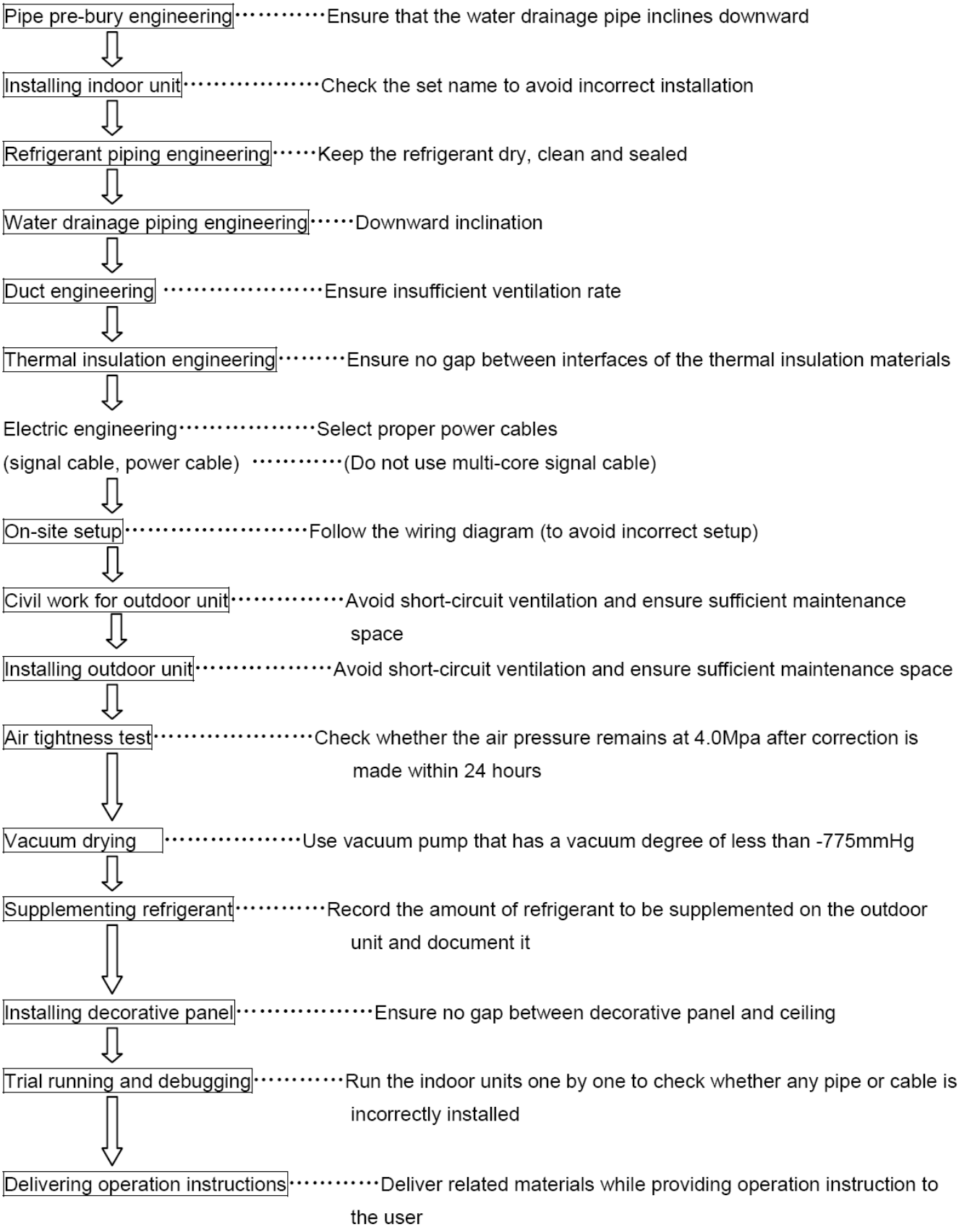
Part 4
Installation

1. Summarize of Installation

1.1 Installation Procedure



Note: The general procedure for refrigerant machine is subject to change according to the situation.

1.2 Precautions:

Precautions before reading the installation manual.

1. This installation manual is for the outdoor unit.

2. Refer to the indoor unit installation manual for indoor parts installation.
3. Please read the power source unit installation manual to install the power source unit .
4. Please refer to the refrigerant distributor installation manual to install the refrigerant distributor.

1.3 Key Points in Installation:

INSTALLATION

- Confirm the model and name of your air conditioner to avoid installation mistakes.

REFRIGERANT PIPING

- Separately purchased refrigerant distributor (branch connection, header branch pipe) should be used in the process of refrigerant piping.
- Refrigerant piping should accord with specified diameter.
- Charge nitrogen under certain pressure in the refrigerant piping before welding.
- Heat insulation should be done to refrigerant piping.
- After the installing refrigerant piping, do not electrify the indoor unit before the airtight test and vacuum.

AIRTIGHT TEST

- Refrigerant piping must be tested for gas proof [4.3MPa(44kg/cm2)for R410A.]

VACUUM

- Vacuum pump must be used, and vacuuming should be done from the gas side and liquid side simultaneously.

ADD REFRIGERANT

- When the actual pipe is longer than the fiducially length, the added refrigerant volume of every outdoor unit depends on the calculating according to the actual length.
- Fill the form on the outdoor unit electric control box with the added volume, length of pipes (actual length) and the relative height drop between outdoor unit and indoor unit.

WIRING

- Choose power capacity and wire diameter according to the design manual. The power cord of the air conditioner should be wider than the power cord of ordinary motor.
- Do not twist or cross the power cord with wiring (low voltage) between indoor and outdoor unit, or mishandling may occur.
- Connect the indoor unit to the power after airtight test and vacuuming.

TEST RUNNING

- The test running can not begin until the outdoor unit has been connected to the power for 12hr.

1.4 Installation Location

Caution:

1. Please keep away from the following place, or malfunction of the machine may be caused:

- There is combustible gas leakage.
- There is much oil (including engine oil) ingredient.
- There is salty air surrounding(near the coast)
- There is caustic gas (the sulfide, for example) existing in the air (near a hot spring).
- A place the heat air expelled out from the outdoor unit can reach your neighbor's window.
- A place that the noise interferes your neighbors every day life.
- A place that is too weak to bear the weight of the unit.
- Uneven place.
- Insufficient ventilation place.
- Near a private power station or high frequency equipment.

2. The insulation of the metal parts of the building and the air conditioner should comply with the regulation of National Electric Standard.

2. Installation of Outdoor unit

2.1 Carry in the Outdoor Unit:

2.1.1 MDV-D120W/N1 MDV-D140W/N1 MDV-D140W/SN1

Since the gravity center of this unit is not at its physical center, please be careful when lifting it with a sling.

Never hold the air-in of the outdoor unit to prevent it from deforming.

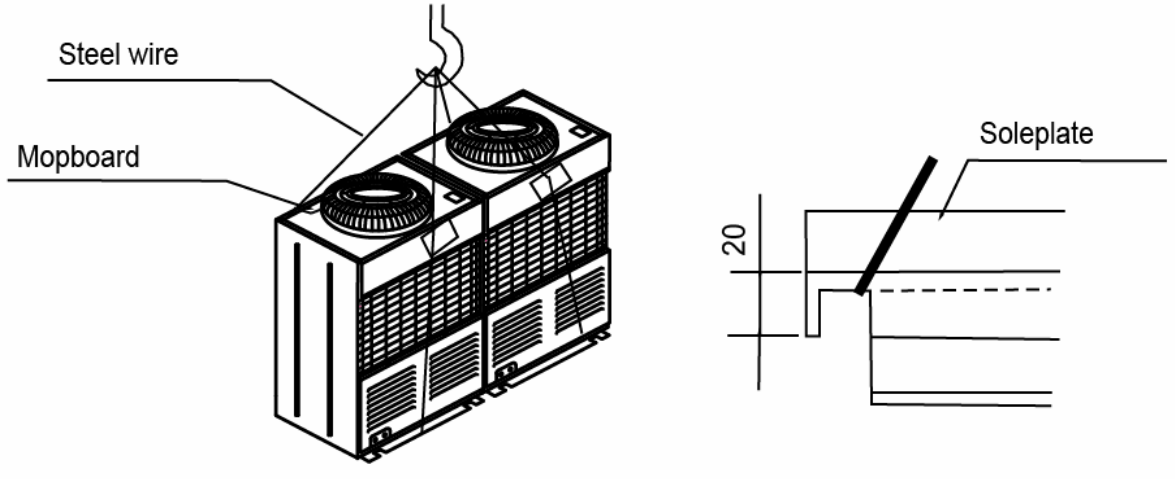
Do not touch the fan with hands or other objects.

Do not lean it more than 45°, and do not lay it sidelong.

Please fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.

2.2.2 MDV-D280W/SN1

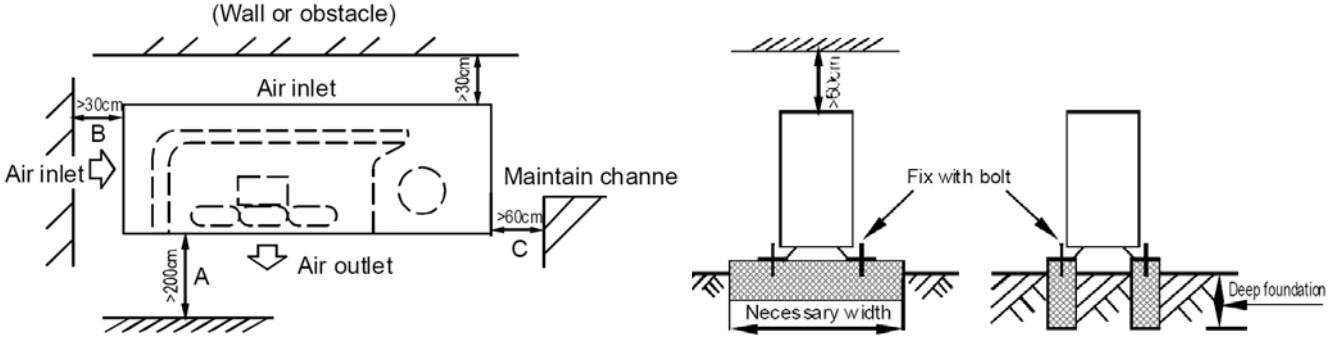
- Sling the outdoor unit and carry it in with 4 steel wire. (Φ6mm or more).
- Use soft board to protect the unit surface from scratch and distortion at where contact the steel wire.



2.2 Required Installation Space and Installation Dimension:

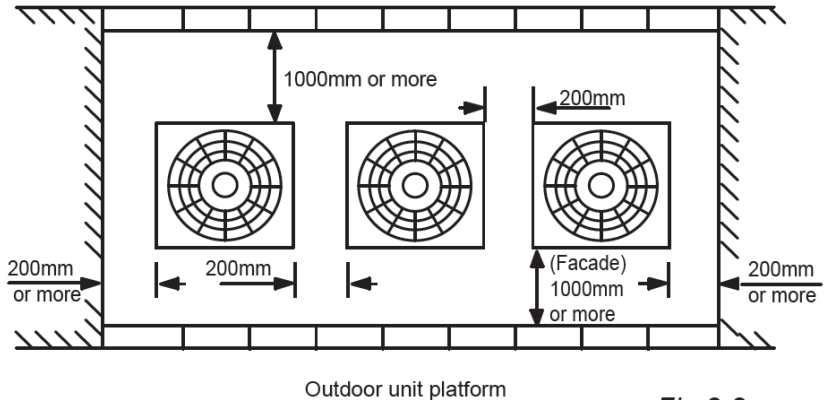
2.2.1 MDV-D120W/N1 MDV-D140W/N1 MDV-D140W/SN1

The minimum distance between the outdoor unit and obstacles described in the installation chart is not applicable to the airtight room. Leave space at two of the following three directions (A, B, C)

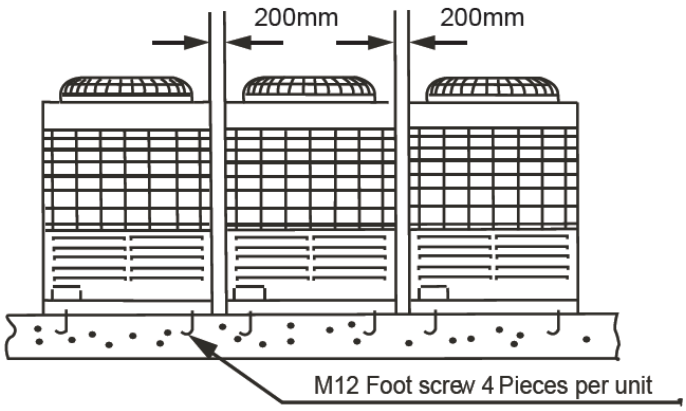


2.2.2 MDV-D280W/SN1

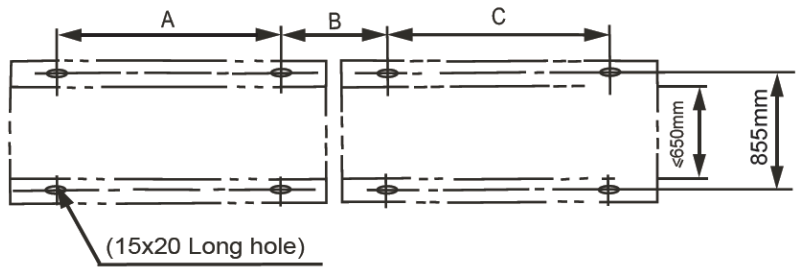
Be sure to left enough room for installation and maintenance.



200mm distance should be left between outdoor units.



Distance between foot screws is shown as follow. The spacing between the tow cement piers shall not be exceeded over than 650mm.



Model	A	B	C
MDV-D280W/SN1	680	——	680

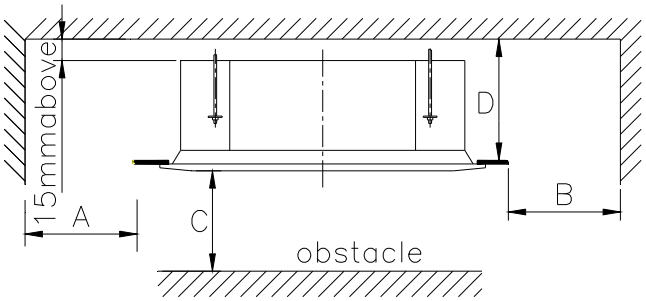
3. Installation of Indoor Unit

3.1 Hanging and Transportation

Please refer to Installation Manual of Indoor unit.

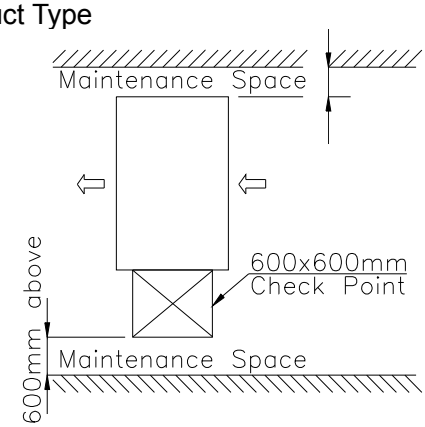
3.2 Required Installation Place

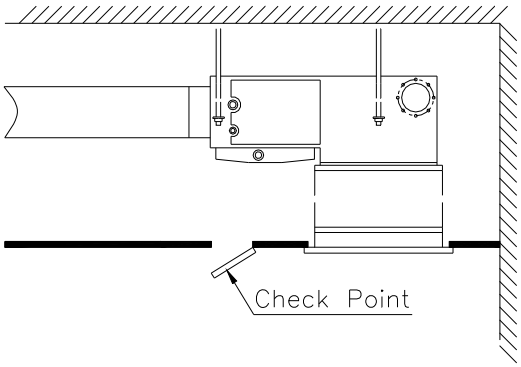
3.2.1 Cassette Type



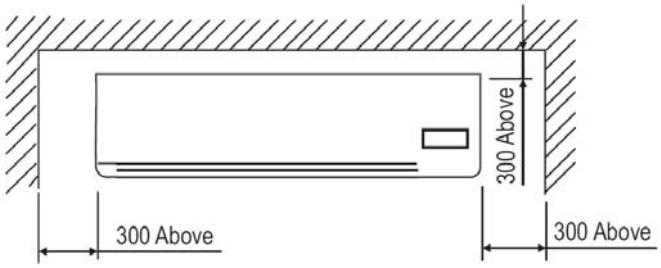
Dimension / model	A	B	C
Four-way Cassette	1000mm above		2300mm above

3.2.2 Duct Type

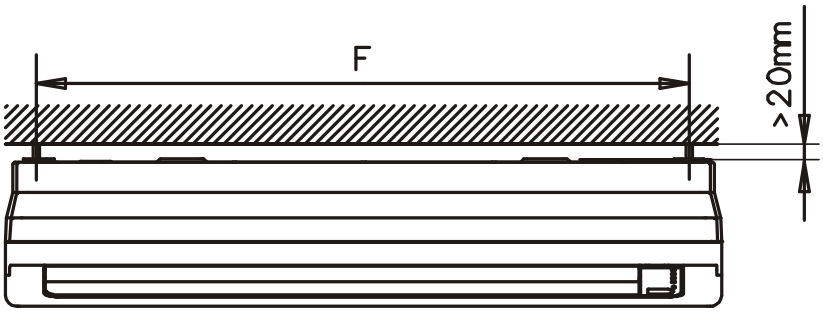


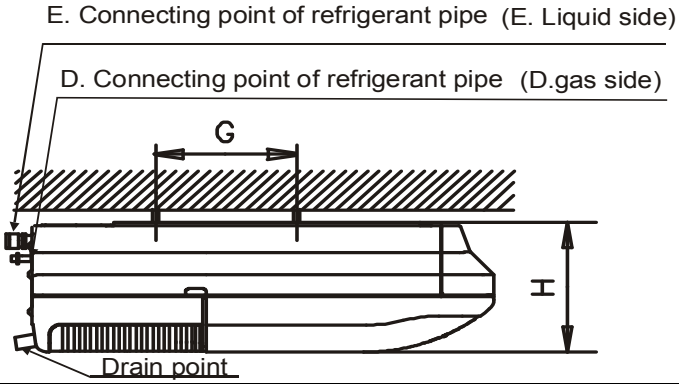


3.2.3 Wall Mounted Type

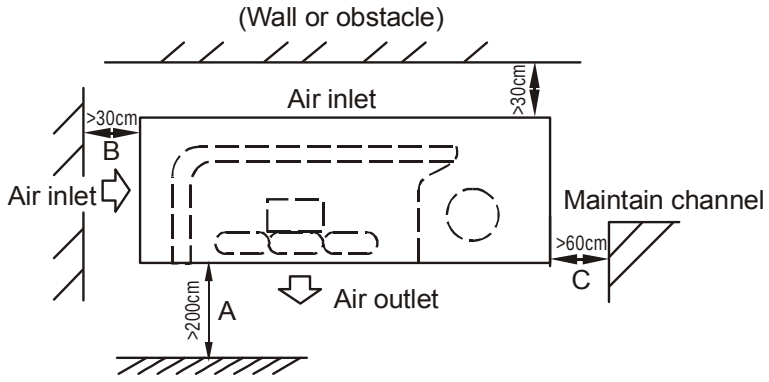


3.2.4 Ceiling and floor





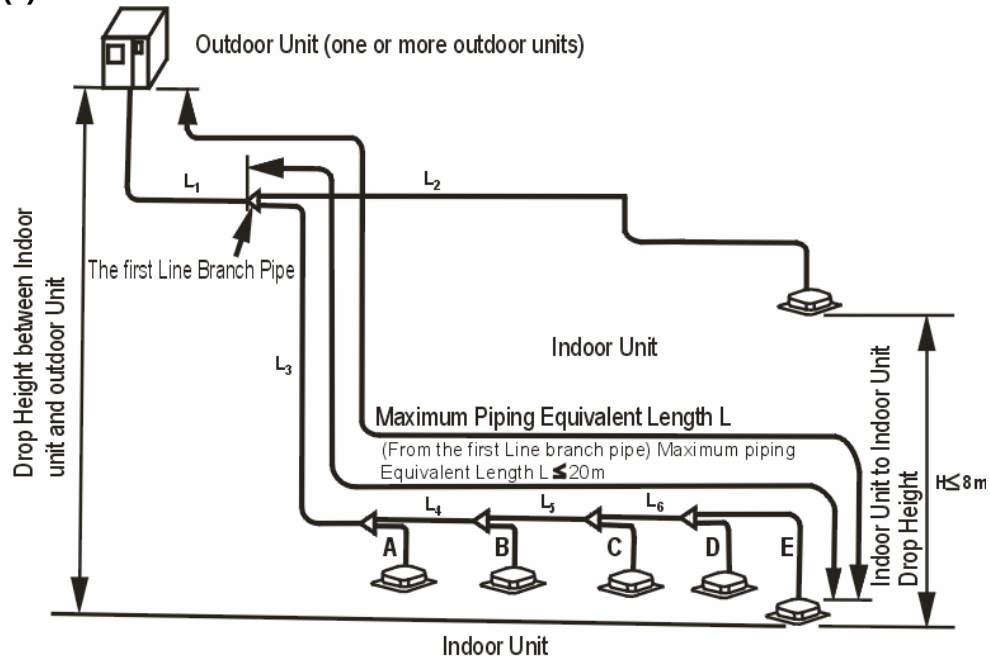
Capacity (KW)	A	B	C	D	E	F	G	H
2.2-8.0 KW	990	660	206	505	506	907	200	203
9.0-11.2 KW	1280	660	206	795	506	1195	200	203
14.0 KW	1670	680	224	1070	450	1542	200	240



4. Installation of Refrigerant Pipe

4.1 The permitted length and drop difference of refrigerant pipe

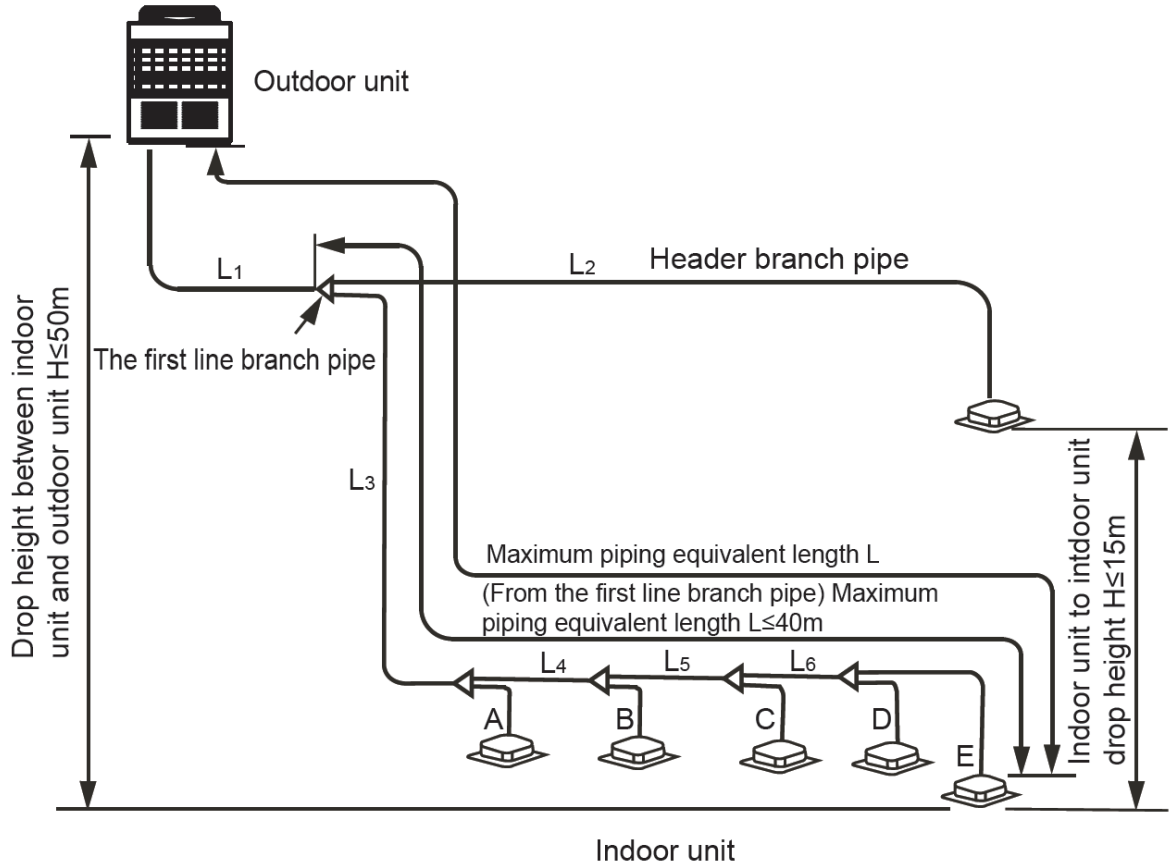
(1) MDV-D120W/N1 MDV-D140W/N1 MDV-D140W/SN1



			Permitted length	Pipe
Pipe length	Pipe total length (actual length)		≤100m	$L_1+L_2+L_3+L_4+L_5+L_6+A+B+C+D+E$
	Farthest pipe length (m)	Actual length	60m	$L_1+L_3+L_4+L_5+L_6+E$
		Equivalent length	70m	
	Equivalent length L of pipe from the first branch to the farthest one(m)		≤20m	$L_3+L_4+L_5+L_6+E$
Drop length	Drop height between indoor and outdoor unit	Outdoor unit up	≤20m	——
		Outdoor unit down	≤20m	——
	Drop height between indoor unit and indoor unit		≤8m	——

Note: Conversion of the equivalent length: Convert into the direct pipe length according to branch Junction 0.5m/l

(2) MDV-D280W/SN1



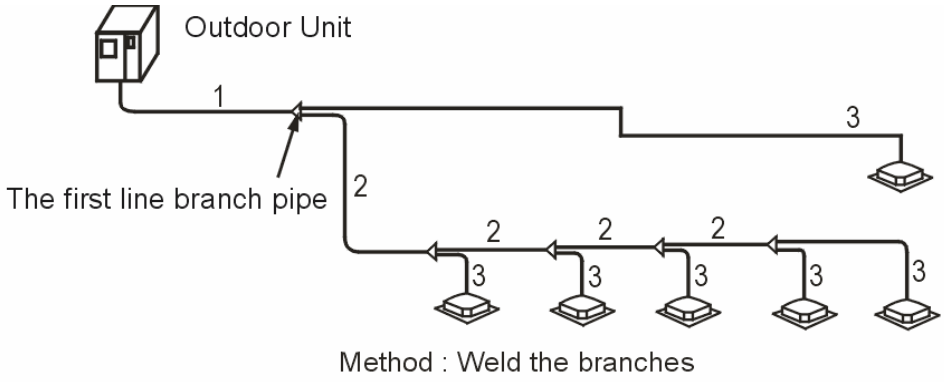
			Permitted length	Pipe
Pipe length	Pipe total length (actual length)		≤250 m	$L_1+L_2+L_{3+}…+L_6+A+B+C+D+E$
	Farthest pipe length（m）	Actual length	≤130m	$L_1+L_3+L_4+L_5+L_6+E$
		Equivalent length	≤150m	
	Equivalent length L of pipe from the first branch to the farthest one （m）		≤40m	$L_3+L_4+L_5+L_6+E$
Drop height	Drop height between indoor unit and outdoor unit	Above outdoor unit	≤50m	——
		Below outdoor unit	≤30m	——
	Drop height between indoor unit and indoor unit		≤15m	——

Note: Conversion of the equivalent length: Convert into the direct pipe length according to branch Junction 0.5m/l

4.2 Pipe size selection

4.2.1 Selection of the refrigerant pipe

Type of the pipe	Connecting part	No.
Main pipe	Between outdoor branch joint and first branch joint	1
Indoor main pipe	Between indoor branch joint	2
Indoor pipe	Between branch part and indoor unit	3



How to choose the Branch joint and the refrigerant pipe?

4.2.2 According the total capacity of outdoor units to select the dimension of main pipe 1:

Refrigerant	Model of outdoor unit	Gas side	Liquid side
R410A	MDV-D120W/N1	Φ19.1	Φ9.5
	MDV-D140W/N1	Φ19.1	Φ9.5
	MDV-D140W/SN1	Φ19.1	Φ9.5
	MDV-D280W/SN1	Φ28.6	Φ12.7
Remarks	A converter pipe is needed for the connection between first branch joint and outdoor unit.		

Notes: Branch header must be connected with indoor units directly, the further branch connection is not allowed.

4.2.3 The maximum connection of indoor units:

Model of outdoor unit	Maximum Quantity of Indoor unit	Sum Capacity of indoor unit(horsepower)
MDV-D120W/N1	8	3~8
MDV-D140W/N1	8	3~8
MDV-D140W/SN1	8	3~8
MDV-D280W/SN1	16	5~13.5

4.2.4 According the capacity of indoor units to select indoor main pipe 2 , main pipe 1 and branch joint:

Indoor main pipe dimension			
The total capacity of indoor units A (x100W)	Liquid Side(mm)	Gas Side(mm)	The model of branch joint for indoor units
A<168	Φ9.5	Φ15.9	FQZHN-01
168≤A<224	Φ9.5	Φ19.1	FQZHN-01
224≤A<330	Φ9.5	Φ22.2	FQZHN-02
330≤A<470	Φ12.7	Φ28.6	FQZHN-03

4.2.5 Select the indoor pipe 3:

A: the total capacity and the gas side/liquid side pipe of indoor units

Refrigerant	A (capacity of indoor unit (x100W))	Gas Side	Liquid Side
R410A	22~45	Φ12.7(Flaring nut)	Φ6.4(Flaring nut)
	56~140	Φ15.9(Flaring nut)	Φ9.5 (Flaring nut)

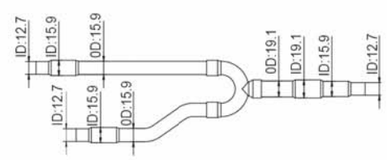
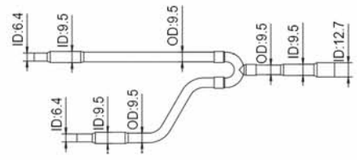
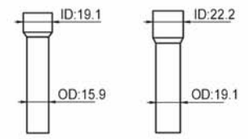
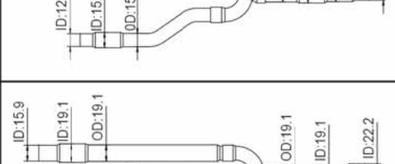
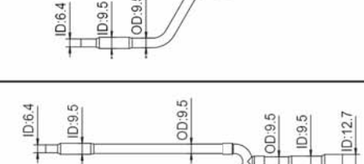
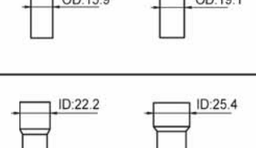
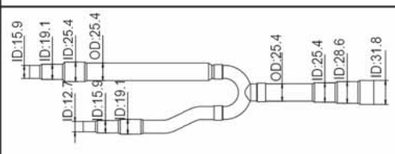
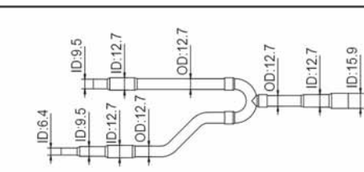
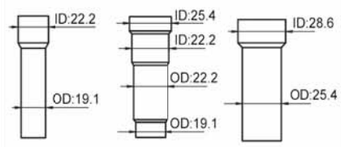
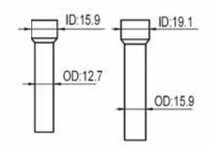
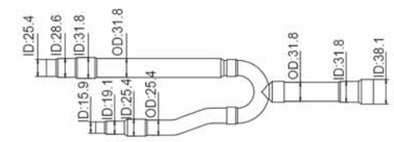
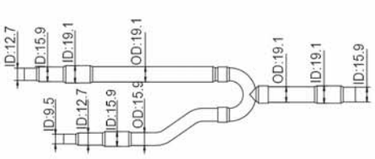
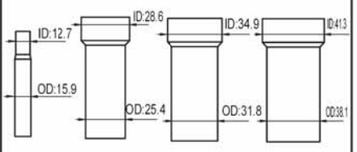
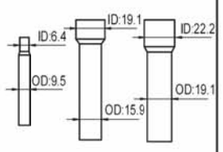
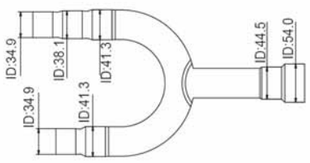
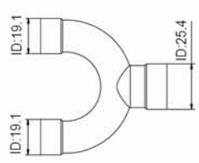
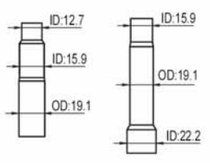
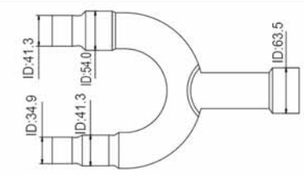
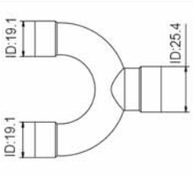
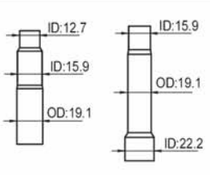
4.2.6 The dimension of branch part (please refer to branch part installation manual)

INDOOR UNIT BRANCH PIPE INSTALLATION MANUAL

Thank you very much for purchasing our air conditioner, Before using your air conditioner , please read this manual carefully and keep it for future reference.

BRANCH LIST

Table.1

Name	Gas side joints	Liquid side joints	Converter pipe (gas pipe used)	Converter pipe (liquid pipe used)
FQZHN-01				
FQZHN-02				
FQZHN-03				
FQZHN-04				
FQZHN-05				
FQZHN-06				

CHOICE

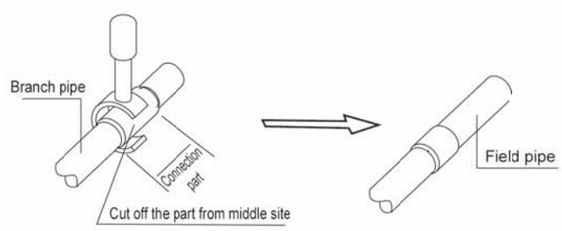
Branch pipes for R22 indoor unit Table.2

Capacity of downstream indoor units A (×100W)	Branch pipe name	Liquid pipe (mm)	Gas pipe (mm)
A<100	FQZHN-01	Φ9.5	Φ15.9
100≤A<160			Φ19.1
160≤A<330	FQZHN-02	Φ12.7	Φ25.4
330≤A<480	FQZHN-03	Φ15.9	Φ34.9
480≤A<640	FQZHN-04	Φ19.1	
640≤A<880			Φ41.3
880≤A<1344	FQZHN-05	Φ22.2	Φ54.0
1344≤A	FQZHN-06	Φ25.4	Φ63.5

Branch pipes for R410A indoor unit Table.3

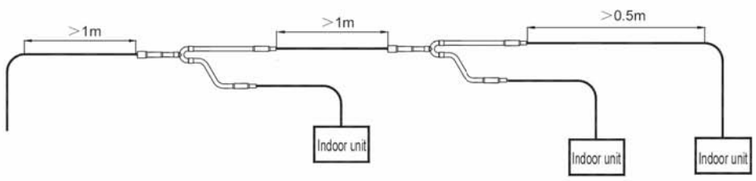
Capacity of downstream indoor units A (×100W)	Branch pipe name	Gas pipe (mm)	Liquid pipe (mm)
A<168	FQZHN-01	Φ15.9	Φ9.5
168≤A<224		Φ19.1	
224≤A<330	FQZHN-02	Φ22.2	
330≤A<470	FQZHN-03	Φ28.6	Φ12.7
470≤A<710			Φ15.9
710≤A<1040	FQZHN-04	Φ34.9	Φ19.1
1040≤A<1344		Φ41.3	
1344≤A	FQZHN-05	Φ44.5	Φ22.2

INCISION



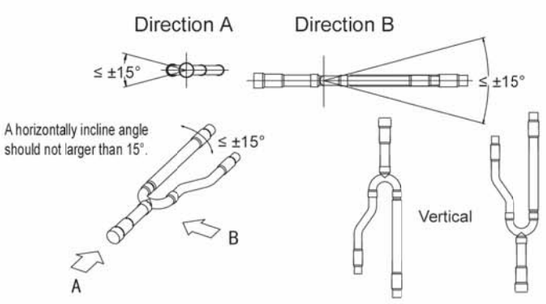
NOTICE FOR INSTALLATION

■ Pay attention to distances among the horizontal straight pipes



- The distance between the turning site of copper pipe and the adjacent branch should ≥1m.
- Distance between two adjacent branches should ≥1m.
- The length of straight pipe between branch and indoor unit should ≥0.5m.

■ Laying of the branches



4.3 Remove Dirt or Water in the Piping

- Make sure there is no any dirt or water before connecting the piping to the outdoor units.
- Wash the piping with high pressure nitrogen, never use refrigerant of the outdoor unit.

4.4 Airtight Test

Charge pressured nitrogen after connecting Indoor unit/outdoor unit piping to do airtight test.

Caution:

Pressured nitrogen [4.3MPa (44kg/cm2) for R410A] should be used in the airtight test.
Tighten high pressure/low pressure valves before applying pressured nitrogen.
Apply pressure from air vent mouth on the high pressure/low pressure valves.
The high pressure/low pressure valves are closed when applying pressured nitrogen.
The airtight test should never use any oxygen, flammable gas or poisonous gas.

4.5 Air Purge With Vacuum Pump

Using vacuum pump to do the vacuum, never using refrigerant to expel the air.
Vacuuming should be done from both liquid side and gas side simultaneously.

4.6 Open All Valves

4.7 Refrigerant Amount To Be Added

Calculate the added refrigerant according to the diameter and the length of the liquid side pipe of the outdoor unit/indoor unit connection.

Diameter of Liquid Pipe	R410A
	Equivalent Refrigerant for Pipe Length of 1m (kg/m)
Φ6. 4	0. 022
Φ9. 5	0. 060
Φ12. 7	0. 110
Φ15. 9	0. 170
Φ19. 1	0. 250
Φ22. 2	0. 350

Note:

Additional refrigerant volume of divergent pipe is 0.1kg per item (consider the liquid side of divergent pipe only).

5. Processing & Installation of Drainage Pipe

5.1 Gradients and Supporting

(1) Keep the drainpipe sloping downwards at a gradient of at least 1/100. Keep the drainpipe as short as possible and eliminate the air bubble.

(2) The horizontal drainpipe should be short. When the pipe is too long, a prop stand must be installed to keep the gradient of 1/100 and prevent bending. Refer to the following table for the specification of the prop stand.

	Diameter	Distance between the prop stands
Hard PVC pipe	25~40mm	1.5~2m

(3) Precautions

① The diameter of drainpipe should meet the drainage requirement at least.

② the drainpipe should be heat-insulated to prevent atomization.

③ Drainpipe should be installed before installing indoor unit. After powering on, there is some water in water-receiver plate. Please check if the drain pump can act correctly.

④ All connection should be firm.

⑤ Wipe color on PVC pipe to note connection.

⑥ Climbing, horizontal and bending conditions are prohibited.

⑦The dimension of drainpipe can't less than the connecting dimension of indoor drainpipe.

⑧ Heat-insulation should be done well to prevent condensation.

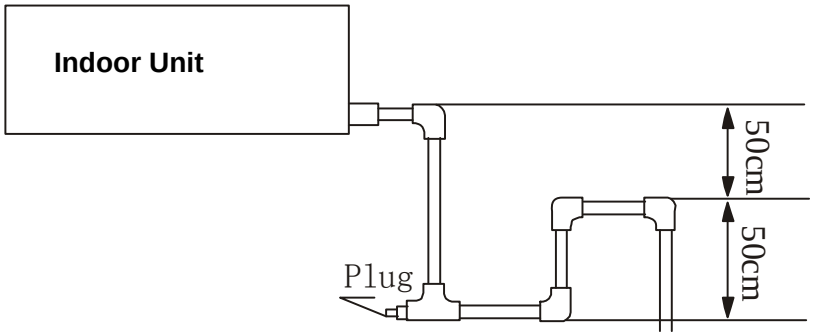
⑨Indoor units with different drainage type can't share one convergent drainpipe.

5.2 Drainpipe Trap

(1) If the pressure at the connection of the drainpipe is negative, it needs to design drainpipe trap.

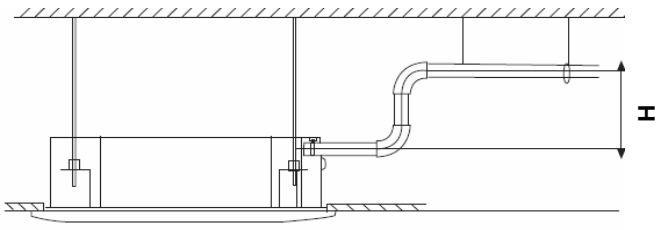
(2) Every indoor unit needs one drainpipe trap.

(3) A plug should be designed to do cleaning.



5.3 Upward drainage (drain pump)

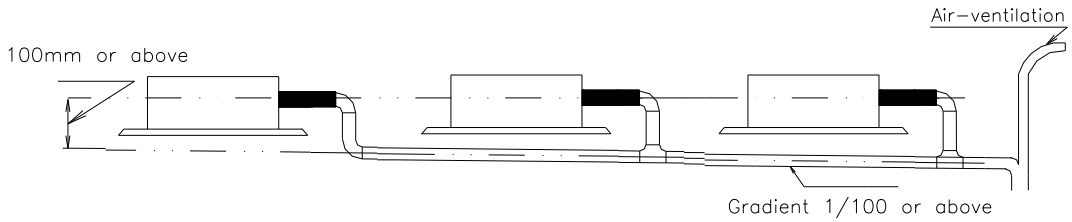
To ensure the gradient 1/100, the drainpipe can be lifted to H: for compact four-way cassette, H=500mm, for other unit, H=750mm.



5.4 Convergent drainage

(1) The number of indoor units should be as small as possible to prevent the traverse main pipe overlong.

(2) Indoor unit with drain pump and indoor unit without drain pump should be in different drainage system.



(3)selection the diameter

Number of connecting indoor units → Calculate drainage volume → Select the diameter

Calculate allowed volume =Total cooling capacity of indoor units (HP) ×2 (l/ hr)

Model	Allowed volume(lean 1/100) (l/ hr)	I.D. (mm)	Thick
Hard PVC	∽≤14	¢25	3.0
Hard PVC	14＜∽≤88	¢30	3.5
Hard PVC	88＜∽≤334	¢40	4.0
Hard PVC	175＜∽≤334	¢50	4.5
Hard PVC	334＜∽	¢80	6.0

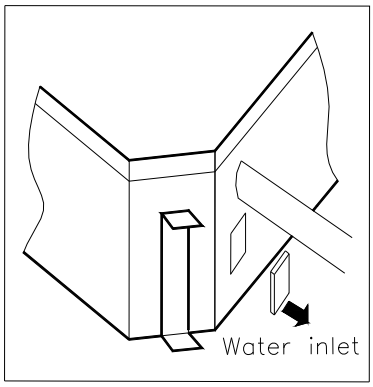
5.5 Drainage test

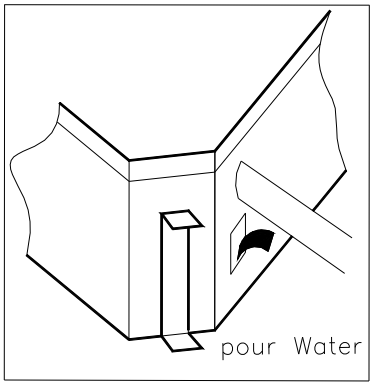
(1) Drainage without drain pump

After finishing drainpipe installation, pour some water into the water plate to check if the water flows smoothly.

(2) Drainage with drain pump

① Poke the Water Level Switch, remove the cover, and use water pipe to pour 2000ml water into the water plate through the water inlet.





② Turn on the power to cooling operation. Check the pump's operation and switch on the Water Level Switch. Check the pump's sound and look into the transparent hard pipe in the outlet at the same time to check if the water can discharge normally.

③ Stop the air conditioner running, turn off the power, and put back the cover.

- Stop the air conditioner. After 3 minutes, check if it has abnormity. If the collocation of drainpipes is illogical, the water will flow back overfull, which will cause the alarm lamp flashes, even circumfluence from the water plate.
- Keep on pouring water until it gives an alarm signal for high water level, check if the pump drains water at once. If the water level can't fall below the alarmed water level after 3 minutes, the air conditioner will stop (means this indoor unit stops, stand-by, but the outdoor unit still work if there is capacity requirement). Turn off the power and drain the remained water, then turn on the air conditioner.

Note: the drain stopper in the main water plate is for maintenance. Stuff up the drain stopper to prevent water leakage.

6. Electric Installation

∗ Electric installation must be carried out according to National Standard.

∗ This chapter is just for reference.

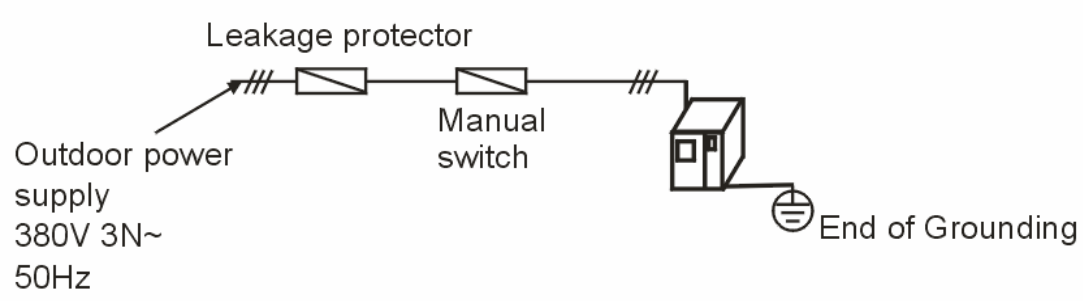
6.1 Brief Introduction

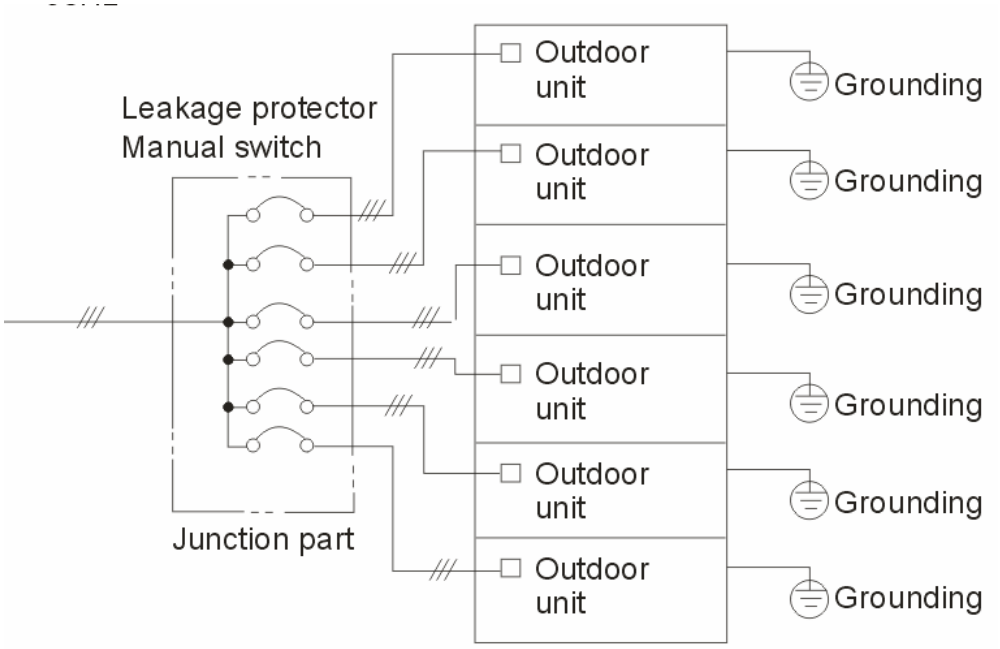
- Please select power supply for indoor unit and outdoor unit separately.
- The power supply should have specified branch circuit with leakage protector and manual switch.
- The power supply, leakage protector and manual of all the indoor units connecting to the same outdoor unit should be universal. (Please set all the indoor unit power supply of one system into the same circuit.)
- Please put the connective piping system between indoor unit and outdoor unit with the refrigerant system together.
- It is suggested to use 2-core screened wire as indoor and outdoor control wire.
- Please design a separate circuit for compressor heater inside the unit for it is frequently heated in using season.
- Please comply with relevant National Electric Standard.
- Power wiring should be engaged by specialized electrician.

6.2 Power circuitry installation

6.2.1 Outdoors power supply wiring

(1) Separate Power Supply (without power facility)





Item / Model	Power supply	Minimum thickness （mm^2） (wiring s of metal and synthetic resin pipe)	manual switch （A）		Creepage breaker
		Continuous wire length A (m)	Capacity	Fuse	
MDV-D120W/N1	220-240V-1N-50Hz	RVV-450/750 3*10mm^2	100	50	100mA 0.1sec or less
MDV-D140W/N1	220-240V-1N-50Hz				
MDV-D140W/SN_1	380V-3N-50Hz	RVV-450/750 5*2.5mm^2	100	16	
MDV-D280W/SN1	380V-3N-50Hz	16(A≤29) 25(29<A≤46) 35(46<A≤78) 16	60	50	

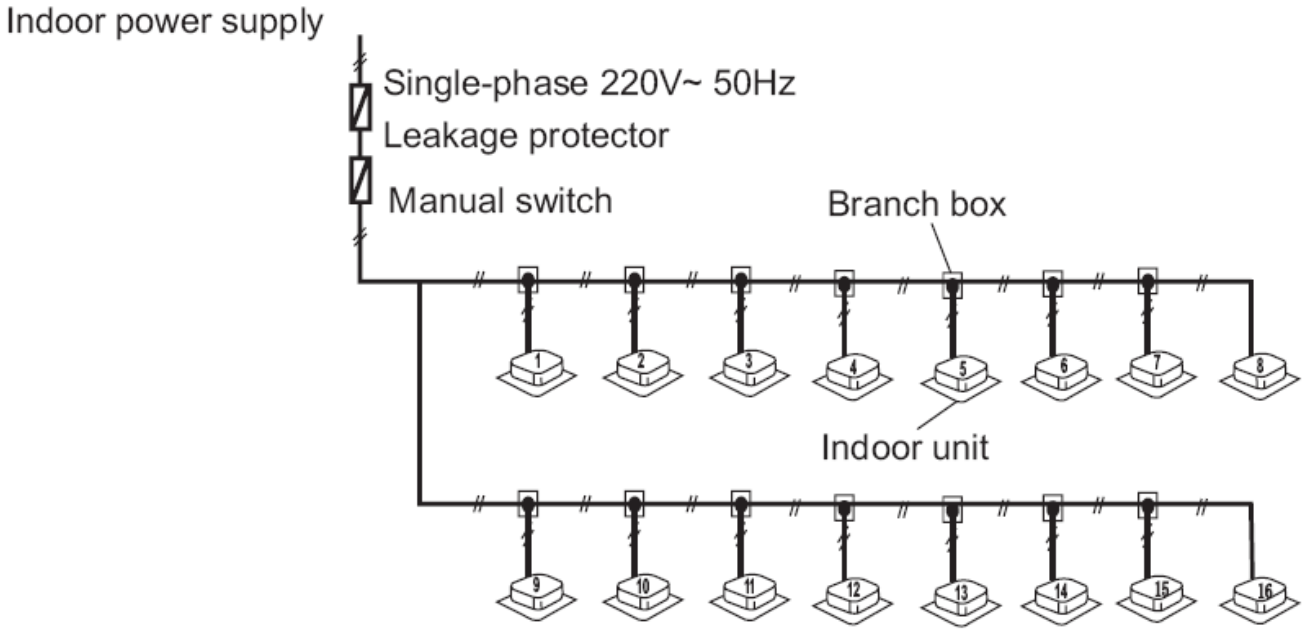
Note: The wiring diameter and the length in the table indicate the condition that the voltage dropping range is within 2%. If the length exceeds the above figure, please select the wire diameter according to relevant standard.

6.2.2 Indoor power supply wiring

The dimension of indoor power supply wiring

Item / Model	Power supply	The minimal dimension of wiring (mm2)		manual switch （A）		Creepage breaker
		Continuous wire length ≤30m	Ground wire	Capacity	Fuse	
All indoor units	220-240V, 1N-50Hz	RVV-300/500 3*1.5mm	φ1.6mm	15	15	20A 30mA 0.1sec or less

Note: The length in the table equals the value of power cord connecting parallel indoor units, indicating the condition that the voltage dropping range is within 2%. If the length exceeds the above figure, please select the wire diameter according to relevant standard.



Note:

1. Set refrigerant piping system, signal wires between indoor-indoor unit, and that between outdoor-outdoor unit into one system.
2. Please do not put the signal wire and power wire in the same wire tube; keep distance between the two tubes. (Current capacity of power supply: less than 10A--300mm, less than 50A--500mm.)
3. Make sure to set address of outdoor unit in case of parallel multi-outdoor units.

6.2.3 Signal wire of indoor/outdoor unit

Signal wire of indoor/outdoor unit adopts 3-core shielded wire（≥0.75mm^2) which has polarity, please connect it correctly.