2. MULTI-TYPE (V MULTI) PACKAGED AIR-CONDITIONER (Split system, Air to air heat pump type)

(OUTDOOR UNIT)

FDCA301HEN
301HES
401HEN
401HES
501HES
601HES
801HES
1001HES

(INDOOR UNIT)

FDTA151	**FDENA151**
201	**201**
251	**251**
301	**301**
401	**401**
501	**501**
FDKNA151	**FDURA201**
201	**251**
251	**301**
301	**401**
	501

For content not covered in this section, please refer to Chapter 1.

CONTENTS

2.1 GENERAL INFORMATION

2.1.1 Specific features

Ideal for the installation conditions characteristic of larger rooms and L-shaped or other non-standard-shaped rooms, the Multi-Type V series allows an extensive degree of flexibility in the selection of indoor units. Specifically, the selection of indoor units with differing capacities and differing or similar types is supported, as is the selection of indoor units with similar capacities and differing types. Furthermore, a maximum of up to four individual indoor units can be operated in synchrony with a single outdoor unit.

(1) A new refrigerant, R410A, which causes no damage to the earth's ozone layer, is used. R410A is a pseudoazeotropic refrigerant, so there is little formation of separate vapor and liquid layers, and it is possible to add refrigerant on-site.

(2) Less refrigerant charge amount due to use of double phase refrigerant flow system. The total refrigerant charge amount has been reduced by more than 50%.

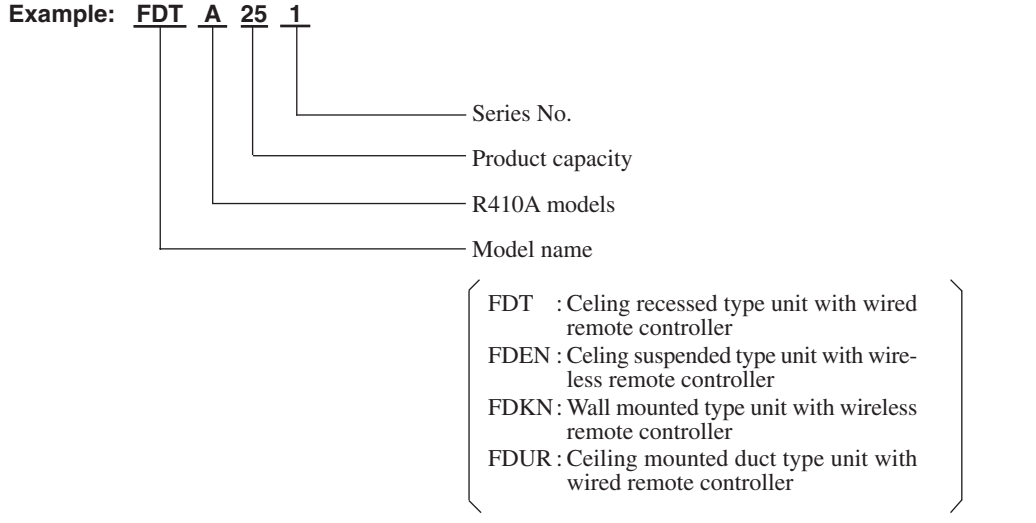
(3) The microcomputer chip is installed in the indoor unit and outdoor unit. There is no need for the unit to communicate between the outdoor and indoor units so the unit is more resistant to electromagnetic noise thus the incidence of microcomputer malfunction has been reduced. The compressor in the outdoor unit has its own self protection function, that reacts according to abnormal high pressure and excessive high temperature.

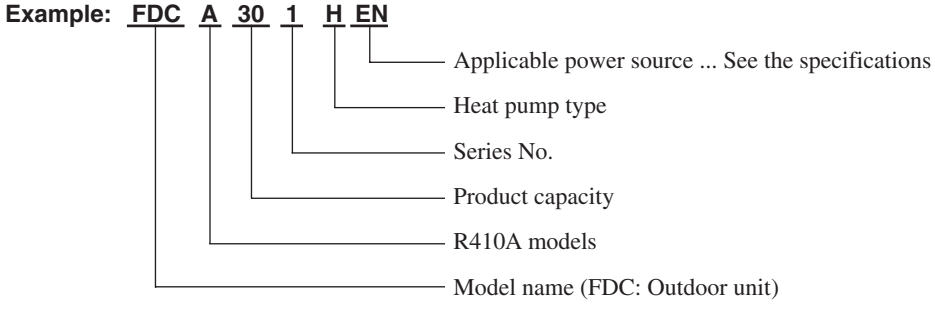
(4) There are only three power lines between the outdoor and indoor unit. One cabtyre cable with 3 wires encased in one sheath is enough for conducting the wiring work between the outdoor unit and the indoor unit. This contributes to simpler wiring work in the field.

(5) All air supply ports have auto swing louvers. (Only case of FDT, FDEN and FDKN models). The indoor fan motor has three speeds of high, medium and low.

(6) All models have service valves protruding from the outdoor unit for faster flare connection (FDCA801, 1001: Only a gas side is brazing) work in the field.

2.1.2 How to read the model name





2.1.3 Table of models

Model \ Capacity	151	201	251	301	401	501
Ceiling recessed type (FDT)	○	○	○	○	○	○
Ceiling suspended type (FDEN)	○	○	○	○	○	○
Wall mounted type (FDKN)	○	○	○	○		
Ceiling mounted duct type (FDUR)		○	○	○	○	○
Outdoor unit to be combined (FDC)	FDCA301HEN (3 Horse Power)	FDCA301HES (3 Horse Power)	FDCA401HEN (4 Horse Power)	FDCA401HES (4 Horse Power)	FDCA501HES (5 Horse Power)	FDCA601HES (6 Horse Power)	FDCA801HES (8 Horse Power)	FDCA1001HES (10 Horse Power)

2.1.4 Table of system combinations

Outdoor unit	Type	Indoor unit assembly capacity	Branch pipe set (Optional)
FDCA301HEN FDCA301HES	Twin	151+151	DIS-WA1
FDCA401HEN FDCA401HES		201+201 151+251	
FDCA501HES		251+251 201+301	
FDCA601HES	Twin	301+401	
	Triple	201+201+201	DIS-TA1
FDCA801HES	Twin	401+401	DIS-WB1
		301+501	
	Triple	301+301+301	DIS-TB1
	Double twin	201+201+201+201	DIS-WA1 x 2set DIS-WB1 x 1set
FDCA1001HES	Twin	501+501	DIS-WB1
	Triple	201+401+401	DIS-TB1
		251+251+501	
		301+301+401	
	Double twin	251+251+251+251	DIS-WA1 x 2set DIS-WB1 x 1set

Notes (1) It is possible to used different models (FDT, FDUR, FDEN) when combining indoor units.

(2) Always use the branch piping set (optional) at branches in the refrigerant piping.

2.2 SELECTION DATA

2.2.1 Specifications

(1) Indoor unit

(a) Ceiling recessed type (FDT)

Models FDTA151, 201, 251

Item \ Model		FDTA151	FDTA201	FDTA251
Nominal cooling capacity(1)	**W**	**4000**	**5000**	**5600**
Nominal heating capacity(1)	**W**	**4500**	**5400**	**6700**
Power source		**1 Phase, 220/230V 50Hz**		
Noise level	dB(A)	Powerful mode Hi: 36 Me : 33 Lo: 32 Mild mode Hi: 33 Me : 32 Lo: 31		Powerful mode Hi: 38 Me : 35 Lo: 33 Mild mode Hi: 35 Me : 33 Lo: 31
Exterior dimensions Height × Width × Depth	**mm**	**Unit:270 × 840 × 840 Panel:35× 950 × 950**		
Net weight	**kg**	**31 (Unit: 24 Panel: 7)**		
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing		
Refrigerant control		—		
Air handling equipment Fan type & Q'ty		Turbo fan × 1		
Motor	**W**	**14×1**		
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Powerful mode Hi: 18 Me : 15 Lo: 14 Mild mode Hi: 15 Me : 14 Lo: 13**		**Powerful mode Hi: 20 Me : 17 Lo: 15 Mild mode Hi: 17 Me : 15 Lo: 13**
Fresh air intake		Available		
Air filter, Q'ty		Long life filter × 1 (Washable)		
Shock & vibration absorber		Rubber sleeve (for fan motor)		
Operation control Operation switch		Wired remote control switch (Optional: RC-E1) Wireless remote control switch (Optional: RCN-T-W-E)		
Room temperature control		Thermostat by electronics		
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.		
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ6.35 (1/4") Gas line: ϕ12.7 (1/2")**		**Liquid line: ϕ6.35 (1/4") Gas line: ϕ15.88 (5/8")**
Connecting method		**Flare piping**		
Drain hose		Connectable with VP25 (I.D.25 mm, O.D.32 mm)		
Insulation for piping		Necessary (both Liquid & Gas lines)		
Accessories		**Mounting kit. Drain hose**		
Optional parts		**Decorative Panel**		

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

● Decorative Panel model or Wireless kit (Optional)

Item / Model	Panel Part No.	Wireless kit
FDTA151, 201, 251	T-PSA-34W-E	RCN-T-W-E

Models FDTA301, 401

Item \ Model		FDTA301	FDTA401
Nominal cooling capacity(1)	**W**	**7200**	**10000**
Nominal heating capacity(1)	**W**	**7300**	**11200**
Power source		**1 Phase, 220/230/240V 50Hz**	
Noise level	dB(A)	Powerful mode Hi: 38 Me: 35 Lo: 33 Mild mode Hi: 35 Me: 33 Lo: 31	Powerful mode Hi: 46 Me: 43 Lo: 41 Mild mode Hi: 43 Me: 41 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**Unit:295 × 840 × 840 Panel:35 × 950 × 950**	
Net weight	**kg**	**31 (Unit:24 Panel:7)**	**33 (Unit:26 Panel:7)**
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing	
Refrigerant control		—	
Air handling equipment Fan type & Q'ty		Turbo fan × 1	
Motor	**W**	**20×1**	**40×1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Powerful mode Hi: 20 Me: 17 Lo: 15 Mild mode Hi: 17 Me: 15 Lo: 13**	**Powerful mode Hi: 25 Me: 22 Lo: 20 Mild mode Hi: 22 Me: 20 Lo: 18**
Fresh air intake		Available	
Air filter, Q'ty		Long life filter × 1 (Washable)	
Shock & vibration absorber		Rubber sleeve (for fan motor)	
Operation control Operation switch		Wired remote control switch (Optional: RC-E1) Wireless remote control switch (Optioanl: RCN-T-W-E)	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25 (I.D.25 mm, O.D.32 mm)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit. Drain hose**	
Optional parts		**Decorative Panel**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

● Decorative Panel model or Wireless kit (Optional)

Model \ Item	Panel Part No.	Wireless kit
FDTA301, 401	T-PSA-34W-E	RCN-T-W-E

Model FDTA501

Item \ Model		FDTA501
Nominal cooling capacity(1)	**W**	**12500**
Nominal heating capacity(1)	**W**	**13600**
Power source		**1 Phase, 220/230/240V 50Hz**
Noise level	dB(A)	Powerful mode Hi: 48 Me: 45 Lo: 43 Mild mode Hi: 45 Me: 43 Lo: 40
Exterior dimensions Height × Width × Depth	**mm**	**Unit:365 × 840 × 840** **Panel:35 × 950 × 950**
Net weight	**kg**	**38 (Unit:31 Panel:7)**
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing
Refrigerant control		—
Air handling equipment Fan type & Q'ty		Turbo fan × 1
Motor	**W**	**120×1**
Starting method		Line starting
Air flow(Standard)	**CMM**	**Powerful mode Hi: 32 Me: 29 Lo: 26** **Mild mode Hi: 29 Me: 26 Lo: 23**
Fresh air intake		Available
Air filter, Q'ty		Long life filter × 1 (Washable)
Shock & vibration absorber		Rubber sleeve (for fan motor)
Operation control Operation switch		Wired remote control switch (Optional: RC-E1) Wireless remote control switch (Optioanl: RCN-T-W-E)
Room temperature control		Thermostat by electronics
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")**
Connecting method		**Flare piping**
Drain hose		Connectable with VP25 (I.D.25 mm, O.D.32 mm)
Insulation for piping		Necessary (both Liquid & Gas line)
Accessories		**Mounting kit. Drain hose**
Optional parts		**Decorative Panel**

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

● Decorative Panel model or Wireless kit (Optional)

Model \ Item	Panel Part No.	Wireless kit
FDTA501	T-PSA-34W-E	RCN-T-W-E

(b) Ceiling suspended type (FDEN)
Models FDENA151, 201, 251

Item \ Model		FDENA151	FDENA201	FDENA251
Nominal cooling capacity(1)	**W**	**3800**	**5000**	**5600**
Nominal heating capacity(1)	**W**	**4500**	**5400**	**6700**
Power source		**1 Phase, 220/230/240V 50Hz**		
Noise level	dB(A)	Powerful mode Hi: 42 Me : 39 Lo: 38 Mild mode Hi: 39 Me : 38 Lo: 37		Powerful mode Hi: 44 Me : 41 Lo: 39 Mild mode Hi: 41 Me : 39 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**210 × 1070 × 690**		**210 × 1320 × 690**
Net weight	**kg**	**30**		**36**
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing		
Refrigerant control		—		
Air handling equipment Fan type & Q'ty		Multiblade centrifugal fan × 2		Multiblade centrifugal fan × 4
Motor	**W**	**25 × 1**		**25 × 2**
Starting method		Line starting		
Air flow(Standard)	**CMM**	**Powerful mode Hi: 12 Me : 11 Lo: 9 Mild mode Hi: 11 Me : 9 Lo: 7**		**Powerful mode Hi: 20 Me : 18 Lo: 14 Mild mode Hi: 18 Me : 14 Lo: 12**
Fresh air intake		Unavailable		
Air filter, Q'ty		Polypropylene net × 2 (Washable)		
Shock & vibration absorber		Rubber sleeve (for fan motor)		
Operation control Operation switch		Wireless remote control switch (Optional: RCN-E1) Wired remote control switch (Optional: RC-E1)		
Room temperature control		Thermostat by electronics		
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.		
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: φ6.35 (1/4") Gas line: φ12.7 (1/2")**		**Liquid line: φ6.35 (1/4") Gas line: φ15.88 (5/8")**
Connecting method		**Flare piping**		
Drain hose		Connectable with VP20 (I.D.20 mm, O.D.26 mm)		
Insulation for piping		Necessary (both Liquid & Gas line)		
Accessories		**Mounting kit. Drain hose**		
Optional parts		**—**		

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

Item \ Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

Models FDENA301, 401

Item	Model	FDENA301	FDENA401
Nominal cooling capacity(1)	**W**	**6400**	**10000**
Nominal heating capacity(1)	**W**	**7100**	**11200**
Power source		**1 Phase, 220/230/240V 50Hz**	
Noise level	dB(A)	Powerful mode Hi: 44 Me: 41 Lo: 39 Mild mode Hi: 41 Me: 39 Lo: 38	Powerful mode Hi: 46 Me: 44 Lo: 41 Mild mode Hi: 44 Me: 41 Lo: 39
Exterior dimensions Height × Width × Depth	**mm**	**210 × 1320 × 690**	**250 × 1620 × 690**
Net weight	**kg**	**36**	**46**
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing	
Refrigerant control		—	
Air handling equipment Fan type & Q'ty		Multiblade centrifugal fan × 4	
Motor	**W**	**25×2**	**30×2**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Powerful mode Hi: 20 Me: 18 Lo: 14** **Mild mode Hi: 18 Me: 14 Lo: 12**	**Powerful mode Hi: 29 Me: 26 Lo: 23** **Mild mode Hi: 26 Me: 23 Lo: 21**
Fresh air intake		Unavailable	
Air filter, Q'ty		Polypropylene net × 2 (Washable)	
Shock & vibration absorber		Rubber sleeve (for fan motor)	
Operation control Operation switch		Wireless remote control switch (Optional: RCN-E1) Wired remote control switch (Optioanl: RC-E1)	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ9.52 (3/8")** **Gas line: ϕ15.88 (5/8")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP20 (I.D.20 mm, O.D.26 mm)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit. Drain hose**	
Optional parts		**—**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

Model FDENA501

Item	Model	FDENA501
Nominal cooling capacity(1)	**W**	**12600**
Nominal heating capacity(1)	**W**	**13300**
Power source		**1 Phase, 220/230/240V**
Noise level	dB(A)	Powerful mode Hi: 48 Me: 46 Lo: 44 Mild mode Hi: 46 Me: 44 Lo: 43
Exterior dimensions Height × Width × Depth	**mm**	**250 ×1620 × 690**
Net weight	**kg**	**46**
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing
Refrigerant control		—
Air handling equipment Fan type & Q'ty		Multiblade centrifugal fan ×4
Motor	**W**	**33×2**
Starting method		Line starting
Air flow(Standard)	**CMM**	**Powerful mode Hi: 31 Me: 29 Lo: 26** **Mild mode Hi: 29 Me: 26 Lo: 23**
Fresh air intake		Unavailable
Air filter, Q'ty		Polypropylene net ×2 (Washable)
Shock & vibration absorber		Rubber sleeve (for fan motor)
Operation control Operation switch		Wireless remote control switch (Optional: RCN-E1) Wired remote control switch (Optioanl: RC-E1)
Room temperature control		Thermostat by electronics
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")**
Connecting method		**Flare piping**
Drain hose		Connectable with VP20 (I.D.20 mm, O.D.26 mm)
Insulation for piping		Necessary (both Liquid & Gas lines)
Accessories		**Mounting kit. Drain hose**
Optional parts		**—**

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(c) Wall mounted type (FDKN)

Models FDKNA151, 251

Item \ Model		FDKNA151	FDKNA201
Nominal cooling capacity(1)	**W**	**4000**	**5000**
Nominal heating capacity(1)	**W**	**4500**	**5400**
Power source		**1 Phase, 220/230/240V 50Hz**	
Noise level	dB(A)	Powerful mode Hi: 44 Me: 42 Lo: 40 Mild mode Hi: 42 Me: 40 Lo: 37	Powerful mode Hi: 47 Me: 44 Lo: 41 Mild mode Hi: 44 Me: 41 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**298 × 840 × 240**	
Net weight	**kg**	**12**	
Refrigerant equipment Heat exchanger		Slitted fins & inner grooved tubing	
Refrigerant control		—	
Air handling equipment Fan type & Q'ty		Tangential fan ×1	
Motor	**W**	**33×1**	
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Powerful mode Hi: 12 Me: 11 Lo: 10 Mild mode Hi: 11 Me: 10 Lo: 9**	**Powerful mode Hi: 13 Me: 12 Lo: 11 Mild mode Hi: 12 Me: 11 Lo: 9**
Fresh air intake		Unavailable	
Air filter, Q'ty		Long life fillter ×2 (Washable)	
Shock & vibration absorber		Rubber sleeve (for fan motor)	
Operation control Operation switch		Wireless remote control switch (Optional: RCN-E1) Wired remote control switch (Optioanl: RC-E1)	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ6.35 (1/4") Gas line: ϕ12.7 (1/2")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP16 (I.D.16 mm, O.D.22 mm)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit. Drain hose**	
Optional parts		**—**	

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

Item \ Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

Models FDKNA251, 301

Item \ Model		FDKNA251	FDKNA301
Nominal cooling capacity(1)	**W**	**5600**	**6700**
Nominal heating capacity(1)	**W**	**6300**	**7300**
Power source		**1 Phase, 220/230/240V 50Hz**	
Noise level	dB(A)	Powerful mode Hi: 48 Me: 45 Lo: 42 Mild mode Hi: 45 Me: 42 Lo: 39	Powerful mode Hi: 49 Me: 46 Lo: 43 Mild mode Hi: 46 Me: 43 Lo: 40
Exterior dimensions Height × Width × Depth	**mm**	**298 × 840 × 240**	**298 × 1155 × 196**
Net weight	**kg**	**12**	**13.5**
Refrigerant equipment Heat exchanger		Slitted fins & inner grooved tubing	Louver fins & inner grooved tubing
Refrigerant control		—	
Air handling equipment Fan type & Q'ty		Tangential fan ×1	
Motor	**W**	**33×1**	**40×1**
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Powerful mode Hi: 14 Me: 13 Lo: 11** **Mild mode Hi: 13 Me: 11 Lo: 10**	**Powerful mode Hi: 21 Me: 18 Lo: 15** **Mild mode Hi: 18 Me: 15 Lo: 13**
Fresh air intake		Unavailable	
Air filter, Q'ty		Long life fillter ×2 (Washable)	
Shock & vibration absorber		Rubber sleeve (for fan motor)	
Operation control Operation switch		Wireless remote control switch (Optional: RCN-E1) Wired remote control switch (Optioanl: RC-E1)	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ6.35 (1/4")** **Gas line: ϕ15.88 (5/8")**	**Liquid line: ϕ9.52 (3/8")** **Gas line: ϕ15.88 (5/8")**
Connecting method		**Flare piping**	
Drain hose		Connectable with VP16 (I.D.16 mm, O.D.22 mm)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit. Drain hose**	
Optional parts		**—**	

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

Item / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(d) Ceiling mounted duct type (FDUR)
Models FDURA201, 251

Item \ Model		FDURA201	FDURA251
Nominal cooling capacity(1)	**W**	**5000**	**5600**
Nominal heating capacity(1)	**W**	**5400**	**6400**
Power source		**1 Phase 220/230/240V 50Hz**	
Noise level	dB(A)	Hi: 40 Lo: 36	Hi: 41 Lo: 37
Exterior dimensions Height × Width × Depth	**mm**	**295 × 850 × 650**	
Net weight	**kg**	**39**	**40**
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing	
Refrigerant control		—	
Air handling equipment Fan type & Q'ty		Multiblade centrifugal fan ×2	
Motor	**W**	90 ×1	130 ×1
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 17 Lo: 13.5**	**Hi: 21 Lo: 17**
Available static pressure	**Pa**	**Standard: 50, Max 85**	
Fresh air intake		—	
Air filter, Q'ty		Polypropylene net ×1 (Washable)	
Shock & vibration absorber		Rubber sleeve (for fan motor)	
Operation control Operation switch		Wired remote control switch (Optional: RC-E1)	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ6.35 (1/4") Gas line: ϕ12.7 (1/2")**	**Liquid line: ϕ6.35 (1/4") Gas line: ϕ15.88 (5/8")**
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25 (I.D.25 mm, O.D.32 mm)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit. Drain hose**	
Optional parts		**Suction grille**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

Models FDURA301, 401

Item \ Model		FDURA301	FDURA401
Nominal cooling capacity(1)	**W**	**6700**	**10000**
Nominal heating capacity(1)	**W**	**7100**	**11200**
Power source		**1 Phase, 220/230/240V 50Hz**	
Noise level	dB(A)	Hi: 41 Lo: 37	Hi: 42 Lo: 37
Exterior dimensions Height × Width × Depth	**mm**	**295 × 850 × 650**	**350 × 1370 × 650**
Net weight	**kg**	**40**	**63**
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing	
Refrigerant control		—	
Air handling equipment Fan type & Q'ty		Multiblade centrifugal fan ×2	
Motor	**W**	230 ×1	280 ×1
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Hi: 25 Lo: 20**	**Hi: 34 Lo: 27**
Available static pressure	**Pa**	**Standard: 50, Max 130**	
Fresh air intake		—	
Air filter, Q'ty		Polypropylene net ×1 (Washable)	
Shock & vibration absorber		Rubber sleeve (for fan motor)	
Operation control Operation switch		Wired remote control switch (Optional: RC-E1)	
Room temperature control		Thermostat by electronics	
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")**	
Connecting method		**Flare piping**	
Drain hose		Connectable with VP25 (I.D.25 mm, O.D.32 mm)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Mounting kit. Drain hose**	
Optional parts		**Suction grille**	

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

Model FDURA501

Item	Model	FDURA501
Nominal cooling capacity(1)	**W**	**12500**
Nominal heating capacity(1)	**W**	**13600**
Power source		**1 Phase, 220/230/240V 50Hz**
Noise level	dB(A)	Hi: 43 Lo: 38
Exterior dimensions Height × Width × Depth	**mm**	**350 × 1370 × 650**
Net weight	**kg**	**65**
Refrigerant equipment Heat exchanger		Louver fine & inner grooved tubing
Refrigerant control		—
Air handling equipment Fan type & Q'ty		Multiblade centrifugal fan ×2
Motor	**W**	460 ×1
Starting method		Line starting
Air flow(Standard)	**CMM**	**Hi: 42 Lo: 33.5**
Available static pressure	**Pa**	**Standard: 50, Max 130**
Fresh air intake		—
Air filter, Q'ty		Polypropylene net ×1 (Washable)
Shock & vibration absorber		Rubber sleeve (for fan motor)
Operation control Operation switch		Wired remote control switch (Optional: RC-E1)
Room temperature control		Thermostat by electronics
Safety equipment		Internal thermostat for fan motor. Frost protection thermostat.
Installation data Refrigerant piping size	**mm(in)**	**Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")**
Connecting method		**Flare piping**
Drain hose		Connectable with VP25 (I.D.25 mm, O.D.32 mm)
Insulation for piping		Necessary (both Liquid & Gas lines)
Accessories		**Mounting kit. Drain hose**
Optional parts		**Suction grille**

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

Item / Operation	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27℃	19℃	35℃	24℃	ISO-T1
Heating	20℃	—	7℃	6℃	

(2) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"

(2) Outdoor unit
Models FDCA301HEN, 301HES

Item \ Model		FDCA301HEN	FDCA301HES
Power source		**1 Phase, 220/230/240V 50Hz**	**3 Phase, 380/400/415V 50Hz**
Nominal cooling capacity(1)	**W**	**7200**	
Nominal heating capacity(1)	**W**	**7300**	
Noise level	dB(A)	53	
Exterior dimensions Height × Width × Depth	**mm**	**845 × 880 × 340**	
Net weight	**kg**	**75**	
Refrigerant equipment compressor type & Q' ty		ZP26K3E-PFJ × 1	ZP26K3E-TFD × 1
Motor	**kW**	**2.5**	
Starting method		Line starting	
Crankcase heater	W	33	
Heat exchanger		Slitted fines & inner grooued tubing	
Refrigerant control		Electronic expansion valve	
Refrigerant		**R410**	
Quantity	**kg**	**3.15 (Pre-charged up to the piping length of 30m)**	
Refrigerant oil	ℓ	**1.12 (3 MAW POE)**	
Defrost control		MC controlled de-icer	
Air handling equipment Fan type & Q'ty		Propeller fan × 1	
Motor	**W**	**55×1**	
Starting method		Line starting	
Air flow(Standard)	**CMM**	**46**	
Shock & vibration absorber		Rubber mount (for compressor)	
Safety equipment		Internal thermostat for motor. Abnormal discharge temperature protection.	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")**	
Connecting method		**Flare piping**	
Drain		Hole for drain(ϕ20 ×3pcs.)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Edging**	

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in ISO-T1.

(2) The refrigerant quantity in the connecting pipe is not included. Charge it additionally at the site.

Models FDCA401HEN, 401HES

Item \ Model		FDCA401HEN	FDCA401HES
Power source		**1 Phase, 220/230/240V 50Hz**	**3 Phase, 380/400/415V 50Hz**
Nominal cooling capacity(1)	**W**	**10000**	
Nominal heating capacity(1)	**W**	**11200**	
Noise level	dB(A)	54	
Exterior dimensions Height × Width × Depth	**mm**	**1050 × 920 × 340**	
Net weight	**kg**	**92**	
Refrigerant equipment compressor type & Q' ty		ZP41K3E-PFJ × 1	ZP41K3E-TFD × 1
Motor	**kW**	**3.0**	
Starting method		Line starting	
Crankcase heater	W	33	
Heat exchanger		Slitted fines & inner grooved tubing	
Refrigerant control		Electronic expansion valve	
Refrigerant		**R410**	
Quantity	**kg**	**3.9 (Pre-charged up to the piping length of 30m)**	
Refrigerant oil	ℓ	**1.24 (3 MAW POE)**	
Defrost control		MC controlled de-icer	
Air handling equipment Fan type & Q'ty		Propeller fan × 2	
Motor	**W**	**40×2**	
Starting method		Line starting	
Air flow(Standard)	**CMM**	**64**	
Shock & vibration absorber		Rubber mount (for compressor)	
Safety equipment		Internal thermostat for fan motor. Abnormal discharge temperature protection.	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")**	
Connecting method		**Flare piping**	
Drain		Hole for drain (ϕ20 × 3pcs.)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Edging**	

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in ISO-T1.

(2) The refrigerant quantity in the connecting pipe is not included. Charge it additionally at the site.

Models FDCA501HEN, 601HES

Item \ Model		FDCA501HES	FDCA601HES
Power source		**3 Phase, 380/400/415V 50Hz**	
Nominal cooling capacity(1)	**W**	**12600**	**14200**
Nominal heating capacity(1)	**W**	**13300**	**15900**
Noise level	dB(A)	56	57
Exterior dimensions Height × Width × Depth	**mm**	**1300 × 970 × 370**	
Net weight	**kg**	**112**	**126**
Refrigerant equipment compressor type & Q' ty		ZP54K3E-TFD × 1	ZP57K3E-TFD × 1
Motor	**kW**	**3.75**	**4.5**
Starting method		Line starting	
Crankcase heater	W	40	
Heat exchanger		Slitted fines & inner grooved tubing	
Refrigerant control		Electronic expansion valve	
Refrigerant		**R410A**	
Quantity	**kg**	**3.2 (Pre-charged up to the piping length of 30m)**	**3.9 (Pre-charged up to the piping length of 30m)**
Refrigerant oil	ℓ	**1.95 (3 MAW POE)**	**1.66 (3 MAW POE)**
Defrost control		MC controlled de-icer	
Air handling equipment Fan type & Q'ty		Propeller fan × 2	
Motor	**W**	**55×2**	
Starting method		Line starting	
Air flow(Standard)	**CMM**	**100**	
Shock & vibration absorber		Rubber mount (for compressor)	
Safety equipment		Internal thermostat for fan motor. Abnormal discharge temperature protection.	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")**	
Connecting method		**Flare piping**	
Drain		Hole for drain (ϕ20 × 3pcs.)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		**Edging**	

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in ISO-T1.

(2) The refrigerant quantity in the connecting pipe is not included. Charge it additionally at the site.

Models FDCA801HES, 1001HES

Item \ Model		FDCA801HES	FDCA1001HES
Power source		**3 Phase, 380/400/415V 50Hz**	
Nominal cooling capacity(1)	**W**	**20000**	**25000**
Nominal heating capacity(1)	**W**	**22400**	**28000**
Noise level	dB(A)	57	
Exterior dimensions Height × Width × Depth	**mm**	**1690 × 1350 × 720**	
Net weight	**kg**	**210**	**225**
Refrigerant equipment compressor type & Q' ty		GU-C5176MS56 × 1	GU-C5192MS56 × 1
Motor	**kW**	**6.0**	**6.7**
Starting method		Line starting	
Crankcase heater	W	40	
Heat exchanger		Straight fines & inner grooved tubing	
Refrigerant control		Electronic expansion valve	
Refrigerant		**R410A**	
Quantity	**kg**	**6.6 (Pre-charged up to the piping length of 5m)**	**7.9 (Pre-charged up to the piping length of 5m)**
Refrigerant oil	ℓ	**1.9 (MA32R)**	
Defrost control		MC controlled de-icer	
Air handling equipment Fan type & Q'ty		Propeller fan × 2	
Motor	**W**	**100 × 2**	
Starting method		Line starting	
Air flow(Standard)	**CMM**	**Cooling: 220, Heating: 180**	
Shock & vibration absorber		Rubber mount (for compressor)	
Safety equipment		Internal thermostat for fan motor. Abnormal discharge temperature protection.	
Installation data Refrigerant piping size	**mm(in)**	**Liquid line:ϕ9.52 (3/8") Gas line:ϕ25.4 (1")**	**Liquid line:ϕ12.7 (1/2") Gas line:ϕ25.4 (1")**
Connecting method		**Liquid line: Flare piping, Gas line: Brazing**	
Drain		Hole for drain (ϕ20 × 6pcs.)	
Insulation for piping		Necessary (both Liquid & Gas lines)	
Accessories		Reducer kit (Please see page 226)	

Notes (1) The cooling and heating capabilities imply the values when the indoor unit of rated capacity is connected under the condition specified in ISO-T1.

(2) The refrigerant quantity in the connecting pipe is not included. Charge it additionally at the site.

(3) Operation chart

The Multi-Type V series is a system that allows for different models and capacities of indoor units to be combined so the individual operating characteristics of the indoor and outdoor are provided. Use the procedure shown in Item (c) to calculate the combined operating characteristics.

(a) Operating characteristic of outdoor unit

(230 V)

Item \ Model		FDCA301HEN	FDCA401HEN
Cooling input	kW	2.15	3.31
Heating input		2.06	3.08
Cooling running current	A	9.8	15.3
Heating running current		9.5	13.8
Inrush current (L.R.A)	A	63	97
Cooling power factor	%	95	94
Heating power factor		94	97

(400 V)

Item \ Model		FDCA301HES	FDCA401HES	FDCA501HES	FDCA601HES
Cooling input	kW	2.15	3.16	4.29	4.35
Heating input		2.06	2.98	3.58	4.44
Cooling running current	A	3.6	5.5	7.4	7.2
Heating running current		3.5	5.1	6.1	7.0
Inrush current (L.R.A)	A	34	46	67	77
Cooling power factor	%	86	83	84	87
Heating power factor		85	84	85	92

(400 V)

Item \ Model		FDCA801HES	FDCA1001HES
Cooling input	kW	6.79	7.29
Heating input		6.69	7.24
Cooling running current	A	11.0	11.4
Heating running current		11.0	11.6
Inrush current (L.R.A)	A	58	58
Cooling power factor	%	86	89
Heating power factor		85	87

Note (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 “UNITARY AIR-CONDITIONERS”

(b) Operating characteristic of indoor unit

FDT Series

(230 V)

Model / Item	FDT Series					
	151	201	251	301	401	501
Power input (kW)	0.06		0.07		0.13	0.15
Running current (A)	0.3		0.3		0.6	0.7

FDEN Series

(230 V)

Model / Item	FDEN Series					
	151	201	251	301	401	501
Power input (kW)	0.05		0.10		0.13	0.15
Running current (A)	0.2		0.4		0.5	0.6

Notes (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 “UNITARY AIR-CONDITIONERS”
(2) The values shown in the above table are common to both cooling and heating operations.

FDKN Series (230 V)

Item \ Model	FDKN Series			
	151	201	251	301
Power input (kW)	0.02		0.03	0.08
Running current (A)	0.2		0.2	0.5

FDUR Series (230 V)

Item \ Model	FDUR Series				
	201	251	301	401	501
Power input (kW)	0.19	0.22	0.24	0.37	0.45
Running current (A)	0.9	1.0	1.3	1.7	2.0

Notes (1) This packaged air-conditioner is manufactured and tested in conformity with the following standard.
ISO-T1 "UNITARY AIR-CONDITIONERS"
(2) The values shown in the above table are common to both cooling and heating operations.

(c) Calculation of total operation characteristics

Since the operation characteristics of series Multi depend on combination of indoor unit, calculate the total operation characteristics of the system by using the formulas below according to specifications of each indoor unit or outdoor unit.

1)Total power input

Total power input (kW) = Power input of outdoor unit + ∑ (Power input of indoor unit)

2)Total running current

Total running current (A) = Running current of outdoor unit + [∑ (Running current of indoor unit) × 2/3]

3)Total power factor

Total power factor (%) = [Total power input (W) / $\sqrt{3}$ × Total running current (A) × Power source] × 100

Total operation characteristics = Operation characteristic value of outdoor unit + Operation characteristic value of indoor unit

[Example]

(Conditions) Operation Voltage ····· Indoor unit: 230 V, 50 Hz
Outdoor unit: 400 V, 50 Hz
Operation mode ····· Cooling and Heating
Unit····· Outdoor unit: FDCA801HES × 1 unit
Indoor unit: FDTA301 × 1 units, FDTA501 × 1 units

Operation characteristics of each unit

(Cooling/Heating)

Item \ Model	FDCA801HES	FDTA301	FDTA501
Power input (kW)	6.79/6.69	0.07/0.07	0.15/0.15
Running current (A)	11.0/11.0	0.3/0.3	0.7/0.7

① Total power input (kW)

(Cooling) 6.79 + 0.07+ 0.15 = 7.01 (kW)

(Heating) 6.69 + 0.07+ 0.15 = 6.91 (kW)

② Total running current (A)

(Cooling) $11.0 + (0.3+0.7 \times \frac{2}{3}) \fallingdotseq 11.7$ (A)

(Heating) $11.0 + (0.3 + 0.7 \times \frac{2}{3}) \fallingdotseq 11.7$ (A)

③ Total power factor (%)

(Cooling) $\frac{7.01 \times 1000}{\sqrt{3} \times 11.0 \times 400} \times 100 \fallingdotseq 86$ %

(Heating) $\frac{6.91 \times 1000}{\sqrt{3} \times 11.0 \times 400} \times 100 \fallingdotseq 85$ %

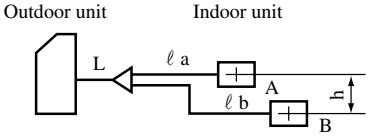
2.2.2 Range of usage & limitations

Item \ Model		FDCA301~601	FDCA801, 1001
Indoor return air temperature (Upper, lower limits)		Refer to the selection chart (See page 203)	
Outdoor air temperature (Upper, lower limits)			
Indoor unit atmosphere (behind ceiling) temperature and humidity		Dew point temperature: 28˚C or less, relative humidity: 80% or less	
Refrigerant line (one way) length (1)		Max. 50m	Max. 70m
Vertical height difference between outdoor unit and indoor unit		Max. 30m (Outdoor unit is higher) Max. 15m (Outdoor unit is lower)	
Difference in after branch piping lengths between indoor units		Max. 20m	Max. 10m
Difference in height between indoor units		Max. 0.5m	
Power source voltage		Rating ± 10%	
Voltage at starting		Min. 85% of rating	
Compressor ON - OFF Frequency	Cycle Time	6 minutes or more (from ON to ON) or (from OFF to OFF)	
	Stop Time	3 minutes or more	

Note (1) Refer to the next page for details of common pipe length.

Height and length restrictions for refrigerant piping

Twin type



FDCA301HEN, 301HES, 401HEN, 401HES, 501HES, 601HES

One-way pipe length (m) $L + \ell a + \ell b \leqq 50$

Branch pipe length (m) $|\ell a - \ell b| \leqq 10$, $\ell a \leqq 20$, $\ell b \leqq 20$

Difference in height between indoor units (m) h=0.5 or less

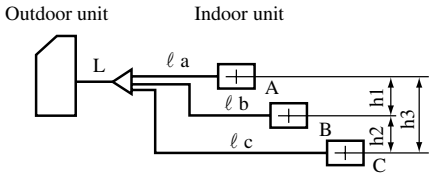
FDCA801HES, 1001HES

One-way pipe length (m) $L + \ell a \leqq 70$, $L + \ell b \leqq 70$

Branch pipe length (m) $|\ell a - \ell b| \leqq 10$, $\ell a \leqq 30$, $\ell b \leqq 30$

Difference in height between indoor units (m) h=0.5 or less

Triple type



FDCA601HES

One-way pipe length (m) $L + \ell a + \ell b + \ell c \leqq 50$

Branch pipe length (m) $|\ell a - \ell b| \leqq 10$, $|\ell a - \ell c| \leqq 10$, $|\ell b - \ell c| \leqq 10$
$\ell a \leqq 20$, $\ell b \leqq 20$, $\ell c \leqq 20$

Difference in height between indoor units (m) h1=0.5 or less, h2=0.5 or less, h3=0.5 or less

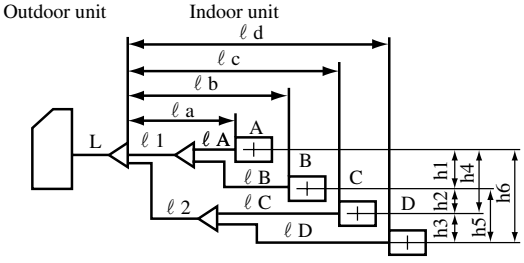
FDCA801HES, 1001HES

One-way pipe length (m) $L + \ell a \leqq 70$, $L + \ell b \leqq 70$, $L + \ell c \leqq 70$

Branch pipe length (m) $|\ell a - \ell b| \leqq 10$, $|\ell a - \ell c| \leqq 10$, $|\ell b - \ell c| \leqq 10$
$\ell a \leqq 30$, $\ell b \leqq 30$, $\ell c \leqq 30$

Difference in height between indoor units (m) h1=0.5 or less, h2=0.5 or less, h3=0.5 or less

Double-twin type



FDCA801HES, 1001HES

One-way pipe length (m) $L + \ell a \leqq 70$, $L + \ell b \leqq 70$, $L + \ell c \leqq 70$, $L + \ell d \leqq 70$

Branch pipe length (m) $|\ell a - \ell b| \leqq 10$, $|\ell a - \ell c| \leqq 10$, $|\ell b - \ell c| \leqq 10$
$|\ell a - \ell d| \leqq 10$, $|\ell b - \ell d| \leqq 10$, $|\ell c - \ell d| \leqq 10$
$\ell a \leqq 30$, $\ell b \leqq 30$, $\ell c \leqq 30$, $\ell d \leqq 30$
$\ell A + \ell B \leqq 15$, $\ell C + \ell D \leqq 15$

Difference in height between indoor units (m) h1=0.5 or less, h2=0.5 or less
h3=0.5 or less, h4=0.5 or less
h5=0.5 or less, h6=0.5 or less

In the illustration the L is main piping and ℓ a, ℓ b, ℓ c, and ℓ d are branch piping.

Request

(1) When the capacity of the indoor unit to be connected is 151, 201 and 251 or less, be sure to use a pipe diameter of ø9.52 for the size of the liquid piping of branch piping (between branch and indoor units). (for double-twin only) For connections to indoor units (liquid piping side dia. ø6.35) use the different diameter adapter coupling that is included in the branch piping kit.

(2) Check to make sure the following pipe length limits are followed.
Refer to the above illustration.

(3) For the branch be sure to select the specified branch pipe set (sold separately) and then to follow the directions of the instruction manual included in the branch pipe set when installing the piping. Be sure to install the branch piping so that the branch is level.

2.2.3 Exterior dimensions

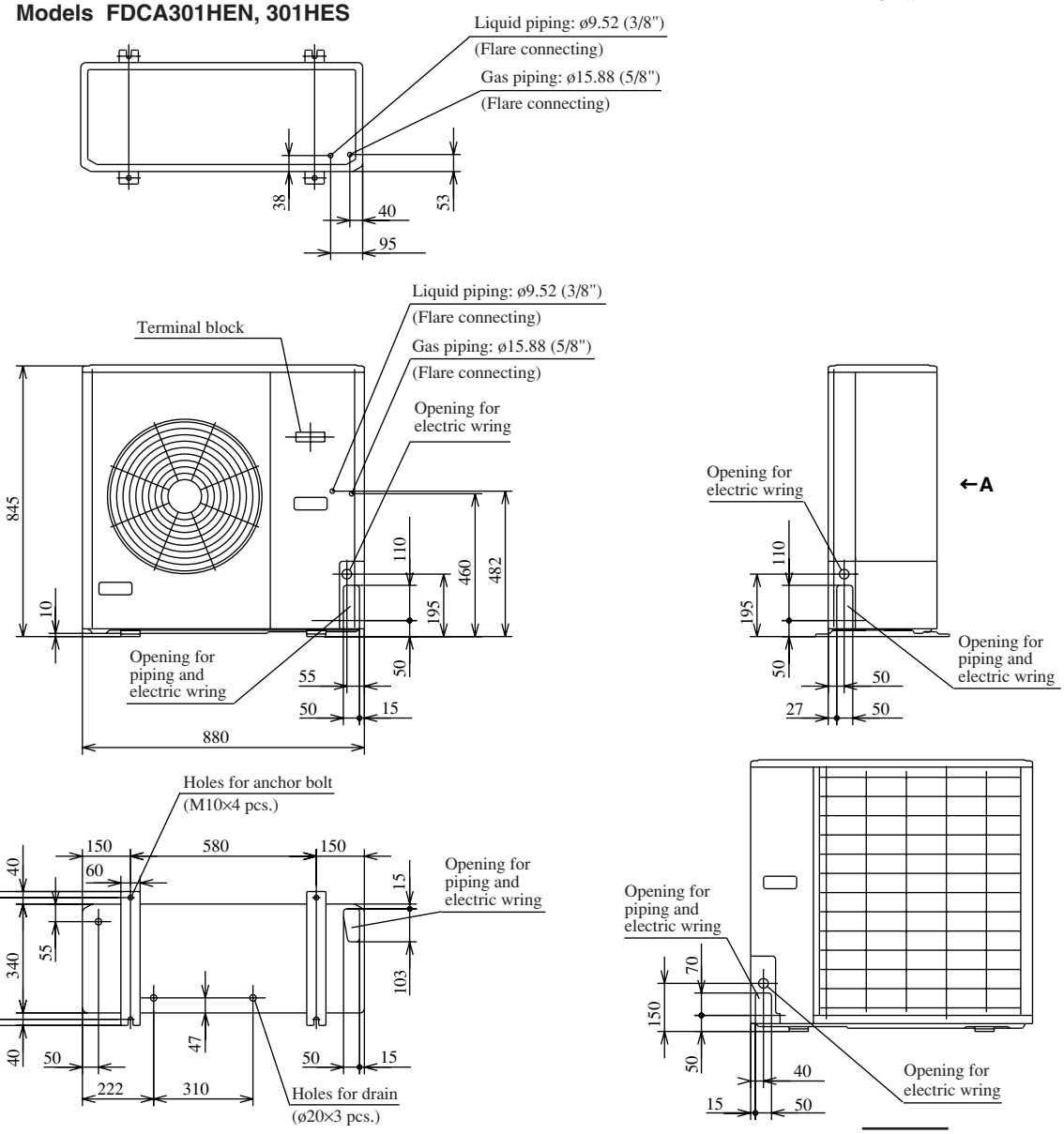
(1) Indoor unit ..... Please see page 36 of Chapter 1

(2) Remote controller (Optional parts) ..... Please see page 46 of Chapter 1

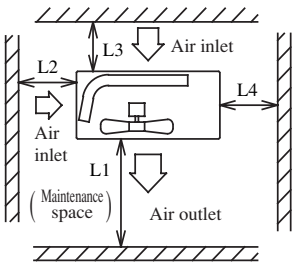
(3) Outdoor unit

Unit: mm

Models FDCA301HEN, 301HES



Required space for maintenance and air flow



Minimum allowable space to the obstacles

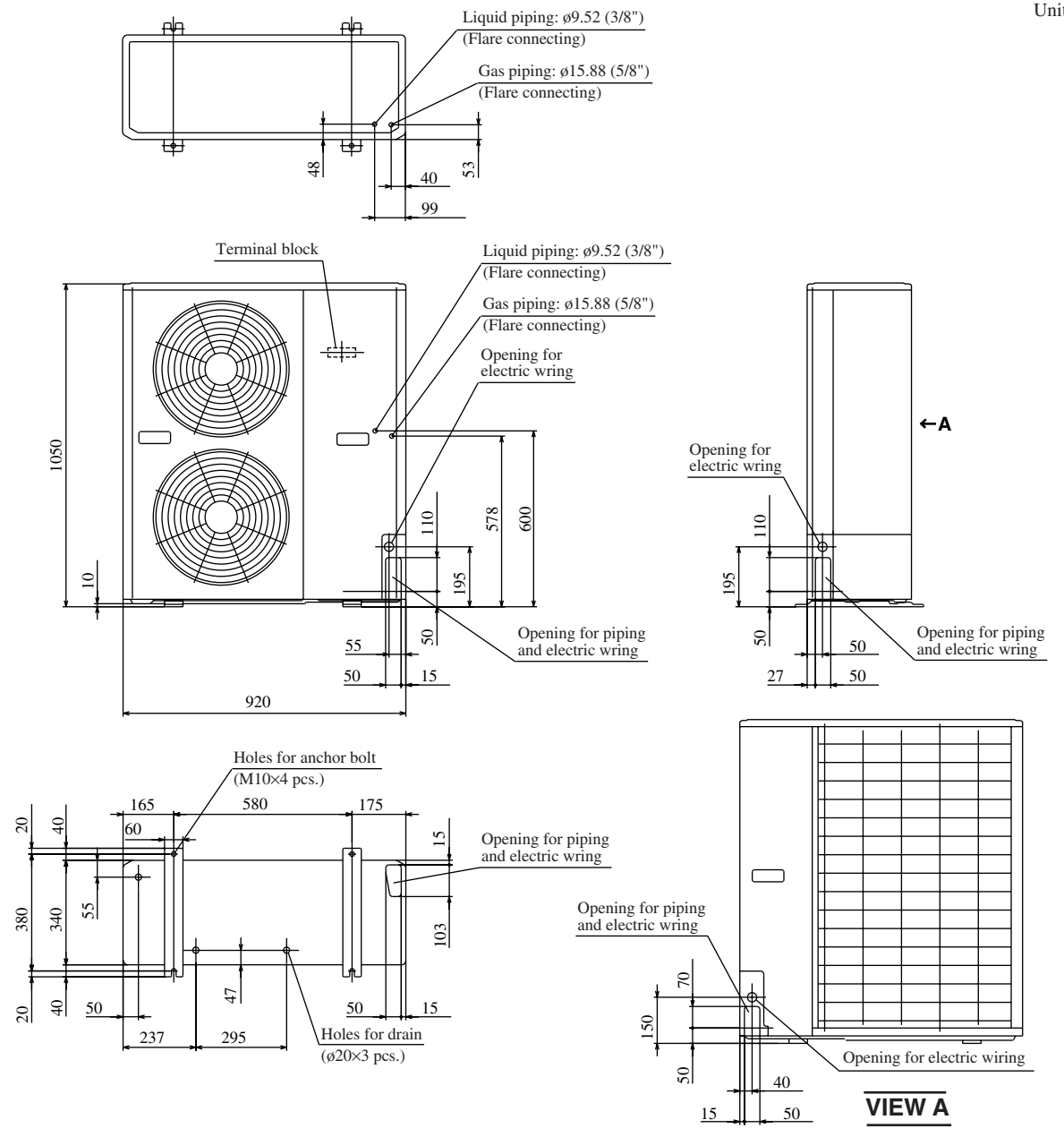
Unit:mm

Mark \ Installation type	Ⅰ	Ⅱ	Ⅲ
L1	Open	Open	500
L2	300	5	Open
L3	100	150	100
L4	5	5	5

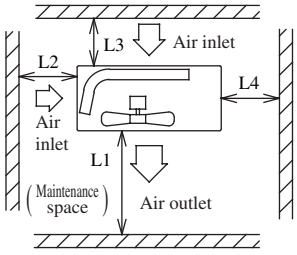
Notes
(1) It is prohibited to install in a space enclosed with walls at four sides.
(2) Unit must be secured with anchor bolts.
Anchor bolt should not protrude more than 15 mm above the surface.
(3) Where strong winds blow, the blow outlet must be oriented at right angle against the wind direction.
(4) Secure a space of 1 m or more above the unit.
(5) Barrier standing in front of the blow outlet must be lower than the height of unit.

Models FDCA401HEN, 401HES

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

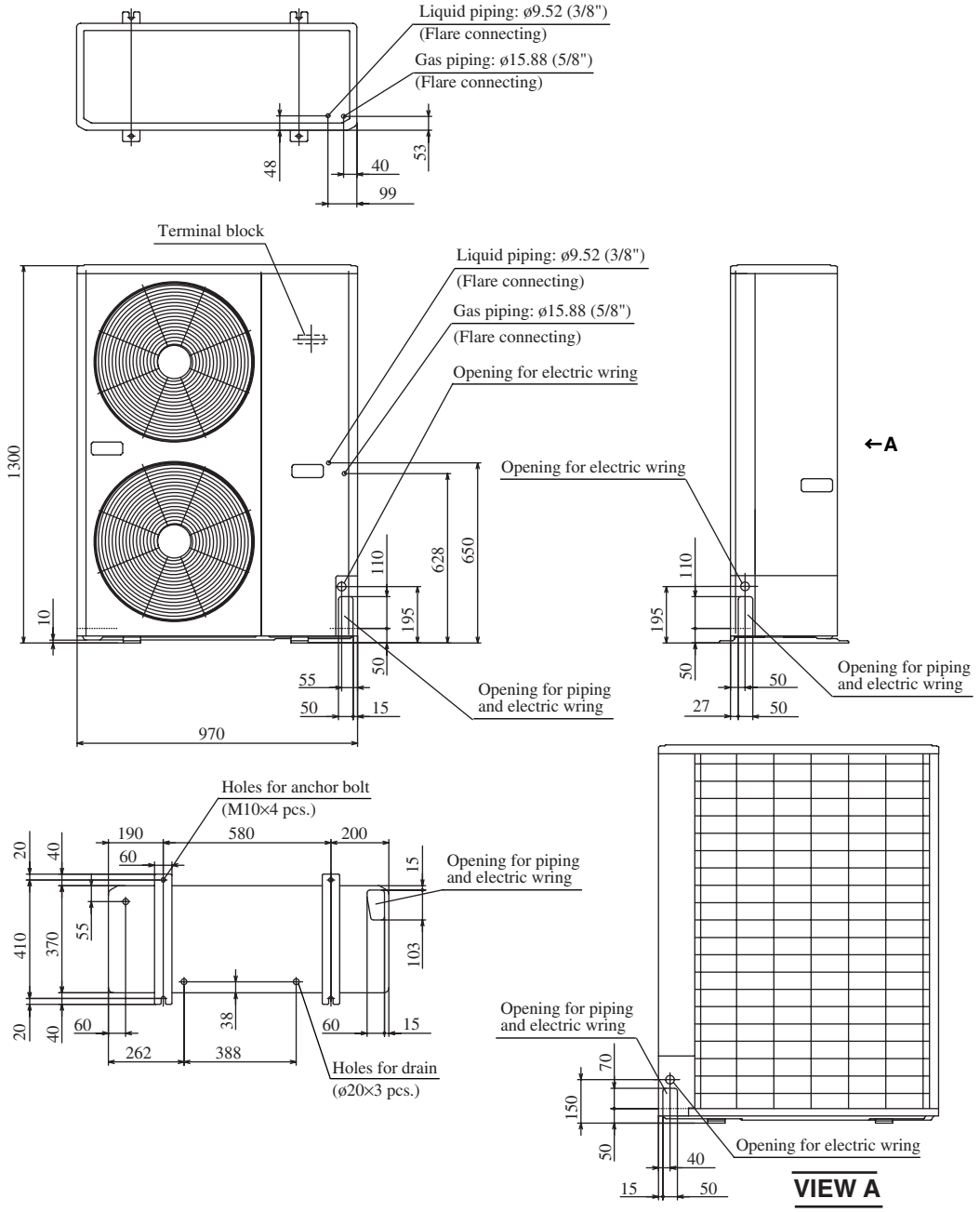
Unit:mm

Mark \ Installation type	Ⅰ	Ⅱ	Ⅲ
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	5	5	5

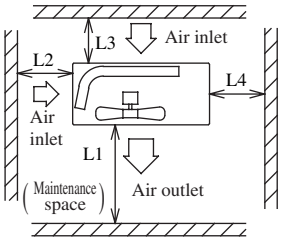
Notes
(1) It is prohibited to install in a space enclosed with walls at four sides.
(2) Unit must be secured with anchor bolts.
Anchor bolt should not protrude more than 15 mm above the surface.
(3) Where strong winds blow, the blow outlet must be oriented at right angle against the wind direction.
(4) Secure a space of 1 m or more above the unit.
(5) Barrier standing in front of the blow outlet must be lower than the height of unit.

Model FDCA501HES

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

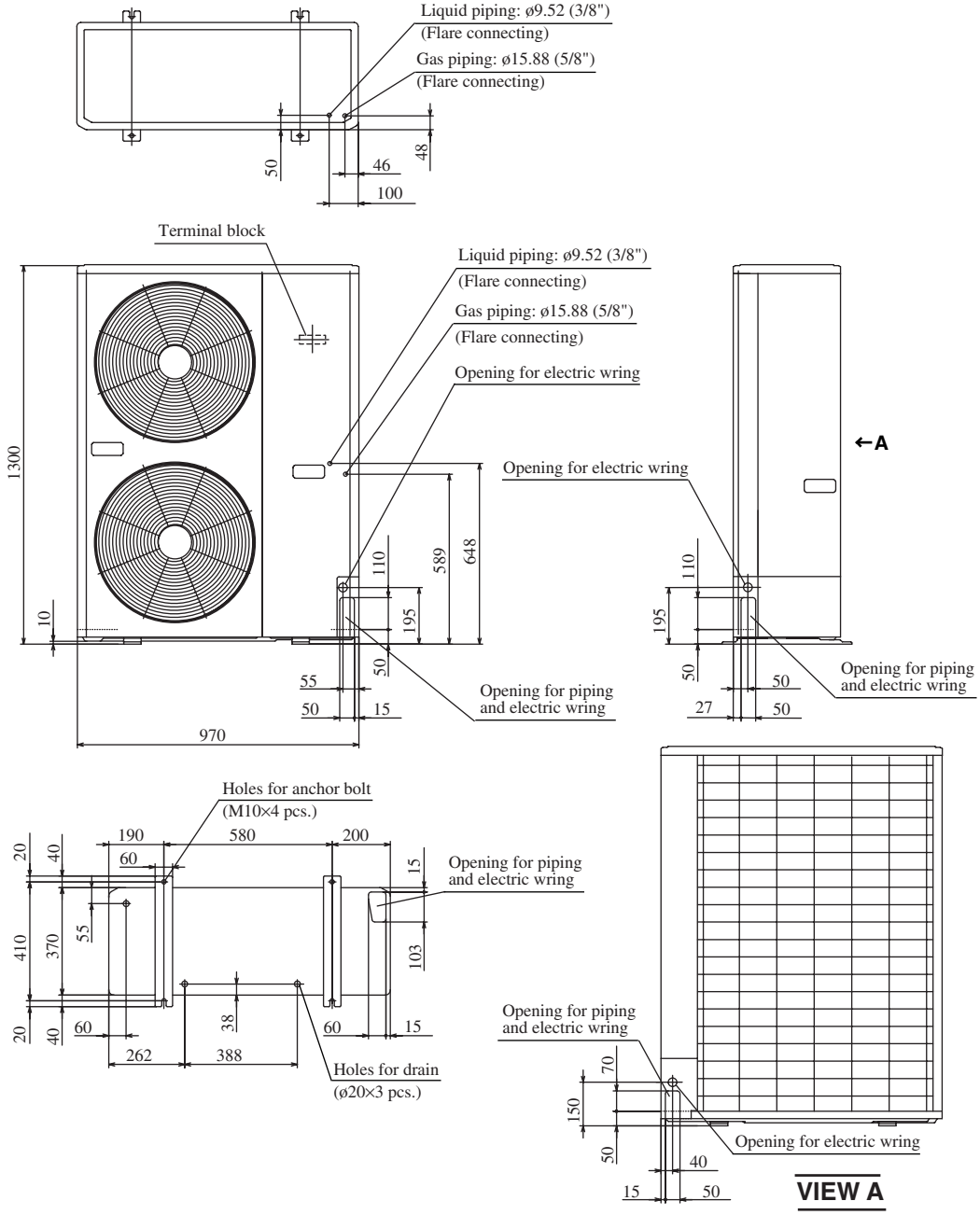
Unit:mm

Mark \ Installation type	Ⅰ	Ⅱ	Ⅲ
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	5	5	5

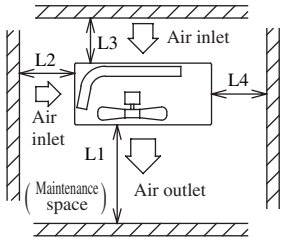
Notes
(1) It is prohibited to install in a space enclosed with walls at four sides.
(2) Unit must be secured with anchor bolts.
Anchor bolt should not protrude more than 15 mm above the surface.
(3) Where strong winds blow, the blow outlet must be oriented at right angle against the wind direction.
(4) Secure a space of 1 m or more above the unit.
(5) Barrier standing in front of the blow outlet must be lower than the height of unit.

Model FDCA601HES

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

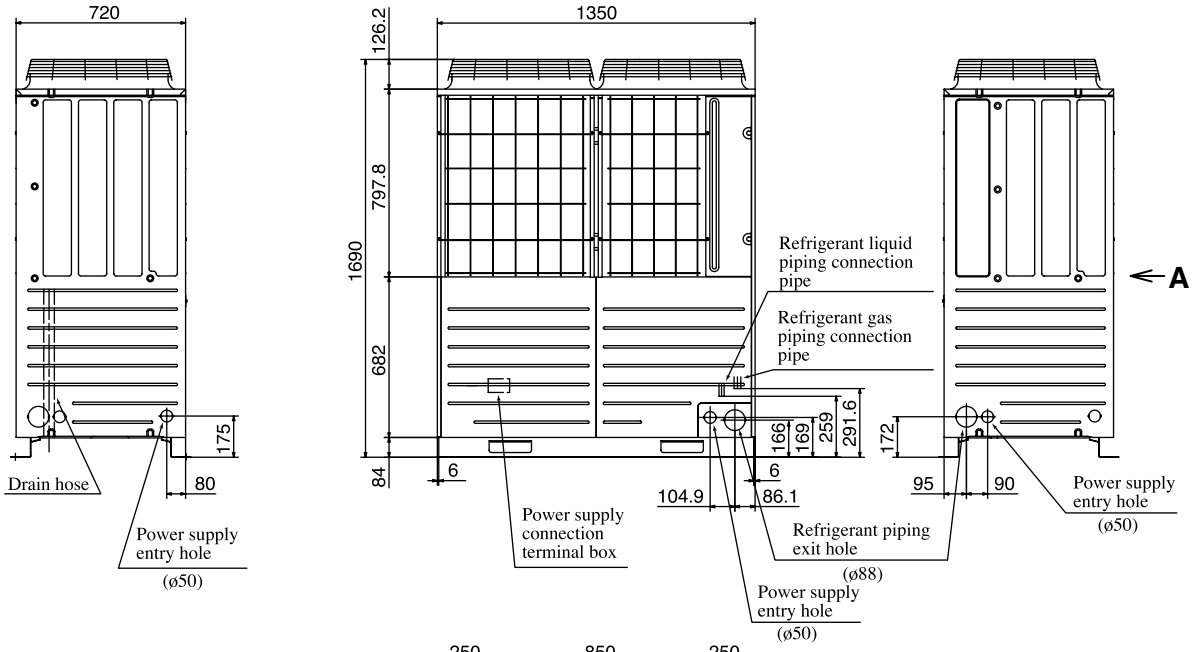
Unit:mm

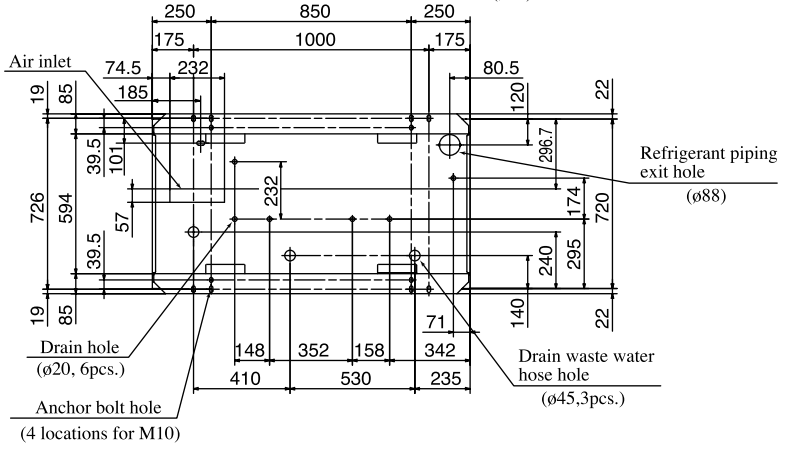
Mark \ Installation type	Ⅰ	Ⅱ	Ⅲ
L1	Open	Open	500
L2	300	5	Open
L3	150	300	150
L4	5	5	5

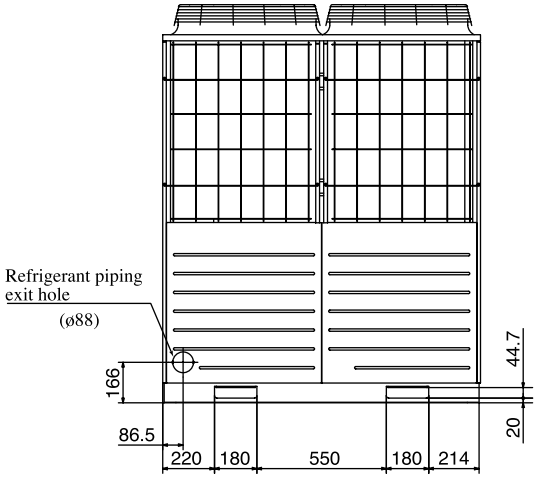
Notes
(1) It is prohibited to install in a space enclosed with walls at four sides.
(2) Unit must be secured with anchor bolts.
Anchor bolt should not protrude more than 15 mm above the surface.
(3) Where strong winds blow, the blow outlet must be oriented at right angle against the wind direction.
(4) Secure a space of 1 m or more above the unit.
(5) Barrier standing in front of the blow outlet must be lower than the height of unit.

Models FDCA801HES, 1001HES

Unit : mm

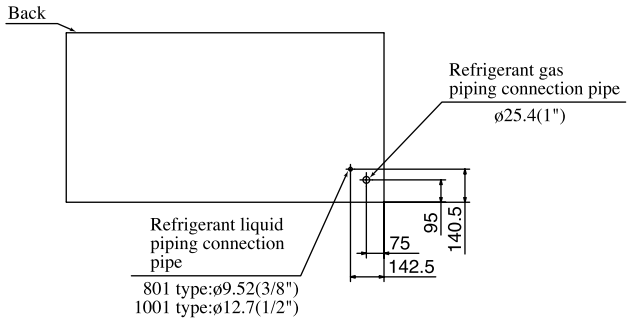






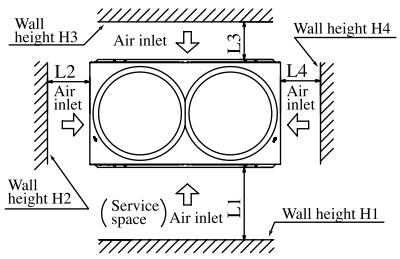
VIEW A

Dimesions after connecting included refrigerant piping (Top view)



Unit:mm

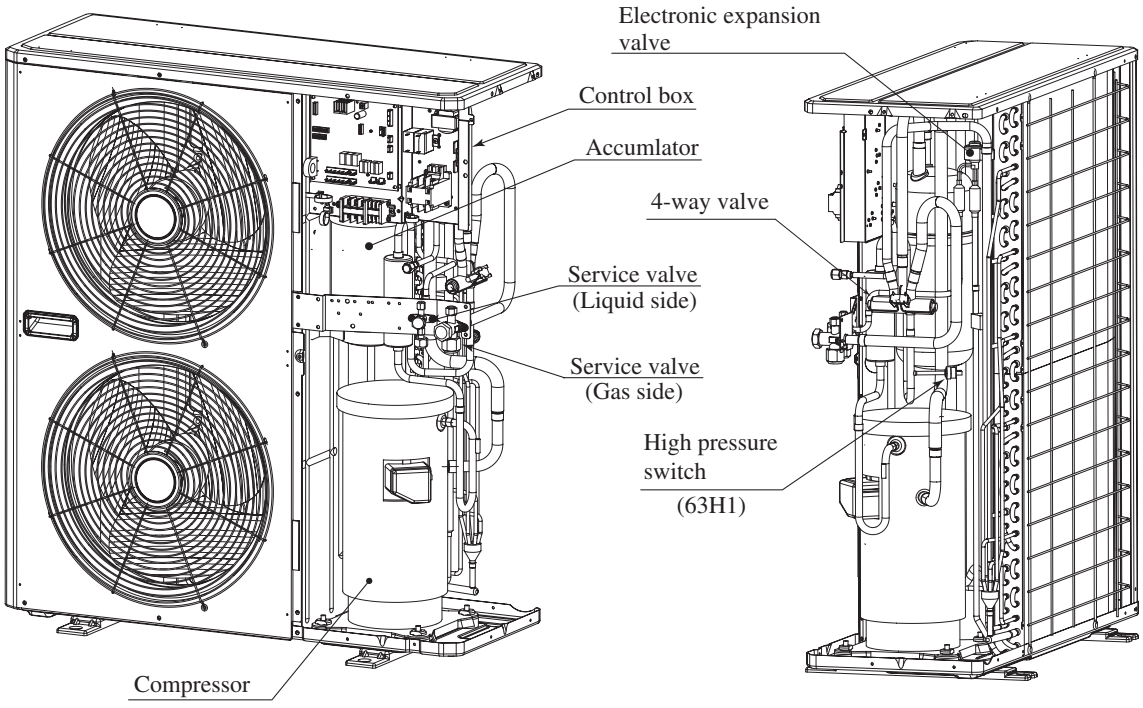
Dimensions \ Installation example	1	2
L1	500	Open
L2	10	10
L3	100	100
L4	10	Open
H1	1500	——
H2	Not limited	Not limited
H3	1000	Not limited
H4	Not limited	——



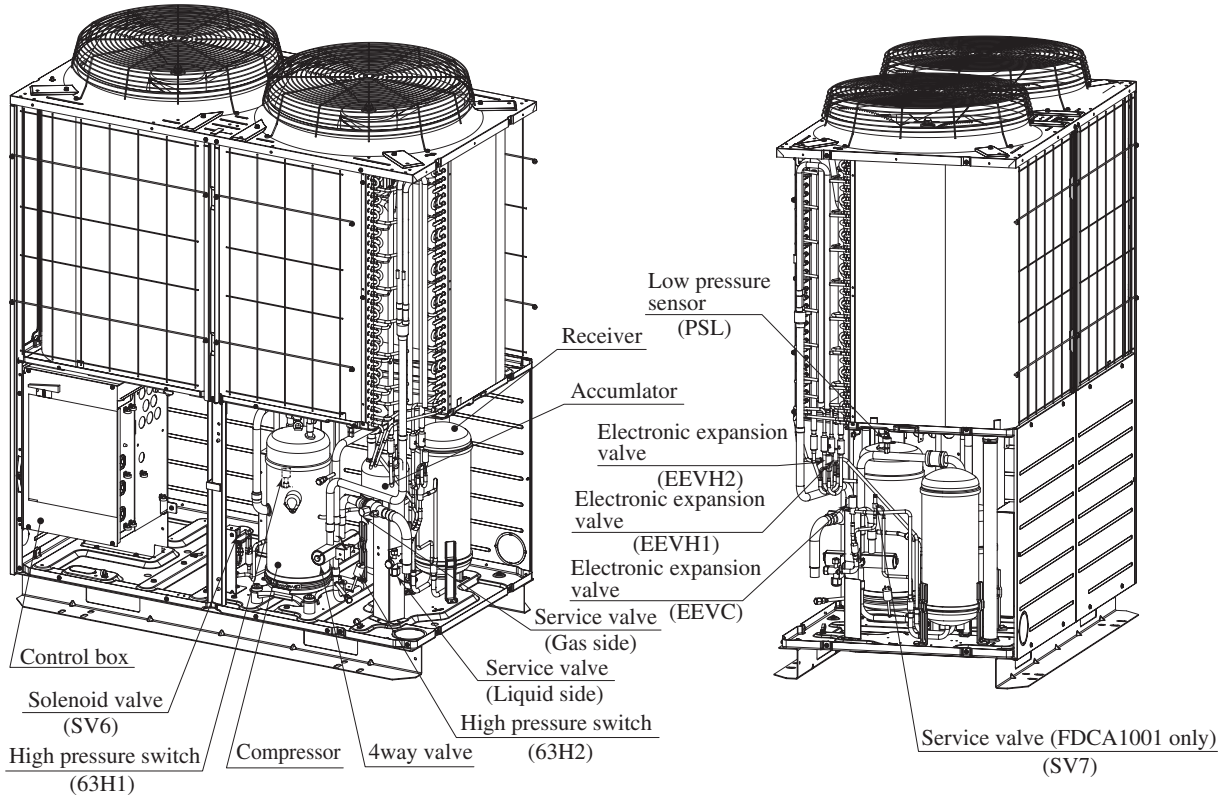
2.2.4 Inside view

(1) Outdoor unit

Models FDCA401HEN,401HES



Models FDCA801HES, 1001HES

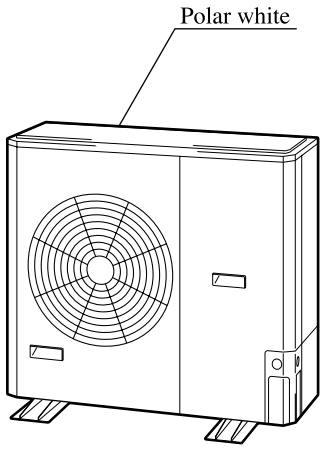


2.2.5 Exterior appearance

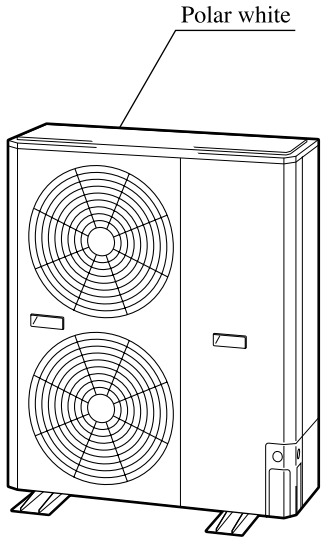
(1) Indoor unit ..... Please see page 55 of Chapter 1

(2) Outdoor unit

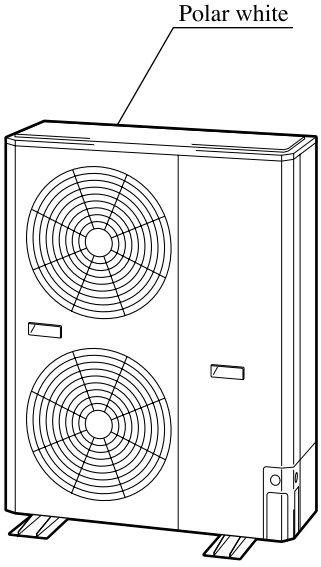
Models FDCA301HEN, 301HES



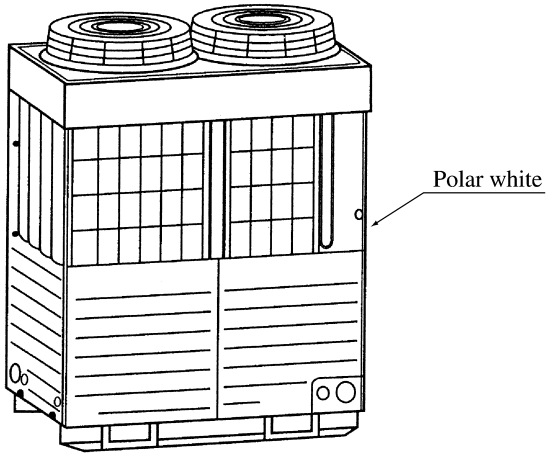
Models FDCA401HEN, 401HES



Models FDCA501HES, 601HES



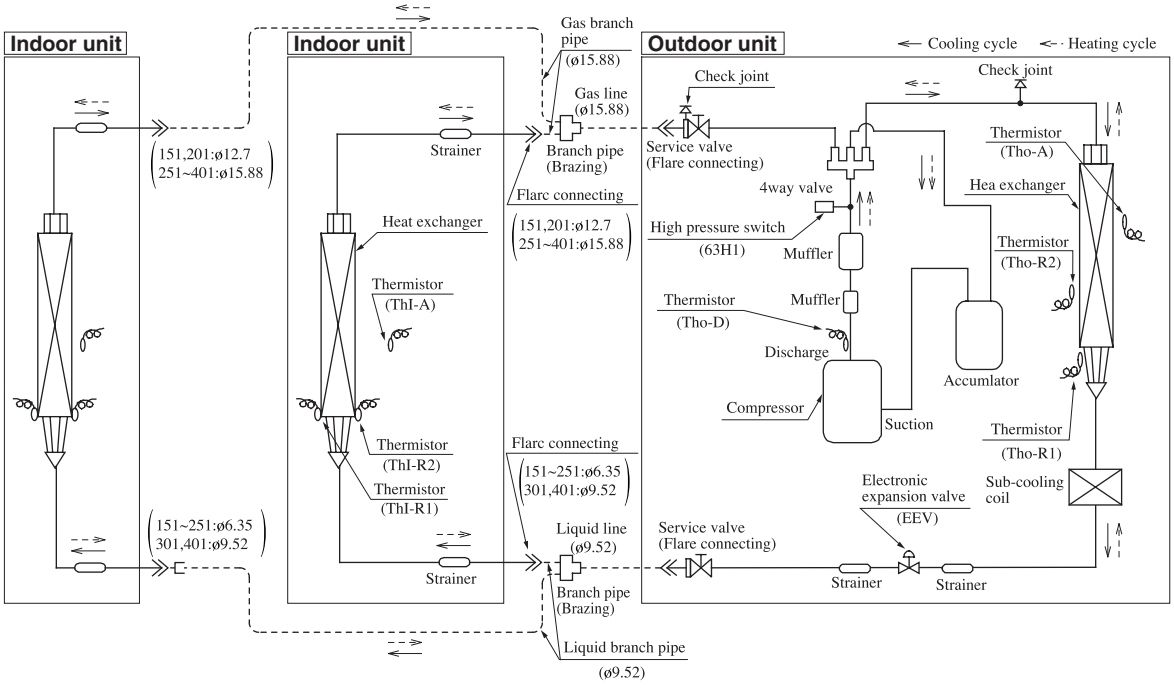
Models FDCA801HES, 1001HES



2.2.6 Piping system

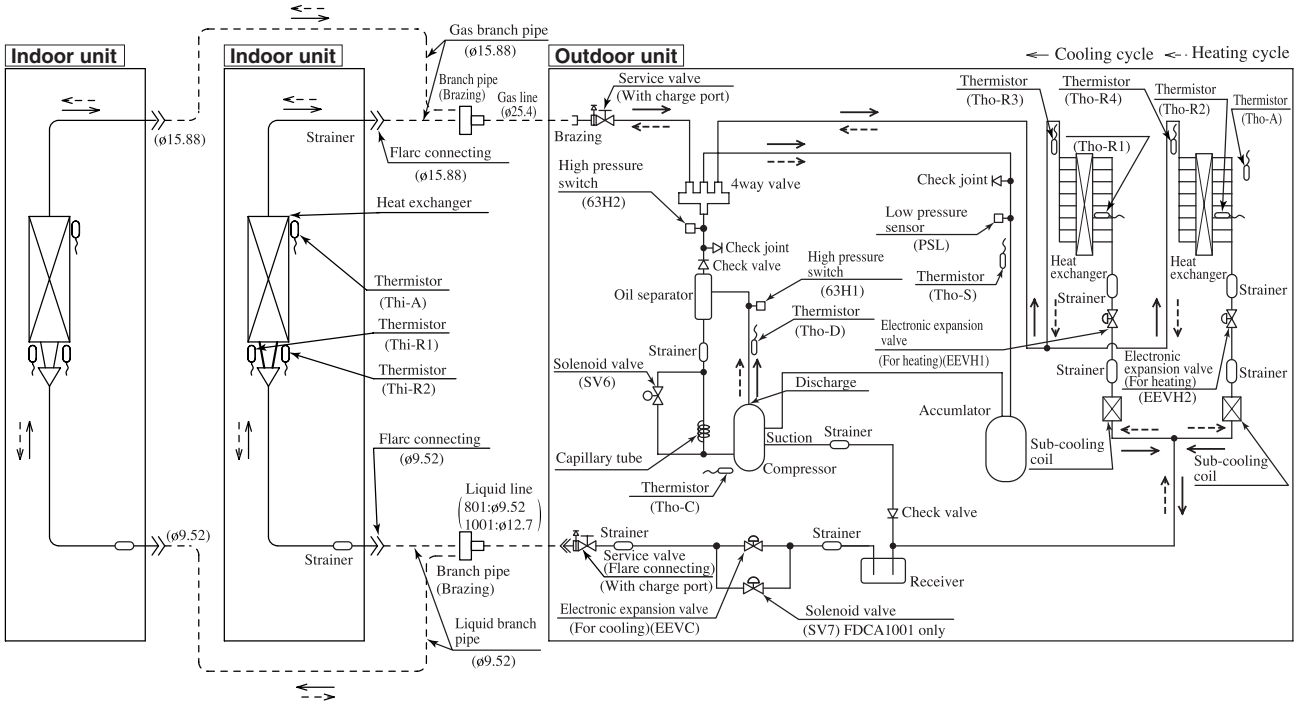
(1) Twin type

Models FDCA301HEN, 301HES, 401HEN, 401HES, 501HES, 601HES



Note (1) A FDEN type strainer only should be used for the indoor unit.
(2) If used in combination with 151~251 Series indoor units, make the fluid pipe size on the branch piping (branch to indoor unit) ø9.52.

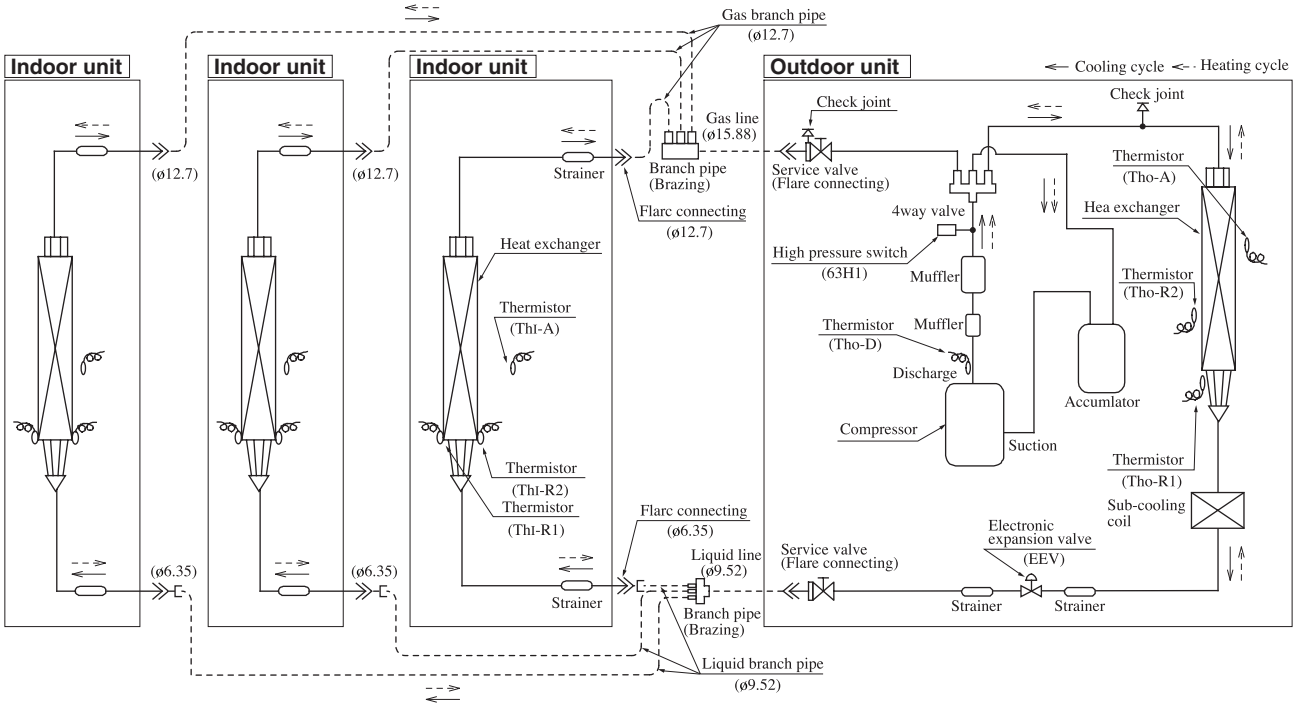
Models FDCA801HES, 1001HES



Note (1) A FDEN type strainer only should be used for the indoor unit.

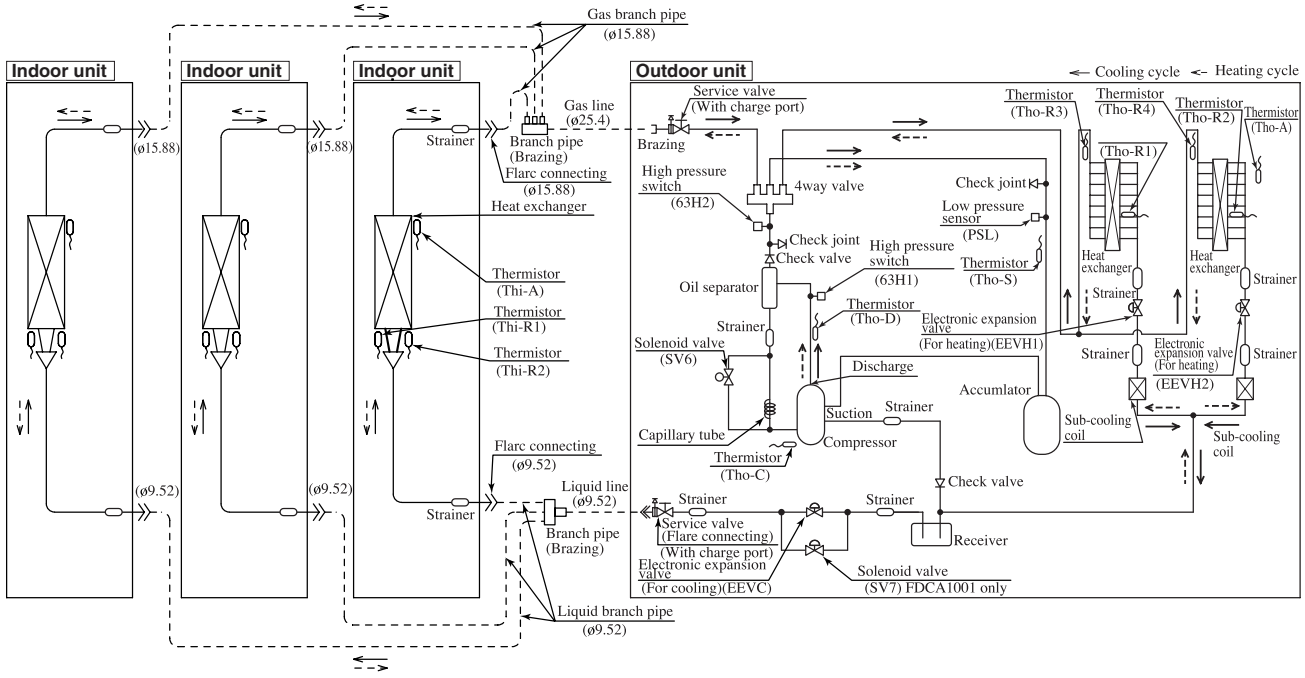
(2) Triple type

Model FDCA601HES



Note (1) A FDE type strainer only should be used for the indoor unit.
(2) Make the fluid pipe size on the branch piping (branch to indoor unit) ø 9.52.

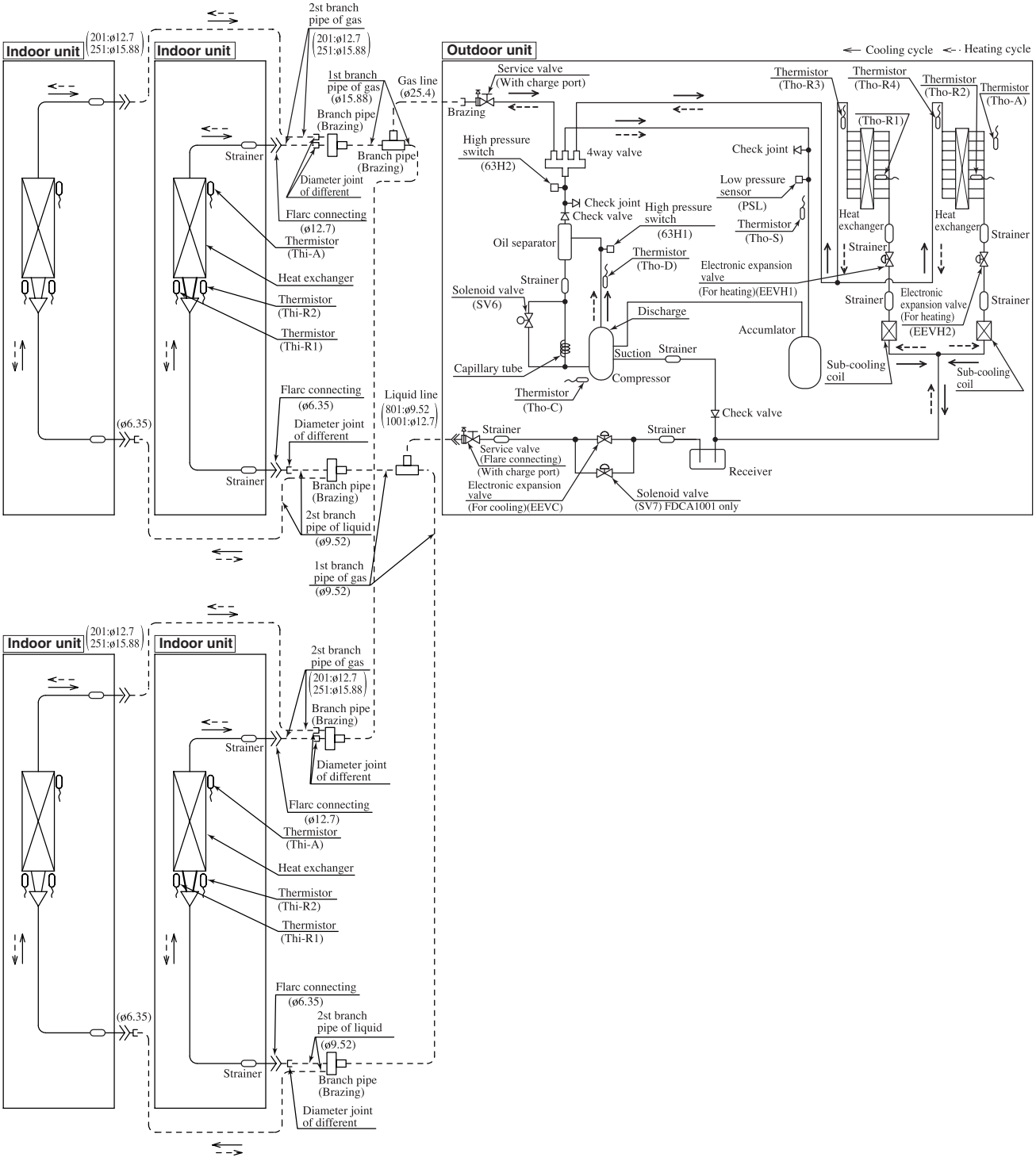
Model FDCA801HES



Note (1) A FDE type strainer only should be used for the indoor unit.

(3) Double twin type

Models FDCA801HES,1001HES



Note (1) A FDEN type strainer only should be used for the indoor unit.

(2) Make the fluid pipe size on the branch piping (branch to indoor unit) ø 9.52.

Preset point of the protective devices

Parts name	Mark	Equipped unit	FDCA301, 401, 501, 601 models	FDCA801, 1001 models
Thermistor (for protection over-loading in heating)	Th_{I}-R	Indoor unit	ON 63˚C OFF 56˚C	
Thermistor (for frost prevention)			ON 1.0˚C OFF 10˚C	
Thermistor (for detecting discharge pipe temp.)	Tho-D	Outdoor unit	ON 121˚C OFF 80˚C	ON 135˚C OFF 90˚C
High pressure switch (for protection)	63H1	Outdoor unit	Open 4.15MPa Closed 3.15MPa	

2.2.7 Selection chart

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

Net capacity = Capacity shown on specification × Correction factors as follows.

(1) Coefficient of cooling and heating capacity in relation to temperatures

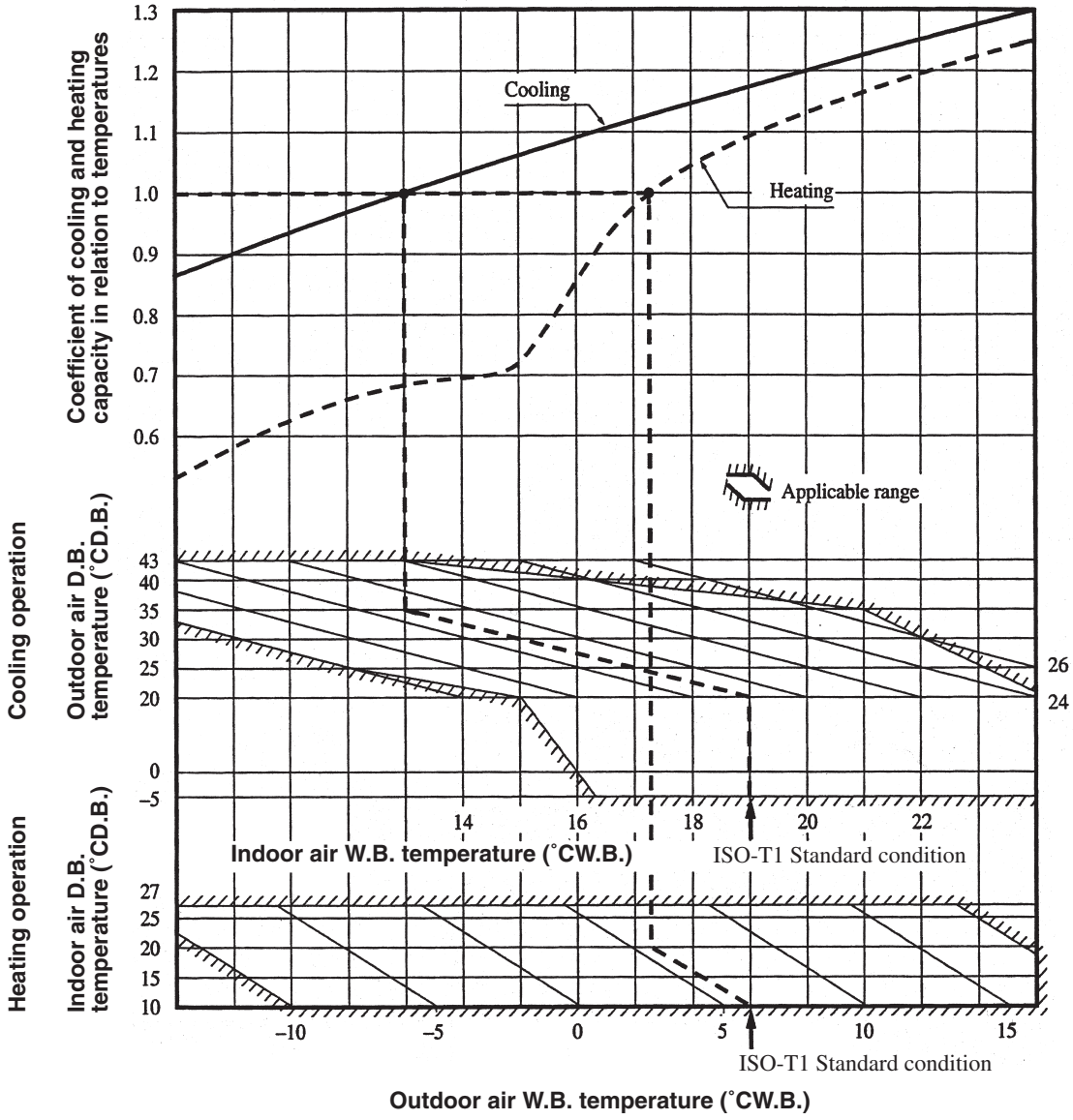


Table of bypass factor (FDT, FDEN, and FDKN series figures show the bypass factor when in the Powerful mode.)

Model FDT type

Item \ Model		FDTA151, 201	FDTA251, 301	FDTA401	FDTA501
Air flow	Hi	0.186	0.040	0.027	0.025
	Me	0.160	0.031	0.021	0.021
	Lo	0.151	0.025	0.018	0.017

Model FDEN type

Item \ Model		FDENA151, 201	FDENA251, 301	FDENA401	FDENA501
Air flow	Hi	0.017	0.026	0.020	0.023
	Me	0.014	0.022	0.016	0.020
	Lo	0.009	0.015	0.013	0.016

Model FDKN type

Item \ Model		FDKNA151, 201	FDKNA251	FDKNA301
Air flow	Hi	0.056	0.063	0.043
	Me	0.041	0.048	0.034
	Lo	0.028	0.034	0.025

Model FDUR type

Item \ Model		FDURA201	FDURA251	FDURA301	FDURA401	FDURA501
Air flow	Hi	0.111	0.053	0.069	0.106	0.050
	Lo	0.083	0.037	0.049	0.079	0.034

(2) Correction of cooling and heating capacity in relation to air flow rate control (fan speed)
Coefficient: 1.00 at High, 0.95 at Low

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

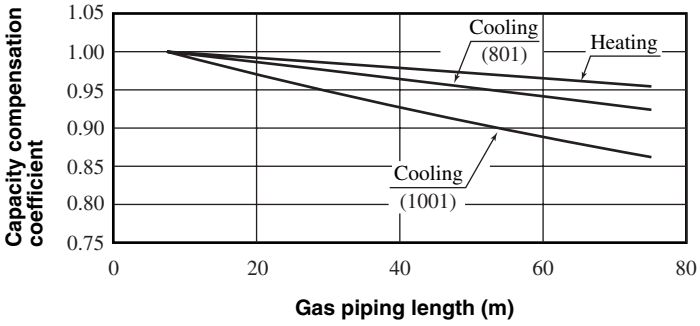
It is necessary to correct the cooling and heating capacity in relation to the one way equivalent piping length between the indoor and outdoor units.

Models FDCA301~601

Equivalent piping length(1) m		7.5	10	15	20	25	30	35	40	45	50	55
Heating		1	0.995	0.992	0.990	0.987	0.984	0.981	0.978	0.975	0.972	0.970
Cooling	FDCA301 model	1	0.996	0.989	0.982	0.974	0.967	0.959	0.952	0.945	0.937	0.930
	FDCA401 model	1	0.995	0.986	0.976	0.967	0.957	0.948	0.938	0.929	0.919	0.910
	FDCA501 model	1	0.994	0.982	0.969	0.957	0.945	0.933	0.921	0.908	0.896	0.884
	FDCA601 model	1	0.993	0.978	0.963	0.948	0.933	0.918	0.903	0.888	0.873	0.858

Models FDCA801, 1001

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	0.992	0.986	0.980	0.974	0.968	0.962	0.956	0.951	0.945	0.939	0.933	0.927	0.921
Cooling	FDCA801 model	1	0.997	0.984	0.972	0.960	0.949	0.937	0.926	0.916	0.906	0.896	0.886	0.877	0.869	0.860
	FDCA1001 model	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



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

- Equivalent Length = Actual Length + (equivalent length of bends x number of bends in the piping)

Equivalent Length for 1 Bend

Gas Pipe Diameter (mm)	ø9.52	ø12.7	ø15.88	ø19.05	ø25.4
Bend Equivalent Length	0.15	0.20	0.25	0.30	0.40

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

Height difference between the indoor unit and outdoor unit in the vertical height difference	**5m**	**10m**	**15m**	**20m**	**25m**	**30m**
Adjustment coefficient	0.01	0.02	0.03	0.04	0.05	0.06

Piping length limitations

Item \ Model	FDCA301~601 models	FDCA801, 1001 models
Max. one way piping length	50m	70m
Max. vertical height difference	Outdoor unit is higher 30m	Outdoor unit is lower 15m

Note (1) Values in the table indicate the one way piping length between the indoor and outdoor units.

How to obtain the cooling and heating capacity

Example : The net cooling capacity of the model FDCA301HEN 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 ˚C and outdoor dry-bulb temperature 35 ˚C is

Net cooling capacity = 7200 × 1.00 × (0.989 - 0.01) × 1.0 = 7049 w

- 7200 : FDCA301HEN
- 1.00 : Air flow "High"
- (0.989 - 0.01) : Length 15m. Height difference 5 m
- 1.0 : Factor by air temperatures

2.2.8 Characteristics of fan please see page 61 of chapter 1

2.2.9 Noise level

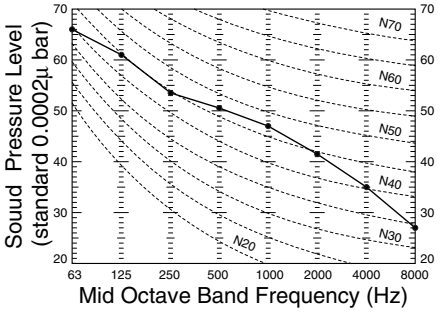
Notes (1) The data are based on the following conditions.
Ambient air temperature: Indoor unit 27˚C DB, 19˚C WB. Outdoor unit 35˚C DB.
(2) The data in the chart are measured in an unechonic room.
(3) The noise levels measured in the field are usually higher than the data because of reflection.
(4) Noise levels for the FDT, FDEN and FDKN series show the noise level when in the Powerful mode.

(1) Indoor unit please see page 62 of chapter 1

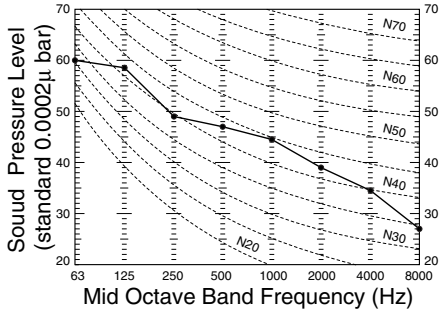
(2) Outdoor unit

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

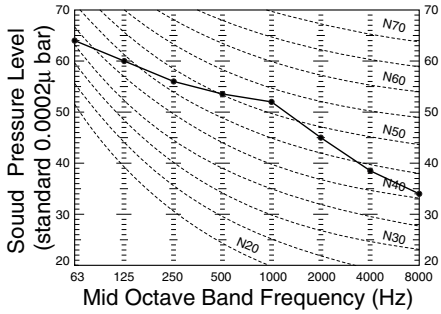
Models FDCA301HEN, 301HES
Noise level 53 dB (A)



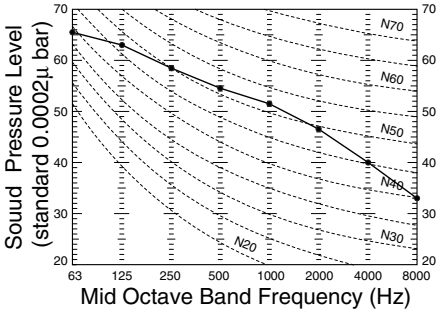
Models FDCA401HEN, 401HES
Noise level 54 dB (A)



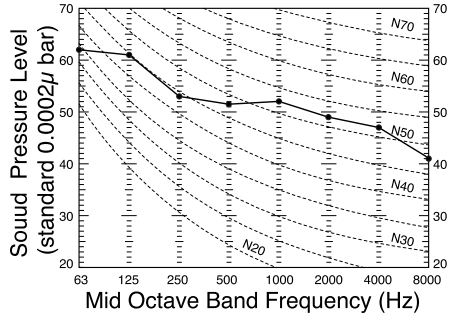
Model FDCA501HES
Noise level 56 dB (A)



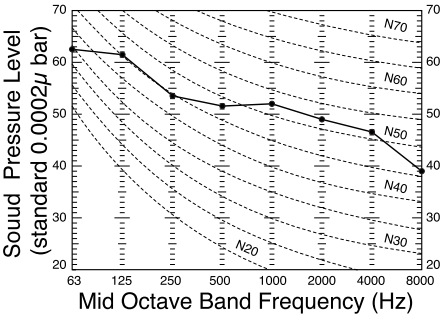
Model FDCA601HES
Noise level 57 dB (A)



Model FDCA801HES
Noise level 57 dB (A)



Model FDCA1001HES
Noise level 57 dB (A)



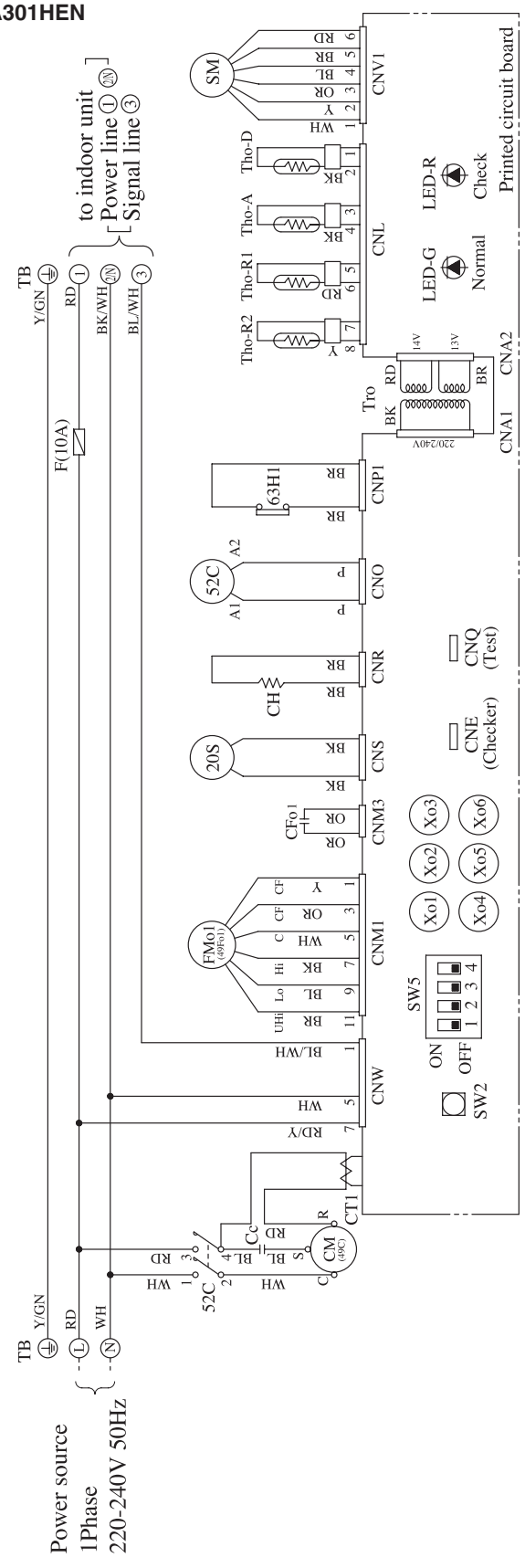
2.3 ELECTRICAL DATA

2.3.1 Electrical wiring

(1) Indoor unit ..... Please see page 66 of Chapter 1

(2) Outdoor unit

Models FDCA301HEN

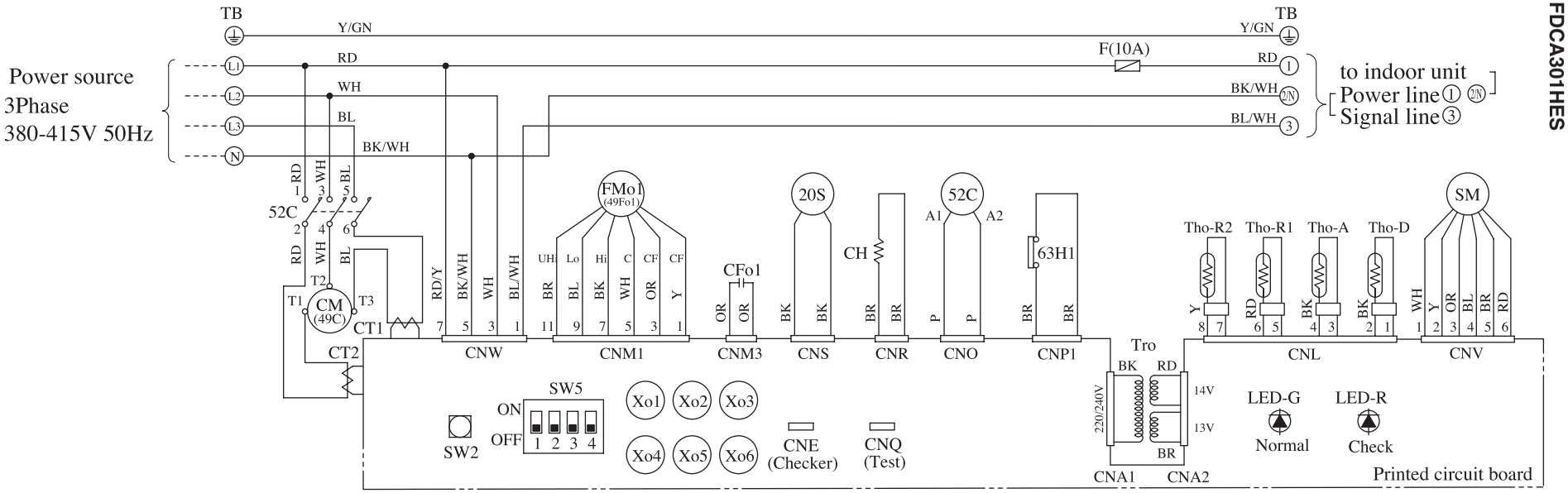


Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
Cc	Capacitor for CM	**SM**	Stepping motor(for EEV)	**Xo1**	Auxiliary relay(for 52C)
CFo1	Capacitor for FMo1	**SW2**	Test run switch	**Xo2,3,4**	Auxiliary relay(for FMo)
CH	Crankcase heater	**SW5-1**	Defrost control switch	**Xo5**	Auxiliary relay(for 20S)
CM	Compressor motor	**SW5-2**	Snow prevented fan control switch	**Xo6**	Auxiliary relay(for CH)
CNA~Z	Connector(□ mark)	**SW5-4**	Operate test run switch	**20S**	4 way valve(coil)
CT1	Current sensor	**TB**	Terminal block(○ mark)	**49C**	Internal thermostat for CM
F	Fuse	**Tho-A**	Thermistor(outdoor air temp.)	**49Fo1**	Internal thermostat for FMo1
FMo1	Fan motor	**Tho-D**	Thermistor(discharge temp.)	**52C**	Magnetic contactor for CM
LED-G	Indication lamp(Green)	**Tho-R1,2**	Thermistor(outdoor H.EX. temp.)	**63H1**	High pressure switch
LED-R	Indication lamp(Red)	**Tro**	Transformer		

Color marks

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

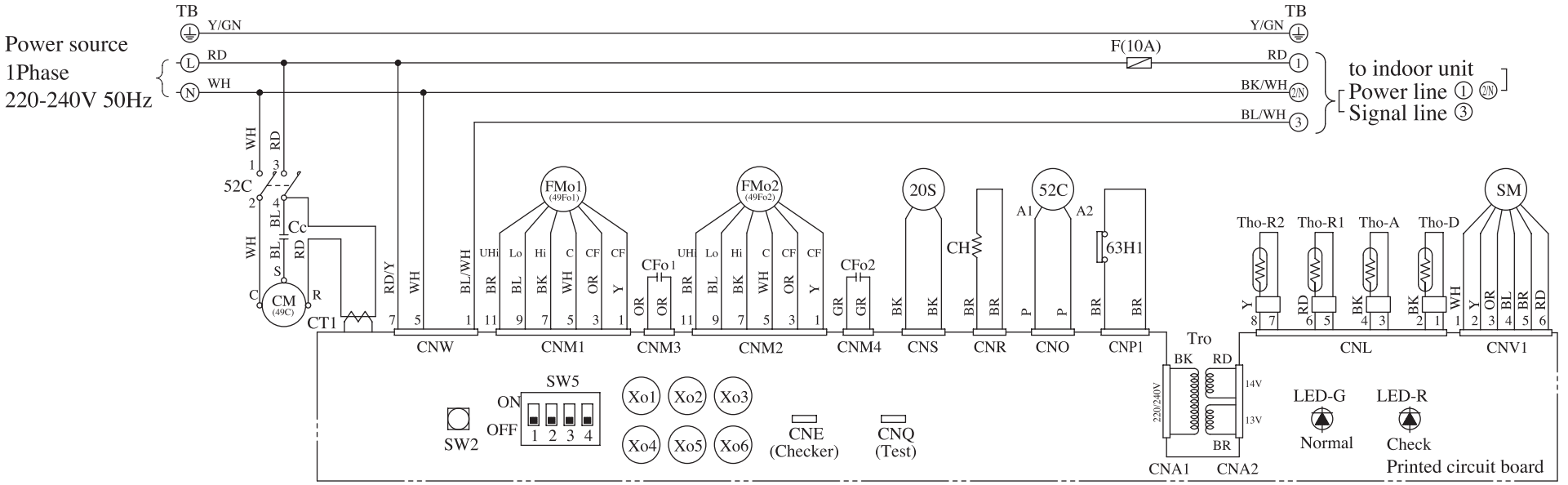


Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
CFo1	Capacitor for FMo1	**SW2**	Test run switch	**Xo2,3,4**	Auxiliary relay(for FMo)
CH	Crankcase heater	**SW5-1**	Defrost control switch	**Xo5**	Auxiliary relay(for 20S)
CM	Compressor motor	**SW5-2**	Snow prevented fan control switch	**Xo6**	Auxiliary relay(for CH)
CNA~Z	Connector(□mark)	**SW5-4**	Operate test run switch	**20S**	4 way valve(coil)
CT1,2	Current sensor	**TB**	Terminal block(○mark)	**49C**	Internal thermostat for CM
F	Fuse	**Tho-A**	Thermistor(outdoor air temp)	**49Fo1**	Internal thermostat for FMo1
FMo1	Fan motor	**Tho-D**	Thermistor(discharge temp)	**52C**	Magnetic contactor for CM
LED-G	Indication lamp(Green)	**Tho-R1,2**	Thermistor(outdoor H.Ex.temp)	**63H1**	High pressure switch
LED-R	Indication lamp(Red)	**Tro**	Transformer		
SM	Stepping motor(for EEV)	**Xo1**	Auxiliary relay(for 52C)		

Color marks

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



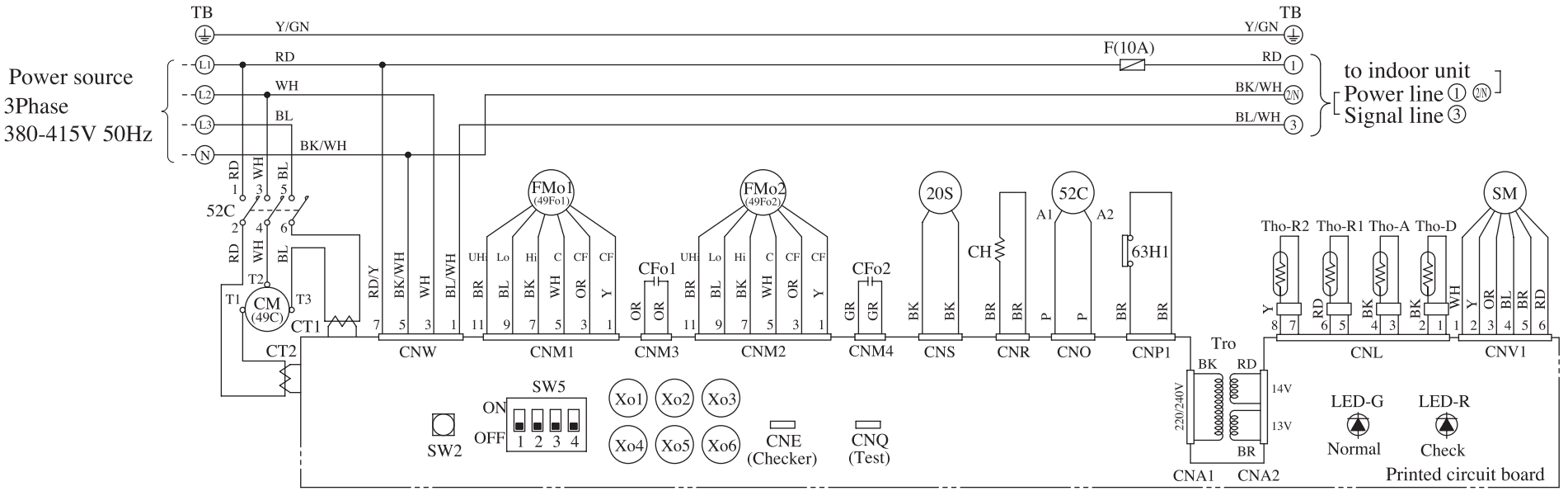
Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
Cc	Capacitor for CM	**SM**	Stepping motor(for EEV)	**Xo1**	Auxiliary relay(for 52C)
CFo1,2	Capacitor for FMo1,2	**SW2**	Test run switch	**Xo2,3,4**	Auxiliary relay(for FMo)
CH	Crankcase heater	**SW5-1**	Defrost control switch	**Xo5**	Auxiliary relay(for 20S)
CM	Compressor motor	**SW5-2**	Snow prevented fan control switch	**Xo6**	Auxiliary relay(for CH)
CNA~Z	Connector(□ mark)	**SW5-4**	Operate test run switch	**20S**	4 way valve(coil)
CT1	Current sensor	**TB**	Terminal block(○ mark)	**49C**	Internal thermostat for CM
F	Fuse	**Tho-A**	Thermistor(outdoor air temp.)	**49Fo1,2**	Internal thermostat for FMo1,2
FMo1,2	Fan motor	**Tho-D**	Thermistor(discharge temp.)	**52C**	Magnetic contactor for CM
LED-G	Indication lamp(Green)	**Tho-R1,2**	Ther mistor(outdoor H.EX. temp.)	**63H1**	High pressure switch
LED-R	Indication lamp(Red)	**Tro**	Transformer		

Color marks

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

V MULTI

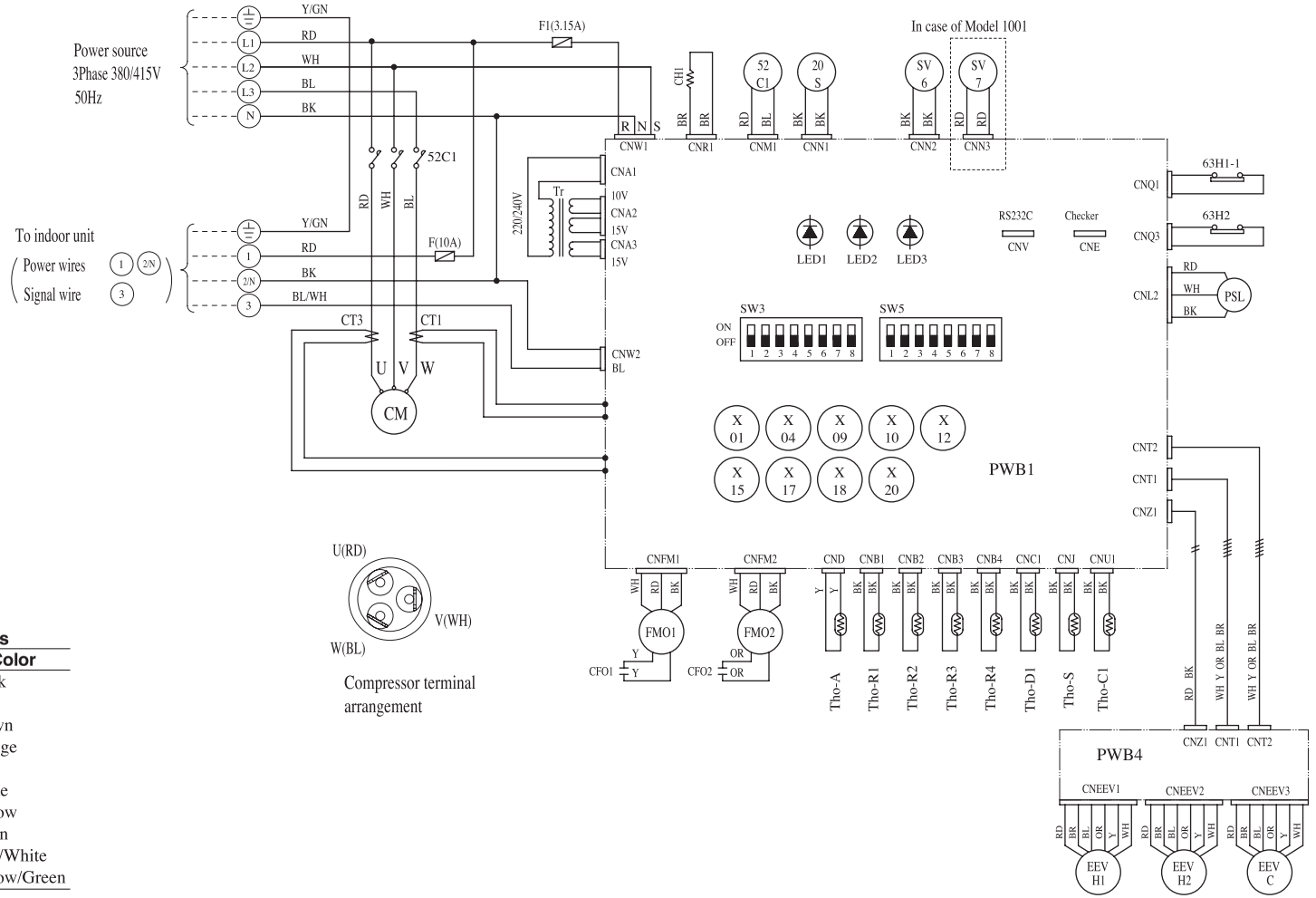


Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
CFo1,2	Capacitor for FMo1,2	**SW2**	Test run switch	**Xo2,3,4**	Auxiliary relay(for FMo)
CH	Crankcase heater	**SW5-1**	Defrost control switch	**Xo5**	Auxiliary relay(for 20S)
CM	Compressor motor	**SW5-2**	Snow prevented fan control switch	**Xo6**	Auxiliary relay(for CH)
CNA~Z	Connector(□mark)	**SW5-4**	Operate test run switch	**20S**	4 way valve(coil)
CT1,2	Current sensor	**TB**	Terminal block(○ mark)	**49C**	Internal thermostat for CM
F	Fuse	**Tho-A**	Thermistor(outdoor air temp)	**49Fo1,2**	Internal thermostat for FMo1,2
FMo1,2	Fan motor	**Tho-D**	Thermistor(discharge temp)	**52C**	Magnetic contactor for CM
LED-G	Indication lamp(Green)	**Tho-R1,2**	Thermistor(outdoor H.Ex.temp)	**63H1**	High pressure switch
LED-R	Indication lamp(Red)	**Tro**	Transformer		
SM	Stepping motor(for EEV)	**Xo1**	Auxiliary relay(for 52C)		

Color marks

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



Color marks

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

Meaning of marks

Mark	Parts name	Mark	Parts name	Mark	Parts name
CM	Compressor motor	20S	4way valve	Tho-S	thermistor (suction temp.)
FMO1,2	Fan motor	SV6	Solenoid valve (oil separator)	PSL	Low pressure sensor
52C1	Magnetic contactor for CM	SV7	Solenoid valve (for assistance of EEVC)	CT1,CT3	Current sensor
CH1	Crankcase heater	EEVH1,2	Expansion valve for heating	Tr	Transformer
CFO1,2	Fan motor condenser	EEVC	Expansion valve for cooling	TB1	Terminal block (○ mark)
X01	Auxiliary relay (for 52C1)	63H1-1	High pressure switch (for protection)	F,F1	Fuse
X04	Auxiliary relay (for 20S)	63H2	High pressure switch (for control)	CnA~Z	Connector (□ mark)
X09	Auxiliary relay (for SV6)	Tho-A	thermistor (outdoor air temp.)	PWB1,4	Printed wiring board
X10	Auxiliary relay (for SV7)	Tho-C1	thermistor (dome temp.)	LED1	Indication lamp (red)
X12	Auxiliary relay (for CH1)	Tho-D1	thermistor (discharge temp.)	LED2	Indication lamp (green)
X15,17	Auxiliary relay (for FMO1)	Tho-R1,2	thermistor (outdoor H.X. temp. exhaust)	LED3	Indication lamp (green for service)
X18,20	Auxiliary relay (for FMO2)	Tho-R3,4	thermistor (outdoor H.X. temp. inlet)		

Function of switches

Mark		Function	Mark		Function
SW3-1	ON	Defrosting-Cold weather region	SW5-1	ON	Renewal switch
	OFF	Defrosting-Normal		OFF	Normal
SW3-2	ON	Snow protection control-With	SW5-2	ON	Reserve
	OFF	Snow protection control-None		OFF	
SW3-3	ON	Test run operation switch: Test run	SW5-3	ON	LED reset
	OFF	Normal		OFF	Normal
SW3-4	ON	Test run operation: Heating	SW5-4	ON	Test mode
	OFF	Test run operation: Cooling		OFF	Normal
SW3-5	ON	Pump down			
	OFF	Normal			
SW3-6	ON	Defrosting end operation change			
	OFF	Normal			

V MULTI

2.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

(1) Remote controller ..... Please see page 77 of Chapter 1

(2) Operation control function by the indoor unit ..... Please see page 79 of Chapter 1

(3) Operation control function by the wired remote controller ..... Please see page 86 of Chapter 1

(4) Operation control function by the outdoor controller

(a) Compressor Starting Control (FDCA801, 1001 models only)

The controls in 1) and 2) are performed at the moment when compressor operating conditions are met.

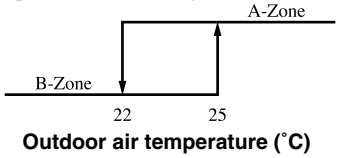
1) If the operating mode is the same as the mode the first time the compressor started after the power was turned ON or the same as the operating mode the previous time.
   The oil return solenoid valve (SV6) and expansion valve auxiliary solenoid valve (SV7 (in the 1001 model only)) go ON, then the compressor starts 5 seconds later.
2) If the operating mode changes from the previous operating mode.
   The 4-way valve switches after 10 seconds, each solenoid valve in item 1) goes ON, then 20 seconds later, the compressor starts.

(b) Outdoor fan control

♦FDCA301~ 601 models only

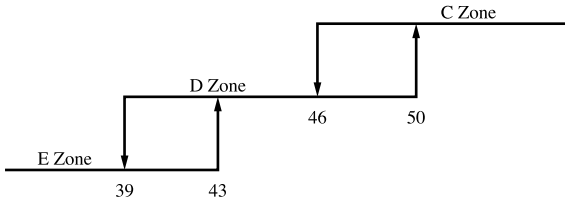
1) Outdoor fan tap control during cooling

The outdoor fan is controlled according to the outdoor heat exchanger temperature (sensed by Tho-R) and outdoor air temperature (sensed by Tho-A).



Outdoor air temperature (˚C)

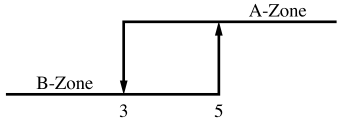
Zone	A	B
C	UHi	
D	Hi	
E	Hi	Lo



Outdoor heat exchanger temperature (˚C)

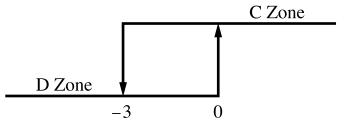
2) Outdoor fan tap control during heating

The outdoor fan tap is controlled in accordance with the outdoor heat exchanger temperature (sensed by Tho-R) and the outdoor air temperature (sensed by Tho-A).



Outdoor air temperature (˚C)

Zone	A	B
C	Hi	
D	Hi	UHi



Outdoor heat exchanger temperature (˚C)

3) Outdoor fan tap control during heating high pressure control

a) If the compressor is started with an outdoor air temperature (sensed by Tho-A) of 12ºC or higher, the outdoor unit's fan motor is turned OFF for 4 minutes, then after 4 minutes of operation, control switches to outdoor fan tap control in item 2).

b) If the outdoor air temperature (sensed by Tho-A) becomes 12 ºC or lower with the outdoor fan motor OFF, operation continues for 4 minutes with the outdoor fan motor OFF.

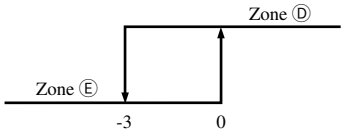
♦FDCA801, 1001 models only

1) Fan speed and fan motor control contents during control

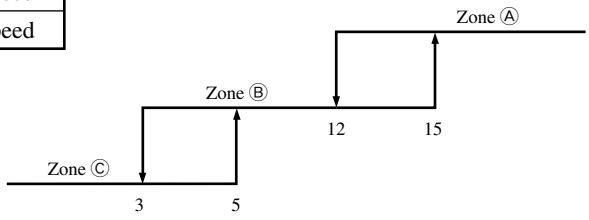
Fan speed	FM01	FM02
4 th speed	Hi	Hi
3 th speed	Hi	Lo
2 th speed	Lo	Lo
1 th speed	Lo	OFF
0 th speed	OFF	OFF

2) During heating operation, the fan speed is controlled in accordance with the outdoor heat exchanger temperature (detected by Tho-R) and the outside air temperature (detected by Tho-A).

Tho-R \ Tho-A	Zone Ⓐ	Zone Ⓑ	Zone Ⓒ
Zone Ⓓ	1th speed	4th speed	4th speed
Zone Ⓔ	1th speed	4th speed	4th speed



Outdoor heat exchanger temperature (˚C)

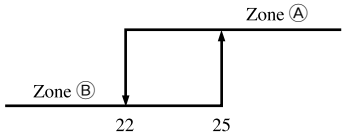


Outside air temperature (˚C)

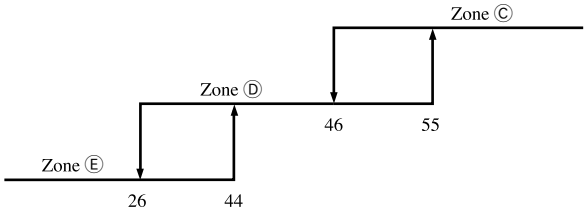
Notes (1) The temperature at whichever outdoor heat exchanger temperature thermistor (Tho-R1 or R2) has the lowest reading is detected.

3) The fan speed is controlled in accordance with the outdoor heat exchanger temperature (detected by Tho-R) and the outside air temperature (detected by Tho-A) during cooling or dehumidifying.

Tho-R \ Tho-A	Zone Ⓐ	Zone Ⓑ
Zone Ⓒ	4th speed	4th speed
Zone Ⓓ	4th speed	2th speed
Zone Ⓔ	2th speed	1th speed



Outside air temperature (˚C)



Outdoor heat exchanger temperature (˚C)

Notes (1) The temperature at whichever outdoor heat exchanger temperature thermistor (Tho-R1 or R2) has the highest reading is detected.

4) Outdoor fan speed control during heating

a) If the fan starts when the outside air temperature (detected by Tho-A) is 12ºC or higher, the outdoor fan motor runs at speed A for 4 minutes, then after 4 minutes control switches to the outdoor fan speed control in item 2).

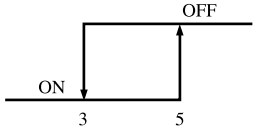
Model \ Control speed	Speed A
801H	1th speed
1001H	0th speed

b) Even if the outside air temperature (detected by Tho-A) drops below 12ºC during operation with the outdoor fan motor OFF, the outdoor fan motor continues to run at 2th speed for 4 minutes.

(c) Snow protection fan control

If SW5-2 (SW3-2) on the outdoor unit PCB is turned ON, a full stop results. Then in the abnormal stop mode and with the thermostat OFF unit's outdoor fan outdoor temperature at 3ºC or lower, the fan is run for 10 seconds at 6th speed once every 10 minutes [Hi tap (4th speed)] .

Note (1) Items is ( ) show in the case of models FDCA801, 1001.



Outdoor air temperature (˚C)

(d) Defrosting

1) Defrosting start conditions

Defrosting operation starts when all the following conditions are satisfied.

a) If 45 (1) minutes of cumulative compressor operating time have passed since defrosting ended and cumulative compressor operating time of 30 minutes have passed since heating operation started (Remote controller: ON)

Note (1) In the case of FDCA301~601, the cumulative time can be changed to 37 minutes by opening jumper J7 (SW6-3) on the outdoor unit's PCB.

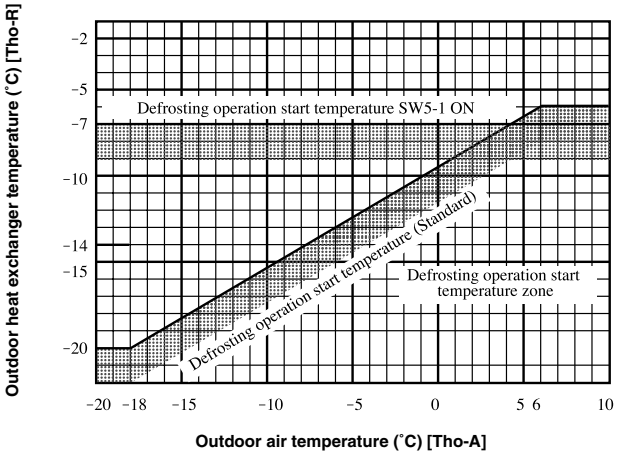
b) If 5 minutes have passed since the compressor went ON.

c) 5 minutes of outdoor fan operation have passed.

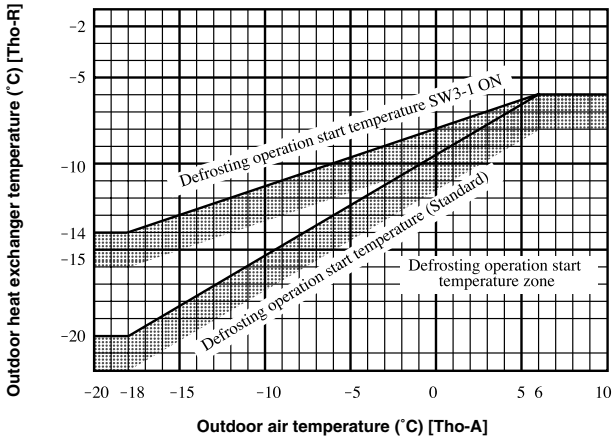
d) After all the above conditions have been met, when the temperature sensed by the outdoor heat exchanger temperature thermistor (Tho-R) and outdoor temperature thermistor (Tho-A) continues for 30 (15) seconds and drops below the dehumidifying operation start temperature shown in the figure at right.

Note (1) Values in ( ) show in the case of the FDCA801, 1001 models.

♦ **Models FDCA301~601**



♦ **Models FDCA801, 1001**



2) Defrosting start temperature change procedure

Turn SW5-1 (SW3-1) on the outdoor unit PCB ON.

a) A cumulative total of 30 minutes of compressor operating time has passed since defrosting ended.

b) When the temperature at the outdoor heat exchanger thermistor (Tho-R) and the temperature at the outdoor air temperature thermistor (Tho-A) is below the defrost operation start temperature continuously for 30 (15) seconds.

c) Other than items a) and b), the same as standard conditions.

Note (1) Values in ( ) show in the case of the FDCA801, 1001 models.

3) Defrosting end conditions

If any of the following conditions is satisfied, the defrosting end operation starts.

♦ **Models FDCA301~601 only**

a) If 10 minutes (1) have passed since defrosting started.

b) If the temperature at the outdoor heat exchanger thermistor (Tho-R) is 14ºC or higher continuously for 2 seconds.

Notes (1) This setting can be changed to 12 minutes by turning SW5-1 on the outdoor unit PCB ON.
(2) When jumper wire J6 (when SW6-2 OFF) is open, raise the defrosting end temperature and carry out forced defrosting.

♦ **Models FDCA801, 1001 only**

a) When 10 minutes 20 seconds have passed since dehumidifying started.

b) When the outdoor heat exchanger thermistor (Tho-R) senses a temperature of 12ºC or higher continuously for 10 seconds.

(e) Compressor protection control

(i) Compressor overcurrent protection

♦ **Models FDCA301~601 only**

1) If a value at or higher than the set value is detected continuously for approximately 0.5 second in the L1 and L2 phases (1 phase model: L phase) on the secondary side of the 52C (sensed by the current sensor (CT)), the compressor stops. After a 3-minute delay, the compressor restarts if the detected current is 1.5 ~ 2 A or lower, but if this condition is repeated 5 times within 60 minutes of the first detection, the unit is subjected to an abnormal stop (E33).

2) After the compressor stops the first time, if 60 seconds pass with the detected current not dropping to 1.5~2 A or lower for 60 minutes, An abnormal stop is performed after the first time.

♦Models FDCA801, 1001 only

1) If an overcurrent of 20A or greater is detected 5 times in 60 minutes after the compressor goes ON, or if an overcurrent of 20A or greater is detected continuously for 60 minutes while the compressor is stopped, an abnormal stop (E33) occurs.
2) If the overcurrent is detected to be 1.5 ~ 2A, operation recovers automatically.

(ii) Reverse phase and out of phase detection

1) Reverse phase protection

The phase sequence in the 52C secondary side is detected, and in cases other than those shown below, reverse phase is judged and the unit is subjected to an abnormal stop (E32).

Terminal block display	L1 · L2 · L3 · N
Wire connections	L1 · L2 · L3 · N
	L3 · L1 · L2 · N
	L2 · L3 · L1 · N

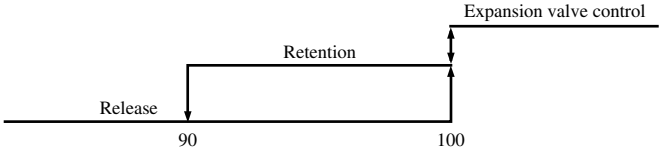
2) Out of phase detection (Detected by the T-phase)

If a current of 1.5 ~ 2A or lower is detected continuously for 4 seconds during compressor operation, the compressor is stopped. If it is detected again within 60 minutes after it is detected the first time, and if it is detected while the compressor is ON within 10 minutes after the power is turned ON (FDCA801, 1001 only), an abnormal stop (E34) occurs.

(iii) Discharge pipe temperature control (Models FDCA301~601 only)

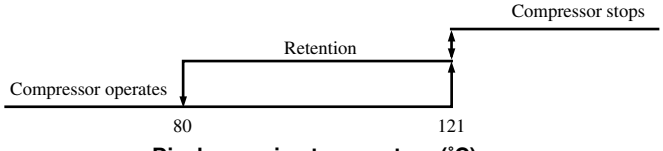
If the discharge pipe temperature (sensed by Tho-D) exceeds the set value, the expansion valve opening angle is controlled to prevent the discharge pipe temperature from rising. If it continues to rise anyway, the compressor is stopped.

1) Compressor speed (Expansion valve) control



2) Abnormal discharge pipe temperature

a) If the discharge pipe temperature rises to 121ºC or higher, the compressor is stopped [the outdoor unit's fan motor stops 30 seconds later. If the temperature drops to 80ºC or lower, the compressor recovers automatically.

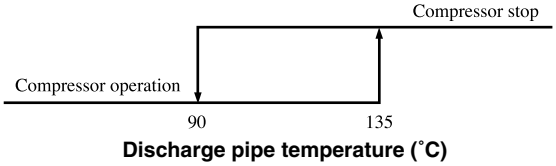


b) If the abnormal discharge pipe temperature occurs 5 times in 60 minutes, or continues at 121ºC or higher for 60 minutes, including when the compressor is stopped, the unit performs an abnormal stop (E36).

Note (1) If the abnormal discharge pipe temperature continues for 45 minutes from the time it first occurs and does not drop below 80ºC, the compressor cannot be operated again.. (It can be reset using the remote control unit.)

(iv) Abnormal discharge pipe temperature (Models FDCA801, 1001)

1) If the discharge pipe temperature rises to 135ºC or higher, the compressor stops. If the temperature drops to 90ºC or lower, the compressor recovers automatically.



2) If the discharge pipe temperature is abnormal 5 times within 60 minutes, including when the compressor is stopped, or is 135ºC or higher continuously for 60 minutes, then unit undergoes an abnormal stop (E36).

(v) High pressure control

♦Models FDCA301~601 only

1) Heating

a) After the compressor starts, the temperature at the indoor heat exchanger temperature (ThI-R) is checked, and when all the following conditions are met, the electronic expansion valve (EEV) is controlled to control the high pressure rise.
① The indoor heat exchanger temperature (ThI-R) is 60 (56)ºC or higher while the compressor is running.
② The electronic expansion valve's (EEV) opening angle is 470 pulses or lower.

b) This control ends when the indoor heat exchanger temperature (ThI-R) becomes 57 (54) ºC or lower.
Note (1) Values in ( ) show the setting when DIP switch SW 5-3 is ON. (It is normally OFF.)

2) Cooling

a) After the compressor starts, when all the following conditions are met, the electronic expansion valve (EEV) is controlled to control the high pressure rise.
① The outdoor heat exchanger temperature (Tho-R) is 58ºC or higher while the compressor is running.
② The outdoor air temperature (Tho-A) is 41ºC or higher.
③ The outdoor fan motor runs continuously for 30 seconds or longer at the UHi tap.
④ The electronic expansion valve's (EEV) opening angle is 470 pulses or lower.

b) This control ends when the temperature at the outdoor heat exchanger (Tho-R) becomes 53ºC or lower.

3) High pressure abnormal

a) Heating, cooling

① If the high pressure switch (63H1) opens (4.15 MPa), the compressor stops (the outdoor unit's fan motor stops after running for 30 seconds longer). After a 3-minute delay, when the high pressure switch (63H1) is restored to the closed state (3.15 MPa), the compressor restarts. If the same condition occurs 5 times within 60 minutes after the first detection, an abnormal stop is performed and an error message (E40) is displayed.

b) Cooling

① If the outdoor heat exchanger temperature (sensed by Tho-R) is 65ºC or higher 5 times within 60 minutes while the compressor is operating, or if that temperature is detected continuously for 60 minutes, an abnormal stop is performed.

② If the outdoor heat exchanger temperature becomes 48ºC or lower, it becomes possible to reset the unit using the remote control unit.

♦Models FDCA801, 1001 only

1) High pressure control during heating

a) When the pressure at the high pressure switch (63H2) during operation in the heating mode is 3.24 MPa or higher, the outdoor fan and electronic expansion valve (EEVH1, 2)for heating are controlled and increases in the high pressure are prevented.

b) When either of the following conditions exists
① This control ends when pressure at the high pressure switch (63H2) drops to 2.65 MPa or lower.
② If this control continues intermittently for 30 minutes, this control ends and the compressor is stopped.

2) Abnormality detection control using the high pressure switch (63H1)

If the high pressure switch (63H1) is open (4.15 MPa), the compressor stops. After a 3-minute delay, when the high pressure switch (63H1) recovers (3.15 MPa), the compressor is restarted. If this condition is detected 5 times within 60 minutes after it is detected the first time, an abnormal stop occurs and an error message (E40) is displayed.

3) Abnormal high pressure control using the outdoor heat exchanger temperature (Tho-R1, R2)

a) If the outdoor heat exchanger temperature sensors Tho-R1 or Tho-R2 detect a temperature of 65ºC or higher in the cooling mode during compressor operation, stop control is carried out. This control ends when the outdoor heat exchanger temperature drops to 48ºC or lower.

b) When an outdoor heat exchanger temperature of 65ºC or higher (Tho-R1, R2) is detected 5 times in 60 minutes, or if it is detected continuously for 60 minutes, including when the compressor is stopped, an abnormal stop (E35) occurs.

(vi) Abnormal low pressure detection control (FDCA801, 1001 only)

1) The compressor is stopped when the following conditions are satisfied.
① When the low pressure sensor detects a pressure of 0.079 MPa or lower continuously for 15 seconds after the compressor starts operating.
② Superheat (SH) rises to 30ºC or higher continuously for 60 seconds when the pressure detected by the low pressure sensor is 0.120 MPa or lower 10 minutes or longer after the compressor starts.

2) The compressor recovers when the pressure detected by the low pressure sensor rises to 0.128 MPa or higher.

3) If the condition in ① or ② of item 1) above is detected 3 times within 60 minutes, or if a pressure of 0.079 MPa or lower is detected continuously for 5 minutes or longer by the low pressure sensor, an abnormal stop (E49) occurs.

(f) Detection of disconnected wires in temperature thermistors (outdoor heat exchanger, outside air temperature, discharge pipe, suction pipe, under-dome) and low pressure sensor.

1) Outdoor heat exchanger temperature thermistor, outside air temperature thermistor and low pressure sensor

If the following conditions are detected continuously for 5 seconds between 2 minutes and 2 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3-minute delay, the compressor is restarted, but if the same condition is detected 3 times within 60 minutes (within 40 min.), an abnormal stop occurs.

Note (1) For 3 minutes after dehumidifying and defrosting are finished (2 min ~ 2 min. 20 seconds), there is no detection.

- Outdoor heat exchanger temperature thermistor: -30 (-50) ˚C or lower.
- Outside air temperature thermistor: -30˚C or lower
- Low pressure sensor thermistor: 0V or lower, or 3.49 V or higher (FDCA801, 1001 only)

Note (1) Values in ( ) show in the case of the FDCA801, 1001 models.

2) Discharge pipe temperature thermistor, suction pipe temperature thermistor, under-dome temperature thermistor

If the following conditions are detected continuously for 5 seconds between 10 minutes and 10 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3-minute delay, the compressor is restarted, but if the same condition is detected 3 times within 60 minutes (within 40 min.), an abnormal stop occurs.

Note (1) For 3 minutes after dehumidifying and defrosting are finished, there is no detection.

- Discharge pipe temperature thermistor: -10˚C or lower
- Suction pipe temperature thermistor: -50˚C or lower (FDCA801, 1001 only)
- Under-dome temperature thermistor: -50˚C or lower (FDCA801, 1001 only)

Note (1) Values in ( ) show in the case of the FDCA801, 1001 models.

(g) Insufficient refrigirant protection control

1) 3 minutes after the compressor starts in the case of cooling and dehumidification, and 4 minutes after in the case of heating, the indoor heat exchanger temperature (sensed by Thi-R) and indoor return air temperature (sensed by Thi-A) are detected and at the point when all the following conditions are satisfied, stop control is performed.
   a) When the following conditions are detected continuously for 5 minutes or longer.
      - During cooling and dehumidification: The indoor heat exchanger temperature (Thi-R) is 4 degrees higher than the indoor return air temperature (Thi-A).
      - During heating: The indoor heat exchanger temperature (Thi-R) is 6 degrees lower than the indoor return air temperature (Thi-A).

   b) If the controls in item a) are implemented 3 times within 30 minutes, an abnormal stop is performed and an error message is displayed (E57).
2) If the compressor is starting for the first time after the power is turned ON, and abnormal stop is performed the first time and an error message (E57) is displayed.

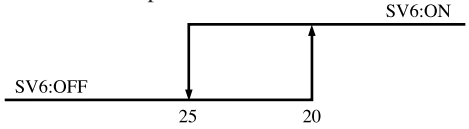
Note (1) A defrost operation or pump down control are excluded.

(h) Low voltage protection control

If a power supply voltage of 176 V or lower is detected while the compressor is stopped, or if a power supply voltage of 176 V or lower is detected for 3 minutes during compressor operation, the compressor is stopped.

(i) Oil return solenoid valve (SV6) control (Models FDCA801, 1001 only)

During compressor operation, signals from the under-dome temperature sensor are sent to the oil return solenoid valve (SV6) to control the dilution rate inside the compressor.



Under-dome superheat rate(1) (deg)

Note (1) The under-dome superheat rate is the under-dome sensor value. It is a value determined by the intake pressure saturation temperature.

(o) Test operation

1) It is possible to operate the outdoor unit using SW2 (SW3) and SW5-4 (SW3-4) on the outdoor unit PCB.

SW2 (SW3)	After pressing continuously for 1 second	**SW5-4 (SW3-4)**	OFF	Cooling test operation
			ON	Heating test operation
		Test operation is ended by pressing SW2 (SW3) during test operation.		

Note (1) Items in ( ) show in the case of FDCA801, 1001 models.

2) Test operation control

a) Each protective control and abnormal sensing control is activated.

b) If SW5-4 (SW3-4) is switched back during test operation, stop control is implemented and the cooling and heating operations are toggled.

c) Remote control unit settings and displays during test operation

Capacity / Mode	Remote control unit settings, display contents
Cooling operation	Cooling. The initial setting temperature is 5ºC. The temperature at the indoor unit's heat exchanger is displayed in the return air temperature display.
Heating operation	The initial set temperature for heating (preparation) is 30ºC and the return air temperature is displayed in the return air temperature display.

Note (1) Iteme in ( ) show in the case of FDCA801, 1001 models.

(j) Pump down control (Models FDCA801, 1001 only)

If the pump down switch (SW3-5) is turned ON during an operation stop or during an abnormal stop (except when the thermostat is OFF), pump down operation starts. (This control is invalid during indoor unit operation. It is valid during indoor unit abnormal stop or when the indoor units are OFF.)

1) Control contents

a) The compressor starts in the cooling mode.

b) The red and green (LED's) on the outdoor unit control board blink continuously.

c) Each protective and abnormal detection control is valid except low pressure control.

d) The outdoor fan is controlled as normal.

e) The electronic expansion valve (cooling, heating) is fully open.

2) Control end conditions

Stop control is executed when any of the following conditions exists.

a) A low pressure of 0.87 MPa or lower is detected (PSL).

Ⓐ Red LED: On continuously, Green LED: Blinking; shows a remote control stop.

Ⓑ When the low pressure (PSL) rises above 0.87 MPa, it is possible to restart.

Ⓒ The electronic expansion valve (cooling, heating) is fully open.

b) Stopped by Error Detection Control

Ⓐ Red LED: Blinks continuously, Green LED: Blinks.

Ⓑ Restarting is impossible. Reset the power supply to resume normal operation.

Ⓒ The electronic expansion valve (cooling, heating) is fully open.

c) The compressor's cumulative operating time under pump down control becomes 5 minutes.

Ⓐ Red LED: Off, Green LED: Blinks, Remote control stop.

Ⓑ Resumption of pump down control is possible.

Ⓒ The electronic expansion valve (cooling, heating) is fully open.

Caution: Communications with the indoor units is cancelled when the pump down switch is pressed, so E5, "Transmission Error" is displayed by the indoor units and the remote controller. However, there is no error.

2.5 APPLICATION DATA

SAFETY PRECAUTIONS

- Please read these "Safety Precautios" first then accurately execute the installation work.
- Though the precautionary points indicated herein are divided under two headings, ⚠WARNING and ⚠CAUTION, those points which are related to the strong possibility of an installation done in error resulting in death or serious injury are listed in the ⚠WARNING section. However, there is also a possibility of serious consequences in relationship to the points listed in the ⚠CAUTION section as well.

  In either case, important safety related information is indicated, so by all means, properly observe all that is mentioned.
- After completing the installation, along with confirming that no abnormalities were seen from the operation tests, please explain operating methods as well as maintenance methods to the user (customer) of this equipment, based on the owner's manual. Moreover, ask the customer to keep this sheet together with the owner's manual.

⚠ WARNING

- Installation should be performed by the dealer or a company speciallizing in this type of installarion. If you install the equipment yourself, installation errors could result in water leaks, electric shock, and/or a fire, as well as other hazards.
- Conduct installation work in accordance with the instructions in this installation manual. Installation errors could result in water leaks, electric shock, or fire.
- Sling the unit at the specified points with ropes property reted for the weight in liftting it for portage. An improper manner of portage can result in a fail of the unit resulting in an accident invoiving personal death or injury.
- When installing a unit in a small rooms, take measure so that if the refrigerant leaks, it does not exceed the concertration limit. For information regarding measures to prevent the concertration limit from being exceed, please contact the dealer.
- It refrigerant leaks and the concentration limit is exceeded, suffocation could occur.
- Install the equipment in a location that can sufficiently support the weight of the equipment. If the area is not strong enough, an accident could result from the unit falling.
- Install the equipment in a location that can withstand strong winds, such as typhoons, and earthquakes. If the installation is not secure, an accident could result from the unit falling.
- Always turn off power before work is performed inside the unit such as for installation or servicing. A failure to observe this instruction can cause a danger or electric shock.
- Electrical work should be done by a licensed electrician who shall do the work in accordance with the Technical Standards Regarding Electrical Equipment. Indoor Wiring Provisions, and this installation manual. The electrician shall use specified circus for the equipment. If the power supply circuit capacity is insuficient or the work is not done correcty, it could result in electric shock or a fire.
- For wiring, the specified cable should be used, the connections should be secure, and the fixtures shall be strong enough to prevent cabies from being pulted out from the terminal connections. Incorrect connections or work fixtures could result in heat generation or a fire.
- In cabling, arrange cables suitably so that they may not get off their support and then fix the service panel securely. Improper installation can cause heat generation and a resultant fire. Please prevent any substance other than the specified refrigerant (R410A) such as air from entering the refrigerant cycle in installing or moving the air conditioning system. Contamination by air or a foreign substance can cause an abnormal pressure build-up inside the refrigerant cycle and a resultant explosion and personaly injury.
- Use only parts supplied with the unit and specified supply parts for installation. The use of unauthorized parts may cause the leaking of water or electricitly causing a danger of electric shock or a fire, a refrigerant leak, performance degradation, and control failures.
- Do not open operation valves (either liquid or gas or both) until refrigerant piping, an air-tightness test and an air purge are completed. When a leak of refrigerant gas occurs during piping work, stop brazing pipes and ventilate the room. Refrigerant gas, when it comes into contact with bare fire, can generate a toxic gas.
- When installation is completed, check for refrigerant gas leaks. If the refrigerant gas leaks indoors, it could come in contact with a tan heater, burner, or hot plate, which could generate a poisonous gas.

⚠ CAUTION

- Ground the equipment. Do not connect the ground wire to gas piping, water piping, a lightning rod, or telephone ground wires. It grounding is not performed correctly electric shock could occur.
- Depending on the installation location, a circuit breaker may need to be installed. It a circuit breaker is not installed, electric shock may occur.
- Please follow this manual faithfully in performing installation work. Improper installation work can cause abnormal vibrations and noise generation.
- Do not install the equipment in areas where there is danger of flammable gas leaks. It such gas does leak it could collect around the units and cause a fire.
- Install the drain piping in accordance with the installation manual so that it properly discharges waste water and is maintained at a temperature that prevents condensation.
- Do not install the outdoor unit where winds from its dan blow directly onto a plant, etc. Winds can affect adversely to the plant, etc.
- Secure a space for inspection and maintenance as specified in the manual. An insufficient space can result in an accident such as a fall from the installation point and a resultant personal injury.
- When the outdoor unit is installed on a roof or at an elevated point, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.
- In tightening a flare nut, use a double spanner and observe the specified tightening torque. Care must be taken so as not to overtighten a nut and damage the flare part. (Please refer to the tightening torque) The loosening or damage of the flare part can cause a refrigerant gas leak and a resultant lack-of-oxygen accident.
- Please dress the refrigerant piping with a heat insulation material for prevention of dew condensation. Improper heat insulation for prevention of dew condensation can cause the leaking or dripping of water and a resultant soaking of household effects.
- When refrigerant piping is completed, check its air-tighteness with nitrogen gas to make sure it does not have a leak. A leak of refrigerant gas in a narrow room beyond the safety limit concentration can cause a lack-of oxygen accident.

2.5.1 Installation of indoor unit ..... Please see page 97 of Chapter 1

2.5.2 Installation of remote controller ..... Please see page 116 of Chapter 1

2.5.3 Installation of outdoor unit

Special instructions for R410A air conditioning systems

- Use only R410A refrigerant. R410A refrigerant is operated at about 1.6 times as high pressure as the conventional refrigerant is.
- Air conditioning systems using R410A are equipped with different-diameter outdoor unit service valve charge ports and check joints provided in the units so as to prevent wrong refrigerant from being charged by mistake. To achieve higher strength resistible to refrigerant pressure, the dimensions of flaring and the across-the-flats measurement of a flare nut have been changed for refrigerant piping. Therefore, please arrange dedicated R410A tools as listed in the table shown on the below before you set to installation or service work.
- Do not use a charge cylinder. The use of a charge cylinder will cause the refrigerant composition to change, resulting in performance degradation falling short of the rated capacity.
- In charging refrigerant, always take out refrigerant from a cylinder in the liquid phase.

	Dedicated R410 tools
ⓐ	Gauge manifold
ⓑ	Charge hose
ⓒ	Electronic scale for refrigerant charging
ⓓ	Torque wrench
ⓔ	Flare tool
ⓕ	Protrusion control copper pipe gauge
ⓖ	Vacuum pump adapter
ⓗ	Gas leak sensor

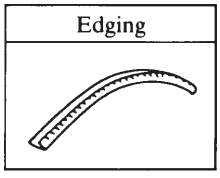
(1) Installation

◆ Models FDCA301~601 only

(a) Accessories

Confirm accessories shown below are attached in the bag with this installation manual.

1) "Edging" for protection of electric wires from opening edge.



(b) Selection of installation location

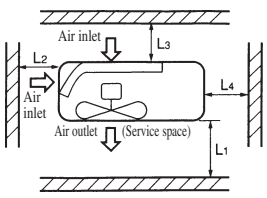
Select the installation location after obtaining the approval of customer.

1) The place where the foundation can bear the weight of Outdoor unit.
2) The place where there is no concern about leakage of combustible gas.
3) The place where it is not stuffy.
4) The place where free from thermal radiation of other thermal source.
5) The place where flow of drain is allowed.
6) The place where noise and hot air blast do not trouble neighboring houses.
7) When the unit is installed at the particular location as shown below, corrosion or failure may be caused. Please consult the dealer from which you purchased the air-conditioner.
   a) The place where corrosive gas is generated (hot spring, etc.).
   b) The place where wind containing salt blows (seaside area).
   c) The place where enveloped by oil mist.
   d) The place where there is a machine that radiates electromagnetic wave.

- Restrict the height of obstruction wall in front of the discharge air port to the height of unit or less.
- Do not enclose around the unit by the obstruction. Secure the top space for 1 m or more.
- When installing the units side by side in series, secure a space of 10 mm between units.
- When installing the unit where there is a concern about the short circuit, attach the guide louver in front of discharge air port to prevent the short circuit.
- When installing plural units in a group, secure sufficient intake space to prevent the short circuit.
- When installing the unit where it is covered by snow, provide appropriate snow break means.

(c) The minimum space for installation

Select the space considering the direction of refrigerant piping.



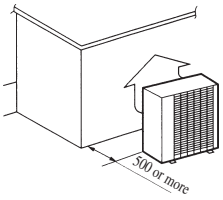
Unit : mm

Installation example / Distance	FDCA301			FDCA401, 501, 601		
	Ⅰ	Ⅱ	Ⅲ	Ⅰ	Ⅱ	Ⅲ
L_1	Open space	Open space	500	Open space	Open space	500
L_2	300	5	Open space	300	5	Open space
L_3	100	150	100	150	300	150
L_4	5	5	5	5	5	5

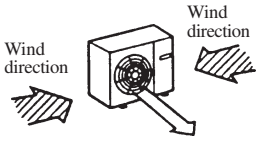
(d) Location where strong wind blows against the unit

- Where the unit is likely to be subjected to strong winds, guard it from winds with the following measures.
  A failure to give protection against winds may cause performance degradation, a rise of high pressure resulting is an operation interruption, a broken fan, etc.

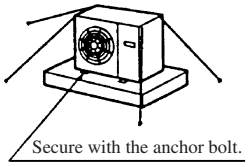
1) Install the unit directing the discharge air port to the wall.



2) Install the unit directing the discharge air port at a right angle to the wind direction.



3) Where the foundation is not stable, secure the unit with wire, etc.



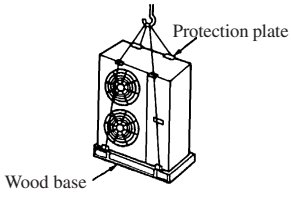
(e) Carry-in and installation of unit

Pay sufficient attention to the carry-in and moving work of the unit, and always execute work by two persons or more.

1) Carry-in

a) When carrying-in the unit, carry it in as packed condition to the installation site as near as possible.

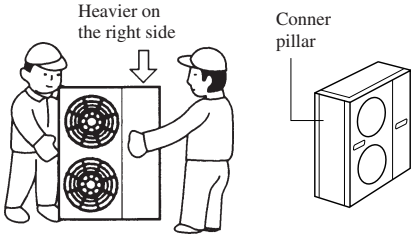
b) If you are compelled to carry-in the unit unpacked condition, lift the unit by the rope using a nylon sling or applying protection plates so that the unit is not marred.



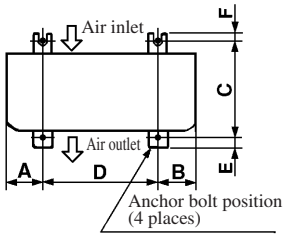
⚠ CAUTION ● **Rope the unit taking the discrepancy of center of gravity into consideration.**

2) Moving

a) The unit is heavier on the right side looking from the front of unit (air outlet port side). Therefore, sufficient caution is required for the person who carries the right side of unit. The person who carries the left side must hold the handle of front panle and the conner pillar with both hands.



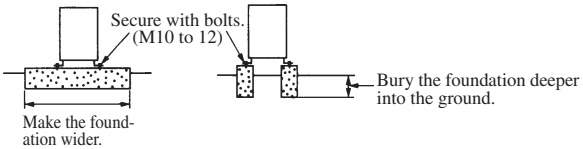
3) Bolt securing position



Unit : mm

Model \ Item	A	B	C	D	E	F
FDCA301	150	150	380	580	20	20
FDCA401	165	175	380	580	20	20
FDCA501, 601	190	200	410	580	20	20

a) To install the unit, secure the legs of unit by below mentioned bolts without fail.



b) Limit the protrusion height of front side anchor bolts to 15 mm at the maximum.

c) Install the unit firmly so that it does not fall by earthquake and strong wind.

d) Make the concrete foundation by referring the above illustration.

e) Install the unit in level. (The height difference between right and left is within 5 mm.)

◆ **Models FDCA801, 1001 only**

(a) Selecting the installation location

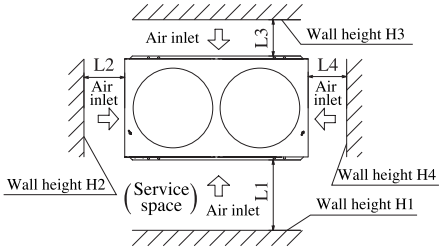
1) **Where air is not trapped.**
2) **Where the installation fittings can be firmly installed.**
3) **Where wind does not hinder the intake and outlet pipes.**
4) **Out the heat range of other heat sources.**
5) **Where it is safe for the drain water to be discharged.**
6) **Where noise and hot air will not bother neighboring residents.**
7) **Where snow will not accumulate.**
8) **Where strong winds will not blow against the outlet pipe.**

Notes (1) A four-sided enclosure cannot be used. Leave a space of at least 1m above the unit.
(2) If there is a danger of a short-circuit, then install a wind direction variable adapter.
(3) When installing multiple units, provide sufficient intake space so that a short-circuit does not occur.
(4) In areas where there is snowfall, install the unit in a frame or under a snow hood to prevent snow from accumulating on it.
(Inhibition of collective drain discharge in a snowy country)
(5) Do not install the equipment in areas where there is a danger of flammable gas leaks.
∗ Please ask your distributor about optional parts such as wind vane adapters, snow guard hoods, etc.

(b) Installation space (service space) example

Please secure sufficient clearance (room for maintenance work, passage, draft and piping). (If your installation site does not fulfill the installation condition requirements set out on this drawing, please consult with your distributor or the manufacturer)

1) When one unit is installed

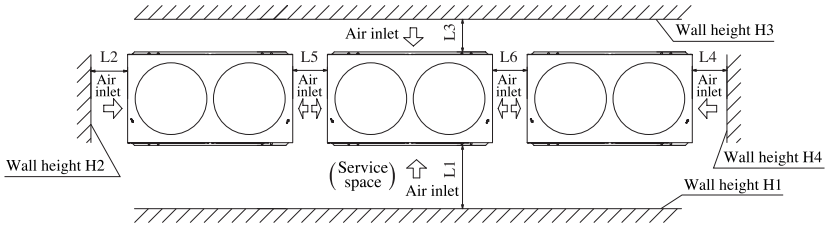


Installation space

Unit: mm

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

2) When more than one unit are installed.



Installation space

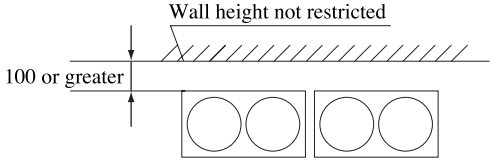
Unit: mm

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

3) Multiple unit installation (Multiple longitudinal and vertical and horizontal rows installed)

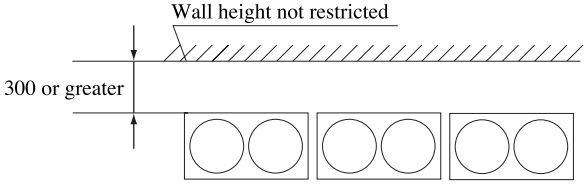
• Pattern 1

3-side Intake Example 1 (2 units)



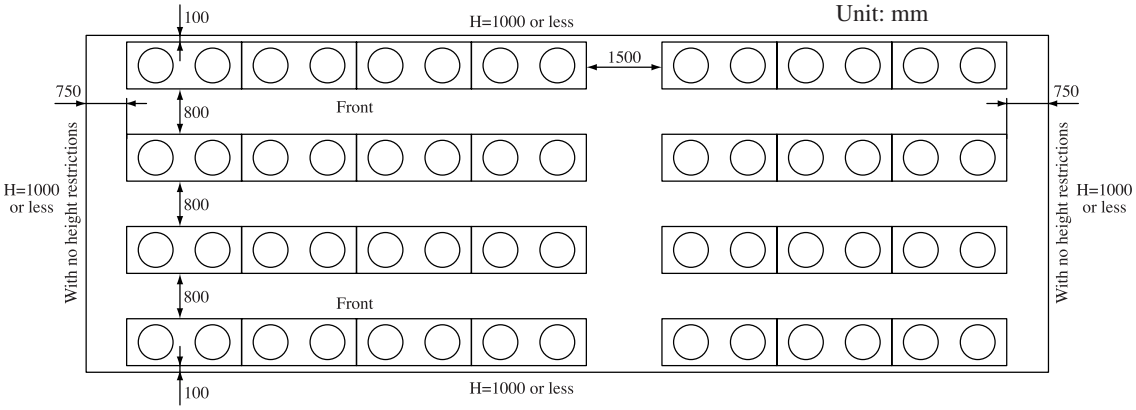
• Pattern 2

3-side Intake Example 2 (3 units)



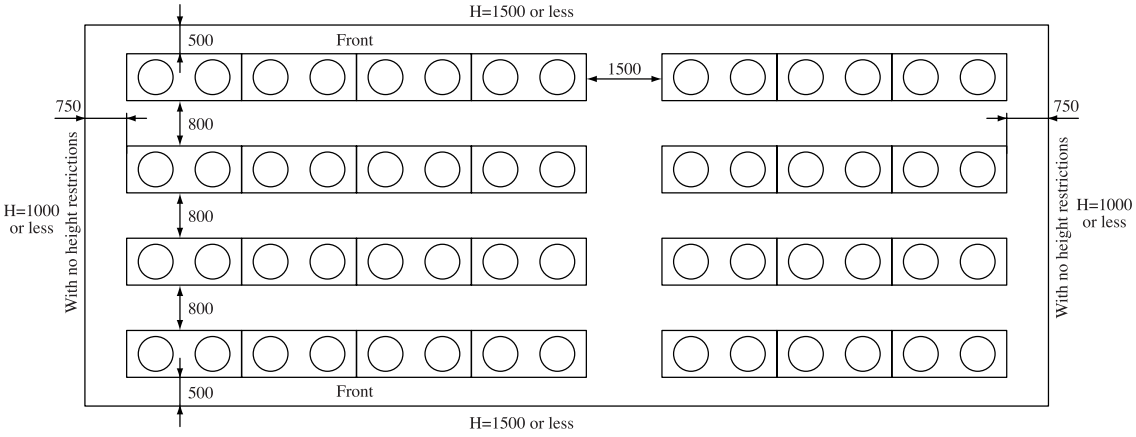
• **Pattern 3**

Multiple longitudinal and vertical and horizontal rows installed



• **Pattern 4**

Multiple longitudinal and vertical and horizontal rows installed

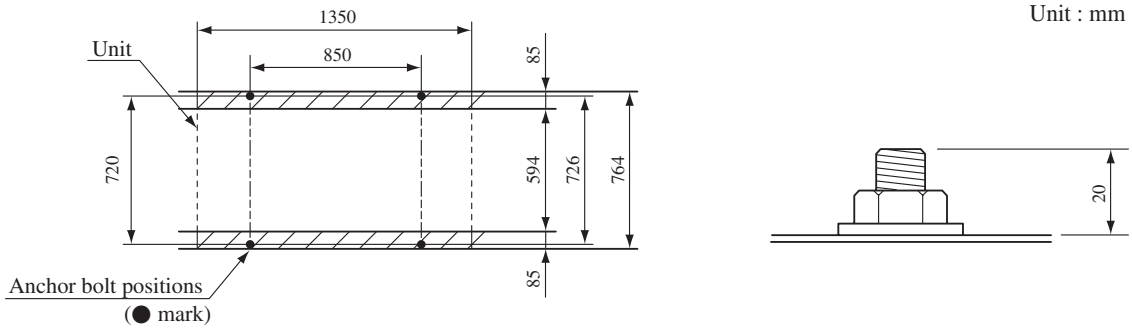


(c) Notabilia for installation

1) Anchor bolt positions

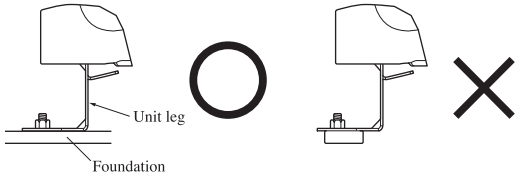
a) Use four anchor bolts (M10) to fix an outdoor unit's anchoring legs at all times. Ideally, an anchor bolt should protrude 20mm.

Unit : mm



b) Base

- Install the unit so that it does not vibrate and doesn't make noise. Make sure the base is strong and that it is installed level.
- Provide a foundation that is at least as wide as the area shown by the shaded portion in the diagram above (wider than the width between the front surface of the anchoring legs of the outdoor unit).



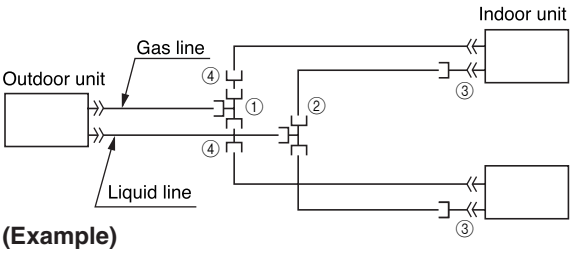
(2) Refrigerant piping work

Select the piping specification to fit the specification of Indoor unit and installation location.

(a) Decision of piping specification

(i) Twin type

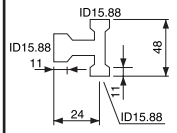
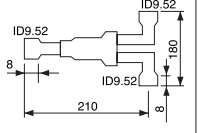
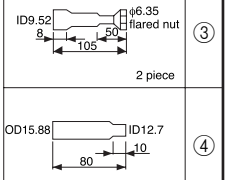
Models FDCA301~601 [Branch pipe set : DIS-WA1]



(Example)

Item / Model	Indoor unit combinations	Liquid pipe		Gas pipe	
		Main pipe	Branch pipe	Main pipe	Branch pipe
FDCA301	151 + 151	φ9.52×t 0.8	φ9.52×t 0.8	φ15.88×t 1.0	φ12.7×t 0.8
FDCA401	201 + 201				
FDCA501	251 + 251				φ15.88×t 1.0
FDCA601	301 + 301				

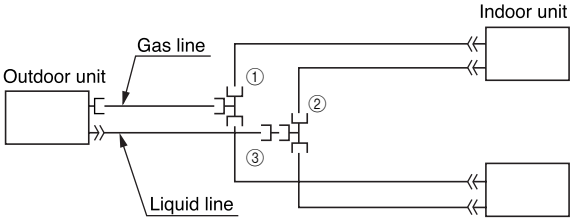
Chart of shapes of branch piping parts (DIS-WA1)

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
	①		②		③ ④

Notes (1) ① to ④ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
(2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the drawing below for details.)

Notes (1) If you are using this model in combination with the 151 ~ 251 Series indoor units, use the irregular fittings ③ supplied with the branch piping set and make the branch piping (branch ~ indoor unit) liquid piping size φ9.52.
(2) Mark is ④ to FDC301, 401 only.

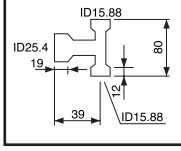
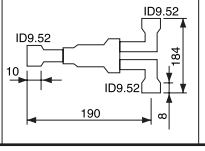
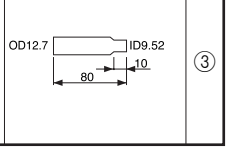
Models FDCA801, 1001 [Branch pipe set : DIS-WB1]



(Example)

Item / Model	Indoor unit combinations	Liquid pipe		Gas pipe	
		Main pipe	Branch pipe	Main pipe	Branch pipe
FDCA801	401 + 401	φ9.52×t 0.8	φ9.52×t 0.8	φ25.4×t 1.0	φ15.88×t 1.0
FDCA1001	501 + 501	φ12.7×t 0.8			

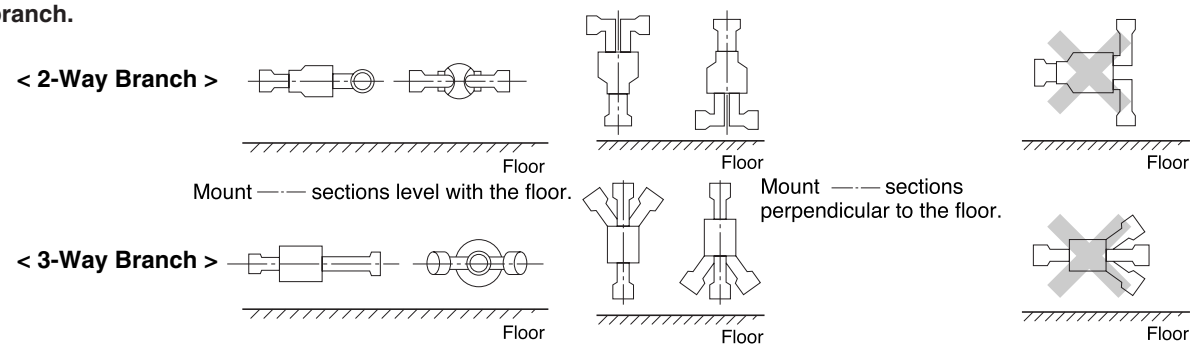
Chart of shapes of branch piping parts (DIS-WB1)

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
	①		②		③

Notes (1) ① to ③ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
(2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the drawing below for details.)

Notes (1) In the case of the FDCA801, if the length of the main pipe exceeds 40 m, make the liquid piping size φ12.7.

The branch piping (both gas and liquid lines) should always be arranged to have a level or perpendicular branch.



(ii) Triple type

Model FDCA601 [Branch pipe set : DIS-TA1]

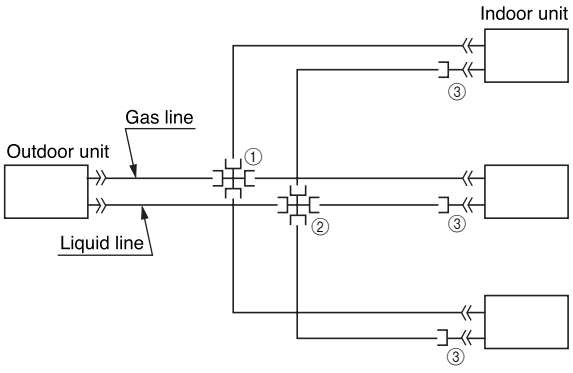
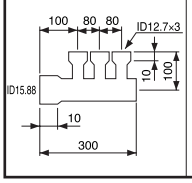
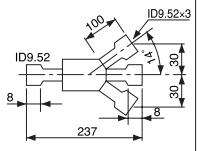
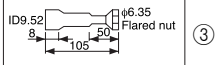


Chart of shapes of branch piping parts (DIS-TA1)

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
	①		②		③

Notes (1) ① to ③ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
(2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the preceding page for details.)

Item / Model	Indoor unit combinations	Liquid pipe		Gas pipe	
		Main pipe	Branch pipe	Main pipe	Branch pipe
FDCA601	201+201+201	φ9.52×t 0.8	φ9.52×t 0.8	φ15.88×t 1.0	φ12.7×t 0.8

Notes (1) Use the irregular fittings ③ supplied with the branch piping set on the indoor unit side, and make the branch piping (branch ~ indoor unit) liquid piping size φ9.52.

Model FDCA801 [Branch pipe set : DIS-TB1]

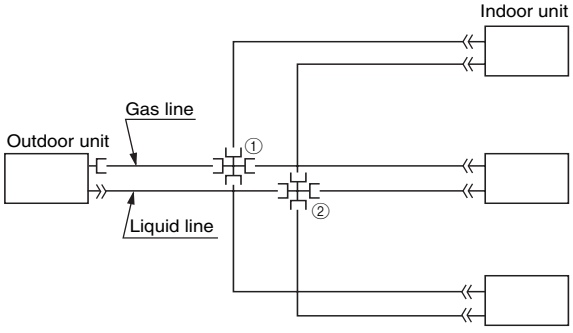
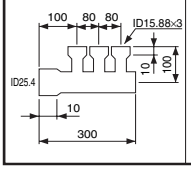
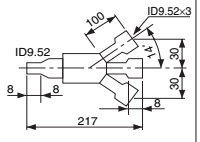
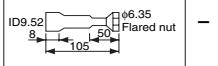
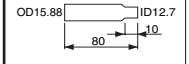
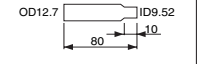


Chart of shapes of branch piping parts (DIS-TB1)

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
	①		②		–

Reducer	Mark	Reducer	Mark
	–		–

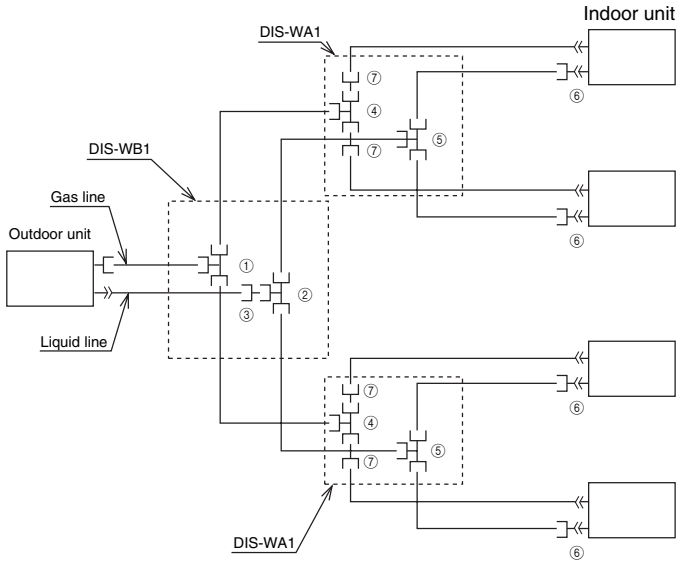
Notes (1) ① to ② in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
(2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the preceding page for details.)

Item / Model	Indoor unit combinations	Liquid pipe		Gas pipe	
		Main pipe	Branch pipe	Main pipe	Branch pipe
FDCA801	301+301+301	φ9.52×t 0.8	φ9.52×t 0.8	φ25.4×t 1.0	φ15.88×t 0.8

Notes (1) If the length of the main pipe exceeds 40 m, make the liquid piping size φ12.7.

(iii) Double twin type

Models FDCA801, 1001 [Branch pipe set : DIS-WA1 × 2set, DIS-WB1 × 1set]



Item / Model	Indoor unit combinations	Liquid pipe			Gas pipe		
		Main pipe	1st branch pipe	2st branch pipe	Main pipe	1st branch pipe	2st branch pipe
FDCA801	201+201+201+201	φ 9.52×t 0.8	φ 9.52×t 0.8	φ 9.52×t 0.8	φ 25.4×t 1.0	φ 15.88×t 1.0	φ 12.7×t 0.8
FDCA1001	251+251+251+251	φ 12.7×t 0.8					φ 15.88×t 1.0

Notes (1) In the case of the FDCA801, if the length of the main pipe exceeds 40 m, make the liquid piping size φ12.7.
(2) Use the irregular fittings ⑥ supplied with the branch piping set on the indoor unit side, and make the branch piping (branch ~ indoor unit) liquid piping size φ9.52.
(3) Mark is ⑦ to FDCA801 only.

Chart of shapes of branch piping parts (DIS-WB1)

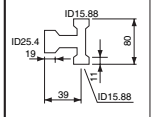
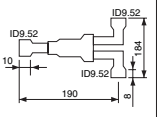
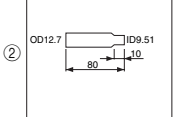
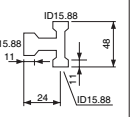
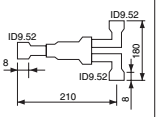
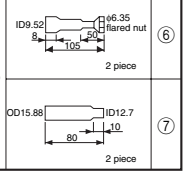
Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
	①		②		③

Chart of shapes of branch piping parts (DIS-WA1)

Gas pipe	Mark	Liquid pipe	Mark	Reducer	Mark
	④		⑤		⑥ ⑦

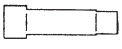
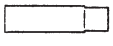
Notes (1) ① to ⑦ in the drawing include parts provided in the branch piping set. It shows the codes for the shapes of different-diameter connections.
(2) Branch piping should always be arranged to have level or perpendicular branch. (Refer to the 224 page for details.)
(3) Mark ③ shows for the FDCA801 model only.

(b) Installation manual for pipe size reducer kit

Applicable outdoor models	FDCA801HES
	FDCA1001HES
Designed tor R410A refrigerant	

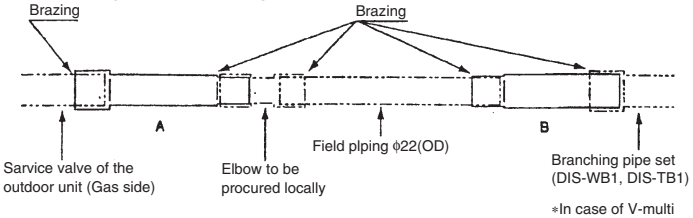
- φ22.2 (OD) size of the refrigerant gas pipe can be used by using this kit, although φ25.4 (OD) size of the refrigerant gas pipe is standard.
  (When φ25.4 (OD) size of the refrigerant gas pipe is used, this kit doesn't be needed.)
  (∗) OD: Outer diameter.

● This kit includes the following parts.

A	B
ID25.4  0D22.2	0D25.4  ID22.2

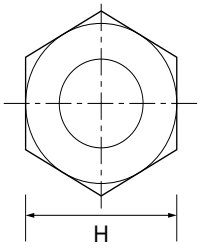
(∗) ID: Lnner diameter.

● Install this kit according to the following.



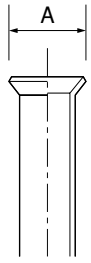
(c) Flare processing

1) The unit and the refrigerant pipe are to be flare connected. Flare a pipe after a flare nut is attached onto it.
2) Because the parallel side measurement of a ϕ12.7 or ϕ15.88 flare nut will be changed depending on the measurement after flaring, do not fail to change the size of a flare to one specified for R410A.
3) A flare size for R410A is different from that for R407C. Although we recommend the use of flare tools developed specifically for R410A, conventional flare tools can also be used by adjusting the measurement of protrusion B with a protrusion control copper pipe gauge.



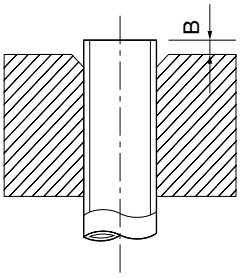
Flare nut parallel side measurement: H (mm)

Copper pipe outer diameter	H
ø6.35	17
ø9.52	22
ø12.7	26
ø15.88	29



Flared pipe end: A (mm)

Copper pipe outer diameter	A $^{0}_{-0.4}$
ø6.35	9.1
ø9.52	13.2
ø12.7	16.6
ø15.88	19.7



Copper pipe protrusion for flaring: B (mm)

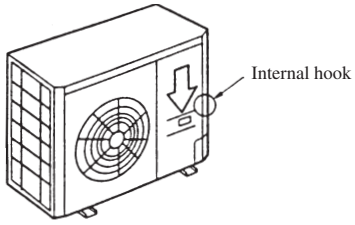
Copper pipe outer diameter	In the case of a rigid (clutch) type	
	With an R410A tool	With a conventional tool
ø6.35	0~0.5	0.7~1.3
ø9.52		
ø12.7		
ø15.88		

4) Tighten a flare joint securely with a double spanner. Use the following tightening torque values for flare nuts.

ø 6.35 Flare nut	14~18 N·m (1.4~1.8kg·m)
ø 9.52 Flare nut	34~42 N·m (3.4~4.2kg·m)
ø 12.7 Flare nut	49~61 N·m (4.9~6.1kg·m)
ø 15.88 Flare nut	68~82 N·m (6.8~8.2kg·m)

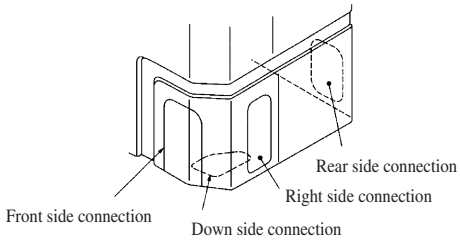
(d) How to remove the service panel (Models FDCA 301~601 only)

First unscrew four screws holding the service panel in place, pull down the panel toward the direction indicated by the arrow, and then pull it toward you to remove it from the casing.



(e) Refrigerant pipe connection (Models FDCA 301~601 only)

1) The pipe can be laid in any of the following directions: side right, front, rear and downward.
2) 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 approriate length before laying a pipe.



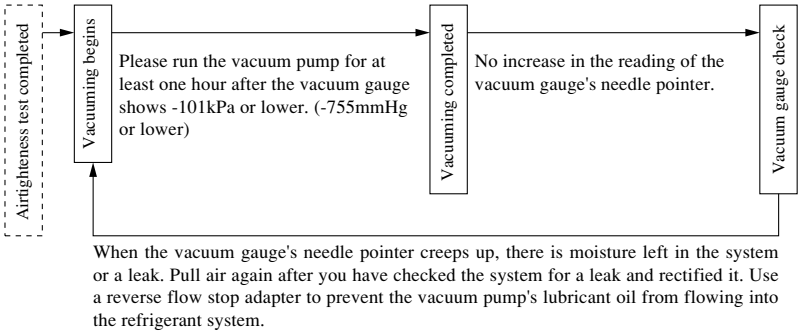
(3) Air tightness test and air purge

- Always use a vacuum pump to purge air trapped within an indoor and the refrigerant piping.

(a) Air tightness test

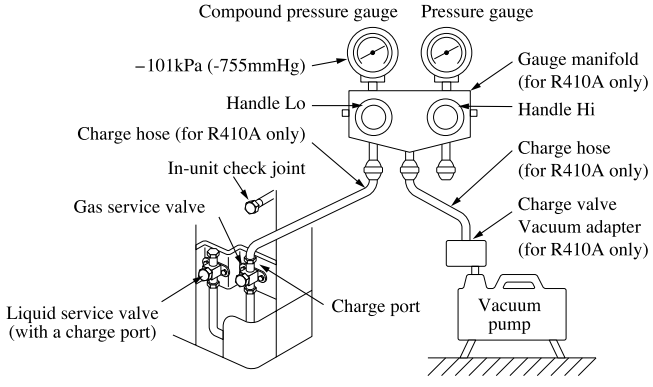
1) When all the flare nuts on both indoor and outdoor unit sides are fastened. Conduct an air-tightness test from the service valves (on both liquid and gas sides) closed tightly to check whether the system has no leaks.
2) Use nitrogen gas in the air-tightness test. Do not use gas other than nitrogen gas under any circumstances. Conduct the air-tightness test by applying 4.15MPa of pressure.
3) Do not apply the specified pressure at once, but increase pressure gradually.
   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 the pressure does not drop after the units is left for approximately one day, the airtighteness is acceptable. When the ambient temperature changes 1˚C, the pressure also changes approximately 0.01 MPa. The pressure. if changed, should be compensated for.

(b) Air purge



When a vacuum air purge is completed, remove the valve rod cap nuts and open the service valves (both liquid and gas sides) as illustrated below. After you have made sure that the valves are in the full-open position, lighten the cap nuts (for the valve rads and charge ports).

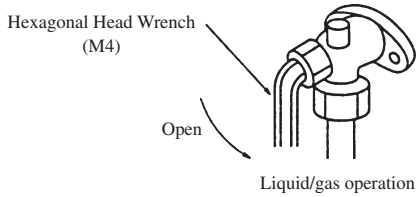
Pay attention to the following points in addition to the above for the R410A and compatible machines.
◯ To prevent a different oil from entering, please assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R470C, etc.).
◯ Use a counterflow prevention adapter to prevent vacuum pump oil from entering the refrigerant system.



- You can purge air with either liquid operation valve or gas operation valve.

◆ **Models FDCA301~601**

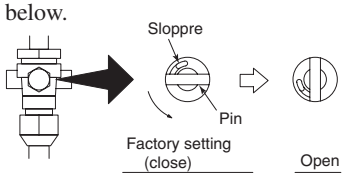
► **Hexagonal wrench type**



- Open the valve rod until it touches the stopper. You need not apply lorce to push it further.
- When an operation is completed, replace the cap nut and tighten it as before.

► **Pin type**

Remove the hexagon cap nut, set it as illustrated in the drawing below.

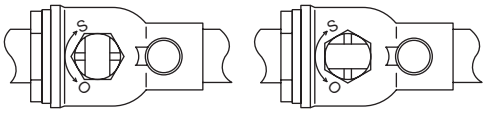


- When a pin setting operation is completed, replace the cap nut and tighten it as before.

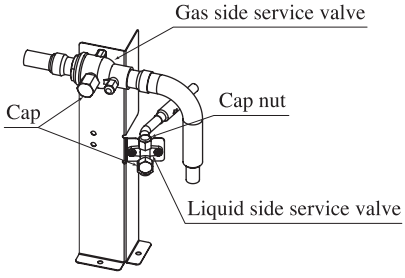
◆ **Models FDCA801, 1001**

Method of opening/closing a valve

- Remove the cap, turn the gas pipe side until comes to the "Closed" position as indicated in the drawing on the right.
- For the liquid side pipe, turn with a hexagonal wrench until the shaft stops. If excessive force is applied, the valve main body can be damaged. Always use a dedicated special tool.
- Tighten the cap securely.
  For tightening torque, refer to the table below.



Opened position Closed position



	Tightening torque N · m		
	Shaft (valve main body)	Cap (lid)	Cap nut (check joint section)
For gas pipes	7 or less	30 or less	13
For liquid pipes	7.85 (MAX 15.7)	29.4 (MAX 39.2)	8.8 (MAX 14.7)

(4) Refrigerant charge

◆ **Models FDCA301~601**

(a) The outdoor unit is charged with enough refrigerant for a piping length of 30 m when it is shipped from the factory, and additional charging is not necessary in the case of a system with 30 m or piping or less.

(b) If the system's piping exceeds 30 m, charge with an amount of additional refrigerant corresponding to the additional length of piping in the system.

Item \ Model	FDCA301	FDCA401	FDCA501	FDCA601
Factory Charge Amount (for 30 m of pipe) (kg)	3.15	3.9	3.2	3.9
Additional Charge Amount (for each 1 m of piping) (kg/m)	0.040			

(Example) If the FDCA301 model is newly installed and the piping length is 45 m.
Additional Charge Amount: 0.60 kg = (45 – 30) m × 0.040 kg/m

◆ **Models FDCA801, 1001**

(a) Additional charge amount

Item / Model	Standard refrigerant charge volume (kg) (1)	Additional charge volume per meter of refrigerant piping (kg) (2)	Charge volume when shipped from factory (kg)	Local piping length for which additional charge is not required. (m)	Limit length of refrigerant piping (m)
			Outdoor unit		
FDCA801	6.3	Main pipe Liquid piping ϕ 9.52 : 0.06 Liquid piping ϕ 12.7 : 0.12 Branch pipe 0.06	6.6	5	70
FDCA1001	7.3	Main pipe 0.12 Branch pipe 0.06	7.9		

Notes (1) The standard refrigerant charge volume shows the charge volume with the length of refrigerant piping is 0 m.

(2) Concerning the additional charge per meter of piping and the refrigerant charge volume when the unit is shipped from the factory, as shown in the above the unit is charged with a portion of the refrigerant needed for the local piping, so be sure to calculate the amount of additional charge that is needed and charge the system locally.

(b) Example of calculation of additional charge volume

FDCA801 (Twin type) Main pipe: 20 m, Branch pipe: 15m What is the amount of additional charge?

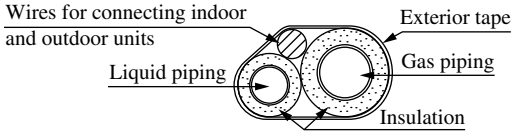
$(20-5)\times 0.12+15\times 0.06=2.7$

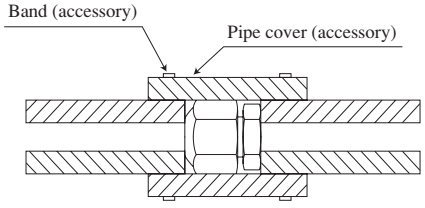
- 0.06: Additional charge (kg/m) per meter of branch pipe
- 15: Branch pipe total length (m)
- 0.12: Additional charge (kg/m) per meter of main pipe
- 5: Length of main pipe (m) that can be connected with the refrigerant charge already supplied to the unit.
- 20: Main pipe length

Amount of additional charge = 2.7 kg (be sure to weigh the refrigerant before charging).

(5) Heating and condensation prevention

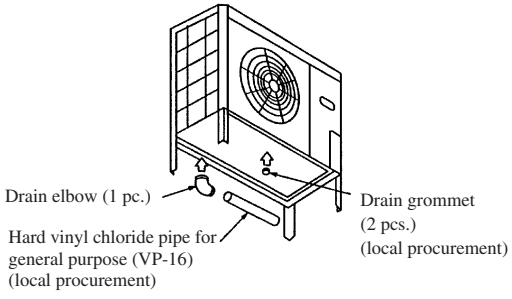
1) Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.
   Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.
2) Use a heat insulating material that can withstand 120˚C or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.
   a) The gas pipe can cause during a cooling operation dew condensation, which will become drain water causing a possible water-leak accident, or reach during a heating operation as high a temperature as 60˚C to 110˚C, posing a risk of bums, when touched accidentally. So, do not fail to dress it with a heat insulation material.
   b) Warp indoor unit's flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).
   c) Give heat insulation to both gas and liquid side pipes. Bundle a heat insulating material and a pipe tightly together so that no gaps may be left between them and warp them together with a connecting cable by a dressing tape.
   d) Although this air conditioning unit has been tested under the JIS condensation test conditions, the dripping of water may occur when it is operated in a high-humidity atmosphere (23˚C or a higher dew point temperature). In such a case, apply an additional heat insulation material of 10 to 20 mm thick to dress an indoor unit body, piping and drain pipes.





(6) Drain piping work (Models FDCA301~601 only)

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



(7) Electrical wiring

- This air conditioning system should be notificated to supply authority before connection to power supply system.

(a) Selection of size of power supply and interconnecting wires.

⚠ IMPORTANT

- Electric wiring work should be conducted only by authorized personnel.
- Use copper conductor only.
- Power source wires and Interconnecting wires shall not be lighter than polychloroprene sheathed flexible cord (design HO5RN-F IEC 57).
- Do not connect more than three wires to the terminal block.
- Use round type crimped terminal lugs with insulated grip on the end of the wires.

- Select wire sizes and circuit protection from Table 1.

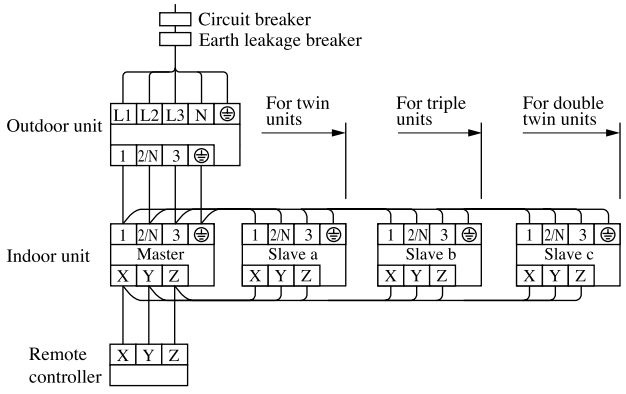
Table 1

Item / Model	Phase	Earth leakage breaker	Circuit breaker		Power source wires (minimum)	Interconnecting and grounding wires (minimum)
			Switch breaker (A)	Over-current protector rated capacity (A)		
FDCA301HEN	1	20A, 30mA, 0.1 sec or less	30	20	3.5mm²	ø 1.6
FDCA301HES	3	15A, 30mA, 0.1 sec or less		15	2.0mm²	
FDCA401HEN	1	40A, 30mA, 0.1 sec or less	40	40	5.5mm²	
FDCA401HES	3	15A, 30mA, 0.1 sec or less	30	15	3.5mm²	
FDCA501HES		20A, 30mA, 0.1 sec or less		20		
FDCA601HES						
FDCA801HES		40A, 6mA, 0.4 sec or less	60	40	5.5mm²	Interconnecting wire: ø1.6 Grounding wire: 3.5mm²
FDCA1001HES						

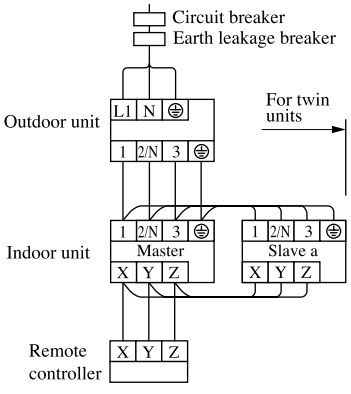
(b) Wiring connection.

1) Connect the same terminal number between the Indoor unit and Outdoor unit as shown in the following diagram.
2) Secure the wiring with wiring clamp so that no external force is transmitted to the connecting portion of terminal.
3) There is a ground (Earth) terminal in the control box.

- 3 phase model



- 1 phase model



4) Between master and slave indoor units, connect between the same numbers ①, ②, ③ and Ⓧ, Ⓨ, Ⓩ on the respective terminal blocks.
5) Set the same address for the master and slave indoor units as the communications address for the remote controller using rotary switch SW2 on the indoor units' control PCB.
6) Set Slave a, Slave b and Slave c using DIP switch SW5-1 and SW5-2 on the control PCB of the respective indoor slave units.
7) Be sure to press the AIR CON No. button on the remote controller after turning on the power, then check if the indoor master and slave unit No. is displayed in the remote controller.
   The indoor unit address is displayed when the AIR CON No. button is pressed. After that, pressing the ▲ or ▼ key displays the unit No. beginning from the lowest No.

(c) Plural Master / Slave setting

Set the plural address switches SW5-1 and SW5-2 on the indoor circuit board as shown in the table below.

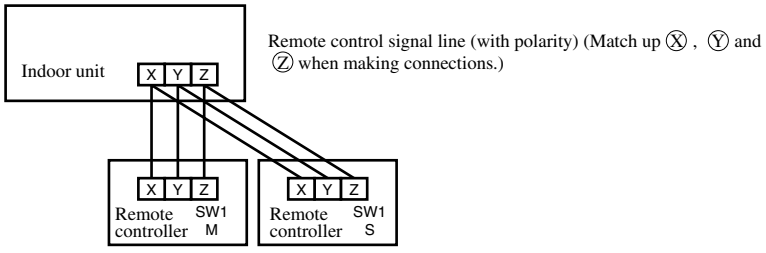
Master setting at time of factory shipment		Indoor unit			
		Master	Slave a	Slave b	Slave c
Plural address switch	SW5-1	OFF	OFF	ON	ON
	SW5-2	OFF	ON	OFF	ON

(d) Remote controller wiring and connection procedure

1) Master-slave settings when using multiple remote controllers

- Up to 2 remote controllers can be connected for each indoor unit (or group).

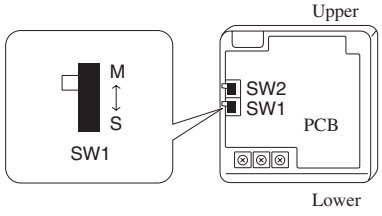
a) There are two methods, one where the remote controller signal line (3-wire) for the slave remote controller is taken from the indoor unit and the other where the signal lines are taken from the master remote controller.



b) Set the SW1 select switch on the slave remote controller on the Slave setting. (It is set on the Master setting at the factory.)

Note (1) Remote controller sensor activation settings are possible only with the master remote controller. Install the master remote controller in a location where it can sense the room temperature.

Switch		Function
SW1	M	Mastor remote controller
	S	Slave remote controller

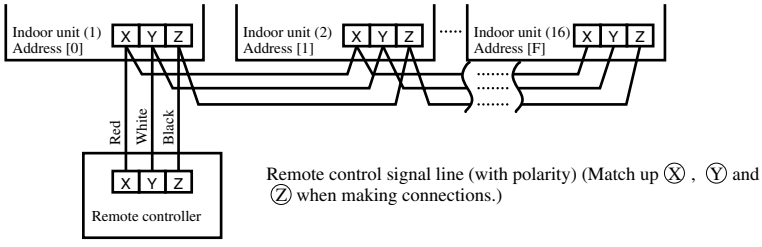


2) Controlling multiple indoor units using a single remote controller.

- Up to 16 indoor units can be controlled with a single remote controller.

a) Run 3-wire remote control lines between each of the indoor units. See “Cautions when extending remote control lines” on page concerning extended remote control lines.

b) Set the remote controller communications address on “0” ~ “F” using rotary switch SW2 on the indoor unit’s control board, taking care not to overlap the addresses of any of the units.



c) After turning the power on, press the AIR CON No. button to display the indoor unit’s address. Be sure to confirm that the settings are displayed correctly in the remote controller by using the ▲ and ▼ buttons to display the address of each connected indoor unit.

(8) Setting functions using the remote controller

(a) The default settings of this unit's functions are as follows: If you want to charge a setting, follow the procedure found in the installation manual and set to your desired setting.

For the method of setting, please refer to the installation manual of a remote controller unit.

① Remote controller unit functions (FUNCTION ▼)

Function number Ⓐ	Function description Ⓑ	Setting Ⓒ	Default setting
01	GRILLE ↑↓ SET (Grille lift panel setting)	↑↓ INVALID	○
		50Hz AREA ONLY	
		60Hz AREA ONLY	
02	AUTO RUN SET	AUTO RUN ON	✻
		AUTO RUN OFF	
03	TEMP S/W	VALID	○
		INVALID	
04	MODE S/W	VALID	○
		INVALID	
05	ON/OFF S/W	VALID	○
		INVALID	
06	FANSPEED S/W	VALID	○
		INVALID	
07	LOUVER S/W	VALID	✻
		INVALID	
08	TIMER S/W	VALID	○
		INVALID	
09	SENSOR S/W (Remote control sensor setting)	SENSOR OFF (Invalid)	○
		SENSOR ON (Valid)	
10	POWER FAILURE COMPENSATION SET	INVALID	○
		VALID	✻
11	VENTI SET	NO VENTI	○
		VENTI LINK SET	
		NO VENTI LINK	○
12	TEMP RANGE SET	DISP CHANGE	
		NO DISP CHANGE	○
13	I/U FAN SPEED (Indoor unit fan speed setting)	3 FAN SPEED	✻
		2 FAN SPEED	
		1 FAN SPEED	
14	MODEL TYPE	HEAT PUMP	✻
		COOLING ONLY	
15	EXTERNAL CONTROL SET	INDIVIDUAL OPERATION	○
		SAME OPERATION FOR ALL UNITS	
16	ERROR DISP SET	ERROR DISP	○
		NO ERROR DISP	
17	POSITION (Louver control setting)	FIX (1 OF 4) (4 position stop)	○
		IN MOTION (Free stop)	
18	°C/°F SET	°C	○
		°F	

Notes(1) Setting marked with [○] are the default setting.
(2) Setting marked with [✻] are those that are set automatically according to an indoor unit or an outdoor unit connected. Please check default settings with the indoor unit's installation manual.
(3) When Item 17 : " POSITION" is changed, please also change Item 04 " POSITION" setting found in "Indoor unit functions".

② Indoor unit functions (I/U FUNCTION ▲)

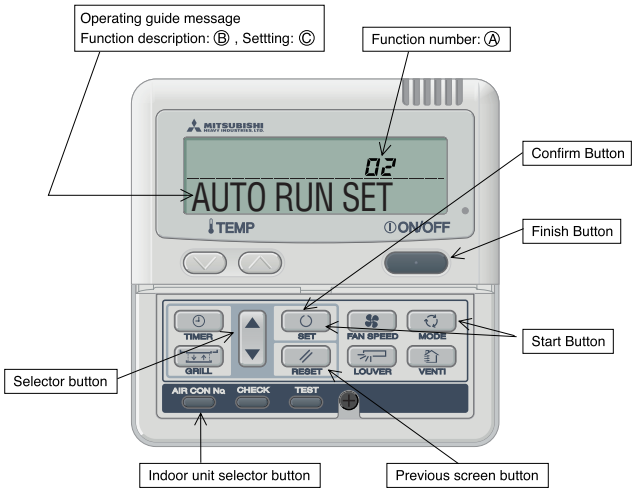
Function number Ⓐ	Function description Ⓑ	Setting Ⓒ	Default setting
01	Hi CEILING SET	STANDARD (Mild mode)	✻
		Hi CEILING 1 (Powerful mode)	
03	FILTER SIGN SET	NO DISPLAY	✻
		AFTER 180H	
		AFTER 600H	
		AFTER 1000H	
		1000H→STOP	
04	POSITION (Louver control setting)	FIX (1 OF 4) (4 positiion stop)	○
		IN MOTION (Free stop)	
05	EXTERNAL INPUT SET	LEVEL INPUT	○
		PULSE INPUT	
06	OPERATION PERMISSION PROHIBITED	NORMAL OPERATION	○
		VALID	
07	ROOM TEMP OFFSET (Heating room temperature offset)	NORMAL OPERATION	○
		TEMP SHIFT +3°C	
08	FAN CONTROL (Heating fan control)	LOW FAN	✻
		STOP→LOW FAN (Intermittent operation)	
09	FREEZE PREVENT TEMP	TEMP Hi	
		TEMP Lo	○
10	FREEZE PREVENT CONTROL	FAN CONTROL ON	○
		FAN CONTROL OFF	

Notes(1) Setting marked with [○] are the default setting.
(2) Setting marked with [✻] are those that are set automatically according to an indoor unit or an outdoor unit connected. Please check default settings with the indoor unit's installation manual.

(b) Function setting method

1) Stop the air conditioner
2) Press the SET and MODE buttons simultaneously for 3 seconds or longer.
   The screen display will be switched as follows:
   "◆ SELECT ITEM" →
   "○ SET" →
   "FUNCTION SET ▼ "

3) Press the SET button.
   The unit will enter the function setting mode. The screen display will charge to " FUNCTION ▼".



4) Check which category your desired setting belongs to, " FUNCTION ▼ (Remote controller unit function)" or "I/U FUNCTION ▲" (Indoor unit function).
5) Press either ▲ or ▼ button.
   Select either " FUNCTION ▼ " or "I/U FUNCTION ▲".

6) Press the SET button.

When " FUNCTION▼ " is selected.

① "DATA LOADING" (blinking) → "◆ FUNCTION"→
"01 GRILLE ↑↓ SET" (Function number: Ⓐ, Function description: Ⓑ)
The screen display will be switched like this.

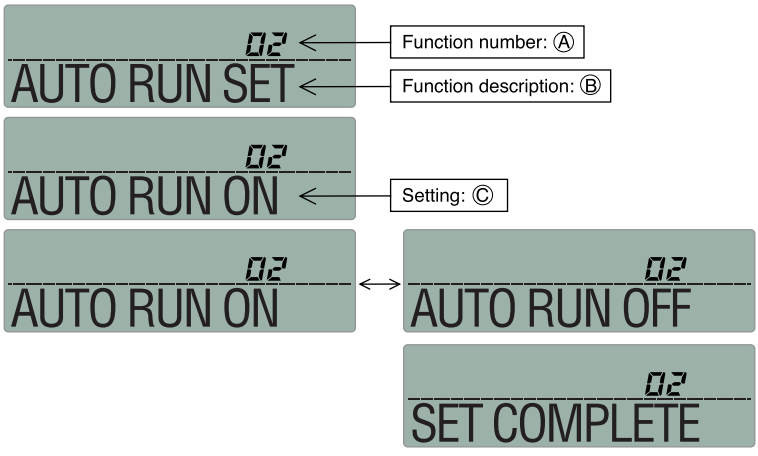
② Press either ▲ or ▼ button.
"Function number: Ⓐ, Function description: Ⓑ " from the list of remote controller unit functions will be displayed one by one. Select a desired function.

③ Press the SET button.
The screen display will be switched as follows:
"◆ SETTING" → "Setting: Ⓒ" (ex. "AUTO RUN ON")

④ Press either ▲ or ▼ button.
A list of "Settings: Ⓒ" will be displayed one by one. Select your desired setting.

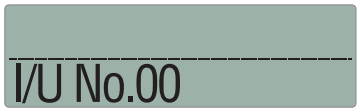
⑤ Press the SET button.
The selected setting is displayed for 2 seconds, then followed by "SET COMPLETE" and the function setting process is completed.
Then the screen display will be swiched to "Function number: Ⓐ, Function description: Ⓑ," so if you want to continue to set another function, repeat the steps as explained above.
To finish the function setting process, please proceed to Step (c).

* When "02 AUTO RUN SET " is selected.



When "I/U FUNCTION ▲" is selected.

① The screen display will be switched as follows:
"◆☝ I/U SELECT" → "○☝ SET" → "I/U No.00" (blinking)



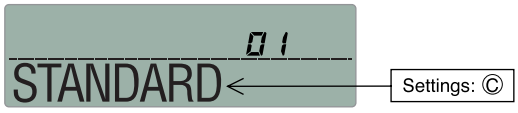
② Press either ▲ or ▼ button.
Select the indoor unit number that you want to change settings. If only one indoor unit is connected, the indoor unit number will not charge, so please proceed to Step ③.
If "ALL I/U ▼ " is selected while indoor group control is in effect, you can set all units to the same settings.

③ Press the SET button.
Indoor unit number indication will change from blinking to lit continuously, The screen display will be switched as follows:
"DATA LOADING" (blinking for about 2 to 23 seconds) → "◆☝ FUNCTION" → "01 Hi CEILING SET"
(Function number: Ⓐ, Function description: Ⓑ)

* When "01 Hi CEILING SET" is selected.

④ Press either ▲ or ▼ button.
"Function number: Ⓐ, Function description: Ⓑ" from the list of indoor unit functions will be displayed one by one. Select a desired function.

⑤ Press the SET button.
The screen display will be switched as follows: "◆☝ SETTING" → "Setting: Ⓒ" (ex. "STANDARD")



⑥ Press either ▲ or ▼ button.
A list "Setting: Ⓒ" will be displayed one by one. Select your desired setting.

⑦ Press the SET button.
The selected setting is displayed for 2 seconds, then followed by "SET COMPLETE" and the function setting process is completed.
Then the screen display will be switched to "Function number: Ⓐ, Function description: Ⓑ" so if you want to continue to set another function, repeat the stepa as explained above. To finish the function setting process, please proceed to Step 8.

⑧ Press AIR CON No. button.
The screen display will go back to the indoor unit selection screen (ex. " I/U No.00").
If you want to continue to set another indoor unit, please follow the steps explained above.

(c) Press the ON/OFF button.

This ends a function setting process. Even if a function setting process is not completed, this ends the process.
Please note that any setting that is not completed will become void.

- **Pressing the RESET button during a function setting process will allow you to go back the previous step. Please note that any setting that is not completed will become void.**
- **Method of checking the current setting**
  While following the above mentioned step, the setting that appears when the SET button is pressed for each "Function number: Ⓐ, Function description: Ⓑ" is the current setting "Stting: Ⓒ". (When "ALL I/U ▼" is selected, the setting of the indoor unit with the lowest number is displayed)
- **Settings are stored in the controller and not lost even a power outage occurs.**

(d) Changing the remote controller's temperature setting range

1) The temperature setting range of the remote controller can be changed.
   Through remote controller button operations, the upper limit and lower limit set temperature values can be changed individually.
   During heating operation, the changed upper limit value becomes valid and at times other than during heating operation, (during cooling, dehumidification, auto and fan operation), the changed lower limit value becomes valid.
   Range of Possible Changes
   Upper Limit Value: 22~30ºC (valid during heating) Lower Limit Value: 18 ~ 26ºC (valid at times other than during heating)
2) Operation
   a) With the remote controller in the stopped state, press the SET and MODE buttons simultaneously for 3 seconds or longer. The display will changed from " SELECT ITEM" → " SET" → "FUNCTION SET ▼ "
   b) Press the ▼ button once. The display will change to TEMP RANGE ▲ .
   c) Press the SET button to enter the temperature range setting mode.
   d) Using the ▲ or ▼ button, select "Hi LIMIT SET ▼ " or "Lo LIMIT SET ▲ ," the press the SET button.
   e) If "Hi LIMIT SET" is selected,
      ① The display changes from " SET UP" → "Hi LIMIT 22ºC " (flashing).
      ② Using the " " button, select the upper limit value. Display example: "Hi LIMIT 22ºC " (flashing)
      ③ Press the SET button to fix the setting. Display example: "Hi LIMIT 22ºC" (lighted up)
   f) If "Lo LIMIT SET" is selected,
      ① The display changes from " SET UP" → "Lo LIMIT 26ºC " (flashing).
      ② Using the " " button, select the upper limit value. Display example: "Lo LIMIT 26ºC " (flashing)
      ③ Press the SET button to fix the setting. Display example: "Lo LIMIT 26ºC" (lighted up)
   g) Press the ON/OFF button to end the setting procedure.
      (The procedure also ends if the ON/OFF button is pressed during the setting operation. However, settings which have not been fixed become invalid, so exercise caution.)

- If the RESET button is pressed during a setting operation, the display returns to the previously displayed setting screen. However, settings which have not been fixed become invalid, so exercise caution.
  * If "NO DISP CHANGE" is selected in No. 12, "TEMP RANGE SET" of the remote controller's functions, of the function setting modes, the remote controller's display does not change even if the temperature range has been changed.

(Example) If the upper limit is set at 28˚C

Function No. A	Function Contents B	Setting Contents C	Control Contents
12	TEMP RANGE SET	DISP CHANGE	The remote controller's display and sent data upper limit changes to 28°C.
		NO DISP CHANGE	The remote controller's display upper limit remains at 30ºC and only the upper limit of the sent data is changed to 28°C.

(9) Test run

(a) Carry out test operation from outdoor units.

Models FDCA301~601

1) Test run method

a) A test run can be initiated from an outdoor unit by using SW2 and SW5-4 for on-site setting.

b) Press SW2 (push-button switch) for one second. The compressor will start when the button is released. The compressor will stop when 30 minutes elaps.

c) The unit will start a cooling operation, when SW5-4 is OFF, or a heating operation, when SW5-4 is ON.

d) When a test run is completed, press SW2 (push-button switch) again for one second and then release it.

2) Checking the state of the unit in operation

Check discharge pressure and suction pressure, using the check joint provided inside the outdoor unit and the gas charge valve charge port. The check joint in the unit is provided on the pipe connecting the four-way valva and the heat exchanger, and these points offer different pressure measurements depending on a cooling or heating operation as summarized in the table below.

	Check joint in the unit	Gas operation valve charge port
Cooling	Discharge pressure (high pressure)	Suction pressure (low pressure)
Heating	Suction pressure (low pressure)	Discharge pressure (high pressure)

3) Setting SW5-1, SW5-2 on-site

a) Defrost conteol switching (SW5-1)

① When this switch is turned on, the unit will run in the defrost mode more frequentiy.

② Please set this switch to ON, when installed in a region where outdoor temperaure falls below zero during the season the unit is run for a heating operation.

b) Snow guard fan control (SW5-2)

① 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.

② When the unit is used in a very snowy country, please set this switch to ON.

Models FDCA801, 1001

a) Trial operation can be performed using the local setting switches SW3-3 and SW3-4.

① Turning SW3-3 ON operates the compressor.

② Turning SW3-4 OFF starts cooling. Turning SW3-4 ON starts heating.

Note (1) Be sure to turn SW3-3 OFF when trial operation is finished.

(b) Trial operation from a remote controller

1) Cooling Test Operation Procedure

Carry out the following test operation procedure using the remote controller.

a) Starting the Cooling Test Operation

① Press the ON/OFF button to start operation.

② Press the MODE button and select "❄ (COOL)".

③ Press the TEST button continuously for 3 seconds or longer.
The display changes from " ▲▼ SELECT ITEM" → "○ SET" → " ❄ TEST RUN ▼ ".

④ When " ❄ TEST RUN ▼ " is displayed, press the SET button to begin the cooling test operation. The display shows " ❄ TEST RUN."

b) Canceling the Cooling Test Operation

Pressing the ON/OFF button or the TEMP ▽ △ button ends the cooling test operation.
The " ❄ TEST RUN" display is cleared.

(10) Checking Operation Data

Operation data can be checked with remote controller unit operation.

① Press the CHECK button.
The display change from " ◆☝ SELECT ITEM" → "○☝ SET" → "OPERATION DATA ▼ ".

② Press the SET button while "OPERATION DATA ▼ " is displayed.

③ The display will change to "I/U No. 00 ▲ " (blinking indication).
Select the indoor unit number you want to have data displayed with the ▲ ▼ button.
(When only one indoor unit connected, the indoor unit number displayed on the screen will not change.)

④ Determine the indoor unit number will the SET button.
(The indoor unit number changes from blinking indication to continuous indication.)
"DATA LOADING" (A blinking indication appears while data is loaded)
↓
"OPERATION DATA ◆ " appears and data number 01 is displayed.

⑤ Upon operation of the ▲ ▼ button, the current operation data is displayed in order from Data number 01.
The items displayed are as follows:
* Depending on models, the items that do not have corresponding data are not displayed.

⑥ 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.

⑦ Pressing the ON/OFF button will stop displaying data.

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

Number	Data item	
01	✳	(Operation mode)
02	SET TEMP	
03	RETURN AIR	
04	I/U HEAT EXCH 1	(Indoor unit heat exchanger temperature 1)
05	I/U HEAT EXCH 2	(Indoor unit heat exchanger temperature 2)
07	I/U FAN	(Indoor unit fan speed)
11	TOTAL I/U RAN	(Indoor unit operation hours)
21	OUTDOOR	(Outside air temperature)
22	O/U HEAT EXCH 1	(Outdoor unit heat exchanger temperature 1)
23	O/U HEAT EXCH 2	(Outdoor unit heat exchanger temperature 2)
24	COMP HERTZ	
27	DISCHARGE	(Discharge pipe temperature)
28	DOME BOTTOM	
29	CT	
31	O/U FAN	(Outdoor unit fan speed)
32	SILENT MODE ON/OFF	
34	63H1 ON/OFF	
35	DEFROST ON/OFF	
36	TOTAL COMP RUN	(Compressor operation hours)
37	EEV 1	(Expansion valve opening 1)

2.6 MAINTENANCE DATA

2.6.1 Servicing

(1) Evacuation

The evacuation is a procedure to purge impurities, such as noncondensable gas, air, moisture from the refrigerant equipment by using a vacuum pump. Since the refrigerant R410A is very insoluble in water, even a small amount of moisture left in the refrigerant equipment will freeze, causing what is called ice clogging.

Evacuation procedure

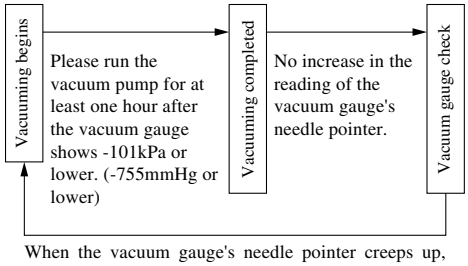
Make sure that the both service valves of gas and liquid line are fully opened.

(a) Check to ensure that there is no internal pressure in the unit. If there is an internal pressure, it should be relived through the service port.

(b) Connect the charging hose of the gauge manifold to the service port of the gas piping. Close high pressure valve ② of gange manifold.

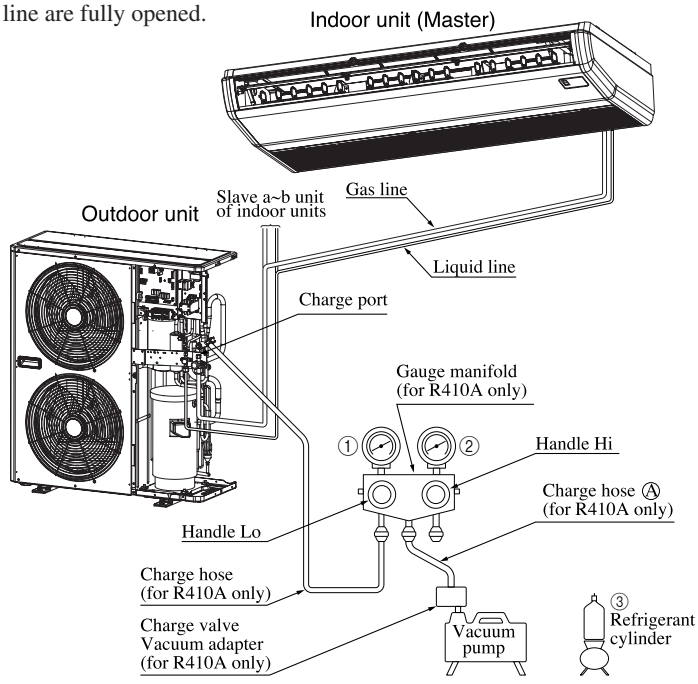
(c) Connect the charging hose Ⓐ to a vacuum pump.

Repeat evacuation in the following sequence.



When the vacuum gauge's needle pointer creeps up, there is moisture left in the system or a leak. Pull air again after you have checked the system for a leak and rectified it. Use a reverse flow stop adapter to prevent the vacuum pump's lubricant oil from flowing into the refrigerant system.

Notes (1) Do not use the refrigerant pressure to expel air.
(2) Do not use the compressor for evacuation.
(3) Do not operate the compressor in a vacuum condition.



Notes (1) Refer to the exterior-view drawing for the position of the service valve.
(2) When connecting of ther service valve, flare connection for both the indoor and outdoor unit.

(2) Refrigerant charging

(a) After the evacuation shown in the above, change the connection of the charge hose Ⓐ to the refrigerant cylinder.

(b) Purge air from the charge hose Ⓐ.

First loosen the connecting portion of the charge hose at the gauge manifold side and open valve ③ for a few seconds, and then immediately retighten it after observing that gas has blown out from loosened connecting portion.

(c) Open valves ① and ③ then gas refrigerant begins flowing from the cylinder into the unit.

When refrigerant has been charged into the unit to some extent, refrigerant flow becomes stagnant. When that happens, start the compressor in cooling cycle until the system is filled with the specified amount of gas, then close valves ① and ③ and remove the gauge manifold. Cover the service port with caps and tighten them securely.

(d) Check for gas leakage by applying a gas leak detector around the piping connection.

(e) Start the air conditioner and make sure of its operating condition.

2.6.2 Trouble shooting for refrigerant circuit

(1) Judgement of operating condition by operation pressure and temperature difference

Making an accurate judgement requires a skill that is acquired only after years of experience, one trouble may lead to an another trouble from a single trouble source and several other troubles may exist at the same time which comes from a undetected different trouble source.

Filtering out the trouble sources can be done easier by comparing with daily operating conditions. Some good guides are to judge the operating pressure and the temperature difference between suction air and delivery air.

Following are some pointers,

Pressure						Trouble cause
Indication / Circuit	Too low	A little low	Normal	A little high	Too high	
High side					●	1) Excessive overcharging of refrigerant
Low side					●	2) Mixture of non condensable gas (air etc.)
High side	●					Ineffective compression
Low side					●	(defective compressor)
High side		●				1) Insufficient refrigerant in circuit
Low side	●					2) Clogging of strainer 3) Gas leakage 4) Clogging of air filter (in cooling) 5) Decrease in heat load (in cooling) 6) Locking of indoor fan (in cooling)
High side					●	1) Locking of outdoor unit fan (in cooling)
Low side				●		2) Dirty outdoor heat exchanger (in cooling) 3) Mixture of non condensable gas (air etc.)
High side				●		1) Too high temperature of room
Low side					●	

(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 eroor code, indoor/outdoor unit green LED (power pilot lamp and microcomputer normality pilot lamp) or red LED (check pilot lamp).

1) Indoor unit side

Remote controller error code	Indoor unit LED		Outdoor unit LED		Cause
	Green	Red	Green	Red	
No-indication	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Normal
	Stays OFF	Stays OFF	Stays OFF	Stays OFF	Power OFF, L phase wiring is open, power source failure
	Keeps flashing	*3 time flash	Keeps flashing	Stays OFF	Remote controller wires X and Y are reversely connected. *For wire breaking at power ON, the LED is OFF. Remote controller wire is open. (X wire breaking : A beep is produced and no indication is made. Z wire breaking : No beep and no indication) The remote controller wires Y and Z are reversely connected.
LCD flashes continuously or is off.	Keeps flashing	Stays OFF	Keeps flashing	2 time flash	Poor connection or disconnection in wires connecting the indoor and outdoor units.
E1	Stay OFF or Lights continuously	Stay OFF	Keeps flashing	Stays OFF	Indoor unit PCB fault
	Keeps flashing	Stay OFF	Keeps flashing	Stays OFF	The remote controller wire Y is open. The remote controller wires X and Y are reversely connected. Noise is penetrating the remote control lines. The remote controller or indoor control PCB is faulty. (The communications circuit is faulty.)
E5	Keeps flashing	2 time flash	Keeps flashing	2 time flash	Indoor / outdoor transmission error.
	Keeps flashing	2 time flash	Keeps flashing	Stays OFF	Outdoor unit microcomputer failure
E6	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Indoor unit heat exchanger thermistor failure
E7	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Indoor unit return air thermistor failure
E8	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	Heating overload (indoor heat exchanger temperature is abnormally high) and indoor heat exchanger thermistor is faulty.
E9	Keeps flashing	1 time flash	Keeps flashing	Stays OFF	The float SW operates (with FS only). Drain up kit wiring fault.
E10	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	When multi-unit control by remote controller is performed, the number of units is over (more than 17 units). Two remote controller are provided for one controller is performed.
E16	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Fan motor is faulty (FDTA 501 type, FDKN type).
E28	Keeps flashing	Stays OFF	Keeps flashing	Stays OFF	Remote controller thermistor failure

V MULTI

2) Outdoor unit side

Remote controller error code	Indoor unit LED		Outdoor unit LED		Cause
	Green	Red	Green	Red	
E32	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Wiring is open or reversal phase
E33	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Abnormal current cut of compressor
E34	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	52C secondary side L3-phase wiring is open.
E35	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outdoor heat exchanger temperature is high or outdoor heat exchanger thermistor is faulty.
E36	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Discharge temperature abnormality.
E37	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outdoor unit heat exchanger thermistor failure
E38	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Outdoor air temperature thermistor failure
E39	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Discharge pipe thermistor failure
E40	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	63H1 operation
E49	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Low pressure error or gas low error. Service valve closes operation. (FDCA801, 1001 type)
E52	Keeps flashing	Stays OFF	Keeps flashing	Lights contiously	52C abnormal.
E53	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Suction pipe temperature thermistor failure (FDCA801, 1001 type)
E54	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Low pressure sensor disconnection/output error (FDCA801, 1001 type)
E55	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Under-doom thermistor failure (FDCA801, 1001 type)
E57	Keeps flashing	Stays OFF	Keeps flashing	1 time flash	Insufficient refrigerant.

(b) Display sequence of error, inspection display lamp

1) One kind error
   Display corresponding to the error is shown.
2) More than one errors.

Section	Display section
Error code of remote controller	• Displays the error of higher priority (When plural errors are persisting) E1> E5> ..... E10 > E32 ..... E57 • Displays the present errors. (When a new error has occurred after the former error was reset.)
Inspection LED (red) of indoor unit PCB	
Inspection LED (red) of outdoor unit PCB	

3) Timing of error detection

● Indoor unit side.

Error detail	Error code	Timing of error detection
Drain error (float switch motion)	E9	Normally, 30 seconds after the power is turned ON.
Wrong connection between the indoor and outdoor units.	"Wait"	No communications even once with the outdoor unit.
Transmission error of remote controller indoor unit	E1	After 1 or more communications of the indoor unit with the remote controller following power on, transmission errors cause an interruption for 2 minutes.
Transmission error between indoor/outdoor units	E5	After communications with the outdoor unit 1 or more times, communications are abnormal continuously for 2 minutes.
The number of connected indoor units exceeds the connection limit (when multiple units are control by a single remote controller).	E10	Normally after the power is turned ON (during communications).
Broken wire of indoor unit return air thermistor	E7	When an input temperature of –50°C or lower is measured by the return air thermistor is measured for 5 seconds or longer within 60 minutes after the first detection.
Broken wire of heat exchanger thermistor	E6	When an input temperature of –50°C or lower is measured by the heat exchanger thermistor is measured for 5 seconds or longer within 60 minutes after the first detection.

● Outdoor unit side.

Error detail	Error code	Timing of error detection
Broken wire of outdoor air temperature thermistor	E38	When a thermistor input temperature of –30°C or lower is measured for 5 seconds or longer within 60 minutes (3 times within 60 minutes) after the 1st detection between 2 minutes and 2 minutes 20 seconds after compressor operation starts.
Broken wire of heat exchanger thermister	E37	When a thermistor input temperature of –30°C or lower is measured for 5 seconds or longer within 60 minutes (3 times within 60 minutes) after the 1st detection between 2 minutes and 2 minutes 20 seconds after compressor operation starts.
Broken wire of discharge pipe thermistor	E39	When a thermistor input temperature of –10°C or lower is measured for 5 seconds or longer within 60 minutes (3 times within 60 minutes) after the 1st detection between 10 minutes and 10 minutes 20 seconds (between 2 minutes and 2 minutes 20 seconds) after compressor operation starts.
Broken wire of under-doom thermistor	E55	When the under-dome thermistor input temperature of –10°C is measured for 5 seconds or longer 3 times within 60 minutes after the 1st detection between 10 minutes and 10 minutes 20 seconds after compressor operation starts.

Notes (1) Values in ( ) show for the FDCA801, 1001 models.
(2) The under-doom thermistor is used in the FDCA801, 1001 models only.

4) Recording and reset of error

Error display	Memory	Reset
Error code of remote controller	• Saves in memory the mode (1) of higher priority	• Stop the unit operation by pressing the ON/OFF switch of remote controller. • Operation can be started again if the error has been reset.
Indoor unit inspection lamp (red)	• Cannot save in memory	
Outdoor unit inspection lamp (red)	• Saves in memory the mode (1) of higher priority	

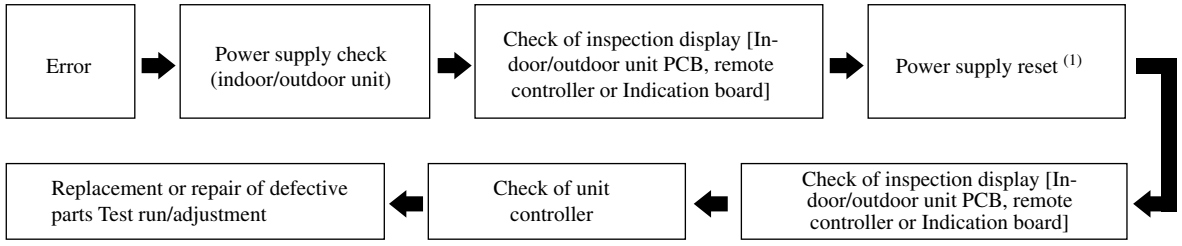
Notes (1) Priority is in the order of E1 > ... > E10 > ... > E57.

Indoor unit : Press the ON/OFF button on the remote controller. Or disconnect and reconnect the power supply connector (CNW1 or CNW0) on the indoor unit control PCB or turn the main power supply OFF.

Outdoor unit : Turn the main power supply OFF.

(2) Procedures of trouble diagnosis

When any error occurs, inspect in following sequence. Detailed explanation on each step is given later in this text.



Note (1) It means the operation to turn off the power and back on again more than 1 min. later in order to reset the malfunction of microcomputer due to the effect of power supply conditions or accidental noise.

(3) Error diagnosis procedures at the indoor unit side

Please see page 132 of Chapter 1.

(4) Error diagnosis procedures at the outdoor units side

At the error diagnosis related to the outdoor unit, check at first the error code of remote controller and the illumination patterns of norma1 and inspection display lamps in the same manner as the case of indoor unit.

Then estimate the outline, the cause and the location of error based on the pattern and proceed to the inspcetion and repair.

Since the self diagnosis function by means of the microcomputers of indoor/outdoor units provide the judgement of error of microcomputers them selves irregularity power supply line, overload, etc. caused by the installation space, inadequate volume of refrigerant etc., the location and cause of trouble will be discovered without difficulty.

In addition, the display lamps error code of indoor/outdoor unit is kept flashing, (except when the power supply is iterrupted) after the irregularity is automatically recovered to give irregularity information to the service presonnel. If any mode of higher priority than the error retained in memory occurs after the reset of error, it is switched to that mode and saved in the memory.

(a) Replacement parts assembly related to the outdoor unit controller

Outdoor unit PCB, capacitor, thermistor, (heat exchanger, discharge pipe, outdoor temperature, under-doom), fuse, transformer, etc.

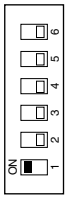
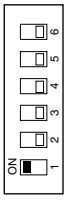
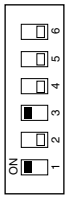
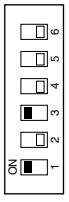
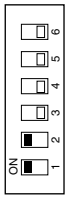
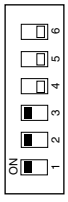
(b) Replacement procedure of outdoor unit microcomputer printed circuit board.

Microcomputer printed circuit board can replaced with following procedure.

1) Confirm the parts numbers. (Refer to the following parts layout drawing for the location of parts number.)

Parts No.	Applicable Model
PCA505A065ZP	FDCA301HEN, 401HEN
PCA505A065ZT	FDCA301HES, 401HES, 501HES, 601HES
PCB505A042PB	FDCA801HES, 1001HES

2) Set the overcurrent value using the overcurrent setting switch for CM (SW3). (In the case of the FDCA301~601 only)
Switch Setting Table (All switches are set in the OFF position when shipped from the factory.)

Model	FDCA 301HEN	FDCA 301HES	FDCA 401HEN	FDCA 401HES	FDCA 501HES	FDCA 601HES
Setting Value (A)	17	10	27	11	12	14
Switch Setting Table Set the switches ON or OFF for each switch No. (■ON, □OFF)						

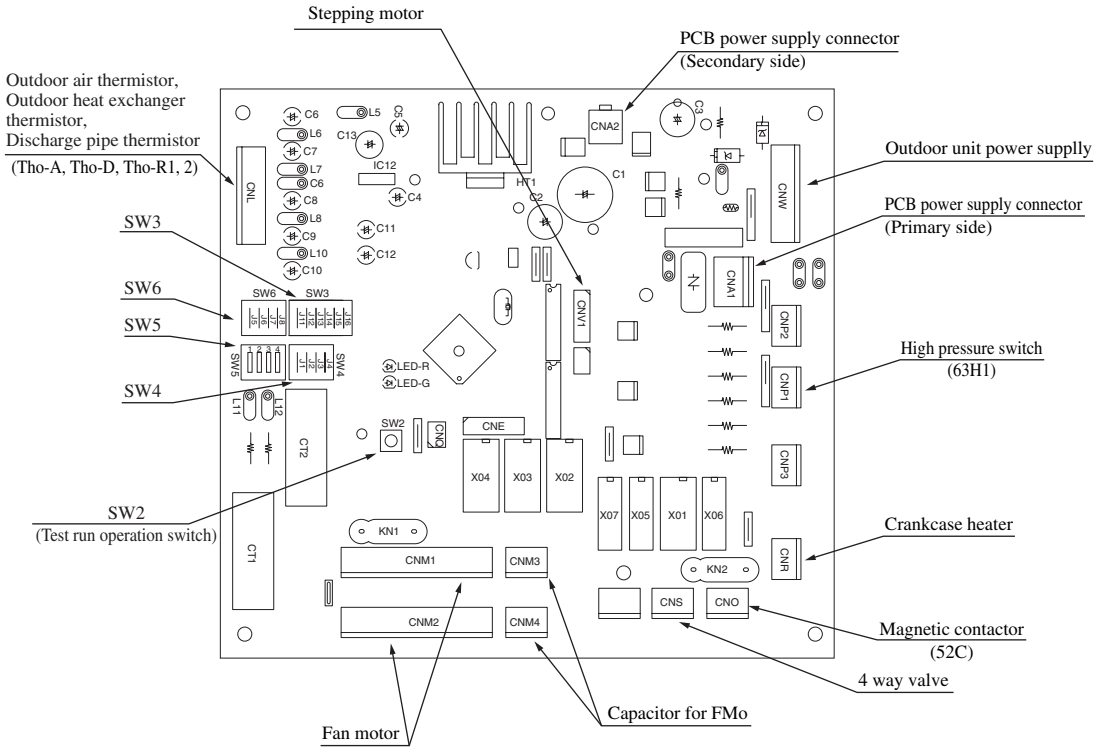
3) Set the control select switch to match the previously set settings on the previous board.
If the previously set settings were set with jumper wires, the control select switch should be set in the ON position if there was a jumper wire and in the OFF position if there wasn't a jumper wire.

4) Connect the faston terminals and connectors to the control board.
When connecting the wires to the faston terminals, connect each wire to the terminal printed with the same color on the board.

Note (1) When connecting the faston terminals to the control PCB, connect them so that there is no deformation of the far end of the control PCB.

Parts layout on the outdoor unit PCB

◆ Models FDCA301~601 type



● Change by the jumper wire

Switch		Function
J1 (SW4-1)	with	1 Phase
	None(1)	3 Phase
J2 (SW4-2)	with	Cooling
	None(1)	Heating
J6 (SW6-2)	with	Defrost recovery temperature 14ºC
	None(1)	Defrost recovery temperature (See page 78)
J7 (SW6-3)	with	Defrost prohibited temperature 45 min.
	None(1)	Defrost prohibited temperature 37 min.
J8 (SW6-4)	None(1)	—

Notes (1) "None" means that jumper wire is not provided on the PCB or the connection is cut

(2) The replacement board is not equipped with jumper wires JA1~JA8. Instead, SW4 and 6 are mounted in the same position and have the same functions as jumper wires JA1~JA8. Carry out the local settings in accordance with the above table using SW4 and 6.

● Function of DIP switches (SW5) (Usually all turned OFF)

Switch		Function
SW5-1	ON	Defrost Setting Select For cold regions.
	OFF	Normal
SW5-2	ON	Snow-guard fan control-Effective
	OFF	Snow-guard fan control-Invalid
SW5-3	ON	Low refrigerant protection control-Effective
	OFF	Low refrigerant protection control-Invalid
SW5-4	ON	Test run operation-Heating
	OFF	Test run operation-Cooling

● Overcurrent Setting

Model	301HEN	301HES	401HEN	401HES	501HES	601HES
Setting Value (A)	17	10	27	11	12	14
J11 (SW3-1)	With	With	With	With	With	With
J12 (SW3-2)	None(1)	None(1)	None(1)	None(1)	With	With
J13 (SW3-3)	None(1)	None(1)	With	With	None(1)	With

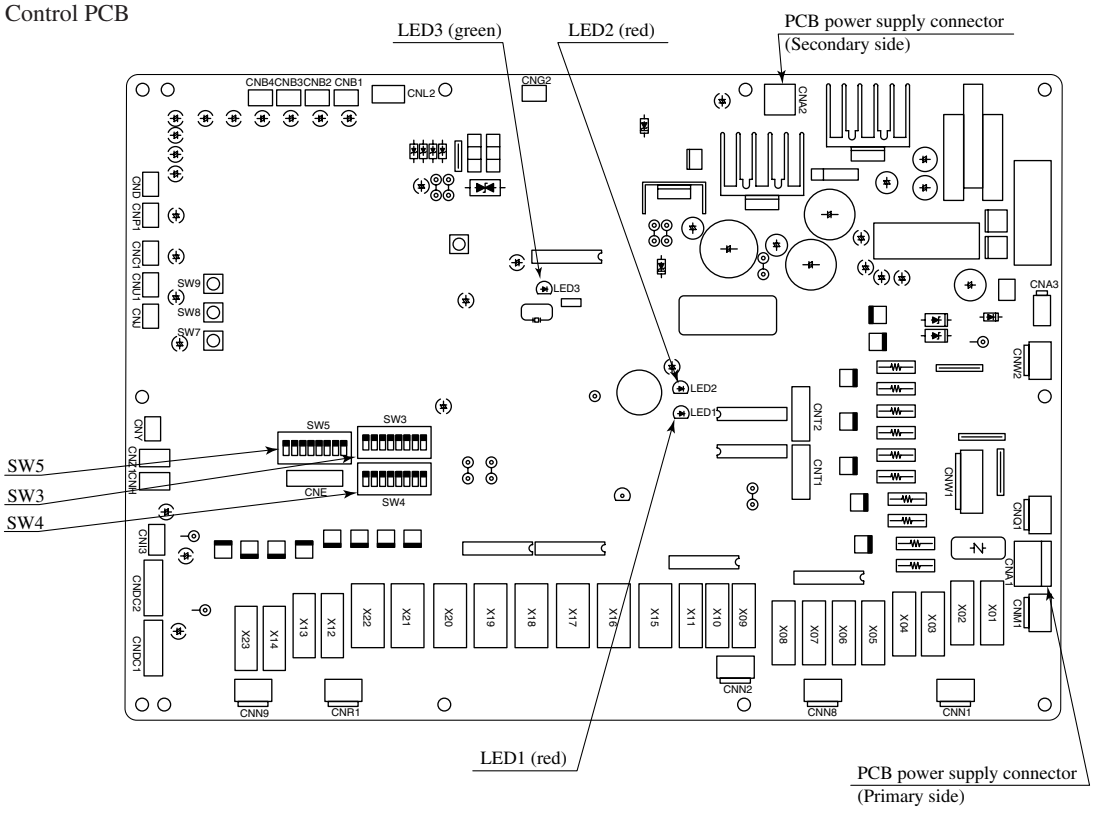
Notes (1) "None" means that jumper wire is not provided on the PCB or the connection is cut

(2) The replacement board is not equipped with jumper wires J11~J13. Instead, SW3 is mounted in the same position and has the same functions as jumper wires J11~J13. Carry out the local settings in accordance with the above table using SW3.

(3) The overcurrent setting value becomes the above setting value (A) automatically in accordance with the settings on J11(SW3-1) ~ J13(SW3-3) and J1(SW4-1).

◆ Models FDCA801, 1001 type

- Control PCB



■ Control change switch (SW3, SW4, SW5)

- Function of switch SW3 (Usually all turned OFF)

Name		Function
SW3-1	ON	Defrosting-Cold weather region
	OFF	Defrosting-Normal
SW3-2	ON	Snow protection control-With
	OFF	Snow protection control-None
SW3-3	ON	Test run operation switch: Test run
	OFF	Normal
SW3-4	ON	Test run operation: Heating
	OFF	Test run operation: Cooling
SW3-5	ON	Pump down
	OFF	Normal
SW3-6	ON	Defrosting end operation change
	OFF	Normal

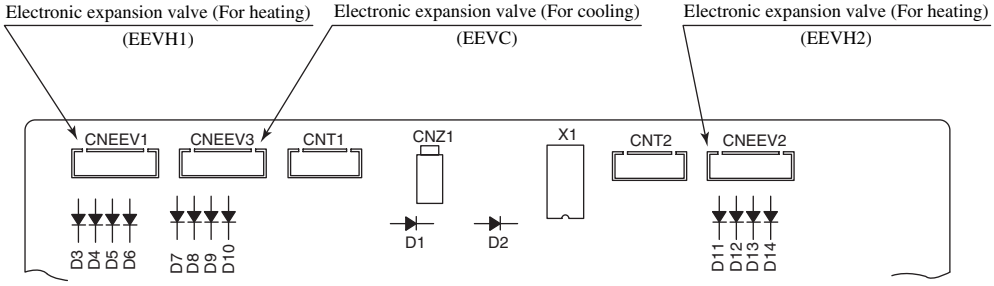
- Function of switch (SW5) (Usually all turned OFF)

Name		Function
SW5-1	ON	Renewal switch
	OFF	Normal
SW5-2	ON	Reserve
	OFF	
SW5-3	ON	LED reset
	OFF	Normal
SW5-4	ON	Test mode
	OFF	Normal

- Function of switch SW4

	FDCA801	FDCA1001
SW4-1	OFF	ON
SW4-2	OFF	OFF
SW4-3	ON	ON
SW4-4	ON	ON

- Electronic expansion valve PCB

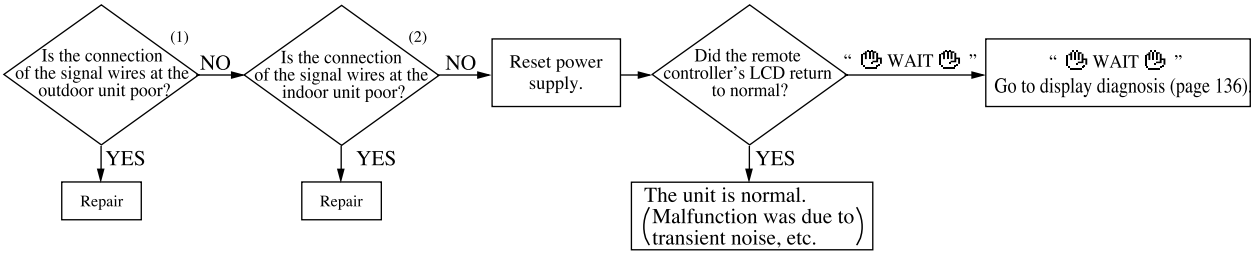


Electronic expansion valve PCB parts number

Parts No.	Applicable Model
PCB505A041ZA	FDCA801, 1001

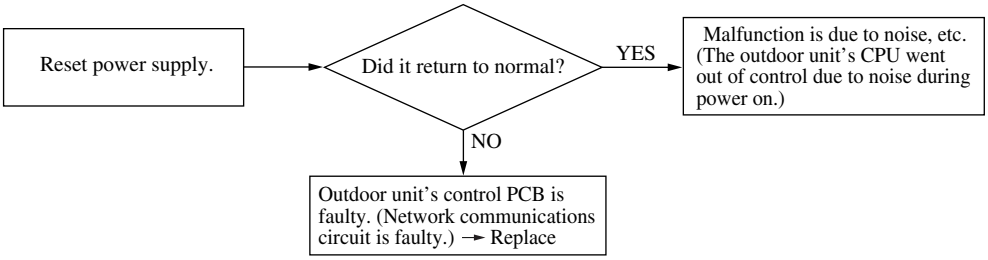
1 Error display : E5 [Communications error during operation]

Indoor unit		Outdoor unit	
Red LED	2 time flash	Red LED	2 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



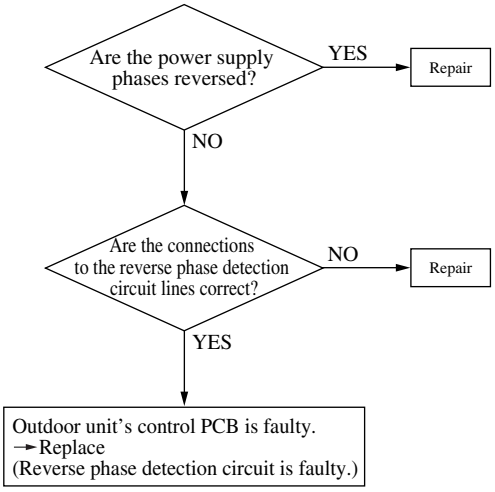
Notes (1) Check for poor connections (disconnection, looseness) on the outdoor unit's terminal block.
(2) Check for poor connections or disconnection of the signal lines between the indoor and outdoor units.

Indoor unit		Outdoor unit	
Red LED	2 time flash	Red LED	Stays OFF
Green LED	Keeps flashing	Green LED	Keeps flashing



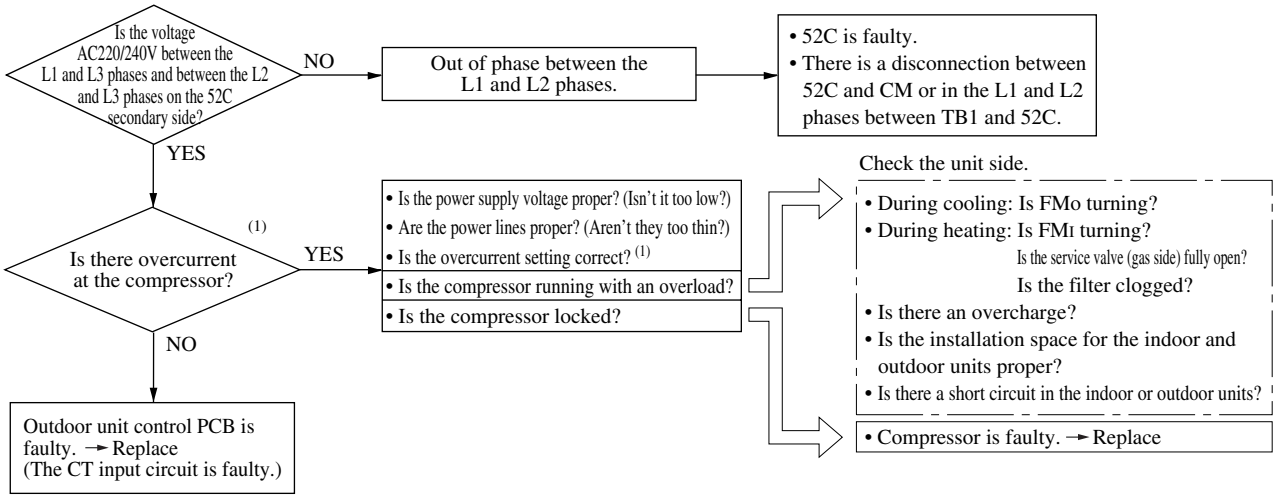
2 Error display : E32 [Power supply phases reversed]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



3 Error display : E33 [Compressor overcurrent trouble]

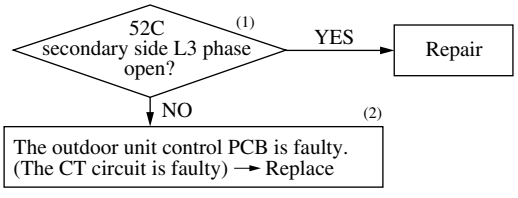
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



Notes (1) Measure the overcurrent value to make sure. (Models FDCA301~601 only)
Also make sure the overcurrent setting set with SW3 and SW4-1 on the outdoor unit control PCB is not incorrect.

4 Error display : E34 [Open phase at L3 phase of 52C secondary side]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

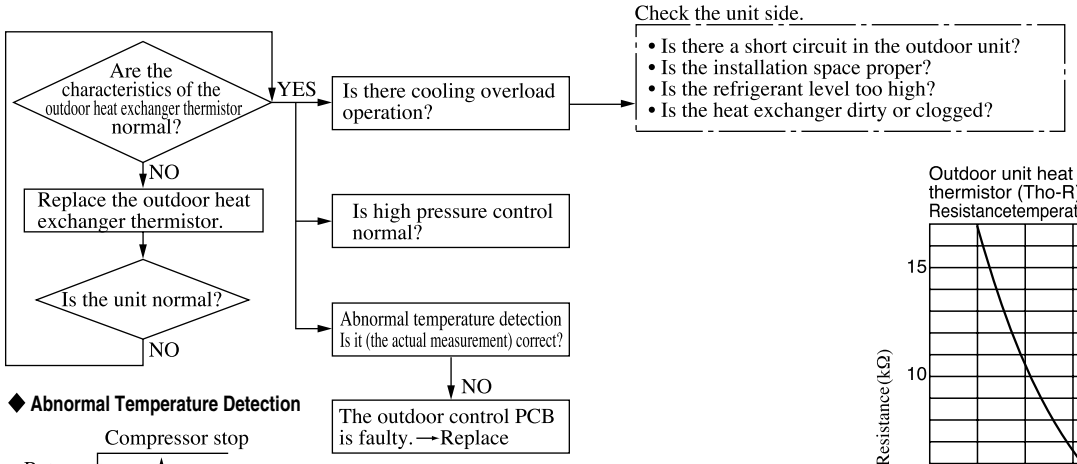


Notes (1) Also check if there is voltage at the L3 phase on the 52C primary side, but no voltage on the secondary side (coil wire disconnection or faulty contacts).
(2) If there is voltage at the L3 phase on the 52C primary side and it is not abnormal, the outdoor unit control PCB is faulty.

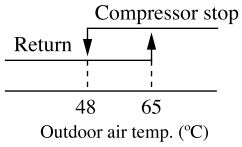
Only case of FDCA301~601
If the unit is operated with the service valve closed, 49C (internal thermostat) operates. E34 may also be displayed. Check the service valve.

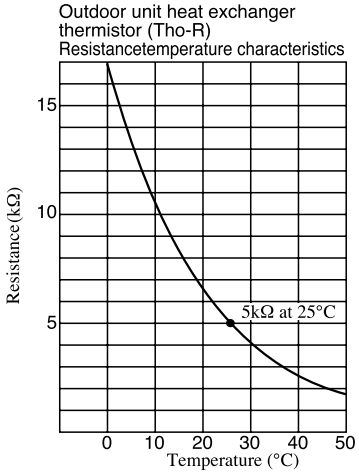
5 Error display : E35 [Cooling overload operation]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



◆ **Abnormal Temperature Detection**

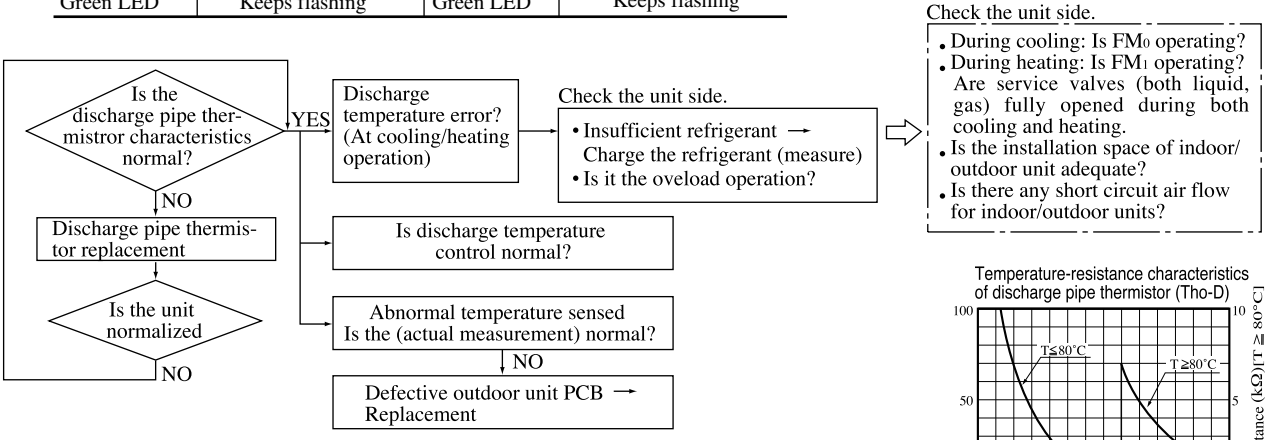


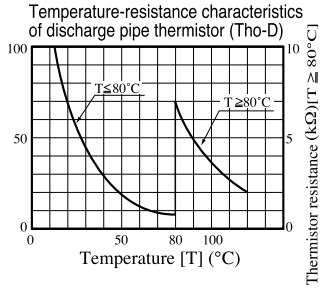


- Display Conditions
  If the outdoor heat exchanger temperature becomes 65ºC 5 times within 60 minutes, including while the compressor is stopped, or if it continues at that temperature for 10 minutes or longer.

6 Error display : E36 [Discharge temperature error]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

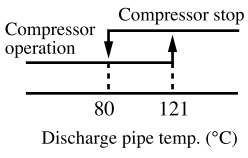




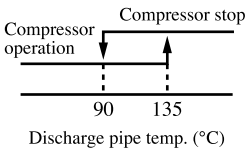
- Display conditions
  If the discharge temperature is as shown at left 5 times within 60 minutes, or continuously for 60 minutes, including when the compressor is stopped.

◆ **Abnormal Temperature Detection**

FDCA301~601 type

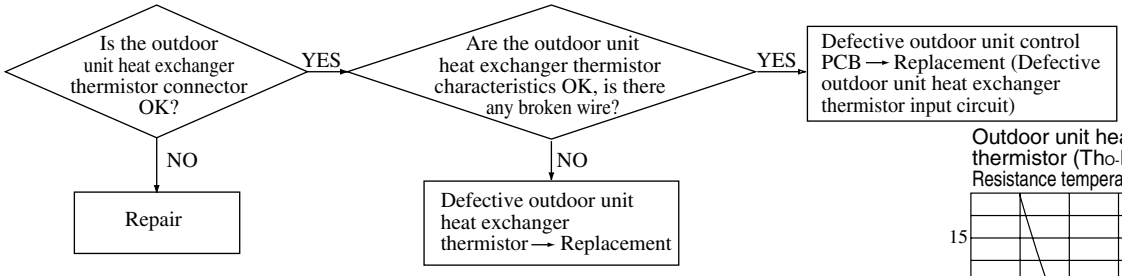


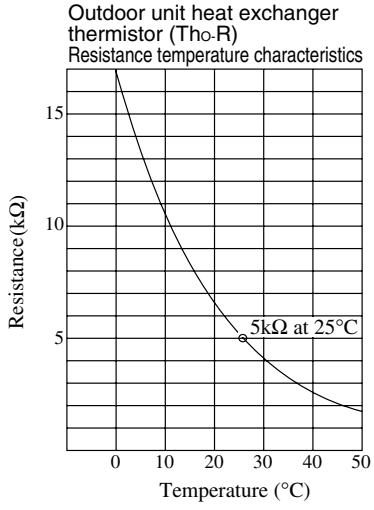
FDCA801, 1001 type



7 Error display : E37 [Defective outdoor unit heat exchanger thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing





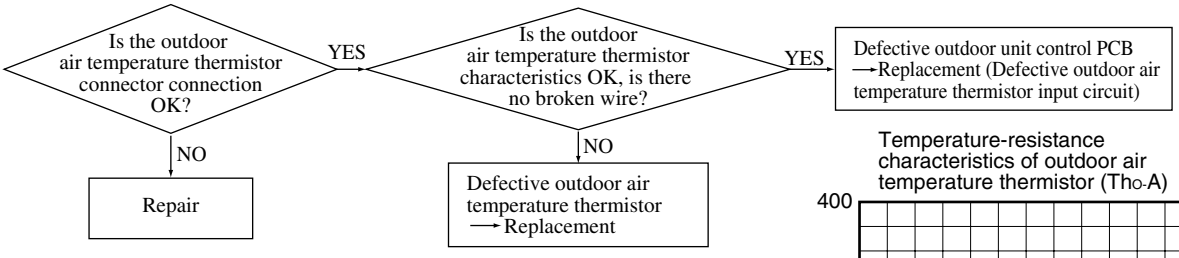
- Display conditions

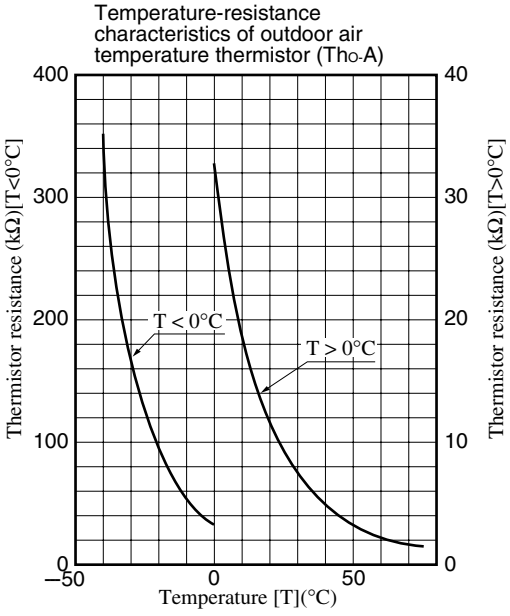
  If the temperature sensed by the thermistor is −30 (−50) ℃ or lower continuously for 5 seconds between 2 minutes and 2 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected 3 times in 60 (40) minutes.

Note (1) Values in ( ) show for the case of the FDCA801, 1001 models.

8 Error display : E38 [Defective outdoor air temperature thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing





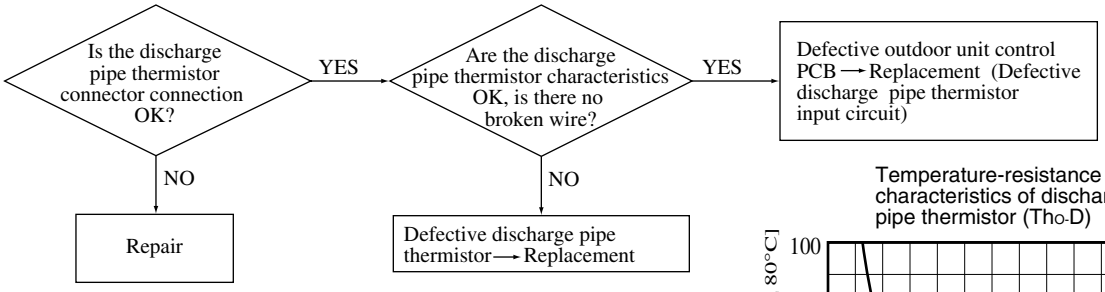
- Display conditions

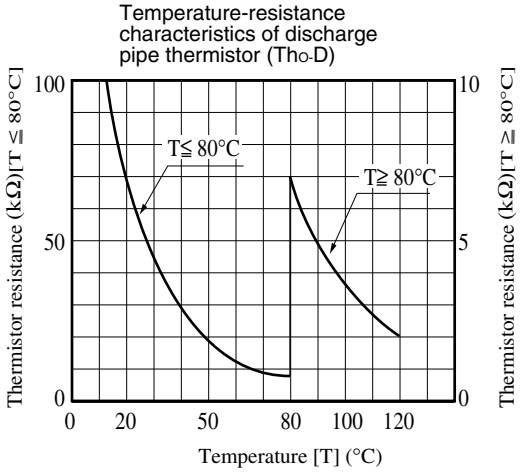
  If the temperature sensed by the thermistor is −30℃ or lower continuously for 5 seconds between 2 minutes and 2 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected 3 times in 60 (40) minutes.

Note (1) Values in ( ) show for the case of the FDCA801, 1001 models.

9 Error display : E39 [Defective discharge pipe thermistor]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing





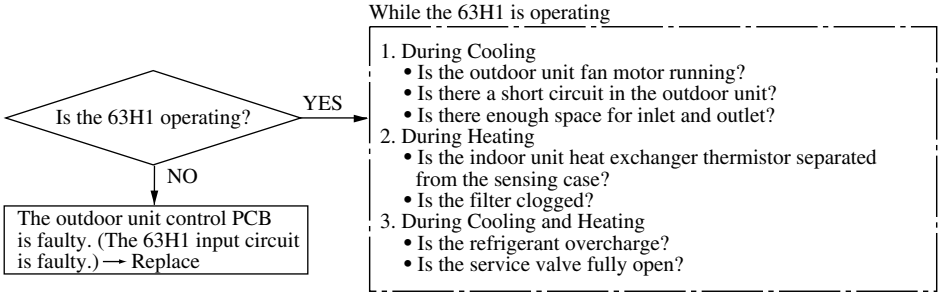
- Display conditions

  If the temperature sensed by the thermistor is –10ºC or lower continuously for 5 seconds between 2 minutes and 2 minutes 20 seconds (10 minutes and 10 minutes 20 seconds) after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected 3 times in 60 (40) minutes.

Note (1) Values in ( ) show for the case of the FDCA801, 1001 models.

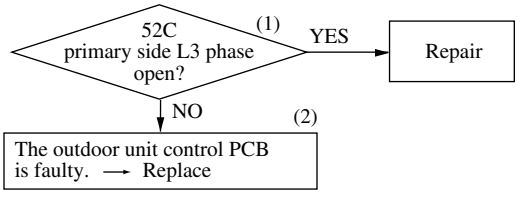
10 Error display : E40 [63H1 operation]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



[Open phase at L3-phase of 52C primary side]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing

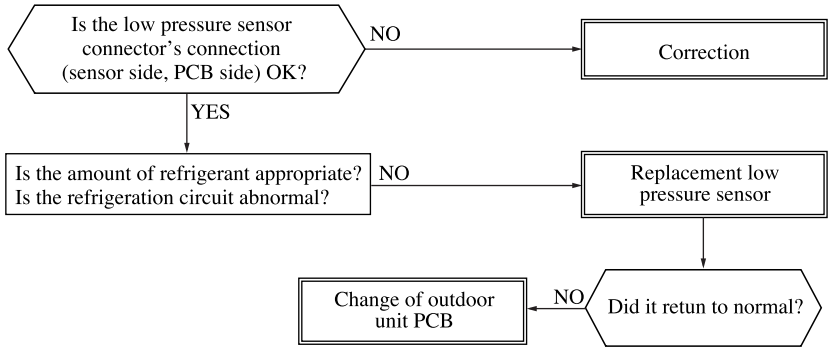


Notes (1) Also check if there is voltage at the L3 phase on the 52C primary side, but no voltage on the secondary side (coil wire disconnection or faulty contacts).

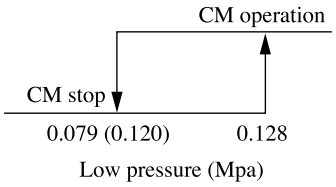
(2) If there is voltage at the L3 phase on the 52C primary side and it is not abnormal, the outdoor unit control PCB is faulty.

11 Error display : E49 [Abnormal low pressure or low pressure sensor wire disconnected] (Only case of FDCA801, 1001 type)

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



◆ **Abnormal pressure detection**



- Display Conditions

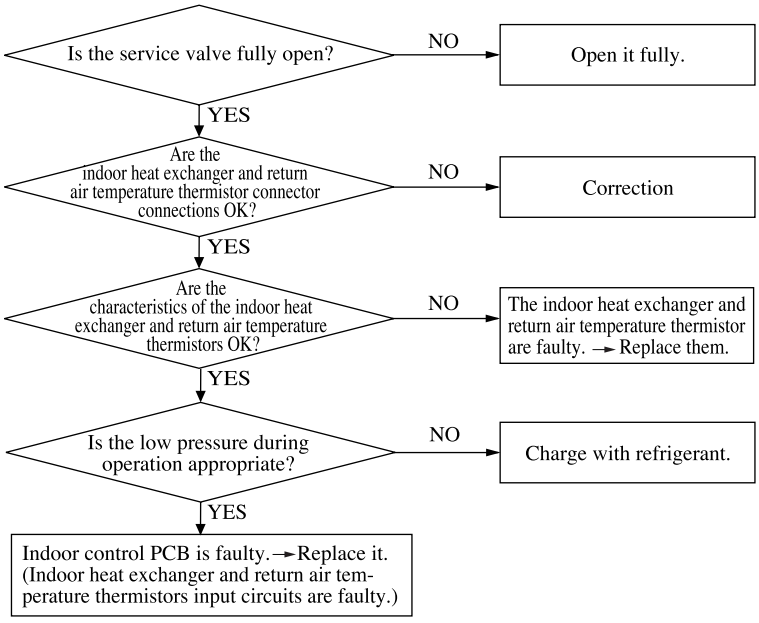
  The compressor stops if the low pressure sensor detects a pressure of 0.079 (0.120) MPa or lower continuously for 15 seconds.

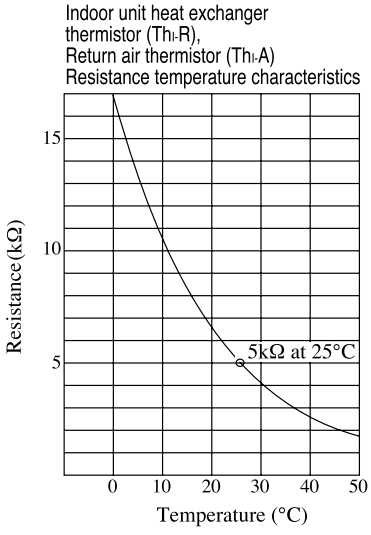
  After a 3-minute delay, the compressor restarts, but if this occurs 3 times within 60 minutes.

Note (1) Values in ( ) show in the case where 10 minutes or longer have passed since the compressor started.

[Gas low error] (Only case of FDCA801, 1001 type)

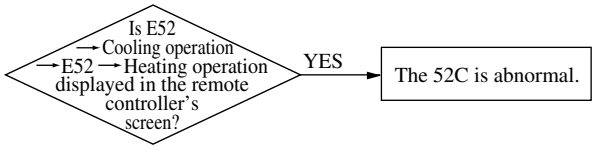
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing





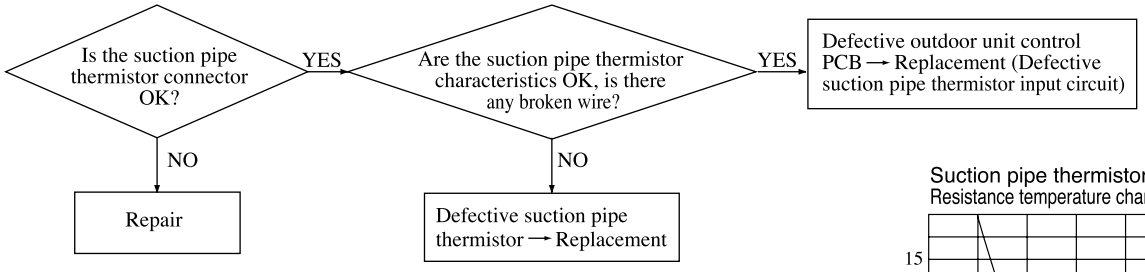
12 Error display : E52 [52C Abnormal]

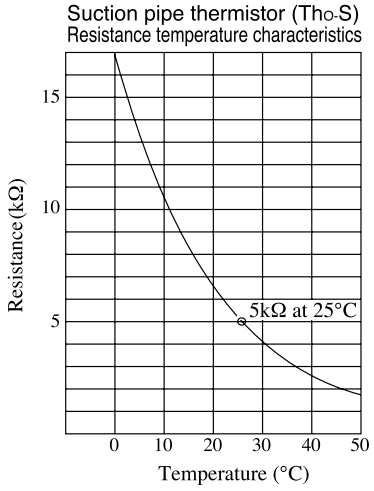
Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	Lights contiously
Green LED	Keeps flashing	Green LED	Keeps flashing



13 Error display : E53 [Defective suction pipe thermistor] (Only case of FDCA801, 1001 type)

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



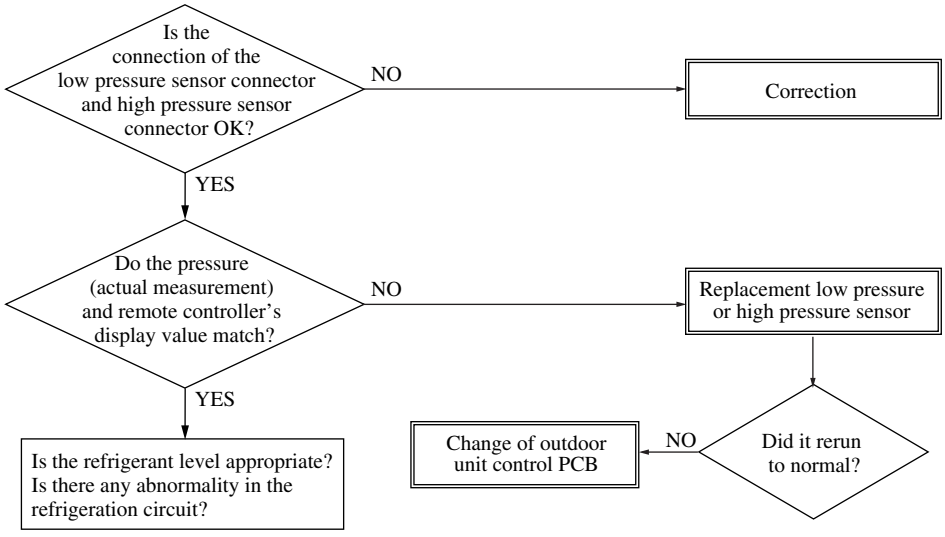


- Display conditions

  If the temperature sensed by the thermistor is –50ºC or lower continuously for 5 seconds between 10 minutes and 10 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected 3 times in 40 minutes.

14 Error display : E54 [Defective low pressure and high pressure sensor] (Only case of FDCA801, 1001 type)

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



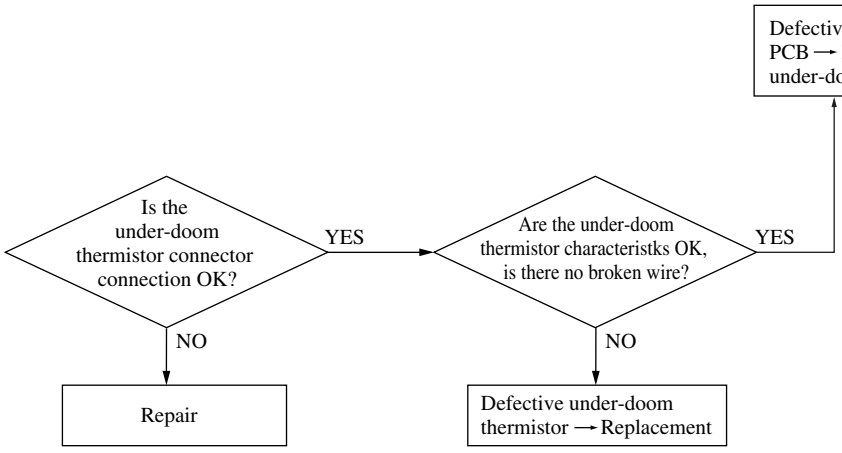
Note (1) See page 155 concerning the methods of displaying operating data with the remote controller.

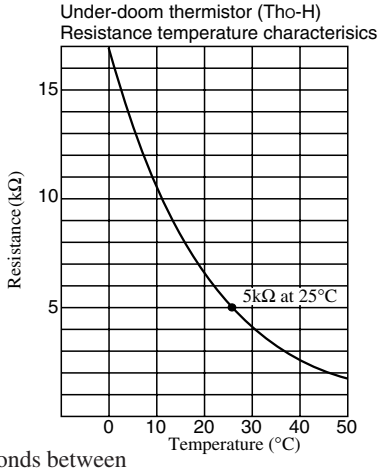
- Display conditions

  If the voltage detected by the sensor is OV or lower or 3.49 V or higher continuously for 5 seconds between 2 minutes and 2 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts If this condition is detected 3 times withhin 40 minutes.

15 Error display : E55 [Defective under-doom thermistor] (Only case of FDCA801, 1001 type)

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing



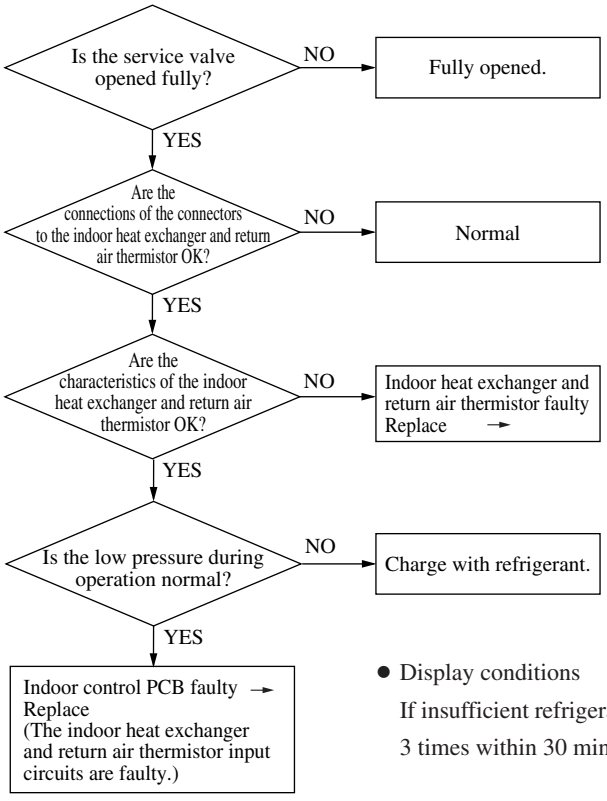


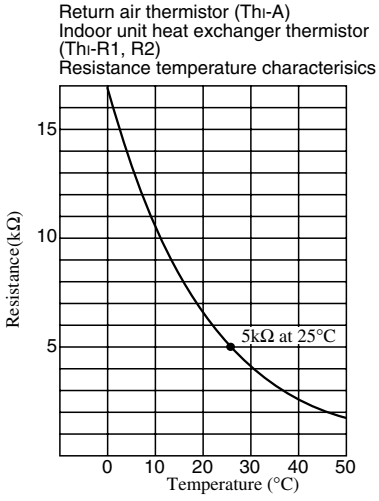
- Display conditions

  If the temperature sensed by the thermistor is –50ºC or lower continuously for 5 seconds between 10 minutes and 10 minutes 20 seconds after the compressor goes ON, the compressor stops. After a 3 minute delay, the compressor restarts. If this state is detected 3 times in 40 minutes.

16 Error display : E57 [Insufficient refrigerant volume.]

Indoor unit		Outdoor unit	
Red LED	Stays OFF	Red LED	1 time flash
Green LED	Keeps flashing	Green LED	Keeps flashing





- Display conditions

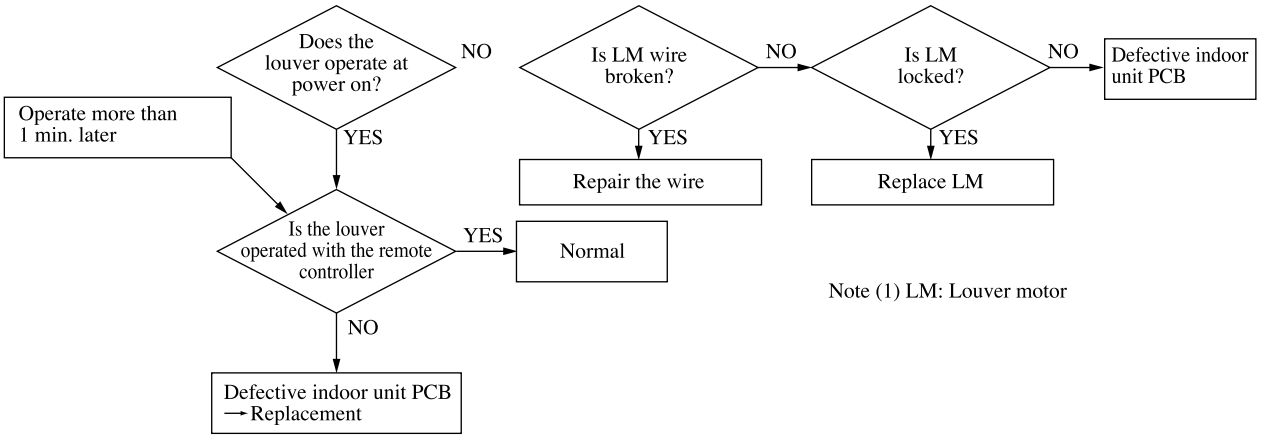
  If insufficient refrigerant protection (See page 81) is implemented 3 times within 30 minutes.

(d) How to advance checks for each faulty symptom

(i) Inspection method when there is no error display

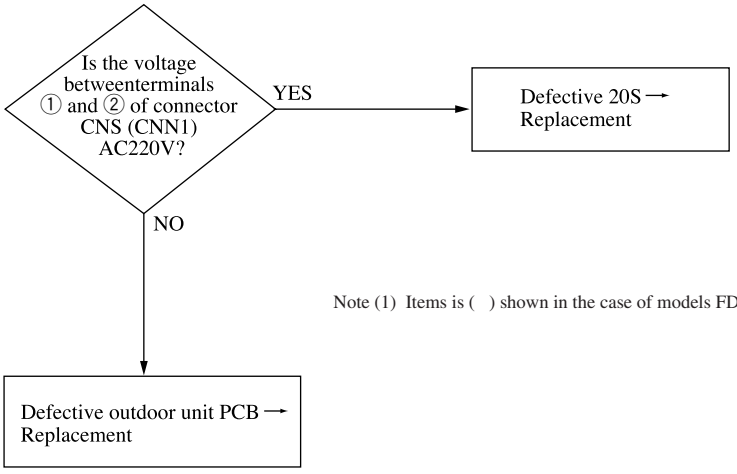
1) Louver motor does not operate

► Inspect at the indoor unit side.



Note (1) LM: Louver motor

3) Four way valve does not switch during heating operation



Note (1) Items is ( ) shown in the case of models FDCA801, 1001.

(5) Check abnormal operation data with the remote controller

Operation data are recorded when there is an abnormal state and these data can be displayed in the remote controller by operating the remote controller buttons.

(1) Press the CHECK button.
The display will change from " FUNCTION" → " SET " → "OPERATION DATA ▼"

(2) Press the ▼ button once. The display will change to "ERROR DATA ▲".

(3) Press the SET button to enter the abnormal operation data display mode.

(4) If there are abnormalities from the past, they will be displayed by an error code and unit No.
(Example) "E8" (Lighted up)
"I/U No. 00 ▲" (Flashing)

(5) Using the ▲ or ▼ button, select the indoor unit No. you want to display the error data for.
If only one indoor unit is connected, the indoor unit No. does not change.

(6) Fix the selection using the SET button. (The displayed indoor unit No. will change from flashing to light up continuously.)
(Example) "E8"
"DATA LOADING" (This message flashes while data are being read.)
↓
"E8"
"ERROR DATA "
The data are then displayed beginning with item No. 01.
Displayed items are as shown below.

(7) Display the other data for when the error occurred in order from the currently displayed operation data No. 01 using the ▲ or ▼ button.
* Depending on the model, items for which corresponding data do not exist are not displayed.

(8) To change the indoor unit, press the AIR CON No. button and return to the indoor unit selection display.

(9) Press the ON/OFF button to end the abnormal operation data check.

If you press the RESET button during the settings, the display returns to the previous setting screen.

No.	Data item	
01	(Operation mode)	
02	SET TEMP	27°C
03	RETURN AIR	28°C
04	I/U HEAT EXCH1	6°C
05	I/U HEAT EXCH2	5°C
07	I/U FAN	Hi
11	TOTAL I/U RUN	10500H
21	OUTDOOR	35°C
22	O/U HEAT EXCH1	55°C
23	O/U HEAT EXCH2	55°C
24	COMP HERTZ	85.0Hz
26	Lo PRESSURE	0.40MPa
27	DISCHARGE	98°C
28	DOME BOTTOM	56°C
29	CT	26A
31	O/U FAN	Hi
32	SILENT MODE	ON/OFF
34	63H1 ON/OFF	
35	DEFROST ON/ OFF	
36	TOTAL COMP RUN	8500H
37	EEV1	480PULS

2.6.4 Check display on wireless specification models (FDEN • FDKN)
Please see page 164 of Chapter 1

2.7 WIRELESS KIT (OPTION FOR FDT MODEL ONLY)
Please see page 165 of Chapter 1

MEMO