Manual No. '11 • PAC-T-160

MHI

THCHNICAL MANUAL

HYPER INVERTER PACKAGED AIR-CONDITIONERS

(Split system, Air to air heat pump type)

FLOOR STANDING TYPE

Single type

- Single phase use
  - FDF71VNXVD
  - 100VNXVD
  - 125VNXVD
  - 140VNXVD
- 3 phase use
  - FDF100VSXVD
  - 125VSXVD
  - 140VSXVD

Twin type

- Single phase use
  - FDF140VNXPVD
- 3 phase use
  - FDF140VSXPVD

MICRO INVERTER PACKAGED AIR-CONDITIONERS

(Split system, Air to air heat pump type)

FLOOR STANDING TYPE

Single type

- Single phase use
  - FDF100VNVD
  - 125VNVD
  - 140VNVD
- 3 phase use
  - FDF100VSVD
  - 125VSVD
  - 140VSVD

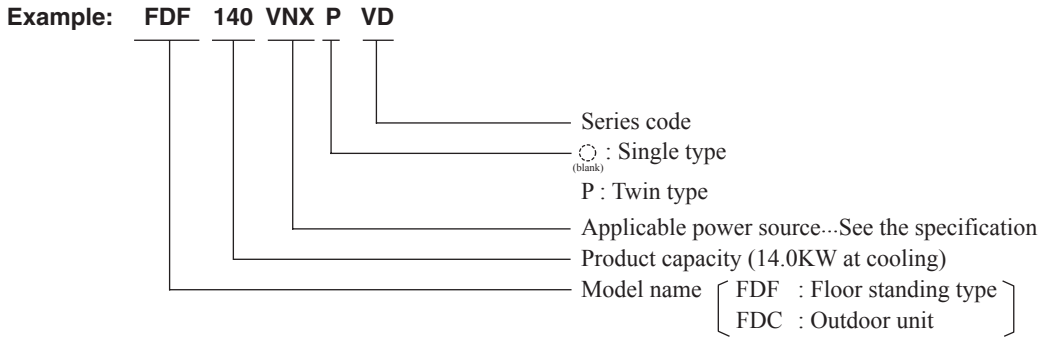
Twin type

- Single phase use
  - FDF140VNPVD
- 3 phase use
  - FDF140VSPVD
  - 200VSPVD
  - 250VSPVD

MITSUBISHI HEAVY INDUSTRIES, LTD.

CONTENTS

How to read the model name



1. SPECIFICATIONS

(1) Hyper inverter series

(a) Single phase use

1) Single type

Adapted to **RoHS** directive

Item \ Model		FDF71VNXVD	
		Indoor unit **FDF71VD**	Outdoor unit **FDC71VNX**
Power source			220-240V~50Hz / 220V~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	7.1 [3.2 (Min.)~8.0 (Max.)]	8.0 [3.6 (Min.)~9.0 (Max.)]
Power consumption	kW	2.21	2.21
Running current	A	9.8 / 10.3	9.9 / 10.4
Power factor	%	98	97
Inrush current	A	5 < Max.running current 17 >	
Sound Pressure Level	dB(A)	P-Hi : 42 Hi : 39 Me : 35 Lo : 33	Cooling : 51, Heating : 48
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	750×880 (+88) × 340
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	49	60
Refrigerant equipment Compressor type & Q'ty		—	RMT5118MDE2 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.675 (M-MA68)
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 20 Hi : 18 Me : 16 Lo : 14	Cooling : 60, Heating : 50
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/Uϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 2.95kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	—

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 230V50Hz or 220V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF100VNXVD	
		Indoor unit **FDF100VD**	Outdoor unit **FDC100VNX**
Power source			220-240V~50Hz / 220V~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	10.0 [4.0 (Min.)~11.2 (Max.)]	11.2 [4.0 (Min.)~12.5 (Max.)]
Power consumption	kW	2.83	3.04
Running current	A	12.6 / 13.1	13.5 / 14.1
Power factor	%	98	98
Inrush current	A	5 < Max.running current 24 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	Cooling : 48 Heating : 50
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,300 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	105
Refrigerant equipment Compressor type & Q'ty		—	RMT5134MDE2 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 × 2 < Direct line start >
Air flow (Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	100
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.100m	
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	See page 43
Refrigerant Quantity		R410A 4.5kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 230V50Hz or 220V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF125VNXVD	
		Indoor unit **FDF125VD**	Outdoor unit **FDC125VNX**
Power source			220-240V~50Hz / 220V~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	12.5 [5.0 (Min.)~14.0 (Max.)]	14.0 [4.0 (Min.)~17.0 (Max.)]
Power consumption	kW	3.89	3.88
Running current	A	17.3 / 18.0	17.2 / 18.0
Power factor	%	98	98
Inrush current	A	5 < Max.running current 26 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	Cooling : 48 Heating : 50
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,300 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	105
Refrigerant equipment Compressor type & Q'ty		—	RMT5134MDE2 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 x 2 < Direct line start >
Air flow(Standard)	CMM	P-Hi:29 Hi:26 Me:23 Lo:19	100
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data Refrigerant piping size	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52(3/8") × 0.8 O/Uϕ9.52 (3/8")	
		Gas line: ϕ15.88 (5/8") ϕ15.88(5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.100m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 4.5kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 230V50Hz or 220V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF140VNXVD	
		Indoor unit **FDF140VD**	Outdoor unit **FDC140VNX**
Power source			220-240V~50Hz / 220V~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	14.0 [5.0 (Min.)~16.0 (Max.)]	16.0 [4.0 (Min.)~18.0 (Max.)]
Power consumption	kW	4.65	4.69
Running current	A	20.6 / 21.6	20.8 / 21.8
Power factor	%	98	98
Inrush current	A	5 < Max.running current 24 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	Cooling : 49 Heating : 52
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,300 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	105
Refrigerant equipment			
Compressor type & Q'ty		—	RMT5134MDE2 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment			
Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 × 2 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	100
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ15.88 (5/8") ϕ 15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.100m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 4.5kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.ner is operated at 230V50Hz or 220V60Hz.

(4) The operation data indicates when the air-conditio

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

2) Twin type

Adapted to **RoHS** directive

Item \ Model		FDF140VNXPVD	
		Indoor unit **FDF71VD (2 units)**	Outdoor unit **FDC140VNX**
Power source			220-240V~50Hz / 220V~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	14.0 [5.0 (Min.) ~16.0 (Max.)]	16.0 [4.0 (Min.) ~18.0 (Max.)]
Power consumption	kW	4.83	4.97
Running current	A	21.4 / 22.4	22.0 / 23.1
Power factor	%	98	98
Inrush current	A	5 < Max.running current 26 >	
Sound Pressure Level	dB(A)	P-Hi : 42 Hi : 39 Me : 35 Lo : 33	Cooling : 49 Heating : 52
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,300 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	49	105
Refrigerant equipment Compressor type & Q'ty		—	RMT5134MDE2 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 x 2 < Direct line start >
Air flow (Standard)	CMM	P-Hi : 18 Hi : 16 Me : 14 Lo : 12	100
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data Refrigerant piping size	mm	Liquid line: I/U ϕ9.52 (3/8") ②ϕ9.52 (3/8") × 0.8 ①ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8") Gas line: I/U ϕ15.88 (5/8") ②ϕ15.88 (5/8") × 1.0 ①ϕ15.88 (5/8") × 1.0 O/U ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.100m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 4.5kg (Pre-charged up to the piping length of 30m) Outdoor unit	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

(2) This packaged air-conditioner is manufactured and tested in conformity with the ISO.
(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.
(4) The operation data indicates when the air-conditioner is operated at 230V50Hz or 220V60Hz.
(5) Indoor unit specifications for one unit. Capacity and operation data is two indoor units are combined and run together.
(6) Branching pipe set "DIS-WA1" × 1 (option). ①: Pipe of O/U~Branch, ②: Pipe of Branch~I/U
(7) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

(b) 3 phase use

1) Single type

Adapted to **RoHS** directive

Item \ Model		FDF100VSXVD	
		Indoor unit **FDF100VD**	Outdoor unit **FDC100VSX**
			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	10.0 [4.0 (Min.)~11.2 (Max.)]	11.2 [4.0 (Min.)~16.0 (Max.)]
Power consumption	kW	2.83	3.04
Running current	A	4.2 / 4.4	4.5 / 4.7
Power factor	%	97 / 98	98
Inrush current	A	5 < Max.running current 15 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	Cooling : 48 Heating : 50
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,300 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	105
Refrigerant equipment			
Compressor type & Q'ty		—	RMT5134MDE3 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment			
Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 × 2 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	100
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/Uϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.100m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 4.5kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ 20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
	DB	WB	DB	WB
Operation				
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF125VSXVD	
		Indoor unit **FDF125VD**	Outdoor unit **FDC125VSX**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	12.5 [5.0 (Min.)~14.0 (Max.)]	14.0 [4.0 (Min.)~18.0 (Max.)]
Power consumption	kW	3.89	3.88
Running current	A	5.7 / 6.0	5.7 / 6.0
Power factor	%	99	98
Inrush current	A	5 < Max.running current 15 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	Cooling : 48 Heating : 50
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,300 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	105
Refrigerant equipment			
Compressor type & Q'ty		—	RMT5134MDE3 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment			
Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 × 2 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	100
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/Uϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.100m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 4.5kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

(2) This packaged air-conditioner is manufactured and tested in conformity with the ISO.
(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.
(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.
(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF140VSXVD	
		Indoor unit **FDF140VD**	Outdoor unit **FDC140VSX**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	14.0 [5.0 (Min.)~16.0 (Max.)]	16.0 [4.0 (Min.)~20.0 (Max.)]
Power consumption	kW	4.65	4.69
Running current	A	6.8 / 7.2	6.9 / 7.3
Power factor	%	99/98	98
Inrush current	A	5 < Max.running current 15 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	Cooling : 49 Heating : 52
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,300 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	105
Refrigerant equipment			
Compressor type & Q'ty		—	RMT5134MDE3 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment			
Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 × 2 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	100
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.100m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 4.5kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

2) Twin type

Adapted to **RoHS** directive

Item \ Model		FDF140VSXPVD	
		Indoor unit **FDF71VD (2 units)**	Outdoor unit **FDC140VSX**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	14.0 [5.0 (Min.)~16.0 (Max.)]	16.0 [4.0 (Min.)~20.0 (Max.)]
Power consumption	kW	4.83	4.97
Running current	A	7.1 / 7.5	7.3 / 7.7
Power factor	%	98	98
Inrush current	A	5 < Max.running current 15 >	
Sound Pressure Level	dB(A)	P-Hi : 42 Hi : 39 Me : 35 Lo : 33	Cooling : 49 Heating : 52
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,300 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	49	105
Refrigerant equipment Compressor type & Q'ty		—	RMT5134MDE3 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 x 2 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 18 Hi : 16 Me : 14 Lo : 12	100
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data Refrigerant piping size	mm	Liquid line: I/U ϕ9.52 (3/8") ②ϕ9.52 (3/8") × 0.8 ①ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8") Gas line: I/U ϕ15.88 (5/8") ②ϕ15.88 (5/8") × 1.0 ①ϕ15.88 (5/8") × 1.0 O/U ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.100m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 4.5kg (Pre-charged up to the piping length of 30m) Outdoor unit	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

(2) This packaged air-conditioner is manufactured and tested in conformity with the ISO.
(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.
(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.
(5) Indoor unit specifications for one unit. Capacity and operation data is two indoor units are combined and run together.
(6) Branching pipe set "DIS-WA1" × 1 (option). ①: Pipe of O/U~Branch, ②: Pipe of Branch~I/U
(7) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

(2) Micro inverter series
(a) Single plase use
1) Single type

Adapted to **RoHS** directive

Item \ Model		FDF100VNVD	
		Indoor unit **FDF100VD**	Outdoor unit **FDC100VN**
Power source			220-240V~50Hz / 220V~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	10.0 [4.0 (Min.)~11.2 (Max.)]	11.2 [4.0 (Min.)~12.5 (Max.)]
Power consumption	kW	3.12	3.10
Running current	A	13.8 / 14.5	13.8 / 14.4
Power factor	%	98	98
Inrush current	A	5 < Max.running current 24 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	49
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	845 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	81
Refrigerant equipment Compressor type & Q'ty		—	RMT5126MDE2 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow (Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	Cooling : 75, Heating : 73
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 3.8kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

(2) This packaged air-conditioner is manufactured and tested in conformity with the ISO.
(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.
(4) The operation data indicates when the air-conditioner is operated at 230V50Hz or 220V60Hz.
(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF125VNVD	
		Indoor unit **FDF125VD**	Outdoor unit **FDC125VN**
Power source			220-240V~50Hz / 220V~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	12.5 [5.0 (Min.)~14.0 (Max.)]	14.0 [4.0 (Min.)~16.0 (Max.)]
Power consumption	kW	4.40	4.36
Running current	A	19.5 / 20.4	19.3 / 20.2
Power factor	%	98	98
Inrush current	A	5 < Max.running current 24 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	Cooling : 50 Heating : 51
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	845 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	81
Refrigerant equipment Compressor type & Q'ty		—	RMT5126MDE2 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	Cooling : 75, Heating : 73
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data Refrigerant piping size	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 3.8kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 230V50Hz or 220V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF140VNVD	
		Indoor unit **FDF140VD**	Outdoor unit **FDC140VN**
Power source			220-240V~50Hz / 220V~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	14.0 [5.0 (Min.)~14.5 (Max.)]	16.0 [4.0 (Min.)~16.5 (Max.)]
Power consumption	kW	5.15	5.31
Running current	A	22.8 / 23.9	23.6 / 24.6
Power factor	%	98	98
Inrush current	A	5 < Max.running current 24 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	51
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	845 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	81
Refrigerant equipment Compressor type & Q'ty		—	RMT5126MDE2 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	Cooling : 75, Heating : 73
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data Refrigerant piping size	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 3.8kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 230V50Hz or 220V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

2) Twin type

Adapted to **RoHS** directive

Item \ Model		FDF140VNPVD	
		Indoor unit **FDF71VD (2 units)**	Outdoor unit **FDC140VN**
Power source			220-240V~50Hz / 220V~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	14.0 [5.0 (Min.)~14.5 (Max.)]	16.0 [4.0 (Min.)~16.5 (Max.)]
Power consumption	kW	5.16	5.01
Running current	A	22.9 / 23.9	22.2 / 23.2
Power factor	%	98	98
Inrush current	A	5 < Max.running current 24 >	
Sound Pressure Level	dB(A)	P-Hi : 42 Hi : 39 Me : 35 Lo : 33	51
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	845 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	49	81
Refrigerant equipment			
Compressor type & Q'ty		—	RMT5126MDE2 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment			
Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 18 Hi : 16 Me : 14 Lo : 12	Cooling : 75, Heating : 73
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") ②ϕ9.52 (3/8") × 0.8 ①ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8")	
Refrigerant piping size		Gas line: I/U ϕ15.88 (5/8") ②ϕ15.88 (5/8") × 1.0 ①ϕ15.88 (5/8") × 1.0 O/U ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 3.8kg (Pre-charged up to the piping length of 30m) Outdoor unit	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

(2) This packaged air-conditioner is manufactured and tested in conformity with the ISO.
(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.
(4) The operation data indicates when the air-conditioner is operated at 230V50Hz or 220V60Hz.
(5) Indoor unit specifications for one unit. Capacity and operation data is two indoor units are combined and run together.
(6) Branching pipe set "DIS-WA1" × 1 (option). ①: Pipe of O/U~Branch, ②: Pipe of Branch~I/U
(7) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

(b) 3 plase use

1) Single type

Adapted to **RoHS** directive

Item \ Model		FDF100VSVD	
		Indoor unit **FDF100VD**	Outdoor unit **FDC100VS**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	10.0 [4.0 (Min.)~11.2 (Max.)]	11.2 [4.0 (Min.)~12.5 (Max.)]
Power consumption	kW	3.12	3.1
Running current	A	4.6 / 4.8	4.6 / 4.8
Power factor	%	98/99	97/98
Inrush current	A	5 < Max.running current 15 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	49
Exterior dimensions Height x Width x Depth	mr	1,850 × 600 × 320	845 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	83
Refrigerant equipment Compressor type & Q'ty		—	RMT5126MDE3 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	Cooling : 75, Heating : 73
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/Uϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 3.8kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF125VSVD	
		Indoor unit **FDF125VD**	Outdoor unit **FDC125VS**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	12.5 [5.0 (Min.)~14.0 (Max.)]	14.0 [4.0 (Min.)~16.0 (Max.)]
Power consumption	kW	4.4	4.36
Running current	A	6.5 / 6.8	6.5 / 6.8
Power factor	%	98	97
Inrush current	A	5 < Max.running current 15 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	Cooling : 50 Heating : 51
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	845 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	83
Refrigerant equipment Compressor type & Q'ty		—	RMT5126MDE3 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow (Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	Cooling : 75, Heating : 73
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ 15.88 (5/8") ϕ 15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 3.8kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF140VSVD	
		Indoor unit **FDF140VD**	Outdoor unit **FDC140VS**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	14.0 [5.0 (Min.)~14.5 (Max.)]	16.0 [4.0 (Min.)~16.5 (Max.)]
Power consumption	kW	5.15	5.31
Running current	A	7.6 / 8.0	7.9 / 8.2
Power factor	%	98	97/98
Inrush current	A	5 < Max.running current 15 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	51
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	845 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	83
Refrigerant equipment			
Compressor type & Q'ty		—	RMT5126MDE3 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment			
Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	Cooling : 75, Heating : 73
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") Pipe ϕ9.52 (3/8") × 0.8 O/Uϕ9.52 (3/8")	
Refrigerant piping size		Gas line: ϕ15.88 (5/8") ϕ15.88 (5/8") × 1.0 ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 3.8kg in outdoor unit (incl. the amount for the piping of : 30m)	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

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

(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.

(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.

(5) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

2) Twin type

Adapted to **RoHS** directive

Item \ Model		FDF140VSPVD	
		Indoor unit **FDF71VD (2 units)**	Outdoor unit **FDC140VS**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	14.0 [5.0 (Min.)~14.5 (Max.)]	16.0 [4.0 (Min.)~16.5 (Max.)]
Power consumption	kW	5.16	5.01
Running current	A	7.6 / 8.0	7.4 / 7.8
Power factor	%	98	98
Inrush current	A	5 < Max.running current 15 >	
Sound Pressure Level	dB(A)	P-Hi : 42 Hi : 39 Me : 35 Lo : 33	51
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	845 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	49	83
Refrigerant equipment			
Compressor type & Q'ty		—	RMT5126MDE3 × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	0.9 M-MA68
Heat exchanger		Louver fine & inner grooved tubing	M shape fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment			
Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 1
Motor <Starting method>	W	157 < Direct line start >	86 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 18 Hi : 16 Me : 14 Lo : 12	Cooling : 75, Heating : 73
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	20 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") ②ϕ9.52 (3/8") × 0.8 ①ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8")	
Refrigerant piping size		Gas line: I/U ϕ15.88 (5/8") ②ϕ15.88 (5/8") × 1.0 ①ϕ15.88 (5/8") × 1.0 O/U ϕ15.88 (5/8")	
Connecting method		Flare piping	Flare piping
Refrigerant line (one way) length		Max.50m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 3.8kg (Pre-charged up to the piping length of 30m) Outdoor unit	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

(2) This packaged air-conditioner is manufactured and tested in conformity with the ISO.
(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.
(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.
(5) Indoor unit specifications for one unit. Capacity and operation data is two indoor units are combined and run together.
(6) Branching pipe set "DIS-WA1" × 1 (option). ①: Pipe of O/U~Branch, ②: Pipe of Branch~I/U
(7) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF200VSPVD	
		Indoor unit **FDF100VD (2 units)**	Outdoor unit **FDC200VS**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	20.0 [7.0 (Min.)~22.4 (Max.)]	22.4 [7.6 (Min.)~25.0 (Max.)]
Power consumption	kW	6.50	6.42
Running current	A	9.6 / 10.1	9.5 / 10.0
Power factor	%	98	98
Inrush current	A	5 < Max.running current 19 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	57
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,300 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	122
Refrigerant equipment			
Compressor type & Q'ty		—	GTC5150ND70K × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	1.45 M-MA32R
Heat exchanger		Louver fine & inner grooved tubing	Straight fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment			
Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 × 2 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	Cooling : 150, Heating : 145
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	33 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data	mm	Liquid line: I/U ϕ9.52 (3/8") ②ϕ9.52 (3/8") × 0.8 ①ϕ9.52 (3/8") × 0.8 O/U ϕ9.52 (3/8")	
Refrigerant piping size		Gas line: I/U ϕ15.88 (5/8") ②ϕ15.88 (5/8") × 1.0 ①ϕ22.22 (7/8") × 1.0 O/U ϕ22.22 (7/8")	
Connecting method		Flare piping	Liquid : Flare / Gas : Brazing
Refrigerant line (one way) length		Max.70m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 5.4kg (Pre-charged up to the piping length of 30m) Outdoor unit	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Connecting pipe, Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

(2) This packaged air-conditioner is manufactured and tested in conformity with the ISO.
(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.
(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.
(5) Indoor unit specifications for one unit. Capacity and operation data is two indoor units are combined and run together.
(6) Branching pipe set "DIS-WB1" × 1(option). ①: Pipe of O/U~Branch, ②: Pipe of Branch~I/U
(7) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

Adapted to **RoHS** directive

Item \ Model		FDF250VSPVD	
		Indoor unit **FDF125VD (2 units)**	Outdoor unit **FDC250VS**
Power source			380-415V 3N~50Hz / 380V 3N~60Hz
Operation data		Cooling	Heating
Nominal capacity	kW	25.0 [10.0 (Min.)~28.0 (Max.)]	28.0 [9.5 (Min.)~31.5 (Max.)]
Power consumption	kW	8.95	9.17
Running current	A	13.2 / 13.9	13.5 / 14.2
Power factor	%	98	98
Inrush current	A	5 < Max.running current 22 >	
Sound Pressure Level	dB(A)	P-Hi : 54 Hi : 50 Me : 48 Lo : 44	Cooling : 57 Heating : 58
Exterior dimensions Height x Width x Depth	mm	1,850 × 600 × 320	1,505 × 970 × 370
Exterior appearance (Munsell color)		Ceramic White (N8.0) near equivalent	Stucco White (4.2Y7.5/1.1) near equivalent
Net weight	kg	52	140
Refrigerant equipment Compressor type & Q'ty		—	GTC5150ND70K × 1
Starting method		—	Direct line start
Refrigerant oil	·	—	1.45 M-MA32R
Heat exchanger		Louver fine & inner grooved tubing	Straight fin & inner grooved tubing
Refrigerant control		—	Electronic expansion valve
Air handling equipment Fan type & Q'ty		Centrifugal fan × 1	Propeller fan × 2
Motor <Starting method>	W	157 < Direct line start >	86 × 2 < Direct line start >
Air flow(Standard)	CMM	P-Hi : 29 Hi : 26 Me : 23 Lo : 19	Cooling : 150, Heating : 145
External static pressure	Pa	0	—
Outside air intake		Not possible	—
Air filter, Q'ty		Plastic net × 1 (Washable)	—
Shock & vibration absorber		Rubber sleeve (for fan motor)	Rubber sleeve (for Compressor)
Insulation (noise & heat)		Polyurethane form	—
Electric heater	W	—	33 (Crank case heater)
Remote controller		RC-E4 Installed / wireless : RCN-KIT3-E (option)	
Room temperature control		Thermostat by electronics	—
Safety equipment		Overload protection for fan motor Frost protection thermostat	Internal thermostat for fan motor Abnormal discharge temperature protection.
Installation data Refrigerant piping size	mm	Liquid line: I/U ϕ9.52 (3/8") ②ϕ9.52 (3/8") × 0.8 ①ϕ12.7 (1/2") × 0.8 O/U ϕ12.7 (1/2") Gas line: I/U ϕ15.88 (5/8") ②ϕ15.88 (5/8") × 1.0 ①ϕ22.22 (7/8") × 1.0 O/U ϕ22.22 (7/8")	
Connecting method		Flare piping	Liquid : Flare / Gas : Brazing
Refrigerant line (one way) length		Max.70m	See page 43
Vertical height difference between outdoor unit and indoor unit		Max.30m (Outdoor unit is higher) Max.15m (Outdoor unit is lower)	
Refrigerant Quantity		R410A 7.2kg (Pre-charged up to the piping length of 30m) Outdoor unit	
Drain pump		—	—
Drain		Hose Connectable with VP20	Holes size ϕ20 × 3pcs
Insulation for piping		Necessary (both Liquid & Gas lines)	
Standard Accessories		Mounting kit	Connecting pipe, Edging

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

Item	Indoor air temperature		Outdoor air temperature	
Operation	DB	WB	DB	WB
Cooling	27°C	19°C	35°C	24°C
Heating	20°C		7°C	6°C

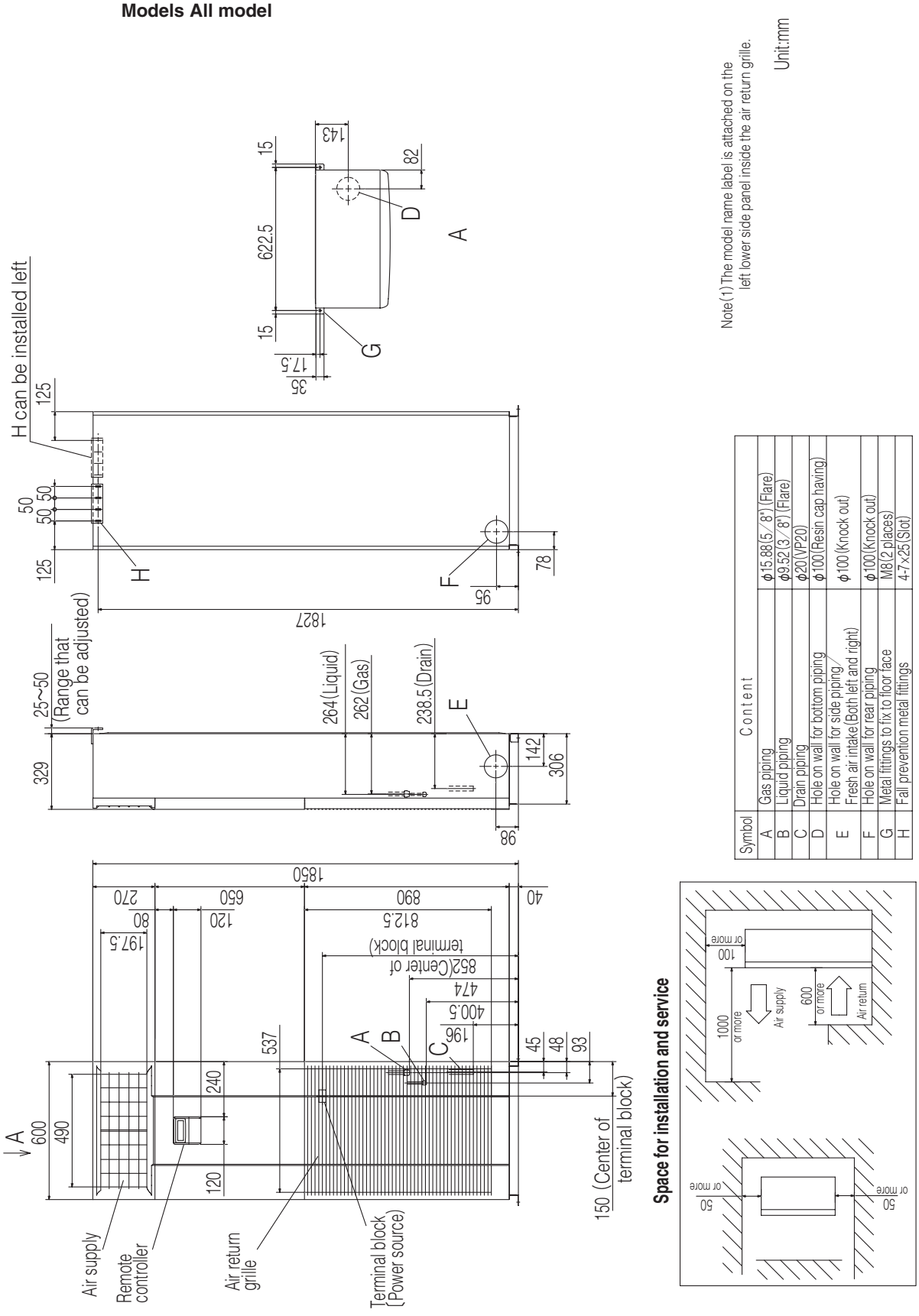
(2) This packaged air-conditioner is manufactured and tested in conformity with the ISO.
(3) Sound pressure level indicates the value in an anechoic chamber. During operation these value are somewhat higher due to ambient temperature.
(4) The operation data indicates when the air-conditioner is operated at 400V50Hz or 380V60Hz.
(5) Indoor unit specifications for one unit. Capacity and operation data is two indoor units are combined and run together.
(6) Branching pipe set "DIS-WB1" × 1(option). ① : Pipe of O/U~Branch, ② : Pipe of Branch~I/U
(7) If wireless remote controller is used, only 3-speed fan setting (Hi-Me-Lo) is available.

PGA000Z780

2. EXTERIOR DIMENSIONS

(1) Indoor units

Models All model



Note (1) The model name label is attached on the left lower side panel inside the air return grille.

Unit:mm

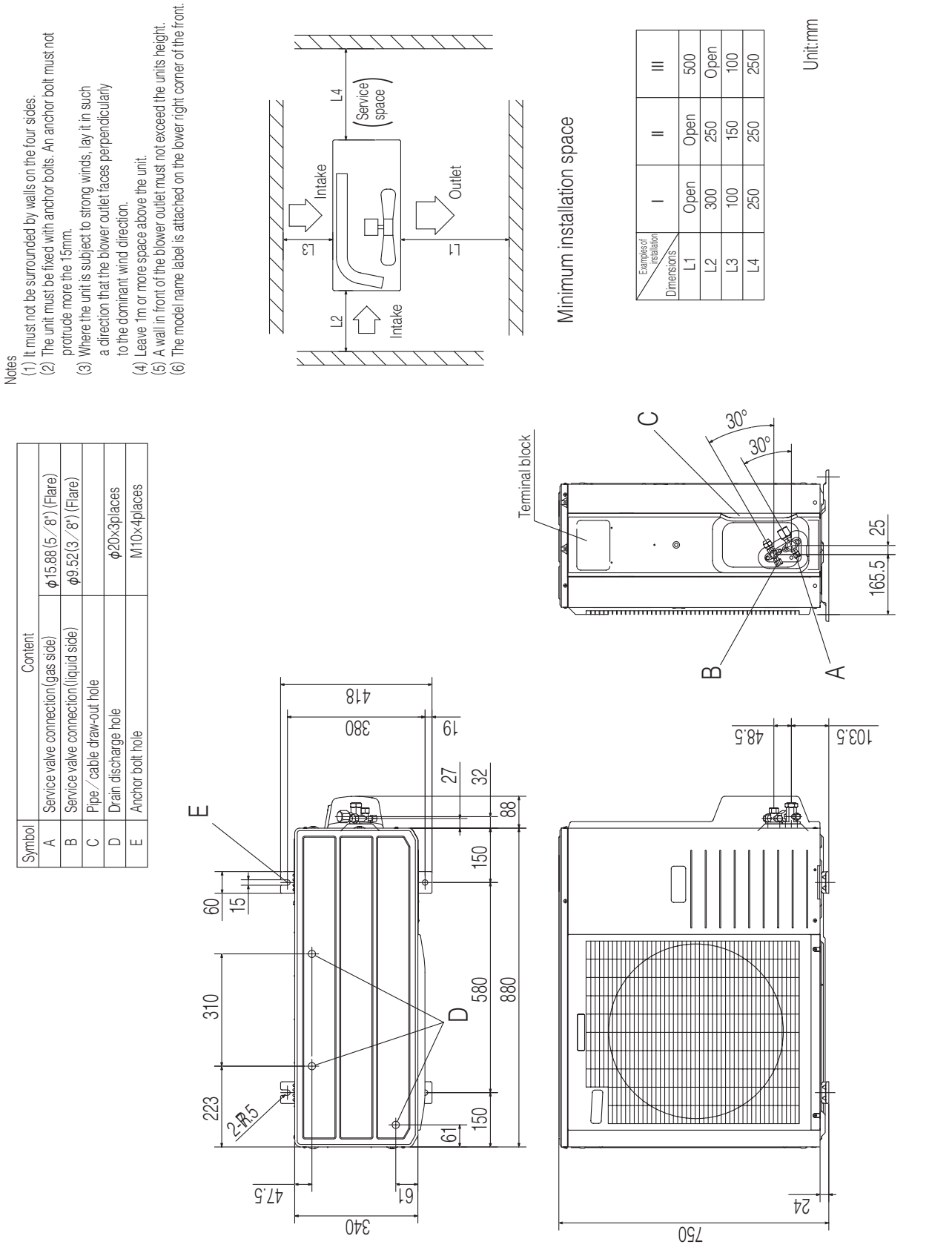
Symbol	Content	
A	Gas piping	φ15.88 (5/8") (Flare)
B	Liquid piping	φ9.52 (3/8") (Flare)
C	Drain piping	φ20 (VP20)
D	Hole on wall for bottom piping	φ100 (Resin cap having)
E	Hole on wall for side piping Fresh air intake (Both left and right)	φ100 (Knock out)
F	Hole on wall for rear piping	φ100 (Knock out)
G	Metal fittings to fix to floor face	M8 (2 places)
H	Fall prevention metal fittings	4-7×25 (Slot)

PGA000Z781

(2) Outdoor units

(a) Hyper inverter

Model FDC71VNX



PCA001Z603

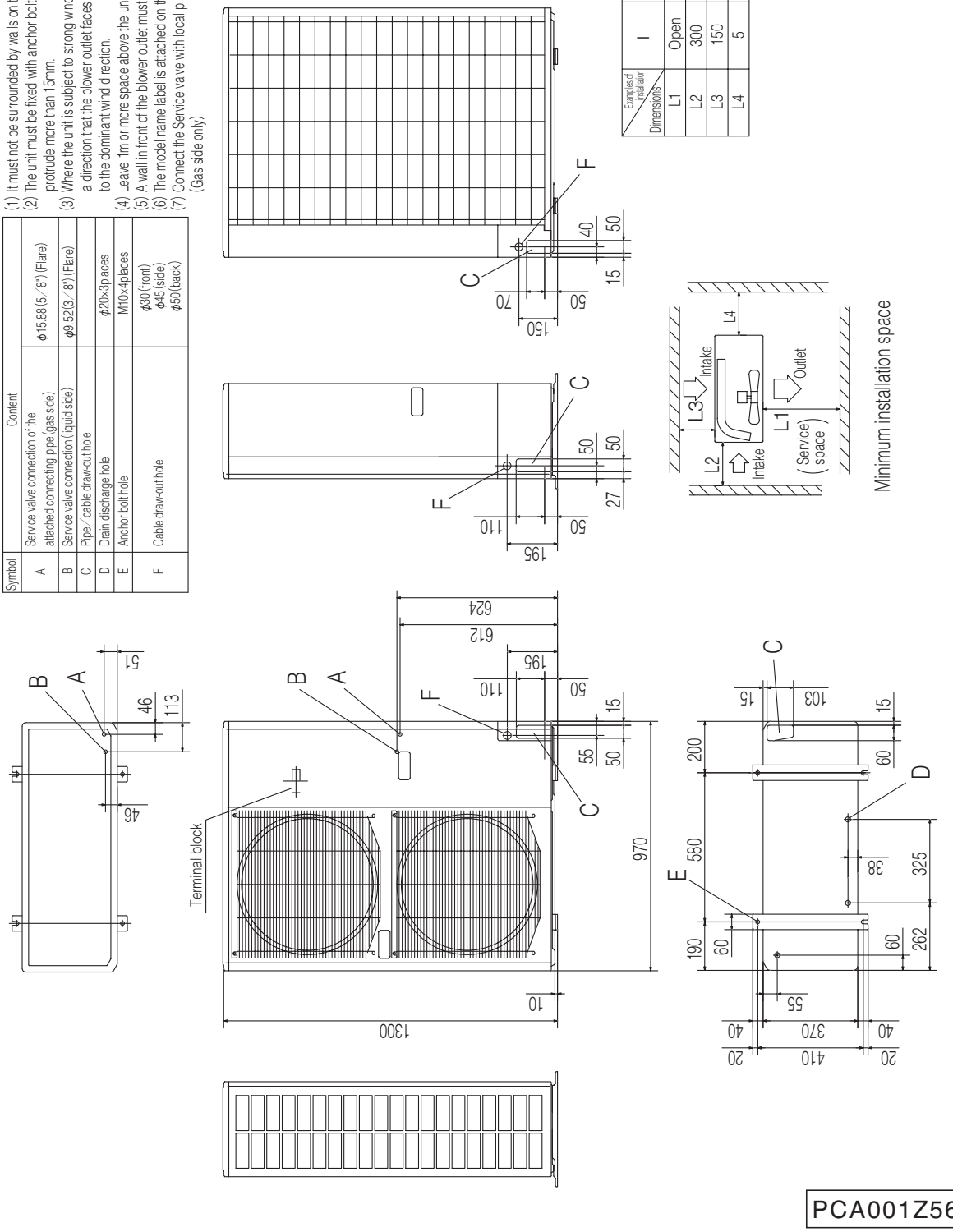
Models FDC100, 125, 140VNX
FDC100, 125, 140VSX

Notes
(1) It must not be surrounded by walls on the four sides.
(2) The unit must be fixed with anchor bolts. An anchor bolt must not protrude more than 15mm.
(3) Where the unit is subject to strong winds, lay it in such a direction that the blower outlet faces perpendicularly to the dominant wind direction.
(4) Leave 1m or more space above the unit.
(5) A wall in front of the blower outlet must not exceed the units height.
(6) The model name label is attached on the lower right corner of the front panel.
(7) Connect the Service valve with local pipe by using the pipe of the attachment. (Gas side only)

Symbol	Content	
A	Service valve connection of the attached connecting pipe (gas side)	φ15.88(5/8") (Flare)
B	Service valve connection (liquid side)	φ9.52(3/8") (Flare)
C	Pipe/ cable draw-out hole	
D	Drain discharge hole	φ20×3places
E	Anchor bolt hole	M10×4places
F	Cable draw-out hole	φ30 (front) φ45 (side) φ50 (back)

Examples of installation / Dimensions	I	II	III
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	5	5	5

Unit:mm

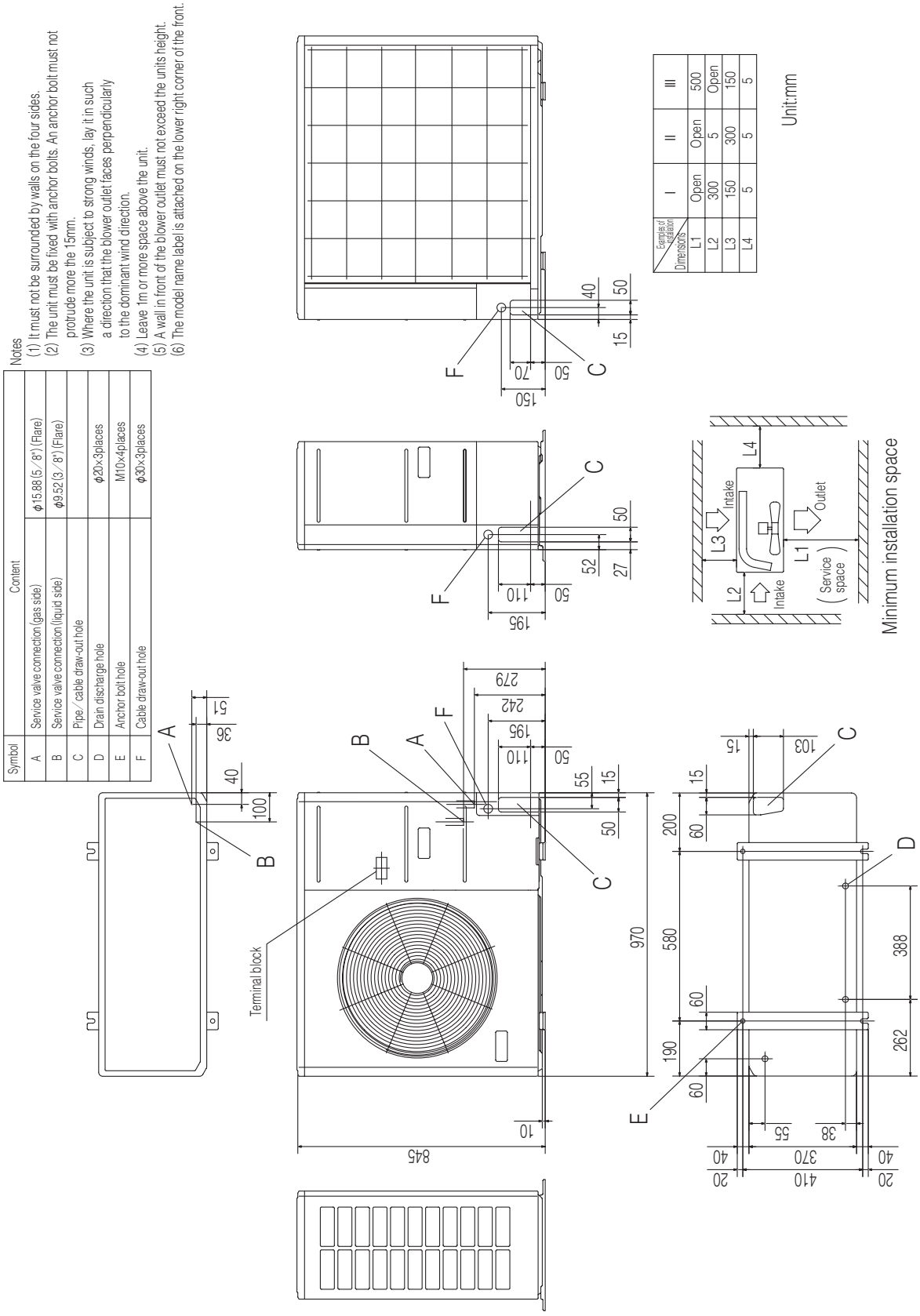


PCA001Z569 A

(b) Micro inverter

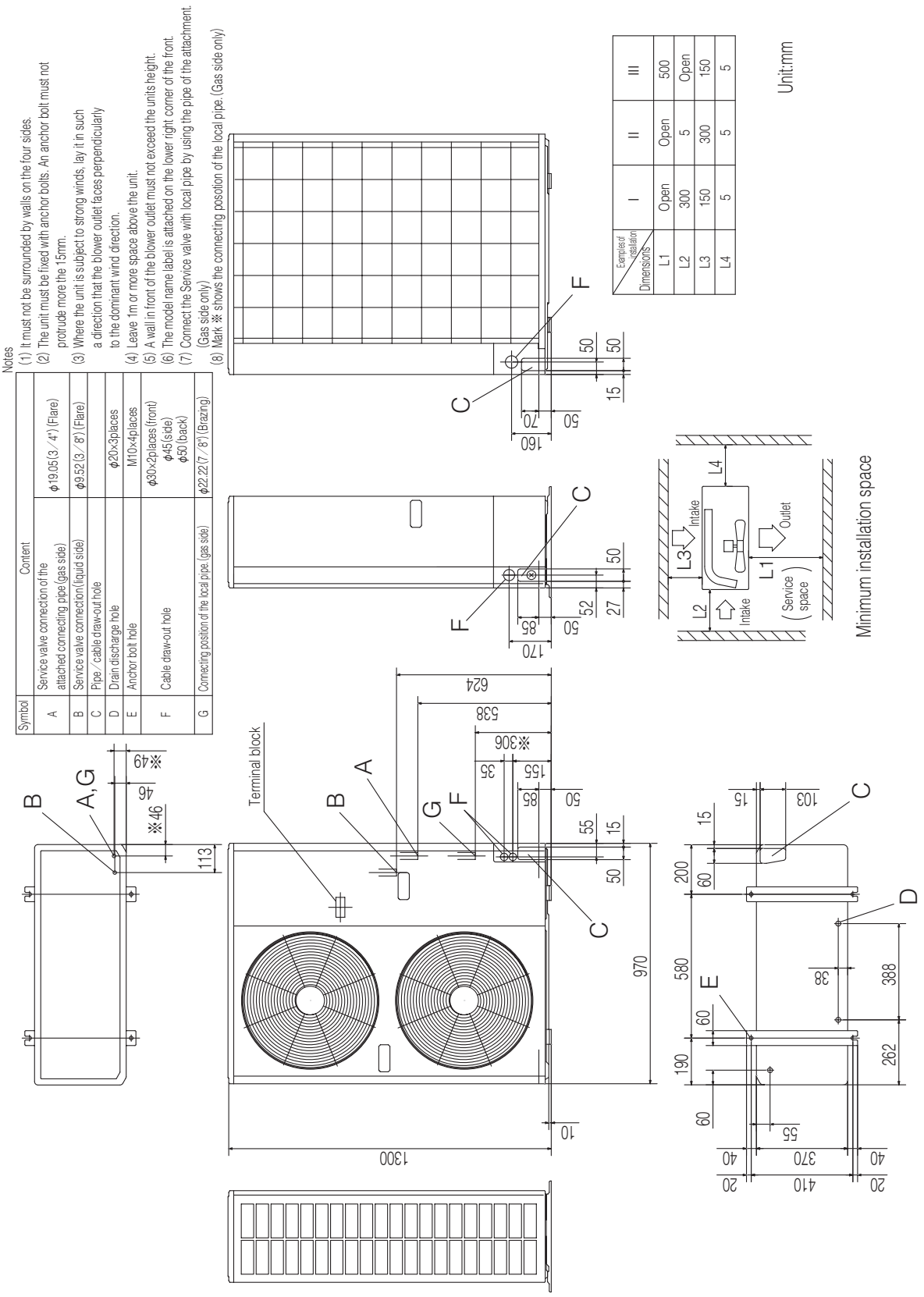
Models FDC100VN, 125VN, 140VN

FDC100VS, 125VS, 140VS



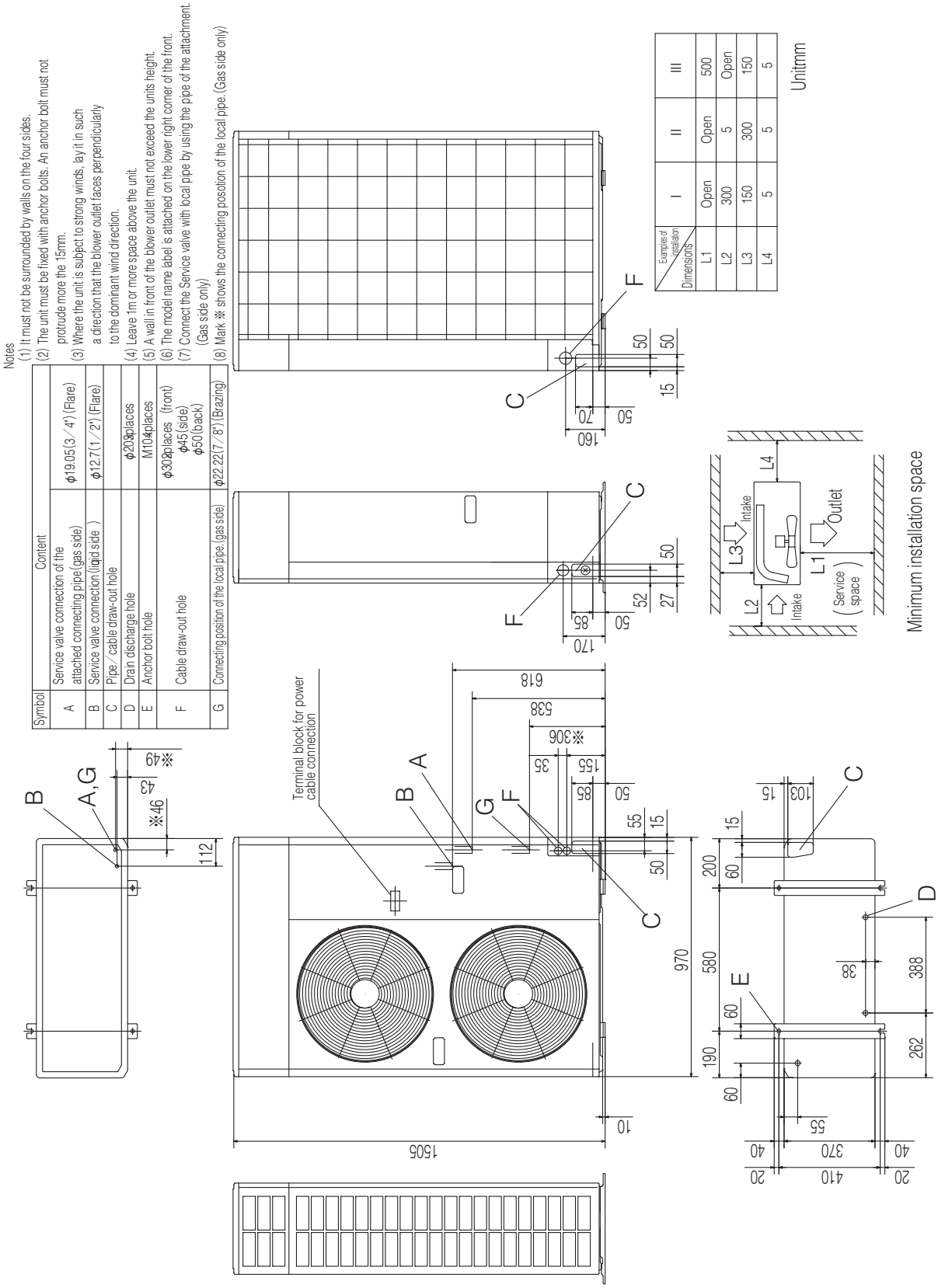
PCA001Z535

Model FDC200VS



PCA001Z536

Model FDC250VS

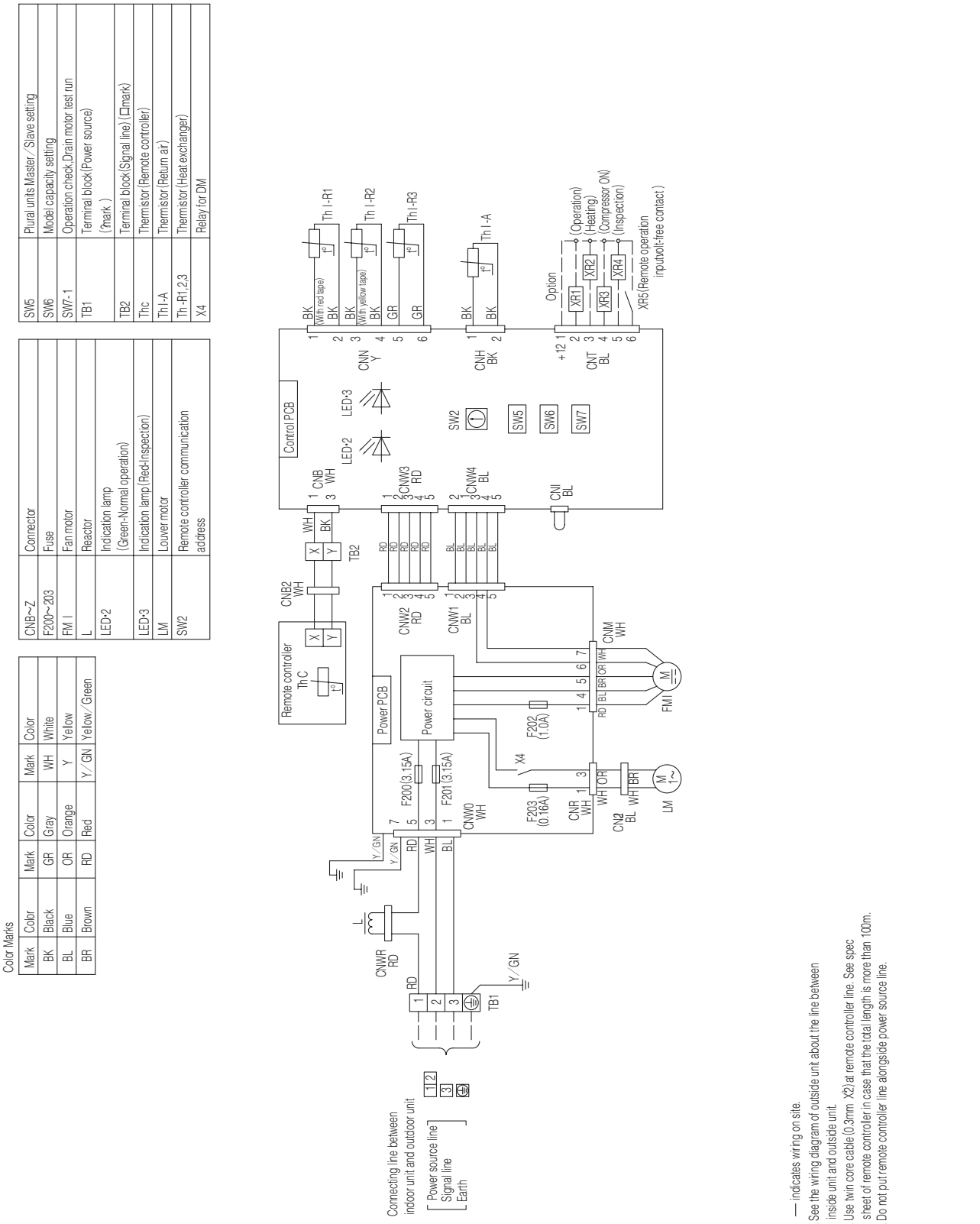


PCA001Z537

3. ELECTRICAL WIRING

(1) Indoor units

Models All model



Notes 1. — indicates wiring on site.
2. See the wiring diagram of outside unit about the line between inside unit and outside unit.
3. Use twin core cable (0.3mm X2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put remote controller line alongside power source line.

PGA000Z783

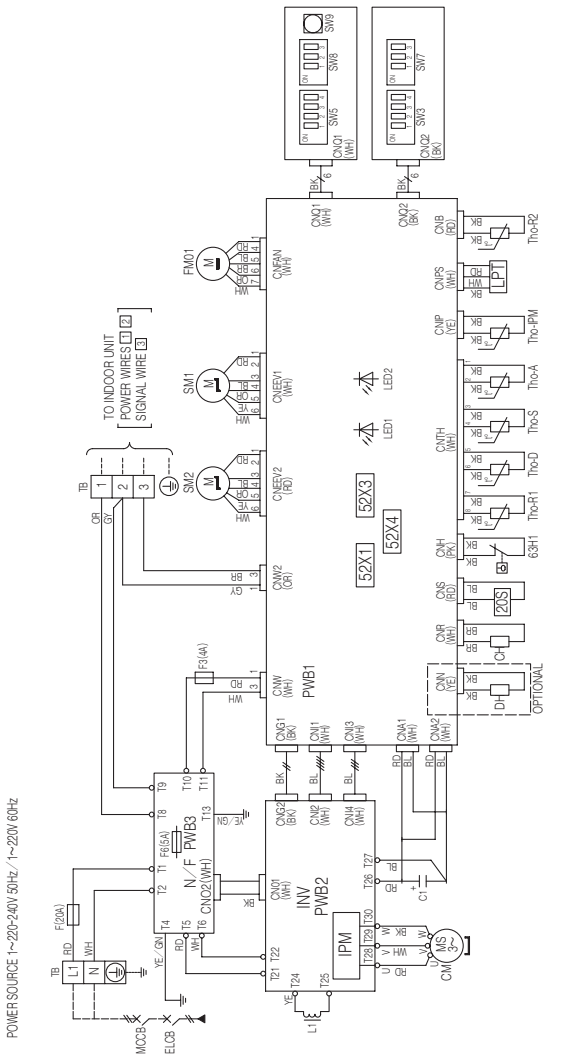
(2) Outdoor units

(a) Hyper inverter

Model FDC71VNX

ITEM	DESCRIPTION
CM	Compressor motor
FM01	Fan motor
CH	Crankcase heater
DH	Drain pan heater
52X1	Auxiliary relay (for CH)
52X3	Auxiliary relay (for 20S)
52X4	Auxiliary relay (for DH)
20S	Solenoid valve for 4 way valve
SM1	Expansion valve for cooling
SM2	Expansion valve for heating
63H1	High pressure switch
Tho-A	Thermistor (Outdoor air temp.)
Tho-D	Thermistor (Discharge pipe temp.)
Tho-R1,R2	Thermistor (Heat exchanger temp.)
Tho-S	Thermistor (Suction pipe temp.)
Tho-IPM	Thermistor (IPM)
LPT	Low pressure sensor
IPM	Intelligent power module
TB	Terminal block
F,F3	Fuse
CnA~Z	Connector
SW9	Pump down switch
SW3,5	Local setting switch
LED1	Indication lamp (GREEN)
LED2	Indication lamp (RED)
L1	Reactor

Mark	Color
BK	Black
BL	Blue
BR	Brown
OR	Orange
RD	Red
WH	White
YE	Yellow
YE/GN	Yellow/Green
GY	Gray
PK	Pink



Local setting switch SW3, SW5 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrosting operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 10 seconds in every 10 minutes, when outdoor temperature falls to 3°C or lower and the compressor is not running when the unit is used in a very snowy country, set this switch to ON.
SW5-3,4	Trial operation	Method of trial operation 1. Trial operation can be performed by using SW5-3. 2. Cooling trial operation will be performed when SW5-4 is OFF, and heating trial operation when SW5-4 is ON. 3. Be sure to turn OFF SW5-3 after the trial operation is finished.

Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number (mm^2)	Earth wire size (mm^2)
71	17	3.5	21	Ø1.6mm x 3	Ø1.6mm

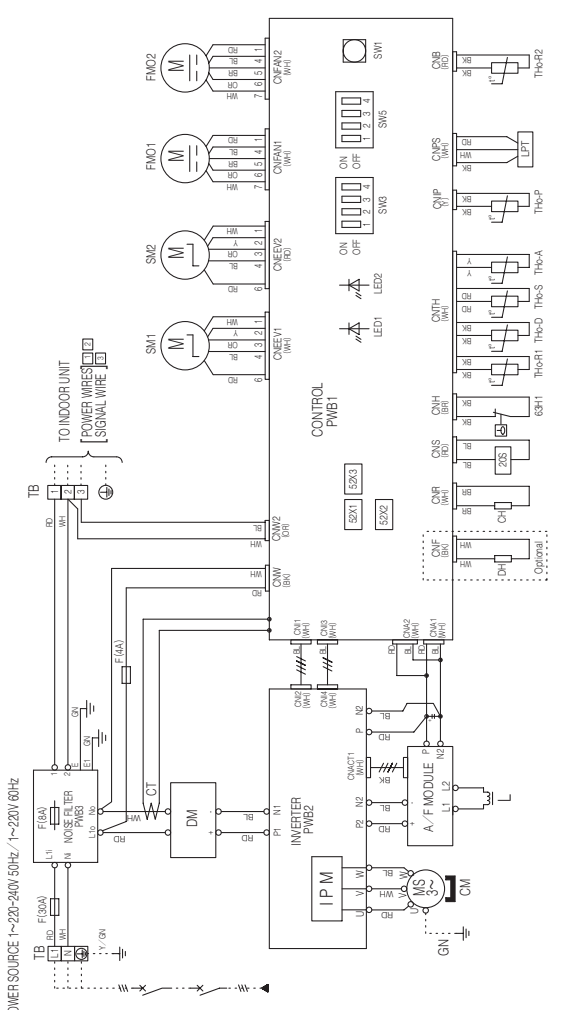
- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation failing outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.
- Refer to installation manual or technical manual about usage of local setting switch.
- Don't operate SW3-3,SW5-1,SW5-2,SW7,SW8

PCA001Z605

Models FDC100VNX, 125VNX, 140VNX

Item	Description
CnA~Z	Connector
CH	Crankcase heater
DH	Drain pan heater
CM	Compressor motor
CT	Current sensor
DM	Diode module
F	Fuse
FMO1	Fan motor
IPM	Intelligent power module
L	Reactor
LED1	Indication lamp(GREEN)
LED2	Indication lamp(RED)
LPT	Low pressure sensor
SM1	Expansion valve for cooling
SM2	Expansion valve for heating
SW1	Pump down switch
SW3,5	Local setting switch
TB	Terminal block
THo-A	Thermistor (Outdoor air temp.)
THo-D	Thermistor (Discharge pipe temp.)
THo-P	Thermistor (IPM)
THo-R1,2	Thermistor (Heat exchanger pipe temp.)
THo-S	Thermistor (Suction pipe temp.)
20S	Solenoid valve for 4 way valve
52X1	Auxiliary relay (for CH)
52X2	Auxiliary relay (for DH)
52X3	Auxiliary relay (for 20S)
63H1	High pressure switch

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



Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number	Earth wire size (mm)
100	24	5.5	25	Ø1.6mm x 3	Ø1.6
125	26		23		
140					

?At the connection with the duct type indoor unit.

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number	Earth wire size (mm)
100	25	5.5	24	Ø1.6mm x 3	Ø1.6
125	29	8	31		
140	30		30		

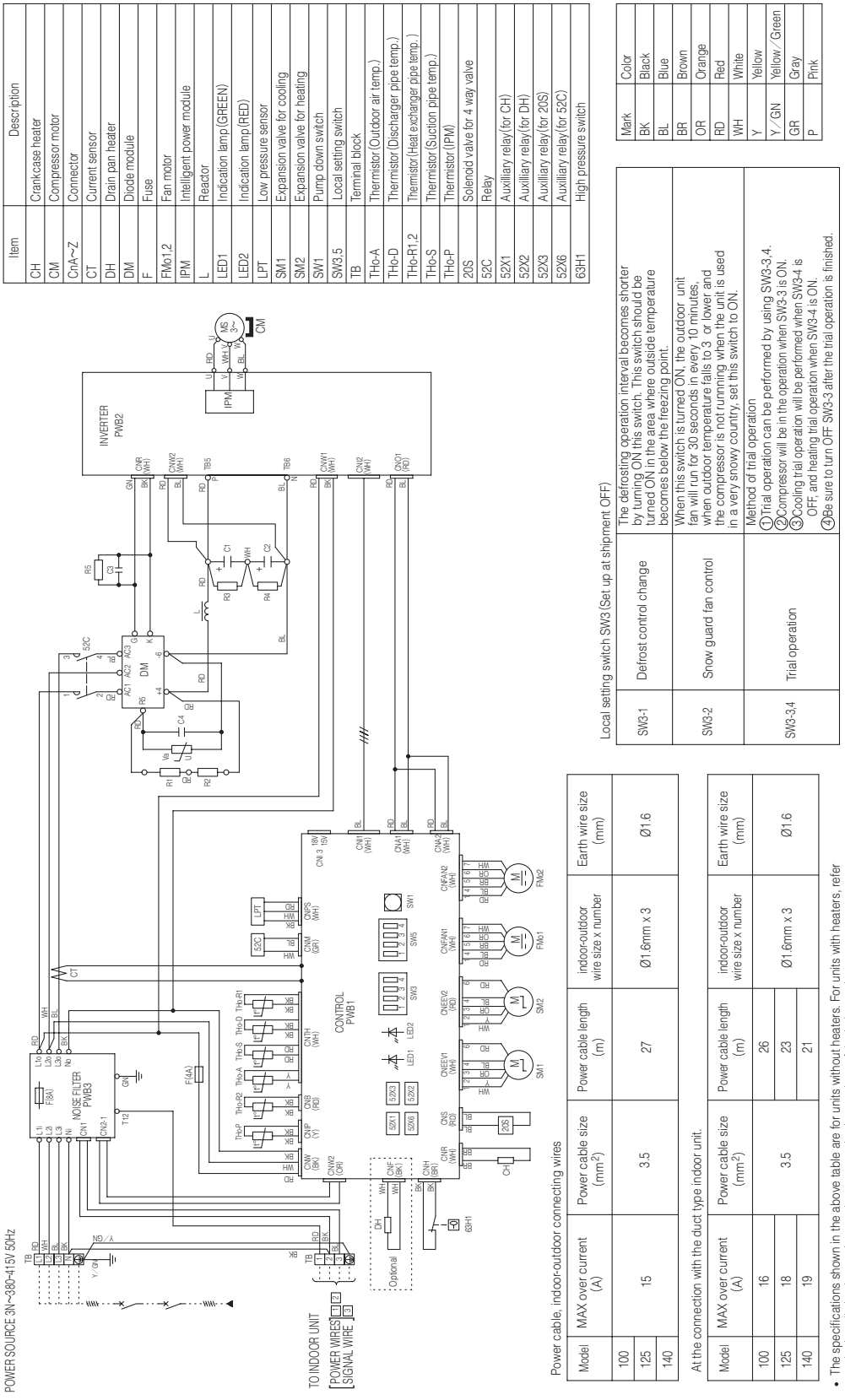
Local setting switch SW3 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrosting operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3? or lower and the compressor is not running. When the unit is used in a very snowy country, set this switch to ON.
SW3-3,4	Trial operation	Method of trial operation ①Trial operation can be performed by using SW3-3,4. ②Compressor will be in the operation when SW3-3 is ON. ③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON. ④Be sure to turn OFF SW3-3 after the trial operation is finished.

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

PCA001Z570 A

Models FDC100VSX, 125VSX, 140VSX



Item	Description
CH	Crankcase heater
CM	Compressor motor
CnA~Z	Connector
CT	Current sensor
DH	Drain pan heater
DM	Diode module
F	Fuse
FMo1,2	Fan motor
IPM	Intelligent power module
L	Reactor
LED1	Indication lamp(GREEN)
LED2	Indication lamp(RED)
LPT	Low pressure sensor
SM1	Expansion valve for cooling
SM2	Expansion valve for heating
SW1	Pump down switch
SW3,5	Local setting switch
TB	Terminal block
THo-A	Thermistor (Outdoor air temp.)
THo-D	Thermistor (Discharger pipe temp.)
THo-R1,2	Thermistor (Heat exchanger pipe temp.)
THo-S	Thermistor (Suction pipe temp.)
THo-P	Thermistor (IPM)
20S	Solenoid valve for 4 way valve
52C	Relay
52X1	Auxiliary relay (for CH)
52X2	Auxiliary relay (for DH)
52X3	Auxiliary relay (for 20S)
52X6	Auxiliary relay (for 52C)
63H1	High pressure switch

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

Local setting switch SW3 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrosting operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3 °C or lower and the compressor is not running. When the unit is used in a very snowy country, set this switch to ON.
SW3-3,4	Trial operation	Method of trial operation ①Trial operation can be performed by using SW3-3, 4. ②Compressor will be in the operation when SW3-3 is ON. ③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON. ④Be sure to turn OFF SW3-3 after the trial operation is finished.

Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number	Earth wire size (mm)
100	15	3.5	27	Ø1.6mm x 3	Ø1.6
125					
140					

At the connection with the duct type indoor unit.

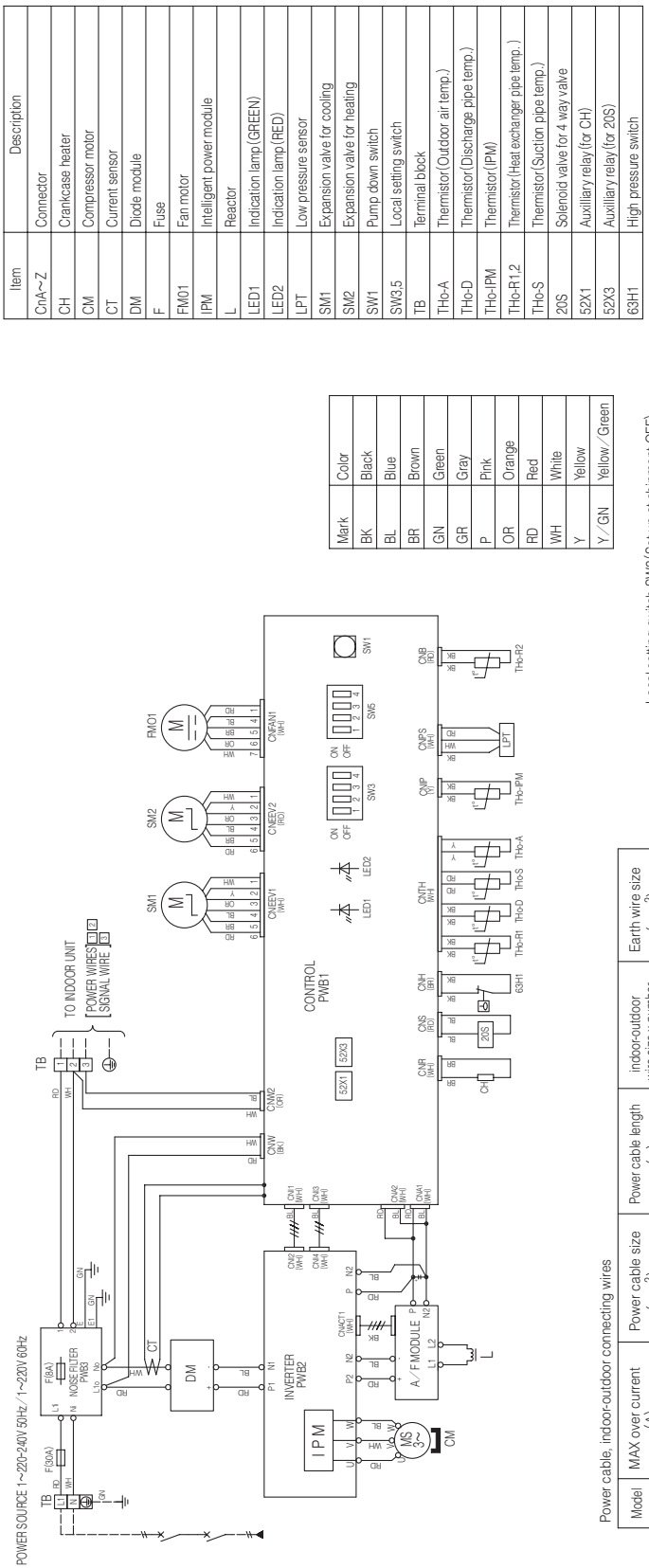
Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number	Earth wire size (mm)
100	16	3.5	26	Ø1.6mm x 3	Ø1.6
125	18		23		
140	19		21		

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear or Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

PCA001Z571 A

(b) Micro inverter

Models FDC100VN, 125VN, 140VN



Item	Description
CnA~Z	Connector
CH	Crankcase heater
CM	Compressor motor
CT	Current sensor
DM	Diode module
F	Fuse
FM01	Fan motor
IPM	Intelligent power module
L	Reactor
LED1	Indication lamp (GREEN)
LED2	Indication lamp (RED)
LPT	Low pressure sensor
SM1	Expansion valve for cooling
SM2	Expansion valve for heating
SW1	Pump down switch
SW3,5	Local setting switch
TB	Terminal block
THo-A	Thermistor (Outdoor air temp.)
THo-D	Thermistor (Discharge pipe temp.)
THo-IPM	Thermistor (IPM)
THo-R1,2	Thermistor (Heat exchanger pipe temp.)
THo-S	Thermistor (Suction pipe temp.)
20S	Solenoid valve for 4 way valve
52X1	Auxiliary relay (for CH)
52X3	Auxiliary relay (for 20S)
63H1	High pressure switch

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

Local setting switch SW3 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrosting operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3 or lower and the compressor is not runnning when the unit is used in a very snowy country, set this switch to ON.
SW3-3,4	Trial operation	Method of trial operation ①Trial operation can be performed by using SW3-3,4. ②Compressor will be in the operation when SW3-3 is ON. ③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON. ④Be sure to turn OFF SW3-3 after the trial operation is finished.

Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number (mm^2)	Earth wire size (mm^2)
100	24	5.5	25	Ø1.6mm x 3	Ø1.6mm
125					
140					

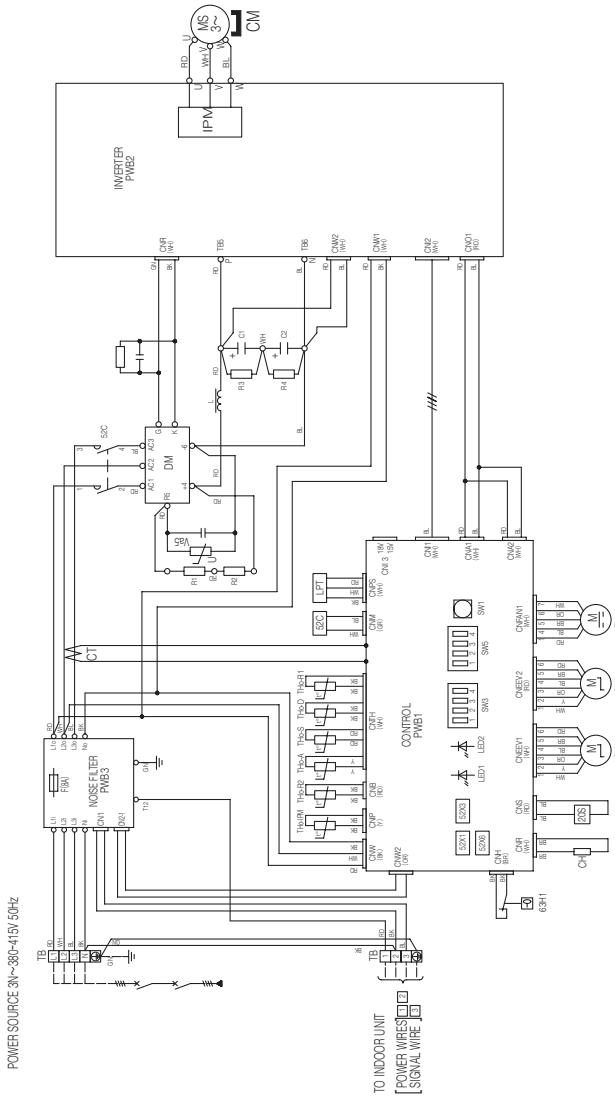
At the connection with the duct type indoor unit.

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number (mm^2)	Earth wire size (mm^2)
100	25	5.5	24	Ø1.6mm x 3	Ø1.6mm
125	27		22		
140	28	8	32		

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

PCA001Z539

Models FDC100VS, 125VS, 140VS



Item	Description
CnA~Z	Connector
CH	Crankcase heater
CM	Compressor motor
CT	Current sensor
DM	Diode module
F	Fuse
FM01	Fan motor
IPM	Intelligent power module
L	Reactor
LED1	Indication lamp (GREEN)
LED2	Indication lamp (RED)
LPT	Low pressure sensor
SM1	Expansion valve for cooling
SM2	Expansion valve for heating
SW1	Pump down switch
SW3,5	Local setting switch
TB	Terminal block
THo-A	Thermistor (Outdoor air temp.)
THo-D	Thermistor (Discharger pipe temp.)
THo-IPM	Thermistor (IPM)
THo-R1,2	Thermistor (Heat exchanger pipe temp.)
THo-S	Thermistor (Suction pipe temp.)
20S	Solenoid valve for 4 way valve
52X1	Auxiliary relay (for CH)
52X3	Auxiliary relay (for 20S)
52X6	Auxiliary relay (for 52C)
63H1	High pressure switch

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

Local setting switch SW3 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrosting operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3 °C or lower and the compressor is not running. When the unit is used in a very snowy country, set this switch to ON.
SW3-3,4	Trial operation	Method of trial operation ①Trial operation can be performed by using SW3-3,4. ②Compressor will be in the operation when SW3-3 is ON. ③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON. ④Be sure to turn OFF SW3-3 after the trial operation is finished.

Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number (mm^2)	Earth wire size (mm^2)
100	15	3.5	27	Ø1.6mm x 3	Ø1.6mm
125					
140					

At the connection with the duct type indoor unit.

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number (mm^2)	Earth wire size (mm^2)
100	16	3.5	26	Ø1.6mm x 3	Ø1.6mm
125	18		23		
140	19		21		

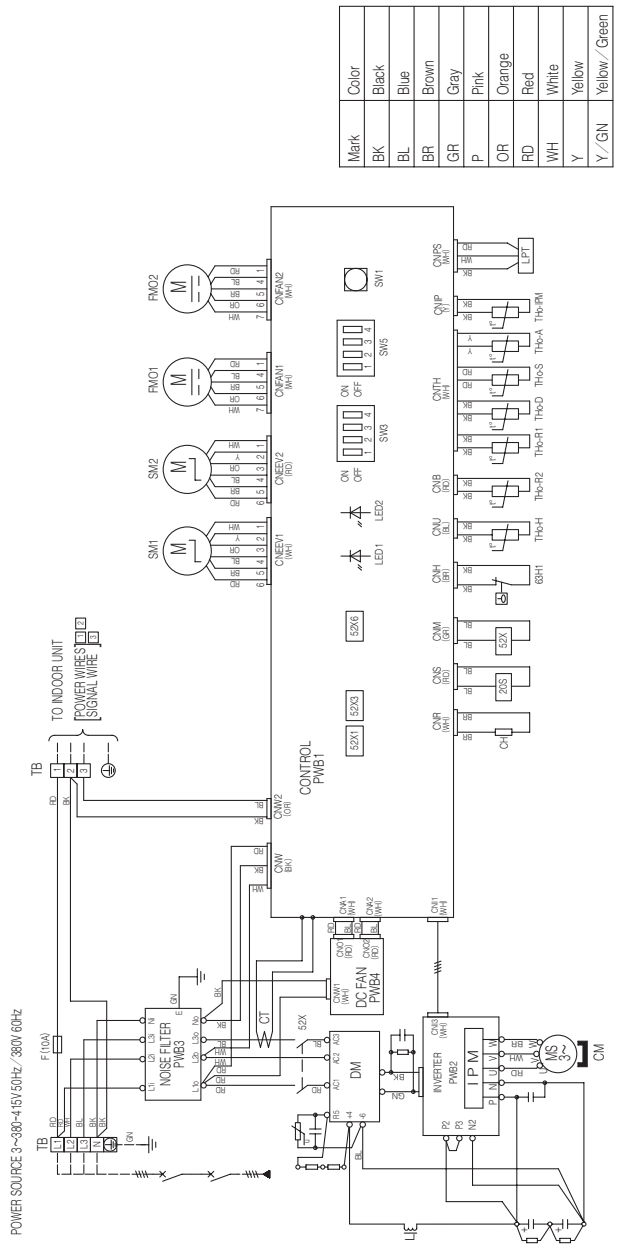
- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

PCA001Z540

Models FDC200VS, 250VS

Item	Description
CnA~Z	Connector
CH	Crankcase heater
CM	Compressor motor
CT	Current sensor
DM	Diode module
F	Fuse
FMO1,02	Fan motor
IPM	Intelligent power module
L	Reactor
LED1	Indication lamp (GREEN)
LED2	Indication lamp (RED)
LPT	Low pressure sensor
SM1	Expansion valve for cooling
SM2	Expansion valve for heating
SW1	Pump down switch
SW3,5	Local setting switch
TB	Terminal block
THo-A	Thermistor (Outdoor air temp.)
THo-D	Thermistor (Discharge pipe temp.)
THo-IPM	Thermistor (IPM)
THo-R1,2	Thermistor (Heat exchanger pipe temp.)
THo-S	Thermistor (Suction pipe temp.)
20S	Solenoid valve for 4 way valve
52X1	Auxiliary relay (for CH)
52X3	Auxiliary relay (for 20S)
52X6	Auxiliary relay (for 52X)
63H1	High pressure switch

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



Local setting switch SW3 (Set up at shipment OFF)

SW3-1	Defrost control change	The defrosting operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point.
SW3-2	Snow guard fan control	When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3 °C or lower and the compressor is not running. When the unit is used in a very snowy country, set this switch to ON.
SW3-3,4	Trial operation	Method of trial operation ①Trial operation can be performed by using SW3-3,4. ②Compressor will be in the operation when SW3-3 is ON. ③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON. ④Be sure to turn OFF SW3-3 after the trial operation is finished.

Power cable, indoor-outdoor connecting wires

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number (mm^2)	Earth wire size (mm^2)
200	19	3.5	21	Ø1.6mm x 3	Ø1.6mm
280	22	5.5	31		

At the connection with the duct type indoor unit.

Model	MAX over current (A)	Power cable size (mm^2)	Power cable length (m)	indoor-outdoor wire size x number (mm^2)	Earth wire size (mm^2)
200	24	5.5	29	Ø1.6mm x 3	Ø1.6mm
280	27		26		

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

PCA001Z541

4. NOISE LEVEL

Notes (1) The data are based on the following conditions.
Ambient air temperature: Indoor unit 27℃WB. Outdoor unit 35℃DB.
(2) The data in the chart are measured in an anechoic room.
(3) The noise levels measured in the field are usually higher than the data because of reflection.

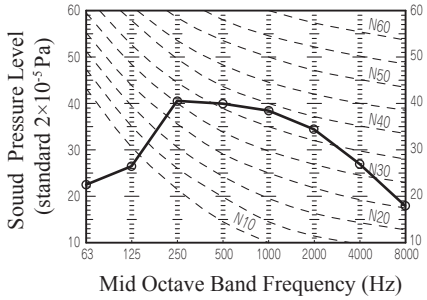
(1) Indoor units

Measured based on JIS B 8616
Mike position as right

Mike (1 m each at front face, forward & height)

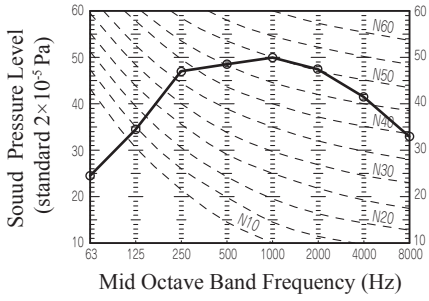
Model FDF71VD

Noise level 42 dB (A) at P-HIGH
39 dB (A) at HIGH
35 dB (A) at MEDIUM
33 dB (A) at LOW



Models FDF100VD, 125VD, 140VD

Noise level 54 dB (A) at P-HIGH
50 dB (A) at HIGH
48 dB (A) at MEDIUM
44 dB (A) at LOW



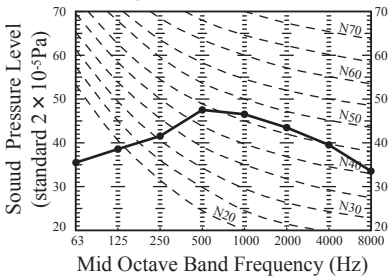
(2) Outdoor units

Measured based on JIS B 8616
Mike position: at highest noise level in position as mentined below
Distance from front side 1m
Height 1m

(a) Hyper inverter

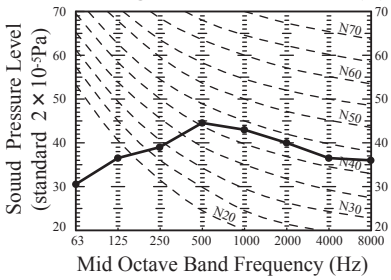
Model FDC71VNX

Cooling noise level 51 dB (A)



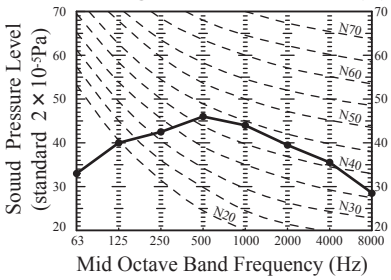
Model FDC71VNX

Heating noise level 48 dB (A)



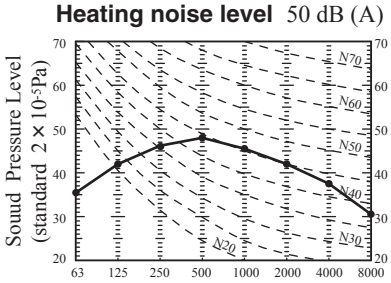
Model FDC100VNX,100VSX

Cooling noise level 48 dB (A)



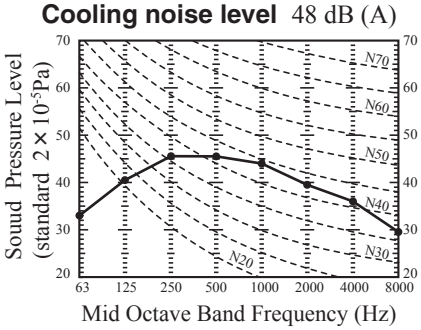
Model FDC100VNX,100VSX

Heating noise level 50 dB (A)



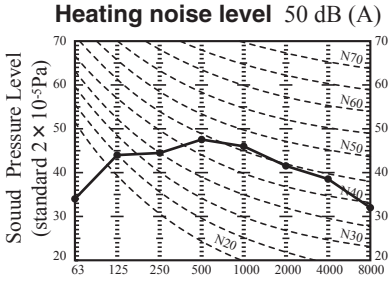
Models FDC125VNX,125VSX

Cooling noise level 48 dB (A)



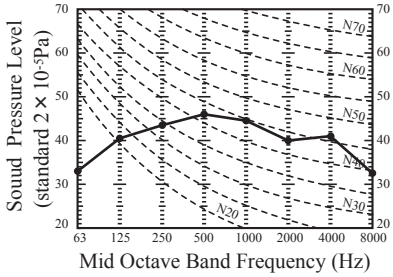
Models FDC125VNX,125VSX

Heating noise level 50 dB (A)



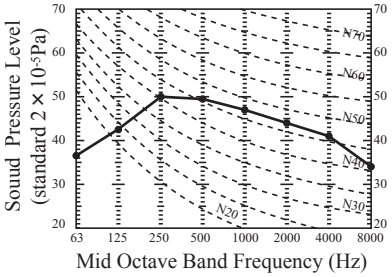
Models FDC140VNX,140VSX

Heating noise level 49 dB (A)



Models FDC140VNX,140VSX

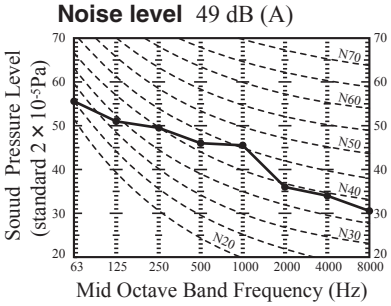
Heating noise level 52 dB (A)



(b) Micro inverter

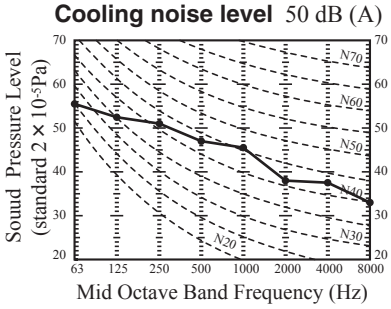
Models FDC100VN,100VS

Noise level 49 dB (A)



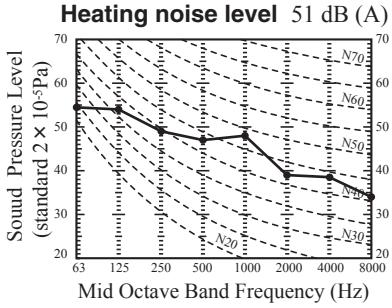
Models FDC125VN,125VS

Cooling noise level 50 dB (A)



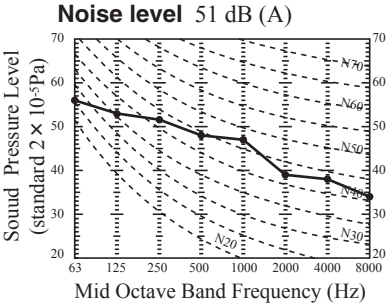
Models FDC125VN,125VS

Heating noise level 51 dB (A)



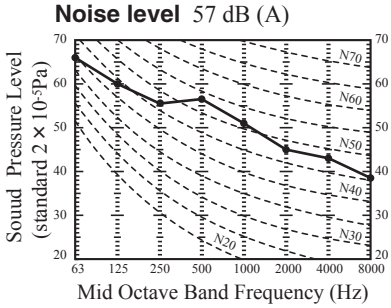
Models FDC140VN,140VS

Noise level 51 dB (A)



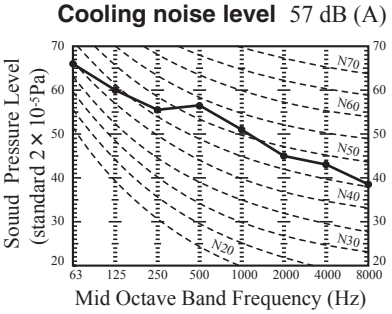
Model FDC200VS

Noise level 57 dB (A)



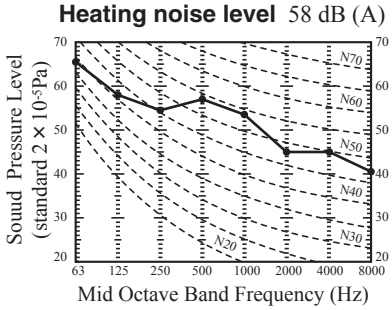
Model FDC250VS

Cooling noise level 57 dB (A)



Model FDC250VS

Heating noise level 58 dB (A)



5. TEMPERATURE DISTRIBUTION

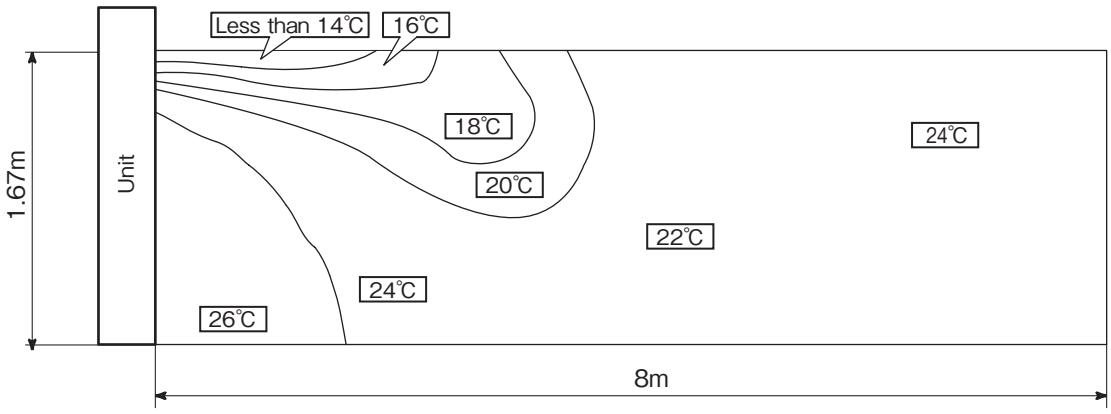
Indoor temperature
Cooling 27˚CDB/19˚CWB
Heating 20˚CDB

Note:
These figures represent the typical main range of temperature and velocity distribution at the center of air outlet within the published conditions.
In the actual installation, they may differ from the typical figures under the influence of air temperature conditions, ceiling height, operation conditions and obstacles.

Models All model

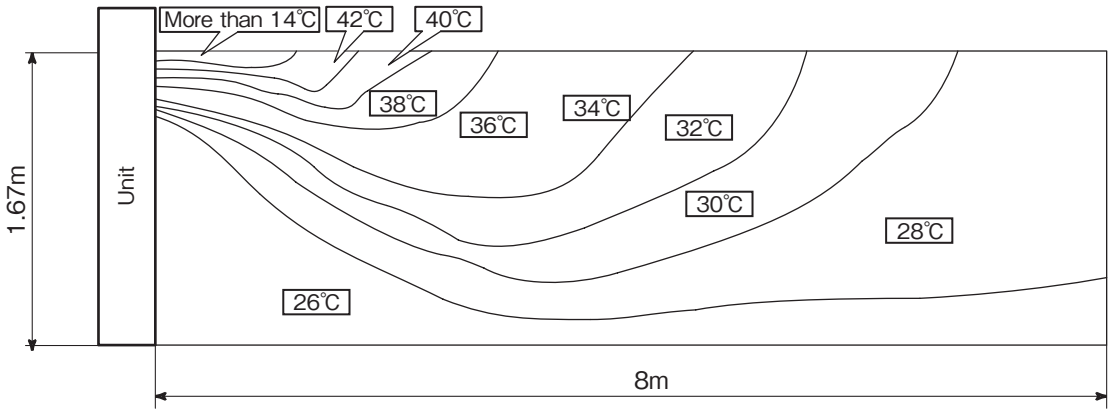
(1) Cooling Air flow:Hi (Louver position:Horizontal)

Temperature distribution



(2) Heating Air flow:Hi (Louver position:Horizontal)

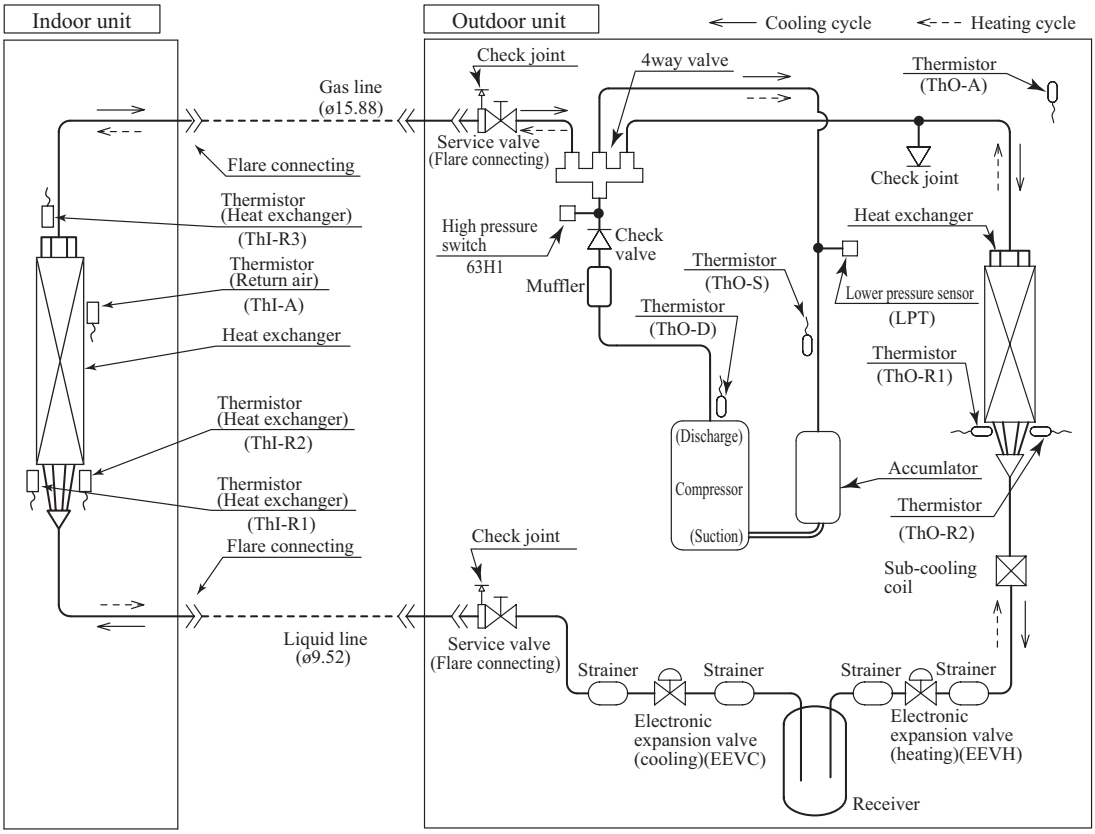
Temperature distribution



6. PIPING SYSTEM

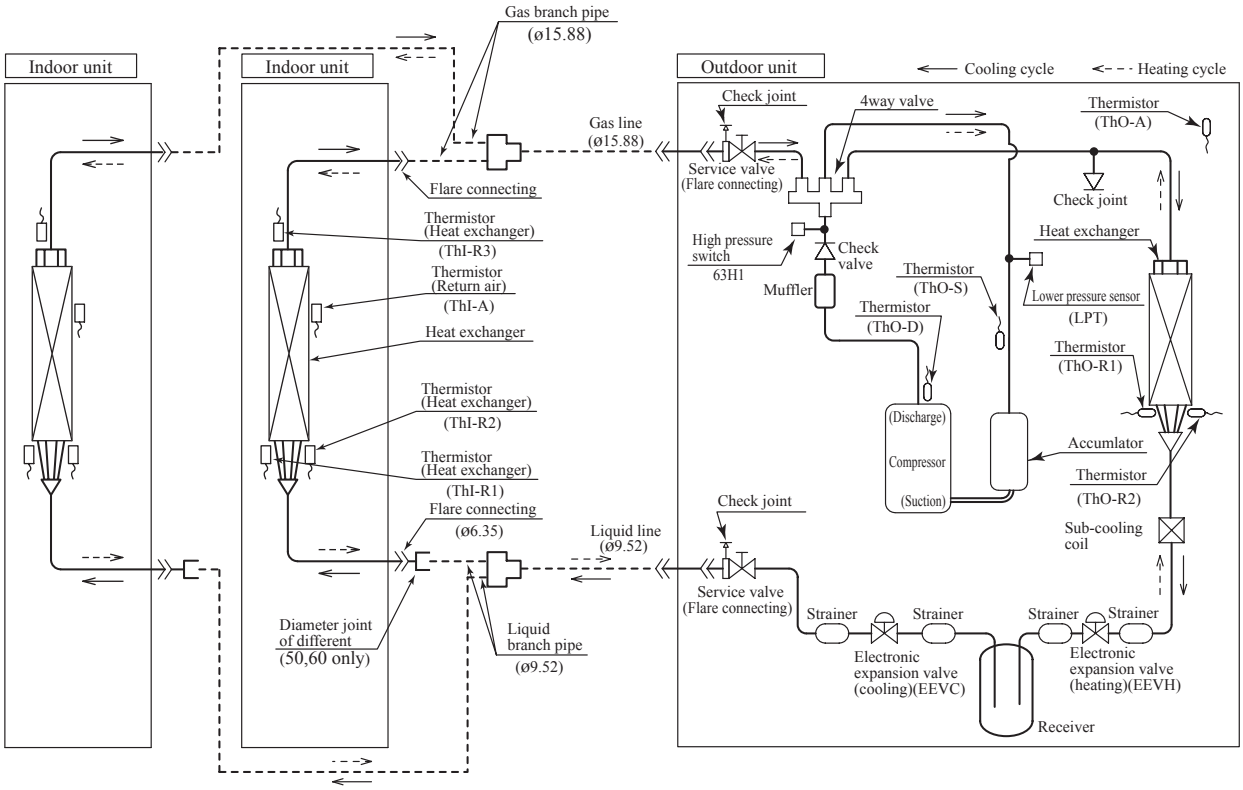
(1) Single type

Models 71, 100, 125, 140

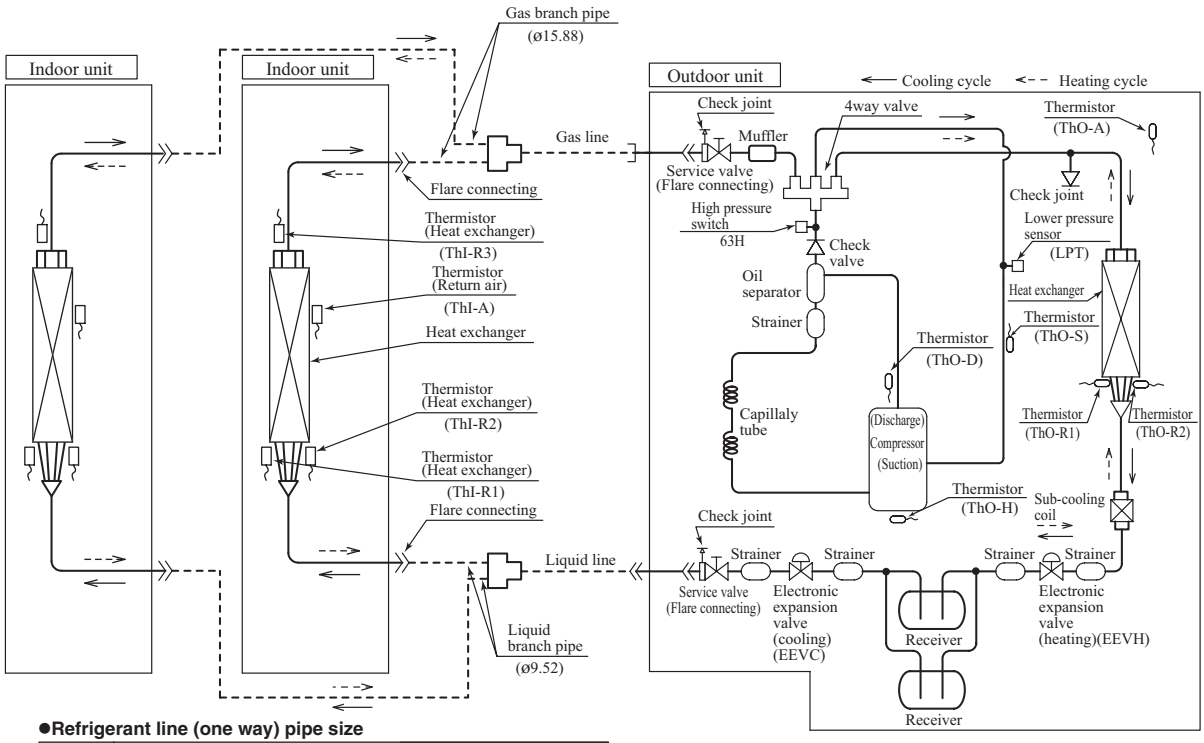


(2) Twin type

Model 140



Models 200, 250



●**Refrigerant line (one way) pipe size**

Model	Gas line	Liquid line
200	In case of ø22.22 : 35m In case of ø25.4 or ø28.58 : 70m	In case of ø9.52 : 40m In case of ø12.7 : 70m
250		In case of ø12.7 : 70m

Preset point of the protective devices

Parts name	Mark	Equipped unit	71, 100, 125, 140 model	200, 250 model
Thermistor (for protection over-loading in heating)	**Thı-R**	Indoor unit	OFF 63˚C ON 56˚C	
Thermistor (for frost prevention)			OFF 1.0˚C ON 10˚C	
Thermistor (for protection high pressure in cooling.)	**Tho-R (TH1)**	Outdoor unit	OFF 51˚C ON 65˚C	
Thermistor (for detecting dis-charge pipe temp.)	**Tho-D (TH3)**	Outdoor unit	OFF 115˚C ON 85˚C	OFF 135˚C ON 90˚C
High pressure switch (for protection)	**63H1**	Outdoor unit	OFF 4.15MPa ON 3.15MPa	
Low pressure sensor (for protection)	**LPT**	Outdoor unit	OFF 0.227MPa ON 0.079MPa	

7. RANGE OF USAGE & LIMITATIONS

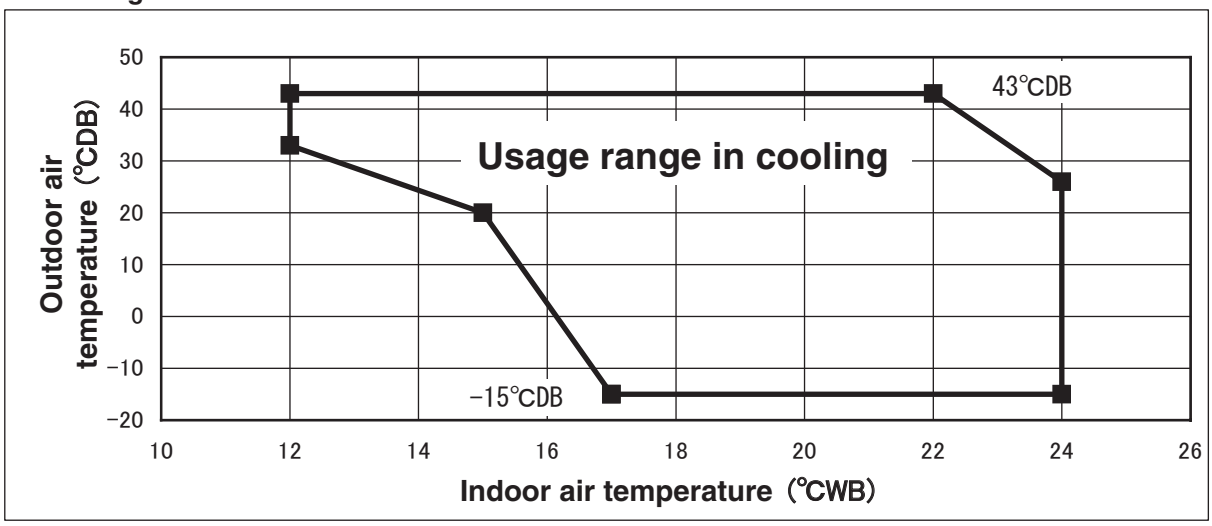
Operating temperature range		See next page.
		When used below -5˚C, install a snow hood (option)
Recommendable area to install		Considering to get sufficient heating capacity, the area where the averaged lowest ambient air temperature in day time during winter is above 0˚C, and it has no accumulation of snow.
Installation site		The limitations of installation space are shown in the page for exterior dimensions.
Temperature and humidity conditions surrounding the indoor unit		Dew point temperature : 23˚C or less, relative hummdity : 80% or less
Limitations on unit and piping installation		See page 43
Compressor ON-OFF cycling	Cycle Time	7 minutes or more (from OFF to OFF) or (from ON to ON)
	Stop Time	3 minutes or more
Power source	Voltage range	Rating ±10%
	Voltage drop at start-up	Min.85% of rating
	Phase-to-phase imbalance	3% or less

Note 1. Do not install the unit in places which :
1) Flammable gas may leak.
2) Carbon fiber, metal particles, powder, etc. are floating.
3) Cosmetic or special sprays are used frequently.
4) Exposed to oil splashes or steam (e.g. kitchen and machine plant).
5) Exposed to sea breeze (e.g. coastal area) or calcium chloride (e.g. snow melting agent).
6) Exposed to ammonia substance (e.g. organic fertilizer).
7) Matters affecting devices, such as sulfuric gas, chlorine gas, acid, alkali, etc. may generate or accumulate.
8) Chimney smoke is hanging.
9) Sucking the exhaust gas from heat exchanger.
10) Adjacent to equipment generating electromagnetic waves or high frequency waves.
11) There is light beams that affect the receiving device of indoor unit in case of the wireless specification.
12) Snow falls heavily.
13) At an elevation of 1000 meters or higher.
14) On mobile machine (e.g. vehicle, ship, etc.)
15) Splashed with water to indoor unit (e.g. laundry room).
16) Indoor units of twin, triple and double-twin specifications separately in a room with partition.

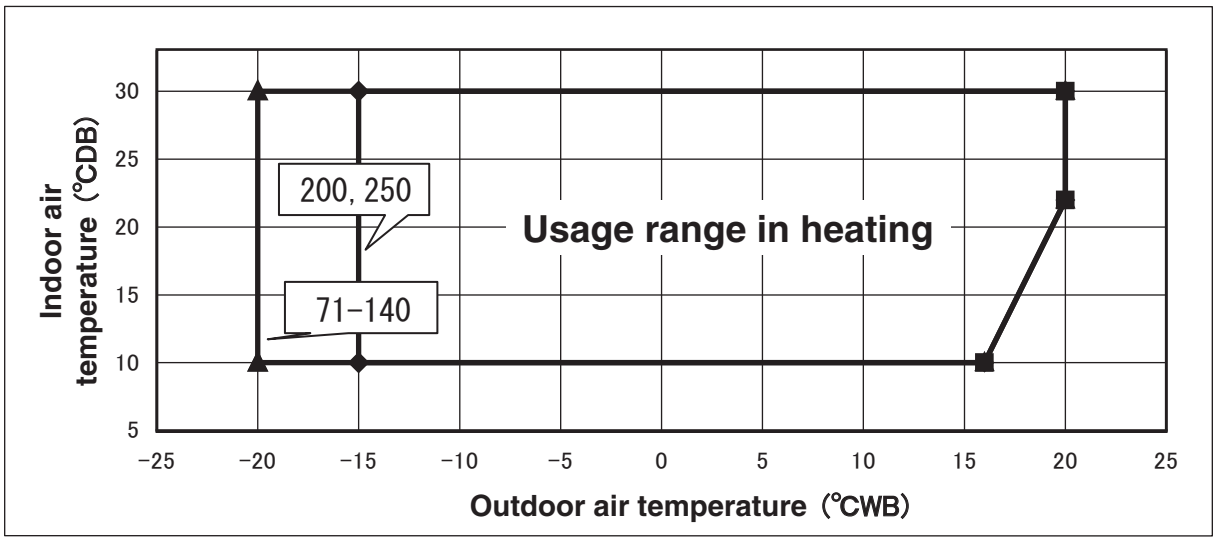
Note 2. Both gas and liquid pipes need to be coverd with 20mm or thicker heat insulation materials at the place where humidity exceeds 70%.

Operating temperature range

■ **Cooling**



■ **Heating**



Decline in cooling and heating capacity or operation stop may occur when the outdoor unit is installed in places where natural wind can increase or decrease its design airflow rate.

PGA000Z784△A

"CAUTION" Cooling operation under low outdoor air temperature conditions

PAC 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, mount the flex flow adapter (prepared as optional part) or like such devices onto the outdoor unit in order to divert the strong wind.

[Reason]

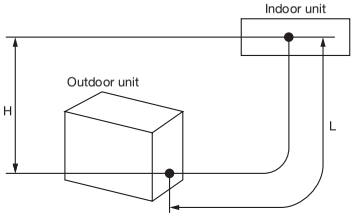
Under the low outdoor air temperature conditions of -5℃ or lower, the outdoor fan is controlled at lower or lowest speed by outdoor fan control, but if strong wind directly blow into the outdoor unit, the outdoor heat exchanger temperature will drop more.

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.

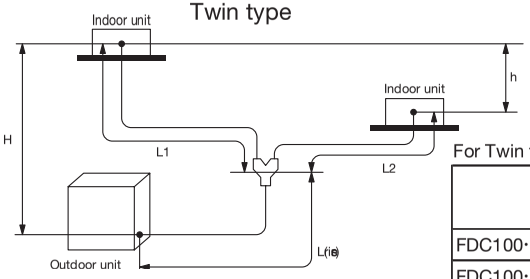
Limitation on unit and piping installation - single, twin.

Descriptions	Models for outdoor unit			Dimensional limitations	Marks appearing in the drawing	
					Single type	Twin type
One-way pipe length	FDC71VNX			≦ 50m	L	
	FDC100·125·140VN, FDC100·125·140VS					L+L1+L2
	FDC100·125·140VNX, FDC100·125·140VSX			≦ 100m		
	FDC200VS	Liquid piping	ϕ9.52	≦ 40m		L+L1 L+L2
			ϕ12.7	≦ 70m		
	FDC200VS FDC250VS	Gas piping	ϕ25.4 or ϕ28.58			
			ϕ22.22	≦ 35m		
Main pipe length	FDC100·125·140VNX, FDC100·125·140VSX			≦ 100m		L
	FDC100·125·140VN, FDC100·125·140VS			≦ 50m		
	FDC200VS	Liquid piping	ϕ9.52	≦ 40m		
			ϕ12.7	≦ 70m		
	FDC200VS FDC250VS	Gas piping	ϕ25.4 or ϕ28.58			
			ϕ22.22	≦ 35m		
One-way pipe length after first branching point	FDC71VNX			≦ 20m		L1,L2
	FDC100·125·140VNX, FDC100·125·140VSX			≦ 30m		
	FDC100·125·140VN, FDC100·125·140·200·250VS					
Difference of pipe length after first branching point				≦ 10m		L1-L2 L2-L1
Elevation difference between indoor and outdoor unit	When outdoor unit is positioned higher	FDC71VNX		≦ 30m	H	
		FDC100·125·140VNX, FDC100·125·140VSX				H
		FDC100·125·140VN, FDC100·125·140VS				
		FDC200·250VS				
	When outdoor unit is positioned lower	FDC71VNX		≦ 15m	H	
		FDC100·125·140VNX, FDC100·125·140VSX				H
		FDC100·125·140VN, FDC100·125·140VS				
		FDC200·250VS				
Elevation difference among indoor units				≦0.5m		h

Single type



Twin type



For Twin type

Model for outdoor units	Branch piping set (option)
FDC100·125·140VNX, FDC100·125·140VS	DIS-WA1
FDC100·125·140VN, FDC100·125·140VS	
FDC200· 250VS	DIS-WB1

(1) A riser pipe must be part of the main.
A branching pipe set should be installed horizontally at point as close to an indoor unit as possible.
(2) Reduce refrigerant amount by 1.0kg from the factory charge when refrigerant piping is shorter than 3m.

PGA000Z784 A

8. SELECTION CHART

Correct the cooling and heating capacity in accordance with the operating conditions. The net cooling and heating capacity can be obtained in the following way.

Net capacity = Capacity shown in the capacity tables (8.1) × Correction factors shown in he table (8.2) (8.3) (8.4).

Caution: In case that the cooling operation during low outdoor air temperature below -5°C is expected, install the outdoor unit where it is not influenced by natural wind. Otherwise protection control by low pressure will be activated much more frequently and it will cause insufficient capacity or breakdown of the compressor in worst case.

8.1 Capacity tables

(1) Hyper inverter

(a) Single phase use

1) Single type

Model FDF71VNXVD Indoor unit FDF71VD Outdoor unit FDC71VNX

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18°CDB 12°CWB		21°CDB 14°CWB		23°CDB 16°CWB		26°CDB 18°CWB		27°CDB 19°CWB		28°CDB 20°CWB		31°CDB 22°CWB		33°CDB 24°CWB	
°CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					4.87	4.24	6.02	4.89	6.59	4.96	6.79	4.90	7.19	5.15	7.59	5.00
13					5.33	4.40	6.32	4.99	6.82	5.03	7.03	4.97	7.45	5.22	7.88	5.07
15					5.79	4.57	6.63	5.09	7.05	5.11	7.27	5.04	7.71	5.29	8.16	5.14
17					6.26	4.74	6.94	5.20	7.27	5.18	7.51	5.12	7.97	5.36	8.44	5.21
19					6.59	4.86	7.16	5.28	7.44	5.23	7.68	5.17	8.15	5.42	8.63	5.26
21					6.93	5.00	7.38	5.36	7.60	5.29	7.84	5.22	8.33	5.47	8.82	5.30
23					6.91	4.99	7.35	5.34	7.57	5.28	7.81	5.21	8.30	5.46	8.78	5.29
25			6.46	5.15	6.89	4.98	7.32	5.33	7.54	5.27	7.78	5.20	8.26	5.45	8.74	5.28
27			6.45	5.15	6.87	4.97	7.30	5.33	7.52	5.26	7.74	5.19	8.18	5.42		
29			6.34	5.10	6.75	4.93	7.19	5.29	7.41	5.22	7.64	5.16	8.09	5.40		
31			6.23	5.05	6.64	4.88	7.08	5.25	7.31	5.19	7.54	5.13	7.99	5.37		
33	5.77	4.70	6.05	4.98	6.53	4.84	6.97	5.21	7.20	5.15	7.44	5.10	7.90	5.34		
35	5.67	4.65	5.95	4.94	6.42	4.80	6.86	5.17	7.10	5.12	7.34	5.06	7.81	5.32		
37	5.58	4.61	5.85	4.90	6.31	4.76	6.72	5.12	6.95	5.07	7.18	5.02	7.64	5.27		
39	5.49	4.57	5.76	4.86	6.20	4.72	6.59	5.08	6.81	5.03	7.03	4.97	7.46	5.22		
41	5.39	4.53	5.67	4.82	6.09	4.68	6.45	5.03	6.66	4.98	6.87	4.92	7.29	5.18		
43	5.30	4.49	5.57	4.78	5.97	4.63	6.31	4.99	6.51	4.93	6.71	4.87	7.12	5.13		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature °CDB				
°CDB	°CWB	16	18	20	22	24
-19.8	-20	3.95	3.93	3.91	3.88	3.86
-17.7	-18	4.18	4.16	4.14	4.11	4.09
-15.7	-16	4.42	4.39	4.37	4.34	4.32
-13.5	-14	4.68	4.65	4.63	4.60	4.57
-11.5	-12	4.94	4.91	4.88	4.85	4.82
-9.5	-10	5.20	5.17	5.14	5.11	5.08
-7.5	-8	5.46	5.43	5.40	5.36	5.33
-5.5	-6	5.59	5.55	5.52	5.48	5.44
-3.0	-4	5.71	5.68	5.64	5.60	5.56
-1.0	-2	5.84	5.80	5.76	5.72	5.67
1.0	0	5.97	5.92	5.88	5.83	5.79
2.0	1	6.03	5.98	5.94	5.89	5.85
3.0	2	6.45	6.40	6.35	6.30	6.25
5.0	4	7.29	7.23	7.18	7.12	7.06
7.0	6	8.13	8.06	8.00	7.93	7.87
9.0	8	8.42	8.36	8.29	8.23	8.16
11.5	10	8.72	8.65	8.59	8.52	8.46
13.5	12	9.20	9.13	9.06	9.00	8.92
15.5	14	9.69	9.61	9.53	9.47	9.39
16.5	16	9.93	9.85	9.77	9.71	9.62

PGA000Z770

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

Model FDF100VNXVD Indoor unit FDF100VD Outdoor unit FDC100VNX

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB 12℃CWB		21℃CDB 14℃CWB		23℃CDB 16℃CWB		26℃CDB 18℃CWB		27℃CDB 19℃CWB		28℃CDB 20℃CWB		31℃CDB 22℃CWB		33℃CDB 24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					8.33	7.11	8.84	7.70	9.10	7.65	9.38	7.60	9.94	8.05	10.50	7.92
13					8.63	7.24	9.17	7.83	9.43	7.77	9.73	7.73	10.32	8.17	10.92	8.04
15					8.93	7.36	9.49	7.96	9.77	7.90	10.09	7.86	10.71	8.30	11.34	8.17
17					9.23	7.49	9.82	8.09	10.11	8.03	10.44	7.98	11.10	8.43	11.75	8.29
19					9.44	7.58	10.04	8.17	10.34	8.12	10.68	8.07	11.35	8.52	12.01	8.37
21					9.64	7.67	10.26	8.26	10.57	8.21	10.91	8.16	11.59	8.60	12.28	8.46
23					9.64	7.67	10.28	8.27	10.59	8.21	10.94	8.17	11.63	8.61	12.32	8.47
25			8.95	7.80	9.64	7.67	10.30	8.28	10.62	8.23	10.97	8.18	11.66	8.62	12.36	8.48
27			8.91	7.78	9.64	7.67	10.33	8.29	10.64	8.23	10.96	8.17	11.59	8.60		
29			8.84	7.75	9.51	7.61	10.16	8.22	10.48	8.17	10.80	8.12	11.45	8.55		
31			8.76	7.71	9.37	7.55	10.00	8.16	10.32	8.11	10.65	8.06	11.30	8.50		
33	8.21	7.18	8.58	7.63	9.23	7.49	9.83	8.09	10.16	8.05	10.49	8.00	11.15	8.45		
35	7.77	6.97	8.31	7.51	9.09	7.43	9.66	8.02	10.00	7.99	10.34	7.95	11.01	8.40		
37	7.68	6.92	8.18	7.45	8.92	7.36	9.49	7.96	9.81	7.92	10.13	7.87	10.77	8.32		
39	7.58	6.87	8.04	7.39	8.76	7.29	9.31	7.89	9.62	7.85	9.93	7.80	10.54	8.25		
41	7.49	6.83	7.91	7.33	8.59	7.22	9.14	7.82	9.43	7.77	9.73	7.73	10.31	8.17		
43	7.40	6.79	7.78	7.27	8.42	7.15	8.96	7.75	9.24	7.70	9.52	7.65	10.08	8.09		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	7.30	7.24	7.18	7.12	7.06
-17.7	-18	7.74	7.68	7.62	7.55	7.49
-15.7	-16	8.18	8.12	8.05	7.99	7.92
-13.5	-14	8.54	8.47	8.40	8.33	8.27
-11.5	-12	8.89	8.82	8.75	8.68	8.61
-9.5	-10	9.25	9.17	9.10	9.03	8.95
-7.5	-8	9.60	9.53	9.45	9.38	9.30
-5.5	-6	10.00	9.92	9.84	9.76	9.68
-3.0	-4	10.39	10.31	10.23	10.14	10.06
-1.0	-2	10.79	10.70	10.62	10.53	10.44
1.0	0	11.18	11.09	11.01	10.91	10.82
2.0	1	11.38	11.29	11.20	11.10	11.01
3.0	2	11.38	11.29	11.20	11.10	11.01
5.0	4	11.38	11.29	11.20	11.11	11.01
7.0	6	11.37	11.29	11.20	11.11	11.01
9.0	8	11.85	11.76	11.67	11.58	11.48
11.5	10	12.32	12.23	12.15	12.05	11.95
13.5	12	12.97	12.88	12.78	12.68	12.72
15.5	14	13.62	13.52	13.41	13.32	13.49
16.5	16	13.95	13.84	13.72	13.63	13.87

PGA000Z770

Model FDF125VNXVD Indoor unit FDF125VD Outdoor unit FDC125VNX

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB 12℃CWB		21℃CDB 14℃CWB		23℃CDB 16℃CWB		26℃CDB 18℃CWB		27℃CDB 19℃CWB		28℃CDB 20℃CWB		31℃CDB 22℃CWB		33℃CDB 24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					10.41	8.00	11.05	8.58	11.37	8.52	11.72	8.46	12.42	8.88	13.12	8.72
13					10.79	8.17	11.46	8.75	11.79	8.68	12.16	8.63	12.91	9.06	13.65	8.89
15					11.16	8.34	11.87	8.92	12.22	8.86	12.61	8.80	13.39	9.23	14.17	9.06
17					11.54	8.51	12.27	9.09	12.64	9.03	13.05	8.97	13.87	9.40	14.69	9.23
19					11.80	8.63	12.55	9.21	12.93	9.14	13.34	9.09	14.18	9.51	15.02	9.34
21					12.05	8.74	12.83	9.33	13.21	9.26	13.64	9.20	14.49	9.62	15.34	9.45
23					12.05	8.74	12.85	9.34	13.24	9.27	13.67	9.22	14.54	9.64	15.40	9.47
25			11.19	8.87	12.05	8.74	12.88	9.35	13.27	9.28	13.71	9.23	14.58	9.66	15.45	9.49
27			11.14	8.85	12.05	8.74	12.91	9.36	13.30	9.30	13.70	9.23	14.49	9.62		
29			11.05	8.80	11.88	8.66	12.70	9.27	13.10	9.21	13.51	9.15	14.31	9.56		
31			10.95	8.75	11.71	8.59	12.49	9.18	12.90	9.13	13.31	9.07	14.13	9.49		
33	10.26	8.22	10.73	8.64	11.53	8.50	12.29	9.10	12.70	9.05	13.11	8.99	13.94	9.42		
35	9.71	7.93	10.39	8.48	11.36	8.43	12.08	9.01	12.50	8.97	12.92	8.92	13.76	9.36		
37	9.60	7.88	10.22	8.40	11.15	8.33	11.86	8.92	12.26	8.87	12.67	8.82	13.47	9.25		
39	9.48	7.82	10.05	8.32	10.94	8.24	11.64	8.82	12.03	8.78	12.41	8.72	13.18	9.15		
41	9.36	7.75	9.89	8.24	10.74	8.15	11.42	8.73	11.79	8.68	12.16	8.63	12.89	9.05		
43	9.25	7.70	9.72	8.16	10.53	8.05	11.21	8.65	11.55	8.59	11.90	8.53	12.60	8.95		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	9.12	9.05	8.97	8.90	8.83
-17.7	-18	9.67	9.60	9.52	9.44	9.37
-15.7	-16	10.23	10.15	10.07	9.98	9.90
-13.5	-14	10.67	10.59	10.50	10.42	10.33
-11.5	-12	11.11	11.03	10.94	10.85	10.76
-9.5	-10	11.56	11.47	11.38	11.29	11.19
-7.5	-8	12.00	11.91	11.82	11.72	11.62
-5.5	-6	12.49	12.40	12.30	12.20	12.10
-3.0	-4	12.99	12.89	12.79	12.68	12.57
-1.0	-2	13.48	13.38	13.27	13.16	13.05
1.0	0	13.98	13.87	13.76	13.64	13.52
2.0	1	14.22	14.11	14.00	13.88	13.76
3.0	2	14.22	14.11	14.00	13.88	13.76
5.0	4	14.22	14.11	14.00	13.88	13.76
7.0	6	14.22	14.11	14.00	13.88	13.77
9.0	8	14.81	14.70	14.59	14.47	14.35
11.5	10	15.41	15.29	15.18	15.06	14.94
13.5	12	16.22	16.09	15.97	15.85	15.90
15.5	14	17.03	16.90	16.76	16.65	16.86
16.5	16	17.44	17.30	17.16	17.04	17.34

PGA000Z770

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.(Cooling only)
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

Model FDF140VNXVD Indoor unit FDF140VD Outdoor unit FDC140VNX

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB 12℃CWB		21℃CDB 14℃CWB		23℃CDB 16℃CWB		26℃CDB 18℃CWB		27℃CDB 19℃CWB		28℃CDB 20℃CWB		31℃CDB 22℃CWB		33℃CDB 24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					11.66	8.56	12.38	9.13	12.73	9.06	13.13	9.00	13.91	9.41	14.70	9.24
13					12.08	8.76	12.83	9.33	13.21	9.26	13.62	9.20	14.45	9.61	15.28	9.43
15					12.50	8.95	13.29	9.53	13.68	9.46	14.12	9.40	14.99	9.81	15.87	9.63
17					12.92	9.15	13.75	9.73	14.16	9.66	14.62	9.60	15.54	10.02	16.45	9.83
19					13.21	9.29	14.06	9.87	14.48	9.80	14.95	9.74	15.88	10.15	16.82	9.96
21					13.50	9.43	14.36	10.00	14.80	9.93	15.28	9.87	16.23	10.28	17.19	10.09
23					13.50	9.43	14.40	10.02	14.83	9.95	15.31	9.89	16.28	10.30	17.25	10.11
25			12.53	9.54	13.50	9.43	14.43	10.03	14.87	9.96	15.35	9.90	16.33	10.32	17.30	10.13
27			12.48	9.52	13.50	9.43	14.46	10.05	14.90	9.98	15.34	9.90	16.23	10.28		
29			12.37	9.46	13.31	9.34	14.23	9.94	14.68	9.88	15.13	9.81	16.03	10.20		
31			12.26	9.41	13.11	9.24	13.99	9.84	14.45	9.78	14.91	9.72	15.82	10.12		
33	11.49	8.87	12.02	9.28	12.92	9.15	13.76	9.73	14.23	9.69	14.69	9.63	15.61	10.04		
35	10.88	8.54	11.63	9.09	12.72	9.05	13.53	9.63	14.00	9.59	14.47	9.54	15.41	9.97		
37	10.75	8.47	11.45	9.00	12.49	8.95	13.29	9.53	13.74	9.48	14.18	9.42	15.08	9.84		
39	10.62	8.41	11.26	8.90	12.26	8.84	13.04	9.42	13.47	9.37	13.90	9.31	14.76	9.72		
41	10.49	8.34	11.07	8.81	12.02	8.73	12.80	9.31	13.21	9.26	13.62	9.20	14.44	9.61		
43	10.35	8.26	10.89	8.72	11.79	8.62	12.55	9.21	12.94	9.15	13.33	9.08	14.11	9.49		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	10.42	10.34	10.26	10.17	10.09
-17.7	-18	11.06	10.97	10.88	10.79	10.70
-15.7	-16	11.69	11.60	11.50	11.41	11.32
-13.5	-14	12.20	12.10	12.00	11.91	11.81
-11.5	-12	12.70	12.60	12.50	12.40	12.30
-9.5	-10	13.21	13.11	13.00	12.90	12.79
-7.5	-8	13.71	13.61	13.50	13.39	13.28
-5.5	-6	14.28	14.17	14.06	13.94	13.83
-3.0	-4	14.84	14.73	14.61	14.49	14.37
-1.0	-2	15.41	15.29	15.17	15.04	14.91
1.0	0	15.97	15.85	15.72	15.59	15.45
2.0	1	16.26	16.13	16.00	15.86	15.73
3.0	2	16.25	16.13	16.00	15.86	15.73
5.0	4	16.25	16.13	16.00	15.86	15.73
7.0	6	16.25	16.12	16.00	15.87	15.73
9.0	8	16.93	16.80	16.68	16.54	16.40
11.5	10	17.61	17.48	17.35	17.21	17.07
13.5	12	18.53	18.39	18.25	18.12	18.17
15.5	14	19.46	19.31	19.16	19.02	19.27
16.5	16	19.93	19.77	19.61	19.48	19.82

PGA000Z770

2) Twin type

Model FDF140VNXPVD Indoor unit FDF71VD (2 units) Outdoor unit FDC140VNX

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB 12℃CWB		21℃CDB 14℃CWB		23℃CDB 16℃CWB		26℃CDB 18℃CWB		27℃CDB 19℃CWB		28℃CDB 20℃CWB		31℃CDB 22℃CWB		33℃CDB 24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					11.66	9.16	12.38	9.89	12.73	9.77	13.13	9.66	13.91	10.17	14.70	9.89
13					12.08	9.31	12.83	10.04	13.21	9.92	13.62	9.80	14.45	10.32	15.28	10.03
15					12.50	9.47	13.29	10.20	13.68	10.07	14.12	9.96	14.99	10.46	15.87	10.17
17					12.92	9.63	13.75	10.36	14.16	10.23	14.62	10.11	15.54	10.62	16.45	10.31
19					13.21	9.74	14.06	10.46	14.48	10.34	14.95	10.21	15.88	10.71	16.82	10.40
21					13.50	9.85	14.36	10.57	14.80	10.44	15.28	10.32	16.23	10.81	17.19	10.49
23					13.50	9.85	14.40	10.58	14.83	10.45	15.31	10.33	16.28	10.82	17.25	10.51
25			12.53	10.14	13.50	9.85	14.43	10.59	14.87	10.47	15.35	10.34	16.33	10.84	17.30	10.52
27			12.48	10.12	13.50	9.85	14.46	10.60	14.90	10.48	15.34	10.34	16.23	10.81		
29			12.37	10.07	13.31	9.78	14.23	10.52	14.68	10.40	15.13	10.27	16.03	10.75		
31			12.26	10.02	13.11	9.70	13.99	10.44	14.45	10.33	14.91	10.20	15.82	10.69		
33	11.49	9.37	12.02	9.92	12.92	9.63	13.76	10.36	14.23	10.25	14.69	10.13	15.61	10.64		
35	10.88	9.10	11.63	9.76	12.72	9.55	13.53	10.28	14.00	10.18	14.47	10.06	15.41	10.58		
37	10.75	9.04	11.45	9.69	12.49	9.47	13.29	10.20	13.74	10.09	14.18	9.97	15.08	10.49		
39	10.62	8.98	11.26	9.61	12.26	9.38	13.04	10.11	13.47	10.01	13.90	9.89	14.76	10.40		
41	10.49	8.92	11.07	9.54	12.02	9.29	12.80	10.03	13.21	9.92	13.62	9.80	14.44	10.31		
43	10.35	8.86	10.89	9.46	11.79	9.21	12.55	9.95	12.94	9.84	13.33	9.72	14.11	10.23		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	10.42	10.34	10.26	10.17	10.09
-17.7	-18	11.06	10.97	10.88	10.79	10.70
-15.7	-16	11.69	11.60	11.50	11.41	11.32
-13.5	-14	12.20	12.10	12.00	11.91	11.81
-11.5	-12	12.70	12.60	12.50	12.40	12.30
-9.5	-10	13.21	13.11	13.00	12.90	12.79
-7.5	-8	13.71	13.61	13.50	13.39	13.28
-5.5	-6	14.28	14.17	14.06	13.94	13.83
-3.0	-4	14.84	14.73	14.61	14.49	14.37
-1.0	-2	15.41	15.29	15.17	15.04	14.91
1.0	0	15.97	15.85	15.72	15.59	15.45
2.0	1	16.26	16.13	16.00	15.86	15.73
3.0	2	16.25	16.13	16.00	15.86	15.73
5.0	4	16.25	16.13	16.00	15.86	15.73
7.0	6	16.25	16.12	16.00	15.87	15.73
9.0	8	16.93	16.80	16.68	16.54	16.40
11.5	10	17.61	17.48	17.35	17.21	17.07
13.5	12	18.53	18.39	18.25	18.12	18.17
15.5	14	19.46	19.31	19.16	19.02	19.27
16.5	16	19.93	19.77	19.61	19.48	19.82

PGA000Z770

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.(Cooling only)
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

(b) 3 phase use
1) Single type

Model FDF100VSXVD Indoor unit FDF100VD Outdoor unit FDC100VSX

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18°CDB 12°CWB		21°CDB 14°CWB		23°CDB 16°CWB		26°CDB 18°CWB		27°CDB 19°CWB		28°CDB 20°CWB		31°CDB 22°CWB		33°CDB 24°CWB	
°CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					8.33	7.11	8.84	7.70	9.10	7.65	9.38	7.60	9.94	8.05	10.50	7.92
13					8.63	7.24	9.17	7.83	9.43	7.77	9.73	7.73	10.32	8.17	10.92	8.04
15					8.93	7.36	9.49	7.96	9.77	7.90	10.09	7.86	10.71	8.30	11.34	8.17
17					9.23	7.49	9.82	8.09	10.11	8.03	10.44	7.98	11.10	8.43	11.75	8.29
19					9.44	7.58	10.04	8.17	10.34	8.12	10.68	8.07	11.35	8.52	12.01	8.37
21					9.64	7.67	10.26	8.26	10.57	8.21	10.91	8.16	11.59	8.60	12.28	8.46
23					9.64	7.67	10.28	8.27	10.59	8.21	10.94	8.17	11.63	8.61	12.32	8.47
25			8.95	7.80	9.64	7.67	10.30	8.28	10.62	8.23	10.97	8.18	11.66	8.62	12.36	8.48
27			8.91	7.78	9.64	7.67	10.33	8.29	10.64	8.23	10.96	8.17	11.59	8.60		
29			8.84	7.75	9.51	7.61	10.16	8.22	10.48	8.17	10.80	8.12	11.45	8.55		
31			8.76	7.71	9.37	7.55	10.00	8.16	10.32	8.11	10.65	8.06	11.30	8.50		
33	8.21	7.18	8.58	7.63	9.23	7.49	9.83	8.09	10.16	8.05	10.49	8.00	11.15	8.45		
35	7.77	6.97	8.31	7.51	9.09	7.43	9.66	8.02	10.00	7.99	10.34	7.95	11.01	8.40		
37	7.68	6.92	8.18	7.45	8.92	7.36	9.49	7.96	9.81	7.92	10.13	7.87	10.77	8.32		
39	7.58	6.87	8.04	7.39	8.76	7.29	9.31	7.89	9.62	7.85	9.93	7.80	10.54	8.25		
41	7.49	6.83	7.91	7.33	8.59	7.22	9.14	7.82	9.43	7.77	9.73	7.73	10.31	8.17		
43	7.40	6.79	7.78	7.27	8.42	7.15	8.96	7.75	9.24	7.70	9.52	7.65	10.08	8.09		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature °CDB				
°CDB	°CWB	16	18	20	22	24
-19.8	-20	11.29	11.20	11.11	11.02	10.93
-17.7	-18	11.34	11.25	11.16	11.06	10.97
-15.7	-16	11.38	11.29	11.20	11.11	11.02
-13.5	-14	11.38	11.29	11.20	11.11	11.02
-11.5	-12	11.38	11.29	11.20	11.11	11.02
-9.5	-10	11.38	11.29	11.20	11.11	11.02
-7.5	-8	11.37	11.29	11.20	11.11	11.02
-5.5	-6	11.38	11.29	11.20	11.11	11.02
-3.0	-4	11.38	11.29	11.20	11.11	11.01
-1.0	-2	11.38	11.29	11.20	11.11	11.01
1.0	0	11.38	11.29	11.20	11.10	11.01
2.0	1	11.38	11.29	11.20	11.10	11.01
3.0	2	11.38	11.29	11.20	11.10	11.01
5.0	4	11.38	11.29	11.20	11.11	11.01
7.0	6	11.37	11.29	11.20	11.11	11.01
9.0	8	11.85	11.76	11.67	11.58	11.48
11.5	10	12.32	12.23	12.15	12.05	11.95
13.5	12	12.97	12.88	12.78	12.68	12.72
15.5	14	13.62	13.52	13.41	13.32	13.49
16.5	16	13.95	13.84	13.72	13.63	13.87

PGA000Z770

Model FDF125VSXVD Indoor unit FDF125VD Outdoor unit FDC125VSX

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18°CDB 12°CWB		21°CDB 14°CWB		23°CDB 16°CWB		26°CDB 18°CWB		27°CDB 19°CWB		28°CDB 20°CWB		31°CDB 22°CWB		33°CDB 24°CWB	
°CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					10.41	8.00	11.05	8.58	11.37	8.52	11.72	8.46	12.42	8.88	13.12	8.72
13					10.79	8.17	11.46	8.75	11.79	8.68	12.16	8.63	12.91	9.06	13.65	8.89
15					11.16	8.34	11.87	8.92	12.22	8.86	12.61	8.80	13.39	9.23	14.17	9.06
17					11.54	8.51	12.27	9.09	12.64	9.03	13.05	8.97	13.87	9.40	14.69	9.23
19					11.80	8.63	12.55	9.21	12.93	9.14	13.34	9.09	14.18	9.51	15.02	9.34
21					12.05	8.74	12.83	9.33	13.21	9.26	13.64	9.20	14.49	9.62	15.34	9.45
23					12.05	8.74	12.85	9.34	13.24	9.27	13.67	9.22	14.54	9.64	15.40	9.47
25			11.19	8.87	12.05	8.74	12.88	9.35	13.27	9.28	13.71	9.23	14.58	9.66	15.45	9.49
27			11.14	8.85	12.05	8.74	12.91	9.36	13.30	9.30	13.70	9.23	14.49	9.62		
29			11.05	8.80	11.88	8.66	12.70	9.27	13.10	9.21	13.51	9.15	14.31	9.56		
31			10.95	8.75	11.71	8.59	12.49	9.18	12.90	9.13	13.31	9.07	14.13	9.49		
33	10.26	8.22	10.73	8.64	11.53	8.50	12.29	9.10	12.70	9.05	13.11	8.99	13.94	9.42		
35	9.71	7.93	10.39	8.48	11.36	8.43	12.08	9.01	12.50	8.97	12.92	8.92	13.76	9.36		
37	9.60	7.88	10.22	8.40	11.15	8.33	11.86	8.92	12.26	8.87	12.67	8.82	13.47	9.25		
39	9.48	7.82	10.05	8.32	10.94	8.24	11.64	8.82	12.03	8.78	12.41	8.72	13.18	9.15		
41	9.36	7.75	9.89	8.24	10.74	8.15	11.42	8.73	11.79	8.68	12.16	8.63	12.89	9.05		
43	9.25	7.70	9.72	8.16	10.53	8.05	11.21	8.65	11.55	8.59	11.90	8.53	12.60	8.95		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature °CDB				
°CDB	°CWB	16	18	20	22	24
-19.8	-20	14.11	14.00	13.89	13.78	13.66
-17.7	-18	14.17	14.06	13.94	13.83	13.72
-15.7	-16	14.23	14.11	14.00	13.89	13.77
-13.5	-14	14.23	14.11	14.00	13.89	13.77
-11.5	-12	14.22	14.11	14.00	13.89	13.77
-9.5	-10	14.22	14.11	14.00	13.89	13.77
-7.5	-8	14.22	14.11	14.00	13.89	13.77
-5.5	-6	14.22	14.11	14.00	13.88	13.77
-3.0	-4	14.22	14.11	14.00	13.88	13.77
-1.0	-2	14.22	14.11	14.00	13.88	13.76
1.0	0	14.22	14.11	14.00	13.88	13.76
2.0	1	14.22	14.11	14.00	13.88	13.76
3.0	2	14.22	14.11	14.00	13.88	13.76
5.0	4	14.22	14.11	14.00	13.88	13.76
7.0	6	14.22	14.11	14.00	13.88	13.77
9.0	8	14.81	14.70	14.59	14.47	14.35
11.5	10	15.41	15.29	15.18	15.06	14.94
13.5	12	16.22	16.09	15.97	15.85	15.90
15.5	14	17.03	16.90	16.76	16.65	16.86
16.5	16	17.44	17.30	17.16	17.04	17.34

PGA000Z770

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.(Cooling only)
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

Model FDF140VSXVD Indoor unit FDF140VD Outdoor unit FDC140VSX

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB 12℃CWB		21℃CDB 14℃CWB		23℃CDB 16℃CWB		26℃CDB 18℃CWB		27℃CDB 19℃CWB		28℃CDB 20℃CWB		31℃CDB 22℃CWB		33℃CDB 24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					11.66	8.56	12.38	9.13	12.73	9.06	13.13	9.00	13.91	9.41	14.70	9.24
13					12.08	8.76	12.83	9.33	13.21	9.26	13.62	9.20	14.45	9.61	15.28	9.43
15					12.50	8.95	13.29	9.53	13.68	9.46	14.12	9.40	14.99	9.81	15.87	9.63
17					12.92	9.15	13.75	9.73	14.16	9.66	14.62	9.60	15.54	10.02	16.45	9.83
19					13.21	9.29	14.06	9.87	14.48	9.80	14.95	9.74	15.88	10.15	16.82	9.96
21					13.50	9.43	14.36	10.00	14.80	9.93	15.28	9.87	16.23	10.28	17.19	10.09
23					13.50	9.43	14.40	10.02	14.83	9.95	15.31	9.89	16.28	10.30	17.25	10.11
25			12.53	9.54	13.50	9.43	14.43	10.03	14.87	9.96	15.35	9.90	16.33	10.32	17.30	10.13
27			12.48	9.52	13.50	9.43	14.46	10.05	14.90	9.98	15.34	9.90	16.23	10.28		
29			12.37	9.46	13.31	9.34	14.23	9.94	14.68	9.88	15.13	9.81	16.03	10.20		
31			12.26	9.41	13.11	9.24	13.99	9.84	14.45	9.78	14.91	9.72	15.82	10.12		
33	11.49	8.87	12.02	9.28	12.92	9.15	13.76	9.73	14.23	9.69	14.69	9.63	15.61	10.04		
35	10.88	8.54	11.63	9.09	12.72	9.05	13.53	9.63	14.00	9.59	14.47	9.54	15.41	9.97		
37	10.75	8.47	11.45	9.00	12.49	8.95	13.29	9.53	13.74	9.48	14.18	9.42	15.08	9.84		
39	10.62	8.41	11.26	8.90	12.26	8.84	13.04	9.42	13.47	9.37	13.90	9.31	14.76	9.72		
41	10.49	8.34	11.07	8.81	12.02	8.73	12.80	9.31	13.21	9.26	13.62	9.20	14.44	9.61		
43	10.35	8.26	10.89	8.72	11.79	8.62	12.55	9.21	12.94	9.15	13.33	9.08	14.11	9.49		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	16.13	16.00	15.87	15.74	15.61
-17.7	-18	16.19	16.07	15.94	15.81	15.68
-15.7	-16	16.26	16.13	16.00	15.87	15.74
-13.5	-14	16.26	16.13	16.00	15.87	15.74
-11.5	-12	16.25	16.13	16.00	15.87	15.74
-9.5	-10	16.25	16.13	16.00	15.87	15.74
-7.5	-8	16.25	16.12	16.00	15.87	15.74
-5.5	-6	16.25	16.13	16.00	15.87	15.74
-3.0	-4	16.25	16.13	16.00	15.87	15.73
-1.0	-2	16.25	16.13	16.00	15.86	15.73
1.0	0	16.25	16.13	16.00	15.86	15.73
2.0	1	16.26	16.13	16.00	15.86	15.73
3.0	2	16.25	16.13	16.00	15.86	15.73
5.0	4	16.25	16.13	16.00	15.86	15.73
7.0	6	16.25	16.12	16.00	15.87	15.73
9.0	8	16.93	16.80	16.68	16.54	16.40
11.5	10	17.61	17.48	17.35	17.21	17.07
13.5	12	18.53	18.39	18.25	18.12	18.17
15.5	14	19.46	19.31	19.16	19.02	19.27
16.5	16	19.93	19.77	19.61	19.48	19.82

PGA000Z770

2) Twin type

Model FDF140VSXPVD Indoor unit FDF71VD (2 units) Outdoor unit FDC140VSX

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB 12℃CWB		21℃CDB 14℃CWB		23℃CDB 16℃CWB		26℃CDB 18℃CWB		27℃CDB 19℃CWB		28℃CDB 20℃CWB		31℃CDB 22℃CWB		33℃CDB 24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					11.66	9.16	12.38	9.89	12.73	9.77	13.13	9.66	13.91	10.17	14.70	9.89
13					12.08	9.31	12.83	10.04	13.21	9.92	13.62	9.80	14.45	10.32	15.28	10.03
15					12.50	9.47	13.29	10.20	13.68	10.07	14.12	9.96	14.99	10.46	15.87	10.17
17					12.92	9.63	13.75	10.36	14.16	10.23	14.62	10.11	15.54	10.62	16.45	10.31
19					13.21	9.74	14.06	10.46	14.48	10.34	14.95	10.21	15.88	10.71	16.82	10.40
21					13.50	9.85	14.36	10.57	14.80	10.44	15.28	10.32	16.23	10.81	17.19	10.49
23					13.50	9.85	14.40	10.58	14.83	10.45	15.31	10.33	16.28	10.82	17.25	10.51
25			12.53	10.14	13.50	9.85	14.43	10.59	14.87	10.47	15.35	10.34	16.33	10.84	17.30	10.52
27			12.48	10.12	13.50	9.85	14.46	10.60	14.90	10.48	15.34	10.34	16.23	10.81		
29			12.37	10.07	13.31	9.78	14.23	10.52	14.68	10.40	15.13	10.27	16.03	10.75		
31			12.26	10.02	13.11	9.70	13.99	10.44	14.45	10.33	14.91	10.20	15.82	10.69		
33	11.49	9.37	12.02	9.92	12.92	9.63	13.76	10.36	14.23	10.25	14.69	10.13	15.61	10.64		
35	10.88	9.10	11.63	9.76	12.72	9.55	13.53	10.28	14.00	10.18	14.47	10.06	15.41	10.58		
37	10.75	9.04	11.45	9.69	12.49	9.47	13.29	10.20	13.74	10.09	14.18	9.97	15.08	10.49		
39	10.62	8.98	11.26	9.61	12.26	9.38	13.04	10.11	13.47	10.01	13.90	9.89	14.76	10.40		
41	10.49	8.92	11.07	9.54	12.02	9.29	12.80	10.03	13.21	9.92	13.62	9.80	14.44	10.31		
43	10.35	8.86	10.89	9.46	11.79	9.21	12.55	9.95	12.94	9.84	13.33	9.72	14.11	10.23		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	16.13	16.00	15.87	15.74	15.61
-17.7	-18	16.19	16.07	15.94	15.81	15.68
-15.7	-16	16.26	16.13	16.00	15.87	15.74
-13.5	-14	16.26	16.13	16.00	15.87	15.74
-11.5	-12	16.25	16.13	16.00	15.87	15.74
-9.5	-10	16.25	16.13	16.00	15.87	15.74
-7.5	-8	16.25	16.12	16.00	15.87	15.74
-5.5	-6	16.25	16.13	16.00	15.87	15.74
-3.0	-4	16.25	16.13	16.00	15.87	15.73
-1.0	-2	16.25	16.13	16.00	15.86	15.73
1.0	0	16.25	16.13	16.00	15.86	15.73
2.0	1	16.26	16.13	16.00	15.86	15.73
3.0	2	16.25	16.13	16.00	15.86	15.73
5.0	4	16.25	16.13	16.00	15.86	15.73
7.0	6	16.25	16.12	16.00	15.87	15.73
9.0	8	16.93	16.80	16.68	16.54	16.40
11.5	10	17.61	17.48	17.35	17.21	17.07
13.5	12	18.53	18.39	18.25	18.12	18.17
15.5	14	19.46	19.31	19.16	19.02	19.27
16.5	16	19.93	19.77	19.61	19.48	19.82

PGA000Z770

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.(Cooling only)
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

(2) Micro inverter

(a) Single phase use

1) Single type

Model FDF100VNVD Indoor unit FDF100VD Outdoor unit FDC100VN

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18˚CDB 12˚CWB		21˚CDB 14˚CWB		23˚CDB 16˚CWB		26˚CDB 18˚CWB		27˚CDB 19˚CWB		28˚CDB 20˚CWB		31˚CDB 22˚CWB		33˚CDB 24˚CWB	
˚CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					8.12	7.02	8.59	7.61	8.82	7.55	9.07	7.49	9.56	7.93	10.06	7.79
13					8.50	7.18	9.00	7.77	9.26	7.71	9.52	7.65	10.06	8.09	10.60	7.95
15					8.88	7.34	9.42	7.93	9.69	7.87	9.98	7.82	10.56	8.25	11.14	8.11
17					9.26	7.50	9.84	8.09	10.12	8.03	10.43	7.98	11.05	8.42	11.67	8.27
19					9.46	7.59	10.05	8.18	10.34	8.12	10.65	8.06	11.29	8.50	11.92	8.35
21					9.65	7.67	10.25	8.26	10.56	8.20	10.88	8.15	11.52	8.57	12.16	8.42
23					9.65	7.67	10.28	8.27	10.59	8.21	10.91	8.16	11.56	8.59	12.21	8.44
25			8.93	7.79	9.64	7.67	10.31	8.28	10.62	8.23	10.95	8.17	11.61	8.61	12.27	8.46
27			8.86	7.76	9.64	7.67	10.34	8.29	10.65	8.24	10.96	8.17	11.57	8.59		
29			8.80	7.73	9.50	7.61	10.17	8.22	10.49	8.18	10.81	8.12	11.45	8.55		
31			8.73	7.70	9.35	7.54	9.99	8.15	10.32	8.11	10.66	8.06	11.32	8.51		
33	8.22	7.19	8.58	7.63	9.21	7.48	9.82	8.09	10.16	8.05	10.51	8.01	11.19	8.46		
35	8.05	7.10	8.44	7.57	9.06	7.42	9.64	8.01	10.00	7.99	10.36	7.95	11.07	8.42		
37	7.92	7.04	8.30	7.50	8.91	7.35	9.46	7.94	9.79	7.91	10.13	7.87	10.80	8.33		
39	7.78	6.97	8.16	7.44	8.75	7.29	9.28	7.87	9.59	7.83	9.90	7.79	10.53	8.24		
41	7.64	6.90	8.02	7.38	8.60	7.22	9.09	7.80	9.38	7.76	9.68	7.71	10.26	8.15		
43	7.50	6.84	7.88	7.32	8.45	7.16	8.91	7.73	9.18	7.68	9.45	7.63	9.99	8.07		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ˚CDB				
˚CDB	˚CWB	16	18	20	22	24
-19.8	-20	5.64	5.62	5.60	5.58	5.56
-17.7	-18	5.97	5.95	5.92	5.90	5.87
-15.7	-16	6.30	6.27	6.25	6.22	6.19
-13.5	-14	6.66	6.63	6.60	6.57	6.54
-11.5	-12	7.03	6.99	6.96	6.93	6.90
-9.5	-10	7.39	7.36	7.32	7.29	7.25
-7.5	-8	7.75	7.72	7.68	7.64	7.60
-5.5	-6	7.92	7.88	7.85	7.80	7.76
-3.0	-4	8.10	8.05	8.01	7.97	7.92
-1.0	-2	8.27	8.22	8.18	8.13	8.08
1.0	0	8.44	8.39	8.34	8.29	8.24
2.0	1	8.52	8.47	8.42	8.37	8.32
3.0	2	9.08	9.03	8.98	8.94	8.90
5.0	4	10.21	10.15	10.09	10.08	10.07
7.0	6	11.33	11.27	11.20	11.22	11.23
9.0	8	11.78	11.71	11.64	11.62	11.59
11.5	10	12.23	12.16	12.09	12.02	11.94
13.5	12	12.91	12.83	12.75	12.65	12.60
15.5	14	13.59	13.50	13.42	13.29	13.26
16.5	16	13.93	13.84	13.75	13.61	13.59

PGA000Z772

Model FDF125VNVD Indoor unit FDF125VD Outdoor unit FDC125VN

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18˚CDB 12˚CWB		21˚CDB 14˚CWB		23˚CDB 16˚CWB		26˚CDB 18˚CWB		27˚CDB 19˚CWB		28˚CDB 20˚CWB		31˚CDB 22˚CWB		33˚CDB 24˚CWB	
˚CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					10.15	7.89	10.74	8.45	11.03	8.38	11.34	8.32	11.96	8.72	12.57	8.55
13					10.63	8.10	11.26	8.67	11.57	8.60	11.91	8.53	12.58	8.94	13.25	8.76
15					11.10	8.31	11.78	8.88	12.11	8.81	12.47	8.75	13.20	9.16	13.92	8.98
17					11.58	8.53	12.29	9.10	12.65	9.03	13.04	8.97	13.82	9.38	14.59	9.20
19					11.82	8.64	12.56	9.21	12.92	9.14	13.32	9.08	14.11	9.49	14.90	9.30
21					12.06	8.75	12.82	9.32	13.19	9.25	13.60	9.19	14.40	9.59	15.20	9.40
23					12.06	8.75	12.85	9.34	13.23	9.27	13.64	9.20	14.45	9.61	15.27	9.43
25			11.16	8.86	12.06	8.75	12.89	9.35	13.27	9.28	13.68	9.22	14.51	9.63	15.34	9.45
27			11.08	8.82	12.05	8.74	12.92	9.37	13.31	9.30	13.69	9.22	14.47	9.62		
29			11.00	8.78	11.87	8.66	12.71	9.28	13.11	9.22	13.51	9.15	14.31	9.56		
31			10.92	8.74	11.69	8.58	12.49	9.18	12.90	9.13	13.32	9.08	14.15	9.50		
33	10.27	8.22	10.72	8.64	11.51	8.49	12.27	9.09	12.70	9.05	13.13	9.00	13.99	9.44		
35	10.07	8.12	10.55	8.56	11.33	8.41	12.06	9.00	12.50	8.97	12.94	8.93	13.83	9.38		
37	9.90	8.03	10.38	8.48	11.13	8.32	11.83	8.90	12.24	8.86	12.66	8.82	13.50	9.26		
39	9.72	7.94	10.20	8.39	10.94	8.24	11.60	8.81	11.99	8.76	12.38	8.71	13.16	9.14		
41	9.55	7.85	10.02	8.30	10.75	8.15	11.37	8.71	11.73	8.66	12.09	8.60	12.82	9.02		
43	9.38	7.76	9.85	8.22	10.56	8.07	11.14	8.62	11.47	8.56	11.81	8.49	12.48	8.90		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ˚CDB				
˚CDB	˚CWB	16	18	20	22	24
-19.8	-20	7.06	7.03	7.00	6.97	6.95
-17.7	-18	7.46	7.43	7.41	7.37	7.34
-15.7	-16	7.87	7.84	7.81	7.77	7.74
-13.5	-14	8.33	8.29	8.26	8.22	8.18
-11.5	-12	8.78	8.74	8.70	8.66	8.62
-9.5	-10	9.24	9.19	9.15	9.11	9.06
-7.5	-8	9.69	9.65	9.60	9.55	9.50
-5.5	-6	9.91	9.86	9.81	9.75	9.70
-3.0	-4	10.12	10.07	10.01	9.96	9.90
-1.0	-2	10.33	10.28	10.22	10.16	10.10
1.0	0	10.55	10.49	10.43	10.36	10.30
2.0	1	10.65	10.59	10.53	10.47	10.40
3.0	2	11.36	11.29	11.22	11.18	11.13
5.0	4	12.76	12.69	12.61	12.60	12.58
7.0	6	14.16	14.08	14.00	14.02	14.04
9.0	8	14.72	14.64	14.56	14.52	14.49
11.5	10	15.28	15.20	15.11	15.02	14.93
13.5	12	16.13	16.04	15.94	15.82	15.75
15.5	14	16.98	16.88	16.77	16.62	16.58
16.5	16	17.41	17.30	17.19	17.02	16.99

PGA000Z772

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

Model FDF140VNVD Indoor unit FDF140VD Outdoor unit FDC140VN

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB 12℃CWB		21℃CDB 14℃CWB		23℃CDB 16℃CWB		26℃CDB 18℃CWB		27℃CDB 19℃CWB		28℃CDB 20℃CWB		31℃CDB 22℃CWB		33℃CDB 24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					11.37	8.43	12.02	8.98	12.35	8.91	12.70	8.83	13.39	9.23	14.08	9.03
13					11.90	8.67	12.61	9.23	12.96	9.16	13.33	9.08	14.09	9.48	14.84	9.28
15					12.43	8.92	13.19	9.48	13.57	9.41	13.97	9.34	14.78	9.73	15.59	9.54
17					12.96	9.17	13.77	9.74	14.17	9.66	14.61	9.60	15.48	9.99	16.34	9.79
19					13.24	9.30	14.06	9.87	14.48	9.80	14.92	9.72	15.80	10.12	16.68	9.91
21					13.51	9.43	14.36	10.00	14.78	9.93	15.23	9.85	16.12	10.24	17.02	10.03
23					13.51	9.43	14.40	10.02	14.82	9.94	15.28	9.87	16.19	10.26	17.10	10.06
25			12.50	9.53	13.50	9.43	14.43	10.03	14.86	9.96	15.33	9.89	16.25	10.29	17.18	10.09
27			12.41	9.48	13.50	9.43	14.47	10.05	14.91	9.98	15.34	9.90	16.20	10.27		
29			12.32	9.44	13.29	9.33	14.23	9.94	14.68	9.88	15.13	9.81	16.02	10.20		
31			12.23	9.39	13.09	9.23	13.99	9.84	14.45	9.78	14.92	9.72	15.85	10.13		
33	11.51	8.88	12.01	9.28	12.89	9.14	13.75	9.73	14.23	9.69	14.71	9.64	15.67	10.07		
35	11.28	8.76	11.82	9.18	12.68	9.04	13.50	9.62	14.00	9.59	14.50	9.55	15.49	10.00		
37	11.08	8.65	11.62	9.08	12.47	8.94	13.25	9.51	13.71	9.47	14.18	9.42	15.12	9.86		
39	10.89	8.55	11.43	8.99	12.26	8.84	12.99	9.40	13.43	9.35	13.86	9.29	14.74	9.72		
41	10.70	8.45	11.23	8.89	12.04	8.74	12.73	9.28	13.14	9.23	13.55	9.17	14.36	9.58		
43	10.51	8.35	11.03	8.79	11.83	8.64	12.47	9.17	12.85	9.11	13.23	9.04	13.98	9.44		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	8.06	8.03	8.00	7.97	7.94
-17.7	-18	8.53	8.50	8.46	8.43	8.39
-15.7	-16	9.00	8.96	8.92	8.88	8.85
-13.5	-14	9.52	9.48	9.43	9.39	9.35
-11.5	-12	10.04	9.99	9.95	9.90	9.85
-9.5	-10	10.56	10.51	10.46	10.41	10.36
-7.5	-8	11.08	11.02	10.97	10.91	10.86
-5.5	-6	11.32	11.26	11.21	11.15	11.09
-3.0	-4	11.56	11.50	11.44	11.38	11.31
-1.0	-2	11.81	11.75	11.68	11.61	11.54
1.0	0	12.05	11.99	11.92	11.84	11.77
2.0	1	12.18	12.11	12.04	11.96	11.89
3.0	2	12.98	12.90	12.83	12.77	12.72
5.0	4	14.58	14.50	14.41	14.40	14.38
7.0	6	16.19	16.09	16.00	16.02	16.05
9.0	8	16.83	16.73	16.63	16.59	16.55
11.5	10	17.46	17.37	17.27	17.17	17.06
13.5	12	18.44	18.33	18.22	18.08	18.00
15.5	14	19.41	19.29	19.17	18.99	18.95
16.5	16	19.90	19.77	19.64	19.45	19.42

PGA000Z772

2) Twin type

Model FDF140VNPVD Indoor unit FDF71VD (2 units) Outdoor unit FDC140VN

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB 12℃CWB		21℃CDB 14℃CWB		23℃CDB 16℃CWB		26℃CDB 18℃CWB		27℃CDB 19℃CWB		28℃CDB 20℃CWB		31℃CDB 22℃CWB		33℃CDB 24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					11.37	9.05	12.02	9.77	12.35	9.65	12.70	9.53	13.39	10.04	14.08	9.75
13					11.90	9.25	12.61	9.97	12.96	9.84	13.33	9.72	14.09	10.22	14.84	9.92
15					12.43	9.45	13.19	10.16	13.57	10.04	13.97	9.91	14.78	10.41	15.59	10.10
17					12.96	9.65	13.77	10.36	14.17	10.23	14.61	10.11	15.48	10.60	16.34	10.28
19					13.24	9.75	14.06	10.46	14.48	10.34	14.92	10.20	15.80	10.69	16.68	10.37
21					13.51	9.86	14.36	10.57	14.78	10.44	15.23	10.30	16.12	10.78	17.02	10.45
23					13.51	9.86	14.40	10.58	14.82	10.45	15.28	10.32	16.19	10.80	17.10	10.47
25			12.50	10.12	13.50	9.85	14.43	10.59	14.86	10.46	15.33	10.33	16.25	10.82	17.18	10.49
27			12.41	10.09	13.50	9.85	14.47	10.61	14.91	10.48	15.34	10.34	16.20	10.80		
29			12.32	10.05	13.29	9.77	14.23	10.52	14.68	10.40	15.13	10.27	16.02	10.75		
31			12.23	10.01	13.09	9.70	13.99	10.44	14.45	10.33	14.92	10.20	15.85	10.70		
33	11.51	9.38	12.01	9.92	12.89	9.62	13.75	10.36	14.23	10.25	14.71	10.14	15.67	10.65		
35	11.28	9.28	11.82	9.84	12.68	9.54	13.50	10.27	14.00	10.18	14.50	10.07	15.49	10.60		
37	11.08	9.19	11.62	9.76	12.47	9.46	13.25	10.18	13.71	10.08	14.18	9.97	15.12	10.50		
39	10.89	9.10	11.43	9.68	12.26	9.38	12.99	10.10	13.43	9.99	13.86	9.88	14.74	10.40		
41	10.70	9.02	11.23	9.60	12.04	9.30	12.73	10.01	13.14	9.90	13.55	9.78	14.36	10.29		
43	10.51	8.93	11.03	9.52	11.83	9.22	12.47	9.92	12.85	9.81	13.23	9.69	13.98	10.19		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	8.06	8.03	8.00	7.97	7.94
-17.7	-18	8.53	8.50	8.46	8.43	8.39
-15.7	-16	9.00	8.96	8.92	8.88	8.85
-13.5	-14	9.52	9.48	9.43	9.39	9.35
-11.5	-12	10.04	9.99	9.95	9.90	9.85
-9.5	-10	10.56	10.51	10.46	10.41	10.36
-7.5	-8	11.08	11.02	10.97	10.91	10.86
-5.5	-6	11.32	11.26	11.21	11.15	11.09
-3.0	-4	11.56	11.50	11.44	11.38	11.31
-1.0	-2	11.81	11.75	11.68	11.61	11.54
1.0	0	12.05	11.99	11.92	11.84	11.77
2.0	1	12.18	12.11	12.04	11.96	11.89
3.0	2	12.98	12.90	12.83	12.77	12.72
5.0	4	14.58	14.50	14.41	14.40	14.38
7.0	6	16.19	16.09	16.00	16.02	16.05
9.0	8	16.83	16.73	16.63	16.59	16.55
11.5	10	17.46	17.37	17.27	17.17	17.06
13.5	12	18.44	18.33	18.22	18.08	18.00
15.5	14	19.41	19.29	19.17	18.99	18.95
16.5	16	19.90	19.77	19.64	19.45	19.42

PGA000Z772

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

(b) 3phase use
1) Single type

Model FDF100VSVD Indoor unit FDF100VD Outdoor unit FDC100VS

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18°CDB		21°CDB		23°CDB		26°CDB		27°CDB		28°CDB		31°CDB		33°CDB	
	12°CWB		14°CWB		16°CWB		18°CWB		19°CWB		20°CWB		22°CWB		24°CWB	
°CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					8.12	7.02	8.59	7.61	8.82	7.55	9.07	7.49	9.56	7.93	10.06	7.79
13					8.50	7.18	9.00	7.77	9.26	7.71	9.52	7.65	10.06	8.09	10.60	7.95
15					8.88	7.34	9.42	7.93	9.69	7.87	9.98	7.82	10.56	8.25	11.14	8.11
17					9.26	7.50	9.84	8.09	10.12	8.03	10.43	7.98	11.05	8.42	11.67	8.27
19					9.46	7.59	10.05	8.18	10.34	8.12	10.65	8.06	11.29	8.50	11.92	8.35
21					9.65	7.67	10.25	8.26	10.56	8.20	10.88	8.15	11.52	8.57	12.16	8.42
23					9.65	7.67	10.28	8.27	10.59	8.21	10.91	8.16	11.56	8.59	12.21	8.44
25			8.93	7.79	9.64	7.67	10.31	8.28	10.62	8.23	10.95	8.17	11.61	8.61	12.27	8.46
27			8.86	7.76	9.64	7.67	10.34	8.29	10.65	8.24	10.96	8.17	11.57	8.59		
29			8.80	7.73	9.50	7.61	10.17	8.22	10.49	8.18	10.81	8.12	11.45	8.55		
31			8.73	7.70	9.35	7.54	9.99	8.15	10.32	8.11	10.66	8.06	11.32	8.51		
33	8.22	7.19	8.58	7.63	9.21	7.48	9.82	8.09	10.16	8.05	10.51	8.01	11.19	8.46		
35	8.05	7.10	8.44	7.57	9.06	7.42	9.64	8.01	10.00	7.99	10.36	7.95	11.07	8.42		
37	7.92	7.04	8.30	7.50	8.91	7.35	9.46	7.94	9.79	7.91	10.13	7.87	10.80	8.33		
39	7.78	6.97	8.16	7.44	8.75	7.29	9.28	7.87	9.59	7.83	9.90	7.79	10.53	8.24		
41	7.64	6.90	8.02	7.38	8.60	7.22	9.09	7.80	9.38	7.76	9.68	7.71	10.26	8.15		
43	7.50	6.84	7.88	7.32	8.45	7.16	8.91	7.73	9.18	7.68	9.45	7.63	9.99	8.07		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature °CDB				
°CDB	°CWB	16	18	20	22	24
-19.8	-20	5.64	5.62	5.60	5.58	5.56
-17.7	-18	5.97	5.95	5.92	5.90	5.87
-15.7	-16	6.30	6.27	6.25	6.22	6.19
-13.5	-14	6.66	6.63	6.60	6.57	6.54
-11.5	-12	7.03	6.99	6.96	6.93	6.90
-9.5	-10	7.39	7.36	7.32	7.29	7.25
-7.5	-8	7.75	7.72	7.68	7.64	7.60
-5.5	-6	7.92	7.88	7.85	7.80	7.76
-3.0	-4	8.10	8.05	8.01	7.97	7.92
-1.0	-2	8.27	8.22	8.18	8.13	8.08
1.0	0	8.44	8.39	8.34	8.29	8.24
2.0	1	8.52	8.47	8.42	8.37	8.32
3.0	2	9.08	9.03	8.98	8.94	8.90
5.0	4	10.21	10.15	10.09	10.08	10.07
7.0	6	11.33	11.27	11.20	11.22	11.23
9.0	8	11.78	11.71	11.64	11.62	11.59
11.5	10	12.23	12.16	12.09	12.02	11.94
13.5	12	12.91	12.83	12.75	12.65	12.60
15.5	14	13.59	13.50	13.42	13.29	13.26
16.5	16	13.93	13.84	13.75	13.61	13.59

PGA000Z772

Model FDF125VSVD Indoor unit FDF125VD Outdoor unit FDC125VS

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18°CDB		21°CDB		23°CDB		26°CDB		27°CDB		28°CDB		31°CDB		33°CDB	
	12°CWB		14°CWB		16°CWB		18°CWB		19°CWB		20°CWB		22°CWB		24°CWB	
°CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					10.15	7.89	10.74	8.45	11.03	8.38	11.34	8.32	11.96	8.72	12.57	8.55
13					10.63	8.10	11.26	8.67	11.57	8.60	11.91	8.53	12.58	8.94	13.25	8.76
15					11.10	8.31	11.78	8.88	12.11	8.81	12.47	8.75	13.20	9.16	13.92	8.98
17					11.58	8.53	12.29	9.10	12.65	9.03	13.04	8.97	13.82	9.38	14.59	9.20
19					11.82	8.64	12.56	9.21	12.92	9.14	13.32	9.08	14.11	9.49	14.90	9.30
21					12.06	8.75	12.82	9.32	13.19	9.25	13.60	9.19	14.40	9.59	15.20	9.40
23					12.06	8.75	12.85	9.34	13.23	9.27	13.64	9.20	14.45	9.61	15.27	9.43
25			11.16	8.86	12.06	8.75	12.89	9.35	13.27	9.28	13.68	9.22	14.51	9.63	15.34	9.45
27			11.08	8.82	12.05	8.74	12.92	9.37	13.31	9.30	13.69	9.22	14.47	9.62		
29			11.00	8.78	11.87	8.66	12.71	9.28	13.11	9.22	13.51	9.15	14.31	9.56		
31			10.92	8.74	11.69	8.58	12.49	9.18	12.90	9.13	13.32	9.08	14.15	9.50		
33	10.27	8.22	10.72	8.64	11.51	8.49	12.27	9.09	12.70	9.05	13.13	9.00	13.99	9.44		
35	10.07	8.12	10.55	8.56	11.33	8.41	12.06	9.00	12.50	8.97	12.94	8.93	13.83	9.38		
37	9.90	8.03	10.38	8.48	11.13	8.32	11.83	8.90	12.24	8.86	12.66	8.82	13.50	9.26		
39	9.72	7.94	10.20	8.39	10.94	8.24	11.60	8.81	11.99	8.76	12.38	8.71	13.16	9.14		
41	9.55	7.85	10.02	8.30	10.75	8.15	11.37	8.71	11.73	8.66	12.09	8.60	12.82	9.02		
43	9.38	7.76	9.85	8.22	10.56	8.07	11.14	8.62	11.47	8.56	11.81	8.49	12.48	8.90		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature °CDB				
°CDB	°CWB	16	18	20	22	24
-19.8	-20	7.06	7.03	7.00	6.97	6.95
-17.7	-18	7.46	7.43	7.41	7.37	7.34
-15.7	-16	7.87	7.84	7.81	7.77	7.74
-13.5	-14	8.33	8.29	8.26	8.22	8.18
-11.5	-12	8.78	8.74	8.70	8.66	8.62
-9.5	-10	9.24	9.19	9.15	9.11	9.06
-7.5	-8	9.69	9.65	9.60	9.55	9.50
-5.5	-6	9.91	9.86	9.81	9.75	9.70
-3.0	-4	10.12	10.07	10.01	9.96	9.90
-1.0	-2	10.33	10.28	10.22	10.16	10.10
1.0	0	10.55	10.49	10.43	10.36	10.30
2.0	1	10.65	10.59	10.53	10.47	10.40
3.0	2	11.36	11.29	11.22	11.18	11.13
5.0	4	12.76	12.69	12.61	12.60	12.58
7.0	6	14.16	14.08	14.00	14.02	14.04
9.0	8	14.72	14.64	14.56	14.52	14.49
11.5	10	15.28	15.20	15.11	15.02	14.93
13.5	12	16.13	16.04	15.94	15.82	15.75
15.5	14	16.98	16.88	16.77	16.62	16.58
16.5	16	17.41	17.30	17.19	17.02	16.99

PGA000Z772

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

Model FDF140VSVD Indoor unit FDF140VD Outdoor unit FDC140VS

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB		21℃CDB		23℃CDB		26℃CDB		27℃CDB		28℃CDB		31℃CDB		33℃CDB	
	12℃CWB		14℃CWB		16℃CWB		18℃CWB		19℃CWB		20℃CWB		22℃CWB		24 ℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					11.37	8.43	12.02	8.98	12.35	8.91	12.70	8.83	13.39	9.23	14.08	9.03
13					11.90	8.67	12.61	9.23	12.96	9.16	13.33	9.08	14.09	9.48	14.84	9.28
15					12.43	8.92	13.19	9.48	13.57	9.41	13.97	9.34	14.78	9.73	15.59	9.54
17					12.96	9.17	13.77	9.74	14.17	9.66	14.61	9.60	15.48	9.99	16.34	9.79
19					13.24	9.30	14.06	9.87	14.48	9.80	14.92	9.72	15.80	10.12	16.68	9.91
21					13.51	9.43	14.36	10.00	14.78	9.93	15.23	9.85	16.12	10.24	17.02	10.03
23					13.51	9.43	14.40	10.02	14.82	9.94	15.28	9.87	16.19	10.26	17.10	10.06
25			12.50	9.53	13.50	9.43	14.43	10.03	14.86	9.96	15.33	9.89	16.25	10.29	17.18	10.09
27			12.41	9.48	13.50	9.43	14.47	10.05	14.91	9.98	15.34	9.90	16.20	10.27		
29			12.32	9.44	13.29	9.33	14.23	9.94	14.68	9.88	15.13	9.81	16.02	10.20		
31			12.23	9.39	13.09	9.23	13.99	9.84	14.45	9.78	14.92	9.72	15.85	10.13		
33	11.51	8.88	12.01	9.28	12.89	9.14	13.75	9.73	14.23	9.69	14.71	9.64	15.67	10.07		
35	11.28	8.76	11.82	9.18	12.68	9.04	13.50	9.62	14.00	9.59	14.50	9.55	15.49	10.00		
37	11.08	8.65	11.62	9.08	12.47	8.94	13.25	9.51	13.71	9.47	14.18	9.42	15.12	9.86		
39	10.89	8.55	11.43	8.99	12.26	8.84	12.99	9.40	13.43	9.35	13.86	9.29	14.74	9.72		
41	10.70	8.45	11.23	8.89	12.04	8.74	12.73	9.28	13.14	9.23	13.55	9.17	14.36	9.58		
43	10.51	8.35	11.03	8.79	11.83	8.64	12.47	9.17	12.85	9.11	13.23	9.04	13.98	9.44		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	8.06	8.03	8.00	7.97	7.94
-17.7	-18	8.53	8.50	8.46	8.43	8.39
-15.7	-16	9.00	8.96	8.92	8.88	8.85
-13.5	-14	9.52	9.48	9.43	9.39	9.35
-11.5	-12	10.04	9.99	9.95	9.90	9.85
-9.5	-10	10.56	10.51	10.46	10.41	10.36
-7.5	-8	11.08	11.02	10.97	10.91	10.86
-5.5	-6	11.32	11.26	11.21	11.15	11.09
-3.0	-4	11.56	11.50	11.44	11.38	11.31
-1.0	-2	11.81	11.75	11.68	11.61	11.54
1.0	0	12.05	11.99	11.92	11.84	11.77
2.0	1	12.18	12.11	12.04	11.96	11.89
3.0	2	12.98	12.90	12.83	12.77	12.72
5.0	4	14.58	14.50	14.41	14.40	14.38
7.0	6	16.19	16.09	16.00	16.02	16.05
9.0	8	16.83	16.73	16.63	16.59	16.55
11.5	10	17.46	17.37	17.27	17.17	17.06
13.5	12	18.44	18.33	18.22	18.08	18.00
15.5	14	19.41	19.29	19.17	18.99	18.95
16.5	16	19.90	19.77	19.64	19.45	19.42

PGA000Z772

2) Twin type

Model FDF140VSPVD Indoor unit FDF71VD (2 units) Outdoor unit FDC140VS

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB		21℃CDB		23℃CDB		26℃CDB		27℃CDB		28℃CDB		31℃CDB		33℃CDB	
	12℃CWB		14℃CWB		16℃CWB		18℃CWB		19℃CWB		20℃CWB		22 ℃CWB		24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					11.37	9.05	12.02	9.77	12.35	9.65	12.70	9.53	13.39	10.04	14.08	9.75
13					11.90	9.25	12.61	9.97	12.96	9.84	13.33	9.72	14.09	10.22	14.84	9.92
15					12.43	9.45	13.19	10.16	13.57	10.04	13.97	9.91	14.78	10.41	15.59	10.10
17					12.96	9.65	13.77	10.36	14.17	10.23	14.61	10.11	15.48	10.60	16.34	10.28
19					13.24	9.75	14.06	10.46	14.48	10.34	14.92	10.20	15.80	10.69	16.68	10.37
21					13.51	9.86	14.36	10.57	14.78	10.44	15.23	10.30	16.12	10.78	17.02	10.45
23					13.51	9.86	14.40	10.58	14.82	10.45	15.28	10.32	16.19	10.80	17.10	10.47
25			12.50	10.12	13.50	9.85	14.43	10.59	14.86	10.46	15.33	10.33	16.25	10.82	17.18	10.49
27			12.41	10.09	13.50	9.85	14.47	10.61	14.91	10.48	15.34	10.34	16.20	10.80		
29			12.32	10.05	13.29	9.77	14.23	10.52	14.68	10.40	15.13	10.27	16.02	10.75		
31			12.23	10.01	13.09	9.70	13.99	10.44	14.45	10.33	14.92	10.20	15.85	10.70		
33	11.51	9.38	12.01	9.92	12.89	9.62	13.75	10.36	14.23	10.25	14.71	10.14	15.67	10.65		
35	11.28	9.28	11.82	9.84	12.68	9.54	13.50	10.27	14.00	10.18	14.50	10.07	15.49	10.60		
37	11.08	9.19	11.62	9.76	12.47	9.46	13.25	10.18	13.71	10.08	14.18	9.97	15.12	10.50		
39	10.89	9.10	11.43	9.68	12.26	9.38	12.99	10.10	13.43	9.99	13.86	9.88	14.74	10.40		
41	10.70	9.02	11.23	9.60	12.04	9.30	12.73	10.01	13.14	9.90	13.55	9.78	14.36	10.29		
43	10.51	8.93	11.03	9.52	11.83	9.22	12.47	9.92	12.85	9.81	13.23	9.69	13.98	10.19		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20	8.06	8.03	8.00	7.97	7.94
-17.7	-18	8.53	8.50	8.46	8.43	8.39
-15.7	-16	9.00	8.96	8.92	8.88	8.85
-13.5	-14	9.52	9.48	9.43	9.39	9.35
-11.5	-12	10.04	9.99	9.95	9.90	9.85
-9.5	-10	10.56	10.51	10.46	10.41	10.36
-7.5	-8	11.08	11.02	10.97	10.91	10.86
-5.5	-6	11.32	11.26	11.21	11.15	11.09
-3.0	-4	11.56	11.50	11.44	11.38	11.31
-1.0	-2	11.81	11.75	11.68	11.61	11.54
1.0	0	12.05	11.99	11.92	11.84	11.77
2.0	1	12.18	12.11	12.04	11.96	11.89
3.0	2	12.98	12.90	12.83	12.77	12.72
5.0	4	14.58	14.50	14.41	14.40	14.38
7.0	6	16.19	16.09	16.00	16.02	16.05
9.0	8	16.83	16.73	16.63	16.59	16.55
11.5	10	17.46	17.37	17.27	17.17	17.06
13.5	12	18.44	18.33	18.22	18.08	18.00
15.5	14	19.41	19.29	19.17	18.99	18.95
16.5	16	19.90	19.77	19.64	19.45	19.42

PGA000Z772

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

Model FDF200VSPVD Indoor unit FDF100VD (2 units) Outdoor unit FDC200VS

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB		21℃CDB		23℃CDB		26℃CDB		27℃CDB		28℃CDB		31℃CDB		33℃CDB	
	12℃CWB		14℃CWB		16℃CWB		18℃CWB		19℃CWB		20℃CWB		22℃CWB		24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					17.37	14.52	18.41	15.69	18.94	15.58	19.50	15.47	20.63	16.34	21.76	16.06
13					17.90	14.74	18.99	15.92	19.54	15.80	20.13	15.69	21.31	16.57	22.49	16.28
15					18.43	14.97	19.57	16.14	20.14	16.03	20.75	15.92	21.98	16.79	23.21	16.50
17					18.96	15.19	20.14	16.37	20.73	16.25	21.38	16.15	22.66	17.02	23.94	16.72
19					19.35	15.36	20.56	16.54	21.16	16.42	21.81	16.31	23.12	17.18	24.42	16.87
21					19.41	15.39	20.98	16.71	21.59	16.59	22.25	16.47	23.57	17.33	24.89	17.02
23					19.31	15.35	20.86	16.66	21.47	16.54	22.12	16.42	23.43	17.28	24.73	16.97
25			17.35	15.35	19.20	15.30	20.74	16.61	21.35	16.49	21.99	16.38	23.28	17.23	24.57	16.92
27			17.28	15.32	19.10	15.25	20.62	16.56	21.22	16.44	21.83	16.32	23.04	17.15		
29			17.14	15.25	18.85	15.15	20.31	16.44	20.92	16.33	21.53	16.21	22.75	17.05		
31			16.99	15.19	18.59	15.04	20.00	16.31	20.61	16.21	21.22	16.09	22.45	16.95		
33	16.46	14.38	17.03	15.20	18.33	14.93	19.69	16.19	20.31	16.09	20.92	15.98	22.15	16.85		
35	16.14	14.23	16.76	15.08	18.08	14.82	19.38	16.07	20.00	15.98	20.62	15.87	21.85	16.75		
37	15.86	14.09	16.50	14.96	17.76	14.68	18.98	15.91	19.57	15.81	20.17	15.71	21.35	16.58		
39	15.59	13.96	16.23	14.84	17.44	14.55	18.58	15.76	19.15	15.66	19.71	15.54	20.85	16.42		
41	15.32	13.83	15.97	14.73	17.13	14.42	18.17	15.60	18.72	15.50	19.26	15.38	20.35	16.25		
43	15.04	13.69	15.70	14.60	16.81	14.29	17.77	15.44	18.29	15.34	18.81	15.22	19.85	16.09		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20					
-17.7	-18					
-15.7	-16					
-13.5	-14	13.21	13.18	13.14	13.11	13.08
-11.5	-12	13.91	13.87	13.83	13.79	13.76
-9.5	-10	14.61	14.57	14.52	14.47	14.43
-7.5	-8	15.31	15.26	15.21	15.16	15.10
-5.5	-6	15.64	15.58	15.52	15.46	15.40
-3.0	-4	15.96	15.89	15.82	15.76	15.69
-1.0	-2	16.29	16.21	16.13	16.06	15.98
1.0	0	16.61	16.53	16.44	16.36	16.28
2.0	1	16.78	16.69	16.59	16.51	16.42
3.0	2	17.96	17.86	17.76	17.66	17.56
5.0	4	20.33	20.21	20.08	19.96	19.84
7.0	6	22.71	22.55	22.40	22.26	22.12
9.0	8	23.43	23.28	23.13	22.88	22.63
11.5	10	24.14	24.00	23.86	23.50	23.13
13.5	12	25.41	25.24	25.07	24.77	24.43
15.5	14	26.67	26.47	26.27	26.05	25.72
16.5	16	27.30	27.09	26.87	26.69	26.37

PGA000Z772

Model FDF250VSPVD Indoor unit FDF125VD (2 units) Outdoor unit FDC250VS

Cool Mode (kW)

Outdoor air temp.	Indoor air temperature															
	18℃CDB		21℃CDB		23℃CDB		26℃CDB		27℃CDB		28℃CDB		31℃CDB		33℃CDB	
	12℃CWB		14℃CWB		16℃CWB		18℃CWB		19℃CWB		20℃CWB		22℃CWB		24℃CWB	
℃CDB	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC	TC	SHC
11					21.71	16.40	23.02	17.54	23.67	17.40	24.38	17.28	25.79	18.10	27.21	17.76
13					22.38	16.70	23.74	17.84	24.42	17.70	25.16	17.58	26.63	18.40	28.11	18.05
15					23.04	17.00	24.46	18.14	25.17	18.01	25.94	17.88	27.48	18.70	29.02	18.35
17					23.70	17.30	25.18	18.45	25.92	18.31	26.72	18.19	28.32	19.01	29.92	18.65
19					24.19	17.53	25.70	18.67	26.45	18.53	27.27	18.40	28.89	19.22	30.52	18.85
21					24.26	17.56	26.22	18.90	26.99	18.76	27.82	18.63	29.47	19.43	31.12	19.05
23					24.13	17.50	26.07	18.83	26.84	18.69	27.65	18.56	29.28	19.36	30.91	18.98
25			21.69	17.40	24.00	17.44	25.92	18.77	26.68	18.63	27.49	18.49	29.10	19.29	30.71	18.91
27			21.60	17.36	23.88	17.38	25.77	18.70	26.53	18.57	27.29	18.41	28.80	19.18		
29			21.42	17.27	23.56	17.24	25.39	18.54	26.15	18.41	26.91	18.26	28.43	19.05		
31			21.24	17.18	23.24	17.09	25.00	18.37	25.77	18.25	26.53	18.11	28.06	18.91		
33	20.58	16.47	21.29	17.21	22.92	16.94	24.61	18.21	25.38	18.09	26.15	17.96	27.69	18.78		
35	20.17	16.25	20.96	17.05	22.60	16.80	24.23	18.05	25.00	17.94	25.77	17.81	27.31	18.64		
37	19.83	16.08	20.62	16.88	22.20	16.62	23.73	17.84	24.47	17.72	25.21	17.60	26.69	18.42		
39	19.49	15.90	20.29	16.73	21.80	16.44	23.22	17.62	23.93	17.51	24.64	17.38	26.06	18.20		
41	19.15	15.73	19.96	16.57	21.41	16.27	22.72	17.42	23.40	17.29	24.08	17.16	25.43	17.97		
43	18.81	15.56	19.63	16.41	21.01	16.09	22.22	17.21	22.86	17.08	23.51	16.94	24.81	17.76		

Heat Mode (kW)

Outdoor air temp.		Indoor air temperature ℃CDB				
℃CDB	℃CWB	16	18	20	22	24
-19.8	-20					
-17.7	-18					
-15.7	-16					
-13.5	-14	16.52	16.47	16.43	16.39	16.35
-11.5	-12	17.39	17.34	17.29	17.24	17.19
-9.5	-10	18.26	18.21	18.15	18.09	18.04
-7.5	-8	19.14	19.07	19.01	18.94	18.88
-5.5	-6	19.55	19.47	19.40	19.32	19.24
-3.0	-4	19.95	19.87	19.78	19.70	19.61
-1.0	-2	20.36	20.26	20.17	20.07	19.98
1.0	0	20.77	20.66	20.55	20.45	20.35
2.0	1	20.97	20.86	20.74	20.64	20.53
3.0	2	22.45	22.32	22.19	22.07	21.95
5.0	4	25.42	25.26	25.10	24.95	24.80
7.0	6	28.38	28.19	28.00	27.82	27.65
9.0	8	29.28	29.10	28.91	28.60	28.28
11.5	10	30.18	30.00	29.83	29.37	28.91
13.5	12	31.76	31.55	31.33	30.97	30.53
15.5	14	33.34	33.09	32.84	32.57	32.15
16.5	16	34.13	33.86	33.59	33.37	32.96

PGA000Z772

Note(1) These data show average status.
Depending on the system control, there may be ranges where the operation is not conducted continuously.
These data show the case where the operation frequency of a compressor is fixed.
(2) Capacities are based on the following conditions.
Corresponding refrigerant piping length :7.5m
Level difference of Zero.
(3) Symbols are as follows
TC :Total cooling capacity (kW)
SHC :Sensible heat capacity (kW)

8.2 Correction of cooling and heating capacity in relation to air flow rate control (fan speed)

Fan speed	P-Hi or Hi	Me	Lo
Coefficient	1.00	0.97	0.95

8.3 Correction of cooling and heating capacity in relation to one way length of refrigerant piping

It is necessary to correct the cooling and heating capacity in relation to the one way equivalent piping length between the indoor and outdoor units.

(1) Models 71 ~ 140

Equivalent piping length (1)(m)			7.5	10	15	20	25	30	35	40	45	50	55
Heating			1	1	1	1	1	0.998	0.998	0.993	0.993	0.988	0.988
Cooling	71 model	ϕ15.88	1	0.996	0.989	0.982	0.975	0.968	0.961	0.954	0.947	0.940	0.933
	100 model		1	0.991	0.978	0.964	0.951	0.937	0.924	0.910	0.897	0.883	0.870
	125 model		1	0.986	0.968	0.950	0.932	0.914	0.896	0.878	0.860	0.842	0.824
	140 model		1	0.985	0.966	0.946	0.927	0.907	0.888	0.868	0.849	0.829	0.810
	71 model	ϕ19.05	1.008	1.006	1.003	1	0.997	0.994	0.991	0.988	0.985	0.982	0.979
	100 model		1.016	1.013	1.007	1.002	0.996	0.991	0.985	0.980	0.974	0.969	0.963
	125 model		1.022	1.018	1.009	1.001	0.992	0.984	0.975	0.967	0.958	0.950	0.941
	140 model		1.026	1.021	1.011	1.002	0.992	0.983	0.973	0.964	0.954	0.945	0.935

Equivalent piping length (1)(m)			60	65	70	75	80	85	90	95	100	105
Heating			0.983	0.983	0.978	0.978	0.973	0.973	0.968	0.968	0.963	0.963
Cooling	71 model	ϕ15.88	—	—	—	—	—	—	—	—	—	—
	100 model		0.856	0.843	0.829	0.816	0.803	0.789	0.776	0.762	0.749	0.736
	125 model		0.806	0.788	0.770	0.752	0.734	0.716	0.698	0.680	0.662	0.644
	140 model		0.790	0.771	0.751	0.732	0.712	0.693	0.673	0.654	0.634	0.615
	71 model	ϕ19.05	—	—	—	—	—	—	—	—	—	—
	100 model		0.959	0.955	0.951	0.948	0.944	0.940	0.936	0.932	0.929	0.926
	125 model		0.935	0.929	0.924	0.919	0.912	0.908	0.902	0.897	0.892	0.887
	140 model		0.928	0.920	0.913	0.907	0.900	0.894	0.888	0.882	0.876	0.870

Note (1) Calculate the equivalent length using the following formula.
However, install the piping so that the piping length is within +5 m of the limit length (actual length) for the respective types.

(2) Models 200, 250

Equivalent piping length (1) (m)			7.5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Heating			1	0.998	0.995	0.991	0.988	0.984	0.981	0.977	0.974	0.970	0.967	0.963	0.960	0.956	0.953
Cooling	200 model	ϕ25.4	1.007	1.005	1.002	0.998	0.995	0.991	0.988	0.984	0.981	0.977	0.974	0.970	0.967	0.963	0.960
	250 model		1.012	1.008	1.002	0.996	0.990	0.984	0.978	0.972	0.966	0.960	0.953	0.947	0.941	0.935	0.929
	200 model	ϕ22.22	1	0.997	0.991	0.984	0.978	0.971	0.965	–	–	–	–	–	–	–	–
	250 model		1	0.995	0.985	0.975	0.965	0.954	0.944	–	–	–	–	–	–	–	–
	200 model	ϕ28.58	1.010	1.009	1.007	1.005	1.003	1.001	0.999	0.997	0.995	0.993	0.991	0.989	0.987	0.985	0.983
	250 model		1.016	1.015	1.011	1.008	1.004	1.001	0.997	0.994	0.990	0.987	0.983	0.980	0.976	0.973	0.969

Note (1) Calculate the equivalent length using the following formula.
However, install the piping so that the piping length is within +5 m of the limit length (actual length) for the respective types.

• Equivalent Length =Actual Length + (Equivalent bend length x number of bends in the piping.)
Equivalent length per bend.

Gas Pipe Diameter (mm)	ϕ12.7	ϕ15.88	ϕ19.05	ϕ22.22	ϕ25.4	ϕ28.58
Equivalent Bend Length	0.20	0.25	0.30	0.35	0.40	0.45

8.4 Height difference between the indoor unit and outdoor unit

When the outdoor unit is located below indoor units in cooling mode, or when the outdoor unit is located above indoor units in heating mode, the correction coefficient mentioned in the below table should be subtracted from the value in the above table.

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

Piping length limitations

Item \ Model	71VNX 100, 125, 140VN/VS	100, 125, 140VNX/VSX	200, 250
Max. one way piping length	50m	100m	70m or 35m(2)
Max. vertical height difference	Outdoor unit is higher 30m Outdoor unit is lower 15m		

Notes (1) Values in the table indicate the one way piping length between the indoor and outdoor units.
(2) When ϕ22.22 gas pipe is applied to 200 and 250, maximum one way length is limited to 35m.

How to obtain the cooling and heating capacity

Example : The net cooling capacity of the model FDF100VNVD with the air flow “High”, the piping length of 15m, the outdoor unit located 5m lower than the indoor unit, indoor wet-bulb temperature at 19.0℃ and outdoor dry-bulb temperature 35℃ is

Net cooling capacity = 10.0 × 1.00 × 0.978 × 0.99 ≒ 9.7kW

- 10.0 : Net cooling total capacity of FDF100VNVD (Outdoor temp. : 35℃DB Indoor temp. : 19℃WB) shown in table 8.1
- 1.00 : Air flow : High shown in table 8.2
- 0.978 : Piping length :15m (Gas pipe size is ϕ15.88) shown in table 8.3
- 0.99 : Height diff. :5m (Outdoor unit : below) shown in table 8.4

9. APPLICATION DATA

9.1 Installation of indoor unit

PGA012D404

INSTALLATION MANUAL FOR FLOOR STANDING (FDF)

This manual is for the installation of an indoor unit.
For electrical wiring work (Indoor), refer to the electrical wiring work installation manual. For remote controller installation, refer to the installation manual attached to a remote controller. For wireless kit installation, refer to the installation manual attached to a wireless kit. For electrical wiring work (Outdoor) and refrigerant pipe work installation for outdoor unit, refer to Page 64.

SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, ⚠WARNING and ⚠CAUTION .
  ⚠WARNING : Wrong installation would cause serious consequences such as injuries or death.
  ⚠CAUTION : Wrong installation might cause serious consequences depending on circumstances.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
- 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.
- After completing the installation, do commissioning to confirm there are no abnormalities, and explain to the customers about "SAFETY PRECAUTIONS", correct operation method and maintenance method (air filter cleaning, operation method and temperature setting method) with user's manual of this unit.
  Ask your customers to keep this installation manual together with the user's manual. Also, ask them to hand over the user's manual to the new user when the owner is changed.

⚠WARNING

- **Installation should be performed by the specialist.**
  If you install the unit by yourself, it may lead to serious trouble such as water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Install the system correctly according to these installation manuals.**
  Improper installation may cause explosion, injury, water leakage, electric shock, and fire.
- **Check the density refered by the foumula (accordance with ISO5149).**
  If the density exceeds the limit density, please consult the dealer and installate the ventilation system.
- **Use the genuine accessories and the specified parts for installation.**
  If parts unspecified by our company are used it could cause water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Ventilate the working area well in case the refrigerant leaks during installation.**
  If the refrigerant contacts the fire, toxic gas is produced.
- **Install the unit in a location that can hold heavy weight.**
  Improper installation may cause the unit to fall leading to accidents.
- **Install the unit properly in order to be able to withstand strong winds such as typhoons, and earthquakes.**
  Improper installation may cause the unit to fall leading to accidents.
- **Do not mix air in to the cooling cycle on installation or removal of the air conditioner.**
  If air is mixed in, the pressure in the cooling cycle will rise abnormally and may cause explosion and injuries.
- **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
  Power source with insufficient capacity and improper work can cause electric shock and fire.
- **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
  Loose connections or hold could result in abnormal heat generation or fire.
- **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
  Improper fitting may cause abnormal heat and fire.
- **Check for refrigerant gas leakage after installation is completed.**
  If the refrigerant gas leaks into the house and comes in contact with a fan heater, a stove, or an oven, toxic gas is produced.
- **Use the specified pipe, flare nut, and tools for R410A.**
  Using existing parts (R22) could cause the unit failure and serious accident due to explosion of the cooling cycle.
- **Tighten the flare nut according to the specified method by with torque wrench.**
  If the flare nut were tightened with excess torque, it could cause burst and refrigerant leakage after a long period.
- **Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulfide gas can occur.**
  Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety. This can also cause the corrosion of the indoor unit and a resultant unit failure or refrigerant leak.
- **Connect the pipes for refrigeration circuit securely in installation work before compressor is operated.**
  If the compressor is operated when the service valve is open without connecting the pipe, it could cause explosion and injuries due to abnormal high pressure in the system.
- **Stop the compressor before removing the pipe after shutting the service valve on pump down work.**
  If the pipe is removed when the compressor is in operation with the service valve open, air would be mixed in the refrigeration circuit and it could cause explosion and injuries due to abnormal high pressure in the cooling cycle.
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not repair by yourself. And consult with the dealer about repair.**
  Improper repair may cause water leakage, electric shock or fire.
- **Consult the dealer or a specialist about removal of the air conditioner.**
  Improper installation may cause water leakage, electric shock or fire.
- **Turn off the power source during servicing or inspection work.**
  If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.
- **Do not run the unit when the panel or protection guard are taken off.**
  Touching the rotating equipment, hot surface, or high voltage section could cause an injury to be caught in the machine, to get burned, or electric shock.
- **Shut off the power before electrical wiring work.**
  It could cause electric shock, unit failure and improper running.

⚠ CAUTION

- **Perform earth wiring surely.**
  Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Imperfect earth work (grounding) could cause an electric shock or fire if some trouble or earth leakage occurs.
- **Earth leakage breaker must be installed.**
  Unless the earth leakage circuit breaker is provided, if could cause a fire or electric shock.
- **Use the circuit breaker of correct capacity. Circuit breaker should be the one that disconnect all poles under over current.**
  Using the incorrect one could cause the system failure and fire.
- **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
  Connecting the circuit by wire or copper wire could cause unit failure and fire.
- **Do not install the indoor unit near the location where there is possibility of flammable gas leakages.**
  If the gas leaks and gathers around the unit, it could cause fire.
- **Do not install and use the unit where corrosive gas (such as sulfurous acid gas etc.) or flammable gas (such as thinner, petroleum etc.) may be generated or accumulated, or volatile flammable substances are handled.**
  It could cause the corrosion of heat exchanger, breakage of plastic parts etc. And inflammable gas could cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place.
- **Do not use the indoor unit at the place where water splashes such as laundry.**
  Indoor unit is not waterproof. It could cause electric shock and fire.
- **Do not use the indoor unit for a special purpose such as food storage, cooling for precision instrument, preservation of animals, plants, and a work of art.**
  It could cause the damage of the items.
- **Do not install nor use the system near equipments which generate electromagnetic wave or high harmonics.**
  Equipments like inverter equipment, private power generator, high-frequency medical equipment, or telecommunication equipment might influence the air conditioner and cause a malfunction and breakdown. Or the air conditioner might influence medical equipments or telecommunication equipments, and obstruct their medical activity or cause jamming.
- **Do not install the remote controller at the direct sunlight.**
  It could cause breakdown or deformation of the remote controller.
- **Do not install the indoor unit at the place listed below.**
  · Places where flammable gas could leak.
  · Places where carbon fiber, metal powder or any powder is floated.
  · Place where the substances which affect the air conditioner are generated such as sulfide gas, chloride gas, acid, alkali or ammonic atmospheres.
  · Places exposed to oil mist or steam directly.
  · On vehicles and ships
  · Places where machinery which generates high harmonics is used.
  · Places where cosmetics or special sprays are frequently used.
  · Highly salted area such as beach.
  · Heavy snow area
  · Places where the system is affected by smoke from a chimney.
  · Altitude over 1000m
- **Do not install the indoor unit in the locations listed below (Be sure to install the indoor unit according to the installation manual for each model because each indoor unit has each limitation)**
  · Locations with any obstacles which can prevent inlet and outlet air of the unit
  · Locations where vibration can be amplified due to insufficient strength of structure.
  · Locations where the infrared receiver is exposed to the direct sunlight or the strong light beam. (in case of the infrared specification unit)
  · Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  · Locations where drainage cannot run off safely.
  It can affect performance or function and etc..
- **Do not put any valuables which will break down by getting wet under the air conditioner.**
  Condensation could drop when the relative humidity is higher than 80% or drain pipe is clogged, and it damages user's belongings.
- **Do not use the base frame for the outdoor unit which is corroded or damaged after a long period of use.**
  It could cause the unit falling down and injury.
- **Pay attention not to damage the drain pan by weld sputter when brazing work is done near the unit.**
  If sputter entered into the unit during brazing work, it could cause damage (pinhole) of drain pan and leakage of water. To avoid damaging, keep the indoor unit packed or cover the indoor unit.
- **Install the drain pipe to drain the water surely according to the installation manual.**
  Improper connection of the drain pipe may cause dropping water into room and damaging user's belongings.
- **Do not share the drain pipe for indoor unit and GHP (Gas Heat Pump system) outdoor unit.**
  Toxic exhaust gas would flow into room and it might cause serious damage (some poisoning or deficiency of oxygen) to user's health and safety.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **For drain pipe installation, be sure to make descending slope of greater than 1/100, not to make traps, and not to make air-bleeding.**
  Check if the drainage is correctly done during commissioning and ensure the space for inspection and maintenance.
- **Ensure the insulation on the pipes for refrigeration circuit so as not to condense water.**
  Incomplete insulation could cause condensation and it would wet ceiling, floor, and any other valuables.
- **Do not install the outdoor unit where is likely to be a nest for insects and small animals.**
  Insects and small animals could come into the electronic components and cause breakdown and fire. Instruct the user to keep the surroundings clean.
- **Pay extra attention, carrying the unit by hand.**
  Carry the unit with 2 people if it is heavier than 20kg. Do not use the plastic straps but the grabbing place, moving the unit by hand. Use protective gloves in order to avoid injury by the aluminum fin.
- **Make sure to dispose of the packaging material.**
  Leaving the materials may cause injury as metals like nail and woods are used in the package.
- **Do not operate the system without the air filter.**
  It may cause the breakdown of the system due to clogging of the heat exchanger.
- **Do not touch any button with wet hands.**
  It could cause electric shock.
- **Do not touch the refrigerant piping with bare hands when in operation.**
  The pipe during operation would become very hot or cold according to the operating condition, and it could cause a burn or frostbite.
- **Do not clean up the air conditioner with water.**
  It could cause electric shock.
- **Do not turn off the power source immediately after stopping the operation.**
  Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown.
- **Do not control the operation with the circuit breaker.**
  It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury.

①Before installation

○ Install the unit properly according to this instruction manual.
○ Is it in accordance with the construction plan?

Model and power supply specification

Check.

Pipes, wires and small parts

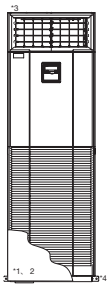
Accessory

(1) **For heat insulation of flare nut** *1

1	Pipe cover		1 pc	For gas side
2	Pipe cover		1 pc	For liquid side
3	Strap		4 pcs	

(2) **For installation** Note) Nos. 1 and 5 are used also as hardware for packing.

1	Fall-prevention fitting		1 pc	*3
2	Wood screw		2 pcs	For No. 1
3	Washer		2 pcs	For No. 2 wood screw
4	Rubber bushing		1 pc	For refrigerant and drain pipes
5	L fitting		2 pcs	*4



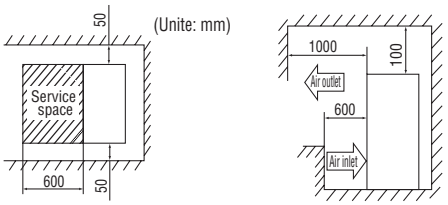
Where the accessories are put in

*1. Open the air inlet grill and Nos. (1) will be found in the unit.
*2. Nos. (2)-2-4 will be found at the same place as 1.
*3. Fall-prevention fitting is mounting on the top panel of the unit.
*4. L-fittings are mounted on the bottom part of the unit.

②Selection of installation place for the indoor unit

(Indoor unit)

Installation space Minimum required spaces are shown as follows.



• Secure sufficient spaces for inspection and maintenance.

⚠WARNING

• Install the unit securely on a floor that can endure its weight sufficiently Insufficient strength or incorrect installation could result in injuries if the unit falls.

ATTENTION: Select a place for installation where the following conditions are fulfilled with customer's consent.
• Where cool or hot air can be blown sufficiently and widely.
• Where the piping and wiring work to outdoor unit can be done easily.
• Where drainage water can run off completely.
• Where the installation floor is strong enough.
• Where the unit its protected from direct exposure to sunlight.
• Where there is no obstacle at he air inlet and air outlet.
• Where the fire alarm apparatus will not be activated by malfunction. Where There is no risk for short-circuit of air.

③Carrying-in and installation of the unit

Carrying-in

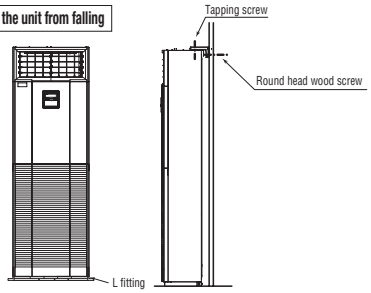
Carry with the front face at top.

ATTENTION:
• Carry in the unit kept in a package as near as possible to the installation place.
• When it is necessary to unpack the unit before carrying in, sufficient care must be taken not to damage it by using nylon slings or the like.
Note) Do not hold on the air inlet grill, air outlet louver or other sections made of plastics.
• When placing the unit on the floor after unpacking, be sure to have its front face at the top.

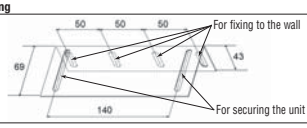
③Carrying-in and installation of the unit (Continued)

ATTENTION:
• Be sure to fix the unit with L-fittings and the fall-prevention fitting.
・Since the unit is tall, secure the unit no sooner than setting it in place.

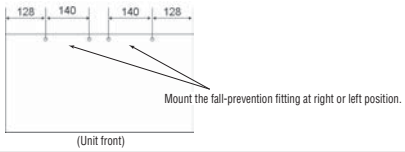
Procedure for preventing the unit from falling



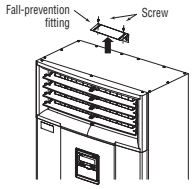
Fall-prevention fitting



Top panel

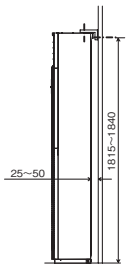
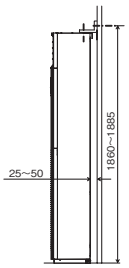


(1) Fixing the unit with the fall-prevention fitting



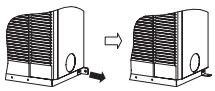
①Loosen screws (2 pcs) and remove the fall-prevention fitting.
②Select a position to fix the fall-prevention fitting as illustrated and fix it to the top of unit and the wall.
・The fixing positon of the fall-prevention fitting is as illastrated below.

Fixing position (Fall-prevention fitting)

Fitting facing upward	Fitting facing downward
	

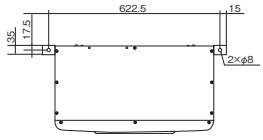
• Dimensions indicate the allowance for adjustment between the unit and the wall or floor.
• Fix the longer side of fitting to the unit.
• When the fitting is faced downward, fix it to the wall first.

(2) Fixing the unit with the L-fittings



①Remove the L-fittings mounted on the unit with screws.
②Turn over the L-fitting and fix it to the unit and either the floor or the wall as illustrated.
・Fixing position of the L-fittings are as illustrated below.

Fixing position (L fitting)



ATTENTION:
• Install the unit on the level.
Inclination must be less than 1°in fore-aft and right-left directions.

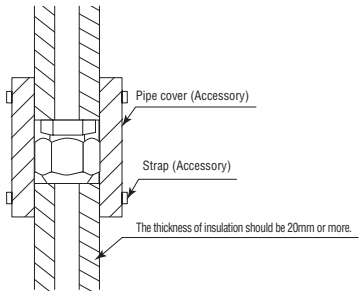
④Refrigerant piping

Caution

- ●Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  - ・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  - ・Do not use thin-walled pipes.
- ●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- ●Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And if air getting into refrigerant circuit, it may cause anomaously high pres and may result in burst, etc.
- ●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- ●Use special tools for R410 refrigerant.

Work procedure

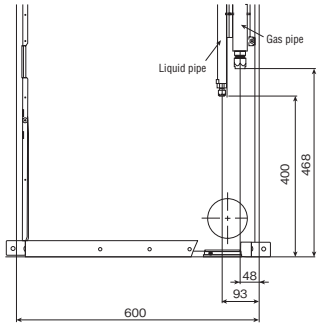
1. Remove the flare nuts and flare caps from the pipes of the indoor unit.
   ※ Make sure to loosen the flare nut by holding the flared male fitting with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out a little at this time, but it is no anomaly.)
   ● Pay attention that the flare nut may pop out.
   (Because it is sometimes pressurized in the indoor unit)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigrant pipes to the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   ● Make sure to loosen the flare nut by holding the flared male fitting with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   ● When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it with a spanner within the specified torque mentioned in the table below.
   Make sure to hold the flared male fitting on the indoor unit side with another spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   ●Make sure to insulate both gas pipes and liquid pipes completely.
   ※Incomplete insulation may cause dew condensation and dew dropping.
4. Refrigerant is pre-charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.



Pipe diameter	Tightening torque N·m
ϕ 6.35	14 to 18
ϕ 9.52	34 to 42
ϕ 12.7	49 to 61
ϕ 15.88	68 to 82
ϕ 19.05	100 to 120

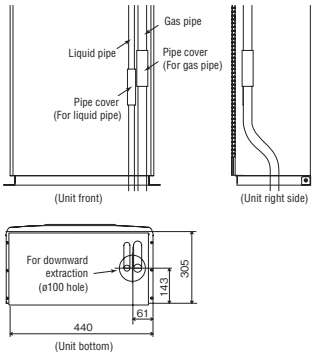
④Refrigerant piping (Continued)

◆ **Pipe and wire extracting position**

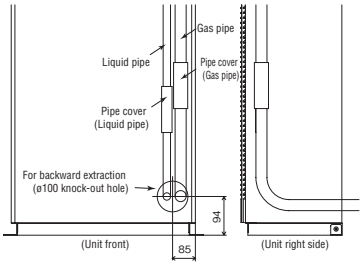


ATTENTION:
- Do not cut off the flange at the hole on the base plate for the downward extraction.

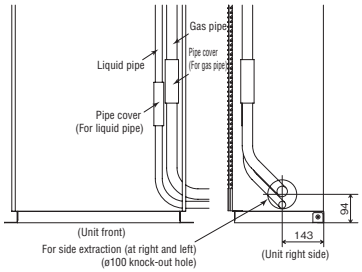
Downward extraction



Backward extraction



Sideward extraction



⑤Drain pipe

⚠WARNING

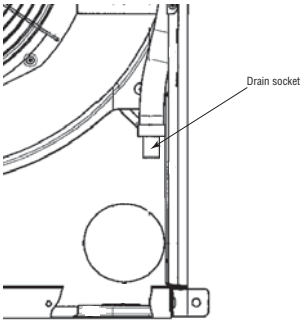
- Do not insert the drain pipe directly in the drain ditch where toxic gases such as sulffuric gas are produced.
  Toxic gas may flow into the room.

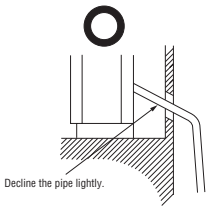
⚠CAUTION

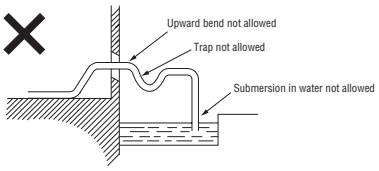
- Install the drain pipe properly according to the installation manu And insulate it to prevent from dew condensation.
  Improper installation of drain pipe may cause damage of furniture drainage water leaked or dew condensation.

Procedure

1. Connect the drain socket to the drain pipe (PV-20) provided at site and fix the joint with adhesive tape, or the like.
2. When the pipe provided at site runs through a room, insulate the pipe with a commercial insulator (Polyethylene foam: Specific gravity 0.03, thickness 15 mm or more) to prevent dewing.







ATTENTION:

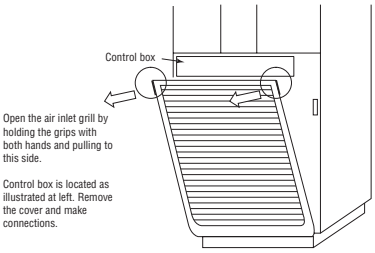
- Insulate the drain pipe to prevent dewing. (Especially in room and unit)
- Incline the drain pipe downward to the outlet (1/50 – 1/100). Upward bend or trap is not allowed on the way.
- Use a commercial hard polyvinyl chloride pipe, PV-20, for the drain pipe.

<Use of adhesive agent is prohibited.>

⑥Wire extracting position and wire connecton

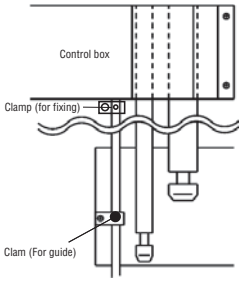
Control box position and power cable connection

- Electric work must be made by qualified electricians according to the "Engineering standards concerning electric equipment", "Extension wiring regulations" and the electric wiring work manual. Be sure to use dedicated electric circuits.
- Make sure to use specified wires for wiring, and connect them securely. Clamp the wires to protect the terminal connection from external force.
- Make sure to protect the unit with the D-type grounding work.
- For details of wiring work, refer to the attached electric wiring work manual.

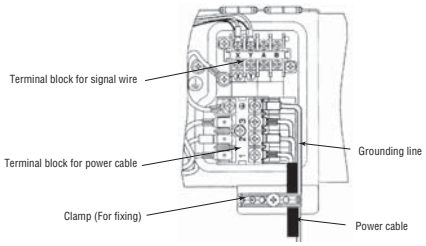


Procedure

①Remove the control box cover (fixed with a screw).
②Introduce wires in the unit and connect securely on the terminals.
③Fix each wire with a clamp (for fixing).
④Install removed parts as they were.



• Make sure to pass the power cable through the clamp (for guide).



⑦Check list after installation

- Check the following items after all installation work completed.

Check if;	Expected trouble	Check
The indoor and outdoor units are fixed securely?	Falling, vibration, noise	
Inspection for gas leakage is done?	Insufficient capacity	
Insulation work is properly done?	Water leakage	
Water is drained properly?	Water leakage	
Supply voltage is same as mentioned in the model name plate?	PCB burnt out, not working at all	
There is mis-wiring or mis-connection of piping?	PCB burnt out, not working at all	
Earth wiring is connected properly?	Electric shock	
Cable size comply with specified size?	PCB burnt out, not working at all	
Any obstacle blocks airflow on air inlet and outlet?	Insufficient capacity	

9.2 Electric wiring work instruction

PGA012D405

Electrical wiring work must be performed by an electrician qualified by a local power provider according to the electrical installation technical standards and interior wiring regulations applicable to the installation site.

Security instructions

- **Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.**
- **The precautionary items mentioned below are distinguished into two levels, ⚠WARNING and ⚠CAUTION .**
  ⚠WARNING : Wrong installation would cause serious consequences such as injuries or death.
  ⚠CAUTION : Wrong installation might cause serious consequences depending on circumstances.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
- **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.
- **Accord with following items. Otherwise, there will be the risks of electric shock and fire caused by overheating or short circuit.**

⚠WARNING

- **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
  Power source with insufficient capacity and improper work can cause electric shock and fire. ❗
- **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
  Loose connections or hold could result in abnormal heat generation or fire. ❗
- **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
  Improper fitting may cause abnormal heat and fire. ❗
- **Use the genuine optional parts. And installation should be performed by a specialist.**
  If you install the unit by yourself, it could cause water leakage, electric shock and fire. ❗
- **Do not repair by yourself. And consult with the dealer about repair.**
  Improper repair may cause water leakage, electric shock or fire. ⃠
- **Consult the dealer or a specialist about removal of the air conditioner.**
  Improper installation may cause water leakage, electric shock or fire. ❗
- **Turn off the power source during servicing or inspection work.**
  If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan. ❗
- **Shut off the power before electrical wiring work.**
  It could cause electric shock, unit failure and improper running. ❗

⚠CAUTION

- **Perform earth wiring surely.**
  Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit. ⏚
- **Earth leakage breaker must be installed.**
  If the earth leakage breaker is not installed, it can cause electric shocks. ❗
- **Make sure to install earth leakage breaker on power source line. (countermeasure thing to high harmonics.)**
  Absence of breaker could cause electric shock. ❗
- **Use the circuit breaker of correct capacity. Circuit breaker should be the one that disconnect all poles under over current.**
  Using the incorrect one could cause the system failure and fire. ❗
- **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
  Connecting the circuit by wire or copper wire could cause unit failure and fire. ⃠
- **Use power source line of correct capacity.**
  Using incorrect capacity one could cause electric leak, abnormal heat generation and fire. ❗
- **Do not mingle solid cord and stranded cord on power source and signal side terminal block.**
  In addition, do not mingle difference capacity solid or stranded cord.
  Inappropriate cord setting could cause loosing screw on terminal block, bad electrical contact, smoke and fire. ⃠
- **Do not turn off the power source immediately after stopping the operation.**
  Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown. ⃠
- **Do not control the operation with the circuit breaker.**
  It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury. ⃠

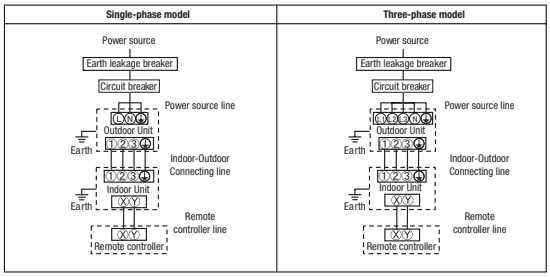
①Electrical Wiring Connection

- Use three-core cable as wiring between indoor and outdoor unit. As for detail, refer to "INSTALLATION MANUAL" of outdoor Unit.
- Set earth of D-type.
- Keep "remote controller line" and "power source line" away from each other on constructing of unit outside.
- Run the lines (power source, remote controller and "between indoor and outdoor unit") upper ceiling through iron pipe or other tube protection to avoid the damage by mouse and so on.
- Do not add cord in the middle of line route (of power source, remote controller and "between indoor and outdoor unit") on outside of unit. If connecting point is flooded, it could cause problem as for electric or communication. (In the case that it is necessary to set connecting point on the way, perform thorough waterproof measurement.)
- Do not connect the power source line [220V/240V/380V/415V] to signal side terminal block. Otherwise, it could cause failure.
- Screw the line to terminal block without any looseness, certainly.
- Do not turn on the switch of power source, before all of line work is done.
- Connection of the line ("Between indoor and outdoor unit", Earth and Remote controller)

①Remove lid of control box before connect the above lines, and connect the lines to terminal block according to number pointed on label of terminal block.
In addition, pay enough attention to confirm the number to lines, because there is electrical polarity except earth line. Furthermore, connect earth line to earth position of terminal block of power source.
②Install earth leakage breaker on power source line. In addition, select the type of breaker for inverter circuit as earth leakage breaker.
③If the function of selected earth leakage breaker is only for earth-fault protection, hand switch (switch itself and type "B" fuse) or circuit breaker is required in series with the earth leakage breaker.
④Install the local switch near the unit.

Cable connection for single unit installation

①As for connecting method of power source, select from following connecting patterns. In principle, do not directly connect power souce line to inside unit.
※ As for exceptional connecting method of power souce, discuss with the power provider of the country with referring to technical documents, and follow its instruction.
②For cable size and circuit breaker selection, refer to the outdoor unit installation manual.



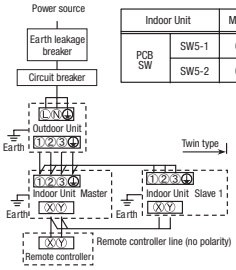
Cable connection for a V multi configuration installation

①Connect the same pairs number of terminal block "①, ②, and ③"and "ⓧandⓨ" between master and slave indoor units.
②Do the same address setting of all inside units belong to same refrigerant system by rotary switch SW2 on indoor unit's PCB (Printed circuit board).
③Set slave indoor unit as "slave 1" through "slave 3" by address switch SW5-1, 5-2 on PCB.
④When the AIR CON NO. button on the remote control unit is pressed after turning on the power, an indoor unit's address number will be displayed. Do not fail to confirm that the connected indoor unit's numbers are displayed on the remote control unit by pressing the ▲ or ▼ button.

Method of setting Master/Slave of indoor unit

(Factory setting: "Master")

Indoor Unit		Master	Slave 1	Slave 2	Slave 3
PCB SW	SW5-1	OFF	OFF	ON	ON
	SW5-2	OFF	ON	OFF	ON



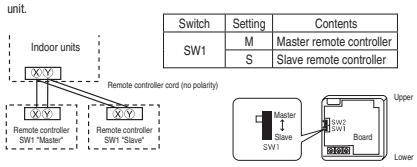
Switch and wiring specification

Refer to the installation manual attached to the outdoor unit.

②Wiring for the remote controller

- For each indoor unit, one more remote controller can be connected in addition to the one which is built in the main unit.

Switch	Setting	Contents
SW1	M	Master remote controller
	S	Slave remote controller

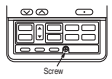


Set SW1 to "Slave" for the slave remote controller. It was factory set to "Master" for shipment.
Note: The setting "Remote controller thermistor enabled" is only selectable with the master remote controller in the position where you want to check room temperature.
The air conditioner operation follows the last operation of the remote controller regardless of the master/ slave setting of it.

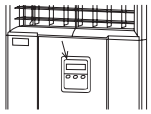
* When setting the remote controller built in the main unit to the "Slave":
Remove the cover and change the setting of switch as follows.

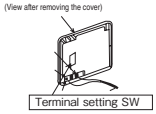
②Wiring for the remote controller (Continued)

① Open the remote controller cover and remove the screw without fail.



② Remove the upper case of remote controller. Attach a flat head screwdriver at the upper part of remote controller and pry lightly. It will come off easily.
Use some cushion to protect the center panel.





③Function Setting by Remote Controller

Installation and wiring of remote controller

①Wiring of remote controller should use 0.3mm² × 2 core wires or cables. (on-site configuration)
②Maximum prolongation of remote controller wiring is 600 m.
If the prolongation is over 100m, change to the size below.
But, wiring in the remote controller case should be under 0.5mm² . Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire connecting section. Be careful about contact failure.

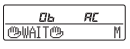
100 - 200m ·····0.5mm² × 2 cores
Under 300m ·····0.75mm² × 2 cores
Under 400m ·····1.25mm² × 2 cores
Under 500m ·····2.0mm² × 2 cores

The indication when power source is supplied

When power source is turned on, the following is displayed on the remote controller until the communication between the remote controller and indoor unit settled.

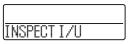
Master remote controller : "WAIT M"
Slave remote controller : "WAIT S"

At the same time, a mark or a number will be displayed for two seconds first.
This is the software's administration number of the remote controller, not an error cord.



※ The left mark is only an example. Other marks may appear.

When remote controller cannot communicate with the indoor unit for half an hour, the below indication willappear.
Check wiring of the indoor unit and the outdoor unit etc.

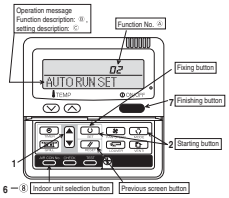


How to set function

1. Stop air-conditioner and press (SET) (MODE) buttons at the same time for over three seconds, and the "FUNCTION SET ▼" will be displayed.

2. Press (SET) button.

3. Make sure which do you want to set, "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).



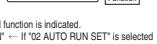
4. Press or button.
Selecct "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).

5. Press (SET) button.

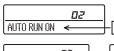
6.【On the occasion of remote controller function selection】

① "DATA LOADING" (Indication with blinking) → Display is changed to "01 GRILLE ↑↓SET".

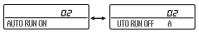
② Press ▲ or ▼ button.
"No. and function"are indicated by turns on the remote controller function table, then you can select from them.
(For example)



③ Press (SET) button.
The current setting of selected function is indicated.
(for example) "AUTO RUN ON" ← If "02 AUTO RUN SET" is selected



④ Press ▲ or ▼ button.
Select the setting.



⑤ Press (SET) button.
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, Set as the same procedure if you want to set continuously ,and if to finish, go to 7.

【On the occasion of indoor unit function selection】

① "DATA LOADING" (Blinking for 2 to 23 seconds to read the data)
↓
Indication is changed to "02 FAN SPEED SET". Go to ②.

[Note]
(1) If plural indoor units are connected to a remote controller, the indication is "I/U 000" (blinking) ← The lowest number of the indoor unit connected is indicated.

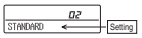
(2) Press ▲ or ▼ button.
Select the number of the indoor unit you are to set
If you select "ALL UNIT ▼", you can set the same setting with all unites.

(3) Press (SET) button.

② Press ▲ or ▼ button.
"No. and function" are indicated by turns on the indoor unit function table, then you can select from them.
(For example)

③Function Setting by Remote Controller (Continued)

③ Press (SET) button.
The current setting of selected function is indicated.
(For example) "STANDARD" ← If "02 FAN SPEED SET" is selected.



④ Press ▲ or ▼ button.
Select the setting.

⑤ Press (SET) button.
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, set as the same procedure if you want to set continuously , and if to finish, go to 7.

※ When plural indoor units are connected to a remote controller, press the AIRCON NO. button, which allows you to go back to the indoor unit selection screen. (example "I/U 000 ▲")

7. Press ON/OFF button.
Setting is finished.

・It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
・During setting, if you press (RESET) button, you return to the previous screen.
・Setting is memorized in the controller and it is saved independently of power failure.

【How to check the current setting】
When you select from "No. and funcion" and press set button by the previous operation, the "Setting" displayed first is the current setting.
(But, if you select "ALL UNIT ▼ ", the setting of the lowest number indoor unit is displayed.)

The functional setting

●The initial function setting for typical using is performed automatically by the indoor unit connected, when remote controller and indoor unit are connected.
As long as they are used in a typical manner, there will be no need to change the initial settings.
If you would like to change the initial setting marked " ○", set your desired setting as for the selected item.
The procedure of functional setting is shown as the following diagram.

Sequence of the function setting is as follows.

The range of temperature setting

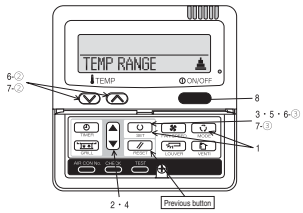
When shipped, the range of set temperature differs depending on the operation mode as below.
Heating : 16~30ûC (55~86ûF)
Except heating (cooling, fan, dry, automatic) : 18~30ûC (62~86ûF)

●Upper limit and lower limit of set temperature can be changed with remote controller.
Upper limit setting: valid during heating operation. Possible to set in the range of 20 to 30ûC (68 to 86ûF).
Lower limit setting: valid except heating (automatic, cooling, fan, dry) Possible to set in the range of 18 to 26ûC (62 to 79ûF).
When you set upper and lower limit by this function, control as below.

1. When ⑫TEMP RANGE SET, remote controller function of function setting mode is "INDN CHANGE" (factory setting),
【If upper limit value is set】
During heating, you cannot set the value exceeding the upper limit.
【If lower limit value is set 】
During operation mode except heating, you cannot set the value below the lower limit.
2. When ⑫ TEMP RANGE SET, remote controller function of function setting mode is "NO INDN CHANGE"
【If upper limit value is set】
During heating, even if the value exceeding the upper limit is set, upper limit value will be sent to the indoor unit.
But, the indication is the same as the temperature set.
【If lower limit value is set 】
During except heating, even if the value lower than the lower limit is set, lower limit value will be sent to the indoor unit.
But, the indication is the same as the temperature set.

●How to set upper and lower limit value
1. Stop the air-conditioner, and press (SET) and (MODE) button at the same time for over three seconds .
The indication changes to "FUNCTION SET ▼".
2. Press ▼ button once, and change to the "TEMP RANGE▲ " indication.
3. Press (SET) button, and enter the temperature range setting mode.
4. Select "UPPER LIMIT ▼" or "LOWER LIMIT▲" by using ▲ ▼ button.
5. Press (SET) button to fix.
6. When "UPPER LIMIT ▼" is selected (valid during heating)
① Indication: " ∨ ∧ SET UP" → "UPPER 30ûC ∨ "
② Select the upper limit value with temperature setting button ∨ ∧. Indication example: "UPPER 26ûC∨ ∧" (blinking)
③ Press (SET) button to fix. Indication example: "UPPER 26ûC" (Displayed for two seconds)
After the fixed upper limit value displayed for two seconds, the indication will return to "UPPER LIMIT ▼".
7. When "LOWER LIMIT ▲" is selected (valid during cooling, dry, fan, automatic)
① Indication: " ∨ ∧ SET UP" → "LOWER 18ûC ∧ "
② Select the lower limit value with temperature setting button ∨ ∧. Indication example: "LOWER 24ûC∨ ∧" (blinking)
③ Press (SET) button to fix. Indication for example: "LOWER 24ûC" (Displayed for two seconds)
After the fixed lower limit value displayed for two seconds, the indication will return to "LOWER LIMIT ▼".
8. Press ON/OFF button to finish.

・It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
・During setting, if you press (RESET) button, you return to the previous screen.



Note 1: Fan setting of "HIGH SPEED"

Fan tap		Indoor unit air flow setting			
FAN SPEED SET	STANDARD	UH - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me
	HIGH SPEED1, 2	UH - UH - Hi - Me	UH - Hi - Me	UH - Me	UH - Hi

Initial function setting of some indoor unit is "HIGH SPEED"

Note 2: As for plural indoor unit, set indoor functions to each master and slave indoor unit.
But only master indoor unit is received the setting change of indoor unit function "05 EXTERNAL INPUT" and "06 PERMISSION / PROHIBISHION".

③Function Setting by Remote Controller (Continued)

[Flow of function setting]

Start : While indoor unit do not operate, press " (SET) " (SET) and " (MODE) " (MODE) button for 3 seconds at the same time.
Finalize : Press " (SET) " (SET) button.
Reset : Press " (RESET) " (RESET) button.
Select : Press ▲ ▼ button.
End : Press ⓘON/OFF button.

It is possible to finish above setting on the way, and unfinished change of setting is unavailable.
" ○ " : Initial settings
" ※ " : Automatic criterion
As for detail, refer to the installation manual of remote controller.

During air-conditioner stopping push (SET) + (MODE) button simultaneously for 3 seconds → FUNCTION SET ▼

Consult the technical data etc for each control details

Record and save the setting

FUNCTION ▼ (Remote controller function)

Function	setting		
01 GRILLE ↑↓ SET	↑↓ INVALID	○	
	50Hz ZONE ONLY		When you use at 50Hz area
	60Hz ZONE ONLY		When you use at 60Hz area
02 AUTO RUN SET	AUTO RUN ON	★	
	AUTO RUN OFF	○	Automatic operation is impossible
03 ▽△ TEMP SW	▽△ VALID	○	
	▽△ INVALID		Temperature setting button is not working
04 MODE SW	MODE VALID	○	
	MODE INVALID		Mode button is not working
05 ⓘ ON/OFF SW	ⓘ VALID	○	
	ⓘ INVALID		On/Off button is not working
06 FAN SPEED SW	FAN VALID	※	
	FAN INVALID	※	Fan speed button is not working
07 LOUVER SW	LOUVER VALID	○	
	LOUVER INVALID	★	Louver button is not working
08 TIMER SW	TIMER VALID	○	
	TIMER INVALID		Timer button is not working
09 SENSOR SET	SENSOR OFF	○	Remote thermistor is not working.
	SENSOR ON		Remote thermistor is working.
	SENSOR +3.0℃		Remote thermistor is working, and to be set for producing +3.0°C increase in temperature.
	SENSOR +2.0℃		Remote thermistor is working, and to be set for producing +2.0°C increase in temperature.
	SENSOR +1.0℃		Remote thermistor is working, and to be set for producing +1.0°C increase in temperature.
	SENSOR -1.0℃		Remote thermistor is working, and to be set for producing -1.0°C increase in temperature.
	SENSOR -2.0℃		Remote thermistor is working, and to be set for producing -2.0°C increase in temperature.
	SENSOR -3.0℃		Remote thermistor is working, and to be set for producing -3.0°C increase in temperature.
10 AUTO RESTART	INVALID	○	
	VALID		
11 VENT LINK SET	NO VENT	○	
	VENT LINK		Connect the Single split series and the VRF series to the indoor board CNT and indoor board CND respectively. If a ventilation device is connected, been geared with the motion of indoor device, the ventilation device is operated/stopped.
	NO VENT LINK		By connecting the ventilation device with the Single split series device to indoor board CNT, the VRF series device to CND, you can operate/stop the ventilation device independently by the handling of ventilation button.
12 TEMP RANGE SET	INDN CHANGE	○	If you change the range of set temperature, the indication of set temperature will vary following the control.
	NO INDN CHANGE		If you change the range of set temperature, the indication of set temperature will not vary following the control, and keep the set temperature.
13 I/U FAN	HI-MID-LO	○	Airflow of fan becomes the three speed of (fan speed icons).
	HI-LO	★	
	HI-MID	★	
	1 FAN SPEED	★	
14 POSITION	4POSITION STOP	★	
	FREE STOP	○	The louver can stop at any position.
15 MODEL TYPE	HEAT PUMP	※	
	COOLING ONLY	※	
16 EXTERNAL CONTROL SET	INDIVIDUAL	○	If you input into the indoor printed circuit board CNT from outside, the indoor device will be operated independently following the input from outside.
	FOR ALL UNITS		If you input into indoor printed circuit board CNT from outside, All units which share the same one remote control network work following the input from outside.
17 ROOM TEMP INDICATION SET	INDICATION OFF	○	
	INDICATION ON		In normal working indication, indoor unit temperature is indicated instead of airflow. (Only the master remote control can be indicated.)
18 ☼INDICATION	INDICATION ON	○	
	INDICATION OFF		Heating preparation indication should not be indicated.
19 ℃/℉ SET	℃	○	Temperature indication is by degree C
	℉		Temperature indication is by degree F

(Indoor unit function) I/U FUNCTION ▲

Only when plural indoor units are connected
Indoor No. selection (Note3): I/U000 ▲, I/U001 ▲▼, I/U002 ▲▼, I/U003 ▲▼, I/U004 ▲▼

If to change re-set with other indoor unit, push AIRCON NO. button, and indoor selection indication (for example: I/U 000) is set back.

Function	setting		
02 FAN SPEED SET	STANDARD	※	
	HIGH SPEED 1	※	(Note2)
	HIGH SPEED 2		
03 FILTER SIGN SET	INDICATION OFF		
	TYPE 1	○	The filter sign is indicated after running for 180 hours.
	TYPE 2		The filter sign is indicated after running for 600 hours.
	TYPE 3		The filter sign is indicated after running for 1000 hours.
	TYPE 4		The filter sign is indicated after running for 1000 hours, then it will be stopped by compulsion after 24 hours.
04 POSITION	4POSITION STOP	★	
	FREE STOP	○	The louver can stop at any positon.
05 EXTERNAL INPUT	LEVEL INPUT	○	
	PULSE INPUT		
06 OPERATION PERMISSION/PROHIBITION	INVALID	○	
	VALID		Make permission/prohibition control of function be in effect.
07 EMERGENCY STOP	INVALID	○	
	VALID		With the VRF series, it is used to stop all indoor units connected with the same outdoor unit immediately. When stop signal is inputed from remote on-off terminal "CNT-6", all indoor units are stopped immediately.
08 ☼ SP OFFSET	OFFSET +3.0℃		To be reset for producing +3.0°C increase in temperature during heating.
	OFFSET +2.0℃		To be reset for producing +2.0°C increase in temperature during heating.
	OFFSET +1.0℃		To be reset for producing +1.0°C increase in temperature during heating.
	NO OFFSET	○	
09 RETURN AIR TEMP	OFFSET +2.0℃		To be reset producing +2.0°C increase in return air temperature of indoor unit.
	OFFSET +1.5℃		To be reset producing +1.5°C increase in return air temperature of indoor unit.
	OFFSET +1.0℃		To be reset producing +1.0°C increase in return air temperature of indoor unit.
	NO OFFSET	○	
	OFFSET -1.0℃		To be reset producing -1.0°C increase in return air temperature of indoor unit.
	OFFSET -1.5℃		To be reset producing -1.5°C increase in return air temperature of indoor unit.
	OFFSET -2.0℃		To be reset producing -2.0°C increase in return air temperature of indoor unit.
10 ☼ FAN CONTROL	LOW FAN SPEED	○	When heating thermostat is off, to be operated with low fan speed. (or with ultra low fan speed in case of some models)
	SET FAN SPEED		When heating thermostat is off, to be operated with set fan speed.
	INTERMITTENCE		When heating thermostat is off, to be operated intermittently.
	FAN OFF		When heating thermostat is off, the fan stops. When the remote thermistor is working, "FAN OFF" is set automatically. Do not set when the indoor unit's thermistor is working.
11 FROST PREVENTION TEMP			Change of indoor heat exchanger temperature to start frost prevention control.
	TEMP HIGH		
	TEMP LOW	○	
12 FROST PREVENTION CONTROL			Working only with the single split series.
	FAN CONTROL ON	○	To control frost prevention, the indoor fan tap is raised.
	FAN CONTROL OFF		
13 DRAIN PUMP LINK	❄💧	○	Drain pump is on during cooling and dry.
	❄💧 AND ☼		Drain pump is on during cooling, dry and heating.
	❄💧 AND ☼ AND ≋		Drain pump is on during cooling, dry, heating and fan.
	❄💧 AND ≋		Drain pump is on during cooling, dry and fan.
14 ❄ FAN REMAINING	NO REMAINING	○	After cooling is stopped the fan does not perform extra operation.
	0.5 HOUR		After cooling is stopped the fan perform extra operation for half an hour.
	1 HOUR		After cooling is stopped the fan perform extra operation for an hour.
	6 HOUR		After cooling is stopped the fan perform extra operation for six hours.
15 ☼ FAN REMAINING	NO REMAINING	○	After heating is stopped or heating thermostat is off, the fan does not perform extra operation.
	0.5 HOUR		After heating is stopped or heating thermostat is off,the fan perform extra operation for half an hour.
	2 HOUR		After heating is stopped or heating thermostat is off,the fan perform extra operation for two hours.
	6 HOUR		After heating is stopped or heating thermostat is off, the fan perform extra operation for six hours.
16 ☼ FAN INTERMITTENCE	NO REMAINING	○	
	20minOFF 5minON		During heating is stopped or heating thermostat is off, the fan perform intermittent operation for five minutes after twenty minutes' off with low airflow.
	5minOFF 5minON		During heating is stopped or heating thermostat is off, the fan perform intermittent operation for five minutes after five minutes' off with low airflow.

ON/OFF button (finished)

Items marked with ★ are not available on the floor standing FDF.
Do not change the initial setting

④Trial operation

The method of trial cooling operation

Operate the remote control unit as follows.

1. Starting a cooling test run.

①Start the system by pressing the ⓘON/OFF button.

②Select " ❄ (Cool)" with the (MODE) button.

③Press the TEST button for 3 seconds or longer.

The screen display will switch to" ❄ TEST RUN ▼ "

④When the (SET) button is pressed while " ❄ TEST RUN ▼ " is indicated, a cooling test run will start.

The screen display will switch to" ❄ TEST RUN ".

2. Ending a cooling test run.

Pressing the ⓘON/OFF button, the (TEMP) button or (MODE) button will end a cooling test run. (Cooling test run will end after 30 minutes pass.)

" ❄ TEST RUN " shown on the screen will go off.

④Trial operation (Continued)

Checking operation data

Operation data can be checked with remote control unit operation.

1. Press the CHECK button.
   The display change " OPER DATA ▼ "
2. Press the (SET) button while
   OPER DATA ▼ " is displayed.
3. When only one indoor unit is connected to remote controller, " DATA LOADING " is displayed (blinking indication during data loading).
   Next, operation data of the indoor unit will be displayed. Skip to step 7.
4. When plural indoor units is connected, the smallest address number of indoor unit among all connected indoor unit is displayed.
   [Example]:
   " SELECT I/U " (blinking 1 seconds)→
   I/U000 ♟ " blinking.
5. Select the indoor unit number you would like to have data displayed with the ▲ ▼ button.
6. Determine the indoor unit number with the (SET) button.
   (The indoor unit number changes from blinking indication to continuous indication)
   I/U000 " (The address of selected indoor unit is blinking for 2 seconds.)
   ↓
   " DATA LOADING " (A blinking indication appears while data loaded.)
   Next, the operation data of the indoor unit is indicated.
7. Upon operation of the ▲ ▼ button, the current operation data is displayed in order from data number 01.
   The items displayed are in the above table.
   ※Depending on models, the items that do not have corresponding data are not displayed.
8. To display the data of a different indoor unit, press the AIR CON NO. button, which allows you to go back to the indoor unit selection screen.
9. Pressing the ⏻ON/OFF button will stop displaying data.
   Pressing the (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.

◎If two (2) remote controllers are connected to one (1) inside unit, only the master controller is available for trial operation and confirmation of operation data. (The slave remote controller is not available.)

Number	Data Item	
01	☼	(Operation Mode)
02	SET TEMP.___℃	(Set Temperature)
03	RETURN AIR___℃	(Return Air Temperature)
04	SENSOR___℃	(Remote Controller Thermistor Temperature)
05	THI-R1___℃	(Indoor Unit Heat Exchanger Thermistor / U Bend)
06	THI-R2___℃	(Indoor Unit Heat Exchanger Thermistor /Capillary)
07	THI-R3___℃	(Indoor Unit Heat Exchanger Thermistor /Gas Header)
08	I/U FANSPEED___	(Indoor Unit Fan Speed)
09	DEMAND___Hz	(Frequency Requirements)
10	ANSWER___Hz	(Response Frequency)
11	I/U EEV____P	(Pulse of Indoor Unit Expansion Value)
12	TOTAL I/U RUN____H	(Total Running Hours of The Indoor Unit)
21	OUTDOOR___℃	(Outdoor Air Temperature)
22	THO-R1___℃	(Outdoor Unit Heat Exchanger Thermistor)
23	THO-R2___℃	(Outdoor Unit Heat Exchanger Thermistor)
24	COMP.___Hz	(Compressor Frequency)
25	HP___MPa	(High Pressure)
26	LP____MPa	(Low Pressure)
27	Td___℃	(Discharge Pipe Temperature)
28	COMP BOTTOM___℃	(Comp Bottom Temperature)
29	CT___AMP	(Current)
30	TARGET SH___℃	(Target Super Heat)
31	SH___℃	(Super Heat)
32	TDSH___℃	(Discharge Pipe Super Heat)
33	PROTECTION No.__	(Protection State No. of The Compressor)
34	O/U FANSPEED___	(Outdoor Unit Fan Speed)
35	63H1	(63H1 On/Off)
36	DEFROST	(Defrost Control On/Off)
37	TOTAL COMP RUN___H	(Total Running Hours of The Compressor)
38	O/U EEV1____P	(Pulse of The Outdoor Unit Expansion Valve EEV1)
39	O/U EEV2____P	(Pulse of The Outdoor Unit Expansion Valve EEV2)

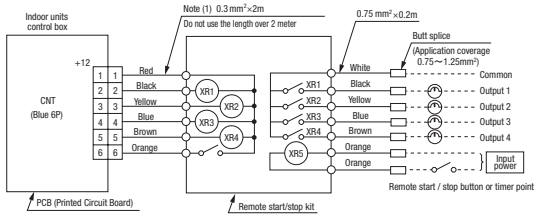
※Depending on outdoor unit model, there are data not shown.

⑤Control mode switching

●The control content of indoor units can be switched in following way.
(☐ is the default setting)

Switch No.	Control Content	
SW2	Indoor unit address (0-Fh)	
SW5-1	Master/Slave Switching (plural /Slave unit Setting)	
SW5-2		
SW6-1～4	Model capacity setting	
SW7－1	ON	Operation check, Drain motor test run
	☐OFF	Normal operation

⑥Function of CNT connector of indoor printed circuit board



●CNT connector (local) vendor model
Connector : Made by molex 5264 - 06
Terminals : Made by molex 5263T

●Function

Output 1	Operation output (there is output when unit is in operation.)
Output 2	Heating output (there is output when operation MODE is HEATING.)
Output 3	Compressor ON output (there is output when compressor is in operation.)
Output 4	Inspection output (there is output when unit is stopped by error.)
Input 5	Remote operation input (Volt-free contact) (Inputted to operate unit)

⑦Troubleshooting

The operation data is saved when the situation of abnormal operation happen, and the data can be confirmed by remote controller.

Error Code of indoor unit

Display on remote controller	LED on indoor circuit board		Content
	red (checking)	green (normal)	
Off	Off	Continuous blinking	Normal
	Off	Off	Fault on power, indoor power off or lack phase
E1	Off	Continuous blinking	Fault on the transmission between indoor circuit board and remote control
	Not sure	Not sure	Indoor computer abnormal
E5	Blinking twice	Continuous blinking	Fault on outdoor-indoor transmission
E6	Blinking once	Continuous blinking	Indoor heat exchange sensor interrupted or short-circuit
E7	Blinking once	Continuous blinking	Indoor air inhaling sensor broken or short-circuit
E8	Blinking once	Continuous blinking	The temperature of heat exchange abnormal
E9	Blinking once	Continuous blinking	Float SW actions (only with FS)
E10	Off	Continuous blinking	Excess number of remote controller connections
E14	Blinking for three times	Continuous blinking	The communication fault for master/slave indoor units
E16	Blinking once	Continuous blinking	Fan motor abnormal
E19	Blinking once	Continuous blinking	Configuration fault on running checking model
E28	Off	Continuous blinking	Remote controller sensor interrupted
Over E30	Off	Continuous blinking	Outdoor unit checking (outdoor circuit board LED checking)

[Operating procedure]

1. Press the CHECK button.
   The display change " OPER DATA ▼ "
2. Once, press the ▼ button, and the display change
   ERROR DATA ♟ ".
3. Press the (SET) button and abnormal operation data mode is started.
4. When only one indoor unit is connected to remote controller, following is displayed.
   ①The case that there is history of abnormal operation.
   → Error code and " DATA LOADING " is displayed.
   [Example]: [E8] (ERROR CODE)
   " DATA LOADING" is displayed (blinking indication during data loading).
   Next, the abnormal operation data of the indoor unit will be displayed. Skip to step 8.
   ②The case that there is not history of abnormal operation.
   → " NO ERROR " is displayed for 3 seconds and this mode is closed.
5. When plural indoor units is connected, following is displayed.
   ①The case that there is history of abnormal operation.
   →Error code and the smallest address number of indoor unit among all connected indoor unit is displayed.
   [Example]: [E8] (ERROR CODE)
   " I/U000 ♟ " blinking
   ②The case that there is not history of abnormal operation.
   →Only address number is displayed.
6. Select the indoor unit number you would like to have data displayed with the ▲ ▼ button.
7. Determine the indoor unit number with the (SET) button.
   [Example]: [E8] (ERROR CODE)
   " I/U000 ♟ " (The address of selected indoor unit is blinking for 2 seconds.)
   ↓
   [E8] " DATA LOADING " (A blinking indication appears while data loaded.)
   Next, the abnormal operation data is indicated.
   If the indoor unit doing normal operation is selected, " NO ERROR " is displayed for 3 seconds and address of indoor unit is displayed.
8. By the ▲ ▼ button, the abnormal operation data is displayed.
   Displayed data item is based on ③ Trial operation .
   ※Depending on models, the items that do not have corresponding data are not displayed.
9. To display the data of a different indoor unit, press the AIR CON No. button, which allows you to go back to the indoor unit slection screen.
10. Pressing the ⏻ON/OFF button will stop displaying data.

Pressing the (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.

◎If two (2) remote controllers are connected to one (1) indoor unit, only the master controller is available for trial operation and confirmation of operation data. (The slave remote controller is not available.)

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9.3 Installation of outdoor unit

(1) Model FDC71VNX

Inverter driven single split PAC
71V
Designed for R410A refrigerant

◎This installation manual deals with outdoor units and general installation specifications only. For indoor units, refer to Page 56.
◎When install the unit, be sure to check whether the selection of installation place, power supply specifications, usage limitation (piping length, height differences between indoor and outdoor units, power supply voltage and etc.) and installation spaces.

SAFETY PRECAUTIONS

- We recommend you to read this "SAFETY PRECAUTIONS" carefully before the installation work in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNING and ⚠CAUTION. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNING and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTION. **These are very important precautions for safety. Be sure to observe all of them without fail.**
- The meaning of "Marks" used here are as shown below.

⃠	Never do it under any circumstance.	❗ ⏚	Always do it according to the instruction

- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user

Check before installation work

- Model name and power source
- Refrigerant piping length
- Piping, wiring and miscellaneous small parts
- Indoor unit installation manual

⚠ WARNING

❗
- **Installation must be carried out by the qualified installer.**
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction.
- **Install the system in full accordance with the instruction manual.**
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- **Use the original accessories and the specified components for installation.**
  If parts other than those prescribed by us are used, it may cause fall of the unit, water leaks, electric shocks, fire, refrigerant leak, substandard performance, control failure and personal injury.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage accordance with ISO5149.**
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- **Ventilate the working area well in the event of refrigerant leakage during installation.**
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- **After completed installation, check that no refrigerant leaks from the system.**
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- **Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.**
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit
- **Install the unit in a location with good support.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.**
  Power supply with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire,
- **Be sure to shut off the power before starting electrical work.**
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- **Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.**
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- **Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.**
  Loose connections or cable mountings can cause anomalous heat production or fire.
- **Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.**
  Incorrect installation may result in overheating and fire.

❗
- **Do not perform brazing work in the airtight room**
  It can cause lack of oxygen.
- **Use the prescribed pipes, flare nuts and tools for R410A.**
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- **Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.**
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- **Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.**
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked into refrigerant circuit, which can cause burst or personal injury due to anomalously high pressure in the refrigerant
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not perform any change of protective device itself or its setup condition**
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- **Be sure to switch off the power supply in the event of installation, inspection or servicing.**
  If the power supply is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- **Consult the dealer or an expert regarding removal of the unit.**
  Incorrect installation can cause water leaks, electric shocks or fire.
- **Stop the compressor before closing valve and disconnecting refrigerant pipes in case of pump down operation.**
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit

⃠
- **Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.**
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- **Do not run the unit with removed panels or protections**
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- **Be sure to fix up the service panels.**
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- **Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.**
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.

⚠ CAUTION

- **Carry out the electrical work for ground lead with care**
  Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting. Never connect the grounding wire to a gas pipe because if gas leaks,it could cause explosion or ignition.
- **Use the circuit breaker for all pole with correct capacity.**
  Using the incorrect circuit breaker, it can cause the unit malfunction and fire.
- **Install isolator or disconnect switch on the power supply wiring in accordance with the local codes and regulations.**
  The isolator should be locked in accordanced with EN60204-1.
- **Take care when carrying the unit by hand.**
  If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.
- **Dispose of any packing materials correctly.**
  Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.
- **Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.**
  If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.
- **Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.**
  Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **Perform installation work properly according to this installation manual.**
  Improper installation can cause abnormal vibrations or increased noise generation.
- **Earth leakage breaker must be installed**
  If the earth leakage breaker is not installed, it can cause fire or electric shocks.
- **Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.**
  Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- **Do not install the unit near the location where leakage of combustible gases can occur.**
  If leaked gases accumulate around the unit, it can cause fire.
- **Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.**
  Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place..
- **When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.**
  If safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- **Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics**
  Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- **Do not install the outdoor unit in a location where insects and small animals can inhabit.**
  Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.
- **Do not use the base flame for outdoor unit which is corroded or damaged due to long periods of operation.**
  Using an old and damage base flame can cause the unit falling down and cause personal injury.
- **Do not install the unit in the locations listed below**
  - Locations where carbon fiber, metal powder or any powder is floating.
  - Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
  - Vehicles and ships
  - Locations where cosmetic or special sprays are often used.
  - Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
  - Locations where any machines which generate high frequency harmonics are used.
  - Locations with salty atmospheres such as coastlines
  - Locations with heavy snow (If installed, be sure to provide base flame and snow hood mentioned in the manual)
  - Locations where the unit is exposed to chimney smoke
  - Locations at high altitude (more than 1000m high)
  - Locations with ammonic atmospheres
  - Locations where heat radiation from other heat source can affect the unit
  - Locations without good air circulation.
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where short circuit of air can occur (in case of multiple units installation)
  - Locations where strong air blows against the air outlet of outdoor unit

  It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- **Do not install the outdoor unit in the locations listed below.**
  - Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
  - Locations where outlet air of the outdoor unit blows directly to an animal or plants. The outlet air can affect adversely to the plant etc.
  - Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
  - Locations where vibration and operation sound generated by the outdoor unit can affect seriously. (on the wall or at the place near bed room)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect surrounding environment and cause a claim
- **Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.**
  It can cause the damage of the items.
- **Do not touch any buttons with wet hands**
  It can cause electric shocks
- **Do not touch any refrigerant pipes with your hands when the system is in operation.**
  During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.
- **Do not clean up the unit with water**
  It can cause electric shocks
- **Do not operate the outdoor unit with any article placed on it.**
  You may incur property damage or personal injure from a fall of the article.
- **Do not step onto the outdoor unit.**
  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. Check connectable indoor unit models in a catalog, etc. (A wrong indoor unit, if connected into the system, will impair proper system operation)

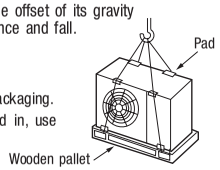
	Dedicated R410A tools
a)	Gauge manifold
b)	Charge hose
c)	Electronic scale for refrigerant charging
d)	Torque wrench
e)	Flare tool
f)	Protrusion control copper pipe gauge
g)	Vacuum pump adapter
h)	Gas leak detector

1. HAULAGE AND INSTALLATION (Take particular care in carrying in or moving the unit, and always perform such an operation with two or more persons.)

⚠CAUTION When a unit is hoisted with slings for haulage, take into consideration the offset of its gravity center position. If not properly balanced, the unit can be thrown off-balance and fall.

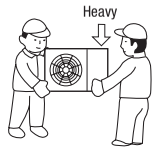
1) Delivery

- Deliver the unit as close as possible to the installation site before removing it from the packaging.
- When some compelling reason necessitates the unpacking of the unit before it is carried in, use nylon slings or protective wood pieces so as not to damage the unit by ropes lifting it.



2) Portage

- The right hand side of the unit as viewed from the front (diffuser side) is heavier. A person carrying the right hand side must take heed of this fact. A person carrying the left hand side must hold with his right hand the handle provided on the front panel of the unit and with his left hand the corner column section.



3) Selection of installation location for the outdoor unit

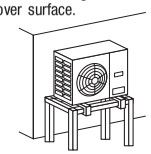
Be sure to select a suitable installation place in consideration of following conditions.

- ○ A place where it is horizontal, stable and can endure the unit weight and will not allow vibration transmittance of the unit.
- ○ A place where it can be free from possibility of bothering neighbors due to noise or exhaust air from the unit
- ○ A place where the unit is not exposed to oil splashes.
- ○ A place where it can be free from danger of flammable gas leakage.
- ○ A place where drain water can be disposed without any trouble.
- ○ A place where the unit will not be affected by heat radiation from other heat source.
- ○ A place where snow will not accumulate.
- ○ A place where the unit can be kept away 5m or more from TV set and/or radio receiver in order to avoid any radio or TV interference.
- ○ A place where good air circulation can be secured, and enough service space can be secured for maintenance and service of the unit safely.
- ○ A place where the unit will not be affected by electromagnetic waves and/or high-harmonic waves generated by other equipment.
- ○ A place where chemical substances like sulfuric gas, chloric gas, acid and alkali (including ammonia), which can harm the unit, will not be generated and not remain.
- ○ A place where strong wind will not blow against the outlet air blow of the unit.

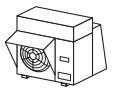
4) Caution about selection of installation location

(1) If the unit is installed in the area where the snow will accumulate, following measures are required.
The bottom plate of unit and intake, outlet may be blocked by snow.

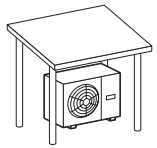
1. Install the unit on the base so that the bottom is higher than snow cover surface.



2. Provide a snow hood to the outdoor unit on site.
Regarding outline of a snow hood, refer to our technical manual.



3. Install the unit under eaves or provide the roof on site.

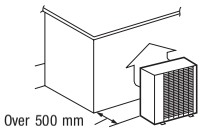


Since drain water generated by defrost control may freeze, following measures are required.

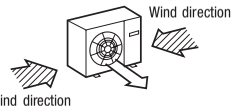
- ● Don't execute drain piping work by using a drain elbow and drain grommets (optional parts). [Refer to Drain piping work.]
- ● Recommend setting Defrost Control (SW3-1) and Snow Guard Fan Control (SW3-2). [Refer to Setting SW3-1, SW3-2.]

(2) If the unit can be affected by strong wind, following measures are required.
Strong wind can cause damage of fan (fan motor), or can cause performance degradation, or can trigger anomalous stop of the unit due to rising of high pressure.

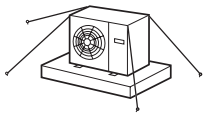
1. Install the outlet air blow side of the unit to face a wall of building, or provide a fence or a windbreak screen.



2. Install the outlet air blow side of the unit in a position perpendicular to the direction of wind.



3. The unit should be installed on the stable and level foundation. If the foundation is not level, tie down the unit with wires.

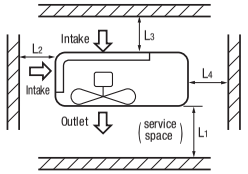


5) Installation space

- ● Walls surrounding the unit in the four sides are not acceptable.
- ● There must be a 1-meter or larger space in the above.
- ● When more than one unit are installed side by side, provide a 250mm or wider interval between them as a service space. In order to facilitate servicing of controllers, please provide a sufficient space between units so that their top plates can be removed easily.
- ● Where a danger of short-circuiting exists, install guide louvers.
- ● When more than one unit are installed, provide sufficient intake space consciously so that short-circuiting may not occur.
- ● Where piling snow can bury the outdoor unit, provide proper snow guards.

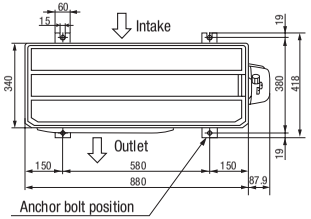
(mm)

Size \ Example installation	71V		
	Ⅰ	Ⅱ	Ⅲ
L1	Open	Open	500
L2	300	250	Open
L3	100	150	100
L4	250	250	250

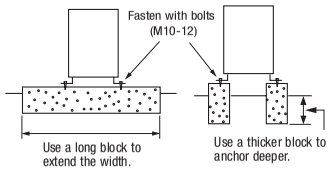


6) Installation

① Anchor bolt fixed position



② Notabilia for installation



- ● In installing the unit, fix the unit's legs with bolts specified on the above.
- ● The protrusion of an anchor bolt on the front side must be kept within 15 mm.
- ● Securely install the unit so that it does not fall over during earthquakes or strong winds, etc.
- ● Refer to the above illustrations for information regarding concrete foundations.
- ● Install the unit in a level area. (With a gradient of 5 mm or less.)
  Improper installation can result in a compressor failure, broken piping within the unit and abnormal noise generation.

7) To run the unit for a cooling operation, when the outdoor temperature is –5°C or lower.

- ● When the outdoor air temperature is -5°C or lower, provide a snow hood to the outdoor unit on site. So that strong wind will not blow against the outdoor heat exchanger directly. Regarding outline of a snow hood, refer to our technical manual.

2. REFRIGERANT PIPING WORK

1) Restrictions on unit installation and use

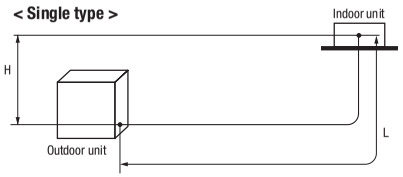
- ● Check the following points in light of the indoor unit specifications and the installation site.
- ● Observe the following restrictions on unit installation and use. Improper installation can result in a compressor failure or performance degradation.

Restrictions		Dimensional restrictions	Marks appearing in the drawing on the right	
			Single type	Twin type
One-way pipe length of refrigerant piping	Model 71V	50m or less	L	L1+L1+L2
Main pipe length			L	L
One-way pipe length after the first branching point		20m or less	—	L1, L2
Difference of pipe length after the first branching point		10m or less	—	L1—L2
Elevation difference between indoor and outdoor units	When the outdoor unit is positioned higher,	30m or less	H	H
	When the outdoor unit is positioned lower,	15m or less	H	H
Elevation difference between indoor units		0.5m or less	—	h

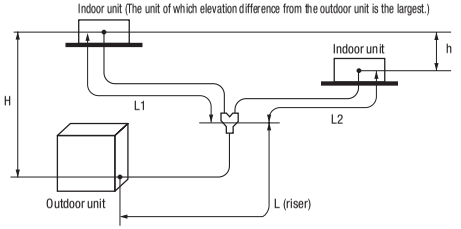
⚠CAUTION

- ● The use restrictions appearing in the table above are applicable to the standard pipe size combinations shown in the table below. Where an existing pipe system is utilized, different one-way pipe length restrictions should apply depending on its pipe size. For more information, please see " 6. UTILIZATION OF EXISTING PIPING."

< Single type >



< Twin type >



2) Determination of pipe size

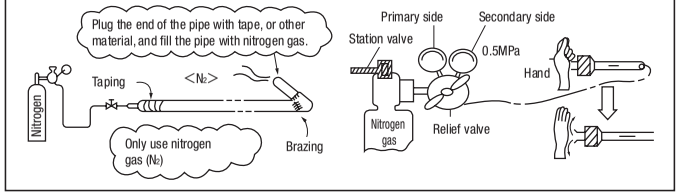
● Determine refrigerant pipe size pursuant to the following guidelines based on the indoor unit specifications.

		Model 71V	
		Gas pipe	Liquid pipe
Outdoor unit connected		ϕ15.88 Flare	ϕ9.52 Flare
Refrigerant piping (branch pipeL)		ϕ15.88	ϕ9.52
In the case of a single type	Indoor unit connected	ϕ15.88	ϕ9.52
	Capacity of indoor unit	Model 71V	
In the case of a twin type	Branching pipe set	DIS-WA1	
	Refrigerant piping (branch pipe L1,L2)	ϕ12.7	ϕ9.52
	Indoor unit connected	ϕ12.7	ϕ6.35
	Capacity of indoor unit	Model 40V×2	

About brazing

Brazing 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.



⚠CAUTION

- ●When the 40V model is connected as an indoor unit, always use a ϕ9.52 liquid pipe for the branch (branching pipe – indoor unit) and a different diameter joint supplied with the branching pipe set for connection with the indoor unit (ϕ6.35 on the liquid pipe side).
  If a ϕ6.35 pipe is used for connection with a branching pipe, a refrigerant distribution disorder may occur, causing one of the indoor units to fall short of the rated capacity.
- ●A riser pipe must be a part of the main. A branching pipe set should be installed horizontally at a point as close to an indoor unit as possible.
  A branching part must be dressed with a heat-insulation material supplied as an accessory.
- ●For the details of installation work required at and near a branching area, see the installation manual supplied with your branching pipe set.

3) Refrigerant pipe wall thickness and material

● Select refrigerant pipes of the table shown on the right wall thickness and material as specified for each pipe size.

Pipe diameter [mm]	6.35	9.52	12.7	15.88
Minimum pipe wall thickness [mm]	0.8	0.8	0.8	1.0
Pipe material*	O-type pipe	O-type pipe	O-type pipe	O-type pipe

NOTE ● Select pipes having a wall thickness larger than the specified minimum pipe thickness.

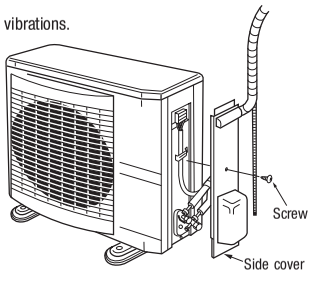
*Phosphorus deoxidized seamless copper pipe C1220T, JIS H3300

4) On-site piping work

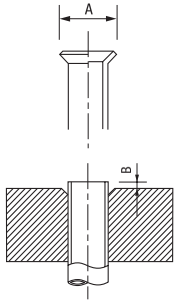
⚠IMPORTANT

● Take care so that installed pipes may not touch components within a unit.
If touching with an internal component, it will generate abnormal sounds and/or vibrations.

How to remove the side cover Please remove the screw of a side cover and remove to the front.



- ● Carry out the on site piping work with the operation valve fully closed.
- ● Give sufficient protection to a pipe end (compressed and blazed, or with an adhesive tape) so that water or foreign matters may not enter the piping.
- ● Bend a pipe to a radius as large as practical.(R100～R150) Do not bend a pipe repeatedly to correct its form.
- ● Flare connection is used between the unit and refrigerant pipe. Flare a pipe after engaging a flare nut onto it. Flare dimensions for R410A are different from those for conventional R407C. Although we recommend the use of flaring tools designed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a protrusion control gauge.
- ● The pipe should be anchored every 1.5m or less to isolate the vibration.
- ●Tighten a flare joint securely with a double spanner.



Flared pipe end: A (mm)

Copper pipe outer diameter	A 0 −0.4
ϕ6.35	9.1
ϕ9.52	13.2
ϕ12.7	16.6
ϕ15.88	19.7

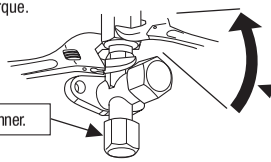
Copper pipe protrusion for flaring: B (mm)

Copper pipe outer diameter	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
ϕ6.35	0～0.5	0.7～1.3
ϕ9.52		
ϕ12.7		
ϕ15.88		

⚠ CAUTION **Do not apply force beyond proper fastening torque in tightening the flare nut.**

Fix both liquid and gas service valves at the valve main bodies as illustrated on the right, and then fasten them, applying appropriate fastening torque.

Operation valve size (mm)	Tightening torque (N-m)	Tightening angle (°)	Recommended length of a 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



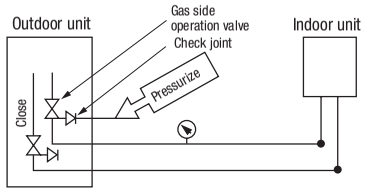
Do not hold the valve cap area with a spanner.

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.

5) Air tightness test

① Although outdoor and indoor units themselves have been tested for air tightness at the factory, check the connecting pipes after the installation work for air tightness from the operation valve's check joint equipped on the outdoor unit side. While conducting a test, keep the operation valve shut all the time.
a) Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes 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 fall 1°C, the pressure also fall 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.

② In conducting an air-tightness test, use nitrogen gas and pressurize the system with nitrogen gas from the gas side. Do not use a medium other than nitrogen gas under any circumstances.



6) Evacuation

<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.

Airtighteness test completed
↓
Vacuuming begins
Run the vacuum pump for at least one hour after the vacuum gauge shows -101kPa or lower. (-755mmHg or lower)
↓
Vacuuming completed
Confirm that the vacuum gauge indicator does not rise even if the system is left for one hour or more.
↓
Vacuum gauge check
↓
Fill refrigerant

Pay attention to the following points in addition to the above for the R410A and compatible machines.

○To prevent a different oil from entering, 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.

7) Additional refrigerant charge

(1) Calculate a required refrigerant charge volume from the following table.

	Standard refrigerant charge volume (kg)	Pipe length for standard refrigerant charge volume (m)	Additional charge volume (kg) per meter of refrigerant piping (liquid pipe ϕ6.35)	Refrigerant volume charged for shipment at the factory (kg)	Installation's pipe length (m) covered without additional refrigerant charge
Model 71V	2.35	20	0.06	2.95	30

● This unit contains factory charged refrigerant covering 30m of refrigerant piping and additional refrigerant charge on the installation site is not required for an installation with up to 30m refrigerant piping. When refrigerant piping exceeds 30m, additionally charge an amount calculated from the pipe length and the above table for the portion in excess of 30m.
● When refrigerant piping is shorter than 3m, reduce refrigerant by 1kg from the factory charged volume and adjust to 1.95kg.
● If an existing pipe system is used, a required refrigerant charge volume will vary depending on the liquid pipe size. For further information, please see "6. UTILIZATION OF EXISTING PIPING."

Formula to calculate the volume of additional refrigerant required

Additional charge volume (kg) = { Main pipe length (m) – Length covered without additional charge 30 (m) } x 0.06 (kg/m) + Total length of branch pipes (m) x 0.06 (kg/m)

*When an additional charge volume calculation result is negative, it is not necessary to charge refrigerant additionally.

● For an installation measuring 3m or longer, but not more than 20m, in pipe length, please charge the standard refrigerant charge volume, when you recharge refrigerant after servicing etc.
● When refrigerant piping is shorter than 3m, recharge 1.95kg of refrigerant.
Ex.) For a 10m installation, charge 2.35 kg of refrigerant.
For a 25m installation, charge "2.35 + (25-20) x 0.06 = 2.65 kg."

(2) Charging refrigerant

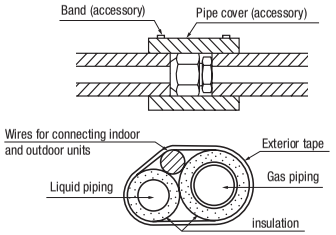
● Since R410A refrigerant must be charged in the liquid phase, you should charge it, keeping the container cylinder upside down or using a refrigerant cylinder equipped with a siphon tube.
● Charge refrigerant always from the liquid side service port with the operation valve shut. When you find it difficult to charge a required amount, fully open the outdoor unit valves on both liquid and gas sides and charge refrigerant from the gas (suction) side service port, while running the unit in the cooling mode. In doing so, care must be taken so that refrigerant may be discharged from the cylinder in the liquid phase all the time. When the cylinder valve is throttled down or a dedicated conversion tool to change liquid-phase refrigerant into mist is used to protect the compressor, however, adjust charge conditions so that refrigerant will gasify upon entering the unit.
● In charging refrigerant, always charge a calculated volume by using a scale to measure the charge volume.
● When refrigerant is charged with the unit being run, complete a charge operation within 30 minutes. Running the unit with an insufficient quantity of refrigerant for a long time can cause a compressor failure.

NOTE Put down the refrigerant volume calculated from the pipe length onto the caution label attached on the back side of the service panel.

8) Heating and condensation prevention

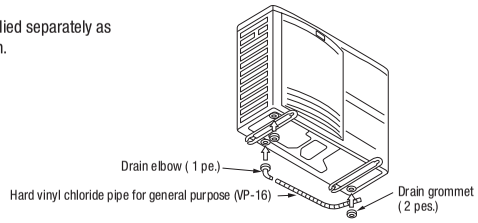
(1) Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.
- Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.

(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.
- All gas pipes must be securely heat insulated in order to prevent damage from dripping water that comes from the condensation formed on them during a cooling operation or personal injury from burns because their surface can reach quite a high temperature due to discharged gas flowing inside during a heating operation.
- Wrap indoor units' flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).
- 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.
- Although it is verified in a test that this air conditioning unit shows satisfactory performance under JIS condensation test conditions, **both gas and liquid pipes need to be dressed with 20 mm or thicker heat insulation materials above the ceiling where relative humidity exceeds 70%.**



3. DRAIN PIPING WORK

● Execute drain piping by using a drain elbow and drain grommets supplied separately as optional parts, where water drained from the outdoor unit is a problem.



○ There are 3 drain holes provided on the bottom plate of an outdoor unit to discharge condensed water.
○ When condensed water needs to be led to a drain, etc., install the unit on a flat base (supplied separately as an optional part) or concrete blocks.
○ Connect a drain elbow as shown in the illustration and close the other two drain holes with grommets.

4. ELECTRICAL WIRING WORK For details of electrical cabling, refer to the indoor unit installation manual.

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.

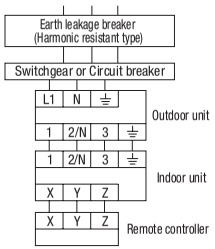
- Do not use any supply cord lighter than one specified in parentheses for each type below.
  - braided cord (code designation 60245 IEC 51),
  - ordinary tough rubber sheathed cord (code designation 60245 IEC 53)
  - flat twin tinsel cord (code designation 60227 IEC 41);

  Do not use anything lighter than polychloroprene sheathed flexible cord (code designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.
- Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire. If impropery grounded, an electric shock or malfunction may result.
- A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.
- The installation of an impulse withstanding type earth leakage breaker is necessary. A failure to install an earth leakage breaker can result in an acccident such as an electric shock or a fire.
- Do not turn on the power until the electrical work is completeted .
- Do not use a condensive capacitor for power factor improvement under any circumstances. (It dose not improve power factor, while it can cause an abnormal overheat accident)
- For power supply cables, use conduits.
- Do not lay electronic control cables (remote control and signaling wires) and other cables together outside the unit. Laying them together can result in the malfunctioning or a failure of the unit due to electric noises.
- Fasten cables so that may not touch the piping, etc.
- When cables are connected, 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.)
- Always use a three-core cable for an indoor-outdoor connecting cable. Never use a shield cable.

Power cable, indoor-outdoor connecting wires

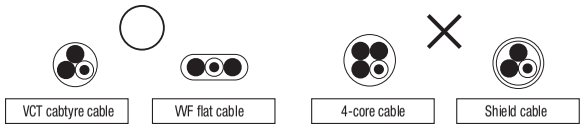
● Always perform grounding system installation work with the power cord unplugged.

⚠ CAUTION Always use an earth leakage circuit breaker designed for inverter circuits to prevent a faulty operation.

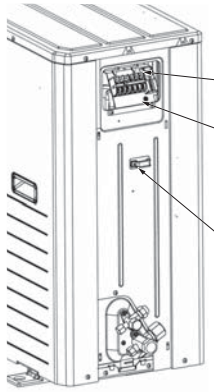


Model	Power source	Power cable thickness (mm^2)	MAX. over current (A)	Cable length (m)	Grounding wire thickness	Indoor-outdoor wire thickness x number
71V	Single phase 3 wire 220-240V 50Hz	3.5	17	21	ϕ1.6mm	ϕ1.6mm x 3

●The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
●Switchgear or Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
●The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, follow the internal cabling regulations. Adapt it to the regulation in effect in each country.



● Connect a pair bearing a common terminal number with an indoor-outdoor connecting wire.
● In cabling, fasten cables securely with cable clamps so that no external force may work on terminal connections.
● Grounding terminals are provided in the control box.



Power source, signal line and ground terminal block

Grounding terminal

○ Do not connect to the grounding wire from another unit, but install a dedicated wire up to the grounding wire from the distribution board.

Wiring clamp

○ Fasten cables and protect the terminal connections from external force.

Wiring diagram

○ It is attached on the back side of the service panel.

5. TEST RUN

⚠ WARNING

- Before conduct a test run, do not fail to make sure that the operation valves are closed.
- Turn on power 6 hours prior to a test run to energize the crank case heater.
- In case of the first operation after turning on power, even if the unit does not move for 30 minutes, it is not a breakdown.
- Always give a 3-minute or longer interval before you start the unit again whenever it is stopped.
- Removing the service panel will expose high-voltage live parts and high-temperature parts, which are quite dangerous. Take utmost care not to incur an electric shock or burns. Do not leave the unit with the service panel open.

} A failure to observe these instructions can result in a compressor breakdown.

⚠ CAUTION

- When you operate switches for on-site setting, be careful not to touch a live part.
- You cannot check discharge pressure from the liquid operation valve charge port.
- The 4-way valve (20S) is energized during a heating operation.
- When power supply is cut off to reset the unit, give 3 or more minutes before you turn on power again after power is cut off. If this procedure is not observed in turning on power again, "E-5" (Communication error) may occur.

About insulation resistance

- An insulation resistance value may drop to several M ohms immediately after installation or when the unit is left for a long time without power, because refrigerant is gathered in the compressor. When the earth-leakage breaker is actuated due to low insulation resistance, please check the following:

(1) Check whether a normal insulation resistance value is restored about 6 hours after power is turned. Turning on power will energize the compressor and heat it to evaporate refrigerant gathered in it.
(2) Check whether the earth-leakage breaker is a harmonic resistant type.
This unit is equipped with an inverter and therefore, the use of a harmonic resistant type earth-leakage breaker is necessary to prevent a false actuation.

1) Test run method

Please remove a side cover.

(1) A test run can be initiated from an outdoor unit by using SW5-4 and SW5-4 for on-site setting.
(2) Switching SW3-3 to ON will start the compressor.
(3) The unit will start a cooling operation, when SW5-4 is OFF, or a heating operation, when SW5-4 is ON.
(4) **Do not fail to switch SW5-3 to OFF when a test run is completed.**

※ **In case of the first operation after turning on the power supply, when the unit runs in the cooling mode at outside temperature 5°C or lower, it automatically changes into the cooling mode after it runs in the heating mode for 10 minutes.**

SW-3-3	SW-3-4	
ON	OFF	Cooling during a test run
	ON	Heating during a test run
OFF	—	Normal or After the test operation

2) Checking the state of the unit in operation

Please remove a service panel.

Use check joints provided on the piping before and after the four-way valve installed inside the outdoor unit for checking discharge pressure and suction pressure.
As indicated in the table shown on the right, pressure detected at each point will vary depending on whether a cooling or heating operation has been selected.

	Check joint of the pipe	Charge port of the gas operation valve
Cooling operation	Discharge pressure (High pressure)	Suction pressure (Low pressure)
Heating operation	Suction pressure (Low pressure)	Discharge pressure (High pressure)

3) Setting SW3-1, SW3-2.

Please remove a service panel.

(1) Defrost control switching (SW3-1)
- ·When this switch is turned ON, the unit will run in the defrost mode more frequently.
- ·Set this switch to ON, when installed in a region where outdoor temperature falls below zero during the season the unit is run for a heating operation.

(2) Snow guard fan control (SW3-2)
- ·When this switch is turned on, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3℃ or lower and the compressor is not running.
- ·When the unit is used in a very snowy country, set this switch to ON.

4) Failure diagnosis in a test run

Error indicated on the remote control unit	Printed circuit board LED(The cycles of 5 seconds)		Failure event	Action
	Red LED	Green LED		
E34	Blinking once	Blinking continuously	Open phase	Check power cables for loose contact or disconnection
E40	Blinking once	Blinking continuously	63H1 actuation or operation with operation valves shut (occurs mainly during a heating operation)	1. Check whether the operation valves are open. 2. If an error has been canceled when 3 minutes have elapsed since a compressor stop, you can restart the unit by effecting Check Reset from the remote control unit.
E49	Blinking once	Blinking continuously	Low pressure error or operation with operation valves shut (occurs mainly during a cooling operation)	

- If an error code other than those listed above is indicated, refer to the wiring diagram of the outdoor unit and the indoor unit.

5) The state of the electronic expansion valve.

The following table illustrates the steady states of the electronic expansion valve.

	When power is turned on	When the unit comes to a normal stop		When the unit comes to an abnormal stop	
		During a cooling operation	During a heating operation	During a cooling operation	During a heating operation
Valve for a cooling operation	Complete shut position	Complete shut position	Full open position	Full open position	Full open position
Valve for a heating operation	Full open position	Full open position	Complete shut position	Full open position	Full open position

6) Heed the following on the first operation after turning on the circuit breaker.

This outdoor unit may start in the standby mode (waiting for a compressor startup), which can continue up to 30 minutes, to prevent the oil level in the compressor from lowering on the first operation after turning on the circuit breaker. If that is the case, do not suspect a unit failure.

Items to checkbefore a test run

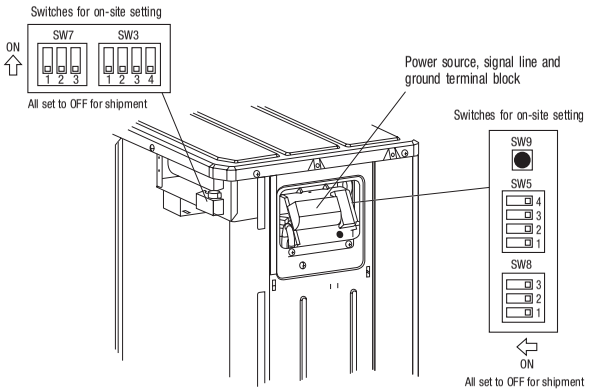
- When you leave the outdoor unit with power supplied to it, be sure to close the panel.

Item No.used in the installation manual	Item	Check item	Check
2	Refrigerant plumbing	If brazed, was it brazed under a nitrogen gas flow?	
		Were air-tightness test and vacuum extraction surely performed?	
		Are heat insulation materials installed on both liquid and gas pipes?	
		Are operation valves surely opened for both liquid and gas systems?	
		Have you recorded the additional refrigerant charge volume and refrigerant pipe length on the panel's label?	
4	Electric wiring	Is the unit free of cabling errors such as uncompleted connection, an absent or reversed phase?	
		Are properly rated electrical equipments used for circuit breakers and cables?	
		Doesn't cabling cross-connect between units, where more than one unit are installed?	
		Aren't indoor-outdoor signal wires connected to remote control wires?	
		Do indoor-outdoor connecting cables connect between the same terminal numbers?	
		Are either VCT cabtyre cables or WF flat cables used for indoor-outdoor connecting cables?	
		Does grounding satisfy the D type grounding (type III grounding) requirements?	
		Is the unit grounded with a dedicated grounding wire not connected to another unit's grounding wire?	
		Are cables free of loose screws at their connection points?	
		Are cables held down with cable clamps so that no external force works onto terminal connections?	
—	Indoor unit	Is indoor unit installation work completed?	
		Where a face cover should be attached onto an indoor unit, is the face cover attached to the indoor unit?	

Test run procedure

- Always carry out a test run and check the following in order as listed.

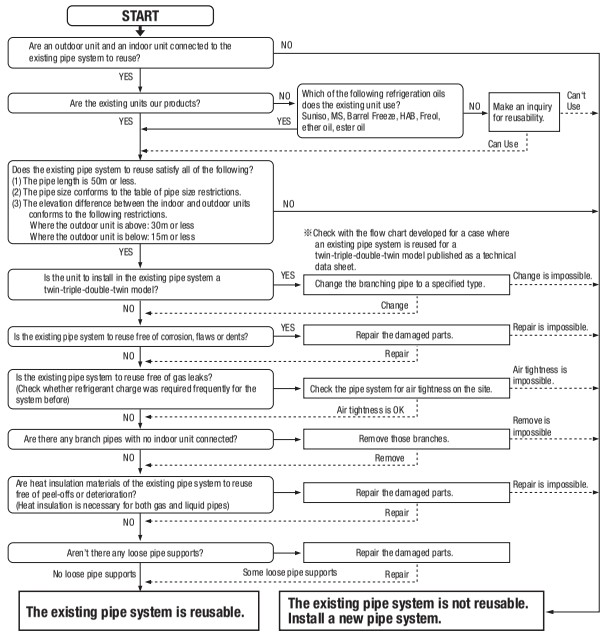
Turn	The contents of operation	Check
①	Open the gas side operation valve fully.	
②	Open the liquid side operation valve fully.	
③	Close the panel.	
④	Where a remote control unit is used for unit setup on the installation site, follow instructions for unit setup on the installation site with a remote control unit.	
⑤	SW5-3 / SW5-4 OFF: the unit will start a cooling operation.	
	SW5-3 / SW5-4 ON: the unit will start a heating operation.	
⑥	When the unit starts operation, press the wind direction button provided on the remote control unit to check its operation.	
⑦	Place your hand before the indoor unit's diffuser to check whether cold (warm) winds come out in a cooling (heating) operation.	
⑧	Make sure that a red LED is not blinking.	
⑨	When you complete the test run, please turn on SW5-3 for 1 second and be sure to end a test run.	
⑩	Where options are used, check their operation according to the respective instruction manuals.	



※1 Do not operate SW3-3, SW5-1, SW5-2, SW8.
※2 Refer to TECHNICAL MANUAL about SW9. (Pump down SW)

6. UTILIZATION OF EXISTING PIPING.

Check whether an existing pipe system is reusable or not by using the following flow chart.



⚠ WARNING <Where the existing unit can be run for a cooling operation.>

Carry out the following steps with the excising unit (in the order of (1), (2), (3) and (4))

(1) Run the unit for 30 minutes for a cooling operation.
(2) Stop the indoor fan and run the unit for 3 minutes for a cooling operation (returning liquid)
(3) Close the liquid side operation valve of the outdoor unit and pump down (refrigerant recovery)
(4) Blow with nitrogen gas. ※ If discolored refrigeration oil or any foreign matters is discharged by the blow, wash the pipe system or install a new pipe system.

- For the flare nut, do not use the old one, but use the one supplied with the outdoor unit. Process a flare to the dimensions specified for R410A.
- **Turn on-site setting switch SW8-1** to the ON position. (Where the gas pipe size is ϕ19.05)

<Table of pipe size restrictions>

◎:Standard pipe size ○:Usable △:Restricted to shorter pipe length limits Cool↓: Cooling capacity drop

Additional charge volume per meter of pipe		0.06kg/m		0.08kg/m
Pipe size	Liquid pipe	ϕ9.52	ϕ9.52	ϕ12.7
	Gas pipe	ϕ12.7	ϕ15.88	ϕ15.88
71V	Usability	Cool↓	◎	△
	Maximum one-way pipe length	35	50	25
	Length covered without additional charge	30	30	15

- **The pipe length should be at least 3m. If the pipe length is shorter than 3m, the quantity of refrigerant needs to be reduced. Please consult with our distributor in the area, if you need to recover refrigerant and charge it again.**
- Any combinations of pipe sizes not listed in the table are not usable.

<Pipe system after the branching pipe>

◎:Standard pipe size ○:Usable

Additional charging amount of refrigerant per 1m			0.06kg/m	
Pipe size	Liquid pipe		ϕ9.52	
	Gas pipe		ϕ12.7	ϕ15.88
Model	Combination type	Combination of capacity		
FDC71	Twin	40+40	◎	○

- Any combinations of pipe sizes not listed in the tableare not usable.

<The model types of existing units of which branching pipes are reusable.>

The branching pipes used with models other than those listed above are not reusable.

Use our genuine branching pipes for R410A.

Formula to calculate additional charge volume

Additional charge volume (kg) = {Main pipe length (m) − Length covered without additional charge shown in the table (m)} × Additional charge volume per meter of pipe shown in the table (kg/m) + Total length of branch pipes (m)× Additional charge volume per meter of pipe shown in the table (kg/m)

※ If you obtain a negative figure as a result of calculation, no additional refrigerant needs to be charged.

Example) When an 71V (single installation) is installed in a 30m long existing pipe system (liquid ϕ12.7, gas ϕ15.88), the quantity of refrigerant to charge additionally should be (30m-15m) x 0.08kg/m = 1.2 kg.

Example) When an 71V (twin installation) is installed in a 30m long existing pipe system (main pipe length 20m, liquid ϕ12.7, gas ϕ15.88; pipe length after branching pipe 5m x 2, liquid ϕ9.52, gas ϕ12.7), the quantity of refrigerant to charge additionally should be (20m-15m) x 0.08kg/m + 5m x 2 x 0.06kg/m = 1.0 kg.

<Where the existing unit cannot be run for a cooling operation.>

Wash the pipe system or install a new pipe system.

- If you choose to wash the pipe system, contact our distributor in the area.

(2) Models FDC100～140VN, FDC100～140VS
FDC100～140VNX, FDC100～140VSX

PSB012D955F

Inverter driven single split PAC
100VN～140VN,100VS～140VS
100VNX～140VNX,100VSX～140VSX
Designed for R410A refrigerant

◎This installation manual deals with outdoor units and general installation specifications only. For indoor units, refer to Page 56.
◎When install the unit, be sure to check whether the selection of installation place, power supply specifications, usage limitation (piping length, height differences between indoor and outdoor units, power supply voltage and etc.) and installation spaces.

SAFETY PRECAUTIONS

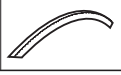
- We recommend you to read this "SAFETY PRECAUTIONS" carefully before the installation work in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNING and ⚠CAUTION. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNING and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTION. **These are very important precautions for safety. Be sure to observe all of them without fail.**
- The meaning of "Marks" used here are as shown below.

⃠	Never do it under any circumstance.	❗	Always do it according to the instruction

- For 3 phase power source outdoor unit,EN61000-3-2 is not applicable if consent by the utility company or nortification to the utility company is given before usage.
- 3phase power source unit, both indoor and outdoor, is suitable for installation in a commercial and light industrial environment. If installed as a house-hold appliance it could cause electromagnetic interference.
- 5 and 6 HP units of single phase power source are equipment complying with IEC 61000-3-12.
- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user

Check before installation work

[Accessory]

Edging		1 piece	knock-out hole protection

- Model name and power source
- Refrigerant piping length
- Piping, wiring and miscellaneous small parts
- Indoor unit installation manual

⚠ WARNING

- **Installation must be carried out by the qualified installer.**
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction.
- **Install the system in full accordance with the instruction manual.**
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- **Use the original accessories and the specified components for installation.**
  If parts other than those prescribed by us are used, it may cause fall of the unit, water leaks, electric shocks, fire, refrigerant leak, substandard performance, control failure and personal injury.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage accordance with ISO5149.**
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- **Ventilate the working area well in the event of refrigerant leakage during installation.**
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- **After completed installation, check that no refrigerant leaks from the system.**
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- **Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.**
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit
- **Install the unit in a location with good support.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.**
  Power supply with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire,
- **Be sure to shut off the power before starting electrical work.**
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- **Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.**
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- **Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.**
  Loose connections or cable mountings can cause anomalous heat production or fire.
- **Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.**
  Incorrect installation may result in overheating and fire.
- **Do not perform brazing work in the airtight room**
  It can cause lack of oxygen.
- **Use the prescribed pipes, flare nuts and tools for R410A.**
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- **Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.**
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- **Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.**
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked into refrigerant circuit, which can cause burst or personal injury due to anomalously high pressure in the refrigerant
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not perform any change of protective device itself or its setup condition**
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- **Be sure to switch off the power supply in the event of installation, inspection or servicing.**
  If the power supply is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- **Consult the dealer or an expert regarding removal of the unit.**
  Incorrect installation can cause water leaks, electric shocks or fire.
- **Stop the compressor before closing valve and disconnecting refrigerant pipes in case of pump down operation.**
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit
- **Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.**
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- **Do not run the unit with removed panels or protections**
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- **Be sure to fix up the service panels.**
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- **Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.**
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.

⚠ CAUTION

- **Carry out the electrical work for ground lead with care**
  Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting. Never connect the grounding wire to a gas pipe because if gas leaks,it could cause explosion or ignition.
- **Use the circuit breaker for all pole with correct capacity.**
  Using the incorrect circuit breaker, it can cause the unit malfunction and fire.
- **Install isolator or disconnect switch on the power supply wiring in accordance with the local codes and regulations.**
  The isolator should be locked in accordanced with EN60204-1.
- **Take care when carrying the unit by hand.**
  If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.
- **Dispose of any packing materials correctly.**
  Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.
- **Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.**
  If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.
- **Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.**
  Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **Perform installation work properly according to this installation manual.**
  Improper installation can cause abnormal vibrations or increased noise generation.
- **Earth leakage breaker must be installed**
  If the earth leakage breaker is not installed, it can cause fire or electric shocks.
- **Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.**
  Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- **Do not install the unit near the location where leakage of combustible gases can occur.**
  If leaked gases accumulate around the unit, it can cause fire.
- **Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.**
  Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place..
- **When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.**
  If safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- **Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics**
  Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- **Do not install the outdoor unit in a location where insects and small animals can inhabit.**
  Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.
- **Do not use the base flame for outdoor unit which is corroded or damaged due to long periods of operation.**
  Using an old and damage base flame can cause the unit falling down and cause personal injury.
- **Do not install the unit in the locations listed below**
  - Locations where carbon fiber, metal powder or any powder is floating.
  - Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
  - Vehicles and ships
  - Locations where cosmetic or special sprays are often used.
  - Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
  - Locations where any machines which generate high frequency harmonics are used.
  - Locations with salty atmospheres such as coastlines
  - Locations with heavy snow (if installed, be sure to provide base flame and snow hood mentioned in the manual)
  - Locations where the unit is exposed to chimney smoke
  - Locations at high altitude (more than 1000m high)
  - Locations with ammonic atmospheres
  - Locations where heat radiation from other heat source can affect the unit
  - Locations without good air circulation.
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where short circuit of air can occur (in case of multiple units installation)
  - Locations where strong air blows against the air outlet of outdoor unit

  It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- **Do not install the outdoor unit in the locations listed below.**
  - Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
  - Locations where outlet air of the outdoor unit blows directly to an animal or plants. The outlet air can affect adversely to the plant etc.
  - Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
  - Locations where vibration and operation sound generated by the outdoor unit can affect seriously. (on the wall or at the place near bed room)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect surrounding environment and cause a claim
- **Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.**
  It can cause the damage of the items.
- **Do not touch any buttons with wet hands**
  It can cause electric shocks
- **Do not touch any refrigerant pipes with your hands when the system is in operation.**
  During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.
- **Do not clean up the unit with water**
  It can cause electric shocks
- **Do not operate the outdoor unit with any article placed on it.**
  You may incur property damage or personal injure from a fall of the article.
- **Do not step onto the outdoor unit.**
  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. Check connectable indoor unit models in a catalog, etc. (A wrong indoor unit, if connected into the system, will impair proper system operation)

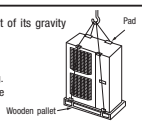
	Dedicated R410A tools
a)	Gauge manifold
b)	Charge hose
c)	Electronic scale for refrigerant charging
d)	Torque wrench
e)	Flare tool
f)	Protrusion control copper pipe gauge
g)	Vacuum pump adapter
h)	Gas leak detector

1. HAULAGE AND INSTALLATION (Take particular care in carrying in or moving the unit, and always perform such an operation with two or more persons.)

⚠CAUTION When a unit is hoisted with slings for haulage, take into consideration the offset of its gravity center position.
If not properly balanced, the unit can be thrown off-balance and fall.

1) Delivery

- Deliver the unit as close as possible to the installation site before removing it from the packaging.
- When some compelling reason necessitates the unpacking of the unit before it is carried in, use nylon slings or protective wood pieces so as not to damage the unit by ropes lifting it.



2) Portage

- The right hand side of the unit as viewed from the front (diffuser side) is heavier. A person carrying the right hand side must take heed of this fact. A person carrying the left hand side must hold with his right hand the handle provided on the front panel of the unit and with his left hand the corner column section.

3) Selection of installation location for the outdoor unit

Be sure to select a suitable installation place in consideration of following conditions.

- ○ A place where it is horizontal, stable and can endure the unit weight and will not allow vibration transmittance of the unit.
- ○ A place where it can be free from possibility of bothering neighbors due to noise or exhaust air from the unit
- ○ A place where the unit is not exposed to oil splashes.
- ○ A place where it can be free from danger of flammable gas leakage.
- ○ A place where drain water can be disposed without any trouble.
- ○ A place where the unit will not be affected by heat radiation from other heat source.
- ○ A place where snow will not accumulate.
- ○ A place where the unit can be kept away 5m or more from TV set and/or radio receiver in order to avoid any radio or TV interference.
- ○ A place where good air circulation can be secured, and enough service space can be secured for maintenance and service of the unit safely.
- ○ A place where the unit will not be affected by electromagnetic waves and/or high-harmonic waves generated by other equipment.
- ○ A place where chemical substances like sulfuric gas, chloric gas, acid and alkali (including ammonia), which can harm the unit, will not be generated and not remain.
- ○ A place where strong wind will not blow against the outlet air blow of the unit.

4) Caution about selection of installation location

(1) If the unit is installed in the area where the snow will accumulate, following measures are required.
The bottom plate of unit and intake, outlet may be blocked by snow.

1.Install the unit on the base so that the bottom is higher than snow cover surface.

2.Provide a snow hood to the outdoor unit on site. Regarding outline of a snow hood, refer to our technical manual.

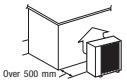
3.Install the unit under eaves or providen the roof on site.

Since drain water generated by defrost control may freeze, following measures are required.

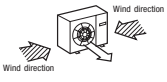
- ● Don't execute drain piping work by using a drain elbow and drain grommets (optional parts). [Refer to Drain piping work.]
- ● Recommend setting Defrost Control (SW3-1) and Snow Guard Fan Control (SW3-2). [Refer to Setting SW3-1, SW3-2.]

(2) If the unit can be affected by strong wind, following measures are required.
Strong wind can cause damage of fan (fan motor), or can cause performance degradation, or can trigger anomalous stop of the unit due to rising of high pressure.

1.Install the outlet air blow side of the unit to face a wall of building, or provide a fence or a windbreak screen.



2.Install the outlet air blow side of the unit in a position perpendicular to the direction of wind.



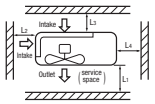
3.The unit should be installed on the stable and level foundation. If the foundation is not level, tie down the unit with wires.

5) Installation space

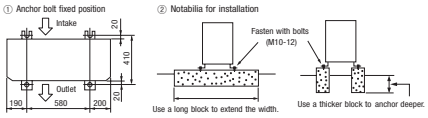
- ● Walls surrounding the unit in the four sides are not acceptable.
- ● There must be a 1-meter or larger space in the above.
- ● Where a danger of short-circuiting exists, install guide louvers.
- ● When more than one unit are installed, provide sufficient intake space consciously so that short-circuiting may not occur.
- ● Where piling snow can bury the outdoor unit, provide proper snow guards.
- ● A barrier wall placed in front of the exhaust diffuser must not be higher than the unit.

(mm)

Example installation / Size	I	II	III
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	5	5	5



6) Installation



- ● In installing the unit, fix the unit's legs with bolts specified on the left.
- ● The protrusion of an anchor bolt on the front side must be kept within 15 mm.
- ● Securely install the unit so that it does not fall over during earthquakes or strong winds, etc.
- ● Refer to the left illustrations for information regarding concrete foundations.
- ● Install the unit in a level area. (With a gradient of 5 mm or less.)
  Improper installation can result in a compressor failure, broken piping within the unit and abnormal noise generation.

7) To run the unit for a cooling operation, when the outdoor temperature is –5°C or lower.

- ● When the outdoor air temperature is -5°C or lower, provide a snow hood to the outdoor unit on site.
  So that strong wind will not blow against the outdoor heat exchanger directly. Regarding outline of a snow hood, refer to our technical manual.

2. REFRIGERANT PIPING WORK

1) Restrictions on unit installation and use

- ● Check the following points in light of the indoor unit specifications and the installation site.
- ● Observe the following restrictions on unit installation and use. Improper installation can result in a compressor failure or performance degradation.

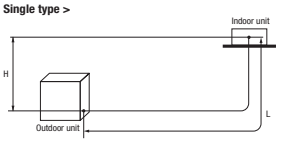
Descriptions	One-way pipe length difference from the first branching point to the indoor unit			Marks appearting in the drawing			
						< 3m	≧ 3m
	Model for outdoor units		Dimensional limitations	Single type	Twin type	Triple type A	Triple type B
One-way pipe length of refrigerant piping	100VN,125VN,100VS,125VS		≦ 50m	L	L+L1+L2	—	—
	140VN,140VS					L+L1+L2+L3	L+La+L1+L2+L3
	100VNX,125VNX,100VSX,125VSX		≦ 100m			—	—
	140VNX,140VSX					L+L1+L2+L3	L+La+L1+L2+L3
Main pipe length	100VN,125VN,100VS,125VS		≦ 50m	—	L	—	—
	140VN,140VS					L	L
	100VNX,125VNX,100VSX,125VSX		≦ 100m			—	—
	140VNX,140VSX					L	L
One-way pipe length between the first branching point from to the second branching point	140VN,140VS, 140VNX,140VSX		≦ 5m	—	—	—	La
One-way pipe length after the first branching point	100VN,125VN,100VS,125VS, 100VNX,125VNX,100VSX,125VSX		≦ 30m	—	L1, L2	—	—
						L1, L2, L3	L1 (1)
One-way pipe length after the first branching point and second branching point	140VN,140VS,140VNX,140VSX		≦ 27m	—	—	—	La+L2, La+L3 (1)
One-way pipe length difference from the first branching point to the indoor unit	Twin type		≦ 10m	—	| L1—L2 |	—	—
	Triple type	140VN,140VS, 140VNX,140VSX	≦ 3m			| L1—L2 | , | L2—L3 | , | L3—L1 |	
			≦ 10m			—	L—(La+L2), L1—(La+L3) (1)
One-way pipe length difference from the second branching point to the indoor unit	140VN,140VS, 140VNX,140VSX		≦ 10m	—	—	—	| L2—L3 |
Elevation difference between indoor and outdoor units	When the outdoor unit is positioned higher.		≦ 30m	H	H	H	H
	When the outdoor unit is positioned lower.		≦ 15m				
Elevation difference between indoor units			≦ 0.5m	—	h	h1, h2, h3	h1, h2, h3

⚠CAUTION

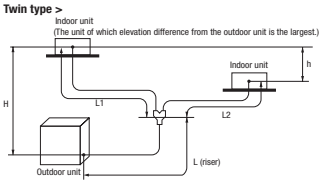
- ● The use restrictions appearing in the table above are applicable to the standard pipe size combinations shown in the table below. Where an existing pipe system is utilized, different one-way pipe length restrictions should apply depending on its pipe size. For more information, see " 6. UTILIZATION OF EXISTING PIPING."
- ● With the triple pipe connection, the way of use is different when the difference of one-way pipe length after the first branching point is 3m to 10m. For details, refer to the above table and right figure.

Note (1) Install the indoor units so that L + L1 becomes the longest one-way pipe.
Keep the pipe length difference between L1 and (La + L2) or (La + L3) within 10m.

< Single type >



< Twin type >



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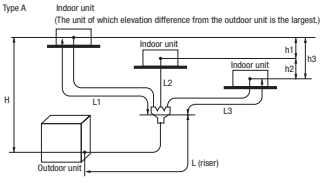

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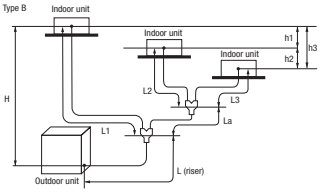


2) Determination of pipe size

- ● Determine refrigerant pipe size pursuant to the following guidelines based on the indoor unit specifications.

		Model 100V		Model 125V		Model 140V	
		Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
Outdoor unit connected		φ15.88	φ9.52	φ15.88	φ9.52	φ15.88	φ9.52
		Flare	Flare	Flare	Flare	Flare	Flare
Refrigerant piping (branch pipeL)		φ15.88	φ9.52	φ15.88	φ9.52	φ15.88	φ9.52
In the case of a single type	Indoor unit connected	φ15.88	φ9.52	φ15.88	φ9.52	φ15.88	φ9.52
	Capacity of indoor unit	Model 100V		Model 125V		Model 140V	
In the case of a twin type	Branching pipe set	DIS-WA1		DIS-WA1		DIS-WA1	
	Refrigerant piping (branch pipe L1,L2)	φ12.7	φ9.52	φ12.7	φ9.52	φ15.88	φ9.52
	Indoor unit connected	φ12.7	φ6.35	φ12.7	φ6.35	φ15.88	φ9.52
	Capacity of indoor unit	Model 50V×2		Model 60V×2		Model 71V×2	
In the case of a triple type A	Branching pipe set	—		—		DIS-TA1	
	Refrigerant piping (branch pipe L1,L2,L3)					φ12.7	φ9.52
	Indoor unit connected					φ12.7	φ6.35
	Capacity of indoor unit					Model 50Vx3	
In the case of a triple type B	Branching pipe set	—		—		DIS-WA1	
	Refrigerant piping (branch pipe La)					φ15.88	φ9.52
	Refrigerant piping (branch pipe L1)					φ12.7	φ9.52
	Indoor unit connected					DIS-WA1	
	Refrigerant piping (branch pipe L2,L3)					φ12.7	φ9.52
	Indoor unit connected					φ12.7	φ6.35
	Capacity of indoor unit					Model 50V×3	

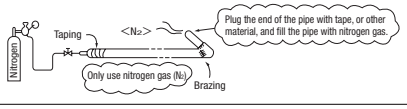
⚠CAUTION

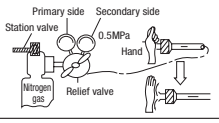
- ● When the 50V or 60V model is connected as an indoor unit, always use a φ9.52 liquid pipe for the branch (branching pipe – indoor unit) and a different diameter joint supplied with the branching pipe set for connection with the indoor unit (φ6.35 on the liquid pipe side).
  If a φ6.35 pipe is used for connection with a branching pipe, a refrigerant distribution disorder may occur, causing one of the indoor units to fall short of the rated capacity.
- ● A riser pipe must be a part of the main. A branching pipe set should be installed horizontally at a point as close to an indoor unit as possible.
  A branching part must be dressed with a heat-insulation material supplied as an accessory.
- ● For the details of installation work required at and near a branching area, see the installation manual supplied with your branching pipe set.

About brazing

Brazing 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) Refrigerant pipe wall thickness and material

- ● Select refrigerant pipes of the table shown on the right wall thickness and material as specified for each pipe size.
- ● This unit uses R410A. Always use 1/2H pipes having a 1.0mm or thicker wall for φ19.05 or larger pipes, because O-type pipes do not meet the pressure resistance requirement.

Pipe diameter [mm]	6.35	9.52	12.7	15.88	22.22	25.4	28.58
Minimum pipe wall thickness [mm]	0.8	0.8	0.8	1.0	1.0	1.0	1.0
Pipe material*	O-type pipe	O-type pipe	O-type pipe	O-type pipe	1/2H-type pipe	1/2H-type pipe	1/2H-type pipe

*Phosphorus deoxidized seamless copper pipe C1220T, JIS H3300

NOTE

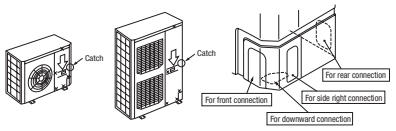
- ● Select pipes having a wall thickness larger than the specified minimum pipe thickness.

4) On-site piping work

⚠IMPORTANT
- Take care so that installed pipes may not touch components within a unit. If touching with an internal component, it will generate abnormal sounds and/or vibrations.

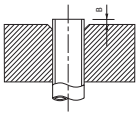
How to remove the service panel
First remove the five screws (✕mark) of the service panel and push it down into the direction of the arrow mark and then remove it by pulling it toward you.

- The pipe can be laid in any of the following directions: side right, front, rear and downward.
- Remove a knock-out plate provided on the pipe penetration to open a minimum necessary area and attach an edging material supplied as an accessory by cutting it to an appropriate length before laying a pipe.
- Carry out the on site piping work with the operation valve fully closed.
- Give sufficient protection to a pipe end (compressed and blazed, or with an adhesive tape) so that water or foreign matters may not enter the piping.
- Bend a pipe to a radius as large as practical.(R100～R150) Do not bend a pipe repeatedly to correct its form.
- Flare connection is used between the unit and refrigerant pipe. Flare a pipe after engaging a flare nut onto it. Flare dimensions for R410A are different from those for conventional R407C. Although we recommend the use of flaring tools designed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a protrusion control gauge.
- The pipe should be anchored every 1.5m or less to isolate the vibration.



Flared pipe end: A (mm)

Copper pipe outer diameter	A 0 −0.4
ϕ6.35	9.1
ϕ9.52	13.2
ϕ12.7	16.6
ϕ15.88	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
ϕ6.35	0～0.5	0.7～1.3
ϕ9.52		
ϕ12.7		
ϕ15.88		

- Tighten a flare joint securely with a double spanner.

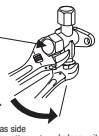
⚠ CAUTION **Do not apply force beyond proper fastening torque in tightening the flare nut.**

Fix both liquid and gas service valves at the valve main bodies as illustrated on the right, and then fasten them, applying appropriate fastening torque.

Operation valve size (mm)	Tightening torque (N-m)	Tightening angle (°)	Recommended length of a 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

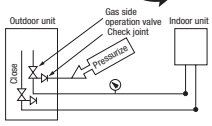
Do not hold the valve cap area with a spanner.

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.



5) Air tightness test

① Although outdoor and indoor units themselves have been tested for air tightness at the factory, check the connecting pipes after the installation work for air tightness from the operation valve's check joint equipped on the outdoor unit side. While conducting a test, keep the operation valve shut all the time.
a) Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes 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 fall 1℃, the pressure also fall 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.
② In conducting an air-tightness test, use nitrogen gas and pressurize the system with nitrogen gas from the gas side. Do not use a medium other than nitrogen gas under any circumstances.



6) Evacuation

<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.

Airtightness test completed
↓
Vacuuming begins
↓
Vacuuming completed
↓
Vacuum gauge check
↓
Fill refrigerant

Run the vacuum pump for at least one hour after the vacuum gauge shows -101kPa or lower. (-755mmHg or lower)
Confirm that the vacuum gauge indicator does not rise even if the system is left for one hour or more.

Pay attention to the following points in addition to the above for the R410A and compatible machines.
- ○To prevent a different oil from entering, 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.

7) Additional refrigerant charge

(1) Calculate a required refrigerant charge volume from the following table.

<Single type>

Item / Capacity	Standard refrigerant charge volume (kg)	Pipe length for standard refrigerant charge volume (m)	Additional charge volume (kg) per meter of refrigerant piping (liquid pipe)	Refrigerant volume charged for shipment at the factory (kg)	Installation's pipe length (m) covered without additional refrigerant charge
100VN～140VN 100VS～140VS	2.0	0	0.06	3.8	30
100VNX～140VNX 100VSX～140VSX	2.7			4.5	

<Twin, triple, W-twin type>

Item / Capacity	Standard refrigerant charge volume (kg)	Pipe length for standard refrigerant charge volume (m)	Additional charge volume (kg) per meter of refrigerant piping (liquid pipe)		Refrigerant volume charged for shipment at the factory (kg)	Installation's pipe length (m) covered without additional refrigerant charge
			Main pipe	Branch pipe		
100VN～140VN 100VS～140VS	2.0	0	0.06		3.8	30
100VNX～140VNX 100VSX～140VSX	2.7				4.5	

- A standard refrigerant charge volume means a refrigerant charge volume for an installation with 0m long refrigerant piping.
- This unit contains factory charged refrigerant covering 30m of refrigerant piping and additional refrigerant charge on the installation site is not required for an installation with up to 30m refrigerant piping. When refrigerant piping exceeds 30m, additionally charge an amount calculated from the pipe length and the above table for the portion in excess of 30m.
- When refrigerant piping is shorter than 3m, reduce refrigerant by 1kg from the factory charged volume and adjust to 2.8kg.
- If an existing pipe system is used, a required refrigerant charge volume will vary depending on the liquid pipe size. For further information, see "6. UTILIZATION OF EXISTING PIPING."

Formula to calculate the volume of additional refrigerant required

Additional charge volume (kg) = { Main pipe length (m) – Length covered without additional charge 30 (m) } x 0.06 (kg/m) + Total length of branch pipes (m) x 0.06 (kg/m)

*When an additional charge volume calculation result is negative, it is not necessary to charge refrigerant additionally.

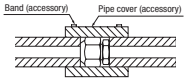
- **To charge refrigerant again, recover refrigerant from the system first and then charge the volume calculated from the above table (Standard refrigerant charge volume + branch pipes charge volume)**

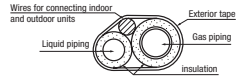
(2) Charging refrigerant
- Since R410A refrigerant must be charged in the liquid phase, you should charge it, keeping the container cylinder upside down or using a refrigerant cylinder equipped with a siphon tube.
- Charge refrigerant always from the liquid side service port with the operation valve shut. When you find it difficult to charge a required amount, fully open the outdoor unit valves on both liquid and gas sides and charge refrigerant from the gas (suction) side service port, while running the unit in the cooling mode. In doing so, care must be taken so that refrigerant may be discharged from the cylinder in the liquid phase all the time. When the cylinder valve is throttled down or a dedicated conversion tool to change liquid-phase refrigerant into mist is used to protect the compressor, however, adjust charge conditions so that refrigerant will gasify upon entering the unit.
- In charging refrigerant, always charge a calculated volume by using a scale to measure the charge volume.
- When refrigerant is charged with the unit being run, complete a charge operation within 30 minutes. Running the unit with an insufficient quantity of refrigerant for a long time can cause a compressor failure.

NOTE Put down the refrigerant volume calculated from the pipe length onto the caution label attached on the back side of the service panel.

8) Heating and condensation prevention

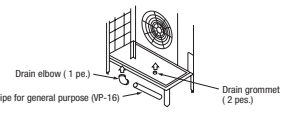
(1) Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.
(2) Use a heat insulating material that can withstand 120℃ or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.
- Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.
- All gas pipes must be securely heat insulated in order to prevent damage from dripping water that comes from the condensation formed on them during a cooling operation or personal injury from burns because their surface can reach quite a high temperature due to discharged gas flowing inside during a heating operation.
- Wrap indoor units' flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).
- 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.
- Although it is verified in a test that this air conditioning unit shows satisfactory performance under JIS condensation test conditions, **both gas and liquid pipes need to be dressed with 20 mm or thicker heat insulation materials above the ceiling where relative humidity exceeds 70%.**





3. DRAIN PIPING WORK

- Execute drain piping by using a drain elbow and drain grommets supplied separately as optional parts, where water drained from the outdoor unit is a problem.

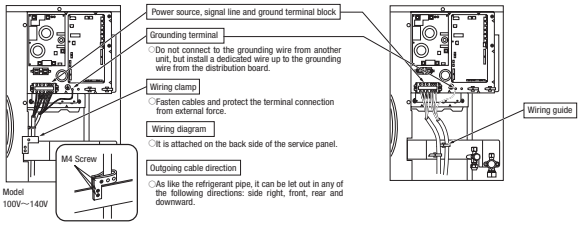


- ○ There are 3 drain holes provided on the bottom plate of an outdoor unit to discharge condensed water.
- ○ When condensed water needs to be led to a drain, etc., install the unit on a flat base (supplied separately as an optional part) or concrete blocks.
- ○ Connect a drain elbow as shown in the illustration and close the other two drain holes with grommets.

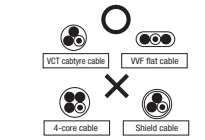
4. ELECTRICAL WIRING WORK For details of electrical cabling, refer to the indoor unit installation manual.

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.
- •Do not use any supply cord lighter than one specified in parentheses for each type below.
  - braided cord (code designation 60245 IEC 51),
  - ordinary tough rubber sheathed cord (code designation 60245 IEC 53)
  - flat twin tinsel cord (code designation 60227 IEC 41);

  Do not use anything lighter than polychloroprene sheathed flexible cord (code designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.
- •Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire. If improgery grounded, an electric shock or malfunction may result.
- •A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.
- •The installation of an impulse withstanding type earth leakage breaker is necessary. A failure to install an earth leakage breaker can result in an acccident such as an electric shock or a fire.

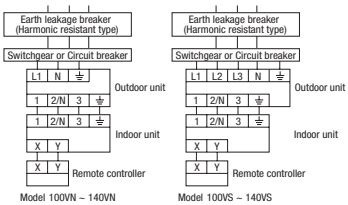


- •Do not turn on the power until the electrical work is completeted .
- •Do not use a condensive capacitor for power factor improvement under any circumstances. (It dose not improve power factor, while it can cause an abnormal overheat accident)
- •For power supply cables, use conduits.
- •Do not lay electronic control cables (remote control and signaling wires) and other cables together outside the unit. Laying them together can result in the malfunctioning or a failure of the unit due to electric noises.
- •Fasten cables so that may not touch the piping, etc.
- •When cables are connected, 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.)
- •Always use a three-core cable for an indoor-outdoor connecting cable. Never use a shield cable.
- Connect a pair bearing a common terminal number with an indoor-outdoor connecting wire.
- In cabling, fasten cables securely with cable clamps so that no external force may work on terminal connections.
- Grounding terminals are provided in the control box.



Power cable, indoor-outdoor connecting wires
- Always perform grounding system installation work with the power cord unplugged.

⚠ CAUTION Always use an earth leakage circuit breaker designed for inverter circuits to prevent a faulty operation.



Model	Power source	Power cable thickness(mm²)	MAX. over current (A)	Cable length (m)	Grounding wire thickness	Indoor-outdoor wire thickness × number
100VN～140VN 100VNX	Single phase 3 wire 220-240V 50Hz 220V 60Hz	5.5	24	25	φ1.6mm	φ1.6mm x 3
125VNX,140VNX			26	23		
100VS～140VS 100VSX～140VSX	3 phase 4 wire 380V 50Hz	3.5	15	27		

●The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
●Switchgear or Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
●The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

※At the connection with the duct type indoor unit.

Model	Power source	Power cable thickness(mm²)	MAX. over current (A)	Cable length (m)	Grounding wire thickness	Indoor-outdoor wire thickness × number
100VN,100VNX	Single phase 3 wire 220-240V 50Hz 220V 60Hz	5.5	25	24	φ1.6mm	φ1.6mm x 3
125VN			27	22		
140VN		8	28	32		
125VNX			29	31		
140VNX			30	30		
100VS,100VSX	3 phase 4 wire 380-415V 50Hz 380V 60Hz	3.5	16	26		
125VS,125VSX			18	23		
140VS,140VSX			19	21		

5. TEST RUN

⚠ WARNING
- Before conduct a test run, do not fail to make sure that the operation valves are closed.
- Turn on power 6 hours prior to a test run to energize the crank case heater.
- In case of the first operation after turning on power, even if the unit does not move for 30 minutes, it is not a breakdown.
- Always give a 3-minute or longer interval before you start the unit again whenever it is stopped.
- Removing the service panel will expose high-voltage live parts and high-temperature parts, which are quite dangerous. Take utmost care not to incur an electric shock or burns. Do not leave the unit with the service panel open.

} A failure to observe these instructions can result in a compressor breakdown.

⚠ CAUTION
- When you operate switches (SW3, SW5) for on-site setting, be careful not to touch a live part.
- You cannot check discharge pressure from the liquid operation valve charge port.
- The 4-way valve (20S) is energized during a heating operation.
- When power supply is cut off to reset the unit, give 3 or more minutes before you turn on power again after power is cut off. If this procedure is not observed in turning on power again, "Communication error between outdoor and indoor unit" may occur.

1) Test run method

(1) A test run can be initiated from an outdoor unit by using SW3-3 and SW3-4 for on-site setting.
(2) Switching SW3-3 to ON will start the compressor.
(3) The unit will start a cooling operation, when SW3-4 is OFF, or a heating operation, when SW3-4 is ON.
(4) **Do not fail to switch SW3-3 to OFF when a test run is completed.**

SW-3-3	SW-3-4	
ON	OFF	Cooling during a test run
	ON	Heating during a test run
OFF	—	Normal or After the test operation

2) Checking the state of the unit in operation

Use check joints provided on the piping before and after the four-way valve installed inside the outdoor unit for checking discharge pressure and suction pressure.
As indicated in the table shown on the right, pressure detected at each point will vary depending on whether a cooling or heating operation has been selected.

	Check joint of the pipe	Charge port of the gas operation valve
Cooling operation	Discharge pressure (High pressure)	Suction pressure (Low pressure)
Heating operation	Suction pressure (Low pressure)	Discharge pressure (High pressure)

3) Setting SW3-1, SW3-2, on-site

(1) Defrost control switching (SW3-1)
・When this switch is turned ON, the unit will run in the defrost mode more frequently.
・Set this switch to ON, when installed in a region where outdoor temperature falls below zero during the season the unit is run for a heating operation.
(2) Snow guard fan control (SW3-2)
・When this switch is turned on, the outdoor unit fan will run for 10 seconds in every 10 minutes, when outdoor temperature falls to 3℃ or lower and the compressor is not running.
・When the unit is used in a very snowy country, set this switch to ON.

4) Failure diagnosis in a test run

Error indicated on the remote control unit	Printed circuit board LED(The cycles of 5 seconds)		Failure event	Action
	Red LED	Green LED		
E34	Blinking once	Blinking continuously	Open phase	Check power cables for loose contact or disconnection
E40	Blinking once	Blinking continuously	63H1 actuation or operation with operation valves shut (occurs mainly during a heating operation)	1. Check whether the operation valves are open. 2. If an error has been canceled when 3 minutes have elapsed since a compressor stop, you can restart the unit by effecting Check Reset from the remote control unit.
E49	Blinking once	Blinking continuously	Low pressure error or operation with operation valves shut (occurs mainly during a cooling operation)	

● If an error code other than those listed above is indicated, refer to the wiring diagram of the outdoor unit and the indoor unit.

5) The state of the electronic expansion valve.

The following table illustrates the steady states of the electronic expansion valve.

	When power is turned on	When the unit comes to a normal stop		When the unit comes to an abnormal stop	
		During a cooling operation	During a heating operation	During a cooling operation	During a heating operation
Valve for a cooling operation	Complete shut position	Complete shut position	Full open position	Full open position	Full open position
Valve for a heating operation	Full open position	Full open position	Complete shut position	Full open position	Full open position

6) Heed the following on the first operation after turning on the circuit breaker.

This outdoor unit may start in the standby mode (waiting for a compressor startup), which can continue up to 30 minutes, to prevent the oil level in the compressor from lowering on the first operation after turning on the circuit breaker. If that is the case, do not suspect a unit failure.

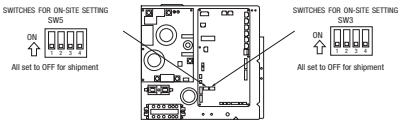
Items to checkbefore a test run

● When you leave the outdoor unit with power supplied to it, be sure to close the panel.

Item No.used in the installation manual	Item	Check item	Check
2	Refrigerant plumbing	If brazed, was it brazed under a nitrogen gas flow?	
		Were air-tightness test and vacuum extraction surely performed?	
		Are heat insulation materials installed on both liquid and gas pipes?	
		Are operation valves surely opened for both liquid and gas systems?	
		Have you recorded the additional refrigerant charge volume and refrigerant pipe length on the panel's label?	
4	Electric wiring	Is the unit free of cabling errors such as uncompleted connection, an absent or reversed phase?	
		Are properly rated electrical equipments used for circuit breakers and cables?	
		Doesn't cabling cross-connect between units, where more than one unit are installed?	
		Aren't indoor-outdoor signal wires connected to remote control wires?	
		Do indoor-outdoor connecting cables connect between the same terminal numbers?	
		Are either VCT cabtyre cables or WF flat cables used for indoor-outdoor connecting cables?	
		Does grounding satisfy the D type grounding (type III grounding) requirements?	
		Is the unit grounded with a dedicated grounding wire not connected to another unit's grounding wire?	
		Are cables free of loose screws at their connection points?	
		Are cables held down with cable clamps so that no external force works onto terminal connections?	
—	Indoor unit	Is indoor unit installation work completed?	
		Where a face cover should be attached onto an indoor unit, is the face cover attached to the indoor unit?	

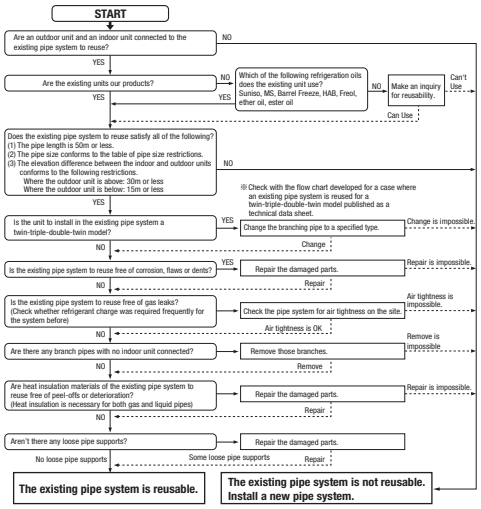
Test run procedure ● Always carry out a test run and check the following in order as listed.

Turn	The contents of operation	Check
①	Open the gas side operation valve fully.	
②	Open the liquid side operation valve fully.	
③	Close the panel.	
④	Where a remote control unit is used for unit setup on the installation site, follow instructions for unit setup on the installation site with a remote control unit.	
⑤	SW3-3 ON / SW3-4 OFF: the unit will start a cooling operation. SW3-3 ON / SW3-4 ON: the unit will start a heating operation.	
⑥	When the unit starts operation, press the wind direction button provided on the remote control unit to check its operation.	
⑦	Place your hand before the indoor unit's diffuser to check whether cold (warm) winds come out in a cooling (heating) operation.	
⑧	Make sure that a red LED is not blinking.	
⑨	When you complete the test run, do not forget to turn SW3-3 to the OFF position.	
⑩	Where options are used, check their operation according to the respective instruction manuals.	



6. UTILIZATION OF EXISTING PIPING.

Check whether an existing pipe system is reusable or not by using the following flow chart.



⚠ WARNING <Where the existing unit can be run for a cooling operation.>

Carry out the following steps with the excising unit (in the order of (1), (2), (3) and (4))
(1) Run the unit for 30 minutes for a cooling operation.
(2) Stop the indoor fan and run the unit for 3 minutes for a cooling operation (returning liquid)
(3) Close the liquid side operation valve of the outdoor unit and pump down (refrigerant recovery)
(4) Blow with nitrogen gas. ※ If discolored refrigeration oil or any foreign matters is discharged by the blow, wash the pipe system or install a new pipe system.
- For the flare nut, do not use the old one, but use the one supplied with the outdoor unit. Process a flare to the dimensions specified for R410A.
- **Turn on-site setting switch SW5-1** to the ON position. (Where the gas pipe size is φ19.05)

<Where the existing unit cannot be run for a cooling operation.>
Wash the pipe system or install a new pipe system.
● If you choose to wash the pipe system, contact our distributor in the area.

<Table of pipe size restrictions>
◎:Standard pipe size ○:Usable
△:Restricted to shorter pipe length limits ×:Not usable

Additional charging amount of refrigerant per 1m		0.06kg/m		0.08kg/m	
Pipe size	Liquid pipe	φ9.52	φ9.52	φ12.7	φ12.7
	Gas pipe	φ15.88	φ19.05	φ15.88	φ19.05
100VN 100VS	Usability	◎	○※1	△	△※1
	Maximum one-way pipe length	50	50	25	25
	Length covered without additional charge	30	30	15	15
125VN 125VS	Usability	◎	○※1	△	△※1
	Maximum one-way pipe length	50	50	25	25
	Length covered without additional charge	30	30	15	15
140VN 140VS	Usability	◎	○※1	△	△※1
	Maximum one-way pipe length	50	50	25	25
	Length covered without additional charge	30	30	15	15

Additional charging amount of refrigerant per 1m		0.02kg/m	0.06kg/m		0.08kg/m	
Pipe size	Liquid pipe	φ6.35	φ9.52	φ9.52	φ12.7	φ12.7
	Gas pipe	φ15.88	φ15.88	φ19.05	φ15.88	φ19.05
100VNX 100VSX	Usability	△	◎	○※1	△	△※1
	Maximum one-way pipe length	20	100	100	50	50
	Length covered without additional charge	10	30	30	15	15
125VNX 125VSX	Usability	△	◎	○※1	△	△※1
	Maximum one-way pipe length	20	100	100	50	50
	Length covered without additional charge	10	30	30	15	15
140VNX 140VSX	Usability	△	◎	○※1	△	△※1
	Maximum one-way pipe length	20	100	100	50	50
	Length covered without additional charge	10	30	30	15	15

<Pipe system after the branching pipe>

Additional charging amount of refrigerant per 1m			After 1st branch ※4			After 2nd branch		
			0.06kg/m			0.08kg/m		
Pipe size	Liquid pipe		φ9.52			φ9.52		
	Gas pipe		φ12.7	φ15.88	φ19.05※1	φ12.7	φ15.88	φ19.05※1
Model	Combination type	Combination of capacity						
100V	Twin	50+50	◎	○	×	—	—	—
125V	Twin	60+60	◎	○	×	—	—	—
140V	Twin	71+71	×	◎	○	—	—	—
	Triple A	50+50+50	◎	○	×	—	—	—
	Triple B	50+50+50	×	◎※5	○※5	◎	○	×

※1 Because of its insufficient pressure resistance, **turn the dip switch SW5-1** provided on the outdoor unit board to the ON position for φ19.05 × t1.0.
(In the case of a twin-triple-double-twin model, this also applies to the case where φ19.05 × t1.0 is used in a pipe system after the first branching point.)
However, you need not turn the dip switch SW5-1 to the ON position, if 1/2H pipes or pipes having 1.2 or thicker walls are used.
※2 When the main pipe length exceeds 40m, a significant capacity drop may be experienced due to pressure loss in the liquid pipe system. Use φ12.7 for the liquid main.
※3 Keep the total pipe length, not one-way pipe length, below the specified maximum pipe length.
※4 Piping size after branch should be equal or smaller than main pipe size.
※5 Piping size from first branch to indoor unit should be φ9.52 (Liquid) /φ12.7 (Gas).
● When refrigerant piping is shoter than 3m, reduce refrigerant by 1kg from factory charged volume.
● Any combinations of pipe sizes not listed in the table or marked with × in the table are not usable.

<The model types of existing units of which branching pipes are reusable.>
Models later than Type 8.
● F D C ＊ ＊ ＊ 8 □ □ □
● F D C P ＊ ＊ ＊ 8 □ □ □

The branching pipes used with models other than those listed above are not reusable because of their insufficient pressure resistance. Please use our genuine branching pipes for R410A.

● ＊ ＊ ＊ are numbers representing horsepower. □□□ is an alphanumeric letter.

Formula to calculate additional charge volume

Additional charge volume (kg) = {Main pipe length (m) − Length covered without additional charge shown in the table (m)} × Additional charge volume per meter of pipe shown in the table (kg/m) + Total length of branch pipes (m)× Additional charge volume per meter of pipe shown in the table (kg/m)

※ If you obtain a negative figure as a result of calculation, no additional refrigerant needs to be charged.
Example) When an 140V (single installation) is installed in a 20m long existing pipe system (liquid φ12.7, gas φ19.05), the quantity of refrigerant to charge additionally should be (20m-15m) x 0.08kg/m = 0.4 kg.

(3) Models FDC200, 250VS

Inverter driven single split PAC
200V·250V
Designed for R410A refrigerant

◎This installation manual deals with outdoor units and general installation specifications only. For indoor units, refer to Page 56.
◎When install the unit, be sure to check whether the selection of installation place, power supply specifications, usage limitation (piping length, height differences between indoor and outdoor units, power supply voltage and etc.) and installation spaces.

SAFETY PRECAUTIONS

- We recommend you to read this "SAFETY PRECAUTIONS" carefully before the installation work in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNING and ⚠CAUTION. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNING and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTION. **These are very important precautions for safety. Be sure to observe all of them without fail.**
- The meaning of "Marks" used here are as shown below.

⃠	Never do it under any circumstance.	❗	Always do it according to the instruction

- For this outdoor unit, EN61000-3-2 is not applicable if consent by the utility company or nortification to the utility company is given before usage.
- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user

Check before installation work

[Accessory]

Edging	Accessory pipe	
1 piece knock-out hole protection	1 piece ID22.22 Accessory pipe A	1 piece OD25.4 ID22.22 Accessory pipe B

- Model name and power source
- Refrigerant piping length
- Piping, wiring and miscellaneous small parts
- Indoor unit installation manual

⚠ WARNING

❗
- **Installation must be carried out by the qualified installer.**
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction.
- **Install the system in full accordance with the instruction manual.**
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- **Use the original accessories and the specified components for installation.**
  If parts other than those prescribed by us are used, It may cause fall of the unit, water leaks, electric shocks, fire, refrigerant leak, substandard performance, control failure and personal injury.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage accordance with ISO5149.**
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- **Ventilate the working area well in the event of refrigerant leakage during installation.**
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- **After completed installation, check that no refrigerant leaks from the system.**
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- **Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.**
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit
- **Install the unit in a location with good support.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.**
  Power supply with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire,
- **Be sure to shut off the power before starting electrical work.**
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- **Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.**
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- **Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.**
  Loose connections or cable mountings can cause anomalous heat production or fire.
- **Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.**
  Incorrect installation may result in overheating and fire.

❗
- **Do not perform brazing work in the airtight room**
  It can cause lack of oxygen.
- **Use the prescribed pipes, flare nuts and tools for R410A.**
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- **Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.**
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- **Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.**
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked into refrigerant circuit, which can cause burst or personal injury due to anomalously high pressure in the refrigerant
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not perform any change of protective device itself or its setup condition**
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- **Be sure to switch off the power supply in the event of installation, inspection or servicing.**
  If the power supply is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- **Consult the dealer or an expert regarding removal of the unit.**
  Incorrect installation can cause water leaks, electric shocks or fire.
- **Stop the compressor before closing valve and disconnecting refrigerant pipes in case of pump down operation.**
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit

⃠
- **Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.**
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- **Do not run the unit with removed panels or protections**
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- **Be sure to fix up the service panels.**
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- **Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.**
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.

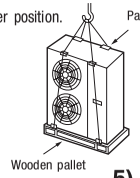
Notabilia as a unit designed for R410A

- 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. 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. HAULAGE AND INSTALLATION (Take particular care in carrying in or moving the unit, and always perform such an operation with two or more persons.)

⚠CAUTION When a unit is hoisted with slings for haulage, take into consideration the offset of its gravity center position. If not properly balanced, the unit can be thrown off-balance and fall.

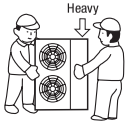


1) Delivery

- Deliver the unit as close as possible to the installation site before removing it from the packaging.
- When some compelling reason necessitates the unpacking of the unit before it is carried in, use nylon slings or protective wood pieces so as not to damage the unit by ropes lifting it.

2) Portage

- The right hand side of the unit as viewed from the front (diffuser side) is heavier. A person carrying the right hand side must take heed of this fact. A person carrying the left hand side must hold with his right hand the handle provided on the front panel of the unit and with his left hand the corner column section.



3) Selection of installation location for the outdoor unit

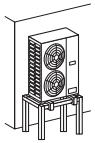
Be sure to select a suitable installation place in consideration of following conditions.

- ○ A place where it is horizontal, stable and can endure the unit weight and will not allow vibration transmittance of the unit.
- ○ A place where it can be free from possibility of bothering neighbors due to noise or exhaust air from the unit
- ○ A place where the unit is not exposed to oil splashes.
- ○ A place where it can be free from danger of flammable gas leakage.
- ○ A place where drain water can be disposed without any trouble.
- ○ A place where the unit will not be affected by heat radiation from other heat source.
- ○ A place where snow will not accumulate.
- ○ A place where the unit can be kept away 5m or more from TV set and/or radio receiver in order to avoid any radio or TV interference.
- ○ A place where good air circulation can be secured, and enough service space can be secured for maintenance and service of the unit safely.
- ○ A place where the unit will not be affected by electromagnetic waves and/or high-harmonic waves generated by other equipment.
- ○ A place where chemical substances like sulfuric gas, chloric gas, acid and alkali (including ammonia), which can harm the unit, will not be generated and not remain.
- ○ A place where strong wind will not blow against the outlet air blow of the unit

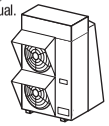
4) Caution about selection of installation location

(1) If the unit is installed in the area where the snow will accumulate, following measures are required. The bottom plate of unit and intake, outlet may be blocked by snow.

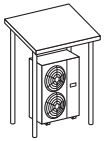
1.Install the unit on the base so that the bottom is higher than snow cover surface.



2.Provide a snow hood to the outdoor unit on site. Regarding outline of a snow hood, refer to our technical manual.



3.Install the unit under eaves or provide the roof on site.

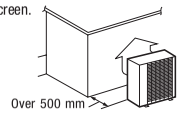


Since drain water generated by defrost control may freeze, following measures are required.

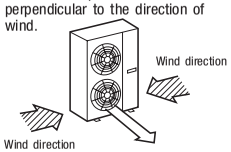
- Don't execute drain piping work by using a drain elbow and drain grommets (optional parts). [Refer to Drain piping work.]
- Recommend setting Defrost Control (SW3-1) and Snow Guard Fan Control (SW3-2). [Refer to Setting SW3-1, SW3-2.]

(2) If the unit can be affected by strong wind, following measures are required. Strong wind can cause damage of fan (fan motor), or can cause performance degradation, or can trigger anomalous stop of the unit due to rising of high pressure.

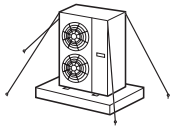
1.Install the outlet air blow side of the unit to face a wall of building, or provide a fence or a windbreak screen.



2.Install the outlet air blow side of the unit in a position perpendicular to the direction of wind.



3.The unit should be installed on the stable and level foundation. If the foundation is not level, tie down the unit with wires.

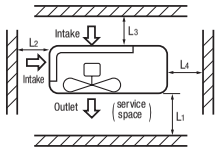


5) Installation space

- Walls surrounding the unit in the four sides are not acceptable.
- There must be a 1-meter or larger space in the above.
- Where a danger of short-circuiting exists, install guide louvers.
- When more than one unit are installed, provide sufficient intake space consciously so that short-circuiting may not occur.
- Where piling snow can bury the outdoor unit, provide proper snow guards.
- A barrier wall placed in front of the exhaust diffuser must not be higher than the unit.

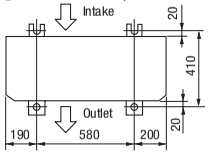
(mm)

Size \ Example installation	200V, 250V		
	I	II	III
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	5	5	5

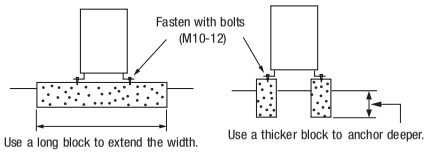


6) Installation

① Anchor bolt fixed position



② Notabilia for installation



- In installing the unit, fix the unit's legs with bolts specified on the left.
- The protrusion of an anchor bolt on the front side must be kept within 15 mm.
- Securely install the unit so that it does not fall over during earthquakes or strong winds, etc.
- Refer to the left illustrations for information regarding concrete foundations.
- Install the unit in a level area. (With a gradient of 5 mm or less.) Improper installation can result in a compressor failure, broken piping within the unit and abnormal noise generation.

7) To run the unit for a cooling operation, when the outdoor temperature is –5°C or lower.

- When the outdoor air temperature is -5°C or lower, provide a snow hood to the outdoor unit on site. So that strong wind will not blow against the outdoor heat exchanger directly. Regarding outline of a snow hood, refer to our technical manual.

2. REFRIGERANT PIPING WORK

1) Restrictions on unit installation and use

- Check the following points in light of the indoor unit specifications and the installation site.
- Observe the following restrictions on unit installation and use. Improper installation can result in a compressor failure or performance degradation.

Restrictions	One-way pipe length difference from the first branching point to the indoor unit					< 3m	≧ 3m	W-twin type
	Model for outdoor units			Dimensional restrictions	Single type	Twin type	Triple type A	Triple type B	
One-way pipe length of refrigerant piping	200V	Liquid Piping	φ9.52	≦ 40m	L	L+L1 L+L2	L+L1, L+L2, L+L3	L+L1 (1)	L+La+L1, L+La+L2 L+Lb+L3, L+Lb+L4
			φ12.7	≦ 70m					
	200V-250V	Gas piping	φ25.4 or φ28.58				L+L1, L+La+L2, L+La+L3 (2) (type B)	Prohibitation of the use	
			φ22.22	≦ 35m					
Main pipe length	200V	Liquid Piping	φ9.52	≦ 40m	—	L	L	L+L1 (1)	L
			φ12.7	≦ 70m				Prohibitation of the use	
	200V-250V	Gas piping	φ25.4 or φ28.58						
			φ22.22	≦ 35m					
One-way pipe length between the first branching point from to the second branching point	200V			≦ 5m	—	—	—	La	—
	250V						La	Prohibitation of the use	
One-way pipe length after the first branching point	200V			≦ 30m	—	—	L1, L2, L3	L1 (1)	La+L1, L+La+L2 Lb+L3, Lb+L4
	250V						L1, La+L2, L+La+L3 (2) (type B)	Prohibitation of the use	
One-way pipe length after the first branching point and second branching point	200V			≦ 27m	—	—	—	La+L2, La+L3 (1)	—
One-way pipe length difference from the first branching point to the indoor unit	Twin type			≦ 10m	—	| L1—L2 |	—	—	—
	Triple type	200V		≦ 3m			| L1—L2 | , | L2—L3 | , | L3—L1 |		
				≦ 10m			—	L1—(La+L2), L1—(La+L3) (1)	
		250V		≦ 3m			| L1—(La+L2) | , | L1—(La+L3) | , | L2—L3 | (2) (type B)	Prohibitation of the use	
	W-twin type	200V-250V		≦ 10m			—	—	| L1—L2 | , | L3—L4 | , | (L1+La)—(L3+Lb) | , | (L2+La)—(L3+Lb) | , | (L1+La)—(L4+Lb) | , | (L2+La)—(L4+Lb) |
One-way pipe length difference from the second branching point to the indoor unit	200V			≦ 10m	—	—	—	| L2—L3 |	| L1—L2 | , | L3—L4 |
Total pipe length after the second branching point				≦ 15m	—	—	—	—	L1+L2, L3+L4
Elevation difference between indoor and outdoor units	When the outdoor unit is positioned higher,			≦ 30m	H	H	H	H	H
	When the outdoor unit is positioned lower,			≦ 15m					
Elevation difference between indoor units				≦ 0.5m	—	h	h1, h2, h3	h1, h2, h3	h1, h2, h3, h4, h5, h6

⚠CAUTION

- For model 200V, **always use φ12.7mm liquid pipes**, when the length of the main "L" exceeds 40m. If φ9.52mm pipes are used in an installation having over 40m piping, they can cause performance degradation and/or water leaks from an indoor unit.
- The use restrictions appearing in the table above are applicable to the standard pipe size combinations shown in the table below. Where an existing pipe system is utilized, different one-way pipe length restrictions should apply depending on its pipe size. For more information, see " 6. UTILIZATION OF EXISTING PIPING."
- With the triple pipe connection, the way of use is different when the difference of one-way pipe length after the first branching point is 3m to 10m. For details, refer to the above table and right figure.

Note (1) Install the indoor units so that L + L1 becomes the longest one-way pipe.
Keep the pipe length difference between L1 and (La + L2) or (La + L3) within 10m.
Note (2) Connect the unit that is the maximum capacity with L1.

2) Determination of pipe size

- Determine refrigerant pipe size pursuant to the following guidelines based on the indoor unit specifications.

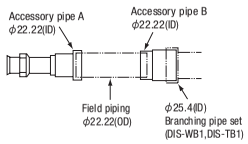
		Model 200V		Model 250V					
		Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	Liquid pipe
Outdoor unit connected		φ22.22	φ9.52	φ22.22	φ12.7	φ22.22	φ12.7	φ22.22	φ12.7
		Brazing	Flare	Brazing	Flare	Brazing	Flare	Brazing	Flare
Refrigerant piping (branch pipe) L)		φ22.22	φ9.52 or φ12.7	φ22.22	φ12.7	φ22.22	φ12.7	φ22.22	φ12.7
In the case of asingle type	Indoor unit connected	φ25.4	φ9.52	φ25.4	φ12.7	—		—	
	Capacity of indoor unit	Model 200V, Model VA80		Model 250V, Model VA100					
In the case of atwin type	Branching pipe set	DIS-WB1		DIS-WB1		—		—	
	Refrigerant piping (branch pipe L1,L2)	φ15.88	φ9.52	φ15.88	φ9.52				
	Indoor unit connected	φ15.88	φ9.52	φ15.88	φ9.52				
	Capacity of indoor unit	Model 100V×2, Model VA40×2		Model 125V×2, Model VA50×2					
In the case of a triple type A	Branching pipe set	DIS-TB1		—		—		—	
	Refrigerant piping (branch pipe L1,L2,L3)	φ15.88	φ9.52						
	Indoor unit connected	φ15.88	φ9.52						
	Capacity of indoor unit	Model 71V×3, Model VA30×3							
In the case of a triple type B	Branching pipe set	DIS-WB1		DIS-WB1		DIS-WB1		DIS-WB1	
	Refrigerant piping (branch pipe La,L1)	φ15.88	φ9.52	φ15.88	φ9.52	φ15.88	φ9.52	φ15.88	φ9.52
	Branching pipe set	DIS-WA1		DIS-WA1		DIS-WA1		DIS-WA1	
	Refrigerant piping (branch pipe L2,L3)	φ15.88	φ9.52	φ12.7	φ9.52	φ15.88	φ9.52	φ15.88	φ9.52
	Indoor unit connected	φ15.88	φ9.52	φ12.7	φ6.35	φ15.88	φ9.52	φ15.88	φ6.35
	Capacity of indoor unit	Model 71V×3, Model VA30×3		Model 60V×2+ Model 125V		Model 71V×2+Model 100V Model VA30×2+Model VA40		Model VA25×2+Model VA50	
In the case of a W-twin type	Branching pipe set	DIS-WA1		DIS-WB1		DIS-WB1		—	
	Refrigerant piping (branch pipe La,Lb)	φ15.88	φ9.52	φ15.88	φ9.52	φ15.88	φ9.52		
	Branching pipe set	DIS-WA1 × 2		DIS-WA1 × 2		DIS-WA1 × 2			
	Refrigerant piping (branch pipe L1,L2,L3,L4)	φ12.7	φ9.52	φ12.7	φ9.52	φ12.7	φ9.52		
	Indoor unit connected	φ12.7	φ6.35	φ12.7	φ6.35	φ12.7	φ6.35		
	Capacity of indoor unit	Model 50V×4, Model VA20×4		Model 60V×4		Model VA25×4			

⚠CAUTION

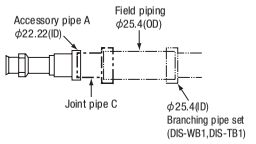
- When the model 50V or model 60V model is connected as an indoor unit, always use a φ9.52 liquid pipe for the branch (branching pipe – indoor unit) and a different diameter joint supplied with the branching pipe set for connection with the indoor unit (φ6.35 on the liquid pipe side).
  If a φ6.35 pipe is used for connection with a branching pipe, a refrigerant distribution disorder may occur, causing one of the indoor units to fall short of the rated capacity.
- A riser pipe must be a part of the main. A branching pipe set should be installed horizontally at a point as close to an indoor unit as possible.
  A branching part must be dressed with a heat-insulation material supplied as an accessory.
- For the details of installation work required at and near a branching area, see the installation manual supplied with your branching pipe set.

3) How to use pipe reducer.

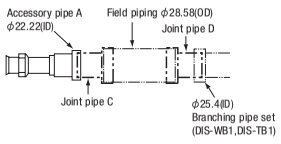
- φ22.22(OD) size of the refrigerant gas pipe can be used by using accessory pipe A,B.



- φ25.4(OD) size of the refrigerant gas pipe can be used by using accessory pipe A and joint pipe C.
  Ready joint C yourself. Need not accessory pipe B.



- φ28.58(OD) size of the refrigerant gas pipe can be used by using accessory pipe A and joint pipe C,D.
  Ready joint C and D yourself.



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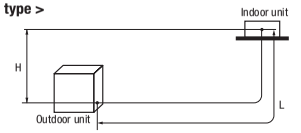

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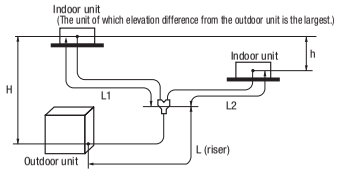

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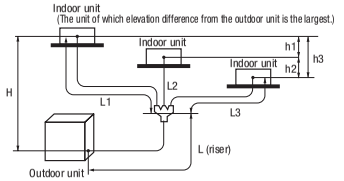
Type A



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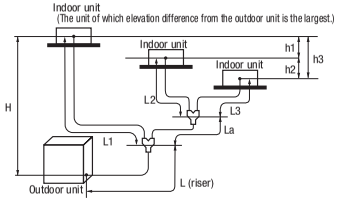
Type B



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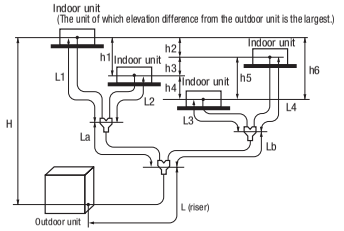
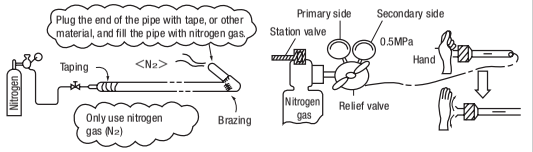


About brazing

Brazing 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.



4) Refrigerant pipe wall thickness and material

- Select refrigerant pipes of the table shown on the right wall thickness and material as specified for each pipe size.
- This unit uses R410A. Always use 1/2H pipes having a 1.0mm or thicker wall for ϕ19.05 or larger pipes, because O-type pipes do not meet the pressure resistance requirement.

Pipe diameter [mm]	6.35	9.52	12.7	15.88	22.22	25.4	28.58
Minimum pipe wall thickness [mm]	0.8	0.8	0.8	1.0	1.0	1.0	1.0
Pipe material*	O-type pipe	O-type pipe	O-type pipe	O-type pipe	1/2H-type pipe	1/2H-type pipe	1/2H-type pipe

*Phosphorus deoxidized seamless copper pipe C1220T, JIS H3300

NOTE

- Select pipes having a wall thickness larger than the specified minimum pipe thickness.

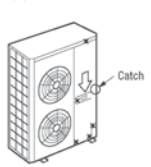
5) On-site piping work

⚠IMPORTANT

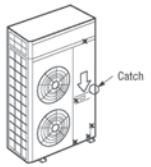
- Take care so that installed pipes may not touch components within a unit. If touching with an internal component, it will generate abnormal sounds and/or vibrations.

How to remove the service panel

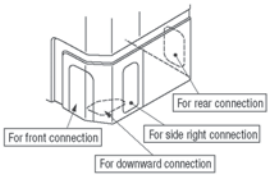
First remove the five screws (× mark) of the service panel and push it down into the direction of the arrow mark and then remove it by pulling it toward you.



Model 200V



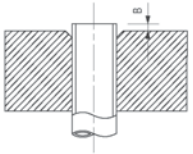
Model 250V



- The pipe can be laid in any of the following directions: side right, front, rear and downward.
- Remove a knock-out plate provided on the pipe penetration to open a minimum necessary area and attach an edging material supplied as an accessory by cutting it to an appropriate length before laying a pipe.
- Carry out the on site piping work with the operation valve fully closed.
- Give sufficient protection to a pipe end (compressed and blazed, or with an adhesive tape) so that water or foreign matters may not enter the piping.
- Bend a pipe to a radius as large as practical.(R100~R150) Do not bend a pipe repeatedly to correct its form.
- Flare connection is used between the unit and refrigerant pipe. Flare a pipe after engaging a flare nut onto it. Flare dimensions for R410A are different from those for conventional R407C. Although we recommend the use of flaring tools designed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a protrusion control gauge.
- Use accessory pipes.
  For detailed installation procedures, consult with the installation manual attached to your accessory pipe.
- The pipe should be anchored every 1.5m or less to isolate the vibration.
- Tighten a flare joint securely with a double spanner.

Flared pipe end: A (mm)

Copper pipe outer diameter	A $^{0}_{-0.4}$
ϕ6.35	9.1
ϕ9.52	13.2
ϕ12.7	16.6
ϕ15.88	19.7



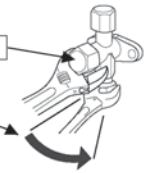
Copper pipe protrusion for flaring: B (mm)

Copper pipe outer diameter	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
ϕ6.35	0~0.5	0.7~1.3
ϕ9.52		
ϕ12.7		
ϕ15.88		

⚠ CAUTION **Do not apply force beyond proper fastening torque in tightening the flare nut.**

Fix both liquid and gas service valves at the valve main bodies as illustrated on the right, and then fasten them, applying appropriate fastening torque.

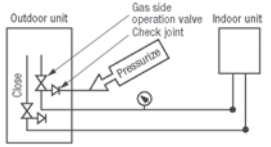
Operation valve size (mm)	Tightening torque (N-m)	Tightening angle (°)	Recommended length of a tool handle (mm)
ϕ6.35 (1/4")	14~18	45~60	150
ϕ9.52 (3/8")	34~42	30~45	200
ϕ12.7 (1/2")	49~61	30~45	250
ϕ15.88(5/8")	68~82	15~20	300
ϕ19.05(3/4")	100~120	15~20	450



6) Air tightness test

① Although outdoor and indoor units themselves have been tested for air tightness at the factory, check the connecting pipes after the installation work for air tightness from the operation valve's check joint equipped on the outdoor unit side. While conducting a test, keep the operation valve shut all the time.
a) Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes 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 fall 1℃, the pressure also fall 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.

② In conducting an air-tightness test, use nitrogen gas and pressurize the system with nitrogen gas from the gas side. Do not use a medium other than nitrogen gas under any circumstances.

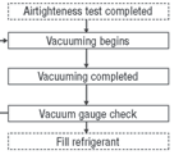


7) Evacuation

<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.

Run the vacuum pump for at least one hour after the vacuum gauge shows -101kPa or lower. (-755mmHg or lower)
Confirm that the vacuum gauge indicator does not rise even if the system is left for one hour or more.



Pay attention to the following points in addition to the above for the R410A and compatible machines.

- To prevent a different oil from entering, 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.

8) Additional refrigerant charge

(1) Calculate a required refrigerant charge volume from the following table.

<Single type>

Item / Capacity	Standard refrigerant charge volume (kg)	Pipe length for standard refrigerant charge volume (m)	Additional charge volume (kg) per meter of refrigerant piping (liquid pipe)	Refrigerant volume charged for shipment at the factory (kg)	Installation's pipe length (m) covered without additional refrigerant charge
Model 200V	3.6	0	0.06 (Liquid piping ϕ9.52)	5.4	30
			0.12 (Liquid piping ϕ12.7)		
Model 250V			0.12	7.2	

<Twin, triple, W-twin type>

Item / Capacity	Standard refrigerant charge volume (kg)	Pipe length for standard refrigerant charge volume (m)	Additional charge volume (kg) per meter of refrigerant piping (liquid pipe)		Refrigerant volume charged for shipment at the factory (kg)	Installation's pipe length (m) covered without additional refrigerant charge
			Main pipe	Branch pipe		
Model V200	3.6	0	0.06		5.4	30
Model V250			0.12	0.06	7.2	

- A standard refrigerant charge volume means a refrigerant charge volume for an installation with 0m long refrigerant piping.
- This unit contains factory charged refrigerant covering 30m of refrigerant piping and additional refrigerant charge on the installation site is not required for an installation with up to 30m refrigerant piping. When refrigerant piping exceeds 30m, additionally charge an amount calculated from the pipe length and the above table for the portion in excess of 30m.
- **When refrigerant piping is shoter than 3m, reduce refrigerant by 1kg from factory charged volume and adjust to 4.4kg(Model 200V) or 6.2kg(Model 250V).**
- If an existing pipe system is used, a required refrigerant charge volume will vary depending on the liquid pipe size. For further information, see " 6. UTILIZATION OF EXISTING PIPING."

Formula to calculate the volume of additional refrigerant required

Model 200V	In the case of ϕ9.52mm liquid piping	Additional charge volume (kg) = { Main pipe length (m) – Length covered without additional charge 30 (m) } x 0.06 (kg/m) + Total length of branch pipes (m) x 0.06 (kg/m)
	In the case of ϕ12.7mm liquid piping	Additional charge volume (kg) = { Main pipe length (m) – Length covered without additional charge 30 (m) } x 0.12 (kg/m) + Total length of branch pipes (m) x 0.06 (kg/m)
Model 250V		

*When an additional charge volume calculation result is negative, it is not necessary to charge refrigerant additionally.

- **To charge refrigerant again, recover refrigerant from the system first and then charge the volume calculated from the above table (Standard refrigerant charge volume + branch pipes charge volume)**

(2) Charging refrigerant

- Since R410A refrigerant must be charged in the liquid phase, you should charge it, keeping the container cylinder upside down or using a refrigerant cylinder equipped with a siphon tube.
- Charge refrigerant always from the liquid side service port with the operation valve shut. When you find it difficult to charge a required amount, fully open the outdoor unit valves on both liquid and gas sides and charge refrigerant from the gas (suction) side service port, while running the unit in the cooling mode. In doing so, care must be taken so that refrigerant may be discharged from the cylinder in the liquid phase all the time. When the cylinder valve is throttled down or a dedicated conversion tool to change liquid-phase refrigerant into mist is used to protect the compressor, however, adjust charge conditions so that refrigerant will gasify upon entering the unit.
- In charging refrigerant, always charge a calculated volume by using a scale to measure the charge volume.
- When refrigerant is charged with the unit being run, complete a charge operation within 30 minutes. Running the unit with an insufficient quantity of refrigerant for a long time can cause a compressor failure.

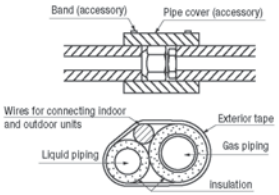
NOTE Put down the refrigerant volume calculated from the pipe length onto the caution label attached on the back side of the service panel.

9) Heating and condensation prevention

(1) Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.

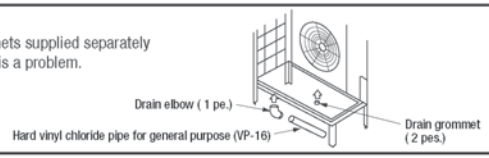
(2) Use a heat insulating material that can withstand 120℃ or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.

- Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.
- All gas pipes must be securely heat insulated in order to prevent damage from dripping water that comes from the condensation formed on them during a cooling operation or personal injury from burns because their surface can reach quite a high temperature due to discharged gas flowing inside during a heating operation.
- Wrap indoor units' flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).
- 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.
- Although it is verified in a test that this air conditioning unit shows satisfactory performance under JIS condensation test conditions, **both gas and liquid pipes need to be dressed with 20 mm or thicker heat insulation materials above the ceiling where relative humidity exceeds 70%.**



3. DRAIN PIPING WORK

- Execute drain piping by using a drain elbow and drain grommets supplied separately as optional parts, where water drained from the outdoor unit is a problem.



- ○ There are 3 drain holes provided on the bottom plate of an outdoor unit to discharge condensed water.
- ○ When condensed water needs to be led to a drain, etc., install the unit on a flat base (supplied separately as an optional part) or concrete blocks.
- ○ Connect a drain elbow as shown in the illustration and close the other two drain holes with grommets.

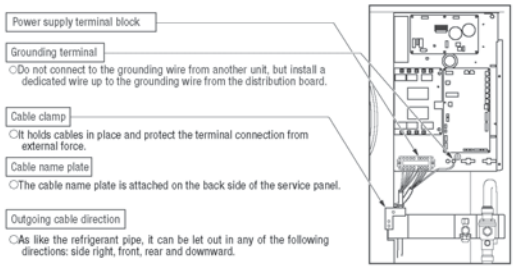
4. ELECTRICAL WIRING WORK For details of electrical cabling, refer to the indoor unit installation manual.

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.

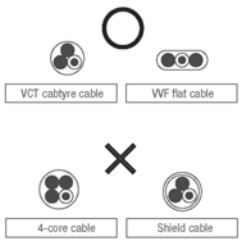
- Do not use any supply cord lighter than one specified in parentheses for each type below.
  - braided cord (code designation 60245 IEC 51),
  - ordinary tough rubber sheathed cord (code designation 60245 IEC 53)
  - flat twin tinsel cord (code designation 60227 IEC 41);

  Do not use anything lighter than polychloroprene sheathed flexible cord (code designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.
- 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.
- A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.
- The installation of an impulse withstanding type earth leakage breaker is necessary. A failure to install an earth leakage breaker can result in an acccident such as an electric shock or a fire.
- Do not turn on the power until the electrical work is completeted .
- Do not use a condensive capacitor for power factor improvement under any circumstances. (It dose not improve power factor, while it can cause an abnormal overheat accident)
- For power supply cables, use conduits.
- Do not lay electronic control cables (remote control and signaling wires) and other cables together outside the unit. Laying them together can result in the malfunctioning or a failure of the unit due to electric noises.
- Fasten cables so that may not touch the piping, etc.
- When cables are connected, 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.)
- Always use a three-core cable for an indoor-outdoor connecting cable. Never use a shield cable.

- Connect a pair bearing a common terminal number with an indoor-outdoor connecting wire.
- In cabling, fasten cables securely with cable clamps so that no external force may work on terminal connections.
- Grounding terminals are provided in the control box.



Model 200V, 250V

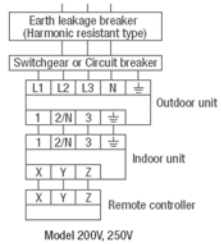


Power cable, indoor-outdoor connecting wires

- Always perform grounding system installation work with the power cord unplugged.

⚠ CAUTION

Always use an earth leakage circuit breaker designed for inverter circuits to prevent a faulty operation.



Model 200V, 250V

Model	Power source	Power cable thickness (mm²)	MAX. over current (A)	Cable length (m)	Grounding wire thickness	Indoor-outdoor wire thickness × number
200V	3 phase 4 wire 380-415V 50Hz 380V 60Hz	3.5	19	21	φ1.6mm	φ1.6mm x 3
250V		5.5	22	31		

Model	Power source	Power cable thickness (mm²)	MAX. over current (A)	Cable length (m)	Grounding wire thickness	Indoor-outdoor wire thickness × number
200V	3 phase 4 wire 380-415V 50Hz 380V 60Hz	5.5	24	29	φ1.6mm	φ1.6mm x 3
250V			27	26		

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear or Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

5. TEST RUN

⚠ WARNING

- Before conduct a test run, do not fail to make sure that the operation valves are closed.
- Turn on power 6 hours prior to a test run to energize the crank case heater.
- Always give a 3-minute or longer interval before you start the unit again whenever it is stopped.

} A failure to observe these instructions can result in a compressor breakdown.

- Removing the service panel will expose high-voltage live parts and high-temperature parts, which are quite dangerous. Take utmost care not to incur an electric shock or burns. Do not leave the unit with the service panel open.

⚠ CAUTION

- When you operate switches (SW3, SW5) for on-site setting, be careful not to touch a live part.
- You cannot check discharge pressure from the liquid operation valve charge port.
- The 4-way valve (20S) is energized during a heating operation.
- When power supply is cut off to reset the unit, give 3 or more minutes before you turn on power again after power is cut off. If this procedure is not observed in turning on power again, "Communication error between outdoor and indoor unit" may occur.

1) Test run method

(1) A test run can be initiated from an outdoor unit by using SW3-3 and SW3-4 for on-site setting.
(2) Switching SW3-3 to ON will start the compressor.
(3) The unit will start a cooling operation, when SW3-4 is OFF, or a heating operation, when SW3-4 is ON.
(4) **Do not fail to switch SW3-3 to OFF when a test run is completed.**

SW-3-3	SW-3-4	
ON	OFF	Cooling during a test run
	ON	Heating during a test run
OFF	—	Normal or After the test operation

2) Checking the state of the unit in operation

Use check joints provided on the piping before and after the four-way valve installed inside the outdoor unit for checking discharge pressure and suction pressure.
As indicated in the table shown on the right, pressure detected at each point will vary depending on whether a cooling or heating operation has been selected.

	Check joint of the pipe	Charge port of the gas operation valve
Cooling operation	Discharge pressure (High pressure)	Suction pressure (Low pressure)
Heating operation	Suction pressure (Low pressure)	Discharge pressure (High pressure)

3) Setting SW3-1, SW3-2, J7 on-site

(1) Defrost control switching (SW3-1)
- ·When this switch is turned ON, the unit will run in the defrost mode more frequently.
- ·Set this switch to ON, when installed in a region where outdoor temperature falls below zero during the season the unit is run for a heating operation.

(2) Snow guard fan control (SW3-2)
- ·When this switch is turned on, the outdoor unit fan will run for 10 seconds in every 10 minutes, when outdoor temperature falls to 3℃ or lower and the compressor is not running.
- ·When the unit is used in a very snowy country, set this switch to ON.

(3) Higth pressure control (J7)
- ·When the option parts that change air flow from outlet are used, cut (open) J7. Cut the jumper wire into two parts and ensure that they are kept isolated from each other.

4) Failure diagnosis in a test run

Error indicated on the remote control unit	Printed circuit board LED(The cycles of 5 seconds)		Failure event	Action
	Red LED	Green LED		
E34	Blinking once	Blinking continuously	Open phase	Check power cables for loose contact or disconnection
E40	Blinking once	Blinking continuously	63H1 actuation or operation with operation valves shut (occurs mainly during a heating operation)	1. Check whether the operation valves are open. 2. If an error has been canceled when 3 minutes have elapsed since a compressor stop, you can restart the unit by effecting Check Reset from the remote control unit.
E49	Blinking once	Blinking continuously	Low pressure error or operation with operation valves shut (occurs mainly during a cooling operation)	

● If an error code other than those listed above is indicated, refer to the wiring diagram of the outdoor unit and the indoor unit.

5) The state of the electronic expansion valve.

The following table illustrates the steady states of the electronic expansion valve.

	When power is turned on	When the unit comes to a normal stop		When the unit comes to an abnormal stop	
		During a cooling operation	During a heating operation	During a cooling operation	During a heating operation
Valve for a cooling operation	Complete shut position	Complete shut position	Full open position	Full open position	Full open position
Valve for a heating operation	Full open position	Full open position	Complete shut position	Full open position	Full open position

6) Heed the following on the first operation after turning on the circuit breaker.

This outdoor unit may start in the standby mode (waiting for a compressor startup), which can continue up to 30 minutes, to prevent the oil level in the compressor from lowering on the first operation after turning on the circuit breaker. If that is the case, do not suspect a unit failure.

Items to checkbefore a test run

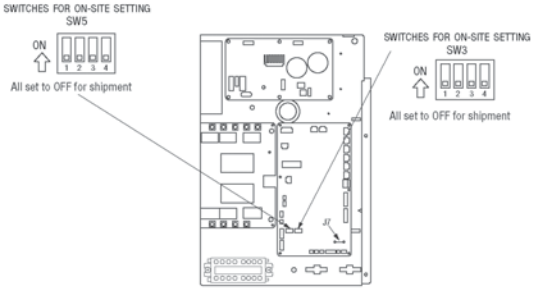
● When you leave the outdoor unit with power supplied to it, be sure to close the panel.

Item No.used in the installation manual	Item	Check item	Check
2	Refrigerant plumbing	If brazed, was it brazed under a nitrogen gas flow?	
		Were air-tightness test and vacuum extraction surely performed?	
		Are heat insulation materials installed on both liquid and gas pipes?	
		Are operation valves surely opened for both liquid and gas systems?	
		Have you recorded the additional refrigerant charge volume and refrigerant pipe length on the panel's label?	
4	Electric wiring	Is the unit free of cabling errors such as uncompleted connection, an absent or reversed phase?	
		Are properly rated electrical equipments used for circuit breakers and cables?	
		Doesn't cabling cross-connect between units, where more than one unit are installed?	
		Aren't indoor-outdoor signal wires connected to remote control wires?	
		Do indoor-outdoor connecting cables connect between the same terminal numbers?	
		Are either VCT cabtyre cables or WF flat cables used for indoor-outdoor connecting cables?	
		Does grounding satisfy the D type grounding (type III grounding) requirements?	
		Is the unit grounded with a dedicated grounding wire not connected to another unit's grounding wire?	
		Are cables free of loose screws at their connection points?	
		Are cables held down with cable clamps so that no external force works onto terminal connections?	
—	Indoor unit	Is indoor unit installation work completed?	
		Where a face cover should be attached onto an indoor unit, is the face cover attached to the indoor unit?	

Test run procedure

● Always carry out a test run and check the following in order as listed.

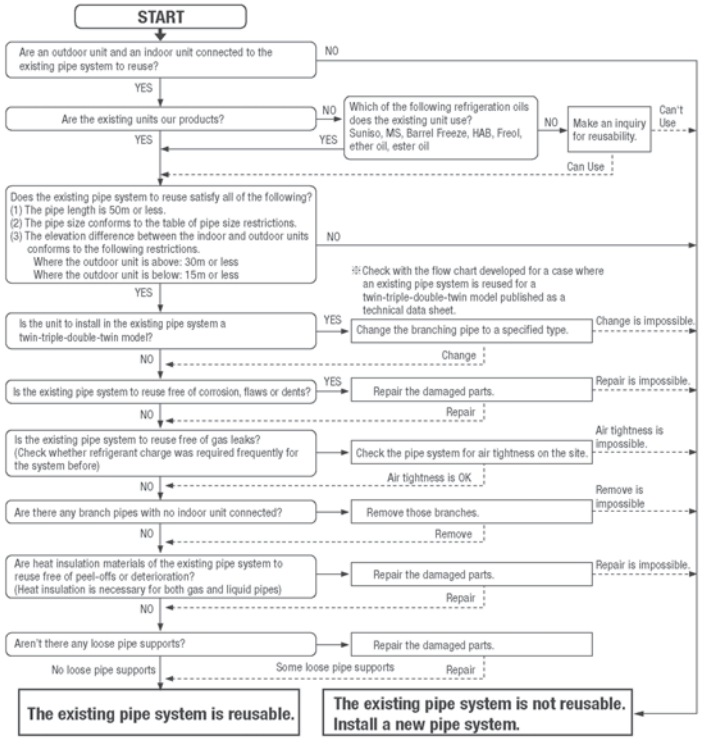
Turn	The contents of operation	Check
①	Open the gas side operation valve fully.	
②	Open the liquid side operation valve fully.	
③	Close the panel.	
④	Where a remote control unit is used for unit setup on the installation site, please follow instructions for unit setup on the installation site with a remote control unit.	
⑤	SW3-3 ON / SW3-4 OFF: the unit will start a cooling operation.	
	SW3-3 ON / SW3-4 ON: the unit will start a heating operation.	
⑥	When the unit starts operation, press the wind direction button provided on the remote control unit to check its operation.	
⑦	Place your hand before the indoor unit's diffuser to check whether cold (warm) winds come out in a cooling (heating) operation.	
⑧	Make sure that a red LED is not blinking.	
⑨	When you complete the test run, do not forget to turn SW3-3 to the OFF position.	
⑩	Where options are used, check their operation according to the respective instruction manuals.	



Model 200V, 250V

6. UTILIZATION OF EXISTING PIPING.

Check whether an existing pipe system is reusable or not by using the following flow chart.



⚠ WARNING <Where the existing unit can be run for a cooling operation.>

Carry out the following steps with the excising unit (in the order of (1), (2), (3) and (4))

(1) Run the unit for 30 minutes for a cooling operation.
(2) Stop the indoor fan and run the unit for 3 minutes for a cooling operation (returning liquid)
(3) Close the liquid side operation valve of the outdoor unit and pump down (refrigerant recovery)
(4) Blow with nitrogen gas. ※ If discolored refrigeration oil or any foreign matters is discharged by the blow, wash the pipe system or install a new pipe system.
- For the flare nut, do not use the old one, but use the one supplied with the outdoor unit. Process a flare to the dimensions specified for R410A.
- **Turn on-site setting switch SW5-1** to the ON position. (Where the gas pipe size is φ19.05)

<Where the existing unit cannot be run for a cooling operation.>

Wash the pipe system or install a new pipe system.
- If you choose to wash the pipe system, contact our distributor in the area.

<Table of pipe size restrictions> ◎:Standard pipe size ○:Usable △:Restricted to shorter pipe length limits
Cool↓: Cooling capacity drop ×:Not usable

Additional charging amount of refrigerant per 1m		0.06kg/m			0.12kg/m			0.2kg/m		
Pipe size	Liquid pipe	φ9.52	φ9.52	φ9.52	φ12.7	φ12.7	φ12.7	φ15.88	φ15.88	φ15.88
	Gas pipe	φ22.22	φ25.4※2	φ28.6※2	φ22.22	φ25.4	φ28.6	φ22.22	φ25.4	φ28.6
200V	Usability	◎	○	○	◎	△※3	△※3	△※3	△※3	×
	Maximum one-way pipe length	35	70	70	35	70	70	24	24	×
	Length covered without additional charge	30	30	30	30	15	15	9	9	×
250V	Usability	×	×	×	◎	○	○	△※3	△※3	△※3
	Maximum one-way pipe length	×	×	×	35	70	70	40	40	40
	Length covered without additional charge	×	×	×	30	30	25	18	18	13

※1 Because of its insufficient pressure resistance, **turn the dip switch SW5-1** provided on the outdoor unit board to the ON position for φ19.05 × t1.0.
(In the case of a twin-triple-double-twin model, this also applies to the case where φ19.05 × t1.0 is used in a pipe system after the first branching point.
However, you need not turn the dip switch SW5-1 to the ON position, if 1/2H pipes or pipes having 1.2 or thicker walls are used.
※2 When the main pipe length exceeds 40m, a significant capacity drop may be experienced due to pressure loss in the liquid pipe system. Use φ12.7 for the liquid main.
※3 Keep the total pipe length, not one-way pipe length, below the specified maximum pipe length.

- **When refrigerant piping is shoter than 3m, reduce refrigerant by 1kg from factory charged volume and djust to 4.4kg(Model 200V) or 6.2kg(Model 250V).**
- Any combinations of pipe sizes not listed in the table or marked with × in the table are not usable.

<Pipe system after the branching pipe> ◎:Standard pipe size ○:Usable ×:Not usable —: Outside of an object

- Any combinations of pipe sizes not listed in the table or marked with × in the table are not usable.

			After 1st branch※4			After 2nd branch		
Additional charging amount of refrigerant per 1m			0.06kg/m			0.06kg/m		
Pipe size	Liquid pipe		φ9.52			φ9.52		
	Gas pipe		φ12.7	φ15.88	φ19.05※1	φ12.7	φ15.88	φ19.05※1
Model	Combination type	Combination of capacity						
200V	Twin	100+100	×	◎	○	—	—	—
	Triple A	71+71+71	×	◎	○	—	—	—
	Triple B	71+71+71	×	◎	○※5	×	◎	○
	Double twin	50+50+50+50	×	◎	○	◎	○	×
250V	Twin	125+125	×	◎	○	—	—	—
	Triple A	—	—	—	—	—	—	—
	Triple B	60+60+125	×	◎	○※5	◎	×	×
	Triple B	71+71+100	×	◎	○※5	×	◎	×
	Double twin	60+60+60+60	×	◎	○	◎	○	×

※4 Piping size after branch should be equal or smaller than main pipe size.
※5 Piping size from first branch to indoor unit should be φ9.52 (Liquid) / φ15.88 (Gas).

<The model types of existing units of which branching pipes are reusable.>

Models later than Type 8.
- FDC＊＊＊8□□□
- FDCP＊＊＊8□□□

The branching pipes used with models other than those listed above are not reusable because of their insufficient pressure resistance. Please use our genuine branching pipes for R410A.

- ＊＊＊ are numbers representing horsepower. □□□ is an alphanumeric letter.

Formula to calculate additional charge volume

Additional charge volume (kg) = {Main pipe length (m) − Length covered without additional charge shown in the table (m)} × Additional charge volume per meter of pipe shown in the table (kg/m) + Total length of branch pipes (m) × Additional charge volume per meter of pipe shown in the table (kg/m)

※ If you obtain a negative figure as a result of calculation, no additional refrigerant needs to be charged.

Example) When an 250V (twin installation) is installed in a 40m long existing pipe system (main pipe length 30m, liquid φ15.88, gas φ25.4; pipe length after branching pipe 5m x 2, liquid φ9.52, gas φ15.88), the quantity of refrigerant to charge additionally should be (30m-18m) x 0.2kg/m + 5m x 2 x 0.06kg/m = 3.0 kg.

PSB012D917C K

(4) Method for connecting the accessory pipe (Models FDC200,250 only)

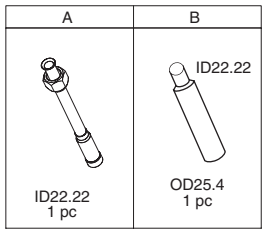
Be sure to use the accessory pipe to connect the operation valve on the gas side with the field pipe.

① Referring to Table ① and Table ②, prepare the straight pipe and the elbow in the field, which are used in the construction examples Ⓐ ~ Ⓓ applicable to the connecting direction.

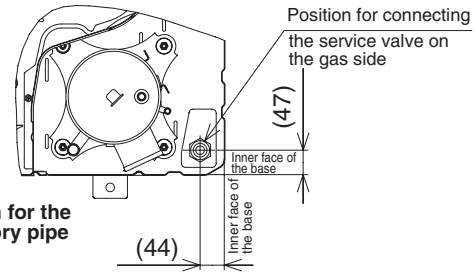
② Firstly, use the accessory pipe to assemble the connecting pipe assembly outside the outdoor unit.
As shown in the figures of construction examples Ⓐ ~ Ⓓ applicable to the connecting direction(chain double dashed line), braze the accessory pipe and the parts prepared in the above ①.

③ After assembly of the connecting pipe, connect it to the service valve on the gas side inside the outdoor unit.
Tighten the flare nut with appropriate torque.

④ After connection of the connecting pipe assembly to the service valve on the gas side, braze the connecting pipe assembly and the field pipe.



Appropriate torque	
ϕ19.05	100~120N·m



Position for the accessory pipe

Table ① Parts used for the connecting pipe assembly

No.	Name	Qty.	Remarks
1	Accessory pipe A	1	Accessories
2	Straight pipe ①	1	Procured in the field
3	Straight pipe ②	1 or 0	Procured in the field (Not required for downward direction)
4	Elbow	1 or 0	Procured in the field (Not required for downward direction)

Table ② Length of the straight pipe (prepared in the field)

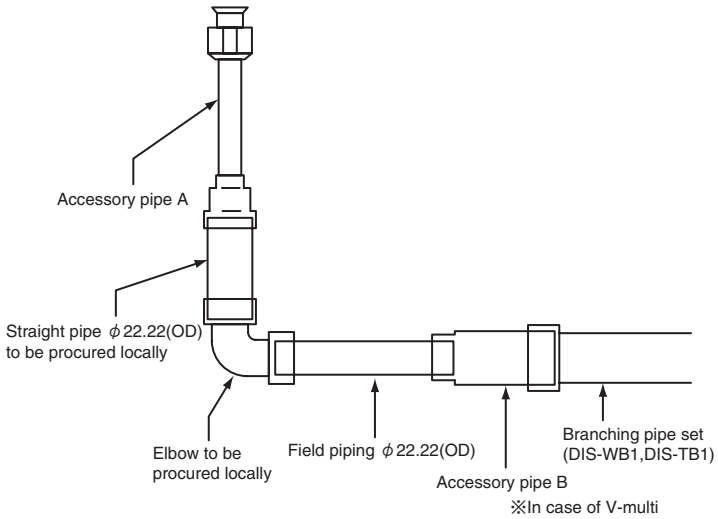
	Pipe size	Ⓐ Downward	Ⓑ Forward	Ⓒ Rightward	Ⓓ Backward
Straight pipe①	ϕ22.22×t1.6	above 415mm	185~235mm	185~235mm	185~235mm
Straight pipe②	ϕ22.22×t1.6	–	above 125mm	above 125mm	above 405mm

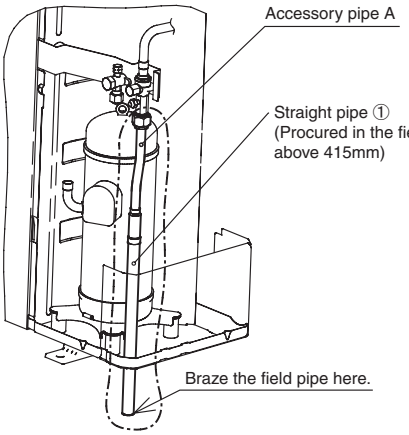
- Be sure to use pipes of 1/2H material, and wall thickness above 1mm. (Pressure resistance of O-type pipe is not enough)
- Switch ON SW5-1 on the control PCB, if O-type pipe must be used and bent with the bender.
  During heating operation, the high-pressure protection may be actuated under the condition lower than the normal pressure, and the heating capacity may decrease.

About brazing

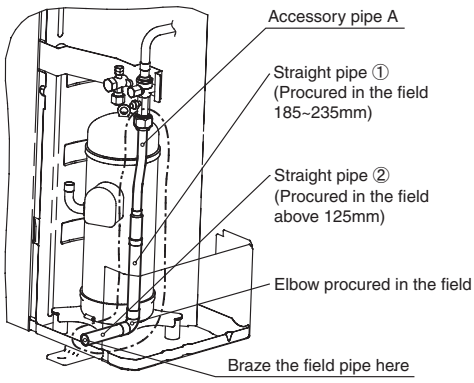
- **Be sure to braze while supplying nitrogen gas.**
  If no nitrogen gas is supplied, a large amount of impurity (oxidized fi lm) will be generated, which may clog the capillary tube and the expansion valve, resulting in fatal malfunction.

- Branching pipe set can be used by using the accessory pipe B. When ϕ22.22(OD) size of the indoor unitgas pipe is used, the accessory pipe B is unnecessory.

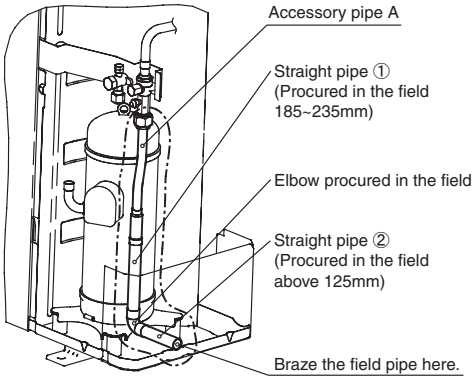




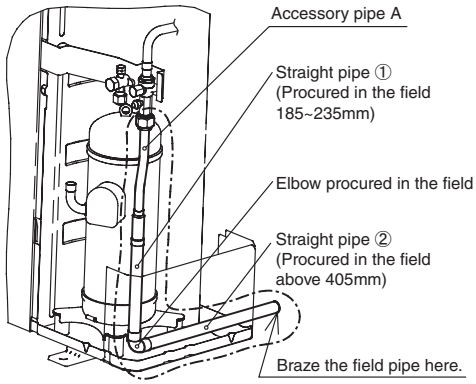
Construction example Ⓐ
(Downward)



Construction example Ⓑ
(Forward)



Construction example Ⓒ
(Rightward)



Construction example Ⓓ
(Backward)

9.4 Instructions for branching pipe set (DIS-WA1, WB1, TA1, TB1)

For R410A

PSB012D865 F

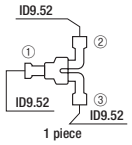
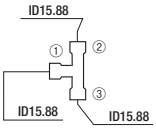
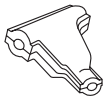
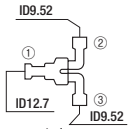
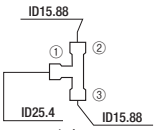
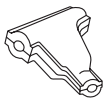
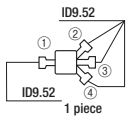
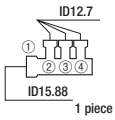
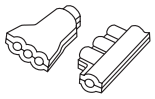
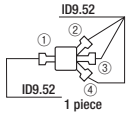
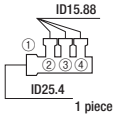
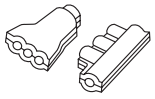
⚠ WARNING / CAUTION

- This set is for R410A refrigerant.
- Select a branching pipe set correctly rated for the combined total capacity of connected indoor units and install it according to this manual.
  An improperly installed branching pipe set can cause degraded performance or an abnormal unit stop.
- Provide good heat insulation to the pipes by following instructions contained in this manual.
  Improper heat insulation can result in degraded performance or a water leak accident from condensation.
- Please make sure that only parts supplied as accessories or the manufacturer's approved parts are used in installing the unit, because a leak of refrigerant can result in a lack-of-oxygen accident, if it reaches a concentration beyond the tolerable limit.

This manual explains how to use a branching pipe set that is indispensable in connecting pipes for a twin/triple/W-twin configuration installation (system). For the details of piping work, unit installation work and electrical installation work, please refer to the installation manuals and installation guides supplied with your outdoor and indoor units.

1. Branching pipe set specifications

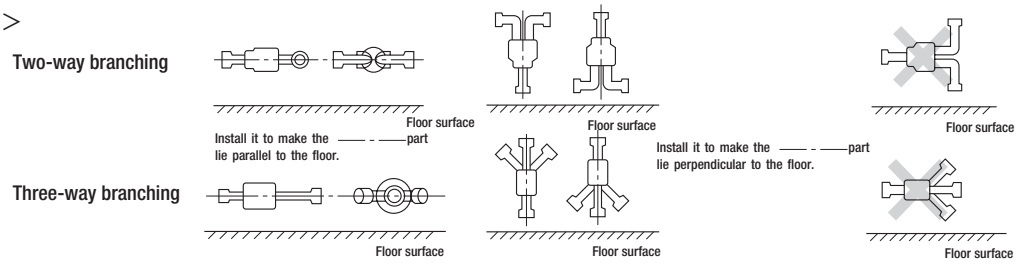
(1) Please make sure that you have chosen the right branching pipe set and the specifications of the parts contained in it by checking with the table below.
(2) Connect pipes as illustrated in the table below. The pipe from an outdoor unit must be brazed to the pipe connection port "①" and the pipes from indoor units to "②," "③" and "④."

Branching pipe set type	Supported outdoor/indoor unit combinations		Part lists			
	Outdoor unit model	Indoor unit model	Branching pipe set for a liquid pipe	Branching pipe set for a gas pipe	Different diameter pipe joint	Heat insulation material
DIS-WA1 (Two-way branching set)	3HP	1.5HP＋1.5HP	 1 piece	 1 piece	Joint A ID9.52 2 pieces Flare joint (for indoor unit side connection) Joint B OD15.88 2 pieces ID12.7	 One each for liquid and gas
	4HP	2HP＋2HP				
		1.5HP＋2.5HP				
	5HP	2.5HP＋2.5HP				
		2HP＋3HP				
	6HP	3HP＋3HP				
		2HP＋4HP				
DIS-WB1 (Two-way branching set)	8HP	4HP＋4HP	 1 piece	 1 piece	Joint C 1 piece OD12.7 ID9.52	 One each for liquid and gas
		3HP＋5HP				
	10HP	5HP＋5HP				
DIS-TA1 (Three-way branching set)	6HP	2HP＋2HP＋2HP	 1 piece	 1 piece	Joint A ID9.52 3 pieces Flare joint (for indoor unit side connection)	 One each for liquid and gas
DIS-TB1 (Three-way branching set)	8HP	3HP＋3HP＋3HP	 1 piece	 1 piece	Joint A ID9.52 2 pieces Flare joint (for indoor unit side connection) Joint B OD15.88 1 piece ID12.7 Joint D ID12.7 1 piece OD9.52	 One each for liquid and gas

ID stands for inner diameter and OD, outer diameter.

(3) A branching pipe set must always be installed into the posture as illustrated in the drawing below.

＜Posture to install into＞

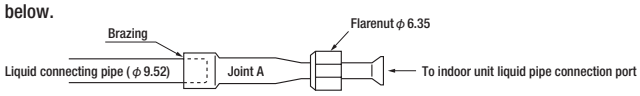


2. Pipe connecting procedure

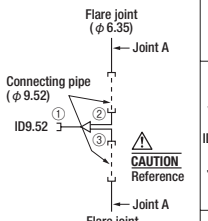
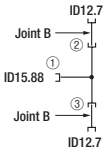
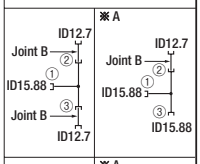
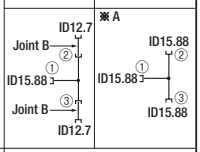
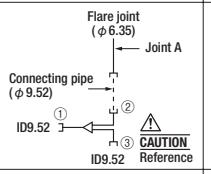
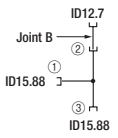
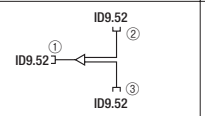
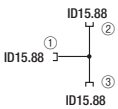
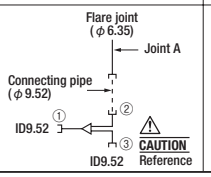
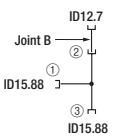
Braze the different diameter pipe joint found in the set matching the connected outdoor and indoor unit capacities according to the instructions set out below.

⚠ CAUTION

In connecting an indoor unit of which capacity is 1.5HP, 2HP or 2.5HP, always use a φ9.52 liquid pipe to connect to the branching pipe (branching pipe – indoor unit).
In connecting to an indoor unit (liquid pipe side: φ6.35), use the different diameter pipe joint A supplied with the set and follow the procedure set out below.

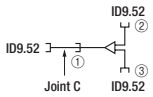
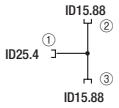
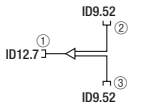
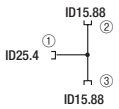


2-1 DIS-WA1

Supported combinations		Liquid branching pipe	Gas branching pipe
Outdoor unit model	Indoor unit model		
3HP	1.5HP＋1.5HP		
4HP	2HP＋2HP		
	1.5HP＋2.5HP		
5HP	2.5HP＋2.5HP		
	2HP＋3HP		
6HP	3HP＋3HP		
	2HP＋4HP		

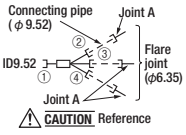
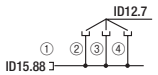
Note When connect the indoor unit of an old model that is shown in the model list, use the joint supplied with the branch piping set like ※A

2-2 DIS-WB1

Supported combinations		Liquid branching pipe	Gas branching pipe
Outdoor unit model	Indoor unit model		
8HP	3HP＋5HP		
	4HP＋4HP		
10HP	5HP＋5HP		

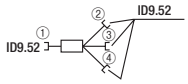
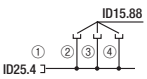
2-3 DIS-TA1

Applicable to the difference in length of pipes after the branch being less than 3 m
* Connection is not allowed when the difference in length of pipes is larger than 3 m.

Supported combinations		Liquid branching pipe	Gas branching pipe
Outdoor unit model	Indoor unit model		
6HP	2HP＋2HP＋2HP		

2-4 DIS-TB1

Applicable to the difference in length of pipes after the branch being less than 3 m
* Connection is not allowed when the difference in length of pipes is larger than 3 m.

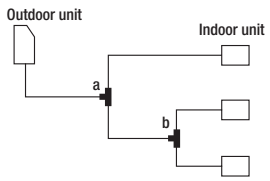
Supported combinations		Liquid branching pipe	Gas branching pipe
Outdoor unit model	Indoor unit model		
8HP	3HP＋3HP＋3HP		

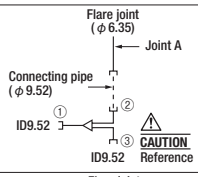
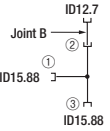
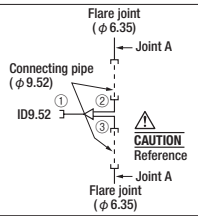
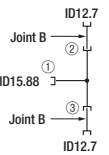
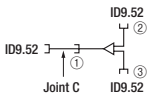
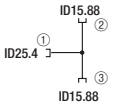
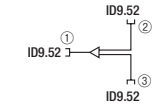
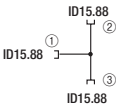
▷ OLD Model list

model name
FDTA251R
FDENA251R
FDKNA251R
FDURA251R
FDUMA252R

2-5. Triple type for same model/same capacity or different model/same capacity

When the difference in length of pipes after the branch is longer than 3 m and shorter than 10 m



Outdoor unit model	Indoor unit model	Branching pipe	Branching pipe set type	Liquid branching pipe	Gas branching pipe
6HP	2HP＋2HP＋2HP	a	DIS-WA1		
		b			
8HP	3HP＋3HP＋3HP	a	DIS-WB1		
		b	DIS-WA1		

10. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

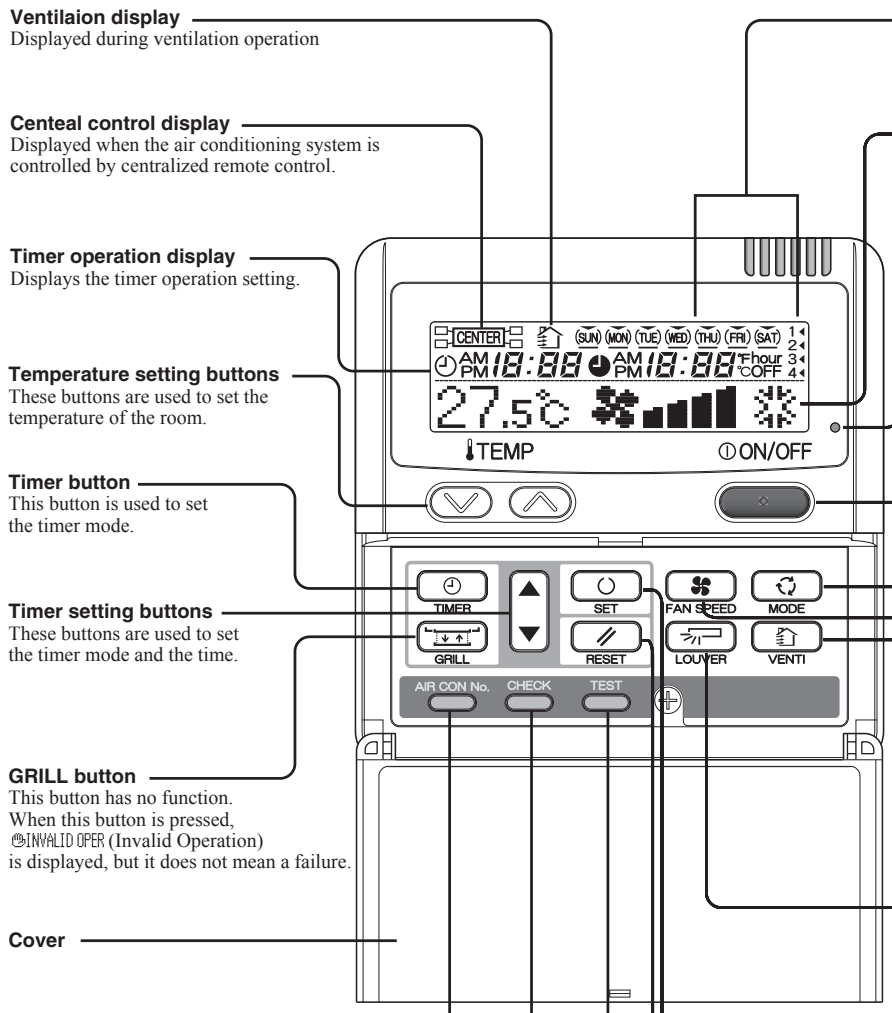
(1) Remote controller (installed)

(a) Remote controller (Model:RC-E4)

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

Characters displayed with dots in the liquid crystal display area are abbreviated.

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



Ventilaion display
Displayed during ventilation operation

Centeal control display
Displayed when the air conditioning system is controlled by centralized remote control.

Timer operation display
Displays the timer operation setting.

Temperature setting buttons
These buttons are used to set the temperature of the room.

Timer button
This button is used to set the timer mode.

Timer setting buttons
These buttons are used to set the timer mode and the time.

GRILL button
This button has no function.
When this button is pressed,
INVALID OPER (Invalid Operation)
is displayed, but it does not mean a failure.

Cover

AIR CON No. button
Display the indoor unit number connected to this remote controller.

CHECK button
This button is used at servicing.

TEST button
This button is used during test operation.

Weekly timer display
Displays the settings of the weekly timer.

Operation setting display area
Displays setting temperature, airflow volume, operation mode and oparation message.

Operation/check indicator light
During oparation: Lit in green
In case of error: Flashing in red

Operation/stop button
This button is used to operate and stop the air conditioning system.
Press the button once to operate the system and press it once again to stop the system.

MODE button
This button is used to change the operation mode.

FAN SPEED button
This button is used to set the airflow volume.

VENT button
This button is used to operate external ventilator.

LOUVER button
This button is used to operate/stop the swing louver.

SET button
•This button is used to fix the setting.
•This button is used to set the silent mode.

RESET button
•Press this button while making settings to go back to the previous operation.
•This button is also used to reset the "**FILTER CLEANING**" display. (Press it after cleaning the air filter)

∗ All displays are described in the liguid crystal display for explanation.

(2) Operation control function by the wired remote controller

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

(b) [CPU reset]

This functions when “CHECK” and “GRILL” buttons on the remote controller are pressed simultaneously. Operation is same as that of the power supply reset.

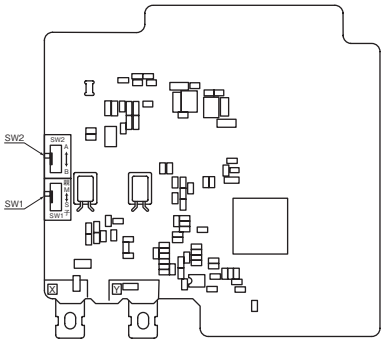
(c) [Power failure compensation function]...Electric power supply failure

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

Note (1) Items⑥, ⑦ and ⑧ are memorized regardless whether the power failure compensation is effective or not while the setting of silent mode is cancelled regardless whether the power failure compensation is effective or not.

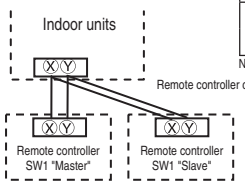
① At power failure – Operating/stopped
If it had been operating under the off timer mode, sleep timer mode, the state of stop is memorized. (Although the timer mode is cancelled at the recovery from power failure, the setting of weekly timer is changed to the holiday setting for all weekdays.)
② Operation mode
③ Airflow volume mode
④ Room temperature setting
⑤ Louver auto swing/stop
However, the stop position (4-position) is cancelled so that it returns to Position (1).
⑥ “Remote controller function items” which have been set with the remote controller function setting (“Indoor function items” are saved in the memory of indoor unit.)
⑦ Upper limit value and lower limit value which have been set with the temperature setting control
⑧ Sleep timer and weekly timer settings (Other timer settings are not memorized.)

[Parts layout on remote controller PCB]



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

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



Switch	Setting	Contents
SW1	M	Master remote controller
	S	Slave remote controller

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

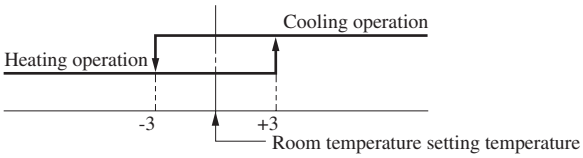
Caution

When using multiple remote controllers, the following dispiays or settings cannot be done with the slave remote controller. It is available only with the master remote controller.
①Louver position setting (set upper or lower limit of swinging range)
②Setting indoor unit functions
③Setting temperature range
④Operation data display
⑤Error data display
⑥Silent mode setting
⑦Test operation of drain pump
⑧Remote controller sensor setting

(3) Operation control function by the indoor controller

(a) Auto operation

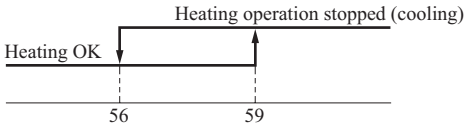
If "Auto" mode is selected by the remote controller, the heating and the cooling are automatically switched according to the difference between outdoor air temperature and setting temperature and the difference between setting temperature and return air temperature. (When the switching of cooling mode ↔ heating mode takes place within 3 minutes, the compressor does not operate for 3 minutes by the control of 3-minute timer.) This will facilitate the cooling/heating switching operation in intermediate seasons and the adaptation to unmanned operation at stores, etc (ATM corner of bank).



Room temperature (detected with Thı-A) [deg]

Note (1) Room temperature control during auto cooling/auto heating is performed according to the room temperature setting temperature. (DIFF: ±1 deg)

(2) If the indoor heat exchanger temperature rises to 59°C or higher during heating operation, it is switched automatically to cooling operation. In addition, for 1 hour after this switching, the heating operation is not performed, regardless of the temperature shown at right.



Indoor heat exchanger temperature (°C)

(b) Operations of functional items during cooling/heating

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

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

(2) ON during the drain motor delay control.

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

(c) Dehumidifying operation

1) When the humidity sensor is not provided

Return air temperature thermistor [Thı-A (by the remote controller when the remote controller thermistor is enabled)] controls the indoor temperature environment simultaneously.

a) Operation is started in the cooling mode. When the difference between the return air temperature and the setting temperature is 2°C or less, the indoor unit fan tap is brought down by one tap. That tap is retained for 3 minutes after changing the indoor unit fan tap.

b) If the return air temperature exceeds the setting temperature by 3°C during defrosting operation, the indoor unit fan tap is raised. That tap is retained for 3 minutes after changing the indoor unit fan tap.

c) If the thermostat OFF is established during the above control, the indoor unit fan tap at the thermostat ON is retained so far as the thermostat is turned OFF.

d) After stopping the cooling operation, the indoor unit continues to run at Lo for 15 seconds.

(d) Timer operation

1) Sleep timer

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

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

2) OFF timer

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

3) ON timer

Time to turn ON the air-conditioner can be set. Indoor temperature can be set simultaneously.

4) Weekly timer

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

5) Timer operations which can be set in combination

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

Note (1) ○: Allowed ×: Not

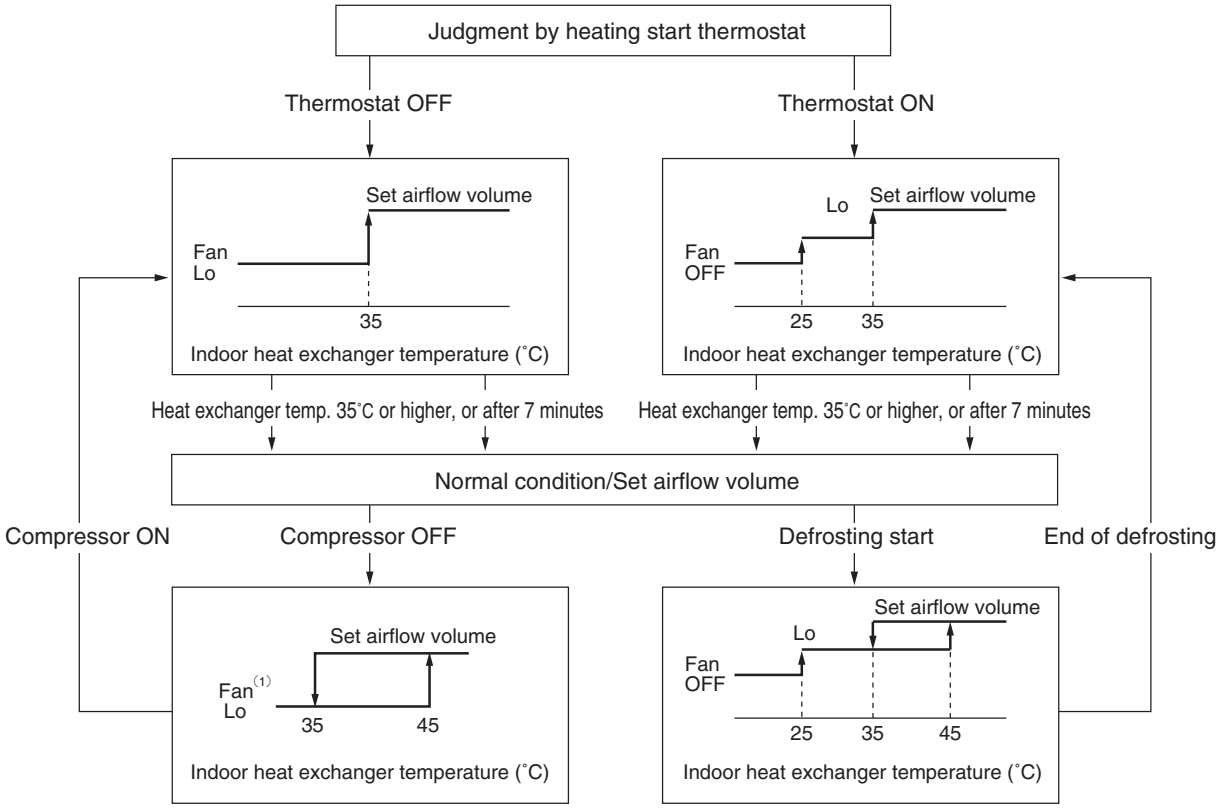
(e) Remote controller display during the operation stop

1) "Centralized control ON" is displayed always on the LCD under the "Center/Remote" and "Center" modes during the operation stop (Power ON). This is not displayed under the "Remote" mode.

2) If this display is not shown under the "Center/Remote" mode, check if the indoor unit power switch is turned on or not.

(f) Hot start (Cold draft prevention at heating)

At the startup of heating operation, at resetting of the thermostat, during defrost operation and at returning to heating, the indoor fan is controlled by the indoor heat exchanger temperature (detected with Thı-R) for preventing the cold draft.



Note (1) Heating preparation is displayed during the hot start (when the compressor is operating and the indoor fan does not provide the set airflow volume).

(g) Hot keep

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

1) Control
   a) When the indoor heat exchanger temperature (detected with Thı-R1 or R2) drops to 35°C or lower, the speed of indoor fan is changed to the lower tap at each setting.
   b) During the hot keep, the louver horizontal control signal is transmitted.
2) Ending condition
   When the indoor fan is at the lower tap at each setting, it returns to the set airflow volume as the indoor heat exchanger temperature rises to 45°C or higher.

(h) Thermostat operation

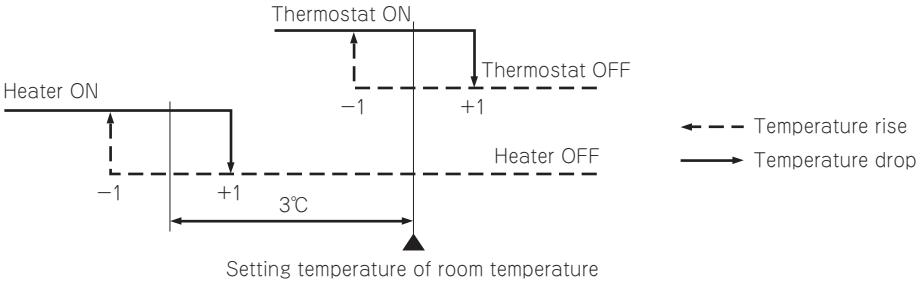
(1) Cooling

1) Thermostat is operated by the room temperature control.
2) Thermostat is turned ON or OFF depending on the setting temperatures of room temperature.

3) Thermostat is turned ON if the room temperature is in the range of -1 < Setting point < +1 at the start of heating operation (including from cooling to heating).

(2) Heating

1) Thermostat is operated by the room temperature control.
2) Thermostat is turned ON or OFF depending on the setting temperatures of room temperature.



3) Thermostat is turned ON if the room temperature is in the range of -1 < Setting point < +1 at the start of heating operation (including from cooling to heating).

(3) Fan control during the heating thermostat OFF

1) When the heating thermostat is turned OFF, following fan controls can be selected according to the indoor unit function setting on the wired remote controller.
   ① Low fan speed (Factory default) ② Set fan speed ③ Intermittent ④ Fan OFF
2) If "Low fan speed (Factory default)" is selected, the fan is operated with the indoor unit fan tap at ULo.
3) If "Set fan speed" is selected, the fan is operated with the set fan speed even if the thermostat is turned OFF.
4) If "Intermittent" is selected, following controls take place.
   a) The indoor unit on which the thermostat is turned OFF during heating operation changes to the hot control and, if the heat exchanger temperature sensors (both ThI-R1 and –R2) detect 25°C or lower, turns OFF the indoor fan.
   b) The indoor fan OFF is fixed for 5 minutes. When 5 minutes elapse, the indoor fan runs at ULo for 2 minutes. In the meantime, the lover is controlled at the horizontal position.
   c) After operating at ULo for 2 minutes, the indoor unit changes to the state of a) above.
   d) If the thermostat is turned ON, the unit changes to the hot start control.
   e) If the heating thermostat is turned OFF, the remote controller displays the temperature detected when the indoor fan is stopped. Thereafter, the temperature is updated when the indoor fan is changed from ULo to stop.
   The remote controller displays temperatures according to the operation data display control and updates temperatures even if the indoor fan is turned OFF.
   f) If the unit operation is changed to the defrosting mode while the heating thermostat is turned OFF or if the thermostat is turned OFF during defrosting, the indoor fan is turned OFF. (Hot keep and hot start controls override.) Suction temperature, however, is updated at every 7-munite.

g) If the heating thermostat is turned OFF or it is changed to other operation mode (including Fan OFF), this control stops and then it returns to the operating state.

5) If "Fan OFF" is selected, the fan on the unit on which the thermostat has been turned OFF is turned OFF. The fan on the unit on which the thermostat has been turned OFF is turned OFF also when the remote controller sensor is effective.

(i) Filter sign

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

Note (1) Time setting for the filter sign can be made as shown below using the indoor function of wired remote controller "FILTER SIGN SET". (It is set at 1 at the shipping from factory.)

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

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

(j) Compressor inching prevention control

1) 3-minute timer

When the compressor has been stopped by the thermostat, remote controller operation switch or anomalous condition, its restart will be inhibited for 3 minutes. However, the 3-minute timer is invalidated at the power on the electric power source for the unit.

2) 3-minute forced operation timer

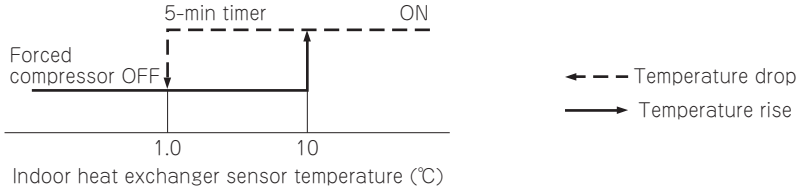
- Compressor will not stop for 3 minutes after the compressor ON. However, it stops immediately when the unit is stopped by means of the ON/OFF switch or by when the thermister turned OFF the change of operation mode.
- If the thermostat is turned OFF during the forced operation control of heating compressor, the louver position (with the auto swing) is returned to the level position.

Note (1) The compressor stops when it has entered the protective control.

(k) Indoor heat exchanger anti-frost (Frost protection)

(1) Forced compressor OFF

1) If the indoor heat exchanger (ThI-R1, -R2) detects the set temperature during "Cooling" or "Dehumidifying" operation, the compressor is turned "OFF".



2) Forced compressor OFF control of the anti-frost protection control is not operable for 4 minutes after the compressor OFF. If the indoor heat exchanger sensor (ThI-R1, -R2) detects temperatures higher than the forced compressor OFF temperature (1.0°C) after 4 minutes have elapsed from the compressor ON, the detection starts from the state that the compressor can be turned ON.

3) If the indoor heat exchanger sensor (ThI-R1 or -R2) detects temperatures lower than the forced compressor OFF temperature (1.0°C) for 5 minutes continuously after 4 minutes have elapsed from the compressor ON, the compressor is turned OFF forcibly. If temperatures of the indoor heat exchanger sensors (ThI-R1, -R2) enter in the range that the compressor can be turned ON, the compressor is turned ON.

4) "Anti-frost" signal is sent to the outdoor unit.

5) The forced compressor OFF temperature can be changed with the frost protection temperature of the wired remote controller indoor function setting.

- Temperature – Low: 1.0°C (Factory default)
- Temperature – High: 2.5°C

(2) Indoor fan control during frost protection control

When the frost protection control starts during cooling or dehumidifying operation, the indoor fan control is changed as follows.

a) When the indoor unit suction air temperature (detected with ThI-A) is higher than 23°C and the indoor heat exchanger sensors (ThI-R1, -R2) detect the frequency drop start temperature A°C + 1.0°C, the indoor fan speed is increased by 20 rps.
   - Frequency drop start temperature (A) – Low: 1.0°C (Factory default)
   - Frequency drop start temperature (A) – High: 2.5°C

b) When the indoor unit suction air temperature (detected with ThI-A) is higher than 23°C and the forced compressor OFF control by the frost protection control is operating, the indoor fan speed is increased by 1 tap.

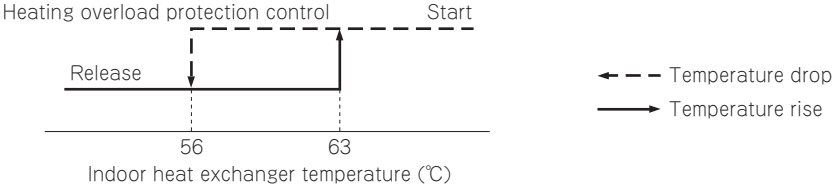
c) When, after increasing the indoor fan speed by the frost protection control, the indoor unit suction air temperature is higher than 23°C and the indoor heat exchanger sensors detect the frequency drop start temperature A°C + 1.0°C, the indoor fan speed is increased by 20 rps.

d) If the condition of b) above is detected again after increasing the indoor fan speed by the frost protection control, the indoor fan speed is raised by 1 tap.

e) Valid or invalid of fan control can be selected with the frost protection control of the wired remote controller indoor function.

(l) Heating overload protection

(1) If the indoor heat exchanger temperature (detected with ThI-R2, -R2) at 63°C or higher is detected for 2 seconds, the heating overload protection control starts and is released if temperatures at 56°C or lower are detected.



(2) First detection of heating overload

1) Compressor OFF signal is sent and the OFF control starts.
2) Compressor is turned ON if the thermostat is turned ON, and if the return air temperature (detected with ThI-A) at 31 °C or higher is detected for 2 seconds, the compressor s turned OFF forcibly.

(3) At second, third or fourth detection after detecting the heating overload

1) Compressor OFF signal is sent and the OFF control starts.
2) Compressor is turned ON if the thermostat is turned ON, and if the indoor fan speed is set at Me or Lo tap, the speed is increased by 1 tap.

(4) If fifth detection occurs within 60 minutes after the first and it is detected for 6 minutes continuously, the compressor stops with the anomalous stop (E8).

(m) Anomalous fan motor

After starting the fan motor, if the fan motor speed is 200rpm or less is detected for 30 seconds continuously and 4 times within 60 minutes, then fan motor stops with the anomalous stop (E16).

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

1) Function

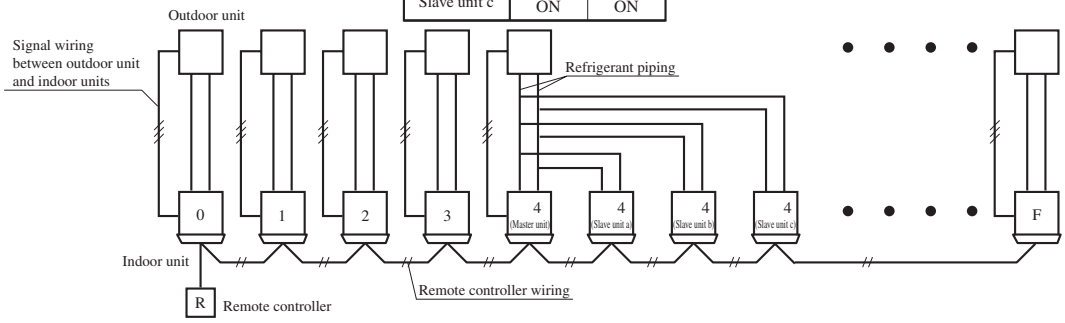
One remote controller switch can control a group of multiple number of unit (Max. 16 indoor units). "Operation mode" which is set by the remote controller switch can operate or stop all units in the group one after another in the order of unit No.(1). Thermostat and protective function of each unit function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

Note (1) Unit No. is set by SW2 on the indoor unit control PCB. Unit No. setting by SW2 is necessary for the indoor unit only. In cases of the twin, triple and double-twin specification, it is necessary set for the master and the slave units. This can be selected by SW5. (All are set for the master unit at the shipping from factory.)

SW2: For setting of 0 – 9, A – F
SW5: For setting of master and slave units
(See table shown at right.)

SW5 setting

Switch / Unit	SW5-1	SW5-2
Master unit	OFF	OFF
Slave unit a	OFF	ON
Slave unit b	ON	OFF
Slave unit c	ON	ON



(2) Unit No. may be set at random unless duplicated, it should be better to set orderly like 0, 1, 2…, F to avoid mistake.

2) Display to the remote controller

a) Center or each remote controller basis, heating preparation: the youngest unit No. among the operating units in the remote mode (or the center mode unless the remote mode is available) is displayed.

b) Inspection display, filter sign: Any of unit that starts initially is displayed.

c) Confirmation of connected units
Pressing "AIR CON No." button on the remote controller displays the indoor unit address. If "▲" "▼" button is pressed at the next, it is displayed orderly starting from the unit of youngest No.

d) In case of anomaly

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

ii) Signal wiring procedure
Signal wiring between indoor and outdoor units should be made on each unit same as the normal wiring. For the group control, lay connect with sires wiring between rooms using terminal blocks (X, Y) of remote controller.
Connect the remote controller communication wire separately from the power supply wire or wires of other electric devices (AC220V or higher).

(o) High ceiling control

In the case of indoor unit installed in a higher ceiling room, the airflow volume mode control can be changed with the wired remote controller indoor unit function "FAN SPEED SET".

Fan tap		Indoor unit airflow setting			
		🌬 - 🌬 - 🌬 - 🌬	🌬 - 🌬 - 🌬	🌬 - 🌬	🌬 - 🌬
FAN SPEED SET	STANDARD	PHi - Hi - Me - Lo	Hi - Me - Lo	Hi - Lo	Hi - Me
	HIGH SPEED1, 2	PHi - PHi - Hi - Me	PHi - Hi - Me	PHi - Me	PHi - Hi

Note (1) Factory default is Standard.
(2) At the hot-start and heating thermostat OFF, or other, the indoor unit fan is operated at the low speed tap of each setting.
(3) This function is not able to be set with wireless remote controls or simple remote control (RCH-E3)

(p) Abnormal temperature thermistor (return air/indoor heat exchanger) wire/short-circuit detection

1) Broken wire detection

When the return air temperature thermistor detects -50°C or lower or the heat exchanger temperature thermistor detect -50°C or lower for 5 seconds continuously, the compressor stops. After a 3-minute delay, the compressor restarts but, if it is detected again within 60 minutes after the initial detection for 6 minutes continuously, stops again (the return air temperature thermistor: E7, the heat exchanger temperature thermistor: E6).

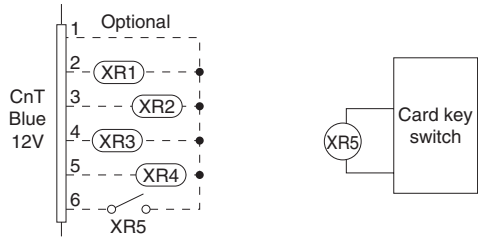
2) Short-circuit detection

If the heat exchanger temperature thermistor detects 70°C or higher for 5 seconds continuously at 2 minutes and 20 seconds after the compressor ON during cooling operation, the compressor stops (E6).

(q) Operation permission/prohibition

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

When the indoor function setting of wired remote controller for "Operation permission/prohibition" is changed from "Invalid (Factory default)" to " Valid", following control becomes effective.



	Normal operation (Factory default)		Operation permission/prohibition mode "Valid" (Local setting)	
CnT-6	ON	OFF	ON	OFF
	Operation	Stop	Operation permission*1	Operation prohibition (Unit stops)

*1 **Only the "LEVEL INPUT" is acceptable for external input**, however when the indoor function setting of "Level input (Factory default)" or "Pulse input" is selected by the function for "External input" of the wired remote controller, operation status will be changed as follows.

In case of "Level input" setting	In case of "Pulse input" setting
Unit operation from the wired remote controller becomes available*(1)	Unit starts operation *(2)

*(1) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Level input (Factory default)";

① When card key switch is ON (CnT-6 ON: Operation permission), start/stop operation of the unit from the wired remote controller becomes available.

② When card key switch is OFF (CnT-6 OFF: Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote controller becomes not available.

*(2) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Pulse input (Local setting)";

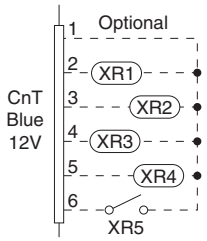
① When card key switch is ON (Operation permission), the unit starts operation in conjunction with ON signal. and also start/stop operation of the unit from the wired remote controller becomes available.

② When card key switch is OFF (Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote controller becomes not available.

(3) This function is invalid only at "Center mode" setting done by central controller.

(r) External input/output control (CnT)

Be sure to connect the wired remote controller to the indoor unit. Without wired remote controller remote operation by CnT is not possible to perform.



①Operation output	(CnT-2: XR1)
②Heating output	(CnT-3: XR2)
③Thermostat ON output	(CnT-4: XR3)
④Error output	(CnT-5: XR4)
⑤Remote operation input	(CnT-6: No-voltage contactor)

1) Output for external control (remote display)

Following output connectors (CnT) are provided on the indoor control PCB for monitoring operation status.

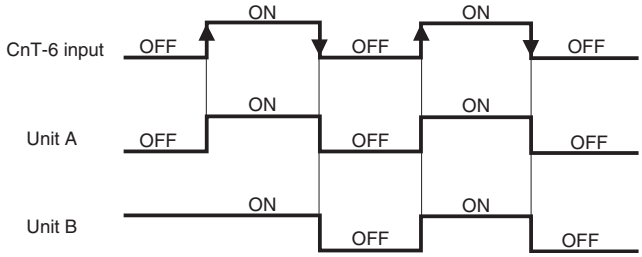
① **Operation output:** Outputs DC12V signal for driving relay during operation
② **Heating output:** Outputs DC12V signal for driving relay during heating operation
③ **Thermostat ON output:** Outputs DC12V signal for driving relay when compressor is operating.
④ **Error output:** Outputs DC12V signal for driving relay when anomalous condition occurs.

2) Remote operation input

Remote operation input connector (CnT-6) is provided on the indoor control PCB.
However remote operation by CnT-6 is not effective, when "Center mode" is selected by center controller.
In case of plural unit (twin, triple, double twin), remote operation input to CnT-6 on the slave indoor unit is invalid.
Only the "LEVEL INPUT" is acceptable for external input, however when the indoor function setting of "Level input (Factory default)" or "Pulse input" is selected by the function for "External input" of the wired remote controller, operation status will be changed as follows.

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

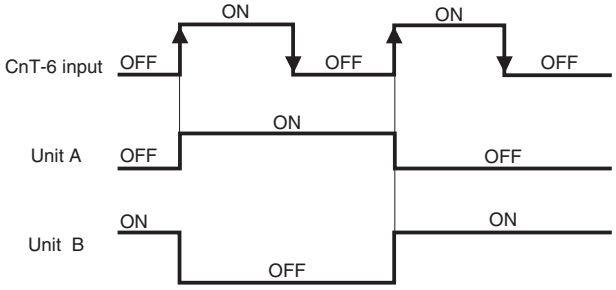
Input signal to CnT-6 is OFF→ON …… unit ON
Input signal to CnT-6 is ON→OFF …… unit OFF
Operation is not inverted.



Note: The latest operation has priority
It is available to operate/stop by remote controller or center controller

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

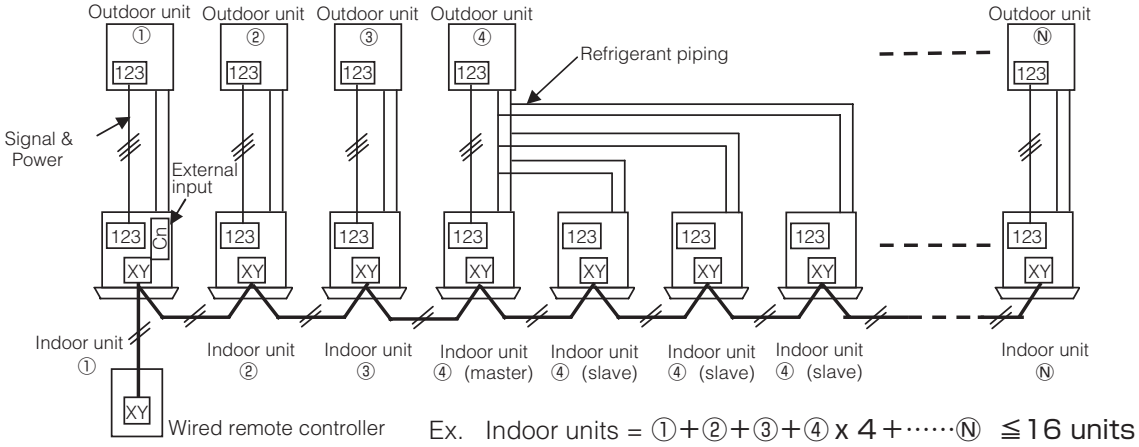
It is effective only when the input signal to CnT-6 is changed OFF→ON, and at that time unit operation [ON/OFF] is inverted.



3) Remote operation

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

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



	Individual operation (Factory default)		All units operation (Local setting)	
CnT-6	ON	OFF	ON	OFF
	Only the unit directly connected to the remote controller can be operated.	Only the unit directly connected to the remote controller can be stopped opeartion.	All units in one remote controller system can be operated.	All units in one remote controller system can be stopped operation.
	Unit ① only	Unit ① only	Units ① – Ⓝ	Units ① – Ⓝ

When more than one indoor unit (Max. 16 indoor units) are connected in one wired remote controller system:

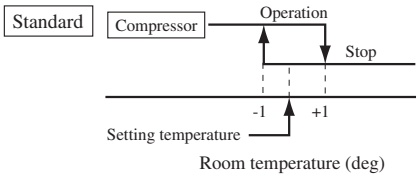
(1) With the factory default, external input to CnT-6 is effective for only the unit ①.

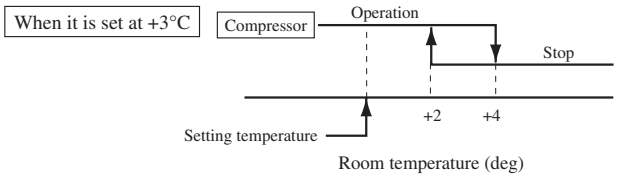
(2) When setting "For all unit" (Local setting), all units in one remote controller system can be controlled by external input to CnT-6 on the indoor unit ①.

(3) External input to CnT-6 on the other indoor unit than the unit ① is not effective.

(s) Room temperature detection temperature compensation during heating

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





(t) Return air temperature compensation

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

1) It is adjustable in the unit of 0.5°C with the wired remote controller indoor unit function "RETURN AIR TEMP".
   • +1.0°C, +1.5°C, +2.0°C • -1.0°C, -1.5°C, -2.0°C
2) Compensated temperature is transmitted to the remote controller and the compressor to control them.

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

(4) Operation control function by the outdoor controller

ESP-FP-1747

(I) Micro inverter series

(a) Determination of compressor speed (frequency)

Required frequency

1) Cooling/dehumidifying operation

Unit: rps

Model		100	125	140	200	250
Max. required frequency	Indoor unit air flow "P-Hi", "Hi"	90	105	105	100	120
	Indoor unit air flow "Me", "Lo"	60	80	85	70	80
Min. required frequency		20	20	20	30	30

2) Heating operation

Unit: rps

Model		100	125	140	200	250
Max. required frequency	Indoor unit air flow "P-Hi", "Hi"	90	105	110	100	120
	Indoor unit air flow "Me", "Lo"	60	80	85	70	80
Min. required frequency		20	20	20	30	30

3) If "Silent mode start" signal is received from the remote controller, the maximum required frequency becomes same as when the indoor air flow is set at "Lo".

4) Max. required frequency under high outdoor air temperature in cooling mode
Maximum required frequency is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		100	125	140	200	250
Max. required frequency	Outdoor air temperature is 40°C or higher	75	90	96	75	98
	Outdoor air temperature is 46°C or higher	75	75	75	66	66

5) Max. required frequency under outdoor air temperature in heating mode
Maximum required frequency is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		100	125	140	200	250
Max. required frequency	Outdoor air temperature is 18°C or higher	60	80	85	70	80
	Outdoor air temperature is 10°C or higher	90	105	110	100	120

6) Selection of max. required frequency by heat exchanger temperature
   1) Maximum required frequency is selected according to the outdoor unit heat exchanger temperature (Tho-R) during cooling/dehumidifying or according to the indoor unit heat exchanger temperature (Thı-R) during heating mode.
   2) When there are 3 indoor unit heat exchanger temperatures (Thı-R), whichever the highest applies,

Unit: rps

Model			100	125	140	200	250
Max. required frequency	Cooling/ dehumidifying	Outdoor unit heat exchanger temperature is 56°C or higher	90	100	100	100	120
	Heating	Indoor unit heat exchanger temperature is 56°C or higher	90	100	100	100	120

7) When any of the controls from 1) to 6) above may duplicate, whichever the smallest value among duplicated controls is taken as the maximum required frequency.

8) During heating, it is operated with the maximum required frequency until the indoor unit heat exchanger temperature becomes 40°C or higher.

(b) Compressor start control

1) Compressor starts upon receipt of the thermostat ON signal from the indoor unit.

2) However, at initial start after turning the power supply breaker, it may enter the standby state for maximum 30 minutes (" PREPARATION" is displayed on the remote controller) in order to prevent the oil loss in the compressor.
If the cooling/dehumidifying/heating operation is selected from the remote controller when the outdoor unit is in the standby state, " PREPARATION" is displayed for 3 seconds on the remote controller.

(c) Compressor soft start control

1) Compressor protection start I

[Control condition] Normally, the compressor operation frequency is raised in this start pattern.

[Control contents] a) Starts with the compressor's target frequency at **A** rps.
However, when the ambient air temperature (Tho-A) is 35°C or higher during cooling/dehumidifying or the indoor return air temperature (THI-A) is 25°C or higher during heating, it starts at **C** rps.

b) At 30 seconds after the start of compressor, its target frequency changes to **B** rps and the compressor is operated for 2 - 4 minutes with its operation frequency fixed at **B** rps.

Model	Operation mode	A rps	B rps	C rps
100~140	Cooling/Dehumidifying	55	55	30
	Heating	55	55	30
200, 250	Cooling/Dehumidifying	55	55	30
	Heating	55	55	30

2) Compressor protection start III

[Control condition] Number of compressor starts is only 1 counted after the power supply breaker ON.

[Control contents] Operates by selecting one of following start patterns according to the operation mode and the outdoor air temperature (Tho-A).

a) Low frequency operation control during cooling/dehumidifying

[Control condition] Upon establishing the conditions of compressor protection start III, the low frequency operation control is performed during cooling/dehumidifying.

[Control contents] ① Starts with the compressor's target frequency at **A** rps. When the outdoor air temperature (Tho-A) is 35°C or higher, it starts at **C** rps.
② At 30 seconds after the compressor start, the compressor's target frequency is changed to **B** rps and the compressor's operation frequency is fixed for 10 minutes.

Model	Operation mode	A rps	B rps	C rps
100~140	Cooling/Dehumidifying	55	55	30
200, 250	Cooling/Dehumidifying	55	30	30

b) Low frequency operation control during heating

[Control condition] When the conditions of compressor protection start III are established and one of following conditions ① and ② is satisfied, the low number of revolutions operation control is performed during heating.
① At 30 minutes or more after turning the power supply breaker on
② Compressor underneath temperature (Tho-H) is 4°C or higher and the difference from the outdoor air temperature (Tho-A) becomes 4°C or higher. [model 200, 250 only]

[Control contents] ① Starts the compressor with its target frequency at **A** rps. However, when the indoor unit return air temperature (THI-A) is 25°C or higher, it start at **C** rps.
② At 30 seconds after the start of compressor, the compressor's target frequency is changed to **B** rps and the compressor's operation frequency is fixed for 10 minutes.

Model	Operation mode	A rps	B rps	C rps
100~140	Heating	55	55	30
200, 250	Heating	55	30	30

(d) Outdoor unit fan control

1) Outdoor unit fan tap and fan motor speed

Unit: min^{-1}

Model	Mode	Fan motor tap						
100~140		① speed	② speed	③ speed	④ speed	⑤ speed	⑥ speed	⑦ speed
	Cooling/Dehumidifying	200	350	600	740	820	870	910 (950)(2)
	Heating	200	350	600	740	820	870	910 (950)(2)
200, 250(1)		① speed	② speed	③ speed	④ speed	⑤ speed	⑥ speed	⑦ speed
	Cooling/Dehumidifying	200	370	560 (600)(3)	820	850	910	950
	Heating	200	370	560 (600)(3)	820	850	910	950

Notes (1) Fan motor speed for model 200 and 250 are same for both upper and lower fan motor.
(2) Value in ( ) are for the model 125, 140.
(3) Value in ( ) are for the model 250.

2) Fan tap control during cooling/Defumidifying operation

Fan taps are selected depending on the outdoor unit heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note (1) It is detected by Tho-R1 or R2, whichever the higher.

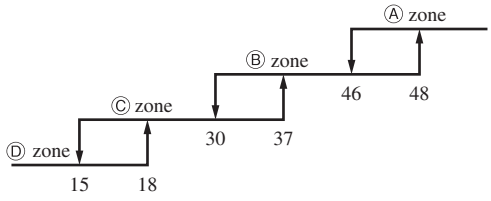
• Model 100 ~ 140

	Ⓐ zone	Ⓑ zone	Ⓒ zone	Ⓓ zone
ⓐ zone	Tap 5	Tap 5	Tap 5	Tap 4
ⓑ zone	Tap 5	Tap 5	Tap 4(1)	Tap 3
ⓒ zone	Tap 4	Tap 4(1)	Tap 3	Tap 2
ⓓ zone	Tap 3	Tap 3	Tap 2	Tap 1

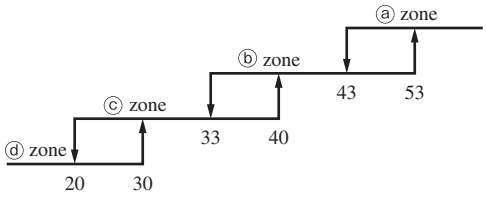
• Model 200, 250

	Ⓐ zone	Ⓑ zone	Ⓒ zone	Ⓓ zone
ⓐ zone	Tap 5	Tap 5	Tap 5	Tap 4
ⓑ zone	Tap 5	Tap 5	Tap 4(1)	Tap 3
ⓒ zone	Tap 4	Tap 4(1)	Tap 3	Tap 2
ⓓ zone	Tap 3	Tap 3	Tap 2	Tap 1

Note (1) In silent mode, the fan taps are shifted from "Tap 4" to "Tap 3" for all models.



Outdoor air temp. (˚C)



Outdoor unit heat exchanger temp. (˚C)

3) Fan tap control during heating operation

Fan taps are selected depending on the outdoor unit heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note (1) It is detected by Tho-R1 or R2, whichever the lower.

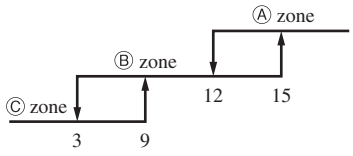
• Model 100 ~ 140

	Ⓐ zone	Ⓑ zone	Ⓒ zone
ⓐ zone	Tap 3	Tap 3	Tap 4
ⓑ zone	Tap 3	Tap 4	Tap 5
ⓒ zone	Tap 4	Tap 5	Tap 6

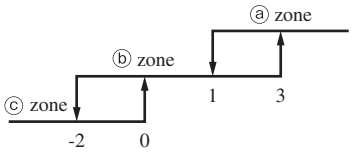
• Model 200, 250

	Ⓐ zone	Ⓑ zone	Ⓒ zone
ⓐ zone	Tap 3	Tap 3	Tap 4(1)
ⓑ zone	Tap 3	Tap 4(1)	Tap 5
ⓒ zone	Tap 4	Tap 5	Tap 6

Note (1) In silent mode, the fan taps are shifted from "Tap 4" to "Tap 3" for all models.



Outdoor air temp. (˚C)

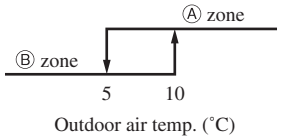


Outdoor unit heat exchanger temp. (˚C)

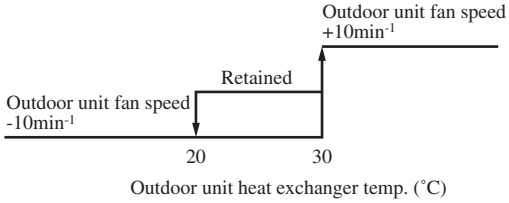
4) Outdoor unit fan control at cooling low outdoor air

a) When all the following conditions are established after the start of compressor, the following control is implemented. If the outdoor air temperature (Tho-A) is in the zone Ⓑ in the cooling/dehumidifying mode, it has elapsed 20 seconds from the start of outdoor unit fan and the outdoor unit fan is at the tap 1 speed, the outdoor unit fan speed is controlled according to the outdoor unit heat exchanger temperature (Tho-R1, R2).

Note (1) It is detected with Tho-R1 or R2, whichever the higher.



Outdoor air temp. (˚C)



Outdoor unit heat exchanger temp. (˚C)

Note (1) In silent mode, the fan taps are shifted from "Tap 4" to "Tap 3" for all models.

b) The outdoor unit heat exchanger temperature is detected always and, when the number of revolutions of the outdoor fan speed has been increased or decreased, there is no change of fan speed for 20 seconds.

c) Rage of the outdoor unit fan speed under this control is as follows.
   ① Lower limit: 130rpm
   ② Upper limit: 500rpm

d) As any of the following conditions is established, this control terminates.
   i) When the outdoor air temperature is in the zone Ⓐ and the outdoor unit heat exchanger temperature at 30°C or higher is established for 40 seconds or more continuously.
   ii) When the outdoor fan speed is 500rpm and the outdoor unit heat exchanger temperature at 30°C or higher is established for 40 seconds or more continuously.
   iii) When the outdoor unit heat changer temperature at 45°C or higher is established for 40 seconds or more.

5) Outdoor unit fan control by the power transistor radiator fin temperature

When all the following conditions are established later than 3 minutes after the start of compressor, the following control is implemented.

a) Cooling/dehumidifying
   ① Outdoor air temperature Tho-A ≧ 33°C
   ② Compressor's actual frequency ≧ **A** rps
   ③ Power transistor radiator fin temperature ≧ **C** °C

b) Heating
   ① Outdoor air temperature Tho-A 16°C
   ② Compressor's actual frequency ≧ **B** rps
   ③ Power transistor radiator fin temperature ≧ **C** °C

c) Control contents
   i) Raises the outdoor unit fan tap by 1 tap.
   ii) When the sampling is for 60 minutes and the value of power transistor radiator fin temperature (Tho-P) is as follows.
   ① When the power transistor radiator fin temperature (Tho-P) ≧ **C** °C, the outdoor unit fan tap is raised by 1 speed further.
   ② When **C** °C > power transistor radiator fin temperature (Tho-P) ≧ **D** °C, present outdoor unit fan tap is maintained.
   ③ When the power transistor radiator fin temperature (Tho-P) ≧ **D** °C, the outdoor unit fan tap is dropped by 1 speed.

d) Ending conditions

   When the operation under the condition of item ii), ③ above and with the outdoor unit fan tap, which is determined by the item 2) is detected 2 times consecutively.

   • Compressor's frequency and power transistor radiator fin temperature

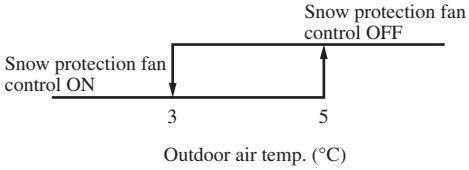
Item / Model	A	B	C	D
100~140	85	85	72	68
200, 250	70	70	80	75

6) Caution at the outdoor unit fan start control

When the outdoor unit fan is running at 400min^{-1} before operating the compressor, it may operate with the compressor only, without starting up the outdoor fan This is normal.

7) Snow protection fan control

If the dip switch (SW3-2) on the outdoor unit control PCB is turned ON, the outdoor unit fan is operated for 30 seconds at 4 tap speed once in every 10 minutes depending on the outdoor air temperature (detected with Tho-A) in the stop mode or anomalous stop mode.



(e) Defrosting

1) Defrosting start conditions

If all of the following defrosting conditions A or conditions B are met, the defrosting operation starts.

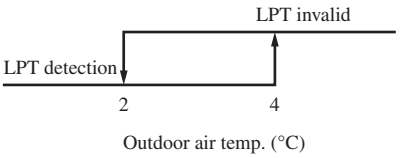
a) Defrosting conditions A

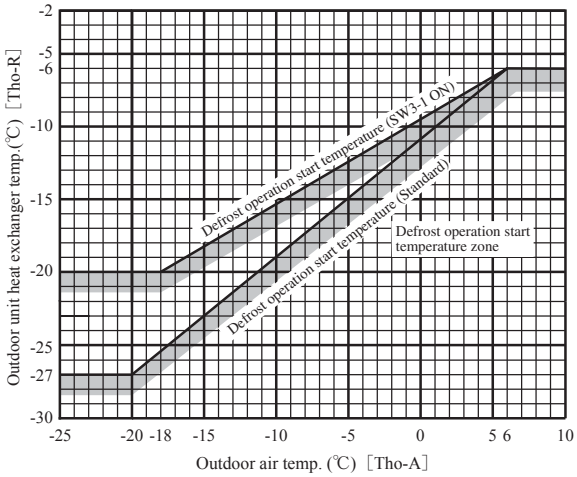
i) Cumulative compressor operation time after the end of defrosting has elapsed 37 minutes, and the cumulative compressor operation time after the start of heating operation (remote controller ON) has elapsed 30 minutes.

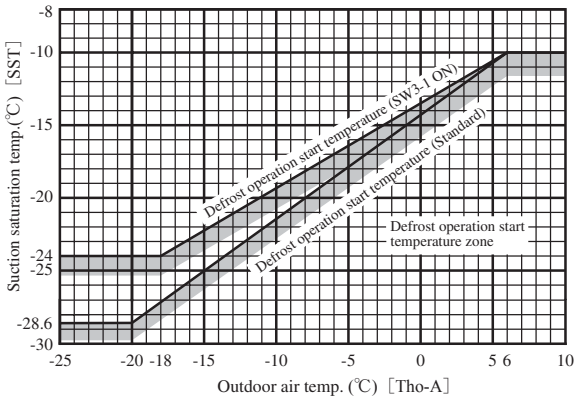
ii) After 5 minutes from the compressor ON

iii) After 5 minutes from the start of outdoor unit fan

iv) After satisfying all above conditions, if temperatures of the outdoor unit heat exchanger temperature thermistor (Tho-R1, R2) and the outdoor air temperature thermistor (Tho-A) become lower than the defrosting start temperature as shown by the right figure for 15 seconds continuously, or the suction gas saturation temperature (SST) and the outdoor air temperature (Tho-A), which are obtained from the value detected by the low pressure sensor (LPT) stay for 3 minutes within the range below the defrosting operation start temperature as shown by the right figure. However, it excludes for 10 minutes after the start of compressor and the outdoor air temperature is as shown by the lower figure.







b) Defrosting conditions B

i) When previous defrosting end condition is the time out of defrosting operation and it is in the heating operation after the cumulative compressor operation time after the end of defrosting has become 30 minutes.

ii) After 5 minutes from the start of compressor

iii) After 5 minutes from the start of outdoor unit fan

2) Defrosting end conditions

When any of the following conditions is satisfied, the defrosting end operation starts.

a) When it has elapsed 8 minutes and 20 seconds after the start of defrosting. (After 10 minutes and 20 seconds for model, 200 and 250)

b) When the outdoor unit heat exchanger temperatures (Tho-R1, R2), whichever the lower, becomes 12°C or higher for 10 seconds continuously.

3) Switching of defrosting control with SW3-1

a) If SW3-1 on the outdoor unit control PCB is turned to ON, it becomes easier to enter the defrosting operation. Use this when installing a unit at snowing regions.

b) Control contents

i) It allows entering the defrosting operation under the defrosting condition A when the cumulative heating operation time becomes 30 minutes. It is 37 minutes at SW3-1 OFF (Factory default).

ii) It allows entering the defrosting operation under the defrosting condition B when the cumulative heating operation time becomes 25 minutes. It is 30 minutes at SW3-1 OFF (Factory default).

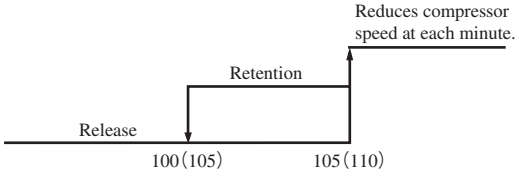
iii) It allows the defrosting operation with the outdoor unit heat exchanger temperature (Tho-R) and suction pressure saturation temperature (SST) being higher than normal.

(f) Protective control/anomalous stop control by compressor's number of revolutions

1) Compressor discharge pipe temperature protection

a) Protective control

As the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of discharge pipe temperature.

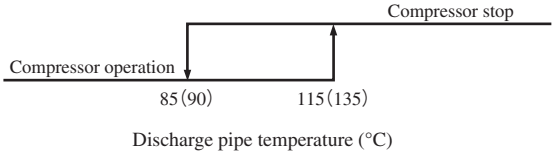


Note (1) Value in ( ) are for the model 200, 250.

b) Anomalous stop control

i) If the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor stops.

ii) When it is detected 2 times within 60 minutes or after continuous 60 minutes, including the stop of compressor, E36 is displayed on the remote controller and it enters the anomalous stop mode.



Note (1) Value in ( ) are for the model 200, 250.

c) Reset of anomalous stop mode

As it drops to the reset value of 85°C (90°C) or lower for 45 minutes continuously, it becomes possible to restart from the remote controller.

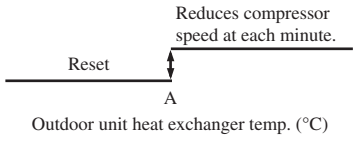
Note (1) Value in ( ) are for the model 200, 250.

2) Cooling high pressure protection

a) Protective control

i) When the outdoor air temperature (Tho-A) is 40°C or higher and the outdoor unit heat exchanger temperature (Tho-R) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of high pressure.

ii) Control value A is updated to an optimum value automatically according to the operating conditions.

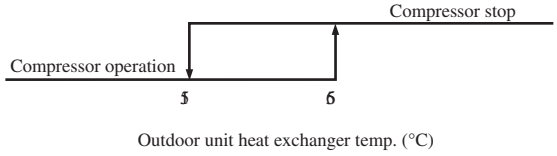


Control value A
54~60°C

b) Anomalous stop control

i) As the outdoor unit heat exchanger temperature (Tho-R) exceeds the setting value, the compressor stops.

ii) If it is detected 5 times within 60 minutes or 65°C or higher continues for 60 minutes, including the stop of compressor, E35 is displayed on the remote controller and it enters the anomalous stop mode.

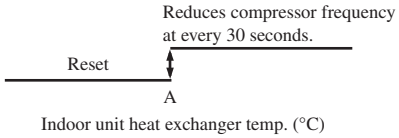


c) Reset of anomalous stop mode

As it reaches the reset value of 51°C or lower, it becomes possible to restart from the remote controller.

3) Heating high pressure protection

a) Protective control
   i) As the indoor unit heat exchanger temperature (Thi-R) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of high pressure.
   ii) Control value A is updated to an optimum value automatically according to the operating conditions.

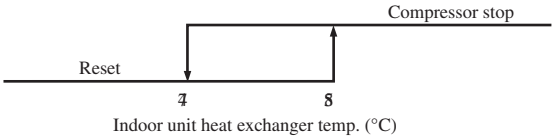


Model	Existing piping adaptation switch: SW5-1 (SW8-1: model 80)	
	OFF (Shipping)	ON
	Control value A (°C)	
100~140	48~54	46~52
200, 250	52~58	

Note (1) Adaptation to existing piping is at ON.

b) Anomalous stop control
Operation control function by the indoor unit controller - See the heating overload protection, page 93.

c) Adaptation to existing piping, stop control
If the existing piping adaptation switch, SW5-1, is turned ON, the compressor stops to protect existing piping when the indoor unit heat exchanger temperature (Thi-R) exceeds the setting value.

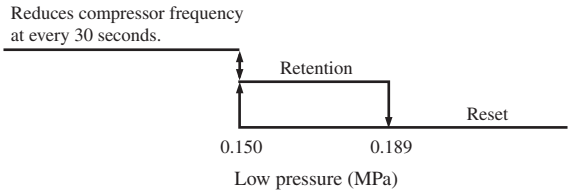


4) Anomaly detection control by the high pressure switch (63H1)

a) If the pressure rises and operates the high pressure switch (opens at 4.15MPA/closes at 3.15MPa), the compressor stops.
b) Under any of the following conditions, E40 is displayed and it enters the anomalous stop mode.
   ① When it occurs 5 times within 60 minutes that pressure rises and the compressor is stopped by 63H1.
   ② When 63H1 has been in the open state for 60 minutes continuously, including the stop of compressor.

5) Low pressure control

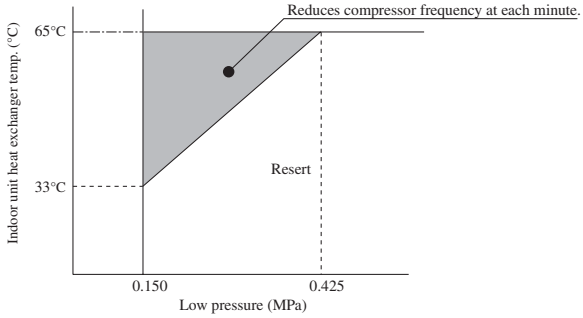
a) Protective control
If the value detected by the low pressure sensor (LPT) exceeds the setting value, the compressor speed (frequency) is controlled to restrain the drop of pressure.



b) Anomalous stop control
   i) When a value detected by the low pressure sensor (LPT) satisfies any of the following conditions, the compressor stops to run for its protection.
      ① When the low pressure drops to 0.079MPa or under for 15 seconds continuously.
      ② At 10 minutes after the start of compressor, the suction overheat becomes 30°C and the low pressure becomes 0.15MPa or under for 60 seconds continuously.
   ii) E49 is displayed under any of the following conditions and it enters the anomalous stop mode.
      a) When the low pressure drops 3 times within 60 minutes and the compressor stops under any of the above conditions.
      b) When a value detected with the low pressure sensor becomes 0.079MPa or under for 5 minutes, including the stop of compressor.
   iii) However, when the control condition ① is established during the compressor protection start III, E49 is displayed at initial stop and it enters the anomalous stop mode.

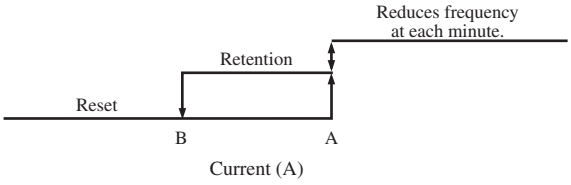
6) Compressor pressure ratio protection control

a) During heating operation, if the indoor unit heat exchanger temperature (Thi-R) and the outdoor unit heat exchanger temperature (Tho-R) exceed the setting values at 10 minutes after the start of compressor, the compressor speed (frequency) is controlled to protect the compressor.
b) This control is not performed during the outdoor fan ON and for 10 minutes from the start of outdoor unit fan.
c) This control is not performed during defrosting operation and at 10 minutes after the reset of defrosting operation.
d) When there are 3 indoor unit heat exchanger temperatures (Thi-R), the highest temperature is detected.

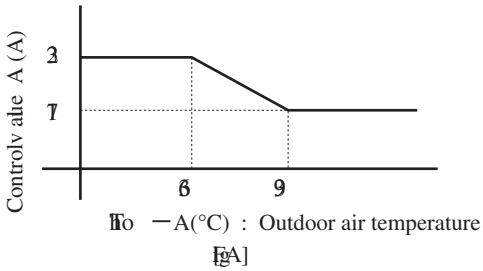


7) Over-current protection current safe controls I, II

Detecting the outdoor unit inverter input (primary) current and the output (secondary) current, if the current values exceed setting values, the compressor speed (frequency) is controlled to protect the inverter.



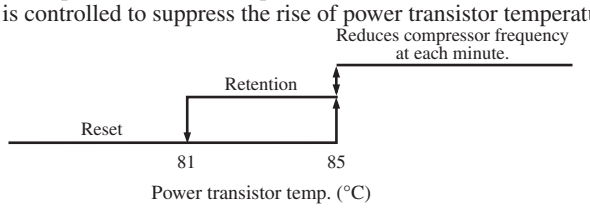
Model		Cooling		Heating	
		Control value A	Reset value B	Control value A	Reset value B
Primary current side	100	16	15	16	15
	125, 140	23	22	23	22
	200	27	26	27	26
	250	33	32	33	32
Secandary current side	100 125, 140	17 ～ 23 (Fig.A)	16 ～ 22	23 (Fig.A)	22
	200	Not implemented			
	250				



[Fig.A]

8) Power transistor temperature protection

a) Protective control
If the power transistor temperature (detected with TIP) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of power transistor temperature.



b) Anomalous stop control (model 200, 250 only)
i) If the power transistor temperature rises further, the protective switch in the power transistor operates to protect the compressor and the power transistor.
ii) Under any of the following condition, E41 is displayed and it enters the anomalous stop mode.
① When the protective switch in the power transistor operates 5 times within 60 minutes and the compressor stops.

9) Anomalous power transistor current

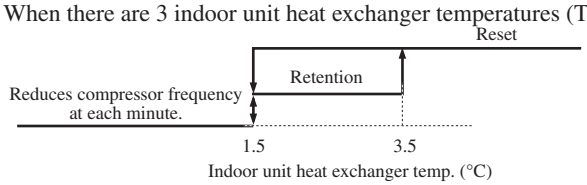
a) Prevents over-current on the inverter. If the current value in the power transistor exceeds the setting value, the compressor stops.
b) If the current value in the power transistor exceeds the specified value and the compressor stops 4 times within 30 minutes, E42 is displayed on the remote controller and it enters the anomalous stop mode.

10) Anomalous inverter PCB

If the power transistor detects any anomaly for 15 minutes, including the stop of compressor, E51 is displayed on the remote controller and it enters the anomalous stop mode.

11) Anti-frost control by the compressor frequency control

a) If the indoor unit heat exchanger temperature (detected with Thı-R) exceeds the setting value at 4 minutes after the start of compressor, the compressor speed (frequency) is controlled to initiate the anti-frost control of indoor unit heat exchanger.
b) When there are 3 indoor unit heat exchanger temperatures (Thı-R), the lowest temperature is detected.



c) Regarding the anti-frost control by the operation stop, refer to the operation control function by the indoor unit controller and the cooling, dehumidifying frost prevention of page 92

12) Dewing prevention control

[Control condition] During cooling and dehumidifying operation, if all the following conditions are established, the compressor speed (frequency) is reduced to prevent dewing and water splash.

① Cooling electronic expansion valve aperture (EEVC) is 500 pulses.

② Suction overheat is 10°C or higher.

③Compressor speed (frequency) is **A** rps or higher.

[Control contents] ① When the suction overheat is 10°C or higher, the compressor speed (frequency) is reduced at each 1 minute.

② Compressor speed (frequency) does not rise till the cooling expansion valve becomes 460 pulses.

③ This control takes **A** rps as its lower limit so that compressor speed is not controlled when it is less than **A** rps.

Model	**A** rps
100~140	60
200, 250	60

13) Refrigerant quantity shortage protection

Under the compressor protection start III control during cooling and dehumidifying operations, the following control is performed by detecting the indoor unit heat exchanger temperature (Thı-R) and the indoor unit return air temperature (Thı-A).

[Control condition] When the state that the indoor unit heat exchanger temperature (Thı-R) does not become lower than the indoor unit return air temperature (Thı-A) by 4°C or more continues for 1 minute.

[Control contents] It judges that the flowing of refrigerant in to the indoor unit is insufficient so that the compressor is stopped and E57 is displayed on the remote controller.

14) Broken wire detection on temperature thermistor and low pressure sensor

a) Outdoor unit heat exchanger thermistor, outdoor air thermistor and low pressure sensor

If the following is detected for 5 second continuously within 2 minutes to 2 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note (1) During defrosting and for 3 minutes after the end of defrosting, it is not detected.

- Outdoor unit heat exchanger thermistor: -50°C or lower
- Outdoor air temperature thermistor: -45 or lower
- Low pressure sensor: 0V or under or 3.49V or over

b) Discharge pipe temperature thermistor, suction pipe temperature thermistor and underneath temperature thermistor (model 200, 250 only)

If the following is detected for 5 second continuously within 10 minutes to 10 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.

Note (1) During defrosting and for 3 minutes after the end of defrosting, it is not detected.

- Discharge pipe temperature thermistor: -10°C or lower
- Suction pipe temperature thermistor: -50 or lower
- Underneath temperature thermistor: -50°C or lower

15) Fan motor error

a) If the fan speed of 100rpm or under is detected for 30 second continuously under the outdoor unit fan control (with the operation command of fan tap at ① speed or higher), the compressor stops.

b) When the fan motor speed drops to 100rpm or under 5 times within 60 minutes and the compressor stops, it enters the anomalous stop mode with E48 displayed on the remote controller.

16) Anomalous stop by the compressor start stop

1) When it fails to shift to the compressor DC motor's rotor position defection operation at 5 seconds after establishing the compressor start condition, the compressor stops temporarily and restarts 3 minutes later.

2) If it fails to shift to the position detection operation again at second time, it judges the anomalous compressor start and stops the compressor by the anomalous stop (E59).

17) Anomalous compressor rotor lock (model 200, 250 only)

After shifting to the compressor rotor's position detection operation, if fails again to detect the rotor position, the compressor stops.

Compressor restarts 3 minutes later but, if it is operated 4 times within 15 minutes, the anomalous stop (E60) occurs.

(g) Silent mode

1) As "Silent mode start" signal is received from the remote controller, it operates by dropping the outdoor unit fan tap and the compressor speed (frequency).
2) For details, refer to items (a) and (d) above.

(h) Test run

1) It is possible to operate from the outdoor unit using the dip switch on the outdoor unit control PCB.

SW3-3 (SW5-3)	ON	SW3-4 (SW5-4)	OFF	Cooling test run
			ON	Heating test run
	OFF	Normal and end of test run		

Make sure to turn SW3-3 (SW5-3) to OFF after the end of operation.

Note (1) Value in ( ) are for the model 71.

2) Test run control

a) Operation is performed at the maximum compressor speed (frequency), which is determined for each model.
b) Each protective control and error detection control are effective.
c) If SW3-4 is switched during test run, the compressor is stoped for once by the stop control and the cooling/heating operation is switched.
d) Setting and display of remote controller during test run

Item / Mode	Contents of remote controller setting/display
Cooling test run	Setting temperature of cooling is 5°C.
Heating test run	Setting temperature of heating (preparation) is 30°C.

(i) Pump-down control

Turning ON the pump-down switch SW1 for 2 seconds during the operation stop or anomalous stop (excluding the thermostat OFF), the pump-down operation is performed. (This is invalid when the indoor unit is operating. This is effective even when the indoor unit is stopped by the anomalous stop or the power supply is turned OFF.)

1) Control contents

a) Close the operation valve at the liquid side. (It is left open at the gas side.)
b) Compressor is started with the target speed (frequency) at 55 rps in the cooling mode.
c) Red and green lamps (LED) flash continuously on the outdoor unit control PCB.
d) Each of protection and error detection controls, excluding the low pressure control, anti-frost control and dewing prevention control, is effective.
e) Outdoor unit fan is controlled as usual.
f) Electronic expansion valve is fully opened.

2) Control ending conditions

Stop control is initiated depending on any of the following conditions.

a) Low pressure of 0.087MPa or lower is detected for 5 seconds continuously.
   i) Red LED: Light, Green LED: Flashing, Remote controller: Displays stop.
   ii) It is possible to restart when the low pressure is 0.087MPa or higher.
   iii) Electronic expansion valve (cooling/heating) is kept fully open.
b) Stop by the error detection control
   i) Red LED: Flashing, Green LED: Flashing
   ii) Restart is prohibited. To return to normal operation, reset the power supply.
   iii) Electronic expansion valve (cooling/heating) is left fully open.
c) When the cumulative operation time of compressor under the pump-down control becomes 5 minutes.
   i) Red LED: OFF, Green LED: Flashing, Remote controller: Stop
   ii) It is possible to pump-down again.
   iii) Electronic expansion valve (cooling/heating) is left fully open.

   Note (1) After the stop of compressor, close the operation valve at the gas side.

Caution: Since pressing the pump-down switch cancels communications with the indoor unit, the indoor unit and the remote controller display "Transmission error – E5". This is normal.

(j) Base heater ON/OFF output control (option)

1) Base heater ON conditions

When all of following conditions are met, the base heater is turned ON.

・Outdoor air temperature (detected with Tho-A) is 3ºC or lower.

・In the heating mode

・When the compressor is turned ON

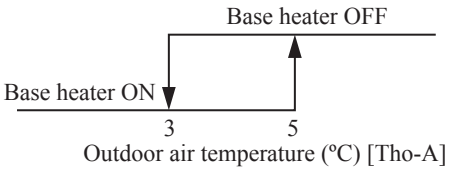
2) Base heater OFF conditions

When either one of following conditions is met, the base heater is turned OFF.

・Outdoor air temperature (detected with Tho-A) is 5ºC or higher.

・When the compressor stop has been detected for 30 minutes continuously

・In the cooling or dehumidifying mode



(Ⅱ) Hyper inverter series

ESP-FP-1930Ⓖ

(1) Determination of compressor speed (frequency)

Required frequency

(a) Cooling/dehumidifying operation

Unit: rps

Model		71	100	125	140
Max. required frequency	Indoor unit air flow “P-Hi”, “Hi”	88	75	95(92)	95(92)
	Indoor unit air flow “Me”, “Lo”	80	50	60	70
Min. required frequency		20	20	20	20

Note (1) Value in ( ) are for the models FDC125VSX, 140VSX.

(b) Heating operation

Unit: rps

Model		71	100	125	140
Max. required frequency	Indoor unit air flow “P-Hi”, “Hi”	112	100	120	120
	Indoor unit air flow “Me”, “Lo”	90	60	70	70
Min. required frequency		20	20	20	20

(c) If “Silent mode start” signal is received from the remote controller, the maximum required frequency becomes same as when the indoor air flow is set at “Lo”.

(d) Max. required frequency under high outdoor air temperature in cooling mode

Maximum required frequency is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		71	100	125	140
Max. required frequency	Outdoor air temperature is 40°C or higher	76	75	75	75
	Outdoor air temperature is 46°C or higher	62	70	70	70

(e) Max. required frequency under outdoor air temperature in heating mode

Maximum required frequency is selected according to the outdoor air temperature (Tho-A).

Unit: rps

Model		71	100	125	140
Max. required frequency	Outdoor air temperature is 18°C or higher	76	75	80	85
	Outdoor air temperature is 10°C or higher	100	100	100	100
	Outdoor air temperature is 5°C or higher	100	–	–	–

(f) Selection of max. required frequency by heat exchanger temperature

1) Maximum required frequency is selected according to the outdoor unit heat exchanger temperature (Tho-R) during cooling/dehumidifying or according to the indoor unit heat exchanger temperature (Thı-R) during heating mode.

2) When there are 3 indoor unit heat exchanger temperatures (Thı-R), whichever the highest applies,

Unit: rps

Model			71	100	125	140
Max. required frequency	Cooling/ dehumidifying	Outdoor unit heat exchanger temperature is 56°C or higher	–	75	95(92)	95(92)
	Heating	Indoor unit heat exchanger temperature is 56°C or higher	–	100	100	100

Note (1) Value in ( ) are for the models FDC125VSX, 140VSX.

(g) When any of the controls from (a) to (f) above may duplicate, whichever the smallest value among duplicated controls is taken as the maximum required frequency.

(h) During heating, it is operated with the maximum required frequency until the indoor unit heat exchanger temperature becomes 40°C or higher.

(2) Compressor start control

(a) Compressor starts upon receipt of the thermostat ON signal from the indoor unit.

(b) However, at initial start after turning the power supply breaker, it may enter the standby state for maximum 30 minutes (" PREPARATION" is displayed on the remote controller) in order to prevent the oil loss in the compressor.

If the cooling/dehumidifying/heating operation is selected from the remote controller when the outdoor unit is in the standby state, " PREPARATION" is displayed for 3 seconds on the remote controller.

(3) Compressor soft start control

(a) Compressor protection start I

[Control condition] Normally, the compressor operation frequency is raised in this start pattern.

[Control contents] 1) Starts with the compressor's target frequency at **A** rps.
However, when the ambient air temperature (Tho-A) is 35°C or higher during cooling/dehumidifying or the indoor return air temperature (Thı-A) is 25°C or higher during heating, it starts at **C** rps.

2) At 30 seconds after the start of compressor, its target frequency changes to **B** rps and the compressor is operated for 2 - 4 minutes with its operation frequency fixed at **B** rps.

Model	Operation mode	**A** rps	**B** rps	**C** rps
71	Cooling/Dehumidifying	42	42	40
	Heating	62	62	40
100, 125, 140	Cooling/Dehumidifying	45	45	25
	Heating	45	45	25

(b) Compressor protection start III

[Control condition] Number of compressor starts is only 1 counted after the power supply breaker ON.

[Control contents] Operates by selecting one of following start patterns according to the operation mode and the outdoor air temperature (Tho-A).

1) Low frequency operation control during cooling/dehumidifying

[Control condition] Upon establishing the conditions of compressor protection start III, the low frequency operation control is performed during cooling/dehumidifying.

[Control contents] a) Starts with the compressor's target frequency at **A** rps. When the outdoor air temperature (Tho-A) is 35°C or higher, it starts at **C** rps.

b) At 30 seconds after the compressor start, the compressor's target frequency is changed to **B** rps and the compressor's operation frequency is fixed for 10 minutes.

Model	Operation mode	**A** rps	**B** rps	**C** rps
71	Cooling/Dehumidifying	42	42	40
100, 125, 140	Cooling/Dehumidifying	45	45	25

2) Low frequency operation control during heating

[Control condition] When the conditions of compressor protection start III are established and one of following conditions a) and b) is satisfied, the low number of revolutions operation control is performed during heating.

a) At 30 minutes or more after turning the power supply breaker on

b) Compressor underneath temperature (Tho-H) is 4°C or higher and the difference from the outdoor air temperature (Tho-A) becomes 4°C or higher. [model 200, 250 only]

[Control contents] a) Starts the compressor with its target frequency at **A** rps. However, when the indoor unit return air temperature (Thı-A) is 25°C or higher, it start at **C** rps.

b) At 30 seconds after the start of compressor, the compressor's target frequency is changed to **B** rps and the compressor's operation frequency is fixed for 10 minutes.

Model	Operation mode	**A** rps	**B** rps	**C** rps
71	Heating	42	42	40
100, 125, 140	Heating	45	45	25

(4) Outdoor unit fan control

(a) Outdoor unit fan tap and fan motor speed

Unit: min^{-1}

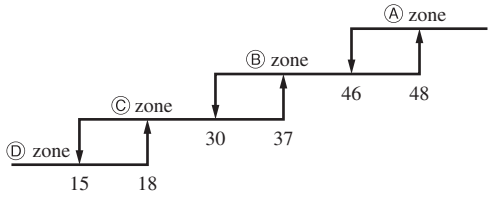
Model	Mode	Fan motor tap						
71		① speed	② speed	③ speed	④ speed	⑤ speed	⑥ speed	⑦ speed
	Cooling/Dehumidifying	200	400	600	710	810	850	950
	Heating	200	400	600	710	810	850	950
100		① speed	② speed	③ speed	④ speed	⑤ speed	⑥ speed	⑦ speed
	Cooling/Dehumidifying	200	350	600	740	820	870	950
	Heating	200	350	600	740	820	870	950
125, 140		① speed	② speed	③ speed	④ speed	⑤ speed	⑥ speed	⑦ speed
	Cooling/Dehumidifying	200	370	560	640	745	870	910
	Heating	200	370	560	640	800	870	910

(b) Fan tap control during cooling/heating operation

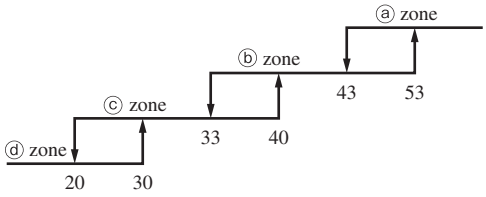
Fan taps are selected depending on the outdoor unit heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note (1) It is detected by Tho-R1 or R2, whichever the higher.

	Ⓐ zone	Ⓑ zone	Ⓒ zone	Ⓓ zone
ⓐ zone	Tap 5(6)	Tap 5(6)	Tap 5(6)	Tap 4
ⓑ zone	Tap 5(6)	Tap 5(6)	Tap 4(6)	Tap 3
ⓒ zone	Tap 4	Tap 4	Tap 3	Tap 2
ⓓ zone	Tap 3	Tap 3	Tap 2	Tap 1

Note (1) Value in ( ) is for the model 71.



Outdoor air temp. (˚C)



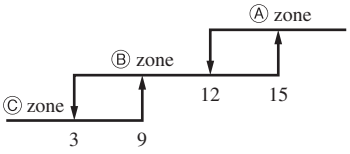
Outdoor unit heat exchanger temp. (˚C)

(c) Fan tap control during heating operation

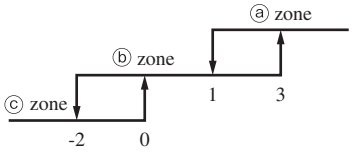
Fan taps are selected depending on the outdoor unit heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note (1) It is detected by Tho-R1 or R2, whichever the lower.

	Ⓐ zone	Ⓑ zone	Ⓒ zone
ⓐ zone	Tap 3	Tap 3	Tap 4
ⓑ zone	Tap 3	Tap 4(5)	Tap 5
ⓒ zone	Tap 4	Tap 5	Tap 6

Note (1) Value in ( ) is for the model 71.



Outdoor air temp. (˚C)

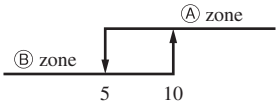


Outdoor unit heat exchanger temp. (˚C)

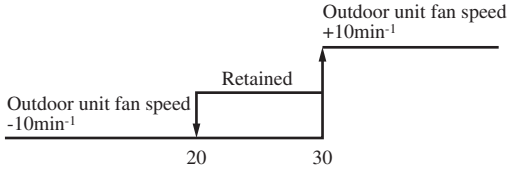
(d) Outdoor unit fan control at cooling low outdoor air

1) When all the following conditions are established after the start of compressor, the following control is implemented. If the outdoor air temperature (Tho-A) is in the zone Ⓑ in the cooling/dehumidifying mode, it has elapsed 20 seconds from the start of outdoor unit fan and the outdoor unit fan is at the tap 1 speed, the outdoor unit fan speed is controlled according to the outdoor unit heat exchanger temperature (Tho-R1, R2).

Note (1) It is detected with Tho-R1 or R2, whichever the higher.



Outdoor air temp. (˚C)



Outdoor unit heat exchanger temp. (˚C)

2) The outdoor unit heat exchanger temperature is detected always and, when the number of revolutions of the outdoor fan speed has been increased or decreased, there is no change of fan speed for 20 seconds.
3) Rage of the outdoor unit fan speed under this control is as follows.
   a) Lower limit: 130rpm
   b) Upper limit: 500rpm
4) As any of the following conditions is established, this control terminates.
   a) When the outdoor air temperature is in the zone Ⓐ and the outdoor unit heat exchanger temperature at 30°C or higher is established for 40 seconds or more continuously.
   b) When the outdoor fan speed is 500rpm and the outdoor unit heat exchanger temperature at 30°C or higher is established for 40 seconds or more continuously.
   c) When the outdoor unit heat changer temperature at 45°C or higher is established for 40 seconds or more.

(e) Outdoor unit fan control by the power transistor radiator fin temperature

When all the following conditions are established later than 3 minutes after the start of compressor, the following control is implemented.

1) Cooling/dehumidifying
   a) Outdoor air temperature Tho-A ≧ 33°C
   b) Compressor's actual frequency ≧ **A** rps
   c) Power transistor radiator fin temperature ≧ **C** °C
2) Heating
   a) Outdoor air temperature Tho-A 16°C
   b) Compressor's actual frequency ≧ **B** rps
   c) Power transistor radiator fin temperature ≧ **C** °C
3) Control contents
   a) Raises the outdoor unit fan tap by 1 tap.
   b) When the sampling is for 60 minutes and the value of power transistor radiator fin temperature (Tho-P) is as follows.
   ① When the power transistor radiator fin temperature (Tho-P) ≧ **C** °C, the outdoor unit fan tap is raised by 1 speed further.
   ② When **C** °C > power transistor radiator fin temperature (Tho-P) ≧ **D** °C, present outdoor unit fan tap is maintained.
   ③ When the power transistor radiator fin temperature (Tho-P) ≧ **D** °C, the outdoor unit fan tap is dropped by 1 speed.
4) Ending conditions

   When the operation under the condition of item b), ③ above and with the outdoor unit fan tap, which is determined by the item (b) is detected 2 times consecutively.

   • Compressor's frequency and power transistor radiator fin temperature

Unit: °C

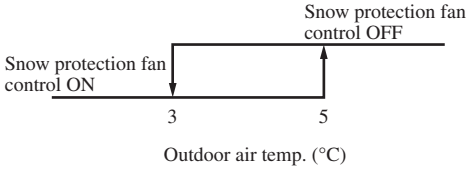
Item / Model	A	B	C	D
71	60	70	80	75
100, 125, 140	65	65	72	68

(f) Caution at the outdoor unit fan start control

When the outdoor unit fan is running at 400min^{-1} before operating the compressor, it may operate with the compressor only, without starting up the outdoor fan This is normal.

(g) Snow protection fan control

If the dip switch (SW3-2) on the outdoor unit control PCB is turned ON, the outdoor unit fan is operated for 30 seconds at 4 tap speed once in every 10 minutes depending on the outdoor air temperature (detected with Tho-A) in the stop mode or anomalous stop mode.

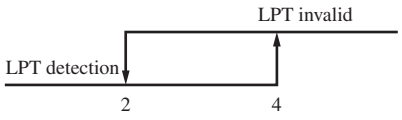


(5) Defrosting

(a) Defrosting start conditions

If all of the following defrosting conditions A or conditions B are met, the defrosting operation starts.

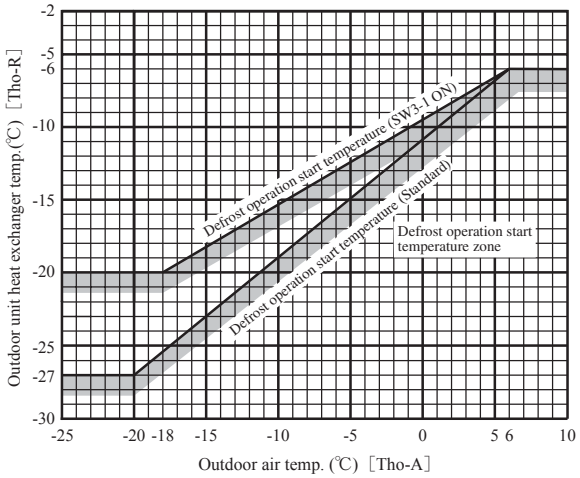
1) Defrosting conditions A
   a) Cumulative compressor operation time after the end of defrosting has elapsed 37 [45] minutes, and the cumulative compressor operation time after the start of heating operation (remote controller ON) has elapsed 30 minutes.
   b) After 5 minutes from the compressor ON
   c) After 5 minutes from the start of outdoor unit fan
   d) After satisfying all above conditions, if temperatures of the outdoor unit heat exchanger temperature thermistor (Tho-R1, R2) and the outdoor air temperature thermistor (Tho-A) become lower than the defrosting start temperature as shown by the right figure for 15 seconds continuously, or the suction gas saturation temperature (SST) and the outdoor air temperature (Tho-A), which are obtained from the value detected by the low pressure sensor (LPT) stay for 3 minutes within the range below the defrosting operation start temperature as shown by the right figure. However, it excludes for 10 minutes after the start of compressor and the outdoor air temperature is as shown by the lower figure.



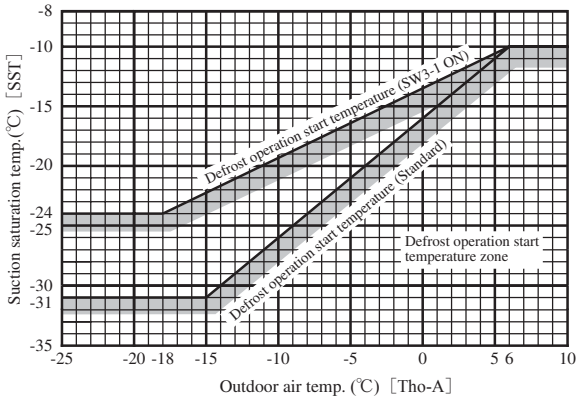
Note (1) Figures in [ ] is for model 71.

2) Defrosting conditions B
   a) When previous defrosting end condition is the time out of defrosting operation and it is in the heating operation after the cumulative compressor operation time after the end of defrosting has become 30 minutes.
   b) After 5 minutes from the start of compressor
   c) After 5 minutes from the start of outdoor unit fan

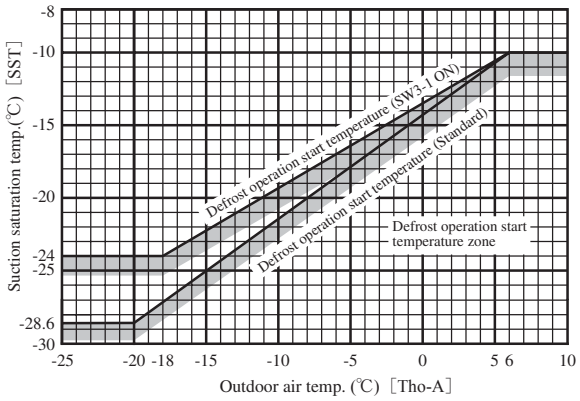
Models 71 ~ 140



Model 71



Models 100 ~ 140



(b) Defrosting end conditions

When any of the following conditions is satisfied, the defrosting end operation starts.

1) When it has elapsed 8 minutes and 20 seconds after the start of defrosting. (After 10 minutes and 20 seconds for model 71)
2) When the outdoor unit heat exchanger temperatures (Tho-R1, R2), whichever the lower, becomes 12°C or higher for 10 seconds continuously.

(c) Switching of defrosting control with SW3-1

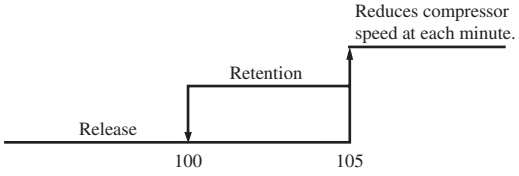
1) If SW3-1 on the outdoor unit control PCB is turned to ON, it becomes easier to enter the defrosting operation. Use this when installing a unit at snowing regions.
2) Control contents
   a) It allows entering the defrosting operation under the defrosting condition A when the cumulative heating operation time becomes 30 minutes. It is 37〔45〕 minutes at SW3-1 OFF (Factory default).
   b) It allows entering the defrosting operation under the defrosting condition B when the cumulative heating operation time becomes 25 minutes. It is 30 minutes at SW3-1 OFF (Factory default).
   c) It allows the defrosting operation with the outdoor unit heat exchanger temperature (Tho-R) and suction pressure saturation temperature (SST) being higher than normal.

Note (1) Figures in 〔 〕 is for the model 71.

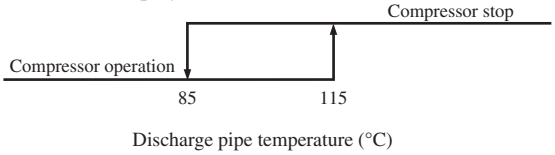
(6) Protective control/anomalous stop control by compressor's number of revolutions

(a) Compressor discharge pipe temperature protection

1) Protective control
As the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of discharge pipe temperature.



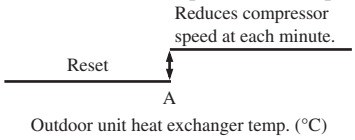
2) Anomalous stop control
   a) If the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor stops.
   b) When it is detected 2 times within 60 minutes or after continuous 60 minutes, including the stop of compressor, E36 is displayed on the remote controller and it enters the anomalous stop mode.



3) Reset of anomalous stop mode
As it drops to the reset value of 85°C or lower for 45 minutes continuously, it becomes possible to restart from the remote controller.

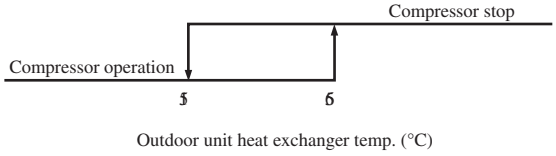
(b) Cooling high pressure protection

1) Protective control
   a) When the outdoor air temperature (Tho-A) is 40°C or higher and the outdoor unit heat exchanger temperature (Tho-R) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of high pressure.
   b) Control value A is updated to an optimum value automatically according to the operating conditions.



Control value A
54~60°C

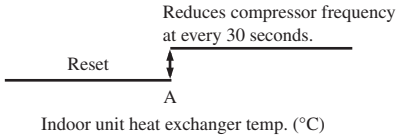
2) Anomalous stop control
   a) As the outdoor unit heat exchanger temperature (Tho-R) exceeds the setting value, the compressor stops.
   b) If it is detected 5 times within 60 minutes or 65°C or higher continues for 60 minutes, including the stop of compressor, E35 is displayed on the remote controller and it enters the anomalous stop mode.



3) Reset of anomalous stop mode
As it reaches the reset value of 51°C or lower, it becomes possible to restart from the remote controller.

(c) Heating high pressure protection

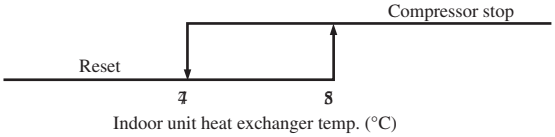
1) Protective control
   a) As the indoor unit heat exchanger temperature (Thı-R) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of high pressure.
   b) Control value A is updated to an optimum value automatically according to the operating conditions.



Model	Existing piping adaptation switch: SW5-1 (SW8-1: model 80)	
	OFF (Shipping)	ON
	Control value A (°C)	
71	52~58	46~52
100~140	48~54	

Note (1) Adaptation to existing piping is at ON.

2) Anomalous stop control
   Operation control function by the indoor unit controller - See the heating overload protection, page 10.
3) Adaptation to existing piping, stop control
   If the existing piping adaptation switch, SW5-1 (SW8-1: 71 type), is turned ON, the compressor stops to protect existing piping when the indoor unit heat exchanger temperature (Thı-R) exceeds the setting value.

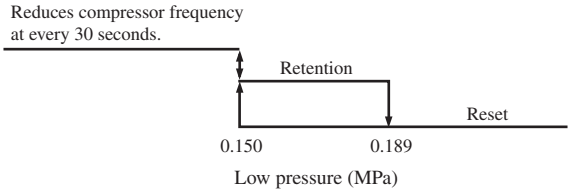


(d) Anomaly detection control by the high pressure switch (63H1)

1) If the pressure rises and operates the high pressure switch (opens at 4.15MPa/closes at 3.15MPa), the compressor stops.
2) Under any of the following conditions, E40 is displayed and it enters the anomalous stop mode.
   a) When it occurs 5 times within 60 minutes that pressure rises and the compressor is stopped by 63H1.
   b) When 63H1 has been in the open state for 60 minutes continuously, including the stop of compressor.

(e) Low pressure control

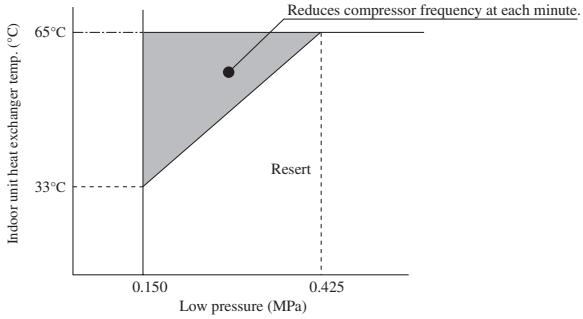
1) Protective control
   If the value detected by the low pressure sensor (LPT) exceeds the setting value, the compressor speed (frequency) is controlled to restrain the drop of pressure.



2) Anomalous stop control
   a) When a value detected by the low pressure sensor (LPT) satisfies any of the following conditions, the compressor stops to run for its protection.
      ① When the low pressure drops to 0.079MPa or under for 15 seconds continuously.
      ② At 10 minutes after the start of compressor, the suction overheat becomes 30°C and the low pressure becomes 0.15MPa or under for 60 seconds continuously.
   b) E49 is displayed under any of the following conditions and it enters the anomalous stop mode.
      ① When the low pressure drops 3 times within 60 minutes and the compressor stops under any of the above conditions.
      ② When a value detected with the low pressure sensor becomes 0.079MPa or under for 5 minutes, including the stop of compressor.
   c) However, when the control condition a). ① is established during the compressor protection start III, E49 is displayed at initial stop and it enters the anomalous stop mode.

(f) Compressor pressure ratio protection control (Except for FDC71VNX)

1) During heating operation, if the indoor unit heat exchanger temperature (Thı-R) and the outdoor unit heat exchanger temperature (Tho-R) exceed the setting values at 10 minutes after the start of compressor, the compressor speed (frequency) is controlled to protect the compressor.
2) This control is not performed during the outdoor fan ON and for 10 minutes from the start of outdoor unit fan.
3) This control is not performed during defrosting operation and at 10 minutes after the reset of defrosting operation.
4) When there are 3 indoor unit heat exchanger temperatures (Thı-R), the highest temperature is detected.



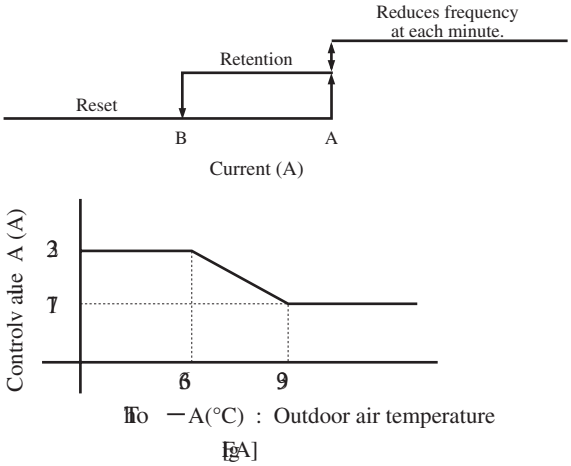
(g) Over-current protection current safe controls I, II

Detecting the outdoor unit inverter input (primary) current and the output (secondary) current, if the current values exceed setting values, the compressor speed (frequency) is controlled to protect the inverter.

Unit : A

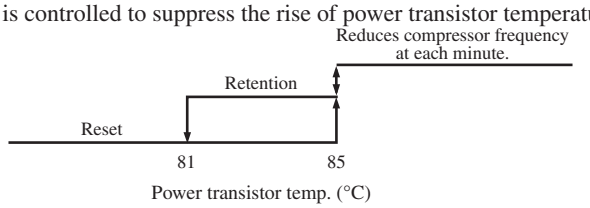
Model		Cooling		Heating	
		Control value A	Reset value B	Control value A	Reset value B
Primary current side	71	15.0	14.0	16.0	15.0
	100	11.0 (23.0)	10.0 (22.0)	11.0 (23.0)	10.0 (22.0)
	125, 140	11.0 (23.0)	10.0 (22.0)	11.0 (25.0)	10.0 (24.0)
Secandary current side	71	13.0A	12.0A	13.0	12.0
	100	17～23 (Fig.A)	16～22	23 (Fig.A)	22
	125, 140	17～23 (Fig.A)	16～22	23 (Fig.A)	22

Note (1) Value in ( ) are for the single phase models.



(h) Power transistor temperature protection

1) Protective control
If the power transistor temperature (detected with TIP) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of power transistor temperature.



(i) Anomalous power transistor current

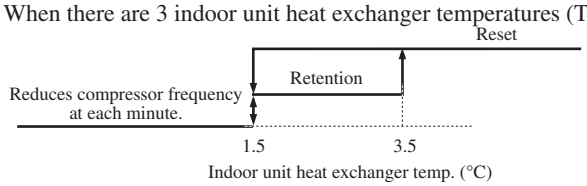
1) Prevents over-current on the inverter. If the current value in the power transistor exceeds the setting value, the compressor stops.
2) If the current value in the power transistor exceeds the specified value and the compressor stops 4 times within 30 minutes, E42 is displayed on the remote controller and it enters the anomalous stop mode.

(j) Anomalous inverter PCB

If the power transistor detects any anomaly for 15 minutes, including the stop of compressor, E51 is displayed on the remote controller and it enters the anomalous stop mode.

(k) Anti-frost control by the compressor frequency control

1) If the indoor unit heat exchanger temperature (detected with Thı-R) exceeds the setting value at 4 minutes after the start of compressor, the compressor speed (frequency) is controlled to initiate the anti-frost control of indoor unit heat exchanger.
2) When there are 3 indoor unit heat exchanger temperatures (Thı-R), the lowest temperature is detected.



3) Regarding the anti-frost control by the operation stop, refer to the operation control function by the indoor unit controller and the cooling, dehumidifying frost prevention of page 92.

(l) Dewing prevention control

[Control condition] During cooling and dehumidifying operation, if all the following conditions are established, the compressor speed (frequency) is reduced to prevent dewing and water splash.

① Cooling electronic expansion valve aperture (EEVC) is 500 pulses.

② Suction overheat is 10°C or higher.

③Compressor speed (frequency) is **A** rps or higher.

[Control contents] ① When the suction overheat is 10°C or higher, the compressor speed (frequency) is reduced at each 1 minute.

② Compressor speed (frequency) does not rise till the cooling expansion valve becomes 460 pulses.

③ This control takes **A** rps as its lower limit so that compressor speed is not controlled when it is less than **A** rps.

Model	**A** rps
71	42
100~140	60

(m) Refrigerant quantity shortage protection

Under the compressor protection start III control during cooling and dehumidifying operations, the following control is performed by detecting the indoor unit heat exchanger temperature (Thı-R) and the indoor unit return air temperature (Thı-A).

[Control condition] When the state that the indoor unit heat exchanger temperature (Thı-R) does not become lower than the indoor unit return air temperature (Thı-A) by 4°C or more continues for 1 minute.

[Control contents] It judges that the flowing of refrigerant in to the indoor unit is insufficient so that the compressor is stopped and E57 is displayed on the remote controller.

(n) Broken wire detection on temperature thermistor and low pressure sensor

1) Outdoor unit heat exchanger thermistor, outdoor air thermistor and low pressure sensor
If the following is detected for 5 second continuously within 2 minutes to 2 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.
Note (1) During defrosting and for 3 minutes after the end of defrosting, it is not detected.
- Outdoor unit heat exchanger thermistor: -50°C or lower
- Outdoor air temperature thermistor: -45 or lower
- Low pressure sensor: 0V or under or 4.0V or over

2) Discharge pipe temperature thermistor, suction pipe temperature thermistor
If the following is detected for 5 second continuously within 10 minutes to 10 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.
Note (1) During defrosting and for 3 minutes after the end of defrosting, it is not detected.
- Discharge pipe temperature thermistor: -10°C or lower
- Suction pipe temperature thermistor: -50 or lower

(o) Fan motor error

1) If the fan speed of 100rpm or under is detected for 30 second continuously under the outdoor unit fan control (with the operation command of fan tap at ① speed or higher), the compressor stops.

2) When the fan motor speed drops to 100rpm or under 5 times within 60 minutes and the compressor stops, it enters the anomalous stop mode with E48 displayed on the remote controller.

(p) Anomalous stop by the compressor start stop

1) When it fails to shift to the compressor DC motor's rotor position defection operation at 5 seconds after establishing the compressor start condition, the compressor stops temporarily and restarts 3 minutes later.

2) If it fails to shift to the position detection operation again at second time, it judges the anomalous compressor start and stops the compressor by the anomalous stop (E59).

(q) Base heater ON/OFF output control (option)

1) Base heater ON conditions

When all of following conditions are met, the base heater is turned ON.

・Outdoor air temperature (detected with Tho-A) is 3ºC or lower.

・In the heating mode

・When the compressor is turned ON

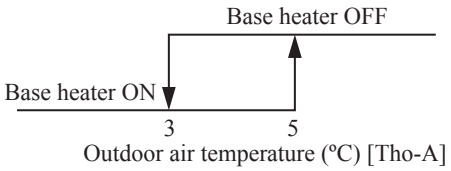
2) Base heater OFF conditions

When either one of following conditions is met, the base heater is turned OFF.

・Outdoor air temperature (detected with Tho-A) is 5ºC or higher.

・When the compressor stop has been detected for 30 minutes continuously

・In the cooling or dehumidifying mode



11. MAINTENANCE DATA

11.1 Diagnosing of microcomputer circuit

(1) Selfdiagnosis function

(a) Check Indicator Table

Whether a failure exists or not on the indoor unit and outdoor unit can be know by the contents of remote controller error code, indoor/outdoor unit green LED (power pilot lamp and microcomputer normality pilot lamp) or red LED (check pilot lamp).

(i) Indoor unit

Remote controller		Indoor control PCB		Outdoor control PCB		Location of trouble	Description of trouble	Repair method	Reference page
Error code	Red LED	Red LED	Green LED (1)	Red LED	Green LED (1)				
No-indication	Stays OFF	Stays OFF	Keeps flashing	Stays OFF	Keeps flashing	—	**• Normal operation**	—	—
		Stays OFF	Stays OFF	2 times flash	Stays OFF	Indoor unit power supply	• Power OFF, broken wire/blown fuse, broken transformer wire	Repair	155
		* 3 times flash	Keeps flashing	Stays OFF	Keeps flashing	Remote controller wires	• Poor connection, breakage of remote controller wire * For wire breaking at power ON, the LED is OFF.	Repair	156
						Remote controller	• Defective remote controller PCB	Replacement of remote controller	
WAIT or INSPECT I/U		Stays OFF	Keeps flashing	2 times flash	Keeps flashing	Indoor-outdoor units connection wire	• Poor connection, breakage of indoor-outdoor units connection wire	Repair	157 • 158
						Remote controller	• Improper setting of master and slave by remote controller		
E1	Keeps flashing	Stays OFF	* Keeps flashing	Stays OFF	Keeps flashing	Remote controller wires (Noise)	**• Poor connection of remote controller signal wire (White)** * For wire breaking at power ON, the LED is OFF **• Intrusion of noise in remote controller wire**	Repair	163
						Remote controller indoor control PCB	*• Defective remote controller or indoor control PCB (defective communication circuit)?	Replacement of remote controller or PCB	
E5		2 times flash	Keeps flashing	2 times flash	Keeps flashing	Indoor-outdoor units connection wire	**• Poor connection of wire between indoor-outdoor units during operation (disconnection, loose connection)** **• Anomalous communication between indoor-outdoor units by noise, etc.**	Repair	164
		2 times flash	Keeps flashing	Stays OFF	Keeps flashing	(Noise)	**• CPU-runaway on outdoor control PCB**	Power reset or Repair	
						Outdoor control PCB	*• Occurrence of defective outdoor control PCB on the way of power supply (defective communication circuit)?	Replacement of PCB	
		2 times flash	Keeps flashing	Stays OFF	Stays OFF	Outdoor control PCB	**• Defective outdoor control PCB on the way of power supply**	Replacement	
						Fuse	**• Blown fuse**		
E6		1 time flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor heat exchanger temperature thermistor	**• Defective indoor heat exchanger temperature thermistor**(defective element, broken wire, short-circuit) • Poor contact of temperature thermistor connector	Replacement, repair of temperature thermistor	165
						Indoor control PCB	***• Defective indoor control PCB (Defective temperature thermistor input circuit)?**	Replacement of PCB	
E7		1 time flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor return air temperature thermistor	**• Defective indoor return air temperature thermistor**(defective element, broken wire, short-circuit) • Poor contact of temperature thermistor connector	Replacement, repair of temperature thermistor	166
						Indoor control PCB	***• Defective indoor control PCB (Defective temperature thermistor input circuit)?**	Replacement of PCB	
E8		1 time flash	Keeps flashing	Stays OFF	Keeps flashing	Installation or operating condition	**• Heating over-load** (Anomalously high indoor heat exchanger temperature)	Repair	167
						Indoor heat exchanger temperature thermistor	**• Defective indoor heat exchanger temperature thermistor (short-circuit)**	Replacement of temperature thermistor	
						Indoor control PCB	***• Defective indoor control PCB** (Defective temperature thermistor input circuit)?	Replacement of PCB	
E10		Stays OFF	Keeps flashing	Stays OFF	Keeps flashing	Number of connected indoor units	**• When multi-unit control by remote controller is performed,the number of units is over**	Repair	168
E14		3 times flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor unit No. setting	•No master is assigned to slaves.	Repair	169
						Rcmote controller wires	•Anomalous remote controller wire connection, broken wire between master and slave units		
E16		Stays OFF	Keeps flashing	Stays OFF	Keeps flashing	Fan motor	**• Defective fan motor**	Replacement, repair	170
						Indoor control PCB	**• Defective indoor control PCB**	Replacement	
E18		1 time flash	Keeps flashing	Stays OFF	Keeps flashing	Indoor control PCB	**• Improper operation mode setting**	Repair	171
E20		1 time flash	Keeps flashing	Stays OFF	Keeps flashing	Fan motor	**Indoor fan motor rotation speed anomaly**	Replace fan motor and power PCB	172
						Indoor control PCB	**Defective indoor control PCB**		
E28		Stays OFF	Keeps flashing	Stays OFF	Keeps flashing	Remote controller temperature thermistor	• Broken wire of remote controller temperature thermistor **(In case of FDTC, FDT, SRK)**	Repair	173

Note (1) **Normal indicator lamp (Indoor, outdoor units: Green) extinguishes (or lights continuously) only when CPU is anomalous. It keeps flashing in any trouble other than anomalous CPU.**

(2) * mark in the Description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

(ii) Outdoor unit

Remote controller		Indoor control PCB		Outdoor control PCB		Outdoor inventer PCB		Location of trouble	Description of trouble(1)	Repair method	Reference page
Error code	Red LED	Red LED	Green LED (1)	Red LED	Green LED	Yellow LED (3)or Red LED	Green LED (2)				
E35	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Keeps flashing	Keeps flashing	Keeps flashing	Installation or operating condition	• Higher outdoor heat exchanger temperature	Repair	174
								Outdoor heat exchanger temperature thermistor	• Defective outdoor heat exchanger temperature thermistor	Replacement of temperature thermistor	
								Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature thermistor input circuit)?	Replacement of PCB	
E36		Stays OFF	Keeps flashing	1 time flash	Keeps flashing			Installation or operating condition	• Higher discharge temperature	Repair	175
								Discharge pipe temperature thermistor	• Defective discharge pipe temperature thermistor	Replacement, repair of temperature thermistor	
								Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature thermistor input circuit)?	Replacement of PCB	
E37		Stays OFF	Keeps flashing	1 time flash	Keeps flashing			Outdoor heat exchanger temperature thermistor	• Defective outdoor heat exchanger temperature thermistor, broken wire or poor connector connection	Replacement, repair of temperature thermistor	176
								Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature thermistor input circuit)?	Replacement of PCB	
E38		Stays OFF	Keeps flashing	1 time flash	Keeps flashing			Outdoor air temperature thermistor	• Defective Outdoor air temperature thermistor, broken wire or poor connector connection	Replacement, repair of temperature thermistor	177
								Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature thermistor input circuit)?	Replacement of PCB	
E39		Stays OFF	Keeps flashing	1 time flash	Keeps flashing			Discharge pipe temperature thermistor	• Defective discharge pipe temperature thermistor, broken wire or poor connector connection	Replacement, repair of temperature thermistor	178
								Outdoor control PCB	*• Defective outdoor control PCB (Defective temperature thermistor input circuit)?	Replacement of PCB	
E40		Stays OFF	Keeps flashing	1 time flash	Keeps flashing			Installation or operating condition	• Rising high pressure (Operation of 63H1) • Service valve closing operation	Repair	179
								Outdoor control PCB	*• Defective outdoor control PCB (Defective 63H input circuit)?	Replacement of PCB	
E41		Stays OFF	Keeps flashing	1 time flash	Keeps flashing	2 times flash or 6 times flash		Inverter PCB or radiator fin	• Power transistor overheat	Replacement of PCB or Repair	180
E42		Stays OFF	Keeps flashing	1 time flash	Keeps flashing	1 time flash or 5 times flash		Outdoor control PCB compressor	• Current cut (Anomalous compressor over-current)	Replacement of PCB	182
								Installation or operating condition	• Service valve closing operation	Repair	
E45		Stays OFF	Keeps flashing	1 time flash	Keeps flashing	Keeps flashing		Outdoor control PCB	• Anomalous outdoor control PCB communication	Service valve opening check	184
								Inverter PCB	• Anomalous inverter PCB communication	Replacement of PCB	
E47		Stays OFF	Keeps flashing	1 time flash	Keeps flashing	7 times flash		Inverter PCB activefilter	• Defective outdoor inverter PCB (Model FDC 71) Defective active filter of control.	Replacement	185
E48		Stays OFF	Keeps flashing	1 time flash	Keeps flashing	Keeps flashing		Outdoor fan motor	• Anomalous outdoor fan motor	Replacement, repair	186
								Outdoor control PCB	*• Defective outdoor control PCB (Defective motor input circuit)?	Replacement of PCB	
E49		Stays OFF	Keeps flashing	1 time flash	Keeps flashing			Installation or operating condition	• Low pressure error • Service valve closing operation	Repair	187
								Low pressure sensor	• Anomalous low pressure, broken wire of low pressure sensor or poor connector connection	Replacement, repair of sensor	
								Outdoor control PCB	*• Defective outdoor control PCB (Defective sensor input circuit)?	Replacement of control PCB	
E51		Stays OFF	Keeps flashing	1 time flash	Keeps flashing	2 times flash or 6 times flash		Inverter PCB	• Anomalous inverter PCB	Replacement of PCB	189
E53		Stays OFF	Keeps flashing	1 time flash	Keeps flashing	Keeps flashing		Suction pipe temperature thermistor	• Defective suction pipe temperature thermistor, broken wire or poor connector connection	Replacement, repair of temperature thermistor	190
								Outdoor control PCB	*• Defective outdoor PCB (Defective thermistor input circuit)?	Replacement of control PCB	
E54		Stays OFF	Keeps flashing	1 time flash	Keeps flashing			Low pressure sensor	• Defective low pressure sensor	Replacement of sensor	191
								Outdoor control PCB	• Defective outdoor control PCB (Defective sensor input circuit)?	Replacement of control PCB	
E55		Stays OFF	Keeps flashing	1 time flash	Keeps flashing			Compressor underneath temperature thermistor	• Defective compressor underneath temperature thermistor (Models 200, 250 only)	Replacement of temperature thermistor	192
								Outdoor control PCB	• Defective outdoor control PCB (Defective thermistor input circuit)? (Models 200, 250 only)	Replacement of control PCB	
E57		Stays OFF	Keeps flashing	1 time flash	Keeps flashing			Operation status	• Shortage in refrigerant quantity	Repair	193
								Installation status	• Service valve closing operation	Service valve opening check	
E59		Stays OFF	Keeps flashing	5 times flash	Keeps flashing	Stays OFF or 4 times flash		Compressor inverter PCB	• Anomalous compressor startup	Replacement	194
E60		Stays OFF	Keeps flashing	1 time flash	Keeps flashing	Keeps flashing		Compressor	• Anomalous compressor rotor position detection (Models 200, 250 only)	Replacement	196

Note (1) * mark in the Description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

(2) This LED is installed on models FDC200, 250VS

(3) This LED is installed on models FDC71~140VNX, FDC100~140VS, FDC100~140VNX, FDC100~140VSX

(4) This LED is installed on models FDC200, 250VS

(iii) Optional controller in-use

		Indoor unit control PCB		Outdoor unit control PCB		Description of trouble	Repair method
Error code	Red LED	Red LED	Green LED	Red LED	Green LED		
E75	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Keeps flashing	• Communication error (Defective communication circuit on the main unit of SC-SL2N-E or SC-SL3N-E) ete.	Replacement

(iv) Display sequence of error codes or inspection indicator lamps

■ **Occurrence of one kind of error**

Displays are shown respectively according to errors.

■ **Occurrence of plural kinds of error**

Section	Category of display
Error code on remote controller	• Displays the error of higher priority (When plural errors are persisting)
Red LED on indoor control PCB	E1>E5>·····>E10>E32>·····Eb0
Red LED on outdoor control PCB	• Displays the present errors. (When a new error has occurred after the former error was reset.)

■ **Error detecting timing**

Section	Error description	Error code	Error detecting timing
INdoor	Communication error at initial operation	"WAIT"	No communication between indoor and outdoor units is established at initial operation.
	Remote controller communication circuit error	E1	Communication between indoor unit and remote controller is interrupted for mote than 2 minutes continuously after initial communication was established.
	Communication error during operation	E5	Communication between indoor and outdoor units is interrupted for mote than 2 minutes continuously after initial communication was established.
	Excessive number of connected indoor units by controlling with one remote controller	E10	Whenever excessively connected indoor units is detected after power ON.
	Return air temperature thermistor anomaly	E7	-50°C or lower is detected for 5 seconds continuously within 60 minutes after initial detection of this anomalous temperature.
	Indoor heat exchanger temperature thermistor anomaly	E6	-50°C or lower is detected for 5 seconds continuously within 60 minutes after initial detection of this anomalous temperature. Or 70°C or higher is detected for 5 seconds continuously.
Outdoor	Outdoor air temperature thermistor anomaly	E38	-45°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or -45°C or higher is detected for 5 seconds continuously within 20 seconds after compressor ON.
	Outdoor heat exchanger temperature thermistor anomaly	E37	-50°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. Or -50°C or lower is detected for 5 seconds continuously within 20 seconds after compressor ON.
	Discharge pipe temperature thermistor anomaly	E39	-10°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature.
	Suction pipe temperature thermistor anomaly	E53	-50°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature.
	Low pressure sensor anomaly	E54	0V or lower or 3.49V or higher is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous pressure.
	Underneath temperature thermistor anomaly	E55	-50°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature.

■ **Error log and reset**

Error indicator	Memorized error log	Reset
Remote controller display	• Higher priority error is memorized.	• Stop the unit by pressing the ON/OFF switch of remote controller. • If the unit has recovered from anomaly, it can be operated.
Red LED on indoor control PCB	• Not memorized.	
Red LED on outdoor control PCB	• Memorizes a mode of higher priority.	

■ **Resetting the error log**

• Resetting the memorized error log in the remote controller

Holding down "CHECK" button, press "TIMER" button to reset the error log memorized in the remote controller.

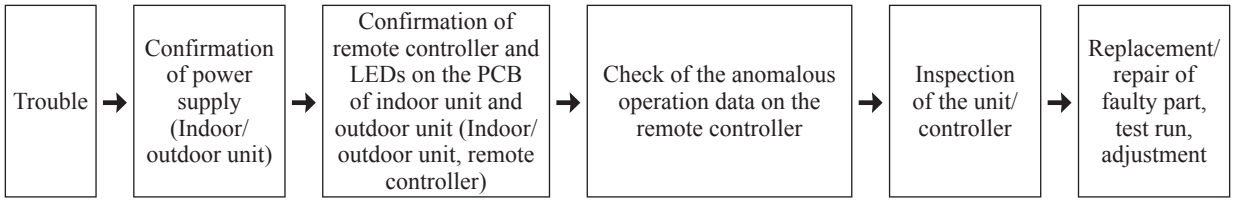
• Resetting the memorized error log

The remote controller transmits error log erase command to the indoor unit when "VENTI" button is pressed while holding down "CHECK" button.

Receiving the command, the indoor unit erase the log and answer the status of no error.

(2) Troubleshooting procedure

When any trouble has occurred, inspect as follows. Details of respective inspection method will be described on later pages.



(3) Troubleshooting at the indoor unit

With the troubleshooting, find out any defective part by checking the voltage (AC, DC), resistance, etc. at respective connectors at around the indoor PCB, according to the inspection display or operation status of unit (the compressor does not run, fan does not run, the 4-way valve does not switch, etc.), and replace or repair in the unit of following part.

(a) Replacement part related to indoor PCB's

Control PCB, power supply PCB, temperature thermistor (return air, indoor heat exchanger), remote controller switch, limit switch, transformer and fuse

Note (1) With regard to parts of high voltage circuits and refrigeration cycle, judge it according to ordinary inspection methods.

(b) INSTRUCTION OF HOW TO REPLACE INDOOR UNIT POWER PCB

PSB012D953C△B

SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the replacement in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, WARNING and CAUTION.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.

⚠WARNING	Wrong installation would cause serious consequences such as injuries or death.
⚠CAUTION	Wrong installation might cause serious consequences depending on circumstances.

- After completing the replacement, do commissioning to confirm there are no abnormalities.

⚠ WARNING

- Replacement should be performed by the specialist.
  If you replace the PCB by yourself, it may lead to serious trouble such as electric shock or fire.
- Replace the PCB correctly according to these instructions.
  Improper replacement may cause electric shock or fire.
- Shut off the power before electrical wiring work.
  Replacement during the applying the current would cause the electric shock, unit failure or improper running.
  It would cause the damage of connected equipment such as fan motor,etc.
- Fasten the wiring to the terminal securely, and hold the cable securely so as not to apply unexpected stress on the terminal.
  Loose connections or hold could result in abnormal heat generation or fire.
- Check the connection of wiring to PCB correctly before turning on the power, after replacement.
  Defectiveness of replacement may cause electric shock or fire.

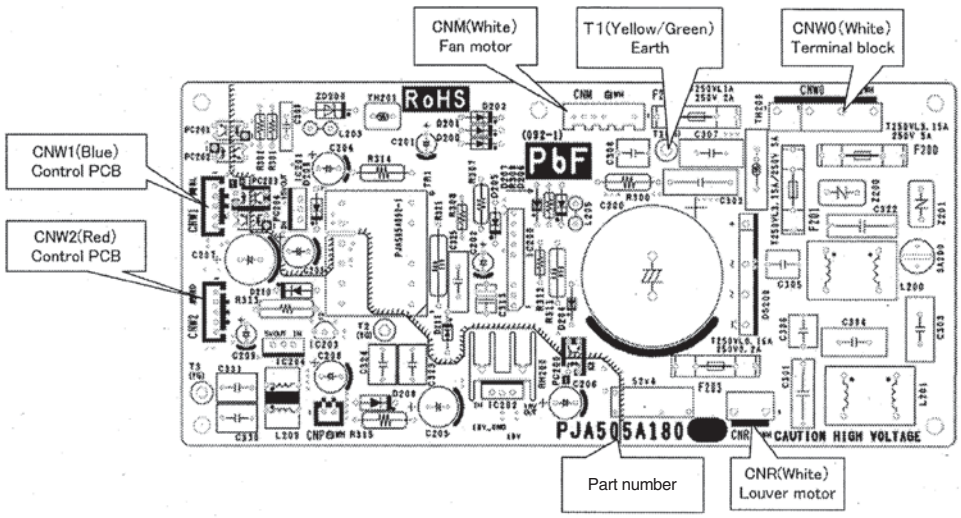
⚠ CAUTION

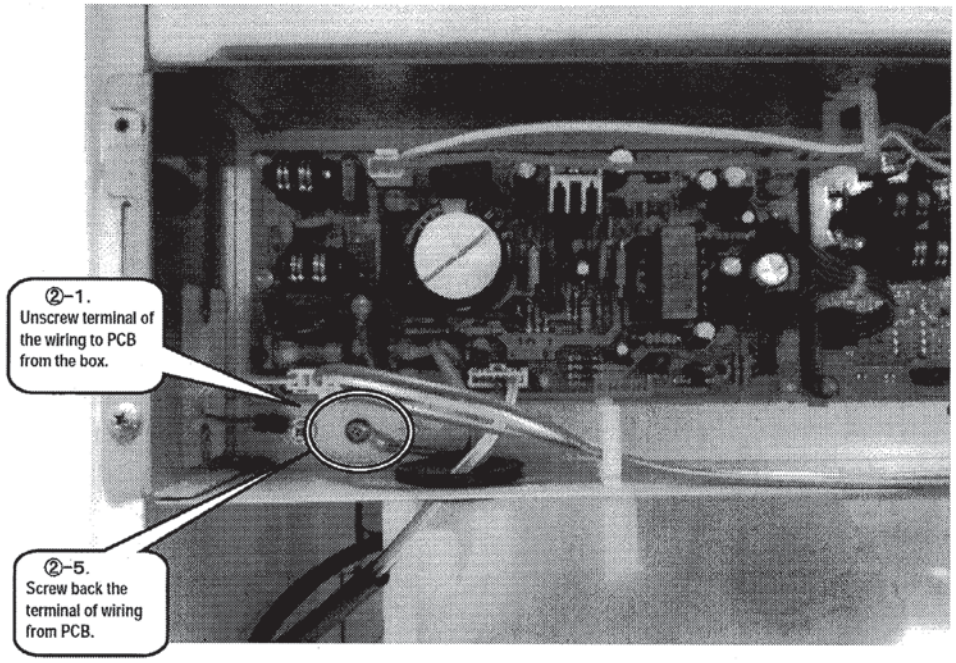
- In connecting connector onto the PCB, connect not to deform the PCB. It may cause breakage or malfunction.
- Insert connecter securely, and hook stopper. It may cause fire or improper running.
- Bundle the cables together so as not to be pinched or be tensioned. It may cause malfunction or electric shock for disconnection or deformation

This PCB is a general PCB. Replace the PCB according to this instruction.

Replace the PCB (refer to next page)

1. Unscrew terminal of the wiring(yellow/green) soldered to PCB from the box.
2. Replace the PCB only after all the wirings connected to the connector are removed.
3. Fix the board such that it will not pinch any of the wires.
4. Reconnect the wirings to the PCB. Wiring connector color should match with the color of connector of the PCB.
5. Screw back the terminal of wiring (yellow/green) from PCB(T1), that was removed in 1.
   In that case, do not place the crimping part of the wiring under the PCB.





●DIP switch setting list

Switches	Description		Default setting		Remarks
SW2	Address No. setting at plural indoor units control by 1 R/C		0		0-F
SW5-1	Master/Slave setting	Master*/Slave	OFF		See table 2
SW5-2			OFF		
SW6-1	Model selection		As per model		See table 1
SW6-2					
SW6-3					
SW6-4					
SW7-1	Test run, Drain motor	Normal*/Test run	OFF	Normal	
SW7-2	Reserved		OFF		keep OFF
SW7-3	Powerful mode	Valid*/Invalid	ON	Valid	
SW7-4	Reserved		OFF		keep OFF
JSL1	Superlink terminal spare	Normal*/switch to spare	With		

* Default setting

Table 1: Indoor unit model selection with SW6-1-SW6-4

0: OFF 1:ON

	71VD	100VD	125VD	140VD
SW6-1	1	1	0	1
SW6-2	0	1	0	0
SW6-3	0	0	1	1
SW6-4	1	1	1	1

Table 2: Indoor unit Master/Slave setting with SW5-1,SW5-2

0: OFF 1:ON

	SW5-1	SW5-2
Master	0	0
Slave1	0	1
Slave2	1	0
Slave3	1	1

(4) Troubleshooting at the outdoor unit

When troubleshooting the outdoor unit, firstly assess the overview of malfunction and try to presume the cause and the faulty part by checking the error cord dispalyed on the remote controller and flashing pattern of indicator lamps (Red LED and Green LED), and then proceed further inspection and remedy it.

Self-diagnosis system by microcomputor on indoor and outdoor PCB can assist to find the cause of malfunction smoothly by making a diagnosis of not only the anomaly of microcomutor, but also the anomaly in power supply system, installation space, overload resulting from improper charging amount of refrigerant and etc.

Unless the power is reset, the error log is saved in memory and the inspection indicator lamps on outdoor PCB keep flashing after automatical recovering from malfunction.

After automatical recovering from malfunction, if any another error mode which has a higher priority than the previous error saved in memory occurs, it is overwritten in memory and is displayed.

[Reset of power supply]

Be sure to avoid electrical shock, when replacing or checking the outdoor control PCB, because some voltage is still retained in the electrolytic capacitor on the PCB even after shutting down tne power supply to the outdoor unit.

Be sure to start repairing work, after confirming that the Red LED or Green LED on the PCB has been extiguished for more than 10 seconds after more than 3 minutes had been passed since power shut down, and reconfirming that voltage has been discharged sufficiently by measuring the voltage (DC) between both terminals of electrolytic capacitor (C58)

(Measurment of voltage may be disturbed by the moisture-proof coating. In such case, remove the coating and measure it by taking care of avoiding electrical shock)

(a) Module of part to be replaced for outdoor unit controller

Outdoor control PCB, Inverter PCB, Temperature thermistor (of outdoor heat exchanger, discharge pipe, outdoor air, IPM and suction pipe), Fuses (for power supply and control PCB), Noise filter, Capacitor, Reactor and Transformer

(b) Replacement procedure of outdoor control PCB

Precautions for Safety

- Since the following precaution is the important contents for safety, be sure to observe them. WARNING and CAUTION are described as follows:

⚠WARNING Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.

⚠CAUTION Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.

⚠ WARNING

- Securely replace the PCB according to this procedure. If the PCB is incorrectly replaced, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before replacing the PCB. The PCB replacement under current-carrying will cause an electric shock or fire.
- After finishing the PCB replacement, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly replaced, it will cause an electric shock or fire.

⚠ CAUTION

- Band the wiring so as not to tense because it will cause an electric shock.

(i) Hyper inverter series

PCA012D021C F

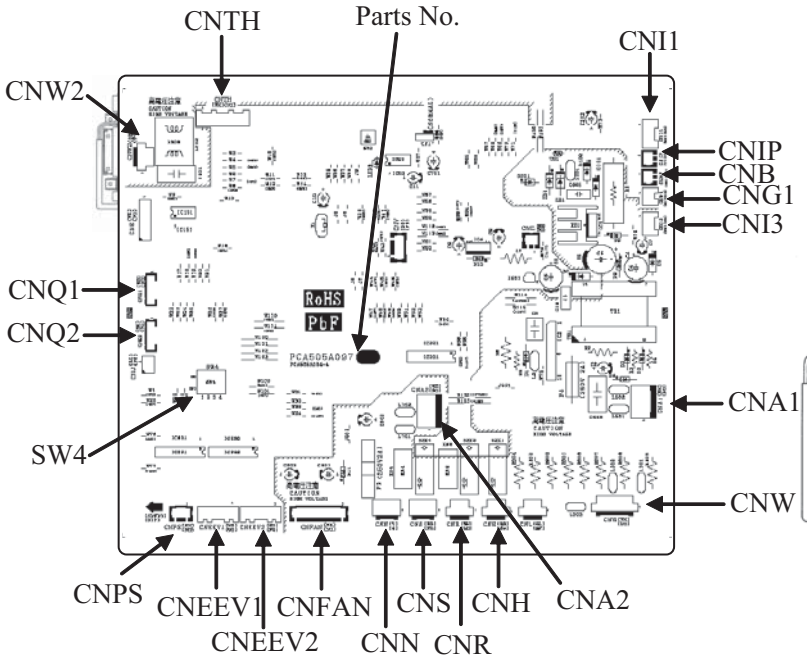
1) Model FDC71VNX

a) Replace the PCB **after elapsing 3 minutes from power OFF.**
(Be sure to measure voltage (DC) between T26 and T27 on inverter PCB, and **check that the voltage is discharged sufficiently(10V or less)**.(Refer to Fig.1))

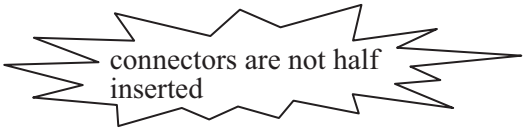
b) Disconnect the connectors from the control PCB.

c) Match the switches setting (SW4) with the former PCB.

d) Connect the connectors to the control PCB.(Confirm the **connectors are not half inserted**.)



Parts Arrangement View



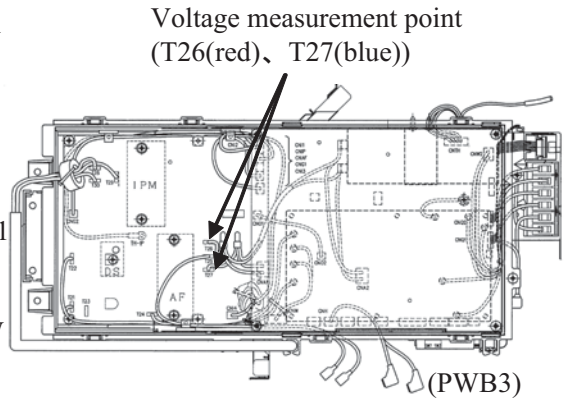


Fig.1 Position of terminal

2) Model FDC100VNX, 125VNX, 140VNX
FDC100VSX, 125VSX, 140VSX

PCA012D024F

a) Replace the PCB **after elapsing 3 minutes from power OFF**.

b) Measurement was done on both ends of connector(CNA1) during measurement, **the voltage(DC) might charged the electrolytic capacitor, be sure that the voltage is discharged sufficiently.** (Refer to Fig.1)

c) Disconnect the connectors from the control PCB.

d) Disconnect the white or blue wiring passing through CT1 on the PCB before replacing the PCB.

e) Match the setting switches (SW3-5, JSW, SW(J5-7)) with the former PCB.

f) Tighten up a screw after passing white or blue wiring through CT1 of the changed.

g) Please connect the connectors with the same place. (Confirm the **connectors are not half inserted**.)

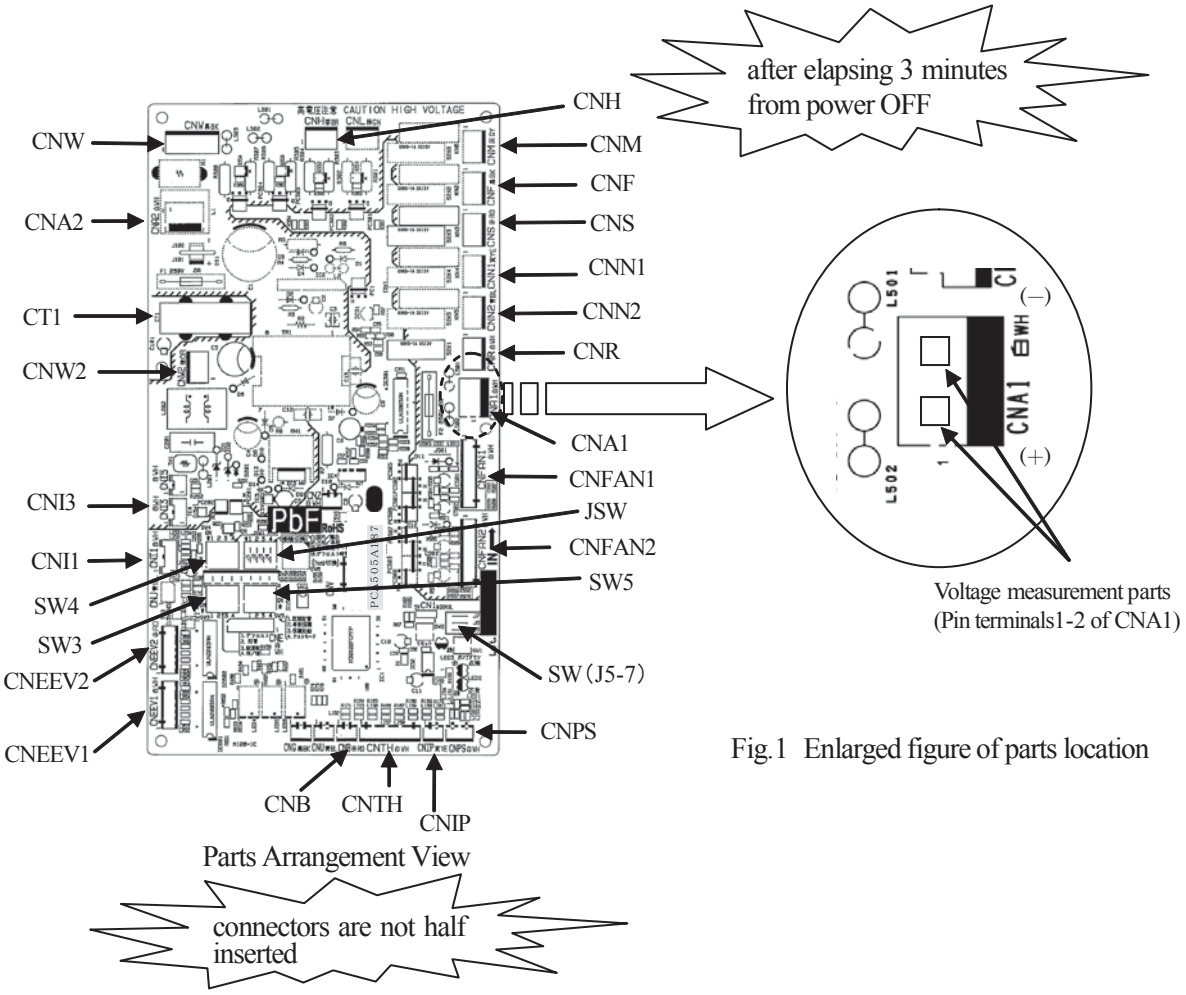


Fig.1 Enlarged figure of parts location

(ii) Micro inverter series

PCA012D024B C

1) Model FDC100VN, 125VN, 140VN

a) ReplacethePCB **after elapsing 3 minutes from power OFF.**
(**Be sure to measure voltage (DC)** onbothcapacitorterminalslocatedincontrollerback, and **check that the voltage is discharged sufficiently**.(RefertoFig.1))

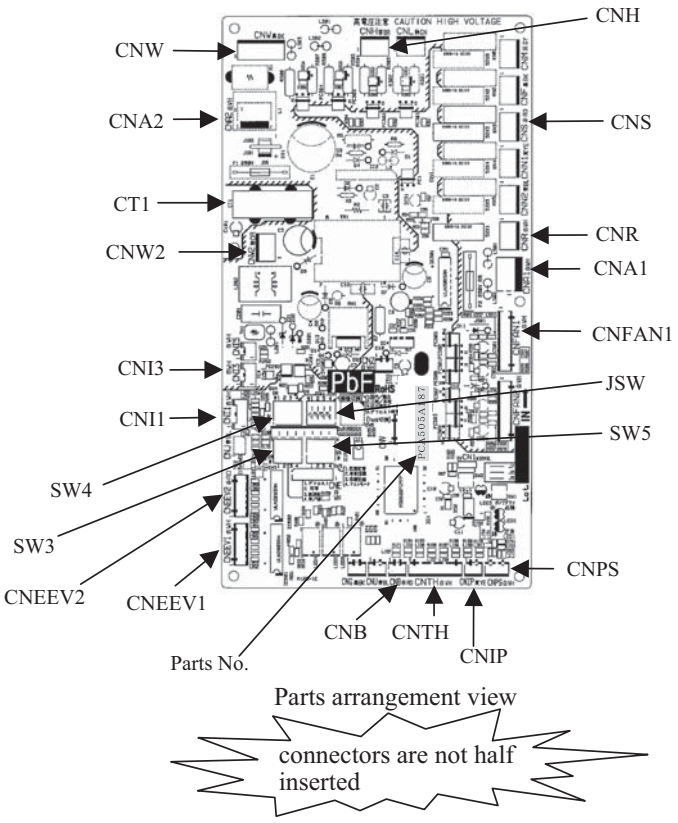
b) Disconnecttheconnectorsfromthecontrol PCB.

c) DisconnectthewhitewiringpassingthroughCT1onthePCBbeforereplacingthePCB.

d) Matchthesettingswitches(SW3-5,JSW)withtheformerPCB.

e) TightenupascrewafterpassingwhitewiringthroughCT1ofthechanged.

f) Connect the connectors to the control PCB.(Confirm the **connectors are not half inserted**.)



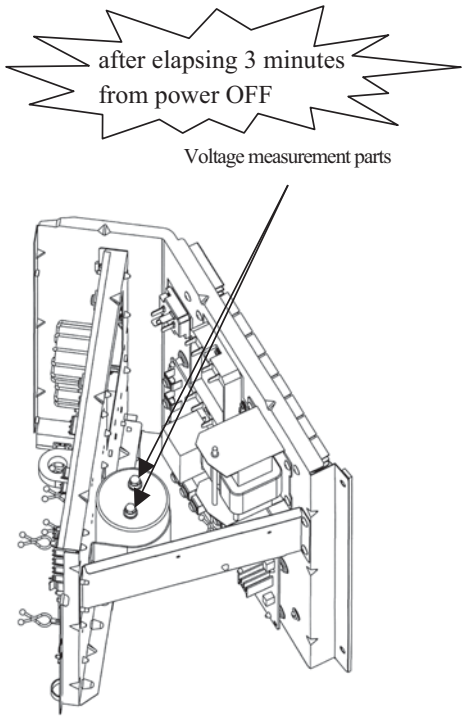


Fig.1 Position of capacitor

2) Model FDC100VS, 125VS, 140VS

PCA012D024C C

a) ReplacethePCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure voltage (DC)** onbothcapacitorterminalslocatedincontrollerback and **check that the voltage is discharged sufficiently**.(RefertoFig.1))

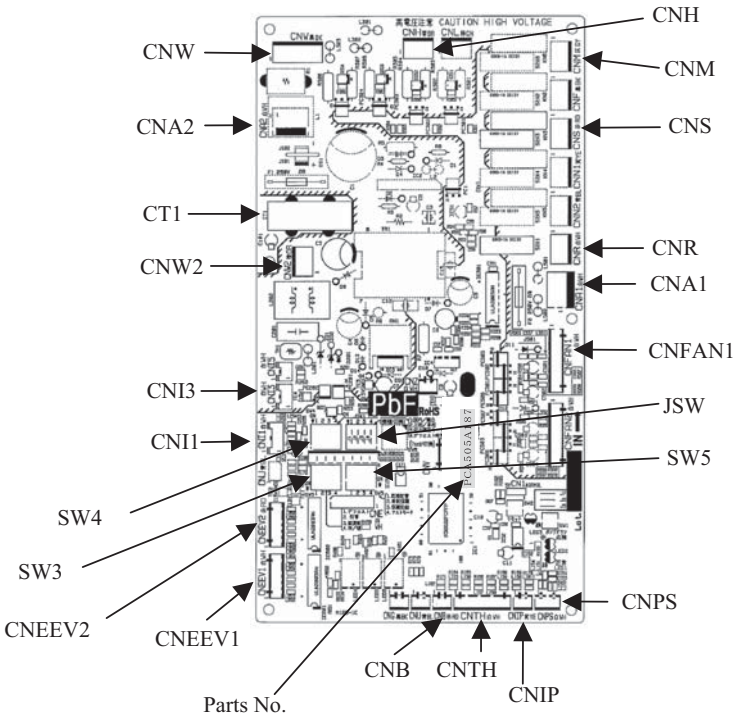
b) Disconnecttheconnectorsfromthecontrol PCB.

c) DisconnectthewhitewiringpassingthroughCT1onthePCBbeforereplacingthePCB.

d) Matchthesettingswitches(SW3-5,JSW)withtheformerPCB.

e) TightenupascrewafterpassingwhitewiringthroughCT1ofthechanged.

f) Connect the connectors to the control PCB.(Confirm the **connectors are not half inserted**.)



Parts arrangement view

connectors are not half inserted

after elapsing 3 minutes from power OFF

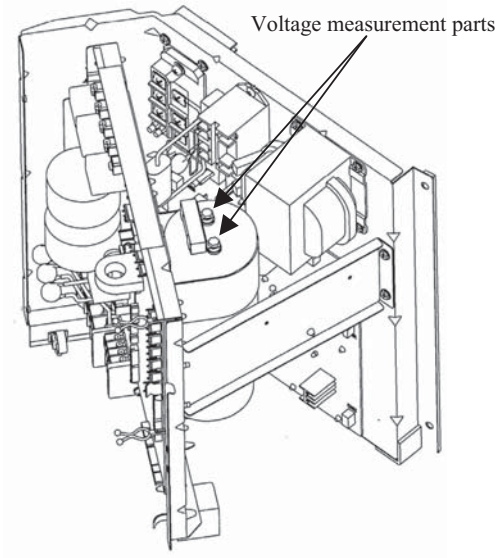
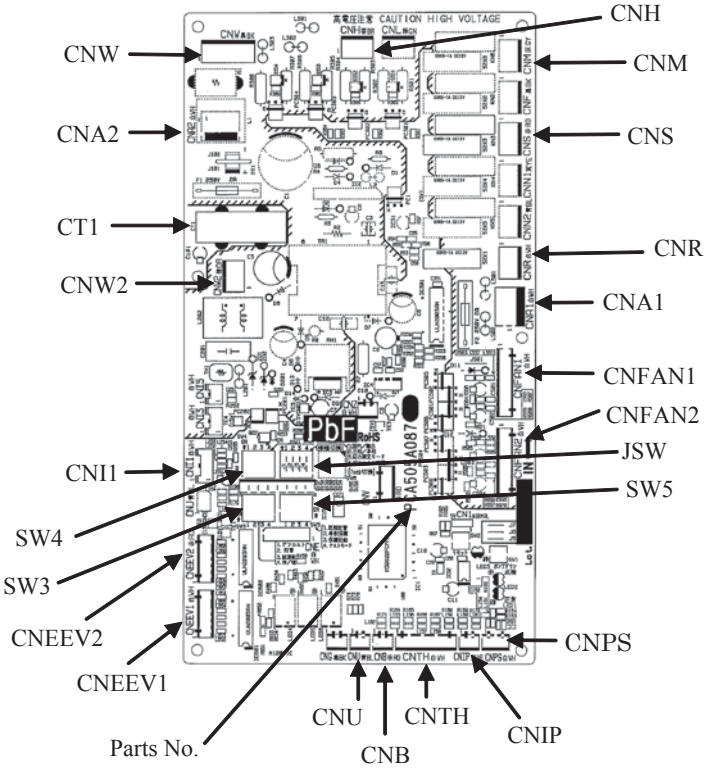


Fig.1 Position of capacitor

3) Model FDC200,250VS

PCA012D017F

a) Replace the PCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure the voltage (DC) of two places** (1.Resistor on PCB at the front of controller 2.Both capacitor terminals located in back of controller), and **check that the voltage is discharged sufficiently**. (Refer to Fig.1))
b) Disconnect the connectors from the control PCB.
c) Disconnect the blue wiring passing through CT1 on the substrate before replacing the PCB.
d) Match the setting switches (SW3-5,JSW) with the former PCB.
e) Tighten up a screw after passing blue wiring through CT1 of the changed.
f) Connect the connectors to the control PCB. (Confirm the **connectors are not half inserted**)



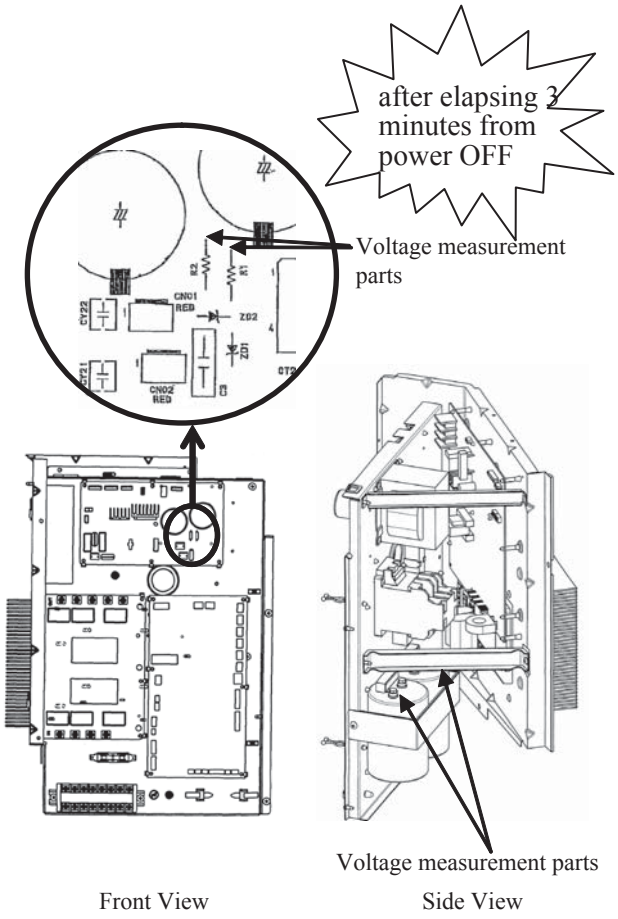


Fig.1 Position of capacitor

(c) Outdoor inverter PCB replacement procedure

Precautions for Safety

- Since the following precaution is the important contents for safety, be sure to observe them. WARNING and CAUTION are described as follows:

⚠ WARNING Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.

⚠ CAUTION Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.

⚠ WARNING

- Securely replace the PCB according to this procedure. If the PCB is incorrectly replaced, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before replacing the PCB. The PCB replacement under current-carrying will cause an electric shock or fire.
- After finishing the PCB replacement, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly replaced, it will cause an electric shock or fire.

⚠ CAUTION

- Band the wiring so as not to tense because it will cause an electric shock.

Replace the inverter PCB according to the following procedure.

(i) Hyper inverter series

1) Model FDC71VNX

PCA012D022G B

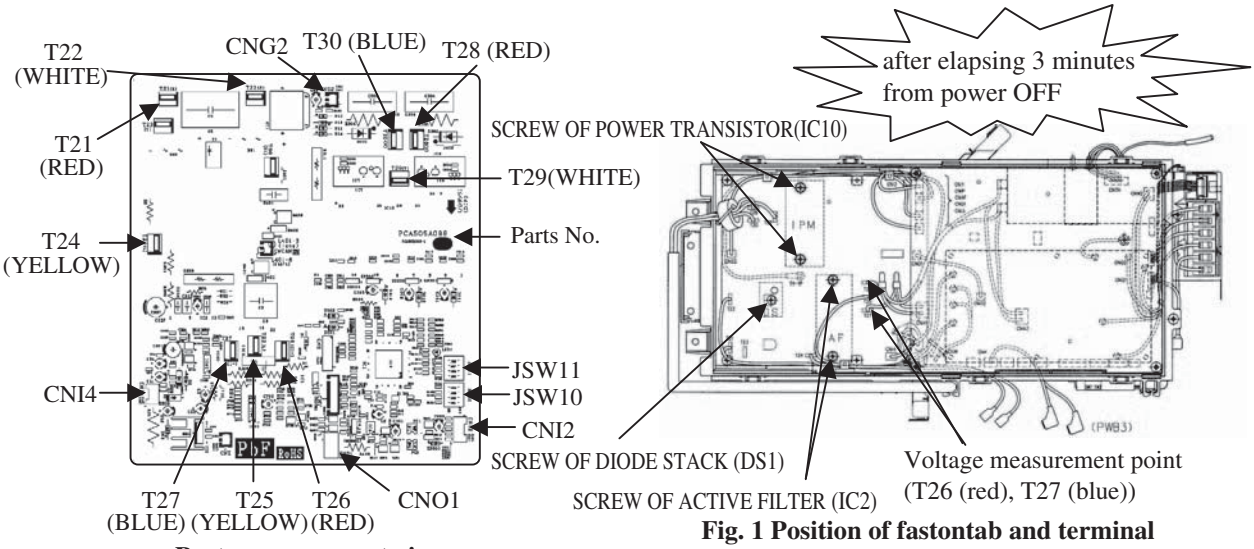
a) Replace the PCB **after elapsing 3 minutes from power OFF.** (**Be sure to measure voltage (DC)** between T26 and T27 on inverter PCB, and **check that the voltage is discharged sufficiently (10V or less)**. (Refer to Fig.1))

b) Take off the connection of inverter PCB terminal and connector, and remove the screw of power transistor (IC10), active filter (IC2), and diode stack (DS1) then remove the PCB. Wipe off the silicon grease neatly on the controller's radiation heat fins. (Refer to Fig.1 and Parts arrangement view)

c) Refer to table1 for the setting of switch (JSW10, 11) of new PCB.

d) Before installing the power transistor (IC10), active filter (IC2), and diode stack (DS1) on the new PCB, apply silicon grease equally to the their surface. (Make full use of the silicon grease.) **They may be damaged unless they apply it**.

e) Tighten the screw of power transistor (IC10), active filter (IC2), and diode stack (DS1) on inverter PCB and connect terminal and connector. Confirm the connection and there is not the half insertion. **Tighten properly power transistor, (IC10) active filter (IC2), and diode stack (DS1) with a screw and make sure there is no slack. They can be damage if not properly tighten.** (Recommended tightening torque: power transistor (IC10)1.2±0.1 and active filter (IC2)0.98±0.1, diode stack(DS1) 0.5±0.1 Unit N·m



Parts arrangement view

Fig. 1 Position of fastontab and terminal

Connectors are not half inserted

Table. 1 Switch setting

JSW10	-1	OFF	JSW11	-1	ON
	-2	OFF		-2	ON
	-3	OFF		-3	ON
	-4	OFF		-4	ON

2) Model FDC100VNX, 125VNX, 140VNX

PCA012D025D F

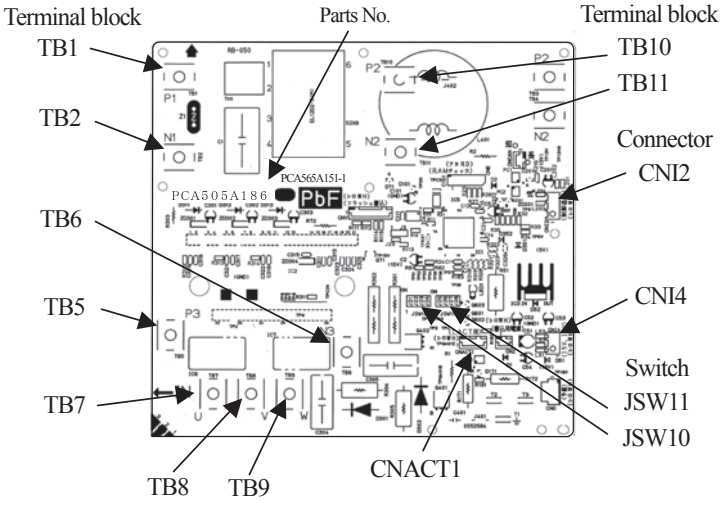
a) Replace the PCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure voltage (DC)** on both capacitor terminals located in controller back, and **check that the voltage is discharged sufficiently**. (Refer to Fig.1))

b) Take off the connection of inverter PCB terminal block connector and remove the screw of power transistor then remove the PCB. Wipe off the silicon grease neatly on the controller's radiation heat fins.

c) Match the settings switches (JSW10, 11) of new PCB with the former PCB.

d) Before installing the power transistor on the new PCB, Apply uniformly a bundled of silicon grease first on the surface of power transistor. Make sure it is applied to prevent damage on power transistor.

e) Tighten the screw of power transistor on inverter PCB and connect the terminal block. Confirm the connection and don't use soldering in the connection. Tighten properly the power transistor with a screw and make sure there is no slack. Power transistor can be damage if not properly tighten. (Recommended power transistor tightening torque: 0.47Nm)



Parts arrangement view

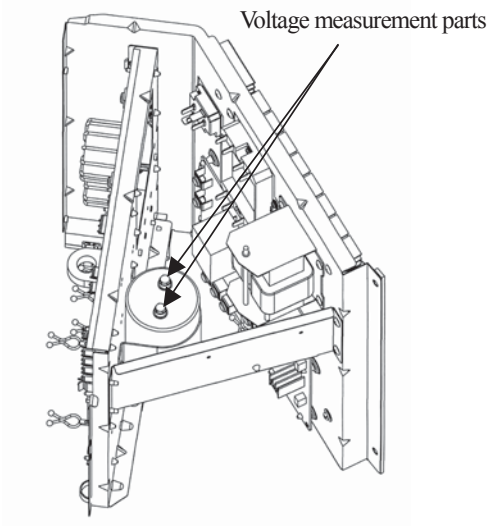


Fig.1 Position of capacitor

Table. 1 Switch setting

JSW10	-1	OFF	JSW11	-1	OFF
	-2	OFF		-2	OFF
	-3	OFF		-3	ON
	-4	OFF		-4	ON

●DIP switch setting list (Outdoor unit)

(1) Control PCB

Model FDC71VNX

Switches	Description		Default setting		Remarks
SW3-1	Defrost condition	Normal*/Cold region	OFF	Normal	
SW3-2	Snow protection control	Normal*/Snow protection	OFF	Normal	
SW3-3	Model selection	Cooling only/Heat pump*	OFF	Heat pump	Keep OFF
SW3-4	Defrost prohibition time	ON: 37min*/OFF: 45min	ON	37min.	
SW4-1	Model selection	Domestic/Overseas*	ON	Overseas	Keep ON
SW4-2	Model selection	3-phase/Single phase*	ON	Single phase	Keep ON
SW4-3	Reserved		OFF		Keep OFF
SW4-4	Spare		OFF		Keep OFF
SW5-1	Model selection	Capacity	OFF		Keep OFF
SW5-2	Model selection	Capacity	OFF		Keep OFF
SW5-3	Test run SW	Normal*/Test run	OFF	Normal	
SW5-4	Test run mode	Cooling*/Heating	OFF	Cooling	
SW7-1	Spare		OFF		
SW7-2	Antifrost control	Valid*/Invalid	OFF	Valid	
SW7-3	Spare		OFF		Keep OFF
SW8-1	Reserved		OFF		Keep OFF
SW8-2	Spare		OFF		Keep OFF
SW8-3	Spare		OFF		Keep OFF
SW9	Pump down operation	Normal*/Pump down	OFF	Normal	

* Default setting

Models FDC100,125,140VNX,100,125,140VSX

Switches	Description		Default setting		Remarks
SW1	Pump down operation	Normal*/Pump down	OFF	Normal	
JSW1-1	Model selection		As per model		See table 1
JSW1-2					
JSW1-3					
JSW1-4					
SW3-1	Defrost condition	Normal*/Cold region	OFF	Normal	
SW3-2	Snow protection control	Normal*/Snow protection	OFF	Normal	
SW3-3	Test run SW	Normal*/Test run	OFF	Normal	
SW3-4	Test run mode	Cooling*/Heating	OFF	Cooling	
SW4-1	Model selection	Domestic/Overseas*	ON	Overseas	See table 1
SW4-2	Model selection	3-phase/Single phase	As per model		See table 1
SW4-3	Reserved		OFF		Keep OFF
SW4-4	Reserved		OFF		Keep OFF
SW5-1	Reserved		OFF		Keep OFF
SW5-2	Reserved		OFF		Keep OFF
SW5-3	Reserved		OFF		Keep OFF
SW5-4	Reserved		OFF		Keep OFF
J5	Antifrost control	Valid*/Invalid	With	Valid	
J7	Outdoor fan control when ducting	Normal*/Hi tap	With	Normal	

* Default setting

Table 1: Outdoor unit model selection with JSW1-1-JSW1-4 and SW4-1-SW4-2

0: OFF 1:ON

	100VNX	100VSX	125VNX	125VSX	140VNX	140VSX
JSW1-1	0	0	1	1	0	0
JSW1-2	0	0	0	0	1	1
JSW1-3	0	0	0	0	0	0
JSW1-4	0	0	0	0	0	0
SW4-1	1	1	1	1	1	1
SW4-2*	1	0	1	0	1	0

* 3-phase: OFF/Single phase: ON

(2) Inverter PCB

Switches	71VNX	100, 125, 140VNX	100, 125, 140VSX
	Single phase models	Single phase models	3-phase models
JSW10-1	OFF	OFF	OFF
JSW10-2	OFF	OFF	OFF
JSW10-3	OFF	OFF	OFF
JSW10-4	OFF *	OFF *	OFF *
JSW11-1	ON	OFF	ON
JSW11-2	ON	OFF	OFF
JSW11-3	ON	ON	ON
JSW11-4	ON	ON	ON

* Whencheckingnewinverter PCBofFDC71 ～140models withinverterchecker,turnJSW10-4ON.
(Regardingthecheckingmethodofnewinverter PCBwithinverterchecker,refertopage141fordetails)

PCA012D025B C

(ii) Micro inverter series

1) Model FDC100VN, 125VN, 140VN

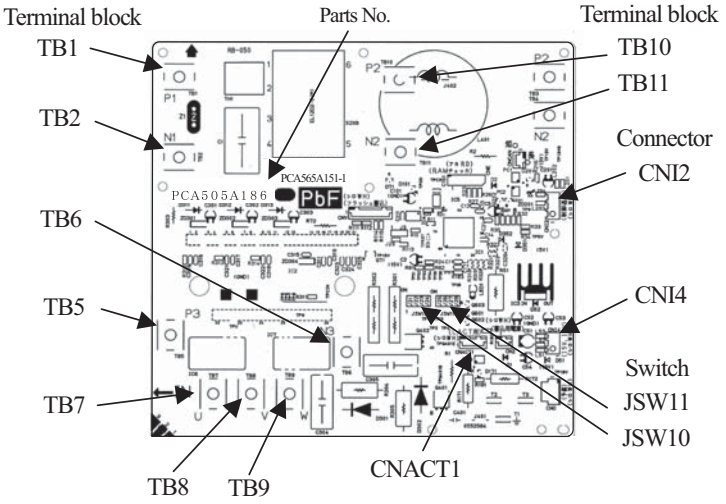
a) Replace the PCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure voltage (DC)** on both capacitor terminals located in controller back, and **check that the voltage is discharged sufficiently**. (Refer to Fig.1))

b) Take off the connection of inverter PCB terminal block connector and remove the screw of power transistor then remove the PCB. Wipe off the silicon grease neatly on the controller's radiation heat fins.

c) Refer to table 1 for the setting of switch (JSW10, 11) of new PCB.

d) Before installing the power transistor on the new PCB, Apply uniformly a bundled of silicon grease first on the surface of power transistor. Make sure it is applied to prevent damage on power transistor.

e) Tighten the screw of power transistor on inverter PCB and connect the terminal block. Confirm the connection and don't use soldering in the connection. Tighten properly the power transistor with a screw and make sure there is no clearance gap. Power transistor can be damage if not properly tighten. (Recommended power transistor tightening torque: 0.47Nm)



Parts arrangement view

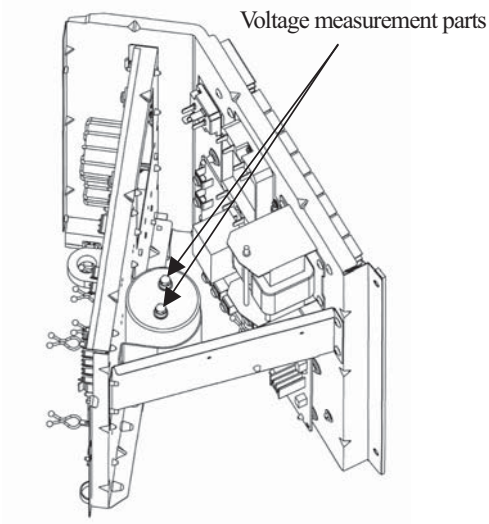


Fig.1 Position of capacitor

Table. 1 Switch setting

JSW10	-1	OFF	JSW11	-1	ON
	-2	OFF		-2	OFF
	-3	OFF		-3	OFF
	-4	OFF		-4	ON

2) Model FDC100VS, 125VS, 140VS

PCA012D025C D

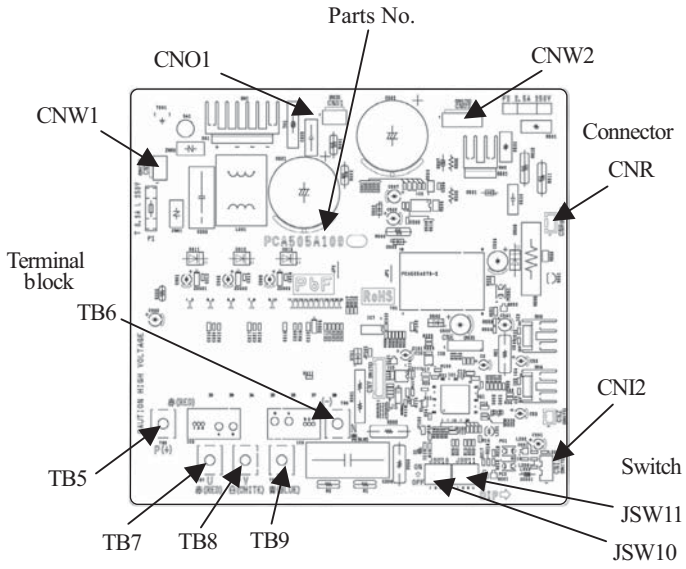
a) Replace the PCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure voltage (DC)** on both capacitor terminals located in controller back, and **check that the voltage is discharged sufficiently**. (Refer to Fig.1))

b) Take off the connection of inverter PCB terminal block connector and remove the screw of power transistor then remove the PCB. Wipe off the silicon grease neatly on the controller's radiation heat fins.

c) Refer to table 1 for the setting of switch (JSW10, 11) of new PCB.

d) Before installing the power transistor on the new PCB, Apply uniformly a bundled of silicon grease first on the surface of power transistor. Make sure it is applied to prevent damage on power transistor.

e) Tighten the screw of power transistor on inverter PCB and connect the terminal block. Confirm the connection and don't use soldering in the connection. Tighten properly the power transistor with a screw and make sure there is no clearance gap. Power transistor can be damage if not properly tighten. (Recommended power transistor tightening torque: 0.47Nm)



Parts arrangement view

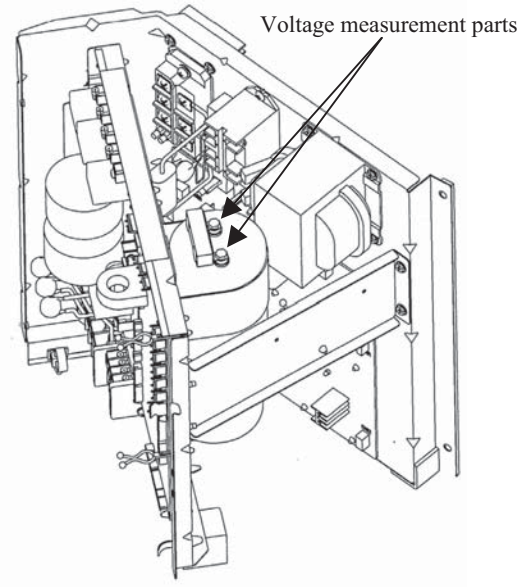


Fig.1 Position of capacitor

Table. 1 Switch setting

JSW10	-1	OFF	JSW11	-1	OFF
	-2	OFF		-2	ON
	-3	OFF		-3	OFF
	-4	OFF		-4	ON

PCB012D007C

3) Model FDC200VS, 250VS

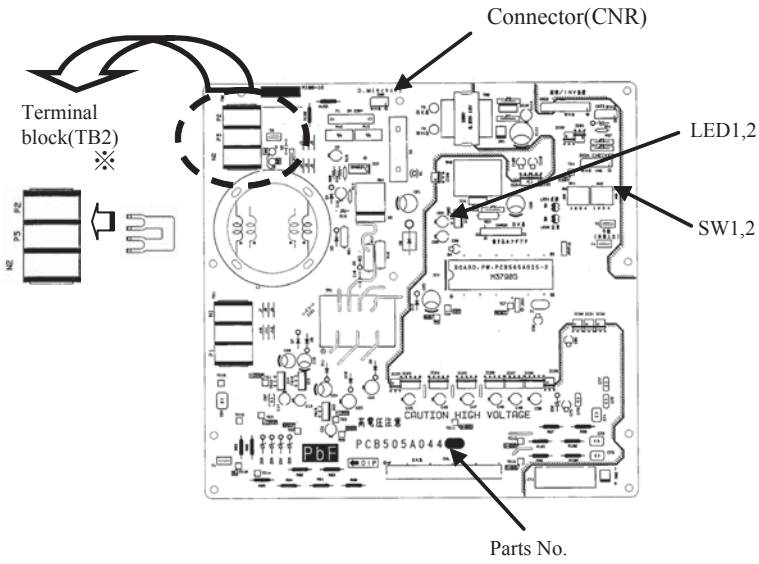
a) Replace the inverter PCB after 10 minutes from power OFF. (Be sure to check that LED (LED1,2) of the inverter PCB put out the lights. It measures that the voltage (AC) between terminals (R,S,T) on the noise filter PCB (see Fig 1) is discharged sufficiently.)

b) Remove the terminal on the terminal block (TB2) of the inverter PCB and the connector (CNR) of replace the PCB.

c) Make set switch (SW1,2) as shown in Table 1.

d) Connect the terminal of terminal block and the connector to the inverter PCB.

※Remove the short bar form the PCB before the replacement.
Connect it with P2-P3 pins of PCB after the replacement.



Parts Arrangement View
(the inverter PCB)

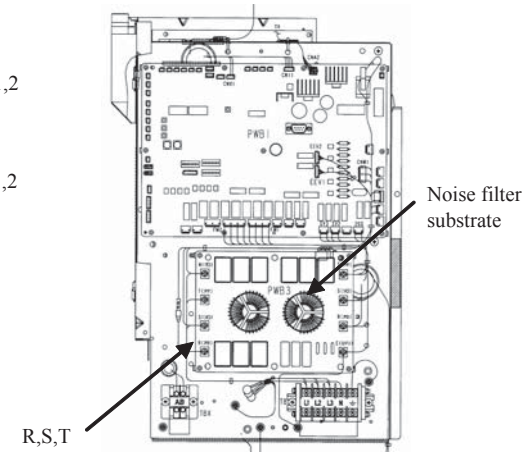


Fig. 1 The front of control

Table.1 Switch setting

In case of one substrate.

SW1-1	OFF
SW1-2	OFF
SW1-3	OFF
SW1-4	OFF
SW2-1	ON
SW2-2	OFF
SW2-3	OFF
SW2-4	OFF

●DIP switch setting list (Outdoor unit)

(1) Control PCB

Models FDC100,125,140VN,100,125,140,200,250VS

Switches	Description		Default setting		Remarks
SW1	Pump down operation	Normal*/Pump down	OFF	Normal	
JSW1-1 JSW1-2 JSW1-3 JSW1-4	Model selection		As per model		See table 1
SW3-1	Defrost condition	Normal*/Cold region	OFF	Normal	
SW3-2	Snow protection control	Normal*/Snow protection	OFF	Normal	
SW3-3	Test run SW	Normal*/Test run	OFF	Normal	
SW3-4	Test run mode	Cooling*/Heating	OFF	Cooling	
SW4-1	Model selection	Domestic/Overseas*	ON	Overseas	See table 1
SW4-2	Model selection	3-phase/Single phase	As per model		See table 1
SW4-3	Reserved		OFF		Keep OFF
SW4-4	Reserved		OFF		Keep OFF
SW5-1	Reserved		OFF		Keep OFF
SW5-2	Reserved		OFF		Keep OFF
SW5-3	Reserved		OFF		Keep OFF
SW5-4	Reserved		OFF		Keep OFF
J5	Antifrost control	Valid*/Invalid	With	Valid	
J6	Drain pan heater	Normal*/Equipped	With	Normal	
J7	Outdoor fan control when ducting	Normal*/Hi tap	With	Normal	

* Default setting

Table 1: Outdoor unit model selection with JSW1-1-JSW1-4 and SW4-1-SW4-2

0: OFF 1:ON

	100VN	100VS	125VN	125VS	140VN	140VS	200VS	250VS
JSW1-1	0	0	1	1	0	0	1	0
JSW1-2	0	0	0	0	1	1	1	0
JSW1-3	0	0	0	0	0	0	0	1
JSW1-4	0	0	0	0	0	0	0	0
SW4-1	1	1	1	1	1	1	1	1
SW4-2*	1	0	1	0	1	0	0	0

* 3-phase: OFF/Single phase: ON

(2) Inverter PCB

Switches	100, 125, 140VN	100, 125, 140VS
	Single phase models	3-phase models
JSW10-1	OFF	OFF
JSW10-2	OFF	OFF
JSW10-3	OFF	OFF
JSW10-4	OFF *	OFF *
JSW11-1	ON	OFF
JSW11-2	OFF	ON
JSW11-3	OFF	OFF
JSW11-4	ON	ON

Switches	200,250VS
	3-phase models
SW1-1	OFF
SW1-2	OFF
SW1-3	OFF
SW1-4	OFF
SW2-1	ON
SW2-2	OFF
SW2-3	OFF
SW2-4	OFF

* When checking inverter PCB of FDC100 ~ 140 models within inverter checker, turn JSW10-4 ON.
(Regarding the checking method of inverter PCB within inverter checker, refer to page 141 for details)

(5) Check of anomalous operation data with the remote controller

Operation data can be checked with remote control unit operation.

① Press the CHECK button.
The display change "OPER DATA ▼"

② Press the ○ (SET) button while "OPER DATA ▼" is displayed.

③ When only one indoor unit is connected to remote controller, "DATA LOADING" is displayed (blinking indication during data loading).
Next, operation data of the indoor unit will be displayed. Skip to step ⑦.

④ When plural indoor units is connected, the smallest address number of indoor unit among all connected indoor units is displayed.
[Example]
"SELECT I/U" (blinking 1 seconds) → "I/U000 ▲" blinking.

⑤ Select the indoor unit number you would like to have data displayed with the ▲ ▼ button.

⑥ Determine the indoor unit number with the ○ (SET) button.
(The indoor unit number changes from blinking indication to continuous indication)
"I/U000" (The address of selected indoor unit is blinking for 2 seconds.)
↓
"DATA LOADING" (A blinking indication appears while data loaded.)
Next, the operation data of the indoor unit is indicated.

⑦ Upon operation of the ▲ ▼ button, the current operation data is displayed in order from data number 0.
The items displayed are in the above table.
※ Depending on models, the items that do not have corresponding data are not displayed.

Number	Data Item	
01	※	(Operation Mode)
02	SET TEMP___℃	(Set Temperature)
03	RETURN AIR___℃	(Return Air Temperature)
04	SENSOR___℃	(Remote Controller Thermistor Tempeature)
05	THI-R1___℃	(Indoor Heat Exchanger Thermistor / U Bend)
06	THI-R2___℃	(Indoor Heat Exchanger Thermistor /Capillary)
07	THI-R3___℃	(Indoor Heat Exchanger Thermistor /Gas Header)
08	I/U FANSPEED___	(Indoor Unit Fan Speed)
09	DEMAND___Hz	(Frequency Requirements)
10	ANSWER___Hz	(Response Frequency)
11	I/U EEV____P	(Pulse of Indoor Unit Expansion Value)
12	TOTAL I/U RUN___H	(Total Running Hours of The Indoor Unit)
21	OUTDOOR___℃	(Outdoor Air Temperature)
22	THO-R1___℃	(Outdoor Heat Exchanger Thermistor)
23	THO-R2___℃	(Outdoor Heat Exchanger Thermistor)
24	COMP___Hz	(Compressor Frequency)
25	HP___MPa	(High Pressure)
26	LP___MPa	(Low Pressure)
27	Td___℃	(Discharge Pipe Temperature)
28	COMP BOTTOM___℃	(Comp Bottom Temperature)
29	CT___AMP	(Current)
30	TARGET SH___℃	(Target Super Heat)
31	SH___℃	(Super Heat)
32	TDSH___℃	(Discharge Pipe Super Heat)
33	PROTECTION No.__	(Protection State No. of The Compressor)
34	O/U FANSPEED___	(Outdoor Unit Fan Speed)
35	63H1	(63H1 On/Off)
36	DEFROST	(Defrost Control On/Off)
37	TOTAL COMP RUN___H	(Total Running Hours of The Compressor)
38	O/U EEV1____P	(Pulse of The Outdoor Unit Expansion Valve EEVC)
39	O/U EEV2____P	(Pulse of The Outdoor Unit Expansion Valve EEVH)

⑧ To display the data of a different indoor unit, press the AIR CON NO. button, which allows you to go back to the indoor unit selection screen.

⑨ Pressing the ①ON/OFF button will stop displaying data.
Pressing the ⁄⁄ (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.

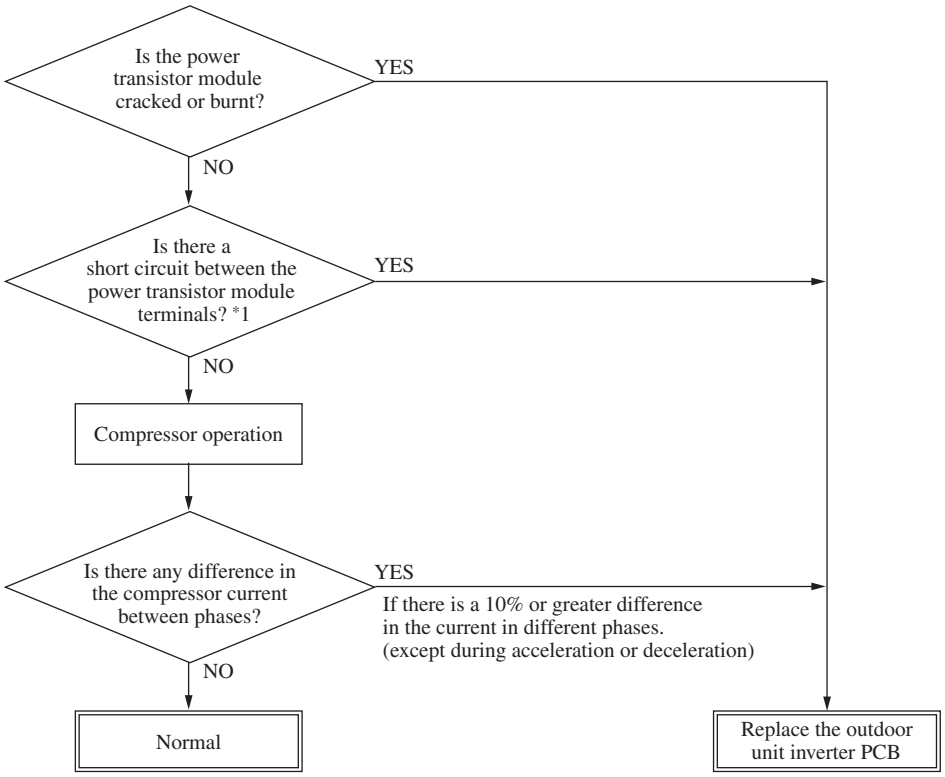
⊙ If two (2) remote controllers are connected to one (1) inside unit, only the master controller is available for trial operation and confirmation of operation data. (The slave remote controller is not available.)

●Details of Compressor protection status No. 33

No.	Contents of display	In case of FDC100-140 refer to
"0"	Normal	
"1"	Discharge pipe temperature protection control	P104 (f).1).a)
"2"	Discharge pipe temperature anomaly	P104 (f).1).b)
"3"	Current safe control of inverter primary current	P106 (f).7)
"4"	High pressure protection control	P104 (f).2).a), P.105, (f).3).a)
"5"	High pressure anomaly	P104 (f).2).b)
"6"	Low pressure protection control	P105 (f).5).a)
"7"	Low pressure anomaly	P105 (f).5).b)
"8"	Anti-frost prevention control	P106 (f).11)
"9"	Current cut	P106 (f).7)
"10"	Power transistor protection control	P106 (f).8)
"11"	Power transistor anomaly (Overheat)	P106 (f).9)
"12"	Compression ratio control	P105 (f).6)
"13"	Spare	
"14"	Dewing prevention control	P107 (f).12)
"15"	Current safe control of inverter secondary current	P106 (f).7)
"16"	Stop by compressor rotor lock	
"17"	Stop by compressor startup failure	P107 (f).17)

Note(1) Operation data display on the remote controller.
・Data is dispalyed until canceling the protection control.
・In case of multiple protections controlled, only the younger No. is displayed.
Note(2) Common item.
① In heating mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "4" is displayed.
② In cooling and dehumidifying mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "8" is displayed.

(6) Power transistor module (including the driver PCB) inspection procedure



Note(1) In models 200 and 250, also replace the power transistor.

*1 Power transistor module terminal short circuit check procedure

Disconnectthecompressorwiring,thenconductashortcircuitcheck

P-JP-V,P-W

N-JN-V,N-W

Checkbetweentheir P-Nterminals.

Bringthetesterprobesincontactwiththefollowing

placesoneachterminal.

PPowertransistorPterminal,

NPowertransistorNterminal,

Endofredharnesstocompressor

VEndofwhiteharnesstocompressor

WEndofblackorblueharnesstocompressor

Checkforapowertransistorshortcircuit.

- Whenyoudonothaveadiagnosticcheckerforjudgingiftheinverter is defective, measure between the terminals of the power transistor parts,judgewhetherthepowertransistorisdefectiveornot.
- Disconnect the compressor, then measure with the controller incorporated.

Tester		Normalvalues(Ω)		
Terminal (+)	Terminal (-)	Model71	Model 1040	Model 2250
P	N	0 (Numerical values.)	Approx1M Approx 300	ScoresofM
N	P			AfewofM
P	U	SeveralM (Numerical values.)	0	ScoresofM
P	V			ScoresofM
P	W			ScoresofM
N	U	Approx5k	Approx1.2M	HundredsofK
N	V			HundredsofK
N	W			HundredsofK
U	P	Approx7k	Approx1.3M	HundredsofK
V	P	Approx4.4M		HundredsofK
W	P	Approx4.4M		HundredsofK
U	N	Approx5k	0	ScoresofM
V	N	Approx4.8M		ScoresofM
W	N	Approx4.9M		ScoresofM

If the measured values range from 0 to several kW, there is a possibility that the elementsaredamaged,soreplacethepowertransistorparts.

(7) Inverter checker for diagnosis of inverter output

●Checkingmethod

(a)Setupproceduretocheckr.

1)PowerOFF(Turnoffthebreakr).

2)Removetheterminalcovrofcompressoranddisconnectthewires(U,V,W)fromcompressor.

3)Connectthewires(U(Red),V(White)andW(Black)ofcheckrtotheterminalofdisconnectedwires(U,V,W) fromcompressorrespectivly

(b)Operationforjudgment.

1)PowerONafterJSW104onoutdoorinvrterPCBwasturnedON.

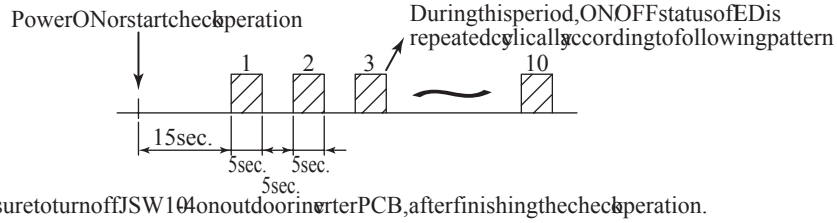
2) After15secondssincepowerhasturnedON

EDstartON/OFFfor5secondscylicallyanditrepeats10times.

3)CheckON/OFFstatusofLEDsonthecheckr.

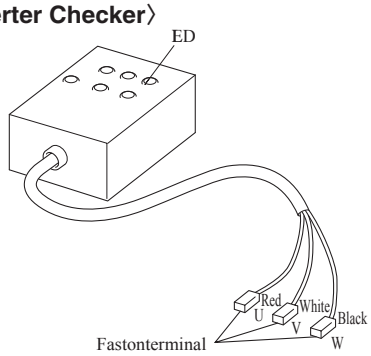
4)JudgethePCBbyON/OFFstatusofLEDsonthecheckr.

ON/OFF statusofLED	IfallofLEDareON/OFF accordingtofollowingpattern	IfallofLEDstayOFFor someofLEDareON/OFF
InvrterPCB	Normal	Anomalous



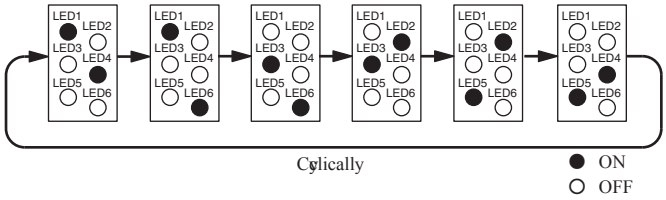
e)BesuretoturnoffJSW104onoutdoorinvrterPCB,afterfinishingthecheckoperation.

〈**Inverter Checker**〉



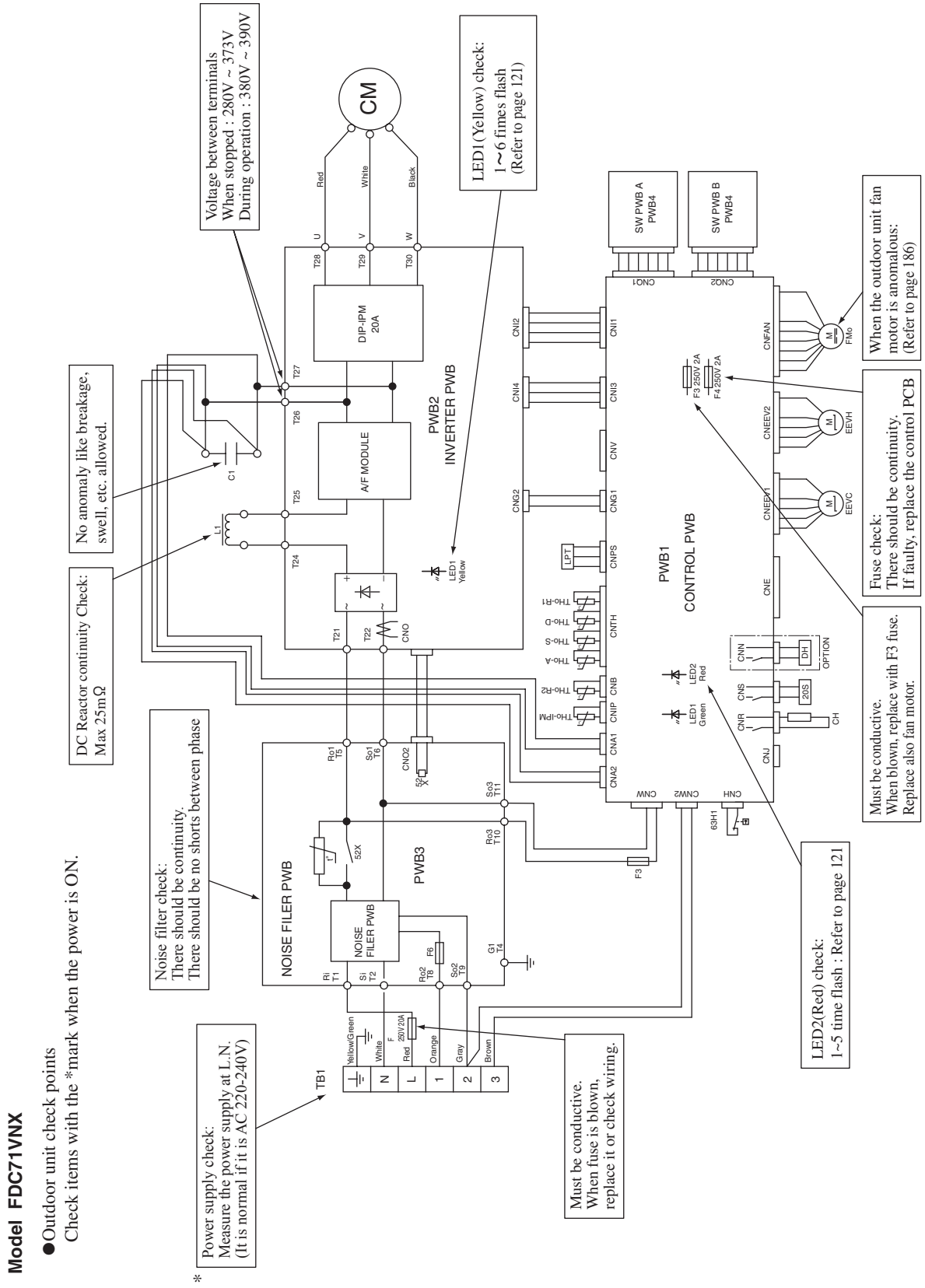
Connecttotheterminalofthewireswhicharedisconnectedfromcompressor.

LED ON/OFF pattern



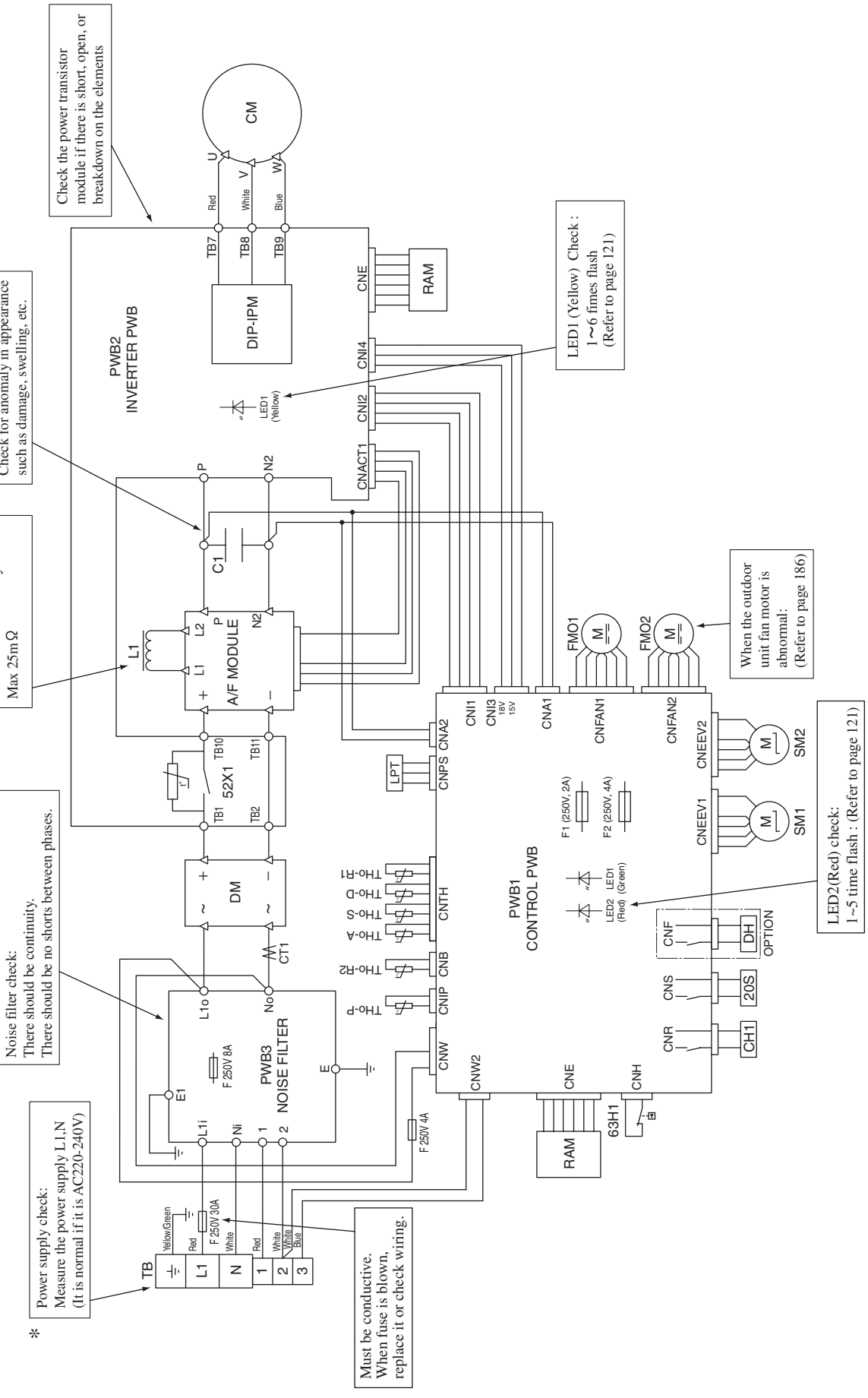
(8) Outdoor unit controller failure diagnosis circuit diagram

(a) Hyper inverter series



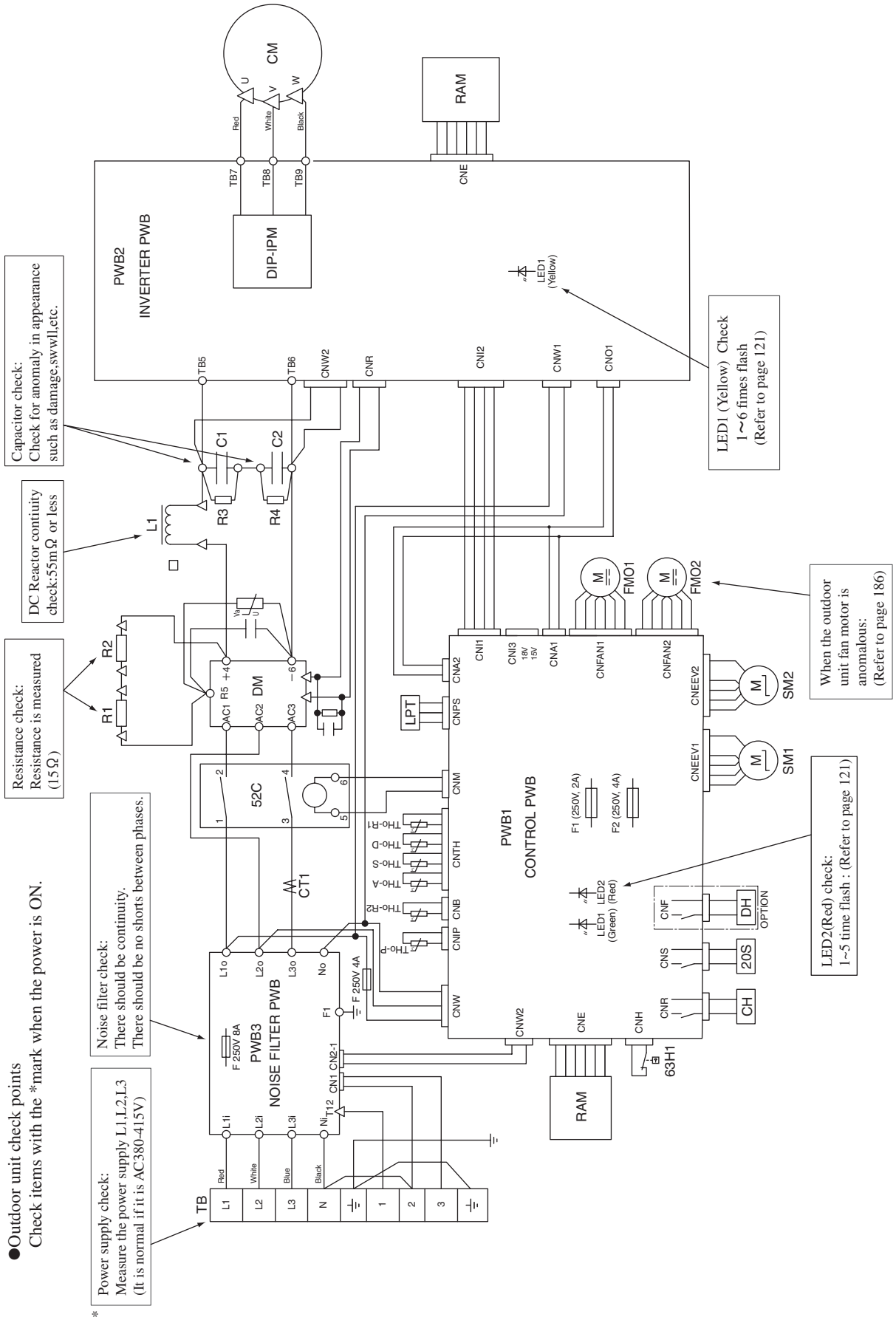
Models FDC100,125,140VNX

●Outdoor unit check points
Check items with the *mark when the power is ON.

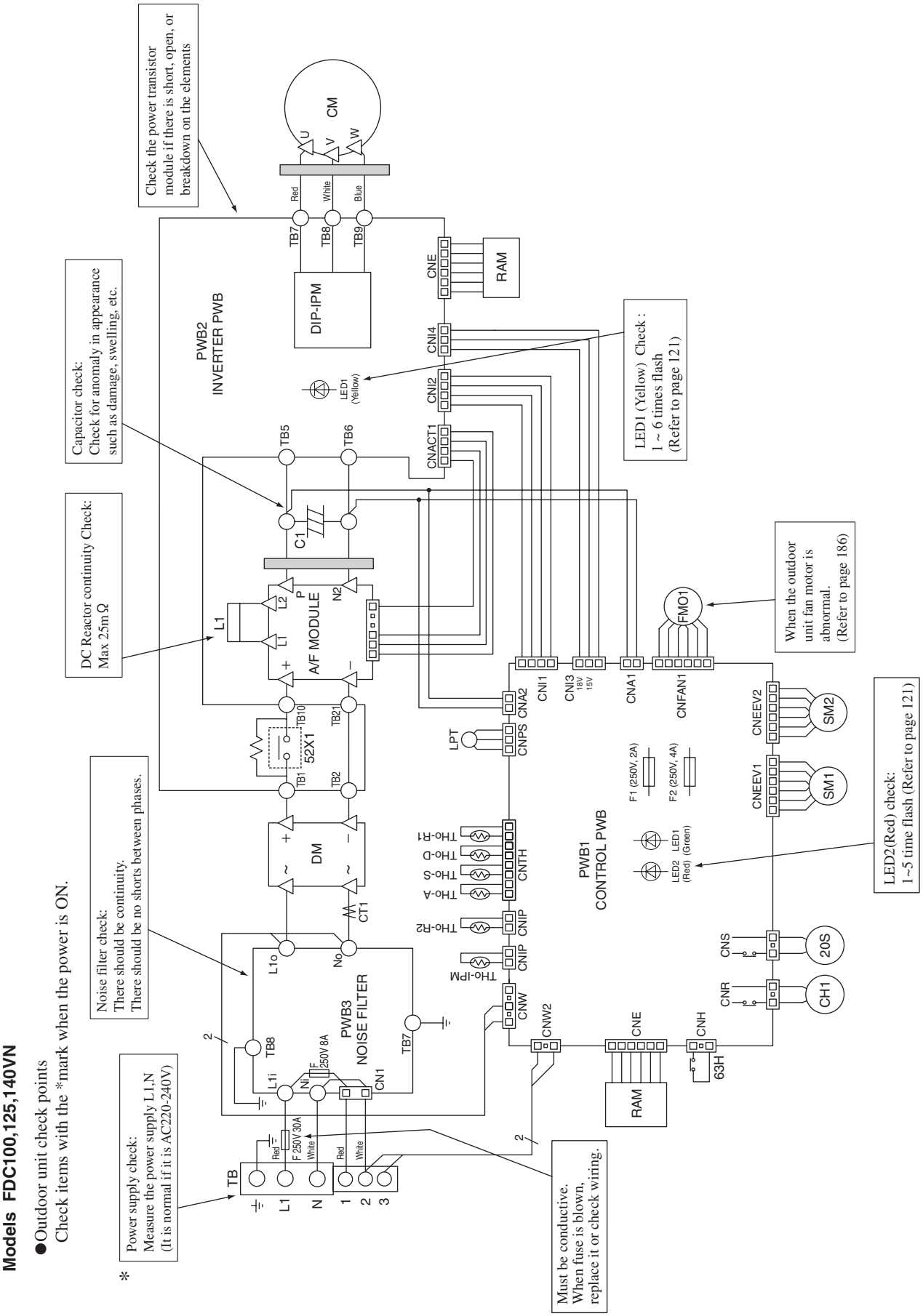


FDC100,125,140VSX

●Outdoor unit check points
Check items with the *mark when the power is ON.

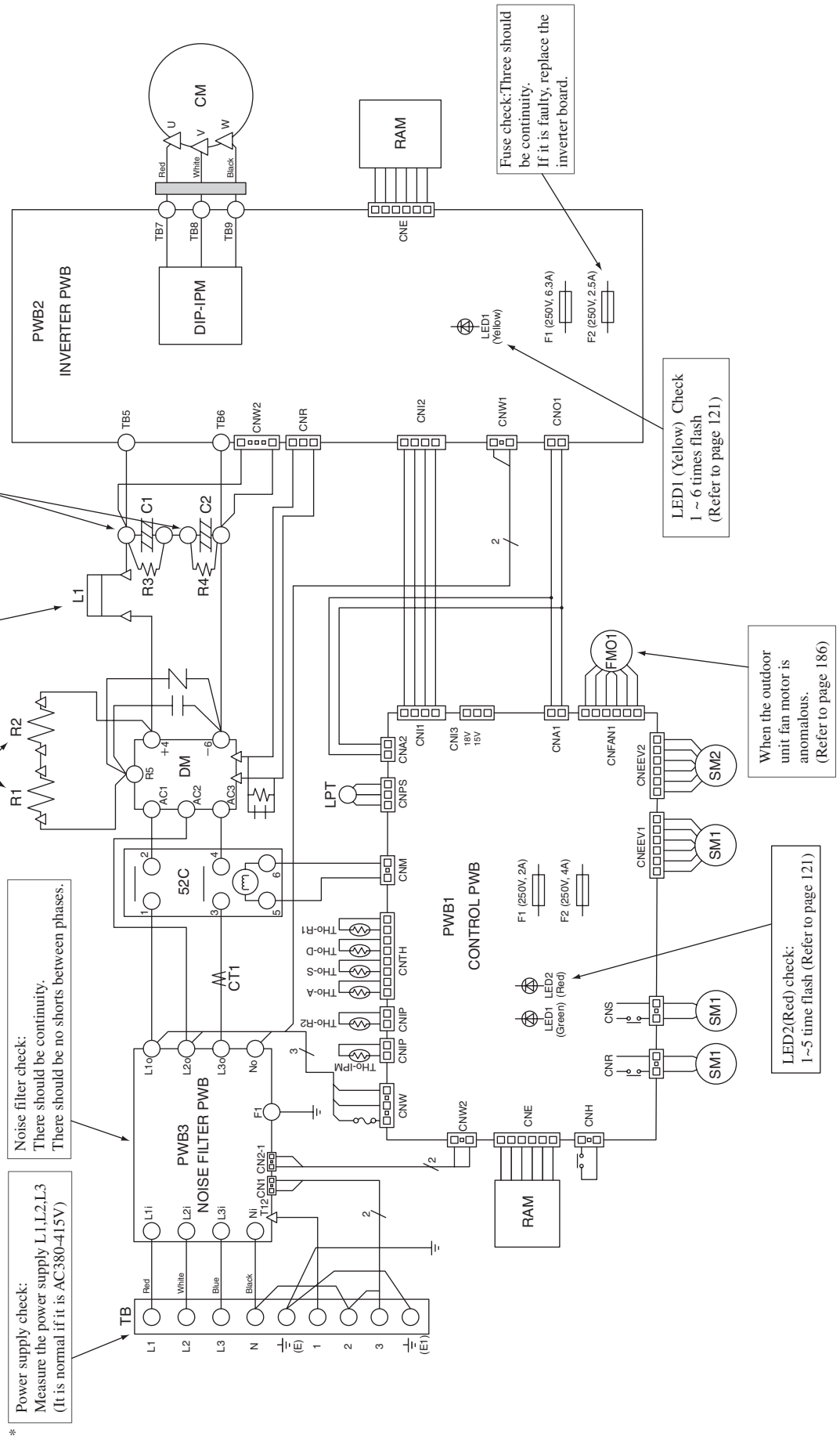


(b) Micro inverter series



FDC100,125,140VS

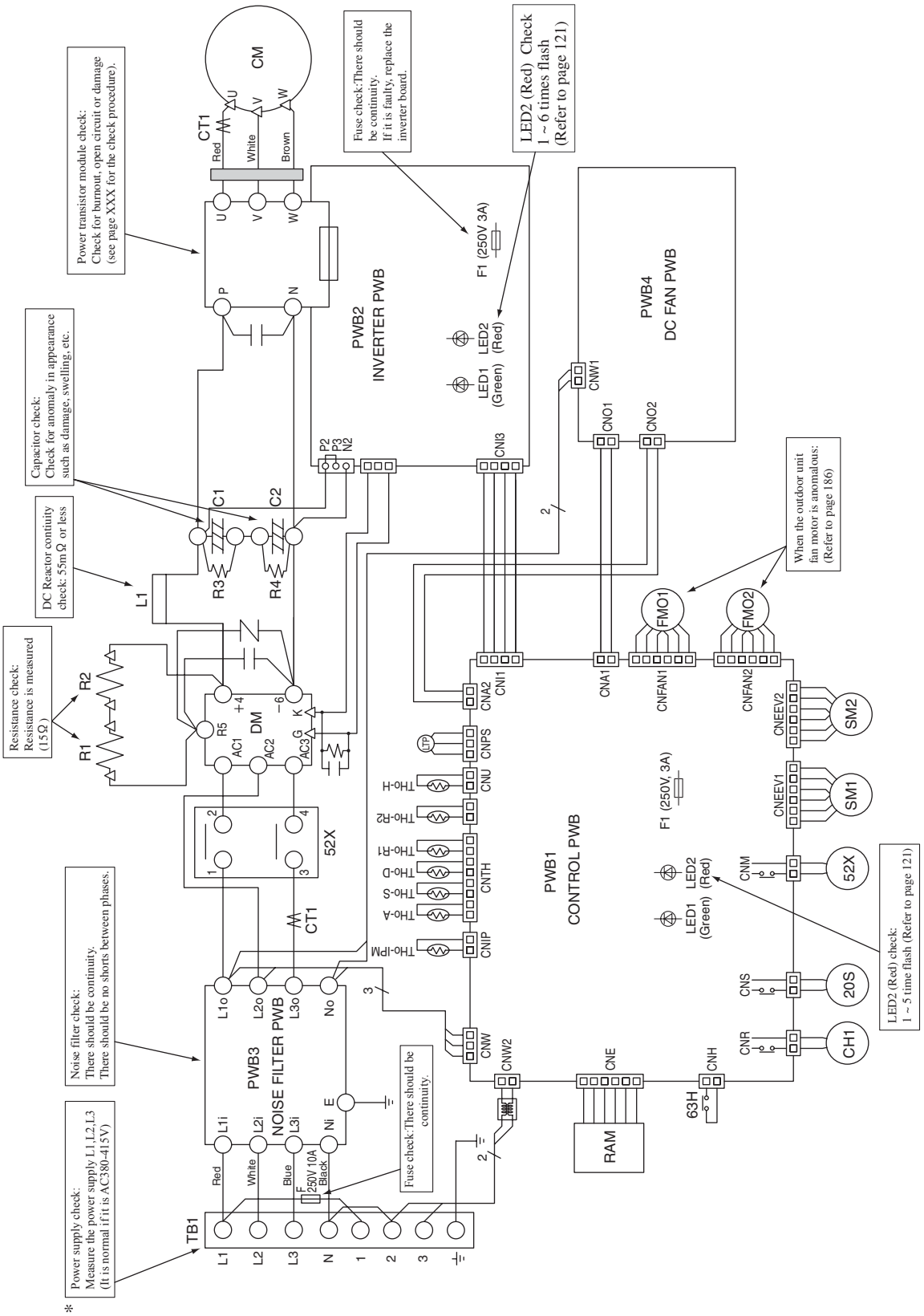
●Outdoor unit check points
Check items with the *mark when the power is ON.



Models FDC200,250VS

●Outdoor unit check points

Cheek items with the *mark when the power is ON.



11.2 Troubleshooting flow

(1) List of troubles

Remote controller display	Description of trouble	Reference page
None	Operates but does not cool.	149
None	Operates but does not heat.	150
None	Earth leakage breaker activated	151
None	Excessive noise/vibration (1/3)	152
None	Excessive noise/vibration (2/3)	153
None	Excessive noise/vibration (3/3)	154
None	Power supply system error (Power supply to indoor control PCB)	155
None	Power supply system error (Power supply to remote controller)	156
INSPECT I/U	INSPECT I/U (When 1 or 2 remote controllers are connected)	157
INSPECT I/U	INSPECT I/U (Connection of 3 units or more remote controllers)	158
WAIT	Communication error at initial operation	159 ～ 161
None	No display	162
E1	Remote controller communication circuit error	163
E5	Communication error during operation	164
E6	Indoor heat exchanger temperature thermistor anomaly	165
E7	Return air temperature thermistor anomaly	166
E8	Heating overload operation	167
E10	Excessive number of connected indoor units (more than 17 units) by controlling with one remote controller	168
E14	Communication error between master and slave indoor units	169
E16	Indoor fan motor anomaly	170
E19	Indoor unit operation check	171
E20	Indoor fan motor rotation speed anomaly	172
E28	Remote controller temperature thermistor anomaly	173
E35	Cooling overload operation	174
E36	Discharge pipe temperature error	175
E37	Outdoor heat exchanger temperature thermistor anomaly	176
E38	Outdoor air temperature thermistor anomaly	177
E39	Discharge pipe temperature thermistor anomaly	178
E40	High pressure error (63H1 activated)	179
E41	Power transistor overheat	180, 181
E42	Current cut	182, 183
E45	Communication error between inverter PCB and outdoor control PCB	184
E47	Inverter PCB A/F module anomaly (Model FDC 71 only)	185
E48	Outdoor fan motor anomaly	186
E49	Low pressure error or low pressure sensor anomaly	187, 188
E51	Inverter and fan motor anomaly	189
E53	Suction pipe temperature thermistor anomaly	190
E54	Low pressure sensor anomaly	191
E55	Underneath temperature thermistor anomaly (Models FDC 200, 250 only)	192
E57	Insufficient refrigerant amount or detection of service valve closure	193
E59	Compressor startup failure	194, 195
E60	Compressor rotor lock error (Models FDC 200, 250 only)	196

(2) Troubleshooting

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	Keeps flashing	Stays OFF	Operates but does not cool
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Poor compression of compressor
- Faulty expansion valve operation

5. Troubleshooting

Diagnosis	Countermeasure
Check the indoor unit fan operation. Check the temperature differnce between return and supply air.	
Is the temperature differnce between return and supply air 10-20°C at cooling? YES → Does the heat load increase after installtion? NO →	It is normal. (This unit is designed to start in the soft start mode by detecting the under dome temperature of compressor when it restart after power reset.
Does the heat load increase after installtion? YES → Mistake in model selection. Calculate heat load once more.	It is necessary to replace to higher capacity one or to install additional unit.
Is the temperature differnce between return and supply air 10-20°C at cooling? NO → Is the compressor operating? NO → "WAIT" message is displayed (for 3 seconds) when performing cooling, defrosting and heating operations from the remote controller. YES →	Compressor refrigerant oil protection control at starting is activated. For the contents of control, refer to the compressor start control of the microcomputer control functions.
Is the compressor operating? NO → "WAIT" message is displayed (for 3 seconds) when performing cooling, defrosting and heating operations from the remote controller. NO →	Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputor control functions.
Is the temperature differnce between return and supply air 10-20°C at cooling? NO → Is the compressor operating? YES → Is the compressor rotation speed low? NO →	Inspect the followings. • Minor clogging of filter • Minor clogging of heat exchanger • Minor short-circuit • Minor shortage of refrigerant amount • Poor compression of compressor
Is the compressor operating? YES → Is the compressor rotation speed low? YES → Check which control "Determination control of conpressor rotation speed" or "Protective control by controlling compressor rotation speed" is appropriate to this phenomenon. → Are the temperature conditions of room and outdoor air close to the rated conditions? (1) YES →	Considering appropriate operation control, check suspicious points. Inspect the followings for reference. • Major clogging of filter • Major clogging of heat exchanger • Major short-circuit • Major shortage of refrigerant amount • Compressor protection ON • Indoor fan tap • Valid setting of silent mode
Are the temperature conditions of room and outdoor air close to the rated conditions? (1) NO → The unit is operating normally but is operating under the contol for protecting compressor or other respective parts.	

Note (1) Outdoor: 35°C, Indoor: 27°C

Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	Keeps flashing	Stays OFF	Operates but does not heat
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

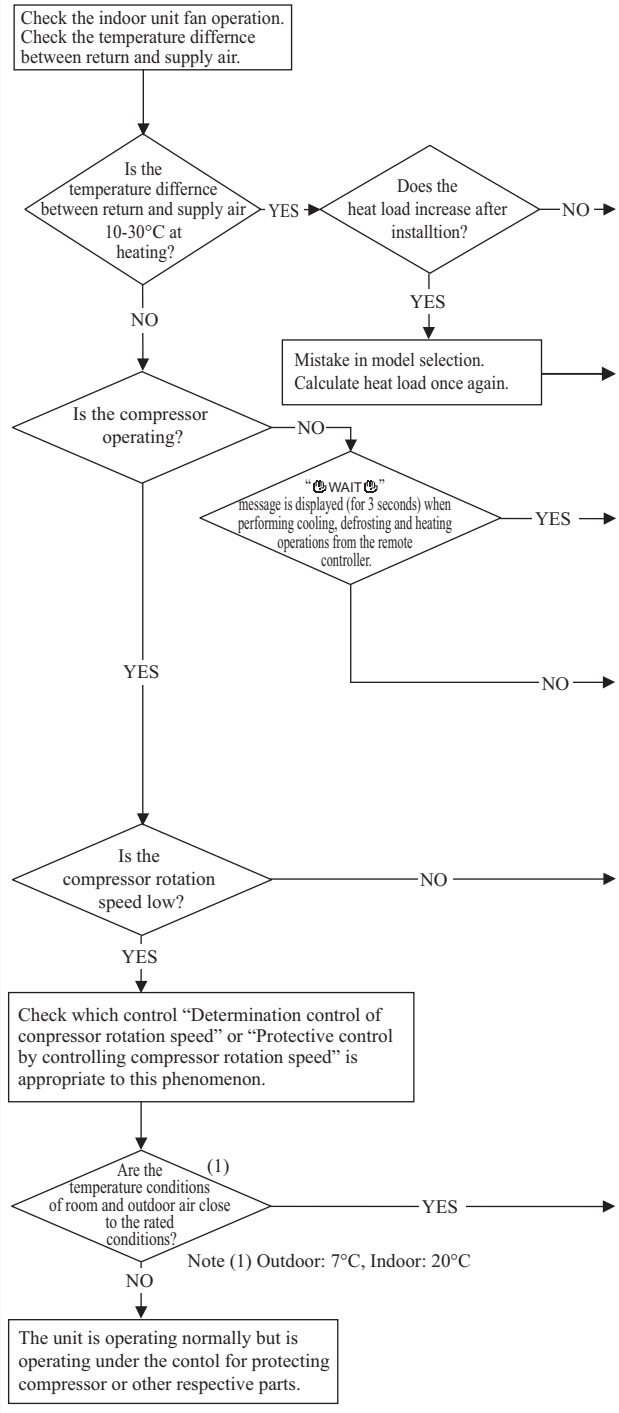
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Faulty 4-way valve operation
- Poor compression of compressor
- Faulty expansion valve operation

5. Troubleshooting



Countermeasure

It is normal.
(This unit is designed to start in the soft start mode by detecting the under dome temperature of compressor when it restart after power reset.

It is necessary to replace to higher capacity one or to install additional unit.

Compressor refrigerant oil protection control at starting is activated. For the contents of control, refer to the compressor start control of the microcomputer control functions.

Compressor may be stopped by the error detection control.
For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputor control functions.

Inspect the followings.
- Minor clogging of filter
- Minor clogging of heat exchanger
- Minor short-circuit
- Minor shortage of refrigerant amount
- Poor compression of compressor

Considering appropriate operation control, check suspicious points.
Inspect the followings for reference.
- Major clogging of filter
- Major clogging of heat exchanger
- Major short-circuit
- Major shortage of refrigerant amount
- Compressor protection ON
- Indoor fan tap
- Valid setting of silent mode

Note:

Error code	ED	Green	Red	Content
Remote controller: None	Indoor	Stays OFF	Stays OFF	Earth leakage breaker activated
	Outdoor	Stays OFF	Stays OFF	

1. Applicable model

All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Defective compressor
- Noise

5. Troubleshooting

Diagnosis	Countermeasure
Are OK the insulation resistance and coil resistance of compressor? → NO	Replace compressor.*
Is insulation of respective harnesses OK? Is any harness bitten between pannel and casing or etc? → NO	Secure insulation resistance.
Check the outdoor unit grounding wire/earth leakage breaker.	

Check of the outdoor unit grounding wire/earth leakage breaker

① Run an independent grounding wire from the grounding screw of outdoor unit to the grounding terminal on the distribution panel. (Do not connect to another grounding wire.)
② In order to prevent malfunction of the earth leakage breaker itself, confirm that it is conformed to higher harmonic regulation.

* Insulation resistance of compressor
- Immediately after installation or when the unit has been left for long time without power supply, the insulation resistance may drop to a few MΩ because of refrigerant migrated in the compressor.
  When the earth breaker is activated at lower insulation resistance, check the following points.

① 6 hours after power ON, check if the insulation resistance recovers to normal.
When power ON, crankcase heater heat up compressor and evaporate the refrigerant migrated in the compressor.
② Check if the earth leakage breaker is conformed to higher harmonic regulation or not.
Since the unit is equipped with inverter, it is necessary to use components conformed to higher harmonic regulation in order to prevent malfunction of earth leakage breaker.

Note:

Error code	LED	Green	Red	Content
Remote controller: None	Indoor	–	–	Excessive noise/vibration (1/3)
	Outdoor	–	–	

1. Applicable model

All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

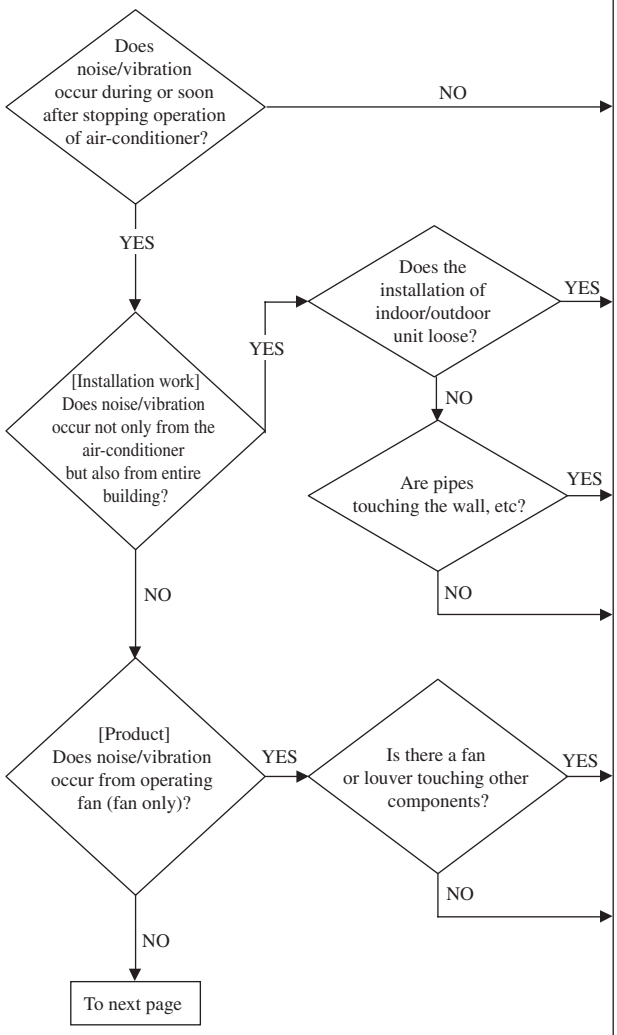
① Improper installation work
- Improper anti-vibration work at instllation
- Insufficient strength of mounting face

② Defective product
- Before/after shipping from factory

③ Improper adjustment during commissioning
- Excess/shortage of refrigerant, etc.

5. Troubleshooting

Diagnosis



Countermeasure

If excessive noise/vibration persists when sufficient time has elapsed after stopping the unit, it is considered that the air-conditioner is not the source.

Check the installed condition carefully, and correct the position or insert rubber cushions or others into the gap, if necessary.

Prevent the vibration from transmitting to wall and etc by fixing pipes on the wall or wrapping rubber cushion around the pipe which goes through the hole in the wall or applying other appropriate means.

Strength of ceiling wall, floor, etc. may be insufficient. Review the installing position or reinforce it.

Check for leaning of installed unit or anomalous mounting of fan, louver or motor and specify the contacting point and correct it.

When the heat exchanger or filter is clogged, clean them. In case that the unit is installed at the site where background noise is very low, small noise from indoor unit can be heard, but it is normal. Before installation, check for background noise. If backgound nois is very low, convince client prior to installation.

Note:

Error code	ED	Green	Red	Content
Remote controller: None	Indoor	–	–	Excessive noise/vibration (2/3)
	Outdoor	–	–	

1. Applicable model

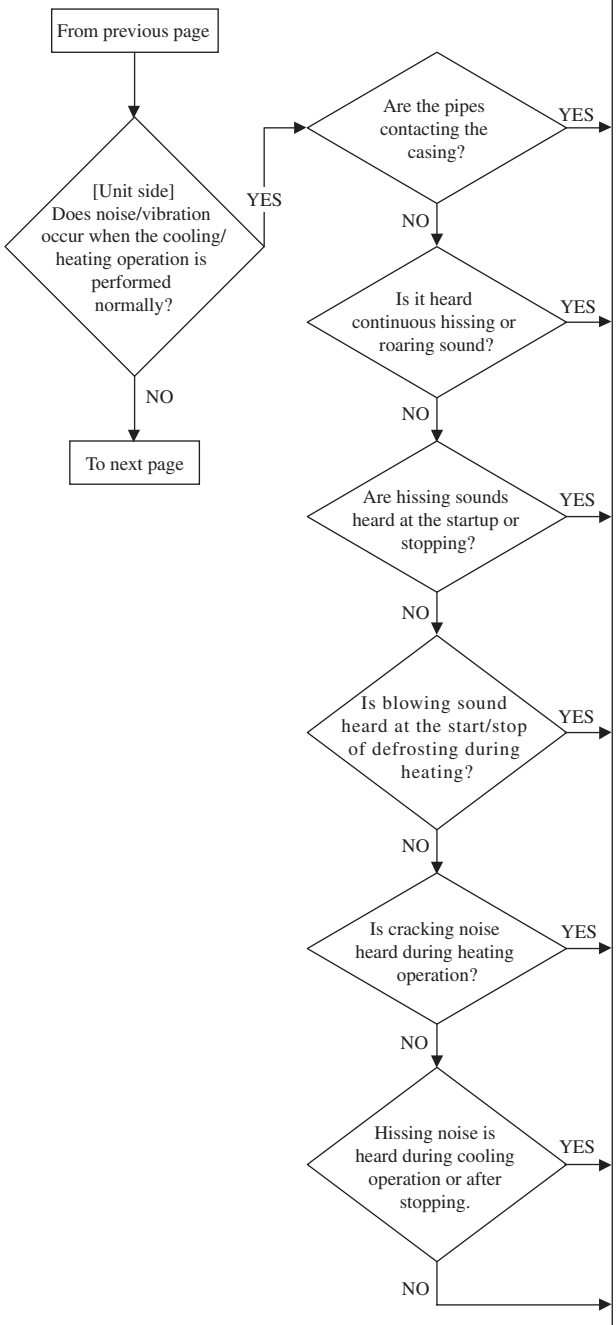
All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

5. Troubleshooting



Diagnosis	Countermeasure
Are the pipes contacting the casing? YES	Rearrange the piping to avoid contact with the casing.
Is it heard continuous hissing or roaring sound? YES	It is noise/vibration that is generated when the refrigerant gas or liquid flow through inside of piping of air-conditioner. It is likely to occur particularly during cooling or defrosting in the heating mode. It is normal.
Are hissing sounds heard at the startup or stopping? YES	The noise/vibration occurs when the refrigerant starts or stops flowing. It is normal.
Is blowing sound heard at the start/stop of defrosting during heating? YES	When the defrosting starts or stops during heating, the refrigerant flow is reversed due to switching 4-way valve. This causes a large change in pressure which produces a blowing sound. It may accompany also the hissing sounds as mentioned above. They are normal.
Is cracking noise heard during heating operation? YES	After the start or stop of heating operation or during defrosting, abrupt changes in temperature cause resin parts to shrink or expand. This is normal.
Hissing noise is heard during cooling operation or after stopping. YES	It is the sound produced by the drain pump that discharges drain from the indoor unit. The pump continues to run for 5 minutes after stopping the cooling operation. This is normal.
NO	Apply the damper sealant at places considered to be the sources such as the pressure reducing mechanism (expansion valve), capillary, etc.

Note:

Error code	ED	Green	Red	Content
Remote controller: None	Indoor	–	–	Excessive noise/vibration (3/3)
	Outdoor	–	–	

1. Applicable model

All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

5. Troubleshooting

Diagnosis	Countermeasure
From previous page Adjustment during commissioning Does noise/vibration occur when the cooling/heating operation is in anomalous condition?	If insufficient cooling/heating problem happens due to anomalous operating conditions at cooling/heating, followings are suspicious. • Overcharge of refrigerant • Insufficient charge of refrigerant • Intrusion of air, nitrogen, etc. In such occasion, it is necessary to recover refrigerant, vacuum-dry and recharge refrigerant. * Since there could be many causes of noise/vibration, the above do not cover all. In such case, check the conditions when, where, how the noise/vibration occurs according to following check point. • Indoor/outdoor unit • Cooling/heating/fan mode • Startup/stop/during operation • Operating condition (Indoor/outdoor temperatures, pressure) • Time it occurred • Operation data retained by the remote controller such as compressor rotation speed, heat exchanger temperature, EEV opening degree, etc. • Tone (If available, record the noise) • Any other anomalies

Note:

Error code

Remote controller: None

LED	Green	Red
Indoor	Stays OFF	Stays OFF
Outdoor	Stays OFF	2 times flash

Content

Power supply system error (Power supply to indoor control PCB)

1. Applicable model

All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Misconnection or breakage of connecting wires
- Blown fuse
- Faulty transformer
- Faulty indoor control or power PCB
- Broken harness
- Faulty outdoor control PCB (Noise filter)

5. Troubleshooting

Diagnosis	Countermeasure
Is AC220/240V detected between 1 and 2 on the terminal block of indoor unit? NO → Is AC380/415V for 3-phase unit detected between 1, 2 and 3 on the teminal block of outdoor unit or is AC220/240V for 1-phase unit detected between 1 and 2 on the terminal block of outdoor unit?	NO → Defective outdoor control PCB (Noise filter)
	YES → Misconnection or breakage of connecting wires
YES → Note(1) F200, F201 (1) Are fuses OK (2 pcs.)? NO → Is the check of resistance between ①-③ of CNW0 OK?	NO → Defective indoor control or power PCB → Replace.
YES → Is the checked result of resistance of FM, LM, etc OK?	NO → Replace FM, LM, etc.
	YES → Replace fuse.
YES → (2) Is DC5V detected between ④-⑤ of CNW2? Note (2) ⑤ for GND	NO → Defective indoor power PCB → Replace.
YES → Is JX1 open?	NO → Open JX1.
	YES → Defective indoor control PCB → Replace.

Note:

Error code	ED	Green	Red	Content
Remote controller: None	Indoor	Keeps flashing	Stays OFF	Power supply system error (Power supply to remote controller)
	Outdoor	Keeps flashing	2 times flash	

1. Applicable model

All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Remote controller wire breakage/short-circuit
- Defective remote controller
- Malfunction by noise
- Faulty indoor power PCB
- Broken harness
- Faulty indoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Isn't there any loose connection of remote controller wires? YES	Correct.
NO → Isn't remote controller wire broken or short-circuited? YES	Replace wires.
NO → Disconnect remote controller wires. → Is DC15V or higher detected between X-Y of indoor unit terminal block? YES	Replace remote controller.
NO → Is DC180V between ①-② of CNW2? NO	Defective indoor power PCB→Replace.
YES	Defective indoor control PCB→Replace.

Note:

Error code	ED	Green	Red	Content
Remote controller: INSPECT I/U	Indoor	Keeps flashing	Stays OFF	INSPECT I/U (When 1 or 2 remote controllers are connected)
	Outdoor	Keeps flashing	2 times flash	

1. Applicable model

All models

2. Error detection method

Communication between indoor unit and remote controller is disabled for more than 30 minutes after the power on.

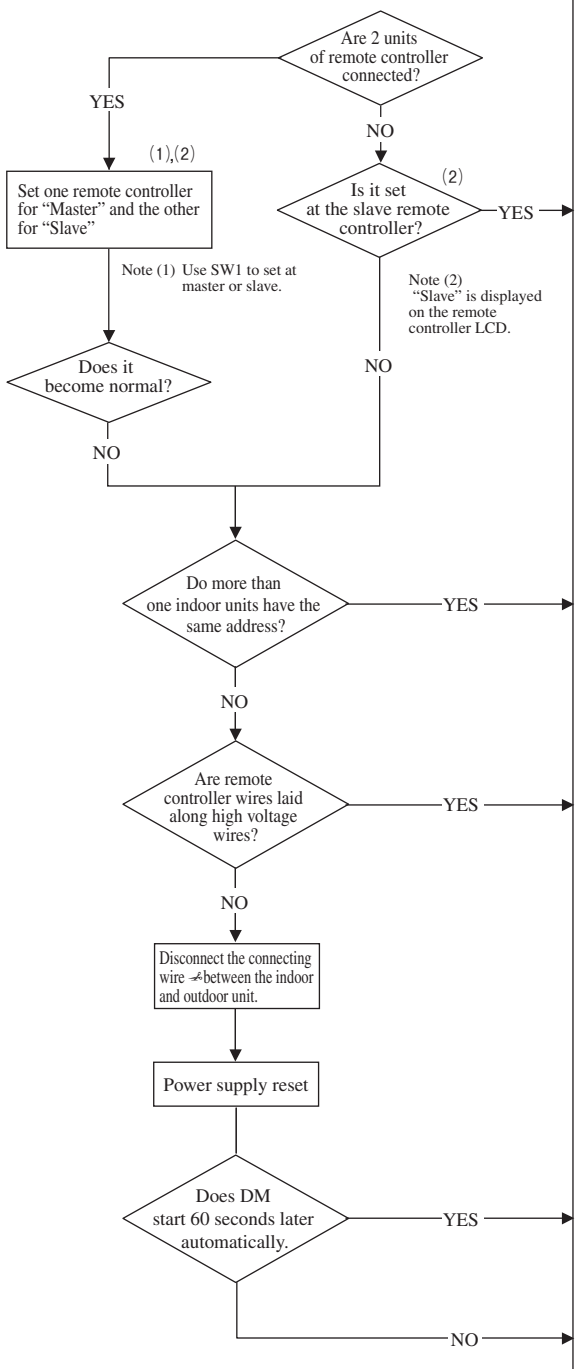
3. Condition of Error displayed

Same as above

4. Presumable cause

- Improper setting
- Surrounding environment
- Defective remote controller communication circuit
- Faulty indoor control PCB

5. Troubleshooting



Note: If any error is detected 30 minutes after displaying "WAIT" on the remote controller, the display changes to "INSPECT I/U".

Error code	ED	Green	Red	Content
Remote controller: INSPECT I/U	Indoor	Keeps flashing	Stays OFF	INSPECT I/U (Connection of 3 units or more remote controller)
	Outdoor	Keeps flashing	2 times flash	

1. Applicable model

All models

2. Error detection method

Indoor unit cannot communicate for more than 30 minutes after the power on with remote controller.

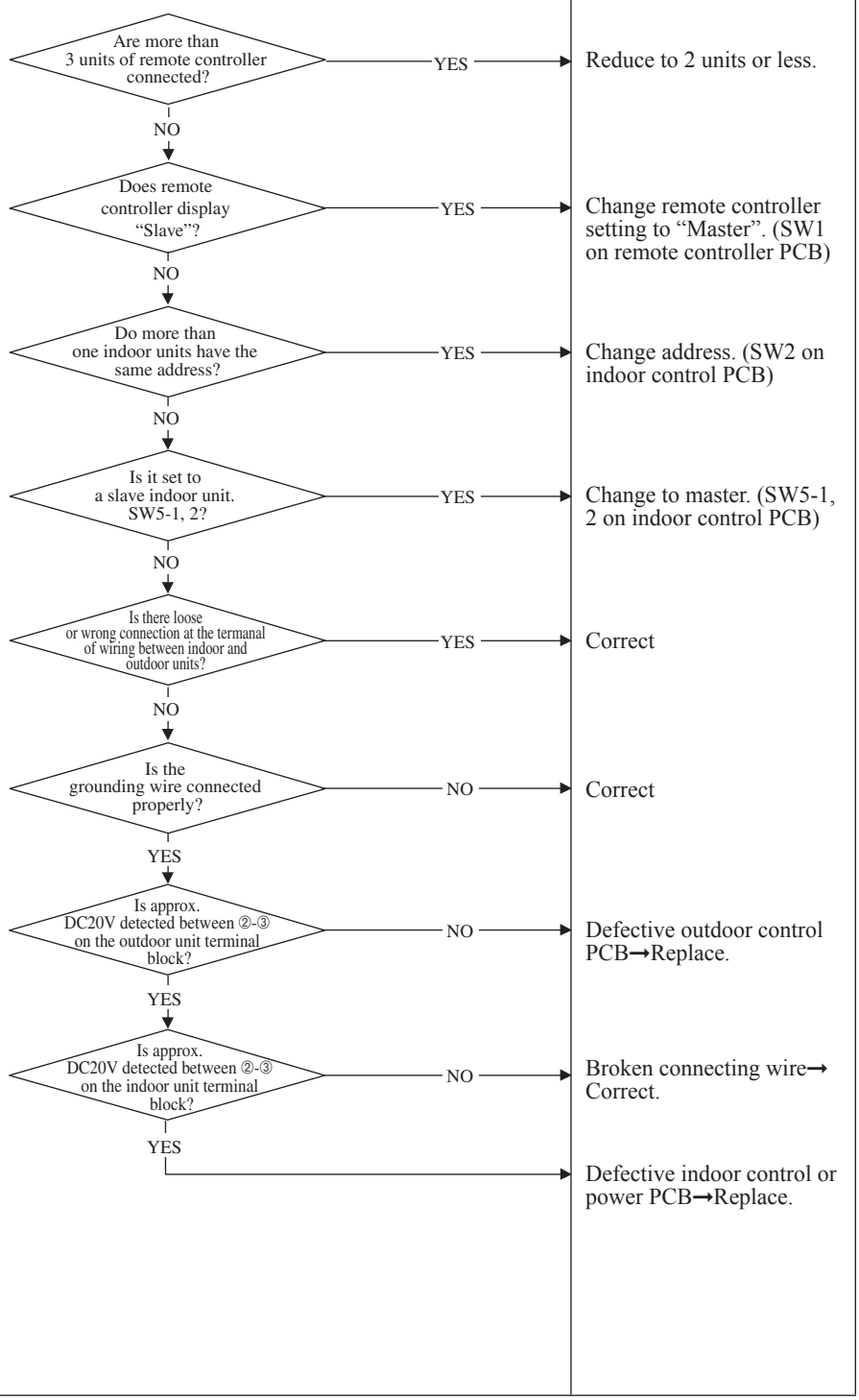
3. Condition of Error displayed

Same as above

4. Presumable cause

- Improper setting
- Surrounding environment
- Defective remote controller communication circuit
- Faulty indoor control or power PCB
- Faulty outdoor control PCB

5. Troubleshooting



Note: If any error is detected 30 minutes after displaying "WAIT" on the remote controller, the display changes to "INSPECT I/U".

Error code

Remote controller: WAIT

ED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	2 times flash

Content

Communication error at initial operation (1/3)

1. Applicable model

All models

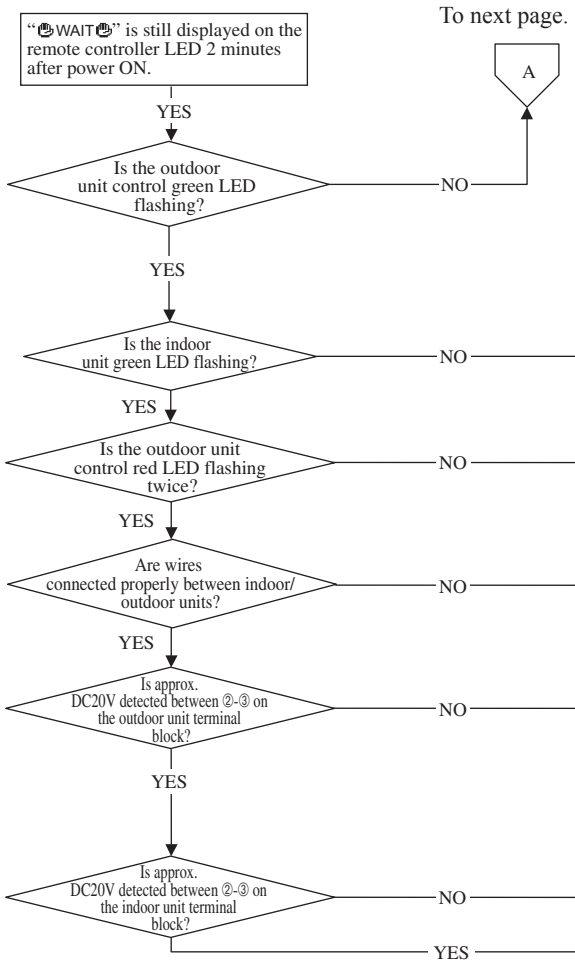
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Faulty indoor control or power PCB
- Defective remote controller
- Broken remote controller wire
- Faulty outdoor control PCB
- Broken connection wires

5. Troubleshooting



Note:

Error code

Remote controller: WAIT

ED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	2 times flash

Content

Communication error at initial operation (2/3)

1. Applicable model

All models

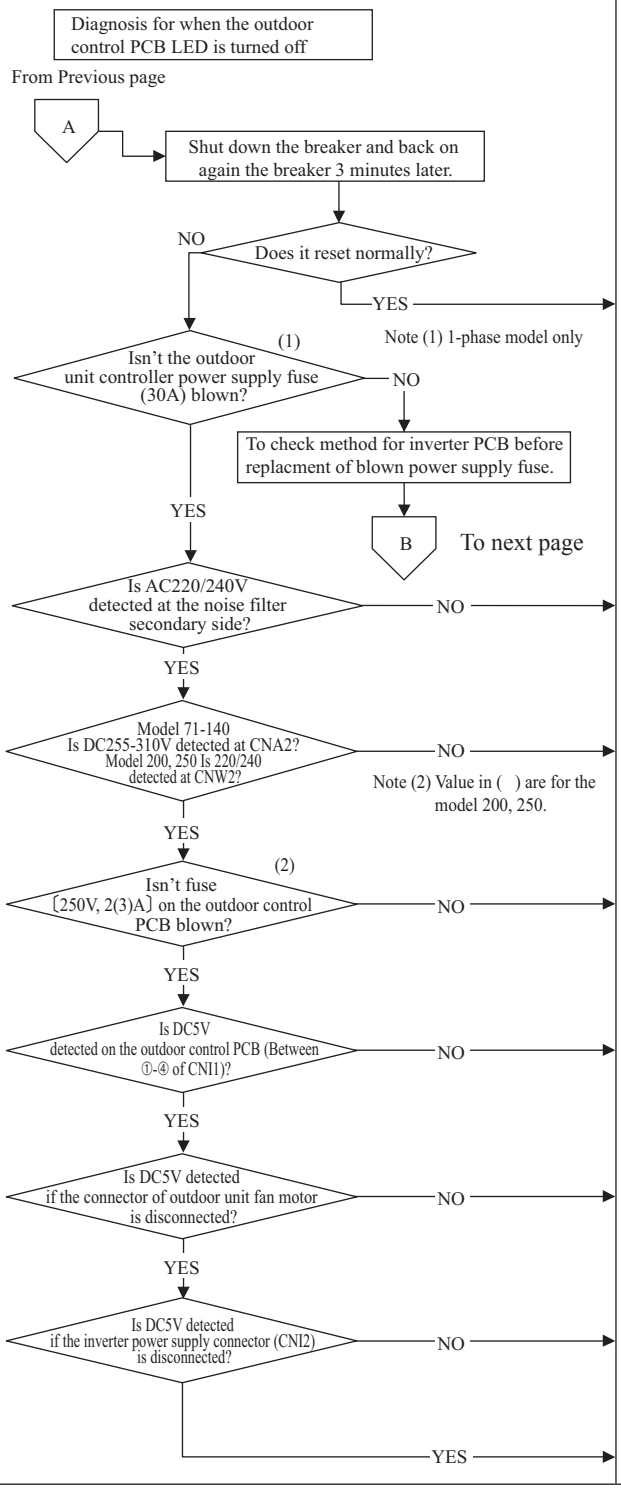
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Faulty noise filter
- Faulty indoor control PCB
- Faulty outdoor control PCB
- Faulty inverter PCB
- Faulty fan motor

5. Troubleshooting



Note:

Error code

Remote controller: WAIT

ED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	2 times flash

Content

Communication error at initial operation (3/3)

1. Applicable model

All models

2. Error detection method

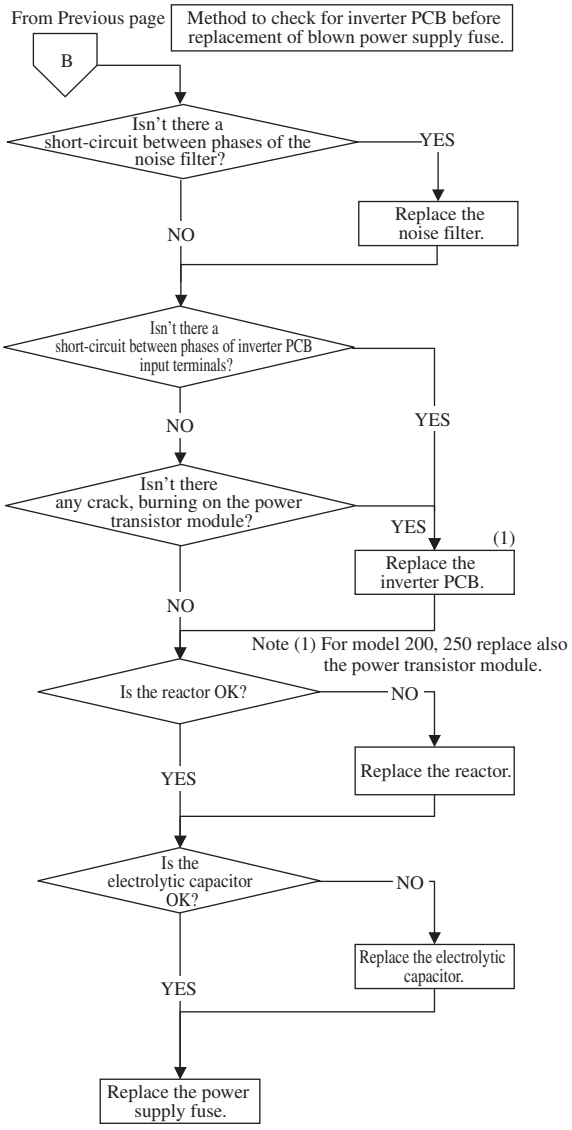
3. Condition of Error displayed

4. Presumable cause

- Blown fuse
- Faulty noise filter
- Faulty inverter PCB
- Faulty reactor
- Faulty electrolytic capacitor

5. Troubleshooting

Diagnosis



Countermeasure

Note:

Error code	ED	Green	Red	Content
Remote controller: None	Indoor	Keeps flashing	Stays OFF	No display
	Outdoor	Keeps flashing	2 times flash	

1. Applicable model

All models

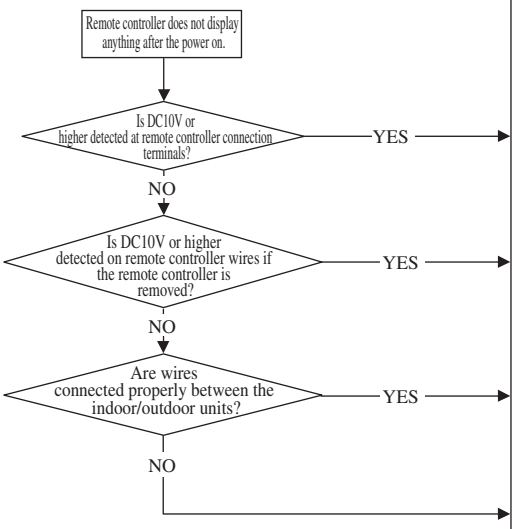
2. Error detection method

3. Condition of Error displayed

4. Presumable cause

- Faulty indoor control PCB
- Defective remote controller
- Broken remote controller wire

5. Troubleshooting



Note:

Error code	ED	Green	Red	Content
Remote controller: E1	Indoor	Keeps flashing	Stays OFF	Remote controller communication circuit error
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

When normal communication between the remote controller and the indoor unit is interrupted for more than 2 minutes. (Detectable only with the remote controller)

3. Condition of Error displayed

Same as above

4. Presumable cause

- Defective communication circuit between remote controller-indoor unit
- Noise
- Defective remote controller
- Faulty indoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is it possible to reset normally by the power reset? → YES	Malfunction by noise Check peripheral environment.
NO → Turn SW7-1 to OFF. → ON Remove the wire ③ connecting between indoor/outdoor units. → Power reset → Does the drain pump restart automatically 1 minute later? → YES	Defective indoor control PCB → Replace.
NO	Defective remote controller → Replace.

Note (2) Does the remote controller still display "WAIT" even after 3 minutes?

Note: If the indoor unit cannot communicate normally with the remote controller for 180 seconds, the indoor unit PCB starts to reset automatically.

Error code	ED	Green	Red	Content
Remote controller: E5	Indoor	Keeps flashing	2 times flash	Communication error during operation
	Outdoor	Keeps flashing	See below	

1. Applicable model

All models

2. Error detection method

When normal communication between indoor and outdoor unit is interrupted for more than 2 minutes.

3. Condition of Error displayed

Same as above is detected during operation.

4. Presumable cause

- Unit No. setting error
- Broken remote controller wire
- Faulty remote controller wire connection
- Faulty outdoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
In case that the outdoor unit red LED flashes 2-times	
Note (1) Inspect faulty connections (disconnection, looseness) on the outdoor unit terminal block.	
Is the connection of signal wires at the outdoor unit side OK? — NO	Repair signal wires.
YES	
Note (2) Check for faulty connection or breakage of signal wires between indoor-outdoor units.	
Is the connection of signal wires between indoor-outdoor units OK? — NO	Repair signal wires.
YES	
Power reset	
Has the remote controller LCD returned to normal state? — NO	To the diagnosis of "WAIT"
YES	Unit is normal. (Malfunction by temporary noise, etc.)
In case that the outdoor unit red LED stays OFF	
Power reset	
NO	
Has the remote controller LCD returned to normal state? — NO	Defective outdoor control PCB (Defective network communication circuit) → Replace.
YES	Unit is normal. (Malfunction by temporary noise, etc.)

Note: Pressing the pump-down switch cancels communications between indoor and outdoor unit so that "communication error-E5" is displayed on indoor unit and remote controller, but it is normal.

Error code	ED	Green	Red	Content
Remote controller: E6	Indoor	Keeps flashing	1 time flash	Indoor heat exchanger temperature thermistor anomaly
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Anomalously low temperature or high temperature (resistance) is detected on the indoor heat exchanger thermistor (ThI-R1, R2 or R3).

3. Condition of Error displayed

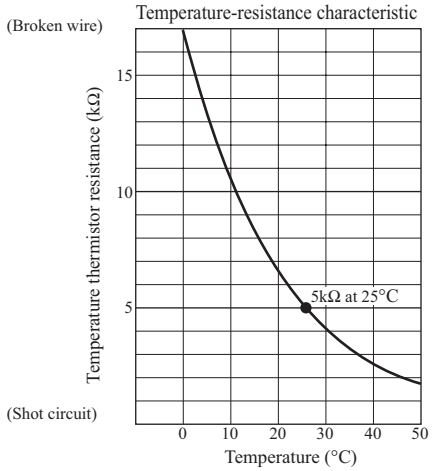
- When the temperature thermistor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.
- Or if 70°C or higher is detected for 5 seconds continuously.

4. Presumable cause

- Defective indoor heat exchanger thermistor connector
- Indoor heat exchanger temperature thermistor anomaly
- Faulty indoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of indoor heat exchanger temperature thermistor connector OK? — NO	Correct. → Insert connector securely.
YES → Are characteristics of indoor heat exchanger temperature thermistor OK? — NO	Defective indoor heat exchanger temperature thermistor → Replace.
YES	Defective indoor control PCB → Replace. (Defective indoor unit heat exchanger temperature thermistor input circuit)



Note:

Error code	ED	Green	Red	Content
Remote controller: E7	Indoor	Keeps flashing	1 time flash	Return air temperature thermistor anomaly
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Anomalously low temperature or high temperature (resistance) is detected by indoor return air temperature thermistor (Thi-A)

3. Condition of Error displayed

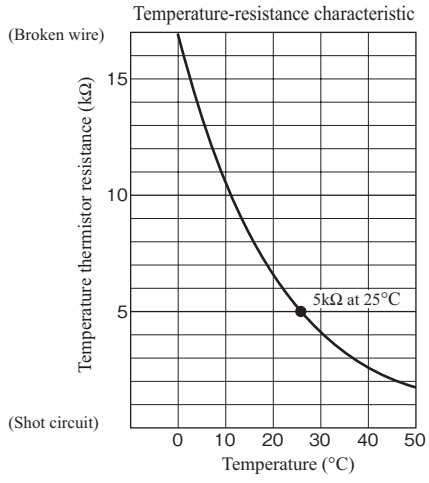
- When the temperature thermistor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.

4. Presumable cause

- Defective return air temperature thermistor connector
- Defective return air temperature thermistor
- Faulty indoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of return air temperature thermistor connector OK? — NO	Correct. → Connect connector.
Are the characteristics of return air temperature thermistor OK? — NO	Defective return air temperature thermistor → Replace.
YES	Defective indoor control PCB → Replace. (Defective return air temperature thermistor input circuit)



Note:

Error code	ED	Green	Red	Content
Remote controller: E8	Indoor	Keeps flashing	1 time flash	Heating overload operation
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Indoor heat exchanger temperature thermistor (ThI-R1, R2, R3)

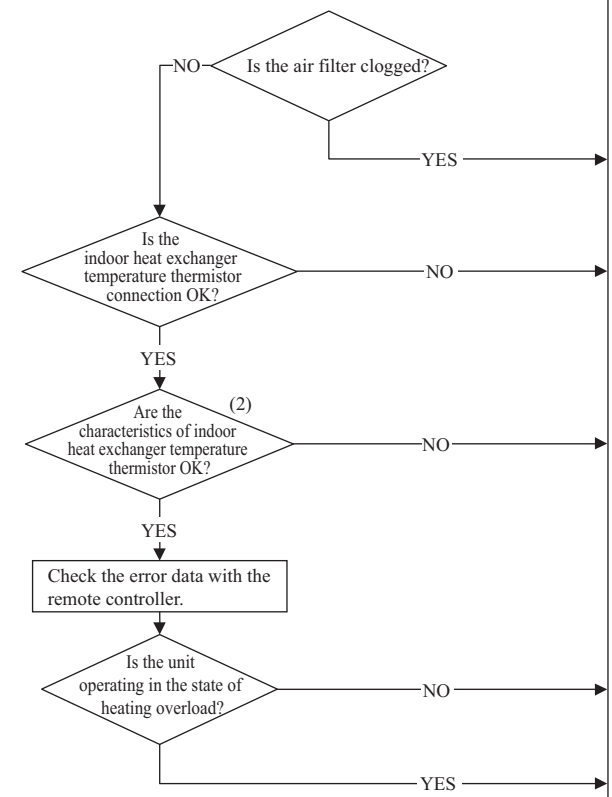
3. Condition of Error displayed

When it is detected 5 times within 60 minutes from initial detection or when the overload condition is detected for 6 minutes continuously.

4. Presumable cause

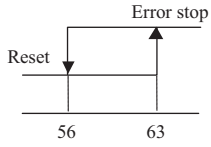
- Clogged air filter
- Defective indoor heat exchanger temperature thermistor connector
- Defective indoor heat exchanger temperature thermistor
- Anomalous refrigerant system

5. Troubleshooting



Note (1) Judge if it is in the state of overload or not as follows.
- ▲ Is there any short-circuit of air?
- ▲ Isn't there any fouling or clogging on the indoor heat exchanger?
- ▲ Is the outdoor fan control normal?
- ▲ Isn't the room and outdoor air temperature too high?

Note (2) For characteristics of indoor heat exchanger temperature thermistor, see the error display E6.



Note: During heating operation; After starting compressor, compressor rotation speed is decreased by detecting indoor heat exchanger temperature (Thi-R) in order to control high pressure.

Error code

Remote controller: E10

ED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	Stays OFF

Content: Excessive number of connected indoor units (more than 17 units) by controlling with one remote controller

1. Applicable model

All models

2. Error detection method

When it detects more than 17 of indoor units connected to one remote contorller

3. Condition of Error displayed

Same as above

4. Presumable cause

- Excessive number of indoor units connected
- Defective remote controller

5. Troubleshooting

Diagnosis	Countermeasure
Aren't more than 17 indoor units connected to one remote controller? — NO	Defective remote controller → Replace.
YES	Reduce to 16 or less units.

Note:

Error code	ED	Green	Red	Content
Remote controller: E14	Indoor	Keeps flashing	3 times flash	Communication error between master and slave indoor units
	Outdoor	Keeps flashing	Stays Off	

1. Applicable model

All models

2. Error detection method

When communication error between master and slave indoor units occurs

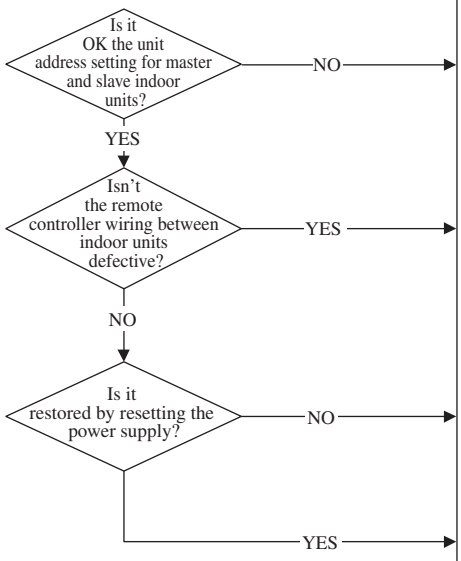
3. Condition of Error displayed

Same as above

4. Presumable cause

- Unit address setting error
- Broken remote controller wire
- Defective remote controller wire connection
- Defective indoor control PCB

5. Troubleshooting



Note (1) Set dip switches SW5-1 and SW5-2 as shown in the following table.
(Factory default setting – "Master")

		Indoor unit			
		Master	Slave-a	Slave-b	Slave-c
Dip switch	SW5-1	OFF	OFF	ON	ON
	SW5-2	OFF	ON	OFF	ON

Note:

Error code	ED	Green	Red	Content
Remote controller: E16	Indoor	Keeps flashing (-)	Stays OFF (-)	Indoor fan motor anomaly
	Outdoor	Keeps flashing	Stays OFF	

Note (1) Value in ( ) are for the model SRK.

1. Applicable model

All models

2. Error detection method

Detected by rotation speed of indoor fan motor

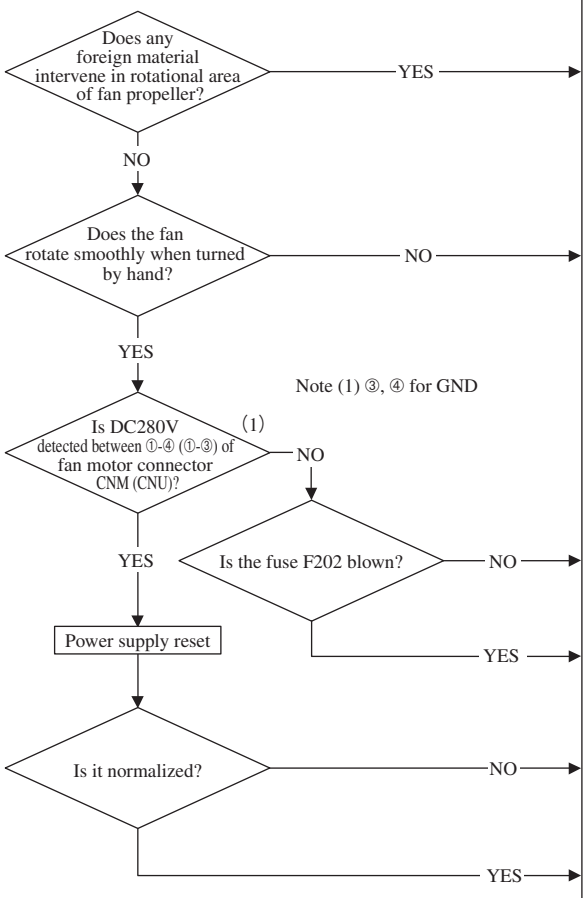
3. Condition of Error displayed

- When actual rotation speed of indoor fan motor drops to lower than 200rpm for 30 seconds continuously, the compressor and the indoor fan motor stop.
- After 2-seconds, it starts again automatically, but if this error occurs 4 times within 60 minutes after the initial detection.

4. Presumable cause

- Defective indoor power (control) PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on control PCB
- Blown fuse
- External noise, surge

5. Troubleshooting



Note:

Error code	ED	Green	Red	Content
Remote controller: E19	Indoor	Keeps flashing	1 time flash	Indoor unit operation check
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

After indoor operation check, when the communication between indoor and outdoor unit is established and SW7-1 is still kept ON.

3. Condition of Error displayed

Same as above

4. Presumable cause

Mistake in SW7-1 setting
(Due to forgetting to turn OFF SW7-1 after indoor operation check)

5. Troubleshooting

Diagnosis	Countermeasure
E19 occurs when the power ON → Is SW7-1 on the indoor control PCB ON ?	
NO	Defective indoor control PCB (Defective SW7) →Replace
YES	Turn SW7-1 on the indoor control PCB OFF and reset the power

Note:

Error code

Remote controller: E20
7-segment display: -

LED	Green	Red
Indoor	Keeps flashing	1 time flash
Outdoor	Keeps flashing	Stays Off

Content

Indoor fan motor rotation speed anomaly

1. Applicable model

All models

2. Error detection method

Detected by rotation speed of indoor fan motor

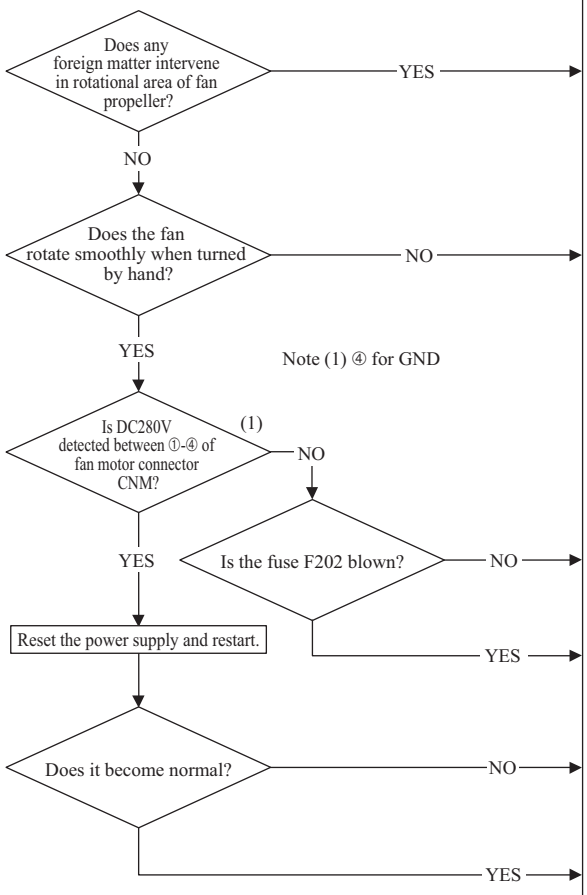
3. Condition of error displayed

When the actual fan rotation speed does not reach to the speed of [required speed −50rpm] after 2 minutes have been elapsed since the fan motor rotation speed command was output, the unit stops by detecting indoor fan motor anomaly.

4. Presumable cause

- Indoor fan motor anomaly
- Foreign matter at rotational area of fan propeller
- Fan motor anomaly
- Dust on control PCB
- Blown fuse
- External noise, surge

5. Troubleshooting



Note:

Error code	ED	Green	Red	Content
Remote controller: E28	Indoor	Keeps flashing	Stays OFF	Remote controller temperature thermistor anomaly
	Outdoor	Keeps flashing	Stays OFF	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) of remote controller temperature thermistor (Thc)

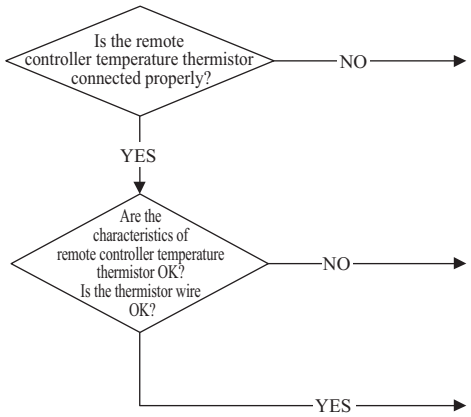
3. Condition of Error displayed

When the temperature thermistor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.

4. Presumable cause

- Faulty connection of remote controller temperature thermistor
- Defective remote controller temperature thermistor
- Defective remote controller PCB

5. Troubleshooting



Resistance-temperature characteristics of remote controller temperature thermistor (ThC)

Temperature (°C)	Resistance value (kΩ)	Temperature (°C)	Resistance value (kΩ)
0	65	30	16
1	62	32	15
2	59	34	14
4	53	36	13
6	48	38	12
8	44	40	11
10	40	42	9.9
12	36	44	9.2
14	33	46	8.5
16	30	48	7.8
18	27	50	7.3
20	25	52	6.7
22	23	54	6.3
24	21	56	5.8
26	19	58	5.4
28	18	60	5.0

Note: After 10 seconds has passed since remote controller thermistor was switched from valid to invalid, E28 will not be displayed even if the thermistor harness is disconnected. At same time the thermistor, which is effective, is switched from remote controller thermistor to indoor return air temperature thermistor. Even though the remote controller thermistor is set to be Effective, the return air temperature displayed on remote controller for checking still shows the value detected by indoor return air temperature thermistor, not by remote controller temperature thermistor.

Error code

Remote controller: E35

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	1 time flash

Content

Cooling overload operation

1. Applicable model

All models

2. Error detection method

For the error detection method, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

3. Condition of Error displayed

When outdoor heat exchanger temperature anomaly is detected 5 times within 60 minutes or this anomalous state is detected 60 minutes continuously including compressor stop.

4. Presumable cause

- Defective outdoor heat exchanger temperature thermistor
- Defective outdoor control PCB
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger
- Excessive refrigerant amount

5. Troubleshooting

Diagnosis	Countermeasure
* For the characteristics of outdoor heat exchanger temperature thermistor, refer to E37. Are the characteristics of outdoor heat exchanger temperature thermistor normal? NO	Replace outdoor heat exchanger temperature thermistor.
YES Is the unit operating in the state of cooling overload? YES	Check unit side. • Isn't the air circulation of outdoor unit short-circuited? • Are installation spaces adequate? • Isn't there any fouling or clogging on heat exchanger?
NO Is the high pressure control normal? NO	Control operation check *
YES Is the temperature (measured actually) at detection of error correct? NO	Defective outdoor control PCB→Replace.
YES	Excessive refrigerant amount : Recharge refrigerant by weighing proper amount on a scale.

* For the contents of control, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

Note:

Error code	LED	Green	Red	Content
Remote controller: E36	Indoor	Keeps flashing	Stays OFF	Discharge pipe temperature error
	Outdoor	Keeps flashing	1〔5〕time flash	

Note (1) Value in〔 〕are for the models SRC40 ~ 60.

1. Applicable model

All models

2. Error detection method

For the error detection method, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

3. Condition of Error displayed

When discharge pipe temperature anomaly is detected 2 times within 60 minutes or this anomalous state is detected 60 minutes continuously including compressor stop.

4. Presumable cause

- Defective outdoor control PCB
- Defective discharge pipe temperature thermistor
- Clogged filter
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger

5. Troubleshooting

Diagnosis	Countermeasure
Are the characteristics of discharge pipe temperature thermistor normal? (* For the characteristics of discharge pipe temperature, refer to E39.) NO	Replace discharge pipe temperature thermistor.
YES → Is the discharge pipe temperature error persisted during cooling operation? YES	Insufficient refrigerant amount : Recharge refrigerant by weighing proper amount on a scale.
NO → Is the discharge pipe temperature control normal? NO	Control operation check *
YES → Is the temperature (measured actually) at detection of error correct? NO	Defective outdoor control PCB→Replace.
YES	Check unit side: • Isn't filter clogged? • Are adequate indoor, outdoor unit installation spaces? • Isn't there any short-circuit of air? • Isn't there any fouling, clogging on indoor heat exchanger?

* For the contents of control, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

Note:

Error code	ED	Green	Red	Content
Remote controller: E37	Indoor	Keeps flashing	Stays OFF	Outdoor heat exchanger temperature themistor anomaly
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) on the outdoor heat exchanger temperature thermistor

3. Condition of Error displayed

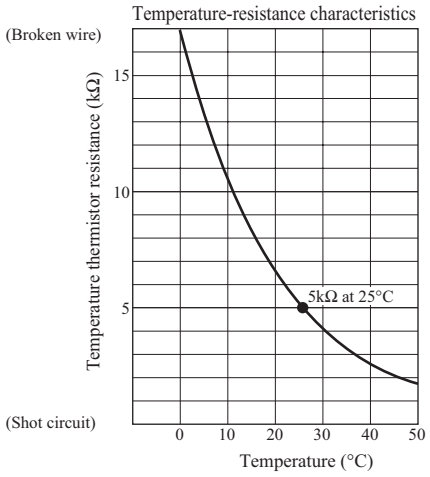
- When the temperature thermistor detects -50°C or lower for 20 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.
- When -50°C or lower is detected for 5 seconds continuously within 20 second after compressor ON.

4. Presumable cause

- Defective outdoor control PCB
- Broken thermistor harness or temperature sensing section
- Disconnected wire connection (connector)

5. Troubleshooting

Diagnosis	Countermeasure
Is the outdoor heat exchanger temperature thermistor connector connected properly? → NO	Correct connector.
YES → For the characteristics of outdoor heat exchanger temperature thermistor, see the following graph. Are the characteristics of outdoor heat exchanger temperature thermistor OK? → NO	Defective outdoor heat exchanger temperature thermistor→Replace.
YES	Defective outdoor control PCB→Replace. (Defective outdoor heat exchanger temperature thermistor input circuit)



Note:

Error code	ED	Green	Red	Content
Remote controller: E38	Indoor	Keeps flashing	Stays OFF	Outdoor air temperature thermistor anomaly
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) on outdoor air temperature thermistor

3. Condition of Error displayed

- When the temperature thermistor detects -45°C or lower for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.
- When -45°C or lower is detected for 5 seconds continuously within 20 second after compressor ON.

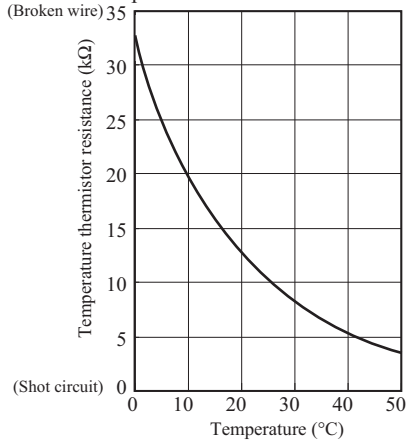
4. Presumable cause

- Defective outdoor control PCB
- Broken thermistor harness or temperature sensing section (Check molding.)
- Disconnected wire connection (connector)

5. Troubleshooting

Diagnosis	Countermeasure
Is the outdoor air temperature thermistor connector connected properly? → NO	Correct connector.
YES → For the characteristics of outdoor air temperature thermistor, see the following graph. Is the characteristics of the outdoor air temperature thermistor OK? → NO	Defective outdoor air temperature thermistor→ Replace.
YES	Defective outdoor control PCB→Replace. (Defective outdoor air temperature thermistor input circuit)

Temperature-resistance characteristics



Note:

Error code	LED	Green	Red	Content
Remote controller: E39	Indoor	Keeps flashing	Stays OFF	Discharge pipe temperature thermistor anomaly
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

All models

2. Error detection method

Detection of anomalously low temperature (resistance) on the discharge pipe temperature thermistor

3. Condition of Error displayed

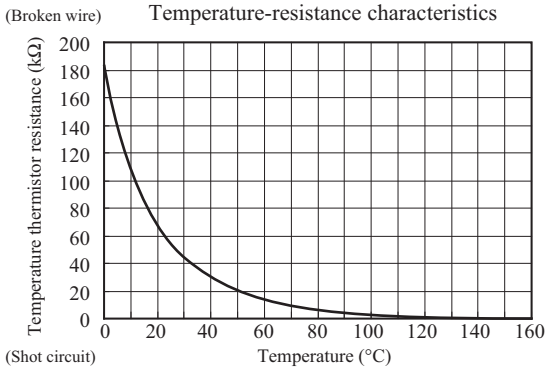
When the temperature thermistor detects -10°C or lower for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.

4. Presumable cause

- Defective outdoor control PCB
- Broken thermistor harness or temperature sensing section (Check molding.)
- Disconnected wire connection (connector)

5. Troubleshooting

Diagnosis	Countermeasure
Is the discharge pipe temperature thermistor connector connected properly? → NO	Correct connector.
YES → Are the characteristics of discharge pipe temperature thermistor OK? (For the characteristics of discharge pipe temperature thermistor, see the following graph.) → NO	Defective discharge pipe temperature thermistor→ Replace.
YES	Defective outdoor control PCB→Replace. (Defective temperature thermistor input circuit)



Note:

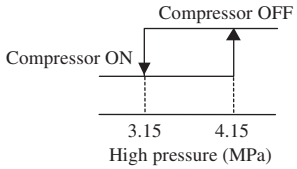
Error code	LED	Green	Red	Content
Remote controller: E40	Indoor	Keeps flashing	Stays OFF	High pressure error (63H1 activated)
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

All models

2. Error detection method

When the high pressure switch 63H1 is activated.



3. Condition of Error displayed

If 63H1 turns OFF (opened), the compressor stops. After 3-minutes delay, the compressor restarts. If this anomaly occurs 5 times within 60 minutes or continues for 60 minutes continuously.

4. Presumable cause

- Short circuit of air flow, disturbance of air flow and clogging filter at outdoor heat exchanger/Breakdown of fan motor
- Defective outdoor control PCB
- Defective 63H1 connector
- Defective electronic expansion valve connector
- Closed service valve
- Mixing of non-condensing gas (nitrogen, etc.)

5. Troubleshooting

Diagnosis	Countermeasure
If the power supply breaker is turned OFF and ON too quickly, E40 may be displayed. (This is normal.)	
Is the service valve fully opened? — NO	Open service valve.
YES	
Has 63H1 activated? — NO	
On operation of 63H1 — YES	
1. During cooling ・ Is the outdoor fan motor running? ・ Isn't any short-circuit of air on the outdoor unit? ・ Are sufficient return air/supply air space secured? 2. During heating ・ Isn't the indoor heat exchanger temperature thermistor disconnected from the thermistor casing? ・ Isn't the filter clogged? * Under the condition of overcharging refirgerant, 63H1 may activate due to delay of starting the preventive control by compressor speed control, because detected heat exhanger temperature, which conducts compressor speed control, becomes lower than normal condition due to excess sub-cooling degree.	
Is 63H1 connector connected properly? — NO	Correct 63H1 connector.
YES	
Is the electronic expansion valve connector connection OK? — NO	Correct electronic expansion valve connector.
If any anomaly exists on the electronic expansion valve connector connection, the power supply must be reset.	
YES	Defective outdoor control PCB→Replace. (Defective 63H1 input circuit)

Note: In the protective control range for compressor startup (initial startup after power ON), even if 63H1 is activated only once (63H1turns OFF), immediately the error is displayed.

Error code	ED	Green	Red
Remote controller: E41	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1 time flash
	Outdoor inverter PCB	Yellow	
		6 times flash	

Content

Power transistor overheat (1/2) (Model FDC71～140 only)

1. Applicable model

FDC71～140 models

2. Error detection method

When less than 14VDC of the output voltage is detected between ② and ③ on CNI3, E41 is displayed. (See "Note" mentioned below)

3. Condition of Error displayed

When less than 14VDC of the output voltage is detected between ② and ③ on CNI3, E41 is displayed. (See "Note" mentioned below)

4. Presumable cause

- Inverter PCB anomaly
- Outdoor fan motor anomaly
- Control PCB anomaly
- Noise filter PCB anomaly

5. Troubleshooting

Diagnosis	Countermeasure
① **Single phase models (FDC71-140)**	
Is DC15V detected between ② and ③ on CNI3? (1) (2)	
YES	Replace INV PCB If not solved, replace Noise filter PCB as well
NO Note (1): Under annomalous conditions, the voltage becomes less than 14VDC.	
Is DC15V deteted after disconnecting outdoor fan motor? (1)	
YES	Replace outdoor fan motor
NO	Replace control PCB If not solved, replace INV PCB as well
Note (2) How to check the voltage between ② and ③ of CNI3? ⇒See E51	
② **3-phase models (FDC100-140)** 〔E41〕→Replace inverter PCB	

Note : The "Single phase models" of inverter PAC have no function to output the signal for the power transistor overheat. However since the power source for the power transistor and the outdoor fan motor is in the same line, when the anomaly of the outdoor fan motor occurs, E41 is displayed.

Error code	ED	Green	Red
Remote controller: E41	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1 time flash
	Outdoor inverter PCB	Yellow	
		6 times flash	

Content

Power transistor overheat (2/2) (Model FDC200, 250 only)

1. Applicable model

FDC200, 250 models

2. Error detection method

When anomalously high temperature is detected by power transistor temperature thermistor (Tho-P1)

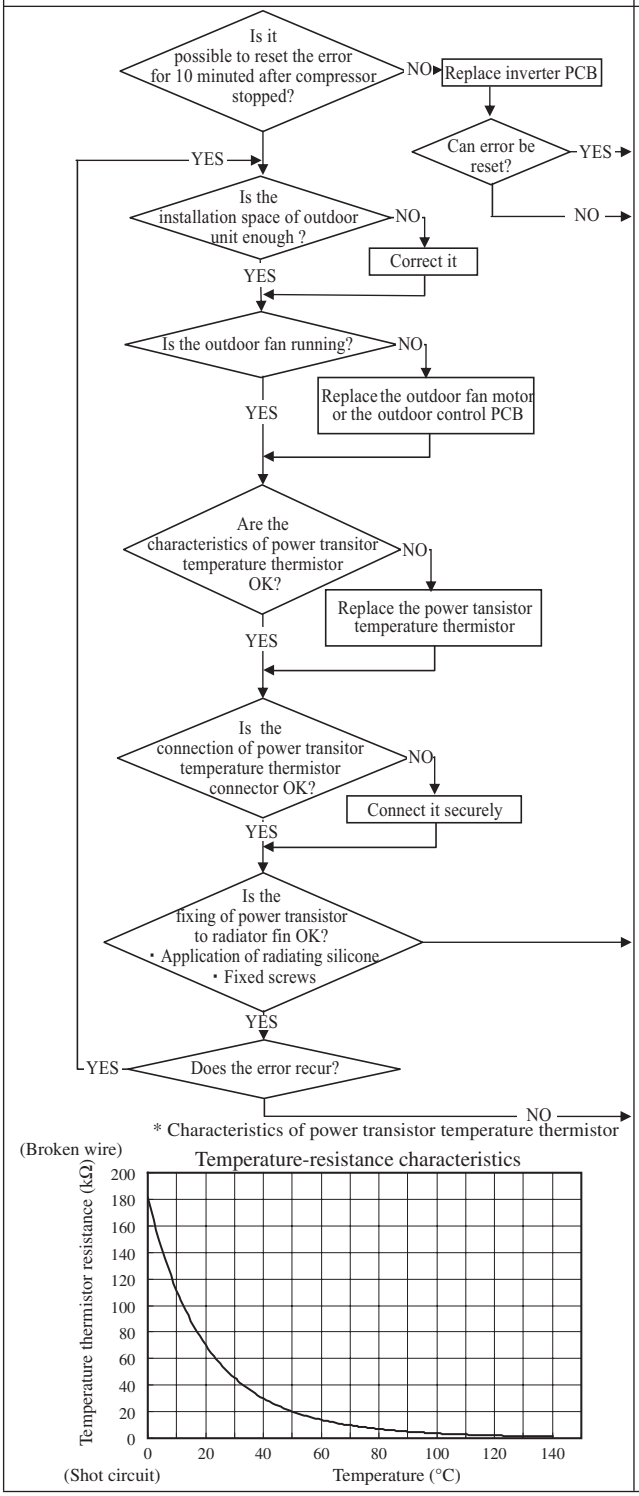
3. Condition of Error displayed

Anomalously high temperature of power transistor is detected 5 times within 60 minutes.

4. Presumable cause

- Inverter PCB anomaly
- Outdoor fan motor anomaly
- Improperly fixing of power transistor to radiator fin
- Power transistor temperture thermistor anomaly
- Inadequate installation space of outdoor unit

5. Troubleshooting



Note :

Error code	LED	Green	Red	Content
Remote controller: E42	Indoor control PCB	Keeps flashing	Stays OFF	Current cut (1/2)
	Outdoor control PCB	Keeps flashing	1 time flash	
	Outdoor inverter PCB	Yellow LED or Red LED	Green LED	
		1 time flash or 5 times flash	Keeps flashing	

1. Applicable model

All models

2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

3. Condition of Error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping.
- After 3-minute delay, the compressor restarts, but if this amonaly occurs 4 times within 30 minute after the intial detection. (Model FDC71 – 250 only)

4. Presumable cause

- The valves closed
- Faulty power supply
- Insufficient refrigerant amount
- Faulty compressor
- Faulty power transistor module

5. Troubleshooting

Diagnosis	Countermeasure
Is the Power supply voltage OK? — NO	Check power supply.
YES → Are the service valves opened? — NO	Open the valves.
YES → Is the high pressure during operation OK? — NO	Check refrigerant amount and refregerant circuit *In case of transitional increase of high pressure and/or test run, several times restarting may recover it, because liquid refrigerant (migrated) in the compresser is discharged from the compressor.
YES → Is the checked result of insulation resistance and coil resistance (1) of compressor motor OK? — NO	Replace compressor.
YES → To next page.	

(1) 1.154Ω or more at 20°C (Model FDC71)
0.293Ω or more at 20°C (Models FDC100〜140)
1.172Ω or more at 20°C (Models FDC100〜140)
0.334Ω or more at 20°C (Models FDC200, 250)

Note:

Error code

Remote controller: E42

LED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor control PCB	Keeps flashing	1 time flash
Outdoor inverter PCB	Yellow LED or Red LED	Green LED
	1 time flash or 5 times flash	Keeps flashing

Content

Current cut (2/2)

1. Applicable model

All models

2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

3. Condition of Error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping.
- After 3-minute delay, the compressor restarts, but if this amonaly occurs 4 times within 30 minute after the intial detection. (Model FDC71 – 250 only)

4. Presumable cause

- Defective outdoor control PCB
- Defective inverter PCB
- Faulty power supply
- Insufficient refrigerant amount
- Faulty compressor
- Faulty power transistor module

5. Troubleshooting

Diagnosis	Countermeasure
From previous page Is the checked result of power transistor module OK? NO	• FDC71 ~ 250 Defective inverter PCB→ Replace. *For model 200, 250 replace also the power transistor module.
YES • Is the space for installation of indoor and/or outdoor unit enough? • Is there any short circuit of air on indoor and/or outdoor unit? • At cooling, does the outdoor fan motor run? Are the service valves fully opened? Is the filter clogged? • At heating, does the indoor fan motor run? Are the service valves fully opened? Is the filter clogged? • Is there any liquid flooding? Is the superheat within normal range? Is the low pressure sensor and suction pipe temperature thermistor normal? • Is there any anoumalous sound on the compressor?	
YES After resetting power for several times does it become normal? NO	• FDC71 ~ 250 Defective inverter PCB→ Replace. *For model 200, 250 replace also the power transistor module.
YES Temporary noise may cause of anomaly. If noise source can be found, take countermeasure.	

Note:

Error code

Remote controller: E45

ED	Green	Red
Indoor	Keeps flashing	Stays OFF
Outdoor	Keeps flashing	1 time flash

Content

Communication error between inverter PCB and outdoor control PCB

1. Applicable model

All models

2. Error detection method

When the communication between inverter PCB and outdoor control PCB is not established.

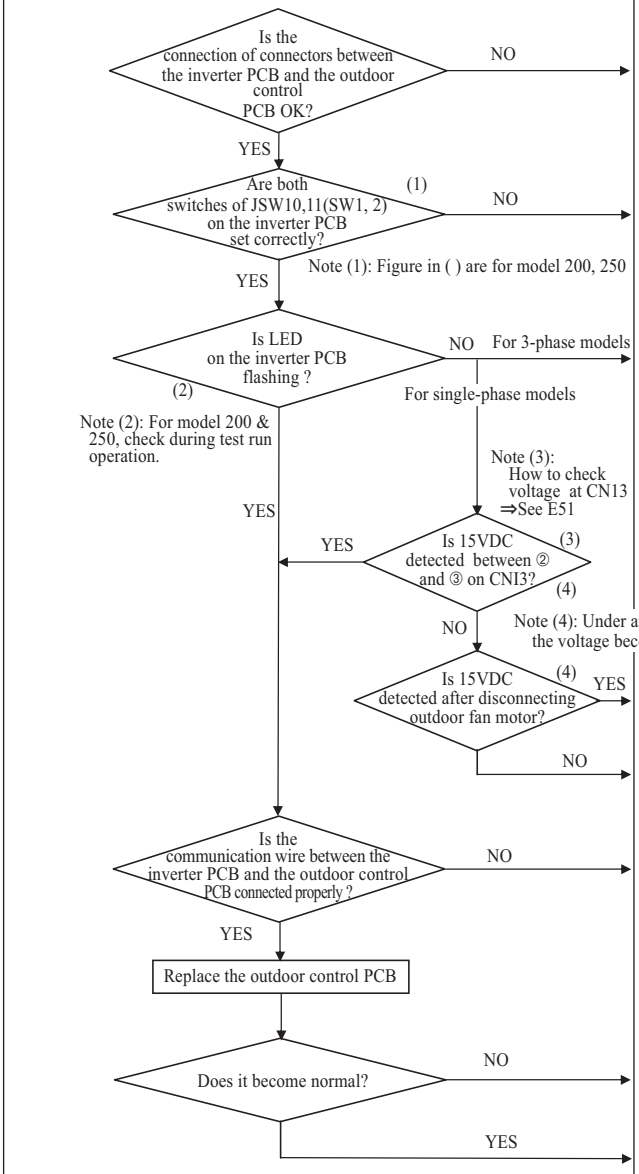
3. Condition of Error displayed

Same as above.

4. Presumable cause

- Inverter PCB anomaly
- Anomalous connection of connector between inverter PCB and outdoor control PCB
- Outdoor control PCB anomaly
- Outdoor fan motor anomaly

5. Troubleshooting



Note:

Error code	LED	Green	Red
Remote controller: E47	Indoor	Keeps flashing	Stays off
	Outdoor control PCB	Keeps flashing	1 time flash
	Outdoor Inverter PCB	Yellow LED or Red LED	Green LED
		7 times flashing	–

Content

Inverter PCB A/F module anomaly
(Model FDC71 only)

1. Applicable model

Model FDC71

2. Error detection method

In order to prevent from overcurrent of A/F, if the current exceeds the specifications, it makes the compressor stopping.

3. Condition of error displayed

• If the output current of A/F exceeds the specifications, it makes the compressor stopping.

4. Presumable cause

• Defective inverter PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the Power supply voltage OK? NO	Check power supply.
YES → Is the checked results of insulation resistance and coil resistance (1) of compressor motor OK? NO (1) 1.154Ω or more at 20°C (FDC71)	Replace compressor.
YES	Defective outdoor Inverter PCB→Replace.

Note:

Error code	ED	Green	Red	Content
Remote controller: E48	Indoor	Keeps flashing	Stays OFF	Outdoor fan motor anomaly
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

All models

2. Error detection method

Detected by rotation speed of outdoor fan motor

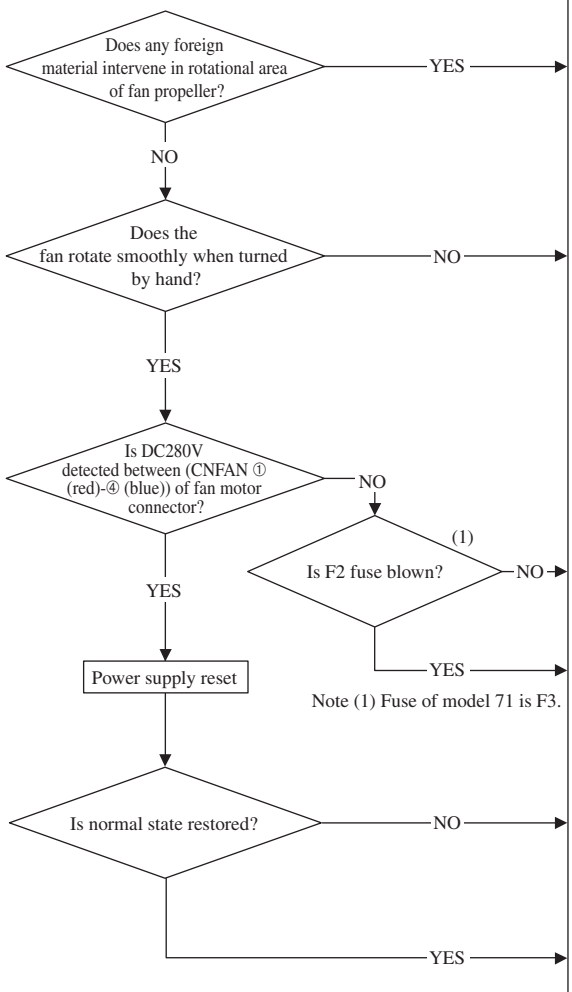
3. Condition of Error displayed

When actual rotation speed of outdoor fan motor (FMo1) drops to 100min^{-1} or lower for 30 minutes continuously, the compressor and the outdoor fan motor stop. After 3-minutes delay, it starts again automatically, but if this anomaly occurs 5 times within 60 minutes after the initial detection.

4. Presumable cause

- Defective outdoor control PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on outdoor control PCB
- Blow fuse
- External noise, surge

5. Troubleshooting



Note: When E48 error occurs, in almost cases F2 fuse (4A) [Model 71:F3 fuse (2A)]on the outdoor control PCB is blown. There are a lot of cases that fuse is blown and E48 occurs due to defective fan motor. And even though only the outdoor control PCB (or fuse) is replaced,, another trouble (*1) could occur. Therefore when fuse is blown, check whether the fan motor is OK or not.
After confirming the fan motor normal, check by power ON. (Don't power ON without confirming the fan motor normal.)
*1 The error which does not seem to relate E48 may occur like as "WAIT", Stay OFF of LED on outdoor control PCB, inverter communication error (E45) and etc.

Error code	LED	Green	Red	Content
Remote controller: E49	Indoor	Keeps flashing	Stays OFF	Low pressure error or low pressure sensor anomaly (1/2)
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

All models

2. Error detection method

Detected by low pressure drop and suction superheat

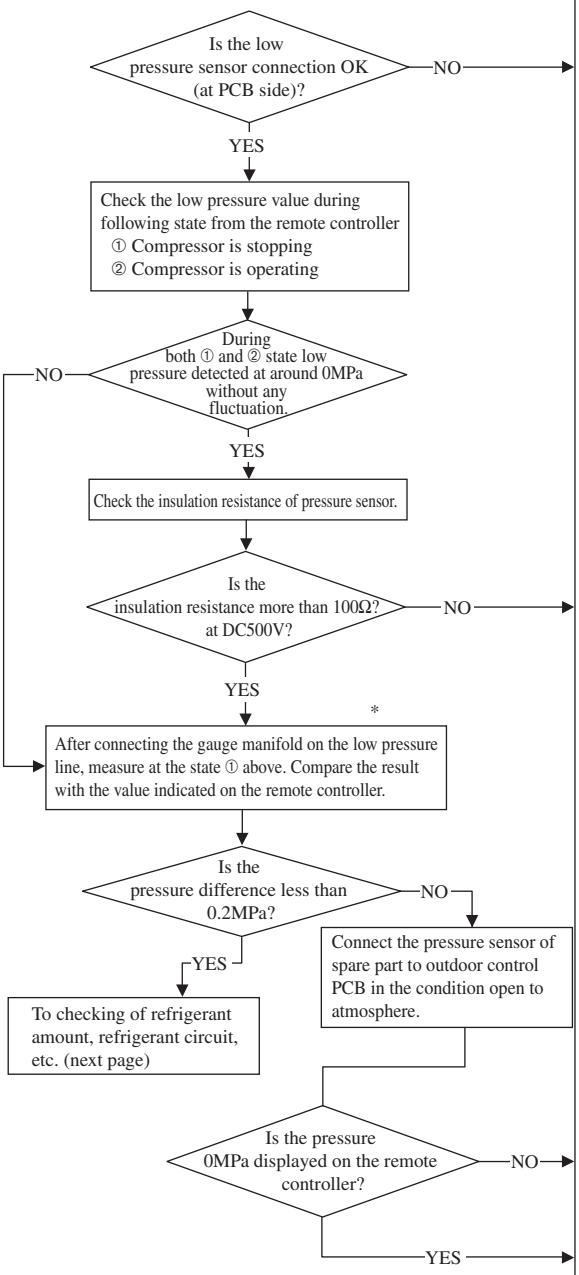
3. Condition of Error displayed

① When the low pressure sensor detects 0.079MPa or lower for 15 seconds continuously, compressor stops and it restarts automatically after 3-minutes delay. And if this anomaly occurs 3 times within 60 minutes,
② 10 minutes after the compressor starts, if the low pressure sensor detects 0.15MPa or lower for 60 minutes continuously and compressor suction superheat is detected 30°C or higher for 60 minutes continuously. And if this anomaly occurs 3 times within 60 minutes,
③ If low pressure sensor detects 0.079MPa or lower for 5 minutes continuously (including the compressor stop status),

4. Presumable cause

- Defective outdoor control PCB
- Defective low pressure sensor connector
- Defective low pressure sensor
- Defective suction pipe temperature thermistor connector
- Defective suction pipe temperature thermistor

5. Troubleshooting



Note: * Connect the gauge manifold to the service valve check joint during cooling, or connect it to the check joint at internal piping of outdoor unit during heating.

Error code	LED	Green	Red	Content
Remote controller: E49	Indoor	Keeps flashing	Stays OFF	Low pressure error or low pressure sensor anomaly (2/2)
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

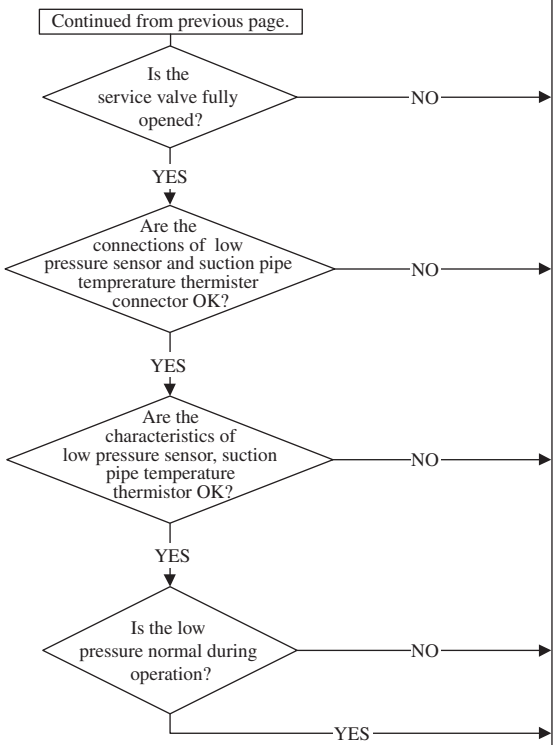
All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: E51	Indoor control PCB	Keeps flashing	Stays OFF	Inverter and fan motor anomaly
	Outdoor control PCB	Keeps flashing	1 time flash	
	Outdoor inverter PCB	Yellow or Red LED	Green	
		6 times flash or 2 times flash	Keeps flashing	

1. Applicable model

All models

2. Error detection method

When power transistor anomaly is detected
for 15 minutes continuously

3. Condition of Error displayed

Same as above

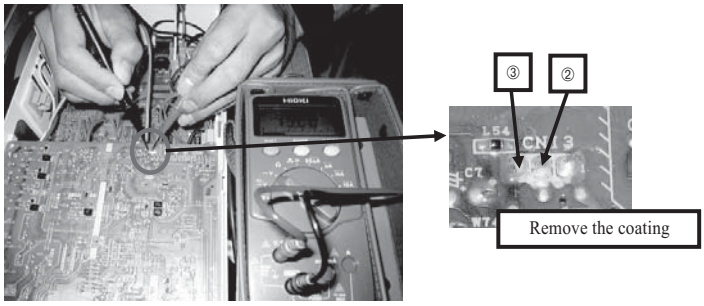
4. Presumable cause

- Outdoor fan motor anomaly
- Inverter PCB anomaly
- Outdoor control PCB anomaly

5. Troubleshooting

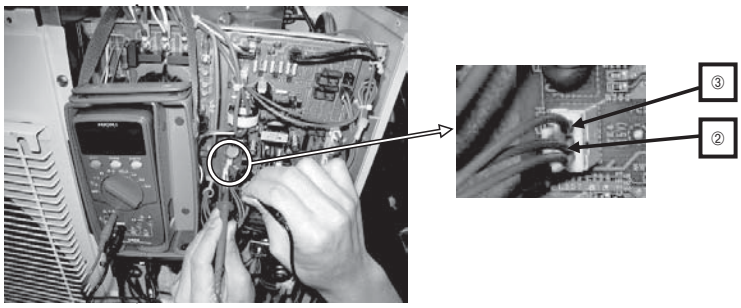
Diagnosis	Countermeasure
・Model FDC71-140VN Is DC15V detected between ② and ③ on CNI3? (1) (2) → YES Replace INV PCB If not solved, replace Noise filter PCB as well NO Note (1): Under anomalous conditions, the voltage becomes less than 14VDC Is DC15V detected after disconnecting outdoor fan motor? (1) → YES Replace outdoor fan motor NO Replace control PCB If not solved, replace INV PCB as well ・Model FDC100-140VS and FDC200, 250VS Replace immediately the inverter PCB and the power transistor Note (2) How to check the voltage between ② and ③ of CNI3?	

For FDC71



② :15V (+)
③ :GND (-)

For FDC100-140 and FDC200, 250



Note:

Error code	LED	Green	Red	Content
Remote controller: E53	Indoor	Keeps flashing	Stays OFF	Suction pipe temperature thermistor anomaly
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

All models

2. Error detection method

When the suction pipe temperature thermistor detects anomalously low temperature

3. Condition of Error displayed

If the temperature thermistor detects -50°C or lower for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after compressor ON, the compressor stops. When the compressor is restarted automatically after 3-minutes delay, if this anomaly ocuurs 3 times within 40 minute.

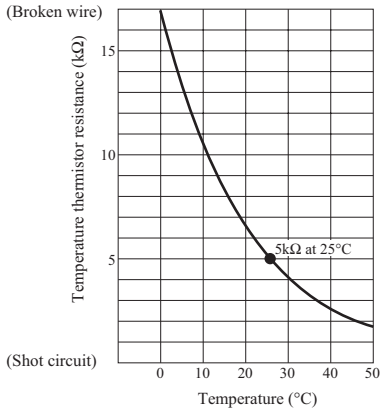
4. Presumable cause

- Defective suction pipe temperature thermistor connection
- Defective suction pipe temperature thermistor
- Defective outdoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of suction pipe temperature thermistor connector OK? — NO	Correct connection of suction pipe temperature thermistor connector.
YES → Are the characteristics of suction pipe temperature thermistor OK? — NO	Defective suction pipe temperature thermistor→ Replace.
YES	Defective outdoor control PCB→Replace. (Defective suction pipe temperature thermistor input circuit)

Temperature-resistance characteristics



Note:

Error code	LED	Green	Red	Content
Remote controller: E54	Indoor	Keeps flashing	Stays OFF	Low pressure sensor anomaly
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

All models

2. Error detection method

When anomalous voltage (pressure) is detected

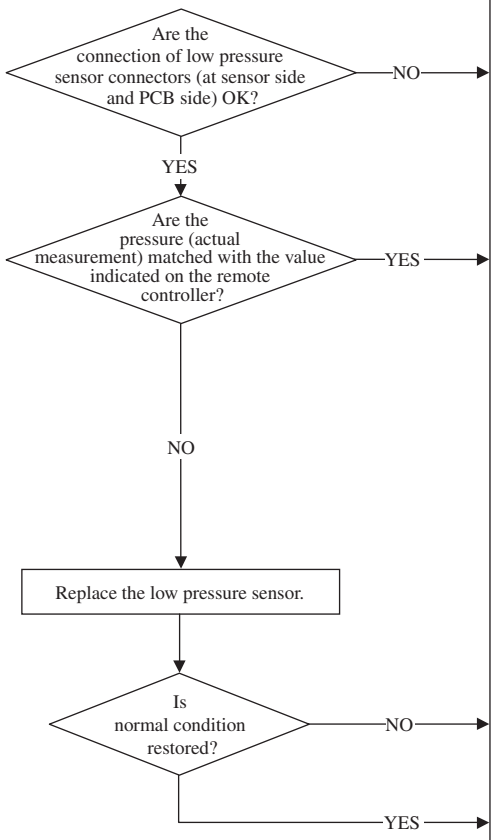
3. Condition of Error displayed

If the pressure sensor detects 0V or lower and 3.49V or higher for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after compressor ON, the compressor stops. When the compressor is restarted automatically after 3-minuts delay, if this anomaly occurs 3 times within 40 minutes

4. Presumable cause

- Defective low pressure sensor connection
- Defective low pressure sensor
- Defective outdoor control PCB
- Improper amount of refrigerant
- Anomalous refrigeration circuit

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: E55	Indoor	Keeps flashing	Stays OFF	Underneath temperature thermistor anomaly (Models FDC200, 250 only)
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

Models FDC200, 250

2. Error detection method

When anoumalous low temperature (resistance) is detected by the underneath temperature thermistor

3. Condition of Error displayed

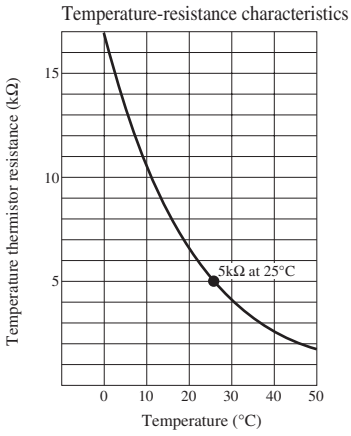
If the temperature thermistor detcts -50°C or lower for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after compressor ON, the compressor stops. When the compressor is restarted automatically after 3-minutes delay, if this anomaly ocuurs 3 times within 40 minute.

4. Presumable cause

- Defective underneath temperature thermistor connection
- Defective underneath temperature thermistor
- Defective outdoor control PCB

5. Troubleshooting

Diagnosis	Countermeasure
Is the connection of underneath temperature thermistor connector OK? — NO	Correct connection of underneath temperature thermistor connector.
YES → Are the characteristics of underneath temperature thermistor OK? — NO	Defective underneath temperature thermistor→ Replace.
YES	Replace outdoor control PCB. (Defective underneath temperature thermistor input circuit)



Note:

Error code	LED	Green	Red	Content
Remote controller: E57	Indoor	Keeps flashing	Stays OFF	Insufficient refrigerant amount or detection of service valve closure
	Outdoor	Keeps flashing	1 time flash	

1. Applicable model

All models

2. Error detection method

- Judge insufficient refrigerant amount by detecting the temperature differnce between indoor heat exchanger (ThI-R) and indoor return air (ThI-A).
- It detects at initial startup in cooling or dehumidifying mode after power ON. (In case of model 71 it cannot detect)

3. Condition of Error displayed

When the insufficient refrigerant amount is detected 3 times within 30 minutes.
(In case of Models 100 ～ 250 it makes anomalous stop at initial detection)

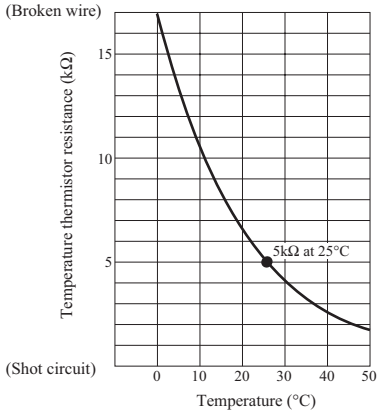
4. Presumable cause

- Defective indoor heat exchanger temperature thermistor
- Defective indoor return air temperature thermistor
- Defective indoor control PCB
- Insufficient refregerant amount

5. Troubleshooting

Diagnosis	Countermeasure
Is the service valve fully opened? NO	Open fully.
YES → Are the connections of indoor heat exchanger and/or return air temperature thermistor connectors OK? NO	Correct indoor heat exchanger, return air temperature thermistor connector connections.
YES → Are the characteristics of indoor heat exchanger and/or return air temperature thermistor OK? NO	Defective indoor heat exchanger, return air temperature thermistor → Replace.
YES → Is the low pressure during operation normal? NO	Charge refrigerant.
YES	Defective indoor control PCB→Replace. (Defective indoor heat exchanger, return air temperature thermistor input circuits)

Indoor heat exchanger, return air temperature thermistor
Temperature-resistance characteristics



Note: Insufficient refrigerant amount preventive control makes compressor stopped, if it judges insufficient refrigerant amount by detecting the temperature difference between indoor heat exchanger (ThI-R) and return air temperature (ThI-A) for 1 minute after compressor ON in cooling or dehumidifying mode and for 9 minutes after compressor ON in heating mode. [in cooling mode: (ThI-A)-(ThI-R)>4degC, in heating mode: (ThI-R)-(ThI-A)<4degC]

Error code	ED	Green	Red
Remote controller: E59	Indoor control PCB	Keeps flashing	Stays OFF
	Outdoor control PCB	Keeps flashing	1 time flash
	Outdoor inverter PCB	Yellow or Red ED	Green
		Stays off or 4 times flash	Keeps flashing

Content

Compressor startup failure (1/2)

1. Applicable model

All models

2. Error detection method

When it fails to change over to the operation for rotor position detection of compressor motor (If the compressor speed cannot increase 11Hz or higher)

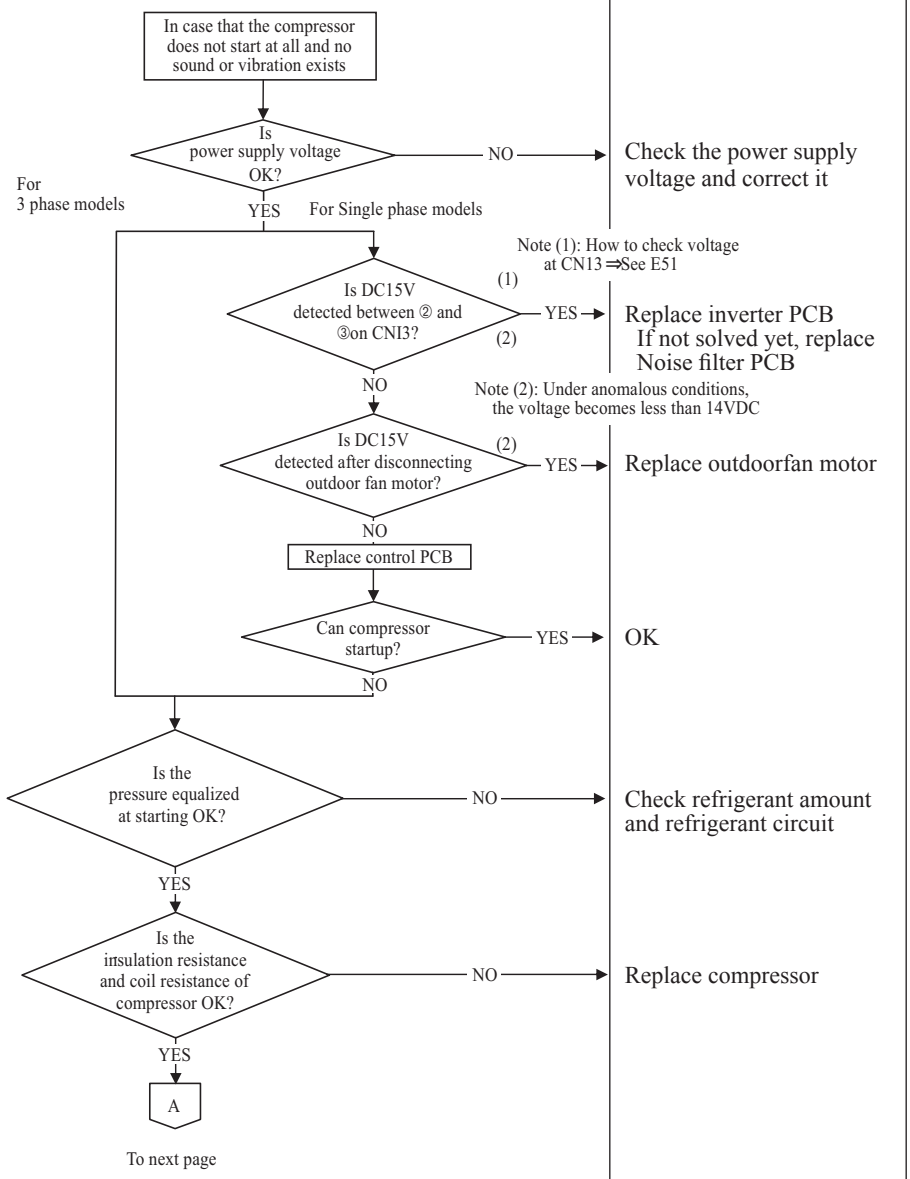
3. Condition of Error displayed

If the compressor fails to startup for 20 times (10 patterns x 2 times) continuously.

4. Presumable cause

- Outdoor fan motor anomaly
- Outdoor control PCB anomaly
- Inverter PCB anomaly
- Anomalous power supply voltage
- Insufficient or Excessive refrigerant amount
- Faulty component for refrigerant circuit
- Compressor anomaly (Motor or bearing)

5. Troubleshooting



Note : Insulation resistance
- The unit is left for long period without power supply or soon after installation, insulation resistance may decrease to several MΩor lower due to the liquid refrigerant migrated in the refrigerant oil in compressor. If the electric leakage breaker is activated due to low insulation resistance, check followings.
  ① Check whether the insulation resistance can recover or not, after 6 hours has passed since power ON.
  (By energize the crankcase heater, liquid refrigerant migrated in the refrigerant oil in compressor can be evaporated)
  ② Check whether the electric leakage breaker conforms to high-harmonic specifications
  (As INV PAC units has inverter, in order to prevent from improper operation, be sure to use the breaker of high-harmonic type)

Error code

Remote controller: E59

ED	Green	Red
Indoor control PCB	Keeps flashing	Stays OFF
Outdoor control PCB	Keeps flashing	1 time flash
Outdoor inverter PCB	Yellow or Red ED	Green
	Stays off or 4 times flash	Keeps flashing

Content

Compressor startup failure (2/2)

1. Applicable model

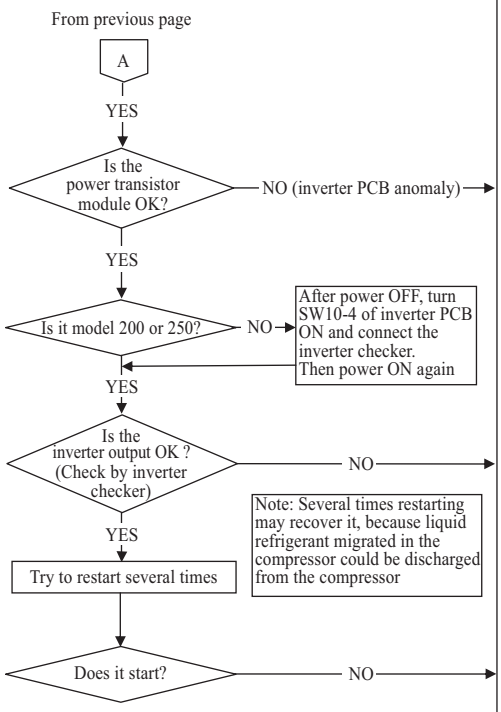
All models

2. Error detection method

3. Condition of Error displayed

4. Presumable cause

5. Troubleshooting



Note:

Error code	LED	Green	Red	Content
Remote controller: E60	Indoor	Keeps flashing	Stays OFF	Compressor rotor lock error (Models FDC200, 250 only)
	Outdoor	Keeps flashing	1〔7〕time flash	

Note (1) Value in 〔 〕are for the Models SRC40 ~ 60.

1. Applicable model

Models FDC200, 250

2. Error detection method

Compressor rotor position

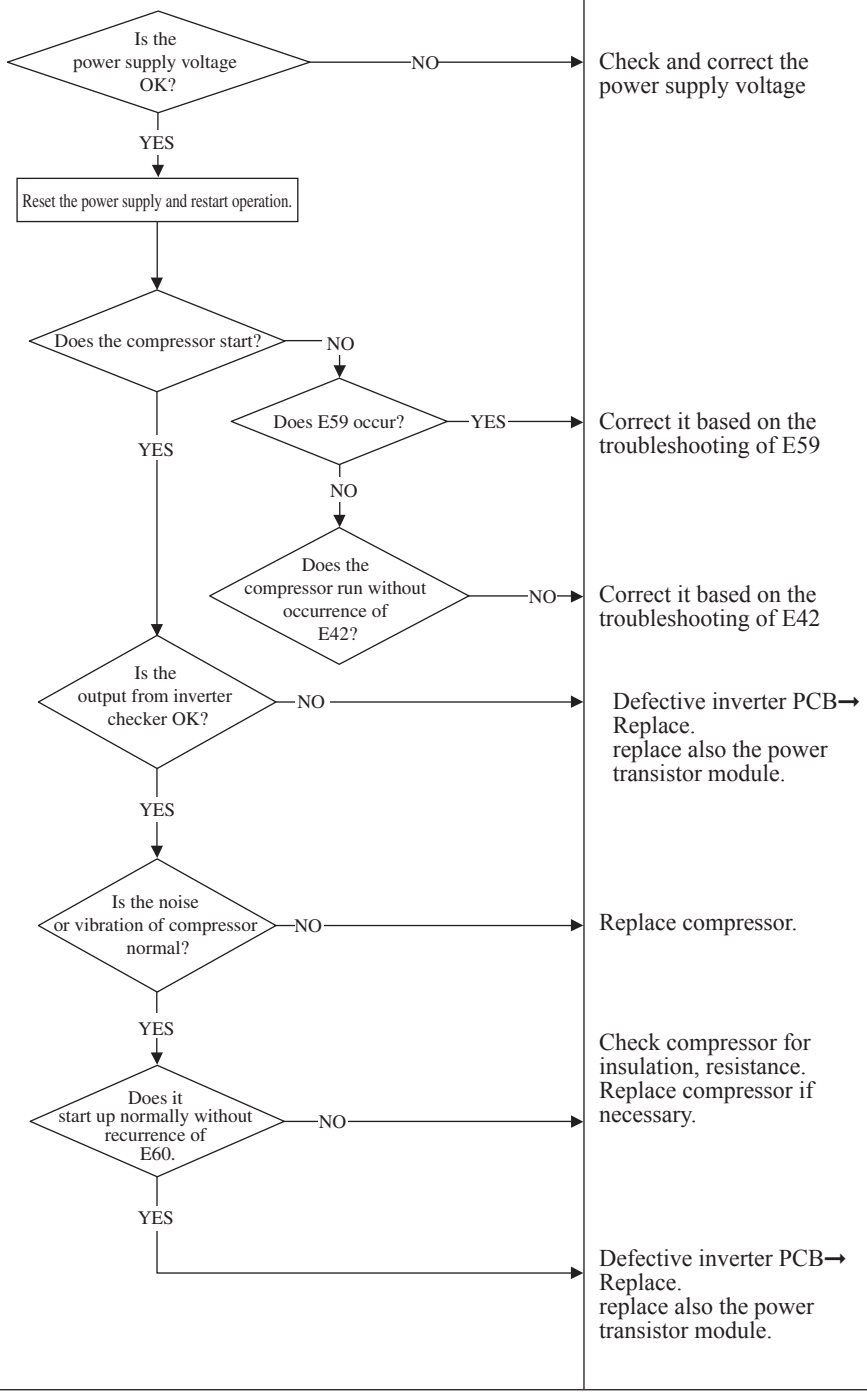
3. Condition of Error displayed

If it fails again to detect the rotor position after shifting to the compressor rotor position detection operation, the compressor stops.
When it is restart automatically after 3 minutes, it is detected 4 times within 15 minutes.

4. Presumable cause

- Defective outdoor fan motor
- Defective outdoor control PCB
- Defective inverter PCB
- Anomalous power supply voltage
- Improper refrigerant amount and refrigerant circuit
- Defective compressor (motor, bearing)

5. Troubleshooting



Note: Insulation resistance
- The unit is left for long period without power supply or soon after installation, migrated liquid refrigerant may dissolve in the refrigerant oil in the compressor. In such case insulation resistance decreases upto several MΩ or lower. If the electric leakage breaker is activated due to low insulation resistance, check followings.
  ① Check whehter the insulation resistance can recover or not, ater 6 hours has passed since power ON. (By energize the crankcase heater, migrated liquid refrigerant in the refrigerant oil in compressor can be evaporated)
  ② Check whether the electric leakage breake conforms to high-hermonic specifications (As units has inverter, in order to prevent from improper operation, be sure to use high-hermonic one.)

12. OPTION PARTS

(1) Wireless kit (RCN-KIT3-E)

Read this manual together with the installation manual attached to the air conditioner.

PJZ012D060a

⚠ WARNING

- Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal. Loose connection or hold will cause abnormal heat generation or fire.
- Make sure the power supply is turned off when electric wiring work. Otherwise, electric shock, malfunction and improper running may occur.

⚠ CAUTION

- DO NOT install the wireless kit at the following places in order to avoid malfunction.
  (1)Places exposed to direct sunlight
  (2)Places near heat devices
  (3)High humidity places
  (4)Hot surface or cold surface enough to generate condensation
  (5)Places exposed to oil mist or steam directly
  (6)Uneven surface
  (7)Places affected by the direct airflow of the AC unit.
  (8)Places where the receiver is influenced by the fluorescent lamp (especially in verter type) or sunlight.
  (9)Places where the receiver is affected by infrared rays of any other communication devices.
  (10)Places where some object may obstruct the communication with the remote controller
- DO NOT leave the wireless kit without the cover. In case the cover needs to be detached, protect the receiver with a packaging box or bag in order to keep it away from water and dust.

Attention

- Instruct the customer how to operate it correctly referring to the instruction manual.
- User's manual of a wireless remote controller is attached to a indoor unit or a outside unit.
- Read this together with a manual attached to this kit.

① Accessories

Please make sure that you have all of the following accessories.

① Receiver		1
② Wiring (3m)		1
③ Parts set (A)		1
④ Parts set (B)		1
⑤ Parts set (C)		1
⑥ Wireless remote controller		1
⑦ User's manual		1

① Remote controller holder		1
② Screw for holder		2
③ AAA dry cell battery (R03)		2

① Screw for receiver		2
② Fixing band		1
③ Clamp		5
④ Screw for clamp		5

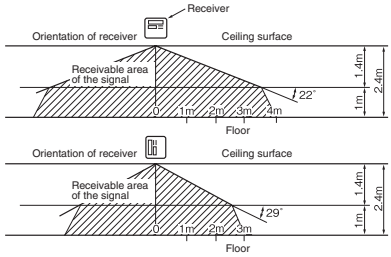
① Receiver installation bracket		1
② Screw for the bracket		2
③ Installation fitting		2

② Wireless remote controller's operable area

(1) **When installed on ceiling**

① Standard reachable area of the signal

condition Illuminance at the receiver : **300lux** (when no lighting is installed within 1m of the receiver in an ordinary of ce.)

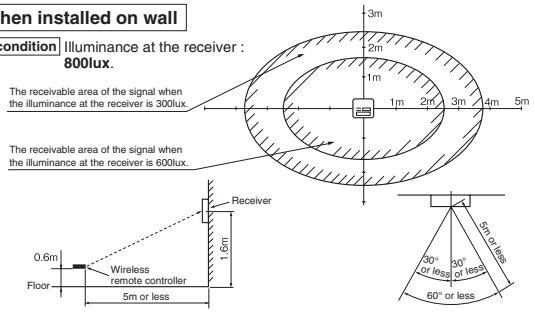


② Correlation between illuminance at the receiver and reachable area of the signal in a plain view.

condition Correlation between the reachable area of the signal and illuminance at the receiver when the remote controller is operated at 1.1m high under the condition of ceiling height of 2.5m.
When the illuminance becomes double, the area is narrowed down to two third.

(2) **When installed on wall**

condition Illuminance at the receiver : **800lux**.



③ How to install the receiver

The following two methods can be used to install the receiver onto a ceiling or a wall.
Select a method according to the installation position.

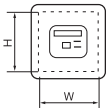
<Installation position>

(A) Direct installation onto the ceiling with wood screws.
(B) Installation with accessory's bracket

(1) **Drilling of the ceiling (ceiling opening)**

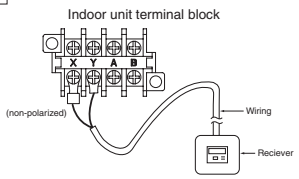
Drill the receiver installation holes with the following dimensions at the ceiling position where wires can be connected.

(A) Direct installation onto the ceiling with wood screws.	88mm(H)×101mm(W)
(B) Installation with enclosed bracket.	108mm(H)×108mm(W)



(2) **Wiring connection of receiver**

Caution
Do not connect the wiring to the power source of the terminal block. If it is connected, printed board will be damaged.

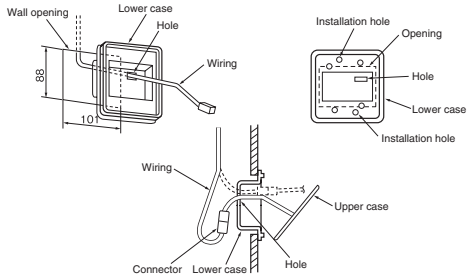


(3) **Installation of the receiver**

Remove the screw on the side of the receiver and sprit it into the upper case and lower case.Install the receiver with one of the two installation methods (A) or (B) shown below.

(A) Direct installation onto the ceiling with screws

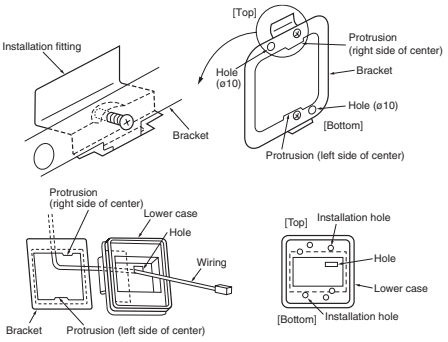
Use this installation method when the ceiling is wooden, and there is no problem for strength in installing directly with wood screws.



①Put through the wiring from the back side to the hole of the lower case.
②Fit the lower case into the ceiling opening. Make sure that the clearance between the convex part of the back of the lower case and the ceiling opening must be as equal as possible on both sides.
③Using the two installation holes shown above, fix the lower case onto the ceiling with the enclosed wood screws. (The other four holes are not used.)
④Connect the wiring with the wiring from the upper case by the connector.
⑤Take out the connector to the backside from the hole of the lower case putting through the wiring at ①.
⑥Fit the upper case and the lower case, and tighten the screws.

(B) Installation with enclosed bracket

Use this method when installaing onto a gypsum board (7 to 18mm), etc.



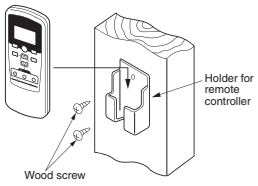
①Catch the two protrusion of the enclosed bracket onto the tting as shown above, and temporarily fix with the screws. (The bracket has an up/down and front/back orientation. Con rm the top/bottom protrusion positions and the positional relation of the ø 10 holes on the bracket and the installation hole on the lower case with the above drawing.)
②Insert the end of the installation tting into the back of the ceiling from the opening, and tighten the screws to fix the bracket onto the ceiling.
③Pass the wiring from the rear side through the hole on the lower case.
④Fit the lower case onto the bracket, and fix the lower case to the bracket using the two installation holes shown above. (The other four holes are not used.)
⑤Follow step ① to ⑥ for (A) to complete the installation.

④ Remotecontroller

Installation of the controller holder

Caution

DO NOT install it on the following places
1) Places exposed to direct sunlight
2) Places near heat devices
3) High humidity places
4) Hot surface or cold surface enough to generate condensation
5) Places exposed to oil mist or steam directly
6) Uneven surface



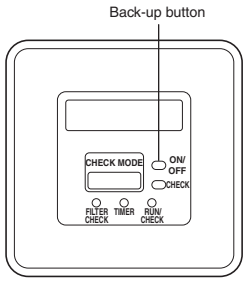
Installation tips for the remote controller holder
- Adjust and keep the holder upright.
- Tighten the screw to the end to avoid scratching the remote controller.
- DO NOT attach the holder to plaster wall.

How to insert batteries

① Detach the back lid.
② Insert the batteries. (two AAA batteries)
③ Reattach the back lid.

⑤ Cooling test run operation

- After safety con rmation, turn on the power.
- Transmit a cooling operation command with wireless remote controller, while the backup button on the receiver is pressed.
- If the backup button on the receiver is pressed during a test run, it will end the test run.
- If you cannot operate the unit properly during a test run, please check by consulting with inspection guides on the wiring diagram of outdoor units.



⑥ Setting of wireless remote controller and receiver

(A) Methods of avoiding the malfunction due to the mixed communication

Do both procedures ① and ②.

This setting is to avoid the mixed communication with other household electric appliances or the mixed communication when two receivers are located closely.

①**Setting change of the wireless remote controller**

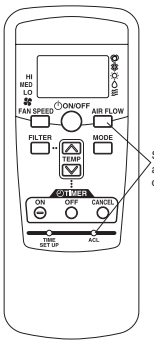
Pressing ACL and AIRFLOW button at the same time or inserting the batteries with pressing AIRFLOW button will customize the signal.

Note ***When the batteries are removed, the setting will return to the default setting. Make sure to reset it when the batteries are replaced.**

②**Setting the PCB of the receiver**

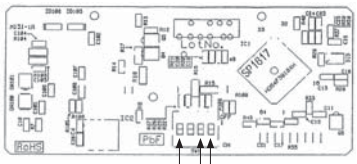
Turn SW1-1 off.

† ●**Wireless remote controller**



Setting to avoid mixed communication.

† ●**PCB of the receiver**



SW1-4 (Auto restart)

SW1-1 (Customized signal setting to avoid mixed communication)

SW1-2 (Receiver master/slave setting)

SW1-1	Customized signal setting to avoid mixed communication	ON : Normal OFF : Remote
SW1-2	Receiver master/slave setting	ON : Master OFF : Slave
SW1-4	Auto restart	ON : Valid OFF : Invalid

□ : Default setting

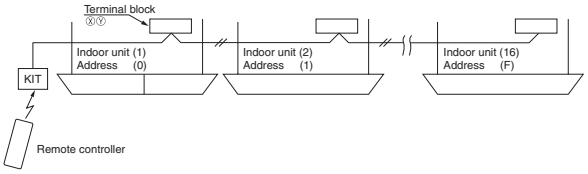
(B) Control plural indoor units with one remote controller

Up to 16 indoor units can be connected.

①Connect the XY terminal with 2-core wire.
As for the size, refer to the following note.

②For Packaged air conditioner series, set the indoor unit address with SW2 on the indoor unit PCB from [0] to [F] so as not to duplicate.

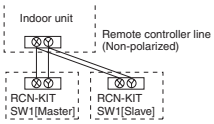
Restrictions on the thickness and length of wire (Maximun total extension 600m.)	
Standard	Within 100m x 0.3 mm²
	Within 200m x 0.5 mm²
	Within 300m x 0.75mm²
	Within 400m x 1.25mm²
	Within 600m x 2.0 mm²



③For VRF series, set the indoor unit address with SW1, SW2 and SW5-2 on the indoor unit PCB from [000] to [127] so as not to duplicate.

(C) Master/Slave setting when using plural remote controller

Up to two receivers can be installed in one indoor unit group.



Switch	Setting	Function
SW1-2	ON	Master
	OFF	Slave

(D) Change setting of auto mode operation

Auto mode operation is prohibited to be selected for KX models (except for KXR models).
Therefore be sure to change setting of remote controller to disable the auto mode operation for these models according to the following procedure.
While pressing the MODE button, press the ACL switch, or while pressing the MODE button, insert the batteries to the remote controller. Then the auto mode can be invalid.
Attention
When the batteries are removed, it is returned to initial setting (Auto mode becomes valid).
Accordingly when replacing the batteries, be sure to perform the above operation once again.

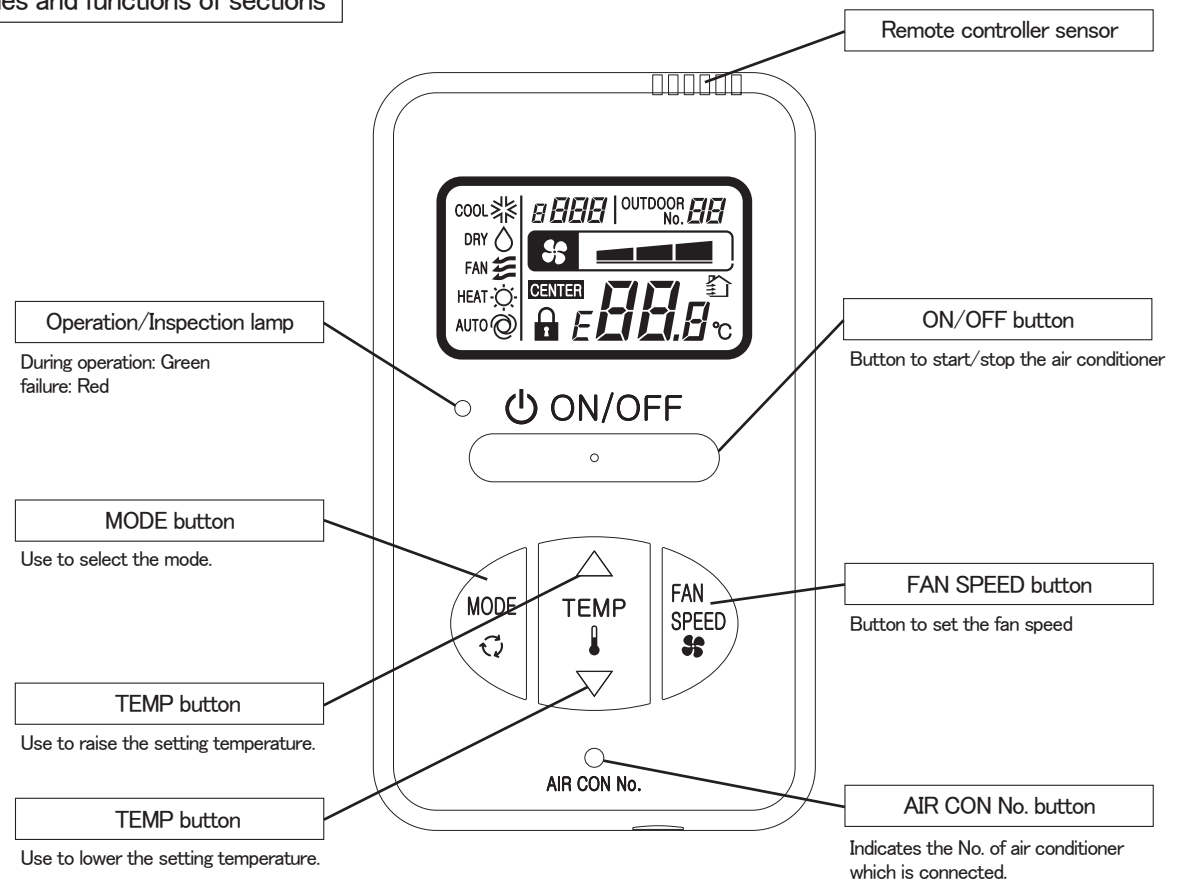
(E) Change setting of fan speed

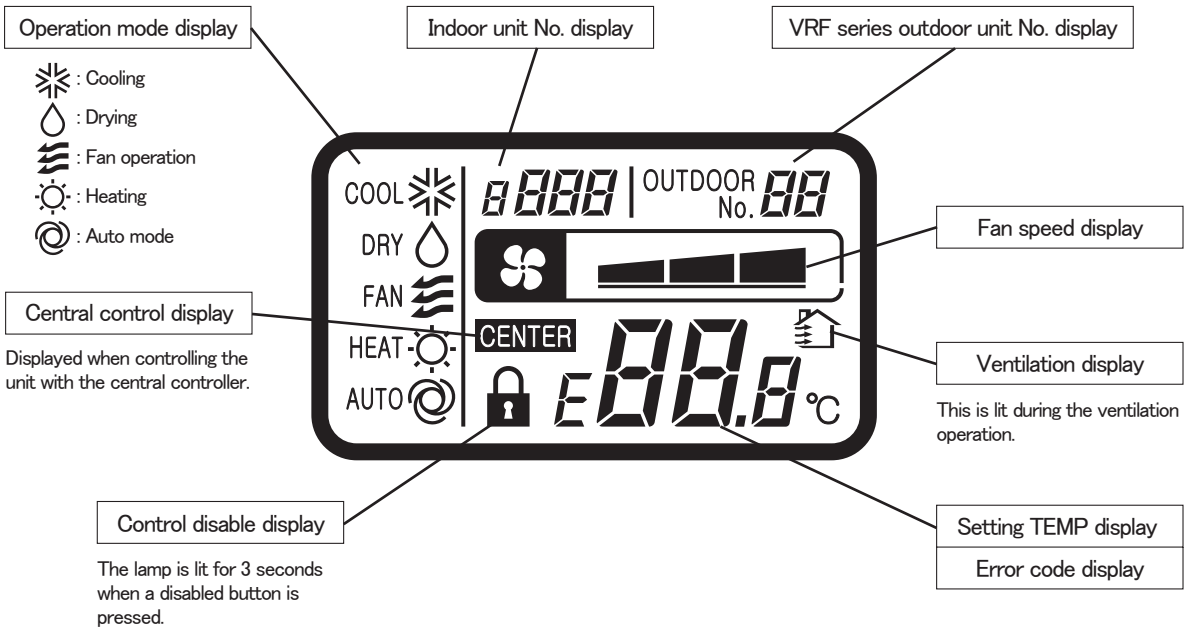
While pressing the FAN SPEED button, press the ACL switch, or while pressing the FAN SPEED button, insert the batteries to the remote controller. Then the fan speed can be changed from 2-speed setting to 3-speed setting.
When changing fan speed setting of remote controller, be sure to perform the same fan speed setting as that of the indoor unit model to be used.
Attention
When the batteries are removed, it is returned to initial setting (Fan speed setting is 2-speed).
Accordingly when replacing the batteries, be sure to perform the above operation once again.

(2) Simple wired remote controller (RCH-E3)

Notes :
Following functions of Type-D indoor unit series are not able to be set with this simple wired remote control (RCH-E3).
1. Individual flap control system (for FDT/FDTC)
2. Flap control system (for FDEN)
3. 4-fan speed setting (P-Hi/Hi/Me/Lo) → 3-fan speed setting (Hi/Me/Lo) (for FDT/FDTC/FDUM/FDEN)

Names and functions of sections





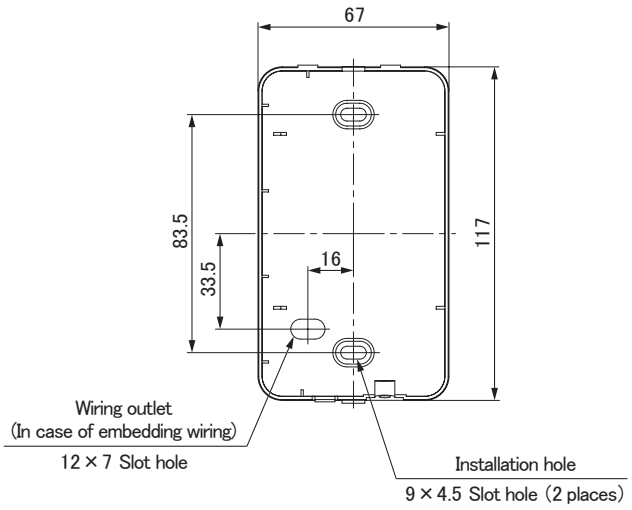
Installation of remote controller

DO NOT install the remote controller at the following places in order to avoid malfunction.

(1) Places exposed to direct sunlight
(2) Places near heat devices
(3) High humidity places
(4) Hot surface or cold surface enough to generate condensation
(5) Places exposed to oil mist or steam directly
(6) Uneven surface

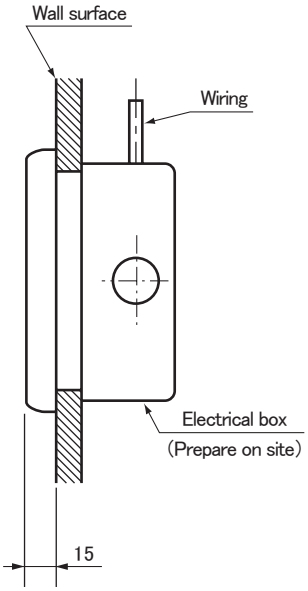
PJZ000Z272

Remote control installation dimensions

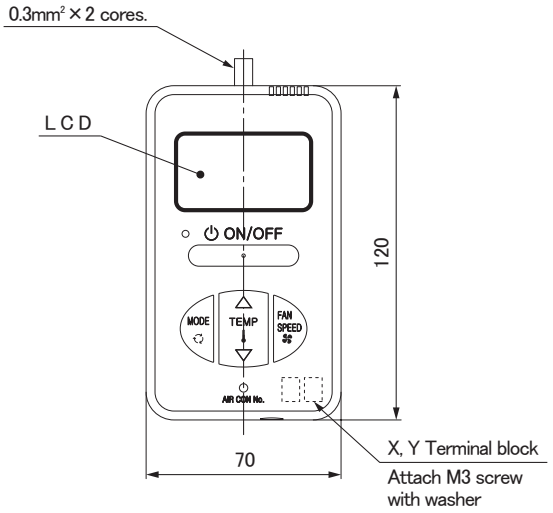


Note: Installation screw for remote controller
M4 Screw (2 pieces)

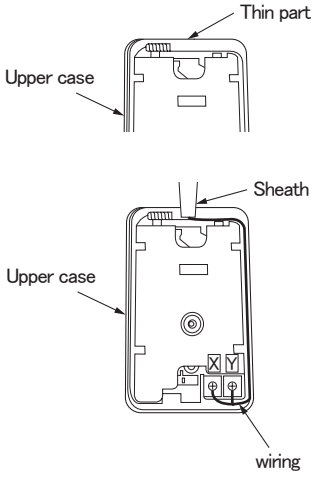
In case of embedding wiring



In case of exposing wiring

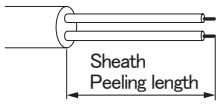


The remote controller wiring can be extracted from the upper center. After the thin part in the upper side of the remote controller upper case is scraped with a nipper or knife, remove burr with a file.



The peeling length of each wiring is as follows:

X wiring : 160mm Y wiring : 150mm



Wiring specifications

(1) Wiring of remote controller should use 0.3mm² × 2 core wires or cables. (on-site configuration)
(2) Maximum prolongation of remote controller wiring is 600m.
If the prolongation is over 100m, change to the size below.
But, the wiring in the remote controller case should be 0.3mm² (recommended) to 0.5mm².
Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire
connecting section. Be careful about contact failure.

Unit:mm

Length	Wiring thickness
100 to 200m	0.5mm² × 2 cores
Under 300m	0.75mm² × 2 cores
Under 400m	1.25mm² × 2 cores
Under 600m	2.0mm² × 2 cores

Adapted to **RoHS** directive

Simple Remote Controller Installation Manual

PJZ012D069

Read together with indoor unit's installation manual.

⚠WARNING

- **Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal.**
  Loose connection or hold will cause abnormal heat generation or fire.
- **Make sure the power supply is turned off when electric wiring work.**
  Otherwise, electric shock, malfunction and improper running may occur.

⚠ CAUTION

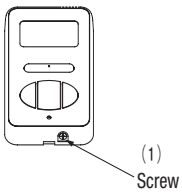
- **DO NOT install the remote controller at the following places in order to avoid malfunction.**
  (1) Places exposed to direct sunlight
  (2) Places near heat devices
  (3) High humidity places
  (4) Hot surface or cold surface enough to generate condensation
  (5) Places exposed to oil mist or steam directly
  (6) Uneven surface
- **DO NOT leave the remote controller without the upper case.**
  In case the upper cace needs to be detached, protect the remote controller with a packaging box or bag in order to keep it away from water and dust.

Accessories	Remote controller, wood screw (ϕ 3.5×16) 2 pieces
Prepare on site	Remote controller cord (2 cores) (Refer to [2. Installation and wiring of remote controller]) [In case of embedding cord] Electrical box, M4 screw (2 pieces) [In case of exposing cord] Cord clamp (if needed)

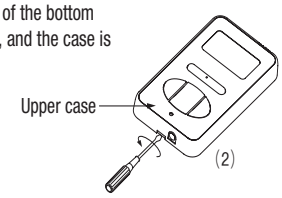
1. Installation procedure

In case of embedding cord

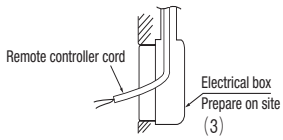
(1) Make certain to remove the screw on the bottom surface of the remote controller.



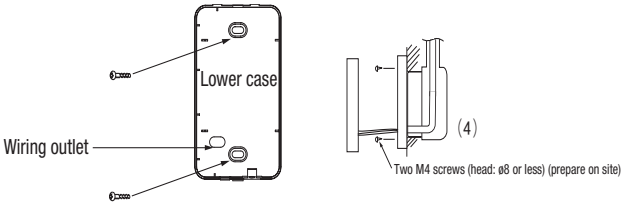
(2) Remove the upper case of the remote controller.
Insert a flat-blade screwdriver to a concave portion of the bottom surface of the remote controller and slightly twist it, and the case is removed.



(3) Pre-bury the electrical box and remote controller cord.



(4) Prepare two M4 screws (recommended length: 12 – 16mm), and install the lower case to the electrical box.
Do not use a screw whose screw head is larger than the height of the wall around the screw hole.

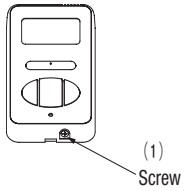


(5) Connect the remote controller cord to the terminal block.
Connect the terminals (X and Y) of the remote controller and the terminals (X and Y) of the indoor unit. (No polarity of X and Y)

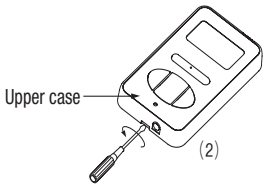
(6) Mount the upper case for restoring to its former state so as not to crimp the remote controller cord, and secure with the removed screw.

In case of exposing cord

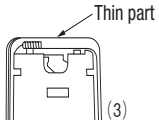
(1) Make certain to remove a screw on the bottom surface of the remote controller.



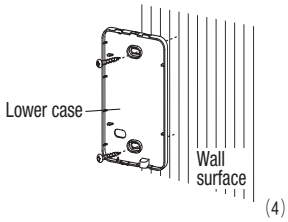
(2) Remove the upper case of the remote controller.
Insert a flat-blade screwdriver to a concave portion of the bottom surface of the remote control and slightly twist it, and the case is removed.



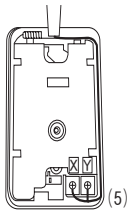
(3) The remote controller cord can be extracted from the upper center.
After the thin part in the upper side of the remote controller upper case is scraped with a nipper or knife, remove burr with a file.



(4) The lower case of the remote controller is mounted to a flat wall with two accessory wood screws.

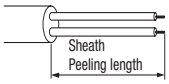


(5) Connect the remote controller cord to the terminal block.
Connect the terminals (X and Y) of the remote controller and the terminals (X and Y) of the indoor unit. (No polarity of X and Y)
The wiring route is as shown in the right.



The wiring in the remote controller case should be 0.3 mm^2 (recommended) to 0.5 mm^2 at maximum.
Further, peel off the sheath.
The peeling length of each wiring is as follows:

X wiring : 160mm
Y wiring : 150mm



(6) Mount the upper case for restoring to its former state so as not to crimp the remote controller cord, and secure with the removed screw.

(7) In the case of exposing installation, secure the remote controller cord to the wall surface with a cord clamp so as not to loosen the remote controller cord.

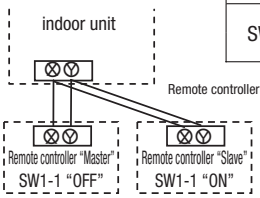
2. Installation and wiring of remote controller

(1) Wiring of remote controller should use 0.3mm^2 × 2 core wires or cables. (on-site configuration)
(2) Maximum prolongation of remote controller wiring is 600 m.
If the prolongation is over 100m, change to the size below.
But, the wiring in the remote controller case should be 0.3mm^2 (recommended) to 0.5mm^2.
Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire
connecting section. Be careful about contact failure.
100 - 200m·····0.5mm^2 × 2 cores
Under 300m·····0.75mm^2 × 2 cores
Under 400m·····1.25mm^2 × 2 cores
Under 600m·····2.0mm^2 × 2 cores

3. Master/ slave setting when more than one remote controller are used

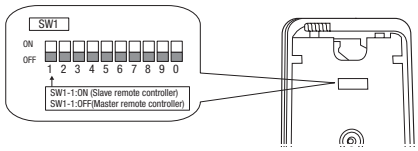
(1) Up to two remote controllers can be connected to one unit (or one group) of indoor unit.

Switch	Setting	Function detail
SW1-1	ON	Slave remote controller
	OFF	Master remote controller



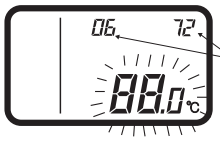
(2) Set the switch SW1-1 of the slave remote controller is "Slave" (ON). The factory default is set as "Master" (OFF).

(Note) • The remote controller thermistor enabled setting can be set only to the master remote controller.
• Install the master remote controller at the position to detect room temperature.
• The air conditioner operation follows the last operation of the remote controller in case of the master / slave setting.



4. The indication when power source is supplied

(1) At the time of turning the power source on, after the light is on for the first 2 seconds, the display becomes as shown below.
The number displayed on the upper side of LCD in the remote control is the software number, and this is not an error code.



Software number
(The number in the left is one example. Another number may be shown.)

(2) Then, "88.0 °C" blinks on the remote controller until the communication between the remote controller and the indoor unit is established.

(3) In the case of connecting one remote controller with one unit (or one group) of indoor unit, make certain to set the master remote controller (factory default).
If the slave remote control is set, a communication cannot be established.

(4) If a state where the communication between the remote controller and the indoor unit cannot be established continues about for 30 minutes, "E" is displayed. Confirm the wiring of the indoor unit and the outdoor unit and master/slave setting of the remote controller.

5. Confirmation method for return air temperature

Return air temperature can be confirmed by the remote controller operation.

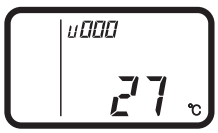
(1) **Press AIR CON NO. button for over 5 seconds.**
"88" blinks on the temperature setting indicator.
("88" blinks for approximately 2 seconds while data is read.)
↓
Then, the return air temperature is displayed.
(Example) return air temperature: "27 °C" (blinking)

(Note) For the return air temperature, in the normal case, the return air temperature of the indoor unit is displayed; however, in the case that the remote control thermistor is effective, detected temperature by the remote controller thermistor is displayed.

(2) **Press ⏻ ON/OFF button.**
End.

[In the case that the remote thermistor is ineffective and plural indoor units are connected to one remote controller]

(1) **Press AIR CON NO. button for over 5 seconds.**
indoor unit No. indicator: "U 000" (blinking)
(Among the connected indoor units, the lowest number is displayed.)



(2) **Press TEMP△ or TEMP▽ button.**
Select the indoor unit No.

(3) **Press MODE button.**
Dectder the indoor unit No.
(Example) indoor unit No. indicator: "U 000"
"88" blinks on the temperature setting indicator. (blinking for approximately 2 to 10 seconds while data is read) Then, the return air temperature is displayed. When AIR CON NO. is pressed, return to the indoor unit selection display (example, "U 000").

(4) **Press ⏻ ON/OFF button.**
End.

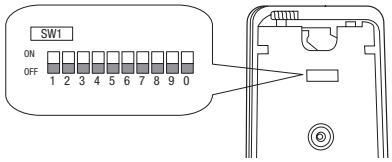
6. Function setting

Each function of the remote controller and the indoor unit is automatically set to the initial setting, which is the standard use, on the occasion of connecting the remote controller with the indoor unit. In the case of the standard use, the setting change is unnecessary. However, if you whould like to change the initial setting " ○ ", change the setting for only the item of the function number. **Record the setting contents and stored them.**

(1) Function setting item by switch on PCB

Switch No.	Setting	Setting detail	Initial setting
SW1-1	ON	Slave remote controller	
	OFF	Master remote controller	○
SW1-2	ON	Remote controller thermistor enabled	
	OFF	Remote controller thermistor disabled	○
SW1-3	ON	"MODE" button prohibited	
	OFF	"MODE" button enabled	○
SW1-4	ON	"ON/OFF" button prohibited	
	OFF	"ON/OFF" button enabled	○

Switch No.	Setting	Setting detail	Initial setting
SW1-5	ON	"TEMP" button prohibited	
	OFF	"TEMP" button enabled	○
SW1-6	ON	"FAN SPEED" button prohibited	※ Note 1
	OFF	"FAN SPEED" button enabled	※ Note 1
SW1-7	ON	Auto restart function enabled	
	OFF	Auto restart function disabled	○
SW1-8, 9, 0	ON	Not used	
	OFF		



- As for the slave remote controller, function setting is impossible other than SW1-1.
- In the indoor unit with only one fan speed, "FAN SPEED" button cannot be enabled.

(2) Function setting item by button operation

Classification	Function No.	Function	Setting No.	Setting	Initial setting	Remarks
Remote controller function	01	Indoor unit fan speed	01	Fan speed: three steps	※ Note 1	The fan speed is three steps, ❋ ■■■ - ❋ ■■ - ❋ ■ .
			02	Fan speed: two steps (Hi-Lo)	※ Note 1	The fan speed is two steps, ❋ ■■■ - ❋ ■ .
			03	Fan speed: two steps (Hi-Me)		The fan speed is two steps, ❋ ■■■ - ❋ ■■ .
			04	Fan: one step	※ Note 1	The fan speed is fixed to one step.
	03	Remote controller thermistor at the time of cooling	01	Remote controller thermistor: no offset	○	
			02	Remote controller thermistor: +3.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at +3.0°C.
			03	Remote controller thermistor: +2.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at +2.0°C.
			04	Remote controller thermistor: +1.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at +1.0°C.
			05	Remote controller thermistor: -1.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at -1.0°C.
			06	Remote controller thermistor: -2.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offset temperature at -2.0°C.
			07	Remote controller thermistor: -3.0 °C		At the time of cooling, in the case of remote controller thermistor enabled, offsett temperature at -3.0°C.
	04	Remote controller thermistor at the time of heating	01	Remote controller thermistor: no offset	○	
			02	Remote controller thermistor: +3.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at +3.0°C.
			03	Remote controller thermistor: +2.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at +2.0°C.
			04	Remote controller thermistor: +1.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at +1.0°C.
			05	Remote controller thermistor: -1.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at -1.0°C.
			06	Remote controller thermistor: -2.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at -2.0°C.
			07	Remote controller thermistor: -3.0 °C		At the time of heating, in the case of remote controller thermistor enabled, offset temperature at -3.0°C.
	05	Ventilation setting	01	No ventilator connection	○	
			02	Ventilator links air-conditioner		In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), the operation of ventilation device is linked with the operation of indoor unit.
	06	"Auto" operation setting	01	"Auto" operation enabled	※ Note 1	
			02	"Auto" operation disabled	※ Note 1	"Auto" operation disabled
Indoor unit function	07	Operation permission/ prohibition	01	Disabled	○	
			02	Enabled		Operation permission/prohibition controller is enabled.
	08	External input	01	Level input	○	
			02	Pulse input		
	09	Fan speed setting	01	Standard	Note2	
			02	High speed 1	Note2	
			03	High speed 2	Note2	
	10	Fan remaining operation at the time of cooling	01	No remaining operation	○	After cooling stopped, no fan remaining operation
			02	0.5 hours		After cooling stopped, fan remaining operation for 0.5 hours
			03	1 hour		After cooling stopped, fan remaining operation for 1 hour
			04	6 hours		After cooling stopped, fan remaining operation for 6 hours
	11	Fan remaining operation at the time of heating	01	No remaining operation	○	After heating stopped or after heating thermostat OFF, no fan remaining operation
			02	0.5 hours		After heating stopped or after heating thermostat OFF, fan remaining operation for 0.5 hours
			03	2 hours		After heating stopped or after heating thermostat OFF, fan remaining operation for 2 hours
			04	6 hours		After heating stopped or after heating thermostat OFF, fan remaining operation for 6 hours
	12	Setting temperature offset at the time of heating	01	No offset	○	
			02	Setting temperature offset + 3.0 °C		The setting temperature at the time of heating is offset by +3.0 °C.
			03	Setting temperature offset + 2.0 °C		The setting temperature at the time of heating is offset by +2.0 °C.
			04	Setting temperature offset + 1.0 °C		The setting temperature at the time of heating is offset by +1.0 °C.
	13	Heating fan controller	01	Low fan speed	※ Note 1	At the time of heating thermostat OFF, operate with low fan speed.
			02	Setting fan speed		At the time of heating thermostat OFF, operate with the setting fan speed.
			03	Intermittent operation	※ Note 1	At the time of heatingr thermostat OFF, intermittently operate.
			04	Fan off		At the time of heating thermostat OFF, a fan will be stopped. When the remote controller thermistor is enabled, automatically set to "Fan off". Do not set at the time of the indoor unit thermistor.
	14	Return air temperature offset	01	No offset	○	
			02	Return air temperature offset +2.0 °C		Offset the return air temperature of the indoor unit by +2.0 °C.
			03	Return air temperature offset +1.5 °C		Offset the return air temperature of the indoor unit by +1.5 °C.
			04	Return air temperature offset +1.0 °C		Offset the return air temperature of the indoor unit by +1.0 °C.
			05	Return air temperature offset -1.0 °C		Offset the return air temperature of the indoor unit by -1.0 °C.
			06	Return air temperature offset -1.5 °C		Offset the return air temperature of the indoor unit by -1.5 °C.
			07	Return air temperature offset -2.0 °C		Offset the return air temperature of the indoor unit by -2.0 °C.

Note 1: The symbol " ※ " in the initial setting varies depending upon the indoor unit and the outdoor unit to be connected, and this is automatically determined as follows:

Swith No. Function No.	Function	Setting	Product model
SW1-6	"FAN SPEED" button	"FAN SPEED" button prohibited	Product model whose indoor fan speed is only one step
		"FAN SPEED" button enabled	Product model whose indoor fan speed is two steps or three steps
Remote controller function 01	Indoor unit fan speed	Fan speed: three steps	Product model whose indoor unit fan speed is three steps
		Fan speed: two steps (Hi-Lo)	Product model whose indoor unit fan speed is two steps
		Fan speed: two steps (Hi-Me)	
		Fan: one step	Product model whose indoor unit fan speed is only one step
Remote controller function 06	"Auto" operation setting	"Auto" operation enabled	Product model where "Auto" mode is selectable
		"Auto" operation disabled	Product model without "Auto" mode
Indoor unit function 13	Heating fan control	Low fan speed	Product model except FDUS
		Intermittent operation	FDUS

Note 2: Fan speed of "High speed" setting

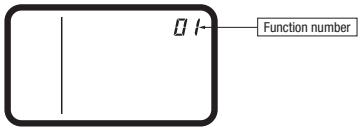
Fan speed setting	Indoor unit fan speed setting		
	❋ ■■■ - ❋ ■■ - ❋ ■	❋ ■■■ - ❋ ■	❋ ■■■ - ❋ ■■
Standard	Hi — Mid — Lo	Hi — Lo	Hi — Mid
High speed 1・2	UHi — Hi — Mid	UHi — Mid	UHi — Hi

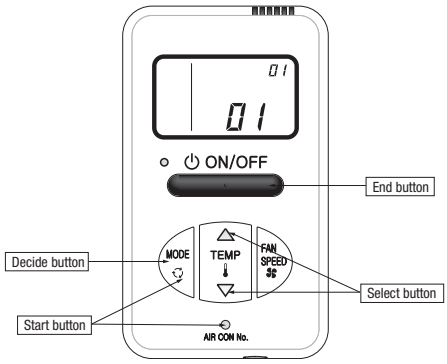
Initial setting of some indoor unit is "High speed".

Note 3: As for plural indoor unit, set indoor functions to each master and slave indoor unit.
But only master indoor unit is received the setting change of indoor unit function "07 Operation permission/ prohibition" and "08 External input".

7. How to set functions by button operation

(1) **Stop air-conditioning, and simultaneously press AIR CON NO. and MODE buttons at the same time for over three seconds.**
The function number "01" blinks in the upper right.

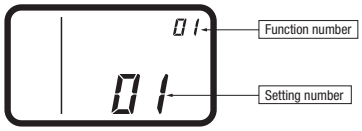




(2) **Press TEMP△ or TEMP▽ button.**
Select the function number.

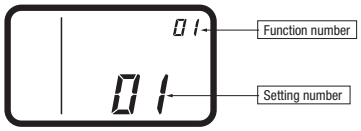
(3) **Press MODE button.**
Decide the function number.

(4) **[In the case of selecting the remote controller function (01-06)]**
① The current setting number of the selected function number blinks
(Example)
Function number: "01" (lighting)
Setting number: "01" (blinking)



② **Press TEMP△ or TEMP▽ button.**
Select the setting number.

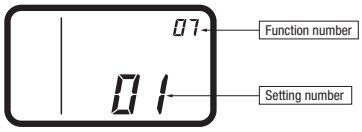
③ **Press MODE button.**
The setting is completed.
Light is on for approximately 3 to 20 seconds while data of the decided function No. and setting No. is transmitted.
(Example)
Function number: "01" (lighting for 3 to 20 seconds)
Setting number: "01" (lighting for 3 to 20 seconds)



Then, the screen goes back to the function number blinking indication (1), if the setting is sequentially conducted, continue with the same procedures. If the setting is finished, proceed to (5).

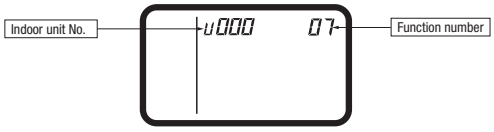
(5) **Press ON/OFF button.**
The setting is completed.

[In the case of selecting the indoor unit function (07-14)]
① **"88" blinks on the temperature setting indicators.**
(blinking for approximately 2 to 10 seconds while data is read)
↓
After that, the current setting number of the selected function number blinks.
(Example)
Function number: "07" (lighting)
Setting number: "01" (blinking)



Proceed to ② .

[Note]
a. In the case of connecting one remote control to plural indoor units, the display will be as follows:
Indoor unit No. display: "U 000" (blinking)
(Display the lowest number among the connected indoor units.)

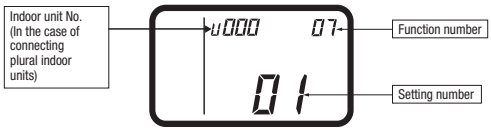


b. Press TEMP△ or TEMP▽ button.
Select the indoor unit No. to be set.
If "U ALL" is selected, the same setting can be set to all units.

c. Press MODE button.
Decide the indoor unit No.
"88" blinks on the temperature setting indicators. (blinking for 2 to 10 seconds while data is read)
When AIR CON NO. button is pressed, go back to the indoor unit selection display (for example, "U 000" blinking).

② **Press TEMP△ or TEMP▽ button.**
Select the setting number

③ **Press MODE button.**
The setting is completed.
Light is on for approximately 3 to 20 seconds while data of the decided function No. and setting No. is transmitted.
(Example)
Indoor unit No.: "U 000" (lighting for 3 to 20 seconds)
Function number: "07" (lighting for 3 to 20 seconds)
Setting number: "01" (lighting for 3 to 20 seconds)



Then, the screen goes back to the function number blinking indication (1), if the setting is sequentially conducted, continue with the same procedures. If the setting is finished, proceed to (5).

- Even if ON/OFF button is pressed during setting, the setting is ended. However, any details where the setting has not been completed will be ineffective.
- The setting contents are stored in the controller, and even if the power failure occur, this will not be lost.

[Confirmation method for current setting]
According to the operation, the "setting number" displayed first after selecting "function number" and pressing MODE button is the currently set content.
(However, in the case of selecting "U ALL" (all units), the setting number of the lowest number among the indoor units is displayed.)

PCZ012D007

(3) Base heater kit (CW-H-E1)

Model Name: CW-H-E

Parts Number: 518325

⚠ WARNING

- **Follow the instruction and installation manual for outdoor unit when installing the heater.**
- **This heater must be installed by authorized personnel.**
- **Turn off the power supply when the kit is installed.**

Failure to follow the above will result in serious accident like electrical shock or fire.

⚠ CAUTION

- **Follow the law or regulation of the country where it is installed.**
- **Do not alter the heater.**
- **Lay down the heater so that the edge of the sheet metal does not damage the heater.**
- **Bending radius must be bigger than 25mm.**
- **Do not use the heater near flammable substances.**
- **Be sure to check the electrical insulation before use.**
- **Be sure to check the drain is not trapped by the heater.**
- **Do not leave refrigerant oil on the base.**

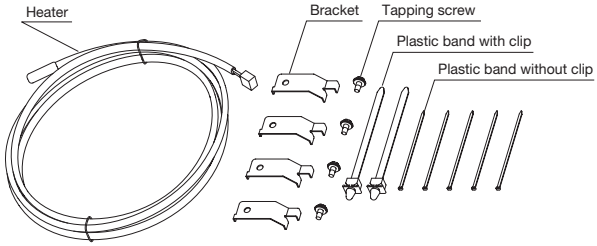
AREAS TO BE APPLIED

This kit is to be used in an area where the lowest temperature drops below zero.

⚠Caution: In case the heater is not applied on the unit which is installed in an area mentioned above, it may be regarded as installation failure and warranty may not be given.

Components

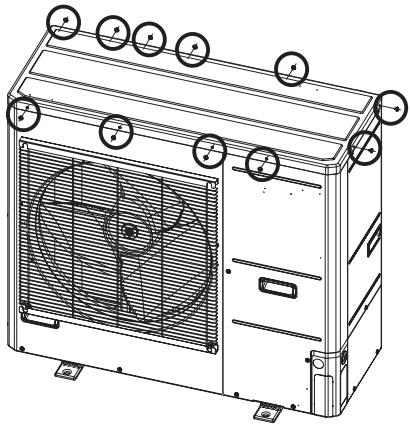
- **Heater : 1pc**
- **Bracket : 4pcs**
- **Tapping screw : 4pcs**
- **Plastic band with clip : 2pcs**
- **Plastic band : 5pcs**



Installation procedure

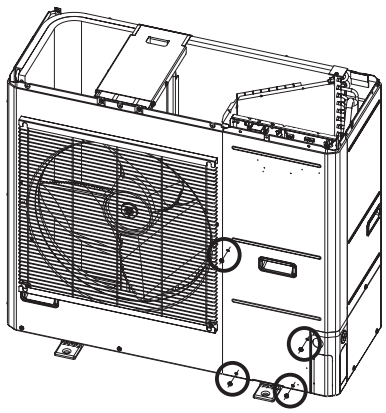
Step 1

1. Remove the top panel of the outdoor unit (11 pcs of tapping screws).



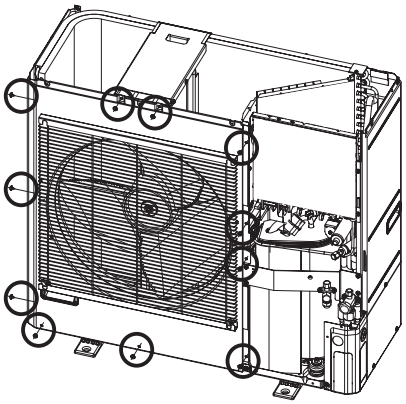
Step 2

2. Remove the service panel (4 pcs of tapping screws).



Step 3

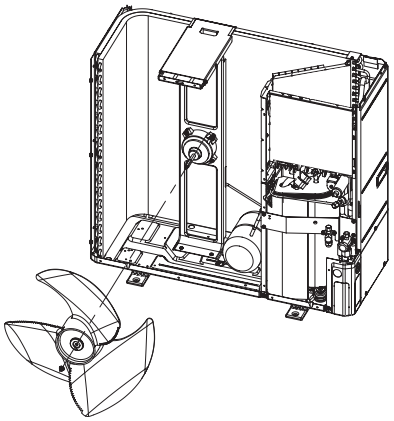
3. Remove the front panel
   (11 pcs of tapping screws).
   Pull the panel straightforward so that the panel doesn't touch the fan blade.



Step 4

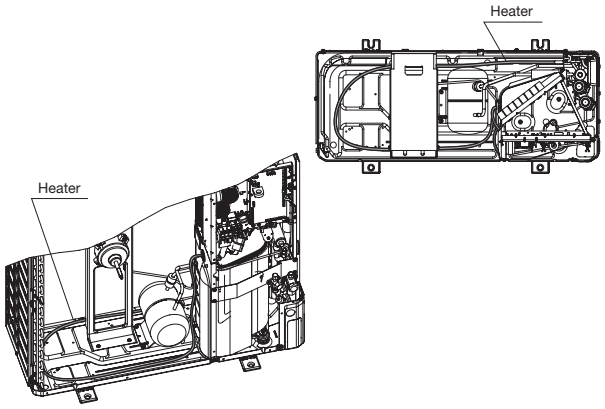
4. Remove the fan blade if necessary.

   <Note>
   Do not rotate the axis of fan motor when removing the fan blade.
   It may cause malfunction of the fan motor.



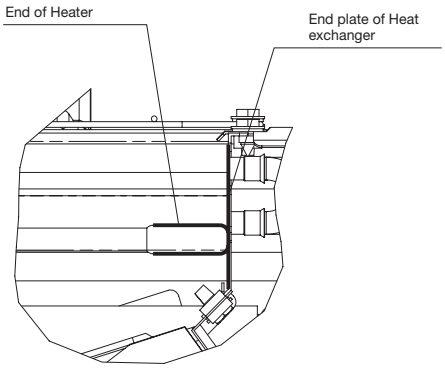
Step 5

5. Lay down the drain pan heater on the base.



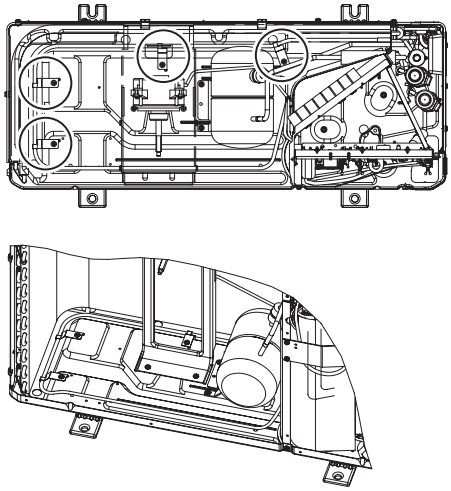
Step 6

6. Put the heater underneath the heat exchanger and align the end of heater with the end plate of heat exchanger.



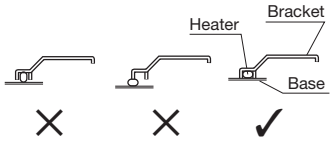
Step 7

7. Fix the heater with 4 brackets.

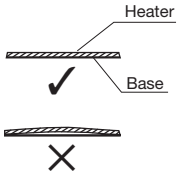


<Note>

1) Fix the heater so that the bracket doesn't pinch the heater as figure shows.



2) Place the heater so as to touch the base completely.

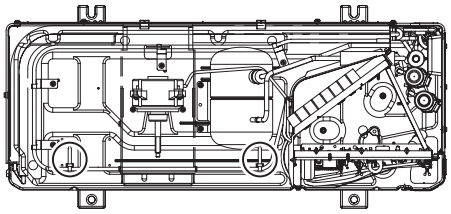


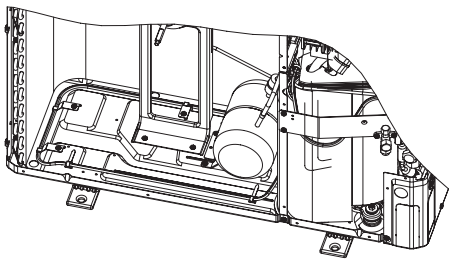
3) In bending position, twist the heater to make it easier to bend, and get back to be able to fix it with bracket.

4) Be careful not to be injured by aluminum fin when fixing the heater with screw.

Step 8

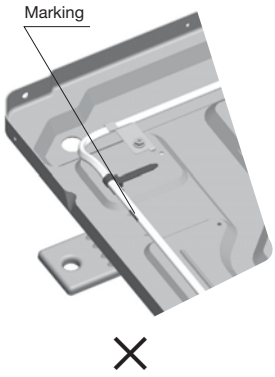
8. Insert the plastic band with clip on the designated place (2 places), and fix the heater.



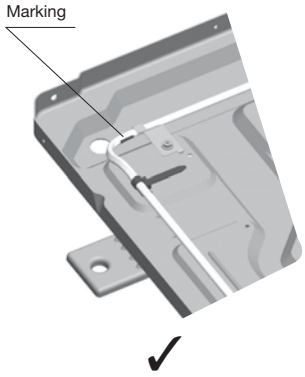


<Note>

1) Do not fasten the heating part with the plastic band.
There is a marking on the end of heating part.

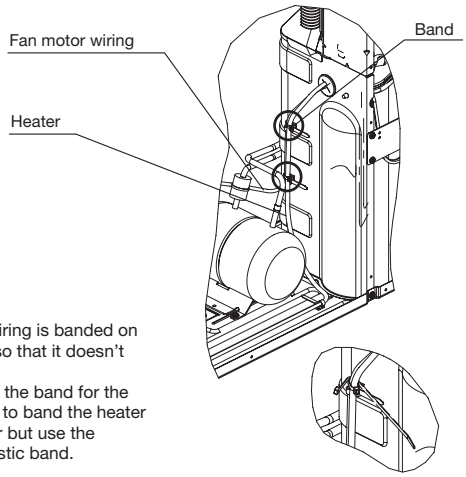


2) When the heater is laid down correctly, the end of heating part comes to the corner of the base.



Step 9

9. Lay down the wiring on the same route of fan motor wiring, and fix the wire with attached plastic band (2 places) at the same place where the fan motor wiring is banded.

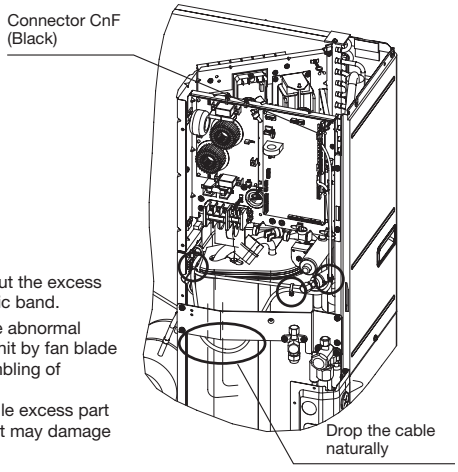


<Note>

Fan motor wiring is banded on the bracket so that it doesn't loosen.
Do not loose the band for the motor wiring to band the heater wire together but use the attached plastic band.

Step 10

10. Insert the connector to the port CnF (Black) on the top right of the PCB, and fix the wire with bands (3 places). Excess part of the wire should be dropped naturally.



<Note>

Be sure to cut the excess part of plastic band.

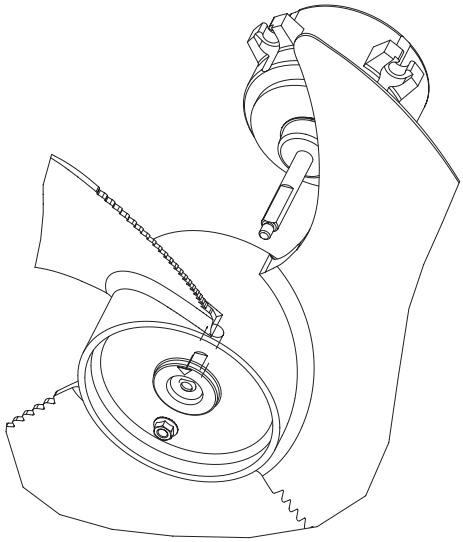
It may cause abnormal noise when hit by fan blade or misassembling of panels.
Do not bundle excess part of the wire. It may damage the heater.

Step 11

11. Reassemble the fan blade.
Take care to align the D-cut of motor shaft and the fan blade.
▽ mark on the center of the fan shows the position of D-cut.

<Note>

1. Tightening torque of the nut is 4.0-4.9 N·m.
2. Do not rotate the axis of fan motor when tightening the nut.
It may cause malfunction of the fan motor.

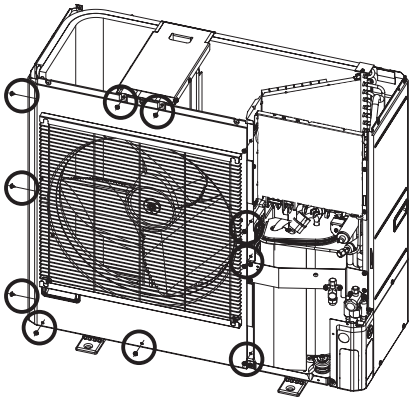


Step 12

12. Reassemble the panels.

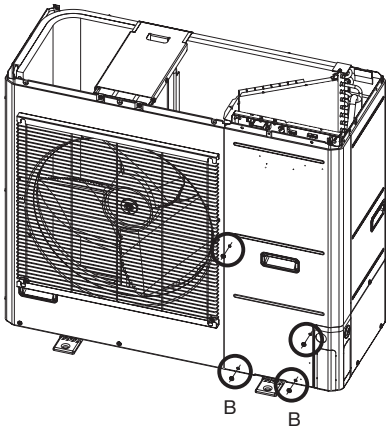
1) Front panel

Use screw B for all places.

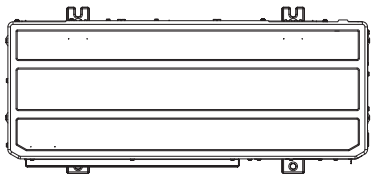


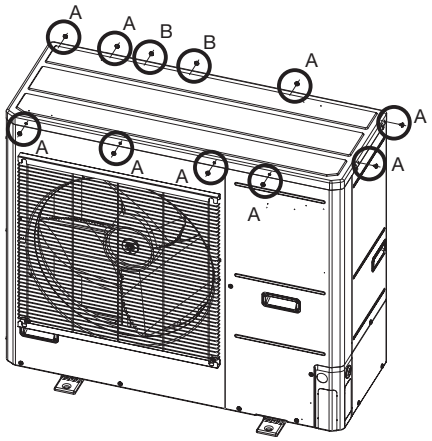
2) Service panel

Use screw B for all places.



3) Top panel





<Note>

1) When reassembling the service panel, take care not to damage the front panel with the edge.
2) There are two different length of screws.
Be sure to use correct screw.
Long screw A: used for Top panel other than fixing fan bracket.
Short screw B: other place than A.

<Note>

- This heater should have bending radius of at least 25mm including non-heating part. Do not bundle the excess part of the wire. It may cause disconnection of the heater or insufficient capacity.
- Be sure to prevent the heater from touching any refrigerant piping.
Especially, pay close attention not to make it touch with pipes which are close to the wiring route such as suction pipe, check valve and check joint.

HYPER&MICRO INVERTER PACKAGED AIR-CONDITIONERS

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