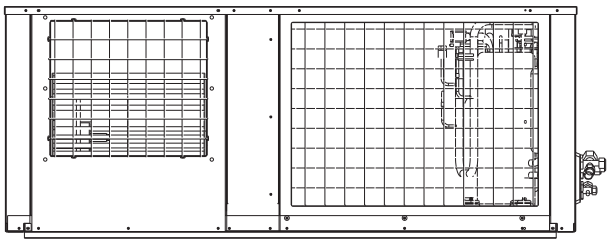
MUNDOCLIMA®

'HIDEN' SERIES MVH CENTRIFUGAL OUTDOOR UNIT

Installation manual and information requirements

MVH-H100C/DN1
MVH-H140C/DGN1A
MVH-H160C/DGN1A
MVH-H224C/DGN1



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CL23800 to CL23809
English

1. Original instructions
2. This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
3. GWP：R410A：2087. 5
4. This appliance is not intended for use by persons(including children) with reduce physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
5. Children should be supervised to ensure that they do not play with the appliance.
6. The appliance shall be installed in accordance with national wiring regulations.
7. This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.
8. Children shall not play with the appliance.
9. Cleaning and user maintenance shall not be made by children without supervision.
10. Disconnect the appliance from its power source during service and when replacing parts.
11. Warning：before obtaining access to terminals, all supply circuits must be disconnected.
12. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or a similarly qualified person in order to avoid a hazard.
13. An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
14. Disconnect the power supply before cleaning and maintenance.
15. The appliance shall not be installed in the laundry：
16. F-Gas label

The equipment contains fluorinated greenhouse gas R410A
Global Warming Potential(GWP):2087.5

Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

Contents

The equipment contains fluorinated
greenhouse gas R410A
Global Warming Potential(GWP):2087.5

1 Safety Precaution

⚠ WARNING

This unit is suitable for commercial and industrial use, not suitable for home use . Don't use it in some special places for machine rooms, precise instruments, foods, plants, animals, artworks, etc

- The installation shall be done by the distributor or the professional staff. The installation staff must have related professional knowledge. Misoperation in the self-installation will result in fire, electric shock, injury, water leak, etc.
- If the air conditioner is installed in a small room, some proper measures shall be taken to make sure that the concentration of refrigerant leak in the room shall not exceed the critical level. For detailed measures, please consult the distributor.
- When connecting the power supply, comply with the regulations specified by the local power company. According to the law, the ground wire must be connected. The misconnection of the ground wire will result in electric shock.
- If the air conditioner needs to be moved or reinstalled, please inform the distributor or the professional staff to operate. Incorrect installation will result in fire, electric shock, injury, water leak, etc.
- The users are not permitted to rebuild or repair the air conditioner by their own. Incorrect repair will result in fire, electric shock, injury, water leak, etc.. Please inform the distributor or the professional staff to repair.

⚠ NOTE

- Make sure the water drainage ditch is useable.
- Make sure a current leakage protection switch is equipped. The current leakage protection switch must be equipped. If not, an electric shock will take place.
- It mustn't be installed in any potential leakage location of inflammable gas. In case of the inflammable gas leak around the outdoor unit, a fire takes place.
- Make sure the foundation and hoisting are firm and reliable. If not, it will result in a falling accident.
- Make sure all cables are correctly connected. The misconnection of the cables will result in the damage of electrical components.
- Pre-installation exposure to water or other moistures will result in short circuit of its electrical components. Don't store it in any damp cellar or expose it to rain or water.
- In case of the refrigerant leaks during installation, the room must be ventilated at once. If the leaked refrigerant is exposed to flame, some toxic gases will be generated.
- After installation, make sure the refrigerant is not leaked.
- If the refrigerant gas in the room is exposed to flame source, such as a heater, a stove or an electric cooker, some toxic gases will be generated..
- A lightning protection device must be equipped according to national laws and regulations against the lightning strike.

2 Key Points for Construction Inspection

2.1 Arrival of goods and open-case inspection

1. When receiving the machine, check if there is any damage in transportation. If any surface or internal damage is found, please inform the transportation agency in a written form.
2. After receiving the machine, check if the type, specification and quantity of the machine conform to the contract.
3. When unpacking the product, please keep the Manual well and check all accessories.

2.2 Refrigerant pipe

1. The refrigerant pipe must be installed by the special refrigerant distributor made by our company (purchase).
2. The refrigerant pipe must use the pipe with specified diameter and wall thickness.
3. The welding of the copper pipe must be performed with nitrogen-filled protection. Before welding, the copper pipe must be filled with the nitrogen of 0.2kgf/cm^2. After welding, the nitrogen must be cut off until the copper pipe is thoroughly cooled down.
4. The refrigerant pipe must be treated with thermal insulation.
5. After the refrigerant pipe is installed and before the air tightness test and vacuumization are performed, the indoor unit cannot be power-on.

2.3 Air tightness test

After the refrigerant pipe is installed, nitrogen of 40kgf/cm^2 (4.0MPa) must be filled from the gas side and liquid side simultaneously for 24-hour air tightness test.

2.4 Vacuumizing

After the air tightness test, vacuumization (-0.1MPa) must be performed from both the gas side and the liquid side simultaneously.

2.5 Refilling of refrigerant

1. The refilling volume of refrigerant is calculated by the diameter and length (actual length) of the pipe at the liquid sides of the indoor and outdoor units.
2. The refilling volume of refrigerant, diameter and length (actual length) of liquid pipe, and height difference of the indoor and outdoor units shall be recorded into the use confirmation table of the outdoor unit (on the cover plate of electronic control box) for future reference.

2.6 Electrical wiring

1. The power supply capacity and wire diameter shall be selected according to the design manual. Generally, the power line of the air conditioner is thicker than that of the motor.
2. To prevent misoperation of the air-conditioner, don't interlace or wind the power line (220-240V-/380V 3N-) with the connecting wires (low-voltage wires) of the indoor and outdoor units.
3. The indoor unit is power-on after air tightness test and vacuumization.

2.7 Trial Run

1. Trial run cannot be performed until the outdoor unit is power-on for more than 12 hours, or the system may be damaged.

3 Installation of Outdoor Unit

WARNING

- The air conditioner must be installed in the place, which is strong enough to support the weight of the machine.
- If it is not strong enough, the machine may fall down and cause some personal injury.
- The special installation must be performed against strong wind or earthquake.
- The falling-down because of incorrect installation may cause some accidents
- Air conditioners must be installed indoors or where the rain doesn't reach.

3.1 Selection of installation position

1. Enough space for installation and maintenance.
2. No barrier at the air inlet and the air outlet and away from strong wind.
3. Dry and ventilated, make sure not exposed to rain and snow.
4. The flat supporting surface is able to bear the weight of the outdoor unit. The outdoor unit shall be horizontally installed, without any noise or vibration.
5. Neighbors shall not be influenced by running noise and exhaust gas.
6. Without inflammable gas leak.
7. Convenient for installation of connecting pipe and electrical connection.

3.2 Dimensional drawing of outdoor unit (Unit: mm)

1. Fig. 3-1 is applicable for models of MVH-H100C/DN1 ; MVH-H140C/DGN1A ; MVH-H160C/DGN1A
2. Fig. 3-2 is applicable for models of MVH-H224C/DGN1

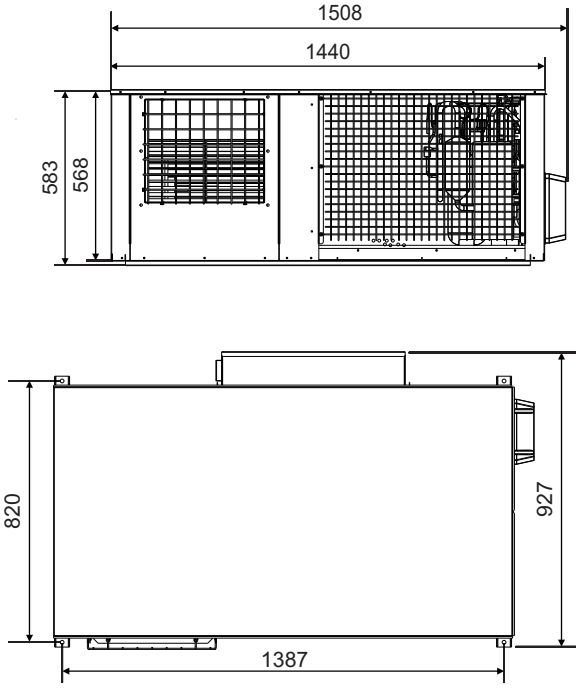


Fig. 3-1 Dimension of Outdoor Unit

3 Installation of Outdoor Unit

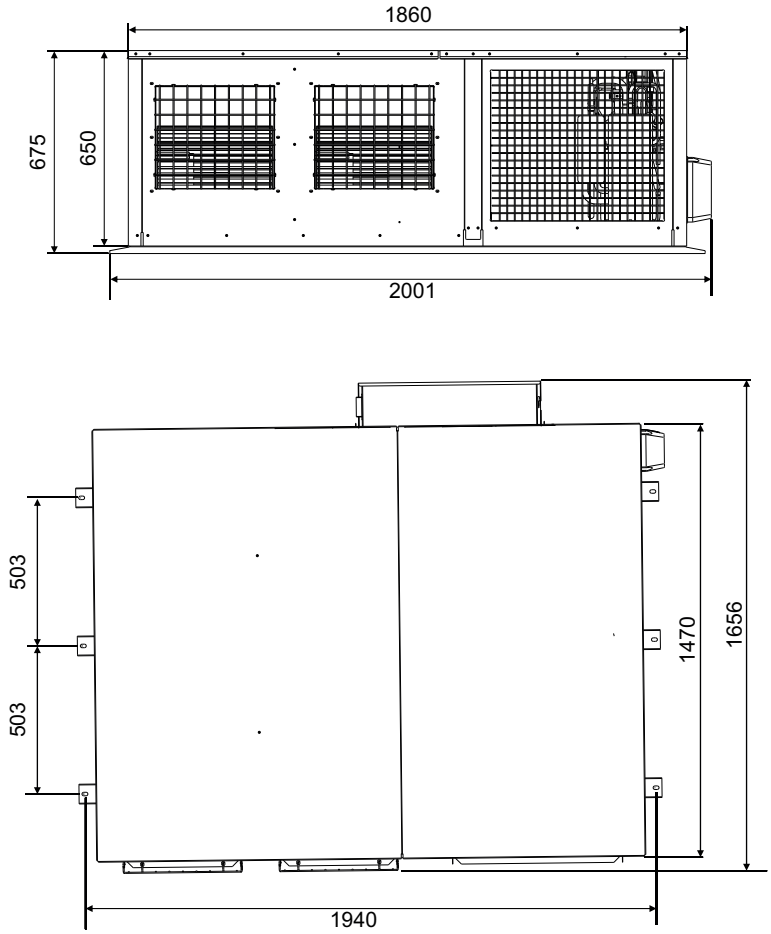


Fig. 3-2 Dimension of Outdoor Unit

3.3 Hoisting of outdoor unit

1. Don't remove any package upon hoisting. Two ropes (more than 8cm) shall be used to hoist the well-packaged machine stably and safely. If there is no package or the packaging material is broken, use some backing plates or packaging materials to protect the machine.
2. The outdoor unit shall be carried and hoisted vertically, within an inclination of less than 15 degrees. Care should be taken to safety during carrying and hoisting the machine.
3. The gravity of the machine is not in the center, so be careful to hoist the machine.
4. Don't hold the suction inlet of the housing, or it will be deformed.

3.4 Installation and maintenance space of outdoor unit

1. Provide a firm and adequate foundation to:
   1) Prevent the outdoor unit from being sunken;
   2) Prevent the outdoor unit from abnormal noise.
2. Foundation types
   1) Steel structure
   2) Concrete structure (Common practice is shown in the Fig. below)

3 Installation of Outdoor Unit

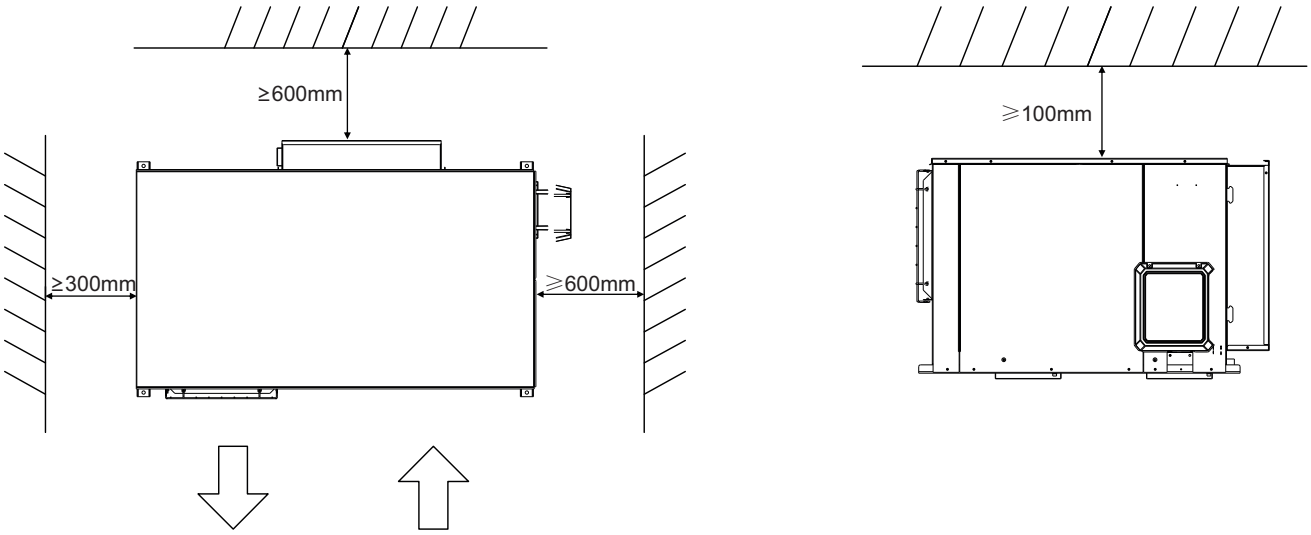


Fig 3-3 Space schematic diagram I for installation and maintenance of outdoor unit

3.5 Pipe Connection

1. Must be connected to air supply and return pipe of more than 1m, also can effectively avoid short circuit of supplying and returning.
2. The equivalent static pressure of the longest pipe length should be less than or equal to 90Pa to ensure the normal operation of the unit.
3. Install a downwardly sloping pipe to prevent rain from entering and to provide heat to the pipes and connections to prevent condensation.
4. Static pressure dialing of electronic control should be selected according to the static pressure of the installed pipeline.

3.6 Position and installation of outlet pipe

1. Drainage sometimes gets ice, so avoid draining where people use it often.
2. When installing this unit, the outlet section of the drain pipe should be lower than the opposite side（>25mm/<30mm） to avoid poor drainage.
3. As shown in the figure below, the siphon must be connected and special care must be taken when connecting the unit.
4. The inner diameter of the prepared drain pipe should be greater than 25mm, and the drain pipe should be bent downwards, and the slope should be greater than 2%.
5. Check to make sure the drain is smooth. Pour some water into the drain pan to make sure the water does not stay on the drain pan.
6. Check drain fittings regularly (annually) to avoid water leakage.

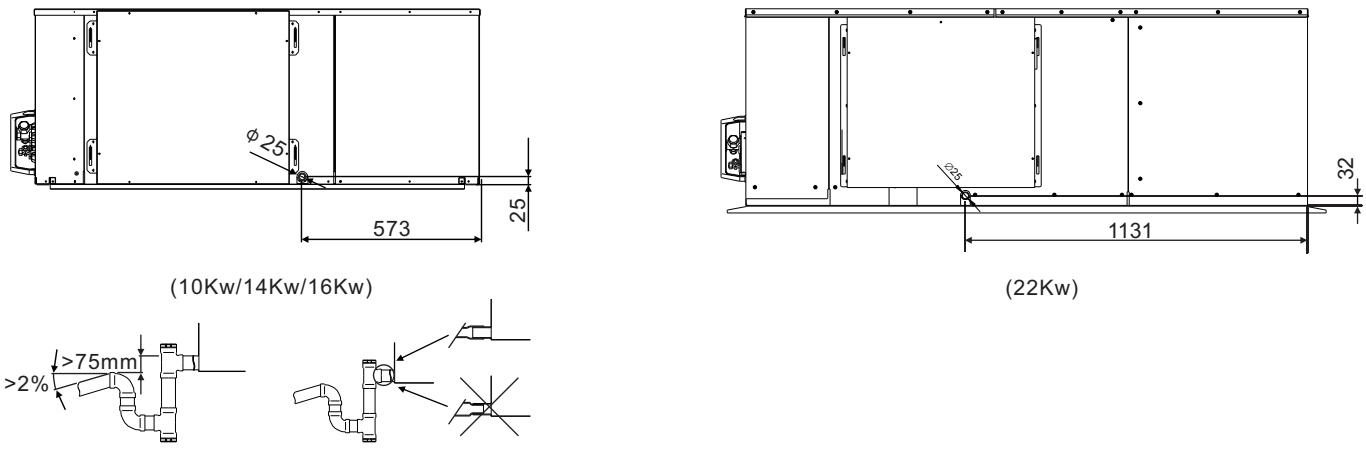


Fig. 3-4 Schematic diagram for connecting pipe of outdoor unit

4 Installation of Connecting Pipe

4.1 Refrigerant pipe

1. Flaring

Use a pipe cutter to cut the refrigerant pipe and a pipe expander to flare.

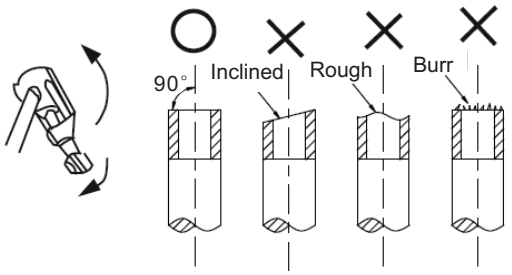
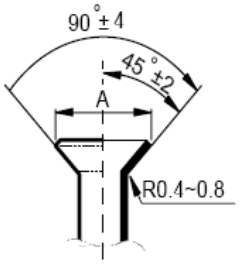


Fig. 4-1 Cutting Pipe of Connecting Pipe

Table 4-1 Flaring Dimension of Connecting Pipe

Outer Diameter (mm)	A(mm)	
	Maximum	Minimum
φ6. 4	8. 7	8. 3
φ9. 5	12. 4	12. 0
φ12. 7	15. 8	15. 4
φ15. 9	19. 0	18. 6
φ19.1	23.3	22.9



2. Fastening nut

Align the connecting pipe, tighten it by hand, and then by a wrench.

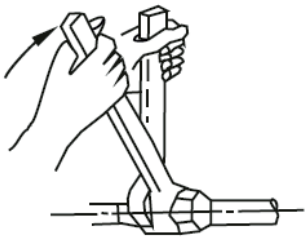


Fig. 4-2 Tightening Schematic Diagram

Table 4-2 Tightening Torque

Pipe Dimension (mm)	Tightening Torque (Nm)
Φ6. 4	14. 2～17. 2（144～176 kgf•cm）
Φ9. 5	32. 7～39. 9（333～407 kgf•cm）
Φ12. 7	49. 5～60. 3（504～616 kgf•cm）
Φ15. 9	61. 8～75. 4（630～770 kgf•cm）
Φ19.1	97.2～118.6（1115～1364 kgf•cm）

⚠ NOTE

- To prevent the copper pipe from internal oxidation upon welding, the copper pipe shall be filled with nitrogen. Otherwise, the oxide skin will block the refrigeration system!
- When fastening the nut, too strong force will damage the flared socket, but too weak force will result in leakage. Please refer to the tightening torque in the table above to fasten the nuts!

4.2 Set refrigerant pipe dimension and pipe connecting steps

Table 4-3 Definition of Pipe

Name of Pipes	Connecting Position of Pipe	Code
Main pipe	Pipe between the outdoor unit and the first distributor at the indoor unit side	L1
Main pipe of indoor unit	Pipe behind the first distributor at the indoor side and indirectly connected to the indoor unit	L2~L5
Branch pipe of indoor unit	Pipe behind the distributor and directly connected to the indoor unit	A,b, c, d, e, f
Distributor components of indoor unit	Pipe components to connect the main pipe, main branch pipe and branch pipe	A, B, C, D, E

4 Installation of Connecting Pipe

1. Connecting mode I

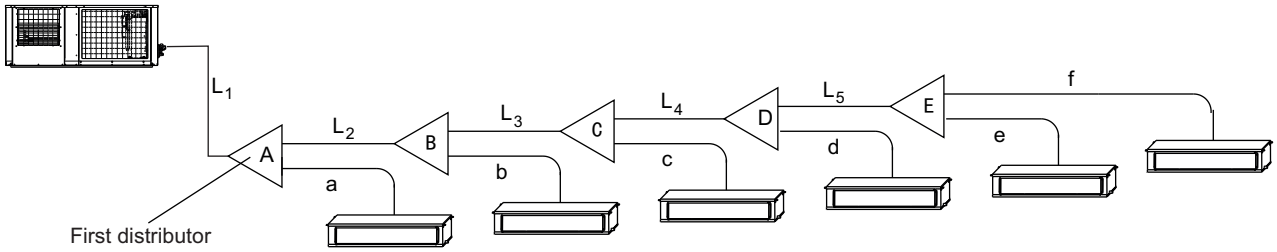


Fig. 4 -3 Connecting mode I

2. Connecting mode II

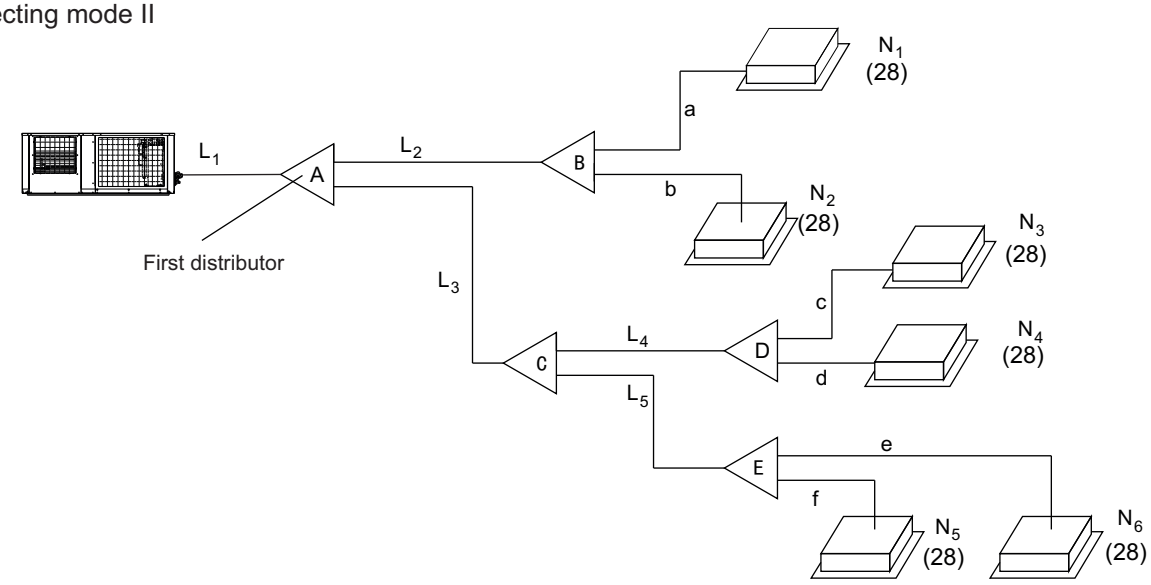


Fig. 4 -4 Connecting mode II

NOTE

- All distributors must use our company's special distributors. Otherwise, it may cause severe faults of the system!
- The indoor unit shall be equally installed on both sides of the U-type distributor.

4.3 Determination of main pipe (L1) diameter

Table 4-4 Diameter of Main Pipe

Capacity of Outdoor Unit (kW)	Pipe				
	Dimension of Main Pipe (mm)				
	L_1<30m		L_1≥30m		First distributor
	Liquid pipe	Gas pipe	Liquid pipe	Gas pipe	
10	Φ9. 52	Φ15.88	Φ9. 52	Φ19.05	FQZHN-01D (LC 23 220)
14/16/22	Φ9. 52	Φ19. 05	Φ9. 52	Φ19. 05	FQZHN-01D (LC 23 220)

4 Installation of Connecting Pipe

4.4 Determination of main pipe (L_2-L_5) diameter

Table 4-5 Diameter of Pipe

Capacity of Downstream Indoor Unit (kW)	Length of Downstream Equivalent Pipe		
	Dimension of main pipe of indoor unit		Applicable to distributor
	Liquid pipe	Gas pipe	
W＜6. 5	Φ9. 52	Φ12. 7	FQZHN-01D (LC 23 220)
6. 5≤W＜18	Φ9. 52	Φ15. 88	FQZHN-01D (LC 23 220)
18≤W＜24	Φ9. 52	Φ19. 05	FQZHN-01D (LC 23 220)

4.5 Allowable length and height difference of the refrigerant pipe

1. Connecting mode I

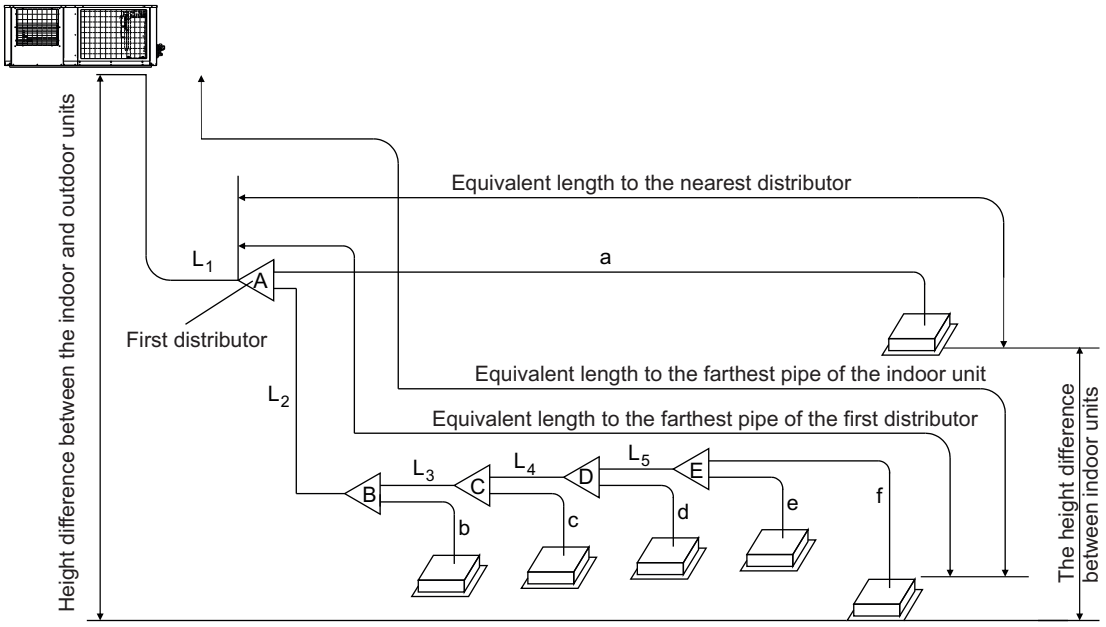


Fig. 4 -5 Connecting Mode I

2. Connecting mode II

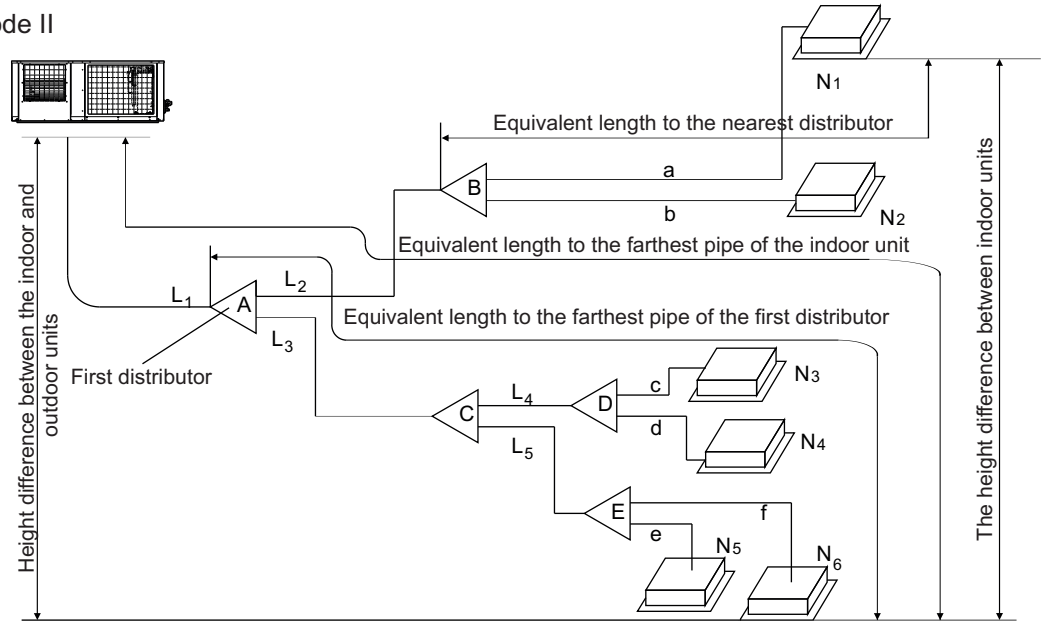


Fig. 4 -6 Connecting Mode II

4 Installation of Connecting Pipe

Table 4-6 Diameter of Pipe			
Total Pipe Length		≤100m	$L_1+L_2+L_3+L_4+L_5+a+b+c+d+e+f$
Length of the farthest pipe	Actual length	≤60m	$L_1+L_2+L_3+L_4+L_5+f$(connecting mode I) or $L_1+L_3+L_5+f$(connecting mode II)
	Equivalent length	≤70m	
Equivalent length to the farthest pipe of the first distributor		≤20m	$L_2+L_3+L_4+L_5+f$(connecting mode I) or L_3+L_5+f(connecting mode II)
Equivalent length to the nearest distributor		≤15m	a、b、c、d、e、f
Height difference between the indoor and outdoor units	Outdoor upper	≤30m	-
	Outdoor lower	≤20m	-
Height difference between the indoor units		≤8m	-

4.6 Installation of distributor

1. The distributor shall use U-type or Y-type, instead of T-type.
2. The distributor shall be installed horizontally, with the deviation angle of no greater than ± 10°C.
3. The distributor cannot be turned directly, with the straight pipe of no less than 0.8 meter.

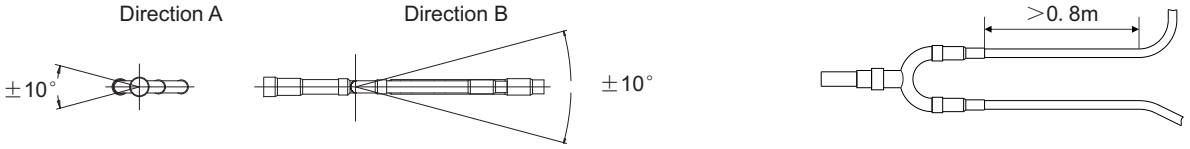


Fig. 4-7 Installation of Distributor

4.7 Oil return bend settings

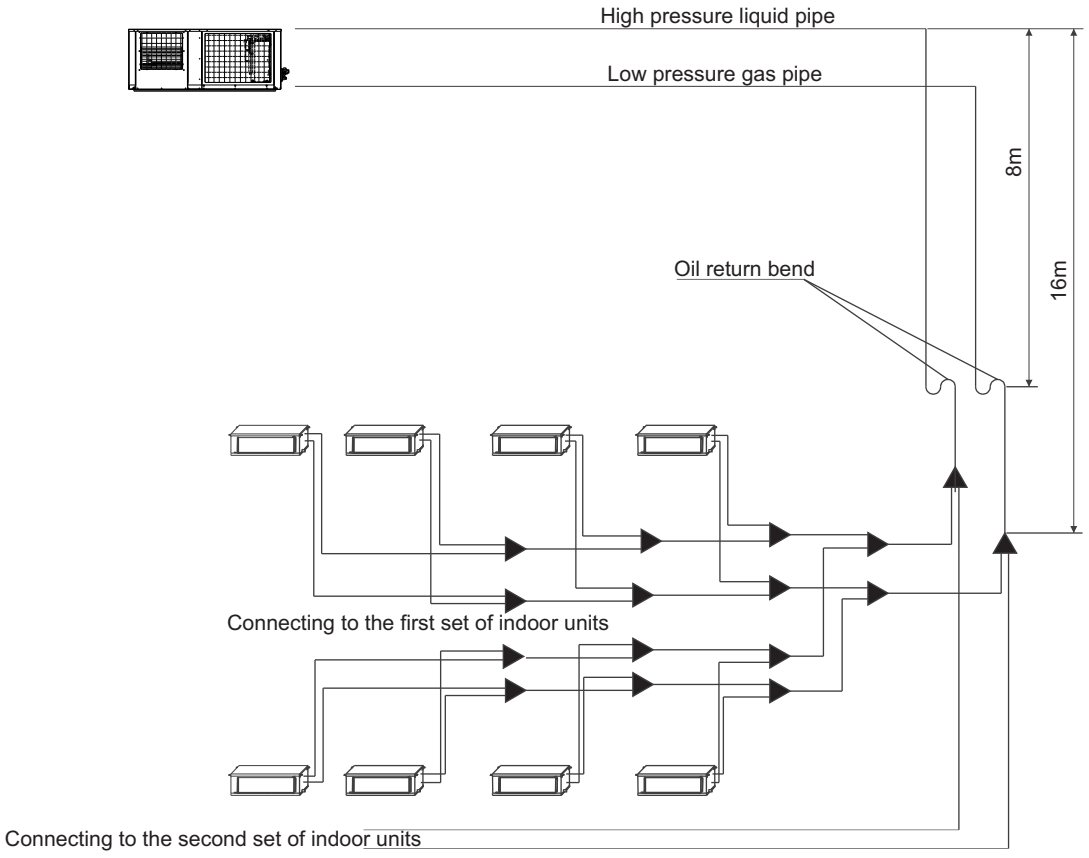


Fig. 4-8 Position of Oil Return Bend at the Height Direction

4 Installation of Connecting Pipe

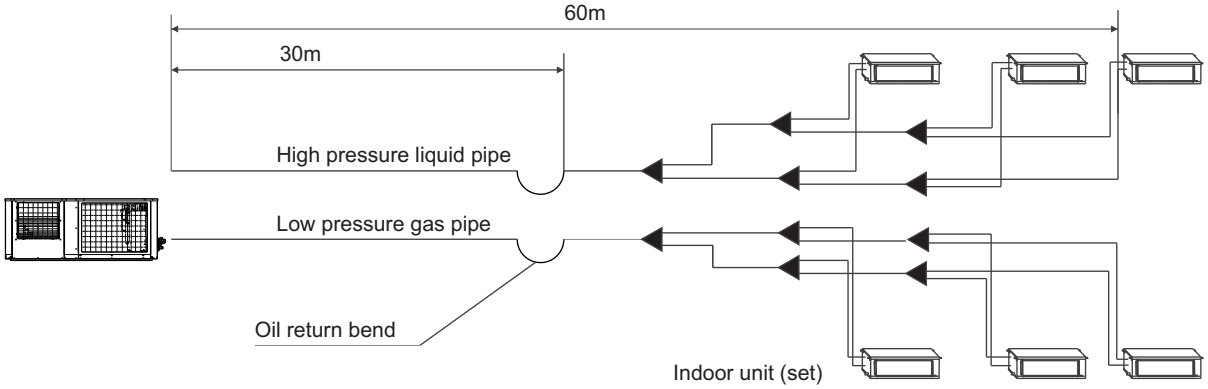


Fig. 4-9 Position of Oil Return Bend at the Horizontal Direction

4.8 Remove foreign materials in the pipeline.

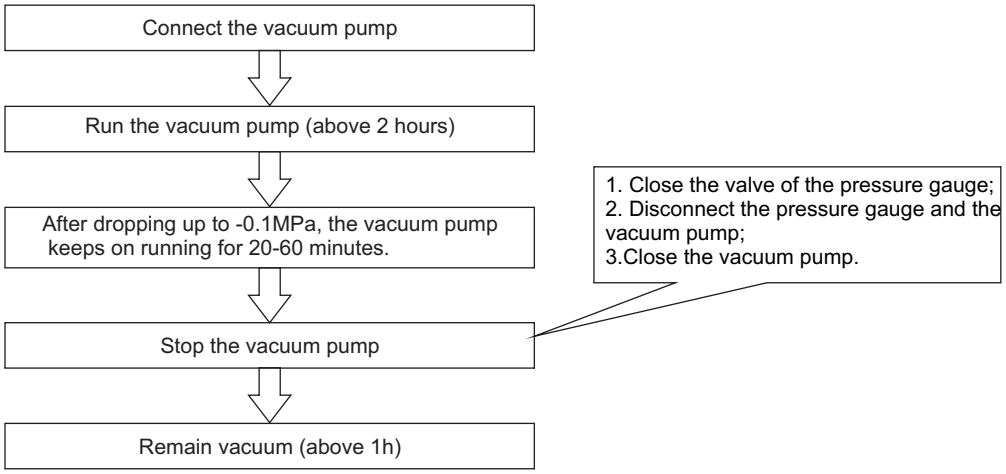
1. The foreign materials, which enter the refrigerant pipe during installation, shall be cleaned with high pressure nitrogen.
2. Don't connect with the indoor unit upon cleaning.
3. Use the nitrogen instead of refrigerant or flammable toxic gases like oxygen.

4.9 Air tightness test

1. After the refrigerant pipe is installed and connected to the indoor unit, and before the connecting pipes between the indoor and outdoor units are connected to the valves of the outdoor units, refill the nitrogen with the pressure of 40kgf/cm² (4.0MPa) from the gas side and the fluid side simultaneously, mark the pressure value, and then perform 24-hour air tightness test.
2. If the pressure drops, recheck the leakage of all interfaces and then maintain the pressure for 24 hours.
3. Don't connect with the outdoor unit during maintaining the pressure.

4.10 Vacuumizing

1. The vacuum pump has the vacuum degree of less than -0.1MPa and the air displacement of more than 40L/min.
2. It is unnecessary to vacuumize the outdoor unit. Don't open the check valves at the gas side and the liquid side of the outdoor unit.
3. Make sure the vacuum pump can drop up to -0.1MPa within 2 hours; if it fails to drop up to -0.1MPa after 3 hours, check moisture or air leak.
4. The vacuum pump must have a check valve.



NOTE

- Don't use tools and measuring apparatus using in different refrigerants or directly contacting the refrigerant.
- Don't exhaust air with refrigerant gas.
- If the vacuum degree cannot reach -0.1MPa, recheck its leakage. If not, keep the vacuum pump on for 1-2h.

4 Installation of Connecting Pipe

4.11 Refilling volume of refrigerant

The refilling volume of refrigerant (R410A) is calculated according to the diameter and length of the pipe at the liquid side of the indoor and outdoor units.

Table 4-7 Refilling Volume of Refrigerant

Diameters of pipe at the liquid side (mm)	Refilling volume of refrigerant equal to the length of 1m pipe (unit: kg)
φ6. 35	0.023
φ9. 52	0.040

Note: The R410A refrigerant must be weighed by an electronic scale and filled in the liquid state.

4.12 Stop valve instructions

1. It is closed when leaving the factory;
2. Open the valve counterclockwise or close the valve clockwise with a 6mm socket head wrench;
3. After completing the operation, tighten the valve cover;
4. R410A special tool shall be used to vacuumize the valve and fill the refrigerant at the service entrance. Fill the refrigerant at the service entrance at the gas side, and vacuumize the valve at the service entrance at the liquid side and the gas side simultaneously.

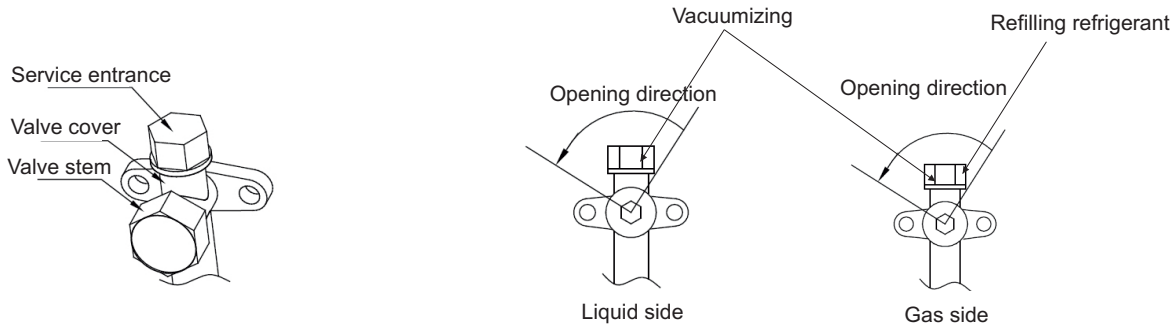


Fig. 4-10 Stop Valve Instructions

4.13 Thermal insulation of pipe

1. Apply thermal insulation to the pipes at the gas side and the liquid side respectively;
2. Use closed-cell thermal insulation materials, with the flame retardant grade of B1 and high temperature resistance of 120℃;
3. Outer diameter of copper pipe ≤ φ12. 7 and thickness of thermal insulation cotton ≥ 15mm; outer diameter of copper pipe ≥ φ15. 88 and thickness of thermal insulation cotton ≥ 20mm.
4. The nut joints of the indoor unit shall be performed thermal insulation

⚠ NOTE

- The power supplies for the indoor and outdoor units shall be separately designed.
- The power supply must be designed with a sub-circuit, and equipped with a current leakage protector and a manual switch.
- All indoor units in the same system shall be arranged on the same power circuit, and shall be turned on/off the power simultaneously. It is not allowed to equip each indoor unit with a power switch.
- The connecting wire system and the refrigerant pipe system of the indoor unit shall be incorporated into the same system.
- To reduce the interference, the indoor and outdoor communication cables shall use two-core or three-core shielded twisted-pair cables instead of ordinary multi-core cables.
- Conform to related national electrical standards.
- Electrical wiring shall be done by a professional electrician.

5 Electrical Wiring

5.1 Outdoor unit wiring

Table 5-1 Outdoor Unit Wiring

Capacity (kW)	Power Supply		Power Line (mm2)	Breaker/ Fuse (A)	Signal Wire of Indoor/Outdoor Units (mm) (Signal Wire of Weak Current)
10	Single-phase	220V-240V～50Hz	3×6	40/35	three-core shielded cable 3×1.0 (two-core shielded cable 2×1.0)
14/16	Three-phase	380V～50Hz/60Hz	5×2. 5	25/20	three-core shielded cable 3×1.0 (two-core shielded cable 2×1.0)
22	Three-phase	380V～50Hz/60Hz	5×6	35/30	three-core shielded cable 3×1.0 (two-core shielded cable 2×1.0)

If needed, the user can purchase a centralized controller, as shown in the dashed box. For the specific method of installation, please contact your local supplier.

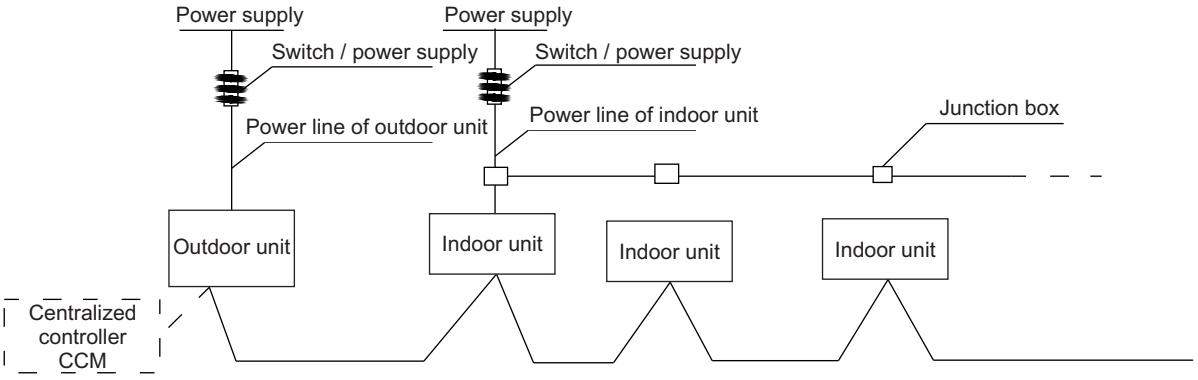


Fig. 5-1 Wiring and Control

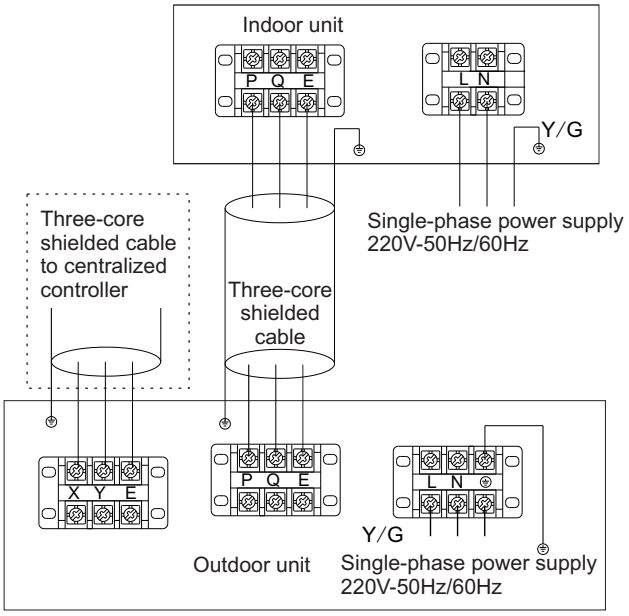


Fig. 5−2 Electrical Wiring of Single-phase Outdoor Units

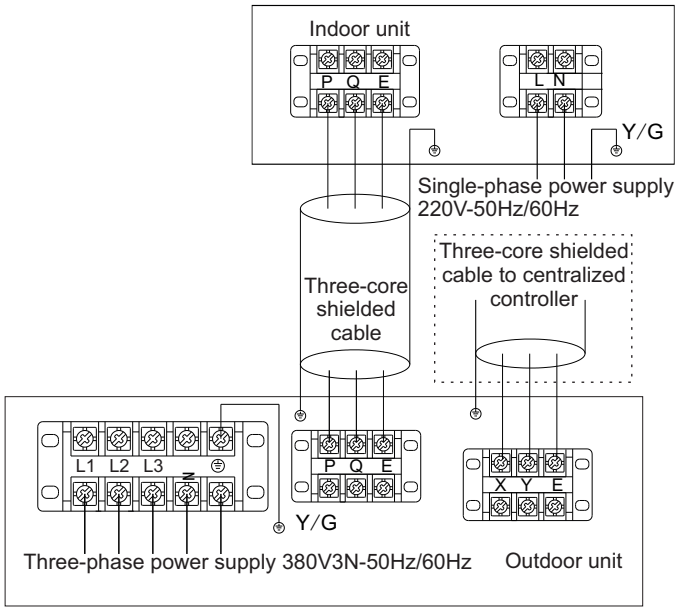


Fig. 5-3 Electrical Wiring of Three-phase Outdoor Units

NOTE

- When the signal line uses a two-core shielded cable, the shielding net shall be connected to “E” of the terminal block. When the signal line uses a three-core shielded cable, the shielding net shall be connected to the ground.
- Never connect the power line (strong current) to the terminal block of the signal line (weak current). Otherwise, the power board will be burnt out.

5 Electrical Wiring

5.2 Indoor unit power supply wiring

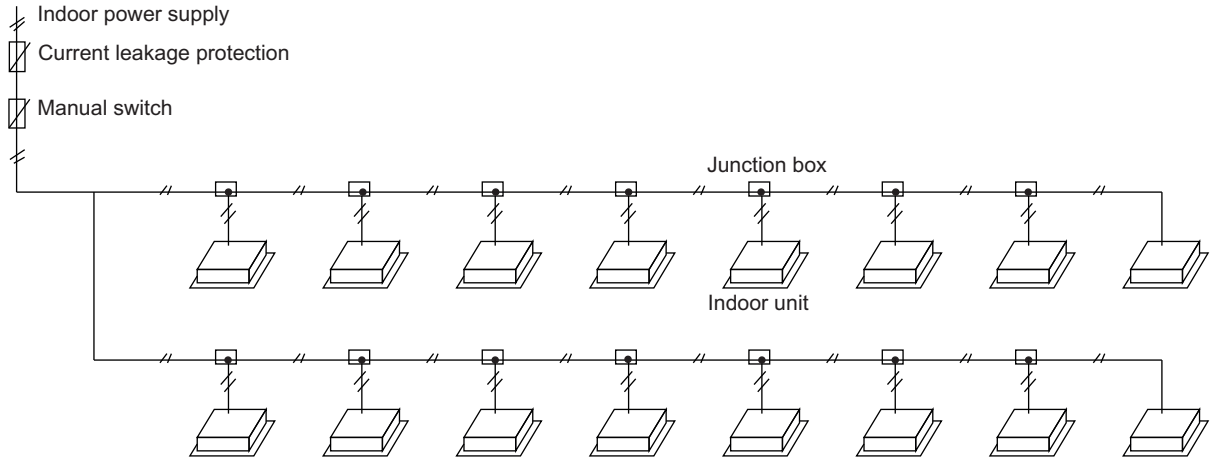


Fig. 5-4 Indoor Unit Power Supply Wiring

NOTE

- When the power line is parallel to the signal line, please put the electrical wires into their own wire pipes, with proper wire spacing (10A or below: 300mm, 50A or below: 500mm).

5.3 Indoor unit signal line wiring

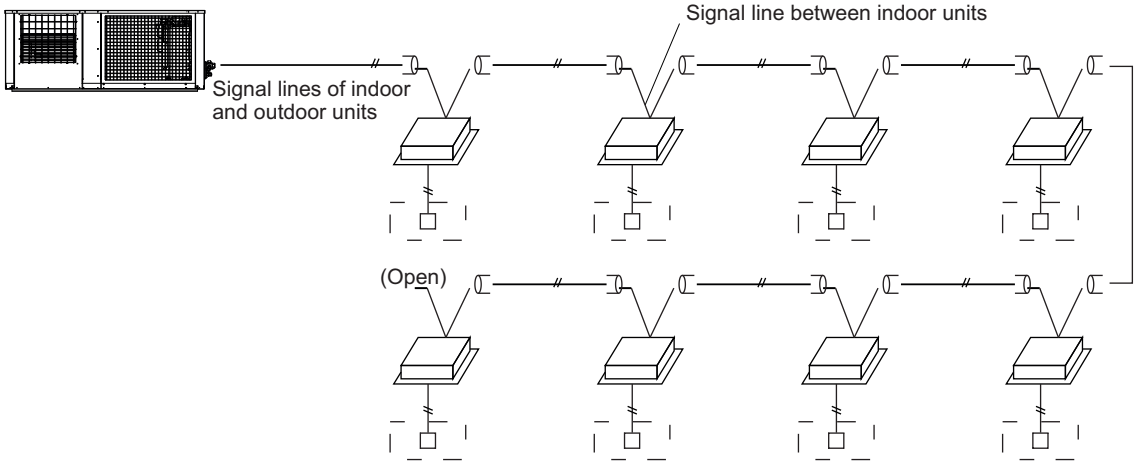


Fig. 5-5 Indoor Unit Power Supply Wiring

If needed, the user can purchase a wire controller, as shown in the dashed box.

5.4 Wiring diagram

For electrical wiring diagram of outdoor unit, refer to the wiring diagram at the side of the right side plate of the outdoor unit.

5 Electrical Wiring

5.5 Dialing setting of main control board

1. Dialing setting of main control board

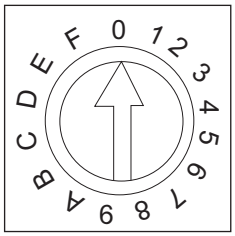
Table 5-2 Dialing setting of main control board for models

SW1	Static Pressure
ON 1 2	Mute
ON 1 2	0Pa (factory default)
ON 1 2	50Pa
ON 1 2	90Pa

SW1	Night Time
ON 3 4	6/10h (factory default)
ON 3 4	8/12h
ON 3 4	8/10h
ON 3 4	6/12h

SW2	Priority Mode
ON 1 2 3	Automatic selection mode priority (factory default)
ON 1 2 3	Heating mode priority
ON 1 2 3	Cooling mode priority
ON 1 2 3	Only respond to heating mode
ON 1 2 3	Only respond to cooling mode
ON 1 2 3	VIP+Automatic priority
ON 1 2 3	Fist-start mode priority

Define outdoor unit capacity by S1 dialing



The number you dial means the capacity of outdoor unit selected

Dialing	Capacity
1	/
2	10KW
3	/
4	/
5	/
6	/

5 Electrical Wiring

Table 5-3 Inspection Instructions of Outdoor Unit for 10KW			
No.		Display contents	Remarks
0	0	Current frequency / number of indoor units	Display number of online units when standby
1	1-	Capacity of outdoor unit	80, 100, 112, 120, 140, 160, 180
2	2-	Operation mode	0:off/fan; 2:cooling; 3:heating; 4:forced cooling
3	3-	Total capacity need of indoor unit	
4	4-	Actual capacity needs revised by outdoor unit	
5	5-	Actual running capacity of outdoor unit	
6	6-	Fan status(fan speed)	0-8
7	7-	T2/T2B average temperature	T2B average when cooling, T2 average when heating
8	8-	T3 pipe temperature	
9	9-	T3B condenser temperature	
10	10-	T4 outdoor air temperature	
11	11-	T5 exhaust temperature	
12	12-	Temperature of IPM	
13	13-	T7 refrigerant cooling inlet pipe temperature	
14	14-	Electronic expansion valve opening degree	Actual value=display value*4
15	15-	Primary current	
16	16-	Secondary current	
17	17-	Primary voltage	
18	18-	Secondary voltage(DC bus)	Actual value=display value*4
19	19-	Number of indoor units	
20	20-	Number of operating indoor units	
21	21-	Priority mode	0:Auto ; 1:heating priority; 2:coolingpriority; 3:only cooling 4:only heating 5:VIP+auto priority 6: First priority
26	26-	Frequency limit display	0: no frequency limit; 1: T3B limit frequency ; 2: T4 limit frequency 4: T5 frequency limit;8:voltage limit frequency ;16:current limit frequency 32:Temperature of IPM frequency limit 64: silent limit frequency(will display total if there are multiple frequency limits)
27	27-	Last failure or protection code	No protection or fault display E-
28	28-	Program version	
29	29-	EEPROM version	

5 Electrical Wiring

Table 5-4 Inspection Instructions of Outdoor Unit for 14Kw/16Kw/22Kw			
No.		Display contents	Remarks
0	0	Current frequency / number of indoor units	Display number of online units when standby
1	1–	Capacity of outdoor unit	120, 140, 160, 180, 200, 224, 260, 280, 335
2	2–	Operation mode	0:off/fan; 2:cooling; 3:heating; 4:forced cooling
3	3–	Total capacity need of indoor unit	
4	4–	Actual capacity needs revised by outdoor unit	
5	5–	Actual running capacity of outdoor unit	
6	6–	Fan status(fan speed)	0-8
7	7–	T2/T2B average temperature	T2B average when cooling, T2 average when heating
8	8–	T3 pipe temperature	
9	9–	T3B condenser temperature	
10	10–	T4 outdoor air temperature	
11	11–	T5 exhaust temperature	
12	12–	Temperature of IPM	
13	13–	T7 refrigerant cooling inlet pipe temperature	
14	14–	Electronic expansion valve opening degree	Actual value=display value*4
15	15–	Primary current	
16	16–	Secondary current	
17	17–	Primary voltage	Actual value=display value*2
18	18–	Secondary voltage(DC bus)	Actual value=display value*4
19	19–	Number of indoor units	
20	20–	Number of operating indoor units	
21	21–	Priority mode	0:Auto ; 1:heating priority; 2:coolingpriority; 3:only cooling 4:only heating 5:VIP+auto priority 6: First priority
26	26–	Frequency limit display	0: no frequency limit; 1: T3B limit frequency ; 2: T4 limit frequency 4: T5 frequency limit;8:voltage limit frequency ;16:current limit frequency 32:Temperature of IPM frequency limit 64: silent limit frequency(will display total if there are multiple frequency limits)
27	27–	Last failure or protection code	No protection or fault display E-
28	28–	Program version	
29	29–	EEPROM version	

5 Electrical Wiring

Table 5-5 Outdoor Unit Fault Code		
Fault Code	Fault Contents	Remark
E1	Outdoor unit phase-sequence fault	
E2	Communication fault between the indoor unit and the outdoor unit	20-minute break at first or 2-minute break later
E4	T4 outdoor air temperature sensor fault	
E6	T3 Condenser pipe temperature sensor fault (outlet)	
E8	T5 Exhaust temperature sensor fault	
E9	AC over-voltage / under-voltage protection	
E10	EEPROM fault	
EA	T3B condenser temperature sensor fault (middle)	
EC	T7 refrigerant cooling pipe inlet temperature sensor fault	
H0	Communication fault of master board and driver chip	
H4	Display P6(IPM module protection) for 3 times within 30 minutes	
H5	Display P2 (system pressure is too low) protection for 3 times within 30 minutes	20-minute break at first or 2-minute break later
H6	Display P4 (T5 Exhaust temperature is too high) protection for 3 times within 100 minutes	Only restore when power on again
H7	The decrease in number of indoor unit	Indoor units are lost for more than 3 minutes. It can't be restored until number of indoor units are restored.
H9	Display P9 (AC fan fault) protection for 2 times within 10 minutes	Only restore when power on again
H10	Display P3(inverter over current protection) protection for 3 times within 60 minutes	Only restore when power on again
H11	Display P13 protection for 2 times within 10 minutes	Only restore when power on again
H12	There are 3 times Pb protection in 60 minutes.	
P1	High pressure protection	
P2	Low pressure protection	Display H5 after P2 protection for 3 times within 30 minutes
P3	inverter overcurrent protection	
P4	Exhaust overheating protection	Display H6 for 3 times within 100 minutes
P5	T3 or T3B condenser pipe overheating protection	
P6	IPM protection	Display H4 after P6 protection for 3 times within 30 minutes
P9	DC fan fault	Display H9 after P9 protection for 2 times within 10 minutes
P10	Anti-typhoon protection	
P11	T2 high temperature protection when heating	
P13	Current detection error protection	
Pb	Inverter module temperature T9 too high protection	

6 Trial Run

6.1 Inspection and confirmation before debugging

1. Check and make sure the refrigerating pipeline and communication line connecting with the indoor and outdoor units are connected with the same refrigerating system. Otherwise, some running faults occur.
2. The power supply voltage is within the rated voltage of ±10%.
3. Check and make sure the power supply line and the control line are correctly connected.
4. Before power-on, make sure there is no short circuit.
5. Check if all units have passed 24-hour nitrogen pressure-maintaining (40kgf /cm^2) test.
6. Make sure the debugged system is fully vacuumized, dried and filled with the refrigerant as specified.

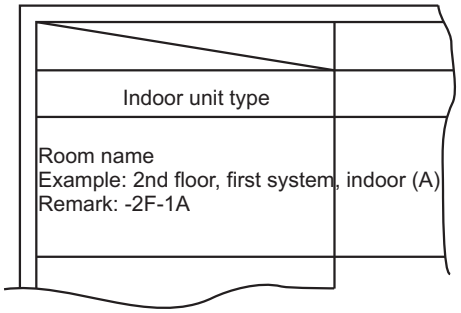


Fig. 6-1 Filling of Names of Connecting Systems

6.2 Preparation before debugging

1. Calculate the refilling volume of refrigerant for each set of units according to the length of on-site liquid pipe.
2. Prepare the required refrigerant.
3. Prepare the system plan, system piping diagram and control wiring diagram.
4. Mark the set address codes on the system plan.
5. Turn on the power supply switch of the outdoor unit in advance, and make sure it is power-on for more than 12 hours, so that the heater heats the compressor oil.
6. Fully open air pipe check valve, liquid pipe check valve and oil balance valve of the outdoor unit. If they are fully opened, the machine may be damaged.
7. Check if the power supply phase sequence of the outdoor unit is correct.
8. Check if all dialing switches of the indoor and outdoor units are set according to the technical requirements of the product.

6.3 Filling of names of connecting systems

When the multiple indoor units are arranged, in order to distinguish the connecting systems of indoor and outdoor units, all systems shall be named respectively and recorded on the nameplate on the electronic control box cover of the outdoor unit.

6.4 Precautions against refrigerant leak

1. The refrigerant of the air conditioner is harmless and nonflammable.
2. The room for the air conditioner shall have an appropriate space. In case of refrigerant leak, it cannot go beyond the critical concentration. In addition, necessary measures can be taken.
3. The critical gas concentration harmless to the human body is 0.3 kg/m^3.
4. Confirm the critical concentration according to the following steps and take corresponding measures.
   a. Calculate the filling volume of refrigerant (A[kg])
   Volume of refrigerant = filling volume of refrigerant before delivery (see the nameplate) + refilling volume of refrigerant corresponding to the length of pipe
   b. Calculate the indoor volume (B [m^3]) (by the minimum volume)
   c. Calculate the refrigerant concentration: $\frac{A[kg]}{B[m^3]} \leqslant$ Critical concentration:0. 3[Kg/m³]

6 Trial Run

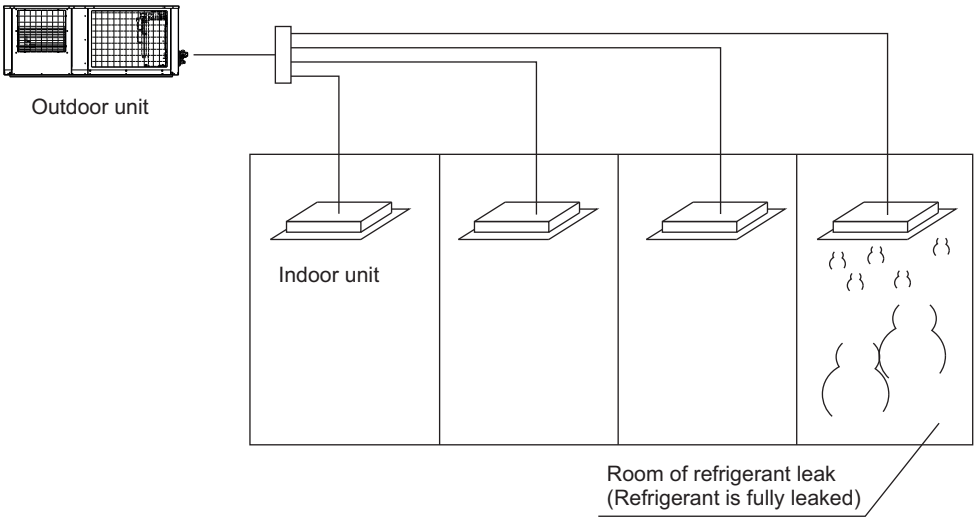
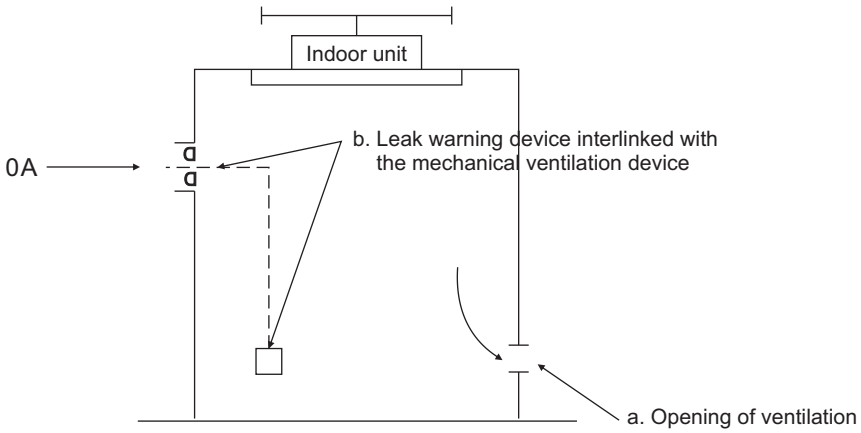


Fig. 6-2 Refrigerant Leak

5. Measures against exceeding the critical concentration
   a. To reduce the refrigerant concentration below the critical concentration, install a mechanical ventilation device (for frequent ventilation).
   b. If frequent ventilation cannot be performed, please install a leak warning device interlinked with the mechanical ventilation device.



(The leak warning device shall be installed in the gathering place of refrigerant.)

Fig. 6-3 Mechanical Ventilation Device

6.5 Hand over to the client

1. Hand over the Use Manual for the Indoor Unit and the Installation Manual for the Outdoor Unit to the client.
2. Explain the contents of Use and Installation Manual to the client carefully.

6 Trial Run

6.6 Important information for the used refrigerant

This product has the fluorinated gas, it is forbidden to release to air.
Refrigerant type: R410A; Volume of GWP: 2088;
GWP=Global Warming Potential

Model	Factory Change	
	Refrigerant/Kg	Tonnes CO_2 equivalent
10 kW	2,6	5,42
14 kW	3,7	7,72
16 kW	3,7	7,72
22 kW	7,5	15,66

Attention:

Frequency of Refrigerant Leak Checks

1) For equipment that contains fluorinated greenhouse gases in quantities of 5 tonnes of CO_2 equivalent or more, but of less than 50 tonnes of CO_2 equipment,at least every 12 months, or where a leakage detection system is installed, at least every 24 months.
2) For equipment that contains fluorinated greenhouse gases in quantities of 50 tonnes of CO_2 equivalent or more, but of less than 500 tonnes of CO equipment, at least every six months, or where a leakage detection system is installed, at least every 12 months.
3) For equipment that contains fluorinated greenhouse gases in quantities of 500 tonnes of CO_2 equivalent or more, at least every three months, or where a leakage detection system is installed, at least every six months.
4) Non-hermetically sealed equipment charged with fluorinated greenhouse gases shall only be sold to the end user where evidence is provide that the installation is to be carried out by an undertaking certified person.
5) Only certificated person is allowed to do installation, operation and maintenance.

PRODUCT FICHE

Trade Mark		MUNDOCLIMA
Model: Outdoor		MVH-H100C/DN1
Sound power level at standard rating conditions (Outdoor)	[dB(A)]	68
Refrigerant type		R410A
GWP		2088
Charge amount	[g]	2600
CO2 equivalent	[tonnes]	5,43
SEER	[W/W]	6,1
Energy efficency class in cooling		A++
Annual electricityu consumption in cooling [1]	[kWh/a]	600
Design load in cooling mode (Pdesign)	[kW]	10
SCOP (avarage heating season)	[W/W]	4
Energy efficency class in heating (average season)		A+
Annual electricity consumption in heating (avarage season)[2]	[kWh/a]	2500
Warmer heating season		-
Colder heating season		-
Design load in heating mode (Pdesign)	[kW]	7,2
Declared capacity at reference design condition (heating avarage season)	[kW]	5,9
Back up heating capacity at reference design condition (heating average season)	[kW]	1,3
Refrigerant leakage contributes to climate change. Refrigerant with lower global warming potential (GWP) would contribute less to global warning than a refrigerant with higher GWP, if leaked to the atmosphere. This appliance contains a refrigerant fluid with a GWP equal to [675]. This means that if 1kg of this refrigerant fluid would be leaked to the atmosphere, the impact on global warming would be [675] times higher than 1kg of CO2, over a period of 100 years.Never try to interfere with the refrigerant circuit yourself or disassemble the product yourself and always ask a profesional.		
Contains fluorinated greenhouse gases.		
Importer: SALVADOR ESCODA S.A. NÁPOLES, 249 P1 08013 BARCELONA (SPAIN)		
Manufecturer: SALVADOR ESCODA S.A. NÁPOLES, 249 P1 08013 BARCELONA (SPAIN)		
[1] [2] Energy consumption "XYZ" kWh per year, based on standard test results. Actual energy consumption will depend on how the appliance is used and where it is located.		
Note: Please check the model information above according to the model name on the nameplate.		

INFORMATION REQUIREMENTS (FOR UNITS > 12KW)

Cooling - Information requirements for air-to-air air conditioners

Information requirements for air-to-air air conditioners								
Model(s): MVH-H140C/DGN1A								
Outdoor side heat exchanger of air conditioner: Air								
Indoor side heat exchanger of air conditioner: Air								
Type: compressor driven								
If applicable: driver of compressor: electric motor								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated cooling capacity	$P_{rated,c}$	14,0	kW		Seasonal space cooling energy efficiency	$\eta_{s,c}$	247,8	%
Declared cooling capacity for part load at given outdoor temperatures T_j and indoor 27°/19 °C (dry/wet bulb)					Declared energy efficiency ratio or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
Tj = 35°C	P_{dc}	13,029	kW		Tj = 35°C	EER_d	2,884	—
Tj = 30°C	P_{dc}	9,820	kW		Tj = 30°C	EER_d	3,886	—
Tj = 25°C	P_{dc}	6,412	kW		Tj = 25°C	EER_d	7,810	—
Tj = 20°C	P_{dc}	3,999	kW		Tj = 20°C	EER_d	13,026	—
Degradation co-efficient for air conditioners (*)	C_{dc}	0,25	—					
Power consumption in modes other than 'active mode'								
Off mode	P_{OFF}	0,0005	kW		Crankcase heater mode	P_{CK}	—	kW
Thermostat-off mode	P_{TO}	0,045	kW		Standby mode	P_{SB}	0,0005	kW
Other items								
Capacity control	variable				For air-to-air air conditioner: air flow rate, outdoor measured	—	6500	m3/h
Sound power level, outdoor	L_{WA}	70,5	dB					
GWP of the refrigerant		2088	kg $CO_{2\ eq}$ (100 years)					
Contact details	SALVADOR ESCODA SA NÁPOLES 249 1st FLOOR 08013 BARCELONA (SPAIN) +34 93 446 27 80							
(*) If Cdc is not determined by measurement then the default degradation coefficient of heat pumps shall be 0.25								
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer								

Information requirements for air-to-air air conditioners								
Model(s): MVH-H160C/DGN1A								
Outdoor side heat exchanger of air conditioner: Air								
Indoor side heat exchanger of air conditioner: Air								
Type: compressor driven								
If applicable: driver of compressor: electric motor								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated cooling capacity	$P_{rated,c}$	16,0	kW		Seasonal space cooling energy efficiency	$\eta_{s,c}$	233,9	%
Declared cooling capacity for part load at given outdoor temperatures T_j and indoor 27°/19 °C (dry/wet bulb)					Declared energy efficiency ratio or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
Tj = 35°C	P_{dc}	15,216	kW		Tj = 35°C	EER_d	2,468	—
Tj = 30°C	P_{dc}	11,355	kW		Tj = 30°C	EER_d	3,847	—
Tj = 25°C	P_{dc}	7,171	kW		Tj = 25°C	EER_d	7,251	—
Tj = 20°C	P_{dc}	4,017	kW		Tj = 20°C	EER_d	13,085	—
Degradation co-efficient for air conditioners (*)	C_{dc}	0,25	—					
Power consumption in modes other than 'active mode'								
Off mode	P_{OFF}	0,0005	kW		Crankcase heater mode	P_{CK}	—	kW
Thermostat-off mode	P_{TO}	0,045	kW		Standby mode	P_{SB}	0,0005	kW
Other items								
Capacity control	variable				For air-to-air air conditioner: air flow rate, outdoor measured	—	6500	m3/h
Sound power level, outdoor	L_{WA}	71,2	dB					
GWP of the refrigerant		2088	kg $CO_{2\ eq}$ (100 years)					
Contact details	SALVADOR ESCODA SA NÁPOLES 249 1st FLOOR 08013 BARCELONA (SPAIN) +34 93 446 27 80							
(*) If Cdc is not determined by measurement then the default degradation coefficient of heat pumps shall be 0.25								
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer								

Information requirements for air-to-air air conditioners								
Model(s): MVH-H224C/DGN1								
Outdoor side heat exchanger of air conditioner: Air								
Indoor side heat exchanger of air conditioner: Air								
Type: compressor driven								
If applicable: driver of compressor: electric motor								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated cooling capacity	$P_{rated,c}$	22,4	kW		Seasonal space cooling energy efficiency	$\eta_{s,c}$	195,6	%
Declared cooling capacity for part load at given outdoor temperatures T_j and indoor 27°/19 °C (dry/wet bulb)					Declared energy efficiency ratio or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
Tj = 35°C	P_{dc}	22,400	kW		Tj = 35°C	EER_d	2,15	—
Tj = 30°C	P_{dc}	16,505	kW		Tj = 30°C	EER_d	4,06	—
Tj = 25°C	P_{dc}	10,611	kW		Tj = 25°C	EER_d	6,00	—
Tj = 20°C	P_{dc}	4,716	kW		Tj = 20°C	EER_d	7,95	—
Degradation co-efficient for air conditioners (*)	C_{dc}	0,25	—					
Power consumption in modes other than 'active mode'								
Off mode	P_{OFF}	0,04	kW		Crankcase heater mode	P_{CK}	—	kW
Thermostat-off mode	P_{TO}	0,04	kW		Standby mode	P_{SB}	0,04	kW
Other items								
Capacity control	variable				For air-to-air air conditioner: air flow rate, outdoor measured	—	7000	m3/h
Sound power level, outdoor	L_{WA}	70	dB					
GWP of the refrigerant		2088	kg $CO_{2\ eq}$ (100 years)					
Contact details	SALVADOR ESCODA SA NÁPOLES 249 1st FLOOR 08013 BARCELONA (SPAIN) +34 93 446 27 80							
(*) If Cdc is not determined by measurement then the default degradation coefficient of heat pumps shall be 0.25								
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer								

Heating - Information requirements for heat pumps

Information requirements for heat pumps								
Model(s): MVH-H140C/DGN1A								
Outdoor side heat exchanger of heat pump: Air								
Indoor side heat exchanger of heat pump: Air								
Indication if the heater is equipped with a supplementary heater: no								
If applicable: driver of compressor: electric motor								
Parameters shall be declared for the average heating season, parameters for the warmer and colder heating seasons are optional.								
Item	Symbol	Value	Unit		Item	Symbol	Value	Unit
Rated heatling capacity	$P_{rated,h}$	14,0	kW		Seasonal space heating energy efficiency	$\eta_{s,h}$	149,4	%
Declared heating capacity for part load at indoor temperature 20 °C and outdoor temperature T_j					Declared coefficient of performance or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
Tj = -7°C	P_{dh}	8,593	kW		Tj = -7°C	COP_d	2,091	—
Tj = 2°C	P_{dh}	5,300	kW		Tj = 2°C	COP_d	3,562	—
Tj = 7°C	P_{dh}	3,550	kW		Tj = 7°C	COP_d	5,585	—
Tj = 12°C	P_{dh}	3,120	kW		Tj = 12°C	COP_d	7,429	—
T_{biv} = bivalent temperature	P_{dh}	8,593	kW		T_{biv} = bivalent temperature	COP_d	2,091	—
T_{OL} = operating limit	P_{dh}	9,602	kW		T_{OL} = operating limit	COP_d	1,974	—
Bivalent temperature	T_{biv}	-7	°C		For air-to-air heat pumps: Operation limit	Tol	-10	°C
Degradation co-efficient heat pumps (**)	C_{dh}	0,25	—					
Power consumption in modes other than 'active mode'					Supplementary heater			
Off mode	P_{off}	0,0005	kW		Back-up heating capacity (*)	elbu	—	kW
Thermostat-off mode	P_{TO}	0,045	kW		Type of energy input			
Crankcase heater mode	P_{CK}	—	kW		Standby mode	P_{sb}	0,0005	kW
Other items								
Capacity control	variable				For air-to-air heat pumps: air flow rate, outdoor measured	—	6500	m3/h
Sound power level, outdoor	L_{WA}	70,5	dB					
GWP of the refrigerant		2088	kg $CO_{2\ eq}$ (100 years)					
Contact details	SALVADOR ESCODA SA NÁPOLES 249 1st FLOOR 08013 BARCELONA (SPAIN) +34 93 446 27 80							
(**) If Cdc is not determined by measurement then the default degradation coefficient of heat pumps shall be 0.25								
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer								

Information requirements for heat pumps							
Model(s): MVH-H160C/DGN1A							
Outdoor side heat exchanger of heat pump: Air							
Indoor side heat exchanger of heat pump: Air							
Indication if the heater is equipped with a supplementary heater: no							
If applicable: driver of compressor: electric motor							
Parameters shall be declared for the average heating season, parameters for the warmer and colder heating seasons are optional.							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heatling capacity	$P_{rated,h}$	16,0	kW	Seasonal space heating energy efficiency	$\eta_{s,h}$	145,1	%
Declared heating capacity for part load at indoor temperature 20 °C and outdoor temperature T_j				Declared coefficient of performance or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
Tj = -7°C	P_{dh}	8,587	kW	Tj = -7°C	COP_d	2,116	—
Tj = 2°C	P_{dh}	5,035	kW	Tj = 2°C	COP_d	3,384	—
Tj = 7°C	P_{dh}	3,554	kW	Tj = 7°C	COP_d	5,874	—
Tj = 12°C	P_{dh}	3,119	kW	Tj = 12°C	COP_d	7,426	—
T_{biv} = bivalent temperature	P_{dh}	8,587	kW	T_{biv} = bivalent temperature	COP_d	2,116	—
T_{OL} = operating limit	P_{dh}	9,603	kW	T_{OL} = operating limit	COP_d	1,972	—
Bivalent temperature	T_{biv}	-7	°C	For air-to-air heat pumps: Operation limit	Tol	-10	°C
Degradation co-efficient heat pumps (**)	C_{dh}	0,25	—				
Power consumption in modes other than 'active mode'				Supplementary heater			
Off mode	P_{off}	0,0005	kW	Back-up heating capacity (*)	elbu	—	kW
Thermostat-off mode	P_{TO}	0,045	kW	Type of energy input			
Crankcase heater mode	P_{CK}	—	kW	Standby mode	P_{sb}	0,0005	kW
Other items							
Capacity control	variable			For air-to-air heat pumps: air flow rate, outdoor measured	—	6500	m3/h
Sound power level, outdoor	L_{WA}	71,2	dB				
GWP of the refrigerant		2088	kg $CO_{2\ eq}$ (100 years)				
Contact details	SALVADOR ESCODA SA NÁPOLES 249 1st FLOOR 08013 BARCELONA (SPAIN) +34 93 446 27 80						
(**) If Cdc is not determined by measurement then the default degradation coefficient of heat pumps shall be 0.25							
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer							

Information requirements for heat pumps							
Model(s): MVH-H224C/DGN1							
Outdoor side heat exchanger of heat pump: Air							
Indoor side heat exchanger of heat pump: Air							
Indication if the heater is equipped with a supplementary heater: no							
If applicable: driver of compressor: electric motor							
Parameters shall be declared for the average heating season, parameters for the warmer and colder heating seasons are optional.							
Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heatling capacity	$P_{rated,h}$	22,4	kW	Seasonal space heating energy efficiency	$\eta_{s,h}$	139,6	%
Declared heating capacity for part load at indoor temperature 20 °C and outdoor temperature T_j				Declared coefficient of performance or gas utilisation efficiency/auxiliary energy factor for part load at given outdoor temperatures T_j			
Tj = -7°C	P_{dh}	15,500	kW	Tj = -7°C	COP_d	1,94	—
Tj = 2°C	P_{dh}	13,712	kW	Tj = 2°C	COP_d	2,31	—
Tj = 7°C	P_{dh}	13,712	kW	Tj = 7°C	COP_d	2,31	—
Tj = 12°C	P_{dh}	8,348	kW	Tj = 12°C	COP_d	3,18	—
T_{biv} = bivalent temperature	P_{dh}	5,365	kW	T_{biv} = bivalent temperature	COP_d	5,16	—
T_{OL} = operating limit	P_{dh}	2,385	kW	T_{OL} = operating limit	COP_d	6,19	—
Bivalent temperature	T_{biv}	-7	°C	For air-to-air heat pumps: Operation limit	Tol	-10	°C
Degradation co-efficient heat pumps (**)	C_{dh}	0,25	—				
Power consumption in modes other than 'active mode'				Supplementary heater			
Off mode	P_{off}	0,035	kW	Back-up heating capacity (*)	elbu	—	kW
Thermostat-off mode	P_{TO}	0,035	kW	Type of energy input			
Crankcase heater mode	P_{CK}	0,08	kW	Standby mode	P_{sb}	0,035	kW
Other items							
Capacity control	variable			For air-to-air heat pumps: air flow rate, outdoor measured	—	7000	m3/h
Sound power level, outdoor	L_{WA}	70	dB				
GWP of the refrigerant		2088	kg $CO_{2\ eq}$ (100 years)				
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(**) If Cdc is not determined by measurement then the default degradation coefficient of heat pumps shall be 0.25							
Where information relates to multi-split air conditioners, the test result and performance data may be obtained on the basis of performance of the outdoor unit, with a combination of indoor unit(s) recommended by the manufacturer or importer							

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