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

(Split system, Air to air heat pump type)

FDU308HEN-SB
308HES-SB
408HES-SB
508HES-SB
808HES-SB

CONTENTS

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 cabtyre 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.

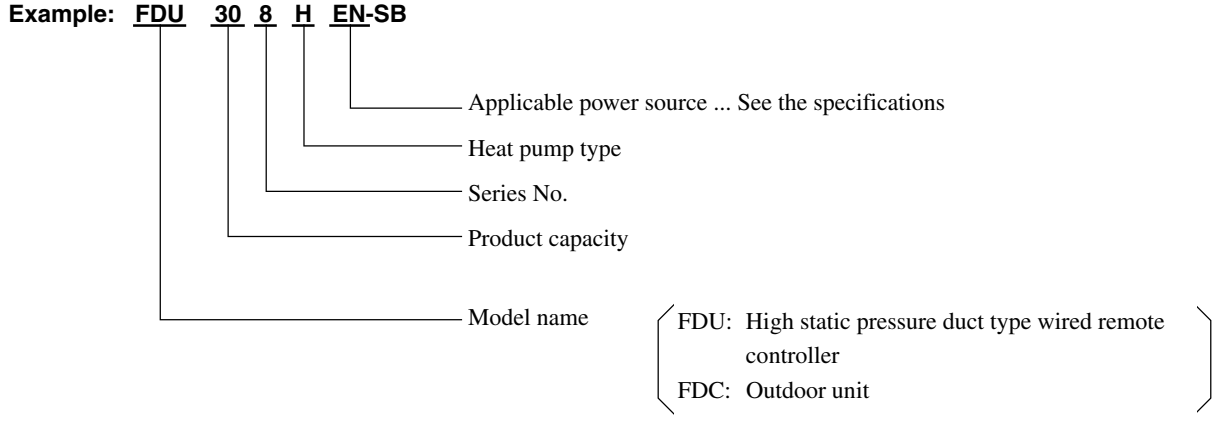
(4) All models have control valves protruding from the outdoor unit for faster flare connection work in the field.

(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



15.2 SELECTION DATA

15.2.1 Specifications

Model FDU308HEN-SB

Item		Model	FDU308HEN-SB	
			FDU308-A	FDC308HEN3B
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**	–	**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	**Standard: 100, Max: 200**	–
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 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)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit.	
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˚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.
ISO-T1 "UNITARY AIR-CONDITIONERS"

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

Model FDU308HES-SB

Item		Model	FDU308HES-SB	
			FDU308-A	FDC308HES3B
Nominal cooling capacity(1)		W	**7100**	
Nominal heating capacity(1)		W	**8000**	
Power source			**3 Phase, 380/415V 50Hz**	
Operation data(3)	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)	%	8.1/7.2	
	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**	–	**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	**Standard: 100, Max 200**	–
	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 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)	–
Insulation for piping			Necessary (both Liquid & Gas lines)	
Accessories			Mounting kit.	
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˚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.
ISO-T1 "UNITARY AIR-CONDITIONERS"

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

Model FDU408HES-SB

Item		Model	FDU408HES-SB	
			FDU408-A	FDC408HES3B
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**	–	**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	**Standard: 100, Max 200**	–
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 Refrigerant piping size		**mm (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 / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
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.
ISO-T1 "UNITARY AIR-CONDITIONERS"

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

Model FDU508HES-SB

Item		Model	FDU508HES-SB	
			FDU508-A	FDC508HES3B
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**	–	**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	**Standard: 100, Max 200**	–
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 Refrigerant piping size		**mm (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 / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
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.
ISO-T1 "UNITARY AIR-CONDITIONERS"

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

Model FDU808HES-SB

Item		Model	FDU808HES-SB	
			FDU808-A	FDC808HES3B
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 Height × Width × Depth		**mm**	**360 × 1570 × 830**	**1450 × 1350 × 600**
Net weight		**kg**	**92**	**185**
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**	–	**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	**Standard: 100, Max: 200**	–
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: ϕ12.7 (1/2″) Gas line: ϕ25.4 (1″)**	
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 / Operation	Indoor air temperature DB	Indoor air temperature WB	Outdoor air temperature DB	Outdoor air temperature WB	Standards
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.
ISO-T1 "UNITARY AIR-CONDITIONERS"

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

15.2.2 Range of usage & limitations

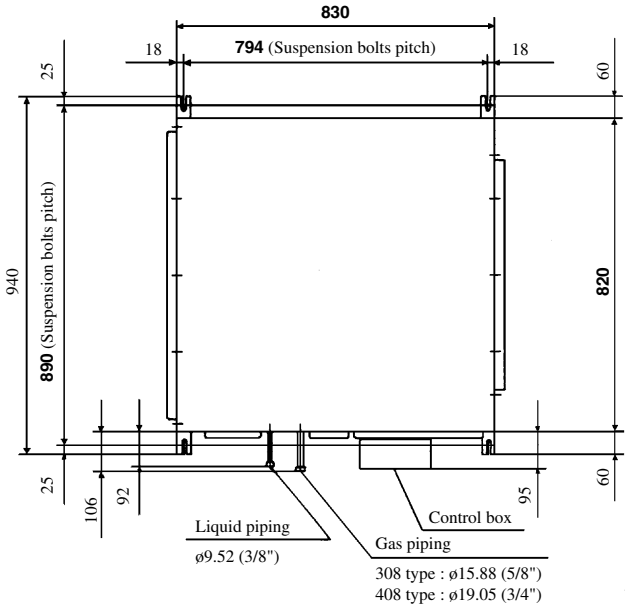
Item \ Models	All models
Indoor return air temperature (Upper, lower limits)	Refer to the selection chart
Outdoor air temperature (Upper, lower limits)	
Indoor unit atmosphere (behind ceiling) temperature and humidity	Dew point temperature: 28˚C or less, relative humidity: 80% or less
Refrigerant line (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 ± 10%
Voltage at starting	Min. 85% of rating
Frequency of ON-OFF cycle	Max. 10 times/h
ON and OFF interval	Max. 3 minutes

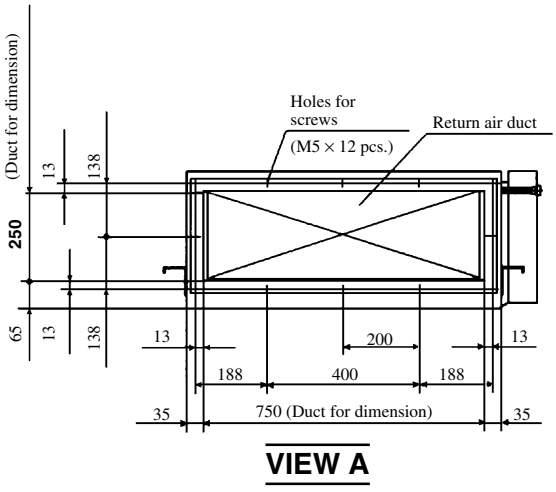
15.2.3 Exterior dimensions

(1) Indoor unit

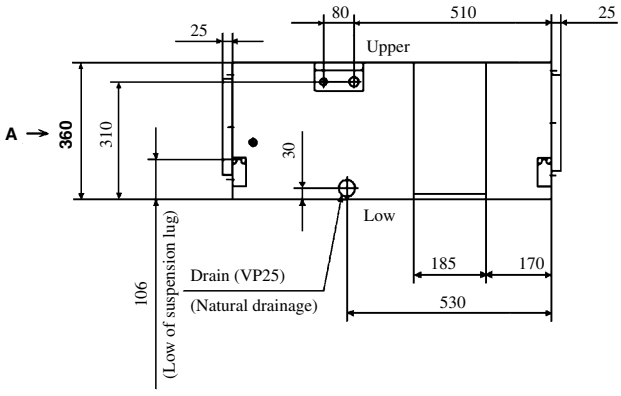
Models FDU308-A, 408-A

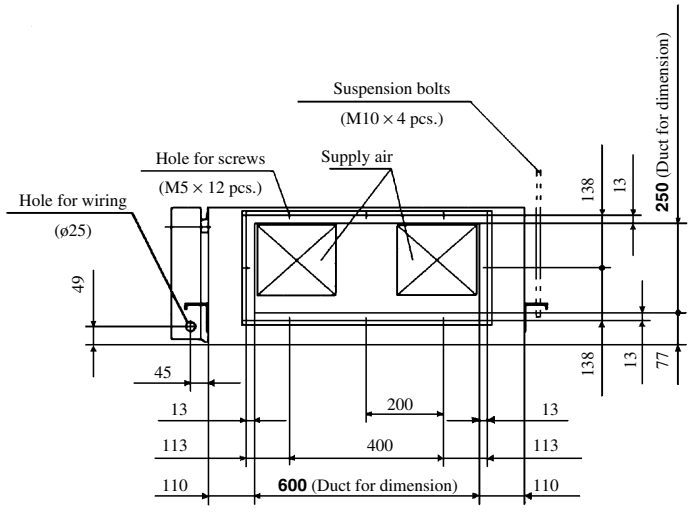
Unit : mm



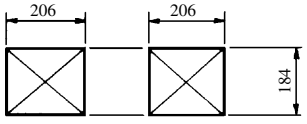


VIEW A

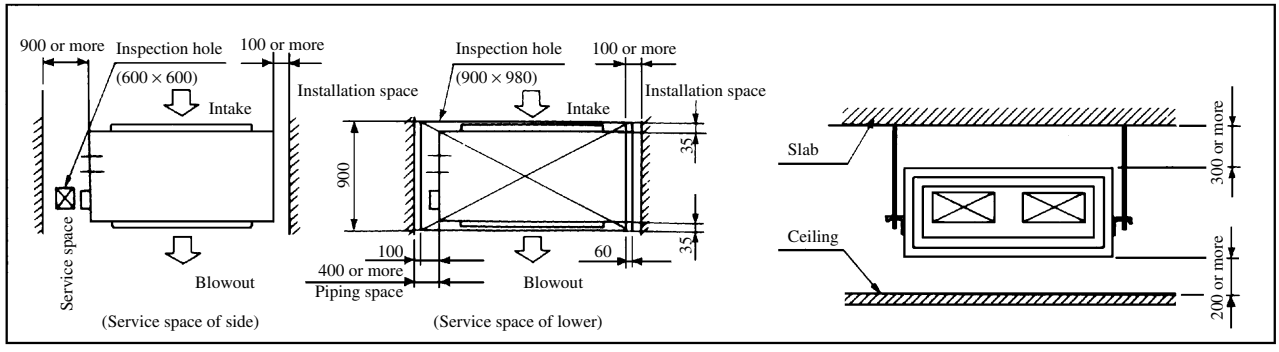




Dimension for supply air

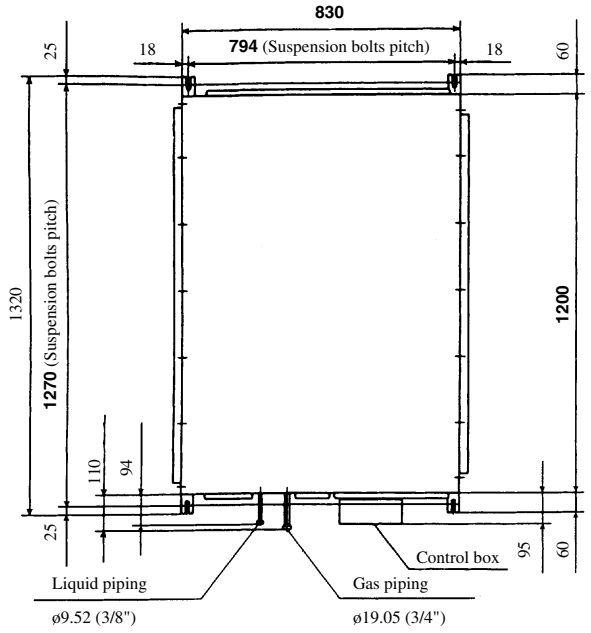


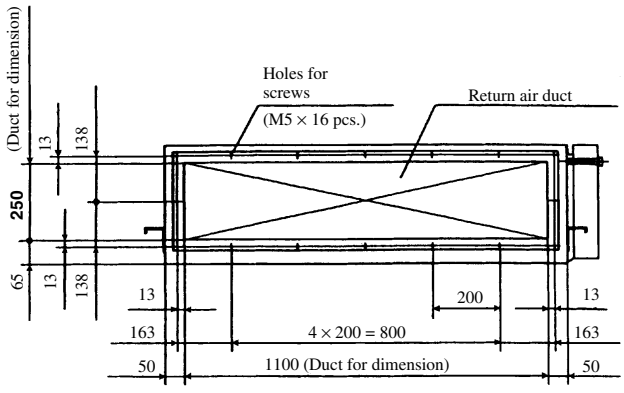
Space for installation and service



Model FDU508-A

Unit : mm





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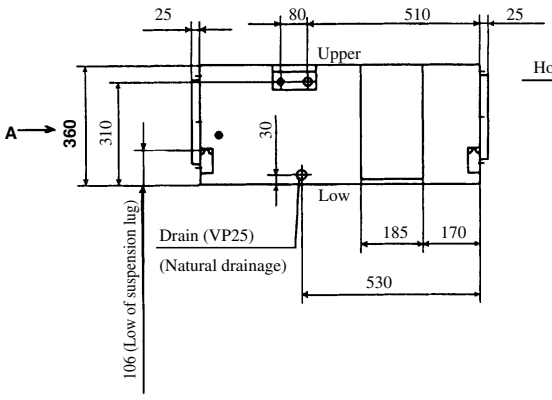
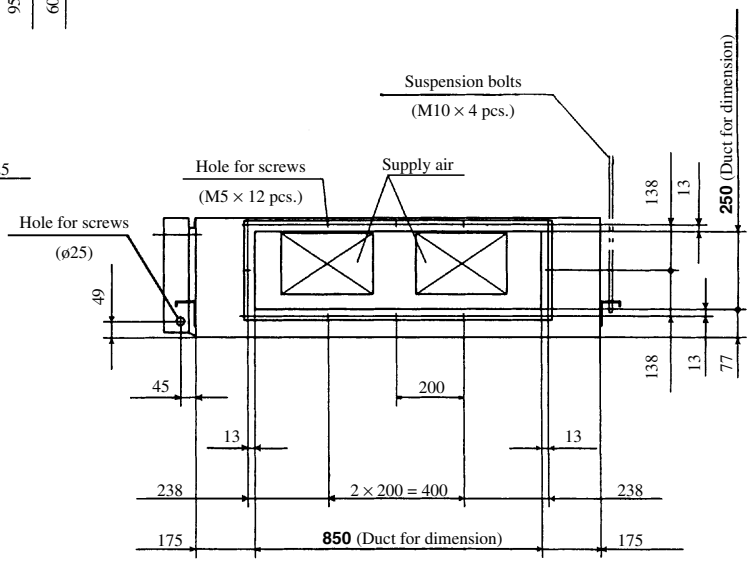
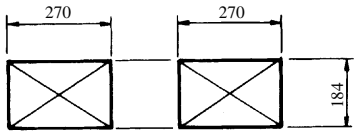
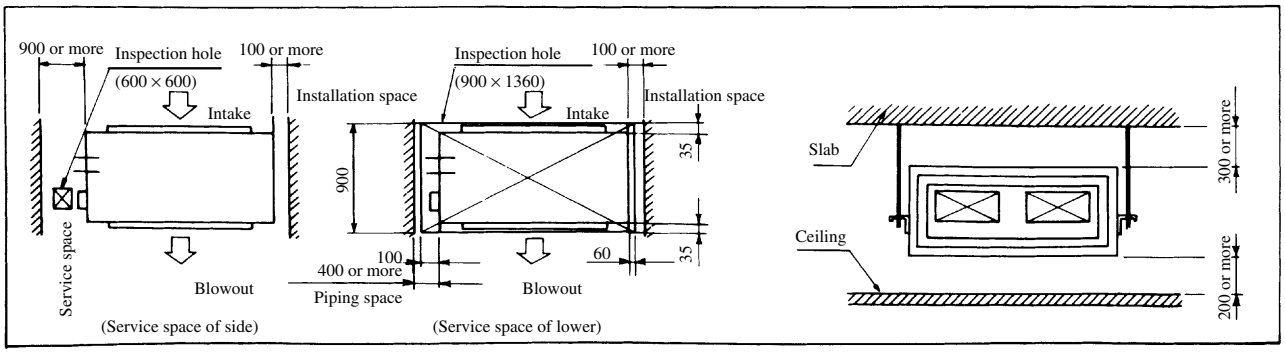




Dimension for supply air

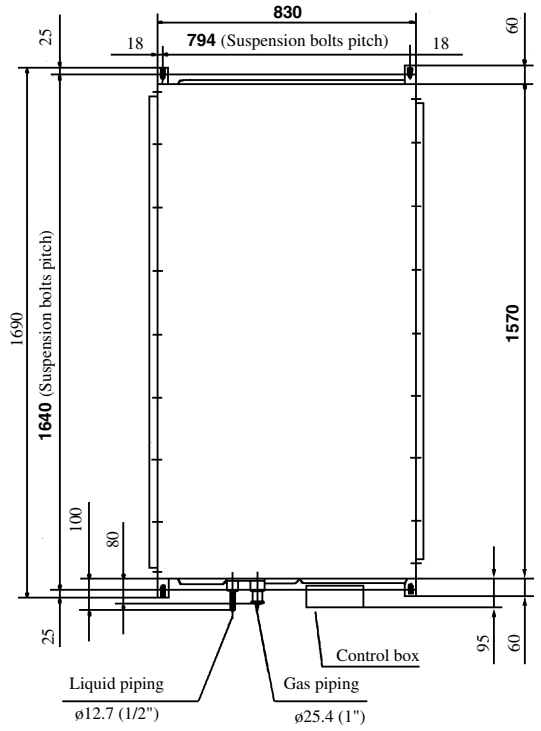


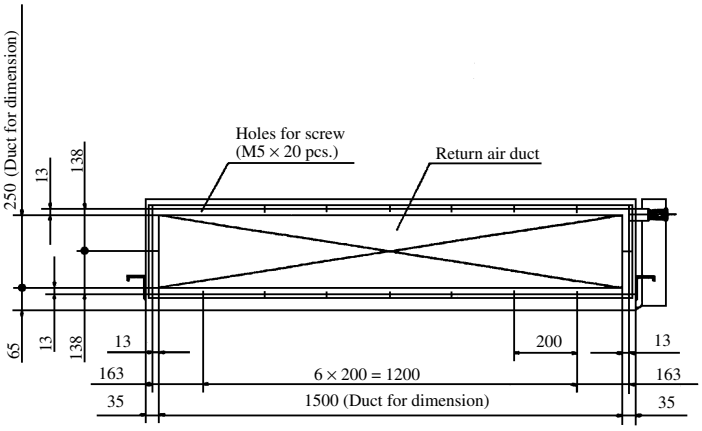
Space for installation and service

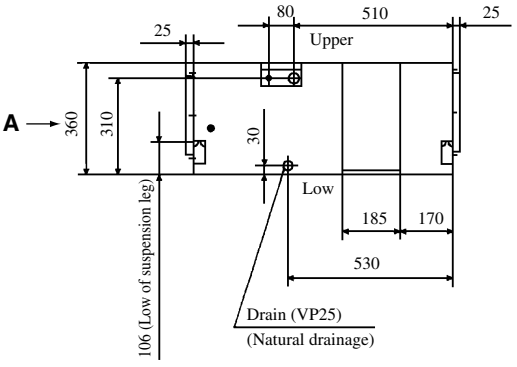


Model FDU808-A

Unit : mm







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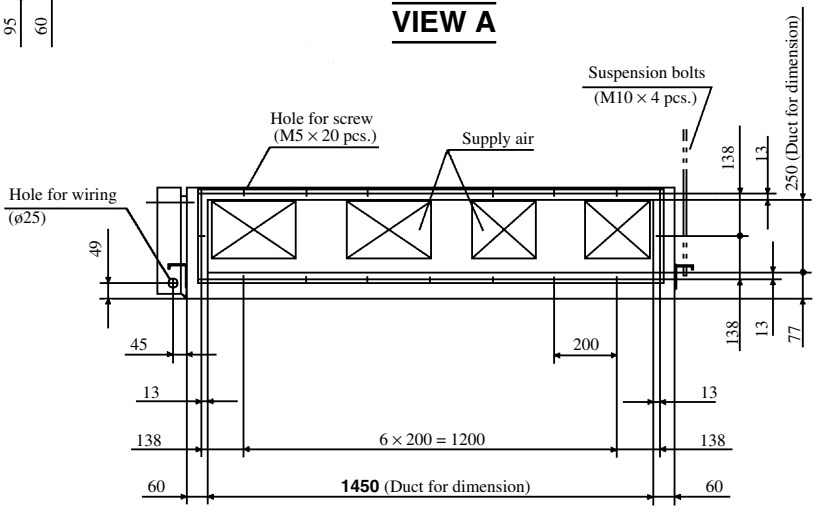
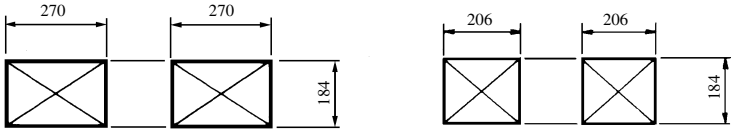
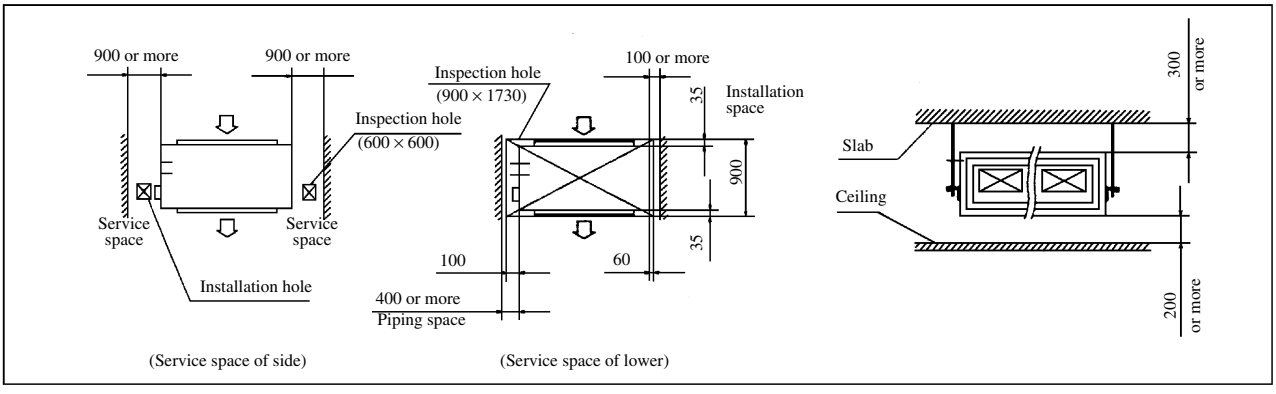


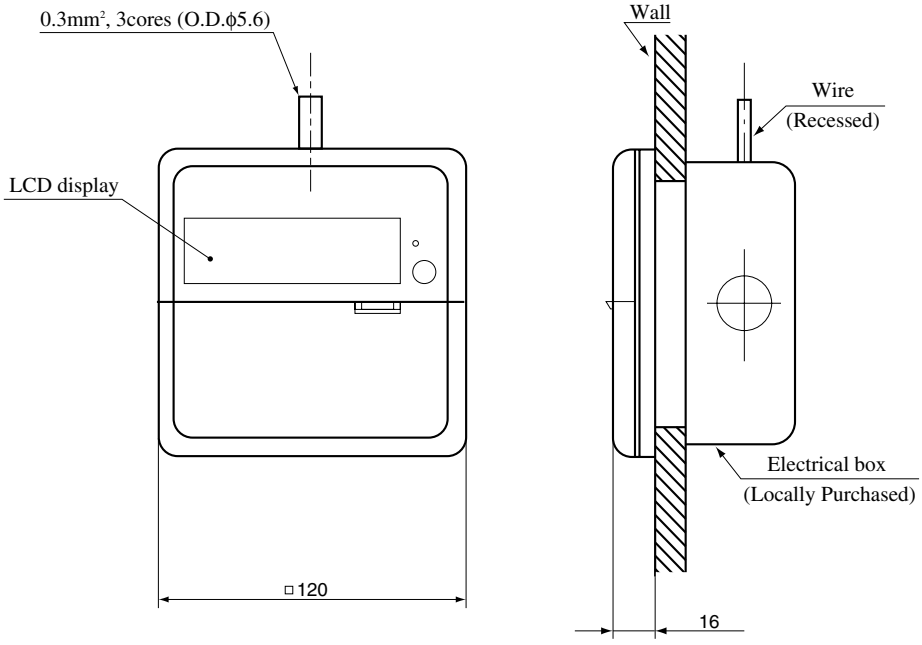
Dimension for supply air



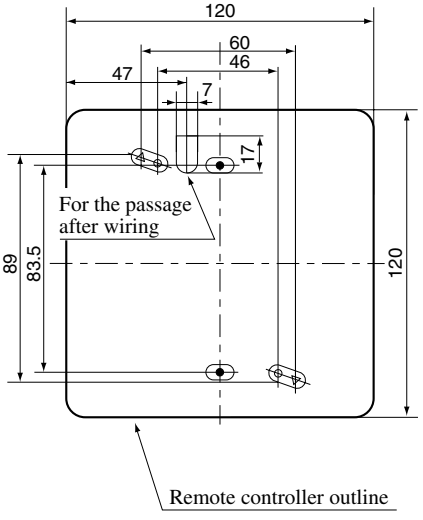
Space for installation and service



(2) Remote controller (Optional parts)



Remote controller mounting dimensions



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

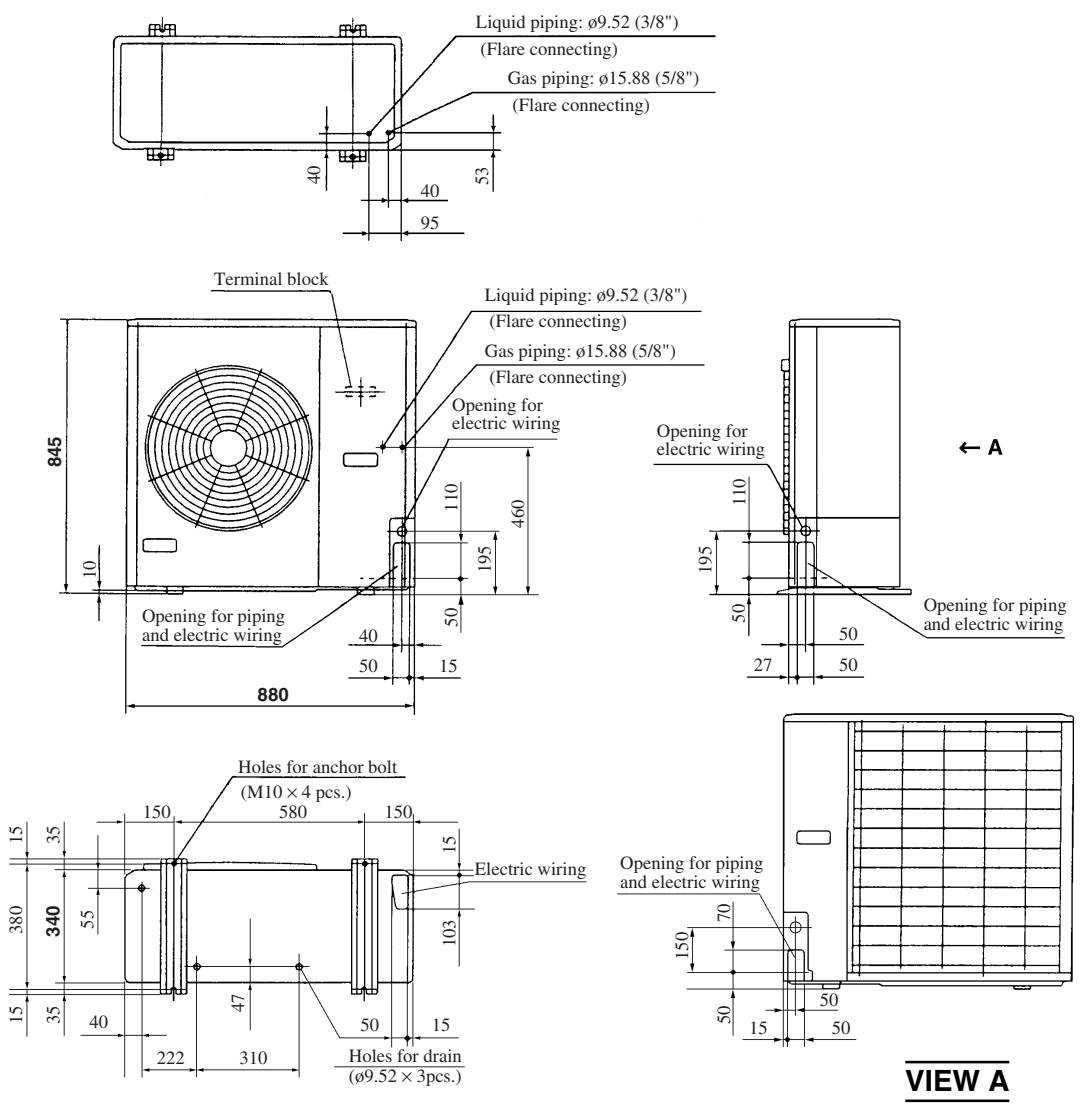
Allowable rang of wire thickness and length

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

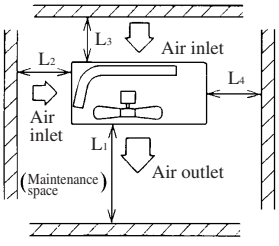
(3) Outdoor unit

Models FDC308HEN3B, 308HES3B

Unit: mm



Required space for maintenance and air flow



Minimum allowable space to the obstacles

Unit:mm

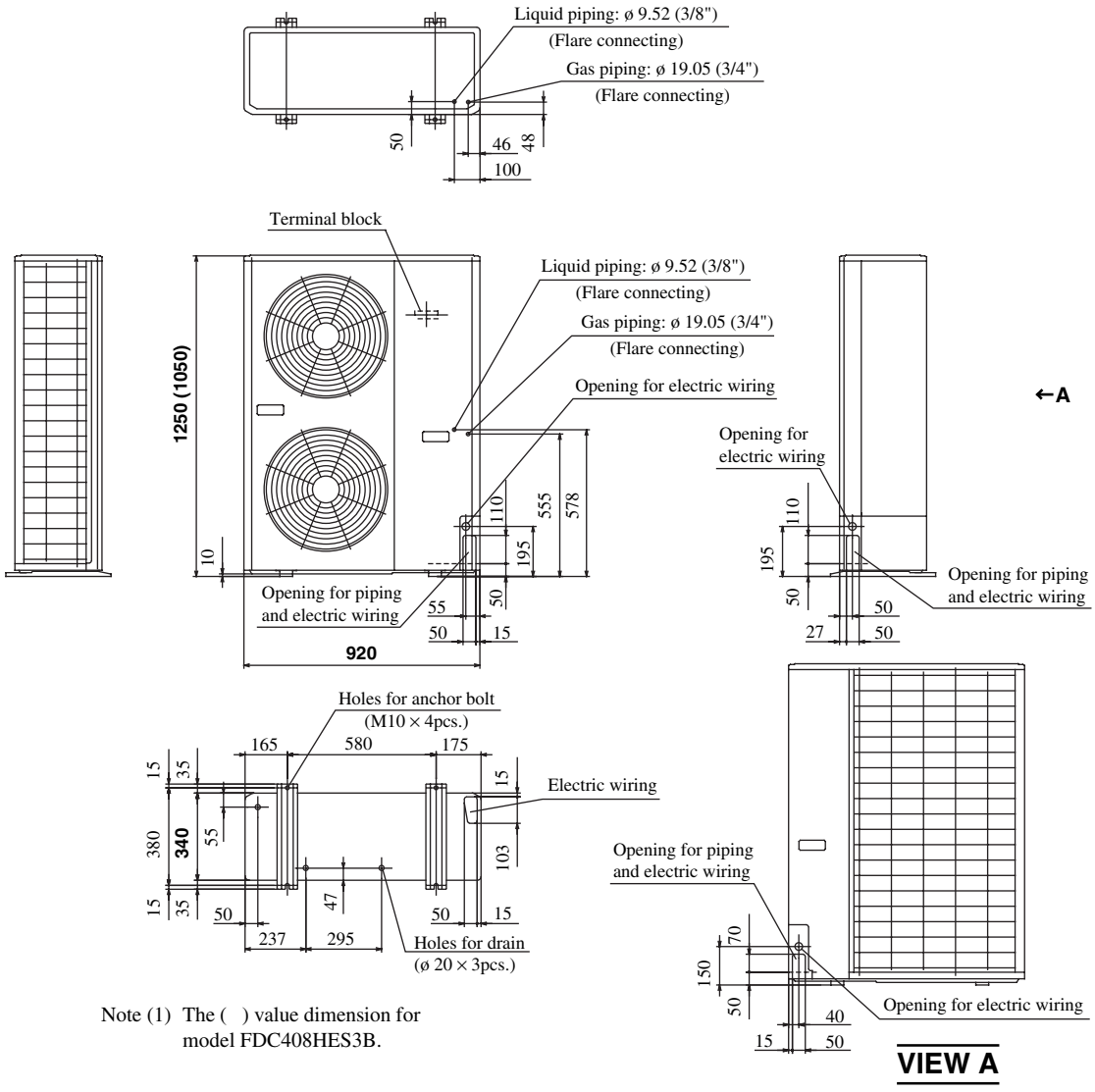
Mark \ Installation type	Ⅰ	Ⅱ	Ⅲ
L_1	Open	Open	500
L_2	300	5	Open
L_3	100	150	100
L_4	5	5	5

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.

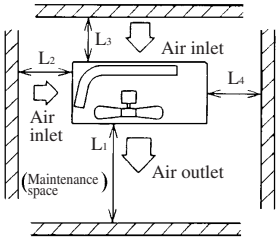
Models FDC408HES3B, 508HES3B

Unit: mm



Note (1) The ( ) value dimension for model FDC408HES3B.

Required space for maintenance and air flow



Minimum allowable space to the obstacles

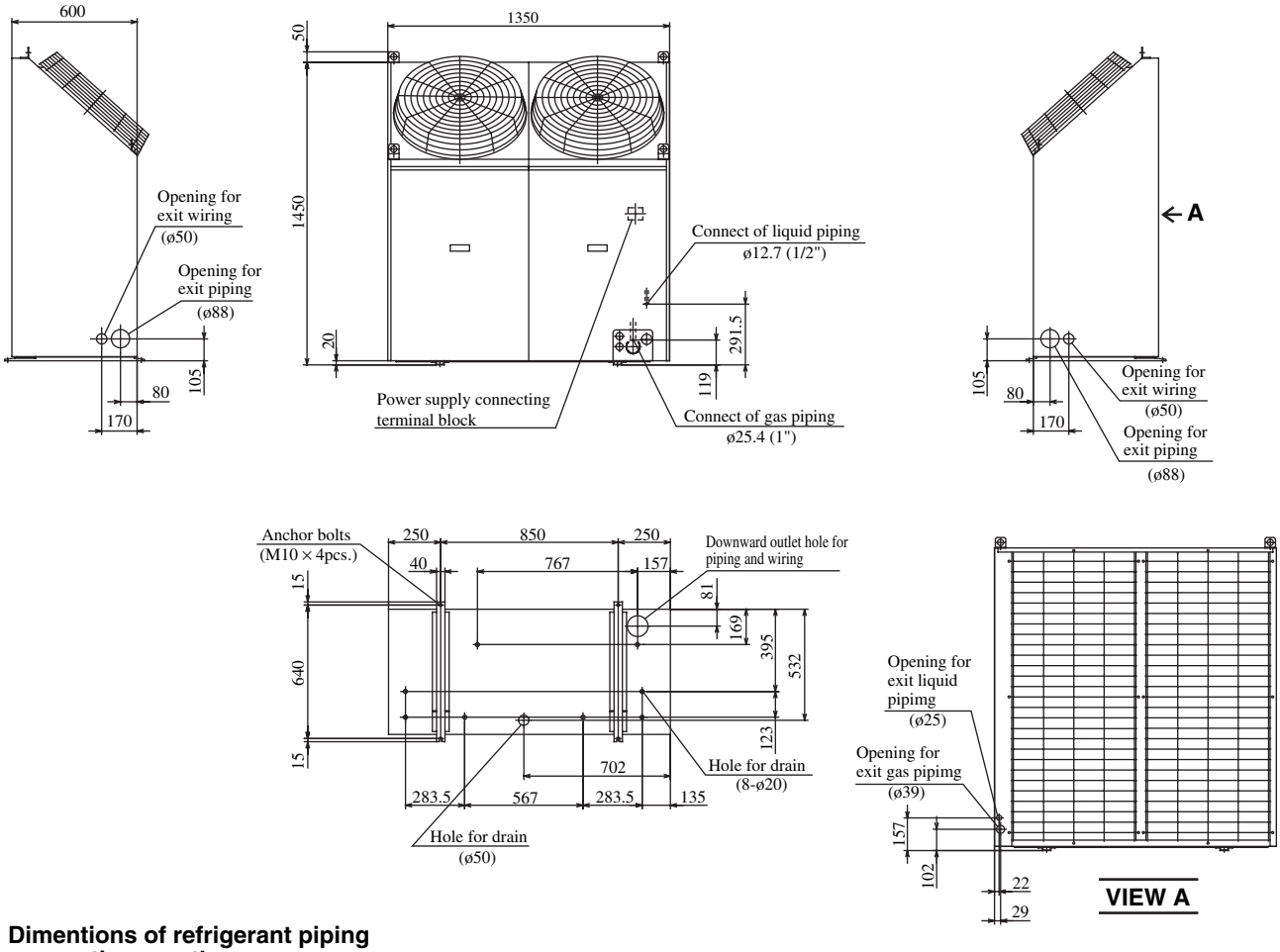
Unit:mm

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

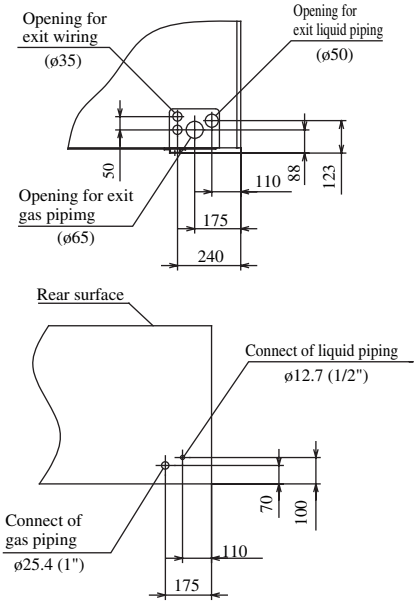
Notes
(1) Avoid the location where four sides are entirely surrounded by walls.
(2) Fix the unit by anchor bolts without fail. Restrict the protrusion length of anchor bolt to 15 mm and under.
(3) When strong wind blows against the unit, direct the discharge port at a right angle to the wind direction.
(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.

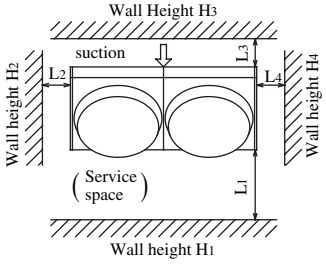
Model FDC808HES3B

Unit: mm



Dimentions of refrigerant piping connecting mouth (Front)





Unit:mm

Dimensions \ Installation example	I	II	III
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

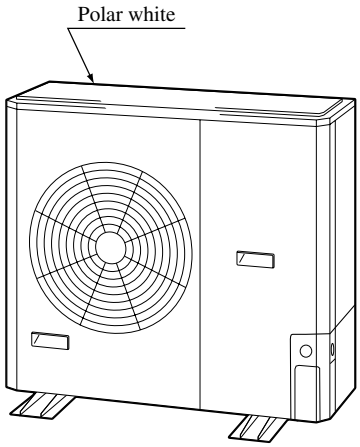
Notes (1) Make sure to secure the unit with anchor bolts.
(2) When the strong wind blows, place the unit so that discharge outlet faces the wind direction with right angle.
(3) Make sure to allow the space of 1 m or more above the unit.
(4) Connect the refrigerant piping (both gas side and liquid side) 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.

15.2.4 Exterior appearance

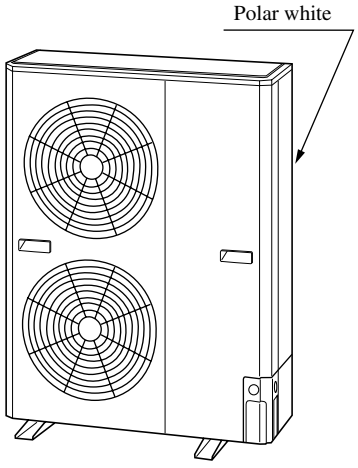
(1) Indoor unit ..... Zinc steel plate

(2) Outdoor unit

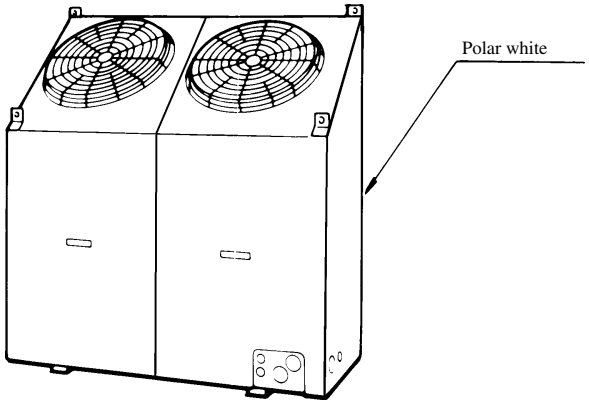
Models FDC308HEN3B, 308HES3B



Models FDC408HES3B, 508HES3B

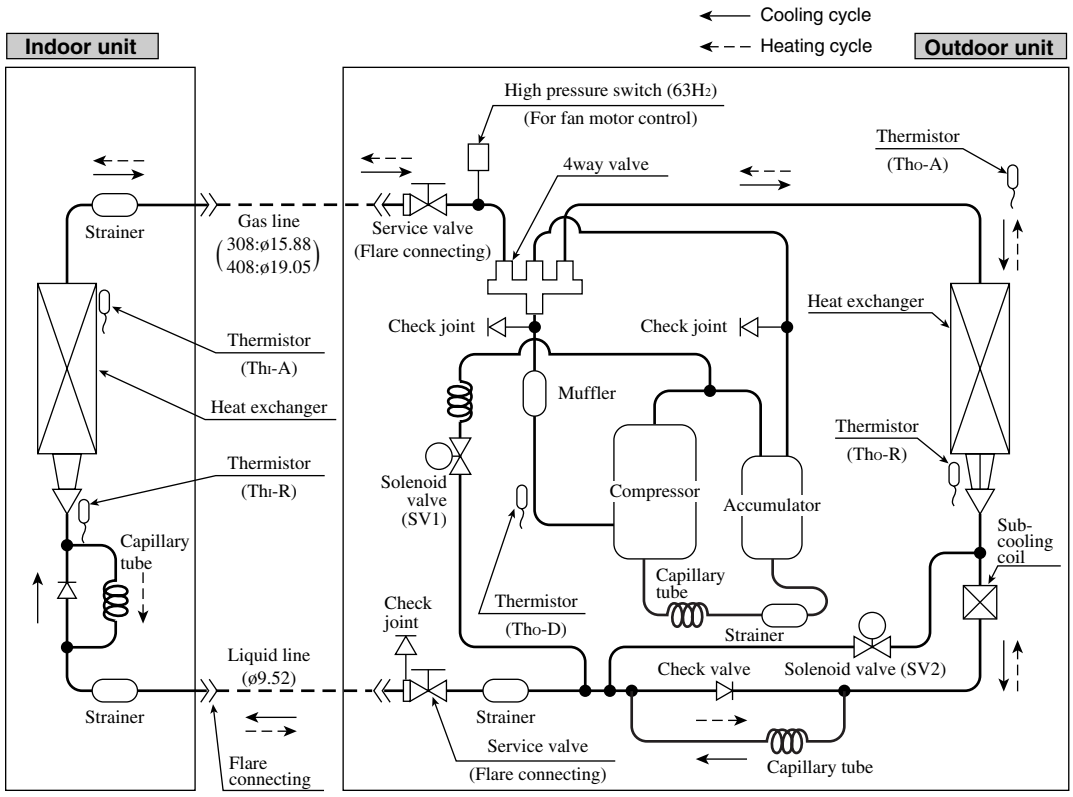


Model FDC808HES3B

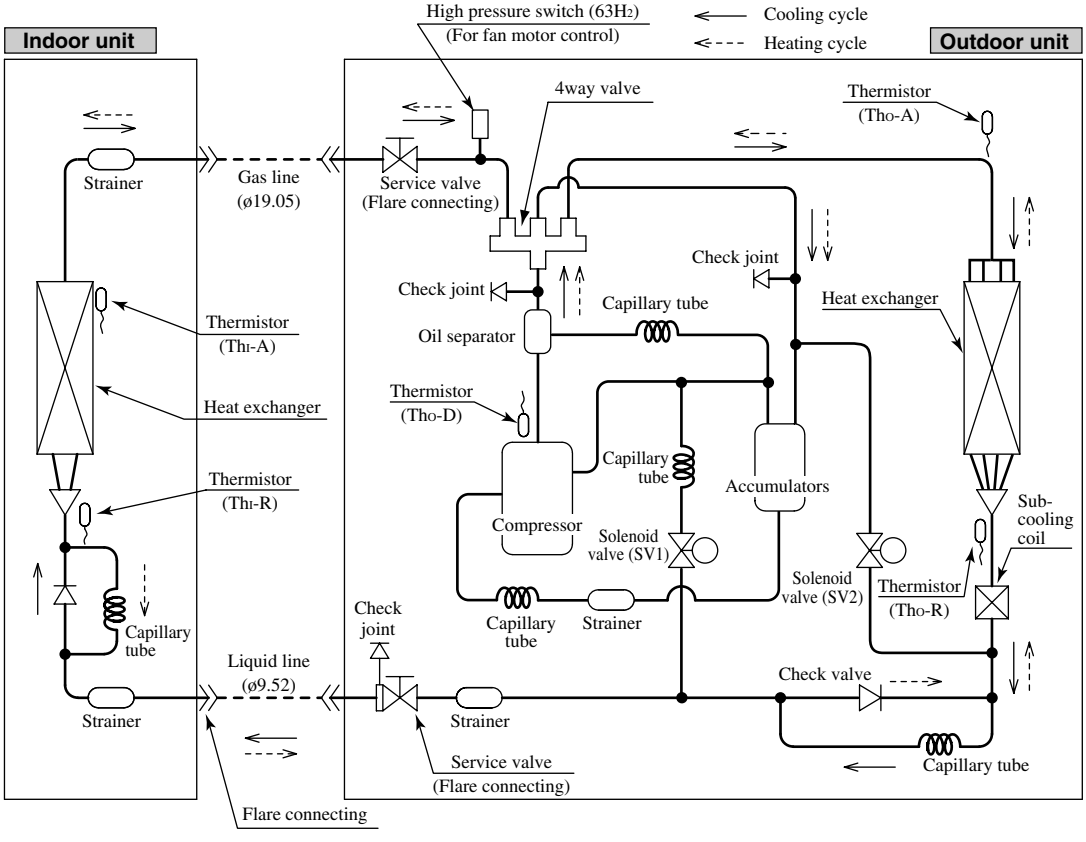


15.2.5 Piping system

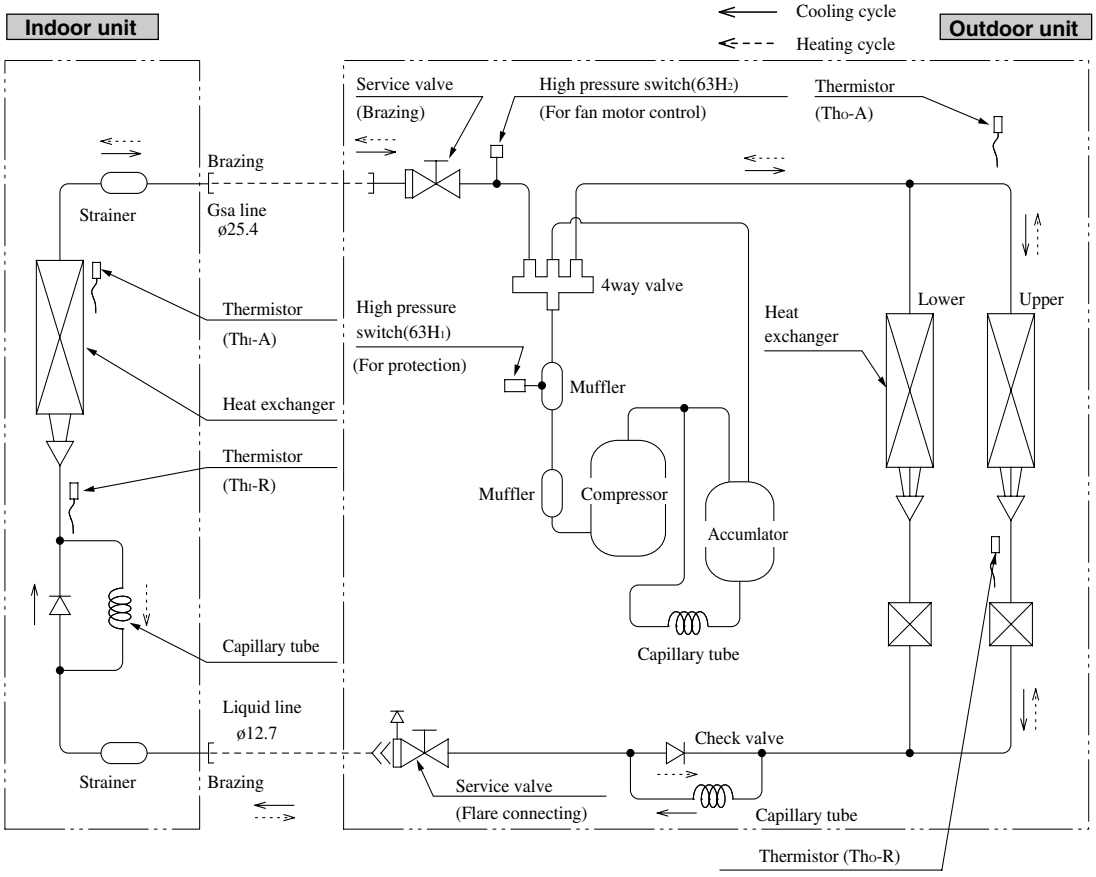
Models FDU308HEN-SB, 308HES-SB, 408HES-SB



Model FDU508HES-SB



Model FDU808HES-SB



Preset point of the protective devices

Parts name	Mark	Equipped unit	FDU308~508	FDU808
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 dis-charge 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 FM0)	**63H2**	Outdoor unit	OFF 2.50MPa ON 2.06MPa	OFF 2.41MPa ON 1.86MPa
High pressure switch (for protection)	**63H1**	Outdoor unit	————	OFF 2.75MPa ON 2.16MPa

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

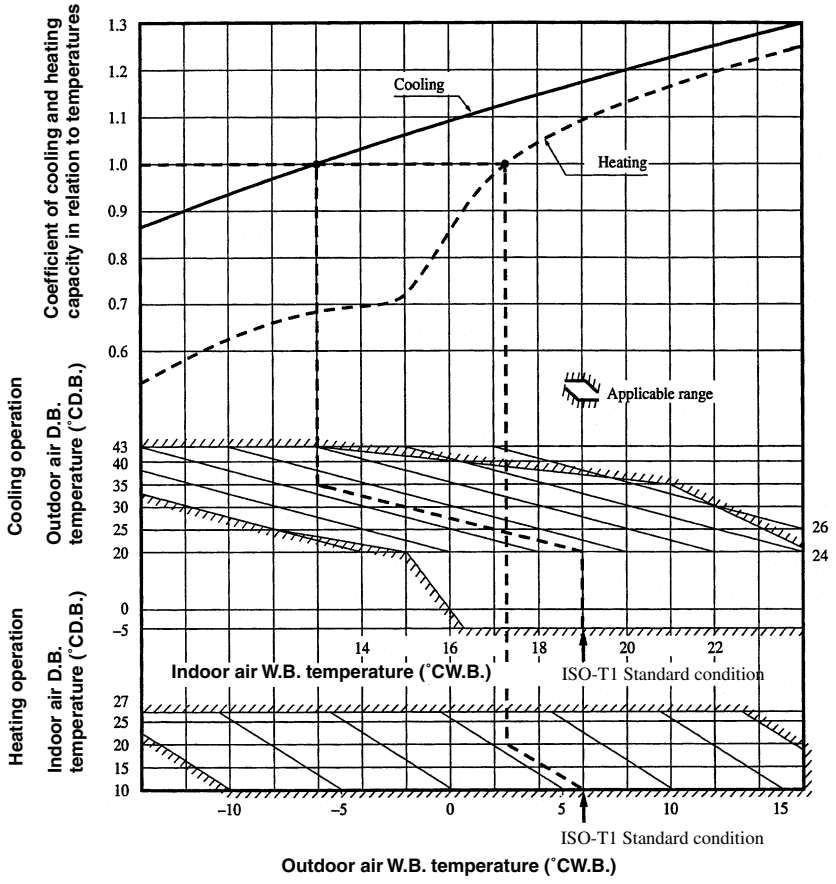


Table of bypass factor

Item \ Model		FDU 308	FDU 408	FDU 508	FDU 808
Air flow	Upper limit	0.019	0.048	0.103	0.040
	Standard	0.067	0.032	0.076	0.025
	Lower limit	0.043	0.017	0.051	0.013

(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.

Equivalent piping length(1) m		7.5	10	15	20	25	30	35	40	45	50	55
Heating		1.0	1.0	1.0	1.0	1.0	0.998	0.998	0.993	0.993	0.988	0.988
Cooling	FDU308	1.0	0.995	0.985	0.975	0.965	0.955	0.945	0.935	0.925	0.915	0.905
	FDU408	1.0	0.998	0.990	0.985	0.975	0.970	0.960	0.955	0.945	0.940	0.930
	FDU508	1.0	0.995	0.980	0.970	0.955	0.945	0.930	0.920	0.905	0.895	0.880
	FDU808	1.0	0.995	0.985	0.975	0.965	0.955	0.945	0.935	0.925	0.915	0.905

Note (1) Equivalent piping length can be obtained by calculating as follows.
308 series [ϕ15.88(5/8″)]: Equivalent piping length = Real piping length + (0.10 × Number or bends in piping)
408, 508 series [ϕ19.05(3/4″)]: Equivalent piping length = Real piping length + (0.15 × Number of bends in piping)
808 series [ϕ25.4(1″)]: Equivalent piping length = Real piping length + (0.15 × 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

Item \ Model	All models
Max. one way piping length	50m
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 FDU308HEN-SB 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

$$\text{Net cooling capacity} = \underset{\text{FDU308HEN-SB}}{7100} \times \underset{\text{Air flow "High"}}{1.00} \times \underset{\substack{\text{Length 15m.}\\ \text{Height difference 5 m}}}{(0.985 - 0.01)} \times \underset{\substack{\text{Factor by air}\\ \text{temperatures}}}{1.0} = 6923 \text{ w}$$

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, it is required to have 138Pa outside static pressure at 23.6m³/min air flow volume as the operation point?

Move the 138Pa 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 23.6m³/min air flow volume upwards, is the appropriate Volume Number. In this example the appropriate Volume Number is "No. 6".

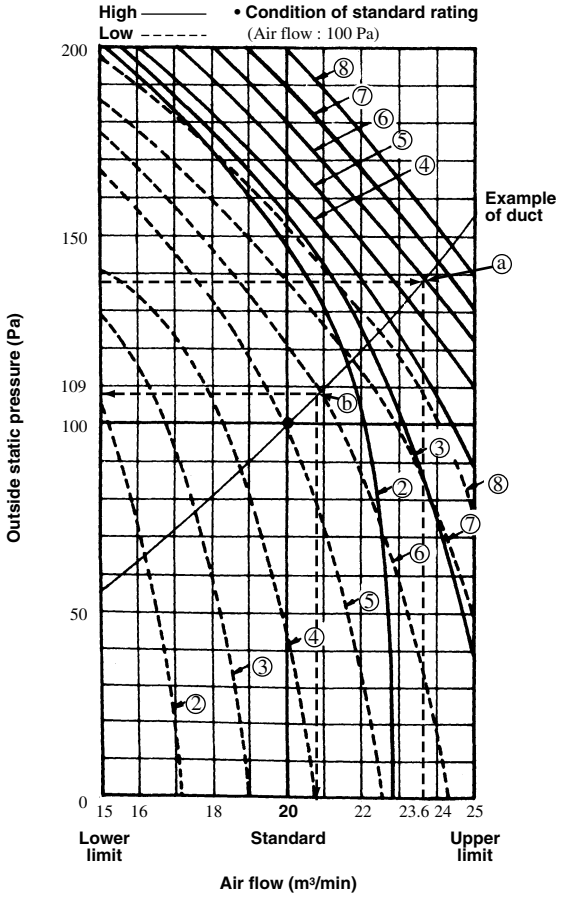
● In this situation, a condition of 20.9m³/min air flow volume at 109Pa outside static pressure can be predicated at Low Tap and it can be concluded that operation is possible.

Always follow the procedure in " b -point" to verify that the condition at Low Tap is not outside the Feasible Operation Air flow Volume Range.

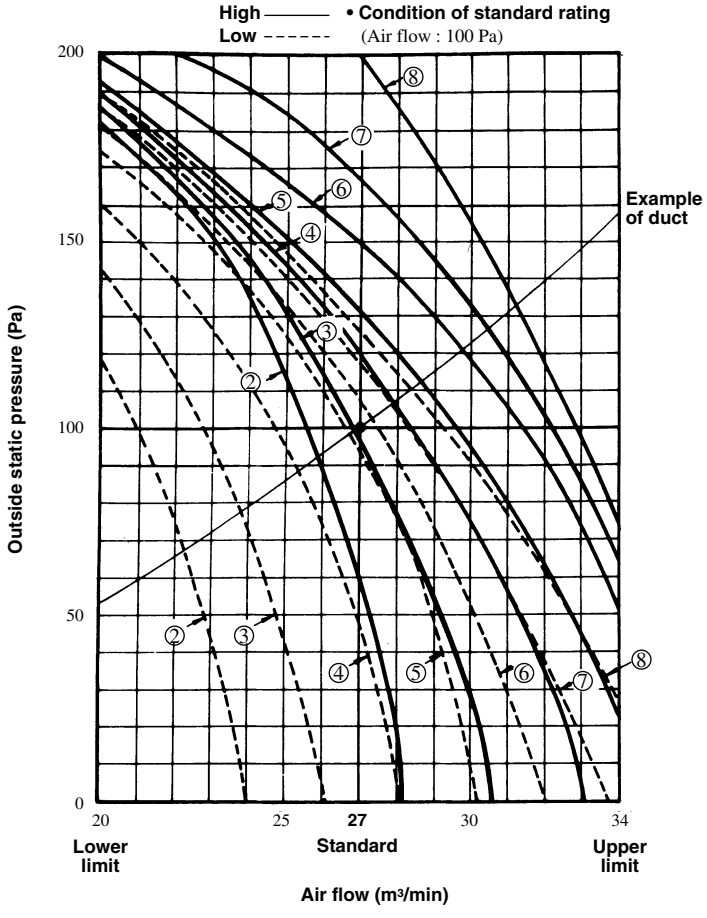
Notes (1) Circled values in the Special Feature Table indicate Fan Controller Volume Numbers. Volume Numbers with no entry are outside the Feasible Operation Air flow Volume Range and therefore operation is not possible.

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

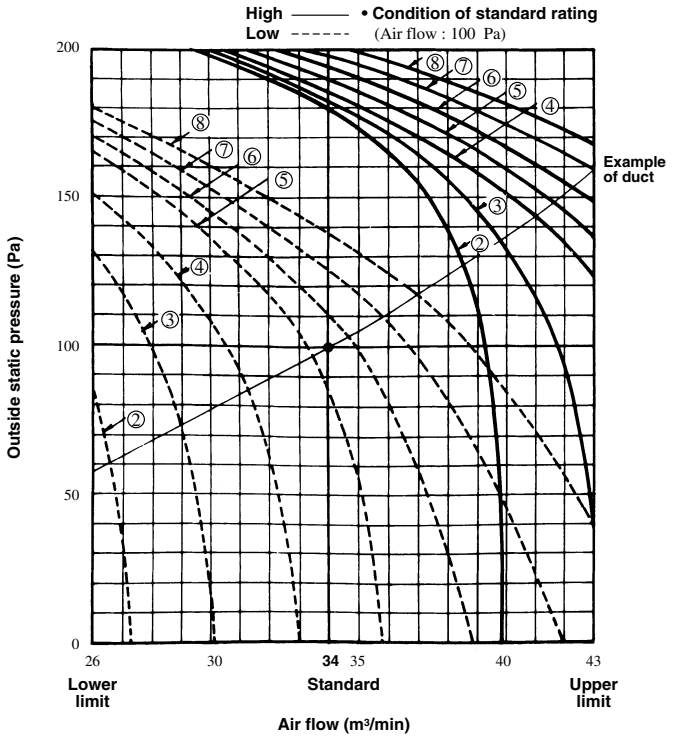
Model FDU308-A



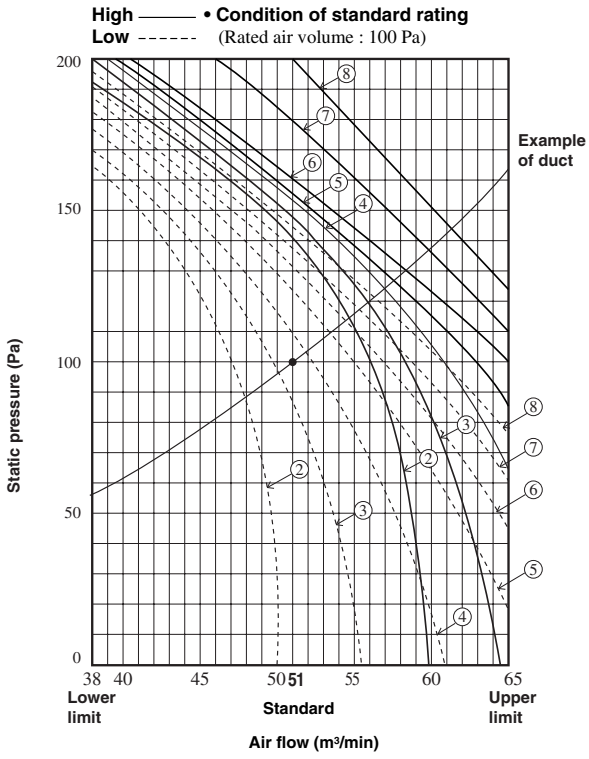
Model FDU408-A



Model FDU508-A



Model FDU808-A



15.2.8 Noise level

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

Ambient air temperature:

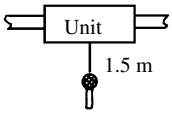
Indoor unit 27°C DB, 19°C WB

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.

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 FDC808 type.

Mike position: Front height is 1 m.

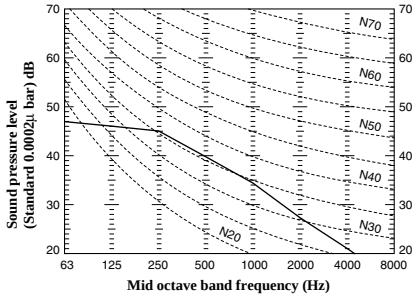
(2) The data in the chart are measured in an unechonic room.

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

(1) Indoor unit

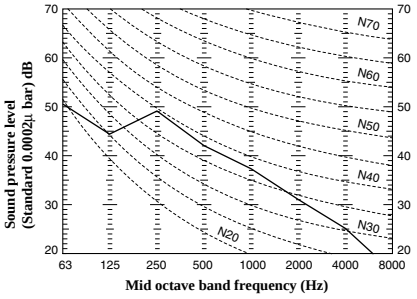
Model FDU308-A

Noise level 41dB (A)



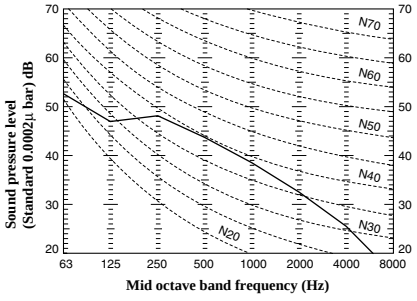
Model FDU408-A

Noise level 44dB (A)



Model FDU508-A

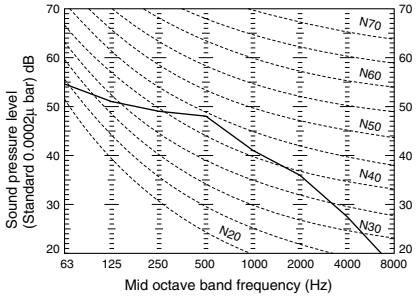
Noise level 45dB (A)



(2) Outdoor unit

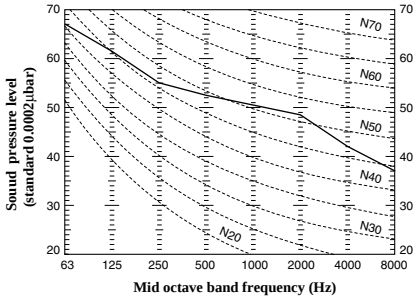
Model FDU808-A

Noise level 48dB (A)



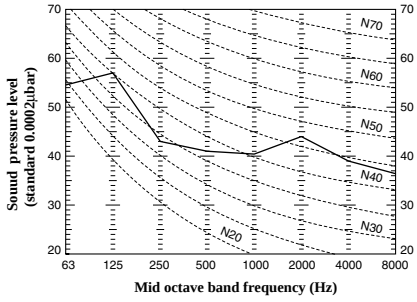
Models FDC308HEN3B, 308HES3B

Noise level 52 dB (A)



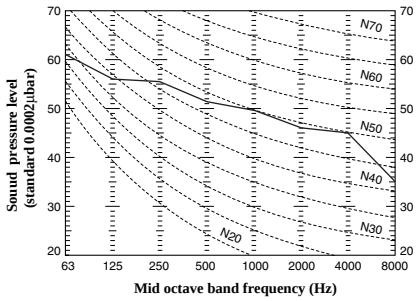
Model FDC408HES3B

Noise level 54 dB (A)



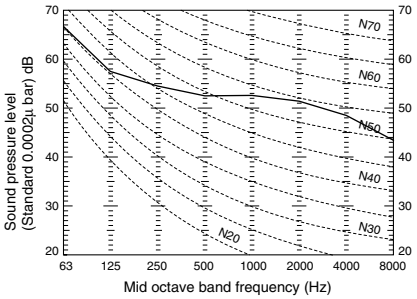
Model FDC508HES3B

Noise leve 55 dB (A)



Model FDC808HES3B

Noise level 58dB (A)

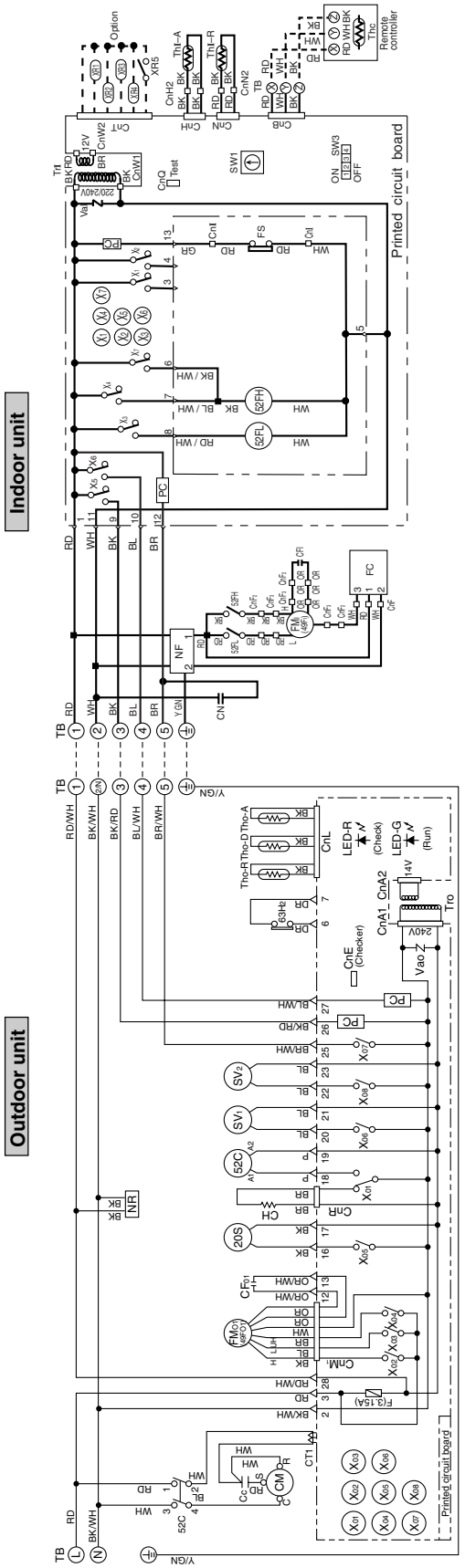


15.3 ELECTRICAL DATA

15.3.1 Electrical wiring

Model FDU308HEN-SB

Power source
1 Phase 220/240V 50Hz



Meaning of marks

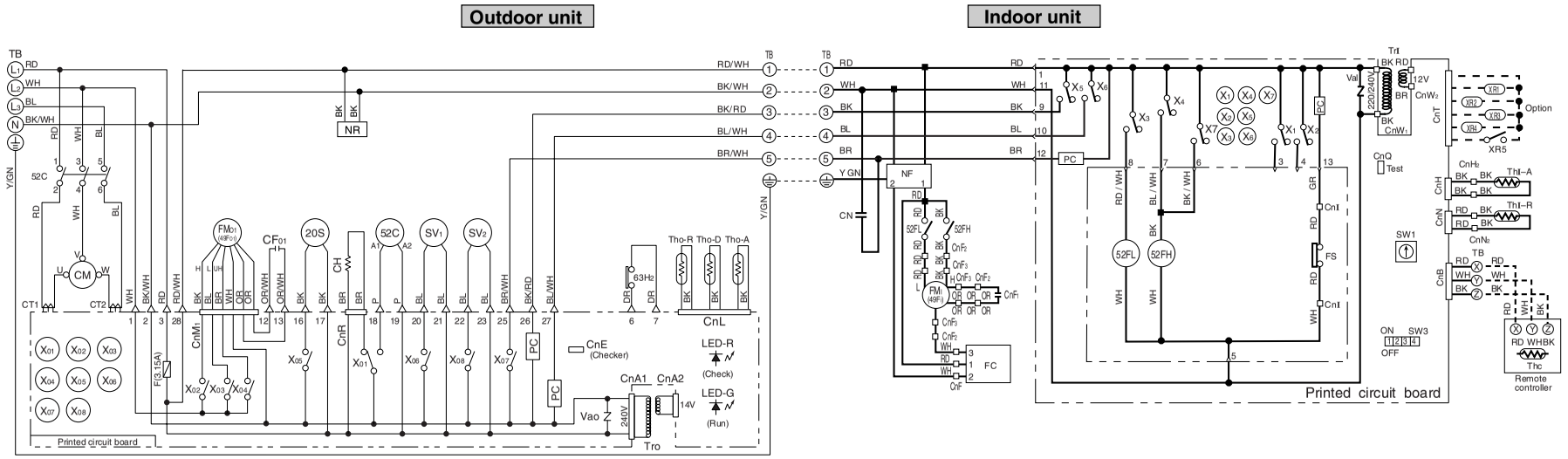
Mark	Parts name	Mark	Parts name
CC	Capacitor for CM	**Thi-R**	Thermistor
CFi	Capacitor for FMi	**Tho-A**	Thermistor
CFo	Capacitor for FMo	**Tho-D**	Thermistor
CH	Crankcase heater	**Tho-R**	Thermistor
CM	Compressor motor	**Tri**	Transformer (Indoor unit)
CN	Capaciter	**Tro**	Transformer (Outdoor unit)
CnA ~ W	Connector (□ mark)	**Val**	Varistor
CT1	Current sensor	**Vao**	Varistor
F	Fuse	**20S**	4-way valve solenoid
FC	Fan controler	**49Fi**	Internal thermostat for FMi
FMi	Fan motor (Indoor unit)	**49Fo**	Internal thermostat for FMo
FMo	Fan motor (Outdoor unit)	**52C**	Magnetic contactor for CM
NF	Noise filter	**52FH**	Relay (for FMi)
NR	Surge suppressor	**52FL**	Auxiliary relay
PC	Photo coupler	**X1~7**	Auxiliary relay
SV1,2	Solenoid coil (for control)	**X01~8**	High pressure switch (for control)
SW1	Switch (Address set)	**63H2**	Terminal (F)
SW3	Changeover switch	**▽**	Connector
TB	Terminal block (○ mark)	**■**	Indication lamp (Green)
FS	Float switch	**LED-G**	Indication lamp (Red)
Thc	Thermistor	**LED-R**	
Thi-A	Thermistor		

Color mark

Mark	Color
BK	Black
BL	Blue
BR	Brown
GR	Gray
OR	Orange
P	Pink
RD	Red
WH	White

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

Power source
3 Phase 380/415V 50Hz



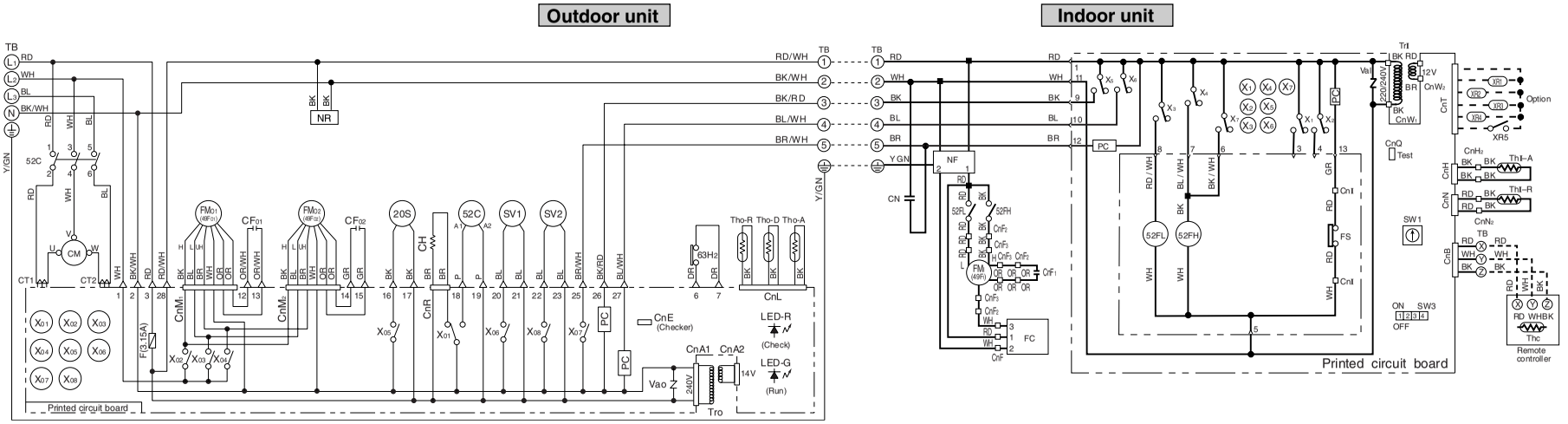
Meaning of marks

Mark	Parts name	Mark	Parts name
CFI	Capacitor for FMI	**ThI-R**	Thermistor
CFO1	Capacitor for FMO	**Tho-A**	Thermistor
CH	Crankcase heater	**Tho-D**	Thermistor
CM	Compressor motor	**Tho-R**	Thermistor
CN	Capaciter	**TrI**	Transformer (Indoor unit)
CnA ~ Z	Connector (□ mark)	**Tro**	Transformer (Outdoor unit)
CT1,2	Current sensor	**Val**	Varistor
F	Fuse	**Vao**	Varistor
FC	Fan controler	**20S**	4-way valve solenoid
FMI	Fan motor (Indoor unit)	**49FI**	Internal thermostat for FMI
FMO1	Fan motor (Outdoor unit)	**49FO1**	Internal thermostat for FMO
FS	Float switch	**52C**	Magnetic contactor for CM
NF	Noise fulter	**52FH**	Relay (for FMI)
NR	Surge suppressor	**52FL**	Relay (for FMI)
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	◁	Terminal (F)
TB	Terminal block (○ mark)	■	Connector
Thc	Thermistor	**LED-G**	Indication lamp (Green)
ThI-A	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		

Power source
3 Phase 380/415V 50Hz



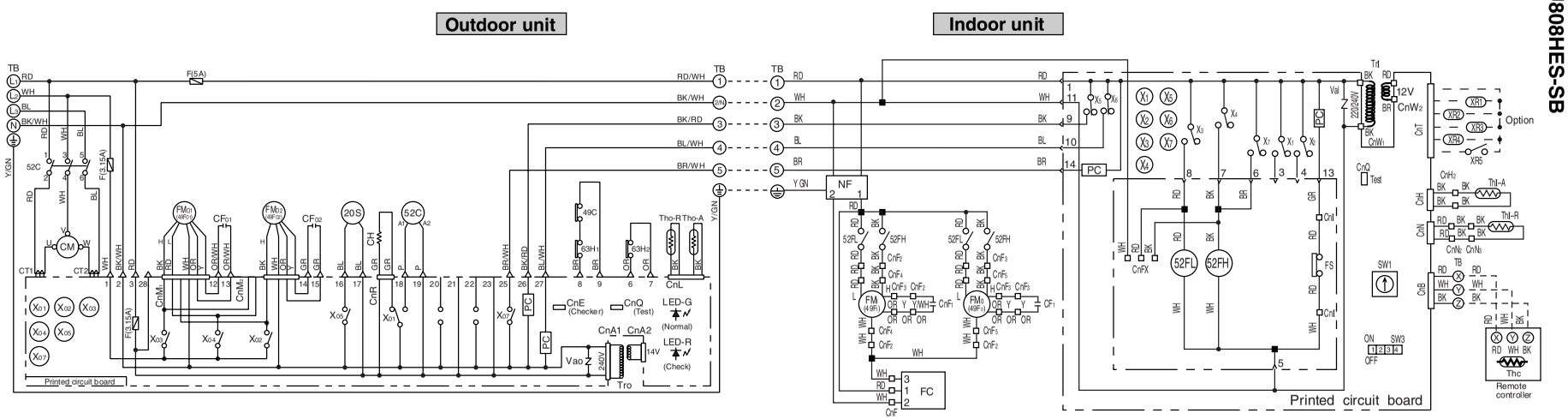
Meaning of marks

Mark	Parts name	Mark	Parts name
CFI	Capacitor for FMI	**THI-R**	Thermistor
CFO1,2	Capacitor for FMO	**Tho-A**	Thermistor
CH	Crankcase heater	**Tho-D**	Thermistor
CM	Compressor motor	**Tho-R**	Thermistor
CN	Capaciter	**TrI**	Transformer (Indoor unit)
CnA ~ Z	Connector (□ mark)	**TrO**	Transformer (Outdoor unit)
CT1,2	Current sensor	**Val**	Varistor
F	Fuse	**Vao**	Varistor
FC	Fan controler	**20S**	4-way valve solenoid
FMI	Fan motor (Indoor unit)	**49FI**	Internal thermostat for FMI
FMO1,2	Fan motor (Outdoor unit)	**49FO1,2**	Internal thermostat for FMO
FS	Float switch	**52C**	Magnetic contactor for CM
NF	Noise filter	**52FH**	Relay (for FMI)
NR	Surge suppressor	**52FL**	Relay (for FMI)
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	◁	Terminal (F)
TB	Terminal block (○ mark)	■	Connector
Thc	Thermistor	**LED-G**	Indication lamp (Green)
THI-A	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		

Power source
3 Phase 380/415V 50Hz



Meaning of marks

Mark	Parts name	Mark	Parts name
CFI1,2	Capacitor for FMI	**Tho-A**	Thermistor
CFO1,2	Capacitor for FMO	**Tho-R**	Thermistor
CH	Crankcase heater	**TrI**	Transformer (Indoor unit)
CM	Compressor motor	**Tro**	Transformer (Outdoor unit)
CnA ~ Z	Connector (□ mark)	**Val**	Varistor
CT1,2	Corrent sensor	**Vao**	Varistor
F	Fuse	**20S**	4-way valve solenoid
FMI1,2	Fan motor (Indoor unit)	**49FI**	Internal thermostat for FMI
FMO1,2	Fan motor (Outdoor unit)	**49FO1,2**	Internal thermostat for FMO
FC	Fan controller	**52C**	Magnetic contactor for CM
FS	Float switch	**52FL,FH**	Riley for FMI1,2
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 (○ mark)	◁	Terminal (F)
Thc	Thermistor	■	Connector
ThI-A	Thermistor	**LED-G**	Indication lamp (Green)
ThI-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		

15.4 OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

This is same as FDUR heat pump series, Refer to page 306.

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 perchased 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 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.

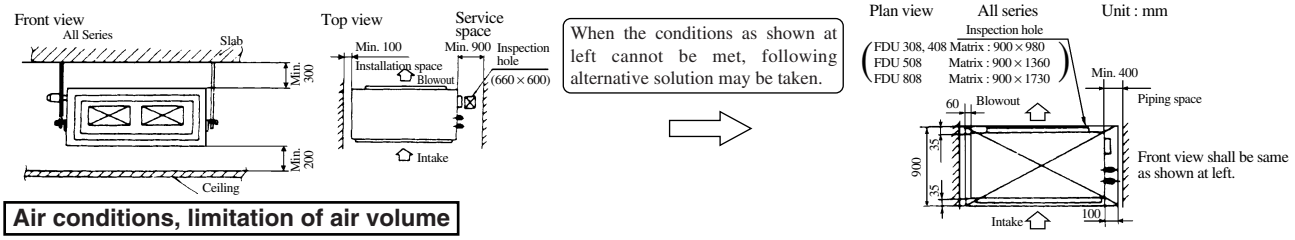
⚠ WARNING

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

Item / Model	Air volume (m^3/min)			Indoor unit suction air temperature		Ambient temperature around indoor unit
	Rating	Lower limit	Upper limit	Cooling	Heating	
FDU308	20	15	25	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	Upper limit Dew point temperature not higher than 28°C and Relative humidity not higher than 80% Lower limit 0°CDB
FDU408	27	20	34			
FDU508	34	26	43			
FDU808	51	38	65			

For further details refer to the engineering data which

(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

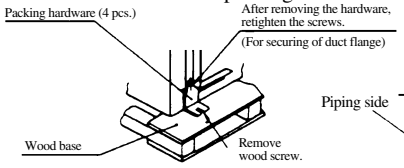
<Delivery>

○ 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.

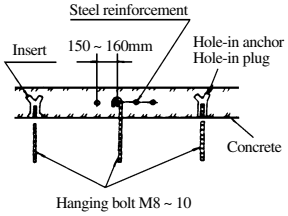
(Packing hardware)

Four pieces of packing hardware are used.
Discard them after unpacking.

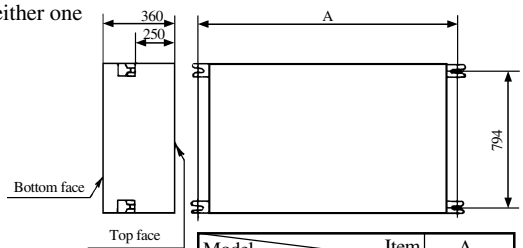


<Securing of Hanging Bolt>

Secure the hanging bolts by either one of following methods.

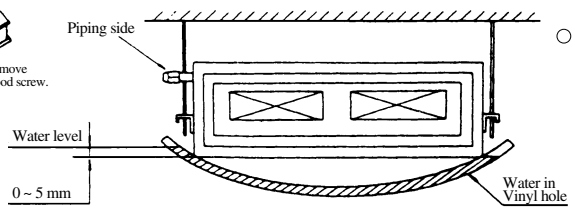


<Hanging bolt location> Unit: mm



Model / Item	A
FDU 308, 408	890
FDU 508	1270
FDU 808	1640

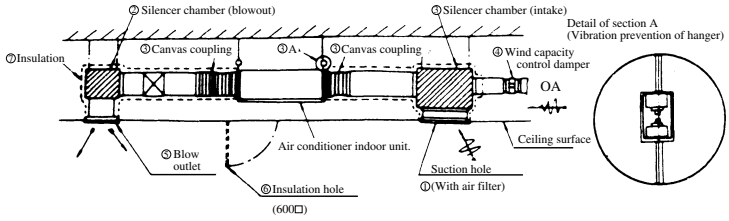
<Adjustment level>



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

○ 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 indoor 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 indoor 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 indoor unit of air conditioner.

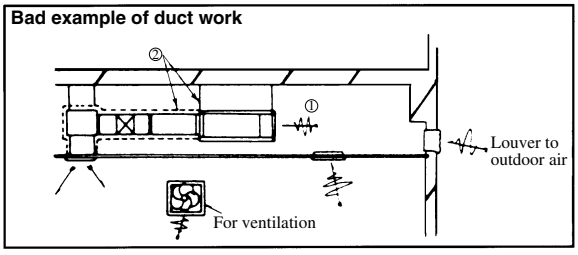
④ A damper to control air volume should be installed on the joint of OA duct to facilitate control of air capacity after the installation.

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.)

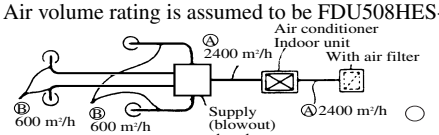
b) It may run out the allowable limit of unit operation (Example: When outdoor air temperature is 35°CDB, suction air temperature is 27°CWB) and it could result in such troubles as compressor overload, etc.

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 and a side of duct is 250 mm.
Air volume rating is assumed to be FDU508HES-SB.



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

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

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

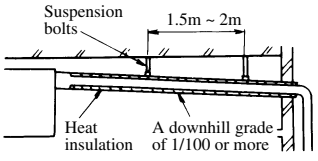
<Table of simplified selection of duct dimensions>

Air volume / Item	Duct form: Square duct — Dimensions
m³/h(m³/min)	(mm × mm)
100	250 × 60
200	250 × 90
300	250 × 120
400	250 × 140
500	250 × 170
Section Ⓑ — 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
Section Ⓐ — 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

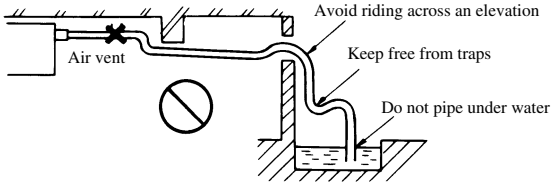
(4) Drain Piping

(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

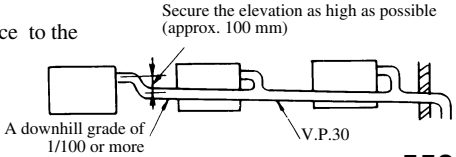


• Improper piping



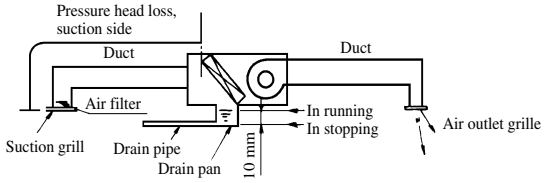
(b) When connecting the drain pipe to unit, pay sufficient attention not to apply excess force to the piping on the unit side. Also, fix the piping at a point as close as possible to the unit.

(c) For drain pipe, use hard PVC general purpose pipe VP-25(I.D.1″) which can be purchased locally.



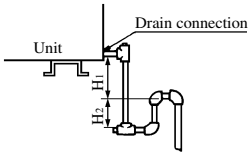
(d) When constructing drain piping for several units, position the common pipe about 100 mm below the drain outlet of each unit as shown in the sketch. Use VP-30 (11/4″) or thicker pipe this purpose.
(e) Be sure to provide heat insulation to hard PVC pipes of indoor placement.
(f) Do not ever provide an air vent.
(g) Avoid postitioning 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, 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.



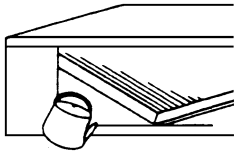
- Provide a trap on way of the drain pipe as shown at left.

H_1=100 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.

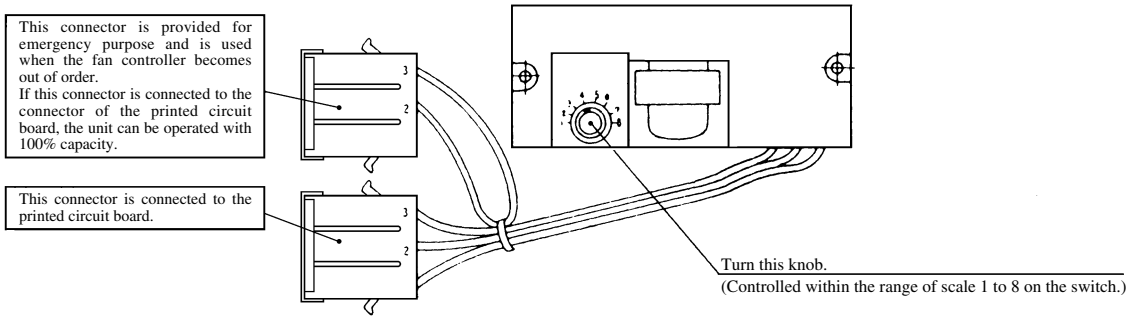
○ Remove the side panel and supply gradually 1,000 cc of water to see if water is drained smoothly or not. Check also for water leakage.



(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 FDUR heat pump series, Refer to page 329.

15.5.3 Installation of outdoor unit

This is same as FDUR heat pump series, Refer to page 330.

15.6 MAINTENANCE DATA

This is same as FDUR heat pump series, Refer to page 340.