HITACHI

Installation, Operation and Maintenance

INSTRUCTIONS MANUAL

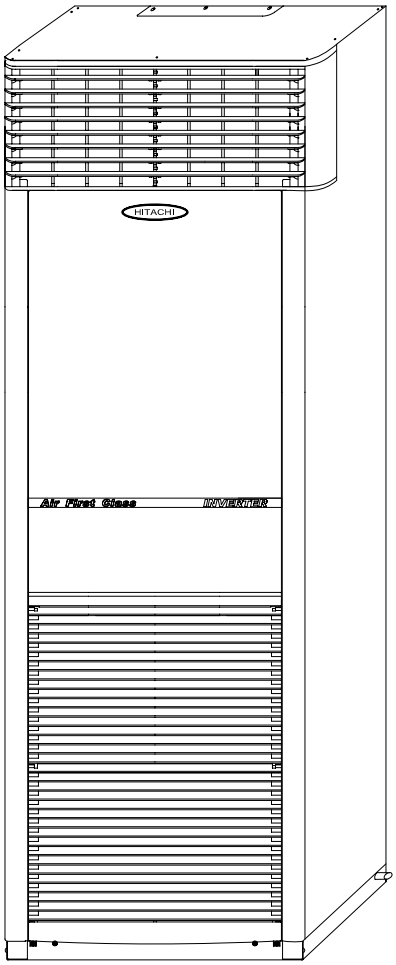
Models :

Indoor Unit	Outdoor Unit
RPS-140AN	+ RAM-140FPS/ RAM-140FPSB

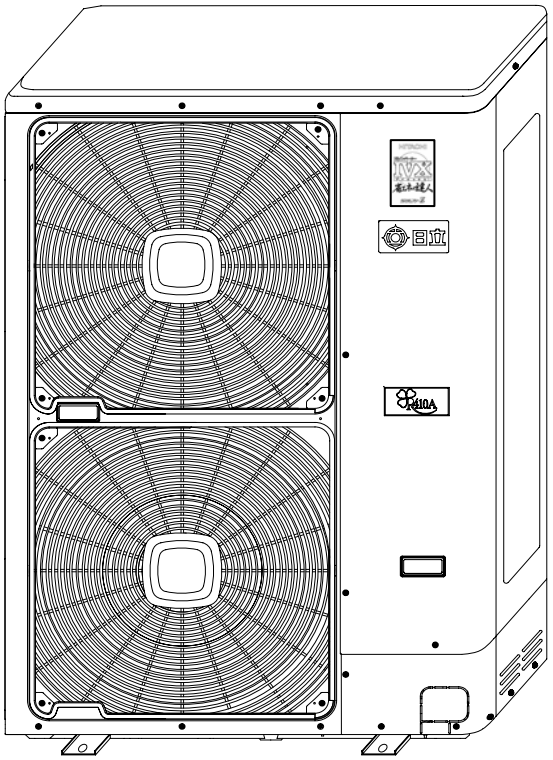
HITACHI PACKAGED-TYPE AIR CONDITIONERS

— INVERTER DRIVEN —

— AIR-COOLED TYPE —



Environment Friendly R410A



IMPORTANT:

READ AND UNDERSTAND THIS INSTRUCTION MANUAL BEFORE USING THIS AIR CONDITIONER. KEEP THIS MANUAL FOR FUTURE REFERENCE.

65MP3192

IMPORTANT NOTICE

- HITACHI pursues a policy of continuing improvement in design and performance of its products. Specification/Design are subject to change without prior notice.
- HITACHI cannot anticipate every possible circumstance that might involve a potential hazard.
- This air conditioner is designed for standard air conditioning only. Do not use for other purposes such as drying clothes, refrigerating foods or for any other cooling process.
- The installer and system specialist shall secure safety against leakage according to local Regulations or standards.
- 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 this operation and/or maintenance.

- If you have any questions, contact your installer, dealer of HITACHI or our customer care.
- This manual gives you description and information on how to operate this air conditioning unit.
- This air conditioner has been designed from the following temperatures.

Indoor Temperature (^{o}C)		Outdoor Temperature (^{o}C)	
Maximum	Minimum	Maximum	Minimum
32DB/23WB	21DB/15WB	43DB	21DB

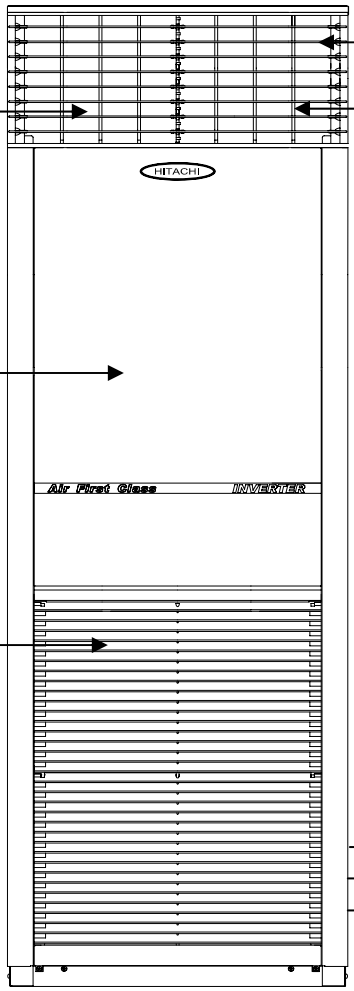
This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

— CONTENTS —

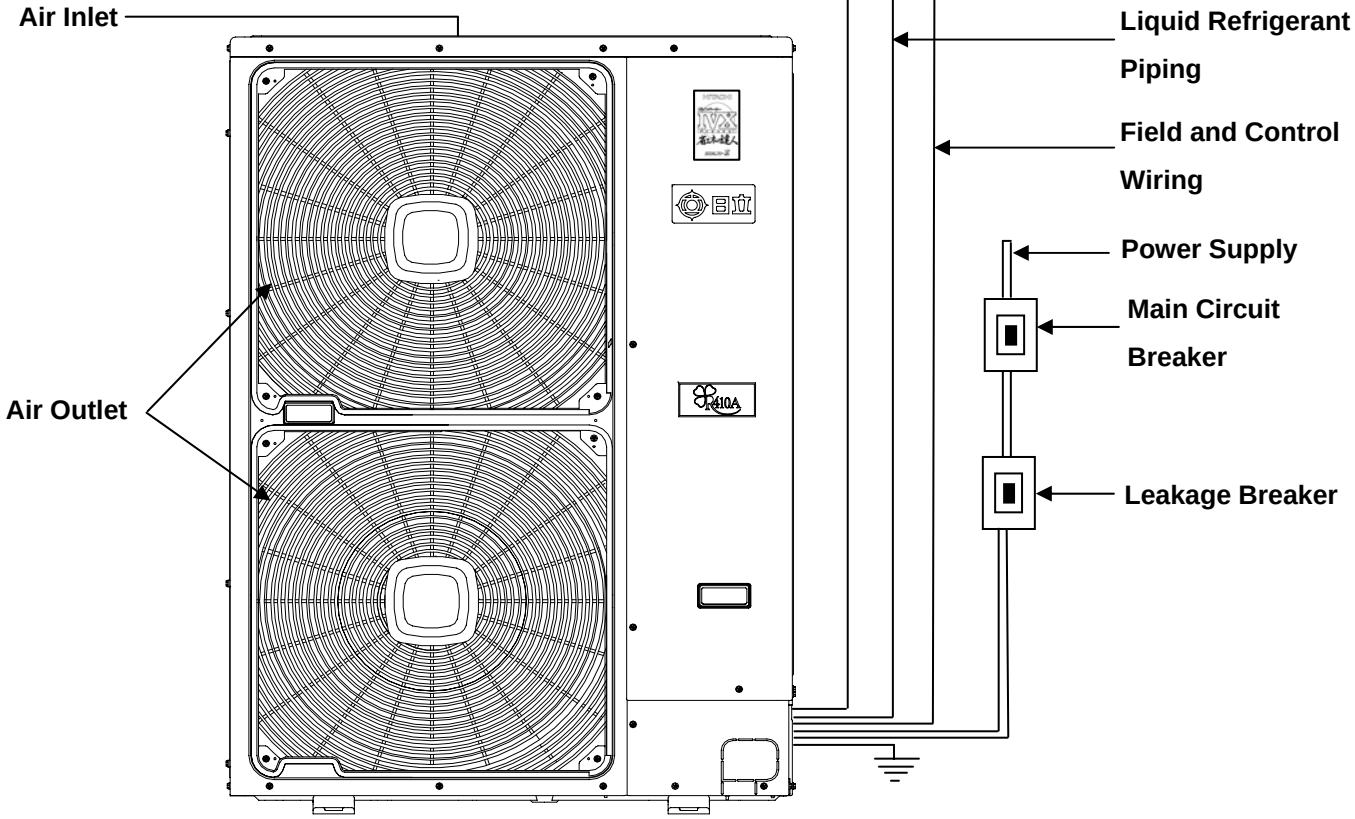
Operation Instructions

◆ Name of Parts

INDOOR UNIT

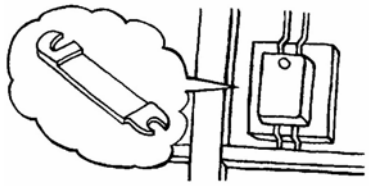


OUTDOOR UNIT



◆ Precautions on Usage

Please use fuse/circuit breaker with proper amperage.



Never use metal or copper wire as a fuse to avoid fault or occurrence of fire hazard.

Don't insert any material into the air inlet and air outlet.

It may cause accidents and may injure and damage the units.

Don't spray flammable gas toward the air conditioner.

It may cause fire.

Overloaded heat source should be reduced.

If there are heat sources which exceeds the air conditioning capacity in the room (room with many people entering or when using heat producing appliances), set room temperature can not be reached.

Set up window curtains or window blinds.

It can insulate the heat source coming through the windows.

Doors or windows should be closed properly to prevent the cooled air to leak outside the room.

During cooling operation, please don't open windows, entrances and exits unless necessary and minimize as possible the number of persons entering or leaving the room.

The setting of room temperature should be suitable.

Adjust the temperature setting button to a suitable index to maintain the most comfortable temperature. Too high or too low temperature will cause discomfort. (a temperature difference of 5 ^{o}C to 7 ^{o}C between the indoor and the outdoor is appropriate)

When there is possibility of lightning strike.

When there is a possibility of lightning strike, turn the unit off to protect the air conditioner, and switch off the power switch. Make sure that the unit is provided with ground.

◆ Remote Control Switch Functions

⚠CAUTION

Press switches only with fingers. Do not press switches by any other item, as it may break switches.Do not touch the CHECK switch. This switch is only for servicing. If touched, press the CHECK switch again to reset.

● **Temperature Setting**

When the TEMP switch is pressed, temperature increases by 1 degree. The minimum setting indication is 19℃ and the maximum setting indication is 30℃.

● **Set and Actual Temperature**

The set temperature is for the air temperature at the sensor (thermistor) of the indoor unit.

The actual room temperature may be different from the air temperature of the sensor due to the difference of the sensing location.

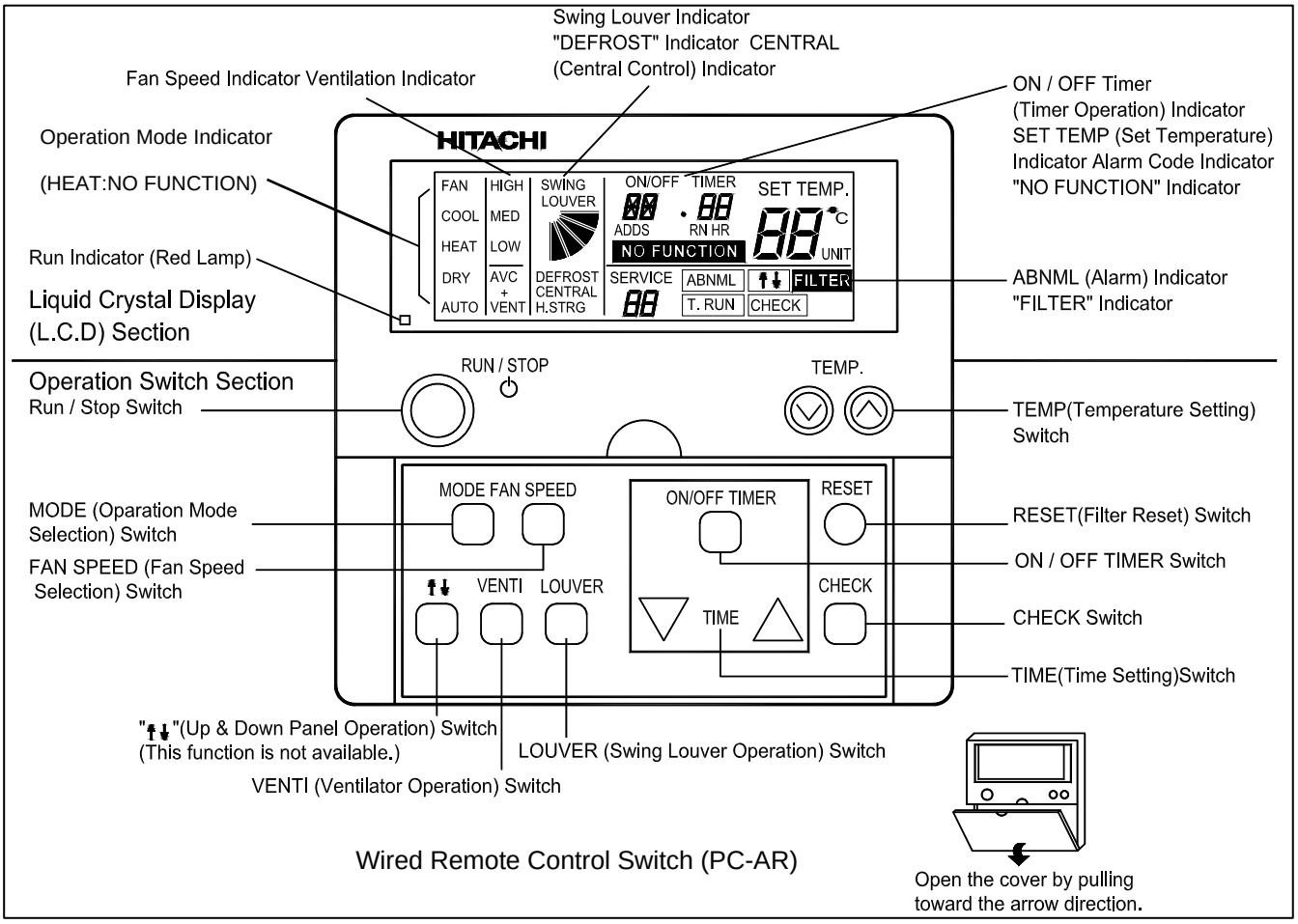
● **Touching Type Switches**

This control switch is for touching type.

Slightly press the switch by finger. The operation can be checked by the liquid crystal display.

NOTE !

The figure in Fig. below shows all the indications for easy understanding. Therefore, during normal operation, only some of them are indicated in the Liquid Crystal Display Section.



◆ Before Operation

⚠CAUTION

Supply electrical power to the system for approximately 12 hours before start-up after long shutdown. Do not start the system immediately after power supply, it may cause a compressor failure, because the compressor is not heated well.

When the system is started after a shutdown longer than approximately 3 months, it is recommended that the system be checked by your service contractor.

Turn OFF the main switch when the system is stopped for a long period of time. If the main switch is not turned OFF, electricity is consumed, because the oil heater is always energized during compressor stopping.

◆ Operation Method

(Cooling , Dry and Fan Operations)

＊Function

- Cooling Operation：To decrease the room temperature
- Dry Operation：To decrease the humidity in the room
- Fan Operation：To circulate the air in the room

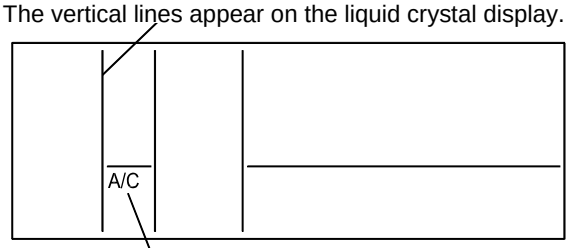
ATTENTION

The recommendable set temperature is as follows;

- Cooling Operation…26~28℃
- Dry Operation…23~25℃

Turn ON the power supply

" The vertical lines appear on the liquid crystal display. "

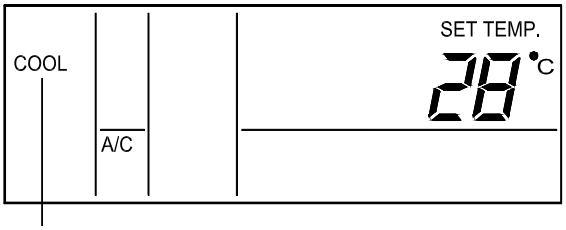


" A/C or VENTI is indicated on the liquid crystal display "

Step 1

Press the MODE switch.

By repeatedly pressing the MODE switch, the indication is changed in order of COOL, DRY and FAN.

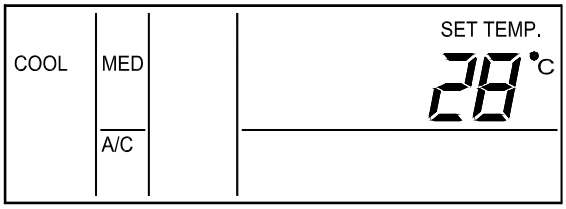


(Indication when setting "COOL" mode)

Step 2

Press the RUN/STOP switch.

The RUN indicator (Red Lamp) is ON. The system is automatically started.



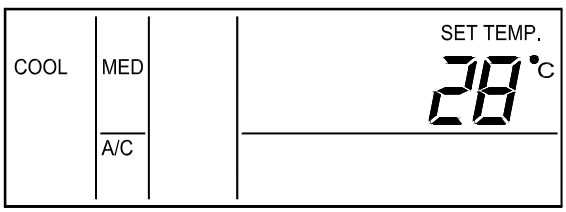
NOTE

Setting of Temperature, Fan Speed and Air Louver Direction

The setting condition is memorized after setting once, therefore the daily setting is not required. In case that the setting is required to be changed, refer to the Adjustment of swing louver direction in page 7.

Stop

Press the RUN/STOP switch again. The RUN indicator (Red Lamp) is OFF. The system is automatically stopped.



Operation Instructions

◆Setting Method

(Temperature, Fan Speed and Air Louver Direction)

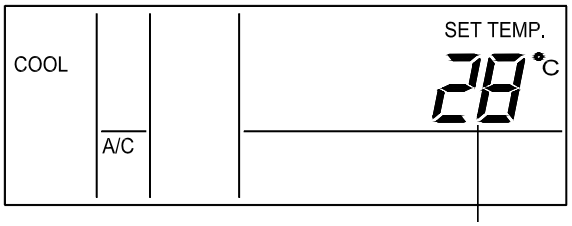
ATTENTION

DO NOT touch the CHECK switch.

- The CHECK switch is used only when servicing.
- In case that the CHECK switch is pressed by mistake and the operation mode is changed to the check mode, press the CHECK switch again for approximately 3 seconds, and press the CHECK switch once again after 10 seconds, and the operation mode is changed to the normal condition.

Setting of Temperature

Adjust the temperature by pressing TEMP "∧" or "∨" switch.



(Indication when setting 28℃)

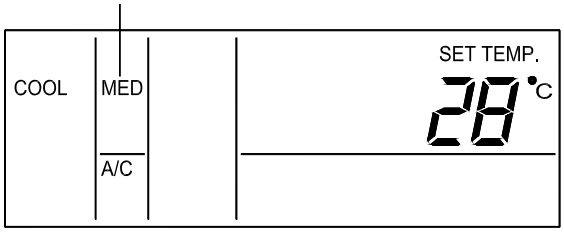
The temperature is increased by 1℃ by pressing "∧" switch (Max.30℃).

The temperature is decreased by 1℃ by pressing "∨" switch (Min.19℃).

Setting of Fan Speed

Press the FAN SPEED switch.

(Indication when setting " MED " speed)



By repeatedly pressing the FAN SPEED switch, the indication is changed in order of HIGH, MED and LOW.

For standard operation, set the fan speed at HIGH.

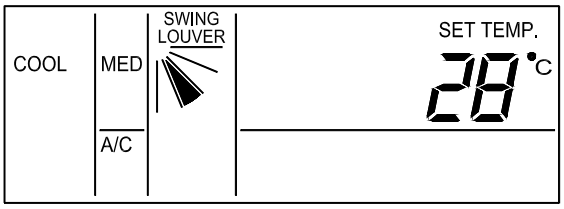
NOTE

In case of DRY mode, the fan speed is automatically changed to LOW, and can not be changed (However. the indication shows the present setting condition.).

Setting of Swing Louver Direction

Press the SWING LOUVER switch, the swing louver starts to swing.

Press the SWING LOUVER switch again, the swing louver is fixed.



By repeatedly pressing the SWING LOUVER switch, the swing louver repeats to stop and swing.

< When Swinging Automatically >

The indications move continuously corresponding to the louver swing.

◆Timer Operation

＊Function

- This Function is used to start or stop operation after a set time.
- The timer operation can be set by the ON/OFF TIMER switch.

" ON TIMER "

：Press the ON/OFF TIMER switch when the system is stopped. The operation is started after a set time.

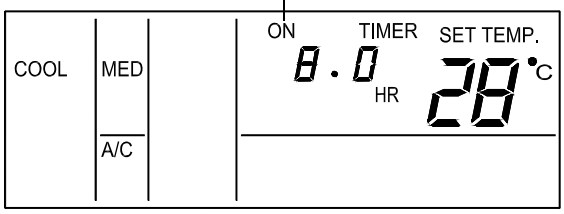
" OFF TIMER "

：Press the ON/OFF TIMER switch when the system is operated. The operation is stopped after a set time.

Step 1

Press the ON/OFF TIMER switch.

(Indication when setting "ON TIMER")

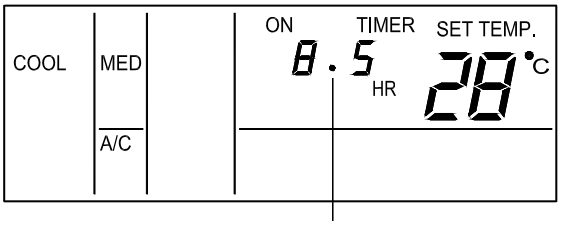


" ON TIMER " is indicated in case that the system is stopped.

" OFF TIMER " is indicated in case that the system is operated.

Step 2

Press the TIME △ or ▽ switch, and set your required time.

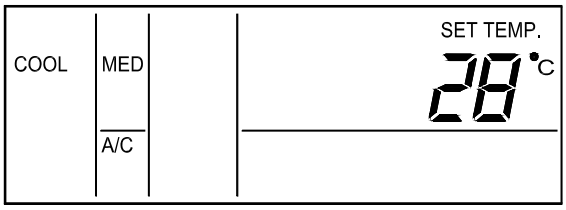


(Indication when setting 8.5 hours for timer operation)

- The set time is increased by 0.5 hours by pressing the △ switch (Max. 72.0 hours) and decreased by 0.5 hours by pressing the ▽ switch (Min.0.5hours).
- In case that the required time is not set, the set time is automatically indicated at 8.0 hours.

Cancel

Press the ON/OFF TIMER switch again.



◆Ventilation

＊Function

- A/C (Air Conditioning)：To operate the air conditioner individually.
- VENTI (Ventilation)：To operate the total heat exchanger unit individually.
- A/C + VENTI：To operate the air conditioner and the total heat exchanger together.

＊RPS-5AN has no function of ventilation

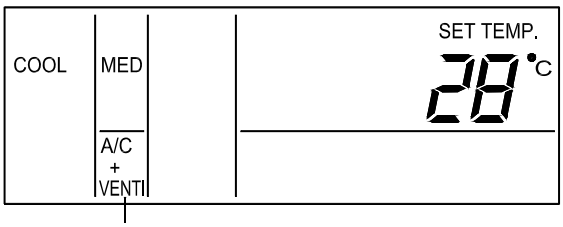
ATTENTION

- This function is available only when the total heat exchanger is connected.

  When the procedures below are performed without the total heat exchanger connected, " NO FUNCTION " flickers for 5 seconds.

Ventilation

Press the VENTI switch.



(Indication when setting " A/C + VENTI ")

By repeatedly pressing the VENTI switch, the indication is changed in order of A/C, VENTI and A/C + VENTI.

Operation Instructions

◆ Automatic Control

The system is equipped with the following functions.

NOTE

Except for a long period of shutdown, keep the main power switch ON. The drain discharge mechanism is operated if the drain level is higher than the setting.

- **Three Minute Guard** (Enforced Stoppage)

  The compressor remains off for at least 3 minutes once it has stopped. If the system is started within approximately 3 minutes after it has stopped, the RUN indicator is activated.

  However, the cooling operation remains off and does not start until after 3 minutes has elapsed.

- **Three Minute Guard** (Enforced Operation)

  If all indoor units of the system are Thermo-OFF within approximately 3 minutes after compressor has started, compressor is operated during 3 minutes continuously.

  However, if all indoor units of the system are stopped by remote control switch, compressor is

  stopped.

- **Oil Return Operation**

  If an indoor unit is stopped more than 2 hours continuously, this function is operated during a few minutes.

  It has this function to prevent to accumulate in the heat exchanger of stoppage indoor unit at cooling operation.

- **Frost Prevention During Cooling Operation**

  When the indoor unit is operated at low discharge air temperature, the cooling operation may be changed to fan operation for a while to avoid frost formation on the indoor heat exchanger.

- **Slow Air Control During Defrosting Operation**

  When the outdoor unit is performing the automatic defrosting operation, the indoor fan is stopped and the louver is fixed horizontally.

NOTE

If the system is stopped due to a power failure, it will not automatically start again although power is restored.

Repeat the start-up procedure from Step 1 to start the system. In the event of a very brief power failure (2 seconds maximum), the settings are memorized.

Therefore, the system starts automatically after approximately 3 minutes.

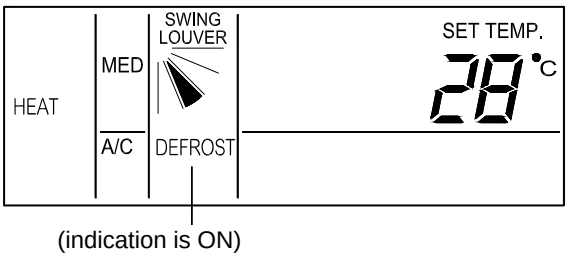
◆ **Other Indications**

∗Indications When in Normal Condition

Defrost

When the defrost operation is performed.

● " DEFROST " indication is ON.



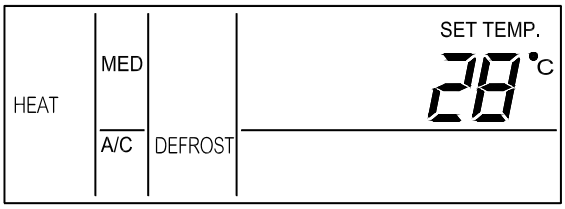
(indication is ON)

The indoor fan is slowed down and stopped.

The louver is fixed at the horizontal position. However, the louver indication of LCD continues to activate.

When the unit is stopped during defrost operation,

● The RUN indicator (Red) is OFF.

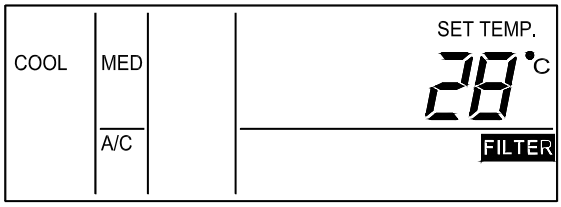


However, the operation continues with "DEFROST" indication, and the unit is stopped after the defrost operation is finished.

Filter

Filter Clogging

● " FILTER " indication is ON when the filter is clogged with dust, etc. Clean up the filter.



Press the RESET switch after cleaning up filter. The " FILTER " indication is OFF.

∗Indications When In Abnormal Condition

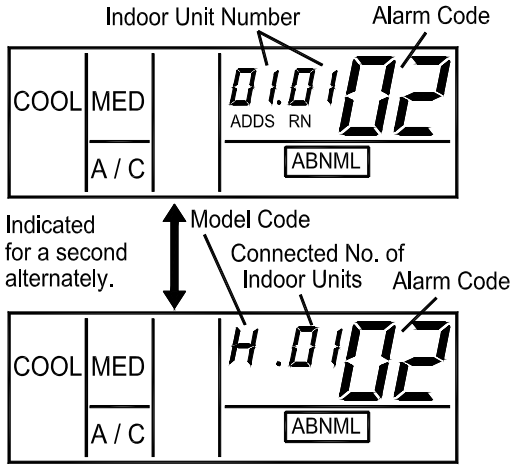
Abnormality

● The RUN indicator (Red) is ON.

● " ALARM " is indicated on the liquid crystal display.

● The indoor unit number, the alarm code, the model code and the connected number of indoor units are indicated on the liquid crystal display.

● In the case that the plural indoor units are connected, the above items for each indoor unit are indicated one by one.



Check the contents of the indications and contact your distributor or dealer of HITACHI.

Power Failure

● All the indications are OFF.

● Once the unit is stopped by power failure, the unit will not be started again although the power recovers. Perform the starting procedures again.

● In case of instantaneous power failure within 2 seconds the unit will be started again automatically.

Electric Noise

● There could be a case that all the indications are OFF and the unit is stopped. This is occured by the activation of the micro computer for the unit protection from the electric noise.

Operation Instructions

◆ Troubleshooting

Unit does not start:

1. Is the main power source switch to the unit ON?
2. Is the main fuse normal?

Poor cooling operation:

1. Are there any obstacles which hamper sufficient air to the indoor unit and outdoor unit coil?
2. Check the temperature setting to make sure that it is set at the desired temperature.
3. Check the air filter if it is dirty or clogged.

⚠WARNING

Please contact your service center if the problem is still not solved.

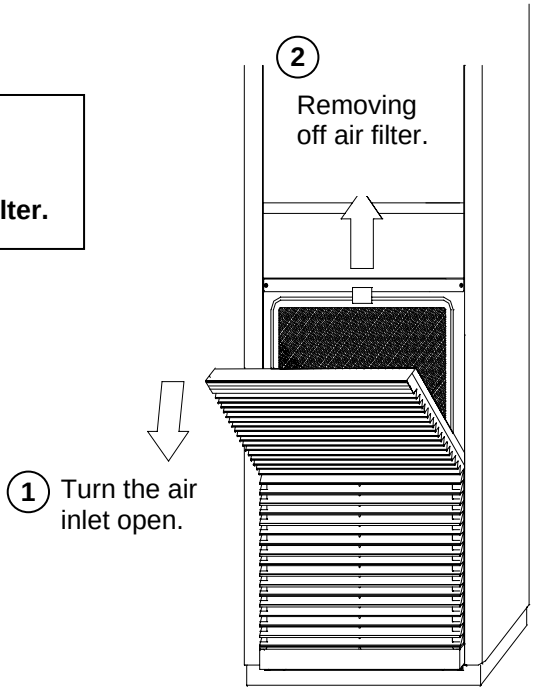
Do not try to repair the unit by yourself.

◆ Maintenance

1. Clean or replace the air filter.
2. Clean the cabinet with clean dry cloth.
3. Clean the condensate drain pan and the drain piping.
4. Clean the condenser and evaporator coil. Call your serviceman to do this type of work.
5. Check for abnormal sound and vibration. If you find abnormal sound and vibration, stop the unit and contact your service center for proper maintenance.

⚠WARNING

Switch the unit OFF before cleaning the air filter.



1. Preparation

1.1 Installation Location

(1) Required Material – Measure, Architectural Information Regarding Installation Location.
(2) Confirm that the final installation location is provided with convenient piping and wiring work.
(3) Check the total piping length and difference in height between indoor and outdoor unit, it should not exceed the following:

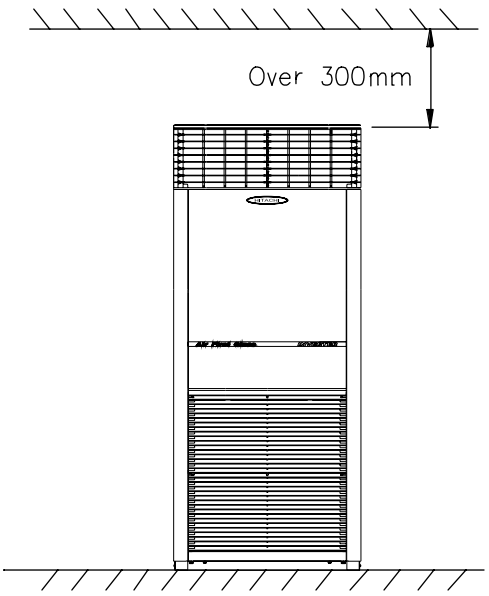
Maximum Piping Length	Difference in Height	Bending Quantity
under 75m	under 30m	under 12

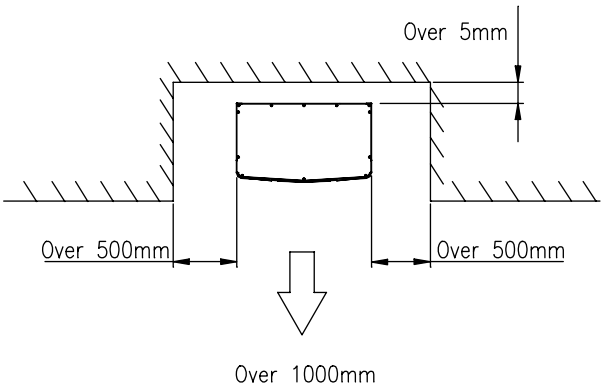
(4) Do not install the air conditioner in place where there are flammable gases and acid solvents.
(5) Do not install the air conditioner near high-frequency machines.
(6) No radiation sources shall be allowed near the installation site.
(7) The installation shall be duly secured for vibration and noise. Hot air released from the outdoor unit shall be led off the neighboring windows. Water drops, drainage, vibration and noise shall be kept off the neighborhood.

1.2 Installation Space

(1) Check for obstacles that restricts unit air flow or hamper maintenance and service work, keep a proper space for operation.

◆ **Operation Space for Indoor Unit**



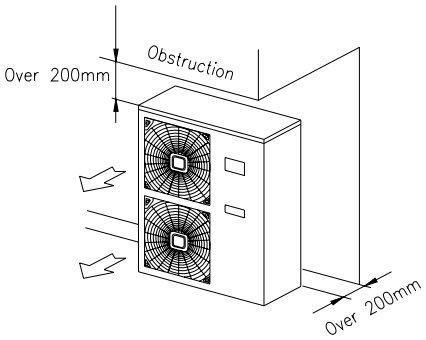


Preparation

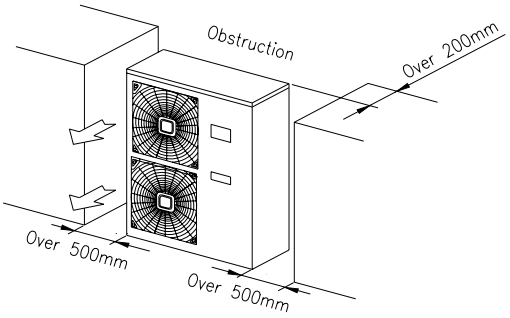
◆ Operation Space for Outdoor Unit

Individual Outdoor Unit

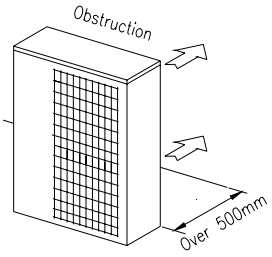
(1) In case of existence of obstruction on top and in the back (open space at front and by the side).



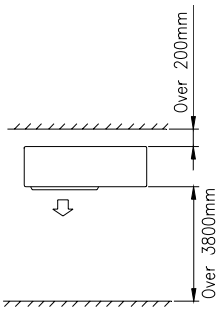
(2) In case of existence of obstruction in the back and by the side (open space at front and on top).



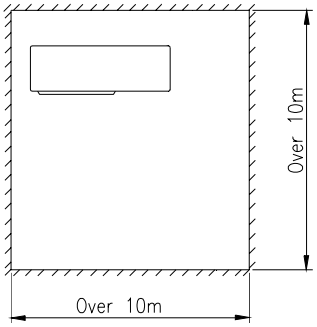
(3) In case of existence of obstruction on the front (open space in the back, by the sides and on the top)



(4) In case of existence of obstruction in the back and on the front (open space by the sides and on the top)

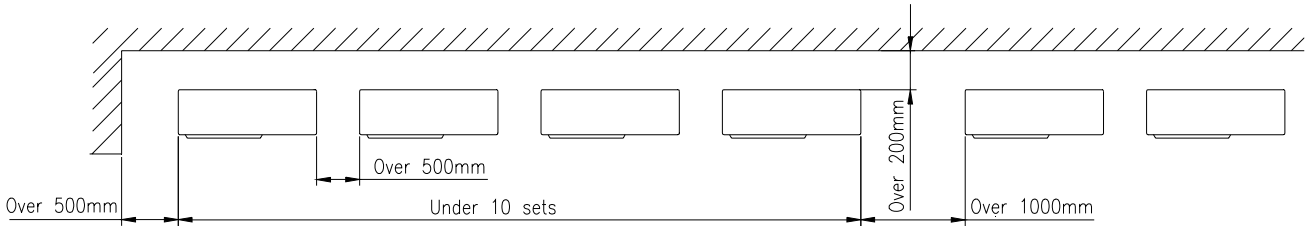


(5) In case of existence of obstruction in the surrounding (open space on top)

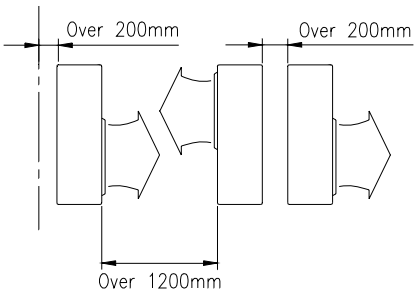


Combined Installation

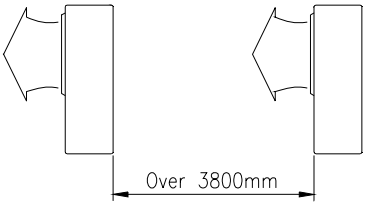
(1) Horizontal



(2) 2-Unit Leveled Installation



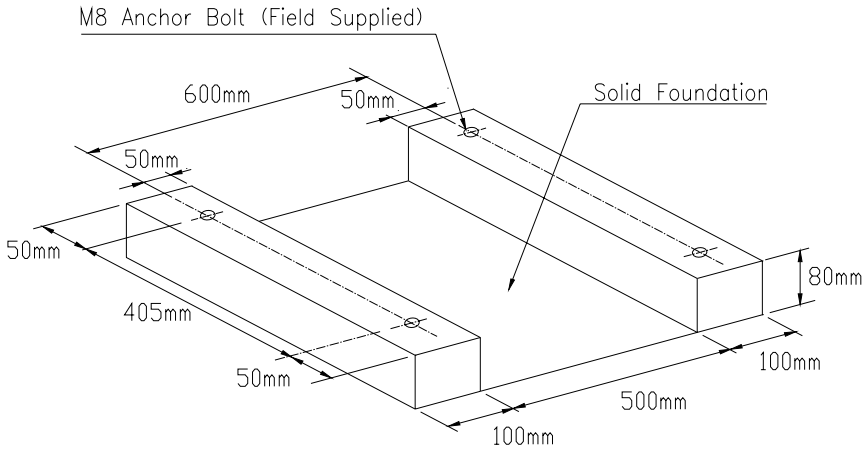
(3) Sequential Installation



1.3 Foundation

(1) Check to ensure that the foundation is flat leveled and sufficiently strong.

(2) Confirm elevation provision for the outdoor unit on a solid base with an iron frame or concrete curbs.



Unit Leveled Installation

(3) In order to obtain proper clearance beneath the either rooftop or on-the-ground installation, provide a gravel or concrete space around the outdoor unit air intake. In order to avoid air flow obstruction due to grass or other vegetation.

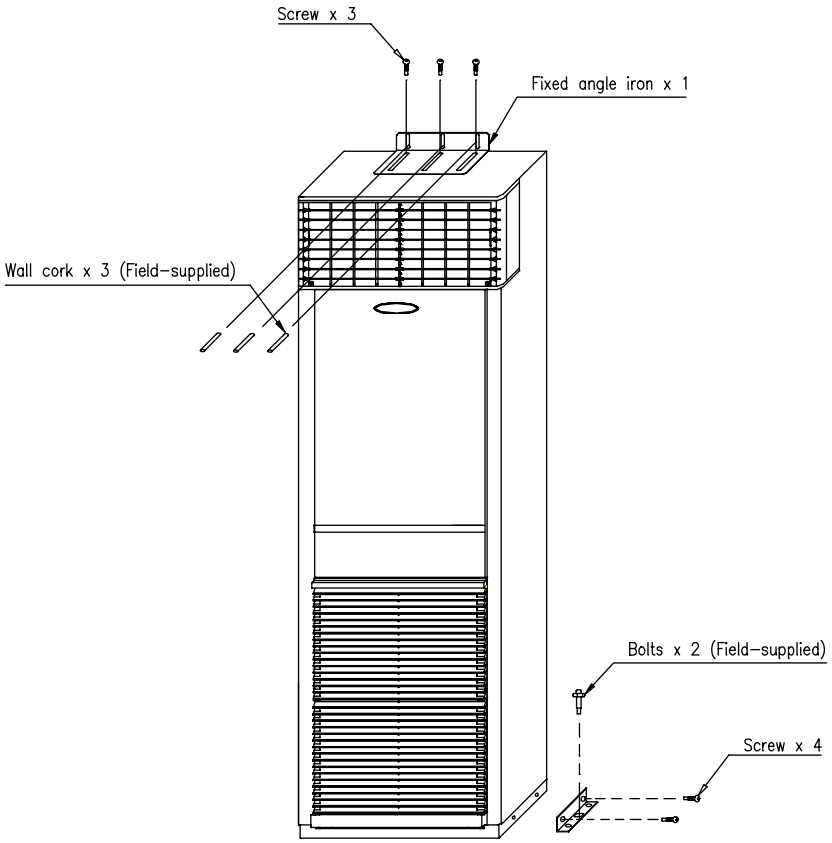
1.4 Unit Check

Check to ensure that the unit has been transported without damage. File a damage claim with the transportation companies if mishandling due to transportation company negligence is suspected.

2. Installation

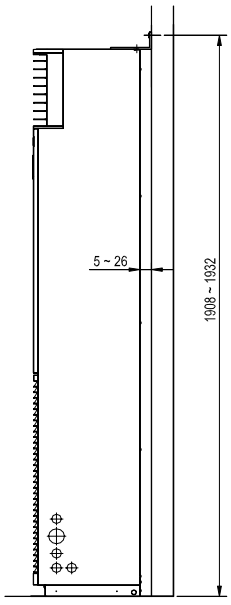
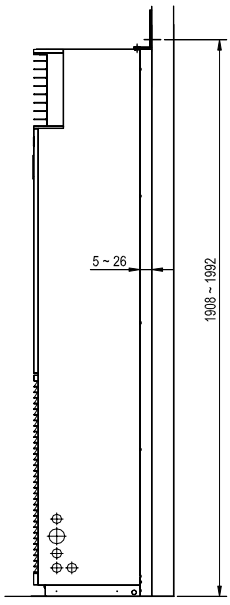
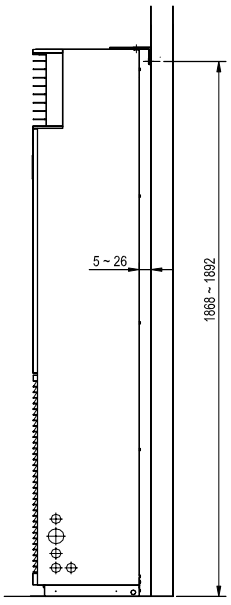
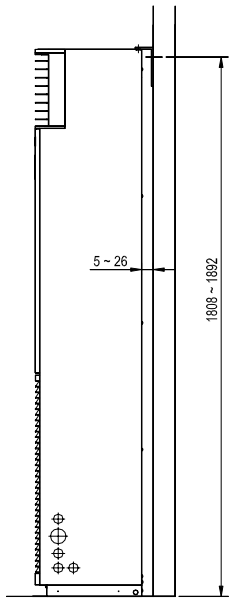
2.1 Anti-tumbler for Indoor Unit

(1) Be sure to secure the air conditioner with the anti-tumbler angle iron.
(2) To keep the air conditioner from tumbling, fix it on the floor and the wall.



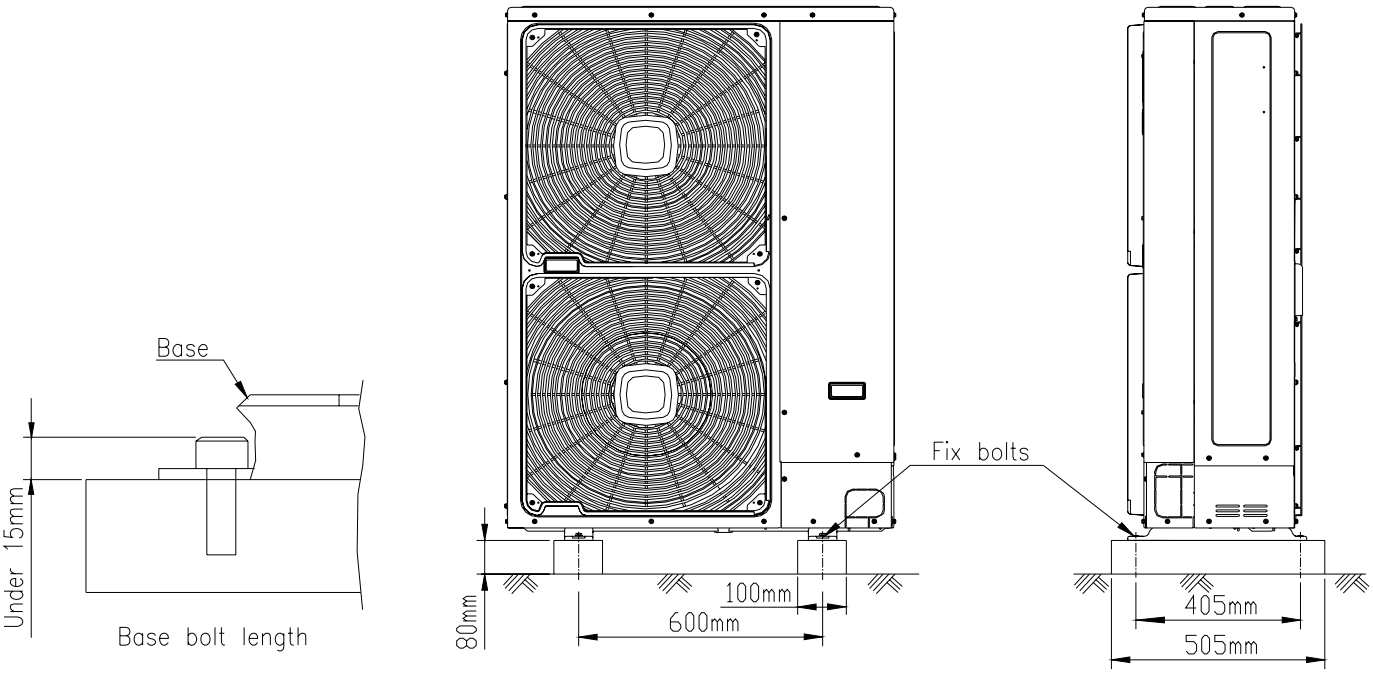
Securing of the wall fixation angle iron

- Refer to the table below for measurement of distance between air conditioner and wall.
- For vertical measurement to the floor refer to the angle iron installation site.

Angle iron facing up		Angle iron facing down	
Short side by wall	Long side by wall	Short side by wall	Long side by wall
			

2.2 Anti-tumbler for Outdoor Unit

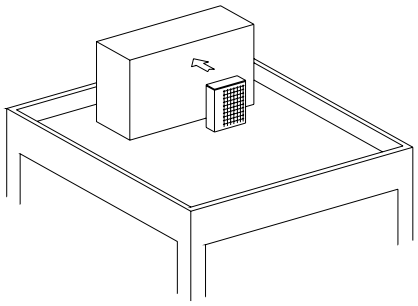
(1) Use fix bolts as shown in the figure right to secure the unit on the base.
(2) Apply enhanced installation to keep off seismic movements and typhoons.
(3) Use cement base. Refer to figure below.
Remark: The securing bolts are measured from 15mm in the base.



Watch for strong wind

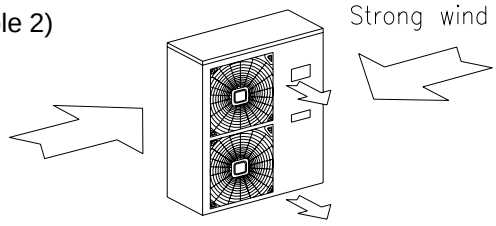
In case of installation in an open space, such as on top of a tall building where the outdoor unit outlet oppose strong winds, with impacts on its rotation and cooling capacity as well, the following are suggestions for improvement.

(Example 1)



Keep outdoor unit face (as shown) the wall and the inlet toward outside with a gap of 60cm between the wall and the front of the outdoor unit.

(Example 2)



Keep outdoor unit outlet and the wind direction of the installation site in a perpendicular position.

3. Refrigerant and Drainage Piping

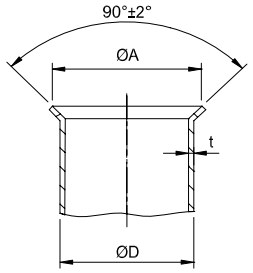
Tools and Instruments

One set of piping tools((+)(-) screw drivers, Tape measure, Knife, Hacksaw, Hexagon spanner, Spanner (14,17,19,22,24 & 30mm opening), Hose cutter, Flared tube expander), Gas Leak Detector, R410A Refrigerant.

Piping Material

(1) The used copper tubes of refrigerant (R410A) unit must be updated, washing and using repeatedly is extremely prohibited.

(2) The pipe end flare mouth of flare nut connection department, please according to refrigerant (R410A)piping require size to process as below.



Piping Diameter (ØD)	Size of (ØA)	Thickness (t)
Ø6.35 (1/4")	Ø10.0	0.8
Ø9.53 (3/8")	Ø13.2	0.8
Ø12.7 (1/2")	Ø16.6	0.8
Ø15.88 (5/8")	Ø19.7	1.0

(3) The unit uses environmentally refrigerant (R410A), when it is in the construction, please make sure the cycle system to keep dry, clean, air-tight three principles. Before piping connections, please use nitrogen or dry air clear the dust or impurities within the pipe.

3.1 Preparations

(1) Confirm that the piping are de-oxidized seamless copper tubes, and that they are free from dirt and moisture.

(2) Piping connections to the outdoor unit can be performed at the stop valves for liquid outlet and gas inlet in the machine compartment. Flare nuts are attached at liquid and gas connections of the indoor and the outdoor unit.

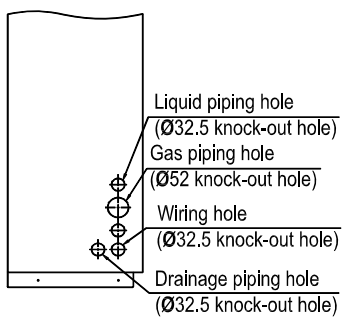
(3) All refrigerant and drainage piping shall be duly insulated to keep off frost.

Specification of refrigerant and drainage piping

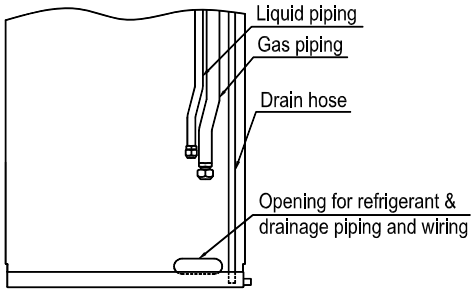
Model		Refrigerant Piping Length (1-75m)		Drainage Piping	Additional Refrigerant (60g)
Indoor Unit	Outdoor Unit	Liquid Line	Gas Line	Outer Diameter	of each increasing 1m
RPS-140AN	RAM-140FPS/ RAM-140FPSB	Size : Ø 9.53mm	Size : Ø 15.88mm	Ø 20mm	From (31~75m)
		Type : 3/8 Flare Nut	Type : 5/8 Flare Nut		
		Quantity : 1	Quantity : 1		

(4) Confirm that the indoor unit piping direction and accessories is suitable.

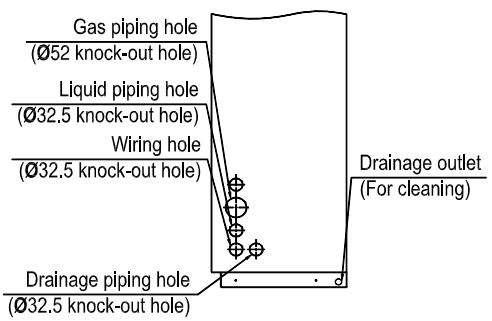
◆ **Indoor unit piping direction**



Left Side Piping



Rear Side Piping
(from front view)



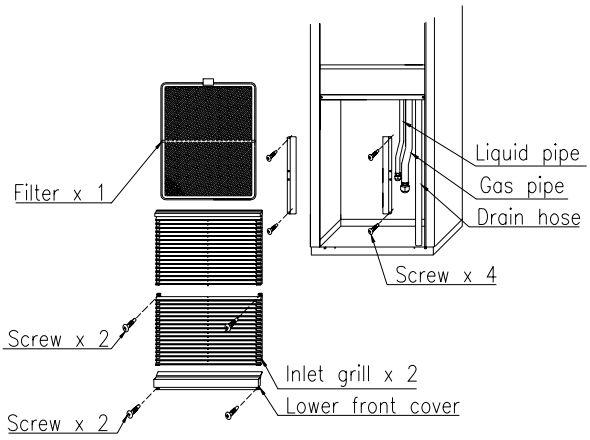
Right Side Piping

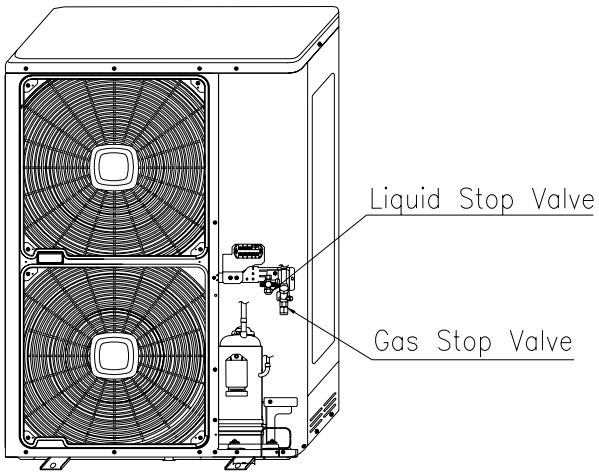
NOTE:

For unit operational durability, it is recommended to use a field-supplied filter dryer in the refrigeration cycle.

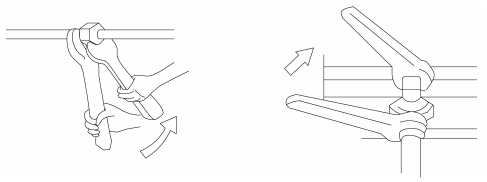
3.2 Refrigerant Piping

(1) Check to ensure that the stop valves of outdoor unit have been closed.
(2) Attach the connection pipes to the stop valves.
(3) Remove the air inlet grill, filter, filter guide and lower front cover.
(4) Connect the indoor and the outdoor unit with the specified refrigerant pipes.
(5) Charge nitrogen or refrigerant from the check joint of the liquid stop valve, using a Gas Leak Detector perform leakage test
(6) After completing the piping, the entire exposed tube adapter shall be duly covered with insulator and tightened with a band.





Tightening Flare Nut – When tightening the flare nut, utilize two spanners as shown below.
The required tightening torque is as follows:

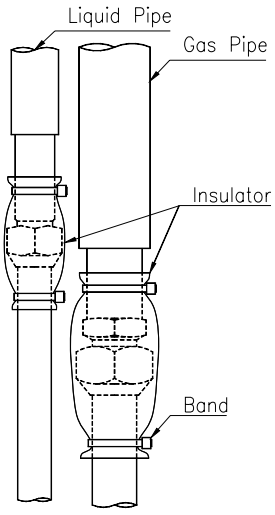


Pipe Size mm (in.)	Tightening Torque (kgf-cm)
6.35(1/4)	140-190
9.53(3/8)	350-450
12.7(1/2)	450-550
15.88(5/8)	500-600

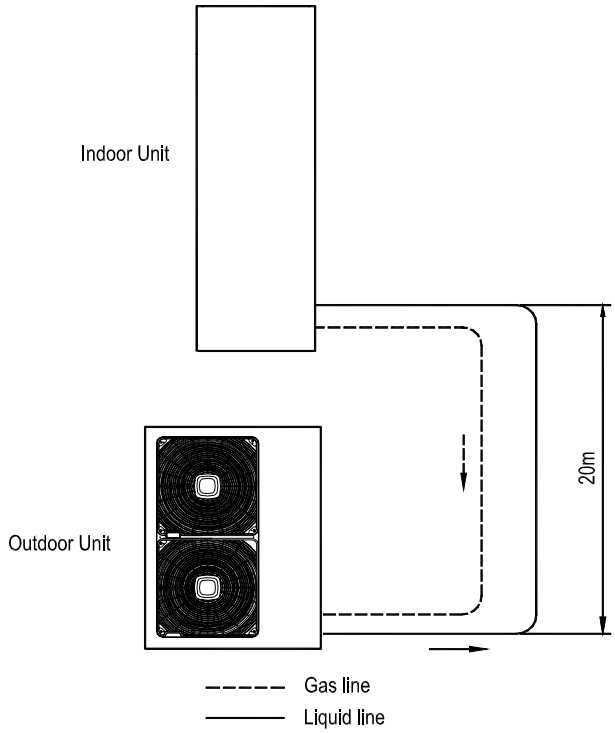
Tightening Work of Flare

⚠DANGER

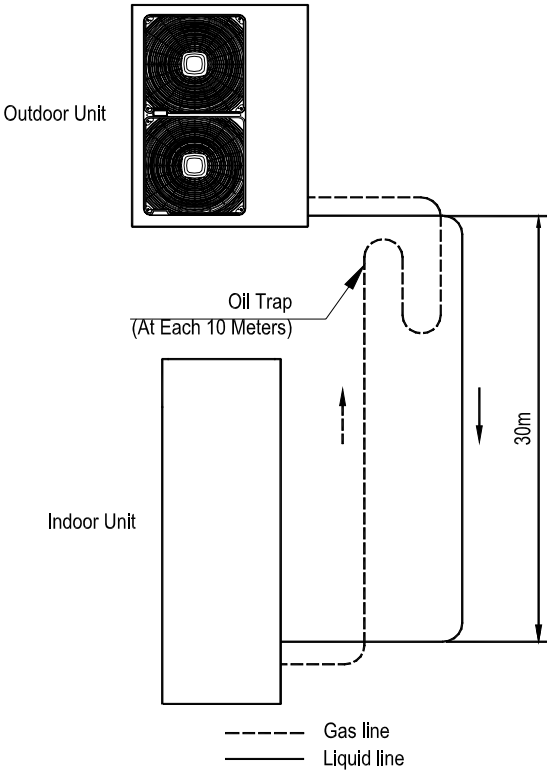
Do not charge OXYGEN, ACETYLENE or other flammable and poisonous gases into the refrigeration cycle when performing a leakage test or an air tight test. These types of gases are extremely dangerous, because explosion can occur. It is recommended that compressed air, nitrogen or refrigerant be charged for these types of tests.



Refrigerant and Drainage Piping



A. Outdoor Unit Below



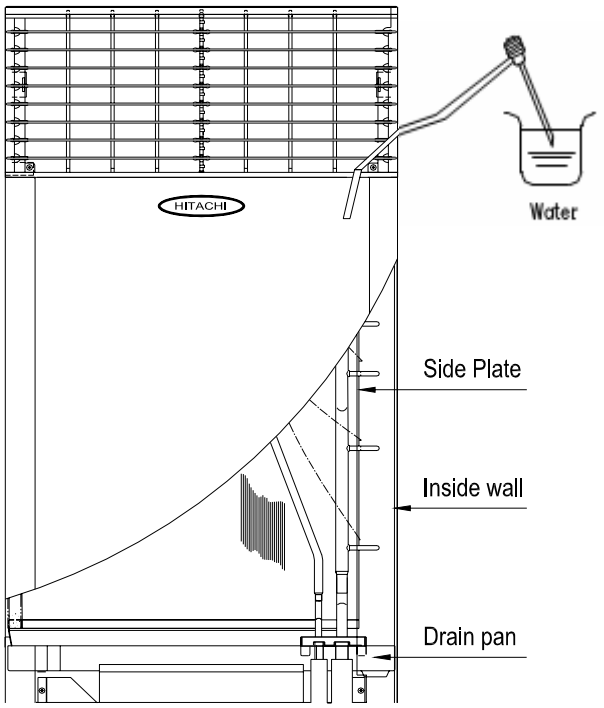
B. Outdoor Unit Above

Field Piping Arrangement (Maximum piping length = 75m)

3.3 Drainage piping

(1) The indoor drainage and the outdoor drainage shall be joined with adherent agents.

(2) For assurance of normal drainage tubing operation, a water filler shall be given for a gradual adding of 1000cc of water from the right side of the air outlet to the evaporator while checking for leakage in the drainage.



4. Evacuation and Refrigerant Charge

Tools and Instruments

Vacuum Pump, High Pressure Compound Gauge, Low Pressure Compound Gauge, Refrigerant Cylinder with Sufficient R410A Refrigerant, Weighing Scale, Charging Hoses (Lead Pipes), Other General Piping Tools and Ratchet Wrenches.

Preparation

Confirm the required amount of refrigerant, referring to the piping instruction label. Arrange piping connection work for evacuation and refrigerant charging as shown in Figure below.

4.1 Evacuation Procedures

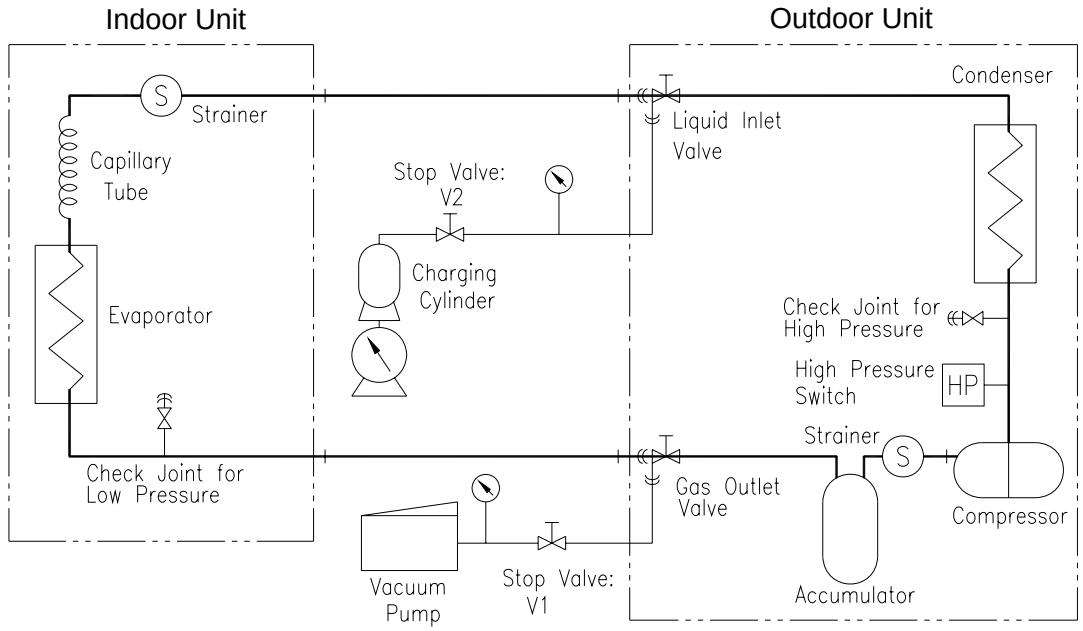
(1) Fully close the stop valves of the indoor unit, and release the backseat position of the liquid inlet valve.
(1) Operate the vacuum pump and ensure that the refrigeration cycle is being evacuated (V1:open, V2:closed).
(2) Continue the vacuum pump operation until the pressure indication of the gauge shows approximately-756mmHg.
(3) Stop the vacuum pump, wait for approximately 5 minutes and confirm the vacuum pressure has not increased.
(4) Close the vacuum pump connection line (V1, V2:closed).

4.2 Refrigerant Charge

(1) Purge air from the refrigerant cylinder connection line (V1,V2:closed).
(2) Charge liquid refrigerant gas as required into the refrigeration cycle by weighing the refrigerant cylinder (V1: closed, V2:open).
(3) Close the charging line (V1, V2:closed).
(4) After all evacuation and charging work, backseat the stop valves of the indoor unit and tighten the packing glands and the cap nuts.

Notes：

(1) A gauge manifold or equivalent piping connected with a vacuum pump and a refrigerant cylinder is recommended for rapid evacuation and charging work.
(2) When charging by weight is stopped due to high ambient temperature or piping arrangements, charge the gas refrigerant from the low pressure check joint while operation the entire system at the stage of initial start-up.



Evacuation and Refrigerant Charge

5. Electrical Wiring

Tools and Instruments

One Set of Wiring Tools, Electrical Testers (Clamp Meter)

5.1 Schedule Check

Confirm that the field-selected electrical components (main power switch, fuses, wires, conduit connections, wire terminals) are properly selected according to the table and to ensure that they comply with national and local codes. It is recommended that the main power switch be locked at the OFF position to prevent against accidental supply of the power during unit servicing.

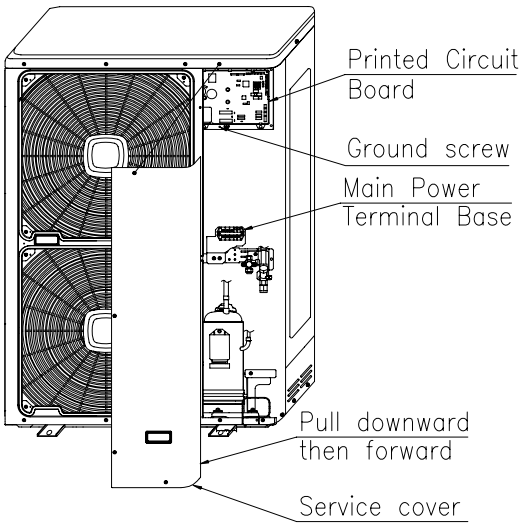
Electrical Data Table

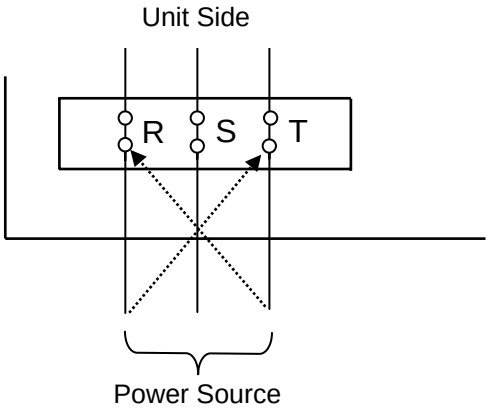
Model		Unit Main Power	Starting Current	Running Current
Indoor Unit	RPS-140AN	1 PHASE , 230V/60Hz	8A	14A
Outdoor Unit	RAM-140FPS	3 PHASE , 230V/60Hz		
	RAM-140FPSB	1 PHASE , 230V/60Hz		

5.2 Main Power Wiring Procedures

(1) Confirm the electrical power is not supplied in the installation location prior to any electrical installation work.
(2) Access to the magnetic switch box is provided with the service cover, which is fixed with screws.
(3) Install the field-supplied main switch box at the properly selected location.
(4) Install conduit connectors in the hole for power wiring.
(5) Connect the main power wires and the grounding wires through the connector screw of terminals in the magnetic switch box.
(6) Firmly connect the wires with wire terminals to the unit screw terminals according to wiring label attached in the magnetic switch box.
(7) Reversal Phase Protection for the Three phase model RPS-140AN.
Because the rotation direction of the orbiting scroll of the scroll type compressor is fixed, the scroll compressor is equipped with a Reversal Phase Protection Relay. If each phase R, S or T of the power source is incorrectly connected, the compressor will not start due to activation of the reversal phase protection relay. Therefore in order to check the correct wiring connection, the utilization of a phase sequence indicator is recommended when the unit is started after installation of the unit.

・If the phase is wrong, exchange two of the three wires connected from the main power source to the main terminals of the unit as indicated with the dotted lines, and then check the rotation direction of the phase sequence indicator once again. Do not exchange the wires in the unit side in order to protect the compressor against the reversal rotation.



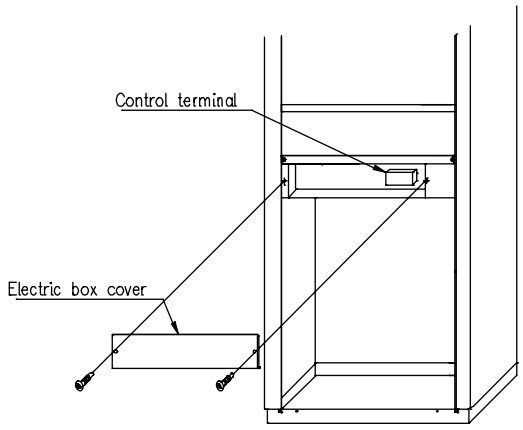


5.3 Main Power Wiring Specification

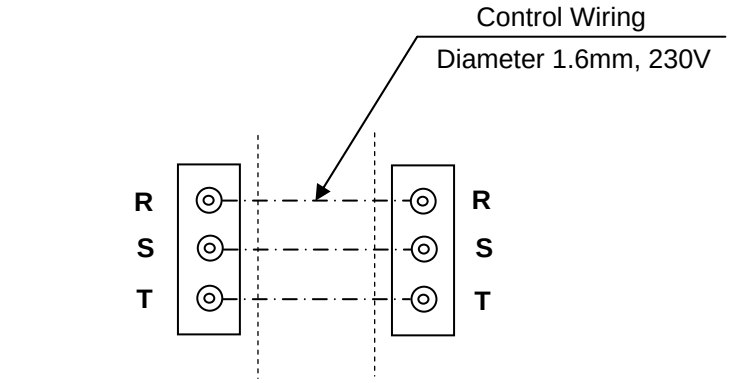
Model	Nominal Cross-Sectional Area
RPS-140AN + RAM-140FPS / RAM-140FPSB	5.5 mm^2 (Or above UL 1015 AWG # 10)

5.4 Control Wiring

Connect the control wires between the indoor unit terminals and the outdoor unit terminals according to the following to the wiring label.



Indoor unit



Indoor Unit Terminal Outdoor Unit Terminal

5.5 Grounding Specification

(1) Grounding impedance shall be below 100.
(2) Grounding wire of over Ø 2.0mm and up in diameter.

6. Test Running

6.1 Final Installation Check

Inspect the installation work according to all documents and drawings. Installation Work Check List shows the minimum check points.

Installation Work Check List

INSTALLATION WORK CHECK LIST

1. Is the unit solidly mounted and leveled? ☐
2. Is the installation location adequate? ☐
   - ☐ Space for the Unit Air Flow
   - ☐ Space for Maintenance Work
   - ☐ Noise and Vibration
   - ☐ Sunshine and Rainfall
   - ☐ Appearance
3. Is the refrigerant piping system adequate? ☐
   - ☐ Piping Size ☐ Cleaning
   - ☐ Length ☐ Dehydration
   - ☐ Bend ☐ Air Purge
   - ☐ Insulation ☐ Refrigerant Charge
4. Is the electrical wiring system adequate? ☐
   - ☐ Wire Size ☐ Tightened Connection
   - ☐ Switch Size ☐ Operation Control Devices
   - ☐ Fuse Size ☐ Safety Devices
   - ☐ Voltage ☐ Hz
5. Are the stop valves for suction gas and liquid open? ☐
6. Have the packing glands and the cap nuts for the stop valves been tightened? ☐

6.2 Preparation

Tools and Instruments - High and Low Pressure Compound Gauge(s), Electrical Tester, General Tools
Confirm the system switch is at the OFF position.

6.3 Test Running

When the unit is wired according to the standard label, test running should be performed as follows.

(1) Confirm the system switch is at OFF position.
(2) Check to ensure that the electrical resistance is more than 1 mega ohm by measuring the resistance between earth and the terminal of the electric parts. If not, do not try to operate the unit until the electrical leakage is found and repaired.
(3) Ensure that the stop valves of the outdoor unit are fully open, and then start the unit.
(4) Check the room temperature if it is higher than 21 °C DB and 15 °C WB while on cooling operation.
(5) Switch ON the main power source.
(6) Check the operating voltage, phase balance and operating current.
(7) Check to ensure that the operate panel functions properly.
(8) Check to ensure that the control and protective devices functions properly (refer to Test Running and Maintenance Record).

6.4 Safety and Control Device Setting

Model		RPS-140AN + RAM-140FPS / RAM-140FPSB
For Compressor High Pressure Switch		Auto Reset,Non-adjustable
Cut-out	kg/cm^2 G	42
	kPa	4150
Cut-In	kg/cm^2 G	32
	kPa	3200
Discharge Gas Thermostat		
Cut-Out	^oC	127
Cut-In	^oC	-
Internal Thermostat for Outdoor Fan Motor Cut-Out	^oC	120
Cut-In	^oC	-
Reverse Phase Protection Relay		Included
For Outdoor Fan Motor Fuse Capacity	A	5
For Control Circuit Fuse Capacity	A	5
For Power Circuit Fuse Capacity	A	30

7. Maintenance

The unit should be periodically inspected according to the same items as those described in the paragraph entitled “Test Running”. In order to ensure dependable operation and long life, the following additional items should be given particular attention.

7.1 Components

(Outdoor Unit)

(1) **Compressor** – No maintenance work is required for hermetic compressor if the refrigeration cycle remains sealed.
(2) **Air-Cooled Condenser –** Inspect the condenser and remove any accumulated dirt from the coil at regular intervals. Other obstacles such as growing grass and pieces of paper, which might restrict air flow, should also be removed.
(3) **Electrical Equipment –** Always pay careful attention to working voltage, amperage and phase balance. Check for faulty contact caused by loosened terminal connections, oxidized contacts, foreign matters and others.
(4) **Safety and Control Devices –** Do not readjust the setting in the field unless the setting is maintained at a point other than the point listed in Table .

(Indoor Unit)

(5) **Air Filter –** Inspect for accumulated dirt on the filter. Change or clean the filter if required. The inspection interval may be determined by the operating conditions for each installation site.
(6) **Condensate Drain pan and Drain Line –** Inspect and clean the condensate drain line at least twice a year.
(7) **Evaporator Fan –** Check for loosened fixed screw and abnormal sounds.
(8) **Operate Panel –** Check for abnormal function.

7.2 Lubrication

Compressor – The compressors are charged at the factory with the correct quantity of oil listed on the compressor nameplates. It is unnecessary to add oil if the refrigeration cycle remains sealed.
Fan Motor – Bearings of fan motor are pre-lubricated. Lubrication is not required.

7.3 Refrigerant Charge

When the refrigeration cycle requires recharging due to leakage or part replacement, follow the procedures given below for two cases:

1. When the refrigeration cycle completely leaked, evacuate and recharge the cycle according to the procedures given in “Evacuation and Refrigerant Charge”.
2. When the refrigeration cycle slightly leaked, evacuation may not be required. Refrigerant addition can be performed by liquid charging the service joint of the unit while operating the entire system. Slowly charge refrigerant into the refrigeration cycle, checking the discharge and suction pressure.

NOTE:

Do not purge the refrigerant gas from the service joint of the liquid line stop valve in order to prevent the oil from draining from the refrigeration cycle.

7.4 Compressor Removal

When removing the compressor:

(1) Shut off the power supply of the unit.
(2) Close all the unit stop valves, gas inlet and liquid outlet valves.
(3) Remove all wiring connections and piping connections to the compressor.
(4) Remove refrigerant.
(5) Remove the bolts fastened on the compressor base.
(6) Pull out the compressor base.
(7) Slightly lift the compressor and pull the compressor from the unit.

7.5 Start-Up After Extended Shutdown

After any extended period of shutdown, prepare the unit for operation as follows:
(1) Thoroughly inspect and clean the unit.
(2) Clean or replace the air filter.
(3) Clean the condensate drain lines.
(4) Remove any accumulated dirt from the condenser and evaporator coils.
(5) Check the fan screw tightness.
(6) Check the fan balance and try to operate the fan.
(7) Inspect the refrigerant piping for leakage.
(8) Tighten all wiring connections and access panels.

7.6 Replacement of Parts

Replacement of parts should be performed by ordering from the HITACHI Parts List. The Form A HITACHI Recommended Spare Parts List is advisable. When replacement of parts becomes necessary, prepare the parts shown in the Form A Parts List.

Maintenance

Test Running and Maintenance Record

POWER SUPPLY : Main Power:_____V, _____Hz Control :_____V

	Unit	Compressor
Model	**RPS - + RAM - (V, Hz)**	
Production No.		

CUSTOMER'S NAME :_____ **(PHONE NO.**_____**)**

CUSTOMER'S ADDRESS: _____

INSTALLED BY:_____ **DATE:**_____

START-UP BY:_____ **DATE:**_____

1. Is the indoor air flow sufficient? ☐
2. Are there any abnormal sounds? ☐
3. Has the unit been operated for at least twenty (20) minutes? ☐
4. Check Room Temperatures*: ☐
   - Inlet: DB_____^{o}C, WB_____^{o}C
   - Outlet: DB_____^{o}C, WB_____^{o}C
5. Check ambient Temperature*:
   - Inlet: DB_____^{o}C, WB_____^{o}C
   - Outlet: DB_____^{o}C, WB_____^{o}C
6. Check suction line Temperature and Superheat:
   - Suction line Temperature:_____^{o}C
   - Superheat: _____^{o}C
7. Check Pressures:
   - Gas Valve Pressure:_____kg/cm^{2} G
   - Liquid Valve Pressure:_____kg/cm^{2} G
8. Check Voltage:
   - Rated Voltage:_____V
   - Operation Voltage: R-S_____V, S-T_____V, T-R_____V
   - Starting Voltage:_____V
   - Phase Imbalance: 1-V/V_m =_____
9. Check Input and Running Current:

	Compressor	Indoor Fan Motor	Outdoor Fan Motor
Input (kW)			
Running Current (A)			

10. Do the operation control devices function properly? ☐
11. Do the safety devices function correctly? ☐
12. Is the refrigerant charge adequate? ☐
13. Are the drain lines draining freely? ☐
14. Are the filters clean? ☐
15. Are the indoor coil and outdoor coil clean? ☐
16. Are all cabinet panels fixed? ☐
17. Are all cabinet panels free from rattling? ☐
18. Has the unit been checked for refrigerant leakage? ☐
19. Is the unit clean inside and outside? ☐

*See the applicable range in "Working Range".

Johnson Controls-Hitachi Air Conditioning Philippines, Inc.

No. 1A Binictican Drive

Subic Bay Industrial Park Phase ll

Subic Bay Freeport Zone

Philippines

TEL: (02)362-4847

TEL(SERVICE): (02)362-3842

(RP-AF-H)