

USER'S MANUAL

Split Air Conditioner

HPR-09A2

HPR-12A2

HPR-18A2

HPR-24A2

Thank you for choosing Pioneer International Air Conditioners, please read this owner's manual carefully before operation and retain it for future reference.

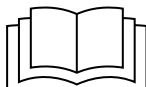
If you have lost the User's Manual, please contact the local agent or visit www.pioneerair.com.au or sent email to sales@pioneerair.com.au

Manufactured for Australia and New Zealand.



Appliance filled with flammable gas M50.

Caution, risk of fire



Before use the appliance, read the owner's manual first.



Before install the appliance, read the installation manual first.



Before repair the appliance, read the service manual first.

The Refrigerant

- To realize the function of the air conditioner unit, a natural refrigerant circulates in the system. The refrigerant is the hydrocarbon M50, which is specially purified. Refrigerants are highly flammable and tasteless. When M50 refrigerant is in a sealed room and the concentration is between 2.1% and 9.5% it can be flammable. At other concentrations levels, it will not be flammable!
- Compared to common refrigerants, M50 is a nonpolluting refrigerant with no harm to the ozonosphere. The influence upon the greenhouse effect is also lower. M50 embraces very good thermodynamic features which lead to a really high energy efficiency. The units therefore need a less mass charge.

 **WARNING**

- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacture. Should repair be necessary, contact your nearest authorized Service Centre. Any repairs carried out by unqualified personnel may be dangerous.
- The appliance shall be stored in a room without continuously operating ignition sources. (for example: open flames, an operating gas appliance or an operating electric heater.)
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.
- Appliance shall be installed, operated and stored in a room with a floor area larger than Xm^2 . (HPR-09A2:X=12; HPR-12A2:X=15; HPR-18A2:X=31; HPR-24A2:X=46)
- The installation of pipe-work shall be kept to a minimum Xm^2 . (HPR-09A2:X=12; HPR-12A2:X=15; HPR-18A2:X=31; HPR-24A2:X=46)
- Spaces where refrigerant pipes shall be compliance with national gas regulations.
- Servicing shall be performed only as recommended by the manufacturer.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- All working procedure that affets safety means shall only be carried by competent persons.





Annex CC (informative)

Transportation, marking and storage for units that employ flammable refrigerants

- The following information is provided for units that employ flammable refrigerants.

CC.1 Transport of equipment containing flammable refrigerants

Attention is drawn to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment, permitted to be transported together will be determined by the applicable transport regulations.

CC.2 Marking of equipment using signs

Signs for similar appliances used in a work area generally are addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location.

All required signs are to be maintained and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in connection with these signs. The effectiveness of signs should not be diminished by too many signs being placed together.

Any pictograms used should be as simple as possible and contain only essential details.

CC.3 Disposal of equipment using flammable refrigerants

See national regulations.

CC.4 Storage of equipment/appliances

The storage of equipment should be in accordance with the manufacturer's instructions.

CC.5 Storage of packed (unsold) equipment

Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.

The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

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This appliance is not intended for use by persons (including children) 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 to ensure that they do not play with the appliance.

If it needs to install, move or maintain the air conditioner, please contact dealer or local service center to conduct it at first. Air conditioner must be installed, moved or maintained by appointed unit. Otherwise, it may cause serious damage or personal injury or death.



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.

Operation and Maintenance

- This appliance can be used by children aged of 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.
- Children shall not play with the appliance.
- Cleaning and user maintenance shall not be made by children without supervision.
- Do not connect air conditioner to multi-purpose socket. Otherwise, it may cause fire hazard.
- Do disconnect power supply when cleaning air conditioner. Otherwise, it may cause electric shock.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- Do not wash the air conditioner with water to avoid electric shock.
- Do not spray water on indoor unit. It may cause electric shock or malfunction.
- After removing the filter, do not touch fins to avoid injury.
- Do not use fire or hair dryer to dry the filter to avoid deformation or fire hazard.
- Maintenance must be performed by qualified professionals. Otherwise, it may cause personal injury or damage.
- Do not repair air conditioner by yourself. It may cause electric shock or damage. Please contact dealer when you need to repair air conditioner.
- Do not extend fingers or objects into air inlet or air outlet, It may cause personal injury or damage.
- Do not block air outlet or air inlet. It may cause malfunction.
- Do not spill water on the remote controller. Otherwise the remote controller may be broken.
- When below phenomenon occurs, please turn off air conditioner and disconnect power immediately, and then contact the dealer or qualified professionals for service.
 1. Power cord is overheating or damaged.
 2. There's abnormal sound during operation.
 3. Circuit break trips off frequently.
 4. Air conditioner gives off burning smell.
 5. Indoor unit is leaking.

Precautions



- If the air conditioner operates under abnormal conditions, it may cause malfunction, electric shock or fire hazard.
- When turning on or turning off the unit by emergency operation switch, please press this switch with an insulating object other than metal.
- Do not step on top panel of outdoor unit, or put heavy objects. It may cause damage or personal injury.

Attachment

- Installation must be performed by qualified professionals. Otherwise, it may cause personal injury or damage.
- Must follow the electric safety regulations when installing the unit.
- According to the local safety regulations, use qualified power supply circuit and circuit break.
- Do install the circuit break. If not, it may cause malfunction.
- An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
- Air conditioner should be properly grounded. Incorrect grounding may cause electric shock.
- Including an circuit break with suitable capacity, please note the following table. Air switch should be included magnet buckle and heating buckle function, it can protect the circuit-short and overload.
- Don't use unqualified power cord.
- Make sure the power supply matches with the requirement of air conditioner. Unstable power supply or incorrect wiring or malfunction. Please install proper supply cables before using the air conditioner.
- Properly connect the live wire, neutral wire and grounding wire of power socket.
- Be sure to cut off the power supply before proceeding any work related to electricity and safety.
- Do not provide power to the air conditioner until the installation is complete.
- If the supply cord is damage, it must be replaced by the manufacture, tits service agent or similarly qualified persons in order to avoid a hazard.
- The temperature of refrigerant circuit will be high, please keep the interconnection cable away from, the copper tube.
- The appliance shall be installed in accordance with nation wiring regulations.
- Installation must be performed in accordance with the requirement of NEC and CEC by authorized personnel only.

Precautions

- The air conditioner is a first class electric appliance. It must be properly grounded with specialized grounding device by a qualified professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.
- The yellow-green wire in air condition is grounding wire, which can't be used for other purposes.
- The grounding resistance should comply with national electric safety regulation.
- The appliance must be positioned so that the plug is accessible.
- All wires of indoor unit and outdoor unit should be connected by a qualified professional.
- If the length of power connection wire is insufficient, please contact the supplier for a new one. Avoid extending the wire by yourself.
- For the air conditioner with plug, the plug should be reachable after finishing installation.
- For the air conditioner without plug, can circuit break must be installed in the line.
- If you need to relocate the air conditioner to another place, only the qualified person can perform the work. Otherwise, it may cause personal injury or damage.
- Select a location which is out of reach for children and far away from animals or plants. If it is unavoidable, please add the fence for safety purpose.
- The indoor unit should be installed close to the wall.

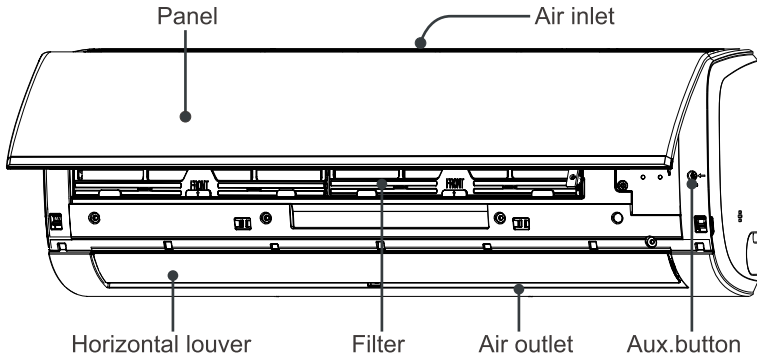
Working temperature range

	Indoor side DB/WB(°C)	Outdoor side DB/WB(°C)
Maximum cooling	32/23	43/31
Maximum heating	27/-	24/18

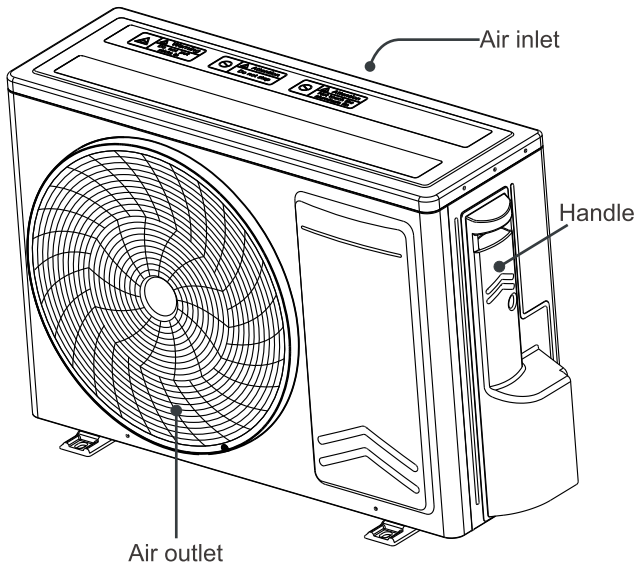
The operating temperature range (outdoor temperature) for cooling only unit is 18°C~43°C, for heat pump unit is -7°C~43°C.

Parts Name

Indoor unit:



Outdoor unit:

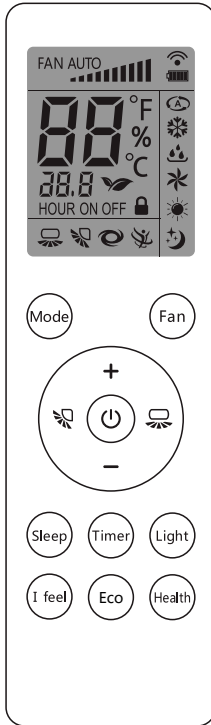


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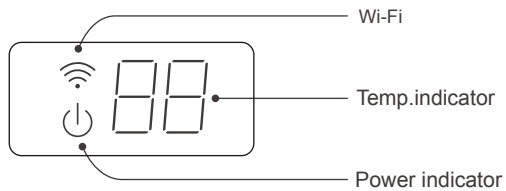
Actual product may be different from above graphics, please refer to actual products.

Parts Name

Remote controller:



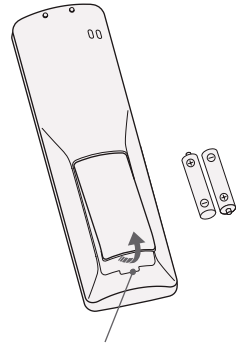
Display:



Operation Guide




Installation batteries

1. Press the back side of remote controller, as shown in the fig, and then push out the cover of battery box along the arrow direction.
2. Install two 7#(AAA1.5V) dry batteries, and make sure the position of “+” polar and “-” polar are correct.
3. Reinstall the cover of battery box.



Battery lid switch

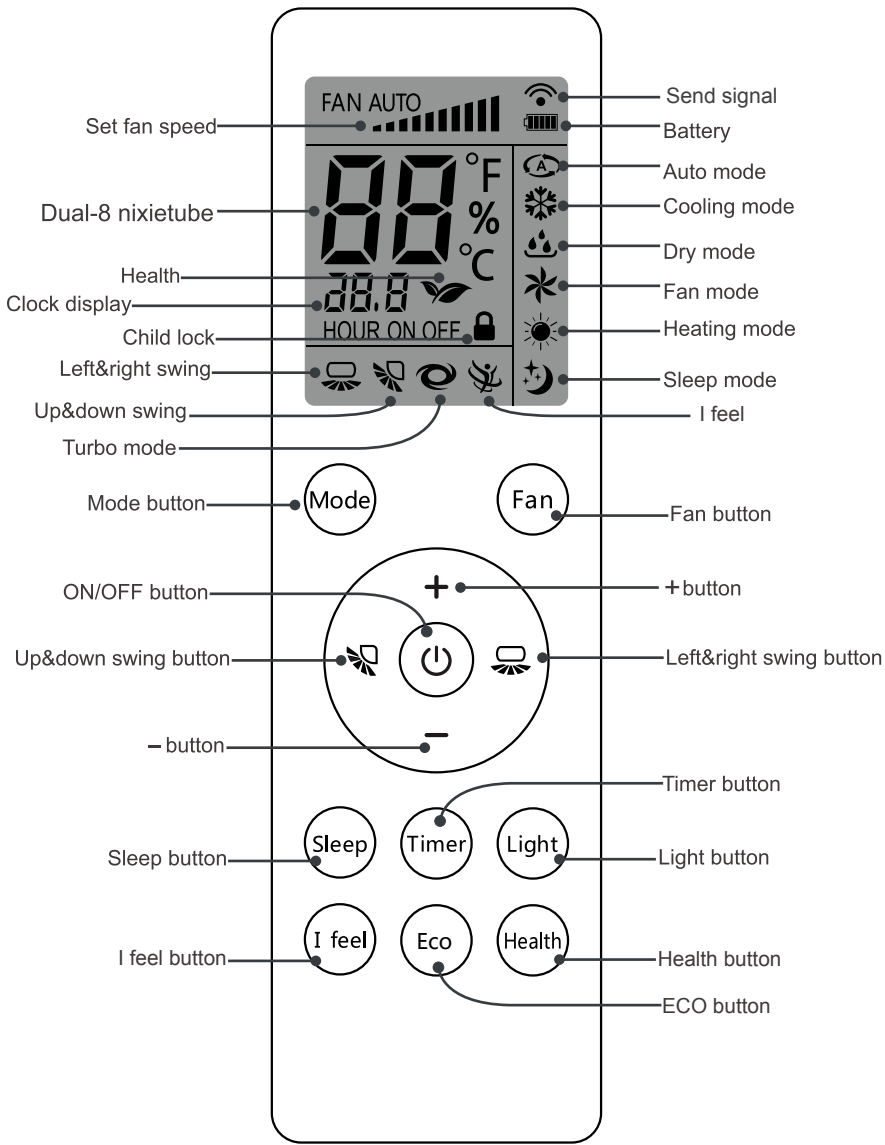
Operation guide

1. After connecting the power, press “” button on the remote controller to turn on the air conditioner.
2. Press “ Mode ” button to select your required mode:Auto,Cooling, Dry,Fan,Heating.
3. Press “ + ” or “ - ” button to set your required temperature,(Temperature can't be adjust under auto mode).
4. Press “ Fan ” button to set your required fan speed:auto,fan1,fan2,fan3,fan4,fan5, turbo,stepless speed.
5. Press “” or “” button to select fan blowing angle.

Note:

- During operation, point the remote control signal sender at the receiving window on indoor unit.
- The distance between signal sender and receiving window should be no more than 8m , and there should be no obstacles between them.
- Signal may be interfered easily in the room where there is fluorescent lamp or wireless telephone; remote controller should be close to indoor unit during operation.
- Replace new batteries of the same model when replacement is required.
- When you don't use remote controller for a long time,please take out the batteries.
- If the display on remote controller is fuzzy or there's no display , please replace batteries.

Remote Controller



Buttons on Remote Controller

After connecting the power, the air conditioner will be make a sound. Power indicator is ON. After that, you can operate the air conditioner by using remote controller.

In state of turning on, pressing the button on the remote controller, the air conditioner will make a “beep” sound, which means the signal has been sent to the air conditioner. The display will show the corresponding setting function icons.

In state of turning off, light and clock icon will be displayed on the display of remote controller (If timer on, timer off and light functions are set, the corresponding icons will be displayed on the display of remote controller at the same time).











On/Off button

Press this button can turn on or turn off the air conditioner.

Mode button

Press this button to select your required operation mode.








- When selecting auto mode, air conditioner will operate automatically according to ex-factory setting. Setting temperature can't be adjusted and will not be displayed as well. Press “Fan” button can adjust fan speed. Press “” or “” button can adjust fan blowing angel.
- When selecting cool mode, air conditioner will operate under cooling mode. Press “+” or “-” button to adjust setting temperature. Press “Fan” button to adjust fan speed. Press “” or “” button to adjust fan blowing angle.
- When selecting dry mode, the air conditioner will operate in fan1, fan speed can't be adjusted. Press “” or “” button to adjust fan blowing angle.
- When selecting fan mode, the air conditioner will only blow, with no cooling and no heating. Press “Fan” button to adjust fan speed. Press “” or “” button to adjust fan blowing angle.
- When selecting heat mode, the air conditioner will operate in heating mode. Press “+” or “-” button to adjust setting temperature. Press “Fan” button to adjust fan speed. Press “” or “” button to adjust fan blowing angle. (Cooling only unit won't receive heat mode signal. If setting heating mode with remote controller, press ON/OFF button can't start up the unit).

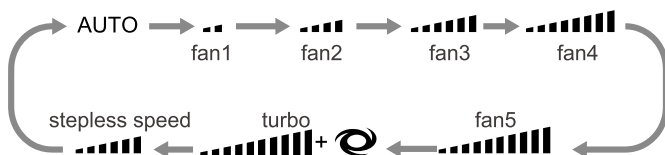
Note:

- To preventing cold air, after starting up heating mode, indoor unit will delay 1~5 minutes to blow air (auto delay time is depend on indoor ambient temperature).
- Setting temperature range from remote controller: 16~31°C; Fan speed: auto, fan1, fan2, fan3, fan4, fan5, turbo, stepless speed.

Buttons on Remote Controller

Fan button

Press this button can set fan speed circularly as: auto(AUTO), fan1(), fan2(), Fan3(), fan4(), fan5(), turbo( + ), stepless speed.

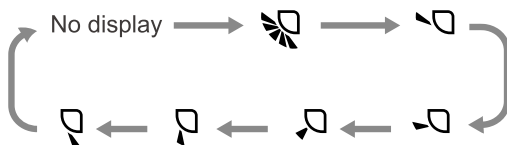


Note:








- In AUTO speed, air conditioner will select proper fan speed automatically according to ambient temperature.
- Fan speed under dry mode is fan1.
- After entering the stepless speed mode, users can adjust the fan speed according to the button “+” or “-”.

button

Press this button can select up&down swing angle. Fan blow angle can be selected circularly as below:



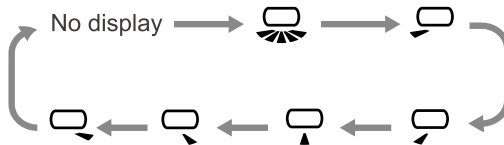
Note:

- When convert “NO display” into “” status, if press this button after 2s, swing status directly turns into “NO display”; if press this button within 2s, swing status changes according to the above order.
- When selecting “” with remote controller, it’s auto swing. Up & down swing louver of air conditioner will swing up & down automatically at the maximum angle.
- When selecting “ ,  ,  ,  ,  ” with remote controller, it’s the fixed position swing. Up & down swing louver of air conditioner will stop at the position as shown by the icon to swing. There is no this function for some remote control.








Buttons on Remote Controller

button

Press this button can select left & right swing angle. Fan blow angle can be selected circularly as below:



Note:

- When convert “NO display” into “” status, if press this button after 2s, swing status directly turns into “NO display”; if press this button within 2s, swing status changes according to the above order.
- When selecting “” with remote controller, it’s auto swing. Left & right swing louver of air conditioner will swing left & right automatically at the maximum angle.
- When selecting “     ” with remote controller, it’s the fixed position swing. Left & right swing louver of air conditioner will stop at the position as shown by the icon to swing. There is no this function for some remote control.

Notice:

This function is not available in Australia and New Zealand.

+ and – button

Press “+” or “–” button once to increase or decrease 1°C of temperature. Holding “+” or “–” button, temperature on remote controller will change quickly. On releasing button after setting is finished, temperature indicator on indoor unit will change accordingly. (Temperature can’t be adjusted under auto mode)

When setting TIMER ON, TIME OFF, press “+” or “–” button to adjust time. (Refer to “Timer” buttons)

Buttons on Remote Controller

Sleep button

Press this button to turn on or turn off the sleep function under cooling, dry, heating mode.

Note:

- This function is off as defaulted after power on.
- It will be cleared after changing mode.
- It is no use under “Fan” mode and “Auto” mode.
- If there is no this function for units, press this button, then main unit will sound, but it also runs under original status.

Timer button

This button can set the time for timer on (timer off). After pressing this button, “**HOUR ON (HOUR OFF)**” on remote controller blinks. Press “**+**” or “**-**” button within 5s to set timer on (timer off) time. Each pressing of “**+**” or “**-**” button, the time will increase or decrease 0.5 hour. Hold “**+**” or “**-**” button, the time will change quickly until reaching your required time. Press “**Timer**” to confirm it. The word “**HOUR ON (HOUR OFF)**” will stop blinking. “**HOUR ON (HOUR OFF)**” and “**8.0**” on remote controller will be displayed.

Cancel Timer on (off)

In the condition of timer on(off) is started up, press “**Timer**” button to cancel it.


Note:

- Time set range:0.5~24 hours.
- When timer on has set, the controller display as the unit is on.
- Timing of the initial set hour is 0.0 hour.


Light button

Press this button can turn on or turn off the light for indoor unit’s display.

I feel button

Press this button to start ifeel function and “” will be displayed on the remote controller. After this function is set, the remote controller will send the detected ambient temperature to the indoor unit and the unit will automatically adjust the indoor

Buttons on Remote Controller

temperature according to the detected temperature. Press this button again to close ifeel function and “” will disappear.


Note:

Please put the remote controller near user and confirm the unit can receive the remote code when this function is set. Do not put the remote controller near the object of high temperature or low temperature in order to avoid detecting inaccurate ambient temperature.

ECO button

In cool mode, press this button and the unit will operate under ECO mode.

Note:

- Change mode will exit the ECO mode.
- In ECO mode, remote controller display “”. Set temperature can't be adjusted.
- In ECO mode, air conditioner will operate at auto fan speed, fan can't be adjusted.

Health button

Press this button to turn on or turn off the cold plasma generator.

The cold plasma generator can effectively eliminate the bacteria and odor in the air.



1. The H₂O molecules are ionized.
2. Neutral reaction between the positive ions and negative ions can eliminate bacterial and odor molecules.

Notice:

This function is not available in Australia and New Zealand.

Function introduction for combination buttons

1. Child lock function

Press “+” or “-” simultaneously for 3s to turn on or turn off child lock function. When child lock function is on, “” icon is displayed on remote controller. If you operate the remote controller, the “” icon will blink three times without sending signal to the unit.

Buttons on Remote Controller

2. Temperature display switchover function

In the off mode, press " Mode " and " – " buttons simultaneously to switch temperature display between °C and °F .

3. Wi-Fi

Press "  " and " Mode " buttons for 3s into the Wi-Fi setting.

Note:

Optional function, if the model without this function, no feedback from the air conditioner when press these two buttons.

4. Low temperature heating function setting

- In heating mode, pressing " Mode " and " + " button at the same time will enter/exit the low temperature heating function.
- "LA" would be showed on the remote controller after entered into the low temperature heating function.
- When switching from one mode to another mode, low temperature heating function was canceled. Turn off and then turn on air conditioner that will remain the low temperature heating function. When in an energized state/when power on, the low temperature heating function would be canceled.
- In the low temperature heating mode, " Sleep " and " Low temperature heating " function cannot start at the same time. When low temperature heating mode has already started, meanwhile you press the "Sleep" button, the air conditioner will exit low temperature heating mode and enter the sleep mode.

Note:

- In the low temperature heating mode, the fan speed was default to Auto and non-adjustable.
- In the low temperature heating mode, " Turbo " and " Quiet " can't be set. If enter the low temperature heating mode, the turbo and quiet function than started before will be canceled. As well as when exit the low temperature heating mode, it will not resume.
- When exit from the low temperature heating mode, the speed and temperature will turn into the original condition before it started.
- You can set up other function.

Clean and Maintenance

WARNING

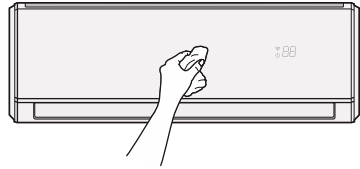
- Turn off the air conditioner and disconnect the power before cleaning the air conditioner to avoid electric shock.
- Do not wash the air conditioner with water to avoid electric shock.
- Do not use volatile liquid to clean the air conditioner.

Clean surface of indoor unit

When the surface of indoor unit is dirty, it is recommended to use a soft dry cloth or wet cloth to wipe it.

Note:

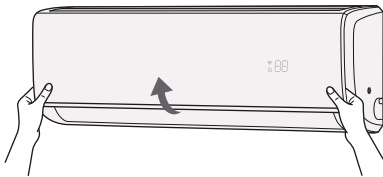
Do not remove the panel when cleaning it.



Clean filter

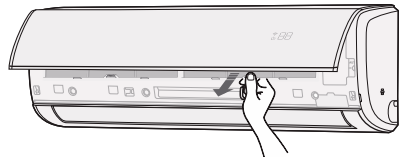
1. Open panel

Pull out the panel to a certain angle as shown in the fig.



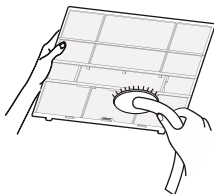
2. Remove filter

Remove the filter as indicated in the fig.



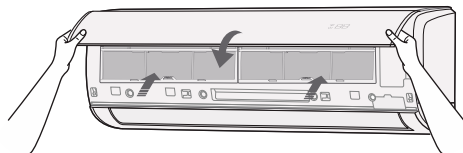
3. Clean filter

Use dust catcher or water to clean the filter. When the filter is very dirty, use the water (below 45 °C) to clean it, and then put it in a shady and cool place to Dry.



4. Installation filter

Installation the filter and then close the panel cover tightly.



Clean and Maintenance

Note:

- The filter should be cleaned every three months. If there is much dust in the operation environment, clean frequency can be increased.
- After removing the filter, do not touch fins to avoid injury.
- Do not use fire or hair dryer to dry the filter to avoid deformation or fire hazard.

Cleaning before use-season

1. Check whether air inlets and air outlets are blocked.
2. Check whether air switch, plug and socket are in good condition.
3. Check whether filter is clean.
4. Check whether drainage pipe is damaged.

Cleaning after use-season

1. Disconnect power supply.
2. Clean filter and indoor unit's panel.

Notice for recovery

1. Most of packing materials are recyclable materials. Please dispose them in appropriate.
2. If you want to dispose the air conditioner, please contact local dealer or consultant service center for the correct disposal method.

Malfunction Analysis

General phenomenon analysis

Please check below items before asking for maintenance. If the malfunction still can't be eliminated, please contact local dealer or qualified professionals.

Phenomenon	Check items	Solution
In door unit can't receive remote controller's signal or remote controller has no action.	Whether it's interfered severely(such as static electricity, stable voltage)?	Pull out the plug. Reinsert the plug after about 3min, and then turn on the unit again.
	Whether remote controller is within the signal receiving range?	Signal receiving range is 8m.
	Whether there are obstacles?	Remove obstacles.
	Whether remote controller is pointing at the receiving window?	Select proper angle and point the remote controller at the receiving window on indoor unit.
	Is sensitivity of remote controller low; fuzzy display and no display?	Check the batteries. If the power of batteries id too low , please replace them.
	No display when operating remote controller?	Check whether remote controller appears to be damaged. I f yes, replace it.
	Fluorescent lamp in room?	Take the remote controller close to indoor unit. Turn off the fluorescent lamp and then try it again.
No air emitted from indoor unit.	Air inlet or air outlet of indoor unit is blocked?	Eliminate obstacles.
	Under heating mode, indoor temperature is reached to set temperature?	After reaching to set temperature, indoor unit will stop blowing out air.
	Heating mode is turned on just now?	In order to prevent blowing out cold air, indoor unit will be started after delaying for several minutes, which is a normal phenomenon.
Air conditioner can't operate	Power failure?	Wait unit power recovery.
	Is plug loose?	Reinsert the plug.
	Circuit break trips off or fuse is burn out?	Ask professional to replace circuit break or fuse.
	Wiring has malfunction?	Ask professional to replace it.
	Unit has restarted immediately after stopping operation?	Wait for 3min and then turn on the unit again.
Whether the function setting for remote controller is correct?	Reset the function.	

Malfunction Analysis

Phenomenon	Check items	Solution
Mist is emitted from indoor unit's air outlet.	Indoor temperature and humidity is high?	Because indoor air is cooled rapidly. After a while, indoor temperature and humidity will be decrease and mist will display.
Set temperature can't be adjusted	Unit is operating under auto mode?	Temperature can't be adjusted under auto mode. Please switch the operation mode if you need to adjust temperature.
	Your required temperature exceeds the temperature range?	Set temperature range:16°C~31°C
Cooling (heating) effect is not good	Voltage is too low?	Wait until the voltage resumes normal.
	Filter is dirty?	Clean the filter.
	Set temperature is in proper range?	Adjust temperature to proper range.
	Door and window are open?	Close door and window.
Odours are emitted	Whether there's odour source, such as furniture and cigarette,etc.	Clean the filter. Eliminate the odour source.
Air conditioner operates normally suddenly	Whether there's interference, such as thunder, wireless device,etc.	Disconnect power, put back power, and then turn on the unit again.
Outdoor unit has vapor	Heating mode is turned on?	During defrosting under heating mode, it may generate vapor, which is a normal phenomenon.
" Water flowing " noise	Air conditioner is turned on or turned off just now?	The noise is the sound of refrigerant flowing inside the unit, which is a normal phenomenon.
Cracking noise	Air conditioner is turned on or turned off just now?	This is the sound of friction caused by expansion and / or contraction of panel or other parts due to the change of temperature.

Malfunction Analysis

Error Code

When air conditioner status is abnormal, temperature indicator on indoor unit will blink to display corresponding error code. Please refer to below list for identification of error code.



Note:

Above indicator diagram is only for reference. Please refer to actual product for the actual indicator and position.

Below listed error codes are only part error codes. Please refer to error code list in service manual for more information.

Error code	Name
CL	Filter clean remind
H0	High exhaust temp.protection
H1	Overcapacity protection
H2	Compressor overload protection
H3	Anti-frost protection
H4	System high pressure protection
H5	System low pressure protection
H6	Lack refrigerant / valve stop protection
C8	Auxiliary heat adhesion protection
C9	The communication between indoor unit and wired controller fault
E0	Indoor temp.sensor open / short circuit
CJ	Wired controller temp.sensor fault
FF	Defrost or heating oil return
C3	Indoor unit report outdoor unit fault
Cb	Water full protection

If there are other errors codes, please contact qualified professionals for service.

Malfunction Analysis

Contact us

When below phenomenon occurs, please turn off air conditioner and disconnect power immediately, and then contact the dealer or qualified professionals for service.

- **Power cord is overheating or damaged.**
- **Air conditioner gives off burning smell.**
- **There's abnormal sound during operation.**
- **Circuit break trips off frequently.**
- **Indoor unit is leaking.**

Do not repair or refit the conditioner by yourself. If the air conditioner operates under abnormal conditions, it may cause malfunction, electric shock or fire hazard.

***Qualification requirement for installation and maintenance
minimum qualification required is J174***

Safety operation of flammable refrigerant

- Qualification requirement for installation and maintenance minimum qualification required is J174.
- All the work men who are engaging in the refrigeration system should bear the valid certification awarded by the authoritative organization and the qualification for dealing with the refrigeration system recognized by this industry. If it needs other technician to maintain and repair the appliance, they should be supervised by the person who bears the qualification for using the flammable refrigerant. It can only be repaired by the method suggested by the equipment's manufacturer.

Installation notes

- The air conditioner is not allowed to use in a room that has running fire (such as fire source, working coal gas ware, operating heater).
- It is not allowed to drill hole or burn the connection pipe.
- The air conditioner must be installed in a room that is larger than the minimum room area. The minimum room area is shown on the nameplate or following table.
- Leak test is a must after installation.
- Please consult to MS 2678:2017 Flammable Refrigerant System- code of practice.

Safety operation of flammable refrigerant

M50 Refrigerant Charge Limitation Standard for Air Conditioning System

Refrigerant	Minimum Combustion Limit (kg/m ³)	Installation Height of Product(m)	Room area(m ²)						
			4	7	10	15	20	30	50
M50 (kg)	0.038	0.6	0.05	0.07	0.08	0.1	0.11	0.14	0.18
		1	0.08	0.11	0.13	0.16	0.19	0.23	0.3
		1.8	0.15	0.2	0.24	0.29	0.34	0.41	0.53
		2.2	0.18	0.24	0.29	0.36	0.41	0.51	0.65

Maintenance notes

- Check whether the maintenance area or the room area meet the requirement of the nameplate.
 - It's only allowed to be operated in the rooms that meet the requirement of the nameplate.
- Check whether the maintenance area is well-ventilated.
 - The continuous ventilation status should be kept during the operation process.
- Check whether there is fire source or potential fire source in the maintenance area.
 - The naked flame is prohibited in the maintenance area; and the “no smoking” warning board should be hanged.
- Check whether the appliance mark is in good condition.
 - Replace the vague or damaged warning mark.

Fuse Size

- Indoor unit:T3.15AH; 250VAC
- Outdoor unit:
 - Fuse 1: 9K & 12K:T15AH; 250VAC
 - 18K & 24K:T25AH; 250VAC
 - Fuse 2:T3.15AL; 250VAC

Power supply cord and Inter connection cord

9K &12K:H07RN-F 3G1.0 mm²;
 18K:H07RN-F 3G1.5 mm²;
 24K:H07RN-F 3G2.5 mm²
 Inter connection cord:4G 0.75 mm²

Safety operation of flammable refrigerant

Welding

- If you should cut or weld the refrigerant system pipes in the process of maintaining, please follow the steps as below:
 - a. Shut down the unit and cut power supply
 - b. Eliminate the refrigerant
 - c. Vacuuming
 - d. Clean it with N2 gas
 - e. Cutting or welding
 - f. Carry back to the service spot for welding
- The refrigerant should be recycled into the specialized storage tank.
- Make sure that there isn't any naked flame near the outlet of the vacuum pump and it's well-ventilated.

Filling the refrigerant

- Use the refrigerant filling appliances specialized for M50. Make sure that different kinds of refrigerant won't contaminate with each other.
- The refrigerant tank should be kept upright at the time of filling refrigerant.
- Follow the label on the system at all times.
- Don't overfilling.
- After filling is finished, please do the leakage detection before test running; another time of leak detection should be done when it's removed.

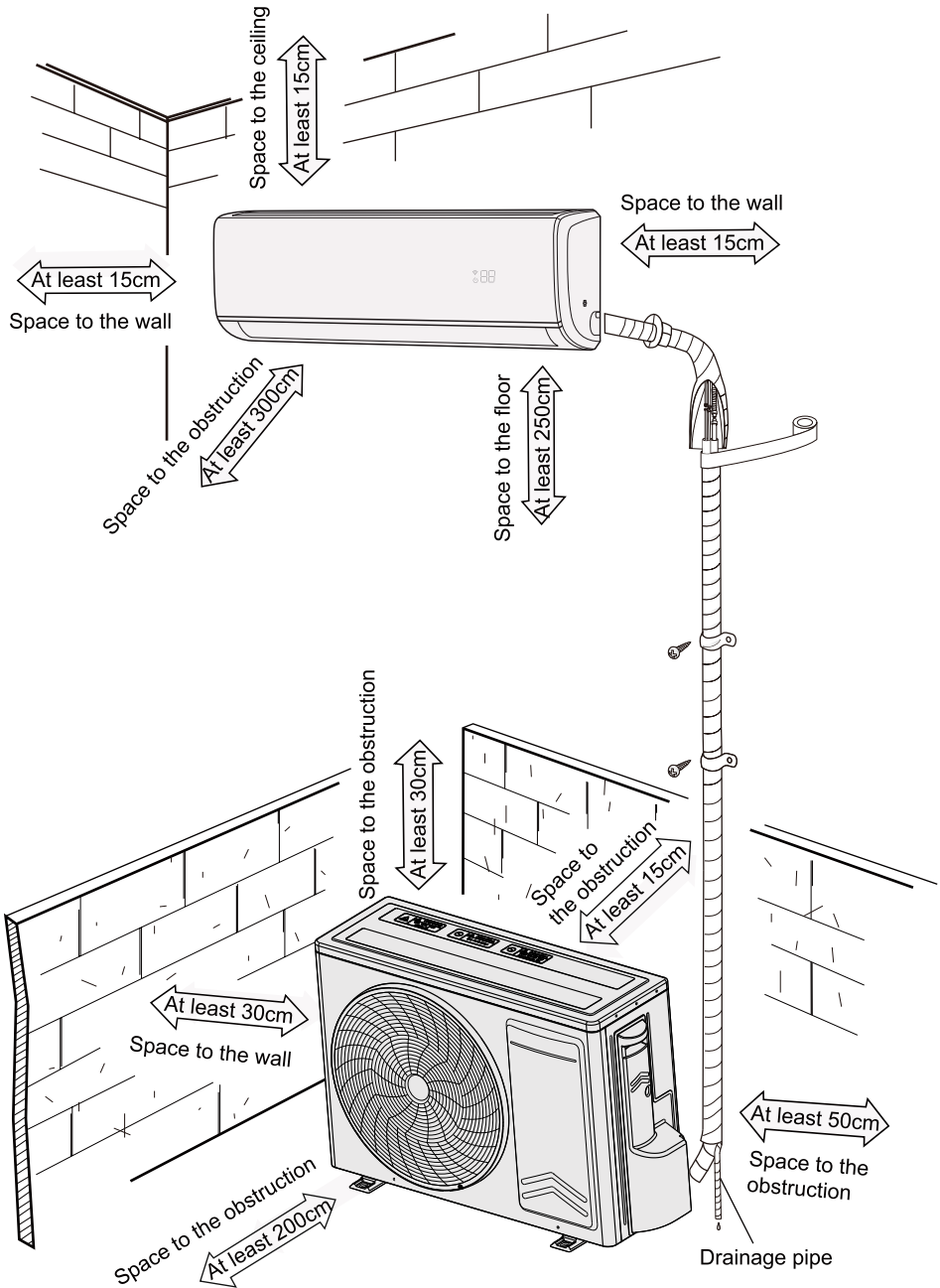
Safety instructions for transportation and storage

- Please use the flammable gas detector to check before unload and open the container.
- No fire source and smoking.
- According to the local rules and laws.

Refrigerant Charge

The product specific value is subject to the rating plate.

Installation Drawing



Safety precautions for installing and relocating the unit

To ensure safety, please be mindful of the following precautions.

WARNING

- **When installing or relocating the unit, be sure to keep the refrigerant circuit free from air or substances other than the specified refrigerant.**
Any presence of air or other foreign substance in the refrigerant circuit will cause system pressure rise or compressor rupture, resulting in injury.
- **When installing or moving this unit, do not charge the refrigerant which is not comply with that on the nameplate or unqualified refrigerant.**
Otherwise, it may cause abnormal operation, wrong action, mechanical malfunction or even series safety accident.
- **When refrigerant needs to be recovered during relocating or repairing the unit, be sure that the unit is running in cooling mode. Then, fully close the valve at high pressure side (liquid valve). About 30-40 seconds later, fully close the valve at low pressure side (gas valve), immediately stop the unit and disconnect power. Please note that the time for refrigerant recovery should not exceed 1 minute.**
If refrigerant recovery takes too much time, air may be sucked in and cause pressure rise or compressor rupture, resulting in injury.
- **During refrigerant recovery, make sure that liquid valve and gas valve are fully closed and power is disconnected before detaching the connection pipe.**
If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.
- **When installing the unit, make sure that connection pipe is securely connected before the compressor starts running.**
If compressor starts running when stop valve is open and connection pipe is not yet connected, air will be sucked in and cause pressure rise or compressor rupture, resulting in injury.
- **Prohibit installing the unit at the place where there may be leaked corrosive gas or flammable gas.**
If there leaked gas around the unit, it may cause explosion and other accidents.
- **Do not use extension cords for electrical connections. If the electric wire is not long enough, please contact a local service center authorized and ask for a proper electric wire.**
Poor connections may lead to electric shock or fire.
- **Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the wires so that their terminals receive no external stresses.**
Electric wires with insufficient capacity, wrong wire connections and insecure wire terminals may cause electric shock or fire.

Installation Prepare

Tools

1 Level meter	2 Screw driver	3 Impact drill
4 Drill head	5 Pipe expander	6 Torque wrench
7 Open-end wrench	8 Pipe cutter	9 Leakage detector
10 Vacuum pump	11 Pressure meter	12 Universal meter
13 Inner hexagon spanner	14 Measuring tape	

Selection of location

Basic requirement

Installing the unit in the following places may cause malfunction. If it is unavoidable, please consult the local dealer.

1. The place with strong heat sources, vapors, flammable or explosive gas, or volatile objects spread in the air.
2. The place with high-frequency devices (such as welding machine, medical equipment).
3. The place near coast area.
4. The place with oil or fumes in the air.
5. The place with sulfured gas.
6. Other places with special circumstances.
7. The appliance shall not be installed in the laundry.

Indoor unit

1. There should be no obstruction near air inlet and air outlet.
2. Select a location where the condensation water can be dispersed easily and won't affect other people.
3. Select a location which is convenient to connect the outdoor unit and near the power socket.
4. Select a location which is out of reach for children.
5. The location should be able to withstand the weight of indoor unit and won't increase noise and vibration.
6. The appliance must be installed 2.5m above floor.
7. Don't install the indoor unit right above the electric appliance.
8. Please try your best to keep away from fluorescent lamp.

Outdoor unit

1. Select a location where the noise and out flow air emitted by the outdoor unit will not affect neighborhood.
2. The location should be well ventilated and dry, in which the outdoor unit won't be exposed directly to sunlight or strong wind.
3. The location should be able to withstand the weight of outdoor unit.
4. Make sure that the installation follows the requirement of installation dimension diagram.
5. Select a location which is out of reach for children and far away from animals or plants. If it is unavoidable, please add the fence for safety purpose.

Installation Prepare

Safety precaution

- Must follow the electric safety regulations when installing the unit.
- According to the local safety regulation, use qualified power supply circuit and air switch.
- Make sure the power supply matches with the requirement of air conditioner. Unstable power supply or incorrect wiring or malfunction. Press install proper power supply cables before using the air conditioner.
- Properly connect the live wire, neutral wire and grounding wire of power socket.
- Be sure to cut off the power supply before proceeding any work related to electricity and safety.
- Do not connect the power before finishing installation.
- If the supply cord is damaged, it must be replaced by the manufacture, its service agent or similarly qualified persons in order to avoid a hazard.
- The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.
- The appliance shall be installed in accordance with national wiring regulations.
- Installation must be performed in accordance with the requirement of NEC and CEC by authorized personnel only. Appliance shall be installed, operated and stored in a room with a floor area larger than Xm^2 . (HPR-09A2:X=12; HPR-12A2:X=15; HPR-18A2:X=31; HPR-24A2:X=46)



Please notice that the unit is filled with flammable gas M50. Inappropriate treatment of the unit involves the risk of severe damages of people and material. Details to this refrigerant are found in chapter “refrigerant”.

Grounding requirement

- The air conditioner is the first class electric appliance. It must be properly grounding with specialized grounding device by a professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.
- The yellow-green wire in air conditioner is grounding wire, which can't be used for other purposes.
- The grounding resistance should comply with national electric safety regulations.
- The appliance must be positioned so that the plug is accessible.
- An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring. For models with a power plug, make sure the plug is within reach after installation.
- Including an circuit break with suitable capacity, please note the following table. Circuit break should be included magnet buckle and heating buckle function, it can protect the circuit-short and overload. (Caution: please do not use the fuse only for protect the circuit)

Air conditioner	9K、12K	18K	24K
Circuit break capacity	10A	16A	25A

Installation of Indoor unit

Step 1: Choosing installation location

Recommend the installation location to the client and then confirm it with the client.

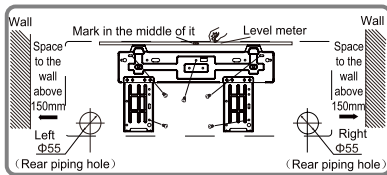
Step 2: Install wall-mounting frame

1. Hang the wall-mounting frame on the wall; adjust it in horizontal position with the level meter and then point out the screw fixing holes on the wall.
2. Drill the screw fixing holes on the wall with impact drill (the specification of drill head should be the same as the plastic expansion particle) and then fill the plastic expansion particles in the holes.
3. Fix the wall-mounting frame on the wall with tapping screws (ST4.2X25TA) and then check if the frame is firmly installed by pulling the frame. If the plastic expansion particle is loose, please drill another fixing hole nearby.

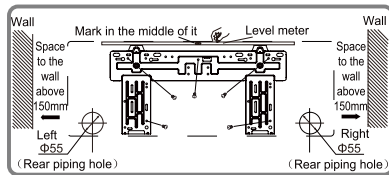
Step 3: Open piping hole

1. Choosing the position of piping hole according to the direction of outlet pipe. The position of piping hole should be a little lower than the wall-mounted frame, shown as below.

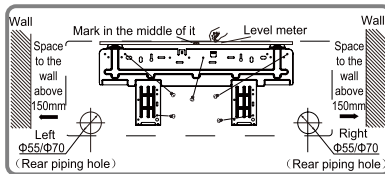
Dimension: 792x279x195



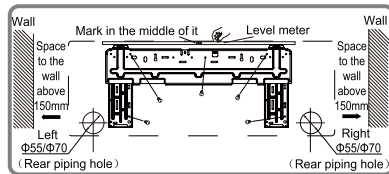
Dimension: 850x291x203



Dimension: 972x302x224



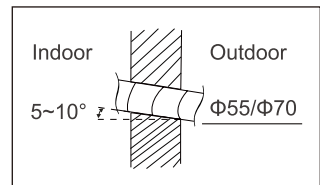
Dimension: 1081x327x248



2. Open a piping hole with the diameter of $\Phi 55/\Phi 70$ on the selected outlet pipe position. In order to drain smoothly, slant the piping hole on the wall slightly downward to the outdoor side with the gradient of $5\sim 10^\circ$.

Note:

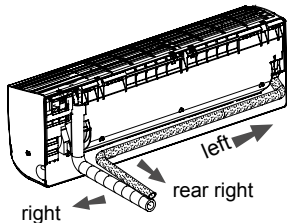
- Pay attention to dust prevention and take relevant safety measures when opening the hole.
- The plastic expansion particles are not provided And should be bought locally.



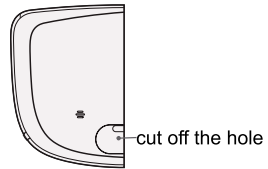
Installation of Indoor unit

Step 4: Outlet pipe

1. The pipe can be led out in the direction of right, near right or left.

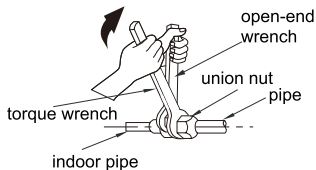
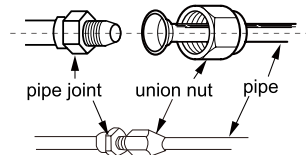


2. When select leading out the pipe from left or right, please cut off the hole on the bottom case.

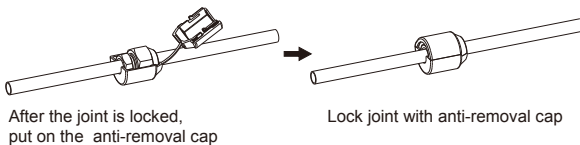


Step 5: Connect the pipe of indoor unit

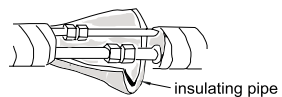
1. Aim the pipe joint at the corresponding bellmouth.
2. Pretightening the union nut with hand.
3. Adjust the torque by referring to the following sheet. Place the open-end wrench on the pipe joint and place the torque wrench on the union nut. Tighten the union nut with torque wrench.



Hex nut diameter	Tightening torque (N.m)
Φ 6	15~20
Φ 9.52	30~40
Φ 12	45~55
Φ 16	60~65
Φ 19	70~75



4. Wrap the indoor pipe and joint of connection pipe with insulating pipe, and then wrap it with tape.



Note:

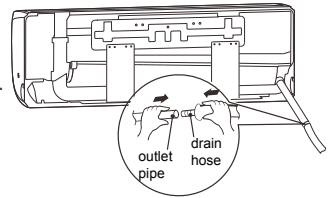
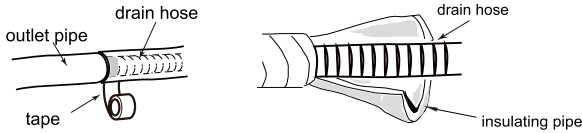
The corresponding moment wrench is needed to connect the piping. If other tools are used, the pipe will be damaged due to improper exertion. The insulation material of the piping should be as close as possible to the nut of the joint to ensure that the copper pipe is not exposed.

According to the requirement of air conditioning standard IEC 60335-2-40, the installation method of the model connecting pipe with refrigerant M50 is the same as that of the common connecting head, but once the joint is installed, it can not be disassembled. If leakage occurs due to poor connection technology, the connection must be replaced by a professional appointed or authorized by the manufacturer and re-welded.

Installation of Indoor unit

Step 6: Install drain hose

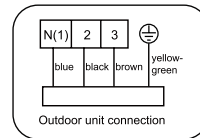
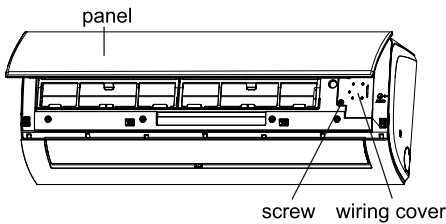
1. Connect the drain hose to the outlet pipe of indoor unit.
2. Bind the joint with tape.



- Add insulating pipe in the indoor drain hose in order to prevent condensation.
- The plastic expansion particles are not provided.

Step 7: Connect wire of indoor unit

1. Open the panel, remove the screw on the wiring cover and then take down the cover.



2. Make the power connection wire go through the cable-cross hole at the back of indoor unit and then pull it out from the front side.
3. Remove the wire clip, connect the power connection wire to the wiring terminal according to the color; tighten the screw and then fix the power connection wire with wire clip.
4. Put wiring cover back and then tighten the screw.
5. Close the hole.

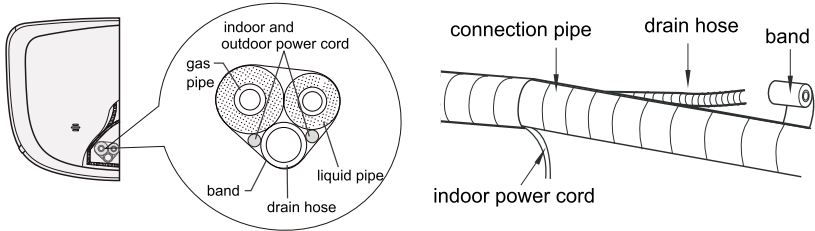
Note:

- All wires of indoor unit and outdoor unit should be connected by a professional.
- If the length of power connection wire is insufficient, please contact the supplier for a new one. Avoid extending the wire by yourself.
- For the air conditioner with plug, the plug should be reachable after finishing installation.
- For the air conditioner without plug, an air switch must be installed in the line.
The air switch should be all-pole parting and the contact parting distance should be more than 3mm.

Installation of Indoor unit

Step 8: Bind up pipe

1. Bind up the connection pipe, power cord and drain hose with the band.
2. Reserve a certain length of drain hose and power cord for installation when binding them. When binding to a certain degree, separate the indoor power and then separate the drain hose.



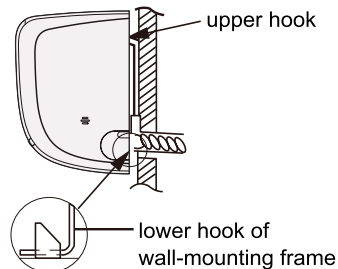
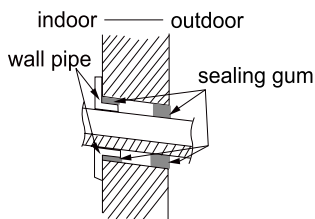
3. Bind them evenly.
4. The liquid pipe and gas pipe should be bound separate at the end.

Note:

- The power cord and control wire can't be crossed or winding.
- The drain hose should be bound at the bottom.

Step 9: Hang the indoor unit

1. Put the bound pipes in the wall pipe and then make them pass through the wall hole.
2. Hang the indoor unit on then wall-mounting frame.
3. Stuff the gap between pipes and wall hole with sealant.
4. Fix the wall pipe.
5. Check if the indoor units is installed firmly and closed to the wall.



Note:

- Do not bend the drain hose too excessively in order to prevent blocking.

Installation of Outdoor unit

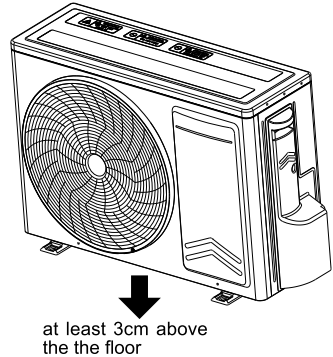
Step 1: Fix the support of outdoor

Select it according to the actual installation situation.

1. Select installation location according to the house structure.
2. Fix the support of outdoor unit on the selected location with expansion screws.

Note:

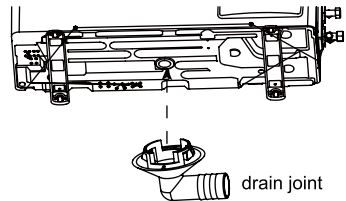
- Take sufficient protective measures when installing the outdoor unit.
- Make sure the support can withstand at least four times of the unit weight.
- The outdoor unit should be installed at least 3cm above the floor in order to install drain joint.
- For the unit with cooling capacity of 2300W~5000W, 6 expansion screws are needed; for the unit with cooling capacity of 6000W~8000W, 8 expansion screws are needed; for the unit with cooling capacity of 10000W~16000W, 10 expansion screws are needed.



Step 2: Install drain joint

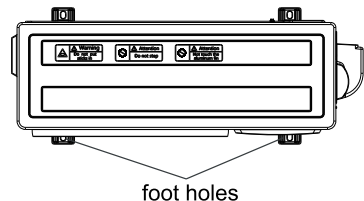
(Only for cooling and heating unit)

1. Connect the outdoor drain joint into the hole on the chassis, as shown in the picture below.
2. Connect the drain hose into the drain vent.



Step 3: Fix outdoor unit

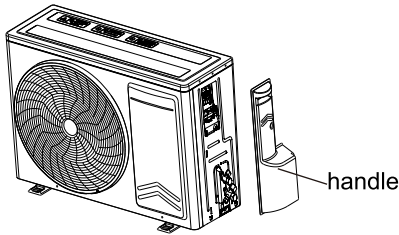
1. Place the outdoor unit on the support.
2. Fix the foot holes of outdoor unit with bolts.



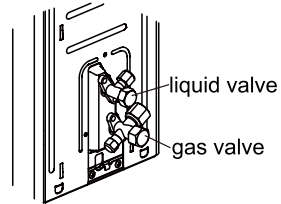
Installation of Outdoor unit

Step 4: Connect indoor and outdoor pipe

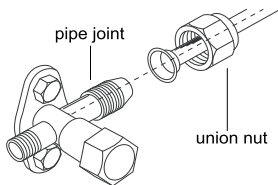
1. Remove the screw on the right handle of outdoor unit and then remove the handle.



2. Remove the screw cap of valve and aim the pipe joint at the bellmouth of pipe



3. Pretightening the union nut with hand.

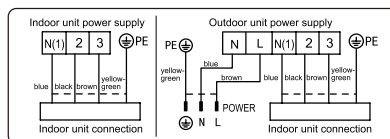
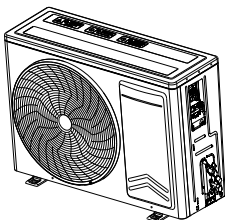


4. Tighten the union nut with torque wrench by referring to the sheet below.

Hex nut diameter	Tightening torque (N.m)
Φ 6	15~20
Φ 9.52	30~40
Φ 12	45~55
Φ 16	60~65
Φ 19	70~75

Step 5: Connect indoor and outdoor

1. Remove the wire clip; connect the power connection wire and signal control wire (only for cooling and heating unit) to the wiring terminal according to the color, fix them with screws.
2. Fix the power connection wire and signal control wire with wire clip (only for cooling and heating unit).



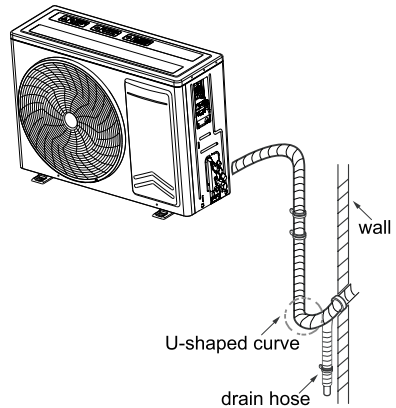
Note:

- After tighten the screw, pull the power cord slightly to check if it is firm.
- Never cut the power connection wire to prolong or shorten the distance.

Installation of Outdoor unit

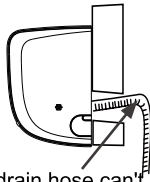
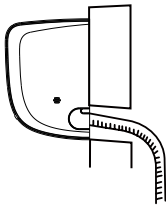
Step 6: Neaten the pipes

1. The pipes should be placed along the wall, bent reasonably and hidden possibly. Min.semidiometer of bending the pipe is 10cm.
2. If the outdoor unit is higher than the wall hole, you must set a U-shaped curve in the pipe before pipe goes into the room, in order to prevent rain from getting into the room .

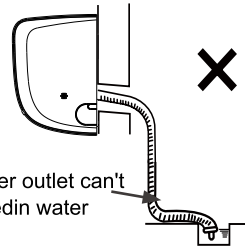


Note:

The through-wall height of drain hose shouldn't be higher than the outlet pipe hole of indoor unit. The water outlet can't be placed in water in order to drain smoothly.



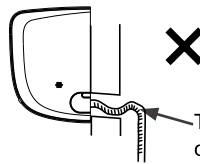
The drain hose can't raise upwards.



The water outlet can't be placed in water



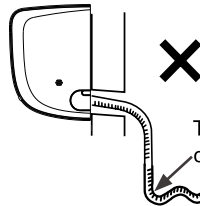
Slant the drain hose slightly downwards. The drain hose can't be curved, raised and fluctuant, etc.



The drain hose can't be fluctuant



The drain hose can't be fluctuan.



The water outlet can't be fluctuant

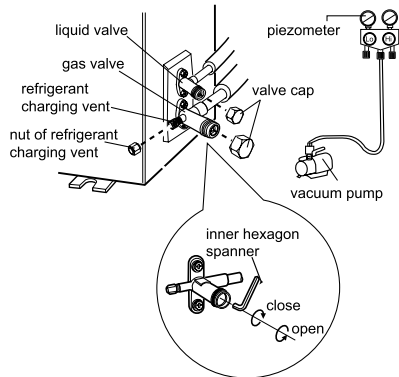


Installation of Outdoor unit

Step 7: Vacuum pumping

Use vacuum pump

1. Remove the valve caps on the liquid valve and gas valve and the nut of refrigerant charging vent.
2. Connect the charging hose of piezometer to the refrigerant charging vent of gas valve and then connect the other charging hose to the vacuum pump.
3. Open the piezometer completely and operate for 10~15min to check if the pressure of piezometer remains in -0.1MPa .
4. Close the vacuum pump and maintain this status for 1~2min to check if the pressure of piezometer remains in -0.1MPa . If the pressure decreases, there may be leakage.
5. Remove the piezometer, open the valve core of liquid valve and gas valve completely within inner hexagon spanner.
6. Tighten the screw caps of valve and refrigerant charging vent.
7. Reinstall the handle.



Step 8: Leakage detection

1. With leakage detector:

Check if there is leakage with leakage detector.

2. With soap water:

If leakage detector is not available, please use soap water for leakage detection.

Apply soap water at the suspected position and keep the soap water for more than 3min. If there are air bubbles coming out of this position, there's a leakage.

Check after Installation

Check according to the following requirement after finishing installation.

Items to be checked	Possible malfunction
Has the unit been installed firmly?	The unit may drop, shake or emit noise.
Have you done the refrigerant leakage test?	It may cause in sufficient cooling(heating) capacity.
Is heat insulation of pipeline sufficient?	It may cause condensation and water dripping.
Is water drained well?	It may cause condensation and water dripping.
Is the voltage of power supply according to the voltage marked on the nameplate?	It may cause malfunction or damaging the parts.
Is electric wiring and pipeline installed correctly?	It may cause malfunction or damaging the parts.
Is the unit grounded securely?	It may cause electric leakage.
Dose the power cord follow the specification?	It may cause malfunction and damaging the parts.
Is there any obstruction in the air inlet and outlet?	It may cause in sufficient cooling (heating) capacity.
The dust and sundries caused during installation are removed?	It may cause malfunction and damaging the parts.
The gas valve and liquid valve of connection pipe are open completely?	It may cause in sufficient cooling (heating) capacity.

Test operation

1. Preparation of test operation

- The client approves the air conditioner.
- Specify the important notes for air conditioner to the client.

2. Method of test operation

- Connect the power, press “ON/OFF” button on the remote controller to start operation.
- Press “ Mode “ button to select Auto ,Cooling , Dry ,Fan, Heating to check whether the operation is normal or not.
- If the ambient temperature is lower than 16°C ,the air conditioner can't start cooling.

Configuration of connection pipe

1. Standard length of connection pipe • 5m
2. Min.length of connection pipe is 3m
3. Max.length of connection pipe and max.high difference.

Model	Max length of connection pipe (m)	Max height difference (m)
HPR-09A2	20	10
HPR-12A2	20	10
HPR-18A2	25	10
HPR-24A2	25	10

4. The additional refrigerant oil and refrigerant charging required after prolonging connection pipe
 - After the length of connection pipe is prolonged for 10m at the basis of standard length, you should add 5ml of refrigerant oil for each additional 5m of connection pipe.
 - The unit is precharged with M50 Refrigerant for 3m pipe distance:
Additional refrigerant charge amount = (Length of Liquid pipe - 3m) x Additional refrigerant charging amount per meter
 - Basing on the length of standard pipe, add refrigerant according to the requirement as shown in the table. The additional refrigerant charging amount is the extra pipe length after 3m. See the following sheet.

Additional refrigerant charging amount for M50

Model	Refrigerant added after 3m pre Charge (g/m)
HPR-09A2	10
HPR-12A2	10
HPR-18A2	10
HPR-24A2	10

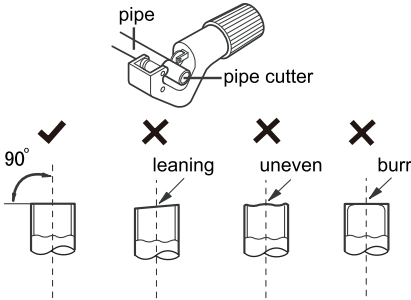
Pipe expanding method

Improper pipe expanding is the main cause of refrigerant leakage. Please expand the pipe according to the following steps:

A: cut the pipe

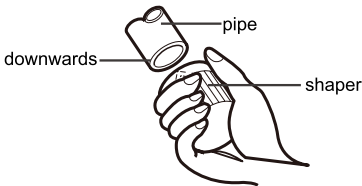
Confirm the pipe length according to the distance of indoor unit and outdoor unit.

Cut the required pipe with pipe cutter.



B: Remove the burrs

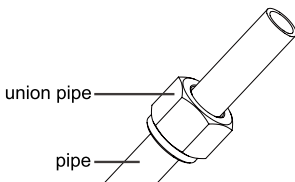
Remove the burrs with shaper and prevent the burrs from getting into the pipe.



C: Put on suitable insulating pipe

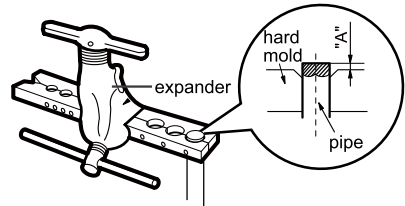
D: Put on the union nut

Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



E: Expand the port

Expand the port with expander.



Note:

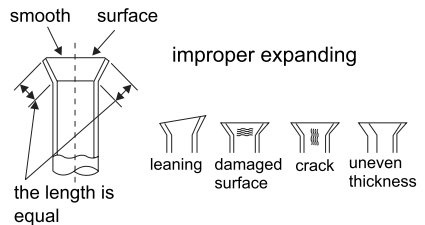
- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter (mm)	A (mm)	
	Max	Min
Φ6 - 6.35(1/4")	1.3	0.7
Φ9.52(3/8")	1.6	1.0
Φ12-12.7(1/2")	1.8	1.0
Φ15.8-16(5/8")	2.4	2.2

F: Inspection

Check the quality of expanding port.

If there is any blemish, expand the port again according to the step above.



Maintenance safety

Information on servicing

- Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

- Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

- General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

- Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

- Presence of fire extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO₂ fire extinguisher adjacent to the charging area.

- No ignition sources

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

- Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

- Checks to the refrigeration equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance.

Maintenance safety

The following checks shall be applied to installations using flammable refrigerants:

- The charge size is in accordance with the room size within which the refrigerant containing parts are installed;
- The ventilation machinery and outlets are operating adequately and are not obstructed;
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

- Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That there no live electrical components and wiring are exposed while charging, recovering or purging the system;
- That there is continuity of earth bonding.

Repairs to sealed components

- During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is isabsolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
- Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected.

This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc. Ensure that apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

Maintenance safety

Note:

The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

Leak detection methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

Maintenance safety

If a leak is suspected, all naked flames shall be removed/ extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

Removal and evacuation

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:

- Remove refrigerant;
- Purge the circuit with inert gas;
- Evacuate;
- Purge again with inert gas;
- Open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be “flushed” with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task. Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place. Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
 - Cylinders shall be kept upright.
 - Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
 - Label the system when charging is complete (if not already).
 - Extreme care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system it shall be pressure tested with OFN. The system shall be

Maintenance safety

leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar

with the equipment and all its detail. It is recommended good practice that all refrigerants

are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

- a) Become familiar with the equipment and its operation.
- b) Isolate system electrically.
- c) Before attempting the procedure ensure that:
 - Mechanical handling equipment is available, if required, for handling refrigerant cylinders;
 - All personal protective equipment is available and being used correctly;
 - The recovery process is supervised at all times by a competent person;
 - Recovery equipment and cylinders conform to the appropriate standards.
- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery takes place.
- g) Start the recovery machine and operate in accordance with manufacturer's instructions.
- h) Do not overfill cylinders. (No more than 80 % volume liquid charge).
- i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

Maintenance safety

Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning

the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

