Haier

Round-way Smart Air Flow Cassette

Service Manual

SYJS-07-2017 REV.A Edition: 2017-07

Haier

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1. Features

MVAL009MV2AA
MVAL012MV2AA
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MVAL048MV2AA

- Unique round-way air outlet, no blind spot
- Innovative 4 independent air flow control
- 6 adjustable louver positions, 1296 air flow combinations
- Move eye intelligent system, intelligence all around (optional)

2. Specification

	MVAL009MV2AA	MVAL012MV2AA
Rated Cooling Capacity Btu/hr	9,000	12,000
Rated Heating Capacity Btu/hr	10,000	13,500
Voltage, Cycle, Phase V/Hz/-	208-230/60/1	208-230/60/1
Fan Speed Stages	3+Auto	3+Auto
Airflow (High/Med/Low) CFM	1000/810/620	1000/810/620
Motor Speed (High/Med/Low) RPM	540/490/440	540/490/440
Indoor Sound Level dB (High/Med/Low)	30/27/25	30/27/25
Grill Model	PB-950KC	PB-950KC
Chassis Dimension: Height in (mm)	7 3/16 (183)	7 3/16 (183)
Chassis Dimension: Width in (mm)	33 1/16 (840)	33 1/16 (840)
Chassis Dimension: Depth in (mm)	33 1/16 (840)	33 1/16 (840)
Grill Dimension: Height in (mm)	1 15/16 (50)	1 15/16 (50)
Grill Dimension: Width in (mm)	37 3/8 (950)	37 3/8 (950)
Grill Dimension: Depth in (mm)	37 3/8 (950)	37 3/8 (950)
Weight (Ship/Net)- lbs (kg)	88.2/76.1 (40/34.5)	88.2/76.1 (40/34.5)
Connections	Flare	Flare
Liquid O.D. in	1/4	1/4
Suction O.D. in	3/8	1/2
Drainpipe Size O.D. in	1	1
Internal Condensate Pump	Standard	Standard
Max. Drain-Lift height in(mm)	27 1/2 (700)	27 1/2 (700)

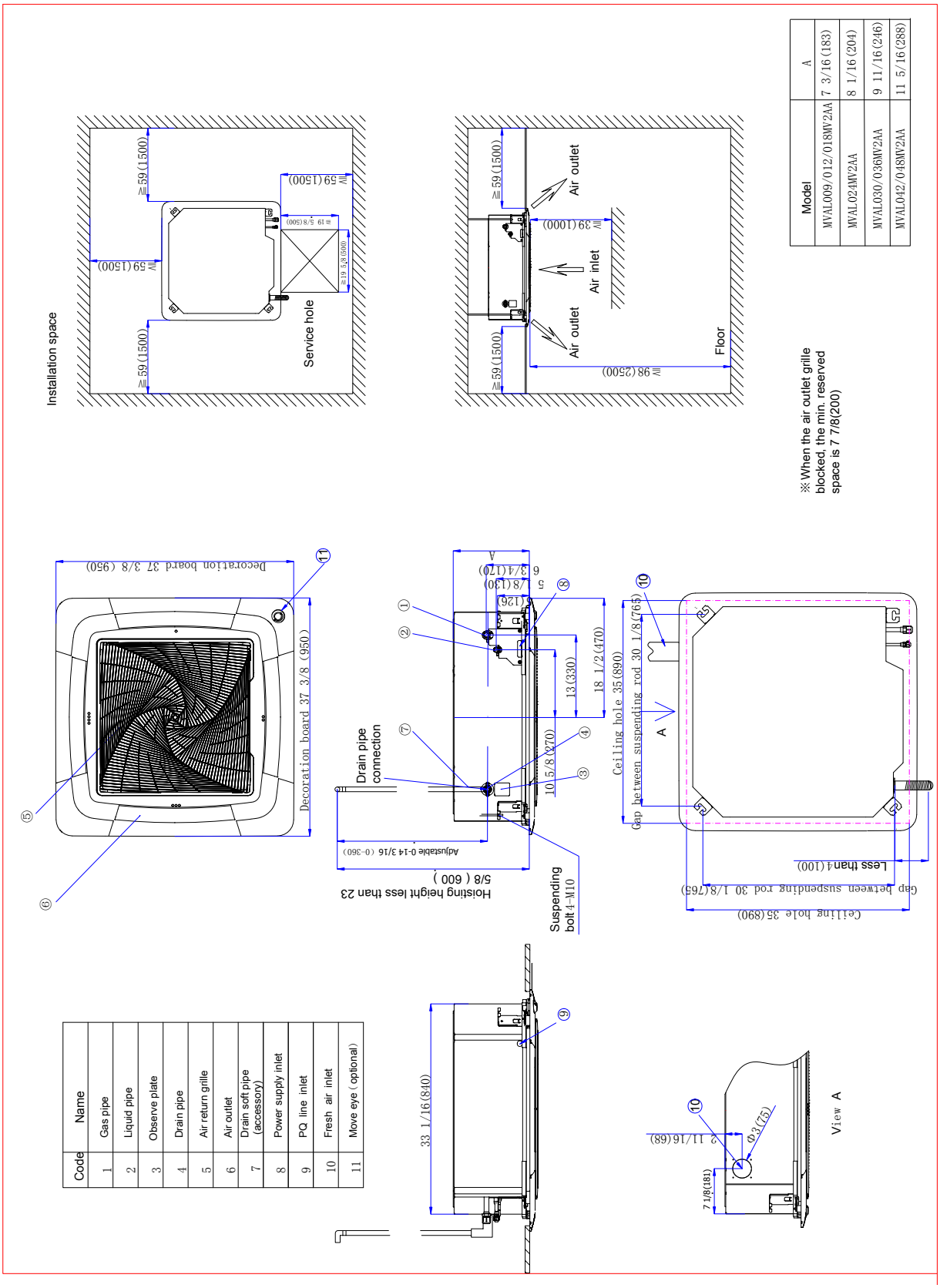
	MVAL018MV2AA	MVAL024MV2AA
Rated Cooling Capacity Btu/hr	19,000	24,000
Rated Heating Capacity Btu/hr	21,000	27,000
Voltage, Cycle, Phase V/Hz/-	208-230/60/1	208-230/60/1
Fan Speed Stages	3+Auto	3+Auto
Airflow (High/Med/Low) CFM	1000/810/620	1380/1190/1000
Motor Speed (High/Med/Low) RPM	540/490/440	650/600/520
Indoor Sound Level dB (High/Med/Low)	33/30/29	35/34/31
Grill Model	PB-950KC	PB-950KC
Chassis Dimension: Height in (mm)	7 3/16 (183)	8 1/16 (204)
Chassis Dimension: Width in (mm)	33 1/16 (840)	33 1/16 (840)
Chassis Dimension: Depth in (mm)	33 1/16 (840)	33 1/16 (840)
Grill Dimension: Height in (mm)	1 15/16 (50)	1 15/16 (50)
Grill Dimension: Width in (mm)	37 3/8 (950)	37 3/8 (950)
Grill Dimension: Depth in (mm)	37 3/8 (950)	37 3/8 (950)
Weight (Ship/Net)- lbs (kg)	88.2/76.1 (40/34.5)	90.4/78.3 (41/35.5)
Connections	Flare	Flare
Liquid O.D. in	1/4	1/4
Suction O.D. in	1/2	5/8
Drainpipe Size O.D. in	1	1
Internal Condensate Pump	Standard	Standard
Max. Drain-Lift height in(mm)	27 1/2 (700)	27 1/2 (700)

	MVAL030MV2AA	MVAL036MV2AA
Rated Cooling Capacity Btu/hr	30,000	36,000
Rated Heating Capacity Btu/hr	34,000	40,000
Voltage, Cycle, Phase V/Hz/-	208-230/60/1	208-230/60/1
Fan Speed Stages	3+Auto	3+Auto
Airflow (High/Med/Low) CFM	2050/1860/1670	2050/1860/1670
Motor Speed (High/Med/Low) RPM	750/650/550	750/650/550
Indoor Sound Level dB (High/Med/Low)	37/35/31	37/35/31
Grill Model	PB-950KC	PB-950KC
Chassis Dimension: Height in (mm)	9 11/16 (246)	9 11/16 (246)
Chassis Dimension: Width in (mm)	33 1/16 (840)	33 1/16 (840)
Chassis Dimension: Depth in (mm)	33 1/16 (840)	33 1/16 (840)
Grill Dimension: Height in (mm)	1 15/16 (50)	1 15/16 (50)
Grill Dimension: Width in (mm)	37 3/8 (950)	37 3/8 (950)
Grill Dimension: Depth in (mm)	37 3/8 (950)	37 3/8 (950)
Weight (Ship/Net)- lbs (kg)	101.4/89.3 (46/40.5)	101.4/89.3 (46/40.5)
Connections	Flare	Flare
Liquid O.D. in	1/4	1/4
Suction O.D. in	5/8	5/8
Drainpipe Size O.D. in	1	1
Internal Condensate Pump	Standard	Standard
Max. Drain-Lift height in(mm)	27 1/2 (700)	27 1/2 (700)

	MVAL042MV2AA	MVAL048MV2AA
Rated Cooling Capacity Btu/hr	42,000	48,000
Rated Heating Capacity Btu/hr	47,000	54,000
Voltage, Cycle, Phase V/Hz/-	208-230/60/1	208-230/60/1
Fan Speed Stages	3+Auto	3+Auto
Airflow (High/Med/Low) CFM	2100/1910/1720	2100/1910/1720
Motor Speed (High/Med/Low) RPM	850/750/650	850/750/650
Indoor Sound Level dB (High/Med/Low)	44/40/36	44/40/36
Grill Model	PB-950KC	PB-950KC
Chassis Dimension: Height in (mm)	11 5/16 (288)	11 5/16 (288)
Chassis Dimension: Width in (mm)	33 1/16 (840)	33 1/16 (840)
Chassis Dimension: Depth in (mm)	33 1/16 (840)	33 1/16 (840)
Grill Dimension: Height in (mm)	1 15/16 (50)	1 15/16 (50)
Grill Dimension: Width in (mm)	37 3/8 (950)	37 3/8 (950)
Grill Dimension: Depth in (mm)	37 3/8 (950)	37 3/8 (950)
Weight (Ship/Net)- lbs (kg)	103.6/91.5 (47/41.5)	103.6/91.5 (47/41.5)
Connections	Flare	Flare
Liquid O.D. in	1/4	1/4
Suction O.D. in	5/8	5/8
Drainpipe Size O.D. in	1	1
Internal Condensate Pump	Standard	Standard
Max. Drain-Lift height in(mm)	27 1/2 (700)	27 1/2 (700)

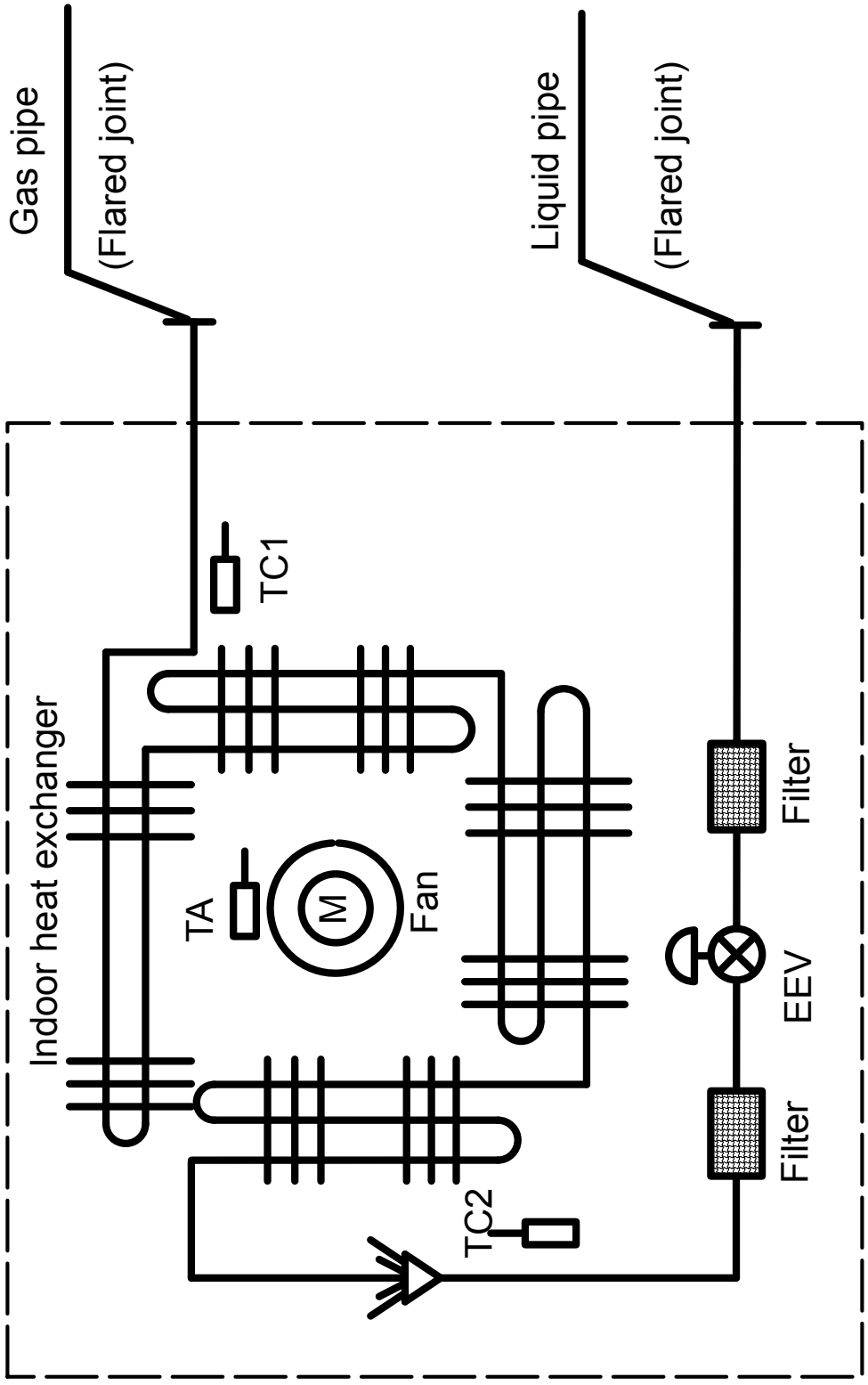
3. Dimension

Unit: inch(mm)

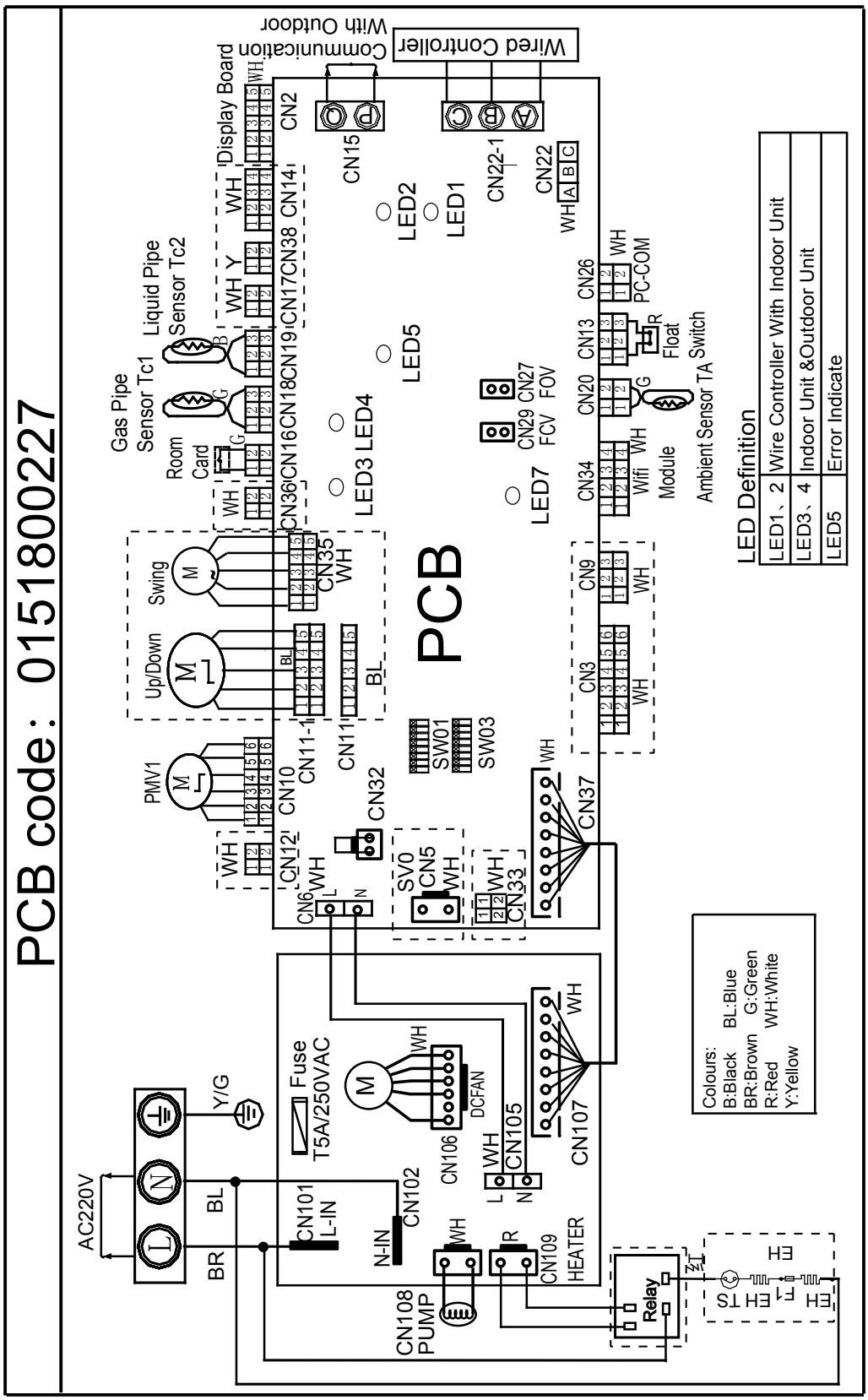


Code	Name
1	Gas pipe
2	Liquid pipe
3	Observe plate
4	Drain pipe
5	Air return grille
6	Air outlet
7	Drain soft pipe (accessory)
8	Power supply inlet
9	PQ line inlet
10	Fresh air inlet
11	Move eye (optional)

4. Piping diagram



5. Wiring diagram



6. Electric characteristics

Units					Power supply		Indoor fan motor		Power input (w)	
Model	Phase	FQY	Voltage	Volt. range	MCA	MFA	Output (W)	FLA	Cooling	Heating
MVAL009MV2AA	1	50/60	220	198~242	0.39	1.24	22	0.31	30	30
MVAL012MV2AA	1	50/60	220	198~242	0.39	1.24	22	0.31	30	30
MVAL018MV2AA	1	50/60	220	198~242	0.39	1.24	22	0.31	30	30
MVAL024MV2AA	1	50/60	220	198~242	0.39	1.24	36	0.31	50	50
MVAL030MV2AA	1	50/60	220	198~242	0.71	2.28	63	0.57	90	90
MVAL036MV2AA	1	50/60	220	198~242	0.71	2.28	63	0.57	90	90
MVAL042MV2AA	1	50/60	220	198~242	0.71	2.28	78	0.57	110	110
MVAL048MV2AA	1	50/60	220	198~242	0.71	2.28	78	0.57	110	110

Symbols:

MCA: Min. circuit amps (A)

MFA: Max. fuse amps of circuit breaker

Output: Fan motor rated output (w)

FLA: Full load amps (A)

Note:

1. Voltage range

The units are applicable for the electrical systems where voltage supplied to unit is in the range.

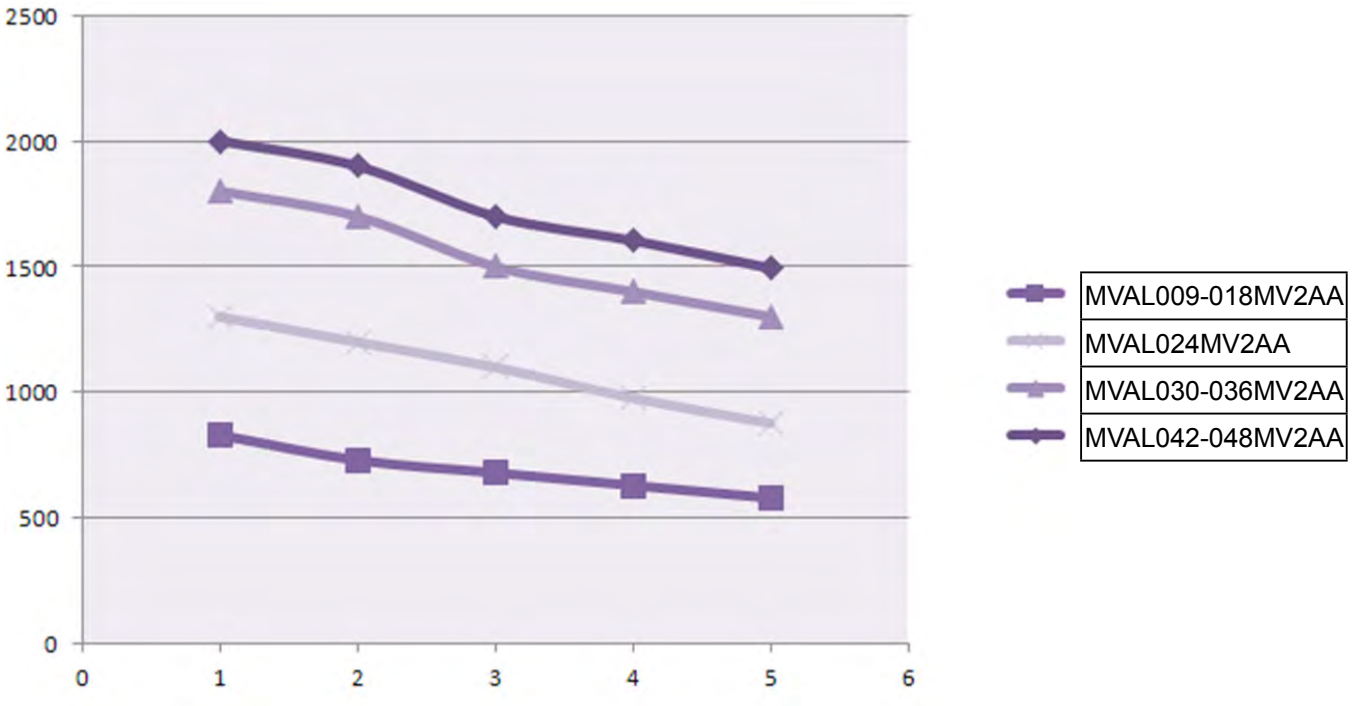
2. Maximum allowable voltage unbalance between phases is 2%.

*3. MCA=1.25*FLA MFA≤4*FLA*

4. Power supply uses the circuit breaker.

7. Air flow and fan speed curve

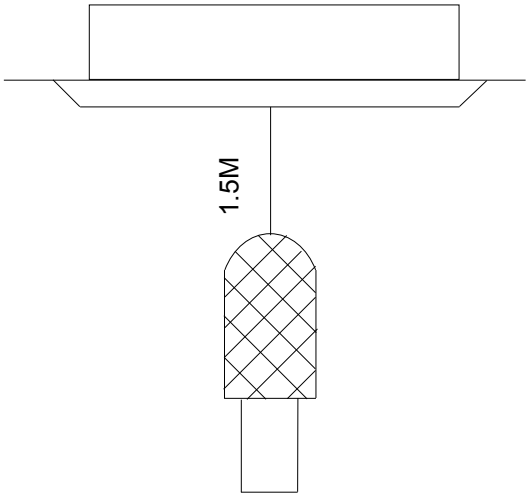
Air flow (m^3/h)



1. Strong speed
2. High speed
3. Medium speed
4. Low speed
5. Quiet

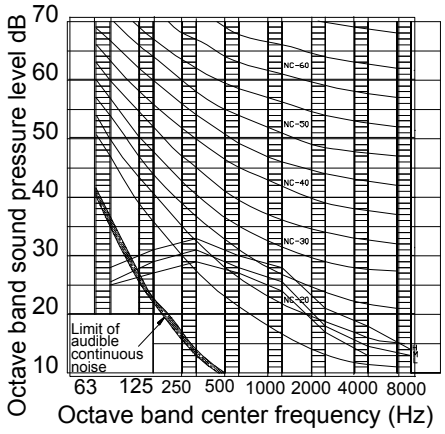
8. Sound pressure level

1) Testing illustrate:

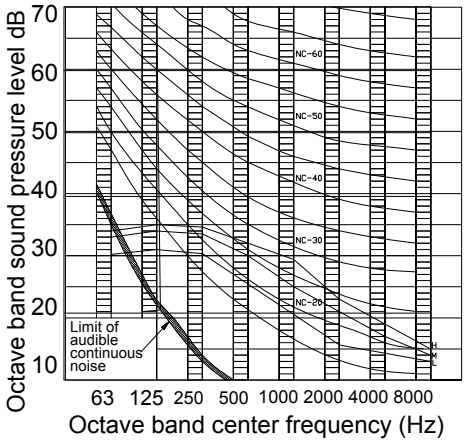


2) Testing condition:
a: Unit running in the normal condition
b: Test in the semi-anechoic chamber
c: Noise level varies from the actual factors such as room structure, etc.

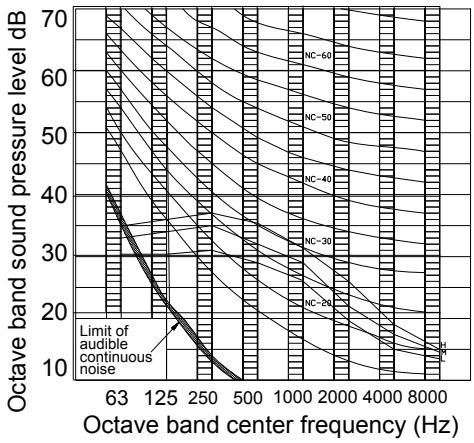
MVAL009-018MV2AA



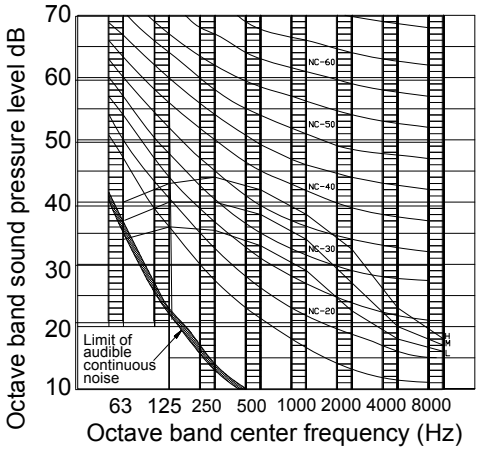
MVAL024MV2AA



MVAL030-036MV2AA

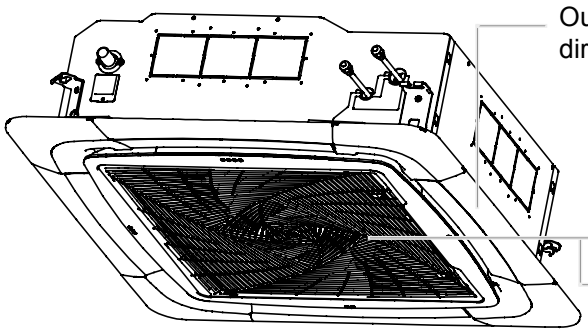


MVAL042-048MV2AA



9. Installation

9.1 Parts and functions



9.2 Safety

- This manual should be saved and stored close to this air conditioning equipment.
- There are two types if indications. Both are related to safety and should be strictly followed. "⚠Warning" highlights issues that pose a risk of major injury or death. "⚠Caution" highlights issues that pose a risk of equipment or bodily injury.
- After installation and start-up commissioning, please give the manual to the user. The manual should be kept in safe place and close to the unit.

⚠WARNING

- Installation and maintenance should be performed by an authorized agency. The wrong operation of this air condition equipment may cause water damage, electric shock or fire.
- Please install the unit on the top of a solid foundation or structure which is strong enough to support the unit.
- The installation of this condition equipment should follow local building codes.
- Use the right cable size, secure the terminal firmly, organize the cables well and make sure no tension is added on cables. Cable insulation should not be damaged. Improper wire installation may lead to fire.
- This unit is only compatible with R-410A refrigerant. If any other gas enters the system, it may lead to abnormal high pressure which may cause damage or injury.
- Only use branches supplied by Haier. Use of any other branches will void warranty.
- Keep the condensate drain pipe away from toxic gas vents to prevent possible pollution of indoor environment.
- Care should be taken to ensure that there are no refrigerant leaks. R-410A is a heavy gas and will displace oxygen. Ventilate the area if a leak if found.
- The unit is not explosion-proof. Please keep it away from flammable gases.
- The drain pipe should be installed per this manual to ensure proper drainage. The pipe should be well insulated to avoid condensation. Wrong installation may lead to water damage.
- Both liquid pipe and the vapor pipe should be also well insulated. Not enough insulation may lead to system performance deterioration or condensate formation.
- This equipment should not be used or serviced by personnel who have not been properly trained in its operation and maintenance.
- Children should be supervised to ensure that they do not play on or near the equipment.
- Keep the appliance and its cord out of reach of children.
- The appliances are not intended to be operated by means of an external timer or separate remote-control system.

⚠CAUTION

- Grounding wire should be connected to the grounding bar. The grounding wire cannot be connected to the gas pipe, water pipe, lightening rod or the telephone grounding wire. Improper grounding may cause electric shock.
- A circuit breaker should be installed. If not, it may cause electric shocks or accidents.
- After installation, the air condition equipment should be powered on and passed the electric leakage current lest.
- If the ambient humidity is more than 80%, if the water discharge hole is blocked or the filter becomes dirty or the airflow speed changes, this may lead to condensate water leaks. There may also be some drops of water spraying out.

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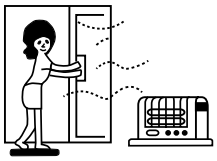
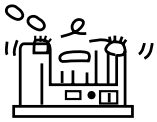
Notices during Operation

⚠ Attention	
• Do not put any heating apparatus under the indoor units. The heat may cause distortion of the units.	• 3-minutes protection To protect the unit, there is a 3-minute time-out after the unit stops or after power is applied.
• Pay attention to the ventilation to avoid anoxic injury. 	• Close the window to avoid outdoor air getting in. Curtains or window shutters can be put down to avoid the sunshine. 
• Do not place an open flame in the path of blowing air. 	• Do not touch the power switch with the wet hand to avoid power shock.
• Do not install in a corrosive environment. If the base collapses, the unit may fall and cause damage, product failure, personal injury or death.	• Turn off the system and remove power when servicing the unit.
• Do not use the unit for special purposes such as preserving foods, works of art etc. It is an air conditioner for comfort cooling / heating, not a precision refrigeration system.	• Don't remove power while system is running.
• Use the correctly rated breaker or fuse. Improper breaker or fuse may lead to fire, electric shock, explosion, personal injury or death.	• Do not clean the unit with water spray. There is risk of unit failure, fire, electric shock, personal injury or death. 
• Do not permit water or steam to enter the unit and the wired controller. There is risk of unit failure, fire, electric shock, personal injury or death.	• Keep flammable gas or combustibles away from the unit. There is risk of product failure, fire, personal injury or death.
• Turn off the power to save energy if the unit will be not used for a long period. If the unit is not powered off, it will consume power.	• Please keep children away from this air condition equipment.

9.3 Maintenance

⚠ Attention

- Repair can only be performed by licensed service technicians.
- Before touching the electrical connections, all power supplies should be turned off. Only after switching off the power supply can the operator clean the air conditioner otherwise there is a risk of electric shock or injury.
- When cleaning the air cleaner, make sure to use a stable platform; don't flush the air conditioner with water, or electric shock might occur.

Filter Maintenance:

Clean the air filter & air inlet grid.

- Don't remove the air filter except for cleaning, or faults may occur.
- When the air conditioner operates in the environment with too much dust, clean the air conditioner more times (generally once every two weeks).

1. Remove the air inlet grid as shown below: press on the two locks on the grid (as shown in Fig. 1), gently lift it at a 45 degree angle (as shown in Fig. 2), and then remove the air inlet grid.
2. Dismantle the filter: press the outer frame of the air inlet grid, and draw the base angle of the filter pull it out as to disengage the locks, and remove the filter (as shown in Fig. 3).

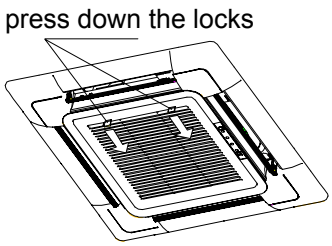


Fig. 1

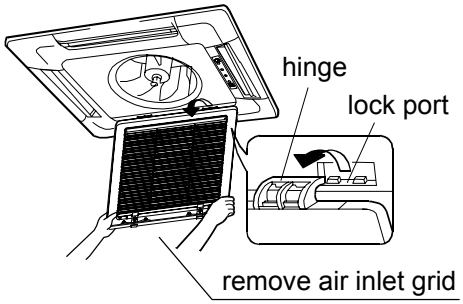


Fig. 2

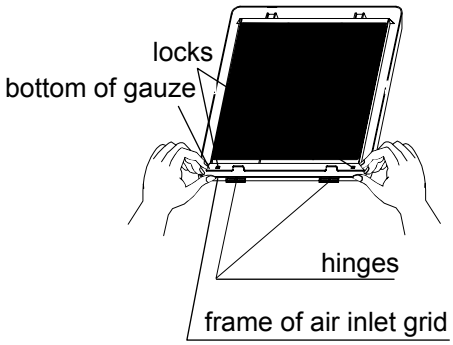
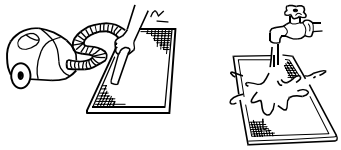


Fig. 3

Cleaning Air Cleaner

Clean the air filter with a vacuum or water to remove dust.
For heavy dust, use the vacuum or directly spray mild soap on the air inlet grid, and then clean it with water after soaking for ~10 minutes.
(A) remove dust with dust collector.



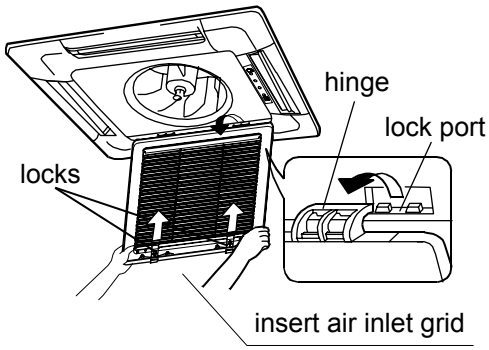
(B) for heavy dust, use a soft brush and mild detergent to clean.
(C) rinse off water/soap and dry in a cool place.

⚠ Attention

- Do not clean it with hot water 122°F(50°C) to avoid fading or distortion.

Installing air cleaner and air inlet grid:

1. Mounting the filter: opposite of dismantling the filter (as shown in Fig. 3 above).
2. Mounting the air inlet grid: as shown in the right figure, clip the locks on the grid as directed by the arrows, put the side with the hinges into the lock port, and then put the side with locks into the panel frame. Release the locks to position the grid after determining that the grid is flush with the bottom of the panel frame.



Cleaning the air outlet port and the shell:

⚠ Attention

- Do not use gasoline, benzene, diluents, polishing powder or liquid insecticide to clean them.
- Do not clean them with hot water of over 122°F(50°C) to avoid fading or distorting.

- Wipe them with a soft dry cloth.
- Water or neutral dry cleaner is recommended if the dust cannot be removed.

Cleaning Louvers:

- To avoid damage to the louvers care should be taken when cleaning. Use damp cloth and mild detergent.

9.4 Fault checkup

Please check the following when consigning repair service:

	Symptoms	Reasons
All these are not problems	Water flow sound	Water flow sound can be heard during starting operation, during operation or immediately after stopping operation. When it starts for 2-3 minutes, the sound may become louder, which is the flowing sound of refrigerant or the draining sound of condensate water.
	Cracking sound	During operation, the air conditioner may make a crackling sound, which is caused from the temperature changes of the heat exchanger.
	Terrible smell in outlet air	The terrible smell may be caused from walls, carpet, furniture, clothing, cigarette and cosmetics, that attach to the air conditioner.
	Flashing operating indicator	When switching it on again after power failure, turning on the manual power switch will show the operating indicator flashes.
	Awaiting indication	It displays the waiting indication as it fails to perform refrigerating operation while other indoor units are in heating operation. When the operator set it to the cooing or heating mode and the operation is opposite to the setting, it displays the waiting indication.
	Idle indoor unit still has sound of refrigerant flowing and radiating temperatures.	To prevent oil and refrigerant from blocking the valve of idle units (off or satisfied) while other indoor units are operating, some refrigerant flow is allowed to pass through. This may result in some radiating temperature and flow noise.
	Clicking sound when unit comes on.	When the conditioner is powered on, the sound is made due to the expansion valve resetting.
Please make another check.	Start or stop working automatically	Check if it is set to Timer-ON and Timer-OFF.
	Failure to work 	Check if there is a power failure. Check if the supply fuse and breaker are disconnected. Check if the unit is displaying any faults. Check if wait symbol is displayed. This is due to other indoor units connected to the same outdoor unit are running in the opposite mode. System cannot heat and cool simultaneously.
	Bad cooling & heating effects	Check if air intake port and air outlet port of outdoor units are blocked. Check if the door and windows are open. Check if the air filter is blocked with sludge or dust. Check if the setting of fan speed is set to low speed. Check if the setting in in Fan Operation state. Check if the temperature setting is correct.

Under the following circumstances, immediately stop the operation, disconnect the manual supply switch and contact the after-service personnel.

- When buttons are inflexible actuated;
- When fuse and breaker have been burnt over and over;
- When there are foreign objects or ice in the unit.;
- When system won't run after resetting power and waiting for 3-minute time out;
- When other abnormal conditions occur.

9.5 Installation procedures

Caution:
Choose a suitable installation location.
Avoid places with high salinity (salt water) and high sulfur gas. Unit will corrode and damage will not be covered by warranty.
Avoid excess oil (including mechanical oil) and steam. This can reduce efficiencies and product performance.
Avoid areas where machines generate high frequency electromagnetic waves. They can cause control issues.

Warning:
protect the machine from winds or earthquake, install according to regulations. Improper installation will cause accidents due to unit coming loose and falling.

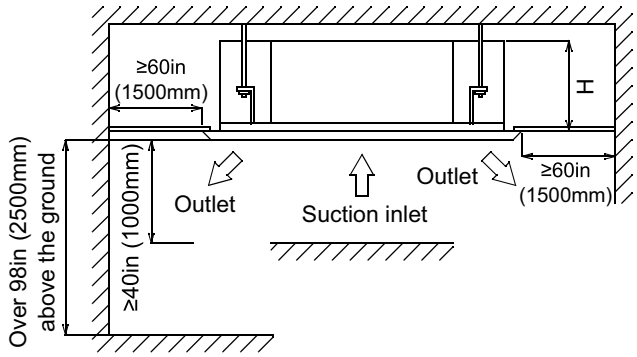
Select the following places to install indoor units.

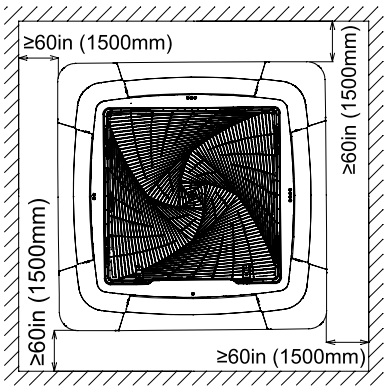
(1) where there is enough room for the machine above the ceiling;
(2) where the drainpipes can be well positioned;
(3) where the distance between the air outlet port of the machine and the floor is not more than 8.86ft(2.7m);
(4) where air inlet & outlet of the indoor units are not blocked;
(5) where it is sturdy enough to bear the weight of the unit;
(6) where there are no televisions, pianos or other valuables under the indoor units as to avoid condensate dropping down, causing damage.
(7) Where it is over 3.28ft(1m) away from the television and radio as to avoid the interference from television and radio.

Required Tools for Installation
- Brazing torch
- 15% silver phosphorous copper brazing alloy
- Wire stripper
- Soap-and-water solution or gas leakage detector
- Torque wrench
- 17mm, 22mm, 26mm
- Tubing cutter
- Reaming tool
- Flaring tool
- Razor knife
- Measuring tape
- Level
- Vacuum pump
- Micron gauge
- Nitrogen
- Mini-Split AD-87 Adapter (1/4” to 5/16”)
- Non-adhesive Tape
- Adhesive Tape
- Electrical wiring

Installation Space

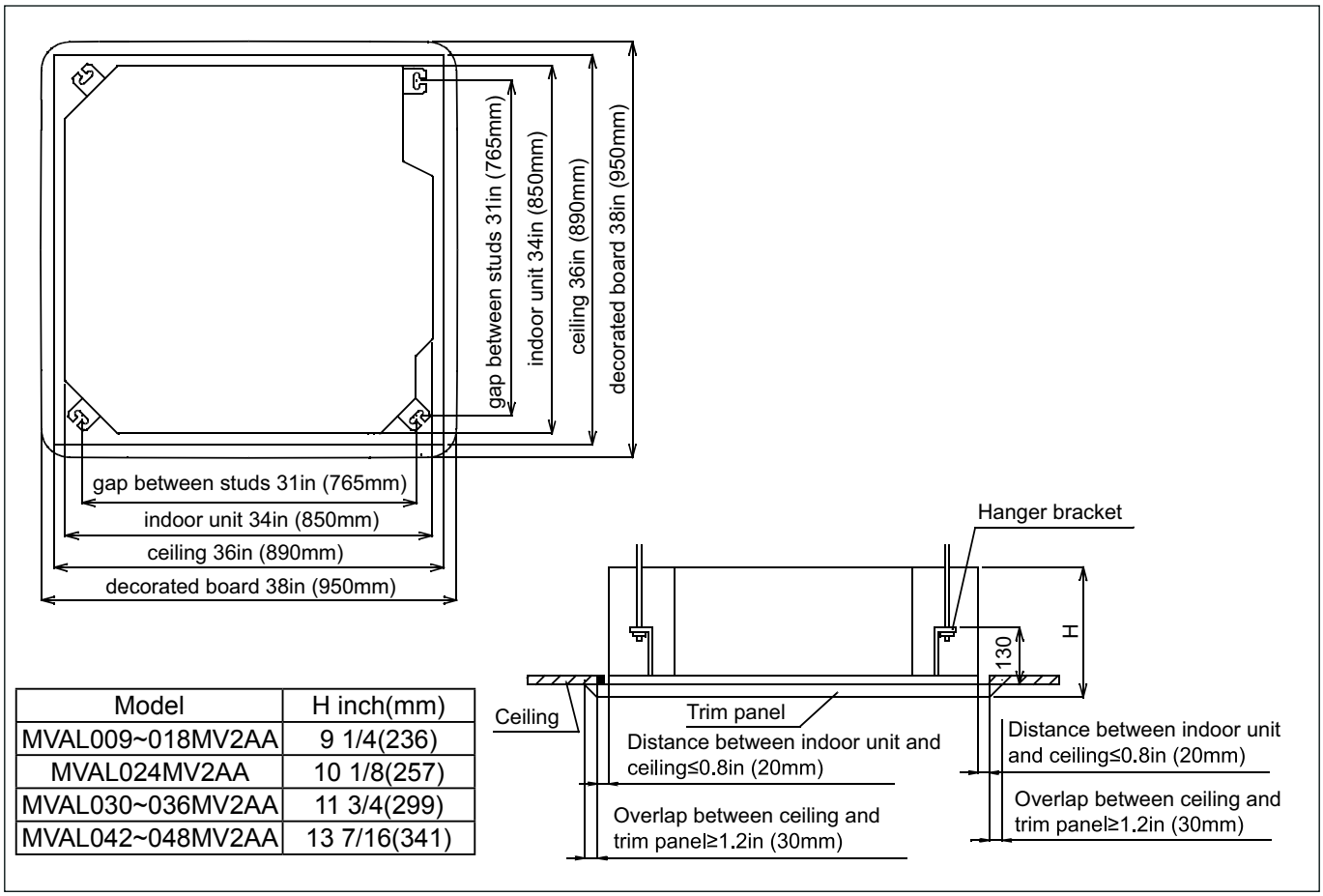
Ensure the required space for installation and maintenance (refer to the following drawings).
The installation height should be kept within 8.86ft(2.7m).
When the height of the ceiling exceeds 8.86ft(2.7m), the warm air is harder to blow to the ground.





Space required for installation, unit: in (mm)

Model	H
MVAL009~018MV2AA	8.2 (206)
MVAL024MV2AA	9 (227)
MVAL030~036MV2AA	10.6 (269)
MVAL042~048MV2AA	12.3 (311)



Model	H inch(mm)
MVAL009~018MV2AA	9 1/4(236)
MVAL024MV2AA	10 1/8(257)
MVAL030~036MV2AA	11 3/4(299)
MVAL042~048MV2AA	13 7/16(341)

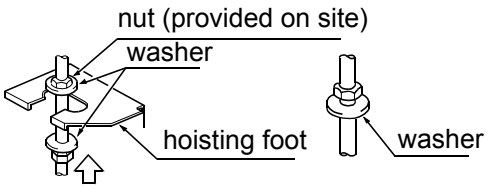
Note:

Before suspending the indoor unit, select an installation location according to the piping and wiring in the ceiling, and determine the direction of the piping. Prepare all pipes (refrigeration and drainage) and wiring (power supply, communication and control) to be ready to connect once unit is installed.

Hanging Unit

1. Use cardboard template to locate desired location. Mark the mounting positions of the threaded rods using the guides on the cardboard template.
2. Install 3/8in threaded rods to structure using appropriate fasteners.
3. Add nuts and washers at approximate height.
4. Lift the cassette and position the threaded rods into the 4 mounting clips on each corner of the cassette unit.
5. Adjust the height of the unit so that bottom surface is recessed 1 inch from ceiling surface.
6. Using a level, adjust the nuts on the threaded rods to obtain a level reading across the bottom of the cassette unit.
7. Tighten the top nuts to lock unit into place. An additional nut on top and bottom of bracket may be added to jam against the installation nuts to prevent them from loosening due to unit vibration.

Tighten the nut on the washer.



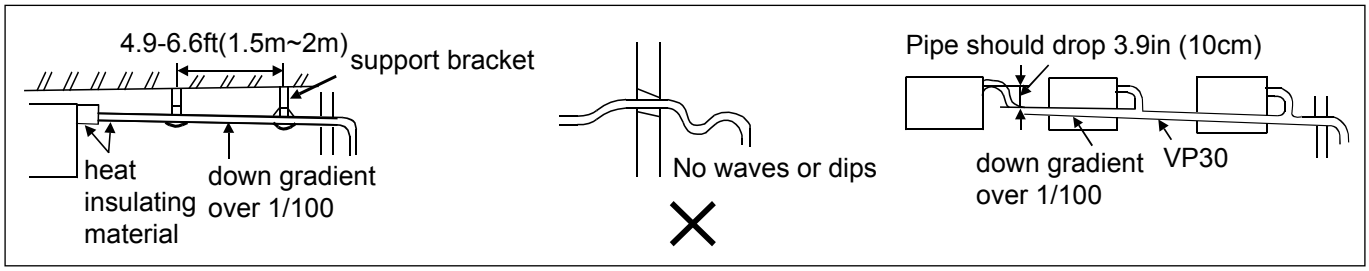
- Check if the indoor unit is level with the water level and that the polythene tube drains with water. Check if the size of the ceiling hole is correct. Remove any water before mounting the decorated board.
- Fasten the screws to make the height difference between the two sides of the indoor unit less than 0.2in(5mm).

⚠ Attention

- For proper drainage, the drainpipes should be connected according to the installation manual.
- Insulate the drainpipes to prevent exterior condensation.
- Follow local plumbing codes when connecting drainpipes.

Requirements:

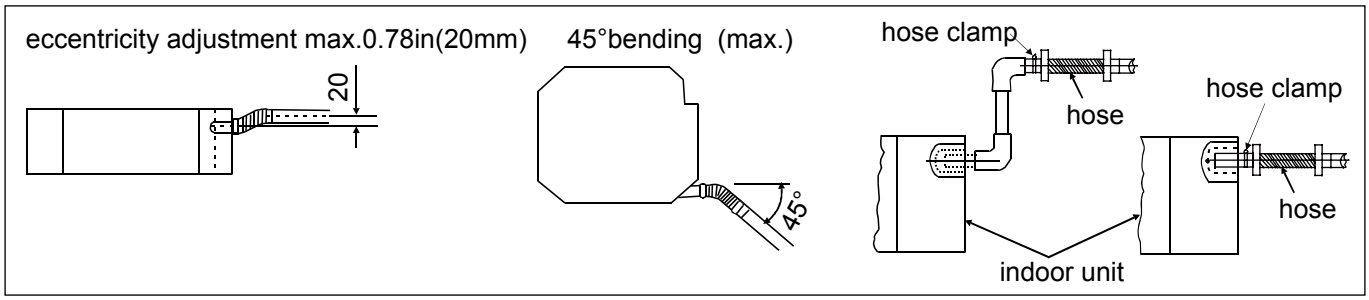
- The drainpipe of the indoor unit should be insulated.
- Maintain a downward slope. Avoid waves or dips.
- The horizon length of the drainpipe should be kept with 65.6ft(20m). Under the condition of long pipes, supports can be provided every 4.9-6.6ft(1.5~2m) as to avoid unevenness.
- The central piping should be connected according the following drawing.
- Take care not to apply external force on the connection of the drainpipes.



Piping Material	1-1/4 inch sch. 40 PVC
Insulating Material	1/4 inch thick Polyethylene wrap.

Drain Hose

Attach the soft end of the drain hose to the drain port with clamp. The hard end is 1-1/4 PVC. Use glue to attach condensate drain line.

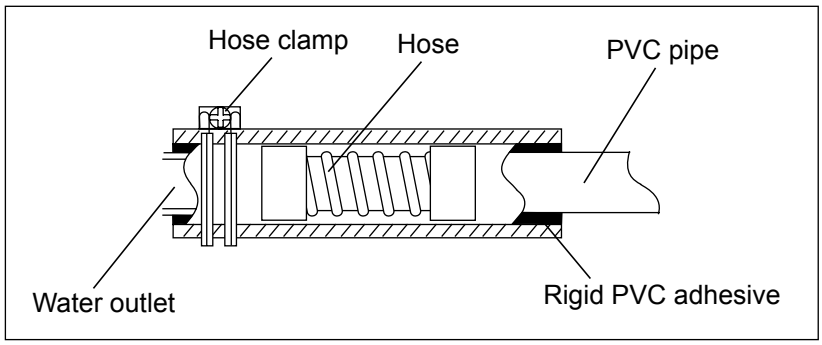


Insulation Wrap:

- All exposed drain pipe needs to be insulated to prevent condensation buildup and possible water damage.

Lifting Drainpipe

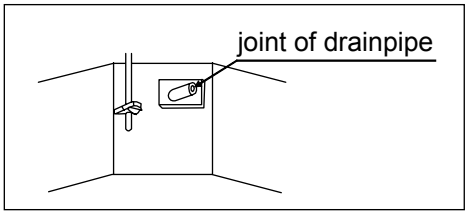
The drainpipe can be maximally lifted 24in (360mm) to provide adequate slope to drain water.

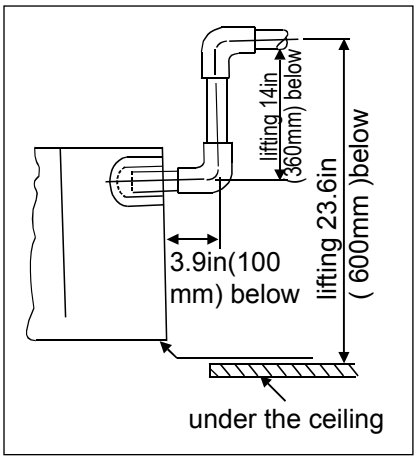


Drain Test

Test the drainpipe to confirm that there are no leaks or other issues with the drainpipe.

- After system is fully installed and power is applied, turn on cooling operation and add water to check for drainage.
- Confirm sound from the motor of the drainage pump and check for proper drainage.





Tubing Permissible Length & Height Difference

Please refer to the Haier MRV selection software.

Tubing Materials & Specifications

Please refer to the manual of the outdoor unit.

Model		MVAB009~018MV2AA	MVAL024~048MV2AA
Tubing Size in (mm)	Gas pipe	Ø1/2"(Ø12.7)	Ø5/8"(Ø15.88)
	Liquid pipe	Ø1/4"(Ø6.35)	Ø3/8"(Ø9.52)
Tubing Material	R-410a rated copper tubing		

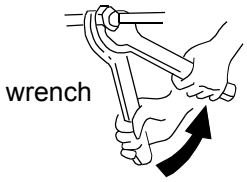
Additional Refrigerant Charge

Add refrigerant according to the installation manual of outdoor unit. The addition of R410A refrigerant must be performed with a digital scale to ensure the specified amount is added. Not following this can potentially cause efficiency issues or compressor failure.

Connecting Procedures of Refrigerant Tubing

Connect all the refrigerant tubes via flare connections.

- Dual wrenches must be used in the connection of indoor unit tubing.
- For tightening torque refer to the right table.



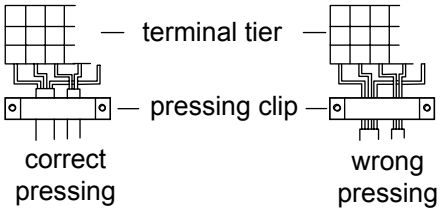
Outer Diameter of Tubing in (mm)	Mounting Torque lb-in(N-m)	Flare Torque Spec ft-lb (N-m)
Ø1/4"(Ø6.35)	104.4(11.8)	13 (18)
Ø3/8"(Ø9.52)	216.8(24.5)	30 (40)
Ø1/2"(Ø12.7)	443.7(49.0)	43 (59)
Ø5/8"(Ø15.88)	693.9 (78.4)	76 (103)

Cutting and Enlarging

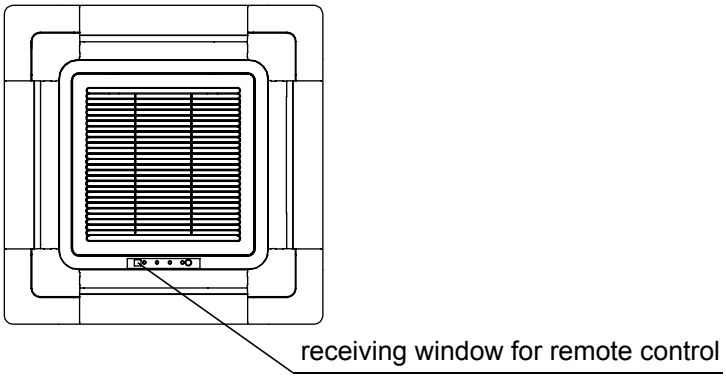
- Cut the tube to the needed length.
- Ream the cut to remove shoulder. Do this with the tube facing down to help fillings fall out.
- Add supplied flare nut to tube.
- Use 45° flare tool to create flare.

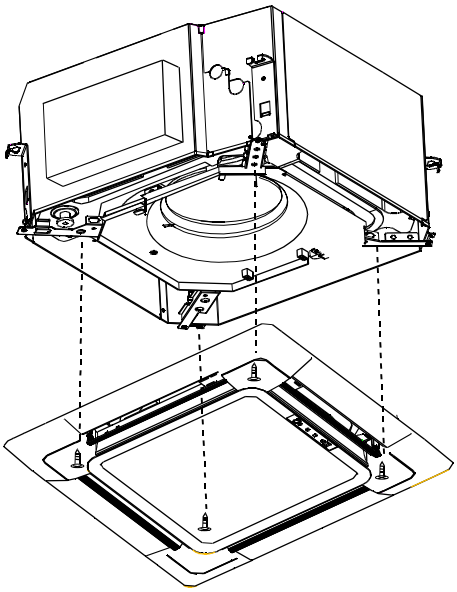
Wire Connections

1. Connecting using circular crimp terminals:
   The method of using circular terminal is shown in the figure. Take off the screw, connect it to the terminal after placing it through the ring at the end of the lead and tighten it down.
2. Connecting using straight terminals:
   The method of using straight terminals is shown as follows: loosen the screw before putting the wire into the terminal block, tighten the screw and confirm it has been tightened by pulling the line gently.
3. Clamp the wires:
   Secure the wires with clips which should press on the insulation of the wires.

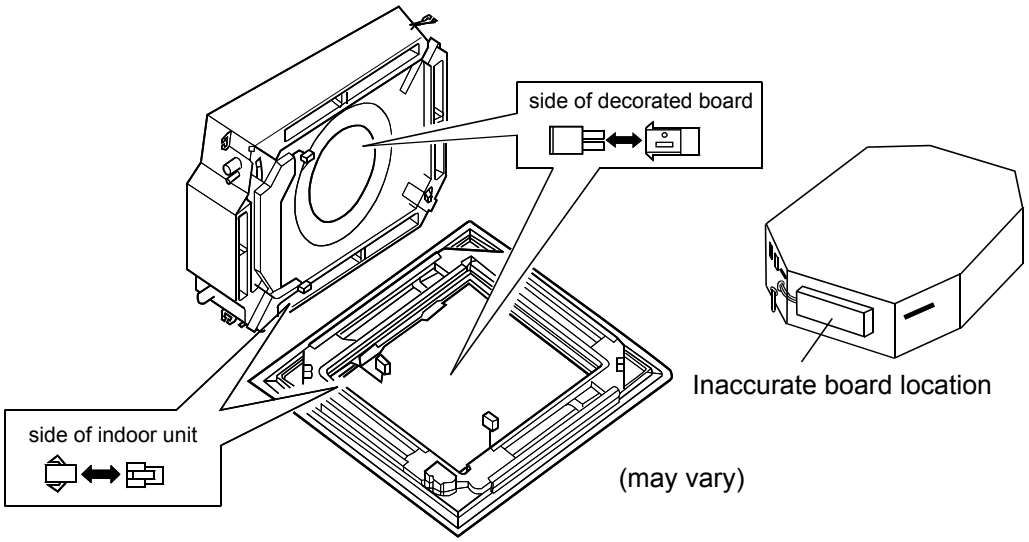


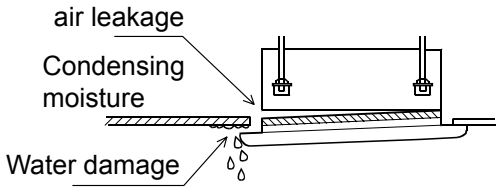
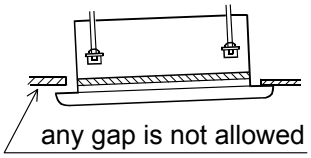
Installing the decorated panel on the body of indoor unit:





- Prior to attaching the panel to the unit locate the louver motor connector on the panel and the unit. Orientate the panel so they can connect.
- First temporarily position it with screws.
- Tighten each screw a little at a time to allow the panel to seat flush against the unit.
- If the foam gasket does not seal against the unit then lower the body of the indoor unit.
- Wiring of panel:
  Connect both connections for the display and louver motors.



Attention
If the panel does not seal against the unit then leaking air could cause moisture to condense on ceiling surfaces and cause water damage.  Fig.1
Unit must be level to prevent water from leaking from the condensate pan.  Fig.2

9.6 Electrical wiring

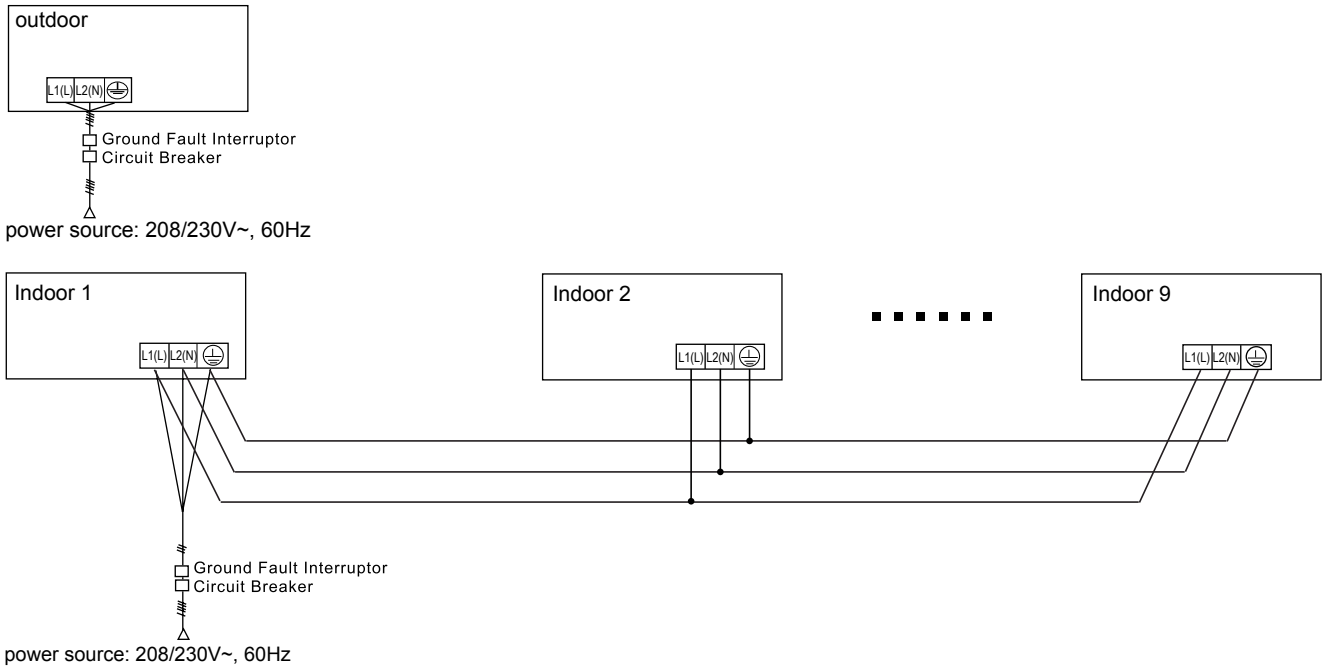
⚠WARNING

- Follow local codes when selecting wire gauge and connecting to house power.
- Use the cable strain relief clips and locking conduit clamps to prevent wires from being pulled off terminal posts.
- Unit must be properly grounded. Do not use water or gas piping, phone ground or lightning rod.

⚠ Attention

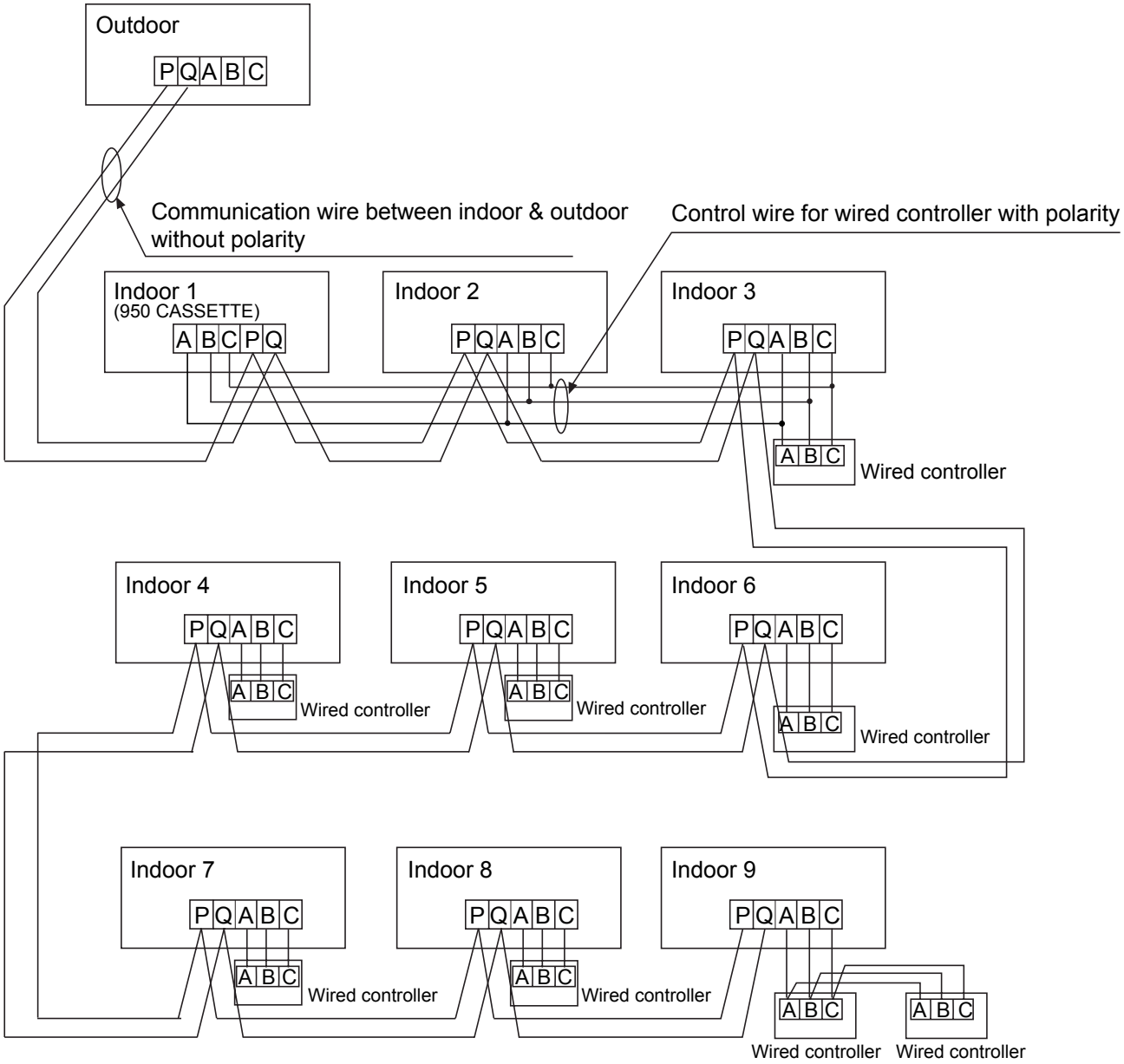
- Only copper wire can be used. A properly sized breaker should be provided, or electric shock may occur.
- Unit requires 208/230VAC - 2 voltage wires and a ground. No neutral.
- All indoor units should be wired to the same breaker to prevent some of the units from being powered off while others are energized.
- Controller wiring and refrigerant tubing can be arranged and ran together.
- Disconnect power from both outdoor and indoor units prior to servicing any component in the system.

Supply Wiring Drawing



- Indoor units and outdoor units should be connected to separate power breakers
- Indoor units must share one single electrical breaker. Circuit breaker specifications should be calculated. It is recommended to have both indoor & outdoor units connected to GFCI and surge devices.

Signal Wiring Drawing



Outdoor units are of parallel connection via three lines with polarity. The main unit, central control and all indoor units
are of parallel connection via two lines without polarity.
There are three ways of connecting the line control and indoor units:

A. One wired control to control multiple units, i.e. 2-9 indoor units, as shown in the above figure, (1-3 indoor units). The indoor unit 3 is the wire controlled main unit and others are the wired controlled sub units. The remote control and the main unit (directly connected to the indoor unit of wired control) are connected via three wires with polarity. Other indoor units and the main unit are connected via three lines with polarity. SW01 on the main unit of wired control is set to 0 while SW01 on other sub units of wired control are set to 1, 2 and so on in turn. (Please refer to the code setting A at page 15)

B. One wired control controls one indoor unit, as shown in the above figure (indoor unit 4-8). The indoor units and the wired control are connected via three lines with polarity.

C. Two wired controls control one indoor unit, as shown in the figure (indoor unit 9). Either of the wired controls can be set to be the master wired control while the other is set to be the auxiliary wired control. The master wired control and indoor units, and the master and auxiliary line controls are connected via three lines with polarity. Note: For DC motor/low ESP duct type, the PCB comes with the terminal blocks. Please be sure to pay attention to do the wiring according to the labels. The power lines and signal lines go through the metal wire hole separately with the protective sleeve of the connecting line.

Wire gauge size and breaker size for total indoor amp draw. Current NEC guidelines and local codes will trump this chart.

Items / Total Current of Indoor Units(A)	Cross Section AWG (mm^2)	Length in.(m)	Rated Current of Overflow Breaker(A)	Rated current of residual Circuit Breaker(A) Ground Fault Interrupter(mA) Response time(S)	Cross Sectional Area of Signal Line
<7	14(2.5)	65.6(20)	10	10 A,30 mA,0.1S or below	16 AWG (1.25mm^2)
≥7 and <11	12(4)	65.6(20)	15	15 A,30 mA,0.1S or below	
≥11and <16	10(6)	82(25)	20	20 A,30 mA,0.1S or below	
≥16 and <22	8(8)	98.4(30)	30	30 A,30 mA,0.1S or below	
≥22 and <27	6(10)	131(40)	30	30 A,30 mA,0.1S or below	

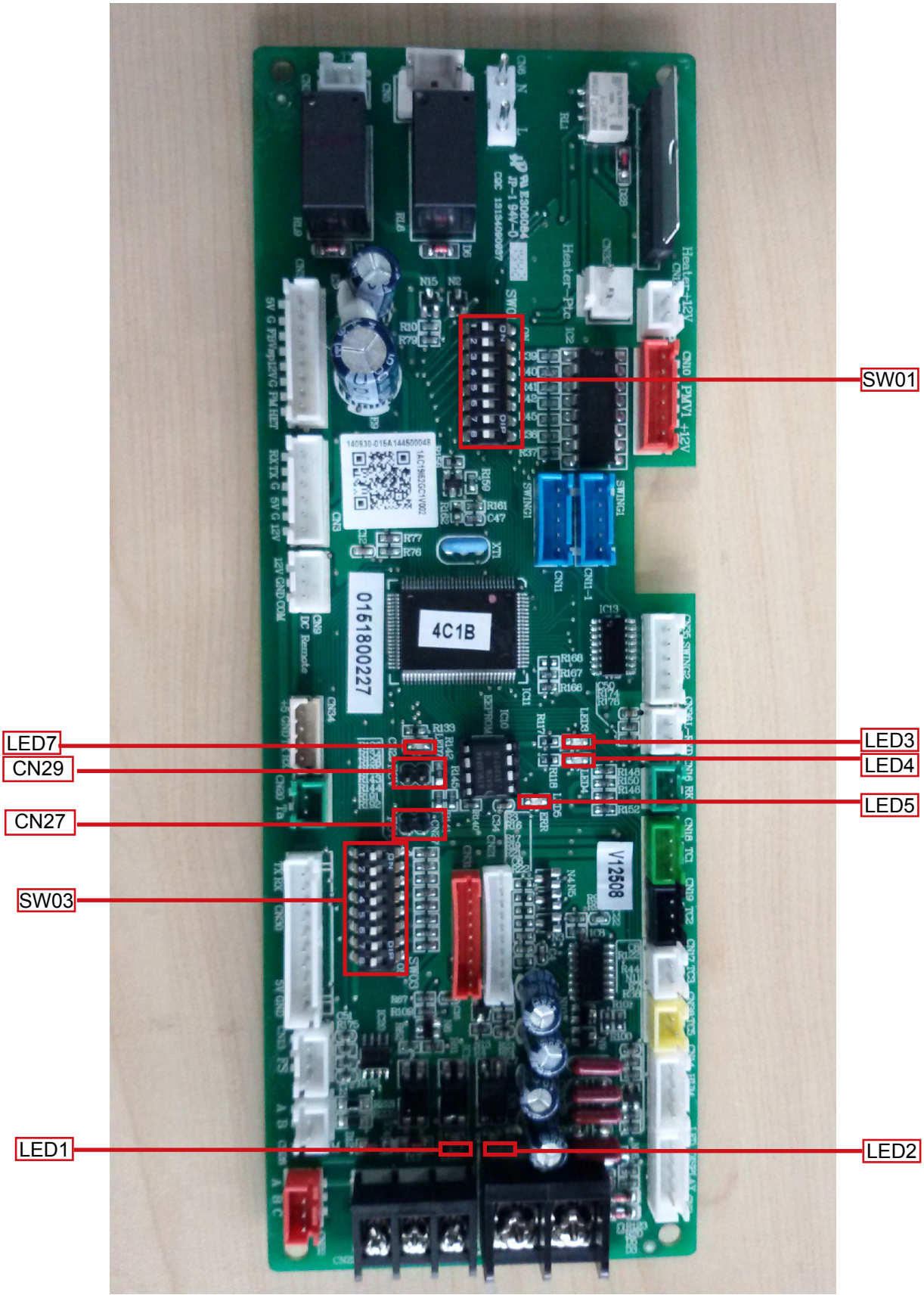
- The electrical power line and signal lines must be tightened.
- Every indoor unit must have a ground connection.
- The power wire should be size up if it exceeds the permissible length.
- Shielding of the wire of all the indoor and outdoor units should be connected together and grounded at one point.
- Signal lines should not exceed 3280ft(1000m).

Wired Controller ABC Chart

Length of Controller Wire ft (m)	Wiring Dimensions AWG (mm^2)
<328(100)	22(0.3) x 3 core shielding line
≥328(100) and <656(200)	20(0.5) x 3 core shielding line
≥656(200)and <984(300)	18(0.75) x 3 core shielding line
≥984(300) and <1312(400)	16(1.25) x 3 core shielding line
≥1312(400) and <1968(600)	14(2) x 3 core shielding line

- The shielding lay of the controller wire must be grounded at one end.
- The total length of the controller wire shall not be more than 1968ft(600m).

10. 0151800227 PCB dip switch setting



LED light introduction:

• LED1, LED2: communication lamp between indoor unit and wired controller.
These two lamps flicker alternately under normal condition; once occurs the communication faulty, these two lamps will light or not light at the same time.

• LED3, LED4: communication lamp between indoor unit and outdoor unit.
These two lamps flicker alternately under normal condition; once occurs the communication faulty, these two lamps will light or not light at the same time.

• LED5: malfunction lamp of indoor unit.
This lamp not light under normal condition; once indoor unit occurs malfunction this lamp will flicker, flicker times indicate the corresponding failure code.

• LED7: for factory testing.

Dip switch introduction

SW01 is used for indoor unit group control address setting and capacity selection. SW03 is used for indoor unit address setting (including physical address and central address).

(1) Description of SW01

SW01_1 SW01_2 SW01_3 SW01_4	Wired control address	[1]	[2]	[3]	[4]	Wired control address
		OFF	**OFF**	**OFF**	**OFF**	Master unit in group control
		OFF	OFF	OFF	ON	Slave unit 1 in group control
		OFF	OFF	ON	OFF	Slave unit 2 in group control
		OFF	OFF	ON	ON	Slave unit 3 in group control
		…	…	…	…	……
		ON	ON	ON	ON	Slave unit 15 in group control
SW01_5 SW01_6 SW01_7 SW01_8	Indoor unit capacity	[5]	[6]	[7]	[8]	Indoor unit capacity
		OFF	OFF	ON	OFF	9000BTU (MVAL009MV2AA)
		OFF	OFF	ON	ON	12000BTU (MVAL012MV2AA)
		OFF	ON	ON	OFF	18000BTU (MVAL018MV2AA)
		OFF	ON	ON	ON	24000BTU (MVAL024MV2AA)
		ON	OFF	OFF	ON	30000BTU (MVAL030MV2AA)
		ON	OFF	ON	OFF	36000BTU (MVAL036MV2AA)
		ON	OFF	ON	ON	42000BTU (MVAL042MV2AA)
		ON	ON	OFF	OFF	48000BTU (MVAL048MV2AA)

(2) Description of SW03

SW03	Set the communication and central control address by dip switch (*Note 1)	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	Communication address	Central control address
		ON	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	0 (default)	0 (default)
		ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	1	1
		ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	2	2
		…	…	…	…	…	…	…	…	…	…
		ON	OFF	ON	ON	ON	ON	ON	ON	63	63
		ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	0	64
		ON	ON	OFF	OFF	OFF	OFF	OFF	ON	1	65
		ON	ON	OFF	OFF	OFF	OFF	ON	OFF	2	66
		…	…	…	…	…	…	…	…	…	…
		ON	ON	ON	ON	ON	ON	ON	ON	63	127
		OFF	…	…	…	…	…	…	…	Set the address by wired controller or automatically (default)	

Note 1

- *The address must be set by dip switch if central control is used.*
- *SW03-2=OFF, central control address = physical address+0*
- *SW03-2=ON, central control address=physical address+64*

(3) CN27, CN29 plug explanation

a) Electronic expansion valve PMV manual control setting (CN27, CN29)

Manual control open fully CN27: After power on, short CN27 for 2 seconds, PMV open fully;

Manual control close fully CN29: After power on, short CN29 for 2 seconds, PMV close fully.

b) Shorten time running and self-inspection

After power on, short CN27 and CN29 for 2 seconds at the same time, enter shorten time running the running time;

Before power on, short CN27, after power on the unit enter self-inspection;

Before power on, short CN 27 and CN29, enter the production line test.

11. Indoor unit control

11.1 Cooling operation

Set temp. in cooling: Ts=set temp. wired controller;
After startup, indoor unit will send the request to outdoor according to the temp. difference between the set temp. and the room temp.

11.2 Heating operation

Set temp. in heating: Ts=set temp. wired controller+TA correcting value.
After startup, indoor unit will send the request to outdoor according to the temp. difference between the set temp. and the room temp.

11.3 Dry operation

Room temp. - set temp. > 2°C indoor operation is identical with the cooling operation, and send the cooling mode to outdoor;
Room temp. - set temp. ≤ 2°C indoor will send the dry signal to outdoor, and indoor fan motor will run at low speed compulsorily when compressor is running; when room temp. <16°C indoor stops and sends stop signal to outdoor.
In dry operation, the auto mode of indoor fan motor is identical with the cooling mode; EEV control mode is identical with the cooling operation.

11.4 Fan operation

Indoor fan motor will run at the speed set on the wired controller and sends stop signal to outdoor.

11.5 Abnormal operation

When the requested mode collides with the outdoor mode, the entering earlier will be in prior. After indoor receives the startup command from wired controller (remote controller), firstly judge the outdoor current mode. If it is normal mode, the indoor will run as the request of wired controller; if it is abnormal mode, the command can not be executed, and indoor keeps stop; wired controller displays standby mode (if in remote control type, the buzzer will sound twice and the remote controller can not receive the signal). Until the outdoor stops or the outdoor mode is accordant with the requested mode of wired controller (remote controller), the outdoor will work. COOL (including AUTO COOL), DRY, RECOVERY are regarded as the same mode;
HEAT, RECOVERY are as abnormal mode.

11.6 Fan speed control of indoor fan motor

a. Adjustment by hand
Set high/ mid/ low fan speed as the request.
b. Auto fan speed
Confirm the fan speed as the temp. difference between room temp. TA and the set temp.
c. Anti-cool air control
In heating mode, after compressor startup, the unit will control indoor fan motor state due to the indoor coil temp.
In anti-cool air period, indoor sends pre-heat signal to wired controller; in outdoor defrosting period, indoor fan motor will stop, and sends defrost signal to wired controller;
After being switched off in heating mode, indoor fan motor will run at low speed and 30 seconds later will stop.

11.7 Set EEV open angle by hand

When being switched off, short connect CN27 to open the valve fully compulsorily for 2 minutes; When being switched off, short connect CN29 to close the valve fully compulsorily for 2 minutes.

11.8 Anti-freezed protection

In cooling mode, execute the anti-freezed protection due to the measured indoor coil temp. to avoid the indoor heat exchanger causing frost or ice.

11.9 Swing motor control

Indoor will control swing motor ON/OFF due to the swing signal from wired controller.

11.10 Auxiliary electric heater control

In heating mode, if the below conditions can be met, the electric heater will work:
(1) Indoor fan motor and compressor are running;
(2) Air inlet temp. is no more than 22°C;
(3) Room temp. is lower over 2°C than the set temp.;
(4) Compressor has run for 5 seconds;
Either below condition is met, the electric heater will stop:
(1) Indoor fan motor or compressor not runs;
(2) Indoor air inlet temp. is over 23°C;
(3) Indoor air inlet temp. is higher over -1°C than the set temp.;
(4) Unit stops or quit the heating mode.

11.11 Filter cleaning

Check and memorize the running time of indoor fan motor, once arriving the requested time (set by SW07-6), indoor will send filter cleaning signal to wired controller; when indoor receives the filter reset signal from wired controller, if the time exceeds the requested time, the filter will reset.

11.12 Compulsory defrosting

After indoor receives the compulsory defrosting signal from wired controller, it will send compulsory defrosting signal to outdoor continuously for 10 times. In the sending period, indoor will execute the normal defrost.

11.13 Trial operation

Set the mode as cooling (heating), press ON/OFF for 5 seconds to enter compulsory cooling (heating).
In compulsory cooling, display "LL" and COOL will flash;
In compulsory heating, display "HH" and HEAT will flash, fan speed is AUTO. At this time, only ON/OFF, TEMP +/- are valid.

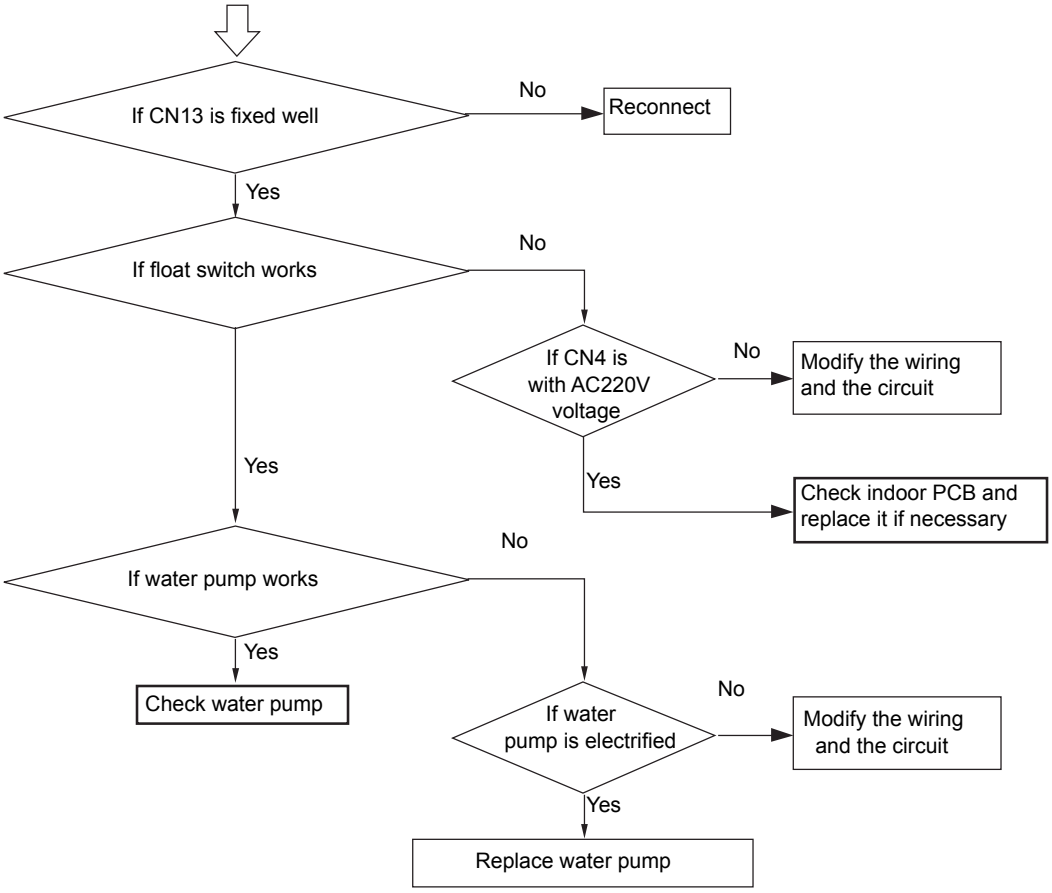
12. Failure code

Failure code on wired controller	PCB LED5 (Indoor units) / receiver timer lamp (remote controller)	Fault Descriptions
01	1	Indoor ambient temp. sensor TA failure
02	2	Indoor coil pipe temp. sensor TC1 failure
03	3	Indoor coil pipe temp. sensor TC2 failure
05	5	Indoor EEPROM failure
06	6	Communication between indoor and outdoor failure
07	7	Communication between indoor and wired controller failure
08	8	Indoor float switch failure
09	9	Indoor address repeated failure
0A	10	Communication between indoor and display board failure
0C	12	Indoor unit 50Hz Zero-crossing failure
0E	14	DC motor failure
Outdoor failure code	20	Outdoor failure code

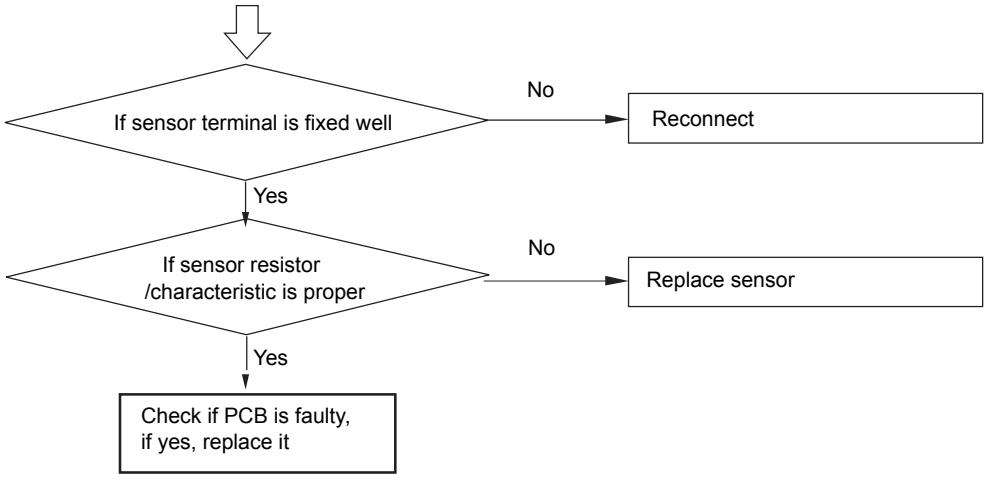
13. Troubleshooting

Indoor failure diagnose

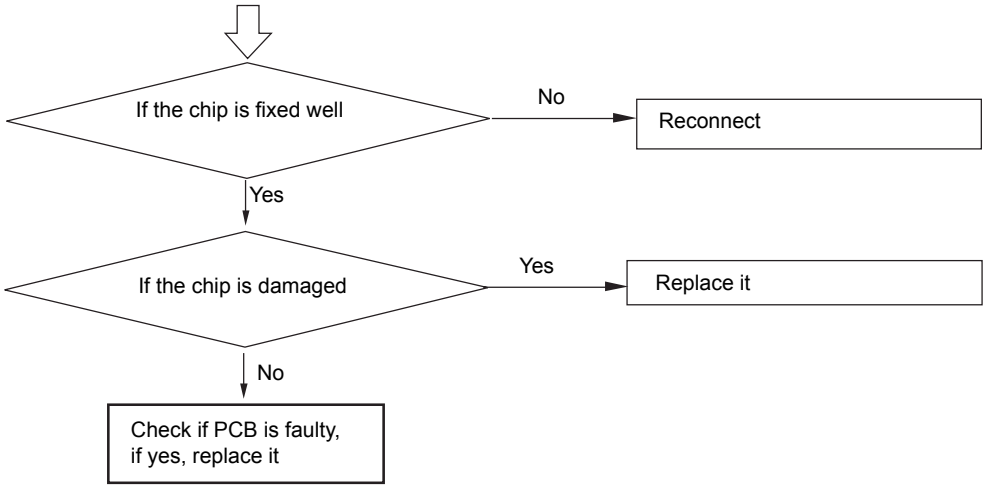
[08] Indoor drainage system failure/float switch circuit on indoor PCB failure



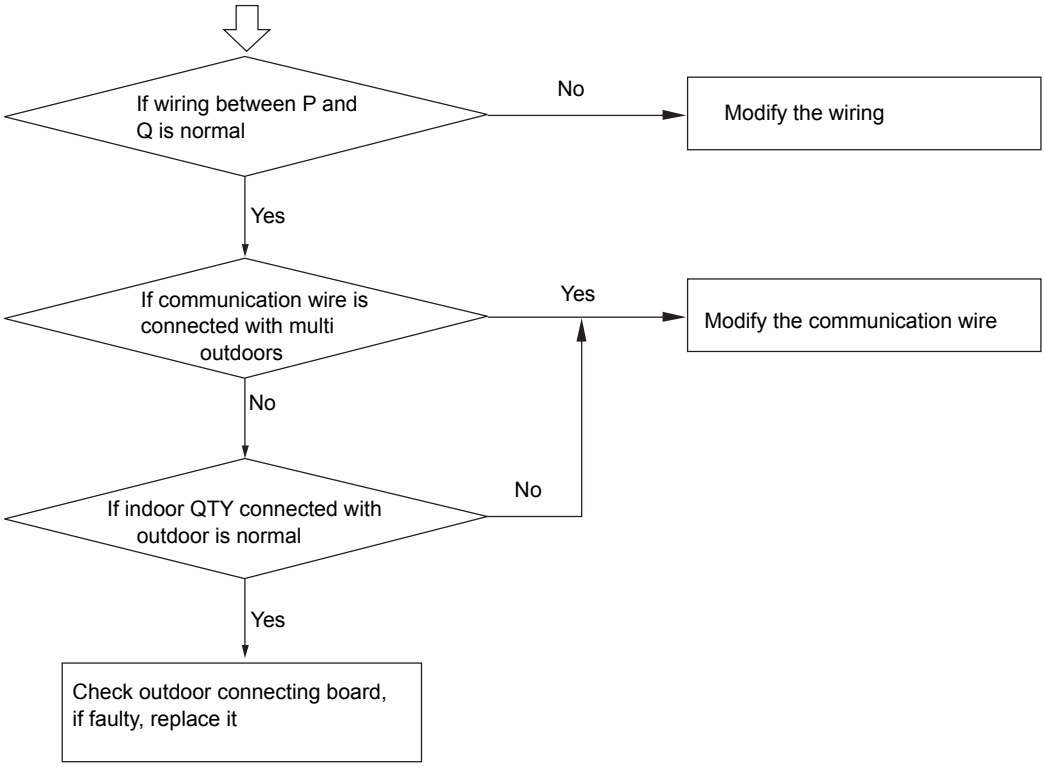
[1/2/3/4/15] Indoor sensor failure



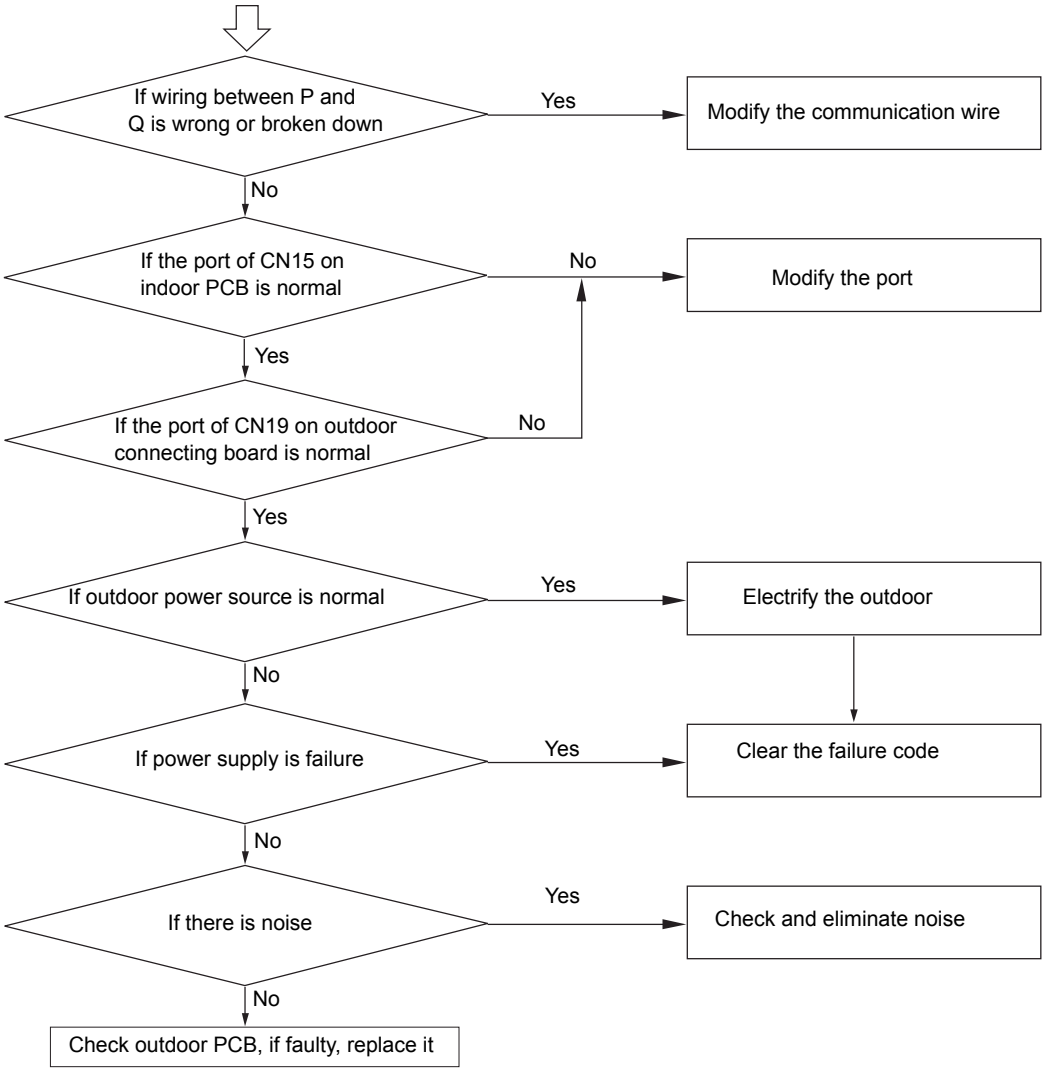
[05] EEPROM failure



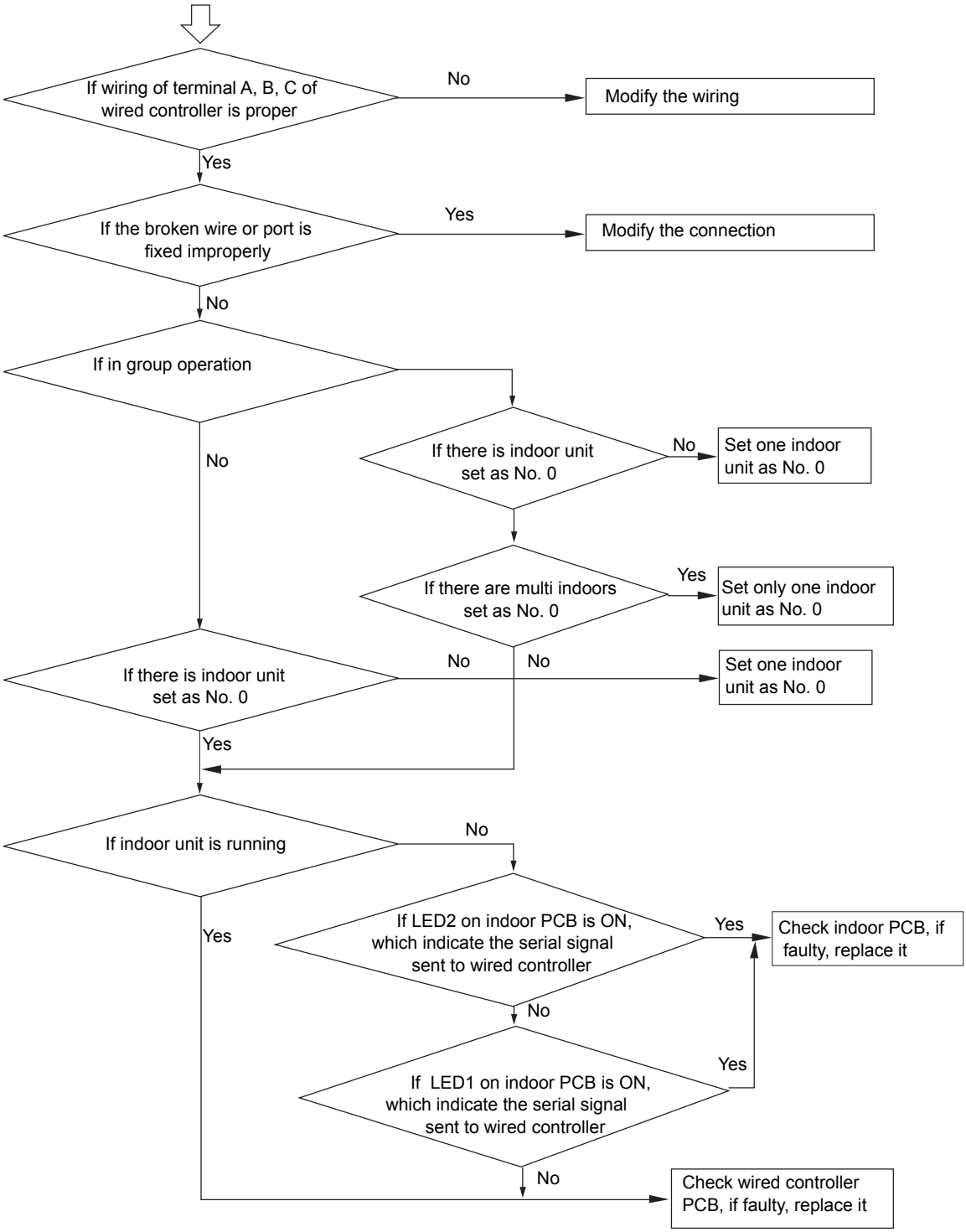
[09] Indoor address repeated



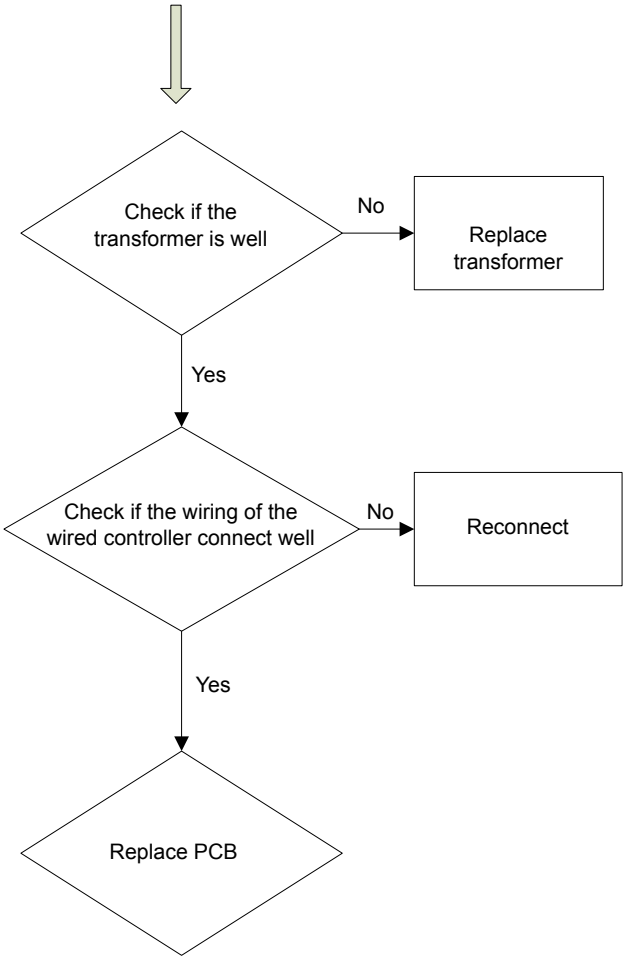
[06] Communication circuit between indoor and outdoor



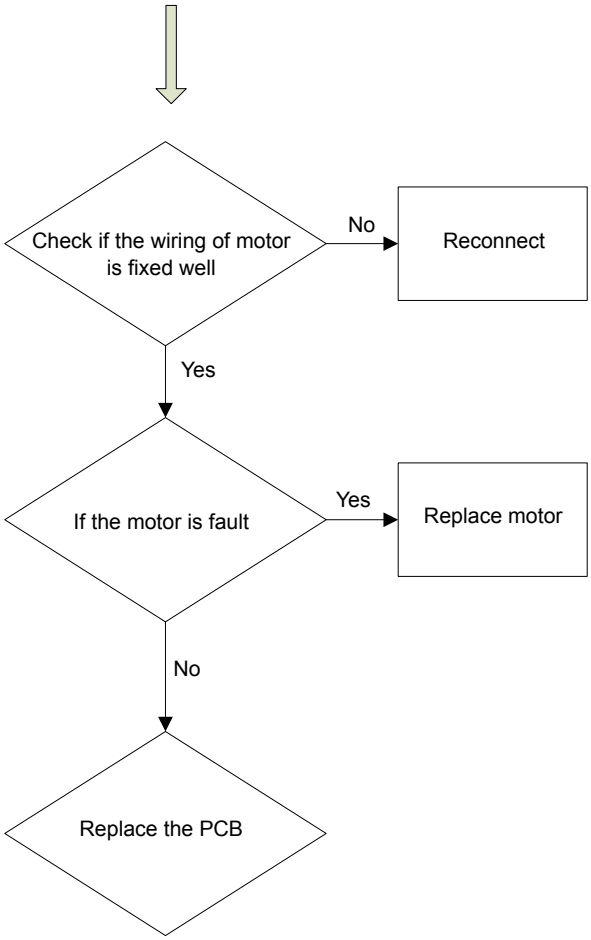
[07] Communication abnormal between indoor and wired controller



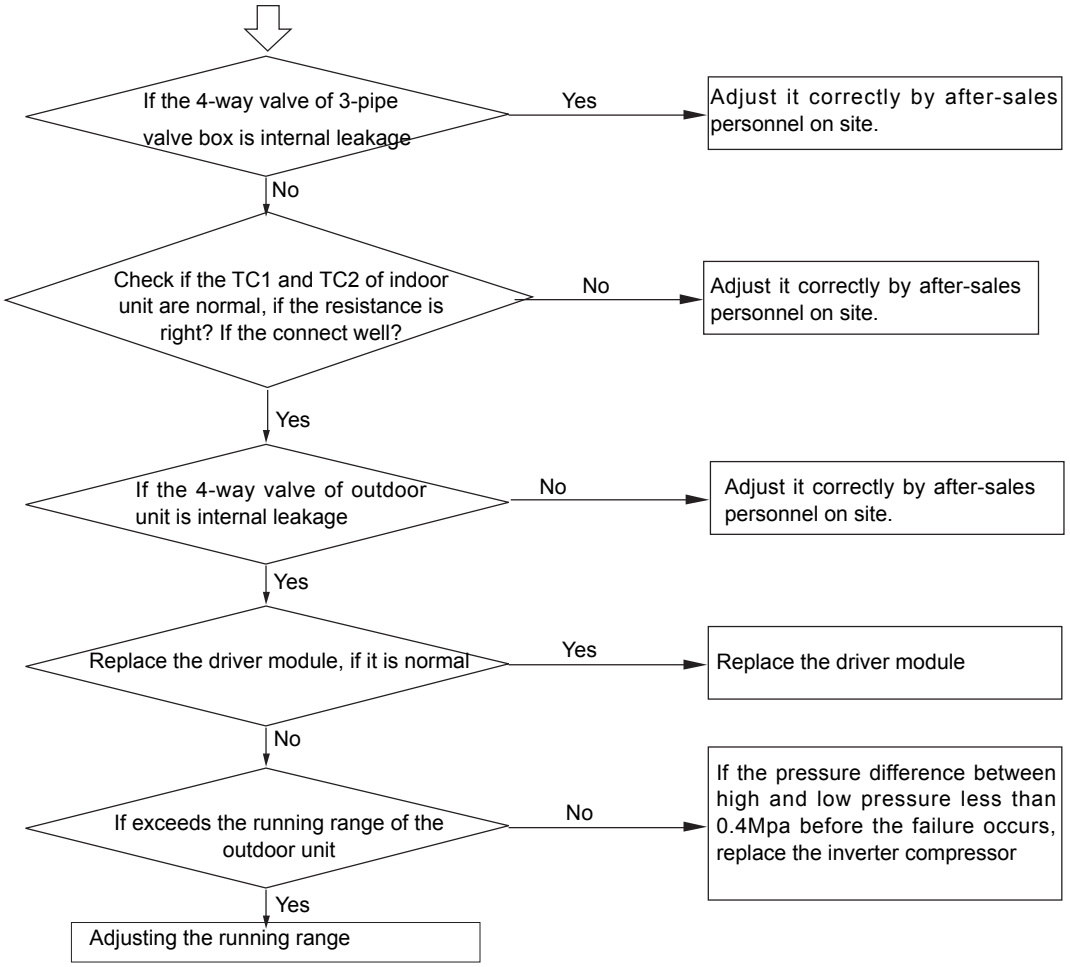
[12] No 50Hz zero passage signal



[14] DC motor failure



[18] The 4-way valve of 3-pipe valve box reversing failure



Note: abnomity confirmation conditions
For MRVIII-RC system, the outdoor unit is running normally, when the 4-way valve of valve box is power on and its connected heating indoor unit's parameter satisfy following conditions

- & • When 4-way valve of valve box is ON
  - • TC2 ≤ CT-20°C lasts for 5min
  - • or • TC1 ≤ 0°C lasts for 5min
    - • TC1 ≤ master unit Ps_temp+10°C lasts for 5min

14. Capacity

Cooling

CA: total capacity (Btu/h)
SHC: sensible heat capacity (Btu/h)

Model	Outdoor Temp.	Indoor Temp.													
		70.7°FDB		73.4°F DB		77°F DB		80.6°F DB		82.4°F DB		86°F DB		89.6°F DB	
		59°F WB		60.8°F WB		64.4°F WB		66.2°F WB		68°F WB		71.6°F WB		75.2°F WB	
	°F DB	CA	SHC	CA	SHC	CA	SHC	CA	SHC	CA	SHC	CA	SHC	CA	SHC
MVAL009MV2AA	68	8679	7071	9000	7071	9321	7071	9643	7071	9643	7393	9964	7071	10286	7071
	72.5	8679	7071	9000	7071	9321	7071	9321	7071	9643	7393	9964	7071	10286	7071
	77	8679	6750	8679	7071	9321	7071	9321	7071	9643	7393	9964	7071	10286	6750
	81.5	8679	6750	8679	7071	9000	7071	9321	7071	9321	7071	9964	7071	10286	6750
	86	8357	6750	8679	7071	9000	6750	9321	7071	9321	7071	9643	7071	9964	6750
	90.5	8357	6750	8679	7071	9000	6750	9000	6750	9321	7071	9643	7071	9964	6750
	95	8357	6750	8357	6750	8679	6750	9000	6750	9321	7071	9643	7071	9964	6750
	99.5	8036	6750	8357	6750	8679	6750	9000	6750	9000	7071	9321	7071	9964	6750
	104	8036	6750	8357	6750	8679	6750	8679	6750	9000	7071	9321	6750	9643	6750
	109.4	8036	6429	8036	6750	8679	6750	8679	6750	9000	7071	9321	6750	9643	6750
MVAL012MV2AA	68	11667	9000	12000	9000	12333	9000	12667	9000	13000	9333	13333	9000	14000	8667
	72.5	11667	9000	12000	9000	12333	9000	12667	9000	13000	9333	13333	9000	13667	8667
	77	11667	9000	11667	9000	12333	8667	12333	9000	12667	9333	13333	9000	13667	8667
	81.5	11333	8667	11667	9000	12000	8667	12333	9000	12667	9000	13000	9000	13667	8667
	86	11333	8667	11667	9000	12000	8667	12333	8667	12333	9000	13000	9000	13333	8667
	90.5	11000	8667	11333	9000	12000	8667	12000	8667	12333	9000	13000	8667	13333	8667
	95	11000	8667	11333	9000	11667	8667	12000	8667	12333	9000	12667	8667	13333	8667
	99.5	11000	8667	11000	8667	11667	8667	11667	8667	12000	9000	12667	8667	13000	8667
	104	10667	8333	11000	8667	11667	8667	11667	8667	12000	9000	12333	8667	13000	8333
	109.4	10667	8333	11000	8667	11333	8333	11667	8667	12000	9000	12333	9667	12667	8333
MVAL018MV2AA	68	18661	13571	19000	13911	19679	13571	20018	13571	20357	13911	21375	13571	22054	13232
	72.5	18321	13232	18661	13571	19679	13232	20018	13571	20357	13911	21036	13571	21714	13232
	77	18321	13232	18661	13571	19339	13232	19679	13232	20018	13911	21036	13232	21714	12893
	81.5	17982	13232	18321	13571	19339	13232	19679	13232	20018	13571	20696	13232	21375	12893
	86	17982	13232	18321	13232	19000	13232	19339	13232	19679	13571	20357	13232	21375	12893
	90.5	17643	12893	17982	13232	18661	12893	19339	13232	19679	13571	20357	13232	21036	12893
	95	17643	12893	17982	13232	18661	12893	19000	12893	19339	13571	20018	13232	21036	12893
	99.5	17304	12893	17643	13232	18321	12893	18661	12893	19339	13232	20018	12893	20696	12554
	104	16964	12554	17643	12893	18321	12893	18661	12893	19000	13232	19679	12893	20357	12554
	109.4	16964	12554	17304	12893	17982	12554	18321	12893	18661	13232	19679	12893	20357	12554
MVAL024MV2AA	68	23662	16563	24000	16901	25014	16563	25352	16563	26028	16901	27042	16563	27718	15887
	72.5	23324	16563	23662	16563	24676	16225	25352	16225	25690	16901	26704	16225	27718	15887
	77	22986	16225	23662	16563	24338	16225	25014	16225	25352	16563	26366	16225	27380	15887
	81.5	22648	16225	23324	16563	24338	16225	24676	16225	25352	16563	26028	16225	27042	15549
	86	22648	15887	22986	16225	24000	15887	24338	15887	25014	16563	26028	15887	27042	15549
	90.5	22310	15887	22648	16225	23662	15887	24338	15887	24676	16225	25690	15887	26704	15549
	95	21972	15887	22648	16225	23662	15887	24000	15887	24338	16225	25352	15887	26366	15549
	99.5	21972	15549	22310	15887	23324	15549	23662	15549	24338	16225	25352	15887	26028	15211
	104	21634	15549	21972	15887	22986	15549	23662	15549	24000	16225	25014	15549	26028	15211
	109.4	21296	15549	21634	15549	22648	15549	23324	15549	23662	15887	24676	15549	25690	15211

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Model	Outdoor Temp.	Indoor Temp.													
		70.7°FDB		73.4°F DB		77°F DB		80.6°F DB		82.4°F DB		86°F DB		89.6°F DB	
		59°F WB		60.8°F WB		64.4°F WB		66.2°F WB		68°F WB		71.6°F WB		75.2°F WB	
	°F DB	CA	SHC	CA	SHC	CA	SHC	CA	SHC	CA	SHC	CA	SHC	CA	SHC
MVAL030MV2AA	68	29333	21000	30000	21333	31333	21000	31667	21000	32333	21667	33667	21000	34667	20333
	72.5	29000	21000	29667	21333	31000	20667	31667	21000	32000	21667	33333	21000	34667	20333
	77	28667	20667	29333	21000	30667	20667	31333	20667	31667	21333	33000	21000	34333	20333
	81.5	28667	20667	29000	21000	30333	20667	31000	20667	31667	21333	32667	20667	34000	20000
	86	28333	20333	28667	21000	30000	20333	30667	20667	31333	21333	32333	20667	33667	20000
	90.5	28000	20333	28667	20667	29667	20333	30333	20333	31000	21000	32000	20667	33333	20000
	95	27667	20000	28333	20667	29333	20000	30000	20333	30667	21000	32000	20333	33000	19667
	99.5	27333	20000	28000	20333	29000	20000	29667	20000	30333	20667	31667	20333	32667	19667
	104	27000	19667	27667	20333	28667	20000	29333	20000	30000	20667	31333	20000	32333	19667
	109.4	26667	19667	27333	20000	28333	19667	29000	20000	29667	20667	31000	20000	32000	19333
MVAL036MV2AA	68	35357	25714	36000	26357	37286	25714	38250	26036	38893	26679	40179	26036	41786	25393
	72.5	35036	25714	35679	26357	36964	25714	37929	25714	38571	26679	39857	26036	41464	25071
	77	34714	25393	35357	26036	36643	25393	37286	25714	38250	26357	39536	25714	41143	25071
	81.5	34071	25393	35036	26036	36321	25393	36964	25393	37929	26357	39214	25714	40821	25071
	86	33750	25071	34714	25714	36000	25071	36643	25393	37286	26036	38893	25393	40179	24750
	90.5	33429	25071	34071	25393	35679	25071	36321	25071	36964	26036	38571	25393	39857	24750
	95	33107	24750	33750	25393	35357	24750	36000	25071	36643	26036	38250	25393	39536	24429
	99.5	32786	24750	33429	25071	35036	24750	35679	25071	36321	25714	37929	25071	39214	24429
	104	32464	24429	33107	25071	34714	24429	35357	24750	36000	25714	37286	25071	38893	24429
	109.4	31821	24107	32786	24750	34071	24429	34714	24429	35679	25393	36964	24750	38571	24107
MVAL042MV2AA	68	41100	28800	42000	29400	43800	28800	44400	28800	45300	29700	47100	28800	48600	27900
	72.5	40800	28800	41700	29100	43200	28500	44100	28500	45000	29400	46500	28500	48300	27600
	77	40200	28500	41100	29100	42900	28200	43800	28500	44400	29100	46200	28500	48000	27600
	81.5	39900	28200	40800	28800	42300	28200	43200	28200	44100	28800	45900	28200	47400	27300
	86	39600	27900	40200	28500	42000	27900	42900	27900	43800	28500	45300	27900	47100	27300
	90.5	39000	27900	39900	28200	41700	27600	42300	27900	43200	28500	45000	27900	46500	27000
	95	38700	27600	39600	28200	41100	27600	42000	27600	42900	28500	44400	27600	46200	27000
	99.5	38100	27300	39000	27900	40800	27300	41700	27300	42300	28200	44100	27600	45900	26700
	104	37800	27000	38700	27600	40200	27000	41100	27300	42000	28200	43800	27300	45300	26700
	109.4	37200	27000	38100	27300	39900	27000	40800	27000	41400	27900	43200	27300	45000	26400
MVAL048MV2AA	68	46800	32400	48000	33000	49800	32400	51000	32400	51600	33600	54000	32400	55800	31200
	72.5	46800	32400	47400	32400	49200	31800	50400	31800	51600	33000	53400	31800	55200	31200
	77	46200	31800	46800	32400	49200	31800	49800	31800	51000	32400	52800	31800	54600	31200
	81.5	45600	31800	46800	32400	48600	31800	49200	31800	50400	32400	52200	31800	54000	30600
	86	45000	31200	46200	31800	48000	31200	49200	31200	49800	31800	51600	31200	54000	30600
	90.5	44400	31200	45600	31800	47400	31200	48600	31200	49200	31800	51600	31200	53400	30000
	95	44400	31200	45000	31800	46800	31200	48000	31200	49200	31800	51000	31200	52800	30000
	99.5	43800	30600	44400	31200	46800	30600	47400	30600	48600	31800	50400	31200	52200	30000
	104	43200	30000	44400	31200	46200	30000	46800	30600	48000	31800	49800	30600	51600	30000
	109.4	42600	30000	43800	30600	45600	30000	46200	30000	47400	31200	49200	30600	51000	29400

Heating

SHC: sensible heat capacity

Model	Outdoor Temp.	Indoor Temp. (°F DB)			
		59	68.0	77.0	80.6
	°F WB	SHC (Btu/h)	SHC (Btu/h)	SHC (Btu/h)	SHC (Btu/h)
MVAL009MV2AA	5	6563	6563	6563	6563
	14	7500	7500	7500	6875
	23	8438	8438	7813	6875
	32	9688	9375	7813	6875
	36.5	10000	10000	7813	6875
	42.8	10000	10000	7813	6875
	43.7	10625	10000	7813	6875
	50	11250	10000	7813	6875
	54.5	11875	10000	7813	6875
	59.9	12188	10000	7813	6875
MVAL012MV2AA	5	9113	8775	8775	8775
	14	10463	10125	10125	9450
	23	11475	11475	10463	9450
	32	12825	12825	10463	9450
	36.5	13500	13500	10463	9450
	42.8	13500	13500	10463	9450
	43.7	14175	13500	10463	9450
	50	15188	13500	10463	9450
	54.5	16200	13500	10463	9450
	59.9	16200	13500	10463	9450
MVAL018MV2AA	5	14000	14000	13667	13667
	14	16000	16000	15667	14333
	23	18000	17667	16333	14333
	32	20000	19667	16333	14333
	36.5	21000	20667	16333	14333
	42.8	21333	21000	16333	14333
	43.7	22000	21000	16333	14333
	50	23667	21000	16333	14333
	54.5	25000	21000	16333	14333
	59.9	25333	21000	16333	14333
MVAL024MV2AA	5	18225	17888	17550	17550
	14	20588	20250	20250	18563
	23	23288	22950	20925	18563
	32	25650	25313	20925	18563
	36.5	27000	26663	20925	18563
	42.8	27338	27000	20925	18563
	43.7	28350	27000	20925	18563
	50	30375	27000	20925	18563
	54.5	32400	27000	20925	18563
	59.9	32738	27000	20925	18563

Model	Outdoor Temp.	Indoor Temp. (°F DB)			
		59	68.0	77.0	80.6
	°F WB	SHC (Btu/h)	SHC (Btu/h)	SHC (Btu/h)	SHC (Btu/h)
MVAL030MV2AA	5	22780	22440	22100	22100
	14	25840	25500	25160	23460
	23	29240	28900	26520	23460
	32	32300	31960	26520	23460
	36.5	34000	33660	26520	23460
	42.8	34340	34000	26520	23460
	43.7	35700	34000	26520	23460
	50	38080	34000	26520	23460
	54.5	40800	34000	26520	23460
	59.9	41140	34000	26520	23460
MVAL036MV2AA	5	26880	26240	26240	25920
	14	30720	30080	29760	27520
	23	34240	33920	31360	27520
	32	38080	37760	31360	27520
	36.5	40000	39680	31360	27520
	42.8	40000	40000	31360	27520
	43.7	42240	40000	31360	27520
	50	45120	40000	31360	27520
	54.5	48000	40000	31360	27520
	59.9	48320	40000	31360	27520
MVAL042MV2AA	5	31431	31138	30844	30550
	14	35838	35544	34956	32313
	23	40244	39950	36719	32313
	32	44944	44356	36719	32313
	36.5	47000	46413	36719	32313
	42.8	47588	47000	36719	32313
	43.7	49350	47000	36719	32313
	50	52875	47000	36719	32313
	54.5	56106	47000	36719	32313
	59.9	56988	47000	36719	32313
MVAL048MV2AA	5	36000	35400	35400	35400
	14	41400	40800	40200	37200
	23	46200	45600	42000	37200
	32	51600	51000	42000	37200
	36.5	54000	53400	42000	37200
	42.8	54600	54000	42000	37200
	43.7	57000	54000	42000	37200
	50	60600	54000	42000	37200
	54.5	64800	54000	42000	37200
	59.9	65400	54000	42000	37200

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