Haier

MRV5-H Service Manual

Haier

CONTENTS

PART 1 1. Safety Cautions

Cautions and warnings

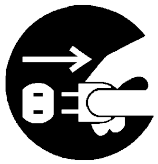
Read these SAFETY CONSIDERATIONS carefully before installing air conditioning equipment. Make sure that the unit operates properly during the start-up operation after completing installation.
Instruct the customer on how to operate and maintain the unit.
Inform customers that they should store this Installation manual with the operation manual for future reference.
Always use a licensed installer or contractor for installation of this product. Improper installation can result in water or refrigerant leakage, electrical shock, fire, or explosion.
Meanings of DANGER, WARNING, CAUTION, and NOTE Symbols:

⚠ DANGER ..... Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING ..... Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION ..... Indicates a potentially hazardous situation, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
⚠ NOTE .....Indicates situations that may result in equipment or property-damage accidents only. Be sure to read the following safety cautions before conducting repair work.

1.1 Cautions in Repair

⚠ Warning	
Be sure to turn off power at disconnect switch and lock before making repairs. Working on the equipment while it is connected to the power supply can cause an electrical shock. Do not touch any electrically charged sections of the equipment if it is necessary to supply power to the equipment for repairs or inspecting the circuits	
Do not touch refrigerant gas piping if refrigerant gas discharges during repair work. The cold temperature can cause personal injury.	
Recover refrigerant gas completely when disconnecting the suction or discharge pipe from the compressor at welded sections. Residual refrigerant gas and oil can cause injury if allowed to discharge while servicing the compressor.	
Ventilate the area completely if refrigerant gas is discharged during repair work. The refrigerant gas can generate toxic gases if it comes in contact with flames.	
Capacitors will store high levels of power in the outdoor unit. Be sure to discharge all capacitors completely before conducting repair work. A charged capacitor can cause an electrical shock.	

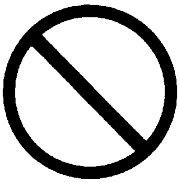
Warning	
Do not start or stop the equipment by switching the unit disconnect. Switching the disconnect to operate the equipment can cause electrical shock or fire.	

Caution	
Do not attempt to repair equipment with wet hands. Working on the equipment with wet hands can cause an electrical shock.	
Do not clean the air conditioner by spraying it with water. Washing the unit with water can damage the equipment and cause electrical shock.	
Be sure to prevent electrical shocks by providing proper grounding when repairing the equipment; especially in humid or wet places.	
Turn off the power at the equipment disconnect and lock out while cleaning the equipment. The internal fan rotates at a high speed, and can cause injury.	
Keep equipment level while removing it. The water inside the unit can spill and damage property.	
Be sure to check that the refrigeration section has cooled down sufficiently before conducting repair work. Working on the unit when the refrigerating section is hot can cause burns.	
Use brazing and welding equipment in well-ventilated places. Using a welder in an enclosed room can cause oxygen deficiency.	

1.2 Post Repair Cautions

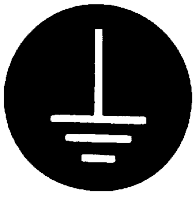
⚠ Warning	
Be sure to use parts listed in the service parts list and appropriate tools for the applicable model equipment for repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire.	
Make sure that the planned installation site has sufficient strength to securely hold the weight of the equipment. The equipment can fall and cause injury if the installation site does not have sufficient strength and if the installation work is not done correctly.	
Use a dedicated power circuit for the equipment, and follow national and local electric codes. This installation manual should be followed for wiring instructions when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock or fire.	
Use twist ed-shielded communication wire to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections can cause excessive heat generation or fire.	
Make sure that the terminal cover does not lift off or dismount when connecting the cable between the indoor and outdoor units. The terminal connection section can cause an electrical shock, excessive heat generation or fire if the cable cover is not mounted properly.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, heating, or pulling the power cable can cause damage.	

Warning	
Do not mix refrigerant gasses in the sealed refrigerant system. Refrigerant R410A is the only gas allowed in the system. High pressures, internal damage and possible personal injury will result if air is allowed to enter the system.	
Locate any refrigerant leaks and make necessary repairs before replenishing refrigerant. Make sure that there are no refrigerant leaks after re-charging refrigerant. Perform a system pump-down and then close the service valves if the system has a leak. Do not allow refrigerant gas to leak into rooms. The refrigerant gas itself is harmless, but it can generate toxic gases if it contacts flames.	
Dispose of old batteries properly when remote batteries are changed. Protect children from swallowing old batteries and contact a physician immediately if ingested.	

Caution	
Equipment power connections require a properly sized circuit breaker in order to prevent electrical shock, equipment damage or fire.	
Do not install the equipment in a place where there is a possibility of combustible gasses in the enviroment. Volatile materials may be ignited by the electrical components in the equipment. .	
Restore all gaskets and water seals after servicing the equipment. Failure to restore gaskets and seals can cause water damage to the equipment.	For integral units only

1.3 Inspection after Repair

⚠ Warning	
Check all power connections for tightness. Loose connections can cause electrical shock or fire.	
Electrical wire insulation should be free of scratches, cracking and gouging. Replace all conductors with non-damaged insulation otherwise electric shock, heat generation or fire may result.	
Do not splice electrical wires and cabling. Power to this equipment must be dedicated and not be shared with any other electrical load or electric shock, excessive heat or fire could result.	

⚠ Caution	
Check all wiring and component connections for proper connection. Improper installation and connections can cause excessive heat generation, fire or an electrical shock.	
Check support structure routinely for corrosion and soundness. Weakened support structure can fail and cause the unit to fall resulting in damage and injury.	
Check all electrical grounds and repair if necessary. Improper grounding can cause electrical shock.	
Check all electrical conductor insulation. Make sure it is free of cracks or scratches. Faulty insulation can cause electrical shock.	
Be sure that indoor unit drain pans are empty before servicing equipment.	

2. General Information

2.1 Energy Saving

Super efficiency

√ Optimized design, intelligent control with full DC inverter EVI compressors mean higher efficiency and minimized scroll gas leakage and greater dependability

√ Top 3 ranking in EER/IEER/COP/SCHE

√ Low ambient performance in heating with operating range down to -13 degrees Fahrenheit.

Heating capacity @5°F	≥80% of rated
Heating capacity @-4°F	≥70% of rated
Heating capacity @-13°F	≥60% of rated

√ To meet IECC2018 standard, and will be listed with AHRI standard AHRI 1230

AHRI CERTIFIED®
www.ahridirectory.org
Globally Recognized. Industry Respected.

√ Bigger heat exchanger area 31 sq ft, and black fin to meet 1000 hrs per ASTM B117

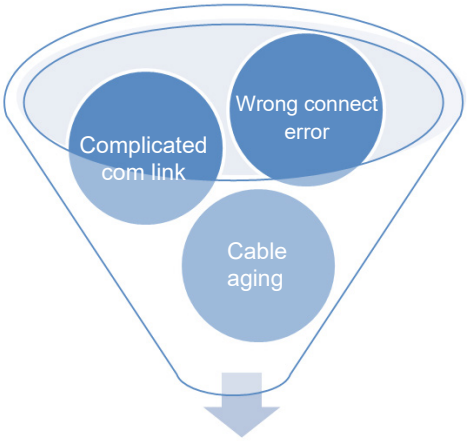
Black fin

VS

Normal fin

2.2 MRV-Link

Wired link



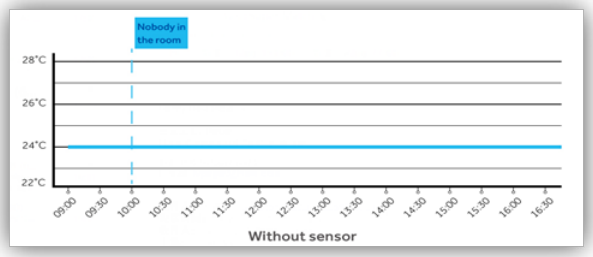
- √ Labor saving
- √ Automatic network connection
- √ Convenient maintenance.
- √ Stable performance
- √ Total Cost saving is about 30%

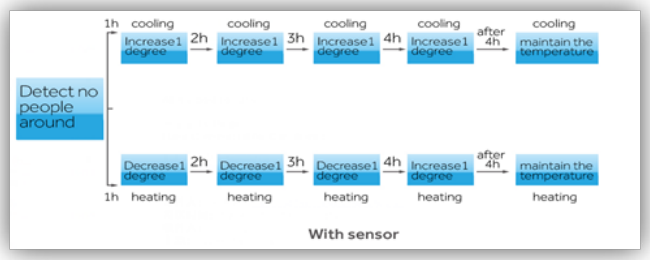
MRV-link / Zigbee

2.3 Comfort

2.3.1 Move Eye Intelligent System (Optional)

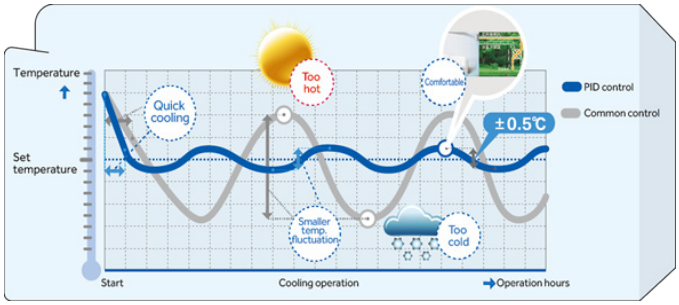
√ The occupancy sensor will check if there is nobody in the room, then change the temperature setting. Energy consumption can be reduced 27% (estimated).





2.3.2 Precise Temperature Control at ±1F

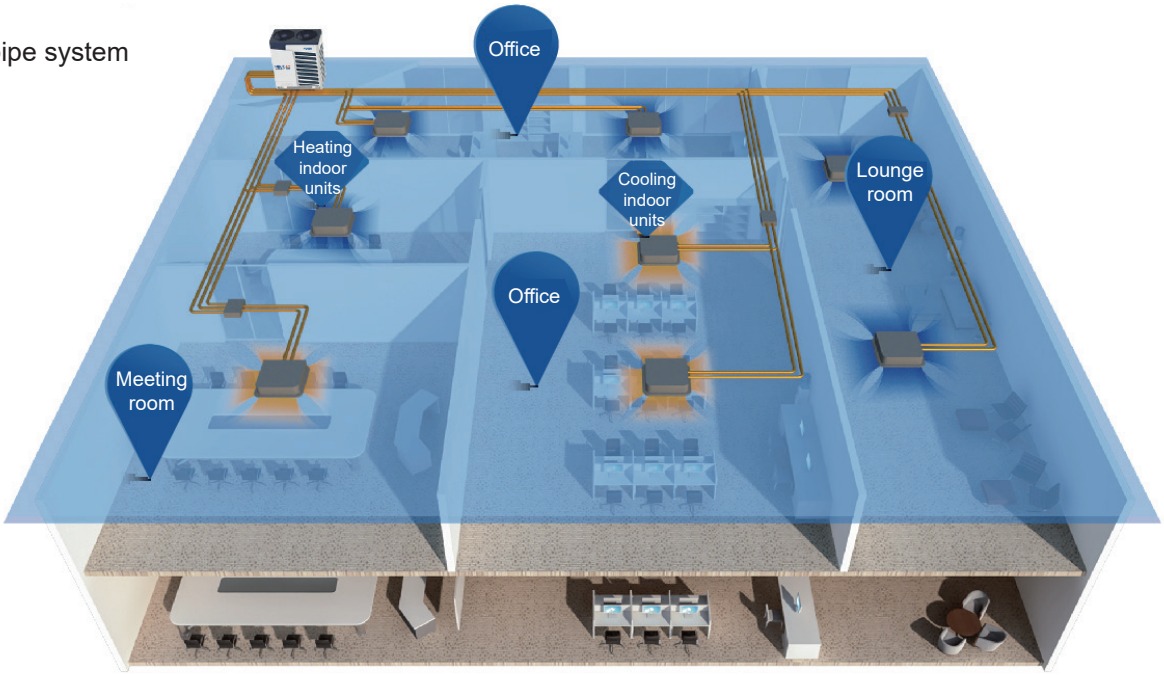
√ Remote temperature sensor
√ Refrigerant volume is adjusted automatically with twin EEV and pressure sensors.



2.4 Feature

System Introduction

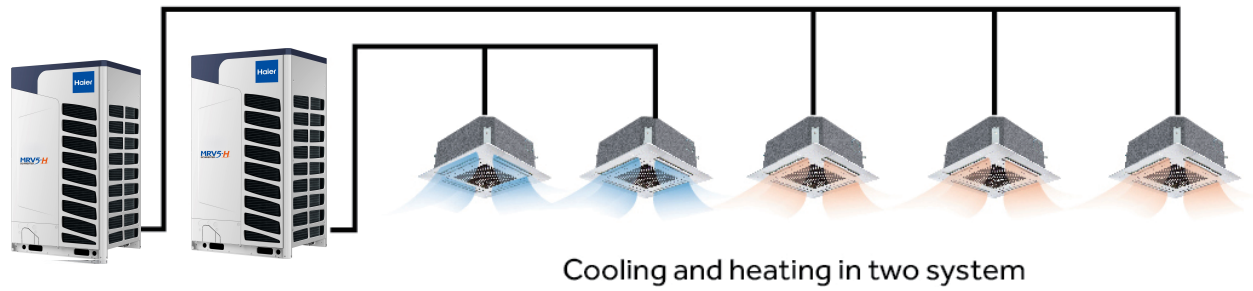
Typical 3 pipe system



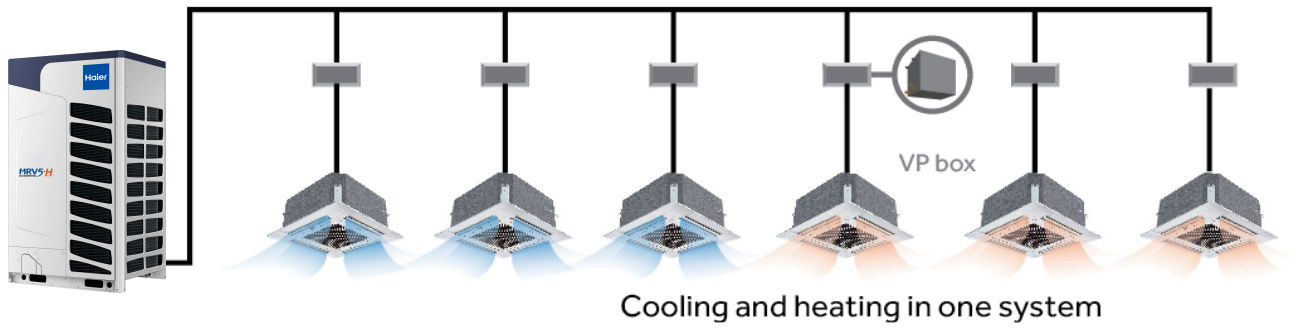
What's is MRV5-HQ

•Dual model Heat pump and Heat recovery model

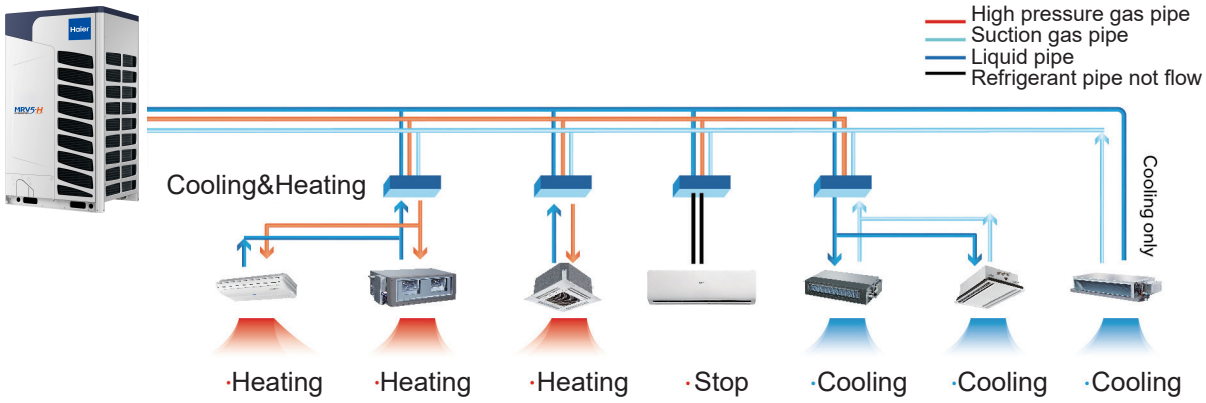
2-pipe system



3-pipe system



Variable operation mode in one system

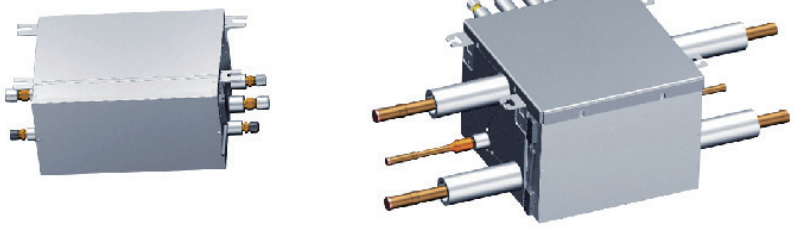


Outdoor Structure

Vp (valve pipe) box structure overview

Overview

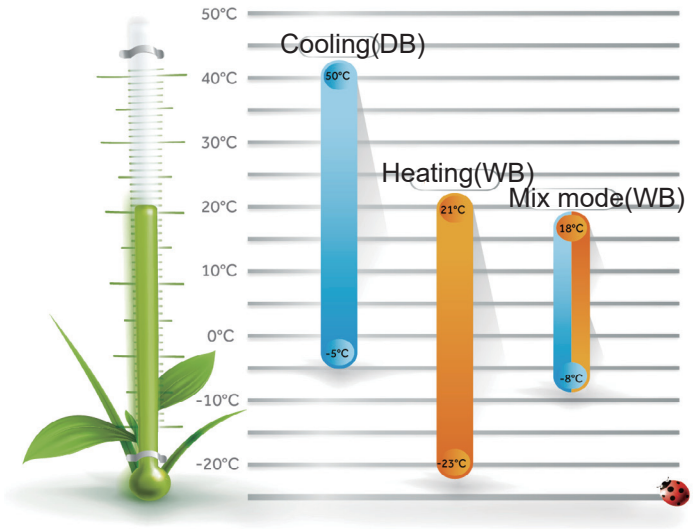
- Specially designed for MRV5-HQ, greatly reduced the volume
- Individual Valve + Pipe Box for Heat Recovery
- Threaded joint connection, easy for installation



Model Name	Max.Capacity of Indoor (kw)	Power Supply	Max. indoor units	Dimension (in.)
VP1-112B	x≤11.2	1/220-240/50/60	5	15/8/11
VP1-180B	11.2<x≤18	1/220-240/50/60	8	15/8/11
VP1-280B	18<x≤28	1/220-240/50/60	8	15/8/11
VP4-450B	≤45	1/220-240/50/60	20	16/12/17

System Introduction

Wide temperature operation range



2.5 Products Lineup

2.5.1 Nomenclature

Indoor Unit

Capacity Range (Ton)		0.4	0.6		1	1.25	1.5	2	2.5
Capacity Index (Kbtu)		5	7	9	12	15	18	24	30
One Way Cassette	MVAO	005ME	007ME	009ME	012ME	—	—	—	—
Compact Cassette (2*2)	MVAB	005MV	007MV	009MV	012MV	—	018MV	—	—
Large Cassette (3*3)	MVAL	—	007ME	009ME	012ME	015ME	018ME	024ME	030ME
Slim Duct	MVAD	—	007MV	009MV	012MV	—	018MV	024MV	—
Medium Static Duct	MVAM	—	007ME	009ME	012ME	015ME	018ME	024ME	030ME
High Static Duct	MVAH	—	—	—	—	—	—	—	—
Multi Position Air Handler	MVAX	—	—	009ME	012ME	—	018ME	024ME	030ME
Highwall	MVAW	—	007MV	009MV	012MV	—	018MV	024MV	030MV

Capacity Range (Ton)		3	3.5	4	4.5	5	6	8	Power Supply Standard
Capacity Index (Kbtu)		36	42	48	54	60	72	96	
One Way Cassette	MVAO	—	—	—	—	—	—	—	2AA
Compact Cassette (2*2)	MVAB	—	—	—	—	—	—	—	
Large Cassette (3*3)	MVAL	036ME	042ME	048ME	—	—	—	—	
Slim Duct	MVAD	—	—	—	—	—	—	—	
Medium Static Duct	MVAM	036ME	—	048ME	054ME	—	—	—	
High Static Duct	MVAH	—	—	—	—	—	072ME	096ME	
Multi Position Air Handler	MVAX	036ME	042ME	048ME	054ME	060ME	—	—	
Highwall	MVAW	—	—	—	—	—	—	—	

Outdoor Unit

Capacity Range

Capacity Range (Ton)		6	8	10	12	14	16	18	20	Power Supply Standard
Capacity Index (Kbtu)		72	96	120	144	168	192	216	240	
Dual Model	208/230V	072ME	096ME	120ME	144ME	168ME	192ME	216ME	240ME	2CA
	460V									4CA

Capacity Range (Ton)		22	24	26	28	30	32
Capacity Index (Kbtu)		264	288	312	336	360	384
Dual Model	208/230V	264ME	288ME	312ME	336ME	360ME	384ME
	460V						

Capacity Range (Ton)		34	36	38	Power Supply Standard
Capacity Index (Kbtu)		408	432	456	
Dual Model	208/230V	408ME	432ME	456ME	2CA
	460V				4CA

Dual Model 208/230V

Model Name	MVHQ072ME2CA	MVHQ096ME2CA	MVHQ120ME2CA	MVHQ144ME2CA
Outdoor Unit 1	MVHQ072ME2CA	MVHQ096ME2CA	MVHQ120ME2CA	MVHQ144ME2CA

Model Name	MVHQ168ME2CA	MVHQ192ME2CA	MVHQ216ME2CA	MVHQ240ME2CA
Outdoor Unit 1	MVHQ168ME2CA	MVHQ192ME2CA	MVHQ216ME2CA	MVHQ240ME2CA

Model Name	MVHQ264ME2CA	MVHQ288ME2CA	MVHQ312ME2CA	MVHQ336ME2CA
Outdoor Unit 1	MVHQ144ME2CA	MVHQ144ME2CA	MVHQ144ME2CA	MVHQ144ME2CA
Outdoor Unit 2	MVHQ120ME2CA	MVHQ144ME2CA	MVHQ168ME2CA	MVHQ192ME2CA

Model Name	MVHQ360ME2CA	MVHQ384ME2CA	MVHQ408ME2CA	MVHQ432ME2CA
Outdoor Unit 1	MVHQ168ME2CA	MVHQ192ME2CA	MVHQ192ME2CA	MVHQ216ME2CA
Outdoor Unit 2	MVHQ192ME2CA	MVHQ192ME2CA	MVHQ216ME2CA	MVHQ216ME2CA

Model Name	MVHQ456ME2CA
Outdoor Unit 1	MVHQ168ME2CA
Outdoor Unit 2	MVHQ168ME2CA
Outdoor Unit 3	MVHQ120ME2CA

Dual Model 460V

Model Name	MVHQ072ME4CA	MVHQ096ME4CA	MVHQ120ME4CA	MVHQ144ME4CA
Outdoor Unit 1	MVHQ072ME4CA	MVHQ096ME4CA	MVHQ120ME4CA	MVHQ144ME4CA

Model Name	MVHQ168ME4CA	MVHQ192ME4CA	MVHQ216ME4CA	MVHQ240ME4CA
Outdoor Unit 1	MVHQ168ME4CA	MVHQ192ME4CA	MVHQ216ME4CA	MVHQ240ME4CA

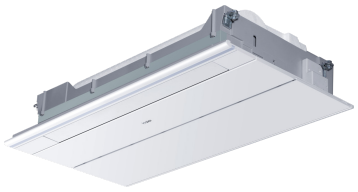
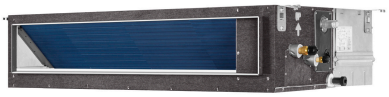
Model Name	MVHQ264ME4CA	MVHQ288ME4CA	MVHQ312ME4CA	MVHQ336ME4CA
Outdoor Unit 1	MVHQ144ME4CA	MVHQ144ME4CA	MVHQ144ME4CA	MVHQ144ME4CA
Outdoor Unit 2	MVHQ120ME4CA	MVHQ144ME4CA	MVHQ168ME4CA	MVHQ192ME4CA

Model Name	MVHQ360ME4CA	MVHQ384ME4CA	MVHQ408ME4CA	MVHQ432ME4CA
Outdoor Unit 1	MVHQ168ME4CA	MVHQ192ME4CA	MVHQ192ME4CA	MVHQ216ME4CA
Outdoor Unit 2	MVHQ192ME4CA	MVHQ192ME4CA	MVHQ216ME4CA	MVHQ216ME4CA

Model Name	MVHQ456ME4CA
Outdoor Unit 1	MVHQ168ME4CA
Outdoor Unit 2	MVHQ168ME4CA
Outdoor Unit 3	MVHQ120ME4CA

2.5.2 External Appearance

Indoor Unit

One Way Cassette MVAO005ME2AA MVAO007ME2AA MVAO009ME2AA MVAO012ME2AA 	Compact Cassette (2*2) MVAB005MV2AA MVAB007MV2AA MVAB009MV2AA MVAB012MV2AA MVAB018MV2AA 
Large Cassette (3*3) MVAL007ME2AA MVAL009ME2AA MVAL012ME2AA MVAL015ME2AA MVAL018ME2AA MVAL024ME2AA MVAL030ME2AA MVAL036ME2AA MVAL042ME2AA MVAL048ME2AA 	Slim Duct MVAD007MV2AA MVAD009MV2AA MVAD012MV2AA MVAD018MV2AA MVAD024MV2AA 
Medium Static Duct MVAM007ME2AA MVAM009ME2AA MVAM012ME2AA MVAM015ME2AA MVAM018ME2AA MVAM024ME2AA MVAM036ME2AA MVAM048ME2AA MVAM054ME2AA 	High Static Duct MVAH072ME2AA MVAH096ME2AA 
Multi Position Air Handler MVAX009ME2AA MVAX012ME2AA MVAX018ME2AA MVAX024ME2AA MVAX030ME2AA MVAX036ME2AA MVAX042ME2AA MVAX048ME2AA MVAX054ME2AA MVAX060ME2AA 	Highwall MVAW007MV2AA MVAW009MV2AA MVAW012MV2AA MVAW018MV2AA MVAW024MV2AA MVAW030MV2AA 

Outdoor Units

MVHQ072ME2CA
MVHQ072ME4CA

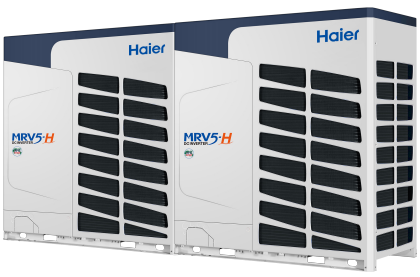
MVHQ096/120/144ME2CA
MVHQ096/120/144ME4CA

MVHQ168/192/216/240ME2CA
MVHQ168/192/216/240ME4CA

MVHQ264/288ME2CA
MVHQ264/288ME4CA

MVHQ312/336ME2CA
MVHQ312/336ME4CA

MVHQ360/384/408/432ME2CA
MVHQ360/384/408/432ME4CA



MVHQ456ME2CA
MVHQ456ME4CA

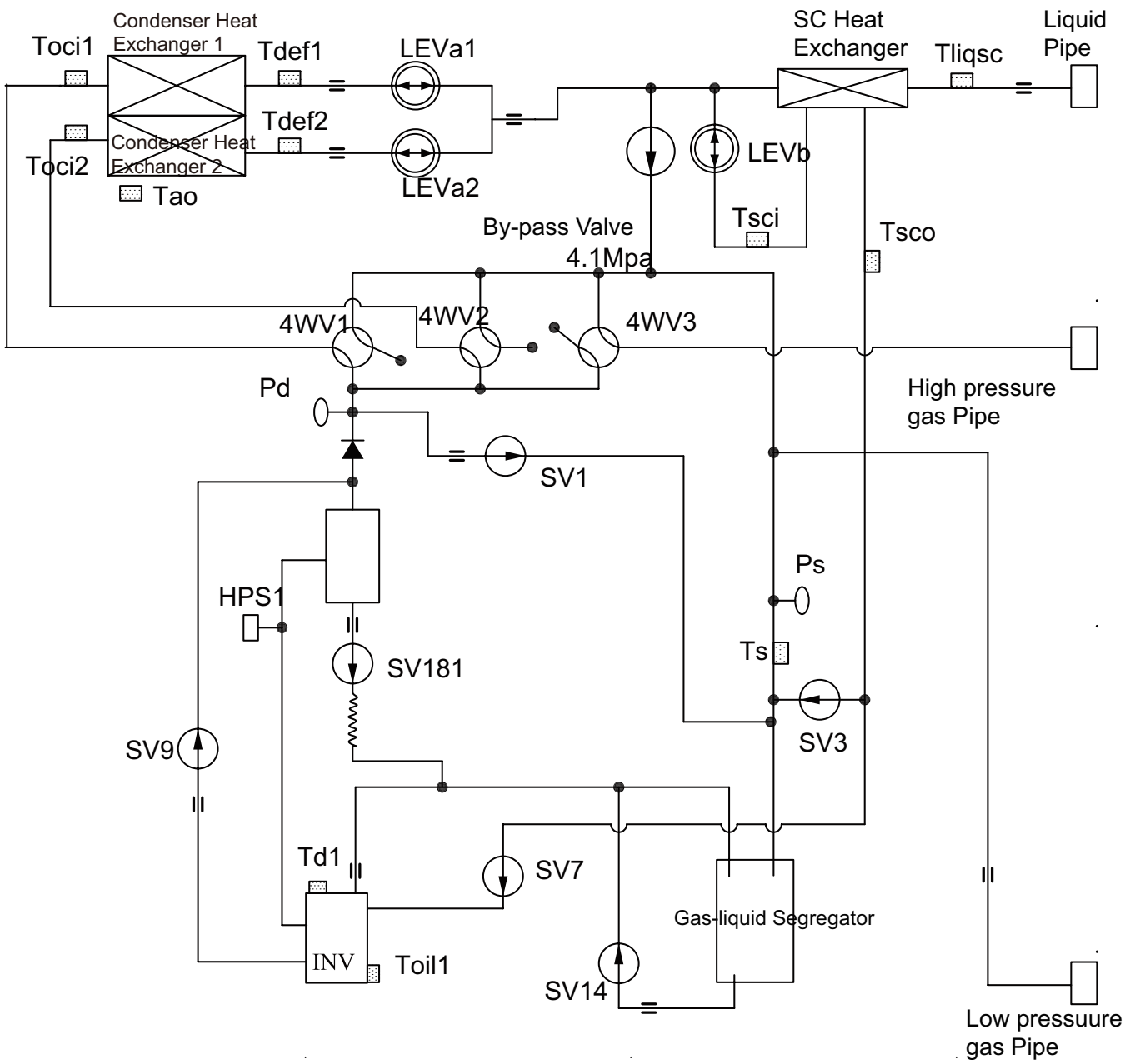
2.5.3 Combination of Outdoor Units

Model Name	System Capacity (Ton)	Number of Units	Module							
			72	96	120	144	168	192	216	240
MVHQ072ME2CA MVHQ072ME4CA	6		•							
MVHQ096ME2CA MVHQ096ME4CA	8			•						
MVHQ120ME2CA MVHQ120ME4CA	10				•					
MVHQ144ME2CA MVHQ144ME4CA	12					•				
MVHQ168ME2CA MVHQ168ME4CA	14						•			
MVHQ192ME2CA MVHQ192ME4CA	16							•		
MVHQ216ME2CA MVHQ216ME4CA	18								•	
MVHQ240ME2CA MVHQ240ME4CA	20									•
MVHQ264ME2CA MVHQ264ME4CA	22				•	•				
MVHQ288ME2CA MVHQ288ME4CA	24					••				
MVHQ312ME2CA MVHQ312ME4CA	26				•		•			
MVHQ336ME2CA MVHQ336ME4CA	28					•		•		
MVHQ360ME2CA MVHQ360ME4CA	30						•	•		
MVHQ384ME2CA MVHQ384ME4CA	32							••		
MVHQ408ME2CA MVHQ408ME4CA	34							•	•	
MVHQ432ME2CA MVHQ432ME4CA	36								••	
MVHQ456ME2CA MVHQ456ME4CA	38				•		••			

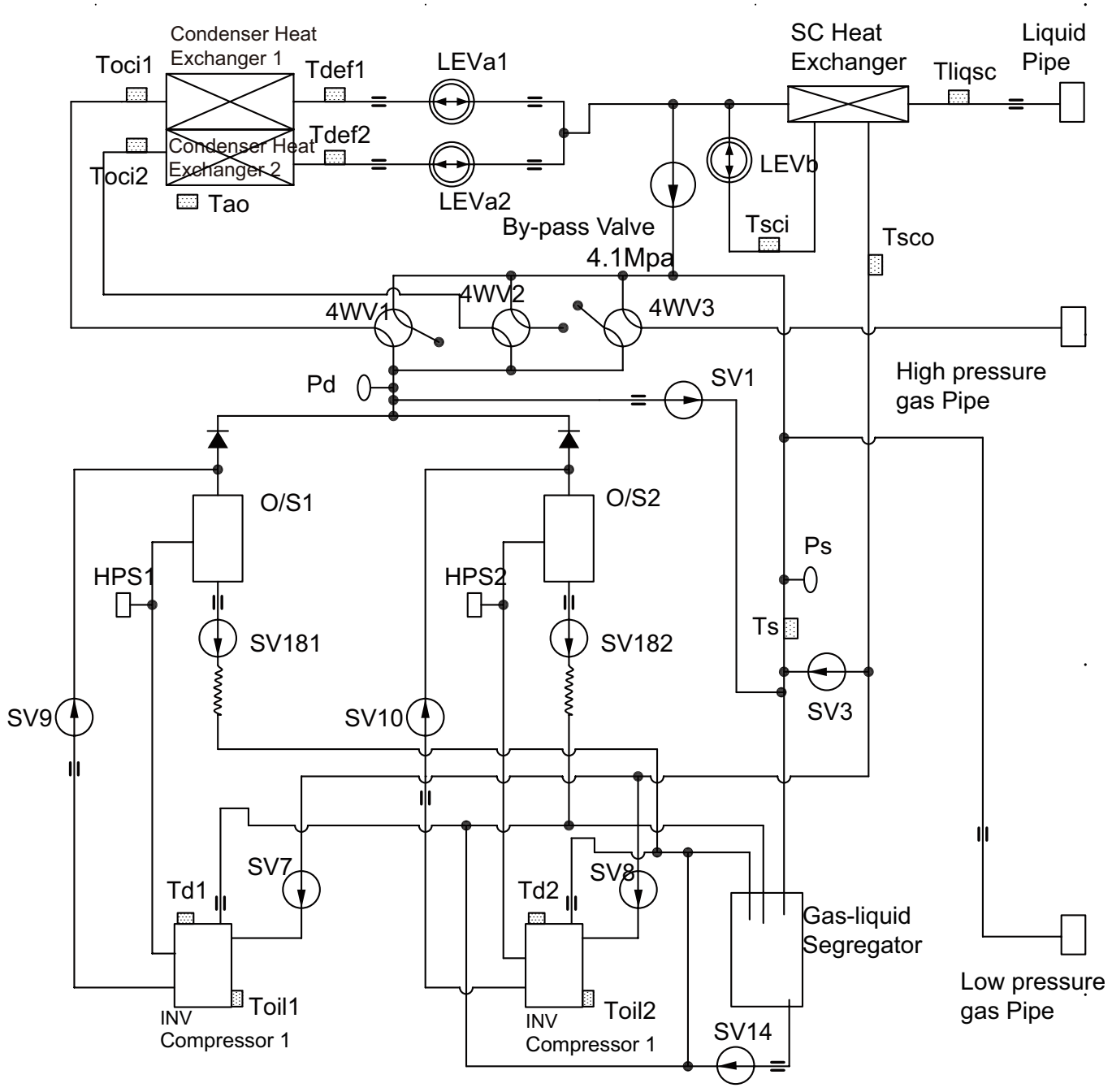
Note:
For multiple connection, the outdoor unit multi connection piping kit is required.

3. Refrigerant Circuit

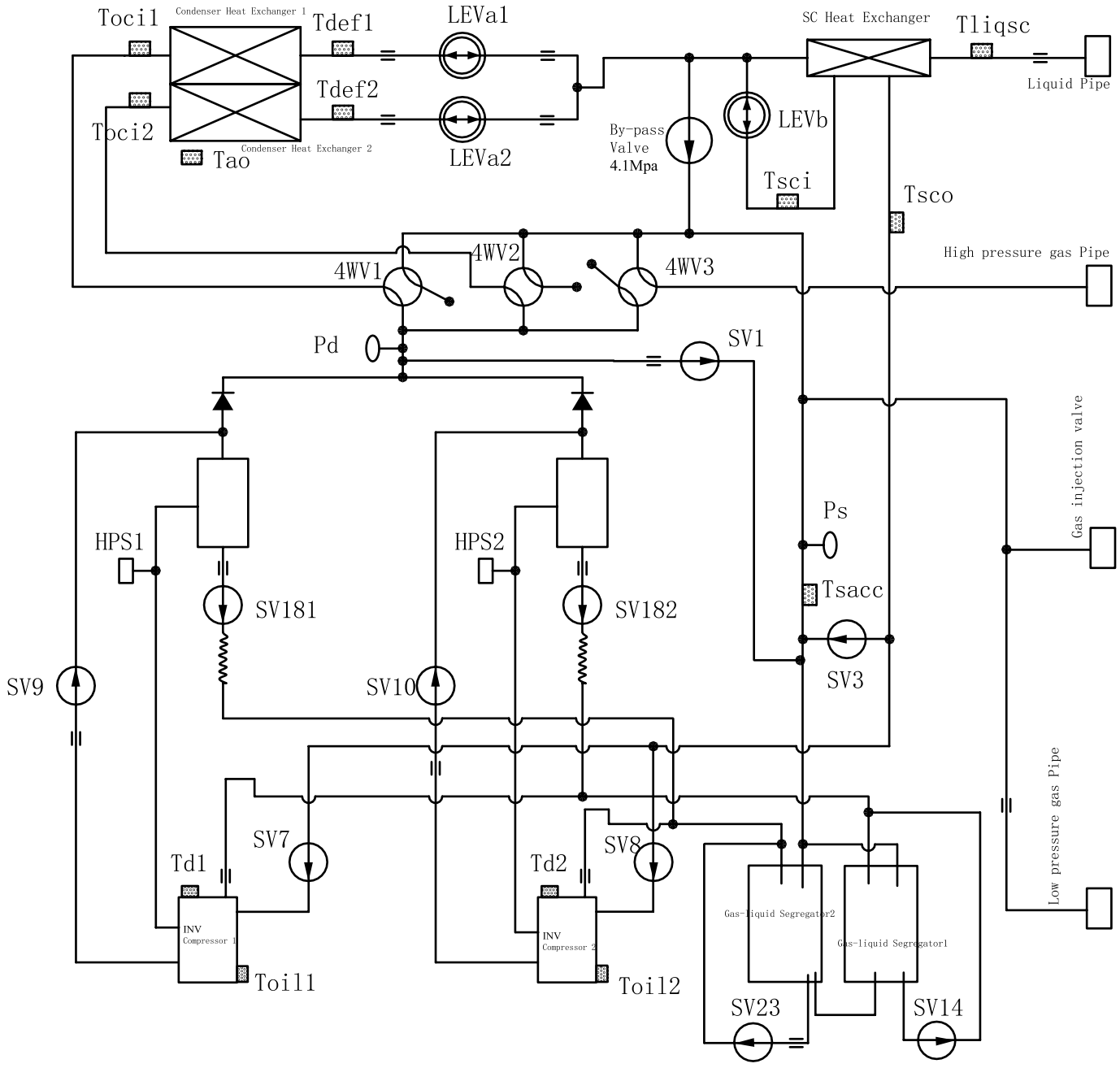
MVHQ072/096/120ME2CA-Cooling Operation
MVHQ072/096/120ME4CA-Cooling Operation



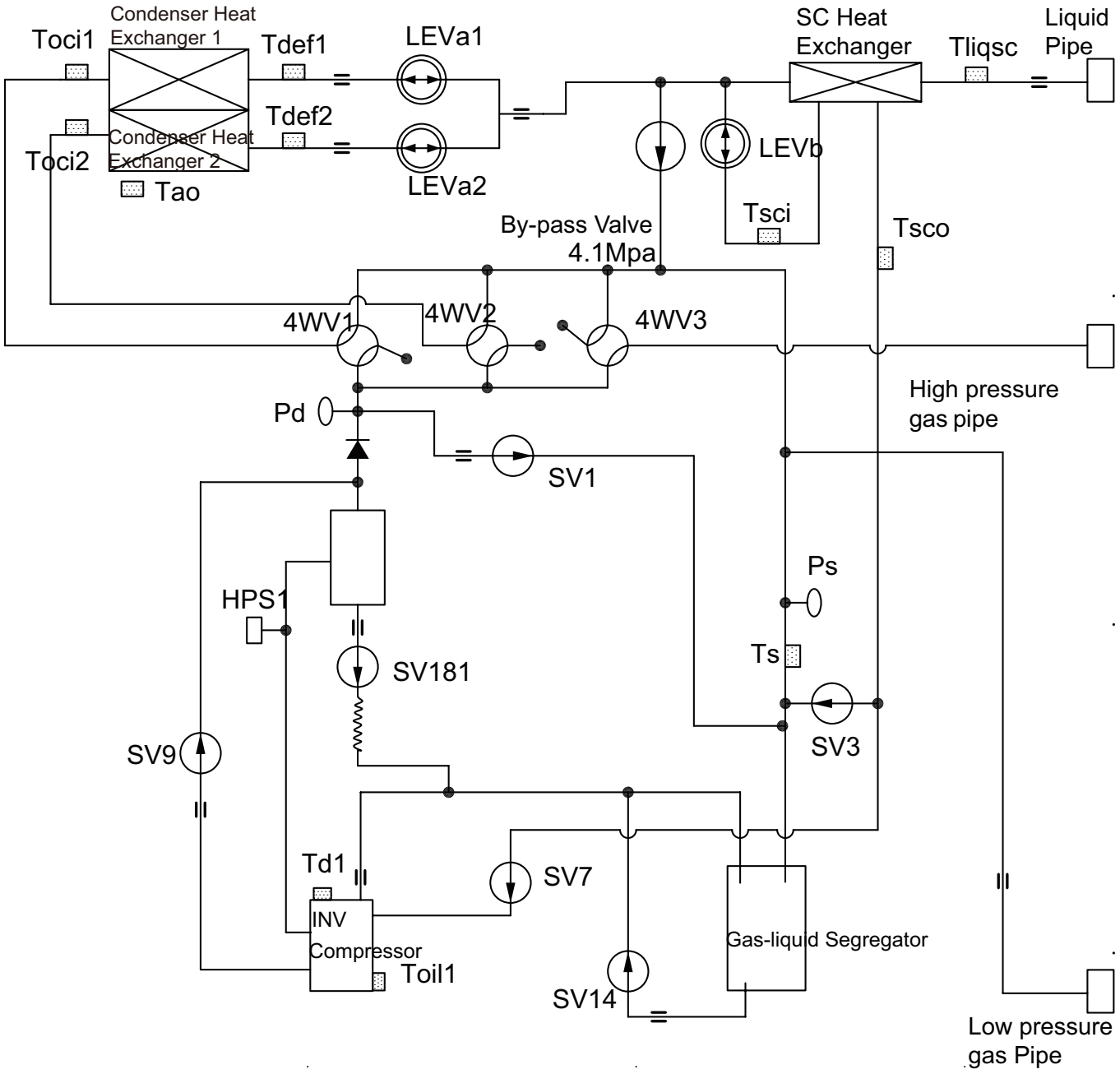
MVHQ144ME2CA-Cooling Operation
MVHQ144ME4CA-Cooling Operation



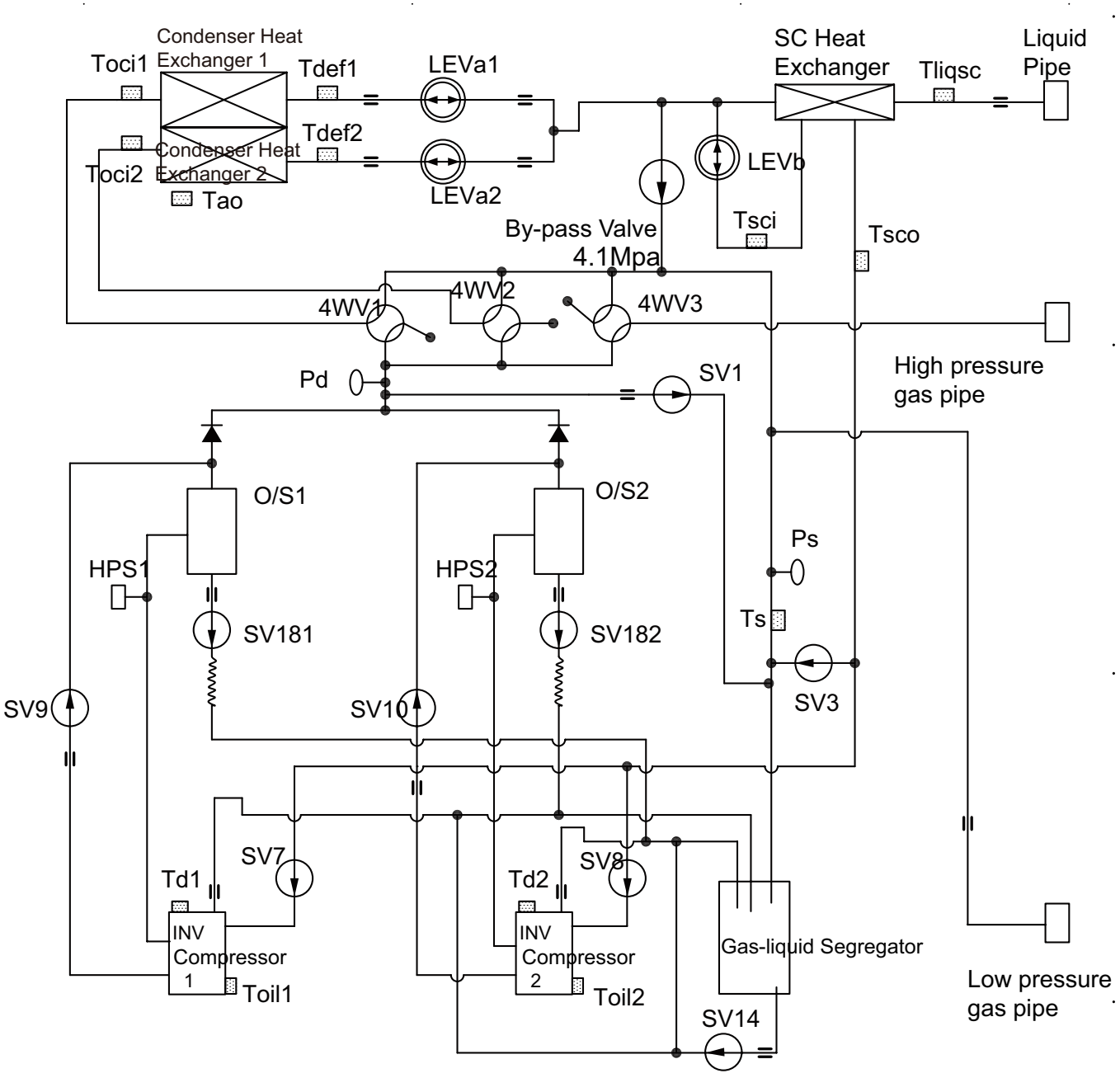
MVHQ168/192/210/240ME2CA-Cooling Operation
MVHQ168/192/210/240ME4CA-Cooling Operation



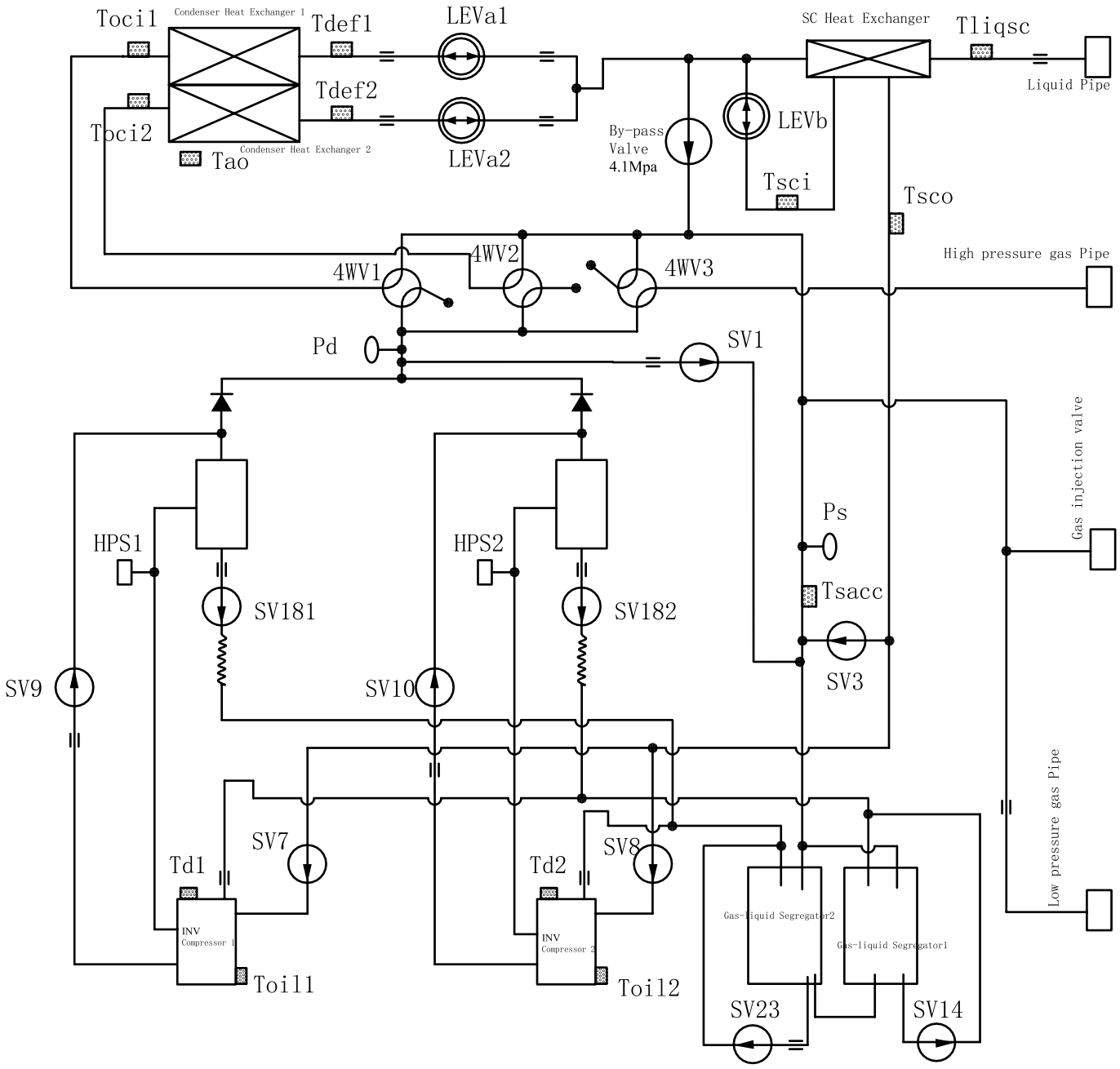
MVHQ072/096/120ME2CA-Heating Operation
MVHQ072/096/120ME4CA-Heating Operation



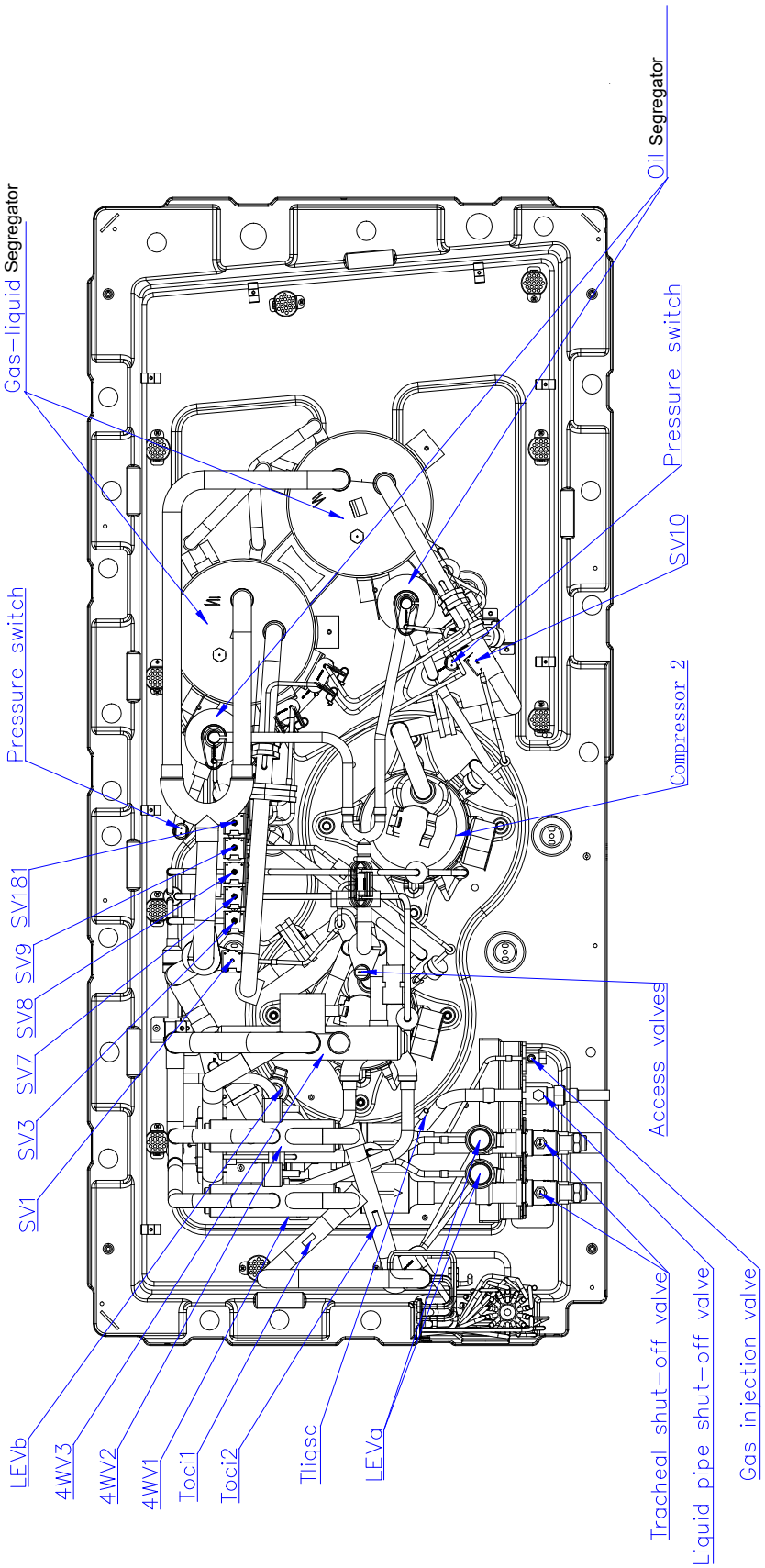
MVHQ144ME2CA-Heating Operation
MVHQ144ME4CA-Heating Operation

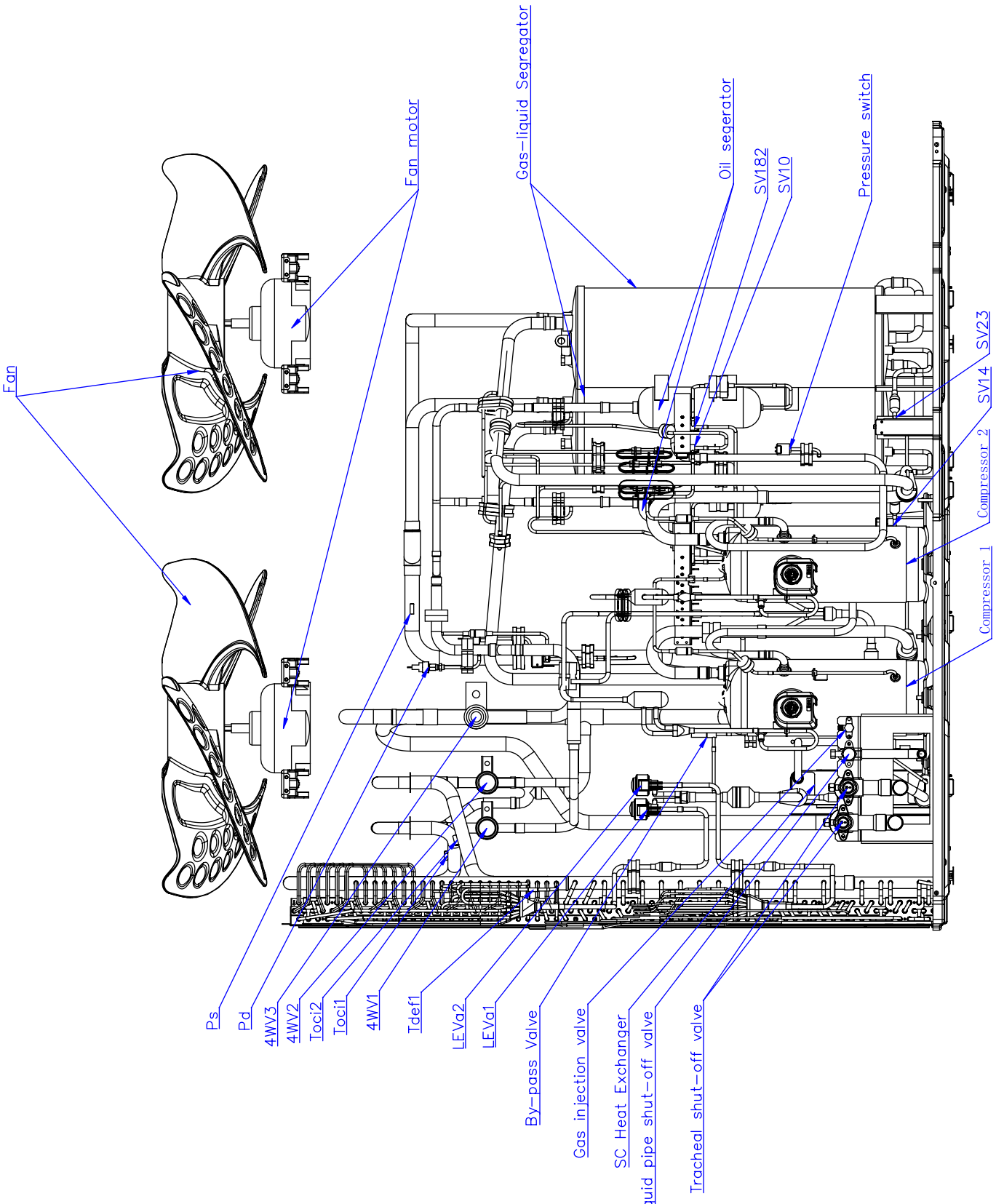


MVHQ168/192/210/240ME2CA-Heating Operation
MVHQ168/192/210/240ME4CA-Heating Operation

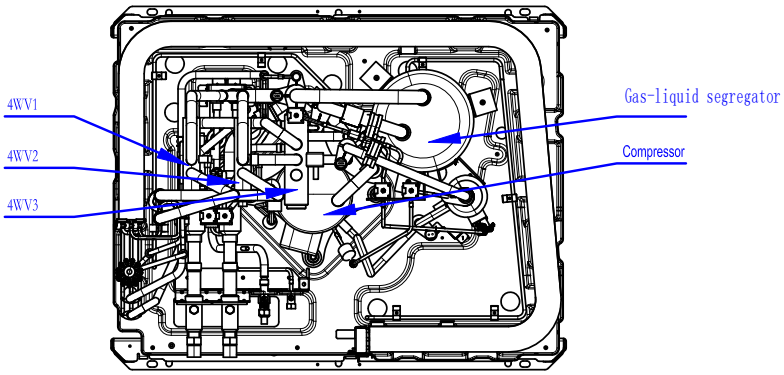


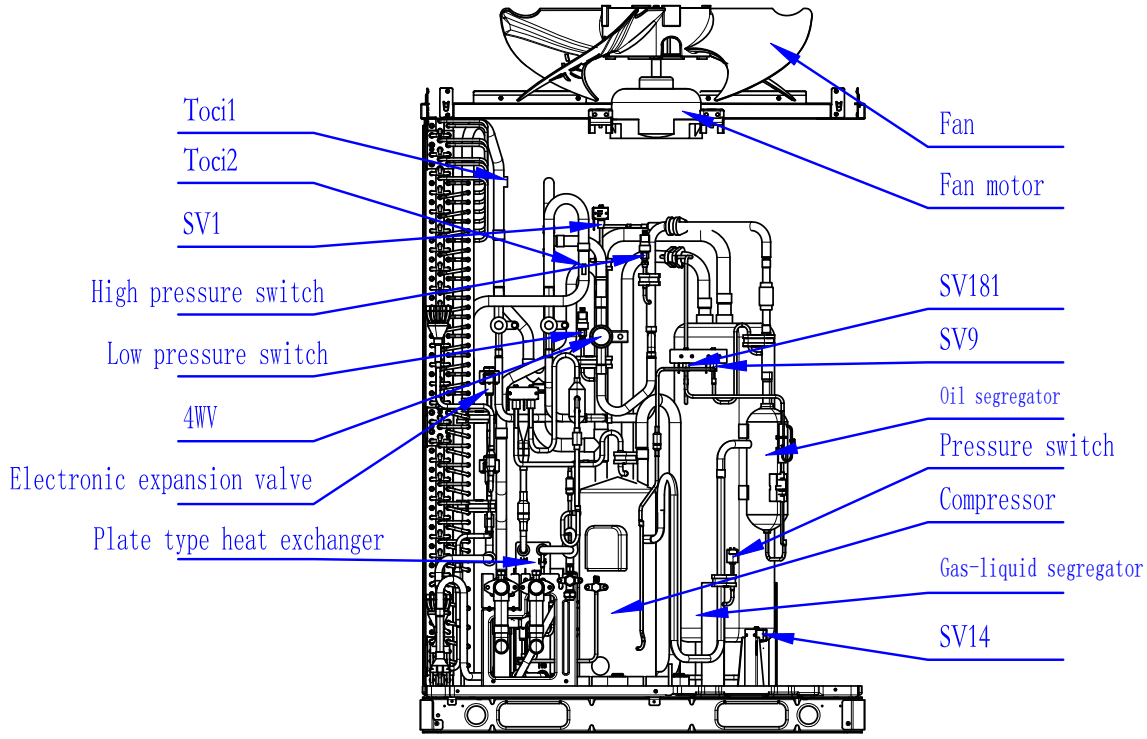
4. Functional Parts Layout



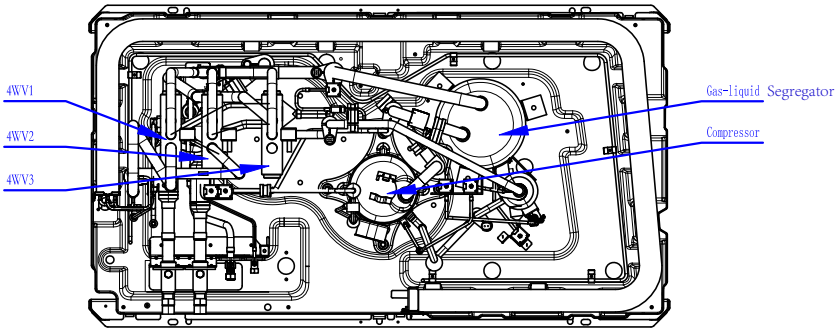

Fan
Fan motor
Gas-liquid Segregator
Oil segerator
SV182
SV10
Pressure switch
SV23
SV14
Compressor 2
Compressor 1
Ps
Pd
4WV3
4WV2
Toci2
Toci1
4WV1
Tdef1
LEVa2
LEVa1
By-pass Valve
Gas injection valve
SC Heat Exchanger
Liquid pipe shut-off valve
Tracheal shut-off valve

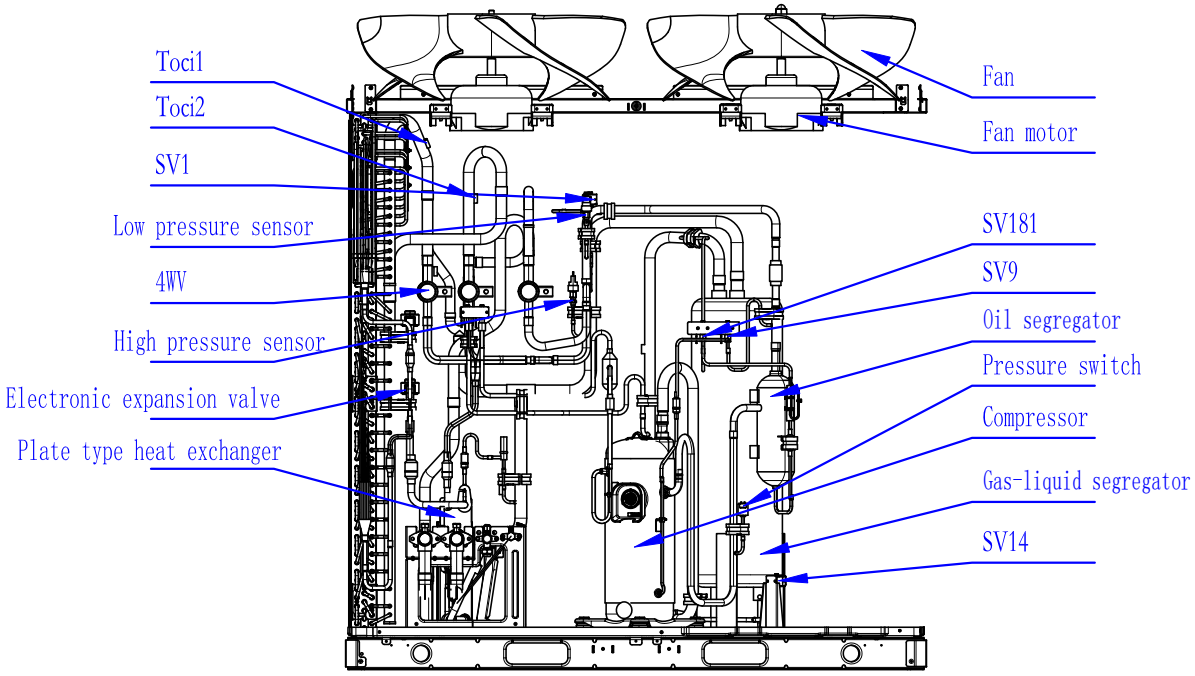
MVHQ072ME2CA
MVHQ072ME4CA



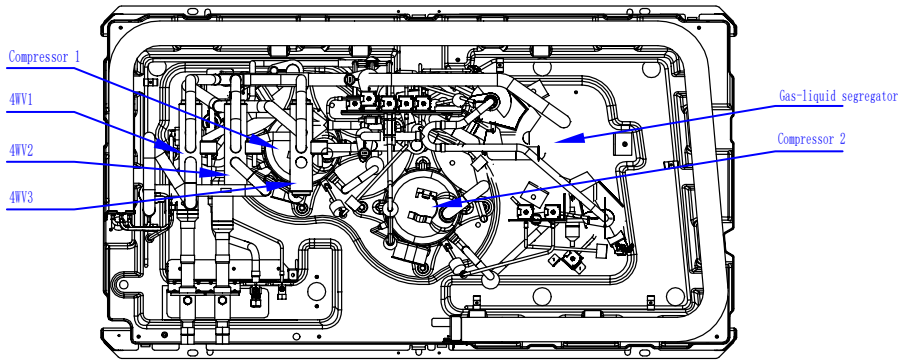


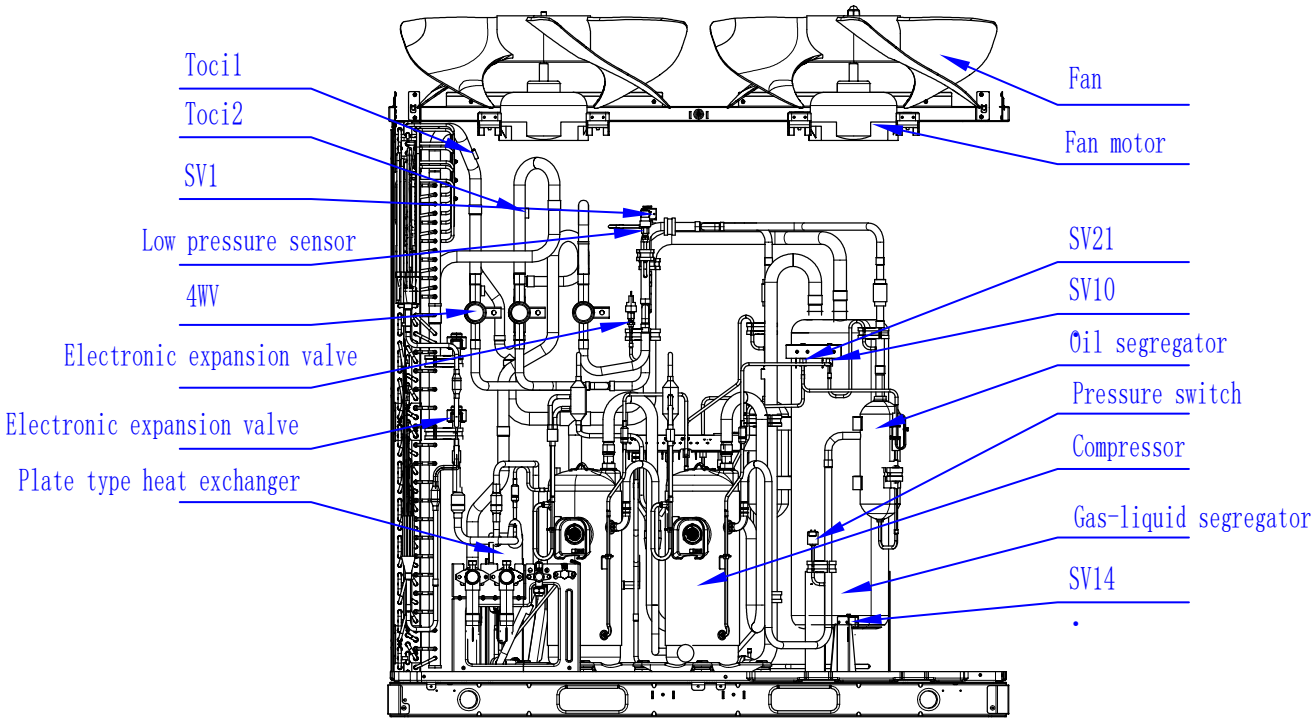
MVHQ096/120ME2CA
MVHQ096/120ME4CA



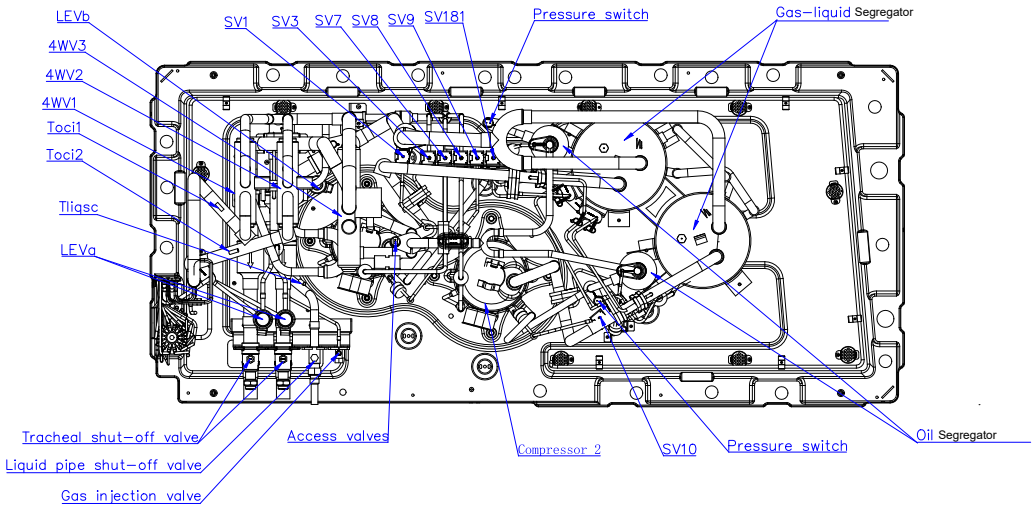


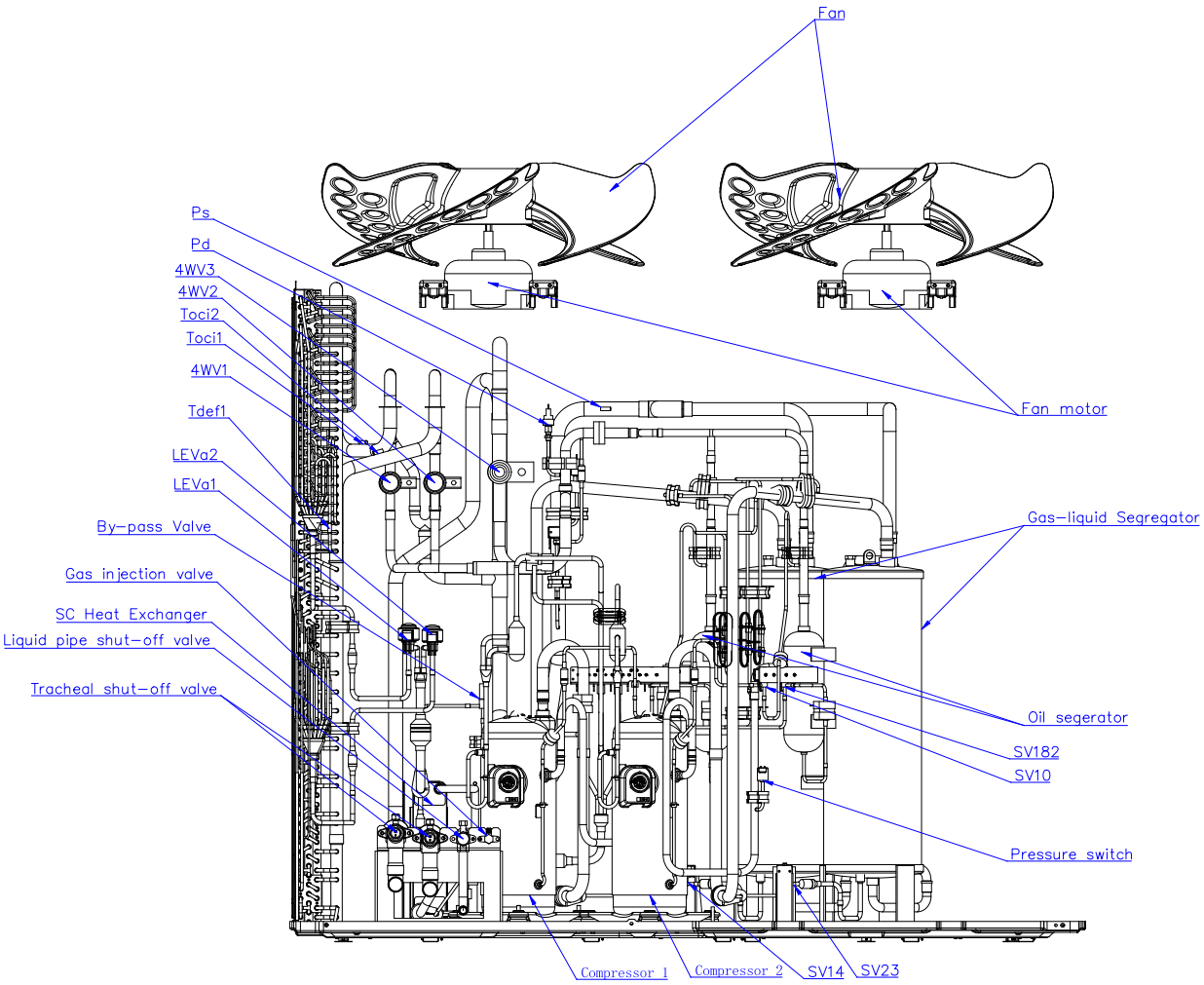
MVHQ144ME2CA
MVHQ144ME4CA





MVHQ168/192/216/240ME2CA
MVHQ168/192/216/240ME4CA



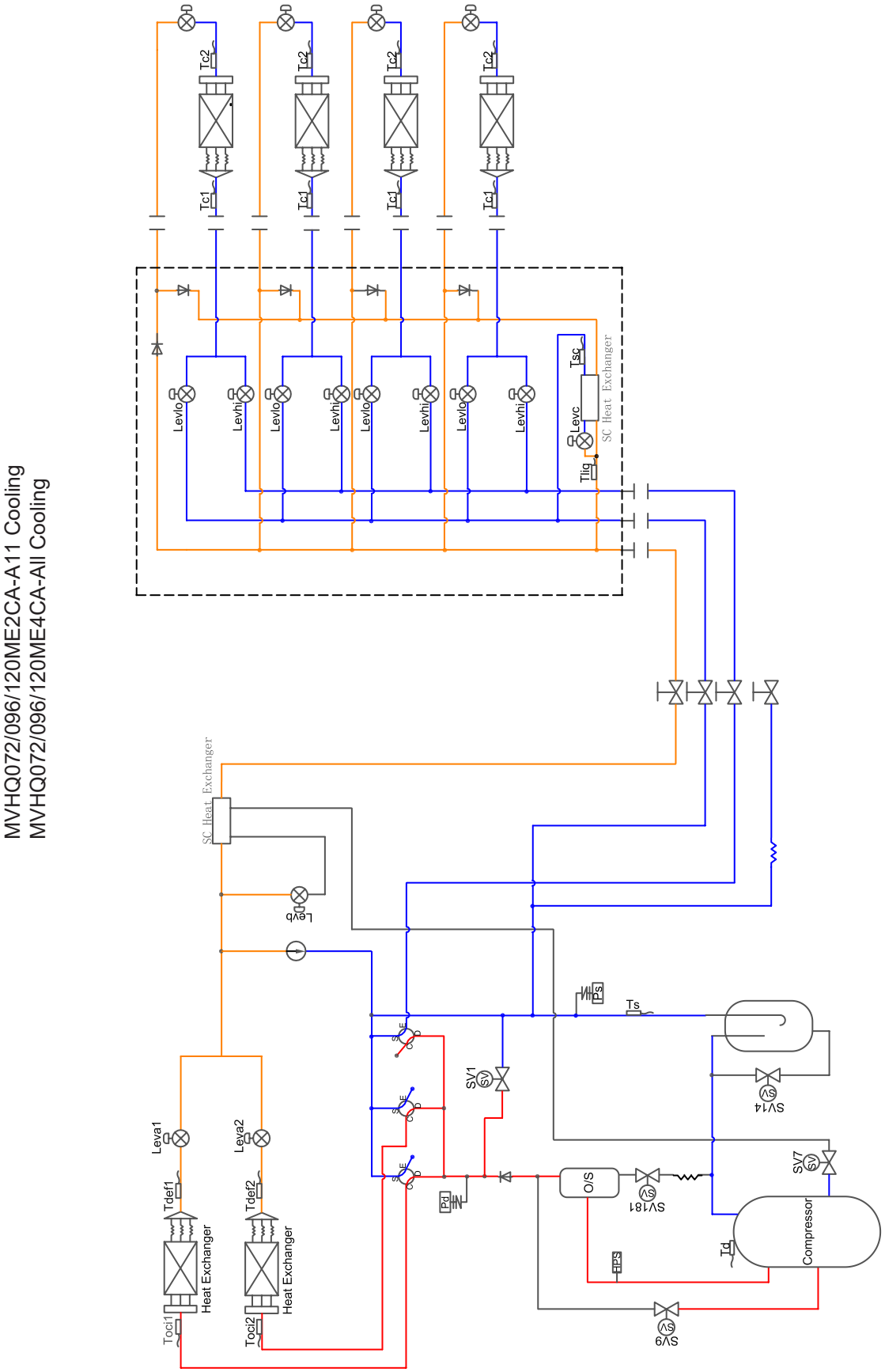


Part Name	Sign	Function	Data	Remark
Compressor	/	"Capacity control, to meet indoor load through frequency adjustment."	ANB66FZPMT: 0.23Ω ANB78FZPMT: 0.23Ω ANB66FZYMT: 0.23Ω ANB78FZYMT: 0.23Ω	
Pressure Switch	HPS1/2	Protection control for high pressure.	602psi, OFF setting	
Pressure Sensor	Pd	In heating, compressor frequency adjustment and protection control for abnormal pressure.	0~601psi	
	Ps	In cooling, compressor frequency adjustment and protection control for abnormal pressure.	29-218psi.	
"Electronic Expansion Valve"	LEVa1/2	Refrigerant flow control in heating.	HAM-BD30SM-2	
	LEVb	1. Sub-cooling valve. 2. Refrigerant spraying when discharge temp. or oil temp. is too high.	UKV-25D133	
Solenoid Valve	SV1	1. Balance between high and low pressures when the compressor starts and stops; 2. Protection to prevent high and low pressures.	AC220V/2A	
	SV31	Started when the compressor discharging temperature and oil temperature are too high to carry out temperature reduction by refrigerant spraying.	AC220V/2A	
	SV7	Compressor VVI solenoid valve, which increases refrigerant circulation of compressor	AC220V/2A	Single compressor unit/ Double compressors unit-compressor 1
	SV8	Compressor VVI solenoid valve, which increases refrigerant circulation of compressor	AC220V/2A	Double compressors unit-compressor 2
	SV9	The outdoor unit for oil discharging starts SV9 for oil balancing during oil balance among modules.	AC220V/2A	Single compressor unit/ Double compressors unit-compressor 1
	SV10	Outdoor unit SV10 for oil suction starts during oil balance; for pressure relief to prevent explosion of pipe group.	AC220V/2A	Double compressors unit-compressor 2
	SV14	Segrigator bottom oil return solenoid valve.which makes the lubricating oil returned to the compressor in time thus to avoid compressor failure due to the lack of lubricating oil and ensure the normal operation of the compressor.	AC220V/2A	
	SV181	Segrigator bottom oil return solenoid valve,which makes the lubricating oil returned to the compressor in time thus to avoid compressor failure due to the lack of lubricating oil and ensure the normal operation of the compressor.	AC220V/2A	Single compressor unit/ Double compressors unit-compressor 1
	SV182	Segrigator bottom oil return solenoid valve,which makes the lubricating oil returned to the compressor in time thus to avoid compressor failure due to the lack of lubricating oil and ensure the normal operation of the compressor.	AC220V/2A	Double compressors unit-compressor 2
	SV23	"Segrigator bottom oil return solenoid valve. which makes the lubricating oil returned to the compressor in time thus to avoid compressor failure due to the lack of lubricating oil and ensure the normal operation of the compressor."	AC220V/2A	

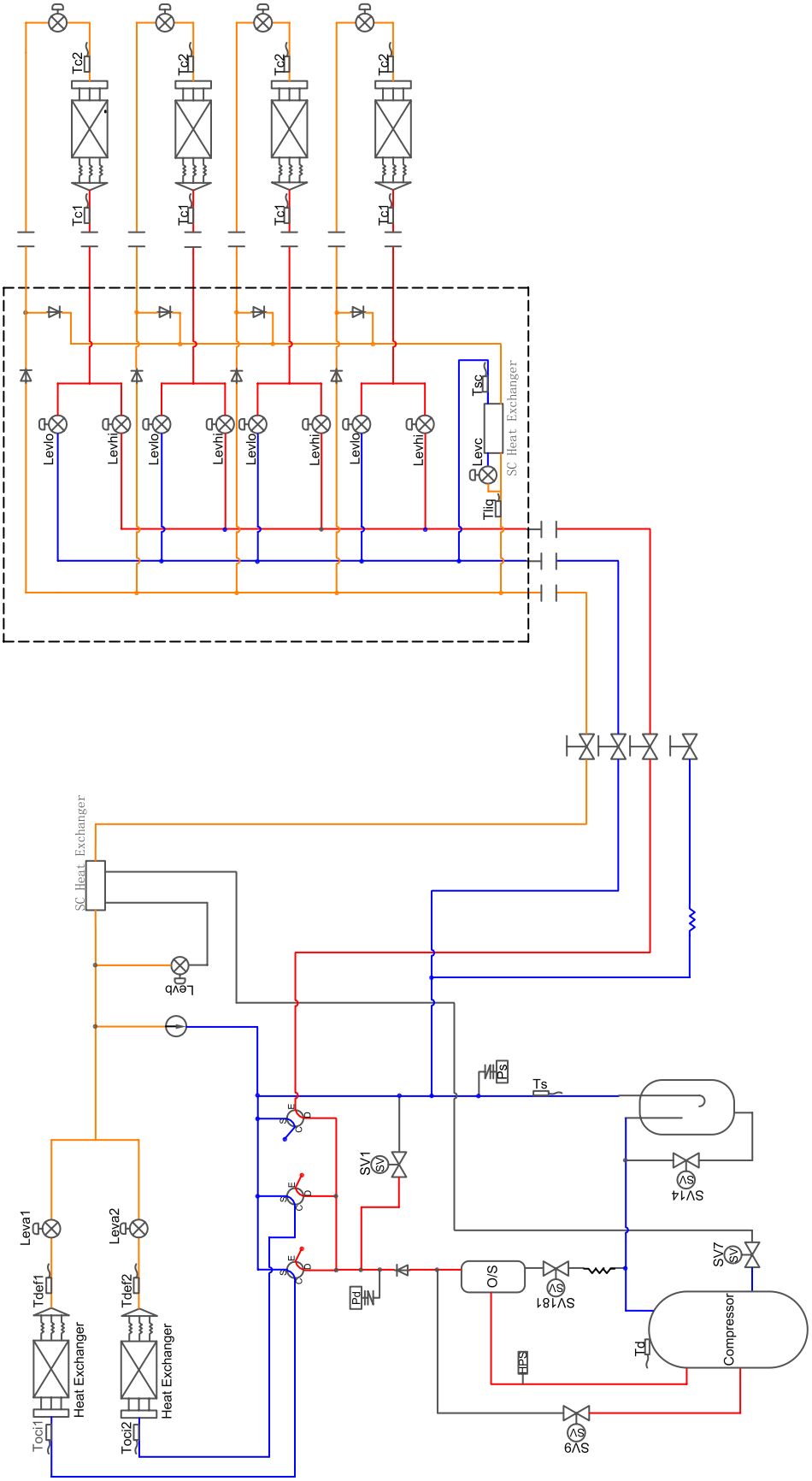
Part Name	Sign	Function	Data	Remark
Four-Way Valve	4WV1 4WV1/2/3	Switch between cooling and heating.	AC220V Power on during heating and power off during cooling or defrosting.	HR:3EA/Unit
Temperature Sensor	Tsuc	Detecting the temperature of gas pipe. It is used to check whether the four-way valve is normal.	R(77°F)=10K, B(77°F/122°F) =3700K	
	Tsci	Detecting the inlet temperature of sub-cooling pipe and controlling sub-cooling valve's opening		
	Tsco	Detecting the inlet temperature of sub-cooling pipe and controlling sub-cooling valve's opening		
	Tliqsc	Detecting the temperature of liquid pipe and controlling sub-cooling degree.		
	Toil1/2	"To detect the temperature of refrigeration lubricant at the compressor bottom."	"R (176°F) - 50K B (77/176°F)=4450K"	
	Td1/Td2	To detect the top temperature of inverter/ON- OFF compressor.		
	Tdef1/2	"To detect the frosting of outdoor heat exchanger."	R(77°F)=10K, B(77°F/122°F) =3700K	
	Toci1/2	"To detect the temperature of condenser main gas pipe to control LEVa1, 2 during heating."		
	Ts	To detect the inlet temperature of gas-liquid segregator.		
	Tao	"To detect ambient temperature and control the initial air speed and defrosting conditions."		
Heater	HEAT1/2	"Used to heat the compressor oil in the inverter compressor."	"33W, 220V, 2 pieces/ compressor."	

5. Refrigerant Flow for Each Operation Mode

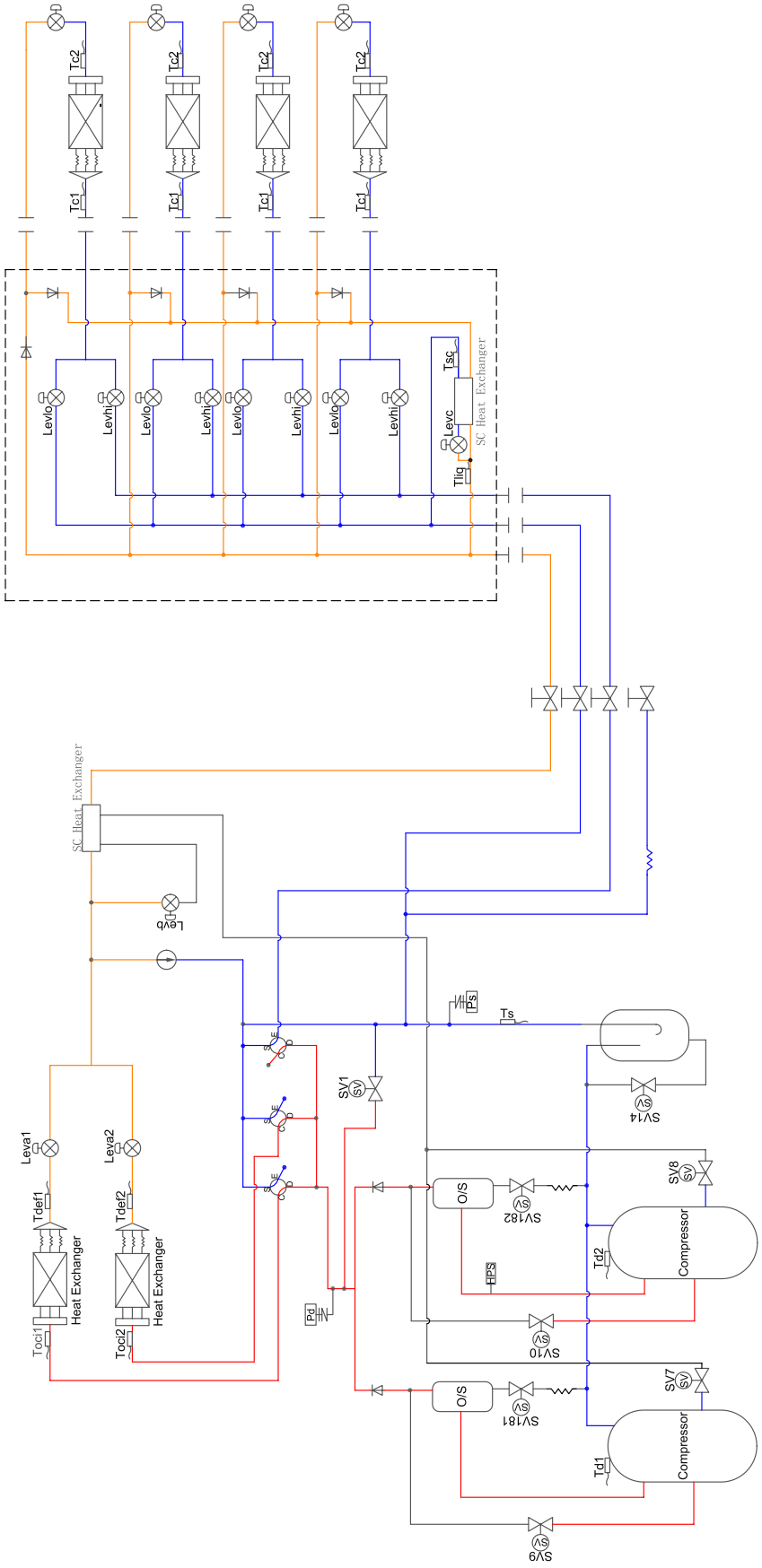
MVHQ072/096/120ME2CA-A11 Cooling
MVHQ072/096/120ME4CA-All Cooling



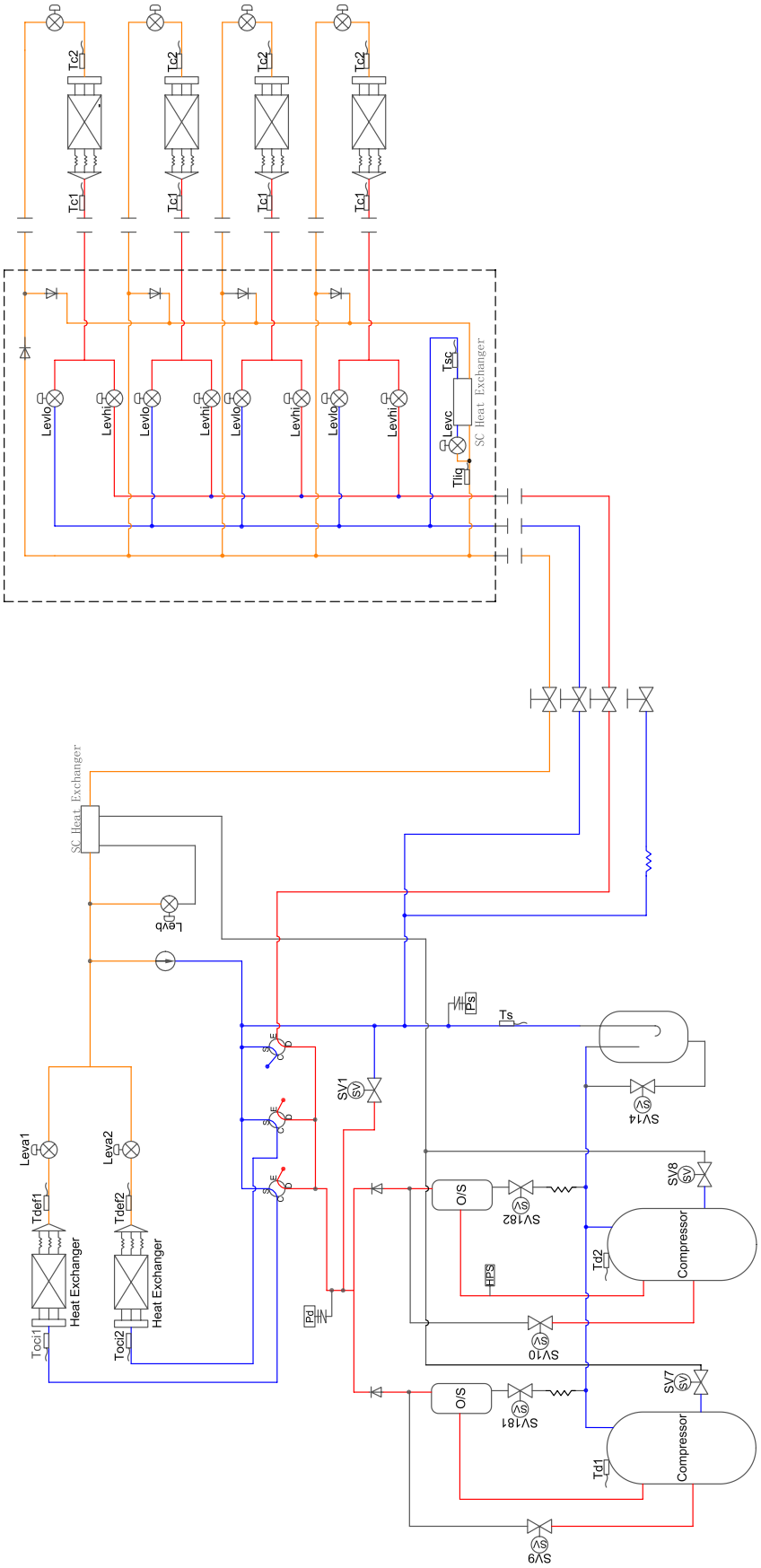
MVHQ072/096/120ME2CA-A11 Heating
MVHQ072/096/120ME4CA-A11 Heating



MVHQ144ME2CA-A11 Cooling
MVHQ144ME4CA-A11 Cooling



MVHQ144ME2CA-A11 Cooling
MVHQ144ME4CA-A11 Cooling



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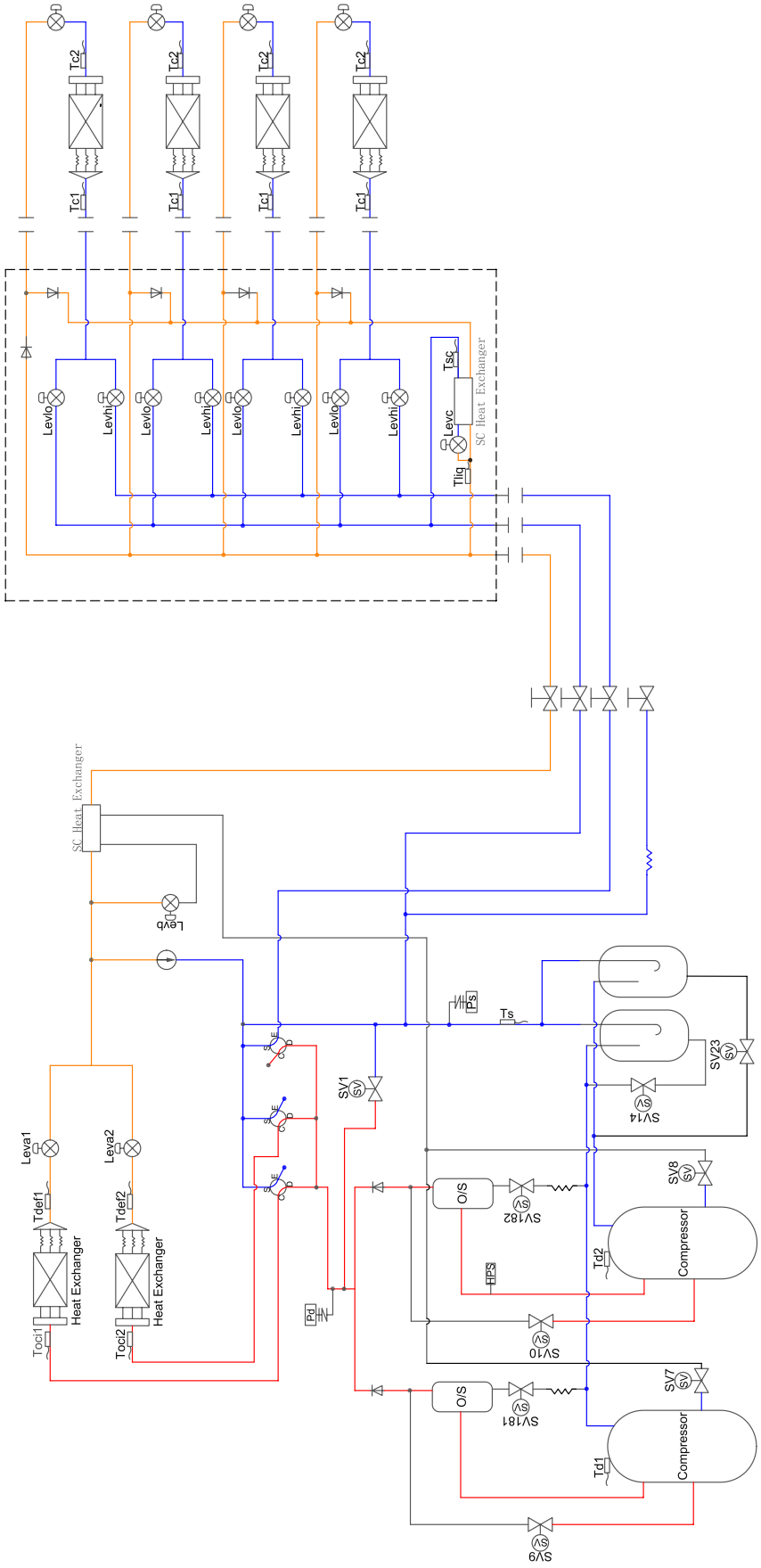
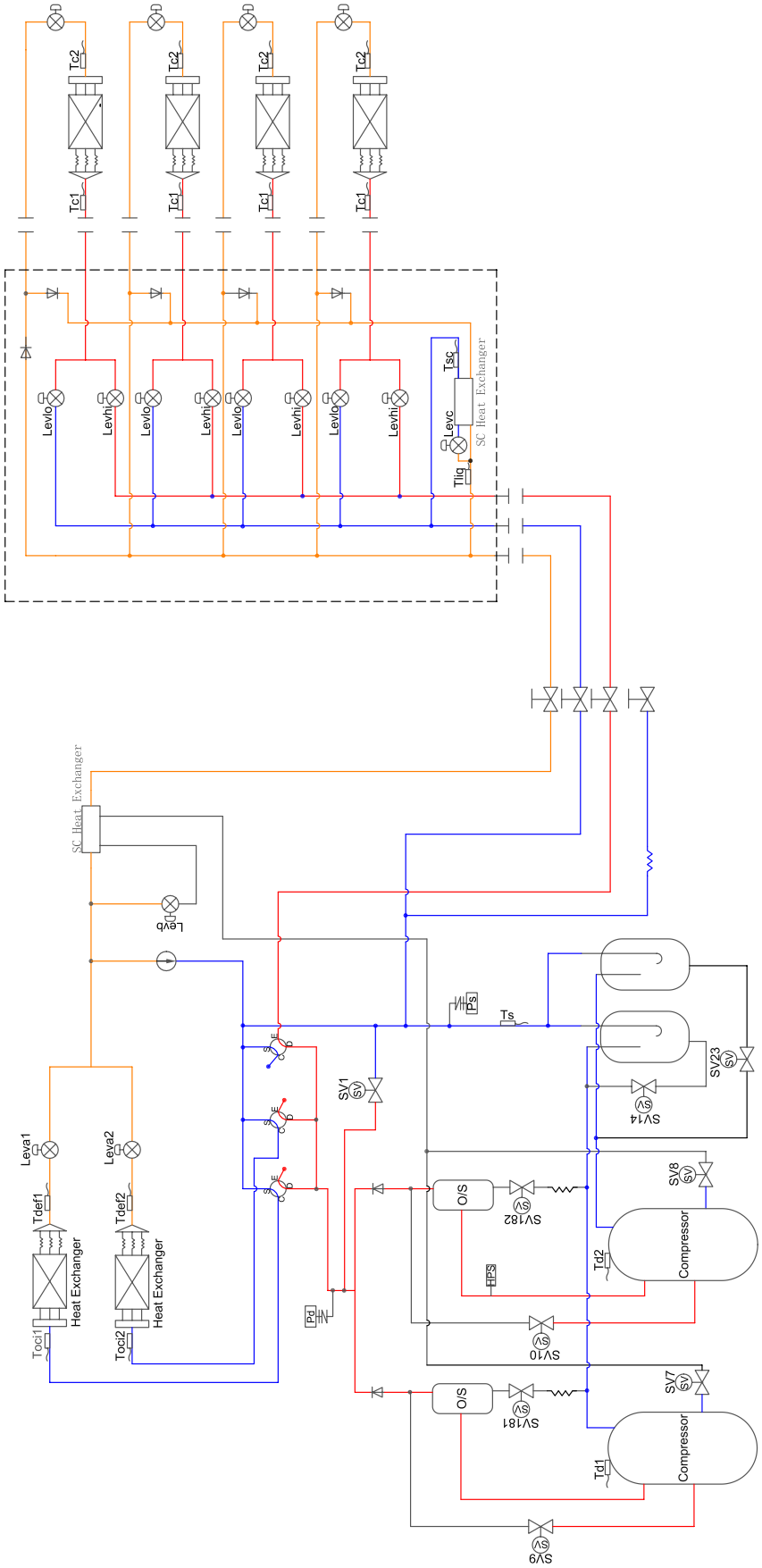
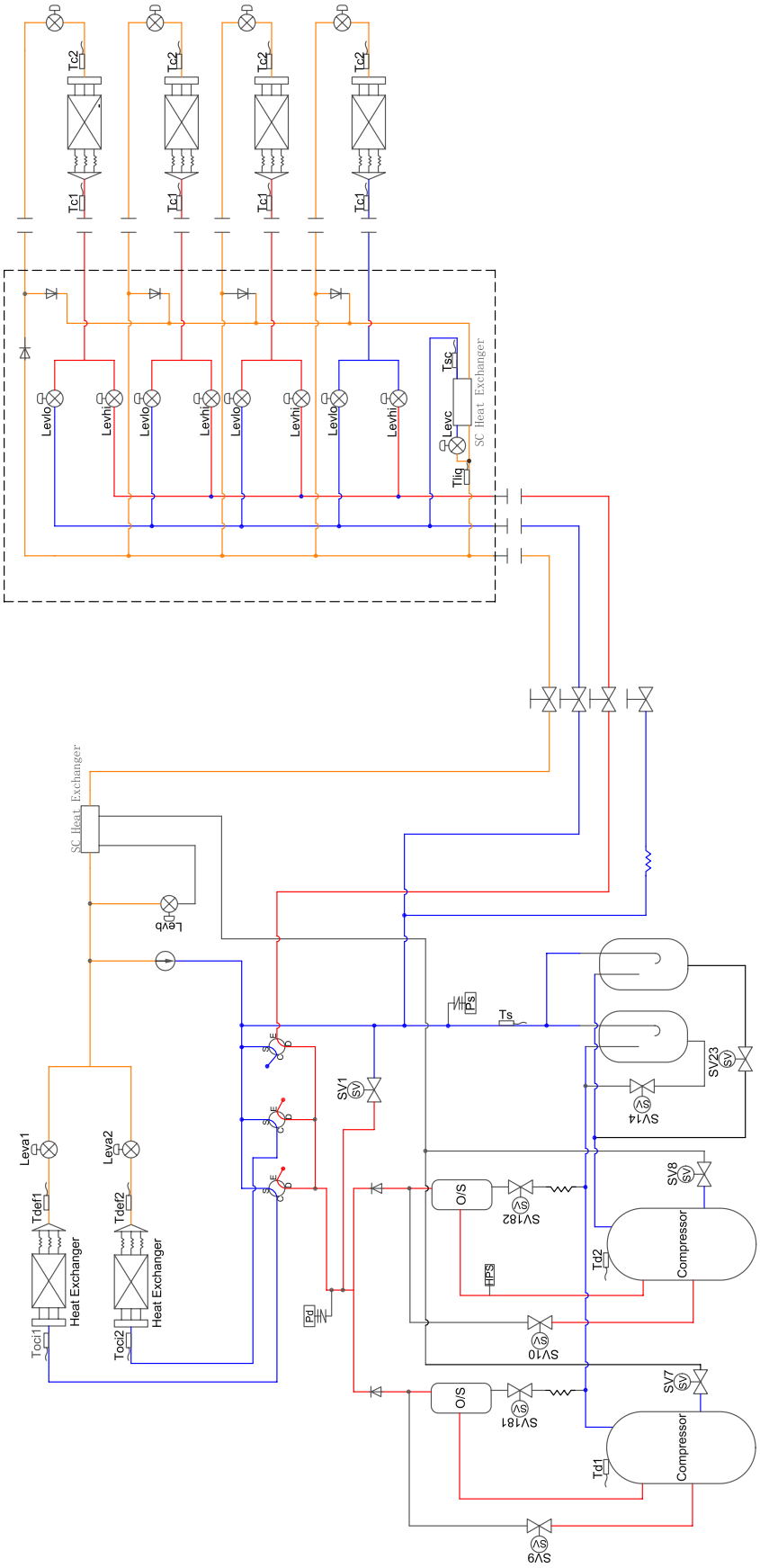
MVHQ168/192/216/240ME4CA-A11Cooling



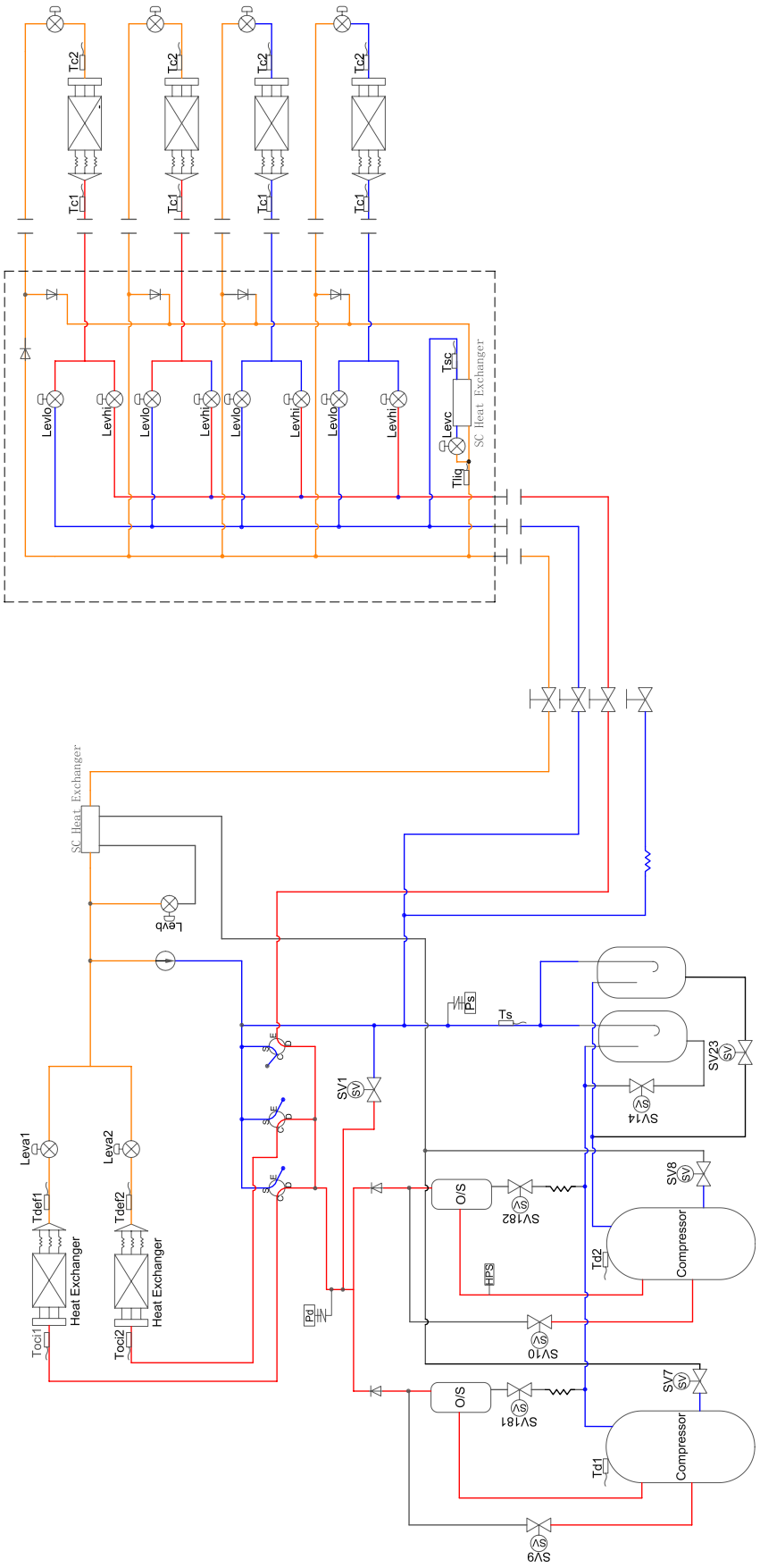
MVHQ168/192/216/240ME2CA-A11 Heating
MVHQ168/192/216/240ME4CA-A11 Heating



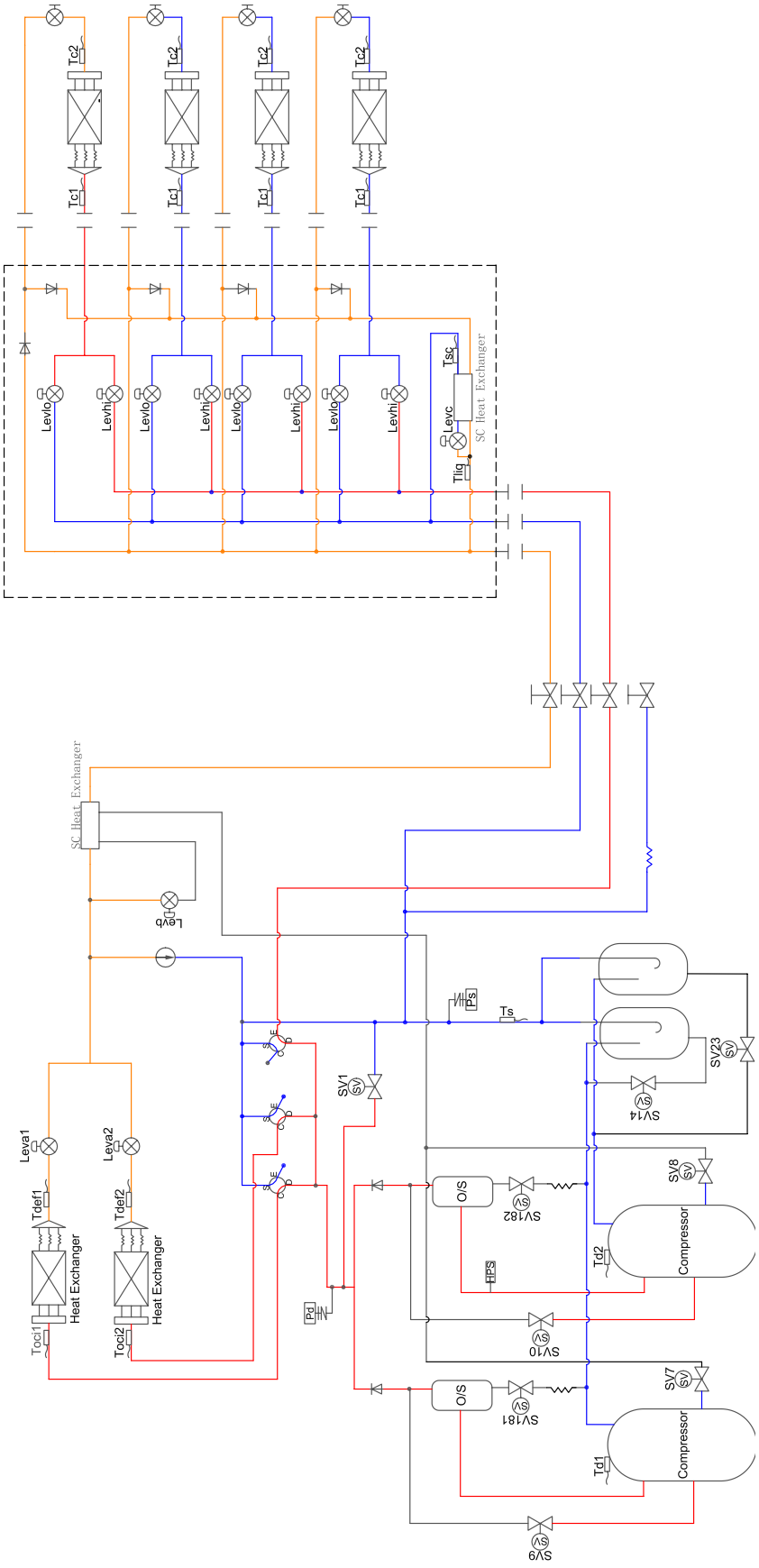
Cooling < Heating



Cooling = Heating



Cooling > Heating



6. Functions and Control

6.1 Startup

6.1.1 Startup Procedure

1. Materials preparation before on-site commissioning
 --Printed drawing of architectural design
 --Printed installation check list and system start request
 --Startup manual
 --MRV 5-H service manual
 --Troubleshooting and error codes

2. Read carefully before start up

3. Installation check
 --installation check list
 --Parameter standard check list

4. Operation
 --Dip switch settings for indoor units
 --Dip switch settings for outdoor units
 --Dip switch settings for controllers
 --Power on
 --Locking quantity of indoor and outdoor units (BM1-1/BM1-2)

5. Trail operation
 --Startup of indoor units
 --Running parameter check
 --Running parameter standard
 --Completion of startup report

6.1.2 Installation Check

1. Piping
 --Enough pipe supports
 --Branch fittings installed flat and correctly
 --Brazing (Nitrogen flow)
 --Branch pipe distance,1m (39.37 inch) away from each other and 0.5m (19.7 inch) far from IDU

2. Drain
 --1% gradient (indoor unit)
 --Outlet for drain pipe (indoor unit)
 --Aerial part height above 200mm (8 in.) (outdoor unit)

3. Communication wire (important)
 --PQ cable connected hand over hand (daisy chain)
 --The PQ shielded layer must be single point grounded to master unit
 --The PQ cable is 2X0.75mm with shielded layer
 --There is at least 10cm (3.94 inch) distance between communication and power source line
 --Don’t connect the terminal PQ to the ODU before completing start up; it may cause premature start

4. Electric wire
 --Independent power line to each IDU
 -- Same phase power supply
 -- Add breaker for each IDU
 -- Electricial wires installed to IDU and ODU correctly

5. Indoor unit
 --Anti-dust protection during installation
 --Installed proper and level
 --Service space reserved at least 19.69X19.69 inch

6. Outdoor unit
 -- Installed on anti-vibration pads at bottom
 -- Space (20cm/7.87inch away from each other)
 -- Gather fittings are the same level
 -- Breaker
 -- Communication cable (A / B / C, PQ)

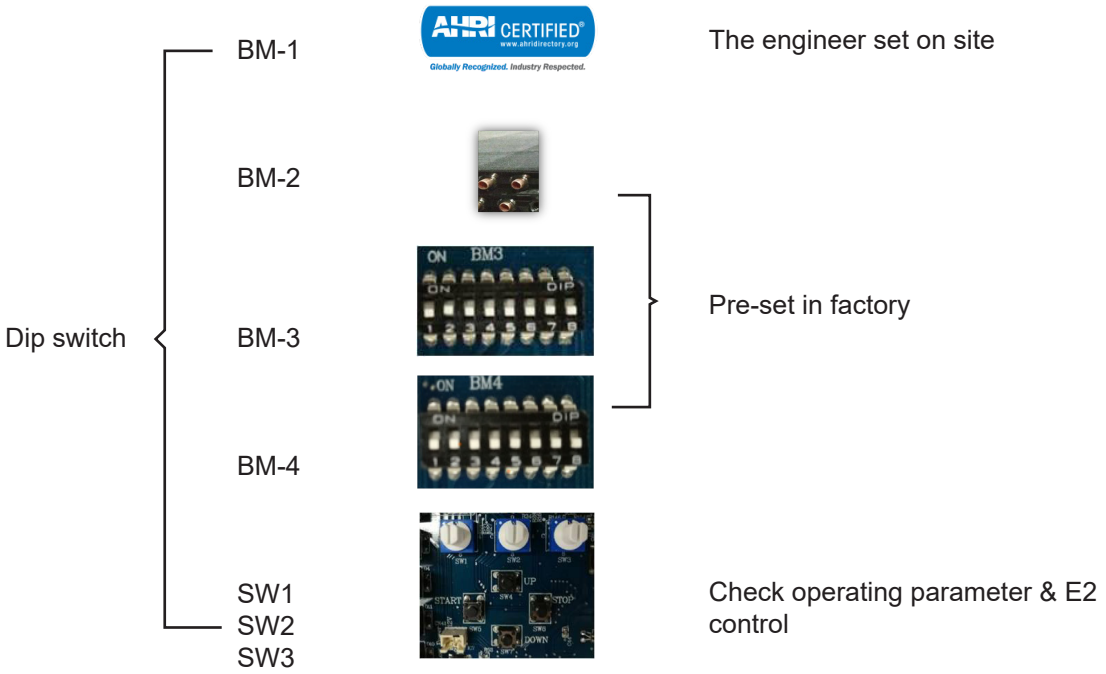
7. Pre start up
 -- 100% of the piping completed and pressure test passed
 -- Vacuum test
 -- The system has been with electric power more than 6 hours
 -- Outdoor unit addressing (Master 0, slave1, slave2)
 -- Indoor units are addressed correctly
 -- All the indoor units work correctly in Fan mode

6.1.3 Configuration Dip Switches

1. Indoor dip switch setting—Indoor units for MRV5 and indoor units for MRV IV-C are the same, so indoor dip switch setting is the same; please check with the service manual.
2. Controller dip switch setting- it's the same as the controller dip switch setting of MRV-IV, please check the service manual.

IDU Dip switch setting
For different IDU PCB board; the setting is little different. When start up, check the Dip switch settings below:
SW01 (1~4 or 2~4)--------Set the master/slave unit when wired controllers are in group control
SW01 (5~8)----------Set the capacity of the unit (default setting, no need to reset)
SW03 (1~8)----------Set the communication address and central address (the default setting is set the address by wired controller or automatically)

ODU Dip switch setting



6.1.4 Power on

1. For the protection of the compressor, It is required to preheat the compressor oil 6 hours before unit start up. Six hours of preheating is the standard time for preheating. Commissioning technicians must wait for 6 hours until the compressor oil reaches the required temp. The main PCB will show on the LED time counting down.
2. The outdoor and indoor units communication P, Q should be disconnected before turning on indoor units in case of premature start up.

6.1.5 Search and Lock Outdoor \ Indoor Unit

1. Search: Set BM1-1 at off to search outdoor unit, set BM1-2 at off to search indoor unit.
2. Lock: When ensuring that the displayed indoor units, valve boxes and outdoor units quantity is equal to that of actually installed, the indoor, valve box and outdoor units quantity can be locked. The locking method is to set the master module dip switch BM1-1 and BM1-2 from OFF to ON.

6.1.6 Trial Operation and Parameters Record

1. The oil temperature startup requirement is 60º Fahrenheit, high speed fan in cooling mode and 86º degree Fahrenheit, high speed fan in heating mode. The following is the example when using wired controllers for temp. display.
2. In cooling or in heating mode, let the outdoor and indoor units run for 1 hour;
3. Record for the first time after the unit running for 1 hour, and then record every half an hour for 5 times.
4. Running Parameters Checking Standard.

Mode	TA	Pd(psi)	Ps(MPa)	Toil	Td(°F)	Ts	Outdoor EEV	Indoor EEV
Cooling	18~27	217~348	0.4~0.85	closed to Td	140~230	-68~86°F	250	60~480
	28~35	246~464	0.5~0.9	closed to Td	140~230	-68~86°F	250	60~480
	above 35	290~420	0.7~1.05	closed to Td	140~230	-68~86°F	250	60~480
Heating	below -5	232~406	0.1~0.4	closed to Td	140~230	-68~86°F	60-350	200~480
	-5~7	275~406	0.3~0.8	closed to Td	140~230	-68~86°F	60-350	200~480
	above 7	319~522	0.8~1.05	closed to Td	140~230	-68~86°F	60-350	200~480

6.1.7 MRV 5-H System Startup Report

Haier	MRV 5-H

INSTALATION CHECK LIST AND SYSTEM START UP REQUEST ENGLISH BETA 1.2

PROJECT: _____
CUSTOMER: _____
INSTALLER: _____
CITY/COUNTRY: _____
ADDRESS: _____
CONTACT TEL: _____

DATE: DD / MM / YY

PROJECT CONFIGURATION

SYSTEM 1 CODE		MODEL	
SYSTEM 2 CODE		MODEL	
SYSTEM 3 CODE		MODEL	
SYSTEM 4 CODE		MODEL	
SYSTEM 5 CODE		MODEL	
SYSTEM 6 CODE		MODEL	
SYSTEM 7 CODE		MODEL	
SYSTEM 8 CODE		MODEL	
SYSTEM 9 CODE		MODEL	
SYSTEM 10 CODE		MODEL	
SYSTEM 11 CODE		MODEL	
SYSTEM 12 CODE		MODEL	
SYSTEM 13 CODE		MODEL	
SYSTEM 14 CODE		MODEL	
SYSTEM 15 CODE		MODEL	

COMMENTS:

INSTALLER: _____ SIGNATURE: _____
DATE : _____

Haier	MRV 5-H

INSTALATION CHECK LIST ENGLISH BETA 1.2

1. PREINSTALATION	YES
1.1. REFRIGERATION PIPING	
* Refrigerant piping is correctly insulated.	☐
* Refrigerant piping have enough fixed supports.	☐
* All welds were made with nitrogen flow to eliminate copper oxidation.	☐
* All branch fittings are installed in a horizontal position.	☐
* Thereis at least 3-1/2 feet seperation between branchs, and 2 feet clearance from the indoor units.	☐
1.2. DRAIN	
* Drain piping is correctly insulated.	☐
* Outlet for drain pipe.	☐
* A drop of at least 1% is required (about 1 inch in 10 feet).	☐
* Drain's piping diameter is sized per specifications.	☐
* Drain piping is separated for unit with condensate pump.	☐
1.3. COMMUNICATION WIRE	
* The communication wire is properly installed between outdoor and indoor units - P/Q (Assy. chain).	☐
* The wire for centralized control is properly installed between A/C and interface (Assy. chain).	☐
* Sequence of colors in the comm buss is guaranteed P-P, Q-Q.	☐
* The wiring is 2 x 15 with shield. The shield layer is fixed to ground at outdoor unit chassis only.	☐
* The communication wire is enclosed in a dedicated conduit.	☐
* There is a 4 inch minimum distance between communication wire and power conductors.	☐
* Before commissioning; do not connect the comm buss wires to terminals P, Q on the outdoor unit.	☐
1.4. ELECTRICIAL WIRE	
* There is independent conduit for power wires to each indoor unit.	☐
* There is a general power supply for all indoor units.	☐
* There power supply phase for all indoor units that are grouped under one wired controller is the same.	☐
* Power disconnects: is there a breaker for each outdoor and indoor unit?	☐
* Electrical wires are installed to indoor and outdoor units correctly.	☐
1.5. INDOOR UNITS	
* Indoor units had dustproof protection during installation.	☐
* All the units are properly leveled, and fixing system allow adjustments when required.	☐
* The flare nuts are properly torqued for each indoor unit.	☐
* Indoor units are in perfect physical condition free of dents or dings.	☐
* There is at least 20 inches of free space around indoor unit for service and maintenance.	☐

Haier	MRV 5-H

1.6. OUTDOOR UNITS

* Outdoor units are Installed on anti-vibration pads or rails. ☐
* Outdoor units are installed on level ground. ☐
* 3-1/2 feet of clearance is required for the outdoor units from walls and others equipment. ☐
* Outdoor units are in perfect physical conditions, free of dents or dings. ☐
* The outdoor units in same system have 8 inches clearance from each other. ☐
* Gather fittingsand lines are on the same level. ☐
* Each outdoor unit has a circuit breaker. ☐
* Drainage must be proveded for outdoor units (HEAT MODE). ☐
* The communication wire is properly installed between the outdoor units A, B, C. ☐
* The communication wire is correctly installed for the centralized monitor between master outdoor unit and interface (Assy. chain) ☐
* Outdoor units are supported on anti-vibration pads or rails. ☐

2. PRE START UP

* 100% Of the piping completed the pressure test at 80 psi (5.5 Kg/cm^2) during 3 Minutes ☐
* 100% Of the piping completed the pressure test at 250 psi (17.5 Kg/cm^2) during 2 Hours ☐
* 100% Of the piping completed the pressure test at 590 psi (40.5 Kg/cm^2) during 24 Hours ☐

* Vacuum test; reaching gauge presssure of 350 microns. ☐

* The systems have been with Electric power more than 6 hours before start up. ☐
* Indoor units are addressed properly. ☐
* Outdoor units are addressed according the position Master, Slave 1, Slave 2, Slave 3. ☐
* Once the system is connected to electric power, the master outdoor unit display show the indoor units quantity connected. ☐
* All the Indoor units and valve boxes work correctly in Fan Mode. ☐

Haier						MRV 5-H	
						ENGLISH BETA 1.2	
SYSTEM START UP LIST							
SYSTEM CODE			MODEL				
* Refrigerant recharge calculation							
Liquid pipe size	Multiple factor	Length	Subtotal				
1/4" (6.35)	0.022						
3/8" (9.52)	0.054						
1/2" (12.7)	0.11						
3/4" (15.88)	0.17						
5/8" (19.05)	0.25						
7/8" (22.22)	0.35						
1" (25.4)	0.52						
		Total(lb)					
Outdoor unit No.	Model		Serial No.				
Master							
Slave1							
Slave2							

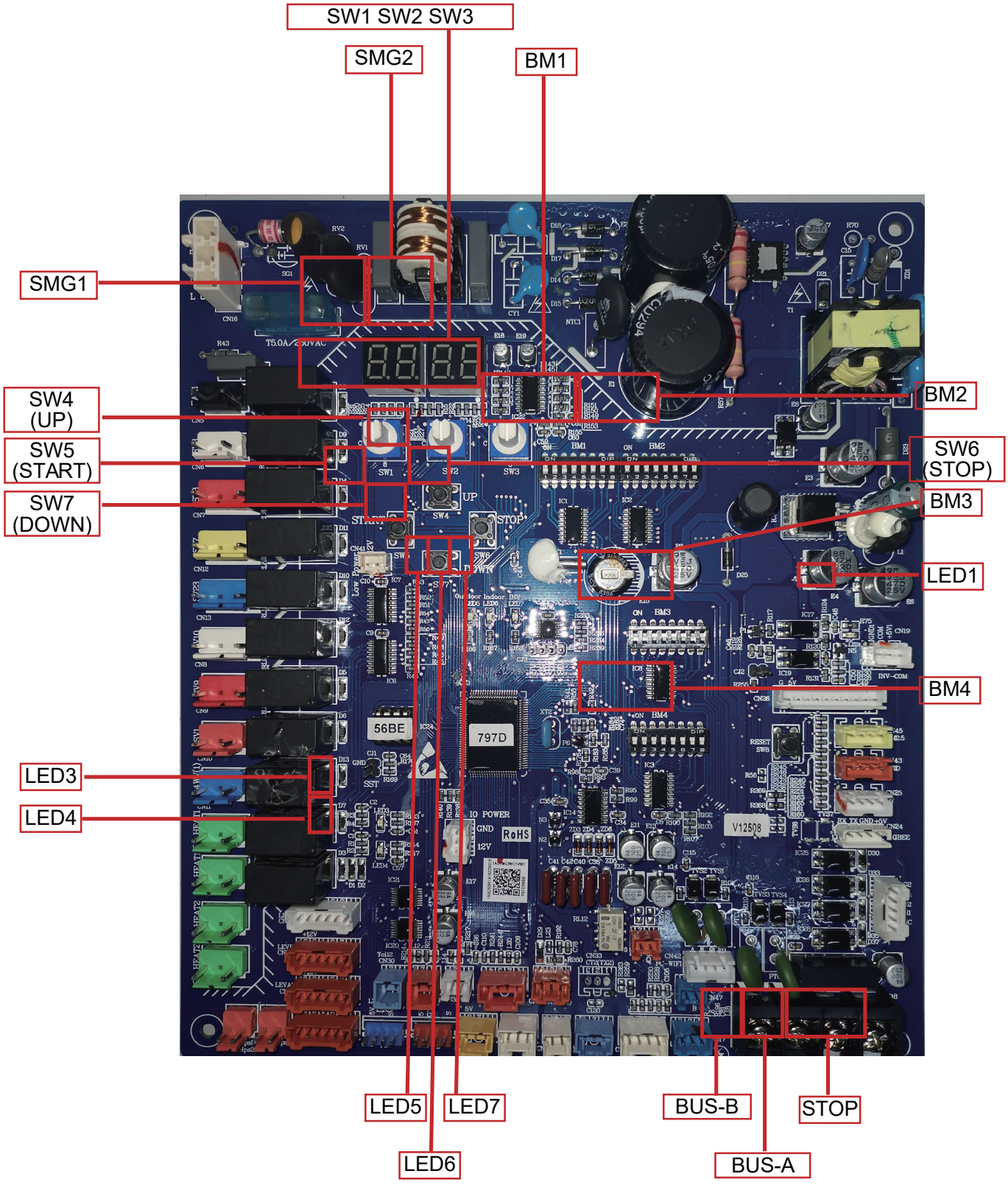
*Please input measured voltage values before start up:							
L1 vs. L2	V	L1 vs. N	V		L1 vs. Ground	V	
L2 vs. L3	V	L2 vs. N	V		L2 vs. Ground	V	
L3 vs. L1	V	L3 vs. N	V		L3 vs. Ground	V	

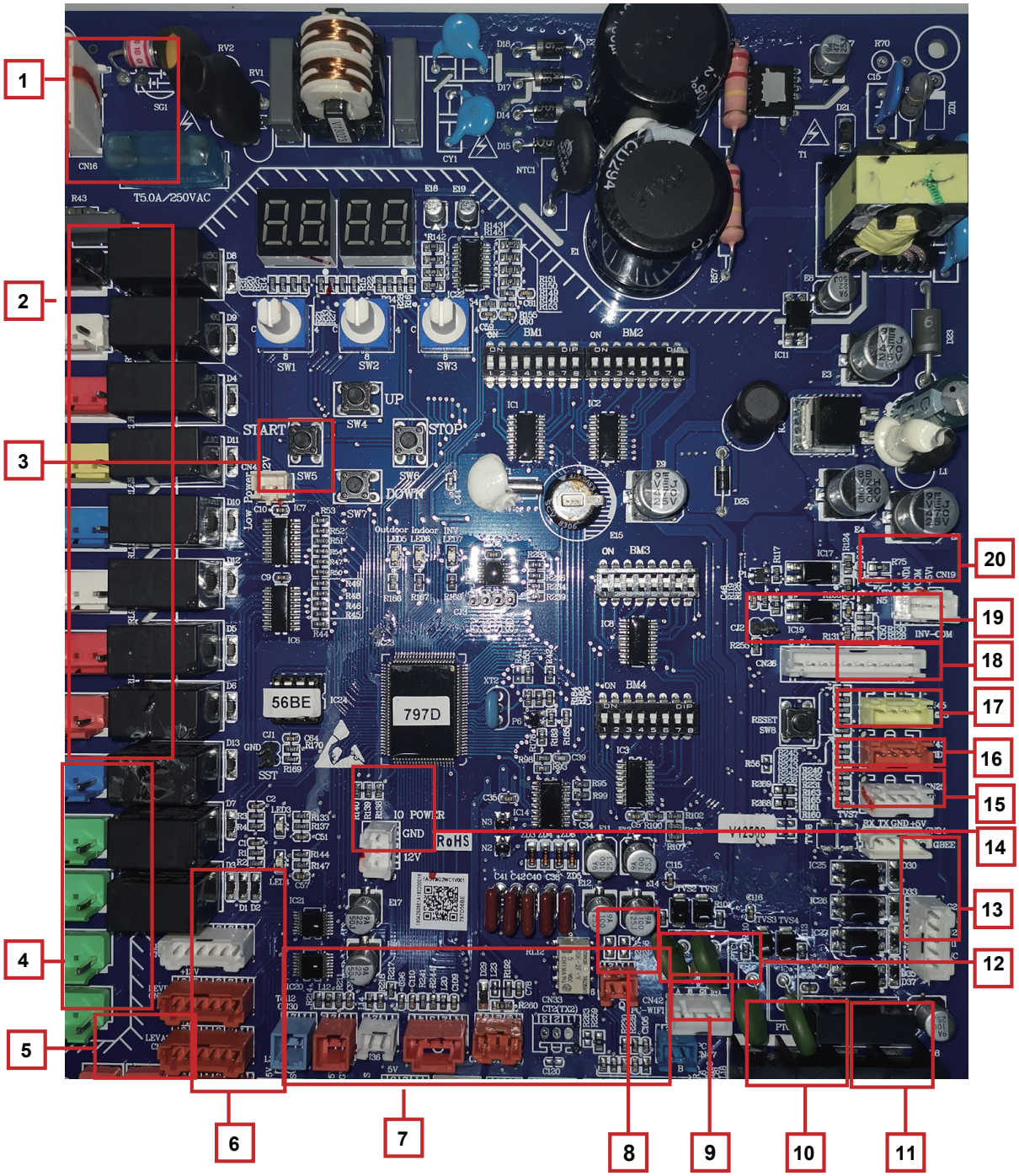
Haier						MRV 5-H	
						ENGLISH BETA 1.2	
START UP							
* Do measurements with all units switched ON after 1 hour.							
No.	Items	SW9/10/11	Master	SW9/10/11	SLAVE 1	SW9/10/11	SLAVE 2
1	Pressure Pd1 (psi)	0/0/1		1/0/1		2/0/1	
3	Pressure Ps (psi)	0/2/1		1/2/1		2/2/1	
4	Temp.Td1 (°F)	0/3/1		1/3/1		2/3/1	
5	Temp.Td2 (°F)	0/4/1		1/4/1		2/4/1	
8	Temp.Tdef1 (°F)	0/5/1		1/5/1		2/5/1	
10	Temp.TA (°F)	0/1/15		1/1/15		2/1/15	
11	Temp.Toil1 (°F)	0/7/1		1/7/1		2/7/1	
12	Temp.Toil2 (°F)	0/8/1		1/8/1		2/8/1	
13	Temp.Toci1 (°F)	0/9/1		1/8/1		2/8/1	
15	Current CT of inverter compressor INV1	0/10/15		1/10/15		2/10/15	
16	Current CT of inverter compressor INV2	0/11/15		1/11/15		2/11/15	
17	Fixed Compress current	0/15/1		1/15/1		2/15/1	
18	Current frequency of inverter compressor INV1	0/5/0		1/5/0		2/5/0	
19	Current frequency of inverter compressor INV2	0/6/0		1/6/0		2/6/0	
20	Outdoor unit QTY	0/2/2					
21	Indoor unit QTY	0/3/2					
22	Running indoor unit QTY	0/4/2					
23	The end						

Indoor unit No.	Model	PMV	TA	TC1	TC2	Serial N°
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

6.2 Outdoor Control Board Photo

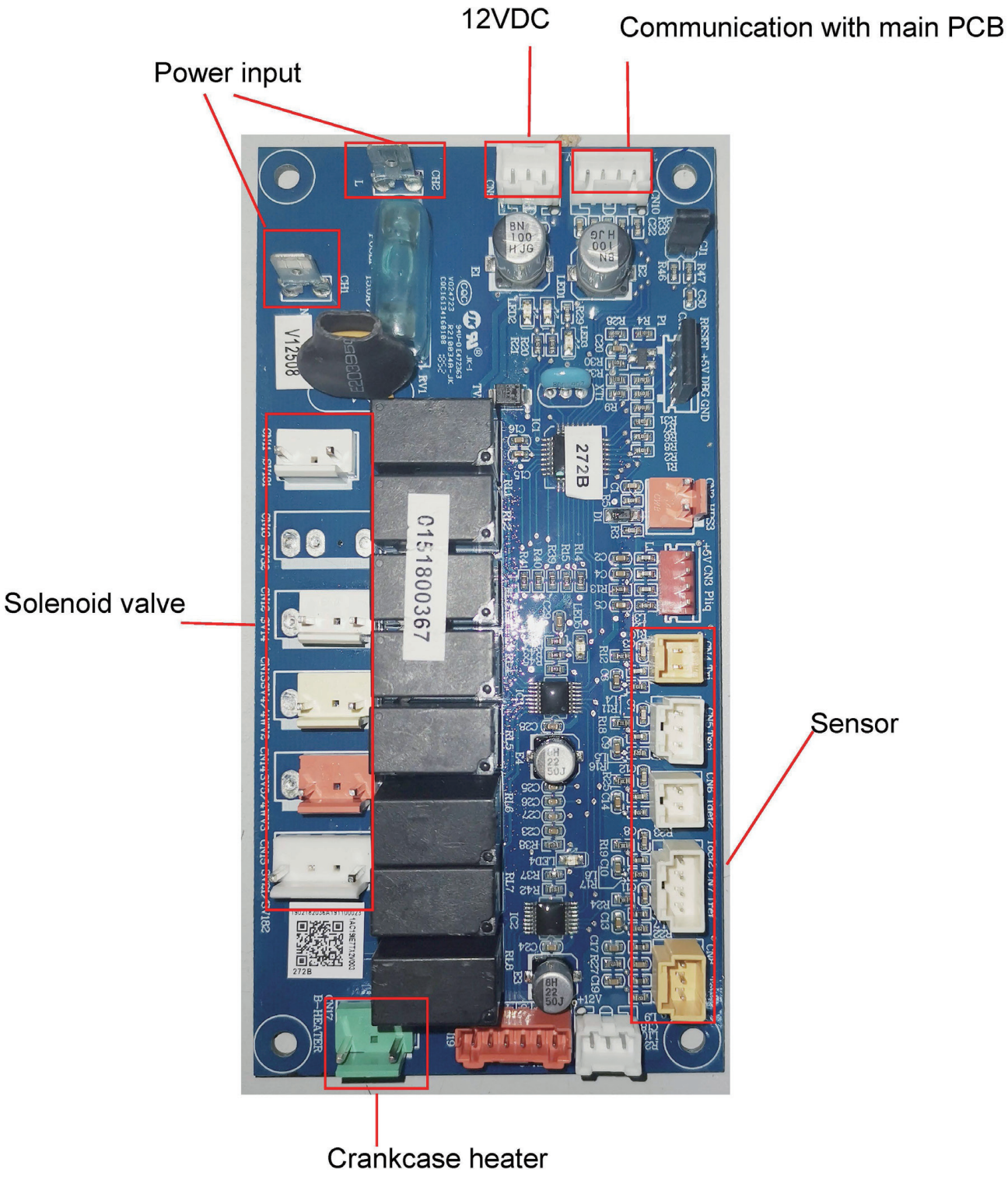
PCB code: 0151800256CM



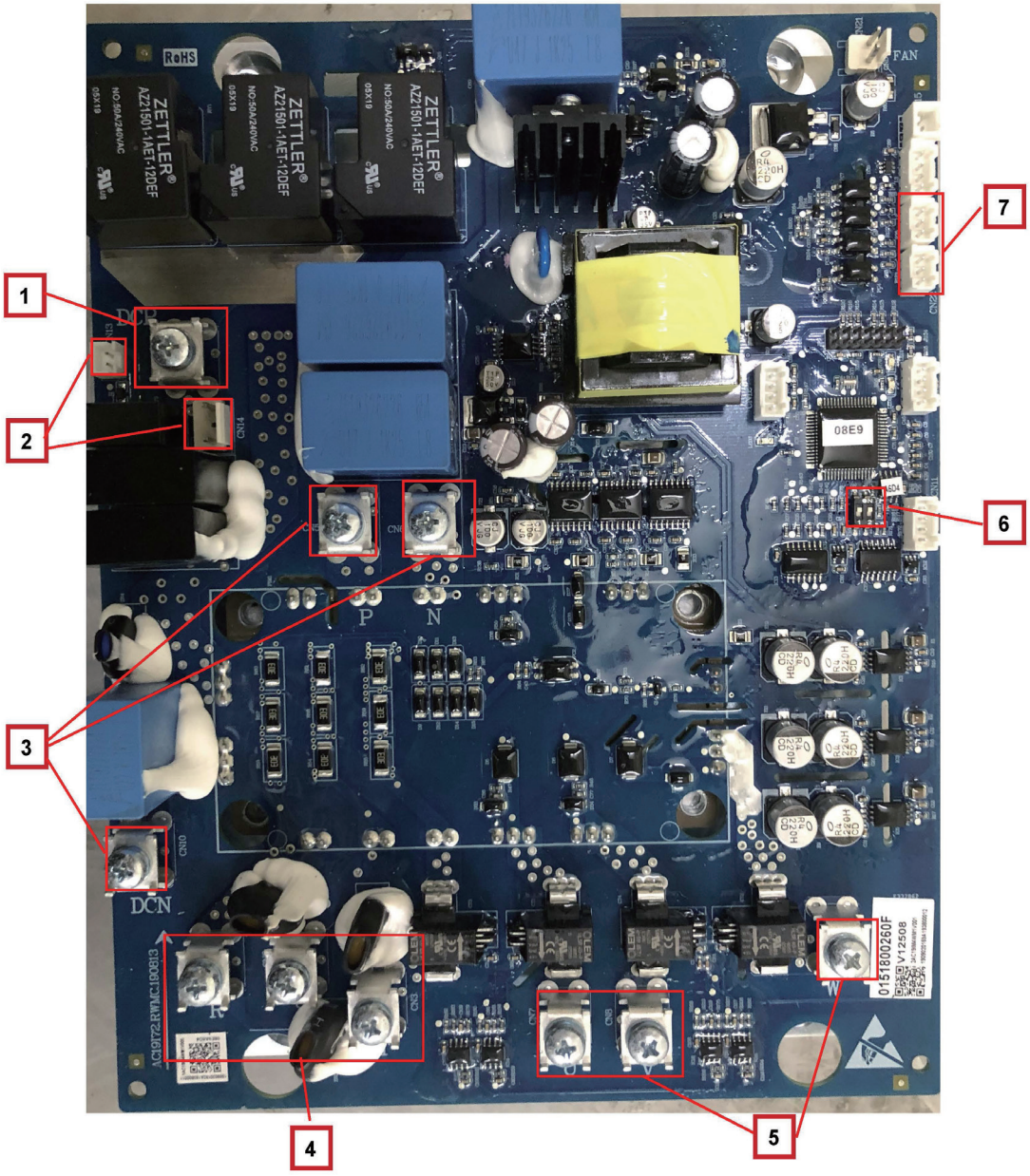


No.	Function	No.	Function
1	Power connector	11	Emergency stop signal connector
2	Solenoid valve connector	12	Monitoring PC WIFI connector
3	Low-power standby control connector	13	Power suppression signal connector
4	Compressor heating tape connector	14	Expansion PCB 12VDC power supply connector
5	High pressure switch connector	15	Zigbee wireless communication connector
6	Outdoor EEV connector	16	Expansion PCB communication connector
7	Ambient temperature, coil temperature sensor	17	Reserved password lock decryption connector
8	Indoor communicating connector	18	Reserved PM2.5 detection connector
9	Monitoring computer connector	19	Programming connector
10	Centralized control 485 communication connector	20	Module board communicating connector

PCB code: 0151800367

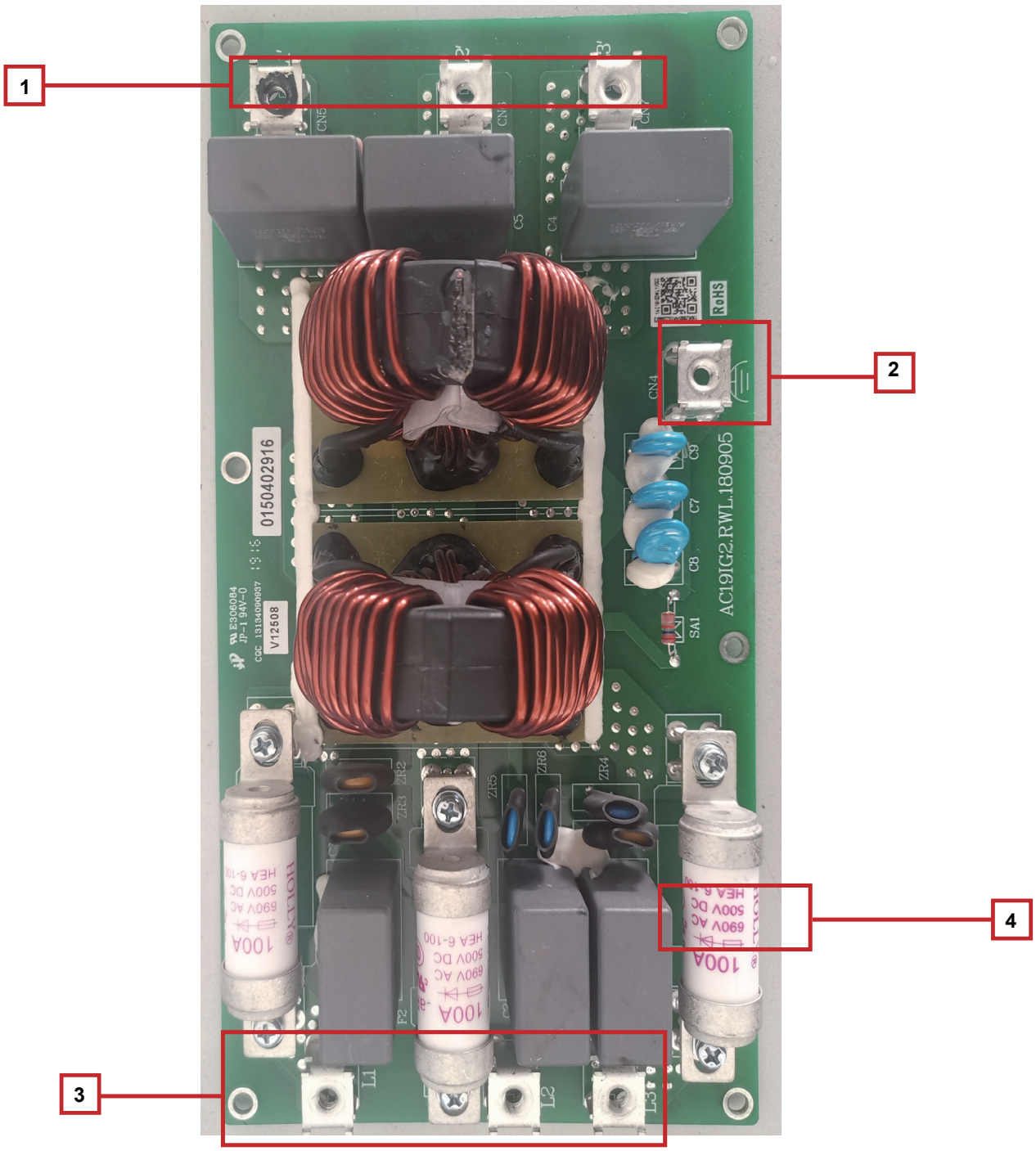


Compressor driver board: 0151800260F



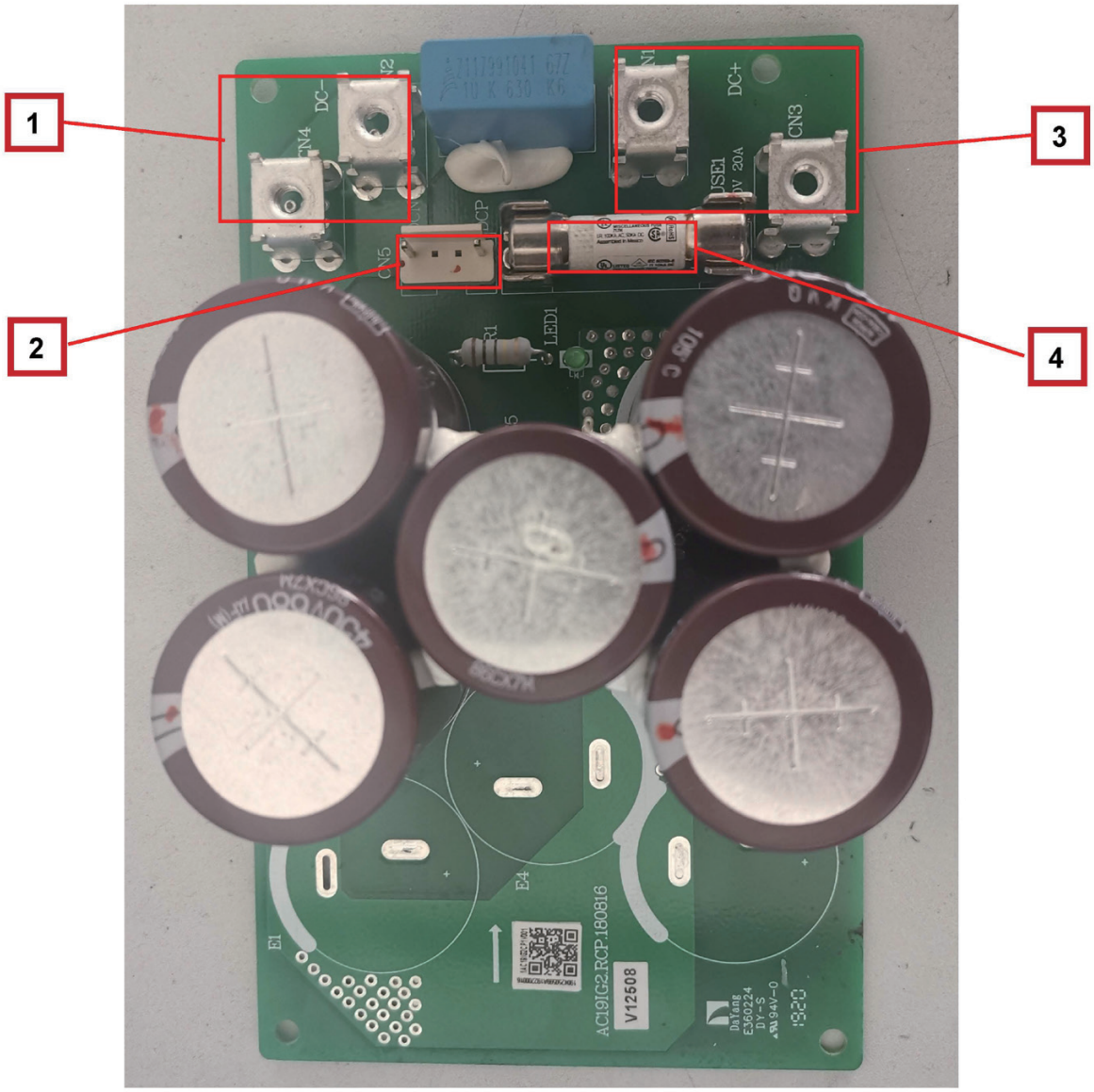
No.	Function
1	Connected reactor connector
2	Low-power standby control connector
3	Connect electrolytic capacitor PCB connector
4	Module three-phase power input connector
5	Module drive output connector
6	Dip switch
7	Main PCB and fan motor communicating connector

Filter board: 0150402916



No.	Function
1	Filter board output connector
2	Filter board ground wire connector
3	Filter board power input connector
4	Fuse

Capacitor board: 0150402920



No.	Function
1	Electrolytic capacitor negative connector
2	Fan DC power supply connector
3	Electrolytic capacitor positive connector
4	Fuse

6.3 Outdoor PCB Dip Switch Setting

LED light definition:

• LED1: power supply lamp
Power on light

• LED3: electronic expansion valve LEVa1, LEVa2, fault lamp
No fault, not light

• LED4: electronic expansion valve LEVb, LEVc, fault lamp
No fault, not light

• LED5: communication lamp between outdoors
Communication is normal, flashing

• LED6: communication lamp between indoor and outdoor
Communication is normal, flashing

• LED7: communication lamp between PCB and power module
Communication is normal, flashing
Outdoor dip switch configuration:

Identification:
• Master Unit: Master unit is identified by setting dip switch BM1-7, 8 to zero.
• Function master unit: the outdoor unit, whose priority is set as 0, operates with the highest priority.
• Physical slave unit: by setting dip switch, the unit number is not 0.
• Functional slave unit: the outdoor without the highest priority of running, the priority clas is 1~3.
• Group class setting: physical master unit setting is valid, which can be used for all the units. For example, silence, snow-proof, piping length etc setting. Set all kinds of state on the physical master unit as a representative.
• Single clas setting: only be used for the single unit, instead of the whole group. For example, sensor backup running, inverter board selection etc.
• In the following table, 1 is ON, 0 is OFF.

Dip switch introduction:
• BM1 is usually set by the engineer on site; BM2, BM3, BM4 are pre-set in the factory.

• BM1_1: Master outdoor unit searches the total outdoor units after power on at first time. The quantity of total outdoor units is floating from right to left on digital tube SMG1 and SMG2. "1=0" is one outdoor unit, "2=01" is two outdoor units, "3=012" is three outdoor units, "4=0123" is four outdoor units.

• BM1_2: Master outdoor unit searches the total indoor units after locked the quantity of the outdoor units. The quantity of total indoor units is floating from right to left on digital tube SMG1 and SMG2. "-04-" is 4 indoor units, "-06-" is 6 indoor units, "-15-" is 15 indoor units.

• BM1_3: The setting is OFF or ON. Default is ON. Once power off, unit software shall reset to "OFF" automatically ignoring BM1_3 setting.

① BM1Introduction

BM1_1	outdoor searching after startup	0	begin to search outdoor	Group class (physical master unit is valid)
		1	stop searching outdoor and lock the quantity	
BM1_2	indoor searching after startup	0	begin to search indoor	
		1	stop searching indoor and lock the quantity	
BM1_3	start up after pre-heating for 6 hours	0	allow(must be electrified for 6 hours)	
		1	within 6 hours when oil temp. meets the allowed value (allowed value lower than the standard value)	
BM1_4	Outdoor mode setting	0	Normal (default)	
		1	Cool Only	
BM1_5	Outdoor fan static pressure selection	0	No static pressure, high speed (default)	
		1	Ultra high-speed	
BM1_6	Communication protocol between IDU & ODU	0	New protocol (default)	
		1	old	

		BM1_7	BM1_8	unit number
BM1_7 BM1_8	address setting	0	0	0# (physical master unit)
		0	1	1#
		1	0	2#
		1	1	3#

② BM2 Introduction

BM2_1 BM2_2	Indoor and outdoor unit new protocol communication type setting (BM1_6 selection of the new agreement is valid for 0)	BM2_1	BM2_2	Indoor and outdoor unit communication category set	Group class (physical master unit is valid)
		0	0	Wired 9600bps General Agreement (ex factory default)	
		0	1	Wired 9600bps New upgrade protocol	
		1	0	Wireless 9600bps communication	
		1	1	Reserve	
BM2_3	Outdoor unit heat mode setting (BM1_4 =0)	0	Normal (default)		
		1	Only Heat		
BM2_4	Outdoor machine lock slave wireless module MAC address	0	Lock slave wireless module address (default)		
		1	Allow new slave wireless module to join		
BM2_5	Completely empty the wireless external mode EEPROM	0	Normal (default)		
		1	The three dials of the digital tube are first dialed to 1-1-1, which is cleared after OFF_ON.		
BM2_6	Communication conversion board charging module (wireless communication)	0	No (default)		
		1	Yes		
BM2_7 BM2_8	Reserve	0	Reserve		

③ BM3 Introduction

BM3_1 BM3_2 BM3_3 BM3-4	Outdoor machine model Set	BM3_1	BM3_2	BM3_3	BM3_4	Outdoor
		0	0	0	0	Normal
		0	0	1	0	Update use
		0	1	0	0	Heat pump model
		0	1	1	0	Heat recovery model
		1	0	1	0	Heat pump model for US(230V)
		1	1	0	0	Heat recovery modelfor US(230V)
		1	0	1	1	Heat pump model for US(460V)
		1	1	0	1	Heat recovery modelfor US(460V)
BM3_5 BM3_6 BM3_7 BM3_8	Outdoor capacity setting	BM3_5	BM3_6	BM3_7	BM3_8	Outdoor tonnage
		0	0	0	1	072
		0	0	1	0	096
		0	0	1	1	120
		0	1	0	0	144
		0	1	0	1	168
		0	1	1	1	192
		1	0	0	0	216
		1	0	0	1	240
		Reverse				

④ BM4 Introduction: Group class (physical master unit is valid)

BM4_1 BM4_2	ModeBus Centralized control protocol selection	BM4_1		BM4_2			Protocol selection
		0		0			Third party standard MODBUS protocol
		0		1			Computer management protocol
		1		0			Specific centralized control protocol (default)
		1		1			Reserve
BM4_4 ~ BM4_8	ModeBus centralized control communication address	BM4_4	BM4_5	BM4_6	BM4_7	BM4_8	ModeBus set control communication address (IGU02 using the address in brackets)
		0	0	0	0	0	Address1(0)
		0	0	0	0	1	Address2(1)
		0	0	0	1	0	Address3(2)
		0	0	0	1	1	Address4(3)
		0	0	1	0	0	Address5(4)
		0	0	1	0	1	Address6(5)
		0	0	1	1	0	Address7(6)
		0	0	1	1	1	Address8(7)
		0	1	0	0	0	Address9(8)
		0	1	0	0	1	Address10(9)
		...	...	...	...	...	...
		1	1	1	1	1	Address32(31)

Outdoor machine digital tube display settings

The contents of the display are defined as follows:
Key parts: long press the left START (SW5) control to enter, short press UP (SW4) data scroll up, short press down DOWN (SW7) data scroll down, long press the right STOP (SW6) enter data and exit
Dial: SW1, SW2, SW3: set the rotary dial switch is 0 - 15 (Note: the dial plate, with the letters A for 10, B for 11, C for 12, D for 13, E for 14, F for 15)
Display parts: LD1, LD2, LD3, LD4:4 digital tube from left to right

① Indoor machine parameter view

You can view the indoor machine 128 sets of parameters: SW1 and SW2 represent the indoor machine addres, SW3 range 3-14 can view the indoor machine parameters

SW1	SW2	Address
0	0-15	1 to 16 (address 0#-15#)
1		17 to 32 (address 16#-31#)
2		33 to 48 (address 32#-47#)
3		49 to 64 (address 48#-63#)
7		65 to 80 (address 64#-79#)
8		81 to 96 (address 80#-95#)
9		97 to 112 (address 96#-11#)
10		113 to 128 (address 112#-127#)

SW3	Function	Digital Tube LD1 ~ 4 Display
3	Indoor unit communication check and program version	Communication normal display indoor unit program version(1 decimal), the communication interrupted normal display “0000” (5 consecutive round of no communication success), communication has been abnormal display “---- ----””. For example: 3.9, means the indoor unit version is V3.9
4	Indoor unit failure	Display indoor failure code; no failure, display 0
5	Indoor unit capacity	The indoor unit capacity (unit: HP, one decimal), 1.5 HP displays 1.5
6	Indoor unit expansion valve opening	expansion valve opening (pulse)
7	Indoor unit environment temperature Tai	zone temperature (°F)
8	Indoor gas temperature Tc1	Gas pipe temperature (Unit: °F)
9	Indoor liquid temperature Tc2	Liquid pipe temperature (Unit: °F)
10(A)	Indoor unit boot mode, the actual operation of wind speed and SCODE code	LD1 said the boot mode O: stop C: refrigeration H: heating LD2 said the actual operating speed of the indoor machine (0- stop, 1- low speed, 2- Middle speed , 3- high speed), LD3 and LD4 are represented by SCODE codes (0 ~ 15). Such as C311 said the cooling operation of high speed, SCODE 11.
11(B)	Indoor set temperature Tset	Indoor set temperature (Unit: °F)
12(C)	Indoor unit consistency control setting	Display the indoor unit corresponding to the same contract use (0 unallocated group number, their control) Method of setting group and the <E2 control parameters and Display Settings > (Note: all in the unit at the same time can be set by a dial 15-0-2 set “in the same unit drive outside unit control”, 0- indoor unit according to the number ofautomatic control, 1- indoor unit with all contract, all within each 2- indoor unit control, banned from drive off)

SW3	Function	Digital Tube LD1 ~ 4 Display
13(D)	Low temperature automatic running function of indoor unit	Indicates if machine has this function or not; 0=no, 1=yes Use E2 control parameters display and settings. Access by setting dial switches to 15-1-2. Set low temperature and automatic operation at the same time. 0=automatic control,1= all machine settings valid 2= all machine settings not valid
14(E)	Forced indoor cooling / heating / shutdown	(1) pres START (SW5) for 2 s, to enter the instruction set state, flashing display instructions. (2) according to UP (SW4) or DOWN (SW7) () adjustment instructions (COOL/HEAT/OFF). (3) after the adjustment is completed, according to STOP (SW6) for 2 s,the implementation of the instruction set and stop flashing display

② Outdoor unit parameter view

SW1 0~3 is used to select the outdoor unit number. To select a different unit; SW3 set to 0~15(outdoor unit number). (the host can display the parameters of the other outdoor unit and the indoor unit parameters, and the sub unit only displays the unit parameter SW1 is 0).
(1) The first boot, the first sub search engine, from left to right circular display 1:0, if found a table display 2:01 two table display 3:012. "3:012" means a total of 3 units of the system, 012 said the addres of the machine. (":" the actual display "=").
(2) Lock machine units, start the search within the machine number, cycle "- in - machine units", such as "-6-" said the system connects the 6 station machine
(3) After the search is completed, the display of the machine's fault code, the machine has no fault when the display 0.

SW1	SW2	SW3	Function	Digital Tube LD1 ~ 4 Display
Outdoor Unit Address 0-3	0	0	Display outdoor unit failure code	External machine bus data transfer fault code. If there is no fault display on the compressor crankcase heat 6 hour countdown time to form a stopwatch. Press START (SW5) for 2 s, 1111, into the fault query state, can query the last 10 faults occur: fault and fault code flashing display serial number, each by 1 UP (SW4) plus 1 serial number, each by 1 DOWN (SW7) serial number minus 1; 2min automatic exit. Steady state Press STOP (SW6) for 2 s, display 0000, quit the status of the query, stop flashing display. The dial in 13,0,0, pres START (SW5) 2 s, 1111, can clear the historical record of failure
	1	0	Display outdoor unit priority and outdoor unit capacity	LD1： Display priority of outdoor unit LD2：Display “-” LD3-4：Display outdoor unit capacity (unit: HP)
	2	0	Display operation mode and outdoor unit operation output ratio	LD1 shows O: Stop C: Cooling H: Heating LD2 to LD4 show: 60 shows 60% capacity output
	3	0	Outdoor fan 1 speed	345 representation 345rpm • Press START (SW5) for 2s continuously, display 1111, then to set: flashing. Press UP (SW4) once, wind speed will go up 1 level; press DOWN (SW7) once, wind speed will decrease 1 level. 5 min later, quit the setting condition automatically. • Press STOP (SW6) for 2s continuously, display 0000, then quit the setting condition, and stop flashing.
	4	0	Outdoor fan 2 speed	

SW1	SW2	SW3	Function	Digital Tube LD1 ~ 4 Display
Outdoor unit address 0-3	5	0	Frequency converter INV1 current frequency	110 representation 110.0Hz Press START (SW5) for 2 seconds, display 1111, enter the set state: flashing display, each according to the 1 UP (SW4) frequency rise 1Hz, every 1 times DOWN (SW7) frequency drop 1Hz; 5min after automatically quit the set state. Press STOP (SW6) for 2 seconds, display 0000, quit the set state, stop flashing display; (When the system is faulty, the compressor is forbidden to start.)
	6	0	Frequency converter INV2 current frequency	
	7	0	Outdoor unit LEVa1 open degree	0---470 pluse Press START (SW5) for 2 seconds, 1111, enter the setting state: flashing, press UP (SW4) valve fully open, press DOWN (SW7) the valve is fully closed; 2 min later automatically exit the setting state Press STOP (SW6) for 2 seconds, display 0000, quit the setting state, stop flashing display
	8	0	Outdoor unit LEVa2 open degree	
	9	0	Outdoor unit LEVb open degree	
	10(A)	0	Outdoor unit LEVc open degree	
	11(B)	0	Outdoor unit output electromagnetic valve	LD1: 4WV :1 open 0 close——High to the left LD2: SV1 : 1 open 0 close LD3: SV3: 1 open 0 close LD4: Reserved: Display “-”
	12(C)	0	Outdoor unit output electromagnetic valve	LD1: SV6: 1 open 0 close——High to the left LD2: SV9: 1 open 0 close LD3: SV10: 1 open 0 close LD4: SV11: 1 open 0 close
	13(D)	0	Outdoor unit output electromagnetic valve	LD1: SVX: 1 open 0 close LD2: SVY: 1 open 0 close LD3: Reserved: Display “-” LD4: Reserved: Display “-”
	14(E)	0	Heating belt output	LD1: CH1: 1 open 0 close LD2: CH2: 1 open 0 close LD3: CHa : 1 open 0 close LD4: Reserved: Display “-
	15(F)	0	Program version	1 representation Ver1.0

SW1	SW2	SW3	Function	Digital Tube LD1 ~ 4 display
Outdoor unit address 0-3	0	1	Pd	Unit: psi, 1 decimal places
	2	1	Ps	
	3	1	Td1	Unit: F
	4	1	Td2	
	5	1	Tdef	
	7	1	Toil1	
	8	1	Toil2	
	9	1	Toci1	
	14(E)	1	Ts	
	15(F)	1	Th	

SW1	SW2	SW3	Function	Digital Tube LD1 ~ 4 Display
Outdoor unit address 0-3	0	15(F)	Reserved	
	1		Tao	25 Unit: °F
	2		Pd_temp	
	4		Ps_temp	
	5		Tliqsc	
	6		Tsco	
	8		Frequency conversion pres INV1 running time	Unit: Min
	9		Frequency conversion pres INV2 running time	Unit: Min
	10(A)		Frequency conversion pres INV1 current CT	Unit: A, 1 decimal places
	11(B)		Frequency conversion pres INV2 current CT	Unit: A, 1 decimal places
	12(C)		Frequency conversion compresor INV1 DC voltage	Unit: V
	13(D)		Frequency conversion compresor INV2 DC voltage	Unit: V
	14(E)		Frequency converter INV1 module temperature	Unit: °F
	15(F)		Frequency converter INV2 module temperature	

③ System status display and control (master unit)

SW1	SW2	SW3	Function	Digital Tube LD1 ~ 4 Display
0	0	2	Refrigerant type	410A means 410A refrigerant
	1	2	The same outdoor unit total number and total capacity	LD1:The total number of outdoor unit LD2:Display "-" LD3/ LD4:Total outdoor unit capacity (unit: Horse) For example: 3-48 said 3 outdoor machines, with a total capacity of 48 horses (9000 Btu/HP)
	2	2	Total indoor unit capacity	50 represents 50 kbtu/h
	3	2	The indoor units quantity in one system	For example: 64
	4	2	Number of indoor unit working	Temperature sensor ON as a sign of the work of the indoor unit
	5	2	With the outdoor unit running mode the same indoor unit number	E.g.: 13
	6	2	Cooling target temperature	Unit: °F
	7	2	Heating target temperature	
	8	2	Automatic recovery of refrigerant Note: the end of the recovery must be canceled or reset	When the outdoor stops, press START (SW5) for 2 seconds, display 1111, start. (the setting is invalid when the outdoor unit is running) Press STOP (SW6) for 2 seconds, display 0000, stop
	10(A)	2	Test run setup Note: the end of the test run must be canceled or reset	When the outdoor stops, press START (SW5) for 2 seconds, display 1111, start. (the setting is invalid when the outdoor unit is running) Press STOP (SW6) for 2 seconds, display 0000, stop
	11(B)	2	Outdoor unit mode	0-normal C-cooling only H-heating only
	12(C)	2	Indoor unit expansion valve fully open	Press START (SW5) for 2 seconds, display 1111, indoor valve fully open 2 minutes, 2 minutes after the valve automatically closes
	13(D)	2	All the indoor unit in cooling	Press START (SW5) for 2 seconds, display 1111, open; Press STOP (SW6) for 2 seconds, 0000, close
	14(E)	2	All the indoor unit in heating	
	15(F)	2	Cancel all manual control (running class)	Press START (SW5) for 2 seconds, display 1111 cancel; or press STOP (SW6) for 2 seconds, display 0000, cancel Remove all manual control (part), all indoor unit close.

④ E2 control parameters display and setting

Each need to be set, setting method:
(1)Pres START (SW5) for 2 s, display 1111, enter the set state, flashing display the current value
(2)According to UP (SW4) or DOWN (SW7) adjustment parameters
(3)After the adjustment is completed

<A> In the current state of the code, effectively set the time by presing STOP (SW6) for 2 s, showing 0000, keeping the current settings and exit the set state, stop flashing display, waiting for 2 minutes after the power off and then re power up
<B> The current set time is not set by STOP (SW6) or change the dial selection, do not save the current set value, exit the set state, stop flashing display
<C> Effective time setting: the machine with the contract number and set off a low temperature automatic operation function for 10 minutes, the other for 30 s.

SW1	SW2	SW3	Function	Digital Tube LD1 ~ 4 display	Control range
15(F)	0	2	In the same machine drive off control selection	0- indoor unit self control according to the group number, 1- all indoor unit ON/OFF at the same time 2- indoor unit self control, forbidden control at the same time)	Group class (physical master unit is valid)
	1		Selection of low temperature automatic operation control for indoor unit	0- within the machine automatic control, 1- all indoor units is valid, 2- all indoor units is invalid	
	2		Pipe length selection for required sub cooling	0： short pipe length; 1： middle pipe length； 2： long pipe length	
	3		Defrosting conditions selection	0- normal area, 1- easy to frost area	
	4		Operation mode priority	0- first open is priority； 1- last open is priority 2- cooling priority； 3- heating priority	
	6		Heating limit when Outdoor temp Over 77°F(25°C).	0-shows no limitation, 1-shows limitation	
	7		Silent running option	0-without silent operation， 1- silent operation 1， 2- silent operation 2， 3- silent operation 3， 4- silent operation 4	
	8		Snow-proof operation setting	0-without snow-proof operation， 1-snow-proof operation	
	9		When the main outdoor machine is running; the outdoor fan stopped.	0-stop， 1-run	
	12(C)		Power limit operation control mode selection	0- E2 value, 1- external contact DRM	
	13(D)		Power output ratio selection (E2 control method is valid)	Allow maximum capacity output, total of 11 grade, 0 grade is 0%, 10 grade is100%	

6.4 Outdoor System Control Function

6.4.1 Compressor Control

Generally, the compressor frequency is controlled according to the target Ps during cooling.
During the control process, Pd, Td/TOIL, PS, etc. are given priority.
Generally, the compressor frequency is controlled according to the target Pd during heating.
During the control process, Pd, Td/TOIL, PS, etc. are given priority.
Single and double compressor switching based on system load and compressor frequency during dual compressor operation.

6.4.2 Electronic Expansion Valve Control

Cooling:
when startup, the electronic expansion valve is maintained at 100 pls and the electronic expansion valve is fully open after startup.
Heating:
When heating, the electronic expansion valve is usually superheated to 39 Fahrenheit. SH = Toci1-ET=39 (°F)

6.4.3 Fan Motor Control

① Control of MRV 5-H series DC motor
The air supply speed of outdoor unit can be set from speed 0 to 22 in accordance with the operating mode.
The operating is commonly at speed 1 - 22, and it is CVT (Continuously Variable Transmission) control between speed 1 and 22.
② Air supply motor: range of number and rotating speed (unit: rpm)
< Outdoor fan motor control (usually control / high static pressure control) >

Level	Double Fan	Single Fan
24 (high static pressure)	1100+1100	1000
22	1020+1020	1000
21	1000+1000	940
20	970+970	920
19	910+910	880
18	860+860	845
17	800+800	820
16	770+770	760
15	650+650	710
14	560+560	680
13	520+520	640
12	460+460	610
11	410+410	560
10	360+360	520
9	330+330	475
8	300+300	440
7	280+280	415
6	210+210	370
5	190+190	320
4	280	280
3	230	230
2	200	200
1	160	160
0	0	0

The highest speed for each model under normal running condition

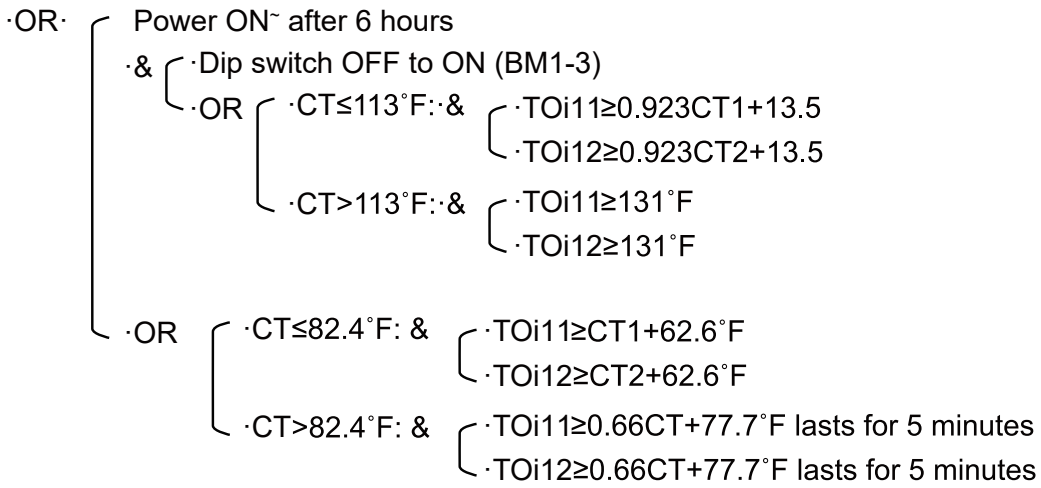
Single Fan					
Horse power	8	10	12	14	16
Speed	0~16	0~16	0~17	0~19	0~19
Double Fan					
Horse power	18	20	22	24	26
Speed	0~19	0~20	0~21	0~22	0~22

a. In cooling mode
Startup procedure: When compressor starts up, if Ta≥95°F, the outdoor motor will run at the highest class; if 77°F≤Ta<95°F, the outdoor motor will run at the 15 class; if 59°F≤Ta<77°F, the outdoor motor will run at the 6 class, if Ta<59°F, the outdoor motor off, the outdoor motor will run automatically after 45 seconds.
In operation, the motor control by the high pressure. If Pd<33lb, the motor will run at 1 class, off after 1min; if 33lb≤Pd<44lb, the motor will reduce 1 class every 20 seconds, until the lowest class; if 44lb≤Pd<55lb, the motor runs at the current speed, if 55lb≤Pd<70lb, the motor will raise 1 class every 20 seconds, if Pd≥70lb, the motor will run at the highest class immediately.

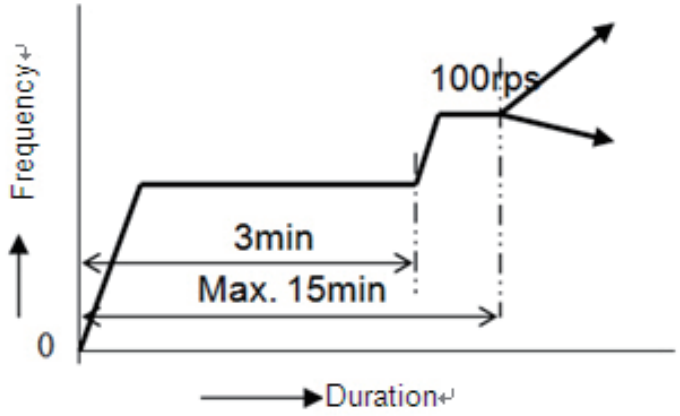
b. In heating mode
When compressor starts up, if Ta<50°F, the outdoor motor will run at the highest class; if 50°F≤Ta<68°F, the outdoor motor will run at the 5 class; if Ta≥68°F, the outdoor motor will run at the 1 class; the outdoor motor will run automatically after 60 seconds.
In operation, the motor control by the high pressure. If Pd>81lb, the motor will be off immediately; if 73lb<Pd≤81lb, the motor will reduce 1 class every 20 seconds; if 62lb<Pd≤73lb, the motor run at the current speed, if 53lb<Pd≤62lb, the motor will raise 1 class every 20 seconds, if Pd≤53lb, the motor will run at the highest class immediately.

6.4.4 Start Control

① Evaluate if the compressor has started according to the oil superheat temperature or the heating time of energized heating trip, in order to prevent prolonged suspension compressor oil from being severely diluted by refrigerant. The compressor starting conditions are as follows:



② Compressor start protecting control: Within the 3 min after starting; the operating frequency of compressor keeps at 50rps or 60rps. 3 min later, if Td SH is higher than 77°F, withdrawal from the starting process and conduct target Pd or target Ps control; 3 min later, if Td SH is lower than 77°F, the frequency goes up to 100rps and withdrawal from the starting until the Td SH is higher than77°F or the starting time reaches 15min. In the process of starting, protecting control has the priority.



[Note] Frequency maintained within the 3 min after starting is as follows:

·OR· { Tao≥59˚F : 50rps
·Tao<59˚F : 60rps

③ Restart of the compressor

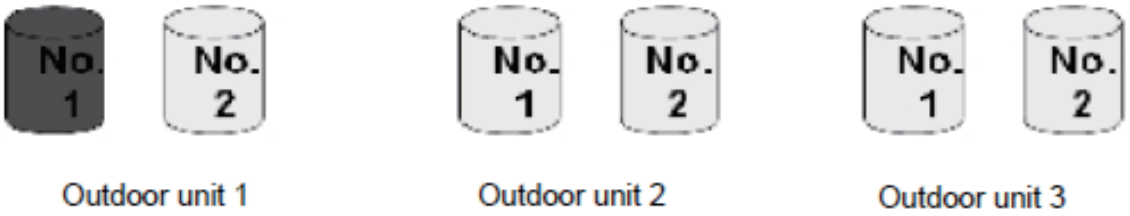
1. In the control of the compressor, in order to prevent starting at differential pressure, it must take some time to balance the high and low pressure after stopping fully, the restarting will delay automatically, and the compressor can restart after stopping for 3 to 5 minutes.
2. When the operating mode shifts from cooling (dehumidifying] to heating; the all compressors shall stop and delay 3~5 min to restart.
3. When powering on, a delay 3~5 min will occur to restart the compressor.
4. Before compressor restart; when the oil temperature cannot meet the start requirement, compressor will delay starting until oil temperature can meet the minimum requirement.

④ Cycle start function of compressor

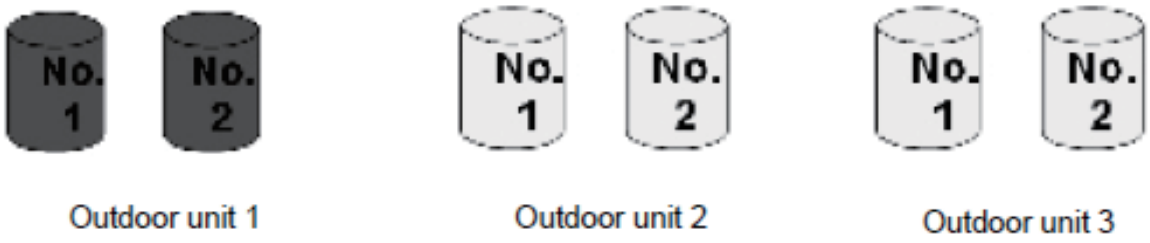
1. According to different loads of indoor unit, determine the number of compressors needing to start and outdoor units needing to start.
2. If there is only 1 outdoor unit but 2 compressors; the priority of compressor 1 and 2 will shift every 4 hours.
3. If there are several outdoor units, the priority of these outdoor units shall be shifted every 8 hours. If the outdoor unit with 2 compressors is operating, it shall shift the priority of compressor 1 and 2 every 4 hours.
4. Shift the priority of compressor and outdoor unit to meet shift interval in the following conditions.
1) When all of compressor and outdoor unit are ON or OFF at the same time, the priority can be shifted directly;
2) When all of outdoor unit and compressor operate in the process of oil return and deforesting, they can shift the priority;
3) When outdoor unit and compressor with higher priority stops upon a failure alarm; the priority can be shifted directly without evaluating the interval period.
5. Multi-connected unit of MX7 series without fixed host and sub-unit can shift in turn according to the conditions.

⑤ Changes of the number of compressors (take the multiple connection of 3 double compressor of outdoor unit as an example):

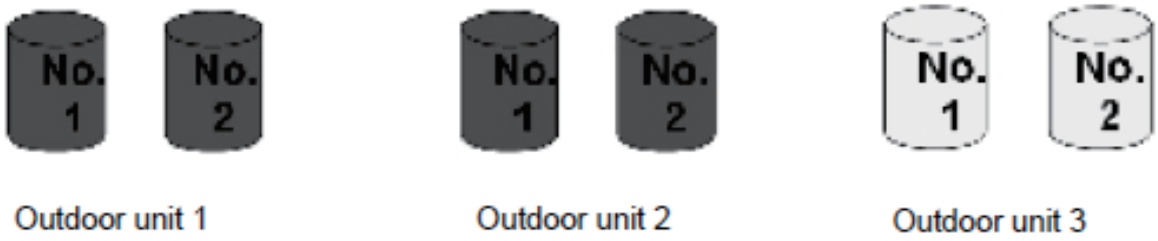
Compressor shifts its operating number with a different operating frequency according to the following pictures.
※ No.1 in the following picture represents the compressor with the highest priority, and outdoor unit 1 represents the outdoor unit with the highest priority, and so on.
1. At first, when operating frequency of one compressor of the outdoor unit 1 is less than 75% of the highest frequency, only No. 1 compressor works.



2. When operating frequency of one compressor rises up to the 75% of the highest frequency, two compressors in the outdoor unit 1 will work at the same time.



3. When the operation output ratio of the outdoor unit 1 (actual operating frequency/total operating frequency) continue to rise up to the 75%, two compressors in the outdoor unit 2 will also work at the same time.



4. When the total operation output ratio of the outdoor unit 1 and outdoor unit 2 (actual operating frequency/total operating frequency) rises up to the 75%, two compressors in the outdoor unit 3 will also work at the same time.

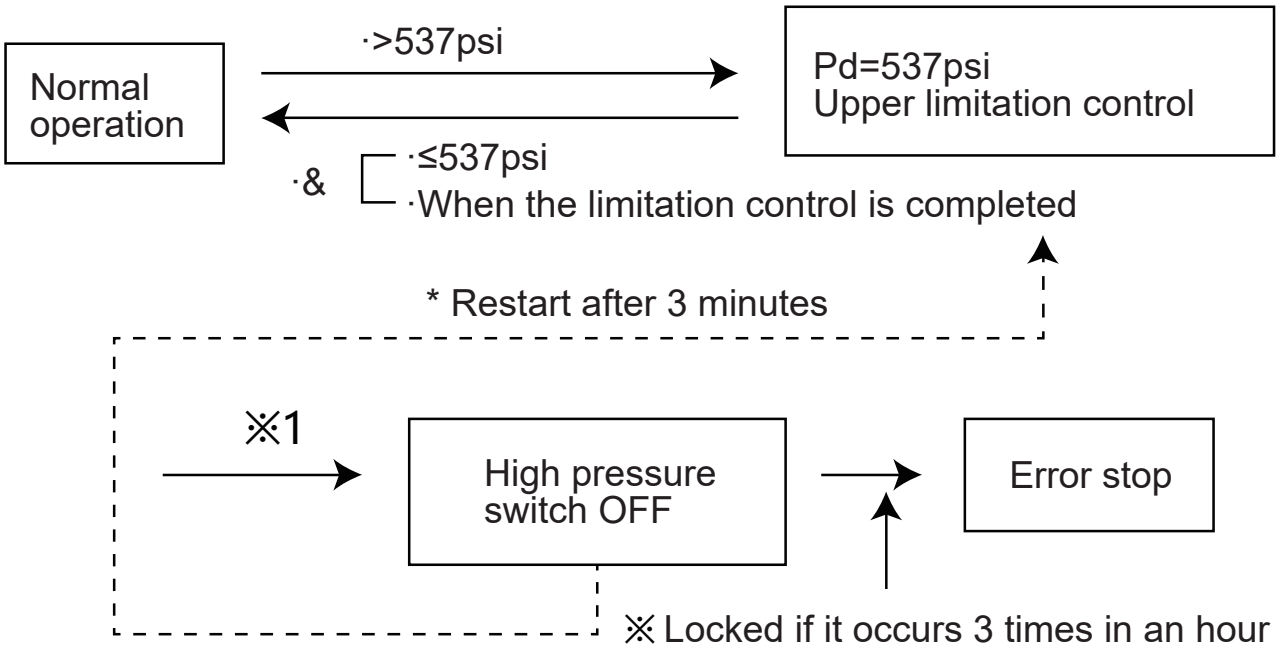
5. When the total operation output ratio of the outdoor unit 1, outdoor unit 2 and outdoor unit 3 declines to the 25%, two compressors in the outdoor unit 3 will stop at the same time, outdoor unit 1 and outdoor unit 2 continue to operate.
6. When the total operation output ratio of the outdoor unit 1 and outdoor unit 2 declines to the 25%, two compressors in the outdoor unit 2 will stop at the same time, and the two compressors in outdoor unit 1 continue to operate.
7. When the total operation output ratio of the outdoor unit 1 declines to the 25%, the No. 2 compressor of outdoor unit 1 will stop and the No. 1 compressor continues to operate.

6.4.5 Pump Down Operation

After the liquid refrigerant is retained in the gas-liquid separator, the refrigeration oil in the compressor is diluted to reduce the lubricity, and can cause Liquid compression, which may damage the compressor. This control is to prevent these situations happening.
Pump down operation for cooling
The outdoor unit frequency is 25%* rated frequency, the indoor LEV is fully closed, and other automatic control, after running for a period of time, the exhaust superheat degree meets the requirements and then exits.
Pump down operation for heating
Outdoor unit frequency 25%* rated frequency, outdoor unit LEV fully closed, other automatic control, after running for a period of time, the exhaust superheat degree meets the requirements and then exits

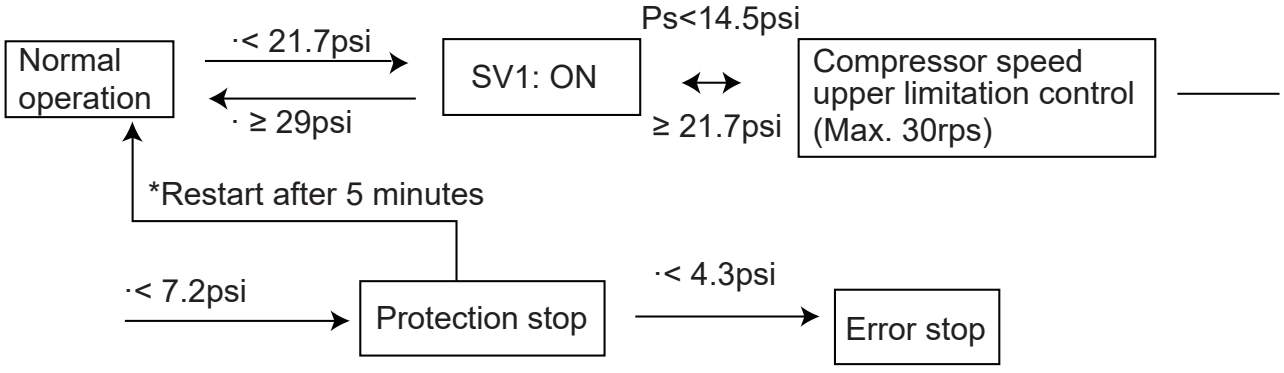
6.4.6 High Pressure Protection

In order to maintain normal cooling and heating operation, high pressure control is performed by a high pressure sensor.
Limit the upper limitation of the compressor operating frequency and operating under a certain high pressure value



6.4.7 Low Pressure Protection

By SV1 and compressor operating frequency control to maintains the low pressure above a specified value.

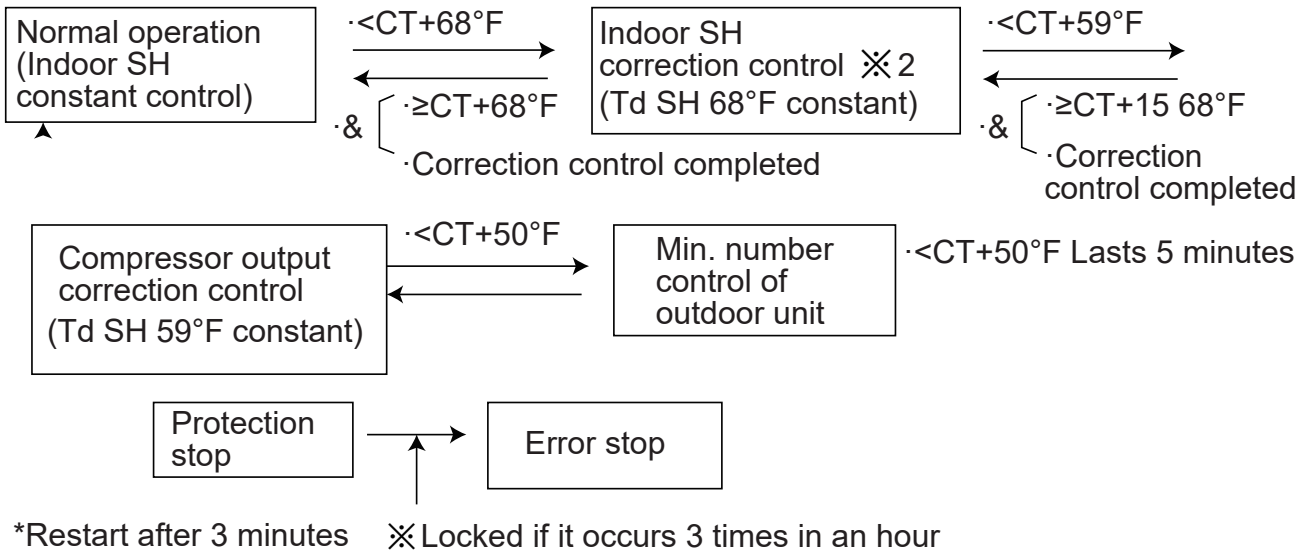


6.4.8 High Discharge Temperature Control

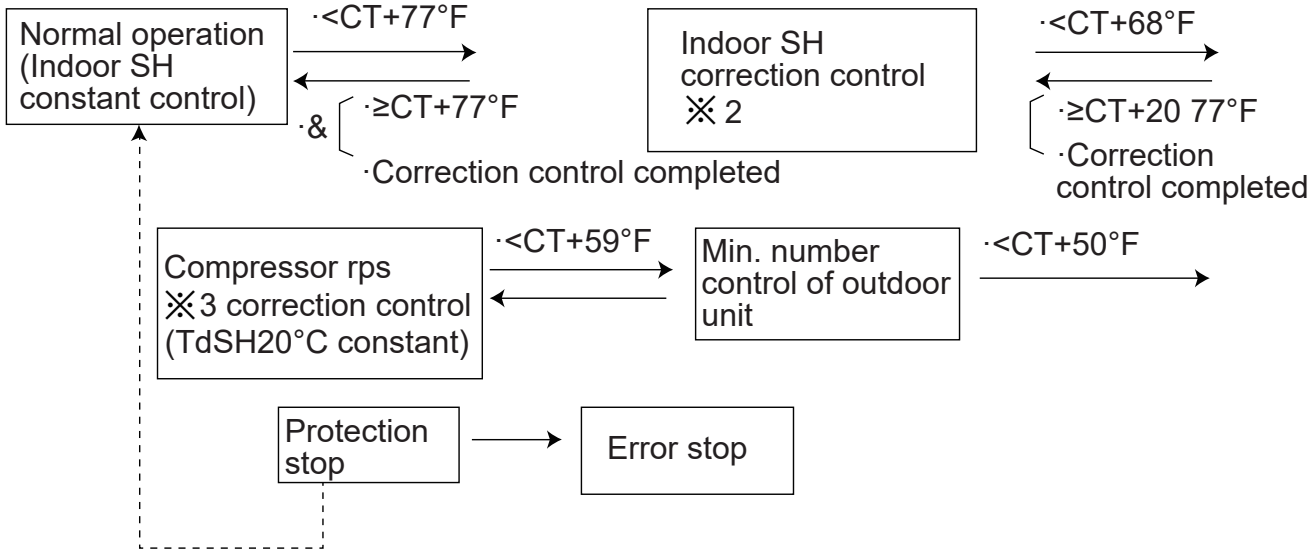
·Td high temperature side (≤248°F) is controlled by the “indoor unit SH correction + SV3 LEVb control + compressor frequency control”. (Note) Compressor frequency control is performed by fuzzy logic control.
When the discharge temperature Td≥203°F, the SV3 is turned on.
When the discharge temperature Td≥221°F, the compressor reduce the frequency
When the discharge temperature Td ≤ 194°F, Recovery usually control

6.4.9 Low Discharge Temperature Control

In cooling:
·Td low temperature side (<CT+50°F) is controlled by the first stage is indoor unit SH control/ the second stage is compressor output control/ the third stage is minimum number of outdoor units running control.



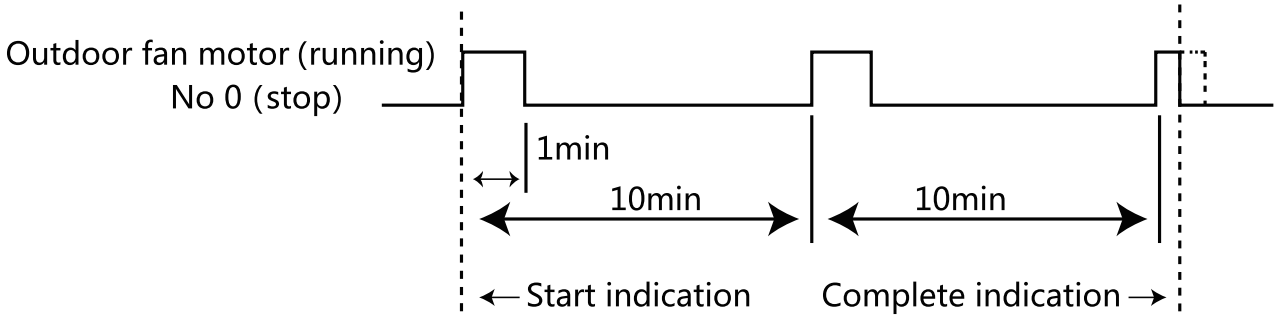
In heating:
·Td low temperature side (<CT+50°F) is controlled by the first stage is indoor unit SH control/ the second stage is compressor output control/ the third stage is
minimum number of outdoor units running control



6.4.10 Coil Protection Control

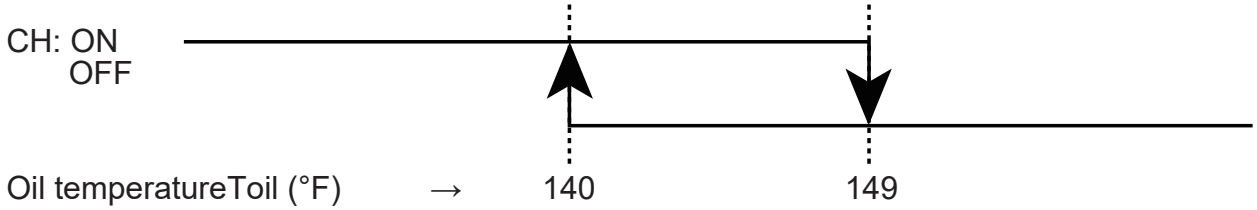
By controlling the frequency of the compressor to control the temperature of the coil, and the coil temperature is usually controlled at 203°F. Above 203°F, the outdoor fan increases the speed.

6.4.11 Anti-Snow Protection



6.4.12 Heater Control

When the system is running, control the heater according to the following picture.



When the compressor oil temperature Toil is 140-149°F, it starts from ON.
CH: Heater (Crank Case Heater)

6.4.13 Target Pressure Control

① Cooling low pressure control

Target Pressure Ps When Cooling		Remarks
Long piping setting	14.3 lb	
Medium piping setting	16.5 lb	Factory default setting
Short piping setting	18.3 lb	

• During cooling the operating frequency of compressor is fuzzy logic controlled based on target Ps.
• The frequency of compressor goes down and Ps goes up; the frequency of compressor goes up and Ps goes down.
• During cooling; if the low pressure reaches 152.3 psi, the LEV control of all indoor units will limit suction pressure to 152.3 psi.

[Note]
The one-way connection piping of the units is generally defined as: when the longest piping is less than 98 ft (30m), it is short piping; 98-295 ft (30-90m), medium piping; more than 295 ft (90m), long piping. The specific situation is determined by installation in site.

② Heating high pressure control

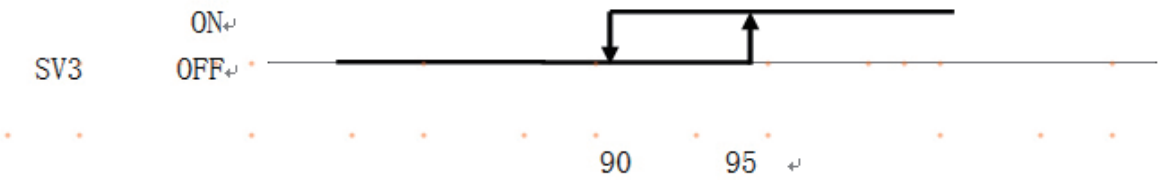
Target Pressure Pd When Heating		Remarks
Long piping setting	66.1 lb	
Medium piping setting	61.7 lb	Factory default setting
Short piping setting	57.3 lb	

During heating, the operating frequency of compressor is fuzzy logic controlled based on target Pd.
The frequency of compressor goes down and Pd goes down; the frequency of compressor goes up and Pd goes up.

[Note]
For heating capacity; if the discharge pressure is higher then the capacity is higher. However, if the discharge pressure is higher, the COP of unit will be lower.

6.4.14 Overheating Protection Control

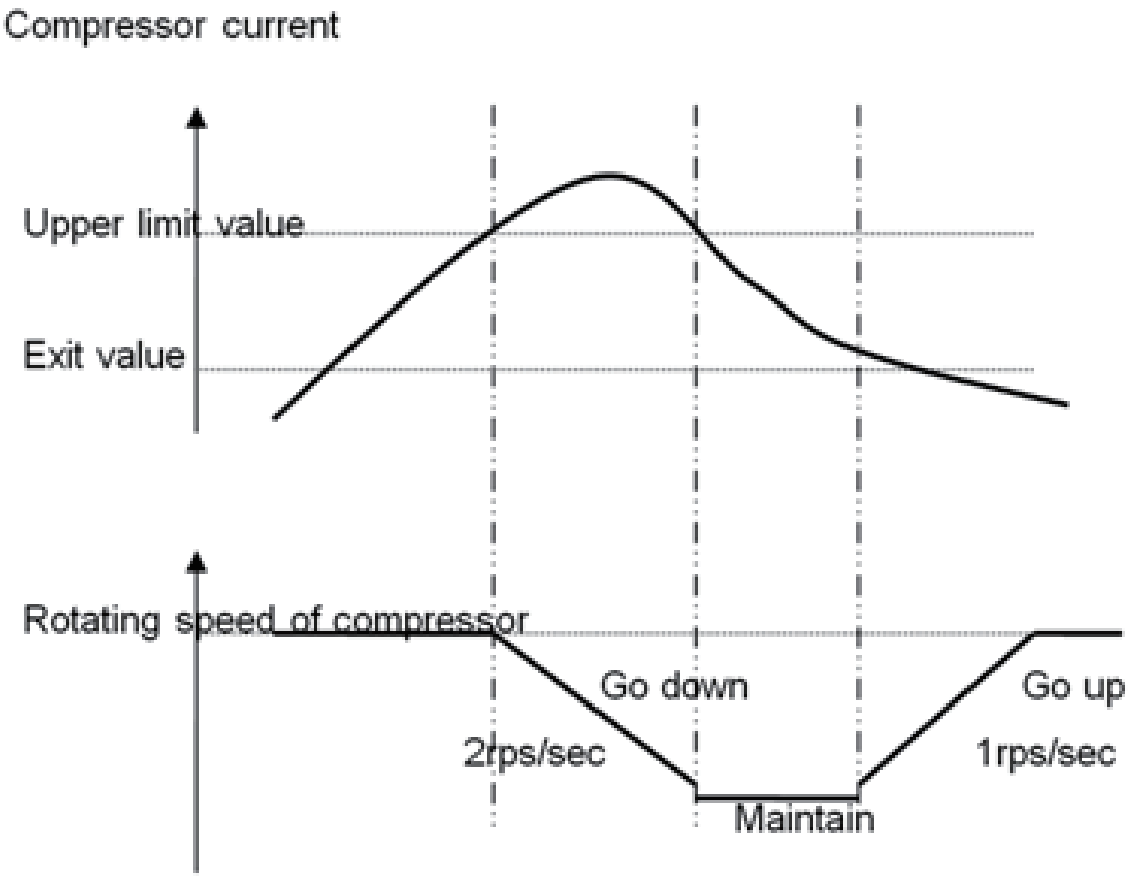
① When the temperature at the top of the compressor rises; the corresponding SV3 is started to conduct the liquid bypass cooling.
(Refer to Figure) Td high temperature side (≤ 248°F) control / SV3 control



When Td ≥212°F, in cooling, the indoor unit SH modification control, maximum modification value - 5
When Td ≥221°F, control the compressor frequency.

6.4.15 Current Protection Control

① If the compressor current exceeds the stipulated upper limit value; the operating frequency is reduced for control before the current changes to exit-value or below.
② When the current cannot reach the upper limit value or below, even at the lowest rotating speed (20rps), the compressor will stop operating.
③ If the operating current reaches the exit-value or below, it will return to the target rotating speed.



Compressor	ANB42	ANB52	ANB66	ANB78	ANB87
Rated Current	33A	34A	40A	45A	50A

6.4.16 Heating is Prohibited

Heating is prohibited
When the outdoor temperature is greater than or equal to 77 degrees, the setting can be made through the outdoor unit rotary dial, and the outdoor is prohibited from starting.

SW1	SW2	SW3	Function	Digital Tube LD1 - 4 Display
15	6	2	Heating limitation when outdoor temp over 77 ° Fahrenheit	0- no limitation, 1-limitation

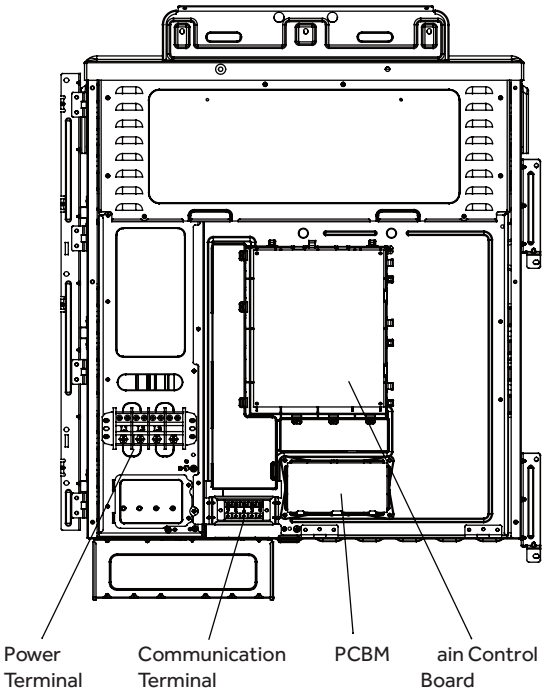
7. Comissioning

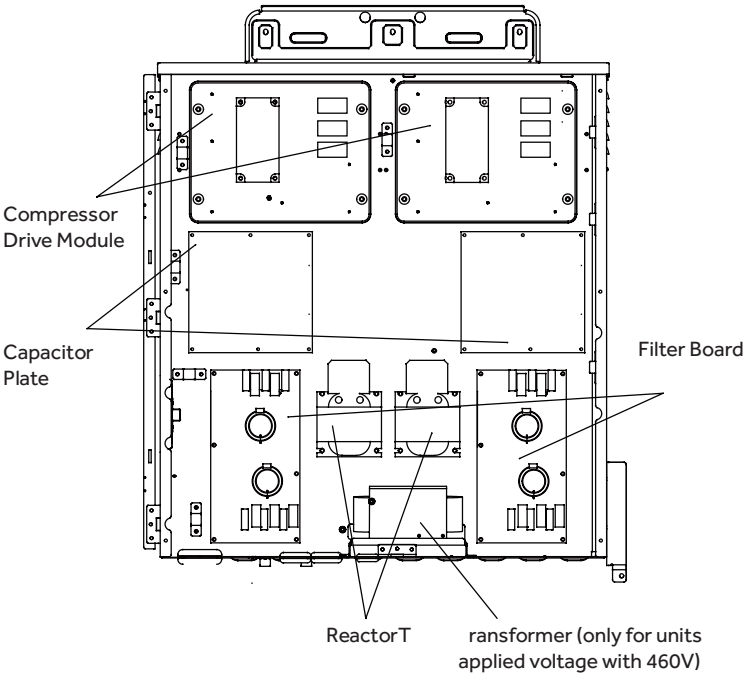
7.1 Field Settings for Outdoor Unit

7.1.1 Settings by DIP Switches

Electric Wiring and Applications Cont.

Internal Layout of Electric Box





Outdoor Dip Switch Configuration:

• Main Unit: Main Unit is identified by setting dip switch BM1-7, 8 to zero.
• Function main unit: The outdoor unit, whose priority is set as 0, operates with the highest priority.
• Physical sub unit: By setting the dip switch, the unit number is not 0.
• Functional sub unit: The outdoor without the highest priority of running, the priority class is 1-3.
• Group class setting: Physical main unit setting is valid, which can be used for all units. For example, silence, snow-proof,
piping length, etc. setting. Set all kinds of state on the physical main unit as a representative.
• Single class setting: Only be used for the single unit, instead of the whole group. For example, sensor backup running,
inverter board selection etc.
• In the following table, 1 is ON, 0 is OFF.

BM1 Introduction

BM1_1	Outdoor searching after startup	0	Begin to search outdoor	Group Class (Physical Main Unit is Valid)
		1	Stop searching outdoor and lock the quantity	
BM1_2	Indoor searching after startup	0	Begin to search indoor	
		1	Stop searching indoor and lock the quantity	
BM1_3	Start up after pre-heating for 6 hours	0	Allow (must be electrified for 6 hours)	
		1	Within 6 hours when oil temp. meets the allowed value (allowed value lower than the standard value)	
BM1_4	Outdoor mode setting	0	Normal (default)	
		1	Only cool	
BM1_5	Outdoor fan static pressure selection	0	No static pressure, high speed (default)	
		1	Ultra high-speed	
BM1_6	Communication protocol between IDU & ODU	0	New protocol (default)	
		1	Old	

BM1_7 BM1_8	Address setting	BM1_7	BM1_8	Unit Number
		0	0	0# (Physical Main Unit)
		0	1	1#
		1	0	2#
		1	1	3#

BM2 Introduction

BM2_1 BM2_2	Indoor and outdoor unit new protocol communication type setting (BM1_6 selection of the new agreement is valid for 0)	BM2_1	BM2_2	Indoor and outdoor unit communication category set	Group class (physical main unit is valid)
		0	0	Wired 9600bps General Agreement (ex factory default)	
		0	1	Wired 9600bps New2 upgrade protocol	
		1	0	Wired 9600bps Communication	
		1	1	Reserve	

BM2_3	OUtdoor unit heat mode setting (BM1_4 = 0)	0	Normal (default)
		1	Only heat
BM2_4	OUtdoor machine lock sub wireless module MAC address	0	Lock sub wireless module address (default)
		1	Allow new sub wireless module to join
BM2_5	Completely empty the wireless external mode EEPROM	0	Normal (default)
		1	The three dials of the digital tube are first dialed to 1-1-1, which is cleared after OFF_ON
BM2_6	Communication conversion board chaging module (wireless communication)	0	No (default)
		1	Yes
BM2_7 BM2_8	Reserve	0	Reserve

BM3 Introduction

BM3_1 BM3_2 BM3_3 BM3_4	Outdoor model setting	BM3_1	BM3_2	BM3_3	BM3_4	Outdoor
		0	0	0	0	Normal
		0	0	1	0	Update use
		0	1	0	0	Heat pump model
		0	1	1	0	Heat recovery model
		1	0	1	0	Heat pump model for US(230V)
		1	1	0	0	Heat recovery model for US(230V)
		1	0	1	1	Heat pump model for US(460V)
		1	1	0	1	Heat recovery model for US(460V)
BM3_5 BM3_6 BM3_7 BM3_8	Outdoor capacity setting	BM3_5	BM3_6	BM3_7	BM3_8	Model mark
		0	0	0	1	072
		0	0	1	0	096
		0	0	1	1	120
		0	1	0	0	144
		0	1	0	1	168
		0	1	1	1	192
		1	0	0	0	216
		1	0	0	1	240
		Reserve				

BM3 Introduction

BM4_1 BM4_2	ModeBus Centralized control protocol selection	BM4_1		BM4_2			Protocol selection
		0		0			Third party standard MODBUS protocol
		0		1			Computer management protocol
		1		0			Specific centralized control protocol (default)
		1		1			Reserve
BM4_4 ~ BM4_8	ModeBus centralized control communication address	BM4_4	BM4_5	BM4_6	BM4_7	BM4_8	ModeBus set control communication address (IGU02 using the address in brackets)
		0	0	0	0	0	Address 1(0)
		0	0	0	0	1	Address 2(1)
		0	0	0	1	0	Address 3(2)
		0	0	0	1	1	Address 4(3)
		0	0	1	0	0	Address 5(4)
		0	0	1	0	1	Address 6(5)
		0	0	1	1	0	Address 7(6)
		0	0	1	1	1	Address 8(7)
		0	1	0	0	0	Address 9(8)
		0	1	0	0	1	Address 10(9)
		---	---	---	---	---	---
		1	1	1	1	1	Address 32(31)

Electric Wiring and Applications Cont.

Outdoor Machine Digital Tube Display Setting
The contents of the display are defined as follows:
• Key parts: long press the left START (SW5) control to enter, short press UP (SW4) data scroll up, short press DOWN (SW7) data scroll down, long press the right STOP (SW6) enter data and exit.
• DIal: SW1, SW2, SW3: set the rotary dial switch is 0-15.
• NOTE: The dial plate, with the letters A for 10, B for 11, C for 12, D for 13, E for 14, F for 15.
• Display parts: LD1, LD2, LD3, LD4:4 digital tube from left to right.

1. Indoor Machine Parameter View
You can view the indoor machine 128 sets of parameters: SW1 and SW2 represent the indoor machine address, SW3 range 3-14 can view the indoor machine parameters.

SW1	SW2	Address
0	0-15	1 to 16 (address 0# - 15#)
1		17 to 32 (address 16# - 31#)
2		33 to 48 (address 32# - 47#)
3		49 to 64 (address 48# - 63#)
7		65 to 80 (address 64# - 79#)
8		81 to 96 (address 80# - 95#)
9		97 to 112 (address 96# - 111#)
10		113 to 128 (address 112# - 127#)

SW3	Function	Digital Tube LD1 ~ 4 Display
3	Digital Tube LD1 - 4 Display	Communication normal display indoor machine program version (1 decimal), the communication interrupted normal display “0000” (5 consecutive rounds of “no Communication” success,), communication has not been normal display “---- ----””. Such as 3.9, said the machine version number is V3.9
4	Indoor unit failure	Display indoor unit fault code, no fault display 0
5	Indoor unit capacity	The indoor unit capacity (tonnage, 1 decimal places), 1.5 tonnage show 1.5
6	Indoor unit expansion valve opening	expansion valve opening (pulse)
7	Indoor unit environment temperature Tai	zone temperature (°F)
8	Indoor gas temperature Tc1	gas temperature Tc1 (°F)
9	Indoor liquid temperature Tc2	liquid temperature (°F)
10(A)	Indoor unit boot mode, the actual operation of wind speed and SCODE code	LD1 said the boot mode O: stop C: refrigeration H: heating LD2 said the actual operating speed of the indoor machine (0-stop, 1- low speed, 2- Middle speed , 3- high speed), LD3 and LD4 are represented by SCODE codes (0-15)° Such as C311 said the cooling operation of high speed, SCODE 11°
11(B)	Indoor set temperature Tset	Indoor set point temperature (°F)
12(C)	Indoor unit consistancy control setting	Display the indoor unit corresponding to the same contract use (0 unallocated group number, their control) Method of setting group and the <E2 control parameters and Display Settings > (Note: all in the unit at the same time can be set by a dial 15-0-2 set “in the same unit drive outside unit control”, 0- indoor unit according to the number of automatic control, 1-indoor unit with all contract, all within each 2- indoor unit control, banned from drive off
13(D)	Low temperature automatic running function of indoor unit	Indicates if machine has this function or not; 0=no, 1=yes Use E2 control parameters display and settings. Access by setting dial switches to 15-1-2. Set low temperature and automatic operation at the same time. 0=automatic control, 1= all machine settings valid, 2= all machine settings not valid
14(E)	Forced indoor unit cooling / heating / shutdown	(1)Press START(SW5)for 2 s, to enter the instruction set state,flashing display instructions. (2)according to UP (SW4) or DOWN (SW7) adjustment instructions (COOL/HEAT/OFF). (3)after the adjustment is completed, according to STOP (SW6) for 2 s,the implementation of the instruction set and stop flashing display

Electric Wiring and Applications Cont.

Outdoor Machine Digital Tube Display Setting

2. Outdoor Unit Parameter View

SW1 0-3 is used to select the outdoor unit number, To select a different unit; SW3 set to 0-15 (outdoor unit number) (The host can display the parameters of the other outdoor unit and the indoor unit parameters, and the sub unit only displays the unit parameter SW1 is 0).

(1) The first boot, the first sub search engine, from left to right circular display 1:0, if found a table display 2:01 two table display 3:012 “3:012” means a total of 3 units of the system, 012 said the address of the machine (“.” the actual display “=”).

(2) Lock machine units, start the search within the machine number, cycle “-in-machine units”, such as “-6-” said the system connects the 6 station machine.

(2) After the search is completed, the display of the machine’s fault code, the machine has no fault when the display is 0.

SW1	SW2	SW3	Function	Digital tube LD1 ~ 4 Display
Outdoor unit address 0-3	0	0	Display outdoor unit fault code	External machine bus data transfer fault code. If there is no fault display on the compressor crankcase heat 6 hour countdown time to form a stopwatch. Press START (SW5) for 2 s, 1111, into the fault query state, can query the last 10 faults occur: fault and fault code flashing display serial number, each by 1 UP (SW4) plus 1 serial number, each by 1 DOWN (SW7) serial number minus 1; 2 min automatic exit. Steady state Press STOP (SW6) for 2 s, display 0000, quit the status of the query, stop flashing display; The dial in 13,0,0, press START (SW5) 2 s, 1111, can clear the historical record of failure
	1	0	Display outdoor unit priority and outdoor unit capacity	LD1: Display priority of outdoor unit LD2: Display “-” LD3-4: Display outdoor unit capacity (Horse)
	2	0	Display operation mode and outdoor unit operation output ratio	LD1 said O: stop C: refrigeration H: heating LD2-LD4 said: 60 of the ability to express the output of 60%
	3	0	Outdoor fan speed 1	345 representation 345 rpm Press START (SW5) for 2 s,1111, enter the set state: flashing, each by 1 UP (SW4) level of wind speed increased by 1 per level, by1 DOWN (SW7) wind speed increased by 1 grade; 5min automatically exit the setting state. Press STOP (SW6) for 2 s, display 0000, quit the set state, stop
	4	0	Outdoor fan speed 2	
	5	0	Frequency converter INV1 current frequency	110 representation 110.0Hz Press START (SW5) for 2 s, display 1111, enter the set state: flashing display, each according to the 1 UP (SW4) frequency rise 1Hz, every 1 times DOWN (SW7) frequency drop 1Hz; 5min after automatically quit the set state. Press STOP (SW6) for 2 s, display 0000, quit the set state, stop flashing display;(When the system is in trouble, the compressor is forbidden to start)
	6	0	Frequency coverter INV2 current frequency	

Electric Wiring and Applications Cont.

SW1	SW2	SW3	Function	Digital tube LD1 ~ 4 Display
Outdoor unit address 0-3	7	0	Outdoor unit LEVa1 open degree	0---470 pluse Press START (SW5) for 2 s, 1111, enter the set state: flashing, press UP (SW4) valve fully open, according to DOWN (SW7) 2min after the valve is fully closed; automatically exit the setting state Press STOP (SW6) for 2 s, display 0000, quit the set state, stop flashing display
	8	0	Outdoor unit LEVa2 open degree	
	9	0	Outdoor unit LEVb open degree	
	10(A)	0	Outdoor unit LEVc open degree	
	11(B)	0	Outdoor unit output electromagnetic valve	LD1: 4WV: 1 open 0 close——High to the left LD2: SV1: 1 open 0 close LD3: SV3: 1 open 0 close LD4: Reserved, Display “-”
	12(C)	0	Outdoor unit output electromagnetic valve	LD1: SV6: 1 open 0 close——High to the left LD2: SV9: 1 open 0 close LD3: SV10: 1 open 0 close LD4: SV11: 1 open 0 close
	13(D)	0	Outdoor unit output electromagnetic valve	LD1: SVX: 1 open 0 close LD2: SVY: 1 open 0 close LD3: Reserved: Display “-” LD4: Reserved: Display “-”
	14(E)	0	Heating belt output	LD1: CH1: 1 open 0 close LD2: CH2: 1 open 0 close LD3: CHa: 1 open 0 close LD4: Reserved: Display
	15(F)	0	Program version	1 representation Ver1.0

SW1	SW2	SW3	Function	Digital tube LD1 ~ 4 Display
Outdoor unit address 0-3	0	1	Pd	Unit: psi, 1 decimal place
	2	1	Ps	
	3	1	Td1	Unit: °F
	4	1	Td2	
	5	1	Tdef	
	7	1	Toil1	
	8	1	Toil2	
	9	1	Toci1	
	14(E)	1	Tsacc	
	15(F)	1	Th	

SW1	SW2	SW3	Function	Digital tube LD1 ~ 4 Display
Outdoor unit address 0-3	0	15(F)	Reserved	
	1	15(F)	Tao	25 Unit: °F
	2	15(F)	Pd_temp	
	4	15(F)	Ps_temp	
	5	15(F)	Tliqsc	
	6	15(F)	Tsco	
	8	15(F)	Frequency conversion press INV1 running time	Unit: Min
	9	15(F)	Frequency conversion press INV2 running time	Unit: Min
	10(A)	15(F)	Frequency conversion press INV1 current CT	Unit: A, 1 decimal place
	11(B)	15(F)	Frequency conversion press INV2 current CT	Unit: A, 1 decimal place
	12(C)	15(F)	Frequency conversion compressor INV1 DC voltage	Unit: V
	13(D)	15(F)	Frequency conversion compressor INV2 DC voltage	Unit: V
	14(E)	15(F)	Frequency converter INV1 module temperature	Unit: °F
	15(F)	15(F)	Frequency converter INV2 module temperature	Unit: °F

Electric Wiring and Applications Cont.

3. System Status Display and Control (host)

SW1	SW2	SW3	Function	Digital tube LD1 - 4 Display
0	0	2	Refrigerant type	410A represents 410A refrigerant
0	1	2	The same outdoor unit total number and total capacity	LD1: The total number of outdoor unit LD2: Display "-" LD3/ LD4: Total outdoor unit capacity (unit: Horse) For example: 3-48 said 3 outdoor machines, with a total capacity of 48 horses
0	2	2	Total indoor unit capacity	50 represents 50 kbtu/h
0	3	2	The indoor units within the same system	For example: 64
0	4	2	Number of indoor units working	Temperature sensor ON as a sign of the work of the indoor unit
00	5	2	With the outdoor unit running mode the same indoor unit number	For example: 13
0	6	2	Cooling target temperature	Unit: °F
0	7	2	Heating target temperature	
0	8	2	Automatic recovery of refrigerant NOTE: the end of the recovery must be canceled or reset	When the outdoor stops, press START (SW5) for 2 s, display 1111, start. (the outdoor is set to work in a state of operation) Press STOP (SW6) for 2 s, display 0000, stop
0	10(A)	2	Test run setup NOTE: the end of the test run must be canceled or reset	When the outdoor stops, press START (SW5) for 2 s, display 1111, start. (the outdoor is set to work in a state of operation) Press STOP (SW6) for 2 s, display 0000, stop
0	11(B)	2	Outdoor unit mode	0-normal, C-only cool H-only heat
0	12(C)	2	Indoor unit expansion valve fully open	Press START (SW5) for 2 s, display 1111, indoor valve fully open 2 minutes, 2 minutes after the automatic shutdown valve
0	13(D)	2	All the indoor unit for cooling	Press START (SW5) for 2 s, display 1111, fully open; Press STOP (SW6) for 2 s, display 0000 closed
0	14(E)	2	All the indoor unit for heating	
0	15(F)	2	Cancel all manual control (running class)	Press START (SW5) for 2 s, display 1111 cancel; or press STOP (SW6) for 2 s, display 0000, cancel Remove all manual control (part), closed indoor unit

Electric Wiring and Applications Cont.

4. E2 control parameters display and setting

Each need to be set, setting method:

(1) Press START (SW5) for 2 seconds. Display will show 1111, enter the set state. Flashing display the current value.

(2) Press UP (SW4) or DOWN (SW7) to adjust the parameters.

(3) After the adjustment is completed:

<A> In the current state of code, effectively set the time by pressing STOP (SW6) for 2 seconds, showing 0000. Keep the current settings and exit the set state, stop flashing display, waiting for 2 minutes after the power off and then power up again.
<B> The cuurent set time is not set by STOP (SW6) or change the dial selection, do not save the current set value, exit the set state, stop flashing display.
<C> Effective time setting: the machine with the contract number and set off a low temperature automatic operation function for 10 minutes, the other for 30 seconds.

SW1	SW2	SW3	Function	Digital tube LD1 - 4 Display	Control Range
15(F)	0	2	In the same machine drive off control selection	0- indoor units auto-control according to the group number 1- all indoor units open and close together 2- all indoor units auto-control, forbidden to open or close at the same time	Group class (physical main unit is valid
15(F)	1	2	Selection of low temperature automatic operation control for indoor unit	0- within the machine automatic control, 1- all indoor units is valid, 2- all indoor units is invalid	
15(F)	2	2	Pipe length selection	0: short pipe length; 1: middle pipe length; 2: long pipe length	
15(F)	3	2	Defrosting conditions selection	0- normal area, 1- area easy to frost	
15(F)	4	2	Operation mode priority	0- first open priority; 1- after opening priority 2- cooling priority; 3- heating priority	
15(F)	6	2	Heating limit when outdoor temp over 77° F (25 °C)	0-shows no limitation, 1-shows limitation	
15(F)	7	2	Silent running option	0-without silent operation, 1- silent operation 1, 2- silent operation 2, 3- silent operation 3, 4- silent operation 4	
15(F)	8	2	Snow-proof operation setting	0-without snow-proof operation, 1- with snow-proof operation	
15(F)	9	2	When the main outdoor machine is running,the choice of the operation of the outdoor wind turbine stopped	0-stop, 1-run	
15(F)	12(C)	2	Power limit operation control mode selection	0- By E2 value, 1- By external contact DRM	
15(F)	13(D)	2	Power output ratio selection (E2 control method is valid)	Allow maximum capacity output, total of 11 grade, 0 grade is 0%, 10 grade is100%	

7.2 Test Operation

7.2.1 Initial Power Up

No.	Contents to be confirmed	Result
1	Whether there is power on interface board of the outdoor unit, whether the 7-segment display is on and whether the displayed data on dip switch panel and the 7-segment display are variable.	
2	For MRV outdoor unit; indoor unit number displayed on the 7-segment display is consistent with the actual number when dip switch panels SW1, SW2 and SW3 are turned to “0 3 2”, and dip switch code BM1-2 is turned from OFF to ON.	
3	For MRV outdoor unit system, outdoor unit number displayed on the 7-segment display is consistent with the actual number when dip switch panels SW1, SW2 and SW3 are turned to “0 2 2”, and dip switch code BM1-1 is turned from OFF to ON.	
4	For MRV outdoor unit system, the HP of outdoor unit sets displayed on the 7-segment display is consistent with the actual unit type when dip switch panels SW1, SW2 and SW3 are turned to “0 1 2” MVHP072ME4CA shows "1-69" MVHP096ME4CA shows "1-92" MVHP120ME4CA shows "1-115" MVHP144ME4CA shows "1-138"	
5	Check whether the parameters, such as parameters of outdoor unit sensors, number of indoors connected and the opening of electronic expansion valves, etc., are correct through dip switch on the outdoor unit interface board or by using testing equipment and computer software.	
6	Check whether the parameters, such as parameters of indoor unit sensors, the opening of electronic expansion valves, etc., are correct through dip switch on the outdoor unit interface board or by using testing equipment and computer software.	

Note:
If the indoor unit cannot be searched or the number of the searched units isn't consistent with the actual number of indoor units in the system within four and a half minutes, it will be reported as communication fault 26-X.

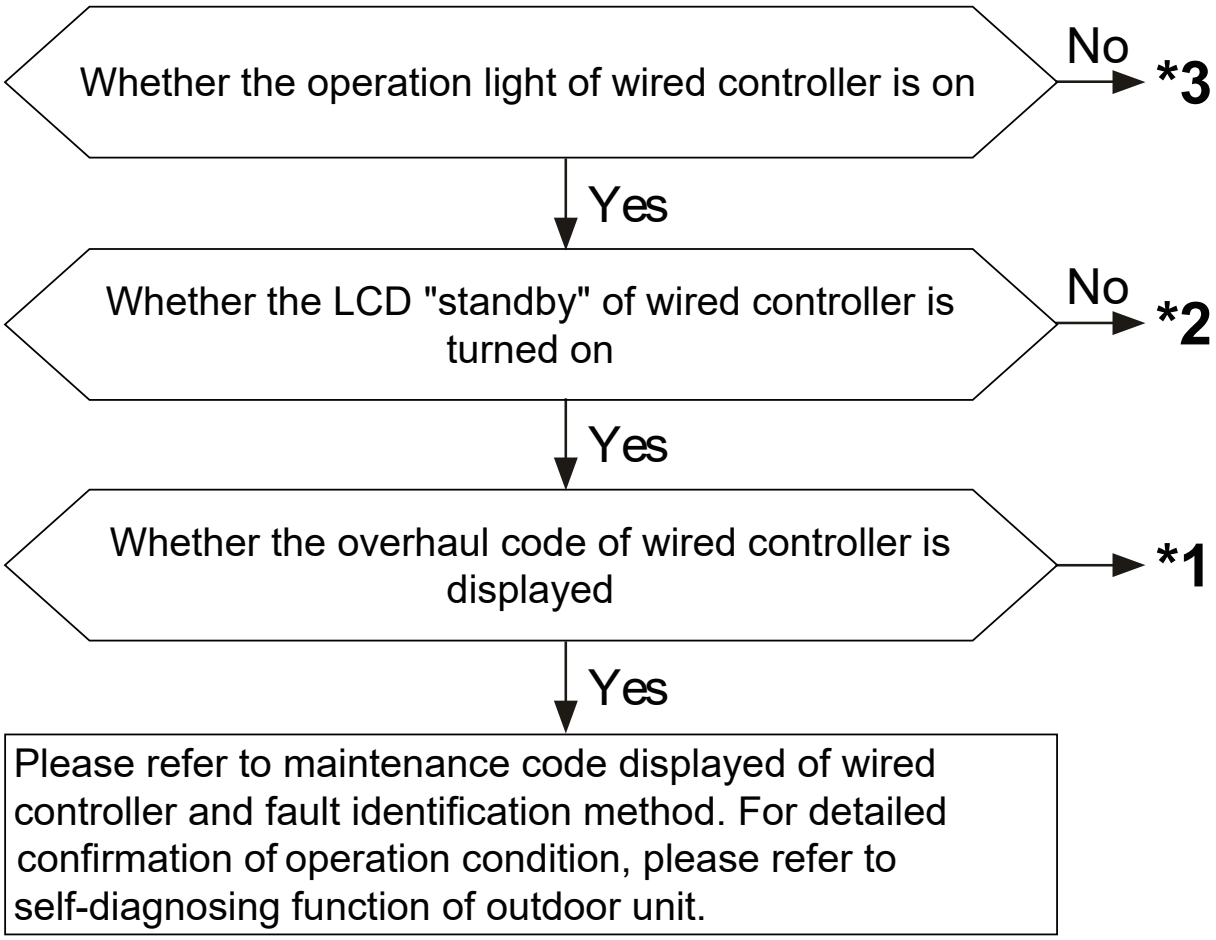
7.2.2 Rated Operation

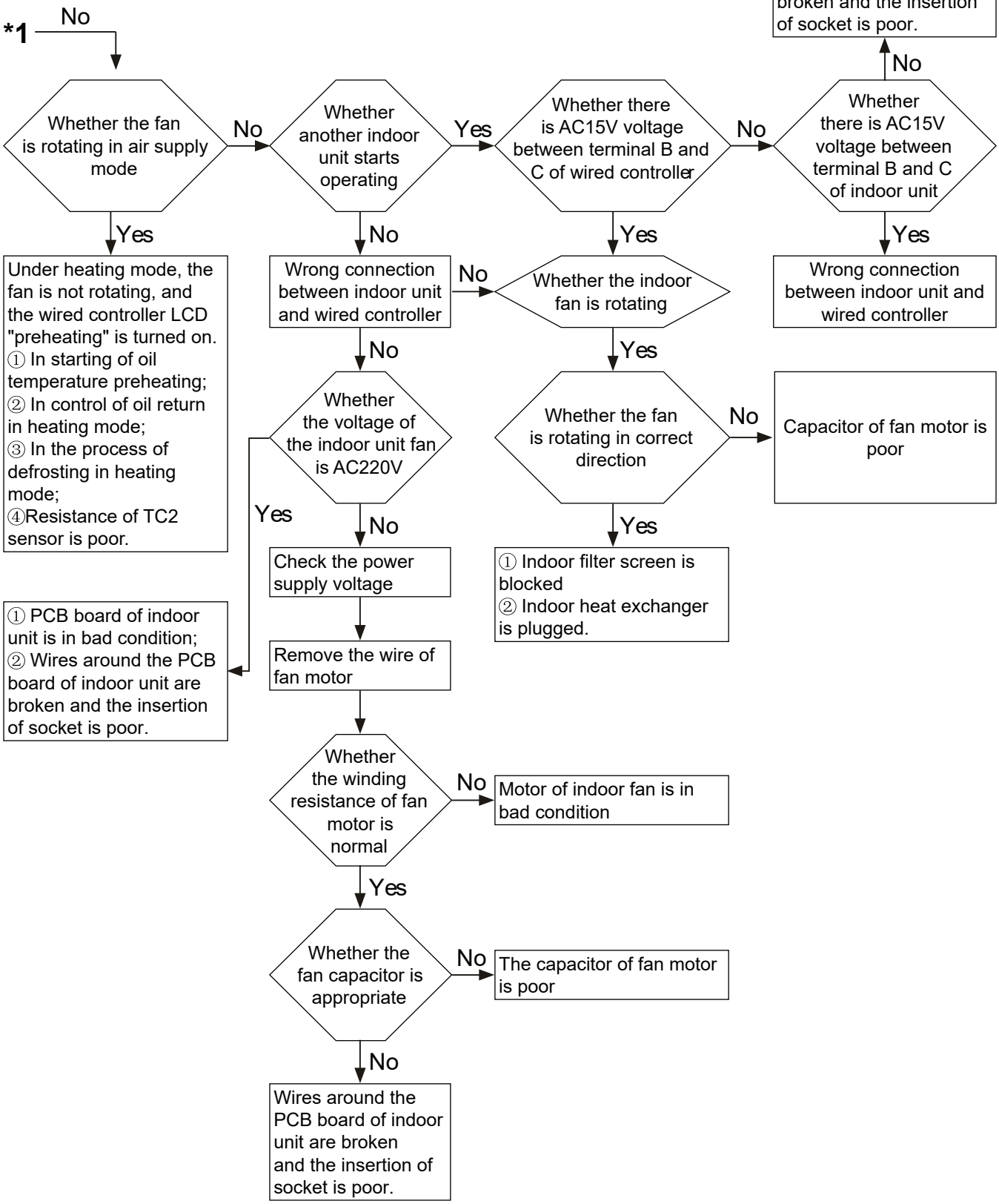
Startup control on indoor and outdoor units and operation condition inspection for outdoor units can be completed through rated operation. In case of inspection on single indoor unit, wired controller or remote controller of indoor unit will be adopted for control.
Rated cooling operation: when SW1, SW2 and SW3 dip switches are turned to 0, 13, 2, the indoor units will be started up automatically and be forced to turn to cooling operation.
Rated heating operation: when SW1, SW2 and SW3 dip switches are turned to 0, 14, 2, the indoor units will be started up automatically and be forced to turn to heating operation.

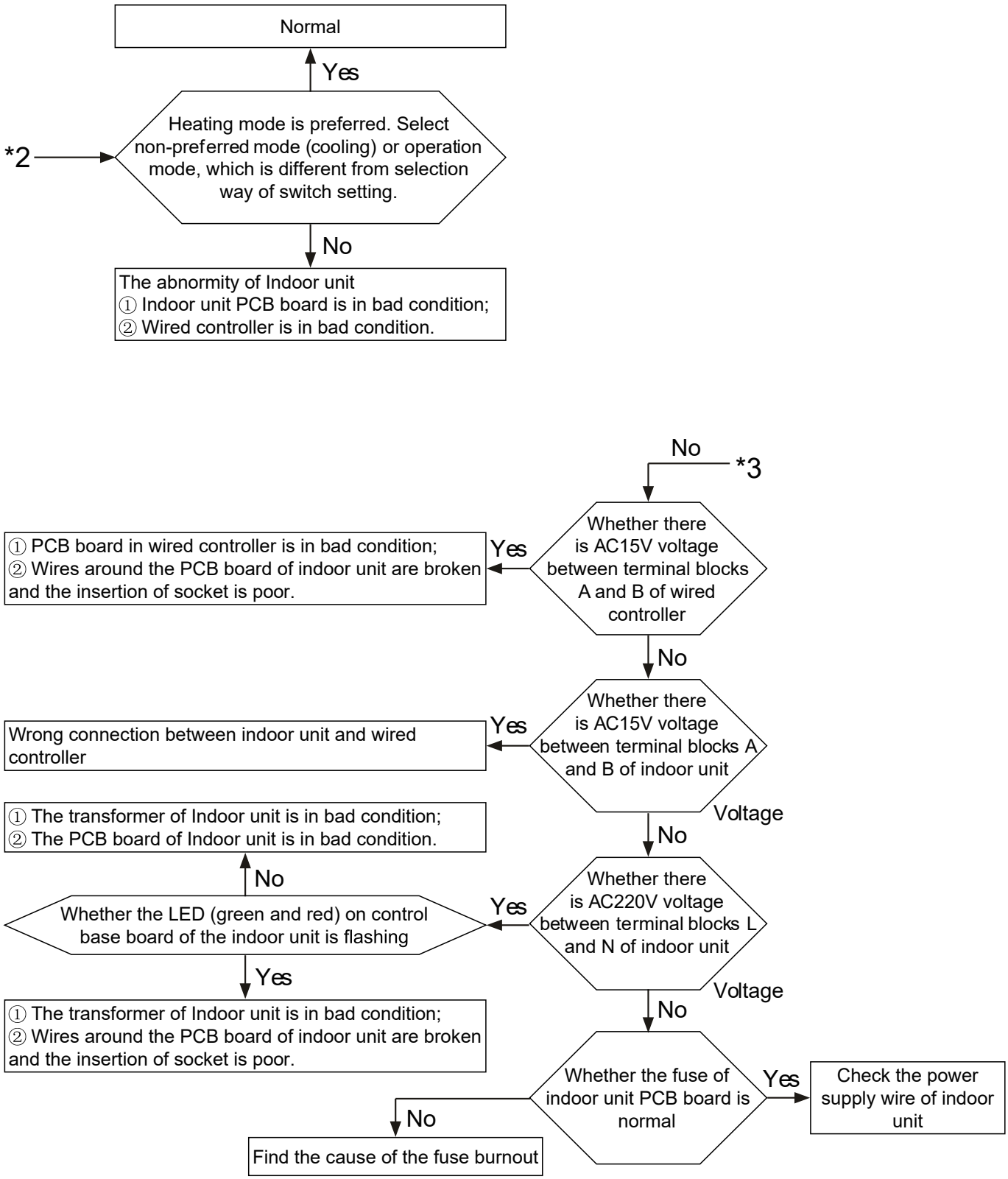
7.2.3 Trial Operation Confirmation

The test run confirmation, in principle, shows that all the indoor units should be confirmed one by one. Improper connection of refrigeration lines and control wires cannot be confirmed when all the indoor units are running simultaneously so all the other indoor units should be set in "stopped condition".

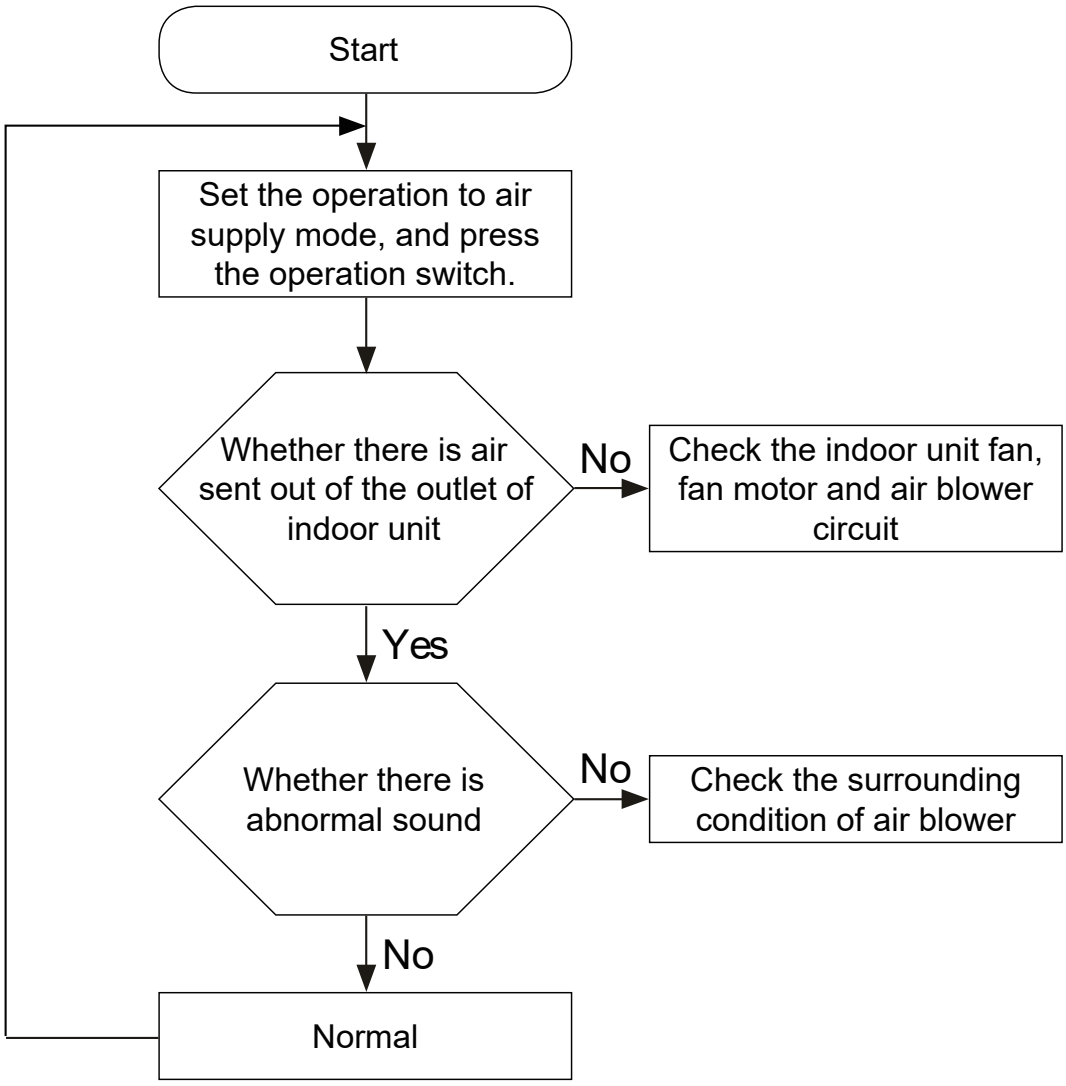
A. Main power supply and initial confirmation




*1
No
Whether the fan is rotating in air supply mode
No
Whether another indoor unit starts operating
Yes
Whether there is AC15V voltage between terminal B and C of wired controller
No
Whether there is AC15V voltage between terminal B and C of indoor unit
No
PCB board of indoor unit is in bad condition; Wires around the PCB board of indoor unit are broken and the insertion of socket is poor.
Yes
Under heating mode, the fan is not rotating, and the wired controller LCD "preheating" is turned on.
① In starting of oil temperature preheating;
② In control of oil return in heating mode;
③ In the process of defrosting in heating mode;
④Resistance of TC2 sensor is poor.
No
Wrong connection between indoor unit and wired controller
No
Whether the indoor fan is rotating
Yes
Wrong connection between indoor unit and wired controller
No
Whether the voltage of the indoor unit fan is AC220V
Yes
① PCB board of indoor unit is in bad condition;
② Wires around the PCB board of indoor unit are broken and the insertion of socket is poor.
No
Check the power supply voltage
Remove the wire of fan motor
Whether the winding resistance of fan motor is normal
No
Motor of indoor fan is in bad condition
Yes
Whether the fan capacitor is appropriate
No
The capacitor of fan motor is poor
No
Wires around the PCB board of indoor unit are broken and the insertion of socket is poor.
Yes
Whether the fan is rotating in correct direction
No
Capacitor of fan motor is poor
Yes
① Indoor filter screen is blocked
② Indoor heat exchanger is plugged.

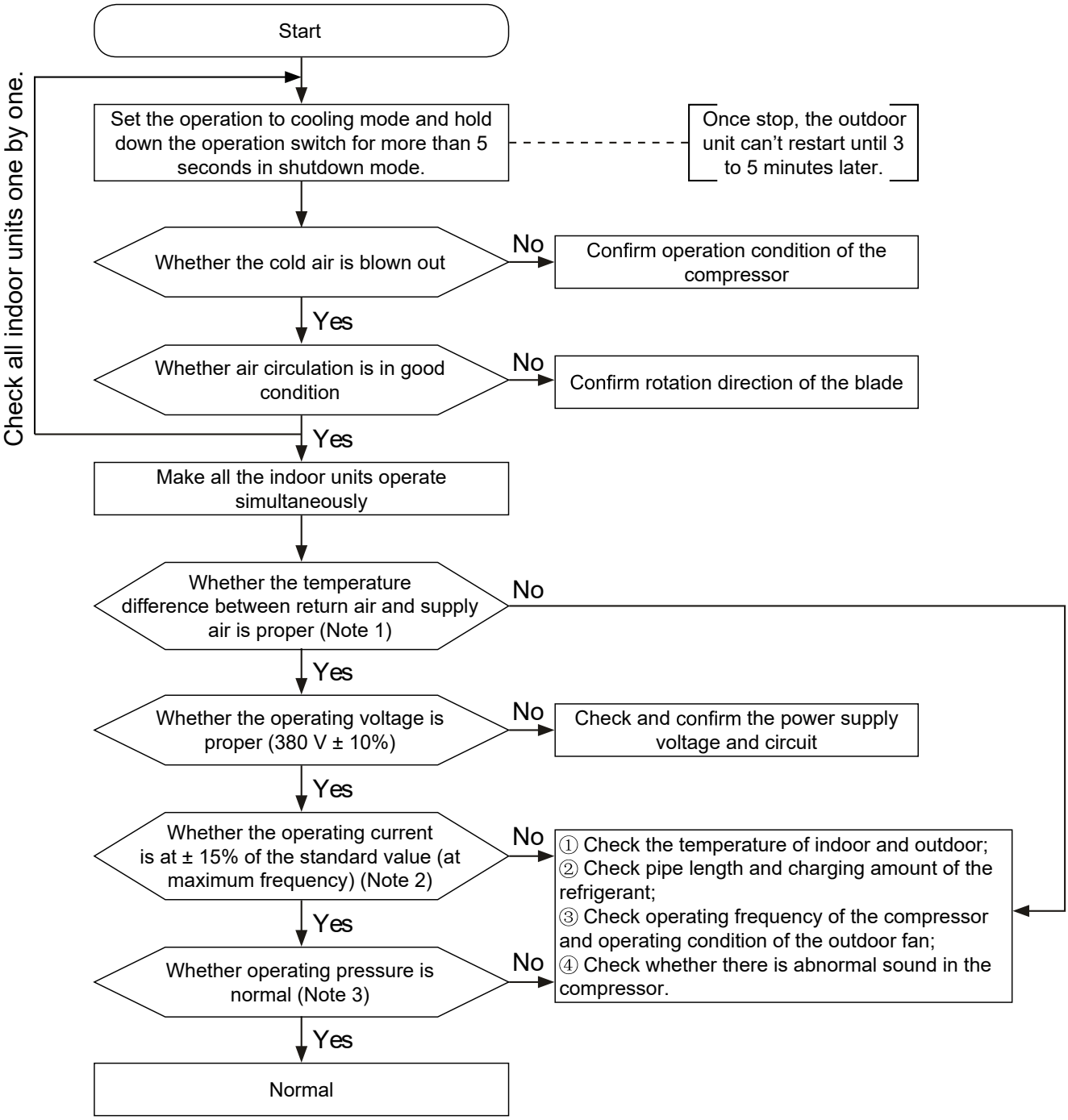

Normal
Yes
*2
Heating mode is preferred. Select non-preferred mode (cooling) or operation mode, which is different from selection way of switch setting.
No
The abnormity of Indoor unit
① Indoor unit PCB board is in bad condition;
② Wired controller is in bad condition.
No
*3
Whether there is AC15V voltage between terminal blocks A and B of wired controller
Yes
① PCB board in wired controller is in bad condition;
② Wires around the PCB board of indoor unit are broken and the insertion of socket is poor.
No
Whether there is AC15V voltage between terminal blocks A and B of indoor unit
Yes
Wrong connection between indoor unit and wired controller
Voltage
No
Whether there is AC220V voltage between terminal blocks L and N of indoor unit
Yes
① The transformer of Indoor unit is in bad condition;
② The PCB board of Indoor unit is in bad condition.
Voltage
No
Whether the fuse of indoor unit PCB board is normal
Yes
Check the power supply wire of indoor unit
No
Find the cause of the fuse burnout
No
Whether the LED (green and red) on control base board of the indoor unit is flashing
Yes
Yes
① The transformer of Indoor unit is in bad condition;
② Wires around the PCB board of indoor unit are broken and the insertion of socket is poor.

B. Air blower operation confirmation

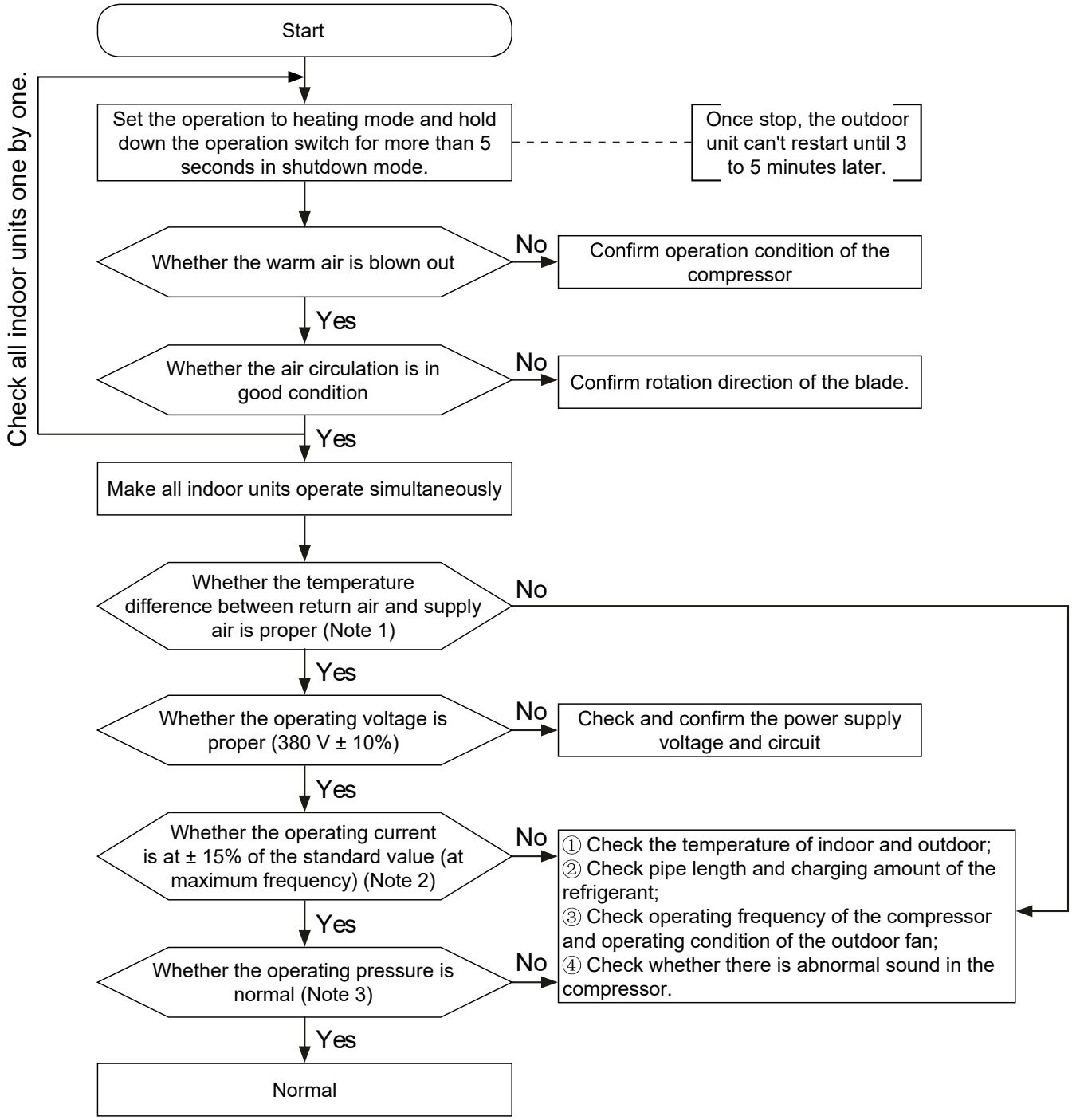


Note: Check the indoor units one by one.

C. Cooling operation confirmation



D. Heating operation confirmation



(Note 1)The general standard for temperature difference between inlet and outlet air
In "cooling" operation; it is normal that the dry bulb temperature difference between inlet air and outlet air of the air conditioner is over 50°F (at the maximum frequency) after 30 minutes of operation.
In "heating" operation; it is normal that the dry bulb temperature difference between inlet air and outlet air of the air conditioner is over 57°F (at the maximum frequency) after 30 minutes of operation.

(Note 2) General standard for operating current
It is normal that the current in either cooling/heating operation mode is within ±15% of the calibrated current. The value of current may have the following differences due to different operating conditions: When higher than the standard current value: the temperature indoors and outdoors are high; heat dissipation of outdoor unit is poor. When lower than the standard value of the current: the temperatures of indoor and outdoor are low; refrigerant gas leaks (insufficient refrigerant).

(Note 3) General standard for operating pressure

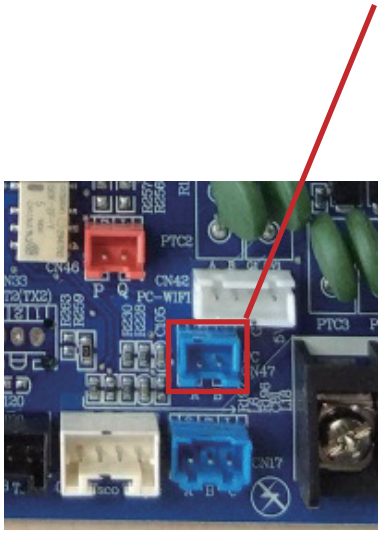
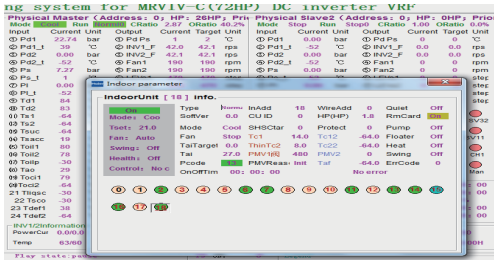
Cooling (at the maximum frequency)	High pressure 290~551 psi	Indoor 64-90°F Outdoor 77-95°F
	Low pressure 87~145 psi	
Heating (at the maximum frequency)	High pressure 319~435 psi	Indoor 59-77°F Outdoor 41-50°F
	Low pressure 43~116 psi	

Values after 15-minute operation (the temperature therein refers to dry bulb temperature with unit of °F)
The transformation trend of high pressure and low pressure due to change of operation condition
Refrigeration/heating:

Indoor temperature rises – high/low pressure rises
Indoor temperature drops – high/low pressure drops
Outdoor temperature rises – high/low pressure rises
Outdoor temperature drops – high/low pressure drops

Evaluating unit through test device

Operation	Begin to operate the system after all configuration settings has been confirmed. Operating methods:	
	1. Switch the BM1, BM2 to OFF, search the indoor units and outdoor unit to check if the number of indoor units are correct.	
	2. Switch the SW1, SW2, SW3 to 0, 13, 2 respectively, then press SW2 for 2 seconds, the 7-segment display will display “1111” and indoor unit will enter into cooling operation; or switch SW1, SW2, SW3 to 0, 14, 2 respectively, then press SW2 for 2 seconds, the 7-segment display will display “1111”, indoor unit will turn on automatically and enter into heating operation. Frequency of compressor is controlled by low pressure control for cooling, and high pressure control for heating.	

<table>
<tr><td rowspan="4">Data Measuring</td><td>1. Connecting methods of test device:
Insert one end of data line into the terminal of main PCB CN31 with a two-core terminal, one end connects with 485 device or Gangda device, the other end of the device connects computer.</td><td rowspan="4">Position of inserting test device (CN47)
 
It is normal if there is high pressure frequency limitation or high discharging temperature frequency limitation when outdoor ambient temperature is high and all the indoor units are operating.</td></tr>
<tr><td>2. The data that can acquire through device Outdoor unit: The frequency of outdoor unit compressor /Outdoor fan speed/Opening of outdoor electronic expansion valve/ High pressure of outdoor unit/Corresponding saturation temperature of outdoor unit’s high pressure/Low pressure of outdoor unit/Corresponding saturation temperature of outdoor unit’s low pressure/Discharging temperature/ Suction temperature/Oil temperature/ Temperature of condenser outlet pipe/Ambient temperature/Temperature of defrosting sensor/Starting of all kinds of solenoid valve Indoor unit: Temperatures of gas pipe and liquid pipe, opening angle of electronic expansion valve /Display of failure</td></tr>
<tr><td>3.Test device can display failures of the unit during operation, moreover it can realize a function of storing data in real time, and the test data can be stored in computer.</td></tr>
<tr><td>4.Prepare a report according to the test data and submit it to user.</td></tr>
<tr><td rowspan="6">Confirmation of the Data</td><td>The confirmation of running data/Timing and recording of the measurement.
After the measurement is begun, check the system pressure through detection software. Generally, the cooling low pressure is about 7.5kg and the heating high pressure is about 28kg under rated cooling and heating modes.
Then observe if operation under each parameter is normal.</td><td rowspan="6">  </td></tr>
<tr><td>There is a picture about cooling operating parameters’ data in the right column, after operating about half hour, the unit remains stable.</td></tr>
<tr><td>Check if there is a blockage in capillary during operation, if any, replace it.</td></tr>
<tr><td>Check if there is contact between refrigerant piping and capillary tube, if any, deal with it.</td></tr>
<tr><td>Check if wires of sensor (such as wiring, pressure sensor, etc.) are too tight, or contact with vibrating pipe, if so, deal with it.</td></tr>
<tr><td>Check if the value of sensor is correct.</td></tr>
</table>

8. Service Diagnosis

8.1 Error Code

Failure Codes
Failure code description: (failure code of the whole system is showed as 8 bits, so 256 codes. Indoor failure code is listed in the table and by unit number)
• Outdoor failure code exists in EEPROM, in which 5 failure codes can be kept.
• Indoor failure code exists in EEPROM, in which 5 failure codes can be kept.
• Can clear failure code by indoor or outdoor.
Failure codes are distributed as following: 0~19: indoor failure code
0~19: indoor failure code
20~99: outdoor failure code
100~109: DC motor failure code
110~125: inverter module failure code
126~127: soft auto-check failure code

Physical main unit:
Dip switch SW9, SW10, SW11 are at 0,0,0, digital tube displays failure code 20-127, it is the main failure code.
Dip switch SW9, SW10, SW11 are 1,0,0, digital tube displays failure code 20-127, it is failure code of No.1 sub unit.
Dip switch SW9, SW10, SW11 are 2,0,0, digital tube displays failure code 20-127, it is failure code of No.2 sub unit.

Physical sub unit:
Dip switch SW9, SW10, SW11 are at 0,0,0, digital tube displays failure code 20-127, it is single sub unit failure code.
Outdoor failure code display principle on wired controller:
When outdoor compressor is running, indoor wired controller will display the failure code of outdoor with higher priority. When compressor stops, it displays all indoor failures. The indoor failures will be classified as below: sensor failure, inverter board failure, fan motor driving board failure, any protections etc.

Digital Tube Indication on Main Unit	Failure Code Definition	Failure Description	Remarks
20-0	Defrosting temp sensor Tdef failure	AD value is below 11(open circuit) or over 1012(short circuit) for 60 seconds, in cooling mode, if the sensor is abnormal, the unit does not deal with it, besides, in defrosting and within 3 minutes after defrosting, no alarm	Resumable
21	Ambient temp sensor Ta failure	AD value is below 11(open circuit) or over1012(short circuit) for 60 seconds	
22-2	Ts(acc) failure		
23-0	Discharging temp sensor Td1 failure	AD value is below 11(open circuit) or over1012(short circuit) for 60 seconds	
23-1	Discharging temp sensor Td2 failure		
24-0	Modular heat sensor Th failure	AD value is below 11(open circuit) or over1012(short circuit) for 60 seconds	
24-1	Oil temp sensor Toil1 failure	AD value is below 11(open circuit) or over1012(short circuit) for 60 seconds	
24-2	Oil temp sensor Toil2 failure		
25-0	Inlet temp of heat exchanger Toci1 failure	AD value is below 11(open circuit) or over1012(short circuit) for 60 seconds	
26-0	Indoor commuication failure	For continuous 200 cycles, can not find connected indoors	
26-1		For continuous 270 s, the searched indoor quantity is less than the set quantity	
26-2		For continuous 170 s, the searched indoor quantity is more than the set quantity	

Digital Tube Indication on Main Unit	Failure Code Definition	Failure Description	Remarks
26-3	Outdoor unit and VP-box communication failure	The searched VP-box quantity is less than set quantity for continuous 5 minutes.	Resumable
26-4		The searched VP-box quantity is more than set quantity for continuous 5 minutes.	
27-0	Oil temp too high protection(Toil1)	Toil ≥ 248 °F(120 °C) continuous 2 s exceeds the set value after shutdown alarm; the alarm condition after stopping the oil temperature below 10 °F, automatic recovery after 2min 50s.Four times an hour to confirm the fault	Once confirmed un-resumable
27-1	Oil temp too high protection(Toil2)		
28	High pressure sensor Pd failure	AD value is below 11 (open circuit) or over 1012 (short circuit) for 30s	Resumable
29	Low pressure sensor Ps failure	AD value is below 11 (open circuit) or over 1012 (short circuit) for 30s. If Tao ≥ 104 °F(40°C), short circuit fault is not detected.	
30-0	High pressure switch HPS1 failure	If disconnected for 2s continuously, alarm. If alarm 3 times in an hour, the failure is confirmed.	Once confirmed un-resumable
30-1	High pressure switch HPS2 failure		
32-0	Heat exchanger outlet temp. Tsco failure	If AD value is below 11(open circuit) or over 1012(short circuit) fo 60 seconds, alarm, sensor has no alarm when abnormal in heating mode.	Resumable
32-1	Liquid pipe SC temp. of subcooler Tliqsc failure		
33-0	EEPROM failure	AT24C04 EEPROM communication failure	Once confirmed un-resumable
33-2		AT24C04 EEPROM data check failure (model code, check sun etc.)	
33-3		AT24C04 EEPROM data check failure (data beyond limit, reverse sequence etc.)	
34-.0	Discharging temp too high protection (Td1)	If Td ≥ 248 °F(120 °C) continues over 2 s, then stop and alarm; the alarm condition after stopping the oil temperature below 50 °F(10 °C), automatic recovery after 2min50s. Four times an hour to confirm the fault	
34-1	Discharging temp too high protection (Td2)		
35-0	4-way valve reversign failure	If below conditions are met for more than 10 seconds after the 4-way valve is energized for 10 minutes, reversing is finished. This outdoor compressor is running normally Td1 or Td2-Tdef1 ≥ 50 °F(10 °C) & Toci-Tao ≤ 25 °F & Pd-Ps ≥ 44 psi, otherwise failure is confirmed if the system alarms more than 3 times in one hour.	
35-1	4-way valve reversin failure	If there is 4-way valve of sub unit not electrified after main unit heating detection starts up for 20 min, Failure is confirmed if detection occurs more than 2 times in one hour.	
36-0	Oil temp too low protection (Toil1)	In normal operation,if Toil < CT+ 50 °F(10 °C) for continuous 5 minutes,the unit is stopped and alarmed 2 minutes and 50 s later, then is resumed automatically. If it occurs 3 times in an hour, the failure is confirmed.	
36-1	Oil temp too low protection (Toil2)		
39-0	Low pressure sensor Ps too low protection	After compressor is running (except for residual operation), if in cooling, Ps < 1 psi or in heating, Ps < 7 psi for continuous 5 minutes, alarm and stop. 2 minutes and 50 s later, resume automatically. If it occurs 3 times in an hour, the failure is confirmed.	
39-1	Compression ratio too high protection	After compressor is running, compression ratio ε > 10.0 for continuous 5 minutes, stop and alarm. 2 minutes and 50 s later, resume automatically. If it occurs 4 times in an hour, the failure is confirmed.	
40	High pressure sensor Pd too high protection	If Pd ≥ 602 psi, alarm and stop, 2 minutes and 50 s later, resume automatically. If it occurs 3 times in an hour, the failure is confirmed.	Once confirmed un-resumable

Digital Tube Indication on Main Unit	Failure code definition	Failure description	Remarks
43-0	Discharging temp sensor Tdi too low protection	In normal operation, If Td < CT + 50 °F (10 °C) for continuous 5 minutes, the unit stops and alarms. 2 minutes and 50 s later, resume automatically. If it occurs 3 times in an hour, the failure is confirmed.	Once confirmed un-resumable
43-1	Discharging temp sensor Td1 too low protection		
45	Communication failure between outdoors	Continuous 30 s no communication	Resumable
46-0	Communication failure with INV1 module board		
46-1	Communication failure with INV2 module board		
46-4	Communication with fan 1 module board		
46-5	Communication with fan 2 module board		
47	Communication failure with wireless module	Wireless module can not detect 2 minute alarm	
51-0	LEVa1 over current protection	LEV drive chip detection	
51-1	LEVa2 over current protection		
52-0	LEVa1 disconnection fault		
52-1	LEVa2 disconnection fault		
74	Emergency Stop	External interface control(The machine will stop quickly after switch cut off)	
75-0	High and low pressure difference is too small	Pd - Ps = 51 psi for 3 minutes, if the outdoor protective stop. Protect stop after 5 minutes, then restart.	Once confirmed un-resumable
76-0	Incorrect outdoor address or capacity setting	The number of sub machine and host data does not match the EERPOM set	Reset
76-1		The address of sub machine and host data does not match the EEPROM set	
76-2		The capacity setting of sub machine and host data does not match the EEPROM set	
83	Incorrect parameter setting or incorrect match of outdoor unit	Outdoor machine type dial code settings error or with the host model does not match	Non recoverable
99-x	Program self default	X=0~5	Resumable

Digital Tube Indication on Main Unit	Failure Code Definition	Failure Description	Remarks
108	Module rectifier-side software transient overcurrent	–	0: compressor module 1; 1: compressor module 2; -4: fan module 1; -5: fan module 2; Four fault confirmed for one hour, Once confirmed un-resumable
109	Module rectifier-side current detection circuit anomaly	–	
110	Module hardware overcurrent	–	
111	Compressor out of step	The rotor position can not be detected 6 times in a row while starting or running, and the INV control board is automatically restored after stopping 5 s.	
112	Module heat sink over temperature	The temperature more than 201 °F(94 °C) fault alarm. Automatic recovery of INV control board when temperature is 201 °F(94 °C)	
113	Module overload	–	
114	Inverter input power abnormal	P/N voltage<420V, alarm P/N voltage>420V, auto recovery	
		P/N voltage>642V, alarm P/N voltage<642V, auto recovery	
		Iverter input power voltage sags and brief interruptions	
115	Module DC bus DC overvoltage	When the supply voltage is greater than DC642V, the fault alarm. When the voltage is less than DC642V, the INV control board is automatically restored.	
116	Communication error between module and control board	For 30 s, the communication signal is not detected, and the INV control board is recovered immediately after detection.	
117	Modular software overcurrent	–	
118	Module boot failure	Compressor 5 consecutive start failure.	
119	Module current detection circuit error	Abnormality of current detection sensor, no connection or connection error.	
120	Module power supply error	Inverter controller power supply instantaneous interrupt.	
121	Module control board power supply abnormal	Inverter controller board power supply instantaneous interrupt.	
122	Module radiator temperature sensor abnormal	Temperature sensor resistance is abnormal or not connected.	
123	Module rectifer side hardware transient overcurrent	–	
124	Three phase power supply failure	–	
125-0/1	Compressor frequency mismatch	–The current frequency is greater than or equal to INV or +3Hz target frequency target actual frequency > 0 & & = 0 for 5 minutes	Resumable
125-4/5	Fan speed mismatch (locked rotor)	20 rpm run below the 30 s, or the target value of 70% to run for up to 2 minutes after the shutdown, automatic recovery after 2 minutes and 50 s, one hour and four fault confirmed.	Once confirmed un-resumable
127	MCU reset fault	If the host detects sub machine MCU reset, and the machine is in operation, the host MCU reset the fault, the whole system down; if in the heating mode, then restart the 4WV power, the system re 4WV reversing operation. Four fault confirmed for one hour	Once confirmed un-resumable

In the case of no fault, if the system does not meet the start-up condition, the host digital display standby code.

555.0	Indoor machine capacity beyond the outdoor machine capacity of 150% or less than 50%, standby system	Indoor machine capacity beyond the outdoor machine capacity of 150% or less than 50%, standby system	Resumable
555.1	79 °F(26 °C) standby	Ambient temperature above 79 °F(26 °C) indoor heat can not boot	
555.2	Low pressure (gas) standby	Refrigeration Ps < 33 psi or heating Ps < 17 °° start, system standby	
555.3	125 °F(54 °C) above the cooling outdoor machine is not running	125 °F(54 °C) above the cooling outdoor machine is not running	
555.5	Power restriction	Power inhibit setting maximum capacity output is 0%	
555.6	Password lock	Password lock system to set the maximum operating time to the system standby	
555.8	No trial running	No trial running	

Indoor failure code list

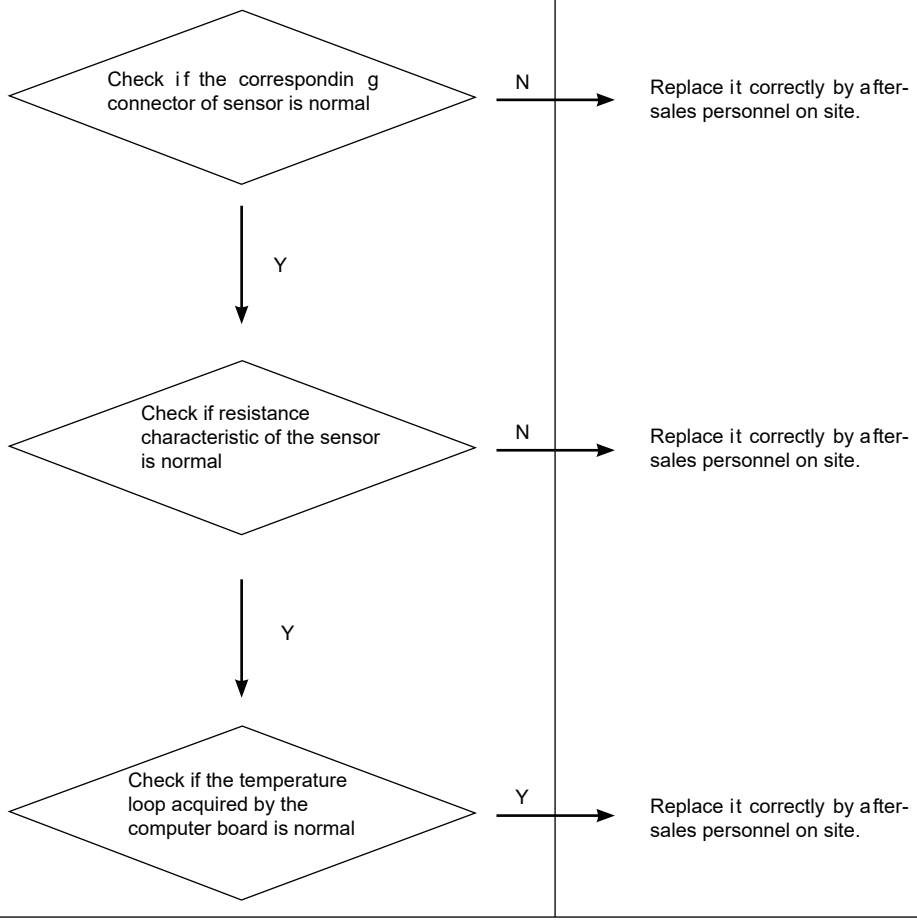
Indication on Main Unit	Indication on Wired Controller	Flash Times of LED5 on Indoor PCB/timer LED on Remote Receiver	Failure Code Definition
01	01	1	Indoor ambient temp sensor Ta failure
02	02	2	Indoor coil temp sensor Tc1 failure
03	03	3	Indoor coil temp sensor Tc2 failure
04	04	4	Indoor TW sensor failure
05	05	5	Indoor EEPROM failure
06	06	6	Communication between indoor and outdoor failure
07	07	7	Communication between indoor and wired controller failure
08	08	8	Indoor drainage failure
09	09	9	Indoor repeated address
0A	0A	10	Indoor repeated central control address
0C	0C	12	50Hz zero crossing fault
Outdoor failure code	Outdoor failure code	20	Outdoor corresponding failure

8.2 Troubleshooting

8.2.1 Troubleshooting by Error Code

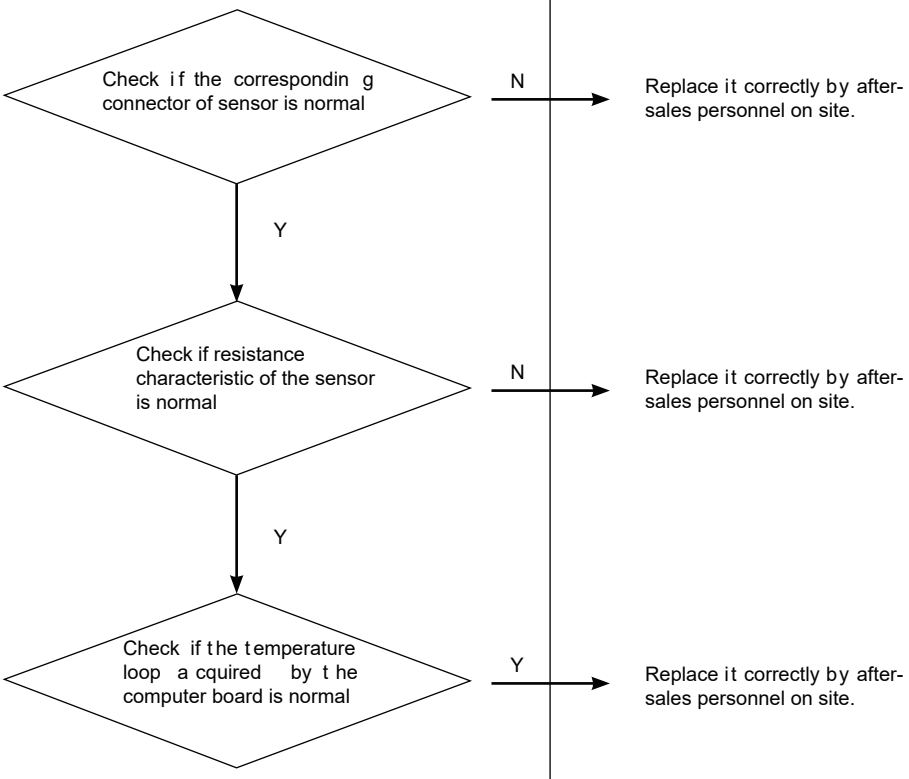
Failure code Outdoor digital display tube: 20-0 Indoor wired controller: 14	Indoor unit LED status	LED5		Failure description: Defrosting temperature sensors: Tdef failure
		20 times		
	Outdoor unit LED status Normal	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HRseries	Diagnosis	Troubleshooting
2. Abnormity detection method		
◆ Check if the sensor connection is normal; ◆ Check if resistance characteristic of the sensor is normal; ◆ Check if the temperature loop acquired by the PCB is normal.		
3. Abnormity confirmation conditions		
AD value is below 11 (open circuit) or over 1012 (short circuit) for 60 seconds, sensor has no alarm when abnormal in cooling mode.		
4. Possible causes		
◆ The connection of sensor is not secure; ◆ The sensor is broken; ◆ The sensor is with resistance drift; ◆ The temperature acquired by PCB is not accurate.		



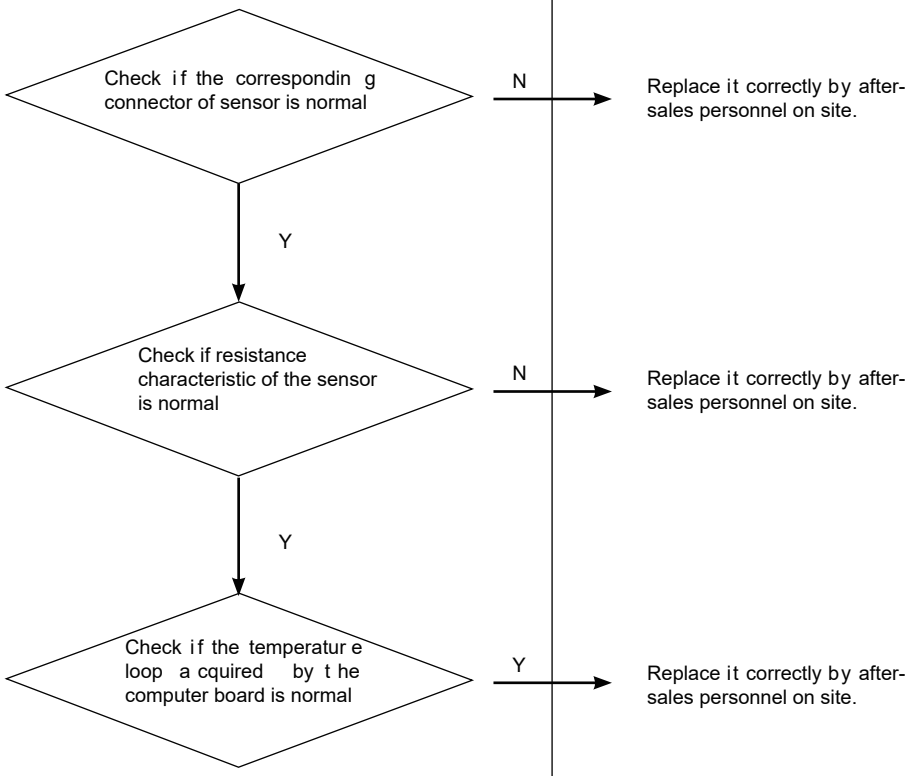
Failure code Outdoor digital display tube: 21 Indoor wired controller: 15	Indoor unit LED status	LED5		Failure description: Ambient temperature sensor: Tao failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	Diagnosis	Troubleshooting
2. Abnormity detection method		
◆ Check if the sensor connection is normal; ◆ Check if resistance characteristic of the sensor is normal; ◆ Check if the temperature loop acquired by the PCB is normal.		
3. Abnormity confirmation conditions		
It is detected that the AD value is below 11 (open circuit) or above 1012 (short circuit) for 60 seconds continuously, and no alarm is given during defrosting and within 3 minutes at the end of defrosting.		
4. Possible causes		
◆ The connection of sensor is not secure; ◆ The sensor is broken; ◆ The sensor is with resistance drift; ◆ The temperature acquired by PCB is not accurate.		



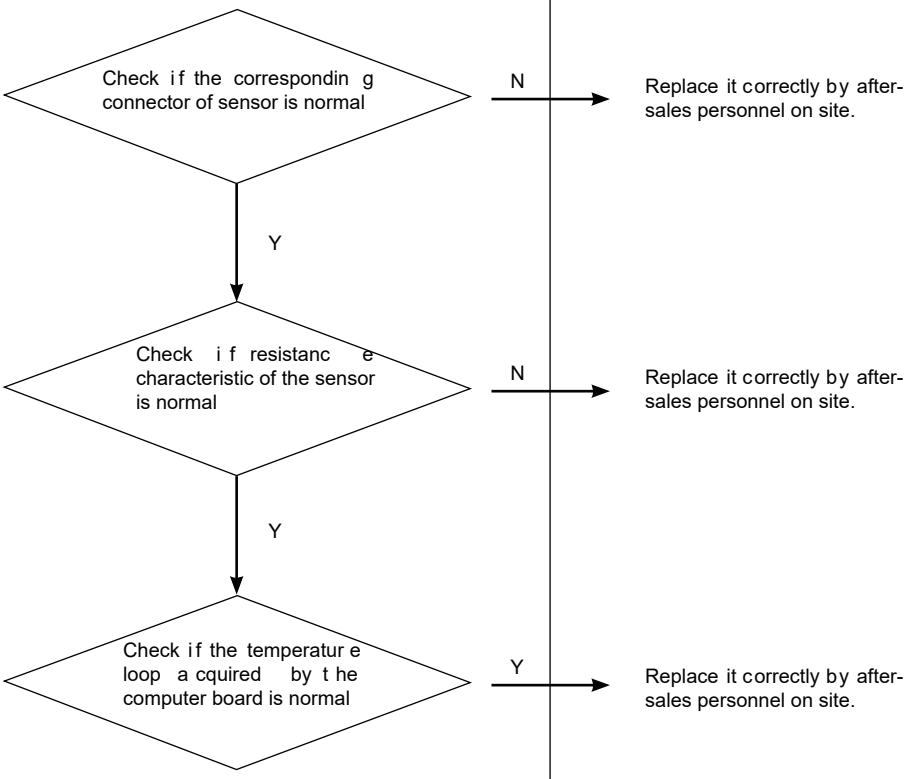
Failure code Outdoor digital display tube: 22-2 Indoor wired controller: 16	Indoor unit LED status	LED5		Failure description: Suction temperature sensor: Ts failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the sensor connection is normal; ◆ Check if resistance characteristic of the sensor is normal; ◆ Check if the temperature loop acquired by the PCB is normal.		
3. Abnormity confirmation conditions		
It is detected that the AD value is below 11 (open circuit) or above 1012 (short circuit) for 60 seconds continuously, and no alarm is given during defrosting and within 3 minutes at the end of defrosting.		
4. Possible causes		
◆ The connection of sensor is not secure; ◆ The sensor is broken; ◆ The sensor is with resistance drift; ◆ The temperature acquired by PCB is not accurate.		



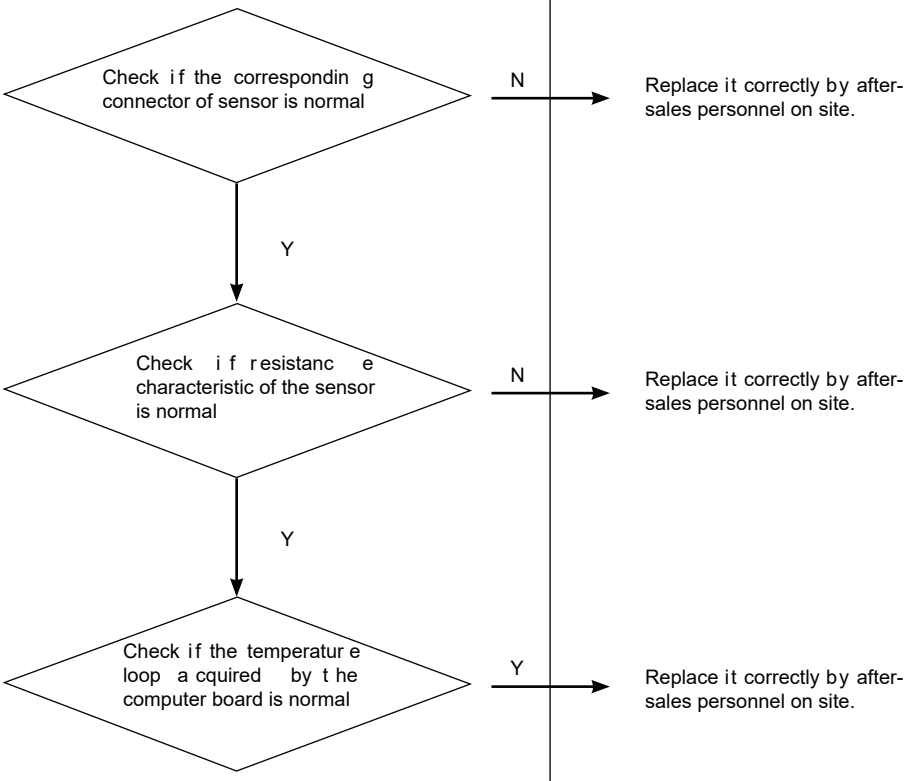
FFailure code Outdoor digital display tube: 23-0,1 Indoor wired controller: 17	Indoor unit LED status	LED5F		ailure description: Discharging temperature sensor: Td1and Td2 failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the sensor connection is normal; ◆ Check if resistance characteristic of the sensor is normal; ◆ Check if the temperature loop acquired by the PCB is normal.		
3. Abnormity confirmation conditions		
It is detected that the AD value is below 11 (open circuit) or above 1012 (short circuit) for 60 seconds continuously. If Ta≤-10°C the open circuit is detected after 3 minutes of compressor operation (AD value is below 11).		
4. Possible causes		
◆ The connection of sensor is not secure; ◆ The sensor is broken; ◆ The sensor is with resistance drift; ◆ The temperature acquired by PCB is not accurate.		



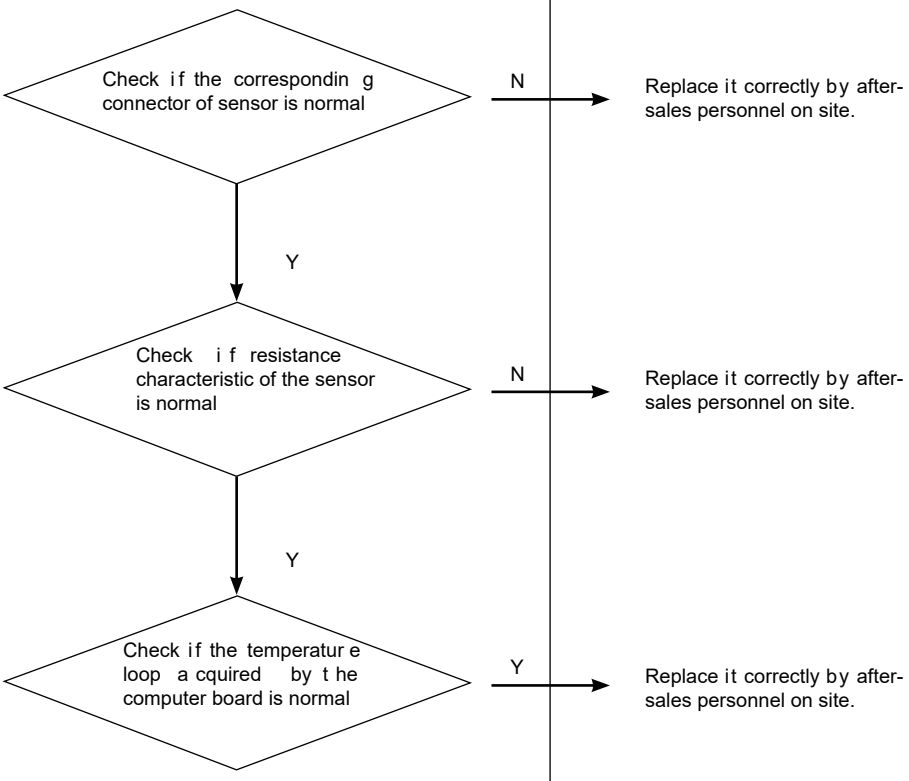
Failure code Outdoor digital display tube: 24-0, 12 Indoor wired controller: 18	Indoor unit LED status	LED5		Failure description: Oil temperature sensor: Th, Toil1 and Toil2 failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the sensor connection is normal; ◆ Check if resistance characteristic of the sensor is normal; ◆ Check if the temperature loop acquired by the PCB is normal.		
3. Abnormity confirmation conditions		
It is detected that the AD value is below 11 (open circuit) or above 1012 (short circuit) for 60 seconds continuously, when Ta≤-10°C, no alarm is given; when ET≤-10°C, no alarm is given within 5 minutes.		
4. Possible causes		
◆ The connection of sensor is not secure; ◆ The sensor is broken; ◆ The oil temperature sensor is with resistance drift; ◆ The temperature acquired by PCB is not accurate.		



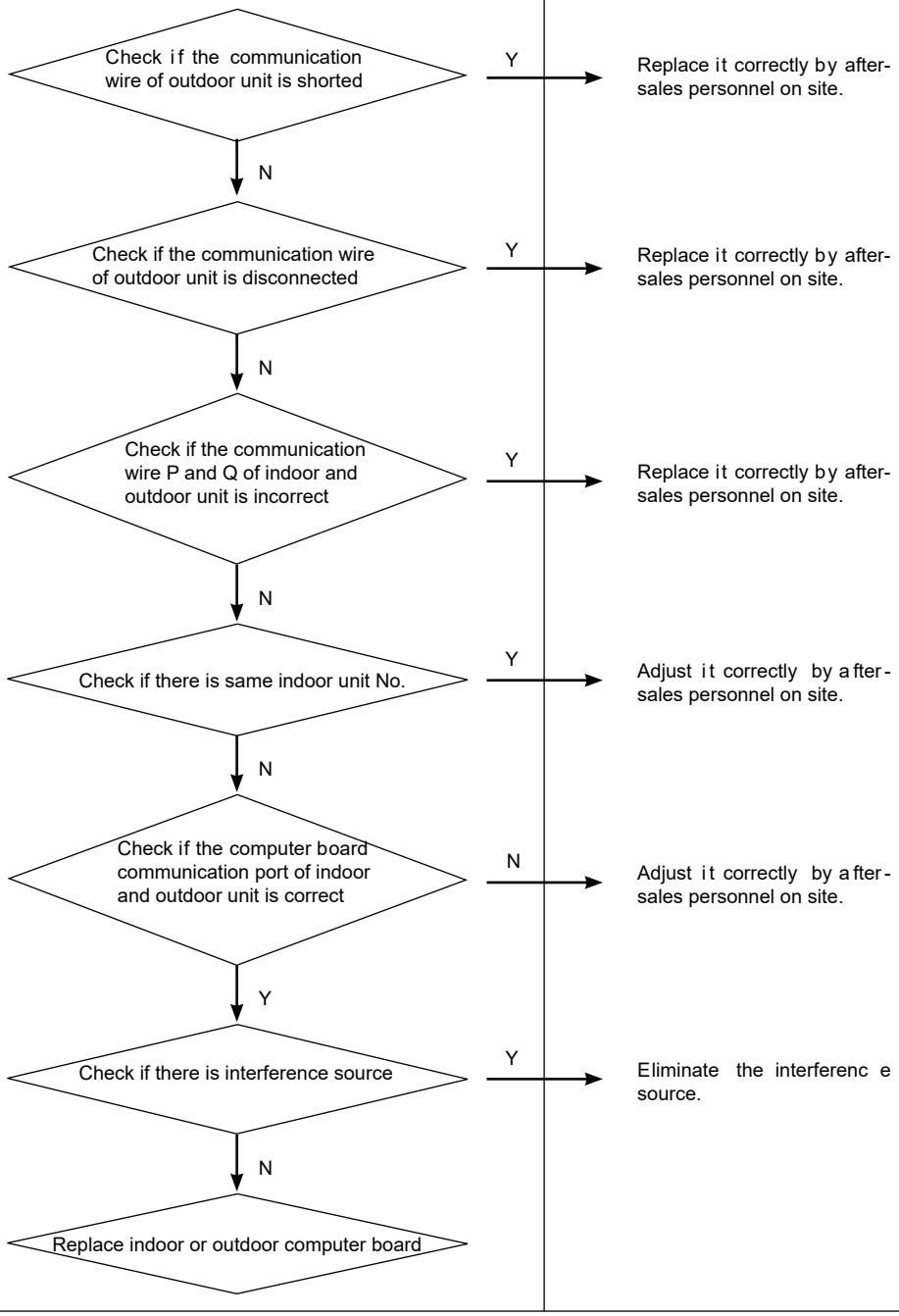
Failure code Outdoor digital display tube: 25-0 Indoor wired controller: 19	Indoor unit LED status	LED5		Failure description: Heat exchanger inlet temperature: Toci1 failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the sensor connection is normal; ◆ Check if resistance characteristic of the sensor is normal; ◆ Check if the temperature loop acquired by the PCB is normal.		
3. Abnormity confirmation conditions		
It is detected that the AD value is below 11 (open circuit) or above 1012 (short circuit) for 60 seconds continuously, the cooling mode operates the sensor abnormity without troubleshooting it, and no alarm is given during defrosting and within 3 minutes at the end of defrosting.		
4. Possible causes		
◆ The connection of sensor is not secure; ◆ The sensor is broken; ◆ The sensor is with resistance drift; ◆ The temperature acquired by PCB is not accurate.		



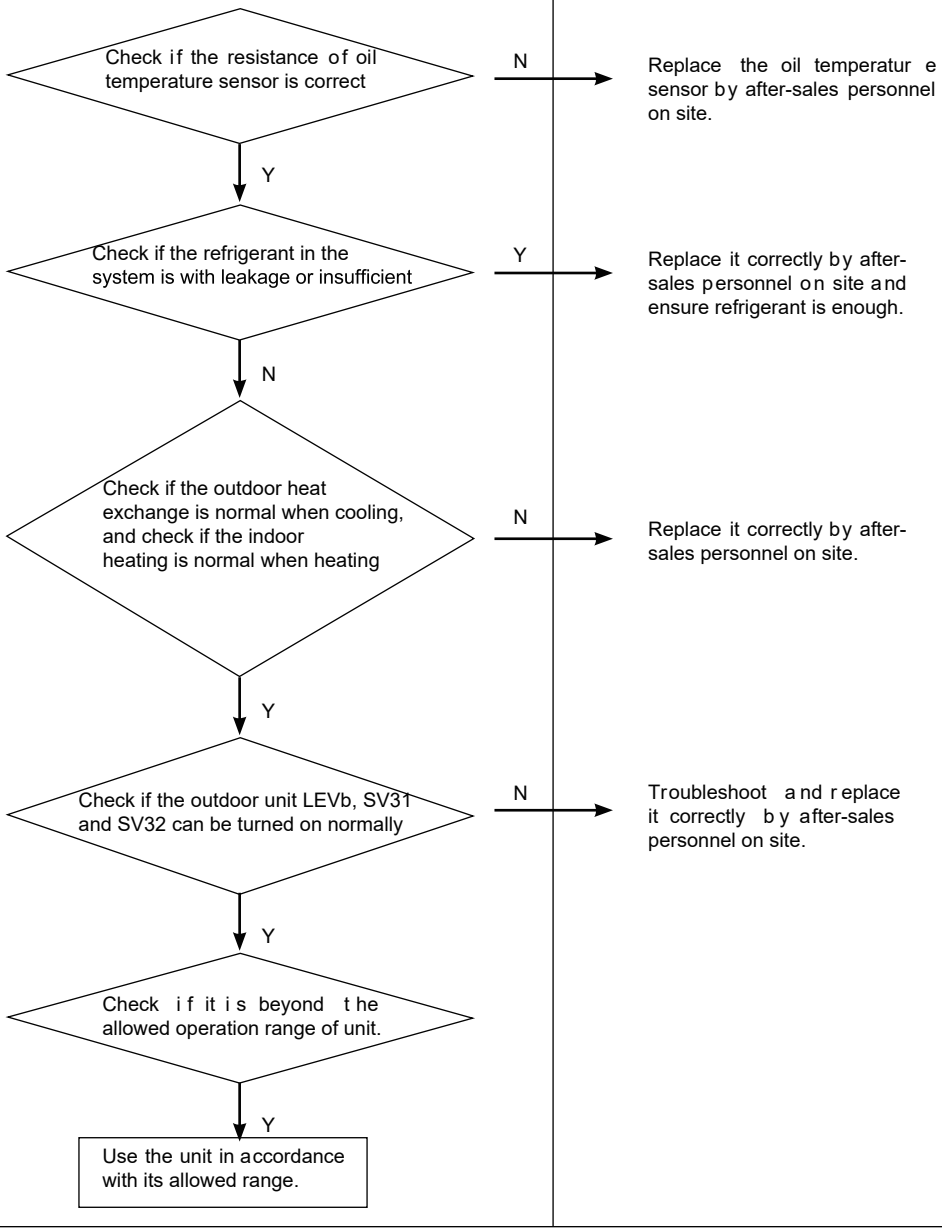
Failure code Outdoor digital display tube: 26-0, 12 Indoor wired controller: 1A	Indoor unit LED status	LED5F		ailure description: Communication between indoor unit and outdoor unit failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Grounded short-circuit of communication wire, or disconnected communication wire P and Q; ◆ Incorrect wiring of communication wire P and Q; ◆ Uniform indoor unit power supply, and partial indoor unit being powered off. ◆ Larger interference and unstable communication signal. ◆ Failure in PCB of indoor and outdoor unit results in unstable communication.		
3. Abnormity confirmation conditions		
It is not detected that there is indoor unit connection for 200 rounds continuously; it is detected that the number of indoor units is less than set number for 270 seconds continuously; it is detected that the number of indoor units is more than set number for 170 seconds continuously.		
4. Possible causes		
◆Poor communication wire: short circuit and disconnection; ◆Incorrect wiring of communication wire P and Q P and Q; ◆Poor PCB results poor communication; ◆Larger interference of normal communication.		



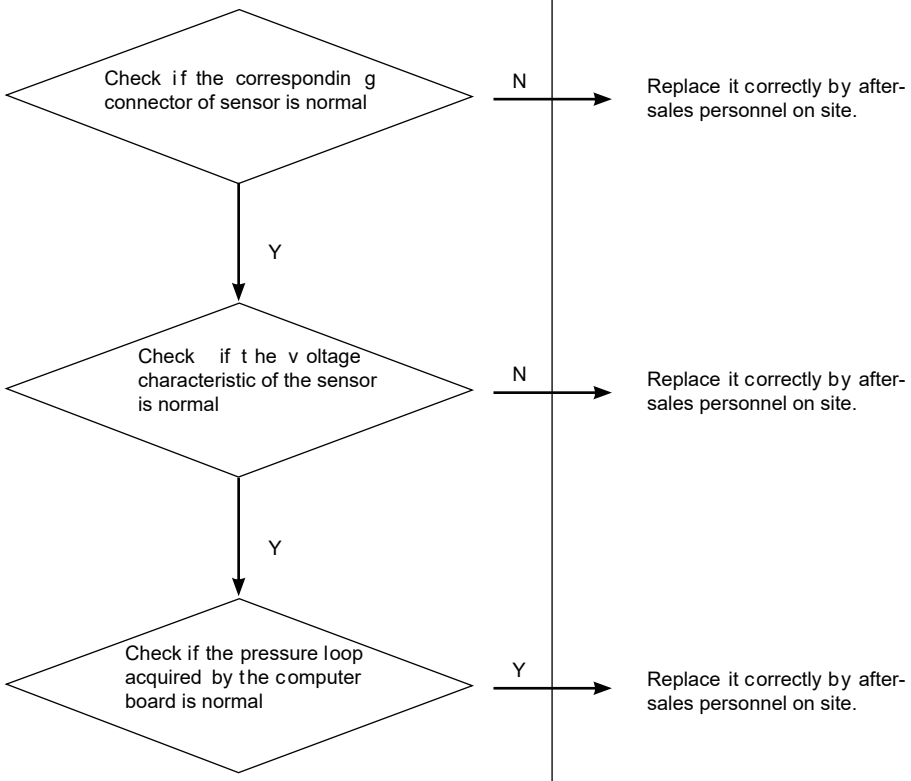
Failure code Outdoor digital display tube: 27-0, 1 Indoor wired controller: 1B	Indoor unit LED status	LED5		Failure description: Outdoor compressor oil temperature too high failure(Toil1 and Toil2)
		20 times		
	Outdoor unit LED status	LED1L	ED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the temperature detected by the oil temperature sensor is correct; ◆ Check the unit for leakage or insufficient refrigerant; ◆ Check if the outdoor unit SV31, SV32, LEVb, etc. can be normally turned on; ◆ Check the outdoor heat exchanger of this unit for filth blockage and inlet & outlet air blockage. ◆ Check the indoor heat exchanger of this unit for filth blockage and inlet & outlet air blockage when cooling.		
3. Abnormity confirmation conditions		
Toil1/Toil2≥120°C.		
4. Possible causes		
◆ The oil temperature sensor is with resistance drift; ◆ The refrigerant in the system is insufficient; ◆ The outdoor unit LEVb, SV31, SV32, etc. cannot be turned on normally; ◆ The unit condensation side is with poor heat transfer function. ◆ The operation environment is beyond the allowed range.		



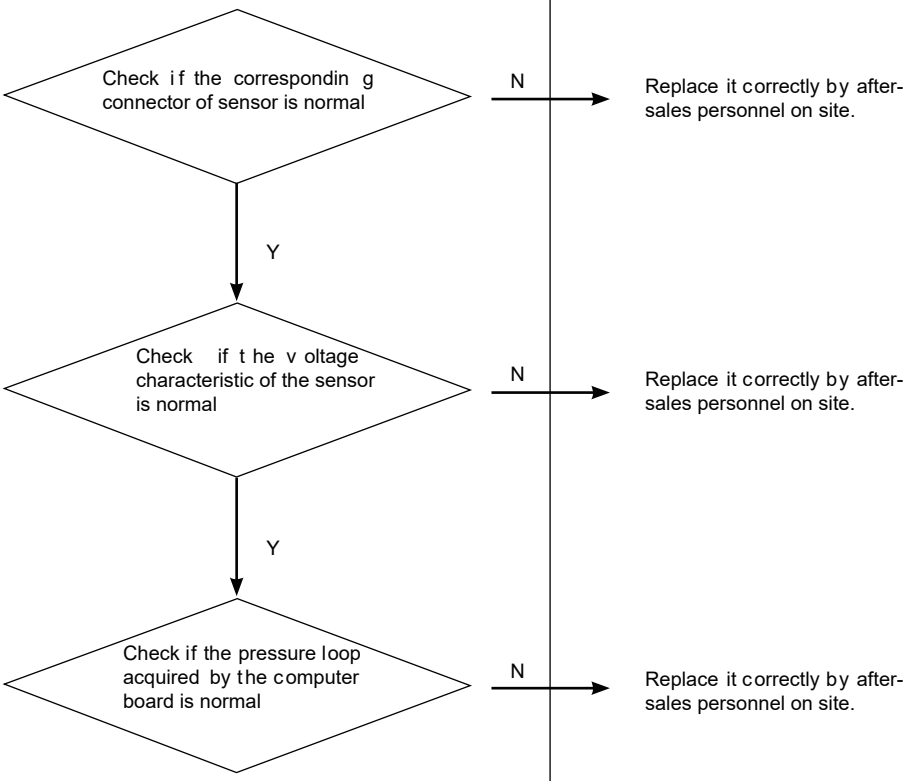
Failure code Outdoor digital display tube: 28 Indoor wired controller: 1C	Indoor unit LED status	LED5		Failure description: High pressure sensor Pd failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the sensor connection is normal; ◆ Check if voltage characteristic of the sensor is normal; ◆ Check if the pressure loop acquired by the PCB is normal.		
3. Abnormity confirmation conditions		
It is detected that the AD value is below 11 (open circuit) or above 1012 (short circuit) for 30 seconds continuously, and no alarm is given during defrosting and within 3 minutes at the end of defrosting.		
4. Possible causes		
◆ The connection of pressure sensor is not secure; ◆ The pressure sensor is broken; ◆ The pressure acquired by PCB is not accurate.		



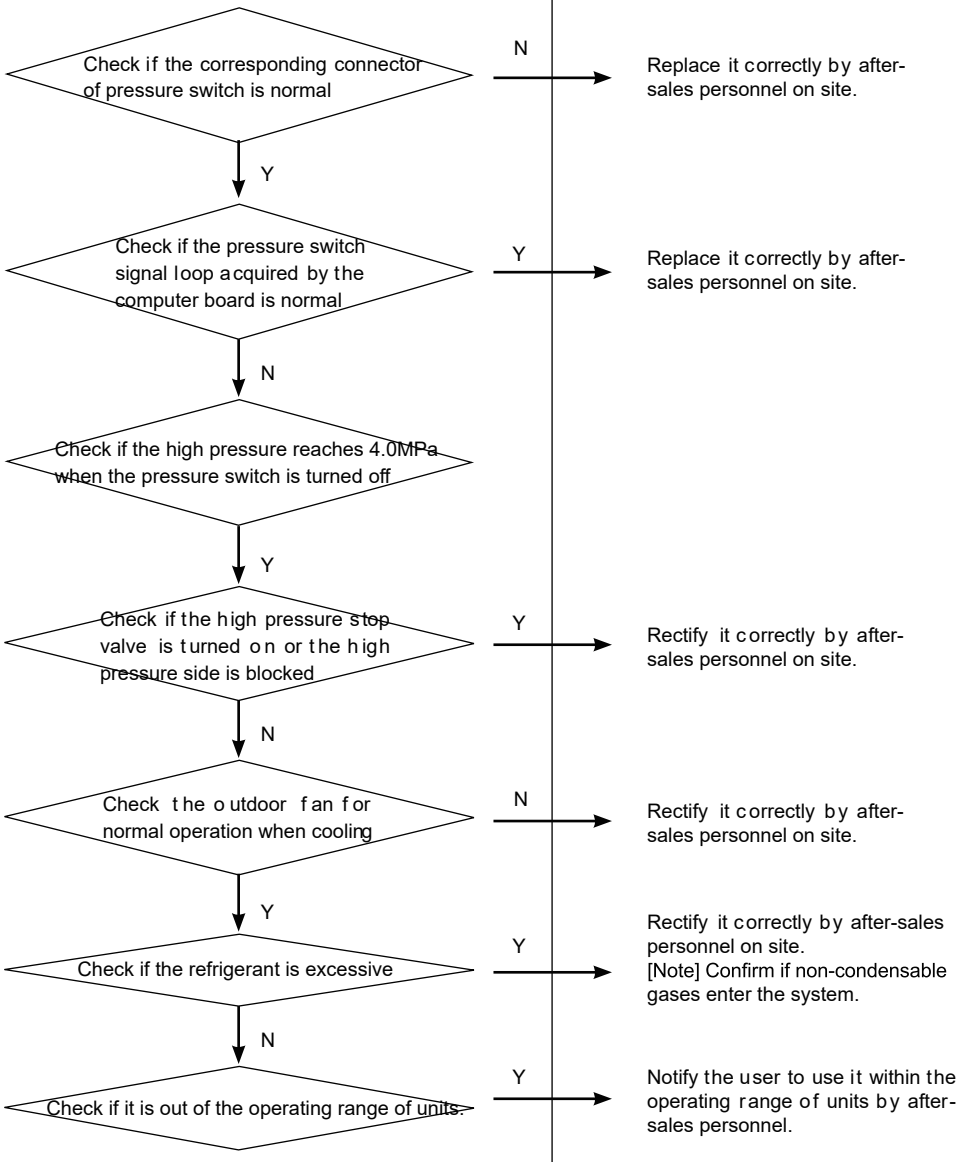
Failure code Outdoor digital display tube: 29 Indoor wired controller: 1D	Indoor unit LED status	LED5		Failure description: Low pressure sensor Ps failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the sensor connection is normal; ◆ Check if voltage characteristic of the sensor is normal; ◆ Check if the pressure loop acquired by the PCB is normal.		
3. Abnormity confirmation conditions		
It is detected that the AD value is below 11 (open circuit) or above 1012 (short circuit) for 30 seconds continuously, and no alarm is given during defrosting and within 3 minutes at the end of defrosting.		
4. Possible causes		
◆ The connection of pressure sensor is not secure; ◆ The pressure sensor is broken; ◆ The pressure acquired by PCB is not accurate.		



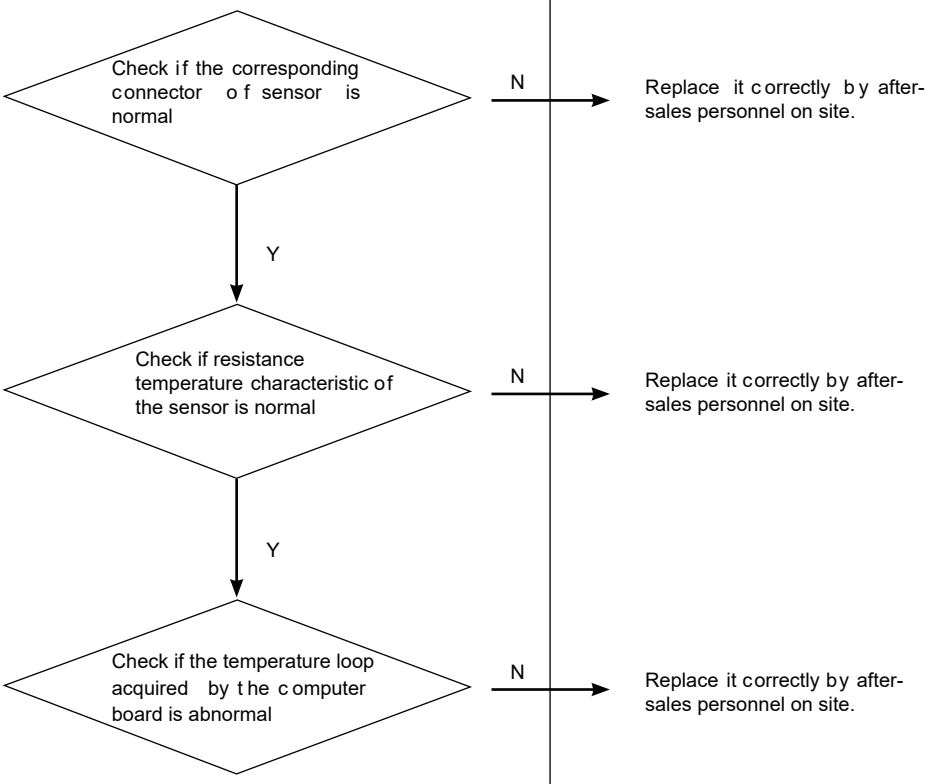
Failure code Outdoor digital display tube: 30-0, 1 Indoor wired controller: 1E	Indoor unit LED status	LED5		Failure description: High pressure switch HPS1 and HPS2 failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

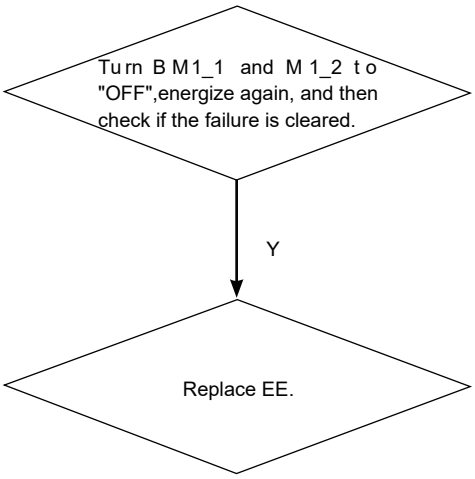
1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the pressure switch connection is normal; ◆ Check if the pressure switch signal loop acquired by the PCB is normal; ◆ Check if the pressure switch is turned off usually and the pressure exceeds 4.0MPa when disconnection; ◆ Check if the high pressure side of the system is blocked; ◆ Check the outdoor fan for normal operation when cooling.		
3. Abnormity confirmation conditions		
The high pressure switch is turned off for 2s.		
4. Possible causes		
◆ The connection of pressure switch is not secure; ◆ Pressure switch is broken; ◆ The pressure switch signal acquired by the PCB is incorrect; ◆ The high pressure side of the unit is blocked; ◆ The outdoor fan stops operating when cooling; ◆ The refrigerant is excessive; ◆ It is out of the operating range of units.		



FFailure code Outdoor digital display tube: 32-0, 1 Indoor wired controller: 20	Indoor unit LED status	LED5		Failure description: Defrosting temperature sensor failure: Tsco and Tliqsc
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

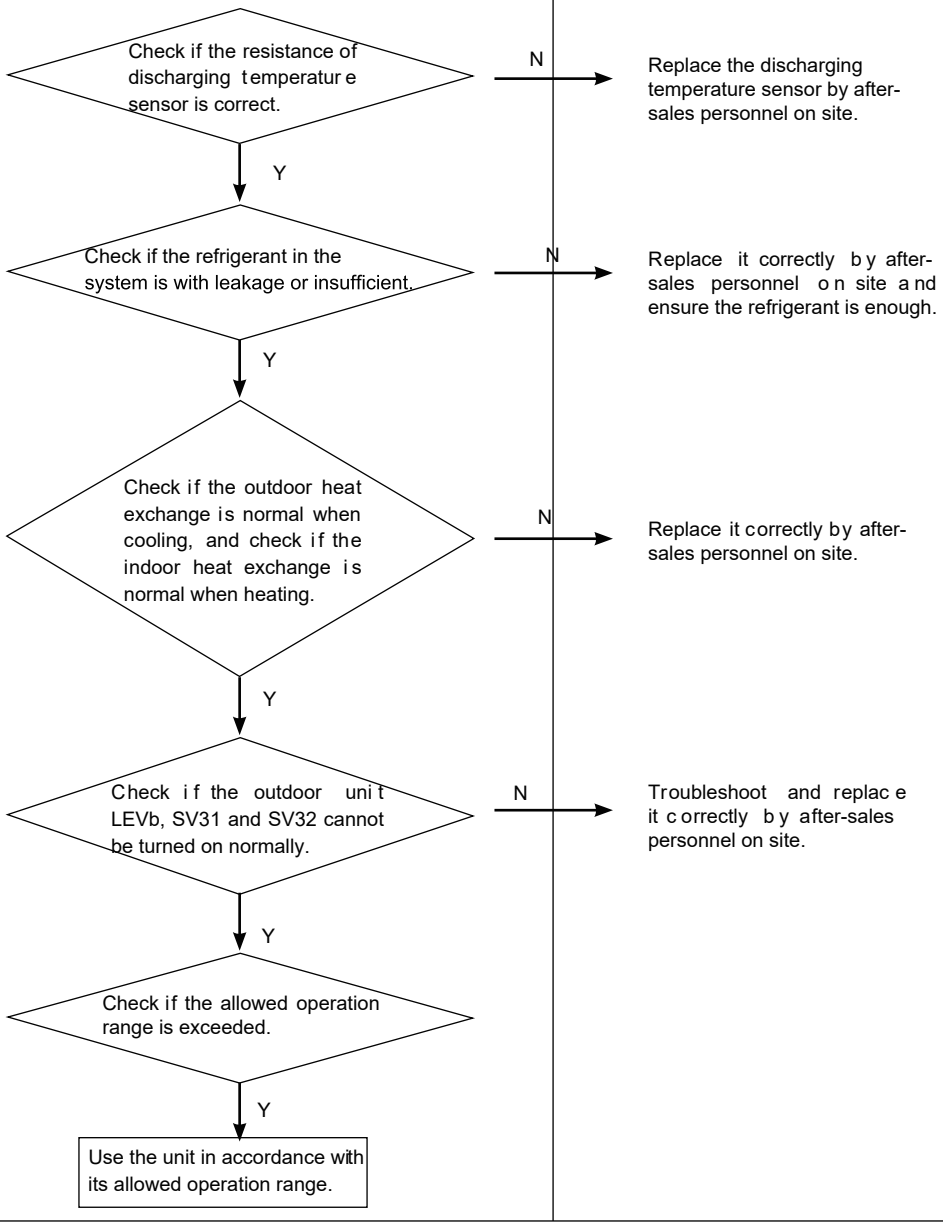
1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the sensor connection is normal; ◆ Check if resistance characteristic of the sensor is normal; ◆ Check if the temperature loop acquired by the PCB is abnormal.		
3. Abnormity confirmation conditions		
It is detected that the AD value is below 11 (open circuit) or above 1012 (short circuit) for 60 seconds continuously, the cooling mode operates the sensor abnormity without troubleshooting it, and no alarm is given during defrosting and within 3 minutes at the end of defrosting.		
4. Possible causes		
◆ The connection of sensor is not secure; ◆ The sensor is broken; ◆ The sensor is with resistance drift; ◆ The temperature acquired by PCB is not accurate.		



<table>
<tr><td rowspan="3">Failure code
Outdoor digital display tube: 33-0, 21
Indoor wired controller: 21</td><td colspan="2" rowspan="2">Indoor unit LED status</td><td colspan="2">LED5</td><td rowspan="3">Failure description:
AT24C04 EEPROM communication failure
AT24C04 EEPROM data check failure
IM EEPROM data or communication failure</td></tr>
<tr><td colspan="2">20 times</td></tr>
<tr><td colspan="2">Outdoor unit LED status</td><td>LED1</td><td>LED2</td></tr>
<tr><td colspan="2"></td><td>Normal</td><td>Normal</td></tr>
<tr><td>1. Model</td><td colspan="5">Diagnosis and troubleshooting</td></tr>
<tr><td rowspan="8">MRV 5-HR series</td><td colspan="3">DiagnosisT</td><td colspan="2">roubleshooting</td></tr>
<tr><td colspan="3" rowspan="7"> 
</td><td colspan="2" rowspan="7"></td></tr>
<tr><td>2. Abnormity detection method</td></tr>
<tr><td>◆ Incorrect EEPROM data.</td></tr>
<tr><td>3. Abnormity confirmation conditions</td></tr>
<tr><td>EEPROM communication error; EEPROM data check error (model ID, checksum, etc.); EEPROM data logic error (wider data range, wrong order, etc.)</td></tr>
<tr><td>4. Possible causes</td></tr>
<tr><td>◆ EEPROM is an old version, while the program is a new version.</td></tr>
</table>

Failure code Outdoor digital display tube: 34-0, 1 Indoor wired controller: 22	Indoor unit LED status	LED5		Failure description: Outdoor compressor discharging temperature (Td1, Td2).too high failure
		20 times		
	Outdoor unit LED status	LED1L	ED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the temperature detected via a discharging temperature sensor is correct. ◆ Check the unit for leakage or insufficient refrigerant; ◆ Check if the outdoor unit SV31, SV32, LEVb, etc. can be normally turned on; ◆ Check the outdoor heat exchanger of unit for filth blockage and air inlet & outlet short circuit when cooling. ◆ Check the indoor heat exchanger of the unit for filth blockage and air inlet & outlet short circuit when heating.		
3. Abnormity confirmation conditions		
Toil1/Toil2≥120°C.		
4. Possible causes		
◆ The oil temperature sensor is with resistance drift; ◆ The refrigerant in the system is insufficient; ◆ The outdoor unit LEVb, SV31 and SV32 cannot be turned on normally. ◆ The unit condensation side is with poor heat transfer function; ◆ The operation environment is beyond the allowed range.		



Failure code Outdoor digital display tube: 35-0, 1 Indoor wired controller: 23	Indoor unit LED status	LED5		Failure description: Four-way valve reversing failure
		20 times		
	Outdoor unit LED status	LED1L	ED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting

2. Abnormity detection method

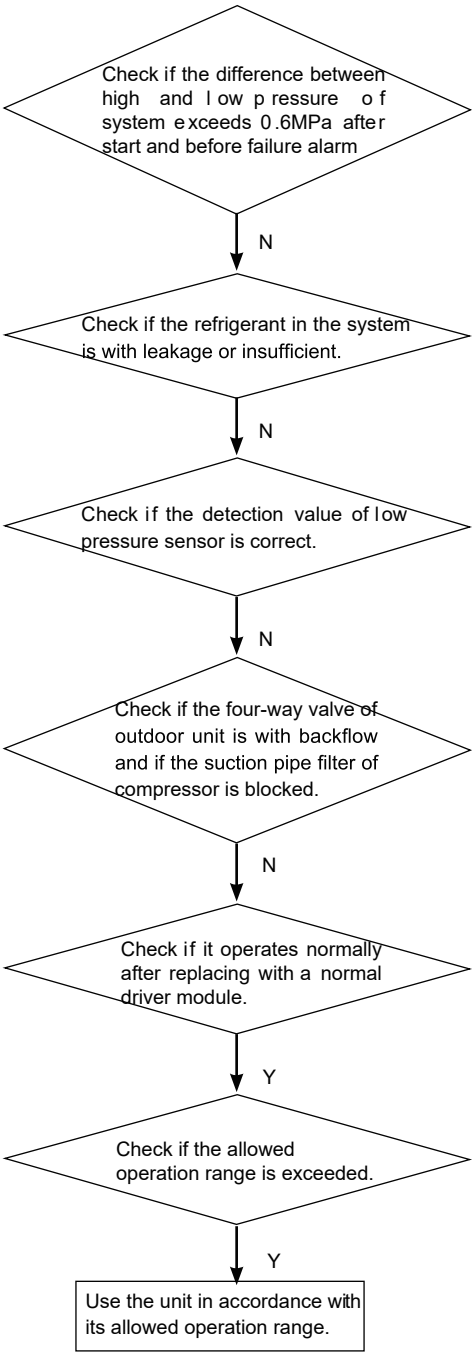
◆ Check if the difference between high and low pressure of system exceeds 0.6MPa after start and before failure alarm
◆ Check if the unit lack of refrigerant.
◆ Check the four-way valve of unit for normal switching and free from backflow.
◆ Check if the detection value of high/low pressure sensor is correct
◆ Check if the unit is beyond the operation range.

3. Abnormity confirmation conditions

In case of meeting one of the following conditions after the four-way valve is energized for 3min and lasts for 10s, it is judged as switching completion:
•Tsuc-Tdef≥10°C
•Pd-Ps≥βMpa
(Tao>-10°C, β=0.60;Tao≤-10°C, β=0.40), otherwise, it is judged as failure.

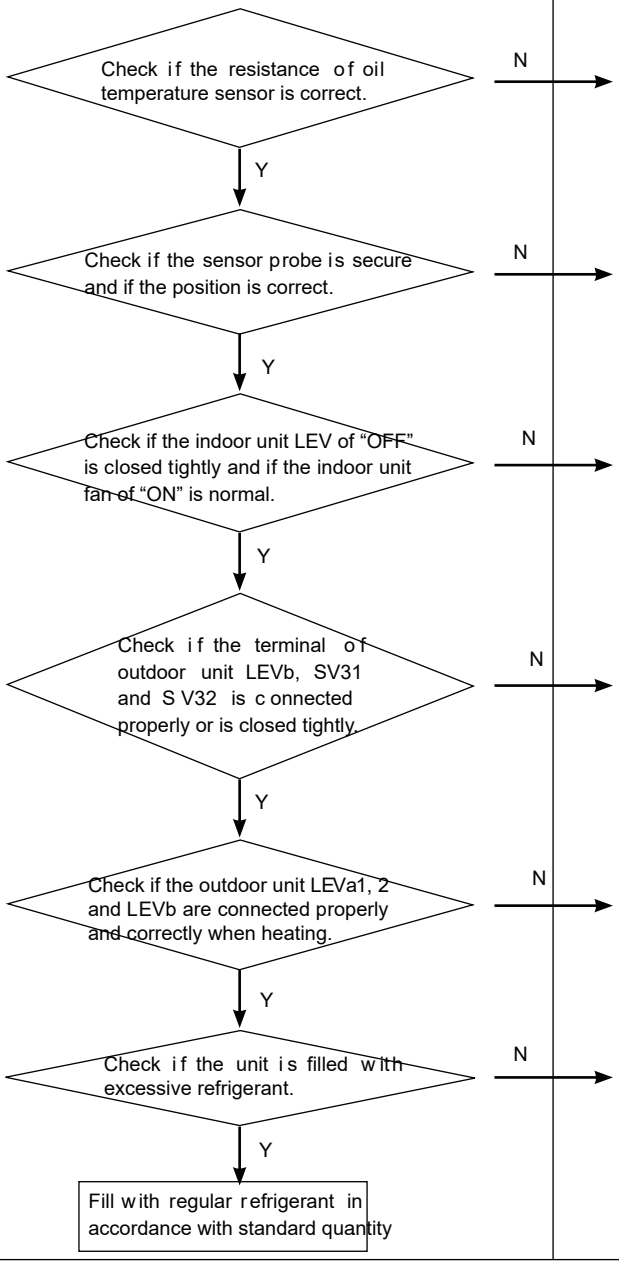
4. Possible causes

◆ The detection value of high/ low pressure sensor is incorrect
◆ The refrigerant in the system is insufficient;
◆ The four-way valve cannot be switched normally or with backflow.
◆ The filter of compressor suction pipe is blocked by foreign matters;
◆ The detection value of Tsuc or Tdef1/2 sensor is incorrect
The power module cannot drive the compressor operating normally;
◆ The operation environment is beyond the allowed range.



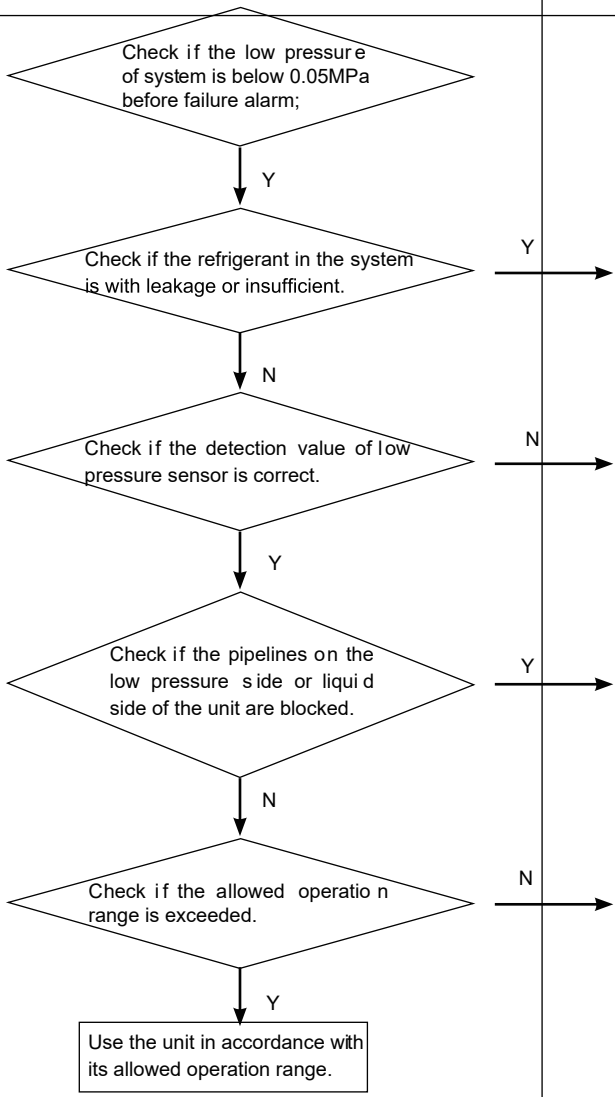
Failure code Outdoor digital display tube: 36-0, 1 Indoor wired controller: 24	Indoor unit LED status	LED5		Failure description: Outdoor compressor oil temperature (Toil1, Toil2) too low failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the temperature detected by the oil temperature sensor is correct. ◆ Check if the outdoor unit SV31, SV32, LEVb, etc. are with abnormal leakage and check if the detected temperature is correct; ◆ Check if the shutdown indoor unit LEV of unit is closed tightly, and if the running indoor unit fan operates normally.		
3. Abnormity confirmation conditions		
Toil1/Toil2-CT≤10°C lasts for 5min.		
4. Possible causes		
◆ The probe of oil temperature sensor falls off or is with unsecure connection; ◆ The probe of oil temperature sensor is misplaced; ◆ The oil temperature sensor is with resistance drift; ◆ The outdoor unit LEVb, SV31 and SV32 are with leakage; ◆ The terminal of outdoor unit LEVa1, 2 and LEVb is connected incorrectly; ◆ For the unit, there is LEV leakage in shutdown indoor unit and non-operation of fan in operating indoor unit; ◆ The system refrigerant is too much ◆ The operation environment is beyond the allowed range.		



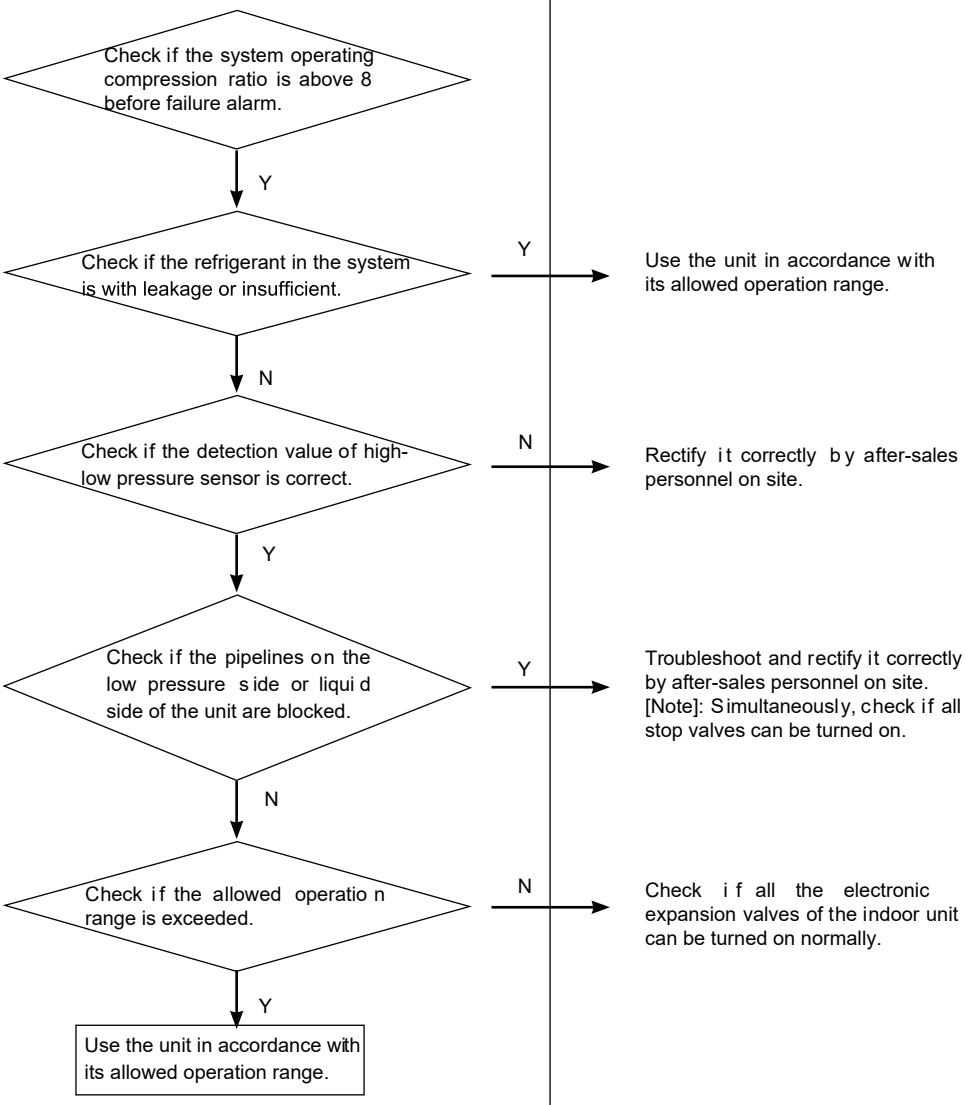
Failure code Outdoor digital display tube: 39-0 Indoor wired controller: 27	Indoor unit LED status	LED5		Failure description: Low pressure sensor Ps too low protection
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the low pressure of system is below 0.06MPa before failure alarm; ◆ Check if the unit lack of refrigerant. ◆ Check if the pipelines on the low pressure side or liquid side of the unit are blocked; ◆ Check if the detection value of low pressure sensor is correct ◆ Check if the unit is beyond the operation range.		
3. Abnormity confirmation conditions		
Alarm to shut down if the followings are detected for 5min: cooling: Ps< 0.10Mpa; heating: Ps< 0.05Mpa; oil return: Ps<0.03Mpa after the compressor operates. (except residual operation)		
4. Possible causes		
◆ The detection value of low pressure sensor is incorrect ◆ The refrigerant in the system is insufficient or the system is with air leakage ◆ The pipelines on the low pressure side or liquid side of the unit are blocked; ◆ The outdoor unit cannot be turned on normally due to failure to open electronic expansion of outdoor heat exchanger when heating; ◆ The operation environment is beyond the allowed range		



Failure code Outdoor digital display tube: 39-1 Indoor wired controller: 27	Indoor unit LED status	LED5		Failure description: Compressor ratio ε too high protection
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the operating compression ratio of system is above 8 before failure alarm. ◆ Check if the unit lack of refrigerant. ◆ Check if the pipelines on the low pressure side or liquid side are blocked. ◆ Check if the detection value of high/low pressure sensor is correct. ◆ Check if the unit is beyond the operation range		
3. Abnormity confirmation conditions		
Alarm to shut down if the compression ratio ε>8.0 is detected for continuous 5min after the compressor operates; alarm to shut down if the compression ratio ε>9.0 or ε>8.5 when cooling or heating for 1min separately.		
4. Possible causes		
◆ The detection value of high/low pressure sensor is incorrect. ◆ The refrigerant in the system is insufficient or the system is with air leakage. ◆ The pipelines on the high pressure side or liquid side of the unit are blocked. ◆ The outdoor unit cannot be turned on normally due to failure to open electronic expansion of outdoor heat exchanger when heating. ◆ The operation environment is beyond the allowed range		



Failure code Outdoor digital display tube: 40 Indoor wired controller: 28	Indoor unit LED status	LED5		Failure description: High pressure sensor Pd too high protection
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

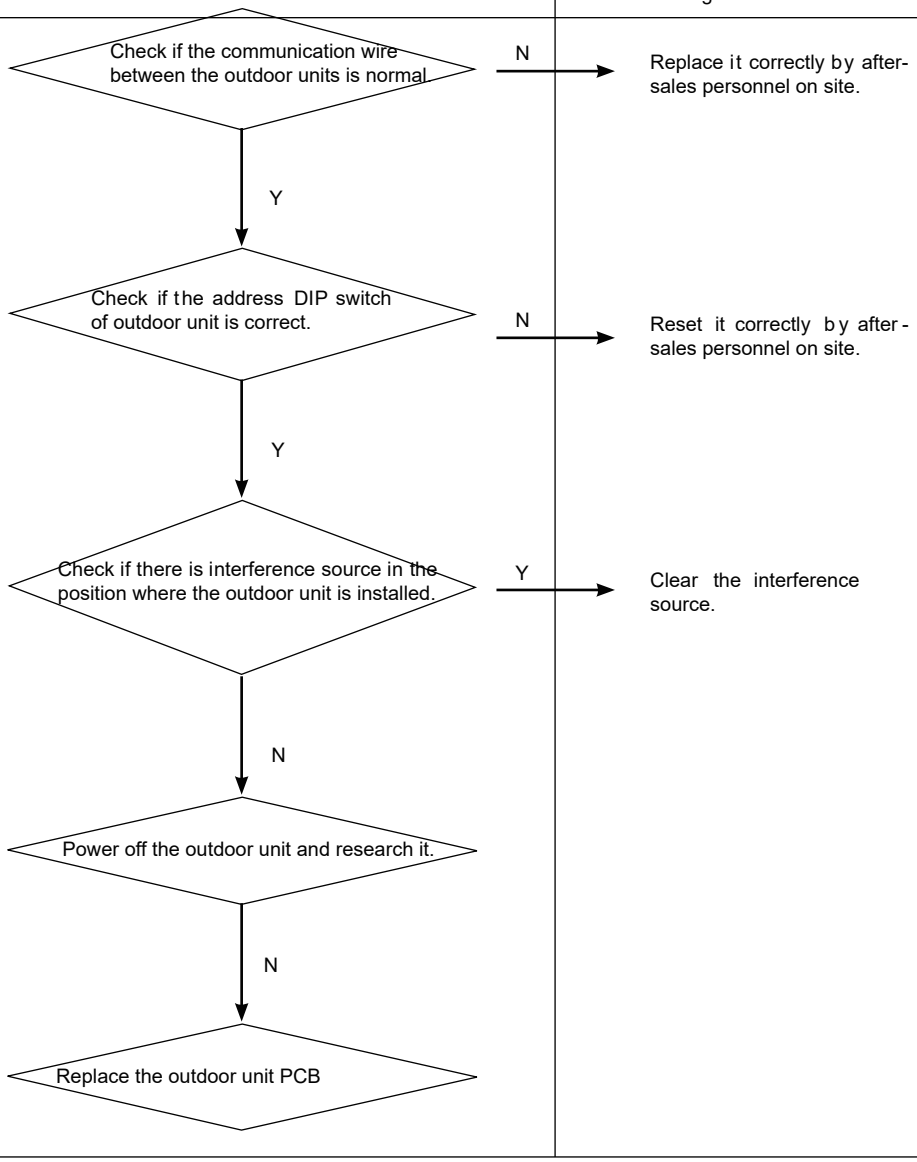
1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method ◆ Check if the high pressure acquired by the PCB is correct; ◆ Check if the voltage characteristic corresponding to the pressure sensor is correct; ◆ Check if the high pressure side of the system is blocked ; ◆ Check the outdoor fan for normal operation when cooling.	Check if the voltage characteristic of the corresponding pressure sensor is normal. N → Replace it correctly by after-sales personnel on site. Y Check if the pressure sensor signal acquisition loop of the computer board is normal. N → Replace it correctly by after-sales personnel on site. Y Check if the high pressure reaches 4.0MPa upon failure alarm.	
3. Abnormity confirmation conditions The high pressure switch is turned off for 2s.	Y Check if the high pressure stop valve is turned on or the high pressure side is blocked. Y → Rectify it correctly by after-sale s personnel on site. N	
4. Possible causes ◆ The pressure sensor is broken; ◆ The pressure sensor signal acquired by the PCB is incorrect ◆ The high pressure side of the unit is blocked ◆ The outdoor fan stops operating when cooling; ◆ The refrigerant is excessive ◆ It is out of the operating range of units.	Check the outdoor fan for normal operation when cooling. N → Rectify it correctly by after-sales personnel on site. Y Check if the refrigerant is excessive. Y → Rectify it correctly by after-sale s personnel on site. Note: confirm if the system including the noncondensable gas N Check if the allowed operatio n range is exceeded Y → Notify the user to use it within the operating range of units by after-sales personnel.	

Failure code Outdoor digital display tube: 43-0, 1 Indoor wired controller: 2B	Indoor unit LED status	LED5		Failure description: Outdoor unit compressor discharging temperature (Td1, Td2) too low failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the temperature detected by the oil temperature sensor is correct. ◆ Check the outdoor unit SV31, SV32, LEVb, etc. for abnormal leakage and check if the detected temperature is correct; ◆ Check if the shutdown indoor unit LEV of unit is closed tightly, and if the running indoor unit fan operates normally.		
3. Abnormity confirmation conditions		
Td1/Td2-CT≤10°C lasts for 5min.		
4. Possible causes		
◆ The probe of oil temperature sensor falls off or is with unsecure connection; ◆ The probe of oil temperature sensor is misplaced; ◆ The oil temperature sensor is with resistance drift; ◆ The outdoor unit LEVb, SV31 and SV32 are with leakage; ◆ The terminal of outdoor unit LEVa1, 2 and LEVb is connected incorrectly; ◆ For the unit, there is LEV leakage in shutdown indoor unit and non-operation of fan in operating indoor unit; ◆ The system is filled with excessive refrigerant. ◆ The operation environment is beyond the allowed range.	Check if the resistance of discharging temperature sensor is correct. N → Replace the discharging temperature sensor by after-sales personnel on site. Y Check if the sensor probe is secure and if the position is correct. N → Replace it correctly by after-sales personnel on site. [Note]: Check if it is inserted, connected and intersected with another compressor, especially when a single compressor operates. Y Check if the indoor unit LEV of “OFF” is closed tightly and if the indoor unit fan of “ON” is normal. N → Replace the poor valve (with leakage) and fan correctly by after-sales personnel on site. Y Check if the terminal of outdoor unit terminal LEVb, SV31 and SV32 is connected properly or is closed tightly. N → Replace the poor valve (with leakage) and fan correctly by after-sales personnel on site. Y Check if the outdoor unit LEVa1, 2 and LEVb are connected properly and correctly. N → Replace it correctly by after-sales personnel on site. Y Check if the unit is filled with excessive refrigerant. N → Check if the computer board can normally control the related electronic expansion valve and solenoid valve, if not, replace it. Y Fill with refrigerant in accordance with standard quantity.	

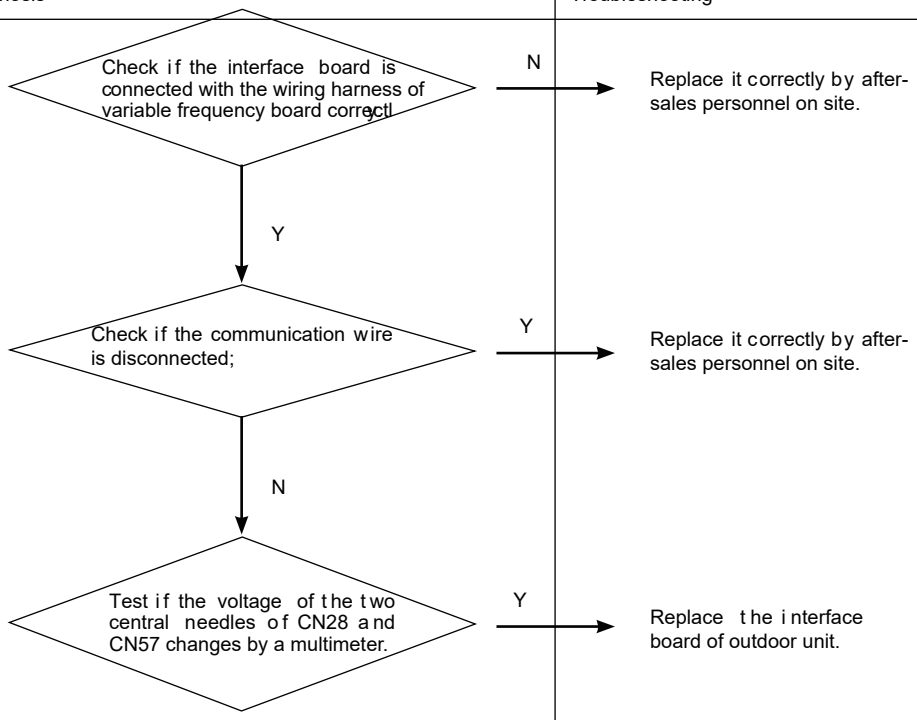
Failure code Outdoor digital display tube: 45 Indoor wired controller: 2D	Indoor unit LED status	LED5		Failure description: Communications between outdoor units failure.
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Incorrect order of outdoor communication wire ; ◆ Incorrect wiring of outdoor communication wire ; ◆ Incorrect terminal connection of outdoor communication wire ; ◆ Incorrect setting of address dip switch of outdoor unit;		
3. Abnormity confirmation conditions		
No communication for 30s (E)		
4. Possible causes		
◆ Poor communication wire: short circuit or disconnection; ◆ Non-corresponding communication wire A, B and C; ◆ Incorrect connection of outdoor unit communication port of PCB ; ◆ Interference source, which causes unstable communication of outdoor unit .		



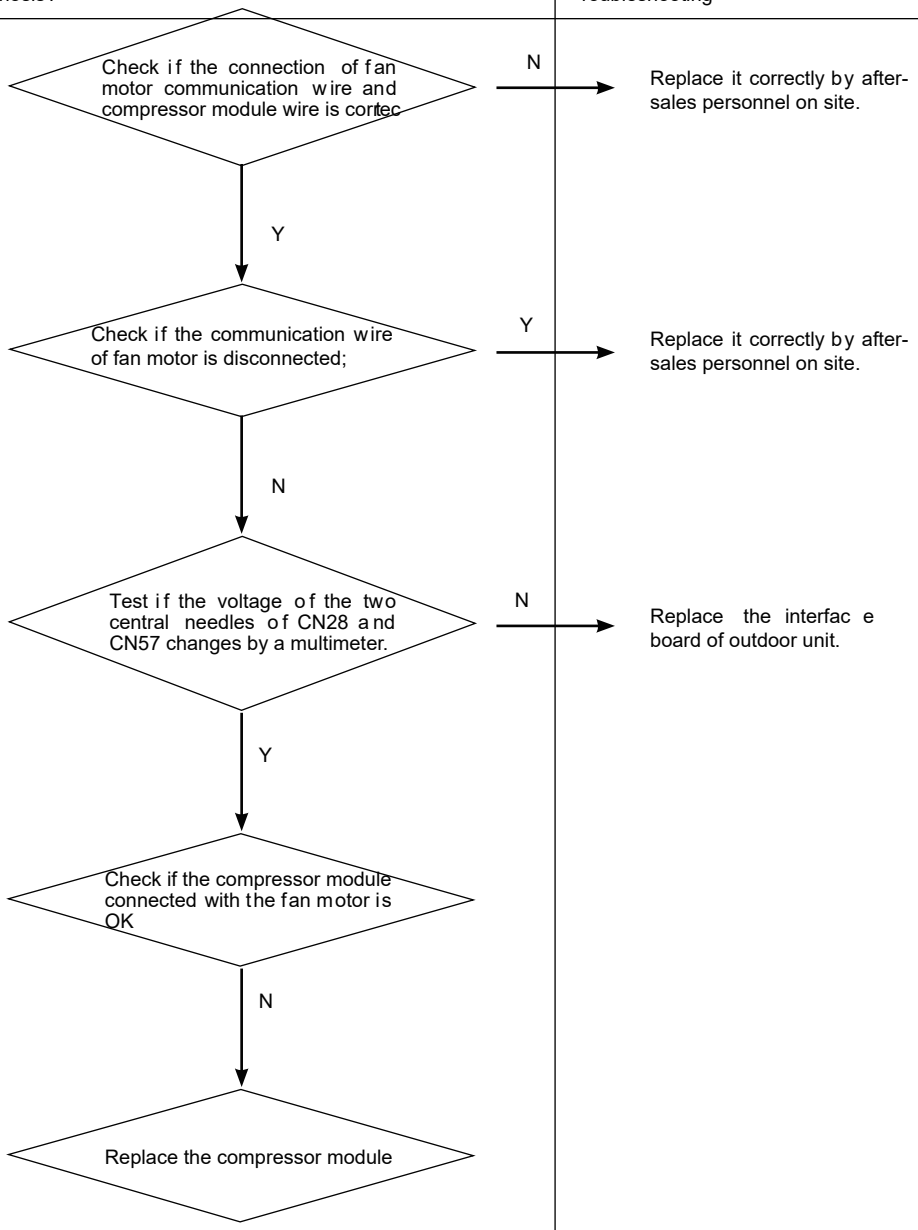
Failure code Outdoor digital display tube: 46-0, 1 Indoor wired controller: 2E	Indoor unit LED status	LED5		Failure description: Communication with INV1 and INV2 module board failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	Diagnosis	Troubleshooting
2. Abnormity detection method		
◆ Check if the communication wire correspondence of inverter module is correct; ◆ Check if the communication wire is disconnected;		
3. Abnormity confirmation conditions		
No communication for 30s		
4. Possible causes		
◆ Poor communication wire: disconnection; ◆ Incorrect correspondence of INV1 and INV2; incorrect connection of outdoor unit communication port of PCB; ◆ Poor inverter board or connection board		



Failure code Outdoor digital display tube: 46-4, 5 Indoor wired controller: 2E	Indoor unit LED status	LED5		Failure description: Communication with fan motor module board 1, 2 failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the communication wire correspondence of fan motor is correct; ◆ Check if the communication wire is disconnected; ◆ Check if the driver module whitch power supply to the fan motor is powered		
3. Abnormity confirmation conditions		
Fan motor has a host computer or compressor inverter, no communication for 30s		
4. Possible causes		
◆ Poor communication wire: disconnection; ◆ Incorrect correspondence of INV1 and INV2; incorrect connection of outdoor unit communication port of PCB; ◆ Poor inverter board or connection board		

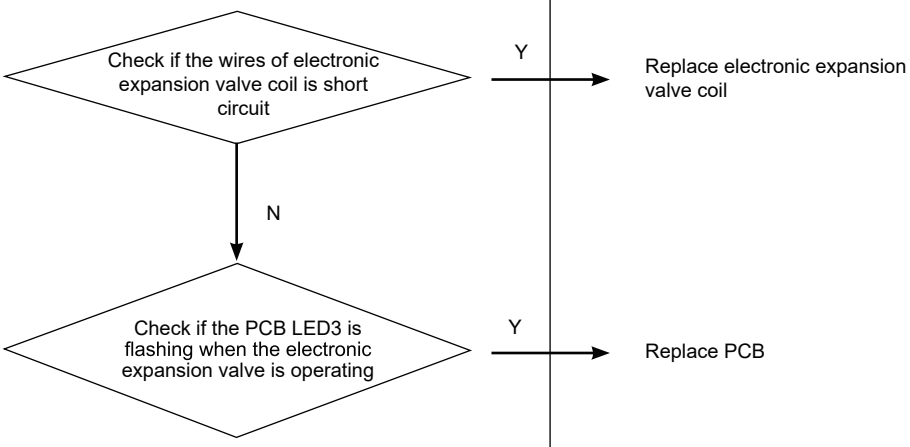


Failure code Outdoor digital display tube: 47 Indoor wired controller: 2F	Indoor unit LED status	LED5		Failure description: Communication with wireless communicaiton module failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the dip switch of BM2-1 and BM2-2 is correct	Check if the dip switch of BM2-1 and BM2-2 is OFF position → N → Change the dip switch by after-sales personnel on site.	
3. Abnormity confirmation conditions		
Can't detect the wireless communication module within 120 seconds continuously, alarm		
4. Possible causes		
◆ The dip switch of BM2-1 and BM2-2 is wrong		

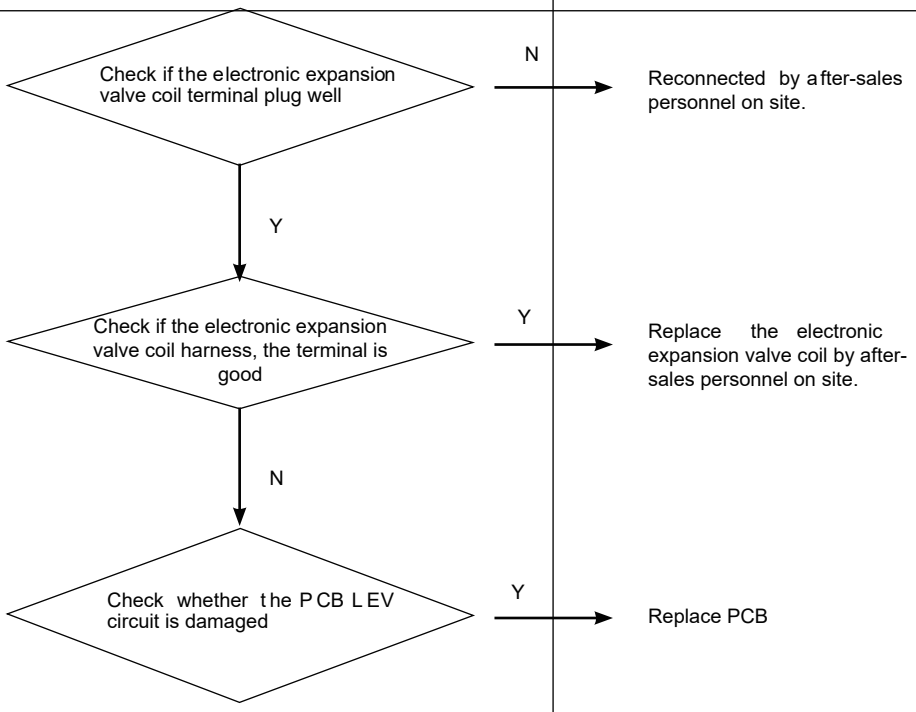
Failure code Outdoor digital display tube: 51-0,1,2,3 Indoor wired controller: 33	Indoor unit LED status	LED5F		ailure description: LEVa1,2 and LEVb,c over current protection
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ LEV driver chip detection		
3. Abnormity confirmation conditions		
LEV driver chip detection		
4. Possible causes		
◆ The wires of electronic expansion valve coil short circuit ◆ LEV drive output circuit anomalies		



Failure code Outdoor digital display tube: 52-0,1,2,3 Indoor wired controller: 34	Indoor unit LED status	LED5		Failure description: LEVa1,2 and LEVb,c open circuit
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ LEV driver chip detection		
3. Abnormity confirmation conditions		
LEV driver chip detection		
4. Possible causes		
◆ The electronic expansion valve coil connector is disengaged or misplaced ◆ Electronic expansion valve coil harness breaks ◆ LEV drive circuit is open		



Failure code Outdoor digital display tube: 74 Indoor wired controller: 4A	Indoor unit LED status	LED5		Failure description: Emergency stop function switch failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	Diagnosis	Troubleshooting
2. Abnormity detection method		
◆ Check if the CN18 is open circuit		
3. Abnormity confirmation conditions	If the PCB CN18 is short circuit → N → Short circuit the CN18	
4. Possible causes		
◆ CN18 is open circuit		

Failure code Outdoor digital display tube: 75-0 Indoor wired controller: 4B	Indoor unit LED status	LED5		Failure description: Pressure difference between high and low pressure too low failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Diagnosis and troubleshooting	
MRV 5-HR series	Diagnosis	Troubleshooting
2. Abnormity detection method ◆ Check if the difference between high and low pressure of system exceeds 0.4MPa after start and before failure alarm; ◆ Check if the unit lack of refrigerant. ◆ Check the four-way valve of unit for normal switching and free from backflow. ◆ Check if the detection value of high/low pressure sensor is correct ◆ Check if the unit is beyond the operation range	Check if the high-low pressure difference of system exceeds 0.4MPa after start and before failure alarm; N Check if the refrigerant in the system is with leakage or insufficient. Y → Replace it correctly by after-sale s personnel on site and ensure the refrigerant is enough. N Check if the detection value of low pressure sensor is correct. N → Rectify it correctly by after-sale s personnel on site. Check if the corresponding pressure sensor is intersected with another compressor, especially for a double compressor system. Y If the four-way valve of outdoor unit is with backflow and if the suction pipe filter of compressor is blocked. Y → Troubleshoot and replace it correctly by after-sales personnel on site. [Note]: Check if the suction pipe filter of compressor is blocked, when the discharging temperature rises obviously. N Check if it operates normally after replacing a normal driver module. N → Replace the driver module correctly. Y if the allowed operation range is exceeded. N → Replace the inverter compressor if the high-low pressure difference cannot reach 0.4MPa above before failure alarm. Y Use the unit in accordance with its allowed operation range.	
3. Abnormity confirmation conditions 75-0: Pd-Ps≤0.1Mpa within 1min upon the INV compressor starts. 75-4: Pd-Ps≤0.4Mpa lasts for 3min.		
4. Possible causes ◆ The detection value of high/low pressure sensor is incorrect; ◆ The refrigerant in the system is insufficient; ◆ The four-way valve cannot be switched normally or with backflow. The power module cannot drive the compressor operating normally; ◆ The inverter compressor is with serious inter deterioration, which makes it difficult to form difference between high and low pressure. ◆ The operation environment is beyond the allowed range.		

<table>
<tr><td rowspan="3">Failure code
Outdoor digital display tube: 76-0, 1, 2
Indoor wired controller: 4C</td><td colspan="2">Indoor unit LED status</td><td colspan="2">LED5</td><td rowspan="3">Failure description:
Incorrect settings of quantity, address or capacity for outdoor unit</td></tr>
<tr><td colspan="2"></td><td colspan="2">20 times</td></tr>
<tr><td colspan="2">Outdoor unit LED status</td><td>LED1</td><td>LED2</td></tr>
<tr><td colspan="2"></td><td>Normal</td><td>Normal</td><td></td></tr>
<tr><td>1. Model</td><td colspan="5">Diagnosis and troubleshooting</td></tr>
<tr><td rowspan="8">MRV 5-HR series

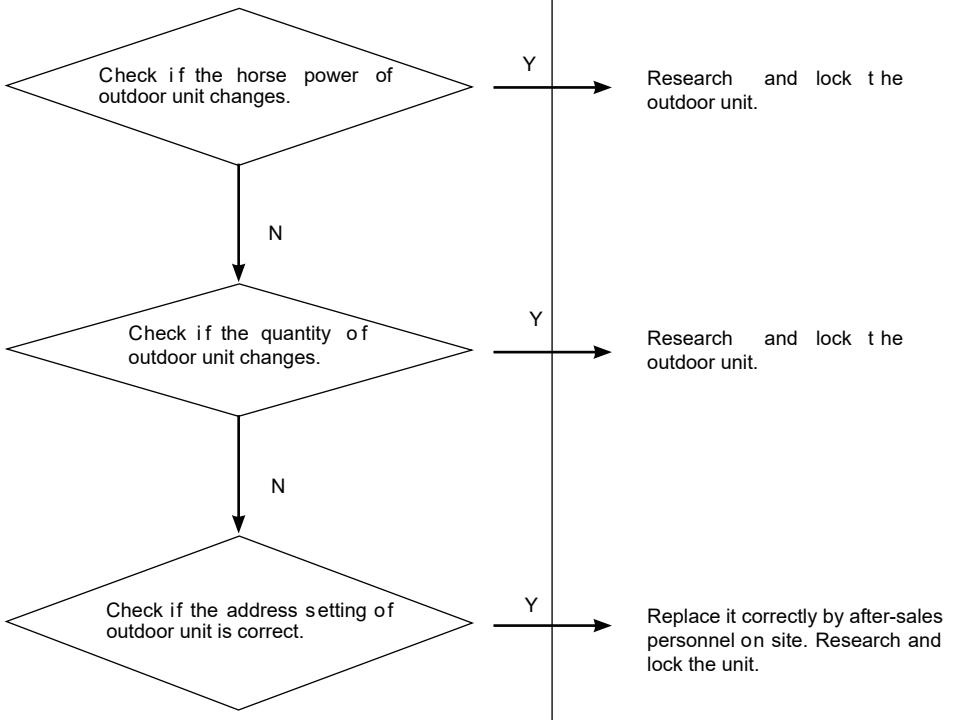
2. Abnormity detection method

◆ Check if the quantity of outdoor unit changes; (76-0)
◆ Check if the address of outdoor unit changes; (76-1)
◆ Check if the horse power of outdoor unit changes.(76-2)

3. Abnormity confirmation conditions

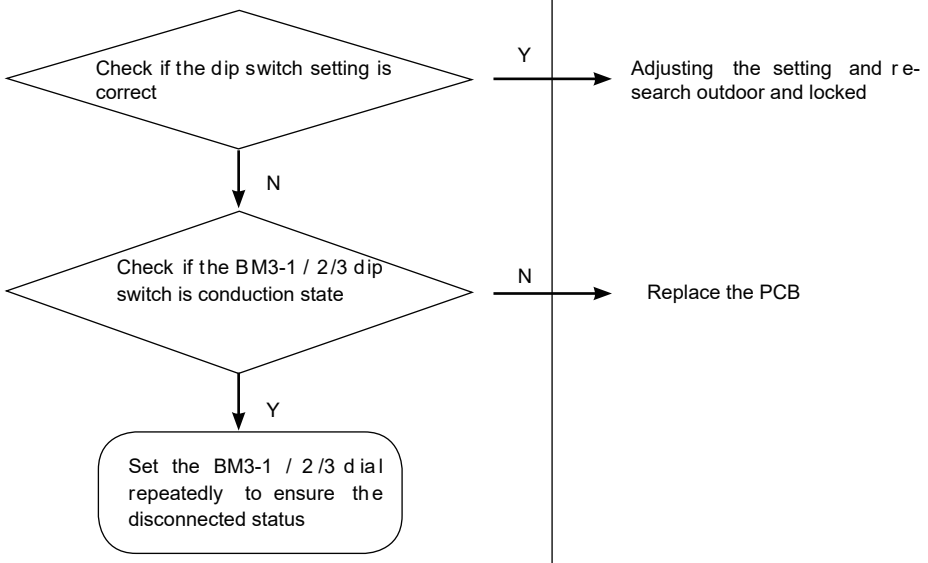
Quantity of sub-unit setting does not conform to host EEPROM data; address of sub-unit setting does not conform to host EEPROM data; horse power setting of sub-unit does not conform to host EEPROM data.

4. Possible causes

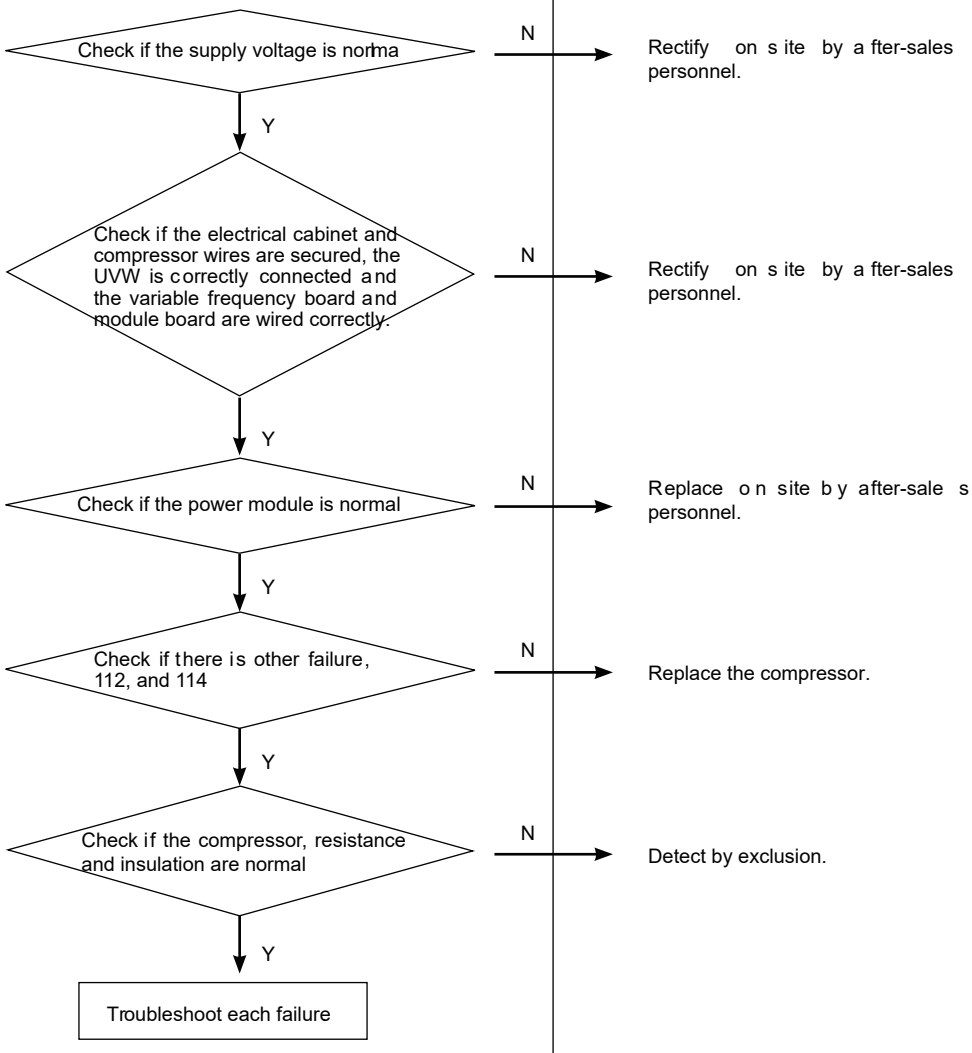
◆ The quantity of connected unit changes;
◆ The horse power of outdoor unit of the same system changes;
◆ The address setting of the same system changes;</td><td colspan="3">DiagnosisT</td><td colspan="2">roubleshooting</td></tr>
<tr><td colspan="5"> 
</td></tr>
</table>

Failure code Outdoor digital display tube: 83 Indoor wired controller: 53	Indoor unit LED status	LED5		Failure description: Outdoor unit model are set incorrectly
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

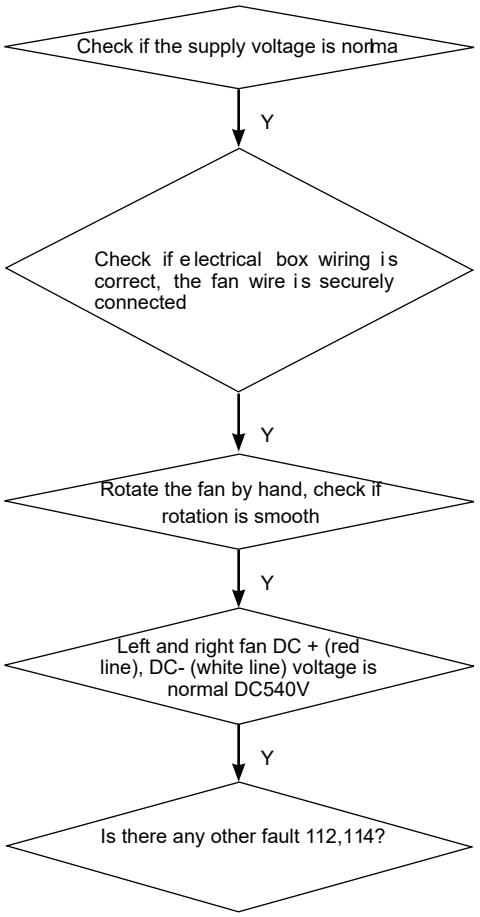
1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
3. Abnormity confirmation conditions		
4. Possible causes		
◆ BM3-1 / 2/3 dip switch setting wrong or bad continuity.		



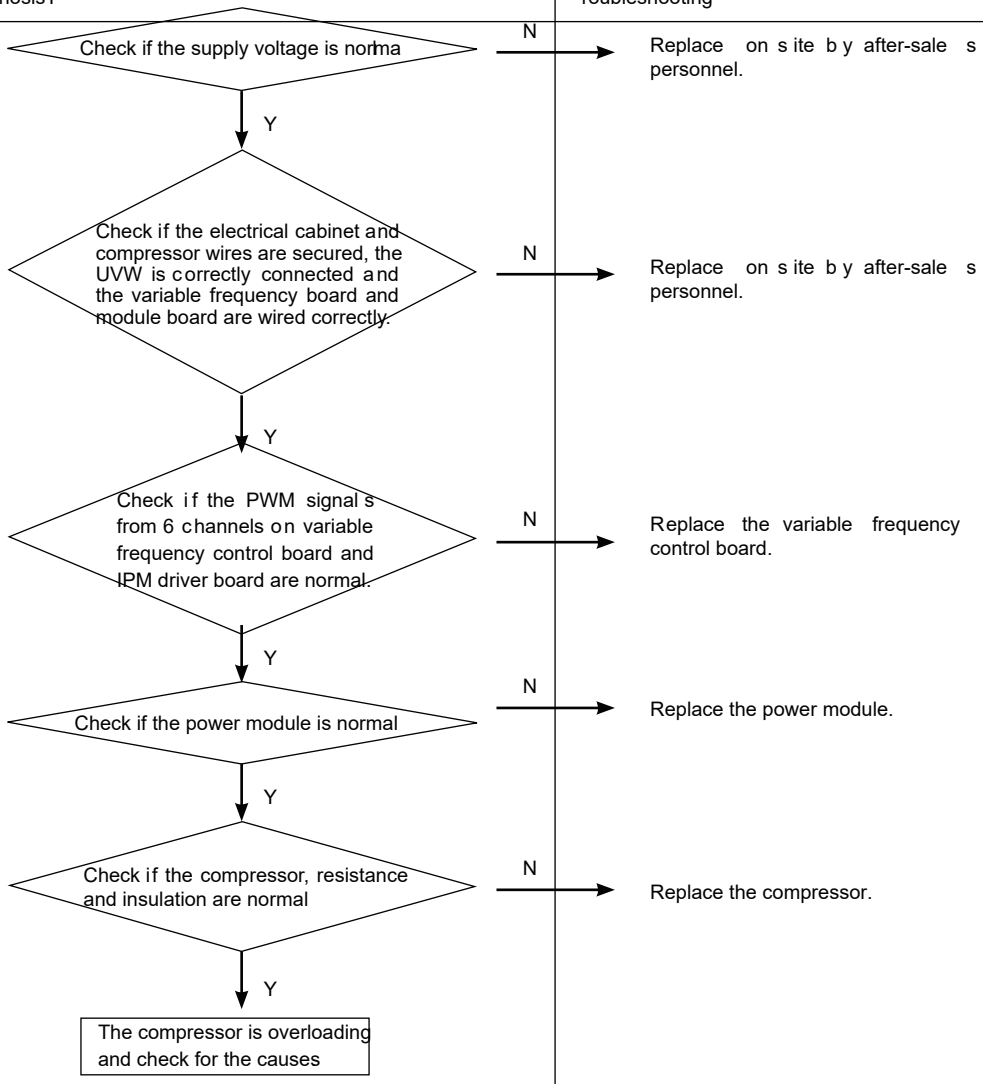
<table>
<tr><td rowspan="3">Failure code
Outdoor digital display tube: 110-0, 1
Indoor wired controller: 6E</td><td colspan="2">Indoor unit LED status</td><td colspan="2">LED5</td><td rowspan="3">Failure description:
Compressor module hardware over current</td></tr>
<tr><td colspan="2"></td><td colspan="2">20 times</td></tr>
<tr><td colspan="2">Outdoor unit LED status</td><td>LED1</td><td>LED2</td></tr>
<tr><td colspan="2"></td><td>Normal</td><td>Normal</td><td></td></tr>
</table>

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the modules are in normal conditions and if P and N are short-circuited to U, V and W. ◆ Check if the modules are fixed securely and the heat dissipation is good; ◆ Check if the compressor resistance is normal, ◆ Check if the compressor wiring UVW is wrongly connected and if the inverter board and module board are wired securely.		
3. Abnormity confirmation conditions		
Over current of module hardware		
4. Possible causes		
◆ The module alarms FO failure due to poor heat dissipation; ◆ The module alarms failure as it is broken down; ◆ Liquid shock is found in compressor, which results in over current upon starting or operating; ◆ The winding resistance of compressor is large; ◆ UVW wiring is wrongly connected or the inverter board and module board are wired insecurely.		

Failure code Outdoor digital display tube: 110-4, 5 Indoor wired controller: 6E	Indoor unit LED status	LED5		Failure description: Fan motor module hardware over current
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

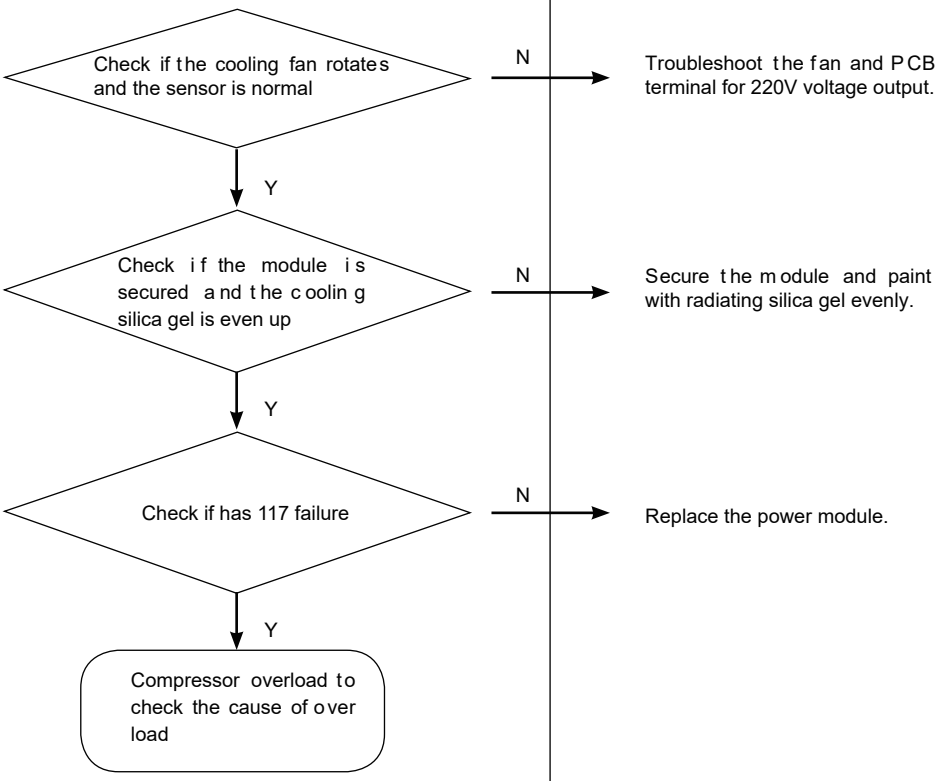
1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method ◆ Check if the motor DC +/- loop is short circuit; ◆ Check fan blade load is stuck, rotation is smooth; ◆ Check if the compressor resistance is normal, ◆ Check the motor resistance is normal;		
3. Abnormity confirmation conditions Fan built-in drive hardware over current		
4. Possible causes ◆ The power supply of fan motor capacitor board is poor ◆ Fan blade load is stuck. ◆ Motor built-in driver is not good		

Failure code Outdoor digital display tube: 11-0, 1 Indoor wired controller: 6F	Indoor unit LED status	LED5		Failure description: Compressor out of control
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the module is in normal conditions and if P and N is short-circuited to U, V and W; Measure with diode to see if there is a voltage drop between P/N and U/V/W. ◆ Check if the module is securely fixed and the heat dissipation is good; ◆ Check if the compressor winding is normal. ◆ Check if the compressor wiring UVW is connected correctly and the inverter board and module board is securely wired.		
3. Abnormity confirmation conditions		
Over current of module hardware		
4. Possible causes		
◆ The module alarms failure as it broke down; ◆ Liquid shock is found in compressor which results in over current upon starting or operating; ◆ The compressor winding is burned out; ◆ UVW wiring is wrongly connected or the inverter board and module board are wired insecurely.		

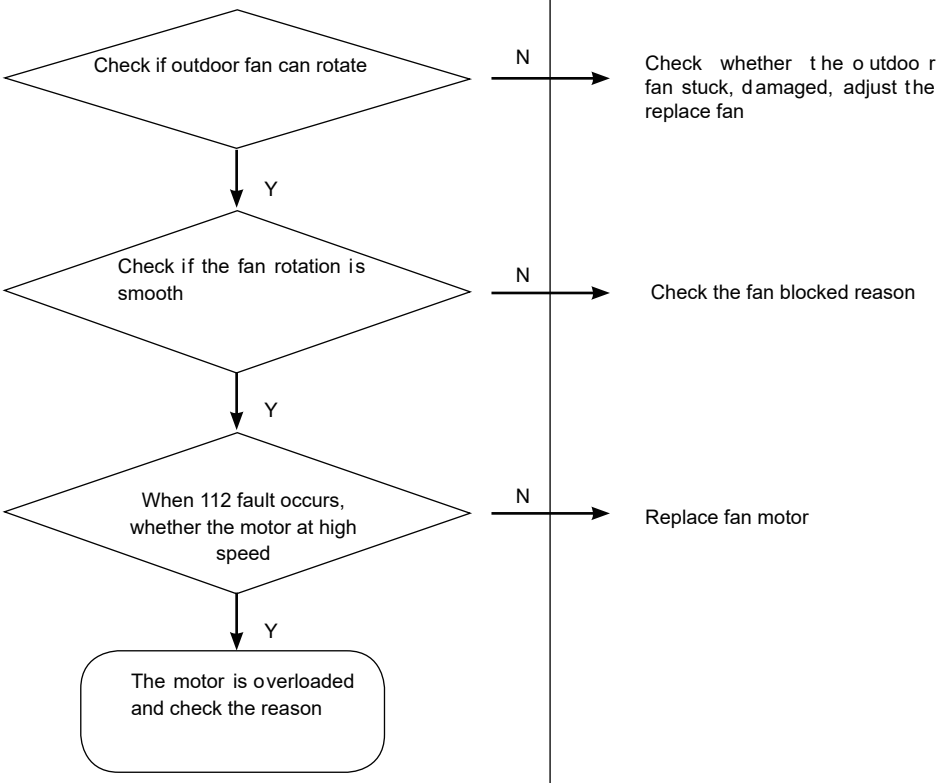
Failure code Outdoor digital display tube: 112-0, 1 Indoor wired controller: 70	Indoor unit LED status	LED5		Failure description: Compressor module radiator temp. too high
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the radiator is in normal conditions; ◆ Check if the cooling fan is in normal conditions; ◆ Check if the radiator sensor is in normal conditions.		
3. Abnormity confirmation conditions		
Raise failure alarm when temperature ≥94°C. INV control board recovers automatically when temperature ≤94°C.		
4. Possible causes		
◆ The module is insecurely fixed, which results in poor heat dissipation; ◆ The radiator sensor is broken which results in high detection temperature; ◆ The cooling fan fails to operate; ◆ There is no 220V output from the terminal of cooling fan of PCB.		



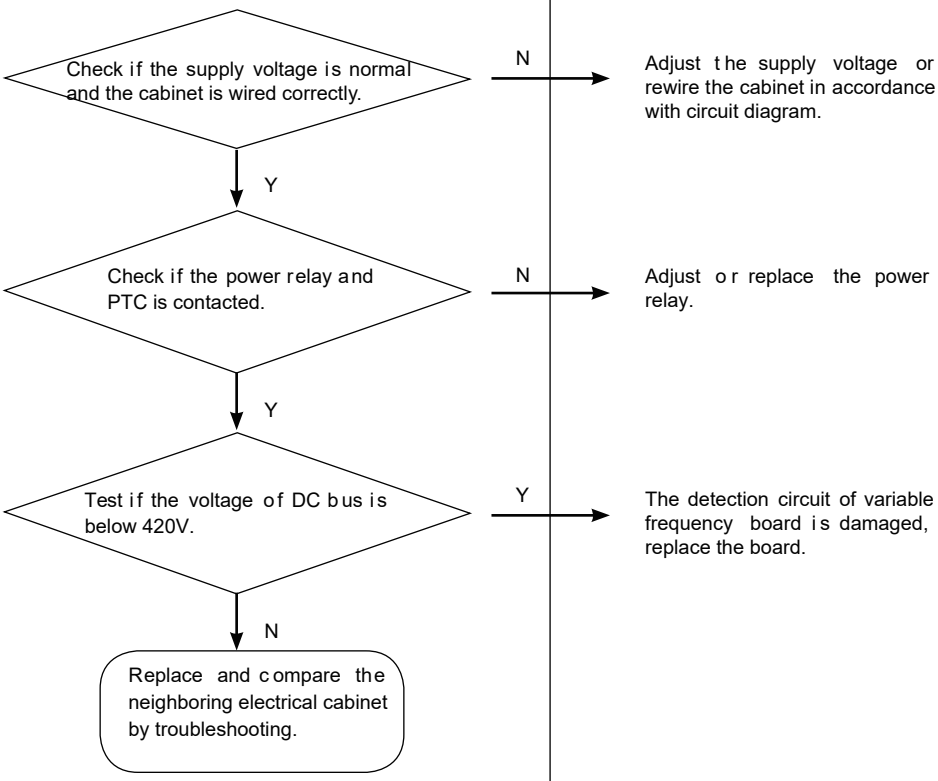
Failure code Outdoor digital display tube: 112- 4, 5 Indoor wired controller: 70	Indoor unit LED status	LED5		Failure description: Fan motor module radiator temp. too high
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the radiating of the fan motor aluminum radiator is good ◆ Check if the fan is good		
3. Abnormity confirmation conditions		
Motor built-in IGBT bottom radiator temperature reaches 95.65 degree;		
4. Possible causes		
◆ Motor built-in IGBT radiating poor; ◆ Outdoor fan does not turn or stuck		

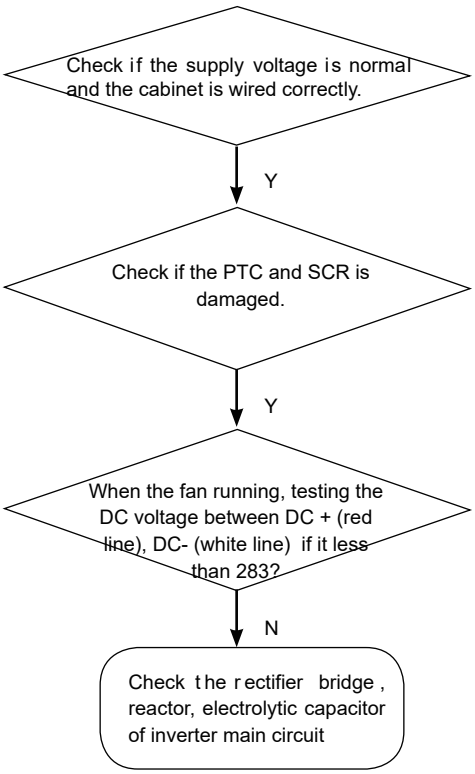


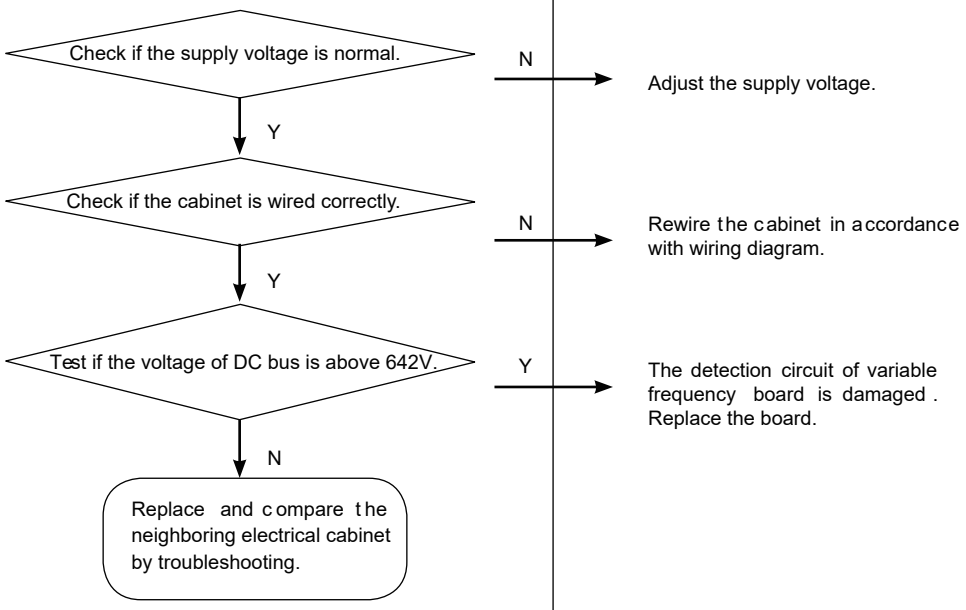
Failure code Outdoor digital display tube: 114-0, 1 Indoor wired controller: 72	Indoor unit LED status	LED5		Failure description: Compressor module DC BUS under voltage
		20 times		
	Outdoor unit LED status	LED1L	ED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the power voltage is too low and results in voltage decrease after rectification; ◆ Check if the PTC is in normal conditions ; ◆ Check if the cabinet is correctly wired .		
3. Abnormity confirmation conditions		
Raise failure alarm when power voltage<DC420V. INV control board recovers automatically when voltage >DC420V		
4. Possible causes		
◆ Incorrect wiring may result in under voltage alarm; ◆ PTC or relay damage may result in under voltage; ◆ Low power voltage may result in under voltage.		



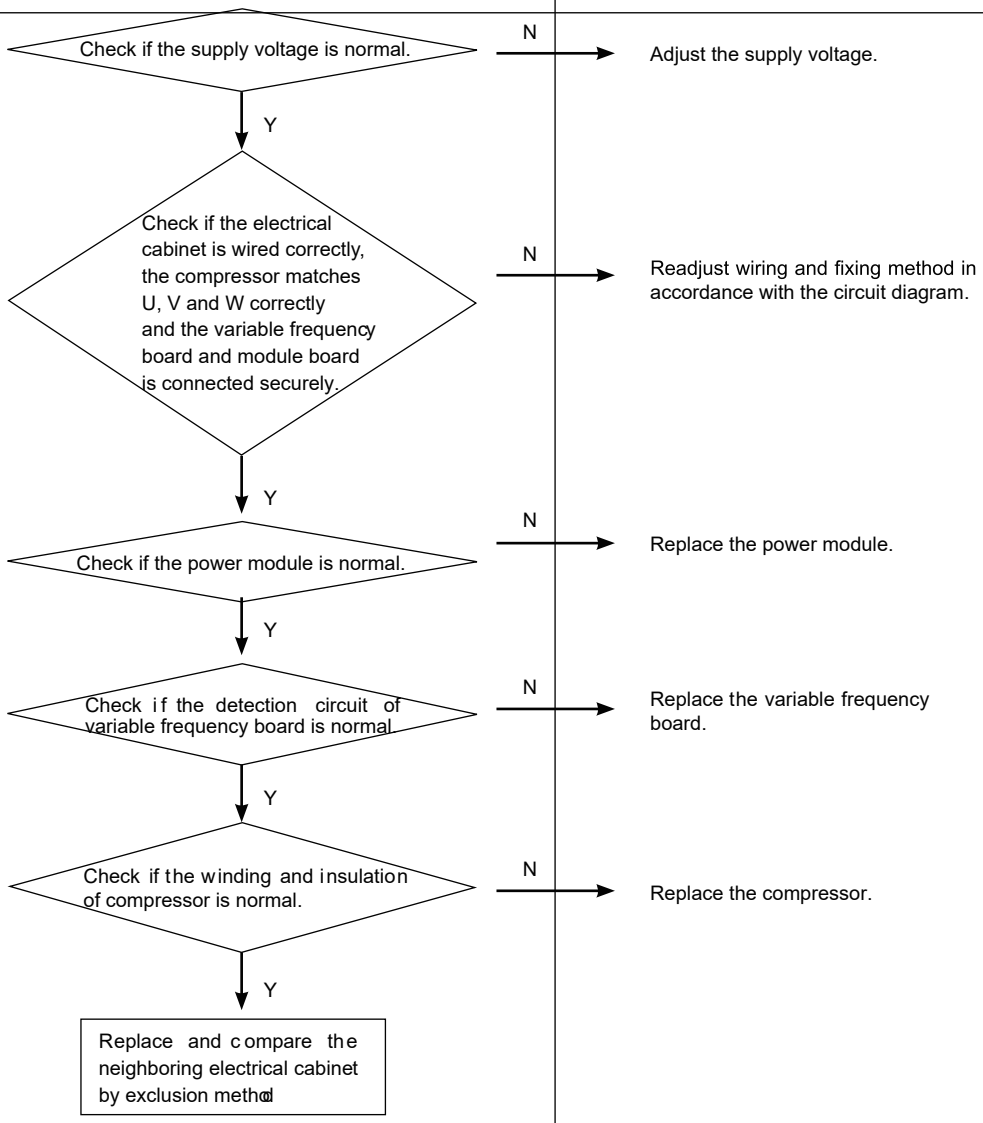
Failure code Outdoor digital display tube: 114-4, 5 Indoor wired controller: 72	Indoor unit LED status	LED5		Failure description: Fan motor module DC BUS under voltage
		20 times		
	Outdoor unit LED status	LED1L	ED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check the power supply voltage is too low , resulting in reduced voltage after rectification; ◆ Check if the PTC is in normal conditions; ◆ Check if the cabinet is correctly wired .		
3. Abnormity confirmation conditions		
When the power voltage <DC283V, fault and alarm. Voltage> DC283V, the motor built-in control panel automatically restored		
4. Possible causes		
◆ Incorrect wiring may result in under voltage alarm; ◆ PTC or SCR damage may result in under voltage; ◆ Low power voltage may result in under voltage.		

<table>
<tr><td rowspan="3">Failure code
Outdoor digital display tube: 115-0, 1
Indoor wired controller: 73</td><td colspan="2">Indoor unit LED status</td><td colspan="2">LED5</td><td rowspan="2">Failure description:
Compressor module DC BUS over voltage</td></tr>
<tr><td colspan="2"></td><td colspan="2">20 times</td></tr>
<tr><td colspan="2">Outdoor unit LED status</td><td>LED1L</td><td>ED2</td></tr>
<tr><td colspan="2"></td><td>Normal</td><td>Normal</td><td></td></tr>
<tr><td>1. Model</td><td colspan="4">Failure diagnosis and troubleshooting</td></tr>
<tr><td>MRV 5-HR series</td><td colspan="2">DiagnosisT</td><td colspan="2">roubleshooting</td></tr>
<tr><td>2. Abnormity detection method</td><td colspan="4" rowspan="6"> 
</td></tr>
<tr><td>◆ Check if the power voltage is too high and results in over voltage after rectification;
◆ Check if the cabinet is correctly wired.</td></tr>
<tr><td>3. Abnormity confirmation conditions</td></tr>
<tr><td>Raise failure alarm when power voltage>DC642V. INV control board recovers automatically when voltage <DC642V.</td></tr>
<tr><td>4. Possible causes</td></tr>
<tr><td>◆ Incorrect connection may result in over voltage alarm;
◆ High power voltage may result in over voltage.</td></tr>
</table>

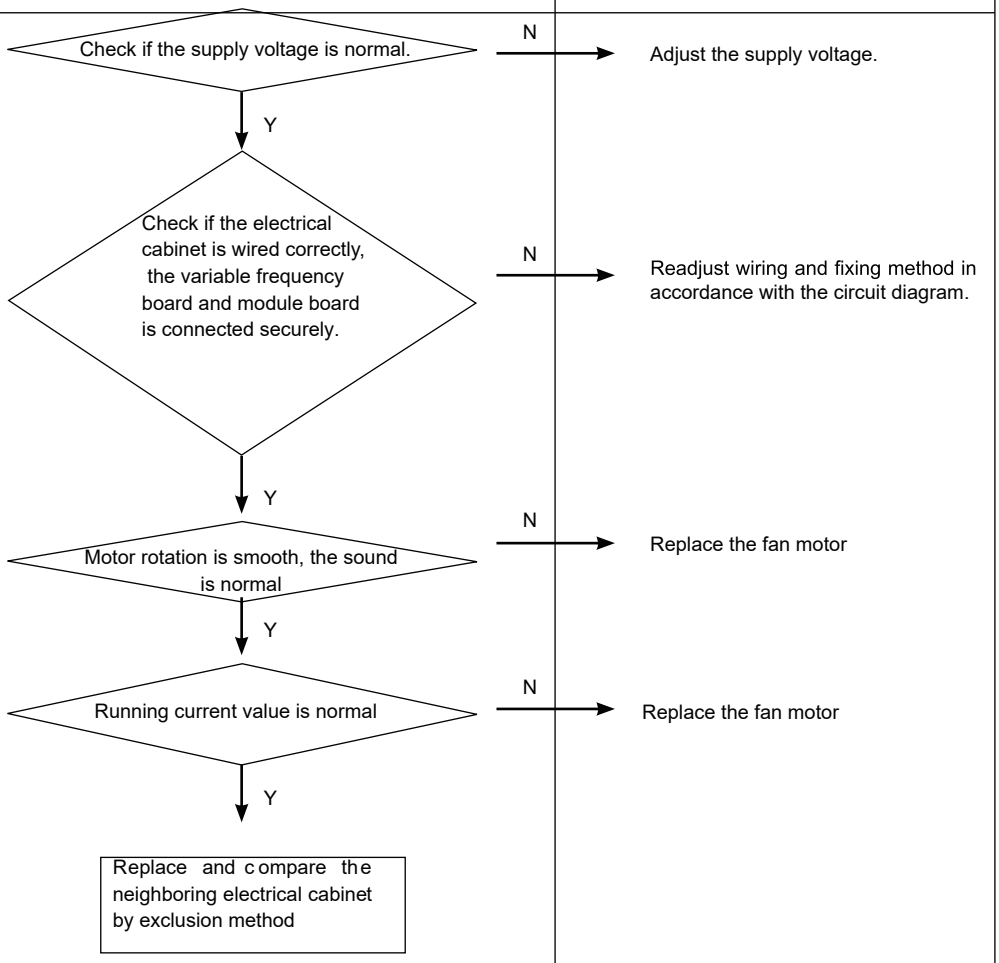
Failure code Outdoor digital display tube: 117-0, 1 Indoor wired controller: 75	Indoor unit LED status	LED5		Failure description: Compressor module software over current
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the compressor is insecurely connected; ◆ Check the system for liquid shock. ◆ Check if the module is in normal conditions and subject to short circuit. ◆ Check if the compressor is well. ◆ Check if the compressor wiring UVW is connected correctly and the inverter board and module board is securely wired.		
3. Abnormity confirmation conditions		
Over current of module software		
4. Possible causes		
◆ The current detection loop of inverter board is in poor performance, which results in rapid current rise of compressor; ◆ Damage or liquid shock is found in compressor, which results in over current; ◆ UVW wiring is wrongly connected or the inverter board and module board are wired insecurely.		



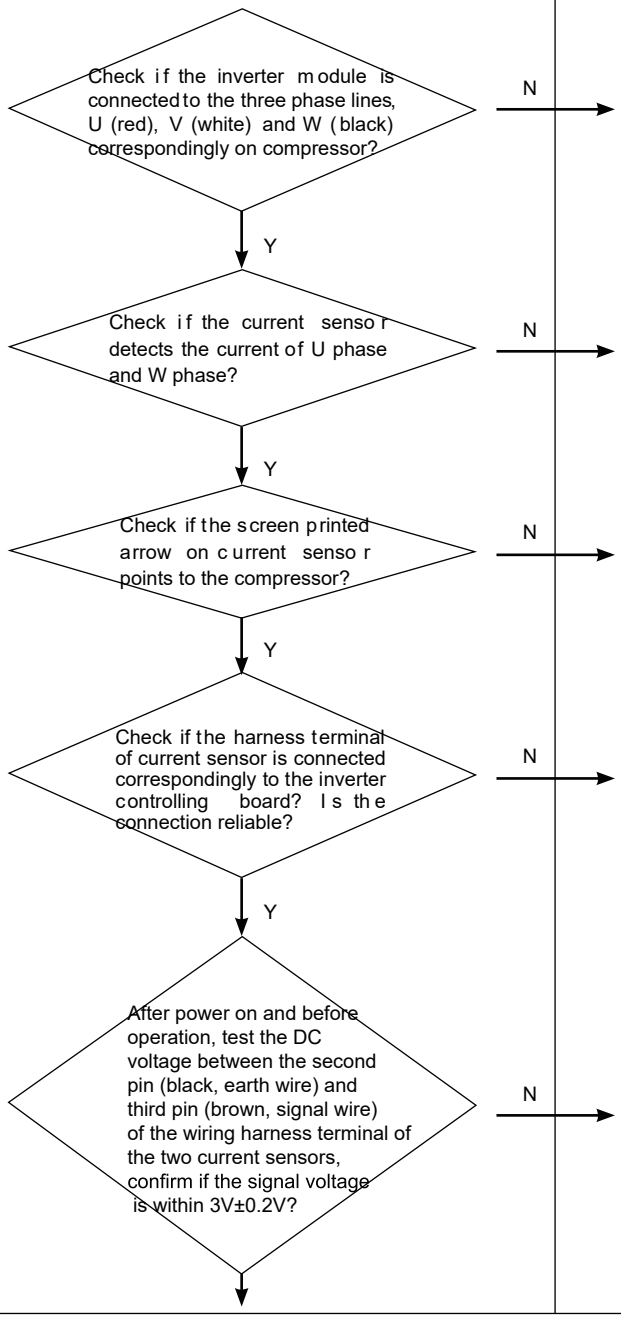
Failure code Outdoor digital display tube: 117- 4, 5 Indoor wired controller: 75	Indoor unit LED status	LED5		Failure description: Fan motor module software over current
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the fan motor strong electricity wire is insecurely connected; ◆ Fan rotation is smooth ◆ Check if the module is normal, if short circuit		
3. Abnormity confirmation conditions		
Double fan: fan running current value over 5.5A, single fan: fan running current value over 6A		
4. Possible causes		
◆ Fan motor is poor ◆ Fan blade overload		



Failure code Outdoor digital display tube: 119-0, 1 Indoor wired controller77	Indoor unit LED status	LED5		Failure description: Current detecting circuit abnormal of compressor module
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the current sensor is reversely connected and U and W is in reverse direction. ◆ Check if the current sensor is in reverse direction. (the arrow on sensor points at the compressor) ◆ Check if the inverter board is well. ◆ Check if the current sensor is well .		
3. Abnormity confirmation conditions		
The current detection sensor of inverter control board is in abnormal conditions, disconnected or connected incorrectly .		
4. Possible causes		
◆ The inverter board and current sensor is anti-connected or the current sensor is in incorrect direction. ◆ The inverter board or current sensor is damaged .		

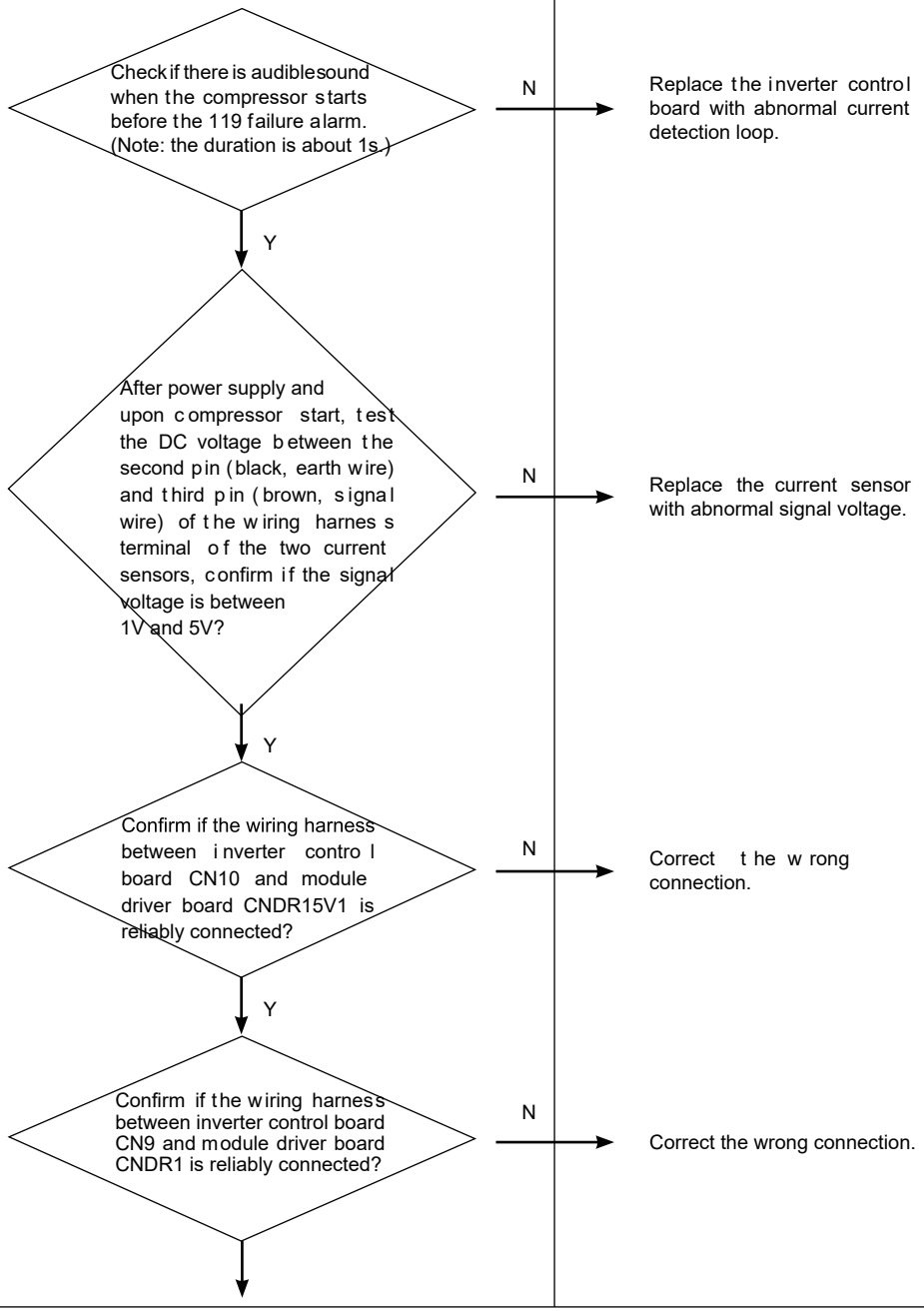


To be continued

Continued

Failure code Outdoor digital display tube: 119-0, 1 Indoor wired controller77	Indoor unit LED status	LED5		Failure description: Current detecting circuit abnormal of compressor module
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the current sensor is reversely connected and U and W is in reverse direction. ◆ Check if the current sensor is in reverse direction. (the arrow on sensor points at the compressor) ◆ Check if the inverter board is well. ◆ Check if the current sensor is well .		
3. Abnormity confirmation conditions		
The current detection sensor of inverter control board is in abnormal conditions, disconnected or connected incorrectly .		
4. Possible causes		
◆ The inverter board and current sensor is anti-connected or the current sensor is in incorrect direction. ◆ The inverter board or current sensor is damaged .		

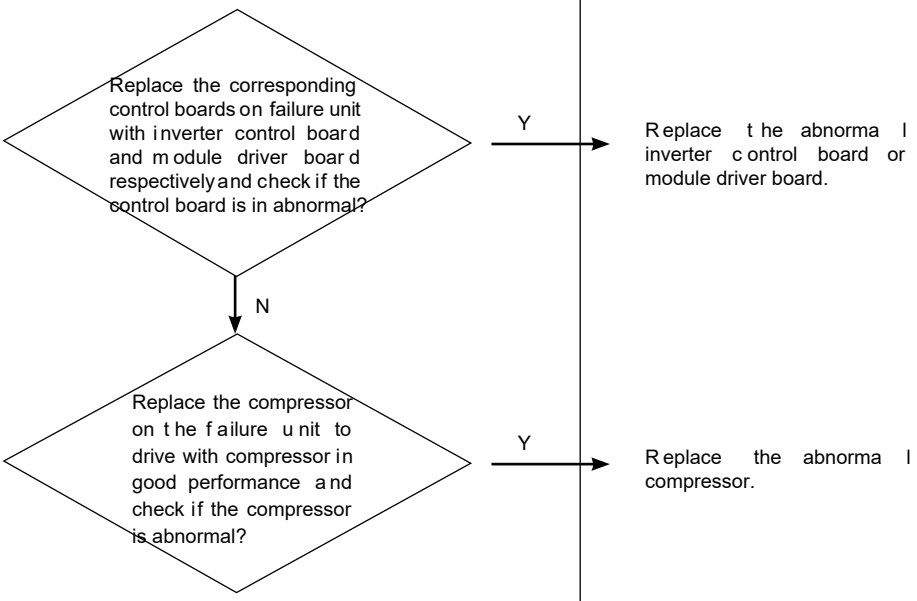


To be continued

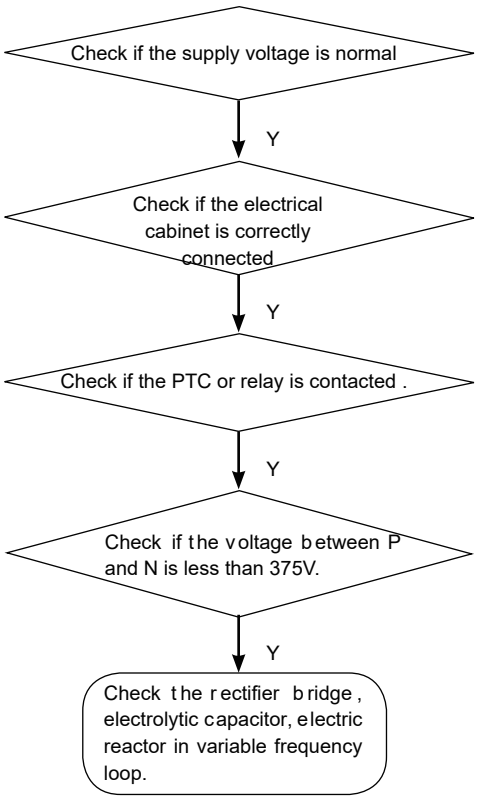
Continued

Failure code Outdoor digital display tube: 119-0, 1 Indoor wired controller77	Indoor unit LED status	LED5		Failure description: Current detecting circuit abnormal of compressor module
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

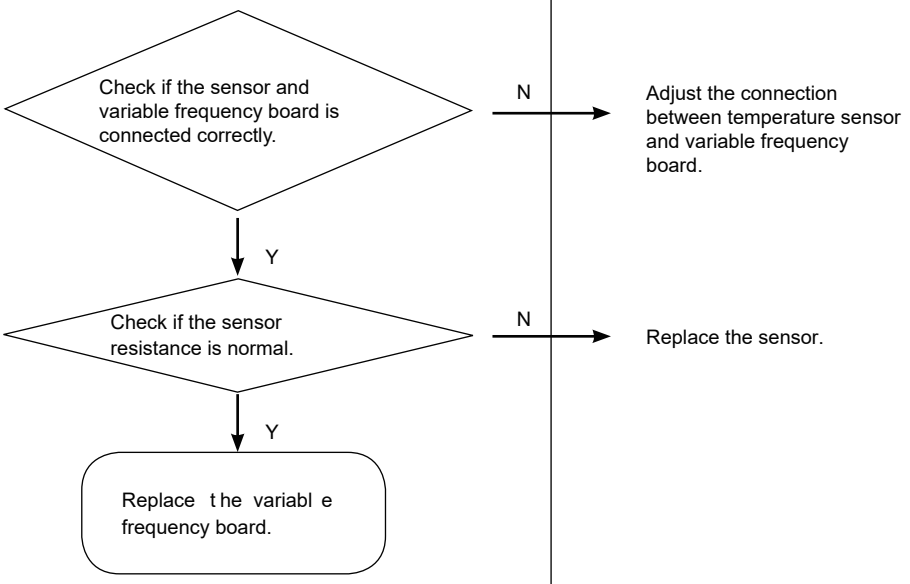
1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the current sensor is reversely connected and U and W is in reverse direction . ◆ Check if the current sensor is in reverse direction. (the arrow on sensor points at the compressor) ◆ Check if the inverter board is well . ◆ Check if the current sensor is well .		
3. Abnormity confirmation conditions		
The current detection sensor of inverter control board is in abnormal conditions, disconnected or connected incorrectly .		
4. Possible causes		
◆ The inverter board and current sensor is anti-connected or the current sensor is in incorrect direction. ◆ The inverter board or current sensor is damaged.		



Failure code Outdoor digital display tube: 120-0, 1 121-0, 1 Indoor wired controller: 78, 79	Indoor unit LED status	LED5		Failure description: Compressor module power supply abnormal
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

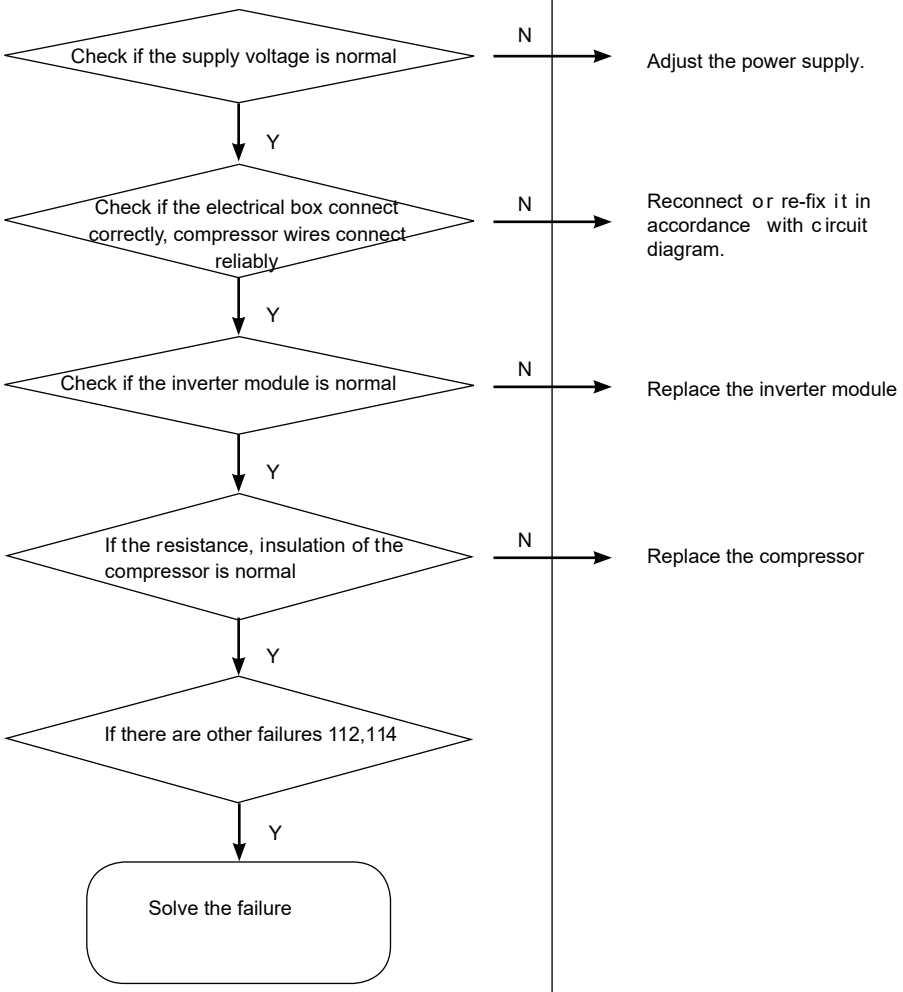
1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method ◆ Check if the supply voltage is abnormal. ◆ Check if the PTC or relay contacts or not. ◆ Check if the DC bus voltage is normal. ◆ Check if the DC power supply of inverter board is normal.		
3. Abnormity confirmation conditions The power supply of inverter control board is interrupted instantly.		
4. Possible causes ◆ The supply voltage is found with abnormal fluctuations. ◆ The PTC or relay does not contact. ◆ The inverter control board is in poor performance.		

Failure code Outdoor digital display tube: 122-0, 1 Indoor wired controller: 7A	Indoor unit LED status	LED5		Failure description: Radiator temp. sensor of compressor module is abnormal.
		20 times		
	Outdoor unit LED status	LED1L	ED2	
		Normal	Normal	

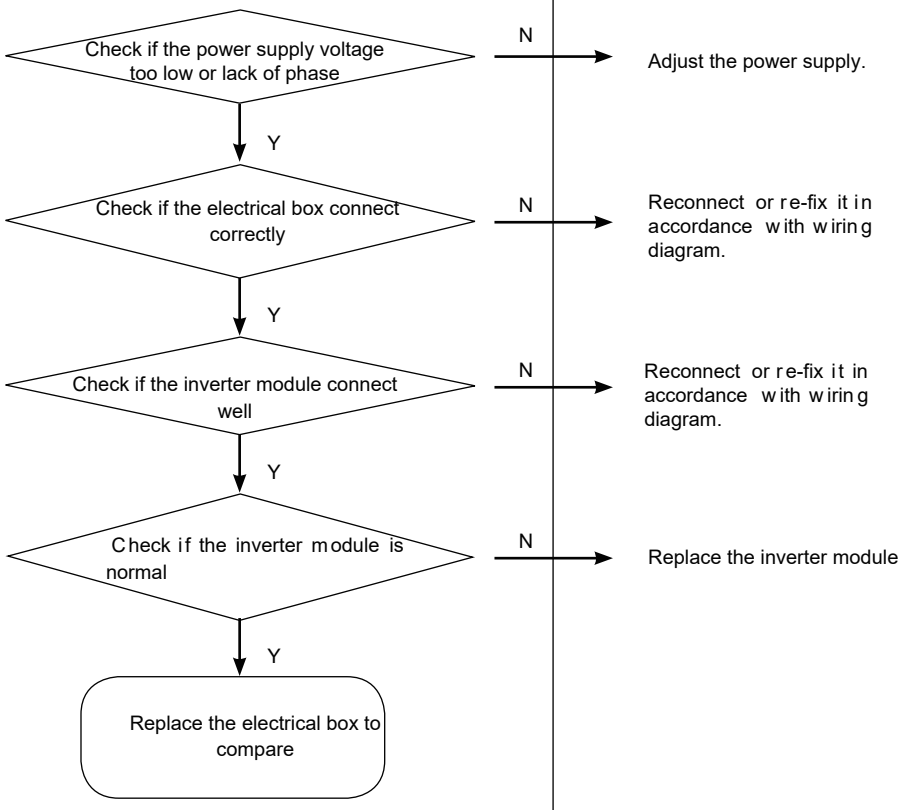
1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the temperature acquisition circuit of inverter board is normal. ◆ Check if the resistance of temperature sensor is normal. ◆ Check if they are connected correctly		
3. Abnormity confirmation conditions		
The temperature sensor is disconnected or the resistance is incorrect.		
4. Possible causes		
◆ The resistance of temperature sensor is found with drift. ◆ The inverter board acquires inaccurate temperature.		

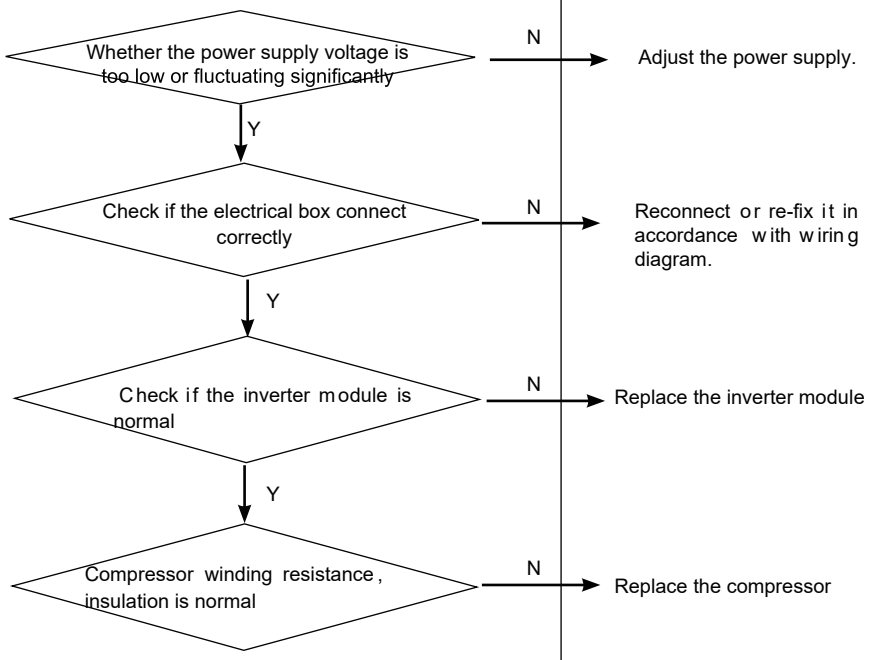
Failure code Outdoor digital display tube: 123-0, 1 Indoor wired controller: 78, 7B	Indoor unit LED status	LED5		Failure description: Hardware instantaneous over current of the compressor module rectifier side
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

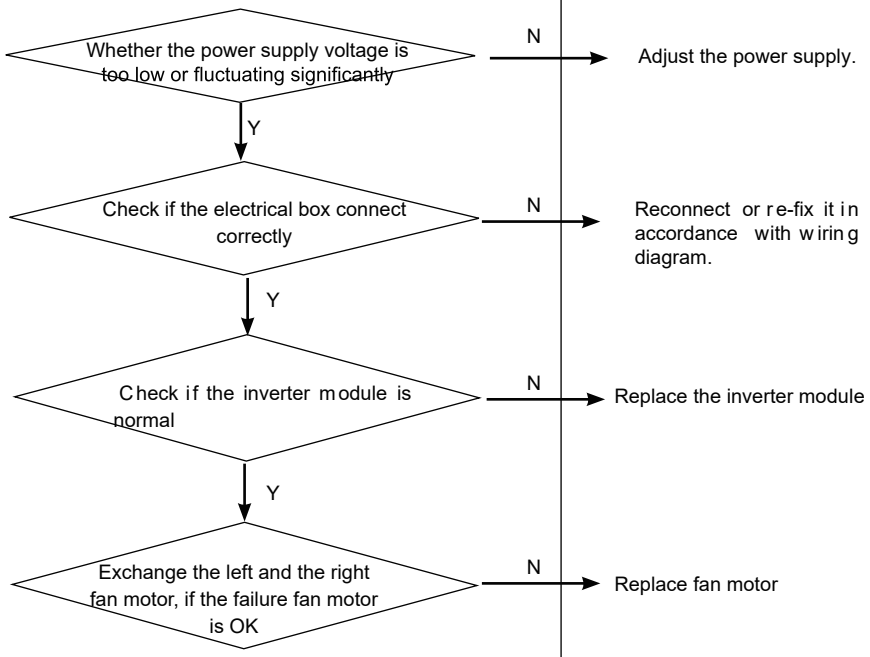
1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check the module is normal, there is short circuit between P, N, U, V, W ◆ Check whether the module is fixed reliably and radiating is good; ◆ Check the compressor resistance is normal, ◆ Check if the wiring of compressor UVW is correct, frequency converter board and module board connection is reliable.		
3. Abnormity confirmation conditions		
Hardware instantaneous over current of the module rectifier side		
4. Possible causes		
◆ Poor radiating caused the module burned; ◆ The module is punctured to cause a breakdown; ◆ Compressor winding resistance too large ◆ UVW wiring short circuit, or compressor line short circuit to ground ◆ The compressor has a liquid shock, causing starting current or operating current too high		



Failure code Outdoor digital display tube: 124-0, 1 Indoor wired controller: 78, 7C	Indoor unit LED status	LED5		Failure description: Compressor module three-phase power failure
		20 times		
	Outdoor unit LED status	LED1	LED2	
		Normal	Normal	

1. Model	Failure diagnosis and troubleshooting	
MRV 5-HR series	DiagnosisT	roubleshooting
2. Abnormity detection method		
◆ Check if the modules' R, S, T are correct, if missing phase ◆ Check if the power supply of the electrical box lack of phase, if the voltage is too low		
3. Abnormity confirmation conditions		
Module three-phase power failure		
4. Possible causes		
◆ Module three-phase voltage is too low ◆ Module three-phase power lack of phase or imbalance		

<table>
<tr><td rowspan="3">Failure code
Outdoor digital display tube: 125-0, 1
Indoor wired controller: 7D</td><td colspan="2" rowspan="2">Indoor unit LED status</td><td colspan="2">LED5</td><td rowspan="2">Failure description:
Compressor frequency un-match</td></tr>
<tr><td colspan="2">20 times</td></tr>
<tr><td rowspan="2">Outdoor unit LED status</td><td>LED1</td><td>LED2</td></tr>
<tr><td>Normal</td><td>Normal</td></tr>
<tr><td>1. Model</td><td colspan="5">Failure diagnosis and troubleshooting</td></tr>
<tr><td>MRV 5-HR series</td><td colspan="3">Diagnosis</td><td colspan="2">Troubleshooting</td></tr>
<tr><td>2. Abnormity detection method</td><td colspan="5" rowspan="4"> 
</td></tr>
<tr><td>◆ Check if the communication circuits of power module and inverter board are securely inserted and connected.
◆ Check if the power module is well.
◆ Check if the inverter board is well.</td></tr>
<tr><td>3. Abnormity confirmation conditions</td></tr>
<tr><td>(current frequency ≥ INV target frequency +3Hz) or (target frequency ≥0 && actual frequency =0) for continuous 5 minutes</td></tr>
<tr><td>4. Possible causes</td><td colspan="5">◆ The power module and inverter board are connected loosely, which results in detection failure of compressor rotation speed.
◆ The power module is damaged.</td></tr>
</table>

<table>
<tr><td rowspan="3">Failure code
Outdoor digital display tube: 125-4, 5
Indoor wired controller: 7D</td><td colspan="2" rowspan="2">Indoor unit LED status</td><td colspan="2">LED5</td><td rowspan="2">Failure description:
Fan motor speed un-match</td></tr>
<tr><td colspan="2">20 times</td></tr>
<tr><td colspan="2" rowspan="2">Outdoor unit LED status</td><td>LED1</td><td>LED2</td></tr>
<tr><td>Normal</td><td>Normal</td></tr>
<tr><td>1. Model</td><td colspan="5">Failure diagnosis and troubleshooting</td></tr>
<tr><td>MRV 5-HR series</td><td colspan="3">DiagnosisT</td><td colspan="2">roubleshooting</td></tr>
<tr><td>2. Abnormity detection method</td><td colspan="5" rowspan="5"> 
</td></tr>
<tr><td>◆ Check if the compressor module is damaged
◆ Check if the fan rotation is smooth;
◆ Check whether the fan blade load is blocked;</td></tr>
<tr><td>3. Abnormity confirmation conditions</td></tr>
<tr><td>Hall signal logic built-in the fan motor is wrong too many times</td></tr>
<tr><td>4. Possible causes</td></tr>
<tr><td>◆ Fan blade overload
◆ Fan motor is bad</td><td colspan="5"></td></tr>
</table>

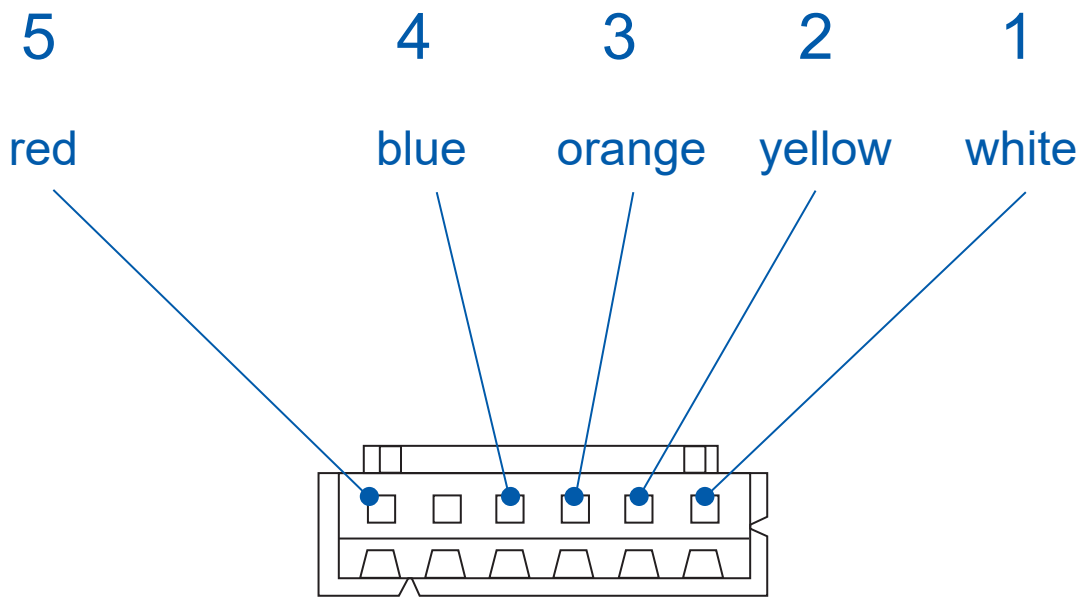
8.2.2 Refrigerant charge check

(1) Refer to the R410A system static balance pressure reference value form
(2) Check if the temp. difference between coil pipe and ambient temp. less than 39.2°F, if yes, it means the system lack of refrigerant.

R410A system static balance pressure reference value			
Outdoor ambient temp. (°F)	Pressure (psi)	Outdoor ambient temp. (°F)	Pressure (psi)
-9.4	37.4	60.8	173.7
-7.6	39.4	62.6	179.1
-5.8	41.6	64.4	184.6
-4	43.6	66.2	190.3
-2.2	46	68	196.1
-0.4	48.1	69.8	201.9
1.4	50.6	71.6	207.8
3.2	52.9	73.4	213.9
5	55.5	75.2	220.1
6.8	58	77	226.5
8.6	60.8	78.8	233.1
10.4	63.4	80.6	239.7
12.2	66.1	82.4	246.4
14	69	84.2	253.4
15.8	71.9	86	260.3
17.6	75	87.8	267.6
19.4	78	89.6	274.8
21.2	81.2	91.4	282.2
23	84.4	93.2	289.9
24.8	87.7	95	297.6
26.6	91.2	96.8	305.4
28.4	94.7	98.6	313.6
30.2	98.2	100.4	321.7
32	101.9	102.2	330.1
33.8	105.7	104	338.5
35.6	109.5	105.8	347.2
37.4	113.4	107.6	356
39.2	117.5	109.4	364.9
41	121.7	111.2	374
42.8	125.9	113	383.3
44.6	130.2	114.8	392.9
46.4	134.6	116.6	402.5
48.2	139.1	118.4	412.3
50	143.7	120.2	422.2
51.8	148.5	122	432.3
53.6	153.3	123.8	442.8
55.4	158.2	125.6	453.2
57.2	163.3	127.4	463.9
59	168.5		

8.2.3 4-Way Valve Check

1. After the valve is energized, listen to the sound of valve action, if no action enter the next checking.
For the solenoid valve: check if the PCB terminal has 220V output, if yes, change the solenoid valve coil, if not OK, change the solenoid valve body.
For the electronic expansion valve: measure the resistance value.



FUJIKOKI electronic expansion valve
Resistance value:
1 and 5: 46±4Ω
3 and 5: 46±4Ω
1 and 3: 92±8Ω
2 and 4: 92±8Ω

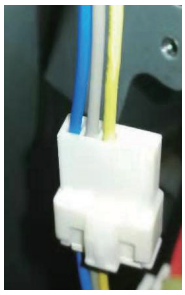
8.2.4 4-Way Valve Function

After 4-Way valve powered on 3 minutes, if it satisfy one of the following condition lasting 10 seconds.

Condition:
--Tsuc-Tdef≥50^{O}F
--Pd-Ps≥βMP (Tao>14^{O}F, β=0.60; Tao≤14^{O}F, β=0.4)

8.2.5 Fan Motor Detection Standard

Fan Motor Code: 0150401918C					
Expected readings of control PWB VDC outputs to DCFM			Expected readings of DC fan motor circuit board resistances		
Multi meter test points for VDC			Multi meter test points for Ω		
Multimeter red probe	Multimeter black probe	PCB DC volts	Multimeter black probe	Multimeter red probe	DCFM PWB resistance value
SE	GND2	5V	SE	GND2	∞
+5V	GND2	5V	+5VG	ND2	∞
A2	GND2	5V	A2	GND2	∞
Wring of DC fan motor					
1G	ND2	Communication signal public ground	Blue		
2S	E	Send or receive signal wire	Gray		
3	+5V	5V communication power supply	Yellow		
4	/	/	/		
5A	2	Communication address	White		
Expected readings of control PWB VDC outputs to DCFM			Expected readings of DC fan motor circuit board resistances		
Multi meter test points for VDC			Multi meter test points for Ω		
Multimeter red probe	Multimeter black probe	PCB DC volts	Multimeter black probe	Multimeter red probe	DCFM PWB resistance value
+280VDC	GND	280VDC	+280VDC	GND	1.31MΩ
Wring of DC fan motor					
1	+280VDC	Input DC high voltage positive	Red		
2G	ND	Input DC high voltage negative	White		
3					
4					

Fan Motor Code: 0150401919C					
Expected readings of control PWB VDC outputs to DCFM			Expected readings of DC fan motor circuit board resistances		
Multi meter test points for VDC			Multi meter test points for Ω		
Multimeter red probe	Multimeter black probe	PCB DC volts	Multimeter black probe	Multimeter red probe	DCFM PWB resistance value
SE	GND2	5V	SE	GND2	∞
+5VG	ND2	5V	+5V	GND2	∞
Wring of DC fan motor					
1G	ND2	Communication signal public ground	Blue		
2S	E	Send or receive signal wire	Gray		
3	+5V	5V communication power supply	Yellow		
4	/	/	/		
5	/	/	/		
Expected readings of control PWB VDC outputs to DCFM			Expected readings of DC fan motor circuit board resistances		
Multi meter test points for VDC			Multi meter test points for Ω		
Multimeter red probe	Multimeter black probe	PCB DC volts	Multimeter black probe	Multimeter red probe	DCFM PWB resistance value
+280VDC	GND	280V	+280VDC	GND	1.27MΩ
Wring of DC fan motor					
1	+280VDC	Input DC high voltage positive	Red		
2G	ND	Input DC high voltage negative	White		
3					
4					

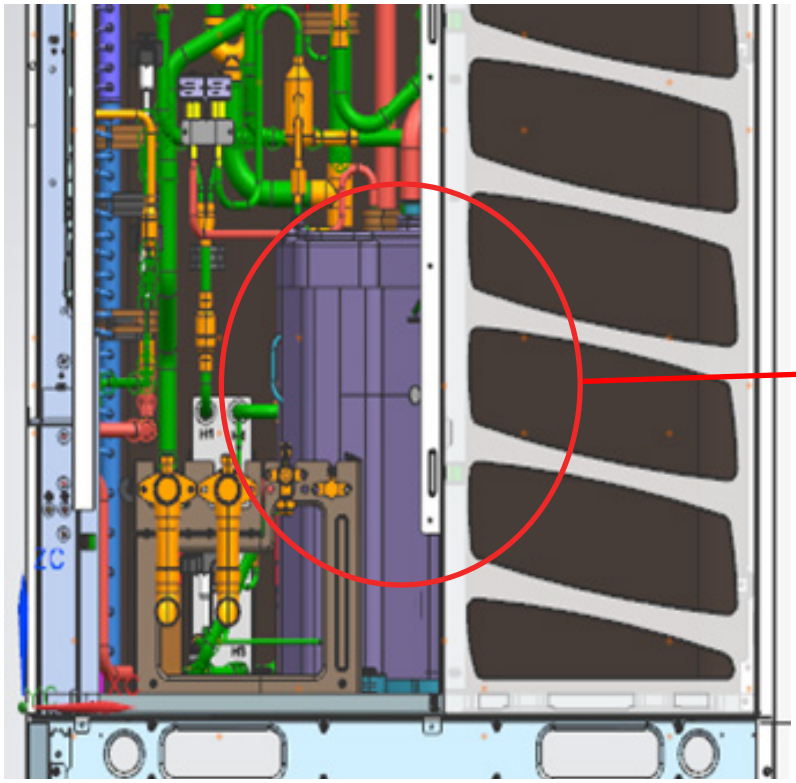
9. Parts Replacement Instructions

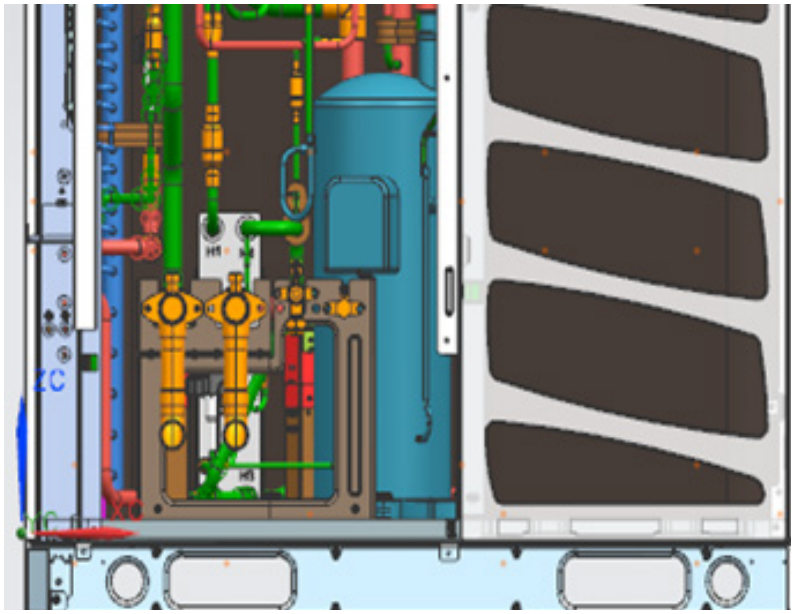
9.1 MRV-link Introduction

A. Compressor Replacement - single compressor unit

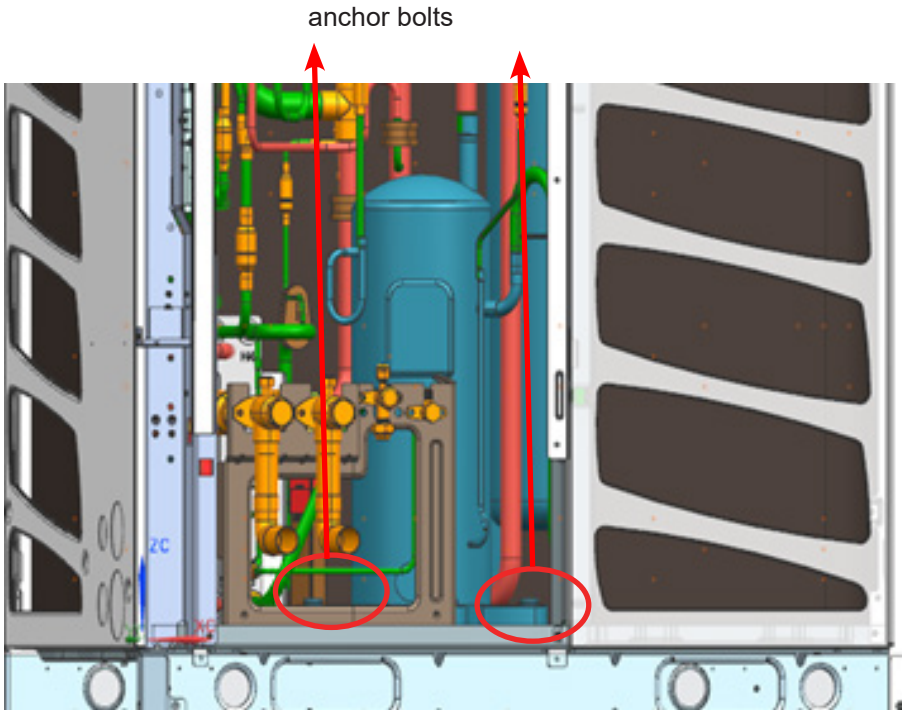
Step 1. Remove the front panel and release the refrigerant from the system through the stop valve.

Step 2. Remove the compressor cushion from the compressor and then remove the power wire and ground wire.

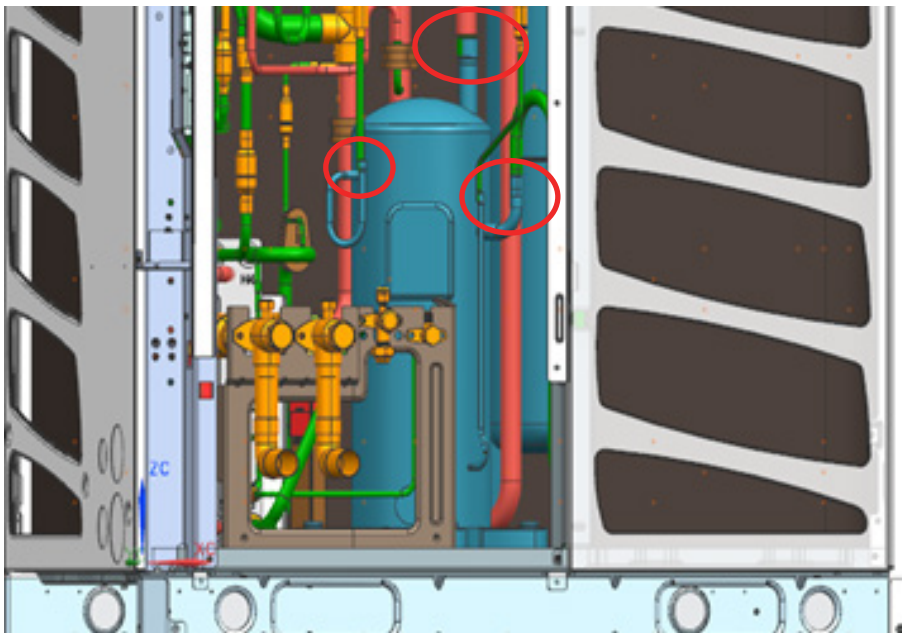




Step 3. Remove four anchor bolts of the compressor.



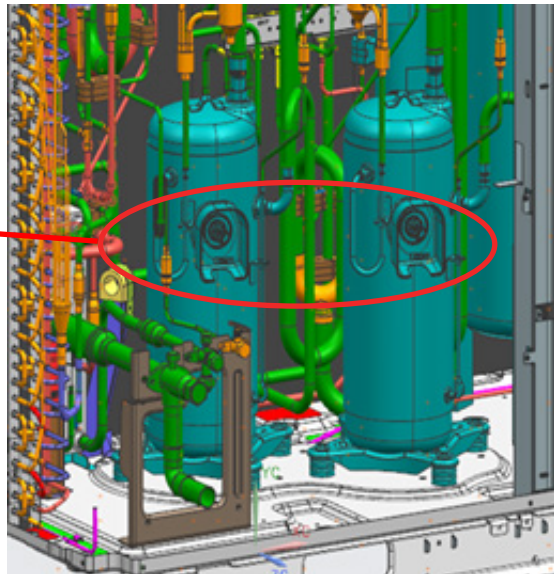
Step 4. Welding cut the compressor discharge & suction pipe, EVI pipe and oil discharge pipe.



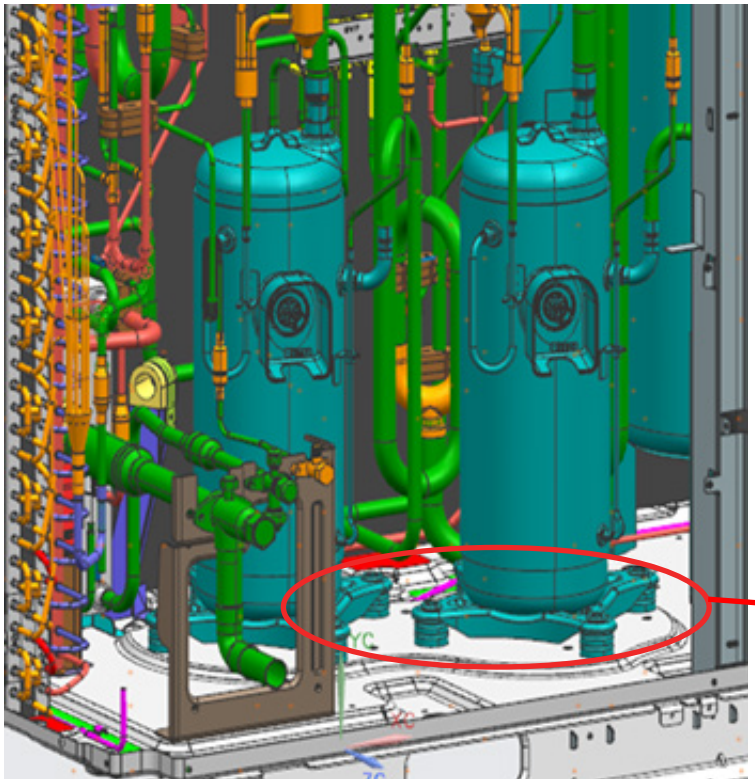
Step 5. After the compressor is removed, put the new compressor in the position to instead the original one, and then reverse the operation in the order of the previous removal. After the compressor is replaced, vacuum the system, recharge refrigerant and start the test run.

B. Compressor Replacement – double compressors unit

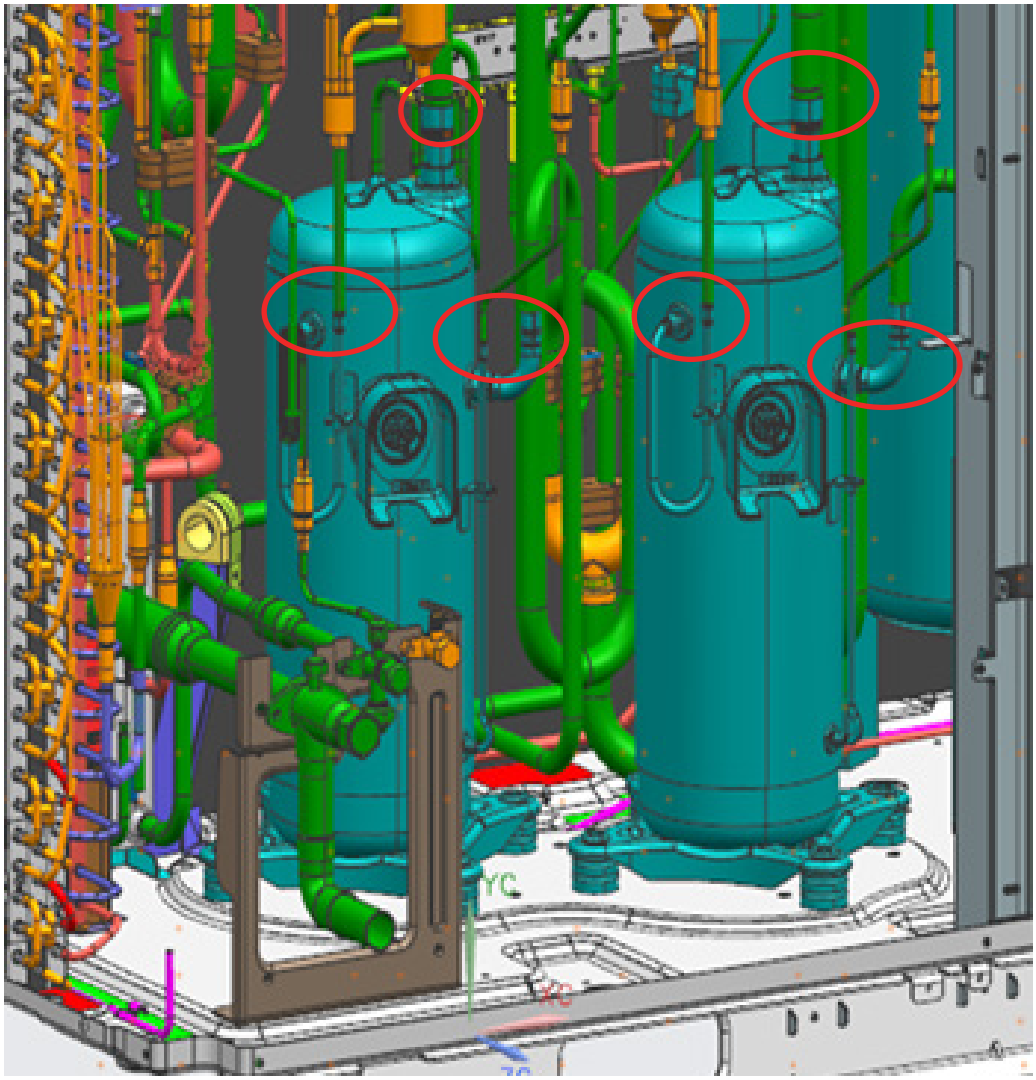
Step 1. Remove the front panel and release the refrigerant from the system through the stop valve.
Step 2. Remove the compressor cushion from the compressor and then remove the power wire and ground wire.



Step 3. Remove four anchor bolts of the compressor.



Step 4. Welding cut the compressor discharge & suction pipe, EVI pipe and oil discharge pipe.

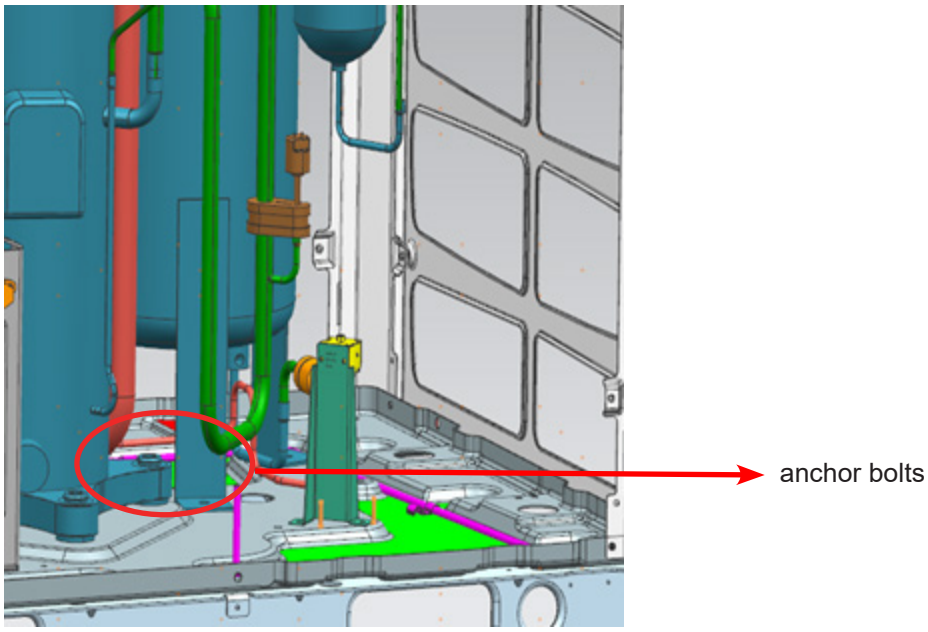


Step 5. After the compressor is removed, put the new compressor in the position to instead the original one, and then reverse the operation in the order of the previous removal. After the compressor is replaced, vacuum the system, recharge refrigerant and start the test run.

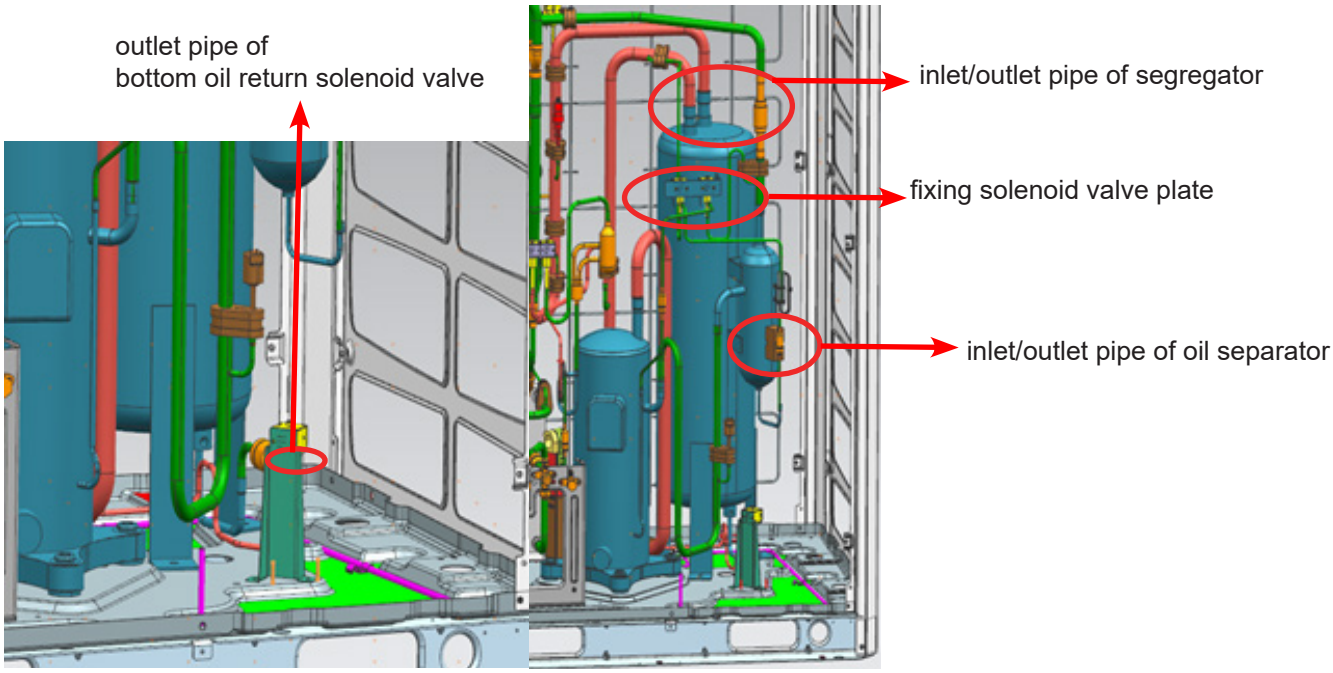
9.2 Gas-liquid Segregator Replacement

A. Gas-liquid segregator Replacement - single compressor unit

Step 1. Remove the front panel and release the refrigerant from the system through the stop valve.
Step 2. Remove the anchor bolts of the gas-liquid segregator.



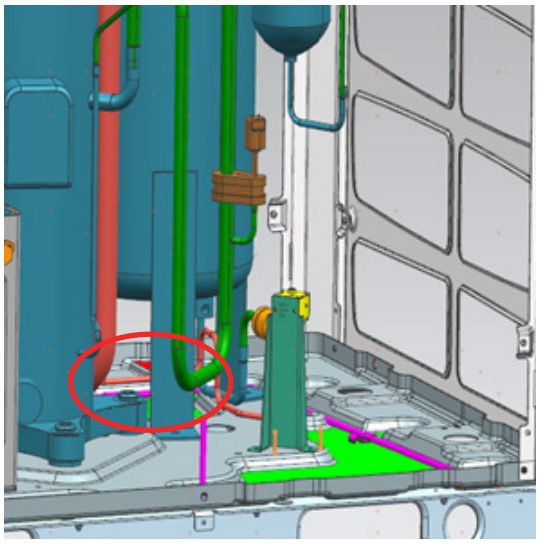
Step 3. Weld to cut the tubes that connecting with the gas-liquid segregator e.g. inlet/outlet pipe of segregator & oil separator and outlet pipe of bottom oil return solenoid valve. And dismantle the fixing solenoid valve plate.



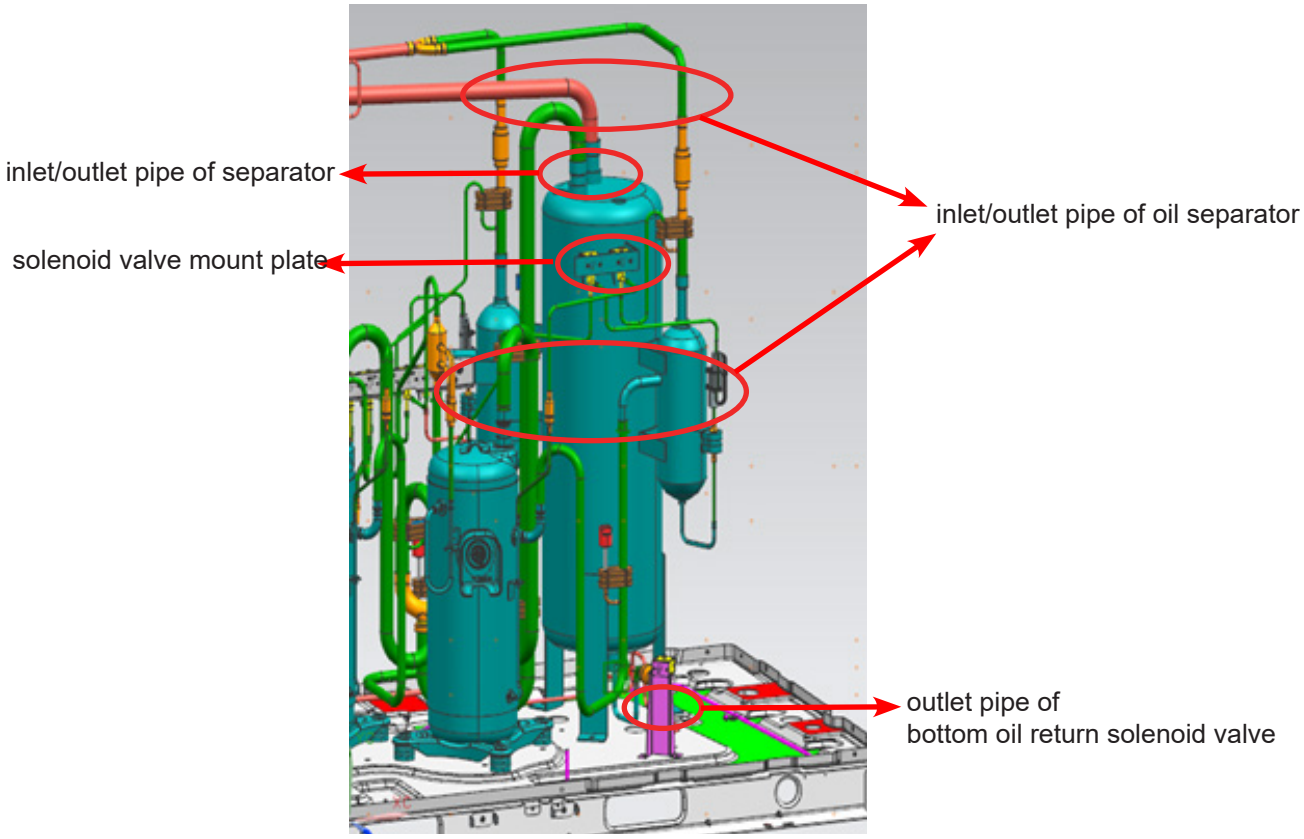
Step 4. After the segregator is removed, put the new one in the position in place of the original one, and then reverse the operation in the order of the previous removal. After the segregator is replaced; vacuum the system and recharge the refrigerant. Start and test run.

B. Gas-liquid segregator Replacement - double compressors unit

Step 1. Remove the front panel and release the refrigerant from the system through the stop valve.
Step 2. Remove the anchor bolts of the gas-liquid segregator.



Step 3. Weld to cut the tubes that connecting with the gas-liquid segregator e.g. inlet/outlet pipe of segregator & oil separator and outlet pipe of bottom oil return solenoid valve. Dismantle the solenoid valve mounting plate.



Step 4. After the segregator is removed; put the new one in the position of the original one, and then reverse the operation in the order of removal. After the segregator is replaced; vacuum the system, recharge the refrigerant and test run.

10. MRV-Link

10.1 MRV-Link Introduction

MRV-link™ is one kind of wireless communication technology that contains a Master wireless module, Slave wireless modules and Repeaters.

1. Master wireless modules, Slave wireless modules and Repeaters share the same hardware but with different software inside.
2.Repeaters are powered by a 5V power adapter

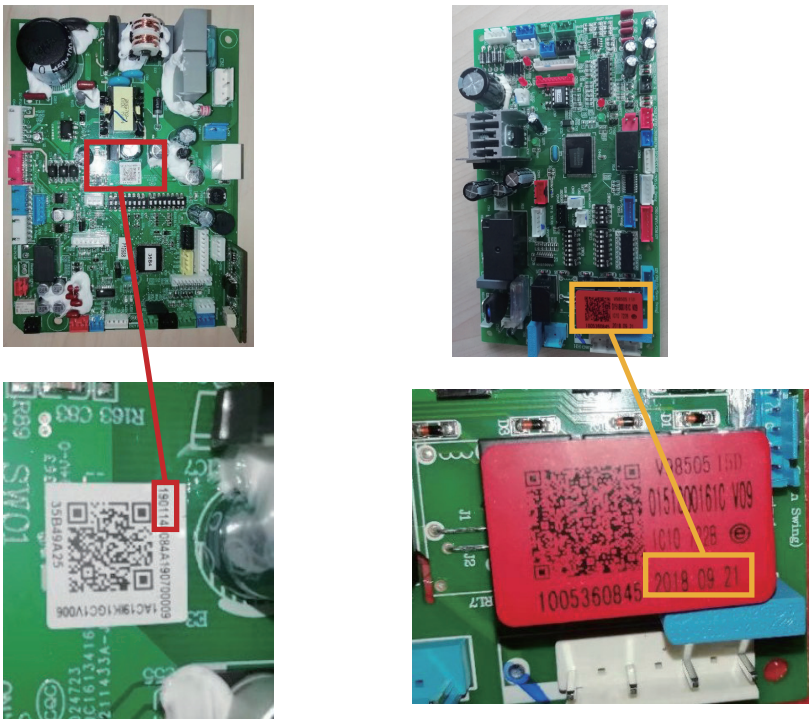
Master / Slave Wireless Module	Repeater
	

Connectable Outdoor Series	Model
MRV5-H	MVHQ***ME*CA

Customer Model	Description
MVAO005ME2AA	One Way Cassette
MVAO007ME2AA	One Way Cassette
MVAO009ME2AA	One Way Cassette
MVAO012ME2AA	One Way Cassette
MVAB005MV2AA	Compact Cassette (2*2)
MVAB007MV2AA	Compact Cassette (2*2)
MVAB009MV2AA	Compact Cassette (2*2)
MVAB012MV2AA	Compact Cassette (2*2)
MVAB018MV2AA	Compact Cassette (2*2)
MVAL007ME2AA	Large Cassette (3*3)
MVAL009ME2AA	Large Cassette (3*3)
MVAL012ME2AA	Large Cassette (3*3)
MVAL015ME2AA	Large Cassette (3*3)

Customer Model	Description
MVAL018ME2AA	Large Cassette (3*3)
MVAL024ME2AA	Large Cassette (3*3)
MVAL030ME2AA	Large Cassette (3*3)
MVAL036ME2AA	Large Cassette (3*3)
MVAL042ME2AA	Large Cassette (3*3)
MVAL048ME2AA	Large Cassette (3*3)
MVAD007MV2AA	Slim Duct
MVAD009MV2AA	Slim Duct
MVAD012MV2AA	Slim Duct
MVAD018MV2AA	Slim Duct
MVAD024MV2AA	Slim Duct
MVAM007ME2AA	Medium Static Duct
MVAM009ME2AA	Medium Static Duct
MVAM012ME2AA	Medium Static Duct
MVAM015ME2AA	Medium Static Duct
MVAM018ME2AA	Medium Static Duct
MVAM024ME2AA	Medium Static Duct
MVAM036ME2AA	Medium Static Duct
MVAM048ME2AA	Medium Static Duct
MVAM054ME2AA	Medium Static Duct
MVAH072ME2AA	High Static Duct
MVAH096ME2AA	High Static Duct
MVAX009ME2AA	Multi Position Air Handler
MVAX012ME2AA	Multi Position Air Handler
MVAX018ME2AA	Multi Position Air Handler
MVAX024ME2AA	Multi Position Air Handler
MVAX030ME2AA	Multi Position Air Handler
MVAX036ME2AA	Multi Position Air Handler
MVAX042ME2AA	Multi Position Air Handler
MVAX048ME2AA	Multi Position Air Handler
MVAX054ME2AA	Multi Position Air Handler
MVAX060ME2AA	Multi Position Air Handler

PCB production time



10.2 MRV-Link Benefits

• Easy Installation
Traditional wired connection has complex operation procedures, such as wiring, wire threading, wire binding and wire cutting etc. which cost a lot of labor and resources.
MRV-link as a wireless communication technology, and makes installation easier by removing the complex wire connection procedures.

• Smart networking
Traditional AC wire connections method is hand-in-hand (daisy-chain), which is not flexible.
MRV-link realizes smart networking by dip switch operation. Smart networking can seek other strong signals in nearby paths and keep the communication system stable.

• Convenient Maintenance
Communication errors in wired connection systems, from one unit, can cause all the units to experience communication errors and stop the system operation.
MRV-link systems will change their communication pathways when one unit experiences a communication error.

• Stable performance.
There can be a high rate of communication errors in wired systems caused by connection failures and electrical noise interference.
MRV-link can reduce the possibility of communication errors and increase performance and stability through wireless communication.

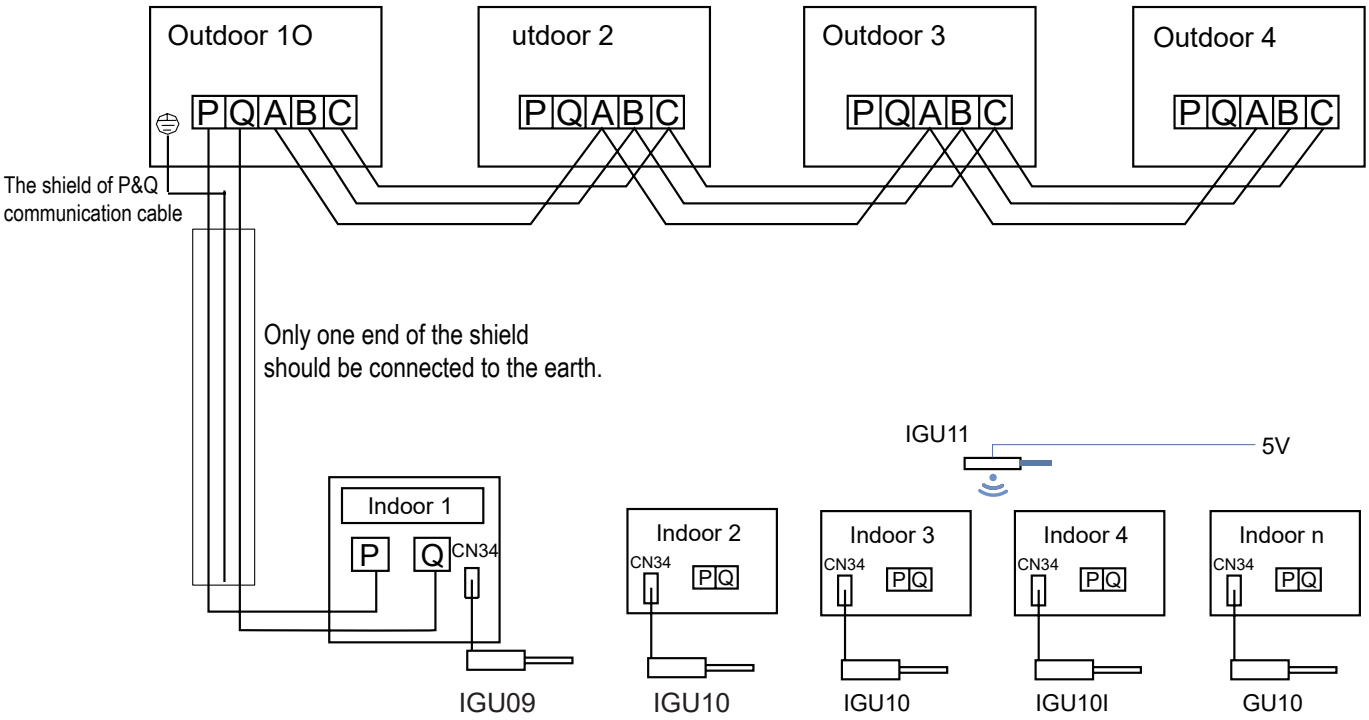
• Big benefits for retrofit projects.
Different manufacturers require different wire specifications and this adds to retrofit costs. MRV-link can be more cost effective for retrofits because MRV-link eliminates the need for unit to unit wiring.

• Indoor units should have the address dip switches properly set. This will make maintenance and unit identification much easier.

10.3 MRV-Link Specification

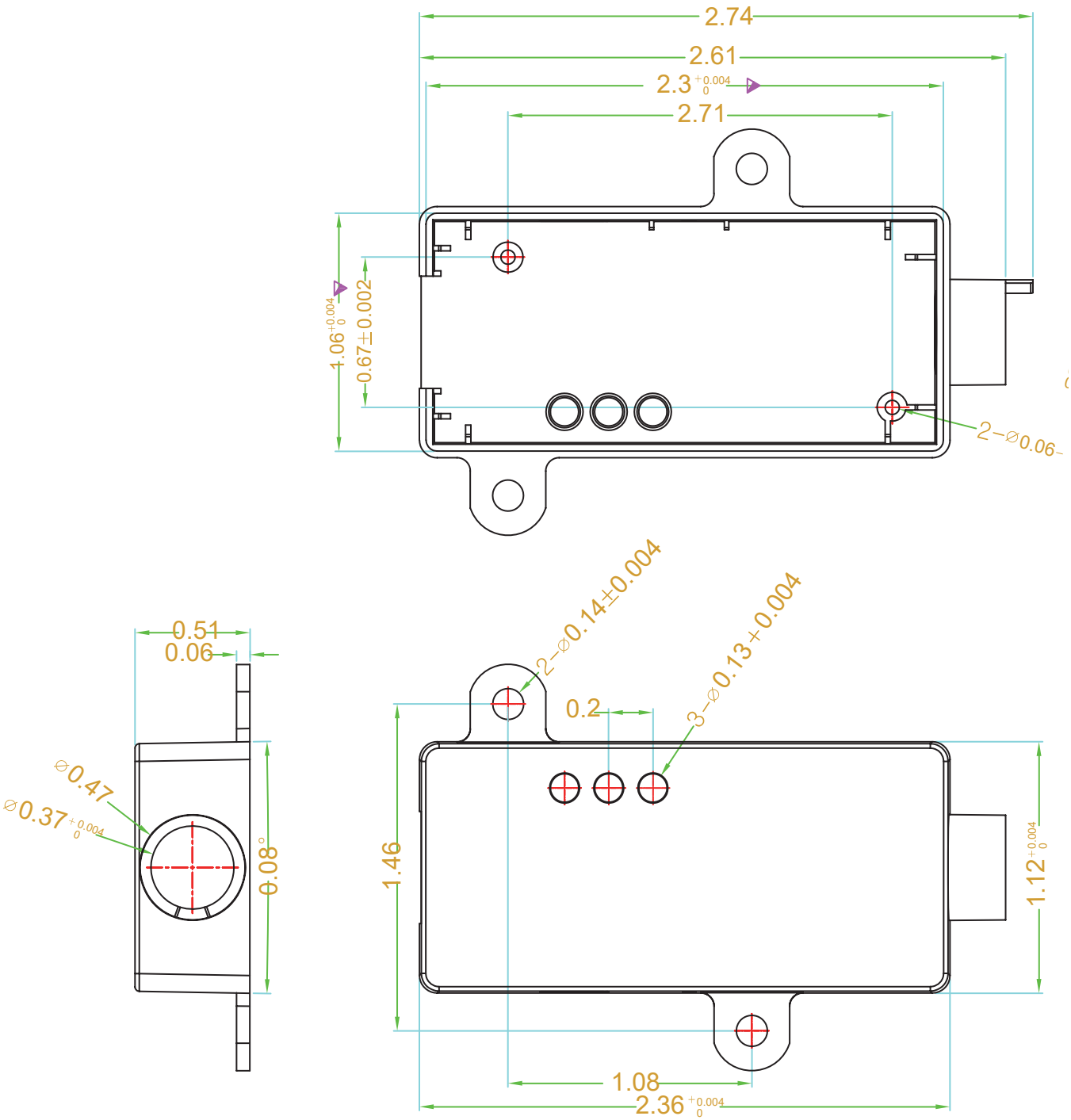
Item	Model	BOM No.	Spare Part Code	Indoor PCB Connection Terminal
Main IDU Wireless module	IGU09	AA9VH2B3P	0151800313C	CN34
Slave IDU Wireless Module	IGU10	AA9VH1B3P	0151800314B	CN34
Repeater	IGU11	AA9VH0B3P	0151800321B	/

10.4 Wiring Figure



Note:
If the system unit adopts Zigbee wireless communication, it must adopt wireless and wired hybrid mode.
The PQ cable must be connected to the IDU which one with the smallest address number.

10.5 Dimension



10.6 Installation Requirements for MRV-Link

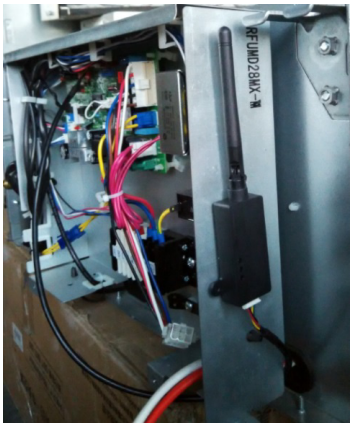
(1). The connection requirements for wireless communication in MRV systems adopting MRV-link includes a wired connection from the outdoor unit to the closest indoor unit which will be identified as the Master unit. The master unit will be equipped with a master MRV-link module, and the remaining indoor units will be equipped with Slave MRV-link modules. The ODU does not need to be equipped with a wireless module. The main IDU wireless module(IGU09) needs to be installed, and the slave IDU wireless module (IGU10) are installed the other IDU.

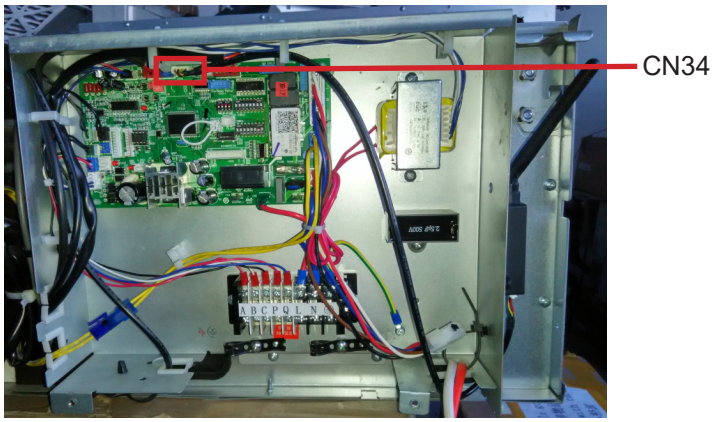
(2) IDU wireless module installation requirements:
a. MRV-link modules can be ordered installed in the IDU from the factory. Be aware which IDU has the master module and which IDUs are slave modules.
MRV-link modules ordered as an accessory need to be plugged into the CN34 port on the IDU circuit board.
b. The antenna of the IDU wireless module is rotatable. Keep the antenna more than 4 inches away from metals
c. Keep the IDUs with wireless module more than 33 feet away from the Wifi devices in the room.

(3) Repeater installation requirements
a. Add one repeater when the distance between any two wireless modules (both ODU wireless module and IDU wireless module) exceeds 328 feet.
b. Add a repeater when there is one wall or other similar structure between any two wireless modules.
c. Repeater should be installed in the open space as much as possible, especially keeping the antenna more than 4 inches away from metals
d. Repeater must have it's own power supply provided by its own power adapter. Power supply and a dry area should be a consideration when choosing repeater locations.

Note:
The quantity of repeaters needed should be established prior to installation to assure network reliability and commissioning can proceed smoothly.

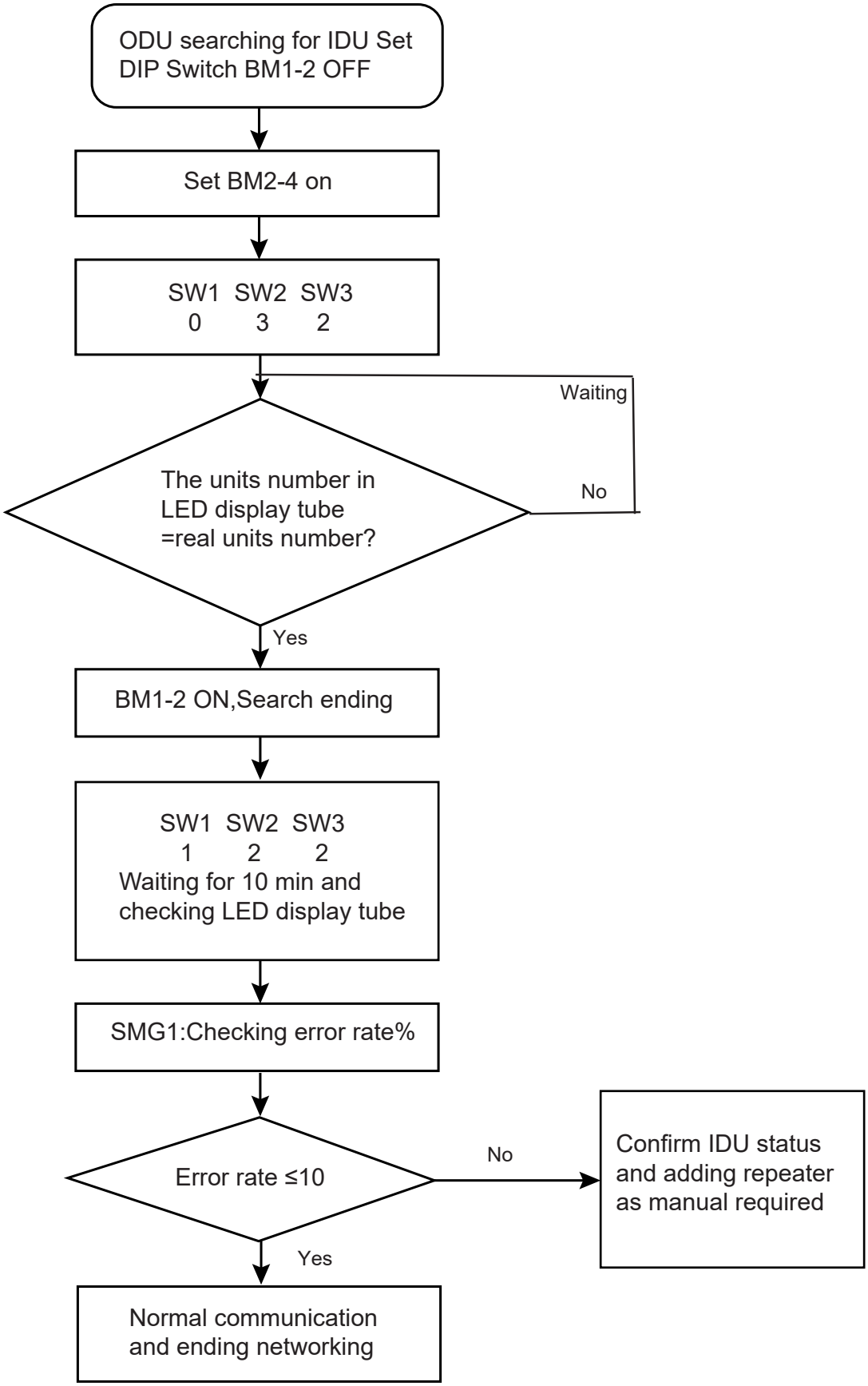
(4) Indoor unit installation requirements
a. Wireless communication systems should use a network structure rather than line-type structure.
b. Do not install indoor units in spaces surrounded by metal such as computer rooms and x-ray rooms.
c. Install indoor units utilizing MRV-link more than 33 feet away from WiFi devices.





Installation Location Diagram of IDU Wireless Module

10.7 MRV-Link Troubleshooting



Each system can finish automatic networking troubleshooting separately, as shown in the left troubleshooting chart.

Note:
1. For initial commissioning and troubleshooting MRV-link wireless communication units, the air conditioner units must be powered on separately. Other IDUs without networking are forbidden to be powered on. Indoor units and systems that have completed network commissioning must be powered off and then other units can start networking in sequence. All the units can be powered on when all wireless network commissioning is completed.

2.MRV-link will search for IDU modules and check for communication error rate per ODU/system. The error rate checking method is listed in the table below. 0% indicates the best communication and 20% or less assures normal operation.

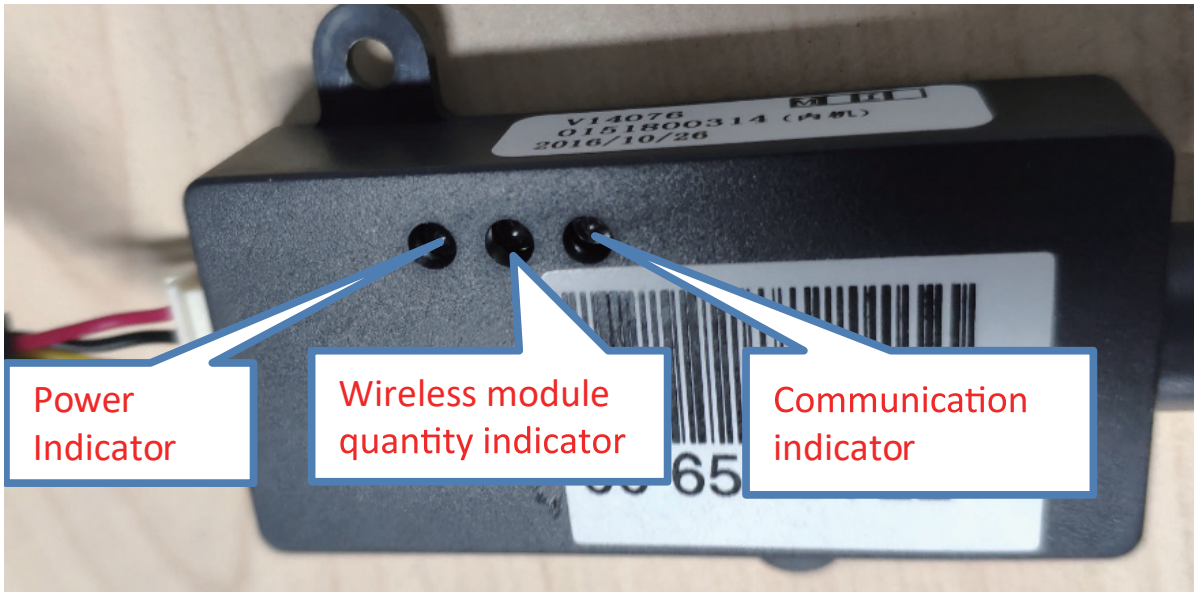
SW1	SW2	SW3	Function	LED Display LD1~4
1	2	2	The first two digits show the percentage of inconsistency between the IDU and the E2 quantity. The last two digits indicates real-time IDU quantity.	For example, 0522 indicates 22 sets of real-time IDUs and 5% of inconsistent communication percentage between the IDUs and the E2 quantity.

3.It will be necessary to confirm whether repeaters must be added when error rates are higher than 20%.

You will need to clear each wireless module information when troubleshooting MRV-link while multiple sets of systems were powered on.

1. Clearing master wireless module:
Power up the outdoor unit, using the three rotary knobs on the PCB; rotate SW1, SW2 and SW3 to position 1. Next, set ODU PCB switch BM2-5 off, then on. This will clear the slave and repeater wireless module information stored in the master wireless module.

2. Clear the slave wireless module information by depressing the button inside the pin hole located on the side of the slave wireless module. Two green lights on the module will flash at the same time to show the information will be cleared (takes about 3 seconds).



1. The power indicator
After the wireless module is powered on, the indicator light is red. If the power indicator is off, check as follows: The internal computer board is not powered on or damaged, or the wireless module is damaged.

2. Wireless module quantity indicator (only suitable for Master Module)

(1) Indicator status: Fast flashing N times, continue to flash rapidly after interval of about 2s, repeating;

(2) Fast flashing "N" times indicates that the total number of Slave /repeater module joining the master module wireless network is "N";

3) The flash number should equal the number of slave and repeater modules in the system.
A slave module can confirm whether all the modules are working by the number of indoor units. Check the indoor units if the flash count does not add up to the actual number of units.

3. Communication indicator

(1) The indicator light flashes, indicating that the wireless module is communicating normally.
Master module is continuously flashing after powered on, Slave module /repeater will flash after joining the Master module wireless network.

(2) The Master module communication indicator is not working.
Reasons:
① The control board does not select the wireless communication protocol, or the ② master module is damaged.

(3)The Slave module/repeater indicator is off, indicating that the wireless module ① is not connected to the wireless network (the network wireless signal is not good), ② Slave module /repeater is damaged.

11. Appendix

11.1 Wiring Diagrams and PCB Photo

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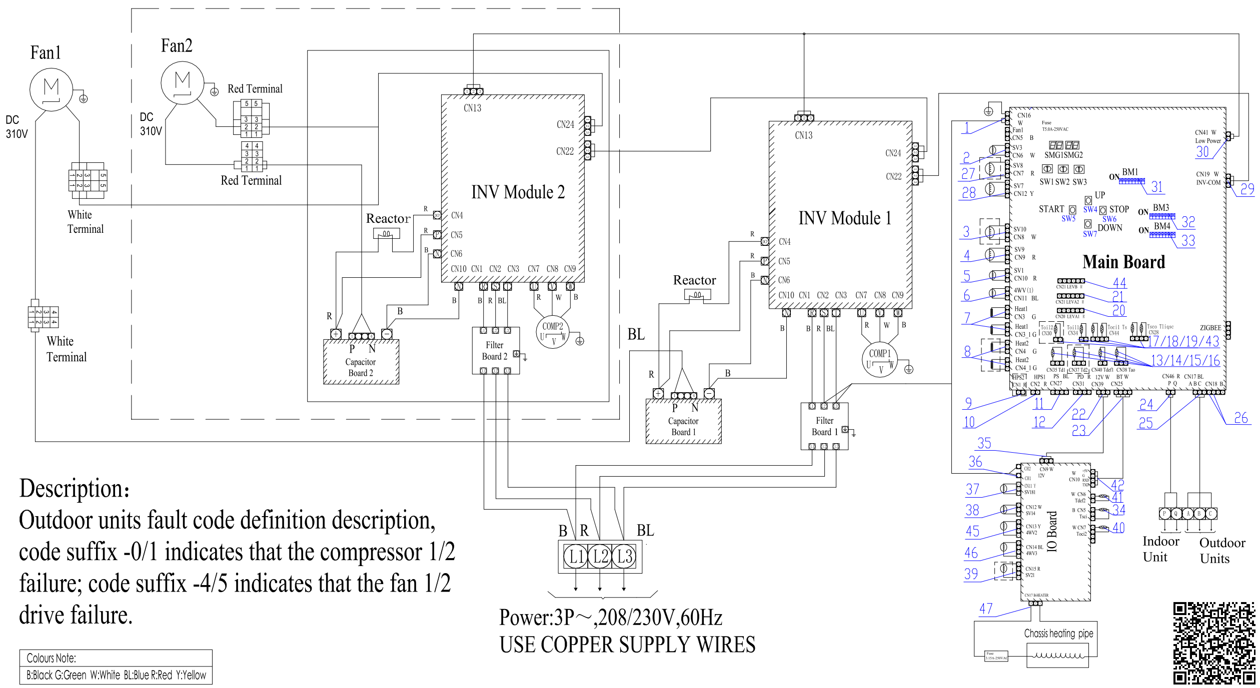

Description:
Outdoor units fault code definition description, code suffix -0/1 indicates that the compressor 1/2 failure; code suffix -4/5 indicates that the fan 1/2 drive failure.

Colours Note:
B:Black G:Green W:White BL:Blue R:Red Y:Yellow

Description of the Main-board Port definition

No.	Port	Port description
1	CN16	Power Input
2	SV3	Liquid Jetting
3	SV10	Drain the oil from compressor 2
4	SV9	Drain the oil from compressor 1
5	SV1	Balance pressure (Load-off)
6	4WV(1)	Hot and cold switching
7	HEAT1	Heating band of compressor 1
8	HEAT2	Heating band of compressor 2
9	HPS2	High Pressure Switch of Compressor 2
10	HPS1	High Pressure Switch of Compressor 1
11	Ps	Low pressure sensor
12	Pd	High pressure sensor
13	Td1	Exhaust temperature of compressor1
14	Td2	Exhaust temperature of compressor2
15	Tdef1	Detect the defrosting temp
16	Tao	Ambient temperature
17	Toil2	Detect the oil temp. of compressor 2
18	Toil1	Detect the oil temp. of compressor 1
19	Toci1/Ts	Detect SH temp. in heating
20	LEVA1	SH control in heating
21	LEVA2	SH control in heating
22	DC12V	Output DC12V
23	BT	Output DC5V/Communication
24	P/Q	Indoor/outdoor unit com. port
25	A/B/C	Outdoor unit com. port
26	Bus-B/A	Centralized control port
27	SV8	Injection valve of compressor 2
28	SV7	Injection valve of compressor 1
29	INV-COM	INV module com. port
30	Low Power	Low standby power consumption
31	BM1	Outdoor and indoor searching Outdoor address setting
32	BM3	HP setting of outdoor units
33	BM4	Set the control address
34	Tsci	Detect temp. of Injection valve
35	DC12V	Input DC12V
36	CH1/CH2	AC Power Input
37	SV181	Oil return control-Oil separator1
38	SV14	Oil return control-Gas liquid separator
39	SV21	Oil return control-Oil separator2
40	Toci2	Detect SH temp. in heating
41	Tdef2	Detect the defrosting temp
42	Tx Rx	Input DC5V/Communication
43	Tliqsc/Tsco	Detect SH temp. of subcooler
44	LEVB	Contral subcooler
45	4WV2	Hot and cold switching
46	4WV3	Hot and cold switching
47	B-HEATER	Chassis heating tube(optional)

Common fault code definition description

No.	Fault cord	Fault code description
1	26-0/1/2	Outdoor unit and indoor unit communication failure
2	35-0/1	4-way valve reversing failure
3	45	Outdoor unit and outdoor unit communication failure
4	46-0/1	Communication with INV1/2 board failure
5	46-4/5	Communication with Fan1/2 motor failure
6	47	Communication with wireless module failure
7	80	The outdoor unit does not match
8	83	Incorrect parameter setting or incorrect match of outdoor unit
9	110-0/1	PIM INV 0/1module protection(FO)
10	110-4/5	Fan motor 1/2 drive protection（FO）
11	111	INV compressor out of control
12	114	Voltage abnomaly of inverter input power supply
13	117-0/1	INV module software over current
14	117-4/5	Fan motor drive software over current
15	124	The three-phase power supply fault
16	125-4/5	Fan speed does not match
17	555.0	Ability to match the standby
18	555.2	Low pressure standby
19	555.8	No trial run standby

NOTE

1.In the air tightness test, please separate the indoor side of the airtight test to prevent nitrogen into the outdoor unit.
2.In the welding process must be nitrogen and cooling protection, to prevent oxidation of the pipeline and the valve body damage.
3.Tighten the bell-shaped pipe joint nut, do not exceed the appropriate torque, otherwise it will cause leakage. Cut off the valve tightening torque as shown on the right:
4.At the time of shipment, the valves are fully closed and must be confirmed that the valves and trachea valves are fully open before starting the unit.
5.After repair or maintenance is completed, the service valve and cap must be tightened with the appropriate torque to prevent refrigerant leakage.

1. Pendant le test d'étanchéité à l'air, veuillez séparer le côté intérieur pour empêcher l'azote d'entrer dans l'unité extérieure.
2. Il doit y avoir une protection d'azote et de refroidissement pendant le soudage pour empêcher l'oxydation du tuyau et les dommages au corps de la vanne.
3.Serrez l'écrou de joint de tube en forme de cloche, ne pas dépasser le couple approprié, sinon il causera des fuites. Coupez le couple de serrage de la valve, comme indiqué sur la figure de droite.
4.Au moment de l'expédition, les vannes sont complètement fermées. Confirmez que les valves et les valves trachéales sont complètement ouvertes avant de démarrer l'appareil.
5. Une fois la réparation ou l'entretien terminé, la vanne de service et le capuchon doivent être serrés avec le couple spécifié pour éviter les fuites de réfrigérant.

Globe valve size	Tightening torque N.m			Globe valve size	Tightening torque N.m			Maintenance valve
	Flare nuts	Shaft (valve body)	Cap (bonnet)		Flare nuts	Shaft (valve body)	Cap (bonnet)	
1/4 in	14～18	5～6		5/8 in	68～82	8～9	20～25	8～10
3/8 in	34～42	5～6	13～16	3/4 in	84～98	8～9	22～27	
1/2 in	49～61	8～9	16～20	11/8 in	welding	37.5±2.5	20～25	

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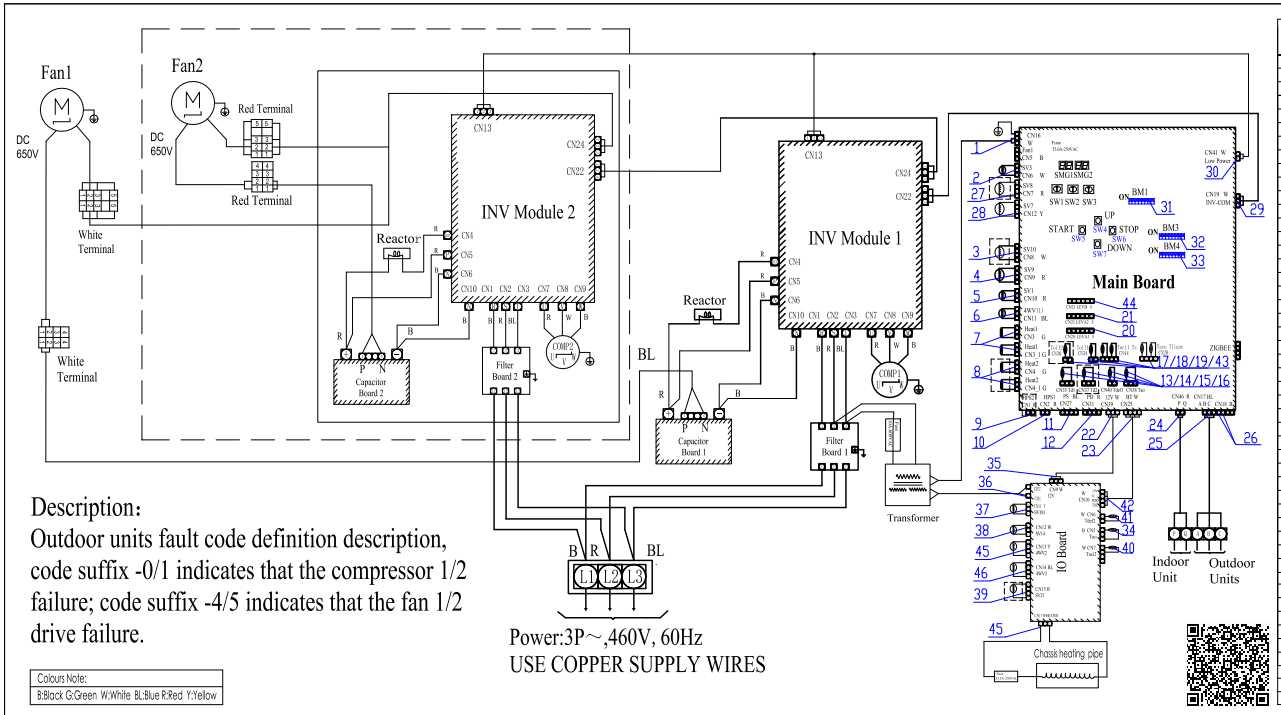

Description:
Outdoor units fault code definition description, code suffix -0/1 indicates that the compressor 1/2 failure; code suffix -4/5 indicates that the fan 1/2 drive failure.

Colours Note:
B:Black G:Green W:White BL:Blue R:Red Y:Yellow

Power:3P～,460V, 60Hz
USE COPPER SUPPLY WIRES

Description of the Main-board Port definition

No.	Port	Port description
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2	SV3	Liquid jetting
3	SV10	Drain the oil from compressor 2
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7	HEAT1	Heating band of compressor 1
8	HEAT2	Heating band of compressor 2
9	HPS2	High Pressure Switch of Compressor 2
10	HPS1	High Pressure Switch of Compressor 1
11	Ps	Low pressure sensor
12	Pd	High pressure sensor
13	Td1	Exhaust temperature of compressor1
14	Td2	Exhaust temperature of compressor2
15	Tdef1	Detect the defrosting temp
16	Tao	Ambient temperature
17	Toil2	Detect the oil temp. of compressor 2
18	Toil1	Detect the oil temp. of compressor 1
19	Tocil /Ts	Detect SH temp. in heating
20	LEVA1	SH control in heating
21	LEVA2	SH control in heating
22	DC12V	Output DC12V
23	BT	Output DC5V/Communication
24	P/Q	Indoor/outdoor unit com. port
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32	BM3	HP setting of outdoor units
33	BM4	Set the control address
34	Tsc	Detect temp. of Injection valve
35	DC12V	Input DC12V
36	CH1/CH2	AC Power Input
37	SV1B1	Oil return control-Oil separator1
38	SV14	Oil return control-Gas liquid separator
39	SV21	Oil return control-Oil separator2
40	Tocl2	Detect SH temp. in heating
41	Tdef2	Detect the defrosting temp
42	Tx Rx	Input DC5V/Communication
43	Tlqsc/Tsco	Detect SH temp. of subcooler
44	LEVB	Control subcooler
45	4WV2	Hot and cold switching
46	4WV3	Hot and cold switching
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Common fault code definition description

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6	47	Communication with wireless module failure
7	80	The outdoor unit does not match
8	83	Incorrect parameter setting or incorrect match of outdoor unit
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11	111	INV compressor out of control
12	114	Voltage abnormaly of inverter input power supply
13	117-0/1	INV module software over current
14	117-4/5	Fan motor drive software over current
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16	125-4/5	Fan speed does not match
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3.Tighten the bell-shaped pipe joint nut, do not exceed the appropriate torque, otherwise it will cause leakage. Cut off the valve tightening torque as shown on the right:
4.At the time of shipment, the valves are fully closed and must be confirmed that the valves and trachea valves are fully open before starting the unit.
5.After repair or maintenance is completed, the service valve and cap must be tightened with the appropriate torque to prevent refrigerant leakage.

1. Pendant le test d'étanchéité à l'air, veuillez séparer le côté intérieur pour empêcher l'azote d'entrer dans l'unité extérieure.
2. Il doit y avoir une protection d'azote et de refroidissement pendant le soudage pour empêcher l'oxydation du tuyau et les dommages au corps de la vanne.
3.Serrez l'écrou de joint de tube en forme de cloche, ne pas dépasser le couple approprié, sinon il causera des fuites. Coupez le couple de serrage de la valve, comme indiqué sur la figure de droite.
4.Au moment de l'expédition, les vannes sont complètement fermées. Confirmez que les valves et les valves trachéales sont complètement ouvertes avant de démarrer l'appareil.
5. Une fois la réparation ou l'entretien terminé, la vanne de service et le capuchon doivent être serrés avec le couple spécifié pour éviter les fuites de réfrigérant.

Globe valve size	Tightening torque N.m			Globe valve size	Tightening torque N.m			Maintenance valve
	Flare nuts	Shaft (valve body)	Cap (bonnet)		Flare nuts	Shaft (valve body)	Cap (bonnet)	
1/4 in	14～18	5～6		5/8 in	68～82	8～9	20～25	8～10
3/8 in	34～42	5～6	13～16	3/4 in	84～98	8～9	22～27	
1/2 in	49～61	8～9	16～20	11/8 in	welding	37.5±2.5	20～25	

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0150571246-460V

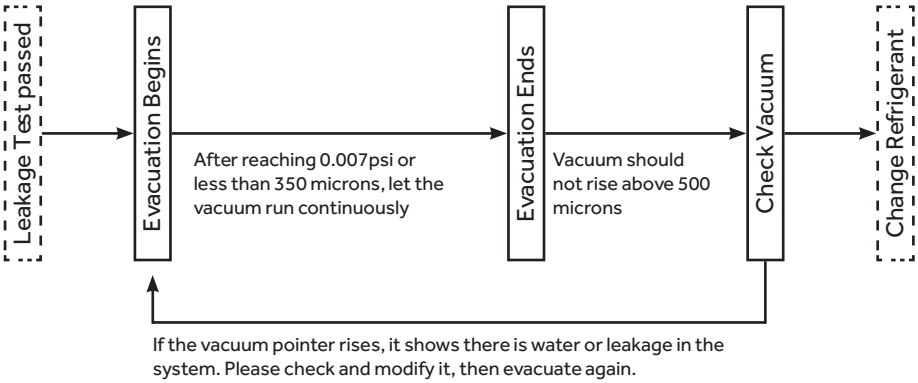
11.2 Sensor Characteristic Table

Model	number	Spare parts number	Description	Resistance(KΩ)
MVHQ072/096/120ME2CA MVHQ072/096/120ME4CA	1	0150402567	Tao sensor	R25=10KΩ
	2	0150402568	Toci1/Ts sensor	R25=10KΩ
	3	0150401913	Tdef/Tdef sensor	R25=10KΩ
	4	0150402566	Td1 sensor	R80=50KΩ
	5	0150402575	Toil1 sensor	R80=50KΩ
	6	0150402570	Tliqsc/Tsco sensor	R25=10KΩ
	7	0150402573	Tsci sensor	R25=10KΩ
	8	0150402571	Tdef2 sensor	R25=10KΩ
	9	0150402572	Toci2 sensor	R25=10KΩ
MVHQ072/096/120ME2CA MVHQ072/096/120ME4CA	1	0150402567	Tao sensor	R25=10KΩ
	2	0150402568	Toci1/Ts sensor	R25=10KΩ
	3	0150401913	Tdef/Tdef sensor	R25=10KΩ
	4	0150402566	Td1 sensor	R80=50KΩ
	5	0150402575	Toil1 sensor	R80=50KΩ
	6	0150402570	Tliqsc/Tsco sensor	R25=10KΩ
	7	0150402573	Tsci sensor	R25=10KΩ
	8	0150402571	Tdef2 sensor	R25=10KΩ
	9	0150402572	Toci2 sensor	R25=10KΩ
MVHQ168/192/216/240ME2CA MVHQ168/192/216/240ME4CA	1	0150402566	Td1 sensor	R80=50KΩ
	2	0150402567	Tao sensor	R25=10KΩ
	3	0150402568	Toci1/Ts sensor	R25=10KΩ
	4	0150401913	Tdef/Tdef sensor	R25=10KΩ
	5	0150402575	Toil1 sensor	R80=50KΩ
	6	0150401915	Td2 sensor	R80=50KΩ
	7	0150402570	Tliqsc/Tsco sensor	R25=10KΩ
	8	0150402573	Tsci sensor	R25=10KΩ
	9	0150402571	Tdef2 sensor	R25=10KΩ
	10	0150402576	Toil2 sensor	R80=50KΩ
	11	0150402572	Toci2 sensor	R25=10KΩ

11.3 Standard for Evacuation, Pressurization, Refrigerant Recharge

Connect the vacuum pump at both liquid and suctions valves

Operation Procedure:



Important:

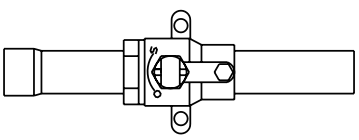
• To prevent the oil going into the pipe, please use the special tool for R410A, especially for gauge manifold and charging hose.
• To prevent the oil from going into the refrigerant cycle, please use the anti-counter flow adapter.
• Release the refrigerant check valve during outdoor unit maintenance. Set the relative dip switch when evacuating system.

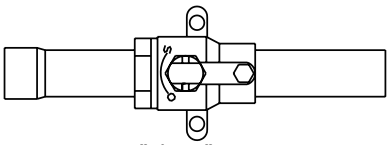
Tighten torque as the table below shows:

Stop valve diameter (in.)	Fastening torque (ft.lb)	Fastening angle (°)	Recommended tool length in(mm)
1/41	0.33 to 13.28	45~60	5-29/32(150)
3/8	25.08 to 30.983	0~45	7-7/8 (200)
1/2	36.14 to 44.99	30~45	9-13/16 (250)
5/85	0.15 to 60.48	15~20	11-13/16(300)
3/4	61.96 to 72.28	15~20	11-13/16(300)

Check valve operation

Open/ close method:
• Take down the valve cap, suction gas pipe, HP gas pipe turns to "open"
• Turn the liquid pipe and the oil equalization pipe with hexangular spanner until it stops. If opening the valve strongly, the valve will be damaged.
• Tighten the valve cap.


"open"state


"close"state

Tighten torque as the table below:

Tighten torque N·m			
	Shaft (valve body)C	ap (cover)T	-shape nut (check joint)
For suction gas pipe and HP gas pipe	Less than 7	Less than 30	13
For liquid pipe	7.85 (MAX15.7)	29.4 (MAX39.2)	8.8 (MAX14.7)
For oil equalization pipe	4.9 (MAX11.8)	16.2 (MAX24.5)	8.8 (MAX14.7)

Additional Refrigerant Charging

• Charge the additional refrigerant as liquid using a digital refrigerant scale and manifold gauges.
• Charge the system in trail mode. Compressor failure can occur if the system runs for a prolonged period of time while undercharged.
• Charging must be complete within a 30 minute period.
• The unit is only partially charged from the factory and will need additional refrigerant. Refer to the report generated by the system design software. W1: Refrigerant charging volume to outdoor unit at factory.
• W2: Refrigerant charging volume to liquid pipe base on different piping length calculation. W2=actual length of liquid pipe×additional amount per ft liquid pipe=
• (L1×3.76)+(L2×2.69)+(L3×1.83)+(L4×1.18)+(L5×0.58)+(L6×0.24) L1:Total length of 7/8 (22.22) liquid pipe; L2:Total length of 3/4(19.05) liquid pipe; L3:Total length of 5/8(15.88) liquid pipe; L4:Total length of 1/2(12.7) liquid pipe; L5:Total length of 3/8(9.52) liquid pipe; L6:Total length of 1/4(6.35) liquid pipe
• Total refrigerant volume charging on site during installation=W2
• W: Total refrigerant volume charging on site for maintenance.

REFRIGERANT RECORD FORM					
Model	W1: Refrigerant charging volume to outdoor unit at factory	W2: Refrigerant charging volume to liquid pipe base on different piping length calculation		Total refrigerant Volume charging on site during installation	W: Total refrigerant volume charging on Liquid pipe site for maintenance
		Liquid pipe Diameter in(mm)	Additional refrigerant amount Oz/ft		
072	511.5 oz	1/4(6.35)	0.24 Oz/ft×__ft=__ Oz	W2=___ Oz	W1+W2=___ Oz
096	754.8 oz	3/8(9.52)	0.58 Oz /ft×__ft=__ Oz		
120	754.8 oz	1/2(12.7)	1.18 Oz /ft×__ft=__ Oz		
144	783.1 oz	5/8(15.88)	1.83 Oz /ft×__ft=__ Oz		
168	1040.6 oz	3/4(19.05)	2.69 Oz /ft×__ft=__ Oz		
192	1040.6 oz	7/8(22.22)	3.76 Oz /ft×__ft=__ Oz		
216	1040.6 oz				
240	1040.6 oz				

Note:
• Do not use manifold gages and hoses that were used on equipment with oil other than PVE. Cross contamination can occur.
• Refrigerant R410A is identified by a pink tank color or label.
• Charging cylinders cannot be used because R410A refrigerant will fractionate.
• Always charge R410A refrigerant using liquid.
• Write the final charge weight on the unit near the name plate for future reference.
This product contains fluorinated greenhouse gasses and its functioning relies upon such gasses.

PART 2 Enginnering Data

12. Specifications

230V VRF Outdoor Unit

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ072ME2CA	MVHQ096ME2CA	MVHQ120ME2CA
Model Name	System	6T	8T	10T
	Combination	/	/	/
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	72000	96000	120000
	Factory Model Number	AV08CMVURAB	AV10CMVURAB	AV12CMVURAB
Electrical	Voltage, Cycle, Phase V/Hz/-	208-230/60/3	208-230/60/3	208-230/60/3
	Maximum Fuse Size A	40	50	60
	Minimum Circuit Amp A	30	38	41
Performance Non-Ducted	Rated Cooling Capacity@95°F (Btu/h)	69000	91000	115000
	EER @95 °F	12.6	11.9	11.6
	IEER	23.6	23.1	23
	Rated Heating Capacity @47°F(Btu/h)	77000	103000	129000
	COP @ 47°F	3.5	3.5	3.5
	Rated Heating Capacity@17°F(Btu/h)	53000	72000	84000
	COP @ 17°F	2.4	2.4	2.5
	SCHE	24.4	23	21.7
	(115°F) Cooling Capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	69000	91000	115000
	EER @95 °F	12	12.2	11.2
	IEER	20.5	21.8	21.6
	Rated Heating Capacity @47°F(Btu/h)	77000	103000	129000
	COP @ 47°F	3.5	3.5	3.5
	Rated Heating Capacity@17°F(Btu/h)	53000	72000	84000
	COP @ 17°F	2.4	2.4	2.5
	SCHE	20	21.4	21.4
	(115°F) Cooling Capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ072ME2CA	MVHQ096ME2CA	MVHQ120ME2CA
Operation Range	Working Temp.Cooling Fº + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	60	61	61
	Acoustic Power dB(A)	77	81	81
	Net Dimension: Height in (mm)	66-1/2 (1689)	66-1/2 (1689.1)	66-1/2 (1689.1)
	Net Dimension: Width in (mm)	38-5/8 (981)	55-1/2 (1410)	55-1/2 (1410)
	Net Dimension: Depth in (mm)	29-1/2 (749)	29-1/2 (749)	29-1/2 (749)
	Wood Crafted Dimension H*W*D (in.)	75*44*35 (1910×1120×880)	75*61*35 (1910×1550×880)"	75*61*35 (1910×1550×880)
	Net Weight (kg)	275	343	343
	Wood Crafted Gross Weight (kg)	354	438	438
	Net Weight (lbs)	606	756	756
	Wood Crafted Gross Weight (lbs)	780	966	966
	Stuffing Quantity (40' Standard)	26	13	13
Connection Ratio	Maxium Number of Indoor Units	15	18	21
	Recommended IDU qty	10	13	17
	Connection Ratio (IDU/ODU Capacity)	50% ~ 130%	50% ~ 130%	50% ~ 130%
Compressor	DC Inverter EVI Compressors*qty	ANB66FZPMT * 1	ANB78FZPMT * 1	ANB78FZPMT * 1
Refrigerant Piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid pipe O.D. I in (mm)	3/8(9.52)	1/2(12.7)	1/2(12.7)
	Gas pipe O.D. I in (mm)	7/8(22.22)	7/8(22.22)	1 1/8(28.58)
	High Gas Pipe O.D. I in (mm)	7/8(22.22)	7/8(22.22)	1 1/8(28.58)
	Piping kits	/	/	/
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	MRV-LINK	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ144ME2CA	MVHQ168ME2CA	MVHQ192ME2CA
Model Name	System	12T	14T	16T
	Combination	/	/	/
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	144000	168,000	192,000
	Factory Model Number	AV14CMVURAB	AV16CMVURAB	AV18CMVURAB
Electrical	Voltage, Cycle, Phase V/Hz/-	208-230/60/3	208-230/60/3	208-230/60/3
	Maximum Fuse Size A	80	90	110
	Minimum Circuit Amp A	56	59	71
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	138000	160000	184000
	EER @95 °F	10.8	11.4	11.2
	IEER	20	23.2	22.2
	Rated Heating Capacity@47°F(Btu/h)	154000	180000	206000
	COP @ 47°F	3.4	3.6	3.5
	Rated Heating Capacity@17°F(Btu/h)	108000	122000	138000
	COP @ 17°F	2.4	2.5	2.4
	SCHE	21.6	26	26.7
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	138000	160000	184000
	EER @95 °F	10.8	11.5	11.3
	IEER	20.3	21.5	21.1
	Rated Heating Capacity @47°F(Btu/h)	154000	180000	206000
	COP @ 47°F	3.4	3.4	3.3
	Rated Heating Capacity@17°F(Btu/h)	108000	122000	138000
	COP @ 17°F	2.4	2.4	2.4
	SCHE	20.6	24.7	24.4
	(115°F) Cooling capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ144ME2CA	MVHQ168ME2CA	MVHQ192ME2CA
Operation Range	Working Temp.Cooling Fº + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	62	72	72
	Acoustic Power dB(A)	83	86	86
	Net Dimension: Height in (mm)	66-1/2 (1689.1)	73-1/4 (1858)	73-1/4 (1858)
	Net Dimension: Width in (mm)	55-1/2 (1410)	70-1/4 (1785)	70-1/4 (1785)
	Net Dimension: Depth in (mm)	29-1/2 (749)	32-1/4 (830)	32-1/4 (830)
	Wood Crafted Dimension H*W*D (in.)	75*61*35 (1910×1550×880)	80*75*38 (2032x1905*965)	80*75*38 (2032x1905*965)
	Net Weight (kg)	406	478	478
	Wood Crafted Gross Weight (kg)	501	591	591
	Net Weight (lbs)	895	1162	1162
	Wood Crafted Gross Weight (lbs)	1105	1354	1354
	Stuffing Quantity (40' Standard)	13	12	12
Connection Ratio	Maxium Number of Indoor Units	24	33	36
	Recommended IDU qty	20	23	26
	Connection Ratio (IDU/ODU Capacity)	50% — 130%	50% — 130%	50% — 130%
Compressor	DC Inverter EVI Compressors*qty	ANB66FZPMT * 2	ANB78FZPMT*2	ANB78FZPMT*2
Refrigerant piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid Pipe O.D. I in (mm)	1/2(12.7)	5/8(15.88)	5/8(15.88)
	Gas Pipe O.D. I in (mm)	1 1/8(28.58)	1-1/8(28.58)	1-1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)	1 1/8(28.58)	1 1/8(28.58)
	Piping kits	/	/	/
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	MRV-LINK	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ216ME2CA	MVHQ240ME2CA	MVHQ264ME2CA
Model Name	System	18T	20T	22T
	Combination	/	/	10T+12T
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	216,000	240,000	264000
	Factory Model Number	AV20CMVURAB	AV22CMVURAB	/
Electrical	Voltage, Cycle, Phase V/Hz/-	208-230/60/3	208-230/60/3	208-230/60/3
	Maximum Fuse Size A	125	135	60+80
	Minimum Circuit Amp A	83	87	41+56
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	206000	222000	253000
	EER @95 °F	10.9	10.1	10.1
	IEER	22	20.3	18.8
	Rated Heating Capacity@47°F(Btu/h)	232000	240000	282000
	COP @ 47°F	3.5	3.4	3.3
	Rated Heating Capacity@17°F(Btu/h)	156000	168000	192000
	COP @ 17°F	2.4	2.4	2.3
	SCHE	25.6	24.6	25.2
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	206000	222000	253000
	EER @95 °F	11.3	10.6	9.8
	IEER	20.8	20.3	19.4
	Rated Heating Capacity @47°F(Btu/h)	232000	240000	282000
	COP @ 47°F	3.3	3.3	3.3
	Rated Heating Capacity@17°F(Btu/h)	156000	168000	192000
	COP @ 17°F	2.4	2.3	2.3
	SCHE	24.2	23.6	23.3
	(115°F) Cooling capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ216ME2CA	MVHQ240ME2CA	MVHQ264ME2CA
Operation Range	Working Temp.Cooling Fº + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	72	72	65
	Acoustic Power dB(A)	86	86	86
	Net Dimension: Height in (mm)	73-1/4 (1858)	73-1/4 (1858)	66-1/2
	Net Dimension: Width in (mm)	70-1/4 (1785)	70-1/4 (1785)	55-1/2+55-1/2
	Net Dimension: Depth in (mm)	32-1/4 (830)	32-1/4 (830)	29-1/2
	Wood Crafted Dimension H*W*D (in.)	80*75*38 (2032x1905*965)	80*75*38 (2032x1905*965)	75*61*35+75*61*35
	Net Weight (kg)	478	478	343+406
	Wood Crafted Gross Weight (kg)	591	591	438+501
	Net Weight (lbs)	1162	1162	756+895
	Wood Crafted Gross Weight (lbs)	1354	1354	802+928
	Stuffing Quantity (40' Standard)	12	12	/
Connection Ratio	Maxium Number of Indoor Units	39	39	45
	Recommended IDU qty	29	29	35
	Connection Ratio (IDU/ODU Capacity)	50% — 130%	50% — 130%	50% — 130%
Compressor	DC Inverter EVI Compressors*qty	ANB78FZPMT*2	ANB78FZPMT*2	ANB78FZPMT * 1 ANB66FZPMT * 2
Refrigerant piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid Pipe O.D. I in (mm)	5/8(15.88)	3/4 (19.05)	1/2(12.7)+1/2(12.7)
	Gas Pipe O.D. I in (mm)	1-1/8(28.58)	1-1/4 (31.75)	1 1/8(28.58)+1 1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)	1-1/4 (31.75)	1 1/8(28.58)+1 1/8(28.58)
	Piping kits	/	/	HZG-R20B
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	MRV-LINK	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ288ME2CA	MVHQ312ME2CA	MVHQ336ME2CA
Model Name	System	24T	26T	28T
	Combination	12T+12T	12T+14T	12T+16T
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	288000	312000	336000
	Factory Model Number	/	/	/
Electrical	Voltage, Cycle, Phase V/Hz/-	208-230/60/3	208-230/60/3	208-230/60/3
	Maximum Fuse Size A	80+80	80+90	80+110
	Minimum Circuit Amp A	56+56	56+59	56+71
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	276000	299000	322000
	EER @95 °F	9.8	9.9	9.7
	IEER	18.4	18.5	18.1
	Rated Heating Capacity@47°F(Btu/h)	308000	334000	360000
	COP @ 47°F	3.2	3.2	3.1
	Rated Heating Capacity@17°F(Btu/h)	216000	228000	240000
	COP @ 17°F	2.2	2.3	2.2
	SCHE	24.8	24	22.3
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	276000	299000	322000
	EER @95 °F	9.7	9.7	9.6
	IEER	18.5	18.2	18
	Rated Heating Capacity @47°F(Btu/h)	308000	334000	360000
	COP @ 47°F	3.2	3.2	3.1
	Rated Heating Capacity@17°F(Btu/h)	216000	228000	240000
	COP @ 17°F	2.3	2.3	2.2
	SCHE	23.3	22.9	22.4
	(115°F) Cooling capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ288ME2CA	MVHQ312ME2CA	MVHQ336ME2CA
Operation Range	Working Temp.Cooling Fº + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	65	67	72
	Acoustic Power dB(A)	86	87	88
	Net Dimension: Height in (mm)	66-1/2	73-1/4	73-1/4
	Net Dimension: Width in (mm)	55-1/2+55-1/2	55-1/2+70-1/4	55-1/2+70-1/4
	Net Dimension: Depth in (mm)	29-1/2	32-1/4	32-1/4
	Wood Crafted Dimension H*W*D (in.)	75*61*35+75*61*35	75*61*35+80*75*38	75*61*35+80*75*38
	Net Weight (kg)	406+406	406+478	406+478
	Wood Crafted Gross Weight (kg)	501+501	501+530	501+530
	Net Weight (lbs)	895+895	895+1162	895+1162
	Wood Crafted Gross Weight (lbs)	928+928	928+1354	928+1354
	Stuffing Quantity (40' Standard)	/	/	/
Connection Ratio	Maxium Number of Indoor Units	48	57	60
	Recommended IDU qty	38	42	45
	Connection Ratio (IDU/ODU Capacity)	50% — 130%	50% — 130%	50% — 130%
Compressor	DC Inverter EVI Compressors*qty	ANB66FZPMT * 4	ANB66FZPMT * 2 ANB78FZPMT * 2	ANB66FZPMT * 2 ANB78FZPMT * 2
Refrigerant piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid Pipe O.D. I in (mm)	1/2(12.7)+1/2(12.7)	1/2(12.7)+5/8 (15.88)	1/2(12.7)+5/8 (15.88)
	Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)
	Piping kits	HZG-R20B	HZG-R20B	HZG-R20B
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	MRV-LINK	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ360ME2CA	MVHQ384ME2CA	MVHQ408ME2CA
Model Name	System	30T	32T	34T
	Combination	14T+16T	16T+16T	16T+18T
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	360000	384000	408000
	Factory Model Number	/	/	/
Electrical	Voltage, Cycle, Phase V/Hz/-	208-230/60/3	208-230/60/3	208-230/60/3
	Maximum Fuse Size A	90+110	110+110	110+125
	Minimum Circuit Amp A	59+71	71+71	71+83
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	345000	364000	380000
	EER @95 °F	9.9	9.7	9.2
	IEER	18.5	18.4	18.1
	Rated Heating Capacity@47°F(Btu/h)	372000	384000	400000
	COP @ 47°F	3.2	3.2	3.2
	Rated Heating Capacity@17°F(Btu/h)	252000	268000	284000
	COP @ 17°F	2.2	2.2	2.2
	SCHE	22.2	20.5	19.1
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	345000	364000	380000
	EER @95 °F	9.7	9.4	9.3
	IEER	18.2	18.5	18.5
	Rated Heating Capacity @47°F(Btu/h)	372000	384000	400000
	COP @ 47°F	3.2	3.3	3.2
	Rated Heating Capacity@17°F(Btu/h)	252000	268000	284000
	COP @ 17°F	2.3	2.3	2.2
	SCHE	22.1	20.8	19.2
	(115°F) Cooling capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ360ME2CA	MVHQ384ME2CA	MVHQ408ME2CA
Operation Range	Working Temp.Cooling Fº + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	72	73	73
	Acoustic Power dB(A)	88	89	89
	Net Dimension: Height in (mm)	73-1/4	73-1/4	73-1/4
	Net Dimension: Width in (mm)	70-1/4 +70-1/4	70-1/4 +70-1/4	70-1/4 +70-1/4
	Net Dimension: Depth in (mm)	32-1/4	32-1/4	32-1/4
	Wood Crafted Dimension H*W*D (in.)	80*75*38+80*75*38	80*75*38+80*75*38	80*75*38+80*75*38
	Net Weight (kg)	478+478	478+478	478+478
	Wood Crafted Gross Weight (kg)	530+530	530+530	530+530
	Net Weight (lbs)	1162+1162	1162+1162	1162+1162
	Wood Crafted Gross Weight (lbs)	1354+1354	1354+1354	1354+1354
	Stuffing Quantity (40' Standard)	/	/	/
Connection Ratio	Maxium Number of Indoor Units	64	64	64
	Recommended IDU qty	49	52	55
	Connection Ratio (IDU/ODU Capacity)	50% — 130%	50% — 130%	50% — 130%
Compressor	DC Inverter EVI Compressors*qty	ANB78FZPMT*4	ANB78FZPMT*4	ANB78FZPMT*4
Refrigerant piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid Pipe O.D. I in (mm)	5/8 (15.88)+5/8 (15.88)	5/8 (15.88)+5/8 (15.88)	5/8 (15.88)+5/8 (15.88)
	Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)
	Piping kits	HZG-R20B	HZG-R20B	HZG-R20B
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	MRV-LINK	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery	
	Marketing Model Name	MVHQ432ME2CA	MVHQ456ME4CA
Model Name	System	36T	38T
	Combination	18T+18T	10T+14T+14T
	Brand	Haier	Haier
	Norminal Capacity (Btu/h)	432000	456000
	Factory Model Number	/	/
Electrical	Voltage, Cycle, Phase V/Hz/-	208-230/60/3	460V/60/3
	Maximum Fuse Size A	125+125	60+90+90
	Minimum Circuit Amp A	83+83	41+59+59
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	400000	436000
	EER @95 °F	8.9	9
	IEER	17.5	16.2
	Rated Heating Capacity@47°F(Btu/h)	410000	476000
	COP @ 47°F	3.2	3.2
	Rated Heating Capacity@17°F(Btu/h)	300000	342000
	COP @ 17°F	2.15	2.15
	SCHE	17.9	15.6
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	400000	436000
	EER @95 °F	9	9
	IEER	18.1	17.1
	Rated Heating Capacity @47°F(Btu/h)	410000	476000
	COP @ 47°F	3.2	3.2
	Rated Heating Capacity@17°F(Btu/h)	300000	342000
	COP @ 17°F	2.2	2.2
	SCHE	17.6	19.1
	(115°F) Cooling capacity(Btu/h)	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery	
	Marketing Model Name	MVHQ432ME2CA	MVHQ456ME4CA
Operation Range	Working Temp.Cooling Fº + Snow Hood	-4F-122F(-20~50C)	
	Working Temp.Heating Fº	-22F~60F(-30~15.5C)	
ODU	Sound Pressure dB(A)	74	74
	Acoustic Power dB(A)	90	90
	Net Dimension: Height in (mm)	73-1/4	66-1/2+73-1/4 +73-1/4
	Net Dimension: Width in (mm)	70-1/4 +70-1/4	55-1/2+70-1/4 +70-1/4
	Net Dimension: Depth in (mm)	32-1/4	29-1/2+32-1/4+32-1/4
	Wood Crafted Dimension H*W*D (in.)	80*75*38+80*75*38	75*61*35+80*75*38+80*75*38
	Net Weight (kg)	478+478	343+478+478
	Wood Crafted Gross Weight (kg)	530+530	438+530+530
	Net Weight (lbs)	1162+1162	756+1162+1162
	Wood Crafted Gross Weight (lbs)	1354+1354	966+1354+1354
	Stuffing Quantity (40' Standard)	/	/
Connection Ratio	Maxium Number of Indoor Units	64	64
	Recommended IDU qty	58	57
	Connection Ratio (IDU/ODU Capacity)	50% — 130%	50% — 130%
Compressor	DC Inverter EVI Compressors*qty	ANB78FZPMT*4	ANB78FZPMT*5
Refrigerant piping	Maximum Total Line Length Ft / m	3280ft/1000m	
	Maximum Height Ft / m	295ft/90m	
	Liquid Pipe O.D. I in (mm)	5/8 (15.88)+5/8 (15.88)	1/2(12.7)+5/8 (15.88)+5/8 (15.88)
	Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)+1 1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)+1 1/8(28.58)
	Piping kits	HZG-R20B	HZG-R30B
	ETL Per 60335	Yes	Yes
	AHRI	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN
	UPC	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	MRV-LINK	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes

460V VRF Outdoor Unit

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ072ME4CA	MVHQ096ME4CA	MVHQ120ME4CA
Model Name	System	6T	8T	10T
	Combination	/	/	/
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	72000	96000	120000
	Factory Model Number	AV08GMVURAB	AV10GMVURAB	AV12GMVURAB
Electrical	Voltage, Cycle, Phase V/Hz/-	460/60/3	460/60/3	460/60/3
	Maximum Fuse Size A	20	25	30
	Minimum Circuit Amp A	16	20	22
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	69000	91000	115000
	EER @95 °F	12.6	11.9	11.6
	IEER	23.6	23.1	23
	Rated Heating Capacity@47°F(Btu/h)	77000	103000	129000
	COP @ 47°F	3.5	3.5	3.5
	Rated Heating Capacity@17°F(Btu/h)	53000	72000	84000
	COP @ 17°F	2.4	2.4	2.5
	SCHE	24.4	23	21.7
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	69000	91000	115000
	EER @95 °F	12	12.2	11.2
	IEER	20.5	21.8	21.6
	Rated Heating Capacity @47°F(Btu/h)	77000	103000	129000
	COP @ 47°F	3.5	3.5	3.5
	Rated Heating Capacity@17°F(Btu/h)	53000	72000	84000
	COP @ 17°F	2.4	2.4	2.5
	SCHE	20	21.4	21.4
	(115°F) Cooling Capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ072ME4CA	MVHQ096ME4CA	MVHQ120ME4CA
Operation Range	Working Temp.Cooling Fº (ºC) + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº (ºC)	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	60	61	61
	Acoustic Power dB(A)	77	81	81
	Net Dimension: Height in (mm)	66-1/2 (1689)	66-1/2 (1689.1)	66-1/2 (1689.1)
	Net Dimension: Width in (mm)	38-5/8 (981)	55-1/2 (1410)	55-1/2 (1410)
	Net Dimension: Depth in (mm)	29-1/2 (749)	29-1/2 (749)	29-1/2 (749)
	Wood Crafted Dimension H*W*D in (mm)	75*44*35 (1910×1120×880)	75*61*35 (1910×1550×880)	75*61*35 (1910×1550×880)
	Net Weight kg	275	343	343
	Wood Crafted Gross Weight kg	354	438	438
	Net Weight lbs	606	756	756
	Wood Crafted Gross Weight lbs	780	966	966
Connection Ratio	Maxium Number of Indoor Units	15	18	21
	Recommended IDU qty	10	13	17
	Connection Ratio (IDU/ODU Capacity)	50% ~ 130%	50% ~ 130%	50% ~ 130%
Compressor	DC Inverter EVI Compressors*qty	ANB66FZYMT * 1	ANB78FZYMT * 1	ANB78FZYMT * 1
Refrigerant Piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid Pipe O.D. I in (mm)	3/8(9.52)	1/2(12.7)	1/2(12.7)
	Gas Pipe O.D. I in (mm)	7/8(22.22)	7/8(22.22)	1 1/8(28.58)
	High Gas Pipe O.D. I in (mm)	7/8(22.22)	7/8(22.22)	1 1/8(28.58)
	Piping kits	/	/	/
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	Multilink	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ144ME4CA	MVHQ168ME4CA	MVHQ192ME4CA
Model Name	System	12T	14T	16T
	Combination	/	/	/
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	144000	168,000	192,000
	Factory Model Number	AV14GMVURAB	AV16GMVURAB	AV18GMVURAB
Electrical	Voltage, Cycle, Phase V/Hz/-	460/60/3	460/60/3	460/60/3
	Maximum Fuse Size A	40	60	60
	Minimum Circuit Amp A	30	40	42
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	138000	160,000	184,000
	EER @95 °F	10.8	11.4	11.2
	IEER	20	23.2	22.2
	Rated Heating Capacity@47°F(Btu/h)	154000	180,000	206,000
	COP @ 47°F	3.4	3.6	3.5
	Rated Heating Capacity@17°F(Btu/h)	108000	122,000	138,000
	COP @ 17°F	2.4	2.5	2.4
	SCHE	21.6	26	26.7
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	138000	160,000	184,000
	EER @95 °F	10.8	11.5	11.3
	IEER	20.3	21.5	21.1
	Rated Heating Capacity @47°F(Btu/h)	154000	180,000	206,000
	COP @ 47°F	3.4	3.4	3.3
	Rated Heating Capacity@17°F(Btu/h)	108000	122,000	138,000
	COP @ 17°F	2.4	2.4	2.4
	SCHE	20.6	24.7	24.4
	(115°F) Cooling Capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ144ME4CA	MVHQ168ME4CA	MVHQ192ME4CA
Operation Range	Working Temp.Cooling Fº (ºC) + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº (ºC)	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	62	72	72
	Acoustic Power dB(A)	83	86	86
	Net Dimension: Height in (mm)	66-1/2 (1689.1)	73-1/4 (1858)	73-1/4 (1858)
	Net Dimension: Width in (mm)	55-1/2 (1410)	70-1/4 (1785)	70-1/4 (1785)
	Net Dimension: Depth in (mm)	29-1/2 (749)	32-1/4 (830)	32-1/4 (830)
	Wood Crafted Dimension H*W*D in (mm)	75*61*35 (1910×1550×880)	80*75*38 (2032x1905*965)	80*75*38 (2032x1905*965)
	Net Weight kg	406	478	478
	Wood Crafted Gross Weight kg	501	591	591
	Net Weight lbs	895	1162	1162
	Wood Crafted Gross Weight lbs	1105	1354	1354
Connection Ratio	Maxium Number of Indoor Units	24	33	36
	Recommended IDU qty	20	23	26
	Connection Ratio (IDU/ODU Capacity)	50% ~ 130%	50% — 130%	50% — 130%
Compressor	DC inverter EVI compressors*qty	ANB66FZYMT * 2	ANB78FZYMT*2	ANB78FZYMT * 2
Refrigerant Piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid Pipe O.D. I in (mm)	1/2(12.7)	5/8(15.88)	5/8(15.88)
	Gas Pipe O.D. I in (mm)	1 1/8(28.58)	1-1/8(28.58)	1-1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)	1 1/8(28.58)	1 1/8(28.58)
	Piping kits	/	/	/
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	Multilink	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ216ME4CA	MVHQ240ME4CA	MVHQ264ME4CA
Model Name	System	18T	20T	22T
	Combination	/	/	10T+12T
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	216,000	240,000	264000
	Factory Model Number	AV20GMVURAB	AV22GMVURAB	/
Electrical	Voltage, Cycle, Phase V/Hz/-	460/60/3	460/60/3	460V/60/3
	Maximum Fuse Size A	70	80	30+40
	Minimum Circuit Amp A	47	51	22+30
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	206000	222000	253000
	EER @95 °F	10.9	10.1	10.1
	IEER	22	20.3	18.8
	Rated Heating Capacity@47°F(Btu/h)	232000	240000	282000
	COP @ 47°F	3.5	3.4	3.3
	Rated Heating Capacity@17°F(Btu/h)	156000	168000	192000
	COP @ 17°F	2.4	2.4	2.3
	SCHE	25.6	24.6	25.2
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	206000	222000	253000
	EER @95 °F	11.3	10.6	9.8
	IEER	20.8	20.3	19.4
	Rated Heating Capacity @47°F(Btu/h)	232000	240000	282000
	COP @ 47°F	3.3	3.3	3.3
	Rated Heating Capacity@17°F(Btu/h)	156000	168000	192000
	COP @ 17°F	2.4	2.3	2.3
	SCHE	24.2	23.6	23.3
	(115°F) Cooling Capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ216ME4CA	MVHQ240ME4CA	MVHQ264ME4CA
Operation Range	Working Temp.Cooling Fº (ºC) + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº (ºC)	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	72	72	65
	Acoustic Power dB(A)	86	86	86
	Net Dimension: Height in (mm)	73-1/4 (1858)	73-1/4 (1858)	66-1/2
	Net Dimension: Width in (mm)	70-1/4 (1785)	70-1/4 (1785)	55-1/2+55-1/2
	Net Dimension: Depth in (mm)	32-1/4 (830)	32-1/4 (830)	29-1/2
	Wood Crafted Dimension H*W*D in (mm)	80*75*38 (2032x1905*965)	80*75*38 (2032x1905*965)	75*61*35+75*61*35
	Net Weight kg	478	478	343+406
	Wood Crafted Gross Weight kg	591	591	438+501
	Net Weight lbs	1162	1162	765+895
	Wood Crafted Gross Weight lbs	1354	1354	802+928
Connection Ratio	Maxium Number of Indoor Units	39	39	45
	Recommended IDU qty	29	29	35
	Connection Ratio (IDU/ODU Capacity)	50% — 130%	50% — 130%	50% — 130%
Compressor	DC inverter EVI compressors*qty	ANB78FZYMT*2	ANB78FZYMT*2	ANB78FZYMT * 1 ANB66FZYMT * 2
Refrigerant Piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid Pipe O.D. I in (mm)	5/8(15.88)	3/4(19.05)	1/2(12.7)+1/2(12.7)
	Gas Pipe O.D. I in (mm)	1 1/8(28.58)	1-1/4(31.75)	1-1/8(28.58)+1-1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)	1-1/4(31.75)	1-1/8(28.58)+1-1/8(28.58)
	Piping kits	/	/	/
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	Multilink	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ288ME4CA	MVHQ312ME4CA	MVHQ336ME4CA
Model Name	System	24T	26T	28T
	Combination	12T+12T	12T+14T	12T+16T
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	288000	312000	336000
	Factory Model Number	/	/	/
Electrical	Voltage, Cycle, Phase V/Hz/-	460V/60/3	460V/60/3	460V/60/3
	Maximum Fuse Size A	40+40	40+60	40+60
	Minimum Circuit Amp A	30+30	30+40	30+42
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	276000	299000	322000
	EER @95 °F	9.8	9.9	9.7
	IEER	18.4	18.5	18.1
	Rated Heating Capacity@47°F(Btu/h)	308000	334000	360000
	COP @ 47°F	3.2	3.2	3.1
	Rated Heating Capacity@17°F(Btu/h)	216000	228000	240000
	COP @ 17°F	2.2	2.3	2.2
	SCHE	24.8	24	22.3
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	276000	299000	322000
	EER @95 °F	9.7	9.7	9.6
	IEER	18.5	18.2	18
	Rated Heating Capacity @47°F(Btu/h)	308000	334000	360000
	COP @ 47°F	3.2	3.2	3.1
	Rated Heating Capacity@17°F(Btu/h)	216000	228000	240000
	COP @ 17°F	2.3	2.3	2.2
	SCHE	23.3	22.9	22.4
	(115°F) Cooling Capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ288ME4CA	MVHQ312ME4CA	MVHQ336ME4CA
Operation Range	Working Temp.Cooling Fº (ºC) + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº (ºC)	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	65	67	72
	Acoustic Power dB(A)	86	87	88
	Net Dimension: Height in (mm)	66-1/2	73-1/4	73-1/4
	Net Dimension: Width in (mm)	55-1/2+55-1/2	55-1/2+70-1/4	70-1/4 +70-1/4
	Net Dimension: Depth in (mm)	29-1/2	32-1/4	32-1/4
	Wood Crafted Dimension H*W*D in (mm)	75*61*35+75*61*35	75*61*35+80*75*38	75*61*35+80*75*38
	Net Weight kg	406+406	406+478	406+478
	Wood Crafted Gross Weight kg	501+501	501+530	501+530
	Net Weight lbs	895+895	895+1162	895+1162
	Wood Crafted Gross Weight lbs	928+928	928+1354	928+1354
Connection Ratio	Maxium Number of Indoor Units	48	57	60
	Recommended IDU qty	38	42	45
	Connection Ratio (IDU/ODU Capacity)	50% — 130%	50% — 130%	50% — 130%
Compressor	DC inverter EVI compressors*qty	ANB66FZYMT * 4	ANB66FZYMT * 2 ANB78FZYMT * 2	ANB66FZYMT * 2 ANB78FZYMT * 2
Refrigerant Piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid Pipe O.D. I in (mm)	1/2(12.7)+1/2(12.7)	1/2(12.7)+5/8 (15.88)	1/2(12.7)+5/8 (15.88)
	Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)
	Piping kits	HZG-R20B	HZG-R20B	HZG-R20B
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	Multilink	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ360ME4CA	MVHQ384ME4CA	MVHQ408ME4CA
Model Name	System	30T	32T	34T
	Combination	14T+16T	16T+16T	16T+18T
	Brand	Haier	Haier	Haier
	Norminal Capacity (Btu/h)	360000	384000	408000
	Factory Model Number	/	/	/
Electrical	Voltage, Cycle, Phase V/Hz/-	460V/60/3	460V/60/3	460V/60/3
	Maximum Fuse Size A	60+60	60+60	60+70
	Minimum Circuit Amp A	40+42	42+42	42+47
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	345000	364000	380000
	EER @95 °F	9.9	9.7	9.2
	IEER	18.5	18.4	18.1
	Rated Heating Capacity@47°F(Btu/h)	372000	384000	400000
	COP @ 47°F	3.2	3.2	3.2
	Rated Heating Capacity@17°F(Btu/h)	252000	268000	284000
	COP @ 17°F	2.2	2.2	2.2
	SCHE	22.2	20.5	19.1
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated	≥60% of rated
	Heating capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	345000	364000	380000
	EER @95 °F	9.7	9.4	9.3
	IEER	18.2	18.5	18.5
	Rated Heating Capacity @47°F(Btu/h)	372000	384000	400000
	COP @ 47°F	3.2	3.3	3.2
	Rated Heating Capacity@17°F(Btu/h)	252000	268000	284000
	COP @ 17°F	2.3	2.3	2.2
	SCHE	22.1	20.8	19.2
	(115°F) Cooling Capacity(Btu/h)	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated	≥25% of rated

Items		New Heat Pump & Heat Recovery		
	Marketing Model Name	MVHQ360ME4CA	MVHQ384ME4CA	MVHQ408ME4CA
Operation Range	Working Temp.Cooling Fº (ºC) + Snow Hood	-4F-122F(-20~50C)		
	Working Temp.Heating Fº (ºC)	-22F~60F(-30~15.5C)		
ODU	Sound Pressure dB(A)	72	73	73
	Acoustic Power dB(A)	88	89	89
	Net Dimension: Height in (mm)	73-1/4	73-1/4	73-1/4
	Net Dimension: Width in (mm)	70-1/4 +70-1/4	70-1/4 +70-1/4	70-1/4 +70-1/4
	Net Dimension: Depth in (mm)	32-1/4	32-1/4	32-1/4
	Wood Crafted Dimension H*W*D in (mm)	80*75*38+80*75*38	80*75*38+80*75*38	80*75*38+80*75*38
	Net Weight kg	478+478	478+478	478+478
	Wood Crafted Gross Weight kg	530+530	530+530	530+530
	Net Weight lbs	1162+1162	1162+1162	1162+1162
	Wood Crafted Gross Weight lbs	1354+1354	1354+1354	1354+1354
Connection Ratio	Maxium Number of Indoor Units	64	64	64
	Recommended IDU qty	49	52	55
	Connection Ratio (IDU/ODU Capacity)	50% — 130%	50% — 130%	50% — 130%
Compressor	DC inverter EVI compressors*qty	ANB78FZYMT*4	ANB78FZYMT*4	ANB78FZYMT*4
Refrigerant Piping	Maximum Total Line Length Ft / m	3280ft/1000m		
	Maximum Height Ft / m	295ft/90m		
	Liquid Pipe O.D. I in (mm)	5/8 (15.88)+5/8 (15.88)	5/8 (15.88)+5/8 (15.88)	5/8 (15.88)+5/8 (15.88)
	Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)
	Piping kits	HZG-R20B	HZG-R20B	HZG-R20B
	ETL Per 60335	Yes	Yes	Yes
	AHRI	Yes	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN	USA & CAN
	UPC	/	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	Multilink	Yes	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes	Yes

Items		New Heat Pump & Heat Recovery	
	Marketing Model Name	MVHQ432ME4CA	MVHQ456ME4CA
Model Name	System	36T	38T
	Combination	18T+18T	10T+14T+14T
	Brand	Haier	Haier
	Norminal Capacity (Btu/h)	432000	456000
	Factory Model Number	/	/
Electrical	Voltage, Cycle, Phase V/Hz/-	460V/60/3	460V/60/3
	Maximum Fuse Size A	70+70	30+60+60
	Minimum Circuit Amp A	47+47	22+40+40
Performance Non-Ducted	Rated Cooling Capacity@95°F(Btu/h)	400000	436000
	EER @95 °F	8.9	9
	IEER	17.5	16.2
	Rated Heating Capacity@47°F(Btu/h)	410000	476000
	COP @ 47°F	3.2	3.2
	Rated Heating Capacity@17°F(Btu/h)	300000	342000
	COP @ 17°F	2.15	2.15
	SCHE	17.9	15.6
	(115°F) Cooling Capacity (Btu/h)	≥80% of rated	≥80% of rated
	Heating Capacity @5° (-15C)	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F (-20C)	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F (-25C)	≥60% of rated	≥60% of rated
	Heating capacity @-22°F (-30C)	≥25% of rated	≥25% of rated
Performance Ducted	Rated Cooling Capacity@95°F (Btu/h)	400000	436000
	EER @95 °F	9	9
	IEER	18.1	17.1
	Rated Heating Capacity @47°F(Btu/h)	410000	476000
	COP @ 47°F	3.2	3.2
	Rated Heating Capacity@17°F(Btu/h)	300000	342000
	COP @ 17°F	2.2	2.2
	SCHE	17.6	19.1
	(115°F) Cooling Capacity(Btu/h)	≥80% of rated	≥80% of rated
	Heating Capacity @5°F	≥80% of rated	≥80% of rated
	Heating Capacity @-4°F	≥70% of rated	≥70% of rated
	Heating Capacity @-13°F	≥60% of rated	≥60% of rated
	Heating Capacity @-22°F (-30C)	≥25% of rated	≥25% of rated

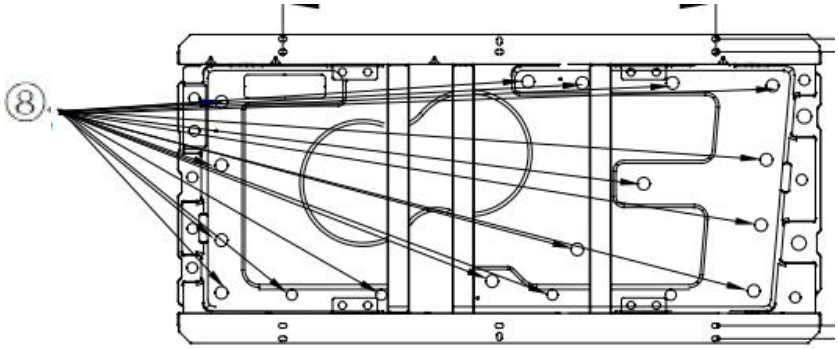
Items		New Heat Pump & Heat Recovery	
	Marketing Model Name	MVHQ432ME4CA	MVHQ456ME4CA
Operation Range	Working Temp.Cooling Fº (ºC) + Snow Hood	-4F-122F(-20~50C)	
	Working Temp.Heating Fº (ºC)	-22F~60F(-30~15.5C)	
ODU	Sound Pressure dB(A)	74	74
	Acoustic Power dB(A)	90	90
	Net Dimension: Height in (mm)	73-/1/4	66-1/2+73-1/4 +73-1/4
	Net Dimension: Width in (mm)	70-1/4 +70-1/4	55-1/2+70-1/4 +70-1/4
	Net Dimension: Depth in (mm)	32-1/4	29-1/2+32-1/4+32-1/4
	Wood Crafted Dimension H*W*D in (mm)	80*75*38+80*75*38	75*61*35+80*75*38+80*75*38
	Net Weight kg	478+478	343+478+478
	Wood Crafted Gross Weight kg	530+530	438+530+530
	Net Weight lbs	1162+1162	756+1162+1162
	Wood Crafted Gross Weight lbs	1354+1354	966+1354+1354
Connection Ratio	Maxium Number of Indoor Units	64	64
	Recommended IDU qty	57	57
	Connection Ratio (IDU/ODU Capacity)	50% — 130%	50% — 130%
Compressor	DC inverter EVI compressors*qty	ANB78FZYMT*4	ANB78FZYMT*5
Refrigerant Piping	Maximum Total Line Length Ft / m	3280ft/1000m	
	Maximum Height Ft / m	295ft/90m	
	Liquid Pipe O.D. I in (mm)	5/8 (15.88)+5/8 (15.88)	1/2(12.7)+5/8 (15.88)+5/8 (15.88)
	Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)+1 1/8(28.58)
	High Gas Pipe O.D. I in (mm)	1 1/8(28.58)+1 1/8(28.58)	1 1/8(28.58)+1 1/8(28.58)+1 1/8(28.58)
	Piping kits	HZG-R20B	HZG-R30B
	ETL Per 60335	Yes	Yes
	AHRI	Yes	Yes
Other	Countries of Sale	USA & CAN	USA & CAN
	UPC	/	/
	Warranty	10 year compressor 10 year parts 0 labor	10 year compressor 10 year parts 0 labor
	Languages	English, French, Spanish for IM	English, French, Spanish for IM
Features and Benefits	Multilink	Yes	Yes
	Anti-Corrosion	1000 hrs per ASTM B117	1000 hrs per ASTM B117
	Rotary Control Box for Convenient Maintenance	Yes	Yes
	Automatic Oil Sharing for Easy Installation	Yes	Yes

Model	Number	Spare parts number	Description	Resistance (KΩ)
MVHQ072/096/120ME2CA MVHQ072/096/120ME4CA	1	0150402567	Tao sensor	R25=10KΩ
	2	0150402568	Toci1/Ts sensor	R25=10KΩ
	3	0150401913	Tdef/Tdef sensor	R25=10KΩ
	4	0150402566	Td1 sensor	R80=50KΩ
	5	0150402575	Toil1 sensor	R80=50KΩ
	6	0150402570	Tliqsc/Tsco sensor	R25=10KΩ
	7	0150402573	Tsci sensor	R25=10KΩ
	8	0150402571	Tdef2 sensor	R25=10KΩ
	9	0150402572	Toci2 sensor	R25=10KΩ
MVHQ144ME2CA MVHQ144ME4CA	1	0150402567	Tao sensor	R25=10KΩ
	2	0150402568	Toci1/Ts sensor	R25=10KΩ
	3	0150401913	Tdef/Tdef sensor	R25=10KΩ
	4	0150402566	Td1 sensor	R80=50KΩ
	5	0150402575	Toil1 sensor	R80=50KΩ
	6	0150402570	Tliqsc/Tsco sensor	R25=10KΩ
	7	0150402573	Tsci sensor	R25=10KΩ
	8	0150402571	Tdef2 sensor	R25=10KΩ
	9	0150402572	Toci2 sensor	R25=10KΩ
MVHQ168/192/216/240ME2CA MVHQ168/192/216/240ME4CA	1	0150402566	Td1 sensor	R80=50KΩ
	2	0150402567	Tao sensor	R25=10KΩ
	3	0150402568	Toci1/Ts sensor	R25=10KΩ
	4	0150401913	Tdef/Tdef sensor	R25=10KΩ
	5	0150402575	Toil1 sensor	R80=50KΩ
	6	0150401915	Td2 sensor	R80=50KΩ
	7	0150402570	Tliqsc/Tsco sensor	R25=10KΩ
	8	0150402573	Tsci sensor	R25=10KΩ
	9	0150402571	Tdef2 sensor	R25=10KΩ
	10	0150402576	Toil2 sensor	R80=50KΩ
	11	0150402572	Toci2 sensor	R25=10KΩ

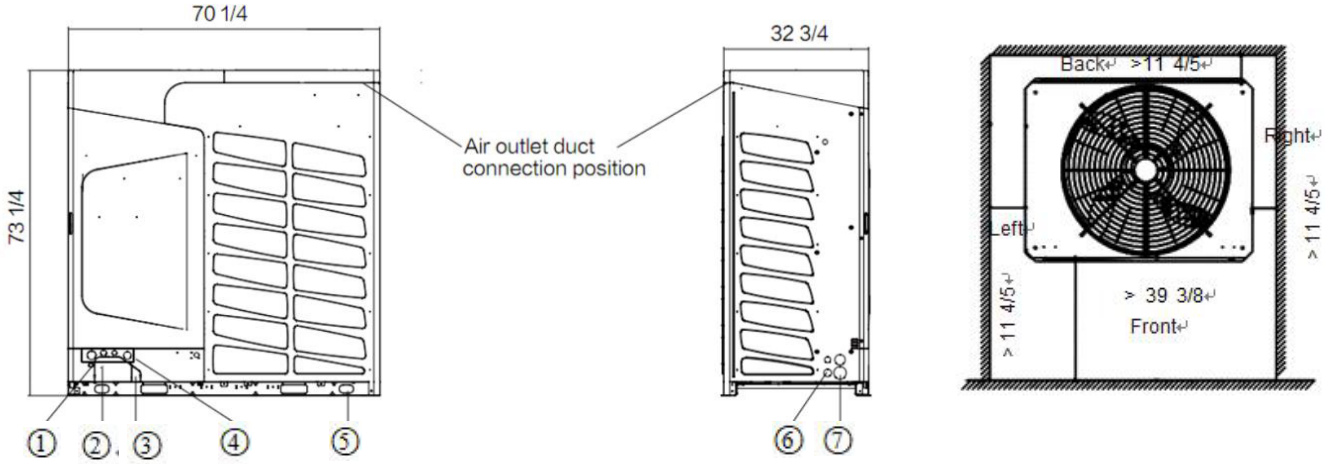
13. Dimensions

MVHQ168/192/216/240ME2CA; MVHQ168/192/216/240ME4CA;

Space between fixing holes 47 2/8

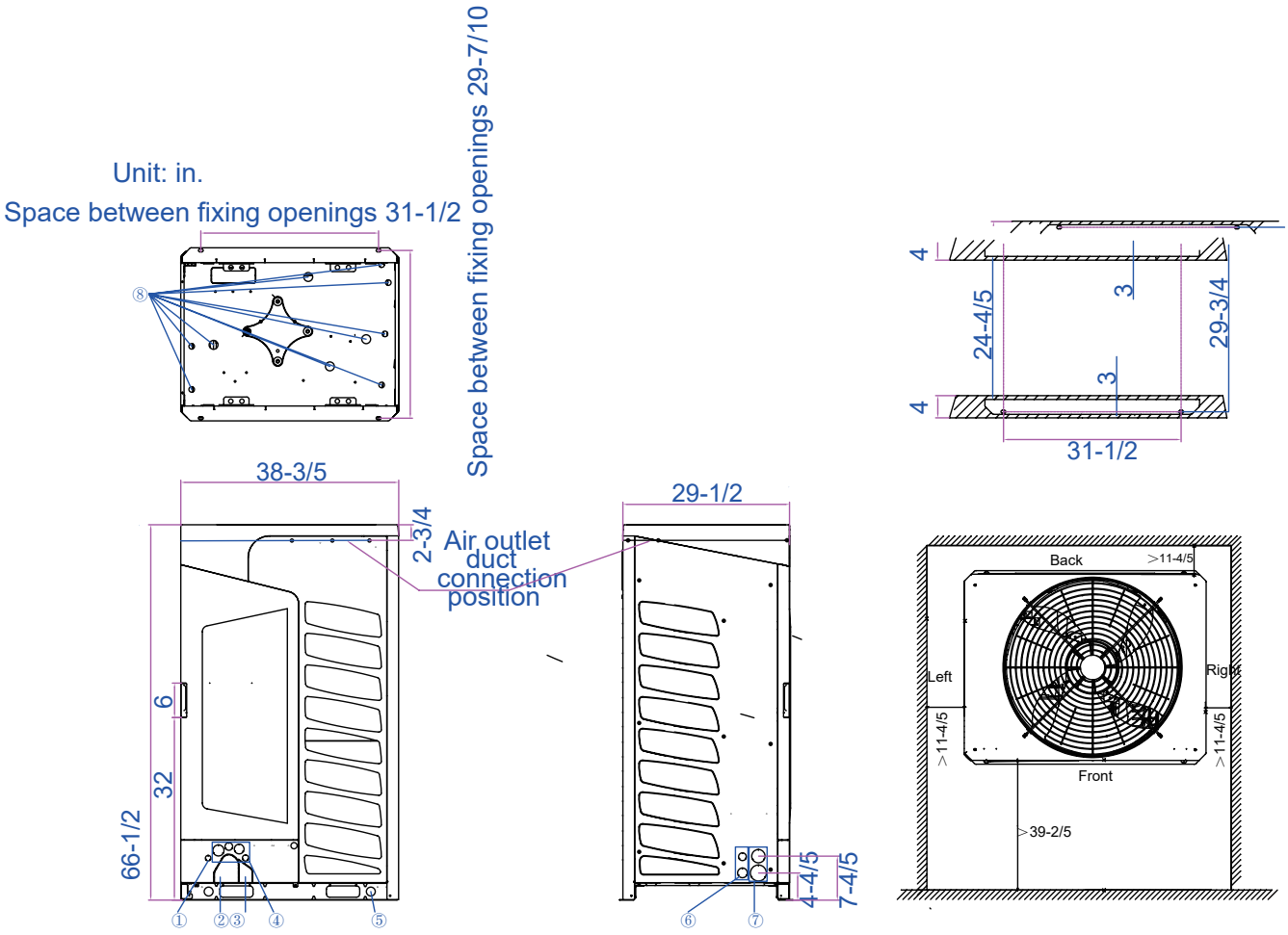


Space between fixing holes 32 5/8



No.	Name Remark	
1	Signall ineh ole(Ø25)	Usingt he rubber plug in the unit'sa ttachment forp rotection
2	Pipeo utletf or 2-pipe system	
3	Pipeo utletf or 3-pipe system	
4	Power supply hole	According to the wire diameter size to choose the appropriate line hole, and using the line sheath in the unit's attachment for protection
5	Hoistingh ole	
6	Power supply of signal line hole	
7	Refrigerant pipe outlet	
8	Drain hole	

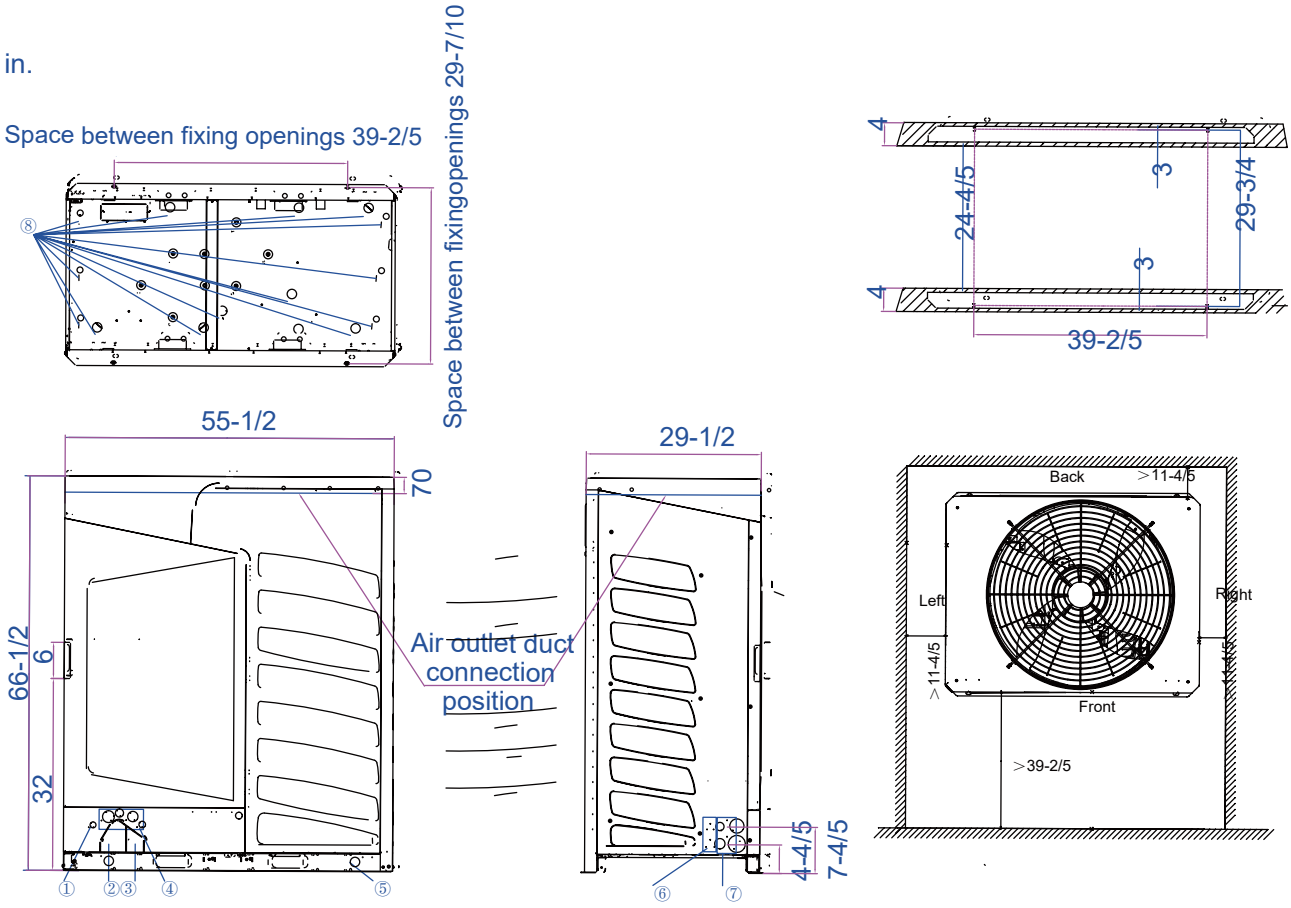
MVHQ072ME2/4CA



No.	Name	Remark
1	Signal line opening (Ø1)	Using the rubber plug in the unit's attachment for protection
2	Pipe outlet for 2-pipe system	
3	Pipe outlet for 3-pipe system	
4	Power supply opening	According to the wire diameter size to choose the appropriate line opening, and using the line sheath in the unit's attachment for protection.
5	Hoisting opening	
6	Power supply of signal line opening	
7	Refrigerant pipe outlet	
8	Drain opening	

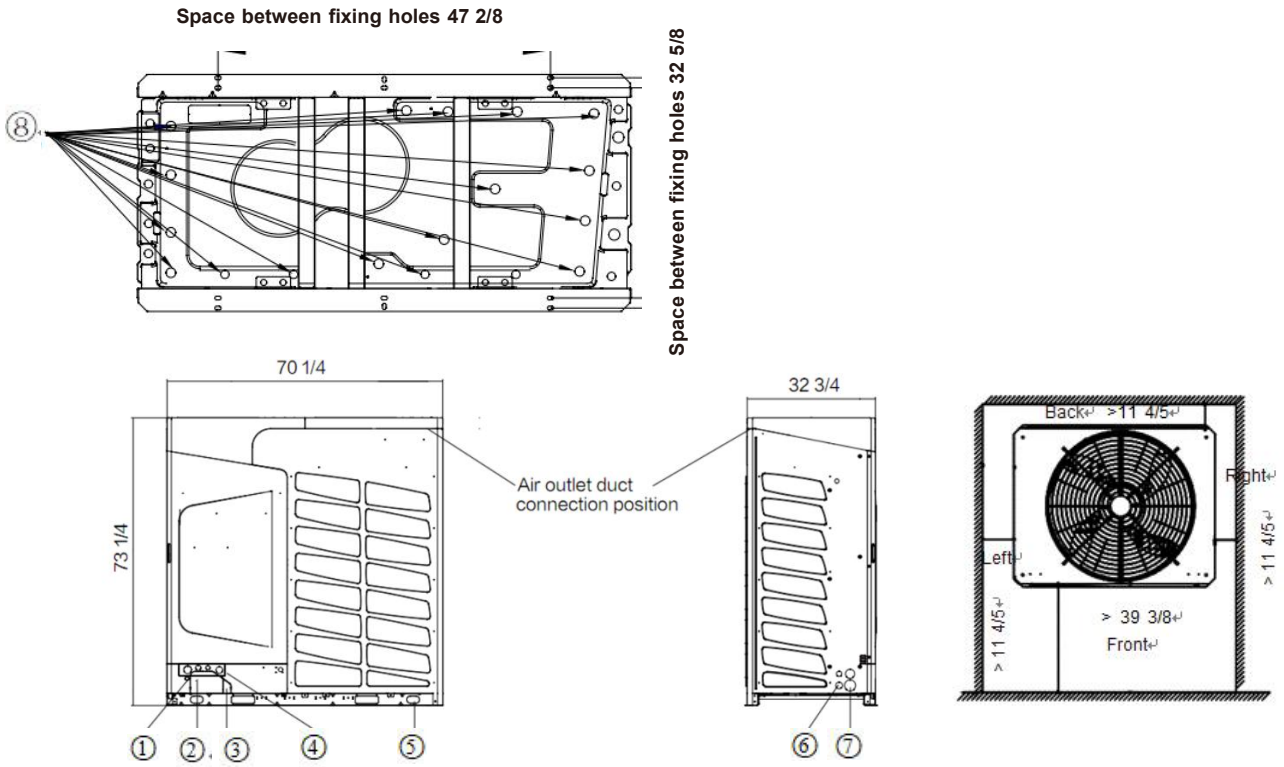
MVHQ096/120/144ME2CA
MVHQ096/120/144ME4CA

Unit: in.



No.	Name	Remark
1	Signal line opening (Ø1)	Using the rubber plug in the unit's attachment for protection
2	Pipe outlet for 2-pipe system	
3	Pipe outlet for 3-pipe system	
4	Power supply opening	According to the wire diameter size to choose the appropriate line opening, and using the line sheath in the unit's attachment for protection.
5	Hoisting opening	
6	Power supply of signal line opening	
7	Refrigerant pipe outlet	
8	Drain opening	

MVHQ168/192/216/240ME2CA
MVHQ168/192/216/240ME4CA



No.	Name	Remark
1	Signal line hole(Ø25)	Using the rubber plug in the unit's attachment for protection
2	Pipe outlet for 2-pipe system	
3	Pipe outlet for 3-pipe system	
4	Power supply hole	According to the wire diameter size to choose the appropriate line hole, and using the line sheath in the unit's attachment for protection
5	Hoisting hole	
6	Power supply of signal line hole	
7	Refrigerant pipe outlet	
8	Drain hole	

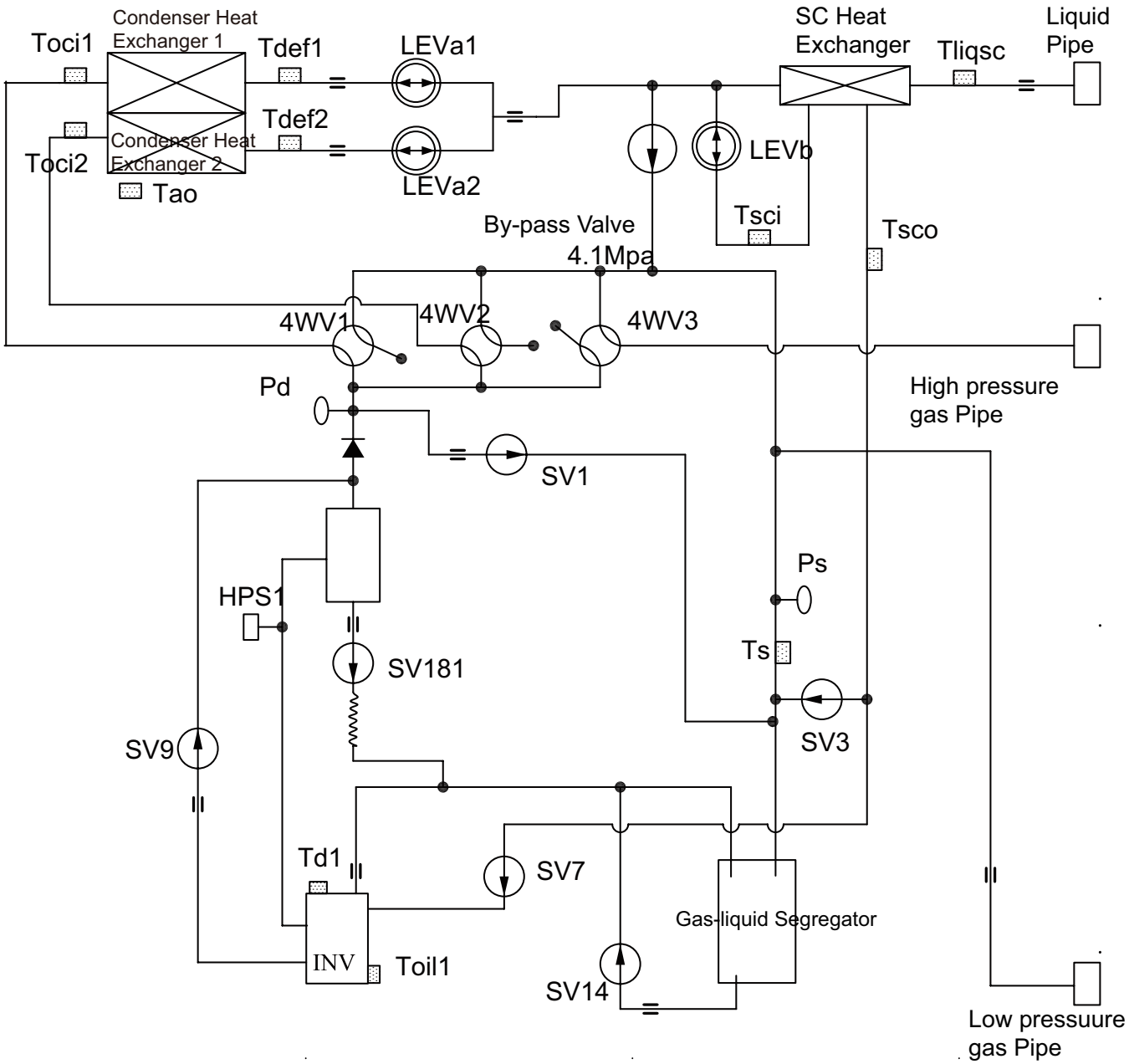
14. Center of Gravity

MVHQ168/192/216/240ME2CA
MVHQ168/192/216/240ME4CA

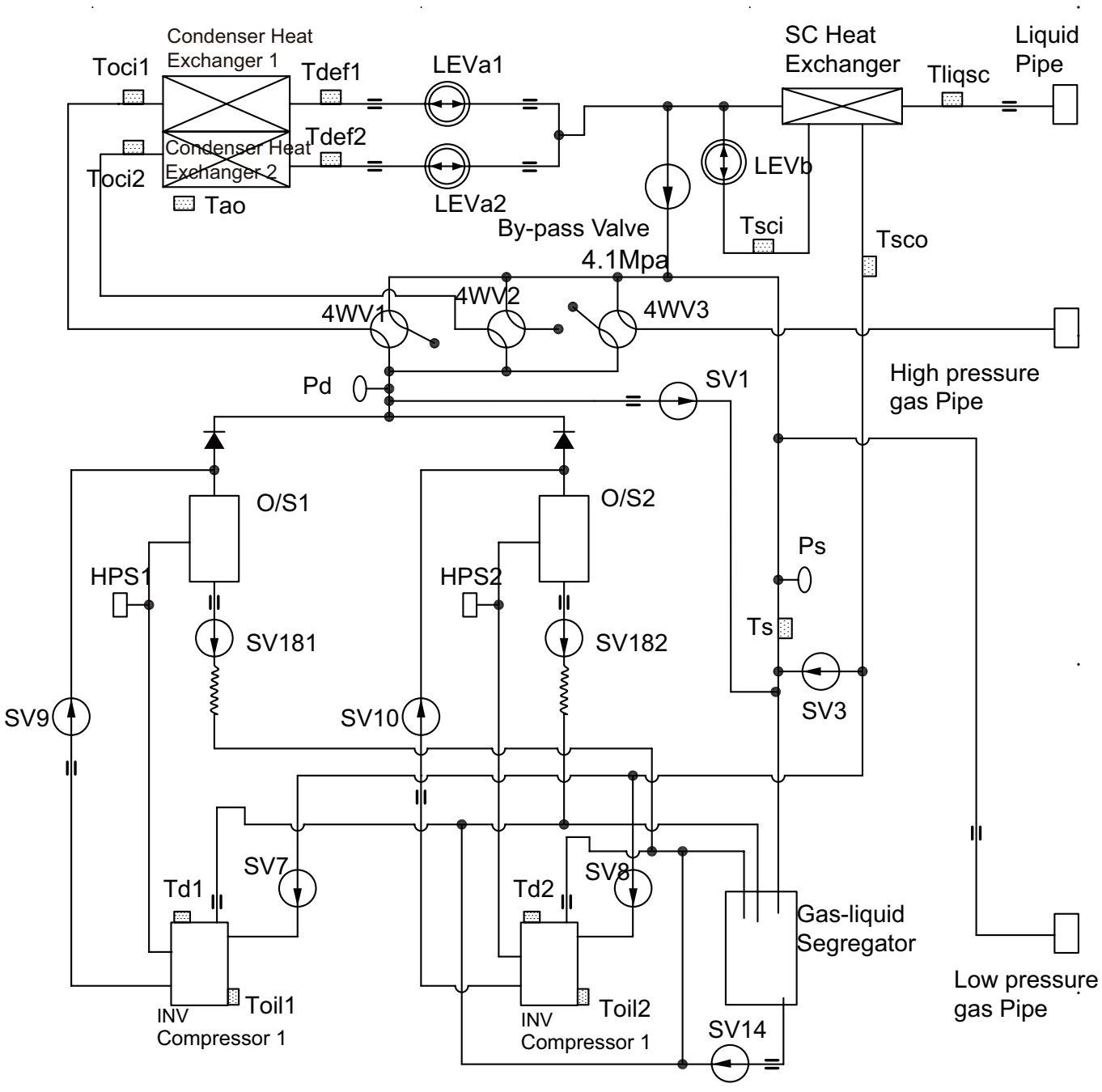
Coordinate position X-34.06 Y-16.93 Z-27.95

15. Piping Diagrams

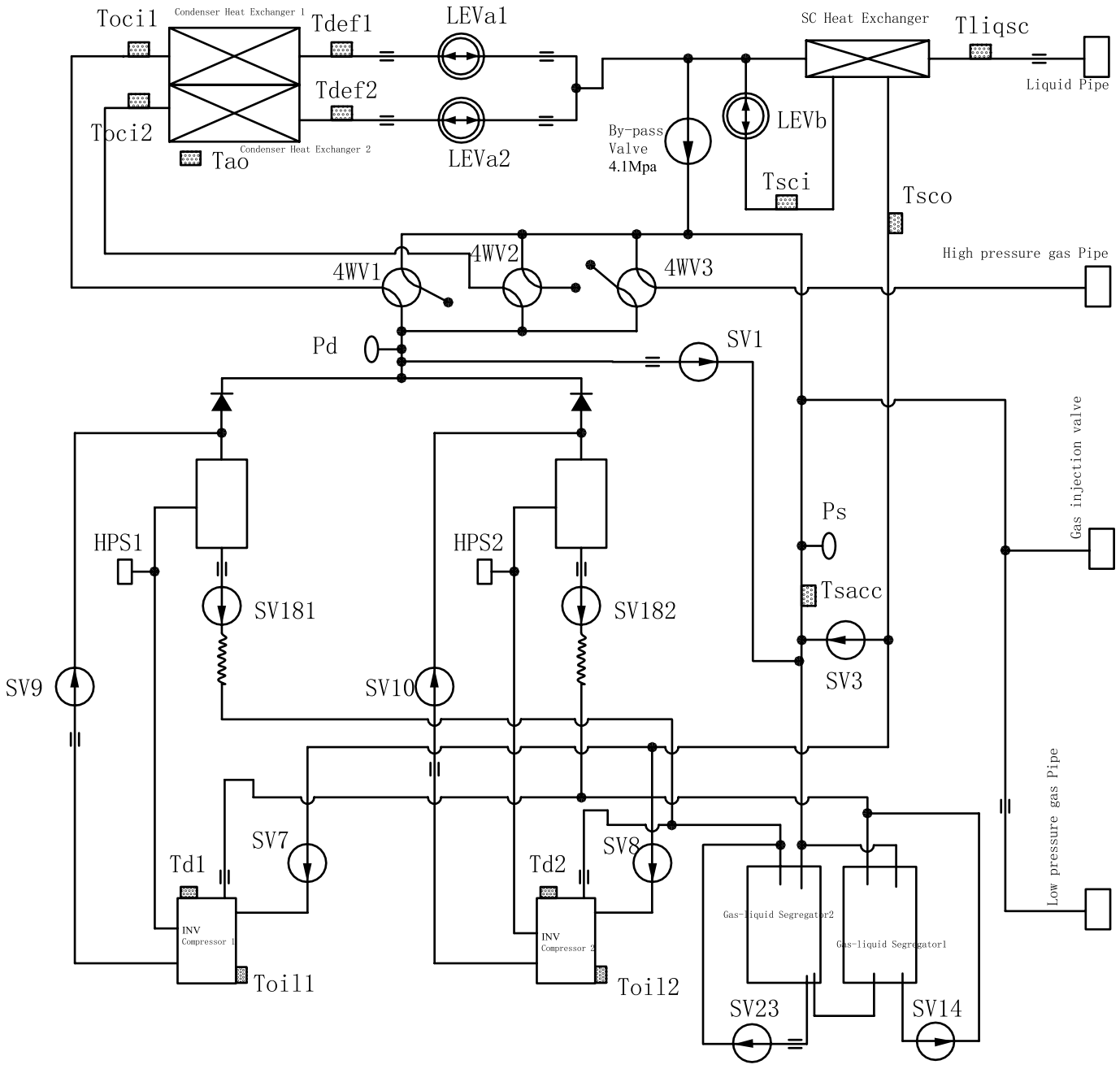
MVHQ072/096/120ME2CA-Cooling Operation
MVHQ072/096/120ME4CA-Cooling Operation



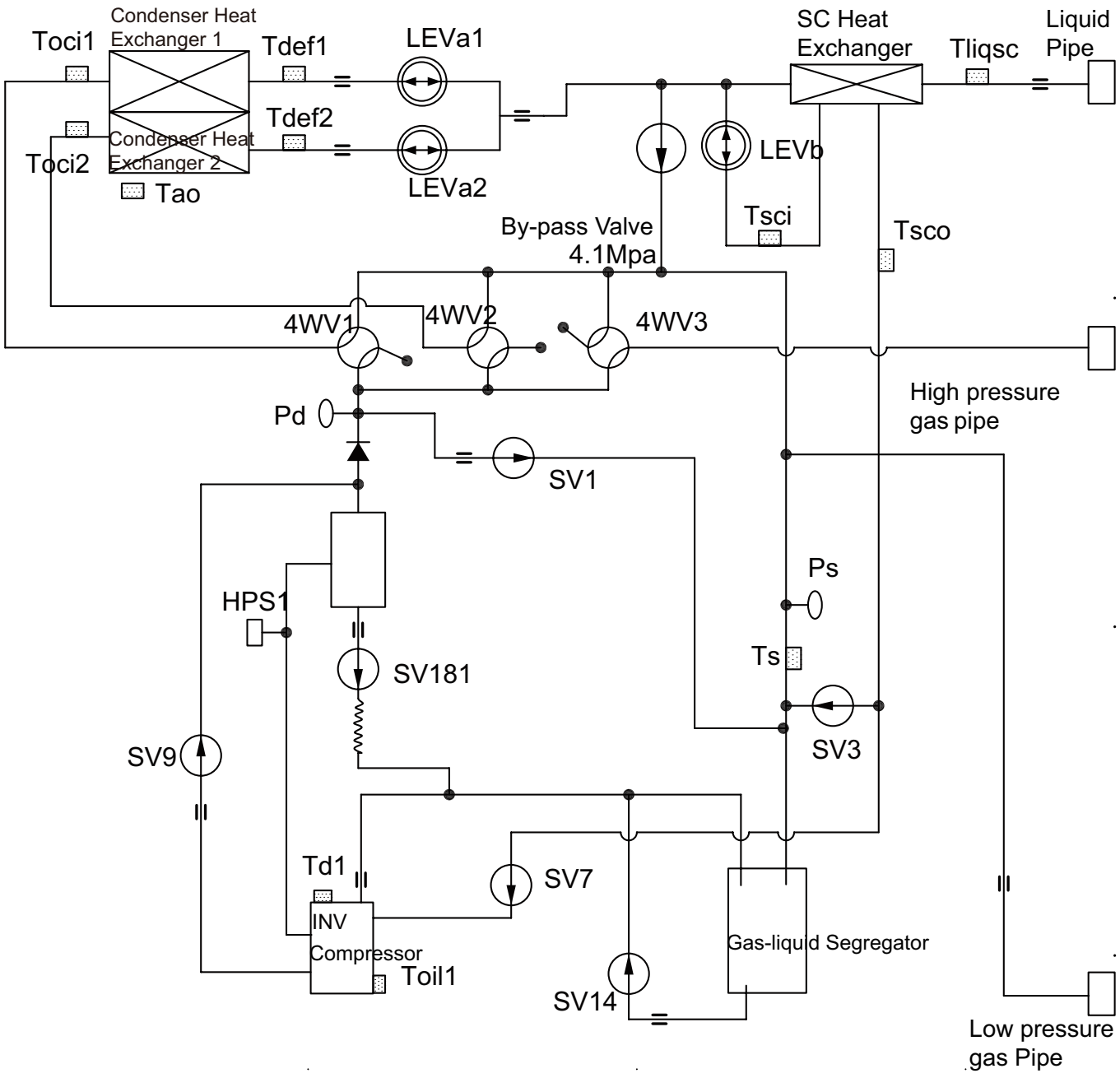
MVHQ144ME2CA-Cooling Operation
MVHQ144ME4CA-Cooling Operation



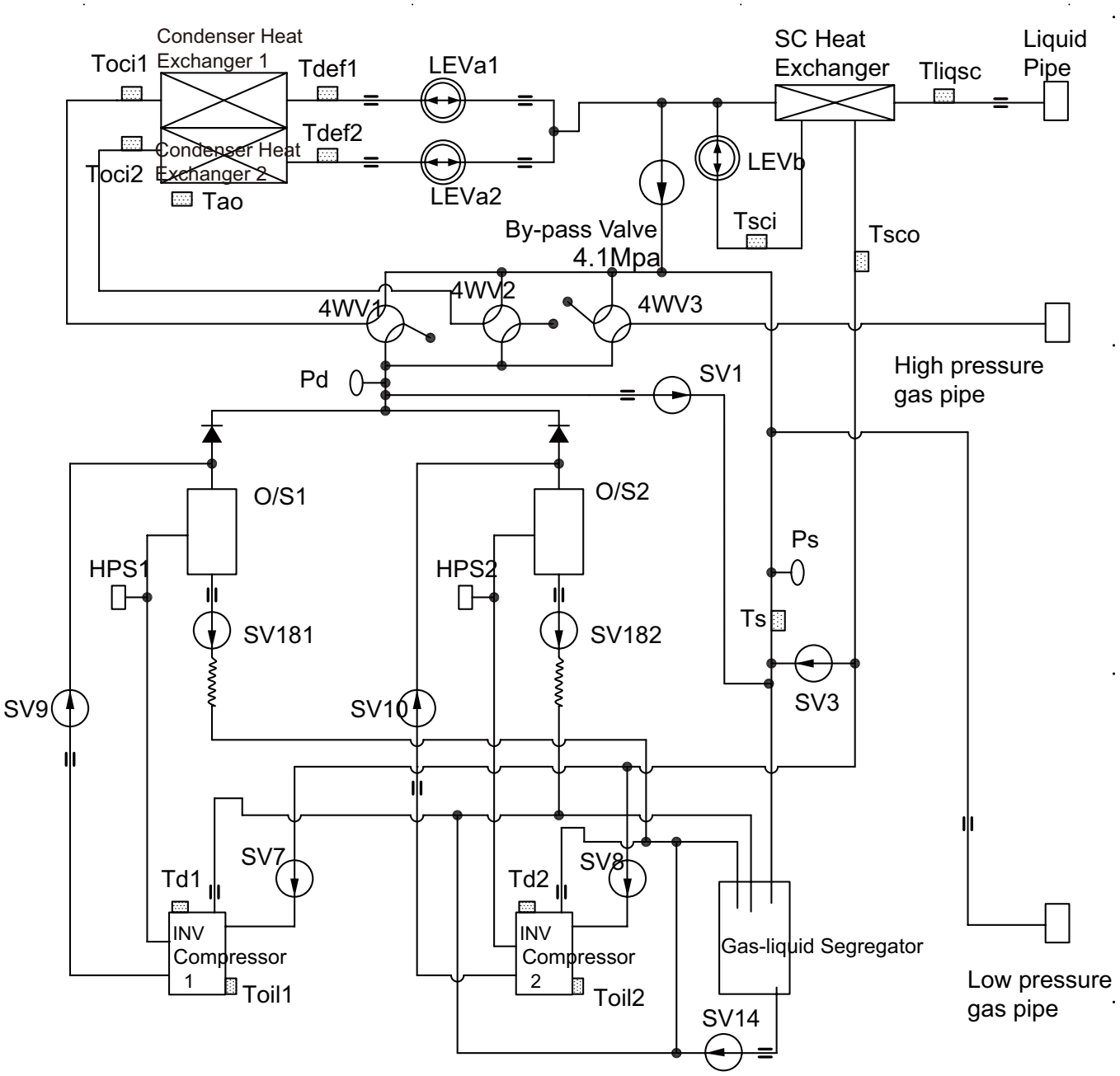
MVHQ168/192/210/240ME2CA-Cooling Operation
MVHQ168/192/210/240ME4CA-Cooling Operation



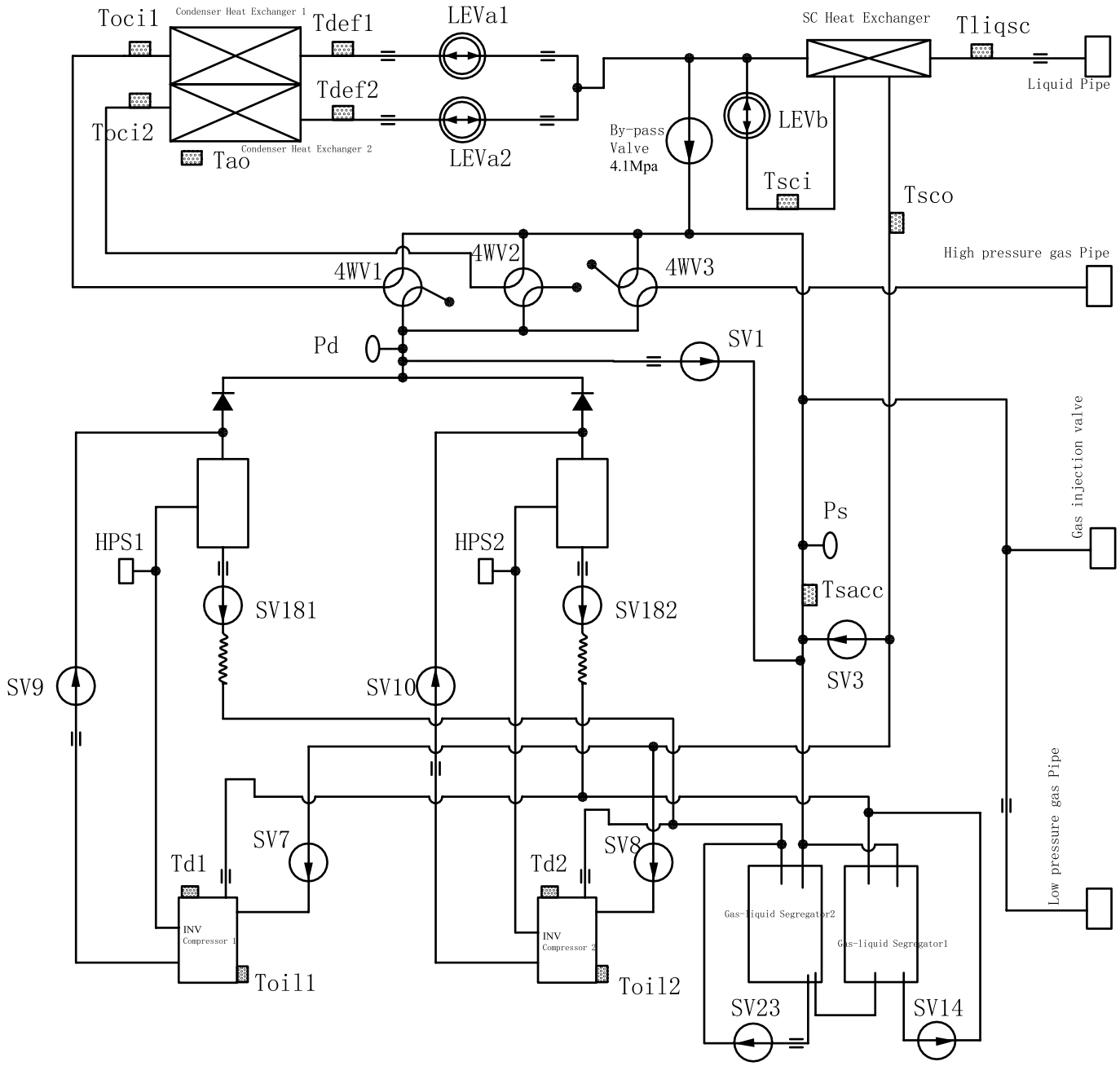
MVHQ072/096/120ME2CA-Heating Operation
MVHQ072/096/120ME4CA-Heating Operation



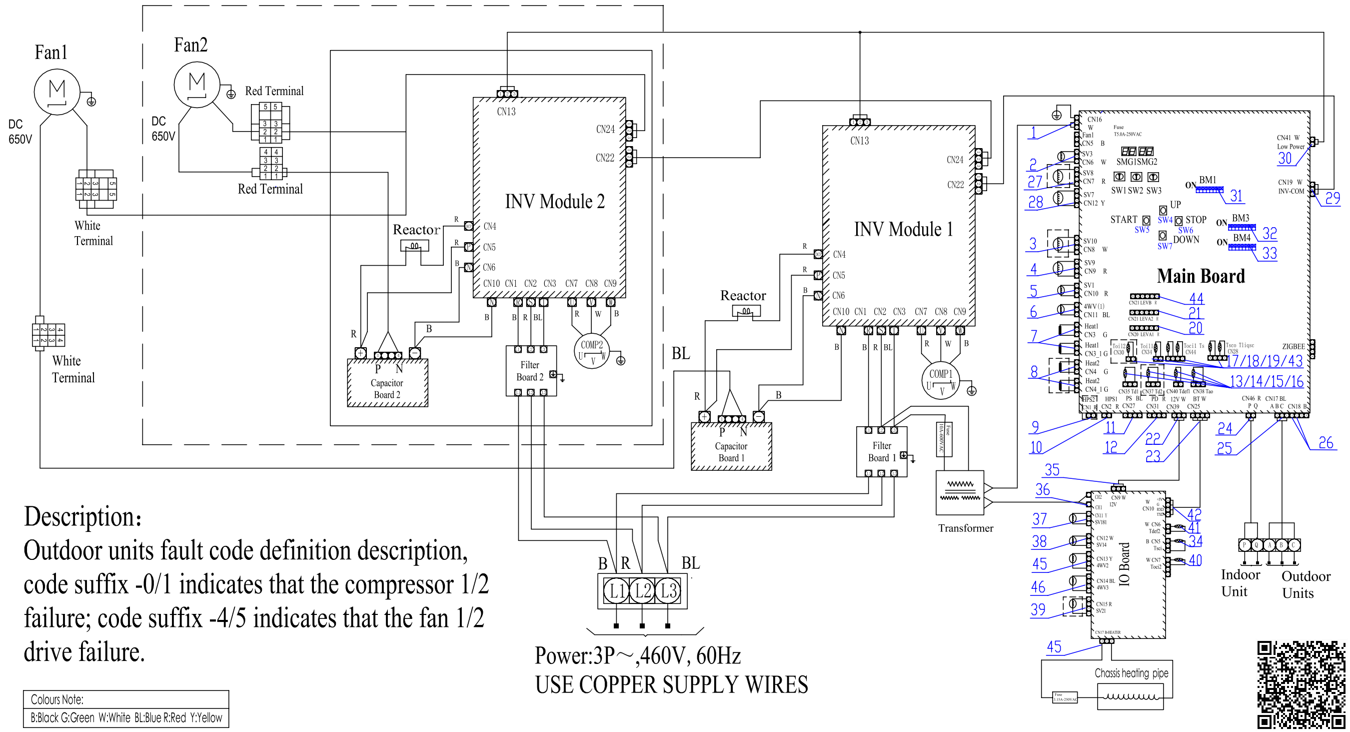
MVHQ144ME2CA-Heating Operation
MVHQ144ME4CA-Heating Operation



MVHQ168/192/210/240ME2CA-Heating Operation
MVHQ168/192/210/240ME4CA-Heating Operation



16. Wiring Diagrams



Description:
Outdoor units fault code definition description, code suffix -0/1 indicates that the compressor 1/2 failure; code suffix -4/5 indicates that the fan 1/2 drive failure.

Colours Note:
B:Black G:Green W:White BL:Blue R:Red Y:Yellow

Description of the Main-board Port definition

No.	Port	Port description
1	CN16	Power Input
2	SV3	Liquid Jetting
3	SV10	Drain the oil from compressor 2
4	SV9	Drain the oil from compressor 1
5	SV1	Balance pressure (Load-off)
6	4WV(1)	Hot and cold switching
7	HEAT1	Heating band of compressor 1
8	HEAT2	Heating band of compressor 2
9	HPS2	High Pressure Switch of Compressor 2
10	HPS1	High Pressure Switch of Compressor 1
11	Ps	Low pressure sensor
12	Pd	High pressure sensor
13	Td1	Exhaust temperature of compressor1
14	Td2	Exhaust temperature of compressor2
15	Tdef1	Detect the defrosting temp
16	Tao	Ambient temperature
17	Toil2	Detect the oil temp. of compressor 2
18	Toil1	Detect the oil temp. of compressor 1
19	Toci1/Ts	Detect SH temp. in heating
20	LEVA1	SH control in heating
21	LEVA2	SH control in heating
22	DC12V	Output DC12V
23	BT	Output DC5V/Communication
24	P/Q	Indoor/outdoor unit com. port
25	A/B/C	Outdoor unit com. port
26	Bus-B/A	Centralized control port
27	SV8	Injection valve of compressor 2
28	SV7	Injection valve of compressor 1
29	INV-COM	INV module com. port
30	Low Power	Low standby power consumption
31	BM1	Outdoor and indoor searching Outdoor address setting
32	BM3	HP setting of outdoor units
33	BM4	Set the control address
34	Tsci	Detect temp. of Injection valve
35	DC12V	Input DC12V
36	CH1/CH2	AC Power Input
37	SV181	Oil return control-Oil separator1
38	SV14	Oil return control-Gas liquid separator
39	SV21	Oil return control-Oil separator2
40	Toci2	Detect SH temp. in heating
41	Tdef2	Detect the defrosting temp
42	Tx Rx	Input DC5V/Communication
43	Tliqsc/Tsco	Detect SH temp. of subcooler
44	LEVB	Contral subcooler
45	4WV2	Hot and cold switching
46	4WV3	Hot and cold switching
47	B-HEATER	Chassis heating tube(optional)

Common fault code definition description

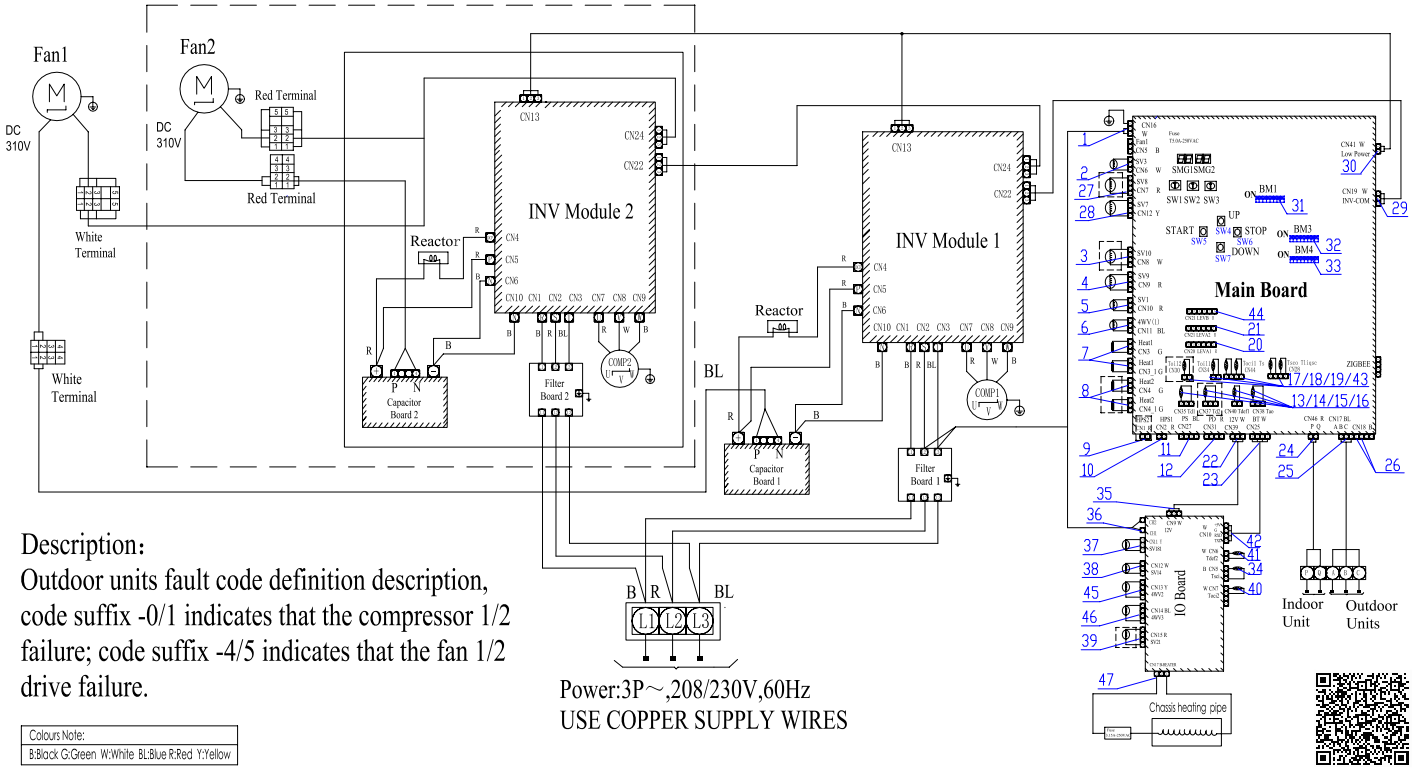
No.	Fault cord	Fault code description
1	26-0/1/2	Outdoor unit and indoor unit communication failure
2	35-0/1	4-way valve reversing failure
3	45	Outdoor unit and outdoor unit communication failure
4	46-0/1	Communication with INV1/2 board failure
5	46-4/5	Communication with Fan1/2 motor failure
6	47	Communication with wireless module failure
7	80	The outdoor unit does not match
8	83	Incorrect parameter setting or incorrect match of outdoor unit
9	110-0/1	PIM INV 0/1module protection(FO)
10	110-4/5	Fan motor 1/2 drive protection（FO）
11	111	INV compressor out of control
12	114	Voltage abnomaly of inverter input power supply
13	117-0/1	INV module software over current
14	117-4/5	Fan motor drive software over current
15	124	The three-phase power supply fault
16	125-4/5	Fan speed does not match
17	555.0	Ability to match the standby
18	555.2	Low pressure standby
19	555.8	No trial run standby

NOTE

1.In the air tightness test, please separate the indoor side of the airtight test to prevent nitrogen into the outdoor unit.
2.In the welding process must be nitrogen and cooling protection, to prevent oxidation of the pipeline and the valve body damage.
3.Tighten the bell-shaped pipe joint nut, do not exceed the appropriate torque, otherwise it will cause leakage. Cut off the valve tightening torque as shown on the right:
4.At the time of shipment, the valves are fully closed and must be confirmed that the valves and trachea valves are fully open before starting the unit.
5.After repair or maintenance is completed, the service valve and cap must be tightened with the appropriate torque to prevent refrigerant leakage.

1. Pendant le test d'étanchéité à l'air, veuillez séparer le côté intérieur pour empêcher l'azote d'entrer dans l'unité extérieure.
2. Il doit y avoir une protection d'azote et de refroidissement pendant le soudage pour empêcher l'oxydation du tuyau et les dommages au corps de la vanne.
3.Serrez l'écrou de joint de tube en forme de cloche, ne pas dépasser le couple approprié, sinon il causera des fuites. Coupez le couple de serrage de la valve, comme indiqué sur la figure de droite.
4.Au moment de l'expédition, les vannes sont complètement fermées. Confirmez que les valves et les valves trachéales sont complètement ouvertes avant de démarrer l'appareil.
5. Une fois la réparation ou l'entretien terminé, la vanne de service et le capuchon doivent être serrés avec le couple spécifié pour éviter les fuites de réfrigérant.

Globe valve size	Tightening torque N.m			Globe valve size	Tightening torque N.m			Maintenance valve
	Flare nuts	Shaft (valve body)	Cap (bonnet)		Flare nuts	Shaft (valve body)	Cap (bonnet)	
1/4 in	14～18	5～6		5/8 in	68～82	8～9	20～25	8～10
3/8 in	34～42	5～6	13～16	3/4 in	84～98	8～9	22～27	
1/2 in	49～61	8～9	16～20	11/8 in	welding	37.5±2.5	20～25	



Description:
Outdoor units fault code definition description, code suffix -0/1 indicates that the compressor 1/2 failure; code suffix -4/5 indicates that the fan 1/2 drive failure.

Colours Note:
B:Black G:Green W:White BL:Blue R:Red Y:Yellow

Power:3P～,208/230V,60Hz
USE COPPER SUPPLY WIRES

Description of the Main-board Port definition

No.	Port	Port description
1	CN16	Power input
2	SV3	Liquid Jetting
3	SV10	Drain the oil from compressor 2
4	SV9	Drain the oil from compressor 1
5	SV1	Balance pressure (Load-off)
6	4WV(1)	Hot and cold switching
7	HEAT1	Heating band of compressor 1
8	HEAT2	Heating band of compressor 2
9	HPS2	High Pressure Switch of Compressor 2
10	HPS1	High Pressure Switch of Compressor 1
11	Ps	Low pressure sensor
12	Pd	High pressure sensor
13	Td1	Exhaust temperature of compressor1
14	Td2	Exhaust temperature of compressor2
15	Tdef1	Detect the defrosting temp
16	Tao	Ambient temperature
17	Toil2	Detect the oil temp. of compressor 2
18	Toil1	Detect the oil temp. of compressor 1
19	Tco1/Ts	Detect SH temp. in heating
20	LEVA1	SH control in heating
21	LEVA2	SH control in heating
22	DC12V	Output DC12V
23	BT	Output DC5V/Communication
24	P/Q	Indoor/outdoor unit com. port
25	A/B/C	Outdoor unit com. port
26	Bus-B/A	Centralized control port
27	SV8	Injection valve of compressor 2
28	SV7	Injection valve of compressor 1
29	INV-COM	INV module com. port
30	Low Power	Low standby power consumption
31	BM1	Outdoor and indoor searching Outdoor address setting
32	BM3	HP setting of outdoor units
33	BM4	Set the control address
34	Tsci	Detect temp. of injection valve
35	DC12V	Input DC12V
36	CH1/CH2	AC Power Input
37	SV181	Oil return control-Oil separator1
38	SV14	Oil return control-Gas liquid separator
39	SV21	Oil return control-Oil separator2
40	Toc2	Detect SH temp. in heating
41	Tdef2	Detect the defrosting temp
42	Tx Rx	Input DC5V/Communication
43	Tlqsc/Tsco	Detect SH temp. of subcooler
44	LEVB	Contral subcooler
45	4WV2	Hot and cold switching
46	4WV3	Hot and cold switching
47	B-HEATER	Chassis heating tube(optional)

Common fault code definition description

No.	Fault cord	Fault code description
1	26-0/1/2	Outdoor unit and indoor unit communication failure
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3	45	Outdoor unit and outdoor unit communication failure
4	46-0/1	Communication with INV1/2 board failure
5	46-4/5	Communication with Fan1/2 motor failure
6	47	Communication with wireless module failure
7	80	The outdoor unit does not match
8	83	Incorrect parameter setting or incorrect match of outdoor unit
9	110-0/1	PIM INV 0/1module protection(FO)
10	110-4/5	Fan motor 1/2 drive protection（FO）
11	111	INV compressor out of control
12	114	Voltage abnomaly of inverter input power supply
13	117-0/1	INV module software over current
14	117-4/5	Fan motor drive software over current
15	124	The three-phase power supply fault
16	125-4/5	Fan speed does not match
17	555.0	Ability to match the standby
18	555.2	Low pressure standby
19	555.8	No trial run standby

NOTE

1.In the air tightness test, please separate the indoor side of the airtight test to prevent nitrogen into the outdoor unit.
2.In the welding process must be nitrogen and cooling protection, to prevent oxidation of the pipeline and the valve body damage.
3.Tighten the bell-shaped pipe joint nut, do not exceed the appropriate torque, otherwise it will cause leakage. Cut off the valve tightening torque as shown on the right:
4.At the time of shipment, the valves are fully closed and must be confirmed that the valves and trachea valves are fully open before starting the unit.
5.After repair or maintenance is completed, the service valve and cap must be tightened with the appropriate torque to prevent refrigerant leakage.

1. Pendant le test d'étanchéité à l'air, veuillez séparer le côté intérieur pour empêcher l'azote d'entrer dans l'unité extérieure.
2. Il doit y avoir une protection d'azote et de refroidissement pendant le soudage pour empêcher l'oxydation du tuyau et les dommages au corps de la vanne.
3.Serrez l'écrou de joint de tube en forme de cloche, ne pas dépasser le couple approprié, sinon il causera des fuites. Coupez le couple de serrage de la valve, comme indiqué sur la figure de droite.
4.Au moment de l'expédition, les vannes sont complètement fermées. Confirmez que les valves et les valves trachéales sont complètement ouvertes avant de démarrer l'appareil.
5. Une fois la réparation ou l'entretien terminé, la vanne de service et le capuchon doivent être serrés avec le couple spécifié pour éviter les fuites de réfrigérant.

Globe valve size	Tightening torque N.m			Globe valve size	Tightening torque N.m			Maintenance valve
	Flare nuts	Shaft (valve body)	Cap (bonnet)		Flare nuts	Shaft (valve body)	Cap (bonnet)	
1/4 in	14～18	5～6		5/8 in	68～82	8～9	20～25	8～10
3/8 in	34～42	5～6	13～16	3/4 in	84～98	8～9	22～27	
1/2 in	49～61	8～9	16～20	11/8 in	welding	37.5±2.5	20～25	

17. Electric Characteristics

Model number		Units				Power Supply	
		HZ	Volts	Min.	Max	MCA	MOP
MVHQ072ME2CA		60	208/230	187	253	30	40
MVHQ096ME2CA		60	208/230	187	253	38	50
MVHQ120ME2CA		60	208/230	187	253	41	60
MVHQ144ME2CA		60	208/230	187	253	56	80
MVHQ168ME2CA		60	208/230	187	253	59	90
MVHQ192ME2CA		60	208/230	187	253	71	110
MVHQ216ME2CA		60	208/230	187	253	83	125
MVHQ240ME2CA		60	208/230	187	253	87	135
MVHQ264ME2CA	MVHQ144ME2CA MVHQ120ME2CA	60	208/230	187	253	56+41	80+60
MVHQ288ME2CA	MVHQ144ME2CA MVHQ168ME2CA	60	208/230	187	253	56+56	80+80
MVHQ312ME2CA	MVHQ144ME2CA MVHQ168ME2CA	60	208/230	187	253	56+59	80+90
MVHQ336ME2CA	MVHQ144ME2CA MVHQ192ME2CA	60	208/230	187	253	56+71	80+110
MVHQ360ME2CA	MVHQ168ME2CA MVHQ192ME2CA	60	208/230	187	253	59+71	90+110
MVHQ384ME2CA	MVHQ192ME2CA MVHQ192ME2CA	60	208/230	187	253	71+71	110+110
MVHQ408ME2CA	MVHQ192ME2CA MVHQ216ME2CA	60	208/230	187	253	71+83	110+125
MVHQ432ME2CA	MVHQ216ME2CA MVHQ216ME2CA	60	208/230	187	253	83+83	125+125
MVHQ456ME2CA	MVHQ120ME2CA MVHQ168ME2CA MVHQ168ME2CA	60	208/230	187	253	41+59+59	60+90+90

Model number		Comp.	OFM		SCCR
		RLA	kw	FLA	
MVHQ072ME2CA		16.7	940	4.1*2	5KA
MVHQ096ME2CA		22.8	720*2	3.88*2	5KA
MVHQ120ME2CA		24	720*2	3.88*2	5KA
MVHQ144ME2CA		16.7	720*2	3.88*2	5KA
MVHQ168ME2CA		26*2	940*2	4.1*2	5KA
MVHQ192ME2CA		28*2	940*2	4.1*2	5KA
MVHQ216ME2CA		30*2	940*2	4.1*2	5KA
MVHQ240ME2CA		32*2	940*2	4.1*2	5KA
MVHQ264ME2CA	MVHQ144ME2CA MVHQ120ME2CA	16.7+24	720*2*2	3.88*2*2	5KA
MVHQ288ME2CA	MVHQ144ME2CA MVHQ168ME2CA	16.7+16.7	720*2*2	3.88*2*2	5KA
MVHQ312ME2CA	MVHQ144ME2CA MVHQ168ME2CA	16.7+26*2	720*2+940*2	3.88*2*2	5KA
MVHQ336ME2CA	MVHQ144ME2CA MVHQ192ME2CA	16.7+28*2	720*2+940*2	3.88*2*2	5KA
MVHQ360ME2CA	MVHQ168ME2CA MVHQ192ME2CA	26*2+28*2	940*2*2	4.1*2*2	5KA
MVHQ384ME2CA	MVHQ192ME2CA MVHQ192ME2CA	28*2+28*2	940*2*2	4.1*2*2	5KA
MVHQ408ME2CA	MVHQ192ME2CA MVHQ216ME2CA	28*2+30*2	940*2*2	4.1*2*2	5KA
MVHQ432ME2CA	MVHQ216ME2CA MVHQ216ME2CA	30*2+30*2	940*2*2	4.1*2*2	5KA
MVHQ456ME2CA	MVHQ120ME2CA MVHQ168ME2CA MVHQ168ME2CA	24+26*2+26*2	940*4+720*2	3.88*2+4.1*2	5KA

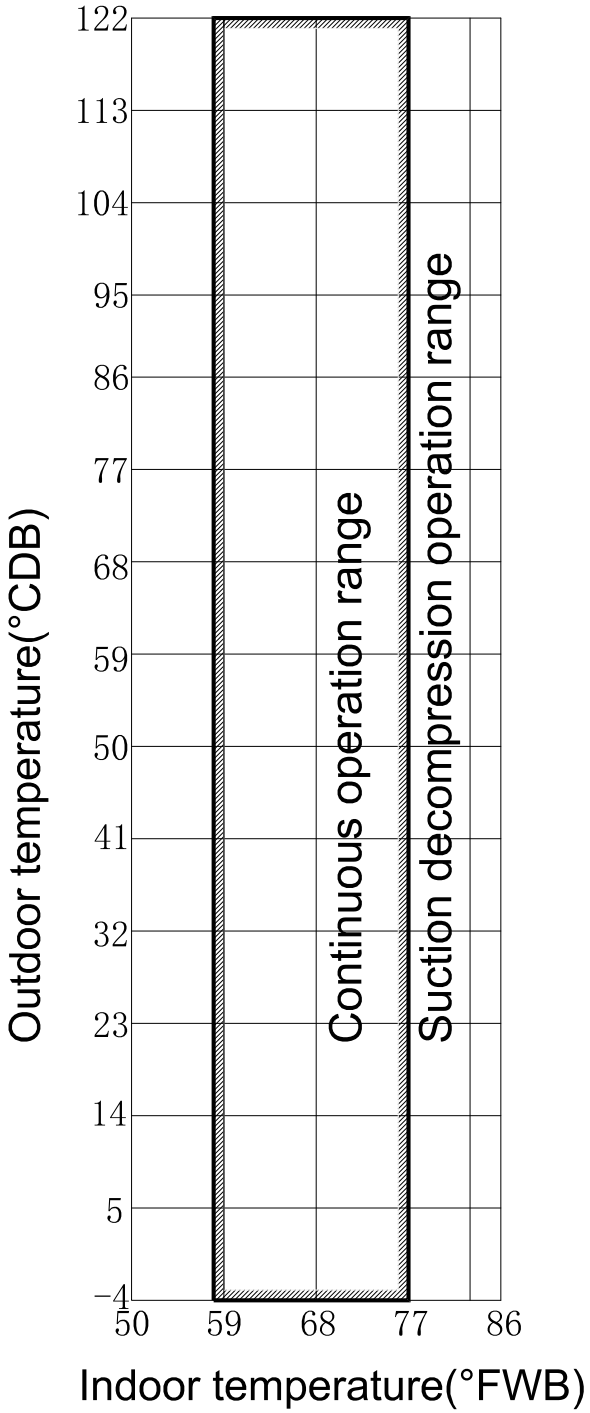
Haier

Model number		Units				Power Supply	
		HZ	Volts	Min.	Max	MCA	MOP
MVHQ072ME4CA		60	460	414	506	16	20
MVHQ096ME4CA		60	460	414	506	20	25
MVHQ120ME4CA		60	460	414	506	22	30
MVHQ144ME4CA		60	460	414	506	30	40
MVHQ168ME4CA		60	460	414	506	40	60
MVHQ192ME4CA		60	460	414	506	42	60
MVHQ216ME4CA		60	460	414	506	47	70
MVHQ240ME4CA		60	460	414	506	51	80
MVHQ264ME4CA	MVHQ144ME4CA MVHQ120ME4CA	60	460	414	506	30+22	40+30
MVHQ288ME4CA	MVHQ144ME4CA MVHQ168ME4CA	60	460	414	506	30+30	40+40
MVHQ312ME4CA	MVHQ144ME4CA MVHQ168ME4CA	60	460	414	506	30+40	40+60
MVHQ336ME4CA	MVHQ144ME4CA MVHQ192ME4CA	60	460	414	506	42+30	40+60
MVHQ360ME4CA	MVHQ168ME4CA MVHQ192ME4CA	60	460	414	506	40+42	60+60
MVHQ384ME4CA	MVHQ192ME4CA MVHQ192ME4CA	60	460	414	506	42+42	60+60
MVHQ408ME4CA	MVHQ192ME4CA MVHQ216ME4CA	60	460	414	506	42+47	60+70
MVHQ432ME4CA	MVHQ216ME4CA MVHQ216ME4CA	60	460	414	506	47+47	70+70
MVHQ456ME4CA	MVHQ120ME4CA MVHQ168ME4CA MVHQ168ME4CA	60	460	414	506	22+40+40	30+60+60

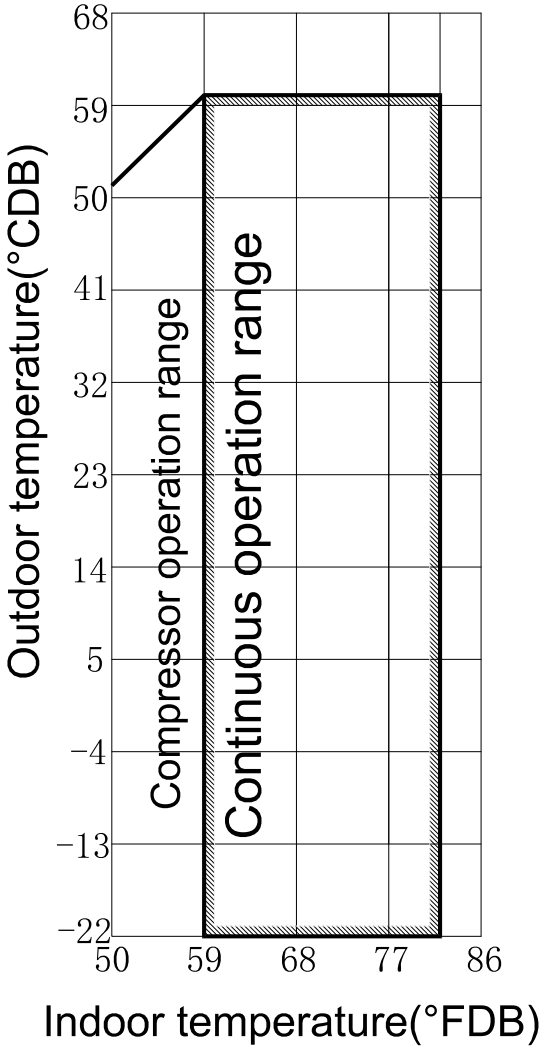
Model number		Comp.	OFM		SCCR
		RLA	kw	FLA	
MVHQ072ME4CA		10.5	950*2	2.2	5KA
MVHQ096ME4CA		14.5	720*2	1.7*2	5KA
MVHQ120ME4CA		16	720*2	1.7*2	5KA
MVHQ144ME4CA		12.5*2	720*2	1.7*2	5KA
MVHQ168ME4CA		12*2	950*2	2.2*2	5KA
MVHQ192ME4CA		14*2	950*2	2.2*2	5KA
MVHQ216ME4CA		16*2	950*2	2.2*2	5KA
MVHQ240ME4CA		18*2	950*2	2.2*2	5KA
MVHQ264ME4CA	MVHQ144ME4CA MVHQ120ME4CA	16.7+24	720*2*2	1.7*2*2	5KA
MVHQ288ME4CA	MVHQ144ME4CA MVHQ168ME4CA	12.5*2+12.5*2	720*2*2	1.7*2*2	5KA
MVHQ312ME4CA	MVHQ144ME4CA MVHQ168ME4CA	12.5*2+12*2	720*2+950*2	2.2*2+1.7*2	5KA
MVHQ336ME4CA	MVHQ144ME4CA MVHQ192ME4CA	12.5*2+14*2	720*2+950*2	2.2*2+1.7*2	5KA
MVHQ360ME4CA	MVHQ168ME4CA MVHQ192ME4CA	12*2+14*2	950*2*2	2.2*2*2	5KA
MVHQ384ME4CA	MVHQ192ME4CA MVHQ192ME4CA	14*2+14*2	950*2*2	2.2*2*2	5KA
MVHQ408ME4CA	MVHQ192ME4CA MVHQ216ME4CA	14*2+16*2	950*2*2	2.2*2*2	5KA
MVHQ432ME4CA	MVHQ216ME4CA MVHQ216ME4CA	16*2+16*2	950*2*2	2.2*2*2	5KA
MVHQ456ME4CA	MVHQ120ME4CA MVHQ168ME4CA MVHQ168ME4CA	16+12*2+12*2	950*4+720*2	2.2*4+1.7*2	5KA

18. Operation Limits

Cooling



Heating

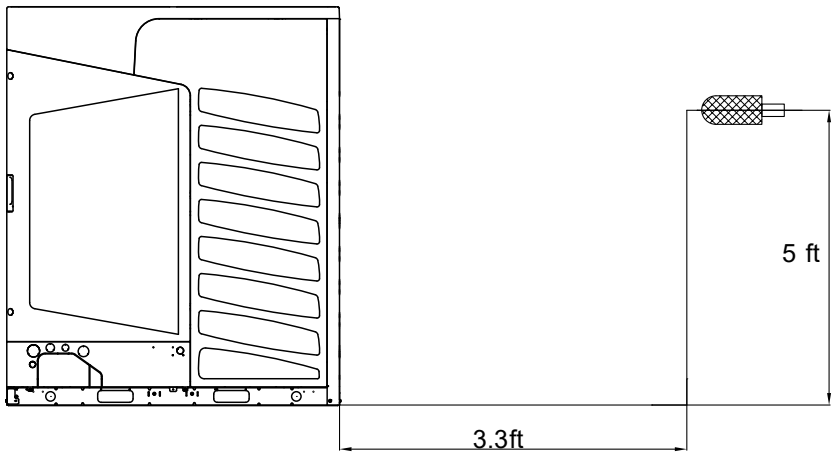


19. Sound Levels (Reference Data)

19. Noise level

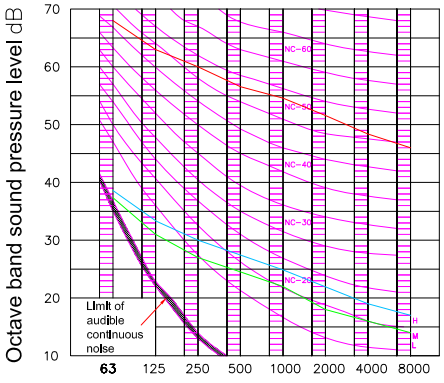
19.1. Sound level testing

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



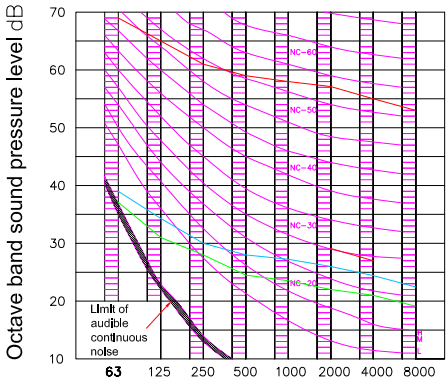
19.2. Octave band level

MVHQ072ME2CA



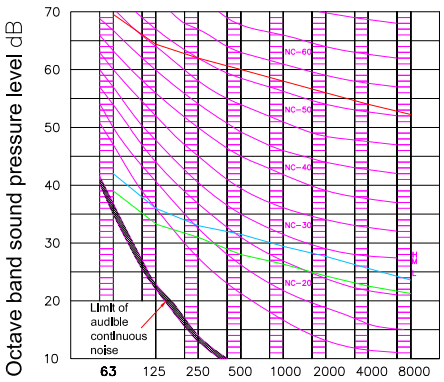
Octave band center frequency（HZ）

MVHQ096ME2CA



Octave band center frequency（HZ）

MVHQ144/168/192/216/240ME2CA



Octave band center frequency（HZ）

20. Optional Accessories

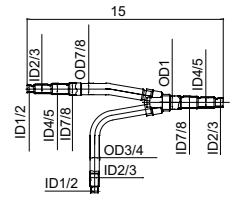
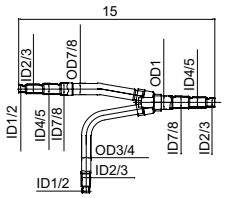
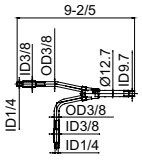
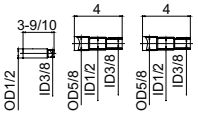
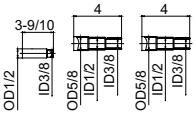
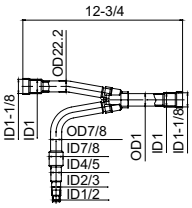
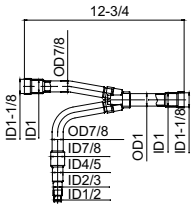
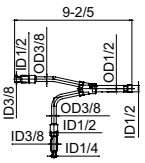
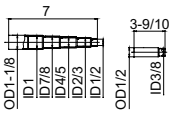
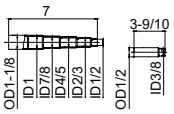
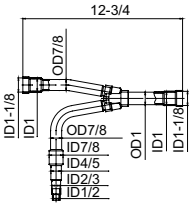
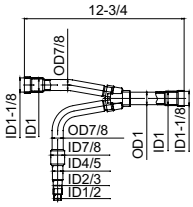
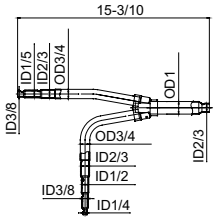
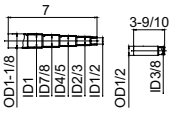
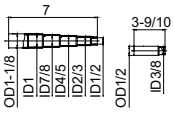
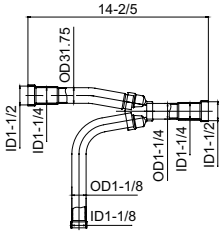
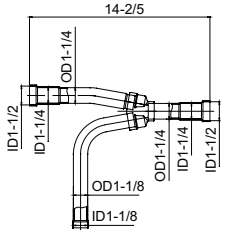
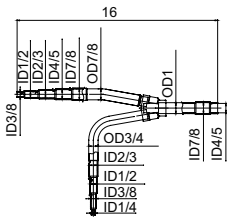
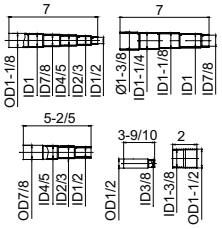
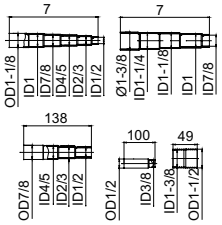
Branch pipe dimension

3-pipe systerm

FQG-R335A FQG-R506A FQG-R730A FQG-R1350A

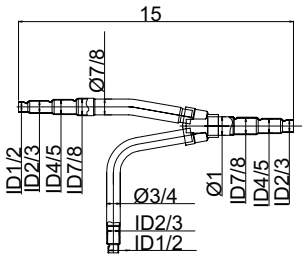
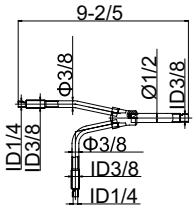
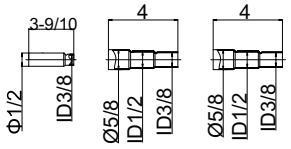
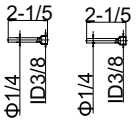
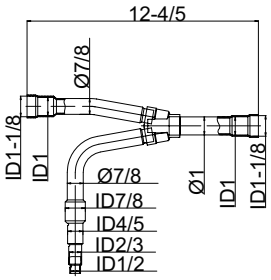
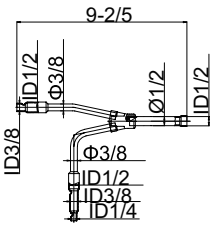
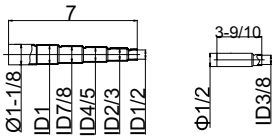
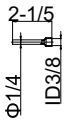
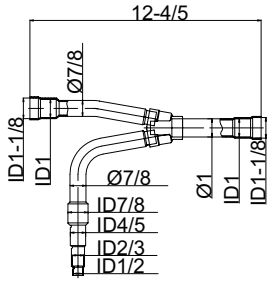
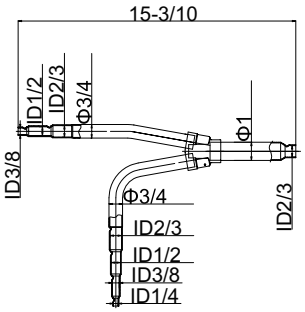
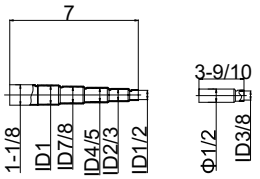
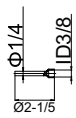
Note: Cut off the pipe from its middle when using.

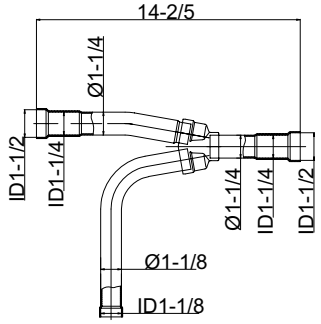
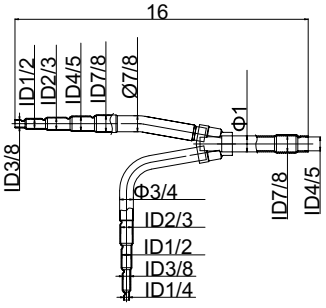
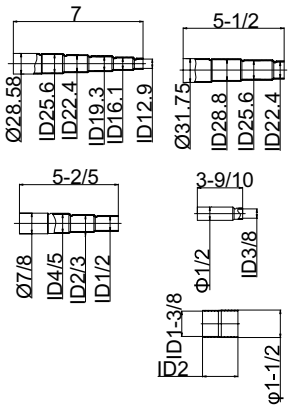
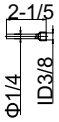
Unit: in. , ID: inner diameter, OD: outer diameter

	Suction gas branch pipe	HP gas branch pipe	Liquid branch pipe	Suction gas manifold pipe	HP gas manifold pipe	Liquid manifold pipe
FQG-R335A						
FQG-R506A						
FQG-R730A						
FQG-R1350A						

2-pipe systerm

Unit: in. ; ID: inner diameter;

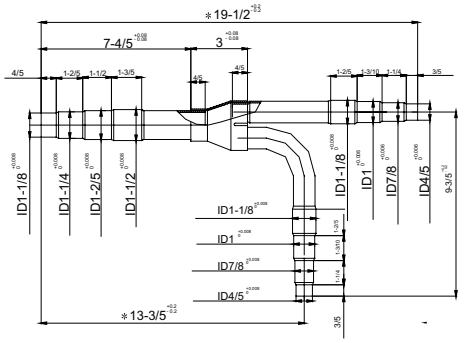
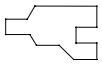
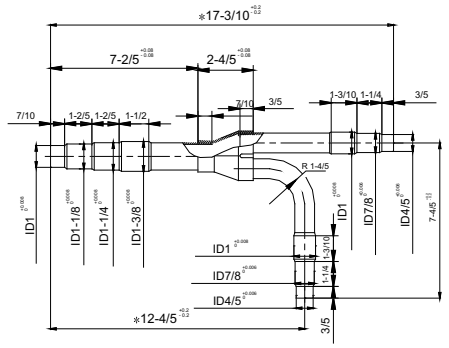
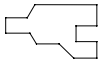
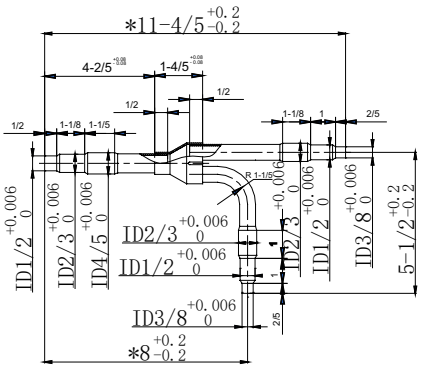
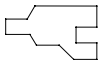
Model	Gas side branch pipe	Liquid side branch pipe	Gas side connection of branch pipe	Liquid side connection of branch pipe
FQG-B335A				
FQG-B506A				
FQG-B730A				

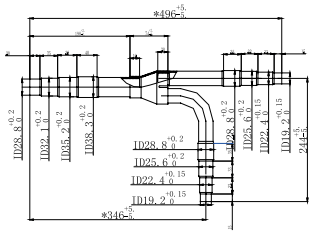
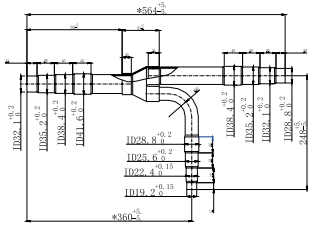
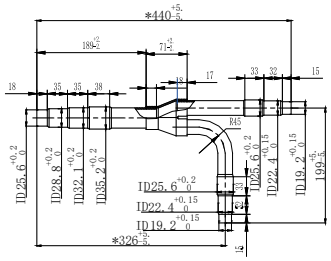
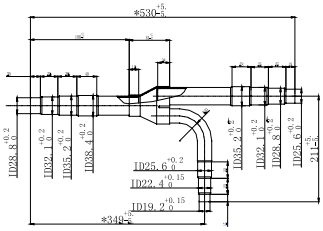
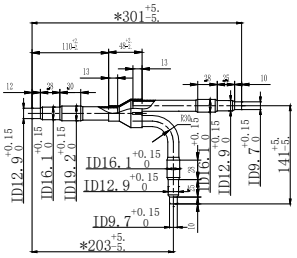
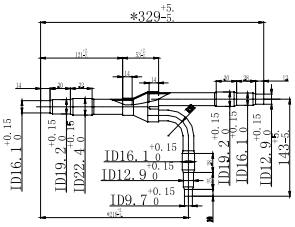
Model	Gas side branch pipe	Liquid side branch pipe	Gas side connection of branch pipe	Liquid side connection of branch pipe
FQG-B1350A				

Gather pipe dimension

Gather pipe is used for combination of outdoor unit. HZG-R20B (for 2 basic modules), HZG-R30B (for 3 basic modules)

Note: Cut off the pipe from its middle when using. Unit: in., ID: inner diameter, OD: outer diameter

Model	Side	Mark	Manifold pipe	Insulation material	Side	Mark	Connection of manifold pipe
HZG-R20B	Suction gas side	A			Suction gas side	1	
	HP gas side	B			HP gas side	2	
	Liquid side	C			Liquid side	3	

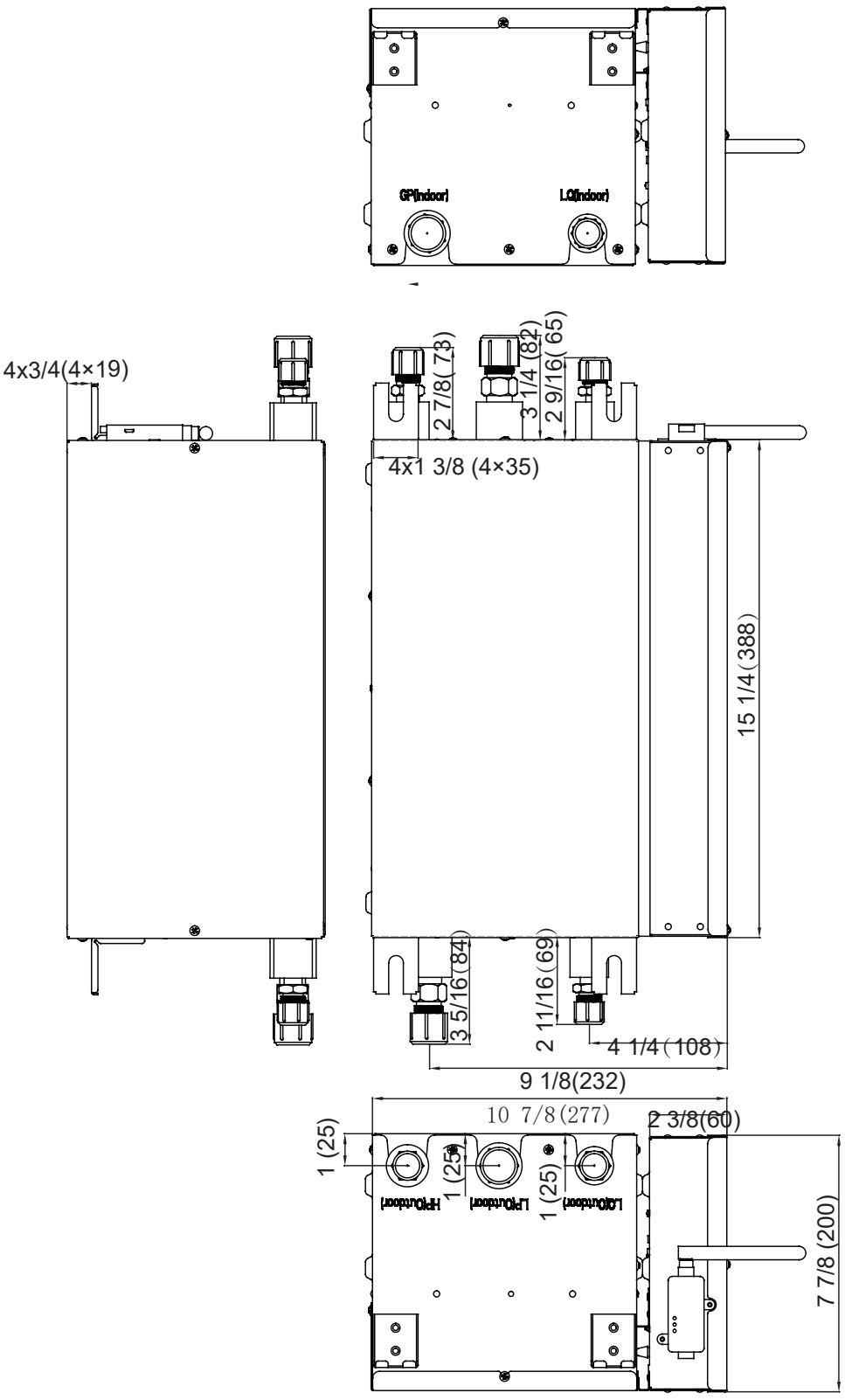
Model	Side	Mark	Manifold pipe	Insulation material	Side	Mark	Connection of manifold pipe
HZG-R30B	Suction gas side	D			Suction gas side	4	
		E				5	
	HP gas side	F			HP gas side	6	
		G				7	
	Liquid side	H			Liquid side	8	
		I				9	

One by one valve box

Specification

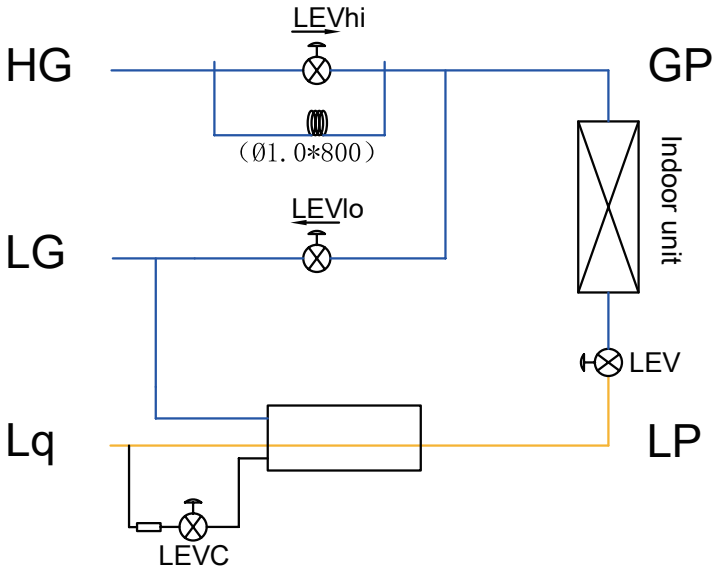
Model		VP1-112B	VP1-180B	VP1-280B
Power Supply		1/220-230/50/60		
Max. Number of branch lines		1	1	1
Branching Number of Connectable Indoor Units		5	8	8
Total Number of Connectable Indoor Units		5	8	8
Branching Capacity of Connectable Indoor Units	kBtu/h(kW)	x≤38 (x≤11.2)	38 K < x ≤ 61 (11.2<x≤18)	61< x ≤95 (18<x≤28)
Total Capacity of Connectable Indoor Units	kBtu/h(kW)	x≤38 (x≤11.2)	38 K < x ≤ 61 (11.2<x≤18)	61< x ≤95 (18<x≤28)
Dimension (W×H×D)	in.(mm)	23.94*13.39*10.67 (388×277×200)	23.94*13.39*10.67 (388×277×200)	23.94*13.39*10.67 (388×277×200)
Net/Gross weight	kg	8.6/10.8	8.6/10.9	9.3/12
Liquid Pipe-Connect To Outdoor Unit	inch.(mm)	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)
Gas Pipe-Connect To Outdoor Unit	inch.(mm	5/8 (15.88)	5/8 (15.88)	7/8 (22.22)
High Pressure Gas Pipe-Connect To Outdoor Unit	inch.(mm	1/2 (12.7)	5/8 (15.88)	3/4 (19.05)
Liquid Pipe-Connect To Indoor Unit	inch.(mm	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)
Gas Pipe-Connect To Indoor Unit	inch.(mm	5/8 (15.88)	5/8 (15.88)	7/8 (22.22)

Dimension

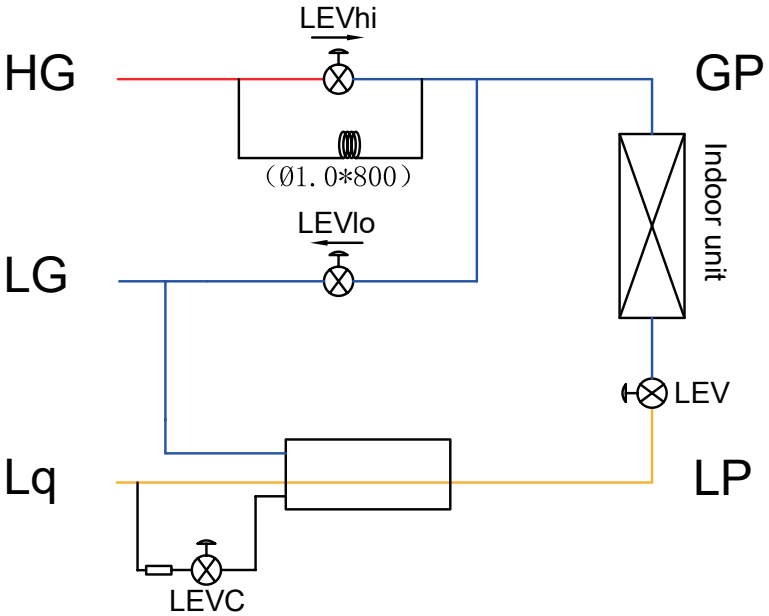

GP(Indoor)
LQ(Indoor)
4x3/4(4×19)
2 7/8(73)
3 1/4 (82)
2 9/16(65)
4x1 3/8 (4×35)
15 1/4 (388)
3 5/16 (84)
2 11/16 (69)
4 1/4 (108)
9 1/8(232)
10 7/8(277)
2 3/8(60)
1 (25)
1 (25)
1 (25)
HP(Outdoor)
LP(Outdoor)
LQ(Outdoor)
7 7/8 (200)

Piping diagram

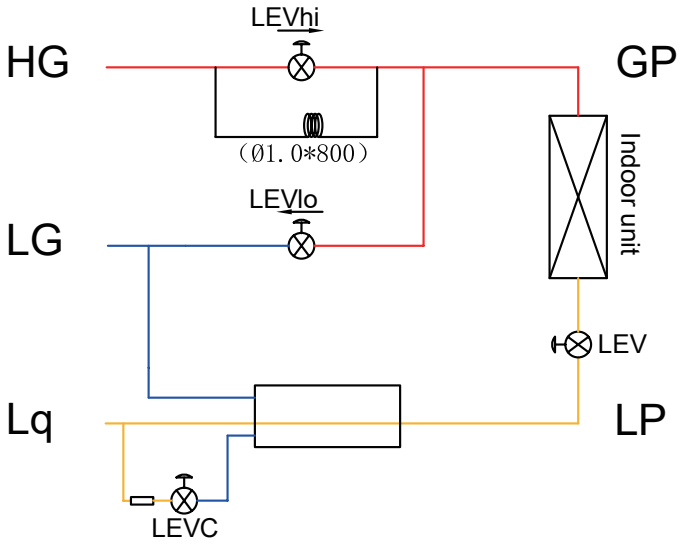
All cooling



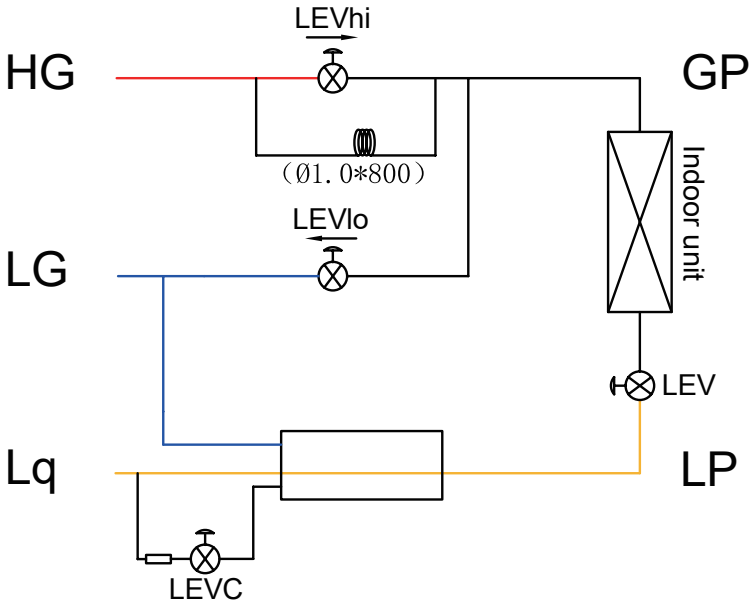
Cooling > Heating



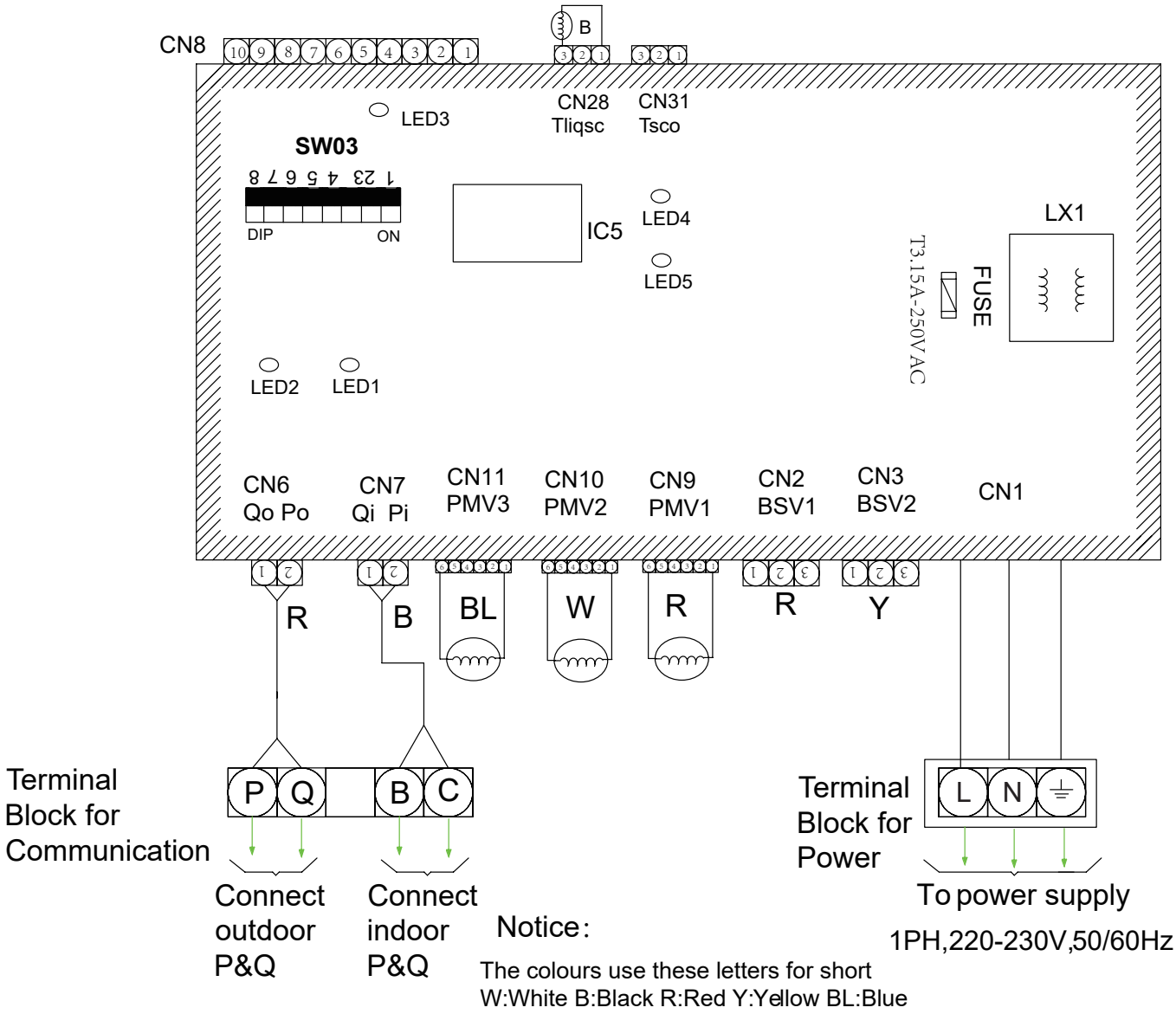
All heating / Heating > Cooling / Heating standby



Cooling OFF



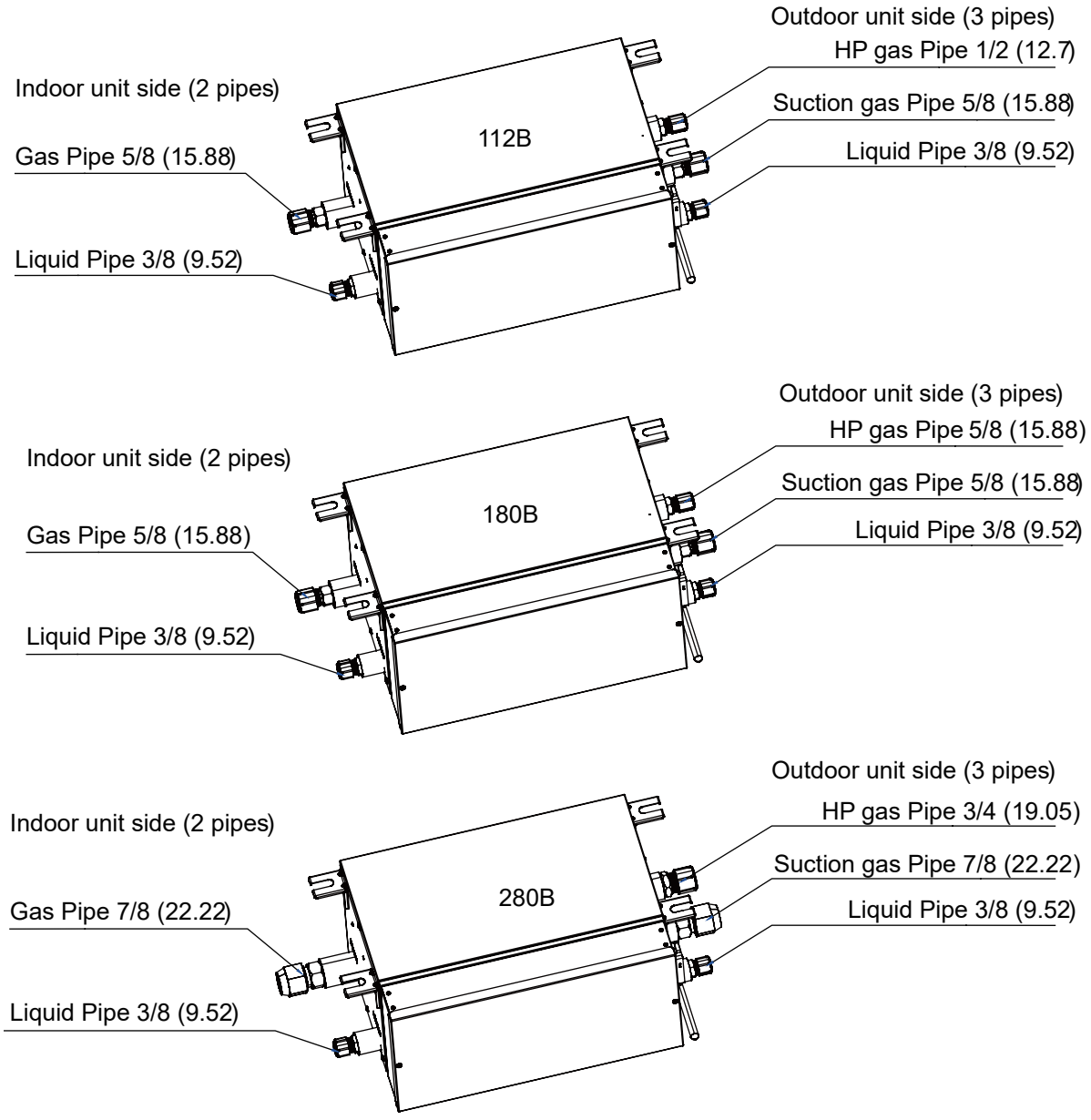
Wiring Diagran



Notice:

The colours use these letters for short
W:White B:Black R:Red Y:Yellow BL:Blue

Wiring Diagran



- If the valve box is transferred to a new user, this manual shall be transferred to the user, together with the conditioner.
- Before installation, be sure to read Safety Considerations in this manual for proper installation.
- The safety considerations stated below is divided into "⚠Warning" and "⚠ Attention". The matters on severe accidents caused from wrong installation, which is likely to lead to death or serious injury, are listed in "⚠ Warning". However, the matters listed in "⚠ Attention" are also likely cause the severe accidents. In general, both of them are the important items related to the security, which should be strictly abided by.
- After the installation, perform test run to make sure everything is in normal conditions, and then operate and maintain the valve box in accordance with the user manual. The user manual should be delivered to the user for proper keeping.

⚠Warning

- Please ask the special maintenance station for installation and repair. Water leakage, electric shocks or fire accidents might be caused from improper installation if you conduct the installation by your own.
- The installation should be conducted properly according to this manual. Water leakage, electric shocks or fire accidents might be caused from improper installation.
- Please make sure to install the valve box on the place where can bear the weight of the valve box. The valve box can't be installed on the grids such as the non-special metal burglar-proof net. The place with insufficient support strength might cause the dropdown of the machine, which may lead to personal injuries.
- The installation should be ensured against typhoons and earthquakes, etc. The installation unconformable to the requirements will lead to accidents due to the turnover of the machine.
- Specific cables should be used for reliable connections of the wirings. Please fix the terminal connections reliably to avoid the outside force applied on the cables from being impressed on the cables. Improper connections and fixings might lead to such accidents as heating or fire accidents.
- Correct shapes of wirings should be kept while the embossed shape is not allowed. The wirings should be reliably connected to avoid the cover and the plate of the electrical cabinet clipping the wiring. Improper installation might cause such accidents as heating or fire accidents.
- While placing or reinstalling the valve box, except the specific refrigerant (R410A), don't let the air go into the refrigeration cycle system. The air in the refrigeration cycle system might lead to the cracking or personal injuries due to abnormal high pressure of the refrigeration cycle system.
- During installation, please use the accompanied spare parts or specific parts. If not, water leakage, electric shocks, fire accidents or refrigerant leakage might be caused.
- During installation, if refrigerant leakage occurs, ventilation measures should be taken, for the refrigerant gas might generate harmful gases upon contacting the flame.
- After installation, check if any refrigerant leakage exists. If the refrigerant gas leaks in the room, such things as air blowing heaters and stoves, etc. may generate harmful gases.
- Don't install the valve box at the places where the flammable gases may leak. In case the gas leakage occurs around the machine, such accidents as fire disasters may be caused.
- The refrigerant gas pipe, HP gas pipe and liquid pipe should be heat insulated to preserve heat. For inappropriate heat insulation, the water caused from the condensation will drop to get the article at home wet.
- The electrical construction shall be implemented by the correspondingly qualified personnel in accordance with electrical construction standards, local electrical laws as well as specifications. Moreover, dedicated circuit must be used, rather than the wire pin. Insufficient capacity of the wire circuit and unprepared construction (if any) may cause electric shock, fires, etc.
- During the process of grounding, the ground wire cannot be connected to the gas pipe, water pipe, lightning rod and ground wire of the telephone. Incomplete grounding may cause electric shock, fires, etc.
- Install residual-current circuit breaker, or electric shock, fires, etc. will occur.
- When contacting electrical components, ensure they are powered off. Contacting the live part may result in the danger of electric shock.

- If there is leakage of the refrigerant gas flow during operation, refrigerant gas is required. If the refrigerant gas contacts any fire, poisonous gases will be produced.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
- We recommend that the appliances be installed properly by qualified installation technicians in accordance with the installation instructions provided with the unit.

⚠ Attention

- The valve box should be effectively grounded. Electric shocks may occur if the valve box is ungrounded or inappropriately grounded. The wire for earthing shouldn't be connected to the connections on the gas pipe, water pipe, lightning rod or telephone.
- The breaker for electricity leakage should be mounted. If not, accidents such as electric shocks may happen.
- The installed valve box should be checked for electricity leakage by being powered.
- After installation, all cassette concealed valve boxes should be trial-tested. After the proper operation of the machine, other fitments can be made.
- When installing the valve box, please fix the box and connecting pipes in an efficient way to avoid shaking when changing valve box.
- If the ambient humidity bigger than 80%, when the water discharge hole be blocked or the filter becomes dirty, or airflow speed change, there maybe leads to condensing water drop down, and at the same time there maybe some drops of water spit out.
- Keep the valve box, power supply wiring, conductor, etc. at least 1 m away from the TV and radio to avoid image interference and noise. However, sometimes there is still noise when the distance is over 1 m due to the different states of radio waves.
- Try to install valve box where the fluorescent lamp is far away.
- When wireless devices are being installed, the distance that the signal from the controller will reach may be shortened in a room with a fluorescent lamp that is turned on in an electric way (frequency conversion or rapid start).
- Please install the valve box in places where noise will not influence the customers too much (such as washroom, passageway, warehouse, equipment room, etc.). Places with high requirement for quiet are not suggested for installation, such as bedroom, drawing room, meeting room, office, etc.
- When starting up, stop, defrosting, and oil-returning in heating mode, the electronic expansion valve will switch and cause noise. This kind of noise is normal for the switching of valve box.

⃠ Prohibitions

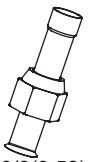
- Do not use components other than the fuse of proper capacity, such as metal wire and copper wire, which will cause fires and other faults if used instead of the fuse.
- When doing the cleaning and maintenance, make sure that the operation has been stopped and the manual power switch is in the off position.
- Do not use appliances such as water heater near the valve box. Using appliances producing steam near the valve box may lead to accidents such as water leakage, electric leakage and short circuit when the cooling system is in operation.
- Two-generation valve boxes VP1-*A and VP1-*B can't be mixed used in one system.

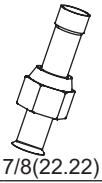
Do not install at such places
1. A place that is filled with mineral oil, a kitchen which has oil and steam everywhere, etc., which may cause degradation, falling off and water leakage of the resinous components.
2. A place with corrosive gases such as sulphurous acid gas, which will lead to the corrosion of the copper tube, welding joint, etc., causing refrigerant leakage.
3. A place where machines give out electromagnetic waves, which will lead to abnormality and improper function of the control system.
4. A place with possible leakage of combustible gases, floating of carbon fiber and combustible dust and use of volatile combustible substances such as diluents, the accumulation of which around the machine set will lead to fires.
5. A place where small animals inhabit, whose contacting the inner electrical components may cause faults, smoking, outbreak of a fire, etc.
6. A coastal place with high salinity and a place with great variation in voltage such as a factory, which may cause faults to vehicles and ships.

Attention item
Install after making sure that the type of the refrigerant used is R410A. If any other type of refrigerant is used, the machine cannot run.
• Before and after the unpacking, if valve box is to be moved, the hoisting handles (totally 4) shall be held firmly. Do not apply force to other parts, especially a refrigerant tube and an electrical cabinet.
• Concerning the installation of the outdoor and indoor units, refer to the installation specification of each unit.

Accessories
Confirm that the accessories below are packed together.

112B	Auxiliary pipe			Wiring harness		Insulation tube			Nut	Specification
Quantity	1	1	1	6	9	2	1	2	5	1
Shape	①-1 1/4(6.35)  3/8(9.52)	①-2 3/8(9.52)  5/8(15.88)	①-3 1/2(12.7)  5/8(15.88)			 3/8 (9.52)	 1/2(12.7)	 5/8 (15.88)		

180B	Auxiliary pipe		Wiring harness		Insulation tube		Nut	Specification
Quantity	1	2	6	9	2	3	4	1
Shape	①-1 1/2  5/8(15.88)	①-2 Ø19.2  3/8(9.52)			 3/8(9.52)	 5/8(15.88)		

280B	Auxiliary pipe				Wiring harness		Insulation tube			Nut	Specification
Quantity	2	2	1	1	6	9	2	2	1	3	1
Shape	①-1 3/4(19.2)  7/8(22.22)	①-2 7/8(22.4)  7/8(22.22)	①-3 5/8(16.1)  3/4(19.05)				 3/8(9.52)	 7/8(22.22)	 3/4(19.05)		

<Entrustment> Before the installation is completed, do not abandon the accessories needed in installation.

Combinations

This series is cooling and heating heat recovery models. Only when the system is equipped with valve box, indoor units under different valve boxes can achieve cooling and heating simultaneously. The modes of the indoors which under the same valve box should be the same. If the indoors connected without valve box, the indoors only can do cooling mode. Do not connect the valve box to the common multi-split system, as the former is dedicated to the cooling & heating multi-split system.

Concerning the model of the connectible indoor unit, see the sample brochure, etc. for confirmation.

Concerning the total capacity of the indoor unit connected at the downstream of the valve box (the total selected capacity of the models), select in Table 1 according to the quantity (refer to Table 2 for the selected capacity of the model of each indoor unit)

Table1: Total capacity of indoor unit:

Valve box	Total capacity of indoor unit kBtu/h (kW)	Quantity of indoor unit
112B	x≤38 (x≤11.2)	Less than 5
180B	38 K < x ≤ 61 (11.2<x≤18)	Less than 8
280B	61< x ≤95 (18<x≤28)	Less than 8

Table 2: Capacity measure and selected capacity of the model of indoor unit

Capacity measure	072	092	122	162	182	242	282	302	382	482	722	962
selected capacity kBtu/h (kW)	7 (2.2)	9 (2.8)	12 (3.6)	16 (4.5)	18 (5.6)	24 (7.0)	28 (8.0)	30 (9.0)	38 (11.2)	48 (14.0)	72 (22.6)	96 (28)

Inspection item

Pay much attention to the following during installation. Check them again after completion.

(1) Inspection items after installation

Inspection item	Defect	Inspection column
If the installation of valve box is secure ?	Falling off, vibration and noise	
If gas leakage inspection is completed ?	No heating/cooling	
If complete insulation is achieved (refrigerant piping and tubing connections) ?	Water leakage	
If the voltage of the power supply is consistent with that on the nameplate ?	Out of service, burnt	
If there is improper wiring or piping ?	Out of service, burnt	
If there is construction without grounding ?	Danger in electric leakage	
If the thickness of the wire is as specified ?	Out of service, burnt	

(2) Inspection upon delivery

Inspection item	Inspection column
If the electric box cover is installed	
If the installation specification is transferred to the customer	

1. Pre-installation

The installation location selected shall meet the following conditions and be approved by users.

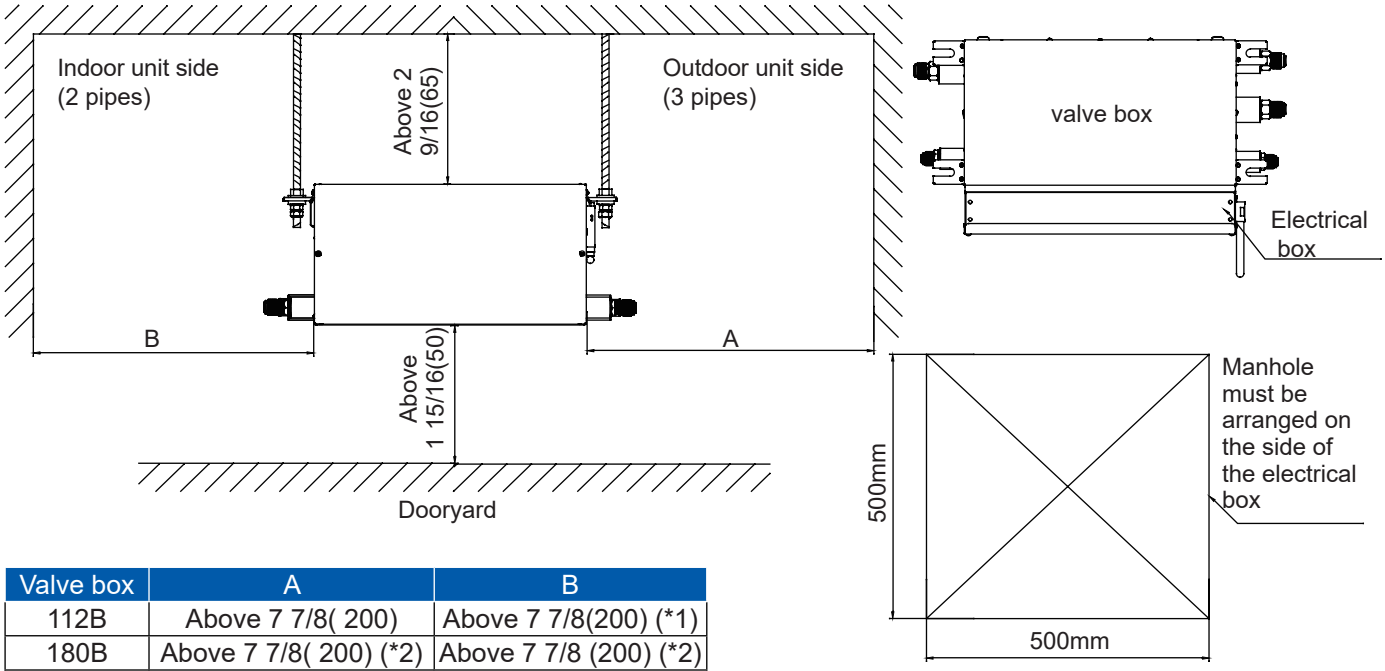
- The strength shall be sufficient to withstand the weight of the valve box
- There is no significant tilt on the plane.
- Ensure that there is enough space for installation and maintenance.as show in Fig.1
- There is space for inspection on the side and top of the electric box
- The length of piping between the indoor and outdoor units shall be within the permissible range (referring to the specification attached to the outdoor unit).
- Please install the valve box in places where noise will not influence the customers too much (such as washroom, passageway, warehouse, equipment room, etc.). Places with high requirement for quiet are not suggested for installation, such as bedroom, drawing room, meeting room, office, etc.

Note:

- the electrical box can be changed as show in 3 valve box installation.
- When starting up, stop, defrosting, and oil-returning in heating mode , the electronic expansion valve will veer and create noise. This kind of noise is normal for the running of valve box.
- A noise may be emitted by the valve box as aresult of control during operation or stopping of an indoor unit. If it is installed in the ceiling where it is exposed, take adequate precautions with the installation location.

<Notice item>

- Inspect whether the installation location can sufficiently withstand the weight of valve box and set the hoisting bolts by reinforcing the beam if necessary. Use hoisting bolts in installation (referring to 2 for the preparation before installation).
- Install the power wiring and power line of the valve box at more than 1 m away from TV and radio to prevent the image clutter and noise. But, there may be noise even if it is more than 1 m according to the different waves.

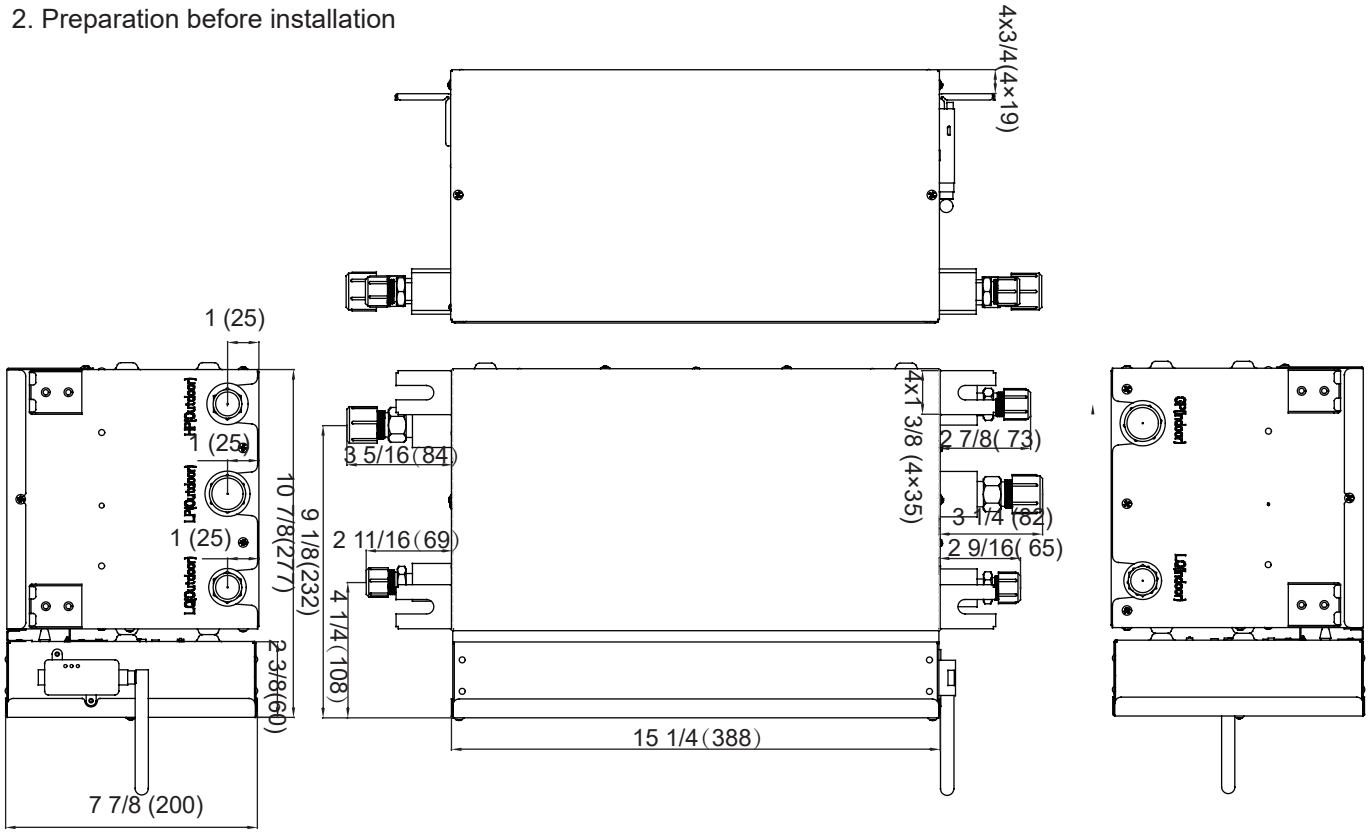


Valve box	A	B
112B	Above 7 7/8(200)	Above 7 7/8(200) (*1)
180B	Above 7 7/8(200) (*2)	Above 7 7/8 (200) (*2)
280B	Above 15 3/4(400)(*3)	Above 15 3/4 (*3)

Fig.1

(*1) Ensure the maintenance area with more than 250 mm when the auxiliary pipe ①-1,①-2,①-3 on page 4 is used.
(*2) Ensure the maintenance area with more than 400 mm when the auxiliary pipe ①-1,①-2 on page 4 is used.
(*3) Ensure the maintenance area with more than 500 mm when the auxiliary pipe ①-2,①-3 on page 4 is used.

2. Preparation before installation



See the Fig.1 & Fig.2 to install the lifting bolts and hoisting tools.
Use the lifting bolts with the size of M8~M10
Press insert for new settings. Press hole in anchor if set. Ensure that it can sufficiently withstand the weight of the valve box before installation.

(2) Lifting dimension of valve box

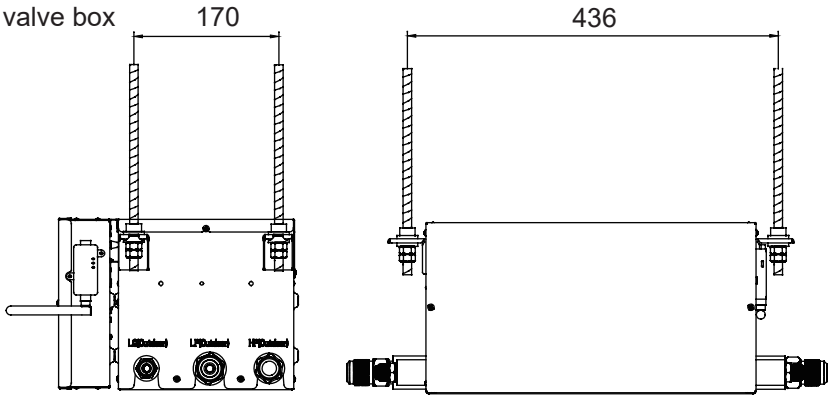


Fig.3 Pitch of lifting bolts

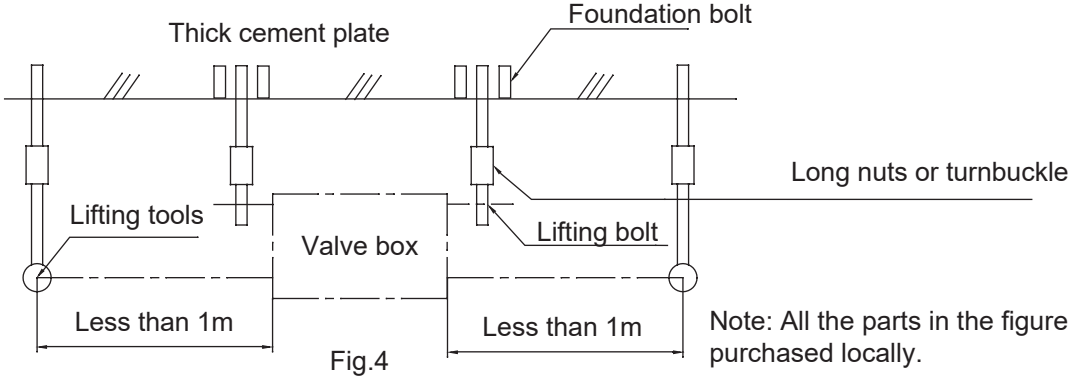


Fig.4

Note: All the parts in the figure are purchased locally.

3. Installation of valve box

Use parts and components specified for installing the installation components.

(1) Change the installation direction of electric box according to requirements following the steps below; (see Fig.1)

① Remove the cover of the electrical appliance box; (2 screws)

② Remove the electrical appliance box; (4 screws)

③ Remove the top plate; (4 screws)

④ Change the outgoing direction of wiring (electronic expansion valve coil) between the equipment and the electrical appliance box;

⑤ Rotate 180° to install the top plate;

⑥ Install the electrical appliance box;

⑦ Install the cover of the electrical appliance box.

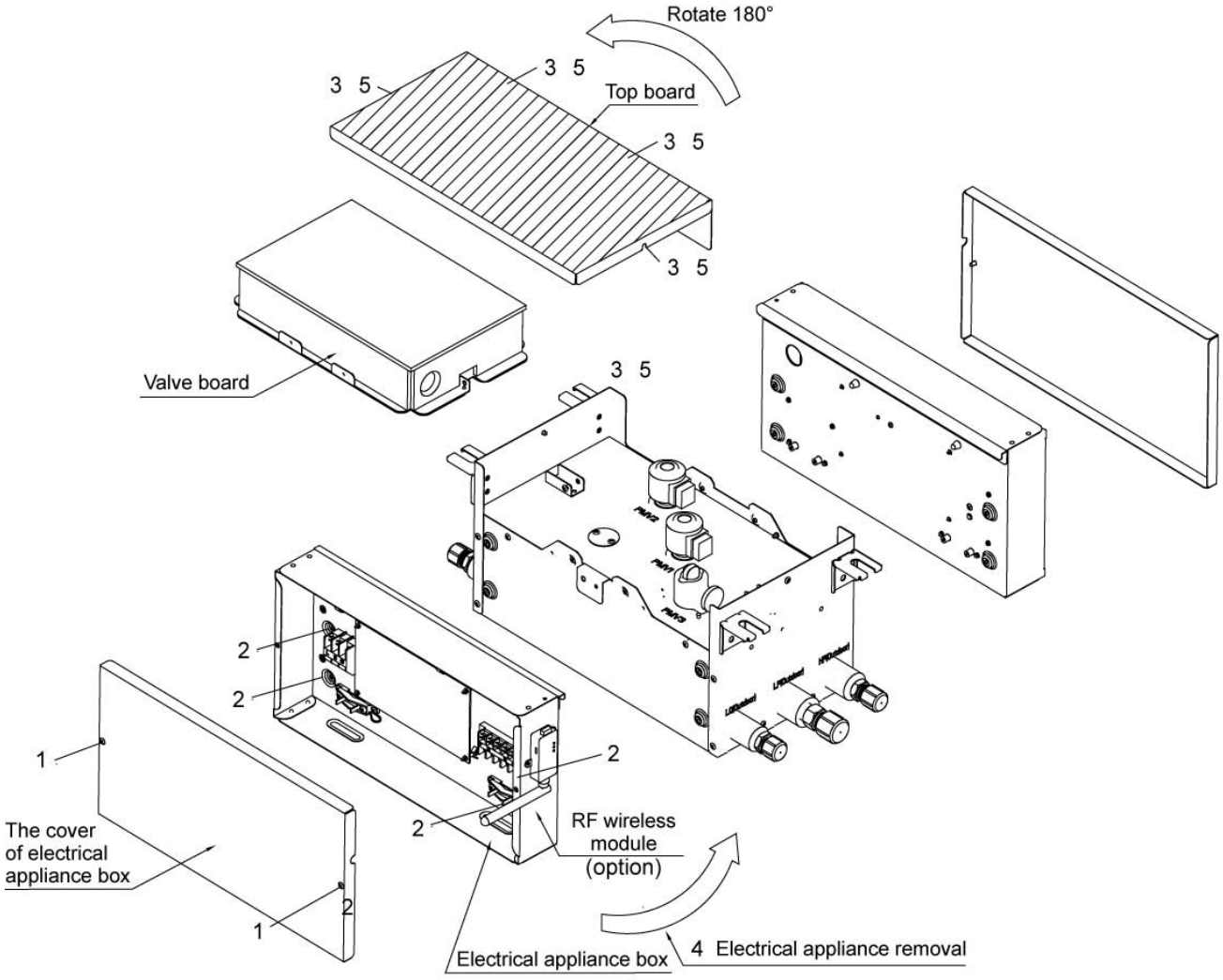


Fig.5

Install the lifting tools on the lifting bolts according to the instruction of the Fig.6

Be sure to follow the stipulations on products locally purchased to use nuts (M8 or M10 of 3 pieces for 4 positions) and gaskets (M8 with the outer diameter of 15/16~1 1/8(24~28) mm and M10 with that of 30~34 mm of 2 pieces for 4 positions) on the upper and lower sides of the lifting tools.

<Note>

Be sure that the product must be installed with the top surface (the oblique surface in the Fig.5) upward, or it will not work well and increase the working noise.

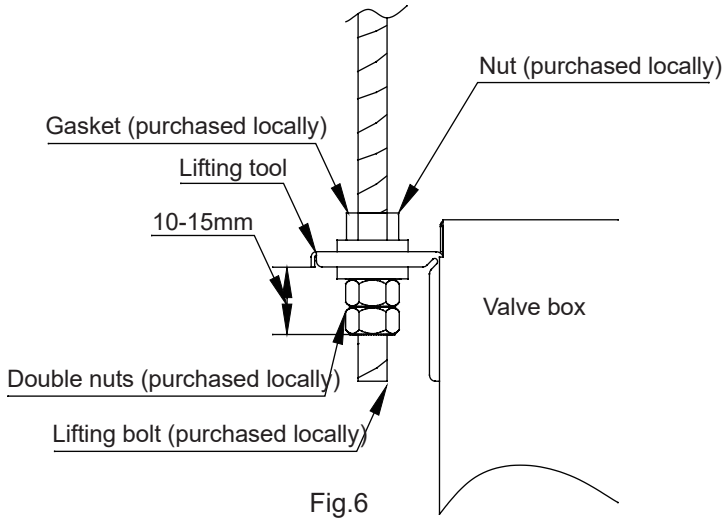


Fig.6

4. Refrigerant pipe Installation

- Pipes between the outdoor unit and valve box, selection of refrigerant branching suite, and the Pipe between refrigerant branching suites and the indoor units, please refer to the installation instructions or equipment design data attached to the outdoor unit.
- Before Installation, make sure the type of the refrigerant to be used is R410A. (If a refrigerant other than this type is used, It cannot run properly)
- Please provide thermal insulation at the high-pressure gas pipe, suction gas pipe,, liquid pipe and oil equalizing pipe (pipes for outdoor units in case of multi-split system) and the connections between these pipes. In the absence of thermal insulation, liquid leakage and scalding may happen. Particularly when the high-pressure gas pipe delivers indrawn air under full-refrigeration condition, it needs the same thermal insulation as does the suction gas pipe. Besides, high-pressure gas pipe and suction gas pipe are to deliver high-pressure gas, thus please provide thermal insulation material that can sustain temperature over 120 °C.
- Enhance the thermal insulation material based on the installation environment. The indicators are shown below.
  For RH75%–80% at 30°C: over 15 mm thick.
  For over 80% at 30°C: over 20 mm thick.
  If not reinforced, the thermal insulation material surface is prone to condensation. Please refer to the equipment design data for further details.
- The high-pressure gas pipe, suction gas pipe, liquid pipe must be provided with reliable thermal insulation. In the absence of thermal insulation, liquid leakage may happen.
- The outdoor unit is already filled with refrigerant.
- To connect the pipes to valve box or remove them from valve box, do use both spanner and torque wrench, as shown in the Fig.7.
- Apply refrigerant oil to inside and outside of the flare. Screw it for 3 to 4 rounds with hands and then tighten it.
- Determine the tightening torque. (Excessive tightening may damage the nuts and hence cause leakage)
- Check the connecting pipes for gas leakage and then fix the thermal insulation, as shown in the Fig.8
- Only use sealing gasket to wrap the part jointing between the gas pipe and thermal insulation.
- For pipe cutter and flare tool, please use R410A special tools.

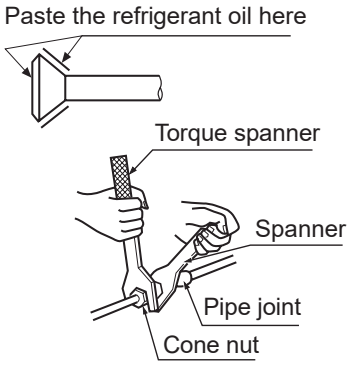


Fig.7

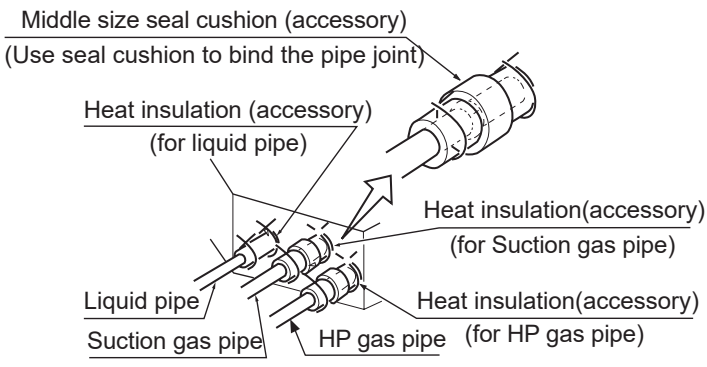


Fig.8

<Notes>
- Please do not let any type of gas other than the specified refrigerant go into the refrigeration system;
- In case of refrigerant leakage during operation, please replace the gas. (Fill the refrigerant at the outdoor unit)

Select piping material

- Make sure both the internal surface and external surface of the pipes are intact and are free from harmful contaminants such as sulphur, oxide, foreign matter, cutting powder, grease and water.
- Please use the following materials for refrigerant pipe.

Pipe material		Phosphorized copper seamless pipe for air conditioner (TP2)		
Model		112B	180B	280B
Function	High pressure gas pipe	1/2 (12.7)	5/8 (15.88)	3/4 (19.05)
	Suction gas pipe	5/8 (15.88)	5/8 (15.88)	7/8 (22.22)
	Liquid pipe (outdoor side)	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)
	Gas pipe (indoor side)	5/8 (15.88)	5/8 (15.88)	7/8 (22.22)
	Liquid pipe (indoor side)	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)

Wall thickness and size: select proper sizes according to Selection of piping dimensions
- For the permissible maximum length, permissible elevation difference and permissible length after branching, please refer to the installation instructions or technical data attached to the outdoor unit.
- The branching pipe for the pipe must have refrigerant branching suite. For selection of refrigerant branching suite, please refer to the installation instructions or technical data attached to the outdoor unit.

Piping maintenance

During installation, provide maintenance as specified in the table in order to prevent water, foreign matter and dust from entering the pipes.

Location	Work period	Maintenance method
Outdoors	More than 1 month	Screw
	Less than 1 month	Screw or strap
Indoors	——	

Note
Particularly when a pipe is to penetrate through a wall or extend to outdoors, make sure foreign matter and dust etc cannot enter the pipe.

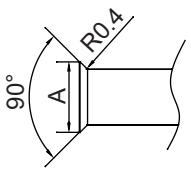
Attention item for piping connection

- To connect a pipe to or remove it from the valve box, do use pliers for screws and torque spanner;
- When installing the valve box, please fix the box and connecting pipes in an efficient way to avoid shaking when changing valve box.
- For the sizes of the flares, please refer to <Table-3>.

<Note>
- For connection at a flare, apply ester or ether oil to the flare (both inner surface and outer surface). Apply such oil for 3 to 4 times and insert the screw in the first use (Refer to Fig.9).
- The tightening torque for the flare is given in <Table-3>.

If no torque wrench is available, act as the follows.
① Use a spanner to tighten the nut of the flare to a position where the tightening torque sharply increases.
② The tightening angle for the position where the tightening torque sharply increases <Table -4>.
③ After the work, make sure there is no air leakage.

<Table-3>

Pipe size OD inch. (mm)	Tightening torque (N.m)	Tightening torque (lbf.ft)	Machined flare size A (mm)	Machined flare size A (mm)	Flare shape
1/4 (6.35)	14.2~17.2	10.5~12.7	8.7~9.1	0.34~0.36	
3/8 (9.52)	32.7~39.9	24.1~29.6	12.8~13.2	0.50~0.52	
1/2(12.7)	49.5~60.3	36.5~44.7	16.2~16.6	0.64~0.65	
5/8 (15.88)	61.8~75.4	45.6~55.9	19.3~19.7	0.76~0.78	
3/4 (19.05)	97.2~118.8	71.1~88.0	23.7~23.9	0.93~0.94	
7/8 (22.22)	117.2~138.8	86.5~102.8	28.2~28.5	1.11~1.12	

<Table-4>

Pipe size OD inch. (mm)	Tightening angle	Recommended tool length inch.(mm)
1/4 (6.35)	60°~90°	5.90(150)
3/8 (9.52)	60°~90°	7.87(200)
1/2(12.7)	30°~60°	9.84(250)
5/8 (15.88)	30°~60°	11.81(300)
3/4 (19.05)	20°~35°	17.72(450)
7/8 (22.22)	15°~30°	23.62(600)

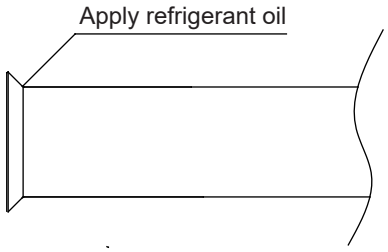


Fig.9

<Note>

- Excessive tightening will result in cracking at the flare and refrigerant leakage.
- To weld the refrigerant pipe, please make nitrogen replacement (*1), or send nitrogen (*2) into the refrigerant pipe while welding the pipe (refer to Fig.9). Finally use the flare or flange to connect the indoor unit and valve box.
  (*1) Nitrogen replacement method is provided in the multi-split system work manual.
  (*2) If nitrogen flowing and welding proceed simultaneously, do use pressure reducing valve. Approximately 0.02 MPa (0.2 Kg/cm with a slight feeling of breeze) pressure is quite proper.

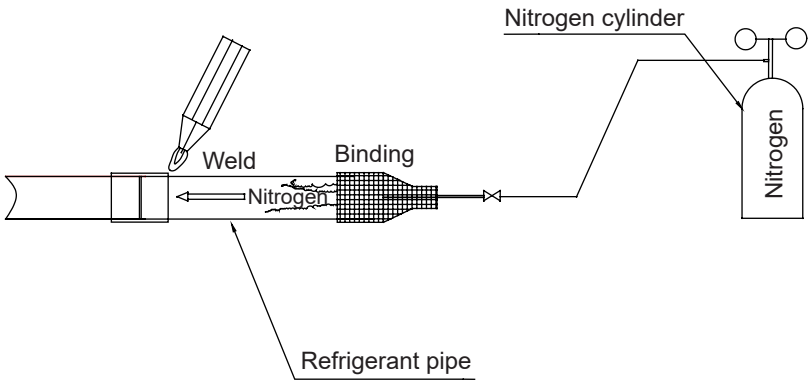


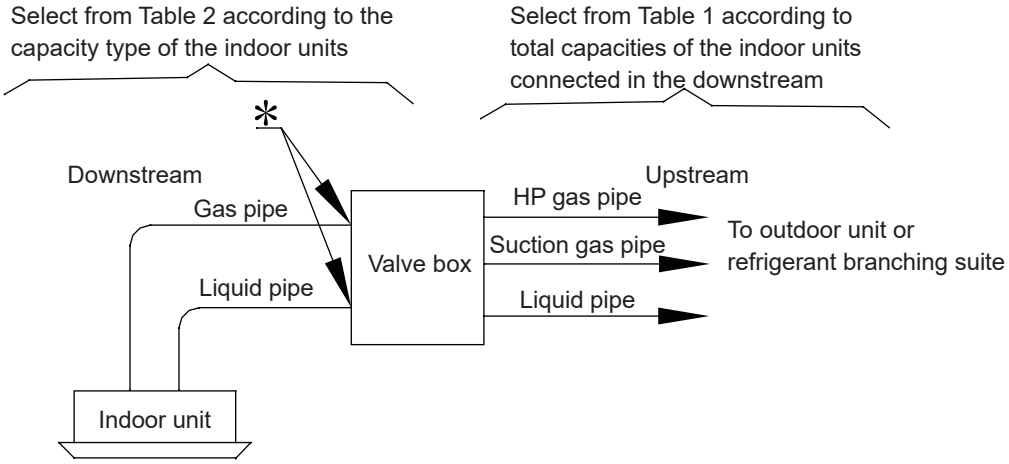
Fig.10

<Note>
- For pipe welding, do not use antioxidant, for its residue may cause tube blocking and component fault.
- For pipe welding, do not use flux. If the flux is chlorine product, it will corrode the tube; if it contains fluorine, it will even cause detrimental effects to the refrigerant system, such as refrigerant oil deterioration. Please do not use phosphor copper for welding material (BCup-2).

Selection of piping dimensions

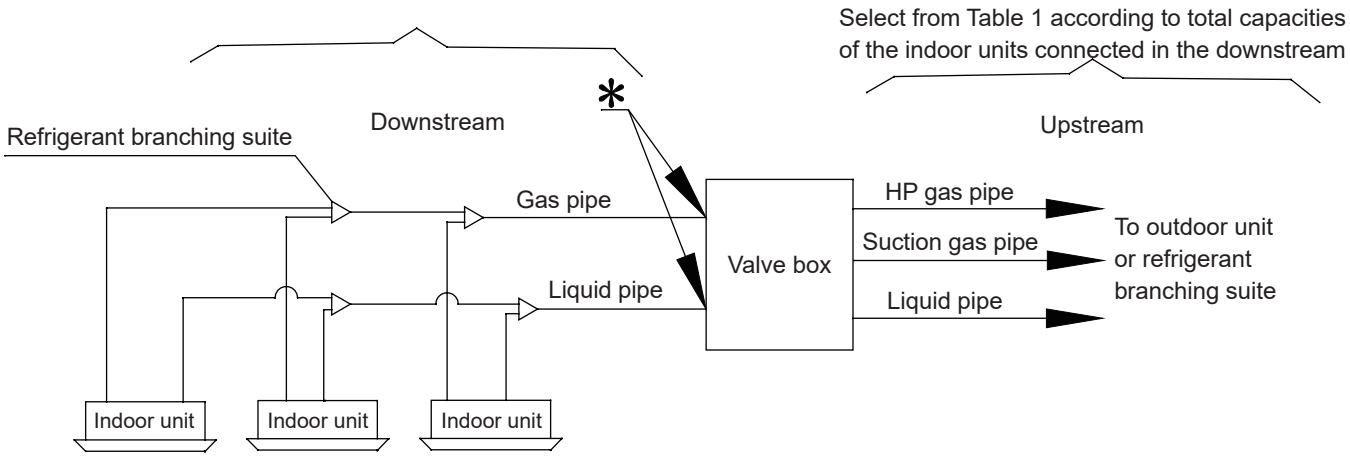
Select refrigerant branching dimensions between outdoor units and valve box, between valve box and indoor units according to the following connection examples 1 and 2 and Tables 5-7.

Connection example 1: Connect an indoor unit to the downstream of the valve box



Connection example 2: with branching in the downstream of the valve box

Select pipe dimensions of the refrigerant branching suite and its components in the indoor unit according to the specifications or technical data provided together with the outdoor unit.



(*) For dimensions of the pipes to the downstream of the valve box, see the table 3. Use the attached pipes for connection in the way shown in Pipe connection according to the pipes dimensions and diameters for indoor unit connection selected in Table 2.

<Table 5> Total capacity and pipe dimensions (mm) of the indoor units

Total capacity of the indoor units Q (kW)	Pipe dimensions (OD × minimum wall thickness)				
	Upstream			Downstream	
	Suction gas pipe	High pressure gas pipe	Liquid pipe	Gas pipe	Liquid pipe
Q<57.3(Q<16.8)	5/8(15.88)×1.0	1/2 (12.7)×1.0	3/8(9.52)×0.8	5/8(15.88)×1.0	3/8(9.52)×0.8
57.3≤Q<76.4(16.8≤Q<22.4)	3/4(19.05)×1.0	5/8(15.88)×1.0		3/4(19.05)×1.0	
76.4≤Q<112.6(22.4≤Q<28.0)	7/8 (22.22)×1.2	7/8 (22.22)×1.0		7/8 (22.22)×1.2	

<Table 6> Dimensions (mm) of connection tube of the indoor units

Total capacity type of the indoor units (×100W)	Pipe dimensions (OD × minimum wall thickness)	
	Gas pipe	Liquid pipe
22, 28	3/8 (9.52)×0.8	1/4(6.35)×0.8
36, 45, 56	1/2(12.7)×0.8	1(6.35)×0.8
71, 80, 90, 112, 140	5/8(15.88)×1.0	3/8(9.52)×0.8
226	1(25.4)×1.2	
280	1(25.4)×1.2	

<Table 7> Dimensions (mm) of connection pipe of the vale box

Type of valve box for switch between cooling and heating	Pipe dimensions (OD × minimum wall thickness)				
	High pressure gas pipe	Suction gas pipe	Liquid pipe at the outdoor unit side	Gas pipe of the indoor unit	Liquid pipe at the indoor unit side
112B	1/2(12.7)×1.0	5/8(15.88)×1.0	3/8(9.52)×0.8	5/8(15.88)×1.0	3/8(9.52)×0.8
180B	5/8(15.88)×1.0	5/8(15.88)×1.0	3/8(9.52)×0.8	5/8(15.88)×1.0	3/8(9.52)×0.8
280B	3/4(19.05)×1.0	7/8(22.22)×1.2	3/8(9.52)×0.8	7/8(22.22)×1.2	3/8(9.52)×0.8

Pipe connection

(*1) Refer to the field pipe
(*2) Please use the flare nut installed on the product body again.

Note:
During installation, please confirm the HP gas pipe and Suction gas pipe between outdoor and valve box (such as by sending nitrogen into the HP gas pipe and Suction gas pipe), then connect Suction gas pipe to the Suction gas pipe of valve box, HP gas pipe to the HP gas pipe of valve box.

112B
(Note):
When a 072, 092, 22 or 28 indoor unit except for the High wall is connected in the downstream, please use the auxiliary pipe ①-1,2 for connection according to Fig.11.
When a 122, 162, 182, 36, 45 or 56 indoor unit except for the High wall is connected in the downstream, please use the auxiliary pipe ①-1,3 for connection according to Fig.11.
When a AS072, AS092 indoor unit is connected in the downstream, please use the auxiliary pipe ①-1,3 for connection according to Fig.11.
When an AS182 indoor unit is connected in the downstream, do not use the auxiliary pipe.

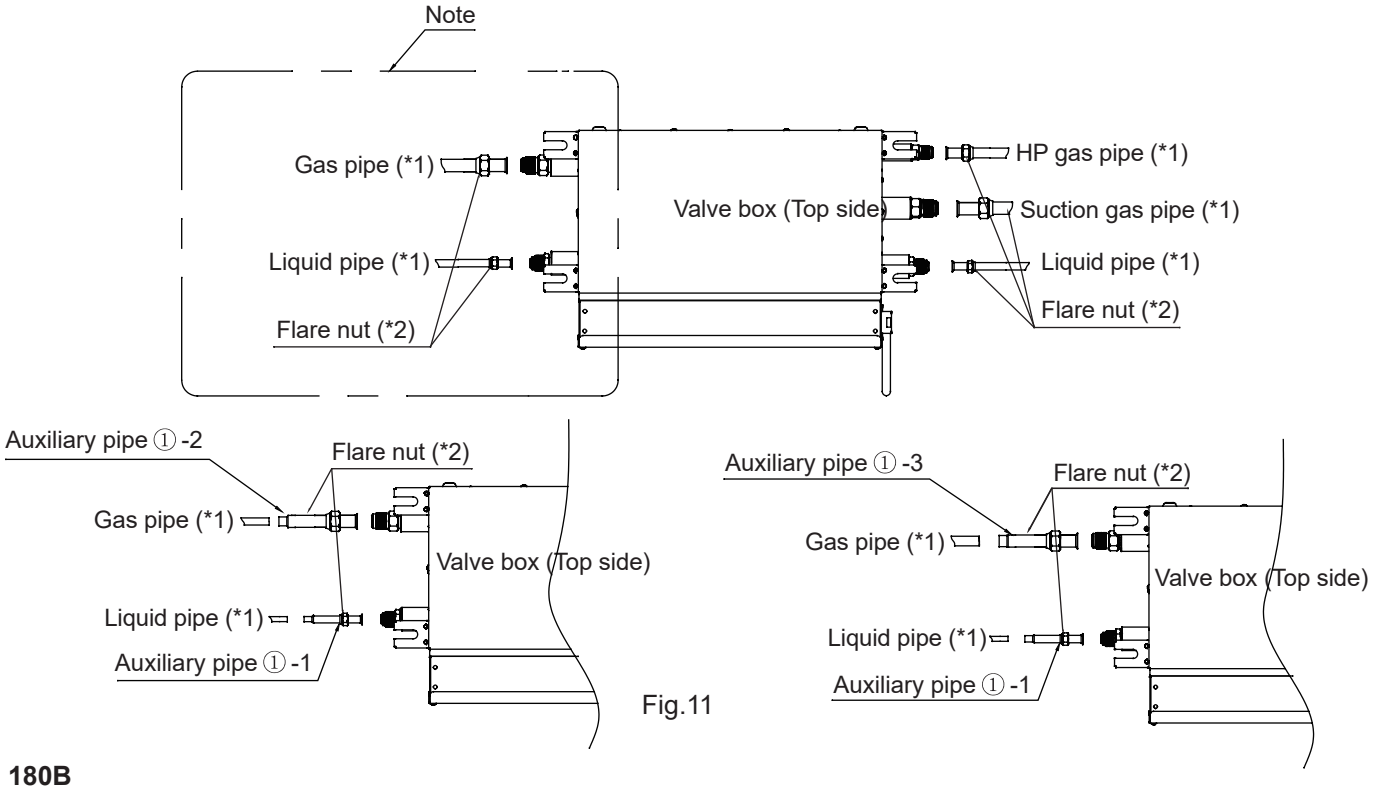


Fig.11

180B

The total capacity of the indoor units in the downstream is more than 11.2 kW but less than 16.8 kW.

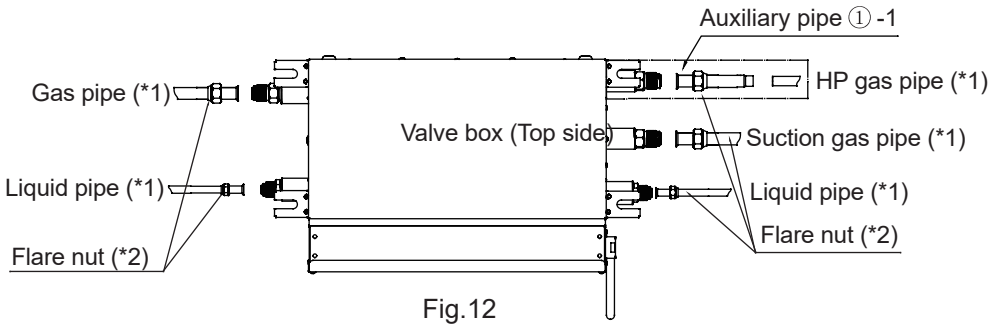
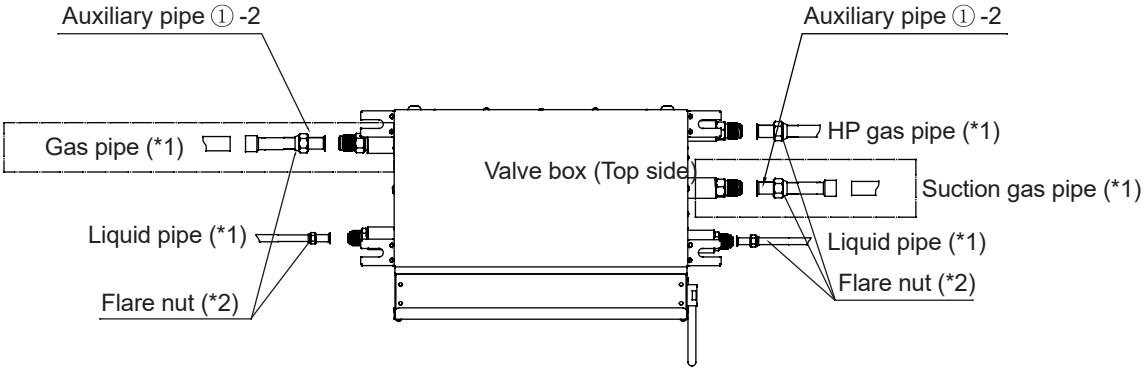


Fig.12

Note : Due to the HP gas pipe and suction gas pipe size of 180B valve box is the same, so during installation, please confirm the HP gas pipe and suction gas pipe between outdoor and valve box(such as by sending nitrogen into the HP gas pipe and suction gas), then connect suction gas pipe to the suction gas pipe of valve box, HP gas pipe to the HP gas pipe of valve box.

The total capacity of the indoor units in the downstream is more than 16.8 kW but less than 18.0 kW.



(Note1):
Auxiliary pipe ①-1,2,3: Install the flare nuts first and then use the auxiliary pipe after being flared in the field.

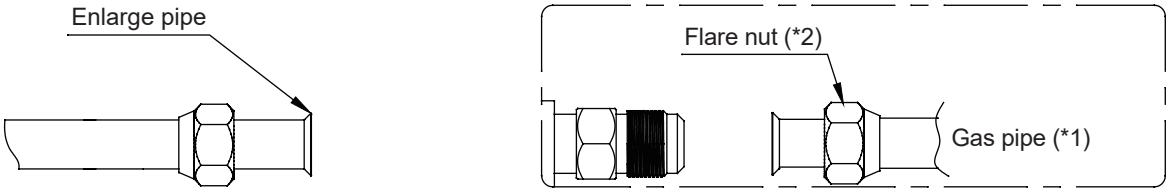


Fig.14

280B

The total capacity of the indoor unit in the downstream is more than 18.0 kW but less than 22.4 kW.

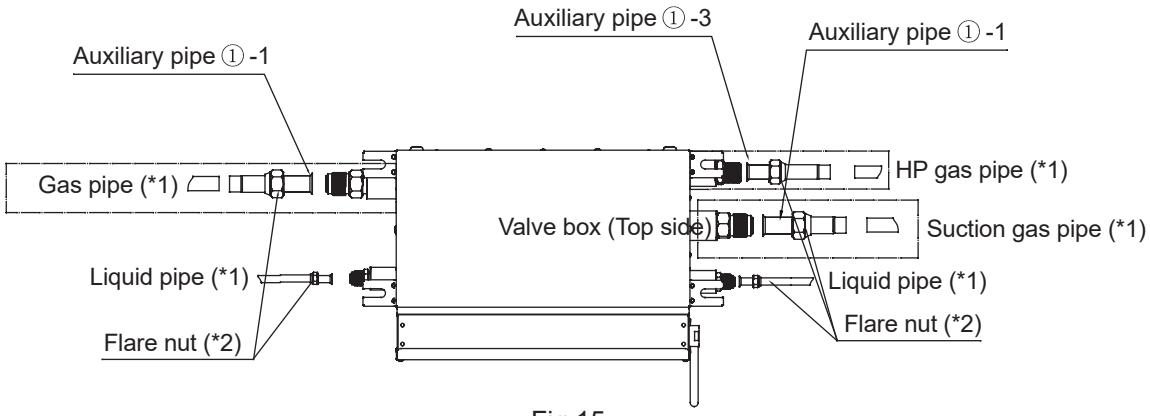


Fig.15

The total capacity of the indoor unit in the downstream is more than 22.4 kW but less than 28.0 kW.

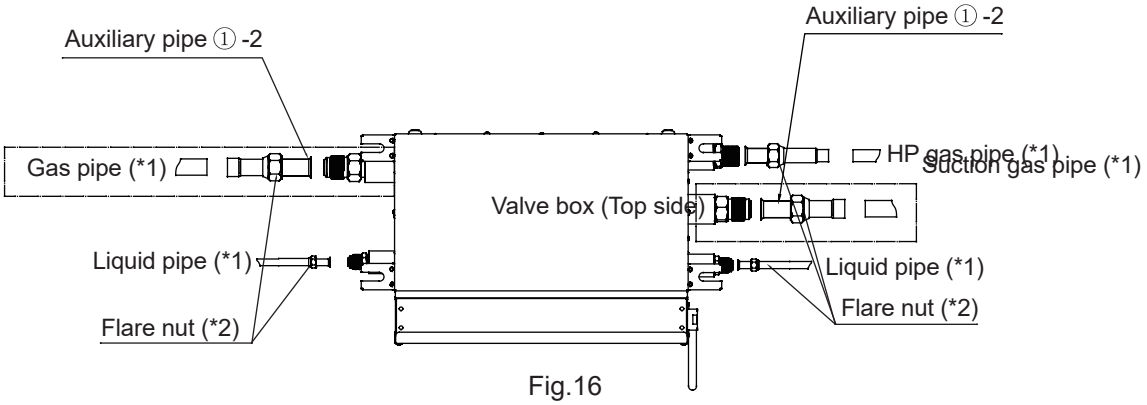


Fig.16

Pipe insulation

Please use the auxiliary insulation cylinder and anchor for insulation works according to Fig.17 after the gas leakage test.

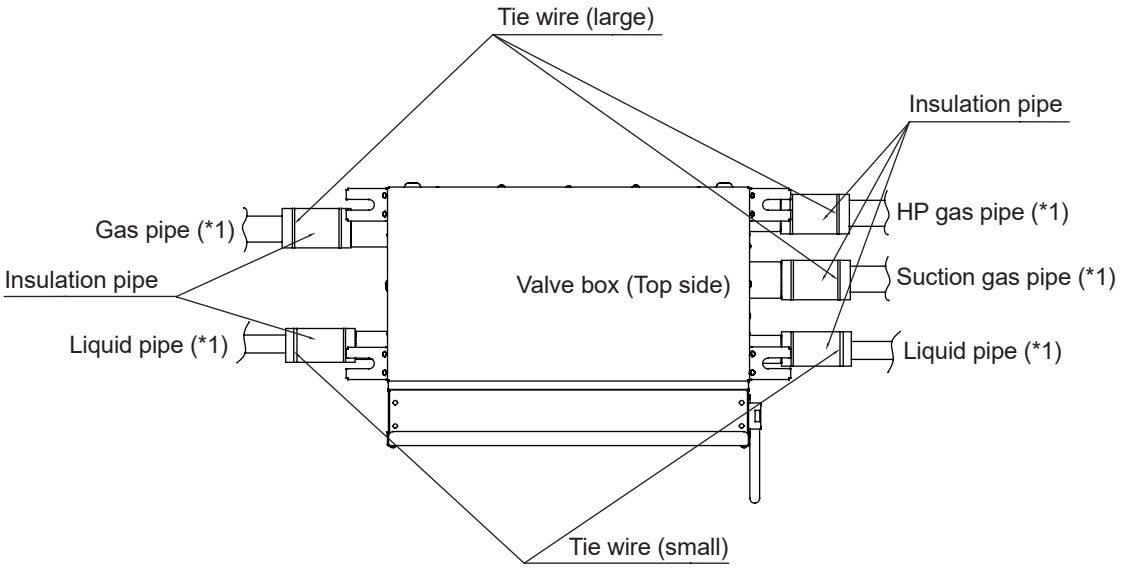


Fig.17

Note 1:
For suction gas pipes, high pressure gas pipe and liquid pipes, gas pipe, flare connections shall be wrapped with insulation materials (purchased locally) when their auxiliary insulation cylinders have been installed.

For installation of insulation materials for the flare nut connections, it shall be cautioned that:
(1) Please connect it tightly so as to ensure no gas leakage at both ends.
(2) The retaining clamp shall not be over tight so as to ensure the thickness of the insulation materials.
(3) Joints of insulation materials (purchased locally) for the upper flare nut connections shall be wrapped upwards.
(4) Ensure that joints of the insulation materials are installed upwards. (See Fig.18.)

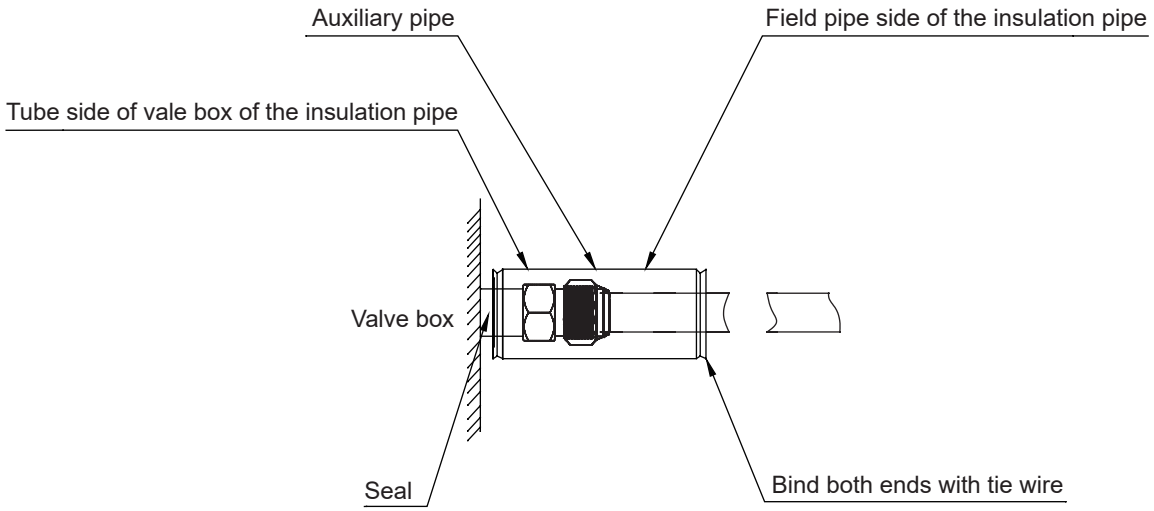


Fig.18

⚠Warning

- Electrical construction should be made with specific mains circuit by the qualified personnel according to the installation instruction. Electric shock and fire may be caused if the capacity of power supply is not sufficient.
- During arranging the wiring layout, specified cables should be used as the mains line, which accords with the local regulations on wiring. Connecting and fastening should be performed reliably to avoid the external force of cables from transmitting to the terminals. Improper connection or fastness may lead to burning or fire accidents.
- There must be the ground connection according to the criterion. Unreliable grounding may cause electrical shocks. Do not connect the grounding line to the gas pipe, water pipe, lightening rod and telephone line.

⚠ Attention

- Only copper wire can be used. Breaker for electric leakage should be provided, or electric shock may occur.
- The wiring of the mains line is of Y type. The power plug L should be connected to the live wire and plug N connected to null wire while ⏚ should be connected to the ground wire. For the type with auxiliary electrically heating function, the live wire and the null wire should not be misconnected, or the surface of electrical heating body will be electrified. If the power line is damaged, replace it by the professional personnel of the manufacturer or service center.
- The power line of valve boxes should be arranged according to the installation instruction of valve boxes.
- The electrical wiring should be out of contact with the high-temperature sections of tubing as to avoid melting the insulating layer of cables, which may cause accidents.
- After connected to the terminal tier, the tubing should be curved into be a U-type elbow and fastened with the pressing clip.
- Controller wiring and refrigerant tubing can be arranged and fixed together.
- The machine can't be powered on before electrical operation. Maintenance should be done while the power is shut down.
- Seal the thread hole with heat insulating materials to avoid condensation.
- Signal line and power line are separately independent, which can't share one line. [Note: the power line, signal line are provided by users. Parameters for power lines are shown as below: 3×(1.0-1.5) mm^2; parameters for signal line: 2×(0.75-1.25)mm^2(shielded line)]
- Valve boxes and outdoor units should be connected to the power source separately. All valve boxes must share one single electrical source, but its capacity and specifications should be calculated. Indoor & outdoor units should be equipped with the power leakage breaker and the overflow breaker.
- Valve box can be installed in multiple, named as unit A, unit B…. Pay attention to the marks on the terminal block when connecting the outdoor unit with the indoor unit. Refer to wiring example as described in 5-2 while ensuring correct connection. In addition, the operation will be abnormal when the wiring and the tubing between indoor and outdoor machine sets are installed in different refrigerant systems.
- Energization is not to be done before it's confirmed that the valve box have completely installed and that the outdoor and indoor installation is completed.

The wiring for the power line and signal line of valve box

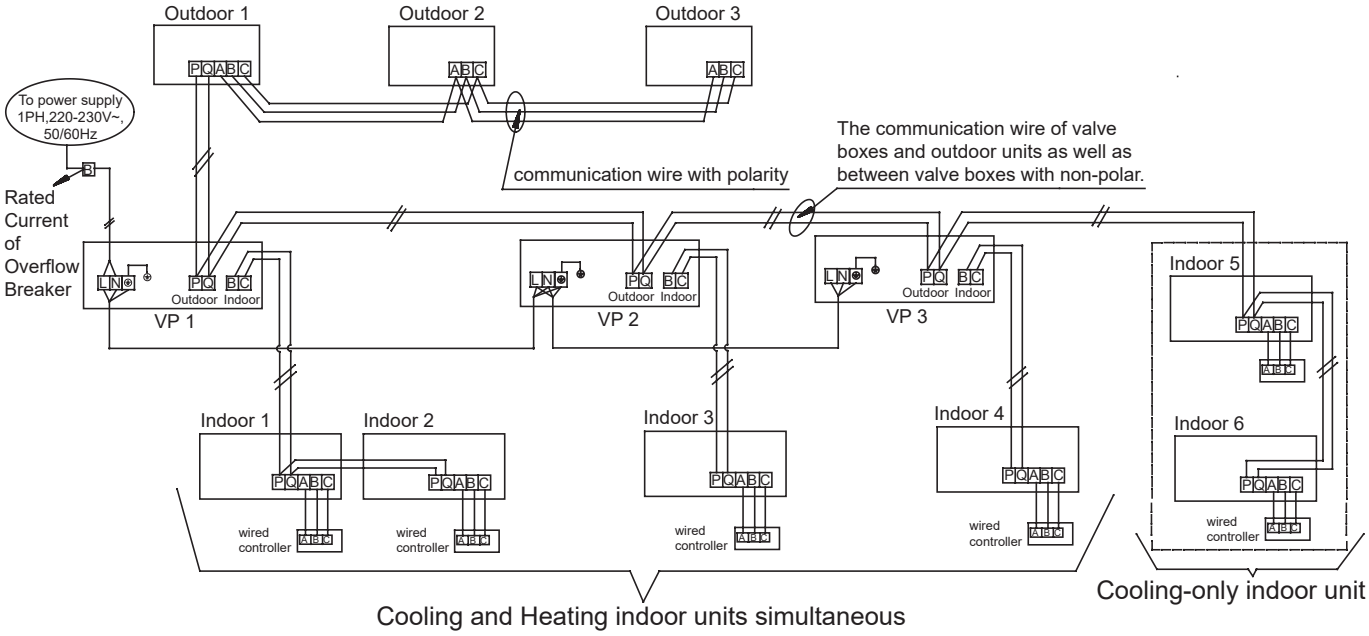
The wiring for the power line of valve box, the wiring for the signal line between valve boxes and outdoor units as well as the wiring between valve boxes.

Items / Total Current of valve boxes (A)	Cross Section (mm^2)	Length ft (m)	Rated Current of Overflow Breaker (A)	Rated Current of Power Leakage Breaker (A) Leaking Current (mA) Operating Period (S)	Cross Sectional Area of Signal Line	
					Outdoor-valve box (mm^2)	Valve box- valve box (mm^2)
<10	2	65(20)	20	20A,30mA,0.1S or below	2cores ×0.75-2.0 mm^2 shielded line	
≥10 and <15	3.5	82(25)	30	30A,30mA, 0.1S or below		
≥15 and <22	5.5	98(30)	40	40A,30mA, 0.1S or below		
≥22 and <27	10	141(40)	50	50A,30mA, 0.1S or below		

- Power cable and communication wire must be fixed firmly.
- Each valve box must be earthed well.
- When power cable exceeds the range, thicken it appropriately.
- Shielded layer of communication wires must be connected together and be earthed at single point.
- Communication wire total length cannot exceed 1000m.

Graphical representation for wiring

Connect the communication terminal block P and Q of the main unit of the outdoor units with the communication terminal block P and Q of the first valve box (VP 1).



Notes:

(1)The above wiring example is only for reference. The number of valve boxs and indoor units shall be subject to the field installation.

(2)Communication line from cooling-only indoor unit may be connected to the communication terminal block P and Q (outdoor) of the valve box.

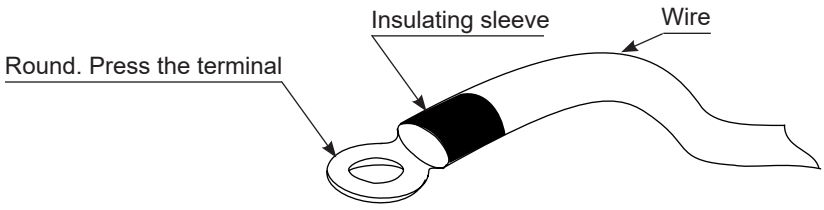
(3)Two-core nonpolar communication line with shield shall be adopted for communication lines between the valve

Prohibitions

nd shield shall be adopted for the wire controller connected to the indoor unit.

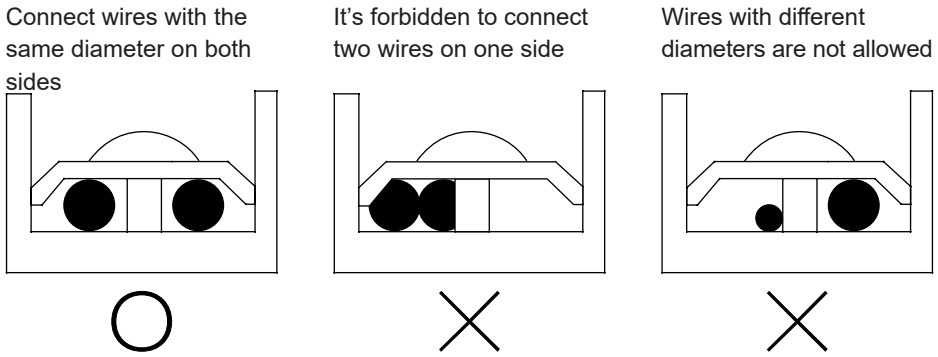
(4)All valve boxes within one system may share one overcurrent breaker for power supply. But it's necessary to compute total current capacity specification.

(5)For wring harness connected to the power terminal block, the terminal shall be pressed with a round (refer to the following figure).



(1)The power terminal block shall not be crimped with 2 wires of different diameters. Otherwise, poor crimp connection and looseness may lead to abnormal heating or sparking of the line.

(2)Refer to the following figure for crimping wires with the same diameter.



(6) Tighten terminal screws with proper screw driver. Screw driver of small dimension will damage the screw head and fail to tighten properly.
(7) If terminal screws are tightened excessively, they may be damaged. Refer to the following table for tightening torques of terminal screws:

Dimension of terminal screw	Tightening torque (N.m)
M3.5 (terminal block for communication line)	0.80~0.96
M4 (terminal block for power line)	1.18~1.44
M4 (terminal block for ground wire)	1.52~1.86

(8) Power line is forbidden to the communication terminal block because it will damage the circuit control board.
(9) Wiring of communication lines shall be within the following scope. Exceeding the limit will possibly lead to abnormal communication.

The maximum wiring length between the outdoor machine and the furthest valve box or Cooling-only indoor unit is 1000m,the valve box and the indoor machine is 90m. The maximum branch number is 16.

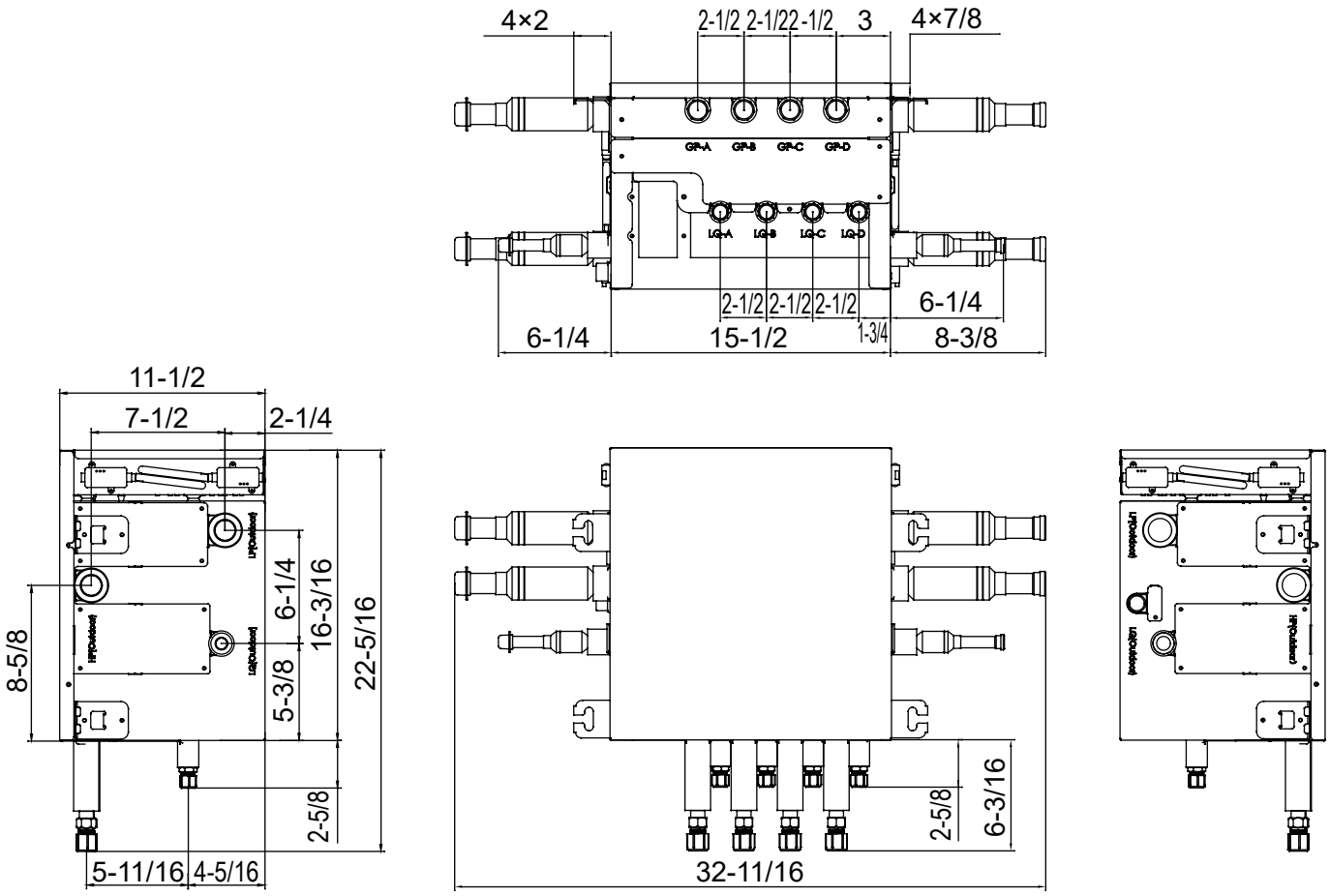
One by four valve box

Specification

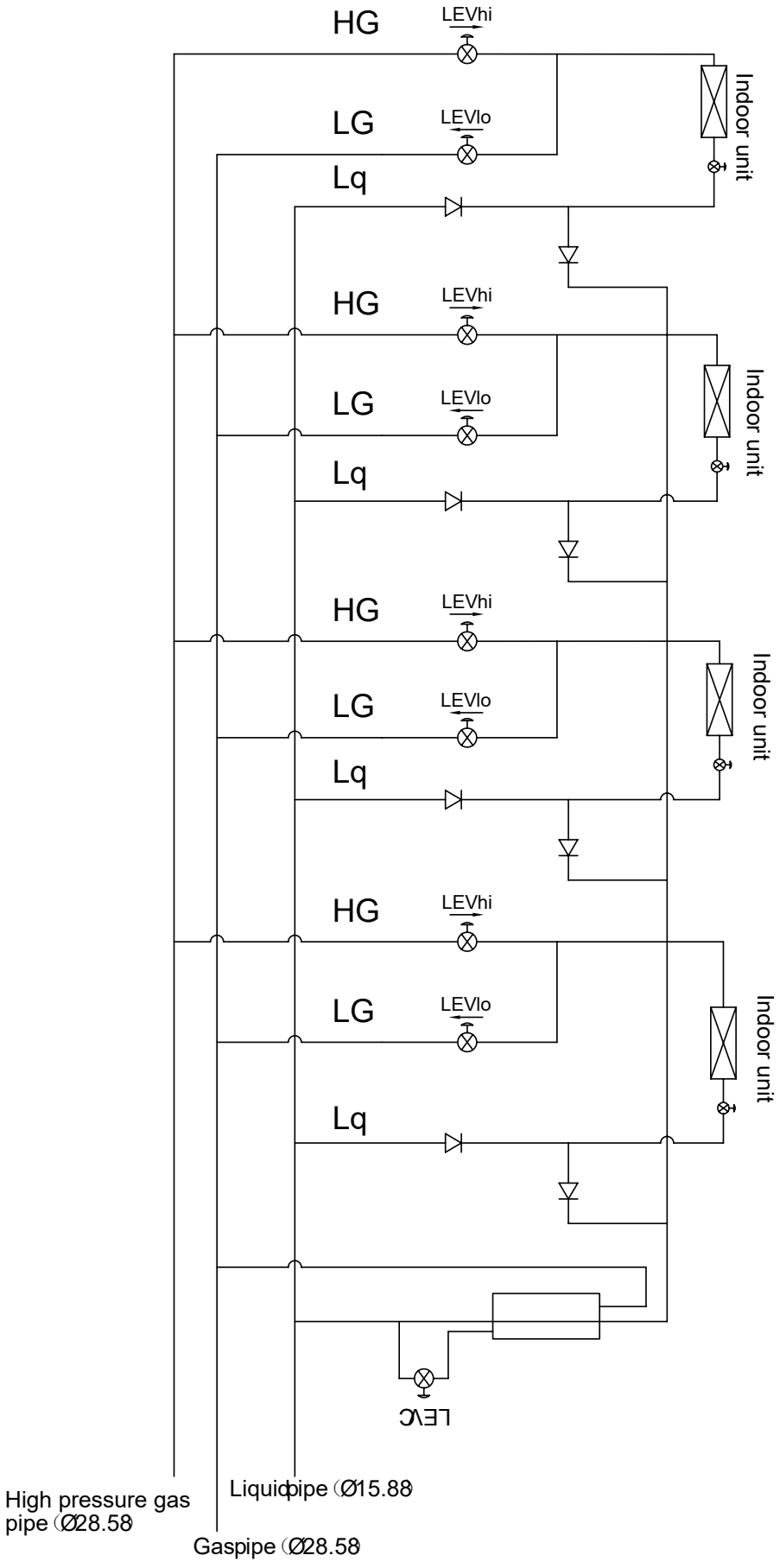
Model		VP4-450B
Power Supply		
Max. Number of valve boxes that can be connected in series		4
Branching Number of Connectable Indoor Units		5
Dimension (W×H×D)	in.(mm)	15 15/16*11 13/16*16 9/16 (405×300×421)
Net	lb(kg)	39.7(18)
Liquid Pipe-Connect To Outdoor Unit	in.(mm)	5/8(15.88)
Gas Pipe-Connect To Outdoor Unit	in.(mm)	1 1/8 (28.58)
High Pressure Gas Pipe-Connect To Outdoor Unit	in.(mm)	1 1/8 (28.58)
Liquid Pipe-Connect To Indoor Unit	in.(mm)	3/8(9.52)×4
Gas Pipe-Connect To Indoor Unit	in.(mm)	5/8(15.58)×4

	VP4-450B*1	VP4-450B *2	VP4-450B *3	VP4-450B *4
Branching Number of Connectable Indoor Units	5	5	5	5
Total indoor unit qty.	20	40	60	64
Capability per branch	≤54.6kBTU(16kW)	≤54.6kBTU(16kW)	≤54.6kBTU(16kW)	≤54.6kBTU(16kW)
Total capacity	≤153.5kBtu/h(45kW)	≤242.3kBTU(71kW)	≤242.3kBTU(71kW)	≤242.3kBTU(71kW)

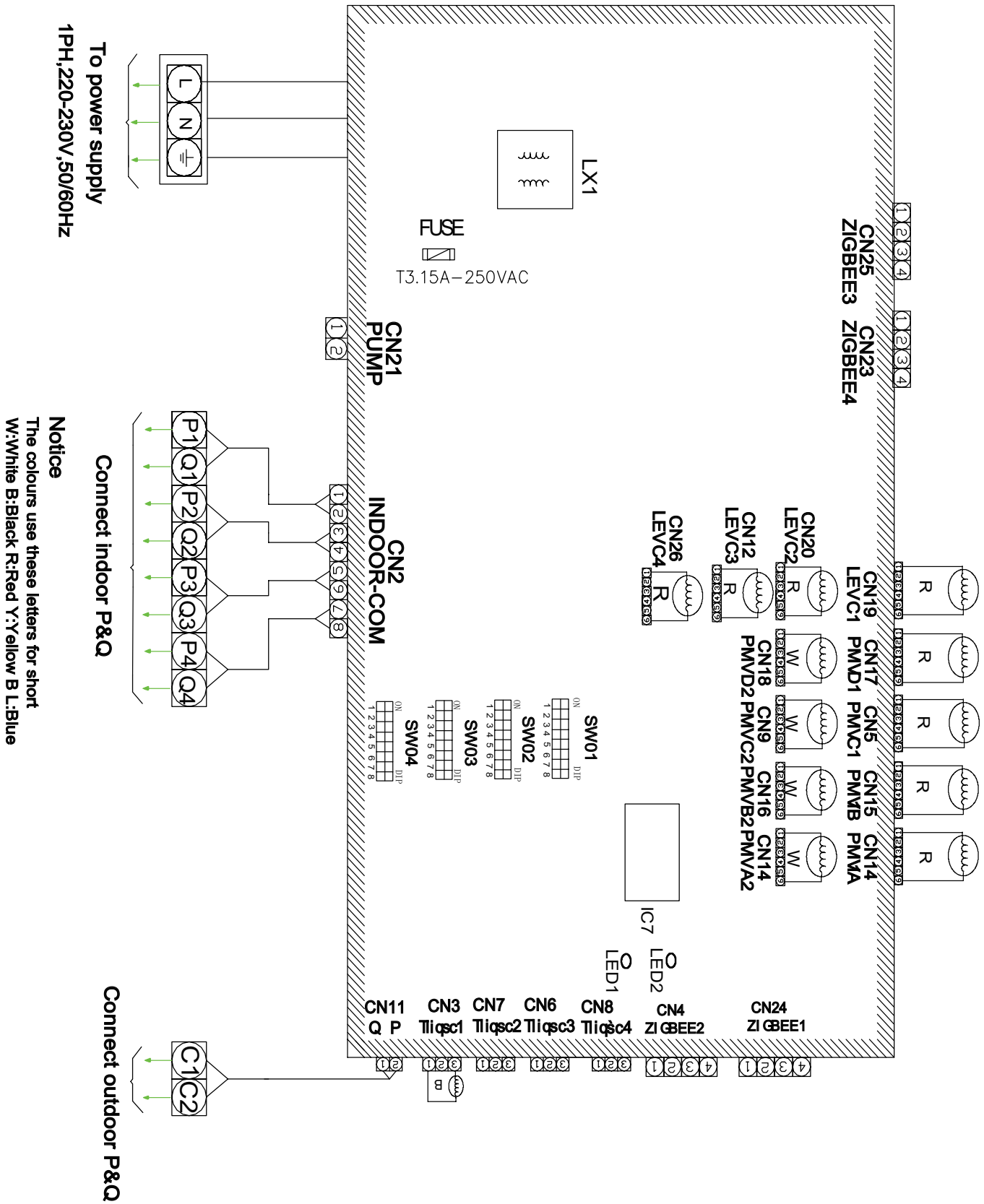
Dimension

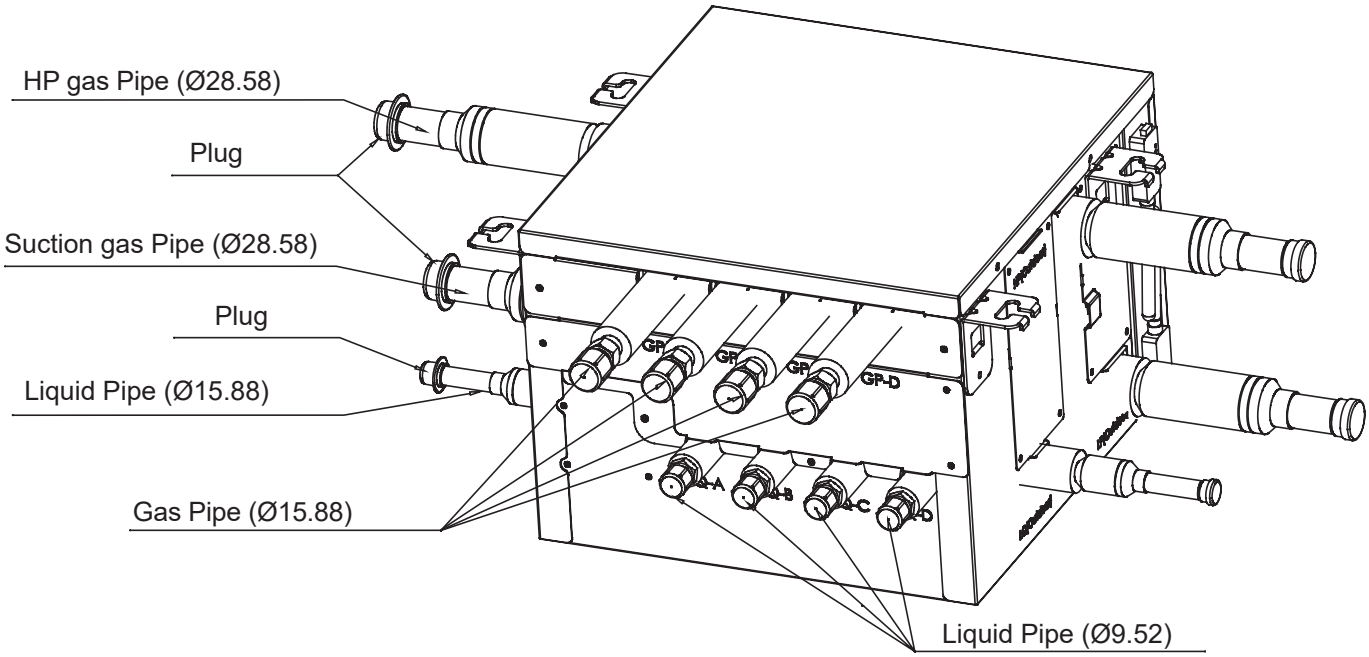


Piping diagram



Wiring diagram





Before installation , be sure to remove the plug .When the valve box is connected with the outdoor unit, the left side of the three pipes or the right side of the three pipes can be selected according to the actual installation requirements. At the same time, the other end of the three tubes needs to be blocked.

- If the valve box is transferred to a new user, this manual shall be transferred to the user, together with the conditioner.
- Before installation, be sure to read Safety Considerations in this manual for proper installation.
- The safety considerations stated below is divided into "⚠Warning" and "⚠ Attention". The matters on severe accidents caused from wrong installation, which is likely to lead to death or serious injury, are listed in "⚠ Warning". However, the matters listed in "⚠ Attention" are also likely cause the severe accidents. In general, both of them are the important items related to the security, which should be strictly abided by.
- After the installation, perform test run to make sure everything is in normal conditions, and then operate and maintain the valve box in accordance with the user manual. The user manual should be delivered to the user for proper keeping.

⚠Warning

- Please ask the special maintenance station for installation and repair. Water leakage, electric shocks or fire accidents might be caused from improper installation if you conduct the installation by your own.
- The installation should be conducted properly according to this manual. Water leakage, electric shocks or fire accidents might be caused from improper installation.
- Please make sure to install the valve box on the place where can bear the weight of the valve box. The valve box can't be installed on the grids such as the non-special metal burglar-proof net. The place with insufficient support strength might cause the dropdown of the machine, which may lead to personal injuries.
- The installation should be ensured against typhoons and earthquakes, etc. The installation unconformable to the requirements will lead to accidents due to the turnover of the machine.
- Specific cables should be used for reliable connections of the wirings. Please fix the terminal connections reliably to avoid the outside force applied on the cables from being impressed on the cables. Improper connections and fixings might lead to such accidents as heating or fire accidents.
- Correct shapes of wirings should be kept while the embossed shape is not allowed. The wirings should be reliably connected to avoid the cover and the plate of the electrical cabinet clipping the wiring. Improper installation might cause such accidents as heating or fire accidents.
- While placing or reinstalling the valve box, except the specific refrigerant (R410A), don't let the air go into the refrigeration cycle system. The air in the refrigeration cycle system might lead to the cracking or personal injuries due to abnormal high pressure of the refrigeration cycle system.
- During installation, please use the accompanied spare parts or specific parts. If not, water leakage, electric shocks, fire accidents or refrigerant leakage might be caused.
- During installation, if refrigerant leakage occurs, ventilation measures should be taken, for the refrigerant gas might generate harmful gases upon contacting the flame.
- After installation, check if any refrigerant leakage exists. If the refrigerant gas leaks in the room, such things as air blowing heaters and stoves, etc. may generate harmful gases.
- Don't install the valve box at the places where the flammable gases may leak. In case the gas leakage occurs around the machine, such accidents as fire disasters may be caused.
- The refrigerant gas pipe, HP gas pipe and liquid pipe should be heat insulated to preserve heat. For inappropriate heat insulation, the water caused from the condensation will drop to get the article at home wet.
- The electrical construction shall be implemented by the correspondingly qualified personnel in accordance with electrical construction standards, local electrical laws as well as specifications. Moreover, dedicated circuit must be used, rather than the wire pin. Insufficient capacity of the wire circuit and unprepared construction (if any) may cause electric shock, fires, etc.
- During the process of grounding, the ground wire cannot be connected to the gas pipe, water pipe, lightning rod and ground wire of the telephone. Incomplete grounding may cause electric shock, fires, etc.
- Install residual-current circuit breaker, or electric shock, fires, etc. will occur.

- When contacting electrical components, ensure they are powered off. Contacting the live part may result in the danger of electric shock.
- If there is leakage of the refrigerant gas flow during operation, refrigerant gas is required. If the refrigerant gas contacts any fire, poisonous gases will be produced.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
- We recommend that the appliances be installed properly by qualified installation technicians in accordance with the installation instructions provided with the unit.

⚠ Attention

- The valve box should be effectively grounded. Electric shocks may occur if the valve box is ungrounded or inappropriately grounded. The wire for earthing shouldn't be connected to the connections on the gas pipe, water pipe, lightning rod or telephone.
- The breaker for electricity leakage should be mounted. If not, accidents such as electric shocks may happen.
- The installed valve box should be checked for electricity leakage by being powered.
- After installation, all cassette concealed valve boxes should be trial-tested. After the proper operation of the machine, other fitments can be made.
- When installing the valve box, please fix the box and connecting pipes in an efficient way to avoid shaking when changing valve box.
- If the ambient humidity bigger than 80%, when the water discharge hole be blocked or the filter becomes dirty, or airflow speed change, there maybe leads to condensing water drop down, and at the same time there maybe some drops of water spit out.
- Keep the valve box, power supply wiring, conductor, etc. at least 1 m away from the TV and radio to avoid image interference and noise. However, sometimes there is still noise when the distance is over 1 m due to the different states of radio waves.
- Try to install valve box where the fluorescent lamp is far away.
- When wireless devices are being installed, the distance that the signal from the controller will reach may be shortened in a room with a fluorescent lamp that is turned on in an electric way (frequency conversion or rapid start).
- Please install the valve box in places where noise will not influence the customers too much (such as washroom, passageway, warehouse, equipment room, etc.). Places with high requirement for quiet are not suggested for installation, such as bedroom, drawing room, meeting room, office, etc.
- When starting up, stop, defrosting, and oil-returning in heating mode, the electronic expansion valve valve will switch and cause noise. This kind of noise is normal for the switching of valve box.

⃠ Prohibitions

- Do not use components other than the fuse of proper capacity, such as metal wire and copper wire, which will cause fires and other faults if used instead of the fuse.
- When doing the cleaning and maintenance, make sure that the operation has been stopped and the manual power switch is in the off position.
- Do not use appliances such as water heater near the valve box. Using appliances producing steam near the valve box may lead to accidents such as water leakage, electric leakage and short circuit when the cooling system is in operation.
- Two-generation valve boxes VP*-*A and VP*-*B can't be mixed used in one system.

Do not install at such places

1. A place that is filled with mineral oil, a kitchen which has oil and steam everywhere, etc., which may cause degradation, falling off and water leakage of the resinous components.
2. A place with corrosive gases such as sulphurous acid gas, which will lead to the corrosion of the copper tube, welding joint, etc., causing refrigerant leakage.
3. A place where machines give out electromagnetic waves, which will lead to abnormality and improper function of the control system.
4. A place with possible leakage of combustible gases, floating of carbon fiber and combustible dust and use of volatile combustible substances such as diluents, the accumulation of which around the machine set will lead to fires.
5. A place where small animals inhabit, whose contacting the inner electrical components may cause faults, smoking, outbreak of a fire, etc.
6. A coastal place with high salinity and a place with great variation in voltage such as a factory, which may cause faults to vehicles and ships.

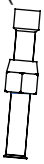
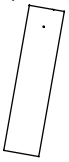
Attention item

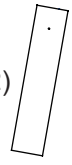
Install after making sure that the type of the refrigerant used is R410A. If any other type of refrigerant is used, the machine cannot run.

- Before and after the unpacking, if valve box is to be moved, the hoisting handles (totally 4) shall be held firmly. Do not apply force to other parts, especially a refrigerant tube and an electrical cabinet.
- Concerning the installation of the outdoor and indoor units, refer to the installation specification of each unit.

Accessories

Confirm that the accessories below are packed together.

VP4-450B	Auxiliary pipe							
Quantity	4	4	4	4	1	1	2	1
Shape	①-1 1/4(6.5)  3/8(9.52)	①-2 3/8(9.52)  5/8(15.88)	①-3 1/2(12.9)  5/8(15.88)	①-4 3/4(19.2)  5/8(15.88)	①-5 1/2(12.9)  5/8(15.88)	①-6 3/8(9.7)  5/8(15.88)	①-7 7/8(22.4)  1 1/8(28.58)	①-8 1(25.6)  1 1/8(28.58)

VP4-450B	Auxiliary pipe		Wiring harness	Insulation tube			
Quantity	2	1	42	4	4	4	4
Shape	①-9 5/8(16.1)  7/8(22.22)	①-10 3/4(19.2)  7/8(22.22)		 Ø10	 Ø16	 Ø28	 Ø46

VP4-450B	Nut		Specification
Quantity	4	4	1
Shape	 3/8(9.52)	 5/8(15.88)	

<Entrustment>
Before the installation is completed, do not abandon the accessories needed in installation.

Combinations

- This series is cooling and heating heat recovery models. Only when the system is equipped with valve box, indoor units under different valve boxes can achieve cooling and heating simultaneously. The modes of the indoors which under the same valve box should be the same. If the indoors connected without valve box, the indoors only can do cooling mode. Do not connect the valve box to the common multi-split system, as the former is dedicated to the cooling & heating multi-split system.
- Concerning the model of the connectible indoor unit, see the sample brochure, etc. for confirmation.
- Concerning the total capacity of the indoor unit connected at the downstream of the valve box (the total selected capacity of the models), select in Table 1 according to the quantity (refer to Table 2 for the selected capacity of the model of each indoor unit)

Table1: Total capacity of indoor unit:

Valve Box	Total of four branches		Per branch	
	Total capacity of indoor unit kBtu/h (kW)	Quantity of indoor unit	Total capacity of indoor unit (kW)	Quantity of indoor unit
VP4-450B	< 154 (< 45)	less than 20	< 154 (< 45)	less than 5

Table 2: Capacity measure and selected capacity of the model of indoor unit

Capacity measure	072	092	122	162	182	242	282	302	382
selected capacity (KW)	7.5 (2.2)	9 (2.8)	12 (3.6)	16 (4.5)	18 (5.6)	24 (7.0)	28 (8.0)	30 (9.0)	38 (11.2)

Do not connect the fresh air unit to this system.

Inspection item

Pay much attention to the following during installation. Check them again after completion.

(1) Inspection items after installation

Inspection item	Defect	Inspection column
If the installation of valve box is secure ?	Falling off, vibration and noise	
If gas leakage inspection is completed ?	No heating/cooling	
If complete insulation is achieved (refrigerant piping and tubing connections) ?	Water leakage	
If the voltage of the power supply is consistent with that on the nameplate ?	Out of service, burnt	
If there is improper wiring or piping ?	Out of service, burnt	
If there is construction without grounding ?	Danger in electric leakage	
If the thickness of the wire is as specified ?	Out of service, burnt	

(2) Inspection upon delivery

Inspection item	Inspection column
If the electric box cover is installed	
If the installation specification is transferred to the customer	

1. Pre-installation

The installation location selected shall meet the following conditions and be approved by users.

- The strength shall be sufficient to withstand the weight of the valve box
- There is no significant tilt on the plane.
- Ensure that there is enough space for installation and maintenance.as show in Fig.1
- There is space for inspection on the side and top of the electric box
- The length of piping between the indoor and outdoor units shall be within the permissible range (referring to the specification attached to the outdoor unit).
- Please install the valve box in places where noise will not influence the customers too much (such as washroom, passageway, warehouse, equipment room, etc.). Places with high requirement for quiet are not suggested for installation, such as bedroom, drawing room, meeting room, office, etc.

Note:

- the electrical box can be changed as show in 3 valve box installation.
- When starting up, stop, defrosting, and oil-returning in heating mode , the 4-way valve will veer and create noise. This kind of noise is normal for the running of valve box.
- A noise may be emitted by the valve box as aresult of control during operation or stopping of an indoor unit. If it is installed in the ceiling where it is exposed, take adequate precautions with the installation location.

<Notice item>

- Inspect whether the installation location can sufficiently withstand the weight of valve box and set the hoisting bolts by reinforcing the beam if necessary. Use hoisting bolts in installation (referring to 2 for the preparation before installation).
- Install the power wiring and power line of the valve box at more than 1 m away from TV and radio to prevent the image clutter and noise. But, there may be noise even if it is more than 1m according to the different waves.

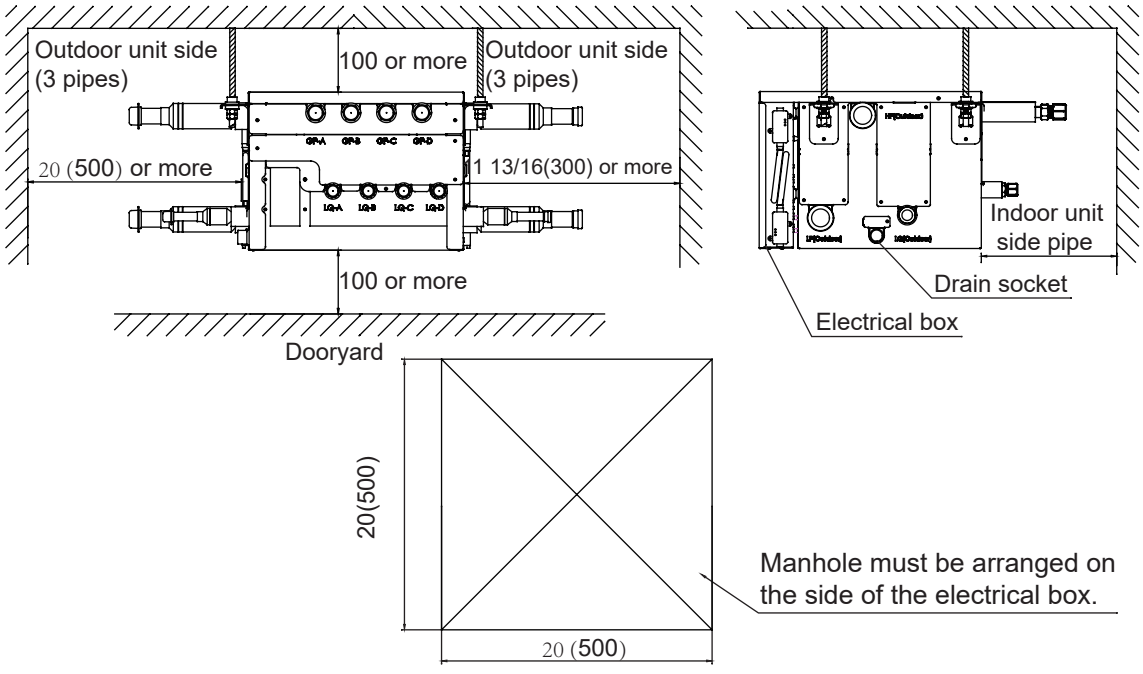
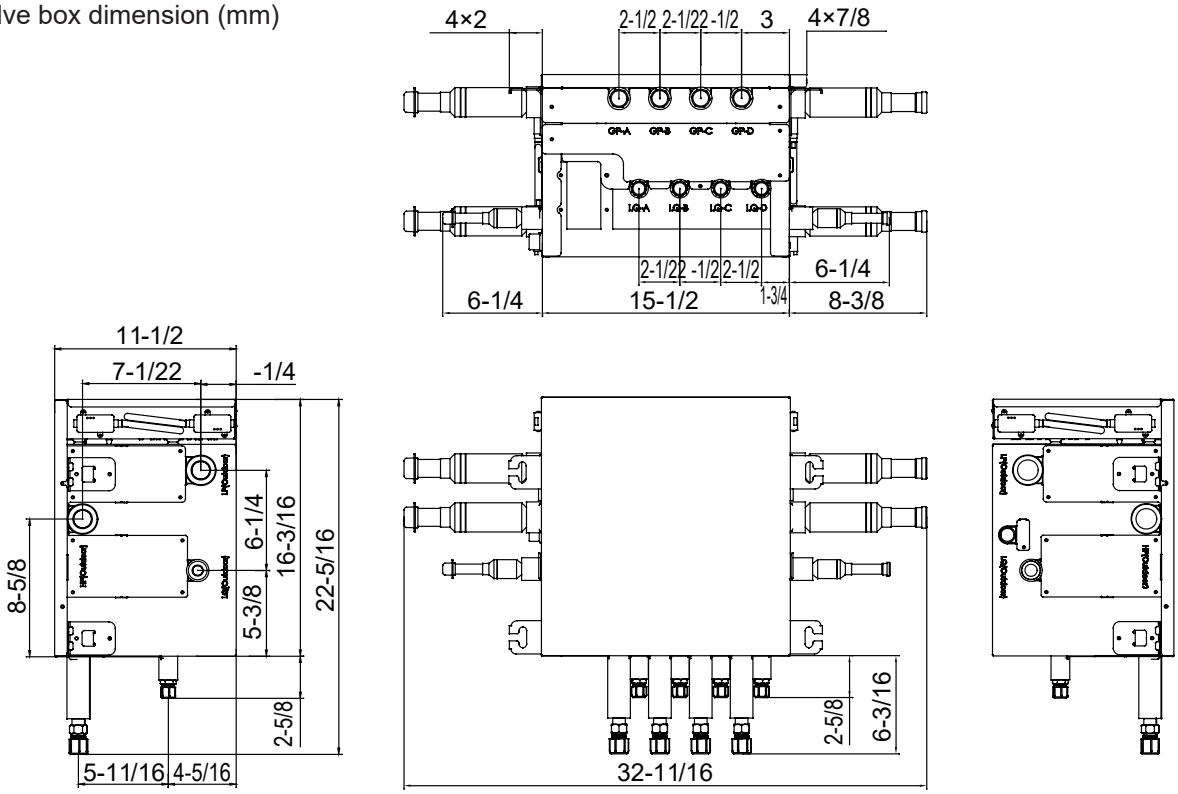


Fig.1

2. Preparation before installation

(1) Valve box dimension (mm)



See the Fig.4 to install the lifting bolts and hoisting tools.

- Use the lifting bolts with the size of M8~M10
- Press insert for new settings. Press hole in anchor if set. Ensure that it can sufficiently withstand the weight of the valve box before installation.

(2) Lifting dimension of valve box

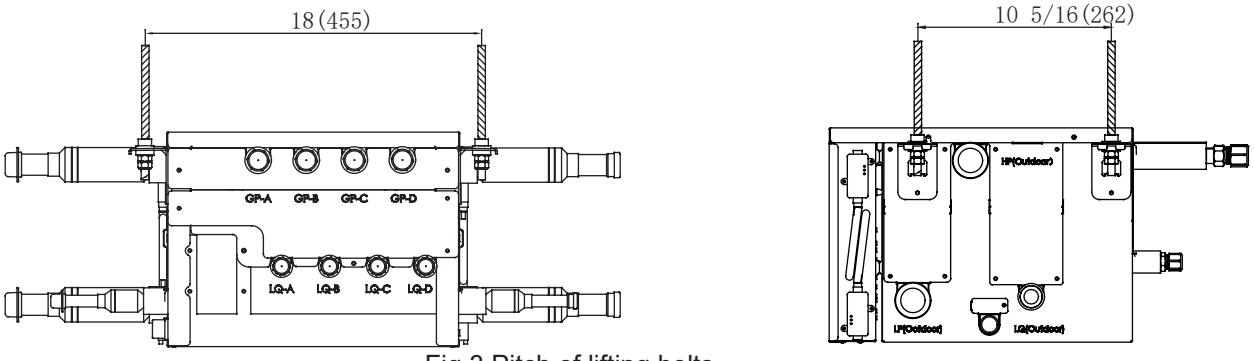


Fig.3 Pitch of lifting bolts

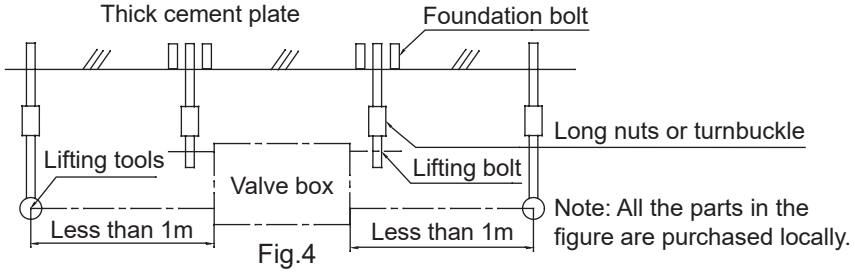


Fig.4

3. Installation of valve box

Use parts and components specified for installing the installation components.

Install the all thread rod, washers and nuts according to the instruction of the Fig.5
Be sure to follow the stipulations on products locally purchased to use nuts 3/8” of 3 pieces for 4 positions) and washers on the upper and lower sides of the lifting tools.

<Note>
Be sure that the product must be installed with the top surface (the oblique surface in the Fig.5) upward, or it will not work well and increase the working noise.

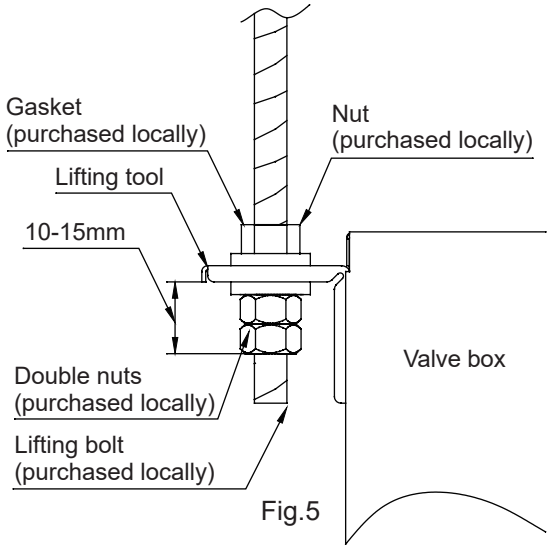
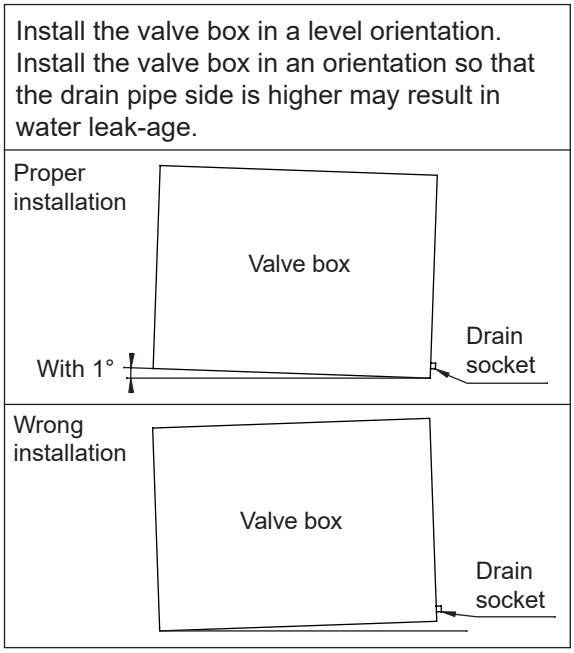


Fig.5



4. Refrigerant pipe Installation

- Pipes between the outdoor unit and valve box, selection of refrigerant branching suite, and the Pipe between refrigerant branching suites and the indoor units, please refer to the installation instructions or equipment design data attached to the outdoor unit.
- Before Installation, make sure the type of the refrigerant to be used is R410A. (If a refrigerant other than this type is used, It cannot run properly)
- Please provide thermal insulation at the high-pressure gas pipe, suction gas pipe,, liquid pipe and oil equalizing pipe (pipes for outdoor units in case of multi-split system) and the connections between these pipes. In the absence of thermal insulation, liquid leakage and scalding may happen. Particularly when the high-pressure gas pipe delivers indrawn air under full-refrigeration condition, it needs the same thermal insulation as does the suction gas pipe. Besides, high-pressure gas pipe and suction gas pipe are to deliver high-pressure gas, thus please provide thermal insulation material that can sustain temperature over 120 °C.
- Enhance the insulation material based on the installation environment. The indicators are shown below.
- For RH75%–80% at 86°F (30°C): over 19/32” thick or more.
- For over 80% at 86°F (30°C): over 25/32" thick or more.
- The thermal insulation material surface is prone to condensation if not reinforced. Please refer to the equipment design data for further details.

The high-pressure gas pipe, suction gas pipe, liquid pipe must be provided with reliable thermal insulation. In the absence of thermal insulation, liquid leakage may happen.
The outdoor unit is already filled with refrigerant.
To connect the pipes to valve box or remove them from valve box, do use both spanner and torque wrench, as shown in the Fig.6.
Apply refrigerant oil to outside of the flare. Screw it for 3 to 4 rounds with hands and then tighten it.
Determine the tightening torque. (Excessive tightening may damage the nuts and hence cause leakage)
Check the connecting pipes for gas leakage and then fix the thermal insulation, as shown in the in the Fig.7.
Only use sealing gasket to wrap the part jointing between the gas pipe and thermal insulation.
For pipe cutter and flare tool, please use R410A special tools.

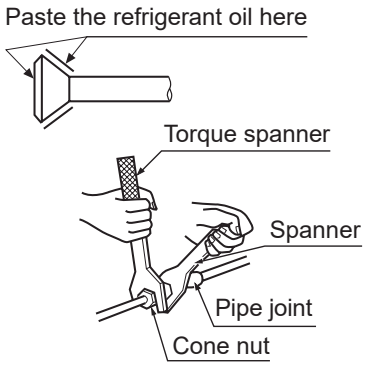


Fig.6

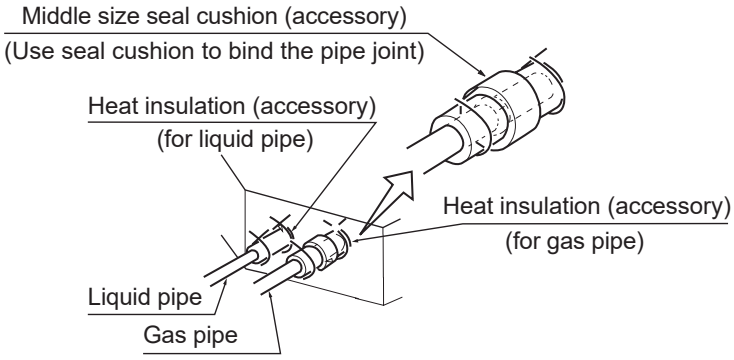


Fig.7

<Notes>
Please do not let any type of gas other than the specified refrigerant go into the refrigeration system;
In case of refrigerant leakage during operation, please replace the gas. (Fill the refrigerant at the outdoor unit)

Select piping material

- Make sure both the internal surface and external surface of the pipes are intact and are free from harmful contaminants such as sulphur, oxide, foreign matter, cutting powder, grease and water.
- Please use the following materials for refrigerant pipe.

Pipe material		Phosphorized copper seamless pipe for air conditioner (TP2)
Model		VP4-450B
Function	High pressure gas pipe	1-1/8” (28.58)
	Suction gas pipe	1-1/8” (28.58)
	Liquid pipe (outdoor side)	5/8”(15.88)
	Gas pipe (indoor side)	5/8”(15.88)
	Liquid pipe (indoor side)	3/8 (9.52)

Wall thickness and size: select proper sizes according to Selection of piping dimensions
- For the permissible maximum length, permissible elevation difference and permissible length after branching, please refer to the installation instructions or technical data attached to the outdoor unit.
- The branching pipe for the pipe must have refrigerant branching suite. For selection of refrigerant branching suite, please refer to the installation instructions or technical data attached to the outdoor unit.

Piping maintenance

During installation, provide maintenance as specified in the table in order to prevent water, foreign matter and dust from entering the pipes.

Location	Work period	Maintenance method
Outdoors	More than 1 month	Screw
	Less than 1 month	Screw or strap
Indoors	——	

Note
Particularly when a pipe is to penetrate through a wall or extend to outdoors, make sure foreign matter and dust etc cannot enter the pipe.

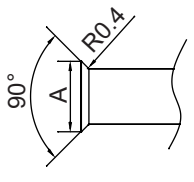
Attention item for piping connection

- To connect a pipe to or remove it from the valve box, do use pliers for screws and torque spanner;
- When installing the valve box, please fix the box and connecting pipes in an efficient way to avoid shaking when changing valve box.
- For the sizes of the flares, please refer to <Table-1>.

<Note>
- For connection at a flare, apply ester or ether oil to the flare (both inner surface and outer surface). Apply such oil for 3 to 4 times and insert the screw in the first use
- The tightening torque for the flare is given in <Table-1>.

If no torque wrench is available, act as the follows.
① Use a spanner to tighten the nut of the flare to a position where the tightening torque sharply increases.
② The tightening angle for the position where the tightening torque sharply increases <Table -2>.
③ After the work, make sure there is no air leakage.

<Table-1>

Pipe size OD inch. (mm)	Tightening torque (N.m)	Tightening torque (lbf.ft)	Machined flare size A (mm)	Machined flare size A (inch)	Flare shape
1/4(6.35)	14.2~17.2	10.5~12.7	8.7~9.1	0.34~0.36	
3/8(9.52)	32.7~39.9	24.1~29.6	12.8~13.2	0.50~0.52	
1/2(12.7)	49.5~60.3	36.5~44.7	16.2~16.6	0.64~0.65	
5/8(15.88)	61.8~75.4	45.6~55.9	19.3~19.7	0.76~0.78	
3/4(19.05)	97.2~118.8	71.1~88.0	23.7—23.9	0.93~0.94	
7/8(22.22)	117.2~138.8	86.5~102.8	28.2-28.5	1.11~1.12	

<Table-2>

Pipe size OD inch. (mm)	Tightening angle	Recommended tool length inch. (mm)
1/4(6.35)	60°~90°	5.90(150)
3/8(9.52)	60°~90°	7.87(200)
1/2(12.7)	30°~60°	9.84(250)
5/8(15.88)	30°~60°	11.81(300)
3/4(19.05)	20°~35°	17.72(450)
7/8(22.22)	15°~30°	23.62(600)

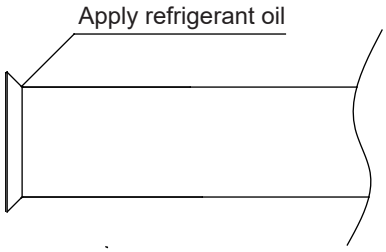


Fig.8

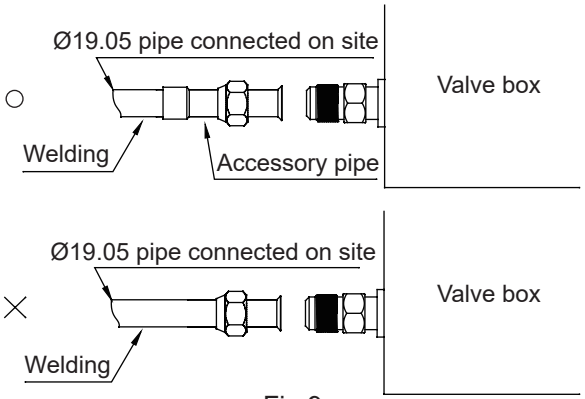


Fig.9

<Note>

- Excessive tightening will result in cracking at the flare and refrigerant leakage.
- To weld the refrigerant pipe, please make nitrogen replacement (*1), or send nitrogen (*2) into the refrigerant pipe while welding the pipe (refer to Fig.10). Finally use the flare or flange to connect the indoor unit and valve box.
  (*1) Nitrogen replacement method is provided in the multi-split system work manual.
  (*2) If nitrogen flowing and welding proceed simultaneously, do use pressure reducing valve. Approximately 0.02 MPa (0.2 Kg/cm with a slight feeling of breeze) pressure is quite proper.

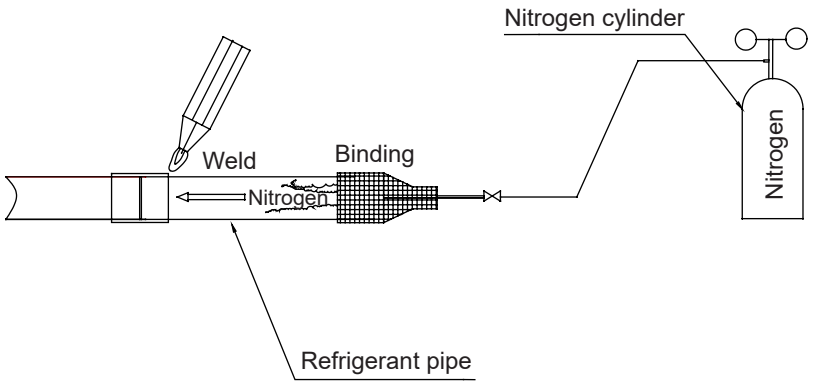


Fig.10

<Note>

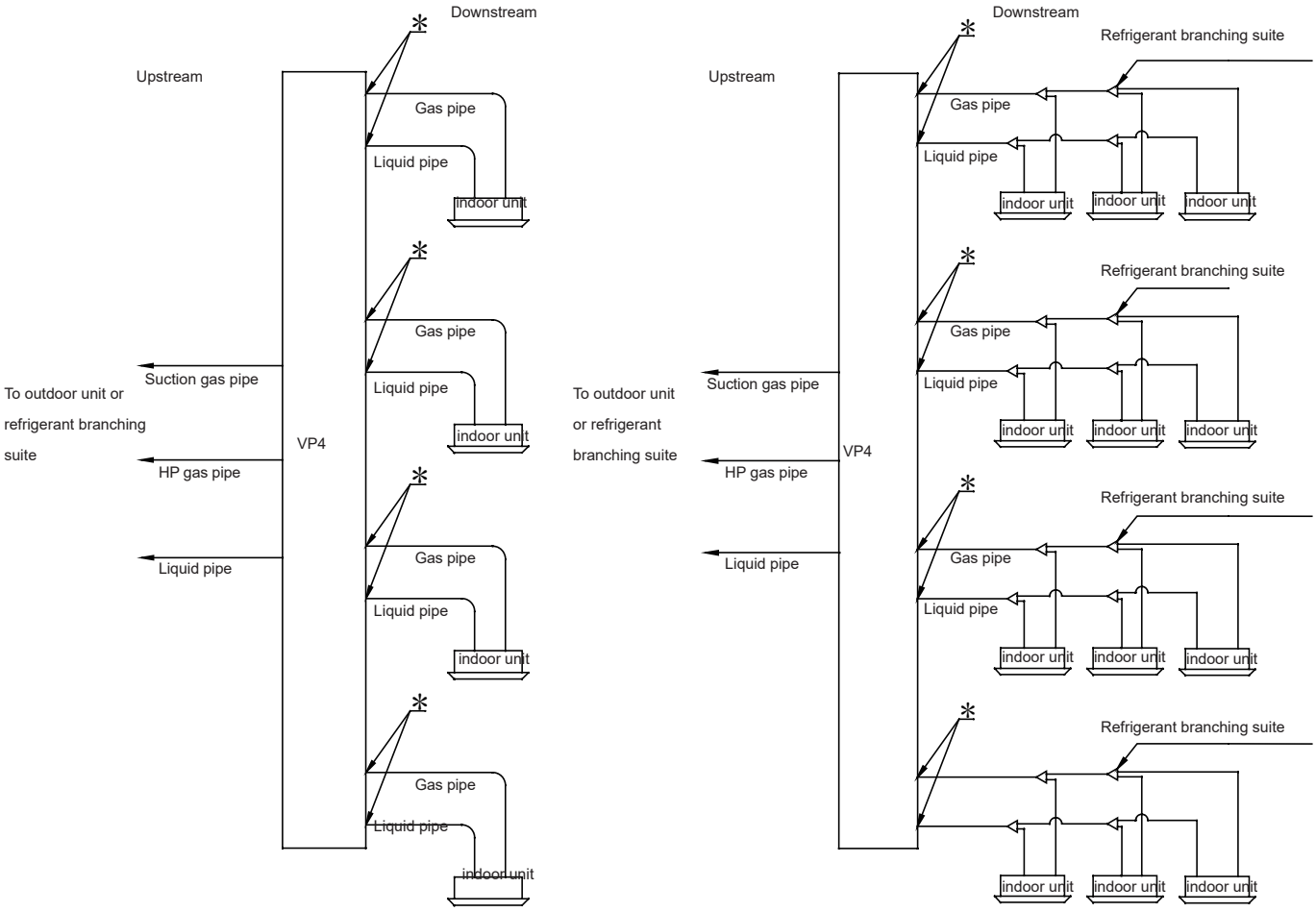
- For pipe welding, do not use antioxidant, for its residue may cause tube blocking and component fault.
- For pipe welding, do not use flux. If the flux is chlorine product, it will corrode the tube; if it contains fluorine, it will even cause detrimental effects to the refrigerant system, such as refrigerant oil deterioration. Please do not use phosphor copper for welding material (BCup-2).

Selection of piping dimensions

Select refrigerant branching dimensions between outdoor units and valve box, between valve box and indoor units according to the following connection examples 1 and 2 and Tables 1-3.

Connection example 1: Connect an indoor unit to the downstream of the valve box

Connection example 2: with branching in the downstream of the valve box



(*) For dimensions of the pipes to the downstream of the valve box, see the table 3. Use the attached pipes for connection in the way shown in Pipe connection according to the pipes dimensions and diameters for indoor unit connection selected in Table 2.

<Table 1> Total capacity and pipe dimensions (mm) of the indoor units

Total capacity of the indoor units Q (kW)	Pipe dimensions (OD × minimum wall thickness)		
	Upstream		
	Suction gas pipe	High pressure gas pipe	Liquid pipe
Q<57.3(Q<16.8)	5/8(15.88)×1.0	5/8(15.88)×1.0	3/8(9.52)×0.8
57.3≤Q<76.4(16.8≤Q<22.4)	3/4(19.05)×1.0	5/8(15.88)×1.0	3/8(9.52)×0.8
76.4≤Q<112.6(22.4≤Q<33)	7/8(22.22)×1.0	3/4(19.05)×1.0	3/8(9.52)×0.8
112.6≤Q<153.5(33≤Q<45)	1-1/8(28.58)×1.2	1(25.4)×1.2	1/2(12.7)×1.0

<Table 2> Dimensions (mm) of connection tube of the indoor units

Indoor (×100W)	Gas pipe (mm)	Liquid pipe (mm)
7.5~9.5(22~28)	3/8(9.52)×0.8	1/4(6.35)×0.8
12.3~19.1(36~56)	1/2(12.7)×0.8	1/4(6.35)×0.8
24.2~38.2(71~112)	5/8(15.88)×1.0	3/8(9.52)×0.8

Note:
High wall 0.8/1HP gas pipe: Ø12.7
High wall 2HP gas pipe/liquid pipe: Ø15.88/Ø9.52

<Table 3> Dimensions (mm) of connection pipe of the vale box

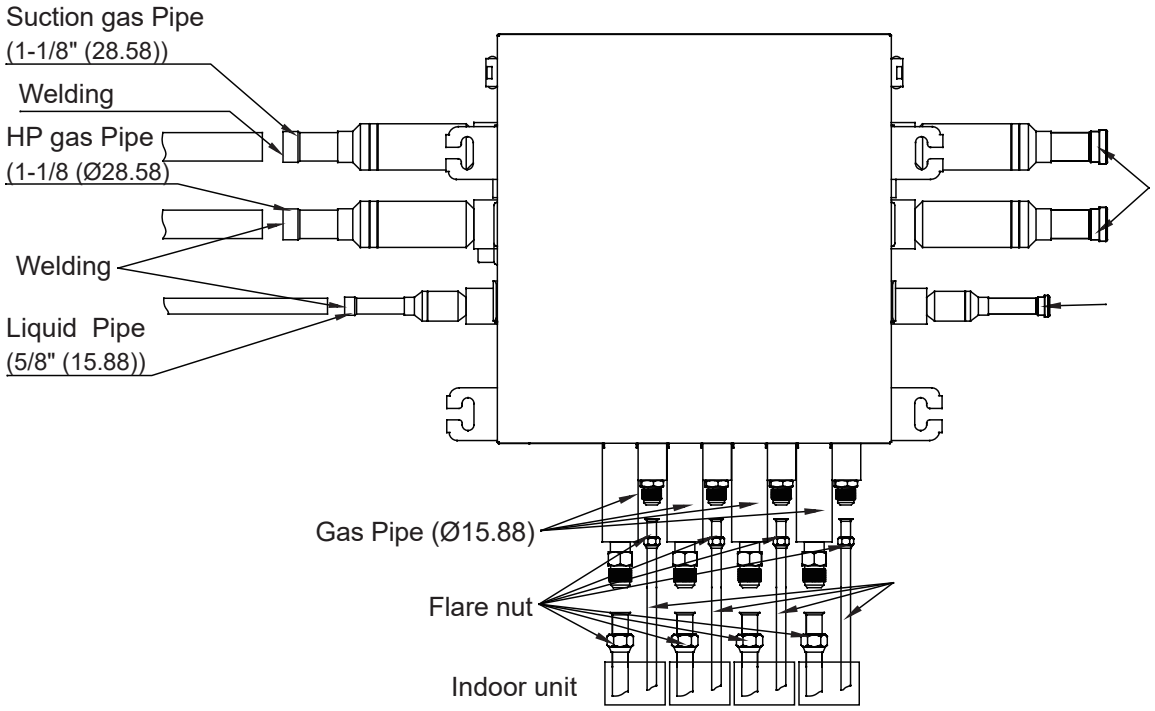
Type of valve box for switch between cooling and heating	Pipe dimensions (OD × minimum wall thickness)				
	High pressure gas pipe	Suction gas pipe	Liquid pipe at the outdoor unit side	Gas pipe of the indoor unit	Liquid pipe at the indoor unit side
VP4-450B	1-1/8(28.58)×1.2	1-1/8(28.58)×1.2	5/8(15.88)×1.0	5/8(15.88)×1.0	3/8(9.52)×0.8

Pipe connection

(*1) Refer to the field pipe
(*2) Please use the flare nut installed on the product body again.

Note:
During installation, please confirm the HP gas pipe and Suction gas pipe between outdoor and valve box (such as by sending nitrogen into the HP gas pipe and Suction gas pipe), then connect Suction gas pipe to the Suction gas pipe of valve box, HP gas pipe to the HP gas pipe of valve box.

(Note):
When a 072, 092 indoor unit is connected in the downstream, please use the auxiliary pipe ①-1,2 for connection according to Fig.11.
When a 122, 162, 182 indoor unit is connected in the downstream, please use the auxiliary pipe ①-1,3 for connection according to Fig.11.
When a High wall 0.8/1HP indoor unit is connected in the downstream, please use the auxiliary pipe ①-1,3 for connection according to Fig.11.
When an High wall 2HP indoor unit is connected in the downstream, do not use the auxiliary pipe.


Suction gas Pipe
(1-1/8" (28.58))
Welding
HP gas Pipe
(1-1/8 (Ø28.58)
Welding
Liquid Pipe
(5/8" (15.88))
Gas Pipe (Ø15.88)
Flare nut
Indoor unit

Or

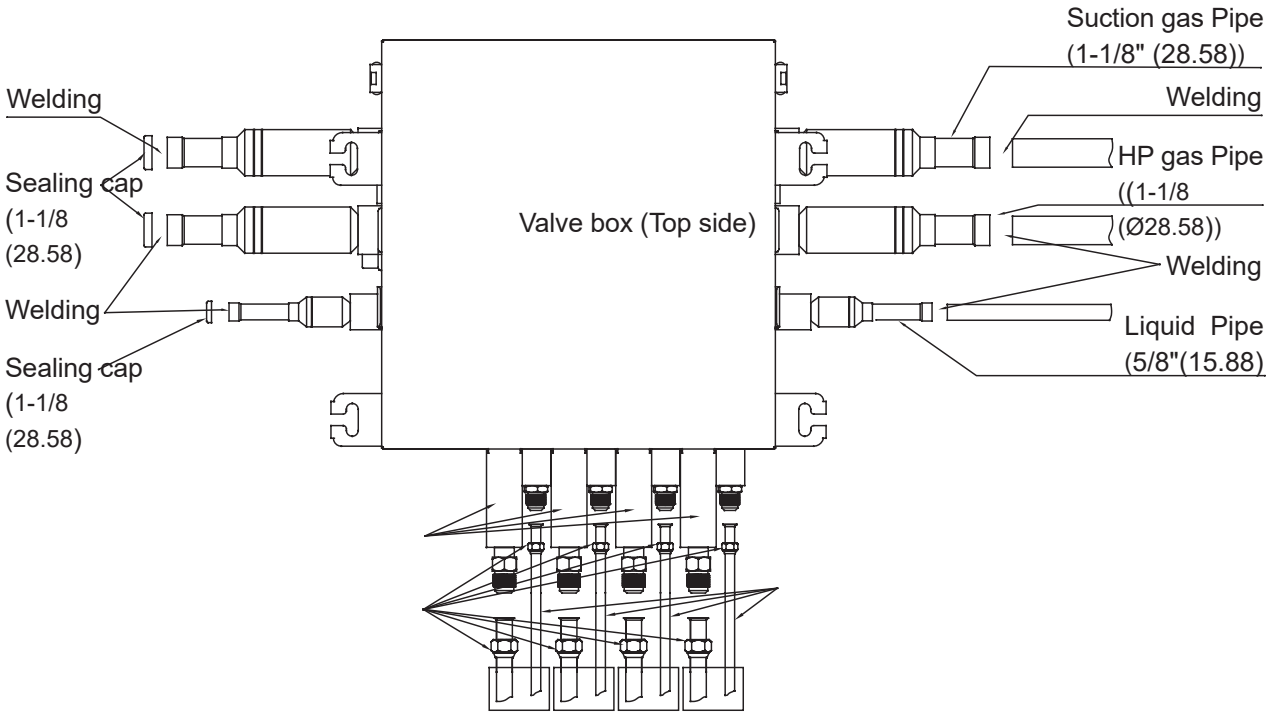

Welding
Sealing cap
(1-1/8
(28.58)
Welding
Sealing cap
(1-1/8
(28.58)
Valve box (Top side)
Suction gas Pipe
(1-1/8" (28.58))
Welding
HP gas Pipe
((1-1/8
(Ø28.58))
Welding
Liquid Pipe
(5/8"(15.88)

Fig. 11

Pipe insulation

Please use the auxiliary insulation cylinder and anchor for insulation works according to Fig.12 after the gas leakage test.

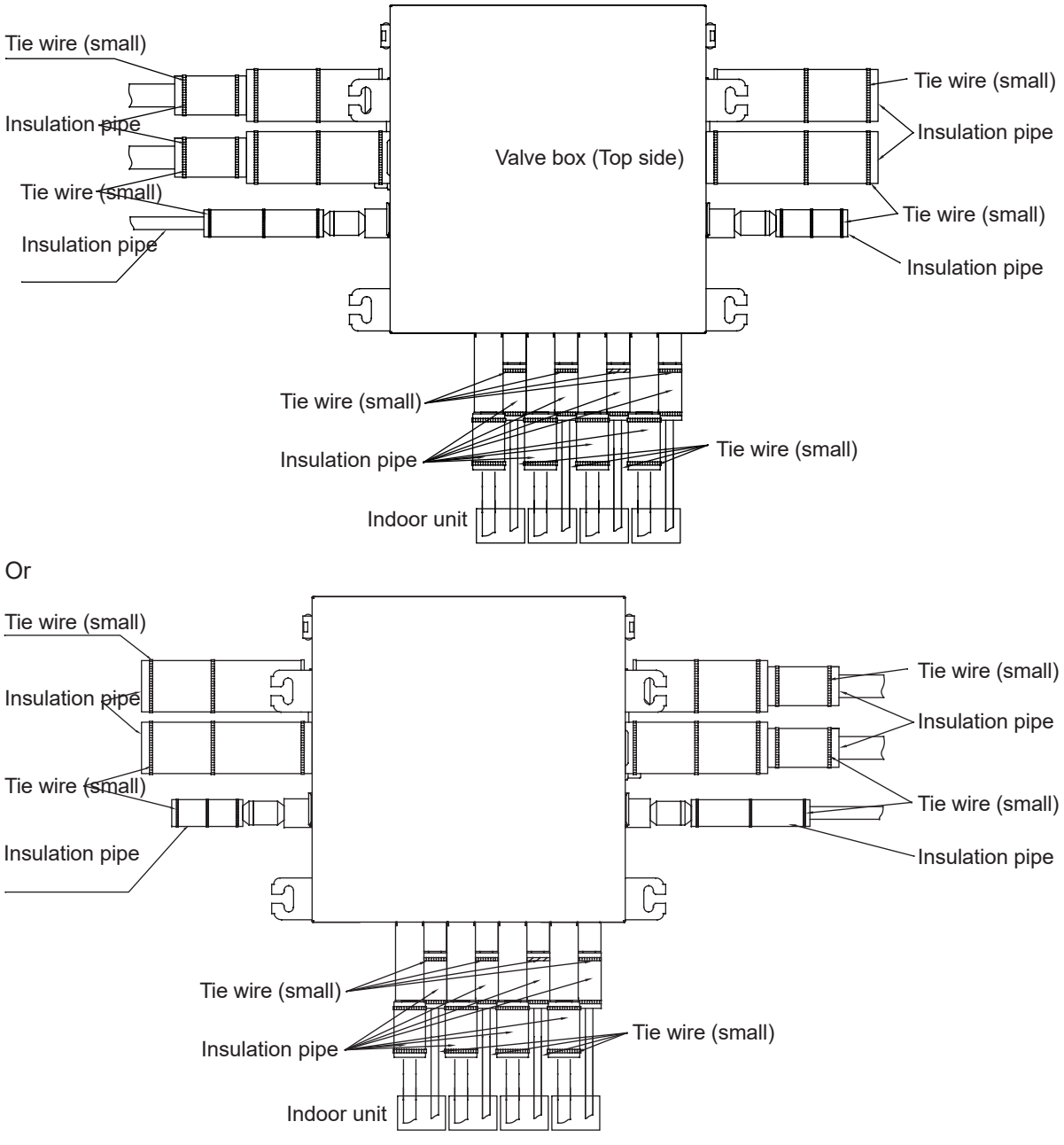


Fig.12

Note 1:
For suction gas pipes, high pressure gas pipe and liquid pipes, gas pipe, flare connections shall be wrapped with insulation materials (purchased locally) when their auxiliary insulation cylinders have been installed.

For installation of insulation materials for the flare nut connections, it shall be cautioned that:
(1) Please connect it tightly so as to ensure no gas leakage at both ends.
(2) The retaining clamp shall not be over tight so as to ensure the thickness of the insulation materials.
(3) Joints of insulation materials (purchased locally) for the upper flare nut connections shall be wrapped upwards.
(4) Ensure that joints of the insulation materials are installed upwards. (See Fig.13.)

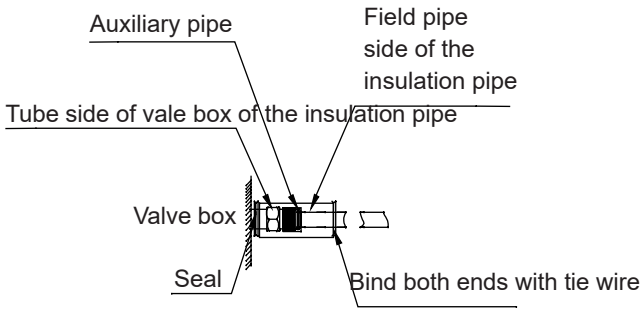


Fig.13

⚠Warning

- Electrical construction should be made with specific mains circuit by the qualified personnel according to the installation instruction. Electric shock and fire may be caused if the capacity of power supply is not sufficient.
- During arranging the wiring layout, specified cables should be used as the mains line, which accords with the local regulations on wiring. Connecting and fastening should be performed reliably to avoid the external force of cables from transmitting to the terminals. Improper connection or fastness may lead to burning or fire accidents.
- There must be the ground connection according to the criterion. Unreliable grounding may cause electrical shocks. Do not connect the grounding line to the gas pipe, water pipe, lightening rod and telephone line.

⚠ Attention

- Only copper wire can be used. Breaker for electric leakage should be provided, or electric shock may occur.
- The wiring of the mains line is of Y type. The power plug L should be connected to the live wire and plug N connected to null wire while ⏚ should be connected to the ground wire. For the type with auxiliary electrically heating function, the live wire and the null wire should not be misconnected, or the surface of electrical heating body will be electrified. If the power line is damaged, replace it by the professional personnel of the manufacturer or service center.
- The power line of valve boxes should be arranged according to the installation instruction of valve boxes.
- The electrical wiring should be out of contact with the high-temperature sections of tubing as to avoid melting the insulating layer of cables, which may cause accidents.
- After connected to the terminal tier, the tubing should be curved into be a U-type elbow and fastened with the pressing clip.
- Controller wiring and refrigerant tubing can be arranged and fixed together.
- The machine can't be powered on before electrical operation. Maintenance should be done while the power is shut down.
- Seal the thread hole with heat insulating materials to avoid condensation.
- Signal line and power line are separately independent, which can't share one line. [Note: the power line, signal line are provided by users. Parameters for power lines are shown as below: 3×(1.0-1.5) mm^2; parameters for signal line: 2×(0.75-1.25)mm^2(shielded line)]
- Valve boxes and outdoor units should be connected to the power source separately. All valve boxes must share one single electrical source, but its capacity and specifications should be calculated. Indoor & outdoor units should be equipped with the power leakage breaker and the overflow breaker.
- Valve box can be installed in multiple, named as unit A, unit B…. Pay attention to the marks on the terminal block when connecting the outdoor unit with the indoor unit. Refer to wiring example as described in 5-2 while ensuring correct connection. In addition, the operation will be abnormal when the wiring and the tubing between indoor and outdoor machine sets are installed in different refrigerant systems.
- Energization is not to be done before it’s confirmed that the valve box have completely installed and that the outdoor and indoor installation is completed.

The wiring for the power line and signal line of valve box

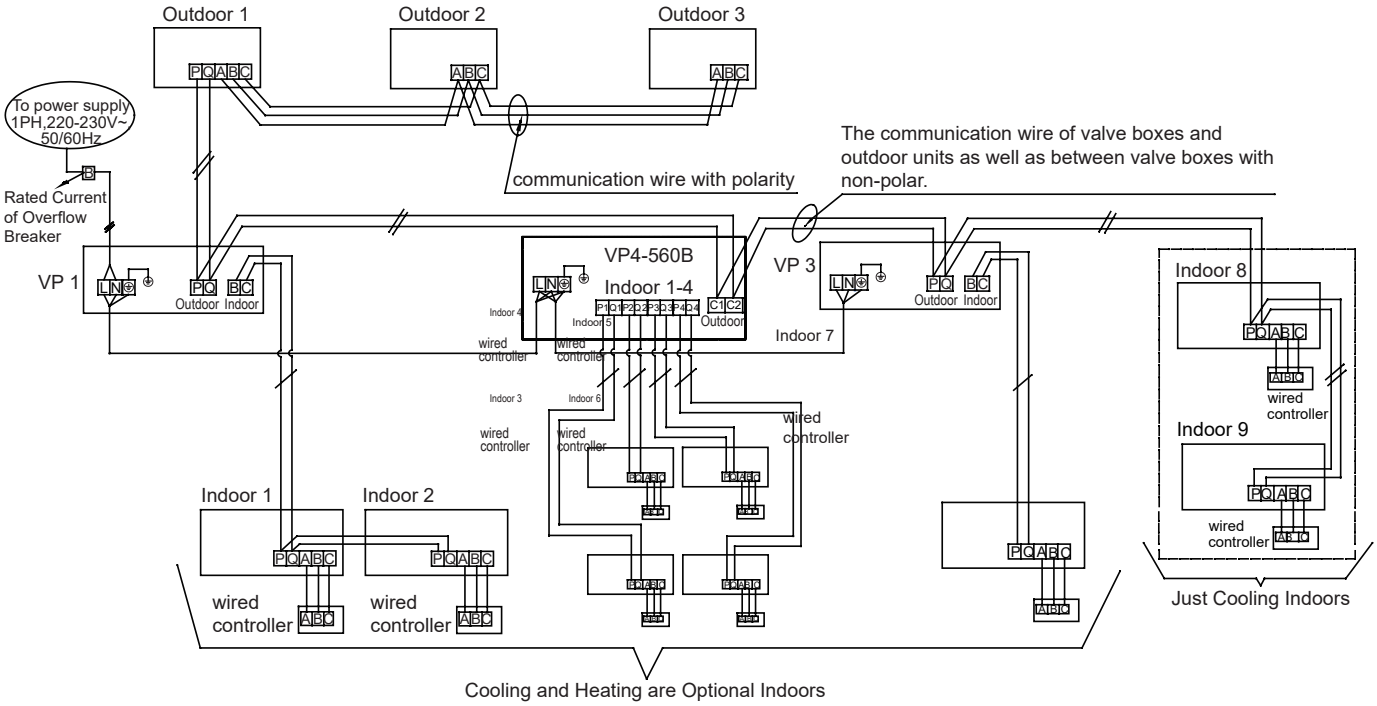
The wiring for the power line of valve box, the wiring for the signal line between valve boxes and outdoor units as well as the wiring between valve boxes.

Items / Total Current of valve boxes (A)	Cross Section (mm^2)	Rated Current of Overflow Breaker (A)	Rated Current of Power Leakage Breaker (A) Leaking Current (mA) Operating Period (S)	Cross Sectional Area of Signal Line	
				Outdoor-valve box (mm^2)	Valve box-valve box (mm^2)
<15	6(2.5)	15	15A, 30mA, 0.1S or below	2cores ×0.75-2.0 mm^2 shielded line	

- Power cable and communication wire must be fixed firmly.
- Each valve box must be earthed well.
- When power cable exceeds the range, thicken it appropriately.
- Shielded layer of communication wires must be connected together and be earthed at single point.
- Communication wire total length cannot exceed 1000m.

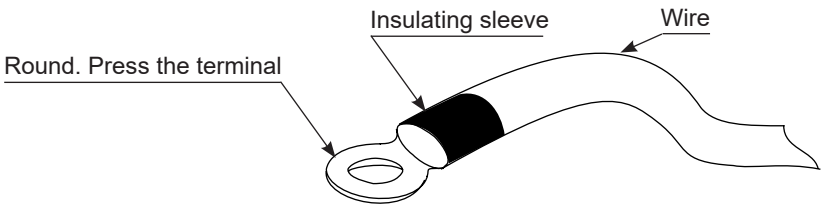
Graphical representation for wiring

Connect the communication terminal block P and Q of the main unit of the outdoor units with the communication terminal block P and Q of the first valve box (VP 1).

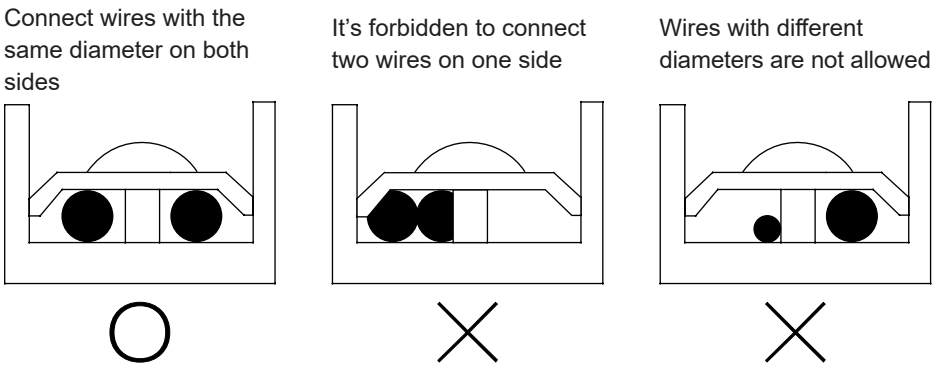


Notes:
(1) The above wiring example is only for reference. The number of valve boxs and indoor units shall be subject to the field installation.
(2) Communication line from cooling-only indoor unit may be connected to the communication terminal block P and Q (outdoor) of the valve box.

(3)Two-core nonpolar communication line with shield shall be adopted for communication lines between the valve box and the indoor/outdoor unit. Three-core polar communication line with distinguished polarities and shield shall be adopted for the wire controller connected to the indoor unit.
(4)All valve boxes within one system may share one overcurrent breaker for power supply. But it's necessary to compute total current capacity specification.
(5)For wring harness connected to the power terminal block, the terminal shall be pressed with a round (refer to the following figure).



1)The power terminal block shall not be crimped with 2 wires of different diameters. Otherwise, poor crimp connection and looseness may lead to abnormal heating or sparking of the line.
2)Refer to the following figure for crimping wires with the same diameter.



(6) Tighten terminal screws with proper screw driver. Screw driver of small dimension will damage the screw head and fail to tighten properly.
(7) If terminal screws are tightened excessively, they may be damaged. Refer to the following table for tightening torques of terminal screws:

Dimension of terminal screw	Tightening torque (N.m)
M3.5 (terminal block for communication line)	0.80~0.96
M4 (terminal block for power line)	1.18~1.44
M4 (terminal block for ground wire)	1.52~1.86

(8)Power line is forbidden to the communication terminal block because it will damage the circuit control board.
(9)Wiring of communication lines shall be within the following scope. Exceeding the limit will possibly lead to abnormal communication.

1)The maximum wiring length between the outdoor machine and the valve cage, the valve cage and the indoor machine, and between valve cages is 1000 m at most. The total wiring length is 2000m at most. The maximum branch number is 16.
2)The maximum wiring length between the valve cage and the wire controller for switching working modes is 500 m at most.

21. Selection procedure