

Hisense

Operation Installation & Maintenance Manual

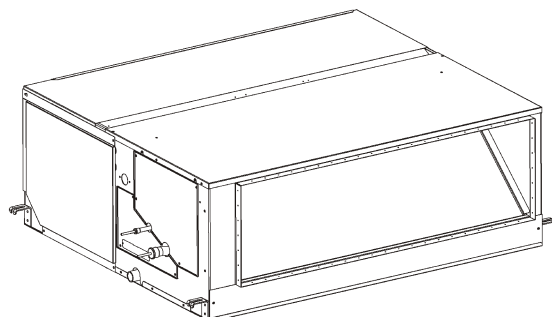
INVERTER-DRIVEN
MULTI-SPLIT AIR-
CONDITIONER
(HEAT PUMP)

- INDOOR UNIT -

Type	Power Source	Model
ALL FRESH AIR TYPE	220-240V ~ 50Hz	AVA-30UXCSCH-70 AVA-48UXCSQH-108 AVA-76UXCSRH-168 AVA-96UXCSRH-210
	380-415V 3N ~ 50Hz	AVA-114UX6SRH-300

IMPORTANT:

READ AND UNDERSTAND
THIS MANUAL BEFORE
USING THIS HEAT-PUMP
AIR CONDITIONERS.
KEEP THIS MANUAL FOR
FUTURE REFERENCE.



P00430Q

ORIGINAL INSTRUCTIONS

IMPORTANT NOTICE

- Hisense pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- Hisense cannot anticipate every possible circumstance that might involve a potential hazard.
- This heat pump air conditioner is designed for standard air conditioning only. Do not use this heat pump air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating process.
- The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available. British Standard, BS4434 or Japan Standard, KHKS0010.
- No part of this manual may be reproduced without written permission.
- Signal words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.

DANGER

: Immediate hazards which WILL result in severe personal injury or death.

WARNING

: Hazards or unsafe practices which COULD result in severe personal injury or death.

CAUTION

: Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

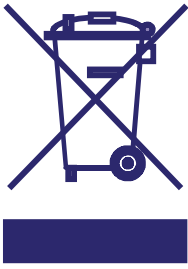
NOTE

: Useful information for operation and/or maintenance.

- It is assumed that this heat pump air conditioner will be operated and serviced by English speaking people. If this is not the case, the customer should add safety, caution and operating signs in the native language.
- If you have any questions, contact your distributor or dealer of Hisense .
- This manual gives a common description and information for this heat pump fresh air conditioner which you operate as well as or other models.
- The indoor unit has been designed for the following temperatures. Running: -7~43℃
Cooling Operation: 20~43 ℃ Heating Operation: -7~15 ℃
The indoor unit will stop when the temperature outside is lower than -7℃ .

This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

IMPORTANT NOTICE



Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes. 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.

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage.
Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.

The standard utilization of the unit shall be explained in these instructions.

Therefore, the utilization of the unit other than those indicated in these instructions is not recommended. Please contact your local agent, as the occasion arises.

Hisense's liability shall not cover defects arising from the alteration performed by a customer without Hisense's consent in a written form.

TABLE OF CONTENTS

1. Safety Summary	1
2. Structure	2
2.1 Indoor Unit & Refrigerant Cycle	2
2.2 Necessary Tools and Instrument List for Installation	3
3. Transportation and Handling	3
3.1 Transportation	3
3.2 Handling of Indoor Unit	3
4. Indoor Unit Installation	4
4.1 Factory-Supplied Accessories	4
4.2 Initial Check	5
4.3 Installation	5
5. Refrigerant Piping Work	9
5.1 Piping Materials	9
5.2 Piping Connection	9
6. Drain Piping	10
7. Electrical Wiring	11
7.1 General Check	11
7.2 Electrical Wiring Connection	11
8. Test Run	12
9. Safety and Control Device Setting	12
10. Common	13
10.1 Additional Charge of Refrigerant.....	13
10.2 Field Minimum Wire Size for Power Source Line	13
10.3 Setting of DIP Switch	14

1. Safety Summary

WARNING

- Do not perform installation work, refrigerant piping work, drain piping and electrical wiring connection without referring to the installation manual.
- Check that the ground wire is securely connected.
- Connect a fuse of specified capacity.
- Pay a special attention to the place, such as a basement, etc. where refrigerant can stay, since refrigerant is heavier than air.

CAUTION

- Do not install the indoor unit ,outdoor unit,remote control switch and cable within approximately 3 meters from strong electromagnetic wave radiators such as medical equipment
- The appliance is not to be used by children or person with reduced 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.
- Children should be supervised that they do not play with the appliance.
- The appliance should not be installed in the laundry.

2. Structure

2.1 Necessary Tools and Instrument List for Installation

No.	Tool	No.	Tool
1	Phillips Screwdriver	10	Charging Cylinder
2	Vacuum Pump	11	Gauge Manifold
3	Refrigerant Gas Hose	12	Cutter for Wires
4	Megohmmeter	13	Gas Leak Detector
5	Copper Pipe Bender	14	Leveller
6	Pipe Cutter	15	Clamper for Solderless Terminals
7	Brazing Kit	16	Hoist (for Indoor Unit)
8	Hexagon Wrench	17	Ammeter
9	Spanner	18	Voltage Meter

NOTE

About vacuum pump, gas hose, charging cylinder, gauge manifold, please use suitable equipments for R410A respectively. Do not mix other refrigerant.

3. Transportation and Handling

3.1 Transportation

Transport the product as close to the installation location as practical before unpacking.

CAUTION

Do not put any material on the product.

3.2 Handling of Indoor Unit

WARNING

Do not put any foreign material into the indoor unit and check to ensure that none exists in the indoor unit before the installation and test run. Otherwise, a fire or failure, etc. may occur.

CAUTION

Be careful not to damage on insulation materials of unit's surface when lifting.

4. Indoor Unit Installation

⚠ DANGER

Do not install the indoor unit in a flammable environment to avoid fire or an explosion.

⚠ WARNING

- Check to ensure that the ceiling slab is strong enough. If not strong enough, the indoor unit may fall down on you.
- Do not install the indoor unit outdoors. If installed outdoors, an electric hazard or electric leakage will occur.

It is recommended that indoor units be installed higher than 2.5 meters from the floor level.

4.1 Factory-Supplied Accessories

Check to ensure that the following accessories are packed with the indoor unit.

NOTE

If any of these accessories are not packed with the unit, please contact your contractor.

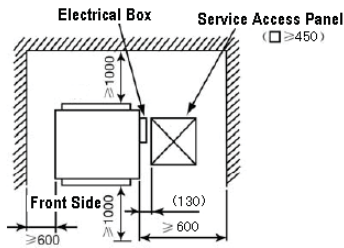
Table 4.1 Factory-Supplied Accessories

Accessory		Q'ty	Purpose
Washer		8	For Unit Suspension
Hose Clamp		1	For Drain Hose Connection
Insulation (26 IDx105)		1	For Refrigerant Liquid Piping
Insulation (28 IDx85)		1	For Refrigerant Gas Piping
Cord Clamp 	Only for 30~48kBtu/h	5	For Fixing Thermal Insulation for Refrigerant Pipings
	Only for 76~114kBtu/h	2	
Cord Clamp 	Only for 30~48kBtu/h	5	For Fixing Thermal Insulation for Refrigerant Pipings
	Only for 76~114kBtu/h	6	
Remote Temperature Sensor		1	For Detection Indoor Temperature
Screw(M4)		1	For Fixing Temperature Sensor
Screw(M4)	Only for 30~48kBtu/h 	16	For Unit Suspension

4.2 Initial Check

- Install the indoor unit with a proper clearance around it for operation and maintenance working space, as shown in Fig. 4.1.

Model:30~48



Model:76~114

unit:mm

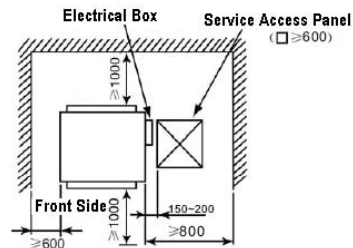


Fig. 4.1 Operation and Installation Space

- Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained.
- Do not install flammable parts in the service space for the indoor unit.
- Avoid obstacles which may hamper the air intake or the air discharge flow.
- Do not install the indoor unit in a machine shop or kitchen where vapor from oil or its mist flows to the indoor unit.

The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance, and may deform and in the worst case, break the plastic parts of the indoor unit.

- Pay attention to the following points when the indoor unit is installed in a hospital or other facilities where there are electronic waves from medical equipment.
 - (A) Do not install the indoor unit where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
 - (B) Install the indoor unit and components as far as practical or at least 3 meters from the electromagnetic wave radiator.
 - (C) Prepare a steel box and install the remote control switch in it. Prepare a steel conduit tube and wire the remote control cable in it. Then, connect the ground wire with the box and the tube.
 - (D) Install a noise filter when the power supply emits harmful noises.
- To avoid any corrosive action to the heat exchangers, do not install the indoor unit in an acid or alkaline environment.

4.3 Installation

4.3.1 Suspension Bolts

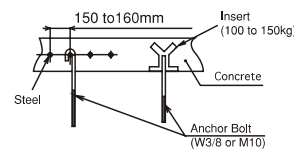
Step 1

Select final location and installation direction of the indoor unit paying careful attention to the space for the piping, wiring and maintenance.

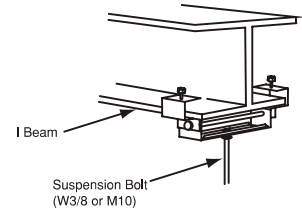
Step 2

Mount suspension bolts, as shown in Fig. 4.2

• For Concrete Slab



• For Steel Beam



• For Wooden Beam Suspension

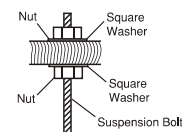
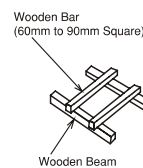
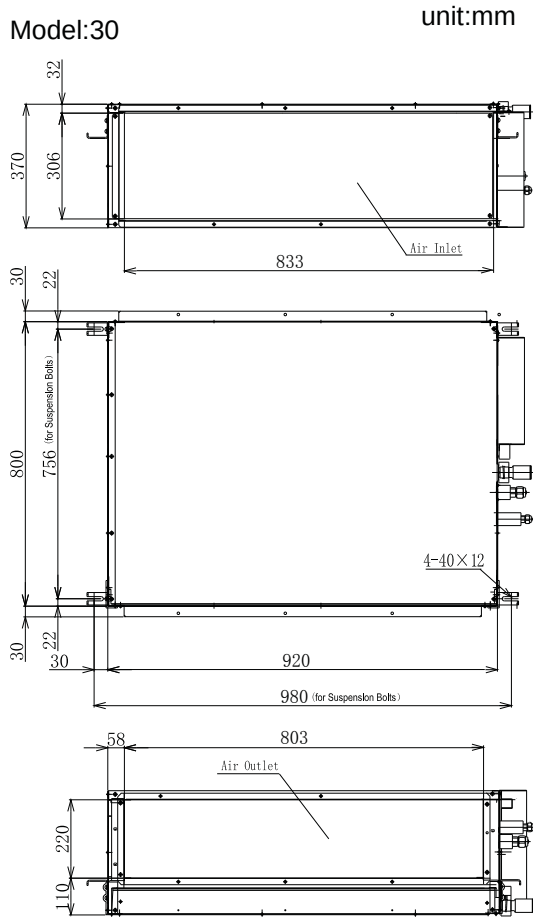


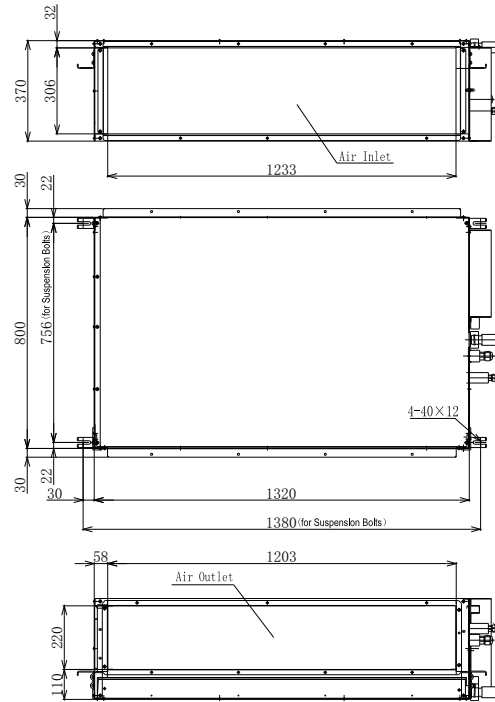
Fig. 4.2 Mounting of Suspension Bolts

4.3.2 Marking of the Positions of the Sling Bolts and Piping Connections

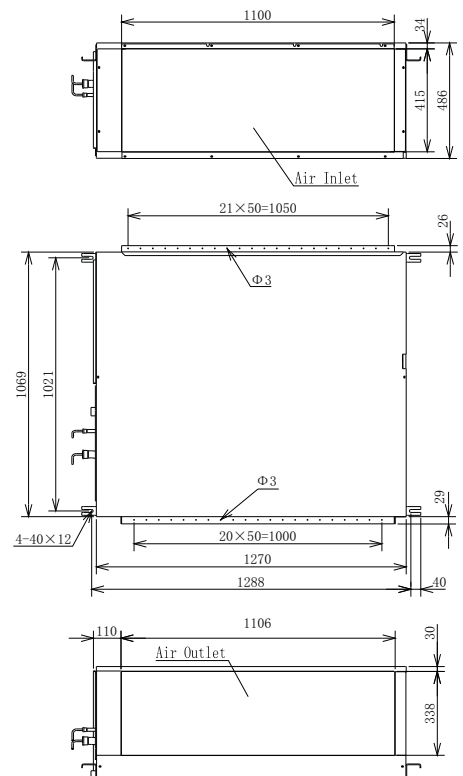
- (1) Mark the positions of the sling bolts, refrigerant piping connections and drain connection.
- (2) Installation dimensions are shown in Fig 4.3.



Model:48 unit:mm



Model:76~114 unit:mm



4.3.3 Mounting the Indoor Unit

Hang the indoor unit as shown in Fig. 4.4.

Field-Supplied Parts

*Sling Bolts 4-M10 or W3/8

*Nut 8-M10 or W3/8

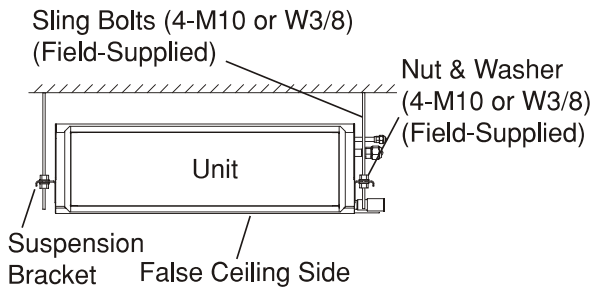


Fig. 4.4 Hanging Indoor Unit

(1) How to put Nuts or Sling Bolts

Put nuts on each of the four hanging bolts, as shown in Fig. 4.5

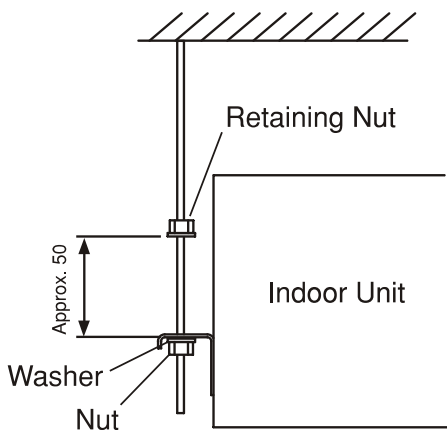


Fig. 4.5 Sling Bolts and Nut

(2) Hanging the Indoor Unit

- * Hook suspension bracket to the nut and washer of each hanging bolt, as shown, starting at the opposite side to service cover side.
- * After checking that the nut and washer are correctly fixed by the retainers of the suspension bracket, hook the suspension bracket of the service cover side to the nut and washer.
(Put the sling bolts away from the unit when hooking.)

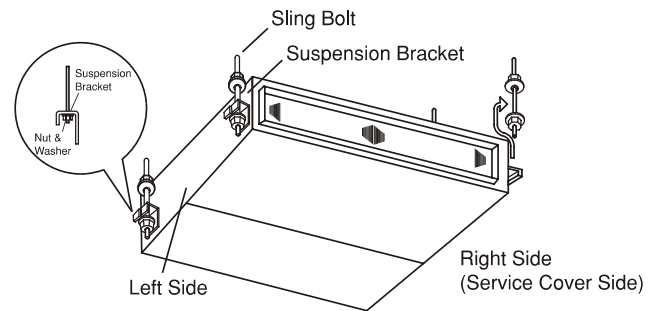


Fig. 4.6 Hanging Indoor Unit

4.3.4 Adjusting of the Unit Level

- (1) Check to ensure that the foundation is flat, taking into account the maximum foundation gradient.

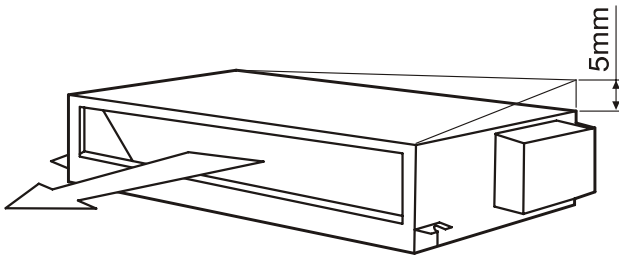


Fig. 4.7 Foundation Gradient

- (2) The unit should be installed so that the rear side of the unit is slightly (0mm~5mm) lower than the front side, in order to avoid the incorrect position of the drain discharge.
- (3) Tighten the bolts of the sling nuts with the suspension brackets after adjustment is completed.

Special plastic paint must be applied to the bolts in order to prevent them from loosening.

NOTE

Keep the unit as well as relevant equipment covered with the vinyl cover during installation work.

4.3.5 Connecting Supply Duct

- (1) The supply duct should be connected with the indoor unit through canvas ducts, in order to avoid abnormal sound vibration (Refer to Fig. 4.8). The unit is equipped with a pre-drilled duct flange for the supply duct connection.
- (2) Attach the vibration proof rubber to Sling Bolt in order to avoid abnormal sound vibration.
- (3) Duct material should be non-flammable material.
- (4) Perform the heat insulation work over the duct for dew protection.

CAUTION

- If a lower sound level is further required, install silencer (field-supplied).
- Design duct arrangement as “Unit External Static Pressure=Pressure Drop of Duct+Pressure Drop of Air Outlet and Air Inlet”.

If duct design is not appropriate, big sound and splash will occur.

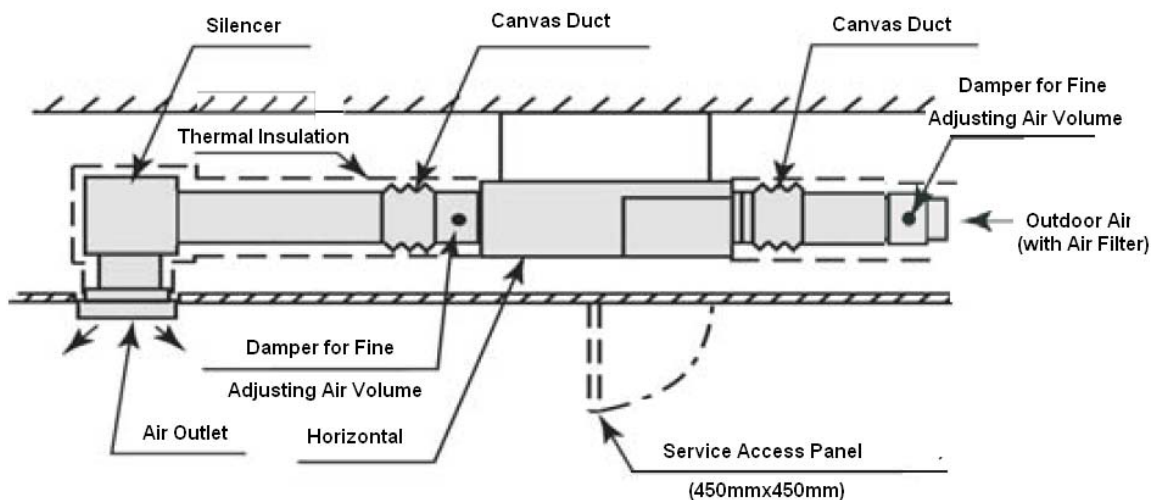


Fig. 4.8 Duct Connection

5. Refrigerant Piping Work

⚠ DANGER

Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.

5.1 Piping Materials

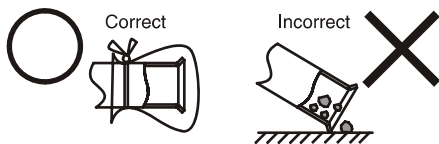
- (1) Prepare locally-supplied copper pipes.
- (2) Select clean copper tubes making sure there is no dust and moisture inside the tubes.

Before connecting pipes, blow the inside of the tubes with nitrogen or dry air, to remove any dust or foreign materials.

5.2 Piping Connection

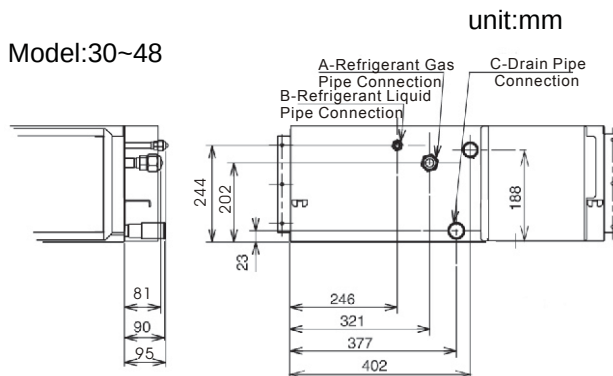
⚠ CAUTION

- Cap the end of the pipe when the pipe is to be inserted through a hole.
- Do not put pipes on the ground directly without a cap or vinyl tape at the end of the pipe.



- An excess or a shortage of refrigerant is the main cause of trouble to the units. Charge the correct refrigerant quantity.

- (1) Position of piping connection is shown below.



Model:76~114

unit:mm

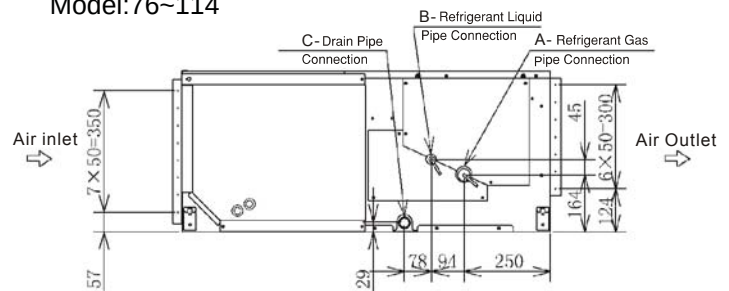
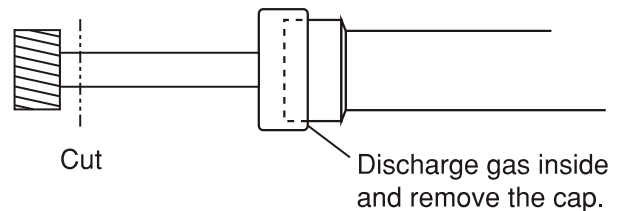


Fig. 5.1 Position of Piping Connection

MODEL	A	B	C
30	15.88(5/8)	9.53(3/8)	VP 25
48	15.88(5/8)	9.53(3/8)	
76	19.05(3/4)	9.53(3/8)	
96	22.2(7/8)	9.53(3/8)	
114	25.4(1)	12.7(1/2)	

⚠ CAUTION

- Cut the pipe end before blazing to remove the cap, and discharge gas inside the pipe. If not discharged, blazing material will be blown off.



- Pay attention so that the flame does not come into contact with the main body itself.

- (2) When brazing the refrigerant pipes, be sure to blaze, after covering the part with shown below a wet cloth to the insulation pipes of the units in order to prevent the thermistors on liquid and gas pipes from damaging by heating.

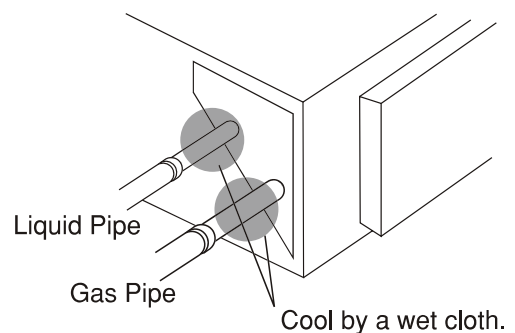


Fig. 5.2 Blazing Pipes

- (3) After brazing, insulate the pipes after checking that there is no leakage. At that time, be sure to cover the space between two insulating peaces by insulation pipe (factory-supplied accessory).

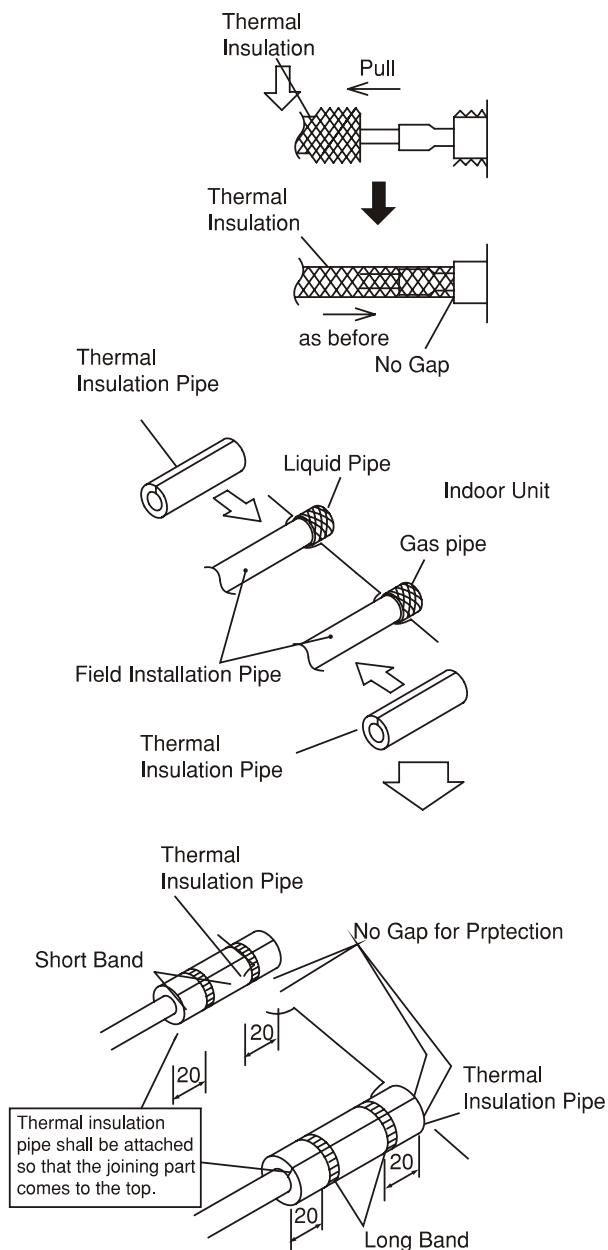
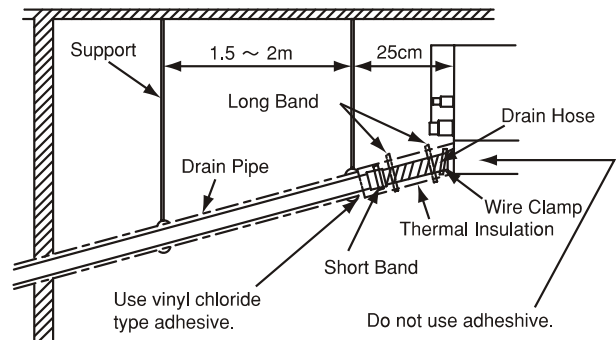


Fig. 5.3 Insulating Pipes

- (4) Evacuation and refrigerant charging procedures should be performed according to "Installation & Maintenance Manual" of the outdoor unit. In relation to the additional refrigerant quantity, refer to "Common".

6. Drain Piping

- (1) The position of the drain piping connection is shown in Fig. 6.1.
- (2) Prepare polyvinyl chloride pipe with a 32mm outer diameter.
- (3) Fasten the tube to the drain hose with the adhesive agent and the factory-supplied clamp. The drain piping must be performed with a DOWN-SLOPE pitch of 1/25 to 1/100.
- (4) Insulate the drain pipe after connecting the drain hose.



- Do not connect the drain-hose to the drain outlet pipe of indoor unit BY ADHESIVE. If used, the servicing of drain-up mechanism is not available, and drain outlet pipe of indoor unit may be cracked due to invasion of the adhesive. But other pipe connecting part, use vinyl chloride type adhesive.

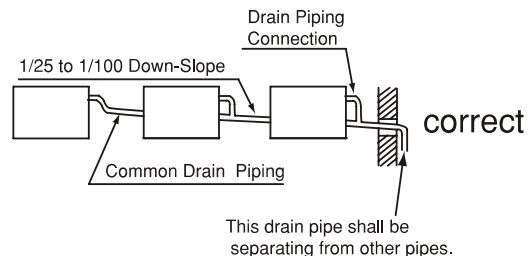
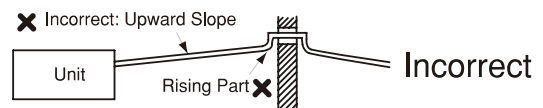


Fig. 6.1 Drain Piping

NOTE

When the relative humidity of inlet or ambient air exceeds 80%, apply an (field-supplied) auxiliary drain pan beneath the indoor unit as shown in Fig.6.2.

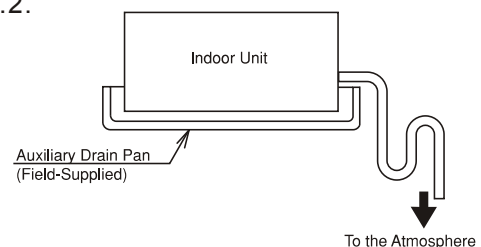


Fig. 6.2 Auxiliary Drain Pan

NOTE

- (1) Do not create an upper-slope or rise for the drain piping, since drain water can flow back to the unit and leakage to the room will occur when the unit operation is stopped.
- (2) Do not connect the drain pipe with sanitary or sewage piping or any other drainage piping.
- (3) When the common drain piping is connected with other indoor units, the connected position of each indoor unit must be higher than the common piping. The pipe size of the common drain pipe must be large enough according to the unit size and number of units.
- (4) After performing drain piping work and electrical wiring, check to ensure that water flows smoothly as in the following procedure.
Checking with the Float Switch
 - a. Switch ON the power supply.
 - b. Pour 2 or 2.5 liters of water into the drain pan.
 - c. Check to ensure that the water flows smoothly or whether no water leakage occurs. When water cannot be found at the end of the drain piping, pour another 2 liters of water into the drain.

7. Electrical Wiring

! WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Protect the wires, drain pipe, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and at the worst, a fire will occur.
- Tighten screws according to the following torque.
 - M3.5: 1.2 N-m
 - M5: 2.0~2.4 N-m

! CAUTION

- Wrap the accessory packing around the wires, and plug the wiring connection hole with the seal material to protect the product from any condensate water or insects.

- **Tightly secure the wires with the cord clamp inside the indoor unit.**
- **Secure the cable of the remote control switch using the cord clamp inside the electrical box.**

7.1 General Check

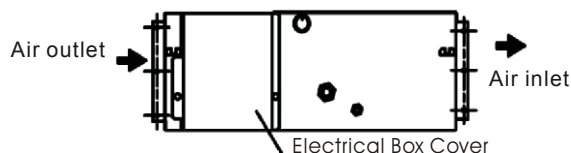
- (1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data given in "Technical Catalog I". Make sure that the components comply with National Electrical Code (NEC).
- (2) Check to ensure that the power supply voltage is within $\pm 10\%$ of the rated voltage.
- (3) Check the capacity of the electrical wires.
 If the power source capacity is too low, the system cannot be started due to the voltage drop.
- (4) Check to ensure that the ground wire is connected.
- (5) Power Source Main Switch
 Install a multi-pole main switch with a space of 3.5mm or more between each phase.

7.2 Electrical Wiring Connection

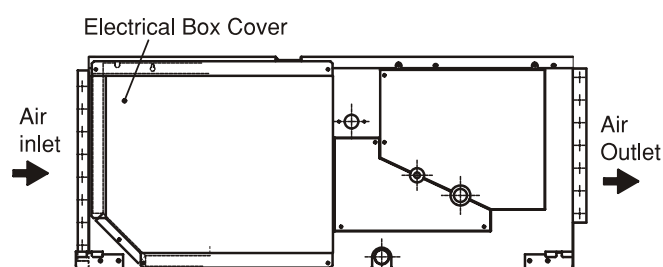
The electrical wiring connection for the indoor unit is shown in Fig. 7.2.

- (1) Connect the cable of an optional remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box through the connecting hole in the cabinet.
- (2) Connect the power supply and earth wires to the terminals in the electrical box.
- (3) Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.
- (4) Tightly clamp the wires using the cord clamp inside the electrical box.

Model:30~48



Model:76~114



Remove the fixing screws for electrical box cover.

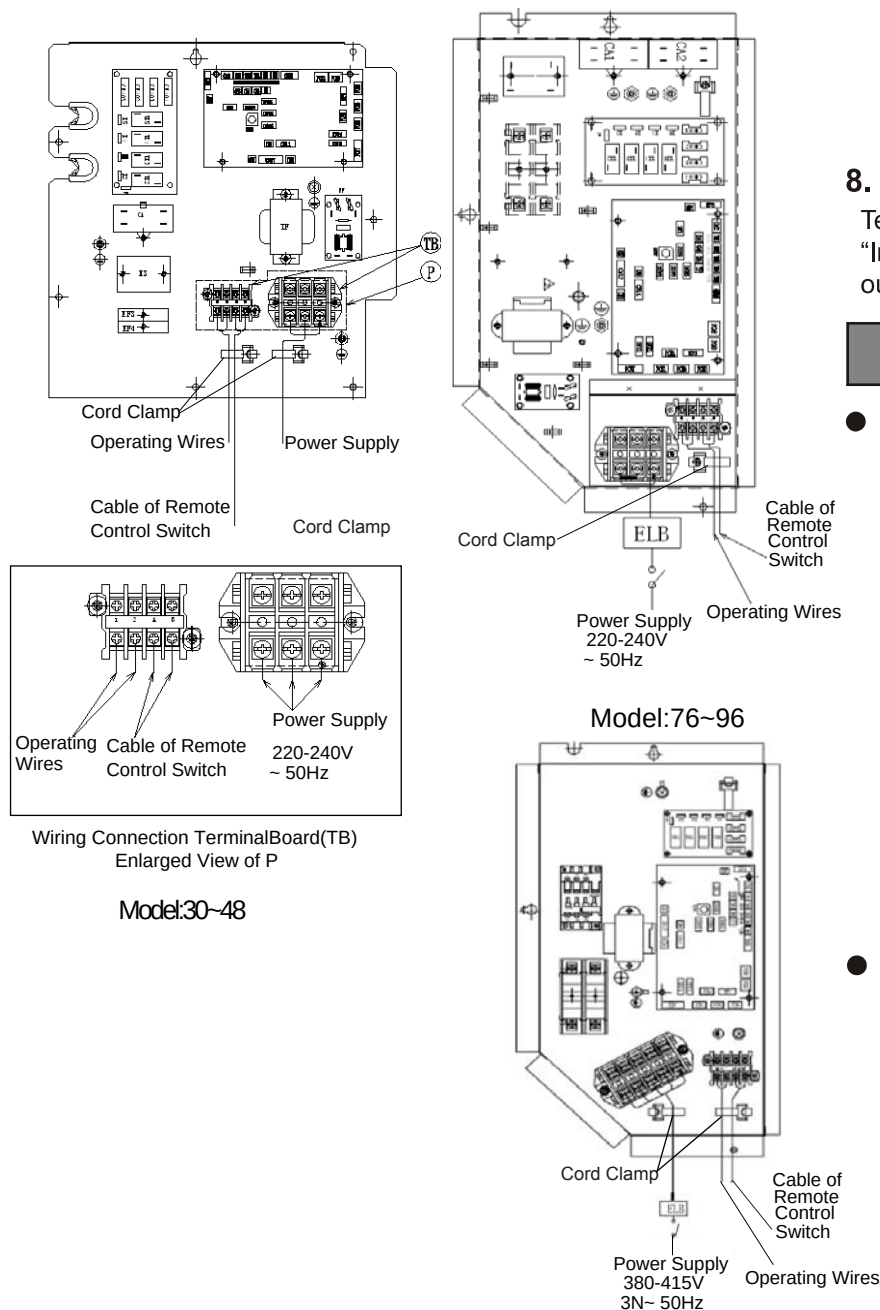


Fig. 7.2 Electrical Wiring Connection

8. Test Run

Test run should be performed according to "Installation & Maintenance Manual" of the outdoor unit.

! WARNING

- Do not operate the system until all the check points have been cleared.
 - (A) Check to ensure that the electrical resistance is more than 1 megohm, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.
 - (B) Check to ensure that the stop valves of the outdoor unit are fully opened, and then start the system.
 - (C) Check to ensure that the switch on the main power source has been ON for more than 12 hours, to warm the compressor oil by the crankcase heater.
- Pay attention to the following items while the system is running.
 - (A) Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 90°C.
 - (B) **DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES).** It will cause a serious accident.

9. Safety and Control Device Setting

Indoor Unit

Model			30~96	114
For Evaporator Fan Motor Thermostat	Cut-Out	°C	130±5	145±5
	Cut-In	°C	83±15	80±15
For Control Circuit Fuse Capacity		A	5	5
Freeze Protection Thermostat	Cut-Out	°C	0	0
	Cut-In	°C	14	14
Thermostat Differential		°C	2	2

10. Common

10.1 Field Minimum Wire Sizes for Power Source

WARNING

- Use an ELB(Electric Leakage Breaker).If not used, it will cause an electric shock or a fire.
- Run through the cables using conduit tube,and Completely seal the end of conduit tube with sealing materials.

Model	Power Source	Maximum Current	Power Source Cable Size	Transmitting Cable Size
			EN60335-1 *1	EN60335-1 *1
30	220- 240V ~ 50Hz	1.2A	2.5mm ²	0.75mm ²
48		2.5A	2.5mm ²	0.75mm ²
76		5.2A	2.5mm ²	0.75mm ²
96		6.0A	2.5mm ²	0.75mm ²
114	380-415V 3N~ 50Hz	2.7A	2.5mm ²	0.75mm ²

NOTES:

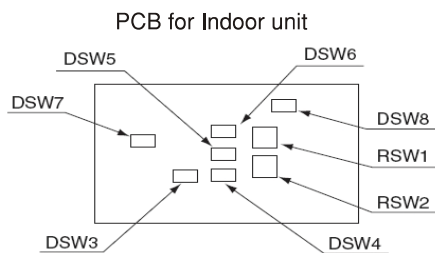
- 1) Follow local codes and regulations when selecting field wires.
- 2) The wire sizes marked with *1 in the above table are selected at the maximum current of the unit according to the European Standard, EN60335-1. Use the wires which are not lighter than the ordinary polyvinyl chloride sheathed flexible cord (code designation H05VV-F).
- 3) Use a shielded cable for the transmitting circuit and connect it to ground.
- 4) In the case that power cables are connected in series, add each unit maximum current and select wires below.

According to EN60 335-1	
Current(A)	Wire Size(mm ²)
$i \leq 6$	2.5
$6 < i \leq 10$	2.5
$10 < i \leq 16$	2.5
$16 < i \leq 25$	4
$25 < i \leq 32$	6
$32 < i \leq 40$	10
$40 < i \leq 63$	16
$63 < i$	※ 1

*2 : In the case that current exceeds 63A, do not connect cables in series.

10. Setting of Dip Switches

(1) Position of Dip Switches



- (2) The PCB in the indoor unit is equipped with 8 types of dip switches and rotary switches. Before testing unit, set these dip switches according to the following instructions. Unless these dip switches are set in the field, the unit can not be operated.

(a) Unit No. Setting (DSW6&RSW1)

Setting is required. Set the unit No. of all indoor units respectively and serially, by following setting position shown in the table below. Numbering must start from "0" for every outdoor unit.

Unit No. Setting

DSW6 (Tens Digit)	RSW1 (Units Digit)	Ex.) Set at No.16 Unit
Before shipment, DSW6 and RSW1 are set to "0". Max. 64 units are available to set when all the equipment to be connected are corresponding to HI-NET. Max. 16 units when the units corresponding/ non-corresponding to HI-NET are combined.		Set No.1 Pin ON Set at "6"

(b) Capacity Code Setting (DSW3)

No setting is required, due to setting before shipment. This switch is utilized for setting the capacity code which corresponds to the Horse Power of the indoor unit.

Model	30	48
Setting Position		
	1, 2 ON	1 ON

Model	76	96~114
Setting Position		
	1, 2, 3, 4 ON	2, 3, 4 ON

(c) Unit Model Code Setting (DSW4)

No setting is required.



(d) Refrigerant Cycle No. Setting (DSW5&RSW2)

Setting is required.

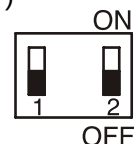
Setting position before shipment is all OFF.

Refrigerant Cycle No. Setting

DSW5 (Tens Digit)	RSW2 (Units Digit)	Ex.) Set at No.5 Cycle
Before shipment, DSW5 and RSW2 are set to "0". Max. 64 cycles are available to set when all the equipment to be connected are corresponding to HI-NET. Max. 16 cycles when the units corresponding/ non-corresponding to HI-NET are combined.		Set All Pins OFF Set at "5"

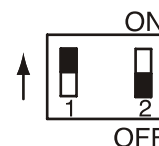
(e) Fuse Recover (DSW7)

* Factory Setting



* No.1 Pin: Fuse Recover

When fuse is cut, turn No.1 Pin ON.



(f) Optional Function Setting (DSW8)

No setting is required.

Setting position before shipment is all OFF.





1030562

Qingdao Hisense Hitachi Air-conditioning Systems Co., Ltd.

Add: 218, Qianwangang Road, Economic & Technical Development Zone, Qingdao, P.R. China

<http://www.hisense-vrf.com> E-mail: export@hisensehitachi.com