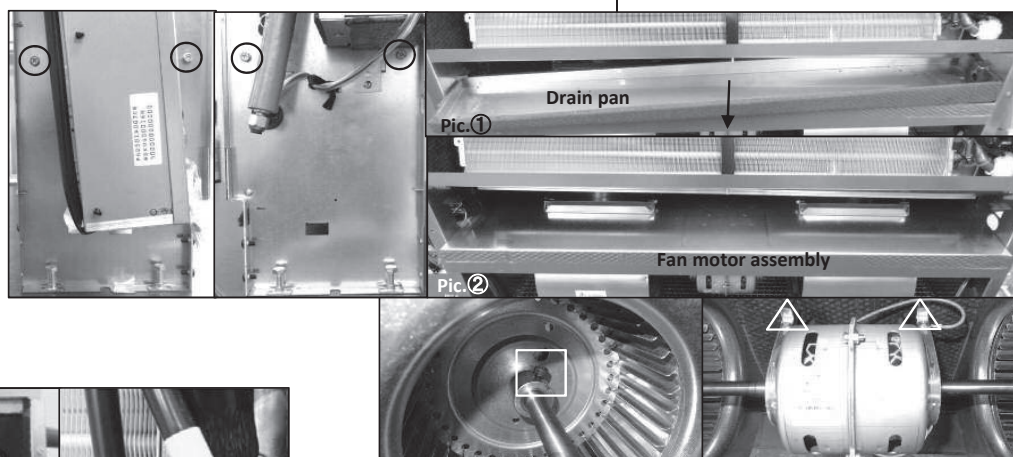
- 2. To remove the printed circuit board (PCB)**
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
(3) Take off 6 power PCB fixing locking supports and remove it.



- 3. To remove the front panel (FDFU)**
(1) Remove 8 front panel fixing screws and remove it.



- 4. To remove the impeller and motor (FM)**
(1) Remove the lid of control box.(See No.1.), remove the front panel.(See No.3.)
(2) Disconnect the motor connector(CNF1) in the way of wiring.
(3) Pull drain pan in the direction of the arrow and remove.(Pic.①)
(4) Remove 4 fan base fixing screws and remove fan motor assembly.(○ mark)
(5) Remove the impeller fixing bolt and remove it.(□ mark)
(6) Remove 2 motor fixing screws and remove it.(△ mark)

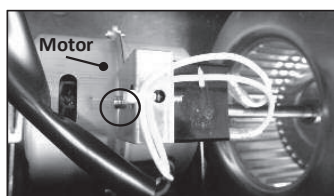


- 5. To remove the temperature sensors (example"Thi-R1")**
(1) Remove the lid of control box.(See No.1.)
(2) Disconnect the Tho-R1 connector(CNNx) in the way of wiring.
(3) Remove the front panel.(See No.3.)
(4) Pull out the temperature sensor"Thi-R1" from the sensor holder.

PROCEDURE & PICTURES

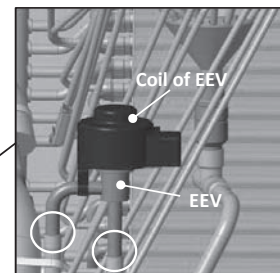
6. To remove the heat exchanger assembly

- (1) Remove 9 top panel fixing screws and remove it .(Pic.① ②)
- (2) Remove 2 support fixing screws and remove it .(Pic.③)
- (3) Remove the lid of EEV box fixing screw and remove it.(□ mark, Pic.④)
- Remove 3 EEV box fixing screws and remove it.(○ mark, Pic.④)
- (4) Remove 2 screws on the left side panel.(Pic.⑤)
- (5) Remove 3 screws on the back side panel.(Pic.⑥)
- (6) Remove 4 screws on the right side panel and pull the heat exchanger assembly to the right. (Pic.⑦)



7. To remove the running capacitor of fan motor

- (1) Remove the fan motor assembly.
(See No.4.)
- (2) Remove faston terminal.
- (3) Remove the running capacitor fixing screw and remove it.



8. To remove the Electronic Expansion Valve (EEV)

- (1) Remove the heat exchanger assembly.(See No.9.)
- (2) Remove the coil of EEV by pull out on the top.
- (3) Remove welded part of EEV by welding.(○ mark)



General view
(FDFL)



General view
(FDFU)

DISASSEMBLY PROCEDURE

WARNING **Precautions for safety**

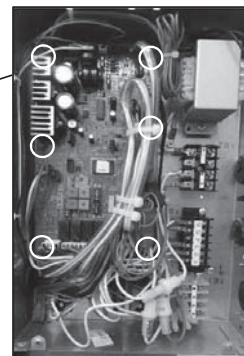
- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- When parts of refrigerant cycle is disassembled by welding, be sure to work after collecting a refrigerant, if the refrigerant isn't collected, the unit might explode.
- Be sure to collect refrigerant without spreading it in the air.
- These contents are an example. Please refer to a similar part of actual unit.

PROCEDURE & PICTURES (SAF-DX series)



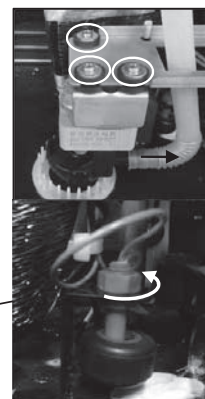
1. To remove the lid of control box
(1) Remove 2 lid fixing screws and remove it.

2. To remove the printed circuit board (PCB)
(1) Remove the lid of control box.(See No.1.)
(2) Pull off all the inserted connectors.
(3) Take off 6 PCB fixing locking supports(○ mark)



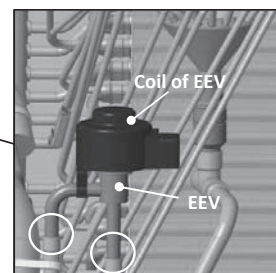
3. To remove the drain pan
(1) Remove 10 bottom panel fixing screws and remove it.
(2) Pull the drain pan and remove it.

4. To remove the heat exchanger assembly
(1) Remove the bottom panel(See No.3.)
(2) Remove 4 fixing screws on the attached plate of heat exchanger and remove it.

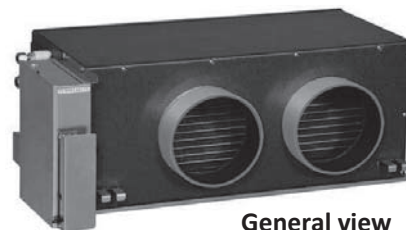


5. To remove the drain pump(DM) and float switch(FS)
(1) Remove the lid of control box.(See No.1.)
(2) Remove the drain pan.(See No.3.)
(3) Disconnect the drain pump connector(CNRx) in the middle of wiring.
(4) Disconnect the float switch connector(CNix) in the middle of wiring.
(5) Pull a hose to the arrow direction and remove it.
(6) Remove 3 drain pump fixing screws and remove it.(○ mark)
(7) Turn float switch to the left and remove it.

6. To remove the Electronic Expansion Valve (EEV)
(1) Remove the heat exchanger assembly.(See No.8.)
(2) Remove the coil of EEV by pull out on the top.
(3) Remove welded part of EEV by welding.(○ mark)



7. To remove the temperature sensors, (example"Thi-R3")
(1) Remove the drain pan.(See No.3.)
(2) Pull out the temperature sensor"Thi-R3" from the sensor holder.



General view

(14) Panel

PSC012D109A

DISASSEMBLY PROCEDURE

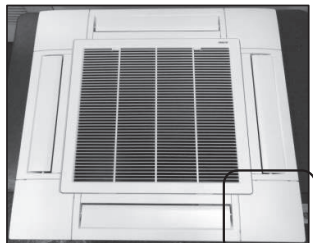
⚠ WARNING

Precautions for safety

- Read these "Precautions for safety" carefully before starting disassembly work and do it in the proper way.
- When disassembling, be sure to turn off the power. When disassembling the electrical components, check the electrical wiring diagram.
- The electrical components are under high voltage by the operation of the booster capacitor.
Fully discharge the capacitor before commencing a repair work. Failure to observe this warning could result in electric shock.
- These contents are an example. Please refer to a similar part of actual unit.

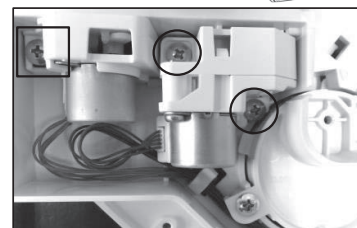
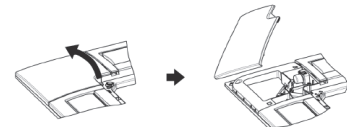
PROCEDURE & PICTURES

FDT series

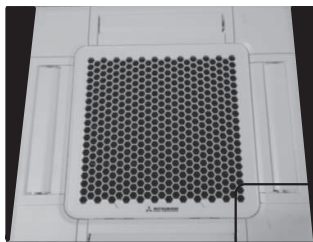


Corner lid

- 1. To remove the corner lid**
 - (1) Remove the inlet grille.
 - (2) Pull the corner lid toward the direction indicated by the arrow and remove it.
(The four corner lids are the same way.)
- 2. To remove the louver motor (LM)**
 - (1) Remove the corner lid.(See No.1.)
 - (2) Remove the louver motor fixing screw and remove it.(□ mark)
- 3. To remove anti draft motor (AM)**
 - (1) Remove the corner lid.(See No.1.)
 - (2) Remove 2 gear box fixing screws and remove it.(O mark)

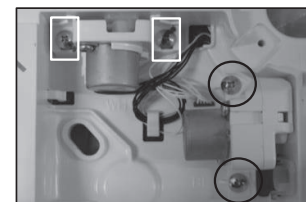
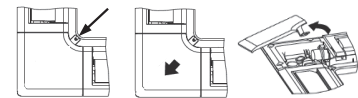


FDTC series

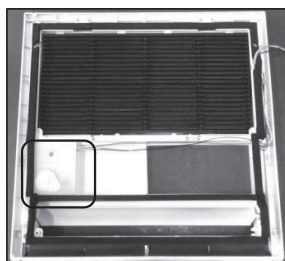


Corner lid

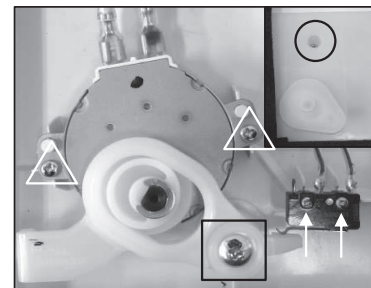
- 1. To remove the corner lid**
 - (1) Remove the inlet grille.
 - (2) Remove the screw(← mark), pull the corner lid toward the direction indicated by the arrow mark.
(The four corner lids are the same way.)
- 2. To remove the louver motor (LM)**
 - (1) Remove the corner lid.(See No.1.)
 - (2) Remove 2 louver motor fixing screws and remove it.(□ mark)
- 3. To remove anti draft motor (AM)**
 - (1) Remove the corner lid.(See No.1.)
 - (2) Remove 2 gear box fixing screws and remove it.(O mark)



FDTS•FDTQ series



- 1. To remove the louver motor (LM)**
 - (1) Remove the cover fixing screw and remove it.(O mark)
 - (2) Remove the cam fixing screw and remove it.(□ mark)
 - (3) Remove 2 louver motor fixing screws and remove it.(Δ mark)
- 2. To remove the limit switch (LS)**
 - (1) Remove the cover fixing screw and remove it.(O mark)
 - (2) Remove 2 limit switch fixing screws and remove it.(← mark)



FDTW series



- 1. To remove the corner lid**
 - (1) Take off the corner panel fixing hooks by a flathead screwdriver and remove it.
- 2. To remove the louver motor (LM)**
 - (1) Remove the corner lid.(See No.1.)
 - (2) Remove 2 louver motor fixing screws and remove it.(O mark)



13. TECHNICAL INFORMATION

13.1 Outdoor units

PSA012J138

Model(s) : FDC280KXZE2			
Outdoor side heat exchanger of air-conditioner :		air	
Indoor side heat exchanger of air-conditioner :		air	
Type : vapour compression			
If applicable : electric motor			
Item	Symbol	Value	Unit
Rated cooling capacity	Prated,c	28.0	kW
Declared cooling capacity for part load at given outdoor temperatures Tj and indoor 27°C/19°C (dry/wet bulb)			
Tj=+35°C	Pdc	28.0	kW
Tj=+30°C	Pdc	20.6	kW
Tj=+25°C	Pdc	13.2	kW
Tj=+20°C	Pdc	10.1	kW
Degradation coefficient for air conditioners**	Cdc	0.25	-
Power consumption in other than 'active mode'			
Off mode	P _{OFF}	0.010	kW
Thermostat-off mode	P _{TO}	0.050	kW
Other items			
Capacity control		variable	
Sound power level, outdoor	L _{WA}	75.0	dB
If engine driven: Emissions of nitrogen oxides	NOx ***	-	mg/kWh fuel input GCV
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)
Seasonal space cooling energy efficiency ηs,c			
		289.1	%
Declared energy efficiency ratio or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=+35°C	EERd or GUEc,bin / AEFc,bin	386.0	%
Tj=+30°C	EERd or GUEc,bin / AEFc,bin	552.0	%
Tj=+25°C	EERd or GUEc,bin / AEFc,bin	910.0	%
Tj=+20°C	EERd or GUEc,bin / AEFc,bin	1290.0	%
Crankcase heater mode			
		P _{CK}	0.035 kW
Standby mode			
		P _{SB}	0.010 kW
For air-to-air air-conditioner: air flow-rate,outdoor measured			
		13500	m ³ /h
Contact details Mitsubishi heavy industries thermal systems,LTD			
** If Cdc is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.			
*** from 26 September 2018			
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.			

Information to identify the model(s) to which the information relates :				FDC280KXZE2			
Outdoor side heat exchanger of heat pump :				air			
Indoor side heat exchanger of heat pump :				air			
Indication if the heater is equipped with a supplementary heater :				No			
if applicable :				electric motor			
Parameters shall be declared for the average heating season , parameters for the warmer and colder heating seasons are optional.							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heating capacity	Prated,h	31.5	kW	Seasonal space heating energy efficiency ηs,h		192.2	%
Declared heating capacity for part load at indoor temperature 20°C and outdoor temperature Tj				Declared coefficient of performance or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=-7°C	Pdh	16.4	kW	Tj=-7°C	COPd or GUEh,bin / AEFh,bin	339.0	%
Tj=+2°C	Pdh	10.0	kW	Tj=+2°C	COPd or GUEh,bin / AEFh,bin	479.0	%
Tj=+7°C	Pdh	6.4	kW	Tj=+7°C	COPd or GUEh,bin / AEFh,bin	790.0	%
Tj=+12°C	Pdh	6.4	kW	Tj=+12°C	COPd or GUEh,bin / AEFh,bin	870.0	%
Tbiv=bivalent temperature	Pdh	18.5	kW	Tbiv=bivalent temperature	COPd or GUEh,bin / AEFh,bin	313.0	%
TOL=operation limit	Pdh	15.3	kW	TOL=operation limit	COPd or GUEh,bin / AEFh,bin	233.0	%
For air-to-water heat pumps : Tj=-15°C (if TOL<-20°C)	Pdh	-	kW	For air-to-water heat pumps:Tj=-15°C (if TOL<-20°C)	COPd or GUEh,bin / AEFh,bin	-	%
Bivalent temperature	Tbiv	-10.0	°C	For water-to-air heat pumps:Operation limit Ta temperature		-	°C
Degradation coefficient heat pumps**	Cdh	0.25	-				
Power consumption in modes other than 'active mode'				Supplementary heater back-up heating capacity			
Off mode	P _{OFF}	0.010	kW		elbu	-	kW
Thermostat-off mode	P _{TO}	0.060	kW	Type of energy input	P _{SB}	0.010	kW
Crankcase heater mode	P _{CK}	0.035	kW	Standby mode			
Other items				For air-to-air heat pumps: air flow-rate,outdoor measured			
Capacity control		variable				13500	m ³ /h
Sound power level, outdoor measured	L _{WA}	76.0	dB	For water-/brine-to-air heat pumps : Rated brine or water flow-rate, outdoor side heat exchanger		-	m ³ /h
Emissions of nitrogen oxides(if applicable)	NOx ***	-	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)				
Contact details				Mitsubishi heavy industries thermal systems,LTD			
** If Cdh is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.							
*** from 26 September 2018							
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.							

Model(s) :		FDC335KXZE2					
Outdoor side heat exchanger of air-conditioner :		air					
Indoor side heat exchanger of air-conditioner :		air					
Type :		vapour compression					
if applicable :		electric motor					
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated cooling capacity	Prated,c	33.5	kW	Seasonal space cooling energy efficiency $\eta_{s,c}$		298.5	%
Declared cooling capacity for part load at given outdoor temperatures Tj and indoor 27°C/19°C(dry/wet bulb)				Declared energy efficiency ratio or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=+35°C	Pdc	33.5	kW	Tj=+35°C	EERd or GUEc,bin / AEFc,bin	373.0	%
Tj=+30°C	Pdc	24.6	kW	Tj=+30°C	EERd or GUEc,bin / AEFc,bin	557.0	%
Tj=+25°C	Pdc	15.8	kW	Tj=+25°C	EERd or GUEc,bin / AEFc,bin	900.0	%
Tj=+20°C	Pdc	10.7	kW	Tj=+20°C	EERd or GUEc,bin / AEFc,bin	1478.0	%
Degradation coefficient for air conditioners**	Cdc	0.25	-				
Power consumption in other than 'active mode'				Crankcase heater mode			
Off mode	P _{OFF}	0.010	kW	Standby mode	P _{CK}	0.035	kW
Thermostat-off mode	P _{TO}	0.050	kW		P _{SB}	0.010	kW
Other items				For air-to-air air-conditioner: air flow-rate,outdoor measured			
Capacity control		variable				17640	m ³ /h
Sound power level, outdoor	L _{WA}	82.0	dB				
If engine driven: Emissions of nitrogen oxides	NOx ***	-	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)				
Contact details		Mitsubishi heavy industries thermal systems,LTD					
** If Cdc is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.							
*** from 26 September 2018							
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.							

Information to identify the model(s) to which the information relates :				FDC335KXZE2			
Outdoor side heat exchanger of heat pump :				air			
Indoor side heat exchanger of heat pump :				air			
Indication if the heater is equipped with a supplementary heater :				No			
if applicable :				electric motor			
Parameters shall be declared for the average heating season , parameters for the warmer and colder heating seasons are optional.							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heating capacity	Prated,h	37.5	kW	Seasonal space heating energy efficiency ηs,h		184.3	%
Declared heating capacity for part load at indoor temperature 20°C and outdoor temperature Tj				Declared coefficient of performance or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=-7°C	Pdh	19.0	kW	Tj=-7°C	COPd or GUEh,bin / AEFh,bin	302.0	%
Tj=+2°C	Pdh	12.0	kW	Tj=+2°C	COPd or GUEh,bin / AEFh,bin	411.0	%
Tj=+7°C	Pdh	7.7	kW	Tj=+7°C	COPd or GUEh,bin / AEFh,bin	743.0	%
Tj=+12°C	Pdh	6.5	kW	Tj=+12°C	COPd or GUEh,bin / AEFh,bin	860.0	%
Tbiv=bivalent temperature	Pdh	22.2	kW	Tbiv=bivalent temperature	COPd or GUEh,bin / AEFh,bin	276.0	%
TOL=operation limit	Pdh	18.3	kW	TOL=operation limit	COPd or GUEh,bin / AEFh,bin	217.0	%
For air-to-water heat pumps : Tj=-15°C (if TOL<-20°C)	Pdh	-	kW	For air-to-water heat pumps:Tj=-15°C (if TOL<-20°C)	COPd or GUEh,bin / AEFh,bin	-	%
Bivalent temperature	Tbiv	-10.0	°C	For water-to-air heat pumps:Operation limit Ta temperature		-	°C
Degradation coefficient heat pumps**	Cdh	0.25	-				
Power consumption in modes other than 'active mode'				Supplementary heater back-up heating capacity			
Off mode	P _{OFF}	0.010	kW		elbu	-	kW
Thermostat-off mode	P _{TO}	0.060	kW	Type of energy input	P _{SB}	0.010	kW
Crankcase heater mode	P _{CK}	0.035	kW	Standby mode			
Other items				For air-to-air heat pumps: air flow-rate,outdoor measured			
Capacity control		variable				16980	m³/h
Sound power level, outdoor measured	L _{WA}	81.0	dB	For water-/brine-to-air heat pumps : Rated brine or water flow-rate, outdoor side heat exchanger		-	m³/h
Emissions of nitrogen oxides(if applicable)	NOx ***	-	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)				
Contact details				Mitsubishi heavy industries thermal systems,LTD			
** If Cdh is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.							
*** from 26 September 2018							
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.							

Model(s) :		FDC400KXZE2					
Outdoor side heat exchanger of air-conditioner :		air					
Indoor side heat exchanger of air-conditioner :		air					
Type :		vapour compression					
if applicable :		electric motor					
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated cooling capacity	Prated,c	40.0	kW	Seasonal space cooling energy efficiency $\eta_{s,c}$		281.7	%
Declared cooling capacity for part load at given outdoor temperatures Tj and indoor 27°C/19°C(dry/wet bulb)				Declared energy efficiency ratio or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=+35°C	Pdc	40.0	kW	Tj=+35°C	EERd or GUEc,bin / AEFc,bin	364.0	%
Tj=+30°C	Pdc	29.4	kW	Tj=+30°C	EERd or GUEc,bin / AEFc,bin	528.0	%
Tj=+25°C	Pdc	18.9	kW	Tj=+25°C	EERd or GUEc,bin / AEFc,bin	962.0	%
Tj=+20°C	Pdc	16.6	kW	Tj=+20°C	EERd or GUEc,bin / AEFc,bin	1107.0	%
Degradation coefficient for air conditioners**	Cdc	0.25	-				
Power consumption in other than 'active mode'				Crankcase heater mode			
Off mode	P _{OFF}	0.010	kW	Standby mode	P _{CK}	0.043	kW
Thermostat-off mode	P _{TO}	0.068	kW		P _{SB}	0.010	kW
Other items				For air-to-air air-conditioner: air flow-rate,outdoor measured			
Capacity control		variable				18240	m ³ /h
Sound power level, outdoor	L _{WA}	80.0	dB				
If engine driven: Emissions of nitrogen oxides	NOx ***	-	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)				
Contact details		Mitsubishi heavy industries thermal systems,LTD					
** If Cdc is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.							
*** from 26 September 2018							
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.							

Information to identify the model(s) to which the information relates :				FDC400KXZE2			
Outdoor side heat exchanger of heat pump :				air			
Indoor side heat exchanger of heat pump :				air			
Indication if the heater is equipped with a supplementary heater :				No			
if applicable :				electric motor			
Parameters shall be declared for the average heating season , parameters for the warmer and colder heating seasons are optional.							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heating capacity	Prated,h	45.0	kW	Seasonal space heating energy efficiency ηs,h		191.8	%
Declared heating capacity for part load at indoor temperature 20°C and outdoor temperature Tj				Declared coefficient of performance or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=-7°C	Pdh	23.0	kW	Tj=-7°C	COPd or GUEh,bin / AEFh,bin	355.0	%
Tj=+2°C	Pdh	14.0	kW	Tj=+2°C	COPd or GUEh,bin / AEFh,bin	458.0	%
Tj=+7°C	Pdh	10.7	kW	Tj=+7°C	COPd or GUEh,bin / AEFh,bin	680.0	%
Tj=+12°C	Pdh	13.4	kW	Tj=+12°C	COPd or GUEh,bin / AEFh,bin	726.0	%
Tbiv=bivalent temperature	Pdh	25.9	kW	Tbiv=bivalent temperature	COPd or GUEh,bin / AEFh,bin	300.0	%
TOL=operation limit	Pdh	26.5	kW	TOL=operation limit	COPd or GUEh,bin / AEFh,bin	200.0	%
For air-to-water heat pumps : Tj=-15°C (if TOL<-20°C)	Pdh	-	kW	For air-to-water heat pumps:Tj=-15°C (if TOL<-20°C)	COPd or GUEh,bin / AEFh,bin	-	%
Bivalent temperature	Tbiv	-10.0	°C	For water-to-air heat pumps:Operation limit Taj temperature		-	°C
Degradation coefficient heat pumps**	Cdh	0.25	-				
Power consumption in modes other than 'active mode'				Supplementary heater back-up heating capacity			
Off mode	P _{OFF}	0.010	kW		elbu	-	kW
Thermostat-off mode	P _{TO}	0.078	kW	Type of energy input	P _{SB}	0.010	kW
Crankcase heater mode	P _{CK}	0.043	kW	Standby mode			
Other items				For air-to-air heat pumps: air flow-rate,outdoor measured			
Capacity control		variable				18240	m³/h
Sound power level, outdoor measured	L _{WA}	82.0	dB	For water-/brine-to-air heat pumps : Rated brine or water flow-rate, outdoor side heat exchanger		-	m³/h
Emissions of nitrogen oxides(if applicable)	NOx ***	-	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)				
Contact details				Mitsubishi heavy industries thermal systems,LTD			
** If Cdh is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.							
*** from 26 September 2018							
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.							

Model(s) : FDC450KXZE2			
Outdoor side heat exchanger of air-conditioner : air			
Indoor side heat exchanger of air-conditioner : air			
Type : vapour compression			
if applicable : electric motor			
Item	Symbol	Value	Unit
Rated cooling capacity	Prated,c	45.0	kW
Declared cooling capacity for part load at given outdoor temperatures Tj and indoor 27°C/19°C(dry/wet bulb)			
Tj=+35°C	Pdc	45.0	kW
Tj=+30°C	Pdc	33.1	kW
Tj=+25°C	Pdc	21.3	kW
Tj=+20°C	Pdc	16.9	kW
Degradation coefficient for air conditioners**	Cdc	0.25	-
Power consumption in other than 'active mode'			
Off mode	P _{OFF}	0.010	kW
Thermostat-off mode	P _{TO}	0.068	kW
Other items			
Capacity control		variable	
Sound power level, outdoor	L _{WA}	81.0	dB
If engine driven: Emissions of nitrogen oxides	NOx ***	-	mg/kWh fuel input GCV
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)
Seasonal space cooling energy efficiency ηs,c			
		277.4	%
Declared energy efficiency ratio or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=+35°C	EERd or GUEc,bin / AEFc,bin	322.0	%
Tj=+30°C	EERd or GUEc,bin / AEFc,bin	530.0	%
Tj=+25°C	EERd or GUEc,bin / AEFc,bin	879.0	%
Tj=+20°C	EERd or GUEc,bin / AEFc,bin	1260.0	%
Crankcase heater mode			
		P _{CK}	0.043 kW
Standby mode			
		P _{SB}	0.010 kW
For air-to-air air-conditioner: air flow-rate,outdoor measured			
		18240	m ³ /h
Contact details Mitsubishi heavy industries thermal systems.LTD			
** If Cdc is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.			
*** from 26 September 2018			
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.			

Information to identify the model(s) to which the information relates :				FDC450KXZE2			
Outdoor side heat exchanger of heat pump :				air			
Indoor side heat exchanger of heat pump :				air			
Indication if the heater is equipped with a supplementary heater :				No			
if applicable :				electric motor			
Parameters shall be declared for the average heating season , parameters for the warmer and colder heating seasons are optional.							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heating capacity	Prated,h	50.0	kW	Seasonal space heating energy efficiency ηs,h		171.4	%
Declared heating capacity for part load at indoor temperature 20°C and outdoor temperature Tj				Declared coefficient of performance or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=-7°C	Pdh	26.2	kW	Tj=-7°C	COPd or GUEh,bin / AEFh,bin	341.0	%
Tj=+2°C	Pdh	16.0	kW	Tj=+2°C	COPd or GUEh,bin / AEFh,bin	371.0	%
Tj=+7°C	Pdh	11.1	kW	Tj=+7°C	COPd or GUEh,bin / AEFh,bin	650.0	%
Tj=+12°C	Pdh	12.2	kW	Tj=+12°C	COPd or GUEh,bin / AEFh,bin	726.0	%
Tbiv=bivalent temperature	Pdh	29.6	kW	Tbiv=bivalent temperature	COPd or GUEh,bin / AEFh,bin	279.0	%
TOL=operation limit	Pdh	26.2	kW	TOL=operation limit	COPd or GUEh,bin / AEFh,bin	228.0	%
For air-to-water heat pumps : Tj=-15°C (if TOL<-20°C)	Pdh	-	kW	For air-to-water heat pumps:Tj=-15°C (if TOL<-20°C)	COPd or GUEh,bin / AEFh,bin	-	%
Bivalent temperature	Tbiv	-10.0	°C	For water-to-air heat pumps:Operation limit Ta temperature		-	°C
Degradation coefficient heat pumps**	Cdh	0.25	-				
Power consumption in modes other than 'active mode'				Supplementary heater back-up heating capacity			
Off mode	P _{OFF}	0.010	kW		elbu	-	kW
Thermostat-off mode	P _{TO}	0.078	kW	Type of energy input	P _{SB}	0.010	kW
Crankcase heater mode	P _{CK}	0.043	kW	Standby mode			
Other items				For air-to-air heat pumps: air flow-rate,outdoor measured			
Capacity control		variable				18240	m³/h
Sound power level, outdoor measured	L _{WA}	82.0	dB	For water-/brine-to-air heat pumps : Rated brine or water flow-rate, outdoor side heat exchanger		-	m³/h
Emissions of nitrogen oxides(if applicable)	NOx ***	-	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)				
Contact details				Mitsubishi heavy industries thermal systems,LTD			
** If Cdh is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.							
*** from 26 September 2018							
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.							

Model(s) : FDC475KXZE2			
Outdoor side heat exchanger of air-conditioner :		air	
Indoor side heat exchanger of air-conditioner :		air	
Type : vapour compression			
if applicable : electric motor			
Item	Symbol	Value	Unit
Rated cooling capacity	Prated,c	47.5	kW
Declared cooling capacity for part load at given outdoor temperatures Tj and indoor 27°C/19°C(dry/wet bulb)			
Tj=+35°C	Pdc	47.5	kW
Tj=+30°C	Pdc	35.0	kW
Tj=+25°C	Pdc	22.5	kW
Tj=+20°C	Pdc	10.7	kW
Degradation coefficient for air conditioners**	Cdc	0.25	-
Power consumption in other than 'active mode'			
Off mode	P _{OFF}	0.010	kW
Thermostat-off mode	P _{TO}	0.096	kW
Other items			
Capacity control		variable	
Sound power level, outdoor	L _{WA}	81.0	dB
If engine driven: Emissions of nitrogen oxides	NOx ***	-	mg/kWh fuel input GCV
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)
Seasonal space cooling energy efficiency η _{s,c}			
		270.6	%
Declared energy efficiency ratio or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=+35°C	EERd or GUEc,bin / AEFc,bin	340.0	%
Tj=+30°C	EERd or GUEc,bin / AEFc,bin	542.0	%
Tj=+25°C	EERd or GUEc,bin / AEFc,bin	724.0	%
Tj=+20°C	EERd or GUEc,bin / AEFc,bin	1465.0	%
Crankcase heater mode P _{CK}			
		0.071	kW
Standby mode P _{SB}			
		0.010	kW
For air-to-air air-conditioner: air flow-rate,outdoor measured			
		18000	m ³ /h
Contact details Mitsubishi heavy industries thermal systems.LTD			
** If Cdc is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25. *** from 26 September 2018 Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.			

Information to identify the model(s) to which the information relates :				FDC475KXZE2			
Outdoor side heat exchanger of heat pump :				air			
Indoor side heat exchanger of heat pump :				air			
Indication if the heater is equipped with a supplementary heater :				No			
if applicable :				electric motor			
Parameters shall be declared for the average heating season , parameters for the warmer and colder heating seasons are optional.							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heating capacity	Prated,h	53.0	kW	Seasonal space heating energy efficiency ηs,h		175.1	%
Declared heating capacity for part load at indoor temperature 20°C and outdoor temperature Tj				Declared coefficient of performance or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=-7°C	Pdh	27.9	kW	Tj=-7°C	COPd or GUEh,bin / AEFh,bin	288.0	%
Tj=+2°C	Pdh	17.0	kW	Tj=+2°C	COPd or GUEh,bin / AEFh,bin	400.0	%
Tj=+7°C	Pdh	12.6	kW	Tj=+7°C	COPd or GUEh,bin / AEFh,bin	689.0	%
Tj=+12°C	Pdh	6.4	kW	Tj=+12°C	COPd or GUEh,bin / AEFh,bin	808.0	%
Tbiv=bivalent temperature	Pdh	31.5	kW	Tbiv=bivalent temperature	COPd or GUEh,bin / AEFh,bin	240.0	%
TOL=operation limit	Pdh	26.8	kW	TOL=operation limit	COPd or GUEh,bin / AEFh,bin	213.0	%
For air-to-water heat pumps : Tj=-15°C (if TOL<-20°C)	Pdh	-	kW	For air-to-water heat pumps:Tj=-15°C (if TOL<-20°C)	COPd or GUEh,bin / AEFh,bin	-	%
Bivalent temperature	Tbiv	-10.0	°C	For water-to-air heat pumps:Operation limit Ta temperature		-	°C
Degradation coefficient heat pumps**	Cdh	0.25	-				
Power consumption in modes other than 'active mode'				Supplementary heater back-up heating capacity			
Off mode	P _{OFF}	0.010	kW		elbu	-	kW
Thermostat-off mode	P _{TO}	0.106	kW	Type of energy input	P _{SB}	0.010	kW
Crankcase heater mode	P _{CK}	0.071	kW	Standby mode			
Other items				For air-to-air heat pumps: air flow-rate,outdoor measured			
Capacity control		variable				18000	m³/h
Sound power level, outdoor measured	L _{WA}	81.0	dB	For water-/brine-to-air heat pumps : Rated brine or water flow-rate, outdoor side heat exchanger		-	m³/h
Emissions of nitrogen oxides(if applicable)	NOx ***	-	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)				
Contact details				Mitsubishi heavy industries thermal systems,LTD			
** If Cdh is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.							
*** from 26 September 2018							
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.							

Model(s) : FDC500KXZE2			
Outdoor side heat exchanger of air-conditioner : air			
Indoor side heat exchanger of air-conditioner : air			
Type : vapour compression			
if applicable : electric motor			
Item	Symbol	Value	Unit
Rated cooling capacity	Prated,c	50.0	kW
Declared cooling capacity for part load at given outdoor temperatures Tj and indoor 27°C/19°C(dry/wet bulb)			
Tj=+35°C	Pdc	50.0	kW
Tj=+30°C	Pdc	36.8	kW
Tj=+25°C	Pdc	23.6	kW
Tj=+20°C	Pdc	10.5	kW
Degradation coefficient for air conditioners**	Cdc	0.25	-
Power consumption in other than 'active mode'			
Off mode	P _{OFF}	0.010	kW
Thermostat-off mode	P _{TO}	0.096	kW
Other items			
Capacity control		variable	
Sound power level, outdoor	L _{WA}	81.0	dB
If engine driven: Emissions of nitrogen oxides	NOx ***	-	mg/kWh fuel input GCV
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)
Seasonal space cooling energy efficiency η _{s,c}			
		288.6	%
Declared energy efficiency ratio or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=+35°C	EERd or GUEc,bin / AEFc,bin	358.0	%
Tj=+30°C	EERd or GUEc,bin / AEFc,bin	555.0	%
Tj=+25°C	EERd or GUEc,bin / AEFc,bin	772.0	%
Tj=+20°C	EERd or GUEc,bin / AEFc,bin	1698.0	%
Crankcase heater mode P _{CK} 0.071 kW			
Standby mode P _{SB} 0.010 kW			
For air-to-air air-conditioner: air flow-rate,outdoor measured 18000 m ³ /h			
Contact details Mitsubishi heavy industries thermal systems.LTD			
** If Cdc is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.			
*** from 26 September 2018			
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.			

Information to identify the model(s) to which the information relates :				FDC500KXZE2			
Outdoor side heat exchanger of heat pump :				air			
Indoor side heat exchanger of heat pump :				air			
Indication if the heater is equipped with a supplementary heater :				No			
if applicable :				electric motor			
Parameters shall be declared for the average heating season , parameters for the warmer and colder heating seasons are optional.							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heating capacity	Prated,h	56.0	kW	Seasonal space heating energy efficiency ηs,h		180.2	%
Declared heating capacity for part load at indoor temperature 20°C and outdoor temperature Tj				Declared coefficient of performance or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=-7°C	Pdh	29.5	kW	Tj=-7°C	COPd or GUEh,bin / AEFh,bin	287.0	%
Tj=+2°C	Pdh	17.9	kW	Tj=+2°C	COPd or GUEh,bin / AEFh,bin	407.0	%
Tj=+7°C	Pdh	12.6	kW	Tj=+7°C	COPd or GUEh,bin / AEFh,bin	714.0	%
Tj=+12°C	Pdh	6.4	kW	Tj=+12°C	COPd or GUEh,bin / AEFh,bin	860.0	%
Tbiv=bivalent temperature	Pdh	33.3	kW	Tbiv=bivalent temperature	COPd or GUEh,bin / AEFh,bin	240.0	%
TOL=operation limit	Pdh	28.9	kW	TOL=operation limit	COPd or GUEh,bin / AEFh,bin	210.0	%
For air-to-water heat pumps : Tj=-15°C (if TOL<-20°C)	Pdh	-	kW	For air-to-water heat pumps:Tj=-15°C (if TOL<-20°C)	COPd or GUEh,bin / AEFh,bin	-	%
Bivalent temperature	Tbiv	-10.0	°C	For water-to-air heat pumps:Operation limit Ta temperature		-	°C
Degradation coefficient heat pumps**	Cdh	0.25	-				
Power consumption in modes other than 'active mode'				Supplementary heater back-up heating capacity			
Off mode	P _{OFF}	0.010	kW		elbu	-	kW
Thermostat-off mode	P _{TO}	0.106	kW	Type of energy input	P _{SB}	0.010	kW
Crankcase heater mode	P _{CK}	0.071	kW	Standby mode			
Other items				For air-to-air heat pumps: air flow-rate,outdoor measured			
Capacity control		variable				18000	m³/h
Sound power level, outdoor measured	L _{WA}	82.0	dB	For water-/brine-to-air heat pumps : Rated brine or water flow-rate, outdoor side heat exchanger		-	m³/h
Emissions of nitrogen oxides(if applicable)	NOx ***	-	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)				
Contact details				Mitsubishi heavy industries thermal systems,LTD			
** If Cdh is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.							
*** from 26 September 2018							
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.							

Model(s) : FDC560KXZE2			
Outdoor side heat exchanger of air-conditioner : air			
Indoor side heat exchanger of air-conditioner : air			
Type : vapour compression			
if applicable : electric motor			
Item	Symbol	Value	Unit
Rated cooling capacity	Prated,c	56.0	kW
Declared cooling capacity for part load at given outdoor temperatures Tj and indoor 27°C/19°C(dry/wet bulb)			
Tj=+35°C	Pdc	56.0	kW
Tj=+30°C	Pdc	41.2	kW
Tj=+25°C	Pdc	26.5	kW
Tj=+20°C	Pdc	11.7	kW
Degradation coefficient for air conditioners**	Cdc	0.25	-
Power consumption in other than 'active mode'			
Off mode	P _{OFF}	0.010	kW
Thermostat-off mode	P _{TO}	0.096	kW
Other items			
Capacity control		variable	
Sound power level, outdoor	L _{WA}	82.0	dB
If engine driven: Emissions of nitrogen oxides	NOx ***	-	mg/kWh fuel input GCV
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)
Seasonal space cooling energy efficiency η _{s,c}			
		266.3	%
Declared energy efficiency ratio or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=+35°C	EERd or GUEc,bin / AEFc,bin	320.0	%
Tj=+30°C	EERd or GUEc,bin / AEFc,bin	514.0	%
Tj=+25°C	EERd or GUEc,bin / AEFc,bin	714.0	%
Tj=+20°C	EERd or GUEc,bin / AEFc,bin	1507.0	%
Crankcase heater mode			
		P _{CK}	0.071 kW
Standby mode			
		P _{SB}	0.010 kW
For air-to-air air-conditioner: air flow-rate,outdoor measured			
		18000	m ³ /h
Contact details Mitsubishi heavy industries thermal systems.LTD			
** If Cdc is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.			
*** from 26 September 2018			
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.			

Information to identify the model(s) to which the information relates :				FDC560KXZE2			
Outdoor side heat exchanger of heat pump :				air			
Indoor side heat exchanger of heat pump :				air			
Indication if the heater is equipped with a supplementary heater :				No			
if applicable :				electric motor			
Parameters shall be declared for the average heating season , parameters for the warmer and colder heating seasons are optional.							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heating capacity	Prated,h	63.0	kW	Seasonal space heating energy efficiency ηs,h		169.0	%
Declared heating capacity for part load at indoor temperature 20°C and outdoor temperature Tj				Declared coefficient of performance or gas utilization efficiency / auxiliary energy factor for part load at given outdoor temperatures Tj			
Tj=-7°C	Pdh	32.7	kW	Tj=-7°C	COPd or GUEh,bin / AEFh,bin	264.0	%
Tj=+2°C	Pdh	19.9	kW	Tj=+2°C	COPd or GUEh,bin / AEFh,bin	388.0	%
Tj=+7°C	Pdh	12.8	kW	Tj=+7°C	COPd or GUEh,bin / AEFh,bin	644.0	%
Tj=+12°C	Pdh	6.4	kW	Tj=+12°C	COPd or GUEh,bin / AEFh,bin	845.0	%
Tbiv=bivalent temperature	Pdh	37.0	kW	Tbiv=bivalent temperature	COPd or GUEh,bin / AEFh,bin	230.0	%
TOL=operation limit	Pdh	28.7	kW	TOL=operation limit	COPd or GUEh,bin / AEFh,bin	209.0	%
For air-to-water heat pumps : Tj=-15°C (if TOL<-20°C)	Pdh	-	kW	For air-to-water heat pumps:Tj=-15°C (if TOL<-20°C)	COPd or GUEh,bin / AEFh,bin	-	%
Bivalent temperature	Tbiv	-10.0	°C	For water-to-air heat pumps:Operation limit Ta temperature		-	°C
Degradation coefficient heat pumps**	Cdh	0.25	-				
Power consumption in modes other than 'active mode'				Supplementary heater back-up heating capacity			
Off mode	P _{OFF}	0.010	kW		elbu	-	kW
Thermostat-off mode	P _{TO}	0.106	kW	Type of energy input	P _{SB}	0.010	kW
Crankcase heater mode	P _{CK}	0.071	kW	Standby mode			
Other items				For air-to-air heat pumps: air flow-rate,outdoor measured			
Capacity control		variable				17040	m³/h
Sound power level, outdoor measured	L _{WA}	83.0	dB	For water-/brine-to-air heat pumps : Rated brine or water flow-rate, outdoor side heat exchanger		-	m³/h
Emissions of nitrogen oxides(if applicable)	NOx ***	-	mg/kWh fuel input GCV				
GWP of the refrigerant		2088	kg CO ₂ eq. (100years)				
Contact details	Mitsubishi heavy industries thermal systems,LTD						
** If Cdh is not determined by measurement then the default degradation coefficient air-conditioners shall be 0,25.							
*** from 26 September 2018							
Where information relates to multi-split air-conditioners,the test result and performance data be obtained on the basis of the performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer.							

13.2 Indoor units

PSA012J140

Model(s) : FDT28KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.7	kW	Total electric power input	P_{elec}	0.040	kW
Cooling capacity (latent)	$P_{rated,c}$	0.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	55.0	dB
Heating capacity	$P_{rated,h}$	3.2	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDT36KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.5	kW	Total electric power input	P_{elec}	0.040	kW
Cooling capacity (latent)	$P_{rated,c}$	0.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	55.0	dB
Heating capacity	$P_{rated,h}$	4.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDT45KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.0	kW	Total electric power input	P_{elec}	0.040	kW
Cooling capacity (latent)	$P_{rated,c}$	0.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	55.0	dB
Heating capacity	$P_{rated,h}$	5.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDT56KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	5.1	kW	Total electric power input	P_{elec}	0.070	kW
Cooling capacity (latent)	$P_{rated,c}$	0.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0	dB
Heating capacity	$P_{rated,h}$	6.3	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDT71KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	6.2	kW	Total electric power input	P_{elec}	0.080	kW
Cooling capacity (latent)	$P_{rated,c}$	0.9	kW	Sound power level (per speed setting,if applicable)	L_{WA}	62.0	dB
Heating capacity	$P_{rated,h}$	8.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDT90KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	7.9	kW	Total electric power input	P_{elec}	0.130	kW
Cooling capacity (latent)	$P_{rated,c}$	1.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	65.0	dB
Heating capacity	$P_{rated,h}$	10.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDT112KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	9.4	kW	Total electric power input	P_{elec}	0.140	kW
Cooling capacity (latent)	$P_{rated,c}$	1.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	66.0	dB
Heating capacity	$P_{rated,h}$	12.5	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDT140KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	10.7	kW	Total electric power input	P_{elec}	0.140	kW
Cooling capacity (latent)	$P_{rated,c}$	3.3	kW	Sound power level (per speed setting,if applicable)	L_{WA}	66.0	dB
Heating capacity	$P_{rated,h}$	16.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDT160KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	11.5	kW	Total electric power input	P_{elec}	0.140	kW
Cooling capacity (latent)	$P_{rated,c}$	4.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	66.0	dB
Heating capacity	$P_{rated,h}$	18.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM22KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.1	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	0.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0	dB
Heating capacity	$P_{rated,h}$	2.5	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM28KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.7	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	0.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0	dB
Heating capacity	$P_{rated,h}$	3.2	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM36KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.3	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	0.3	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0	dB
Heating capacity	$P_{rated,h}$	4.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM45KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.7	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	0.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0	dB
Heating capacity	$P_{rated,h}$	5.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM56KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.1	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	1.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0	dB
Heating capacity	$P_{rated,h}$	6.3	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM71KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	6.0	kW	Total electric power input	P_{elec}	0.200	kW
Cooling capacity (latent)	$P_{rated,c}$	1.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	65.0	dB
Heating capacity	$P_{rated,h}$	8.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM90KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	6.7	kW	Total electric power input	P_{elec}	0.200	kW
Cooling capacity (latent)	$P_{rated,c}$	2.3	kW	Sound power level (per speed setting,if applicable)	L_{WA}	65.0	dB
Heating capacity	$P_{rated,h}$	10.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM112KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	8.6	kW	Total electric power input	P_{elec}	0.290	kW
Cooling capacity (latent)	$P_{rated,c}$	2.6	kW	Sound power level (per speed setting,if applicable)	L_{WA}	67.0	dB
Heating capacity	$P_{rated,h}$	12.5	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM140KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	11.2	kW	Total electric power input	P_{elec}	0.330	kW
Cooling capacity (latent)	$P_{rated,c}$	2.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	72.0	dB
Heating capacity	$P_{rated,h}$	16.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUM160KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	12.4	kW	Total electric power input	P_{elec}	0.450	kW
Cooling capacity (latent)	$P_{rated,c}$	3.6	kW	Sound power level (per speed setting,if applicable)	L_{WA}	76.0	dB
Heating capacity	$P_{rated,h}$	18.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDU224KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	19.7	kW	Total electric power input	P_{elec}	1.180	kW
Cooling capacity (latent)	$P_{rated,c}$	2.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	75.0	dB
Heating capacity	$P_{rated,h}$	25.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDU280KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	21.9	kW	Total electric power input	P_{elec}	1.180	kW
Cooling capacity (latent)	$P_{rated,c}$	6.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	75.0	dB
Heating capacity	$P_{rated,h}$	31.5	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDK15KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	1.2	kW	Total electric power input	P_{elec}	0.020	kW
Cooling capacity (latent)	$P_{rated,c}$	0.3	kW	Sound power level (per speed setting,if applicable)	L_{WA}	54.0	dB
Heating capacity	$P_{rated,h}$	1.7	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDK22KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	1.8	kW	Total electric power input	P_{elec}	0.020	kW
Cooling capacity (latent)	$P_{rated,c}$	0.4	kW	Sound power level (per speed setting,if applicable)	L_{WA}	55.0	dB
Heating capacity	$P_{rated,h}$	2.5	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDK28KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.2	kW	Total electric power input	P_{elec}	0.020	kW
Cooling capacity (latent)	$P_{rated,c}$	0.6	kW	Sound power level (per speed setting,if applicable)	L_{WA}	55.0	dB
Heating capacity	$P_{rated,h}$	3.2	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDK36KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.8	kW	Total electric power input	P_{elec}	0.030	kW
Cooling capacity (latent)	$P_{rated,c}$	0.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0	dB
Heating capacity	$P_{rated,h}$	4.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDK45KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.3	kW	Total electric power input	P_{elec}	0.030	kW
Cooling capacity (latent)	$P_{rated,c}$	1.2	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0	dB
Heating capacity	$P_{rated,h}$	5.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDK56KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.9	kW	Total electric power input	P_{elec}	0.030	kW
Cooling capacity (latent)	$P_{rated,c}$	1.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0	dB
Heating capacity	$P_{rated,h}$	6.3	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDK71KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	5.4	kW	Total electric power input	P_{elec}	0.040	kW
Cooling capacity (latent)	$P_{rated,c}$	1.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	59.0	dB
Heating capacity	$P_{rated,h}$	8.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDK90KXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	6.5	kW	Total electric power input	P_{elec}	0.050	kW
Cooling capacity (latent)	$P_{rated,c}$	2.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	61.0	dB
Heating capacity	$P_{rated,h}$	10.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDTC15KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	1.4	kW	Total electric power input	P_{elec}	0.030 kW
Cooling capacity (latent)	$P_{rated,c}$	0.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	47.0 dB
Heating capacity	$P_{rated,h}$	1.7	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTC22KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.1	kW	Total electric power input	P_{elec}	0.030 kW
Cooling capacity (latent)	$P_{rated,c}$	0.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	49.0 dB
Heating capacity	$P_{rated,h}$	2.5	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTC28KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.4	kW	Total electric power input	P_{elec}	0.030 kW
Cooling capacity (latent)	$P_{rated,c}$	0.4	kW	Sound power level (per speed setting,if applicable)	L_{WA}	49.0 dB
Heating capacity	$P_{rated,h}$	3.2	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTC36KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.9	kW	Total electric power input	P_{elec}	0.040 kW
Cooling capacity (latent)	$P_{rated,c}$	0.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	54.0 dB
Heating capacity	$P_{rated,h}$	4.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTC45KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.5	kW	Total electric power input	P_{elec}	0.050 kW
Cooling capacity (latent)	$P_{rated,c}$	1.0	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0 dB
Heating capacity	$P_{rated,h}$	5.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTC56KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.2	kW	Total electric power input	P_{elec}	0.060 kW
Cooling capacity (latent)	$P_{rated,c}$	1.4	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	6.3	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTW28KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.3	kW	Total electric power input	P_{elec}	0.090 kW
Cooling capacity (latent)	$P_{rated,c}$	0.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0 dB
Heating capacity	$P_{rated,h}$	3.2	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTW45KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.4	kW	Total electric power input	P_{elec}	0.100 kW
Cooling capacity (latent)	$P_{rated,c}$	1.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0 dB
Heating capacity	$P_{rated,h}$	5.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTW56KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.0	kW	Total electric power input	P_{elec}	0.100 kW
Cooling capacity (latent)	$P_{rated,c}$	1.6	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0 dB
Heating capacity	$P_{rated,h}$	6.3	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTW71KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.8	kW	Total electric power input	P_{elec}	0.140 kW
Cooling capacity (latent)	$P_{rated,c}$	2.3	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0 dB
Heating capacity	$P_{rated,h}$	8.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTW90KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	6.8	kW	Total electric power input	P_{elec}	0.190 kW
Cooling capacity (latent)	$P_{rated,c}$	2.2	kW	Sound power level (per speed setting,if applicable)	L_{WA}	65.0 dB
Heating capacity	$P_{rated,h}$	10.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTW112KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	8.1	kW	Total electric power input	P_{elec}	0.190 kW
Cooling capacity (latent)	$P_{rated,c}$	3.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	65.0 dB
Heating capacity	$P_{rated,h}$	12.5	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTW140KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	9.9	kW	Total electric power input	P_{elec}	0.190 kW
Cooling capacity (latent)	$P_{rated,c}$	4.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	65.0 dB
Heating capacity	$P_{rated,h}$	16.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTS45KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.3	kW	Total electric power input	P_{elec}	0.040 kW
Cooling capacity (latent)	$P_{rated,c}$	1.2	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	5.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTS71KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	5.0	kW	Total electric power input	P_{elec}	0.090 kW
Cooling capacity (latent)	$P_{rated,c}$	2.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	61.0 dB
Heating capacity	$P_{rated,h}$	8.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTQ22KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	1.8	kW	Total electric power input	P_{elec}	0.060 kW
Cooling capacity (latent)	$P_{rated,c}$	0.4	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	2.5	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTQ28KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.1	kW	Total electric power input	P_{elec}	0.060 kW
Cooling capacity (latent)	$P_{rated,c}$	0.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	3.2	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDTQ36KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.5	kW	Total electric power input	P_{elec}	0.060 kW
Cooling capacity (latent)	$P_{rated,c}$	1.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	4.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDFL71KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	5.3	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	1.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	62.0	dB
Heating capacity	$P_{rated,h}$	8.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDFU28KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.7	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	0.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0	dB
Heating capacity	$P_{rated,h}$	3.2	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDFU45KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.8	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	0.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0	dB
Heating capacity	$P_{rated,h}$	5.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDFU56KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.2	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	1.4	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0	dB
Heating capacity	$P_{rated,h}$	6.3	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDFU71KXE6F							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	5.3	kW	Total electric power input	P_{elec}	0.100	kW
Cooling capacity (latent)	$P_{rated,c}$	1.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0	dB
Heating capacity	$P_{rated,h}$	8.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDU45KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.7	kW	Total electric power input	P_{elec}	0.100 kW
Cooling capacity (latent)	$P_{rated,c}$	0.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	5.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDU56KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.1	kW	Total electric power input	P_{elec}	0.100 kW
Cooling capacity (latent)	$P_{rated,c}$	1.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	6.3	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDU71KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	6.0	kW	Total electric power input	P_{elec}	0.250 kW
Cooling capacity (latent)	$P_{rated,c}$	1.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	65.0 dB
Heating capacity	$P_{rated,h}$	8.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDU90KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	6.7	kW	Total electric power input	P_{elec}	0.250 kW
Cooling capacity (latent)	$P_{rated,c}$	2.3	kW	Sound power level (per speed setting,if applicable)	L_{WA}	65.0 dB
Heating capacity	$P_{rated,h}$	10.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDU112KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	8.6	kW	Total electric power input	P_{elec}	0.320 kW
Cooling capacity (latent)	$P_{rated,c}$	2.6	kW	Sound power level (per speed setting,if applicable)	L_{WA}	67.0 dB
Heating capacity	$P_{rated,h}$	12.5	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDU140KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	11.2	kW	Total electric power input	P_{elec}	0.360 kW
Cooling capacity (latent)	$P_{rated,c}$	2.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	72.0 dB
Heating capacity	$P_{rated,h}$	16.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDU160KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	12.4	kW	Total electric power input	P_{elec}	0.430 kW
Cooling capacity (latent)	$P_{rated,c}$	3.6	kW	Sound power level (per speed setting,if applicable)	L_{WA}	76.0 dB
Heating capacity	$P_{rated,h}$	18.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDUT15KXE6F-E							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	1.2	kW	Total electric power input	P_{elec}	0.060	kW
Cooling capacity (latent)	$P_{rated,c}$	0.3	kW	Sound power level (per speed setting,if applicable)	L_{WA}	52.0	dB
Heating capacity	$P_{rated,h}$	1.7	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUT22KXE6F-E							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	1.7	kW	Total electric power input	P_{elec}	0.070	kW
Cooling capacity (latent)	$P_{rated,c}$	0.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	52.0	dB
Heating capacity	$P_{rated,h}$	2.5	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUT28KXE6F-E							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.0	kW	Total electric power input	P_{elec}	0.070	kW
Cooling capacity (latent)	$P_{rated,c}$	0.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	52.0	dB
Heating capacity	$P_{rated,h}$	3.2	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUT36KXE6F-E							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.5	kW	Total electric power input	P_{elec}	0.070	kW
Cooling capacity (latent)	$P_{rated,c}$	1.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	57.0	dB
Heating capacity	$P_{rated,h}$	4.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUT45KXE6F-E							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.2	kW	Total electric power input	P_{elec}	0.080	kW
Cooling capacity (latent)	$P_{rated,c}$	1.3	kW	Sound power level (per speed setting,if applicable)	L_{WA}	58.0	dB
Heating capacity	$P_{rated,h}$	5.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUT56KXE6F-E							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.9	kW	Total electric power input	P_{elec}	0.080	kW
Cooling capacity (latent)	$P_{rated,c}$	1.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	59.0	dB
Heating capacity	$P_{rated,h}$	6.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUT71KXE6F-E							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.9	kW	Total electric power input	P_{elec}	0.080	kW
Cooling capacity (latent)	$P_{rated,c}$	2.2	kW	Sound power level (per speed setting,if applicable)	L_{WA}	59.0	dB
Heating capacity	$P_{rated,h}$	8.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDUH22KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	1.8	kW	Total electric power input	P_{elec}	0.060 kW
Cooling capacity (latent)	$P_{rated,c}$	0.4	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	2.5	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDUH28KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.2	kW	Total electric power input	P_{elec}	0.060 kW
Cooling capacity (latent)	$P_{rated,c}$	0.6	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	3.2	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDUH36KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.6	kW	Total electric power input	P_{elec}	0.060 kW
Cooling capacity (latent)	$P_{rated,c}$	1.0	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	4.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDFW28KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.3	kW	Total electric power input	P_{elec}	0.020 kW
Cooling capacity (latent)	$P_{rated,c}$	0.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	55.0 dB
Heating capacity	$P_{rated,h}$	3.2	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDFW45KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.0	kW	Total electric power input	P_{elec}	0.020 kW
Cooling capacity (latent)	$P_{rated,c}$	1.5	kW	Sound power level (per speed setting,if applicable)	L_{WA}	57.0 dB
Heating capacity	$P_{rated,h}$	5.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDFW56KXE6F						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.8	kW	Total electric power input	P_{elec}	0.030 kW
Cooling capacity (latent)	$P_{rated,c}$	1.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	6.3	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDE36KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.7	kW	Total electric power input	P_{elec}	0.050 kW
Cooling capacity (latent)	$P_{rated,c}$	0.9	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	4.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDE45KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.3	kW	Total electric power input	P_{elec}	0.050 kW
Cooling capacity (latent)	$P_{rated,c}$	1.2	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	5.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDE56KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.9	kW	Total electric power input	P_{elec}	0.050 kW
Cooling capacity (latent)	$P_{rated,c}$	1.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	60.0 dB
Heating capacity	$P_{rated,h}$	6.3	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDE71KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	5.2	kW	Total electric power input	P_{elec}	0.070 kW
Cooling capacity (latent)	$P_{rated,c}$	1.9	kW	Sound power level (per speed setting,if applicable)	L_{WA}	62.0 dB
Heating capacity	$P_{rated,h}$	8.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDE112KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	7.9	kW	Total electric power input	P_{elec}	0.100 kW
Cooling capacity (latent)	$P_{rated,c}$	3.3	kW	Sound power level (per speed setting,if applicable)	L_{WA}	63.0 dB
Heating capacity	$P_{rated,h}$	12.5	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDE140KXZE1						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	9.8	kW	Total electric power input	P_{elec}	0.130 kW
Cooling capacity (latent)	$P_{rated,c}$	4.2	kW	Sound power level (per speed setting,if applicable)	L_{WA}	66.0 dB
Heating capacity	$P_{rated,h}$	16.0	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : FDU650FKXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.2	kW	Total electric power input	P_{elec}	0.250	kW
Cooling capacity (latent)	$P_{rated,c}$	5.8	kW	Sound power level (per speed setting,if applicable)	L_{WA}	62.0	dB
Heating capacity	$P_{rated,h}$	6.5	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDU1100FKXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.1	kW	Total electric power input	P_{elec}	0.360	kW
Cooling capacity (latent)	$P_{rated,c}$	9.9	kW	Sound power level (per speed setting,if applicable)	L_{WA}	66.0	dB
Heating capacity	$P_{rated,h}$	10.5	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDU1800FKXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	7.4	kW	Total electric power input	P_{elec}	1.180	kW
Cooling capacity (latent)	$P_{rated,c}$	15.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	70.0	dB
Heating capacity	$P_{rated,h}$	16.0	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : FDU2400FKXZE1							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Cooling capacity (sensible)	$P_{rated,c}$	9.3	kW	Total electric power input	P_{elec}	1.180	kW
Cooling capacity (latent)	$P_{rated,c}$	18.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	73.0	dB
Heating capacity	$P_{rated,h}$	21.5	kW				
Contact details	Mitsubishi heavy industries thermal systems,LTD						

Model(s) : SAF-DX250E6						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	1.3	kW	Total electric power input	P_{elec}	0.007 kW
Cooling capacity (latent)	$P_{rated,c}$	0.7	kW	Sound power level (per speed setting,if applicable)	L_{WA}	- dB
Heating capacity	$P_{rated,h}$	1.8	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : SAF-DX350E6						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	1.8	kW	Total electric power input	P_{elec}	0.007 kW
Cooling capacity (latent)	$P_{rated,c}$	1.0	kW	Sound power level (per speed setting,if applicable)	L_{WA}	- dB
Heating capacity	$P_{rated,h}$	2.2	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : SAF-DX500E6						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	2.4	kW	Total electric power input	P_{elec}	0.007 kW
Cooling capacity (latent)	$P_{rated,c}$	1.2	kW	Sound power level (per speed setting,if applicable)	L_{WA}	- dB
Heating capacity	$P_{rated,h}$	2.8	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

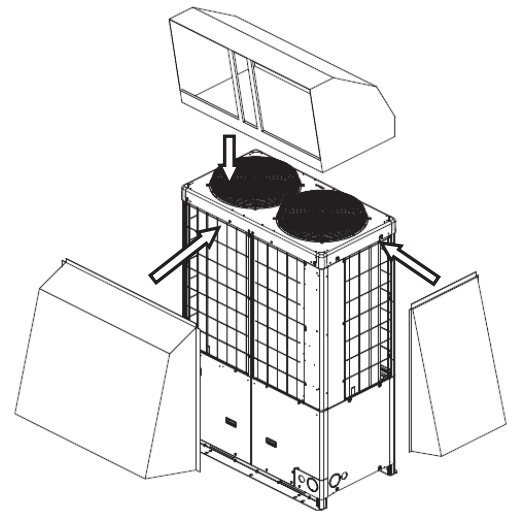
Model(s) : SAF-DX800E6						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	3.7	kW	Total electric power input	P_{elec}	0.007 kW
Cooling capacity (latent)	$P_{rated,c}$	1.9	kW	Sound power level (per speed setting,if applicable)	L_{WA}	- dB
Heating capacity	$P_{rated,h}$	4.5	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

Model(s) : SAF-DX1000E6						
Item	Symbol	Value	Unit	Item	Symbol	Value Unit
Cooling capacity (sensible)	$P_{rated,c}$	4.2	kW	Total electric power input	P_{elec}	0.007 kW
Cooling capacity (latent)	$P_{rated,c}$	2.1	kW	Sound power level (per speed setting,if applicable)	L_{WA}	- dB
Heating capacity	$P_{rated,h}$	5.6	kW			
Contact details	Mitsubishi heavy industries thermal systems,LTD					

APPENDIX : Attaching option parts

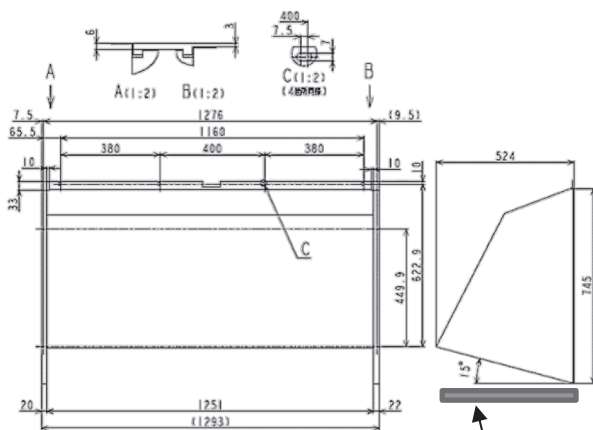
Outdoor units can be equipped with option parts as snow protection hood. Sample image of attaching parts are shown right. Please refer to the option parts drawing and manufacture them at the local distributor.

The screw size to attach the option parts is M5. The width of hole on option parts is 7mm.



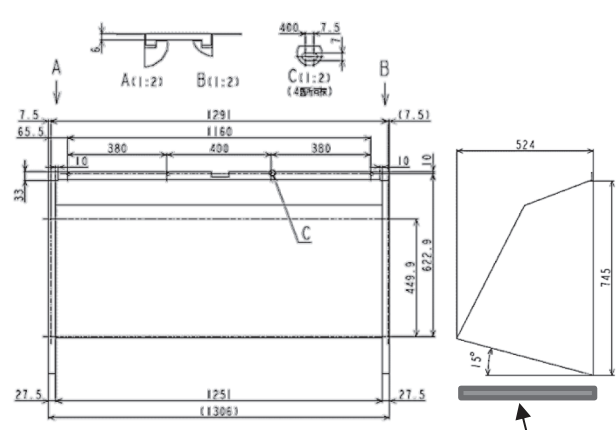
For FDC280,335KXZE2

<Front hood>



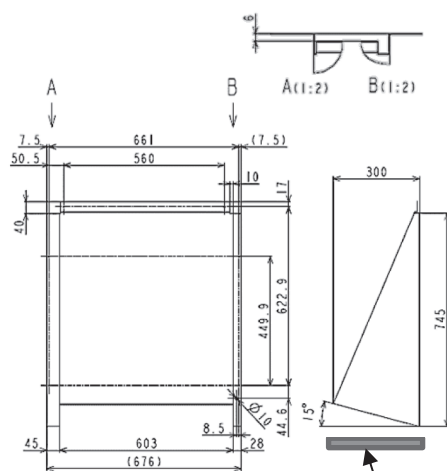
Minimum required opening area : 656cm²

<Rear hood>



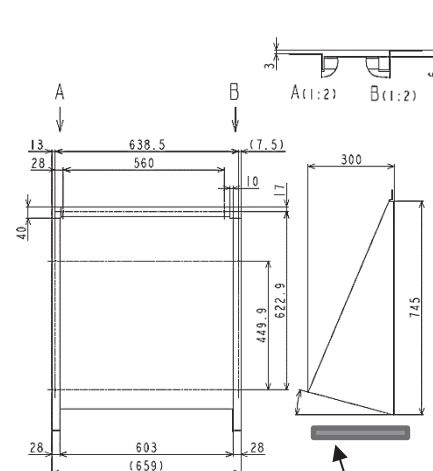
Minimum required opening area : 656cm²

<Left hood>



Minimum required opening area : 181cm²

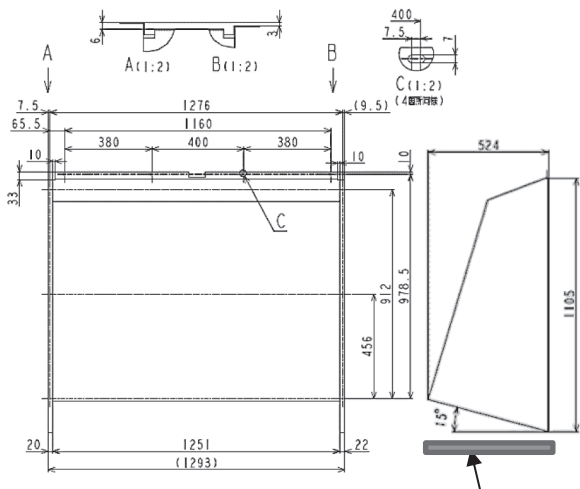
<Right hood>



Minimum required opening area : 181cm²

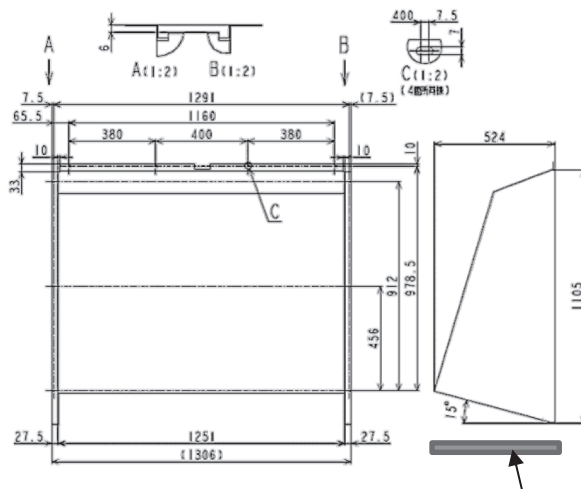
For FDC400-560KXZE2

<Front hood>



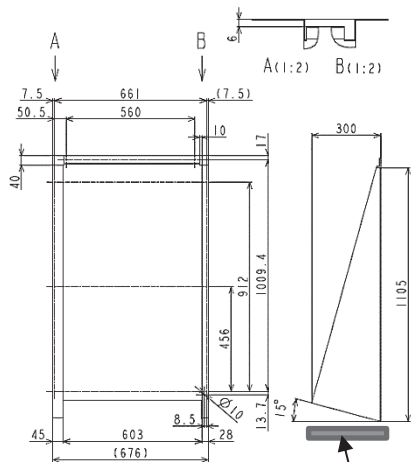
Minimum required opening area : 656cm²

<Rear hood>



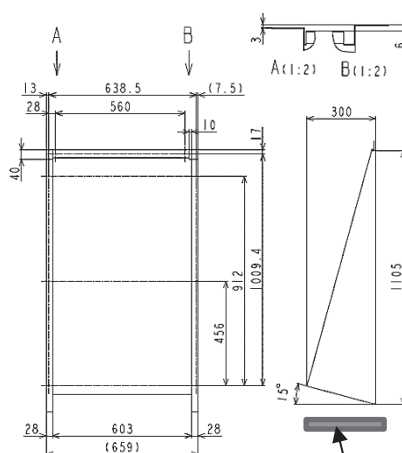
Minimum required opening area : 656cm²

<Left hood>



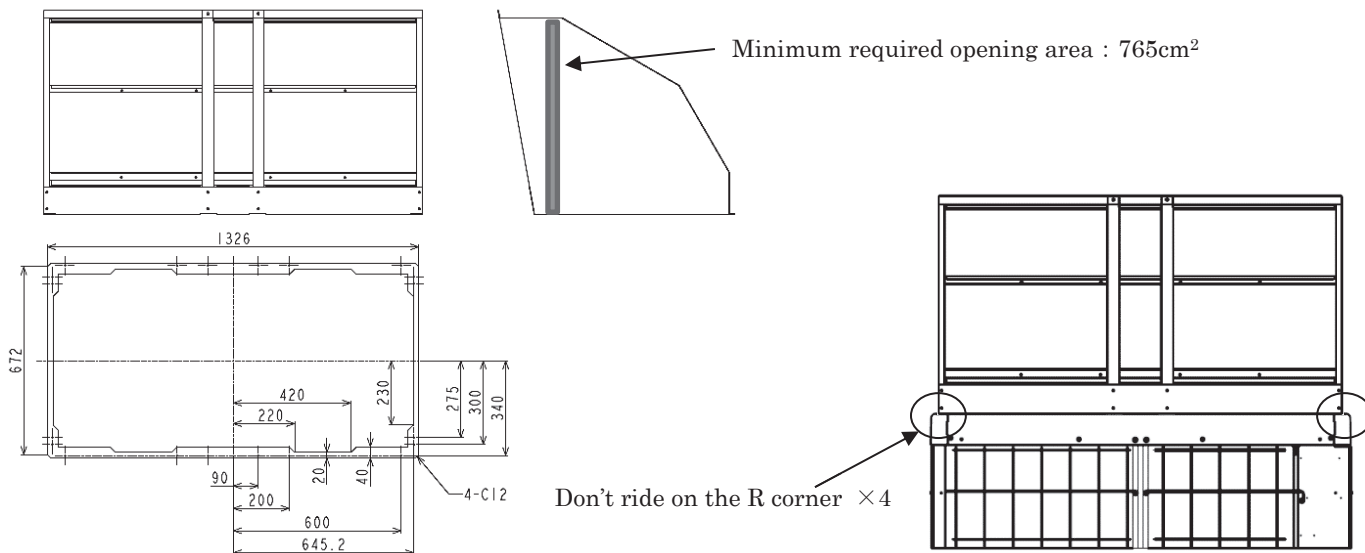
Minimum required opening area:181cm²

<Right hood>



Minimum required opening area:181cm²

<Top hood for all KXZE2 models>



VRF INVERTER MULTI-SYSTEM AIR-CONDITIONERS



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