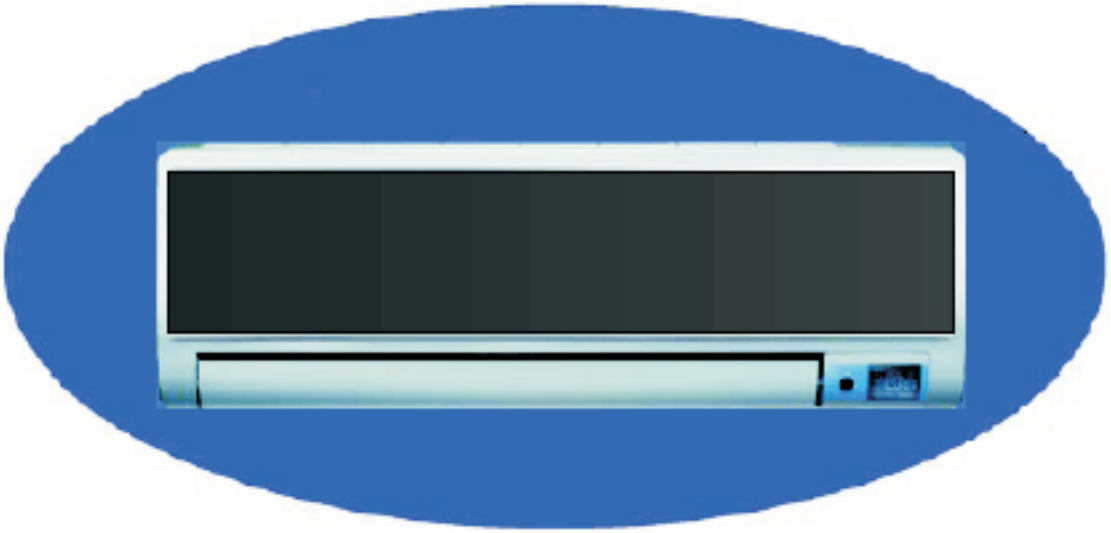
Service manual

Room airconditioner

Split Wall-Mounted Type



Applied to:

GEMS
9 K= 2300 Cal/h
12 K= 3000 Cal/h
18 K= 4500 Cal/h

NOTE:

Before servicing the unit, please read this at first.
Always contact with your service center if meet problem.

Content

1 Precaution

1.1 Safety Precaution

- **To prevent injury to the user or other people and property damage, the following instructions must be followed.**
- **Incorrect operation due to ignoring instruction will cause harm or damage.**
- **Before service unit, be sure to read this service manual at first.**

1.2 Warning

➢ Installation

- **Do not use a defective or underrated circuit breaker. Use this appliance on a dedicated circuit.**
  There is risk of fire or electric shock.
- **For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized service center.**
  Do not disassemble or repair the product, there is risk of fire or electric shock.
- **Always ground the product.**
  There is risk of fire or electric shock.
- **Install the panel and the cover of control box securely.**
  There is risk of fire of electric shock.
- **Always install a dedicated circuit and breaker.**
  Improper wiring or installation may cause fore or electric shock.
- **Use the correctly rated breaker of fuse.**
  There is risk of fire or electric shock.
- **Do not modify or extend the power cable.**
  There is risk of fire or electric shock.
- **Do not install, remove, or reinstall the unit by yourself (customer).**
  There is risk of fire, electric shock, explosion, or injury.
- **Be caution when unpacking and installing the product.**
  Sharp edges could cause injury, be especially careful of the case edges and the fins on the condenser and evaporator.
- **For installation, always contact the dealer or an Authorized service center.**
  There is risk of fire, electric shock, explosion, or injury.
- **Do not install the product on a defective installation stand.**
  It may cause injury, accident, or damage to the product.
- **Be sure the installation area does not deteriorate with age.**
  If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.
- **Do not let the air conditioner run for a long time when the humidity is very high and a door or windows is left open.**
  Moisture may condense and wet or damage furniture.
- **Take care to ensure that power cable could not be pulled out or damaged during operation.**
  There is risk of fire or electric shock.

- **Do not place anything on the power cable.**
  There is risk of fire or electric shock.
- **Do not plug or unplug the power supply plug during operation.**
  There is risk of fire or electric shock.
- **Do not touch (operation) the product with wet hands.**
  There is risk of fire or electric shock.
- **Do not place a heater or other appliance near the power cable.**
  There is risk of fire and electric shock.
- **Do not allow water to run into electric parts.**
  It may cause fire, failure of the product, or electric shock.
- **Do not store or use flammable gas or combustible near the product.**
  There is risk of fire or failure of product.
- **Do not use the product in a tightly closed space for a long time.**
  Oxygen deficiency could occur.
- **When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.**
  Do not use the telephone or turn switches on or off.
  There is risk of explosion or fire.
- **If strange sounds, or small or smoke comes from product. Turn the breaker off or disconnect the power supply cable.**
  There is risk of electric shock or fire.
- **Stop operation and close the window in storm or hurricane. If possible, remove the product from the window before the hurricane arrives.**
  There is risk of property damage, failure of product, or electric shock.
- **Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.**
  There is risk of physical injury, electric shock, or product failure.
- **When the product is soaked (flooded or submerged), contact an Authorized service center.**
  There is risk of fire or electric shock.
- **Be caution that water could not enter the product.**
  There is risk of fire, electric shock, or product damage.
- **Ventilate the product from time to time when operating it together with a stove, etc.**
  There is risk of fire or electric shock.
- **Turn the main power off when cleaning or maintaining the product.**
  There is risk of electric shock.
- **When the product is not be used for a long time, disconnect the power supply plug or turn off the breaker.**
  There is risk of product damage or failure, or unintended operation.
- **Take care to ensure that nobody could step on or fall onto the outdoor unit.**
  This could result in personal injury and product damage.

➢ CAUTION

- **Always check for gas (refrigerant) leakage after installation or repair of product.**
  Low refrigerant levels may cause failure of product.
- **Install the drain hose to ensure that water is drained away properly.**
  A bad connection may cause water leakage.
- **Keep level even when installing the product.**
  To avoid vibration of water leakage.
- **Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.**
  It may cause a problem for your neighbors.

- **Use two or more people to lift and transport the product.**
  Avoid personal injury.
- **Do not install the product where it will be exposed to sea wind (salt spray) directly.**
  It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

➢ Operational

- **Do not expose the skin directly to cool air for long periods of time. (Do not sit in the draft).**
  This could harm to your health.
- **Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigerant system.**
  There is risk of damage or loss of property.
- **Do not block the inlet or outlet of air flow.**
  It may cause product failure.
- **Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.**
  There is risk of fire, electric shock, or damage to the plastic parts of the product.
- **Do not touch the metal parts of the product when removing the air filter. They are very sharp.**
  There is risk of personal injury.
- **Do not step on pr put anything on the product. (outdoor units)**
  There is risk of personal injury and failure of product.
- **Always insert the filter securely. Clean the filter every two weeks or more often if necessary.**
  A dirty filter reduces the efficiency of the air conditioner and could cause product malfunction or damage.
- **Do not insert hands or other object through air inlet or outlet while the product is operated.**
  There are sharp and moving parts that could cause personal injury.
- **Do not drink the water drained from the product.**
  It is not sanitary could cause serious health issues.
- **Use a firm stool or ladder when cleaning or maintaining the product.**
  Be careful and avoid personal injury.
- **Replace the all batteries in the remote control with new ones of the same type. Do not mix old and mew batteries or different types of batteries.**
  There is risk of fire or explosion.
- **Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.**
  They may burn of explode.
- **If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water. Do not use the remote of the batteries have leaked.**
  The chemical in batteries could cause burns or other health hazards.

2 Function

➢ Indoor unit

1. Operation ON/OFF by remote controller

2. Sensing by room temperature

Room temperature sensor. Pipe temperature sensor.

3. Room temperature control

Maintain the room temperature in accordance with the setting temperature.

4. Starting temperature control

Indoor fan is delayed for 5 sec at the starting.

5. Time Delay Safety control

Restarting is for approx. 3 minutes.

6. Indoor fan speed control

High, med, low.

7. Operation indication LCD

Light up in the LCD for each operation mode.

8. Two-direction air vane

The unit will decide the louver direction according to operation mode.

9. Sleep mode auto control

The fan is turn to low speed (cooling/heating). The unit will be turn off after seven hours.

10. Independent dehumidification

The function is usually used in rainy days in springtime or damp areas

11. Self-diag. function

The function will be operate in any operation mode.

12. Air flow Direction control

The louver can be set at the desired position or swing up and down automatically

13. Auto mode

The unit can be change by the room temperature.

14. Anti-cold function

Prevent the cold wind at the beginning of unit start.

15. Temp. Compensation

16. Defrost mode

17. Auto-restart function

18. Flexible wiring connection

19. Self-Clean

20. Ionizer

The function is operated by remote controller.

21. Follow me.

The function is operated by remote controller.

22. Self-clean

Function used after the Shut Down of cooling operation to clean the Evaporator and keep it as fresh for the next operation. The function is operated by remote controller..

23. Turbo

This function enables the unit to reach the preset temperature in the shortest time under cooling mode

➢ Outdoor unit

1. Power relay control

The unit has 3 mins delay between continuously ON/OFF operations.

2. Low noise air flow system

Bird tail propeller fan makes the outdoor unit run more quietly

3. Hydrophilic aluminum fin

The hydrophilic fin can improve the heating efficiency at operation mode.

4. 4 way valve control

It is only operated in the heating operation mode except defrosting operation.

5. Anti-rust cabinet

Made from electrolytic zinc steel sheet and anti-rust coated components.

6. Valve protection cover

It protects the valves and prevents water from dripping.

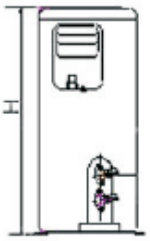
7. Discharge pipe temperature

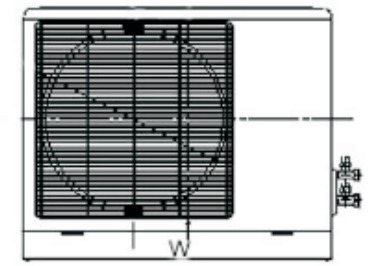
3 Dimension

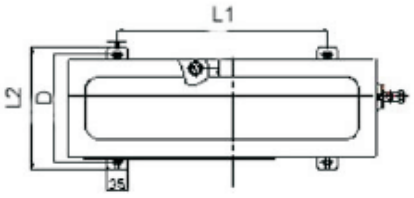
Indoor unit

Dimension / Mode	W	H	D
7K	795	270	165
9K	795	270	165
12K	845	286	165
18K	995	292	194

outdoor unit







Dimension / Mode	W	H	D	L1	L2
7K	700	535	285	458	250
9K(50Hz)	700	535	285	458	250
9K(60Hz)	780	540	250	549	266
12K	780	540	250	549	266
18K	845	695	335	560	360

4 Specification

Datos de placa SPLIT GEMS			**BS23FHX**	**BS23CHX**	**BS30FHX**	**BS30CHX**	**BS45FHX**	**BS45CHX**
		Unidad						
Capacidad	Frío	Cal/h	2300	2300	3000	3000	4500	4500
	Calor	Cal/h	----	2500	----	3300	----	4700
Corriente	Frío	A	4,6	4,6	5,9	5,9	8	8
	Calor	A	----	4,5	----	6	----	8,4
Potencia	Frío	W	970	970	1250	1250	1710	1710
	Calor	W	----	960	----	1270	----	1800
Reffrigerante R22		gr	580	800	850	900	1870	1870

			BS23FHX	BS23CHX
Capacidad	Frío	Cal/h	2300	2300
	Calor	Cal/h	----	2500
Corriente	Frío	A	4,6	4,6
	Calor	A	----	4,5
Potencia	Frío	W	970	970
	Calor	W	----	960
Reffrigerante R22		gr	580	800
Max. current		A	6.3	6.3
Starting current		A	19.8	19.8
Compressor	Model		2P18S225ANK	2P18S225ANK
	Type		Rotary	Rotary
	Brand		Matsushita	Matsushita
	Capacity	Btu/h	9912	9912
	Input	W	970	970
	Rated current(RLA)	A	4.5	4.5
	Locked rotor Amp(LRA)	A	19.8	19.8
	Thermal protector		External	External
	Capacitor	uF	30	30
	Refrigerant oil	ml	350	350
Indoor fan motor	Model		RPG20D	RPG20D
	Brand		Welling	Welling
	Input	W	32	32
	Capacitor	uF	1.2	1.2
	Speed(hi/mi/lo)	r/min	1040/900/800	1040/900/800
Indoor air flow (Hi/Mi/Lo)		m3/h	550	550
Indoor noise level (Hi/Mi/Lo)		dB(A)	38/35/32	38/35/32
Outdoor fan motor	Model		YDK24-6T	YDK24-6T
	Brand		Welling	Welling
	Input	W	70	70
	Capacitor	uF	3	3
	Speed	r/min	850	850
Outdoor air flow		m^3/h	1800	1800
Outdoor noise level		dB(A)	52	52
Refrigerant type R22		g	580	800
Design pressure		MPa	2.6	2.6
Refrigerant piping	Liquid side/ Gas side	mm	Φ6.35/Φ9.53	Φ6.35/Φ9.53
	Max. refrigerant pipe length	m	10	10
	Max. difference in level	m	5	5
Operation temp		℃	17-30	17-30
Ambient temp		℃	18-45	-7-45
Application area		m^2	14-21	14-21

Note:

The noise date is base on hemi-anechoic chamber, during actual operation; these values are normally somewhat different as a result of ambient condition.

The above design and specifications are subject to change without prior notice for product improvement.

			BS30FHX	BS30CHX
Capacidad	Frío	Cal/h		
	Calor	Cal/h		
Corriente	Frío	A		
	Calor	A		
Potencia	Frío	W		
	Calor	W		
Reffrigerante R22		gr		
Max. current		A	1.4	1.4
Starting current		A	1700	1700
Compressor	Model		PH225X2C-4FT	PH225X2C-4FT
	Type		Rotary	Rotary
	Brand		GMCC	GMCC
	Capacity	Btu/h	13197/13299	13197/13299
	Input	W	1250/1285	1250/1285
	Rated current(RLA)	A	5.7/5.5	5.7/5.5
	Locked rotor Amp(LRA)	A	29.9/33	29.9/33
	Thermal protector		UP3RE0591-T56	UP3RE0591-T56
	Capacitor	uF	35	35
	Refrigerant oil	ml	480	480
Indoor fan motor	Model		RPG20D	RPG20D
	Brand		Welling	Welling
	Input	W	32	32
	Capacitor	uF	1.5	1.5
	Speed(hi/mi/lo)	r/min	1260/1080/900	1260/1080/900
Indoor air flow (Hi/Mi/Lo)		m3/h	650	650
Indoor noise level (Hi/Mi/Lo)		dB(A)	42/39/36	42/39/36
Outdoor fan motor	Model		YDK24-6	YDK24-6
	Brand		Welling	Welling
	Input	W	70	70
	Capacitor	uF	2.5	2.5
	Speed	r/min	850	850
Outdoor air flow		m^3/h	1800	1800
Outdoor noise level		dB(A)	54	54
Refrigerant type R22		g	850	900
Design pressure		MPa	2.6	2.6
Refrigerant piping	Liquid side/ Gas side	mm	Φ6.35/φ12.7	Φ6.35/φ12.7
	Max. refrigerant pipe length	m	10	10
	Max. difference in level	m	5	5
Operation temp		℃	17-30	17-30
Ambient temp		℃	18-45	-7-45
Application area		m^2	18-26	18-26

Note:

The noise date is base on hemi-anechoic chamber, during actual operation; these values are normally somewhat different as a result of ambient condition.

The above design and specifications are subject to change without prior notice for product improvement.

			BS45FHX	BS45CHX
Capacidad	Frío	Cal/h	4500	4500
	Calor	Cal/h	----	4700
Corriente	Frío	A	8	8
	Calor	A	----	8,4
Potencia	Frío	W	1710	1710
	Calor	W	----	1800
Reffrigerante R22		gr	1870	1870
Starting current		A	34	34
Compressor	Model		PH310X2CS-4KU3	PH310X2CS-4KU3
	Type		Rotary	Rotary
	Brand		GD Toshiba	GD Toshiba
	Capacity	Btu/h	18254	18254
	Input	W	1690	1690
	Rated current(RLA)	A	7.85	7.85
	Locked rotor Amp(LRA)	A	34	34
	Thermal protector		Internal	Internal
	Capacitor	uF	35UF/370V	35UF/370V
	Refrigerant oil	ml	750	750
Indoor fan motor	Model		RPG28D	RPG28D
	Brand		Welling	Welling
	Input	W	55	55
	Capacitor	uF	1.5	1.5
	Speed(hi/mi/lo)	r/min	1280/1250/1100/1000	1280/1250/1100/1000
Indoor air flow (Hi/Mi/Lo)		m3/h	800/700/600	800/700/600
Indoor noise level (Hi/Mi/Lo)		dB(A)	42	42
Outdoor fan motor	Model		YDK53-6C	YDK53-6C
	Brand		Welling	Welling
	Input	W	125	125
	Capacitor	uF	3	3
	Speed	r/min	800	800
Outdoor air flow		m^3/h	1900	1900
Outdoor noise level		dB(A)	54	54
Refrigerant type R22		g	R22/1870	R22/1870
Design pressure		MPa	2.6	2.6
Refrigerant piping	Liquid side/ Gas side	mm	Φ6.35/φ12.7	Φ6.35/φ12.7
	Max. refrigerant pipe length	m	10	10
	Max. difference in level	m	5	5
Operation temp		℃	17-30	17-30
Ambient temp		℃	18-45	-7-45

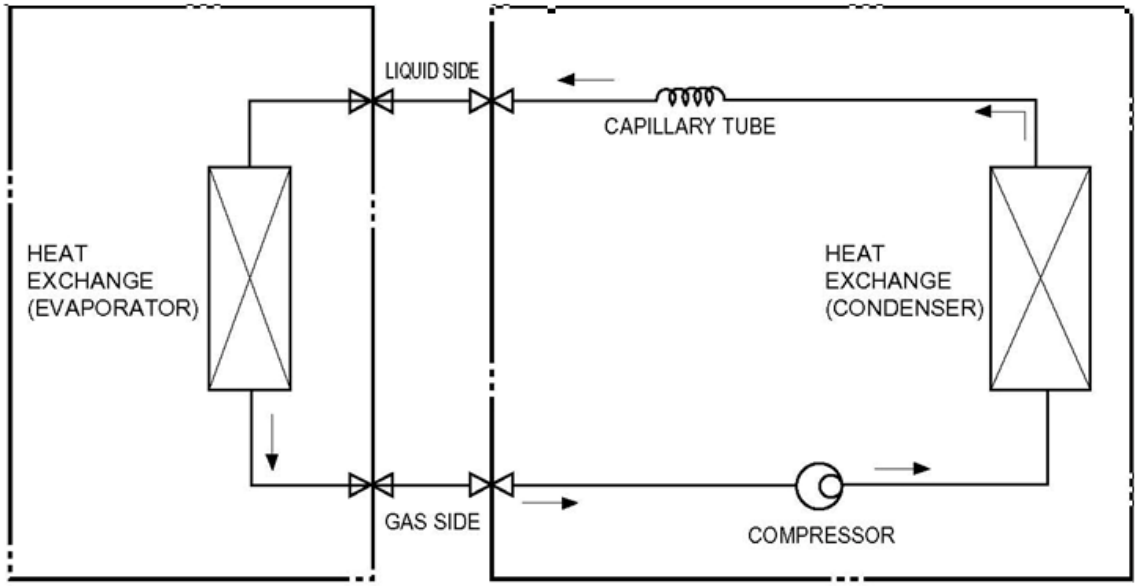
Note:

The noise date is base on hemi-anechoic chamber, during actual operation; these values are normally somewhat different as a result of ambient condition.

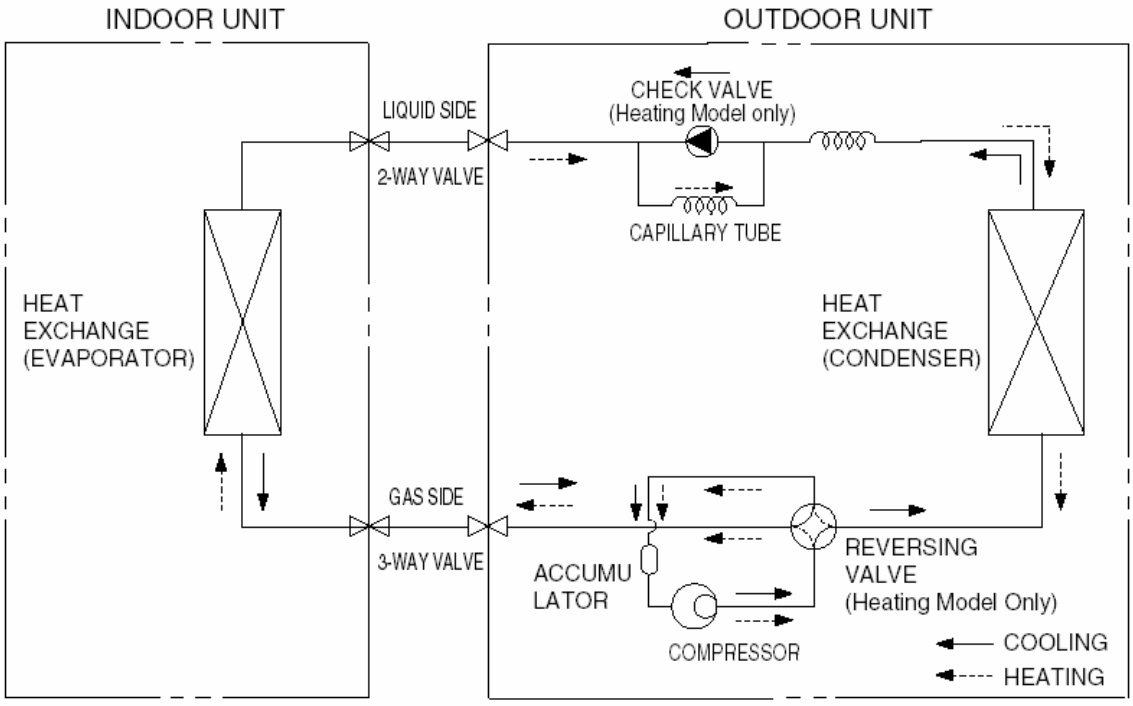
The above design and specifications are subject to change without prior notice for product improvement.

5 Refrigerant cycle diagram

➢ Cooling only

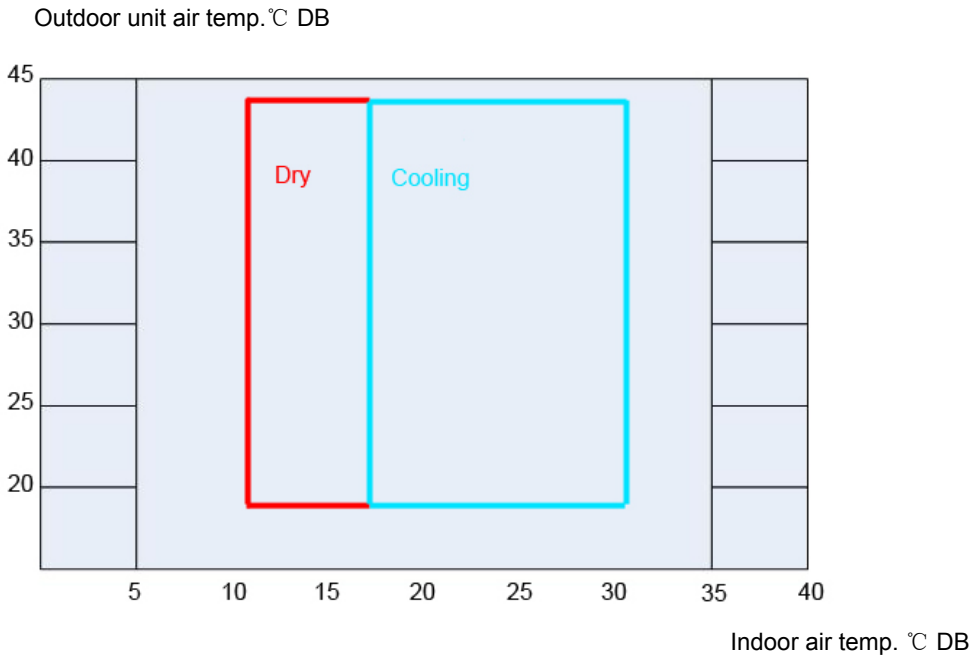


➢ Heat pump mode



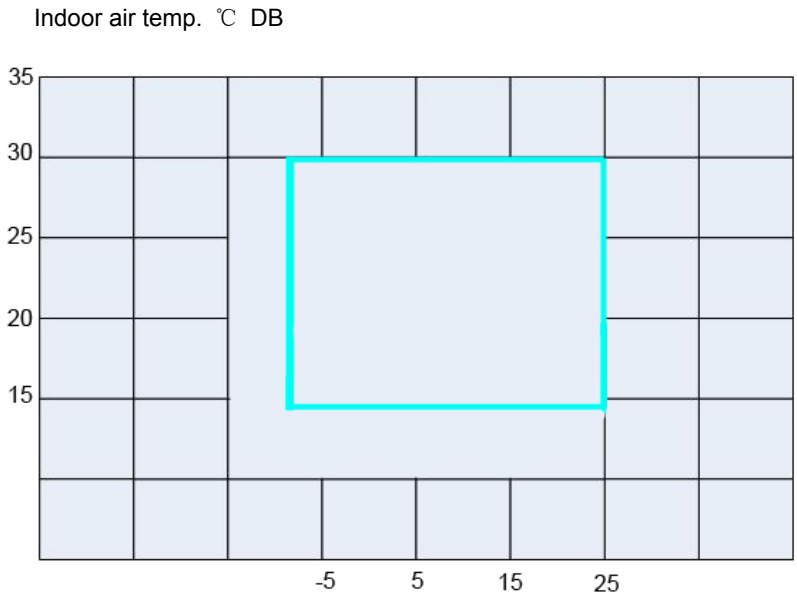
6 Operation limits

Cooling operation



Note: The chart is the result from the continuous operation under constant air temperature conditions. However, excludes the initial pull-down stage.

Heating operation

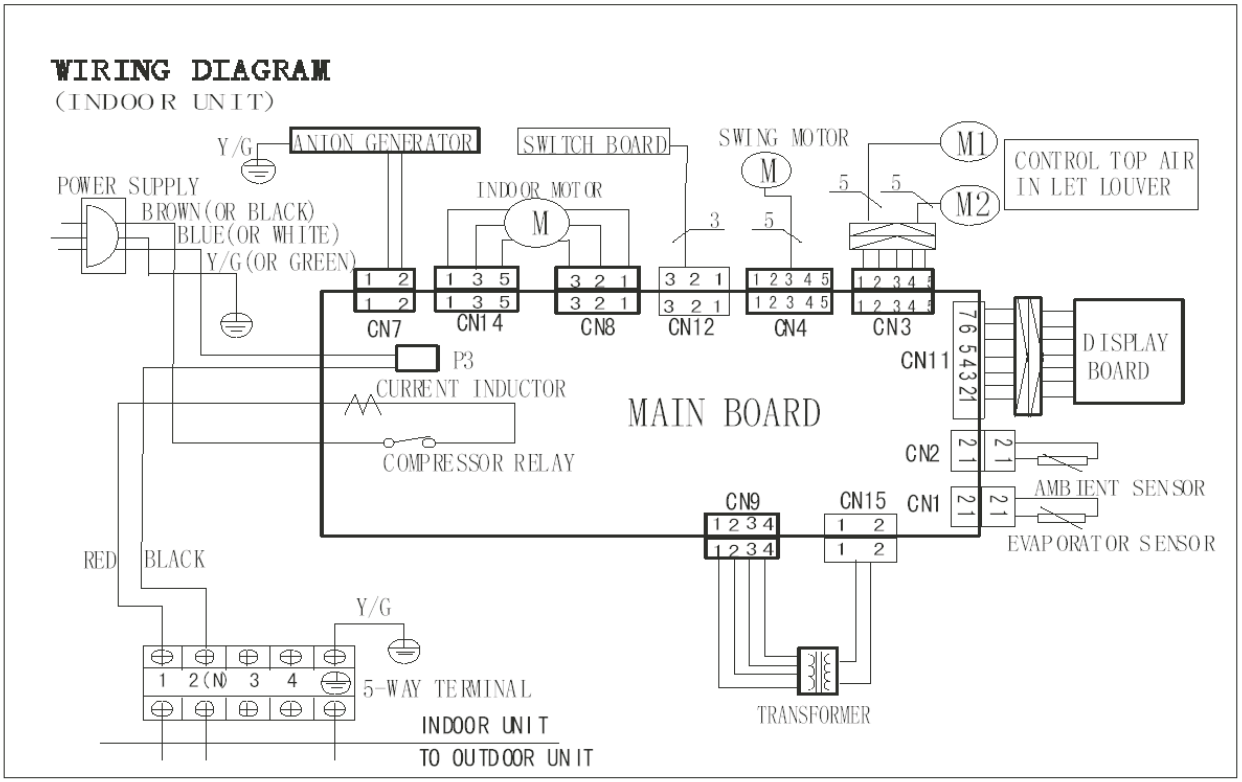


Note: The chart is the result from the continuous operation under constant air temperature conditions. However, excludes the initial pull-down stage.

7 Wiring diagram

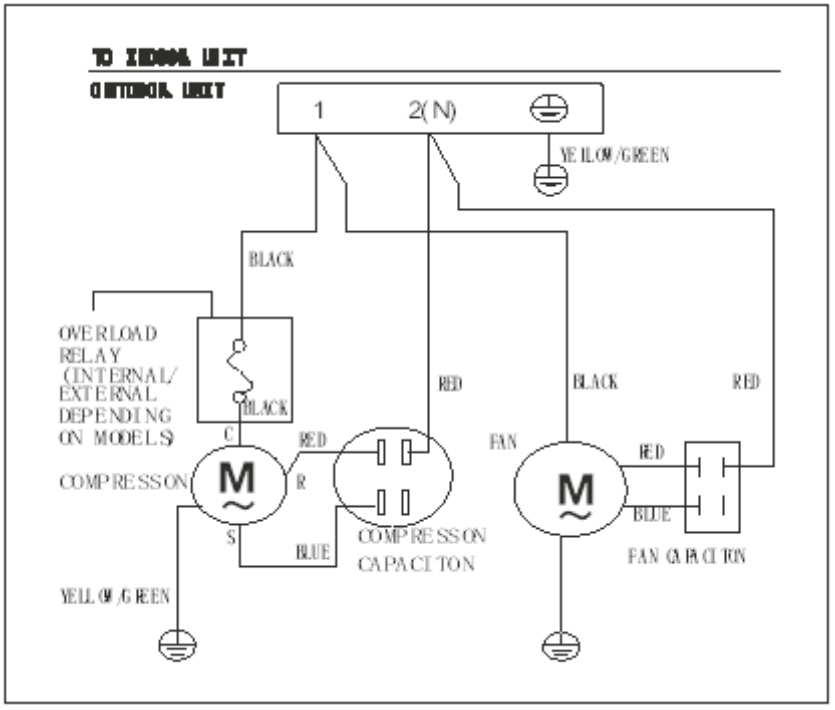
BS23FHX	BS30FHX	BS45FHX

Indoor unit:



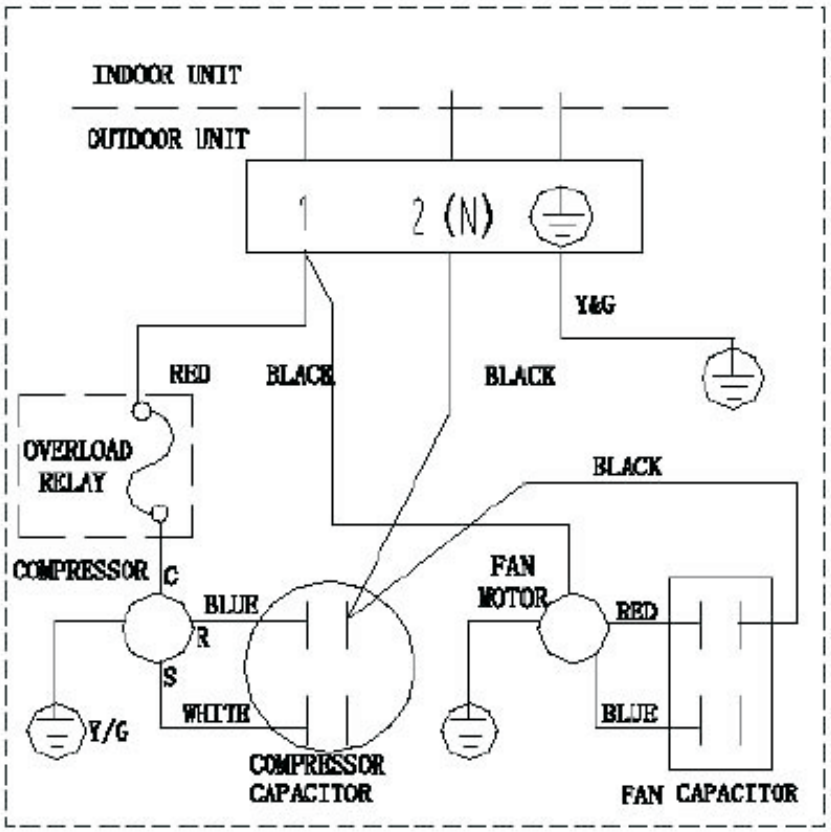
outdoor unit:

BS23FHX	BS30FHX



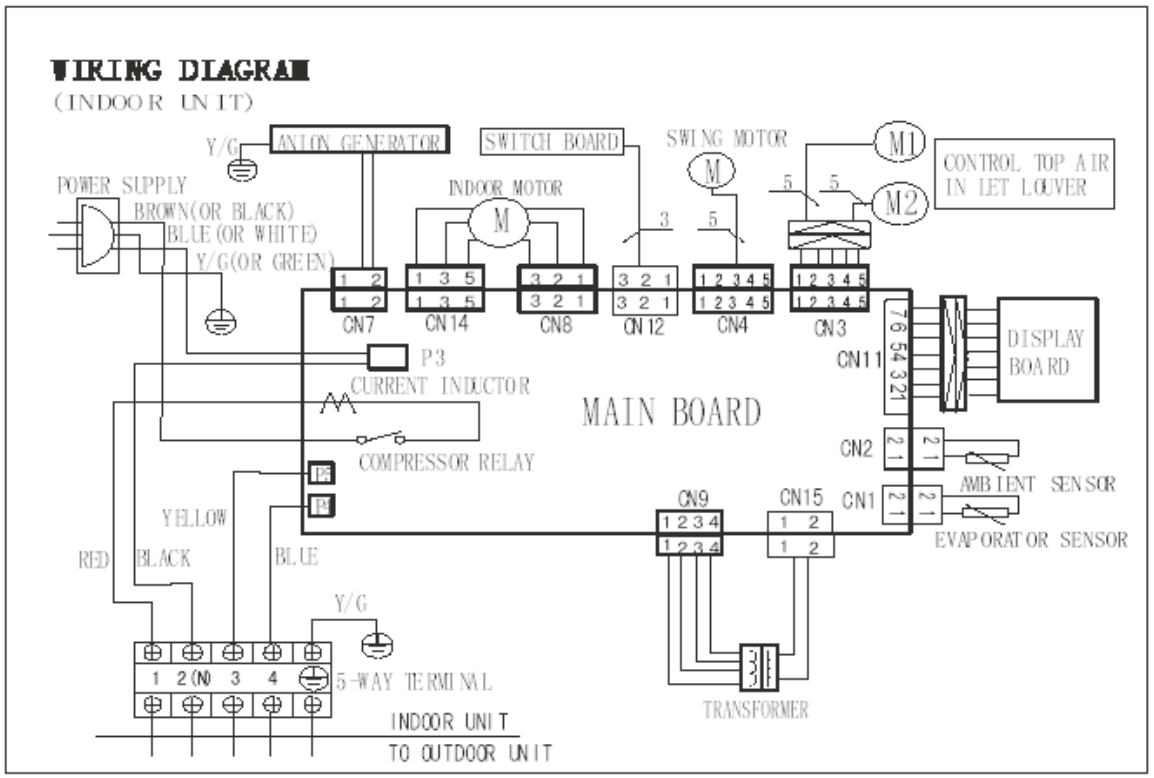
outdoor unit:

BS45FHX



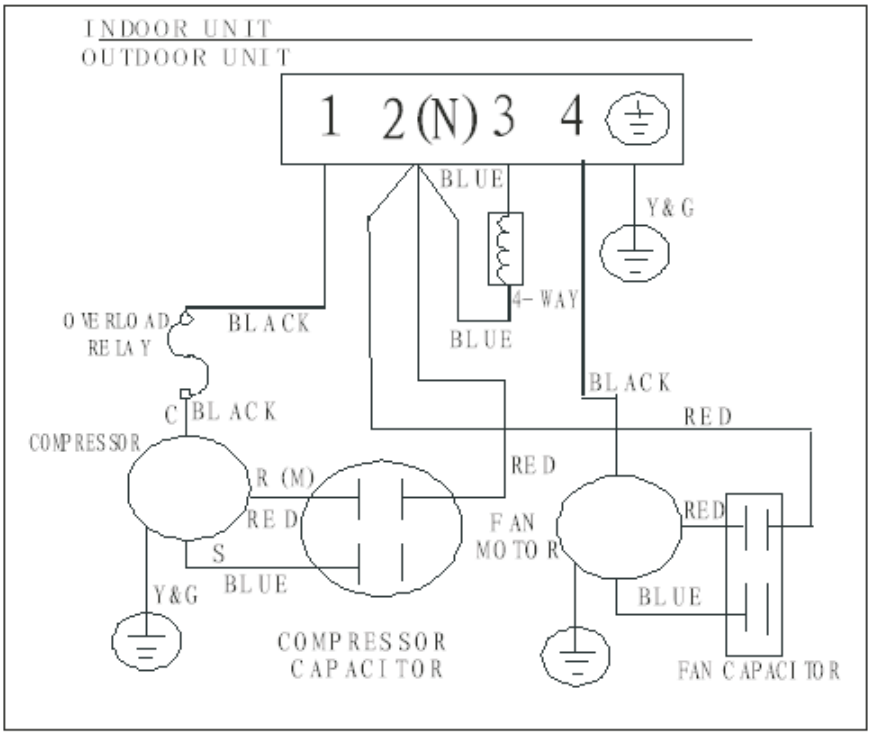
BS23CHX	BS30CHX	BS45CHX

Indoor unit:



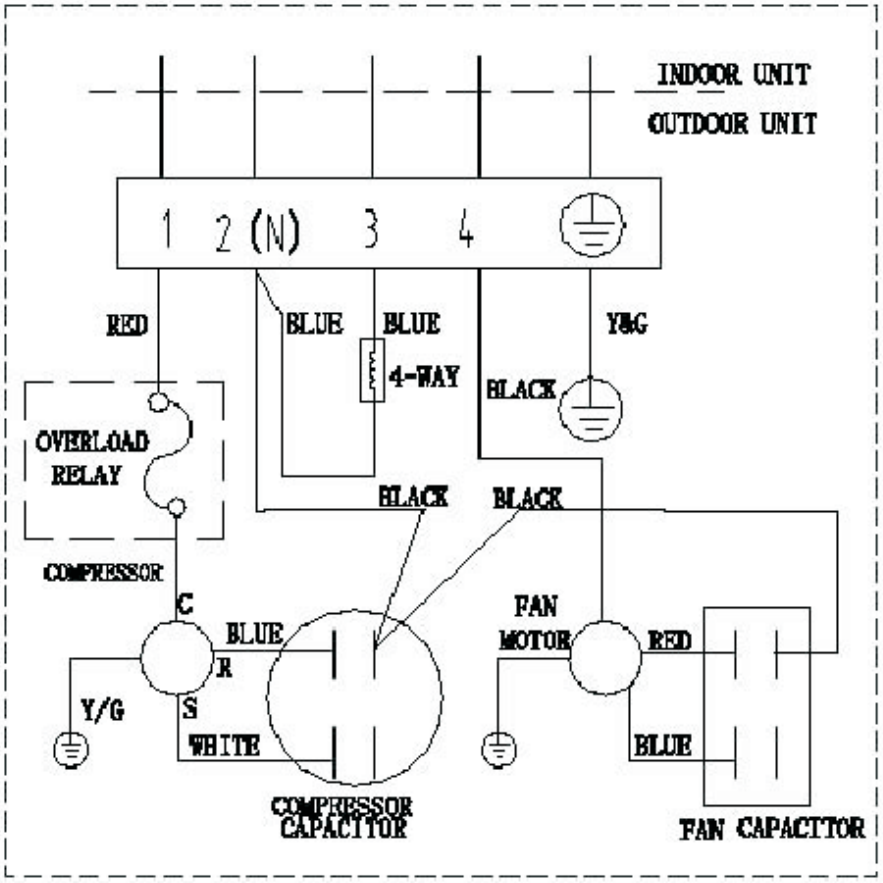
outdoor unit:

BS23CHX	BS30CHX



outdoor unit:

BS45CHX



8 Installation details

8.1 Wrench torque sheet for installation

Outside diameter		Torque
mm	inch	Kg.m
φ6.35	1/4	1.8
φ9.52	3/8	4.2
φ12.7	1/2	5.5
φ15.88	5/8	6.6
φ19.05	3/4	6.6

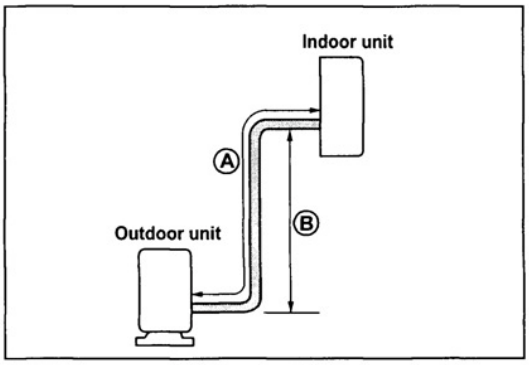
8.2 Connecting the cables

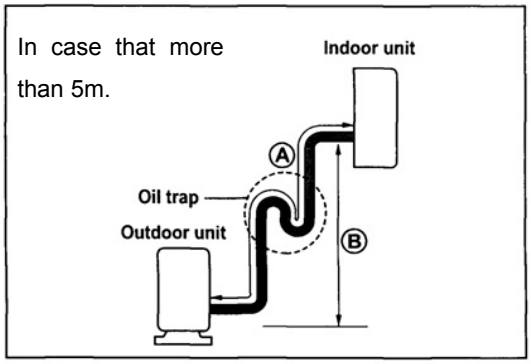
The power cord of connect should be selected according to the following specifications sheet.

	Grade		
Amp	10	15	20
mm^2	1.0	1.5	2.5

8.3 Pipe length and the elevation

Capacity	Pipe size		Standard length	Max.	Max.	Additional
			(m)	Elevation	Elevation	refrigerant
Btu/h	GAS	LIQUID		B (m)	A (m)	(g/m)
7k~12K	3/8'' (φ9.52)	1/4'' (φ6.35)	5	5	10	30
	1/2'' (φ12.7)	1/4'' (φ6.35)	5	5	10	30
16K~28K	1/2'' (φ12.7)	1/4'' (φ6.35)	5	8	15	30
	5/8'' (φ15.88)	1/4'' (φ6.35)	5	10	20	30
	5/8'' (φ15.88)	3/8'' (φ9.52)	5	10	20	65
30K~36K	5/8'' (φ15.88)	3/8'' (φ9.52)	5	15	30	65
	3/4'' (φ19.05)	3/8'' (φ9.52)	5	15	30	65





Caution:

Capacity is base on standard length and maximum allowance length is base of reliability. Oil trap should be install per 5-7 meters.

8.4 Air purging of the piping and indoor unit

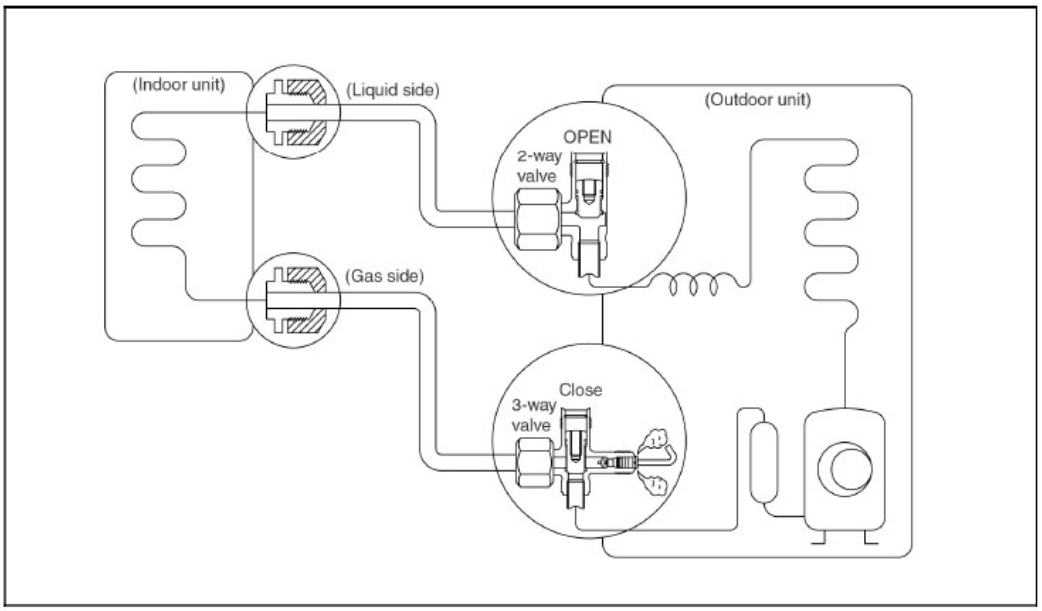
Required tools:

Hexagonal wrench; adjustable wrench; torque wrenches, wrench to hold the joints and gas leak detector.

Note:

The air in the indoor unit and in the piping must be purged. If air remains in the refrigeration piping, it will affect the compressor, reduce the cooling capacity, and could lead to a malfunction of unit.

Be sure, using a torque wrench to tighten the service port cap (after using the service port), so that it prevents the gas leakage from the refrigeration cycle.



Procedure：

1. Recheck the piping connections.
2. Open the valve stem of the 2-way valve counterclockwise approximately 90', wait 10 seconds, and then set it to closed position.

   Be sure to use a hexagonal wrench to operate the valve stem
3. Check for gas leakage.

   Check the flare connection for gas leakage
4. Purge the air from the system.
5. Set the 2-way valve to the open position and remove the cap from the 3-way valve's service port.
6. Using the hexagonal wrench to press the valve core pin, discharge for three seconds and then wait for one minute.
7. Use torque wrench to tighten the service port cap to a torque of 1.8 kg.m. (18n.m)
8. Set the 3-way valve to the opened position.
9. Mounted the valve stem nuts to the 2-way and 3-way valves.
10. Check for gas leakage.
11. At this time, especially check for gas leakage from the 2-way and 3-way stem nuts, and from the service port.

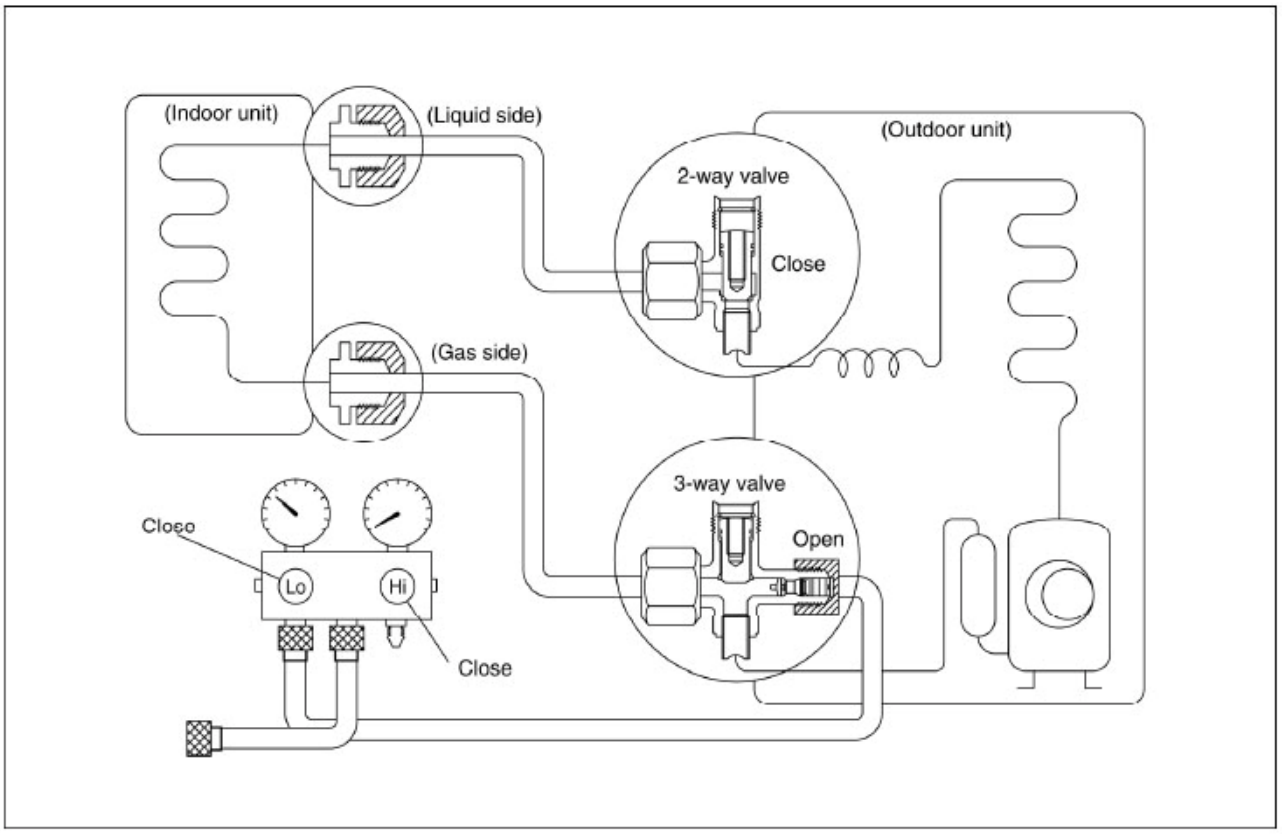
Caution:

If gas leakage is discovered in step (3) above, take the following measures.

If the leaks stop when the piping connections are tightened further, continue working from step (4).

If the gas leaks do not stop when the connections are retightened, repair the location of the leak, discharge all of the gas through the service port, and then recharge with the specified amount of gas from a gas cylinder.

8.5 Pumping down (Re-installation)



Procedure:

1. Confirm that both the 2-way and 3-way valves are set to the opened position.

   Remove the valve stem caps and confirm that the valve stems are in the opened position.

   Be sure to use a hexagonal wrench to operate the valve stems.

2. Operate the unit for 10 to 15 minutes.
3. Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.

   Connect the charge hose with the push pin to the gas service port.

4. Air purging of the charge hose.

   Open the low-pressure valve on the charge set slightly to purge air from the charge hose.

5. Set the 2-way valve to the close position.
6. Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1MPa.
7. Immediately set the 3-way valve to the closed position.

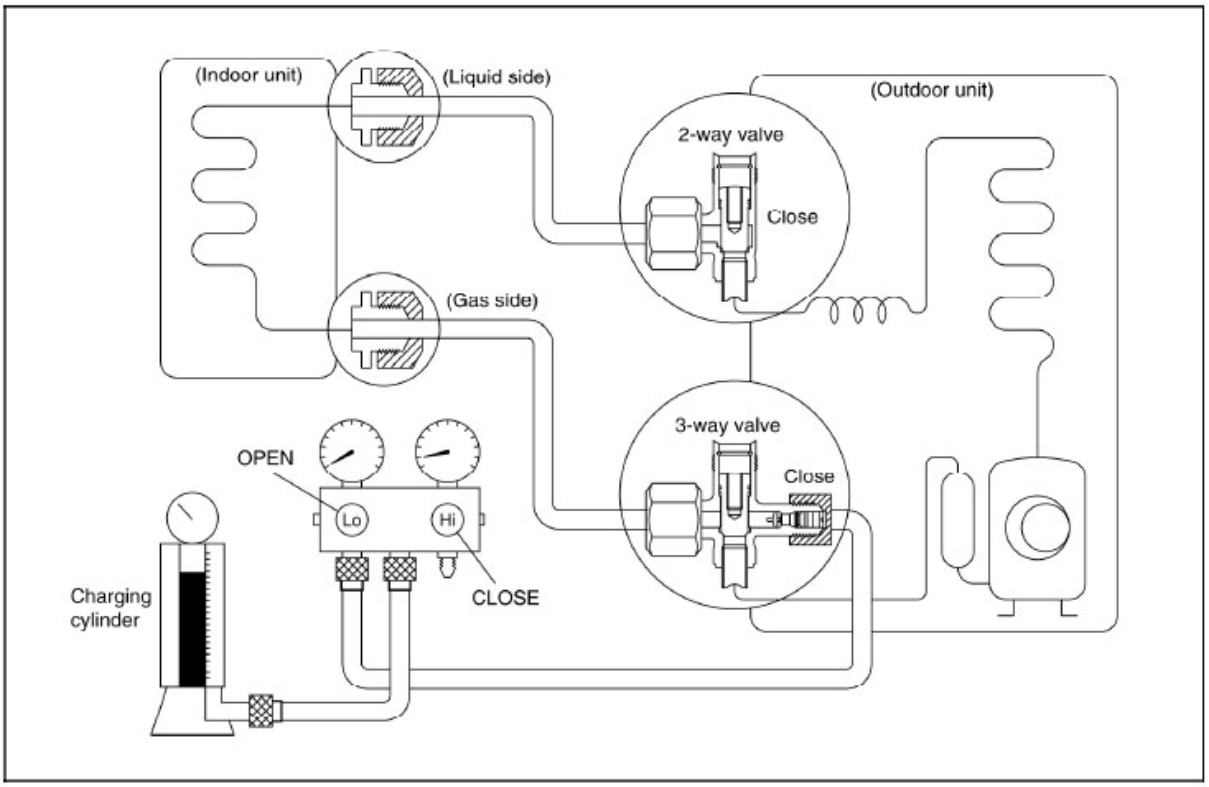
   Do this quickly so that the gauge ends up indicating 0.3 to 0.5Mpa.

8. Disconnect the charge set, and amount the 2-way and 3-way valve's stem nuts and service port caps.

Use a torque wrench to tighten the service port cap to a torque of 1.8 kg.m.

Be sure to check for gas leakage.

8.6 Re-air purging (Re-installation)



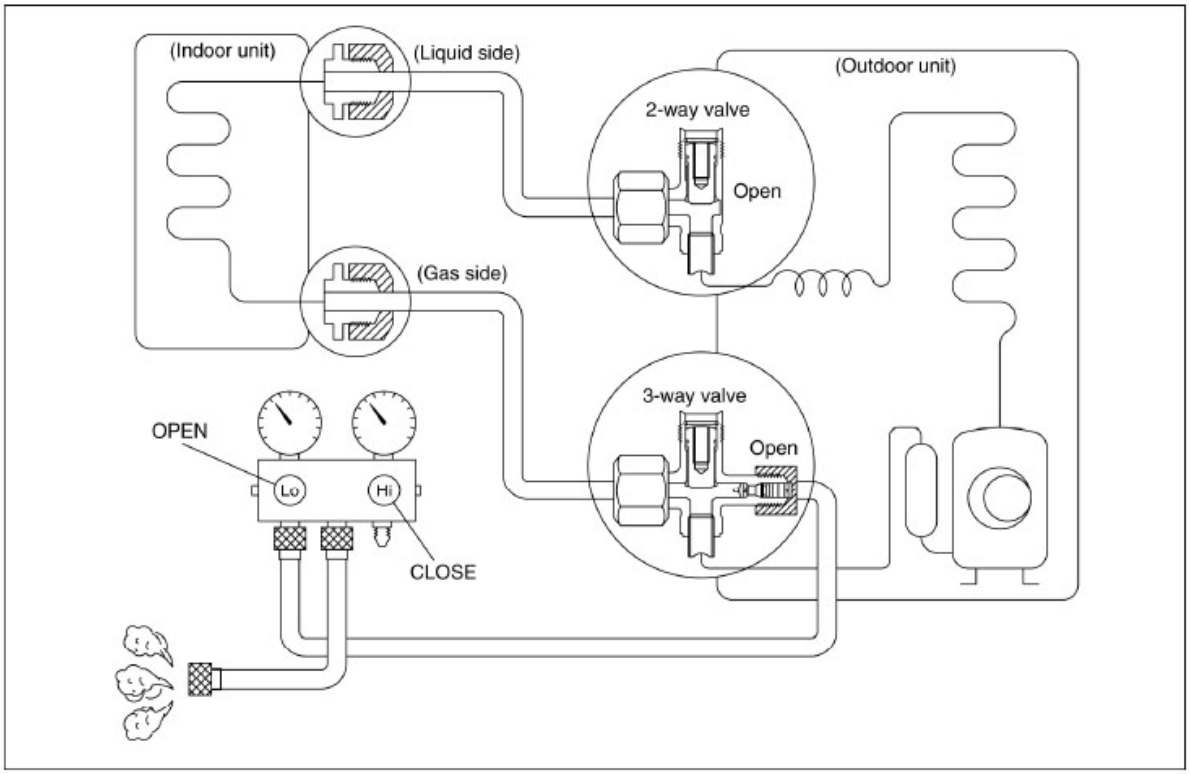
Procedure:

1. Confirm that both the 2-way and 3-way valves are set to the closed position.
2. Connect the charge set and a charging cylinder to the service port of the 3-way valve.
3. Leave the valve on the charging cylinder closed.
4. Air purging.
5. Open the valves on the charging cylinder and the charge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45' for 3 seconds then closing it for 1 minutes; repeat 3 times.
6. After purging the air, use a torque wrench to tighten the flare nut to on the 2-way valve.
7. Check the gas leakage.
8. Check the flare connections for gas leakage.
9. Discharge the refrigerant.
10. Close the valve on the charging cylinder and discharge the refrigerant until the gauge indicate 0.3 to 0.5 Mpa.
11. Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position.
12. Be sure to use a hexagonal wrench to operate the valve stems.
13. Mount the valve stems nuts and the service port cap.

Be sure to use a torque wrench to tighten the service port cap to a torque 18N.m.

Be sure to check the gas leakage.

8.7 Balance refrigerant of the 2-way, 3-way valves



Procedure:

1. Confirm that both the 2-way and 3-way valves are set to the open position.
2. Connect the charge set to the 3-way valve's service port.

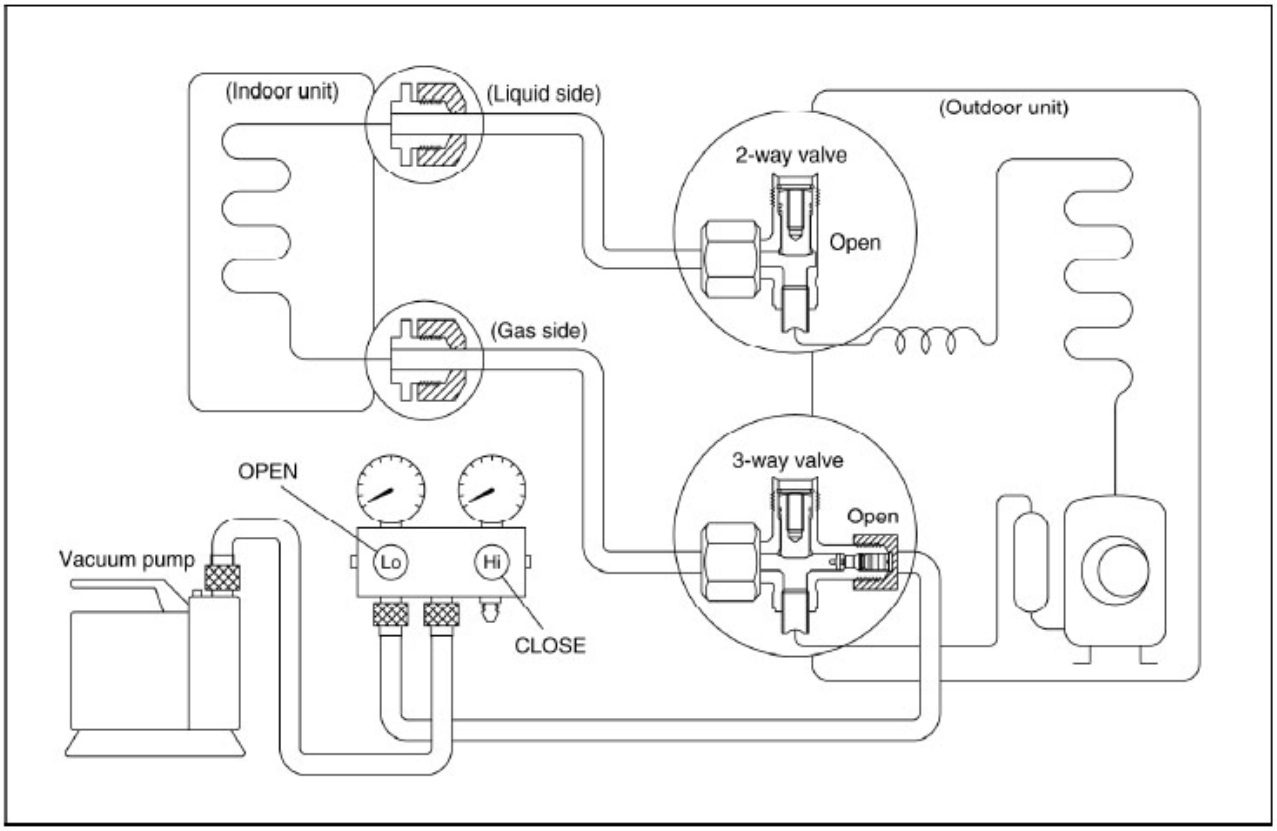
   Leave the valve on the charge set closed.

   Connect the charge hose with the push pin to the service port.
3. Open the valves (Low side) on the charge set and discharge the refrigerant until the gauge indicates 0.05 to 0.1 Mpa.

   If there is no air in the refrigeration cycle [the pressure when the air conditioner is not running is higher than 0.1Mpa, discharge the refrigerant until the gauge indicates 0.05 to 0.1 Mpa. If this is the case, it will not be necessary to apply a evacuation.

   Discharge the refrigeration gradually; if it is discharged too suddenly, the refrigeration oil sill be discharged.

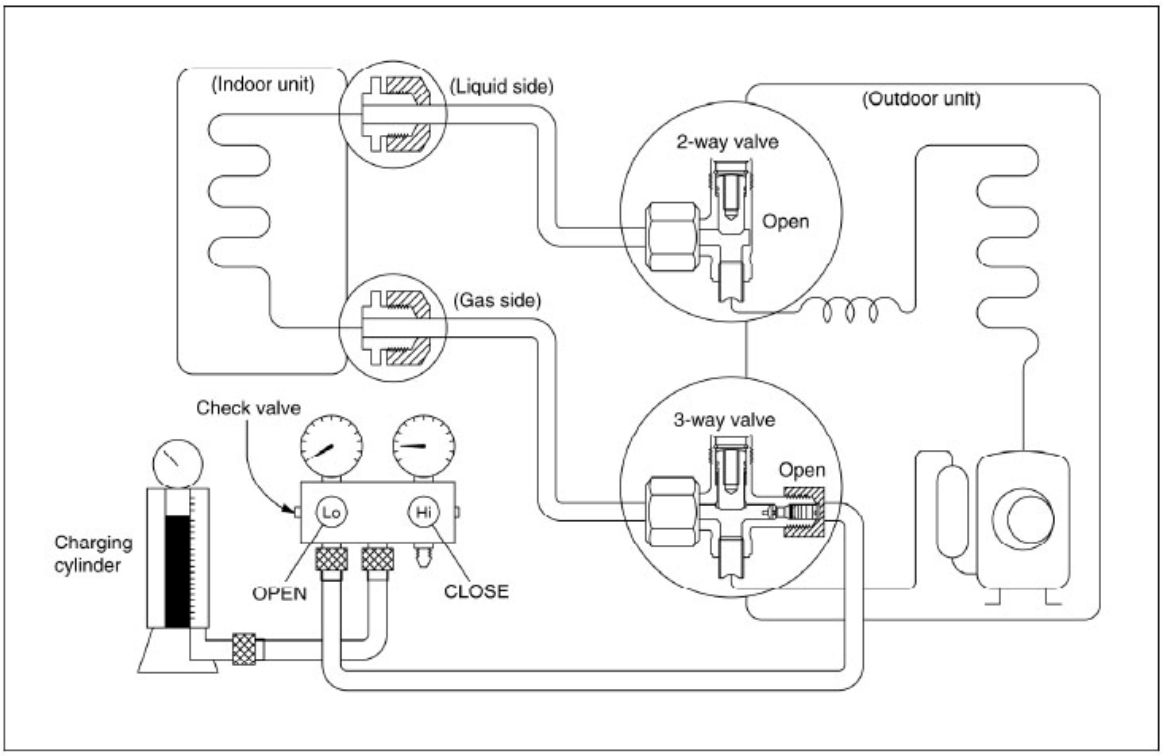
8.8 Evacuation



Procedure:

1. Connect the vacuum pump to the charge set's centre hose.
2. Evacuation for approximately one hour.
   Confirm that the gauge needle has moved toward -0.1 Mpa (-76 cmHg) [vacuum of 4 mmHg or less].
3. Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
4. Disconnect the charge hose from the vacuum pump.
   Vacuum pump oil, if the vacuum pump oil becomes dirty or depleted, replenish as needle.

8.9 Gas charging



Procedure:

1. Connect the charge hose to the charging cylinder.

Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder.

2. Purge the air from the charge hose.

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

3. Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.

If the system cannot be charge with the specified amount of refrigerant, if can be charged with a little at a time (approximately 150g each time0 while operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure.(pumping down-pin).

4. Immediately disconnect the charge hose from the 3-way valve's service port.

Stopping partway will allow the refrigerant to be discharged.

If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.

5. Mounted the valve stem caps and the service port

Use torque wrench to tighten the service port cap to a torque of 18N.m.

Be sure to check for gas leakage.

9 Electronic function

9.1 Electronic control working environment

Input voltage: 198~253V
Input power frequency: 50/60Hz
Ambient temperature: -7°C+43°C
Indoor fan normal working amp is less than 1A
Outdoor fan normal working amp is less than 1.5A
Four-way valve normal working amp is less than 1A
Swing motor: DC12V
Compressor: single-phase power supply. Its normal working amp is less than 15A

9.2 Proper symbols and their meaning

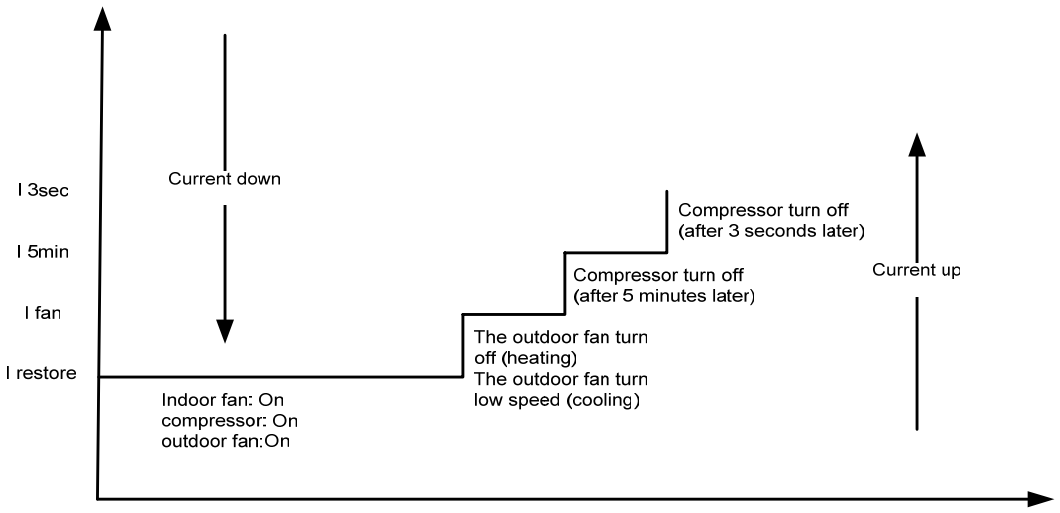
TA: Indoor ambient temperature
TE: Indoor evaporator temperature
TS: Setting temperature through the remote controller
I3sec: Self-protection amp of compressor, continue three seconds until turns off the compressor.
I5MIN: Self-protection amp of compressor, continue five minutes until turns off the compressor.
IFAN: Self-protection amp of outdoor fan/indoor fans when they change from higher wind to lower wind.
IRESTORE: Amp self-protection return value
THDEFROST: High wind, defrosting temperature difference
TMDEFROST: Middle wind, defrosting temperature difference
TLDEFROST: Low wind, defrosting temperature difference
TE1: Anti-cold wind, from Fan Off to Breeze temperature
TE2: Anti-cold wind, from Breeze to Setting Fan Speed temperature
TE3: Anti-cold wind, from Setting Fan Speed to Breeze temperature
TE4: Anti-cold wind, from Breeze to Fan Off temperature
TE5: Evaporator low temperature protection entering temperature
TE6: Evaporator low temperature protection restoring temperature
TE7: Evaporator high temperature protection, compressor off temperature
TE8: Evaporator high temperature protection, fan off temperature
TE9: Evaporator high temperature protection, restoring temperature

9.3 Function

Remote receiving
Testing and forced running
Position set for indoor unit wind vane
LCD displaying and alarm
Timer On or off
Protection for the compressor
Current protection
High temperature protection of indoor heat exchanger at heating mode
Auto defrosting and heating recovery at heating mode
Anti cold air at heating mode
Anti frozen at cooling mode
Auto restart
Self-Clean
Ionizer
Follow me
Auto clean

9.4 Protection

9.4.1 3 minutes delay at restart for compressor.
9.4.2 Sensor protection at open circuit and breaking disconnection
9.4.3 Fan Speed is out of control. When Indoor Fan Speed is too high(higher than High Fan+300RPM)or too low(lower than 400RPM), the unit stops and LED displays failure information and can't returns to normal operation automatically.
9.4.4 Cross Zero signal error warning. If there is no Cross Zero signals in 4 minutes, the unit stops and LED displays failure information and can't returns to normal operation automatically.
9.4.5 The current protection of the compressor



If compressor turns off for continuously 4 times due to current protection in 5 minutes from Compressor On, the unit stops and LCD displays failure information and can't returns to normal operation automatically.

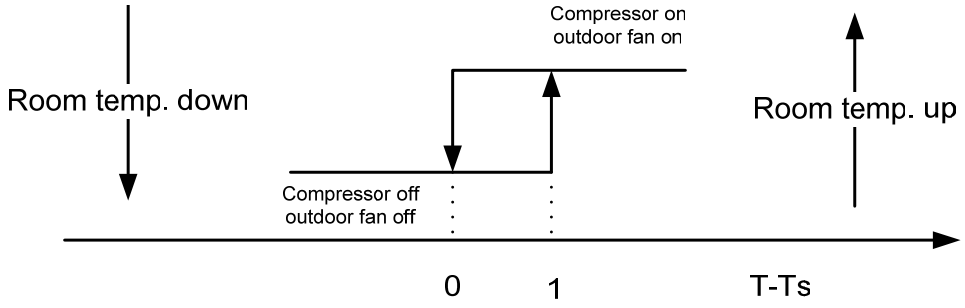
9.5 Fan only mode

Fan speed is high/mid/low/ Auto

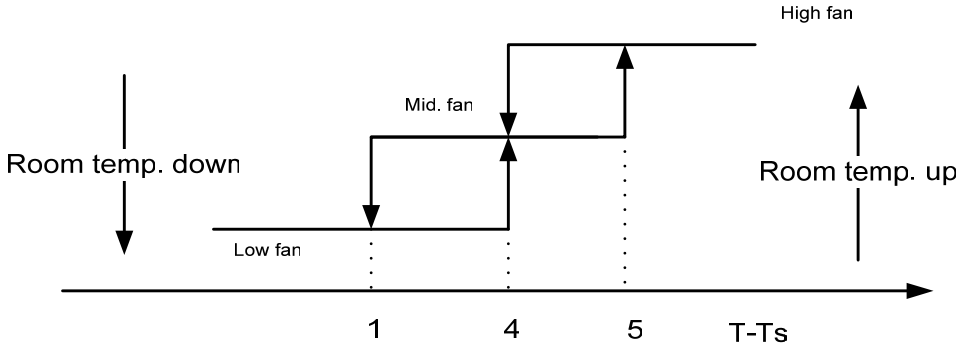
9.6 Cooling mode

The 4-way valve is closed at cooling mode.

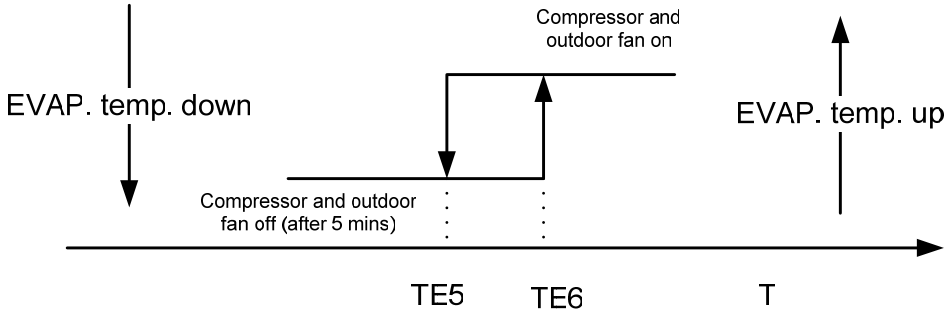
The action of the compressor and the outdoor fan:(T=indoor temperature)



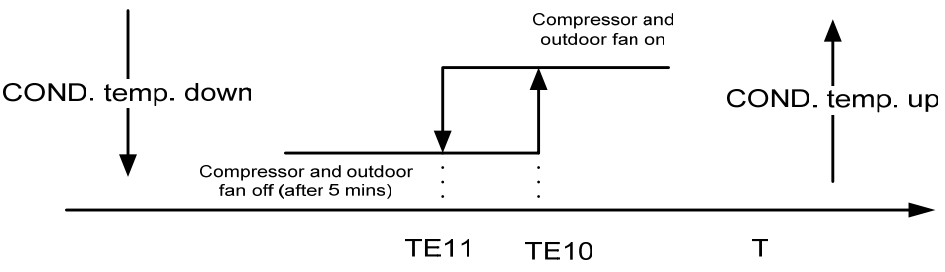
Auto fan at cooling mode:



Anti-freezing control to indoor evaporator at cooling mode (T: evaporator temp.)



Condenser high temperature protection (only for heat pump)



9.7 Dehumidifying mode

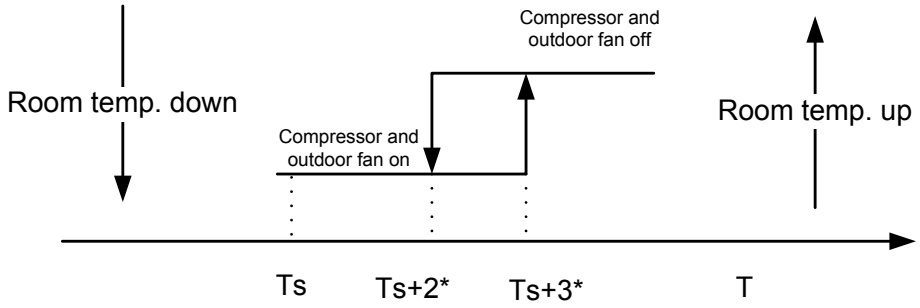
Indoor fan speed at low speed.
Protection is same as cooling mode.

9.8 Heating mode

9.8.1 Generally, the 4-way valve is open in heating mode, but it is closed in defrosting mode. 4-way valve must delay 2 minutes compared with compressor if the compressor changed into non-heating mode or turned off. 4-way valve doesn't delay in dehumidifying mode.

9.8.2 Generally, the outdoor fan is turned off with the on-off action of compressor in heating mode, except for the defrosting mode or the end of defrost.

9.8.3 Action of compressor and outdoor fan motor at heating mode: compressor must run for 7 minutes after starting and then judge temperature. Meanwhile other protections are still valid.

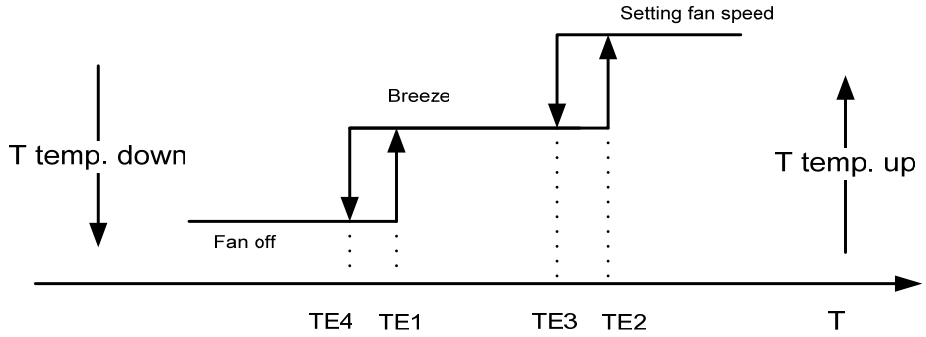


*** This parameter can be changed from 0 to 3**

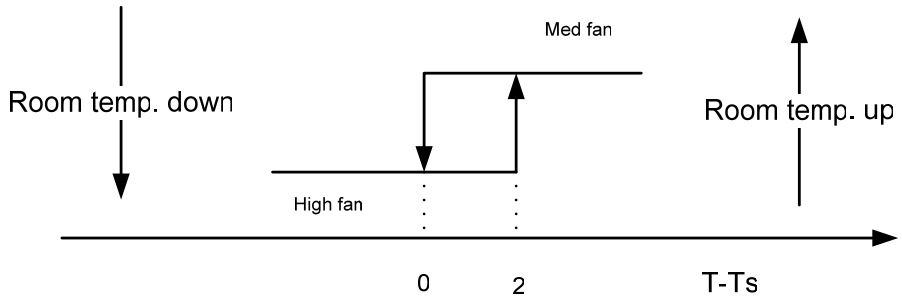
9.8.4 Indoor Fan actions at heating mode

Indoor Fan can be set at HIGH/MID/LOW/AUTO by using a remote controller, but Anti-cold wind function prevails.

Anti-cold wind control function at heating mode (T=indoor exchanger temp.)

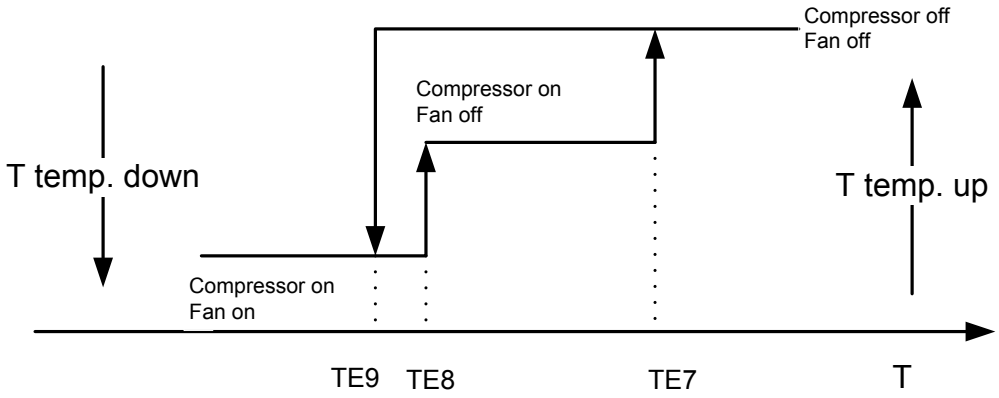


9.8.5 Auto wind at heating mode (T=indoor temp.)



9.8.6 Indoor evaporator high-temperature protection at heating mode

(T=indoor exchanger temp.)



The louver opens to Standard Angle ANGLHEAT when power is on for the first time

9.9 Defrosting mode(available for heating mode)

9.9.1 Defrosting condition:

Defrost starts when either of the following:

T3 lower than 0'C, lasts for more than 40 minutes, provided that the time period then the temperature is lower than -3'C consecutively reaches 3 minutes.

Calculate from the end of latest defrost, evaporator high temp. protection only closes outdoor fan with the compressor still running. Add up to 90 minutes.

9.9.2 Conditions of defrost ending:

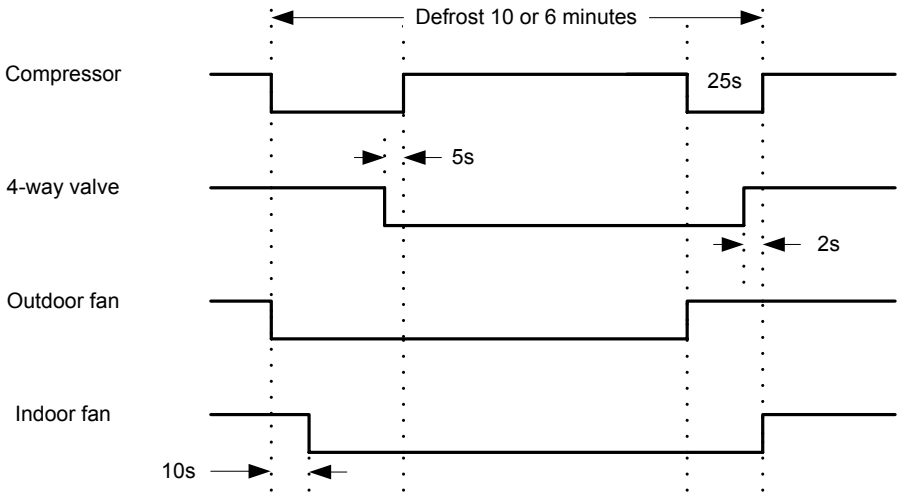
Defrosting ends when either of the following:

The time gets to 10 minutes.

T3>20'C.

The circulation is as following:

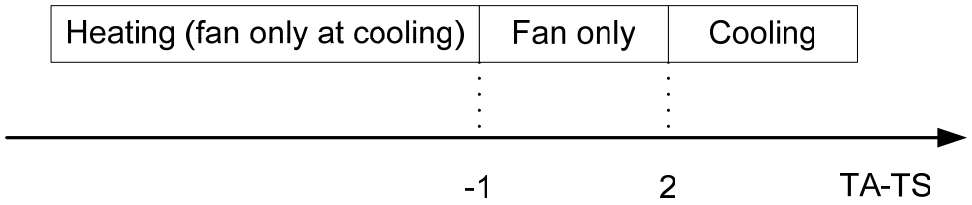
9.9.3 Defrosting Actions



Remark: when the evaporator pipe temperature sensor more than TE16, the indoor fan start to run.

9.10 Auto mode

9.10.1 The air conditioner automatically selects one of the following operation modes: cooling, heating or fan only according to the temperature difference between room temperature (TA) and set temperature (TS).



9.10.2 The indoor fan blows automatically in corresponding selected mode；

9.10.3 The motion of indoor fan's blade should accord with the selected operation mode；

9.10.4 One mode should be carried out for at least 15 minutes once selected. If the compressor cannot start for 15 minutes, reselect the operation mode according to the room temp. and set temp., or reselect when the set temp. varies

9.11 Force cooling function

9.11.1 Select forced cooling function with the forced cooling button or the switch

9.11.2 The compressor is unconditionally turned on, after 30 minutes cooling operation whose fan mode is set as low, the A/C operates at the DRY mode with a set temp. of 24℃

9.11.3 All protections of remote control cooling are available at forced cooling operation

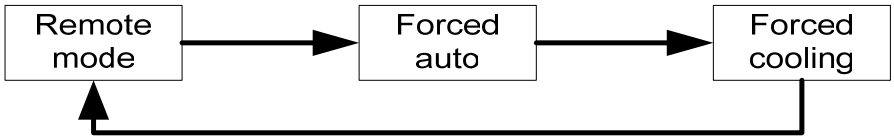
9.11.4 Forced Auto function

Select forced auto function with the forced auto button or the switch.

In forced auto status the A/C operates at remote control mode with a set temp. of 24℃.

Manual operation is controlled by touching buttons and divided into force cooling and forced auto mode.

It transfer between these two modes by pressing the buttons, the cycling order of the button press is as below graph show to you.

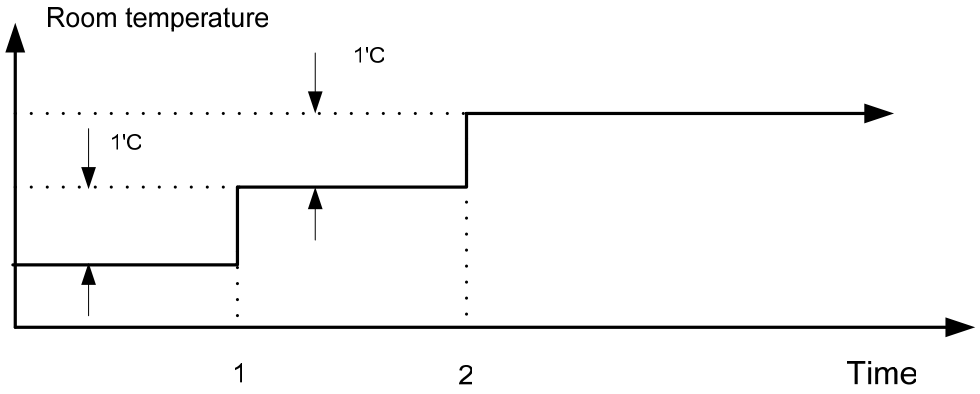


9.12 Sleep mode

9.12.1 The sleep function is available at cooling, heating or auto mode

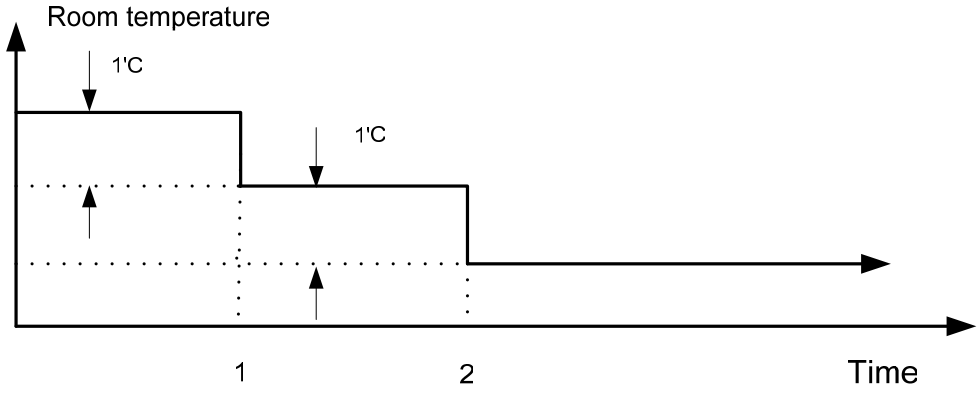
9.12.2 Cooling:

The set temperature rise 1℃ per hour. Two hours later, the set temperature will maintain as a constant and the fan speed is kept at low speed.



9.12.3 Heating:

The set temperature decrease 1℃ per hour. Two hours later, the set temperature will maintain as a constant and the air circulation is kept at low speed (Anti-cold function takes precedence over all).



9.12.4 Auto:

After an hour running under economic mode, the set temp will rise 1℃, if it is under cooling mode; the set temp will decrease 1℃,if it is under heating mode; the set temp will be changeless, if it is under fan-only mode; the condition will be the same after the air conditioner running under economic mode after 2 hours, and during the next time the set temp do not change. The total time is 7 hours, after 7 hours the unit stops.

9.13 Auto restart function

In case of a sudden power failure, this function automatically sets the unit to previous settings before the power failure when power returns.

9.14 Ionizer (air clean) function

9.14.1 Ionizer (air clean) function is effected when the unit is working and controlled by the remote controller.

9.14.2 This function is active when the unit received the signal from the remote controller first time and inactive when received the signal again. Repeat this circle when received signal again.

9.14.3 This function is working only when the indoor fan is working.

9.14.3 This function will not stop when the working mode changed, and be inactive when the unit shut down.

9.15 Follow me function

9.15.1 This function starts when the indoor unit received the signal from remote controller, and the air conditioner is operated by the temperature information included in the signal and the set temperature. In this mode, the indoor temperature sensor in the indoor unit is inactive.

9.15.2 When the indoor unit received the signal by pressing the button of remote controller, the buzzer in indoor unit will sound once. And the remote controller will send the corrected signal automatic per 3 minutes, the buzzer keep quiet at this time.

9.15.3 When the indoor unit have not received the corrected signal for 7 minutes, this function will be shut down. The air conditioner is working in common way.

9.16 Self-clean function

9.16.1 This function is available only under COOLING (including AUTO and FORCE cooling mode) or DRY mode, no matter it's cooling only or cooling & heating model.

9.16.2 For cooling only models, the air conditioner will operate under FAN ONLY mode at LOW fan speed for 30 minutes, and then stop the operation and the unit turn off.

9.16.3 For cooling & heating models, the air conditioner will operate: FAN ONLY mode at Low fan speed(13 minutes)--Heating operation with LOW fan speed (1 minute)---FAN ONLY operation(2 minutes)--Stop Operation---Turn off the unit.

9.16.4 Once the Auto Clean function is activated, all TIMER setting will be cancelled.

9.16.5 This operation will be stopped only by press the AUTO CLEAN button on remote controller again or the OFF button, then the unit will turn off.

9.16.6 During Cleaning operation, only the on/off, auto clean, swing, air direction, clear air and LED display buttons are available.

9.17 Turbo

9.17.1 Under cooling mode (except Force Cooling mode), the indoor fan motor will run in Turbo speed when receive the signal from remoter controller, and will get back to the presetting speed when receive again.

9.17.2 The turbo mode will cancel and indoor fan motor will get back to the presetting speed when one of following condition occur:

a. mode changed;

b. get into Force Cooling mode;

c. turn off the air conditioner;

9.17.3 Sleep mode is not available in this mode.

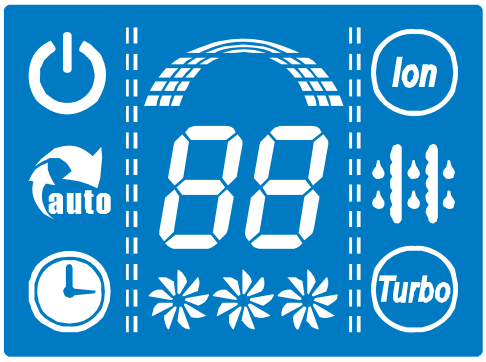
10 Model and Parameters

Model	7K	9K	12K
DELAY_TIME	127sec	127sec	127sec
DEFROST_TIME	7.5min	7.5min	7.5min
I3SEC	7.5	10.0	12.0
I5MIN	6.2	7.5	8.5
IFAN	5.2	6.0	7.5
IRESTORE	4.2	5.0	6.5
IDEFROST	3.2	3.5	5.0
TE1	28	28	34
TE2	32	32	37
TE3	30	30	33
TE4	26	26	22
TE5	4	4	4
TE6	10	10	10
TE7	60	60	63
TE8	53	53	53
TE9	50	50	52
THDEFROST	15	17	18
TMDEFROST	16	18	19
TLDEFROST	17	19	20
ANGLRANGE	196	196	196
ANGLOFF	100	100	100
ANGLCOOL	180	180	180
ANGLHEAT	22	22	22
ANGLCSL	8	8	8
ANGLCSH	40	40	40
ANGLHSL	8	8	8
ANGLHSH	40	40	40
ANGLDL	8	8	8
ANGLDH	190	190	190
ANGLFL	50	50	50
ANGLFH	155	155	155
HSPEEDH	1000	1080	1280
HSPEEDM	900	950	1060
HSPEEDL	800	800	900
HSPEEDS	750	750	750
CSPEEDP	1080	1080	1280
CSPEEDH	1040	1040	1260
CSPEEDM	900	900	1080
CSPEEDL	800	800	900
CSPEEDS	750	750	750

Model	18K		
DELAY_TIME	127sec		
DEFROST_TIME	7.5min		
I3SEC	17		
I5MIN	15		
IFAN	14		
IRESTORE	12		
IDEFROST	8.5		
TE1	37		
TE2	34		
TE3	30		
TE4	20		
TE5	3		
TE6	12		
TE7	60		
TE8	53		
TE9	52		
THDEFROST	19		
TMDEFROST	20		
TLDEFROST	21		
ANGLRANGE	190		
ANGLOFF	97		
ANGLCOOL	174		
ANGLHEAT	15		
ANGLCSL	10		
ANGLCSH	40		
ANGLHSL	10		
ANGLHSH	40		
ANGLDL	10		
ANGLDH	190		
ANGLFL	60		
ANGLFH	150		
HSPEEDH	1280		
HSPEEDM	1100		
HSPEEDL	1000		
HSPEEDS	900		
CSPEEDP	1280		
CSPEEDH	1250		
CSPEEDM	1100		
CSPEEDL	900		
CSPEEDS	800		

11 Troubleshooting

11.1 LCD Display board



ON/OFF indicator

This indicator illuminates when the air conditioner is in operation.

AUTO indicator

This indicator illuminates when the indoor air exchange with the outdoor air.

TIMER indicator

This indicator illuminates when TIMER is set ON/OFF.

Ionizer(Clean air) indicator

This indicator illuminates when the ionizer function is activated.

PRE.-DEF. Indicator (For Cooling & Heating models only)

This indicator illuminates when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating mode.

Turbo indicator

This indicator illuminates when the air conditioner is in turbo operation.

Indoor fan indicator

 This display is separated into three zones. Once the indoor fan is on, the zones illuminate gradually

DIGITAL DISPLAY indicator

 Displaying the current set temperature when the air conditioner is in operation. When Self-Clean feature is activated, it displays " SC ".

FAN SPEED indicator

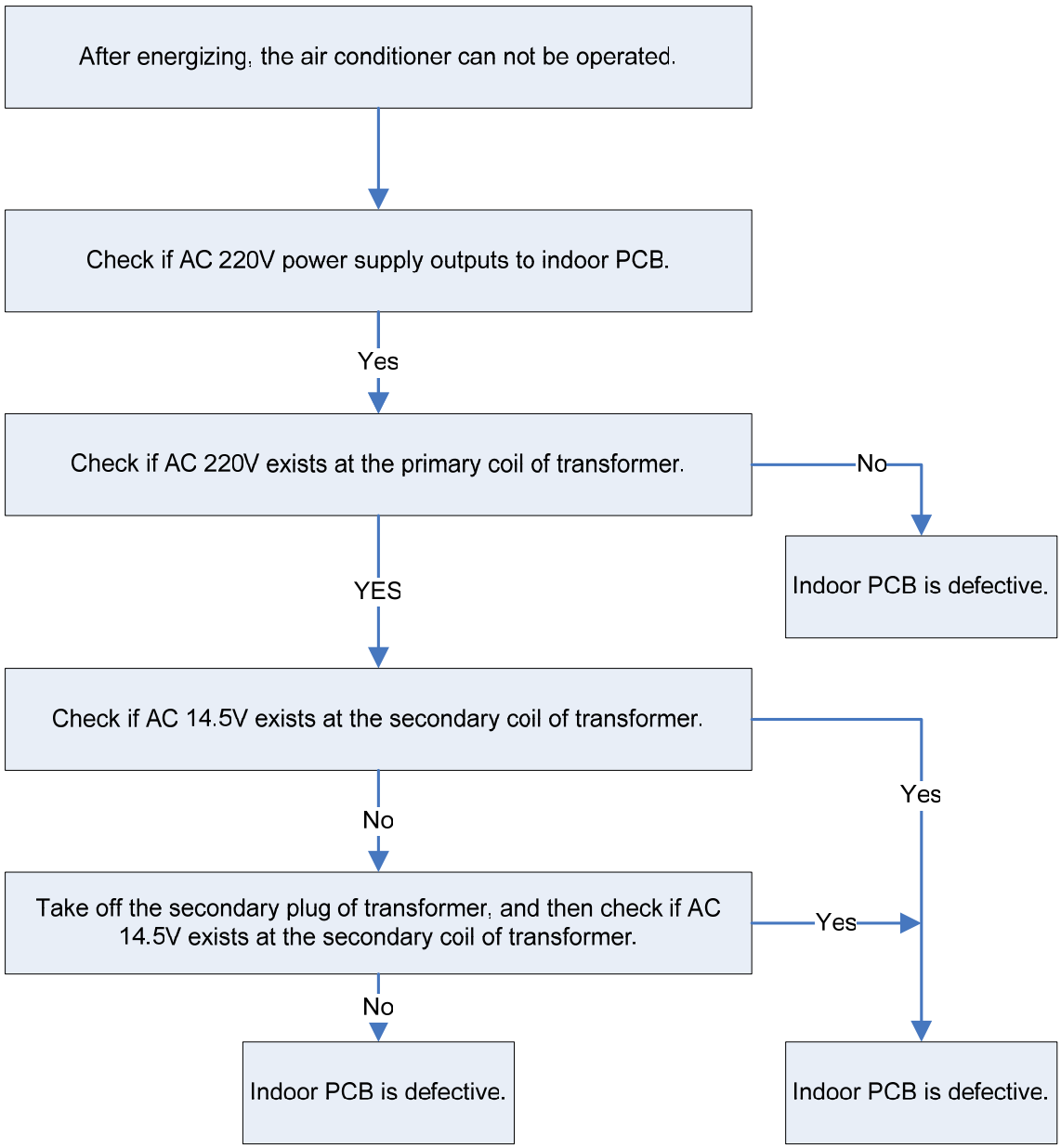
 This indicator illuminates when change the fan speed.

11.2 Indoor Unit Error Display

Display	STATUS
E1	EEPROM error
E2	Zero-crossing examination error
E3	Fan speed beyond control
E4	Over current protection of the compressor occurs 4 times
E5	Open or short circuit of Room temperature sensor
E6	evaporator temperature sensor open or short circuit of

11.3 Diagnostic chart

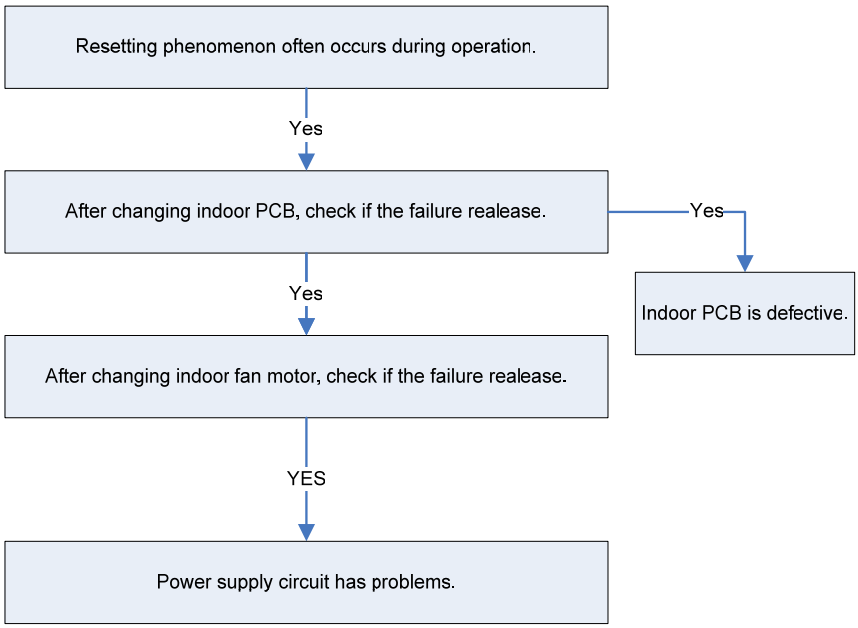
After energizing, no indicator is lighted and the air conditioner can't be operated.



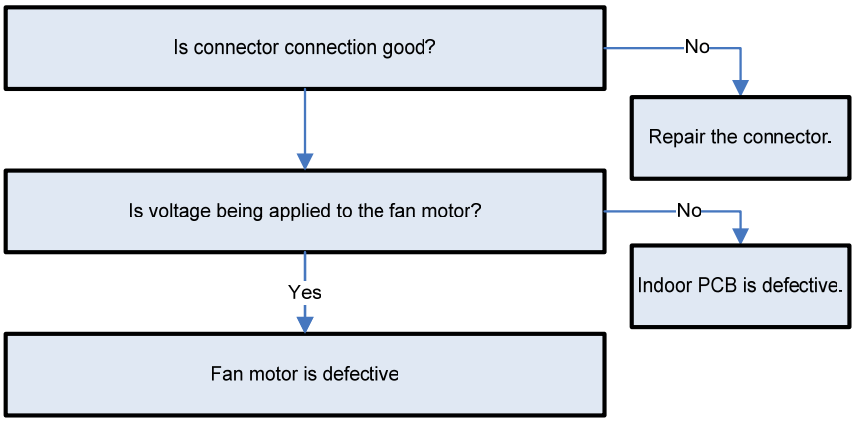
11.4 Resetting phenomenon often occurs during operation.

(That is automatically entering to the status when power is on.)

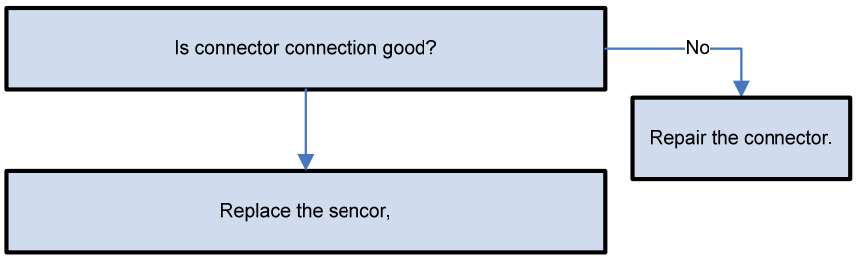
The reason is that the instantaneous voltage of main chip is less than 4.5V. Check according to the following procedure:



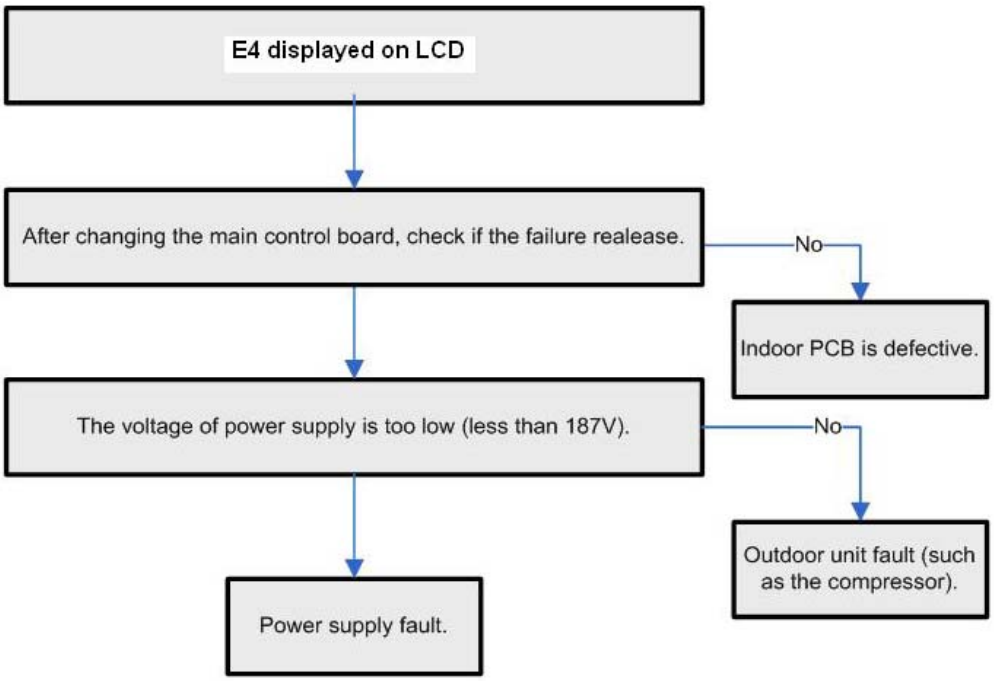
11.5 Indoor Unit Error Display：E3.



11.6 Indoor Unit Error Display：E5 or E6



11.7 Indoor Unit Error Display：E4



11.8 Indoor Unit Error Display：E1

EEROM error, indoor PCB is defective.

11.9 Indoor Unit Error Display：E2

This is alarm signal when the main chip can't detect over-zero signal. When such failure occurs, the main control board must have fault.

12 haracteristic of temperature sensor

Temp.℃	Resistance KΩ	Temp.℃	Resistance KΩ	Temp.℃	Resistance KΩ
-10	62.2756	17	14.6181	44	4.3874
-9	58.7079	18	13.918	45	4.2126
-8	56.3694	19	13.2631	46	4.0459
-7	52.2438	20	12.6431	47	3.8867
-6	49.3161	21	12.0561	48	3.7348
-5	46.5725	22	11.5	49	3.5896
-4	44	23	10.9731	50	3.451
-3	41.5878	24	10.4736	51	3.3185
-2	39.8239	25	10	52	3.1918
-1	37.1988	26	9.5507	53	3.0707
0	35.2024	27	9.1245	54	2.959
1	33.3269	28	8.7198	55	2.8442
2	31.5635	29	8.3357	56	2.7382
3	29.9058	30	7.9708	57	2.6368
4	28.3459	31	7.6241	58	2.5397
5	26.8778	32	7.2946	59	2.4468
6	25.4954	33	6.9814	60	2.3577
7	24.1932	34	6.6835	61	2.2725
8	22.5662	35	6.4002	62	2.1907
9	21.8094	36	6.1306	63	2.1124
10	20.7184	37	5.8736	64	2.0373
11	19.6891	38	5.6296	65	1.9653
12	18.7177	39	5.3969	66	1.8963
13	17.8005	40	5.1752	67	1.83
14	16.9341	41	4.9639	68	1.7665
15	16.1156	42	4.7625	69	1.7055
16	15.3418	43	4.5705	70	1.6469