TOYOTOMI

Service Manual

MODEL:

MTN-MTG A128FS
MTN-MTG A135FS

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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 a window 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.**

It can 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 or 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.

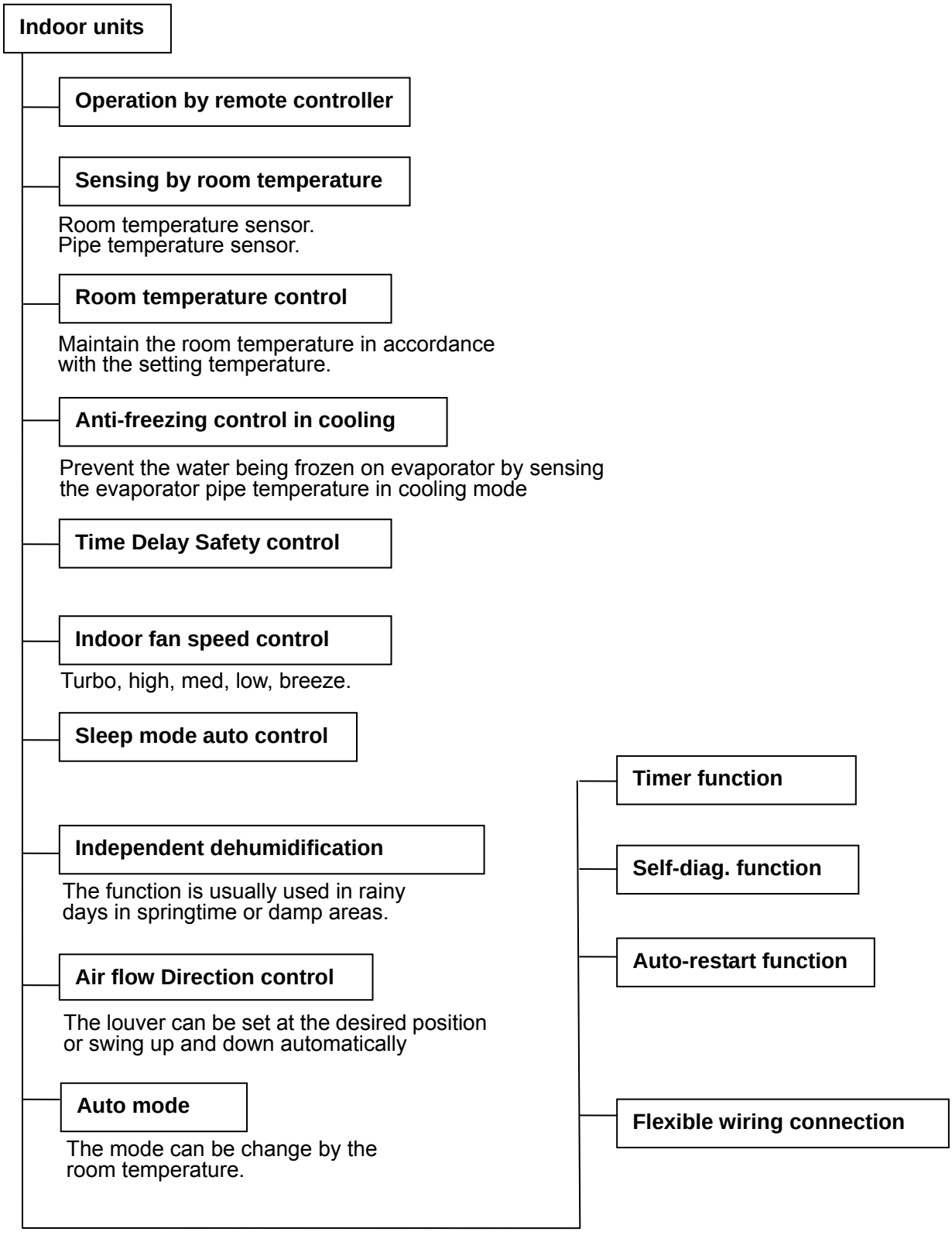
- **Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.**

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

The designs, and information in this book are subject to change without notice for product improvement.


Indoor units
Operation by remote controller
Sensing by room temperature
Room temperature sensor.
Pipe temperature sensor.
Room temperature control
Maintain the room temperature in accordance with the setting temperature.
Anti-freezing control in cooling
Prevent the water being frozen on evaporator by sensing the evaporator pipe temperature in cooling mode
Time Delay Safety control
Indoor fan speed control
Turbo, high, med, low, breeze.
Sleep mode auto control
Independent dehumidification
The function is usually used in rainy days in springtime or damp areas.
Air flow Direction control
The louver can be set at the desired position or swing up and down automatically
Auto mode
The mode can be change by the room temperature.
Timer function
Self-diag. function
Auto-restart function
Flexible wiring connection

Outdoor units

Power relay control

Low noise air flow system

Anti-rust cabinet

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

Valve protection cover

It protects the valves and prevents water from dripping.

3. Dimension

3.1 Indoor Units

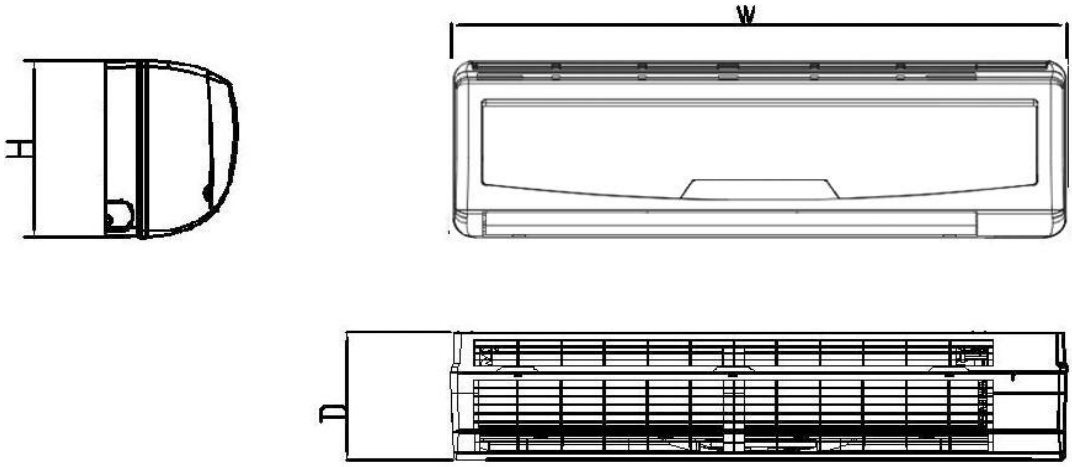


Figure 1 e 2:

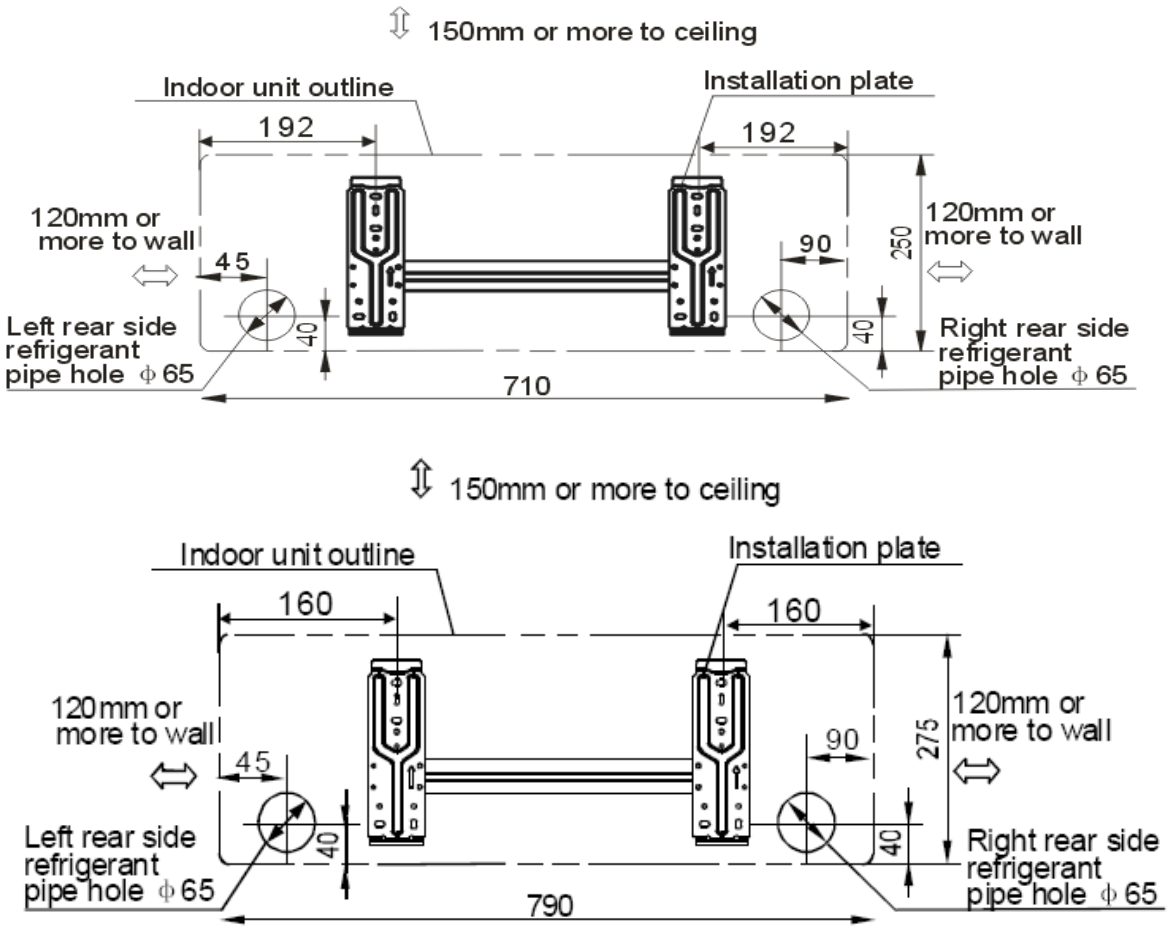
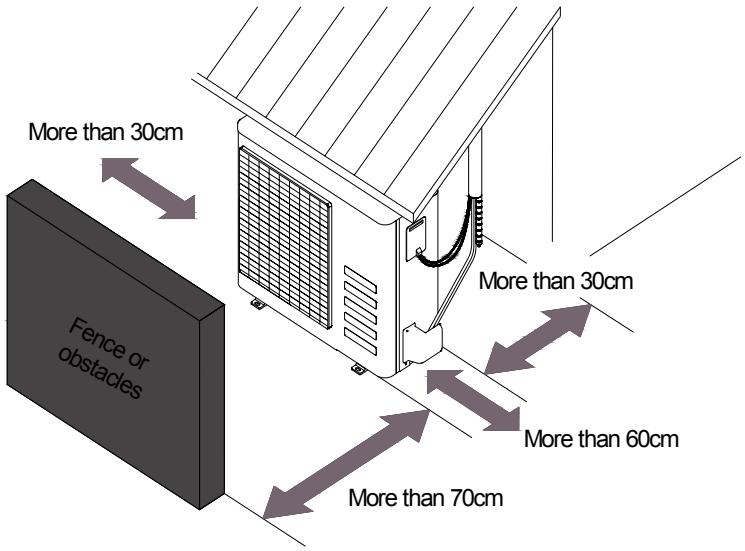
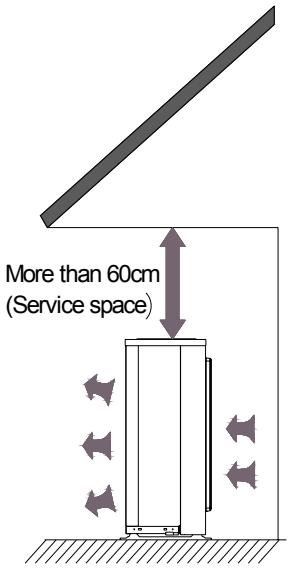
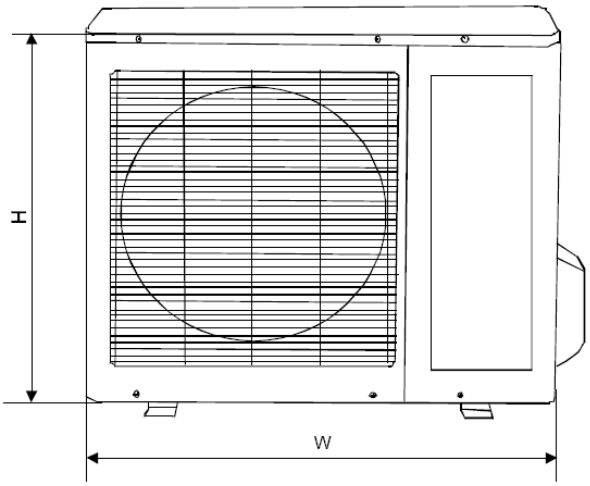


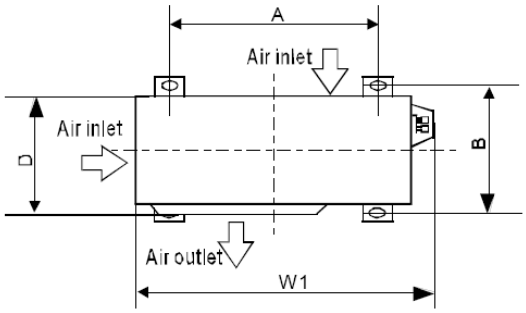
Figure	Models	W	H	D
Figure 1	MTN A128FS	710	250	189
Figure 2	MTN A135FS	790	275	196

3.2 Outdoor Units





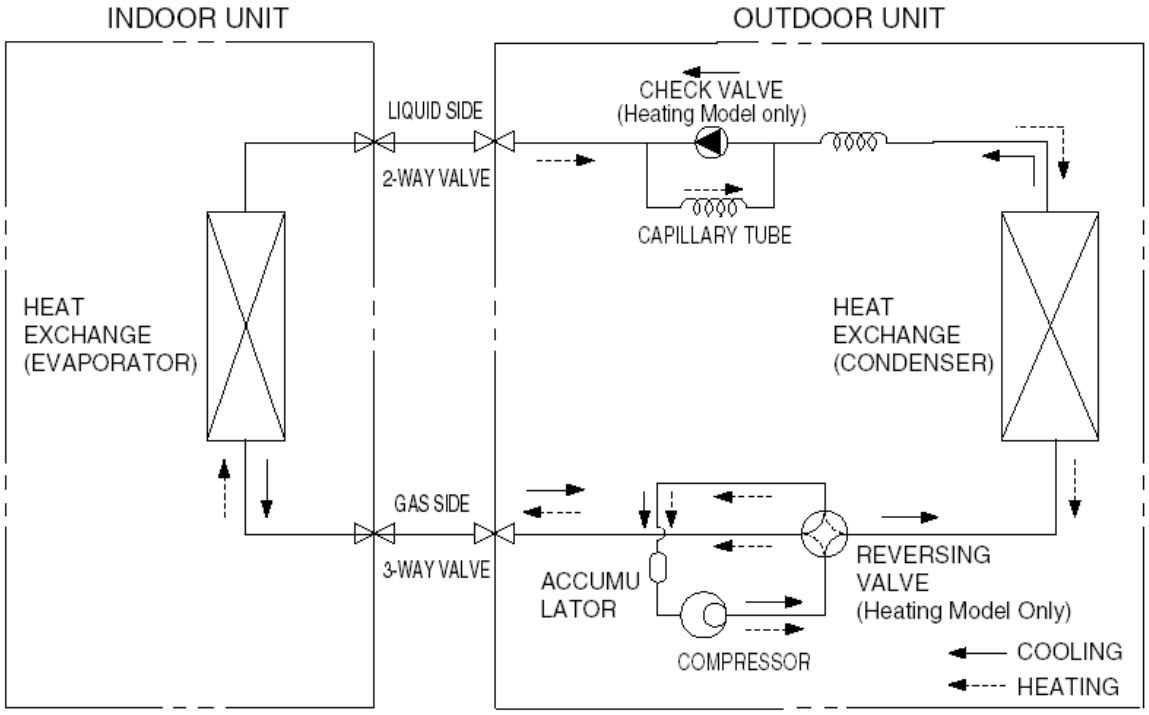




Model	W	D	H	W1	A	B
MTG A128FS	700	240	540	757	458	250
MTG A135FS	780	250	540	843	549	276

4. Refrigerant Cycle Diagram

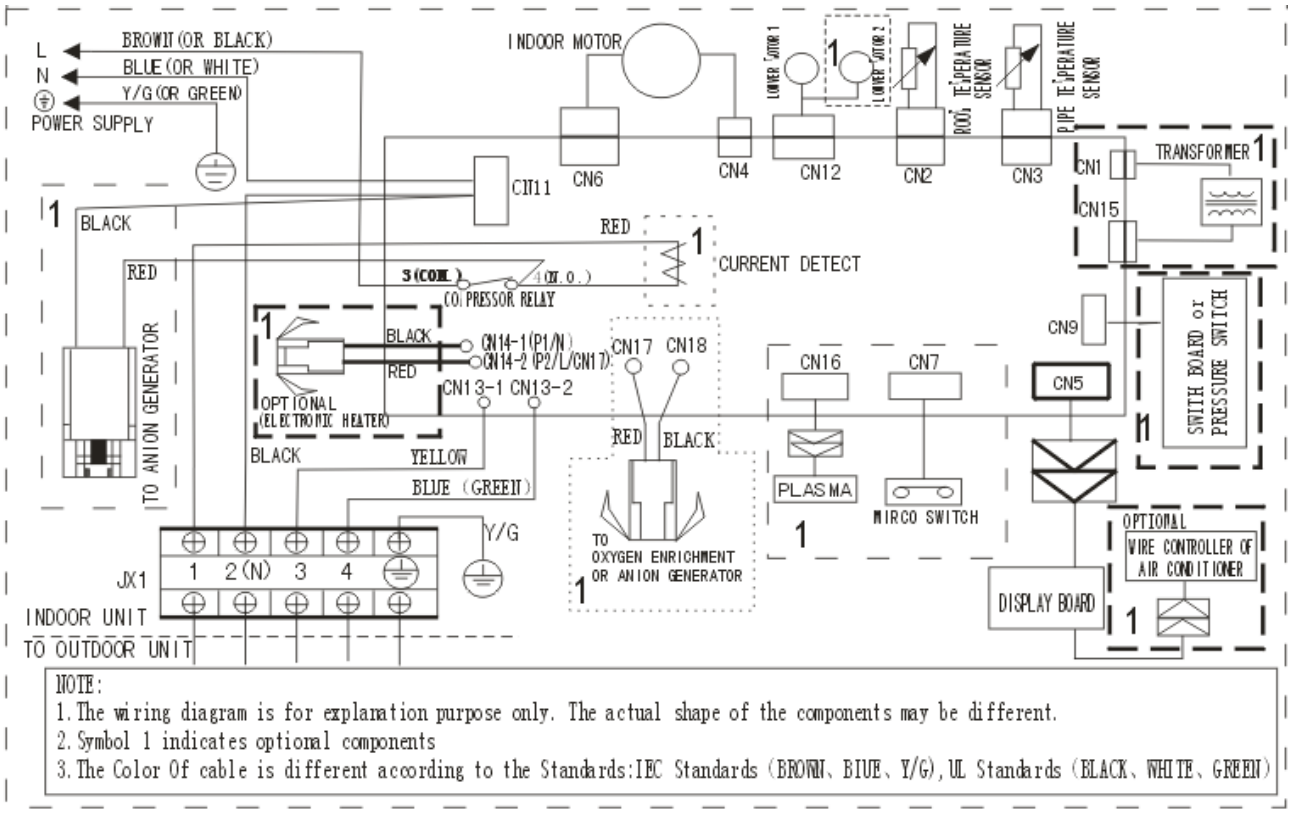
Heating pump mode：



5. Wiring Diagram

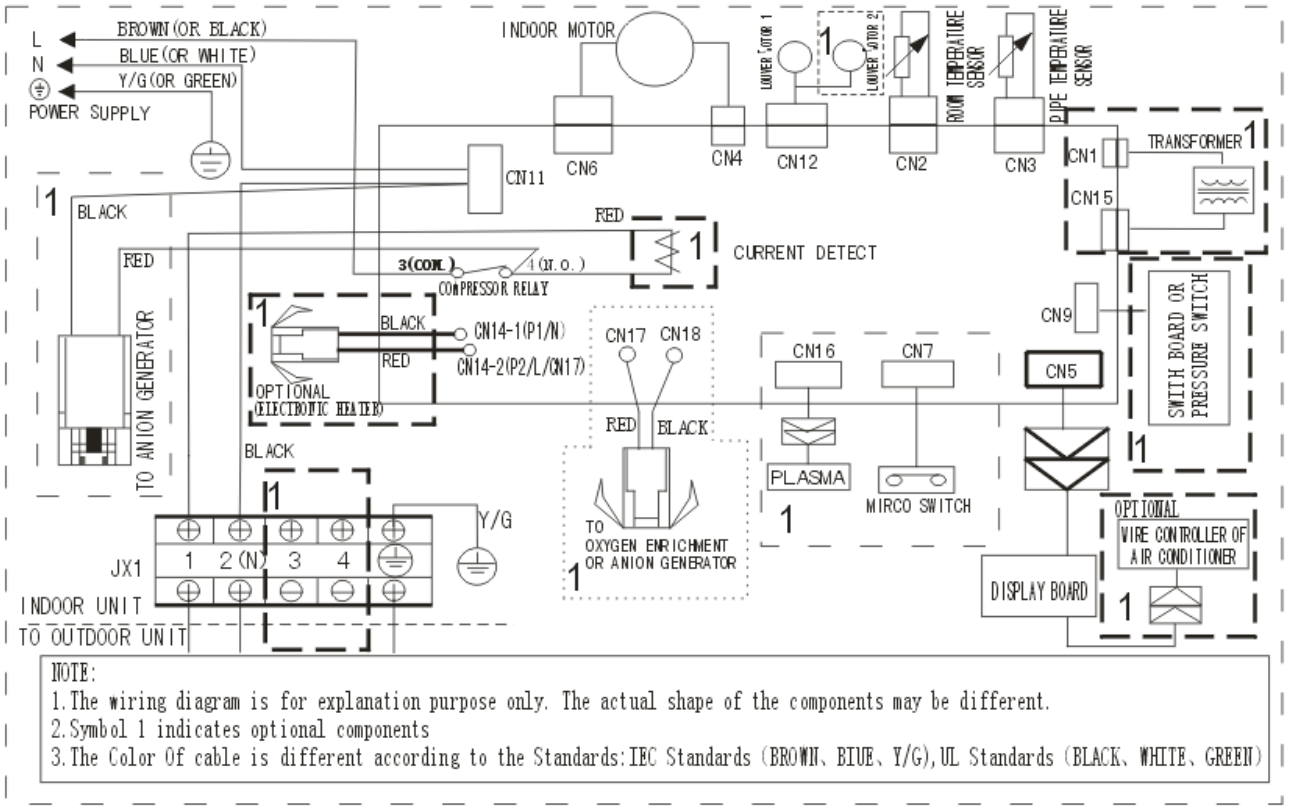
5.1 Indoor Units

MTN A135FS



NOTE:
1. The wiring diagram is for explanation purpose only. The actual shape of the components may be different.
2. Symbol 1 indicates optional components
3. The Color Of cable is different according to the Standards:IEC Standards (BROWN、BLUE、Y/G),UL Standards (BLACK、WHITE、GREEN)

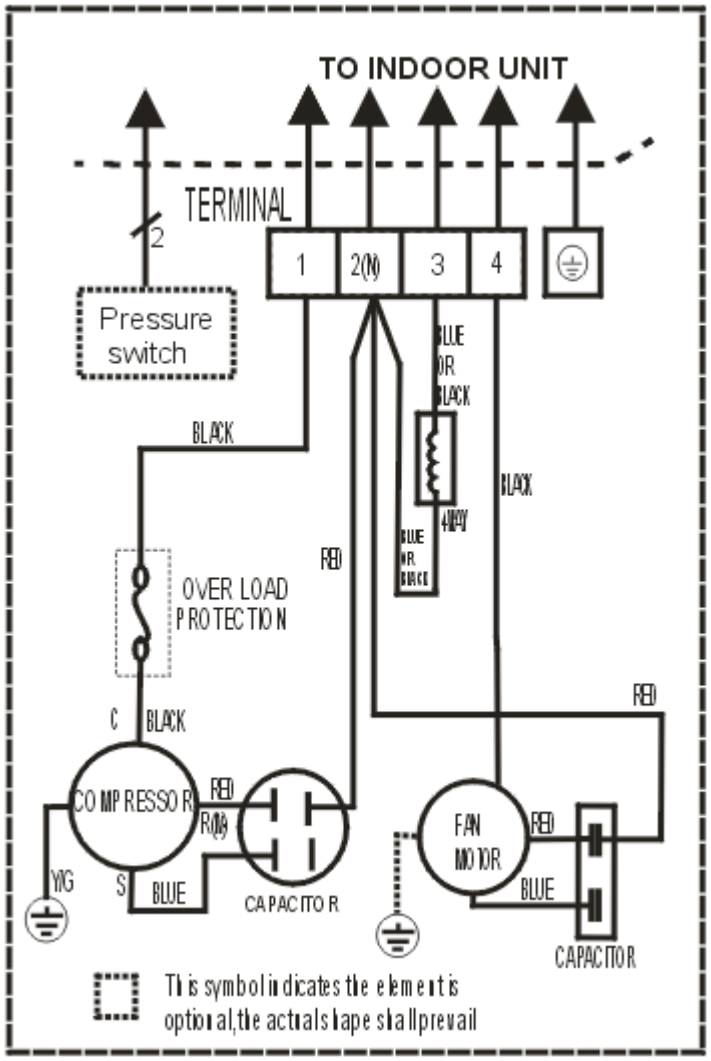
MTN A128FS



NOTE:
1. The wiring diagram is for explanation purpose only. The actual shape of the components may be different.
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5.2 Outdoor Units

MTN A128FS, MTN A135FS



6. Installation details

6.1 Wrench torque sheet for installation

Outside diameter		Torque	Additional tightening torque
mm	**inch**	**N.cm**	**N.cm**
Φ6.35	1/4	1500 (153kgf.cm)	1600 (163kgf.cm)
Φ9.52	3/8	2500 (255kgf.cm)	2600 (265kgf.cm)
Φ12.7	1/2	3500 (357kgf.cm)	3600 (367kgf.cm)
Φ16	5/8	4500 (459kgf.cm)	4700 (479kgf.cm)

6.2 Connecting the cables

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

Rated current of appliance	Nominal cross-sectional area (mm^2)
>3 and ≤6	0.75
>6 and ≤10	1.0
>10 and ≤16	1.5
>16 and ≤25	2.5

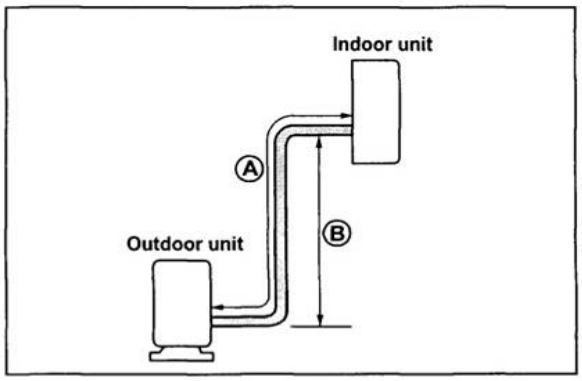
The cable size and the current of the fuse or switch are determined by the maximum current indicated on the nameplate which located on the side panel of the unit. Please refer to the nameplate before selecting the cable, fuse and switch.

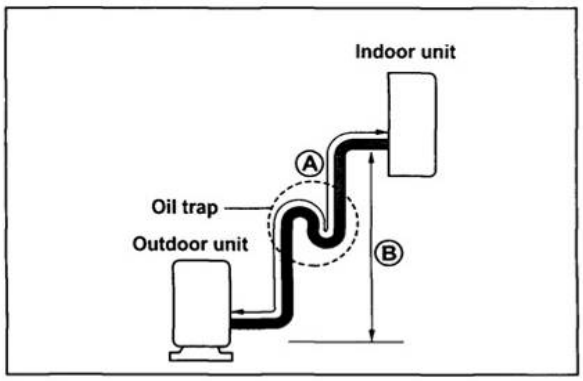
6.3 Pipe length and the elevation

The pipe length and refrigerant amount:

Model	Connective pipe length	Air purging	Additional amount of refrigerant
All	Less than 5m	Use vacuum pump	----------
9k,12k	More than 5m	Use vacuum pump	(Pipe length – 5) × 20g/m

Model	Standard length (m)	Max. Elevation B (m)	Max. Length A (m)
9k,12k	5	8	20





Caution:

Capacity test is based on standard length and maximum allowance length is based on system reliability.

Oil trap should be installed per 3-5 meters.

6.4 Installation for the first time

Air and moisture in the refrigerant system have undesirable effects as below:

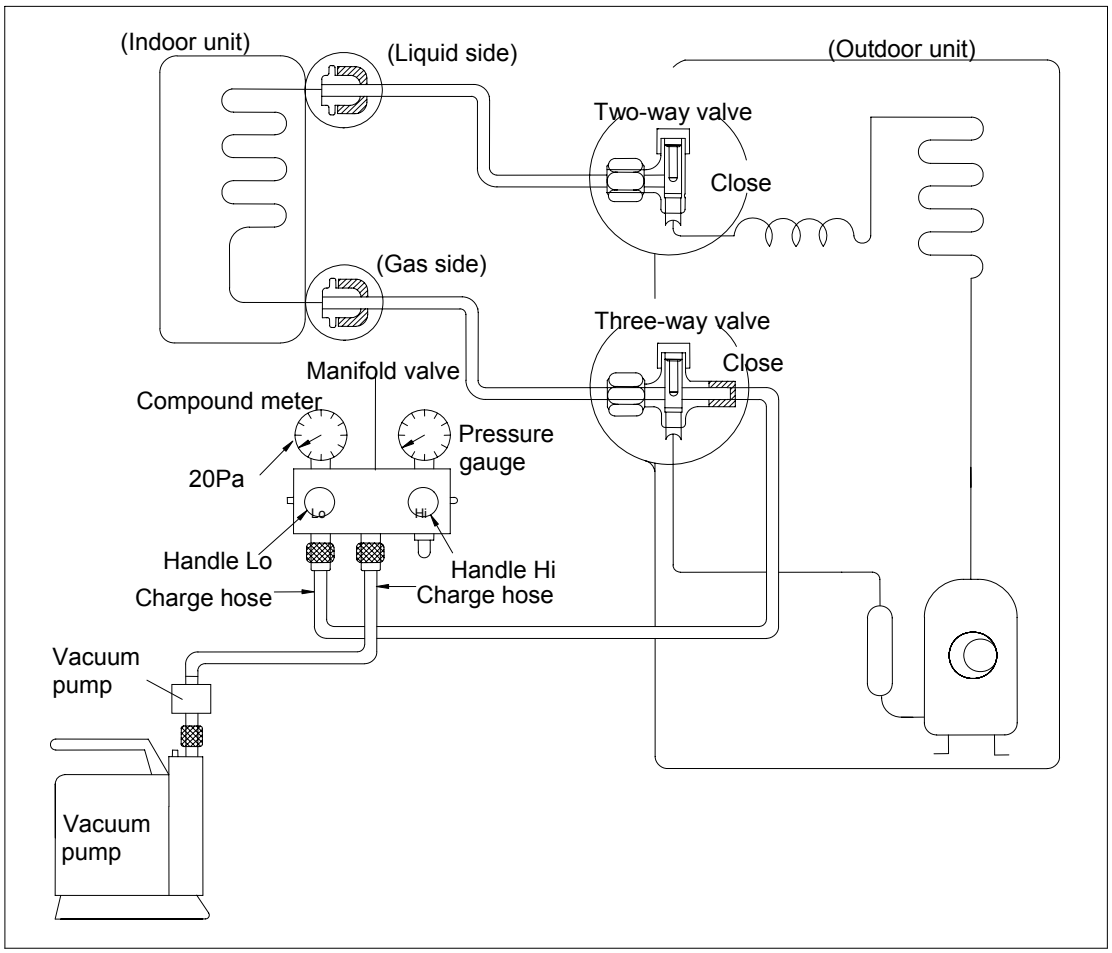
- Pressure in the system rises.
- Operating current rises.
- Cooling or heating efficiency drops.
- Moisture in the refrigerant circuit may freeze and block capillary tubing.
- Water may lead to corrosion of parts in the refrigerant system.

Therefore, the indoor units and the pipes between indoor and outdoor units must be leak tested and evacuated to remove gas and moisture from the system.

Gas leak check (Soap water method):

Apply soap water or a liquid neutral detergent on the indoor unit connections or outdoor unit connections by a soft brush to check for leakage of the connecting points of the piping. If bubbles come out, the pipes have leakage.

1. Air purging with vacuum pump



1) Completely tighten the flare nuts of the indoor and outdoor units, confirm that both the 2-way and 3-way valves are set to the closed position
2) Connect the charge hose with the push pin of handle lo to the 3-way valves gas service port..
3) Connect the charge hose of handle hi connection to the vacuum pump.
4) Fully open the handle Lo of the manifold valve.
5) Operate the vacuum pump to evacuate.
6) Make evacuation for 30 minutes and check whether the compound meter indicates -0.1Mpa. If

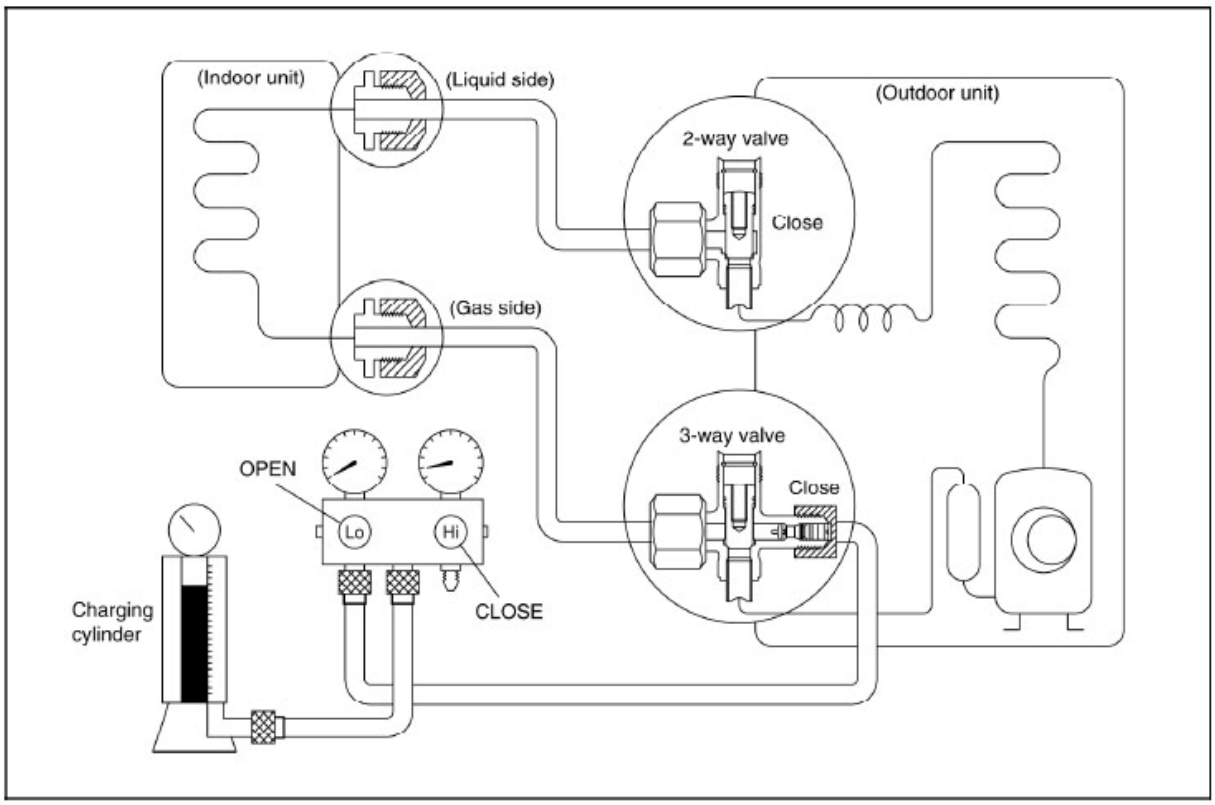
the meter does not indicate -0.1Mpa after pumping 30 minutes, it should be pumped 20 minutes more. If the pressure can't achieve -0.1Mpa after pumping 50 minutes, please check if there are some leakage points.

Fully close the handle Lo valve of the manifold valve and stop the operation of the vacuum pump. Confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

7) Turn the flare nut of the 3-way valves about 45° counterclockwise for 6 or 7seconds after the gas coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure. Then remove the charge hose from the 3 way valve.

8) Fully open the 2 way valve and 3 way valve and securely tighten the cap of the 3 way valve.

2. Air purging by refrigerant



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). Air purging

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 minute; repeat 3 times.

After purging the air, use a torque wrench to tighten the flare nut on the 2-way valve.

4). Check the gas leakage

Check the flare connections for gas leakage.

5). Discharge the refrigerant

Close the valve on the charging cylinder and discharge the refrigerant by loosening the flare nut on the 2-way valve approximately 45’ until the gauge indicates 0.3 to 0.5 Mpa.

6). Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position.

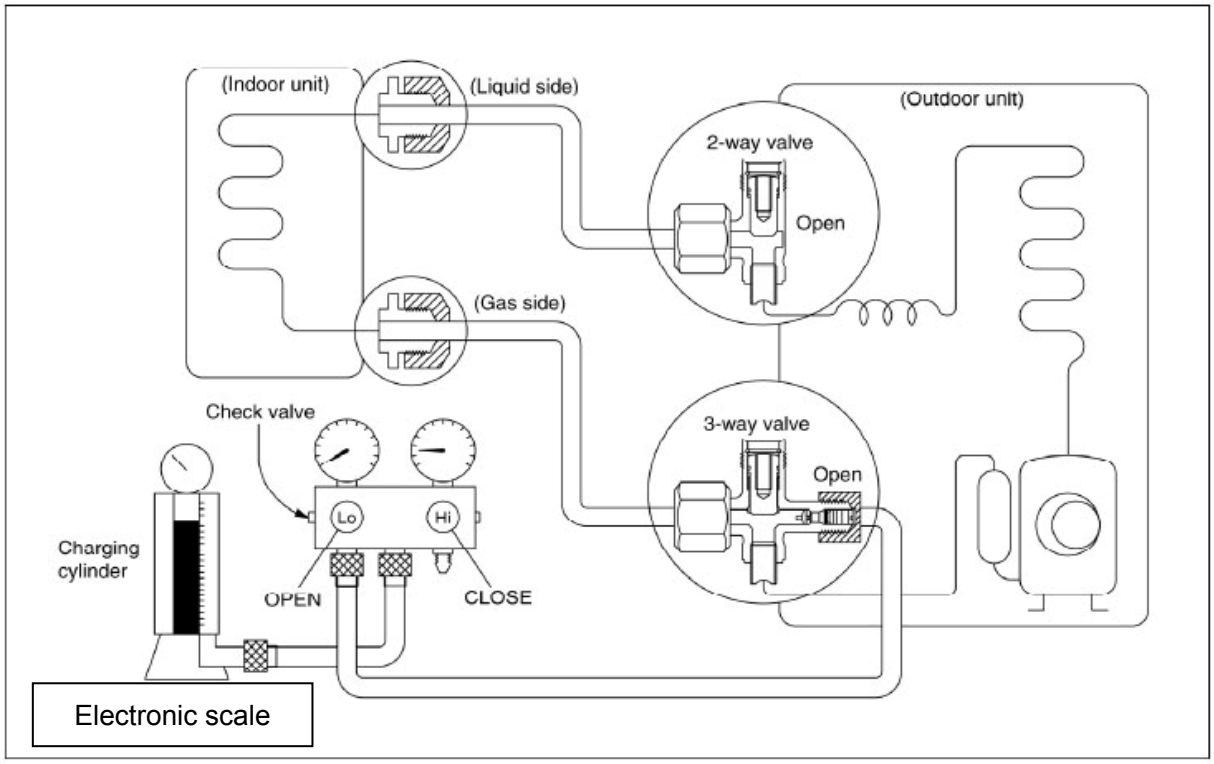
Be sure to use a hexagonal wrench to operate the valve stems.

7). 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.

3. Adding the refrigerant if the pipe length >5m



Procedure:

1). Connect the charge hose to the charging cylinder, open the 2-way valve and the 3-way valve.

Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure the liquid charge.

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) Put the charging cylinder onto the electronic scale and record the weight.

4) Operate the air conditioner at the cooling mode.

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

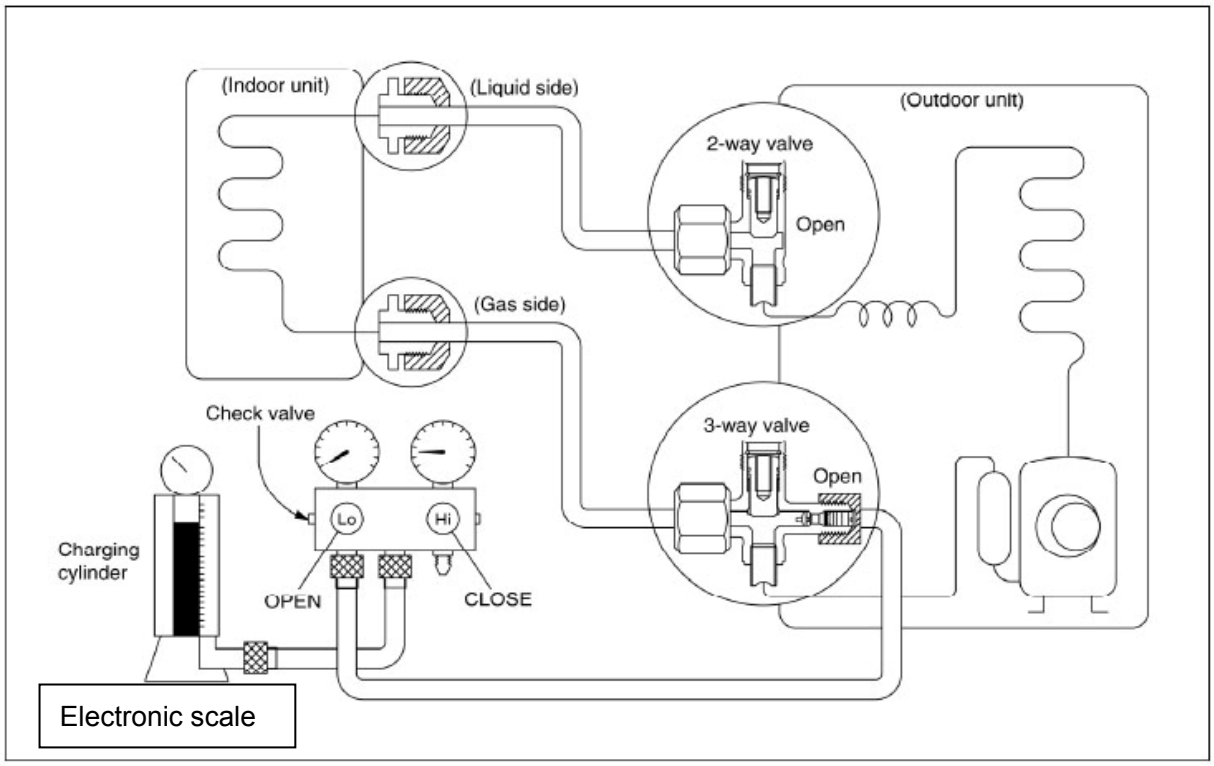
6).When the electronic scale displays the proper weight (refer to the table), disconnect the charge hose from the 3-way valve's service port immediately and turn off the air conditioner before disconnecting the hose.

7). Mount 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.

6.5 Adding the refrigerant after running the system for many years



Procedure:

1). Connect the charge hose to the 3-way service port, open the 2-way valve and the 3-way valve. Connect the charge hose to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.

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) Put the charging cylinder onto the electronic scale and record the weight.

4) Operate the air conditioner at the cooling mode.

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

6).When the electronic scale displays the proper weight (refer to the gauge and the pressure of the low side), disconnect the charge hose from the 3-way valve's service port immediately and turn off the air conditioner before disconnecting the hose.

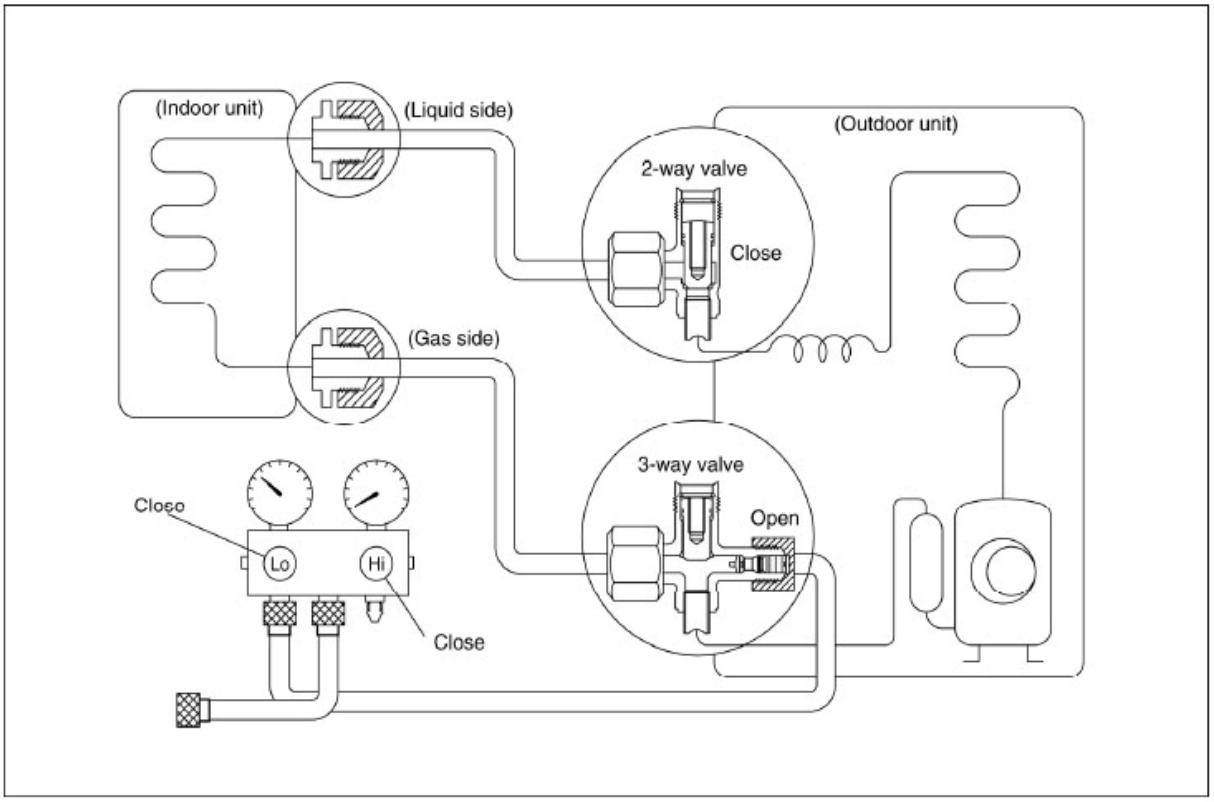
7). Mount the valve stem caps and the service port

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

Be sure to check for gas leakage.

6.6 Re-installation while the indoor unit need to be repaired

1. Collecting the refrigerant into the outdoor unit



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). Connect the charge hose with the push pin of handle lo to the 3-way valves gas service port.

3). Air purging of the charge hose

Open the handle Lo valve of the manifold valve slightly to purge air from the charge hose for 5 seconds and then close it quickly.

4). Set the 2-way valve to the close position.

5). Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1MPa.

6). Set the 3-way valve to the closed position immediately

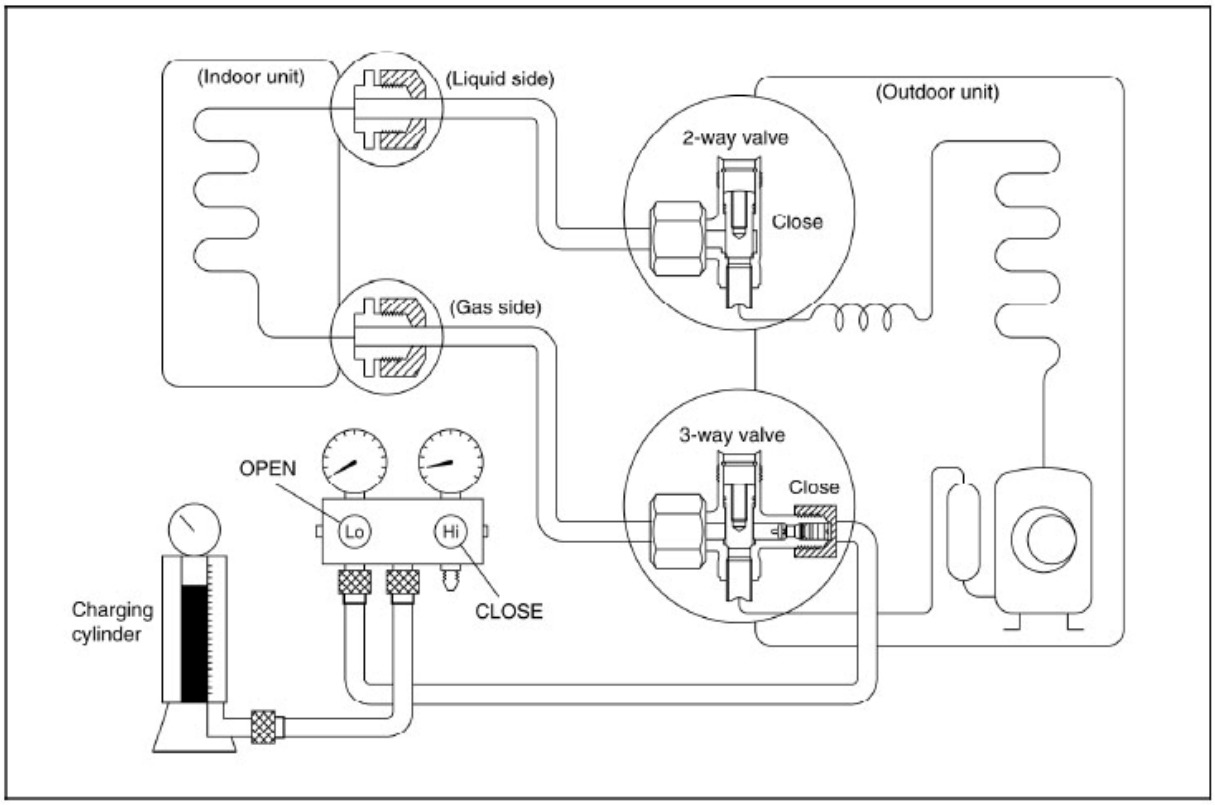
Do this quickly so that the gauge ends up indicating 0.3 to 0.5Mpa.

Disconnect the charge set, and tighten the 2-way and 3-way valve's stem nuts.

Use a torque wrench to tighten the 3-way valves service port cap to a torque of 1.8 kgf.m.

Be sure to check for gas leakage.

2. Air purging by the refrigerant



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.

Leave the valve on the charging cylinder closed.

3). Air purging

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 minute; repeat 3 times.

After purging the air, use a torque wrench to tighten the flare nut on the 2-way valve.

4). Check the gas leakage

Check the flare connections for gas leakage.

5). Discharge the refrigerant

Close the valve on the charging cylinder and discharge the refrigerant by loosening the flare nut on the 2-way valve approximately 45’ until the gauge indicates 0.3 to 0.5 Mpa.

6). Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position.

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

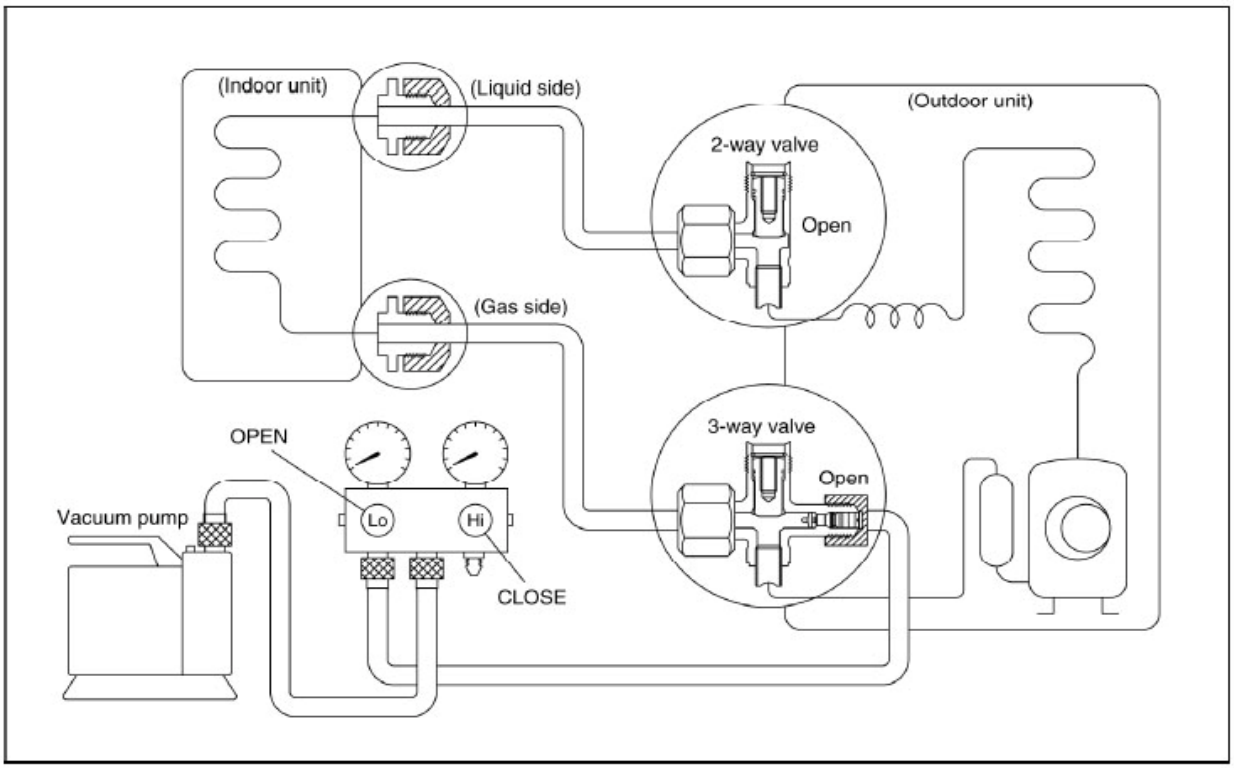
7). Mount the valve stems nuts and the service port cap.

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.

6.7 Re-installation while the outdoor unit need to be repaired

1. Evacuation for the whole system



Procedure:

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

2). Connect the vacuum pump to 3-way valve’s service port.

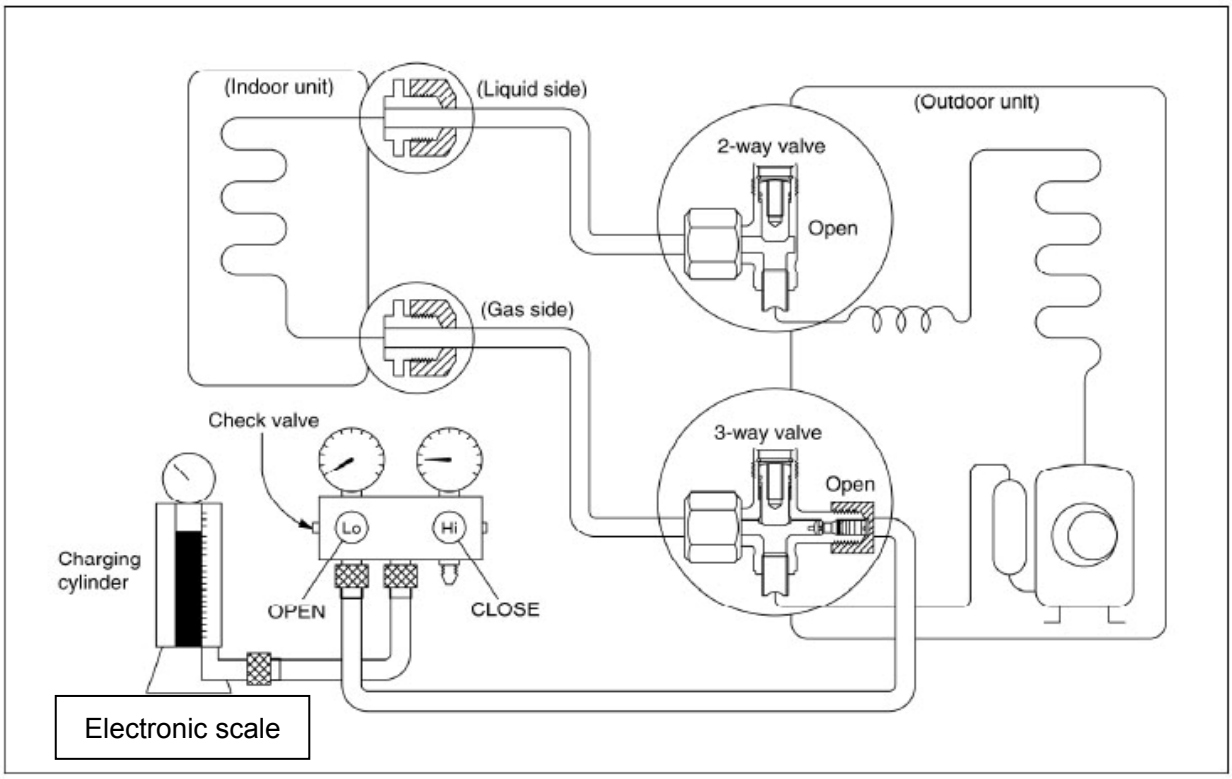
3). Evacuation for approximately one hour

Confirm that the compound meter indicates -0.1Mpa.

4). 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).

5). Disconnect the charge hose from the vacuum pump.

2. Refrigerant charging



Procedure:

1). Connect the charge hose to the charging cylinder, open the 2-way valve and the 3-way valve. Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.

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) Put the charging cylinder onto the electronic scale and record the weight.

4). 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, or can be charged with a little at a time (approximately 150g each time) , operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure.

5).When the electronic scale displays the proper weight, disconnect the charge hose from the 3-way valve's service port immediately.

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

6). 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.

7. Operation characteristics

<table>
<tr><th>Temperature
Mode</th><th>Cooling operation</th><th>Heating operation</th><th>Drying operation</th></tr>
<tr><td rowspan="2">Room temperature</td><td rowspan="2">17℃ ~ 32℃</td><td rowspan="2">0℃ ~ 30℃</td><td>10℃ ~ 32℃
(<21000Btu/h models)</td></tr>
<tr><td>17℃ ~ 32℃
(≥21000Btu/h models)</td></tr>
<tr><td rowspan="3">Outdoor temperature</td><td>18℃ ~ 43℃</td><td rowspan="3">-7℃ ~ 24℃</td><td>11℃ ~ 43℃
(<21000Btu/h models)</td></tr>
<tr><td>-5℃ ~ 43℃
(For the models with
low temperature cooling system)</td><td>18℃ ~ 43℃
(≥21000Btu/h models)</td></tr>
<tr><td>21℃ ~ 52℃(For special tropical models)</td><td>21℃ ~ 52℃
(For special tropical models)</td></tr>
</table>

CAUTION:

1. If air conditioner is used beyond the above conditions, the certain protections may action.

2. Room relative humidity should be less than 80%. If the air conditioner operates in excess of this value, the surface of the air conditioner may attract condensation water. In this case, please set the vertical air louver to its maximum angle (vertically to the floor), and set the fan to high speed.

8. Electronic function

8.1 Abbreviation

T1: Indoor ambient temperature

T2: Coil temperature of indoor heat exchanger

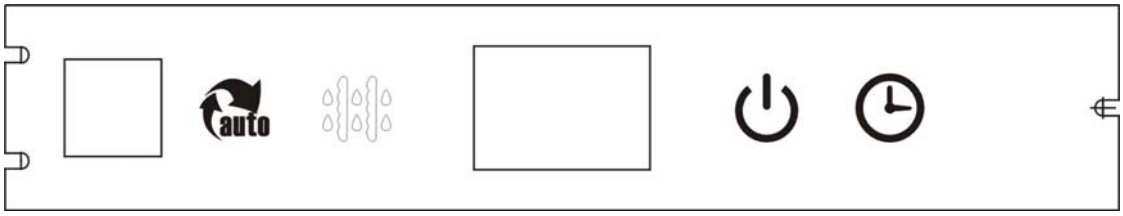
T3: Coil temperature of outdoor heat exchanger

T4: Outdoor ambient temperature

T5: Compressor discharge temperature

8.2 Display function

8.2.1 Icon explanation on indoor display board.



auto	Auto indicator: This indicator illuminates when the air conditioner is in AUTO operation.
	Timer indicator: This indicator illuminates when TIMER is set ON/OFF
	PRE.-DEF. Indicator(only for heat pump models) This indicator illuminates when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating mode.
	OPERATION indicator: This indicator illuminates when the air conditioner is running.

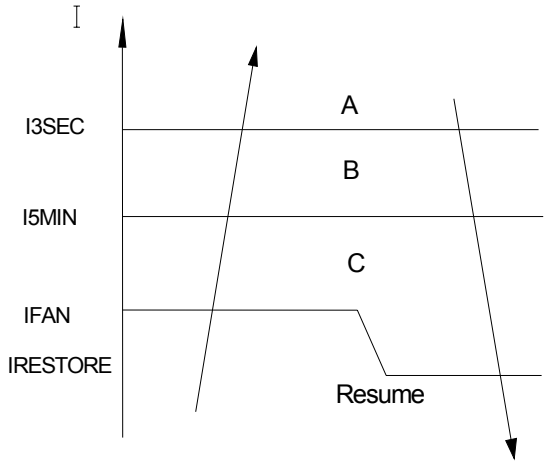
8.3 Main Protection

8.3.1 Time Delay at restart for compressor.

8.3.2 Fan Speed is out of control.

----When Indoor Fan Speed keeps too low or too high for certain time, the unit will stop and the LED will display the failure

8.3.3 Current protection



A zone : The current exceeds I_{3SEC} for 5 seconds(3 seconds for 21k model), the compressor and outdoor fan will shut off.

B zone: The current exceeds I_{5min} for 5 minutes, the compressor and outdoor fan will shut off.

C zone: The current exceeds I_{FAN}, the outdoor fan will shut off if AC is in heating mode. If AC is in cooling mode, the indoor fan will run at low speed.

Model	I_{3SEC}(A)	I_{5min}(A)	I_{FAN}(A)	$I_{RESTORE}$(A)
MTN A128FS	7.5	5.4	5.2	4.2
MTN A135FS	12.0	10.0	9.0	8.0

8.3.4 Zero crossing detection error protection

8.4 Operation Modes and Functions

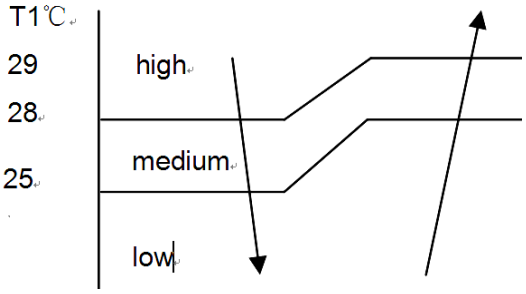
8.4.1 Fan mode

(1) Outdoor fan and compressor stop.

(2) Temperature setting function is disabled, and no setting temperature is displayed.

(3) Indoor fan can be set to high/med/low/auto.

(4) The louver operates same as in cooling mode.

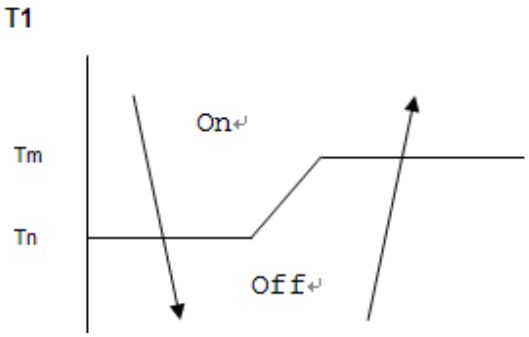

T1℃
29
28
25
high
medium
low

8.4.2 Cooling Mode

8.4.2.1 Compressor running rules:

Once the compressor starts up, it will follow the below rules:

When indoor room temp.T1 is lower than Tn, the compressor and outdoor fan will shut off. When T1 is higher than Tm, the compressor and outdoor fan will start up.



Tm=Ts+1, Tn=Ts.

Tm=Ts, Tn=Ts-2

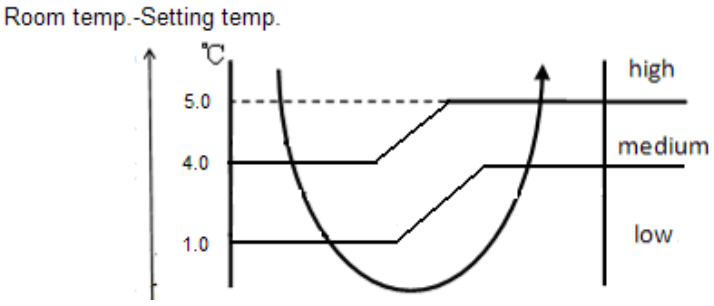
8.4.2.2 Outdoor fan running rules:

The On-off outdoor units have single fan speed. The outdoor fan will run following the compressor except when AC is in evaporator high temp. protection in heating mode ,condenser high temp. protection in cooling mode, defrosting mode and the current protection.

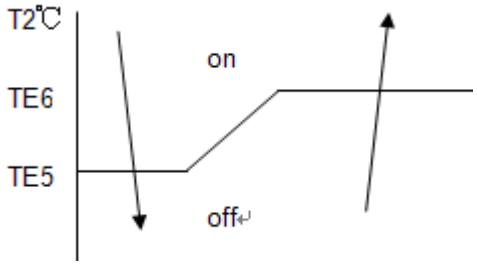
8.4.2.3 Indoor fan running rules

In cooling mode, indoor fan runs all the time and the speed can be selected as high, medium, low and auto.

The auto fan:



8.4.2.4 Evaporator low temperature T2 protection.



When the evaporator coil temp.T2 keeps lower than TE5 for 5 minutes(4 minutes for 21k model), the compressor and outdoor fan will shut off.

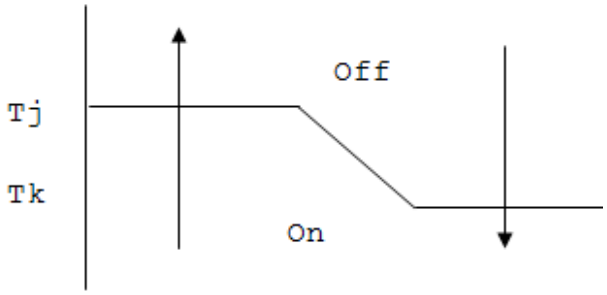
When T2 is higher than TE6, the compressor and outdoor fan will restart up.

8.4.3 Heating Mode

8.4.3.1 Compressor running rules:

For the models, they will follow the below rules once the compressors start up:

When indoor room temp.T1 is higher than Tj, the compressor and outdoor fan will shut off. When T1 is lower than Tk, the compressor and outdoor fan will start up.



Tj=Ts+Tc

Tk=Ts+Tc-1. Tc=1□ for 7k

8.4.3.2 Outdoor fan running rules:

The outdoor units have single fan speed. The outdoor fan will run following the compressor except when AC is in evaporator high temp. protection in heating mode , condenser high temp. protection in cooling mode ,defrosting mode and the current protection.

Anti-cold wind function:

When evaporator coil temp.T2 is getting higher,

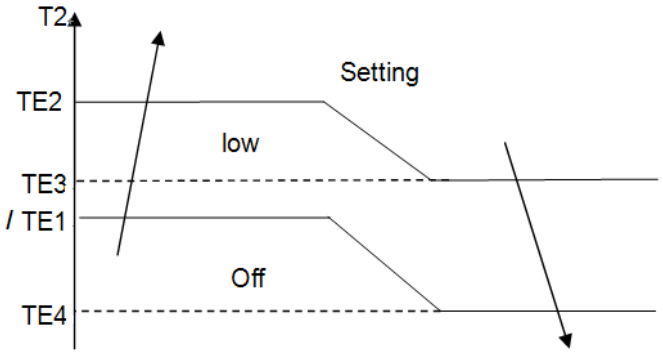
T2>TE2, the indoor fan will run at setting speed.

TE1<T2<TE2, the indoor fan will run at low speed.

When T2 is getting lower,

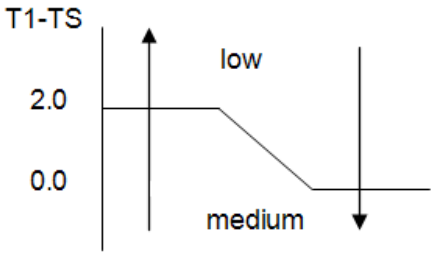
TE4<T2<TE3,the indoor fan will run at low speed.

T2<TE4, the indoor fan will shut off.



While TE1=28□,TE2=32□,TE3=30□,TE4=26□ for **MTN A128FS**
TE1=34□,TE2=37□,TE3=33□,TE4=26□ for **MTN A135FS**model.

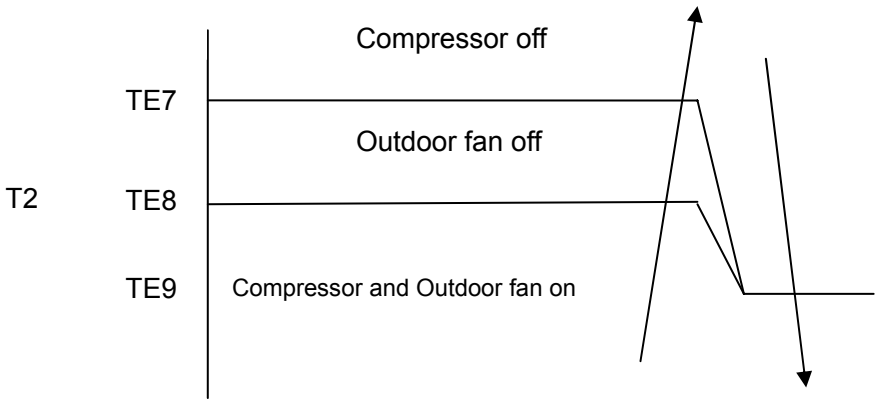
Auto fan action:



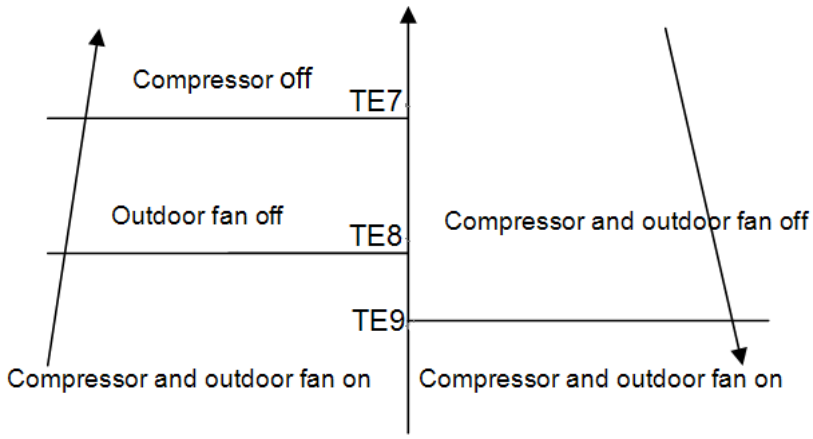
When T1-Ts>2 , the indoor fan will run at low speed.

When T1-Ts≤0 , the indoor fan will run at medium speed.

8.4.3.4 High evaporator coil temp.T2 protection:



Model	T2 (℃)		
	TE7	TE8	TE9
MTN A128FS	60	53	50
MTN A135FS	63	53	52



8.4.3.5 Defrosting mode：

For 9k,12k models:

- **Condition of defrosting:**

AC will enter defrosting mode if any of the following items is satisfied.

(1) Both A and B are satisfied

A: The compressor keeps running for 40 minutes.

B: The evaporator coil temp.T2-Indoor room temp.T1 meets the below table.

	T2 - T1
High speed	< $TH_{DEFROST}$
Medium speed	< $TM_{DEFROST}$
Low speed	< $TL_{DEFROST}$
Breeze/off	No need to compare the T2 and T1

model	$TH_{DEFROST}$	$TM_{DEFROST}$	$TM_{DEFROST}$
MTN A128FS	14	15	16
MTN A135FS	14	15	16

(2) After the last defrosting, the time that the outdoor fan is off but the compressor is on in high T2 protection cumulates up to 90 minutes.

- **Condition of ending defrosting:**

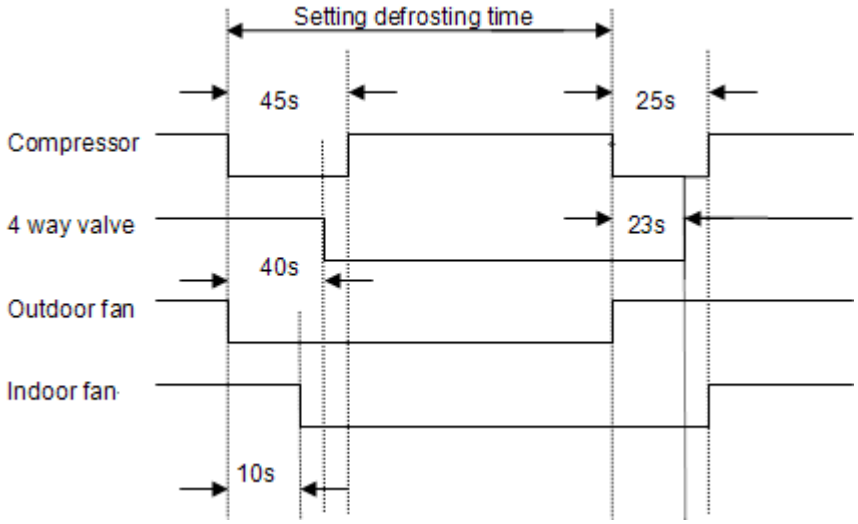
If any one of the following items is satisfied, the defrosting will terminate and the machine will turn to normal heating mode.

(1) The defrosting time is reached to the setting value.

(2) The compressor current reaches or exceeds $I_{DEFROST}$ for 7 seconds.

$I_{DEFROST}$=6.5A for **MTN A128FS** model.

- **Defrosting action：**



About the setting defrosting time:

(1) Condition 1 of defrosting;

If case B happens before case A and lasts till case A happens, the setting defrosting time is 10 minutes. Otherwise the defrosting time is 7.5 minutes.

(2) Condition 2 of defrosting.

The defrosting time is 10 minutes.

(3) No matter what condition of defrosting is, if the defrosting time keeps 7.5 minutes for 3 times, it will be 10 minutes in the 4th defrosting.

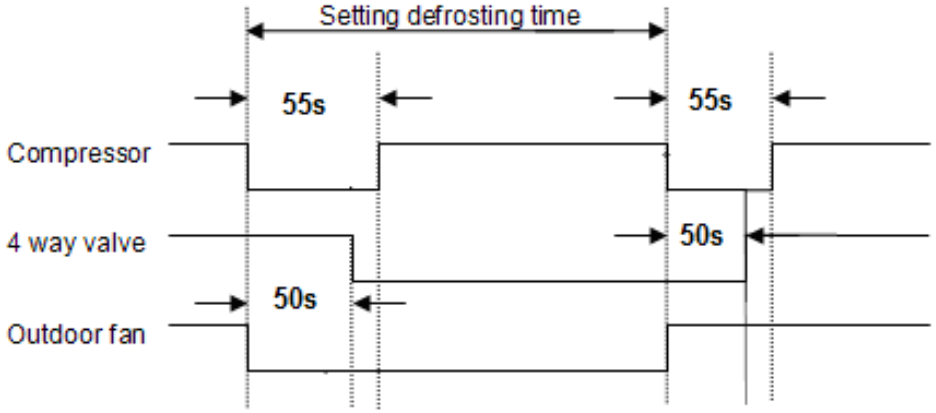
2) Condition of ending defrosting:

If any one of the following items is satisfied, the defrosting will terminate and the machine will turn to normal heating mode.

(1)T3 rises to be higher than TC2. TC2= 20□ 21k model;

(2)The machine has run for 10 minutes in defrosting.

3) Defrosting action :



℃ / Fan speed	T2-T1	Note
High	< $TH_{DEFROST}$	If indoor fan is in high speed and T2-T1< $TH_{DEFROST}$, start defrosting
Medium	< $TM_{DEFROST}$	If indoor fan is in medium speed and T2-T1< $TM_{DEFROST}$, start defrosting
Low	< $TL_{DEFROST}$	If indoor fan is in low speed and T2-T1< $TL_{DEFROST}$, start defrosting
Breeze or stop	/	If indoor fan is breezing or stopped, start defrosting

Condition 2: If the accumulated time of outdoor fan stopped but the compressor keep working due to evaporator high temperature protection mode reaches 90 min from the end of last defrosting mode.

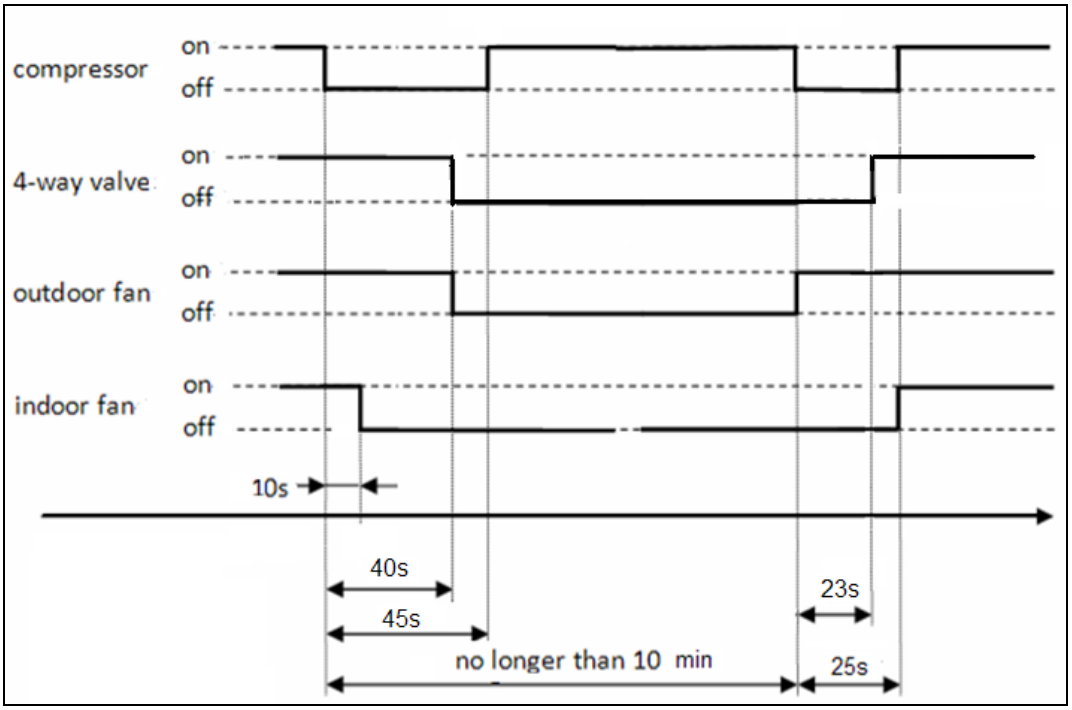
Condition of defrosting stop:

If any one of following conditions occurs, the defrosting will finish and the machine will turn to normal heating mode.

Condition 1: Reached the defrosting time.

Condition 2: The current of compressor is more than $I_{defrost}$ continuously more than 7s. The value of $I_{defrost}$ is depending on the exactly machine.

Defrosting actions：



During the defrosting mode, if the machine stopped or transferred to other mode, the defrosting mode will stop, and all the defrosting conditions will be cleared.

8.4.4 Auto-mode

The machine will choose cooling, heating or fan-only mode according to ΔT (ΔT =T1-Ts).

:

ΔT=T1-Ts	Running mode
ΔT > 2□	Cooling
-1≤ΔT≤2□	Fan-only
ΔT<-1□	Heating(for cooling only models, they will run at fan-only mode)

AC will run in auto mode in the below cases:

（1） Press the forced auto button.

（2） If AC is off, it will run in auto mode when timer on function is active.

（3） After setting the mode, AC will run in auto mode if the compressor keeps not running for 15 minutes

8.4.5 Drying mode

8.4.5.1 The indoor fan will run following the compressor .If the compressor is on, the indoor fan will run at low speed .If the compressor is off, the indoor fan will run at breeze.

Running rules:

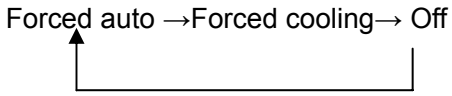
No	Condition	Indoor fan	Compressor and outdoor fan
1	T1 ≥ TS+2	Low Breeze	ON 6 minutes OFF 4 minutes
2	TS ≤T1 < TS+2	Low Breeze	ON 5 minutes OFF 5 minutes
3	T1 < TS	Low Breeze	ON 4 minutes OFF 6 minutes

8.4.5.2 In drying mode, if room temperature is lower than 10□, the indoor fan will run at breeze while the compressor and outdoor fan will stop and not resume until room temperature exceeds 13□.

8.4.5.3 System protection is active in this mode.

8.4.6 Forced operation function

Press the touch button continually, the AC will run as below sequence:



Forced cooling mode:

The compressor and outdoor fan keep running and the indoor fan runs at low speed. After running for 30 minutes, AC will turn to drying mode with 24℃ setting temperature.

Forced auto mode:

The action of forced auto mode is the same as normal auto mode with 24℃ setting temperature.

- When AC receives signals, such as switch on, switch off, timer on, timer off, mode setting, fan speed setting ,sleeping mode setting, follow me setting, it will quit the forced operation.
- The forced operation function can not be memorized if power off.

8.4.7 Timer function

8.4.7.1 Timing range is 24 hours.

8.4.7.2 Timer on. The machine will turn on automatically when reaching the setting time.

8.4.7.3 Timer off. The machine will turn off automatically when reaching the setting time.

8.4.7.4 Timer on/off. The machine will turn on automatically when reaching the setting “on” time, and

then turn off automatically when reaching the setting “off” time.

8.4.7.5 Timer off/on. The machine will turn off automatically when reaching the setting “off” time, and then turn on automatically when reaching the setting “on” time.

8.4.7.6, the timer function will not change the AC current operation mode. Suppose users set the “timer off” function and AC is off now, the AC will keep the current running mode and then turn off when reaching the setting time

8.4.7.7 The setting time is relative time.

8.4.8 Sleep function mode

8.4.8.1 Operation time in sleep mode is 7 hours. After 7 hours, the AC quits this mode and turns off.

8.4.8.2. Operation process in sleep mode is as follow:

After pressing ECONOMIC or SLEEP button on controller, the machine will turn into sleep mode.

When cooling, the setting temperature rises 1□(be lower than 30□) every one hour, 2 hours later the setting temperature stops rising and indoor fan is fixed as low speed.

When heating, the setting temperature decreases 1□(be higher than 17□) every one hour, 2 hours later the setting temperature stops rising and indoor fan is fixed as low speed.(Anti-cold wind function has the priority)

8.4.8.3 Timer setting is available.

8.4.8.4 When user uses timer off function in sleep mode(or sleep function in timer off mode), if the timing is less than 7 hours, sleep function will be cancelled when reaching the setting time. If the timing is more than 7 hours, the machine will not stop until reaches the setting time in sleep mode.

8.4.9 Auto-Restart function

The indoor unit is equipped with auto-restart function, which is carried out through an auto-restart module. In case of a sudden power failure, the module memorizes the setting conditions before the power failure. The unit will resume the previous operation setting (not including Swing function) automatically after 3 minutes when power returns.

If the memorization condition is forced cooling mode, the unit will run in cooling mode for 30 minutes and then turn to drying modeas 24°C setting temp.

8.4.10 Ionizer/Plasma dust collector function (optional)

The indoor unit is equipped with Ionizer, which is controlled by the CLEAN AIR button on the remote controller. When the unit is turned on, press the CLEAN AIR button to activate the function. Press it

again to stop the function. During the time when Ionizer being controlled by remote controller, Ionizer will be turned off automatically, if indoor fan stops running due to malfunctions or anti-cold-wind. When indoor fan restarts after malfunctions being eliminated and anti-cold-wind being released, Ionizer will be available again.

9. Troubleshooting

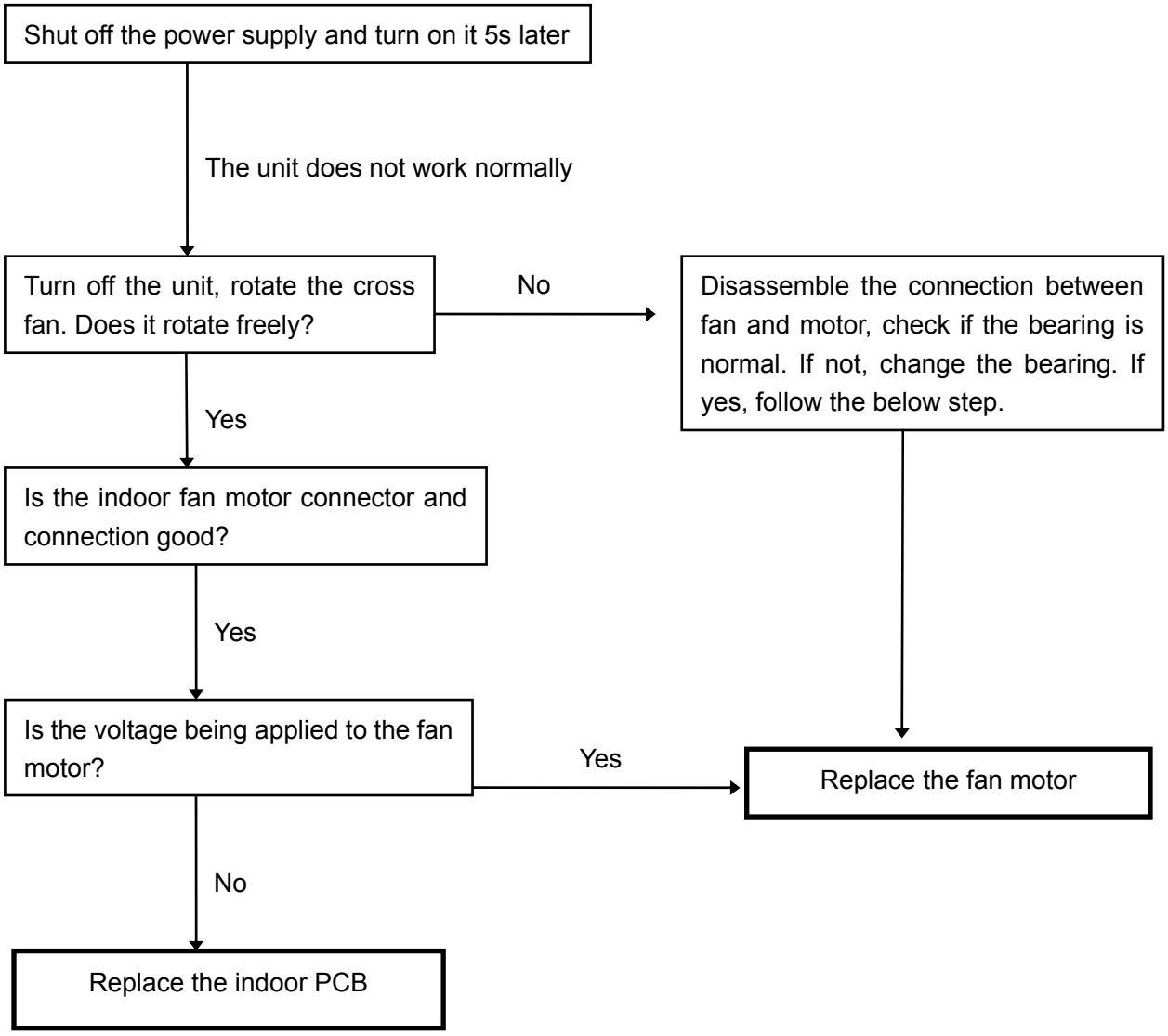
9.1 Indoor unit error display

Operation lamp	Timer lamp	Failure
□	X	Indoor fan speed has been out of control
□	O	The T1 or T2 sensor is open circuit or short circuit
X	□	Over current protection occurs 4 times.
O	□	EEPROM error
□	□	Zero crossing detection error

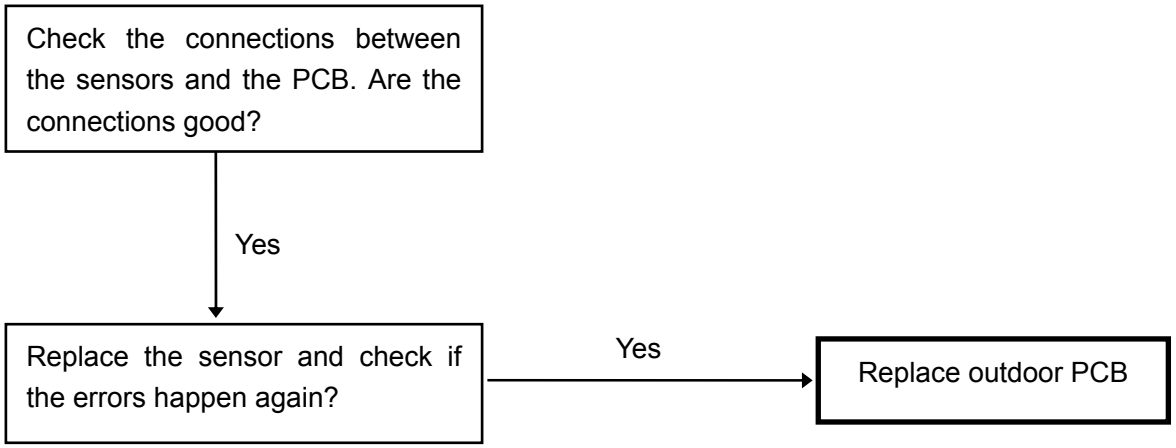
O (light) X (off) □ (flash)

9.2 Diagnosis and Solution

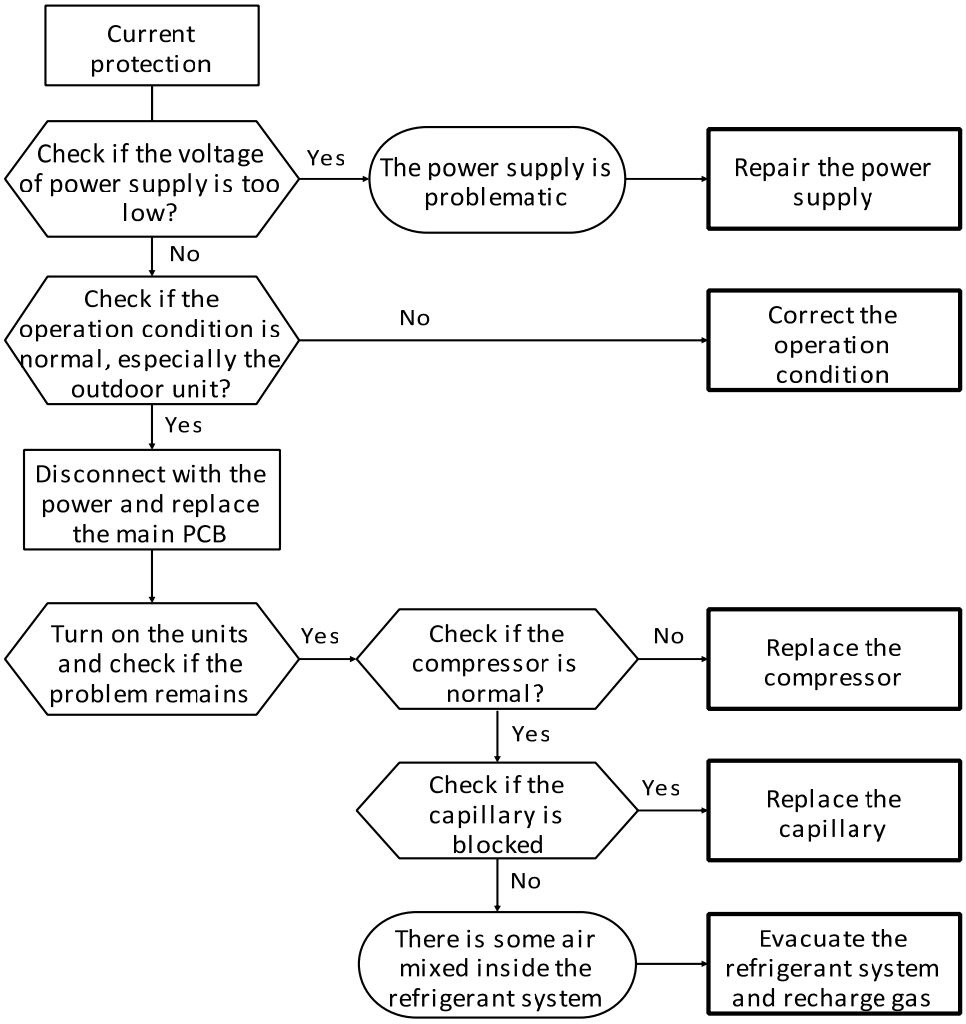
9.2.1 Indoor fan speed out of control diagnosis



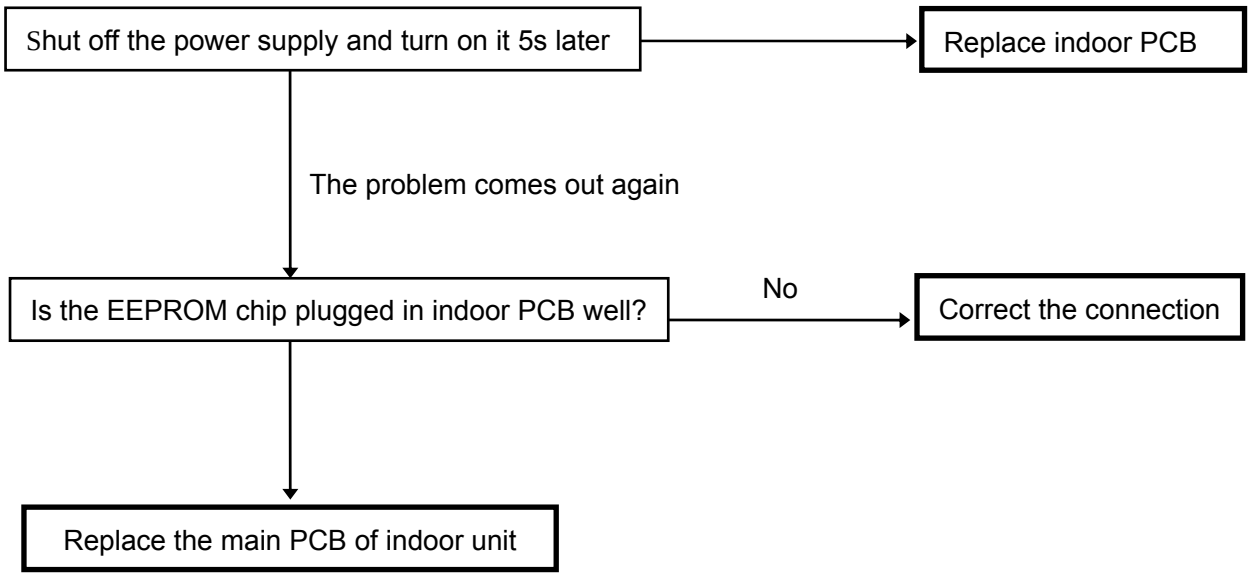
9.2.2 Open or short circuit of temperature sensor diagnosis and solution.



9.2.3 Over current protection occurs 4 times.



9.2.4 EEPROM parameter error diagnosis and solution



9.2.5 Zero crossing detection error

When such failure occurs, the main control board must have fault.

9.2.6 Indoor / outdoor units communication error

