

15. HIGH STATIC PRESSURE, DUCT TYPE PACKAGED AIR- CONDITIONER

**(Split system, Air to air)
heat pump type**

**FDU308HEN-SA
308HES-SA
408HES-SA
508HES-SA
808HES-SA
1008HES-SA**

**FDU308HEN-A
308HES-A
408HES-A
508HES-A
508HEM-A**

CONTENTS

15.1 GENERAL INFORMATION	581
15.1.1 Specific features	581
15.1.2 How to read the model name	581
15.2 SELECTION DATA	582
15.2.1 Specifications	582
15.2.2 Range of usage & limitations	593
15.2.3 Exterior dimensions	594
15.2.4 Exterior appearance	603
15.2.5 Piping system	604
15.2.6 Selection chart	607
15.2.7 Characteristics of fan	610
15.2.8 Noise level	613
15.3 ELECTRICAL DATA	615
15.3.1 Electrical wiring	615
15.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER	623
15.5 APPLICATION DATA	623
15.5.1 Installation of indoor unit	624
15.5.2 Installation of remote controller	626
15.5.3 Installation of outdoor unit	626
15.6 MAINTENANCE DATA	626

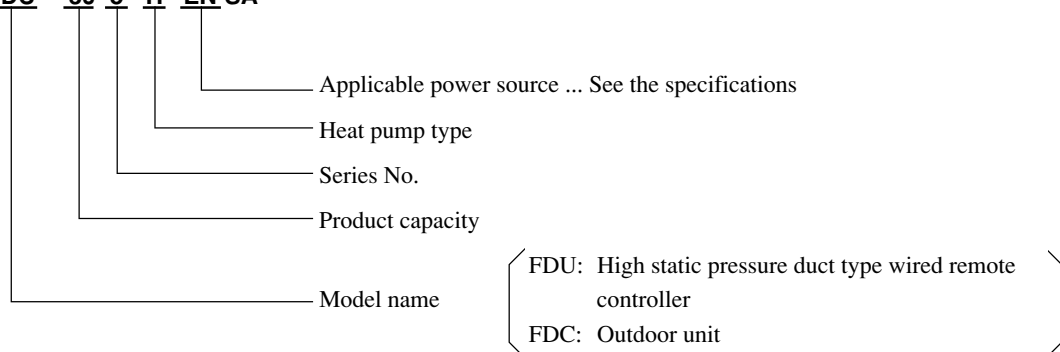
15.1 GENERAL INFORMATION

15.1.1 Specific features

- (1) 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%.
- (2) The indoor outdoor interconnection signal wiring has been done away with. The microcomputer chip is installed in the indoor 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.
- (3) There are only five power lines between the outdoor and indoor unit, As no signal wire is used there is no need to separate the power line from the signal line. One cable with 6 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.
- (4) All models have control valves protruding from the outdoor unit for faster flare connection work in the field.
- (5) Operation noise has been drastically reduced by increasing the number of high performance fans and by through sound insulation.
- (6) When installing, the optimum outside static pressure can be set using the fan controller.
- (7) With the height of all equipment made uniform at 360mm and neatly installed into the ceiling, the installation of equipment with different capacities into the same ceiling space is made easy.

15.1.2 How to read the model name

Example: **FDU 30 8 H EN-SA**



15.2 SELECTION DATA

15.2.1 Specifications

Model FDU308HEN-SA

Item		Model	FDU308HEN-SA	
			FDU308-A	FDC308HEN3
Nominal cooling capacity⁽¹⁾		W	7100	
Nominal heating capacity⁽¹⁾		W	8000	
Power source			1 Phase, 220/240V, 50Hz	
Operation data⁽³⁾	Cooling input	kW	3.20/3.40	
	Running current (Cooling)	A	14.8/15.4	
	Power factor (Cooling)	%	98/92	
	Heating input	kW	3.06/3.22	
	Running current (Heating)	A	14.2/14.7	
	Power factor (Heating)	%	98/91	
	Inrush current (L.R.A)	A	95	
	Noise level	dB(A)	41	52
Exterior dimensions				
Height × Width × Depth		mm	360 × 820 × 830	845 × 880 × 340
Net weight		kg	48	74
Refrigerant equipment				
Compressor type & Q'ty			–	GT-A5534EN41 × 1
Motor		kW	–	2.5
Starting method			–	Line starting
Heat exchanger			Louver fines & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
Refrigerant			R22	
Quantity		kg	Holding charged	1.4 [Pre-charged up to the piping length of 5m]
Refrigerant oil		ℓ	–	1.45 (BARREL FREEZE 32SAM)
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
Air handling equipment				
Fan type & Q'ty			Multiblade centrifugal fan × 2	Propeller fan × 1
Motor		W	130 × 1	55 × 1
Starting method			Line starting	Line starting
Air flow (Standard)		CMM	20	58
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max: 200 (20)	–
Fresh air intake			Available	–
Air filter, Q'ty			Field purchased	–
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	–	33(Crank case heater)
Operation control				
Operation switch			Wired remote control switch (Optional: RCD-H-E)	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
Installation data		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")	
Refrigerant piping size				
Connecting method			Flare piping	
Drain hose			(Connectable with VP25)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit.	
Optional parts			–	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 220/240V 50Hz.

Model FDU308HES-SA

Item		Model	FDU308HES-SA	
			FDU308-A	FDC308HES3
Nominal cooling capacity⁽¹⁾		W	7100	
Nominal heating capacity⁽¹⁾		W	8000	
Power source			3 Phase, 380/415V 50Hz	
Operation data⁽²⁾	Cooling input	kW	3.12/3.18	
	Running current (Cooling)	A	5.7/6.2	
	Power factor (Cooling)	%	83/72	
	Heating input	kW	2.76/2.82	
	Running current (Heating)	A	5.2/5.5	
	Power factor (Heating)	%	81/72	
	Inrush current (L.R.A)	A	45	
	Noise level	dB(A)	41	52
Exterior dimensions				
Height × Width × Depth		mm	360 × 820 × 830	845 × 880 × 340
Net weight		kg	48	74
Refrigerant equipment				
Compressor type & Q'ty			–	GT-A5534ES41 × 1
Motor		kW	–	2.5
Starting method			–	Line starting
Heat exchanger			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
Refrigerant			R22	
Quantity		kg	Holding charged	1.4 [Pre-charged up to the piping length of 5m]
Refrigerant oil		ℓ	–	1.45 (BARREL FREEZE 32SAM)
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
Air handling equipment				
Fan type & Q'ty			Multiblade centrifugal fan × 2	Propeller fan × 1
Motor		W	130 × 1	55 × 1
Starting method			Line starting	Line starting
Air flow (Standard)		CMM	20	58
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max 200 (20)	–
Fresh air intake			Available	–
Air filter, Q'ty			Field purchased	–
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	–	33 (Crank case heater)
Operation control				
Operation switch			Wired remote control switch (Optional: RCD-H-E)	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
Installation data		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")	
Refrigerant piping size				
Connecting method			Flare piping	
Drain hose			(Connectable with VP25)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit.	
Optional parts			–	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

Model FDU408HES-SA

Item		Model	FDU408HES-SA	
			FDU408-A	FDC408HES3
Nominal cooling capacity⁽¹⁾		W	10000	
Nominal heating capacity⁽¹⁾		W	11200	
Power source			3 Phase, 380/415V 50Hz	
Operation data⁽³⁾	Cooling input	kW	4.68/4.78	
	Running current (Cooling)	A	8.1/8.4	
	Power factor (Cooling)	%	87/79	
	Heating input	kW	4.06/4.10	
	Running current (Heating)	A	7.4/7.8	
	Power factor (Heating)	%	83/73	
	Inrush current (L.R.A)	A	53	
	Noise level	dB(A)	44	54
Exterior dimensions				
Height × Width × Depth		mm	360 × 820 × 830	1050 × 920 × 340
Net weight		kg	49	90
Refrigerant equipment				
Compressor type & Q'ty			–	GU-A5550ES41 × 1
Motor		kW	–	2.8
Starting method			–	Line starting
Heat exchanger			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
Refrigerant			R22	
Quantity		kg	Holding charged	1.7 [Pre-charged up to the piping length of 5m]
Refrigerant oil		ℓ	–	1.6 (BARREL FREEZE 32SAM)
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
Air handling equipment				
Fan type & Q'ty			Multiblade centrifugal fan × 2	Propeller fan × 2
Motor		W	200 × 1	40 × 2
Starting method			Line starting	Line starting
Air flow (Standard)		CMM	27	70
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max 200 (20)	–
Fresh air intake			Available	–
Air filter, Q'ty			Field purchased	–
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	–	40 (Crank case heater)
Operation control				
Operation switch			Wired remote control switch (Optional: RCD-H-E)	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
Installation data		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ19.05 (3/4")	
Refrigerant piping size				
Connecting method			Flare piping	
Drain hose			(Connectable with VP25)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit.	
Optional parts			–	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Operation					
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

Model FDU508HES-SA

Item		Model	FDU508HES-SA	
			FDU508-A	FDC508HES3
Nominal cooling capacity⁽¹⁾		W	12500	
Nominal heating capacity⁽¹⁾		W	14000	
Power source			3 Phase, 380/415V 50Hz	
Operation data⁽³⁾	Cooling input	kW	5.44/5.71	
	Running current (Cooling)	A	9.8/10.6	
	Power factor (Cooling)	%	84/75	
	Heating input	kW	4.99/5.14	
	Running current (Heating)	A	9.3/10.2	
	Power factor (Heating)	%	82/70	
	Inrush current (L.R.A)	A	74	
	Noise level	dB(A)	45	55
Exterior dimensions				
Height × Width × Depth		mm	360 × 1200 × 830	1250 × 920 × 340
Net weight		kg	62	101
Refrigerant equipment				
Compressor type & Q'ty			—	GU-A5570ES41 × 1
Motor		kW	—	3.75
Starting method			—	Line starting
Heat exchanger			Louver fins & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
Refrigerant			R22	
Quantity		kg	Holding charged	1.9 [Pre-charged up to the piping length of 5m]
Refrigerant oil		ℓ	—	1.6 (BARREL FREEZE 32SAM)
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
Air handling equipment				
Fan type & Q'ty			Multiblade centrifugal fan × 2	Propeller fan × 2
Motor		W	230 × 1	65 × 2
Starting method			Line starting	Line starting
Air flow (Standard)		CMM	34	110
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max 200 (20)	—
Fresh air intake			Available	—
Air filter, Q'ty			Field purchased	—
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	—	40 (Crank case heater)
Operation control				
Operation switch			Wired remote control switch (Optional: RCD-H-E)	— (Indoor unit side)
Room temperature control			Thermostat by electronics	—
Safety equipment				
			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor. Abnormal discharge temperature protection.
Installation data		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ19.05 (3/4")	
Refrigerant piping size				
Connecting method			Flare piping	
Drain hose			(Connectable with VP25)	—
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit.	
Optional parts			—	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Operation					
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	—	7°C	6°C	

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

Model FDU808HES-SA

Item		Model	FDU808HES-SA	
			FDU808-A	FDC808HES3
Nominal cooling capacity⁽¹⁾		W	20000	
Nominal heating capacity⁽¹⁾		W	21200	
Power source			3 Phase, 380/415V 50Hz	
Operation data⁽³⁾	Cooling input	kW	9.1/9.2	
	Running current (Cooling)	A	16.2/15.5	
	Power factor (Cooling)	%	85/83	
	Heating input	kW	7.1/7.3	
	Running current (Heating)	A	13.6/13.2	
	Power factor (Heating)	%	79/77	
	Inrush current (L.R.A)	A	99	
	Noise level	dB(A)	48	58
Exterior dimensions		mm	360 × 1570 × 830	
Height × Width × Depth			1450 × 1350 × 600	
Net weight		kg	92	
Refrigerant equipment				
Compressor type & Q'ty			CB90 × 1	
Motor		kW	6.5	
Starting method			Line starting	
Heat exchanger			Louver fines & inner grooved tubing	Slitted fines & bare tubing
Refrigerant control			Capillary tube	
Refrigerant			R22	
Quantity		kg	Holding charged	5.33 [Pre-charged up to the piping length of 5m]
Refrigerant oil		ℓ	–	4.4 (BARREL FREEZE 32SAM)
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
Air handling equipment				
Fan type & Q'ty			Multiblade centrifugal fan × 4	Propeller fan × 2
Motor		W	200 × 2	100 × 2
Starting method			Line starting	Line starting
Air flow (Standard)		CMM	51	180
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max: 200 (20)	
Fresh air intake			Available	–
Air filter, Q'ty			Field purchased	–
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	–	70 (Crank case heater)
Operation control				
Operation switch			Wired remote control switch (Optional: RCD-H-E)	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor High pressure protection switch
Installation data		mm	Liquid line: φ12.7 (1/2") Gas line: φ25.4 (1")	
Refrigerant piping size		(in)		
Connecting method			Brazing	Liquid line: Flare Gas line: Brazing
Drain hose			(Connectable with VP25)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit.	
Optional parts			–	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

Model FDU1008HES-SA

Item		Model	FDU1008HES-SA	
			FDU1008-A	FDC1008HES3
Nominal cooling capacity⁽¹⁾		W	25000	
Nominal heating capacity⁽¹⁾		W	28000	
Power source			3 Phase, 380/415V 50Hz	
Operation data⁽³⁾	Cooling input	kW	12.8/12.9	
	Running current (Cooling)	A	22.7/21.7	
	Power factor (Cooling)	%	86/83	
	Heating input	kW	10.6/10.8	
	Running current (Heating)	A	19.2/18.7	
	Power factor (Heating)	%	84/80	
	Inrush current (L.R.A)	A	154	
	Noise level	dB(A)	49	58
Exterior dimensions				
Height × Width × Depth		mm	360 × 1570 × 830	1450 × 1350 × 600
Net weight		kg	92	195
Refrigerant equipment				
Compressor type & Q'ty			–	CB125 × 1
Motor		kW	–	9.0
Starting method			–	Line starting
Heat exchanger			Louver fines & inner grooved tubing	Slitted fines & bare tubing
Refrigerant control			Capillary tube	
Refrigerant			R22	
Quantity		kg	Holding charged	7.6 [Pre-charged up to the piping length of 5m]
Refrigerant oil		ℓ	–	4.4 (BARREL FREEZE 32SAM)
Defrost control			MC controlled de-icer	
High pressure control			High pressure switch	
Air handling equipment				
Fan type & Q'ty			Multiblade centrifugal fan × 4	Propeller fan × 2
Motor		W	230 × 1, 270 × 1	100 × 2
Starting method			Line starting	Line starting
Air flow (Standard)		CMM	68	180
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max: 200 (20)	–
Fresh air intake			Available	–
Air filter, Q'ty			Field purchased	–
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	–	70 (Crank case heater)
Operation control				
Operation switch			Wired remote control switch (Optional: RCD-H-E)	– (Indoor unit side)
Room temperature control			Thermostat by electronics	–
Safety equipment				
			Internal thermostat for fan motor. Frost protection thermostat.	Internal thermostat for fan motor High pressure protection switch
Installation data				
Refrigerant piping size		mm (in)	Liquid line: φ15.88 (5/8") Gas line: φ28.58 (1 1/8")	
Connecting method			Brazing	Liquid line: Flare Gas line: Brazing
Drain hose			(Connectable with VP25)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit.	
Optional parts			–	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Operation					
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380/415V 50Hz.

Model FDU308HEN-A

Item		Model	FDU308HEN-A	
			FDU308-A	FDC306HEN3
Nominal cooling capacity⁽¹⁾		W	7100	
Nominal heating capacity⁽¹⁾		W	7300	
Power source			1 Phase, 220/240V, 50Hz	
Operation data⁽³⁾	Cooling input	kW	3.29/3.33	
	Running current (Cooling)	A	16.5/17.3	
	Power factor (Cooling)	%	91/80	
	Heating input	kW	3.04/3.08	
	Running current (Heating)	A	15.4/16.2	
	Power factor (Heating)	%	90/79	
	Inrush current (L.R.A)	A	89	
	Noise level	dB(A)	41	56
Exterior dimensions		mm	360 × 820 × 830	
Height × Width × Depth			844 × 950 × 340	
Net weight		kg	48	
Refrigerant equipment			RC5532ENE1 × 1	
Compressor type & Q'ty			2.24	
Motor		kW	—	
Starting method			Line starting	
Heat exchanger			Louver fines & inner grooved tubing	Slitted fins & bare tubing
Refrigerant control			Capillary tube	
Refrigerant			R22	
Quantity		kg	Holding charged	1.3 [Pre-charged up to the piping length of 5m]
Refrigerant oil		ℓ	—	1.63 (SUNISO 3GS)
Defrost control			IC controlled de-icer	
High pressure control			High pressure regulator valve	
Air handling equipment			Multiblade centrifugal fan × 2	Propeller fan × 1
Fan type & Q'ty				
Motor		W	130 × 1	60 × 1
Starting method			Line starting	Line starting
Air flow (Standard)		CMM	20	54
Available static pressure		Pa (mmAq)	Standard: 100 (10), Max: 200 (20)	—
Fresh air intake			Available	—
Air filter, Q'ty			Field purchased	—
Shock & vibration absorber			Rubber sleeve (for fan motor)	Rubber mount (for compressor)
Electric heater		W	—	40 (Crank case heater)
Operation control			Wired remote control switch (Optional: RCD-H-E)	— (Indoor unit side)
Operation switch				
Room temperature control			Thermostat by electronics	—
Safety equipment			Internal thermostat for fan motor. Frost protection thermostat.	Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.
Installation data		mm (in)	Liquid line: φ9.52 (3/8") Gas line: φ15.88 (5/8")	
Refrigerant piping size				
Connecting method			Flare piping	
Drain hose			(Connectable with VP25)	—
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit.	
Optional parts			—	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	—	7°C	6°C	

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 220/240V 50Hz.

Model FDU308HES-A

Item			Model	FDU308HES-A	
				FDU308-A	FDC306HES3
Nominal cooling capacity ⁽¹⁾		ISO-T1	W	7100/7700	
		ISO-T3		6000	
Nominal heating capacity ⁽¹⁾		ISO-T1	W	7300/7900	
Power source				3 Phase, 380-415V 50Hz, 380V 60Hz	
Operation data ⁽³⁾	ISO-T1	Cooling input	kW	3.05/3.06/3.64	
		Running current (Cooling)	A	5.9/6.0/7.1	
		Power factor (Cooling)	%	79/71/78	
		Heating input	kW	2.72/2.74/3.19	
		Running current (Heating)	A	5.5/5.7/6.7	
		Power factor (Heating)	%	75/67/72	
	ISO-T3	Cooling input	kW	3.87	
		Running current (Cooling)	A	7.6	
		Power factor (Cooling)	%	77	
		Inrush current (L.R.A)	A	43	
Noise level		dB(A)	41/43 56		
Exterior dimensions			mm	360 × 820 × 830 844 × 950 × 340	
Height × Width × Depth					
Net weight			kg	48 69	
Refrigerant equipment					
Compressor type & Q'ty				RC5538ESE1 × 1	
Motor			kW	2.24	
Starting method				Line starting	
Heat exchanger				Louver fins & inner grooved tubing Slitted fins & bare tubing	
Refrigerant control				Capillary tube	
Refrigerant				R22	
Quantity			kg	Holding charged 1.3 [Pre-charged up to the piping length of 5m]	
Refrigerant oil			ℓ	1.63 (SUNISO 3GS)	
Defrost control				IC controlled de-icer	
High pressure control				High pressure regulator valve	
Air handling equipment					
Fan type & Q'ty				Multiblade centrifugal fan × 2 Propeller fan × 1	
Motor			W	130 × 1 60 × 1	
Starting method				Line starting Line starting	
Air flow (Standard)			CMM	20/24 54/56	
Available static pressure			Pa (mmAq)	Standard: 100 (10), Max 200 (20) -	
Fresh air intake				Available -	
Air filter, Q'ty				Field purchased -	
Shock & vibration absorber				Rubber sleeve (for fan motor) Rubber mount (for compressor)	
Electric heater			W	40 (Crank case heater)	
Operation control					
Operation switch				Wired remote control switch (Optional: RCD-H-E) - (Indoor unit side)	
Room temperature control				Thermostat by electronics -	
Safety equipment				Internal thermostat for fan motor. Frost protection thermostat. Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.	
Installation data			mm		
Refrigerant piping size			(in)	Liquid line: ϕ9.52 (3/8") Gas line: ϕ15.88 (5/8")	
Connecting method				Flare piping	
Drain hose				(Connectable with VP25) -	
Insulation for piping				Necessary (both Liquid & Gas lines)	
Accessories				Mounting kit.	
Optional parts				-	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	
Cooling	29°C	19°C	46°C	24°C	ISO-T3, SASO

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380V 50Hz/415V 50Hz/380V 60Hz.

Model FDU408HES-A

Item			Model	FDU408HES-A	
				FDU408-A	FDC406HES3
Nominal cooling capacity ⁽¹⁾		ISO-T1	W	10200/11300	
		ISO-T3		9900	
Nominal heating capacity ⁽¹⁾		ISO-T1	W	10500/11600	
Power source				3 Phase, 380-415V 50Hz, 380V 60Hz	
Operation data ⁽³⁾	ISO-T1	Cooling input	kW	3.96/3.96/4.88	
		Running current (Cooling)	A	7.8/7.8/9.4	
		Power factor (Cooling)	%	77/71/79	
		Heating input	kW	3.66/3.66/4.51	
		Running current (Heating)	A	7.5/7.5/9.1	
		Power factor (Heating)	%	74/68/75	
	ISO-T3	Cooling input	kW	5.38	
		Running current (Cooling)	A	10.1	
		Power factor (Cooling)	%	81	
		Inrush current (L.R.A)	A	45	
Noise level		dB(A)	44/46 57		
Exterior dimensions			mm	360 × 820 × 830 1250 × 950 × 340	
Height × Width × Depth					
Net weight			kg	49 86	
Refrigerant equipment					
Compressor type & Q'ty				– RC5547ESE1 × 1	
Motor			kW	– 2.61	
Starting method				– Line starting	
Heat exchanger				Louver fins & inner grooved tubing Slitted fins & bare tubing	
Refrigerant control				Capillary tube	
Refrigerant				R22	
Quantity			kg	Holding charged 1.6 [Pre-charged up to the piping length of 0m]	
Refrigerant oil			ℓ	– 1.63 (SUNISO 3GS)	
Defrost control				IC controlled de-icer	
High pressure control				High pressure regulator valve	
Air handling equipment					
Fan type & Q'ty				Multiblade centrifugal fan × 2 Propeller fan × 2	
Motor			W	200 × 1 60 × 2	
Starting method				Line starting Line starting	
Air flow (Standard)			CMM	27/32 100/110	
Available static pressure			Pa (mmAq)	Standard: 100 (10), Max 200 (20) –	
Fresh air intake				Available –	
Air filter, Q'ty				Field purchased –	
Shock & vibration absorber				Rubber sleeve (for fan motor) Rubber mount (for compressor)	
Electric heater			W	– 40 (Crank case heater)	
Operation control					
Operation switch				Wired remote control switch (Optional: RCD-H-E) – (Indoor unit side)	
Room temperature control				Thermostat by electronics –	
Safety equipment				Internal thermostat for fan motor. Frost protection thermostat. Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.	
Installation data			mm		
Refrigerant piping size			(in)	Liquid line: ϕ9.52 (3/8”) Gas line: ϕ19.05 (3/4")	
Connecting method				Flare piping	
Drain hose				(Connectable with VP25) –	
Insulation for piping				Necessary (both Liquid & Gas lines)	
Accessories				Mounting kit.	
Optional parts				–	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	
Cooling	29°C	19°C	46°C	24°C	ISO-T3, SASO

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380V 50Hz/415V 50Hz/380V 60Hz.

Model FDU508HES-A

Item			Model	FDU508HES-A	
				FDU508-A	FDC506HES3
Nominal cooling capacity ⁽¹⁾		ISO-T1	W	12500/14000	
		ISO-T3		11900	
Nominal heating capacity ⁽¹⁾		ISO-T1	W	12800/14400	
Power source				3 Phase, 380-415V 50Hz, 380V 60Hz	
Operation data ⁽³⁾	ISO-T1	Cooling input	kW	5.01/5.03/6.03	
		Running current (Cooling)	A	10.3/10.3/11.5	
		Power factor (Cooling)	%	74/68/80	
		Heating input	kW	4.63/4.67/5.61	
		Running current (Heating)	A	9.5/9.6/10.7	
		Power factor (Heating)	%	74/68/80	
	ISO-T3	Cooling input	kW	6.63	
		Running current (Cooling)	A	12.5	
		Power factor (Cooling)	%	81	
		Inrush current (L.R.A)	A	68	
Noise level		dB(A)	45/47 59		
Exterior dimensions			mm	360 × 1200 × 830 1250 × 950 × 340	
Height × Width × Depth					
Net weight			kg	62 91	
Refrigerant equipment					
Compressor type & Q'ty				RC5563ESE2 × 1	
Motor			kW	3.73	
Starting method				Line starting	
Heat exchanger				Louver fins & inner grooved tubing Slitted fins & bare tubing	
Refrigerant control				Capillary tube	
Refrigerant				R22	
Quantity			kg	Holding charged 2.3 [Pre-charged up to the piping length of 5m]	
Refrigerant oil			ℓ	2.07 (SUNISO 3GS)	
Defrost control				IC controlled de-icer	
High pressure control				High pressure regulator valve	
Air handling equipment					
Fan type & Q'ty				Multiblade centrifugal fan × 2 Propeller fan × 2	
Motor			W	230 × 1 60 × 2	
Starting method				Line starting Line starting	
Air flow (Standard)			CMM	34/40 100/110	
Available static pressure			Pa (mmAq)	Standard: 100 (10), Max 200 (20) -	
Fresh air intake				Available -	
Air filter, Q'ty				Field purchased -	
Shock & vibration absorber				Rubber sleeve (for fan motor) Rubber mount (for compressor)	
Electric heater			W	40 (Crank case heater)	
Operation control					
Operation switch				Wired remote control switch (Optional: RCD-H-E) - (Indoor unit side)	
Room temperature control				Thermostat by electronics -	
Safety equipment				Internal thermostat for fan motor. Frost protection thermostat. Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.	
Installation data			mm		
Refrigerant piping size			(in)	Liquid line: ϕ9.52 (3/8") Gas line: ϕ19.05 (3/4")	
Connecting method				Flare piping	
Drain hose				(Connectable with VP25) -	
Insulation for piping				Necessary (both Liquid & Gas lines)	
Accessories				Mounting kit.	
Optional parts				-	

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	—	7°C	6°C	
Cooling	29°C	19°C	46°C	24°C	ISO-T3, SASO

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 380V 50Hz/415V 50Hz/380V 60Hz.

Model FDU508HEM-A

Item			Model	FDU508HEM-A		
				FDU508-A	FDC506HEM3	
Nominal cooling capacity ⁽¹⁾		ISO-T1	W	12500/14000		
		ISO-T3		11900		
Nominal heating capacity ⁽¹⁾		ISO-T1	W	12800/14400		
Power source				3 Phase, 230V 50Hz, 220V 60Hz		
Operation data ⁽³⁾	ISO-T1	Cooling input	kW	5.01/6.03		
		Running current (Cooling)	A	15.1/18.5		
		Power factor (Cooling)	%	83/86		
		Heating input	kW	4.70/5.61		
		Running current (Heating)	A	14.0/17.1		
		Power factor (Heating)	%	84/86		
	ISO-T3	Cooling input	kW	6.62		
		Running current (Cooling)	A	20.0		
		Power factor (Cooling)	%	87		
		Inrush current (L.R.A)	A	133		
Noise level			dB(A)	45/47	59	
Exterior dimensions			mm	360 × 1200 × 830		1250 × 950 × 340
Height × Width × Depth						
Net weight			kg	62		91
Refrigerant equipment				–		RC5563EME2 × 1
Compressor type & Q'ty				–		
Motor			kW	–		3.75
Starting method				–		Line starting
Heat exchanger				Louver fins & inner grooved tubing		Slitted fins & bare tubing
Refrigerant control				Capillary tube		
Refrigerant				R22		
Quantity			kg	Holding charged		2.3 [Pre-charged up to the piping length of 5m]
Refrigerant oil			ℓ	–		2.07 (SUNISO 3GS)
Defrost control				IC controlled de-icer		
High pressure control				High pressure regulator valve		
Air handling equipment				Multiblade centrifugal fan × 2		Propeller fan × 2
Fan type & Q'ty						
Motor			W	230 × 1		60 × 2
Starting method				Line starting		Line starting
Air flow (Standard)			CMM	34/40		100/110
Available static pressure			Pa (mmAq)	Standard: 100 (10), Max 200 (20)		–
Fresh air intake				Available		–
Air filter, Q'ty				Field purchased		–
Shock & vibration absorber				Rubber sleeve (for fan motor)		Rubber mount (for compressor)
Electric heater			W	–		40 (Crank case heater)
Operation control				Wired remote control switch		
Operation switch				(Optional: RCD-H-E)		– (Indoor unit side)
Room temperature control				Thermostat by electronics		–
Safety equipment				Internal thermostat for fan motor. Frost protection thermostat.		Internal protector for compressor. Internal thermostat for fan motor. Internal pressure relief valve for compressor.
Installation data			mm			
Refrigerant piping size			(in)	Liquid line: ϕ9.52 (3/8”) Gas line: ϕ19.05 (3/4")		
Connecting method				Flare piping		
Drain hose				(Connectable with VP25)		–
Insulation for piping				Necessary (both Liquid & Gas lines)		
Accessories				Mounting kit.		
Optional parts				–		

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

Item	Indoor air temperature		Outdoor air temperature		Standards
	DB	WB	DB	WB	
Cooling	27°C	19°C	35°C	24°C	ISO-T1, JIS B8616
Heating	20°C	–	7°C	6°C	
Cooling	29°C	19°C	46°C	24°C	ISO-T3, SASO

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

JIS B8616 "UNITARY AIR-CONDITIONERS"

(3) The operation data indicate when the air-conditioner is operated at 230V 50Hz/220V 60Hz.

15.2.2 Range of usage & limitations

Models FDU308~1008, (FDC308~1008 type)

Item	Models	FDU308~1008(FDC308~1008 type)
Indoor return air temperature (Upper, lower limits)		Refer to the selection chart
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		Max. 50m
Vertical height difference between outdoor unit and indoor unit		Max. 30m (Outdoor unit is higher) Max. 15m (Outdoor unit is lower)
Power source voltage		Rating $\pm$ 10%
Voltage at starting		Min. 85% of rating
		Max. 10 times/h
ON and OFF interval		Max. 3 minutes

Models FDU308~508 (FDC306~506 type)

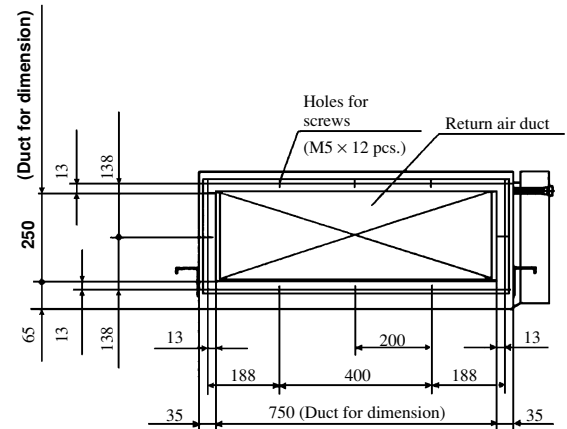
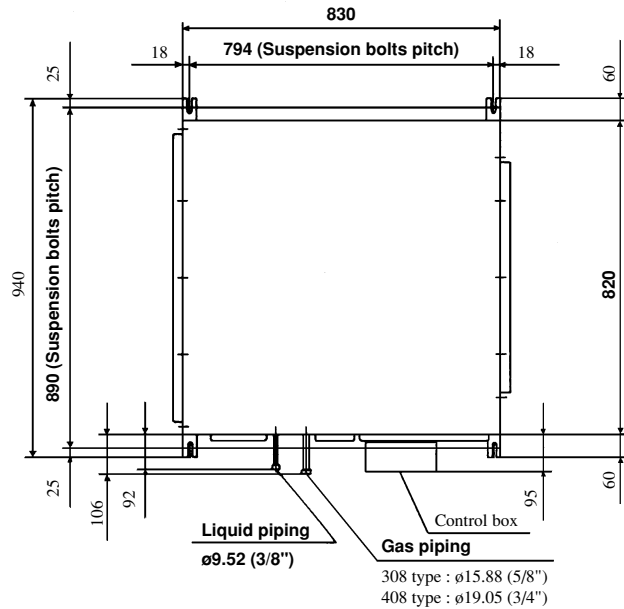
Item	Models	FDU308~508 (FDC306~506 type)
Indoor return air temperature (Upper, lower limits)		Refer to the selection chart
Outdoor air temperature (Upper, lower limits)		
Indoor unit atmosphere (behind ceiling) temperature and humidity		Dew point temperature: 28°C or less, relative humidity: 80% or less
Refrigerant line (one way) length		Max. 30m
Vertical height difference between outdoor unit and indoor unit		Max. 15m
Power source voltage		Rating $\pm$ 10%
Voltage at starting		Min. 85% of rating
Frequency of ON-OFF cycle		Max. 10 times/h
ON and OFF interval		Max. 3 minutes

15.2.3 Exterior dimensions

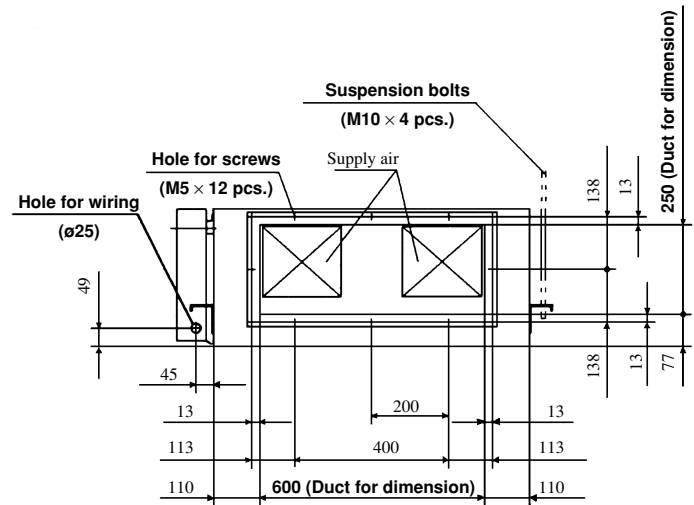
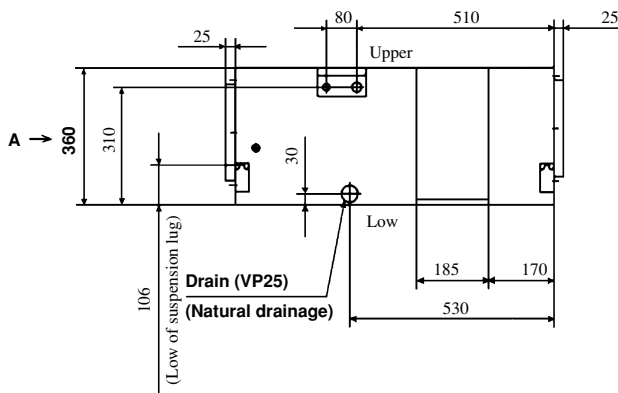
(1) Indoor unit

Models FDU308-A, 408-A

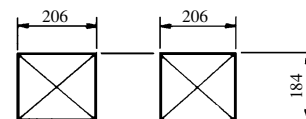
Unit : mm



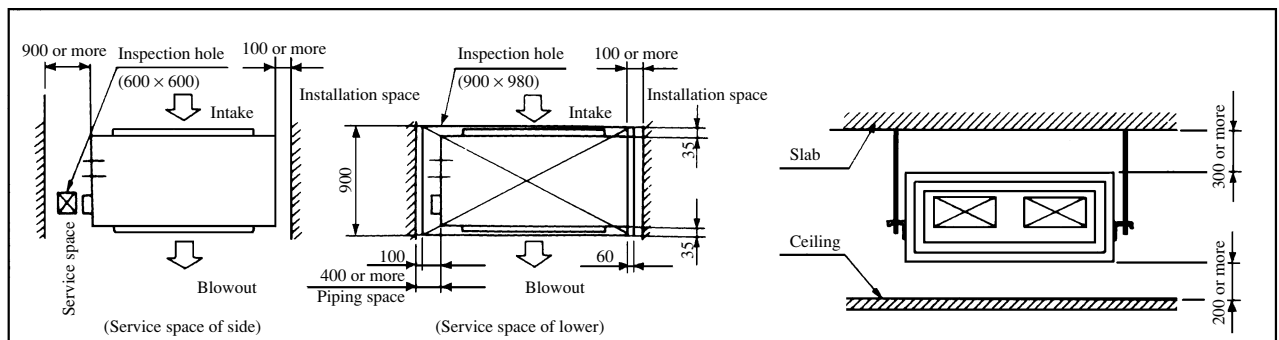
VIEW A



Dimension for supply air

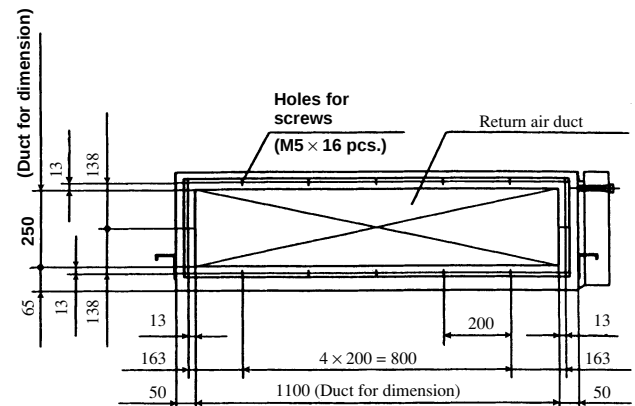
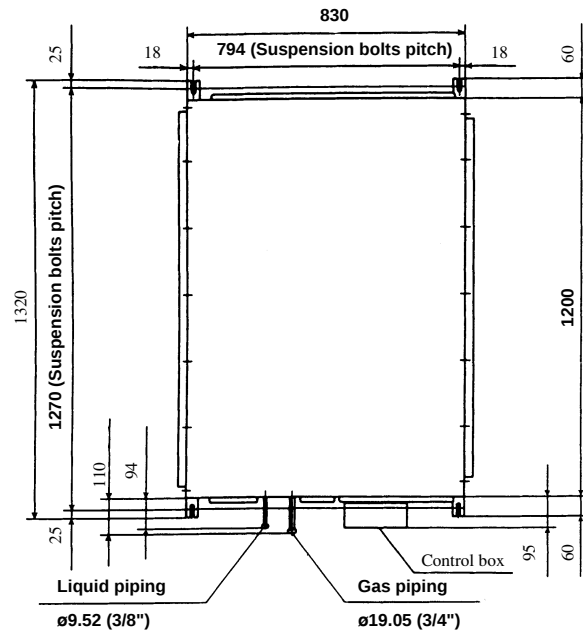


Space for installation and service

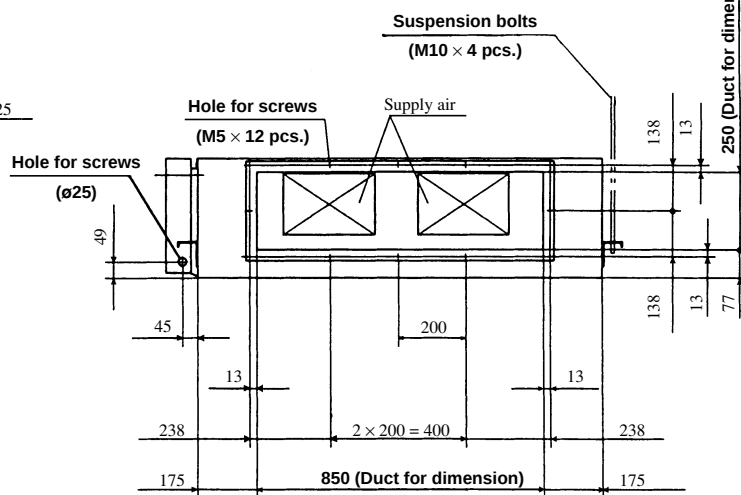
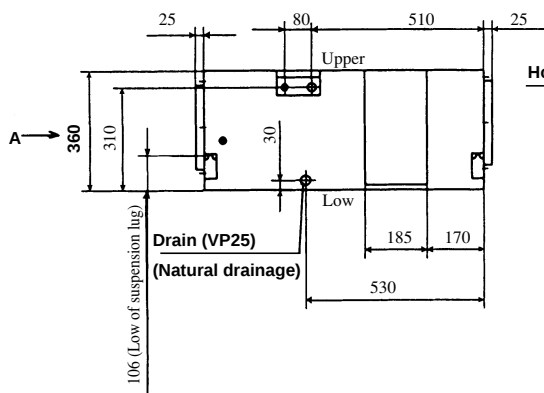


Model FDU508-A

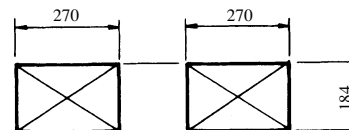
Unit : mm



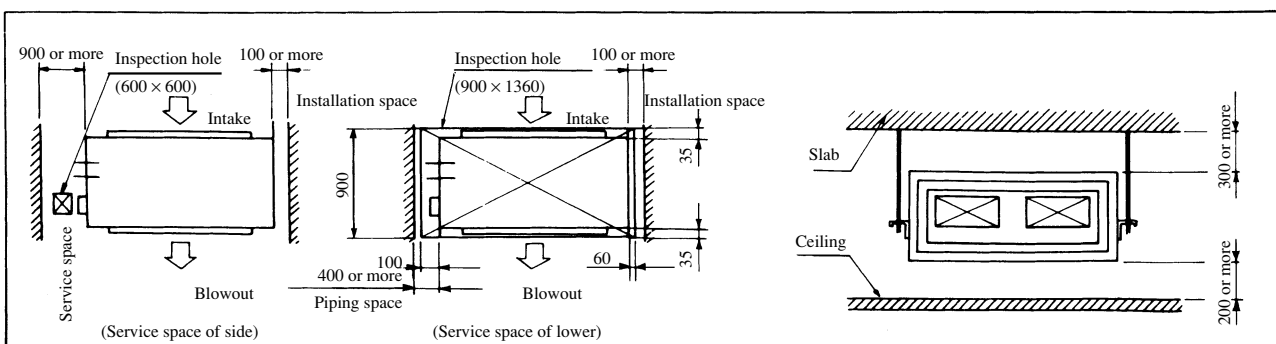
VIEW A



Dimension for supply air

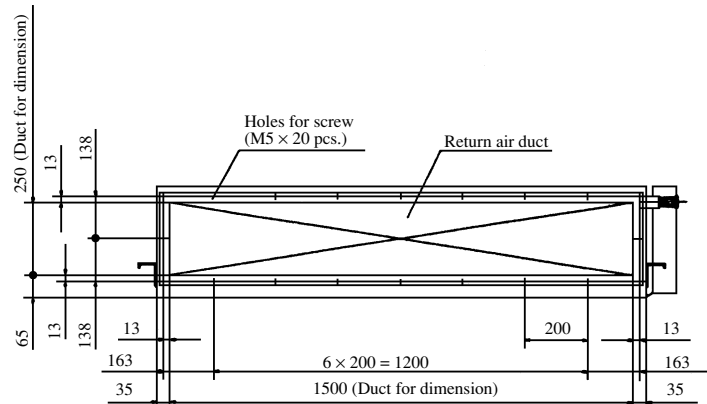
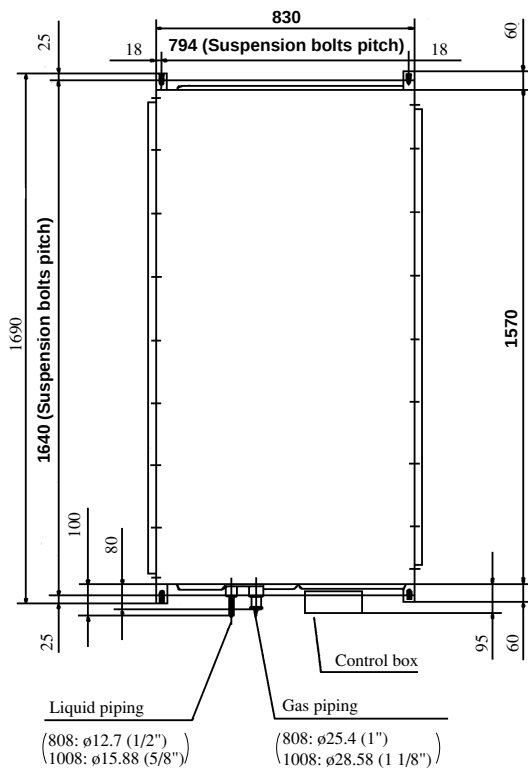


Space for installation and service

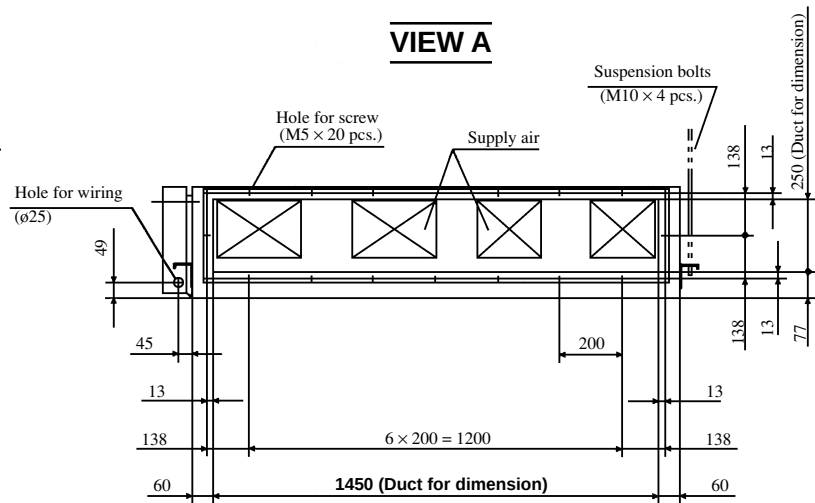
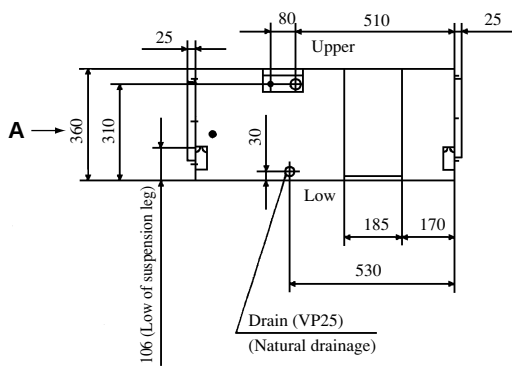


Models FDU808-A, 1008-A

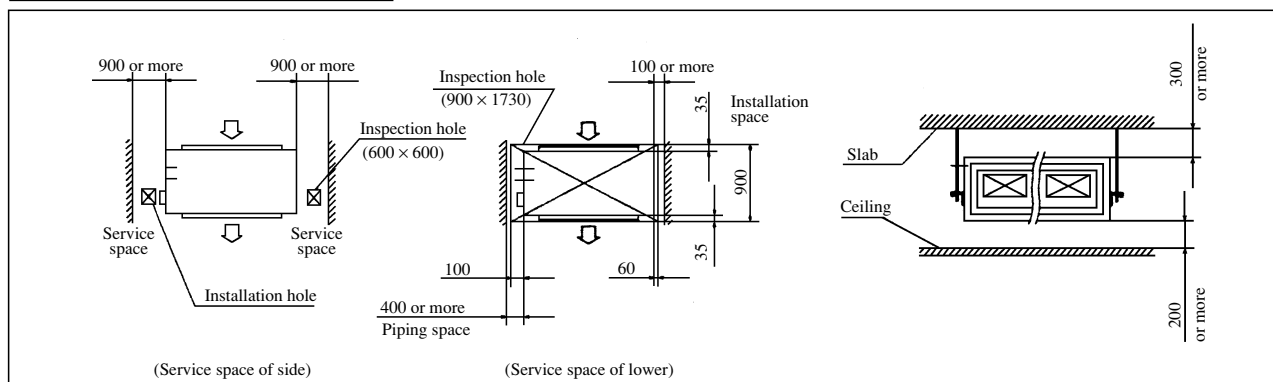
Unit : mm



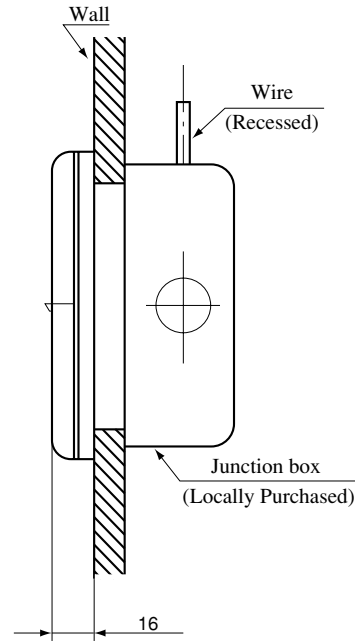
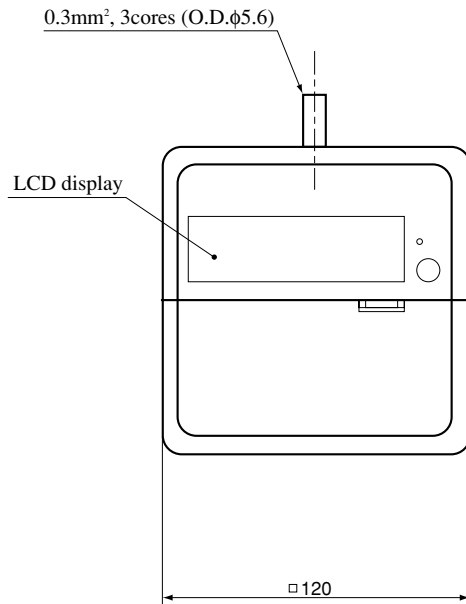
VIEW A



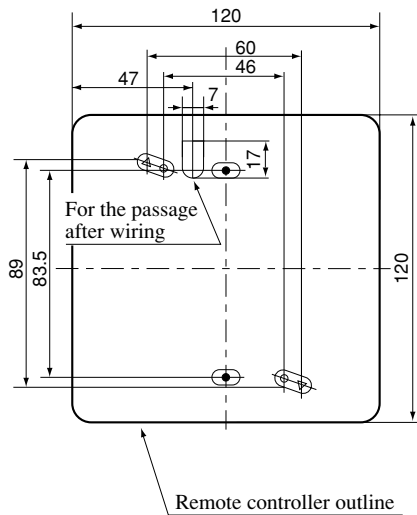
Space for installation and service



(2) Remote controller (Optional parts)



Remote controller mounting dimensions



- ◆ Usable JIS box, JIS C 8336
 - Switch box for 1 piece (without cover)
(use of the ● mark hole as illustrated on the left)
 - Switch box for 2 pieces
(use of the ○ mark hole as illustrated on the left)
(without cover)
(use of the △ mark hole as illustrated on the left)
(when installing the cover)

Notes (1) Allowable length of remote controller cable: 600 m

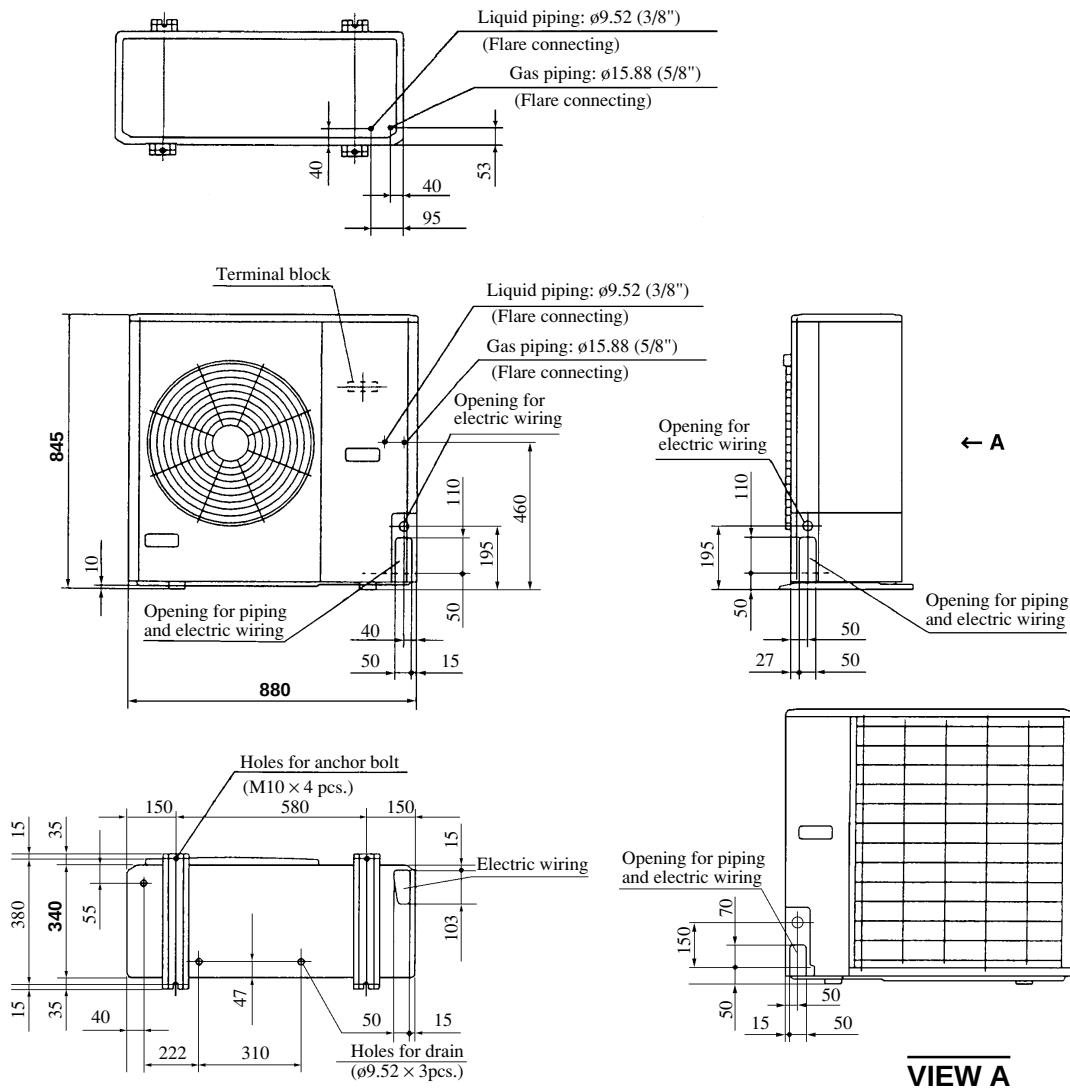
Allowable rang of wire thickness and length

Standard	Within	0.3 mm²	× Within 100 m
		0.5 mm²	× Within 200 m
		0.75 mm²	× Within 300 m
		1.25 mm²	× Within 400 m
		2 mm²	× Within 600 m

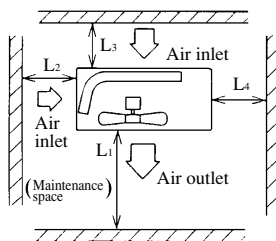
(3) Outdoor unit

Models FDC308HEN3, 308HES3

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

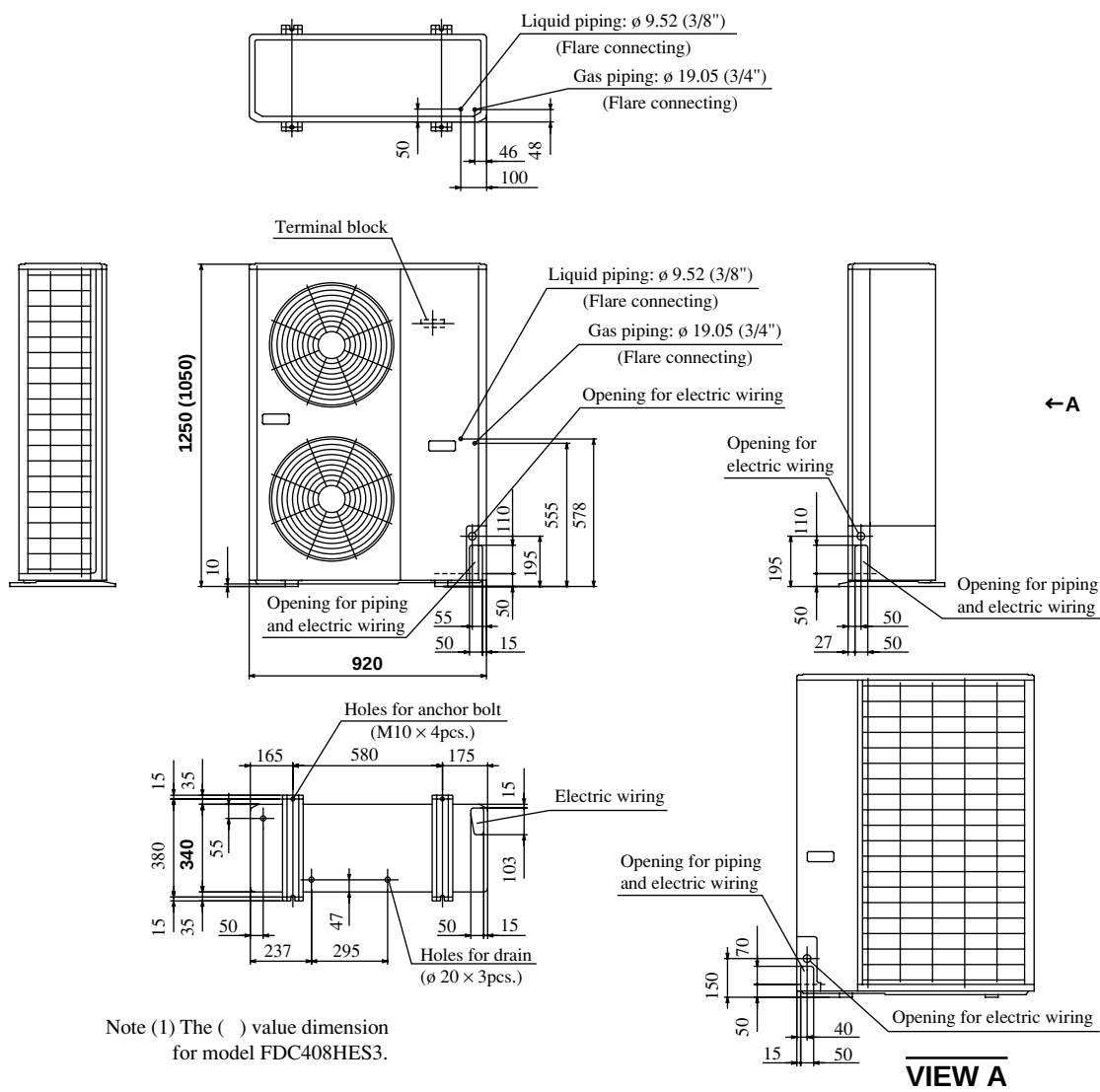
Installation type	I	II	III
Mark			
L_1	Open	Open	500
L_2	300	5	Open
L_3	100	150	100
L_4	5	5	5

Notes

- (1) Avoid the location where four sides are entirely surrounded by walls.
- (2) Fix the unit by anchor bolts without fail. Restrict the protrusion length of anchor bolt to 15 mm and under.
- (3) When strong wind blows against the unit, direct the discharge port at a right angle to the wind direction.
- (4) Secure the space of 1 m and over at the top of unit.
- (5) Make the height of obstruction wall in front of discharge port lower than the height of unit.

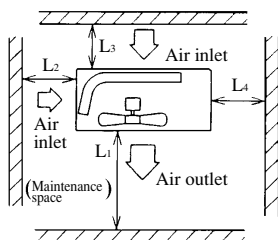
Models FDC408HES3, 508HES3

Unit: mm



Note (1) The () value dimension for model FDC408HES3.

Required space for maintenance and air flow



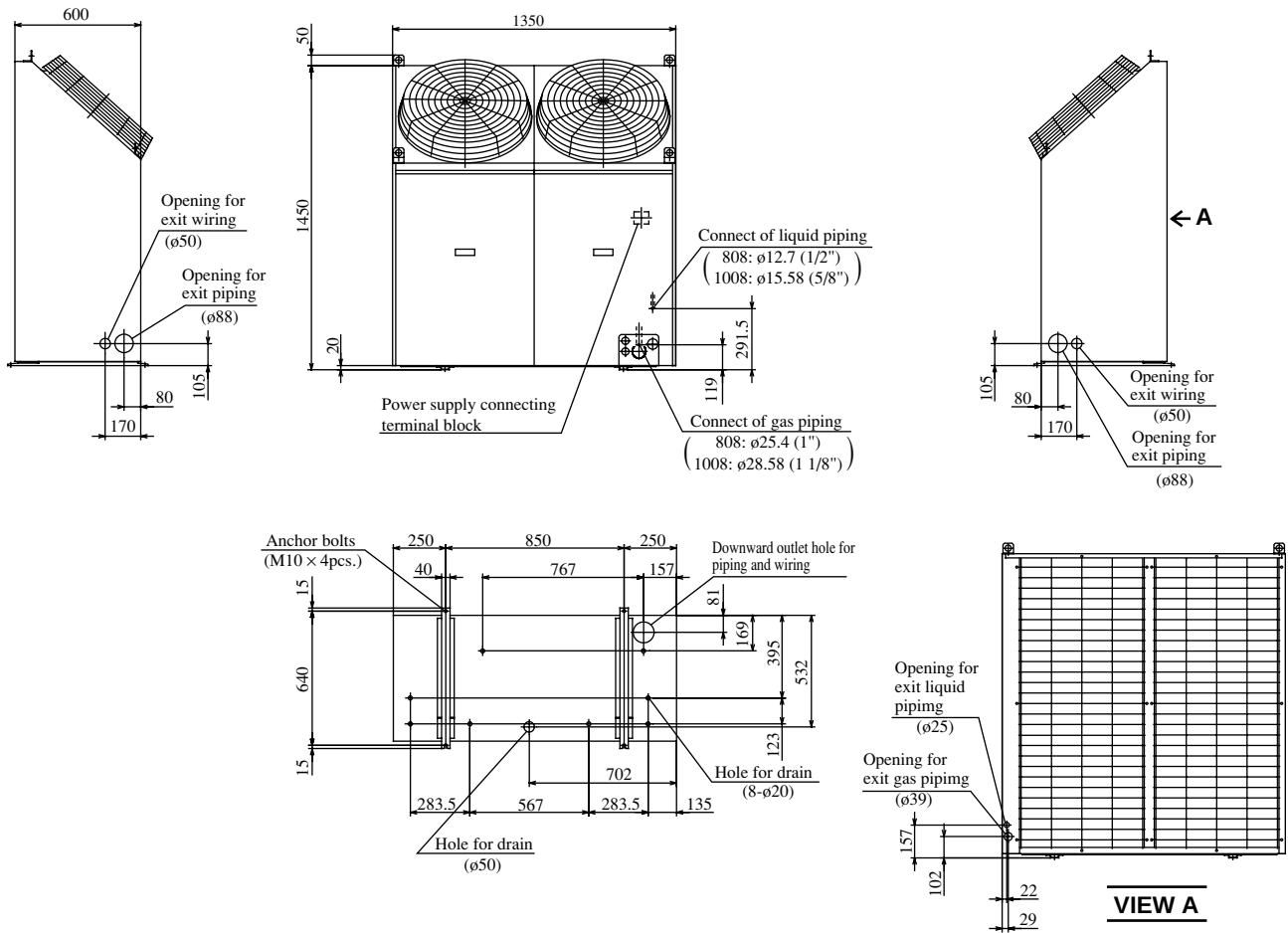
Minimum allowable space to the obstacles

Unit:mm

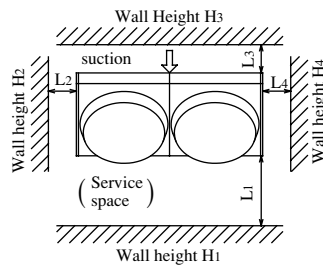
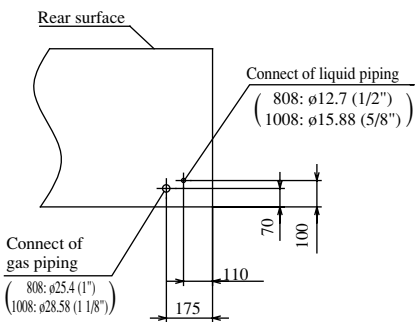
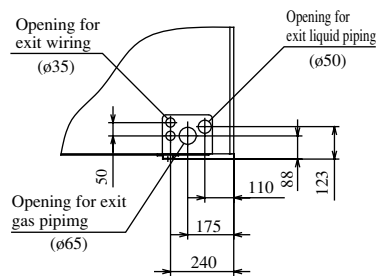
Installation type Mark	I	II	III
L ₁	Open	Open	500
L ₂	300	5	Open
L ₃	150	300	150
L ₄	5	5	5

Notes

- (1) Avoid the location where four sides are entirely surrounded by walls.
- (2) Fix the unit by anchor bolts without fail. Restrict the protrusion length of anchor bolt to 15 mm and under.
- (3) When strong wind blows against the unit, direct the discharge port at a right angle to the wind direction.
- (4) Secure the space of 1 m and over at the top of unit.
- (5) Make the height of obstruction wall in front of discharge port lower than the height of unit.



Dimensions of refrigerant piping connecting mouth (Front)

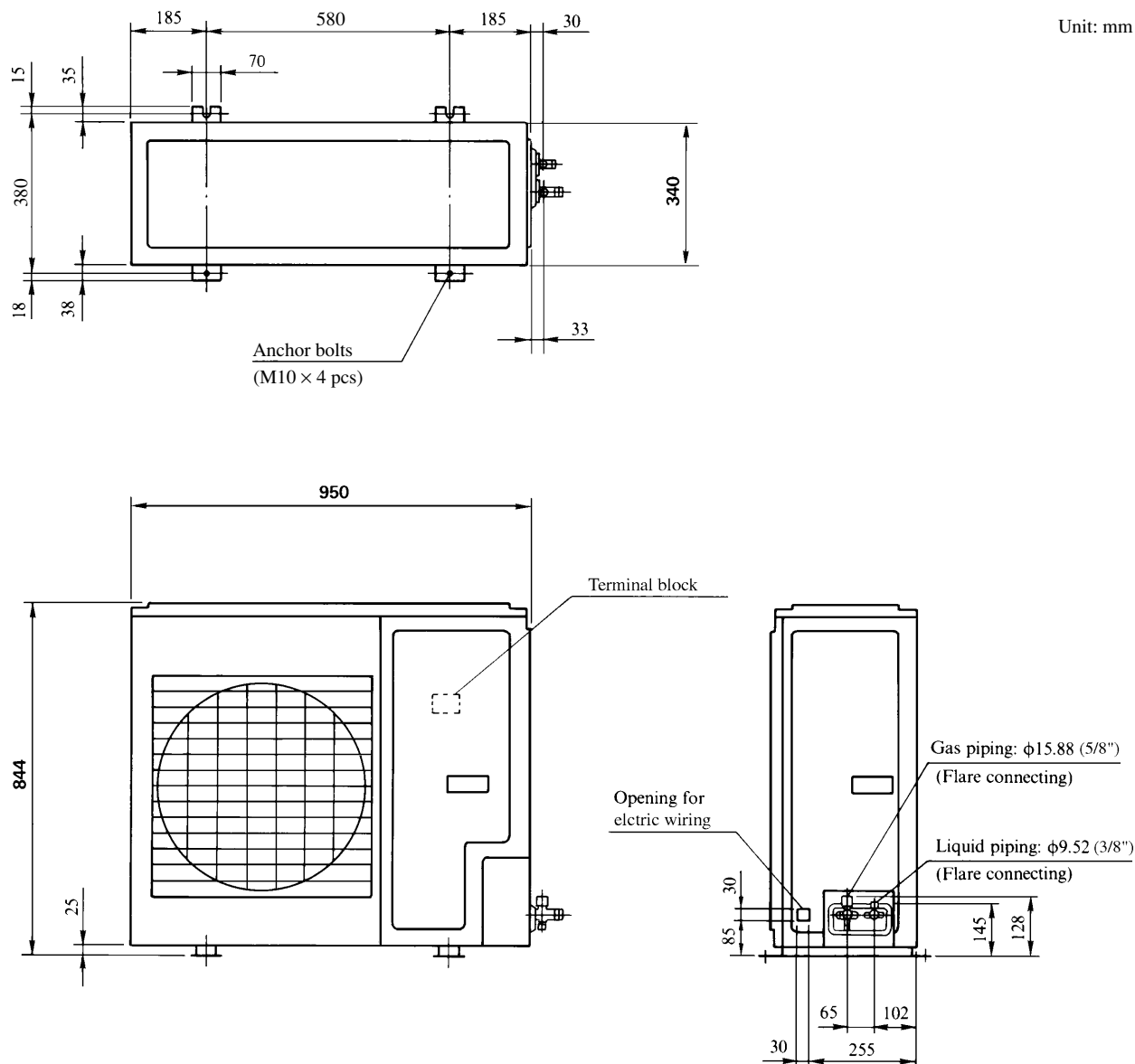


Unit:mm			
Installation example	I	II	III
Dimensions			
L ₁	Open	Open	500
L ₂	0	0	0
L ₃	300	300	300
L ₄	Open	500	0
H ₁	—	—	1000 or less
H ₂	Not limited	Not limited	Not limited
H ₃	Not limited	Not limited	700 or less
H ₄	—	Not limited	Not limited

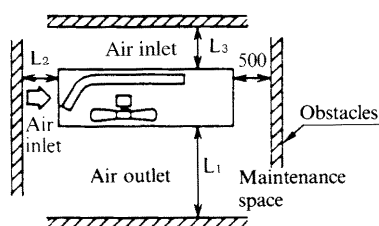
- Notes
- (1) Make sure to secure the unit with anchor bolts.
 - (2) When the strong wind blows, place the unit so that discharge outlet faces the wind direction with right angle.
 - (3) Make sure to allow the space of 1 m or more above the unit.
 - (4) Connect the refrigerant piping (both gas side and liquid side) at local site.
 - (5) If the wall height H₁, H₃ of installation example III exceeds the limited value, make sure the value of L₁, L₃ are to be as follows.
 L₁ = H₁ - 500
 L₃ = 300 + (H₃ - 700) / 2, however, if L₃ exceeds 600, there is no limit for the wall height H₃.

Models FDC306HEN3, 306HES3

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

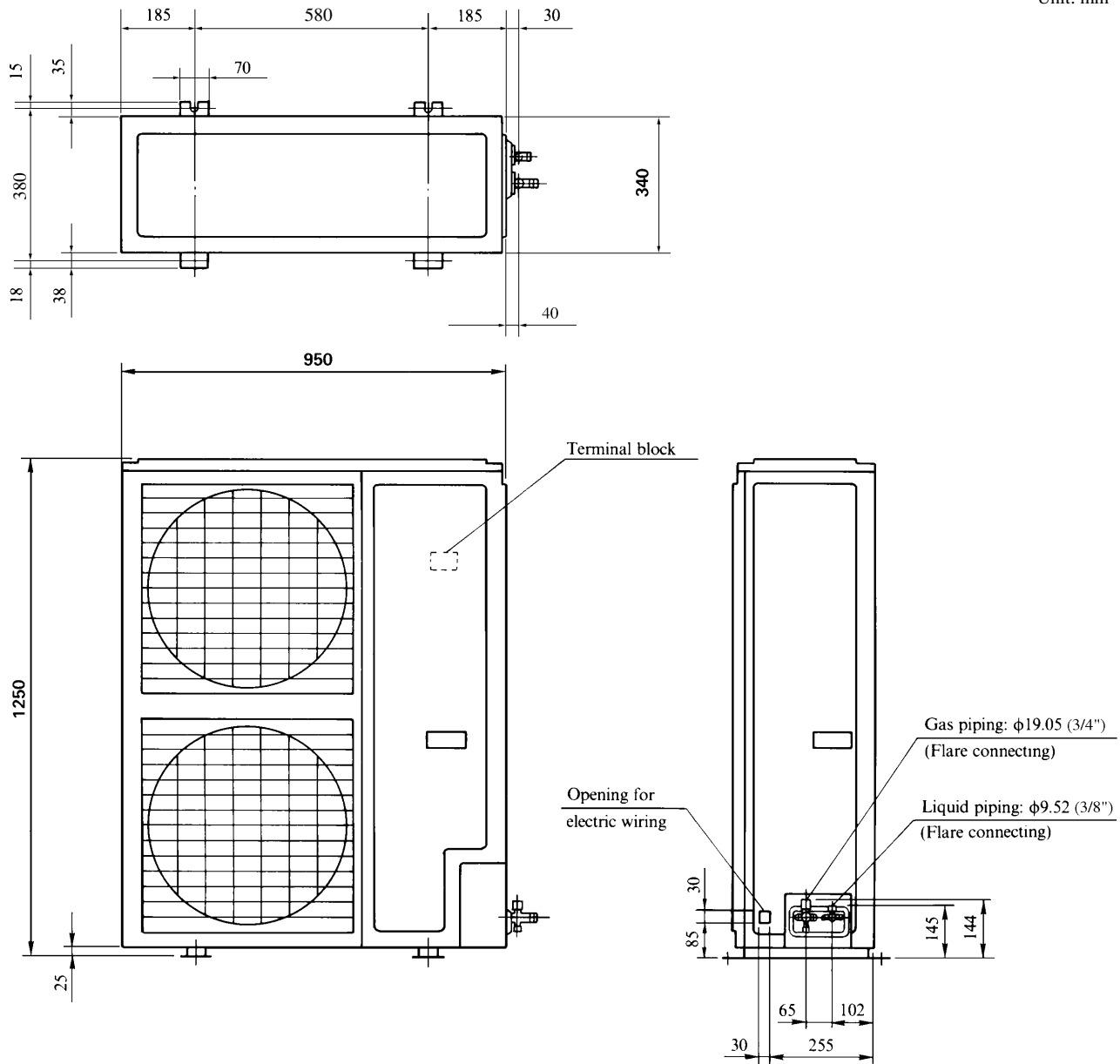
Mark	Installation type		
	I	II	III
L ₁	Open	Open	500
L ₂	300	0	Open
L ₃	100	150	100

Notes

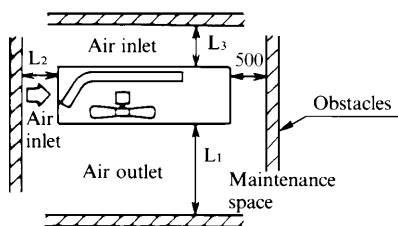
- (1) Fix the unit with anchor bolts.
- (2) Strong wind must not be directed to the air outlet.
- (3) Free space over the unit must be larger than 1 m.
- (4) The unit should not be surrounded by obstructions in all direction. At least one direction around the unit must be free.

Models FDC406HES3, 506HES3, 506HEM3

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

Mark	Installation type		
	I	II	III
L ₁	Open	Open	500
L ₂	300	0	Open
L ₃	150	300	150

Notes

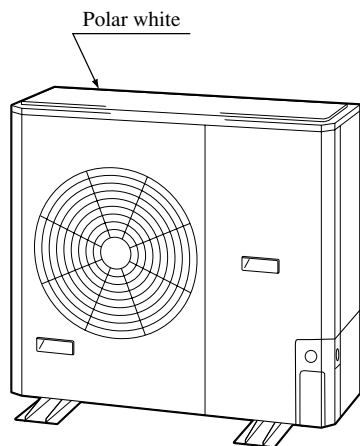
- (1) Fix the unit with anchor bolts.
- (2) Strong wind must not be directed to the air outlet.
- (3) Free space over the unit must be larger than 1 m.
- (4) The unit should not be surrounded by obstructions in all direction. At least one direction around the unit must be free.

15.2.4 Exterior appearance

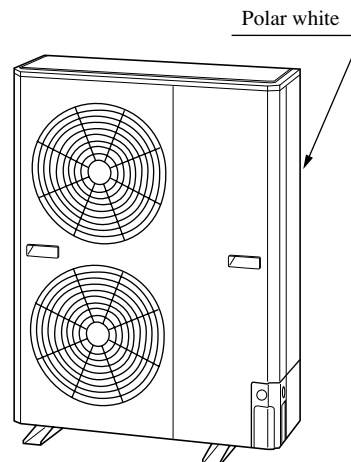
(1) Indoor unit Zinc steel plate

(2) Outdoor unit

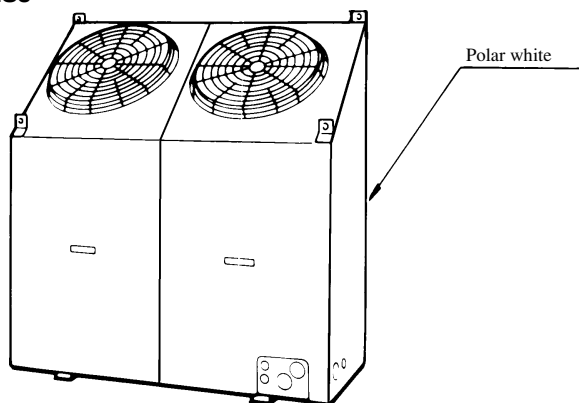
Models FDC308HEN3, 308HES3



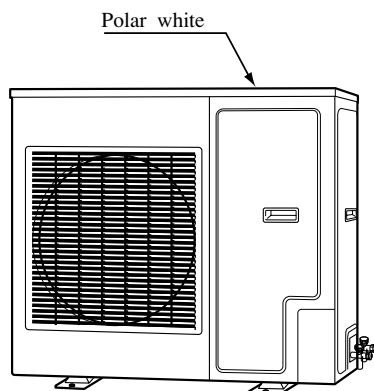
Models FDC408HES3, 508HES3



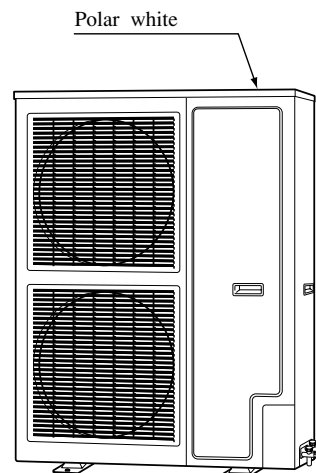
Models FDC808HES3, 1008HES3



Models FDC306HEN3, 306HES3

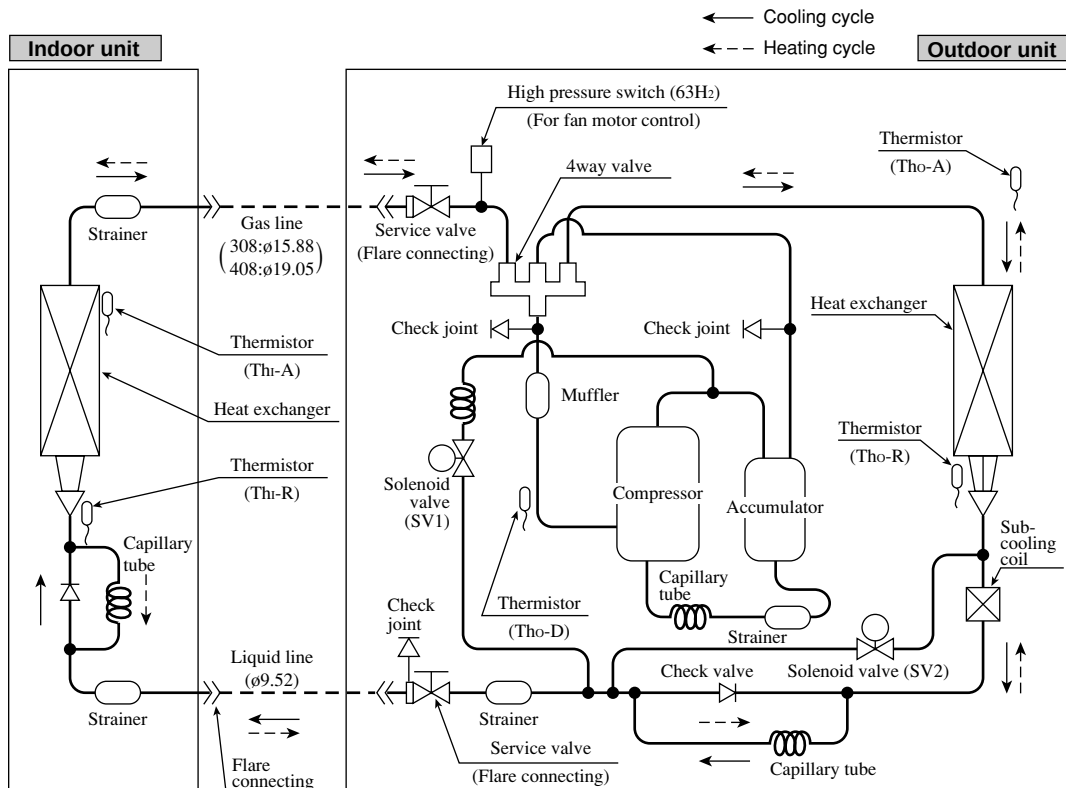


Models FDC406HES3, 506HES3
506HEM3

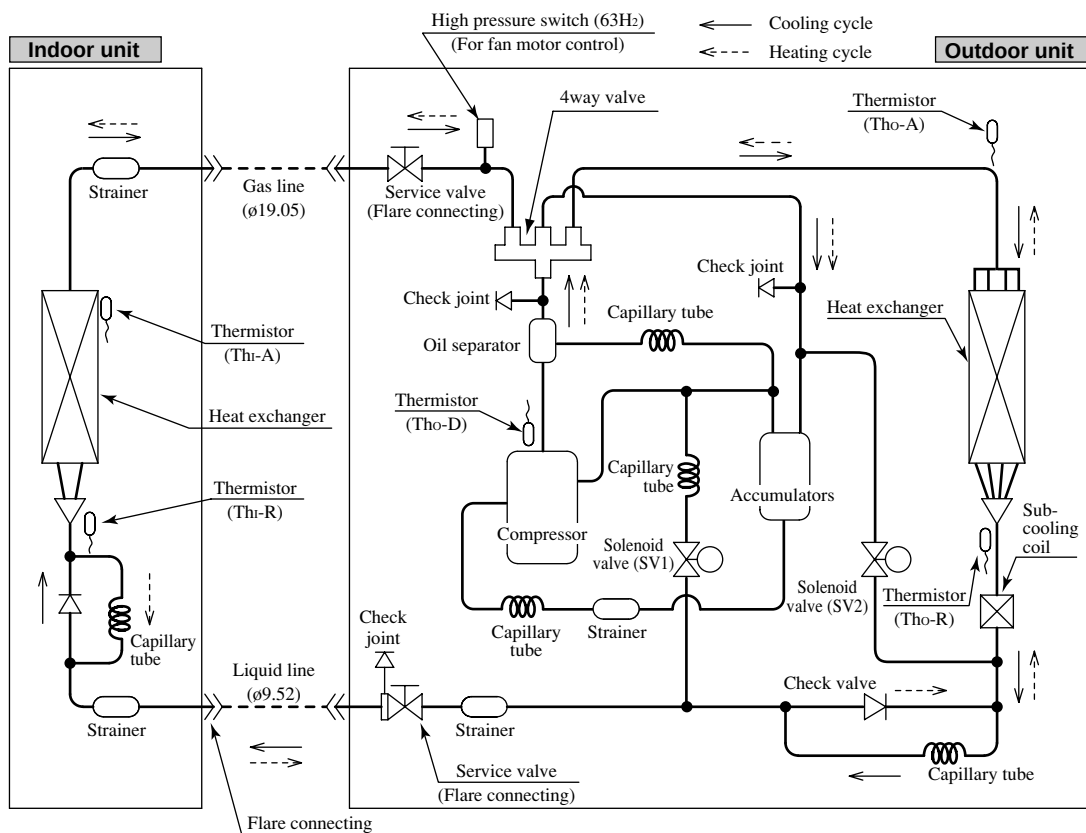


15.2.5 Piping system

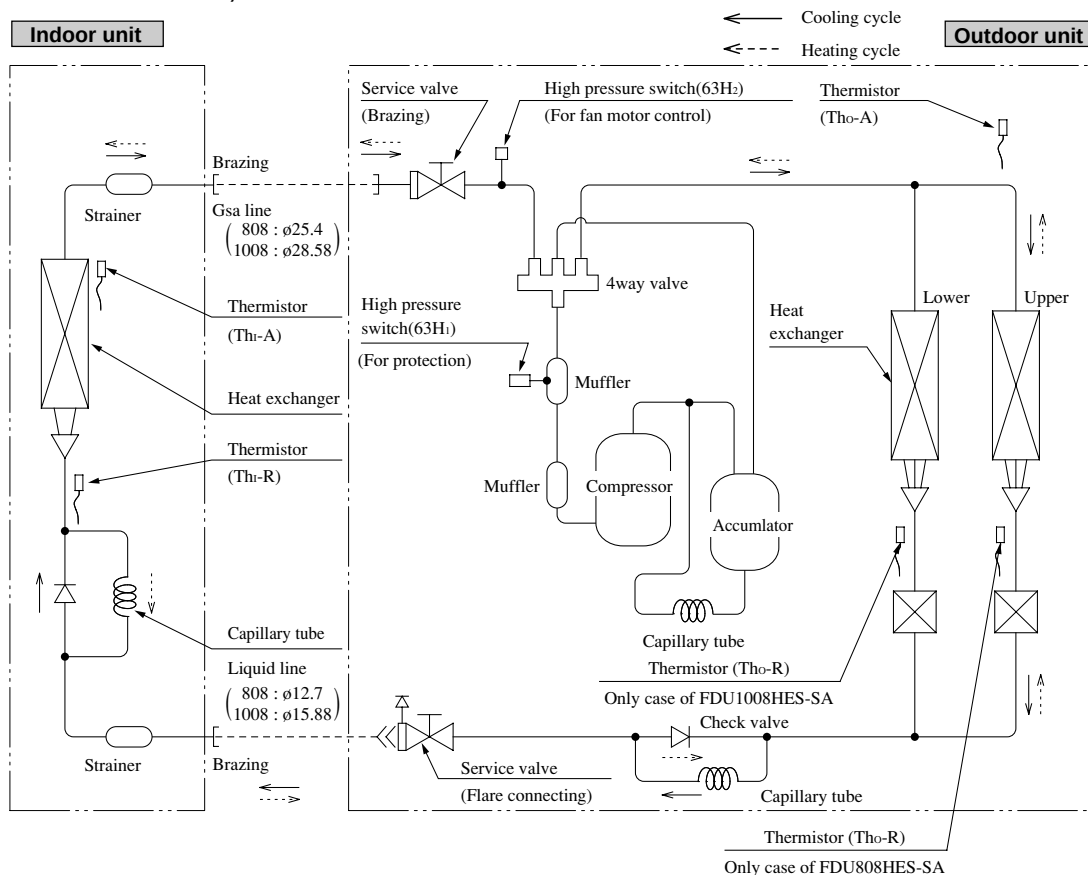
Models FDU308HEN-SA, 308HES-SA, 408HES-SA



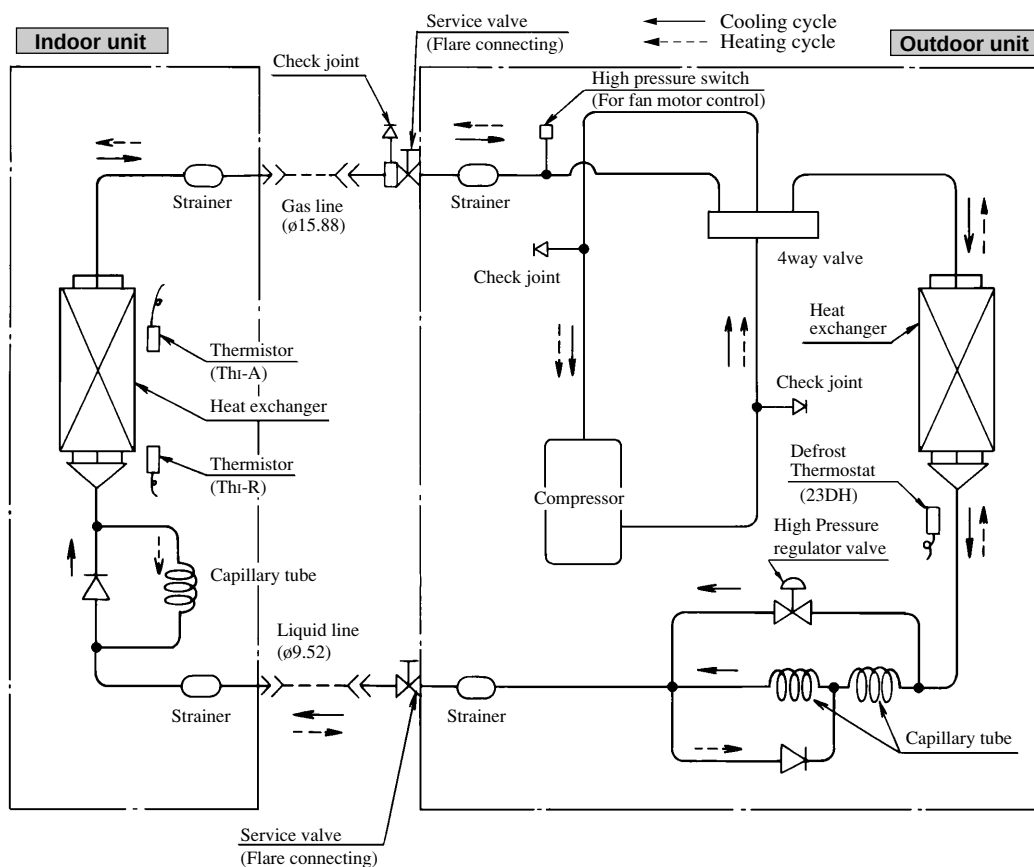
Model FDU508HES-SA



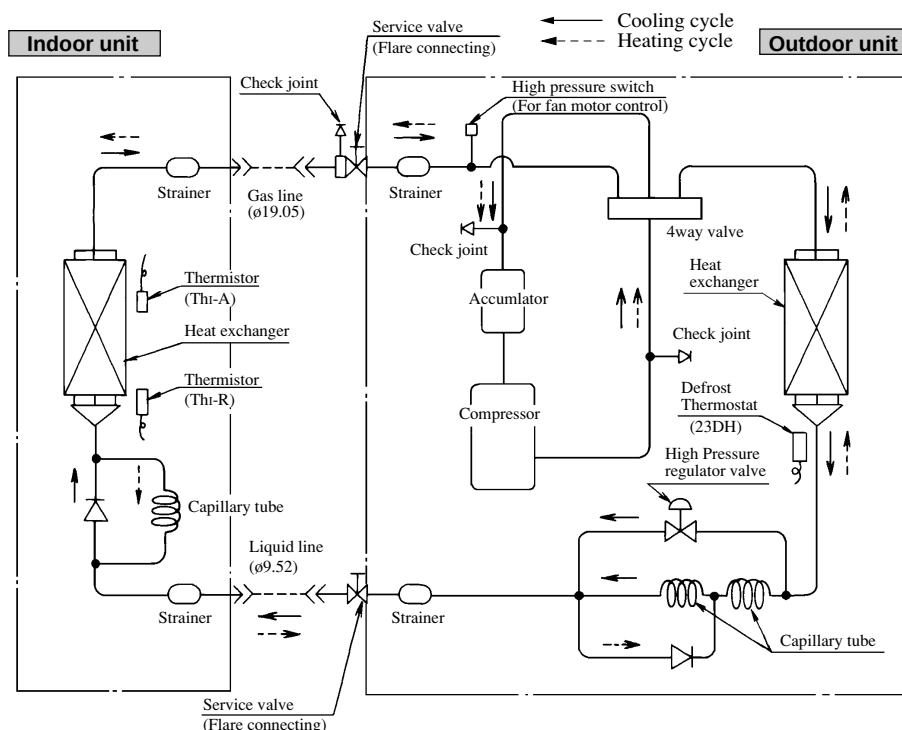
Models FDU808HES-SA, 1008HES-SA



Models FDU308HEN-A, 308HES-A



Models FDU408HES-A, 508HES-A, 508HEM-A



Preset point of the protective devices

Parts name	Mark	Equipped unit	FDU308~508 (FDC308~508 type)	FDU808, 1008
Thermistor (for protection over-loading in heating)	Thi-R	Indoor unit	OFF 68°C ON 61°C	
Thermistor (for frost prevention)			OFF 2.5°C ON 10°C	
Thermistor (for detecting discharge pipe temp.)	Tho-D	Outdoor unit	OFF 135°C ON 90°C	_____
Thermistor (for detecting heat exchange temp.)	Tho-R	Outdoor unit	OFF 70°C ON 60°C	
High pressure switch (for controlling FMO)	63H ₂	Outdoor unit	OFF 2.5MPa (25.5 kgf/cm ²) ON 2.06MPa (21 kgf/cm ²)	OFF 2.75MPa (28 kgf/cm ²) ON 2.16MPa (22 kgf/cm ²)
High pressure switch (for protection)	63H ₁	Outdoor unit	_____	OFF 2.4MPa (24.5 kgf/cm ²) ON 1.86MPa (19.0 kgf/cm ²)
Parts name	Mark	Equipped unit	FDU308~508 (FDC306~506 type)	
Thermistor (for protection over-loading in heating)	Thi-R	Indoor unit	OFF 68°C ON 61°C	
Thermistor (for frost prevention)			OFF 2.5°C ON 10°C	
Defrost thermostat	23DH ₂	Outdoor unit	OFF 12°C	
	23DH ₁		ON -6°C	
High pressure switch (for controlling FMO)	63H ₂	Outdoor unit	OFF 2.5MPa (25.5 Kgf/cm ²) ON 1.86MPa (19 kgf/cm ²)	

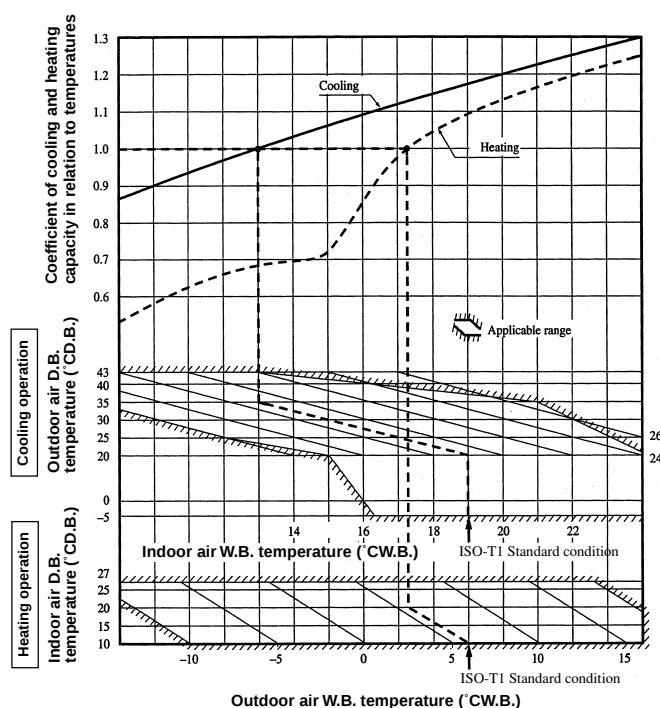
15.2.6 Selection chart

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.

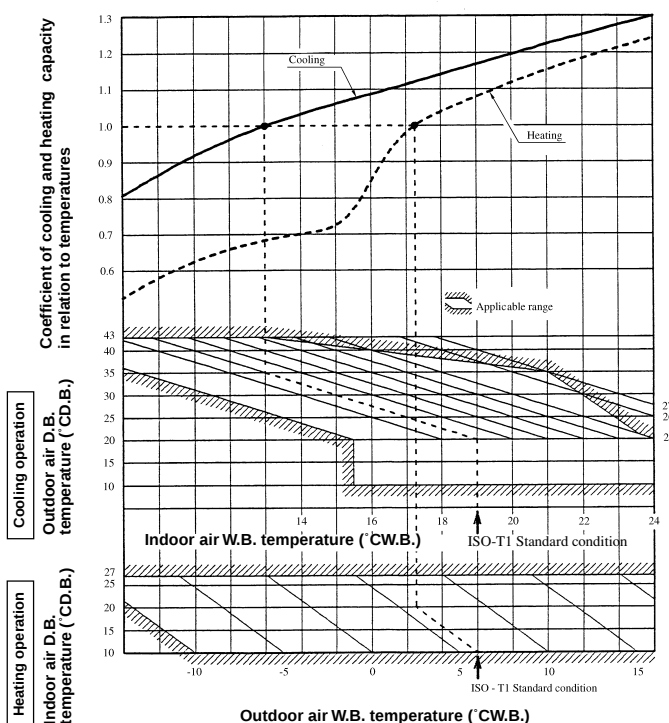
Net capacity = Capacity shown on specification × Correction factors as follows.

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

(a) Only case of ISO-T1 models (Only case of FDC308~1008 type)



(b) Only case of ISO-T1 models (Only case of FDC306~506 type)



(C) Only case of ISO-T3 and SASO models

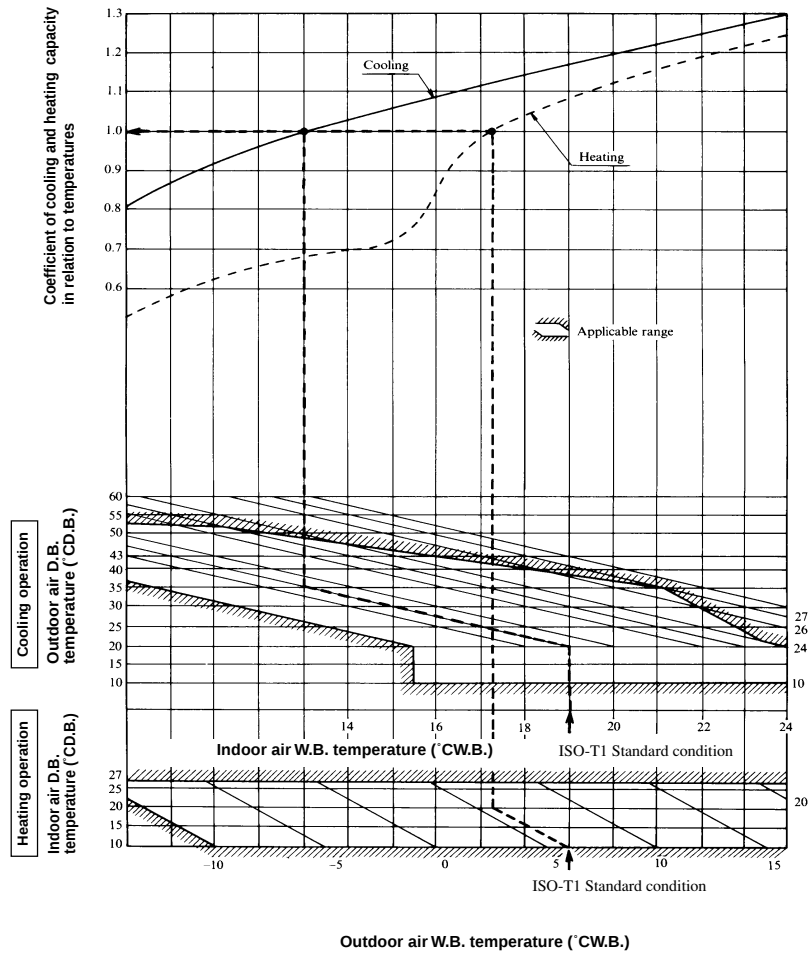


Table of bypass factor

(50/60 Hz)

Model		FDU 308 type	FDU 408 type	FDU 508 type	FDU 808 type	FDU 1008 type
Item	Upper limit	0.019/0.096	0.048/0.05	0.103/0.106	0.063	0.063
	Standard	0.067/0.086	0.032/0.043	0.076/0.094	0.043	0.043
	Lower limit	0.043/0.057	0.017/0.025	0.051/0.064	0.013	0.025

(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.

50/60Hz

Equivalent piping length ⁽¹⁾ m		5	10	15	20	25	30	35	40	45	50	55
Heating		1.0	1.0	1.0	1.0	1.0	0.995	0.995	0.99	0.99	0.985	0.985
Cooling	FDU308 type (FDC308 type)	1.0	0.99	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91	0.9
	FDU408 type (FDC408 type)	1.0	0.995	0.985	0.98	0.97	0.965	0.955	0.95	0.94	0.935	0.925
	FDU508 type (FDC508 type)	1.0	0.99	0.975	0.965	0.95	0.94	0.925	0.915	0.9	0.89	0.875
	FDU808, 1008 type	1.0	0.99	0.98	0.97	0.96	0.95	0.94	0.93	0.92	0.91	0.9
	FDU308 type (FDC306 type)	1.0	0.99	0.98 /0.975	0.97 /0.965	0.96 /0.95	0.95 /0.94	0.94 /0.925	—	—	—	—
	FDU408 type (FDC406 type)	1.0	0.995 /0.99	0.985 /0.98	0.98 /0.97	0.97 /0.96	0.965 /0.95	0.955 /0.94	—	—	—	—
	FDU508 type (FDC506 type)	1.0	0.99 /0.985	0.975 /0.97	0.965 /0.955	0.95 /0.94	0.94 /0.925	0.925 /0.91	—	—	—	—

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

308 series [$\phi 15.88(5/8")$]: Equivalent piping length = Real piping length + (0.10 × Number of bends in piping)

408, 508 series [$\phi 19.05(3/4")$]: Equivalent piping length = Real piping length + (0.15 × Number of bends in piping)

808 series [$\phi 25.4(1")$]: Equivalent piping length = Real piping length + (0.15 × Number of bends in piping)

1008 series [$\phi 28.58(1 1/8")$]: Equivalent piping length = Real piping length + (0.20 × Number of bends in piping)

[Equivalent piping length < Limitation length of piping + 5m]

(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

Model	FDU308~1008 type (FDC308~1008 type)	FDU308~508 type (FDC306~506 type)
Item		
Max. one way piping length	50m	30m
Max. vertical height difference	Outdoor unit is higher 30m Outdoor unit is lower 15m	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 FDU308HEN-SA 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

$$\text{Net cooling capacity} = \underset{\substack{\uparrow \\ \text{FDU308HEN-SA}}}{7100} \times \underset{\substack{\uparrow \\ \text{Air flow "High"}}}{1.00} \times \underset{\substack{\uparrow \\ \text{Length 15m.} \\ \text{Height difference 5 m}}}{(0.98 - 0.01)} \times \underset{\substack{\uparrow \\ \text{Factor by air} \\ \text{temperatures}}}{1.0} = 6887 \text{ w}$$

15.2.7 Characteristics of fan

How to interpret the blower characteristics table

Example • What is the Fan Controller's Volume Number setting if, at the high operation speed of FDU308-A (60Hz), it is required to have 140Pa (14mmAq) outside static pressure at 24m³/min airflow volume as the operation point?

Move the 140Pa (14mmAq) outside static pressure point to the right as shown in the diagram below. The “(a) -point”, i.e. where this intersects with the solid curve tracing the 24m³/min airflow volume upwards, is the appropriate Volume Number. In this example the appropriate Volume Number is “No. 6”.

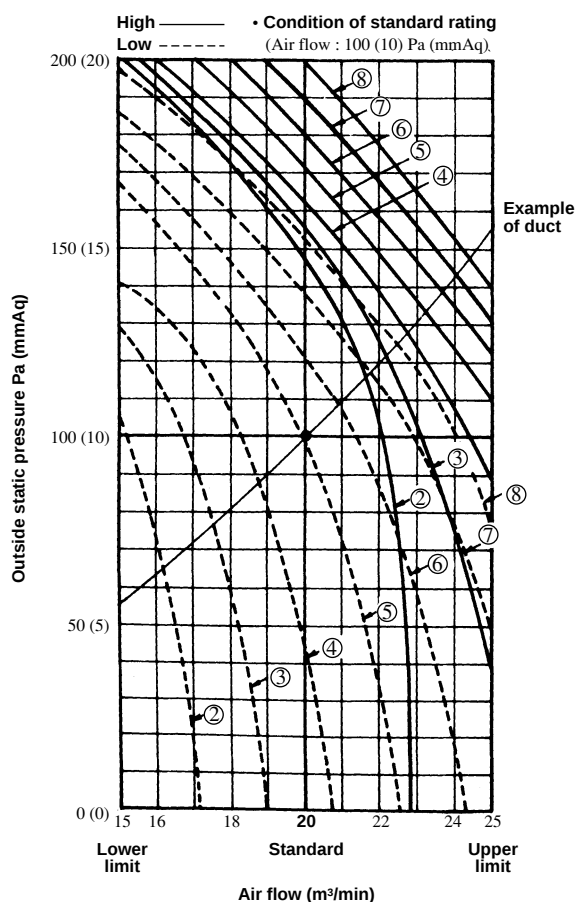
• In this situation, a condition of 19.7m³/min airflow volume at 93Pa (9.3mmAq) outside static pressure can be predicated at Low Tap and it can be concluded that operation is possible.

Always follow the procedure in “(b) -point” to verify that the condition at Low Tap is not outside the Feasible Operation Airflow Volume Range.

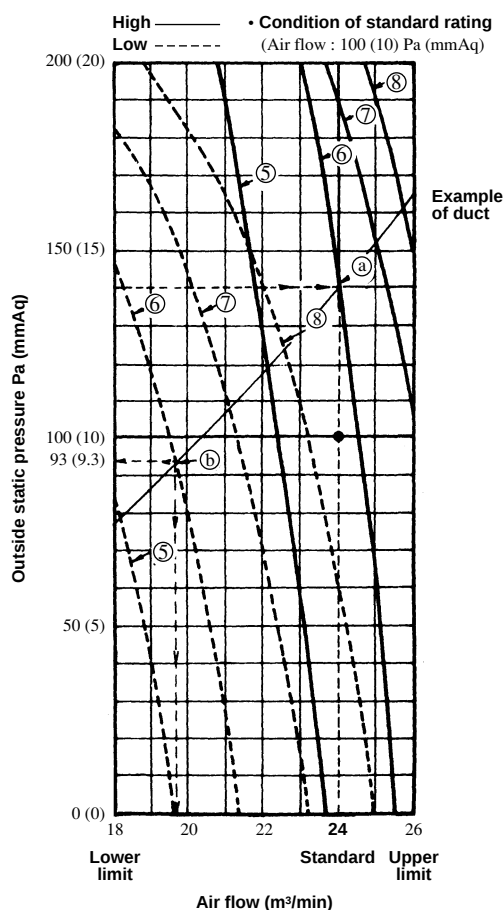
Notes (1) Circled values in the Special Feature Table indicate Fan Controller Volume Numbers. Volume Numbers with no entry are outside the Feasible Operation Airflow Volume Range and therefore operation is not possible.

(2) The Fan Controller Volume Number is set at “No.5” when shipped from the assembly plant.

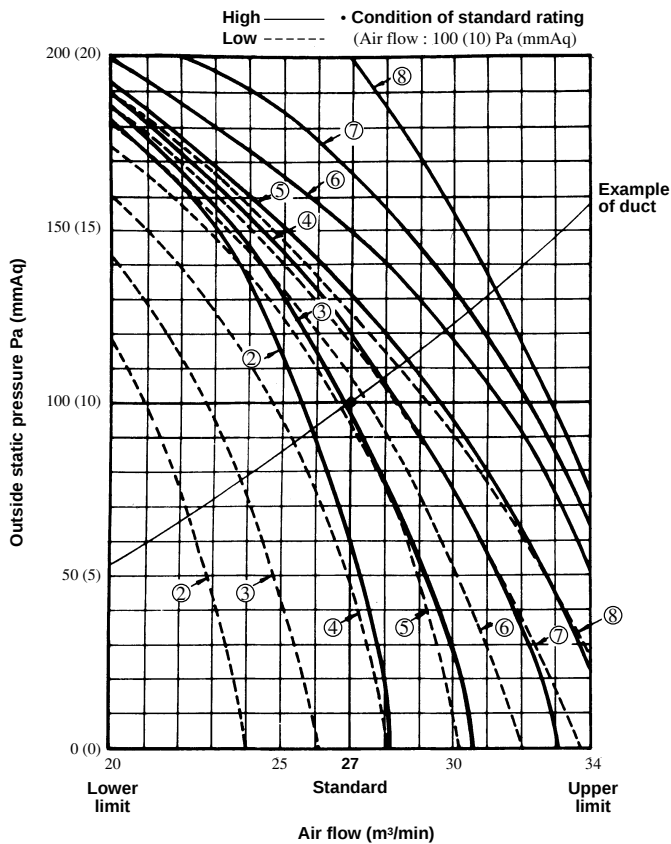
Model FDU308-A (50Hz)



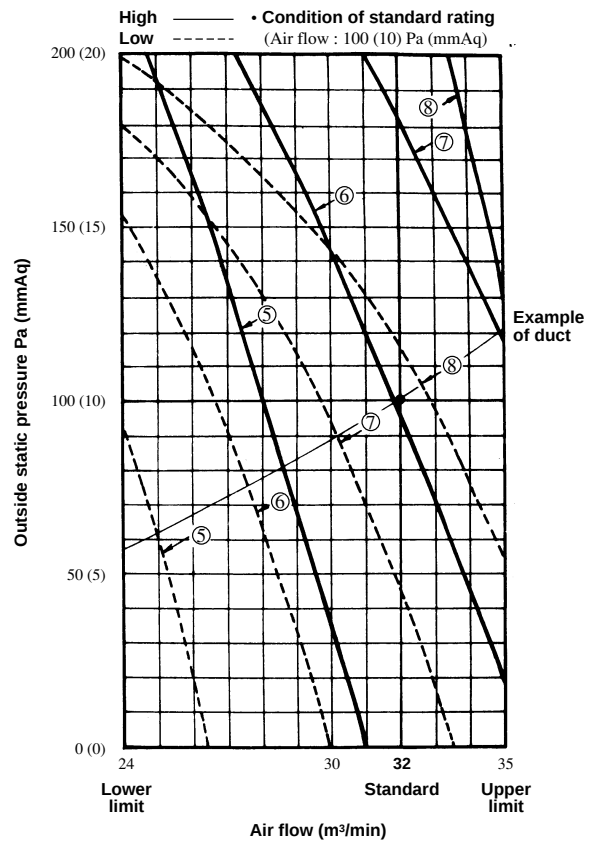
Model FDU308-A (60Hz)



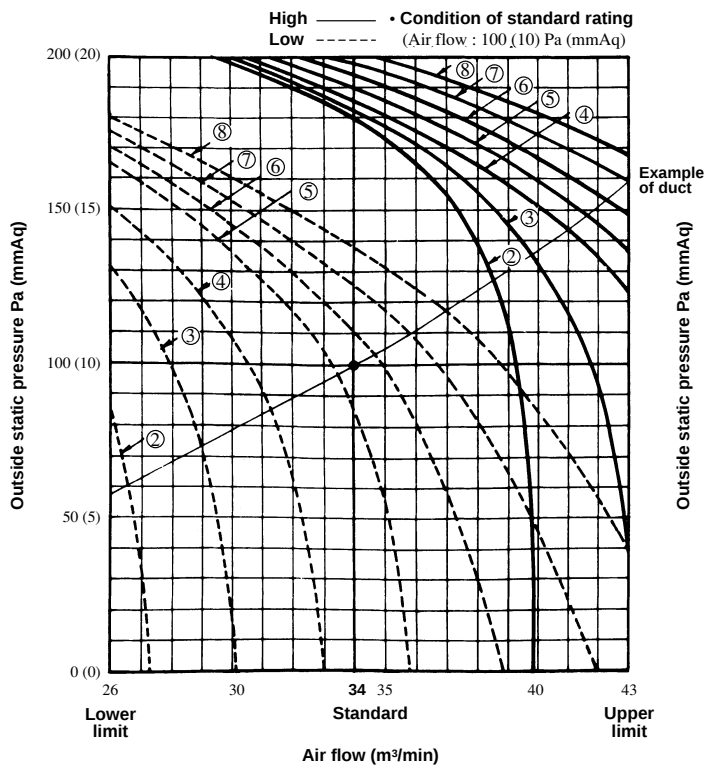
Model FDU408-A (50Hz)



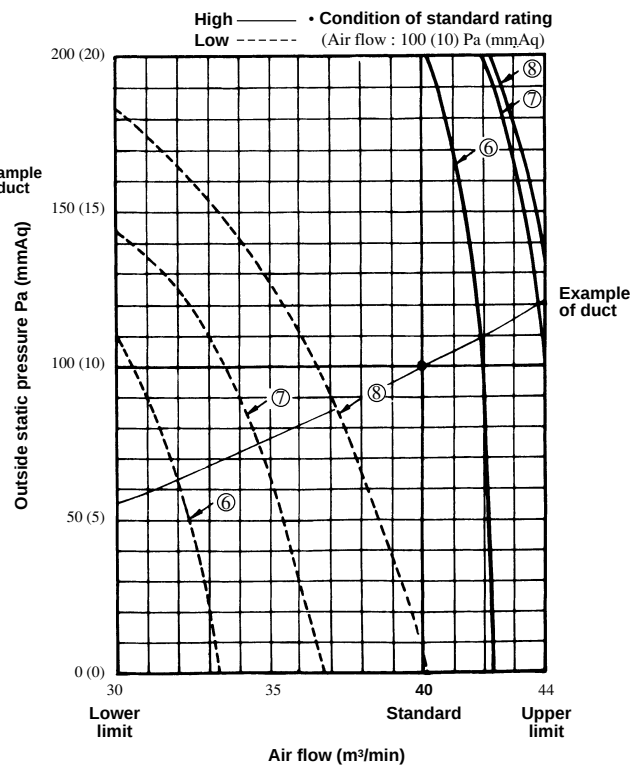
Model FDU408-A (60Hz)



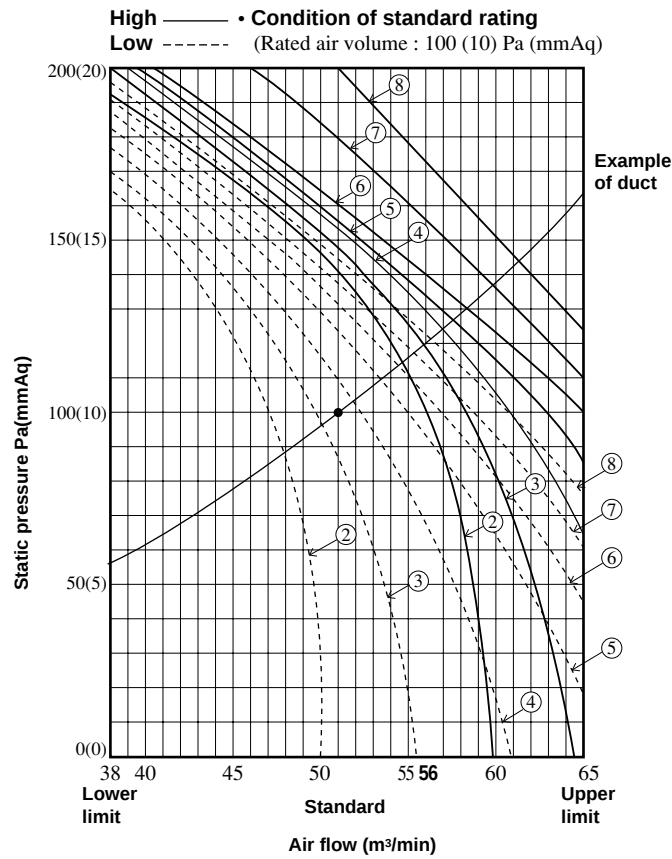
Model FDU508-A (50Hz)



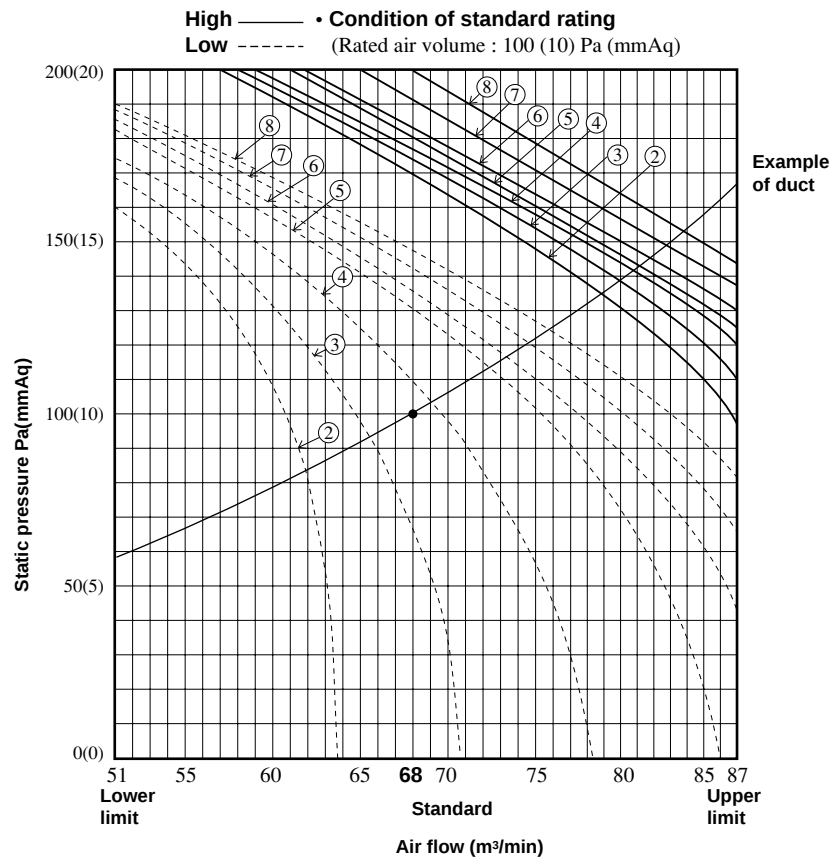
Model FDU508-A (60Hz)



Model FDU808-A



Model FDU1008-A



15.2.8 Noise level

Notes (1) The data are based on the following conditions.

Ambient air temperature:

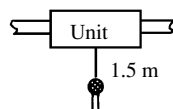
Indoor unit 27°C DB, 19°C WB

Outdoor unit 35°C DB,

Indoor unit

Measured based on JIS B 8616

Mike position as below



Outdoor unit

Only case of FDC 308~508 and FDC 306~506 type.

Measured based on JIS B 8616

Mike position: at highest noise level

in position as below

Distance from front side 1 m

Height 1 m

Only case of FDC 808, 1008 type.

Mike position: Front height is 1 meter.

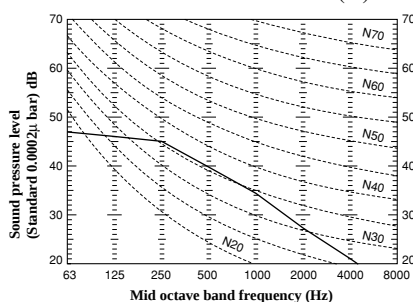
(2) The data in the chart are measured in an unechonic room.

(3) The noise levels measured in the field are usually higher than the data because of reflection.

(1) Indoor unit

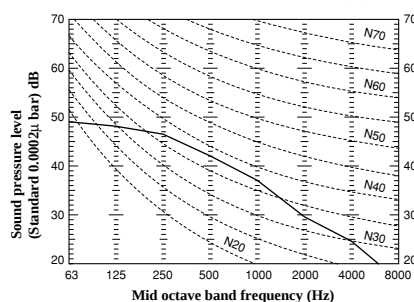
Model FDU308-A (50Hz)

Noise level 41dB (A)



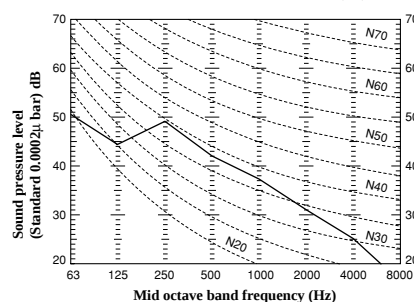
Model FDU308-A (60Hz)

Noise level 43dB (A)



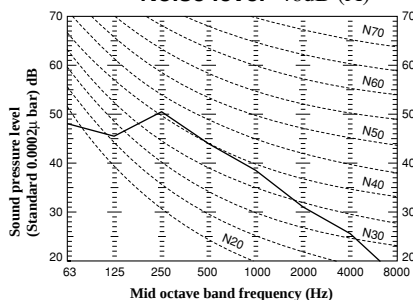
Model FDU408-A (50Hz)

Noise level 44dB (A)



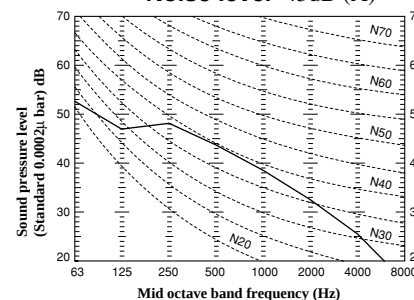
Model FDU408-A (60Hz)

Noise level 46dB (A)



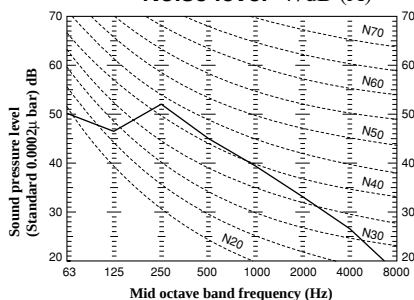
Model FDU508-A (50Hz)

Noise level 45dB (A)



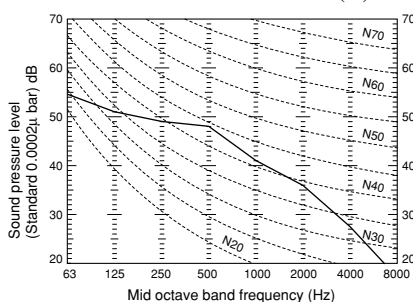
Model FDU508-A (60Hz)

Noise level 47dB (A)



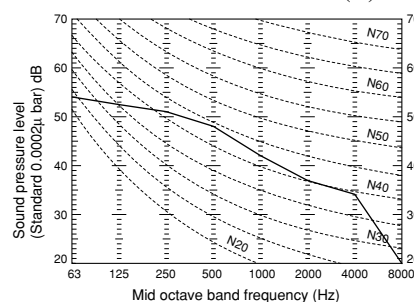
Model FDU808-A

Noise level 48dB (A)



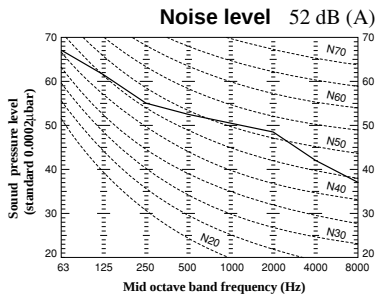
Model FDU1008-A

Noise level 49dB (A)

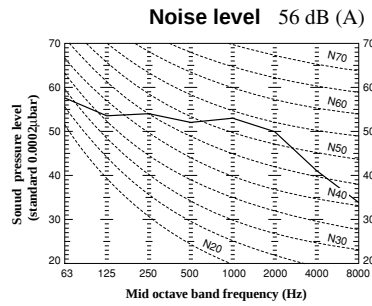


(2) Outdoor unit

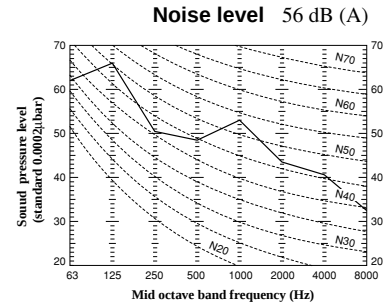
Models FDC308HEN3, 308HES3



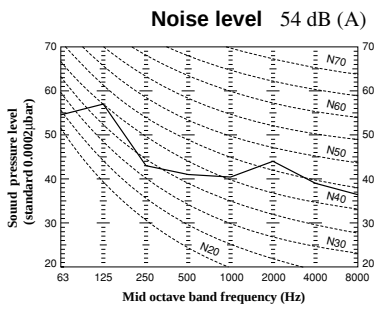
Model FDC306HEN3



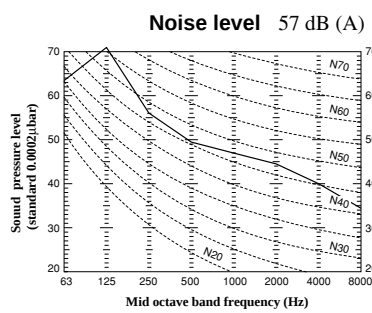
Model FDC306HES3



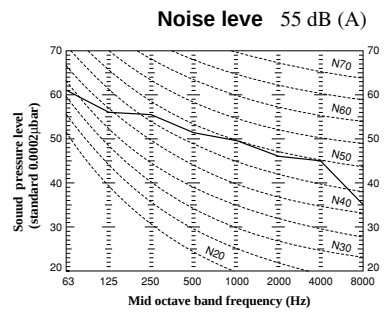
Model FDC408HES3



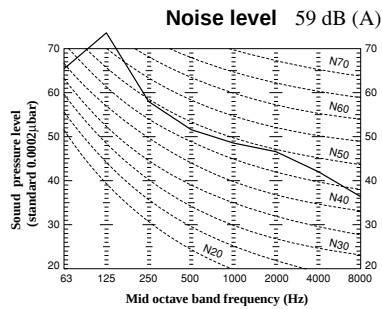
Model FDC406HES3



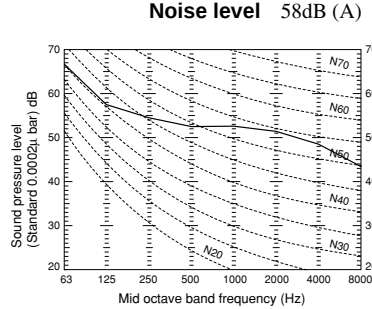
Model FDC508HES3



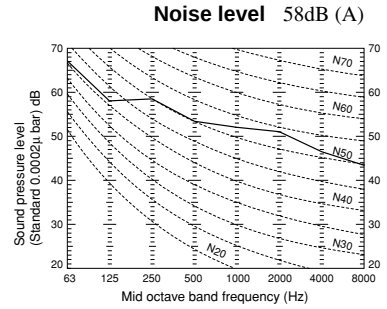
Models FDC506HES3, 506HEM3



Model FDC808HES3



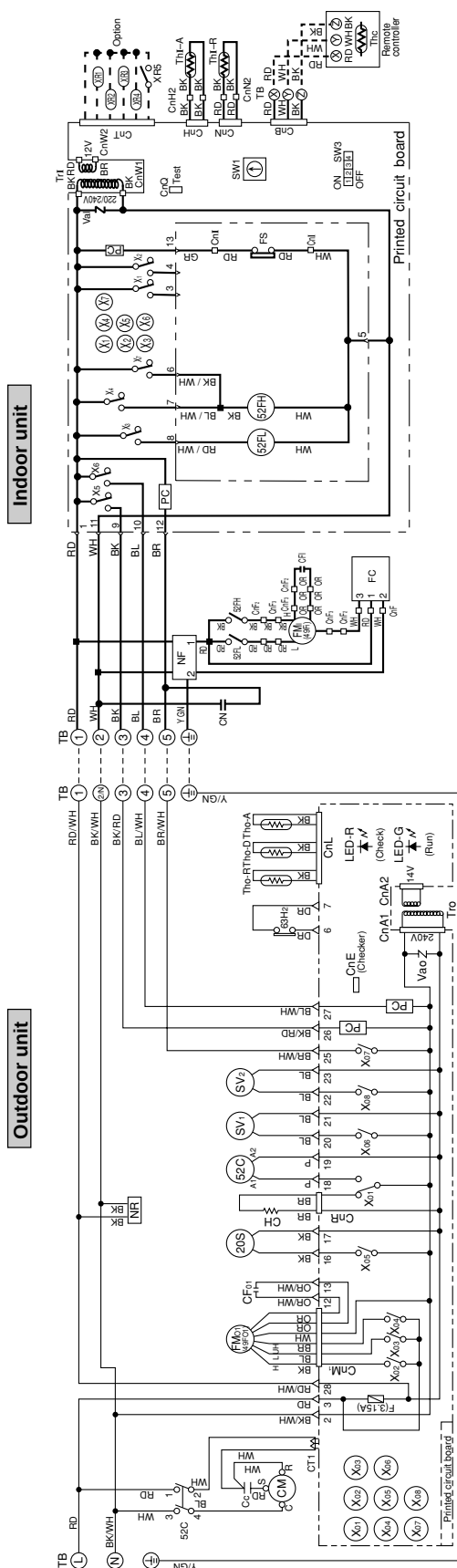
Model FDC1008HES3



15.3 ELECTRICAL DATA

15.3.1 Electrical wiring

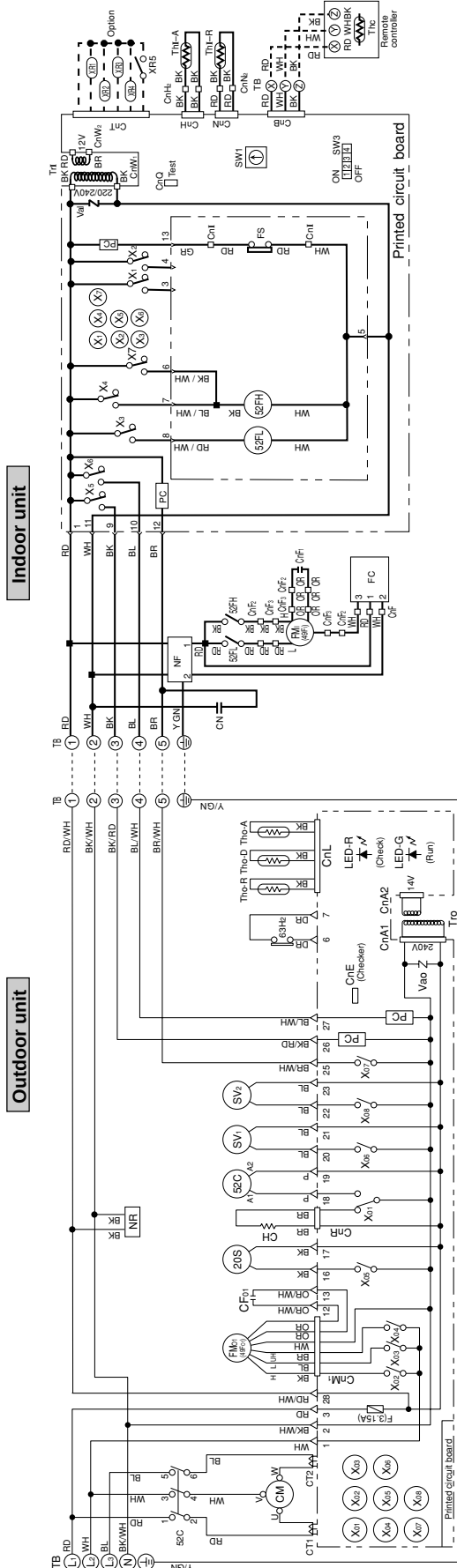
Model FDU308HEN-SA



Color mark			
Mark	Color	Mark	Color
BK	Black	BKRD	Black/Red
BL	Blue	BKWH	Black/White
BR	Brown	BLWH	Blue/White
GR	Gray	BRWH	Brown/White
OR	Orange	ORWH	Orange/White
P	Pink	RDWH	Red/White
RD	Red	YIGN	Yellow/Green
WH	White		

Meaning of marks		
Mark	Parts name	Mark
CC	Capacitor for CM	Th-R
CF1	Capacitor for FM1	Tho-A
CFo	Capacitor for FMo	Tho-D
CH	Crankcase heater	Tho-R
CM	Compressor motor	Tr
CN	Capacitor	TrO
ChA - W	Connector (□ mark)	Val
CT1	Current sensor	Vao
F	Fuse	20S
FC	Fan controller	49Fi
FM1	Fan motor (Indoor unit)	49Fo
FMo	Fan motor (Outdoor unit)	52C
NF	Noise filter	52FH
NR	Surge suppressor	52FL
PC	Photo coupler	X1-7
SV1	Solenoid coil (for control)	X01-8
SW2	Switch (Address set)	63Hz
SW3	Changeover switch	◁
TS	Terminal block (□ mark)	■
FB	Float switch	LED-G
Th	Thermistor	LED-R
Th-A	Thermistor	
		Thermistor
		Thermistor
		Thermistor
		Transformer (Indoor unit)
		Transformer (Outdoor unit)
		Varistor
		4-way valve solenoid
		Internal thermostat for FM1
		Internal thermostat for FMo
		Magnetic contactor for CM1
		Relay (for FM1)
		Relay (for FMo)
		Auxiliary relay
		Auxiliary relay
		High pressure switch (for control)
		Terminal (F)
		Connector
		Indication lamp (Green)
		Indication lamp (Red)

Power source
3 Phase 380/415V 50Hz



Meaning of marks

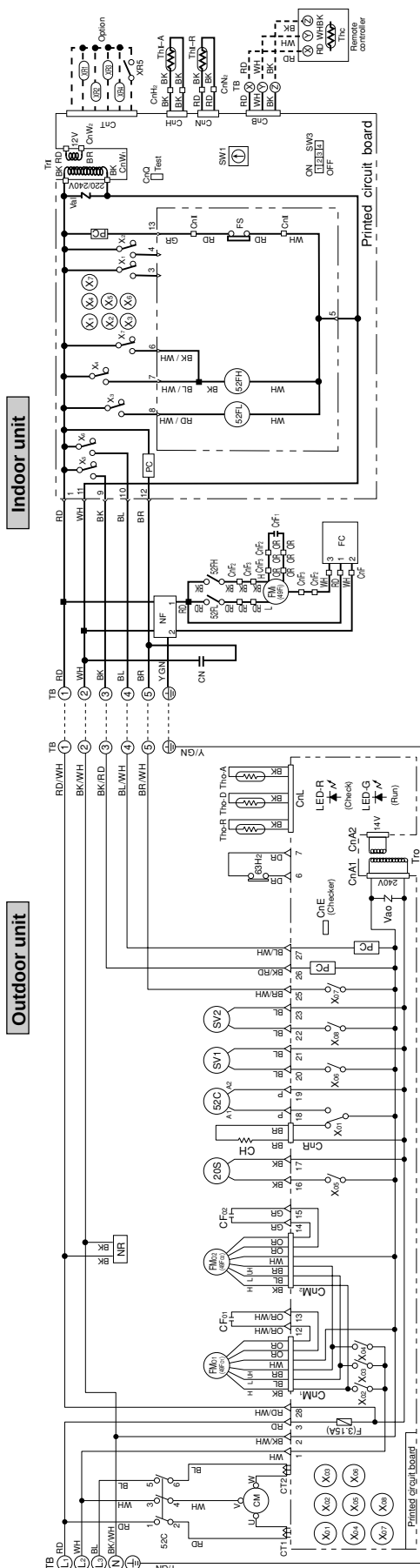
Mark	Parts name	Mark	Parts name
CF ₁	Capacitor for FM ₁	Th-R	Thermistor
CF ₀₁	Capacitor for FM ₀	Th-A	Thermistor
CH	Crankcase heater	Th-D	Thermistor
CM	Compressor motor	Th-R	Thermistor
CN	Capacitor	Tr	Transformer (Indoor unit)
CN-A ~ Z	Connector (□ mark)	Tr	Transformer (Outdoor unit)
CT _{1,2}	Current sensor	Val	Valve
F	Fuse	Vao	Varistor
FC	Fan controller	20S	4-way valve solenoid
FM ₁	Fan motor (Indoor unit)	49F ₁	Internal thermostat for FM ₁
FM ₀₁	Fan motor (Outdoor unit)	52C	Internal thermostat for FM ₀
FS	Float switch	52FH	Magnetic contactor for CM
NF	Noise filter	52FL	Relay (for FM ₁)
NR	Surge suppressor	X1-7	Relay (for FM ₀)
PC	Photo coupler	X04-08	Auxiliary relay
SV _{1,2}	Solenoid coil (for control)	63H ₂	High pressure switch (for control)
SW ₁	Switch (Address set)	LED-G	Terminal (F)
SW ₃	Changeover switch	LED-R	Connector
TB	Terminal block (O mark)		Indication lamp (Green)
Th-A	Thermistor		Indication lamp (Red)

Color mark

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

Models FDU408HES-SA, 508HES-SA

Power source
3 Phase 380/415V 50Hz



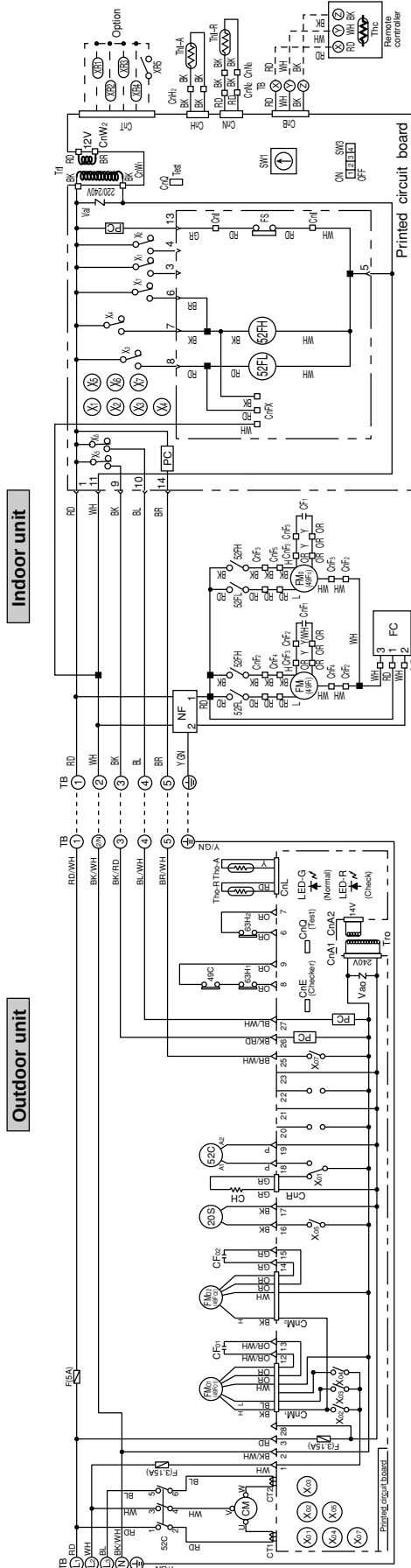
Meaning of marks

Mark	Parts name	Mark	Parts name
CF1	Capacitor for FM1	Th-R	Thermistor
CF01.2	Capacitor for FM0	Tho-A	Thermistor
CH	Crankcase heater	Tho-D	Thermistor
CM	Compressor motor	Tho-R	Thermistor
CN	Capacitor	Tr1	Transformer (Indoor unit)
CnA ~ Z	Connector (□ mark)	Tr0	Transformer (Outdoor unit)
CT1.2	Current sensor	Val	Valve
F	Fuse	Vao	Varistor
FC	Fan controller	20S	4-way valve solenoid
FM1	Fan motor (Indoor unit)	49F1	Internal thermostat for FM1
FM01.2	Fan motor (Outdoor unit)	49F01.2	Internal thermostat for FM0
FS	Float switch	52C	Magnetic contactor for CM
NF	Noise filter	52FH	Relay (for FM1)
NR	Surge suppressor	52FL	Relay (for FM0)
PC	Photo coupler	X1-7	Auxiliary relay
SV1.2	Solenoid coil (for control)	X01-08	Auxiliary relay
SW1	Switch (Address set)	63H2	High pressure switch (for control)
SW3	Changeover switch	LED-G	Terminal (F)
TB	Terminal block (□ mark)	LED-R	Connector
Thc	Thermistor		Indication lamp (Green)
Th-A	Thermistor		Indication lamp (Red)

Color mark

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

Power source
3 Phase 380/415V 50Hz



Meaning of marks

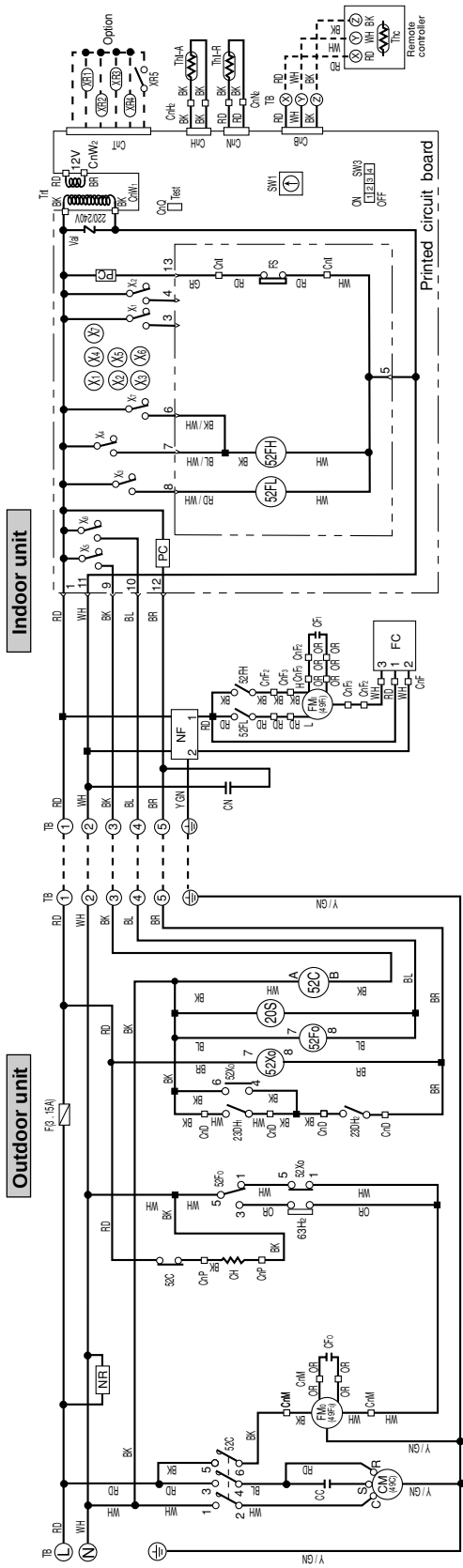
Mark	Parts name	Mark	Parts name
CF1.2	Capacitor for FMi	Tho-A	Thermistor
CF0.2	Capacitor for FMo	Tho-R	Thermistor
CH	Crankcase heater	Tri	Transformer (Indoor unit)
CM	Compressor motor	Tri	Transformer (Outdoor unit)
CnA ~ Z	Connector (C mark)	Val	Valve
CT1.2	Current sensor	Vao	Varistor
F	Fuse	20S	4-way valve solenoid
FM1.2	Fan motor (Indoor unit)	49F1	Internal thermostat for FMi
FM0.2	Fan motor (Outdoor unit)	49F0.2	Internal thermostat for FMo
FC	Fan controller	52C	Magnetic contactor for CM
FS	Float switch	52FLFH	Riley for FMi.2
NF	Noise filter	X1-7	Auxiliary relay
PC	Photo coupler	X01-07	Auxiliary relay
SW1	Switch (Address set)	63H1	High pressure switch (for protection)
SW3	Changeover switch	63H2	High pressure switch (for control)
TB	Terminal block (O mark)	Terminal (F)	Terminal (F)
Thc	Thermistor	Terminal (F)	Terminal (F)
Th-A	Thermistor	LED-G	Indication lamp (Green)
Th-R	Thermistor	LED-R	Indication lamp (Red)

Color mark

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

Model FDU308HEN-A

Power Source
1 Phase 220/240V 50Hz



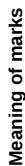
Meaning of marks

Mark	Parts name	Mark	Parts name
CC	Capacitor for CM	Th-A	Thermistor
CFi	Capacitor for FMi	Th-R	Thermistor
CFo	Capacitor for FMo	Tr1	Transformer
CH	Crankcase heater	Val	Valve
CM	Compressor motor	20S	4-way valve solenoid
CN	Capacitor	23DH	Thermostat (deicer)
CnA ~ W	Connector (□ mark)	49C	Internal thermostat for CM
F	Fuse	49Fi	Internal thermostat for FMi
Fc	Fan controller	49Fo	Internal thermostat for FMo
FMi	Fan motor (Indoor unit)	52C	Magnetic contactor for CM
FMo	Fan motor (Outdoor unit)	52FH	Auxiliary relay (for FMi)
FS	Float switch	52FL	Auxiliary relay (for FMo)
NF	Noise filter	52Fo	Relay for fan control
NR	Surge suppressor	52Xo	High pressure switch (for control)
PC	Photo coupler	63H2	Switch (Address set)
SW1	Switch (Address set)	X1-7	Auxiliary relay
SW3	Changeover switch	▽	Terminal block (○ mark)
TB	Terminal block (○ mark)	■	Connector
Thc	Thermistor		

Color mark

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

620



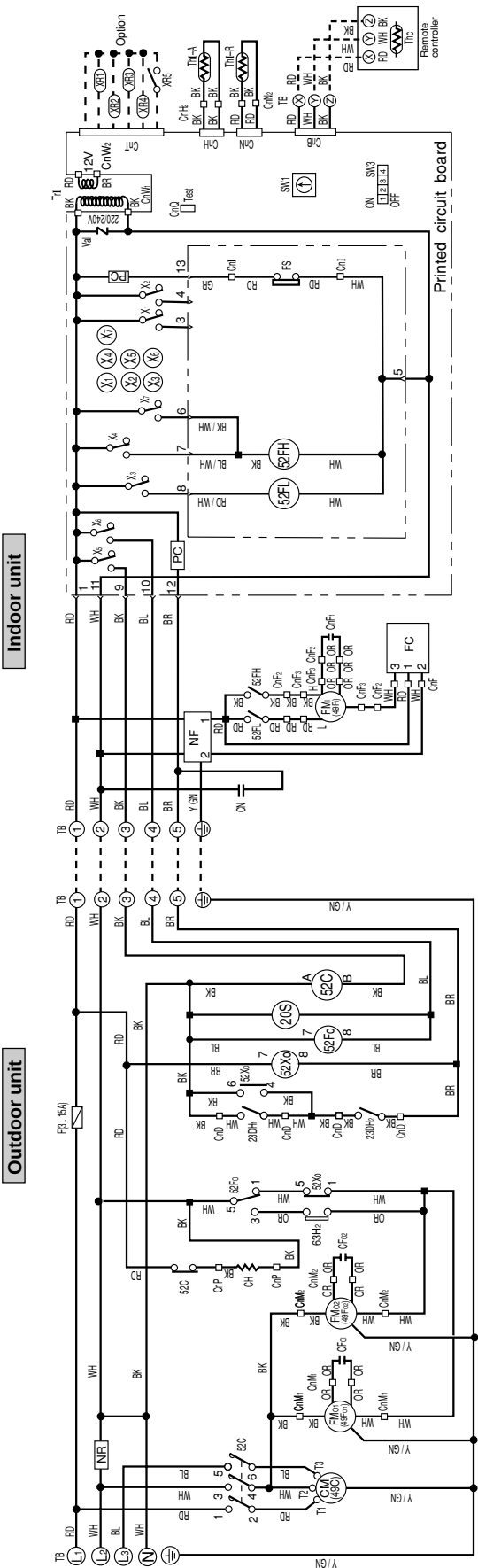
Mark	Parts name	Mark	Parts name
CFi	Capacitor for FMi	Th-A	Thermistor
CFo	Capacitor for FMo	Th-R	Thermistor
CH	Crankcase heater	Trl	Transformer
CM	Compressor motor	Val	Valve
CN	Capacitor	20S	4-way valve solenoid
CNa ~ W	Connector (□ mark)	23DH	Thermostat (deicer)
F	Fuse	49C	Internal thermostat for CM
Fc	Fan controller	49Fi	Internal thermostat for FMi
Fm	Fan motor	49Fo	Internal thermostat for FMo
FMo	Fan motor (Indoor unit)	52C	Magnetic contactor for CM
FS	Floot switch	52FH	Auxiliary relay (for FMo)
NR	Noise filter	52FL	Auxiliary relay (for FMi)
NF	Noise suppressor	52Fo	Relay for FMo
PC	Photo coupler	52Xo	Relay for fan control
SW1	Switch (Address set)	63Hz	High pressure switch (for control)
SW3	Changeover switch	X1-7	Auxiliary relay
TB	Terminal block (○ mark)	△	Terminal (F)
Thc	Thermistor	■	Connector

Color mark

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
RD	Red
WH	White
BK/WH	Black/White
BL/WH	Blue/White
RD/WH	Red/White
VGN	Yellow/Green

Models FDU408HES-A, 508HES-A

Power Source
3 Phase 380-415V 50Hz /380V 60Hz



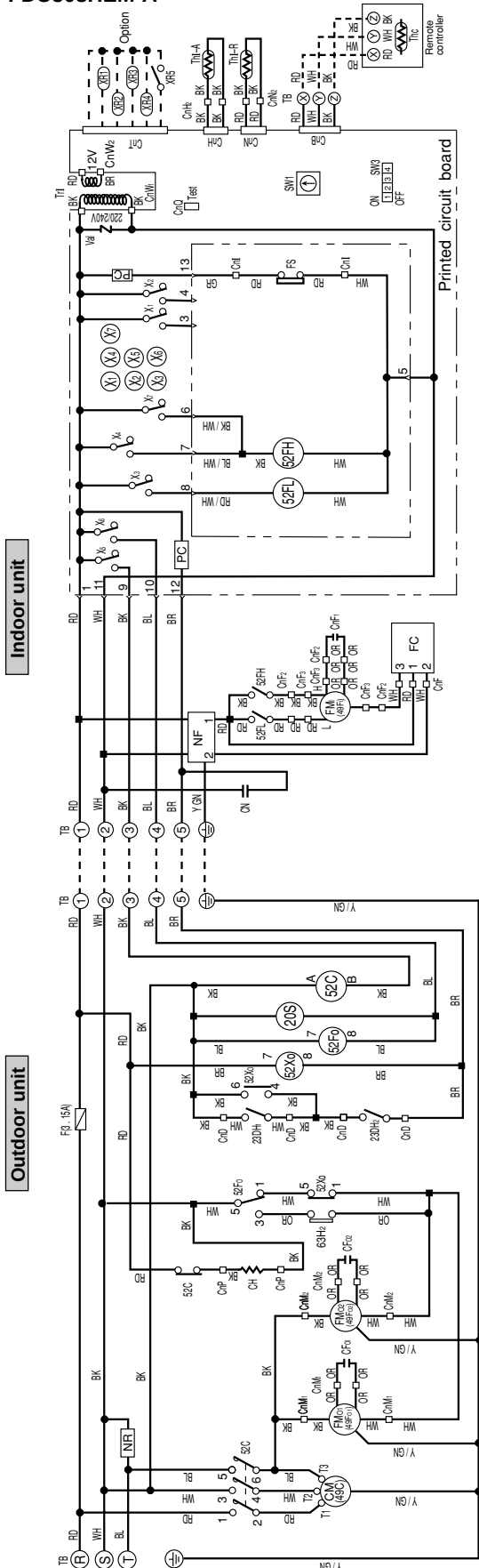
Meaning of marks

Mark	Parts name	Mark	Parts name
CF1	Capacitor for FMi	Th-A	Thermistor
CF01, 2	Capacitor for FMO	Th-R	Thermistor
CH	Crankcase heater	Trl	Transformer
CM	Compressor motor	Val	Valve
CN	Capacitor	20S	20S
CNA ~ W	Connector (□ mark)	23DH	23DH
F	Fuse	49C	49C
Fc	Fan controller	49Fi	49Fi
FMi	Fan motor (Indoor unit)	49F01, 2	49F01, 2
FM01, 2	Fan motor (Outdoor unit)	52FH	52FH
FS	Float switch	52FL	52FL
NF	Noise filter	52FL	52FL
NR	Noise suppressor	52Fo	52Fo
PC	Photo coupler	52Xo	52Xo
SW1	Switch (Address set)	63H2	63H2
SW3	Changeover switch	X1-7	X1-7
TB	Terminal block (○ mark)	▽	Terminal (F)
Thc	Thermistor	■	Connector

Color mark

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

Power Source
3 Phase 230V 50Hz /220V 60Hz



Meaning of marks

Mark	Parts name	Mark	Parts name
CFL	Capacitor for FMI	Thi-A	Thermistor
CFO1, 2	Capacitor for FMO	Thi-R	Thermistor
CH	Crankcase heater	Tri	Transformer
CM	Compressor motor	Val	Valve
CN	Capacitor	20S	4-way valve solenoid
CNA ~ W	Connector (□ mark)	23DH	Thermistat (deicer)
F	Fuse	49C	Internal thermostat for CM
FC	Fan controller	49FI	Internal thermostat for FMI
FMI	Fan motor (Indoor unit)	49FO1, 2	Internal thermostat for FMO
FMO1, 2	Fan motor (Outdoor unit)	52C	Magnetic contactor for CM
FS	Float switch	52FH	Auxiliary relay (for FMI)
NF	Noise filter	52FL	Auxiliary relay (for FMO)
NR	Surge suppressor	52FO	Relay for FMO
PC	Photo coupler	52XO	Relay for fan control
SW1	Switch (Address set)	63H2	High pressure switch (for control)
SW3	Changeover switch	X1-7	Auxiliary relay
TB	Terminal block (○ mark)	▽	Terminal (F)
Thc	Thermistor	■	Connector

Color mark

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

15.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

Same as the cooling/heating equipment for FDT(N) heat pump type. Refer to page 317.

15.5 APPLICATION DATA

SAFETY PRECAUTIONS

- Please read these “Safety Precautions” 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

- This system should be applied to places of office, restaurant, residence and the like. Application to inferior environment such as engineering shop could cause equipment malfunction.
- Please entrust installation to either the company which sold you the equipment or to a professional contractor. Defects from improper installations can be the cause of water leakage, electric shocks and fires.
- Execute the installation accurately, based on following the installation manual. Again, improper installations can result in water leakage, electric shocks and fires.
- When a large air-conditioning system is installed to a small room, it is necessary to have a prior planned countermeasure for the rare case of a refrigerant leakage, to prevent the exceeding of threshold concentration. In regards to preparing this countermeasure, consult with the company from which you purchased the equipment, and make the installation accordingly. In the rare event that a refrigerant leakage and exceeding of threshold concentration does occur, there is the danger of a resultant oxygen deficiency accident.
- For installation, confirm that the installation site can sufficiently support heavy weight. When strength is insufficient, injury can result from a falling of the unit.
- Execute the prescribed installation construction to prepare for earthquakes and the strong winds of typhoons and hurricanes, etc. Improper installations can result in accidents due to a violent falling over of the unit.
- For electrical work, please see that a licensed electrician executes the work while following the safety standards related to electrical equipment, and local regulations as well as the installation instructions, and that only exclusive use circuits are used. Insufficient power source circuit capacity and defective installment execution can be the cause of electric shocks and fires.
- Accurately connect wiring using the proper cable, and insure that the external force of the cable is not conducted to the terminal connection part, through properly securing it. Improper connection or securing can result in heat generation or fire.
- Take care that wiring does not rise upward, and accurately install the lid/service panel. Its improper installation can also result in heat generation or fire.
- When setting up or moving the location of the air-conditioner, do not mix air etc. or anything other than the designated refrigerant (R22) within the refrigeration cycle. Rupture and injury caused by abnormal high pressure can result from such mixing.
- Always use accessory parts and authorized parts for installation construction. Using parts not authorized by this company can result in water leakage, electric shock, fire and refrigerant leakage.

⚠CAUTION

- Execute proper grounding. Do not connect the ground wire to a gas pipe, water pipe, lightning rod or a telephone ground wire. Improper placement of ground wires can result in electric shock.
- The installation of an earth leakage breaker is necessary depending on the established location of the unit. Not installing an earth leakage breaker may result in electric shock.
- Do not install the unit where there is a concern about leakage of combustible gas. The rare event of leaked gas collecting around the unit could result in an outbreak of fire.
- For the drain pipe, follow the installation manual to insure that it allows proper drainage and thermally insulate it to prevent condensation. Inadequate plumbing can result in water leakage and water damage to interior items.

NOTICE

All Wiring of this installation must comply with NATIONAL, STATE AND LOCAL REGULATION. These instructions do not cover all variations for every kind of installation circumstance. Should further information be desired or should particular problems occur, the matter should be referred to Mitsubishi Heavy Industries, Ltd. through your local distributor.

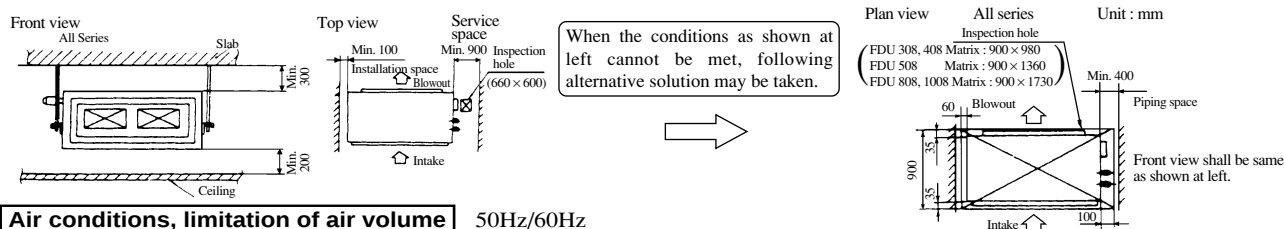
WARNING

BE SURE TO READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD CAUSE SERIOUS INJURY OR DEATH. EQUIPMENT MALFUNCTION AND/OR PROPERTY DAMAGE.

15.5.1 Installation of indoor unit

(1) Selection of installation location

(a) Install the unit at a place as shown below and which meets the conditions as shown by the following table.



Air conditions, limitation of air volume 50Hz/60Hz

Item	Air volume (m ³ /min)			Indoor unit suction air temperature		Ambient temperature around indoor unit
	Rating	Lower limit	Upper limit	Cooling	Heating	
FDU308	20/24	15/18	25/26	Upper limit 27°CWB at ambient temperature 35°C Lower limit 15.5°CWB at ambient temperature 10°C	Upper limit 27°CDB at ambient temperature 24°CWB Lower limit higher than 10°CDB For further details refer to the engineering data which	Upper limit Dew point temperature not higher than 28°C and Relative humidity not higher than 80% Lower limit 0°CDB
FDU408	27/32	20/24	34/35			
FDU508	34/40	26/30	43/44			
FDU808	51	38	65			
FDU1008	68	51	87			

- (b) Places where perfect drainage can be prepared and sufficient drainage gradient is available.
- (c) Places free from air disturbances to the air inlet and outlet of the indoor unit.
- (d) Places with the environmental dew-point temperature is lower than 28°C and the relative humidity is less than 80%.
(When installing at a place under a high humidity environment, pay sufficient attention to prevention of dewing such as thermally insulating the unit properly.)
- (e) *Do not place where the unit is exposed to oil splashes or steam (e.g. kitchens and machine plants).
(Installation and use at such places will cause the performance drop, corrosion in the heat exchanger and damage in molded synthetic resin parts.)
- (f) Do not place where corrosive gas (such as sulfurous acid gas) or inflammable gas (thinner, gasoline, etc.) is generated or remains.
Installation and use at such places will cause corrosion in the heat exchanger and damage in molded synthetic resin parts.
- (g) Do not place adjacent to equipment generating electromagnetic waves or high-frequency waves such as in hospitals, Generated noise may cause malfunctioning of the controller.

(2) Installation

<Delivery>

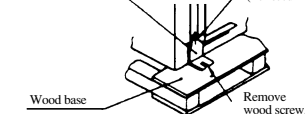
- When delivering the package, move the package to the installation as close as possible.
- When it is unpacked and then moved to the installation place, sufficient care must be taken not to damage the unit during transfer.

(Packing hardware)

Four pieces of packing hardware are used.

Discard them after unpacking.

Packing hardware (4 pcs.) After removing the hardware, retighten the screws.
(For securing of duct flange)



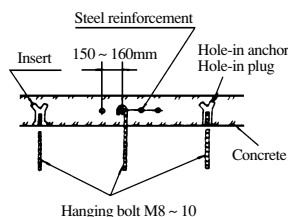
<Adjustment level>



Adjust the piping side a little lower than the opposite side.

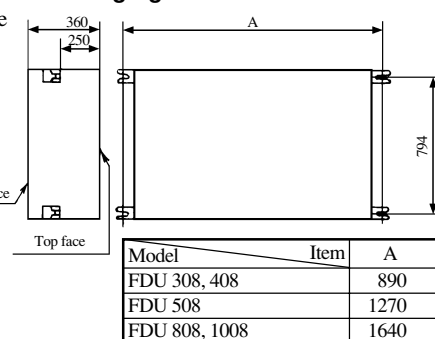
<Securing of Hanging Bolt>

Secure the hanging bolts by either one of following methods.



<Hanging bolt location>

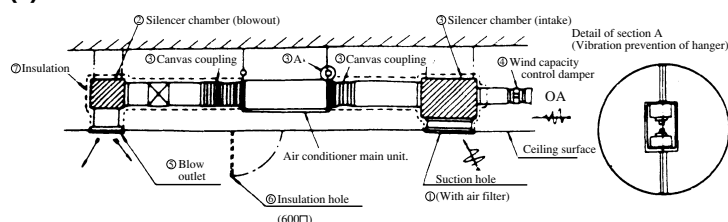
Unit: mm



- To adjust the level, use a level gauge or adjust as shown by the left figure.

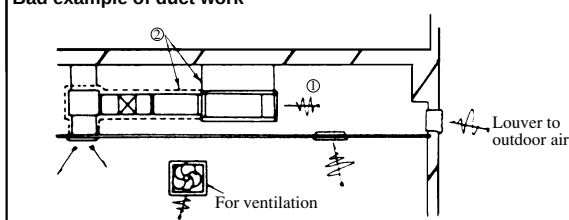
Note: Unless the level is adjusted properly, the float switch may malfunction or operate improperly.

(3) Duct work



- ① Air filter is not installed in the main unit of air conditioner. Air filter should be installed in the suction grill which allows an ample access for cleaning.
- ② Silencer chamber(s) may be necessary depending on the noise level allowed in the room where the air conditioner is installed. Additional silencer may be necessary where a particularly low noise is required. (Provision of silencer is a must at offices and a meeting room.)
- ③ In order not to transmit vibration from the main unit of air conditioner to the ceiling or slab, it is necessary to provide means to prevent vibration, for example, a canvas coupling on the duct or rubber cushion on the main unit of air conditioner.
- ④ A damper to control air volume should be installed on the joint of OA duct to facilitate control of air capacity after the installation.
- ⑤ Location and from of blow outlet should be selected so that air from the outlet will be distributed all over the room, and equipped with a device to control air volume.
- ⑥ Make sure to provide an inspection hole on the ceiling. It is indispensable to service electric equipment, motor, functional components and cleaning of heat exchanger.
- ⑦ Make sure to insulate the duct to prevent dewing on it. Thickness of insulating material is 65 mm minimum.

Bad example of duct work



- ① If a duct is not provided at the suction side but it is substituted with the space over the ceiling, humidity in the space will increase by the influence of capacity of ventilation fan, strength of wind blowing against the outdoor air louver, weather (rainy day) and others.
 - a) Moisture in air is likely to condense over the external plates of the unit and to drip on the ceiling. Unit should be operated under the conditions as listed in the above table and within the limitation of wind volume. When the building is a concrete structure, especially immediately after the construction, humidity tends to rise even if the space over the ceiling is not substituted in place of a duct.

In such occasion, it is necessary to insulate the entire unit with glass wool (25 mm).

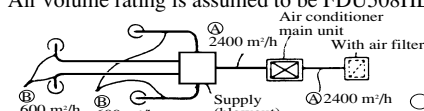
(Use a wire net or equivalent to hold the glass wool in place.)

- b) It may run out the allowable limit of unit operation (Example: When outdoor air temperature is 35°CDB, suction air temperature is 27°CWB) and it could result in such troubles as compressor overload, etc.
- c) There is a possibility that the blow air volume may exceed the allowable range of operation due to the capacity of ventilation fan or strength of wind blowing against external air louver so that drainage from the heat exchanger may fail to reach the drain pan but leak outside (e.g. drip onto the ceiling) with consequential water leakage in the room.
- ② Unless vibration isolation is provided between the unit and duct and between the unit and the slab, vibration will be transmitted to the duct so that vibration noise may generate from between the ceiling and blow outlet or vibration may be transmitted to the slab. Make sure to provide an effective vibration prevention means.

<Simplified method for determination of duct dimensions>

In the following method, it is assumed that the friction resistance per unit length of duct is 1 Pa/m (0.1 mm Aq/m) and a side of duct is 250 mm.

Air volume rating is assumed to be FDU508HES-SA, 60 Hz.



○ Calculation of duct resistance
(Use following simplified calculations.)

	Air volume	Duct (mm × mm)
Section A	2400m³/h (40m³/min)	250 × 560
Section B	600m³/h (10m³/min)	250 × 190

Linear pipe section	Calculate based on 1 Pa (0.1 mm Aq) per 1 m in length 1 Pa/m (0.1 mm Aq/m).
Curved pipe section	Take a curved section as equivalent to 3 ~4 m in straight line.
Blowout section	Calculate based on 25 Pa (2.5 mm Aq).
Chamber	Calculate by taking 1 pc. as 50Pa (5 mm Aq).
Suction grill (with filter)	Calculate by taking 1 pc. as 40Pa (4 mm Aq).

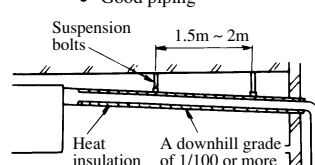
<Table of simplified selection of duct dimensions>

Air volume	Item	Square duct	
		Dimensions	
m³/h(m³/min)		(mm × mm)	
100		250 × 60	
200		250 × 90	
300		250 × 120	
400		250 × 140	
500		250 × 170	
600(10)		250 × 190	
800		250 × 230	
1,000		250 × 270	
1,200(20)		250 × 310	
1,400		250 × 350	
1,600		250 × 390	
1,800(30)		250 × 430	
2,000		250 × 470	
2,400		250 × 560	
3,000(50)		250 × 650	
3,500		250 × 740	
4,000		250 × 830	
4,500		250 × 920	
5,000		250 × 1000	
5,500		250 × 1090	
6,000(100)		250 × 1180	

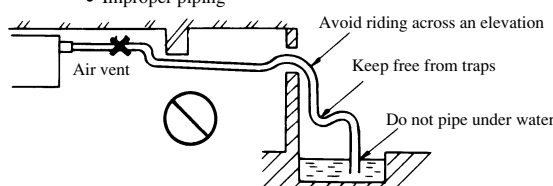
(4) Drain Piping

- (a) Drain piping should always be in a downhill grade (1/50~1/100) and avoid riding across an elevation or making traps.

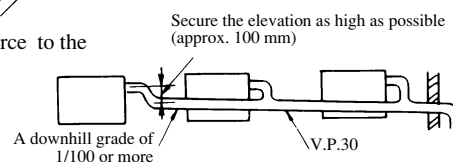
- Good piping



- Improper piping

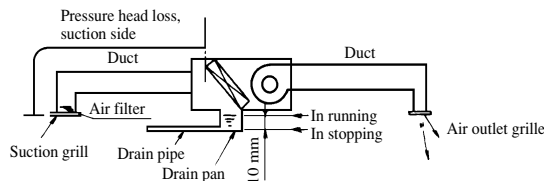


- (b) When connecting the drain pipe to unit, pay sufficient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.
- (c) For drain pipe, use hard PVC general purpose pipe VP-25(1.D.1") which can be purchased locally.



- (d) When constructing drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch. Use VP-30 (1 1/4") or thicker pipe this purpose.
- (e) Be sure to provide heat insulation to hard PVC pipes of indoor placement.
- (f) Do not ever provide an air vent.
- (g) Avoid positioning the drain piping outlet at a place where generation of odor may be stimulated. Do not lead the drain piping direct into a sewer from where sulfur gas may generate.

If the duct is connected and then the blower is operated, inside air pressure will become negative compared with the atmospheric pressure.

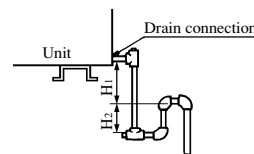


Example: If the pressure loss at the suction side, such as the suction grill, air filter and duct, is 100 Pa (100 mm Aq), the level of drain water will rise approx. 10 mm higher than the state of operation stop.

<Provision of trap>

Since the drain outlet is disposed at a position that makes the pressure negative, it is necessary to provide a trap (during the piping work) in order to prevent water leakage due to rising of water level in the drain pan.

Trap must be so constructed to facilitate cleaning. It should be better to employ a "T" joint as shown below. In addition, the height of trap should be as specified below. The trap should be provided close to the unit.

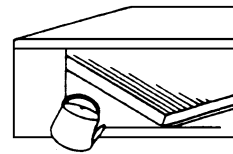


- Provide a trap on way of the drain pipe as shown at left.
- $H_1 = 100 \text{ mm}$ or static pressure of blower
- $H_2 = 1/2 H_1$ or 50 ~ 100 mm

(5) Drain Test

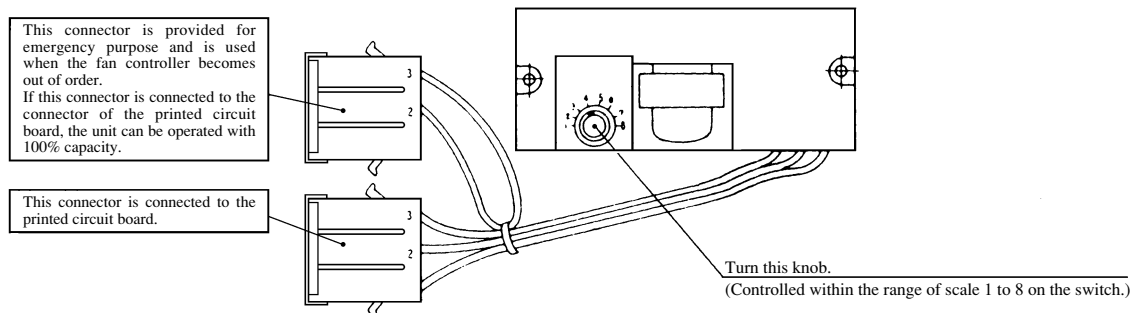
When the drain piping work is over, inject water to inspect if the piping is arranged properly or not.

- Remove the side panel and supply gradually 1,000 cc of water to see if water is drained smoothly or not. Check also for water leakage.



(6) Operating method of fan controller

- This unit allows to continuously adjust the air volume with the fan controller switch which is built the electric equipment box. It is not necessary to control the air volume (outside unit static pressure adjustment) with the damper, etc. at the duct side. Select the point of operation so that it will be within the range of air volume withch can be operated. (Refer to the limitation of air capacity as shown below.)
- Location of the fan controller in the electric equipment box and the operating method are shown below. Refer in advance to the blower characteristics quoted in the separate engineering data, and select the number on the scale of fan controller switch. Referring to the figure below, adjust the number on the scale of fan controller switch at the number selected during the test run after completion of electrical work and check if the intended air volume is obtained or not.



15.5.2 Installation of remote controller

This is same as FDT(N) heat pump series, Refer to page 337.

15.5.3 Installation of outdoor unit

This is same as FDT(N) heat pump series, Refer to page 338.

15.6 MAINTENANCE DATA

This is same as FDT(N) heat pump series, Refer to page 348.