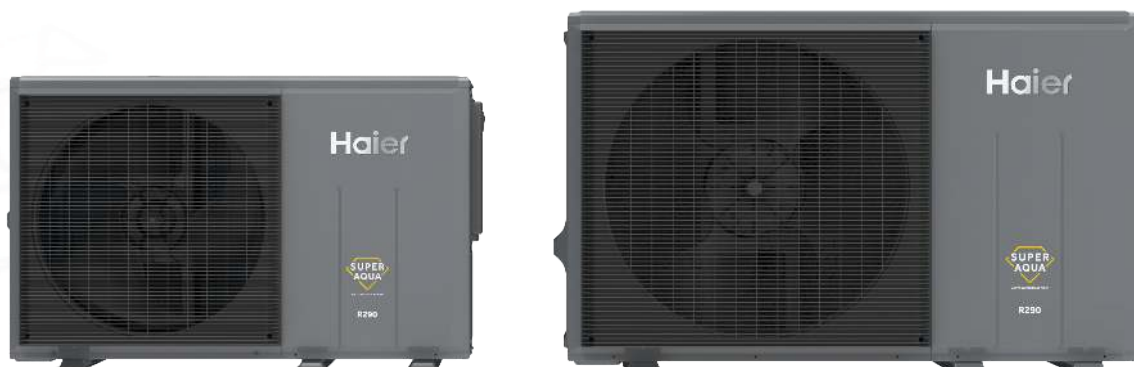


Haier

Service Manual

R290 Super Aqua Monobloc GT



The original documentation is written in English. All other languages are translations.

CONTENTS





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1. Safety Precautions










1.1 General Guidelines

1. The precautions described in this document cover very important topics related to safety, please read carefully.
2. Only licensed electricians and water system installers should perform all electrical and water installation works, in accordance with local regulations.
3. After completing the installation/repair work, make sure that the unit operates normally by carrying out test run operation.
4. Instruct the customer how to operate and maintain the unit and explain the cautions to the customer.
5. Keep this manual for future reference.





1.2 Meaning of Warnings and Symbols

	WARNING Indicates a situation that could result in death or serious injury.
	CAUTION Indicates a situation that could result in minor or moderate injury. It may also be used to alert against unsafe practices.
	This symbol with white background indicates item that must be PROHIBITED.
	This symbol with black background indicates item that must be carried out.








1.3 Safety Measures for Workers

WARNING	
	For electrical work, must ensure to follow the local regulations, wiring standards and installation manual.
	For water circuit installation work, must ensure to follow the relevant European and national regulations and local plumbing and building regulation codes.
	Do not store the units near sources of fire, such as open flames, gas appliances, or electric heaters.
	Must ship and store the units in upright conditions and dry area.
	Must disconnect the power cable from the socket prior to disassembling equipment for repair to avoid electrical shocks. Never touch electrically charged sections of the equipment if power supply is necessary for repair or circuit inspection.
	Do not contact with discharged refrigerant gas during repair as it can cause frostbite.
	Must ensure complete evacuation of the refrigerant gas in a well-ventilated place before disconnecting the suction or discharge pipe of the compressor at the welded section. In case of gas remaining inside the compressor, disconnection of the pipe can lead to discharge of refrigerant gas or refrigerating machine oil, which may cause injury.
	Must ensure good ventilation if refrigerant gas leaks during repair as refrigerant gas may generate toxic gases when it contacts flames.
	Must discharge the capacitor completely prior to repair to avoid electrical shocks as it supplies high-voltage electricity to the outdoor unit's electrical components.














WARNING

	Do not plug in or unplug the power cable to turn the air conditioner on or off as it may cause an electrical shock or fire.
	Must wear a safety helmet, gloves, and a safety belt to prevent falls when working in high places (more than 2 m or 6.5 ft).
	Must use exclusively designed pipes, flare nuts, and tools for R32, R410A and R290 refrigerant models to avoid serious accidents like damage to the refrigerant cycle or equipment failure.
	Do not mix air or any gas other than the specified refrigerant (R32, R410A, R290) in the refrigerant system to avoid excessively high pressure that could result in equipment damage and injury.









CAUTION

	Do not repair electrical components with wet hands to avoid electrical shocks.
	Do not clean the units with water; it can cause electrical shocks.
	Must ensure proper grounding when working in a humid or wet place to avoid electrical shocks.
	Must switch off the power and unplug the cable when cleaning the equipment. The internal fan rotates at a high speed, and may cause injury.
	Must use appropriate tools for repairs to avoid injury.
	Must ensure the refrigerating cycle section has cooled down enough before conducting repair work to avoid burns.
	Must conduct welding work in a well-ventilated place to avoid oxygen deficiency.

1.4 Safety Warnings for Users










WARNING	
	Do not store the units near sources of fire, such as open flames, gas appliances, or electric heaters.
	Only use the parts in the spare parts list for the specific model and appropriate tools when performing repairs. Modifying the equipment is strictly prohibited as it can lead to electrical shocks, excessive heat or fire.
	Replace power cables and lead wires if they show signs of damage or deterioration or it may cause electrical shocks, excessive heat or fire.
	Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances. This can cause electrical shocks, excessive heat or fire.
	Must ensure to use an exclusive power circuit for the equipment. Follow local technical standards, internal wiring regulations and the installation instruction manual when conducting electrical work. Improper electrical work or insufficient power circuit capacity can cause electrical shocks or fire.
	Must use the specified cable for wiring between the indoor and outdoor units and ensure the connections are secure and the cable is routed properly to avoid any force pulling at the connection terminals. Improper connections can lead to excessive heat or fire.
	Must ensure the terminal cover doesn't lift or dismount due to the cable during wiring. If the cover isn't mounted correctly, it can cause electrical shocks, excessive heat or fire.
	Do not damage or modify the power cable as it can cause electrical shocks or fire. Do not place heavy items on the power cable, or heating or pulling the cable.
	Only use the specified refrigerant (R32, R410A, R290) in the refrigerant system. If air enters into the system, it can result in high pressure, causing equipment damage and injury.
	Must locate and repair the leak first before recharging the refrigerant if refrigerant gas leaks. Ensure there are no leaks after recharging. If leaks can't be located and repair work needs to be halted, pump-down and close the service valve to prevent refrigerant gas from leaking into the room. While refrigerant gas is harmless, it may produce toxic gases upon contact with flames.
	Must ensure the new installation site can support the weight of the equipment when relocating the equipment. If not properly installed or the site lacks sufficient strength, the equipment can fall and cause injury.
	Must ensure the power cable plug is clean and securely inserted into the power outlet. A dirty or loose plug can cause electrical shocks or fire.
	Must ensure the dispose of old batteries from the remote controller to prevent children from swallowing them. If a child does swallow a battery, seek immediate medical attention.


CAUTION







	A leakage breaker may be required depending on installation site conditions to prevent electrical shocks.
	Do not install the equipment in an area where combustible gas leaks may occur as this can cause a fire.
	Must confirm that parts and wires are properly mounted and connected, and that connections at soldered or crimped terminals are secure. Improper installation or connections can cause excessive heat, fire or electrical shocks.
	Must ensure to replace corroded installation platforms or frames as it can cause the unit to fall and result in injury.
	Must ensure proper earthing/grounding and repair if necessary. Improper earthing/grounding can cause electrical shocks.
	Must measure insulation resistance after repair and ensure that the resistance is 1 MΩ or above. Faulty insulation can cause an electrical shock.
	Must check the drainage of the indoor unit after repair. Faulty drainage can cause water damage to furniture and flooring.
	Do not tilt the unit when removing it. Water inside the unit may spill and damage furniture or flooring.

2. Precautions for Using R290 Refrigerant

Please pay attention to the following points:

WARNING	
	Do not mix any different refrigerants within a system.
	Well trained and certified personnel are required for operating, maintaining, repairing, and recovering the flammable refrigerants, and also for conducting any operation, servicing and maintenance on a system or relevant parts of the units.
	Do not store any of the parts of refrigeration circuit or pipes near sources of fire, such as open flames, gas appliances, or electric heaters.
	The alarms, mechanical ventilation and detectors must be checked regularly by users or the authorized dealer at least once a year based on the national rules to ensure correct operation.
	It is necessary to keep a logbook and record all outcomes of these checks.
	Ventilation in occupied areas must be checked to make sure there are no any obstructions.
	Before a new refrigeration system is put into operation, the person in charge of system operation should ensure that the operating personnel are properly trained and certified and familiarized with the system's construction, supervision, operation and maintenance, safety precautions, and the properties and handling of the refrigerant used.
	For the trained and certified personnel, they must: <ol style="list-style-type: none"> 1. Well understand the legislation, regulations, and standards related to flammable refrigerants; 2. Own the knowledge and skills in managing flammable refrigerants, personal protective equipment, preventing refrigerant leaks, handling cylinders, charging, leak detection, recovery and disposal; 3. Be able to comprehend and apply national legislation, regulations and standards; 4. Keep continuous, regular and additional training to maintain these skills.
	Must protect the protection devices, refrigeration circuits, and fittings from potentially damaging environmental factors, such as the risk of water collection and freezing in relief pipes or the accumulation of dirt and debris.

CAUTION	
Installation	
	Must follow all related national gas regulations, state municipal regulations and laws, and notify the relevant authorities as per all applicable rules.
	Must ensure that all mechanical connections are accessible for maintenance purposes.
	Must ensure that all ventilation openings are clear without any obstructions.
	Always reach out to local authorities for proper guidance.

CAUTION	
Servicing	
● Service Personnel	
	Any certified individual working on or breaking into a refrigerant circuit should have a valid certificate from an industry-recognized assessment authority, confirming their ability to safely handle refrigerants per industry assessment specifications.
	Servicing should only be done as recommended by the equipment manufacturer. Maintenance and repairs requiring additional specialized personnel should be done under the supervision of a person competent in the use of flammable refrigerants.
	Servicing should be performed only as recommended by the equipment manufacturer.
	The system should be inspected, regularly monitored and maintained by a trained and certified service personnel employed by the user or responsible party.
	Must ensure no leak during refrigerant charge.
● Work	
	Must ensure conducting safety checks before starting work on systems that contain flammable refrigerants to minimize the risk of ignition.
	Must ensure to follow all related safety precautions before conducting work on the system when repairing the refrigeration system.
	Must ensure the work is conducted under controlled procedures to minimize the risk of a flammable gas or vapor being present.
	Avoid working in enclosed space and ensure a safety distance of at least 2 meters from any source, or establish a free space zone of at least 2 meters in radius.
	Must use suitable protective equipment per the actual situation.
	Must ensure to stay away from any flammable materials and heat-producing items.
● Confirming Refrigerant Existence	
	A suitable refrigerant detector should be used to check the area before and during work to identify potentially combustible environments.
	The leak detection equipment should be non-sparking, adequately sealed, or intrinsically safe.
	If a leak or spill occurs, ventilate the area immediately, stay upwind and avoid the spill/release.
	In the event of a leak or spill, inform individuals downwind of the leak/spill, isolate the immediate hazard area, and restrict unauthorized personnel.
● Fire Extinguisher Availability	
	If any heat-related work is to be done on the cooling equipment or any related parts, relevant fire extinguishing equipment should be accessible.
	Keep a dry powder or CO ₂ fire extinguisher close to the charging area.
● Avoid Ignition Sources	
	When working on a cooling system, avoid using any ignition sources that could risk a fire or explosion.
	Keep all potential ignition sources, including smoking, sufficiently far from the installation, repair, removal, and disposal site where flammable refrigerant could be released.
	Check the area around the equipment before starting work to ensure that there are no flammable hazards or ignition risks.
	Must display "No Smoking" signs.
● Ventilated Area	
	Must ensure the area is open or adequately ventilated before opening the system or conducting any heat-related work.
	Ensure continuous ventilation throughout the work.
	Safely disperse any released refrigerant during ventilation, preferably expelling into the atmosphere outside.

CAUTION

● **Checking for Refrigerating Equipment**

	When changing electrical components, must ensure they are suitable and meet the correct specifications.
	Must ensure to follow the guidelines provided by the manufacturer for maintenance and service.
	Must reach out to the manufacturer's technical support for help if there are any unsure points.
	When using flammable refrigerants during installation, please conduct below checks:
	1. Must ensure ventilation equipment and outlets are not obstructed and are functioning properly.
	2. Must check the secondary circuit for the presence of refrigerant if an indirect cooling circuit is being used.
	3. Must ensure the equipment markings are legible and visible and correct any markings that are not legible.
4. Refrigeration pipes or components should not be exposed to corrosive substances unless they are made of corrosion-resistant materials or are properly protected.	






● **Checking for Electrical Devices**






	Maintenance and repairs of electrical components should include initial safety checks and component inspection procedures.
	Initial safety checks should include but not limited to:
	1. Safe discharge of capacitors to prevent sparking.
	2. No live electrical components or wiring exposed during system charging, recovery, or purging.
	3. Continuity of earth bonding.
	Must follow the guidelines provided by the manufacturer for maintenance and service.
	Must reach out to the manufacturer's technical support for help if there are any unsure points.
	If a fault that could compromise safety is present, do not connect the electrical supply to the circuit until it is satisfactorily resolved.
If the fault cannot be immediately corrected but operation must continue, implement a suitable temporary fix.	
The equipment owner must be informed of any issues so that all parties are aware.	



Repairs to Sealed Components

	Must disconnect all electrical supplies from the equipment before removing any sealed covers during repairs.
	Must ensure there is a permanent form of leak detection located at the most critical point to warn of potential hazards if it is necessary to have an electrical supply during servicing.
	Must pay special attention to ensure that working on electrical components will not change the casing in a way that impacts the level of protection, which includes cable damage, excessive connections, terminals not made to the original specification, seal damage, incorrect fitting of glands, etc.
	Must ensure that the equipment is securely mounted.
	Must check that seals or sealing materials have not degraded to the point that they can no longer prevent the entry of flammable atmospheres.
	Must ensure the replacement parts meet the manufacturer's specifications.

Note	The use of silicone sealant may affect the performance of some types of leak detection equipment. Intrinsically safe components do not need to be isolated before working on them.
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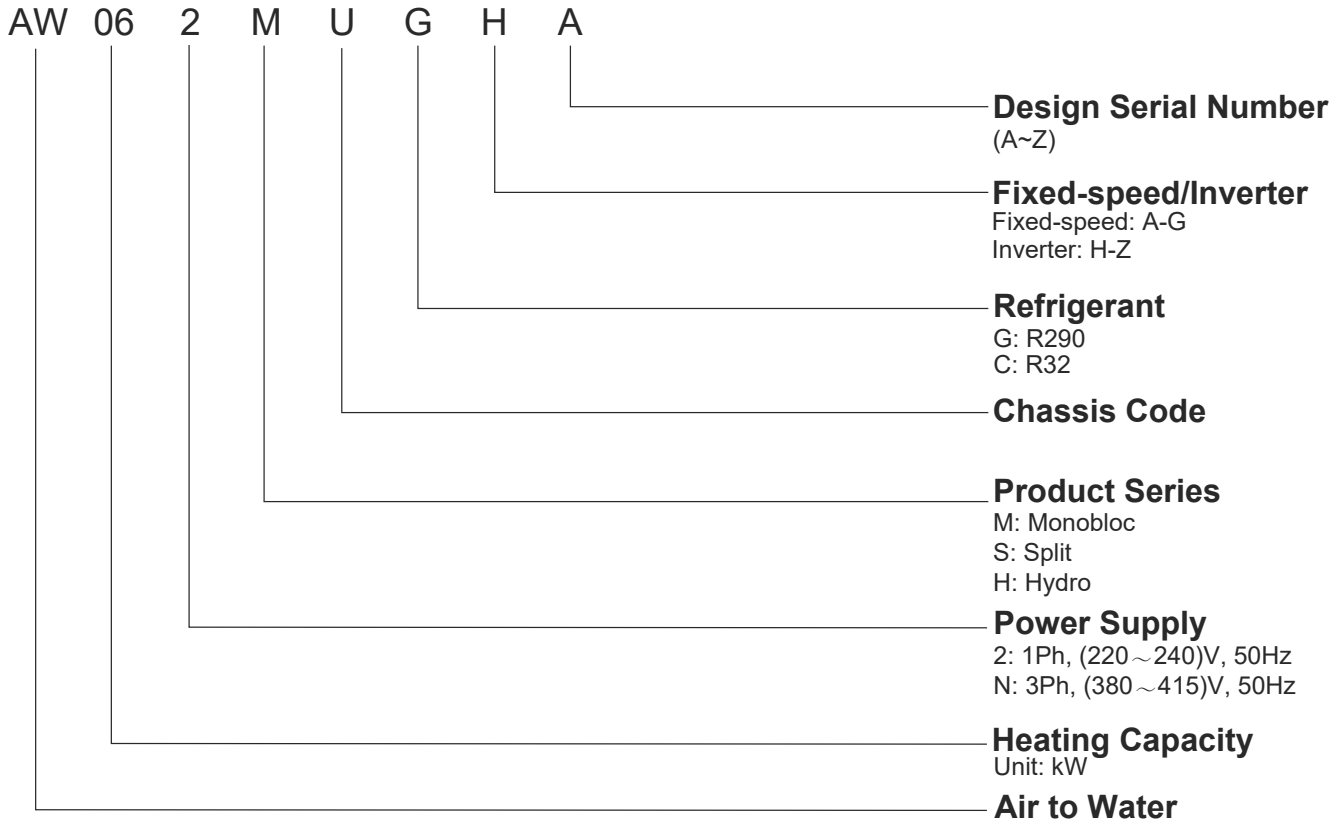
CAUTION	
Maintenance of Intrinsically Safe Components	
	Avoid adding any permanent inductive or capacitance loads to the circuit without verifying that this will not surpass the allowed voltage and current for the equipment in operation.
	Only intrinsically safe components can be serviced while powered on in an environment with a potential for combustion.
	Ensure that the testing equipment is correctly rated.
	Only replace components with parts explicitly recommended by the manufacturer. Utilizing non-specified parts could potentially lead to the ignition of refrigerant in the environment due to a leak.
	Must replace components with parts specified by the manufacturer. Any unspecified parts by manufacturer could potentially lead to the ignition of refrigerant in the environment due to a leak.
Cabling	
	Confirm that the cabling will not be exposed to wear, corrosion, extreme pressure, vibration, sharp edges or other damaging environmental conditions.
	Consider the impacts of aging or continuous vibration from compressors or fans during this check.
Detection of Combustible Refrigerants	
	Absolutely avoid the use of potential ignition sources when searching for or detecting refrigerant leaks.
	A halide torch (or any other detector that uses an open flame) should not be used.
Methods for Detecting Leaks	
	The following methods for detecting leaks are considered suitable for all types of refrigerant systems:
	1. Leak detection should be conducted using equipment with a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0.25 times the maximum allowable pressure (>0.98MPa, max 3.90MPa). A universal sniffer, for instance.
	2. Electronic leak detectors can be used for flammable refrigerants, but they may require recalibration for adequate sensitivity. (The calibration of detector should be done in an area free of refrigerant.)
	3. Ensure the detector does not pose a risk of ignition and is compatible with the refrigerant being used.
	4. The detector should be calibrated to the specific refrigerant used and set to a percentage of the refrigerant's Lower Flammable Limit (LFL), ensuring it doesn't exceed 25%.
	5. Leak-detecting fluids, such as bubble or fluorescent method agents, can be used with most refrigerants. However, detergents with chlorine should be avoided as they can react with the refrigerant and corrode copper piping.
	6. If a leak is suspected, eliminate any potential ignition sources.
	7. If a leak requires brazing to repair, all refrigerant must be recovered from the system first. Must follow the related precautions to remove the refrigerant.
Removal and Evacuation	
	Conventional procedures should be followed when needing to access the refrigerant circuit for repairs or other purposes. Flammability factor must be taken into account, and follow below procedures:
	remove refrigerant ->purge the circuit with inert gas ->evacuate ->purge with inert gas ->open the circuit by cutting
	Brazing is prohibited.
	Recover the refrigerant charge into the appropriate recovery cylinders.
	Purge the system with Oxygen Free Nitrogen (OFN) to ensure safety.
	Repeat this process for several times as necessary.
Compressed air or oxygen is prohibited for this task.	

CAUTION	
	<p>The purging process involves filling the system with OFN until working pressure is achieved, venting to atmosphere, pulling down to a vacuum, and repeating until no refrigerant remains in the system. (Until the concentration of purge gas is 0.25 LFL or less by the leak detector). $\varnothing 0.25LFL = 0.525Vol\%$</p> <p>After the final OFN charge, vent the system down to atmospheric pressure before starting any work.</p> <p>This process is crucial if brazing on the pipework is needed.</p> <p>Must ensure the vacuum pump outlet is located away from any potential ignition sources and in a well-ventilated area.</p>
Charging procedures	
	<p>In addition to standard charging procedures, the following steps should be followed:</p> <ol style="list-style-type: none"> 1. Prevent contamination of different refrigerants when using charging equipment. 2. Use the shortest possible hoses or lines to minimize the amount of refrigerant they can hold. 3. Store cylinders in the correct position as per their instructions. 4. Ground the refrigerating system before charging it with refrigerant. 5. Label the system once charging is complete (if not already). 6. Pay special attention not to overcharge the refrigerating system. <p>Before recharging the system, pressure test it with OFN (refer to “Removal and Evacuation”).</p> <p>After charging, but before commissioning, perform a leak test on the system.</p> <p>Perform a follow-up leak test before leaving the site.</p> <p>Static electricity can build up and create a hazardous situation when charging and discharging refrigerant. To prevent fires or explosions, ground and bond containers and equipment before starting the process.</p>
Decommissioning	
	<p>Before beginning this process, the technician should be thoroughly familiar with the equipment and all its components.</p> <p>It is highly advised that all refrigerants should be safely collected.</p>
	<p>Do not reuse the collected refrigerant.</p>
	<p>Must ensure that the electricity is accessible before starting the task.</p> <ol style="list-style-type: none"> 1. Learn about the equipment and how it operates. 2. Cut off the system's electrical power. 3. Prior to starting the process, confirm that: <ol style="list-style-type: none"> 1) If necessary, mechanical transport tools are ready for moving refrigerant cylinders; 2) all needed personal protection equipment and leak detectors are at hand and used properly; 3) the recovery process is constantly overseen by a qualified individual; 4) Recovery tools and cylinders meet the standard requirements. 4. Ensure that the cylinder is placed on the scales before the recovery begins. 5. Operate the recovery machine by following the guidelines. 6. Avoid overfilling cylinders. (Do not exceed 80% of the cylinder's volume). 7. Must ensure not exceeding the maximum operational pressure of the cylinder, even temporarily. 8. Once the cylinders have been correctly filled and the procedure is done, ensure that the cylinders and equipment are promptly removed from the location and all equipment isolation valves are closed. <p>Charging or discharging the refrigerant might lead to static electricity accumulation, which can be hazardous. To prevent fire or explosion, neutralize static electricity during transfer by grounding and connecting containers and equipment before charging/discharging.</p>

CAUTION	
Labelling	
	Label the equipment to indicate that it has been decommissioned and emptied of refrigerant.
	The label should include the date and signature.
	Ensure that labels on the equipment state that it contains flammable refrigerant.
Recovery	
	It is advised that all refrigerants are safely removed when removing refrigerant from a system, either for servicing or decommissioning.
	Must ensure using suitable refrigerant recovery cylinders if transferring refrigerant into cylinders,.
	Prepare the right amount of cylinders to contain the total system charge.
	All cylinders to be used should be assigned for the recovered refrigerant and labelled for that specific refrigerant (i.e., dedicated cylinders for refrigerant recovery).
	Cylinders should have a fully operational pressure relief valve and associated shut-off valves of good working conditions.
	Recovery cylinders should be evacuated and, if possible, cooled before recovery.
	The recovery equipment should be operational with a set of instructions about the device available and appropriate for flammable refrigerant recovery.
	Ensure the recovery equipment does not create potential ignition risks and is compatible with the refrigerant being used.
	Prepare a set of calibrated weighing scales of good working conditions.
	Hoses should have leak-free disconnected couplings of good working conditions.
	Before using the recovery machine, verify its operational state, proper maintenance, and that any related electrical components are sealed to prevent ignition if a refrigerant leak occurs. Contact the manufacturer if there are any uncertainties.
	Return the recovered refrigerant to the refrigerant supplier in the correct recovery cylinder, and arrange the relevant Waste Transfer Note.
	Refrigerants should not be mixed in recovery units, and especially not in cylinders.
	If compressors or compressor oils need to be removed, they should be evacuated to an acceptable level to ensure no flammable refrigerant remains in the lubricant.
	The evacuation process should be completed before returning the compressor to the suppliers.
Only electrical heating to the compressor body should be used to accelerate this process.	
When draining oil from a system, it should be done safely.	

3. General Information

3.1 Nomenclature



3.2 Certificates and Regulations

EMC directive (2014/30/EU):
EN 55014-1:2021 +A11:2020
EN 55014-2:2021
EN 61000-3-2:2019
EN 61000-3-3:2013+A1:2019

Low-Voltage Directive (2014/35/EU):
EN60335-1:2023+A11:2023
EN60335-1:2012+A13:2017+A1:2019+A14:2019+A2:2019
EN 60335-2-40:2023
ENIEC60335-2-40:2023 +A11:2022
EN60335-2-40-2003/A13-2012
EN 62233:2008

Machinery Directive(2006/42/EC):
EN60335-1:2023+A11:2023
EN60335-1:2012+A13:2017+A1:2019+A14:2019+A2:2019+A15:2021
EN 60335-2-40:2023
ENIEC60335-2-40:2023 +A11:2022
EN60335-2-40-2003/A13-2012
EN 62233:2008

Directive 2014/68/EU (PED)
EN 378-2:2016
EN 14276-2:2020+A1:2011

Directive 2011/65/EU (RoHS)
IEC 62321

3.3 Lineup



Model	Dimension W/D/H	Power Supply (V/Ph/Hz)	Capacity	Compressor type	Heat exchanger	A/C mode	Hydraulic module	Refrigerant
AW042MUGHA	1250*380*790	220~230/1/50	4KW	DC Inverter	Plate Heat Exchanger	Heat Pump	Built-in	R290
AW062MUGHA			6KW					
AW082MUGHA			8KW					
AW102MUGHA			10KW					
AW10NMUGHA		380~415V/3/50	10KW					



Model	Dimension W/D/H	Power Supply (V/Ph/Hz)	Capacity	Compressor type	Heat exchanger	A/C mode	Hydraulic module	Refrigerant
AW122MXGHA	1380*460*880	220~230/1/50	12KW	DC Inverter	Plate Heat Exchanger	Heat Pump	Built-in	R290
AW142MXGHA			14KW					
AW162MXGHA			16KW					
AW12NMXGHA		380~415V/3/50	12KW					
AW14NMXGHA			14KW					
AW16NMXGHA			16KW					

3.4 Features and Benefits

Environmental-friendly

- **Natural refrigerant R290**

High-efficiency

The GT series performs excellently as a result of the following: a higher compression ratio, less oil compressors and an efficient internal thread regenerator are used in the appliance to increase the suction temperature. In turn, improving the units energy efficiency, reaching a maximum COP value of 5.50 can be reached.

- **SCOP A+++/A+++ (35°C/55°C)**

The SCOP at 35°C and 55°C water temperature both reach the top class A+++.

- **Hot water ERP class A+**

DHW efficiency level reaches the top class A+.

Ultimate Comfort

- **High leaving water temperature**

The maximum leaving water temperature can reach 80°C, an industry leading figure. The GT series is the best solution to replace the boiler heating.

- **Low sound level**

With excellent design, the Haier Super Aqua GT series sound pressure level is as low as 55dB(A).

Super Convenience

Easy installation and easy maintenance

The internal structural layout has been optimized to allow for easy installation and maintenance. Components can be removed and assembled without interfering with one another.

High Reliability

- **Wide operating range**

The GT series can operate normally at minus 25°C, guaranteeing the users warmth in cold weather.

- **Silver brazing technology**

Optimisation of system design by reducing the number of welding joints alongside adopting silver brazing, ensures a stronger weld and avoids any leakage of the R290 refrigerant, which is combustible.

- **Refrigerant separator**

The refrigerant separator quickly removing refrigerant from the water system in case of leakage, preventing the refrigerant from entering the water system or indoor space.

- **Sealed electric control box**

Explosion proof electrical control box design, provides increased safety for R290 products. Used to avoid potential fire hazards and provide protection to users.

Intelligence

- **Smart control**

Haier WIFI control can check the running state of the heat pump, allowing flexibility and control of the unit. Encouraging easier lifestyle choices for the user.

Selection software

Authorised users can access a cloud service enabling the system to be built and designed, accessed via their mobile phone or computer. All ATW heat pump models are available for selection and design, an output report specific to the customers residence is produced, allowing a project plan to be constructed.

4. Functional Parts Layout

Structure

Panels and base are made from galvanized steel plate painted with epoxy powder to ensure total resistance to atmospheric pollution, condensate collection pan as standard.

Fin-coil heat exchanger

Ø7 inner-threaded copper pipes optimize heat exchange efficiency. Plate type hydrophilic aluminum foil used for air side heat exchange, which is easy for water drain and prevents frost to a great extent. Blue coating increases the resistance against corrosive agents, enhance durability.

High & low pressure sensor

The high & low pressure sensor achieves the real-time monitoring of the system running pressure, adjust the compressor running frequency based on the load change and make the system run stably and control precisely. The parameters sensed by pressures keep compressor running at the safer and more energy saving range to ensure the system reliability

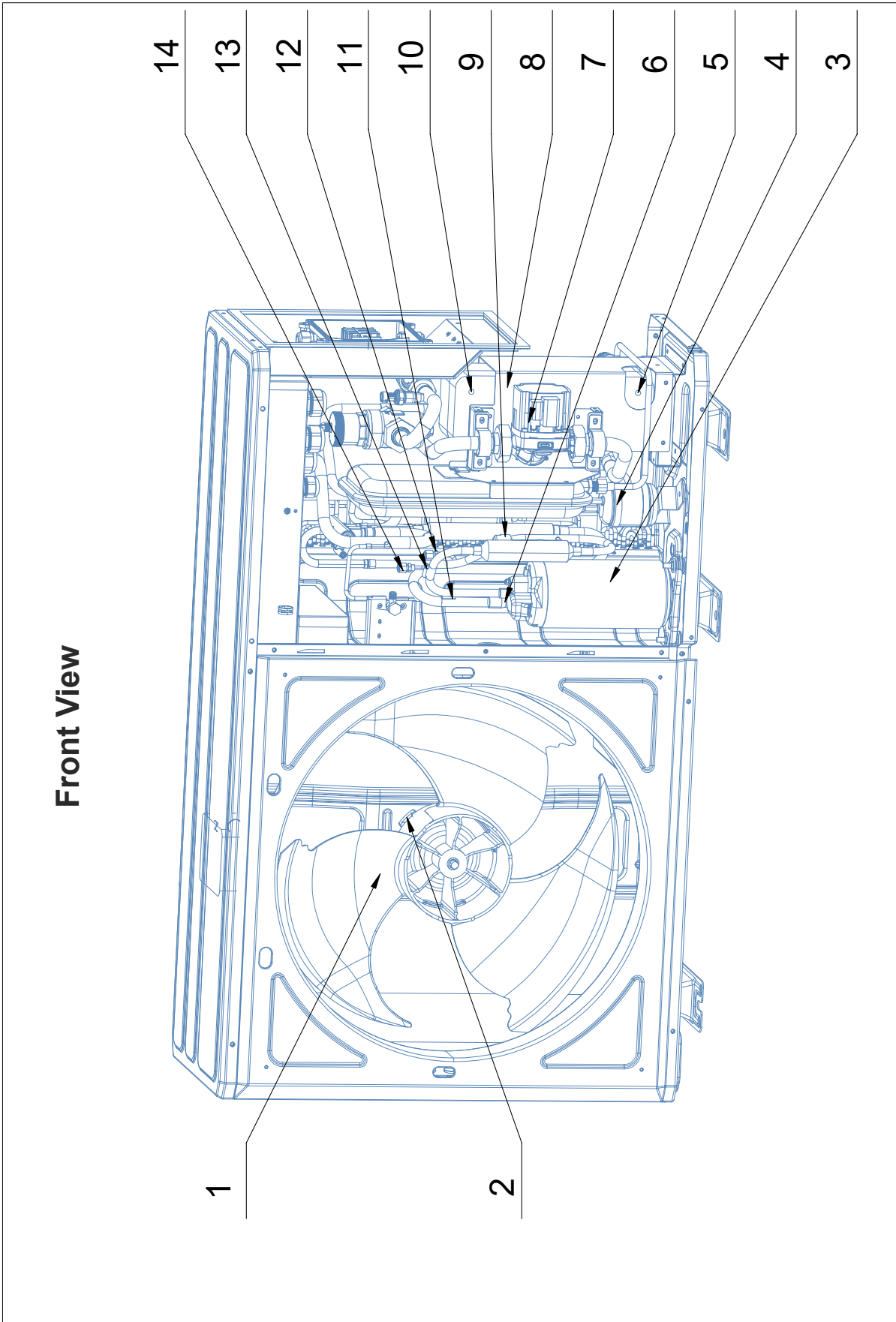
Brushless DC fan motor

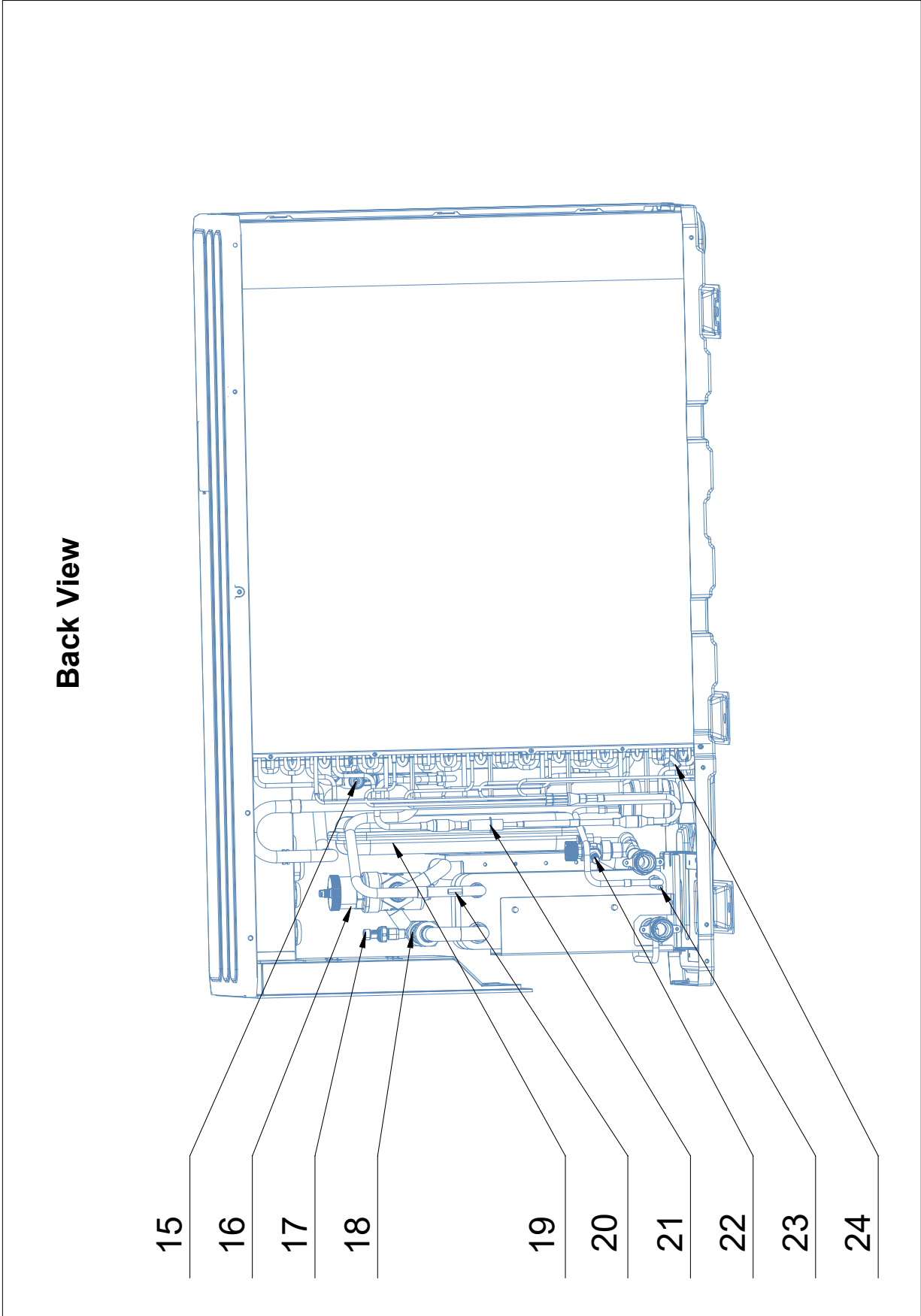
600mm and 700mm diameter fans. BLDC fan motor with stepless control helps to meet heating and cooling demands with low noise fan, super quiet operation, as well low power consumption.

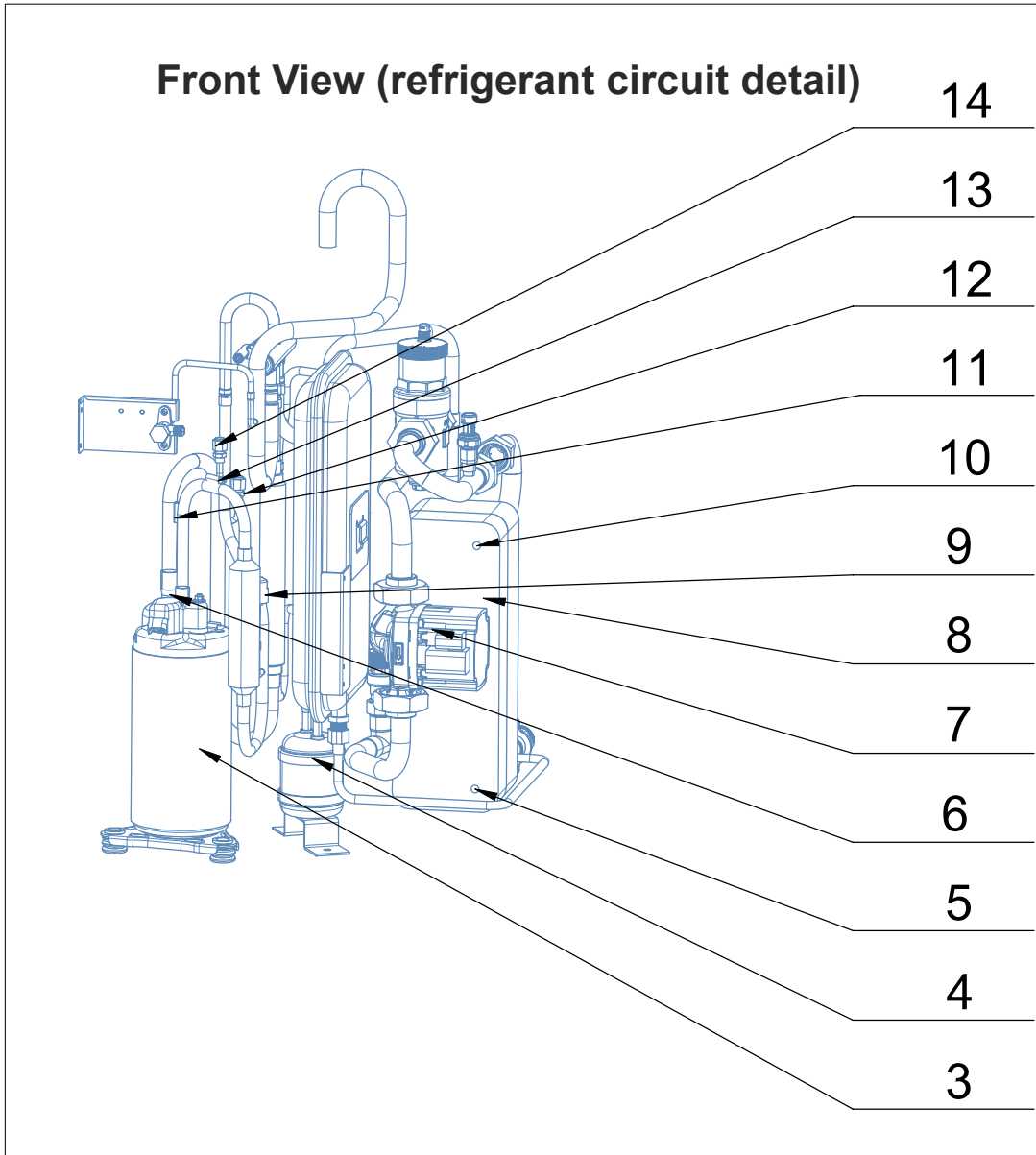
DC inverter compressor

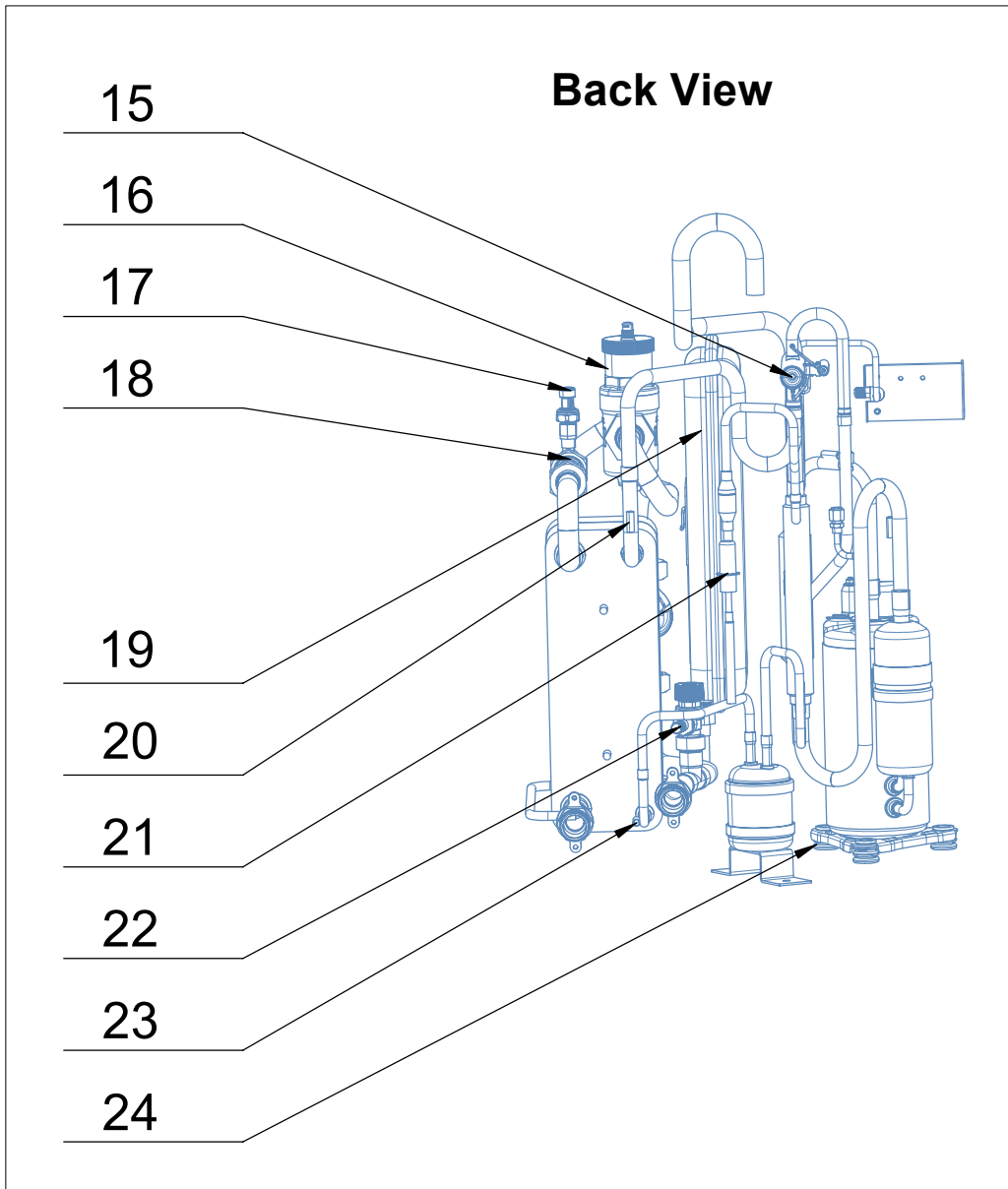
The newly designed twin rotary DC inverter compressor with permanent magnet brings low working sound, wide working frequency and precision control. The upgraded DC motor power system of inverter model forms a full DC frequency conversion system and dramatically reduces power consumption by more than 30%.

AW042MUGHA AW062MUGHA AW082MUGHA AW102MUGHA AW10NMUGHA



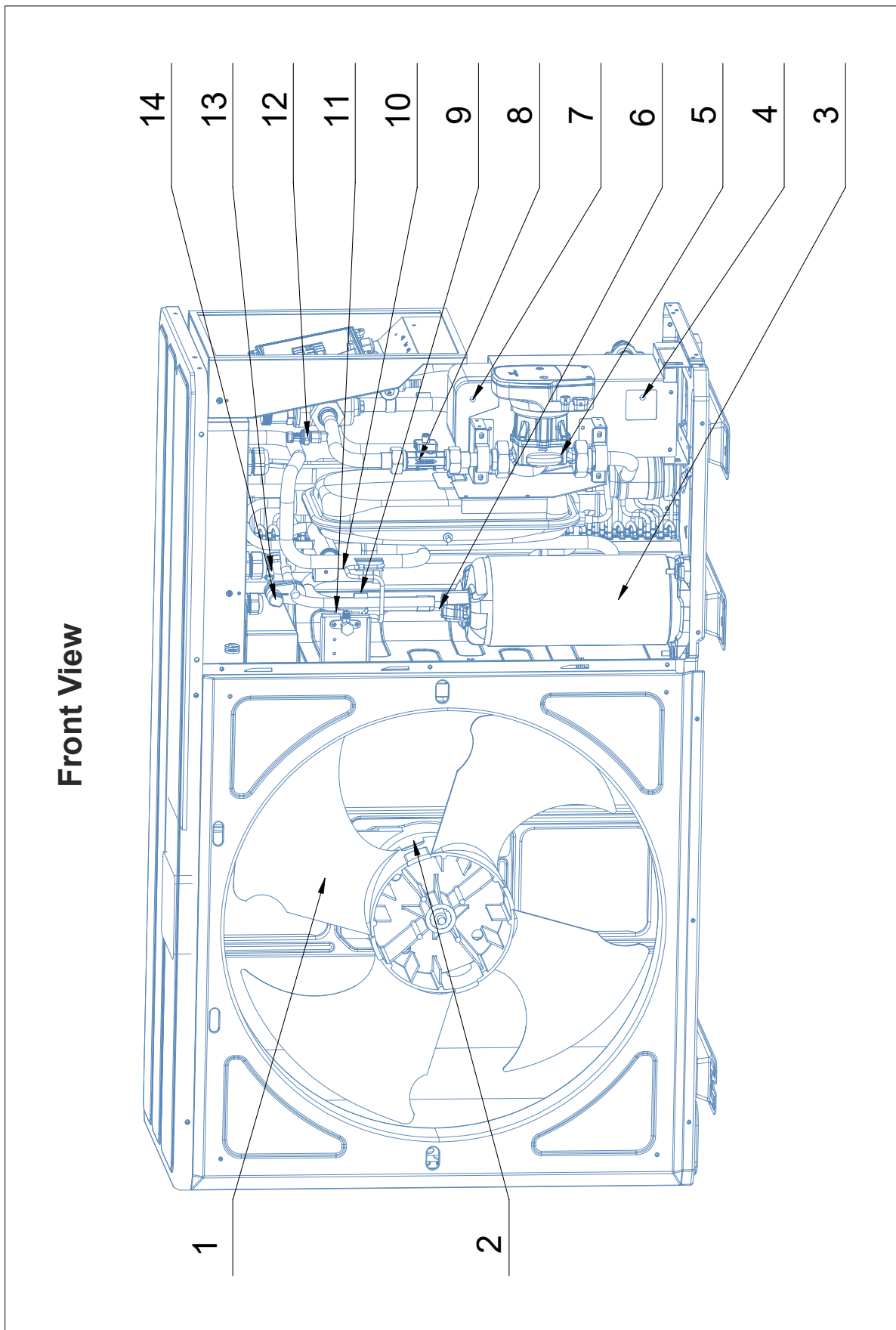




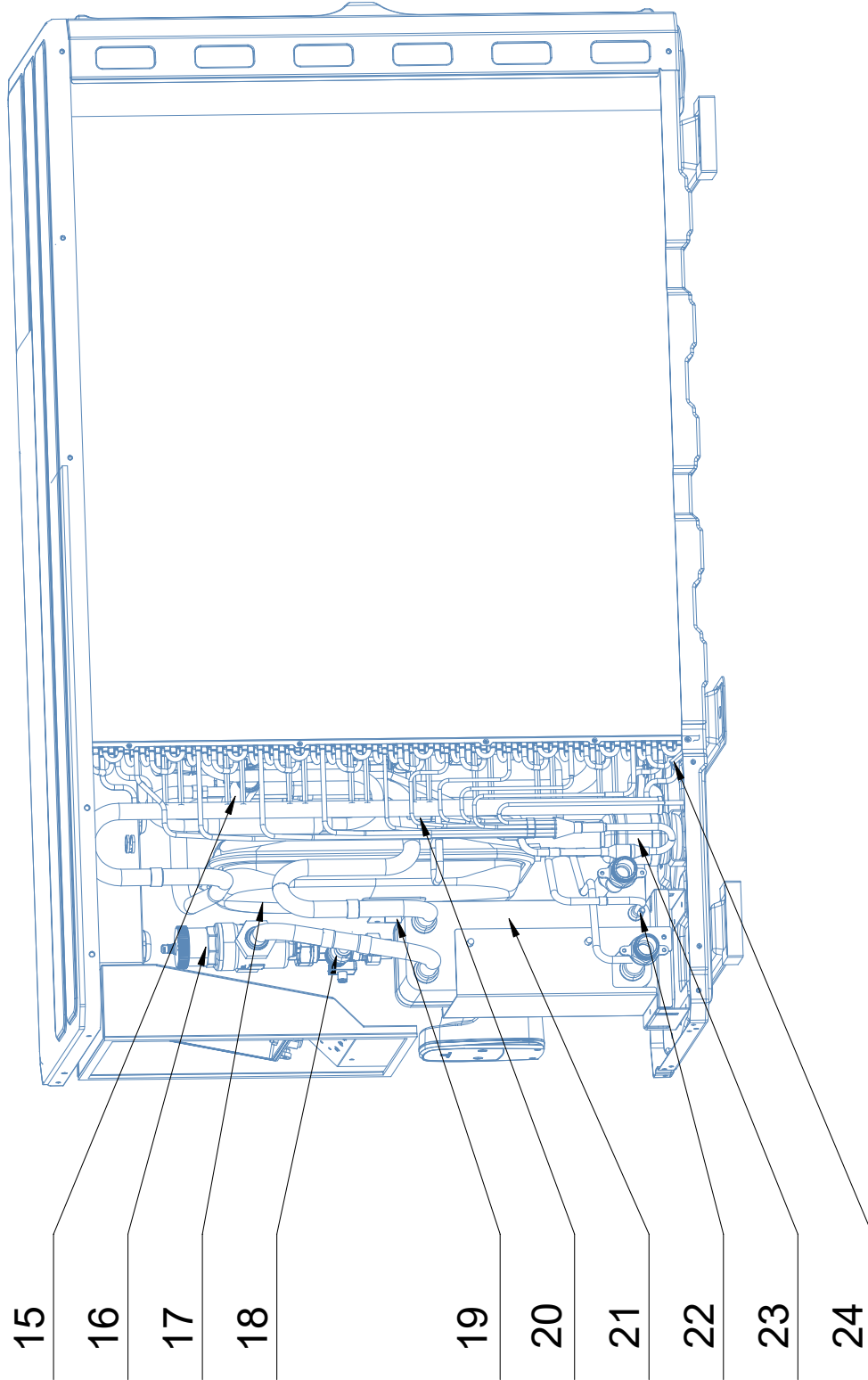


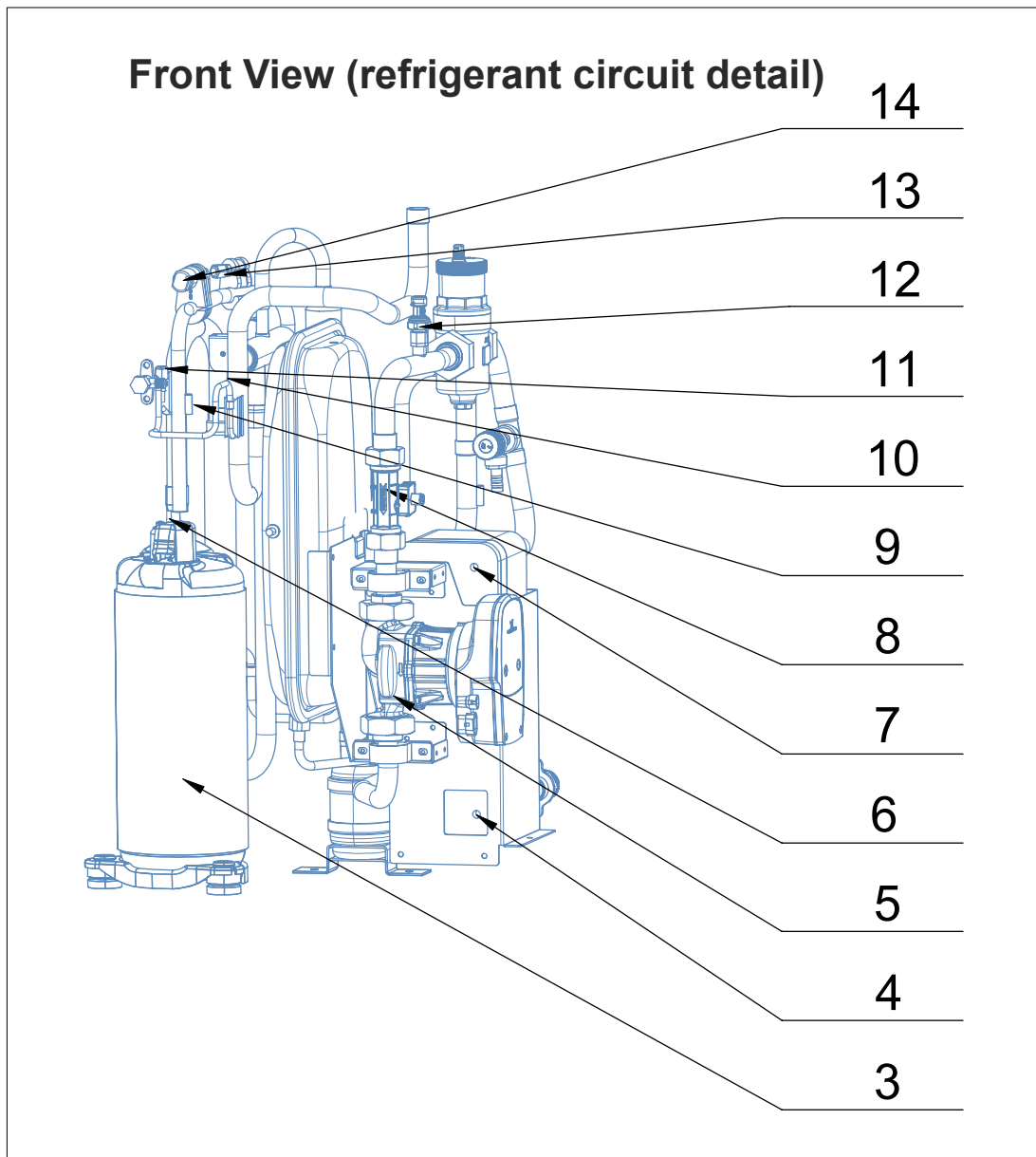
No.	Name	No.	Name
1	Fan	13	Discharge temperature sensor Td
2	Motor	14	High pressure sensor Pd
3	Compressor	15	Four way valve 4WV
4	Accumulator	16	Air purge valve
5	Water inlet temperature sensor Twi	17	Water pressure sensor
6	Gas-liquid separator	18	Flow meter
7	Pump	19	Expansion vessel
8	Plate heat exchange	20	Gas pipe temperature sensor Tho
9	High pressure Switch HPS	21	Electronic expansion valve LEVa
10	Water outlet temperature sensor Two	22	Safety valve
11	Suction temperature sensor Ts	23	Liquid pipe temperature sensor Thi
12	Low pressure sensor Ps	24	Defrosting temperature sensor Te1

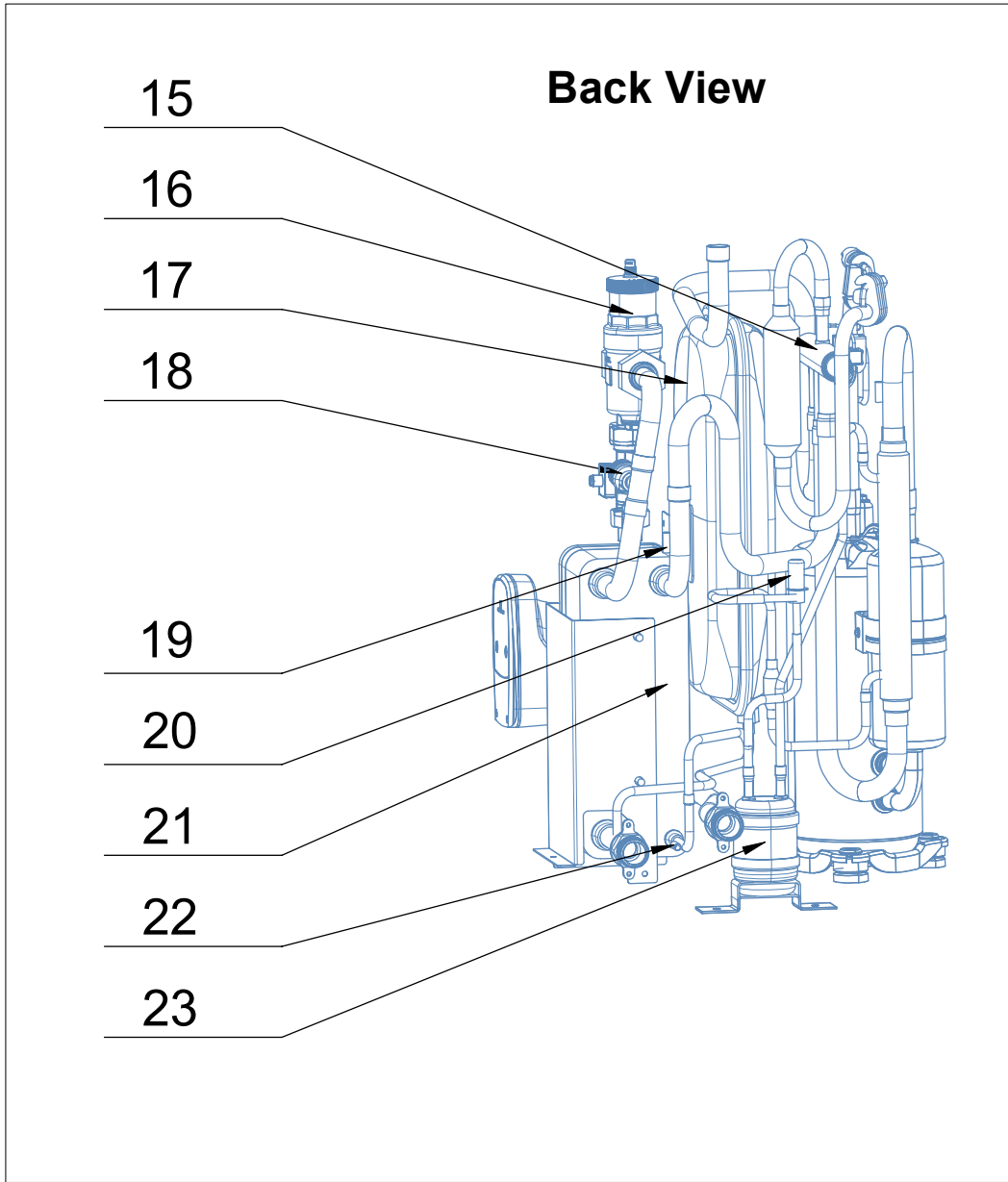
AW122MXGHA AW142MXGHA AW162MXGHA AW12NMXGHA AW14NMXGHA AW16NMXGHA



Back View



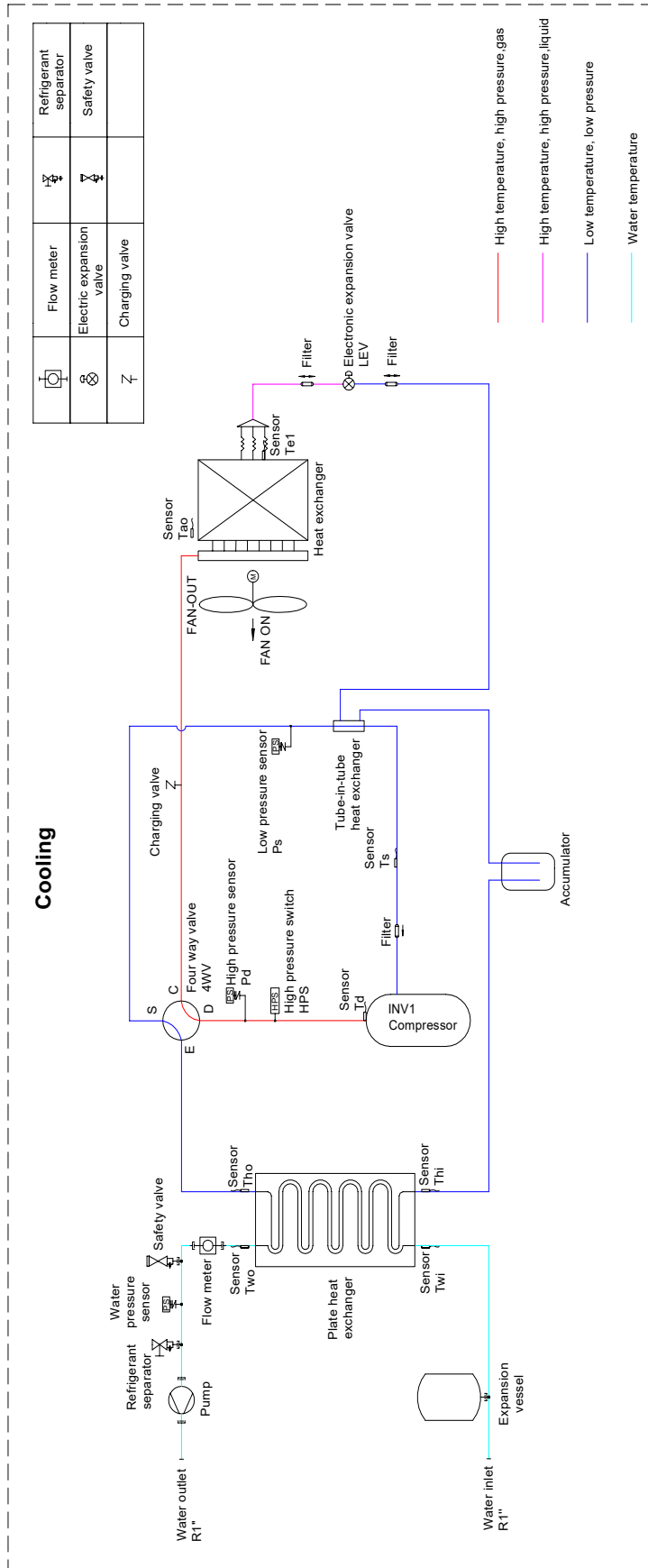




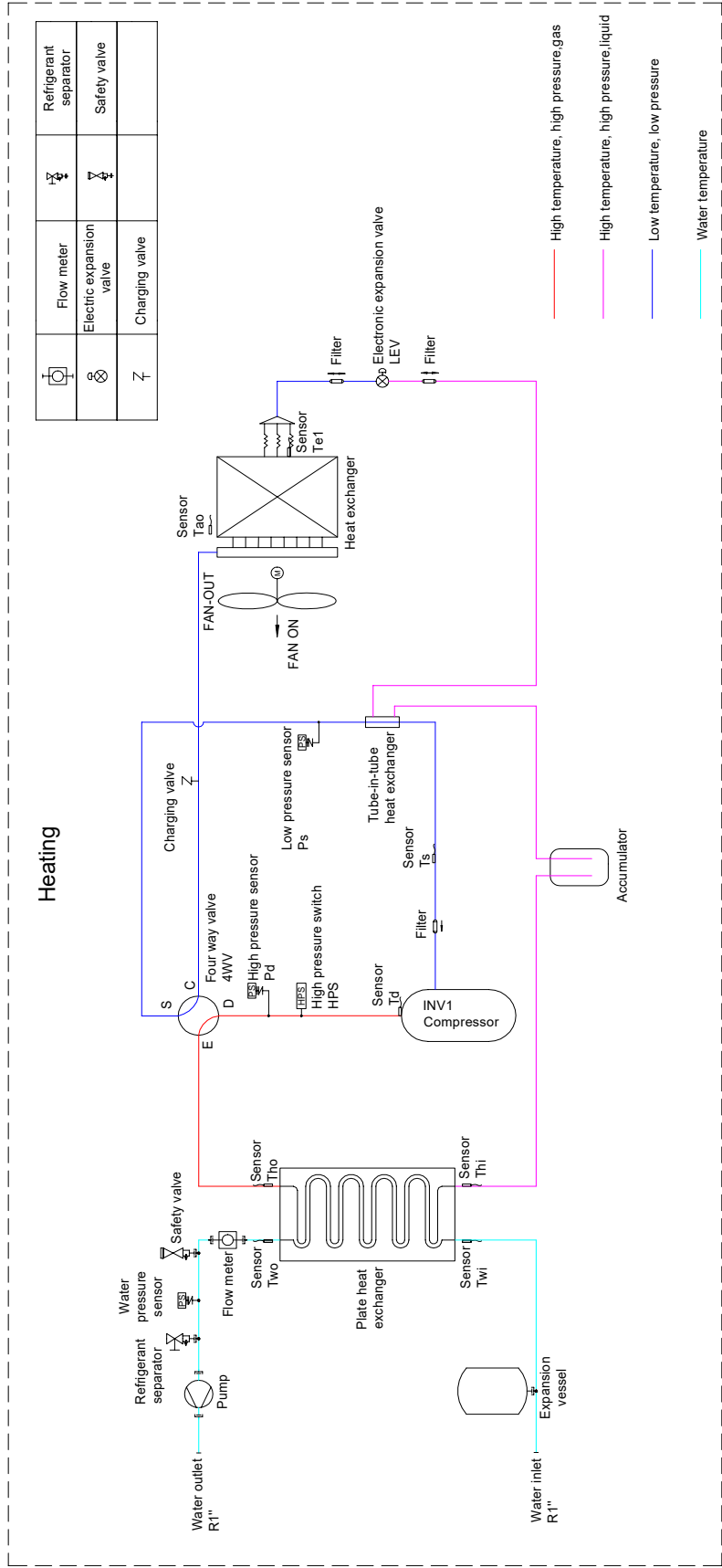
No.	Name	No.	Name
1	Fan	13	High pressure sensor Pd
2	Motor	14	High pressure Switch HPS
3	Compressor	15	Four way valve 4WV
4	Water inlet temperature sensor Twi	16	Air purge valve
5	Pump	17	Expansion vessel
6	Gas-liquid separator	18	Safety valve
7	Water outlet temperature sensor Two	19	Gas pipe temperature sensor Tho
8	Flow meter	20	Electronic expansion valve LEVa
9	Discharge temperature sensor Td	21	Plate heat exchange
10	Suction temperature sensor Ts	22	Liquid pipe temperature sensor Thi
11	Low pressure sensor Ps	23	Accumulator
12	Water pressure sensor	24	Defrosting temperature sensor Te1

5. Piping Diagram

Cooling



Heating



Part name	Model	abbr.	Function	Characteristics
Compressor	AW042MUGHA AW062MUGHA	Comp.	Capacity control, meet indoor load request by adjusting the frequency	Motor resistance(at 20°C):1.44±5%Ω
	AW082MUGHA AW102MUGHA AW10NMUGHA			Motor resistance(at 20°C):0.88±5%Ω
	AW122MXGHA AW142MXGHA AW12NMXGHA AW14NMXGHA			Motor resistance(at 20°C):0.54±5%Ω
	AW162MXGHA AW16NMXGHA			Motor resistance(at 20°C):0.54±5%Ω
Pressure Sensor	All	Pd	High pressure detection	Pressure range: 0 to 4.15 MPa
		Ps	Low pressure detection	Pressure range: 0 to 1.7 MPa
Pressure Switch	All	Hps	High pressure protection	break:3.3MPa reset:2.65MPa
Electronic Expansion Valve1	AW042MUGHA AW062MUGHA	LEVA	Refrigerant flow controll	Ø1.8
	AW082MUGHA AW102MUGHA AW10NMUGHA AW122MXGHA AW142MXGHA AW12NMXGHA AW14NMXGHA			Ø2.4
	AW162MXGHA AW16NMXGHA			Ø3.0
Four Way Valve	AW042MUGHA AW062MUGHA	4WV	Change over between cooling and heating	AC220V, electrified in heat; not electrified in cooling or defrosting
	AW082MUGHA AW102MUGHA AW10NMUGHA			
	AW122MXGHA AW142MXGHA AW12NMXGHA AW14NMXGHA AW162MXGHA AW16NMXGHA			
Liquid Receiver	All	/	Used to storage the refrigerant	Volume:0.3L
Charging Valve	All	/	Used to charge the refrigerant to unit	Ø6.35
Flow Meter	All	/	Detect water flow	5~80 L/min
Pump	AW042MUGHA AW062MUGHA AW082MUGHA AW102MUGHA AW10NMUGHA	Pump	Transport liquid	Pumping head:7.5m
	AW122MXGHA AW142MXGHA AW12NMXGHA AW14NMXGHA AW162MXGHA AW16NMXGHA			Pumping head:12.5m

Part name	Model	abbr.	Function	Characteristics
Expansion Vessel	AW042MUGHA AW062MUGHA AW082MUGHA AW102MUGHA AW10NMUGHA	/	Pressure fluctuation of buffer system	4.5L
	AW122MXGHA AW142MXGHA AW12NMXGHA AW14NMXGHA AW162MXGHA AW16NMXGHA		Pressure fluctuation of buffer system	8L
Filter	All	/	Filter impurities	40 mesh
Refrigerant Separator	All	/	Release refrigerant from the water system	/
Plate Heat Exchanger	All	/	Used to exchange the heat from refrigerant to water	Design pressure of refrigerant side:4.5MPa
Pressure Relief Valve	All	/	Reduce system pressure	Operation pressure:0.3MPa
Temp. Sensor	All	Td	Discharge temp. of compressor	R80=50kΩ; B25/80=4450K
		Ts	Suction temp. of compressor	R25=10KΩ; B25/50=3700K
		Te	Check frost condition of outdoor heat exchanger	R25=10KΩ; B25/50=3700K
		Tao	Detect ambient temp. set primary setting for fan speed target pressure and PMV open angle	R25=10KΩ; B25/50=3700K
		Thi	Detect the refrigerant inlet temp. of heat exchanger	R25=10KΩ; B25/50=3700K
		Tho	Detect the refrigerant outlet temp. of heat exchanger	R25=10KΩ; B25/50=3700K
		Twi	Detect the water inlet temp. of heat exchanger	R25=10KΩ; B25/50=3700K
		Two	Detect the water outlet temp. of heat exchanger	R25=10KΩ; B25/50=3700K
Tube-in-tube heat exchanger	AW042MUGHA AW062MUGHA AW082MUGHA AW102MUGHA AW10NMUGHA AW122MXGHA AW142MXGHA AW162MXGHA AW12NMXGHA AW14NMXGHA AW16NMXGHA	/	Increase the superheat of the return air	/

6. Functions & Controls

1. Operation Control

1.1 Startup

The unit receives the command from the controller, and the compressor will start up after continuous power-on for 5 minutes.

1.2 Defrost

To ensure the heating effect of heating operation, defrost control should be done when ambient temperature $T_{ao} \leq 20^{\circ}\text{C}$.

The defrost startup will be based on the continuous min of $T_e \leq \alpha * T_{ao} + \beta$.

α and β are constants and will vary according to different ambient temperature.

γ is the duration, generally 5~10min.

1.3 Shutdown

During shutdown, to prevent high pressure side liquid seal, LIEV will generally keep a certain opening.

Shutdown during cooling mode, LEV=100pls

Shutdown during heating mode, LEV=100pls

2. Protection Control

2.1 High pressure protection

To prevent unit protection shutdown caused by high pressure abnormal rise during cooling/heating operation.

Generally, the compressor frequency is controlled according to the saturation temperature (Pd_t) of high pressure.

When the Pd_t is too high, the unit will perform frequency reduction and protection shutdown.

When $Pd_t > \alpha^{\circ}\text{C}$, the unit will enter protection shutdown;

When $\beta^{\circ}\text{C} < Pd_t < \alpha^{\circ}\text{C}$, the compressor will lower frequency

α and β are constants. Generally, $\alpha=85^{\circ}\text{C}$, $\beta=80^{\circ}\text{C}$.

2.2 Low pressure protection

Control the compressor frequency according to the low pressure spot.

In cooling mode, when $P_s < \alpha \text{bar}$, lower compressor frequency.

In heating mode, when $P_s < \beta \text{bar}$, lower compressor frequency.

α and β are constants. Generally, $\alpha=4\sim6$, $\beta=1.5$.

2.3 Discharge temperature protection

2.3.1 Discharge temperature too high protection

Cooling: $T_{di} > \alpha$ (95°C), adjust eev opening. $T_{di} > \beta$ (105°C), decrease compressor frequency.

Heating: $T_{di} > \beta$ (105°C), decrease compressor frequency.

It will alarm if the entire discharge temperature $T_{di} > 115^{\circ}\text{C}$.

2.3.2 Discharge temperature (overheat) too low protection

Cooling: $T_{di} - Pd_t < \alpha$ (15°C), adjust eev opening.

Heating: $T_{di} - Pd_t < \alpha$ (15°C), adjust eev opening. $T_{di} - Pd_t < \beta$ (10°C), adjust compressor frequency.

It will alarm if the entire discharge temperature $T_{di} - Pd_t < 115^{\circ}\text{C}$ for 5mins.

3. Other control

3.1 Heating/DHW heating operation range

ZONE heating: $-25^{\circ}\text{C} \leq T_{ao} \leq 27^{\circ}\text{C}$ Note: 27°C can be changed from the unit remote controller.

DHW heating: $-25^{\circ}\text{C} \leq T_{ao} \leq 43^{\circ}\text{C}$

3.2 Compressor crankcase heater

When outdoor temperature is $< \alpha^{\circ}\text{C}$, the compressor electric heater will start up.

α is constant. Generally, $\alpha=0\sim10^{\circ}\text{C}$

Functions & Controls

3.3 Plate heater antifreezing control

In cooling mode, if T_{wo} or $T_{wi} \leq 3^{\circ}\text{C}$, or $T_{wo} - T_{wi} \geq 3^{\circ}\text{C}$ continues for 1min, it will alarm and shut down, and then recover 10mins later.

If this occurs for three times continuously in 1h, it will not recover automatically.

Antifreezing function will start when unit or system is in shutdown or standby.

When $T_{ao} < \alpha^{\circ}\text{C}$, if the water inlet/outlet temperature $T_{wi}/T_{wo} < \beta^{\circ}\text{C}$ continues for 10~30min, the unit water pump will start up and enter antifreezing mode.

α and β are constants. Generally, $\alpha = -28 \sim 10^{\circ}\text{C}$, $\beta = 3 \sim 5^{\circ}\text{C}$.

3.4 zone1/zone2/pool antifreezing control

Antifreezing function will start when unit or system is in shutdown or standby.

When $T_{ao} < \alpha^{\circ}\text{C}$, if zone1/zone2/pool water temperature probe temperature $T_{wi}/T_{wo} < \beta^{\circ}\text{C}$ continues for 10~30min, the unit water pump will start up and enter antifreezing mode.

α and β are constants. Generally, $\alpha = -28 \sim 10^{\circ}\text{C}$, $\beta = 3 \sim 5^{\circ}\text{C}$.

3.5 DHW control

Entry conditions: Controller ON, $T_{\text{tank}} < T_{\text{tankset}} - 3^{\circ}\text{C}$ (Tank re heat temp can be set through the controller), compressor on;

Exit condition: $T_{\text{tank}} \geq T_{\text{tankset}}$ or controller OFF

4. Water Pump Control

Part	Scenario	Startup	Shutdown	Special Control
Main water pump Pum0 control	Water temperature control	The controller starts up and does not reach the set temperature.	The controller starts up or reach the set temperature.	It will operate for 1min every 5mins during standby, and will not operate if there's water flow alarm.
	3rd party control	The controller starts up and the 3rd party controller has therm on order.	The controller starts up or 3rd party controller has no therm on order.	It will not operate if there's water flow alarm.
	Haier indoor controller control	The controller starts up and Haier indoor controller has therm on order.	The controller starts up or Haier controller has no therm on order.	It will not operate if there's water flow alarm.
zone1 water pump Pump1 control	Water temperature control	The controller starts up and zone1 does not reach the set temperature.	The controller starts up or zone1 reaches the set temperature.	It will operate for 1min every 5mins during standby, and will not operate if there's water flow alarm.
	3rd party control	The controller starts up and zone1 3rd party controller has therm on order.	The controller starts up or zone1 3rd party controller has no therm on order.	It will not operate if there's water flow alarm.
	Haier indoor controller control	The controller starts up and zone1 Haier indoor controller has therm on order.	The controller starts up or zone1 Haier controller has no therm on order.	It will not operate if there's water flow alarm.
zone2 water pump Pump2 control	Water temperature control	The controller starts up and zone2 does not reach the set temperature.	The controller starts up or zone2 reaches the set temperature.	It will operate for 1min every 5mins during standby, and will not operate if there's water flow alarm.
	3rd party control	The controller starts up and zone2 3rd party controller has therm on order.	The controller starts up or zone2 3rd party controller has no therm on order.	It will not operate if there's water flow alarm.
	Haier indoor controller control	The controller starts up and zone2 Haier indoor controller has therm on order.	The controller starts up or zone2 Haier controller has no therm on order.	It will not operate if there's water flow alarm.

5. Water pump locked rotor error feedback: alarm when the water flow is low.

7. Service Diagnosis

In the event of an abnormality, an error code will display on the Outdoor Digital Display Tube & Indoor Wired Controller.

Please refer to the Error Codes Table to check the error description, and refer to the Troubleshooting to check the repair procedures

7.1 Error Codes

Indoor Unit

Here, 'indoor unit' refers to ATW-A03N

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
1	E01	Water Inlet Temperature Sensor Twi Abnormality	If water inlet temperature sensor Twi remains open or short circuit for 60 secs,alarm	1) Sensor is broken 2) Loose connection of sensor, 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
2	E02	Water Outlet Temperature Sensor Two /Tout2 Abnormality	If water outlet temperature sensor Two/Tout2 remains open or short circuit for 60 secs,alarm	1) Sensor is broken 2) Loose connection of sensor, 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
3	E03	Liquid Pipe Temperature Sensor Thi Abnormality	If Liquid pipe temperature sensor remains open or short circuit for 60 secs, alarm	1) Sensor is broken 2) Loose connection of sensor, 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
4	E04	Gas Pipe Temperature Sensor Tho Abnormality	If gas pipe temperature sensor remains open or short circuit for 60 secs alarm	1) Sensor is broken 2) Loose connection of sensor, 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
5	E05	EEPROM Abnormality	EEPROM physical damage, electrical failures, or programming errors	PCB malfunction	Repace PCB	Manual
6	E06	Communication error with outdoor unit	Cannot receive the outdoor unit communication signal for 2 minutes	1) No power supply for indoor units 2) Loose connection of communication wire between indoor and outdoor unit 3) Outdoor PCB is broken 4)Indoor PCB is broken	Communication is re-established	Automatic
7	E07	Communication Error between Remote Wired Controller and ATW-A03N	The transmission datagram fault of the wired controller cannot be received for 4 consecutive minutes; Correct data is received and the failure is resolved	1) H connection wire of the wired controller is not securely plugged in 2) The power supply voltage of the controller is insufficient 3)Wrong wiring sequence from wired controller to indoor unit 4) The connecting wire on the indoor unit are inserted incorrectly or not securely on the PCB	Communication is re-established	Automatic
8	E08	Flow Switch/ Flowmeter Abnormality	After the water pump has been running for 120 secs, if the flow switch remains "OFF" for 5 secs, it is judged that the flow rate is too low, and a fault is reported	1) The water pump has not been turned on 2) The flowmeter harness is plugged in incorrectly 3) Flow meter damaged 4) The water pump is not powered on or damaged	Auto reset after the flow switch/ flowmeter is normal and the unit has stopped for 5 minutes	Automatic (less than three alarms within 60 mins); otherwise, Manual

Indoor Unit

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
9	E09	Duplicate ATW-A03N address	Duplicate ATW-A03N address	When connected in parallel, the address set by dip switches is repeat	Change dip switch settings. The last ATW-A03N in the group (with duplicate address) will auto reset	Manual
10	E10	DHW tank temperature sensor T _{tank} up/T _{tank} down abnormality	DHW tank temperature sensor T _{tank} up/T _{tank} down open or short circuit; continue for 60 secs	1) sensor is broken; 2) loose connection of sensor; 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
11	E11	ATW-A02 PCB Communication Abnormality	Loss of communication with ATW-A02 PCB, continue for 2 mins	1) The ATW-A03N PCB is not powered on 2) The communication wire between the indoor unit and the ATW-A03N PCB is not properly connected 3) Poor indoor computer board 4) ATW-A03N PCB malfunction	Communication is re-established	Automatic
12	E12	Zone2 mixing valve temperature sensor Twzone ₂ abnormality	If zone2 mixing valve temperature sensor Twzone ₂ remains open or short circuit for 60 secs, alarm	1) Sensor is broken; 2) loose connection of sensor; 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
13	E13	Water Leakage (reserved)	If micro switch input signal is closed for 60 secs, alarm	1) System leakage water 2) Micro switch abnormality 3) Computer board malfunction	Power off and restart	Manual
14	E14	Low Pressure Switch Abnormality (reserved)	If low pressure switch remains open circuit for 5 secs, alarm	1) System leakage water 2) Micro switch abnormality 3) Computer board malfunction	5 secs after the signal is closed	Automatic
15	E15	Anti-freeze Protection	In cooling mode, 1) Two/Twi ≤ 3°C; continue for 1 min; or 2) Two-Twi ≥ 3°C; continue for 1 min	1) Low water flow rate 2) The outdoor ambient temperature is too low 3) Sensor failure or detection error 4) Computer board malfunction	Auto reset after 10 mins.	Automatic (less than three alarms within 60 mins); otherwise, Manual
16	E16	Water Inlet/Outlet Temperature Over High	Twi /Two ≥ 82°C ; continue for 5 secs	1) The water temperature is too high; 2) The water flow rate is too low; 3) Sensor failure or detection error 4) Computer board malfunction	Twi /Two ≤ 80; continue for 5 secs	Automatic

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
19	E19	Pool mixing valve water outlet/pool water temperature sensor abnormality (optional)	Pool mixing valve water outlet/pool water temperature sensor open or short circuit; continue for 60 secs	1) Sensor is broken 2) Loose connection of sensor 3)PCB port is broken	2 secs after sensor resistance is normal	Automatic

Outdoor Unit

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
20-0	E20-0	Defrosting temperature sensor Te(1) abnormality	Defrosting temperature sensor Te(1) open or short circuit; continue for 60 secs	1) Sensor is broken 2) Loose connection of sensor 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
21	E21	Outdoor ambient temperature sensor Tao abnormality	Outdoor ambient temperature sensor Tao open or short circuit; continue for 60 secs	1) Sensor is broken 2) Loose connection of sensor 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
22	E22	Suction temperature sensor Ts abnormality	Suction temperature sensor Ts open or short circuit; continue for 60 secs	1) Sensor is broken 2) Loose connection of sensor 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
23	E23	Discharge temperature sensor Td abnormality	Discharge temperature sensor Td open or short circuit; continue for 60 secs	1) Sensor is broken 2) Loose connection of sensor 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
26	E26-0	Communication error with ATW-A03N	Loss of communication with ATW-A03N; continue for 200 consecutive times	1) No power supply for indoor units 2) Loose connection of communication wire between indoor and outdoor unit 3) Outdoor PCB is broken 4) Indoor PCB is broken	Communication is re-established	Automatic
28	E28	Compressor Discharge Pressure Sensor Pd Abnormality	High pressure sensor Pd open or short circuit; continue for 60 secs	1) Sensor is broken 2) Loose connection of sensor 3) PCB port is broke	Sensor reading is normal	Automatic
29	E29	Compressor Suction Pressure Sensor Ps Abnormality	Low pressure sensor Ps open or short circuit; continue for 60 secs	1) Sensor is broken 2) Loose connection of sensor 3) PCB port is broke	Sensor reading is normal	Automatic
30	E30	High Pressure Switch HPS Abnormality	High pressure switch HPS open circuit	1) Sensor is broken 2) Loose connection of sensor 3) PCB port is broke	Signal closed	Automatic (less than three alarms within 60 mins), otherwise, Manual
33	E33	Outdoor Unit EEPROM Abnormality	EEPROM physical damage, electrical failures, or programming errors	PCB malfunction	Replace PCB or refresh EE program	Manual

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
34	E34	Discharge temperature Td too high	Td≥115°C	<p>1) Insufficient circulation of refrigerant: Cooling: System leakage, inability of electronic expansion valve to open or valve blockage resulting in low refrigerant circulation. Heating: System leakage, electronic expansion valve cannot be opened or blocked.</p> <p>2) Insufficient heat exchange, such as dirty heat exchangers and poor ventilation: Refrigeration: Poor ventilation of condenser Heating: Plate exchange is dirty and clogged, filter screen is dirty and clogged</p> <p>3) The outdoor ambient temperature is too high during refrigeration.</p> <p>4) Four way valve for air leakage during refrigeration</p>	Td≤95°C	Automatic (less than three alarms within 60 mins), otherwise, Manual

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
35	E35	Four Way Valve Reversing Abnormality	1) After compressor has been running for 10 mins, a pressure difference of 6kg is not met to start reversing, or 2) Cooling mode: 4WV OFF, Two-Twi \geq 1°C; Tho-Two $>$ 5°C, continue for 5 mins; or 3) Heating mode: 4WV ON; Two-Twi \leq -1°C; Thi-Twi $<$ 0°C, continue for 5 mins	1) Four way valve for air leakage 2) Compressor damaged, unable to form effective pressure difference	Auto reset after 3 mins	Automatic (less than three alarms within 60 mins), otherwise, Manual
38	E38	High pressure Pd too low	Pd_temp \leq (Pd_temp corrected by Ps)+1°C	1) The system is leaking air, resulting in a lack of refrigerant in the system. 2) Heating: The electronic expansion valve cannot be opened or blocked. 3) There is a problem with the pressure sensor itself	Auto reset after 3 mins	Automatic (less than three alarms within 60 mins), otherwise, Manual
39-0	E39-0	Low pressure Ps too low	1) Cooling mode: Ps \leq 3bar, continue for 5 mins; or Ps \leq 2.9bar, continue for 1 mins; or Ps-t $<$ -7°C, continue for 10 secs 2) Heating mode: Ps \leq 0.2bar; continue for 5 mins, or Ps \leq 0.3bar, continue for 60 secs; or Ps-t $<$ (-10~-20)°C during defrosting; continue for 60 secs (EE)	1) The system is leaking air, resulting in a lack of refrigerant in the system. 2) Heating: The electronic expansion valve cannot be opened or blocked. 3) There is a problem with the pressure sensor itself	1) Cooling mode: Ps \geq 3.2bar 2) Heating mode: Ps \geq 2.0bar	Automatic (less than three alarms within 60 mins); otherwise, Manual
39-1	E39-1	Compression ratio ϵ too high	Compression ratio $\epsilon \geq 14$, continue for 1 min	1) Too much refrigerant is sealed in 2) In cooling mode, the fan speed is too low or the fan stops 3) In cooling mode, the condenser has low ventilation and is dirty and blocked 4) The outdoor temperature is too high, exceeding the normal range of use 5) The water pump is not turned on in the waterway, and the water flow is too low	Auto reset after 3 mins	Automatic

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
40	E40	High pressure Pd too high	Pd \geq 33bar; continue for 5 mins; or Pd_temp \geq 80°C+HPR, - continue for 5 mins	1) Too much refrigerant is sealed in 2) In cooling mode, the fan speed is too low or the fan stops 3) In cooling mode, the condenser has low ventilation and is dirty and blocked 4) The outdoor temperature is too high, exceeding the normal range of use 5) The water pump is not turned on in the waterway, and the water flow is too low	Pd \leq 17bar	Automatic (less than three alarms within 60 mins), otherwise, Manual
43	E43	Discharge temperature Td too low	10 mins after normal operation; Td \leq Pd_t+5°C, continue for 5 mins	1) Excessive refrigerant quantity 2) There is a problem with the EEV causing liquid return 3) The problem with the EEV in heating mode, the opening angle is too wide, causing liquid return	Oil temperature mets the start condition	Automatic (less than three alarms within 60 mins), otherwise, Manual
46	E46-0	Communication error with compressor inverter PCB	1) Loss of communication with compressor inverter PC, continue for 30 secs, or 2) Received incorrect data, continue for 30 secs	1) Wiring connection error 2) Communication cable damage 3) Main PCB malfunction 4) IPM malfunction	Communication is re-established Communication is re-established	Automatic Automatic
	E46-4	Communication error with fan motor inverter PCB	1) Loss of communication with fan motor inverter PC, continue for 30 secs, or 2) Received incorrect data, continue for 30 secs	1) Wiring connection error 2) Communication cable damage 3) Main malfunction 4) IPM malfunction		
51-0	E51-0	LEV _a overcurrent	Detected by LEV chip on main PCB	1) The coil of the EEV is damaged 2) Poor connection of computer board ports	Correct feedback is received	Automatic
52-0	E52-0	LEV _a open circuit	Detected by LEV chip on main PCB	1) The coil of the EEV is damaged 2) Poor connection of computer board ports	Correct feedback is received	Automatic
53	E53	CT current too low or CT sensor abnormality	After compressor has been running for 1 mins, - compressor frequency \geq 50Hz and CT sample value (analog input) $<$ 10, continue for 5 mins	1) Sensor is broken 2) loose connection of sensor 3) PCB port is broke	Auto reset after 3 mins	Automatic
64	E64	CT current too high	CT current over set-point; continue for 5 secs	1) Current sensor is broken 2) liquid compressed 3) Compressor is broken	Auto reset after 3 mins	Automatic (less than three alarms within 60 mins), otherwise, Manual

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
65	E65	Internal temperature sensor of the electronic control box T_b abnormality	Internal temperature sensor of the electronic control box T_b open or short circuit; continue for 60 secs	1) Sensor is broken 2) loose connection of sensor 3) PCB port is broken	2 secs after sensor resistance is normal	Automatic
71-0	E71-0	Upper DC Fan Motor Abnormality	1) Fan speed below 20 rpm; continue for 2 mins, or 2) Fan speed lower than setpoint ; contiunue for 2 mins	1) Fan is stucked. 2) Motor is broken. 3) Driving board is broken.	Auto reset after 3 mins	Automatic (less than three alarms within 60 mins), otherwise, Manual
74	E74	System Emergency Stop Abnormality	Ermergency stop signal closed	The emergency stop function has been triggered to detect any abnormalities in the equipment	Ermergency stop signal open	Automatic
78	E78	Lack of refrigerant	1) Cooling mode: $P_s \leq 2.8\text{kg}$, contiunue for 30 mins 2) Heating mode: Outdoor EEV fully open (470 pls), suction superheat ($T_s - P_s - t$) $\geq 20^\circ\text{C}$, contiunue for 60 mins	Serious gas leakage, test by pressure meter	1) Cooling mode: $P_s \geq 3\text{kg}$, contiunue for 30 mins 2) Heating mode: $P_s \geq 2.8\text{kg}$, contiunue for 30 mins	Automatic
81	E81	Inverter PCB temperature too high	Inverter PCB temperature $\geq 95^\circ\text{C}$	1) Radiator fan motor is broken. 2) The IPM fixing screw is loose. 3) The silica gel on the surface of radiator is not enough or not symmetrical	Inverter PCB temperature $\leq 75^\circ\text{C}$	Automatic (less than three alarms within 60 mins), otherwise, Manual
82	E82	Compressor overcurrent	Compressor current \geq Setpoint	1) Power voltage abnormal 2) Wrong wiring in electrical box Compressor wire loose 3) IPM is broken 4) compressor is broken	Auto reset after 3 mins	Automatic (less than three alarms within 60 mins), otherwise, Manual
83	E83	Incorrect outdoor unit capacity DIP switch setting	/	Outdoor unit dip switch error	Change dip switch settings	Manual
87	E87	Defrosting with over low water temperature	After defrost electric heater is enabled, if $T_{wo} \geq Y - 5^\circ\text{C}$ and continues for 30 mins, defrost start condition is met. The heater will be turned off after $T_{wo} \geq Y + 2^\circ\text{C}$. After 30 mins, if $T_{wo} < Y - 5^\circ\text{C}$, the unit will stop and the electric heater will be turned off. (Y=18°C)	1) The electric heating is not turned on, causing the water temperature to be too low 2) The sensor itself is malfunctioning 3) Poor sensor contact 4) Computer board port issue	$T_{wo} > Y$ (Y=18°C)	Automatic

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
110	E110	Inverter PCB error — Compressor module hardware overcurrent	Compressor module (backside of PCB) hardware overcurrent	1) Power voltage abnormal 2) Wrong wiring in electrical box ,or compressor wire loose 3) Compressor inverter PCB is broken 4) compressor is broken	Auto reset after 3 mins and retart. If failed, it will restart after another 3 mins	Automatic (less than three alarms within 60 mins),otherwise, Manual
	E110-4	Inverter PCB error — Fan motor module hardware overcurrent	Fan motor module (backside of PCB) hardware overcurrent	1) Power voltage abnormal 2) Wrong wiring in electrical box ,or fan motor wire loose 3) Fan moter inverter PCB is broken 4) Fan motor is broken		
111	E111	1Inverter PCB error — Compressor loss of synchronism	During operation, if rotor position error is below zero and compressor frequency is over 130Hz, the compressor will stop	1) Wire connection is loose between compressor and IPM 2) IPM is broken 3) compressor is broken	Auto reset after 2 mins	Automatic
	E111-4	Inverter PCB error — Fan motor loss of synchronism	1) Position estimation integral is negative (negative speed); or 2) Fan speed≥400 rpm; fan motor current ≤10mA. If any of the above conditions are met, the fan motor will stop. If failed startup attempts are over 5 times, this fault will be reported."	1) Wiring error in the electrical control box or unstable crimping of the fan harness 2) IPM broken 3)Fan motor is broken	Auto reset after 30 secs	
112	E112	Inverter PCB error — Heat sink temperature too high	Heat sink temperature≥95°C	1) Radiator fan motor is broken 2) The IPM fixing screw is loose 3) The silica gel on the surface of radiator is not enough or not symmetrical	Heat sink temperature < 80°C	Automatic
114	E114	Inverter PCB error — DC bus output under-voltage	1) Single phase models: DC voltage<160VDC or DC voltage>430VDC; or 2) Three phase models: DC voltage<200VDC or DC voltage>752VDC 3) Compressor module (backside of PCB) power input interrupted (instaneous)	1) Power voltage abnormal 2) Electrical box wrong wiring 3) Power contactor does not change to short circuit 4) DC bus voltage is lower than normal	1) Single phase models: for AW122/142HVGHA and AW122/142MVGHA models, 160VDC<DC voltage<430VDC, for other single phase models, 200VDC<DC voltage<380VDC 2) Three phase models: 200VDC<DC voltage<752VDC 3) Auto reset after 3 mins and retart. If failed, it will restart after another 3 mins	Automatic

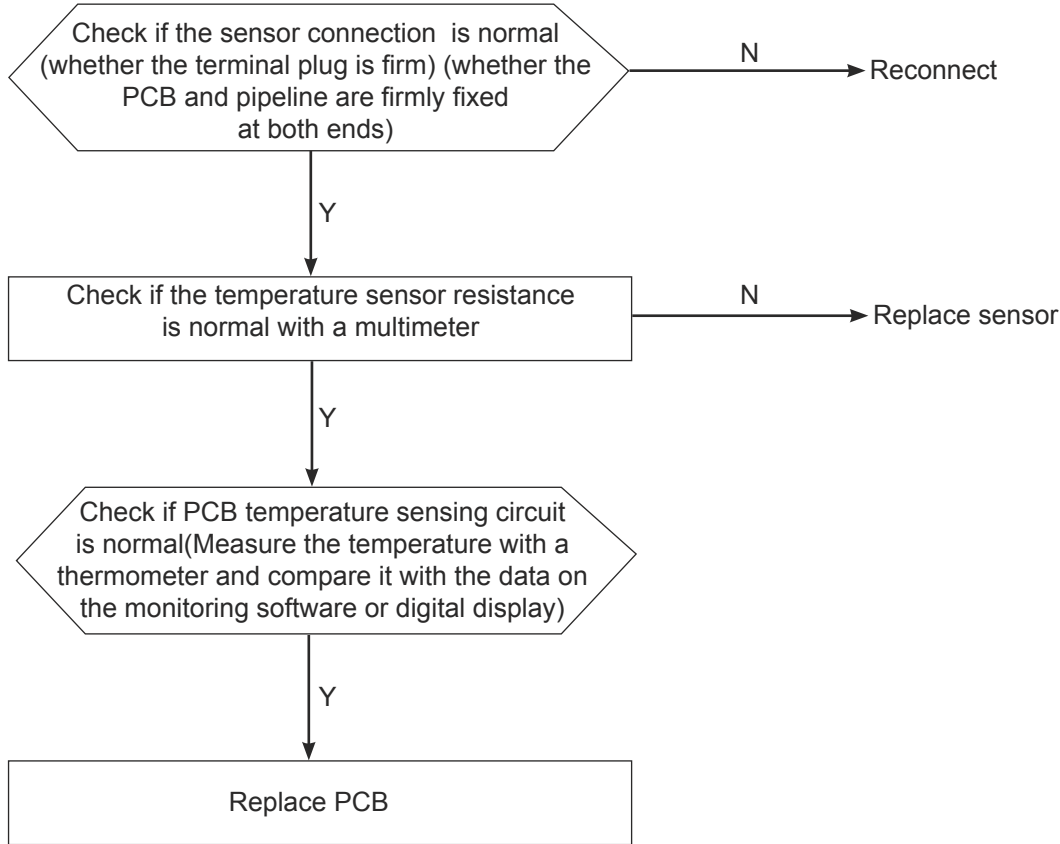
Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
116	E116	Communication error with main PCB	Loss of communication with main PCB; continue for 30 secs	1) Wiring between mainboard and inverter board is abnormal 2) Communication circuit of mainboard is abnormal, Communication LED is flashing abnormal. 3) Communication circuit of inverter control board is abnormal	Communication is re-establishe	Automatic
117	E117	117 Inverter PCB error — Compressor module software overcurrent	1) Compressor module rectifier side software overcurrent (instaneous),or 2) Compressor module overload; or 3) Compressor module software overcurrent (instaneous)	1) Power voltage abnormal 2) Wrong wiring in electrical box 3) IPM is broken 4) Compressor is broken.	Communication is re-established	Automatic
	E117-4	117-4 Inverter PCB error — Fan motor module software overcurrent	1) Compressor module rectifier side software overcurrent (instaneous); or 2) Compressor module overload; or 3) Compressor module software overcurrent (instaneous)	1) Power voltage abnormal 2) Wrong wiring in electrical box or unstable crimping of the fan harness 3) IPM is brokene 4) Fan motor is broken		
118	E118-0	Inverter PCB error — Compressor start-up abnormality	Compressor failed to start up for 5 consecutive times	1) Abnormal power supply voltage 2) Wiring connection error 3. IPM malfunction 4. Compressor malfunction	Compressor starts up successfully	Automatic
	E118-4	Inverter PCB error — Fan motor start-up abnormality	Fan motor failed to start up for 5 consecutive times	1) Abnormal power supply voltage 2) Wiring connection error 3. IPM malfunction 4. Fan motor malfunction	Fan motor starts up successfully	
119	E119	Inverter PCB error — Current sensing circuit abnormality	CT sensor abnormal, disconnected or misplaced	1) Current sensor connection is loosed 2) Current sensor is broken 3) Inverter board is broken	Detected current is normal	Automatic
121	E121	Inverter PCB error — Power supply input abnormality	Inverter PCB power input interrupted (instaneous)	1) Power voltage abnormal 2) Wrong wiring in electrical box or unstable crimping of the fan harness 3) IPM is brokene 4) Fan motor is broken	Power input is normal	Automatic
122	E122	Inverter PCB error — Heat sink temperature sensor abnormality	1) Heat sink temperature sensor resistance incorrect; or 2) Sensor disconnected	1) Current sensor connection is loosed 2) Current sensor is broken 3)inverter board is broken	Sensor with correct resistance is detected	Automatic

Outdoor Digital Display Tube	Indoor Wired Controller	Error Code Definition	Error Description	Malfunction analysis	Reset Method/ Criteria	Remarks
124	E124	Inverter PCB error — Three-phase power supply abnormality	Three-phase power failure	1)Wrong sequence connection of three-phase wires 2)Three phase power supply too high or too low	Three-phase power supply is restored	Automatic

7.2 Troubleshooting

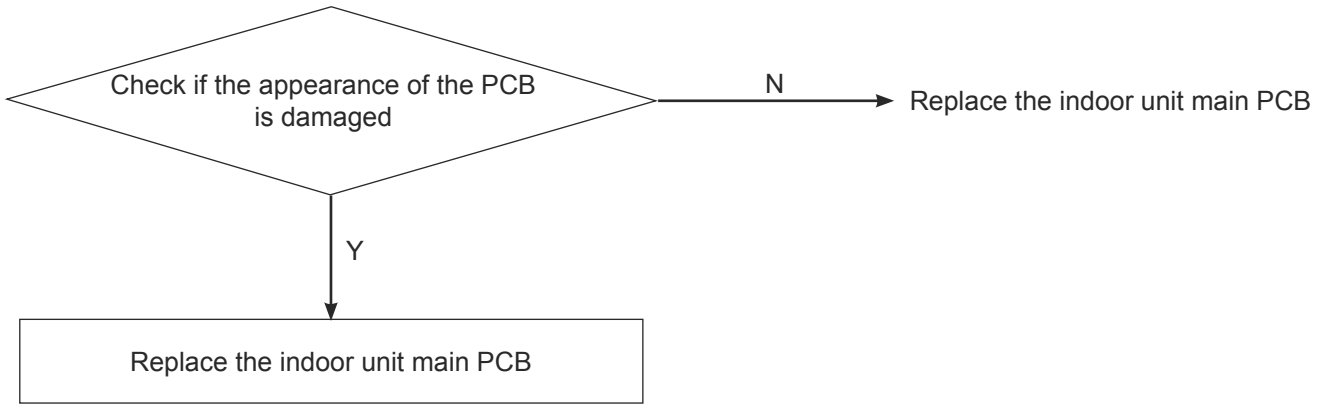
In below flow chart, "Y" stands for "Yes" and "N" stands for "No".

[1, 2, 3, 4, , 10,12,20, 21,22,23] Temperature Sensor Abnormality



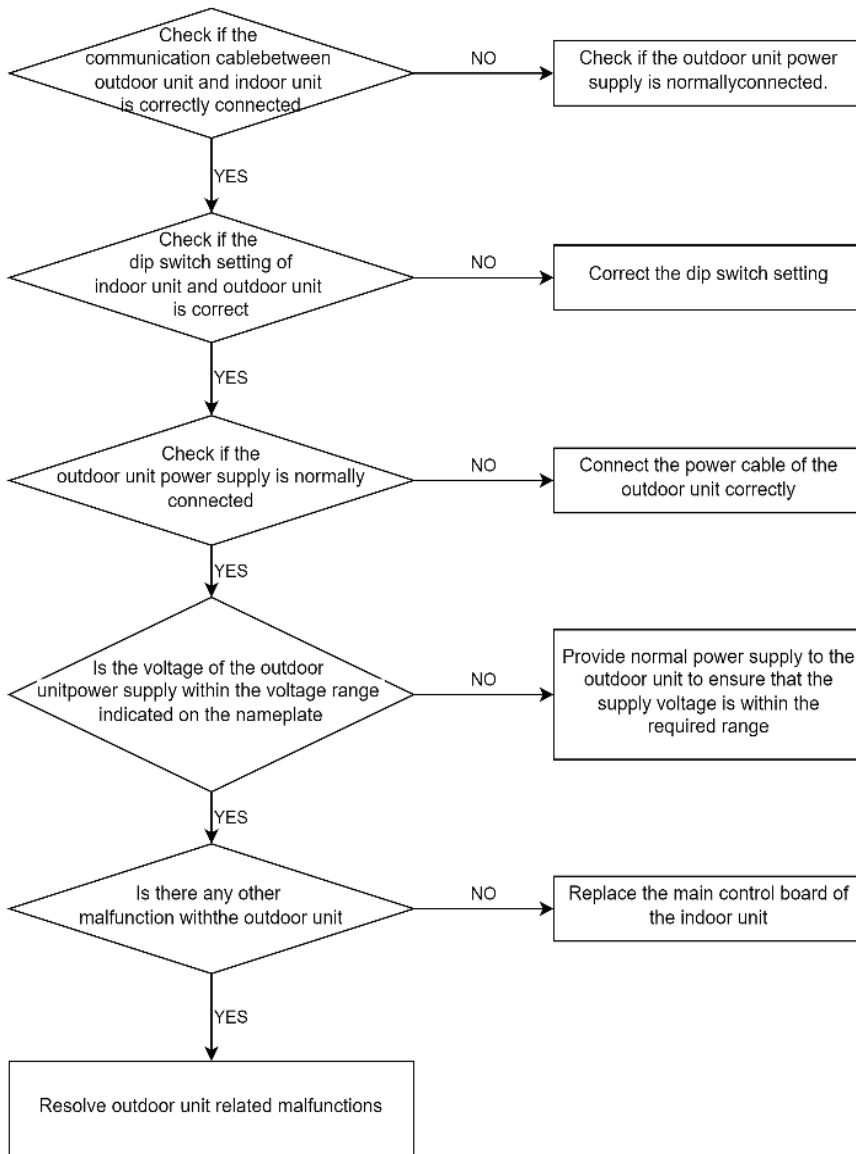
No.	Name	Code	Characteristic
1	Tao (ambient temp. sensor)	0150409004	R25=10KΩ
2	Td(compressor discharge temp. sensor)	0004000045	R80=50KΩ
3	Ts(compressor suction temp. sensor)	0004000046	R25=10KΩ
4	Th1 (defrosting temp. sensor)	0004000047	R25=10KΩ
5	Thi(Temperature sensor for refrigerant inlet the heat exchange unit)	0004000048	R25=10KΩ
6	Tho(Temperature sensor for refrigerant outlet of heat exchange unit)	0004000048	R25=10KΩ
7	Twi(Inlet water temperature sensor of heat exchange unit)	0004000048	R25=10KΩ

[5] EEPROM Abnormality

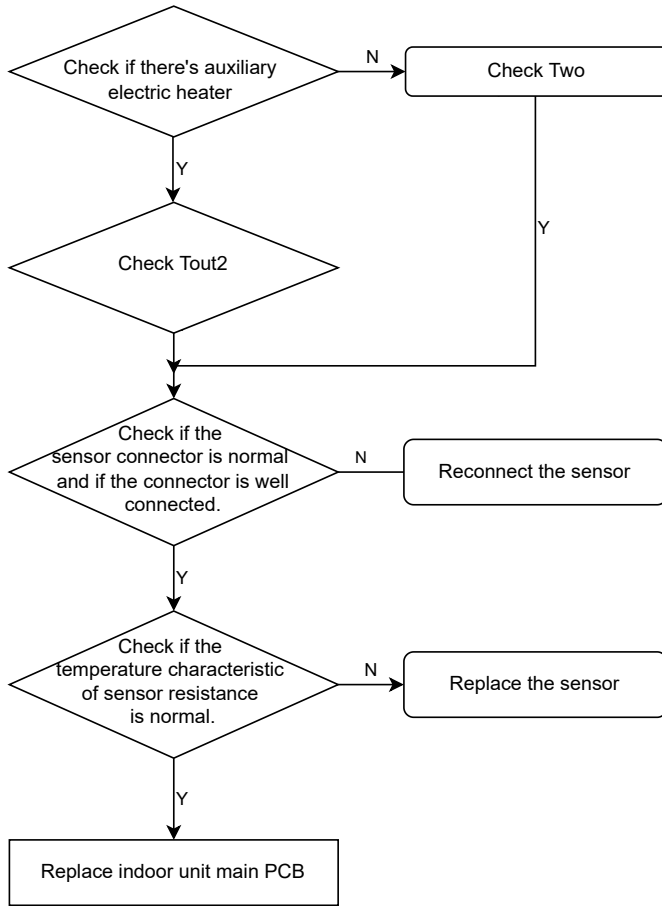


Check if BM1&BM2 dip switches setting of the indoor unit main PCB is correct

[6] Communication Error between Outdoor Unit and Indoor Unit



[7] Communication Error between Remote Wired Controller and Indoor Unit

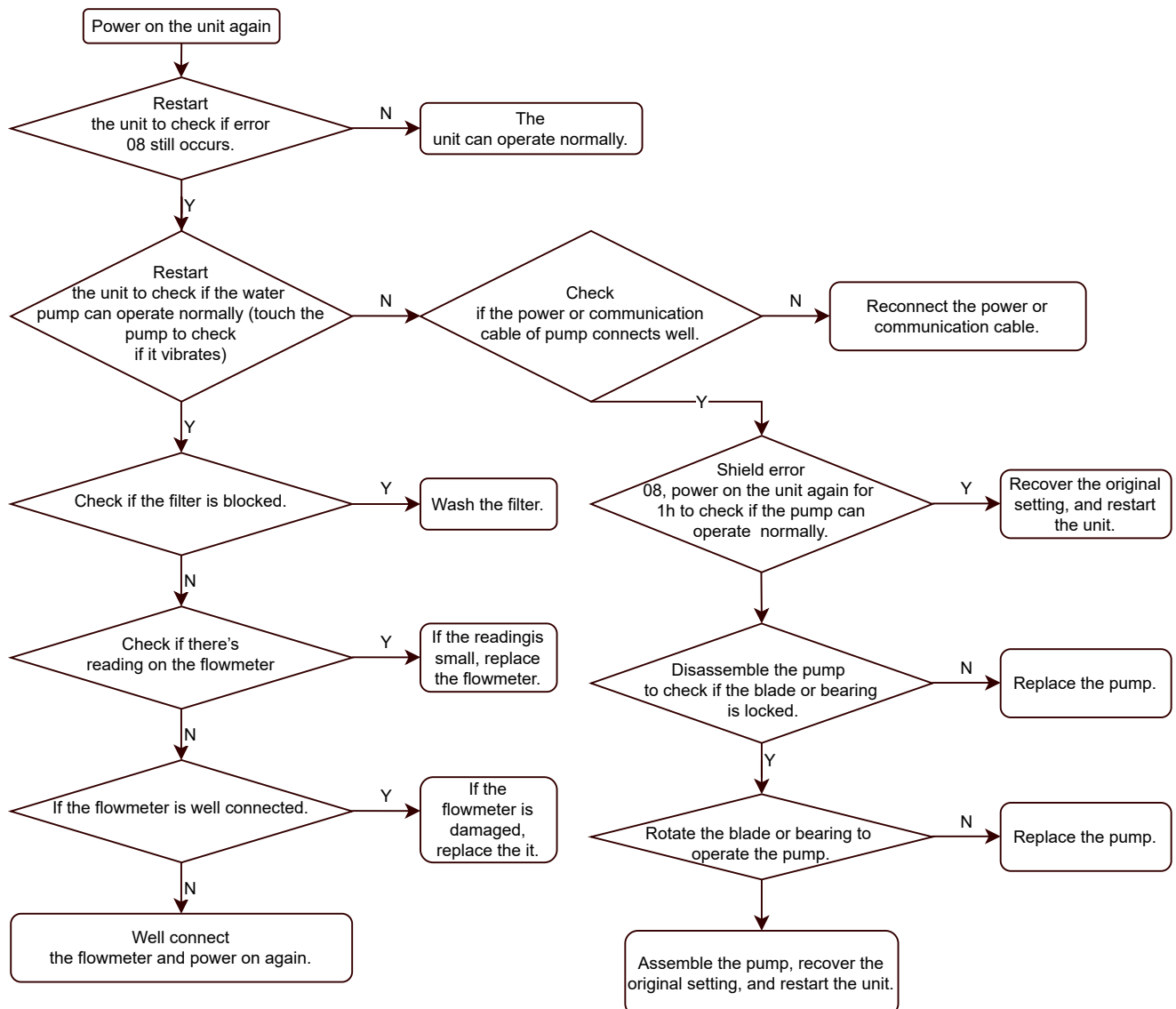


[8] Flow Switch/ Flowmeter Abnormality

Background:

If the unit are in extended shutdown (about over half a year from production to installation or about over half a year after draining off the water from the water system when the unit is installed) or if the water quality is not up to standards, there might be crystallization on the water pump rotor which will result in pump startup failure and showing E08 error. These precautions will be applied if any of below situations occur:

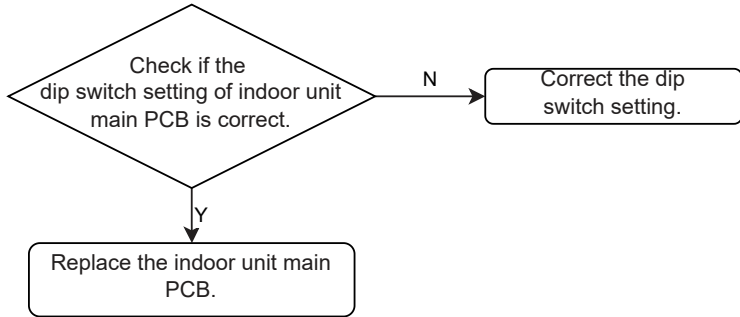
1. First-time installation (about over half a year from production to installation), no matter whether E08 error is shown or not, below procedures must be followed. If it is within about half a year from production to installation, when E08 error shows, below procedures must be followed as the first choice to deal with the error.
2. When the unit start up for the first time after filling water if the unit has been installed but the water has been drained off for about over half a year, no matter whether E08 error is shown or not, below procedures must be followed. If it is within about half a year from water drainage to the first-time water filling, when E08 error shows, below procedures must be followed as the first choice to deal with the error.
3. When E08 error shows during normal operation of the unit, below procedures must be followed as the first choice to deal with the error.



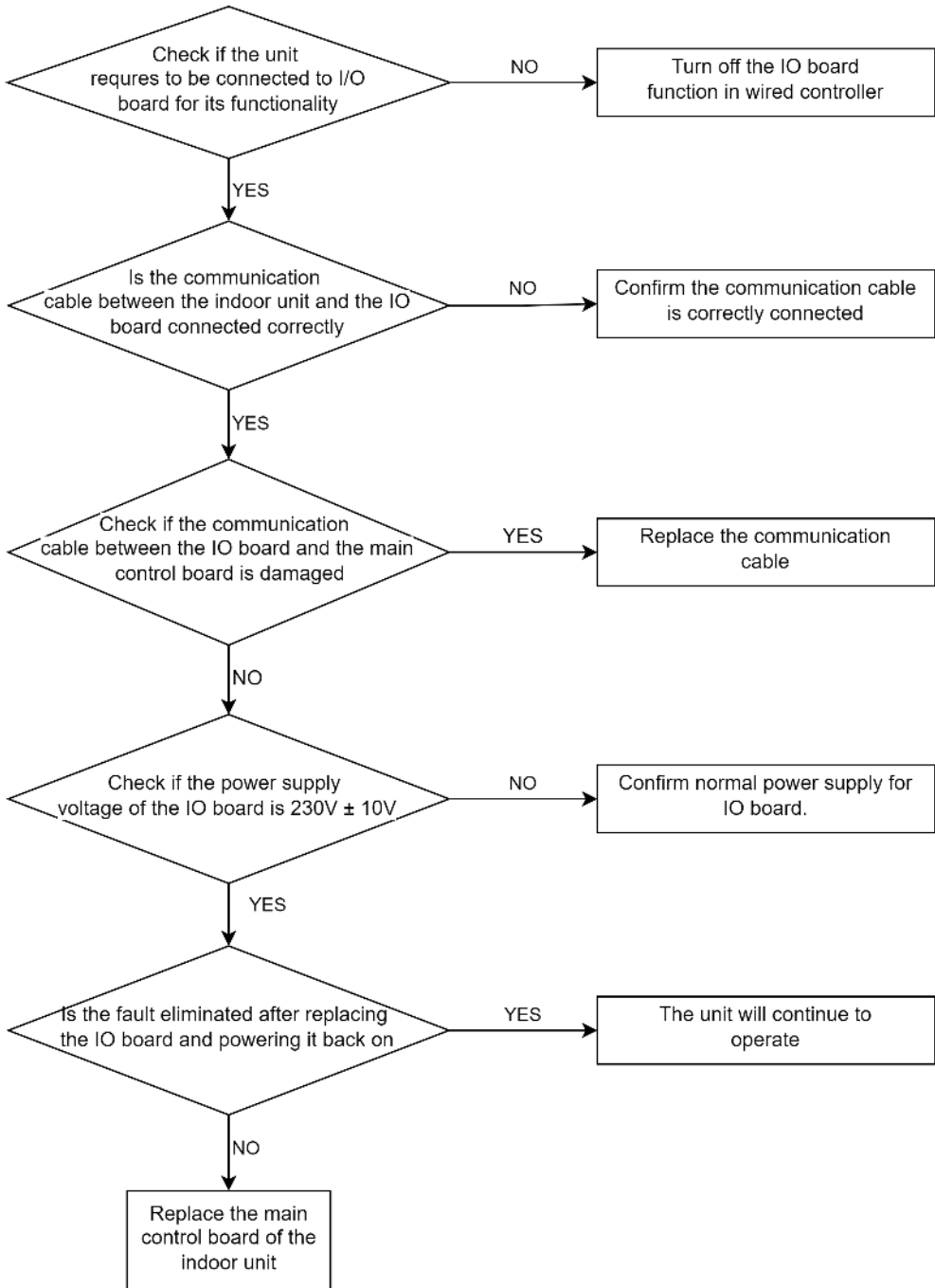
1. If 08E error code occurs during the first-time installation or restart after an extended shutdown with no water in the system, please refer to the Service Manual for 08E troubleshooting.

2. If the system has not been used for an extended period, it is advised that the system is filled with water and that the power stays on (the system owns anti freezing function during shutdown). In the event of a drainage requirement, it is advised to replenish the water as soon as possible after the drainage process or it might result in a potential risk of the water pump's rotor getting locked. In the meanwhile, it is also advised to perform pipeline insulation and add antifreeze after the system is replenished with full water to avoid pipeline break due to low ambient temperature.

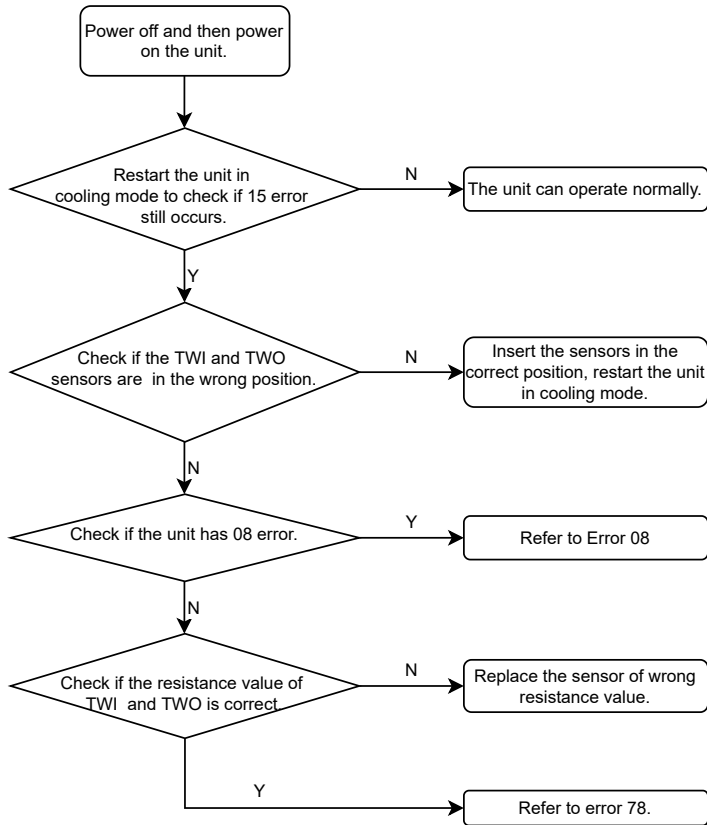
[9] Indoor Unit Address Duplication Abnormality



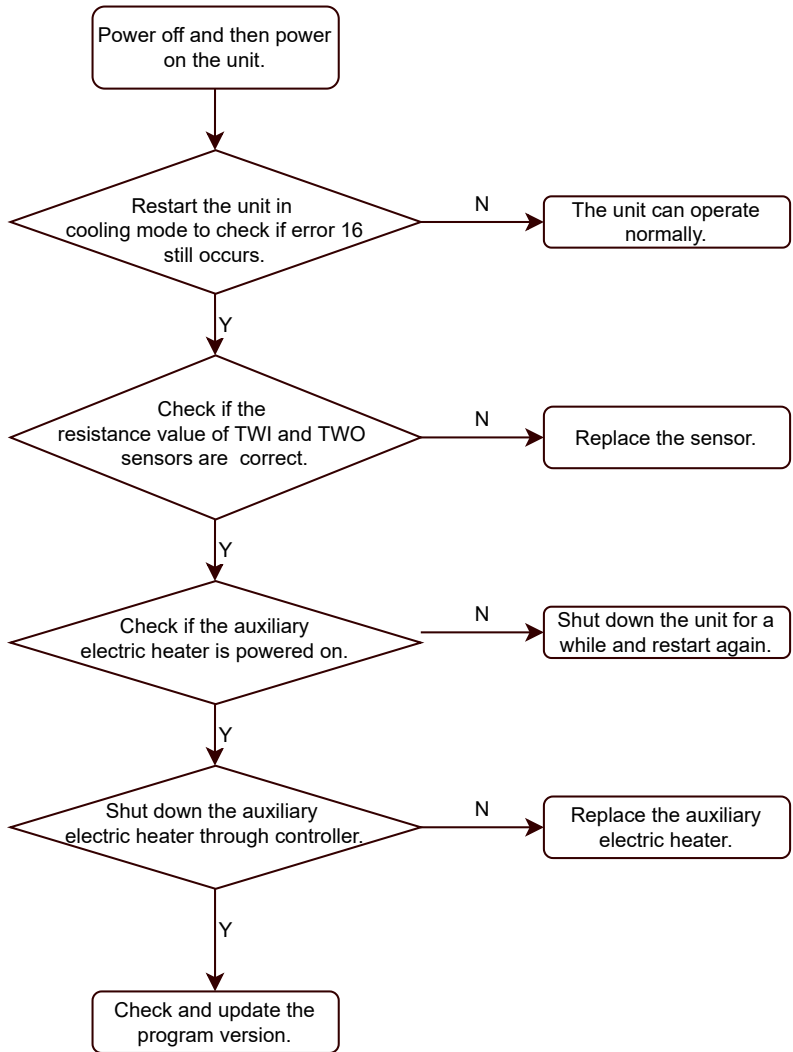
[11] ATW-A03N PCB Communication Abnormality



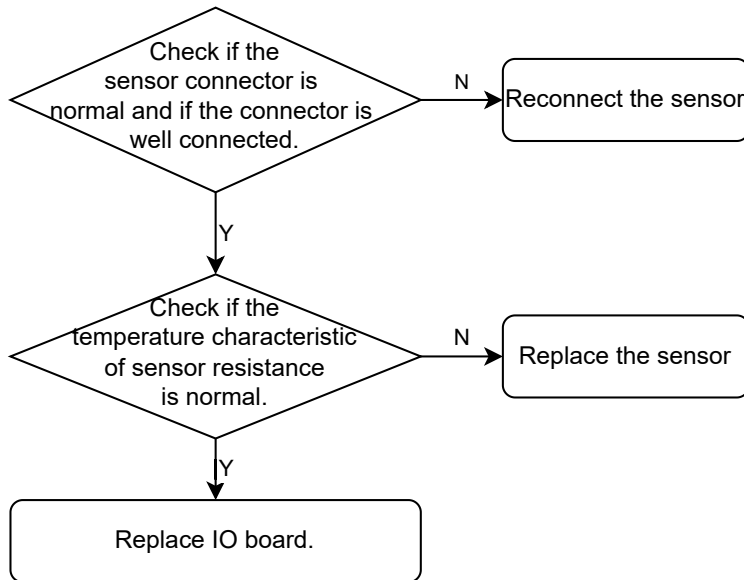
[15] Anti-freeze Abnormality



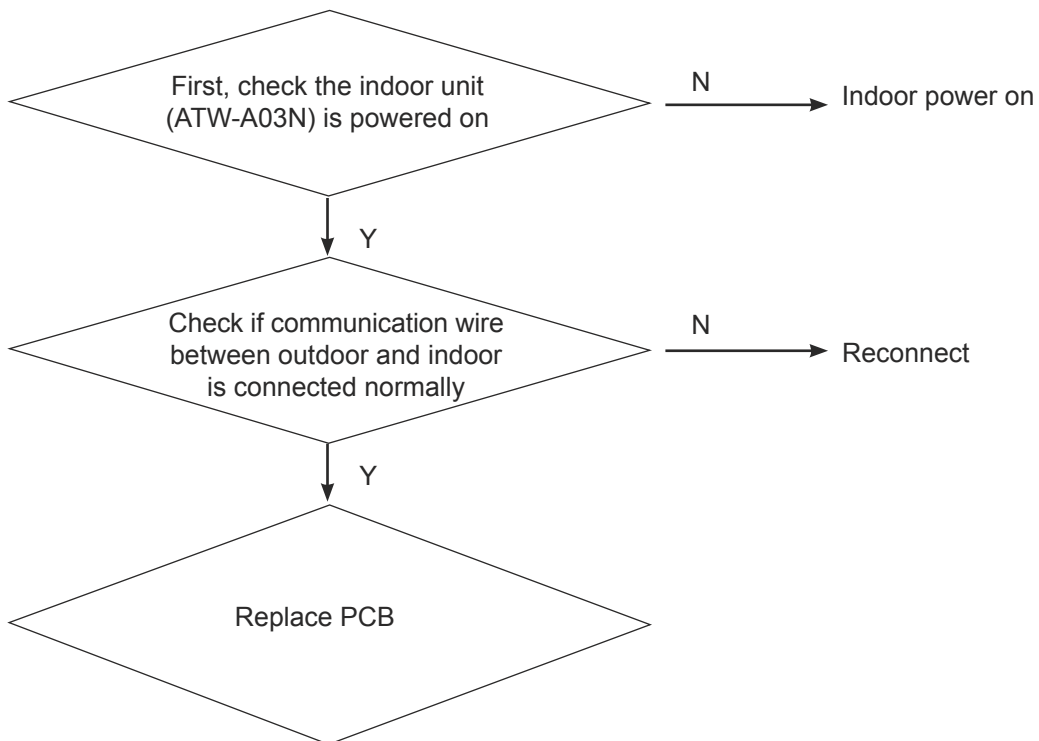
[16] HU Water Inlet/Outlet Temperature Over High



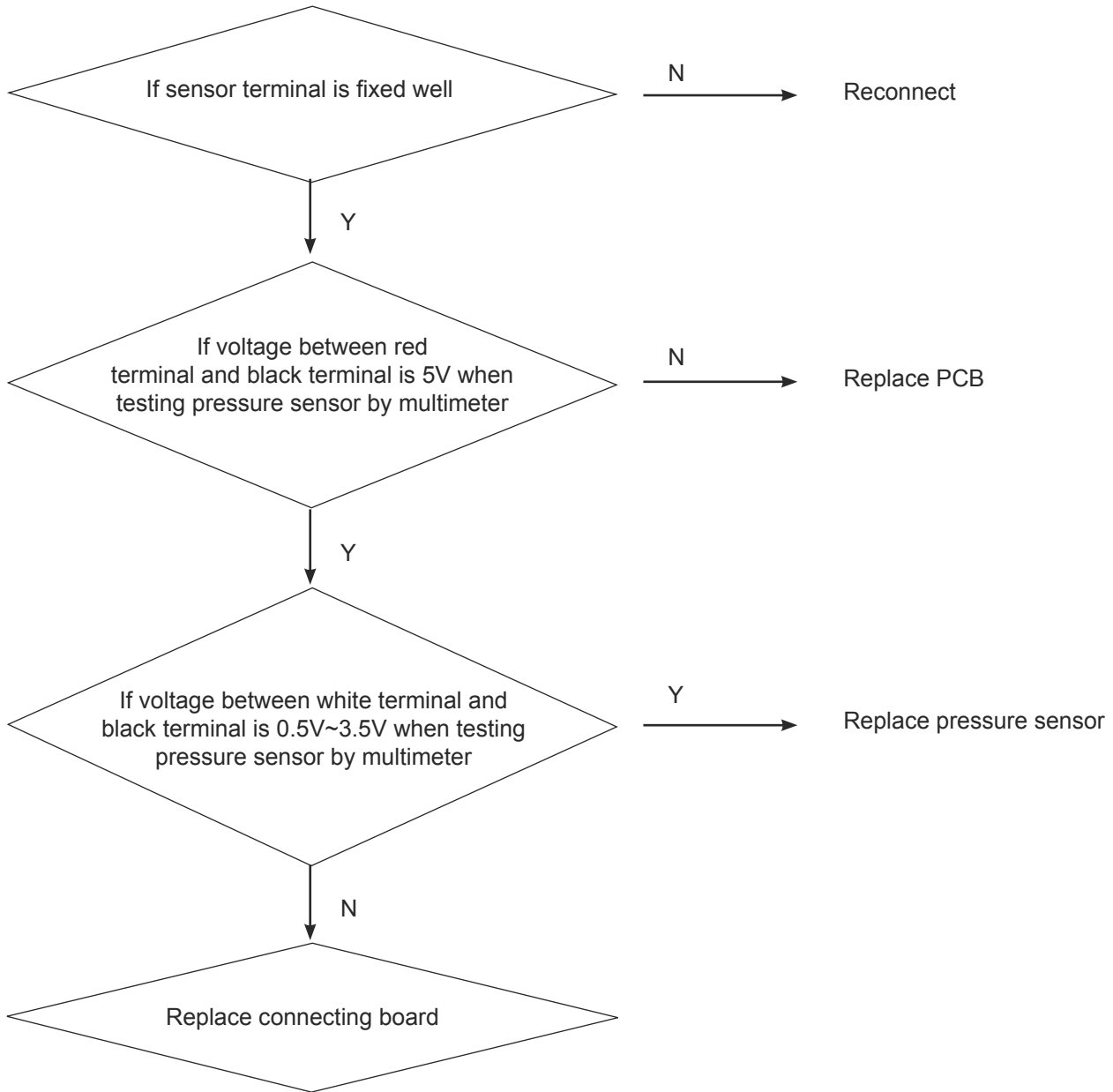
[19] Pool Mixing Valve Water Outlet/Pool Water Temperature Sensor Abnormality



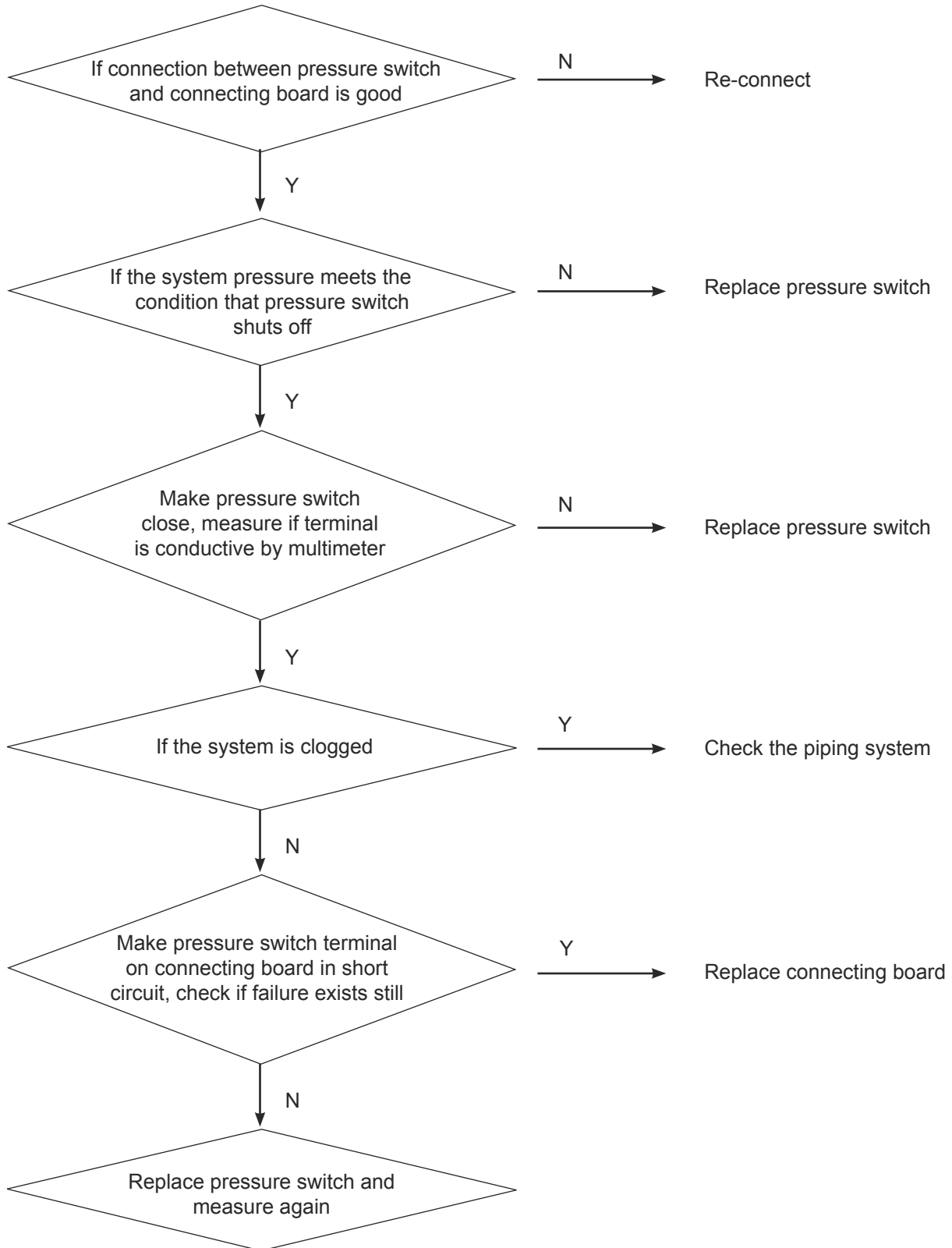
[26] Communication failure with indoor



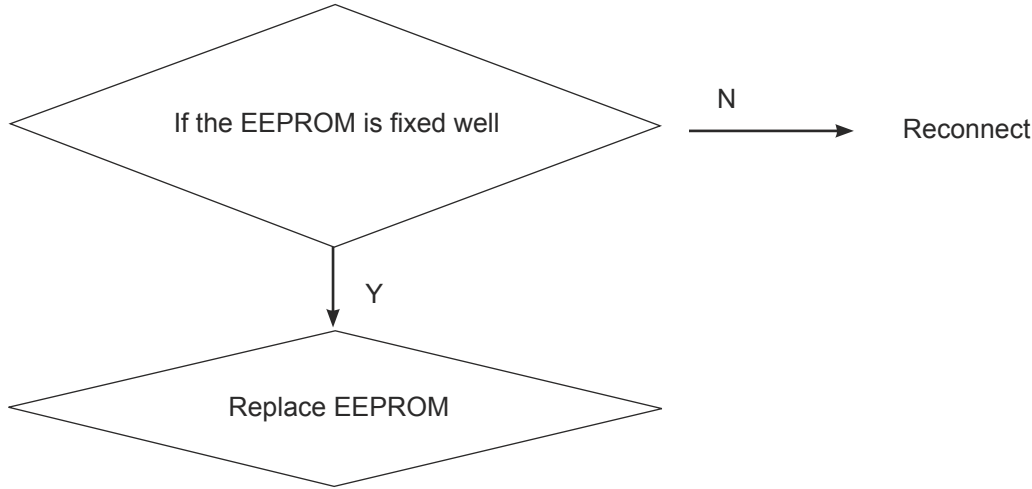
[28, 29] Compressor Discharge/Suction Pressure Sensor Abnormality



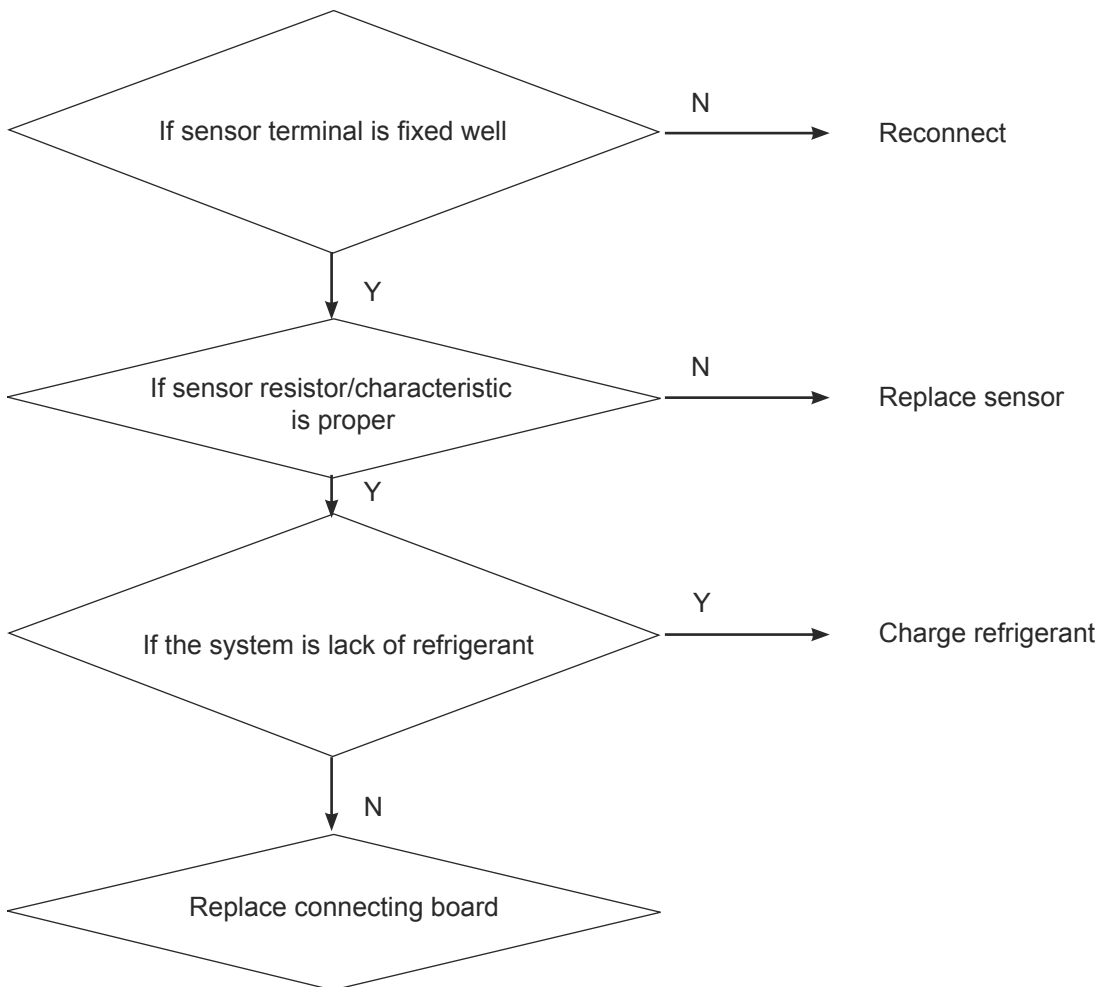
[30] High Pressure Switch HPS Abnormality



[33] Outdoor Unit PCB EEPROM Abnormality



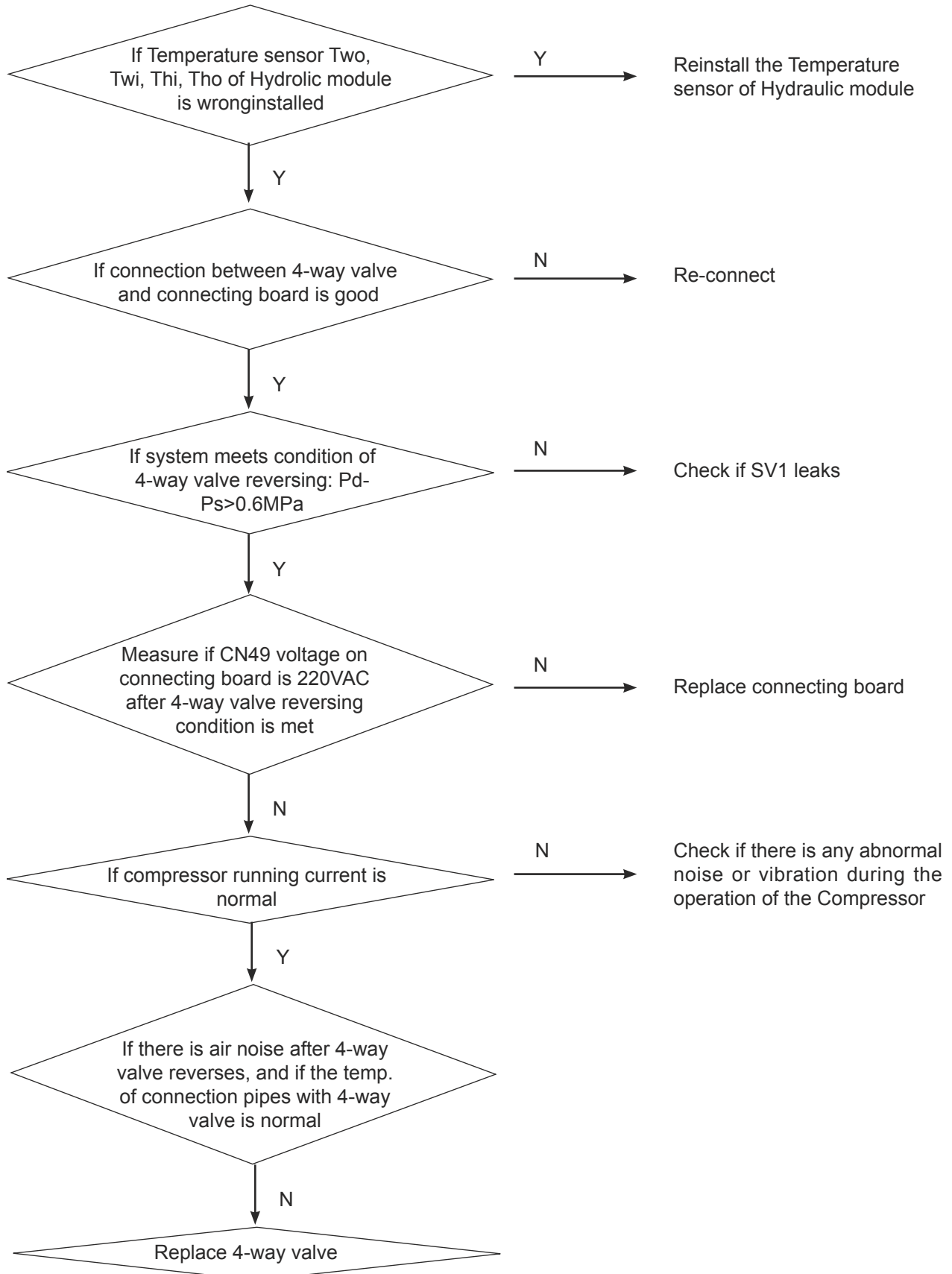
[34] Compressor Discharge Temperature Over High Protection(Td)



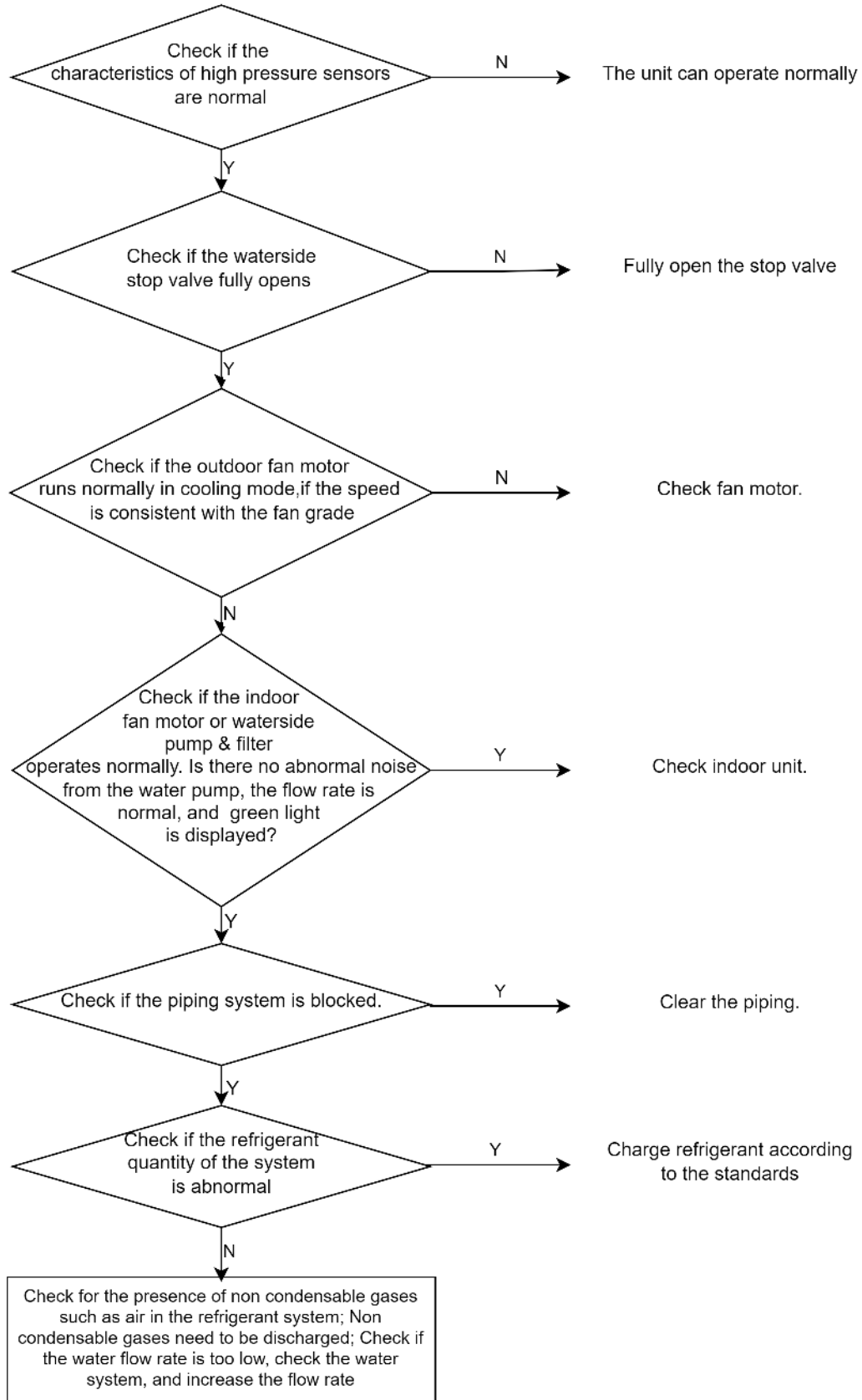
Note: There are two situations in which the amount of refrigerant charged causes the discharge temperature to be too high:

- 1, The refrigerant charge is slightly higher, and the discharge temperature is high but the pressure is also high.
- 2, Low refrigerant charge, high discharge temperature but low pressure.

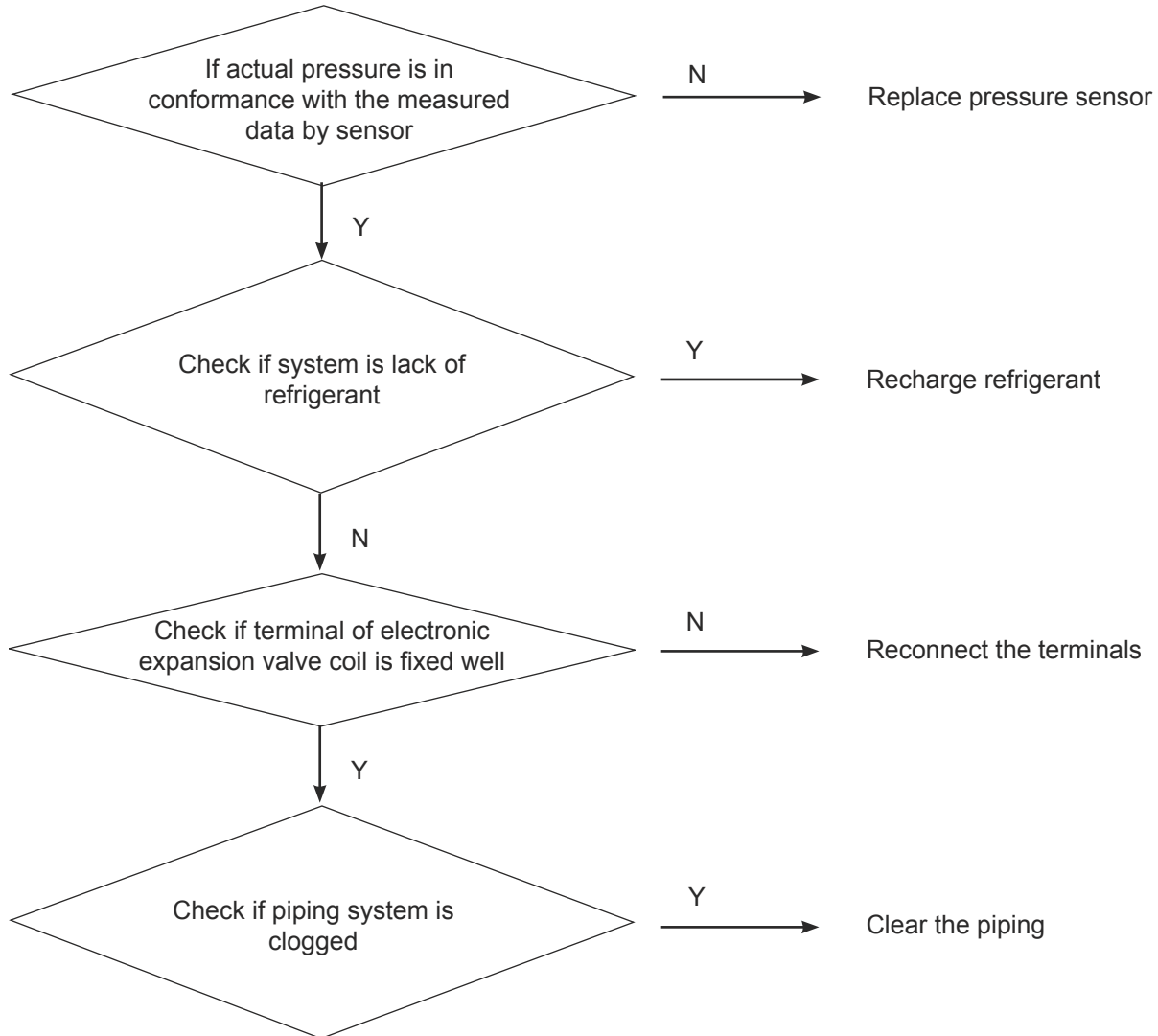
[35] Four Way Valve Reversing Abnormality



[38, 40] High Pressure Over Low/High Protection



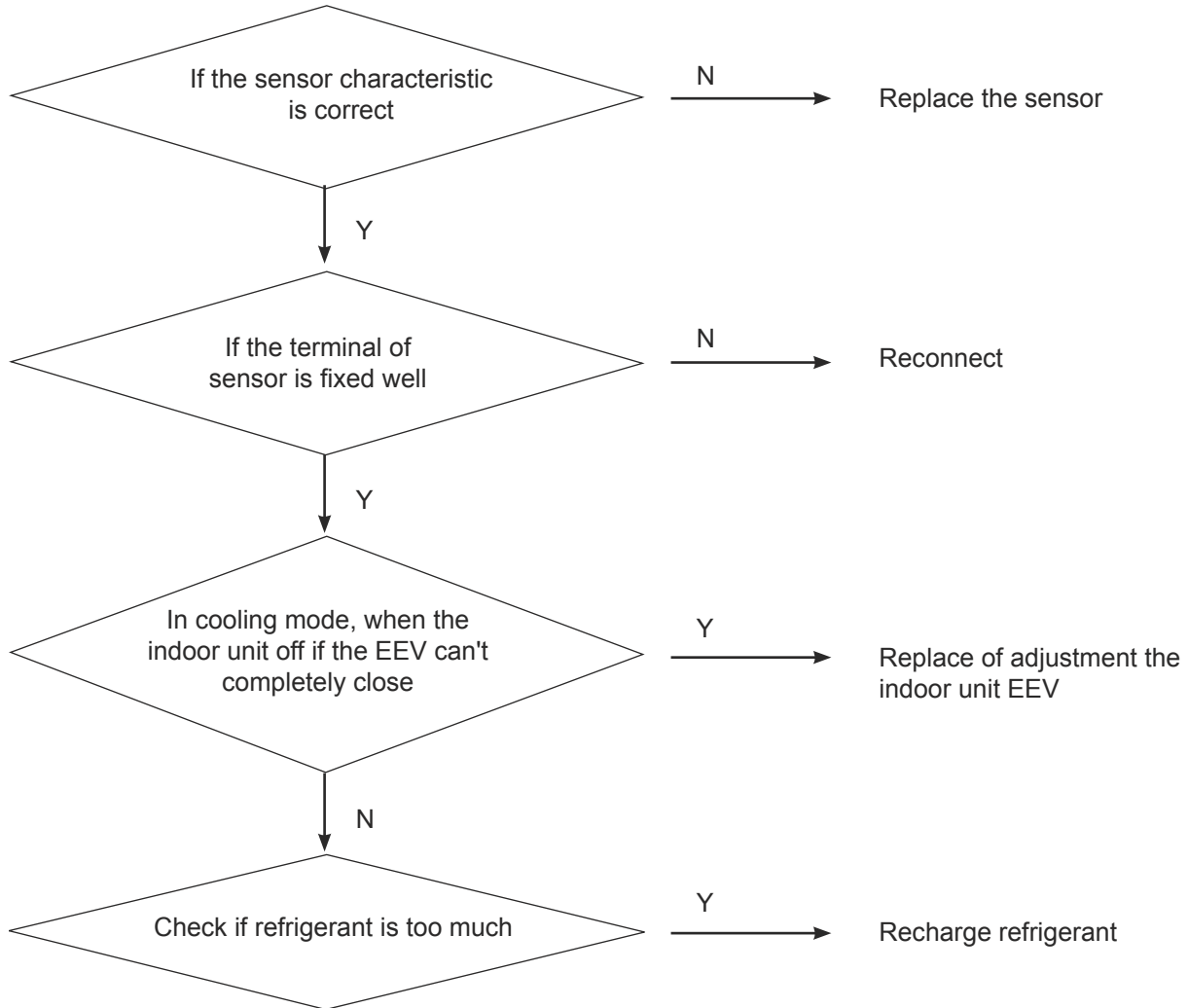
[39-0, 39-1] Low Pressure Over Low Protection/Compression Ratio Over High Protection



Note: There are two situations in which the amount of refrigerant charged causes the discharge temperature to be too high:

- 1, The refrigerant charge is slightly higher, and the discharge temperature is high but the pressure is also high.
- 2, Low refrigerant charge, high discharge temperature but low pressure.

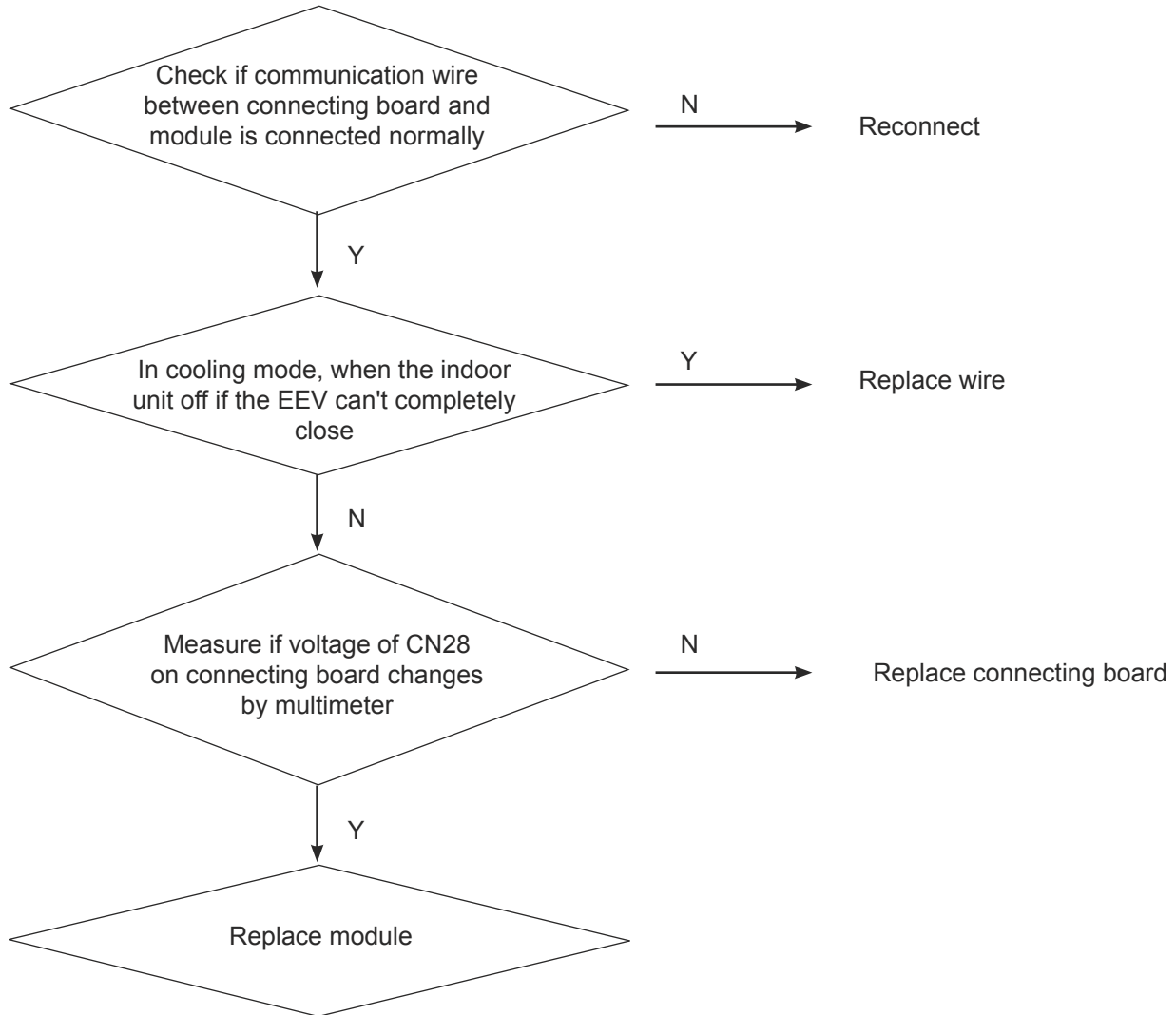
[43] Compressor Discharge Temperature Sensor Over Low Protection



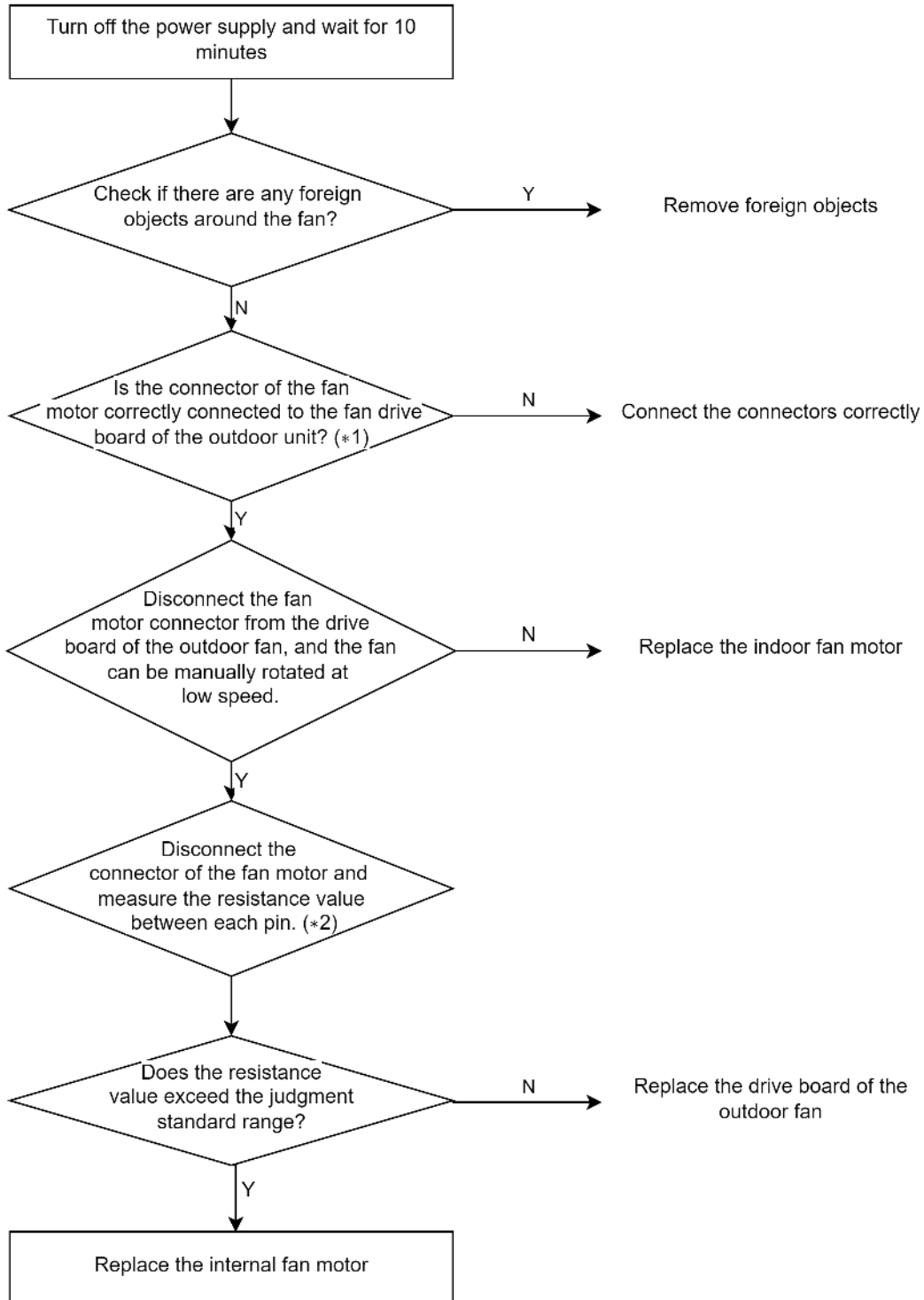
Note: There are two situations in which the amount of refrigerant charged causes the discharge temperature to be too high:

- 1, The refrigerant charge is slightly higher, and the discharge temperature is high but the pressure is also high.
- 2, Low refrigerant charge, high discharge temperature but low pressure.

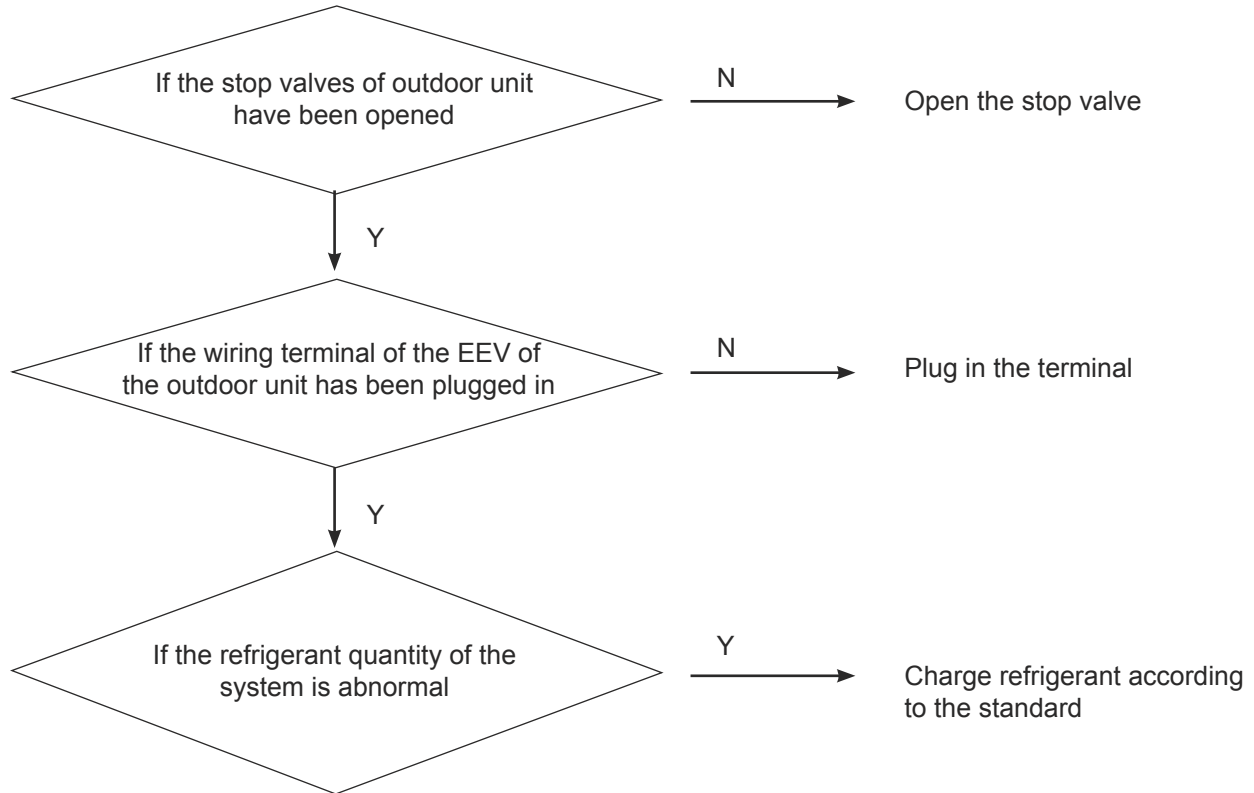
[46] Communication Error with Driver PCB



[71-0] Fan stalling fault



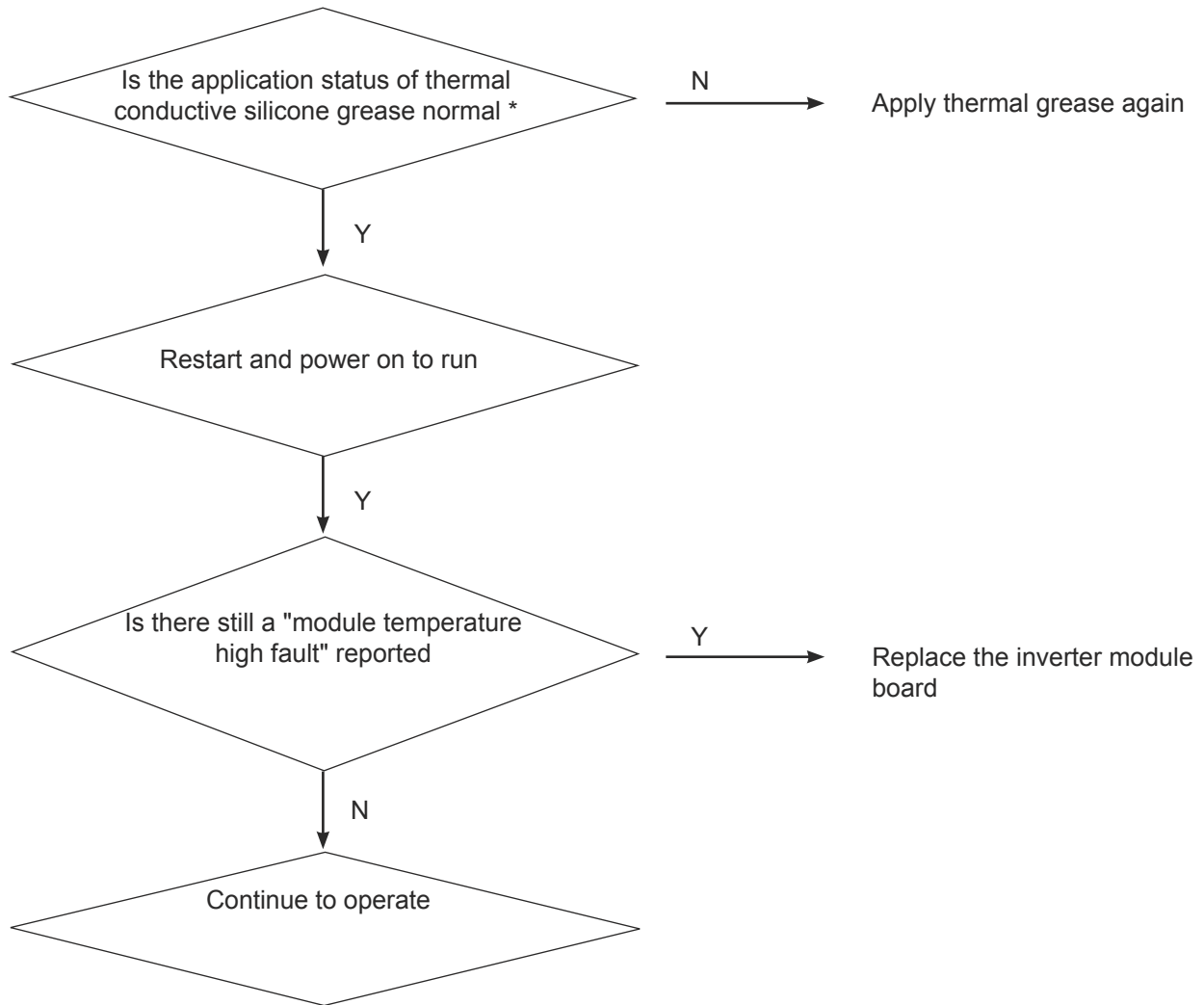
[78] Lack of refrigerant



Note: There are two situations in which the amount of refrigerant charged causes the discharge temperature to be too high:

- 1, The refrigerant charge is slightly higher, and the discharge temperature is high but the pressure is also high.
- 2, Low refrigerant charge, high discharge temperature but low pressure.

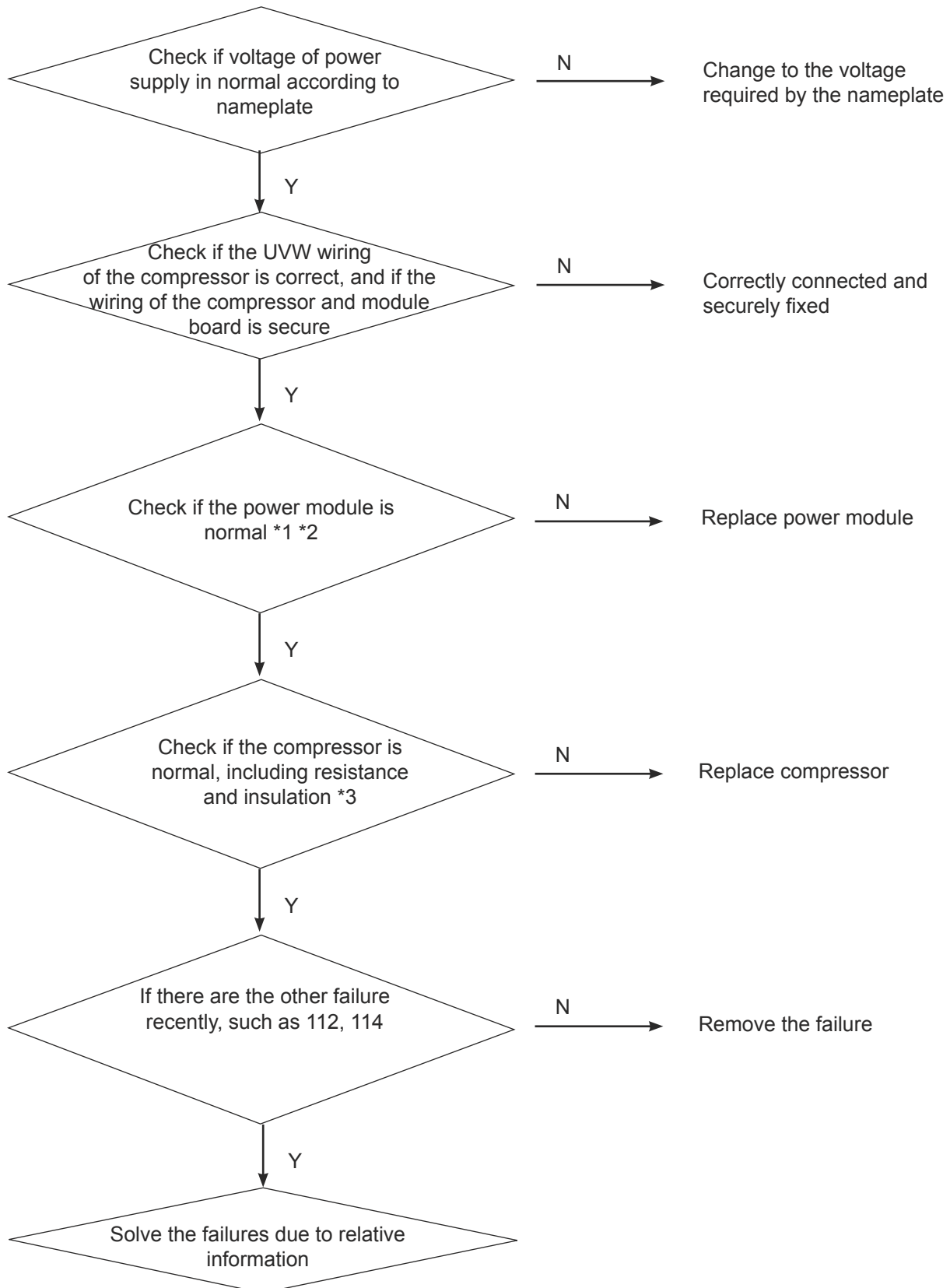
[81] Compressor Driver PCB Temperature Over High Protection
[112] Compressor Driver PCB Heat Sink Temperature Over High



*The normal application state of silicone grease should be:

- (1) The screws fixing the semiconductor devices on the heat sink are not loose, and the heating device and the heat sink can be tightly adhered through thermal conductive silicone grease;
- (2) Silicone grease should be evenly applied, and thermal conductive silicone grease should be applied to all contact surfaces for heat dissipation;
- (3) Thermal conductive silicone grease should not be in a dry solid state.

[82] Compressor Current Protection
[110] Compressor Hardware Overcurrent



*1 Check the following connectors

Model	PCB	Connector
AW042/062MUGHA	0150406832BA	Circular terminal U, V, W
AW082/102MUGHA	0150406834DA	Circular terminal U, V, W
AW122/142MXGHA	0150406834BA	Circular terminal U, V, W
AW162MXGHA	0150411653	Circular terminal U, V, W
AW10NMUGHA	0150405099AC	Insert terminal U, V, W
AW12N/14NMXGHA	0150405099AD	Insert terminal U, V, W
AW16NMXGHA	0150405099AE	Insert terminal U, V, W

*2 . Resistance measuring points and judgment criteria



AW042/062MUGHA



AW082/102MUGHA



AW122/142MXGHA



AW162MXGHA



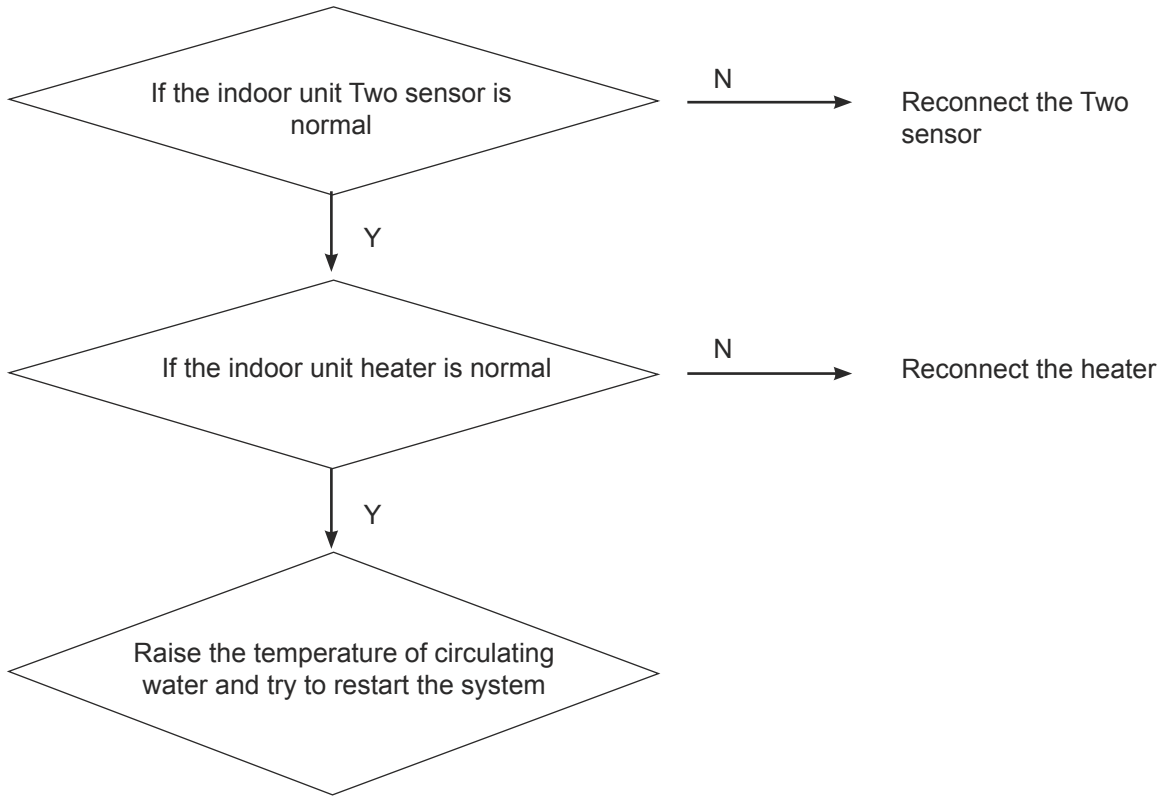
AW10NMUGHA AW12N/14/16NMXGHA

Note: Measure the resistance of U, V, and W separately for P and N. If any one of them is short circuited, it can be determined that the module is damaged

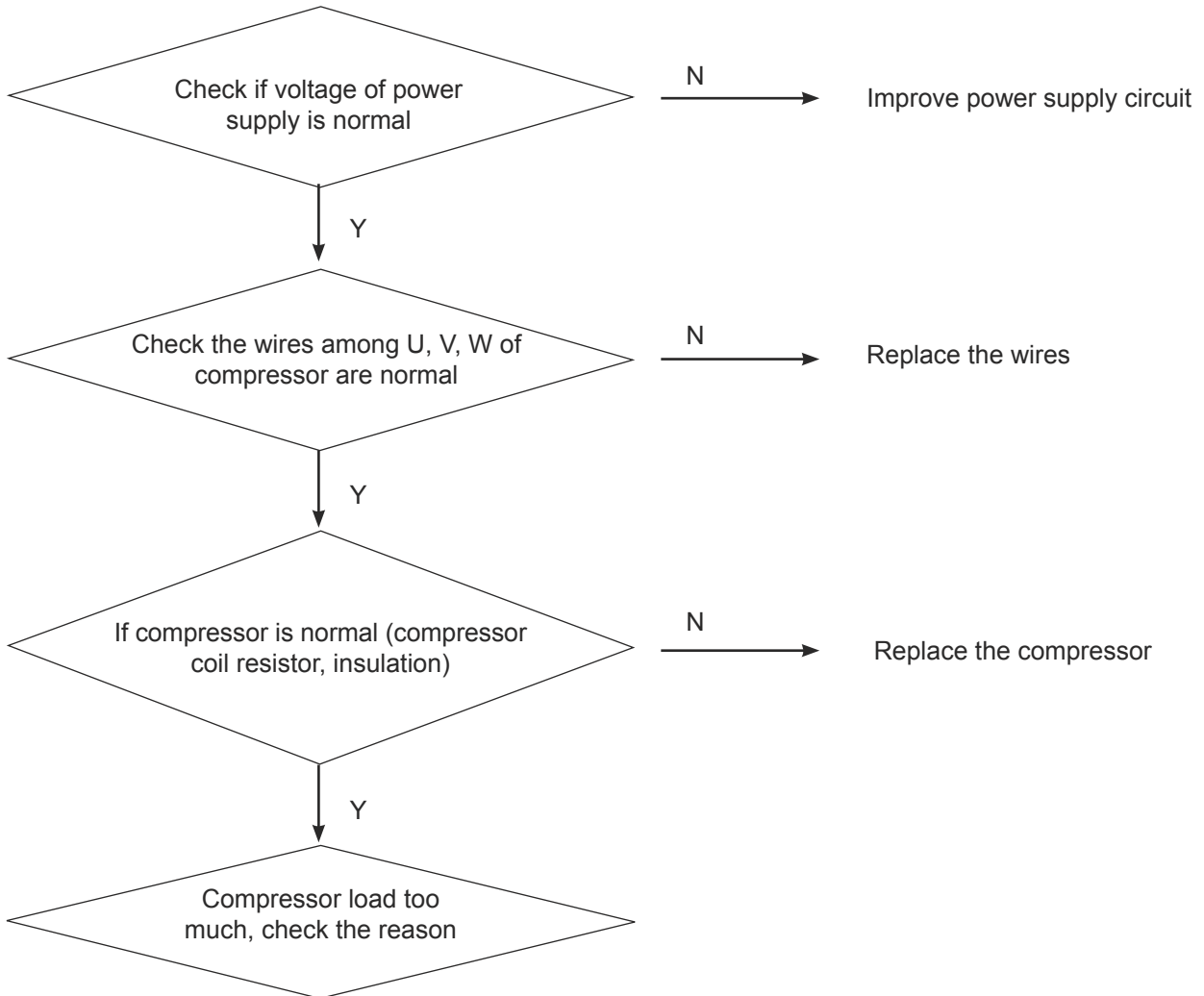
*3 Resistance measuring points and judgment criteria

No.	Measuring point	Criteria(0150768718) AW042/062MUGHA	Criteria(0150768721) AW082/102MUGHA AW10NMUGHA	Criteria(0150768723) AW122/142MXGHA AW12N/14NMXGHA	Criteria(0150768771) AW162MXGHA AW162NMXGHA
1	U-V	0.63Ω ±5%	0.88Ω ±5%	0.54Ω ±5%	0.54Ω ±5%
2	U-W	0.63Ω ±5%	0.88Ω ±5%	0.54Ω ±5%	0.54Ω ±5%
3	V-W	0.63Ω ±5%	0.88Ω ±5%	0.54Ω ±5%	0.54Ω ±5%
4	U-PE	>10MΩ	>10MΩ	>10MΩ	>10MΩ
5	V-PE	>10MΩ	>10MΩ	>10MΩ	>10MΩ
6	W-PE	>10MΩ	>10MΩ	>10MΩ	>10MΩ

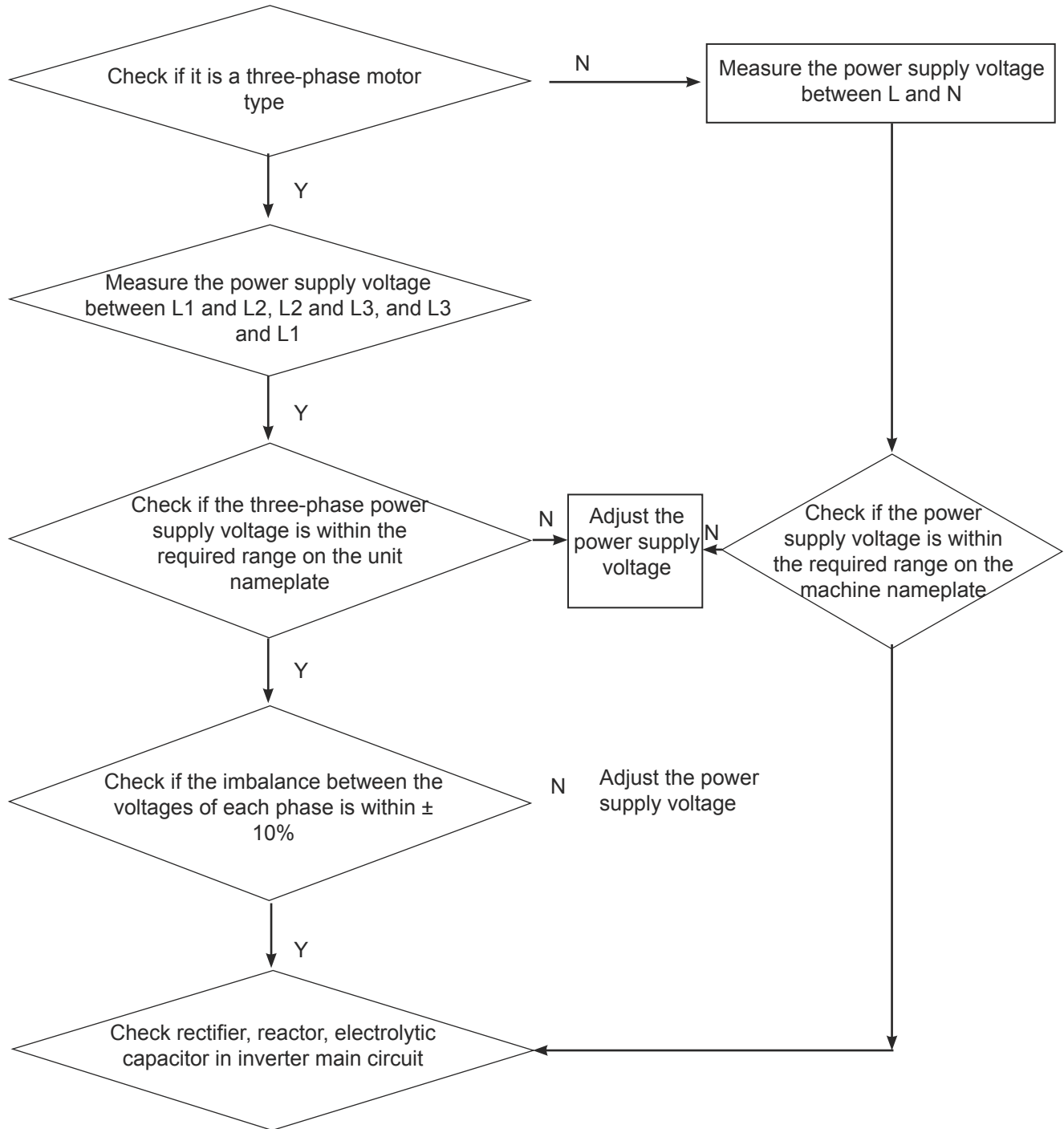
[87] Defrosting with Over Low Water Temperature



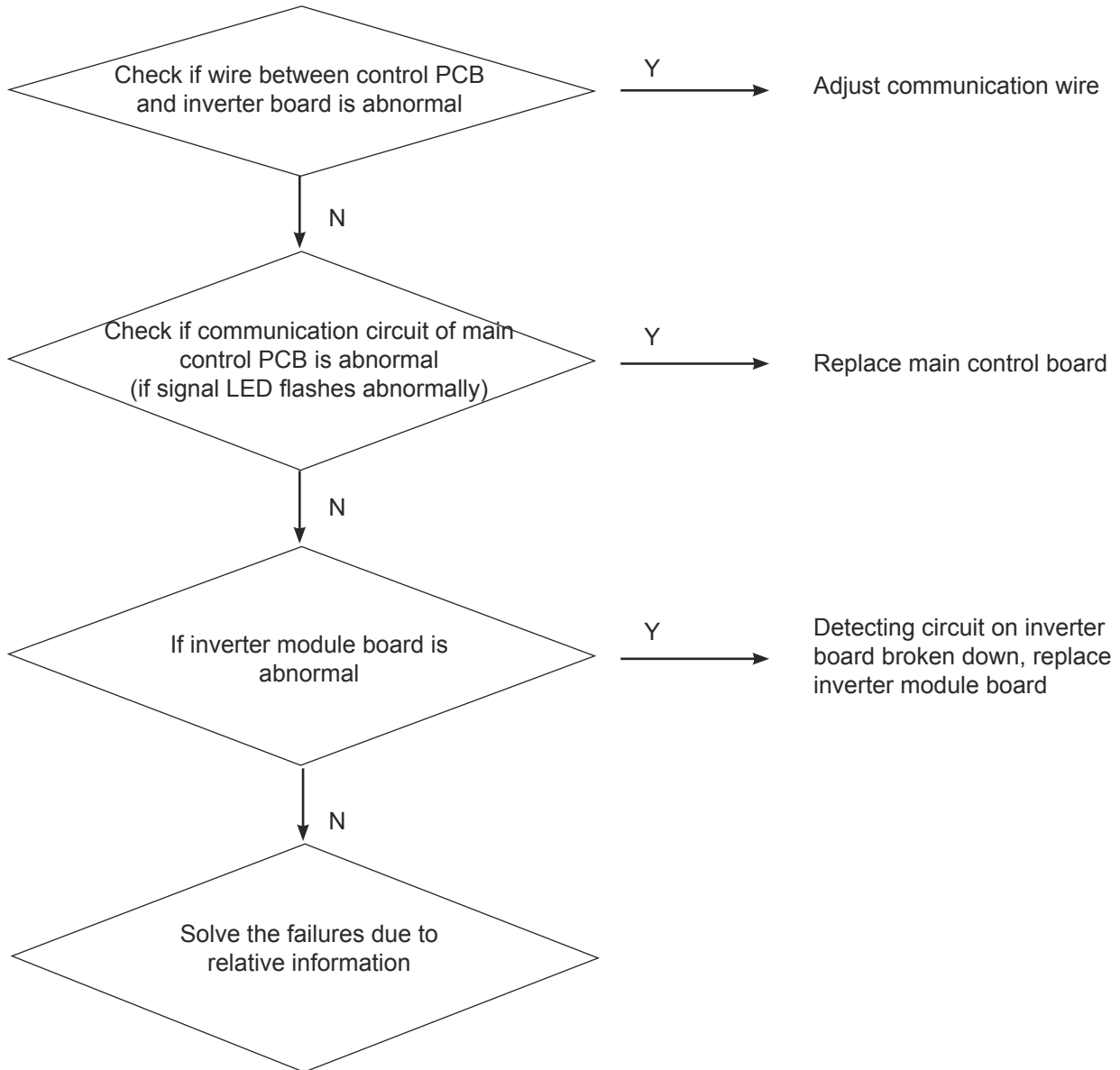
[111] Compressor Loss of Synchronism
[118] Compressor Start-up Abnormality



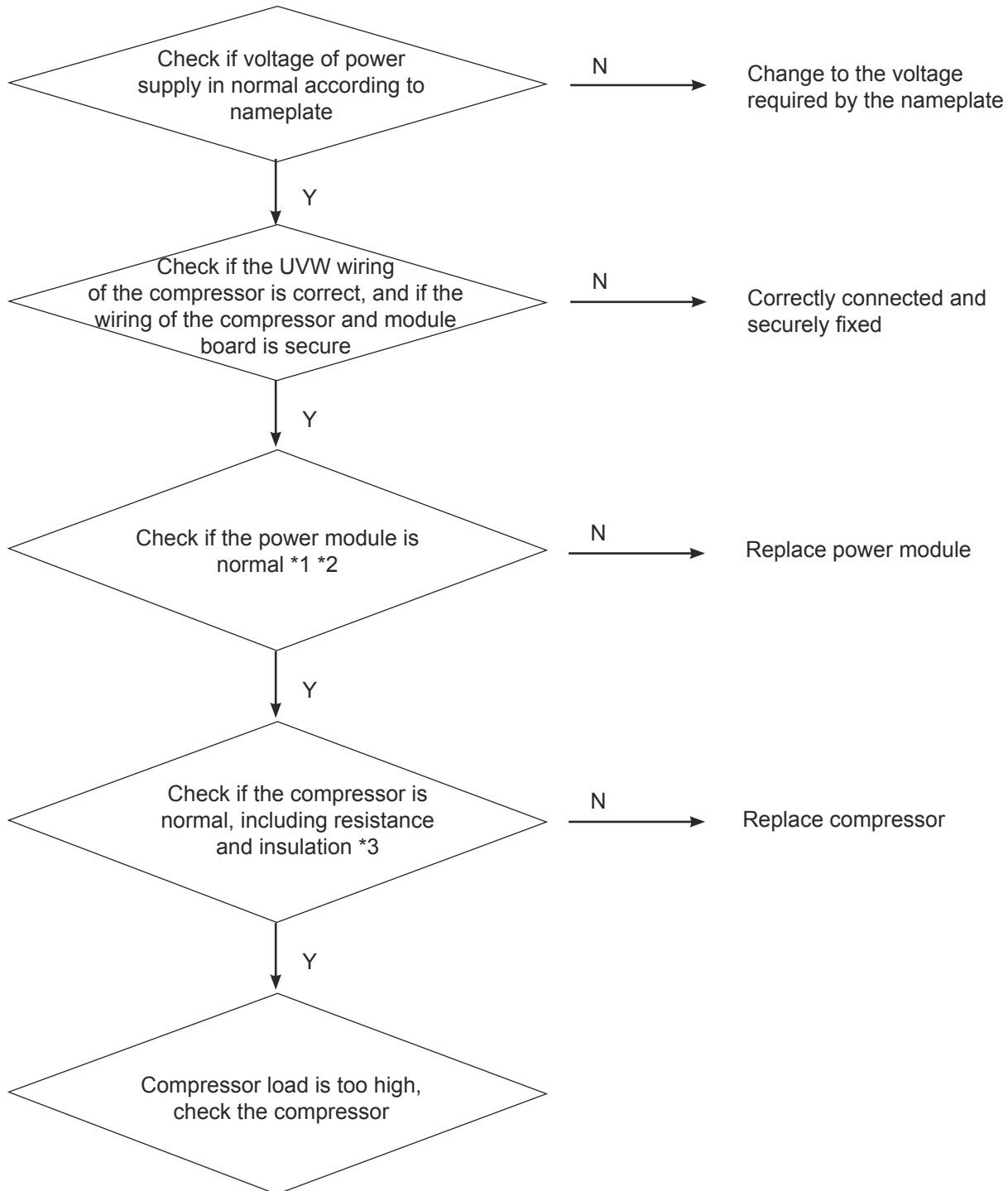
[114] The input power supply voltage of the inverter is abnormal



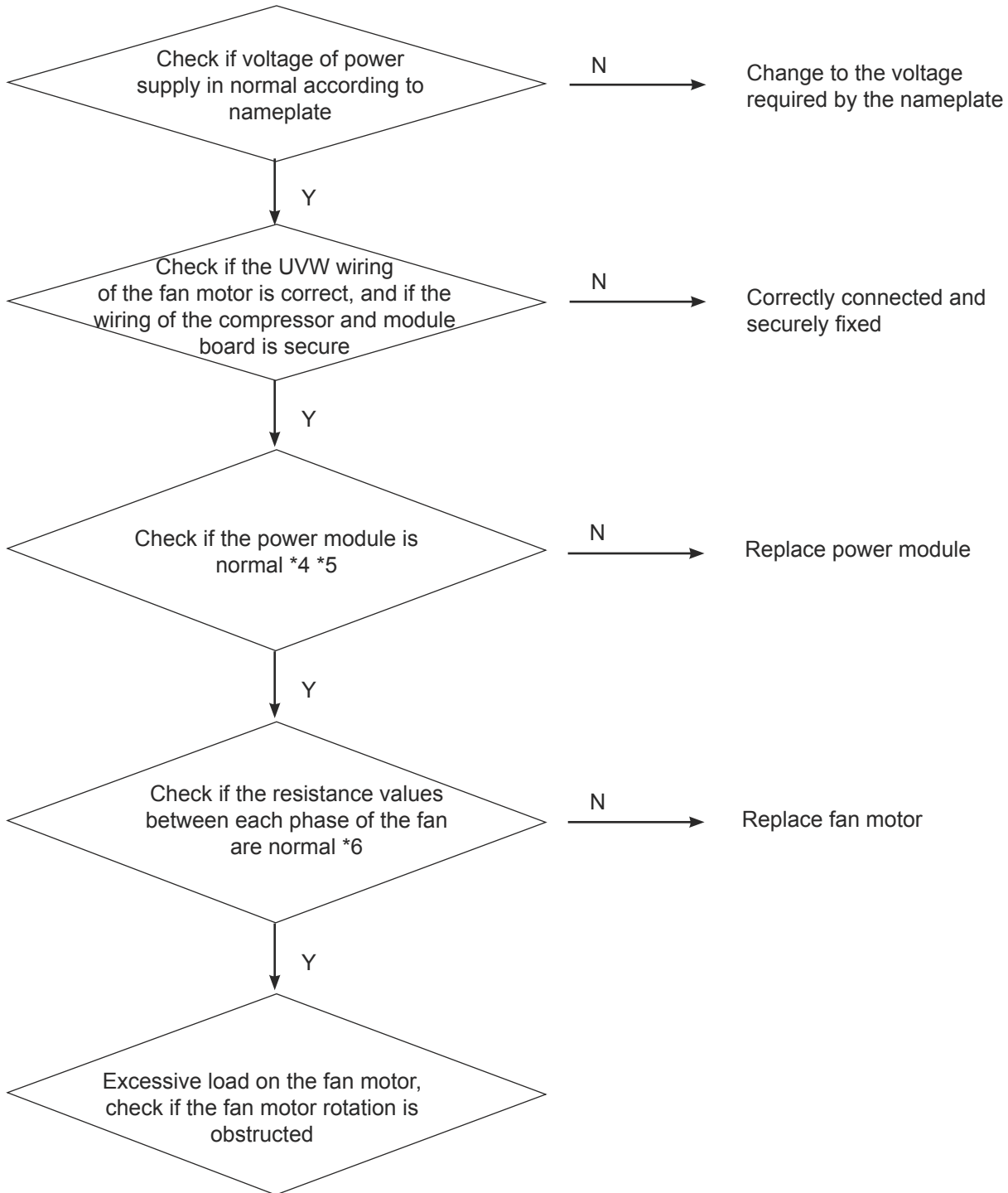
[116] Communication Error between Compressor Driver PCB and Main PCB



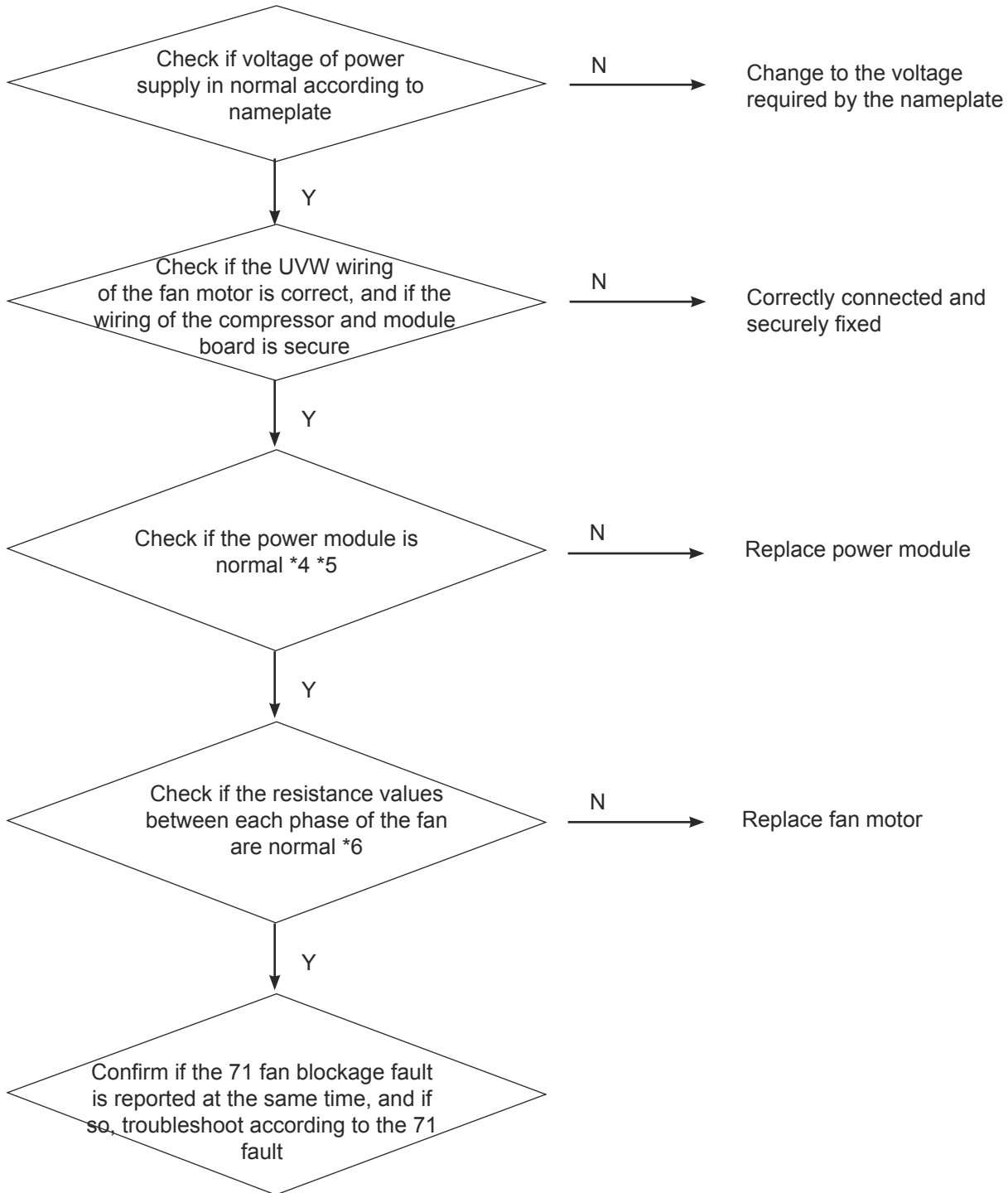
[117] Compressor Software Overcurrent
[118] Compressor Startup Failed



[117-4] Fan motor module software overcurrent



[118-4] Fan startup failed



*4 Wiring terminals for different models of module boards

Model	PCB	Connector
AW042/062MUGHA	0150406832BA	CN12
AW082/102MUGHA	0150406834DA	CN12
AW122/142MXGHA	0150406834BA	DCFAN1
AW162MXGHA	0150411653	CN12
AW10NMUGHA	0150405099AC	CN76
AW12N/14NMXGHA	0150405099AD	CN76
AW16NMXGHA	0150405099AE	CN76

*5 . Resistance measuring points and judgment criteria



AW042/062MUGHA



AW082/102MUGHA



AW122/142MXGHA



AW162MXGHA



AW10NMUGHA AW12N/14/16NMXGHA

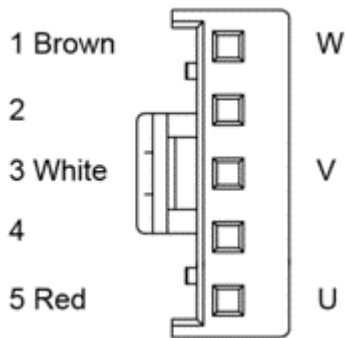
Note: Measure the resistance of U, V, and W separately for P and N. If any one of them is short circuited, it can be determined that the module is damaged

*6 Resistance measuring points and judgment criteria

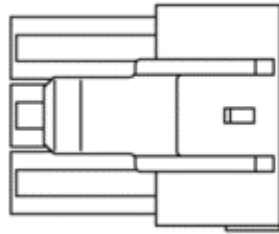
No.	Measuring point	Criteria(0150401754B) AW042/062/082/102MUGHA AW10NMUGHA	Criteria(0150406790) AW122/142/162MXGHA AW12N/14/162NMUGHA
1	U-V	16-21Ω	3.5-6Ω
2	U-W	16-21Ω	3.5-6Ω
3	V-W	16-21Ω	3.5-6Ω

0150401754B The resistance values of each two phases are within the range of the resistance values in the table above, and the deviation between the resistance values of each pair cannot exceed 1 Ω

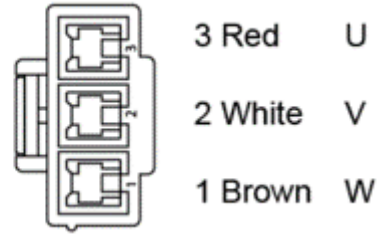
0150406790 The resistance values of each two phases are within the range of the resistance values in the table above, and the deviation between the resistance values of each pair cannot exceed 0.5 Ω



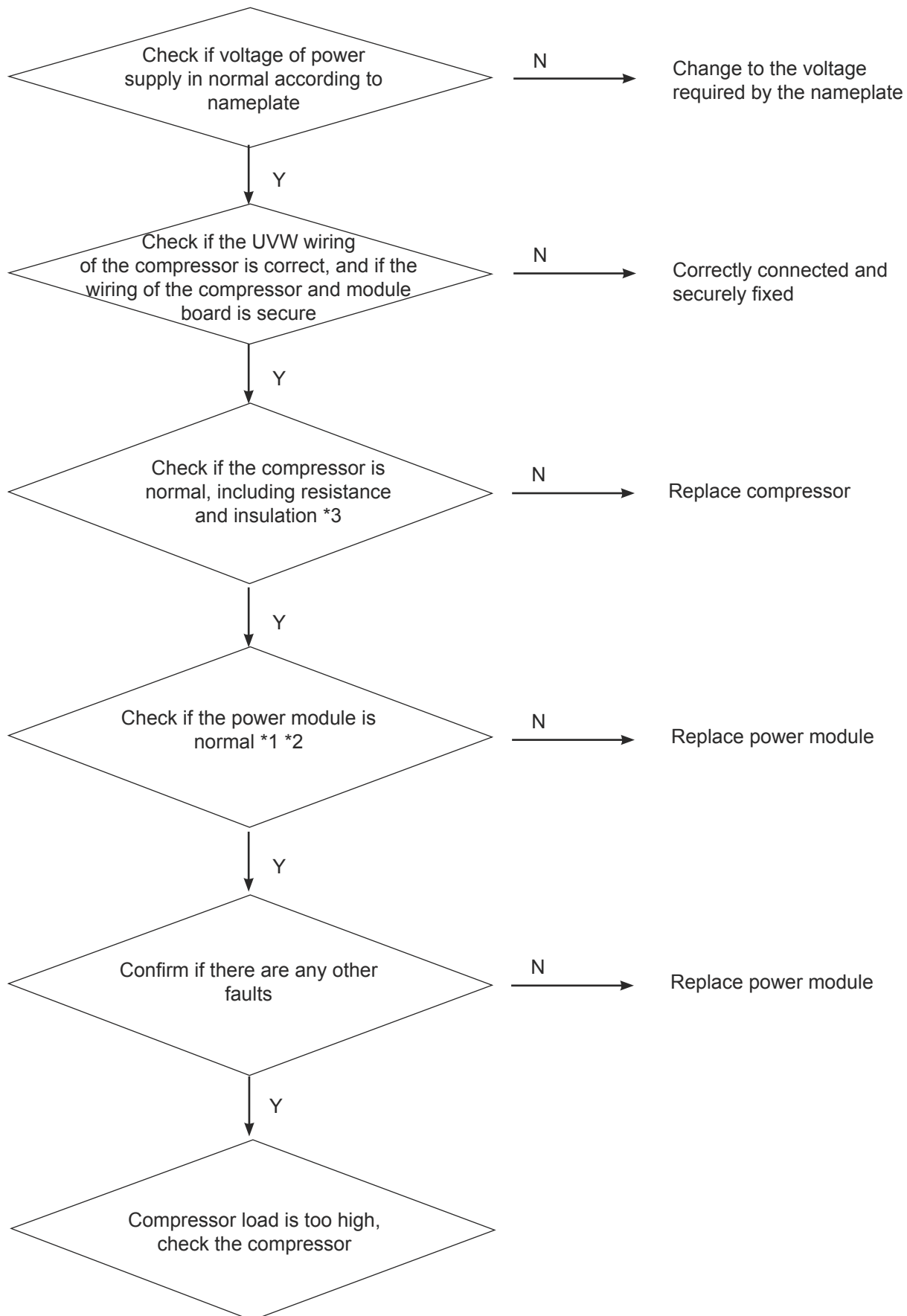
AW042/062/082/102MUGHA
 AW10NMUGHA



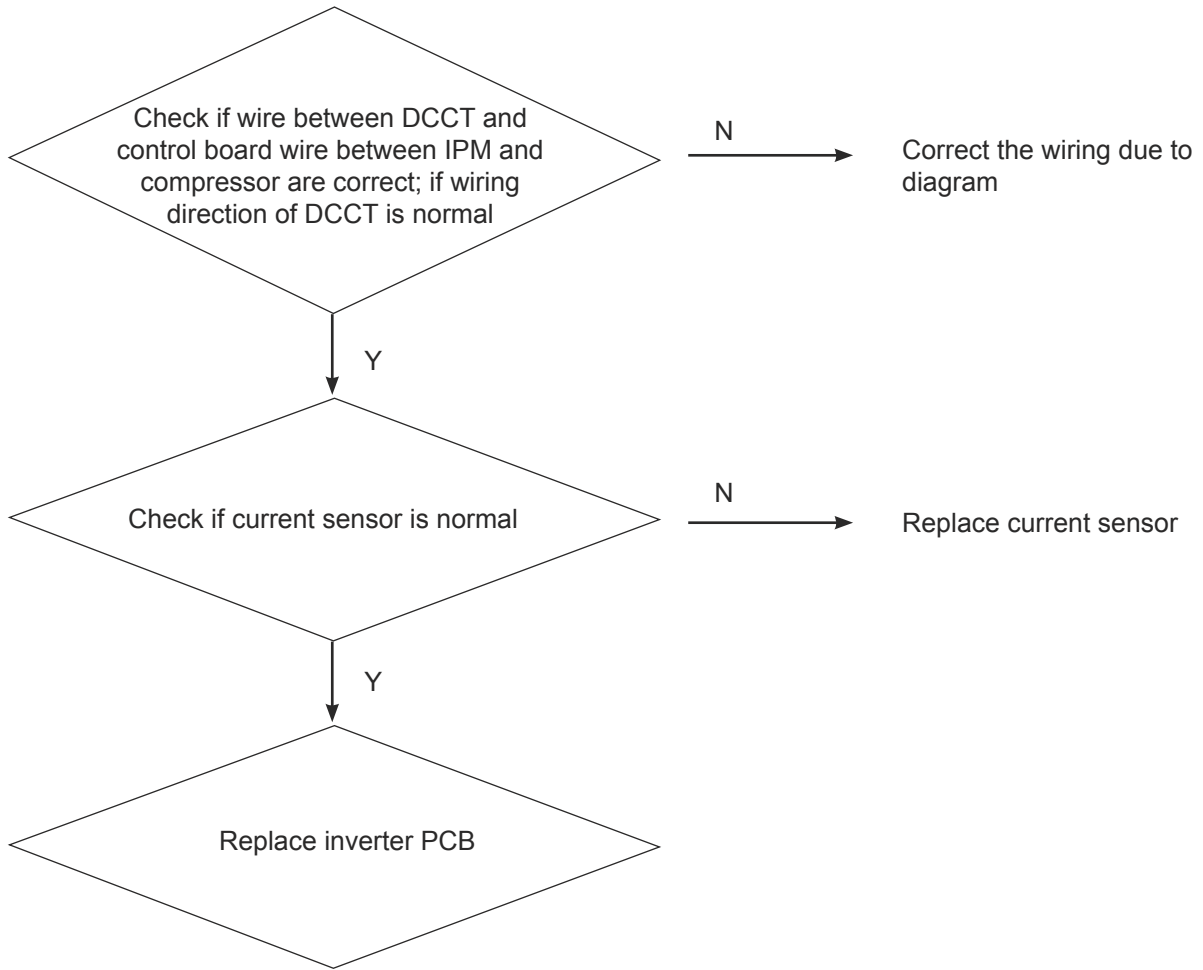
AW122/142/162MXGHA
 AW12N/14/162NMUGHA



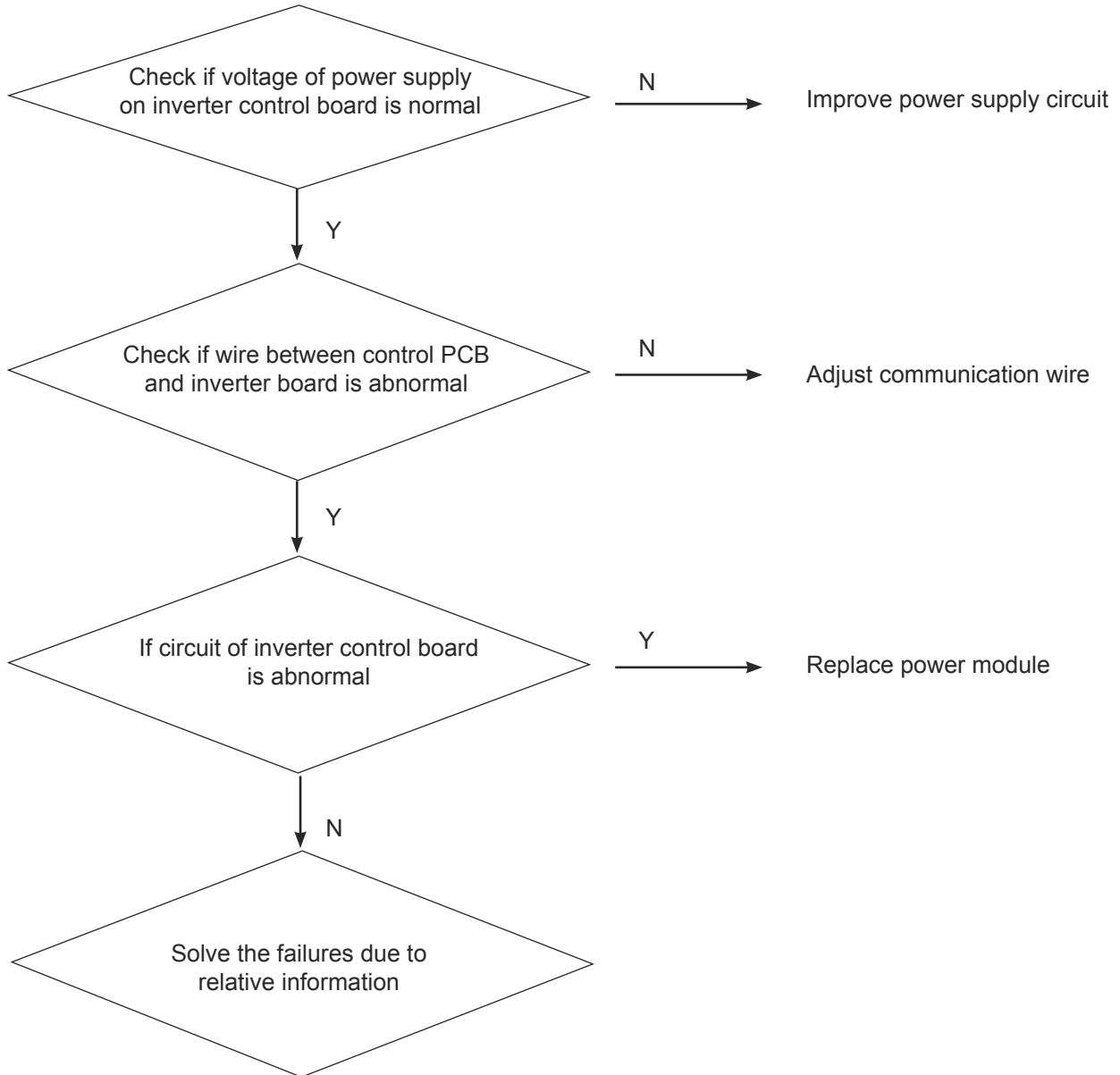
[119] Compressor Driver PCB Current Detect Circuit Abnormality



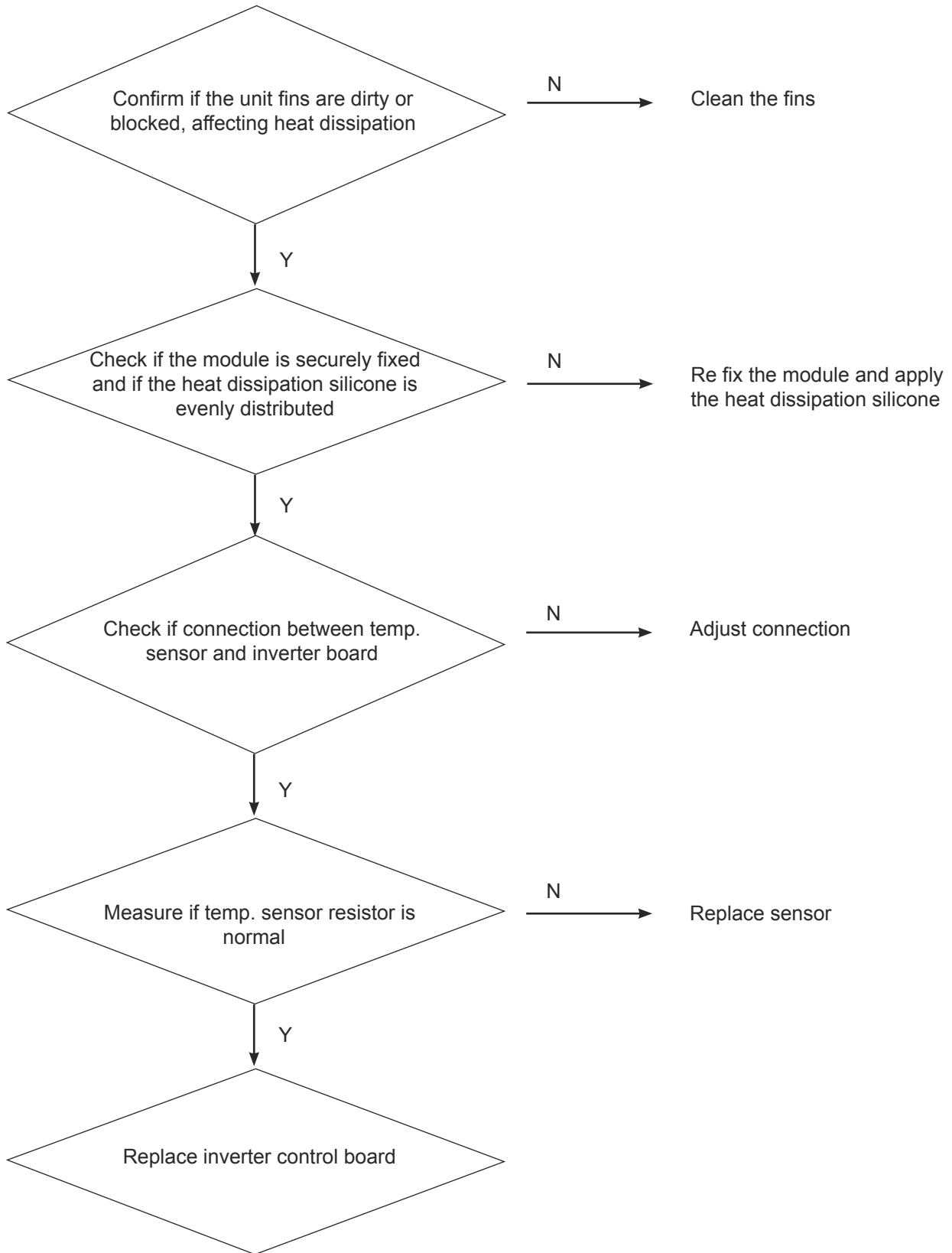
[119] Compressor Driver PCB Current Detect Circuit Abnormality



[121] Compressor Control Board Power Supply Abnormality



[122] Compressor Driver PCB Heat Sink Temperature Sensor Abnormality



8. Modbus

Communication data format

1. Standard modbus communication protocol format, baud rate 9600bps, single-character data format (10bit in total, no check, b0 first)

START	b0	b1	b2	b3	b4	b5	b6	b7	STOP
Start bit	Data bit								Stop bit

2. Definition of data frame format:

(1) Status query instruction -03 (hexadecimal)

The main device sends instructions	The sub device answer instruction
Sub device address	Sub device address
Function code 03	Function code 03
Register start address H	Byte number
Register start address L	Register 1 data H
Number of registers H	Register 1 data L
Number of registers L
CRC (lowbyte)	Register n data H
CRC (highbyte)	Register n data L
	CRC (low byte)
	CRC (high byte)

(2) Single state setting instruction -06 (hexadecimal)

The main device sends instructions	The sub device answer instruction
Sub device address	Sub device address
Function code 06	Function code 06
Register address H	Register address H
Register address L	Register address L
Register data H	Register data H
Register data L	Register data L
CRC (low byte)	CRC (low byte)
CRC (high byte)	CRC (high byte)

(3) Multiple status-setting instruction -0x10 (hexadecimal)

The main device sends instructions	The sub device answer instruction
Sub device address	Sub device address
Function code 0x10	Function code 0x10
Register start address H	Register start address H
Register start address L	Register start address L
Number of registers H	Number of registers H
Number of registers L	Number of registers L
Byte number	CRC (low byte)
Register 1 data H	CRC (high byte)
Register 1 data L	
.....	
Register n data H	
Register n data L	
CRC (low byte)	
CRC (high byte)	

3. The device address is 1-32 (test program default address 1)

4. CRC check: Cyclic redundancy check (data starting from the device address), using polynomial $x^{16} + x^{15} + x^2 + 1$ reverse check, that is, 0xA001.

5. Use 03H function code for query, 06H and 10H function code for control.

Note: In order to avoid data detection errors caused by excessively long frame length, the total length of data frame in query, setting and response is controlled within 50 words

Communication point table content

	Register Address	Function	Description	Read/Write	Range
Control Parameter	40001	On-off state	0- Off 1-On	W	
	40002	Mode Setting	0- Auto, 1- cooling, 2- heating, 3- DHW, 4- pool, 5- heating + pool, 6- Auto + DHW, 7- cooling + DHW, 8- heating + DHW	W	
	40003	Temperature setting of ZONE1	0-80°C (unit: 0.5 °C)	W	0--160,32 means 16 °C
	40004	Temperature setting of ZONE2	0-80 °C (unit: 0.5 °C)	W	0--160,32 means 16 °C
	40005	DHW temperature setting	0-80 °C (unit: 0.5 °C)	W	50--150,32 means 16 °C
	40006	Pool temperature setting	0-80 °C (unit: 0.5 °C)	W	40--60,32 means 16 °C
	40009	Fast DHW function	0- No 1- Yes	W	

	Register Address	Function	Description	Read/Write	Range
Control Parameter	40013	Use of backup heating source	0-HU electrical heater	W	
			1-Auxiliary heating source gas boiler		
			2-HU electrical heater and auxiliary heating source gas boiler		
	40014	HU anti-freezing function	0- Off 1-On	W	
	40015	Temperature of HU starting anti-freezing	0~15°C , Accuracy 1°C	W	
	40016	Buffer tank	0- No 1- Yes	W	
	40017	DHW priority control	0- Off 1-On	W	
	40018	Zone1 Floor drying	0- Off 1-On	W	
	40019	Zone2 Floor drying	0- Off 1-On	W	
	40020	Rust-proof operation	0- Off 1-On	W	
	40021	Set forced defrosting for outdoor unit	0- No 1- Yes	W	
	40022	Allow ZONE 2 cooling	0- No 1-Yes	W	
	40045	Compressor load control	0-100% step size 1 0 control function disabled (default value) 1-9 Compressor stops 10-100 normal control 3 minutes without any updates, restore 0 control function disabled	W	
Query Parameter	40101	On-off state	0- Off 1-On	R	
	40102	Setting Mode	0- Auto, 1- Cooling, 2- Heating, 3- DHW, 4- Pool, 5- Heating + Pool, 6- Auto + DHW, 7- Cooling + DHW, 8- Heating + DHW	R	
	40103	Temperature setting of ZONE1	0-80°C (unit: 0.5 °C)	R	0--160, 32 means 16 °C
	40104	ZONE1 control ways selection	0- Main and sub controllers (water temperature)	R	
			1- External third party controller (water temperature)		
			2- Room air temperature		
	40105	Temperature setting of ZONE 2	0-80°C (unit: 0.5 °C)	R	0--160, 32 means 16 °C
	40106	ZONE 2 control mode selection	0- Main and sub controllers (water temperature)	R	
			1- External third party controller (water temperature)		
			2- Room air temperature		
	40107	DHW temperature setting	0-80 °C (unit: 0.5 °C)	R	50--150, 32 means 16 °C
	40108	Pool temperature setting	0-80 °C (unit: 0.5 °C)	R	40--60, 32 means 16 °C
	40111	Fast DHW function	0- No 1- Yes	R	
	40115	Use of backup heating source	0-HU electrical heater	R	
			1-Auxiliary heating source gas boiler		
2-HU electrical heater and auxiliary heating source gas boiler					
40116	Whether Zone 1 exists	0- No 1- Yes	R		
40117	Whether Zone 2 exists	0- No 1- Yes	R		
40118	Whether DHW exists	0- No 1- Yes	R		
40119	Whether Pool exists	0- No 1- Yes	R		
40120	HU anti-freezing function	0- Off 1-On	R		

	Register Address	Function	Description	Read/Write	Range
Query Parameter	40121	Temperature of HU starting anti-freezing	0~15℃ , Accuracy 1℃	R	
	40123	DHW priority control	0- Off 1-On	R	
	40124	ZONE 1 Floor drying	0- Off 1-On	R	
	40125	ZONE 2 Floor drying	0- Off 1-On	R	
	40126	Rust-proof operation	0- Off 1-On	R	
	40127	Set forced defrosting for outdoor unit	0- No 1- Yes	R	
	40128	ZONE 2 cooling	0- Off 1-On	R	
	40130	Whether solar exists	0- No 1- Yes	R	
	40131	Tank sterilization operation status	0- No 1- Yes	R	
	40132	ZONE1 Pump (pump1) output	0- Off 1-On	R	
	40133	ZONE2 Pump (pump2) output	0- Off 1-On	R	
	40134	Pump in front of pool heat exchanger (pump3) output	0- Off 1-On	R	
	40135	Pump behind of pool heat exchanger (pump4) output function	0- Off 1-On	R	
	40136	Solar thermal pump output	0- Off 1-On	R	
	40137	Gas boiler output	0- Off 1-On	R	
	40138	Tank electric heater output	0- Off 1-On	R	
	40139	Outdoor unit defrosting operation	0- No 1- Yes	R	
	40140	Outdoor unit operation mode	0- Off 1- Cooling 2- Heating	R	
	40141	Outdoor unit ambient temperature	Unit 0.1 ℃	R	
	40142	Temperature of Tai_1 in ZONE1	Unit 0.1 ℃	R	
	40143	Temperature of Twz-1 after the water pump 1	Unit 0.1 ℃	R	
	40145	ZONE2 Temperature of Twz-2 after water pump 2	Unit 0.1 ℃	R	
	40147	DHW tank T_tank temperature	Unit 0.1 ℃	R	
	40148	Water temperature after the pool water pump	Unit 0.1 ℃	R	
40149	Water temperature of swimming pool	Unit 0.1 ℃	R		
40150	Water temperature of the solar thermal system	Unit 0.1 ℃	R		
40151	Inlet temperature of the HU Twi	Unit 0.1 ℃	R		
40152	Outlet temperature of the HU Two	Unit 0.1 ℃	R		

	Register Address	Function	Description	Read/Write	Range
Query Parameter	40153	Current operating mode	0- Auto	R	
			1-Cooling		
			2- Heating		
			3- DHW		
			4- Pool		
	5- Heating + pool				
	40157	High pressure value	Unit: 0.01bar Sent value = actual value *100,16 integer	R	
	40158	Low pressure value	Unit: 0.01bar Sent value = actual value *100,16 integer	R	
	40159	Compressor frequency	Unit: 0.1hz. Sent value = actual value x 10,16 integer	R	
	40160	Speed of fan	Unit :1RPM	R	
	40161	Compressor discharge temperature	Unit 0.1 °C	R	
	40162	Compressor suction temperature	Unit 0.1 °C	R	
	40163	IPM temperature	Unit 0.1 °C	R	
	40164	Thi sensor	Unit 0.1 °C	R	
	40165	Tho sensor	Unit 0.1 °C	R	
	40191	Water flow volume	Unit 0.1 L/min	R	
	40192	Water pressure	Accuracy 0.1bar	R	
	40193	Compressor current	Accuracy 0.1A	R	
	40194	Whole machine input current	Accuracy 0.1A	R	
	40195	Electric power,16 digits high	Accuracy 1W	R	
	40196	Electric power,16 digits low		R	
	40197	heat power,16 digits high	Accuracy 1W	R	
40198	heat power,16 digits low	R			
40199	Compressor load control	0-100% step size 1 0 Control Function Off (Default) 1-9 Compressor stops 10-100 normal control	R		
40204	Current fault subcode	Current outdoor unit fault subcode	R		
40205	Current fault code	Current outdoor unit fault code	R		

Note:Subcode is the error code suffix, for example: 39-1,1 is the subcode.

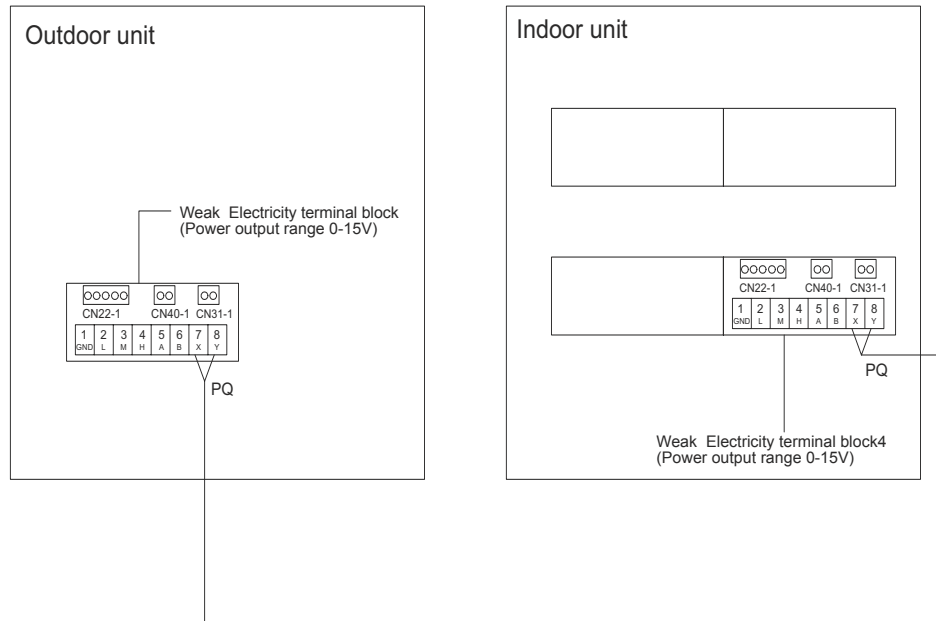
ZONE setting logic

Set ZONE1 and ZONE2 based on register 40104/40106 query data			
ZONE1/ ZONE2 Control Mode Selection	Setting Mode	Temperature Setting of ZONE1/ ZONE2	Note
0- Main and sub controllers (Water temperature control)	0- Auto	The water temperature ranges from 5°C to 80°C . The default temperature is 25°C	Temperature Settings, R/W Turn on and turn off, R/W
	1- Cooling	The water temperature ranges from 5°C to 25°C . The default temperature is 25°C	
	2- Heating	The water temperature ranges from 25°C to 80°C . The default temperature is 25°C	
	5- Heating + pool	The water temperature ranges from 25°C to 80°C . The default temperature is 25°C	
	6- Auto + DHW	The water temperature ranges from 5°C to 60°C . The default temperature is 25°C	
	7- Cooling+ DHW	The water temperature ranges from 5°C to 25°C . The default temperature is 25°C	
	8- Heating+ DHW	The water temperature ranges from 25°C to 80°C . The default temperature is 25°C	
1- External third-party controller (Water temperature control)	0- Auto	The water temperature ranges from 5°C to 80°C . The default temperature is 25°C	Temperature Settings, R/W Turn on and turn off, W
	1- Cooling	The water temperature ranges from 5°C to 25°C . The default temperature is 25°C	
	2- Heating	The water temperature ranges from 25°C to 80°C . The default temperature is 25°C	
	5- Heating + pool	The water temperature ranges from 25°C to 80°C . The default temperature is 25°C	
	6- Auto + DHW	The water temperature ranges from 5°C to 80°C . The default temperature is 25°C	
	7- Cooling+ DHW	The water temperature ranges from 5°C to 25°C . The default temperature is 25°C	
	8- Heating + DHW	The water temperature ranges from 25°C to 80°C . The default temperature is 25°C	
2- Ambient temperature control	All modes	The ambient temperature ranges from 16°C to 30°C . The default value is 24°C	Temperature Settings, R/W Turn on and turn off, R/W

9. Appendix 1

9.1 Wiring diagram of communication and power cables

Communication cable connection between IDU and ODU (IDU refers to ATW-A03N)

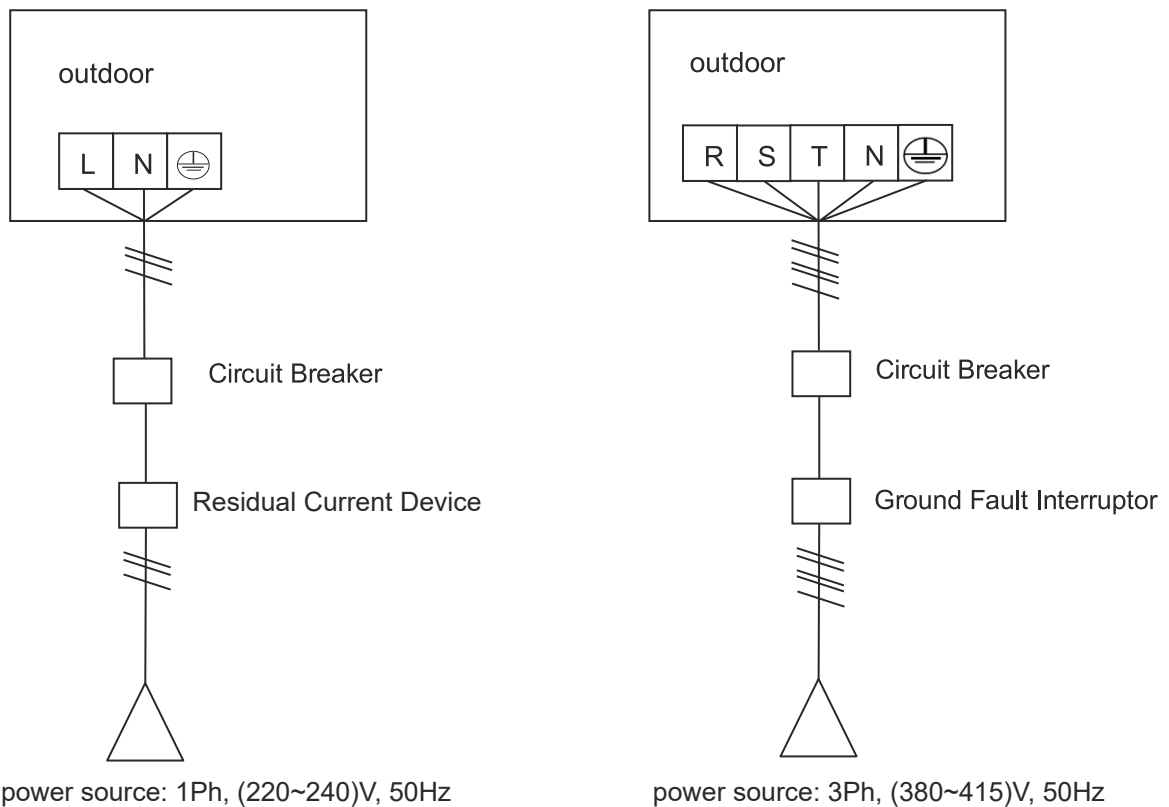


Communication wire to ATW-A03

Length of Signal Line (m)	Wiring Dimensions
≤1000	0.75mm ² × 2 core shielding line

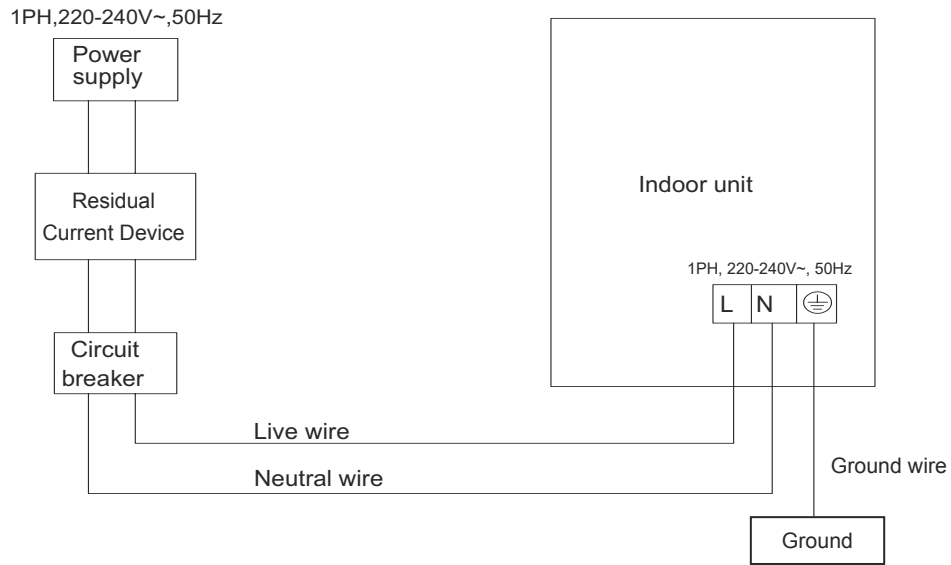
- The shielding lay of the signal line must be grounded at two side.

Connection of ODU power supply cable

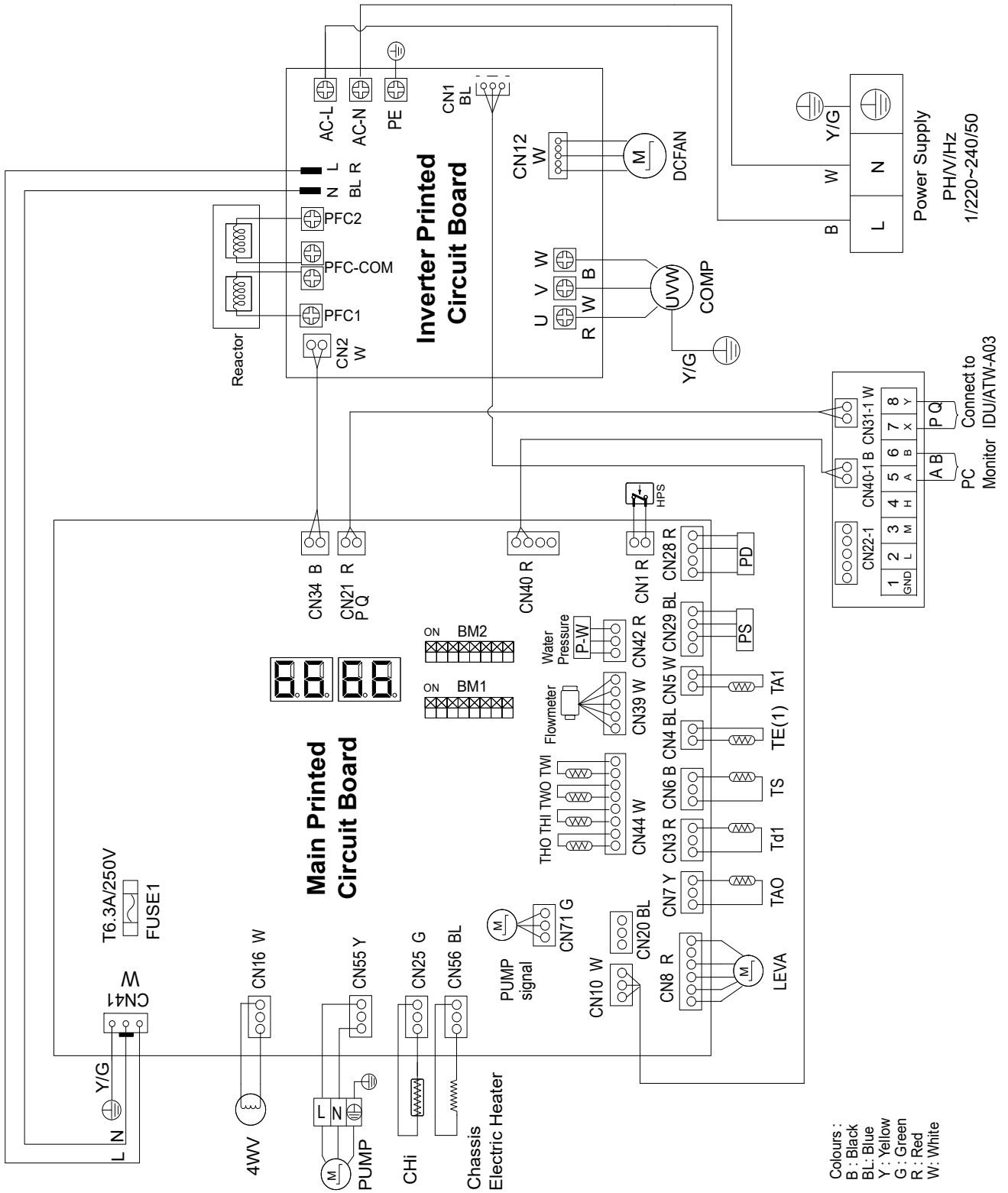


Connection of IDU power supply cable

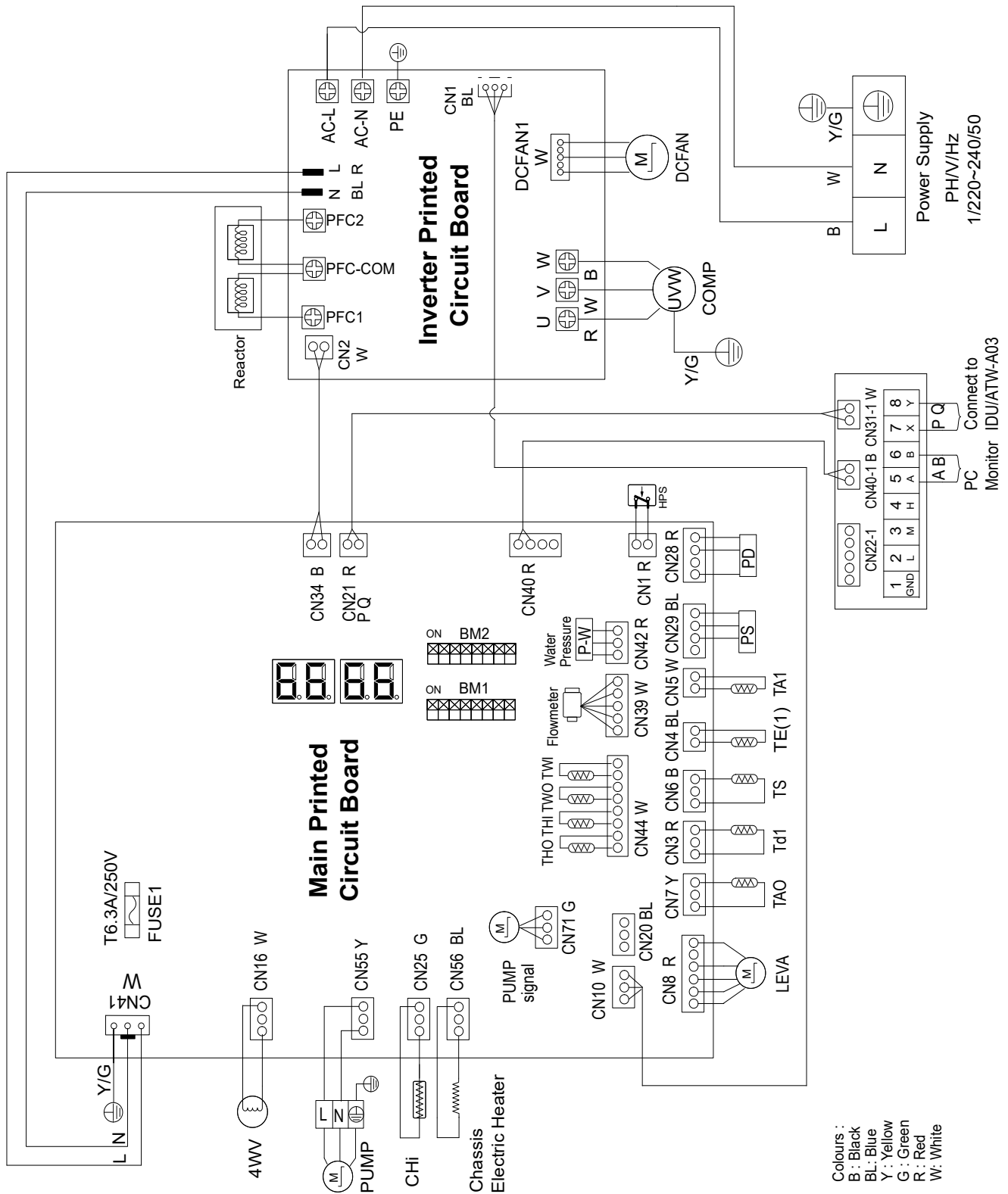
Wiring instructions



AW082MUGHA AW102MUGHA AW162MXGHA



AW122MXGHA AW142MXGHA

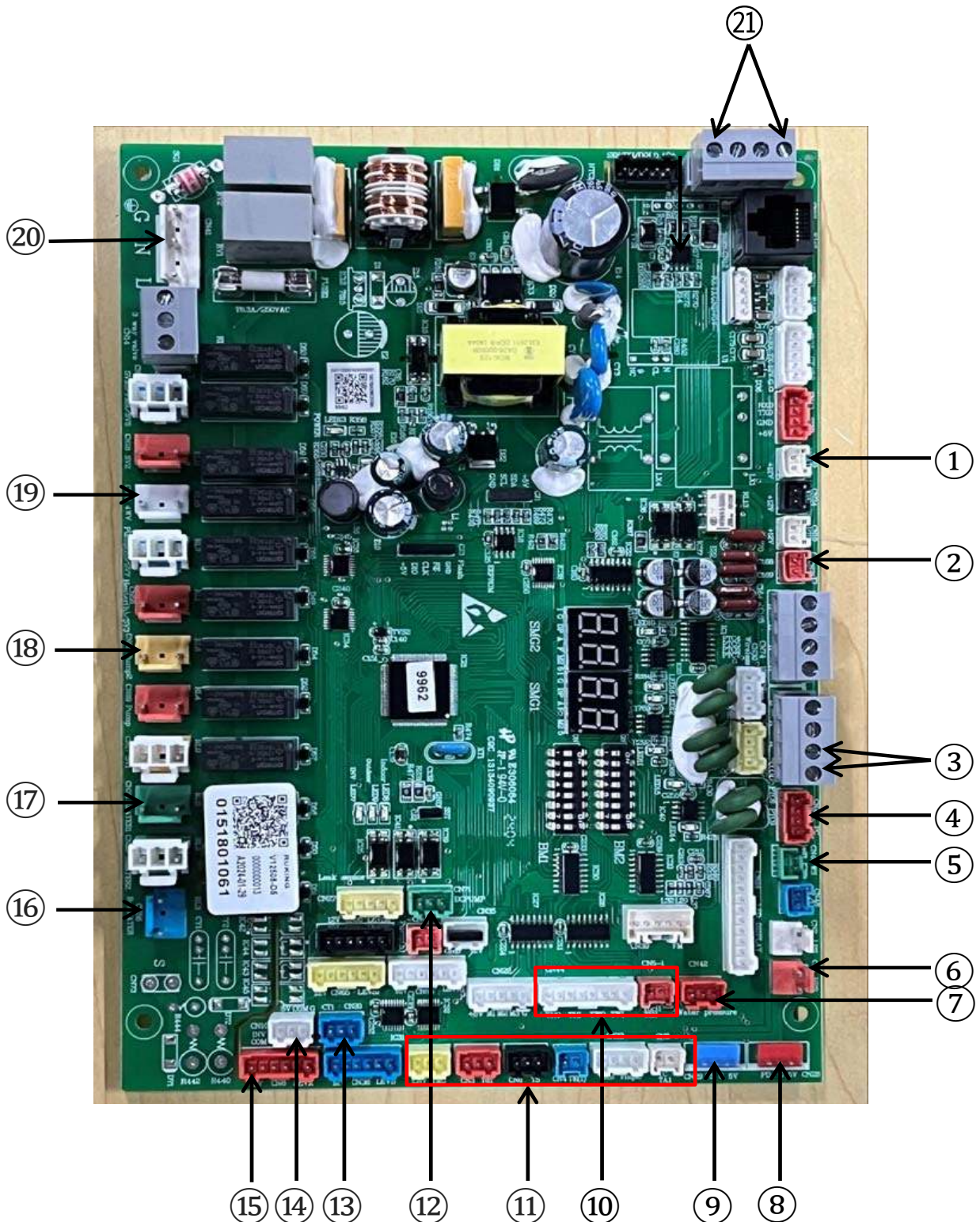


Port	Port Definition	Function Description
CN1	HPS	High Pressure Switch
CN3	Td1	Compressor Discharge Sensor
CN4	Te(1)	Defrost Detection Sensor
CN5	Ta1	Internal Temperature Sensor of Electric Control Box
CN6	Ts	Compressor Suction Sensor
CN7	Tao	Ambient Temperature Sensor
CN8	LEVA	Electronic Expansion Valve Control
CN10	INV-COM	INV Module Communication Port\C7(Single Phase Unit)
CN16	4WV	Four Way Valve
CN20	CT1	Input Current Detection(Three Phase Unit)
CN21	PQ	Internal and External Communication Wires
CN25	HEATER1	Compressor Crankcase Heater
CN28	Pd	High Pressure Sensor
CN29	Pd	Low Pressure Sensor
CN34	low-power consumption	Low-Power Consumption\C7(Single Phase Unit)
CN39	FM	Flowmeter
CN40	PC A/B	PC Communication Interface
CN41	Power Input	220V/50Hz Input
CN42	Wateroutlet	Water Pressure Sensor
CN44	Two	Water Outlet Sensor of Plate Heat Exchanger
	Twi	Water Inlet Sensor of Plate Heat Exchanger
	Thi	Liquid Tube of Plate Heat Exchanger
	Tho	Gas Tube of Plate Heat Exchanger
CN55	Pump2	Built-in Water Pump Power
CN56	B-HEATER	Anti-Freezing Electric Heater of Chassis
CN71	DCPUMP	Built-in Water Pump Control Signal
CN76	DCFAN	Fan power output

9.3 PCB Photos

AW042MUGHA AW062MUGHA AW082MUGHA AW102MUGHA
AW122MXGHA AW142MXGHA AW162MXGHA

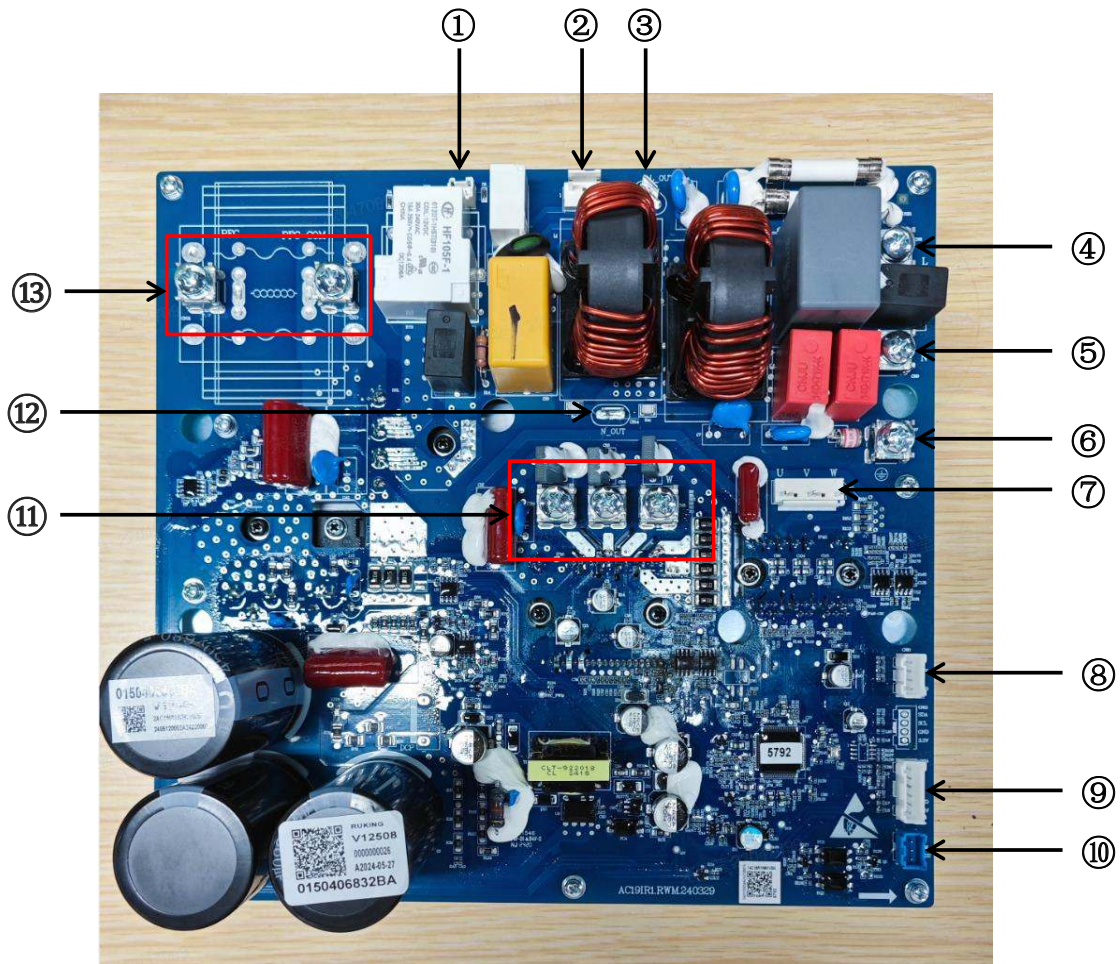
Main PCB Code: 0151801061




No.	Port No.	Silk No.	Full Name Description
1	CN9	HEATER1	Electric Heater Control
2	CN21	Q P	Indoor & Outdoor Units Communication
3	CN31	A B	PC Monitor(Reserved)
4	CN40	PC	PC Monitor
5	CN46	WS	FlowMeter
6	CN1	HPS	High Pressure Switch
7	CN42	Water Pressure	Water Pressure Sensor
8	CN28	PD	High Pressure Sensor
9	CN29	PS	Low Pressure Sensor
10	CN44 CN5-1	THO THI TWO TWI Toci1/TE2	Temperature Sensor
11	CN7 CN3 CN6 CN4 CN23 CN5	TA0 Td1 TS TE (1) Tsc0 Tliqsc TC/TA1	Temperature Sensor
12	CN71	DCPUMP	DC Water Pump Control Signal
13	CN20	CT1	CT PCB
14	CN10	INV COM	Inverter Communication
15	CN8	LEVA	Electronic Expansion Valve
16	CN56	B-HEATER	Chasis Heater
17	CN25	HEATER1	Crankcase Heater
18	CN55	Pump2	DC Water Pump Power Supply
19	CN16	4WV	Four Way Valve
20	CN41	G N L	Power Supply
21	CN32	WIFI/CANDY	Wi-Fi

AW042MUGHA AW062MUGHA

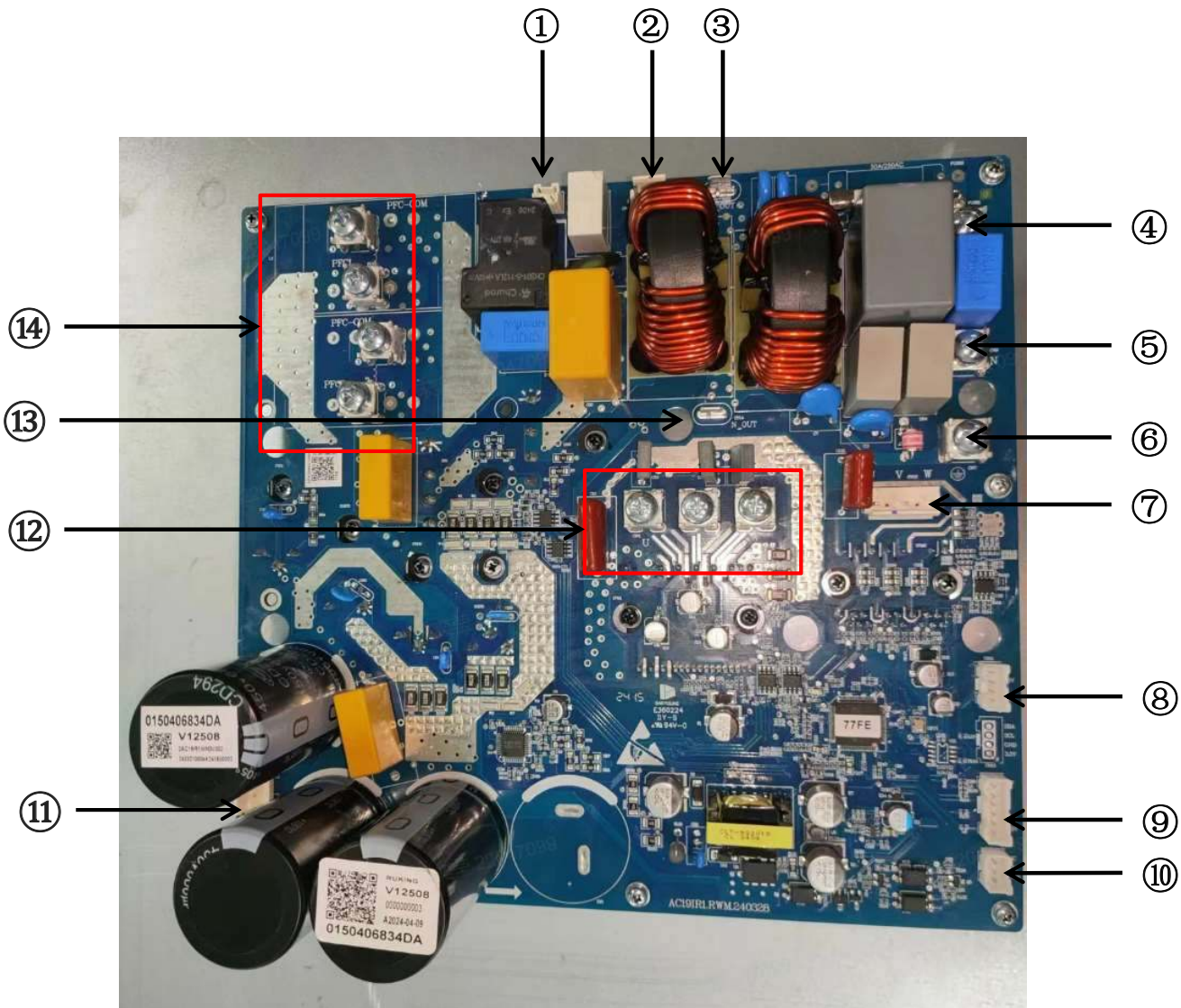
Inverter PCB Code: 0150406832BA




No.	Port No.	Silk No.	Full Name Description
1	CN2	/	12V Standby
2	CN3	/	Jump Wire (Reserved for Standby Function)
3	CN15	L_OUT	L Power Supply
4	CN8	L	L Power Input
5	CN9	N	N Power Input
6	CN7		Earthing Input
7	CN12	U V W	Fan Motor Input
8	CN11	/	Chip Pgoramming
9	CN10	/	Test Monitoring
10	CN1	/	Main PCB Communication
11	CN4 CN5 CN6	U V W	Compressor Output
12	CN14	N_OUT	N Power Supply
13	CN18 CN17	PFC PFC-COM	External Inductance

AW082MUGHA AW102MUGHA

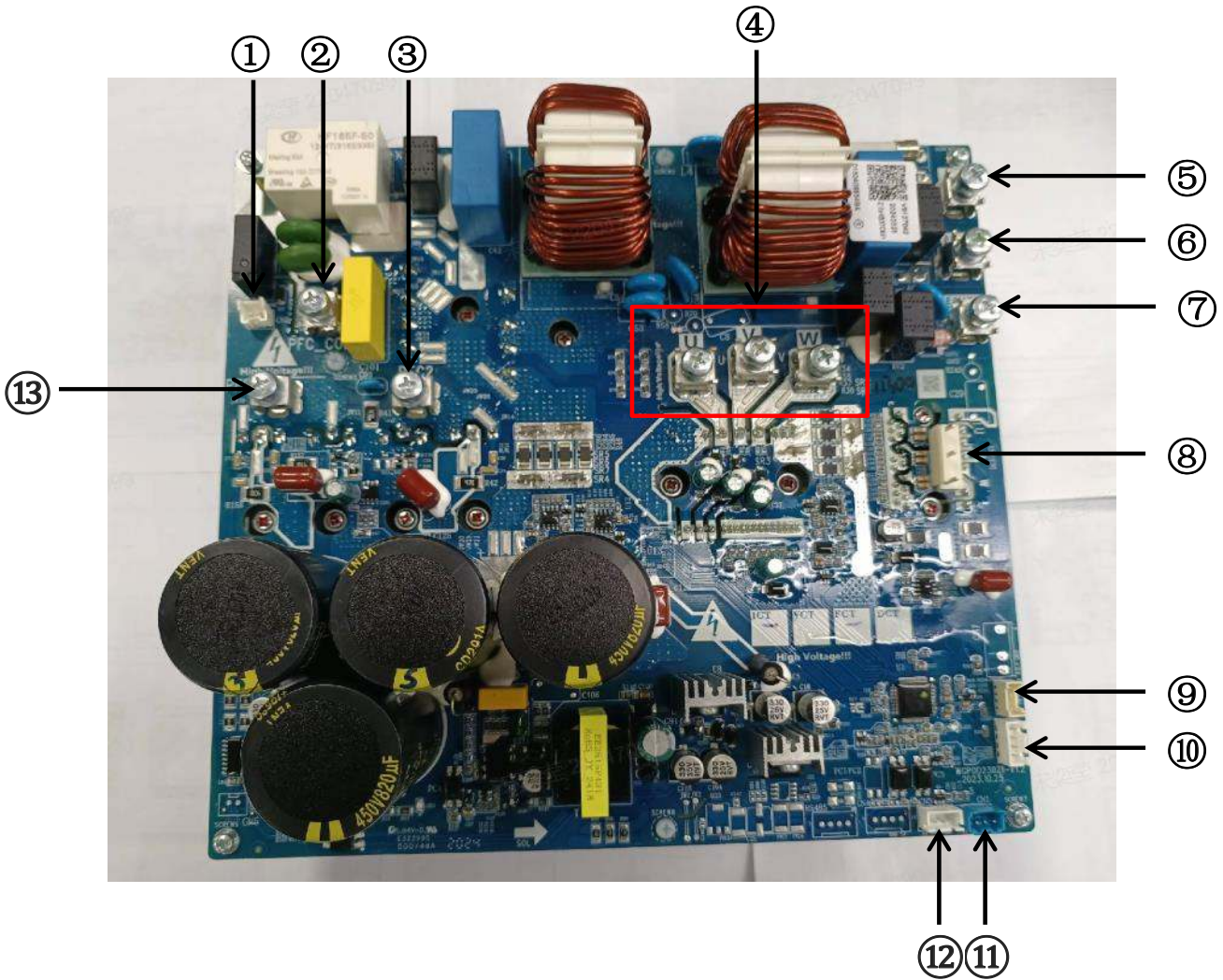
Inverter PCB Code: 0150406834DA



No.	Port No.	Silk No.	Full Name Description
1	CN8	/	12V Standby
2	CN3	/	Jump Wire (Reserved for Standby Function)
3	CN15	L_OUT	L Power Supply
4	CN2	L	L Power Input
5	CN1	N	N Power Input
6	CN7		Earthing Input
7	CN12	U V W	Fan Motor Input
8	CN11	/	Chip Programming
9	CN10	/	Test Monitoring
10	CN9	/	Mian PCB Communication
11	CN16	N P	Compressor Output
12	CN4 CN5 CN6	U V W	DC Bus Voltage Output
13	CN14	N_OUT	N Power Supply
14	P1 P2 P3 P4	PFC-COM PFC1 PFC-COM PFC2	External Inductance

AW122MXGHA AW142MXGHA

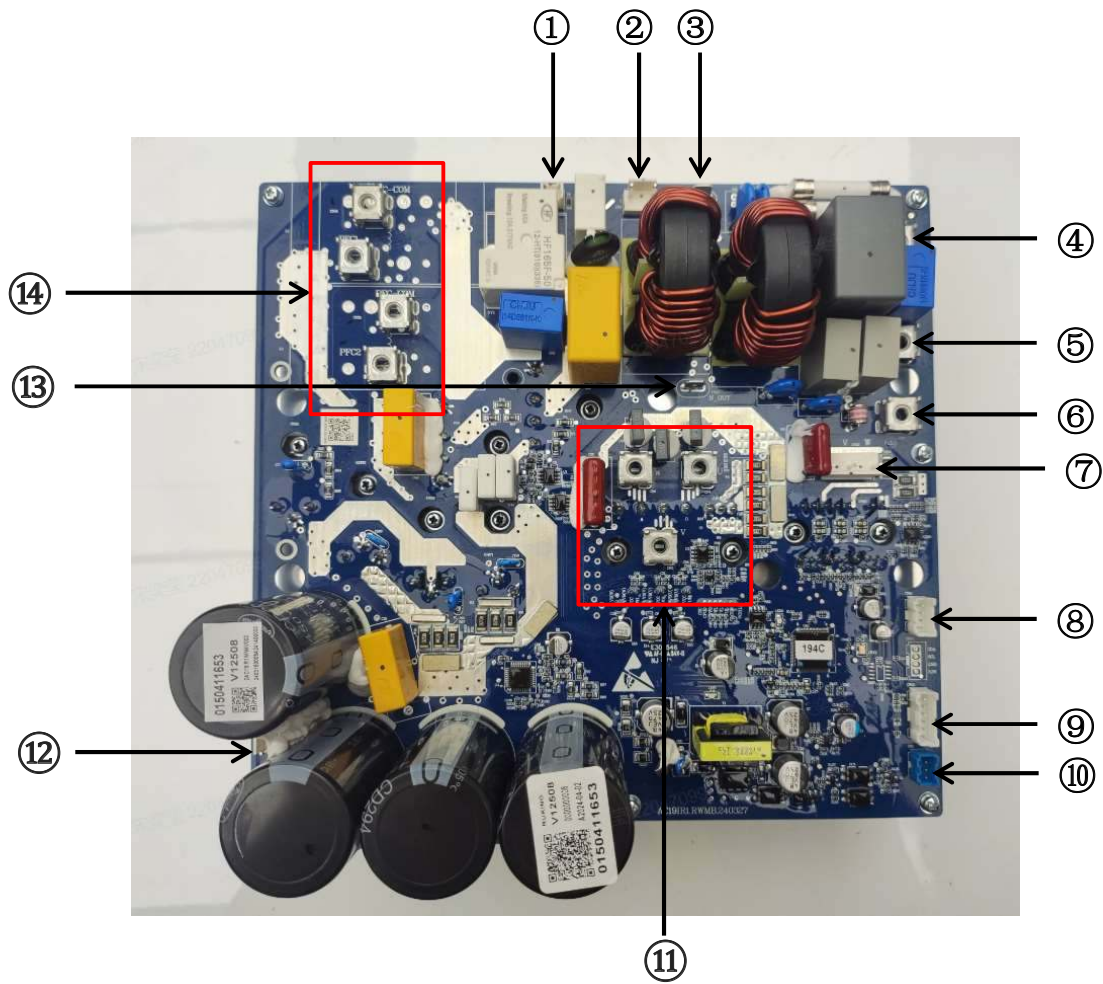
Inverter PCB Code: 0150406834BA




No.	Port No.	Silk No.	Full Name Description
1	CN2	/	12V Standby
2	PFC_COM	PFC_COM	External Inductance
3	PFC2	PFC2	External Inductance
4	U V W	U V W	Compressor Output
5	AC-L	AC-L	L Power Input
6	AC-N	AC-N	N Power Input
7	EARTH	EARTH	Earthing Input
8	DCFAN1	U V W	Fan Motor Output
9	CN-PC	CN-PC	Test Monitoring
10	ISP	ISP	Chip Pgoramming
11	CN1	/	Main PCB Communication
12	CN3	/	Main PCB Communication
13	PFC1	PFC1	External Inductance

AW162MXGHA

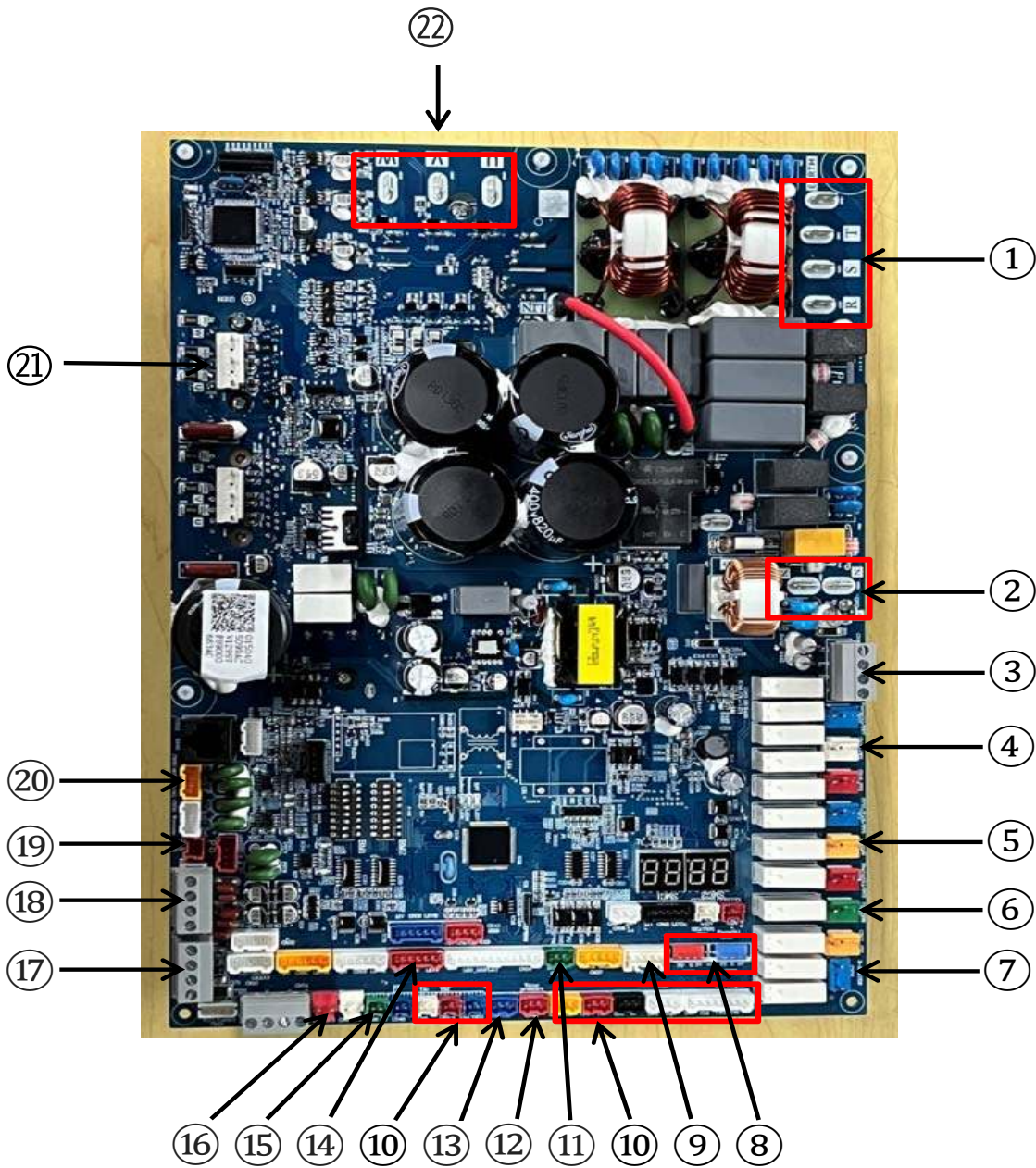
Inverter PCB Code: 0150411653



No.	Port No.	Silk No.	Full Name Description
1	CN2	/	12V Standby
2	CN3	/	Jump Wire (Reserved for Standby Function)
3	CN15	L_OUT	L Power Supply
4	CN8	L	L Power Input
5	CN9	N	N Power Input
6	CN7		Earthing Input
7	CN12	U V W	Fan Motor Output
8	CN11	/	Chip Pgoramming
9	CN10	/	Test Monitoring
10	CN1	/	Main PCB Communication
11	CN4 CN5 CN6	U V W	Compressor Output
12	CN16	N P	DC Bus Voltage Output
13	CN14	N_OUT	N Power Supply
14	CN18 PFC1 CN21 PF2	PFC-COM PFC1 PFC-COM PFC2	External Inductance

AW10NMUGHA AW12NMXGH AW14NMXGHA AW16NMXGHA

Main PCB Code: 0150405099AC 0150405099AD 0150405099AE



No.	Port No.	Silk No.	Full Name Description
1	CN77 CN79 CN81 CN82	R S T EARTH	Driver PCB Power Supply
2	CN93 CN90	N N	Main PCB Power Supply
3	CN14	3 way valve	Three Way Valve(Reserved)
4	CN16	4WV	Four Way Valve
5	CN55	Pump2	Water Pump
6	CN25	HEATER1	Crankcase Heater
7	CN56	B-HEATER	Chasis Heater
8	CN28 CN29	PD PS	Pressure Sensor
9	CN39	FM	Flowmeter
10	CN7 CN3 CN6 CN23 CN44	TAO Td1 TS Tsc0 Tliqsc THO THI TWO TWI	Temperature Sensor
11	CN71	DCPUMP	DC Water Pump Control Signal
12	CN42	Water pressure	Water Pressure Sensor
13	CN20	CT1	CT PCB
14	CN8	LEVA	Electronic Expansion Valve
15	CN46	WS	Flow Switch
16	CN1	HPS	Pressure Switch
17	CN15	/	Wi-Fi(Reserved)
18	CN31	/	PC Monitor(Reserved)
19	CN21	P Q	Indoor & Outdoor Communication
20	CN70	MODBUS/4G	Modbus(Reserved)
21	CN76	U V W	Fan Motor Output
22	CN86 CN87 CN88	U V W	Compressor Output

9.4 Sensor Resistance Table

1. Reference Table

No.	Spare Parts Code	Sign	Parameter	Note
1	0004000046	Ts	25°10 kΩ	Sheet 1
2	0004000047	Te1	25°10 kΩ	Sheet 1
3	0004000052	Tout2	25°10 kΩ	Sheet 1
4	0004000053	Tai	25°10 kΩ	Sheet 1
5	0004000049	T-tank	25°10 kΩ	Sheet 1
6	0004000050	T-tank2	25°10 kΩ	Sheet 1
7	0004000048	Tw1, Two	25°10 kΩ	Sheet 1
8		Thi, Tho	25°10 kΩ	Sheet 1
9	0150409004	Tao	25°10 kΩ	Sheet 1
10	0004000045	Td1	80°50 kΩ	Sheet 2

2. Sensor Resistance Table (Sheet 1)

25°10 kΩ

R25=10.00KΩ±3% B25/50= 3700K±3%

T(°C)	Rnom(KΩ)	T(°C)	Rnom(KΩ)
-40	250.4931	34	6.9733
-39	235.5181	35	6.7067
-38	221.5962	36	6.4516
-37	208.6378	37	6.2076
-36	196.5621	38	5.9740
-35	185.2972	39	5.7503
-34	174.7781	40	5.5362
-33	164.9457	41	5.3311
-32	155.7471	42	5.1346
-31	147.1341	43	4.9463
-30	139.0630	44	4.7659
-29	131.4940	45	4.5929
-28	111.8705	46	4.4271
-27	117.7198	47	4.2681
-26	111.4512	48	4.1155
-25	105.5570	49	3.9692
-24	100.0117	50	3.8287
-23	94.7917	51	3.6947
-22	89.8755	52	3.5660
-21	85.2430	53	3.4424
-20	80.8759	54	3.3237
-19	76.7571	55	3.2096
-18	72.8709	56	3.1000
-17	69.2025	57	2.9946
-16	65.7385	58	2.8933
-15	62.4662	59	2.7959
-14	59.3739	60	2.7022
-13	56.4507	61	2.6121
-12	53.6864	62	2.5253
-11	51.0715	63	2.4419

T(°C)	Rnom(KΩ)	T(°C)	Rnom(KΩ)
-10	48.5972	64	2.3615
-9	46.2552	65	2.2842
-8	44.0377	66	2.2097
-7	41.9376	67	2.1380
-6	39.9480	68	2.0689
-5	38.0627	69	2.0024
-4	36.2756	70	1.9383
-3	34.5812	71	1.8765
-2	32.9744	72	1.8169
-1	31.4500	73	1.7595
0	30.0037	74	1.7042
1	28.6310	75	1.6508
2	27.3278	76	1.5994
3	26.0904	77	1.5497
4	24.9152	78	1.5018
5	23.7987	79	1.4556
6	22.7377	80	1.4110
7	21.7294	81	1.3680
8	20.7707	82	1.3265
9	19.8592	83	1.2864
10	18.9922	84	1.2477
11	18.1673	85	1.2103
12	17.3825	86	1.1742
13	16.6355	87	1.1393
14	15.9243	88	1.1057
15	15.2472	89	1.0731
16	14.6023	90	1.0417
17	13.9879	91	1.0113
18	13.4024	92	0.9819
19	12.8445	93	0.9535
20	12.3126	94	0.9261
21	11.8055	95	0.8996
22	11.3218	96	0.8739
23	10.8604	97	0.8491
24	10.4201	98	0.8251
25	10.0000	99	0.8019
26	9.5989	100	0.7794
27	9.2160	101	0.7577
28	8.8503	102	0.7366
29	8.5010	103	0.7163
30	8.1673	104	0.6966
31	7.8483	105	0.6775
32	7.5435	106	0.6591
33	7.2520	107	0.6412

80°50 kΩ (Sheet 2)
R80=50KΩ±3% B25/80=4450±3% M470-2

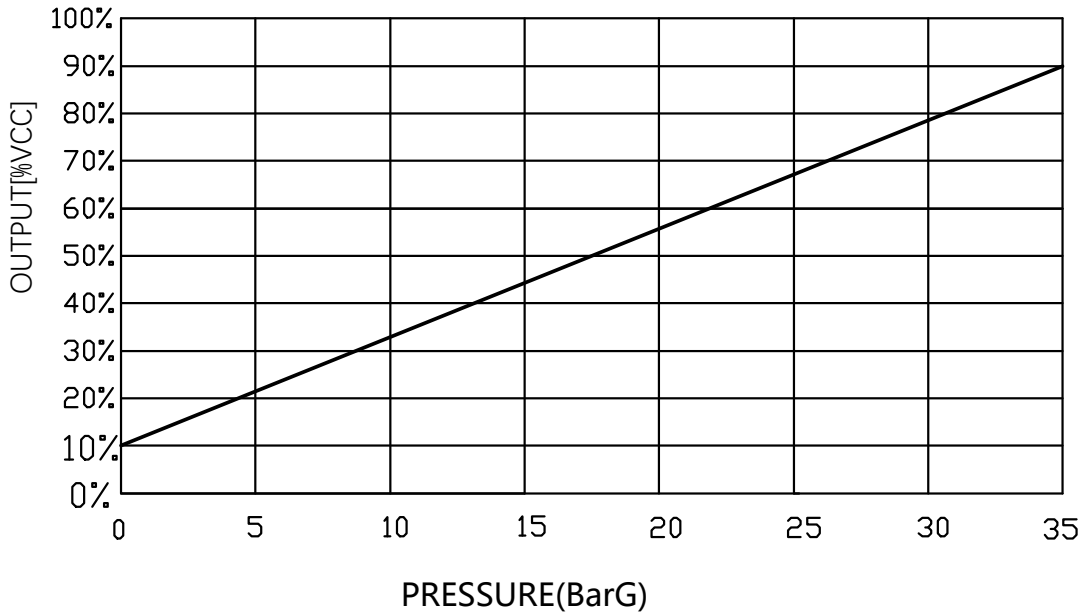
T(°C)	Rnom(KΩ)	T(°C)	Rnom(KΩ)
-40	24087.7290	33	349.3720
-39	22367.9580	34	333.5280
-38	20789.5510	35	318.5030
-37	19338.8110	36	304.1920
-36	18003.4710	37	290.5980
-35	16772.8000	38	277.7190
-34	15637.1890	39	265.4530
-33	14588.0520	40	253.8000
-32	13617.8260	41	242.6590
-31	12719.6600	42	232.1310
-30	11887.4240	43	222.0110
-29	11115.5970	44	212.4030
-28	10399.1710	45	203.3060
-27	9733.7500	46	194.6180
-26	9115.2460	47	186.3380
-25	8539.8760	48	178.3660
-24	8004.3710	49	170.9040
-23	7505.5610	50	163.6470
-22	7040.7880	51	156.8770
-21	6607.3950	52	150.3850
-20	6203.1340	53	144.1920
-19	5825.8580	54	138.2840
-18	5473.5220	55	132.6470
-17	5144.3890	56	127.2660
-16	4836.8240	57	122.1290
-15	4549.1900	58	117.2230
-14	4280.2620	59	112.5390
-13	4028.5060	60	108.0630
-12	3792.9000	61	103.7870
-11	3572.3190	62	99.6990
-10	3365.7420	63	95.7930
-9	3172.0450	64	92.0570
-8	2990.6130	65	88.4850
-7	2820.4240	66	85.0680
-6	2660.7640	67	81.7990
-5	2511.0190	68	78.6710
-4	2370.4730	69	75.6770
-3	2238.5130	70	72.8110
-2	2114.5260	71	70.0670
-1	1998.1030	72	67.4390
0	1888.7330	73	64.9210
1	1785.8020	74	62.5100
2	1689.1060	75	60.1980
3	1598.1350	76	57.9840
4	1512.5810	77	55.8600
5	1432.0350	78	53.8250

T(°C)	Rnom(KΩ)	T(°C)	Rnom(KΩ)
6	1356.1910	79	51.8720
7	1284.7430	80	50.0000
8	1217.4850	81	48.2040
9	1154.1120	82	46.4800
10	1094.3160	83	44.8260
11	1037.9950	84	43.2390
12	984.8440	85	41.7140
13	934.7580	86	40.2510
14	887.4320	87	38.8450
15	842.7640	88	37.4950
16	800.6520	89	36.1980
17	760.7880	90	34.9520
18	723.1730	91	33.7550
19	687.6020	92	32.6030
20	653.9730	93	31.4960
21	622.0820	94	30.4320
22	592.0300	95	29.4090
23	563.5120	96	28.4250
24	536.6300	97	27.4770
25	511.0760	98	26.5660
26	486.8510	99	25.6890
27	463.9550	100	24.8450
28	442.2850	101	24.0330
29	421.7400	102	23.2500
30	402.2170	103	22.4970
31	383.6140	104	21.7720
32	366.0330	105	21.0730

9.5 Pressure Sensor

High Pressure Sensor

OUTPUT CHARACTERISITICS



$$V_{out}/V_{cc} \times 100 = 2.2857 \times P + 10$$

V_{out} : Output Voltage

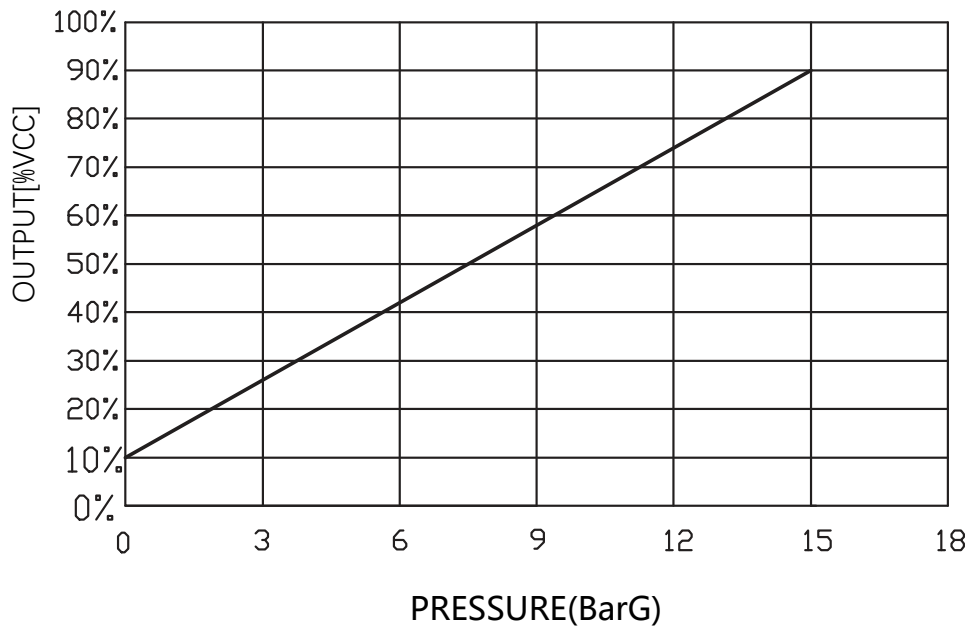
V_{cc} : Supply Volatage

P : Input Pressure in BarG

Note: 0 BarG = 101.325 KPaA

Low Pressure Sensor

OUTPUT CHARACTERISTICS



$$V_{out}/V_{cc} \times 100 = 5.3333 \times P + 10$$

V_{out} : Output Voltage

V_{cc} : Supply Volatage

P : Input Pressure in BarG

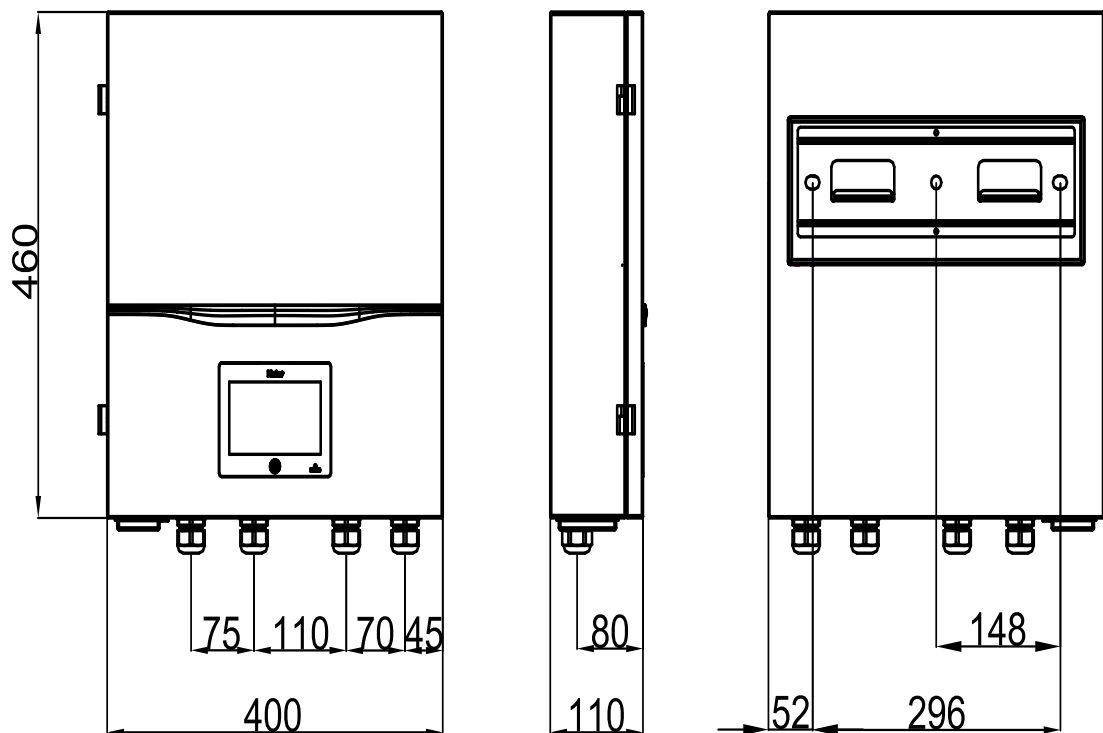
Note: 0 BarG = 101.325 KPaA

10. ATW-A03N

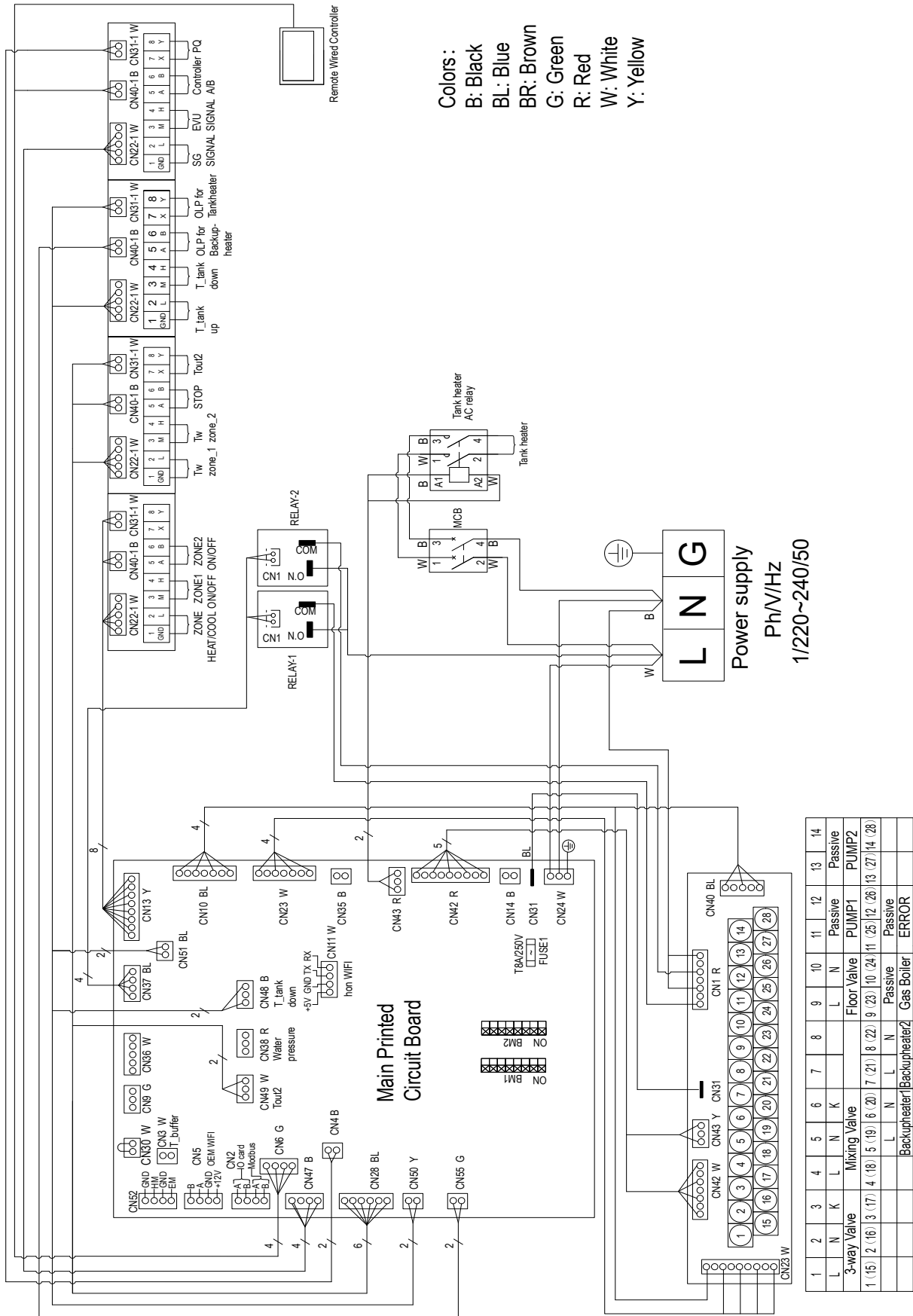
10.1 Appearance



10.2 Dimension



10.3 Wiring Diagram



The wires that have already been connected in the factory

Port	Port Definition	Function Description
CN35	PUMP_0	HU Built-in Pump 220V AC Output
CN10	Gas Boiler	Gas Boiler Pump Control Signal Output(220V)
CN16	Antifreeze Heater	Antifreezing Electric Heating of Plate Heat Exchanger Control Signal Output(220V)
CN34	Tz	Outlet Temperature Sensor
CN38	P_w	Water Pressure Sensor
CN36	FM	Flowmeter

The wires that need to be connected on site

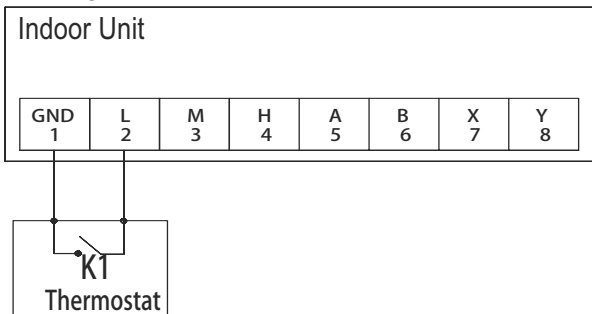
Port	Port Definition	Function Description
CN37	PUMP1	Zone1 Pump Control Signal Output(220V)
CN37	PUMP2	Zone2 Pump Control Signal Output(220V)
CN42	3 way valve	Zone1 Three Way Valve Control Output(220V)
CN42	Mixing valve	Zone2 Mixing Valve Control Output(220V)
CN42	Floor Valve	Floor Heating Valve Control Signal Output(220V)
CN43	Tank Heater	DHW Heater Control Signal Output(220V)
CN23	Backupheater1	Auxiliary Heating 1 Control Signal Output(220V)
CN23	Backupheater2	Auxiliary Heating 2 Control Signal Output(220V)
CN10	ERROR	Fault Output Signal(Passive)
CN28	Twzone_1	Zone1 Water Temperature Behind Water Mixing Valve
CN28	Twzone_2	Zone2 Water Temperature Behind Water Mixing Valve
CN3	T_buffer	Buffer Water Tank Temperature Sensor
CN50	T_tank up	Temperature Sensor on Upper Part of Tank
CN48	T_tank down	Temperature Sensor on Lower Part of Tank
CN49	Tout2	Afterheat Temperature Sensor
CN13	ZONE HEAT/COOL	Zone HEAT/COOL Switch Signal
CN13	ZONE1 ON/OFF	Zone1 ON/OFF Switch Signal
CN13	ZONE2 ON/OFF	Zone2 ON/OFF Switch Signal
CN28	STOP	Externally Controlled Stop
CN47	SG SIGNAL	SG READY 1 Signal
CN47	EVU SIGNAL	SG READY 2 Signal
CN6	controller A/B	Wired Controller A/B
CN4	PQ	Indoor Unit Communication With Outdoor Unit
CN2	Modbus	Third Party Agreement
CN2	IO card	The Indoor Unit Communicates With ATW-A03
CN52	EM	Energy Meter Interface
CN52	HM	Heat Meter Interface
CN5	OEM WIFI	TUYA WIFI Interface
CN11	hon WIFI	CANDY WIFI Interface
CN55	OLP for Backupheater	Auxiliary Electric Heater Protection Signal Feedback Port
CN51	OLP for Tankheater	DHW Auxiliary Electric Heater Protection Signal Feedback Port

Wiring instructions of third party control wiring instructions

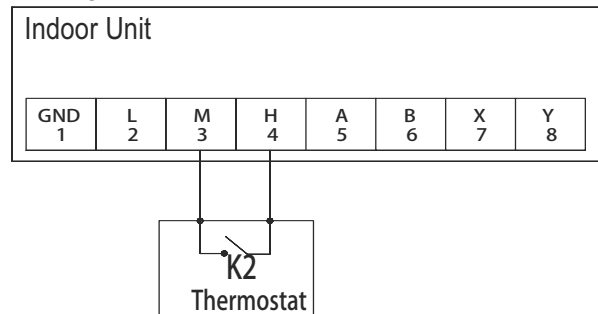
Type1:

ZONE1

Heating Mode



Cooling Mode



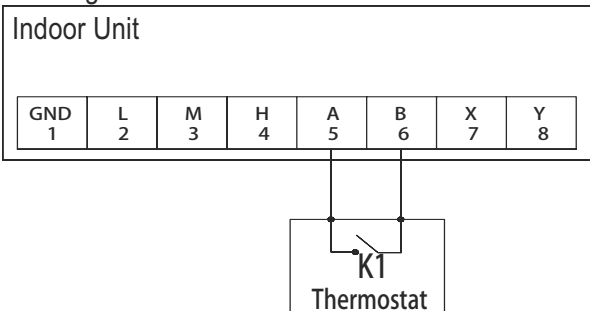
K1: Switch-On represents Heating Mode On; Switch-Off represents Heating Mode Off.

K2: Switch-On represents Cooling Mode On; Switch-Off represents Cooling Mode Off.

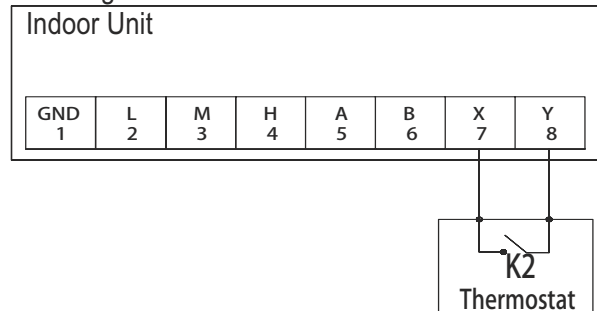
K1 and K2 are not allowed to be switched on simultaneously

ZONE2

Heating Mode



Cooling Mode

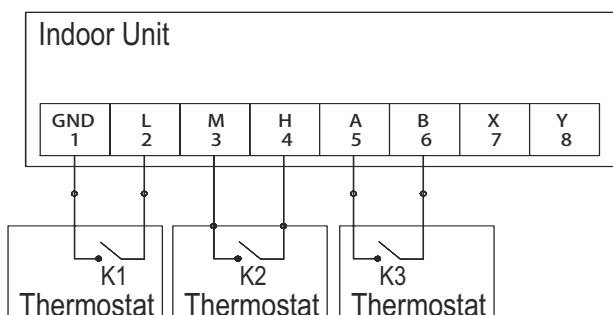


K1: Switch-On represents Cooling Mode On; Switch-Off represents Cooling Mode Off.

K2: Switch-On represents the Heating Mode On; Switch-Off represents Heating Mode Off.

K1 and K2 are not allowed to be switched on simultaneously

Type2:



Cooling/Heating Mode ZONE1 ON/OFF ZONE2 ON/OFF

K1: Switch-On represents Cooling Mode ZONE1/ZONE2 On; Switch-Off represents Heating Mode ZONE1/ZONE2 On

K2: Switch-On represents ZONE1 On; Switch-Off represents ZONE1 Off.

K3: Switch-On represents ZONE2 On; Switch-Off represents ZONE2 Off.

Zone Heat/Cool

This interface is the switching of heating and cooling between zone1 and zone2;

Use a two-core cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

The other end of the cable is connected to the zone1 and zone2 heating and cooling ports outside the electric cabinet. This control port should be passive and only output on-off signals.

Zone1 On/Off

Use a two-core cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

Zone2 On/Off

Use a two-core cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

Tw Zone_1

Install the 0150408957 sensor, entering the electronic control box through the rubber plug hole, where the lead is connected to the terminal block, press and install with screws.

The temperature sensing probe of the sensor must be installed in a proper position behind the Zone1 water mixing valve, according to the actual situation on site.

Tw Zone_2

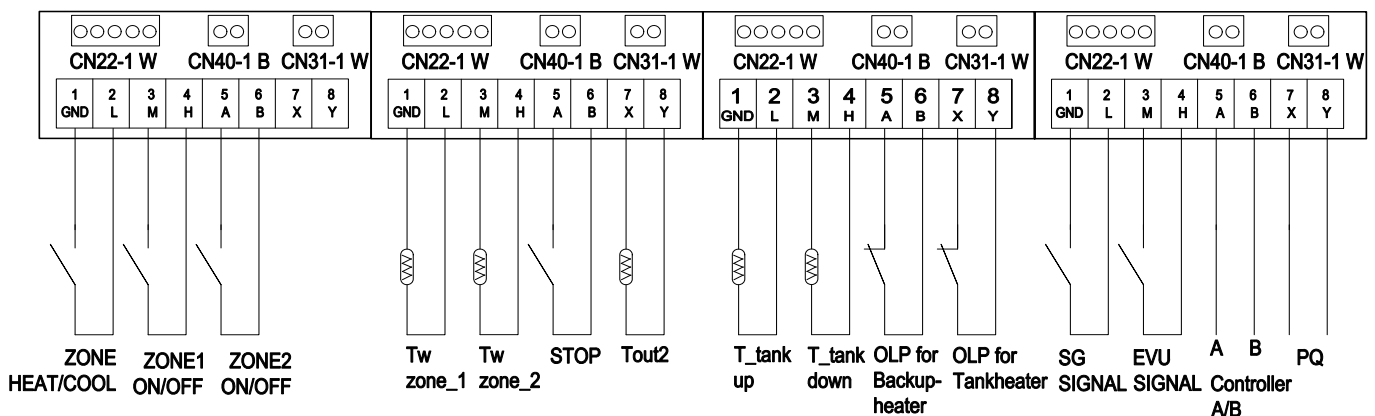
Install the 0150408957 sensor, entering the electronic control box through the rubber plug hole, where the lead is connected to the terminal block, press and install with screws.

The temperature sensing probe of the sensor must be installed in a proper position behind the Zone1 water mixing valve, according to the actual situation on site.

STOP

Use a two-core cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

The other end of the cable is connected to the on-off switch control port outside the electrical control box. This control port should be passive, only outputting on-off signals.



Weak Electricity terminal block interface of internal

Tout2

This interface is the electric auxiliary hot water outlet temperature sensor.

The sensor cable enters the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

According to the actual situation on site, the temperature sensing probe of the sensor is installed at the appropriate position of the electrical auxiliary hot water outlet. It must then be completely wrapped with thermal insulation cotton and firmly fixed with a cable tie.

T_tank up

The sensor cable enters the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

According to the actual situation on site, the temperature sensing probe of the sensor is installed at the temperature detection position of the upper part of the water tank and must be fixed.

T_tank down

The sensor cable enters the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

According to the actual situation on site, the temperature sensing probe of the sensor is installed at the temperature detection position of the upper part of the water tank and must be fixed.

OLP for backup heater (use the same font size for the following text)

Use a two-core cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

The other side of the cable is connected to the feedback signal control port of the electric auxiliary thermal protection outside the electrical control box. This control port should be passive, only outputting on-off signals.

OLP for Tankheater

Use a two-core cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

The other side of the cable is connected to the feedback signal control port of the electric auxiliary thermal protection outside the electrical control box. This control port should be passive, only outputting on-off signals.

The machine is in normal operation when the two terminals of OLP for backup heater are connected. The machine will stop running when the two terminals are disconnected for electrical auxiliary thermal protection. When this protection is not used, the two terminals should be short-circuited with wires.

SG Signal

Use a two-core cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

The other end of the cable is connected to the power grid signal control port outside the electrical cabinet. This control port should be passive, only outputting on-off signals.

EVU Signal

Use a two-core cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

The other end of the cable is connected to the power grid signal control port outside the electrical cabinet. This control port should be passive, only outputting on-off signals.

Controller A/B

This interface is a data communication port to the wire controller, this can be used to connect the indoor temperature and humidity meter to the controller.

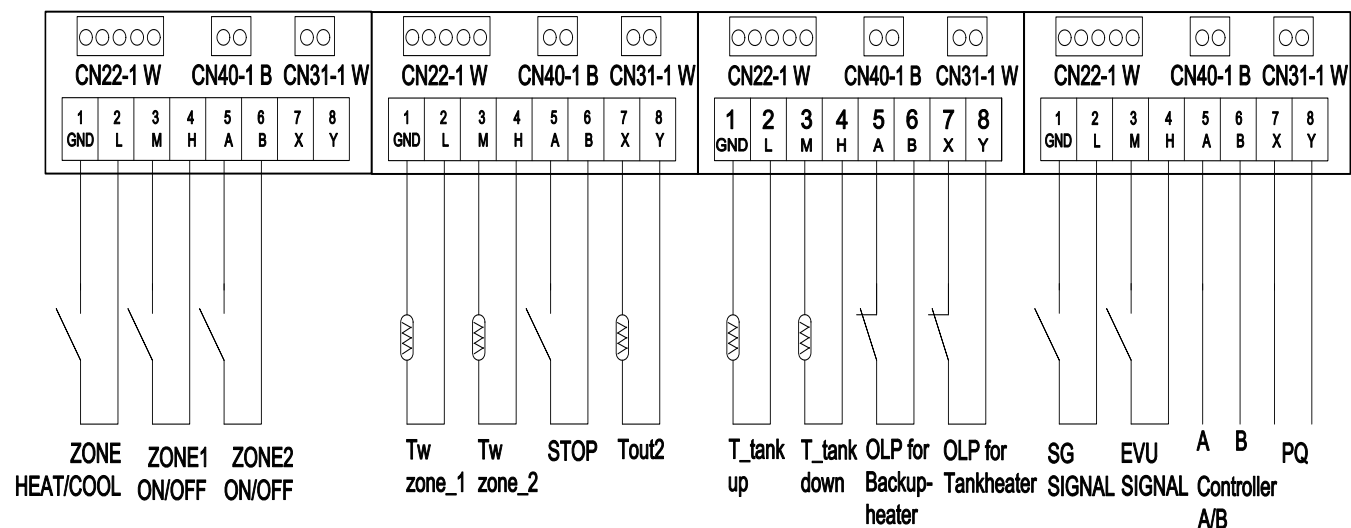
Use a two-core shielded cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws.

The other end of the cable is connected to the thermometer or wire controller outside of the electrical cabinet. Pay attention to the one-to-one correspondence between terminal A and B, both inside and outside of the electric cabinet.

PQ

Use a two-core shielded cable to enter the electronic control box from the rubber plug hole, connect the lead to the terminal block, press and install with screws. The shielding layer is must be connected to the metal plate for grounding.

The other end of the cable is connected to the PQ terminal in the outdoor machine. Press and install it with screws, the shielding layer is grounded with the metal sheet of the outdoor machine.



Weak Electricity terminal block interface of internal

3-way Valve

This interface is the 3-way valve control.

When it is necessary to install the 3-way valve, the wiring and terminal connections enter the electrical control box via the rubber plug hole. Wires L, N and K respectfully represent live, neutral and grounding lines. Connect the lead to the terminal block, press and install with screws.

Mixing Valve

This interface is the water mixing valve control

When it is necessary to install the mixing valve, the wiring and terminal connections enter the electrical control box via the rubber plug hole. Wires L, N and K respectfully represent live, neutral and grounding lines. Connect the lead to the terminal block, press and install with screws.

Floor Valve

This interface is the control for the floor heating main valve.

When it is necessary to install the floor heating main valve, the wiring and terminal connections enter the electrical control box via the rubber plug hole. Wires L, N and K respectfully represent live, neutral and grounding lines. Connect the lead to the terminal block, press and install with screws.

PUMP1

This interface is the outdoor AC water pump power supply used by Zone1.

The terminal enters the electrical control box through the rubber plug hole. Wires L and N respectfully represent live and neutral lines.

Connect L and N power supply lines to the terminal block, press and install with screws. The grounding wire of the water pump enters the control box with the power supply line path, which is reliably grounded at the grounding mark.

The voltage between L and N is the rated voltage input by the power terminal block. Power of the selected water pump must not be greater than 180W.

PUMP2

This interface is the outdoor AC water pump power supply used by Zone2.
 The terminal enters the electrical control box through the rubber plug hole. Wires L and N respectfully represent live and neutral lines.
 Connect L and N power supply lines to the terminal block, press and install with screws. The grounding wire of the water pump enters the control box with the power supply line path, which is reliably grounded at the grounding mark.
 The voltage between L and N is the rated voltage input by the power terminal block. Power of the selected water pump must not be greater than 180W.

Backup Heater1

This interface is the electric auxiliary heating 1 switch control.
 The terminal enters the electrical control box through the rubber plug hole. Wires L and N respectfully represent live and neutral lines.
 The voltage between L and N is the rated voltage input by the computer version. This is a control loop which can only be connected to the secondary control loop, this cannot be directly connected to the auxiliary thermal power supply.

Backup Heater2

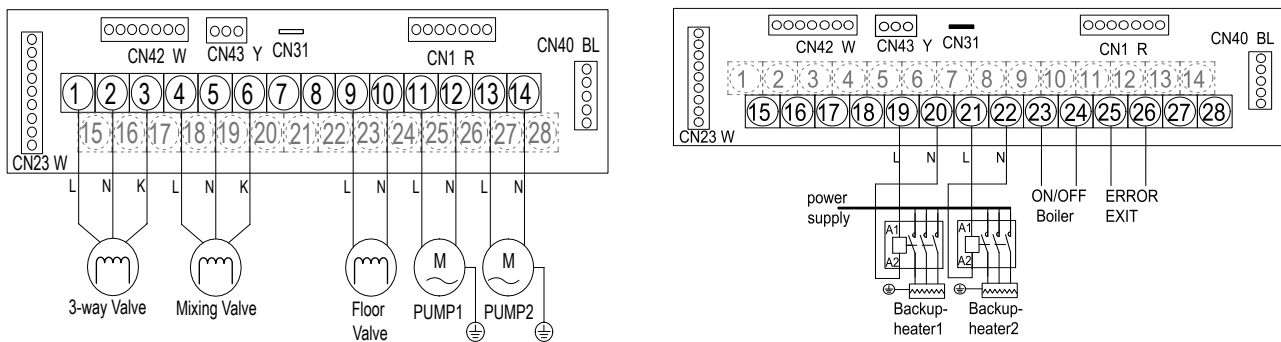
This interface is the electric auxiliary heating 2 switch control.

Gas Boiler :

This interface is the gas furnace control opening interface. This interface is a passive contact output port, which only outputs on-off control signals;
 Use a two-core cable to penetrate into the electronic control box from the rubber plug hole, and connect the lead to the terminal block and press and install it with screws;
 The other end of the cable is connected to the control interface of the gas furnace.

ERROR:

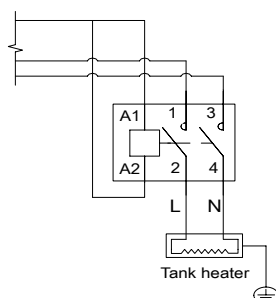
This interface is the fault output signal interface. This interface is a passive contact output port, which only outputs on-off control signals;
 Use a two-core cable to penetrate into the electronic control box from the rubber plug hole, and connect the lead to the terminal block and press and install it with screws;



Strong Electricity terminal block interface of internal

Tank Heater

This is interface 2 and 4 on the contactor, which is the main power supply for electric heating in the water tank. Terminals L, N and the grounding wire for electric heating in the water tank enter the electric control box through the rubber plug hole. Power lines L and N are respectively connected to 2 and 4 interfaces of the AC contactor. The grounding wire is reliably grounded at the grounding symbol of the electrical control box. The maximum operating current of the electrical heater used in the water tank must be less than 20A.



AC contactor interface of internal

CN3

This interface is the buffer water tank temperature sensor.

The plug end enters the electrical control box through the rubber plug hole and is inserted into the port CN3 on the PCB.

One end of the temperature sensing probe is installed at the corresponding position of the buffer tank in order to detect the temperature.

CN52

The HM interface is heat meter and the EM interface is the electric meter.

The heat meter is connected to the HM and GND ports of the PCB CN52, by a two-core cable. The cable enters the electronic control box via the rubber plug hole where the interface must press the lead on the PCB.

The electric meter is connected to the HM and GND ports of the PCB CN52, by a two-core cable. The cable enters the electronic control box via the rubber plug hole where the interface must press the lead on the PCB.

CN5

This is the interface for the OEM WIFI.

The WIFI module is connected to the CN5 port of the PCB by a four-core cable. The interfaces B, A and GND and a +12V on the PCB should correspond to the interface functions on the WIFI module.

The interface on the PCB needs to press the lead.

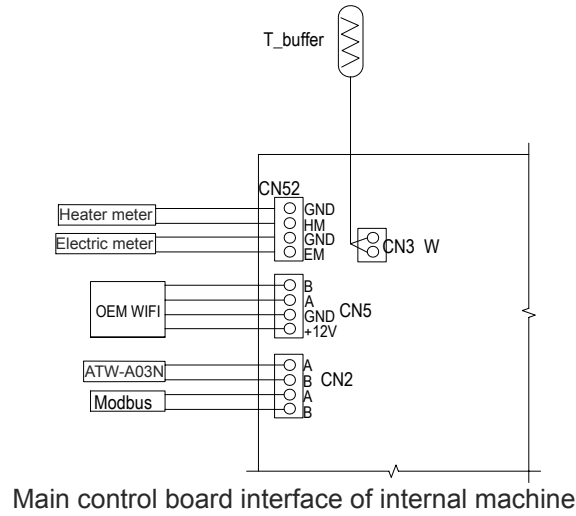
CN2

The IO card interface is the external wiring valve box interface, which can be connected to ATW-A02. Modbus, which is a third party control interface.

Use a two-core cable to enter the electronic control box through the rubber plug hole, connect to A and B ports of the IO card of the PCB, CN2. The other end of the cable is connected with A and B phases of the external wiring valve box. Note that A and B need to correspond to each other.

Use a two core cable to enter the electronic control box through the rubber plug hole. Connect it with A and B ports of Modbus at CN2 of the PCB. The other end of the cable is connected with ports A and B phases of a third-party controller. Note that A and B need to correspond to each other.

The interface on the PCB needs to press the lead.

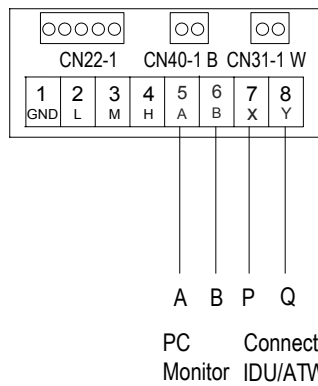


A, B

Use two-core wires to connect and press to the weak current wiring terminal block with screws. Connect the other end to the computer monitor.

P, Q

Use two-core wires with a shielding layer, connect and press to the weak current terminal block with screws. Connect the other end to the PQ wiring terminal of the internal machine or ATW-A03N. The cable shielding layer is grounded with the external machine's sheet metal.



Weak current terminal block interface of external machine

11. Manual Updates Versions

This part will show the update versions of this Manual.

Version Code	Description	Date
SYJS-08-2024 REV.A Edition: 2024-08-29	Add control logic for DHW entry and exit	2024/8/29
SYJS-08-2024 REV.A Edition: 2024-08-29	Add the function of Tube in Tube Heat Exchanger to increase the superheat of the return air	2024/8/29
SYJS-07-2024 REV.B Edition: 2024-07-31	Add Malfunction analysis column to Error code	2024/7/31
SYJS-07-2024 REV.B Edition: 2024-07-31	Modify the format of the sensor resistance table	2024/7/31
SYJS-07-2024 REV.B Edition: 2024-07-31	Change PCB Photos and Port No.	2024/7/31
SYJS-07-2024 REV.B Edition: 2024-07-31	Change Wiring Diagrams	2024/7/31
SYJS-07-2024 REV.B Edition: 2024-07-31	The range of Modbus point table register address 4003~4006, 40103,40105,40107 has been changed from 0-80 to 0-160	2024/7/31
SYJS-07-2024 REV.B Edition: 2024-07-30	Combining troubleshooting 20, 21, 22, 23 with 1, 2, 3, 4, 10	2024/7/31
SYJS-07-2024 REV.B Edition: 2024-07-31	Change DHW heating: $-28^{\circ}\text{C} \leq \text{Tao} \leq 43^{\circ}\text{C}$ to $-25^{\circ}\text{C} \leq \text{Tao} \leq 43^{\circ}\text{C}$	2024/7/31
SYJS-07-2024 REV.B Edition: 2024-07-29	Change Certificates and Regulations	2024/7/31

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