

MHI

DATA BOOK

DRAFT

Manual No. '08•KX-DB-127

INVERTER DRIVEN MULTI-INDOOR UNIT CLIMATE CONTROL SYSTEM

**Alternative refrigerant R410A use models
(OUTDOOR UNIT)**

KX6 series (Heat pump type)

- All-in-one type (Used also for combination)
FDC335KXE6-K, 400KXE6, 450KXE6, 504KXE6, 560KXE6, 560KXE6-K, 615KXE6, 680KXE6
- Combined type
FDC735KXE6, 800KXE6, 850KXE6, 900KXE6, 960KXE6, 1010HKXE6, 1065KXE6, 1130KXE6,
1180KXE6, 1235KXE6, 1300KXE6, 1360KXE6

This DATA BOOK described relating to an outdoor unit.Regarding the Indoor unit,
see Manual No. '08•KX-DB-124.

PREFACE

Combination table for KX4 series and KX6 series

() Date of launching in the market

Category		Indoor unit										
		Connectable remote controller	Same series	Same series	Same series	Mixed series	Mixed series	Mixed series	Same or Mixed series	Mixed series	Same series	
		3-wire type	RC-E1	KXE4 (2004.4-)	KXE4(A) (2004.6-)	KXE4A (2004.11-)	KXE4A (2004.11-)	KXE4A (2004.11-)	KXE4A (2004.11-)			
			RC-E1R				KXE4R (2006.3-) KXE4BR (2007.4-) KXE5R (2007.4-)	KXE4R (2006.3-) KXE4BR (2007.4-) KXE5R (2007.4-)		KXE4R (2006.3-) KXE4BR (2007.4-) KXE5R (2007.4-)	KXE4R (2006.3-) KXE4BR (2007.4-) KXE5R (2007.4-)	
Outdoor unit	2-wire type	RC-E3					KXE6 (2008.3-)	KXE6 (2008.3-)		KXE6 (2008.3-)	KXE6 (2008.3-)	
Heat pump (2-pipe) systems	FDCA-HKXE4 5HP (2004.4-)		YES [C]	YES [C]	YES [C]	NO	NO	NO	NO	NO	NO	
	FDCA-HKXE4 8-48HP (2004.4-)		NO	YES [C]	YES [C]	NO	NO	NO	NO	NO	NO	
	FDCA-HKXE4A 5HP (2006.2-)		NO	YES [C]	YES [C]	YES [C] ^{*1}	NO	NO	YES [C] ^{*1}	NO	NO	
	FDCA-HKXE4R 5,6HP (2006.5-)											
	FDCA-HKXE4A 8-48HP (2006.2-)											
	FDCA-HKXE4R 8-48HP (2006.5-)		NO	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	
	FDCA-HKXE4BR 8-48HP (2007.4-)											
	FDC-KXE6 4,5,6HP (2008.3-)		NO	NO	NO	NO	NO	NO	NO	NO	YES [A] ^{*6}	
	FDC-KXE6 8-12HP (not yet)		NO	NO	NO	NO	NO	NO	YES [B]	YES [B]	YES [A]	
FDC-KXE6 14-48HP (not yet)		NO	NO	NO	NO	NO	NO	YES [B]	YES [B]	YES [A]		
Heat recovery (3-pipe) systems [Note(3)]	FDCA-HKXRE4 8-48HP (2004.11-)		NO	NO	YES [C]	NO	NO	NO		NO	NO	
	FDCA-HKXRE4A 8-48HP (2006.2-)											
	FDCA-HKXRE4R 8-48HP (2006.6-)		NO	NO	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	YES [C]	
	FDCA-HKXRE4BR 8-48HP (2007.4-)											
	FDC-KXRE6 8-48HP (not yet)		NO	NO	NO	NO	NO	NO	YES [B]	YES [B]	YES [A]	

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

*1 except FDCA71KXE5R

	Outdoor unit	Connected Indoor unit		Dip switch setting of outdoor unit KXE6	Superlink Protocol	Limitation
		Same series	Mixed series			
YES [A] ^{*2}	KXE6	KXE6		II (New)	New (for KX6)	New (for 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 KXE6 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

		Central control, PC windows central control and BMS interface unit					
		SC-SL1N-E	SC-SL2N-E	SC-SL3N-AE/BE	SC-WGWN-A/B	SC-LGWN-A	SC-BGWN-A/B
YES [A]	Connectable I/U	16	64	128 (128x1)	128 (64x2) *3	96 (48x2)	128 (64x2) *3
	Superlink protocol	New	New	New	New	New	New
	Connectable network	1	1	1	2	2	2
YES[B] & YES[C]	Connectable I/U	16	48	144 (48x3)	96 *4 (48x2)	96 *4 (48x2)	96 *4 (48x2)
	Superlink*5 protocol	Previous	Previous	Previous	Previous	Previous	Previous
	Connectable network	1	1	3	2	2	2

*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.

(3) The compatibility of PFD refrigerant flow branch controller is mentioned in following table.

Connectable PFD controller		Indoor unit	
		KXE4 & KXE5 series	KXE6 series
Outdoor unit	KXRE4 series	Current one only PFD-E PFD-ER	Current *7 & New (Not yet)
	KXRE4 series	Current one only PFD-E PFD-ER	New one only (Not yet)

*7 When the current PFD controller is connected, the connector of relay kit must be connected to CnT connector (NOT CnT 2).

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1 GENERAL INFORMATION

1.1 Specific features

(1) The new R410A refrigerant is used

The new refrigerant R410A, with an ozone destruction coefficient of zero, is used and the CO₂ discharge volume is reduced. In addition, R410A is a pseudo-azeotropic refrigerant, so there is little change in its consistency that would cause it to divide into the gas and liquid phases, or undergo temperature slide, and it is also possible to add refrigerant on-site.

(2) Connectable indoor capacity

Capacity from 50% to 200% is possible.

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

Model \ Item	Number of connectable	Connectable capacity ⁽¹⁾
FDC400KXE6	1 to 36 units	200 ~ 800
FDC450KXE6	1 to 40 units	225 ~ 900
FDC504KXE6	1 to 36 units	252 ~ 806

Capacity from 50% to 160% is possible.

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

Model \ Item	Number of connectable	Connectable capacity ⁽¹⁾
FDC560KXE6	1 to 40 units	280 ~ 896
FDC615KXE6	2 to 44 units	308 ~ 984
FDC680KXE6	2 to 49 units	340 ~ 1088
FDC735KXE6	2 to 53 units	368 ~ 1176
FDC800KXE6	2 to 58 units	400 ~ 1280
FDC850KXE6	2 to 61 units	425 ~ 1360
FDC900KXE6	2 to 65 units	450 ~ 1440
FDC960KXE6	2 to 69 units	477 ~ 1526

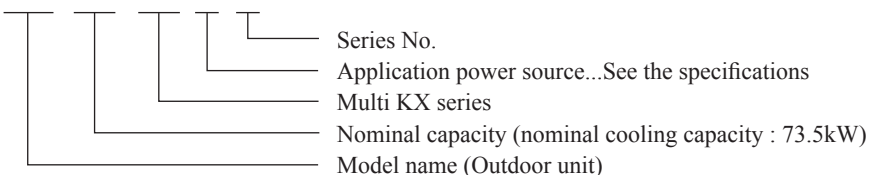
Capacity from 50% to 130% is possible.

Model \ Item	Number of connectable	Connectable capacity
FDC1010KXE6	2 to 59 units	504 ~ 1311
FDC1065KXE6	2 to 62 units	532 ~ 1384
FDC1130KXE6	2 to 66 units	560 ~ 1456
FDC1180KXE6	3 to 69 units	588 ~ 1528
FDC1235KXE6	3 to 72 units	615 ~ 1599
FDC1300KXE6	3 to 76 units	650 ~ 1690
FDC1360KXE6	3 to 80 units	680 ~ 1768

1.2 How to read the model name

Outdoor unit

Example: FDC 735 KX E 6



Note

For outdoor unit, EN60552-2 and EN60555-3 are not applicable as consent by the utility company or notification to the utility company is given before usage.

1.3 Table of models

Model \ Capacity	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-Middle static pressure type (FDUM)	○	○	○	○	○	○	○	○	○			
Duct connected (Ultra thin)-Low static pressure type (FDQS)	○	○	○	○	○							
Wall mounted type (FDK)	○	○	○	○	○	○						
Ceiling suspended type (FDE)			○	○	○	○		○	○			
Floor standing (with casing) type (FDL)		○		○		○						
Floor standing (without casing) type (FDU)		○		○	○	○						
Duct connected-compact and Flexible type (FDUH)	○	○	○									
Outdoor units to be combined (FDC)	FDC335KXE6-K, FDC400KXE6 ~ 560KXE6, FDC560KXE6-K, FDC615KXE6 ~ 1360KXE6											

1.4 Table of indoor units panel (Optional)

Model	Capacity	Parts Model
FDT	Capacity:22,28,36,45,56	TC-PSA-24W-ER
FDT	Capacity:28,36,45,56,71,90,112,140,160	T-PSA-36W-E
FDTW	Capacity:28,45,56	TW-PSA-24W-E
	Capacity:71,90	TW-PSA-34W-E
	Capacity:112,140	TW-PSA-44W-E
FDTQ (Direct blow panel)	Capacity:22,28,36	TQ-PSA-15W-E
		TQ-PSB-15W-E
FDTQ (Duct panel)	Capacity:22,28,36	QR-PNA-14W-ER
		QR-PNB-14W-ER
FDTS	Capacity: 45	TS-PSA-29W-E
	Capacity:71	TS-PSA-39W-E

1.5 Outdoor units combination table

(a) Models FDC735, 800, 850, 900KXE6

Item Models	Combination outdoor unit models			Indoor unit	
	FDC335KXE6-K	FDC400KXE6	FDC450KXE6	Connectable ⁽¹⁾ capacity	Number of connectable units
FDC735KXE6	1	1	—	368 ~ 1176	2 to 53 unit
FDC800KXE6	—	2	—	400 ~ 1280	2 to 58 unit
FDC850KXE6	—	1	1	425 ~ 1360	2 to 61 unit
FDC900KXE6	—	—	2	450 ~ 1440	2 to 65 unit

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

(b) Models FDC960, 1010, 1065, 1130, 1180, 1235, 1300, 1360KXE6

Item Models	Combination outdoor unit models						Indoor unit	
	FDC450 KXE6	FDC504 KXE6	FDC560 KXE6	FDC560 KXE6-K	FDC615 KXE6	FDC680 KXE6	Connectable capacity	Number of connectable units
FDC960KXE6 ⁽¹⁾	1	1	—	—	—	—	477 ~ 1526	2 to 69 unit
FDC1010KXE6	—	2	—	—	—	—	504 ~ 1311	2 to 59 unit
FDC1065KXE6	—	1	1	—	—	—	532 ~ 1384	2 to 62 unit
FDC1130KXE6	—	—	2	—	—	—	560 ~ 1456	2 to 66 unit
FDC1180KXE6	—	—	—	1	1	—	588 ~ 1528	3 to 69 unit
FDC1235KXE6	—	—	—	—	2	—	615 ~ 1599	3 to 72 unit
FDC1300KXE6	—	—	—	—	1	1	650 ~ 1690	3 to 76 unit
FDC1360KXE6	—	—	—	—	—	2	680 ~ 1768	3 to 80 unit

Note (1) When connecting the indoor unit type FDK, FDFL or FDFU Series to FDC960KXE6, limit the connectable capacity not higher than 130%.

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

Outdoor unit	Branch pipe set
For two units (for 735 ~ 1360)	DOS-2A-1

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

(d) Branch pipe set (Option)

Total capacity downstream	Branching pipe set
Less than 180	DIS-22-1
180 or more but less than 371	DIS-180-1
371 or more but less than 540	DIS-371-1
540 or more	DIS-540-2

(e) Header pipe set (Option)

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

2 OUTDOOR UNIT

2.1 Specifications

• All-in-one type (Used also for combination)

Models			FDC335KXE6-K	FDC400KXE6	FDC450KXE6	FDC504KXE6	FDC560KXE6	FDC560KXE6-K	FDC615KXE6	FDC680KXE6
Nominal cooling capacity*1		kW	33.5	40.0	45.0	50.4	56.0	56.0	61.5	68.0
Nominal heating capacity*2			37.5	45.0	50.0	56.5	63.0	63.0	69.0	73.0
Power source			3 Phase 380-415V 50Hz/380V 60Hz							
Power consumption	Cool	kW	8.94	11.27	12.97	14.73	16.79	16.79	20.37	24.98
	Heat		8.93	11.73	13.10	15.12	16.79	16.79	18.48	19.08
Running current	Cool	A	14.5/13.3	18.4/16.9	21.1/19.3	24.1/22.0	27.4/25.1	27.4/25.1	33.1/30.3	40.3/36.9
	Heat		14.8/13.5	19.6/17.9	21.7/19.9	25.2/23.1	28.0/25.7	28.0/25.7	30.7/28.1	31.6/29.0
Sound Pressure Level		dB (A)	59/59	59.5/60	62.5/62.5	61.5/62	63/63.5	63/63.5	64.5/64	65/65
Exterior dimensions		mm	1690×1350×720				2048×1350×720			
Height × Width × Depth										
Net weight		kg	317				341		355	
Refrigerant equipment compressor type & Q'ty			GTC5150NH48L×2					GTD5160NH48L×2		
Motor		kW	2.99×2	3.71×2	4.29×2	4.87×2	5.78×2		6.66×2	7.15×2
Starting method			Direct line starting							
capacity control		%	19-130	15-114	13-112	11-100	10-113	12-113	11-110	10-108
Crankcase heater		W	33×2							
Refrigerant equipment			Straight fin & inner grooved tubing							
Heat exchanger										
Refrigerant control			Electronic expansion valve							
Refrigerant			R410A							
Quantity		kg	11.5							
Refrigerant oil		l	4.2 (M-MA32R)							
Defrost control			Microcomputer controlled De-Icer							
Air handling equipment fan type & Q'ty			Propeller fan × 2							
Motor		W	386×2							
Starting method			Direct start							
Air flow (Standard)		CMM	220/180	250/220	260/240	270/250				
Shock & vibration absorber			Rubber mount (for compressor)							
safety equipment			Compressor overheat protection / overcurrent protection / power transistor overheating protection / abnormal high pressure protection							
Installation data		mm (in)	Gas line : φ25.4 (1") (φ28.58 (11/8"))			Liquid line : φ12.7 (1/2")				
Refrigerant piping size						Gas line : φ28.58 (11/8")				
Connecting method			Gas line : Brazing / Liquid line : Flare							
Drain			Hole for drain (φ20 × 6pcs , φ45 × 3pcs)							
Insulation for piping			Necessary (both Liquid & Gas lines)							
Accessories			-	-	-	-		-	-	-
Exterior dimensions			PCB003Z041	PCB003Z041	PCB003Z041	PCB003Z044	PCB003Z044	PCB003Z044	PCB003Z044	PCB003Z044
Electrical wiring			PCB003Z060	PCB003Z060	PCB003Z060	PCB003Z060	PCB003Z060	PCB003Z060	PCB003Z060	PCB003Z060

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27 °C	19 °C	35 °C	24 °C	ISO-T1
Heating*2	20 °C	—	7 °C	6 °C	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.

ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) Refrigerant piping size applicable to European installations are shown in parentheses.

Adapted to RoHS directive

PCB003Z040

Models			FDC735KXE6	FDC800KXE6	FDC850KXE6	FDC900KXE6	FDC960KXE6	FDC1010KXE6
Combination unit			FDC335KXE6-K	FDC400KXE6	FDC400KXE6	FDC450KXE6	FDC450KXE6	FDC504KXE6
			FDC400KXE6	FDC400KXE6	FDC450KXE6	FDC450KXE6	FDC504KXE6	FDC504KXE6
Power source			3 Phase 380-415V 50Hz/380V 60Hz					
Nominal cooling capacity*1		kW	73.5	80.0	85.0	90.0	96.0	101.0
Nominal heating capacity*2			82.5	90.0	95.0	100.0	108.0	113.0
Power consumption	Cool	kW	20.21	22.54	24.24	25.94	27.7	29.46
	Heat		20.66	23.46	24.83	26.2	28.22	30.24
Running current	Cool	A	32.9/30.2	36.8/33.8	39.5/36.2	42.2/38.6	45.2/41.3	48.2/44
	Heat		34.4/31.4	39.2/35.8	41.3/37.8	43.4/39.8	46.9/43	50.4/46.2
Net weight		kg	634	634	634	634	658	682
Refrigerant piping size	Liquid line	φ mm	φ 15.88					
	Gas line		φ 31.75 (φ 34.92)					
	Oil equalization		φ 9.52					

Models			FDC1065KXE6	FDC1130KXE6	FDC1180KXE6	FDC1235KXE6	FDC1300KXE6	FDC1360KXE6
Combination unit			FDC504KXE6	FDC560KXE6	FDC560KXE6-K	FDC615KXE6	FDC615KXE6	FDC680KXE6
			FDC560KXE6	FDC560KXE6	FDC615KXE6	FDC615KXE6	FDC680KXE6	FDC680KXE6
Power source			3 Phase 380-415V 50Hz/380V 60Hz					
Nominal cooling capacity*1		kW	106.5	113.0	118.0	123.5	130.0	136.0
Nominal heating capacity*2			119.5	127.0	132.0	138.0	142.0	146.0
Power consumption	Cool	kW	31.52	33.58	37.16	40.74	45.35	49.96
	Heat		31.91	33.58	35.27	36.96	37.56	38.16
Running current	Cool	A	51.5/47.1	54.8/50.2	60.5/55.4	66.2/60.6	73.4/67.2	80.6/73.8
	Heat		53.2/48.8	56/51.4	58.7/53.8	61.4/56.2	62.3/57.1	63.2/58
Net weight		kg	682	682	710	710	710	710
Refrigerant piping size	Liquid line	φ mm	φ 19.05					
	Gas line		φ 38.1 (φ 34.92)					
	Oil equalization		φ 9.52					

Notes (1) The data are measured at the following conditions.

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling*1	27 °C	19 °C	35 °C	24 °C	ISO-T1
Heating*2	20 °C	—	7 °C	6 °C	

Adapted to RoHS directive

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.

ISO-T1 "UNITARY AIR-CONDITIONERS"

(3) Refrigerant piping size applicable to European installations are shown in parentheses.

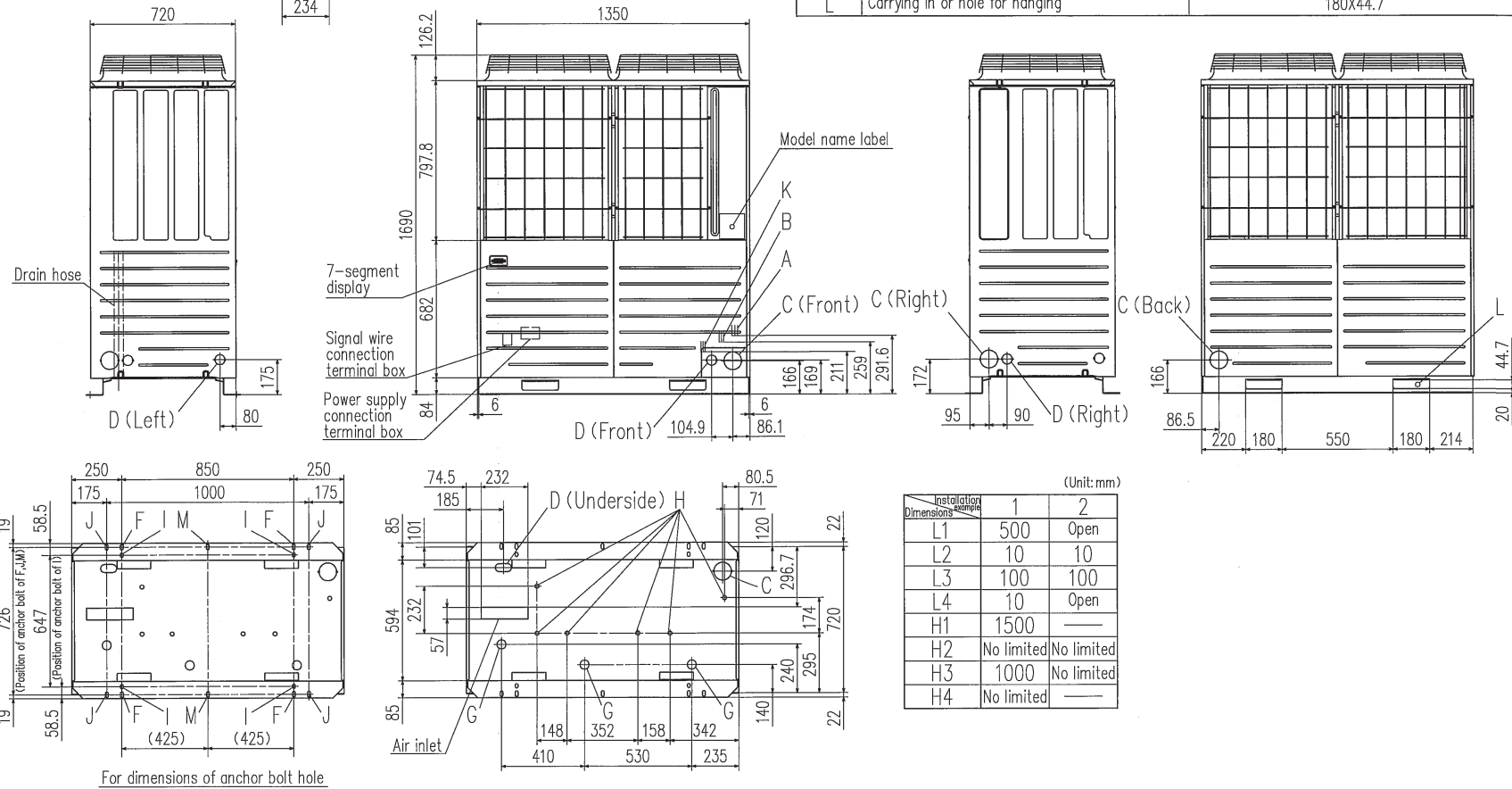
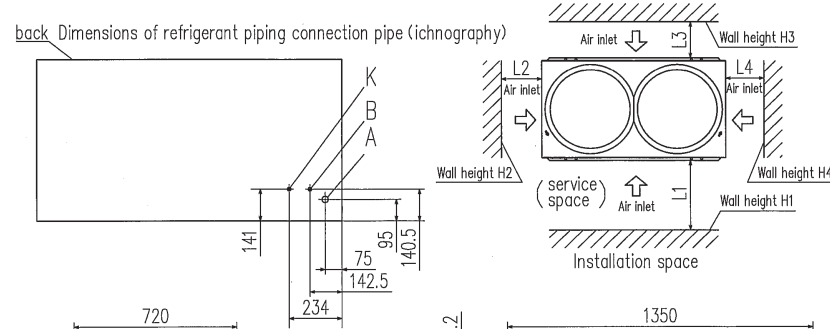
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2.2 Exterior dimensions

Models FDC335KXE6-K, 400KXE6, 450KXE6

Unit: mm

MARK	Content	
A	Refrigerant gas piping connection pipe	335-K, 400: $\phi 25.4$ (Brazing) 450: $\phi 28.58$ (Brazing)
B	Refrigerant liquid piping connection pipe	$\phi 12.7$ (Flare)
C	Refrigerant piping exit hole	$\phi 88$ (or $\phi 100$)
D	Power supply entry hole	$\phi 50$ (right-left-front), long hole 40X80 (under side)
F	Anchor bolt hole	M10, 4pcs.
G	Drain waste water hose hole	$\phi 45$, 3pcs.
H	Drain hole	$\phi 20$, 6pcs.
K	Refrigerant oil equalization piping connection pipe	$\phi 9.52$ (Flare)
L	Carrying in or hole for hanging	180X44.7

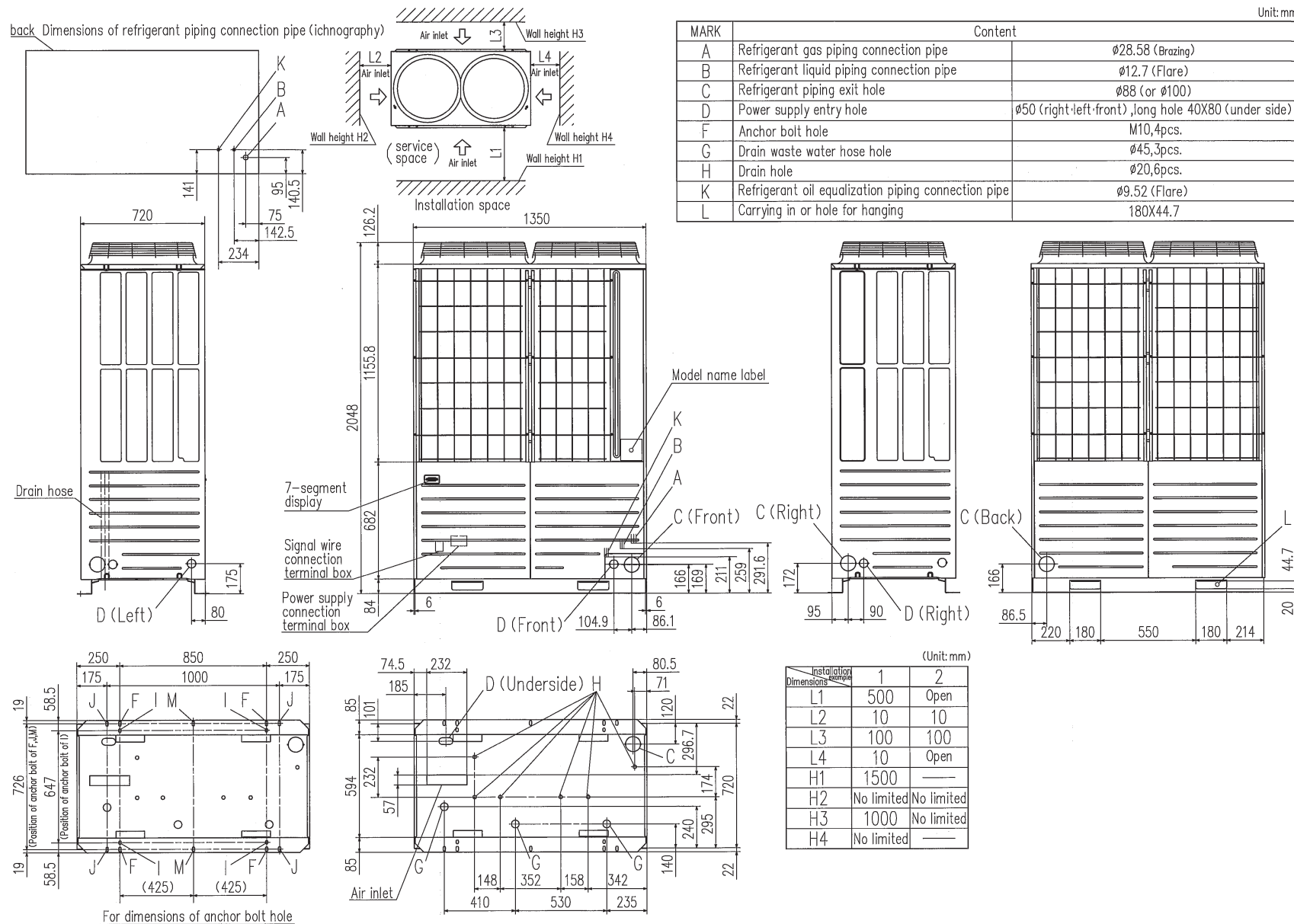


(Unit: mm)

Installation Dimensions	1	2
L1	500	Open
L2	10	10
L3	100	100
L4	10	Open
H1	1500	—
H2	No limited	No limited
H3	1000	No limited
H4	No limited	—

Unit: mm

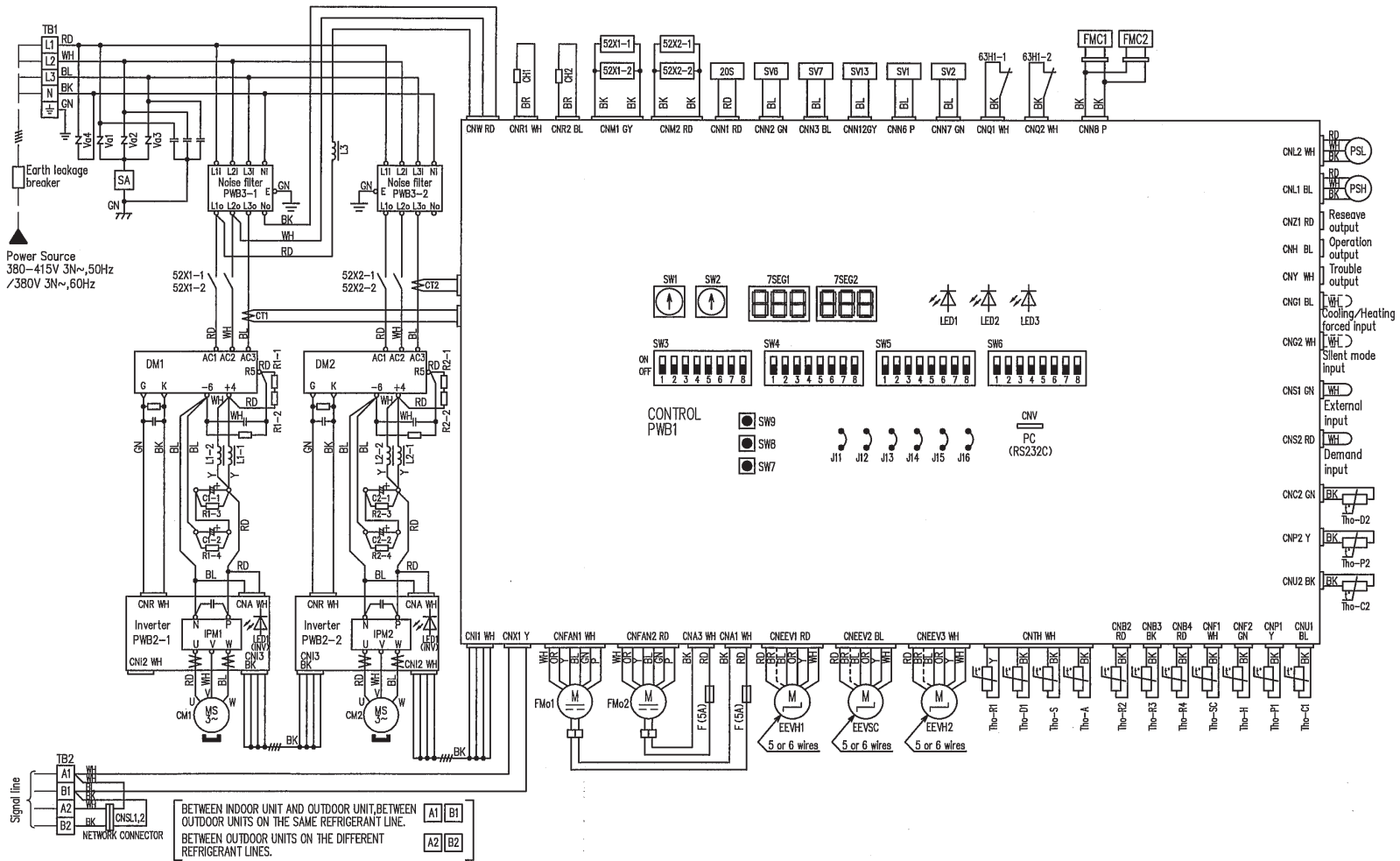
MARK	Content	
A	Refrigerant gas piping connection pipe	φ28.58 (Brazing)
B	Refrigerant liquid piping connection pipe	φ12.7 (Flare)
C	Refrigerant piping exit hole	φ88 (or φ100)
D	Power supply entry hole	φ50 (right-left-front), long hole 40X80 (under side)
F	Anchor bolt hole	M10, 4pcs.
G	Drain waste water hose hole	φ45, 3pcs.
H	Drain hole	φ20, 6pcs.
K	Refrigerant oil equalization piping connection pipe	φ9.52 (Flare)
L	Carrying in or hole for hanging	180X44.7



PCB003Z044

2.3 Electrical wiring

Models All model



PCB003Z060

CH1,2	Crankcase heater
CM1,2	Compressor motor
CNA-Z	Connector
CT1,CT2	Current sensor
C1-12,C2-12	Electrolytic capacitor
DM	Diode module
EEVH1,2	Expansion valve for heating
EEVSC	Expansion valve for SC
F	Fuse
FMC1,2	Fan for IPM
FMo1,2	Blower motor
IPM	Intelligent power module
IPW	Intelligent power module
J11,12	Set up model (volt)
J13	External input select level/pulse
J14	Defrost recover temp
J15	Defrost start temp
J16	Heat recovery unit
LED1	Inspection (Red)
LED1 (INV)	Normal (Yellow) -Flashing
LED2	Normal (Green)
LED3	Service (green for service)
L1-12,L2-12	D.C.reactior
L3	D.C.reactior

PSH	High pressure sensor
PSL	Low pressure sensor
PWB1~3	Printed wiring board (PCB)
R1,2	Rush current suppression resistor
SA	Arrestor
SV1	Solenoid valve (CM1:bypass)
SV2	Solenoid valve (CM2:bypass)
SV6	Solenoid valve (oil separator CM1)
SV7	Solenoid valve (oil separator CM2)
SV13	Solenoid valve (gas bypass)
SW1	Address setting SW outdoor unit No. (2 digits)
SW2	Address setting SW outdoor unit No. (1 digit)
SW3-1	Inspection LED reset
SW3-2	ON Auto backup operation
OFF	Regular operation
SW3-3	Spare
SW3-4	ON Refrigerant quantity check
OFF	Regular operation
SW3-5	ON Check operation
OFF	Regular operation
SW3-6	Spare
SW3-7	ON Forced cooling/heating
OFF	Regular operation

SW3-8	ON Test mode
OFF	Regular operation
SW4-1~4	Model setting
SW4-5	Demand
SW4-6	Demand
SW4-7	Address setting switch (master-slave)
SW4-8	Address setting switch (master-slave)
SW5-1	ON Trial operation
OFF	Regular operation
SW5-2	ON Trial operation mode/cooling
OFF	Trial operation mode/heating
SW5-3	ON Pump down operation
OFF	Regular operation
SW5-4	Spare
SW5-5	ON Super Link communication
OFF	Super Link II communication
SW5-6~8	Spare
SW6-1~8	Spare
SW7	Data clear/insert
SW8	7seg indicate (unit's place)
SW9	7seg indicate (ten's place)
SW10	Reset
TB1,2	Terminal block

Tho-A	External air thermistor
Tho-C1,2	Under-dome thermistor
Tho-D1,2	Discharge pipe thermistor
Tho-H	Sub-cooling coil thermistor 2
Tho-P1,2	Power transistor thermistor
Tho-R1	Heat exchanger thermistor (exhaust)
Tho-R2	Heat exchanger thermistor (exhaust)
Tho-R3	Heat exchanger thermistor (inlet)
Tho-R4	Heat exchanger thermistor (inlet)
Tho-S	Suction pipe thermistor
Tho-SC	Sub-cooling coil thermistor 1
Val-4	Varistor
20S	4way valve
52X1-1,2	Solenoid for CM1
52X2-1,2	Solenoid for CM2
63H1-1,2	High pressure switch (for protection)
7SEG1	7seg L.E.D. (function indication)
7SEG2	7seg L.E.D. (data indication)

Color symbol

BK	Black
BL	Blue
BR	Brown
GN	Green
GR	Gray
OR	Orange
RD	Red
WH	White
Y	Yellow
P	Pink

2.4 Noise level

Measured based on JIS B 8616

Mike position as highest noise level in position as below

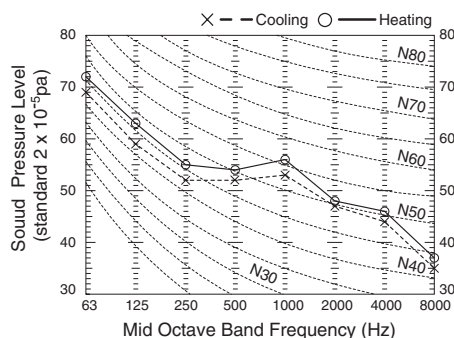
Distance from front side 1m

Height 1m

Model FDC335KXE6-k

Noise level 59 dB (A) at cooling

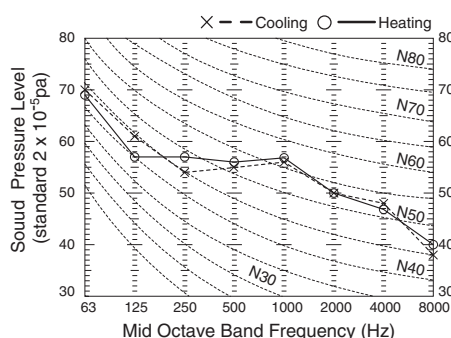
59 dB (A) at heating



Model FDC400KXE6

Noise level 59.5 dB (A) at cooling

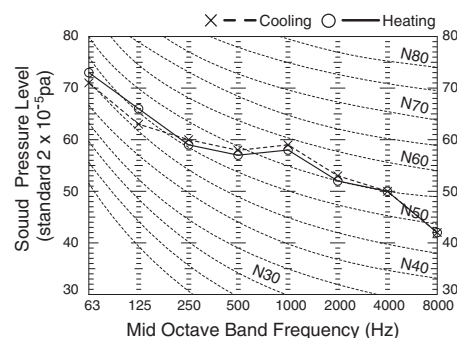
60 dB (A) at heating



Model FDC450KXE6

Noise level 62.5 dB (A) at cooling

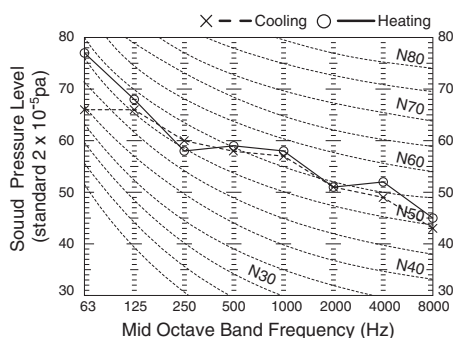
62.5 dB (A) at heating



Model FDC504KXE6

Noise level 61.5 dB (A) at cooling

62 dB (A) at heating

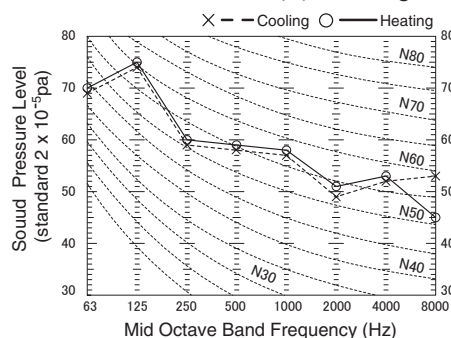


Models FDC560KXE6

560KXE6-K

Noise level 63 dB (A) at cooling

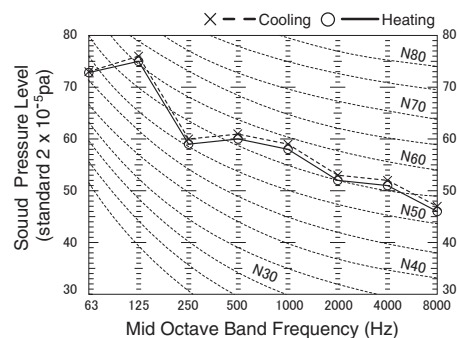
63.5 dB (A) at heating



Model FDC615KXE6

Noise level 64.5 dB (A) at cooling

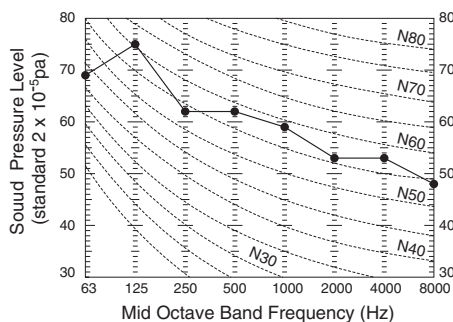
64 dB (A) at heating



Model FDC680KXE6

Noise level 65 dB (A) at cooling

65 dB (A) at heating



3 RANGE OF USAGE & LIMITATIONS

• All-in-one type (also for combined use)

System		FDC400KXE6	FDC450KXE6	FDC504KXE6
Item				
Indoor intake air temperature (Upper, lower limits)		Refer to page 14		
Outdoor air temperature (Upper, lower limits)				
Indoor units that can be used in combination	Number of connected units	1 to 36 unit	1 to 40 unit	1 to 36 unit
	Connectable capacity ⁽¹⁾	200 ~ 800	225 ~ 900	252 ~ 806
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)		
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		
	Outdoor unit is lower	40m or less		
Difference in the elevation of indoor units in a system		18m or less		
Indoor unit atmosphere (behind ceiling) temperature and humidity (Only models FDT, FDT, FDTW, FDT, FDTQ, FDU, FDUM, FDQS, FDUH)		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU : Dew point temperature 23 °C or less, relative humidity 80% or less)		
Compressor stop/start frequency	1 cycle time	6 min or more (3 minutes or more from start to stop or 3 minutes or more from stop 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% of rated voltage		

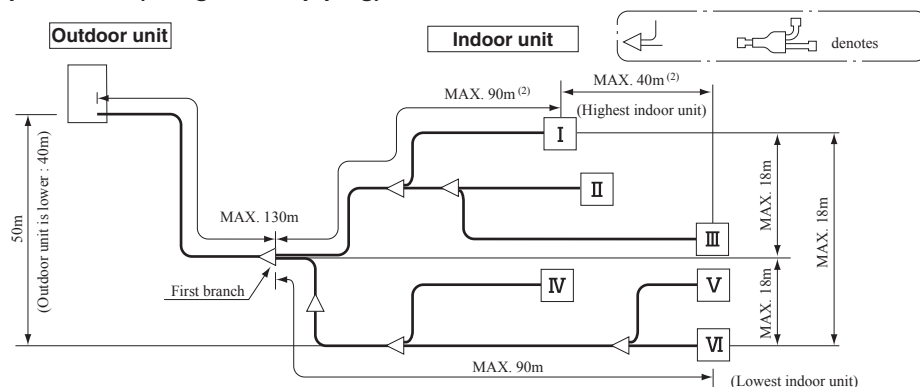
System		FDC560KXE6	FDC615KXE6	FDC680KXE6
Item				
Indoor intake air temperature (Upper, lower limits)		Refer to page 14		
Outdoor air temperature (Upper, lower limits)				
Indoor units that can be used in combination	Number of connected units	1 to 40 unit	2 to 44 unit	2 to 49 unit
	Connectable capacity ⁽¹⁾	280 ~ 896	308 ~ 984	340 ~ 1088
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)		
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		
	Outdoor unit is lower	40m or less		
Difference in the elevation of indoor units in a system		18m or less		
Indoor unit atmosphere (behind ceiling) temperature and humidity (Only models FDT, FDT, FDTW, FDT, FDTQ, FDU, FDUM, FDQS, FDUH)		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU : Dew point temperature 23 °C or less, relative humidity 80% or less)		
Compressor stop/start frequency	1 cycle time	6 min or more (3 minutes or more from start to stop or 3 minutes or more from stop 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% of rated voltage		

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

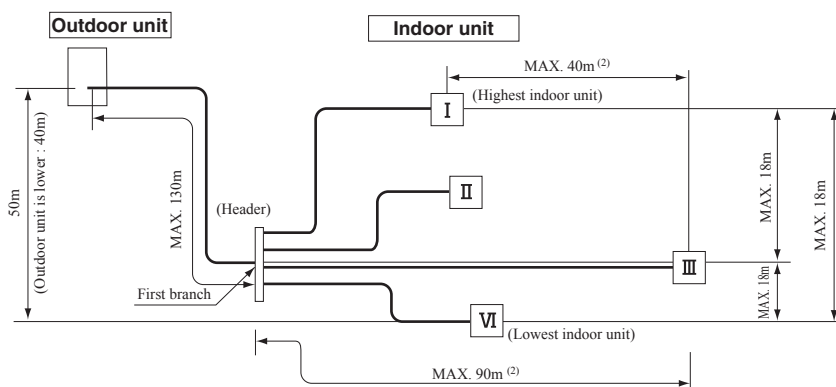
(2) When the pipe extension length exceeds 510 m, additional refrigeration machine oil must be charged (1,000 cc).

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

(1) Branch pipe method (using branch piping)



(2) Header System (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)

Important

When the Additional refrigerant quantity for piping (P) over the following table, please separate the refrigerant line.

Outdoor unit	P (kg)
400-680	50

• Combined type

System		FDC735KXE6	FDC800KXE6	FDC850KXE6	FDC900KXE6
Item					
Indoor intake air temperature (Upper, lower limits)		Refer to page 14			
Outdoor air temperature (Upper, lower limits)					
Indoor units that can be used in combination	Number of connected units	2 to 53 units	2 to 58 units	2 to 61 units	2 to 65 units
	Connectable capacity ⁽¹⁾	368 ~ 1176	400 ~ 1280	425 ~ 1360	450 ~ 1440
Total piping length ⁽²⁾		1000m or less			
Single direction piping length		Actual length : 160m or less, Equival 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)			
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			
	Outdoor unit is lower	40m or less			
Difference in the elevation of indoor units in a system		18m or less			
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, FDQS, FDUH		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU : Dew point temperature 23°C or less, relative humidity 80% or less)			
Compressor stop/start frequency	1 cycle time	6 min or more (3 minutes or more from start to stop or 3 minutes or more from stop 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% of rated voltage			

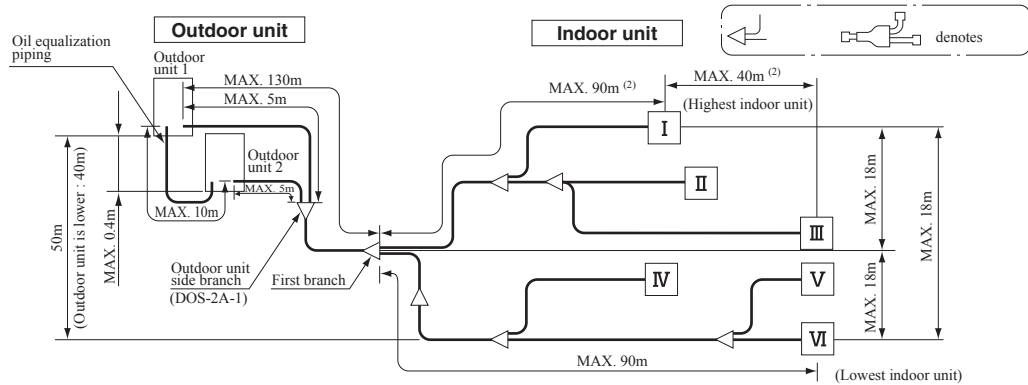
System		FDC960 KXE6	FDC1010 KXE6	FDC1065 KXE6	FDC1130 KXE6	FDC1180 KXE6	FDC1235 KXE6	FDC1306 KXE6	FDC1360 KXE6
Item									
Indoor intake air temperature (Upper, lower limits)		Refer to page 14							
Outdoor air temperature (Upper, lower limits)									
Indoor units that can be used in combination	Number of connected units	2 to 69 ⁽¹⁾ units	2 to 59 units	2 to 62 units	2 to 66 units	3 to 69 units	3 to 72 units	3 to 76 units	3 to 80 units
	Connectable capacity	477 ~ 1526	504 ~ 1311	532 ~ 1384	560 ~ 1456	588 ~ 1528	615 ~ 1599	650 ~ 1690	680 ~ 1768
Total piping length ⁽²⁾		1000m or less							
Single direction piping length		Actual length : 160m or less, Equival 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)							
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							
	Outdoor unit is lower	40m or less							
Difference in the elevation of indoor units in a system		18m or less							
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, FDQS, FDUH		Dew point temperature 28 °C or less, relative humidity 80% or less (FDE, FDK, FDFL, FDFU : Dew point temperature 23°C or less, relative humidity 80% or less)							
Compressor stop/start frequency	1 cycle time	6 min or more (3 minutes or more from start to stop or 3 minutes or more from stop 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% of rated voltage							

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

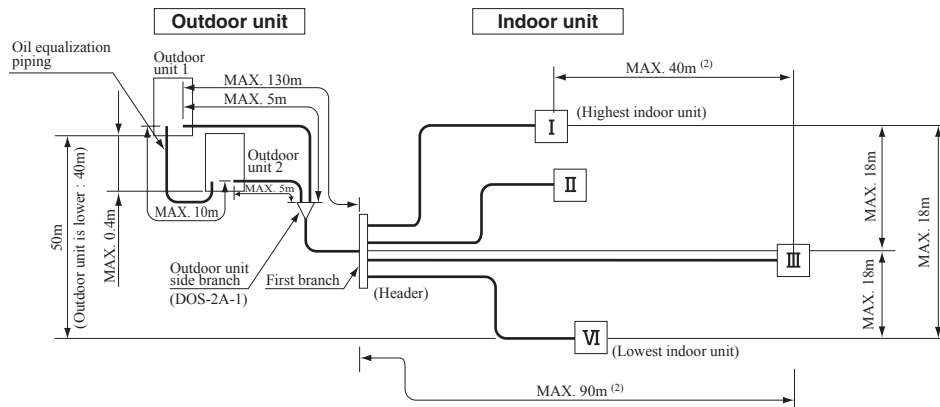
(2) When the pipe extension length exceeds 510 m, additional refrigeration machine oil must be charged (1,000 cc).

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

(1) Branch pipe method (using branch piping)



(2) Header System (Header used)



Note (1) A branch piping system cannot be connected after a header system.

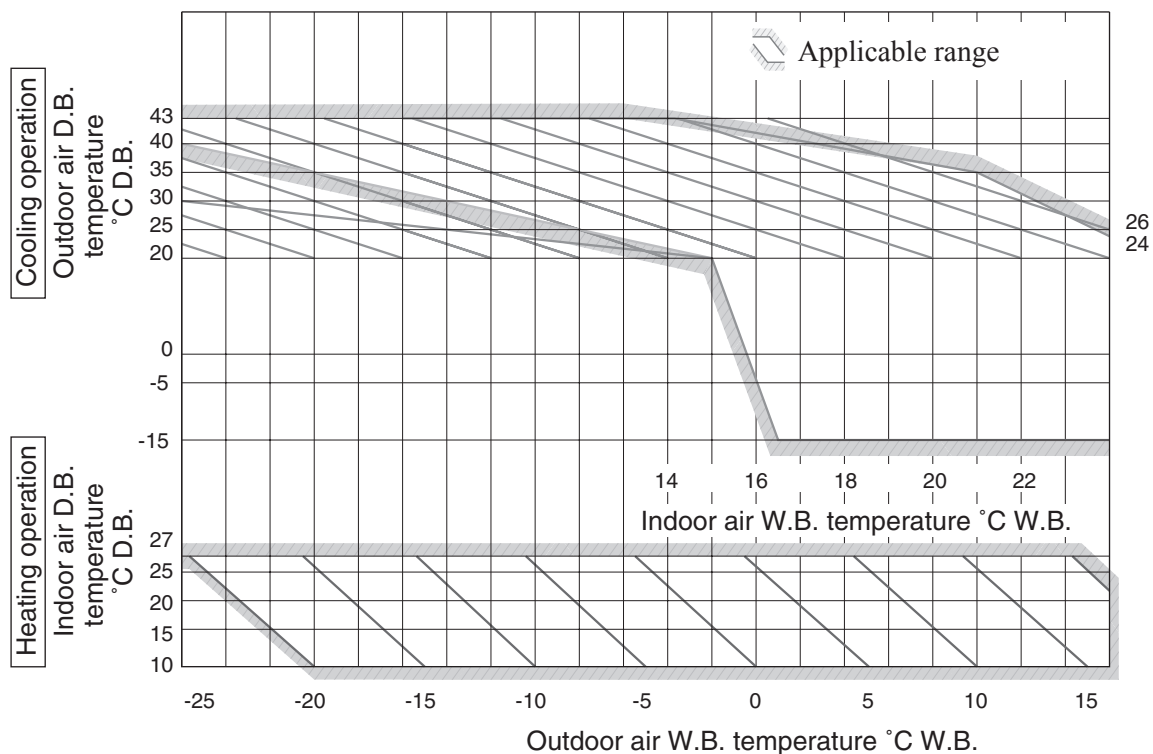
(2) 90m or less (However, difference between the longest and shortest piping : 40m or less)

Important

When the Additional refrigerant quantity for piping (P) over the following table, please separate the refrigerant line.

Outdoor unit	P (kg)
735-1360	100

Operating temperature range



“CAUTION” Cooling operation under low outdoor air temperature conditions

KXE6 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.

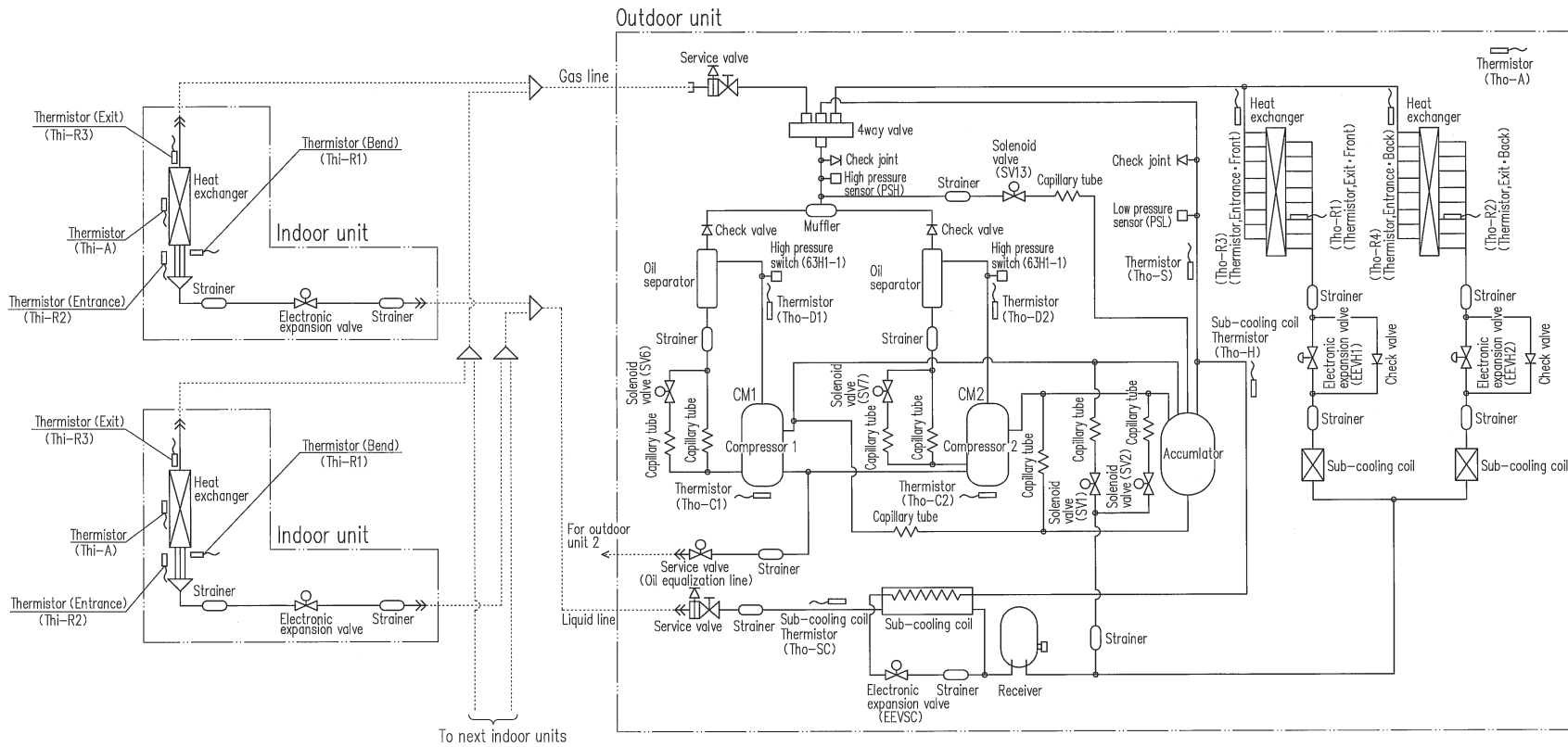
[Precaution]

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.

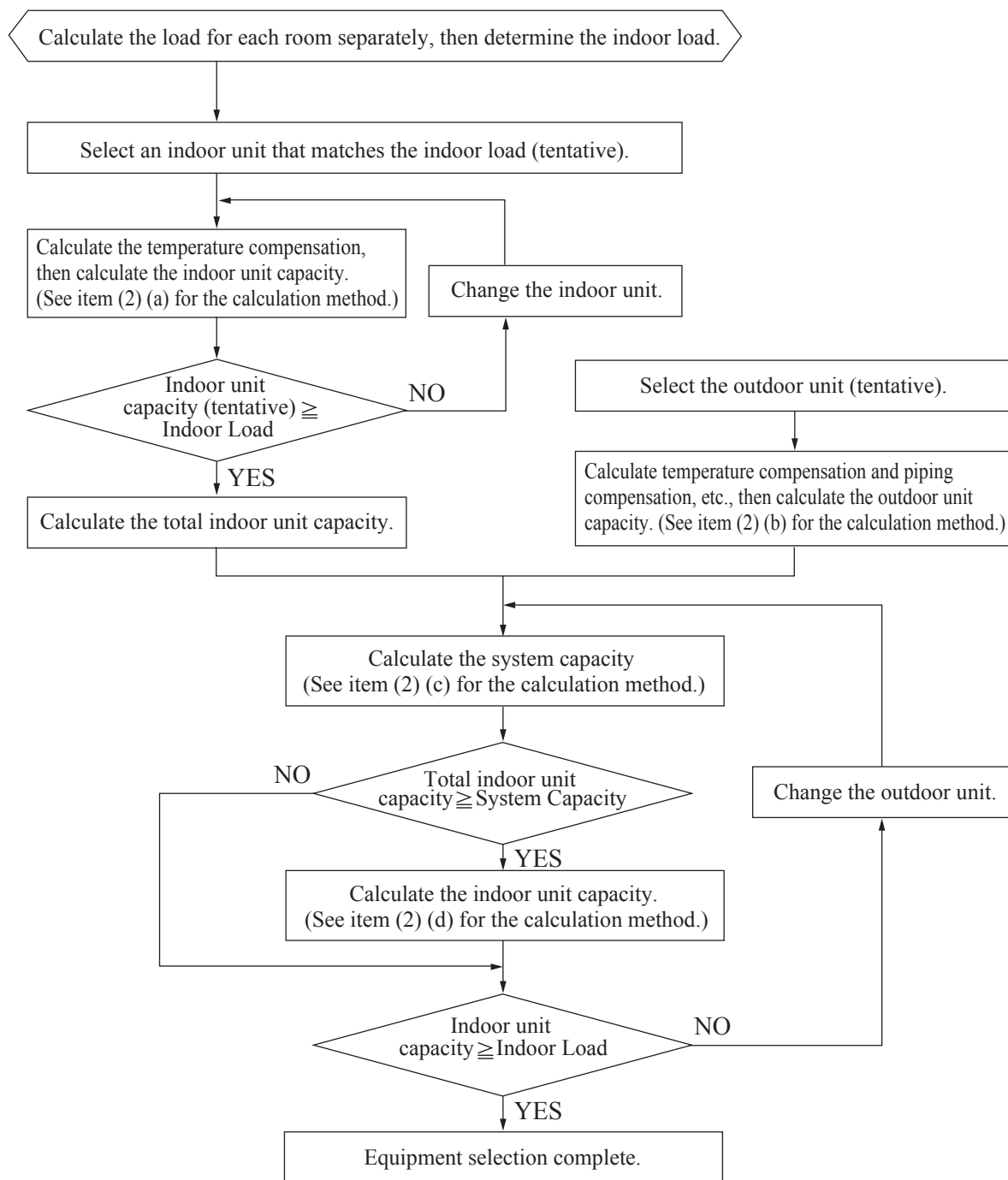


- Notes (1) Preset point of protective devices
63H1-1 : Open 4.15MPa, Close 3.15MPa
(For protection)
- (2) Function of thermistor
PSH : For compressor control
Cooling: 3.70 ON (MPa)
Heating: 3.00 ON (MPa)
PSL : ON 0.18MPa, OFF 0.20MPa
(For compressor control)
ON 0.134MPa, OFF 0.18MPa
(For protection)

- Thi-R1, R2 : Heating operation : Indoor fan control.
Cooling operation : Frost prevention control.
Super heat control.
- Thi-R3 : For super heat control of cooling operation.
Tho-D : For control of discharge pipe temperature.
Tho-C : For control of temperature under the dome.
Tho-S : For control of suction pipe temperature.
Tho-R1, R2 : For control of defrosting.
Tho-A : For control of defrosting.
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 sub-cooling 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
× 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)
× Capacity compensation coefficient according to temperature conditions
× Capacity compensation coefficient according to piping length
× 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

- ① See item (3) (a) concerning the capacity compensation coefficient according to temperature conditions.
- ② See item (3) (c) concerning the capacity compensation coefficient according to piping length.
- ③ See item (3) (d) 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) (e) 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) (f) 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.

(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 FDC450KXE6 1 Unit
- Indoor unit FDT56KXE6A 7 Units
- Piping length 60 m (Equivalent length)
- Indoor, outdoor unit height difference 15 m (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 19)
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 19)
Outdoor unit cooling capacity: 45.0 kW × 1.02 = 45.9 kW
- Capacity compensation coefficient according to piping length: 0.94 (calculated according to 60 m length); (See page 21)
45.9 kW × 0.94 = 43.1 kW

- Capacity compensation coefficient according to height difference: 0.97 (calculated according to 15 m difference); (See page 24)
 $43.1 \text{ kW} \times 0.97 = \underline{41.8 \text{ kW}}$
- Capacity compensation coefficient according to indoor unit connected total capacity: $1.0 \leftarrow (56 \times 7) / 450 < 100\%$
 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
- \Rightarrow 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 FDC450KXE6 1 Unit
- Indoor unit FDT56KXE6A 10 Units
- Piping length 60 m (Equivalent length)
- Indoor, outdoor unit height difference 15 m (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 19)
 Indoor unit cooling capacity: $5.6 \text{ kW} \times 0.95 = 5.3 \text{ kW}$
- Indoor unit total cooling capacity calculation;
 indoor unit total cooling capacity: $5.3 \text{ kW} \times 10 \text{ units} = \underline{53.0 \text{ kW}}$

<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 19)
 Outdoor unit cooling capacity: $45.0 \text{ kW} \times 0.95 = 42.8 \text{ kW}$
- Capacity compensation coefficient according to piping length: 0.94 (calculated according to 60 m length); (See page 21)
 $42.8 \text{ kW} \times 0.94 = 40.2 \text{ kW}$
- 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: $1.05 \leftarrow (56 \times 10) / 450 \approx 120\%$ (See page 25)
 $40.2 \text{ kW} \times 1.05 = \underline{42.2 \text{ kW}}$

<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 : 42.2 kW
- \Rightarrow System cooling capacity: 42.2 kW

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

$$\frac{42.2 \text{ kW} \times 5.3 \text{ kW}}{53.0 \text{ kW}} = \underline{4.2 \text{ kW}}$$

Example 3

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

- Outdoor unit FDC450KXE6 1 Unit
- Indoor unit FDT56KXE6A 10 Units
- Piping length 60 m (Equivalent length)
- Indoor, outdoor unit height difference 20 m (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 20)
 Indoor unit heating capacity: $6.3 \text{ kW} \times 1.04 = 6.6 \text{ kW}$
- Indoor unit total heating capacity calculation;
 indoor unit total heating capacity: $6.6 \text{ kW} \times 10 \text{ units} = \underline{66.0 \text{ kW}}$

<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 20)
Outdoor unit heating capacity: $50.0 \text{ kW} \times 1.04 = 52.0 \text{ kW}$
- Capacity compensation coefficient according to piping length: 0.982 (calculated according to 60 m length); (See page 23)
 $52.0 \text{ kW} \times 0.982 \approx 51.0 \text{ kW}$
- Capacity compensation coefficient according to height difference: 0.96 (calculated according to 20 m difference); (See page 24)
 $51.0 \text{ kW} \times 0.96 \approx 49.0 \text{ kW}$
- Correction of heating capacity in relation to the frost on the outdoor unit heat exchanger: 1.0;
 $49.0 \text{ kW} \times 1.0 \approx 49.0 \text{ kW}$.
- Capacity compensation coefficient according to indoor unit connected total capacity: $1.0 \leftarrow (56 \times 10) / 450 \approx 120\%$ (See page 25)
 $49.0 \text{ kW} \times 1.0 \approx 49.0 \text{ kW}$.

<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 \Rightarrow System heating capacity: 49.0 kW
- Outdoor unit maximum heating capacity : 49.0 kW

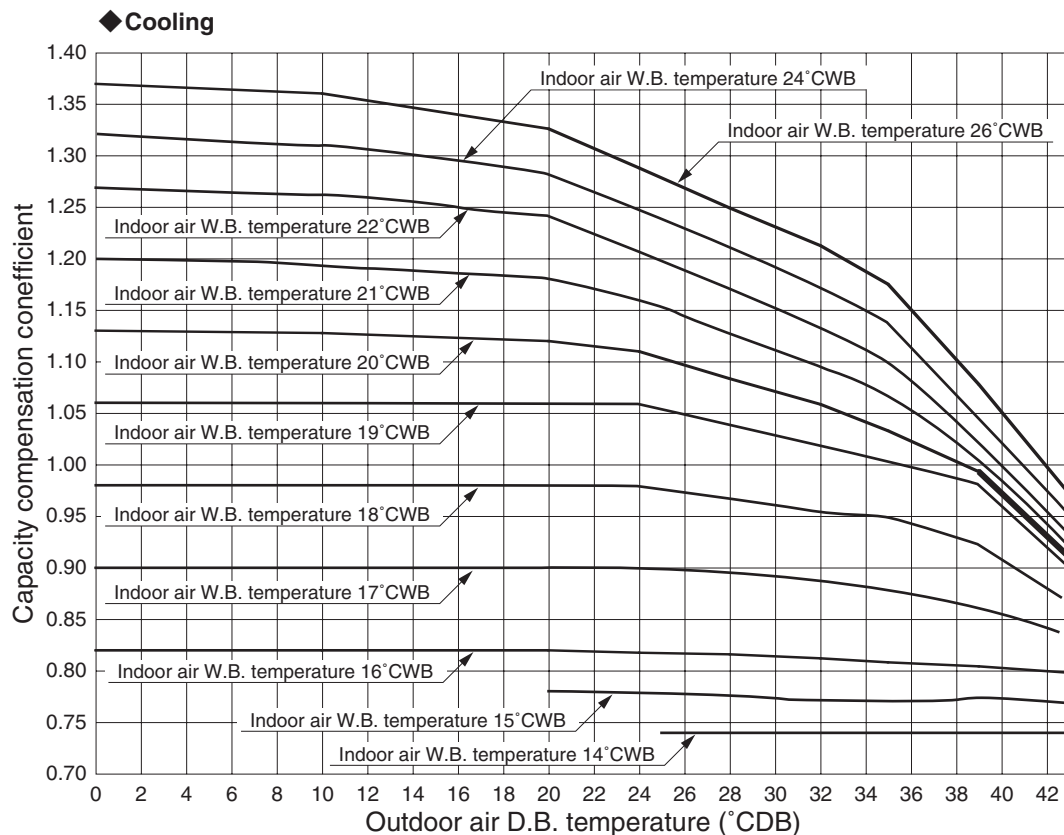
<Indoor unit heating capacity compensation> (Item (2) (d) calculation

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

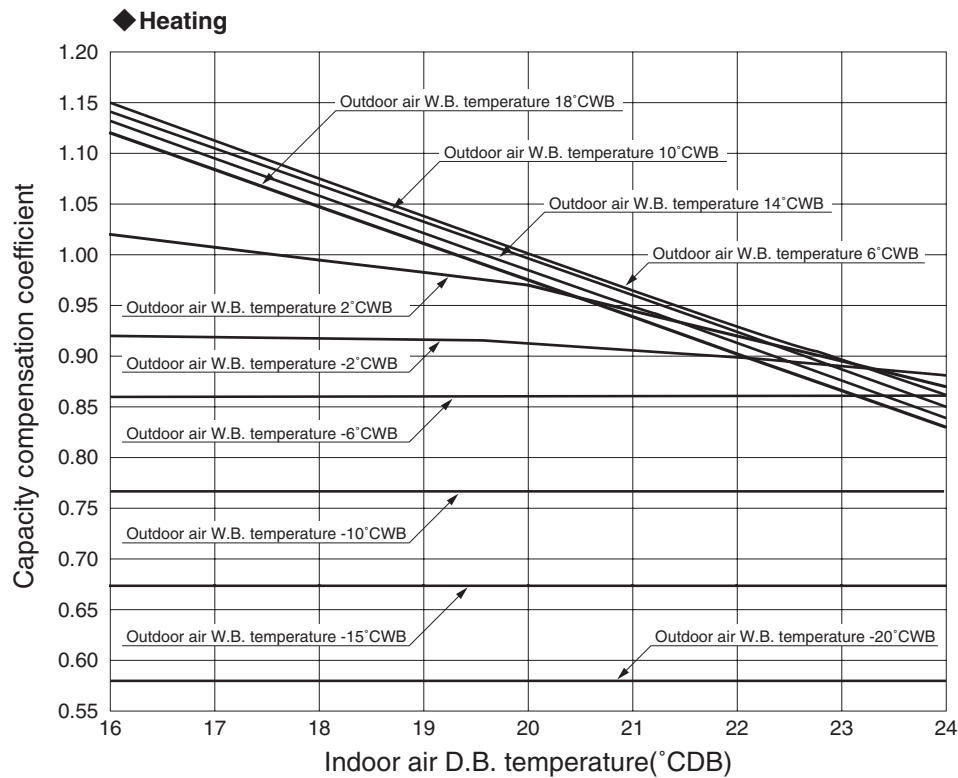
(3) Capacity compensation coefficient

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

1) Capacity compensation coefficient

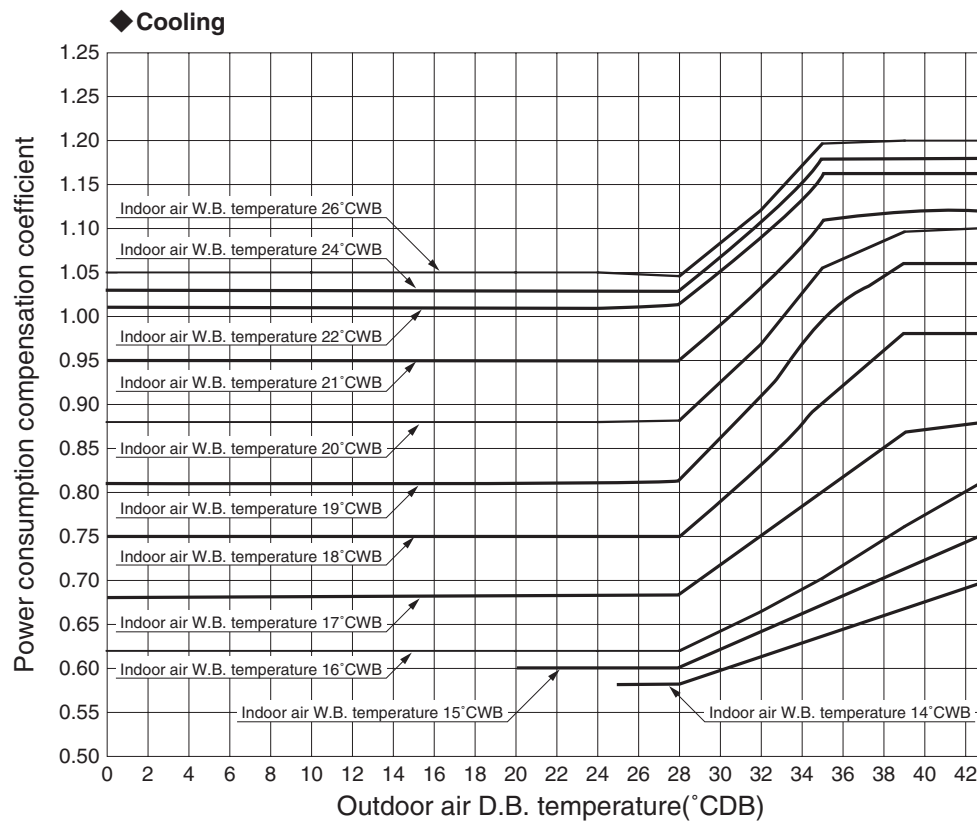


- Note (1) The above-mentioned table shows a typical condition among conditions to occur via controlling an air-conditioning equipment.
(2) When performing the cooling operation with the outdoor air temperature being -5°C or under, a windbreak fence must be installed.



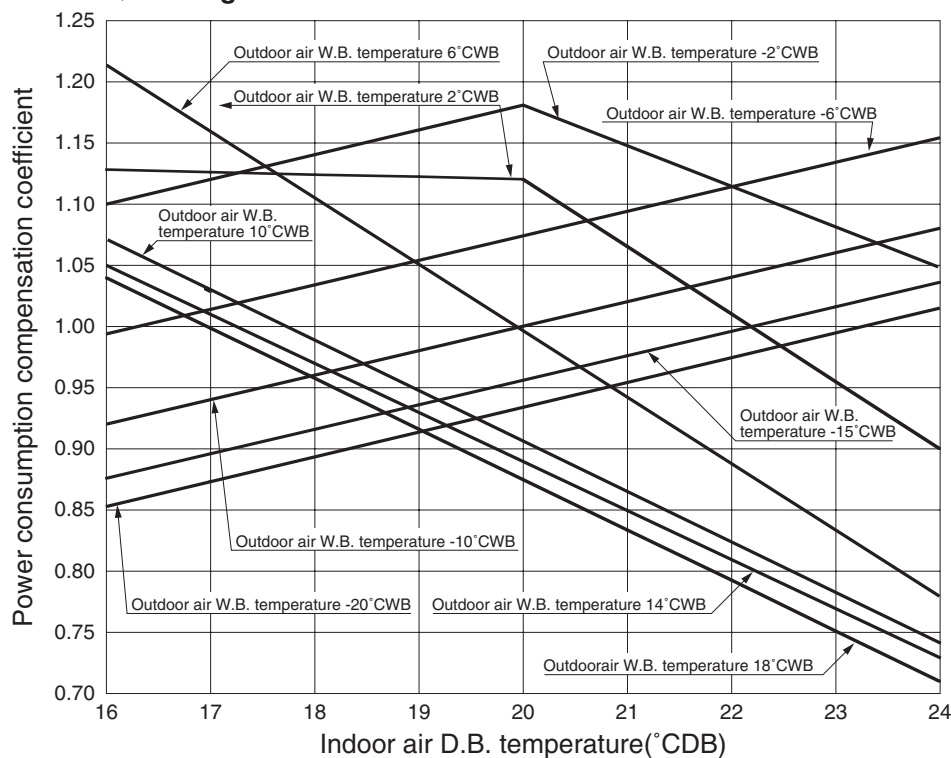
Note (1) The above-mentioned table shows a typical condition among conditions to occur via controlling an air-conditioning equipment.

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.

◆ Heating

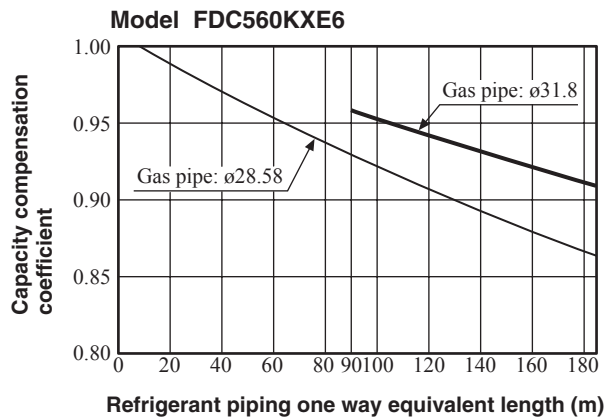
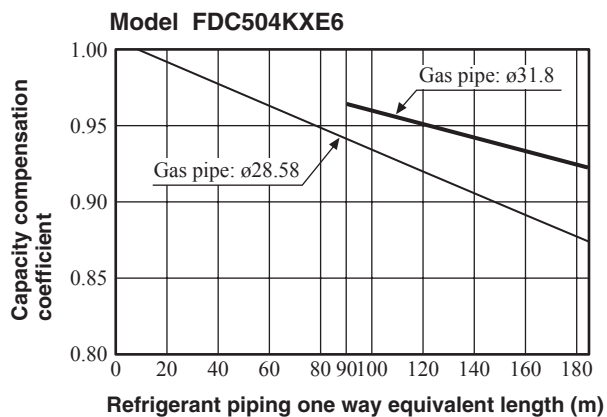
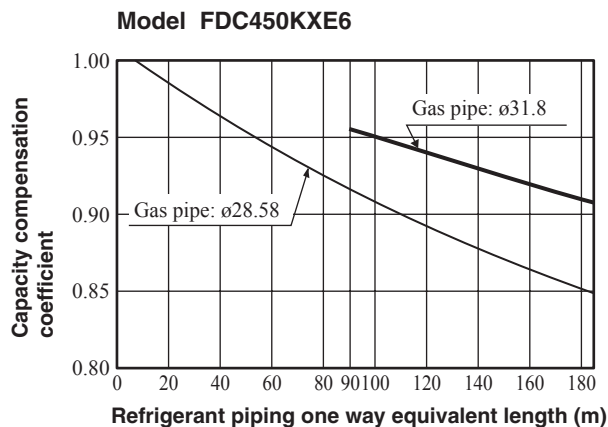
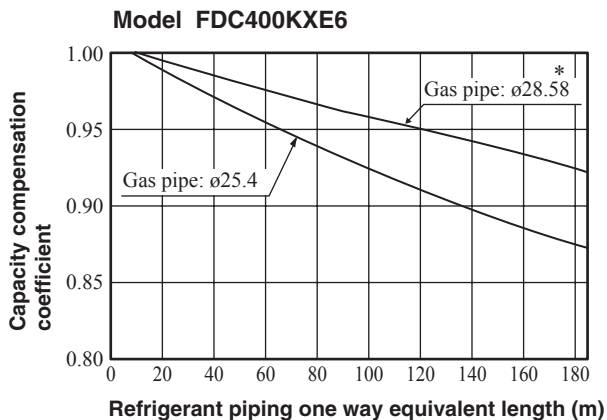


Note (1) The above-mentioned table shows a typical condition among conditions to occur via controlling an air-conditioning equipment.

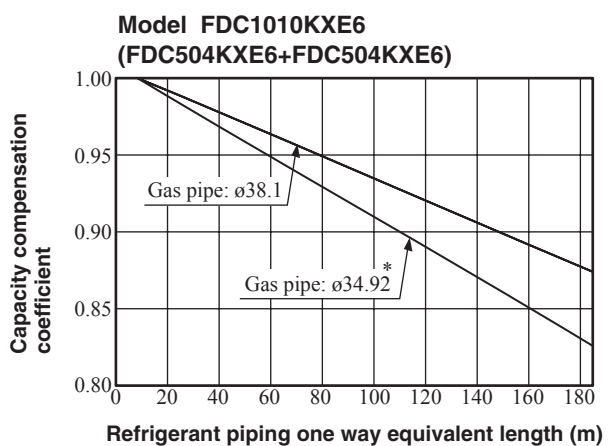
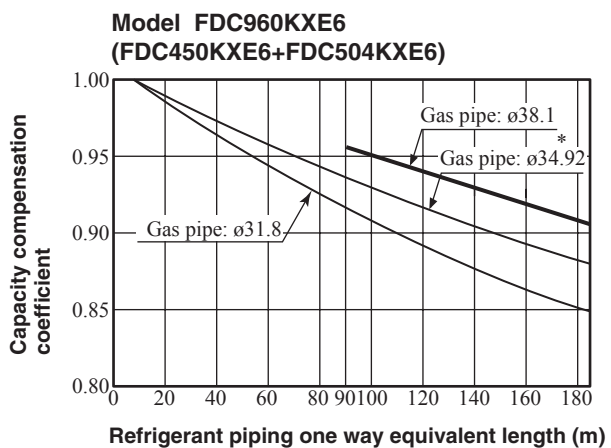
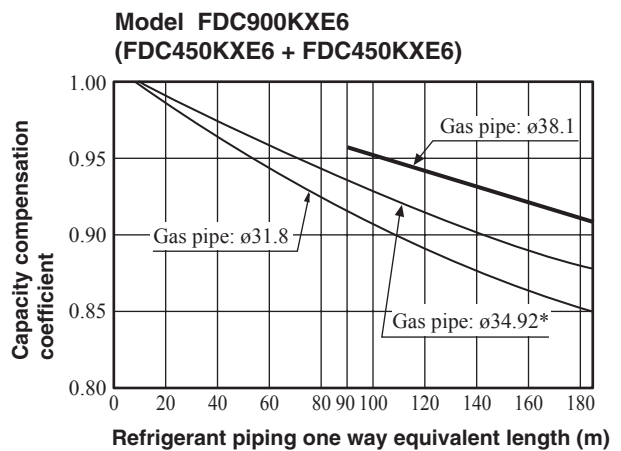
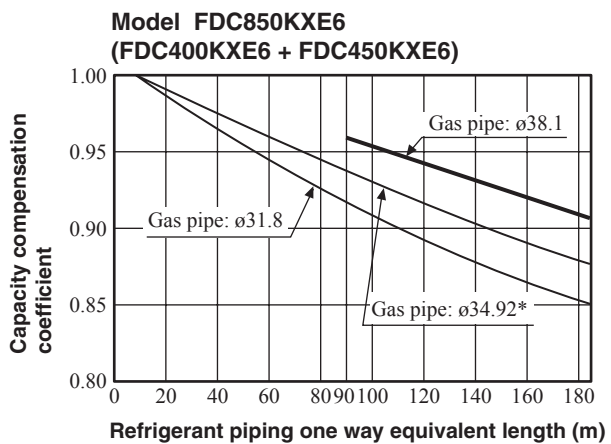
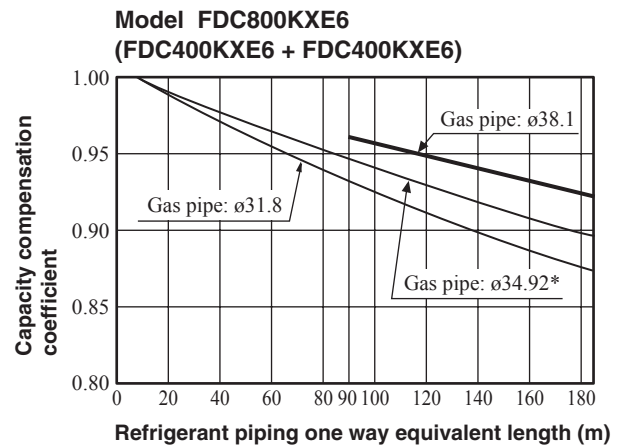
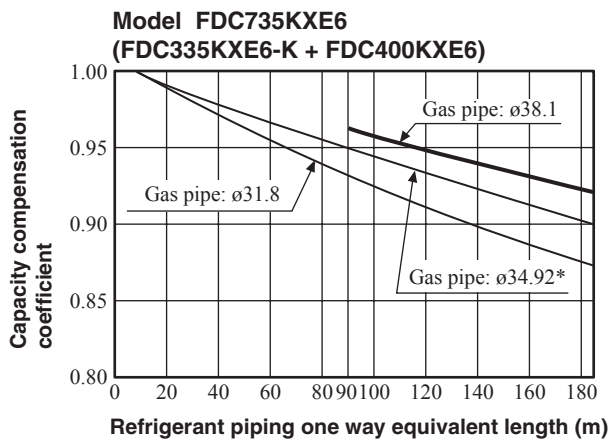
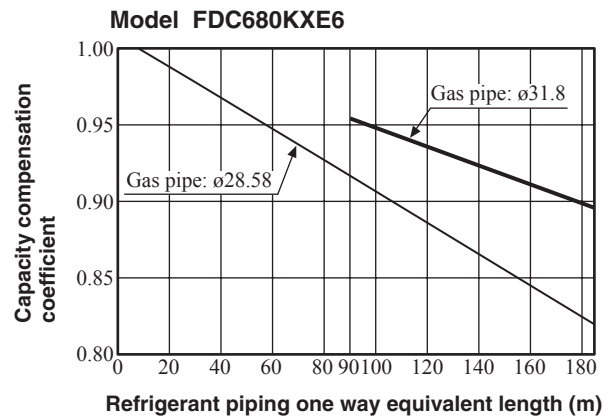
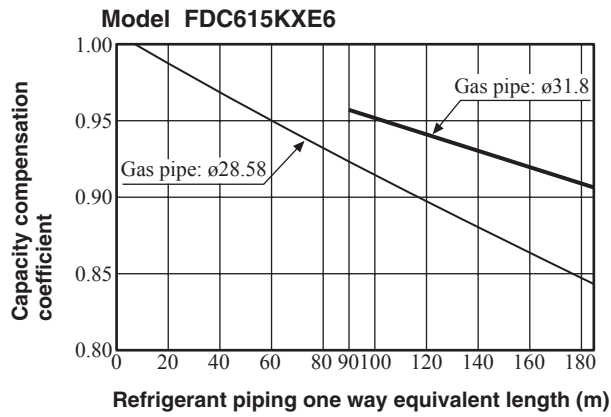
(c) Correction of cooling and heating capacity in relation to one way length of refrigerant piping.

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

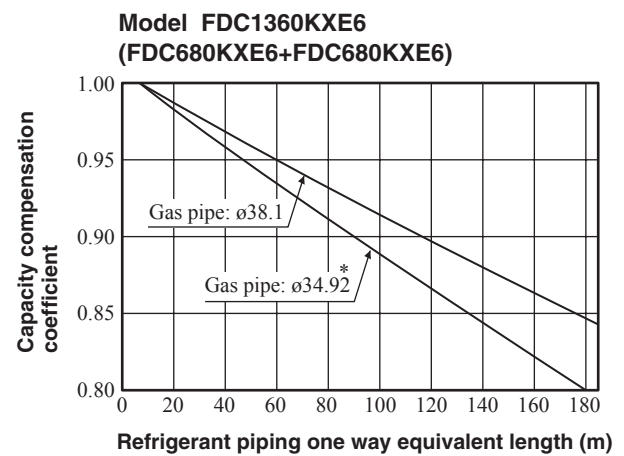
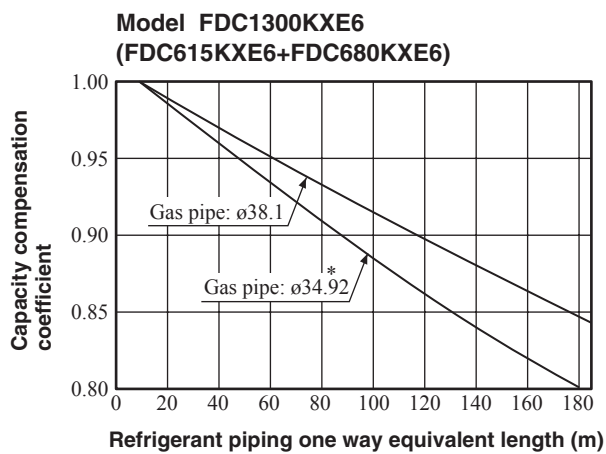
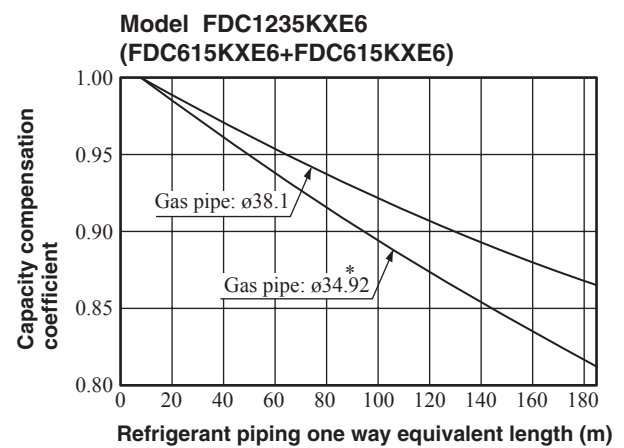
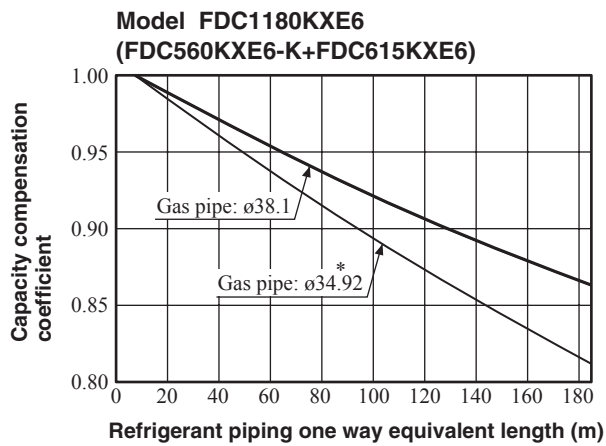
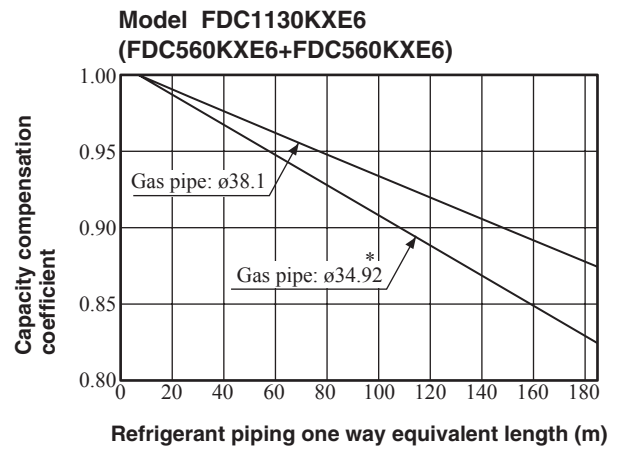
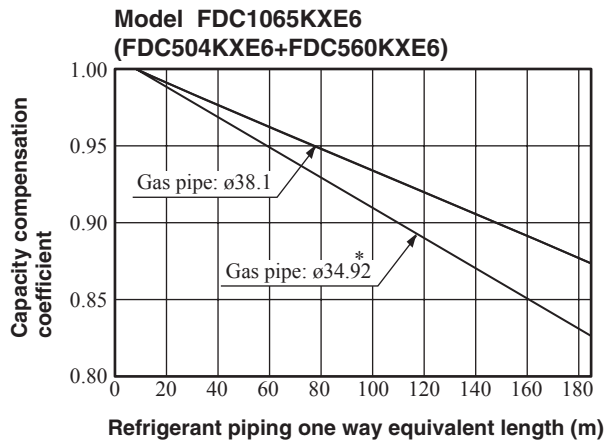
1) Cooling



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

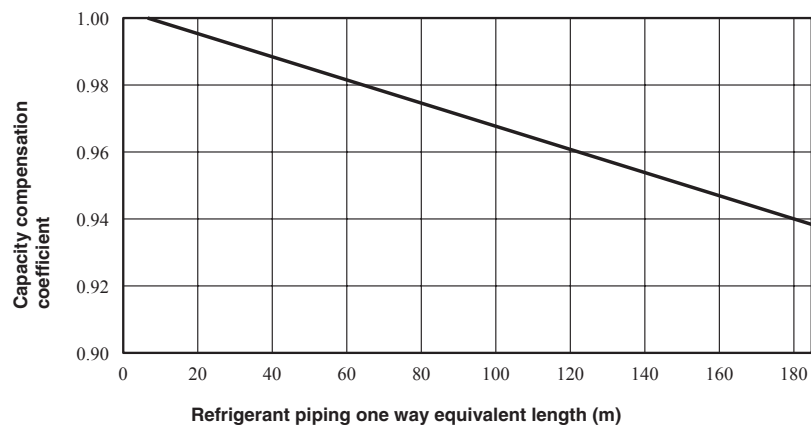


Note (1) Parts with the * mark show the piping size in case used in Europe.



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

2) Heating



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

Equivalent piping length = Real gas piping length + Number of bends in gas piping × Equivalent piping length of bends.

Equivalent length of each joint

Unit : m/one part

Gas piping size	φ9.52	φ12.7	φ15.88	φ19.05	φ25.4	φ28.58	φ31.8
Joint (90°elbow)	0.15	0.20	0.25	0.30	0.40	0.45	0.55

- (d) 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
Adjustment coefficient	0.99	0.98	0.97	0.96	0.95	0.94

Height difference between the indoor unit and outdoor unit in the vertical height difference	35 m	40 m	45 m	50 m
Adjustment coefficient	0.93	0.92	0.91	0.90

- (e) 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.

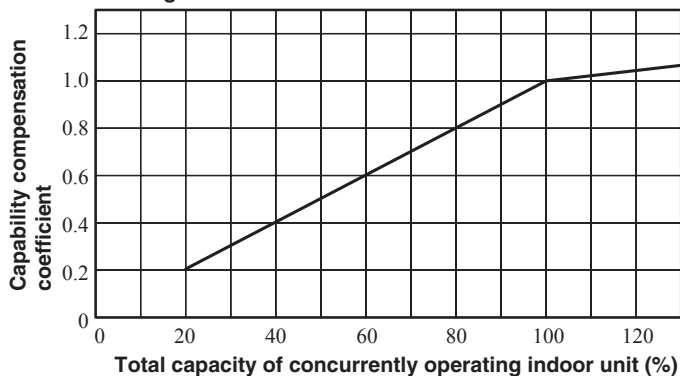
- (f) The capacity compensation coefficient and power consumption compensation coefficient vary according to the total capacity of concurrently operating indoor units, as shown below.

(Note) This table shows typical values.

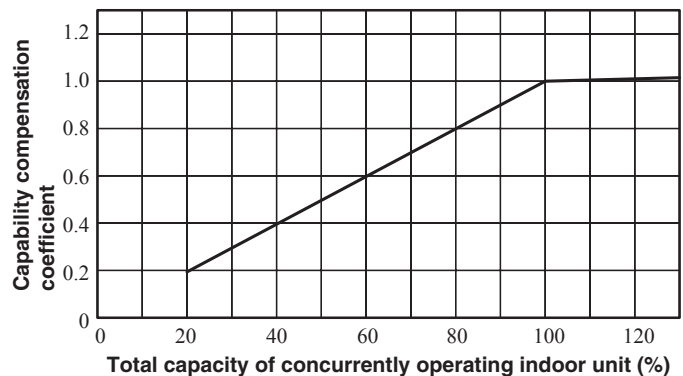
Model FDC400KXE6

◆ Capability compensation coefficient

Cooling

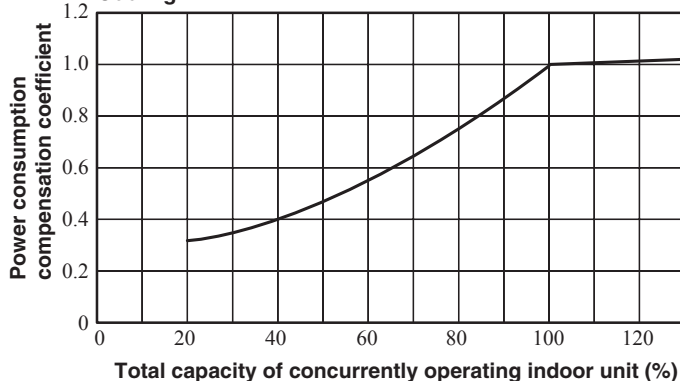


Heating

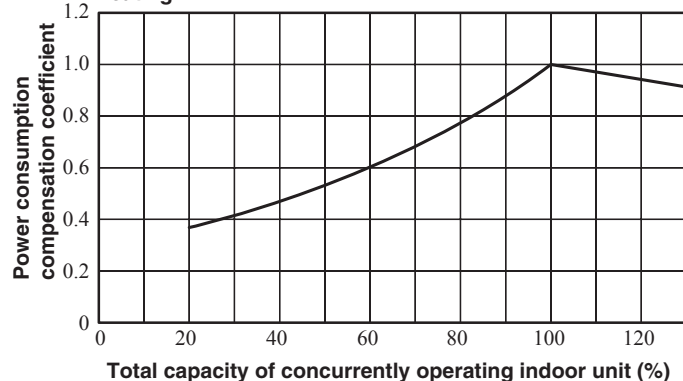


◆ Power consumption compensation coefficient

Cooling



Heating

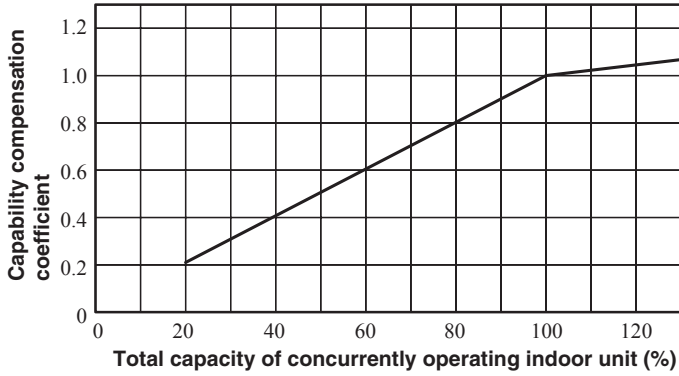


(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

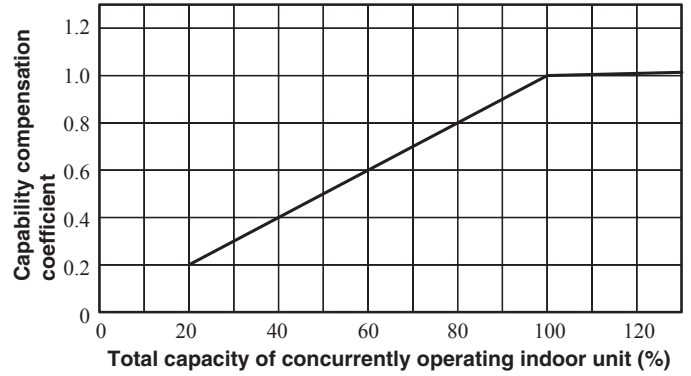
Model FDC450KXE6

◆ Capability compensation coefficient

Cooling

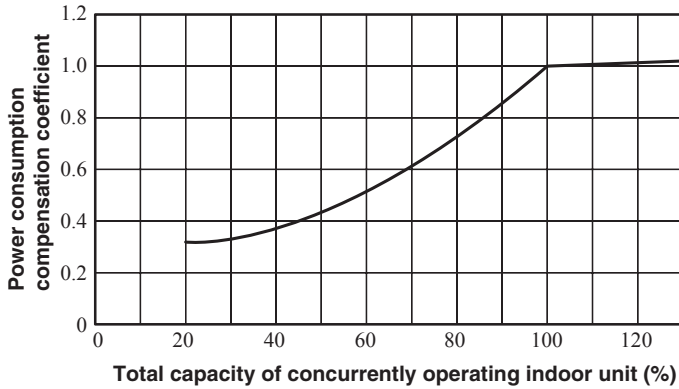


Heating

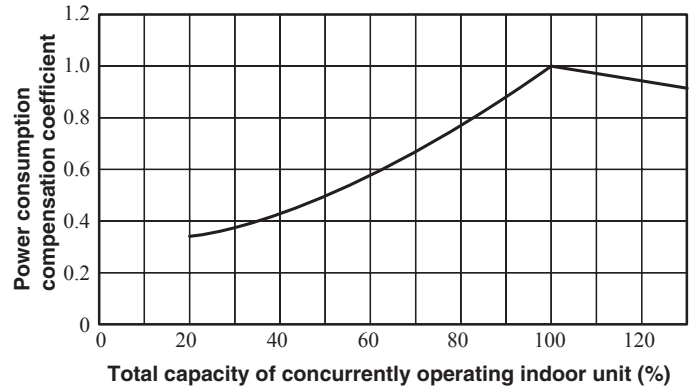


◆ Power consumption compensation coefficient

Cooling



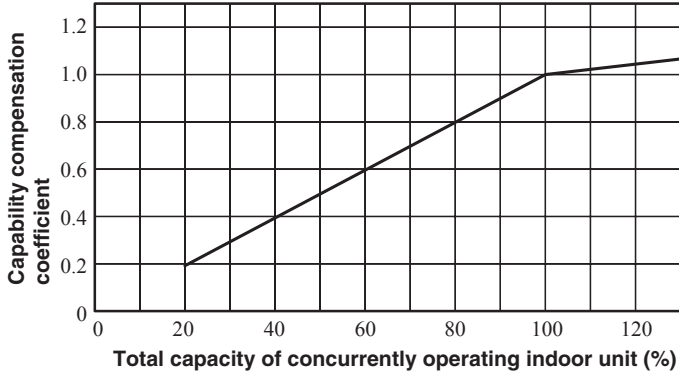
Heating



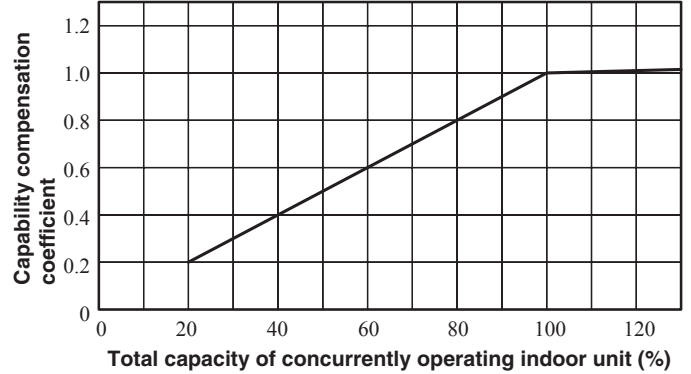
Model FDC504KXE6

◆ Capability compensation coefficient

Cooling

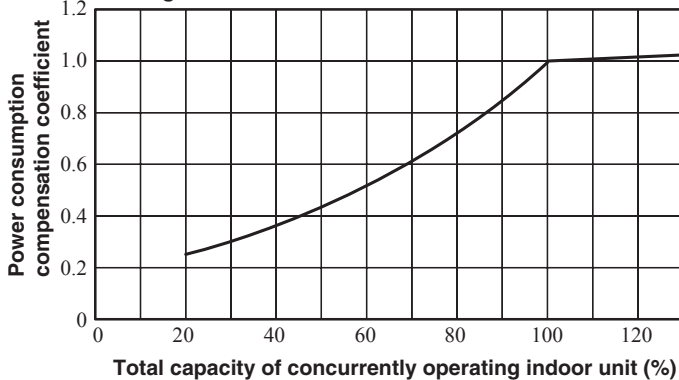


Heating

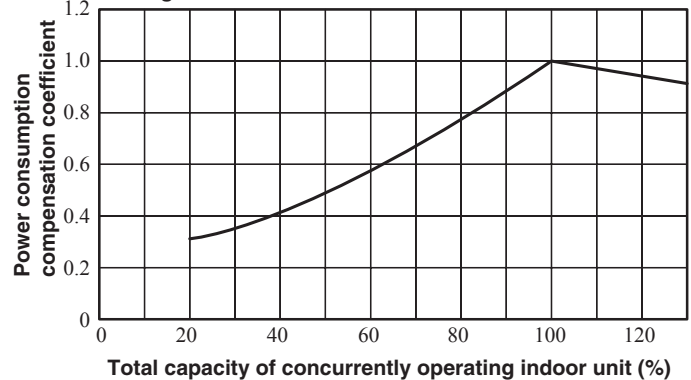


◆ Power consumption compensation coefficient

Cooling



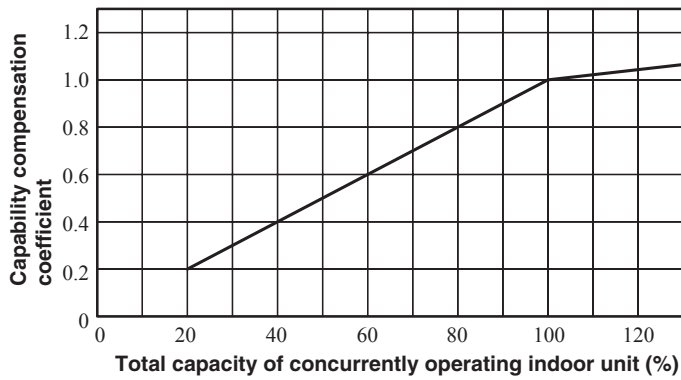
Heating



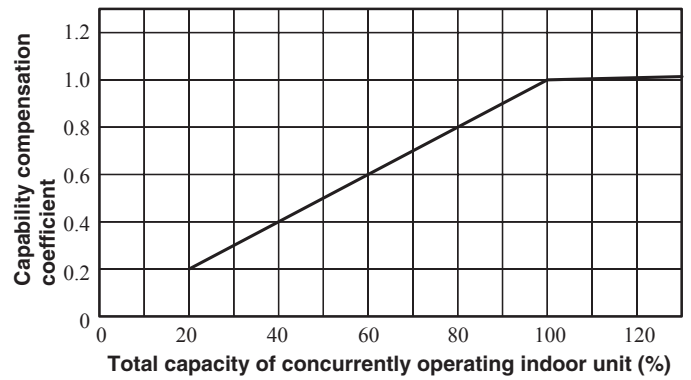
(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

Model FDC560KXE6

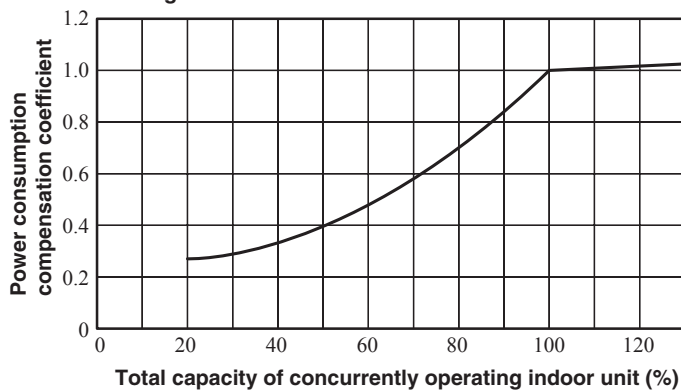
◆ Capability compensation coefficient Cooling



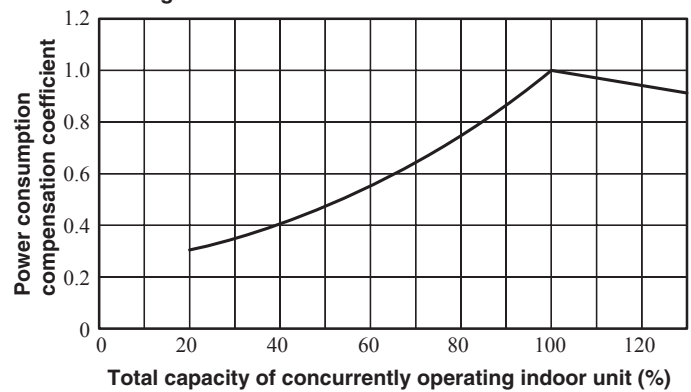
Heating



◆ Power consumption compensation coefficient Cooling

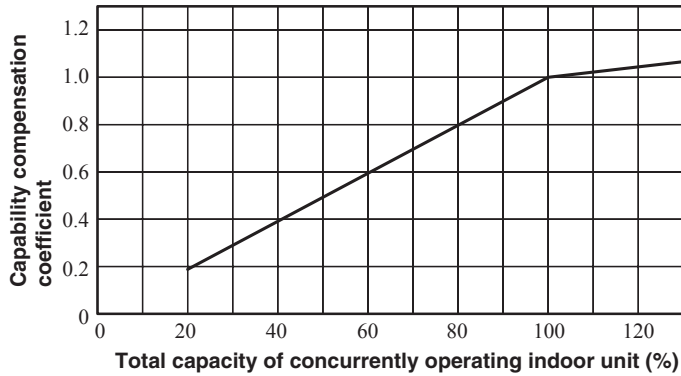


Heating

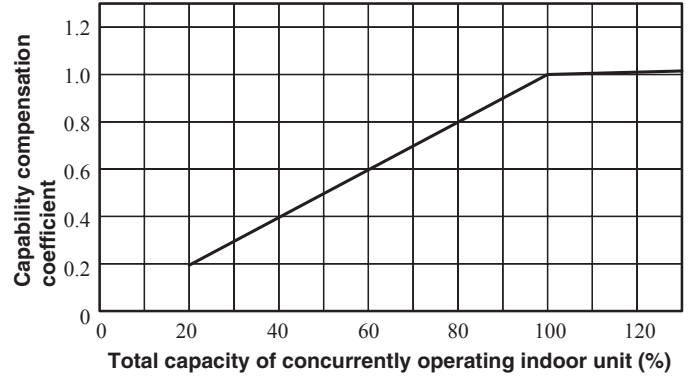


Model FDC615KXE6

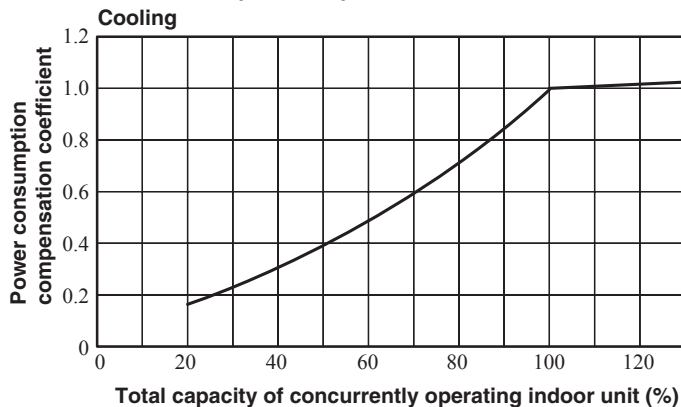
◆ Capability compensation coefficient Cooling



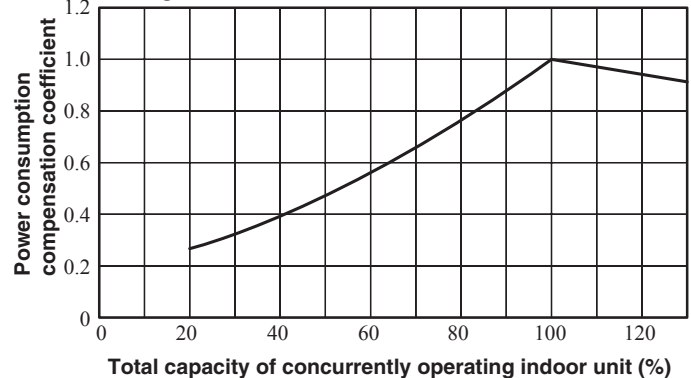
Heating



◆ Power consumption compensation coefficient Cooling



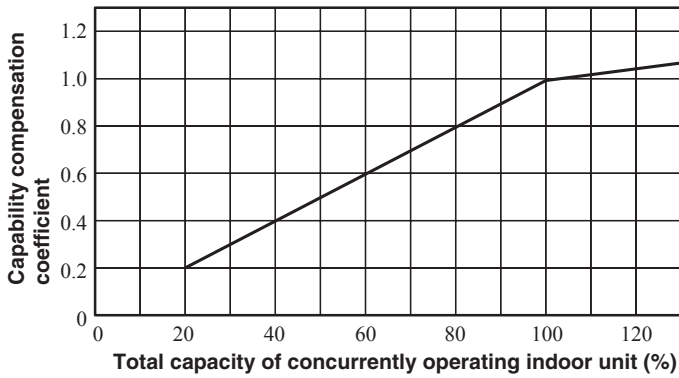
Heating



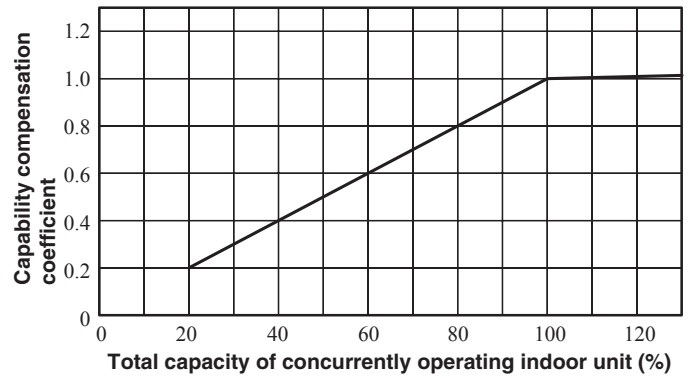
(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

Model FDC680KXE6

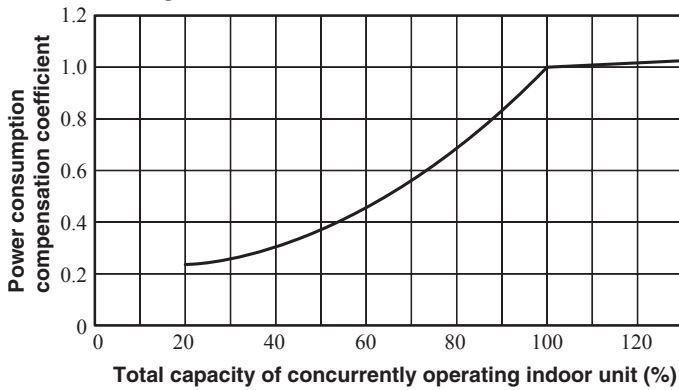
◆ Capability compensation coefficient Cooling



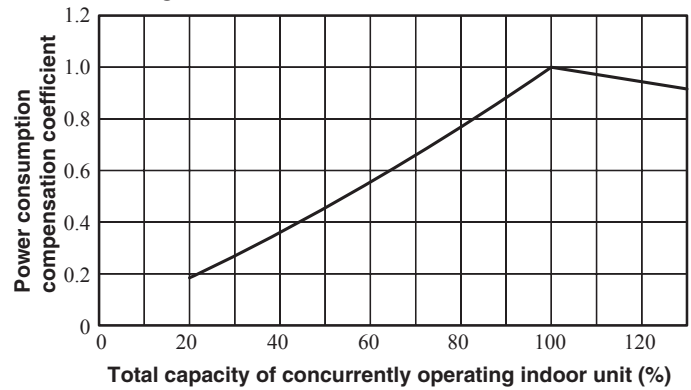
Heating



◆ Power consumption compensation coefficient Cooling

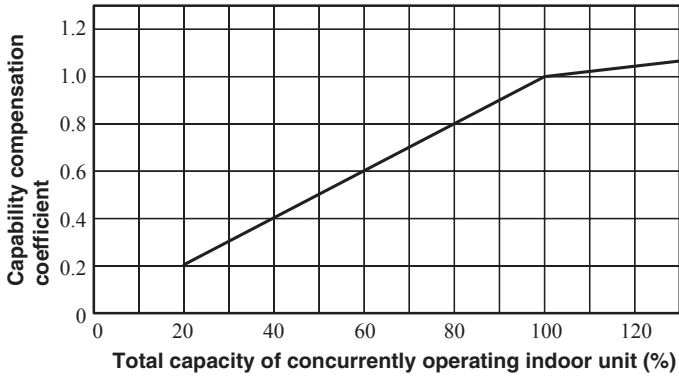


Heating

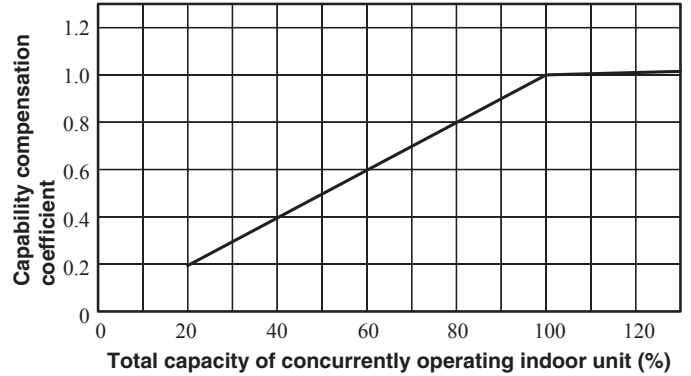


Model FDC735KXE6

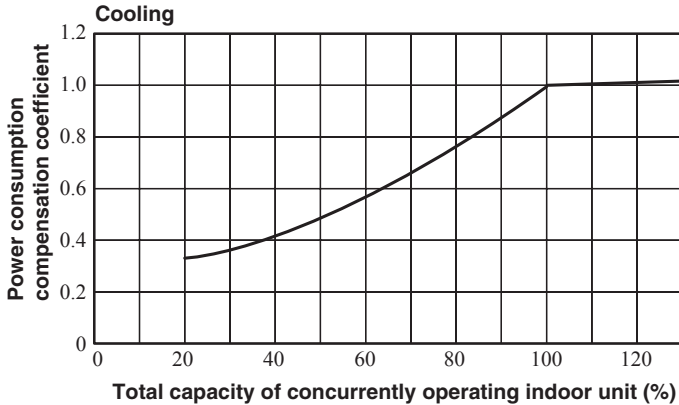
◆ Capability compensation coefficient Cooling



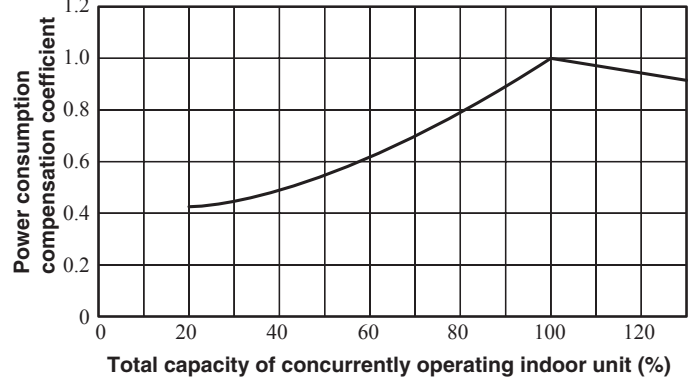
Heating



◆ Power consumption compensation coefficient Cooling



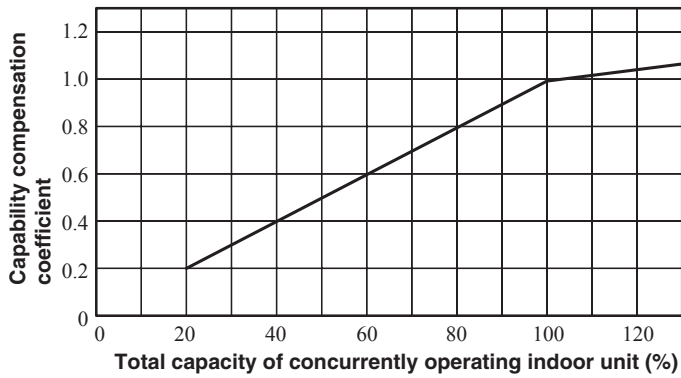
Heating



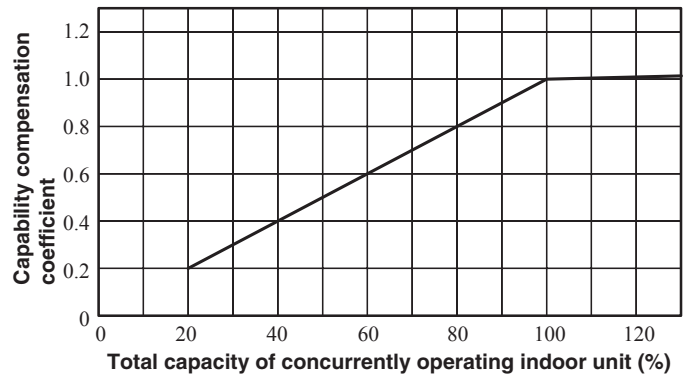
(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

Model FDC800KXE6

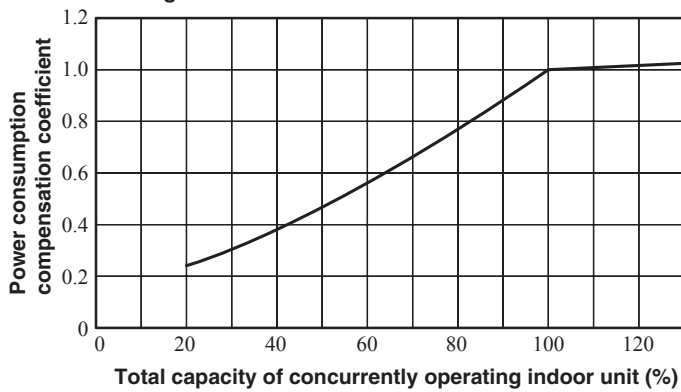
◆ Capability compensation coefficient Cooling



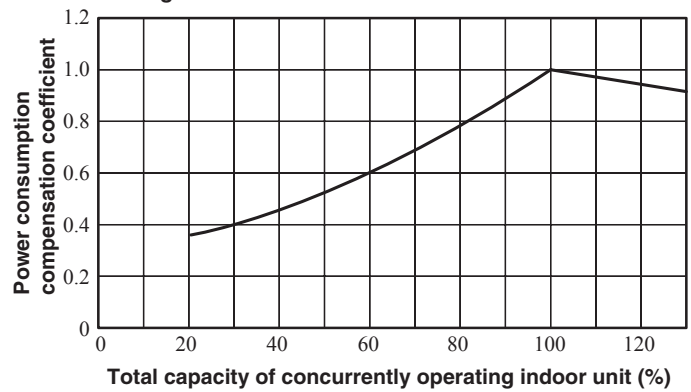
Heating



◆ Power consumption compensation coefficient Cooling

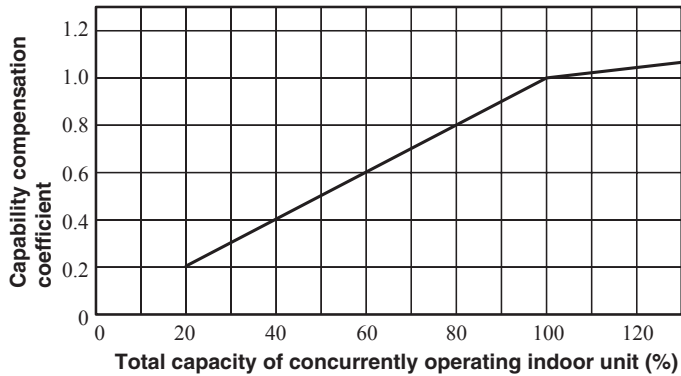


Heating

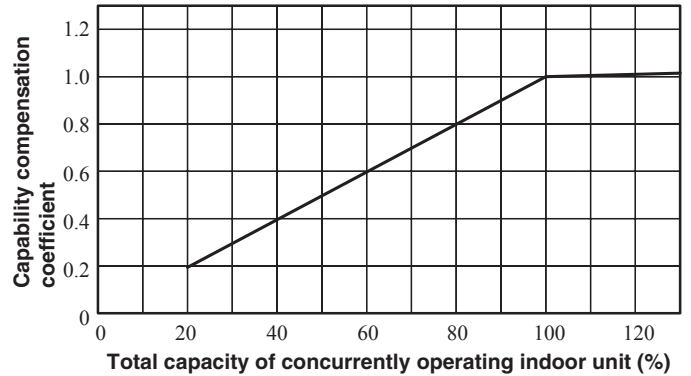


Model FDC850KXE6

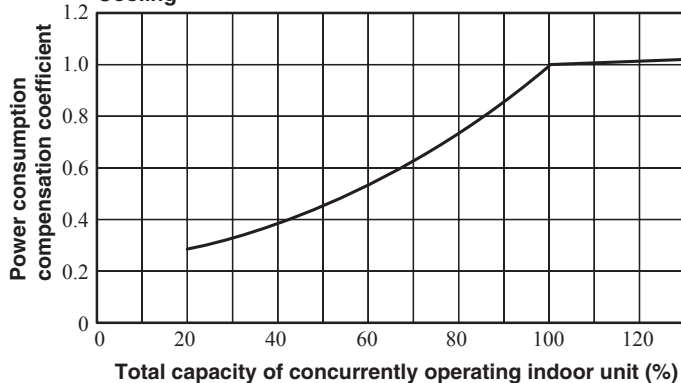
◆ Capability compensation coefficient Cooling



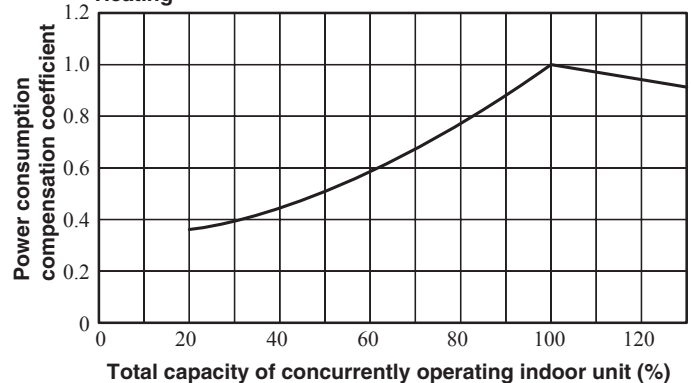
Heating



◆ Power consumption compensation coefficient Cooling



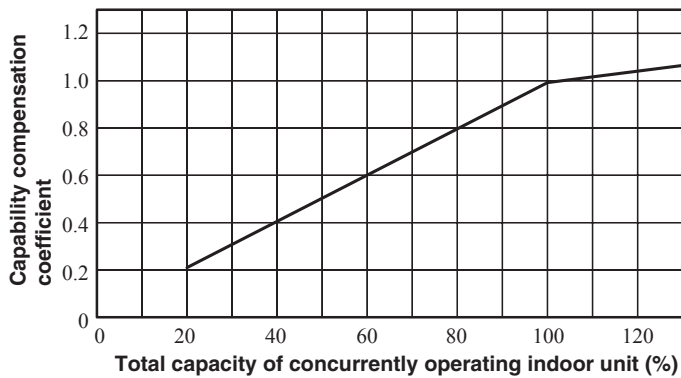
Heating



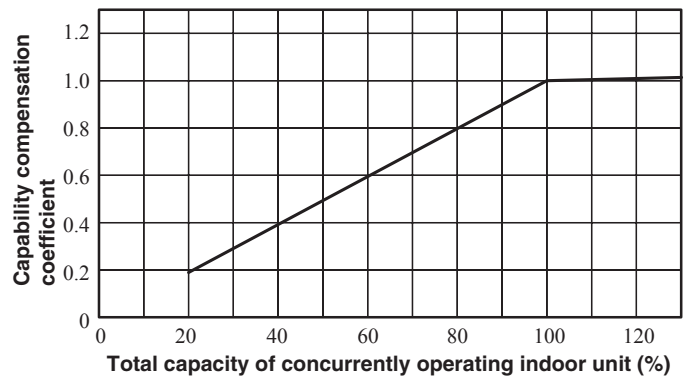
(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

Model FDC900KXE6

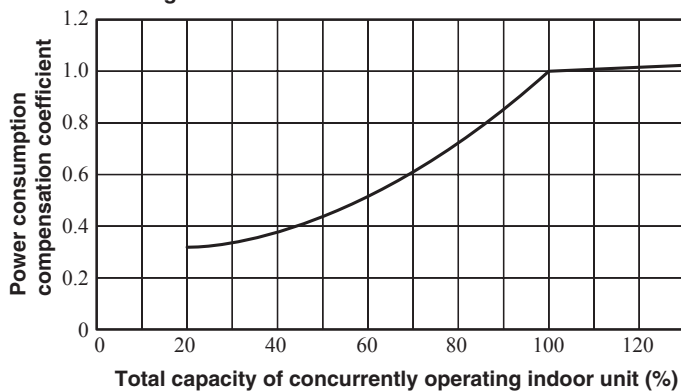
◆ Capability compensation coefficient Cooling



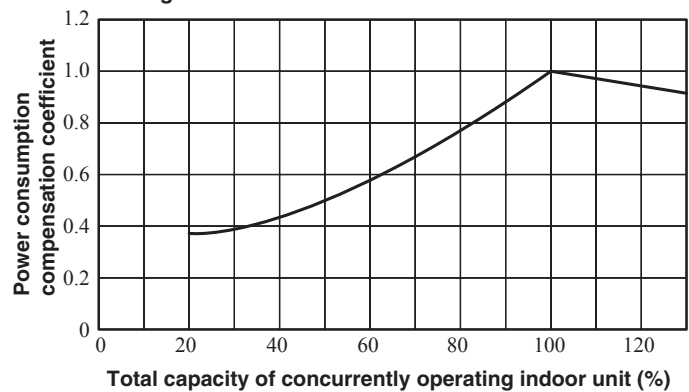
Heating



◆ Power consumption compensation coefficient Cooling

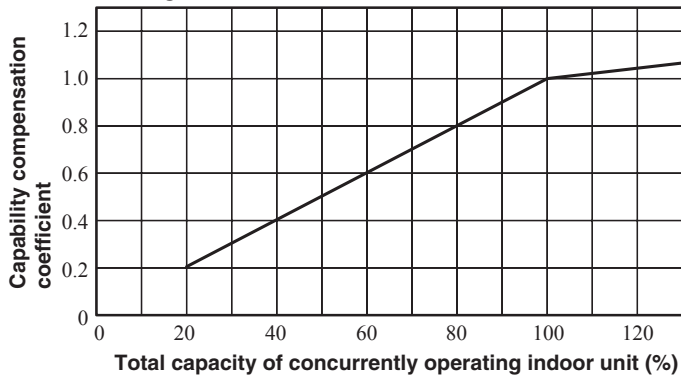


Heating

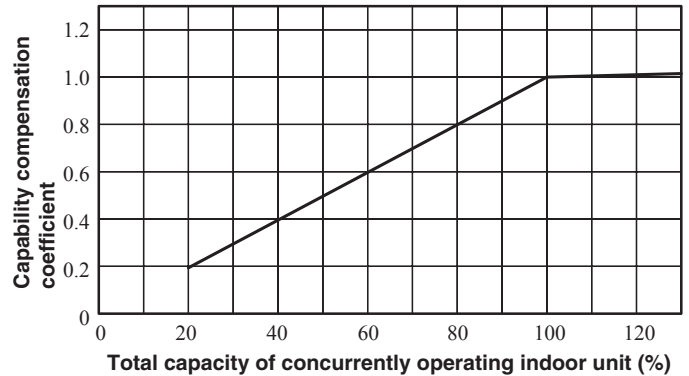


Model FDC960KXE6

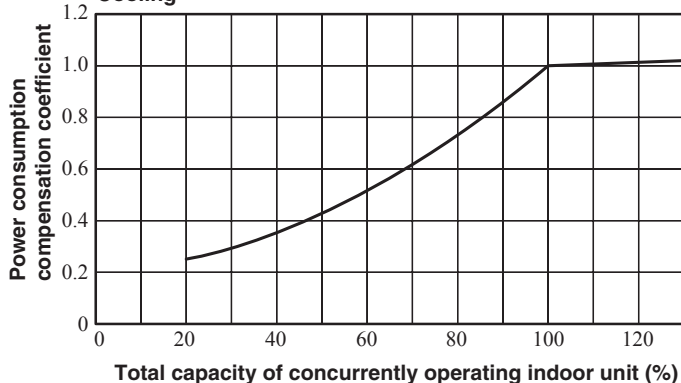
◆ Capability compensation coefficient Cooling



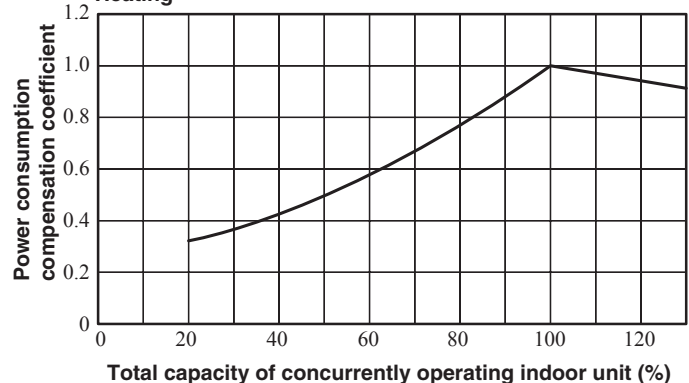
Heating



◆ Power consumption compensation coefficient Cooling



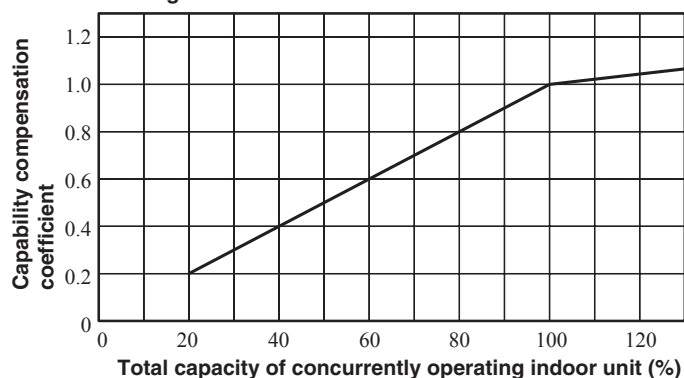
Heating



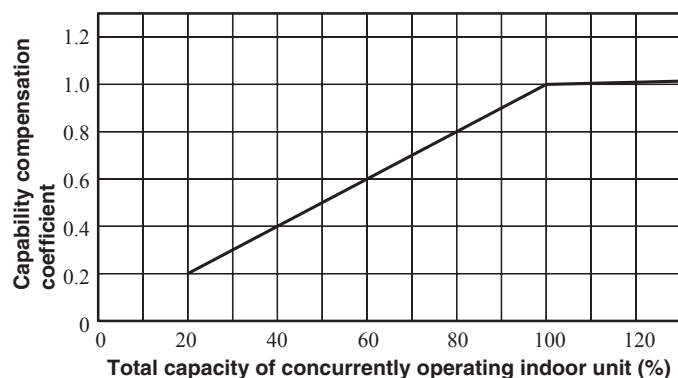
(Note) If the connecting capacity of the indoor unit exceeds 130 %, consider the connecting capacity as 130 %.

Model FDC1010KXE6

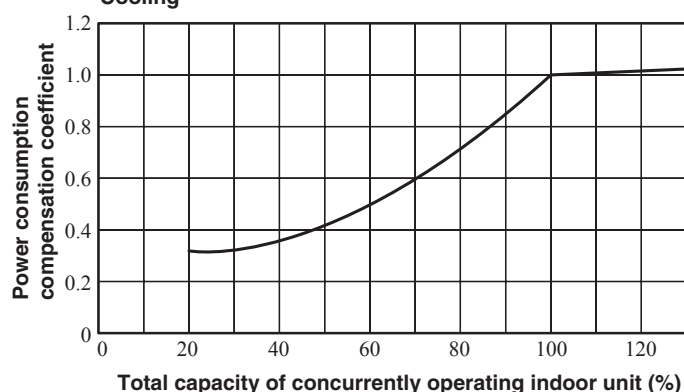
◆ Capability compensation coefficient Cooling



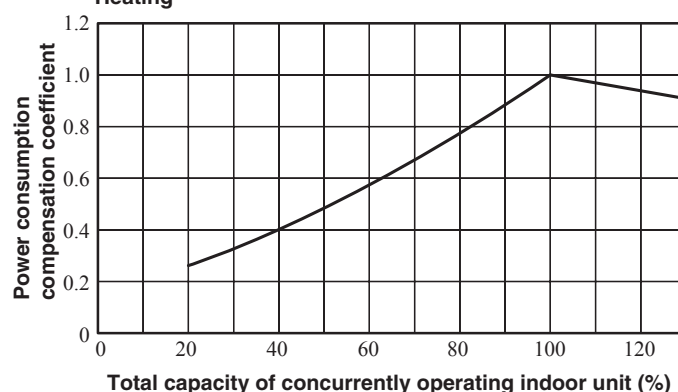
Heating



◆ Power consumption compensation coefficient Cooling

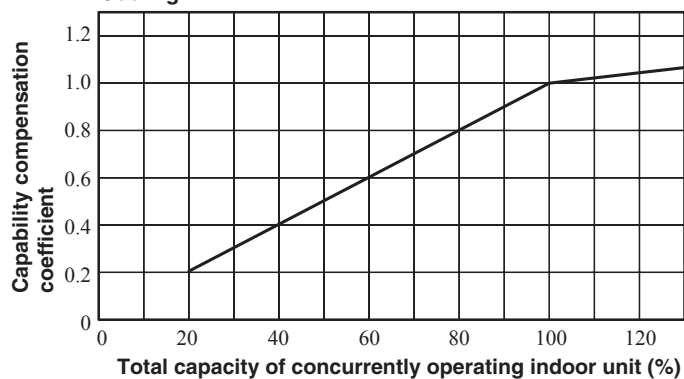


Heating

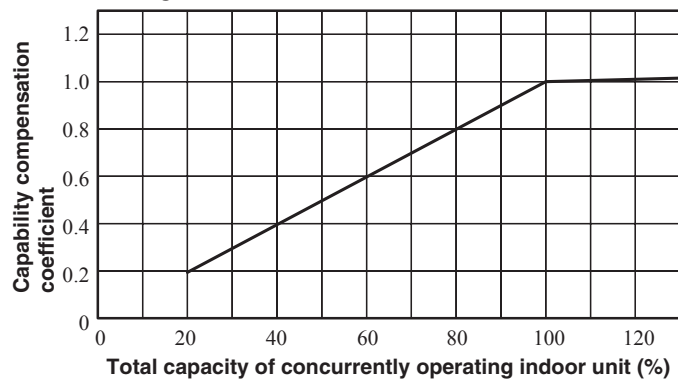


Model FDC1065KXE6

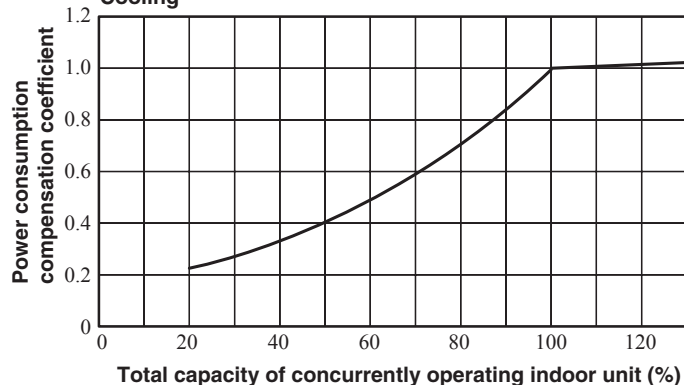
◆ Capability compensation coefficient Cooling



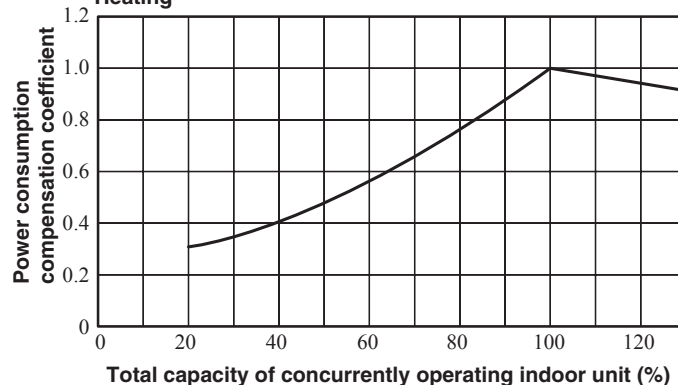
Heating



◆ Power consumption compensation coefficient Cooling

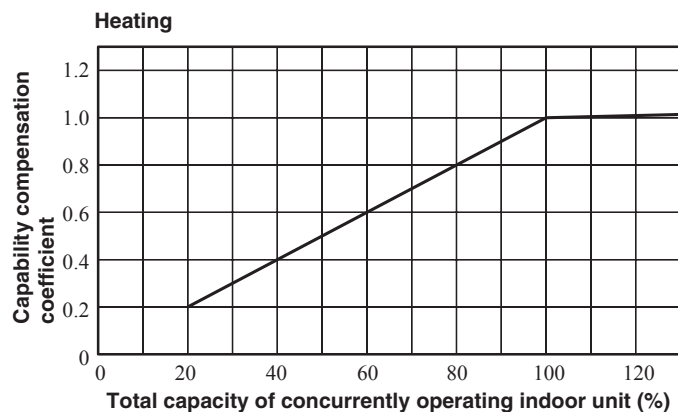
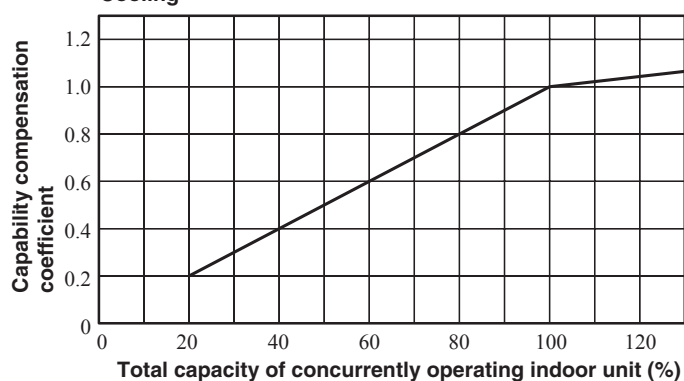


Heating

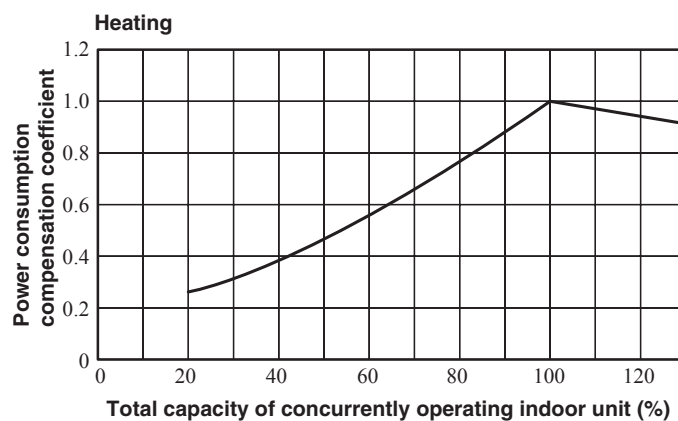
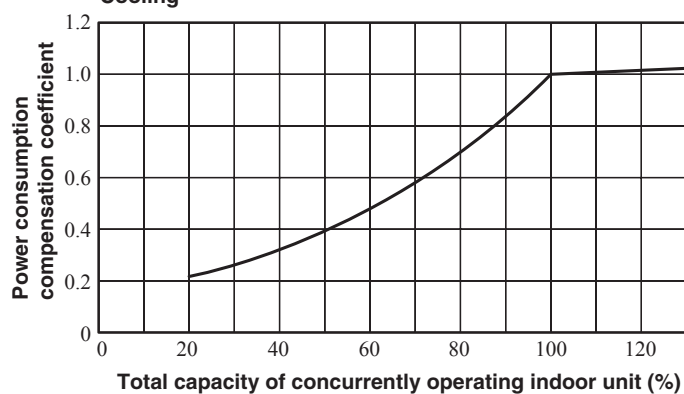


Model FDC1130KXE6

- ◆ Capability compensation coefficient

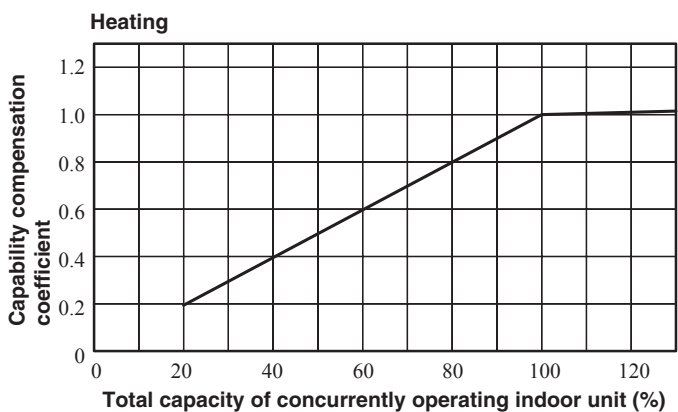
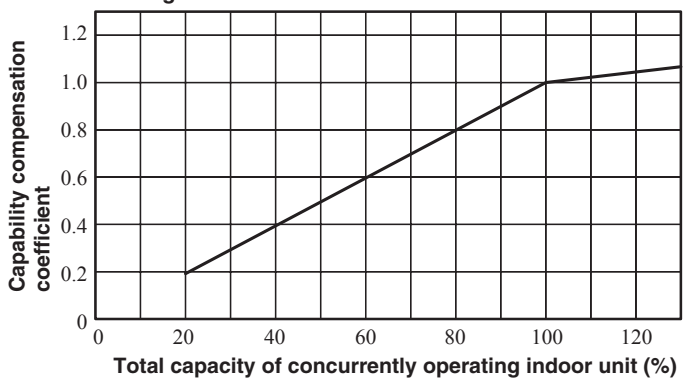


- ◆ Power consumption compensation coefficient

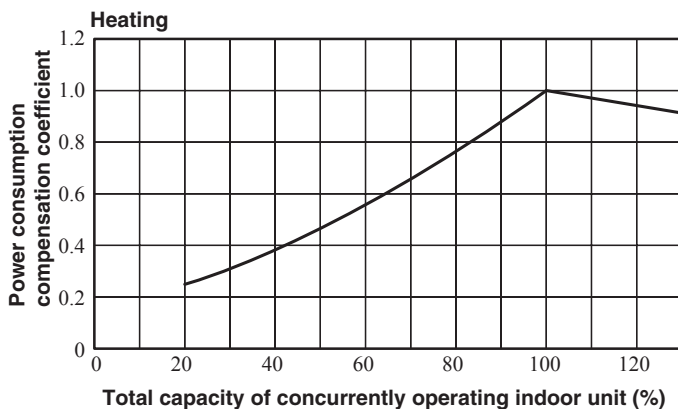
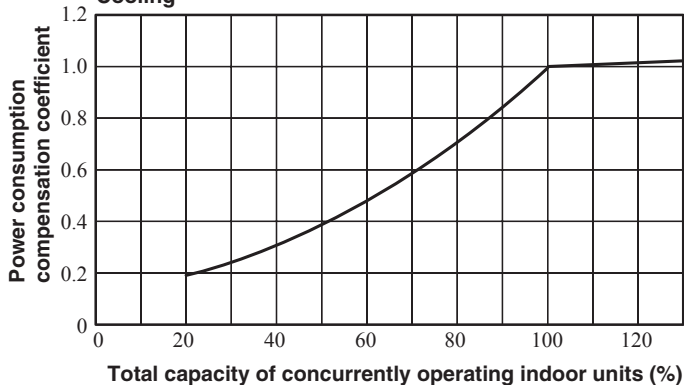


Model FDC1180KXE6

- ◆ Capability compensation coefficient

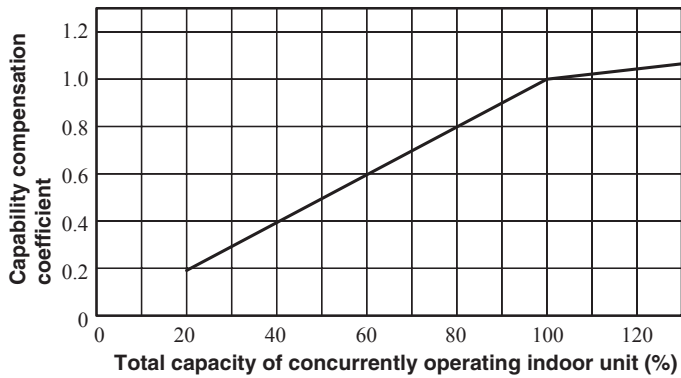


- ◆ Power consumption compensation coefficient

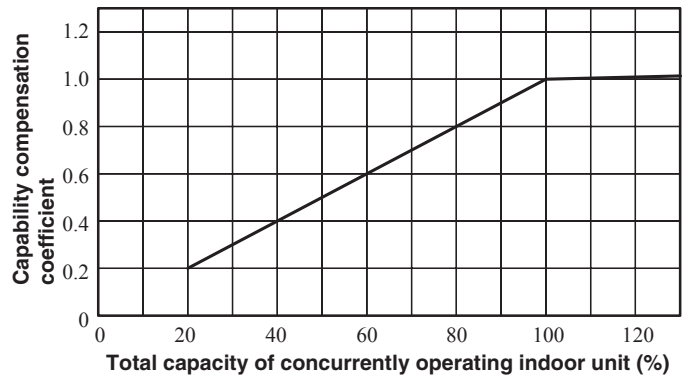


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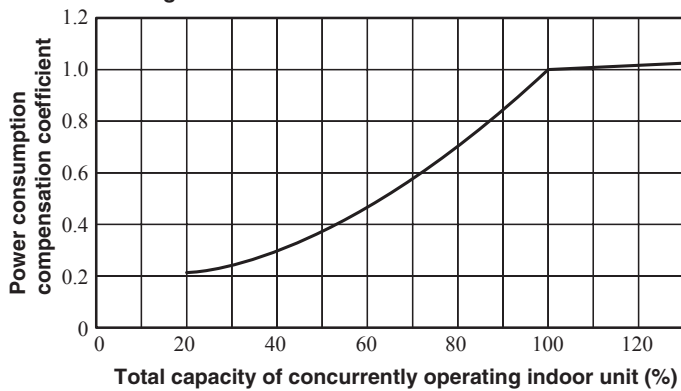
◆ Capability compensation coefficient Cooling



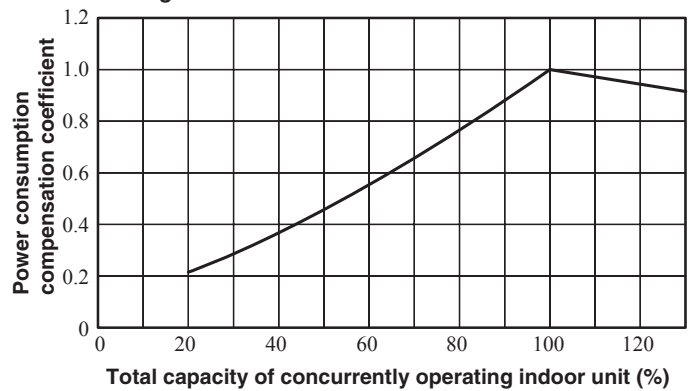
Heating



◆ Power consumption compensation coefficient Cooling

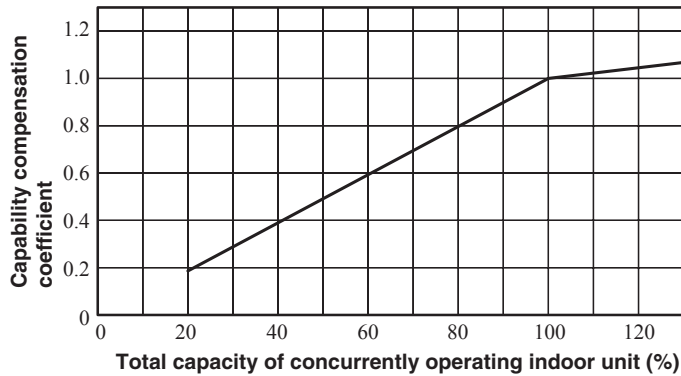


Heating

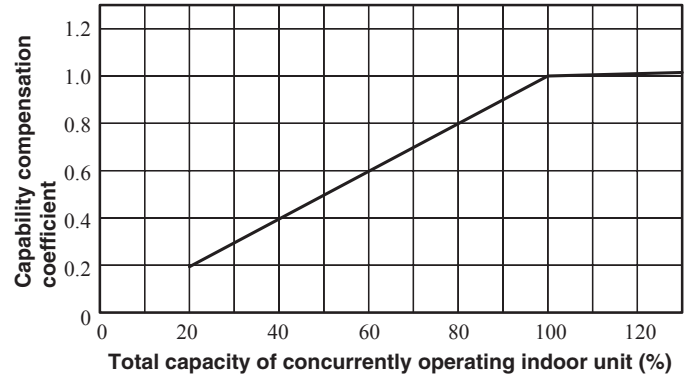


Model FDC1300KXE6

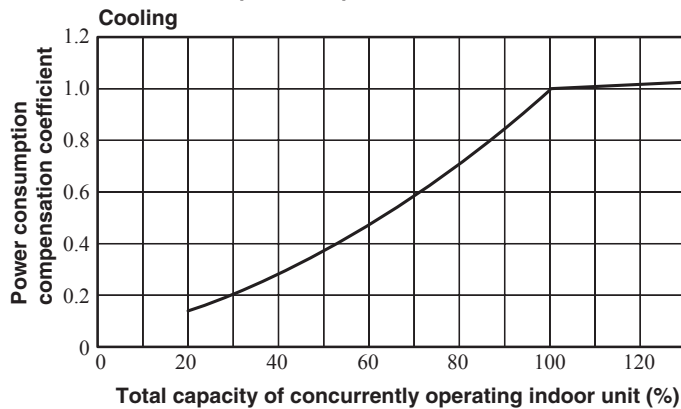
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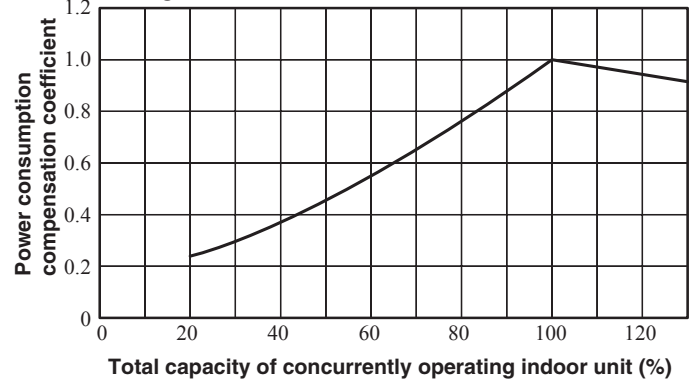
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◆ Power consumption compensation coefficient

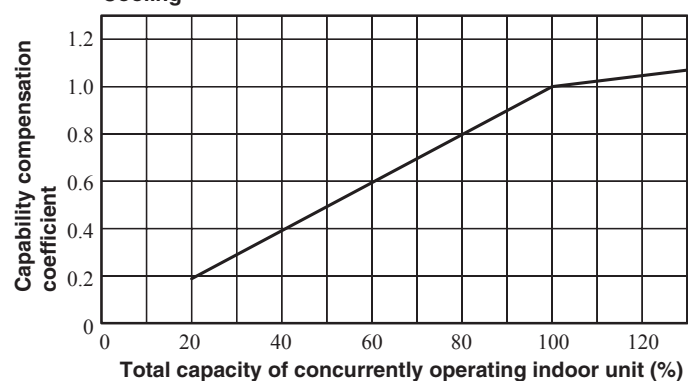


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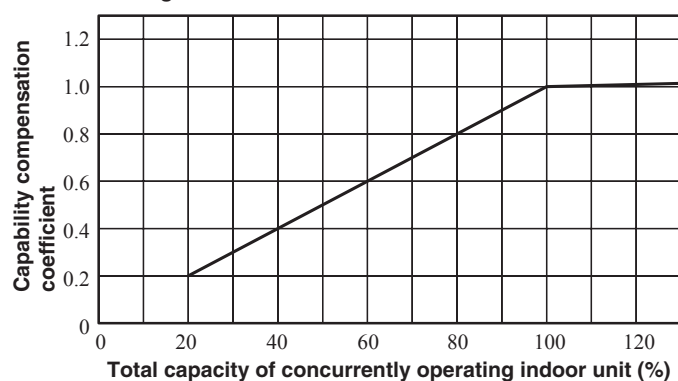


Model FDC1360KXE6

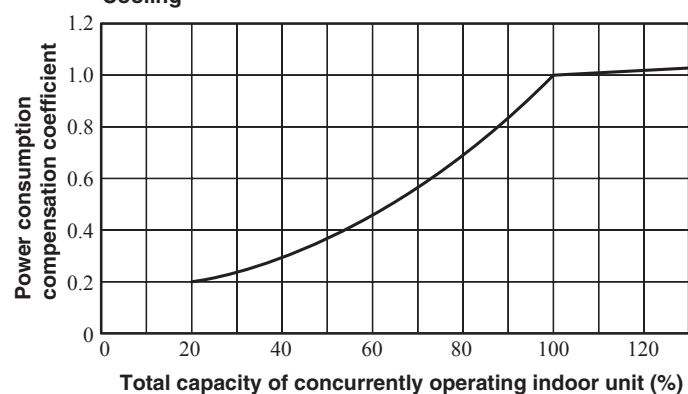
◆ Capability compensation coefficient Cooling



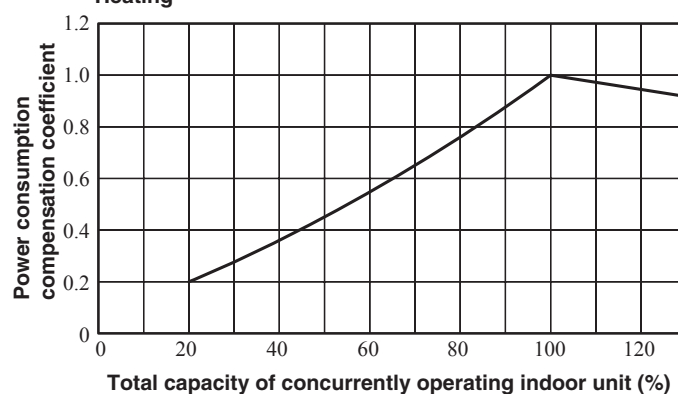
Heating



◆ Power consumption compensation coefficient Cooling



Heating



6 KX SERIES INSTALLATION MANUAL

Designed for R410A refrigerant

PSB012D942C

Outdoor unit capacity
FDC400-1360

- 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.
- 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

!

- Carry out installation work properly according to this installation manual.
- Improper installation work can result in a water leak, an electric shock, a fire, or injury from a fall of the unit.
- Ask your dealer or a specialized service provider to install the unit.
- Improper installation work performed on the part of a user can result in a water leak, an electric shock, a fire or injury from a fall of the unit.
- Always turn off power before you work inside the unit such as for installation or servicing.
- A failure to observe this instruction can result in an electric shock.
- When an indoor unit is installed in a small room, it is necessary to take some safety precaution to keep refrigerant gas from building up beyond the upper limit concentration even if it leaks in the room. For safety precautions to prevent a concentration build-up beyond the upper limit, please consult with the dealer.
- If refrigerant leaks and its concentration builds up beyond the upper limit, it can cause a lack-of-oxygen accident.
- Install the unit securely onto a structure that is strong enough to sustain its weight.
- Insufficient strength can cause a drop or fall of the unit and resultant injury.
- Install the unit according to the prescribed installation specifications so that it can withstand strong winds, such as typhoons, and earthquakes.
- Improper installation work can cause an accident such as from a fall of the unit.
- Wrap the unit with ropes properly rated for its weight at the specified points in hoisting it for haulage.
- An improper hauling method can cause a fall of the unit and resultant death or major injury.
- Use only parts supplied with the unit and approved supply parts for installation work.
- A failure to use genuine parts approved by the manufacturer may result in a fall of the unit, a water leak, a fire, an electric shock, a refrigerant leak, substandard performance or a control failure.
- Ask your dealer or a specialized service provider to install them.
- Improper installation work performed on the part of a user can result in a water leak, electric shock or fire.
- Electrical installation work must be performed by an electrical installation service provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
- A defect in power supply circuits such as insufficient capacity or improper installation can cause an electrical shock or fire.
- Always use specified cables and connect them securely. Fasten cables securely so that the terminal connections may not be subject to external force working through the cables.
- Improper connection or fastening can cause heat generation, a fire or an electric shock.
- 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.
- Dust deposits, clogging or wobble can result in an electric shock or fire.
- Neatly arrange the cables so that they may not get loose, and put on the service panel securely. Improper installation can cause heat generation, a fire or an electric shock.
- In installing the unit, be sure to connect the refrigerant pipe before operating the compressor.
- If you run the compressor without connecting the refrigerant pipe and with the service valves open, you may incur frost bite or injury from an abrupt refrigerant outflow. An abnormal pressure build-up may also occur in the refrigeration cycle as a result of the inhalation of air, which can result in pipe rupture or injury.
- Never open the service valves (either liquid or gas side) until refrigerant pipe installation work, an air-tightness test and evacuation are completed.
- A failure to observe this instruction can result in frost bite or injury from an abrupt refrigerant outflow. If refrigerant gas leaks during installation work, immediately stop pipe blazing and other work and ventilate the room. Refrigerant gas, if it comes into contact with bare fire, can cause the generation of a toxic gas.
- Use pipes, flare nuts and tools specifically designed for R410A.
- The use of existing materials (designed for refrigerant other than R410A) can result in a unit failure as well as a serious accident such as refrigeration cycle rupture or injury.
- Tighten a flare nut to a specified torque with two torque wrenches used together as a set. Over-tightening a flare nut can cause a refrigerant gas leak from flare nut breakage after years of operation. If a flare gets loose or breaks off, refrigerant gas will leak, which can cause a lack-of-oxygen accident.
- In carrying out a pump-down process, stop the compressor before you detach the refrigerant pipe.
- If you detach the refrigerant pipe with the compressor running and the valves open, you may incur frost bite or injury from an abrupt refrigerant outflow. An abnormal pressure build-up may also occur in the refrigeration cycle as a result of the inhalation of air into the compressor, which can result in pipe rupture or injury.
- If refrigerant gas leaks during installation work, ventilate the room.
- Refrigerant gas, if it comes into contact with bare fire, can cause the generation of a toxic gas.
- When installation work is completed, check the system for refrigerant gas leaks.
- If refrigerant gas leaks indoors and comes into contact with bare fire such as of a fan heater, stove or cooking stove, it can cause the generation of a toxic gas.

⚡

- Don't open the operation valves (both for gas and fluid) till the refrigerant piping work, air tightness test and air purge are completed.
- It could cause frostbite or injury due to sudden leakage of refrigerant.
- Do not run the drain piping directly into the sewer where a toxic gas such as sulfuric gas is generated.
- This will pose a risk of a toxic gas flowing back into the room. This can also cause the corrosion of the indoor unit and a resultant unit failure or refrigerant leak.
- In installing or transferring an air conditioning system, never allow air or other foreign matters than specified refrigerant (R410A) to get into the refrigerant cycle.
- If air or other foreign matters gets into the refrigerant cycle, an abnormal pressure build-up will occur, which can result in pipe rupture or injury.

⚡ CAUTION

!

- Secure a service space for inspection and maintenance as specified in the manual.
- An insufficient service space can result in a fall from the installation point and resultant injury.
- When the outdoor unit is installed on a roof top or in an elevated position, provide permanent ladders and handrails along the access path and fences or handrails surrounding the outdoor unit to prevent an accidental fall.
- Perform installation work properly according to this installation manual.
- Improper installation can cause abnormal vibrations or increased noise generation.
- When refrigerant pipe installation is completed, check the system for leaks by conducting an air-tightness test with nitrogen gas.
- Should refrigerant gas leak in a small room and exceed the upper limit concentration, it can cause a lack-of-oxygen accident.
- Dress the refrigerant piping with a heat insulation material to prevent condensation.
- Improper heat insulation given to refrigerant piping for condensation prevention can result in leaking or dripping water soaking household effects.
- Install an earth leakage breaker.
- A failure to install an earth leakage breaker can cause a fire or electric shock.
- Install drain piping according to the installation manual to ensure good drainage, and give it heat insulation to prevent condensation.
- Improper installation can result in a flood of water in the room and soaked household effects.

⚡

- Ensure that the unit is properly grounded. Do not connect the grounding wire to a gas pipe, a water pipe, a lightning rod, the grounding wire of a telephone or other appliances. Improper grounding can result in electric shocks or fire when any trouble or earth leakage occurs.

⚡

- Don't use for any special purposes such as for storing of foods, animals or plants, precision devices or objects of art.
- It could deteriorate the quality of stored items.
- Do not install the outdoor unit in a place where small animals are likely to inhabit.
- If they enter the unit and touch electrical parts inside, they may cause a unit failure, smoke generation or ignition. Please ask the customer to keep the surroundings clean.
- Do not handle the package by holding a packing band.
- Do not handle wooden packaging materials with bare hands.
- Do not install the unit in a place with a risk of inflammable gas leaks or where an inflammable material exists. It can cause a fire where an inflammable gas leaks, flows out or in, or stagnates or where carbon fibers are suspended in the air.
- Do not install the outdoor unit where its fan winds directly hit an animal or plant. Fan winds can affect adversely to the plant etc.
- Do not operate the outdoor unit with any article placed on it, or you may incur property damage or personal injury from a fall of the article.
- Do not step onto the outdoor unit, or you may incur injury from a drop or fall.

⚡

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 operation 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 supply 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, optional 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 thermistor, the inlet pipe thermistor, the pressure sensor, etc. removed can result in a compressor burnout. Avoid operation under such conditions in any circumstances.

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 operation 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 controller	Connection OK/NO
FD○△△KXE6	RC-E3(2 cores)	OK
FD○A△△KXE4R, KXE4BR, KXE5R	RC-E1R(3 cores)	OK
FD○A△△KXE4, KXE4(A), KXE4A	RC-E1R(3 cores)	NO

Notabilia

The same outdoor unit is used whether it is used alone or in combination with another unit.

- For 335 capacity units, however, two different model types are available, one corresponding to a standalone installation and the other to a combined installation. So please pay attention to their model types in selecting a model.
(A 335 capacity unit to be used alone should be FDC335KXE6, while a unit to be used in combination is FDC335KXE6-K)
- Model type differs on the unit with 560 capacity depending on whether the unit is used independently and with the combined capacity of 1065 or 1130, or with the combined capacity of 1180.
(When the unit is used independently and with the combined capacity of 1065 or 1130, the model type is FDC560KXE6. When the unit is used with the combined capacity of 1180, the model type is FDC560KXE6-K.)
- Please note that an installation involving a combination other than those listed below is not operable.(For example, you cannot operate 560 and 680 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
400	Single	1~36	200~800
450	Single	1~40	225~900
504	Single	1~36	252~806
560	Single	1~40	280~896
615	Single	2~44	308~984
680	Single	2~49	340~1088
735	Combination (430+335-K)	2~53	368~1176
800	Combination (400+400)	2~58	400~1280
850	Combination (400+450)	2~61	425~1360
900	Combination (450+450)	2~65	450~1440
960	Combination (450+504)	2~69	477~1526
1010	Combination (504+504)	2~59	504~1311
1065	Combination (504+560)	2~62	532~1384
1130	Combination (560+560)	2~66	560~1456
1180	Combination (615+560-K)	3~69	588~1528
1235	Combination (615+615)	3~72	615~1599
1300	Combination (615+680)	3~76	650~1690
1360	Combination (680+680)	3~80	680~1768

[Optional parts]

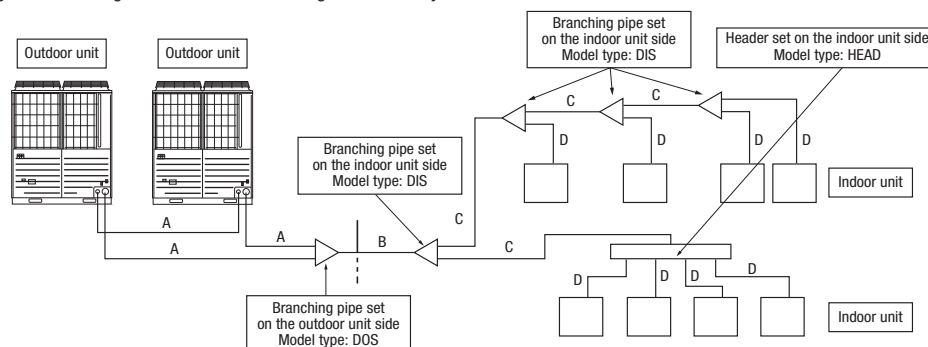
Refrigerant distribution piping components supplied as optional parts will become necessary in installing the unit.

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 indoor 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.



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 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)

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 optional parts such as wind vane adapters, snow guard hoods, etc.

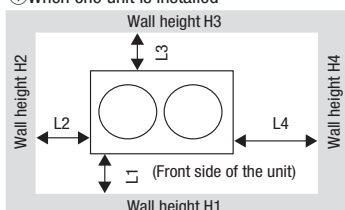
CAUTION

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



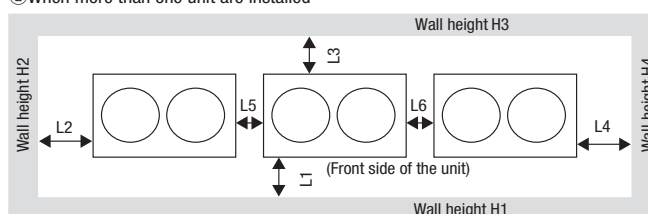
Example installation Dimensions	I	II	III
L1	500	500	Open
L2	10	50	10
L3	100	50	100
L4	10	50	Open
H1	1500	1500	Open
H2	No limit	No limit	No limit
H3	1000	1000	No limit
H4	No limit	No limit	Open

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 (335-K-680).

② When more than one unit are installed



Example installation Dimensions	I	II
L1	500	Open
L2	10	200
L3	100	300
L4	10	Open
L5	10 (0)	400
L6	10 (0)	400
H1	1500	No limit
H2	No limit	No limit
H3	1000	No limit
H4	No limit	No limit

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

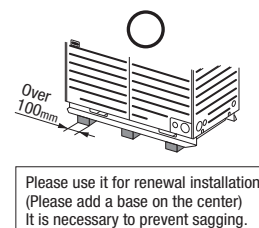
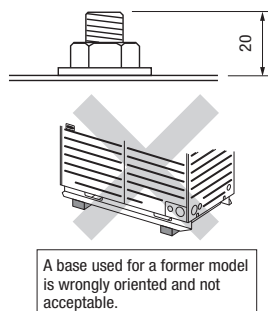
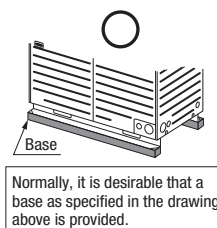
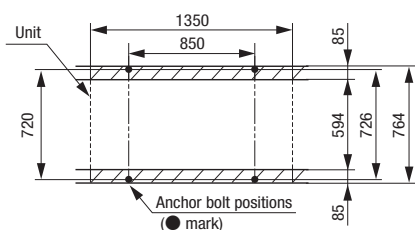
- a) Please do not fail to put belts through the rectangular holes of a unit's anchoring legs.
- b) Apply cloth pads between a canvas belt and a unit to prevent damage.



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

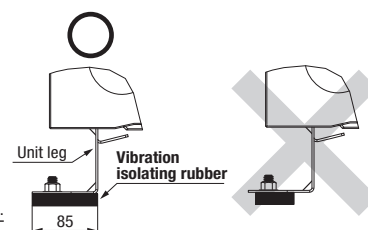
- Please install a unit after ascertaining that the bases have been made to sufficient strength and level to ensure the unit against vibration or noise generation.
- Please construct a base to the size of a shadowed area (the entire bottom area of an outdoor unit's anchoring leg) shown on the above drawing 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

4-1. Restrictions on the use of pipes

(1) Limitation on use of pipes

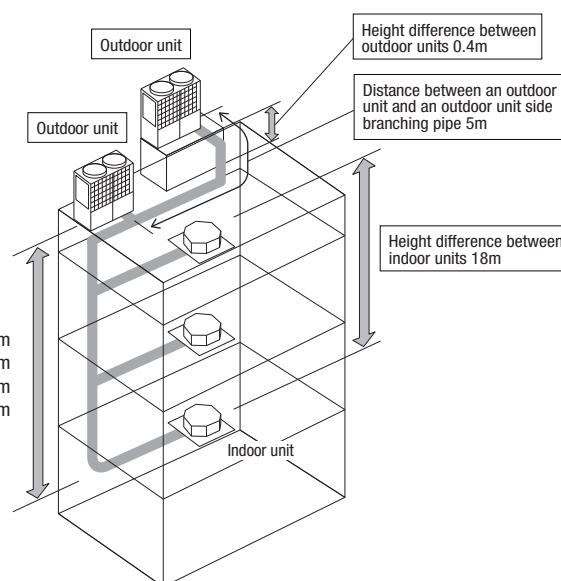
• In installing pipes, always observe the restrictions on the use of pipes specified in this Section (1) including Maximum length, Total pipe length, Allowable pipe length from the first branching, and Allowable elevation difference (head difference).

- 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
- Allowable elevation difference (head difference)
 - (a) When an outdoor unit is installed above 50 m or less
 - (b) When an outdoor unit is installed below 40 m or less
 - (c) Difference in the elevation of indoor units in a system 18 m or less
 - (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.

Difference in the elevation 50m
Actual length 160m
Equivalent length 185m
Total length 1000m



(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 H3300)
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 ϕ 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. (optional parts)
- For the handling of operation valves, please refer to P.8 4-3(3) Method of operating operation 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 tube	Connection method
335-K,400	ϕ 25.4 (ϕ 28.58) \times t 1.0	Blazed	ϕ 12.7 \times t 0.8	Flare	ϕ 9.52 \times t 0.8 ※1	Flare
450	ϕ 28.58 \times t 1.0					
504						
560						
615						
680						

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)

(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
400	$\phi 25.4 (\phi 28.58) \times t 1.0$	$\phi 12.7 \times t 0.8$	$\phi 28.58 \times t 1.0$	$\phi 12.7 \times t 0.8$
450			$\phi 31.8 \times t 1.1$ ($\phi 34.92 \times t 1.2$)	
504				$\phi 15.88 \times t 1.0$
560				
615				
680				
735	$\phi 31.8 \times t 1.1$ ($\phi 34.92 \times t 1.2$)	$\phi 15.88 \times t 1.0$	$\phi 38.1 \times t 1.35$ ($\phi 34.92 \times t 1.2$)	$\phi 19.05 \times t 1.0$
800				
850				
900				
960				
1010				
1065				
1130				
1180				
1235				
1300				
1360				

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	$\phi 12.7 \times t 1.0$	$\phi 9.52 \times t 0.8$
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	$\phi 12.7 \times t 0.8$
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	$\phi 28.58 \times t 1.0$	$\phi 19.05 \times t 1.0$
700 or more but less than 1100	$\phi 31.8 \times t 1.1$ ($\phi 34.92 \times t 1.2$)	
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
	22, 28	$\phi 9.52 \times t 0.8$	$\phi 6.35 \times t 0.8$
	36, 45, 56	$\phi 12.7 \times t 0.8$	
	71, 80, 90, 112, 140, 160	$\phi 15.88 \times t 1.0$	$\phi 9.52 \times t 0.8$
	224	$\phi 19.05 \times t 1.0$	
	280	$\phi 22.22 \times t 1.0$	

Please use C1220T-1/2H for $\phi 19.05$ or larger pipes.

(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)

Outdoor unit	Branching pipe set
For two units (for 735 – 1360)	DOS-2A-1

Please note

- In connecting an outdoor unit, please use a pipe conforming to the pipe size specified for outdoor unit connection.
- Choose a different-diameter pipe joint matching a main pipe size specified in the following section in installing pipes (= main pipes) on the outdoor unit side.
- Always install branching joints (for both gas and liquid) in such a manner that they form either correct horizontal or vertical branch.

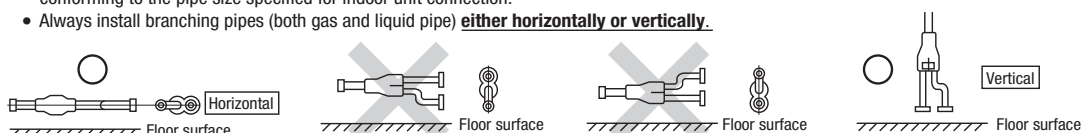
(5) Selection of an indoor unit side branching pipe set**(a) Method of selecting a branching pipe set**

- 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-22-1
180 or more but less than 371	DIS-180-1
371 or more but less than 540	DIS-371-1
540 or more	DIS-540-2

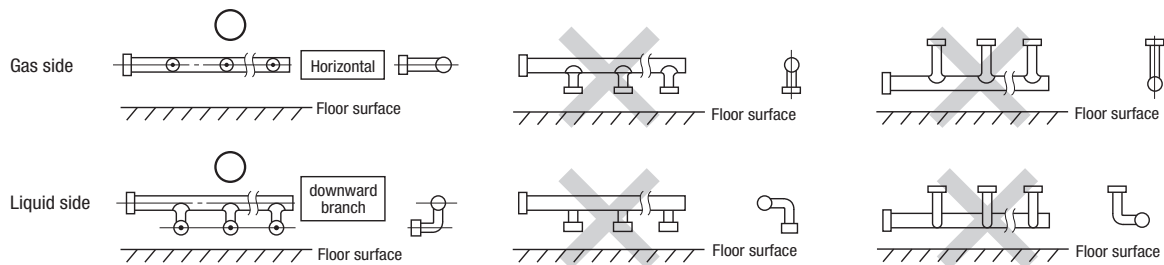


(b) Header Method

- 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).

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

- Please note**
- In connecting a header with an indoor unit, please use a pipe conforming to the pipe size specified for indoor unit connection.
 - In installing a header, always arrange a gas-side header to branch horizontally and a liquid-side header to branch downward.**
 - Indoor units 224 and 280 can not be connected to the header.

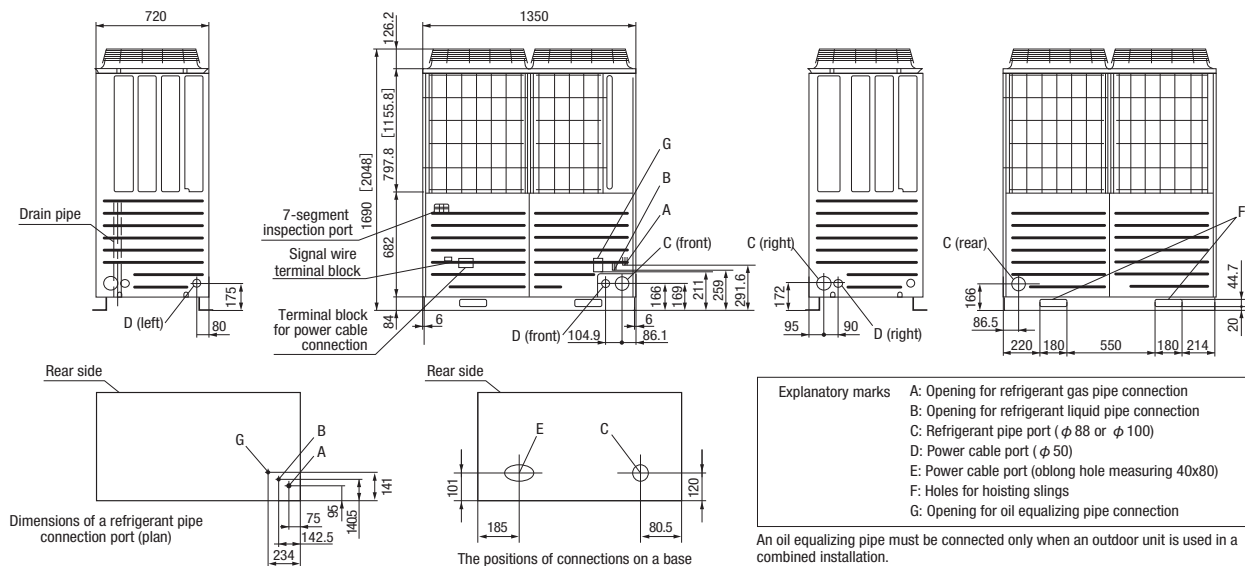


4-2. Pipe connection position and pipe direction

(1) Pipe connecting position and pipe outgoing direction

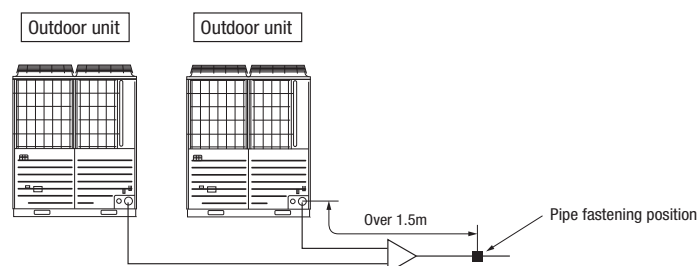
Although this drawing illustrates an installation involving a 450 or smaller capacity unit, an installation involving a 504 or a larger capacity unit should be arranged in the same manner as long as pipe connection points and directions are concerned, except that the height of a unit is different.

Measurements in [] indicate those of a 504 or larger capacity unit.



An oil equalizing pipe must be connected only when an outdoor unit is used in a combined installation.
(When a unit is used as a standalone installation, do not connect it)

- 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 (φ 88 or φ 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.)



(2) Piping work

Important

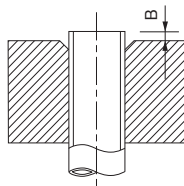
- Please take care so that installed pipes may not touch components within a unit.
- **In laying pipes on the installation site, keep the operation valves shut all the time.**
- Give **sufficient protections** (compressed and brazed or by an adhesive tape) **to pipe ends so that any water or foreign 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 operation 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 protrusion for flaring: B (mm)

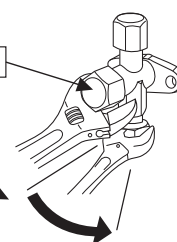
Copper pipe outer diameter	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
φ 6.35	0~0.5	0.7~1.3
φ 9.52		
φ 12.7		
φ 15.88		

Tightening torque (N·m)

Operation valve size (mm)	Tightening torque (N·m)	Tightening angle (°)	Recommended length of tool handle (mm)
φ6.35 (1/4")	14~18	45~60	150
φ9.52 (3/8")	34~42	30~45	200
φ12.7 (1/2")	49~61	30~45	250
φ15.88 (5/8")	68~82	15~20	300
φ19.05 (3/4")	100~120	15~20	450

Do not hold the valve cap area with a spanner.

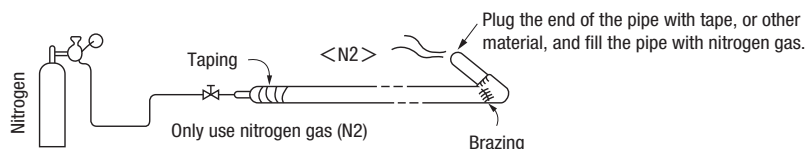
Use a torque wrench. If a torque wrench is not available, fasten the flare nut manually first and then tighten it further, using the left table as a guide.



- Do not apply any oil on a flare joint.
- Pipes are to be brazed 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 operation 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

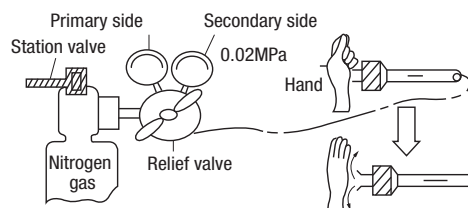
- ① **In laying pipes on the installation site, keep the operation valves shut all the time.**
- ② **Blazing must be performed under a nitrogen gas flow.** Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion 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 operation valve and a pipe, **braze them with the valve main body cooled with a wet towel or the like.**

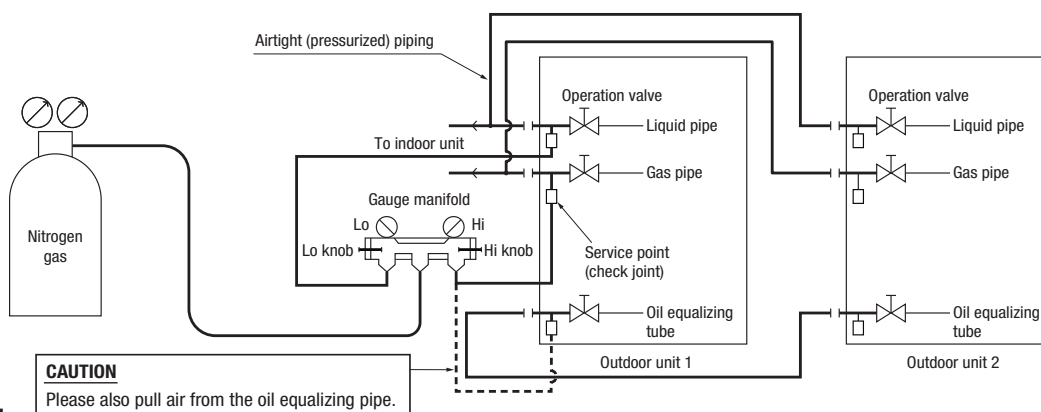
4-3. Air tightness test and air purge

(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 operation valve on the outdoor unit side. While conducting a test, **keep the operation 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 operation 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 in checking e) and 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.

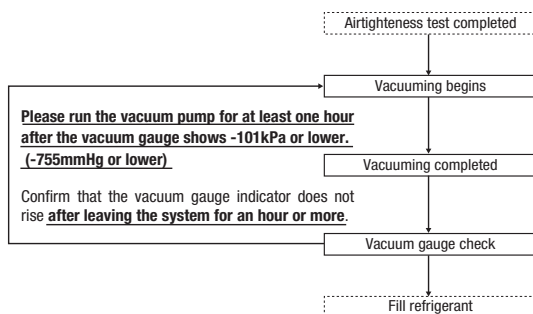
(2) Vacuuming

Please pull air **from the check joints of the operation 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) Method of operating operation valves

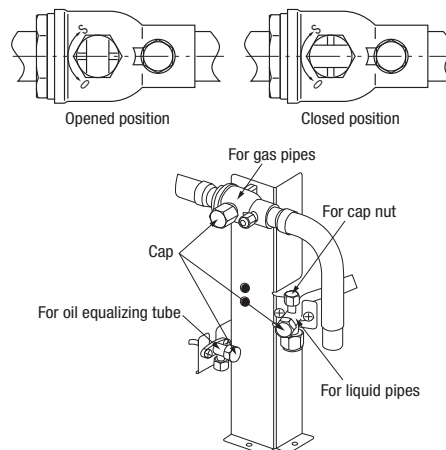
Method of opening/closing a valve

- Remove the cap, turn the gas pipe side until it comes to the "Closed" 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 N · m		
	Shaft (valve main body)	Cap (lid)	Cap nut (check joint section)
For gas pipes	7 or less	30 or less	13
For liquid pipes	7.85 (MAX 15.7)	29.4 (MAX 39.2)	8.8 (MAX 14.7)
For oil equalizing tube	4.9 (MAX 11.8)	16.2 (MAX 24.5)	8.8 (MAX 14.7)

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 **<400~680: 11.5 kg, 735~1360: 23.0 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

S: standard additional refrigerant quantity (kg), P: Additional refrigerant quantity for piping (kg)

Outdoor unit	S (kg)
400	1.3
450	3.1
504	4.8
560	5.9
615	7.1
680	8.4

Outdoor unit	S (kg)
735	1.7
800	2.6
850	4.4
900	6.2
960	7.9
1010	9.6

Outdoor unit	S (kg)
1065	10.7
1130	11.8
1180	13.0
1235	14.2
1300	15.5
1360	16.8

$P = (L1 \times 0.37) + (L2 \times 0.26) + (L3 \times 0.18) + (L4 \times 0.12) + (L5 \times 0.059) + (L6 \times 0.022)$

L1 : ϕ 22.22 total length (m) L2 : ϕ 19.05 total length (m) L3 : ϕ 15.88 total length (m)

L4 : ϕ 12.7 total length (m) L5 : ϕ 9.52 total length (m) L6 : ϕ 6.35 total length (m)

Refrigerant liquid pipe size	ϕ 22.22	ϕ 19.05	ϕ 15.88	ϕ 12.7	ϕ 9.52	ϕ 6.35	Remarks
Additional fill quantity (kg/m)	0.37	0.26	0.18	0.12	0.059	0.022	

Important

When the Additional refrigerant quantity for piping (P) over the following table, please separate the refrigerant line.

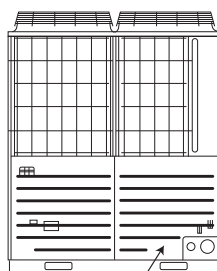
Outdoor unit	P (kg)
400-680	50
735-1360	100

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 side 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.

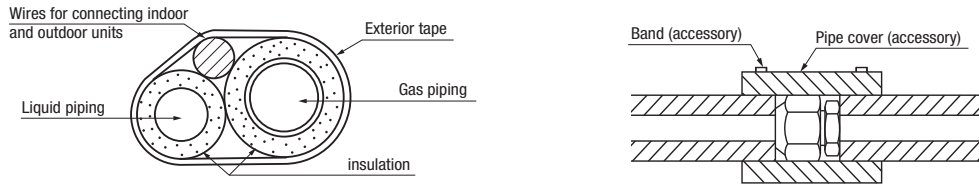
a) The gas pipe can cause during a cooling operation dew condensation, which will become drain water causing a possible water-leak accident, or reach during a heating operation as high a temperature as 60°C to 110°C, posing a risk of burns, when touched accidentally. So, do not fail to dress it with 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 optional 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 supplies 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 supplies 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.

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 supply 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.

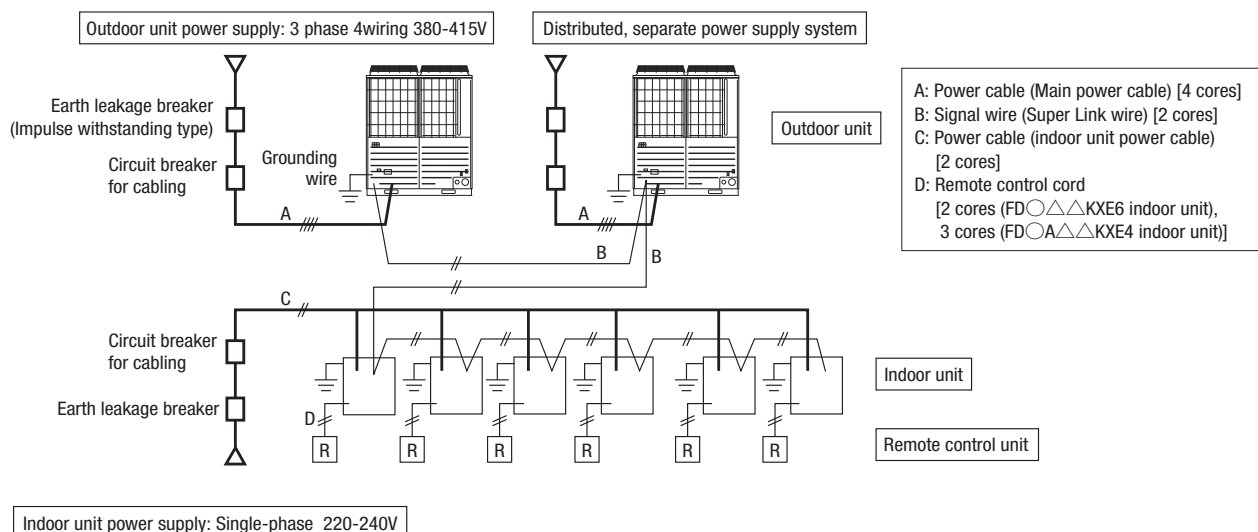
j) Power cables and signaling wires must always be connected to the power cable terminal block and secured by cable fastening clamps provided in the unit.

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.)

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.
- 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.



(3) Outdoor unit power supply specifications : 3 phase 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
335-K,400	3 phase 4 wire 380-415V 50Hz	14	76	60	60	60A100mA less than 0.1 sec	5.5	M5
450		14	76	60	60	60A100mA less than 0.1 sec	5.5	M5
504		14	76	60	60	60A100mA less than 0.1 sec	5.5	M5
560		14	76	60	60	60A100mA less than 0.1 sec	5.5	M5
615		14	76	60	60	60A100mA less than 0.1 sec	5.5	M5
680		14	76	60	60	60A100mA less than 0.1 sec	5.5	M5

Please note

- The method of laying cables has been determined pursuant to the Japanese indoor wiring regulations (JEAC8001). (Please adapt it to the regulations in effect in each country)
- In the case of distributed, separate power supply system, the listed data represent those of an outdoor unit.
- For details, please refer to the installation manual supplied with the indoor unit.
- Wire length in the table above is the value for when the indoor unit is connect to the power cable in series also the wire size and minimum length when the power drop is less than 2% are shown. If the current exceeds the value in the table above, change the wire size according to the indoor wiring regulations. (Please adapt it to the regulations in effect in each country)

(4) Indoor unit power supply specifications : Single phase 220-240V

Combined total capacity of indoor units	Cable size for power source (mm ²)	Wire length (m)	Moulded-case circuit breaker (For ground fault, overload and short circuit protection)	Signal wire size (mm ²)
Less than 7A	2	21	20A 100mA less than 0.1 sec	2cores x 0.75-2.0 *
Less than 11A	3.5	21	20A 100mA less than 0.1 sec	
Less than 12A	5.5	33	20A 100mA less than 0.1 sec	
Less than 16A	5.5	24	30A 100mA less than 0.1 sec	
Less than 19A	5.5	20	40A 100mA less than 0.1 sec	
Less than 22A	8	27	40A 100mA less than 0.1 sec	
Less than 28A	8	21	50A 100mA less than 0.1 sec	

※ Please use a shielded cable.

Please note

- The method of laying cables has been determined pursuant to the Japanese indoor wiring regulations (JEAC8001). (Please adapt it to the regulations in effect in each country)
- Wire length in the table above is the value for when the indoor unit is connect to the power cable in series also the wire size and minimum length when the power drop is less than 2% are shown. If the current exceeds the value in the table above, change the wire size according to the indoor wiring regulations. (Please adapt it to the regulations in effect in each country)
- For details, please refer to the installation manual supplied with the indoor unit.
- Wires connected to indoor units are allowed up to 5.5 mm². For 8 mm² or more, use a dedicated pull box and branch to indoor units with 5.5 mm² or less.
- Values in the table don't include electric heaters. When any electric heater is assembled, both the power supply specification and the wiring specification become different.
- ◎ terminal on the terminal block is specified to connect only an optional auxiliary heater (power supply for heater).

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 controller. 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
No. of connectable outdoor units	Up to 1000m	Up to 2,000 m for wires other than shielding wire Up to 1,500 m for 0.75 mm ² shielding wire (MVVS) Up to 1,000 m for 1.25 mm ² shielding wire (MVVS)
Signal cable (furthest length)	Up to 1000m	Up to 1000m
Connectable units to a network	Units not supporting new SL (FD○A△△KXE4 series) Units supporting new SL (FD○△△KXE6 series) Can be used together.	Units supporting new SL (FD○△△KXE6 series)

Note: For FDT224 and 280 models, calculate the number of units taking 1 indoor unit as 2 units for the sake of communication.

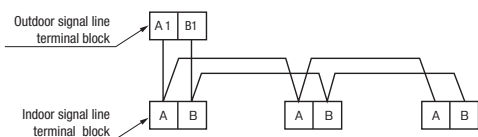
- **Signal cables are for DC 5 V. Never connect wires for 220/240 V or 380/415 V.** Protective fuse on the PCB will trip.

- 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 supply cables may be connected to the signal cable terminal block.
Standard resistance value = $46,000 / (\text{Number of FD○A△△KXE4 Series units connected} \times 5) + (\text{Number of FD○△△KXE6 Series units connected} \times 9)$
 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.

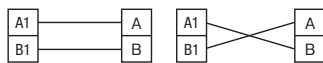
Indoor and outdoor units signal cables

- 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.

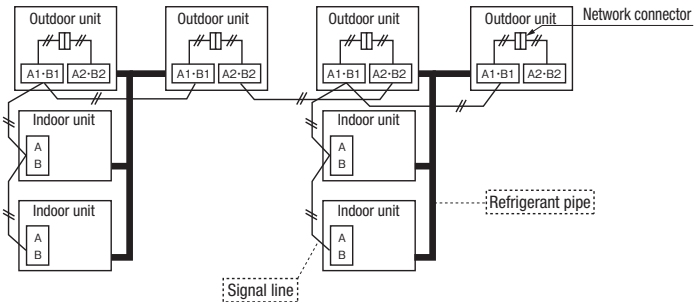
(1) When one outdoor unit is used.



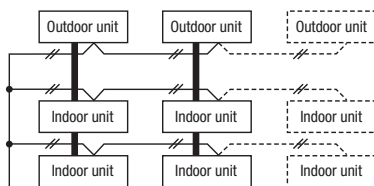
- Indoor and outdoor signal lines do not have a polarity. Any of the connections in the following illustration can be made.



(2) When plural outdoor units are used

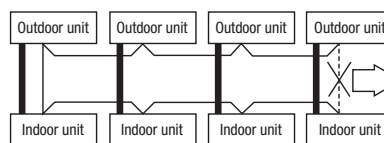


(3) The signal lines can also be connected using the method shown below.



Important

- Loop wiring prohibited.



The signal lines cannot form a loop, so the wirings shown as in the diagram are prohibited.

Remote controller wiring specifications

- (1) **A standard remote controller wire is 0.3mm² x 2 cores (FDC○△△KXE6 indoor unit), 0.3mm² x 3 cores (FD○A△△KXE4 indoor unit).** It can be extended up to 600m. For a remote controller wire exceeding 100m, please upgrade wire size as specified in the table below.

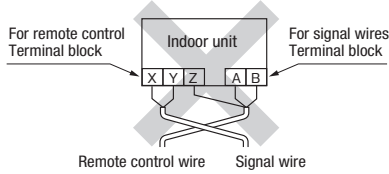
Length (m)	Wire size	
	FD○△△KXE6 indoor unit	FD○A△△KXE4 indoor unit
100 to 200	0.5mm ² × 2 cores	0.5mm ² × 3 cores
To 300	0.75mm ² × 2 cores	0.75mm ² × 3 cores
To 400	1.25mm ² × 2 cores	1.25mm ² × 3 cores
To 600	2 mm ² × 2 cores	2 mm ² × 3 cores

- (2) When the remote controller wire runs parallel to another power supply 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.)

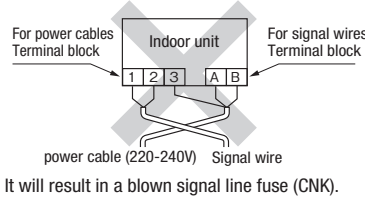
CAUTION

In addition to a possible wiring error between indoor and outdoor units, there are other possibilities of erroneous wiring as illustrated below.

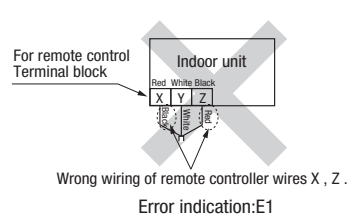
- ① Wrong wiring between signaling wires and remote controller wires.



- ② Connecting power cables to the signaling wire terminal block.



- ③ Wrong wiring of remote controller wires.



7. CONTROLLER SETTINGS

7-1. Unit address setting

This control system controls the controllers 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 controllers. 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 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.

When communication is established after setting addresses, check the communication protocol with the 7 segment display panel of the outdoor unit.

●Address setting methods

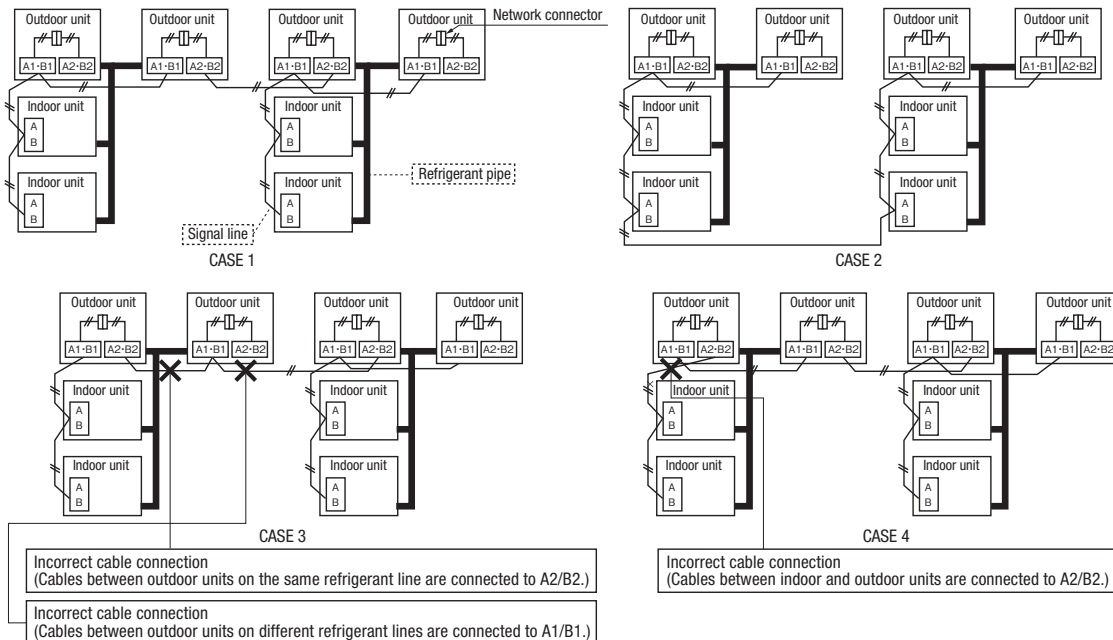
The following address setting methods can be used. The procedure for automatic address setting is different from the conventional one. Please use the automatic address setting function after reading this manual carefully.

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 centralized 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)

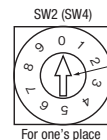
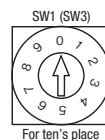
※2 In Case 2, automatic address setting is not available. Set addresses manually.



●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 (green)	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	Outdoor unit address setting	Indoor unit address setting	Outdoor unit address setting	Outdoor unit address setting
Manual address setting (previous SL/new SL)	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 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 Outdoor unit address setting

Set as follows before you turn on power. Upon turning on power, the outdoor unit address is registered.

Set a unique number by avoiding the numbers assigned to other outdoor units on the network.

Set **the Outdoor Unit No. switch to a number 00 - 31 [in the case of previous SL: 00 - 47]**.

- Similarly for the master unit used in a combined installation, set **the Outdoor Unit No. switch to a number 00-31 [in the case of previous SL:00-47]**.
- Similarly for the slave unit used in a combined installation, set **the Outdoor Unit No. switch to the same number with a master unit and then, set the dipswitch SW4-7 of the slave unit to ON.** (Set both master and slave units to the same outdoor unit number.)

Refrigerant system	Outdoor unit	SW1	SW2	SW4-7	Address on a network
A	Master	2	0	OFF	20
	Slave	2	0	ON	21
B	Master	2	2	OFF	22
	Slave	2	2	ON	23
C	Master	3	1	OFF	31
	Slave	3	1	ON	00

CAUTION

A slave unit's address will be set to "the master unit's address +1." When you set a master unit's address, take care not to assign an address duplicating with one used in another system. You cannot operate the installation with a duplicating address assigned. (Error indication: E-31)

This table shows an examples of address settings. **As illustrated with the refrigerant systems A and B in the above example, when successive numbers are used in setting addresses, care must be taken so that an address assigned to the master unit of the refrigerant system B will not duplicate with one assigned to the slave unit of the refrigerant system A.**

② Indoor unit address setting

Set as follows before you turn on power. Upon turning on power, the indoor unit address is registered.

Set **the Indoor Unit No. switch to a number 000 - 127 [in the case of previous SL: 00 - 47]**.

Set **the Outdoor Unit No. switch** to the outdoor unit No. of the associated outdoor unit within the range of **00 - 31 [in the case of previous SL: 00 - 47]**.

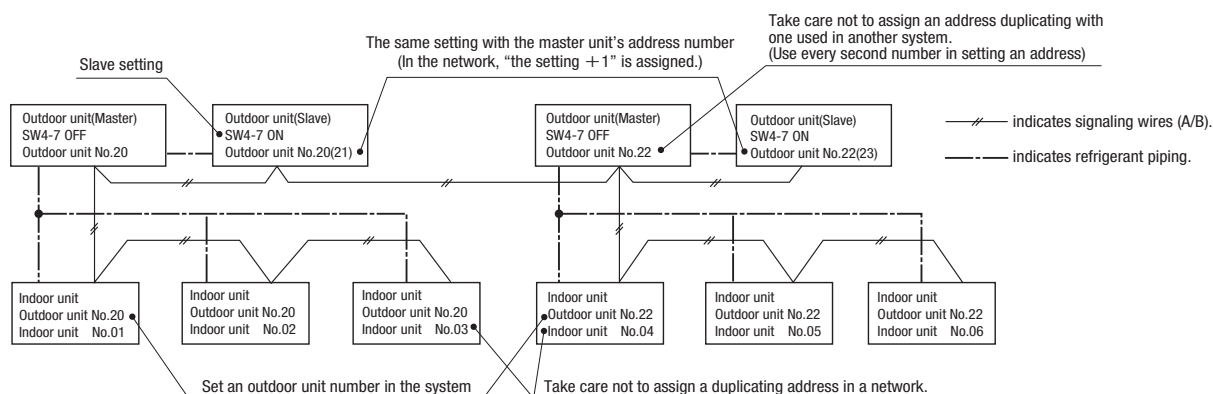
Set a unique number by avoiding the numbers assigned to other indoor units on the network.

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 Outdoor unit address setting

Set as follows before you turn on power.

Make sure that the **Outdoor Unit No. switch** is set to **49 (factory setting)**.

- **Similarly for the master unit used in a combined installation, make sure that the Outdoor unit No. switch is set to 49 (factory setting).**

- **Similarly for the slave unit used in a combined installation, make sure that the Outdoor unit No. switch is set to 49 (factory setting).**

Then, set the dipswitch SW4-7 of the slave unit to ON.

Outdoor unit	SW1	SW2	SW4-7	Address on a network
Master unit	4	9	OFF	49
Slave unit	4	9	ON	00

CAUTION

If the slave unit is not specified, a compressor failure may result.

The **master unit** will be registered as "**49**" regardless of the SW1 and SW2 settings (49).

The **slave unit** will be registered as "**00**" because of its SW4-7 setting as indicated in the table above.

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 Outdoor unit address setting

Set as follows before you turn on power.

Set a unique number by avoiding the numbers assigned to other outdoor units on the network.

Set **the Outdoor Unit No. switch** to a number **00 - 31**. Set a unique number by avoiding the numbers assigned to other outdoor units on the network.

• Similarly for the master unit used in a combined installation, set **the Outdoor Unit No. switch to a number 00-31 [in the case of previous SL: 00-47]**.

• Similarly for the slave unit used in a combined installation, set **the Outdoor Unit No. switch to the same number with a master unit and then, set the dipswitch SW4-7 of the slave unit to ON**. (Set both master and slave units on the same outdoor unit number.)

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 (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.

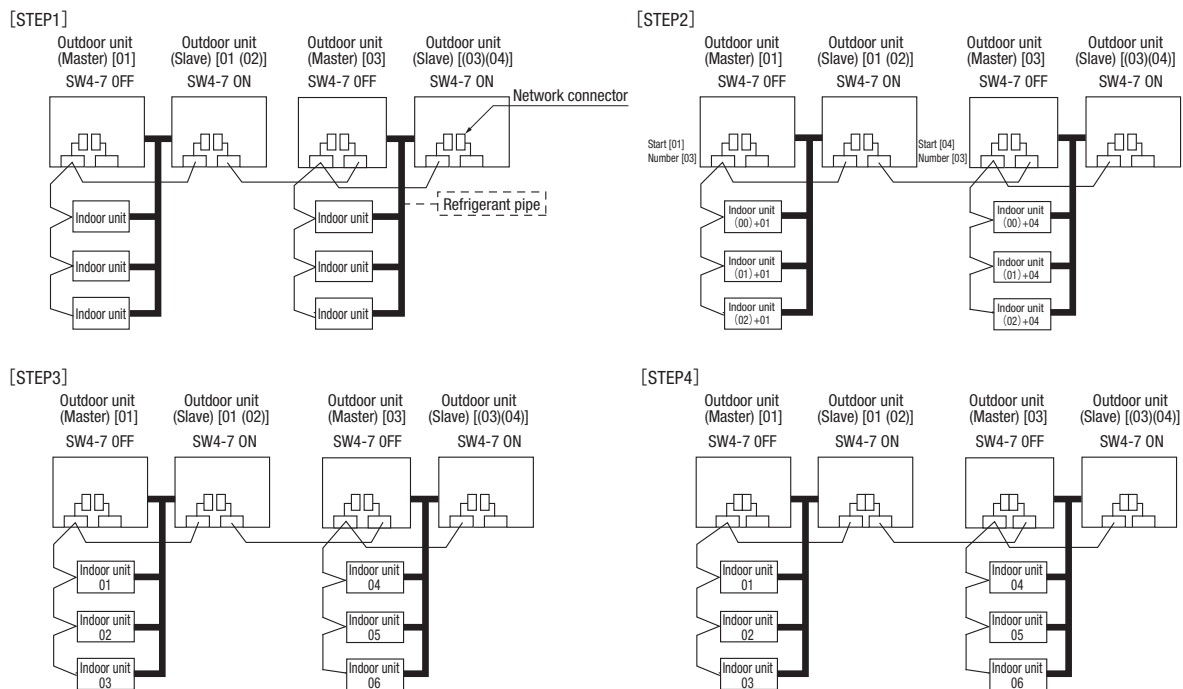
⑩ Network polarity setting

After you have made sure that the network connectors are engaged in ⑧, 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.'s and the outdoor unit address No. displayed on the remote control unit by pressing its Inspection switch.
- Automatic address setting can be used for an installation in which prulal 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 centralized 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 forsingle 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 controller "INVALID OPER" .




















Operating procedure


(1) When single indoor unit is connected to the remote controller.

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 O/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 controller.

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 controller 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 controller 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.'s are registered.

NOTICE Turn on power to centralized 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	Contents of a 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	Contents of a 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	Contents of a display	Please check
A00	Unable to find any indoor unit that can be actually communicated with.	Are signal lines connected properly without any loose connections? Is power for indoor units all turned on?
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	Contents of a display	Cause
E2	Duplicating indoor unit address.	• Incorrect manual address setting
E3	Incorrect pairing of indoor-outdoor units.	• An outdoor unit number that does not exist in the network is specified • No master unit exists in combination outdoor unit.
E11	Address setting for plural remote controllers.	• Indoor unit address is set from plural remote controllers.
E12	Incorrect address setting of indoor units.	• Automatic address setting and manual address setting are mixed.
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. Control mode switching

Controls of outdoor unit may be selected as follows using the dip switches on the PCB and C○○, P○○ on the 7-segment.

To change C○○, P○○ on the 7-segment, hold down SW8 (7-segment display increment up: 1-digit), SW9 (7-segment increment up: 10-digit) and SW7 (Data write/Enter).

Unit set※1	Control selecting method		Content of control
	SW setting on PCB	C○○, P○○ on 7-segment	
Master	SW3-2 to ON	—	Automatic back up operation
Master	SW3-7 to ON *2	Set external input function allocation to "2" *2	Forced cooling mode (It can be fixed at cooling with external input terminals open, or at heating with them short-circuited.)
Master	SW5-1 to ON + SW5-2 to ON	—	Cooling test run
Master	SW5-1 to ON + SW5-2 to OFF	—	Heating test run
Master	Close the fluid operation valve on outdoor unit and set as follows: (1) SW5-2 on PCB to ON (2) SW5-3 on PCB to ON (3) SW5-1 on PCB to ON	—	Pump down operation
Master	SW4-5:OFF, SW4-6:OFF*2 80% (Factory default) SW4-5:ON, SW4-6:OFF*2 60% SW4-5:OFF, SW4-6:ON*2 40% SW4-5:ON, SW4-6:ON*2 00%	Set allocation of external input function to "1" *2	Inputting signals to external input terminals selects the demand mode. (J13 short-circuited: Level input, J13 open: Pulse input)
Master	SW5-5	—	Communication method selection ON: Previous SL communication, OFF: New SL communication
Master	J13: Short-circuited (Factory default), J13: Open	—	External input selection (CnS1, CnS2 only) Short-circuited: Level input, Open: Pulse input
Master/slave	J14: Short-circuited (Factory default), J14: Open	—	Defrosting mode is switched. (will enter defrosting mode more frequently)
Master/slave	J15: Short-circuited (Factory default), J15: Open	—	Defrost selection Short-circuited: Normal defrosting, Open: Forced defrosting
Master	—	C70	Operation priority selection 0: First push priority (at shipping) 1: Last push priority
Master/slave	—	C75	Outdoor unit fan snow protection control 0: Control disabled (at shipping) 1: Control enabled
	—	P11	Allocation of external output (CnS1)
	—	P12	Allocation of external output (CnS2)
	—	P13	Allocation of external output (CnG1)
	—	P14	Allocation of external output (CnG2)
Master/slave	—	P16	Outdoor unit fan snow protection control ON time setting - 30 sec (at shipping) 10, 30-600 sec

※1 "Unit set" shown in the above table refers to the master/slave setting of units comprising a combined installation.

Master: control mode setting required for the master unit only (setting not required with the slave unit).

Master/slave: control mode setting required for both master and slave units.

※2 Control is switched when both the allocation of external input function (P11~14) and SW are changed.

(Example: To use CnS1 for the input of forced cooling mode, set P11 at 2 and SW3-7 at ON. To use CnS2 for the input of forced cooling mode, set P12 at 2 and SW3-7 at ON.)

By changing the allocation of external input functions (P11~14) on the 7-segment, functions of external input terminals may be selected. Inputting signals to external input terminals enable the following functions.

Setting value for allocation of external input function	With external input terminals short-circuited	With external input terminals open
"0" : External operation input	Invalid	Valid
"1" : Demand input	Invalid	Valid
"2" : Cooling/heating forced input	Valid	Invalid
"3" : Silent mode input	Valid	Invalid
"4" : Spare		
"5" : Outdoor fan snow guard control input	Valid	Invalid
"6" : Test run external input 1 (equivalent to SW5-1)	Test run start	Normal
"7" : Test run external input 2 (equivalent to SW5-2)	Cooling	Heating
"8" : Silent mode 2	Valid	Invalid
"9" : Spare		

7-3. External input and output terminals specifications

Name	Purpose (Factory default)	Specification	Operating side connector
External input CnS1	External operation input (Short-circuited at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XAMK-1 (LF) (SN)
External input CnS2	Demand input (Short-circuited at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XARK-1 (LF) (SN)
External input CnG1	Forced refrigerant input (Open at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XAEK-1 (LF) (SN)
External input CnG2	Silencing mode input (Open at shipping)	Non-voltage contactor (DC12V)	NICHIATSU B02B-XASK-1 (LF) (SN)
External output CnH	Operation output	DC12V output	MOLEX 5286-02A-BU
External output CnY	Error output	DC12V output	MOLEX 5266-02A

8. TEST OPERATION AND TRANSFER

8-1. Before starting operation

- (1) **Make sure that a measurement between the power supply terminal block and ground, when measured with a 500V megger, is greater than 1 MΩ.**
- (2) Please check the resistance of the signaling wire terminal block before power is turned on. If a resistance measurement is 100 Ω or less, it suggests a possibility that power cables are connected to the signaling wire terminal block. (Please refer to 6-3. Standard resistance valve.)
- (3) **Be sure to turn on the crank case heater 6 hours before operation.**
- (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 operation 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 operation 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 operation valve is left open (Operation valve open/close check). (In case of combination, however, all operation valves need to be closed on master and slave units to obtain accurate judgment.)
- 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 indicato	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.)
HO	---	Check operation on. (Including preparation operation on). (Indicated only on slave unit of combination.)
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 operation 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 SW setting been changed during the check operation?
CHE	Abnormal indoor unit No.	Abnormal ending of check operation. Indoor unit of which No. is displayed is abnormal.	<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? Is the power supply to the indoor unit turned on?

※ 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. 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  

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.

8-4. 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 ice machine 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 3, Refrigerant piping.


(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 controller lid)

(5) 7-segment LED indication

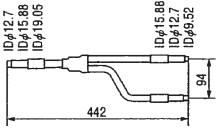
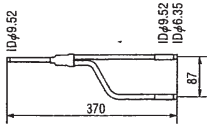
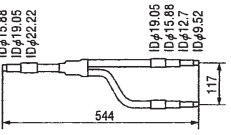
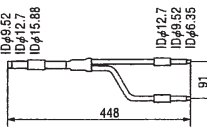
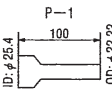
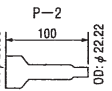
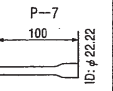
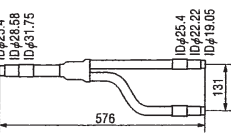
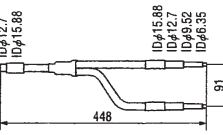
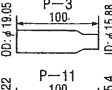
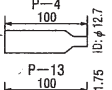
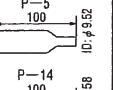
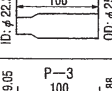
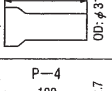
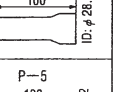
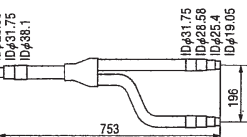
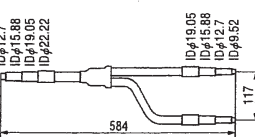
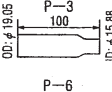
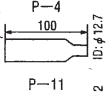
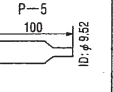
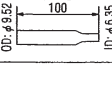
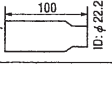
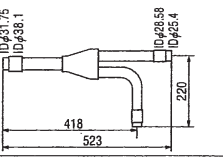
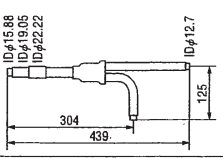
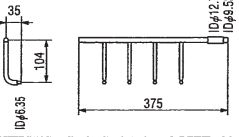
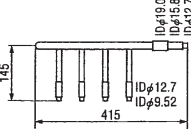
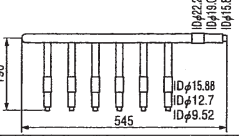
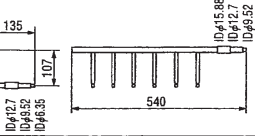
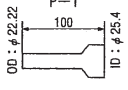
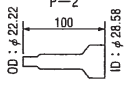
Data are indicated when so chosen with the indication selector switch. For the details of indication, please refer to the cable name plate attached on the unit. (On the face of the controller lid)

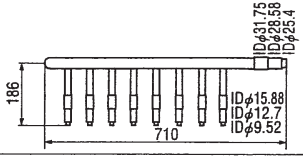
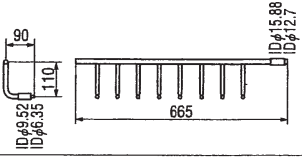
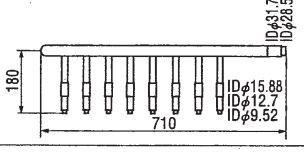
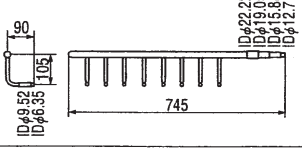
7 INSTRUCTIONS FOR INSTALLING THE BRANCH PIPE SET

PSB012D855A 

- ◎ 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
DIS-22-1			None
DIS-180-1			  
DIS-371-1			     
DIS-540-2			    
DOS-2A-1 (Outdoor units used in combination)			None
HEAD4-22-1			None
HEAD6-180-1			 

Branching pipe set type	Gas side	liquid side	Different diameter pipe joint
HEAD8-371-1			None
HEAD8-540-2			OD : φ 31.75 ID : φ 38.1

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

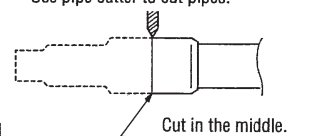
- Use a pipe conforming to a pipe size specified for indoor unit connection for the section between an indoor unit and a branching pipe.
- Use a pipe conforming to a pipe size specified for outdoor unit connection for the section between an outdoor branching pipe and an outdoor unit.

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.

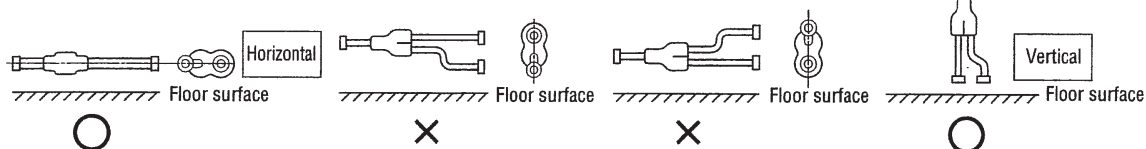
Attention

- 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.

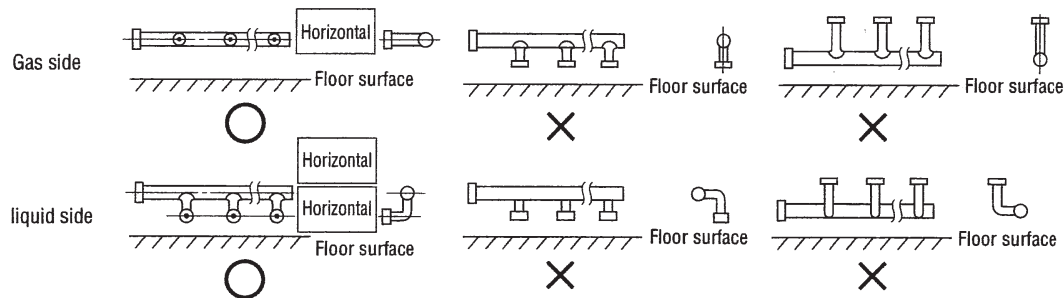
Use pipe cutter to cut pipes.



• In the case of a branching pipe set (model type DIS/TMDIS)



• In the case of a header set (model type HEAD/TMHEAD)

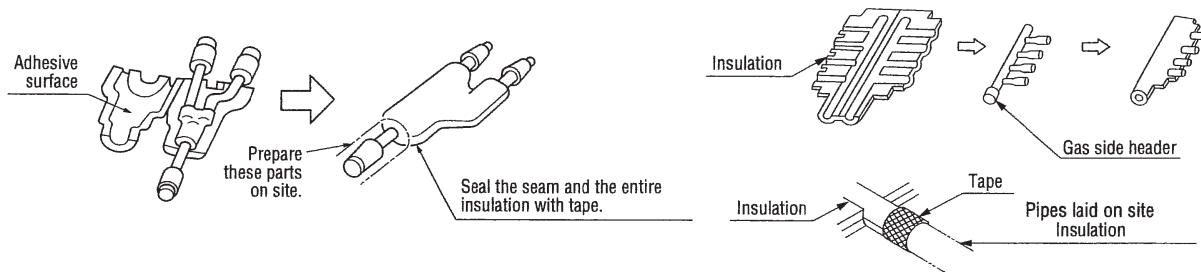


- Always apply nitrogen gas when soldering joints. If nitrogen gas is not applied, a large amount of film oxide will be formed which could lead to a critical failure in the unit. Use caution to prevent moisture or any foreign matters from entering the pipe when connecting pipe ends. For the method of air tightness testing and pulling air, please refer to the installation manual of the outdoor unit.
- 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) How to select a branching pipe set

- 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-22-1. (Even if the capacity of connected indoor units reaches 180 or higher, select DIS-22-1.)

Total capacity downstream	Branching pipe set model type
less than 180	DIS-22-1
180 or higher – less than 371	DIS-180-1
371 or higher – less than 540	DIS-371-1
540 or more	DIS-540-2

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 HEAD4-22-1. (Even if the capacity of connected indoor units reaches 180 or higher, select HEAD4-22-1.)

Total capacity downstream	Header set model type	Number of branches
less than 180	HEAD4-22-1	Up to 4 branches
180 or higher – less than 371	HEAD6-180-1	Up to 6 branches
371 or higher – less than 540	HEAD8-371-1	Up to 8 branches
540 or more	HEAD8-540-2	Up to 8 branches

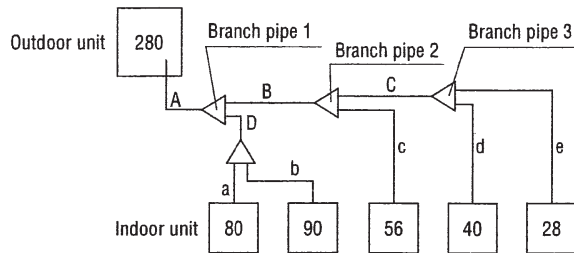
Attention

- 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

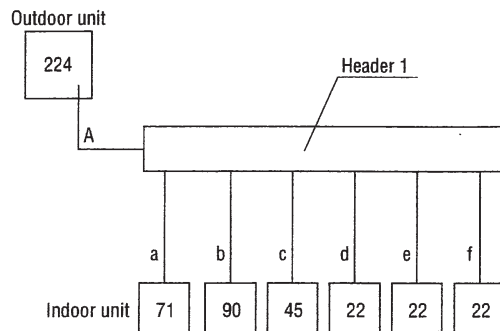


Selection of a branching pipe set

Mark	Selection procedure	Branching pipe set
Branch pipe 1	Combined total capacity of indoor units connected downstream (80+90+56+40+28)=294	DIS-180-1
Branch pipe 2	Combined total capacity of indoor units connected downstream (56+40+28)=124	DIS-22-1
Branch pipe 3	Combined total capacity of indoor units connected downstream (40+28)=68	DIS-22-1

Example 2: Header type configuration

Connected capacity: 272

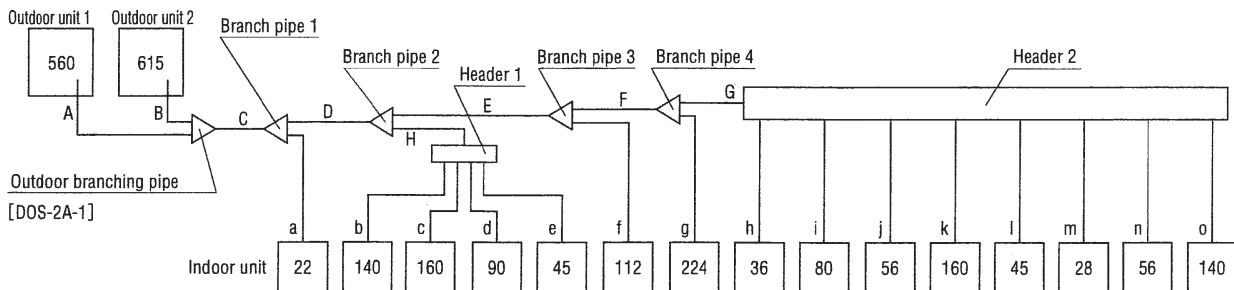


Selection of a header set

Mark	Selection procedure	Header set
Header 1	Combined total capacity of indoor units connected downstream (71+90+45+22+22+22)=272	HEAD6-180-1

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-540-2
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-540-2
Branch pipe 3	Combined total capacity of indoor units connected downstream (112+224+36+80+56+160+45+28+56+140)=937	DIS-540-2
Branch pipe 4	Combined total capacity of indoor units connected downstream (224+36+80+56+160+45+28+56+140)=825	DIS-540-2

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	HEAD8-371-1
Header 2	Combined total capacity of indoor units connected downstream (36+80+56+160+45+28+56+140)=601	HEAD8-540-2

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INVERTER DRIVEN MULTI-INDOOR-UNIT CLIMATE CONTROL SYSTEM



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